GENERAL INFORMATION SECTION

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This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD.

G1250BE1

FOREWORD

FW

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1. Foreword

A: FOREWORD

These manuals are used when performing maintenance, repair or diagnosis of SUBARU IMPREZA, SUBARU CROSSTREK^{TM}, and SUBARU CROSSTREK^{TM} HYBRID.
Applicable model:
2016MY GJ*****, GP*****
The manuals contain the latest information at the time of publication. Changes in the specifications, methods, etc. may be made without notice.

HOW TO USE THIS MANUAL

HU

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1. How to Use This Manual

A: HOW TO USE THIS MANUAL

1. STRUCTURE

Each section consists of SCT that are broken down into SC that are divided into sections for each component. The specification, maintenance and other information for the components are included, and the diagnostic information has also been added where necessary.

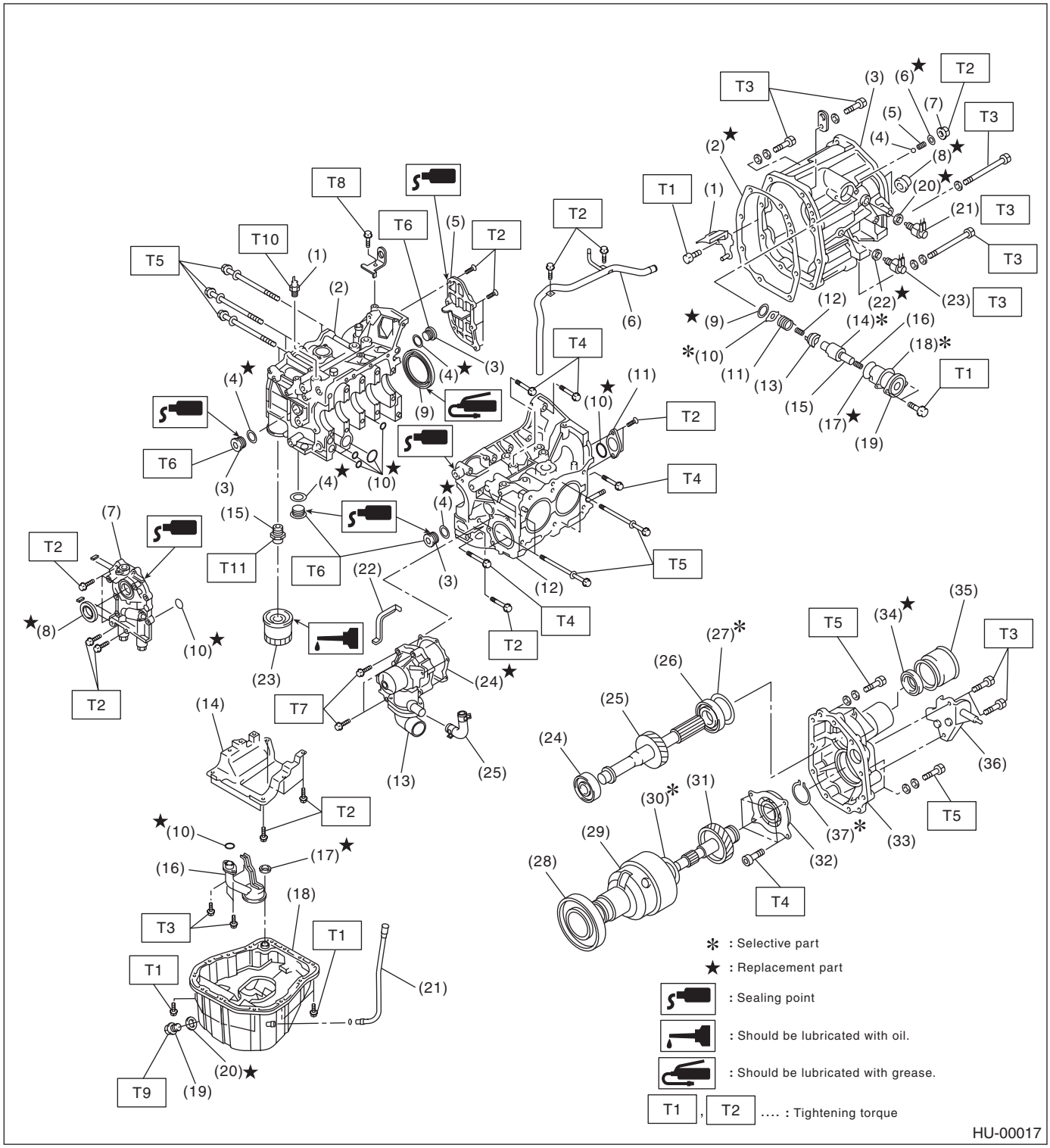
2. CONTENTS

The first page has an index with tabs.

3. COMPONENT

Illustrations are provided for each component. The information necessary for repair work (tightening torque, grease up points, etc.) is described on these illustrations. Information is described using symbol.
To order parts, refer to parts catalogue.

Example:



4. DEFINITIONS OF “NOTE”, “CAUTION”, AND “WARNING”

- NOTE:

Describes additional information to make works easier.

- CAUTION:

Describes prohibited matters to prevent vehicle or parts damage, or matters that requires special attention during work.

- WARNING:

Describes matters that may cause serious damage to the operator or other person, or that may cause damage or accident.

5. SPECIFICATIONS

If necessary, specifications are also included.

6. INSPECTION

Inspections to be carried out before and after maintenance are included.

7. MAINTENANCE

• Maintenance instructions for serviceable parts describe work area and detailed step with illustration. It also describes the use of special tool, tightening torque, caution for each procedure.
• If many serviceable parts are included in one service procedure, appropriate reference is provided for each part.

Example:

15.Main Shaft ← (A)

A: REMOVAL ← (B)

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-33, REMOVAL, Manual Transmission Assembly.> ← (C)

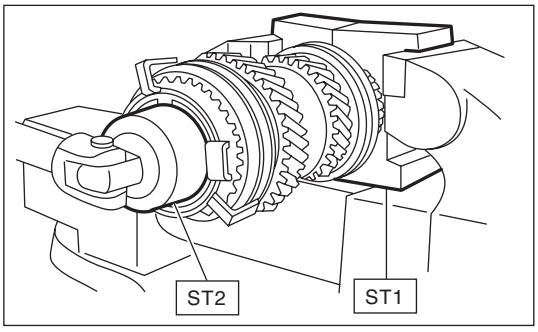
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11) Tighten the lock nuts to the specified torque using ST1 and ST2.

NOTE: ← (D)
Secure the lock nuts in two places after tightening.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 (E) SOCKET WRENCH (35) (F)

Tightening torque:
118 N·m (12.0 kgf-m, 86.8 ft-lb) ← (G)



← (H)

HU-00020

(A) Component
(B) Process
(C) Reference
(D) Cautions
(E) Tool number of special tool
(F) Name of special tool
(G) Tightening torque
(H) Illustration

8. DIAGNOSIS

Step-by-step process is employed for easier diagnosis.

9. SI UNITS

Measurements in these manuals are according to the SI units. Metric and yard/pound measurements are also included.

Example:

Tightening torque:
44 N·m (4.5 kgf-m, 33 ft-lb)

List of SI unit

Item	SI units	Conventional unit	Remarks
Force	N (Newton)	kgf	1 kgf = 9.807 N
Mass (weight)	kg, g	kg, g	
Capacity	L, mL or cm^3	L or cc	1 cc = 1 cm^3 = 1 mL
Torque	N·m	kgf-m, kgf-cm	1 kgf-m = 9.807 N·m
Rotating speed	r/min	rpm	
Pressure	kPa (Kilopascal)	kgf/cm^2	1 kgf/cm^2 = 98.07 kPa
		mmHg	1 mmHg = 0.1333 kPa
Power	W	PS	1 PS = 0.7355 kW
Calorie	W·h	cal	1 kcal = 1.163 W·h
Fuel consumption rate	g/kW·h	g/PS·h	1 g/PS·h = 1.3596 g/kW·h

The figure used in these manuals are described in the SI units and conventional units are described in ( ).

10.EXPLANATION OF TERMINOLOGY

List

2ndr	Secondary
AAI	Air Assist Injection
AAR	Angular Adjusted Roller
A/B	Airbag
ABS	Anti-lock Brake System
A/C	Air Conditioner
AC	Angular Contact
ACC	Accessory
A/F	Air Fuel Ratio
ALT	Generator
API	American Petroleum Institute
APS	Accessory Power Supply Socket
ASSY	Assembly
AT	Automatic Transmission
ATF	Automatic Transmission Fluid
AUX	Auxiliary Storage Unit (External storage)
AVCS	Active Valve Control System
AWD	All Wheel Drive
BATT	Battery
BCM	Brake Control Module
BECM	Battery Energy Control Module
BJ	Bell Joint
BSD/RCTA	Blind Spot Detection / Rear Cross Traffic Alert
CAN	Controller Area Network
CCA	Cold Cranking Ampere
CD	Compact Disc
CD-R/RW	CD Recordable/Rewritable
COMPL	Complete
CPC	Canister Purge Control Solenoid Valve
CPU	Central Processing Unit
CM	Control Module
CVT	Continuously Variable Transmission
CVTF	Continuously Variable Transmission Fluid
DCCD	Driver's Control Center Differential
DMCM	Drive Motor Control Module
DOHC	Double Overhead Camshaft
DOJ	Double Offset Joint
D/R	Dual-range
DTC	Diagnosis Trouble Code
DU	Drive Unit
DVD	Digital Versatile Disc or Digital Video Disc
EBD	Electronic Brake Distribution
EBJ	High-Efficiency Compact Ball Fixed Joint
ECM	Engine Control Module
ECV	Exhaust pressure control valve
EDJ	High-Efficiency Compact Double Offset Joint
E/G	Engine

EGI	Electronic Gasoline Injection
EGR	Exhaust Gas Recirculation
ELR	Emergency Locking Retractor
EPB	Electronic Parking Brake
ETC	Electronic Throttle Control
EX	Exhaust
F/B	Fuse & Joint Box
FL	Fusible Link
Ft	Front
FWD	Front Wheel Drive
GPS	Global Positioning System
HBA	High Beam Assist
HI	High
HID	High-Intensity Discharge
H/K	Harman/Kardon Audio
HPCM	Hybrid Powertrain Control Module
H/L	Headlight
H/U	Hydraulic Unit
HVAC	Heater, Ventilator and Air Conditioner
I/F	Interface
IG	Ignition
ILSAC	International Lubricants Standardization and Approval Committee
IN	Intake
INT	Intermittent
I/O	Input/Output
IR	Infrared Ray
ISC	Idle Speed Control
ISG	Integrated Starter Generator
K/A	Keyless access
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	LH (Left Hand)
LHD	Left Hand Drive
Lo	Low
LSD	Limited Slip Differential
M/B	Main Fuse & Relay Box
MD	Mini Disc
MID	Multi Information Display
MFI	Multi-Point Fuel Injection
MP-T	Multi-Plate Transfer
M/R	Moon Roof
MT	Manual Transmission
NA	Natural Aspiration
NC	Normal Close (Relay)
NO	Normal Open (Relay)
OBD	On-Board Diagnosis
OP	Option Parts

PC	Personal Computer
PCD	Pitch Circle Diameter
PCV	Positive Crankcase Ventilation
PID	Parameter Identification
Pr	Primary
PRG	Power Rear Gate
P/S	Power Steering
PTJ	Pillow Tripod Joint
P/W	Power Window
RAM	Random Access Memory
RH	RH (Right Hand)
RHD	Right Hand Drive
ROM	Read Only Memory
Rr	Rear
SDI	Subaru Diagnostic Interface
SI	Subaru Intelligent
SOHC	Single Overhead Camshaft
SRS	Supplemental Restraint System
SSM	Subaru Select Monitor
ST	Special Tool
STD	Standard
SW	Switch
T/B	Turbocharger
TCS	Traction Control System
TCM	Transmission Control Module
TGV	Tumble Generator Valve
T/M	Transmission
TPMS	Tire Pressure Monitoring System
UJ	Universal Joint
UV	Ultraviolet
VDC	Vehicle Dynamics Control
V.I.N.	Vehicle Identification Number
ViS-C	Viscous Coupling
VSV	Vacuum Switching Valve
VTD	Variable Torque Distribution
W/H	Wiring Harness

SPECIFICATIONS

SPC

Page

1. Impreza 2
2. Crosstrek 13

1. Impreza

A: DIMENSION

Model			4 door	5 door	SPORT
Overall length		mm (in)	4,585 (180.5)	4,420 (174.0)	
Overall width		mm (in)	1,740 (68.5)		
Overall height (at C.W.[*1])		mm (in)	1,465 (57.7)		1,510 (59.4)
Compartment	Length	mm (in)	2,005 (78.9)		
	Width	mm (in)	1,490 (58.7)		
	Height	mm (in)	1,010 (39.8), 946 (37.2)[*2]		
Wheelbase		mm (in)	2,645 (104.1)		
Tread	Front	mm (in)	1,510 (59.4)		
	Rear	mm (in)	1,515 (59.6)		
Minimum road clearance		mm (in)	145 (5.7)		

[*1]: Curb weight
[*2]: With sunroof

B: ENGINE

Model	2.0 L DOHC non-turbo
Engine type	Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine
Valve arrangement	DOHC
Bore × stroke mm (in)	84.0 × 90.0 (3.31 × 3.54)
Displacement cm^3 (cu in)	1,995 (121.7)
Compression ratio	10.5
Ignition order	1 — 3 — 2 — 4
Idle speed at parking or neutral position r/min	650±100
Maximum output kW (HP)/[r/min]	110 (147)/6,200
Maximum torque N·m (kgf-m, ft-lb)/[r/min]	196 (20.0, 145)/4,200

C: ELECTRICAL

Model		2.0 L DOHC non-turbo
Ignition timing (at idling)	BTDC	MT: 12°±10° CVT: 16°±10°
Spark plug	Type and manufacturer	NGK: SILZKAR7B11
Generator		12 V — 130 A
Battery	Type and capacity (5HR)	12 V — 48 AH (55D23L)
	CCA	390 A

D: TRANSMISSION

1. MT

Model			2.0 L DOHC non-turbo
Transmission type			5MT
Clutch type			DSPD
Gear ratio		1st	3.454
		2nd	1.888
		3rd	1.296
		4th	0.972
		5th	0.738
		Rev.	3.333
Reduction gear (front)		Type of gear	Hypoid
		Gear ratio	4.111
Transfer reduction		Type of gear	Helical
		Gear ratio	1.000
Reduction gear (rear)	Final reduction	Type of gear	Hypoid
		Gear ratio	4.111

5MT: 5-forward speeds and 1-reverse with synchromesh
DSPD: Dry Single Plate Diaphragm

2. CVT

Model			2.0 L DOHC non-turbo
Transmission type			CVT
Clutch type			TCC
Gear ratio		Forward	3.420 — 0.544
		Reverse	3.502
Reduction gear (front)	Final reduction	Type of gear	Hypoid
		Gear ratio	3.700
Transfer reduction ratio			1.000
Reduction gear (rear)		Type of gear	Hypoid
		Gear ratio	3.700

CVT: Forward continuously variable speed change, 1-reverse
TCC: Torque Converter Clutch

E: STEERING

Model	2.0 L DOHC non-turbo
Type	Rack and pinion
	Electric power steering
Turns, lock to lock	2.9
Minimum turning radius m (ft)	5.3 (17.39)

F: SUSPENSION

Model	2.0 L DOHC non-turbo
Front	Macpherson strut type suspension
Rear	Double-wishbone type suspension

G: BRAKE

Model	2.0 L DOHC non-turbo
Service brake system	Dual circuit hydraulic with vacuum suspended power unit
Front	Ventilated disc brake
Rear	Solid disc brake
Parking brake	Mechanical on rear brakes

H: TIRE

Model	2.0 L DOHC non-turbo		
Wheel size	15 × 6J	16 × $6^{1}/_{2}$J	17 × 7J 17 × 7JJ
Tire size	P195/65R15 89H	P205/55R16 89V	P205/50R17 88V
Type	Tubeless, steel belted radial		

I: CAPACITY

Model			2.0 L DOHC non-turbo	
			5MT	CVT
Fuel tank		L (US gal, Imp gal)	55 (14.5, 12.1)	
Engine oil	Total capacity (at overhaul)	L (US qt, Imp qt)	5.7 (6.0, 5.0)	
	Filling amount of engine oil L (US qt, Imp qt)	When replacing engine oil and oil filter	4.8 (5.1, 4.2)	
		When replacing engine oil only	4.6 (4.9, 4.0)	
Transmission gear oil		L (US qt, Imp qt)	3.5 (3.7, 3.1)	—
CVTF		L (US qt, Imp qt)	—	11.68 — 12.18 (12.3 — 12.9, 10.3 — 10.7)
CVT front differential gear oil		L (US qt, Imp qt)	—	1.14 — 1.24 (1.2 — 1.3, 1.0 — 1.1)
Rear differential gear oil		L (US qt, Imp qt)	0.8 (0.8, 0.7)	
Engine coolant		L (US qt, Imp qt)	8.0 (8.5, 7.0)	8.4 (8.9, 7.4)

J: WEIGHT

Model			4 door			
			2.0 L DOHC non-turbo			
			2.0 i			
			5MT		CVT	
OP code			U5	C5	U5	C5
			MB	MB	MB	MB
Curb weight (C.W.)	Total	kg (lb)	1,340 (2,955)	1,340 (2,955)	1,375 (3,032)	1,375 (3,032)
	Front	kg (lb)	785 (1,731)	785 (1,731)	820 (1,808)	820 (1,808)
	Rear	kg (lb)	555 (1,224)	555 (1,224)	555 (1,224)	555 (1,224)
Gross vehicle weight (G.V.W.)		kg (lb)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)
Gross axle weight (G.A.W.)	Front	kg (lb)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		—	—	—	—
	Keyless access with push button start		—	—	—	—
	Auto A/C		—	—	—	—
	Manual A/C		○	○	○	○
	Leather package		—	—	—	—
	Genuine leather seat		—	—	—	—
	Standard audio		○	○	○	○
	Premium audio		—	—	—	—
	Navigation		—	—	—	—
	Side airbag		○	○	○	○
	Curtain airbag		○	○	○	○
	HID headlight		—	—	—	—
	Cold weather package		—	—	—	—
	Sunroof		—	—	—	—

Model			4 door										
			2.0 L DOHC non-turbo										
			2.0 i-Premium										2.0 i-Premium EyeSight
			5MT			CVT							
OP code			U5	C5	C5	U5	U5	U5	C5	C5	C4	U5	U5
			3C	3C	2P	3B	3C	3P	3C	2P	3B	3C	VC
Curb weight (C.W.)	Total	kg (lb)	1,355 (2,988)	1,355 (2,988)	1,370 (3,021)	1,395 (3,076)	1,395 (3,076)	1,410 (3,109)	1,395 (3,076)	1,410 (3,109)	1,400 (3,087)	1,395 (3,076)	1,395 (3,076)
	Front	kg (lb)	795 (1,753)	795 (1,753)	800 (1,764)	840 (1,852)	840 (1,852)	845 (1,863)	840 (1,852)	845 (1,863)	840 (1,852)	840 (1,852)	840 (1,852)
	Rear	kg (lb)	560 (1,235)	560 (1,235)	570 (1,257)	555 (1,224)	555 (1,224)	565 (1,246)	555 (1,224)	565 (1,246)	560 (1,235)	555 (1,224)	555 (1,224)
Gross vehicle weight (G.V.W.)		kg (lb)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)
Gross axle weight (G.A.W.)	Front	kg (lb)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○	○	○	○	○	○	○	○
	Keyless access with push button start		—	—	—	—	—	—	—	—	—	—	—
	Auto A/C		—	—	—	—	—	—	—	—	—	—	—
	Manual A/C		○	○	○	○	○	○	○	○	○	○	○
	Leather package		—	—	○	—	—	—	—	○	—	—	—
	Genuine leather seat		—	—	—	—	—	—	—	—	—	—	—
	Standard audio		○	○	○	○	○	○	○	○	○	—	—
	Premium audio		—	—	—	—	—	—	—	—	—	○	—
	Navigation		—	—	—	—	—	—	—	—	—	—	○
	Side airbag		○	○	○	○	○	○	○	○	○	○	○
	Curtain airbag		○	○	○	○	○	○	○	○	○	○	○
	HID headlight		—	—	—	—	—	—	—	—	—	—	—
	Cold weather package		○	○	○	—	○	○	○	○	—	○	○
	Sunroof		—	—	○	—	—	○	—	○	—	—	—

Model			4 door					
			2.0 L DOHC non-turbo					
			2.0 i-Premium+					2.0 i-Premium+ EyeSight
			5MT		CVT			
OP code			U5	C5	U5	C5	C4	C5
			2P	RP	2P	RP	RY	TP
Curb weight (C.W.)	Total	kg (lb)	1,385 (3,054)	1,385 (3,054)	1,415 (3,120)	1,415 (3,120)	1,420 (3,131)	1,415 (3,120)
	Front	kg (lb)	805 (1,775)	805 (1,775)	845 (1,863)	845 (1,863)	845 (1,863)	845 (1,863)
	Rear	kg (lb)	580 (1,279)	580 (1,279)	570 (1,257)	570 (1,257)	575 (1,268)	570 (1,257)
Gross vehicle weight (G.V.W.)		kg (lb)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)
Gross axle weight (G.A.W.)	Front	kg (lb)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○	○	○
	Keyless access with push button start		—	—	—	—	—	○
	Auto A/C		—	○	—	○	○	○
	Manual A/C		○	—	○	—	—	—
	Leather package		○	○	○	○	○	○
	Genuine leather seat		—	—	—	—	—	—
	Standard audio		○	○	○	○	○	○
	Premium audio		—	—	—	—	—	—
	Navigation		—	—	—	—	—	—
	Side airbag		○	○	○	○	○	○
	Curtain airbag		○	○	○	○	○	○
	HID headlight		—	—	—	—	○	—
	Cold weather package		○	○	○	○	—	○
	Sunroof		○	○	○	○	○	○

Model			4 door							
			2.0 L DOHC non-turbo							
			2.0 i-L					2.0 i-Limited EyeSight		
			5MT	CVT						
OP code			C5	U5	U5	C5	C4	U5	U5	C5
			HR	QC	SP	HR	ER	QC	EP	ER
Curb weight (C.W.)	Total	kg (lb)	1,380 (3,043)	1,410 (3,109)	1,425 (3,142)	1,425 (3,142)	1,425 (3,142)	1,410 (3,109)	1,425 (3,142)	1,425 (3,142)
	Front	kg (lb)	805 (1,775)	845 (1,863)	850 (1,874)	850 (1,874)	850 (1,874)	845 (1,863)	850 (1,874)	850 (1,874)
	Rear	kg (lb)	575 (1,268)	565 (1,246)	575 (1,268)	575 (1,268)	575 (1,268)	565 (1,246)	575 (1,268)	575 (1,268)
Gross vehicle weight (G.V.W.)		kg (lb)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)
Gross axle weight (G.A.W.)	Front	kg (lb)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○	○	○	○	○
	Keyless access with push button start		—	—	○	—	○	—	○	○
	Auto A/C		○	○	○	○	○	○	○	○
	Manual A/C		—	—	—	—	—	—	—	—
	Leather package		○	○	○	○	○	○	○	○
	Genuine leather seat		○	○	○	○	○	○	○	○
	Standard audio		—	—	—	—	—	—	—	—
	Premium audio		—	○	○	—	—	○	—	—
	Navigation		○	—	—	○	○	—	○	○
	Side airbag		○	○	○	○	○	○	○	○
	Curtain airbag		○	○	○	○	○	○	○	○
	HID headlight		○	—	—	○	○	—	—	○
	Cold weather package		○	○	○	○	○	○	○	○
	Sunroof		○	—	○	○	○	—	○	○

Model			5 door			
			2.0 L DOHC non-turbo			
			2.0 i			
			5MT		CVT	
OP code			U5	C5	U5	C5
			MB	MB	MB	MB
Curb weight (C.W.)	Total	kg (lb)	1,340 (2,955)	1,340 (2,955)	1,375 (3,032)	1,375 (3,032)
	Front	kg (lb)	785 (1,731)	785 (1,731)	820 (1,808)	820 (1,808)
	Rear	kg (lb)	555 (1,224)	555 (1,224)	555 (1,224)	555 (1,224)
Gross vehicle weight (G.V.W.)		kg (lb)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)
Gross axle weight (G.A.W.)	Front	kg (lb)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		—	—	—	—
	Keyless access with push button start		—	—	—	—
	Auto A/C		—	—	—	—
	Manual A/C		○	○	○	○
	Leather package		—	—	—	—
	Genuine leather seat		—	—	—	—
	Standard audio		○	○	○	○
	Premium audio		—	—	—	—
	Navigation		—	—	—	—
	Side airbag		○	○	○	○
	Curtain airbag		○	○	○	○
	HID headlight		—	—	—	—
	Cold weather package		—	—	—	—
	Sunroof		—	—	—	—

Model			5 door										
			2.0 L DOHC non-turbo										
			2.0 i-Premium										2.0 i-Premium EyeSight
			5MT			CVT							
OP code			U5	C5	C5	U5	U5	U5	C5	C5	C4	U5	U5
			3C	3C	2P	3B	3C	3P	3C	2P	3B	3C	VC
Curb weight (C.W.)	Total	kg (lb)	1,355 (2,988)	1,355 (2,988)	1,370 (3,021)	1,395 (3,076)	1,395 (3,076)	1,410 (3,109)	1,395 (3,076)	1,410 (3,109)	1,400 (3,087)	1,395 (3,076)	1,395 (3,076)
	Front	kg (lb)	795 (1,753)	795 (1,753)	800 (1,764)	840 (1,852)	840 (1,852)	845 (1,863)	840 (1,852)	845 (1,863)	840 (1,852)	840 (1,852)	840 (1,852)
	Rear	kg (lb)	560 (1,235)	560 (1,235)	570 (1,257)	555 (1,224)	555 (1,224)	565 (1,246)	555 (1,224)	565 (1,246)	560 (1,235)	555 (1,224)	555 (1,224)
Gross vehicle weight (G.V.W.)		kg (lb)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)
Gross axle weight (G.A.W.)	Front	kg (lb)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○	○	○	○	○	○	○	○
	Keyless access with push button start		—	—	—	—	—	—	—	—	—	—	—
	Auto A/C		—	—	—	—	—	—	—	—	—	—	—
	Manual A/C		○	○	○	○	○	○	○	○	○	○	○
	Leather package		—	—	○	—	—	—	—	○	—	—	—
	Genuine leather seat		—	—	—	—	—	—	—	—	—	—	—
	Standard audio		○	○	○	○	○	○	○	○	○	—	—
	Premium audio		—	—	—	—	—	—	—	—	—	○	—
	Navigation		—	—	—	—	—	—	—	—	—	—	○
	Side airbag		○	○	○	○	○	○	○	○	○	○	○
	Curtain airbag		○	○	○	○	○	○	○	○	○	○	○
	HID headlight		—	—	—	—	—	—	—	—	—	—	—
	Cold weather package		○	○	○	—	○	○	○	○	—	○	○
	Sunroof		—	—	○	—	—	○	—	○	—	—	—

Model			5 door								
			2.0 L DOHC non-turbo								
			2.0 i-Premium+			2.0 i-Premium+ EyeSight	2.0 i-Limited				
			5MT	CVT			5MT	CVT			
OP code			C5	C5	C4	C5	C5	U5	U5	C5	C4
			RP	RP	RY	TP	HR	QC	SP	HR	ER
Curb weight (C.W.)	Total	kg (lb)	1,375 (3,032)	1,405 (3,098)	1,410 (3,109)	1,405 (3,098)	1,380 (3,043)	1,410 (3,109)	1,425 (3,142)	1,425 (3,142)	1,425 (3,142)
	Front	kg (lb)	800 (1,764)	840 (1,852)	840 (1,852)	840 (1,852)	805 (1,775)	845 (1,863)	850 (1,874)	850 (1,874)	850 (1,874)
	Rear	kg (lb)	575 (1,268)	565 (1,246)	570 (1,257)	565 (1,246)	575 (1,268)	565 (1,246)	575 (1,268)	575 (1,268)	575 (1,268)
Gross vehicle weight (G.V.W.)		kg (lb)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)
Gross axle weight (G.A.W.)	Front	kg (lb)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○	○	○	○	○	○
	Keyless access with push button start		—	—	—	○	—	—	○	—	○
	Auto A/C		○	○	○	○	○	○	○	○	○
	Manual A/C		—	—	—	—	—	—	—	—	—
	Leather package		○	○	○	○	○	○	○	○	○
	Genuine leather seat		—	—	—	—	○	○	○	○	○
	Standard audio		○	○	○	○	—	—	—	—	—
	Premium audio		—	—	—	—	—	○	○	—	—
	Navigation		—	—	—	—	○	—	—	○	○
	Side airbag		○	○	○	○	○	○	○	○	○
	Curtain airbag		○	○	○	○	○	○	○	○	○
	HID headlight		—	—	○	—	○	—	—	○	○
	Cold weather package		○	○	—	○	○	○	○	○	○
	Sunroof		○	○	○	○	○	—	○	○	○

SPECIFICATIONS

Model			5 door									
			2.0 L DOHC non-turbo									
			2.0 i-Limited EyeSight			SPORT			SPORT Eye-Sight	SPORT-Limited		SPORT-Limited EyeSight
			CVT			5MT	CVT					
OP code			U5	U5	C5	U5	U5	U5	U5	U5	U5	U5
			QC	EP	ER	2C	2C	2P	2P	QC	SP	EP
Curb weight (C.W.)	Total	kg (lb)	1,410 (3,109)	1,425 (3,142)	1,425 (3,142)	1,375 (3,032)	1,410 (3,109)	1,425 (3,142)	1,430 (3,153)	1,420 (3,131)	1,435 (3,164)	1,435 (3,164)
	Front	kg (lb)	845 (1,863)	850 (1,874)	850 (1,874)	805 (1,775)	840 (1,852)	845 (1,863)	850 (1,874)	845 (1,863)	850 (1,874)	850 (1,874)
	Rear	kg (lb)	565 (1,246)	575 (1,268)	575 (1,268)	570 (1,257)	570 (1,257)	580 (1,279)	580 (1,279)	575 (1,268)	585 (1,290)	585 (1,290)
Gross vehicle weight (G.V.W.)		kg (lb)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)	1,950 (4,299)
Gross axle weight (G.A.W.)	Front	kg (lb)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)	990 (2,183)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○	○	○	○	○	○	○
	Keyless access with push button start		—	○	○	—	—	—	—	—	○	○
	Auto A/C		○	○	○	—	—	—	—	○	○	○
	Manual A/C		—	—	—	○	○	○	○	—	—	—
	Leather package		○	○	○	○	○	○	○	○	○	○
	Genuine leather seat		○	○	○	—	—	—	—	○	○	○
	Standard audio		—	—	—	○	○	○	○	—	—	—
	Premium audio		○	—	—	—	—	—	—	○	○	—
	Navigation		—	○	○	—	—	—	—	—	—	○
	Side airbag		○	○	○	○	○	○	○	○	○	○
	Curtain airbag		○	○	○	○	○	○	○	○	○	○
	HID headlight		—	—	○	—	—	—	—	—	—	—
	Cold weather package		○	○	○	○	○	○	○	○	○	○
	Sunroof		—	○	○	—	—	○	○	—	○	○

2. Crosstrek

A: DIMENSION

Model			2.0 L DOHC non-turbo	2.0 L DOHC motor hybrid
Overall length		mm (in)	4,450 (175.2)	
Overall width		mm (in)	1,780 (70.1)	
Overall height (at C.W.[*1])		mm (in)	1,615 (63.6)	
Compartment	Length	mm (in)	2,005 (78.9)	
	Width	mm (in)	1,490 (58.7)	
	Height	mm (in)	1,205 (47.4), 1,180 (46.5)[*2]	
Wheelbase		mm (in)	2,635 (103.7)	
Tread	Front	mm (in)	1,525 (60)	
	Rear	mm (in)	1,525 (60)	
Minimum road clearance		mm (in)	220 (8.7)	

[*1]: Curb weight
[*2]: With sunroof

B: ENGINE

Model	2.0 L DOHC non-turbo	2.0 L DOHC motor hybrid
Engine type	Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine	
Valve arrangement	DOHC	
Bore × stroke mm (in)	84.0 × 90.0 (3.31 × 3.54)	
Displacement cm^3 (cu in)	1,995 (121.7)	
Compression ratio	10.5	10.8
Ignition order	1 — 3 — 2 — 4	
Idle speed at parking or neutral position r/min	650±100	
Maximum output kW (HP)/[r/min]	110 (147)/6,200	110 (147)/6,000
Maximum torque N·m (kgf-m, ft-lb)/[r/min]	196 (20.0, 145)/4,200	

C: ELECTRICAL

Model		2.0 L DOHC non-turbo	2.0 L DOHC motor hybrid
Ignition timing (at idling) BTDC		MT: 12°±10° CVT: 16°±10°	10°±10°
Spark plug	Type and manufacturer	NGK: SILZKAR7B11	NGK: DILZKAR7B11
Generator		12 V — 130 A	—
Integrated starter generator (ISG)		—	12 V — 200 A
DC/DC converter		—	12 V — 130 A
Battery	Type and capacity (5HR)	12 V — 48 AH (55D23L)	12 V — 48 AH (55D23L) (12 volt auxiliary battery) 12 V — 41 AH (N55-R) (12 volt engine restart battery)
	CCA	390 A	390 A (12 volt auxiliary battery) 450 A (12 volt engine restart battery)
High voltage battery	Type and capacity (1HR)	—	100.8 V — 5.5 AH Ni-MH (Nickel metal hydride) battery
Drive motor	Kind	—	Three-phase AC synchronous motor
	Rated voltage	—	100 V
	Maximum output	—	10 kW [13.4 HP]
	Maximum torque	—	65 N·m [6.6 kgf-m]

D: TRANSMISSION

1. MT

Model			2.0 L DOHC non-turbo
Transmission type			5MT
Clutch type			DSPD
Gear ratio		1st	3.545
		2nd	1.888
		3rd	1.296
		4th	0.972
		5th	0.780
		Rev.	3.333
Reduction gear (front)		Type of gear	Hypoid
		Gear ratio	4.444
Transfer reduction		Type of gear	Helical
		Gear ratio	1.000
Reduction gear (rear)	Final reduction	Type of gear	Hypoid
		Gear ratio	4.444

5MT: 5-forward speeds and 1-reverse with synchromesh
DSPD: Dry Single Plate Diaphragm

2. CVT

Model			2.0 L DOHC non-turbo	2.0 L DOHC motor hybrid
Transmission type			CVT	CVT (HEV)
Clutch type			TCC	
Gear ratio		Forward	3.581 — 0.570	3.420 — 0.544
		Reverse	3.667	3.502
Reduction gear (front)	Final reduction	Type of gear	Hypoid	
		Gear ratio	3.700	
Transfer reduction ratio			1.000	
Reduction gear (rear)		Type of gear	Hypoid	
		Gear ratio	3.700	

CVT: Forward continuously variable speed change, 1-reverse
TCC: Torque Converter Clutch

E: STEERING

Model	2.0 L DOHC non-turbo	2.0 L DOHC motor hybrid
Type	Rack and pinion	
	Electric power steering	
Turns, lock to lock	2.8	
Minimum turning radius m (ft)	5.3 (17.39)	

F: SUSPENSION

Model	2.0 L DOHC non-turbo	2.0 L DOHC motor hybrid
Front	Macpherson strut type suspension	
Rear	Double-wishbone type suspension	

G: BRAKE

Model	2.0 L DOHC non-turbo	2.0 L DOHC motor hybrid
Service brake system	Dual circuit hydraulic with vacuum suspended power unit	
Front	Ventilated disc brake	
Rear	Solid disc brake	
Parking brake	Mechanical on rear brakes	

H: TIRE

Model	2.0 L DOHC non-turbo	2.0 L DOHC motor hybrid
Wheel size	17 × 7J	
Tire size	P225/55R17 95H	
	225/55R17 97V	—
Type	Tubeless, steel belted radial	

I: CAPACITY

Model			2.0 L DOHC non-turbo		2.0 L DOHC motor hybrid
			5MT	CVT	
Fuel tank		L (US gal, Imp gal)	60 (15.9, 13.2)		52 (13.7, 11.4)
Engine oil	Total capacity (at overhaul)	L (US qt, Imp qt)	5.7 (6.0, 5.0)		
	Filling amount of engine oil L (US qt, Imp qt)	When replacing engine oil and oil filter	4.8 (5.1, 4.2)		
		When replacing engine oil only	4.6 (4.9, 4.0)		
Transmission gear oil		L (US qt, Imp qt)	3.5 (3.7, 3.1)	—	—
CVTF		L (US qt, Imp qt)	—	11.68 — 12.18 (12.3 — 12.9, 10.3 — 10.7)	13.67 — 14.17 (14.4 — 15.0, 12.0 — 12.5)
CVT front differential gear oil		L (US qt, Imp qt)	—	1.14 — 1.24 (1.2 — 1.3, 1.0 — 1.1)	1.3 — 1.4 (1.4 — 1.5, 1.1 — 1.2)
Rear differential gear oil		L (US qt, Imp qt)	0.8 (0.8, 0.7)		
Engine coolant		L (US qt, Imp qt)	8.0 (8.5, 7.0)	8.4 (8.9, 7.4)	8.2 (8.7, 7.2)

J: WEIGHT

Model			5 door			
			2.0 L DOHC non-turbo			
			2.0 i			
			5MT		CVT	
OP code			U5	C5	U5	C5
			3A	3A	3A	3A
Curb weight (C.W.)	Total	kg (lb)	1,410 (3,109)	1,410 (3,109)	1,445 (3,186)	1,445 (3,186)
	Front	kg (lb)	825 (1,819)	825 (1,819)	865 (1,907)	865 (1,907)
	Rear	kg (lb)	585 (1,290)	585 (1,290)	580 (1,279)	580 (1,279)
Gross vehicle weight (G.V.W.)		kg (lb)	1,970 (4,343)	1,970 (4,343)	1,970 (4,343)	1,970 (4,343)
Gross axle weight (G.A.W.)	Front	kg (lb)	1,010 (2,227)	1,010 (2,227)	1,010 (2,227)	1,010 (2,227)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○
	Keyless access with push button start		—	—	—	—
	Auto A/C		—	—	—	—
	Manual A/C		○	○	○	○
	Leather package		—	—	—	—
	Genuine leather seat		—	—	—	—
	Standard audio		○	○	○	○
	Premium audio		—	—	—	—
	Navigation		—	—	—	—
	Side airbag		○	○	○	○
	Curtain airbag		○	○	○	○
	HID headlight		—	—	—	—
	Cold weather package		—	—	—	—
	Privacy glass		○	○	○	○
	Sunroof		—	—	—	—

Model			5 door			
			2.0 L DOHC non-turbo			
			2.0 i-Premium			
			5MT			
OP code			U5	C5	C5	C4
			2E	PE	RU	RB
Curb weight (C.W.)	Total	kg (lb)	1,410 (3,109)	1,410 (3,109)	1,425 (3,142)	1,410 (3,109)
	Front	kg (lb)	825 (1,819)	825 (1,819)	830 (1,830)	820 (1,808)
	Rear	kg (lb)	585 (1,290)	585 (1,290)	595 (1,312)	590 (1,301)
Gross vehicle weight (G.V.W.)		kg (lb)	1,970 (4,343)	1,970 (4,343)	1,970 (4,343)	1,970 (4,343)
Gross axle weight (G.A.W.)	Front	kg (lb)	1,010 (2,227)	1,010 (2,227)	1,010 (2,227)	1,010 (2,227)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○
	Keyless access with push button start		—	—	—	—
	Auto A/C		—	○	○	○
	Manual A/C		○	—	—	—
	Leather package		○	—	○	○
	Genuine leather seat		—	—	—	—
	Standard audio		○	○	○	○
	Premium audio		—	—	—	—
	Navigation		—	—	—	—
	Side airbag		○	○	○	○
	Curtain airbag		○	○	○	○
	HID headlight		—	—	○	—
	Cold weather package		○	○	○	—
	Privacy glass		○	○	○	—
	Sunroof		—	—	○	—

Model			5 door					
			2.0 L DOHC non-turbo					
			2.0 i-Premium					
			CVT					
OP code			U5	U5	U5	C5	C5	C4
			2E	2S	VS	PE	RU	RB
Curb weight (C.W.)	Total	kg (lb)	1,445 (3,186)	1,460 (3,219)	1,460 (3,219)	1,445 (3,186)	1,460 (3,219)	1,450 (3,197)
	Front	kg (lb)	865 (1,907)	870 (1,919)	870 (1,919)	865 (1,907)	870 (1,919)	865 (1,907)
	Rear	kg (lb)	580 (1,279)	590 (1,300)	590 (1,300)	580 (1,279)	590 (1,300)	585 (1,290)
Gross vehicle weight (G.V.W.)		kg (lb)	1,970 (4,343)	1,970 (4,343)	1,970 (4,343)	1,970 (4,343)	1,970 (4,343)	1,970 (4,343)
Gross axle weight (G.A.W.)	Front	kg (lb)	1,010 (2,227)	1,010 (2,227)	1,010 (2,227)	1,010 (2,227)	1,010 (2,227)	1,010 (2,227)
	Rear	kg (lb)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
Option	Aluminum wheel		○	○	○	○	○	○
	Keyless access with push button start		—	—	—	—	—	—
	Auto A/C		—	—	—	○	○	○
	Manual A/C		○	○	○	—	—	—
	Leather package		○	○	—	—	○	○
	Genuine leather seat		—	—	—	—	—	—
	Standard audio		○	○	—	○	○	○
	Premium audio		—	—	—	—	—	—
	Navigation		—	—	○	—	—	—
	Side airbag		○	○	○	○	○	○
	Curtain airbag		○	○	○	○	○	○
	HID headlight		—	—	—	—	○	—
	Cold weather package		○	○	○	○	○	—
	Privacy glass		○	○	○	○	○	—
	Sunroof		—	—	○	—	○	—

Model			5 door										
			2.0 L DOHC non-turbo										
			2.0 i-Premium EyeSight			2.0 i-Limited					2.0 i-Limited EyeSight		
			CVT			5MT	CVT						
OP code			U5	U5	C5	C5	U5	U5	C5	C4	U5	C5	U5
			VE	2E	TU	HU	QE	ES	HU	ER	ES	EU	SE
Curb weight (C.W.)	Total	kg	1,445	1,445	1,460	1,425	1,455	1,470	1,470	1,475	1,470	1,470	1,455
		(lb)	(3,186)	(3,186)	(3,219)	(3,142)	(3,208)	(3,241)	(3,241)	(3,252)	(3,241)	(3,241)	(3,208)
	Front	kg	865	865	870	830	875	880	880	880	880	880	875
		(lb)	(1,907)	(1,907)	(1,919)	(1,830)	(1,930)	(1,941)	(1,941)	(1,941)	(1,941)	(1,941)	(1,930)
	Rear	kg	580	580	590	595	580	590	590	595	590	590	580
		(lb)	(1,279)	(1,279)	(1,300)	(1,312)	(1,278)	(1,300)	(1,300)	(1,311)	(1,300)	(1,300)	(1,278)
Gross vehicle weight (G.V.W.)		kg	1,970	1,970	1,970	1,970	1,970	1,970	1,970	1,970	1,970	1,970	1,970
		(lb)	(4,343)	(4,343)	(4,343)	(4,343)	(4,343)	(4,343)	(4,343)	(4,343)	(4,343)	(4,343)	(4,343)
Gross axle weight (G.A.W.)	Front	kg	1,010	1,010	1,010	1,010	1,010	1,010	1,010	1,010	1,010	1,010	1,010
		(lb)	(2,227)	(2,227)	(2,227)	(2,227)	(2,227)	(2,227)	(2,227)	(2,227)	(2,227)	(2,227)	(2,227)
	Rear	kg	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
		(lb)	(2,205)	(2,205)	(2,205)	(2,205)	(2,205)	(2,205)	(2,205)	(2,205)	(2,205)	(2,205)	(2,205)
Option	Aluminum wheel		○	○	○	○	○	○	○	○	○	○	○
	Keyless access with push button start		—	—	○	—	—	○	—	○	○	○	○
	Auto A/C		—	—	○	○	○	○	○	○	○	○	○
	Manual A/C		○	○	—	—	—	—	—	—	—	—	—
	Leather package		—	○	○	○	○	○	○	○	○	○	○
	Genuine leather seat		—	—	—	○	○	○	○	○	○	○	○
	Standard audio		—	—	○	—	—	—	—	—	—	—	—
	Premium audio		—	○	—	—	○	—	—	—	—	—	○
	Navigation		○	—	—	○	—	○	○	○	○	○	—
	Side airbag		○	○	○	○	○	○	○	○	○	○	○
	Curtain airbag		○	○	○	○	○	○	○	○	○	○	○
	HID headlight		—	—	○	○	—	—	○	○	—	○	—
	Cold weather package		○	○	○	○	○	○	○	○	○	○	○
	Privacy glass		○	○	○	○	○	○	○	—	○	○	○
	Sunroof		—	—	○	○	—	○	○	○	○	○	—

Model			5 door HEV				
			2.0 L DOHC motor hybrid				
			2.0 i-Premium			2.0 i-Limited	
			CVT				
OP code			U5	C5	C5	U5	C5
			TE	TS	TU	ES	EU
Curb weight (C.W.)	Total	kg (lb)	1,565 (3,451)	1,580 (3,484)	1,580 (3,484)	1,585 (3,495)	1,585 (3,495)
	Front	kg (lb)	935 (2,062)	940 (2,073)	940 (2,073)	945 (2,084)	945 (2,084)
	Rear	kg (lb)	630 (1,389)	640 (1,411)	640 (1,411)	640 (1,411)	640 (1,411)
Gross vehicle weight (G.V.W.)		kg (lb)	2,120 (4,674)	2,120 (4,674)	2,120 (4,674)	2,120 (4,674)	2,120 (4,674)
Gross axle weight (G.A.W.)	Front	kg (lb)	1,110 (2,447)	1,110 (2,447)	1,110 (2,447)	1,110 (2,447)	1,110 (2,447)
	Rear	kg (lb)	1,050 (2,315)	1,050 (2,315)	1,050 (2,315)	1,050 (2,315)	1,050 (2,315)
Option	Aluminum wheel		○	○	○	○	○
	Keyless access with push button start		○	○	○	○	○
	Auto A/C		○	○	○	○	○
	Manual A/C		—	—	—	—	—
	Leather package		○	○	○	○	○
	Genuine leather seat		—	—	—	○	○
	Standard audio		○	○	○	—	—
	Premium audio		—	—	—	—	—
	Navigation		—	—	—	○	○
	Side airbag		○	○	○	○	○
	Curtain airbag		○	○	○	○	○
	HID headlight		—	—	○	—	○
	Cold weather package		○	○	○	○	○
	Privacy glass		○	○	○	○	○
	Sunroof		—	○	○	○	○

PRECAUTION

PC

Page
1. Precaution 2

1. Precaution

A: CAUTION

Please clearly understand and adhere to the following general precautions for environmental protection and to avoid minor or serious injury to the person doing the work or people in the area.

1. VEHICLE DYNAMICS CONTROL (VDC)

Handle the VDC as a total system. Do not disassemble or attempt to repair individual parts. Follow the directions in this manual when performing maintenance on the VDCCM&H/U. When parts other than those specified are disassembled, it is possible that the VDC system will not operate when needed or cause it to operate incorrectly and result in injury.

2. BRAKE FLUID

If brake fluid gets in your eyes or on your skin, do the following:
- Wash eyes and seek immediate medical attention.
- Wash your skin with soap and then rinse thoroughly with water.

3. RADIATOR FAN

The radiator fan may rotate without warning, even when the engine is not ON. Do not place your hand, cloth, tools or other items near the fan at any time.

4. ACTIVE GRILLE SHUTTER

The active grille shutter may open and close without warning, even when the engine is not ON. Do not place your hand, cloth, tools or other items nearby at any time.
To prevent unexpected deployment, turn the ignition switch to OFF and disconnect the ground cable from battery, then wait at least 30 seconds before starting work. Also, wait at least 30 seconds before starting work after connecting the battery.

5. ROAD TEST

Always conduct road tests in accordance with traffic rules and regulations to avoid bodily injury and interrupting traffic.

6. AIRBAG

To prevent bodily injury from unexpected deployment of airbags and unnecessary maintenance, follow the instructions in this manual when performing maintenance on the airbag components and nearby, around front of the vehicle (radiator panel, front wheel apron, front side frame, front bumper, front hood panel, front fender panel), around side of the vehicle (front door panel, rear door panel, center pillar, rear fender panel, side sill, rear wheel apron), around rear of the vehicle (the rear seat cushion, rear floor pan, rear sub frame assembly) and the airbag wiring harnesses and nearby.
To prevent unexpected deployment, turn the ignition switch to OFF and disconnect the ground cable from battery, then wait at least 60 seconds to discharge electricity before starting work. Removing or installing the components or the connectors with the ignition switch ON will electrically impair them.

7. AIRBAG AND SEAT BELT PRETENSIONER DISPOSAL

To prevent bodily injury from unexpected airbag deployment, do not dispose the airbag modules or seat belt pretensioner in the same way as other waste. Follow all government regulations concerning disposal of refuse.

8. AIRBAG MODULE

Adhere to the following when handing and storing the airbag module to prevent bodily injury from unexpected deployment:
- Do not hold the harnesses or connectors to carry the module.
- Do not face the bag in the direction that it opens towards yourself or other people.
- Do not face the bag in the direction that it opens towards the floor or walls.

9. AIRBAG SPECIAL TOOL

To prevent unexpected deployment, always use special tools for the area where the operation with special tools are required.

10.WINDOW

Always wear protective goggles when working around any glass to prevent glass fragments from damaging your eyes.

11.WINDOW ADHESIVE

Always use the recommended or equivalent adhesive when attaching glass to prevent it from falling off, resulting in accidents and injury.

12.OIL

When handling oil, adhere to the following to prevent unexpected accident.

- Prepare a container and cloth to prevent scattering of oil when performing work where oil can be spilled. If the oil spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Follow all government and local regulations concerning disposal of refuse when disposing.

13.FUEL

When handling and storing fuel, adhere to the following to prevent from unexpected accident.

- Fuel is flammable. Prevent exposure to flames or sparks or any source of ignition.
- Prepare a container and cloth to prevent scattering of fuels when performing work where fuels can be spilled. If the fuel spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Follow all government and local regulations concerning disposal of refuse when disposing.

14.ENGINE COOLANT

When handling engine coolant, adhere to the following to prevent from unexpected accident.

- Never remove the radiator cap since engine coolant may blow out when the engine is hot.
- Prepare a container and cloth to prevent scattering of engine coolant when performing work where engine coolant can be spilled. If the coolant spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Follow all government and local regulations concerning disposal of refuse when disposing.

15.AIR CONDITIONER REFRIGERANT

In order to prevent from global warming, avoid releasing air conditioner refrigerant into the atmosphere. Using a refrigerant recovery system, discharge and reuse it.

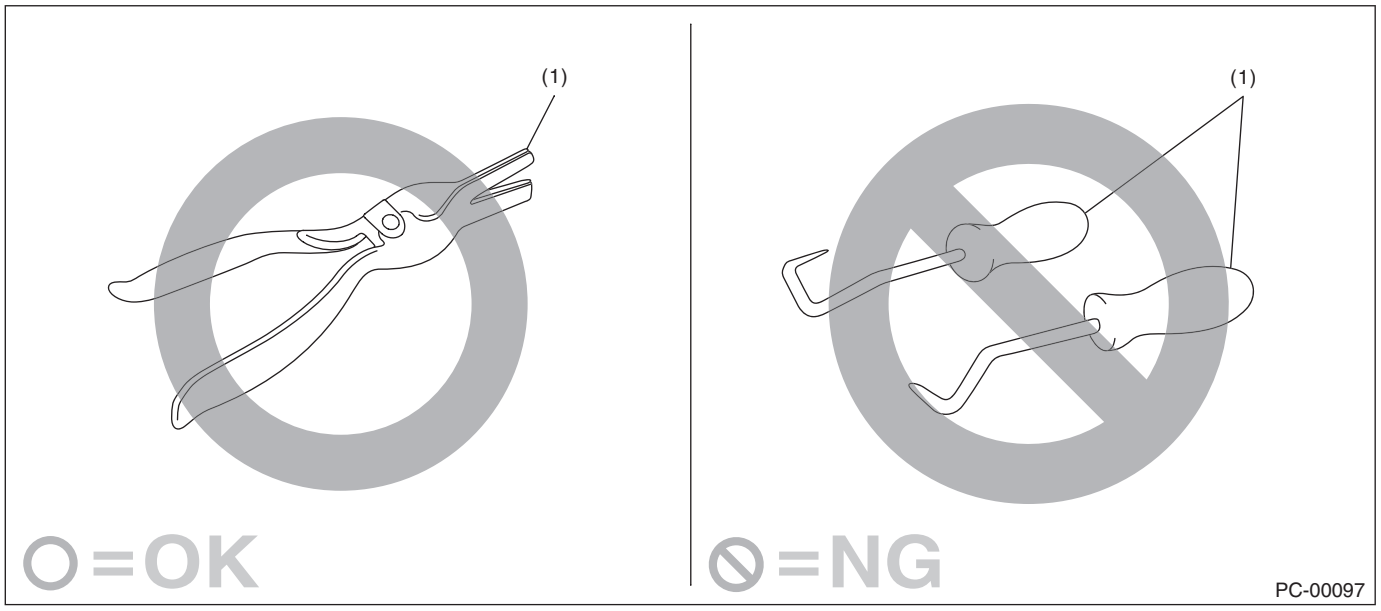
16.REMOVAL AND INSTALLATION OPERATION OF HOSES, ETC.

1. Before the removal and installation operation of hoses, etc.

• If you keep using the damaged or deformed hose, it results bleeds or leakage of the fat adheres or disconnection of the hose. Be careful not to spill fat adheres on exhaust pipes, etc. during maintenance to prevent emitting smoke or causing fires.
• Perform the operation with the hose removed. If the operation is performed without removing the hose, it may damage inner surface of the hose.

2. Removal and installation operation of hoses, etc. during the inspection

• Follow the instructions below when removing hose.
• When removing the hose, do not use a pointed hose remover (hose plucker). Inner portion of the hose can be damaged.

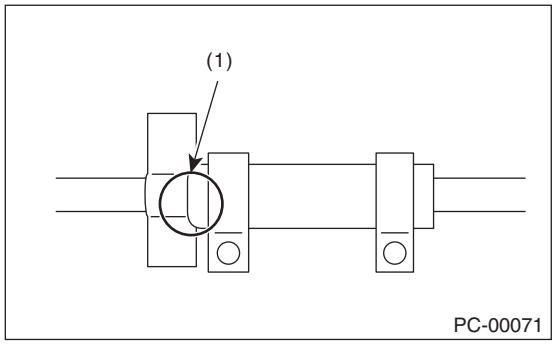


(1) Hose remover

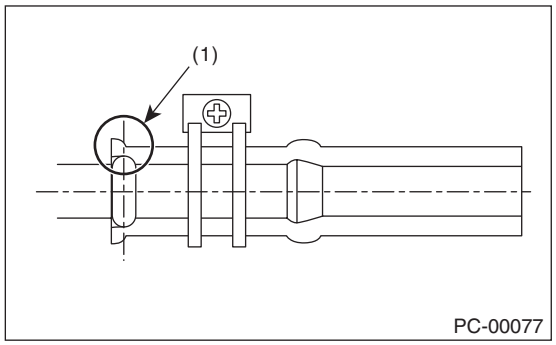
• When removing the hose using pliers, be sure to cover the hose with cloth and rotate the hose slightly to extract straight.

• If you keep using the hose, perform the inspection below and replace the hose with a new part if faulty.

• Replace the hose with a new part if it rides over the stay or the top of spool.



(1) Hose rides over the stay



(1) Hose rides over the top of spool

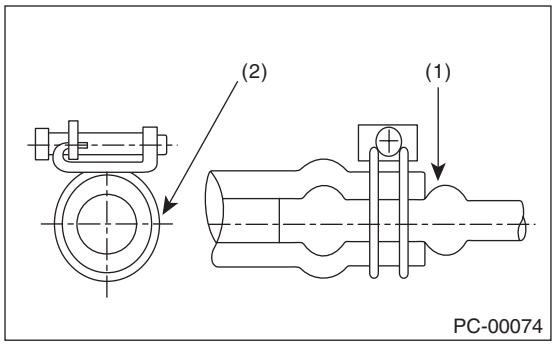
• Check if the surface and the inner surface of the hose are damaged, cracked, bend, hardened, softened, swelled, peeled or deformed due to the adherence or the entry of the foreign matter by bending the hose. Replace with the new part if faulty.

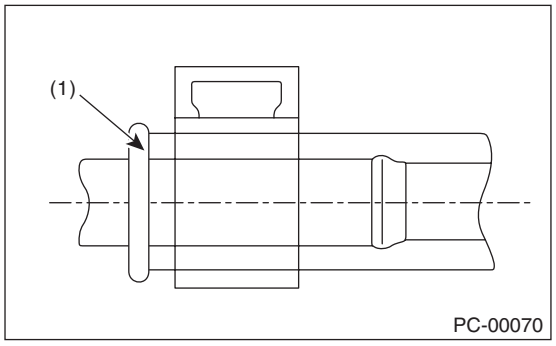
• Follow the instructions below during installation.

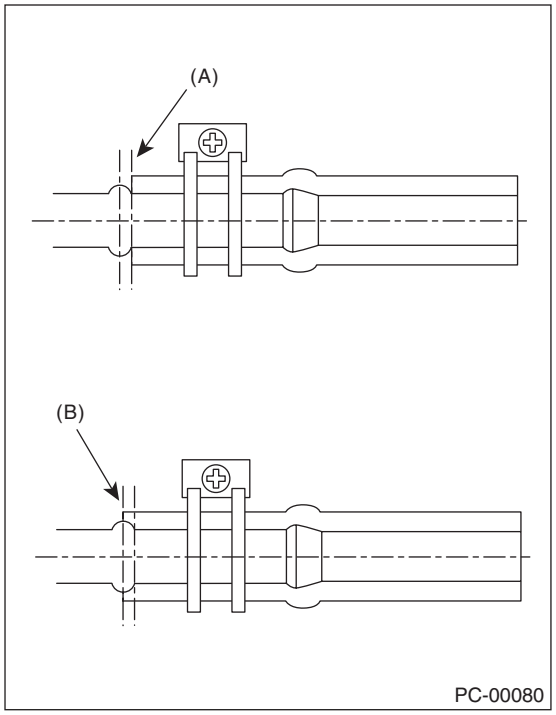
• Check carefully for assembling position.

• Never use lubricants.

• Insert the hose to the specified position (stopper or spool) securely. (The hose should stop at the position between the spool top and root.)







(1) Push against the spool. (Insert the hose and prevent it from becoming wrinkled.)

(2) Tighten the hose cramp completely.

(A) OK position (bottom of spool)

(B) OK position (top of spool)

- Check if the position, direction and hose layout of the hose clamp are correct. (Check if the position, direction, length and the gap around are correct, or if it is different from the condition before the work)
- After the installation, check that the hose is installed securely and there is no leakage. (Check if it is fixed securely with the clamp)

• For hose clips and hose clamps, perform the inspection below and replace them with a new part if faulty.

- Check for deformation, rust, damage or foreign matters.
- For hose clip, check if it works and has clamping force.
- For hose clamp, check if it can tighten screw, not ovalized or the screw is not damaged.

• For hose pipes, perform the inspection below and replace with a new part if faulty.

Check if the pipe is not damaged, rusted, peeled (peeled plates included), covered with foreign matter, bent, compressed or cracked.

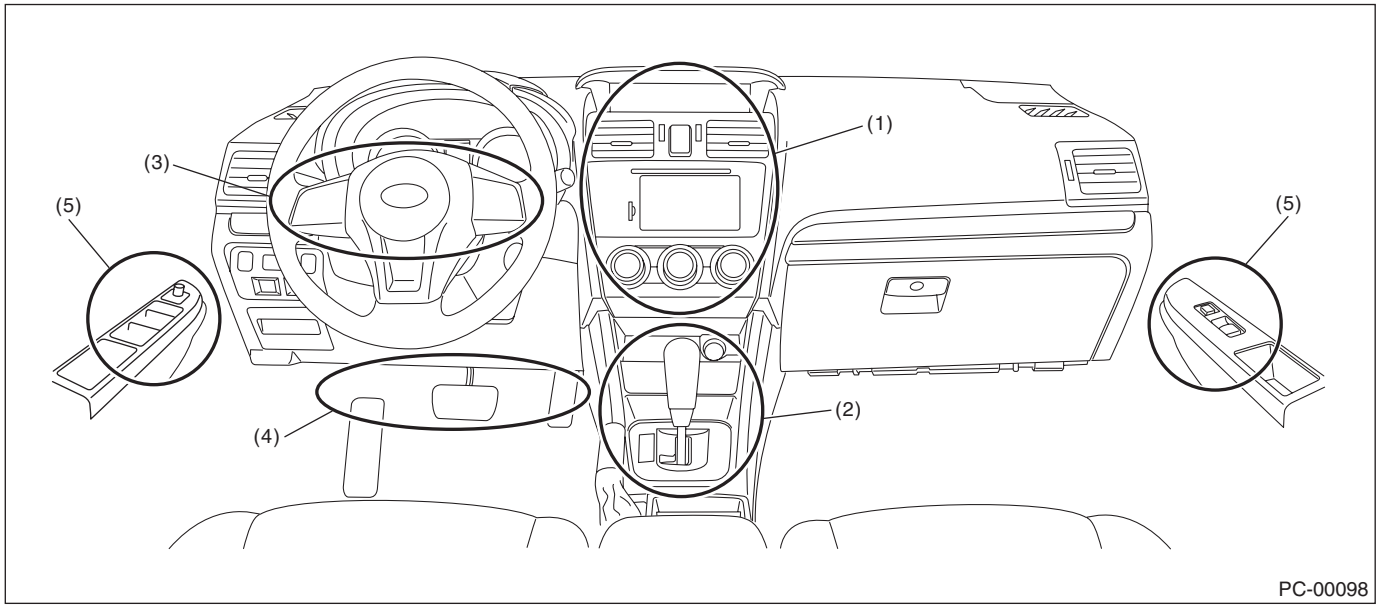
• For the parts below, replaces with a new part when the hose is removed or the installation position is changed.

CVTF oil cooler hose, fuel hose (delivery) (except for those with quick connector)

17.HANDLING PRECAUTIONS FOR SILICON-CONTAINING SPRAY

When a silicon-containing lubricant is used, rust inhibitor or glazing agent adheres to the electrical contact of the relay or switch, which may produce silica dioxide (SiO_2). This may cause poor connection.

- Never spray directly to the electrical equipment.
- When using the spray close to the electrical equipment, always put the cover on the component. Special care must be exercised especially when using the spray to the locations shown in the figure below and their surrounding areas.



(1)	Audio, heater control switch	(3)	Combination switch, steering switch, paddle shift switch	(5)	Power window switch
(2)	Shift/select lever switch, parking switch	(4)	Stop light switch, brake light switch, clutch switch, clutch start switch		

- If the residual silicon remains in the vicinity of the electrical equipment after the spray has been used, the vaporized silicon stands around the electrical equipment and it may adhere to electrical contact. After using the spray, be sure to wipe the silicon off with a cloth.
- Even when using the spray to the place away from the electrical equipment, the droplet of the spray may be splashed to the periphery. Use as small amount of spray as possible, and take care not to splash the silicon to the periphery.

NOTE:
The “silicon” used in this section refers to “silicone”, that is, silicon polymer.

B: CAUTION (HYBRID SYSTEM)

1. PRECAUTIONS FOR MAINTENANCE

The hybrid system includes a high voltage circuit. Mishandling may cause electric shocks and leakage. Therefore, perform proper operations by following procedures in this manual.

High voltage caution display

- Before working on the HEV, the vehicle should be marked with a caution sign.
- Copy this page, fold along the perforation and put it on the roof of the vehicle in service before performing any service on the HEV system.

HIGH VOLTAGE CAUTION LABEL

Person in charge: _____

DURING OPERATION
DO NOT TOUCH
HIGH VOLTAGE.
CAUTION:

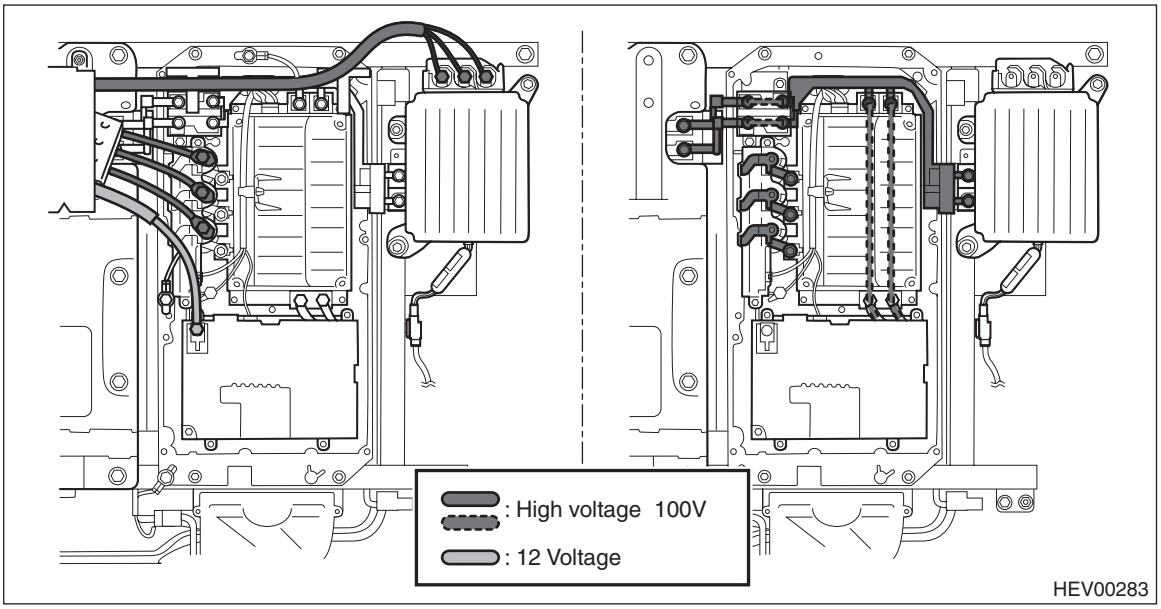
CAUTION:
HIGH VOLTAGE.
DO NOT TOUCH
DURING OPERATION

Person in charge: _____

Copy this page and put it after folding on the roof of the vehicle in service.

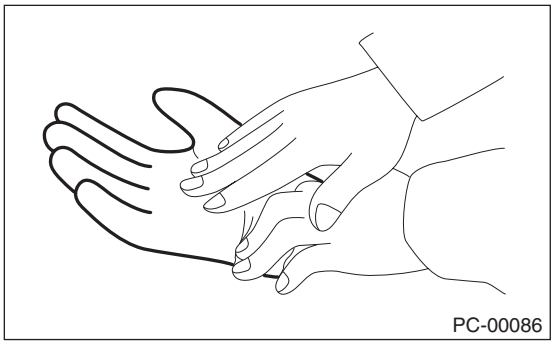
HEV00088

• Only technicians who have received the Subaru training for HEV Systems should be allowed to perform service or maintenance of high voltage circuits.
• All the power cable harnesses and connectors are colored orange. In addition, caution labels indicating [High Voltage] are attached on the High voltage battery and its battery cover. Do not touch the wires and parts related to high voltage without proper Personal Protective Equipment (PPE) and extreme caution.
• Use great care when handling the high voltage system power supply circuits shown in the figure below.



Personal Protective Equipment (PPE)

• Always wear PPE which is in good condition when working on the HEV system. Never touch any high voltage terminals or components without proper PPE.
• Personal Protective Equipment consists of insulated rubber gloves, protective goggles, rubber boots or insulated protective shoes or insulating rubber sheet for the shop floor.
• Always check the insulated gloves for holes or damage before starting work. To check for leaks, create a tight seal around your wrist with the glove gauntlet, and squeeze the glove to confirm that the trapped air does not leak, indicating a hole in the insulating material.



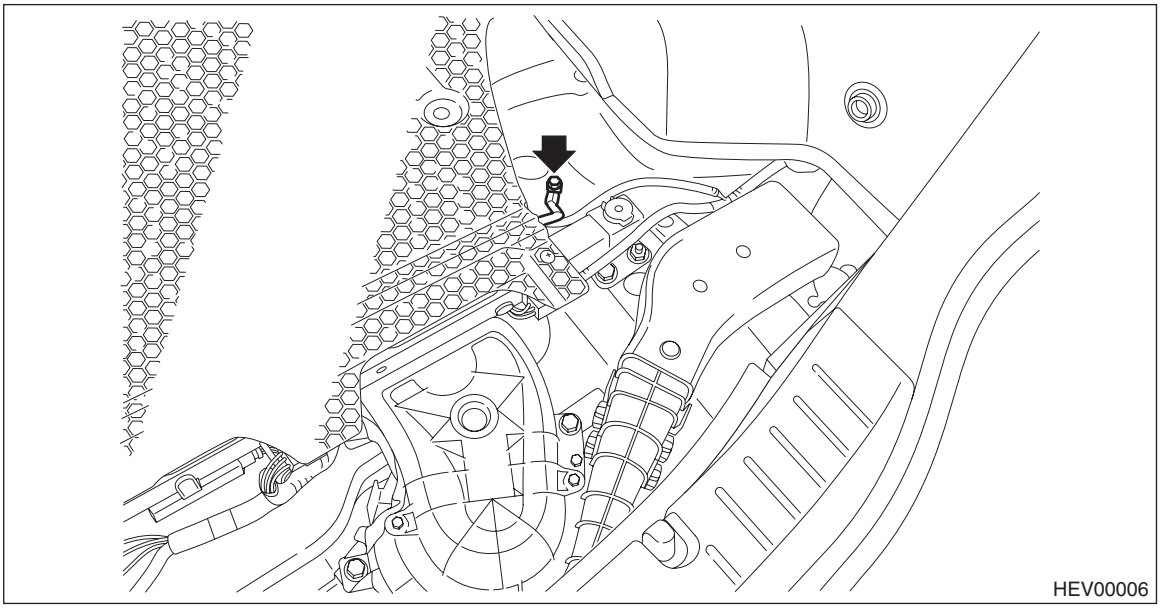
• Never use wet insulated gloves.

NOTE:
Maintenance of the high voltage battery cooling fan and cooling duct parts outside the battery cover, and drive motor control module parts does not require you to wear PPE, even in the compartment, because the voltage is only 12 V.
PPE is not required for maintenance or service of engine compartment and CVT unit. However, orange-colored power cables are excluded.

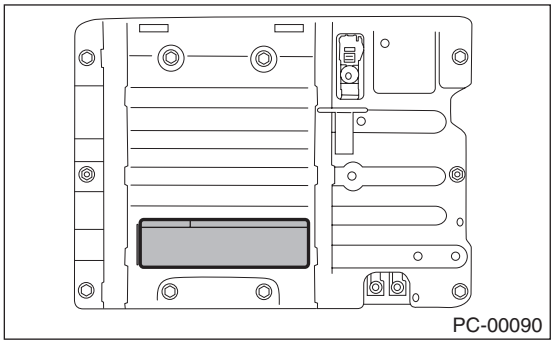
Operation procedure

In addition to PPE, other precautions must be observed when working on the HEV system since parts with high voltage and strong magnetic force are used.

- Do not carry any metallic products, such as mechanical pencils and rulers, etc. They may be dropped and cause a short circuit.
- Do not wear any metallic objects such as belts or buckles, chains, etc.
- The strong magnetic force can damage or erase magnetic recording media (such as cash cards and prepaid cards), etc.
- Always confirm that the voltage at any high voltage terminal is at 0 V using an insulation multimeter before beginning work.
- To work on the high voltage wire connections, always use insulated tools. If insulated tools are not available, wrap tools with electrical tape for insulation before use.
- When using tools wrapped with electrical tape as alternatives to insulated tools, confirm the insulated condition before working, using a insulation multimeter.
- Make sure to maintain the proper polarity of the positive and negative terminal connections during the high voltage battery removal and installation procedures.
- Never connect the high voltage battery in reverse polarity. Otherwise, the control module will be broken instantly, and other parts will also be damaged.
- Do not disconnect the battery terminals while the engine is running. A large counter electromotive force will be generated, and this voltage may damage electronic parts such as control modules.
- When disconnecting the connectors of the electrical components, always be sure to turn the ignition switch to OFF. Perform the Clear Memory Mode after connecting the connectors.
- When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal. Never insert the tapered pin into the terminal because it deforms inside which may lead to malfunction.
- Take care not to allow water to get into the connectors when servicing or washing the vehicle in rainy weather. Avoid exposure to water even if the connectors are waterproof.
- Use the engine ground terminal or engine assembly for the grounding point when measuring the voltage and resistance in engine compartment.
- Use the body ground bolt on the inverter frame as the grounding point, when measuring voltage and resistance in rear of the vehicle.



• All parts related to the hybrid system are precision parts. Do not drop or otherwise apply impact. Do not reuse the parts that are dropped accidentally.
• Each warning light may illuminate during or after the diagnosis. However, this does not indicate a system malfunction. After the hybrid system diagnosis, perform Clear Memory Mode. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>
• Take the ignition key or access key out of the vehicle, except when the key is needed inside.
• When the part is replaced or the label is detached, make sure to attach a new label in the original position and direction. Many of the HEV components are labeled with caution warnings.

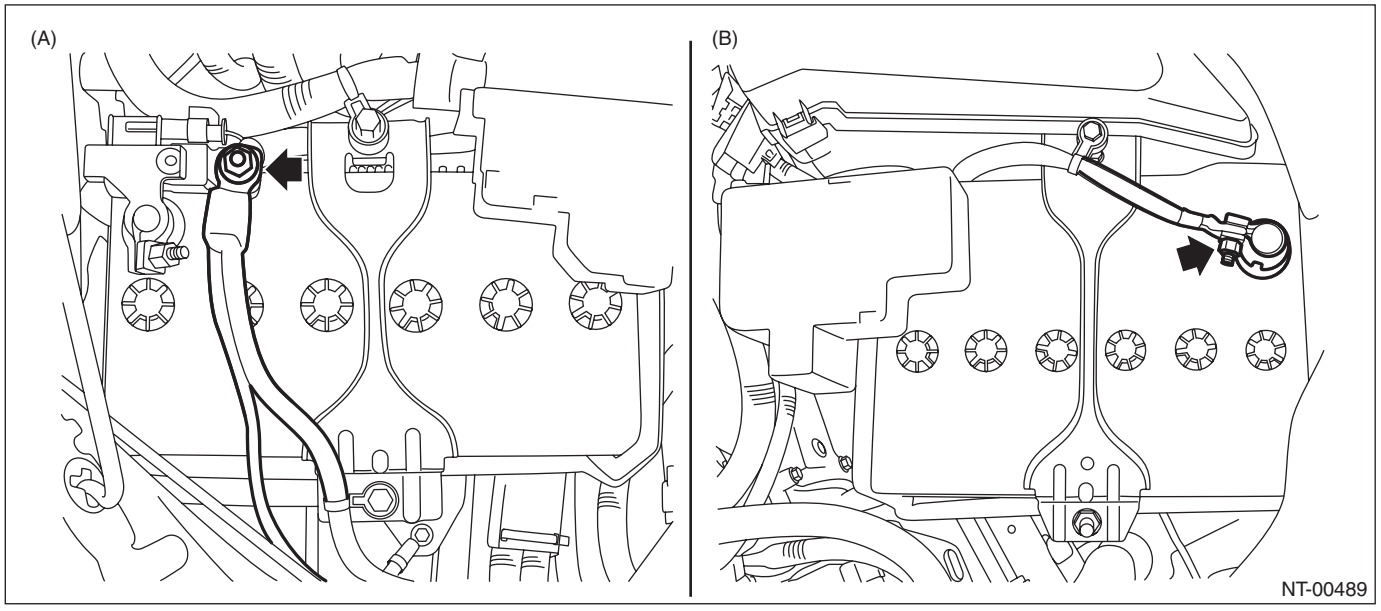


• This vehicle starts and stops the engine automatically, when the Hybrid READY indicator light in the meter illuminates. Make sure to turn the ignition switch to OFF before performing maintenance.

2. SERVICE DISCONNECT PLUG REMOVAL

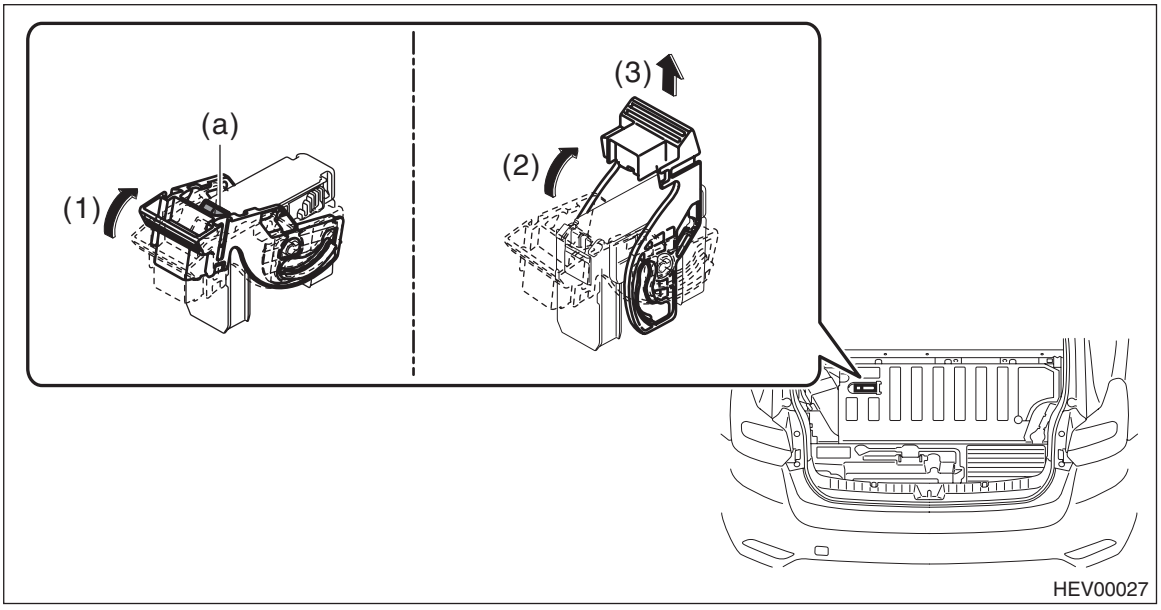
• Always remove the service disconnect plug before beginning work on the HEV system.
• The ignition must be OFF before removing the service disconnect plug.
  1. Turn off the ignition switch and remove the key, or move the access key away from the vehicle.
  2. Confirm that the READY light is not illuminated.

1) Remove the ground terminal from the 12 volt auxiliary battery.
2) For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.



(A) 12 volt engine restart battery (B) 12 volt auxiliary battery

3) Remove the mat - rear floor CTR.
4) Remove the service disconnect plug.



(1) Pull up the lever until it touches the stopper.
(2) Move the lever upwards while pressing the claw (a).

NOTE:
The lever locks in the vertical position.

(3) Pull out the service disconnect plug from high voltage battery.

WARNING:
After removing the service disconnect plug, be sure to wait for ten minutes before touching the high voltage connectors and terminals.

NOTE:
Waiting for 10 minutes allows the high voltage condenser in the inverter to discharge.

- Always confirm that the voltage at any high voltage terminal is at 0 V using an insulation multimeter before beginning additional work.

CAUTION:
After removing the service disconnect plug and waiting ten minutes, cover the connection on the battery with electrical tape to protect from intrusion of foreign matter such as water or dust, tools, etc.

- Do not turn the ignition switch ON with the service disconnect plug removed. The system may be damaged.
- After removal, always carry the removed service disconnect plug in your pocket in order to prevent other technicians from accidentally re-installing it while you are working on the system.
- Even after the service disconnect plug is removed, make sure to wear insulated gloves (PPE) during maintenance of all the parts inside the cover including the battery cover, and underfloor power cable.
- Insulate the high voltage power cables, connectors and terminals with electrical tape immediately after removing them.
- Be sure to tighten the high voltage screw terminals firmly to the specified torque. Lack of, or excess torque causes failures.
- Be careful not to allow foreign matter to enter the high voltage battery.

3. INSTALLATION OF THE SERVICE DISCONNECT PLUG

WARNING:
Make sure the connectors are connected completely and locked securely.
- After performing work for the high voltage system, make sure to check again for misplaced parts and tools, tightening conditions of high voltage terminals, and connector connections, before connecting the Service disconnect plug.
- Always replace faulty or damaged Service disconnect plug with a new part.
- If not damaged, always re-use the original Service disconnect plug form the vehicle you are servicing. Never use a Service disconnect plug removed from another vehicle.

Install in the reverse order of removal.

NOTE:
Move the lever to the horizontal position and push it until a click is heard and confirm it is securely locked.

4. PROCEDURES AT AN ACCIDENT SCENE

- Preparation items

Protective equipment (insulated gloves, rubber gloves, protective goggles, and rubber boots for electrical purposes)
Saturated boric-acid solution 20 L (In a container, dissolve 800 g of boric acid powder purchased at a drug store in 20 L of water.)
Red litmus paper (purchase at a drug store)
Fire extinguisher (used for both oil fire and electric fire)
Cloth, old towels (for wiping electrolytic solution)
Insulating tape
Circuit tester

- Procedures at an accident scene

Do not touch the exposed wires, when whether they are high voltage wires or not is unknown. When it is necessary or possible to touch them, make sure to wear insulated gloves and insulate the wires using insulating tape.
When vehicle is on fire, extinguish a fire using an electrical fire extinguisher. Attempting to extinguish a fire with a small amount of water may be more of a danger. Therefore, spray a large amount of water from a fire hydrant, or wait for arrival of firefighters.
When the vehicle is submerged in water, do not touch the service disconnect plug and any other high voltage parts and wires due to a possibility of electrical shock. Perform work after completely pulling out the vehicle.

- Check for any leakage in the high voltage battery vicinity.

CAUTION:
- **Do not touch any leaked fluid, because it may be strong alkaline electrolytic solution. When it is necessary to touch it, wear insulated gloves and protective goggles, neutralize with saturated boric-acid solution, confirm that red litmus paper does not change to blue, and then wipe off with cloth.**
- **Do not touch the skin or eyes with rubber gloves with the electrolytic solution (strong alkaline) adhered, because it may cause inflammation and blindness.**

- When the vehicle is damaged due to collision, stop the hybrid system in the following steps.
  1. Turn the ignition switch to OFF.

NOTE:
When the ignition switch cannot be turned to OFF, remove the fuse in engine compartment.

2. Wear insulated gloves and remove the service disconnect plug. <Ref. to PC-10, SERVICE DISCONNECT PLUG REMOVAL, CAUTION (HYBRID SYSTEM), Precaution.>

5. MOVING DAMAGED VEHICLE

- When one of the following conditions applies, use a tow truck to move the vehicle.

CAUTION:
Refer to [Towing] for towing procedures. <Ref. to NT-18, TOWING, NOTE, Note.>
High voltage system parts and wires are damaged.
The Hybrid READY indicator light does not illuminate with the ignition switch at ON.

CAUTION:
Using a tow truck, tow the vehicle with the negative terminal of 12 volt auxiliary battery disconnected, and the service disconnect plug removed. <Ref. to PC-10, SERVICE DISCONNECT PLUG REMOVAL, CAUTION (HYBRID SYSTEM), Precaution.>

- Move the vehicle by driving it, only when towing by a tow truck is unnecessary and there is no problem to drive the vehicle.

CAUTION:
When the hybrid fail lamp illuminates, or abnormal noise, odor, or strong vibration is detected during driving, perform the following procedures.

1. Bring the vehicle to a stop in a safe place.
2. Apply the parking brake.
3. Turn the ignition switch to OFF and disconnect the negative terminal from 12 volt auxiliary battery.
4. Wear insulated gloves and remove the service disconnect plug. <Ref. to PC-10, SERVICE DISCONNECT PLUG REMOVAL, CAUTION (HYBRID SYSTEM), Precaution.>

- Procedure after moving damaged vehicle

When there is fluid leakage on the road surface, it may be strong alkaline electrolytic solution. Wear insulated gloves and protective goggles, neutralize with saturated boric-acid solution, confirm that red litmus paper does not change to blue, and then wipe off with cloth.

6. PRECAUTION DURING REPAIR OF DAMAGED VEHICLE

- Preparation items

Protective equipment (insulated gloves, rubber gloves, protective goggles, and rubber boots for electrical purposes)
Saturated boric-acid solution 20 L (In a container, dissolve 800 g of boric acid powder purchased at a drug store in 20 L of water.)
Red litmus paper (purchase at a drug store)
Cloth, old towels (for wiping electrolytic solution)
Insulating tape
Circuit tester

- Precaution during repair of damaged vehicle

CAUTION:
Follow the procedures to ensure safety.
Make sure to use insulated tools, and wear insulated gloves or rubber gloves, protective goggles, and rubber boots for electrical purposes.
Check for any leakage in the high voltage battery vicinity.

CAUTION:

- **Do not touch any leaked fluid, because it may be strong alkaline electrolytic solution. When it is necessary to touch it, wear insulated gloves and protective goggles, neutralize with saturated boric-acid solution, confirm that red litmus paper does not change to blue, and then wipe off with cloth.**
- **If the electrolytic solution should touch the skin directly, immediately wash it away with saturated boric-acid solution or plenty of water. Also, take off the contaminated clothes.**
- **If it enters your eyes, scream for help, do not rub your eyes, immediately wash it away with plenty of water, and consult a doctor.**

When the vehicle is damaged due to collision, stop the hybrid system in the following steps.

CAUTION:
Do not touch the exposed wires, when whether they are high voltage wires or not is unknown. When it is necessary or possible to touch them, make sure to wear insulated gloves and insulate the wires using insulating tape.

1. Turn the ignition switch to OFF.

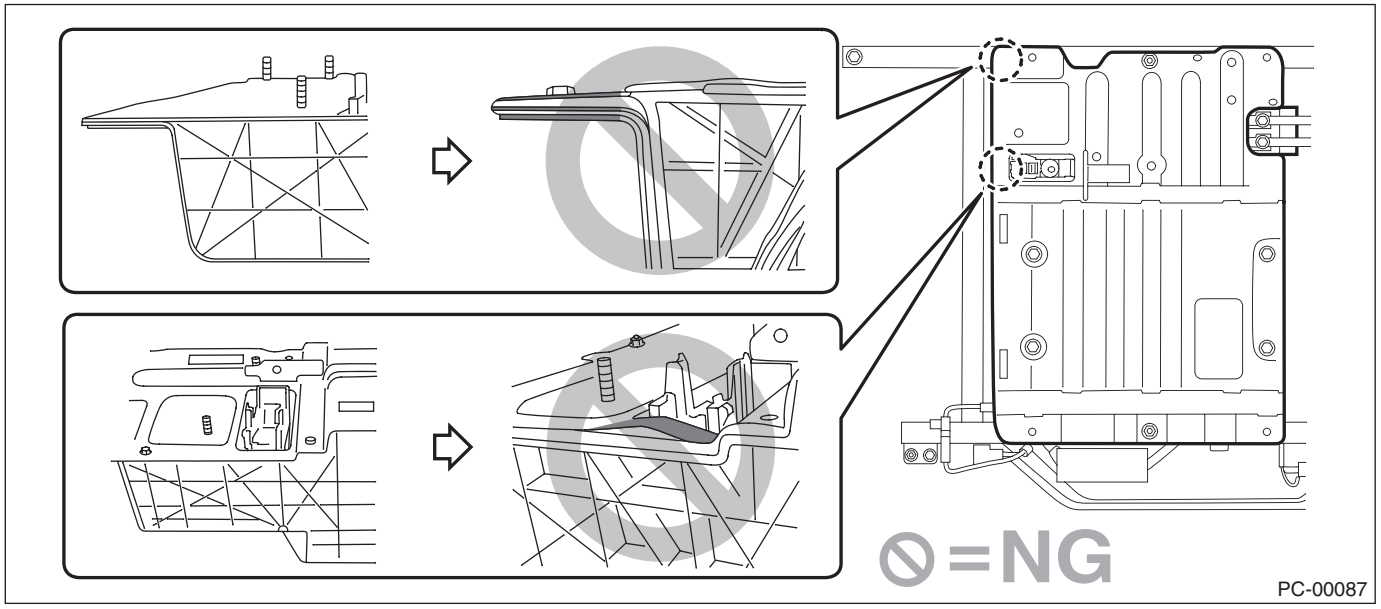
NOTE:
When the ignition switch cannot be turned to OFF, remove the fuse in engine compartment.

2. Wear insulated gloves and remove the service disconnect plug. <Ref. to PC-10, SERVICE DISCONNECT PLUG REMOVAL, CAUTION (HYBRID SYSTEM), Precaution.>

7. PRECAUTION FOR HIGH VOLTAGE BATTERY

Through the route specified by the manufacturer, make sure to collect the high voltage batteries that are no longer needed due to replacement or other reasons.

CAUTION:
• When high voltage batteries are dumped or left without proper measures, electric shock accidents may occur. Be sure to collect the high voltage batteries through the route specified by the manufacturer.
• Do not leave the removed high voltage batteries in a place where water may splash, because generated heat may cause fire.
• When the collision is severe, high impact is applied to the high voltage battery, possibly causing damage inside the high voltage battery. Therefore, visually check the exterior of high voltage battery, and replace with a new one if deformation or such evidence is found at the following locations.



NOTE

NT

Page
1. Note 2

NOTE

1. Note

A: BASIC REPAIR HINT

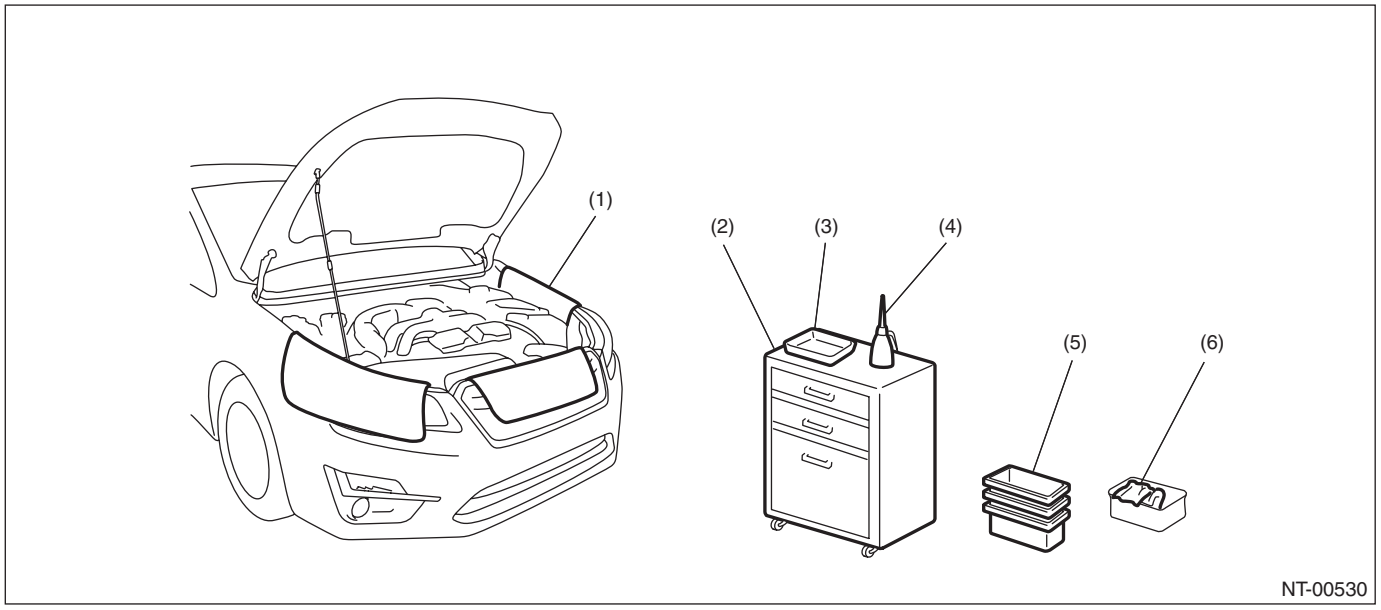
This section describes basic points that the service operator must understand before performing the service operation.

1. APPEARANCE

- Always wear clean work clothing.
- Wear a cap and protective shoes.

2. PROTECTION OF VEHICLE UNDER MAINTENANCE AND PREPARATION OF TOOLS/ EQUIPMENT

- Before work, cover the vehicle body. (Ex. grille cover, fender cover, seat cover and floor mat cover)
- Before performing the service operation, prepare tools, equipment, container box, grease and cloth etc.



(1) Fender cover
(2) Tools/equipment case
(3) Tray
(4) Oil
(5) Container box
(6) Cloth

3. SAFETY

- Before work, set the wheel stoppers to secure the vehicle.
- When performing work by multiple workers, call to each other to make sure that service operation is performed safely.
- Ventilate the room when starting the engine.
- When performing the service operation of high-temperature parts like muffler, or rotating parts like fan and other movable parts, be careful not to get burned or injured.
- For the jack-up and lift up, set the tool to the proper location to support the vehicle correctly. And use the safety device properly when lifting up.
- When touching the power cables, wear insulation protectors.

4. SERVICE OPERATION

- By identifying the vehicle problems thoroughly before work, service operation will be performed effectively.
- Before removing parts, confirm the installation condition or the damage of the parts.
- To reinstall parts properly, leave a note of the condition before work as necessary.
- For a part which needs positioning, take appropriate action such as putting alignment marks.
- For a removed part, clean it as necessary and check for damage and defect before installation. If the part is damaged or defective, replace it with a new part.
- Removing or installing the components or the connectors with the ignition switch ON will electrically impair them.

5. REMOVED PART

- A removed part must be organized to avoid mixing up with similar parts. When same parts are used in multiple locations, such as pistons in engine, manage the parts by using labels with cylinder No. so that the parts are not installed to the wrong location.
- Always replace nonreusable parts such as gasket and O-ring with new parts.
- After work, have a customer confirm the replaced part.

6. WHEN REMOVING BATTERY

When removing battery, power supply is cut off and the information stored in the computer memory is volatilized. Therefore, setting information of some devices is initialized to the factory default. The device and functions initialized by removing battery are as follows.

No.	Item	Job contents when connecting battery
1	Clock (MFD) (settings that the customer set)	Set the clock to the current time.
2	MFD (high grade type)	Set to the contents checked before disconnecting the battery.
3	Audio (settings that the customer set)	Set to the contents checked before disconnecting the battery.
4	Navigation system (settings that the customer set)	• Time setting is not necessary because the time information is received via GPS. • Set the sound and other settings (items that were set in the selection) to the contents checked before disconnecting the battery.
5	Temperature setting of fully automatic air conditioner (settings that the customer set)	Set to the contents checked before disconnecting the battery.
6	Power window system	Initialize automatic full open/close of driver's window (power window system). For the initialization procedure, refer to "GW" section. <Ref. to GW-10, OPERATION, Power Window System.>
7	Steering lock system (model with keyless access with push button start)	If the engine does not start, initialize the steering lock system. For the initialization procedure, refer to "KPS" section. <Ref. to KPS(diag)-141, ENGINE DOES NOT START, INSPECTION, Diagnostics with Phenomenon.>
8	EyeSight (model with EyeSight)	Set to the contents checked before disconnecting the battery.
9	Electronic throttle system	Turn the ignition switch to ON, wait for 10 seconds or more, and start the engine.
10	Engine control system	Let the engine run at idle until it fully warms up (the radiator fan turns 2 times or more) under no electrical load condition.
11	Past trouble history (memory code)	—
12	Brake stroke sensor learning value (HEV model)	Connect the Subaru Select Monitor and read the diagnostic trouble codes (DTC). If any diagnostic trouble code (DTC) is displayed, refer to "List of Diagnostic Trouble Code (DTC)" in "HYBRID ELECTRIC VEHICLE (DIAGNOSTICS)" section. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).>
13	Active grille shutter system	Close the shutter by performing the active test. For procedures, refer to EN(H4DO HEV)(diag). <Ref. to EN(H4DO HEV)(diag)-69, OPERATION, Active Test.>

7. OTHER ADJUSTMENT OPERATIONS BEFORE DELIVERING THE VEHICLE TO CUSTOMER

Due to service and parts replacement convenience, perform the following operations before delivering the vehicle to the customer.

No.	Item	Check operation	Adjustment operation	Additional adjustment operations when replacing parts
1	Positions of devices • Steering • Room mirror • Door mirror • Seat • Air conditioner vent grille	Is the device set to the same position when the vehicle was received from the customer?	Adjust the device to the similar position when the vehicle was received from the customer.	When removing/installing each device • Meter, instrument panel, steering column, etc. • Room mirror, roof trim, sunroof assembly, etc. • Door mirror, door panel, etc. • Seat, floor carpet, parking brake lever, etc. • Vent grille, instrument panel, console box, etc.
2	Positions of switches • SI-Drive • Wiper, light (AUTO or OFF) • Headlight beam leveler • Illumination control • Room light • Seat heater, etc.	Is the switch set to the same position when the vehicle was received from the customer?	Set the switch to the same position when the vehicle was received from the customer.	When removing/installing each switch
3	Position of antenna	Is the antenna set to the same position when the vehicle was received from the customer?	Adjust the position of antenna.	When removing/installing the antenna and washing the vehicle

B: NOTE

This information will improve the efficiency of maintenance and assure the sound work.

1. CLEANING

- Perform the operation in a clean location and use extra caution in dust proofing.
- Clean the items (except for assembly components) with steam, etc. before disassembly. During steam cleaning, wrap the air breather, oil level gauge, connectors, etc. with vinyl tape to prevent steam from entering inside the parts.
- Use an appropriate cleaning solvent.
- Do not clean rubber parts such as O-ring, gasket and oil seal with cleaning solution.

2. FASTENERS NOTICE

Tighten the bolts and nuts to the specified torque.
Do not apply paint, lubricant, rust retardant or other substance to the surface around bolts, nuts, etc. It may cause troubles with tightening to the specified torque and result in looseness and other problems of bolts and nuts.

3. ABOUT SCREWS

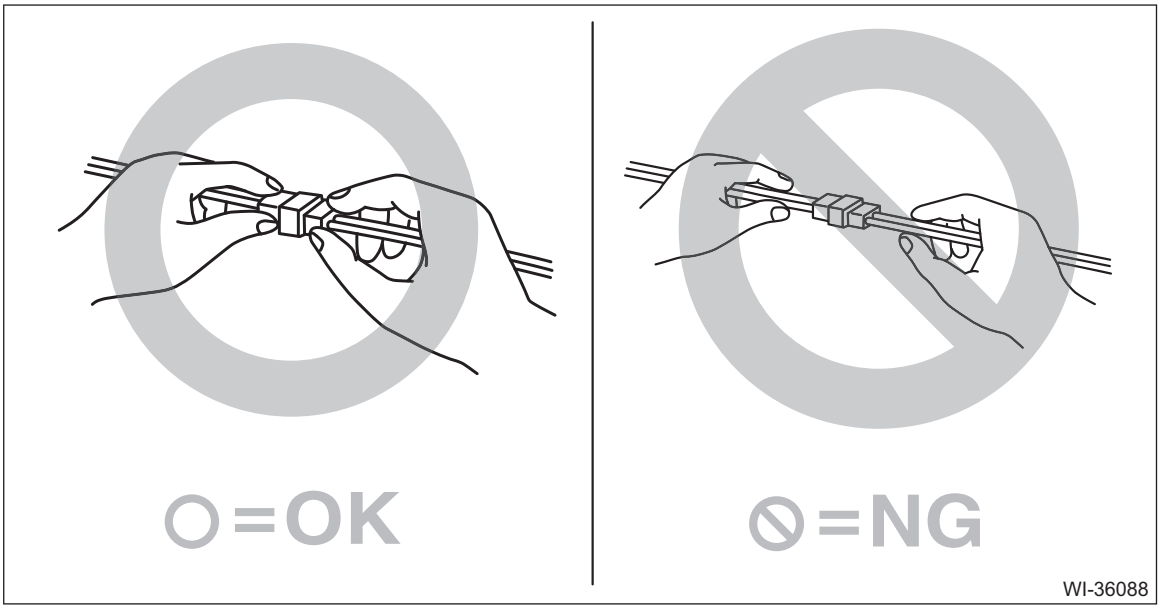
Use an appropriate sized tool. Insert a screw vertically into the hole. Check for any loose screws after installation.
If improper tools are used or screws are inserted obliquely to the hole, the screws cannot be installed correctly, which may result in insufficient tightening force or damage on the hole.

4. STATIC ELECTRICITY DAMAGE

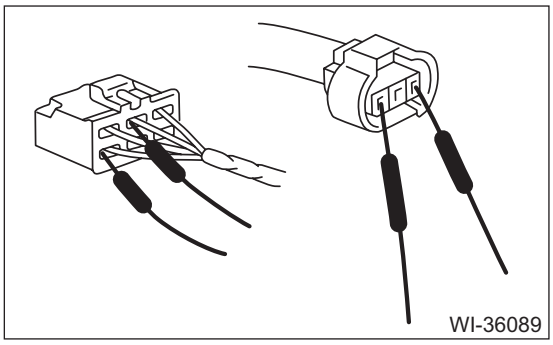
Do not touch the control modules, connectors, logic boards and other such parts when there is a risk of static electricity. Always use a static electricity prevention cord or touch grounded metal for the elimination of static electricity before conducting work.

5. TROUBLESHOOTING OF ELECTRICAL SYSTEM

1) Always refer to “CAUTION” of “General Description” in the same models service manual before starting the diagnostics and repair.
2) Always refer to the cautions of each section when diagnosing and repairing each system and component.
3) The battery cable must be disconnected from the negative terminal after the ignition switch is set to the OFF position, unless otherwise required by the diagnostics.
4) When disconnecting a connector, do not pull the harness, but pull while holding the connector housing.



5) Confirm the locking shape completely before disconnecting a connector. In addition, firmly push in the connector until a click sounds when connecting a connector.
6) When checking continuity between connector terminals, or measuring voltage across the terminal and ground, always touch tester probe(s) to terminals from the harness side.
If the probe is too thick to gain access to the terminal, do not push it in forcibly but use a mini test lead.
7) When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal. Never insert the tapered pin into the terminal at this time. Doing so may cause internal deformation and a malfunction can occur.
8) To check water-proof connectors (which are not measurable from the harness side), touch tester probes on the terminal side and be very careful not to bend or damage the terminals.



9) Securely fasten the harness with clamps and clips so that the harness does not interfere with the body end parts, edges, bolts or screws.
10) When installing a harness and a component, be careful not to catch them on the harness.
11) Sensors, relays, units, etc., are sensitive to strong impacts. Handle them with extra care so that they are not dropped or mishandled.
12) Because the HID headlight uses high voltage, be sure to confirm that the power supply is turned off before diagnostics and repair. Furthermore, do not perform diagnostics and repair with wet hands because there is a possibility of electrical shock.

NOTE

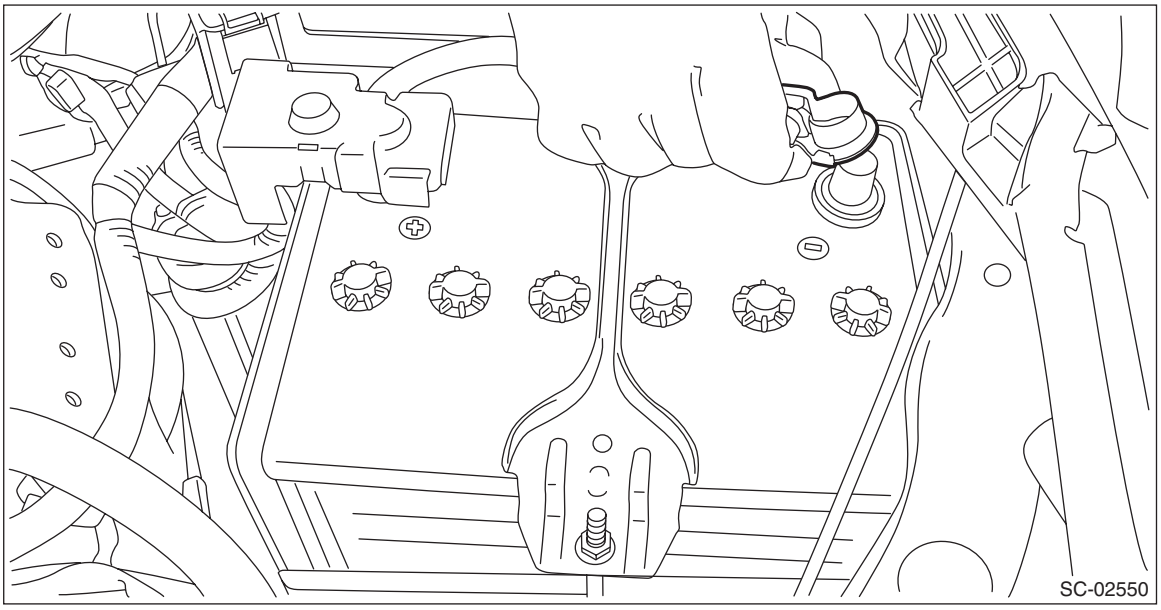
13) When inspecting the airbag system, in order to avoid malfunction, always refer to “CAUTION” of “General Description” of the airbag system in the same model’s service manual.

6. BATTERY

When removing the battery terminal, always be sure to turn the ignition switch to OFF and disconnect the battery ground terminal first.

1. Gasoline engine model

- Disconnect the ground cable from battery.



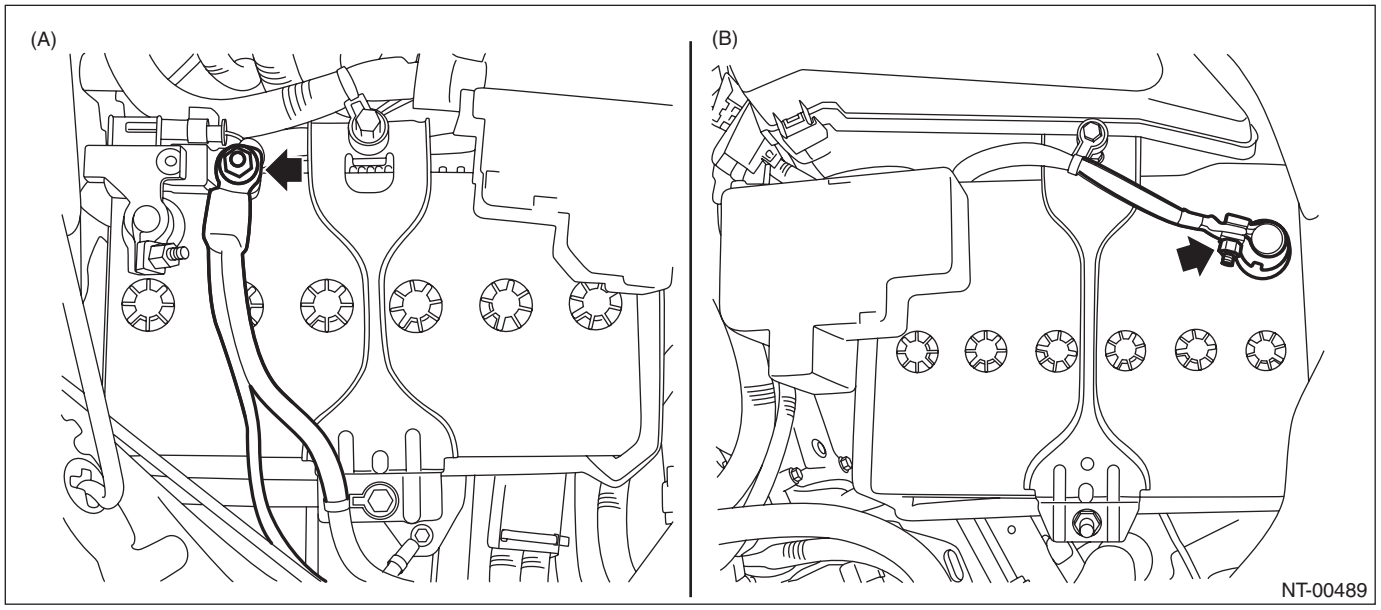
- Install in the reverse order of removal.

NOTE:

- Clean the battery cable terminals and apply grease to retard the formation of corrosion.
- Connect the positive (+) terminal, and then connect the negative (–) terminal of the battery.
- After the battery is installed, initial diagnosis of the electronic throttle control is performed. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.

2. HEV model

• After disconnecting the negative terminal from 12 volt auxiliary battery, disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery.



(A) 12 volt engine restart battery (B) 12 volt auxiliary battery

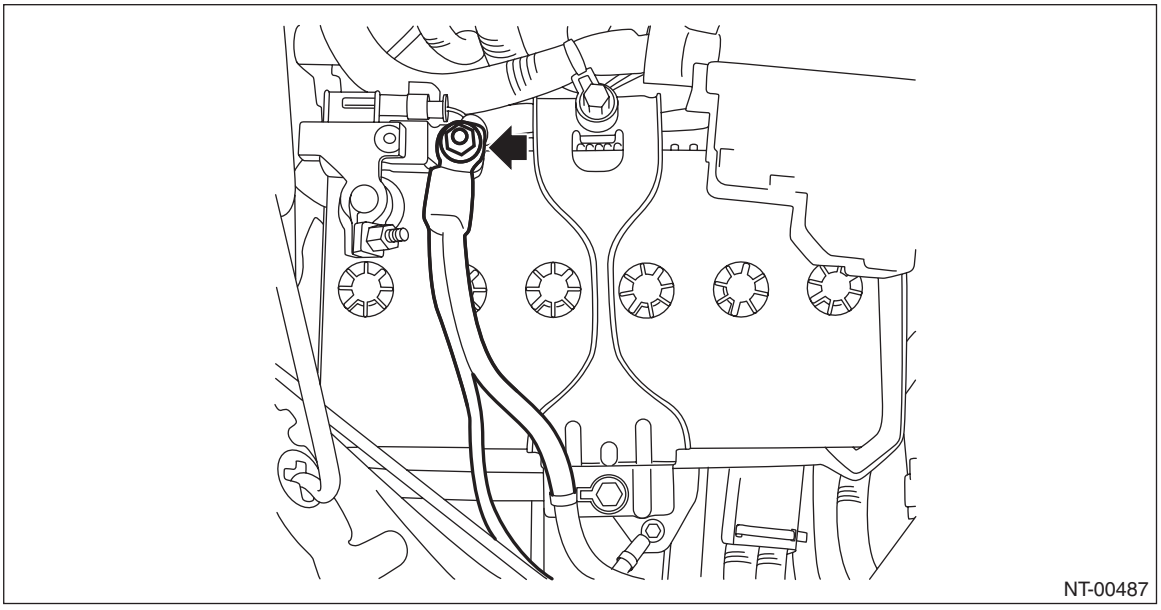
• Install in the reverse order of removal.

NOTE:

• Install the 12V engine restart battery sensor while holding it with your hand to prevent the sensor from turning.
• Clean the battery cable terminals and apply grease to retard the formation of corrosion.
• Connect the positive (+) terminal, and then connect the negative (–) terminal of the battery.
• After connecting the battery ground terminal, the following operations are automatically performed in the vehicle.
  – Initial diagnosis of electronic throttle control
  – Learning control of brake pedal stroke sensor
  Therefore, before starting the engine, be sure to place the select lever in “P” position, turn the ignition switch to ON, and wait at least 10 seconds without depressing the brake pedal.
  – Initialization operation of active grille shutter
  Do not place your hand, cloth, tools or other items nearby, because the active grille shutter opens approximately four seconds after the battery installation.

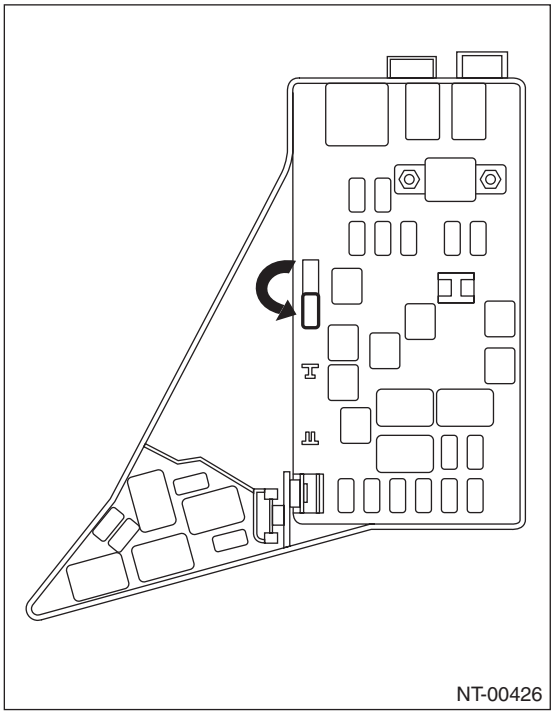
NOTE

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



7. BACKUP/POWER SUPPLY FUSE

Backup fuse (20A) remains removed to prevent the battery consumption when vehicles are delivered. Install the backup fuse by following the illustration.



8. IMMOBILIZER RELATED PART

- Do not replace the immobilizer related parts with the parts from other vehicle.
- Registration of the immobilizer is necessary when a immobilizer-related control module has been replaced. For detailed operation procedure, refer to the “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume.

9. SERVICE PARTS

Use genuine parts for maximum performance and maintenance when conducting repairs. Subaru/FHI will not be responsible for poor performance resulting from the use of parts except for genuine parts.

10.PROTECTING VEHICLE UNDER MAINTENANCE

Make sure to attach the fender cover, seat covers, etc. before work.

11.ENSURING SECURITY DURING WORK

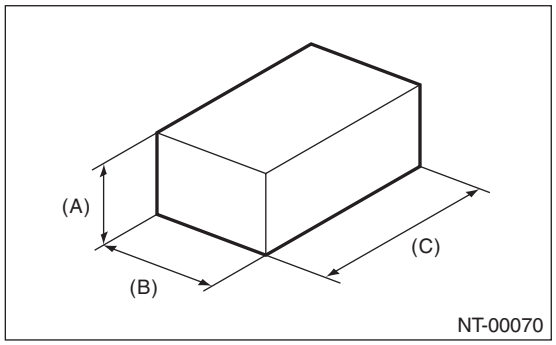
When working in a group of two or more, perform the work with calling each other to ensure mutual safety.

12.LIFT AND JACK

When using a lift or shop jack to raise a vehicle or using rigid rack to support a vehicle, always follow instructions concerning jack-up points and weight limits to prevent the vehicle from falling, which could result in injury. Be especially careful that the vehicle is balanced before raising it. Be sure to set the wheel stoppers when jacking-up only the front or rear side of the vehicle.

CAUTION:
Select the lift attachment so that the side sill does not contact the lift arm.

NOTE:
- When using a lift, follow its operation manual.
- When the side sill cover contacts the lift arm, use a lift attachment.
- Do not work or leave unattended while the vehicle is supported with jack, support it with rigid racks.
- Be sure to use the rigid racks with rubber attached to cradle to support the vehicle.
- When using a lift, use an attachment or something similar.
- When using a plate lift, use a rubber attachment. Place the attachment to the specified position of the vehicle, by adjusting front/rear and left/right sides accordingly.

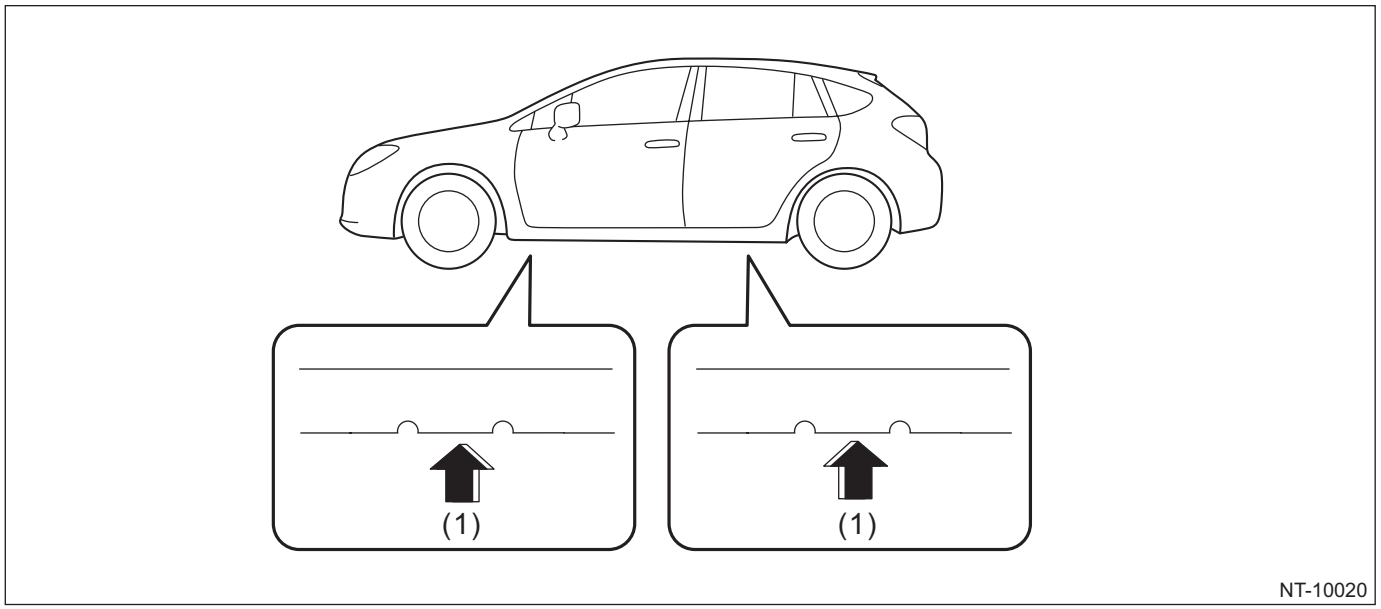


(A) 80 mm (3.1 in) or more
(B) 80 — 100 mm (3.15 — 3.94 in)
(C) 120 — 200 mm (4.72 — 7.87 in)

- Align the cushion rubber center part of plate lift with the center part of rubber attachment.
- Do not use the plate lift whose attachment does not reach the supporting locations.

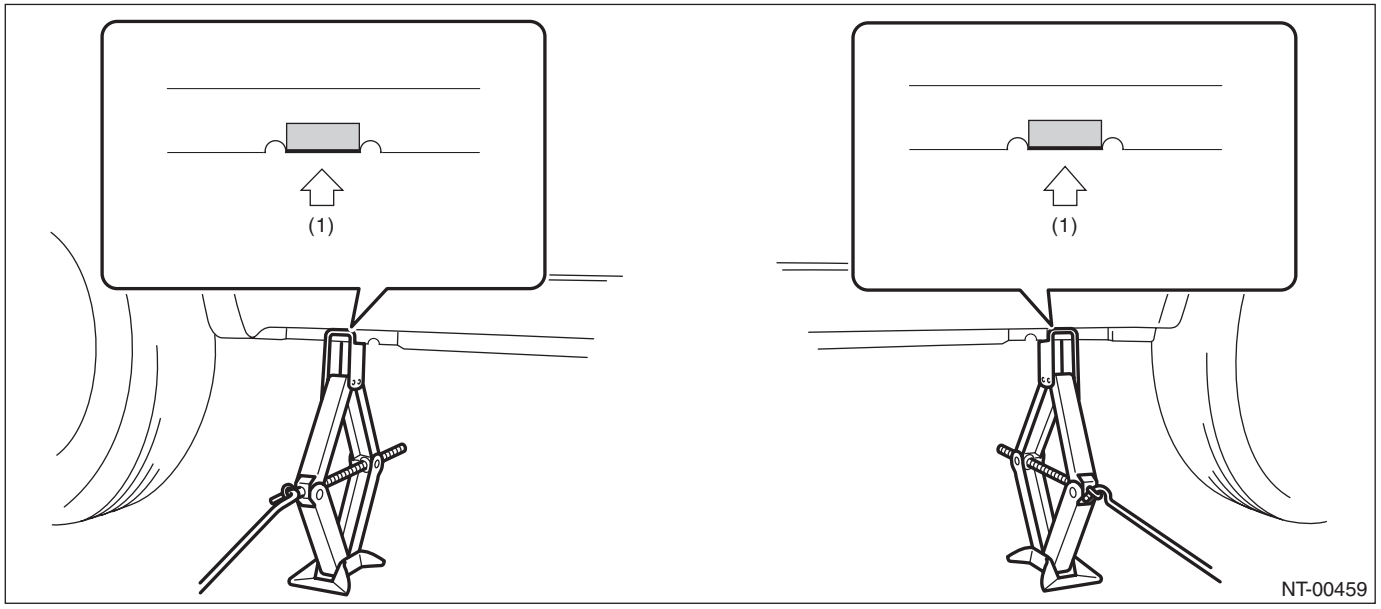
NOTE

- **Support locations**



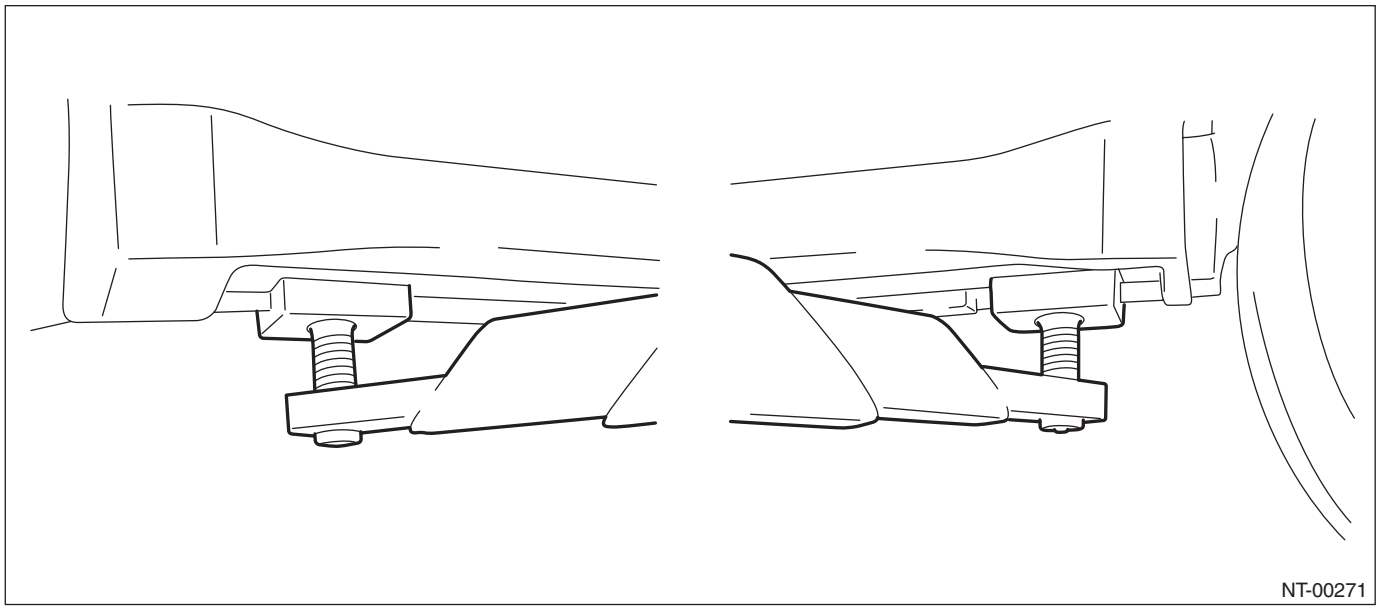
(1) Jack-up point

- **Pantograph jack**



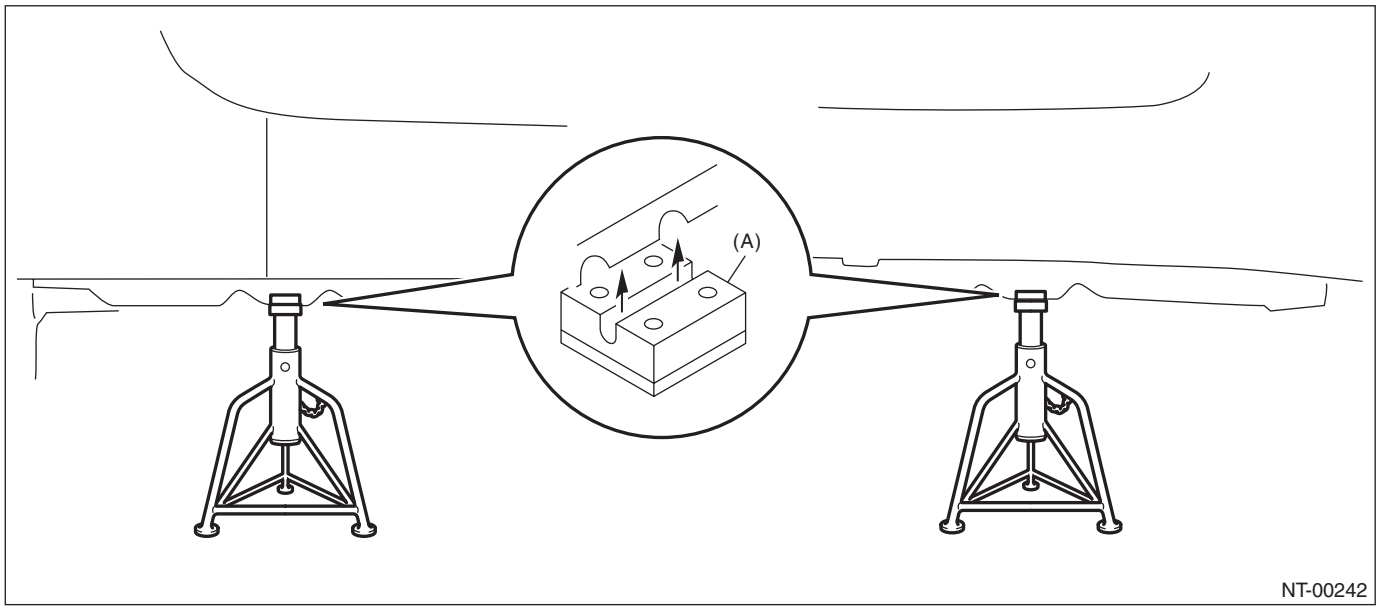
(1) Jack-up point

- **Lift**



CAUTION:
For models with spoiler garnish, use a spacer or an attachment to lift up the vehicle securely at jack up point without the side garnish contacting the lift.

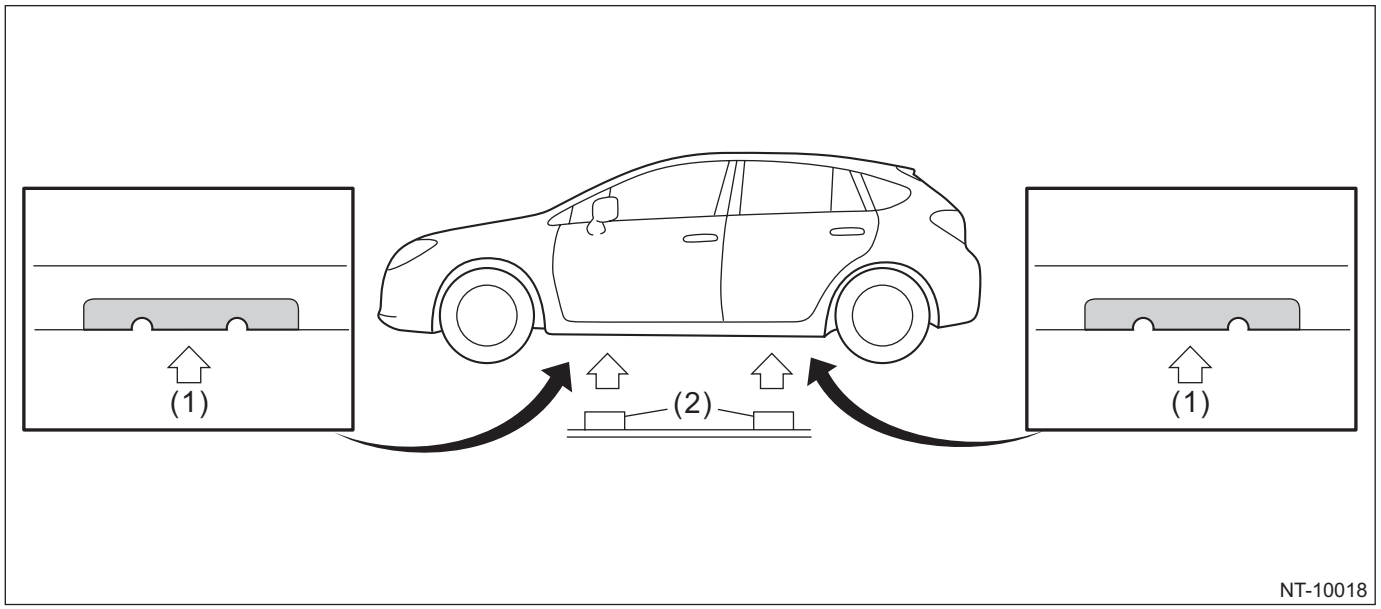
- **Rigid rack**



(A) Attachment

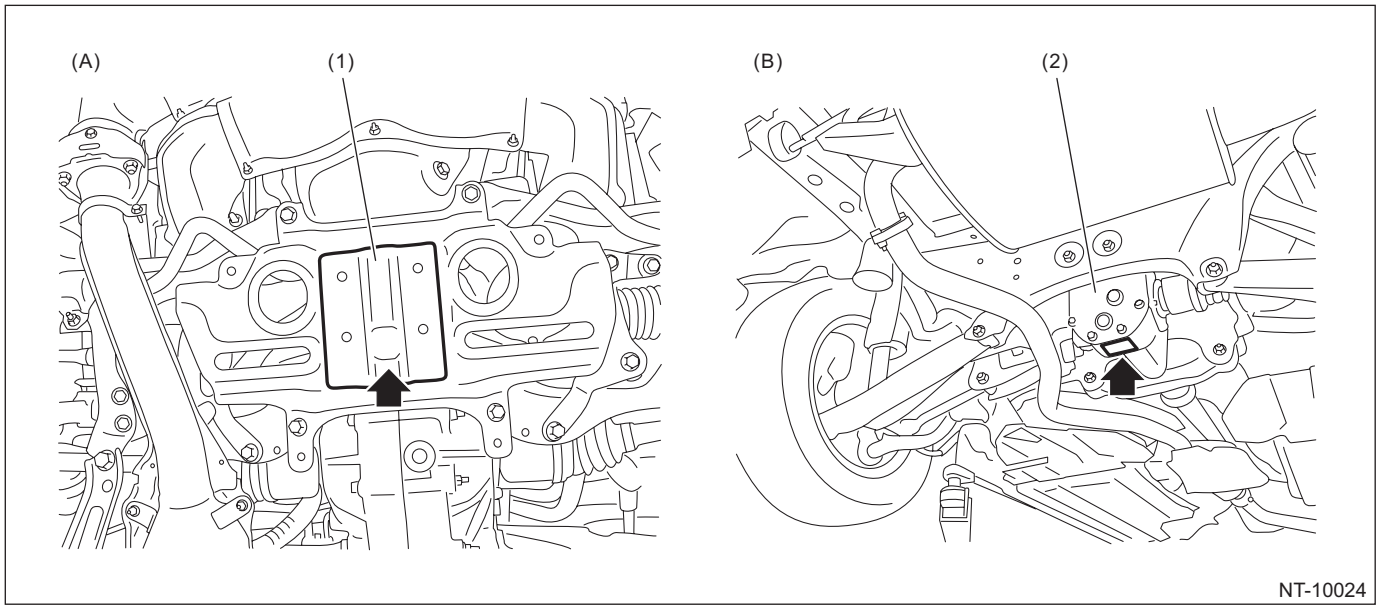
NOTE

- **Plate lift**



(1) Jack-up point (2) Attachment

- **Jack-up point (when using a garage jack)**



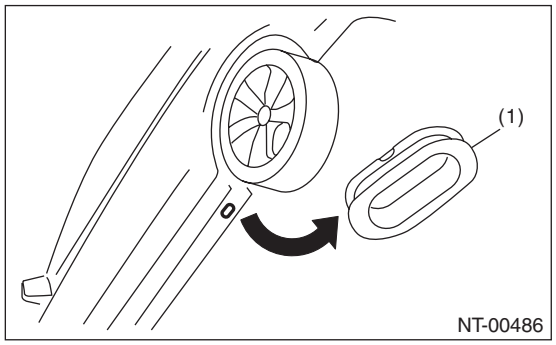
(A) Front (B) Rear

(1) Front crossmember support (2) Rear differential

CAUTION:
If jacking up the front side of the vehicle, make sure that the jack is attached at the center of the jack-up plate not at the sides.

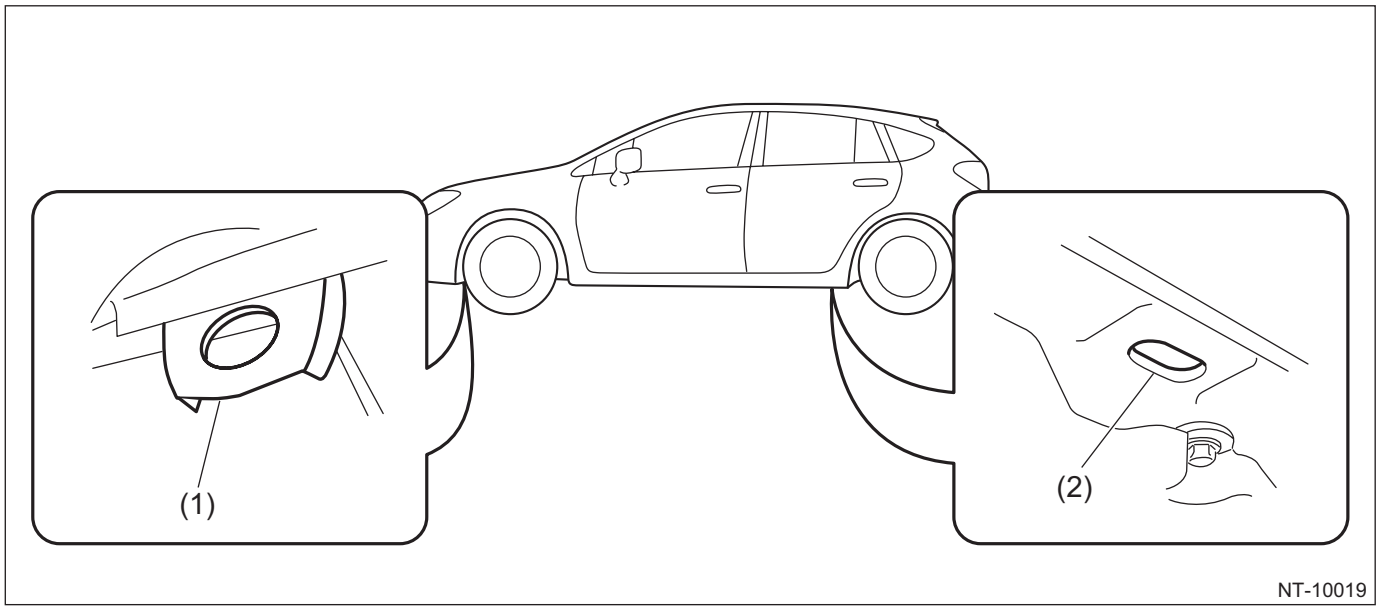
13.TIE-DOWNS

Tie-downs are used when transporting vehicles and when using the chassis dynamo. Remove the grommet of the tie-down hole and install the tie-down only to the specified locations on the vehicle.



(1) Grommet

- **Tie-down location**



(1) Hook for tie-down

(2) Tie-down hole

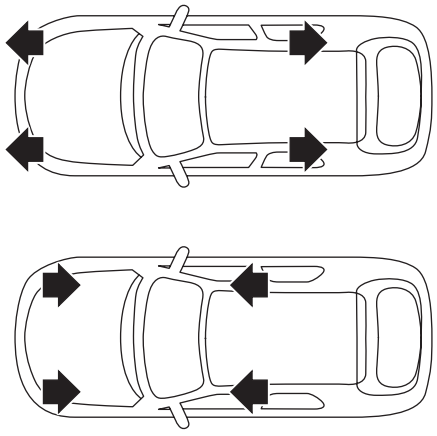
NOTE

• Chain direction at tie-down condition

CAUTION:

• Pull the front and rear of the vehicle in the opposite direction, and pull the left and right of the vehicle in the same direction.

• Patterns except for the followings (recommended) are not allowed.

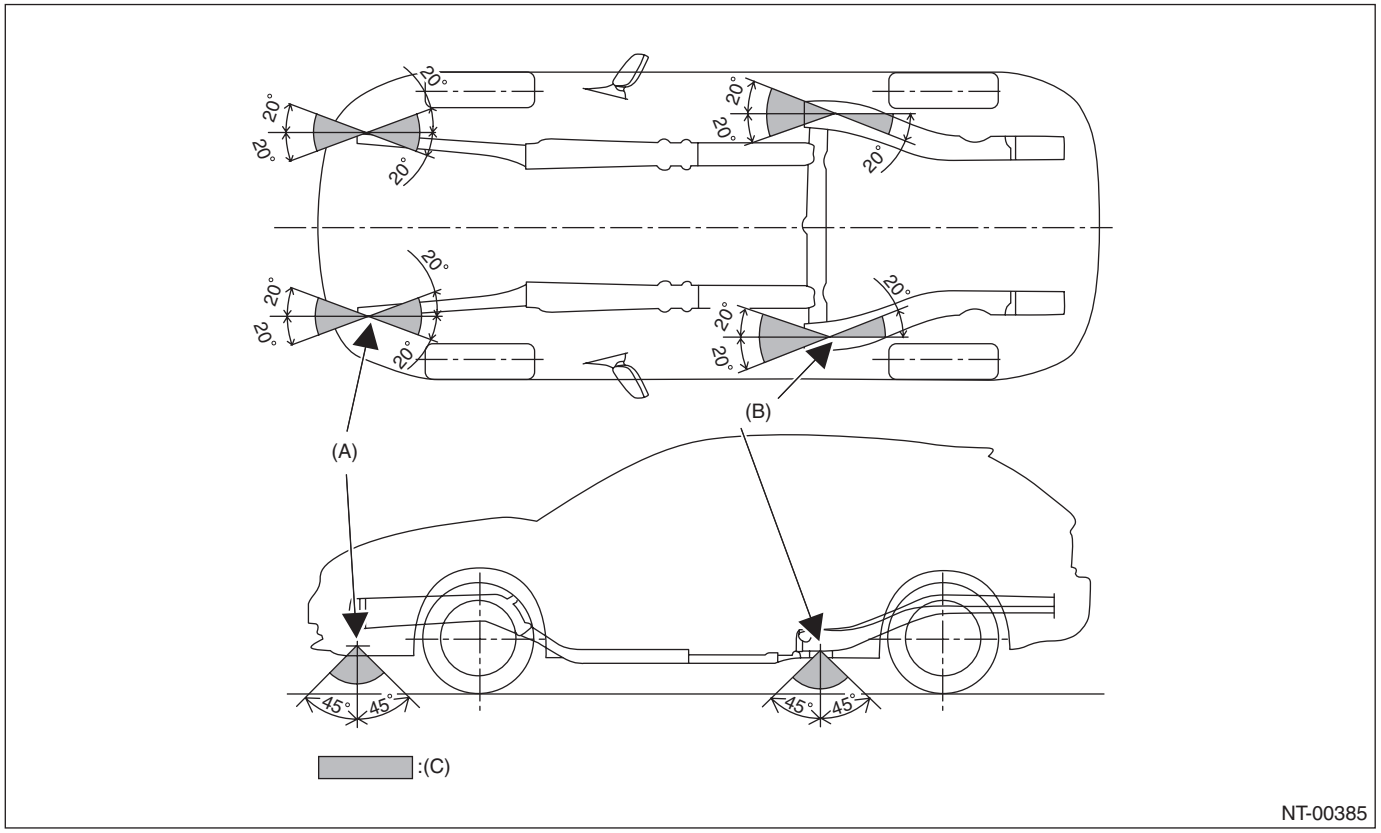
	Recommended
Tie-down direction	 NT-00214

- **Tie-down range**

For ground transportation

CAUTION:

When the vehicle is tied down from vehicle inside, hook the hooks of tie-down chain on the rear tie-down holes from vehicle inside. When the vehicle is tied down from vehicle outside, hook the hooks of tie-down chain on the rear tie-down hooks from vehicle outside.



(A) Front tie-down hook

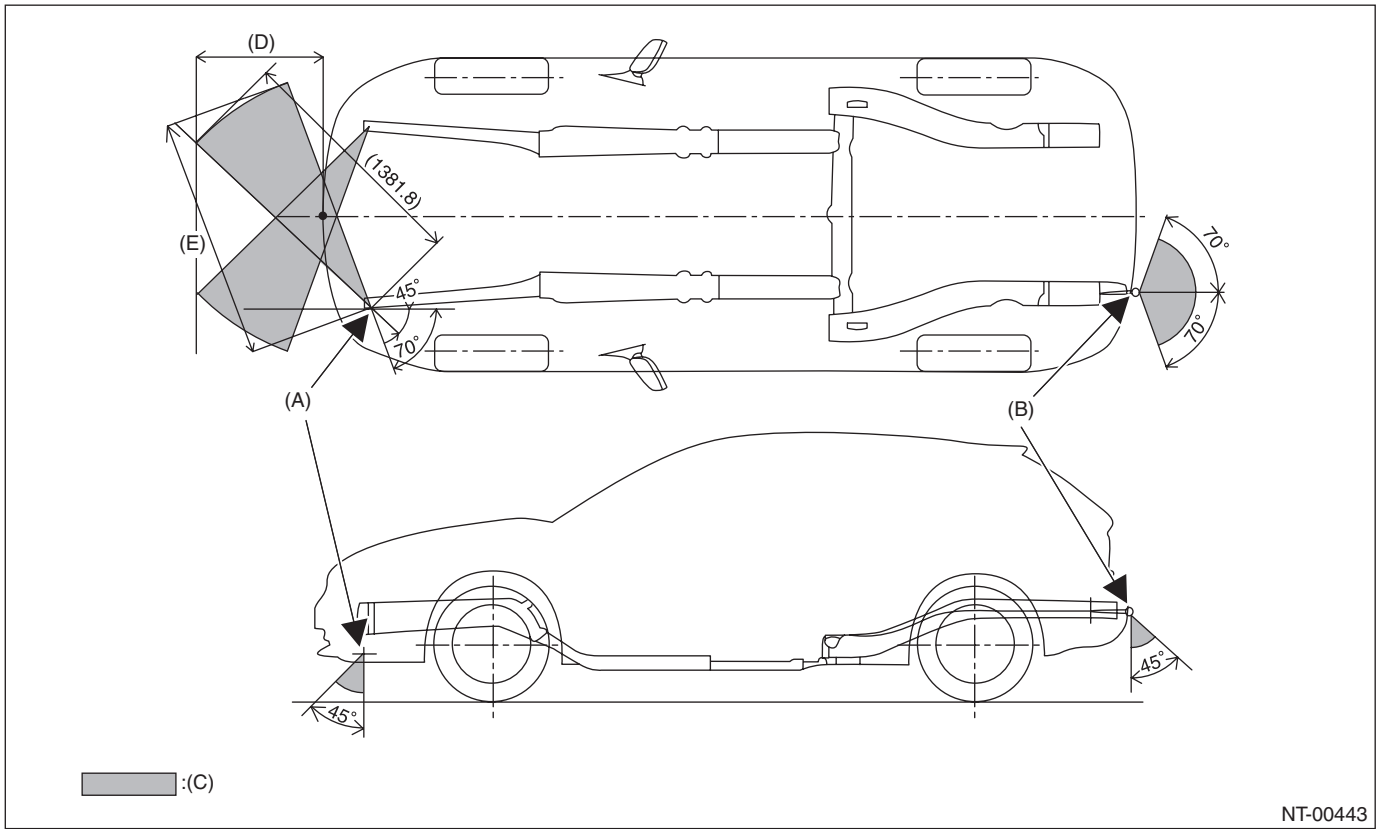
(B) Rear tie-down hole

(C) Chain pulling range at tie-down condition

NOTE

For sea transportation

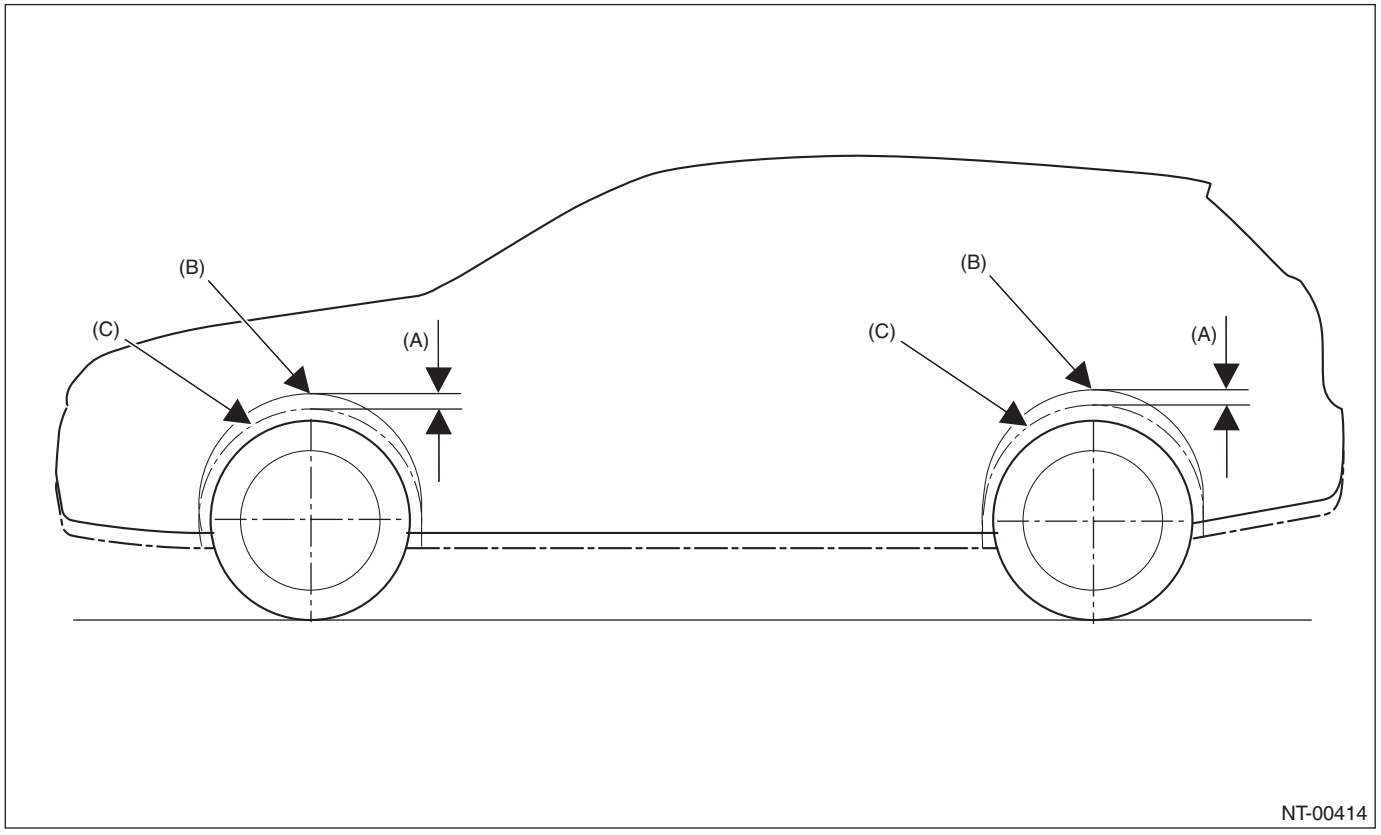
CAUTION:
The eyebolts are exclusively used for towing and sea transportation tie-down, and do not use them for ground and freight transportation.



(A)	Front tie-down hook	(C)	Chain pulling range at tie-down condition	(E)	1,320 mm (52.0 in)
(B)	Eyebolt	(D)	400 mm (15.7 in)		

- **Vehicle sinking volume at tie-down condition**

CAUTION:
The vehicle sinking volume at tie-down condition should be less than 50 mm (1.97 in) and make sure to fix the vehicle securely.
Check to see if the tensions of chains or belts at tie-down condition are appropriate in the following procedures.
1) Before tie-down, measure the distance between the highest tire point and highest arch point at the center of wheel.
2) After tie-down, measure the distance between the highest tire point and highest arch point at the center of wheel.
3) If the distance (A) between the measured value of 1) and 2) above, is less than 50 mm (1.97 in), it is judged as OK. If the distance is 50 mm (1.97 in) or more, it is judged as NG because the tension is too high.



(B) Arch position before tie-down (C) Arch position after tie-down

- **Notes for the use of tie-down hook**

When the vehicle is tied down from vehicle inside, hook the hooks of tie-down chain from vehicle inside, and when the vehicle is tied down from vehicle outside, hook the hooks of tie-down chain from vehicle outside.
For front tie-down hook, use S hook and J hook, and for rear tie-down hole, use S hook, J hook and T hook. T hook can be used only for rear tie-down hole.

NOTE

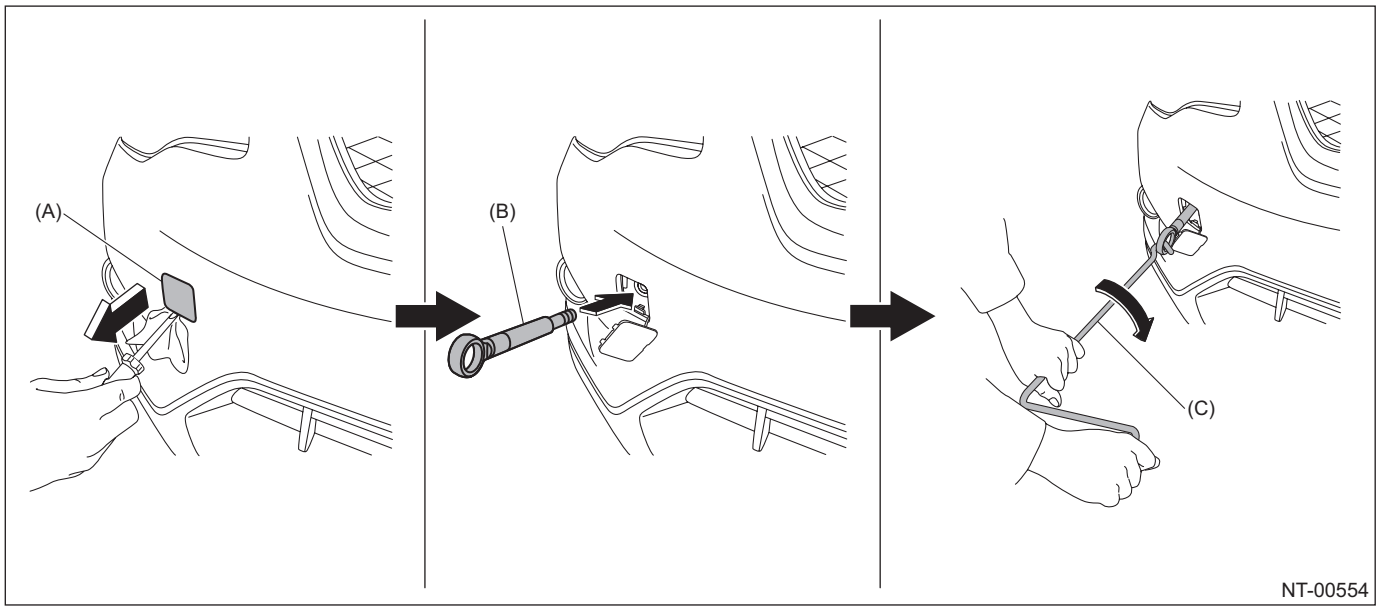
14.TOWING

Avoid towing vehicles except when the vehicle cannot be driven. For models with AWD, CVT or VTD, use a loader instead of towing. When towing other vehicles, pay attention to the following to prevent hook or vehicle damage resulting from excessive weight.

- Do not tow other vehicles with a front tie-down hook.
- Make sure the vehicle towing is heavier than the vehicle being towed.
- When towing the vehicle equipped with Subaru EyeSight, be sure to hold down the pre-collision brake OFF switch to turn OFF the pre-collision brake function. (Check that the pre-collision brake OFF indicator light in the meter lights up.)
- Front

Remove the hook cover, and install the towing hook (eyebolt).

CAUTION:
Make sure to detach the towing hook (eyebolt) after towing. If the hook remains attached, airbag may not operate properly when receiving a shock from front side. And it may also affect the crash performance of the vehicle.



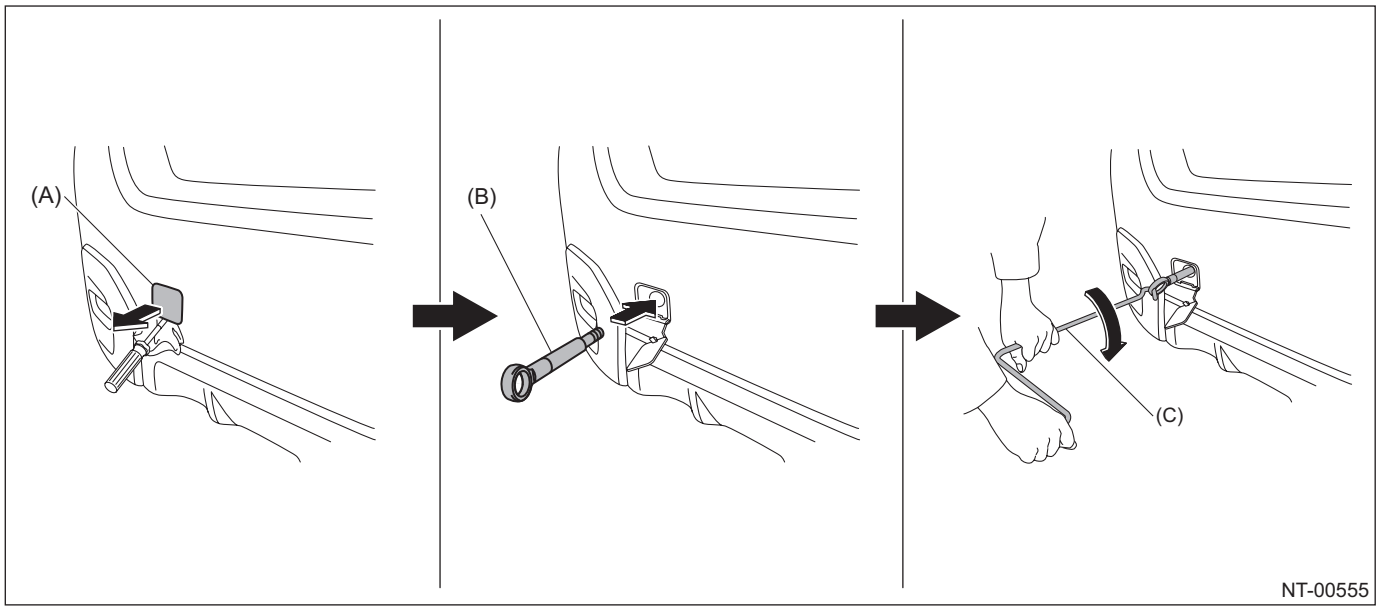
(A) Hook cover (B) Towing hook (eyebolt) (C) Jack handle

- Rear

Remove the hook cover, and install the towing hook (eyebolt).

CAUTION:

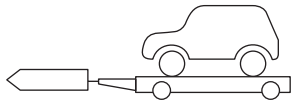
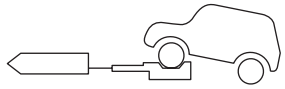
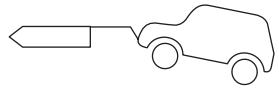
Make sure to detach the towing hook (eyebolt) after towing. If the hook remains attached, the fuel leakage control function of the fuel pump may not operate properly when receiving a shock from rear side. And it may also affect the crash performance of the vehicle.



(A) Hook cover (B) Towing hook (eyebolt) (C) Jack handle

NOTE

- Precautions

Towing	Precautions	MT	CVT
Lifting up four wheels (on a trailer)  NT-00023	Towing the vehicle after lifting up all four wheels is a basic rule for AWD model.	○	○
Rope  NT-00024	• Check if both front and rear wheels are rotated normally. • CVT model driving conditions: Driving speed of 30 km/h (19 MPH) or less Allow driving distance 50 km (31 miles) or less	○	▲
Raising the front wheels  NT-00025	Prohibited for full-time AWD model.	×	×
Lifting up the front wheels  NT-00026	• Prohibited, due to damage on bumper, front grille, etc. • Do not raise the vehicle with bumper.	×	×

Marked ○: OK, Marked ×: Prohibited, Marked ▲: Conditionally OK

CAUTION:
- **Place the shift lever in "N" position during towing.**
- **Do not lift up the rear wheels to avoid unsteady rotation.**
- **Turn the ignition key to "ACC", then check the steering wheel moves freely. (Models without the keyless access with push button start)**
- **Turn the ignition switch to "ACC" or "ON" position, and check that the steering wheel moves freely. (Model with keyless access with push button start)**
- **Release the parking brake to avoid tire dragging.**
- **Since the power steering does not work, be careful for the heavy steering effort. (When engine is stopped)**
- **Since the servo brake does not work, be careful that the brake is not applied effectively. (When engine is stopped)**
- **In case of the malfunction of internal transmission or drive system, lift up four wheels (on a trailer) for towing.**
- **Do not use towing hook (eyebolt) except when towing.**
- **While being towed with all four wheels on the ground, turn the engine switch to ON but do not start the engine.**
- **If the ignition switch is ON while being towed with a rope, the pedestrian alert system may sound. (This is not a malfunction.)**
- **Do not activate the hybrid system.**

15.CARRIER CAR

Before lowering the vehicle from the carrier car, perform the following operations.

CAUTION:
Always perform the following operations before lowering the vehicle from the carrier car. Otherwise, the power unit will rotate reversely, which may cause the damage to the engine, vacuum pump, and transmission.

1) Start the engine.
2) Set the transmission shift position into driving direction of the vehicle. (When the vehicle drives forward, do not set the transmission into R range. When the vehicle drives rearward, do not set the transmission into 1 — 5 speed, or D range.)

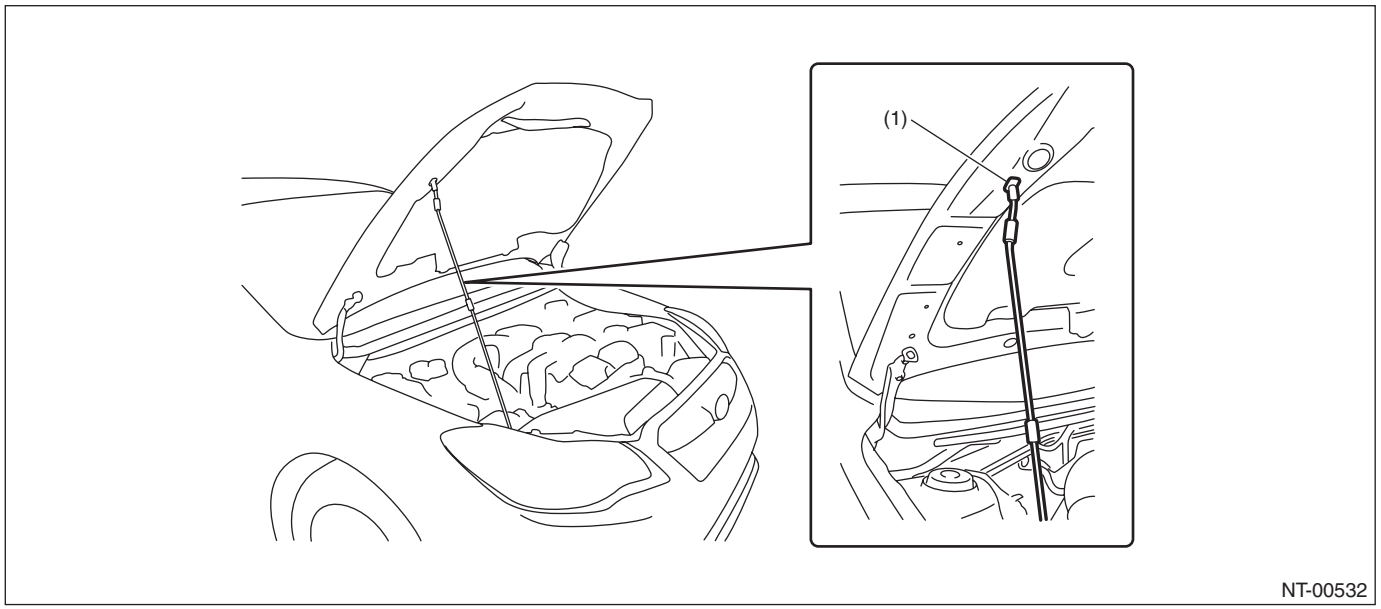
CAUTION:
Be sure to perform 2) mentioned above even if the engine cannot be started in some reasons.

NOTE

16.FRONT HOOD STAY

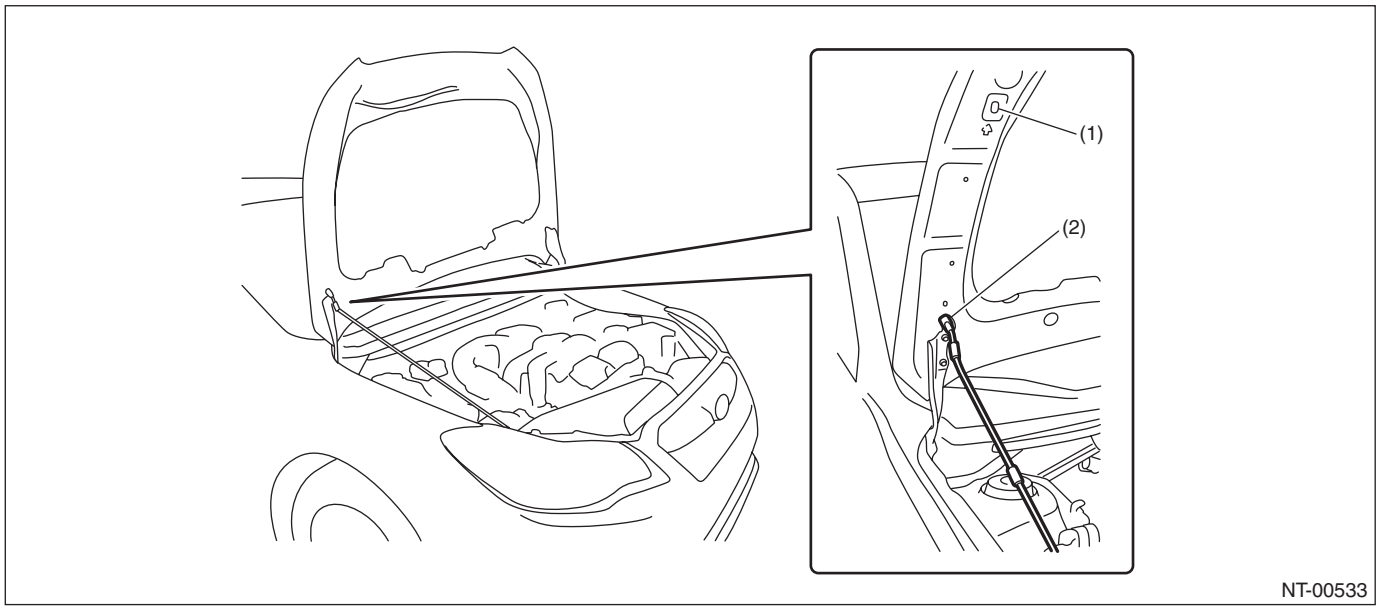
1) Always attach the stay to the normal position when performing works such as inspections and general maintenance.

CAUTION:
- **During the inspection and general maintenance, always be sure to turn the ignition switch to OFF.**
- **At the inspection and general maintenance, do not detach the stay.**



(1) Normal attached position

2) When wider front hood opening is necessary, set the stay to the lower position (hood hinge) as shown in the figure.



(1) Normal attached position (2) Installation position at full open

17.GENERAL SCAN TOOL

Using general scan tools will greatly improve the efficiency of repairing engine electronic throttle controls. Subaru Select Monitor can be used to diagnose the engine, VDC, air conditioner and other parts.

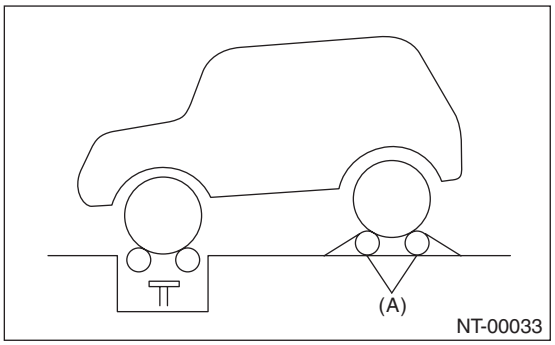
18.AWD CIRCUIT MEASURES

1) Full-time AWD MT model
Since viscous coupling (limited slip differential) is used in the center differential, cut-off of AWD circuit cannot be carried out.
2) Full-time AWD CVT model
Since electronically controlled MP-T hydraulic multi-plate clutch is adapted for center differential, switch to FWD by using Subaru Select Monitor.

19.SPEEDOMETER TEST

1) Rear wheel free roller system
   (1) Set the free roller on the floor of rear wheel side securely according to the wheel base and rear tread of the vehicle.
   (2) Let the vehicle ride on the tester and free roller gently.

CAUTION:
Fix the vehicle using a pulling metal (chain or wire) to the front and rear towing hooks or tie-down hook to prevent the lateral runout of front wheels and springing out of vehicle.



(A) Free roller

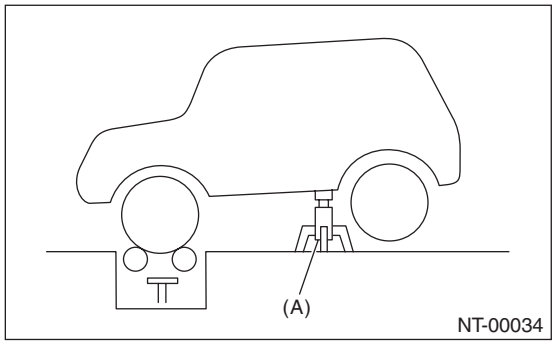
   (3) Set the speedometer tester.
   (4) Conduct the speedometer test work.

CAUTION:
Do not operate the clutch quickly and do not accelerate or decelerate suddenly during work.

2) Rear wheel jack-up system
(1) Set the vehicle on speedometer tester.

CAUTION:
Fix the vehicle using a pulling metal (chain or wire) to the front and rear towing hooks or tie-down hook to prevent the lateral runout of front wheels and springing out of vehicle.

(2) Jack up the rear wheels and set the rigid racks to the specified locations of side sill.



(A) Rigid rack

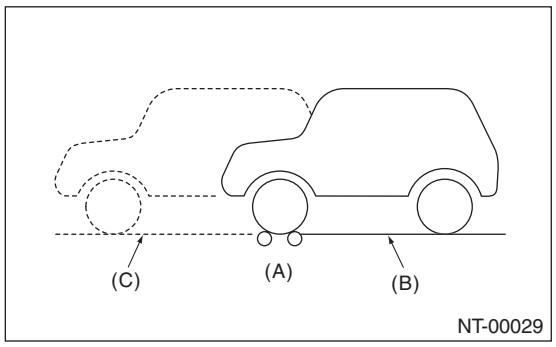
(3) Conduct the speedometer test work.

CAUTION:
Do not operate the clutch quickly and do not accelerate or decelerate suddenly during work.

20.BRAKE TEST

1) Full-time AWD MT model
(1) Perform this test after driving the vehicle 2 to 3 km (1.24 to 1.86 miles) on road in order to stabilize the viscous torque of viscous coupling.
(2) Keep the front or rear wheels on the ground for this test.

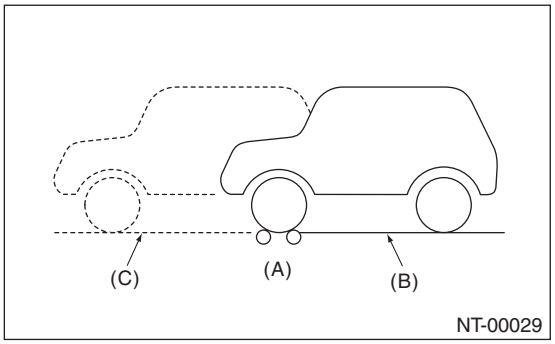
NOTE:
Effect of the viscous torque on braking force will be added approx. 25 kg compared with FWD model.



(A) Brake tester
(B) Position for measuring front wheel
(C) Position for measuring rear wheel

(3) When the brake dragging force is large.
- Check the dragging of brake pad or brake shoe.
- Since it may be affected by the viscosity of viscous coupling, jack up either of the front or rear two wheels to check the each wheel rotation condition with the viscous coupling affection removed.

2) Full-time AWD CVT model
(1) Keep the front or rear wheels on the ground during measurement.



(A) Brake tester
(B) Position for measuring front wheel
(C) Position for measuring rear wheel

(2) When the brake dragging force is large.
• Check the dragging of brake pad or brake shoe.

Specifications:

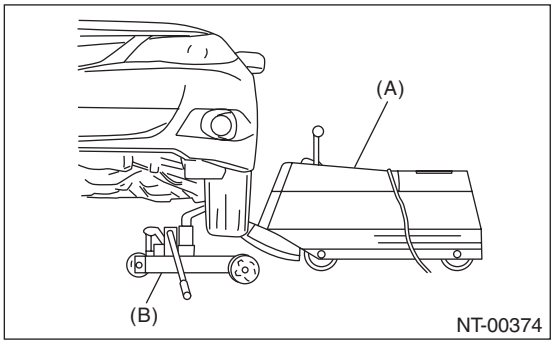
	Braking force
Rear wheel total	10% or more of load on front or rear wheels
Difference between right and left wheels	8% or less of load on front or rear wheels
Grand total	50% or more of vehicle weight at the time of test

• When measurement is difficult to carry out because both of front wheels are locked, break force measurement in this condition conforms to standard grand total.

21.ON THE CAR WHEEL BALANCING

CAUTION:
- **Carry out the procedures after measuring the balance of each single tire.**
- **Set the vehicle so that the front and rear wheels are the same height.**
- **Make sure that the VDC is deactivated.**
- **Release the parking brake during measurement.**
- **Rotate each wheel by hands, and make sure it rotates without dragging.**
- **Do not operate the clutch quickly and do not accelerate or decelerate suddenly during work.**
- **When an error is indicated during engine drive, do not use the motor drive together.**

1) Set the rigid rack to the specified locations of side sill, jack up the front or rear two wheels of non-measuring side and set the pickup stands to two wheels of measuring side.



(A) Balancer body
(B) Pickup stand (left and right)

2) For drive wheel, drive the tires with engine for measurement.
3) For non-drive wheel, drive the tires from the on the car wheel balancer for measurement.

NOTE

IDENTIFICATION

ID

Page
1. Identification 2

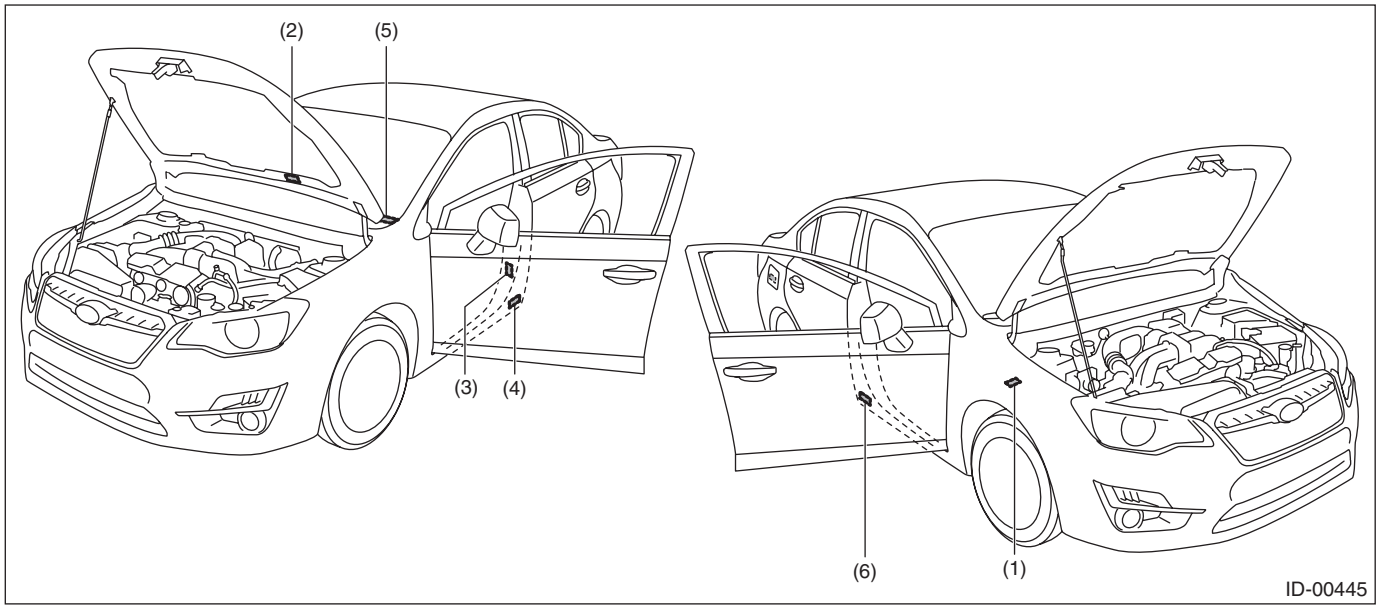
1. Identification

A: IDENTIFICATION

1. IDENTIFICATION NUMBER & LABEL LOCATIONS

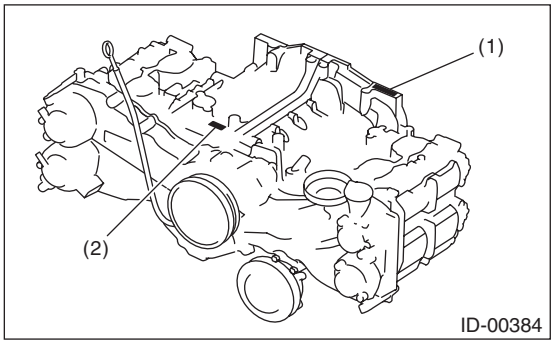
The V.I.N. (Vehicle Identification Numbers) is used to classify the vehicle.

- **Positioning of the label for identification**



(1)	Vehicle identification number (V.I.N.) (below the driver's floor carpet)	(3)	Tire inflation pressure label	(5)	VIN plate
(2)	Emission control label	(4)	FMVSS label (U.S. model) CMVSS label (Canada model)	(6)	Model number label

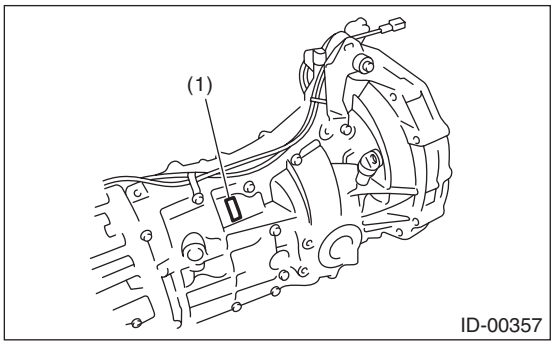
- **Engine**



(1) Engine serial number (punch mark)
(2) Engine type (casting) crankcase upper side

- **Manual transmission**

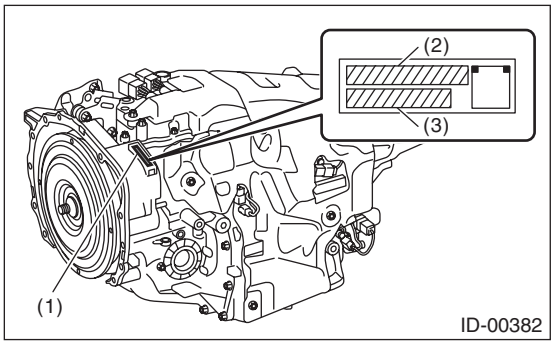
5MT



(1) MT type and transmission serial number label

- **Automatic transmission**

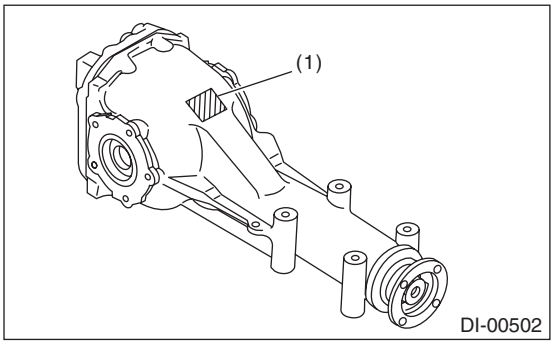
CVT



(1) Label
(2) CVT type label
(3) Transmission serial No. label

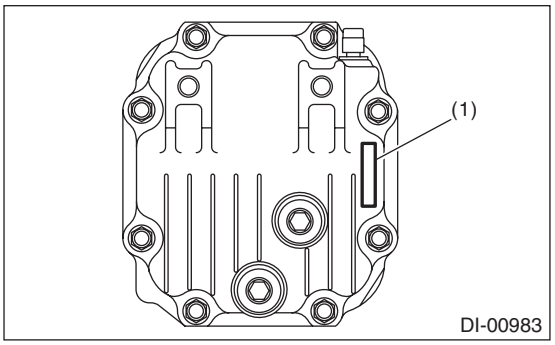
- **Rear differential**

T-type



(1) Identification (white paint)

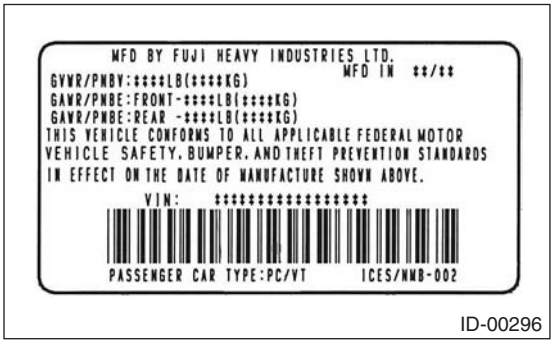
VA1-type



(1) Type (label)

- **MVSS label (except for Crosstrek model)**

For U.S.A.



- **MVSS label (Crosstrek model)**

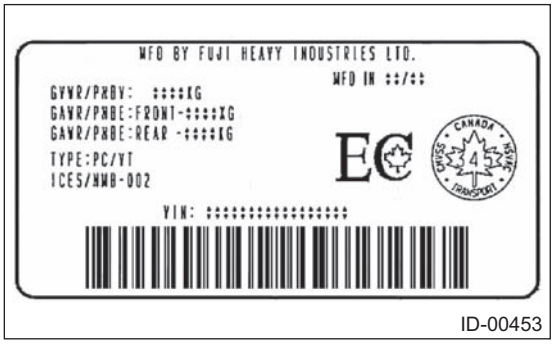
For U.S.A.



ID-00267

- **CMVSS label (except for Crosstrek model)**

For Canada



ID-00453

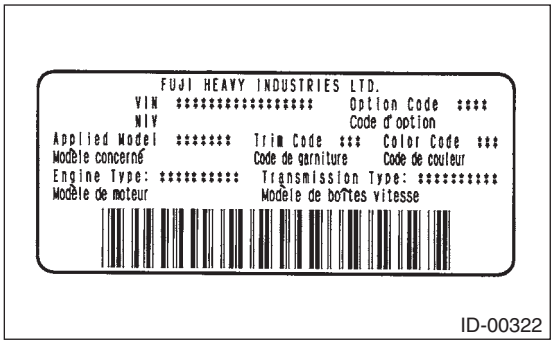
- **CMVSS label (Crosstrek model)**

For Canada



ID-10003

- **Model number label**



ID-00322

2. MEANING OF V.I.N.

The meaning of the V.I.N. is as follows:
]JF1GJAA6XGG002001[
The starting and ending brackets ( ] [ ) are stop marks.

Digits	Code	Meaning	Details
1 — 3	JF1	Manufacturer body area	JF1: Passenger car, FHI made (except for Crosstrek model) JF2: Multipurpose passenger car, FHI made (Crosstrek model)
4	G	Car line	G: IMPREZA, Crosstrek
5	J	Body type	J: 4 door P: 5 door
6	A	Displacement class	A: 2.0 L non-turbo B: 2.0 L HEV
7	A	Grade	A: Base B: Premium C: Premium + Navi D: Premium + EyeSight E: Premium + Navi + EyeSight F: Premium Plus H: Premium Plus + EyeSight K: Limited L: Limited + Navi M: Limited + EyeSight N: Limited + Navi + EyeSight P: Sport S: Sport + EyeSight U: Sport Limited Y: Sport Limited + Navi + EyeSight
8	6	Restraint	6: Manual belts, dual airbag, side airbag for seat back, curtain airbag for roof, driver's knee airbag C: Manual belt, dual airbag, side airbag for seat back, curtain airbag for roof, driver's knee airbag, class C (GVWR 4001 — 5000 lb) (Crosstrek model)
9	X	Check digit	0 — 9 & X
10	G	Model year	G: 2016MY
11	G	Transmission type	G: Full-time AWD single range 5 speed MT (Yajima plant, Gunma) H: Full-time AWD CVT (Yajima plant, Gunma) 8: Full-time AWD CVT (main plant, Gunma) 9: Full-time AWD single range 5 speed MT (main plant, Gunma)
12 — 17	002001	Serial number	002001 — 199999: 4 door 200001 — 399999: 5 door

3. MODEL NUMBER LABEL

The model number label indicates: the applied model, the option code, the trim code, the engine type, the transmission type, and the exterior color code. This information is helpful when placing orders for parts.

GJ7EY4C

Digits	Code	Meaning	Details
1	G	Series	G: IMPREZA, Crosstrek
2	J	Body type	J: 4 door P: 5 door
3	7	Total engine displacement / drive system	7: 2.0 L AWD E: 2.0 L AWD HEV
4	E	Model year	E: 2016MY
5	Y	Destination	Y: U.S., Canada and Mexico
6	4	Grade	4: 2.0 i 5: 2.0 i-Premium 6: 2.0 i-Premium+ 7: 2.0 i-Limited 8: Sport 9: Sport-Limited A: 2.0 i-Premium EyeSight B: 2.0 i-Premium+EyeSight C: 2.0 i-Limited EyeSight D: Sport EyeSight E: Sport-Limited EyeSight F: 2.0 i-Premium (Crosstrek model) G: 2.0 i-Limited (Crosstrek model) J: 2.0 i (Crosstrek model) R: 2.0 i-Premium EyeSight (Crosstrek model) T: 2.0 i-Limited EyeSight (Crosstrek model)
7	C	Fuel feed system / transmission	C: DOHC MFI CVT F: DOHC MFI single range 5MT

The engine and transmission type are as follows.

Engine

FB20BCZA5A

Digits	Code	Meaning	Details
1 and 2	FB	Engine type symbol	FB: 4 cylinder gasoline
3 and 4	20	Displacement	20: 2.0 L
5	B	Valve train/fuel supply system/steering	B: DOHC non-turbo (LH) X: HEV (LH)
6	C	Exhaust regulations	C: For states using California emission standards
7	Z	Intake/exhaust system	Z: Intake AVCS, exhaust AVCS, TGV, EGR
8	A	Mounted transmission	A: 5MT H: CVT
9 and 10	5A	Detailed specifications	Used when ordering parts. For details, refer to the parts catalog.

Transmission (MT)

TY758VD7CA

Digits	Code	Meaning	Details
1	T	Transmission	T: Transmission
2	Y	Transmission system	Y: Full-time AWD MT center differential
3 and 4	75	Distance between gear center	75: Between main shaft and drive pinion
5	8	Classification	8: 5MT
6	V	Transmission specifications	V: Full-time AWD single range 5MT with viscous coupling center differential
7	D	Mounted engine	D: 2.0 L DOHC non-turbo
8 — 10	7CA	Detailed specifications	Used when ordering parts. For details, refer to the parts catalog.

Transmission (CVT)

TR580GD8AA

Digits	Code	Meaning	Details
1	T	Transmission	T: Transmission
2	R	Transmission system	R: Full-time AWD CVT H: HEV Full-time AWD CVT
3 and 4	58	Distance between pulley centers	58: Between pulley centers
5	0	Classification	0: CVT A: MA1
6	G	Transmission specifications	D: With Auto Start Stop, with CVTF cooler (with warmer feature), without CVTF cooler (air cooler) G: Without Auto Start Stop, with CVTF cooler (with warmer feature), without CVTF cooler (air cooler)
7	D	Mounted engine	D: 2.0 L DOHC non-turbo
8 — 10	8AA	Detailed specifications	Used when ordering parts. For details, refer to the parts catalog.

Rear differential

Identification	Reduction gear ratio	LSD
XD	3.700	None
T2	4.111	None
TP	4.444	None

Option code

MB

- 1-digit number

	E	H	M	P	Q	R	S	T	V	2	3
Aluminum wheel	○	○	—	○	○	○	○	○	○	○	○
Keyless access with push button start	○	—	—	—	—	—	○	○	—	—	—
Auto A/C	○	○	—	○	○	○	○	○	—	—	—
Manual A/C	—	—	○	—	—	—	—	—	○	○	○
Leather package	○	○	—	—	○	○	○	○	—	○	—
Genuine leather seat	○	○	—	—	○	—	○	—	—	—	—
High grade audio	—	—	—	—	—	—	—	—	—	—	—
Navigation system	○	○	—	—	—	—	—	—	○	—	—

- 2-digit number

	A	B	C	E	P	R	S	U	Y
Side airbag	○	○	○	○	○	○	○	○	○
Curtain airbag	○	○	○	○	○	○	○	○	○
HID headlight	—	—	—	—	—	○	—	○	○
Cold weather package	—	—	○	○	○	○	○	○	—
Privacy glass	○	—	—	○	—	—	○	○	—
Sunroof	—	—	—	—	○	○	○	○	○

RECOMMENDED MATERIALS

RM

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1. Recommended Materials 2

1. Recommended Materials

A: RECOMMENDED MATERIALS

1. GENERAL

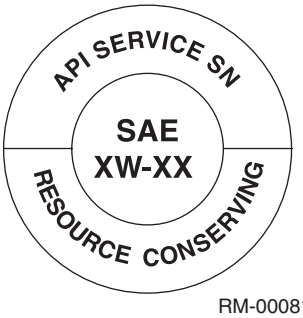
To insure the best performance, always use the specified oil, gasoline, adhesive, sealant, etc. or a substitute of equivalent quality.

2. FUEL

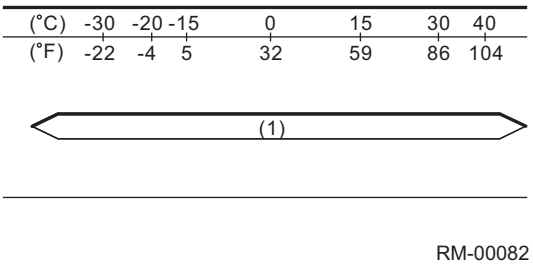
- Use unleaded gasoline because using leaded gasoline will cause a malfunction.
- Do not use the low quality gasoline, or improper fuel such as diesel fuel, fuel alcohol, or gasoline additive because they will adversely affect on engine components and fuel system components.
- Always use gasoline that is equivalent to that prescribed in the owner's manual or that of high octane value. There is the possibility of damaging or improper operation of the engine and fuel injection system if the specifications are not observed. Use the prescribed gasoline type to maintain proper vehicle performance.

3. LUBRICANTS

Use the lubricants shown in the table below, or equivalent. See the table below to choose the correct SAE viscosity.

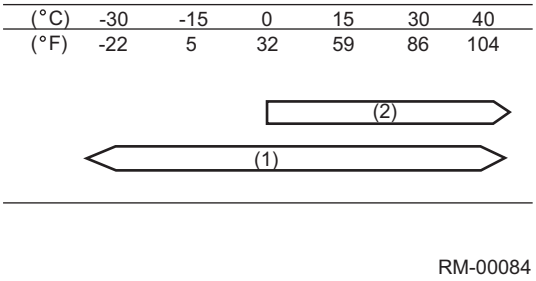
<table>
<tr><td rowspan="2">Lubricant</td><td colspan="2">Recommended materials</td></tr>
<tr><td colspan="2">Engine oil standard</td></tr>
<tr><td>Engine oil
Choose oil suitable for the standard from the right.</td><td>

RM-00081
Those with SN "Resource Conserving" logo in case of API standard.</td><td>or


RM-00002
Those with GF-5 "starburst mark" displayed on top of the container in case of ILSAC standard.</td></tr>
<tr><td colspan="3">SAE viscosity No. and applicable temperature</td></tr>
<tr><td colspan="3">

RM-00082
(1) 0W-20 (synthetic oil) Specified</td></tr>
</table>

Lubricant	Recommended materials
	API standard
Rear differential gear oil*	GL-5
SAE viscosity No. and applicable temperature	



(1) 75W-90 (recommended)
(2) 90

*

CAUTION:
Do not mix two different kinds or makes of gear oil.

4. FLUID

Use the fluids specified in the table below. Do not mix two different kinds or makes of fluid.

CAUTION:
• Be sure to use the recommended CVTF. Using material except recommended one would cause trouble.
• If an alternative transmission gear oil is used, you may not have expected functionality and performance.

Fluid	Recommended materials	Item number	Alternative
Transmission fluid	SUBARU CVT FLUID LINEARTRONIC II	K0425Y0711	—
Transmission gear oil	SUBARU GEAR OIL EXTRA MT	—	GL-5 (75W-90)
CVT front differential gear oil	SUBARU GEAR OIL EXTRA MT	—	GL-5 (75W-90)
Brake fluid and clutch fluid	FMVSS No. 116 DOT3, or DOT4	—	—

5. ENGINE COOLANT

Use genuine engine coolant to protect the engine.

Engine coolant	Recommended materials	Item number	Alternative
Coolant	SUBARU SUPER COOLANT (Concentrated type)	—	—
	SUBARU SUPER COOLANT (Diluted type)	K0670Y0001	
Water for dilution	Distilled water	—	Soft water or tap water
Cooling system protective agent	Cooling system conditioner	SOA345001	—

6. REFRIGERANT

Standard air conditioners on Subaru vehicles use HFC134a refrigerant. Do not mix it with other refrigerants. Also, do not use any air compressor oil except for DH-PR (ZXL200PG).

Air Conditioner	Recommended materials	Item number	Alternative
Refrigerant	HFC134a	—	—
Compressor oil	DH-PR (ZXL200PG)	—	—

7. GREASE

Use grease and supplementary lubricants shown in the table below.

Grease	Application point	Application point	Recommended materials (Item number)	Alternative
Supplementary lubricants	Exhaust	Oxygen sensor	Spray type lubricant (004301003)	—
Grease	MT	MT main shaft (spline parts)	NICHIMOLY N-130	—
		MT main shaft (oil seal lip)		
		Transfer driven gear (front roller bearing, rear roller bearing)		
		Clutch operating cylinder		
		Clutch release bearing (inner circumference)		
		Clutch release lever		
		Clutch master cylinder push rod	SILICONE GREASE G-40M	—
		Gear shift lever	NIGTIGHT LYW No. 2 grease	—
		Clutch pedal		
	Brake	Brake pedal		
	CVT	Select lever	Multemp D	—
	Door	Door latch	SILICONE GREASE G-30M (004404002)	—
		Door striker		
	Steering	Steering gearbox	Multemp AC-P	—
	Brake	Disc brake (lock pin, guide pin)	NIGLUBE RX-2 (000041000)	—
		Brake pad clip	Molykote M7439 (K0770YA000)	—
		Between front brake pad and shim	Molykote AS-880N (K0777YA010)	—
		Between rear brake pad and shim	WAKO grease V160	—
		Brake shoe (parking brake)	Molykote 44MA	—
	Drive shaft	Front axle AAR	One-Luber GKN-C	—
		Front axle AC	Olistamoly 2LN584/Lo	—
		Front axle PTJ	NKG302	—
		Front axle EBJ	NKG814	—
		Rear axle BJ (Crosstrek model)		
		Rear axle DOJ (Crosstrek model)		
		Rear axle EBJ		
		Rear axle DOJ		
		Rear axle BJ	Raremax LF-G	—
		Rear axle DOJ		

8. ADHESIVE

Use the adhesives shown in the table below, or equivalent.

Adhesive	Application point	Application point	Recommended materials	Alternative
Adhesive	Glass and body	Windshield glass, rear window glass, rear quarter glass, rear gate glass and body	• Dow Automotive's adhesive: ESSEX U-400HV or the equivalent • Glass primer: U-401 and U-402 • Painted surface primer: U-413	—

9. SEAL MATERIAL

Use the seal material shown in the table below, or an alternative.

Seal material	Application point		Application point	Recommended materials (Item number)	Alternative
Seal material	Engine		Oil pressure switch	THREE BOND 1324 (004403042)	—
			PCV valve		
			Engine oil pan	THREE BOND 1217G (K0877Y0100) THREE BOND 1217H	—
			Separator cover		
			Camshaft cap		
			Cylinder block		
			Rocker cover		
			Chain cover		
			Oil pan upper		
			Cylinder head		
			Cylinder head gasket		
			Camshaft carrier		
			Camshaft bearing cap		
	MT		MT transmission case	THREE BOND 1215B	DOW CORNING No. 7038 THREE BOND 1215 (004403007)
			MT transfer case		
	CVT		CVT extension case		
			CVT transmission case		
			CVT motor case (HEV model)		
			CVT drive pinion retainer		
			CVT oil pump chain cover		
			Transmission oil pan	THREE BOND 1217B (K0877YA020)	—
	Steering		Steering adjusting screw	THREE BOND 1111B	—
	Door	Front	Sealing cover	3M Butyl Tape 8626	—
		Rear			
	Rear differential	VA-type	Drive pinion shaft and self-locking nut (seating face)	THREE BOND 1324 (004403042)	—
			Hypoid driven gear bolt		
		T-type	Drive pinion shaft and self-locking nut (seating face)		
			Hypoid driven gear bolt		
			Filler plug, drain plug	THREE BOND 1105 (004403010)	DOW CORNING No. 7038
			Side retainer bolt	THREE BOND 1110F	THREE BOND 1110B

PRE-DELIVERY INSPECTION

PI

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1. Pre-delivery Inspection 2

1. Pre-delivery Inspection

A: GENERAL DESCRIPTION

The purposes of the pre-delivery inspection (PDI) are as follows.
- Remove the additional parts used for ensuring the vehicle quality during transportation.
- Check the vehicle or parts before delivery for any damage occurred during transportation or storage.
- Check that the vehicle after repair does not have any problems.
- Make sure to provide a complete vehicle to customer.

For above reasons, SOA service centers must carry out the PDIs before delivery of vehicle.
Besides, all SOA service center and PDI center check the condition of all vehicles to make sure to take responsibility.

B: PRE-DELIVERY INSPECTION (PDI) PROCEDURE

Perform the procedures indicated in the table below.
Static checks just after vehicle receipt

Item	Check point
1. Appearance	1. If the vehicle is covered with protective coating, visually check the vehicle body for damage and dents. If the protective coating has been removed, visually check the painted body surfaces in detail for damage or rust. 2. Visually check the glass and light lenses for any damage, cracks or excessive gaps between body sheet metal. 3. Visually check the plated parts for any damage. 4. Check the instrument panel, console and trim for stains or dirt.
2. Tire	1. Check the tires for damage, defective, and dents on wheels. 2. Check the tire air pressure.
3. Fuse installation	If the vehicle is about to be delivered to customer, attach a back-up fuse.
4. Door lock/unlock and open/close operations	1. Using the key, check the door can be locked or unlocked normally. 2. Open and close all doors to check that there are no problems. 3. Operate the power door lock switch to check that all doors and the rear gate lock and unlock normally.
5. Child safety lock	Check the child safety lock system operates normally.
6. Trunk lid open/close operations	1. Operate the trunk lock release lever to check that the trunk lid opens normally. 2. Open and close the trunk lid to check that there are no problems.
7. Rear gate lock/unlock and open/close operation	1. Check if the rear gate can be unlocked normally through the emergency hole. 2. Open and close the rear gate to check that there are no problems. 3. Operate the power door lock switch to check that all doors and the rear gate lock and unlock normally.
8. Operation check of trunk lid release lever	Operate the trunk lid release lever to check that the trunk lock is unlocked normally.
9. Fuel lid opener lock release lever	Operate the fuel lid opener to check that the fuel filler lid can be unlocked normally.
10. Towing hook (eyebolt)	At factory shipment, the towing hook (eyebolt) is installed to the rear bumper. Remove the towing hook (eyebolt), store it in the holder.
11. Accessory	Check that the following accessories are equipped. • Owner's manual • Warranty booklet • Maintenance note • Spare key • Key No. plate • Jack • Tool set • Spare tire or puncture repair kit • Towing hook
12. Front hood lock release	Operate the front hood lock release lever to check that the front hood opens normally.

Item	Check point
13. 12 V battery	Check the battery for any abnormal conditions such as rust or traces of battery fluid leaks. (Including 12 volt auxiliary battery and 12 volt engine restart battery)
14. High voltage battery air intake	Check that no dirt or fluid is adhered or mixed in.
15. Brake fluid	Check the brake fluid amount.
16. Engine oil	Check the engine oil amount.
17. Transmission gear oil	Check that the transmission gear oil level is normal.
18. CVTF	Check for leakage of CVTF.
19. CVT front differential oil	Check for leakage of CVT front differential oil.
20. Rear differential gear oil	Check for leakage of gear oil from the rear differential.
21. Engine coolant	Check the engine coolant level.
22. Clutch fluid	Check the clutch fluid amount.
23. Window washer fluid	Check the window washer fluid amount.
24. Front hood latch	Check that the front hood is closed normally and locked securely.
25. Keyless entry system	Check that the keyless entry system operates normally.
26. Keyless access system	Check that the keyless access system operates normally.
27. Alarm system	Check that the alarm system operates normally.
28. Seat	1. Check the seat surfaces for stains or dirt. 2. Check the seat installation conditions and functionality.
29. Seat belt	Check the seat belt installation conditions and functionality.
30. TPMS (U.S. model)	If the display of TPMS warning light does not operate normally, perform the diagnosis by referring to TPMS (Diagnosis).

Checks with the engine running

Item	Check point
31. Grommet installation	Install the grommet on the rear seat to the tie-down hole. (When equipped)
32. Delivery (test) mode	Turn the ignition switch to ON and check that the malfunction indicator light starts blinking.
33. Immobilizer system	1. Check that the engine starts with all keys that are equipped on vehicle. 2. Check that the security indicator light operates normally.
34. Push button start	Using the access key that is equipped on vehicle, operate the push button start function to check engine start and stop operations.
35. Starting condition	Start the engine and check that the engine starts smoothly.
36. Exhaust system	Check that the exhaust noise is normal and no leaks are found.
37. Indicator and warning lights	Check that all indicator lights and warning lights are operating correctly.
38. Heater & ventilation	Check that the heater & ventilation system operates normally.
39. Air conditioner	Check that the air conditioner operates normally.
40. Multi-function display (MFD)	Check that the Multi-Function Display (MFD) function operates normally.
41. Audio	Check the radio and AUX operate normally.
42. Navigation	Check the navigation and AUX operate normally.
43. Telematics system	Check the indicator light of overhead console or stereo camera cover assembly goes off.
44. Accessory power supply socket	Check that the accessory power supply socket operates normally.
45. Lighting system	Check that the lighting system operates normally.
46. Illumination control	Check that the illumination control operates normally.
47. Window washer system	Check that the window washer system operates normally.
48. Wiper system	Check that the wiper system operates normally.
49. Wiper deicer	Check that the wiper deicer operates normally.
50. Power window	Check that the power window operates normally.
51. Sunroof	Check that the sunroof operates normally.
52. Rear defogger system	Check that the rear defogger system operates normally.
53. Door mirror	Check that the remote control mirror and heated mirror operate normally.

Item	Check point
54. Room mirror	Check that the automatic anti-glare function operates normally.
55. Blind Spot Detection / Rear Cross Traffic Alert (BSD/RCTA)	1. Press the BSD/RCTA OFF switch several times to check that the system is activated and deactivated correctly. 2. Check the rear bumper around the sensor for dirt, scratch, affixed stickers and poor paint coating.
56. Diagnostic trouble code (DTC) check	Check that the diagnostic trouble code (DTC) is not detected.

Dynamic test with the vehicle running

Item	Check point
57. Brake test	Check the foot brake for normal operations.
58. Parking brake	Check that the parking brake operates normally.
59. Shift control	Check that the shift patterns are correct.
60. Cruise control	Check that the cruise control system operates normally.
61. Subaru EyeSight	Check that the Subaru EyeSight operates normally.
62. Hybrid system	Check that the hybrid system operates normally.
63. EV mode lamp	Check that the EV mode lamp operates normally.

Checks after dynamic test

Item	Check point
64. Power steering system (electric power steering model)	Check the steering warning light operation.
65. Fluid leakage	Check for fluid/oil leaks.
66. Water leak test	Spray the vehicle with water and check for water leaks.
67. Appearance 2	1. Remove the protective coating (if equipped). 2. Check the body paints for damage and stain. 3. Check the plated parts for damage and rust.

1. APPEARANCE

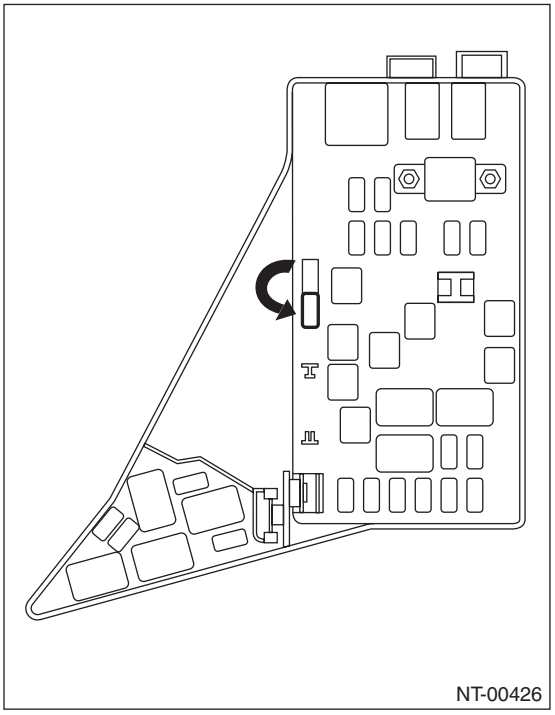
- If the vehicle is covered with protective coating, visually check the vehicle body for damage and dents.
- When there is no protective coating, check the body paints for damage or stains in detail and repair as necessary.
- Check the window glass, door glass, and lights for any cracks or damage, and replace as necessary.
- Visually check the plated parts, such as the grilles and door knobs, for damage or loss of gloss and replace the parts as necessary.
- Check the instrument panel, console and trim for stains or dirt.
- Check the keyless key or access key for dirt, and wipe off if necessary.

2. TIRE

- Check the tires for damage, defective, and dents on wheels.
- Check the tire size, spare tire and tire air pressure described on the tire air pressure label (driver's side).

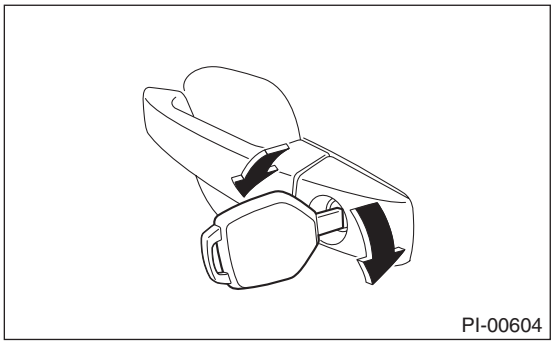
3. FUSE INSTALLATION

Fuses for the back-up circuit on initially delivered vehicles are removed to prevent battery discharge. Attach the 20 A fuse as shown in the figure.

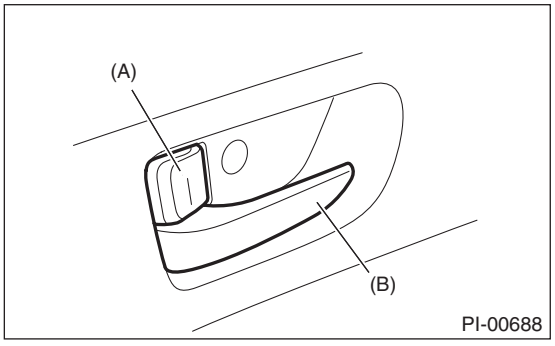


4. LOCK/UNLOCK AND OPEN/CLOSE OPERATION CHECKS OF DOORS

1) Using the key, lock and unlock the door several times to check for normal operation. Open and close the door several times for smooth movement.

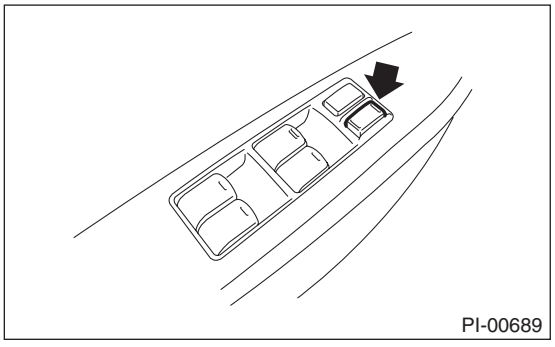


2) Completely close the driver's door, and then check the smooth movement with operating door lock knob from lock to unlock several times. Set the door lock knob (A) to lock position. Then pull the inner remote (B) to ensure that doors will not open.
For other doors, place the door lock knob (A) to lock position and then pull the inner remote (B) to ensure that doors will not open.

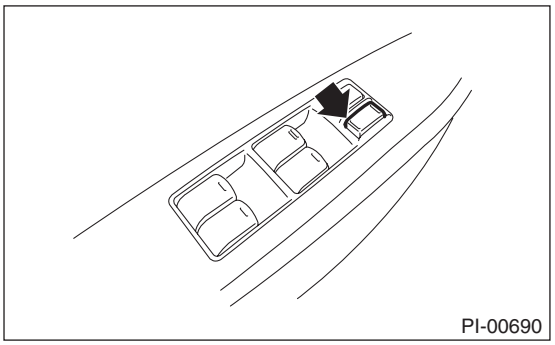


(A) Door lock knob
(B) Inner remote

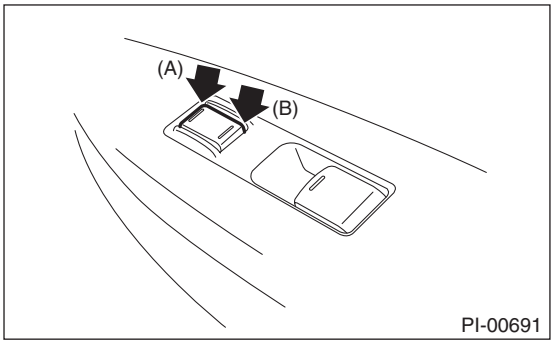
3) Close all the doors, and then press the lock on power door lock switch at driver's side. Check that all doors (including the rear gate) lock.



4) Press the driver's side power door lock switch to unlock side. Check that all doors including rear gate are unlocked.



5) Check that the passenger's power door lock switch locks and unlocks normally in the same manner.



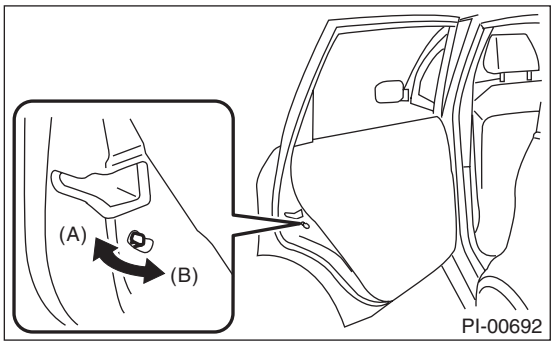
(A) Lock
(B) Unlock

6) Insert the key to ignition switch, and open the driver's side door. Press lock on power door lock. Check that the door is not locked.

5. CHILD SAFETY LOCK

1) Set the child safety lock lever on both rear doors to the lock position.
2) Close the rear doors completely.
3) Check that the lock levers of the rear doors are in the unlock position. Then, pull inner remote of rear doors to ensure that doors will not open.

4) Pull the outer handles to ensure that doors will open.



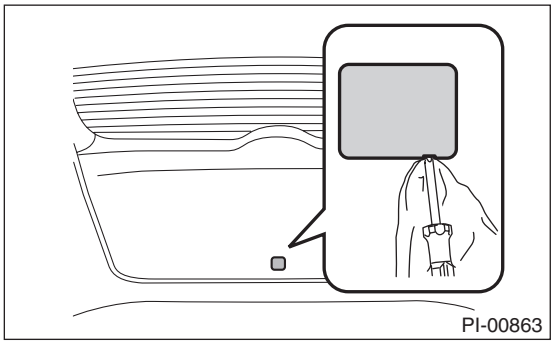
(A) Unlock
(B) Lock

6. TRUNK LID OPEN/CLOSE OPERATIONS

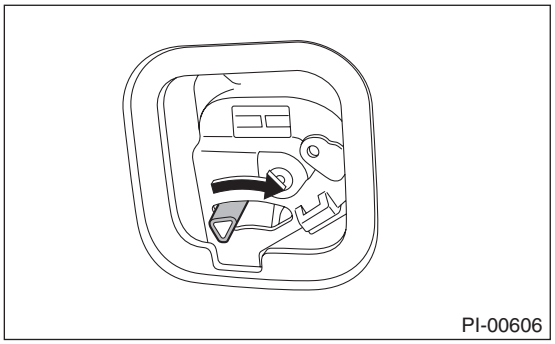
1) Operate the trunk lock release lever to check that the trunk lid opens.
2) Open and close the trunk lid several times for smooth movement.

7. REAR GATE LOCK/UNLOCK AND OPEN/CLOSE OPERATIONS

1) Open and close the rear gate several times for smooth movement.
2) Operate the rear gate emergency release lever to check that the rear gate can be locked and unlocked properly.
(1) Remove the cover inside the rear gate.

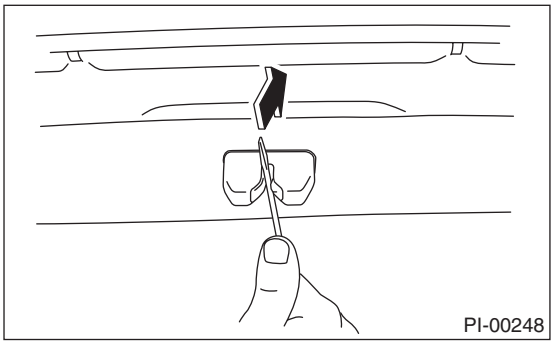


(2) Operate the lever using a tool such as a screwdriver to check that the rear gate is unlocked normally.

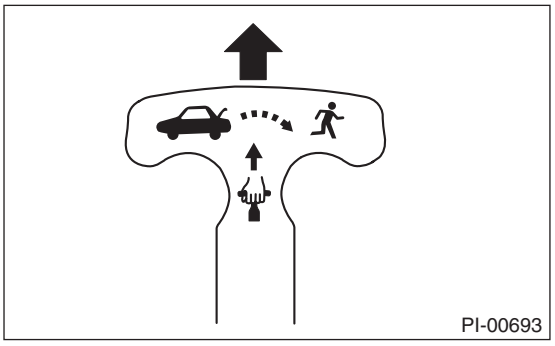


8. OPERATION CHECK OF TRUNK LID RELEASE HANDLE

CAUTION:
Do not check the trunk lid release handle when in the trunk. If the trunk lid release handle is defective, you may be trapped in.
1) Use a flat tip screwdriver. Slide the screwdriver blade from the slit aperture of the lock assembly fully to the end until you hear a click. This places the latch in the locked position.



2) Make sure the latch is released by pulling the yellow trunk lid release handle in the direction of arrow.

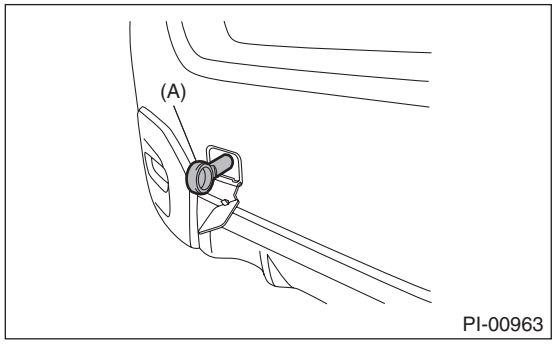


9. FUEL LID OPENER LOCK RELEASE LEVER

Operate the fuel lid lock release lever to check that the fuel lid is unlocked normally. Check that the filler cap is securely closed.

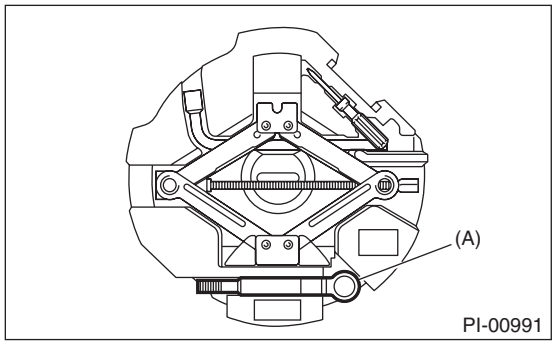
10.TOWING HOOK (EYEBOLT)

NOTE:
At factory shipment, the towing hook (eyebolt) is installed to the rear bumper for securing the vehicle during transportation. Follow the procedure below to store it to the holder in the spare tire or sub-trunk.
1) Remove the towing hook (eyebolt) from the rear bumper.



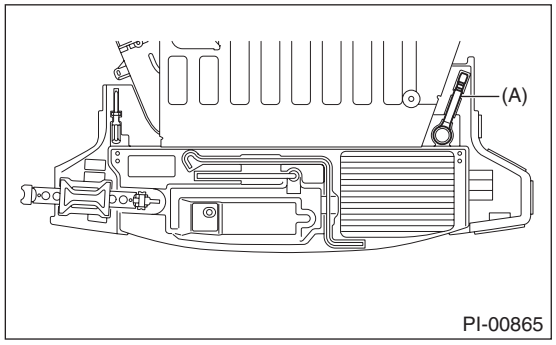
(A) Towing hook (eyebolt)

2) Store the towing hook (eyebolt) to the holder in the spare tire or sub-trunk.
Gasoline engine model



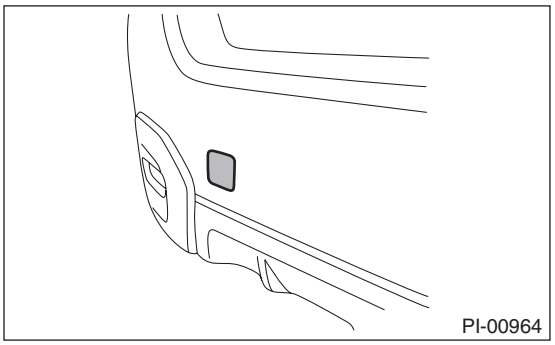
(A) Towing hook (eyebolt)

HEV model



(A) Towing hook (eyebolt)

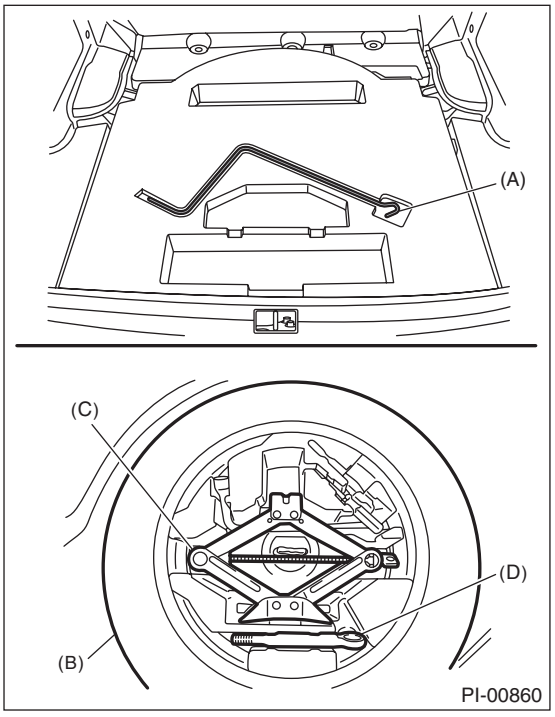
3) Install the supplied rear hook cover to rear bumper.



11.ACCESSORY

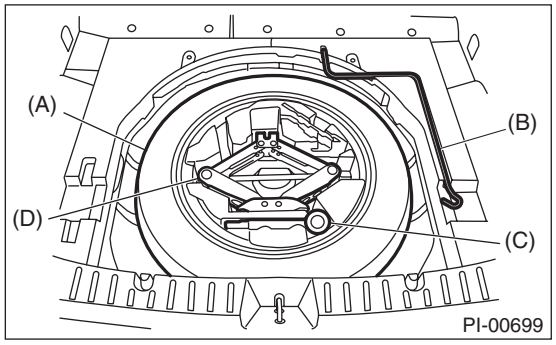
Check that the following accessories are provided.
- Owner's manual
- Warranty booklet
- Maintenance note
- Spare key
- Key No. plate
- Jack
- Tool set
- Spare tire or puncture repair kit
- Towing hook (eyebolt)

4 door



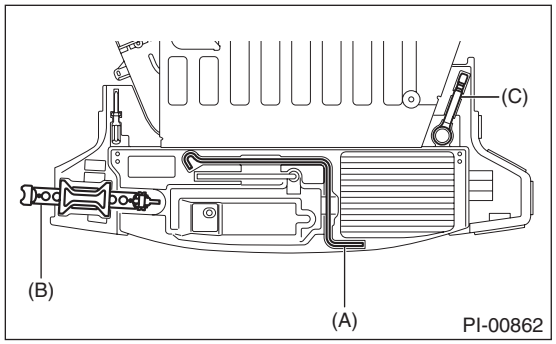
(A) Jack handle
(B) Spare tire
(C) Jack
(D) Towing hook (eyebolt)

5 door

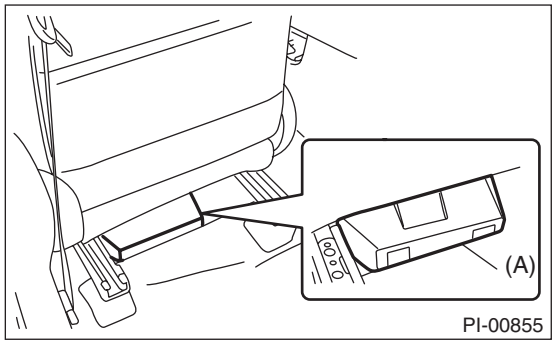


(A) Spare tire
(B) Jack handle
(C) Towing hook (eyebolt)
(D) Jack

5 door (HEV)



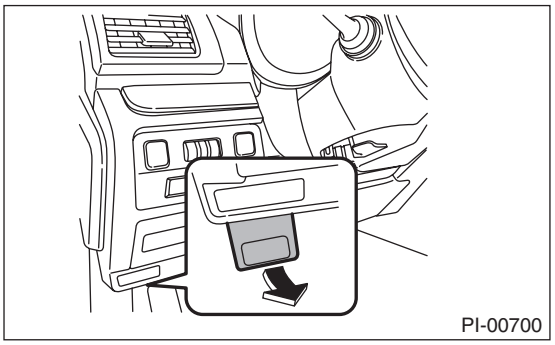
(A) Jack handle
(B) Jack
(C) Towing hook (eyebolt)



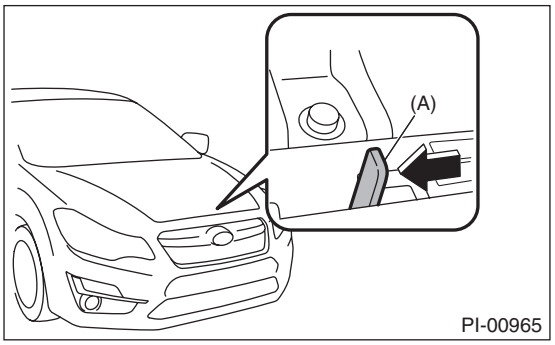
(A) Puncture repair kit (beneath driver's seat)

12.FRONT HOOD LOCK RELEASE

Operate the front hood release lever to check that the front hood is unlocked normally.

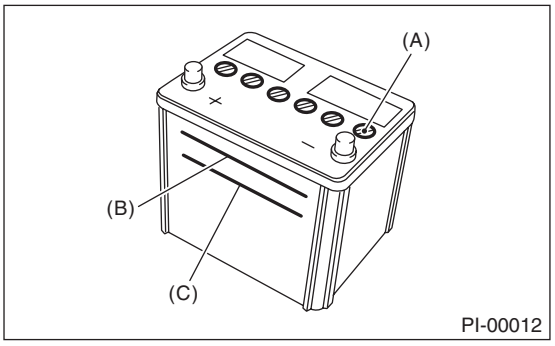


Operate the lever (A) and check that the front hood is opened normally.



13.BATTERY

Check the battery terminals to make sure that there are no rust or corrosions due to fluid leaks. Check that the battery caps are securely tightened. (Including 12 volt auxiliary battery and 12 volt engine restart battery)



(A) Cap
(B) Upper level
(C) Lower level

14.HIGH VOLTAGE BATTERY AIR INTAKE

Check that no dirt or fluid is adhered or mixed in.

15.BRAKE FLUID

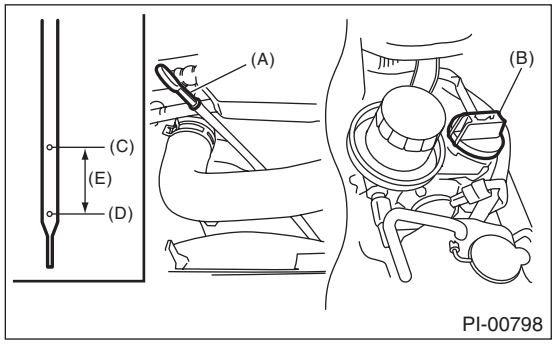
Check the brake fluid amount. If the amount is insufficient, carry out a brake line test to identify brake fluid leaks and check the brake operation. After that, refill the brake fluid tank with the specified type of fluid.

CAUTION:
If the brake fluid is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

16.ENGINE OIL

1) Park the vehicle on a level surface.
2) Remove the oil level gauge and wipe away the oil.
3) Reinsert the oil level gauge all the way. Be sure that the oil level gauge is correctly inserted and properly orientated.
4) Pull out the oil level gauge again, and check both sides of the oil level gauge. Use a lower side to determine the engine oil level. If the engine oil level is below “L” line, add oil to bring the level up to “F” line.
5) Start the engine, and spread the oil in engine room.
6) After turning off the engine, wait a few minutes for the oil to return to the oil pan before checking the oil level.

NOTE:
To prevent overfilling of engine oil, do not add oil above “F” line when the engine is cold.



(A) Engine oil level gauge
(B) Engine oil filler cap
(C) “F” line
(D) “L” line
(E) Approx. 1 L (1.1 US qt, 0.9 Imp qt)

17.TRANSMISSION GEAR OIL

Check the transmission gear oil amount. If the amount of gear oil is insufficient, check for leaks. Then, add the necessary amount of the specified gear oil. Refer to “5MT” section for transmission gear oil inspection. <Ref. to 5MT-22, INSPECTION, Transmission Gear Oil.>

18.CVTF

Check for leakage of CVTF.

CAUTION:
If the CVTF is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

19.CVT FRONT DIFFERENTIAL OIL

Check for leakage of CVT front differential gear oil.

CAUTION:
If gear oil is spilt over the exhaust pipe, wipe it off with a cloth to avoid emitting smoke or causing a fire.

20.REAR DIFFERENTIAL GEAR OIL

Check for leakage of gear oil from the rear differential.

CAUTION:
If the rear differential gear oil is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

21.ENGINE COOLANT

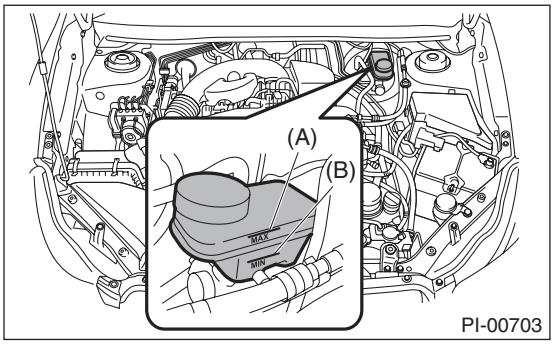
Check the coolant amount on the reservoir. If the amount of engine coolant is insufficient, check that no leaks are found. Then, add the necessary amount of coolant with the specified concentration.

CAUTION:
If the coolant is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

22.CLUTCH FLUID

Check the clutch fluid amount. If the amount of fluid is insufficient, check that no leaks are found. Then, add the necessary amount of specified fluid.

CAUTION:
If any clutch fluid is spilt on the exhaust pipe, wipe it off with a cloth to avoid emitting smoke or causing a fire.

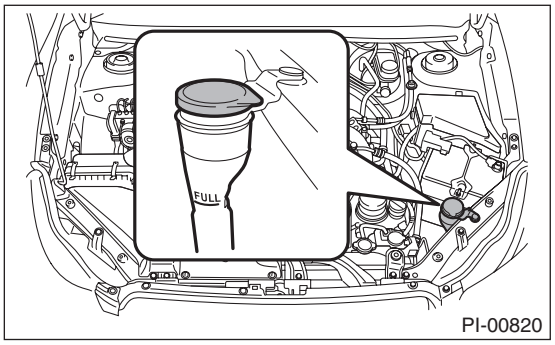


(A) MAX. level
(B) MIN. level

23.WINDOW WASHER FLUID

Check the window washer fluid amount. If the amount of washer fluid is insufficient, check that no leaks are found. Then, add the necessary amount of washer fluid.

NOTE:
If there is the vibration, water comes into the layer of air in the washer tank and the water level may drop. This is not a malfunction.



PI-00820

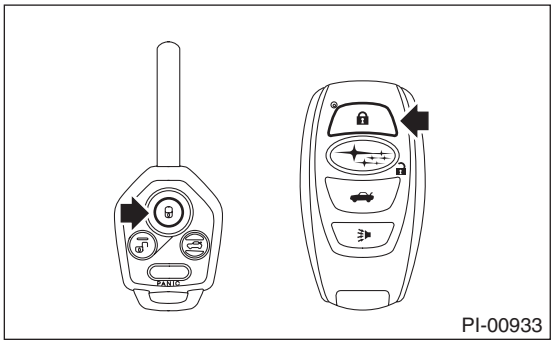
24.FRONT HOOD LATCH

Close the front hood. Check that the front hood is completely latched.

25.KEYLESS ENTRY SYSTEM

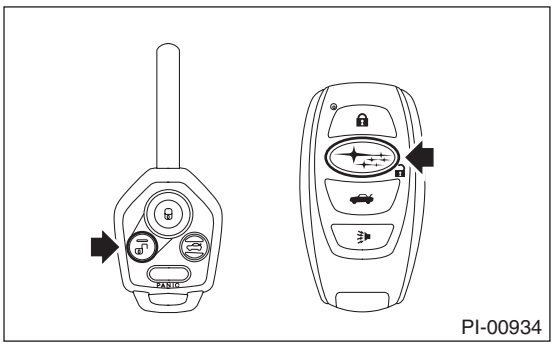
Check the keyless entry system operations as follows:

- Fully open all the door windows.
- Remove the key from the ignition switch and close all the doors including rear gate.
- Press the “LOCK/ARM” button momentarily on the keyless transmitter. Check that all the doors become locked, the buzzer sounds once, and the hazard lights flash once.



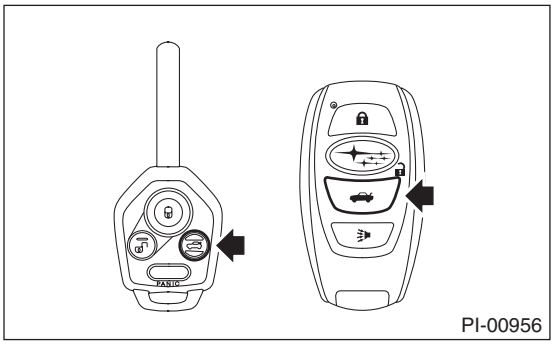
PI-00933

- Press the “UNLOCK/DISARM” button momentarily on the keyless transmitter. Check that the driver’s door is unlocked, the buzzer sounds twice, and the hazard lights flash twice.
- Within 5 seconds, press the “UNLOCK/DISARM” button momentarily on the keyless transmitter. Check that all doors (including rear gate) are unlocked, the buzzer sounds twice, and the hazard lights flash twice.



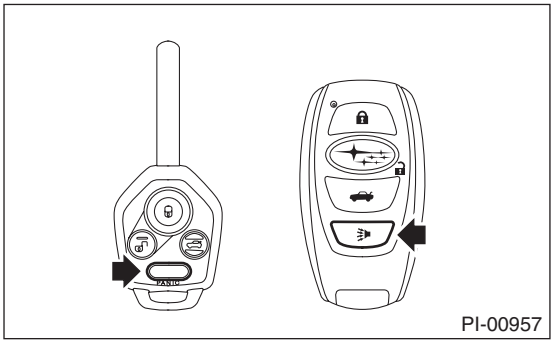
PI-00934

- Lock all the doors including rear gate. Check that the buzzer sounds twice, and the hazard lights flash twice, when the trunk open button is pressed to unlock the rear gate. Press the rear gate opener button and check that the rear gate opens. (Wagon model)
- Check that the buzzer sounds twice, and the hazard lights flash twice, when the trunk open button is held down to unlock the trunk lid. (Sedan model)



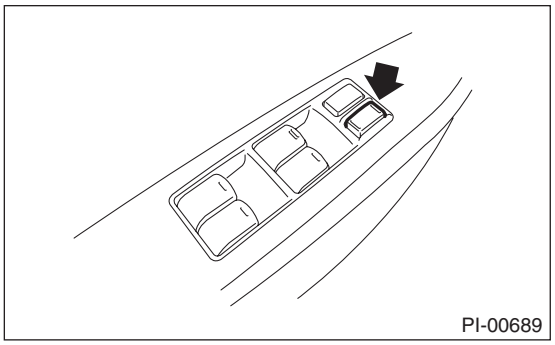
PI-00956

- Press the “PANIC” button of the keyless transmitter. Check that the panic mode (the horn keeps sounding) is initiated. Also, check that this condition continues for 30 seconds or until when any of the buttons on the keyless transmitter are pressed.

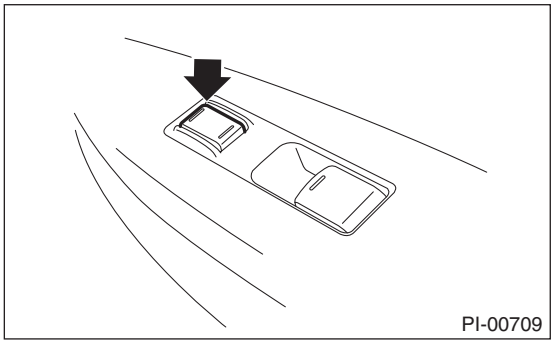


PI-00957

• Press the “LOCK/ARM” button momentarily on the keyless transmitter with one of the doors (including the rear gate) opened. Check that the buzzer sounds 5 times, and the hazard light flashes 5 times to notify the door not being fully closed. Next, close all the doors including rear gate. Check if all doors are locked and buzzer sounds once and the hazard light flashes once.
• With one of the doors open (including the rear gate), press the “LOCK” side of the power door lock switch. Next, close all the doors including rear gate. Check if all doors are locked and buzzer sounds once and the hazard light flashes once.
  • Driver’s side


PI-00689

  • Passenger’s side


PI-00709

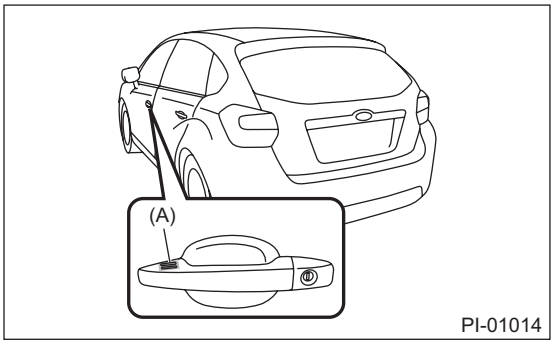
Alarm sound operational check
• The system uses the buzzer and sounds the alarm when the door is locked or unlocked. The alarm sound can be turned OFF. To turn the alarm sound from ON to OFF, close all doors, (with the key not inserted in the key cylinder), hold down the “UNLOCK” side of the power door lock switch and insert the key in the key cylinder. Within 10 seconds, insert and take out the key for 5 times or more, and within 10 seconds after that, open and close the driver’s door. With the door closed, the hazard light will flash 3 times, indicating that the alarm sound has been turned OFF. To turn the alarm sound from OFF to ON, perform this procedure again. The hazard light will flash 3 times, indicating that the alarm has been turned ON.

26.KEYLESS ACCESS SYSTEM

CAUTION:
• When performing the check, check one access key at a time, separating individual keys.
• Do not leave any separated access keys in the vehicle.

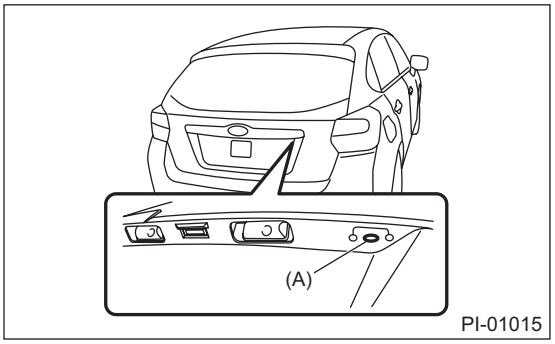
NOTE:
The following inspections show the initial settings. When the settings are different from the initial settings, use Subaru Select Monitor to check the details of each setting for inspections. <Ref. to BC(diag)-12, OPERATION, Read Current Data.>
• While carrying the access key, check that the room light illuminates when you move close to the front door handles of the vehicle whose doors are all locked.
• While carrying the access key, check that all doors and the rear gate are locked, and the hazard lights flash when you touch the touch sensor (lock) of the front door or press the rear lock button of the rear gate.

NOTE:
  • The hazard lights flash twice when unlocking.
  • The hazard lights flash once when locking.



PI-01014

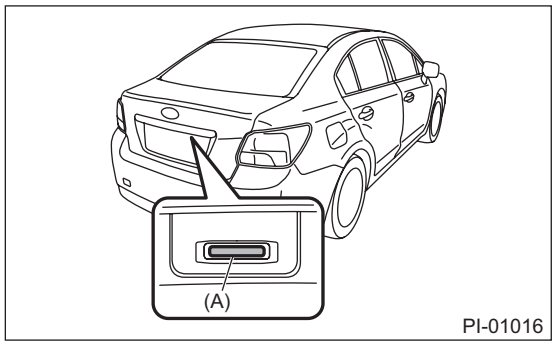
(A) Touch sensor (lock)



PI-01015

(A) Rear lock button

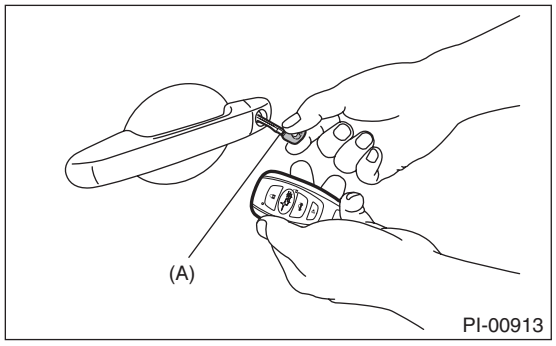
• While carrying the access key, check that the trunk unlocks and the hazard lights flash twice when you press the trunk opener button.



(A) Trunk opener button

• Manually operate the access key button to check the lock/unlock of doors and rear gate, and the flashing of hazard lights.
• Check the mechanical key attached to the access key can be used for locking/unlocking.

CAUTION:
The mechanical key is a single groove type. Insert the mechanical key with the groove side facing the front side of the vehicle.



(A) Mechanical key

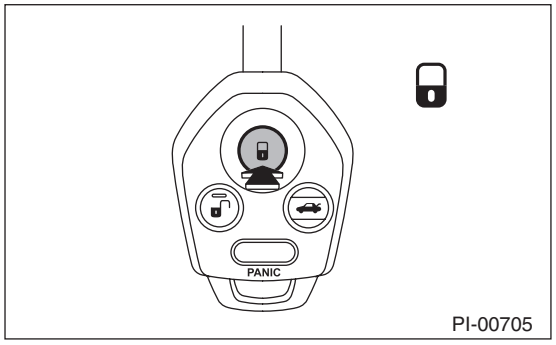
• Check that the warning buzzer sounds and the door-lock does not operate, when the doors are closed with the access key left in the vehicle and the touch sensor (lock) on door is touched, or the rear lock button on rear gate is pressed.

CAUTION:
Remove the mechanical key from the access key and hold the mechanical key.
• With the access key in the trunk, check that the warning buzzer sounds and the trunk unlocks when you press the trunk opener button.

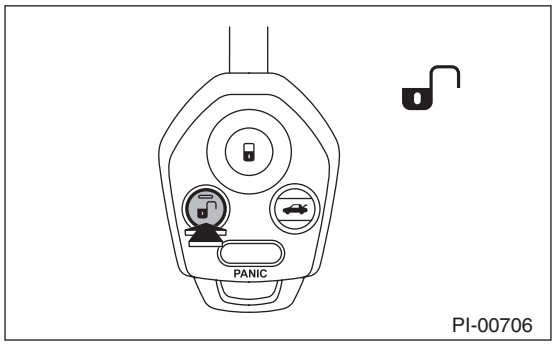
27.ALARM SYSTEM

• Model without keyless access with push button start

NOTE:
The following inspections show the initial settings. When the settings are different from the initial settings, use Subaru Select Monitor to check the details of each setting for inspections. <Ref. to BC(diag)-20, OPERATION, Registration Body Integrated Unit.>
1) Fully open all the door windows.
2) Remove the key from the ignition switch and close all the doors including rear gate.
3) Press the “LOCK” button momentarily on the keyless transmitter. All doors are locked, and the security indicator light blinks faster for 30 seconds and blinks slowly twice repeatedly, then the alarm system is in set condition.



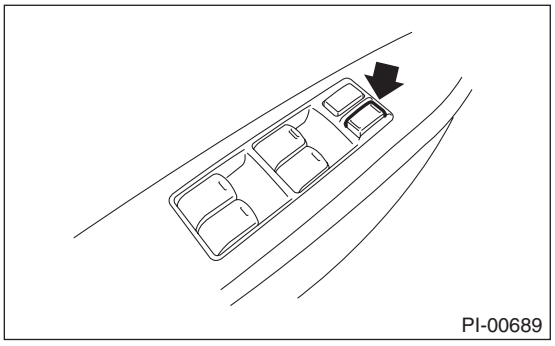
4) Press the “UNLOCK” button momentarily on the keyless transmitter. When the door of the driver’s seat is unlocked, the security indicator blinks, and the alarm system enters the release mode.



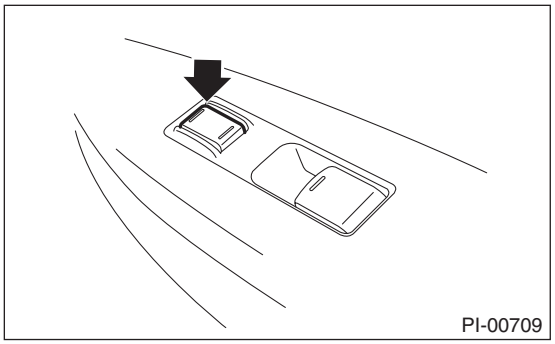
5) Press the “LOCK” button once on the keyless transmitter with one of the doors (including the rear gate) open. Check that the buzzer sounds 5 times to give the door not fully closed warning. The doors are locked when all doors (including the rear gate) are closed, and the security indicator light blinks faster for 30 seconds and blinks slowly twice repeatedly, then the alarm system is in set condition.
6) Press the “UNLOCK” button momentarily on the keyless transmitter. When the door of the driver’s seat is unlocked, the security indicator blinks, and the alarm system enters the release mode.

7) With one of the doors open (including the rear gate), press the “LOCK” side of the power door lock switch. The doors are locked when all doors (including the rear gate) are closed, and the security indicator light blinks faster for 30 seconds and blinks slowly twice repeatedly, then the alarm system is in set condition.

- Driver’s side


PI-00689

- Passenger’s side


PI-00709

8) Unlock a door using the inner lock knob or the key and open the door while the security system is in the set mode. Check if the alarm condition occurs (horn sounds continuously, hazard light blinks, security indicator light illuminates). Check if this condition lasts until any button of the keyless transmitter is pressed or until the ignition switch is turned to IGN ON after inserting the key into the ignition switch.

NOTE:
The alarm sounds for three minutes with the door open.

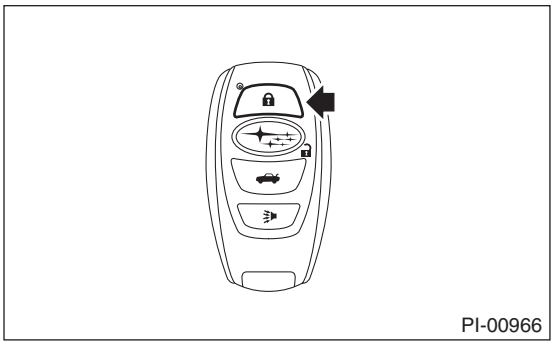
9) On models equipped with an impact sensor, hit the windshield glass with your hand with the alarm system in the monitoring condition, to check that the alarm condition occurs.

10) When none of above is applicable, perform troubleshooting for the security system.

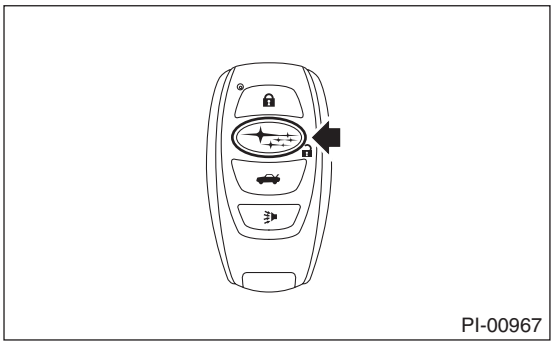
• Model with keyless access with push button start

NOTE:
The following inspections show the initial settings. When the settings are different from the initial settings, use Subaru Select Monitor to check the details of each setting for inspections. <Ref. to BC(diag)-20, OPERATION, Registration Body Integrated Unit.>

1) Fully open all the door windows.
2) Close all the doors and rear gate.
3) Press the “LOCK” button momentarily on the access key. All doors are locked, and the security indicator light blinks faster for 30 seconds and blinks slowly twice repeatedly, then the alarm system is in set condition.


PI-00966

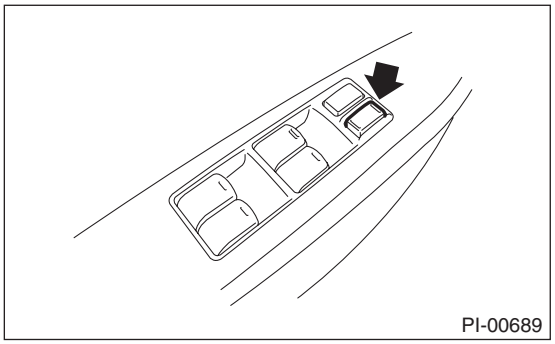
4) Press the “UNLOCK” button momentarily on the access key. When the door of the driver’s seat is unlocked, the security indicator light blinks, and the alarm system enters the release mode.


PI-00967

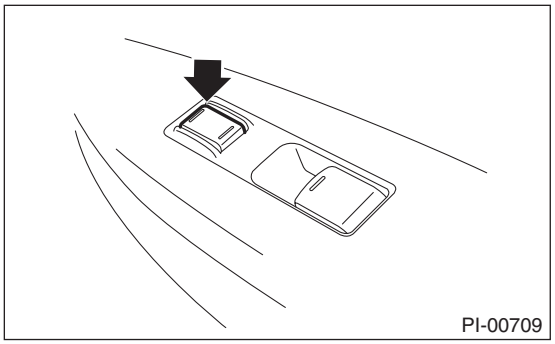
5) Press the “LOCK” button once on the access key with one of the doors (including the rear gate) open. Check that the buzzer sounds 5 times to give the door not fully closed warning. The doors are locked when all doors (including the rear gate) are closed, and the security indicator light blinks faster for 30 seconds and blinks slowly twice repeatedly, then the alarm system is in set condition.
6) Press the “UNLOCK” button momentarily on the access key. When the door of the driver’s seat is unlocked, the security indicator blinks, and the alarm system enters the release mode.

7) With one of the doors open (including the rear gate), press the “LOCK” side of the power door lock switch. The doors are locked when all doors (including the rear gate) are closed, and the security indicator light blinks faster for 30 seconds and blinks slowly twice repeatedly, then the alarm system is in set condition.

- Driver’s side



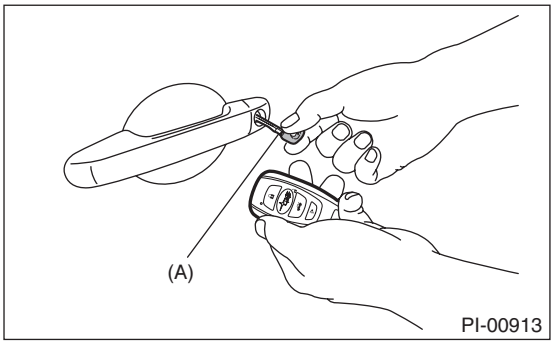
- Passenger’s side



8) Unlock a door using the mechanical key and open the door while the security system is in the set mode. Check if the alarm condition occurs (horn sounds continuously, hazard light blinks, security indicator light illuminates). Check if this condition lasts until any button on the access key is pressed or until the ignition switch is turned to ACC.

CAUTION:
The mechanical key is a single groove type. Insert the mechanical key with the groove side facing the front side of the vehicle.

NOTE:
The alarm sounds for three minutes with the door open.

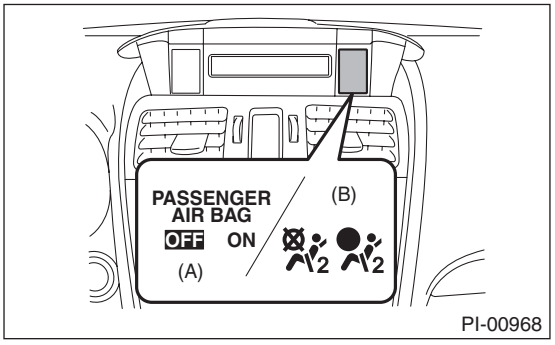


(A) Mechanical key

9) On models equipped with an impact sensor, hit the windshield glass with your hand with the alarm system in the monitoring condition, to check that the alarm condition occurs.
10) When none of above is applicable, perform troubleshooting for the security system.

28.SEAT

1) Check the seat surfaces for stains or dirt.
2) Check that each seat provides full functionality in sliding, reclining, lifter, and tilting. Check all available functions of the rear seat such as backrest tilt knob.
3) Check the passenger’s seat occupant detection system.
(1) Empty the passenger’s seat and turn the ignition switch to ON.
(2) Check that the passenger airbag ON/OFF indicator lights both turn on simultaneously for approximately six seconds, and after turning off for two seconds, only the OFF light illuminates.



(A) Airbag ON/OFF indicator light (U.S.(U5) model)
(B) Airbag ON/OFF indicator light (Canada (C5) model, Mexico (C4) model)

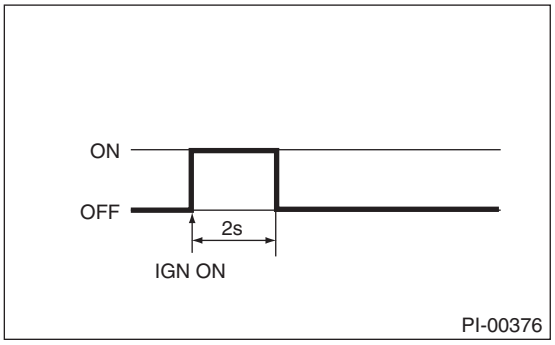
4) With a person weighing approximately 70 kg (155 lb) or more sitting in the passenger's seat, check whether the ON light of the passenger's airbag ON/OFF indicator illuminates or not.
5) Have the passenger get out of the passenger's seat, and check whether the OFF light of the passenger side airbag ON/OFF indicator illuminates.

29.SEAT BELT

1) Pull out the seat belt and then release it. Check that the belt retracts smoothly.
2) Check seat warning system
(1) Turn the ignition switch to ON without driver's and passenger's seat belts on.
(2) Check the seat belt warning lights of the driver's and the passenger's blink for approximately six seconds and the buzzer sounds intermittently.
(3) Then check that the seat belt warning lights illuminate and blink in a cycle of approximately 15 seconds. (If no one is seated on the passenger's seat, the seat belt warning light of the passenger's will not operate.)

30.TPMS (U.S. MODEL)

1) Turn the ignition switch to ON, and check TPMS warning light for normal operation.
- Normal operation (IG ON (light check))

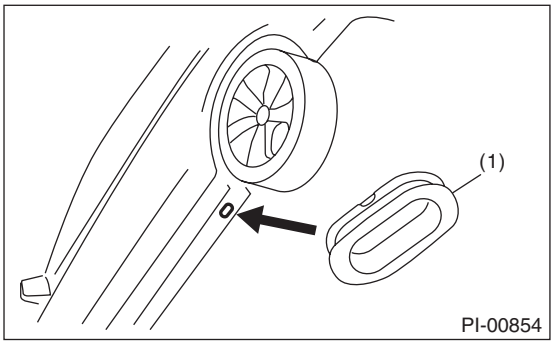


2) If the TPMS warning light display does not operate normally, check and repair the system. <Ref. to TPM(diag)-2, Basic Diagnostic Procedure.>

31.GROMMET INSTALLATION

Install the grommet on the rear seat to the tie-down hole.

CAUTION:
Make sure that the tie-down hole is firmly plugged with the grommet. Otherwise, dust, smell, etc. may come into the passenger compartment indirectly from the rear quarter, via the side sill from the tie-down hole.

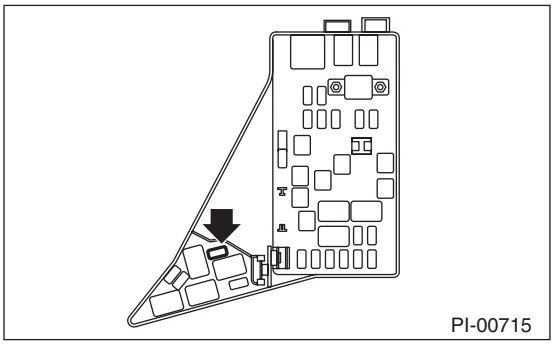


(1) Grommet

32.DELIVERY (TEST) MODE

1) Install the delivery (test) mode fuse with ignition switch to OFF.

CAUTION:
Do not use any fuses that are installed on the vehicle.



2) Turn the ignition switch to ON and check that the malfunction indicator light starts blinking.
3) If the malfunction indicator light blinks, return the ignition key to LOCK.
4) Remove the delivery (test) mode fuse and attach it to the spare fuse holder provided on the fuse box cover.
5) Then, turn the ignition key to ON again.
6) Make sure that the malfunction indicator light is off. If the malfunction indicator light blinks, carry out an engine diagnosis.

33.IMMOBILIZER SYSTEM

1) Check that the engine starts with all keys that are equipped on vehicle.
2) Check that the security indicator light blinks in 60 seconds after turning the ignition switch from ON to ACC or to OFF, and immediately after removing the key. (Models without the keyless access with push button start)
3) Immediately after turning ignition switch from ON to OFF, and immediately after opening/closing a door while the ignition switch is in ON or ACC with the engine stopped and the access key is outside the vehicle, check that the security indicator light is blinking. (Model with keyless access with push button start)

NOTE:
If malfunctions occur, refer to “IMMOBILIZER (DIAGNOSTICS)”. <Ref. to IM(diag)-2, Basic Diagnostic Procedure.>

34.PUSH BUTTON START FUNCTION

1) Get into the vehicle while carrying the access key, with the vehicle in P range and the brake pedal OFF, and check that every time the push button ignition switch is pressed, that it cycles through ACC → IGN ON → IGN OFF, and the indicator light for the push button ignition switch is illuminated in orange.
2) Get into the vehicle while carrying the access key, with the vehicle in P range and the brake pedal ON, check that the indicator light for the push button ignition switch is illuminated in green.

NOTE:
While the select lever button is being pressed, the indicator light of the push button ignition switch does not illuminate in green even if the shift position is in the P range.
3) Get into the vehicle while carrying the access key, with the vehicle in P range and the brake pedal ON, check that the engine starts when you press the push button ignition switch.
4) With the vehicle stopped, the engine running and in P range, check that the engine stops when you press the push button ignition switch.
5) With the vehicle stopped, the engine running and in N range, check that the engine stops when you press the push button ignition switch, and cycles through ACC → IGN ON each time you press the push button ignition switch.

35.STARTING CONDITION

Start the engine and check that the engine starts smoothly. If the 12 V battery voltage is low, recharge or replace the 12 V battery. If any noises are observed, immediately stop the engine and check and repair the abnormal components.

36.EXHAUST

Listen to the exhaust noise to see if no noises are observed. Check that no leaks are found.

37.INDICATOR AND WARNING LIGHTS

Check that all indicator lights and warning lights are operating correctly.

38.HEATER & VENTILATION

Operate the heater & ventilation system to check for normal airflow outlet control, air inlet control, airflow capacity and heating performance.

39.AIR CONDITIONER

Operate the air conditioner. Check that the A/C compressor operates normally and enough cooling is provided.

NOTE:
To prevent the insufficient lubrication of the air conditioner, operate the air conditioner for five minutes at idling.

40.MULTI-FUNCTION DISPLAY (MFD)

Check that the Multi-Function Display (MFD) function operates normally.

41.AUDIO

1) Check if the AM/FM radio broadcasting can be heard.
2) Check that all the radio functions work properly and the noise level is normal.
3) Check the CD and AUX for normal operation.
4) Check that the AUX is installed into the console without looseness.
5) Check that the rearview camera operates normally.

42.NAVIGATION SYSTEM

1) Check all display functions for normal operation. (Refer to the operation manual.)
2) Check that the navigation system operates normally.
3) Check the radio, CD (DVD) player and AUX for normal operation.
4) Check that the AUX is installed into the console without looseness.
5) Check that the rearview camera operates normally.

43.TELEMATICS SYSTEM

Check the indicator light of overhead console or stereo camera cover assembly goes off.

44.ACCESSORY POWER SUPPLY SOCKET

• Check the operation of the front accessory power supply socket.
• Check operation of the accessory power supply socket in console box.

45.LIGHTING

1) Check the headlight operations. When pulling out the key, check if the headlight illuminates by turning the headlight switch from OFF to ON.
2) Check the stop light operation.
3) Check other lights for normal operations.

46.ILLUMINATION CONTROL

Check that the illumination control operates normally.

47.WINDOW WASHER SYSTEM

Check that the window washer system injects washer fluid to the specified area of the windshield and rear window glass. <Ref. to WW-40, NOZZLE - WINDSHIELD WASHER, ADJUSTMENT, Front Washer Nozzle and Hose.> <Ref. to WW-50, INSPECTING THE SPRAY POSITION, INSPECTION, Rear Washer.>

48.WIPER SYSTEM

Check the front and rear wipers for normal operations.

49.WIPER DEICER

Check that the wiper deicer operates normally.

NOTE:
When an ambient temperature is 5°C or more, wiper deicer operation is cancelled. Press the switch for 3 seconds or more to perform the compulsory operation.

50.POWER WINDOW

• Operate the power window switches one by one to check that each of the power windows goes up and down without noises.
• Check AUTO UP/AUTO DOWN operate properly by operating the power window switch on driver's seat side.

CAUTION:
If battery has been removed, AUTO UP does not operate properly because initialized. In this case, perform the initial setting (reset A) and check AUTO UP operates properly.

NOTE:
Check the power window if the door glass of the driver's seat does not open/close automatically. <Ref. to GW-10, INSPECTION, Power Window System.>

51.SUNROOF

Check that the sunroof operates normally.

52.REAR DEFOGGER SYSTEM

Press the rear defogger switch and check that the light inside the switch is activated for approx. 15 minutes and the rear defogger automatically turns to OFF.

53.DOOR MIRROR

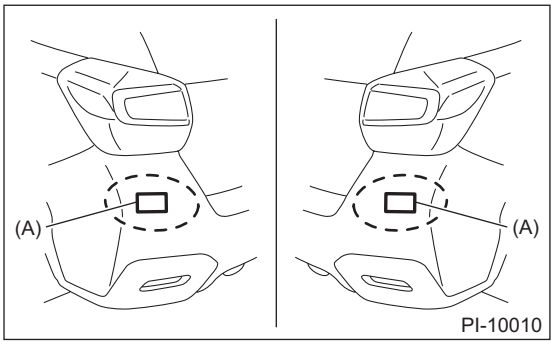
• Check that the remote control mirror operates normally.
• Check that the heated mirror operates normally.

54.ROOM MIRROR

Check that the automatic anti-glare function operates normally.

55.BLIND SPOT DETECTION / REAR CROSS TRAFFIC ALERT (BSD/RCTA)

1) Check that the BSD/RCTA system is activated and deactivated correctly.
   (1) Press the BSD/RCTA OFF switch to check that "BSD/RCTA OFF" is displayed in the combination meter.
   (2) Press the BSD/RCTA OFF switch again to check that the indicators of the right and left side door mirrors illuminate → go off and "BSD/RCTA OFF" is displayed in the combination meter.
   (3) Check that the BSD/RCTA error message is not displayed.
2) Check the rear bumper around the radar sensor for dirt, scratch, affixed stickers and poor paint coating.
• If any dirt is found, clean it off so that the rear bumper is not damaged.
• If any stickers are affixed, remove it so that the rear bumper is not damaged.
• If the bumper is damaged or has poor paint coating, refer to "CAUTION" in "Subaru Rear Vehicle Detection (DIAGNOSTICS)". <Ref. to RVD(diag)-4, CAUTION, General Description.>



(A) Radar sensor

56.DIAGNOSTIC TROUBLE CODE (DTC) CHECK

Read the diagnostic trouble code and check that the diagnostic trouble code is not detected.
If any diagnostic trouble code is detected, clear all.
1) Read Diagnostic Trouble Code

NOTE:
For detailed operation procedures, refer to “Application help”.
2) Clear Memory Mode

NOTE:
For detailed operation procedures, refer to “Application help”.

57.BRAKE TEST

Check the foot brake for normal operations.

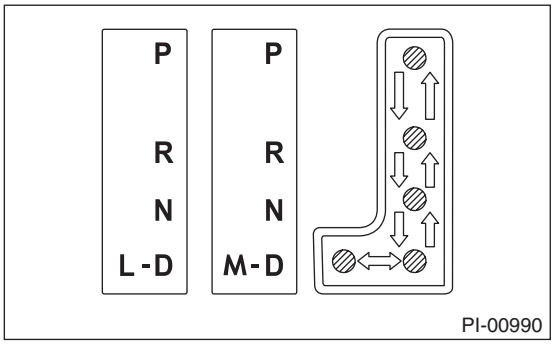
58.PARKING BRAKE

Check the parking brake for normal operations. When pulling the parking brake lever with a force of 200 N (20 kgf, 45 lb), check that the lever stroke of parking brake lever is 7 to 8 notches.

59.SHIFT CONTROL

• CVT model

1) Turn the ignition switch to ON.
2) While brake pedal is not depressed, check if the select lever does not move from “P” range.
3) While brake pedal is depressed, check if the select lever moves from “P” range.
4) Set the select lever to other than “P” range.
5) When the ignition switch is turned to OFF, check if the ignition key switch cannot be removed.
6) Set the selector lever to each gear position and check the shifting while driving the vehicle. Operate the paddle shift at manual mode and check the shifting while driving the vehicle.



Selector position	Gear position					
	1st	2nd	3rd	4th	5th	6th
D	Continuously variable speed change					
Manual mode	OK	OK	OK	OK	OK	OK

7) Set the select lever to other than “P” range. (Models without the keyless access with push button start)
8) When the ignition switch is turned to OFF, check if the ignition key switch cannot be removed. (Models without the keyless access with push button start)

• MT model

Check for smooth operation to each position.

60.CRUISE CONTROL

Operate the cruise control system. Check that the system is activated and deactivated correctly. (In the delivery mode, the cruise control does not operate, even when the cruise control switch is pressed.)

61.SUBARU EyeSight

• Operate the EyeSight system. Check that the system is activated and deactivated correctly.
• Check the stereo camera cover opening for foreign matter.
• Check the glass in front of stereo camera for dirt and stickers.
• Check the lens and filter of the stereo camera for dirt such as fingerprints.
• Check the filter at lens portion of stereo camera for damage.
• According to the “ES(diag)” section, check the windshield glass and dashboard in front of stereo camera to make sure that no aftermarket part is adhered or attached in the prohibited area. <Ref. to ES(diag)-7, WINDSHIELD GLASS AND DASHBOARD, INSPECTION, General Description.>
• When delivering the vehicle, explain to the customer to make sure not to touch the filter at lens portion of the stereo camera.

62.HYBRID SYSTEM

Activate the hybrid system. Check that the system is activated and deactivated properly.

63.EV MODE LAMP

1) Check that the EV mode lamp setting is ON.
2) Check that the EV mode lamp illuminates during EV traveling or when the Auto Start Stop operates.

64.POWER STEERING SYSTEM (ELECTRIC POWER STEERING MODEL)

Check that the electric power steering warning light illuminates after the ignition switch is turned ON, and goes off after the engine is started.

65.FLUID LEAKAGE

Check entire areas of the vehicle for any trace of engine coolant/engine oil/transmission fluid leaks.

66.WATER LEAK TEST

Spray the vehicle with water using a hose and check that no water enters the passenger compartment.

• Before performing the water leakage test, remove anything that may obstruct the operation or which must be kept dry.

• Close all the windows and doors securely. Close the front hood, trunk lid and rear gate before starting the test.

• Connect a hose to a tap, and spray water on the vehicle. The rate of water spray must be approx. 20 to 25 L (5.3 — 6.6 US gal, 4.4 — 5.5 Imp gal) per minute.

When spraying water on areas adjacent to the floor and wheel house, increase the pressure. When spraying water on areas other than the floor and wheel house, decrease the pressure. But the force of water must be made strong occasionally by pressing the end of the hose.

NOTE:

Be sure to keep the hose at least 10 cm (3.9 in) away from vehicle.

Check the following areas.

• Front window and body framework mating portion

• Door mating portions

• Glass mating portions

• Rear quarter window mating portions

• Rear window and body framework mating portion

• Around roof drips

If any dampness in the compartments is discovered after the water has been applied, carefully check all the areas that may have possibly contributed to the leak.

67.APPEARANCE 2

1) If protective coating (wrap guard) is applied, remove it.

NOTE:

• When removing the wrap guard, using steam will make it easier to remove.

• Vehicle left for a extended periods or at low temperatures, spray the vehicle with water heated 50 — 60°C (122 — 140°F) to raise the surface temperature before peeling off the wrap guard. Do not use the water heated to over 60°C (140°F).

• If the adhesive remains exist on the coated surface, soak a flannel rag, etc. with a small amount of coating wax or solvent such as oil benzene and IPA, put the soaked cloth on the remains lightly, and then wipe them off with a flannel rag etc.

• Keep solvent from touching the resin or rubber parts. Do not use coating wax or solvents while the component surface temperature is hot due to hot weather etc.

• If the coated surface is swollen out due to seams or moisture, expose the vehicle to the sunlight for a few hours or heat the seam and swollen portions using a dryer etc.

• Dispose of the peeled wrap guard as burnable industrial garbage.

2) Check the whole vehicle body for flaking paint, damage by transportation, corrosion, dirt, cracks or blisters.

NOTE:

• It is better to determine an inspection pattern in order to avoid missing an area, since the total inspection area is wide.

• Do not repair the body paint unless absolutely necessary. Also, if the vehicle is in need of repair to remove scratches or corroded paint, the repair area must be limited to the minimum. Re-painting and spray painting must be avoided as much as possible.

3) Check each window glass for scratches carefully. Slight damage may be removed by polishing with cerium oxide. (Fill a cup half with cerium oxide, and add warm water to it. Then agitate the content until it turns to wax. Apply this wax to a soft cloth, and polish the glass with it.)

4) Check each portion of the vehicle body and underside components for the formation of rust. If rust is discovered, remove it with sandpaper of #80 to #180 and treat the surface with rust preventive. After this treatment is completed, flush the portion thoroughly, and prepare the surface for repair painting.

5) Check each portion of body and all of the exterior parts for deformation or distortion. Also, check each light lens for cracks.

6) Peel the protective tape, vinyl wrapping and identification seal attached to the following places.

• Seat

• Door trim

• Floor carpet

• Side sill

• Rear shelf

• Aluminum pedal

• Rear wiper

• Door mirror

• High-mounted stop light (placed in passenger room)

• Handle - door outer

• Cover - handle outer

• Fuel opener lever

PERIODIC MAINTENANCE SERVICES

PM

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1. General Description

A: GENERAL DESCRIPTION

Be sure to perform periodic maintenance in order to maintain vehicle performance and find problems before they occur.

2. Schedule

A: MAINTENANCE SCHEDULE

1. MODEL WITH US SPECIFICATION

Maintenance item		Maintenance interval [Number of months or km (miles), whichever occurs first]													
	Months	3	6	12	18	24	30	36	42	48	54	60	66	To be continued to the next table.	Remarks
	× 1,000 km	4.8	9.6	19.2	28.8	38.4	48	57.6	67.2	76.8	86.4	96	105.6		
	× 1,000 miles	3	6	12	18	24	30	36	42	48	54	60	66		
1	Engine oil		R	R	R	R	R	R	R	R	R	R	R		Note 1.
2	Engine oil filter		R	R	R	R	R	R	R	R	R	R	R		Note 1.
3	Spark plug											R			
4	V-belt						I					I			
5	Fuel line						I					I			Note 6. Note 7.
6	Fuel filter														Note 2. Note 7.
7	Air cleaner element						R					R			Note 8.
8	Cooling system						I					I			Note 10.
9	Engine coolant	Replace after the first 11 years or 220,000 km (137,500 miles), and every six years or 120,000 km (75,000 miles) thereafter													Note 10.
10	Clutch system			I		I		I		I		I			
11	Transmission gear oil						I					I			Note 3.
12	CVTF						I					I			Note 4.
13	Front & rear differential gear oil						I					I			Note 3.
14	Brake line			I		I		I		I		I			Note 6.
15	Brake fluid / clutch fluid (MT model only)						R					R			Note 5.
16	Disc brake pad and disc			I		I		I		I		I			Note 6.
17	Parking brake			I		I		I		I		I			Note 6.
18	Suspension			I		I		I		I		I			Note 6.
19	Wheel bearing											I			
20	Axle boots and joints			I		I		I		I		I			Note 6.
21	Tire rotation		P	P	P	P	P	P	P	P	P	P	P		Note 9.
22	Steering system (Power steering)			I		I		I		I		I			Note 6.
23	A/C filter	Replace every 12 months or 19,200 km (12,000 miles)													Note 8.

PERIODIC MAINTENANCE SERVICES

Maintenance item		Maintenance interval [Number of months or km (miles), whichever occurs first]												
	Months	Continued from previous table	72	78	84	90	96	102	108	114	120	126	132	Remarks
	× 1,000 km		115.2	124.8	134.4	144	153.6	163.2	172.8	182.4	192	201.6	211.2	
	× 1,000 miles		72	78	84	90	96	102	108	114	120	126	132	
1	Engine oil		R	R	R	R	R	R	R	R	R	R	R	Note 1.
2	Engine oil filter		R	R	R	R	R	R	R	R	R	R	R	Note 1.
3	Spark plug										R			
4	V-belt					I					I			
5	Fuel line					I					I			Note 6. Note 7.
6	Fuel filter		R											Note 2. Note 7.
7	Air cleaner element					R					R			Note 8.
8	Cooling system					I					I			Note 10.
9	Engine coolant	Replace after the first 11 years or 220,000 km (137,500 miles), and every six years or 120,000 km (75,000 miles) thereafter												Note 10.
10	Clutch system		I		I		I		I		I		I	
11	Transmission gear oil					I					I			Note 3.
12	CVTF					I					I			Note 4.
13	Front & rear differential gear oil					I					I			Note 3.
14	Brake line		I		I		I		I		I		I	Note 6.
15	Brake fluid / clutch fluid (MT model only)					R					R			Note 5.
16	Disc brake pad and disc		I		I		I		I		I		I	Note 6.
17	Parking brake		I		I		I		I		I		I	Note 6.
18	Suspension		I		I		I		I		I		I	Note 6.
19	Wheel bearing										I			
20	Axle boots and joints		I		I		I		I		I		I	Note 6.
21	Tire rotation		P	P	P	P	P	P	P	P	P	P	P	Note 9.
22	Steering system (Power steering)		I		I		I		I		I		I	Note 6.
23	A/C filter	Replace every 12 months or 19,200 km (12,000 miles)												Note 8.

Symbol
R: Replace
I: Inspection
P: Perform

NOTE:
1. When the vehicle is used under severe conditions, replace the engine oil and engine oil filter every 3 months or 4,800 km (3,000 miles).
2. When the vehicle is used under extremely low or high temperature conditions, the fuel filter may become dirty. Therefore, it should be replaced frequently.
3. When the vehicle is used under severe conditions, replace every 15 months or 24,000 km (15,000 miles).
4. When the vehicle is used under severe conditions, replace CVTF every 40,000 km (24,855 miles).
5. When the vehicle is used in high humidity area or mountain area, replace the brake fluid every 15 months or 24,000 km (15,000 miles).
6. When the vehicle is used under severe conditions, replace every 6 months or 9,600 km (6,000 miles).
7. This inspection is not required to maintain emission warranty eligibility and it dose not affect the manufacturer's obligations under EPA's in-use compliance program.
8. When the vehicle is used under extremely dusty conditions, the air cleaner element and A/C filter should be replaced more often.
9. A tire should be replaced when the tread wear indicator appears as a solid band across the tread. The indicators appear when the remaining tread has been worn to 1.6 mm (0.063 in) or less.
10. To prevent cooling system leakage, be sure to add SUBARU genuine cooling system conditioner when replacing coolant.

Examples of severe conditions

a. Drive repeatedly at short distance. (Maintenance items 1 and 2)
b. Drive repeatedly on bumpy muddy road. (Maintenance items 14, 15 and 17)
c. Drive repeatedly in dusty conditions. (Maintenance items 7 and 23)
d. Drive in extremely cold weather. (Maintenance items 1, 2, 16, 18, 20 and 22)
e. Area where salt or other corrosive used. (Maintenance items 5, 14, 15, 16, 17 and 20)
f. Coastal area. (Maintenance item 5)
g. Repeat towing trailer. (Maintenance items 1, 2, 11, 12, 13, 14, 15, 16, 17, 18, 20 and 22)

3. Engine Oil

A: INSPECTION

Refer to “LU” section for engine oil inspection. <Ref. to LU(H4DO(w/o HEV))-12, INSPECTION, Engine Oil.>

B: REPLACEMENT

Refer to “LU” section for engine oil replacement. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>

4. Engine Oil Filter

A: REPLACEMENT

Refer to “LU” section for engine oil filter replacement. <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

5. Spark Plug

A: REPLACEMENT

Refer to “IG” section for spark plug replacement. <Ref. to IG(H4DO(w/o HEV))-4, Spark Plug.>

6. V-belt

A: INSPECTION

Refer to “ME” section for V-belt inspection. <Ref. to ME(H4DO(w/o HEV))-124, V-belt.>

B: REPLACEMENT

Refer to “ME” section for V-belt replacement. <Ref. to ME(H4DO(w/o HEV))-124, V-belt.>

7. Fuel Line

A: INSPECTION

The fuel line is located mostly internally, so check pipes, areas near pipes, and engine compartment piping for rust, hose and tube damage, loose band, etc. If faulty parts are found, repair or replace them. <Ref. to FU(H4DO(w/o HEV))-176, INSPECTION, Fuel Delivery and Evaporation Lines.> <Ref. to FU(H4DO(HEV))-161, INSPECTION, Fuel Delivery and Evaporation Lines.>

8. Fuel Filter

A: REPLACEMENT

For fuel filter replacement procedure, refer to “FU” section. <Ref. to FU(H4DO(w/o HEV))-159, Fuel Filter.> <Ref. to FU(H4DO(HEV))-142, Fuel Filter.>

B: INSPECTION

Replace if the filter is clogged, or time for replacement has come.

9. Air Cleaner Element

A: REPLACEMENT

Refer to “IN” section for air cleaner element replacement. <Ref. to IN(H4DO(w/o HEV))-4, Air Cleaner Element.> <Ref. to IN(H4DO(HEV))-4, Air Cleaner Element.>

10.Cooling System

A: INSPECTION

1. RADIATOR

Check that there are no engine coolant leaks from the hose connections. Refer to “CO” section for radiator inspection. <Ref. to CO(H4DO(w/o HEV))-85, INSPECTION, Radiator.>

2. RADIATOR CAP

Refer to “CO” section for radiator cap inspection. <Ref. to CO(H4DO(w/o HEV))-87, INSPECTION, Radiator Cap.>

3. COOLING FAN

Refer to “CO” section for cooling fan inspection. <Ref. to CO(H4DO(w/o HEV))-11, INSPECTION, Radiator Fan System.>

4. COOLING SYSTEM

Start the engine, and then inspect that it does not overheat or it is not cooled excessively. If it overheats or it is cooled excessively, check the cooling system.

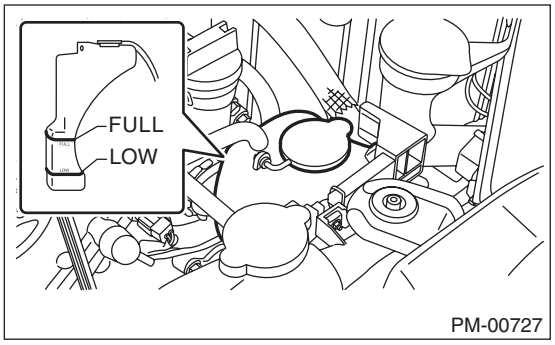
11.Engine Coolant

A: INSPECTION

CAUTION:
- **Do not use water instead of coolant.**
- **Refer to "RM" section for the recommended engine coolant. <Ref. to RM-3, ENGINE COOLANT, RECOMMENDED MATERIALS, Recommended Materials.>**

1) Park the vehicle on a level surface.
2) Make sure the engine coolant level in the reservoir tank is between "FULL" and "LOW" when the engine is cold.

NOTE:
If the engine coolant level drops, make sure that there are no engine coolant leakage, and add engine coolant to the "FULL" line.



3) Remove the radiator cap and make sure that the radiator is filled with engine coolant up to the filler neck position.

B: REPLACEMENT

Refer to "CO" section for engine coolant replacement. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>

12.Clutch System

A: INSPECTION AND ADJUSTMENT

Refer to “CL” section for inspection and adjustment of clutch system. <Ref. to CL-27, INSPECTION, Clutch Pedal.> <Ref. to CL-28, ADJUSTMENT, Clutch Pedal.>

13.Transmission Gear Oil

A: INSPECTION

Refer to “5MT” section for transmission gear oil inspection. <Ref. to 5MT-22, INSPECTION, Transmission Gear Oil.>

B: REPLACEMENT

Refer to “5MT” section for transmission gear oil replacement. <Ref. to 5MT-22, REPLACEMENT, Transmission Gear Oil.>

14.CVTF

A: INSPECTION

Refer to “CVT (TR580)” or “CVT (TH58A)” section for CVTF inspection. <Ref. to CVT(TR580)-38, INSPECTION, CVTF.> <Ref. to CVT(TH58A)-41, INSPECTION, CVTF.>

B: REPLACEMENT

Refer to “CVT (TR580)” or “CVT (TH58A)” section for CVTF replacement. <Ref. to CVT(TR580)-40, REPLACEMENT, CVTF.> <Ref. to CVT(TH58A)-43, REPLACEMENT, CVTF.>

15.Front & Rear Differential Gear Oil

A: INSPECTION

1. FRONT DIFFERENTIAL (MT MODEL)

Front differential gear oil of MT model lubricates the transmission and differential together. Refer to “Transmission Gear Oil” for inspection procedures. <Ref. to 5MT-22, INSPECTION, Transmission Gear Oil.>

2. FRONT DIFFERENTIAL (CVT MODEL)

Refer to “CVT (TR580)” or “CVT (TH58A)” section for front differential gear oil inspection of CVT model. <Ref. to CVT(TR580)-43, INSPECTION, Differential Gear Oil.> <Ref. to CVT(TH58A)-45, INSPECTION, Differential Gear Oil.>

3. REAR DIFFERENTIAL

Refer to “DI” section for rear differential gear oil inspection. <Ref. to DI-19, INSPECTION, Differential Gear Oil.>

B: REPLACEMENT

1. FRONT DIFFERENTIAL (MT MODEL)

Front differential gear oil of MT model lubricates the transmission and differential together. Refer to “5MT” section for replacement procedure. <Ref. to 5MT-22, REPLACEMENT, Transmission Gear Oil.>

2. FRONT DIFFERENTIAL (CVT MODEL)

Refer to “CVT (TR580)” or “CVT (TH58A)” section for front differential gear oil replacement. <Ref. to CVT(TR580)-45, REPLACEMENT, Differential Gear Oil.> <Ref. to CVT(TH58A)-47, REPLACEMENT, Differential Gear Oil.>

3. REAR DIFFERENTIAL

Refer to “DI” section for rear differential gear oil replacement. <Ref. to DI-20, REPLACEMENT, Differential Gear Oil.>

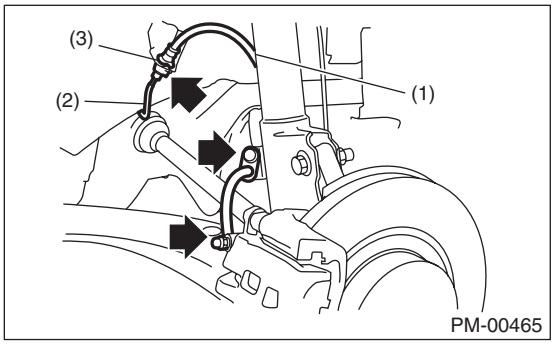
16.Brake Line

A: INSPECTION

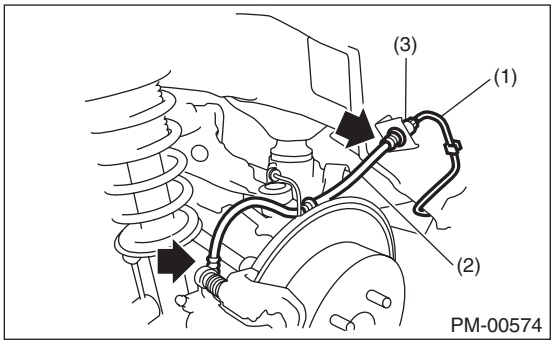
1. BRAKE LINE

1) Check for scratches, swelling, corrosion, traces of fluid leakage on the brake hoses or pipe joints.
2) Make sure that brake pipes/hoses do not interfere with adjacent parts and there is no loose connector/clamp during driving.
3) Check any trace of fluid leakage, scratches, etc. on master cylinder, wheel cylinder and hydraulic unit.

NOTE:
• When the brake fluid level in the reservoir tank is lower than specified limit, the brake warning light on the combination meter will illuminate.
• Visually check the brake hose for damage. (Use a mirror where it is difficult to see)



(1) Front brake hose
(2) Front brake pipe
(3) Clamp



(1) Brake pipe
(2) Rear brake hose
(3) Clamp

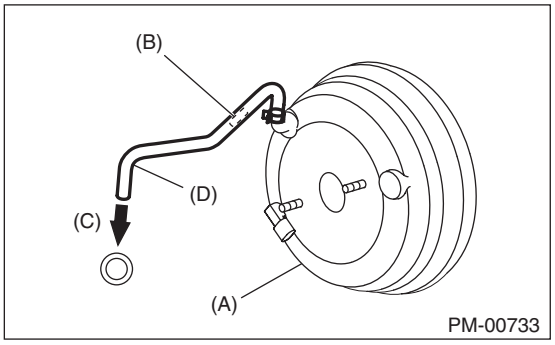
2. SERVICE BRAKE

Refer to “BR” section for foot brake inspection. <Ref. to BR-73, INSPECTION, Brake Pedal.>

3. BRAKE SERVO SYSTEM

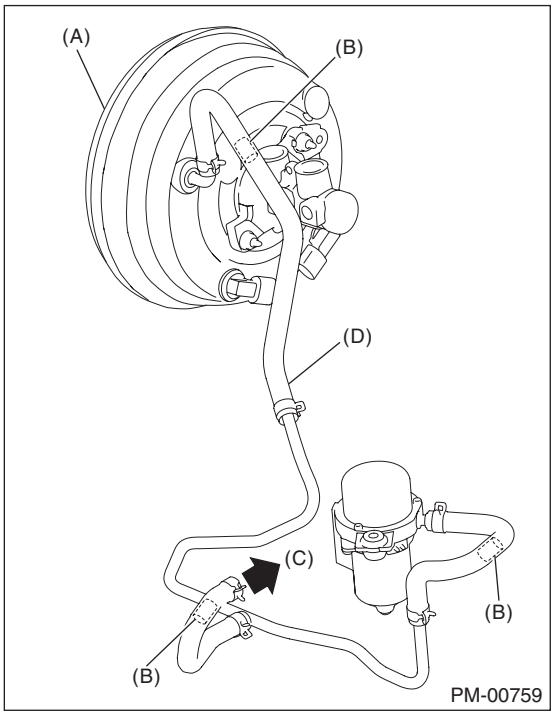
1) With the engine off, depress the brake pedal several times applying the same pedal force. Check that the travel distance should not change.
2) With the brake pedal depressed, start the engine. Check that the pedal moves slightly toward the floor.
3) With the brake pedal depressed, stop the engine and keep the pedal depressed for 30 seconds. Check that the pedal height does not change.
4) A check valve is built into the brake booster nipple. Disconnect the vacuum hose to inspect function of check valve.
Check that check valve ventilates from booster side to engine side. Also, check that there is no ventilation from engine side to booster side.

- Gasoline engine model



(A) Brake booster
(B) Check valve
(C) Engine side
(D) Vacuum hose

- HEV model



(A) Brake booster
(B) Check valve
(C) Engine side
(D) Vacuum hose and pipe ASSY

5) Check the vacuum hose for cracks or other damage.

CAUTION:
When installing the vacuum hose on the engine and brake booster, do not use soapy water or lubricating oil on their connections.
6) Check that the vacuum hose is securely tightened.

17.Brake Fluid

A: INSPECTION

Refer to “BR” section for brake fluid inspection. <Ref. to BR-61, INSPECTION, Brake Fluid.>

B: REPLACEMENT

Refer to “BR” section for brake fluid replacement. <Ref. to BR-62, REPLACEMENT, Brake Fluid.>

18. Disc Brake Pad and Disc

A: INSPECTION

Refer to “BR” section for disc brake pad and disc inspection. <Ref. to BR-20, INSPECTION, Front Brake Pad.> <Ref. to BR-34, INSPECTION, Rear Brake Pad.> <Ref. to BR-22, INSPECTION, Front Disc Rotor.> <Ref. to BR-38, INSPECTION, Rear Disc Rotor.>

19.Parking Brake

A: INSPECTION

Refer to “PB” section for parking brake inspection. <Ref. to PB-16, INSPECTION, Parking Brake Assembly (Rear Disc Brake).>

B: ADJUSTMENT

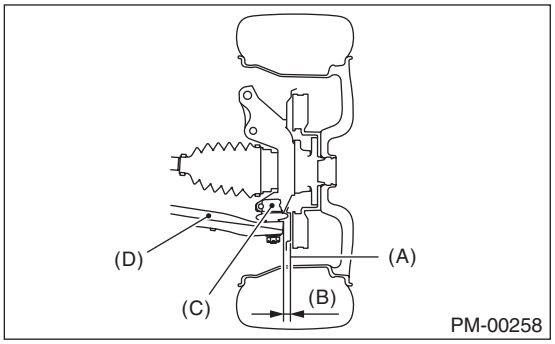
Refer to “PB” section for parking brake adjustment. <Ref. to PB-16, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

20.Suspension

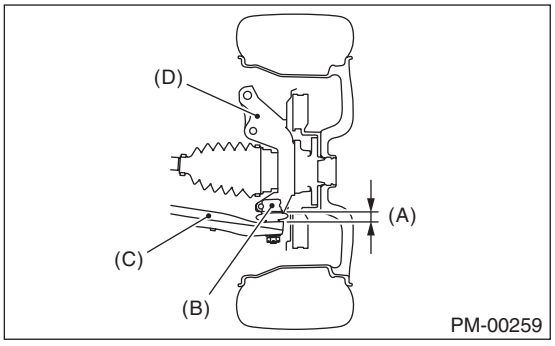
A: INSPECTION

1. FRONT SUSPENSION BALL JOINT

1) Lift up the vehicle until front wheels are off ground.
2) Grasp the bottom of tire and move it in and out in axial direction. If movement (B) is observed between the brake disc cover (A) and end of front arm (D), ball joint (C) may be excessively worn.



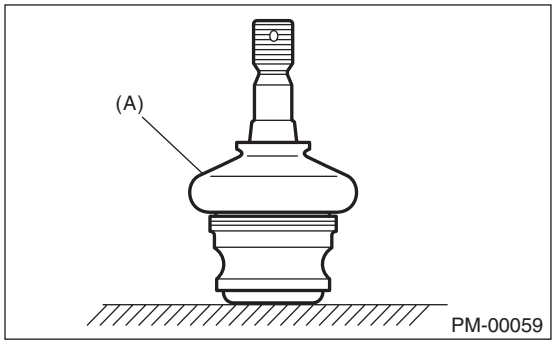
3) Next, grasp the end of front arm (C) and move it up and down. If movement (A) between the housing (D) and front arm (C) boss is observed, ball joint (B) may be excessively worn.



4) If the relative movement is observed in the preceding two steps, remove and inspect the ball joint. If the free play exceeds standard value, replace the ball joint. <Ref. to FS-28, Front Ball Joint.>

5) Damage of dust boot
Visually inspect the ball joint dust boot. Replace if ball joint is damaged.

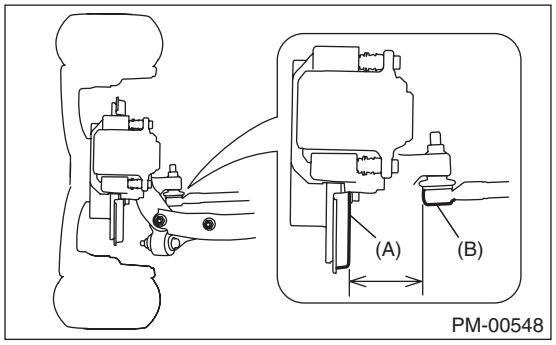
NOTE:
When the front arm ball joint is removed or replaced, check the toe-in of front wheel. If it is not within the specified value, adjust the toe-in. <Ref. to FS-7, Wheel Alignment.>



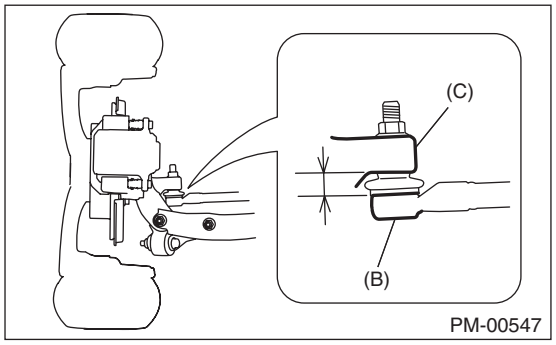
(A) Dust boot

2. REAR SUSPENSION BALL JOINT

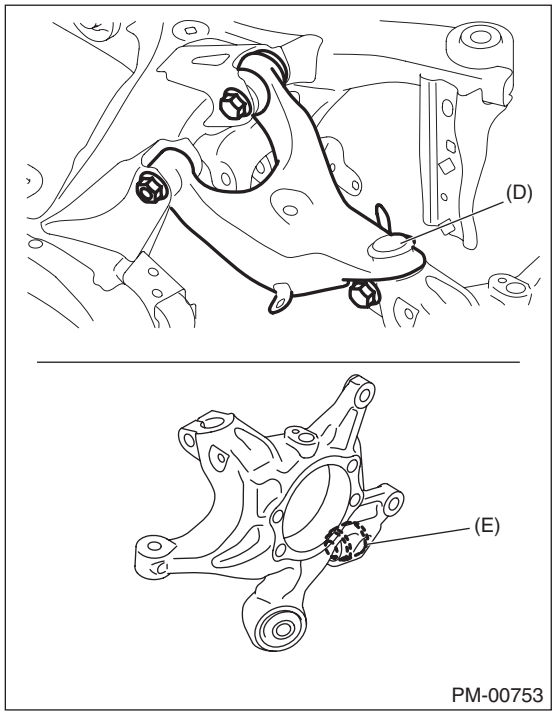
1) Lift up the vehicle until rear wheels are off ground.
2) Grasp the bottom of tire and move it in and out in axial direction.
3) If movement is observed between the brake disc cover (A) and end of front lateral link (B), ball joint may be excessively worn.



4) Grasp the end of front lateral link (B) and move it up and down. If movement is observed between the housing (C) and front lateral link (B) boss, ball joint may be excessively worn.



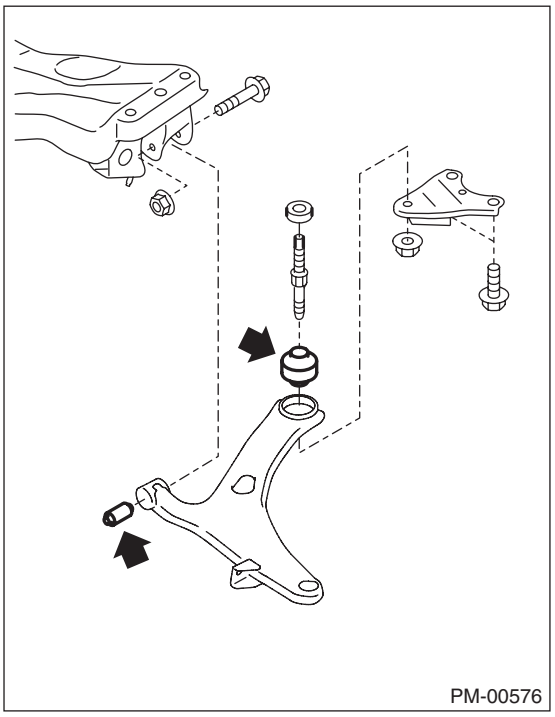
5) If the movement related to the previous two steps is observed, replace the front lateral link. <Ref. to RS-25, Front Lateral Link.>
6) Damage of dust boots
Visually inspect the ball joint dust boots. Replace if front lateral link is damaged.
7) Check the upper arm ball joint (D) and the pillow ball bushing (E) of housing in the same manner.



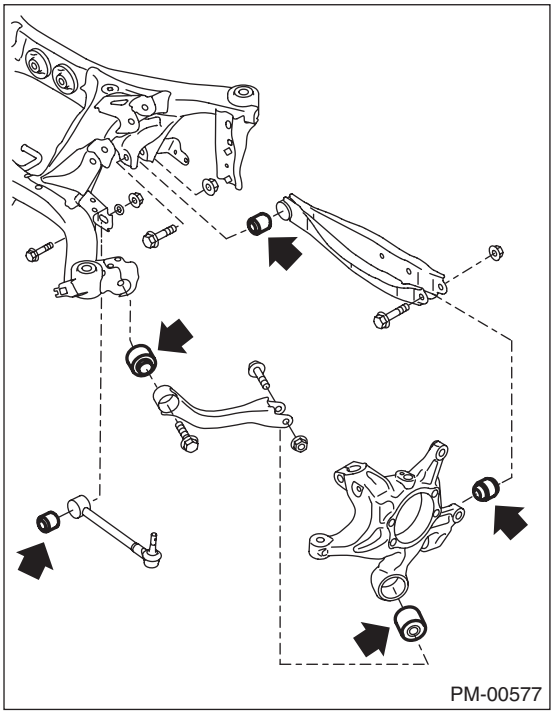
3. FRONT, REAR SUSPENSION BUSHING

Apply pressure with tire lever etc, and inspect the bushing for excessive wear or damage. If defective, replace the bushing.

- Front suspension bushing



- Rear suspension bushing



4. WHEEL ARCH HEIGHT

Refer to “FS” section for wheel arch height inspection. <Ref. to FS-8, WHEEL ARCH HEIGHT, INSPECTION, Wheel Alignment.>

5. WHEEL ALIGNMENT

Measure and adjust the front and rear wheel alignment at a time. Refer to “FS” section for measurement and adjustment of wheel alignment. <Ref. to FS-7, INSPECTION, Wheel Alignment.>

6. OIL LEAKAGE OF STRUT AND SHOCK ABSORBER

Visually inspect the front strut and rear shock absorber for oil leakage. Replace the front strut and rear shock absorber if oil leaks excessively.

7. TIGHTNESS OF BOLTS AND NUTS

Check the bolts and nuts for looseness. Retighten the bolts and nuts to specified torque. If the self-locking nuts and bolts are removed, replace them with new parts. <Ref. to FS-2, General Description.> <Ref. to RS-2, General Description.>

8. DAMAGE TO SUSPENSION PARTS

Check the following parts and the fastening portion of the vehicle body for deformation or excessive rusting which impairs the suspension. Thoroughly remove the deposits of the lower spring seat of strut where dust or mud are likely piled up. If necessary, replace the damaged parts with new parts. If minor rust formation, pitting, etc. are noted, remove the rust and take rust prevention measure.

- Front suspension
  - Front arm
  - Crossmember
  - Strut
- Rear suspension
  - Sub frame
  - Front lateral link
  - Rear lateral link
  - Upper arm
  - Trailing link
  - Shock absorber
- In the area where salt is sprayed to melt snow on a road in winter, check suspension parts for damage caused by rust every 12 months after lapse of 60 months. Take rust prevention measures as required.

21.Wheel Bearing

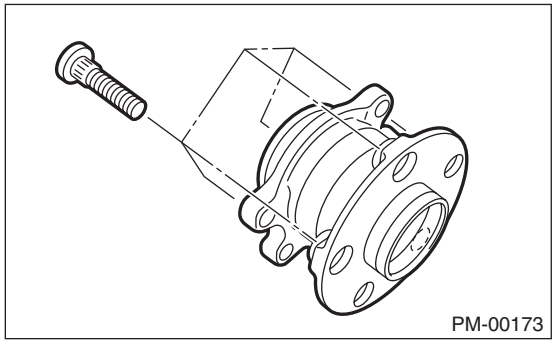
A: INSPECTION

1. FRONT WHEEL BEARING

NOTE:
Inspect the condition of front wheel bearing grease.
1) Jack-up the front side of vehicle.
2) While holding the front wheel by hand, swing it in and out to check bearing free play.
3) Loosen the wheel nuts, and remove the front wheel.
4) If the bearing free play exists in step 2) above, attach a dial gauge to the hub and measure axial play in axial direction.

Service limit:
Straight-ahead position within 0.05 mm (0.0020 in)

5) Remove the bolts and self-locking nuts, and extract the front arm from front crossmember.
6) Remove the joint of front drive shaft from transmission. <Ref. to DS-17, Front Axle.>
7) While supporting the front drive shaft horizontally with one hand, turn the hub with the other hand to check for noise or binding.
If the hub is noisy or binds, replace the front axle.

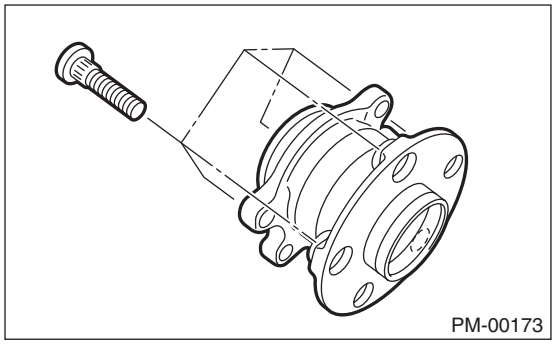

PM-00173

2. REAR WHEEL BEARING

1) Jack-up the rear side of vehicle.
2) While holding the rear wheel by hand, swing it in and out to check bearing free play.
3) Loosen the wheel nuts, and remove the rear wheel.
4) If the bearing free play exists in step 2) above, attach a dial gauge to the hub and measure axial play in axial direction.

Service limit:
Straight-ahead position within 0.05 mm (0.0020 in)

5) Remove the joint of rear drive shaft from rear differential. <Ref. to DS-70, Rear Drive Shaft.>
6) While supporting rear drive shaft horizontally with one hand, turn the hub with the other hand to check for noise or binding.
If the hub is noisy or binds, replace the rear axle.


PM-00173

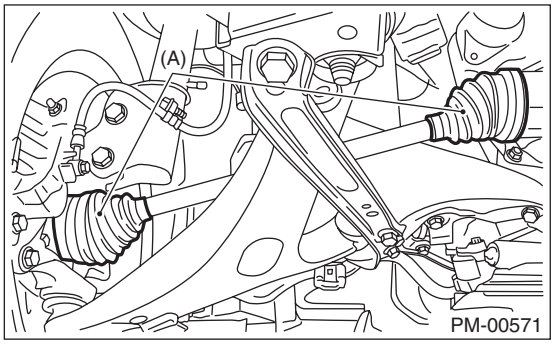
22.Axle Boots & Joints

A: INSPECTION

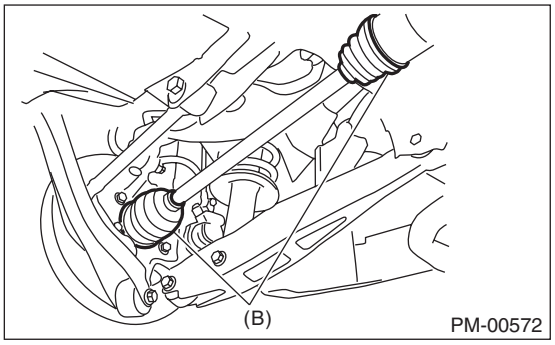
1. FRONT AND REAR AXLE BOOTS

Inspect the front axle boots (A) and rear axle boots (B) for deformation, damage or failure. If faulty, replace with new part. <Ref. to DS-54, Front Drive Shaft.> <Ref. to DS-70, Rear Drive Shaft.>

- Front



- Rear



2. PROPELLER SHAFT

Inspect the propeller shaft for damage or failure. If faulty, replace with new part. <Ref. to DS-12, Propeller Shaft.>

23.Tire Inspection and Rotation

A: INSPECTION

Refer to “WT” section for tire inspection and rotation. <Ref. to WT-6, TIRE ROTATION, INSPECTION, Tire and Wheel.>

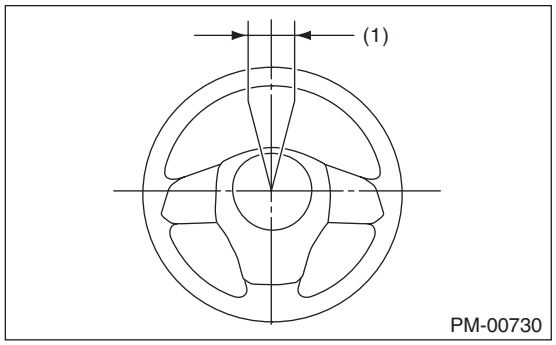
24.Steering System (Power Steering)

A: INSPECTION

1. STEERING WHEEL

1) Set the steering wheel in a straight-ahead position, and check the wheel spokes to make sure they are correctly set in their specified positions.
2) Lightly turn the steering wheel to the left and right to determine the point where front wheels start to move. Measure the distance of the movement of steering wheel (periphery).

Steering wheel free play:
0 — 17 mm (0 — 0.67 in)



(1) Steering wheel free play

Move the steering wheel toward the shaft to check if there is play in the direction.

Play limit:
0.5 mm (0.020 in)

3) Drive the vehicle and check the following items.
(1) Steering force:
The effort required for steering should be smooth and even at all points, and should not vary.
(2) Pulled to one side:
Steering wheel should not be pulled to one side while driving on a level surface.
(3) Wheel runout:
Steering wheel should not show any sign of runout.
(4) Return status:
Steering wheel should return to its original position after it has been turned and then released.

2. STEERING SHAFT JOINT

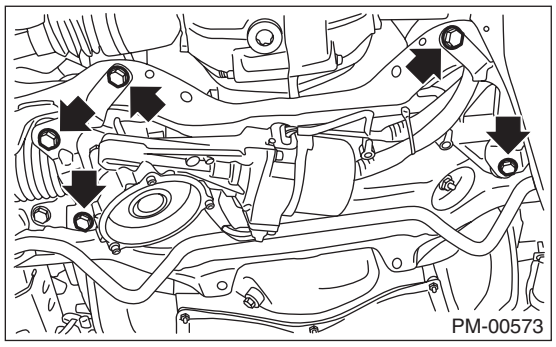
When the steering wheel free play is excessive, disconnect the universal joint of steering shaft and check it for any play and yawing torque (at the point of the crossing direction). Also inspect for any damage to sealing or worn serrations. If the joint is loose, retighten the mounting bolts to the specified torque. <Ref. to PS-16, Universal Joint.>

Tightening torque:
24 N·m (2.4 kgf-m, 17.4 ft-lb)

3. GEARBOX

1) Set the steering wheel in the straight position, then rotate it 90° in both the left and right directions. While steering wheel is being rotated, check the looseness of the gearbox.

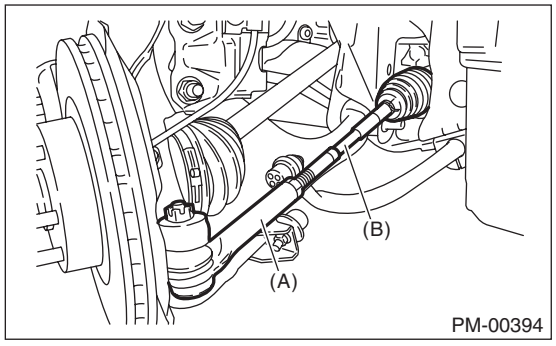
Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



2) Check the boot for damage, cracks or deterioration.
3) With the vehicle stopped on a level surface, quickly turn the steering wheel to the left and right. While steering wheel is being rotated, check the gear backlash. If any noise is noticed, adjust the gear backlash. <Ref. to PS-38, GEARBOX BACKLASH ADJUSTMENT, ADJUSTMENT, Electric Power Steering Gearbox.>

4. TIE-ROD

1) Check the tie-rod and tie-rod ends for bends, scratches or other damage.



(A) Tie-rod end
(B) Tie-rod

2) Confirm that the connections of knuckle ball joints for play, and then check for damage on dust boots and free play of ball studs. If castle nut is loose, retighten it to the specified torque, then tighten further up to a maximum of 60° until the cotter pin hole is aligned.

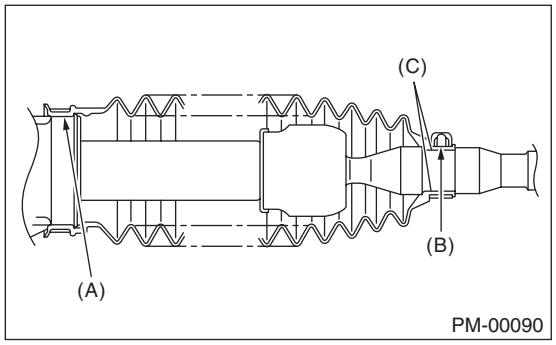
Tightening torque:
27 N·m (2.75 kgf-m, 19.9 ft-lb)
3) Check the lock nut on the tie-rod end for tightness. If it is loose, retighten it to the specified torque.

Tightening torque:
85 N·m (8.7 kgf-m, 62.7 ft-lb)

5. GEARBOX BOOTS

Inspect both sides of the gearbox boot as follows, and correct the defects if necessary.
1) The (A) and (B) positions of the gearbox boot are fitted in (A) and (C) grooves of gearbox and the rod.
2) Clips are fitted onto the boot grooves to the positions (A) and (B) of the boot.
3) Check that there is no cracks or holes in the boot.

NOTE:
Rotate (B) position of gearbox boot against the torsion produced by the adjustment of toe-in etc. Apply grease to the groove (C).



25.A/C Filter

A: REPLACEMENT

Refer to “AC” section for A/C filter replacement. <Ref. to AC-105, REPLACEMENT, A/C Filter.>

ENGINE 1 SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUEL INJECTION (FUEL SYSTEMS)	FU(H4DO(w/o HEV))
EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)	EC(H4DO(w/o HEV))
INTAKE (INDUCTION)	IN(H4DO(w/o HEV))
MECHANICAL	ME(H4DO(w/o HEV))
EXHAUST	EX(H4DO(w/o HEV))
COOLING	CO(H4DO(w/o HEV))
LUBRICATION	LU(H4DO(w/o HEV))
SPEED CONTROL SYSTEMS	SP(H4DO(w/o HEV))
IGNITION	IG(H4DO(w/o HEV))
STARTING/CHARGING SYSTEMS	SC(H4DO(w/o HEV))
ENGINE (DIAGNOSTICS)	EN(H4DO w/o HEV)(diag)

FUEL INJECTION (FUEL SYSTEMS)

FU(H4DO(w/o HEV))

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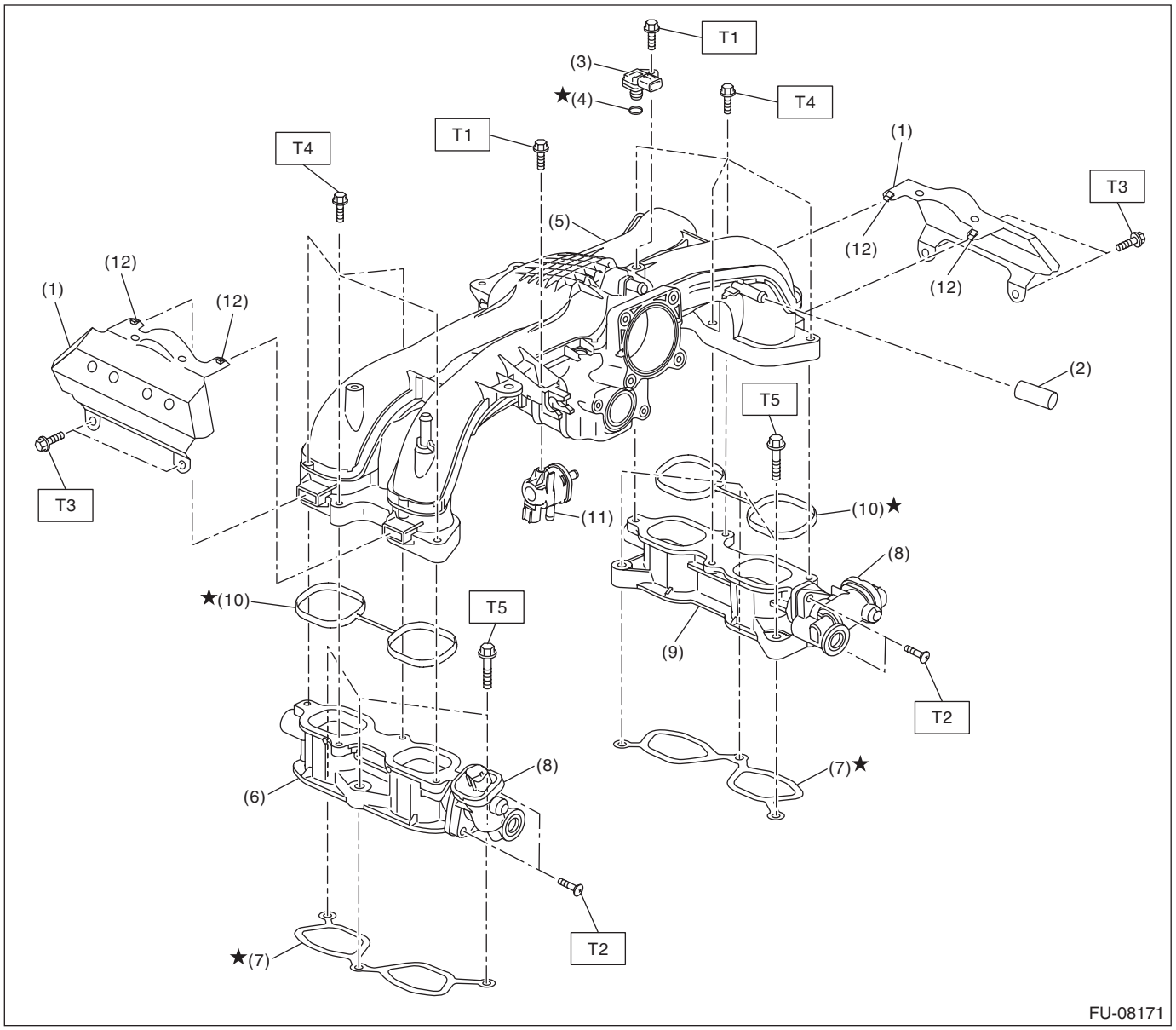
1. General Description

A: SPECIFICATION

Fuel tank	Capacity	Impreza model	55 L (14.5 US gal, 12.1 Imp gal)
		Crosstrek model	60 L (15.9 US gal, 13.2 Imp gal)
	Location		Under rear seat
Fuel pump	Type		Impeller
	Shutoff discharge pressure		750 kPa (7.7 kg/cm^2, 108.8 psi) or less
	Discharge rate		82 L (21.7 US gal, 18 Imp gal)/h or more [12.5 V at 343 kPa (3.5 kg/cm^2, 49.7 psi)]
Fuel filter			In-tank type

B: COMPONENT

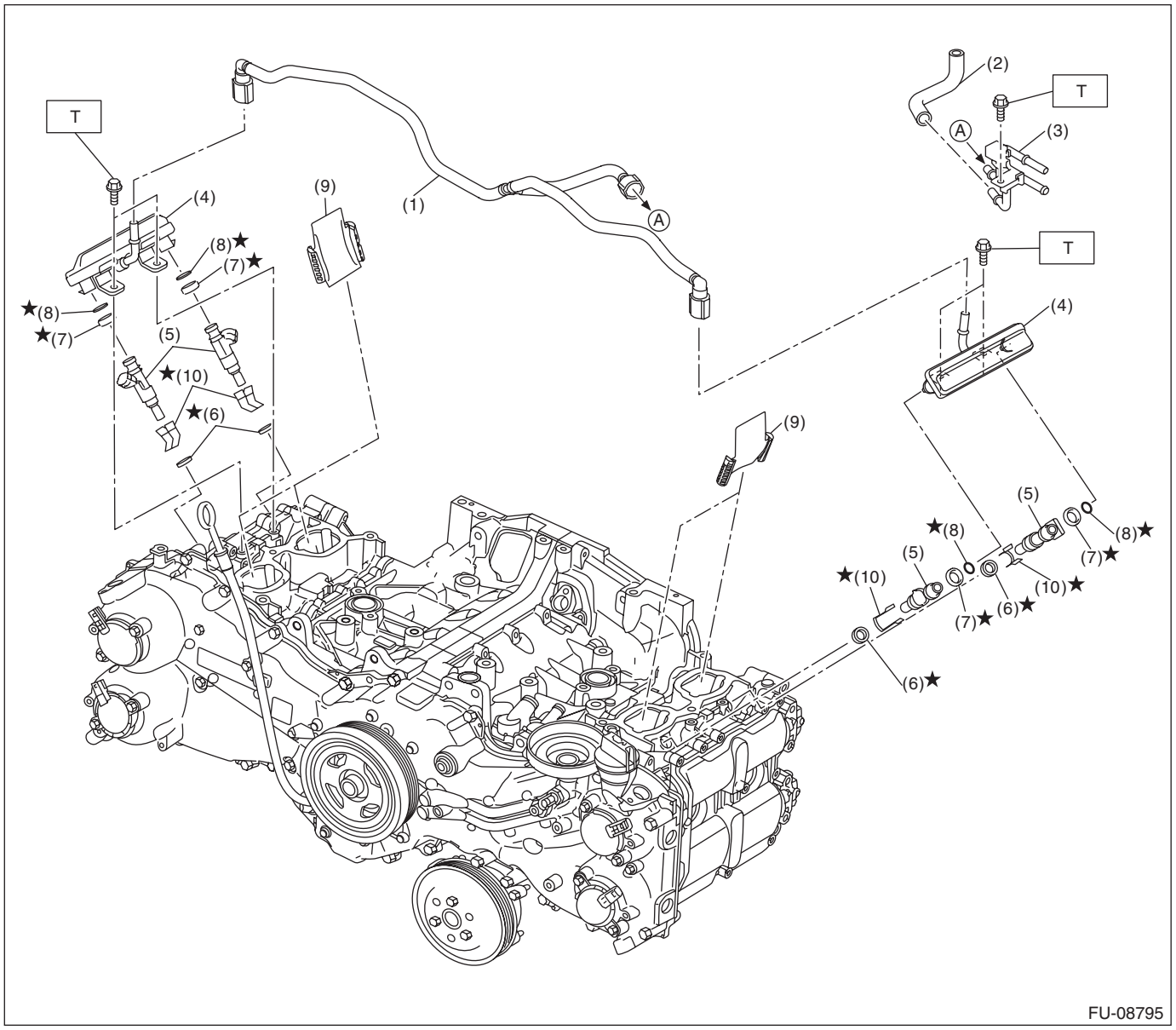
1. INTAKE MANIFOLD 1



(1)	Intake manifold protector	(7)	Gasket	
(2)	Cap	(8)	Tumble generator valve actuator	
(3)	Manifold absolute pressure sensor	(9)	Tumble generator valve RH	
(4)	O-ring	(10)	Gasket	
(5)	Intake manifold	(11)	Purge control solenoid valve	
(6)	Tumble generator valve LH	(12)	Cushion	

Tightening torque: N·m (kgf-m, ft-lb)
T1: 3.4 (0.3, 2.5)
T2: 6 (0.6, 4.4)
T3: 6.4 (0.7, 4.7)
T4: 8.3 (0.8, 6.1)
T5: 25 (2.5, 18.4)

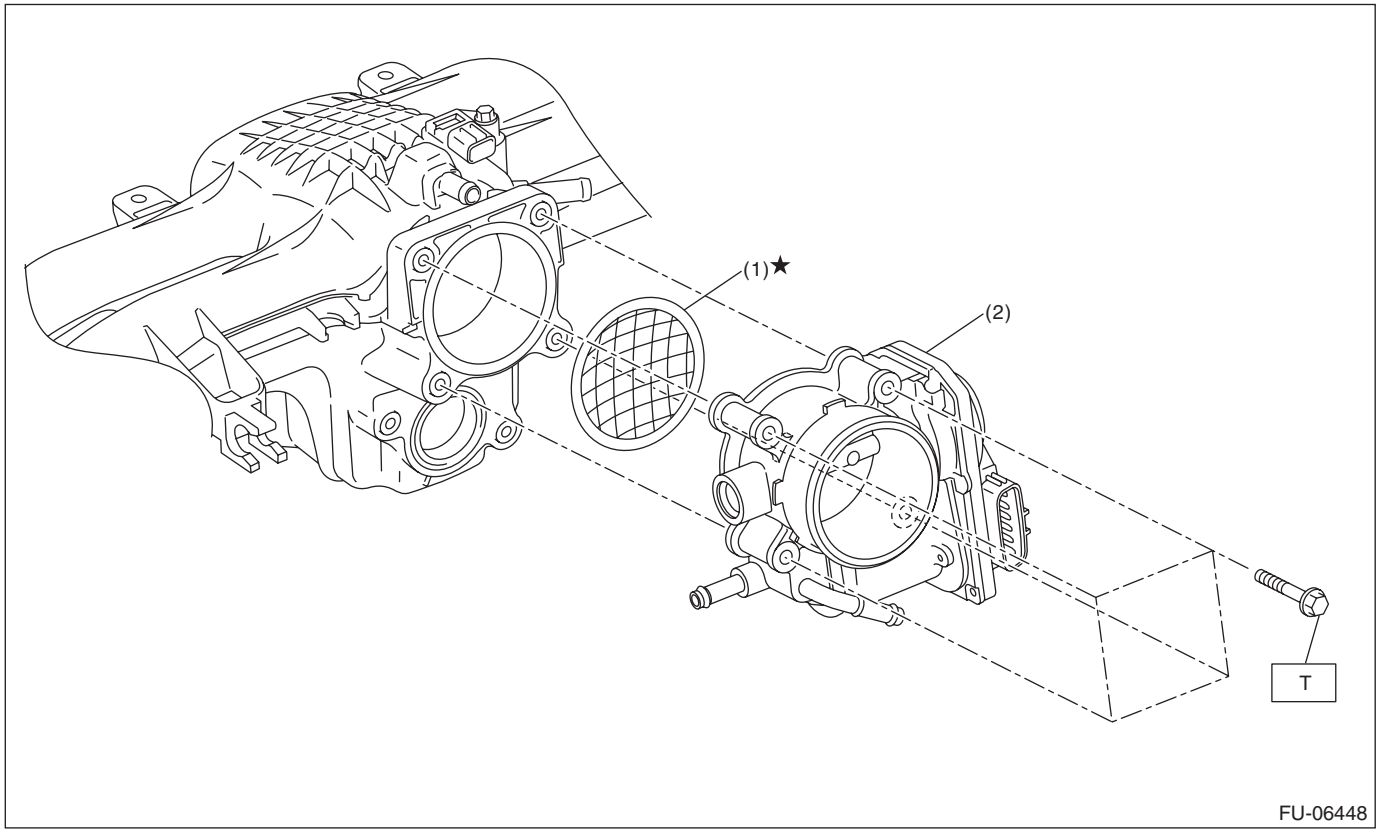
2. INTAKE MANIFOLD 2



(1) Fuel delivery pipe
(2) Vacuum hose
(3) Fuel pipe A
(4) Fuel pipe B
(5) Fuel injector
(6) Seal ring
(7) Rubber
(8) O-ring
(9) Cylinder head plate
(10) Fuel injector holder

Tightening torque: N·m (kgf-m, ft-lb)
T: 6.4 (0.7, 4.7)

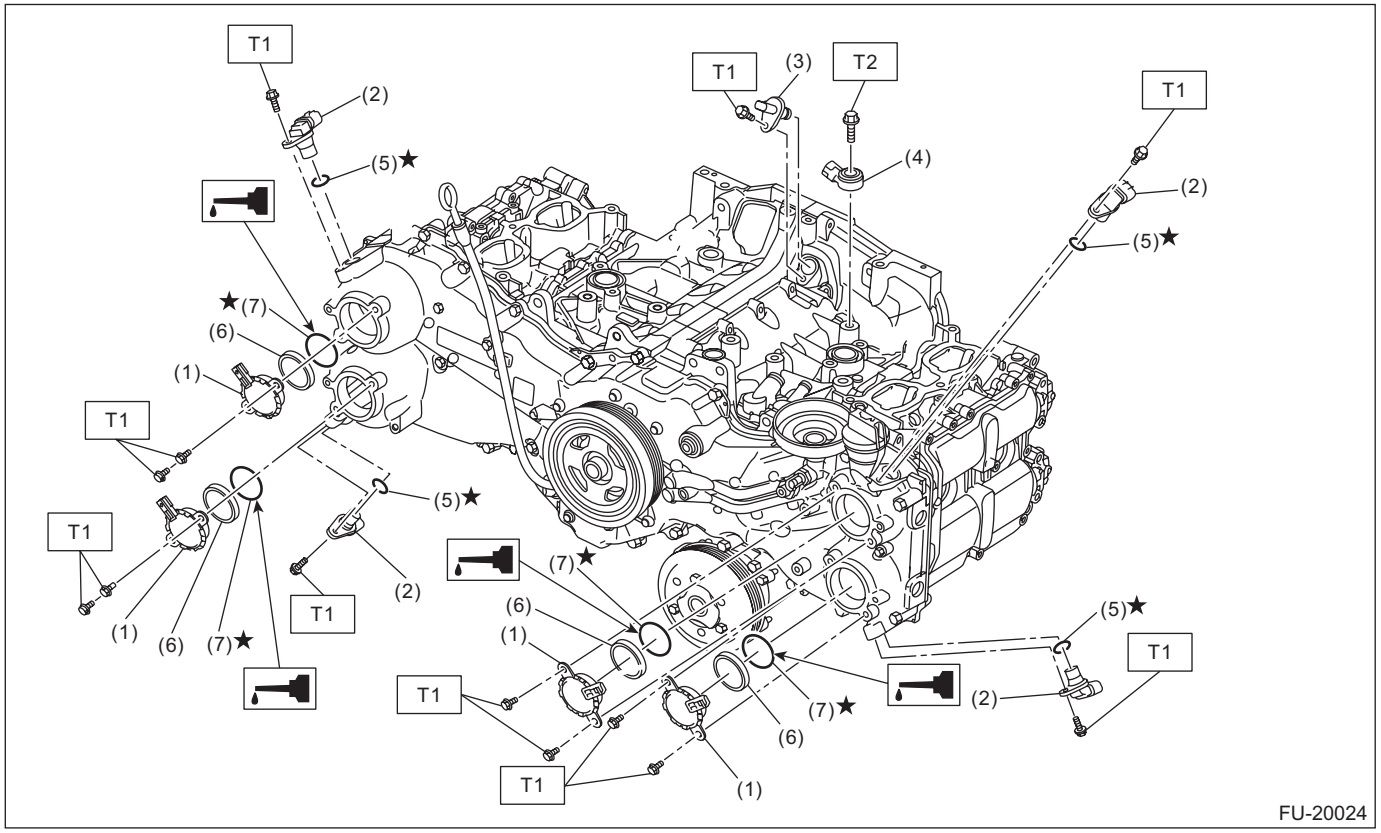
3. THROTTLE BODY



(1) Gasket
(2) Throttle body

Tightening torque: N·m (kgf-m, ft-lb)
T: 8 (0.8, 5.9)

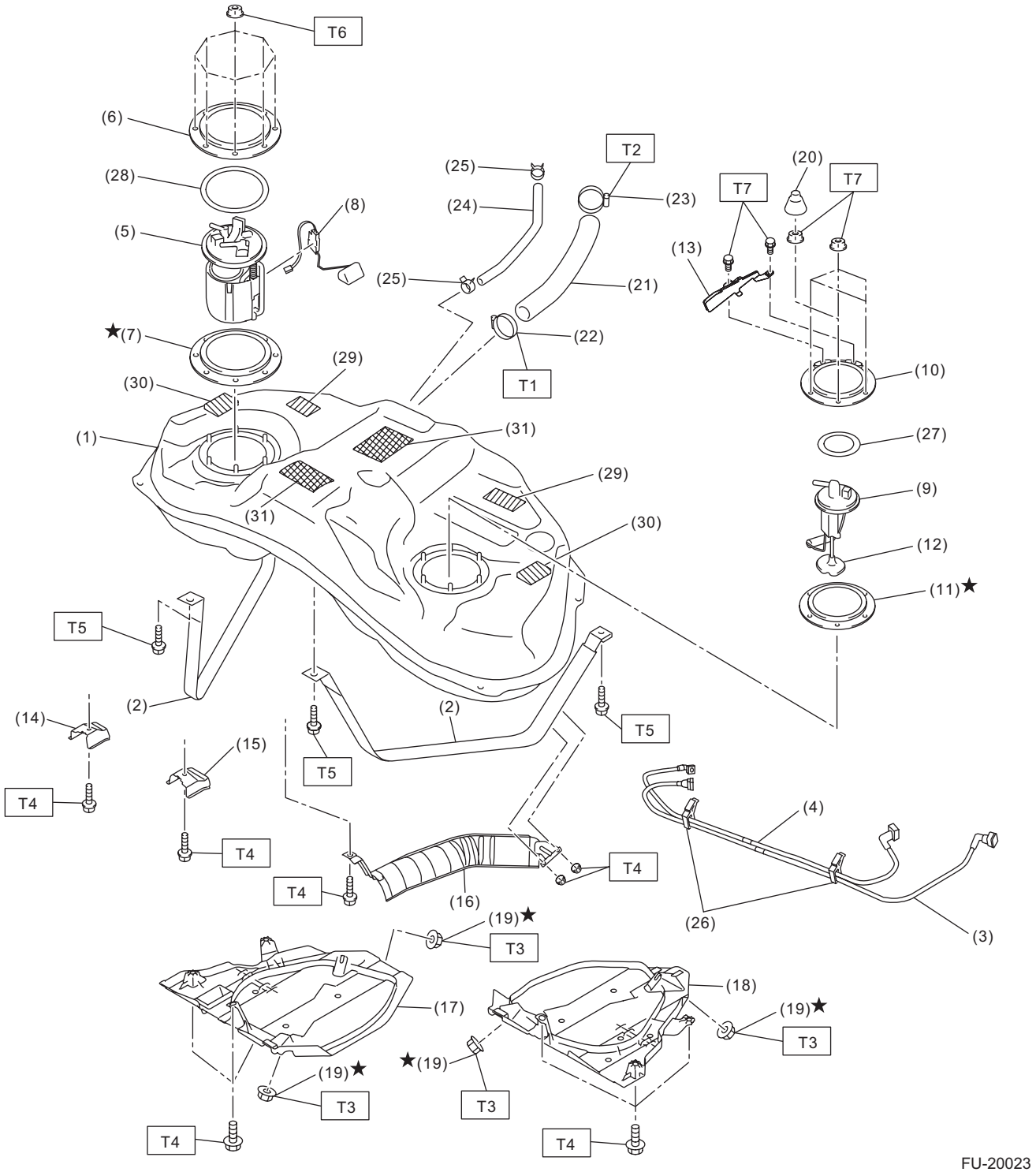
4. CRANKSHAFT POSITION, CAMSHAFT POSITION AND KNOCK SENSORS



(1) Oil control solenoid
(2) Camshaft position sensor
(3) Crankshaft position sensor
(4) Knock sensor
(5) O-ring
(6) Back-up ring
(7) O-ring

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.7, 4.7)
T2: 24 (2.4, 17.7)

5. FUEL TANK



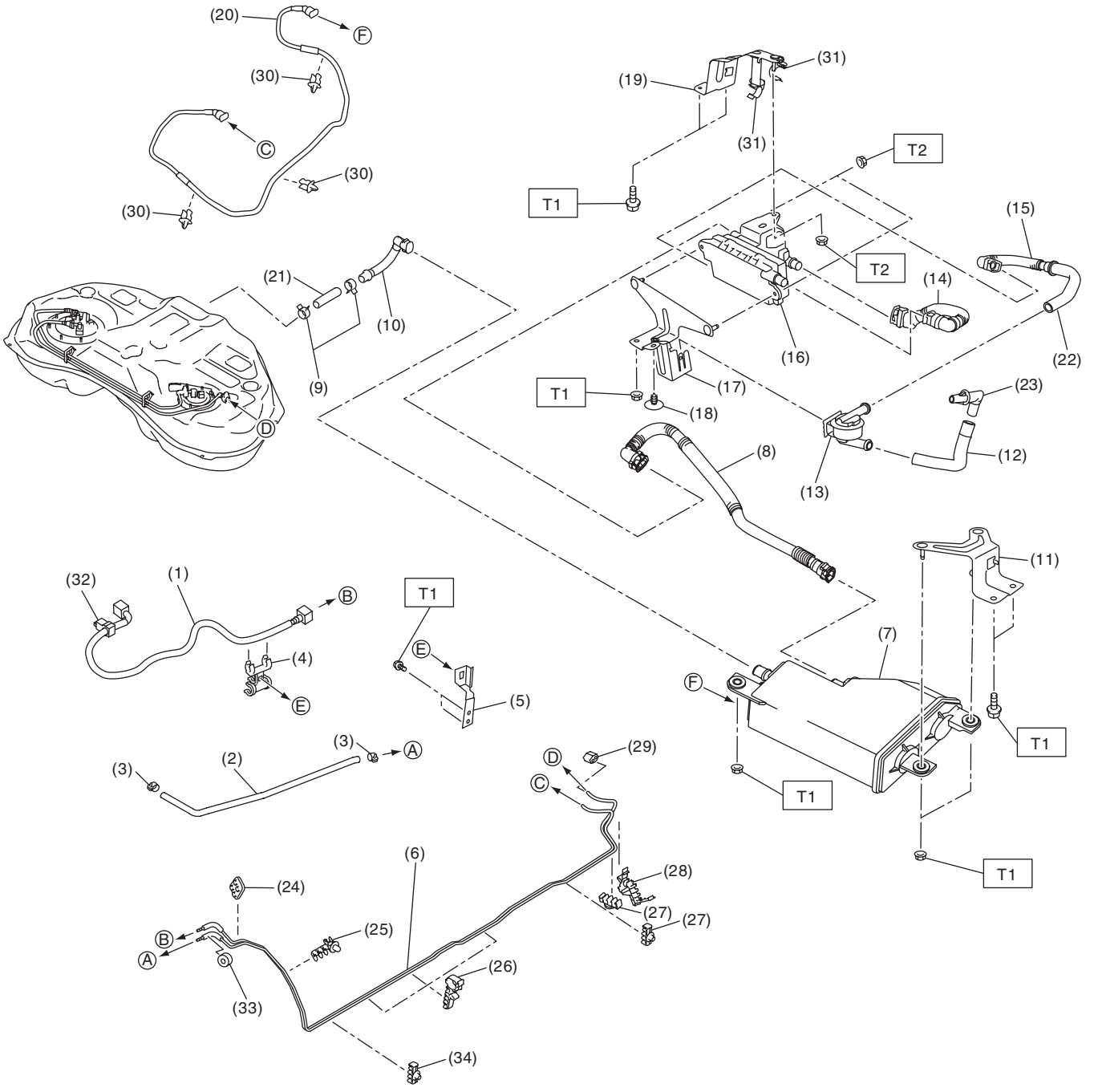
FU-20023

(1) Fuel tank
(2) Fuel tank band
(3) Delivery tube
(4) Jet pump tube
(5) Fuel pump ASSY
(6) Fuel pump upper plate
(7) Fuel pump gasket
(8) Fuel level sensor
(9) Fuel sub level sensor
(10) Fuel sub level sensor upper plate
(11) Fuel sub level sensor gasket
(12) Fuel sub level sensor filter
(13) Fuel sub level sensor protector
(14) Stopper RH
(15) Stopper LH
(16) Heat shield cover
(17) Fuel tank protector RH
(18) Fuel tank protector LH
(19) Self-locking nut
(20) Rubber cap
(21) Fuel filler hose
(22) Clamp
(23) Clamp
(24) Air vent hose
(25) Clip
(26) Tube clamp
(27) Fuel sub level sensor upper plate cushion
(28) Fuel pump upper plate cushion
(29) Cushion
(30) Cushion
(31) Cushion

Tightening torque: N·m (kgf-m, ft-lb)

T1:	***2 (0.2, 1.5)***
T2:	***2.5 (0.3, 1.8)***
T3:	***9 (0.9, 6.6)***
T4:	***18 (1.8, 13.3)***
T5:	***33 (3.4, 24.3)***
T6:	***<Ref. to FU(H4DO(w/o HEV))-140, INSTALLATION, Fuel Pump.>***
T7:	***<Ref. to FU(H4DO(w/o HEV))-152, INSTALLATION, Fuel Sub Level Sensor.>***

6. FUEL LINE

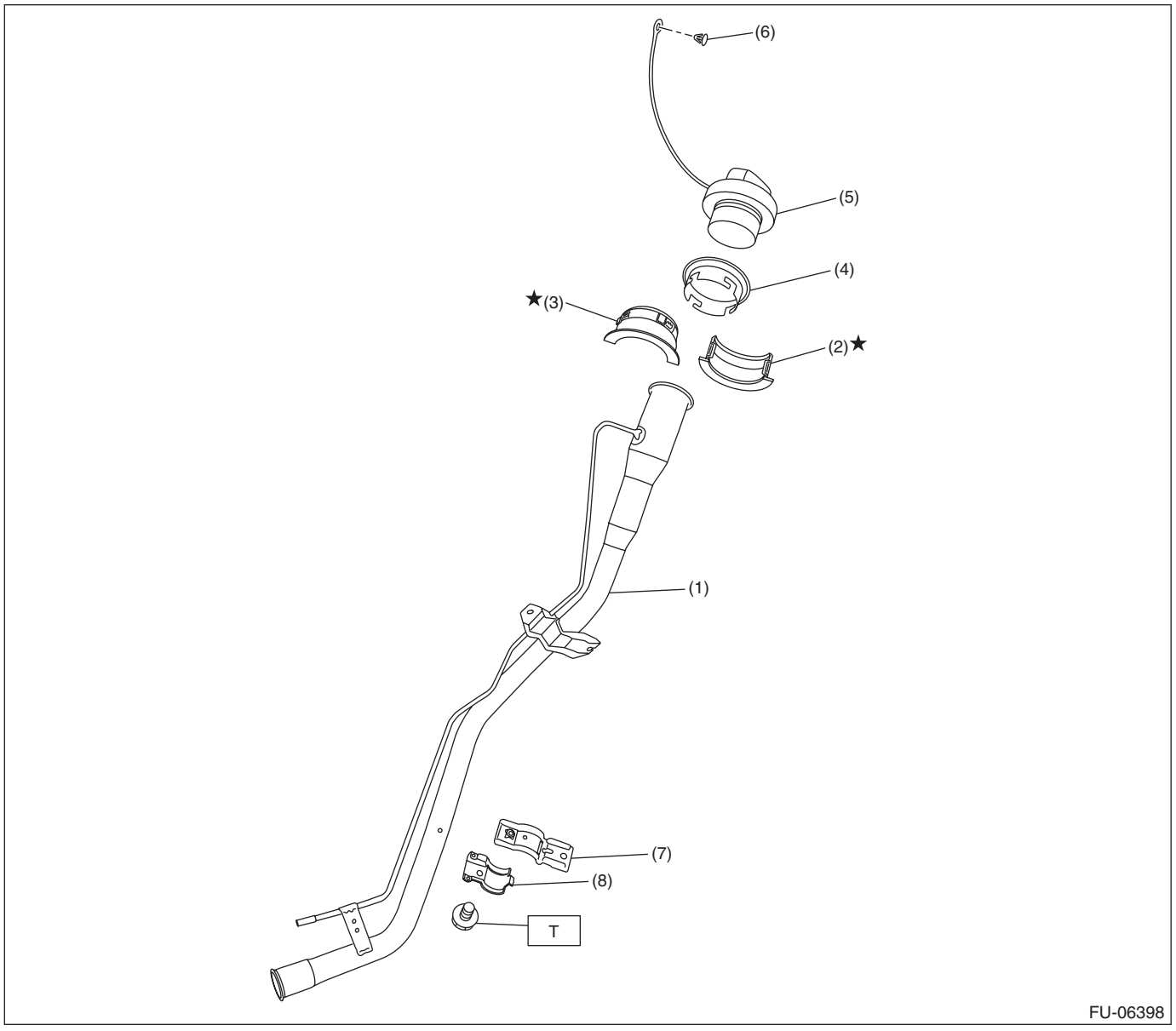


FU-08922

(1) Fuel delivery tube
(2) Evaporation hose
(3) Clip
(4) Hose clamp
(5) Hose clamp bracket
(6) Fuel pipe ASSY
(7) Canister
(8) Drain tube A
(9) Clip
(10) Vent tube
(11) Canister bracket
(12) Intake hose
(13) Drain separator
(14) Drain tube B
(15) Drain tube C
(16) Leak check valve ASSY
(17) Leak check valve bracket A
(18) Clip
(19) Leak check valve bracket B
(20) Purge pipe
(21) Vent hose
(22) Drain hose
(23) Connector
(24) Fuel pipe front grommet
(25) Pipe clamp
(26) Pipe clamp
(27) Pipe clamp
(28) Pipe clamp
(29) Fuel pipe rear grommet
(30) Pipe clamp
(31) Tube clamp
(32) Tube clamp
(33) Bushing
(34) Pipe clamp

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.8, 5.5)
T2: 18 (1.8, 13.3)

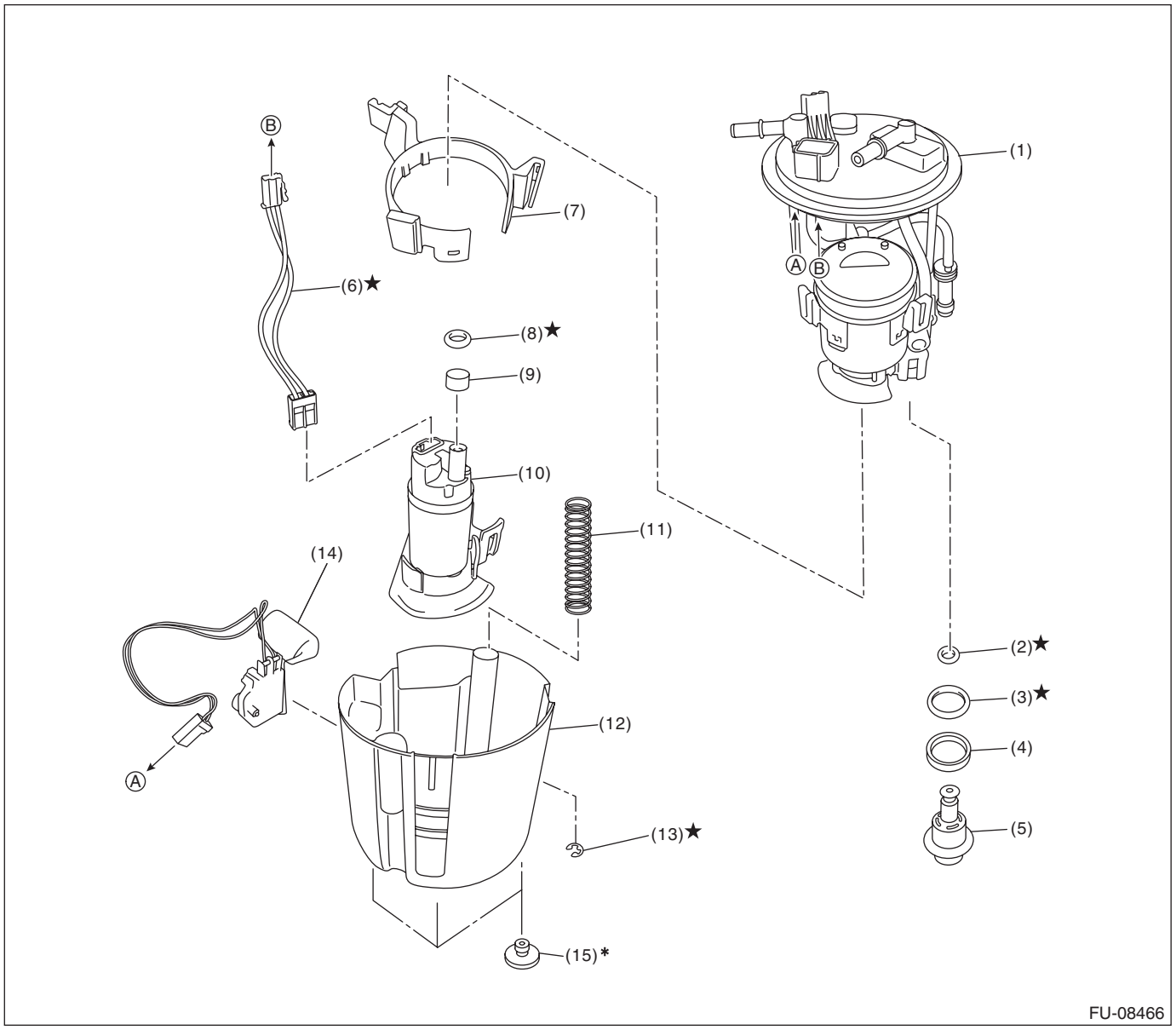
7. FUEL FILLER PIPE



(1) Fuel filler pipe ASSY
(2) Neck holder A
(3) Neck holder B
(4) Fuel filler pipe protector
(5) Fuel filler cap
(6) Clip
(7) Upper bracket
(8) Lower bracket

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.8, 5.5)

8. FUEL PUMP



(1)	Fuel filter ASSY	(6)	Connector cable	(11)	Spring
(2)	O-ring	(7)	Fuel pump holder	(12)	Fuel chamber ASSY
(3)	O-ring	(8)	O-ring	(13)	Clip
(4)	Back-up ring	(9)	Spacer	(14)	Fuel level sensor
(5)	Pressure regulator	(10)	Fuel pump	(15)	Cushion

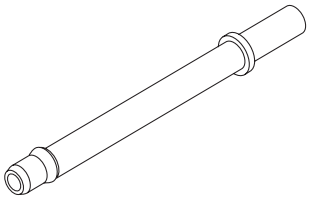
* When removing the cushion from the fuel chamber assembly, replace it with a new part.

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Place “NO OPEN FLAMES” signs near the working area.
- Prepare a container and cloth to prevent scattering of fuels when performing work where fuels can be spilled. If the oil spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Follow all government and local regulations concerning disposal of refuse when disposing fuel.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18471AA000	18471AA000	FUEL PIPE ADAPTER	Used for draining fuel.
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

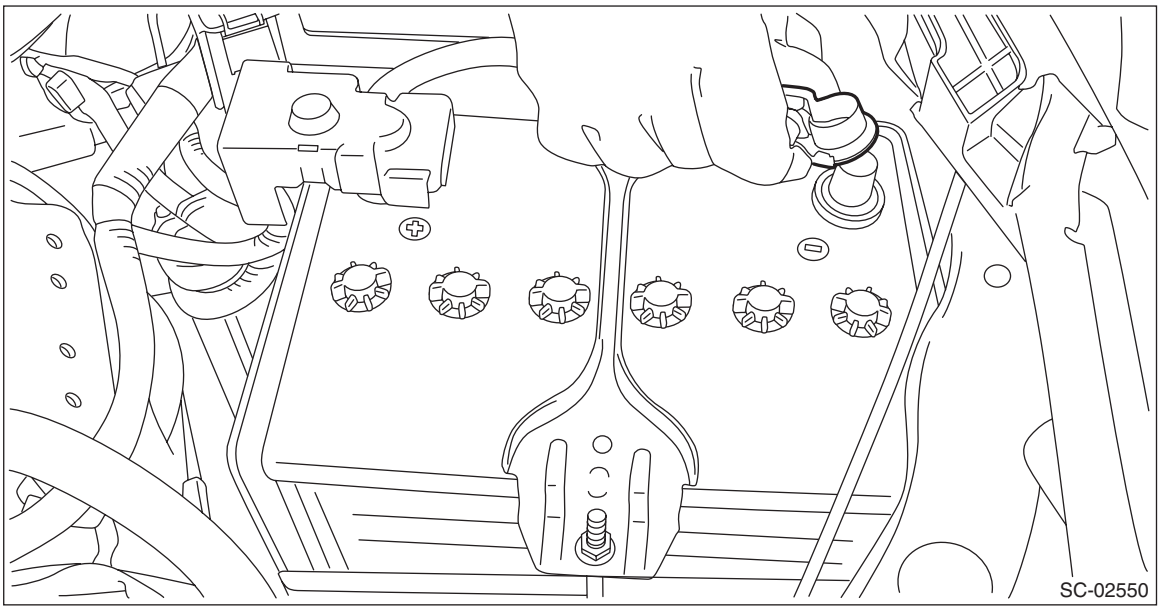
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for inspecting the waveform of each sensor.
Mighty Vac	Used for inspecting the manifold absolute pressure sensor.
DST-i	Used together with Subaru Select Monitor 4.

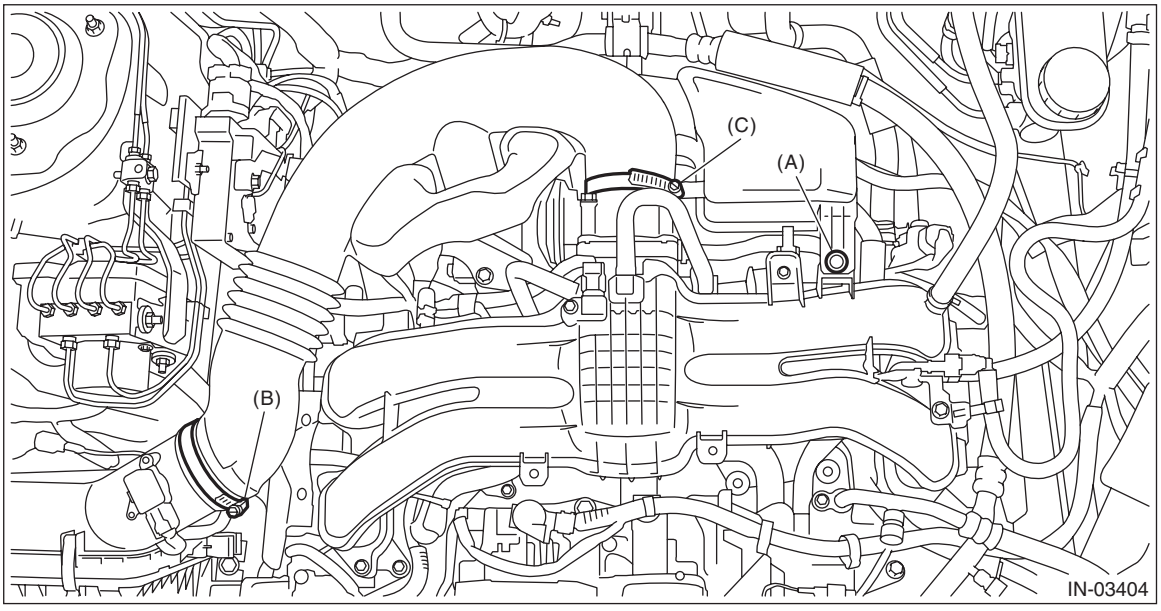
2. Throttle Body

A: REMOVAL

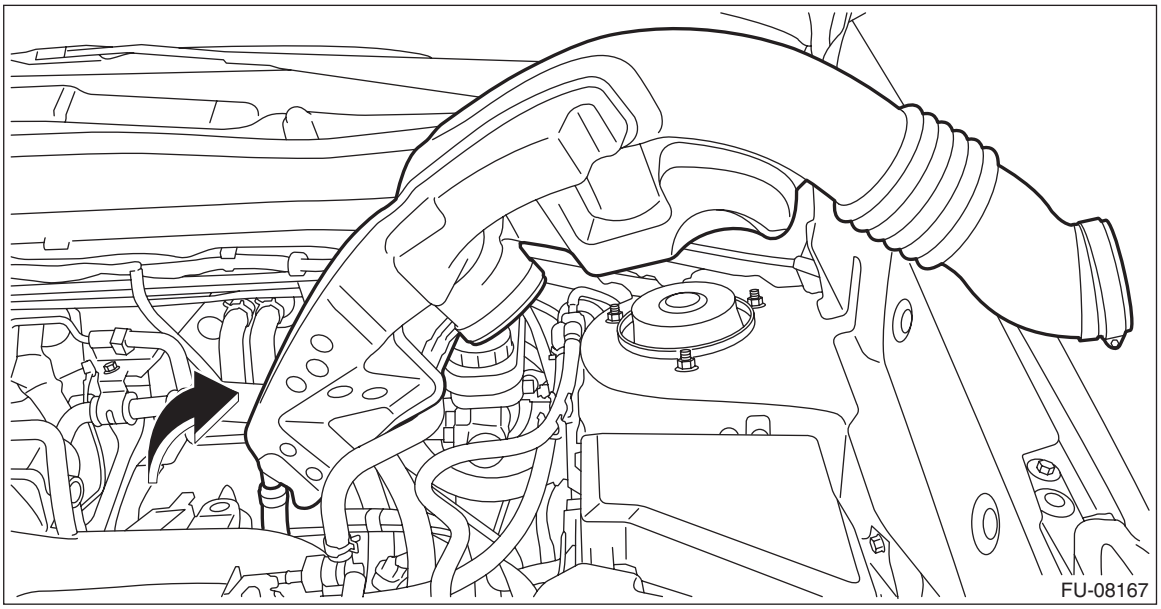
1) Disconnect the ground cable from battery.



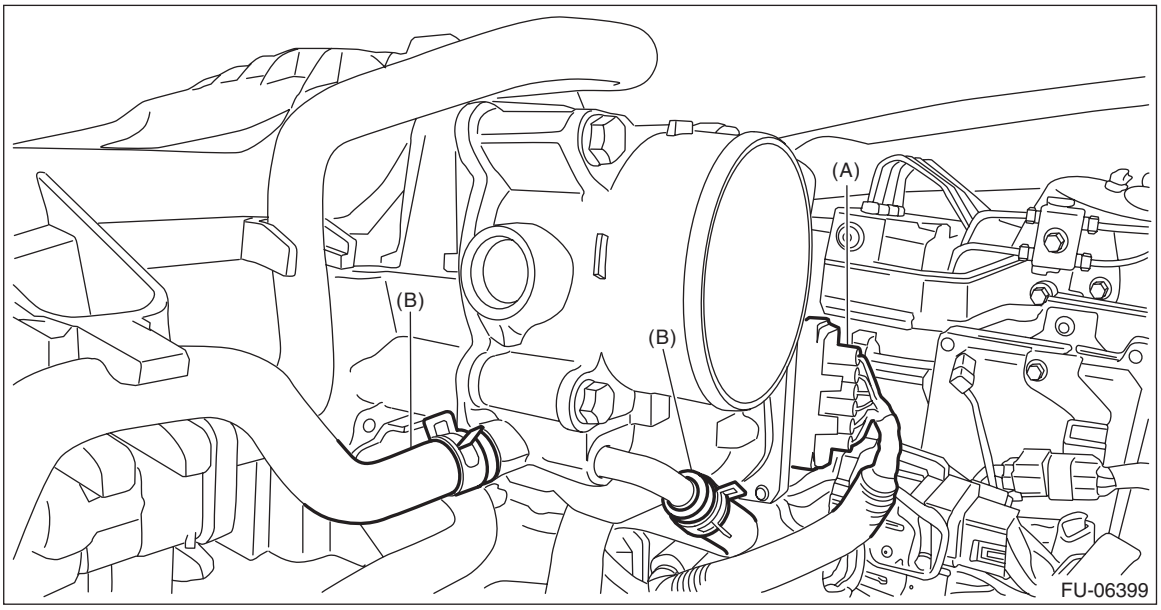
2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Drain approximately 3.0 L (3.2 US qt, 2.6 Imp qt) of coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
5) Remove the clip (A), and loosen the clamps (B) and (C) securing the air intake boot.



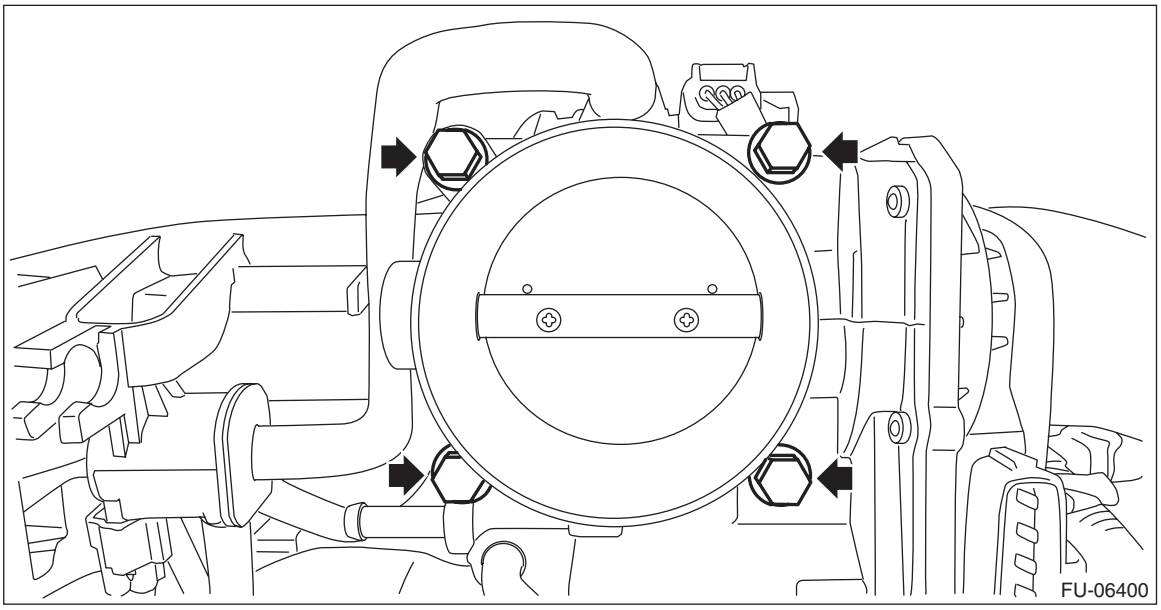
6) Remove the air intake boot from the air cleaner case (rear) and throttle body, and move it to the left side wheel apron.



7) Disconnect the connectors (A) from the throttle position sensor.
8) Disconnect the preheater hose (B) from the throttle body.



9) Remove the throttle body from the intake manifold.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Use a new gasket.

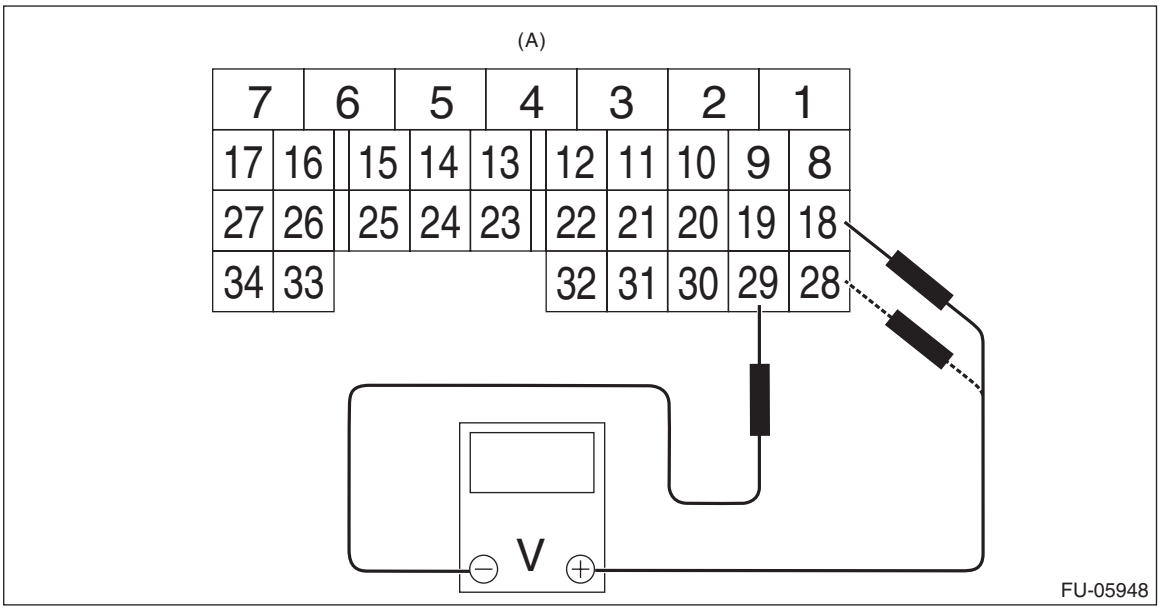
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

C: INSPECTION

1. THROTTLE SENSOR (METHOD WITH CIRCUIT TESTER)

1) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
2) Turn the ignition switch to ON. (engine OFF)
3) Measure the voltage between ECM connector terminals.





(A) To ECM connector

Throttle sensor	Accelerator pedal	Terminal No.	Standard
Main	Not depressed (full closed)	18 (+) and 29 (–)	Approx. 0.6 V
	Depressed (full opened)		Approx. 4.0 V
Sub	Not depressed (full closed)	28 (+) and 29 (–)	Approx. 1.5 V
	Depressed (full opened)		Approx. 4.2 V

4) After inspection, install the related parts in the reverse order of removal.

2. THROTTLE SENSOR (METHOD WITH SUBARU SELECT MONITOR)

1) Turn the ignition switch to ON. (engine OFF)
2) Read the throttle opening angle signal and voltage of throttle sensor using Subaru Select Monitor. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.>

Throttle sensor	Throttle opening angle signal	Standard
Main	0.0%	Approx. 0.6 V
	100.0%	Approx. 4.0 V
Sub	0.0%	Approx. 1.5 V
	100.0%	Approx. 4.2 V

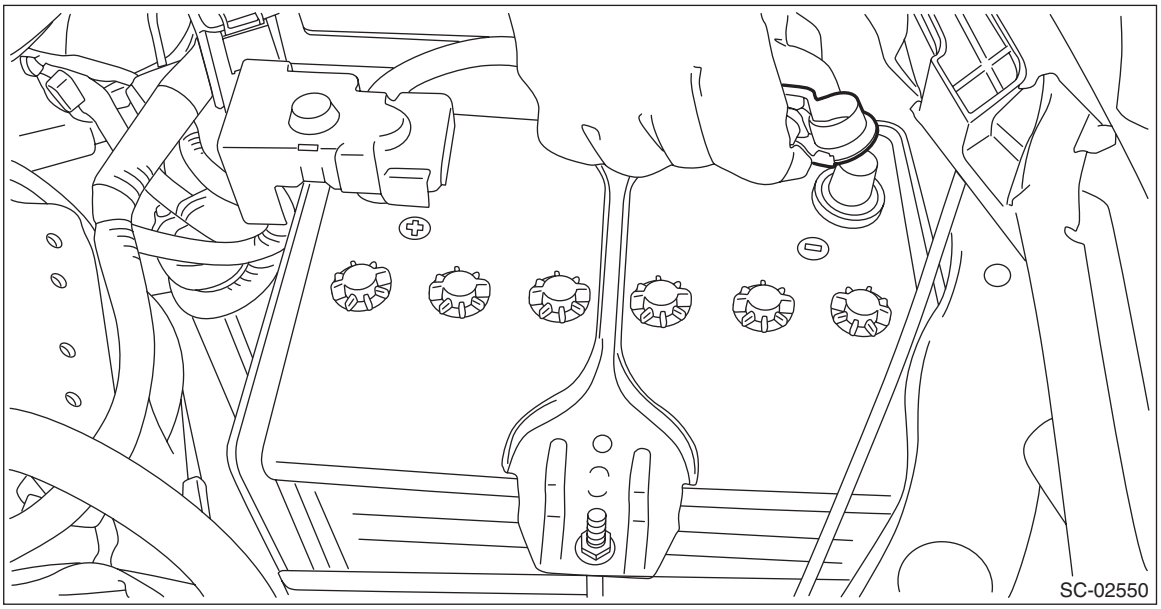
3. OTHER INSPECTIONS

1) Check that the throttle body has no deformation, cracks or other damages.
2) Check that the preheater hose has no cracks, damage or loose part.

3. Intake Manifold

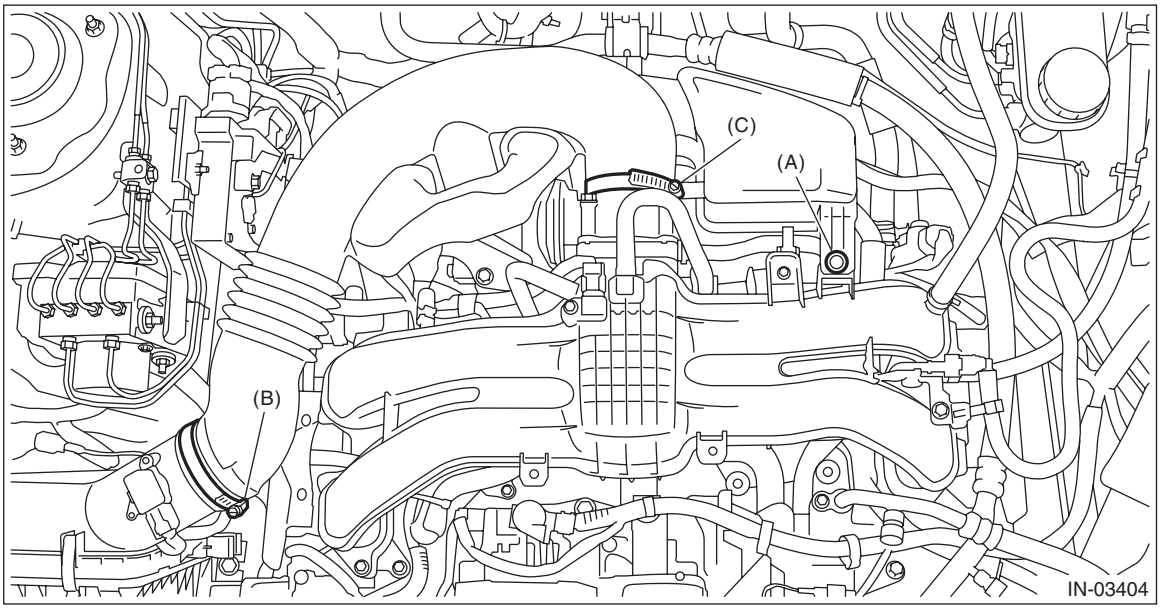
A: REMOVAL

1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the ground cable from battery.

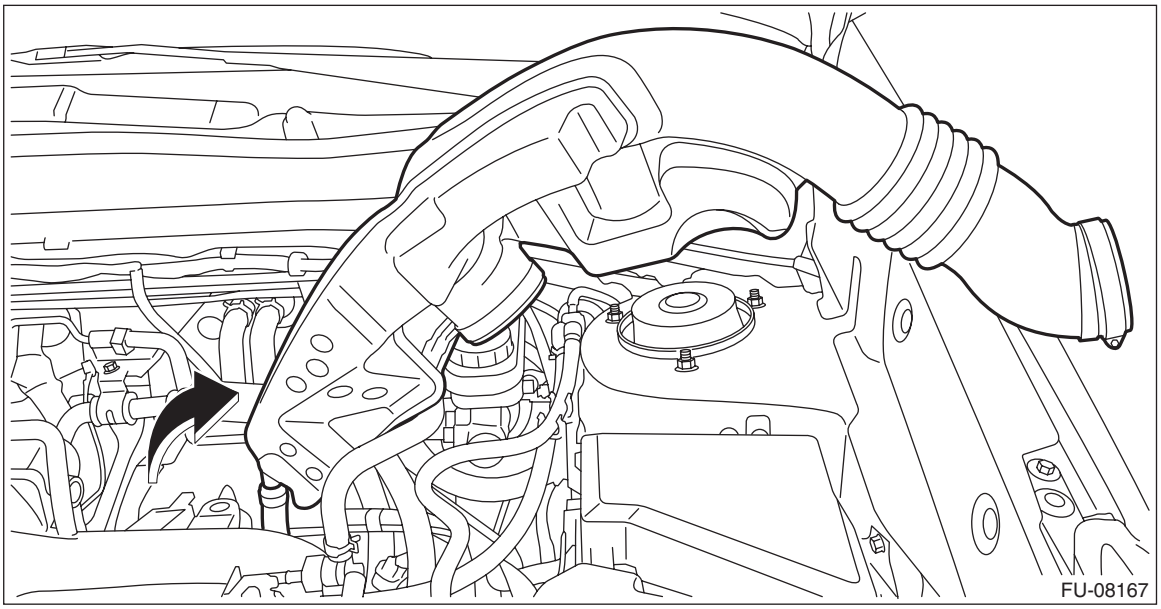


3) Open the fuel filler lid and remove the fuel filler cap.

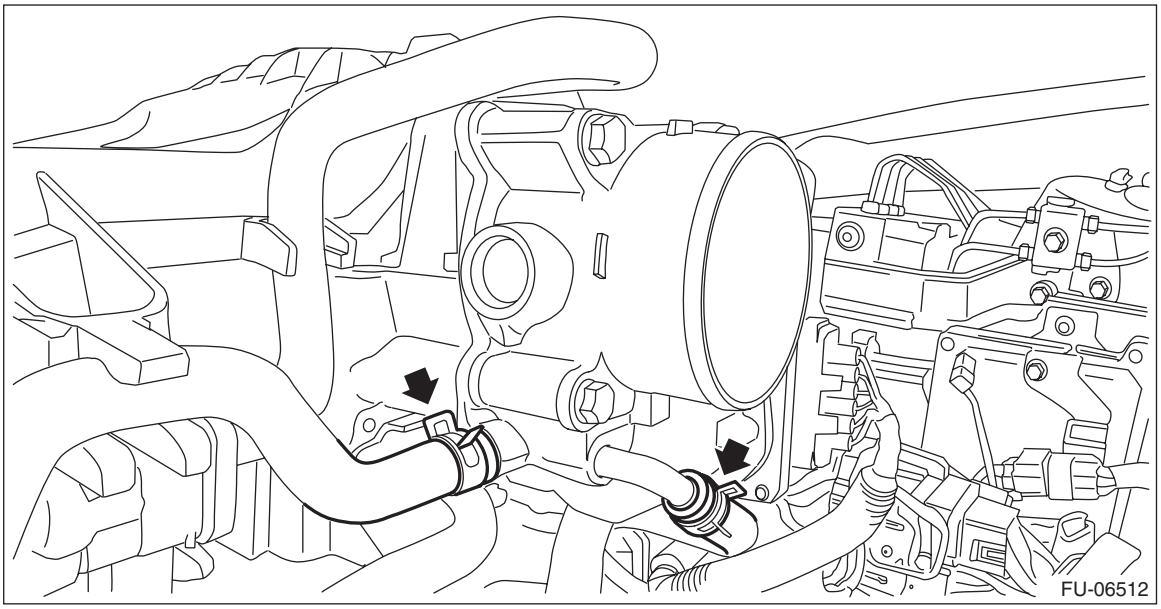
NOTE:
This operation is required to release the inner pressure of the fuel tank.
4) Lift up the vehicle.
5) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
6) Drain approximately 3.0 L (3.2 US qt, 2.6 Imp qt) of coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
7) Remove the clip (A), and loosen the clamps (B) and (C) securing the air intake boot.



8) Remove the air intake boot from the air cleaner case (rear) and throttle body, and move it to the left side wheel apron.

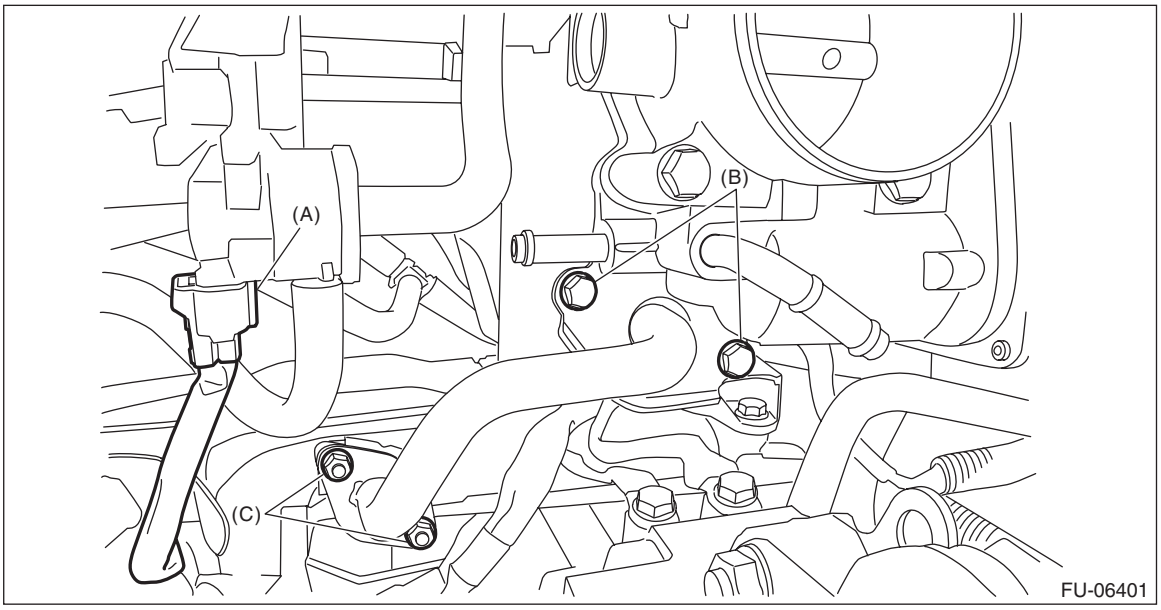


9) Disconnect the preheater hose from throttle body.

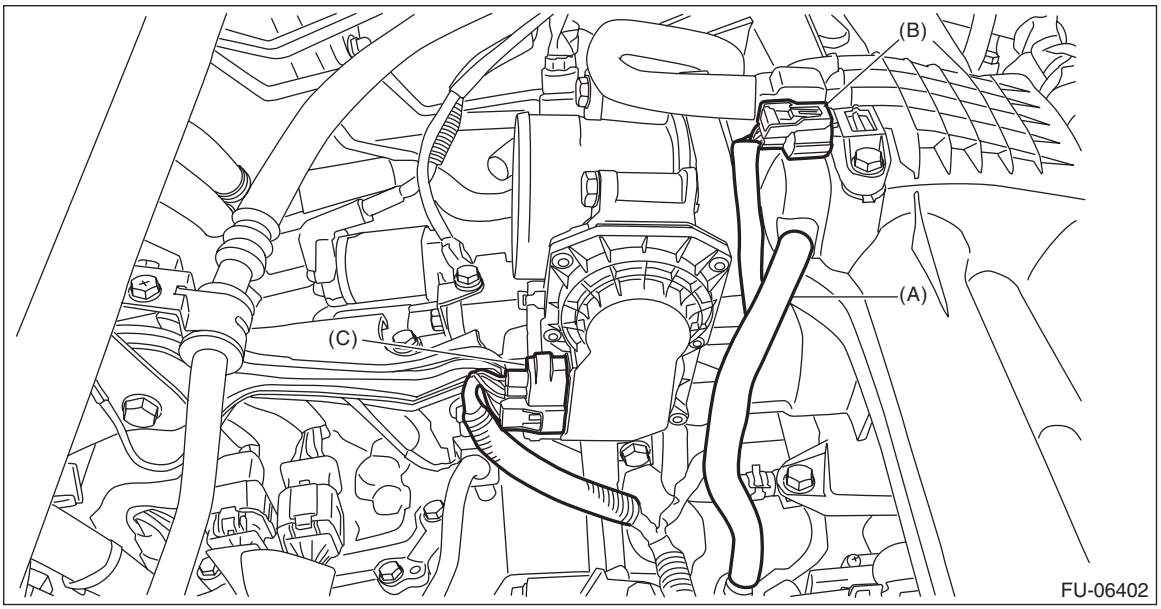


10) Disconnect the connector (A) from the purge control solenoid valve.
11) Loosen the bolt (B) which secures the EGR pipe to the intake manifold.

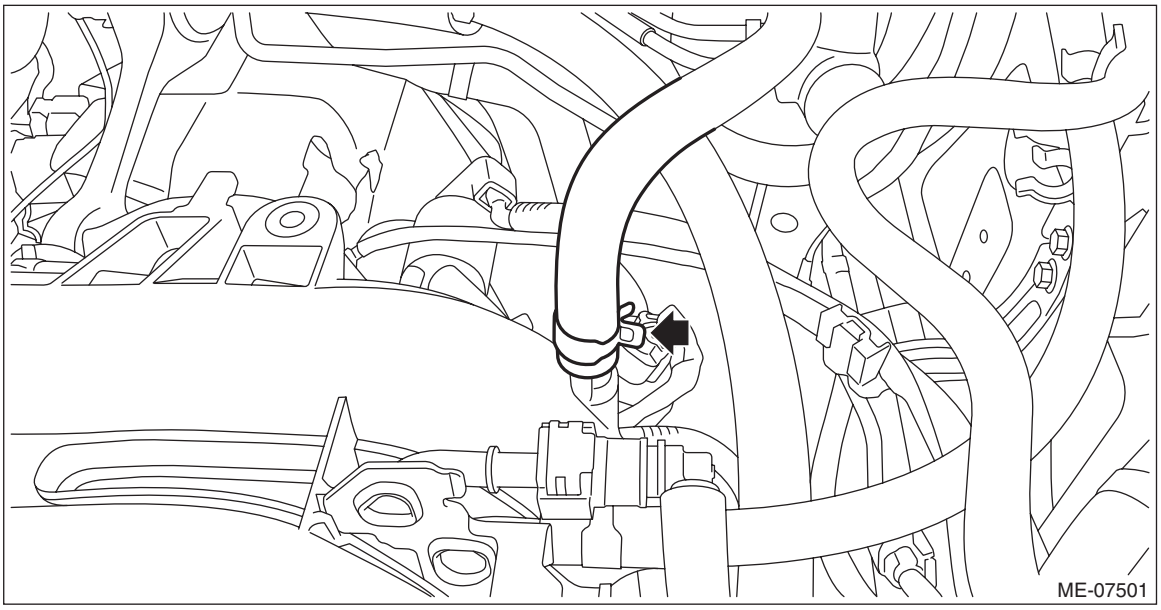
12) Remove the nut (C) which holds EGR pipe from the water pipe assembly.



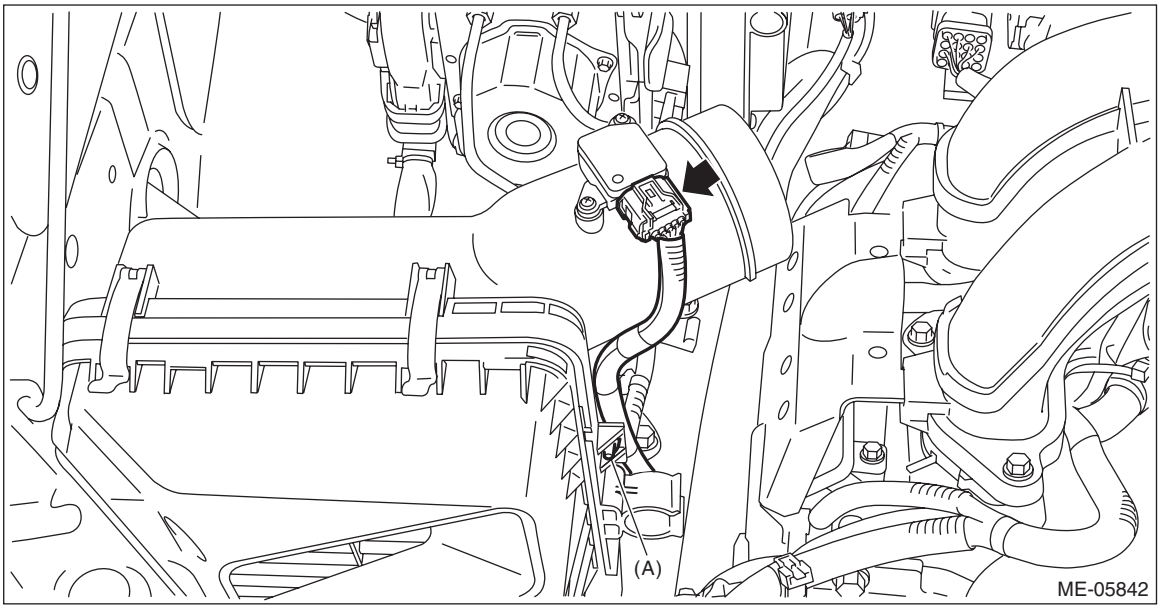
13) Disconnect the PCV hose (A) from intake manifold.
14) Disconnect the connector (B) from manifold absolute pressure sensor.
15) Disconnect the connector (C) from the throttle position sensor.



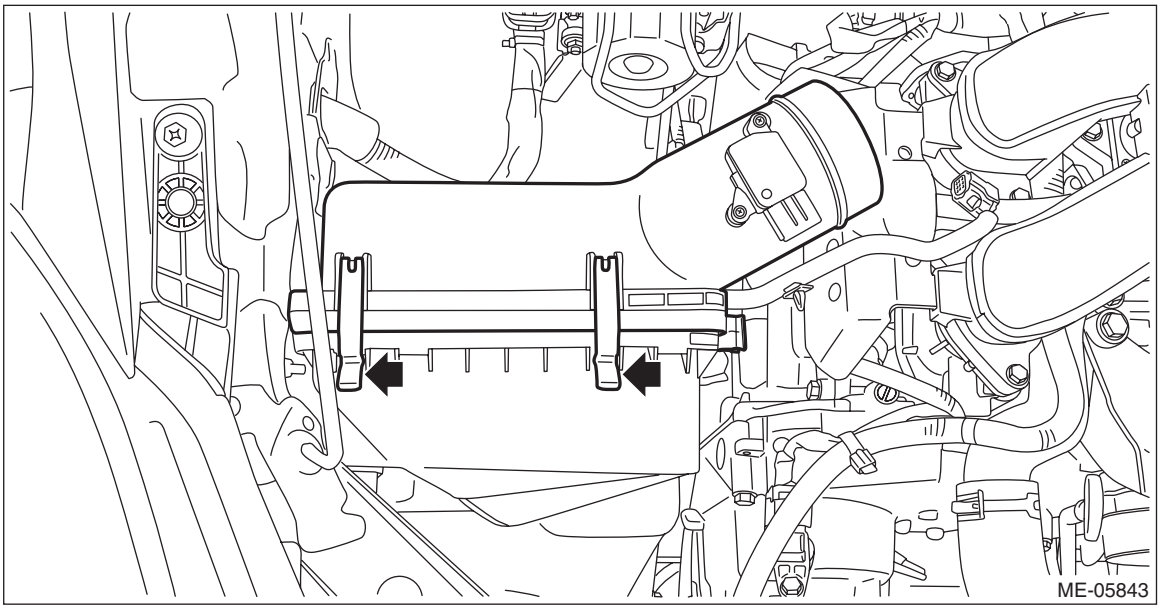
16) Disconnect the brake booster vacuum hose from the intake manifold.



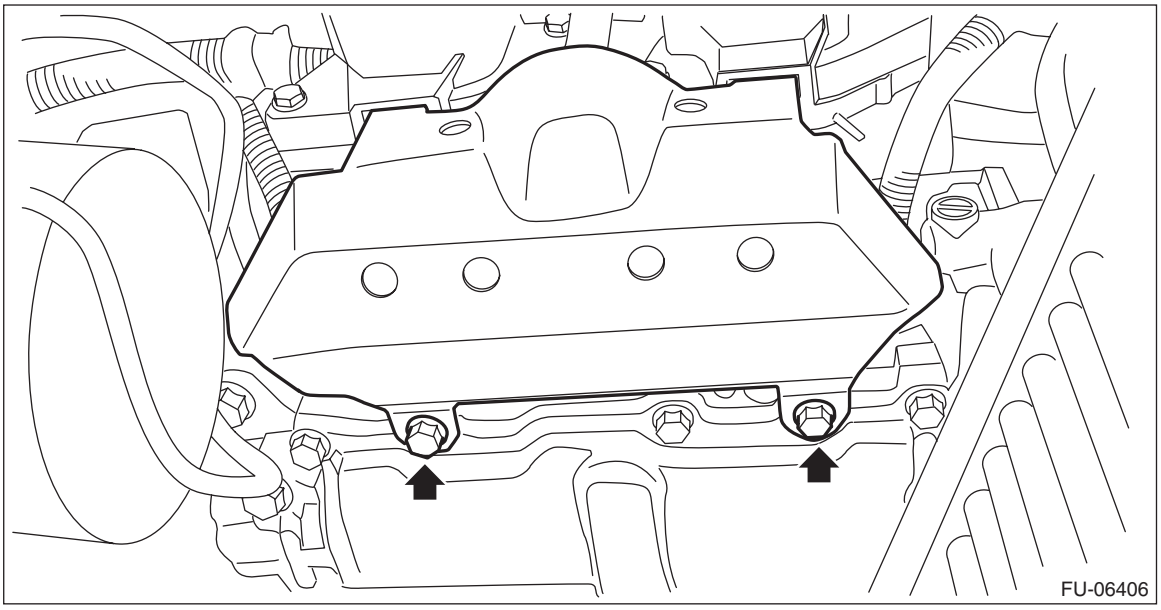
17) Disconnect the connector from the mass air flow and intake air temperature sensor, and remove the clip (A) securing the bulkhead wiring harness.



18) Remove the air cleaner case (rear) together with the air cleaner element.



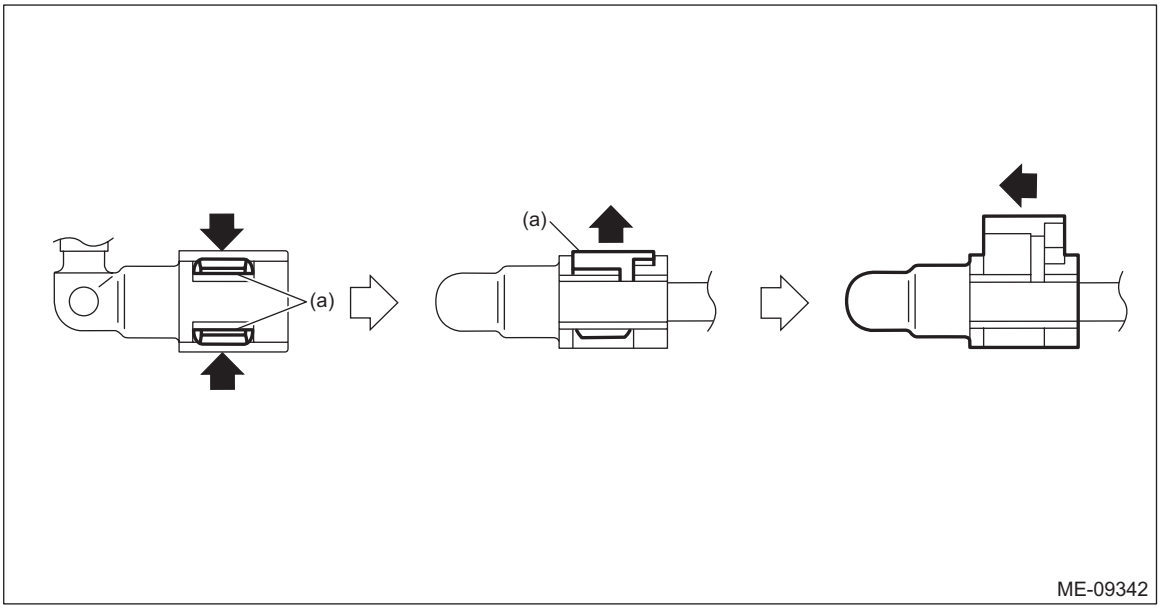
19) Remove the intake manifold protector RH.



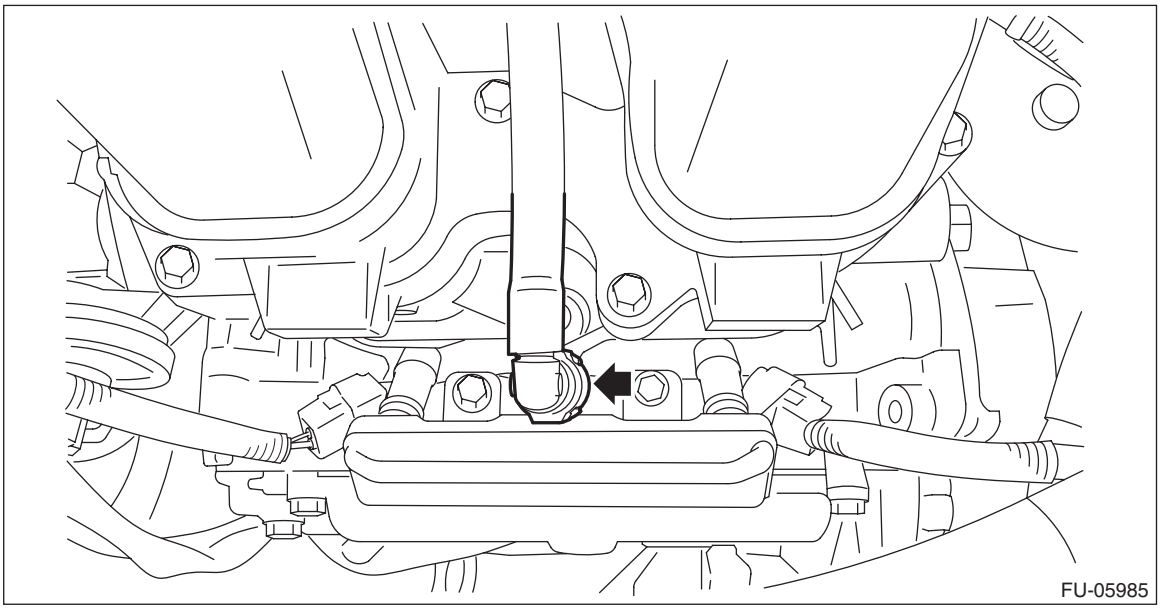
20) Disconnect the fuel delivery pipe from the fuel pipe RH.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the pipes using a container or cloth.**

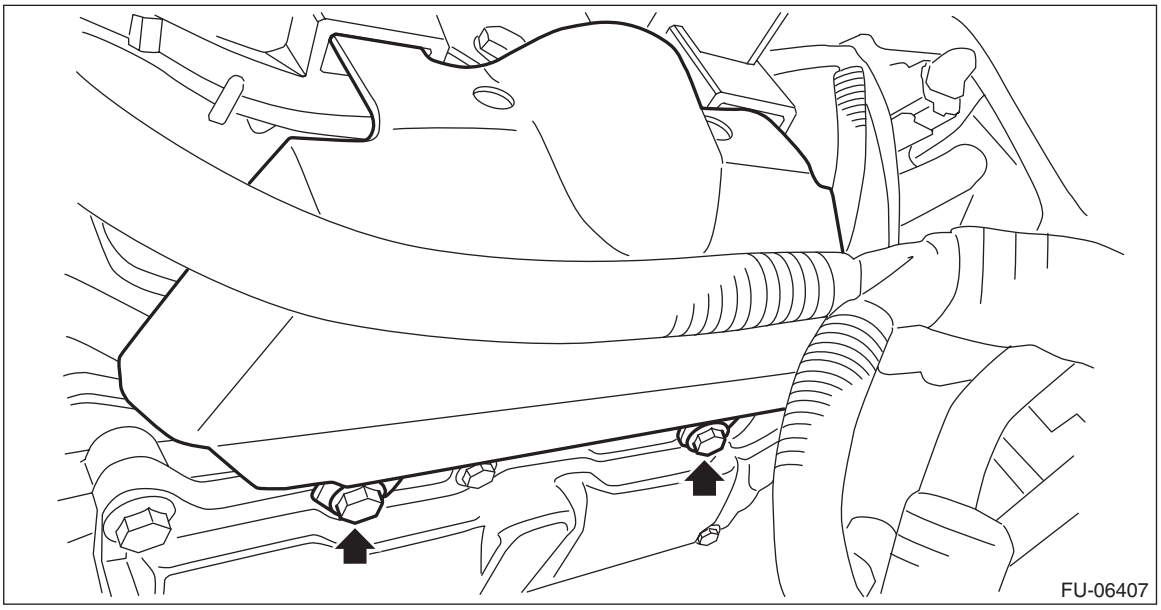
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



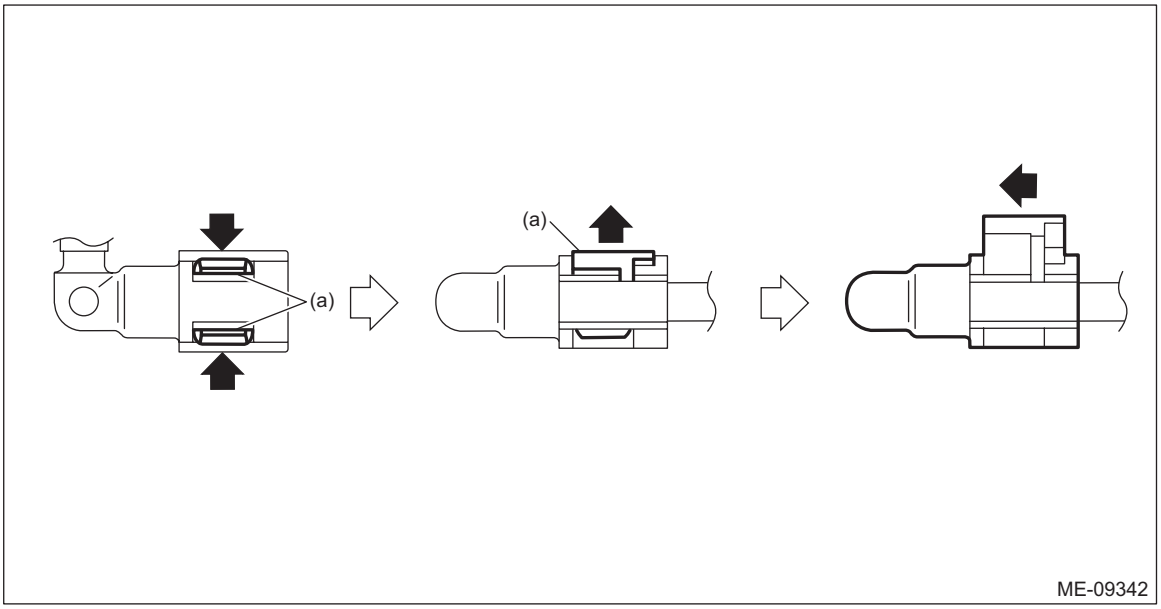
21) Remove the intake manifold protector LH.



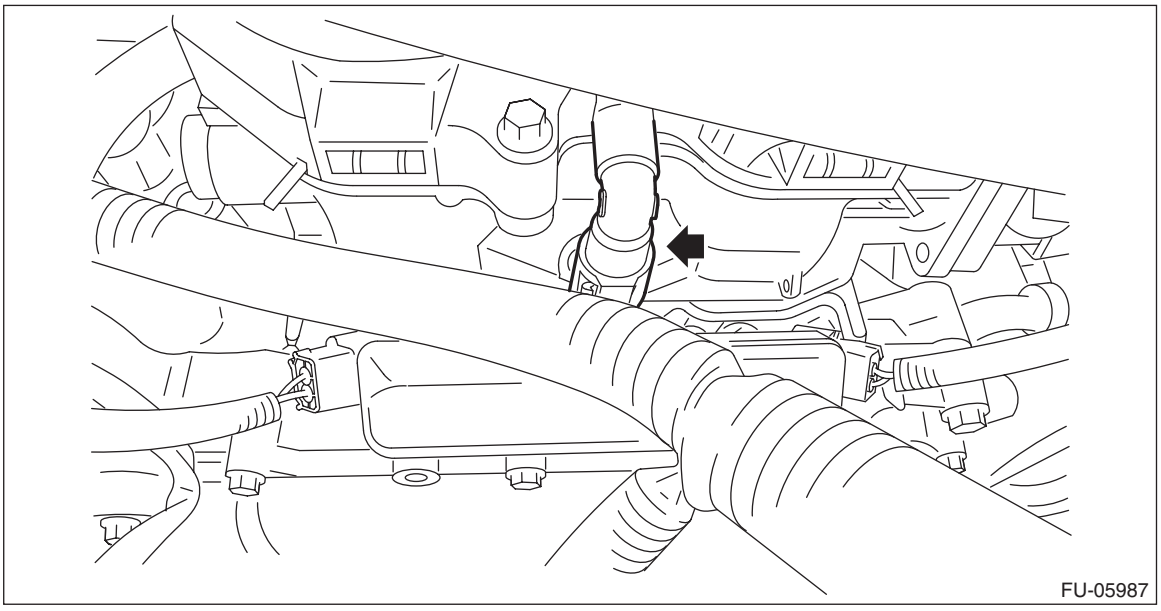
22) Disconnect the fuel delivery pipe from the fuel pipe LH.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the pipes using a container or cloth.**

NOTE:
Disconnect the quick connector as shown in the figure.



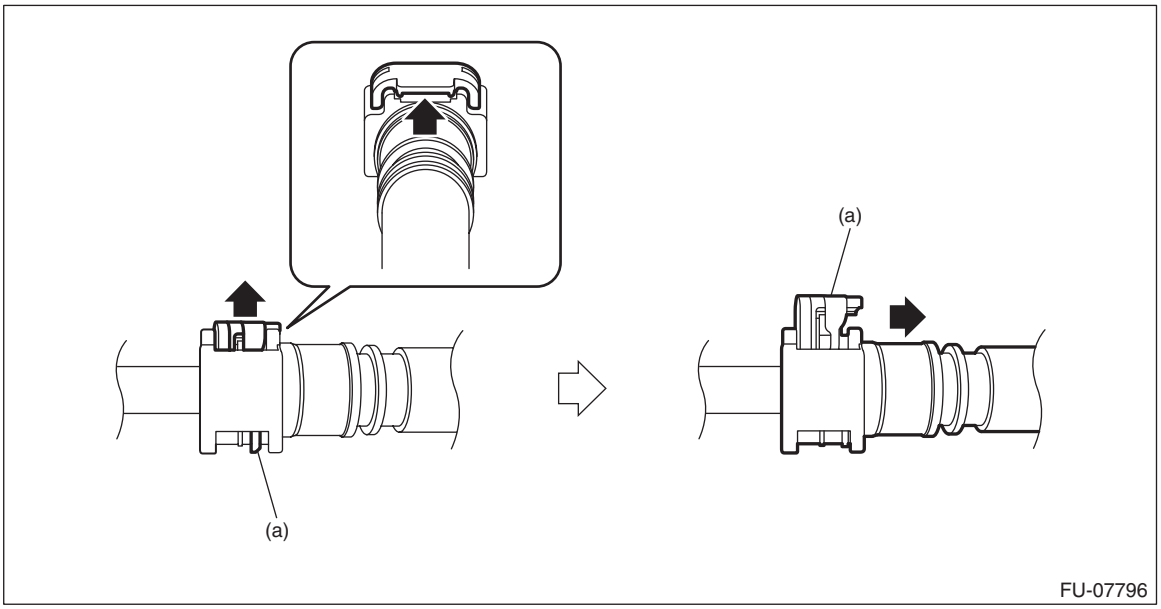
(a) Slider



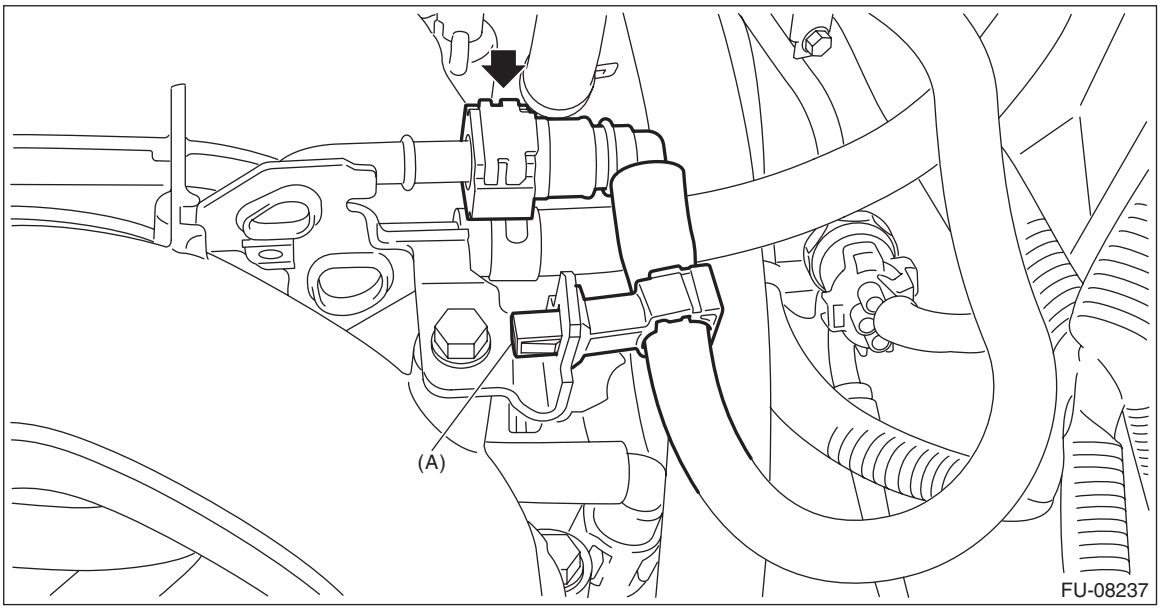
23) Disconnect the fuel delivery tube and evaporation hose.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
  (1) Disconnect the quick connector on the fuel delivery tube from the fuel pipe assembly, and remove the clip (A) securing the fuel delivery tube.

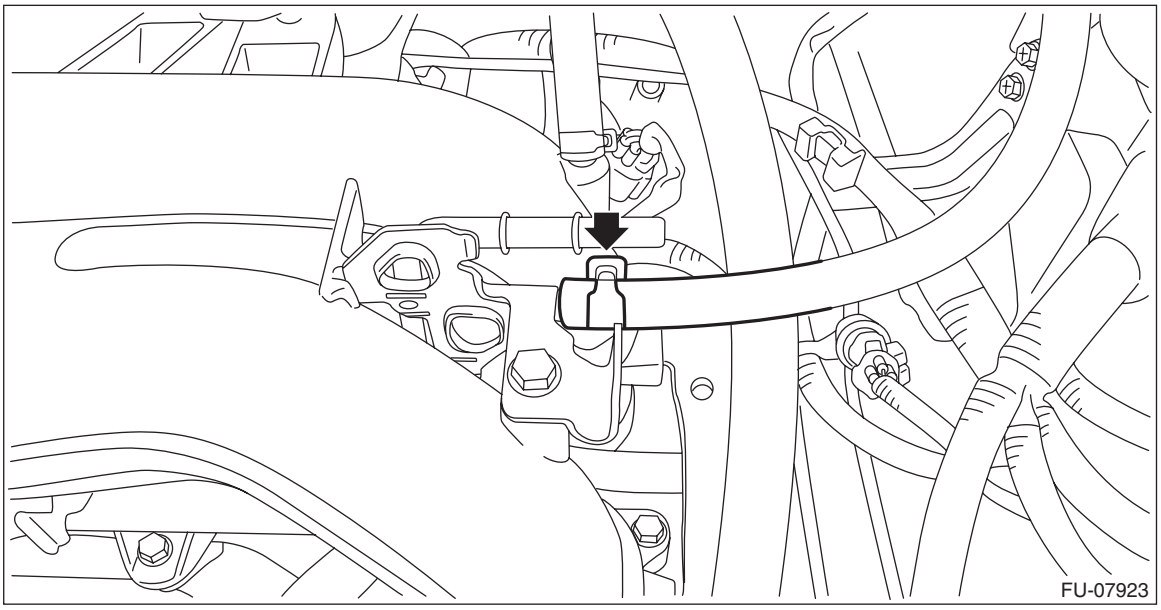
NOTE:
Disconnect the quick connector as shown in the figure.



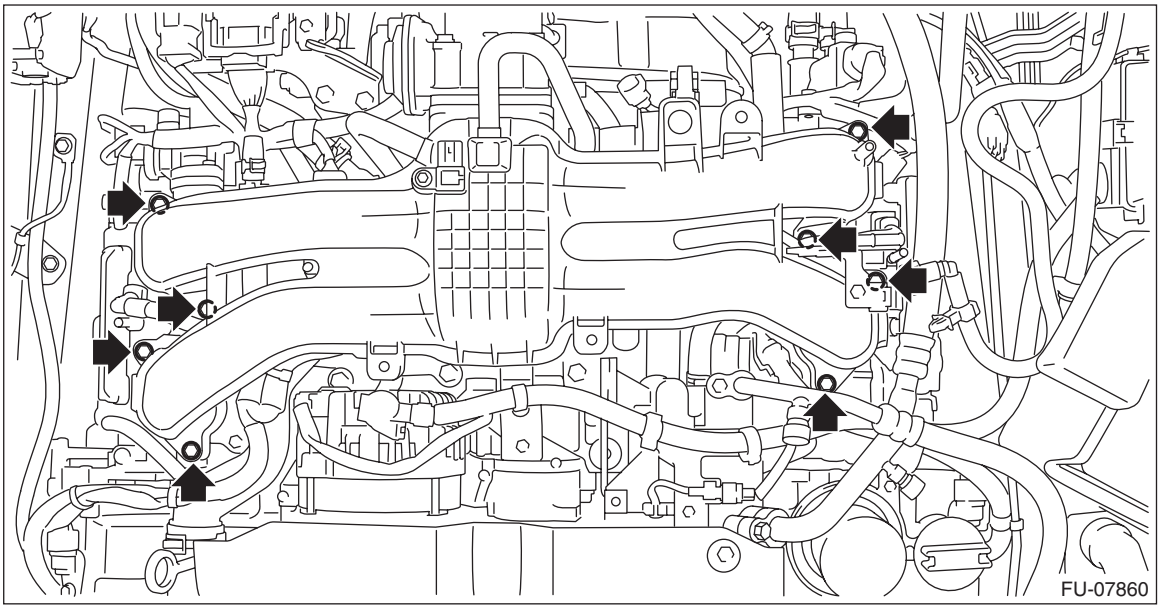
(a) Slider



(2) Disconnect the evaporation hose from the fuel pipe assembly.



24) Remove the intake manifold from the tumble generator valve assembly.



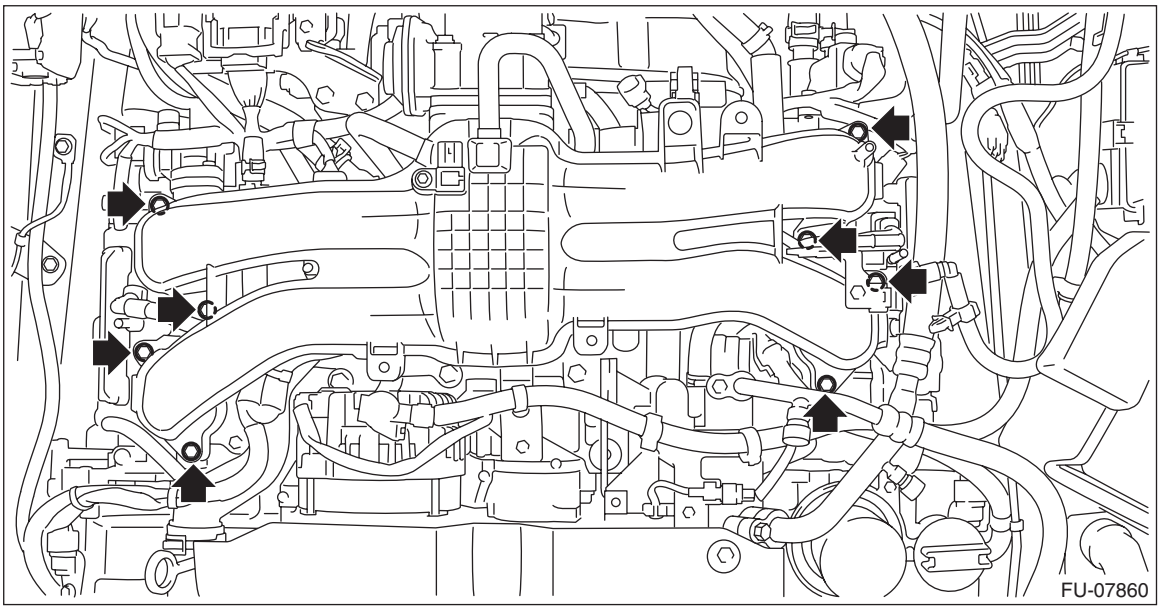
25) Remove the engine wiring harness. <Ref. to FU(H4DO(w/o HEV))-43, REMOVAL, Engine Wiring Harness.>

B: INSTALLATION

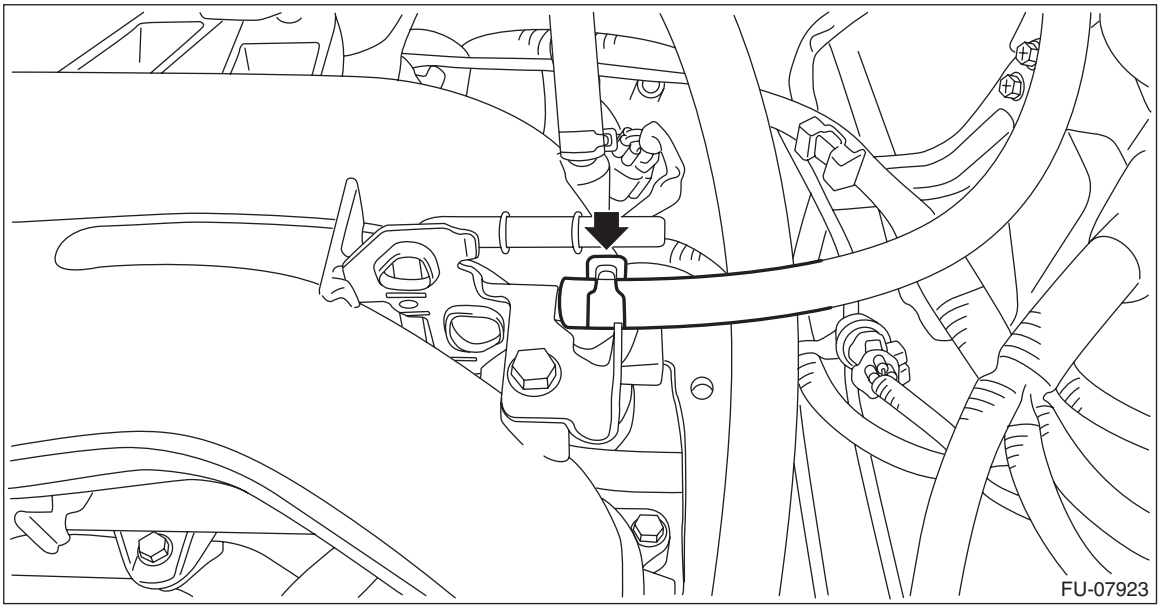
1) Install the engine wiring harness. <Ref. to FU(H4DO(w/o HEV))-47, INSTALLATION, Engine Wiring Harness.>
2) Install the intake manifold to the tumble generator valve assembly.

NOTE:
Use a new gasket.

Tightening torque:
8.3 N·m (0.8 kgf-m, 6.1 ft-lb)



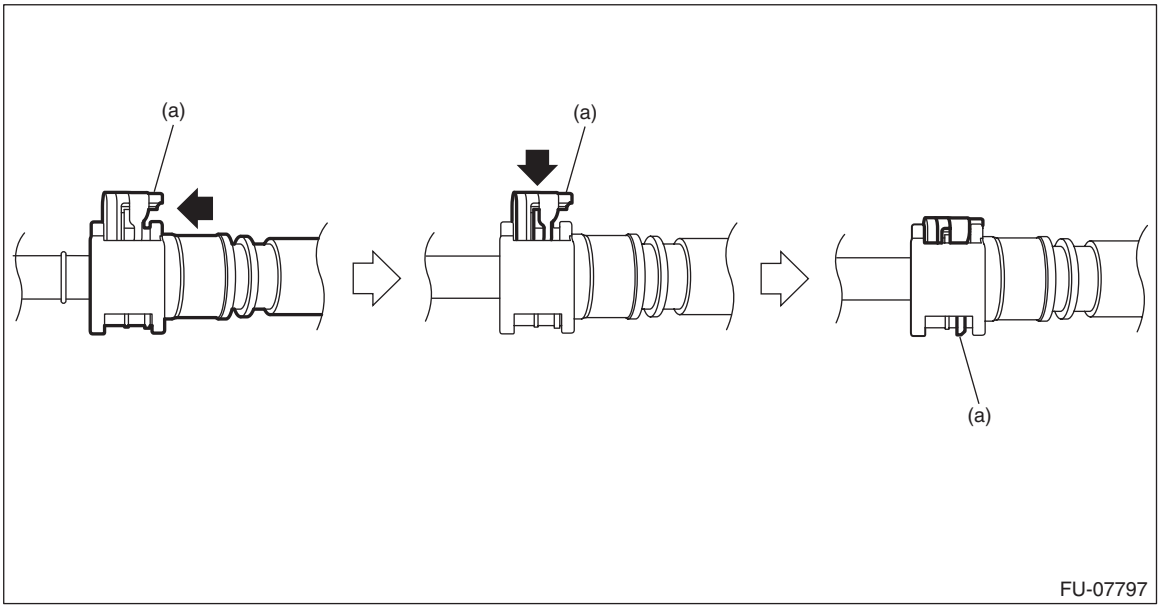
3) Connect the fuel delivery tube and evaporation hose.
(1) Connect the evaporation hose to fuel pipe assembly.



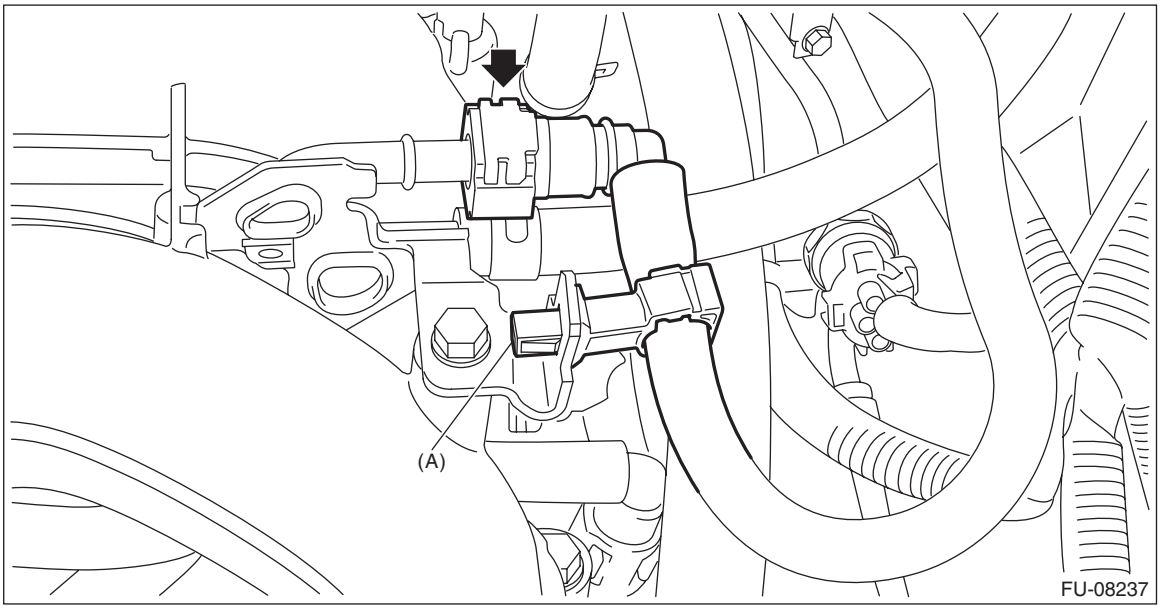
(2) Connect the quick connector of the fuel delivery tube to the fuel pipe assembly, and secure the fuel delivery tube using clip (A).

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.



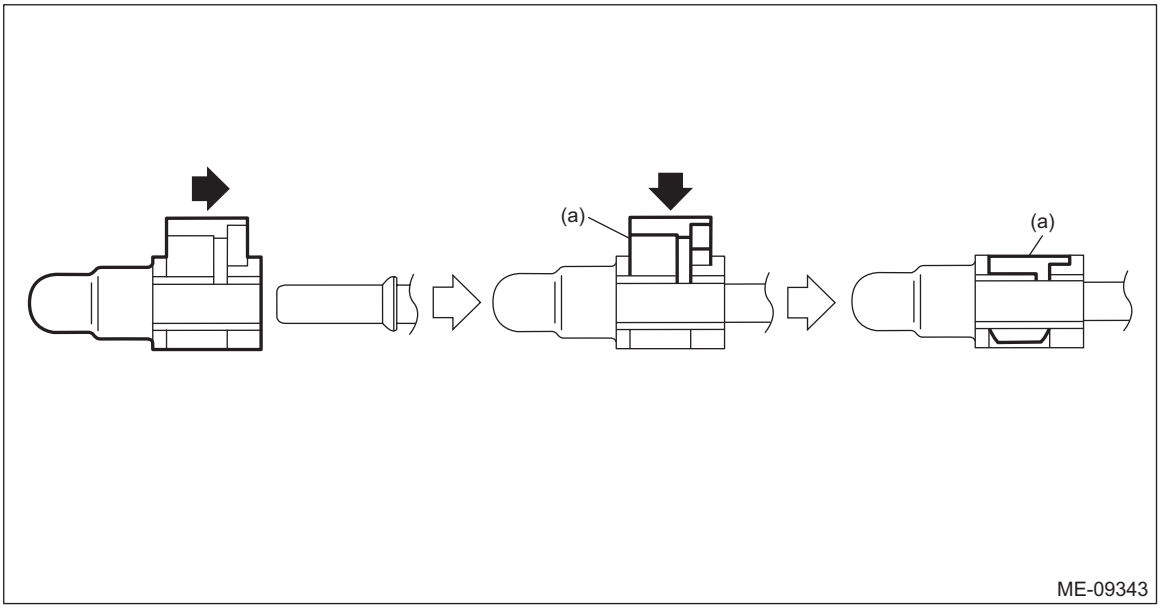
(a) Slider



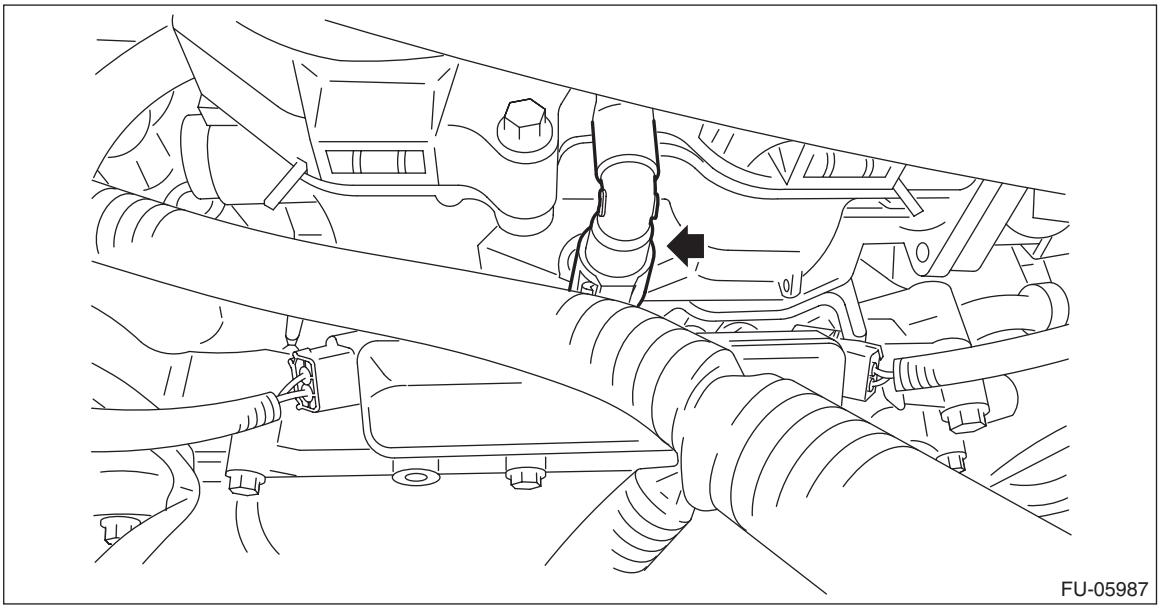
4) Connect the fuel delivery pipe to the fuel pipe LH.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.

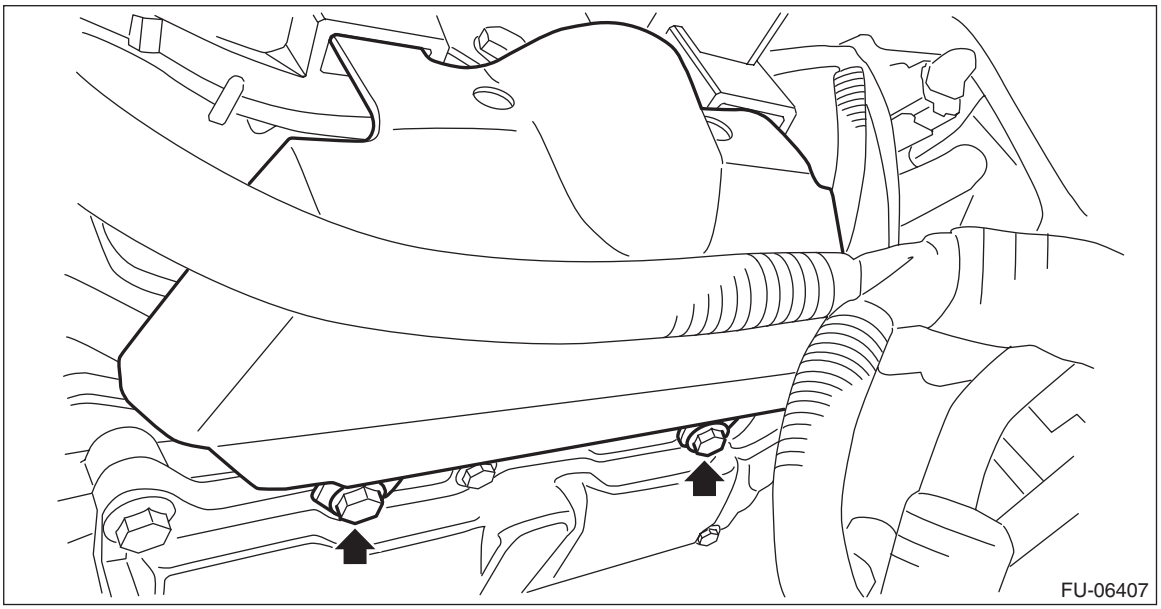


(a) Slider



5) Install the intake manifold protector LH.

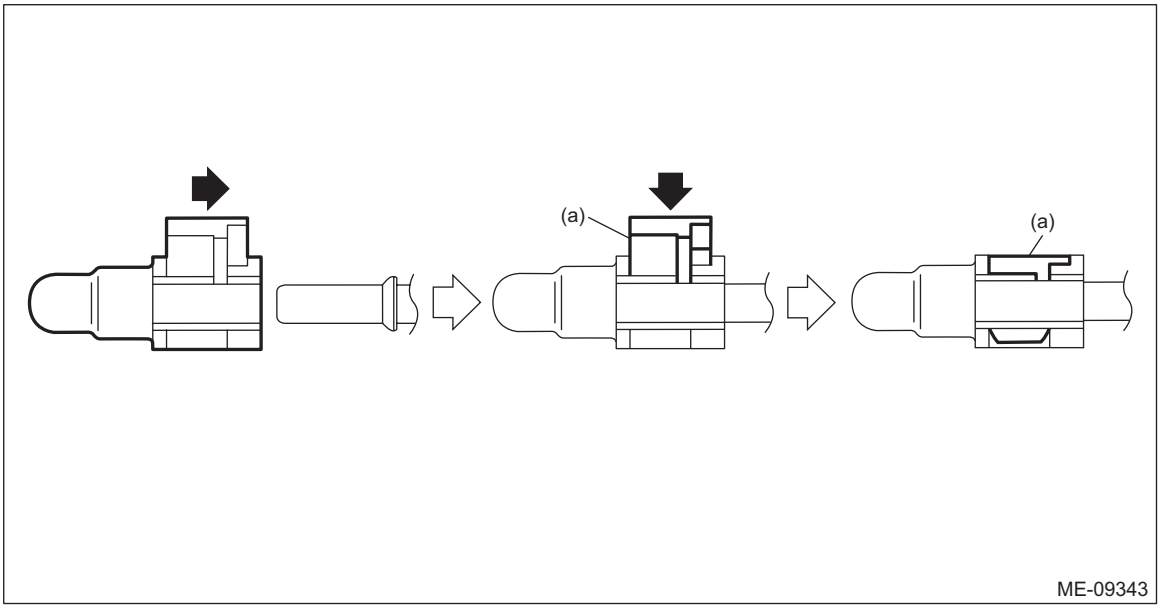
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



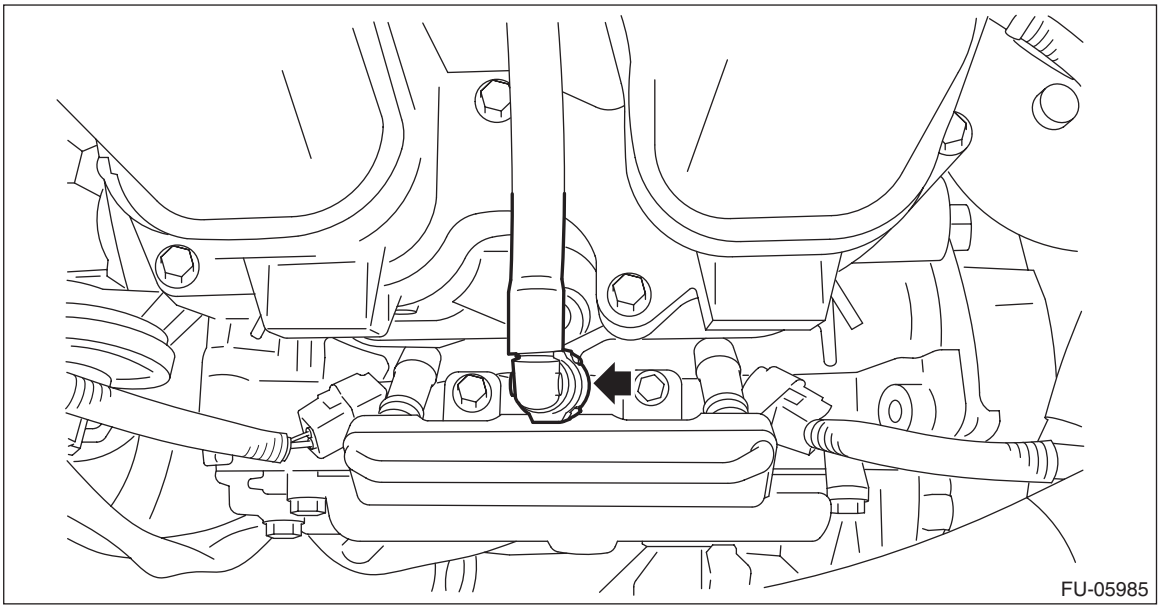
6) Connect the fuel delivery pipe to the fuel pipe RH.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.

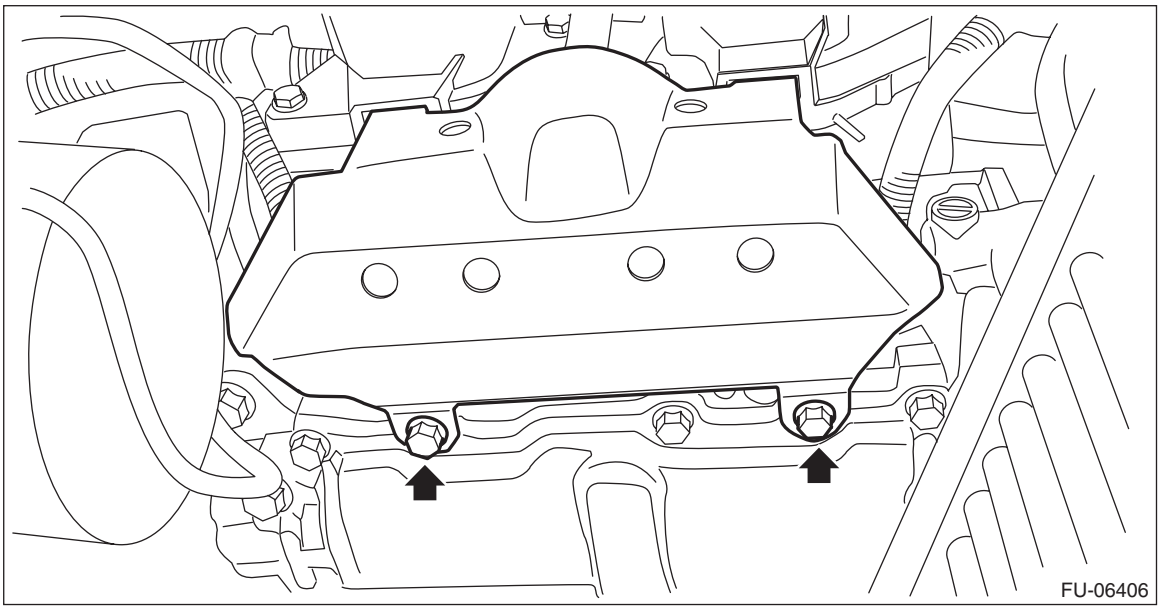


(a) Slider

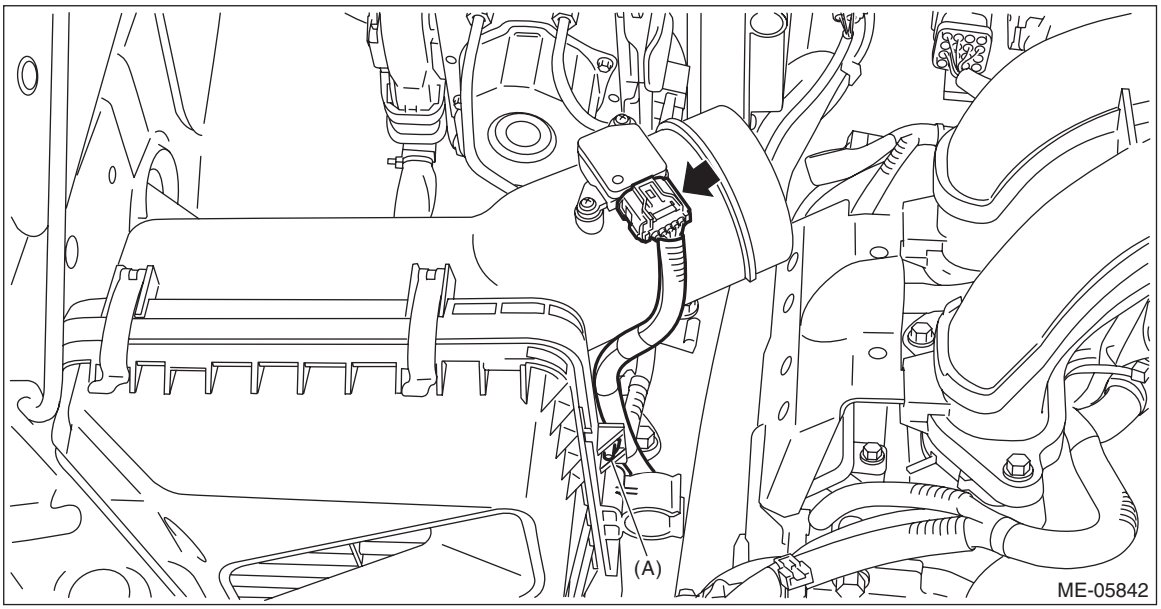


7) Install the intake manifold protector RH.

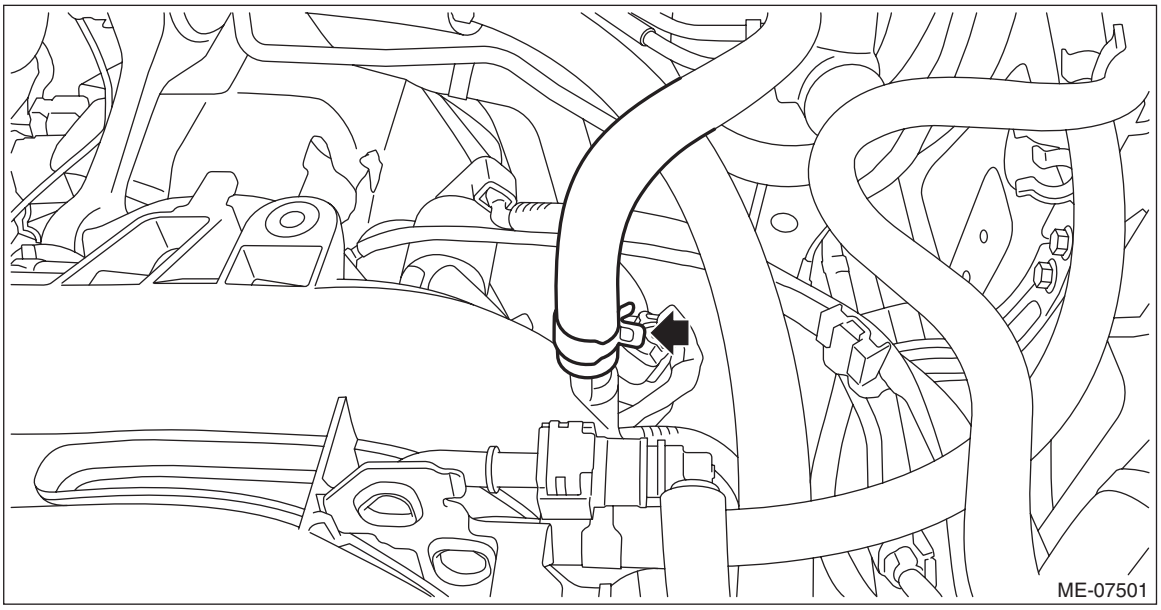
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



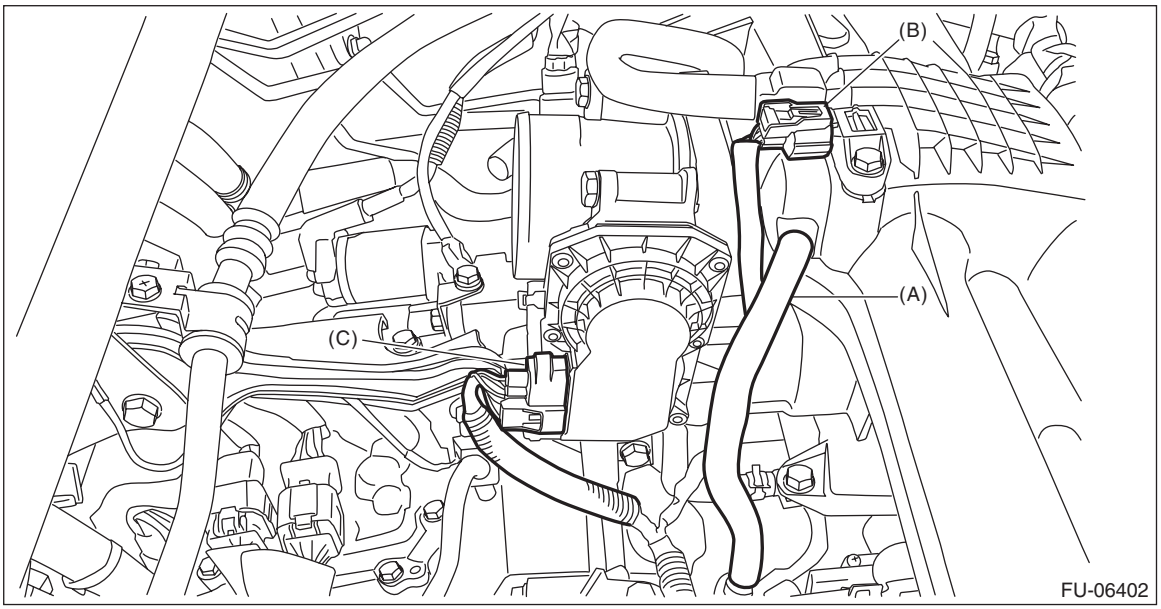
8) Install the air cleaner case (rear) together with the air cleaner element. <Ref. to IN(H4DO(w/o HEV))-9, INSTALLATION, Air Cleaner Case.>
9) Secure the bulkhead wiring harness with clip (A) and connect the connector to the mass air flow and intake air temperature sensor.



10) Connect the brake booster vacuum hose to the intake manifold.



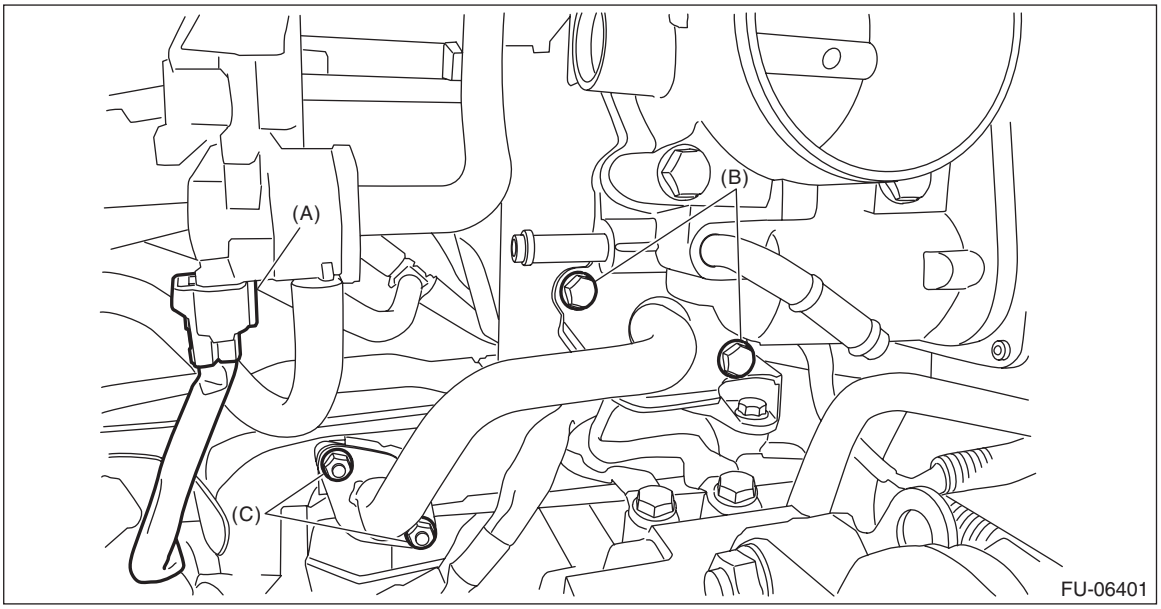
11) Connect the PCV hose (A) to intake manifold.
12) Connect the connector (B) to the manifold absolute pressure sensor.
13) Connect the connector (C) to the throttle position sensor.



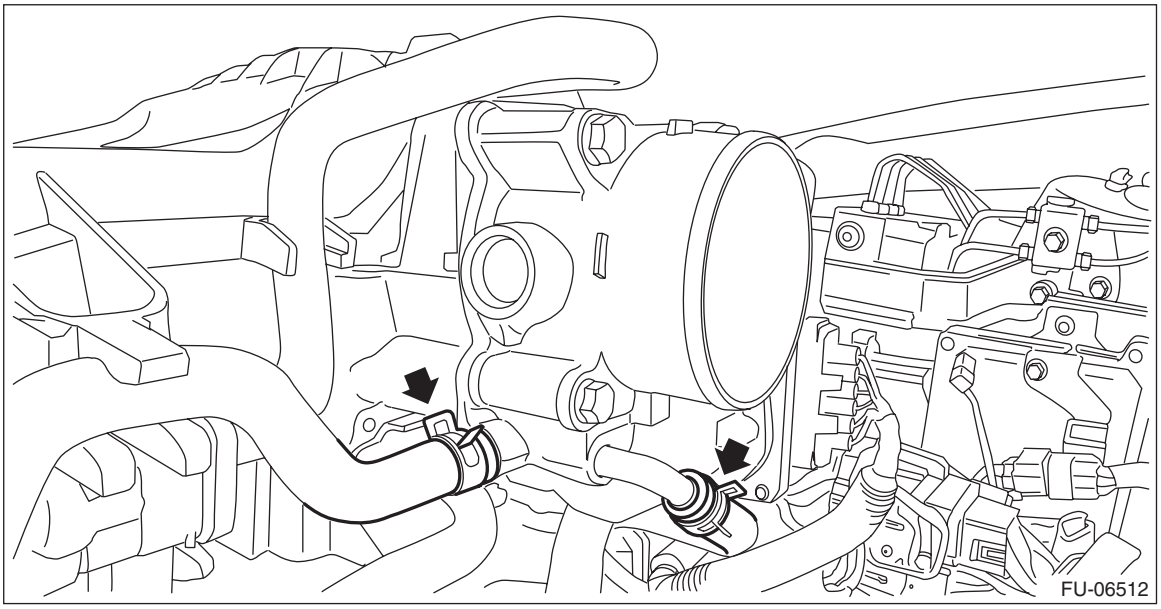
14) Connect the connector (A) to the purge control solenoid valve.
15) Tighten the nut (C) and bolt (B) which hold EGR pipe to the water pipe assembly.

NOTE:
- Use a new gasket.
- Always tighten the EGR pipe at (C) first, and then (B).

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

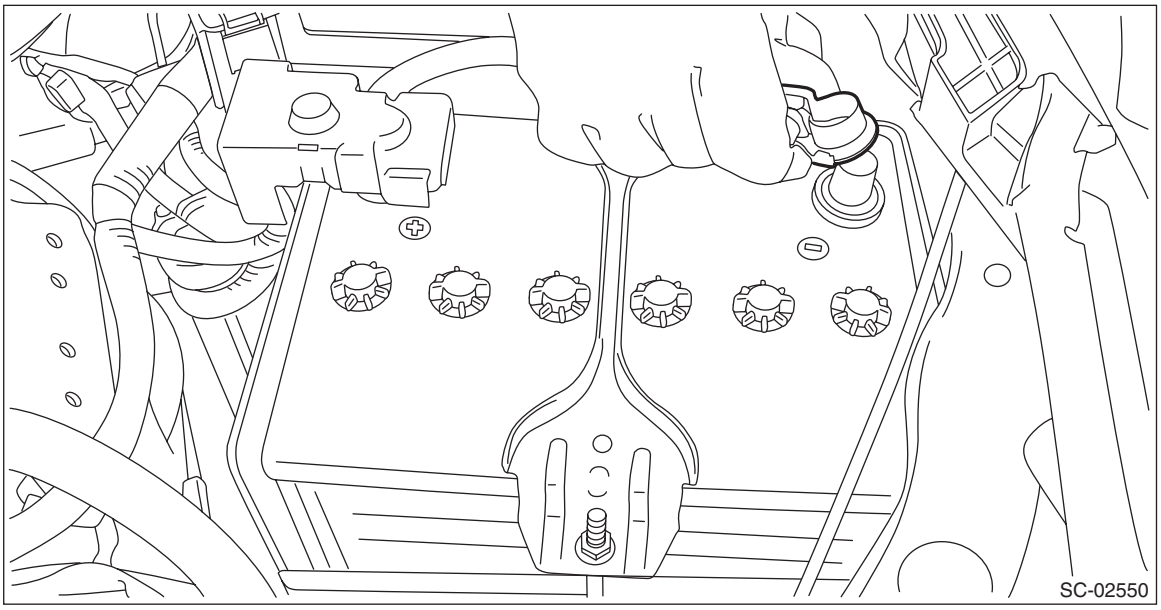


16) Install the preheater hose to the throttle body.



17) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
18) Lift up the vehicle.
19) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
20) Lower the vehicle.

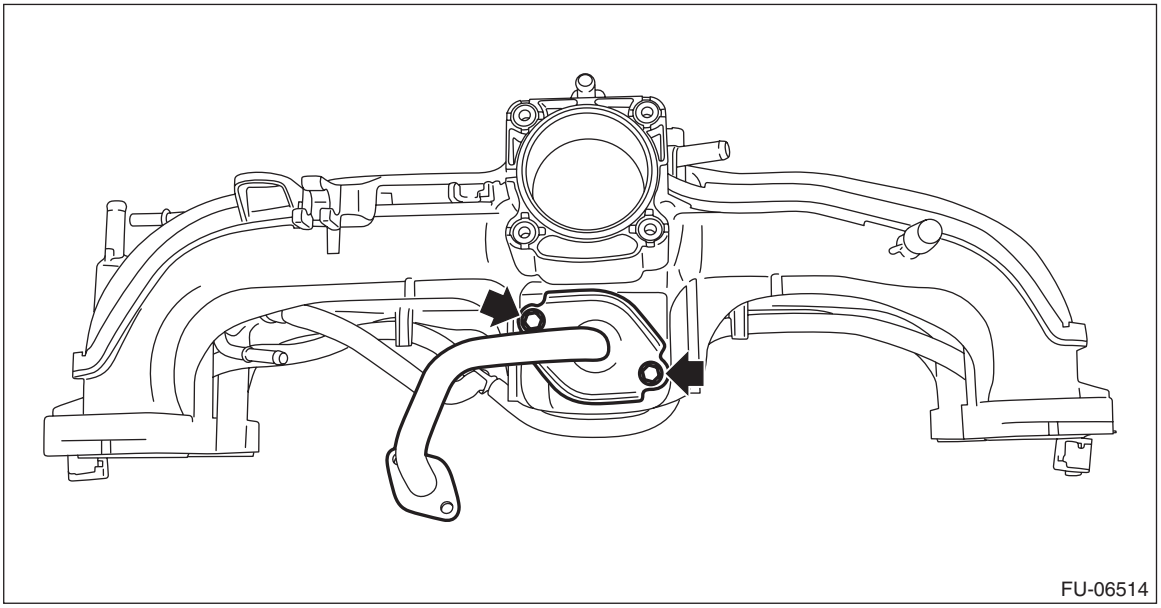
21) Connect the battery ground terminal.



22) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

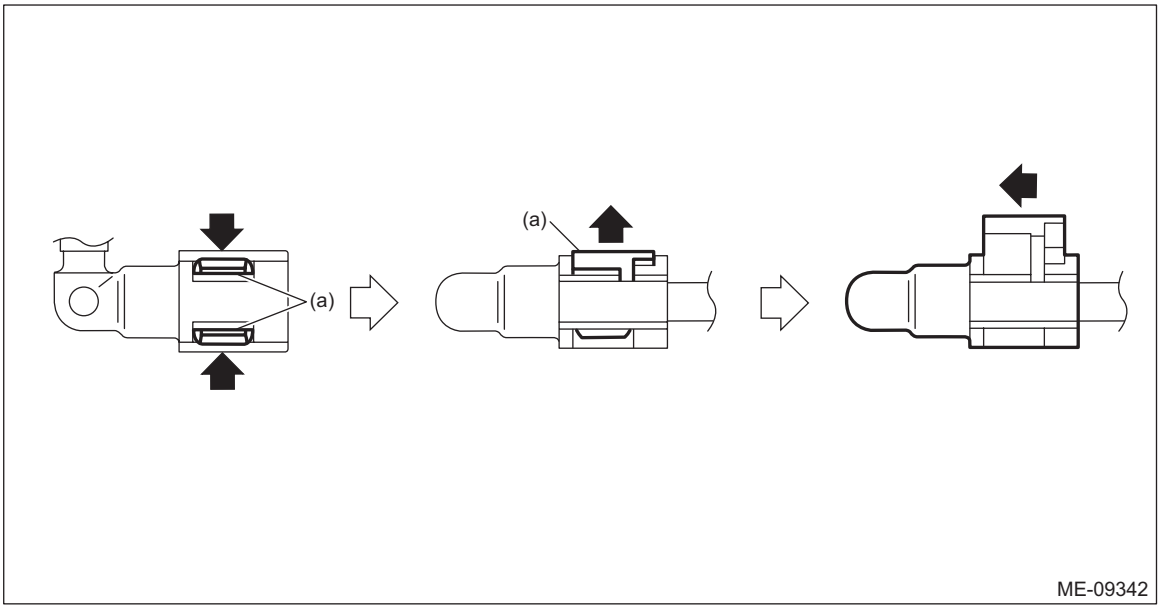
C: DISASSEMBLY

1) Remove the throttle body. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.>
2) Remove the purge control solenoid valve. <Ref. to EC(H4DO(w/o HEV))-18, REMOVAL, Purge Control Solenoid Valve.>
3) Remove the manifold absolute pressure sensor. <Ref. to FU(H4DO(w/o HEV))-76, REMOVAL, Manifold Absolute Pressure Sensor.>
4) Remove the EGR pipe from intake manifold.

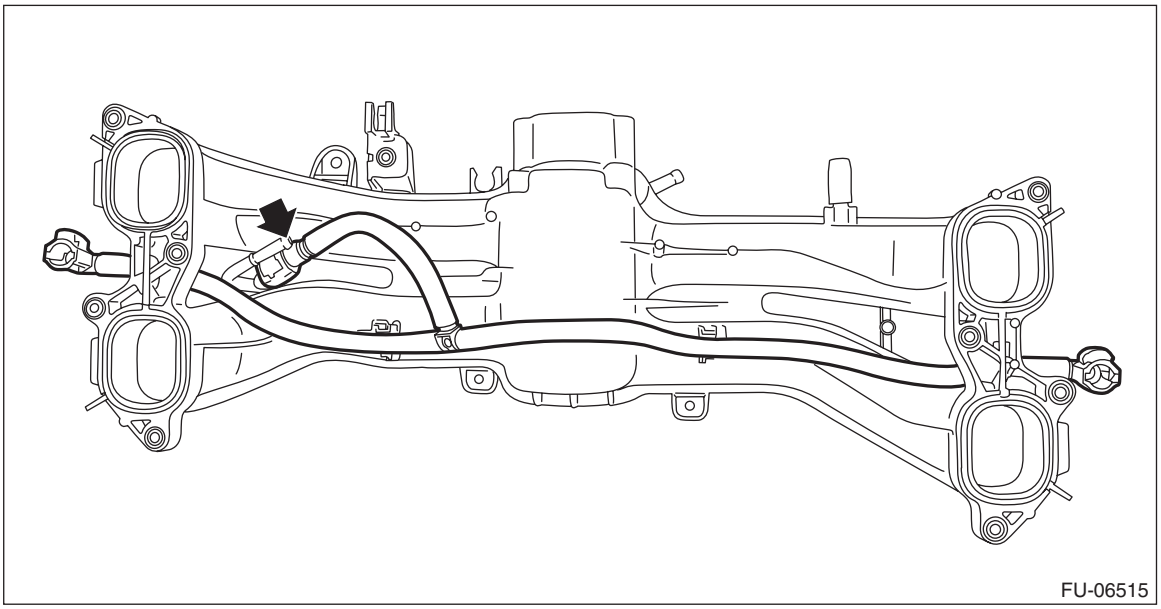


5) Remove the fuel delivery pipe from intake manifold.

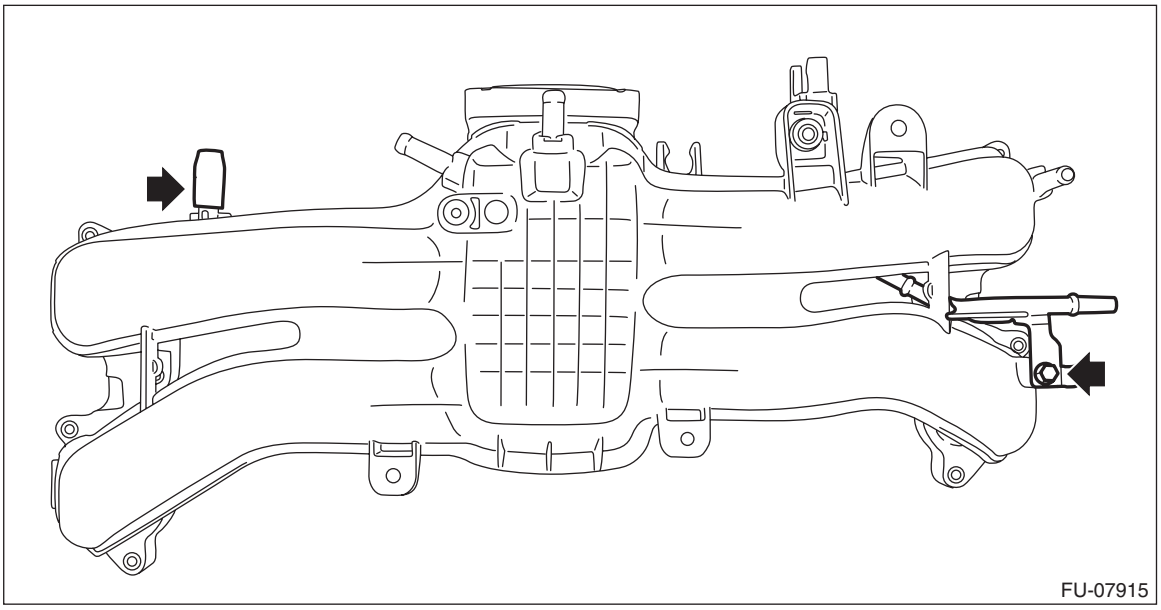
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



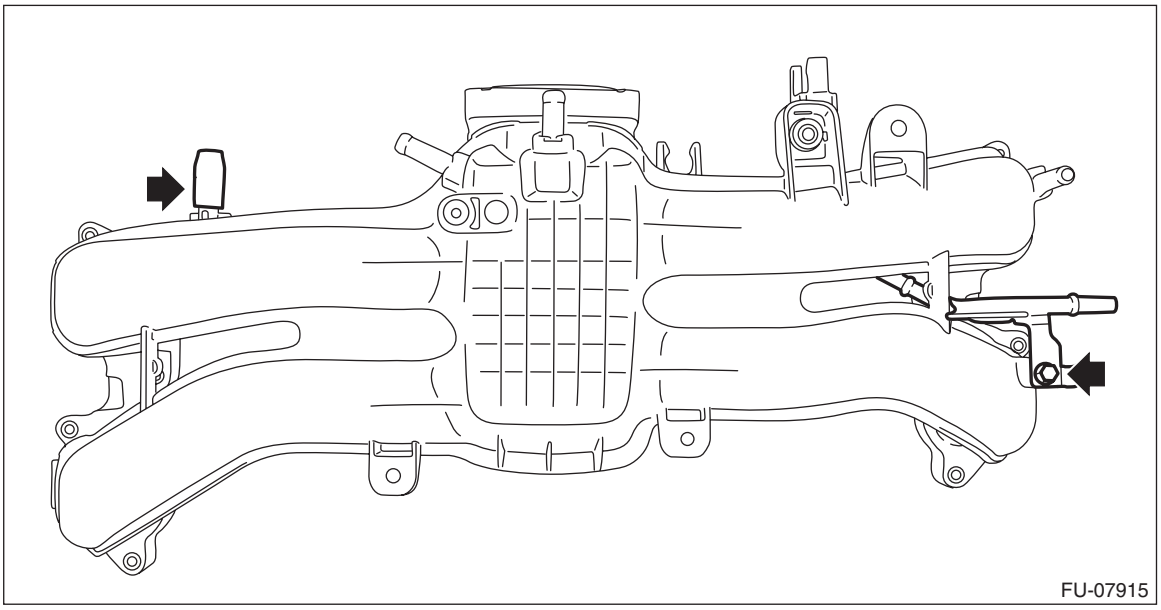
6) Remove the fuel pipe and cap from the intake manifold.



D: ASSEMBLY

1) Install the fuel pipe and cap to the intake manifold.

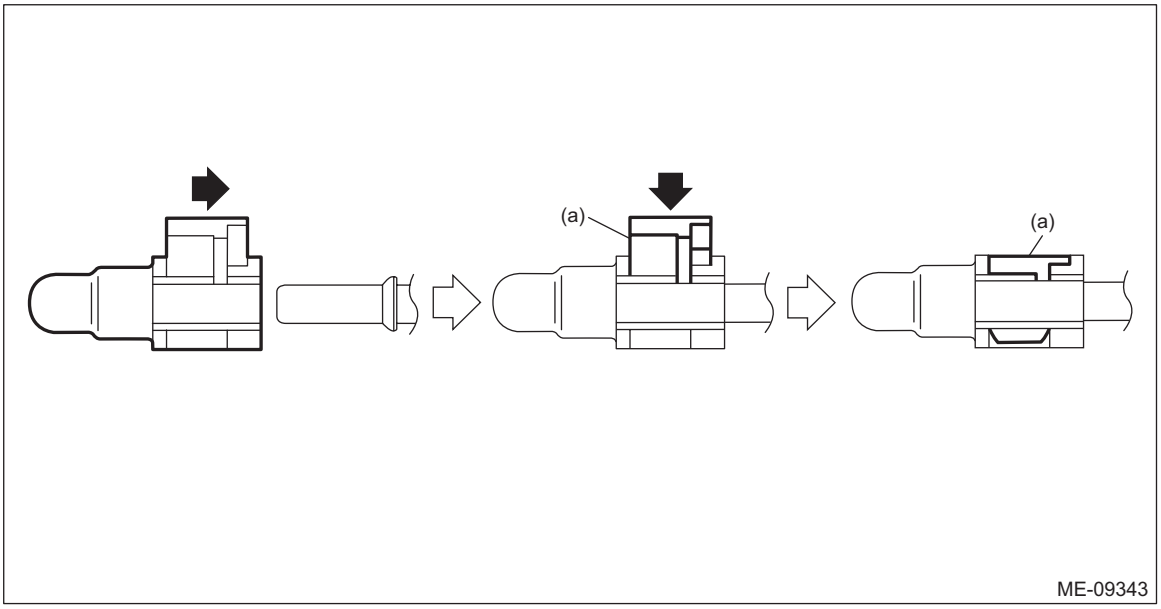
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



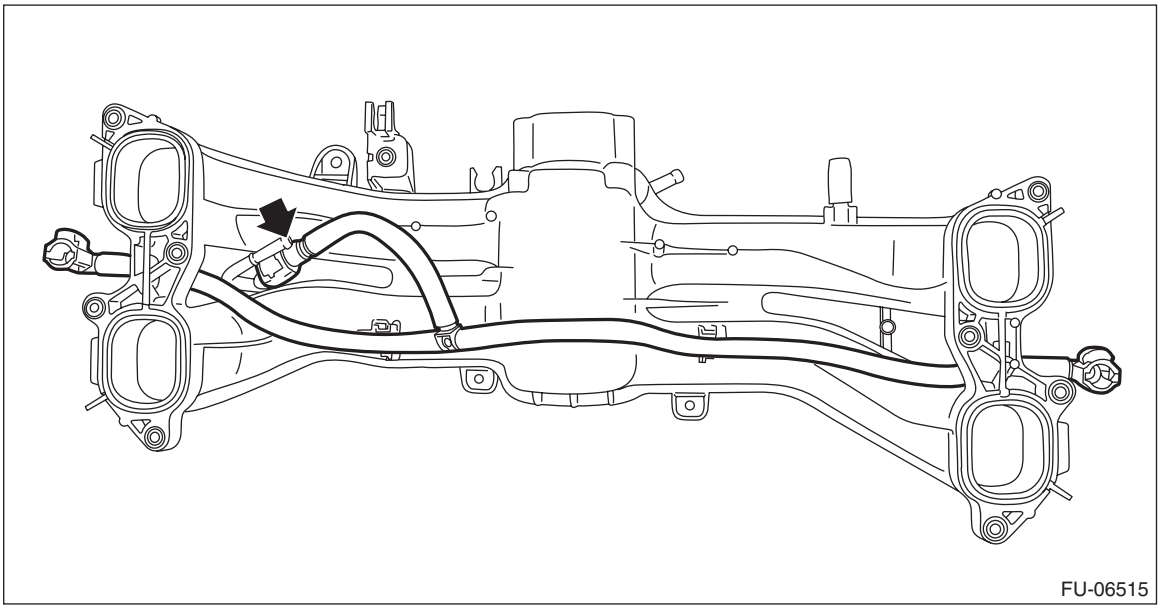
2) Install the fuel delivery pipe to the intake manifold.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.

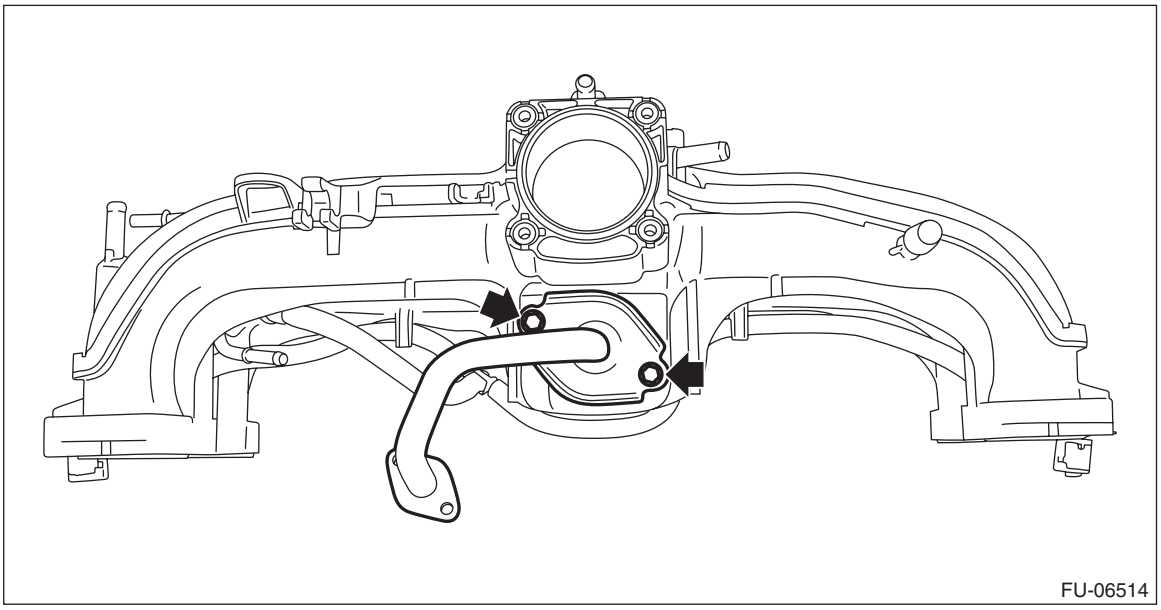


(a) Slider



3) Temporarily install the EGR pipe to the intake manifold.

NOTE:
- Use a new gasket.
- Tighten the EGR pipe when installing the intake manifold.



4) Install the manifold absolute pressure sensor. <Ref. to FU(H4DO(w/o HEV))-76, INSTALLATION, Manifold Absolute Pressure Sensor.>
5) Install the purge control solenoid valve. <Ref. to EC(H4DO(w/o HEV))-20, INSTALLATION, Purge Control Solenoid Valve.>
6) Install the throttle body. <Ref. to FU(H4DO(w/o HEV))-17, INSTALLATION, Throttle Body.>

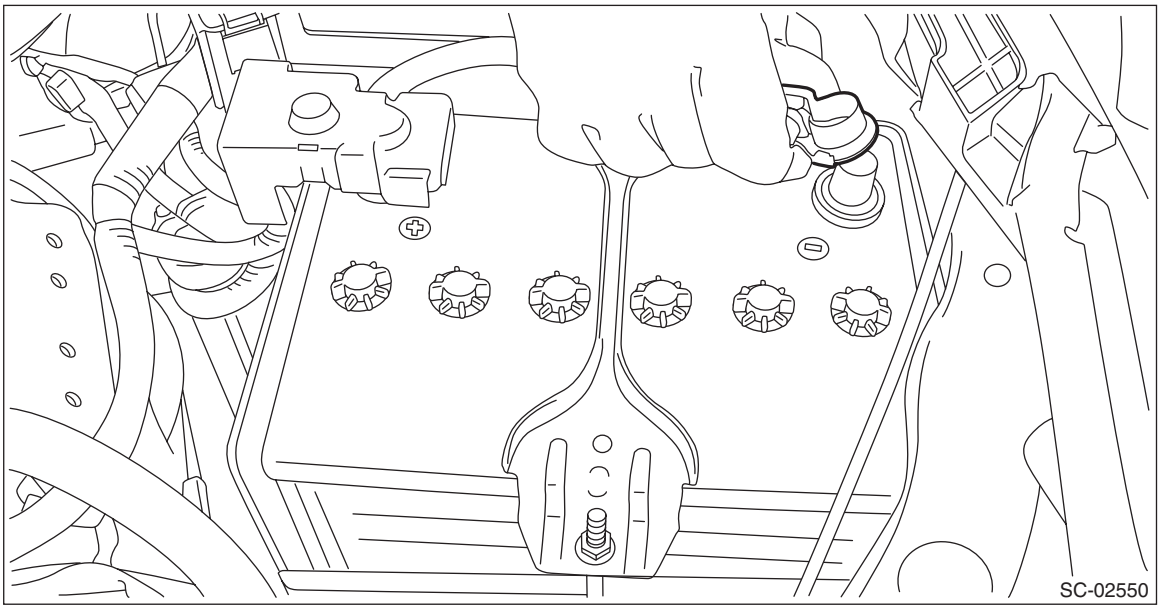
E: INSPECTION

1) Check that the intake manifold and fuel pipe have no deformation, cracks and other damages.
2) Check that the hose has no cracks, damage or loose part.

4. Engine Wiring Harness

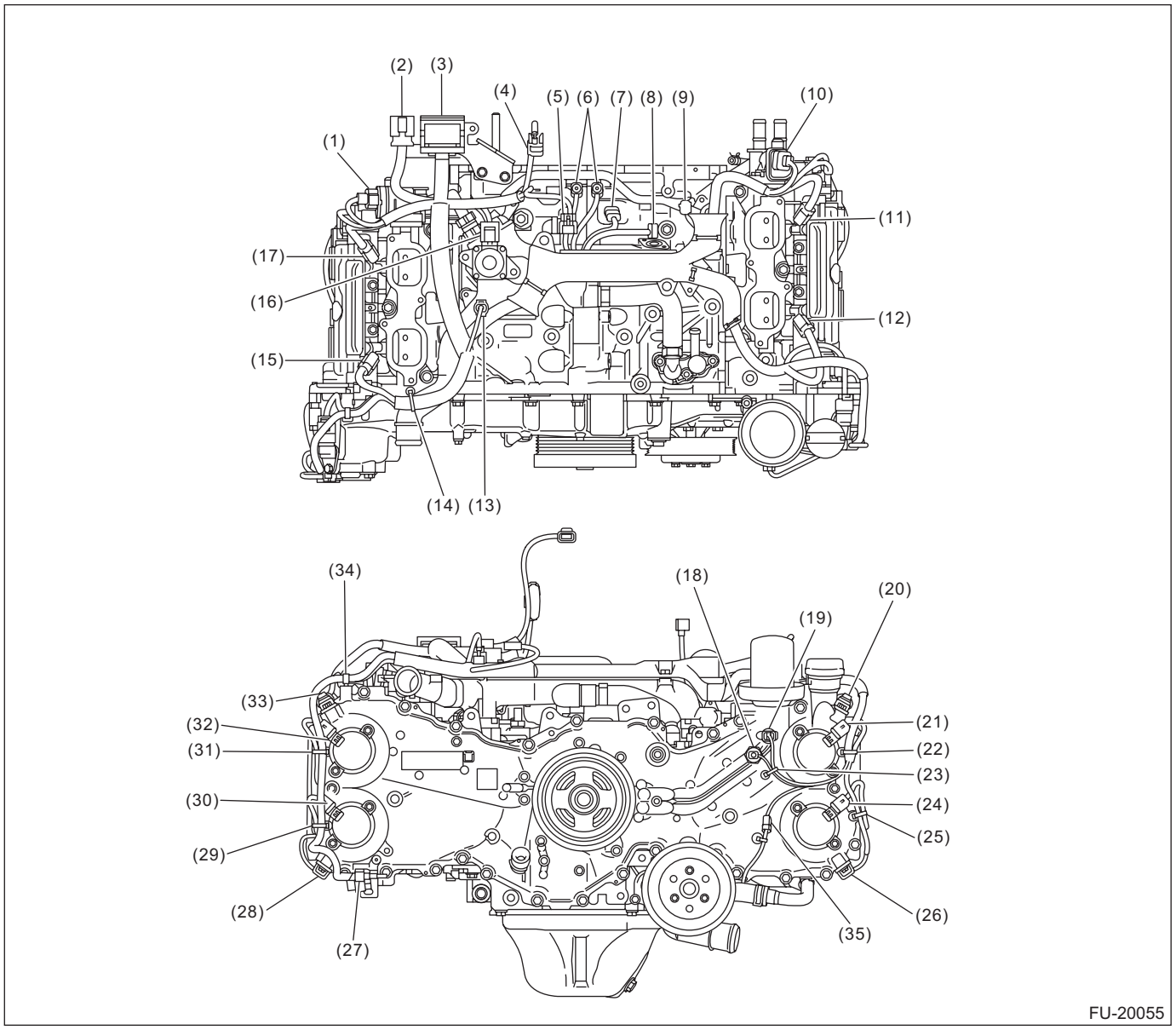
A: REMOVAL

1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the ground cable from battery.



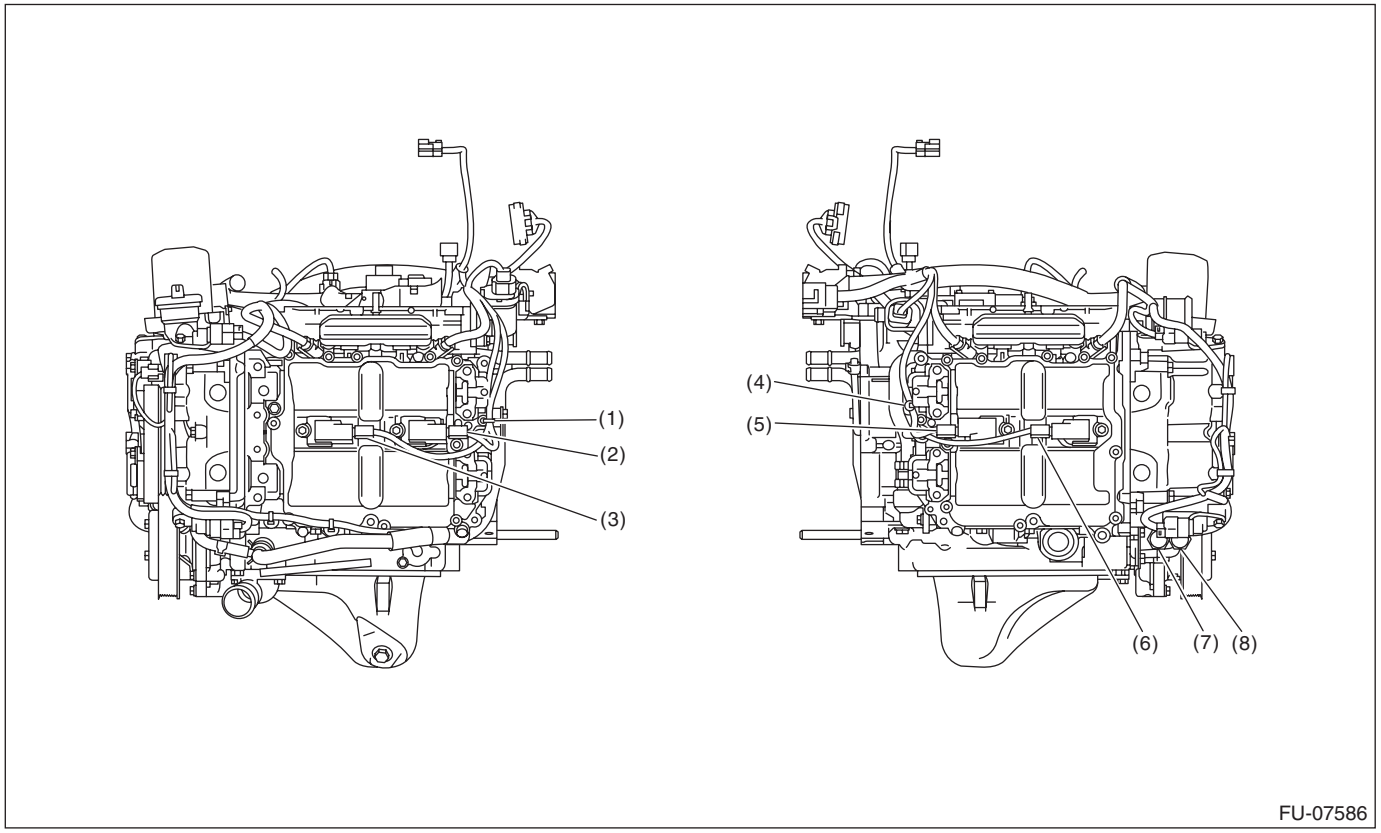
3) Remove the intake manifold. <Ref. to FU(H4DO(w/o HEV))-20, REMOVAL, Intake Manifold.>
4) Disconnect the connector from the engine.

- Structural diagram 1



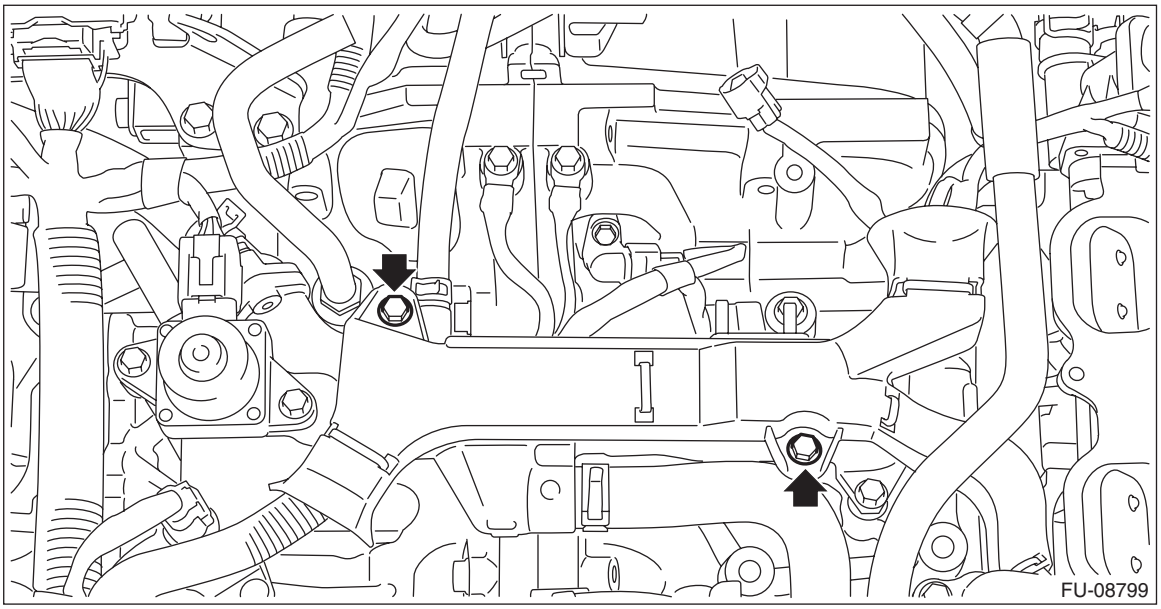
(1) Tumble generator valve actuator RH
(2) Engine harness connector (16P)
(3) Engine harness connector (54P)
(4) Throttle position sensor connector
(5) Manifold absolute pressure sensor connector
(6) Engine ground (2 locations)
(7) Crankshaft position sensor
(8) Knock sensor
(9) Purge control solenoid valve connector
(10) Tumble generator valve actuator LH
(11) Fuel injector (#4)
(12) Fuel injector (#2)
(13) Engine coolant temperature sensor
(14) Remove the clip from the screw hole.
(15) Fuel injector (#1)
(16) EGR valve
(17) Fuel injector (#3)
(18) Oil pressure switch
(19) Engine oil temperature sensor
(20) Intake camshaft position sensor LH
(21) Intake oil control solenoid LH
(22) Remove the clip from the screw hole.
(23) Remove the clip from the screw hole.
(24) Exhaust oil control solenoid LH
(25) Remove the clip from the screw hole.
(26) Exhaust camshaft position sensor LH
(27) Remove the clip from the oval hole.
(28) Exhaust camshaft position sensor RH
(29) Remove the clip from the screw hole.
(30) Exhaust oil control solenoid RH
(31) Remove the clip from the screw hole.
(32) Intake oil control solenoid RH
(33) Intake camshaft position sensor RH
(34) Remove the clip from the screw hole.
(35) Oil level switch connector

- Structural diagram 2



(1) Remove the clip from the screw hole.
(2) Ignition coil No. 4
(3) Ignition coil No. 2
(4) Remove the clip from the screw hole.
(5) Ignition coil No. 3
(6) Ignition coil No. 1
(7) Front oxygen (A/F) sensor
(8) Rear oxygen sensor

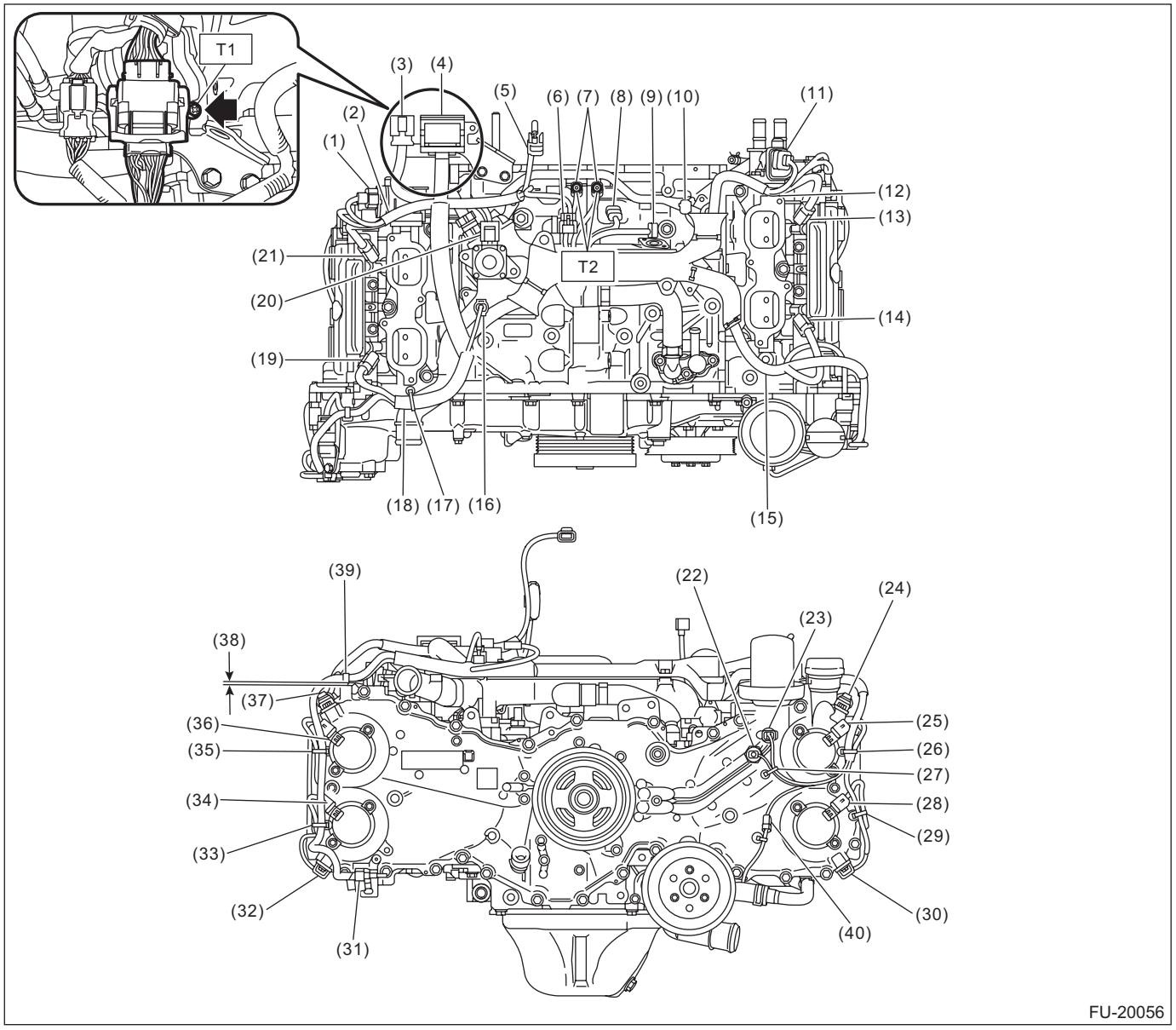
5) Remove the engine wiring harness.



B: INSTALLATION

1) Route the engine wiring harness around the engine and connect connectors.

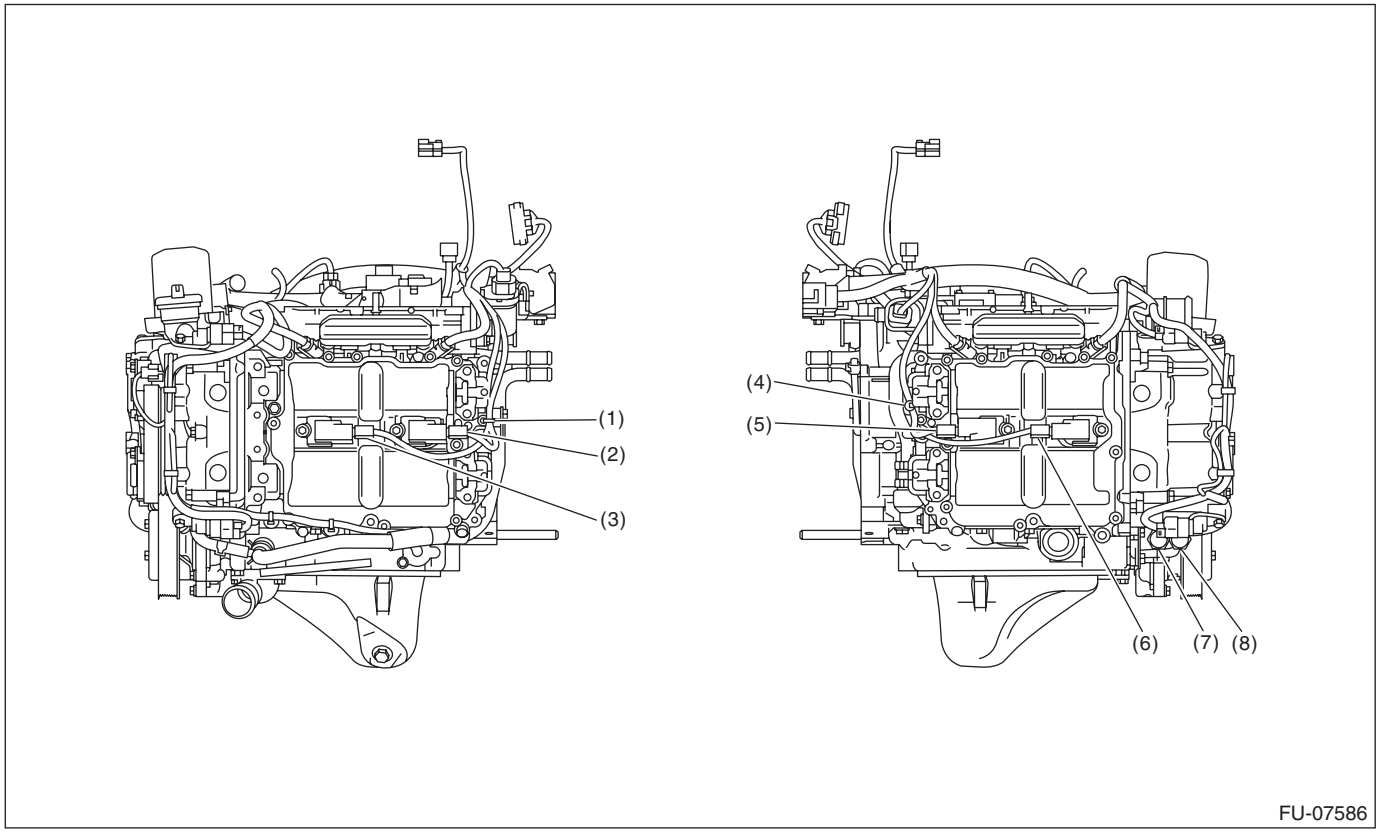
- Structural diagram 1



(1) Tumble generator valve actuator RH
(2) Be careful of pinching when installing the intake manifold.
(3) Engine harness connector (16P)
(4) Engine harness connector (54P)
(5) Throttle position sensor connector
(6) Manifold absolute pressure sensor connector
(7) Engine ground (2 locations)
(8) Crankshaft position sensor
(9) Knock sensor
(10) Purge control solenoid valve connector
(11) Tumble generator valve actuator LH
(12) Be careful of pinching when installing the intake manifold.
(13) Fuel injector (#4)
(14) Fuel injector (#2)
(15) Be careful of pinching when installing the intake manifold and A/C bracket.
(16) Engine coolant temperature sensor
(17) Secure the clip to the screw hole.
(18) Be careful of pinching when installing the intake manifold.
(19) Fuel injector (#1)
(20) EGR valve
(21) Fuel injector (#3)
(22) Oil pressure switch
(23) Engine oil temperature sensor
(24) Intake camshaft position sensor LH
(25) Intake oil control solenoid LH
(26) Secure the clip to the screw hole.
(27) Secure the clip to the screw hole.
(28) Exhaust oil control solenoid LH
(29) Secure the clip to the screw hole.
(30) Exhaust camshaft position sensor LH
(31) Secure the clip to the oval hole.
(32) Exhaust camshaft position sensor RH
(33) Secure the clip to the screw hole.
(34) Exhaust oil control solenoid RH
(35) Secure the clip to the screw hole.
(36) Intake oil control solenoid RH
(37) Intake camshaft position sensor RH
(38) Maximum of 0 — 2 mm (0 — 0.079 in) gap is allowed.
(39) Secure the clip to the screw hole.
(40) Oil level switch connector

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.8, 5.5)
T2: 19 (1.9, 14.0)

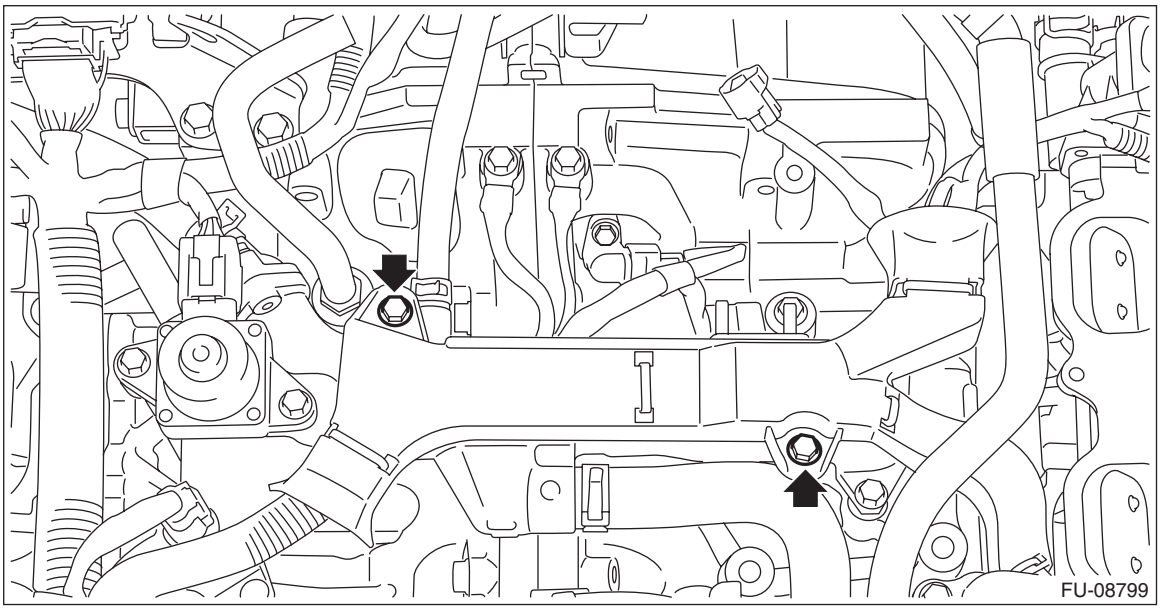
- Structural diagram 2



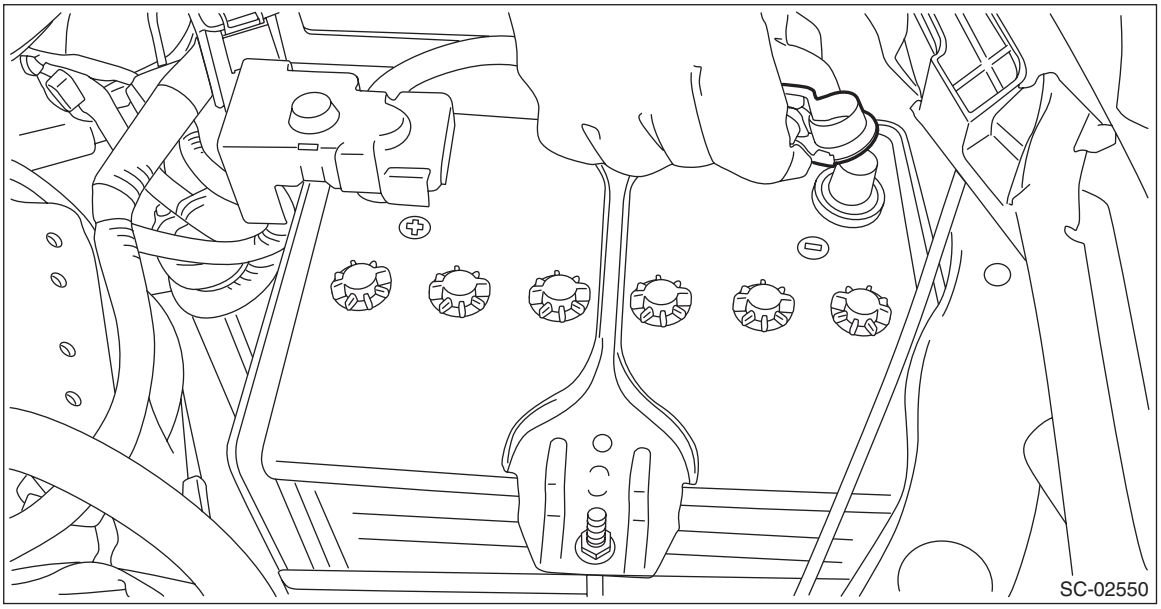
(1) Secure the clip to the screw hole.
(2) Ignition coil No. 4
(3) Ignition coil No. 2
(4) Secure the clip to the screw hole.
(5) Ignition coil No. 3
(6) Ignition coil No. 1
(7) Front oxygen (A/F) sensor
(8) Rear oxygen sensor

2) Install the engine wiring harness.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



3) Install the intake manifold. <Ref. to FU(H4DO(w/o HEV))-30, INSTALLATION, Intake Manifold.>
4) Connect the battery ground terminal.



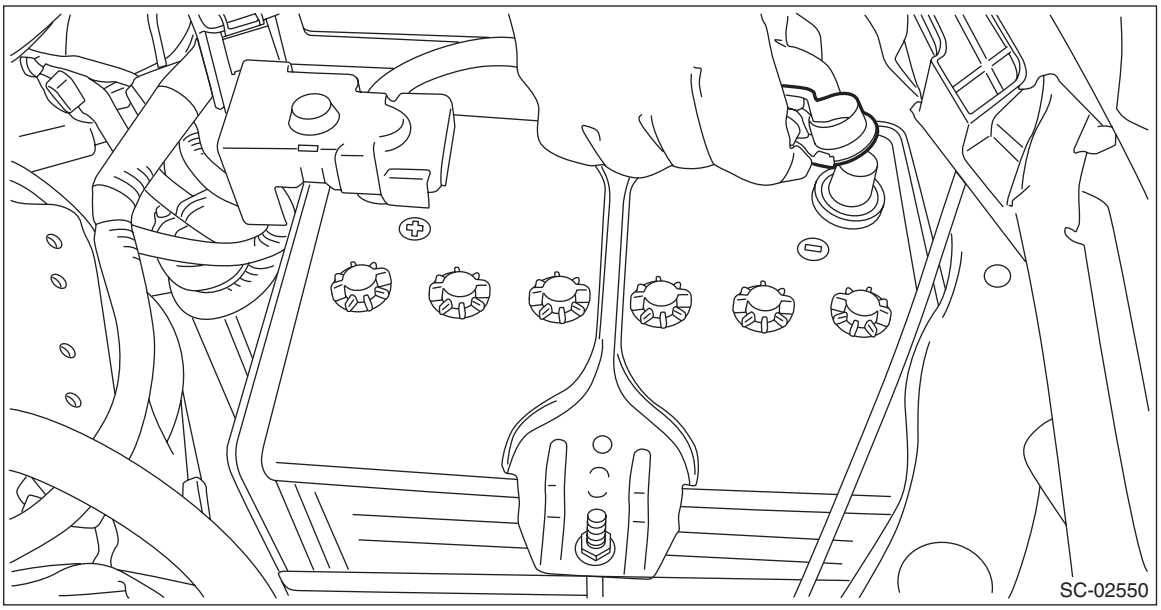
C: INSPECTION

Check that the engine wiring harness does not have deformation, cracks and any other damage.

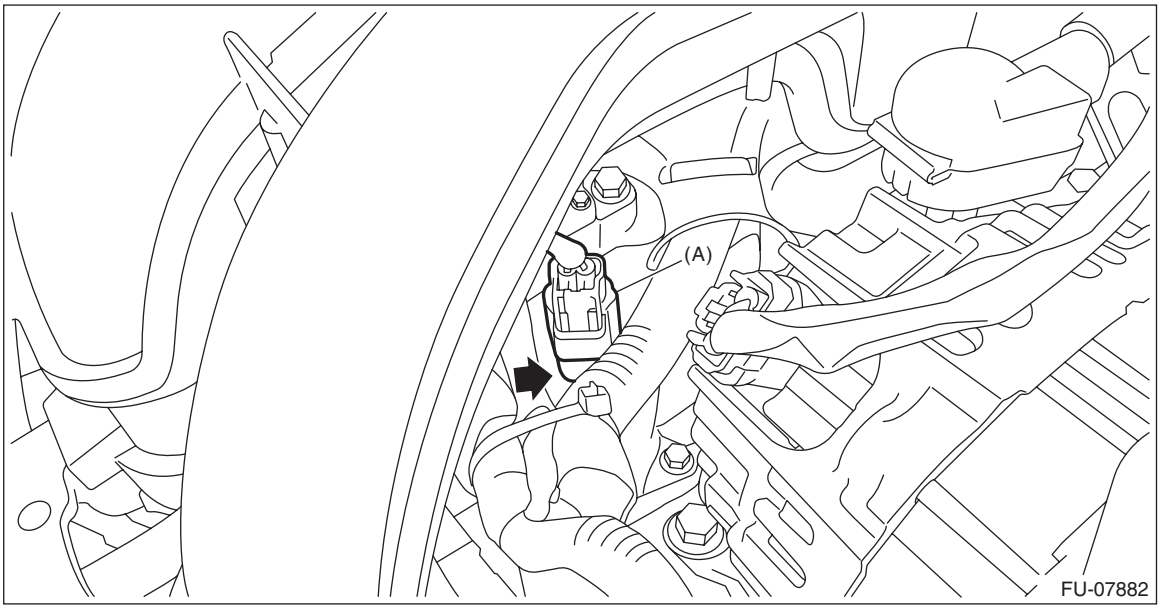
5. Engine Coolant Temperature Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
3) Disconnect the connector (A) from the engine coolant temperature sensor, and remove the engine coolant temperature sensor.



B: INSTALLATION

Install in the reverse order of removal.

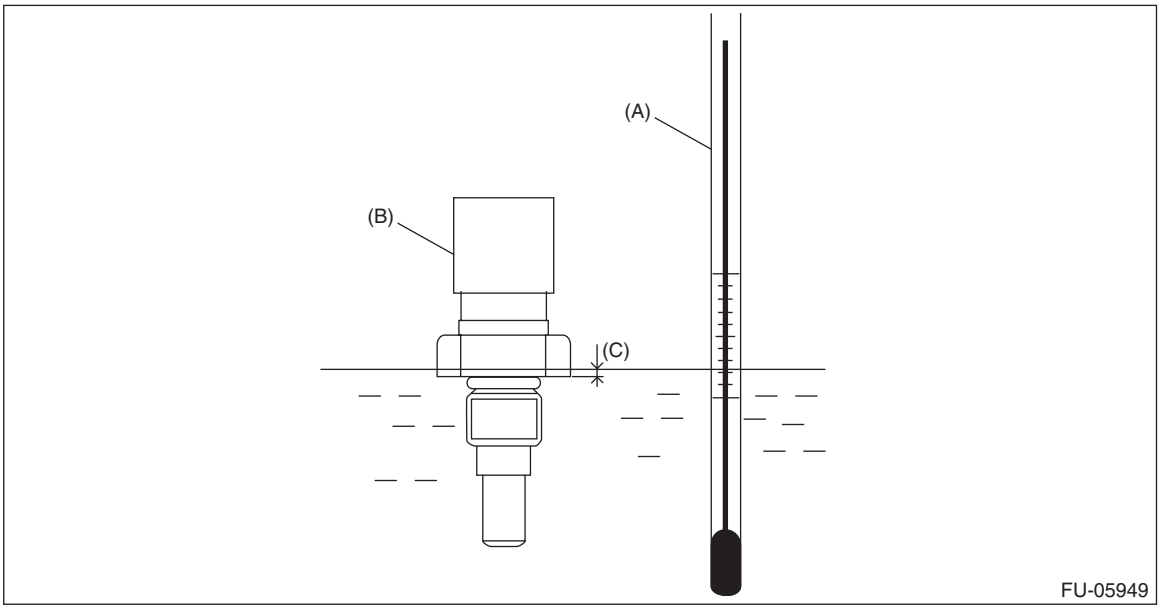
NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

C: INSPECTION

1) Check that the engine coolant temperature sensor has no deformation, cracks or other damages.
2) Immerse the engine coolant temperature sensor and a thermometer in water.

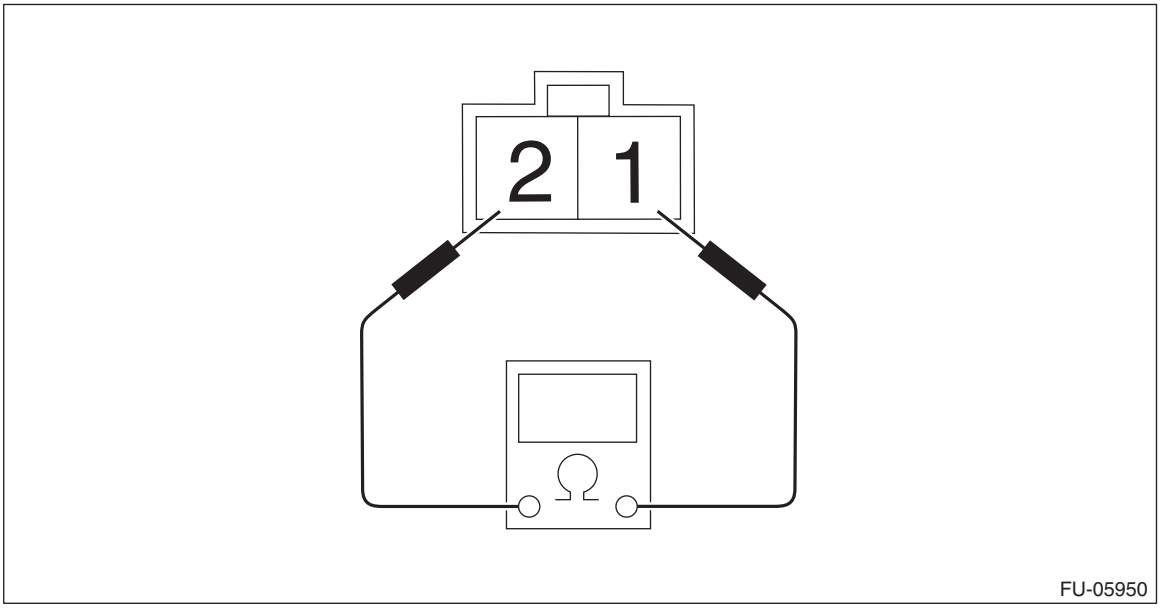
CAUTION:
Take care not to allow water to get into the engine coolant temperature sensor connector. Completely remove any water inside.



(A) Thermometer
(B) Engine coolant temperature sensor
(C) Hexagonal part height: To approx. $^1/_3$

3) Raise water temperature gradually, measure the resistance between the engine coolant temperature sensor terminals when the temperature is 20°C (68°F) and 80°C (176°F).

NOTE:
Agitate the water for even temperature distribution.



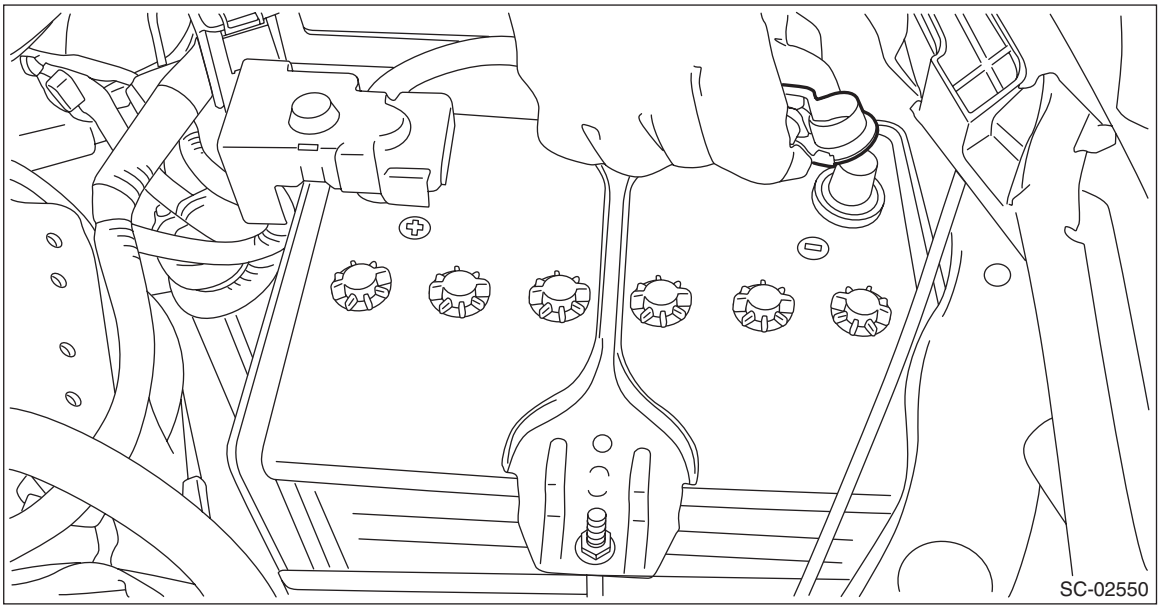
Water temperature	Terminal No.	Standard
20°C (68°F)	1 and 2	Approx. 2.45±0.2 kΩ
80°C (176°F)		Approx. 0.318±0.013 kΩ

6. Engine Oil Temperature Sensor

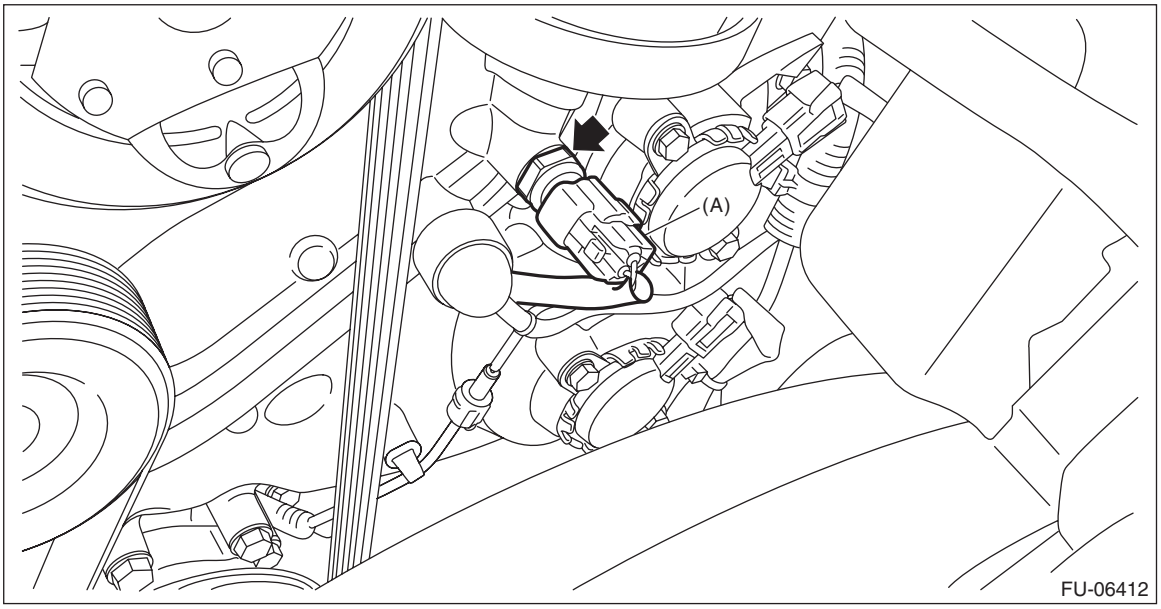
A: REMOVAL

CAUTION:
If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emission of smoke or causing a fire.

1) Disconnect the ground cable from battery.



2) Disconnect the connector (A) from the engine oil temperature sensor, and remove the engine oil temperature sensor from the chain cover.



B: INSTALLATION

Install in the reverse order of removal.

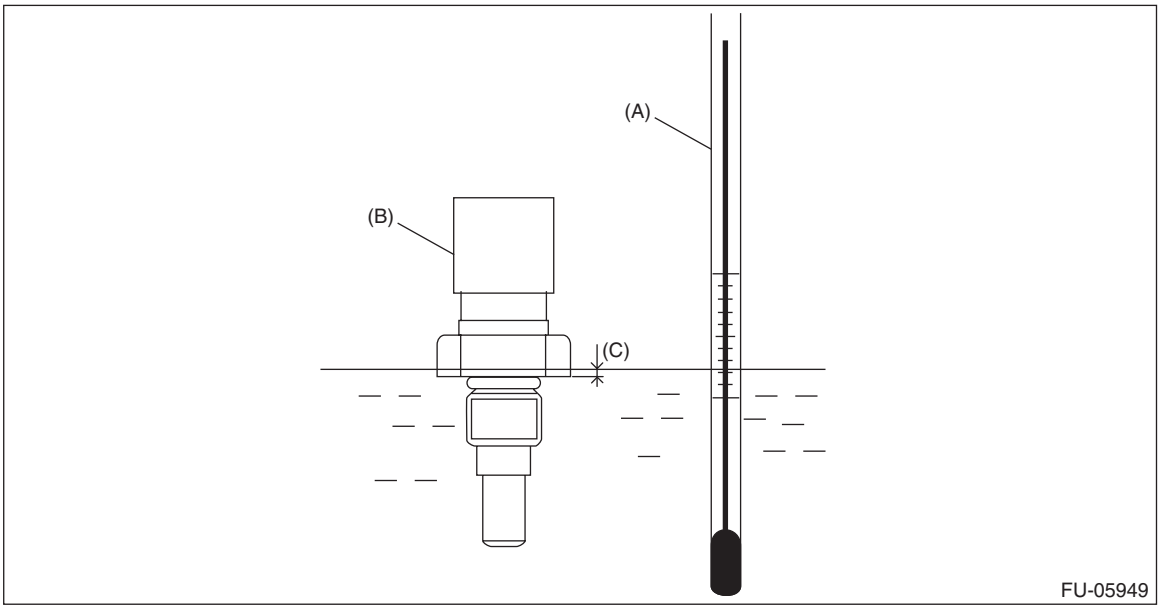
NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

C: INSPECTION

1) Check that the engine oil temperature sensor has no deformation, cracks or other damages.
2) Immerse the engine oil temperature sensor and a thermometer in water.

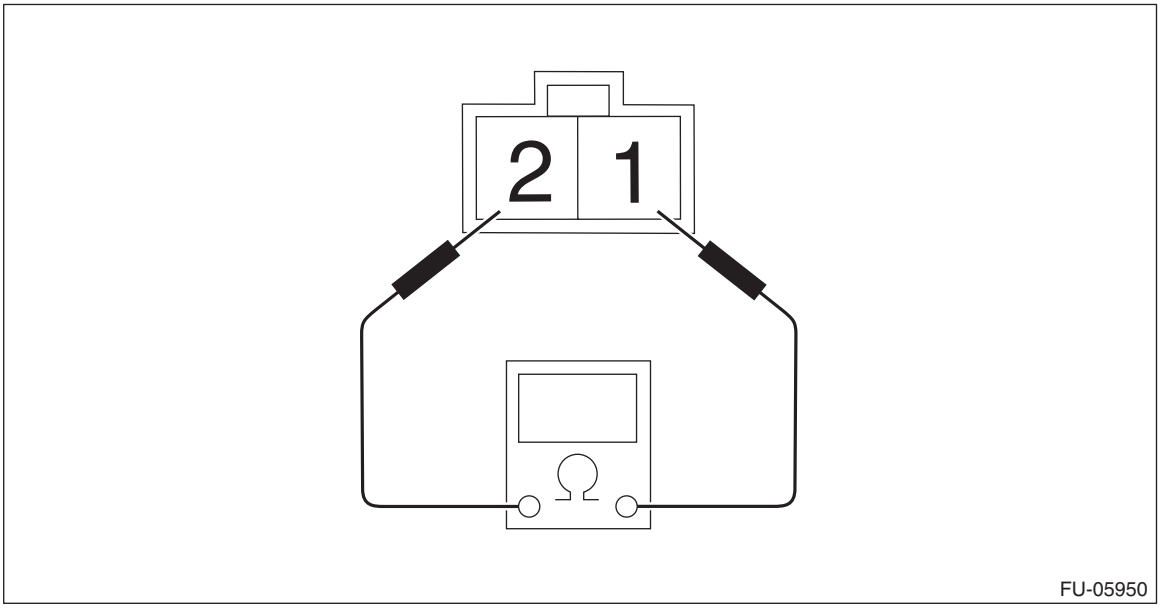
CAUTION:
Take care not to allow water to get into the engine oil temperature sensor connector. Completely remove any water inside.



(A) Thermometer
(B) Engine oil temperature sensor
(C) Hexagonal part height: To approx. $^1/_3$

3) Raise water temperature gradually, measure the resistance between the engine oil temperature sensor terminals when the temperature is 20°C (68°F) and 80°C (176°F).

NOTE:
Agitate the water for even temperature distribution.

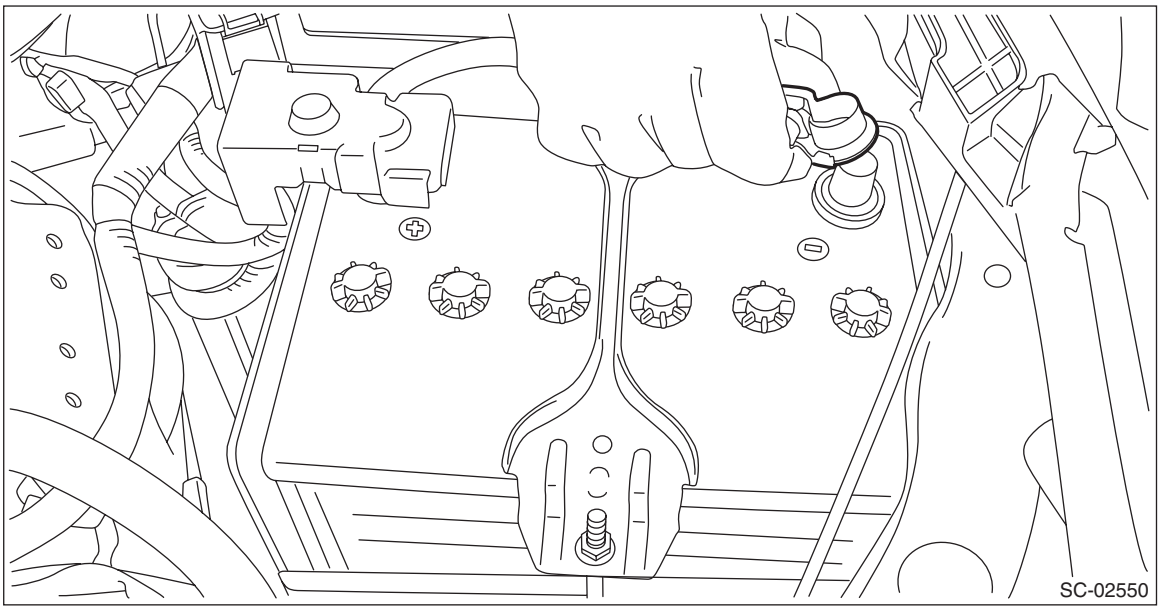


Water temperature	Terminal No.	Standard
20°C (68°F)	1 and 2	Approx. 2.45±0.2 kΩ
80°C (176°F)		Approx. 0.318±0.013 kΩ

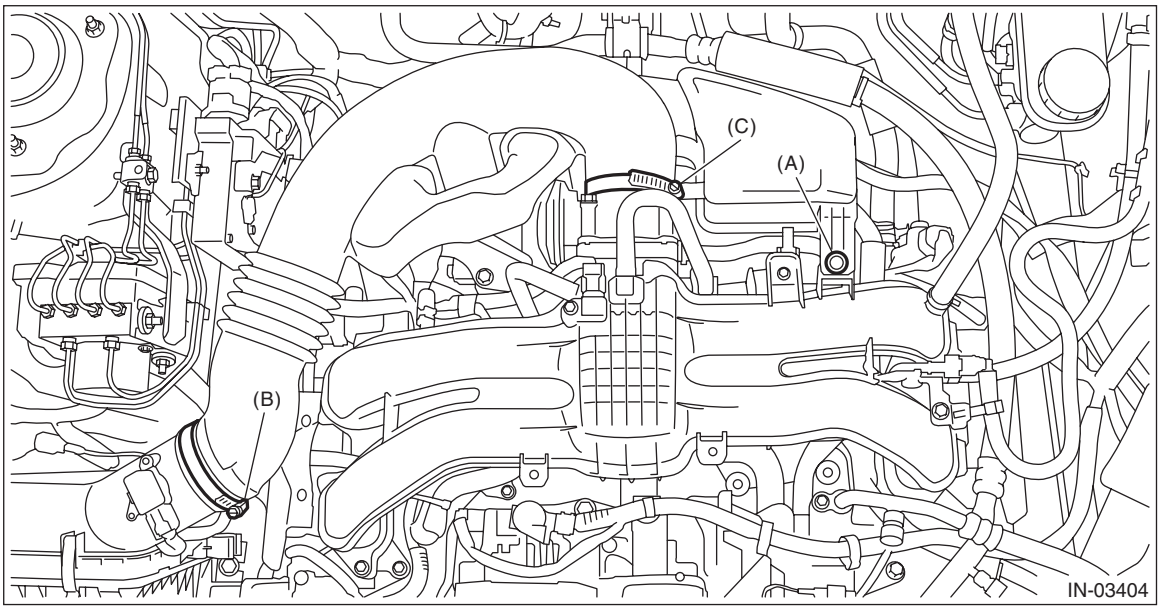
7. Crankshaft Position Sensor

A: REMOVAL

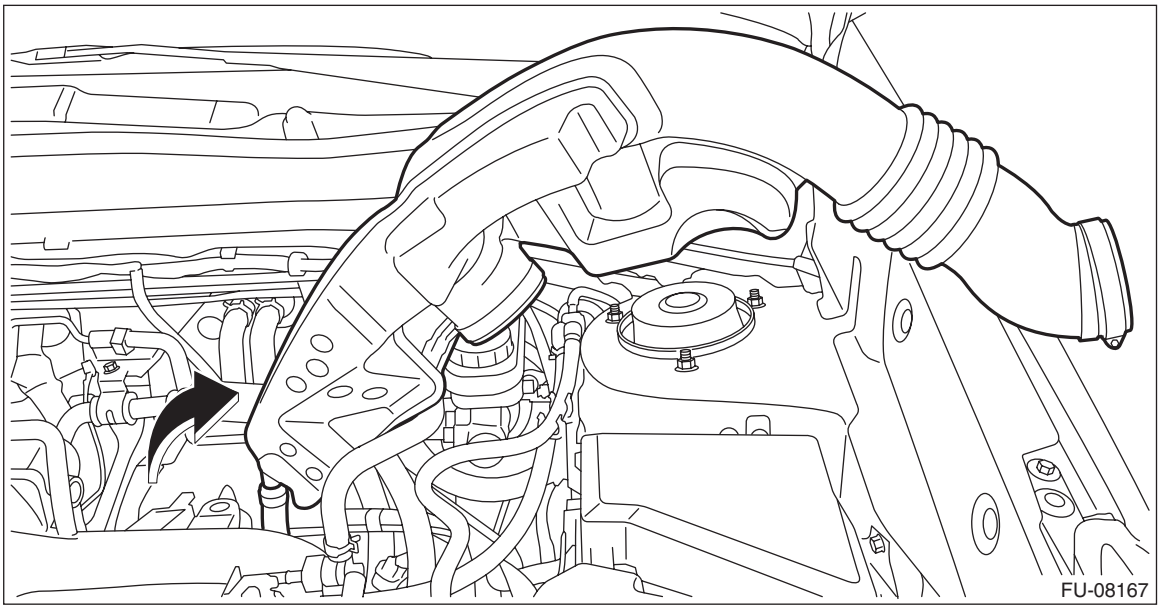
1) Disconnect the ground cable from battery.



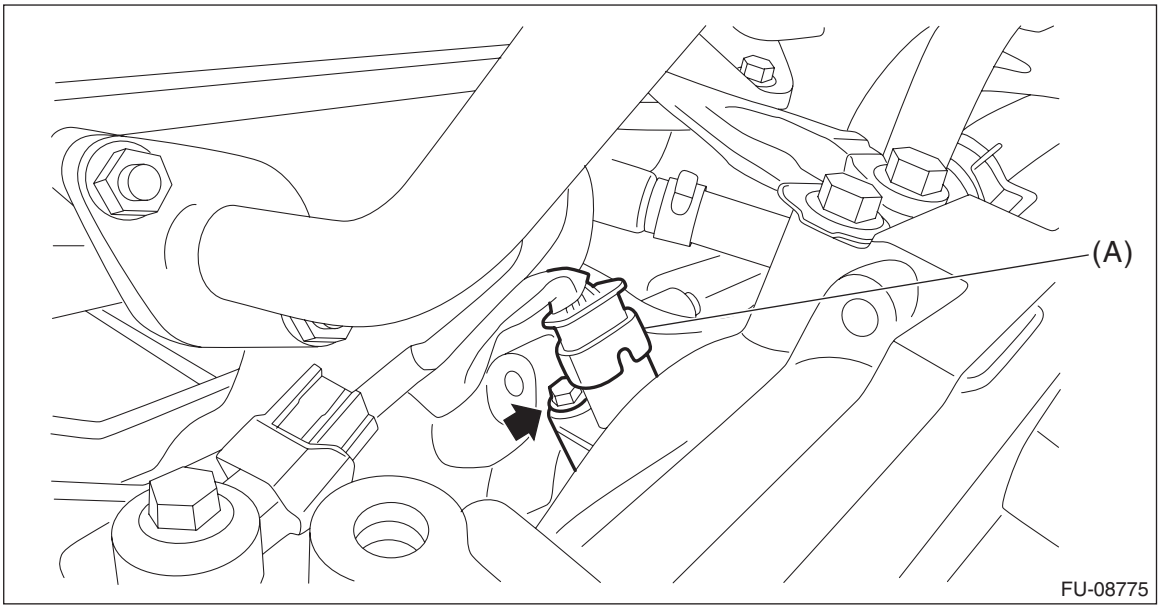
2) Remove the clip (A), and loosen the clamps (B) and (C) securing the air intake boot.



3) Remove the air intake boot from the air cleaner case (rear) and throttle body, and move it to the left side wheel apron.



4) Disconnect the connector (A) from the crankshaft position sensor, and remove the crankshaft position sensor from the cylinder block.



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

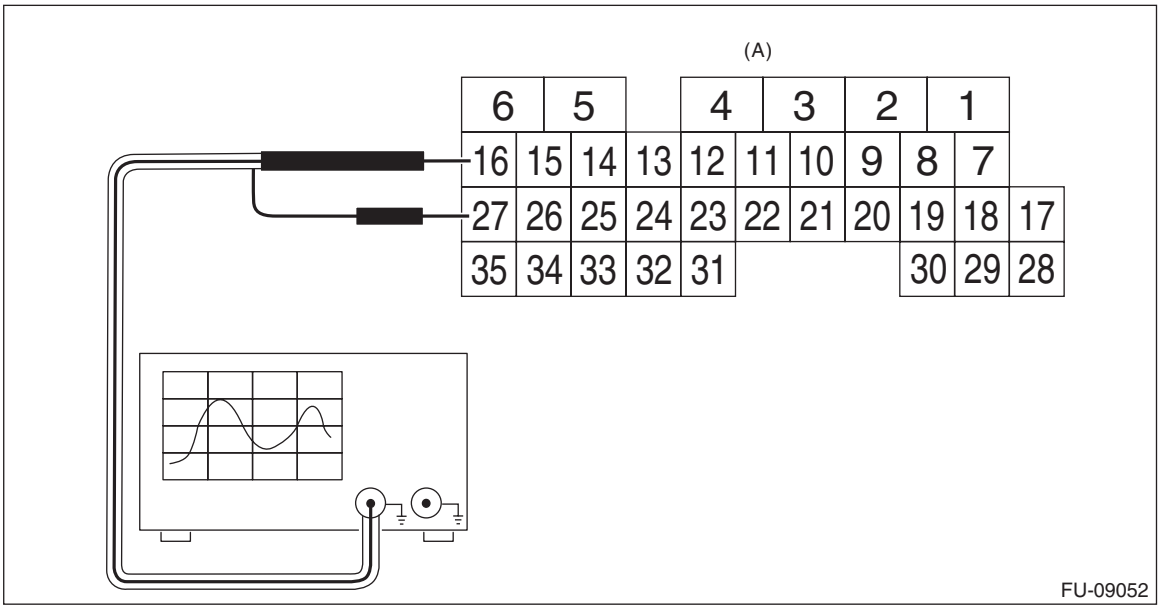
C: INSPECTION

1. CRANKSHAFT POSITION SENSOR (METHOD WITH OSCILLOSCOPE)

1) Prepare an oscilloscope.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>

3) Connect the probe to ECM connector.





(A) To ECM connector

Terminal No.	Probe
16	+
27	–

4) Start the engine and let it idle.
5) Check the waveforms and voltage.

NOTE:
For waveform and voltage, refer to “Engine Control Module (ECM) I/O Signal”. <Ref. to EN(H4DO w/o HEV)(diag)-20, ELECTRICAL SPECIFICATION, Engine Control Module (ECM) I/O Signal.>
6) After inspection, install the related parts in the reverse order of removal.

2. OTHER INSPECTIONS

Check that the crankshaft position sensor has no deformation, cracks or other damages.

8. Crankshaft Position Sensor Plate

A: REMOVAL

The crankshaft position sensor plate is tightened together with the drive plate or flywheel; therefore, refer to “Drive Plate” or “Flywheel” for removal procedure. <Ref. to CVT(TR580)-166, REMOVAL, Drive Plate.> <Ref. to CL-13, REMOVAL, Flywheel.>

B: INSTALLATION

The crankshaft position sensor plate is tightened together with the drive plate or flywheel; therefore, refer to “Drive Plate” or “Flywheel” for installation procedure. <Ref. to CVT(TR580)-166, INSTALLATION, Drive Plate.> <Ref. to CL-13, INSTALLATION, Flywheel.>

C: INSPECTION

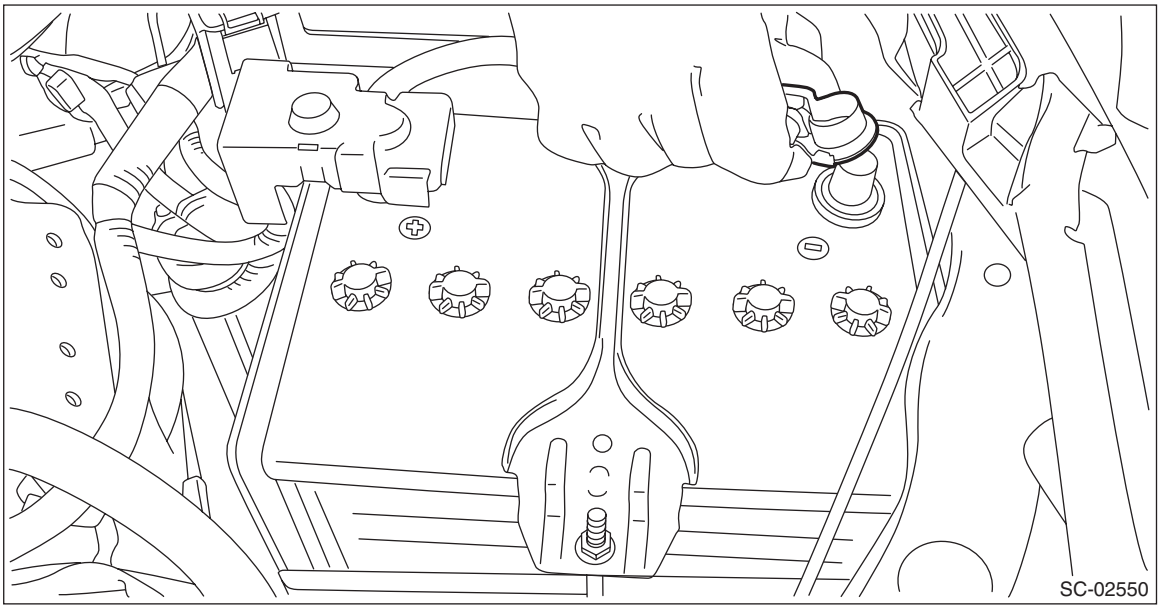
Check that the crankshaft position sensor plate has no deformation, cracks or other damages.

9. Camshaft Position Sensor

A: REMOVAL

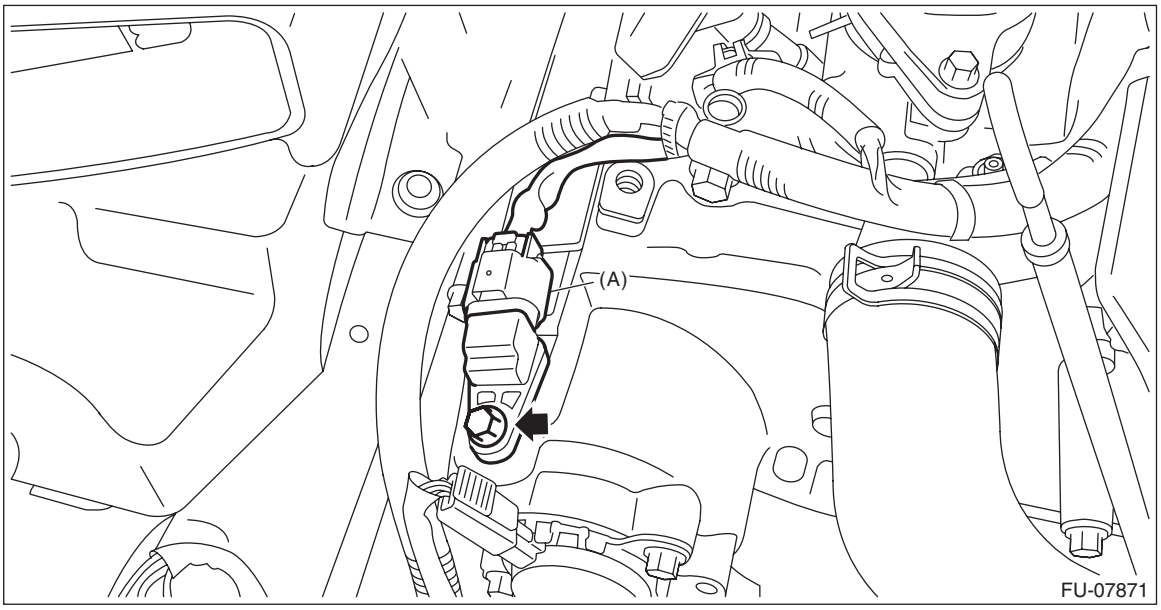
1. INTAKE SIDE

1) Disconnect the ground cable from battery.

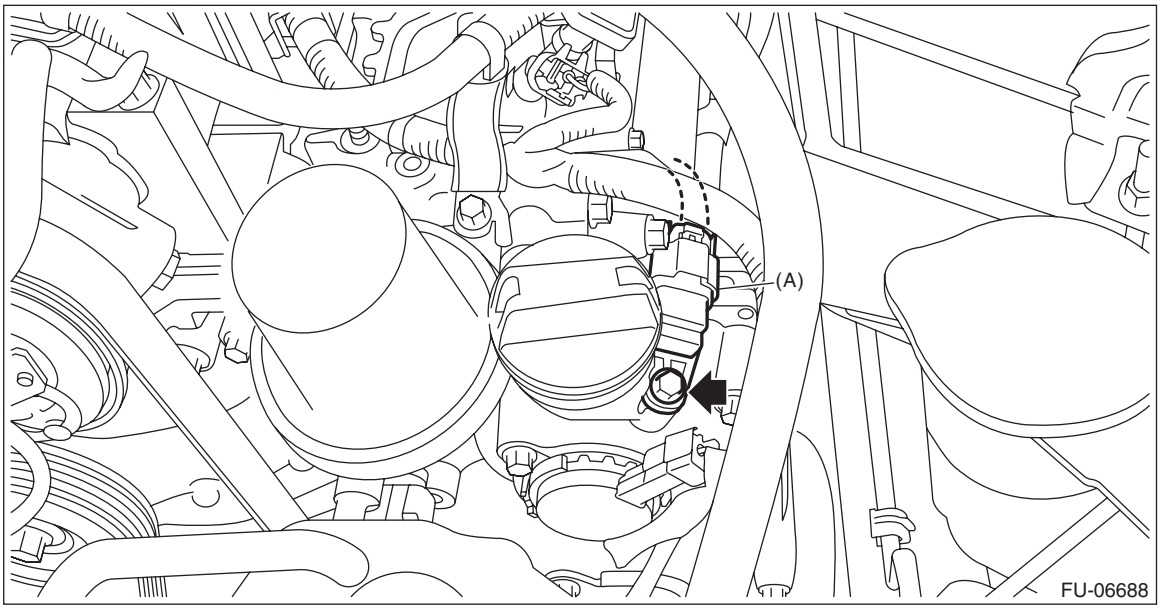


2) Remove the air intake duct. (RH side only) <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
3) Disconnect the connector (A) from the camshaft position sensor, and remove the camshaft position sensor from the chain cover.

- RH side

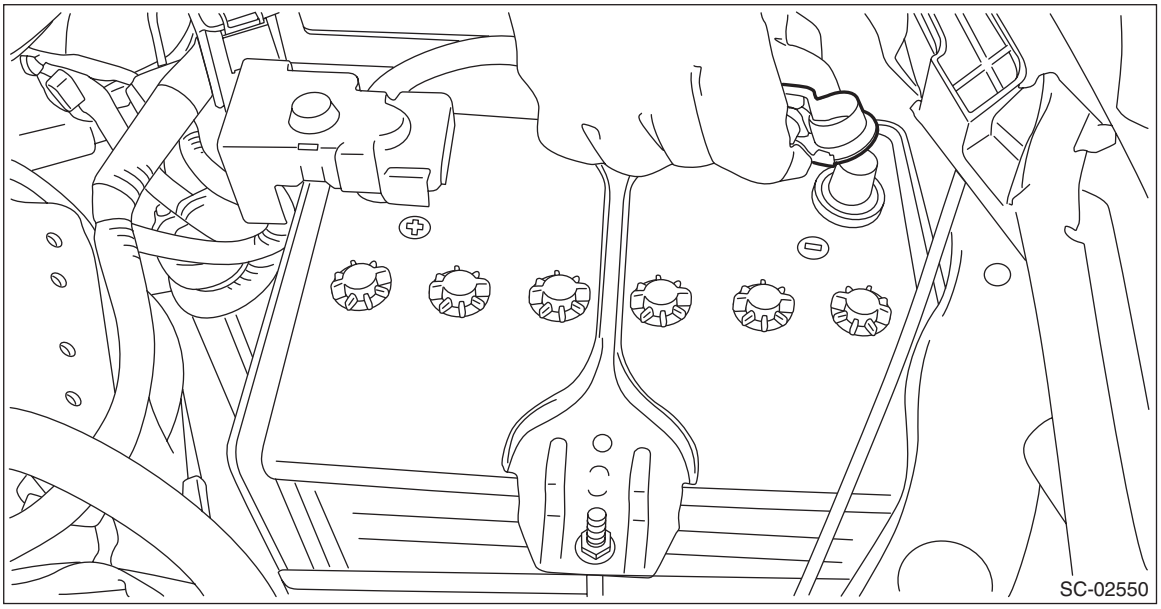


- LH side



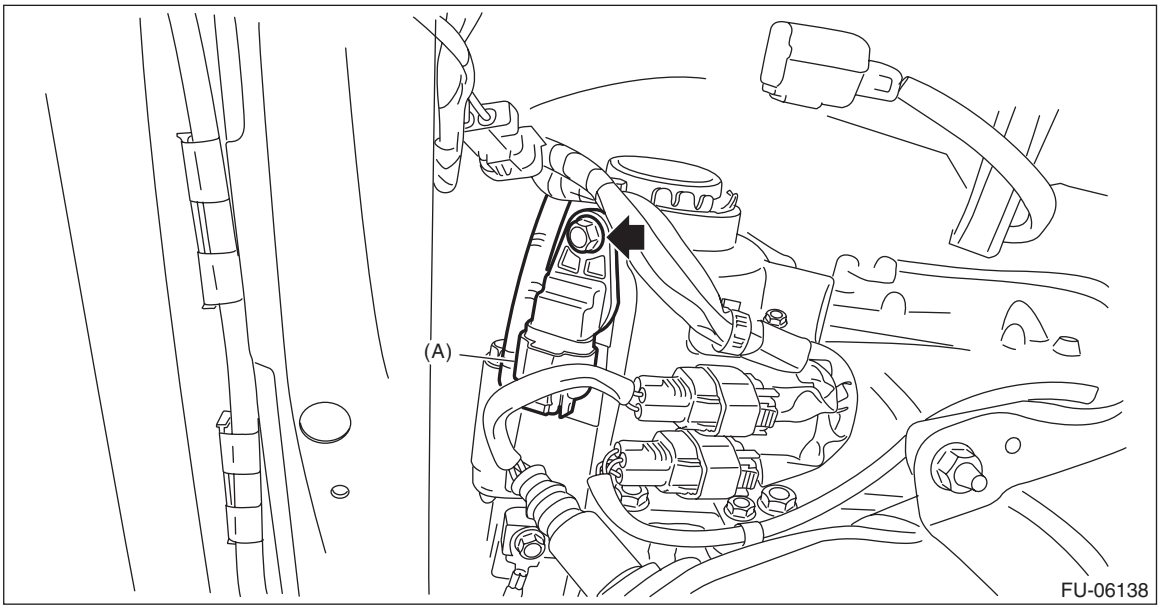
2. EXHAUST SIDE

1) Disconnect the ground cable from battery.

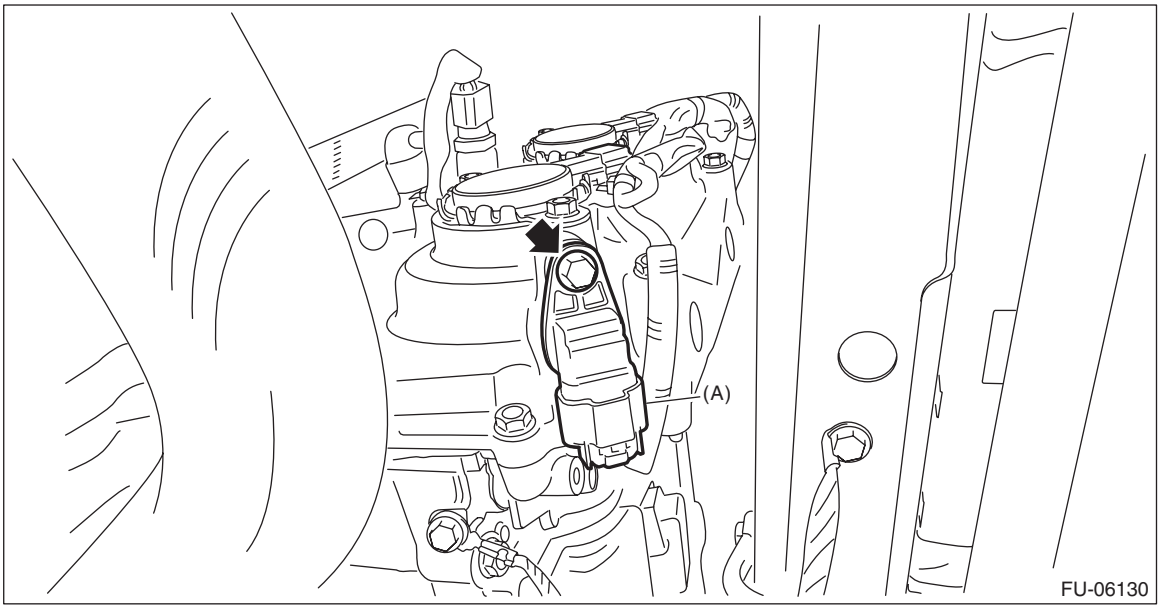


2) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
3) Disconnect the connector (A) from the camshaft position sensor, and remove the camshaft position sensor from the chain cover.

- RH side



- LH side



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
- Use new O-rings.
- Apply engine oil to O-ring.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

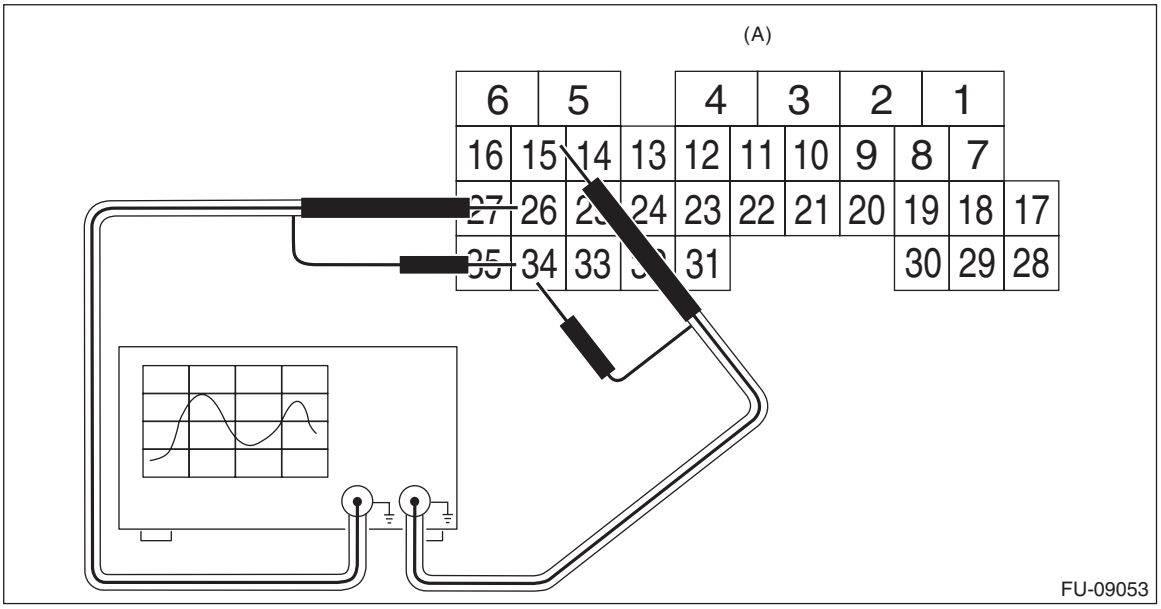
C: INSPECTION

1. CAMSHAFT POSITION SENSOR (METHOD WITH OSCILLOSCOPE)

1) Prepare an oscilloscope.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Connect the probe to ECM connector.

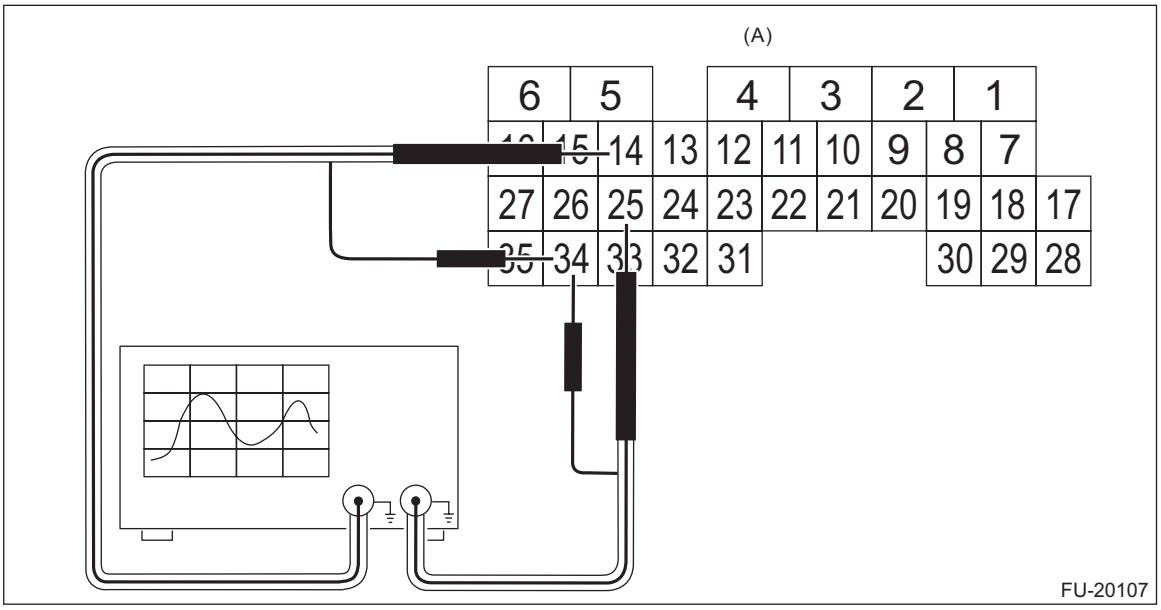


- Intake camshaft position sensor



(A) To ECM connector

- Exhaust camshaft position sensor



(A) To ECM connector

Camshaft position sensor		Terminal No.	Probe
Intake	RH	26	+
	LH	15	+
Exhaust	RH	14	+
	LH	25	+
RH and LH		34	–

4) Start the engine and let it idle.
5) Check the waveforms and voltage.

NOTE:
For waveform and voltage, refer to “Engine Control Module (ECM) I/O Signal”. <Ref. to EN(H4DO w/o HEV)(diag)-20, ELECTRICAL SPECIFICATION, Engine Control Module (ECM) I/O Signal.>
6) After inspection, install the related parts in the reverse order of removal.

2. OTHER INSPECTIONS

Check that the camshaft position sensor has no deformation, cracks or other damages.

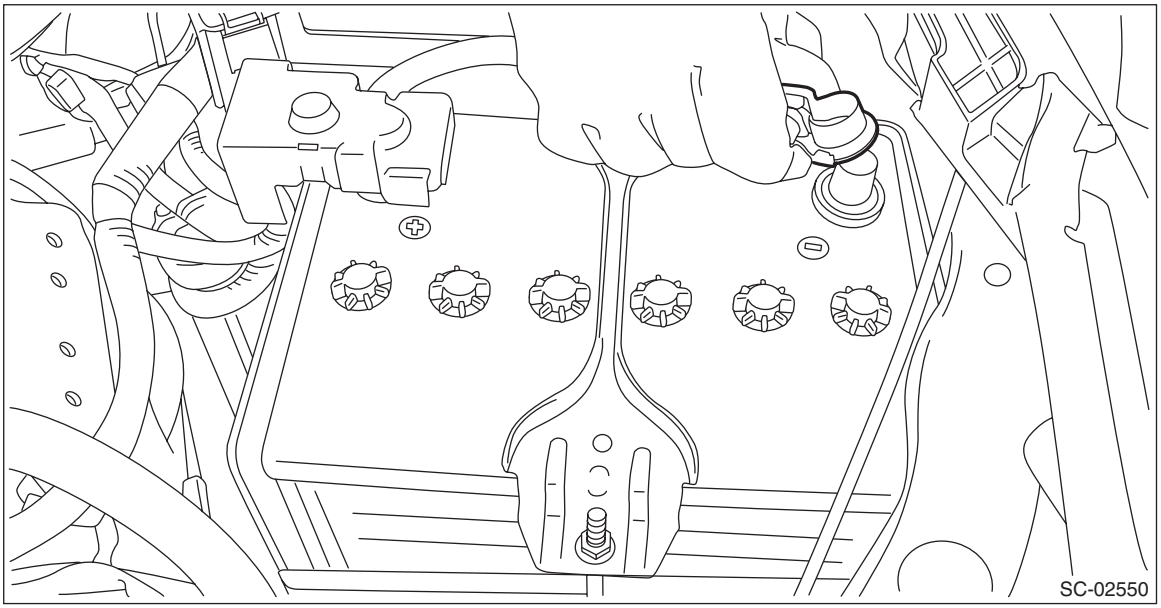
10.Oil Control Solenoid

A: REMOVAL

CAUTION:
If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emission of smoke or causing a fire.

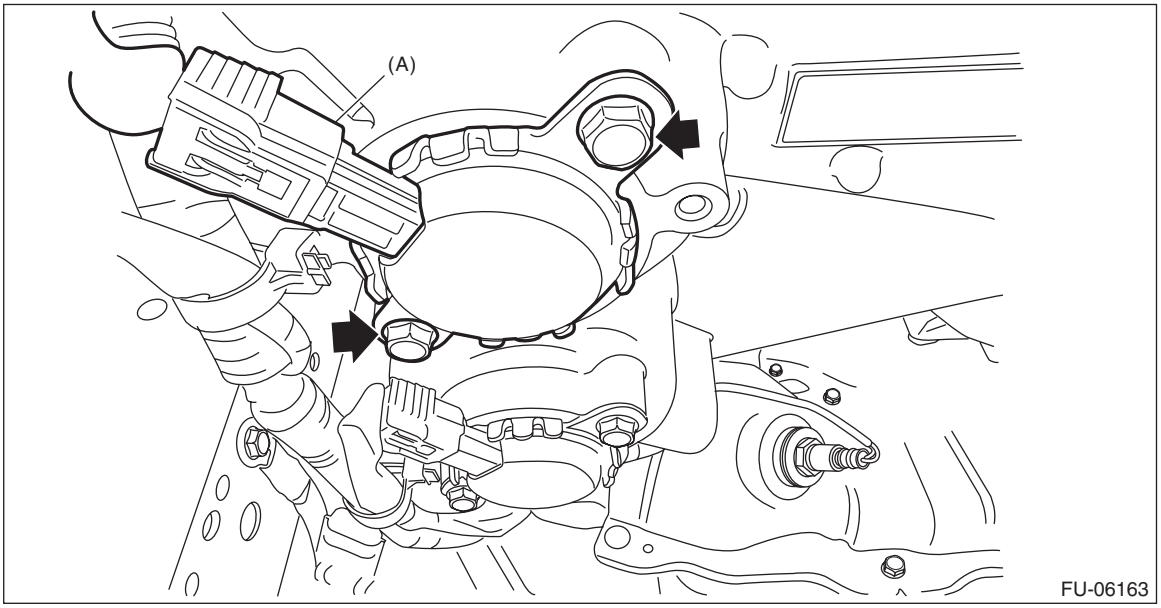
1. INTAKE SIDE

1) Disconnect the ground cable from battery.

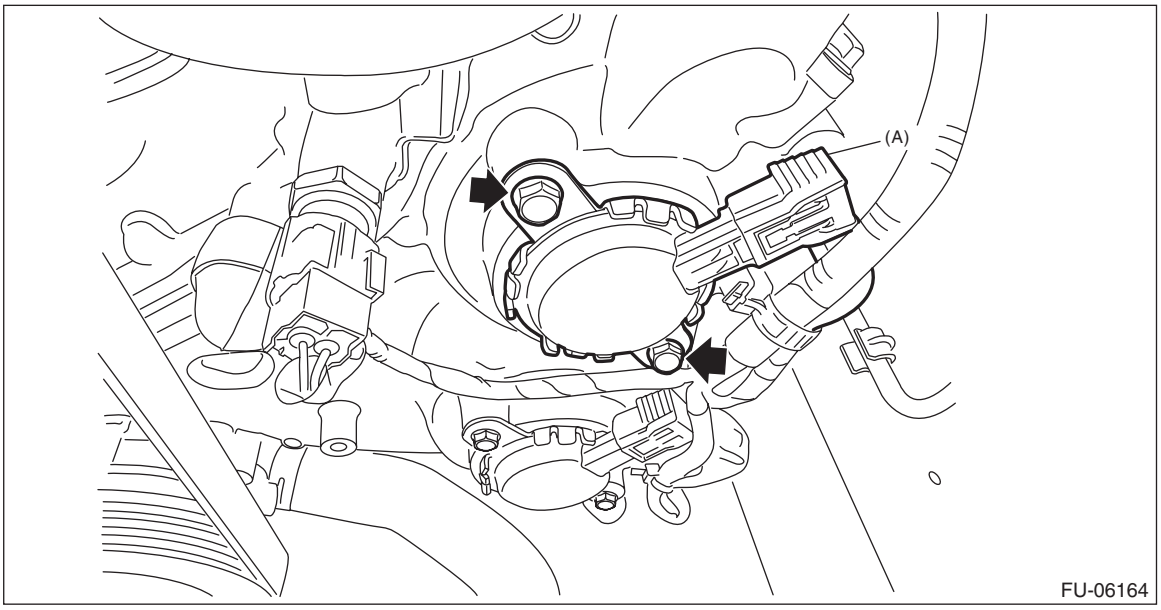


2) Remove the air intake duct. (RH side only) <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
3) Remove the reservoir tank. (LH side only) <Ref. to CO(H4DO(w/o HEV))-96, REMOVAL, Reservoir Tank.>
4) Disconnect the connector (A) from the oil control solenoid, and remove the oil control solenoid from the chain cover.

- RH side

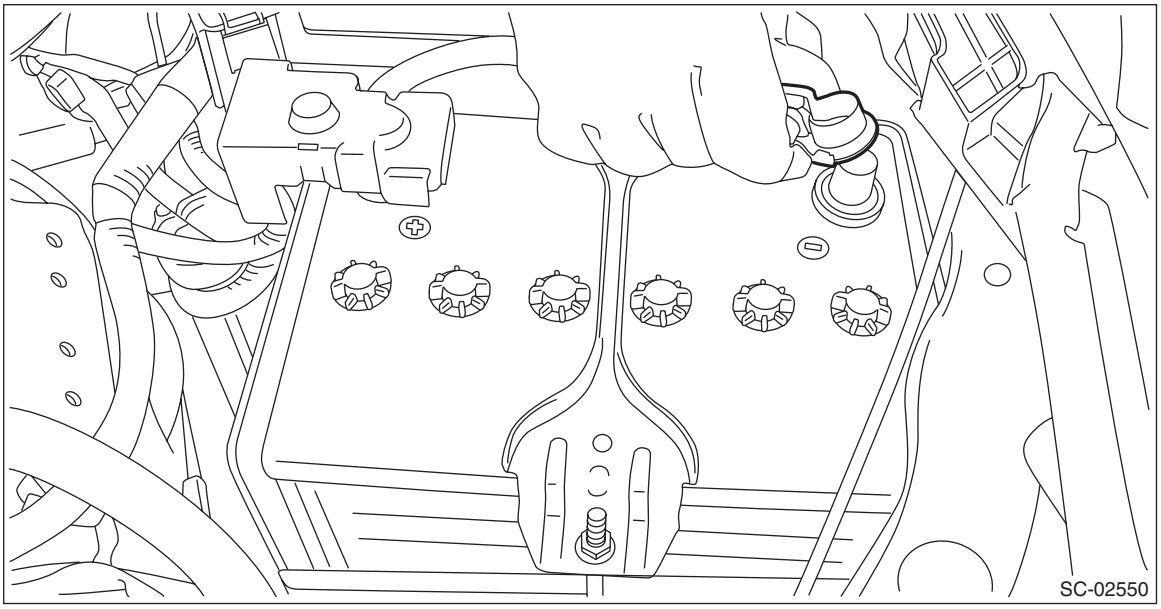


- LH side



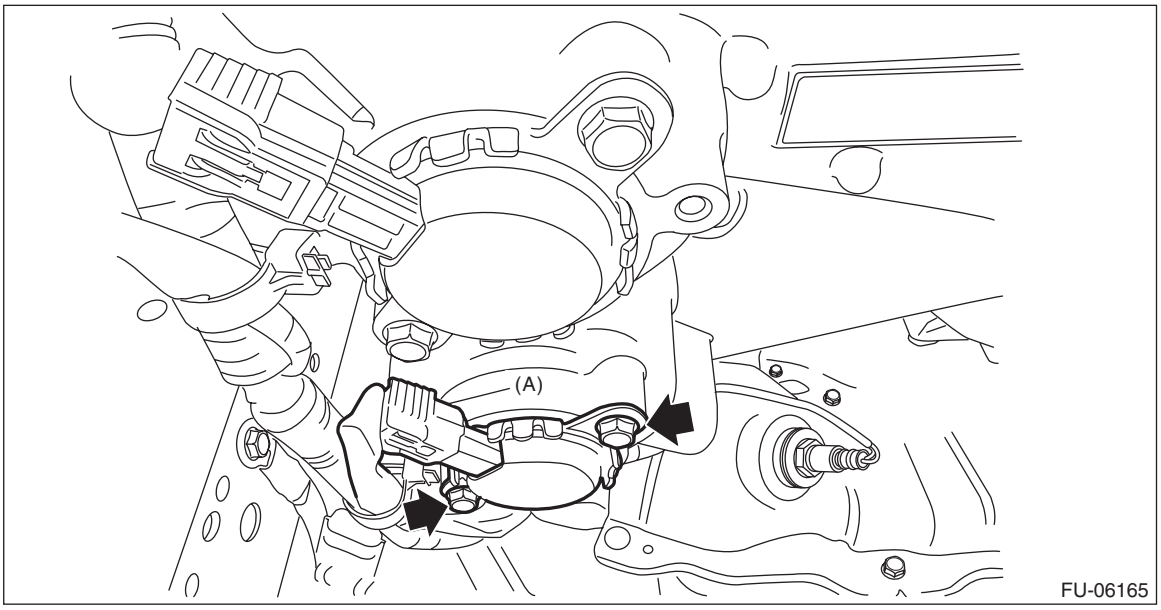
2. EXHAUST SIDE

1) Disconnect the ground cable from battery.

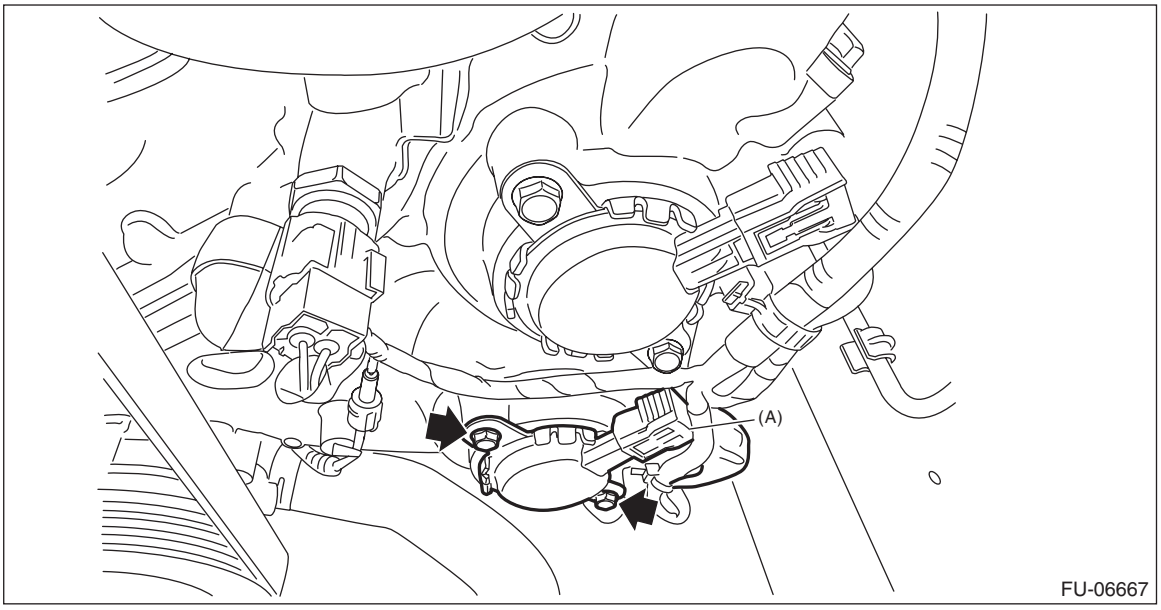


2) Remove the air intake duct. (RH side only) <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
3) Remove the reservoir tank. (LH side only) <Ref. to CO(H4DO(w/o HEV))-96, REMOVAL, Reservoir Tank.>
4) Disconnect the connector (A) from the oil control solenoid, and remove the oil control solenoid from the chain cover.

- RH side



- LH side



B: INSTALLATION

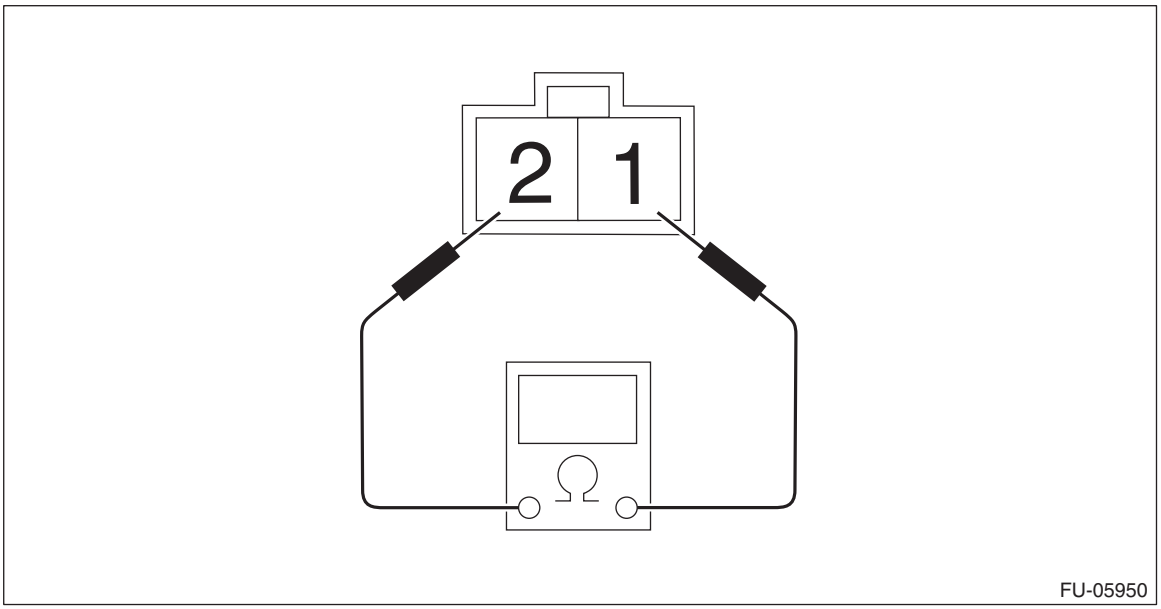
Install in the reverse order of removal.

NOTE:
- Use new O-rings.
- Apply engine oil to O-ring.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

C: INSPECTION

1) Check that the oil control solenoid has no deformation, cracks or other damages.
2) Measure the resistance between the oil control solenoid terminals.

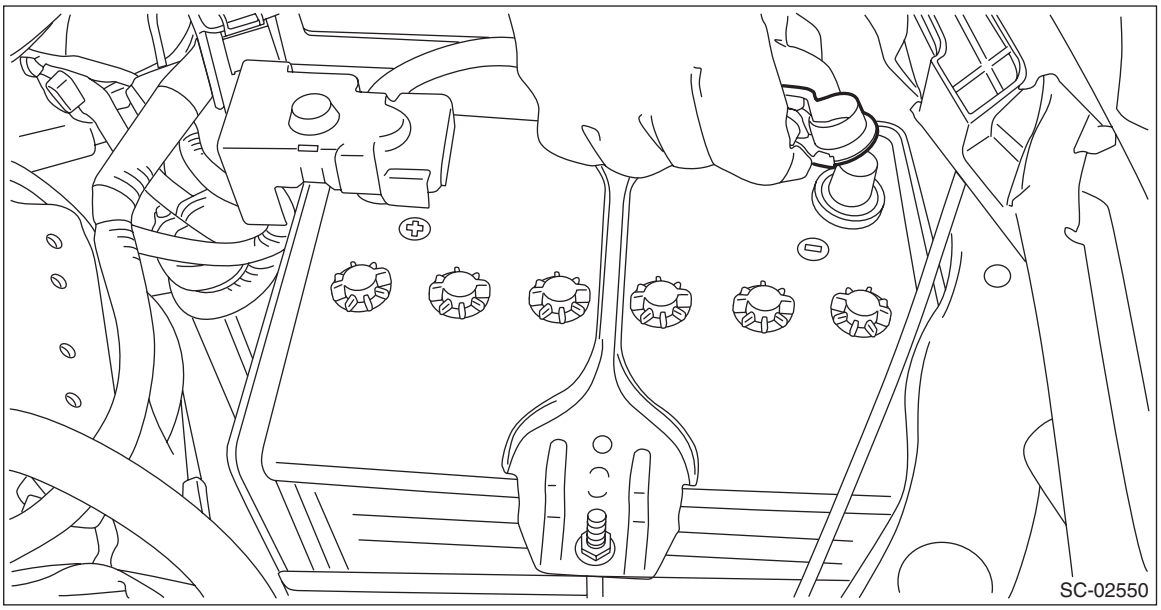


Terminal No.	Standard
1 and 2	7.25±0.4 Ω (when 20°C (68°F))

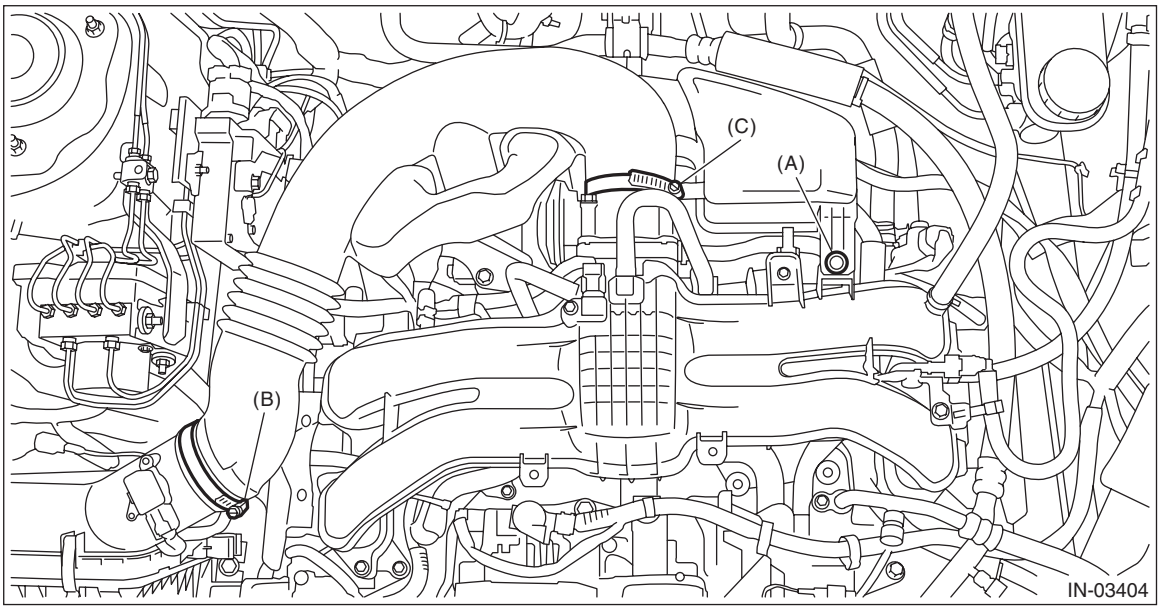
11.Knock Sensor

A: REMOVAL

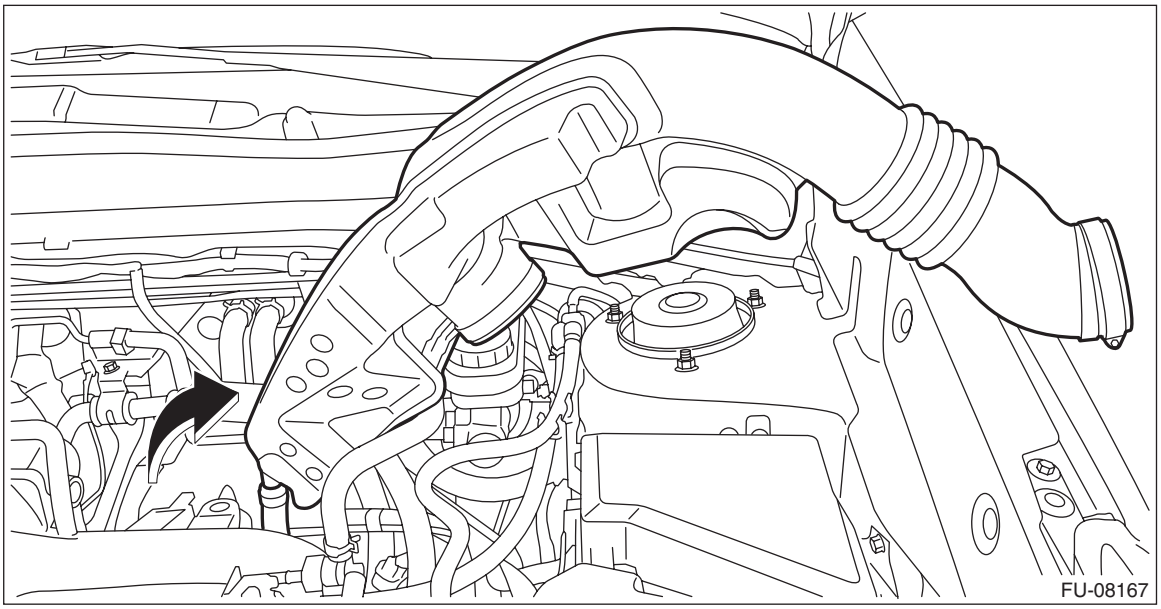
1) Disconnect the ground cable from battery.



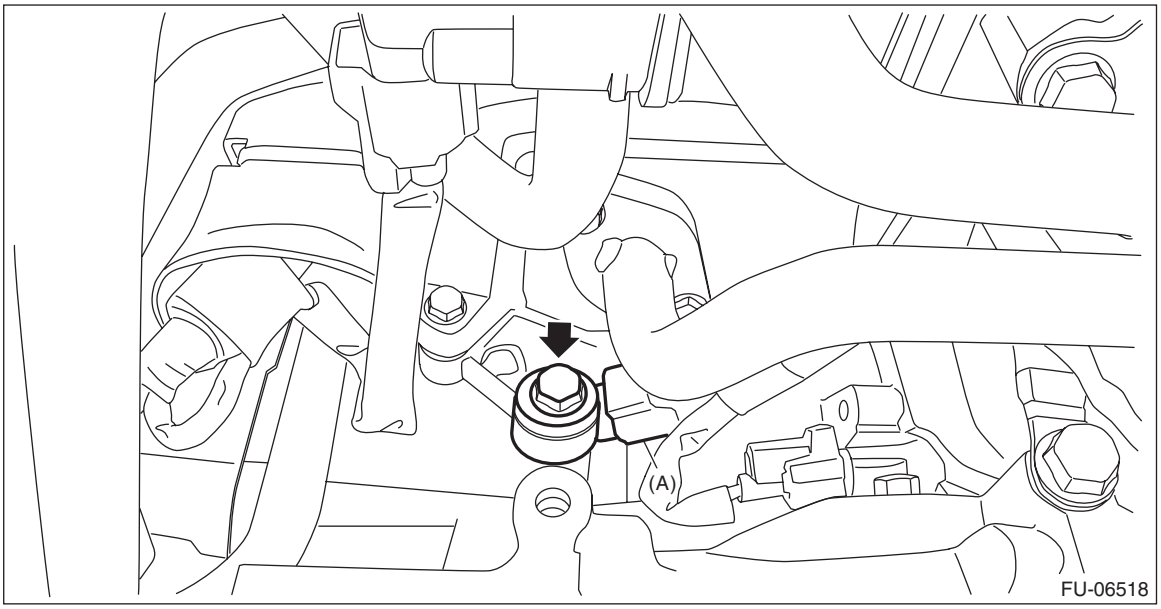
2) Remove the clip (A), and loosen the clamps (B) and (C) securing the air intake boot.



3) Remove the air intake boot from the air cleaner case (rear) and throttle body, and move it to the left side wheel apron.



4) Disconnect the connector (A) from the knock sensor, and remove the knock sensor from the cylinder block.

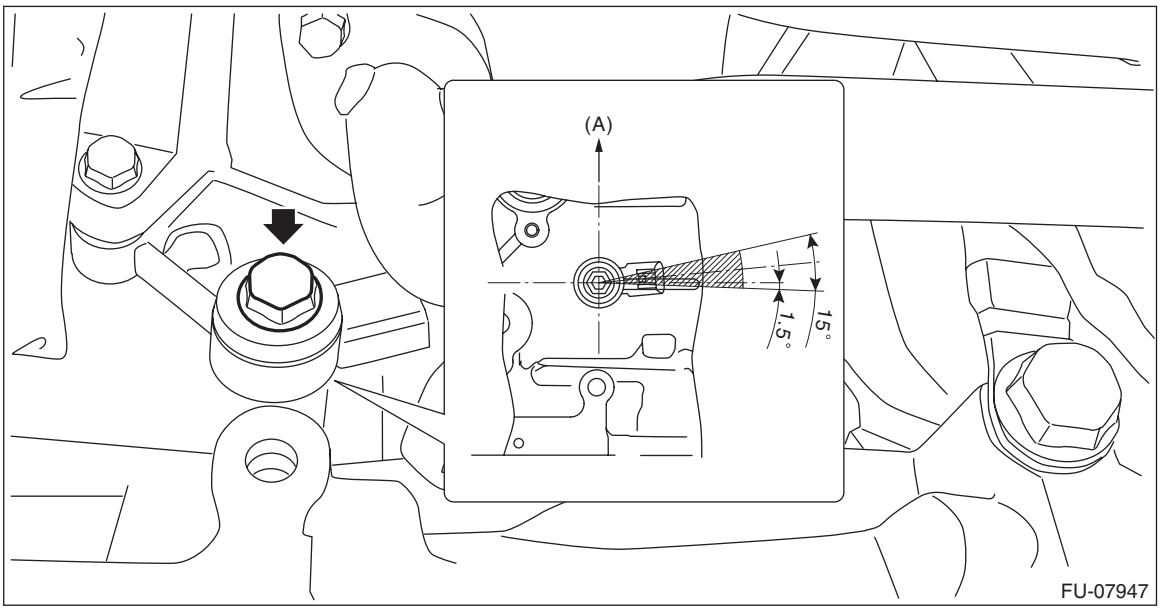


B: INSTALLATION

1) Install the knock sensor to the cylinder block.

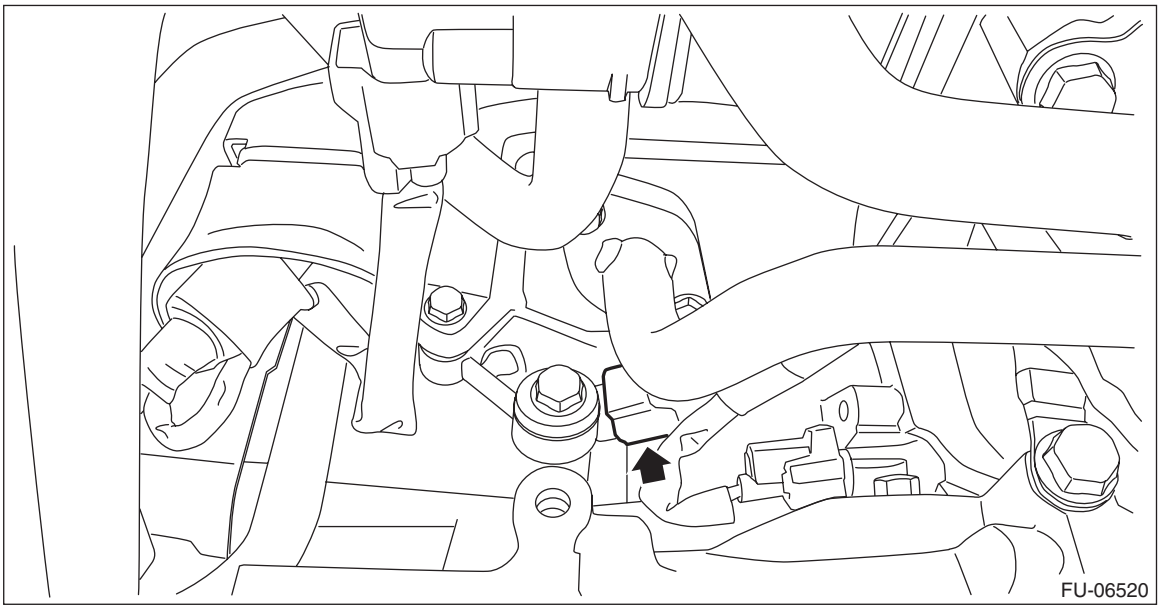
NOTE:
The knock sensor should be installed so that the center of the connector is positioned at a 76.5 — 91.5° angle relative to the front of engine.

Tightening torque:
24 N·m (2.4 kgf-m, 17.7 ft-lb)



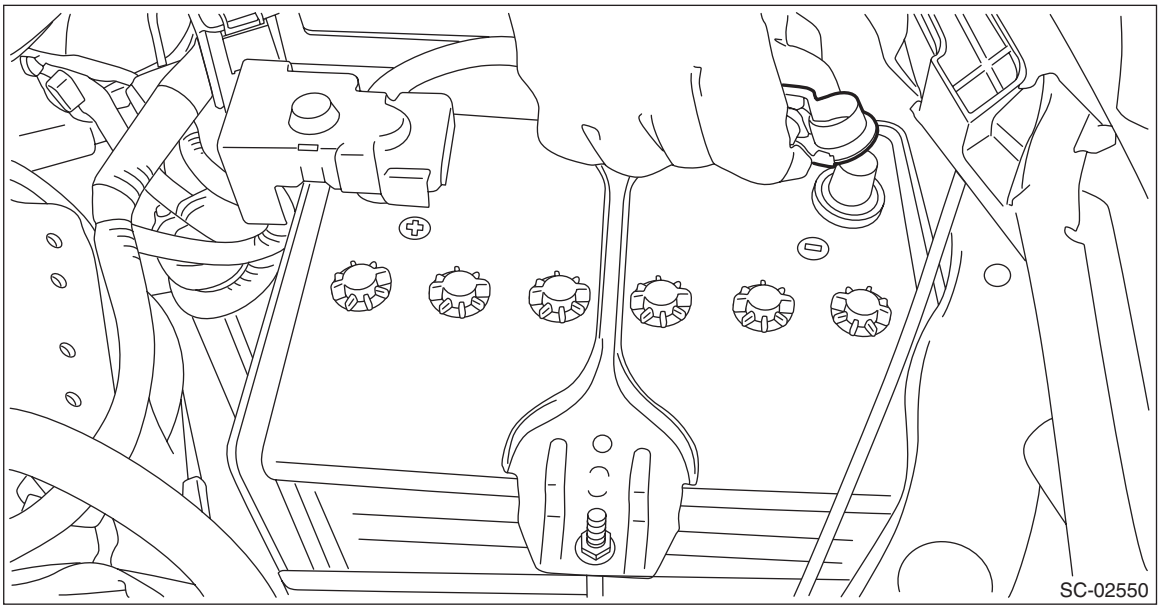
(A) Front of engine

2) Connect the connector to the knock sensor.



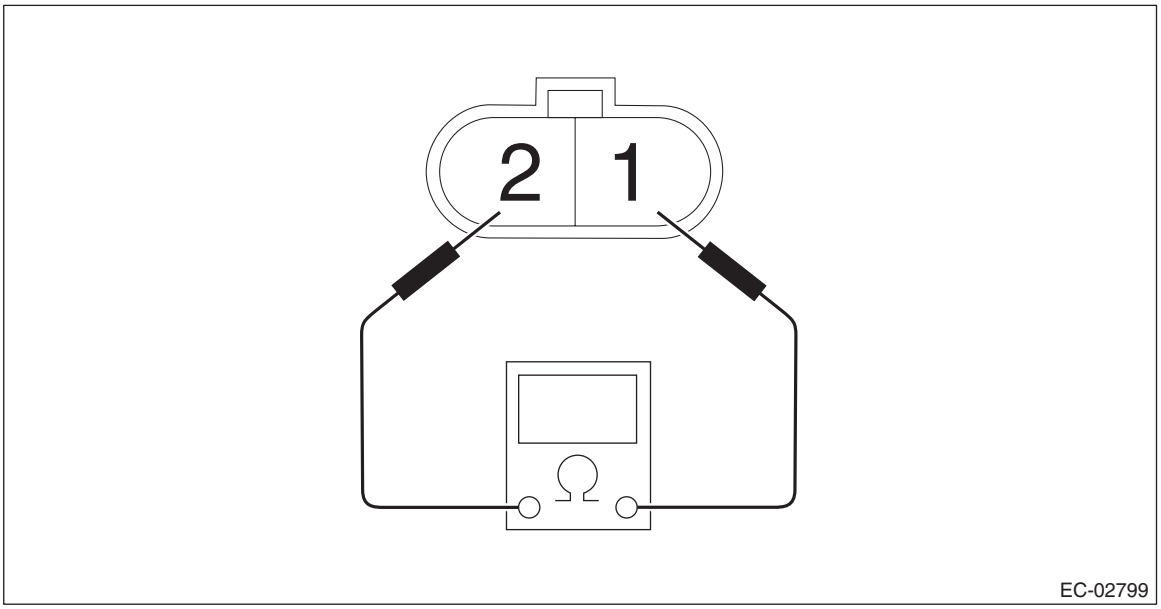
3) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>

4) Connect the battery ground terminal.



C: INSPECTION

1) Check that the knock sensor has no deformation, cracks or other damages.
2) Measure the resistance between knock sensor terminals.



Terminal No.	Standard
1 and 2	560±28 kΩ

12.Throttle Position Sensor

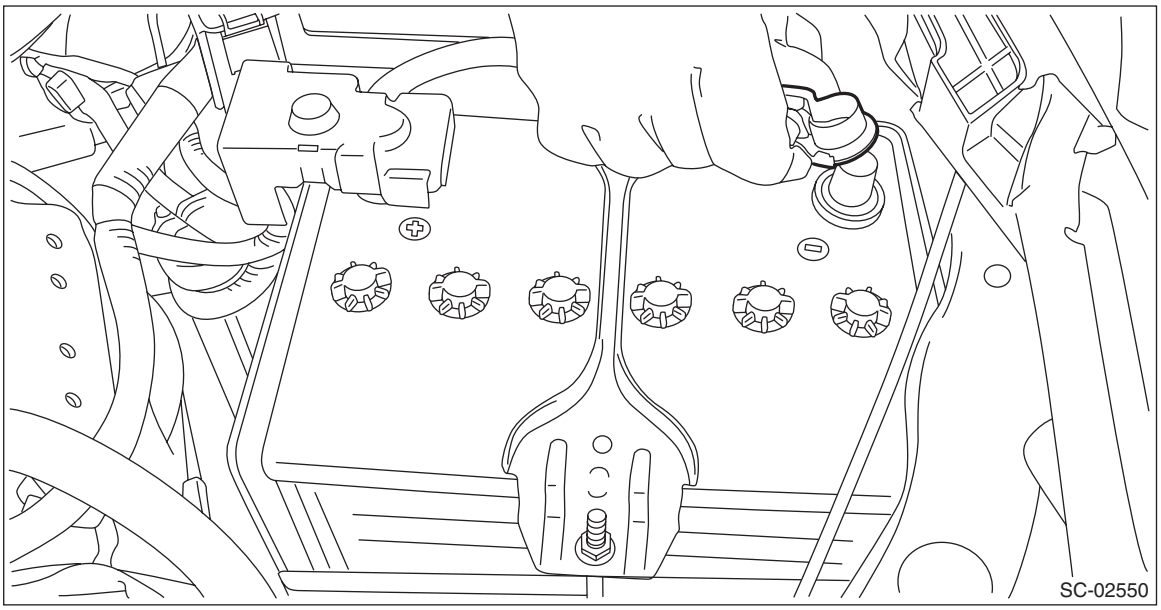
A: SPECIFICATION

Throttle body is a non-disassembled part, so do not remove the throttle position sensor from throttle body. Refer to “Throttle Body” for removal and installation procedure. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.> <Ref. to FU(H4DO(w/o HEV))-17, INSTALLATION, Throttle Body.>

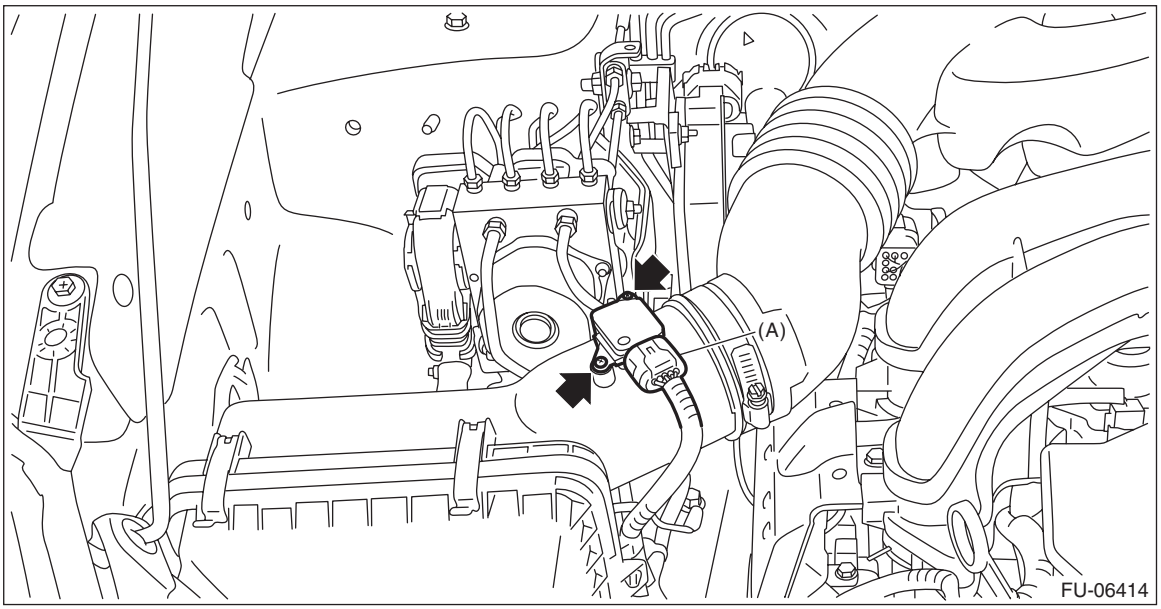
13.Mass Air Flow and Intake Air Temperature Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Disconnect the connector (A) from the mass air flow and intake air temperature sensor, and remove the mass air flow and intake air temperature sensor.



B: INSTALLATION

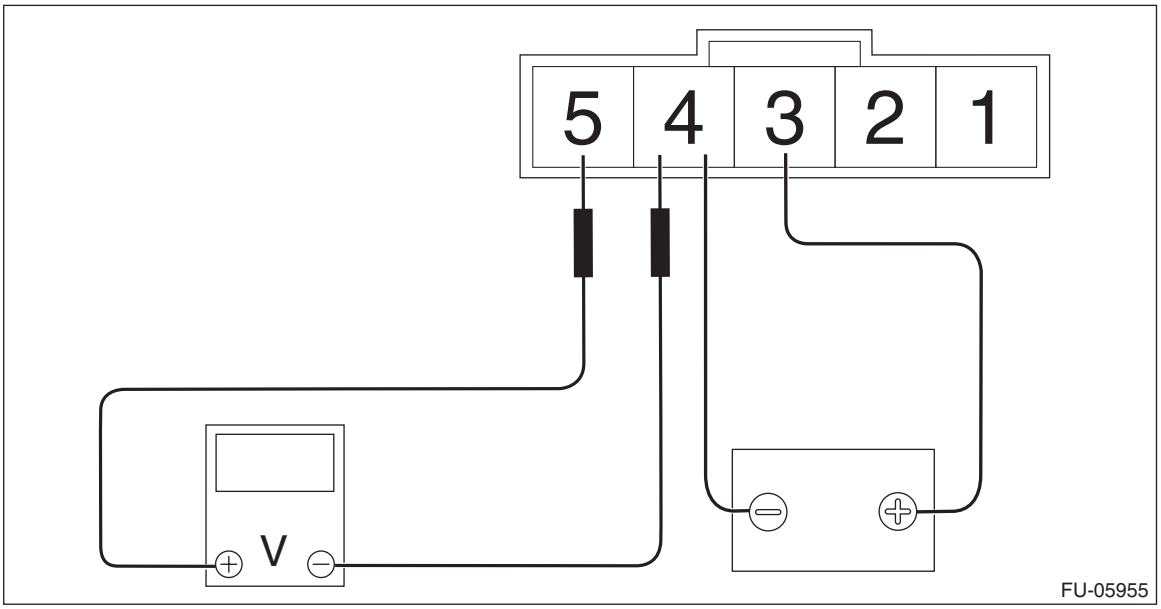
Install in the reverse order of removal.

Tightening torque:
1 N·m (0.1 kgf-m, 0.7 ft-lb)

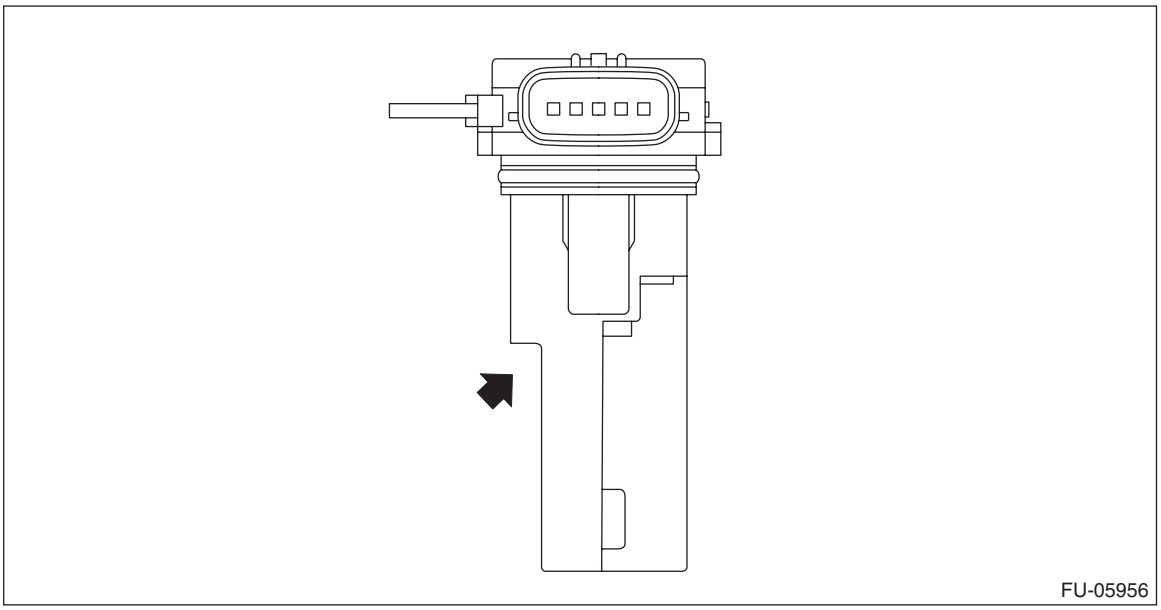
C: INSPECTION

1. CHECK THE MASS AIR FLOW SENSOR UNIT

1) Connect the battery positive terminal to terminal No. 3 and the battery ground terminal to terminal No. 4, the circuit tester positive terminal to terminal No. 5 and the circuit tester ground terminal to terminal No. 4.

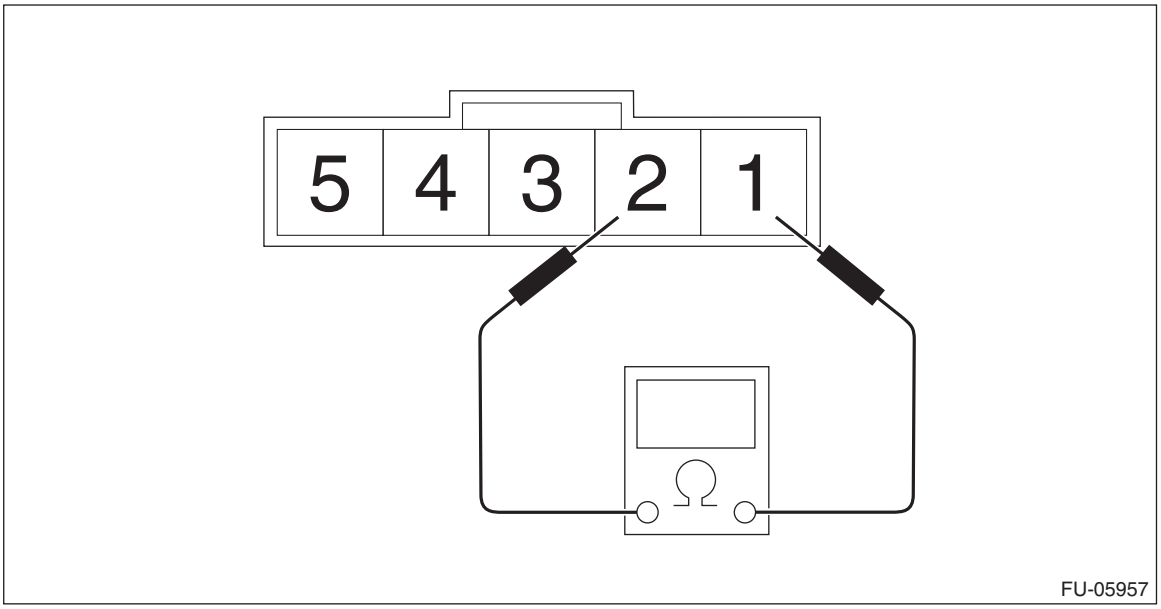


2) Check the voltage changes when air is blown to the mass air flow sensor unit in arrow direction.



2. CHECK THE INTAKE AIR TEMPERATURE SENSOR UNIT

Measure the resistance between intake air temperature sensor terminals.



Temperature	Terminal No.	Standard
–20°C (–4°F)	1 and 2	16.0±2.4 kΩ
20°C (68°F)		2.45±0.24 kΩ
60°C (140°F)		0.58±0.087 kΩ

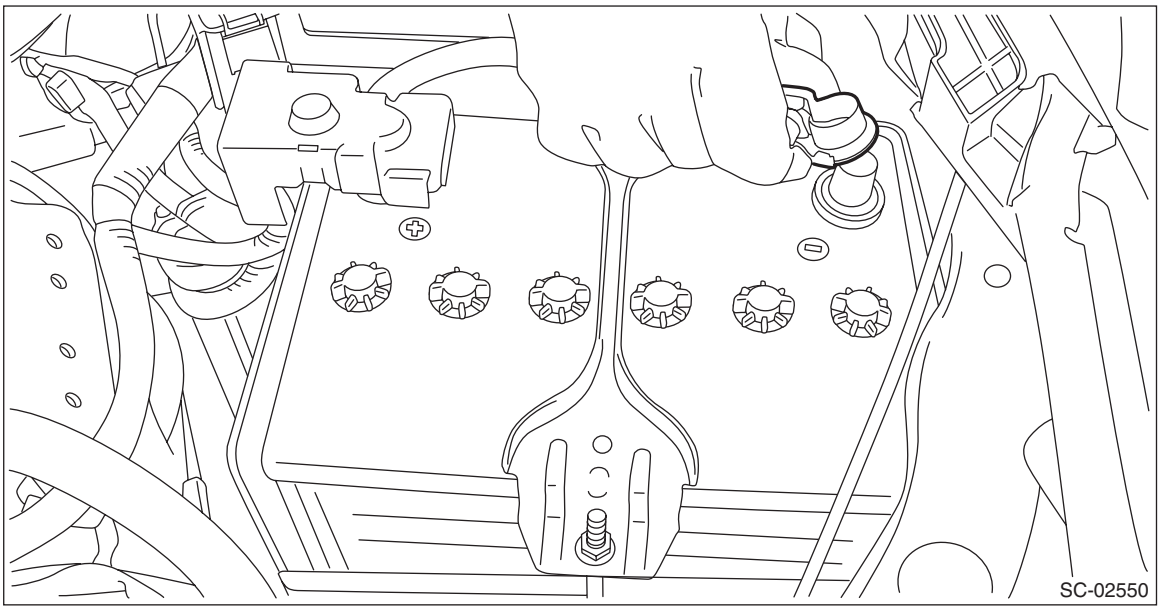
3. OTHER INSPECTIONS

1) Check that the mass air flow and intake air temperature sensor has no deformation, cracks or other damages.
2) Check that the mass air flow and intake air temperature sensor has no dirt.

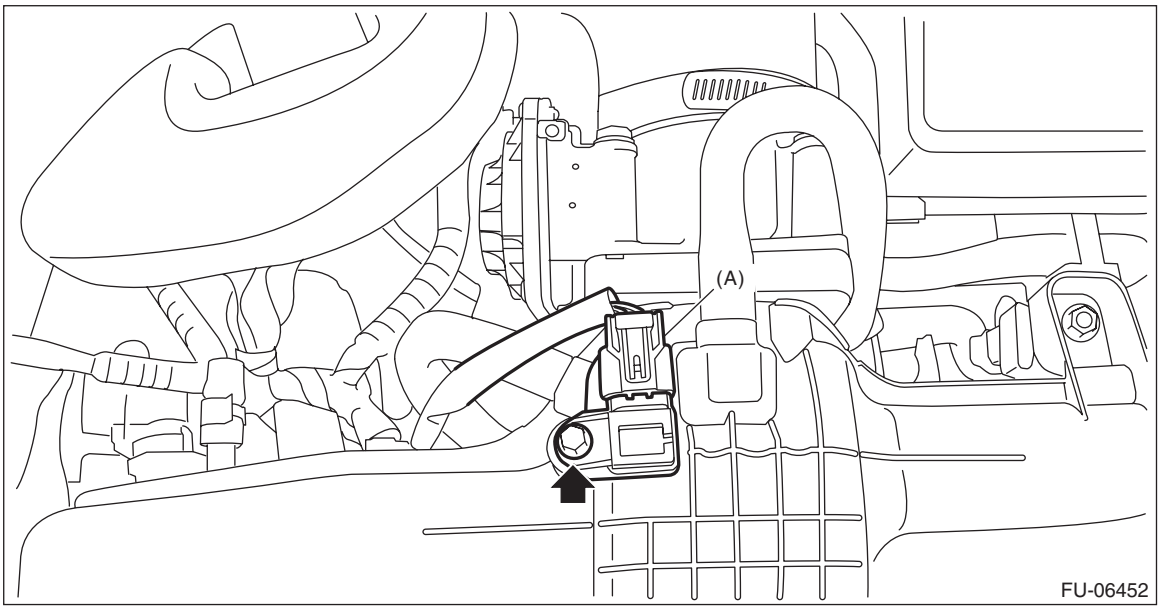
14.Manifold Absolute Pressure Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Disconnect the connector (A) from the manifold absolute pressure sensor, and remove the manifold absolute pressure sensor from intake manifold.



B: INSTALLATION

Install in the reverse order of removal.

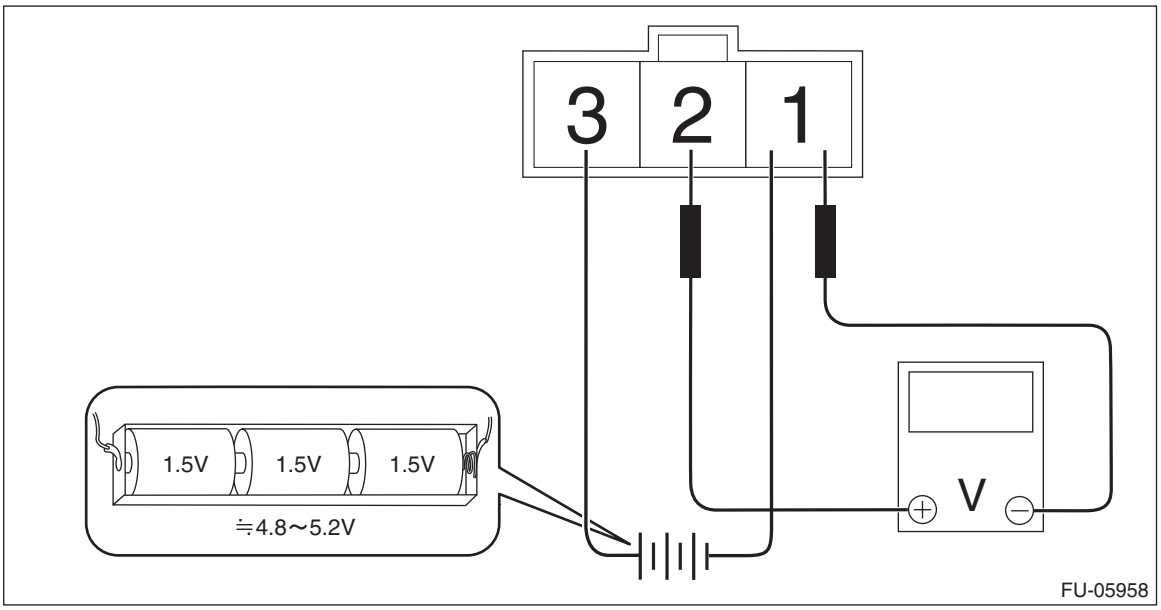
NOTE:
Use new O-rings.

Tightening torque:
3.4 N·m (0.3 kgf-m, 2.5 ft-lb)

C: INSPECTION

1) Check that the manifold absolute pressure sensor has no deformation, cracks or other damages.
2) Connect dry-cell battery positive terminal to terminal No. 3 and dry-cell battery ground terminal to terminal No. 1, circuit tester positive terminal to terminal No. 2 and the circuit tester negative terminal to terminal No. 1.

NOTE:
- Use new dry-cell batteries.
- Using circuit tester, check the voltage of a single dry-cell battery is 1.6 V or more. And also check the voltage of three batteries in series is between 4.8 V and 5.2 V.
- For power supply, 5 V DC voltage source can also be used.

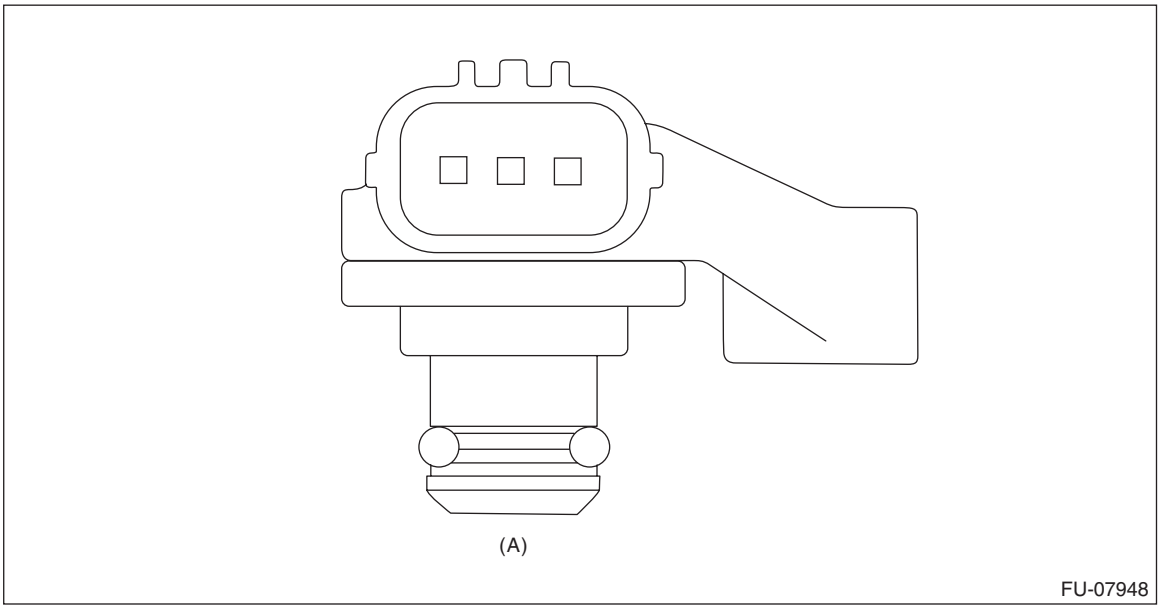


3) Check the voltage at a normal atmospheric pressure.

NOTE:
The atmospheric pressure at higher altitude is lower than normal. Therefore, the voltage is lower than the standard value.

Terminal No.	Standard
2 (+) and 1 (–)	Approx. 4.2 V (when 25°C (77°F))

4) Connect the Mighty Vac to the pressure port (A) of manifold absolute pressure sensor.



5) Check the voltage when generating vacuum using Mighty Vac.

CAUTION:
Do not apply vacuum of less than –88 kPa (–0.9 kg/cm^2, –12.8 psi). Doing so may damage the manifold absolute pressure sensor.

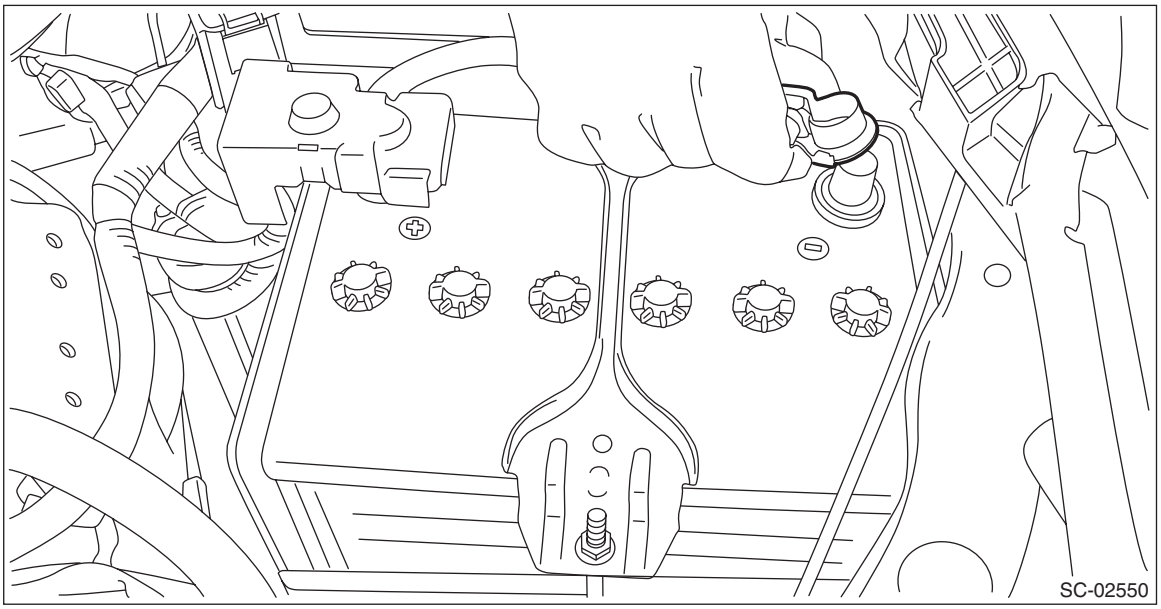
NOTE:
When vacuum occurs at the pressure port of manifold absolute pressure sensor, the voltage will drop from the value as in step 3).

Pressure	Terminal No.	Standard
–88 kPa (–0.9 kg/cm^2, –12.8 psi)	2 (+) and 1 (–)	Approx. 1 V (when 25°C (77°F))

15.Fuel Injector

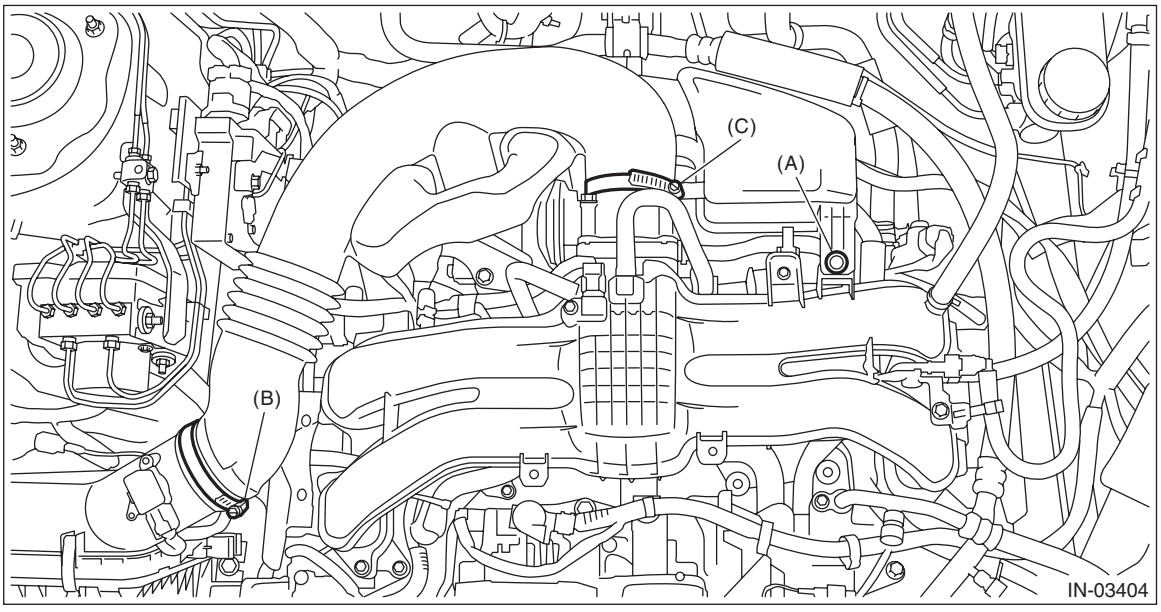
A: REMOVAL

1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the ground cable from battery.

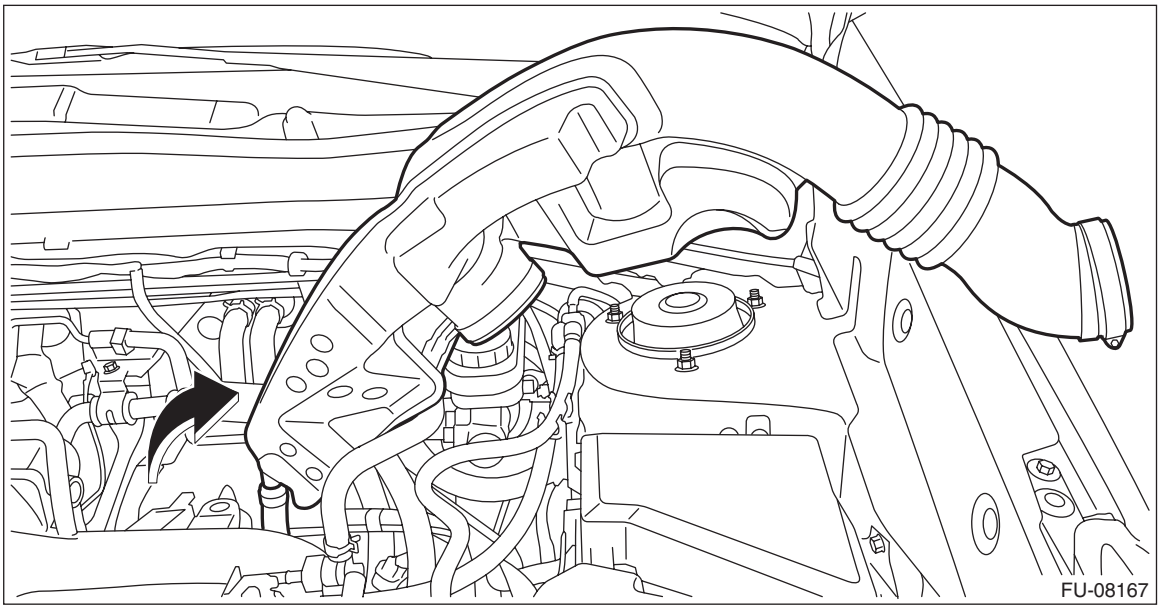


3) Open the fuel filler lid and remove the fuel filler cap.

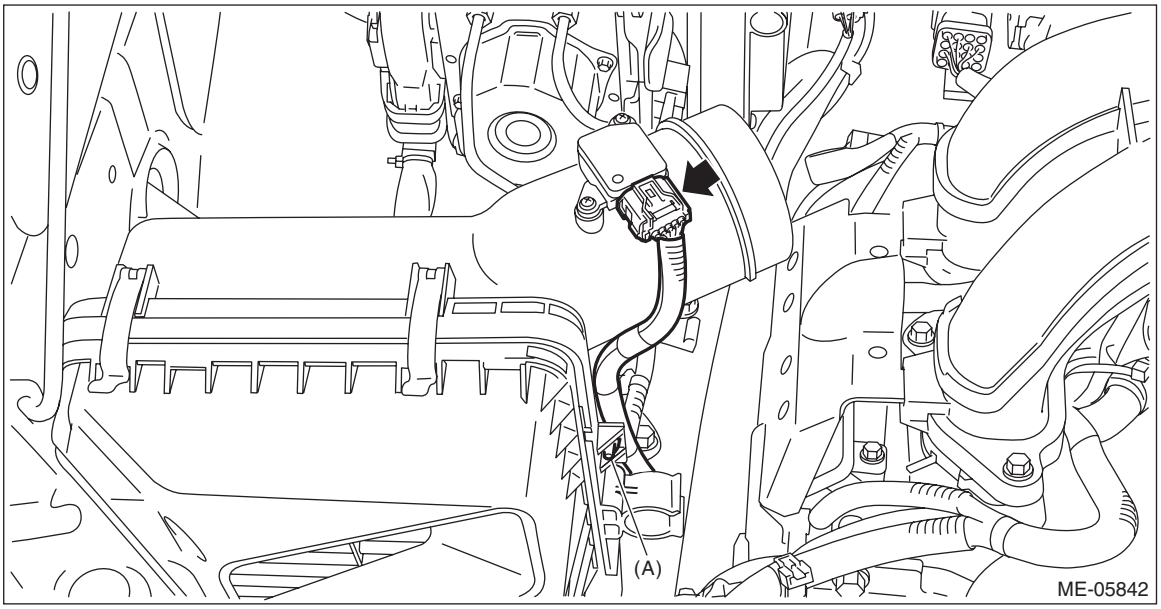
NOTE:
This operation is required to release the inner pressure of the fuel tank.
4) When removing the RH side, also perform the following steps.
(1) Remove the clip (A), and loosen the clamps (B) and (C) securing the air intake boot.



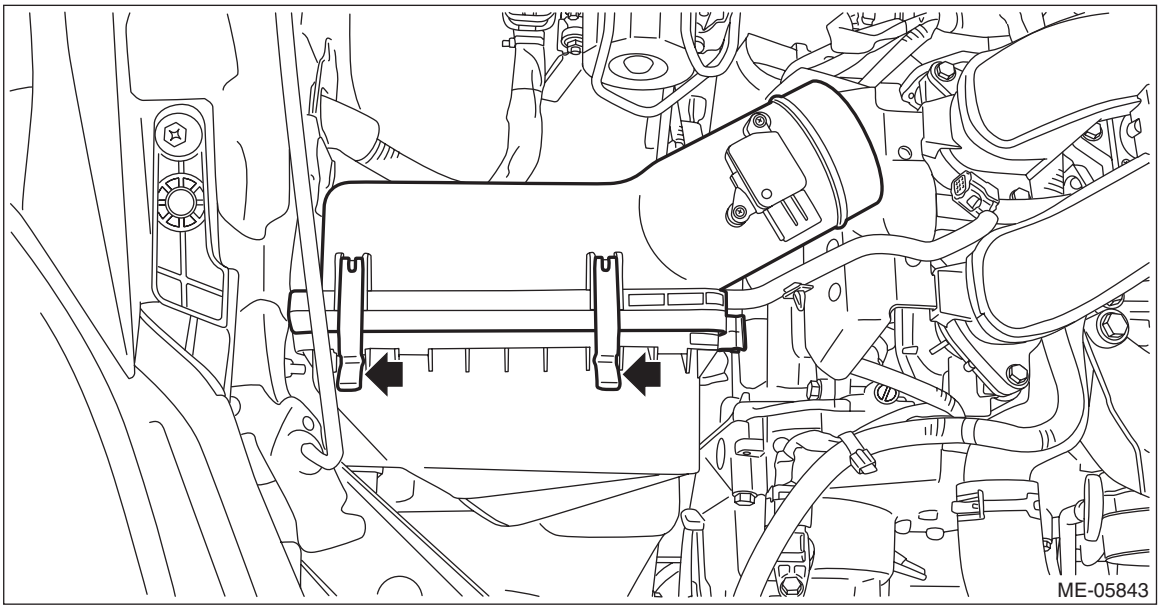
(2) Remove the air intake boot from the air cleaner case (rear) and throttle body, and move it to the left side wheel apron.



(3) Disconnect the connector from the mass air flow and intake air temperature sensor, and remove the clip (A) securing the bulkhead wiring harness.

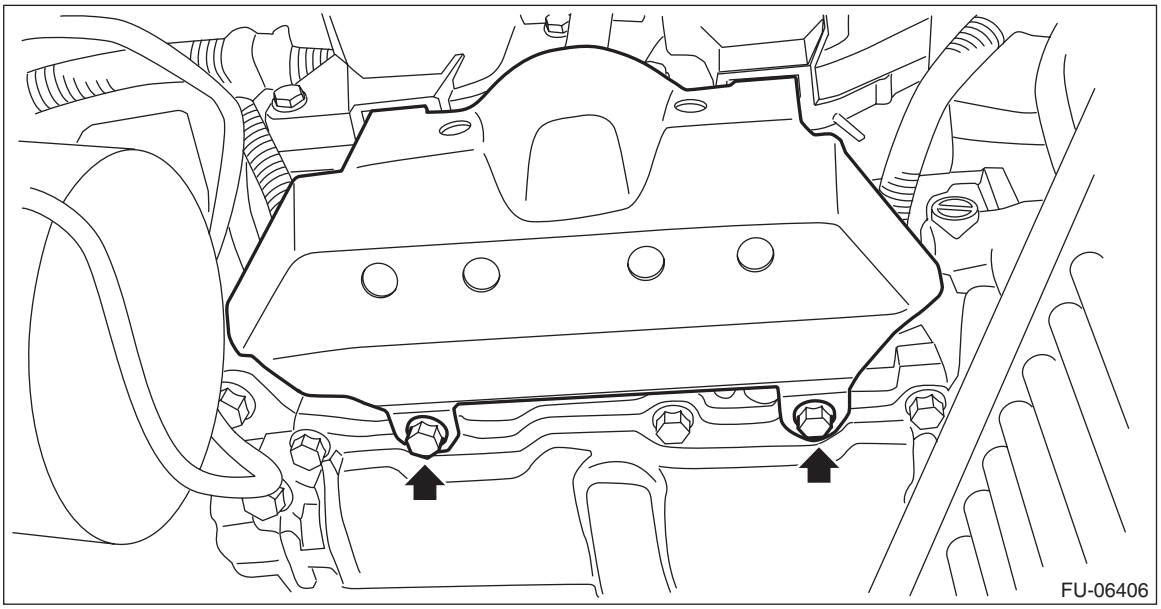


(4) Remove the air cleaner case (rear) together with the air cleaner element.

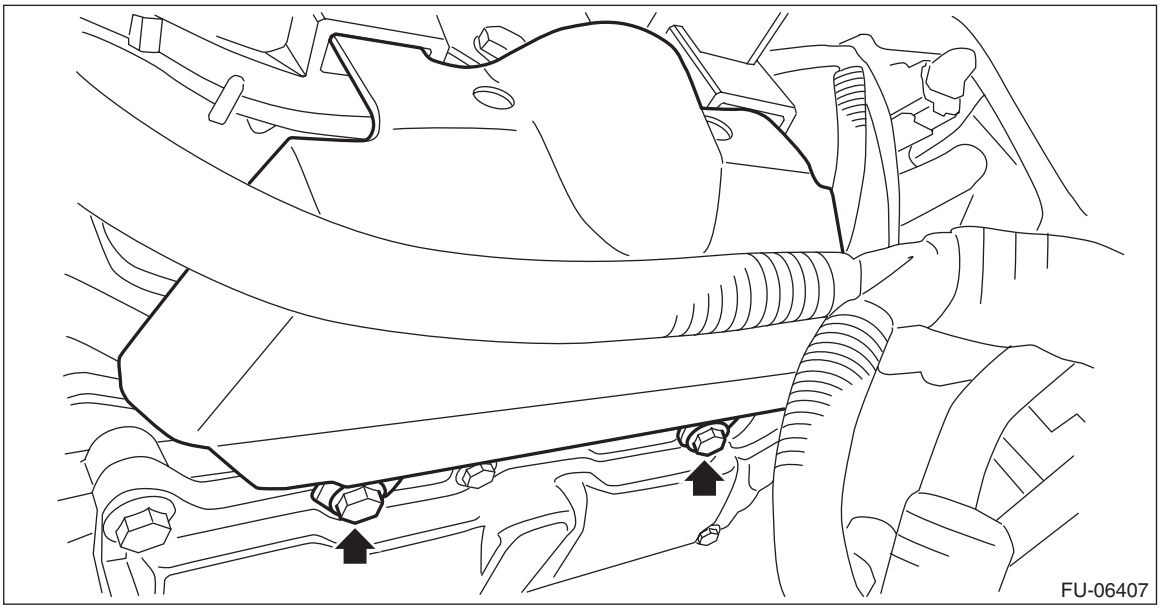


5) Remove the intake manifold protector.

- RH side



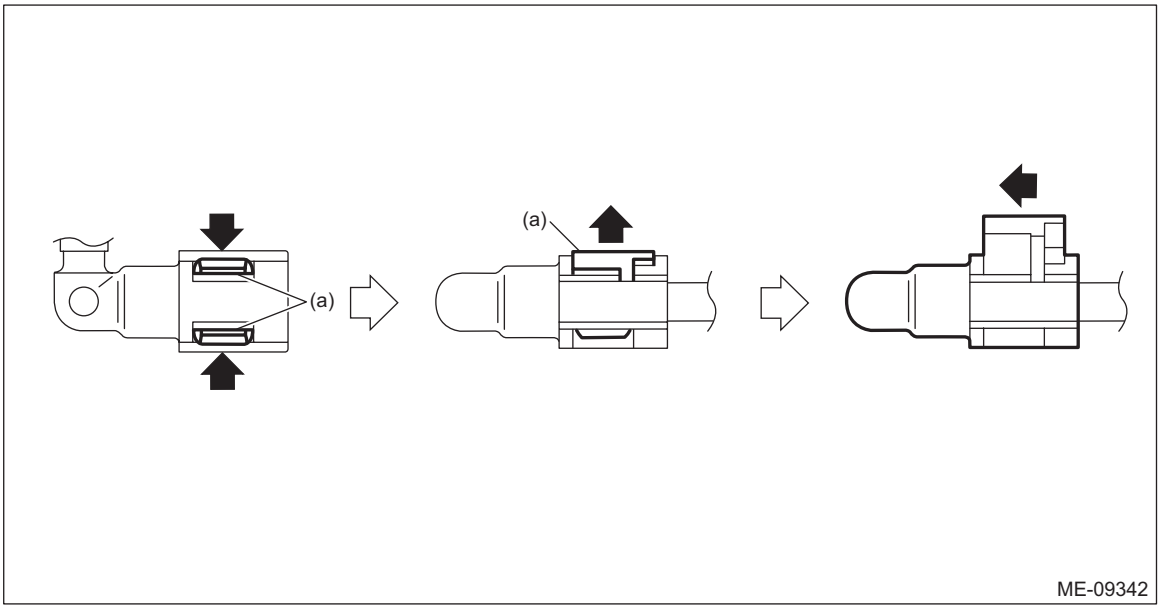
- LH side



6) Disconnect the connectors (A) from fuel injector.
7) Disconnect the quick connector (B) of the fuel delivery pipe from the fuel pipe.

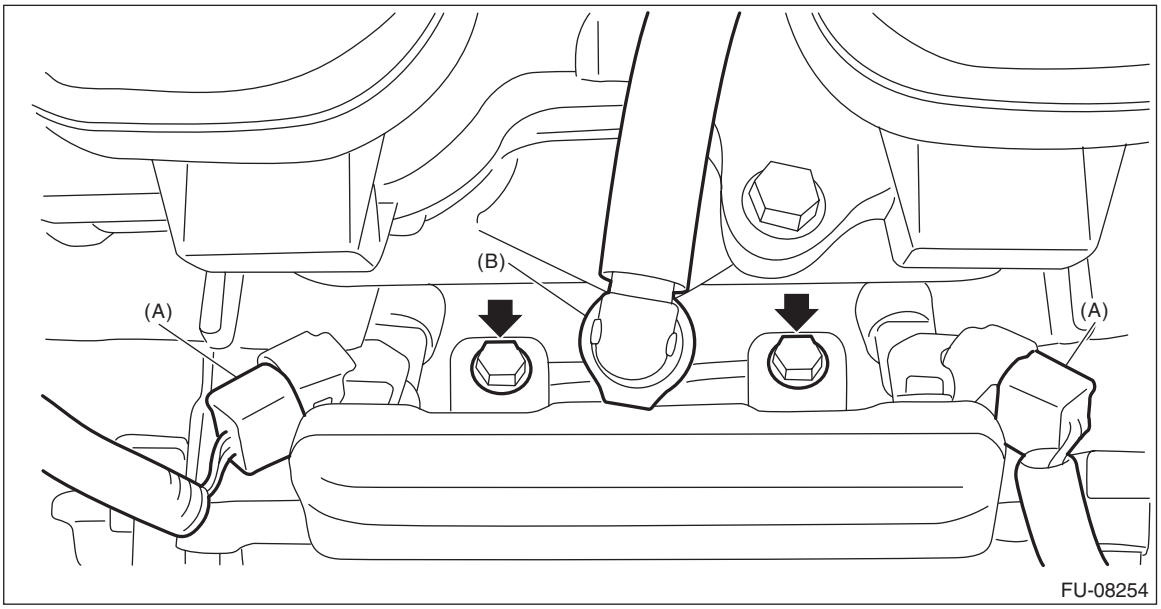
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the pipes using a container or cloth.**

NOTE:
Disconnect the quick connector as shown in the figure.

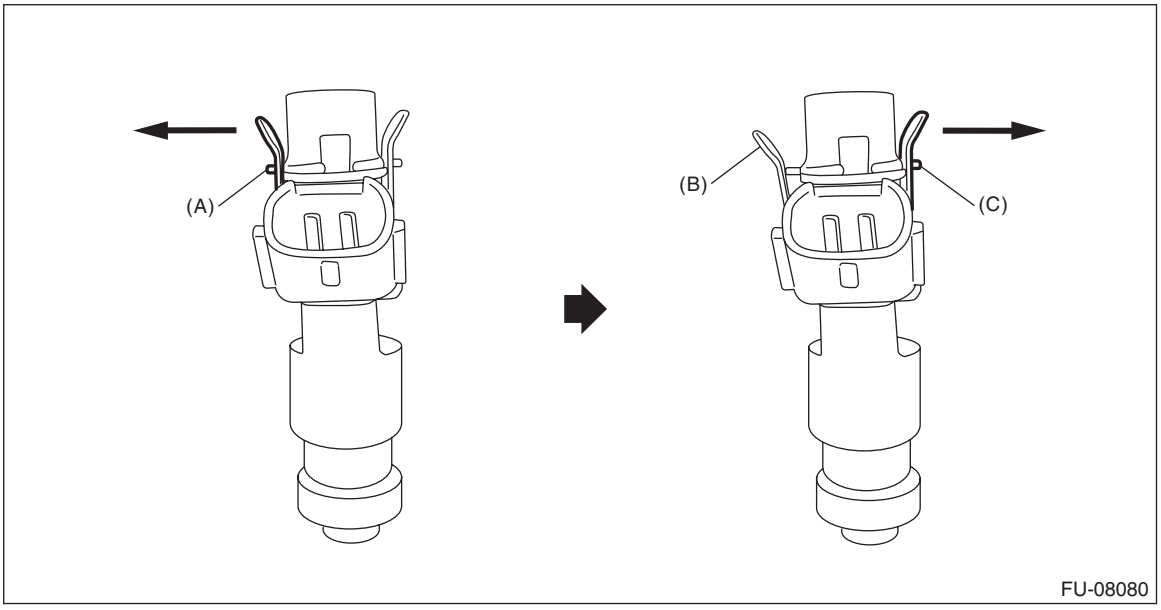


(a) Slider

8) Remove the bolts which hold fuel pipe onto the cam carrier, and remove the fuel pipe together with the fuel injector.



9) Remove the fuel injector from the fuel pipe.
(1) Remove the fuel injector holder from one side of flange section (A) of the fuel pipe.
(2) While holding one side of fuel injector holder (B) you removed in step (1) by finger, remove the other side of fuel injector holder from the flange section (C) of the fuel pipe.

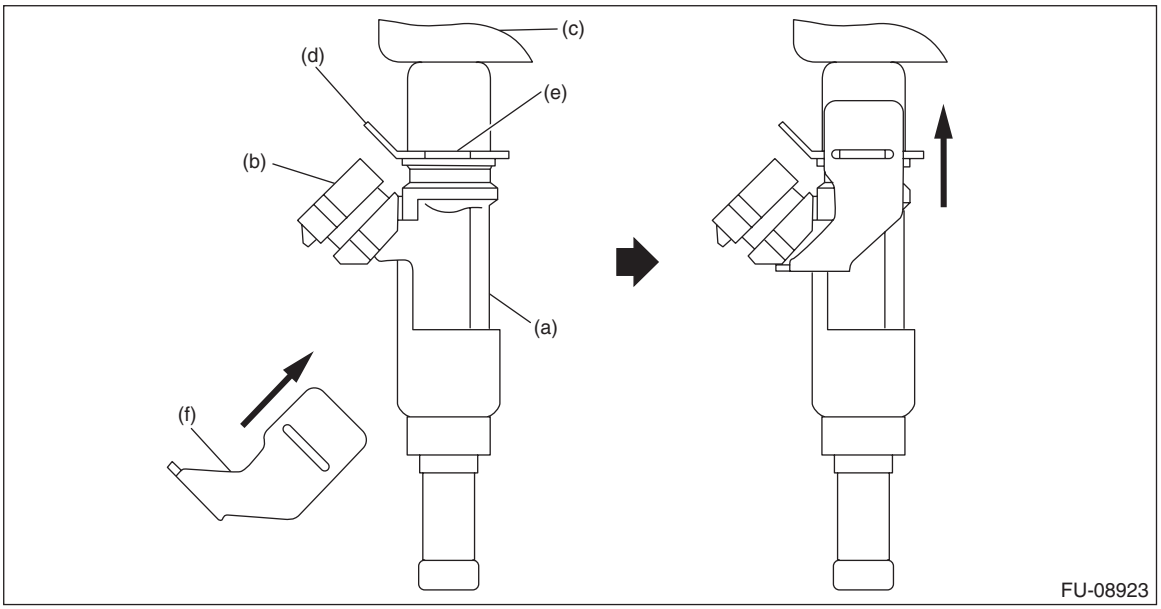


(3) Remove the fuel injector holder from the fuel pipe and fuel injector, and remove the fuel injector from the fuel pipe.
(4) Remove the fuel injector on the LH side in the same manner.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:
- Use new fuel injector holder, O-rings, rubbers and seal rings.
- Install the fuel injector so that the connector joint faces the connector rotation stopper side of the fuel pipe.
- Securely put the flange section of fuel pipe into the groove of fuel injector holder.

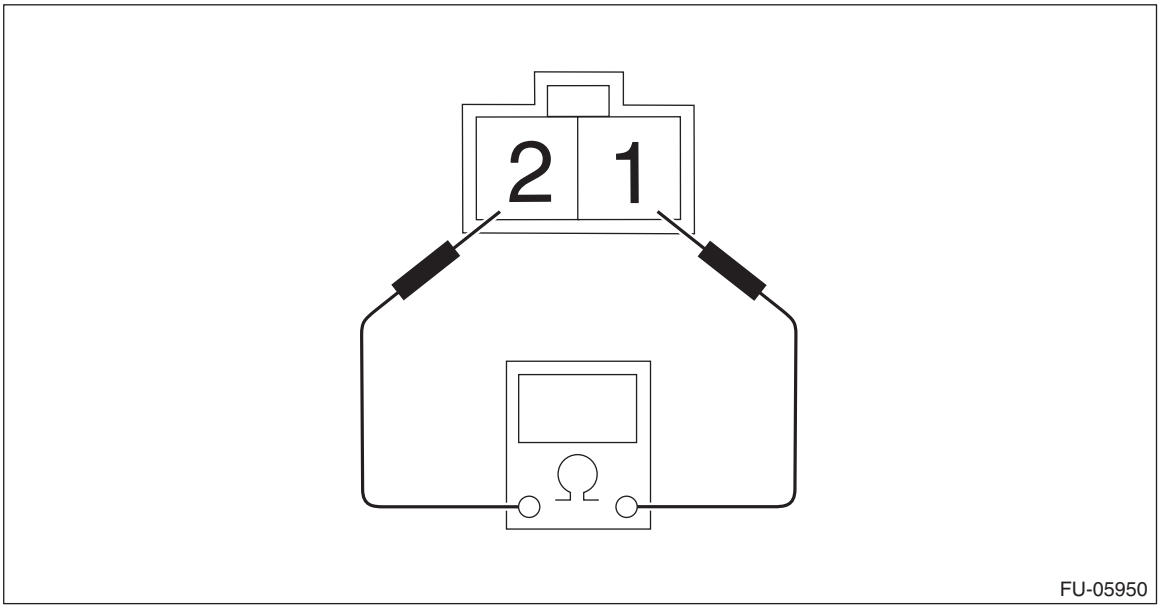


(a)	Fuel injector	(b)	Connector joint	(c)	Fuel pipe
(d)	Connector rotation stopper	(e)	Flange section	(f)	Fuel injector holder

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

C: INSPECTION

1) Check that the fuel injector has no deformation, cracks or other damages.
2) Measure the resistance between fuel injector terminals.

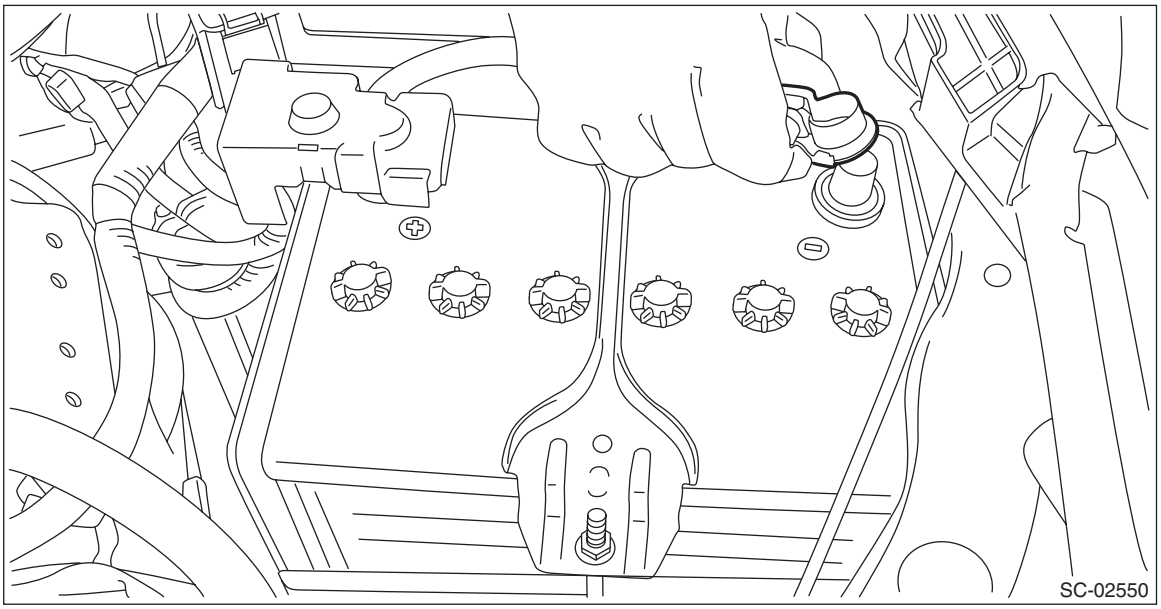


Terminal No.	Standard
1 and 2	Approx. 12.0 Ω (when 20°C (68°F))

16.Tumble Generator Valve Assembly

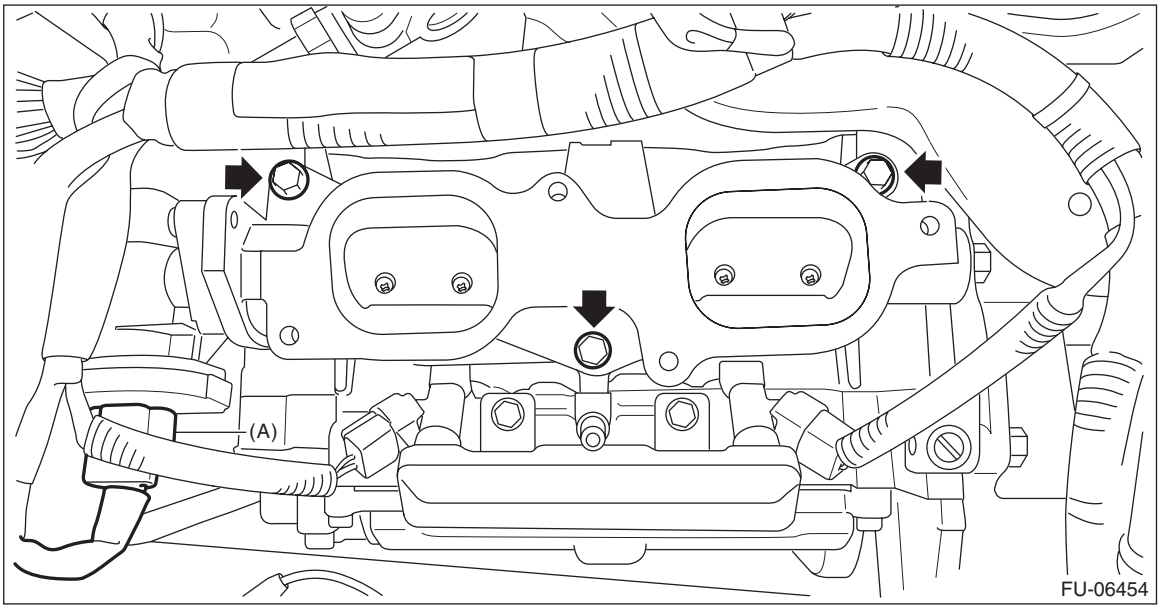
A: REMOVAL

1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the ground cable from battery.

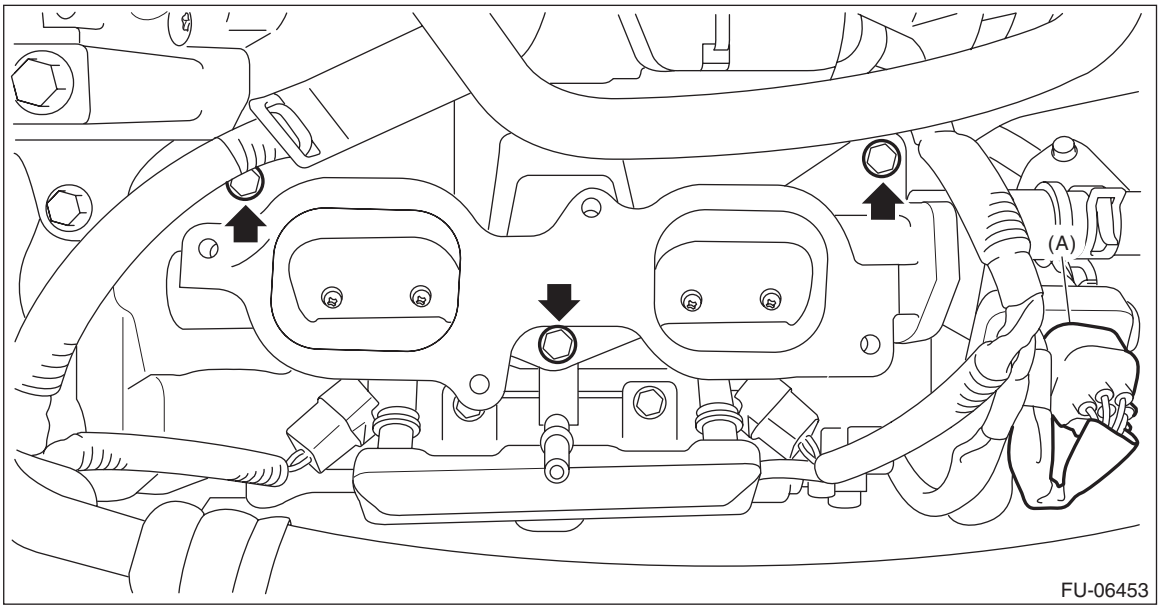


3) Remove the intake manifold. <Ref. to FU(H4DO(w/o HEV))-20, REMOVAL, Intake Manifold.>
4) Disconnect the connector (A) from the tumble generator valve assembly.
5) Remove the tumble generator valve assembly from the cylinder head.

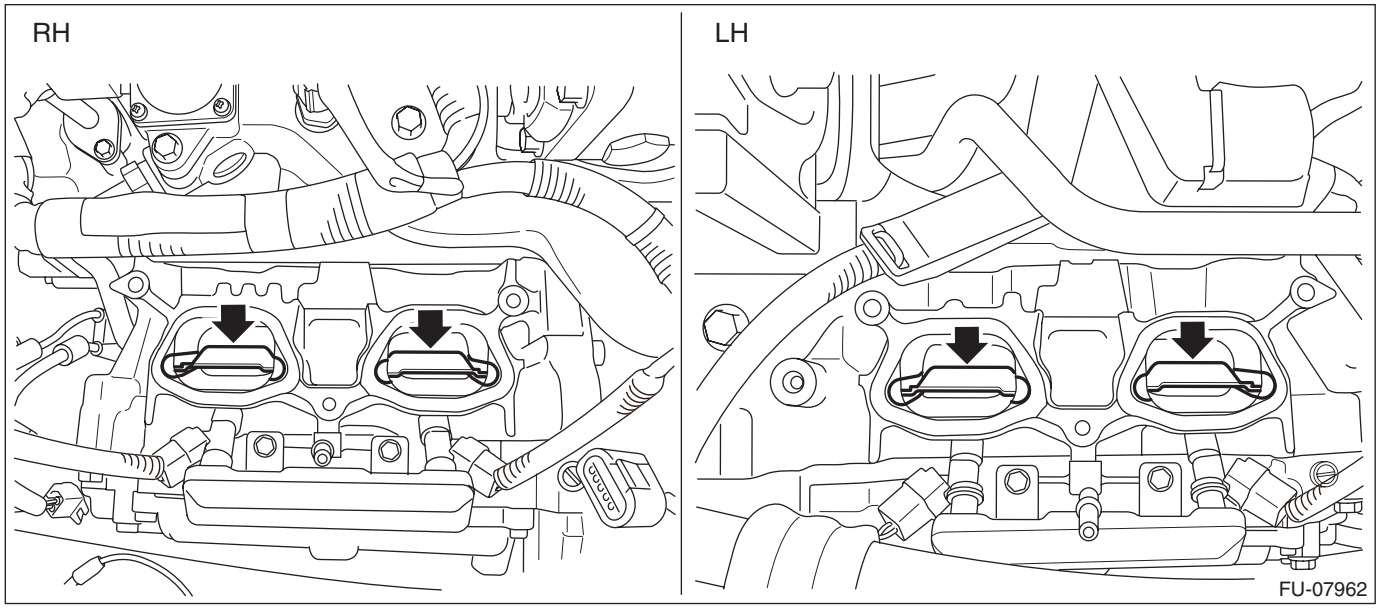
- RH side



- LH side



6) Remove the cylinder head plate from cylinder head.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Use a new gasket.

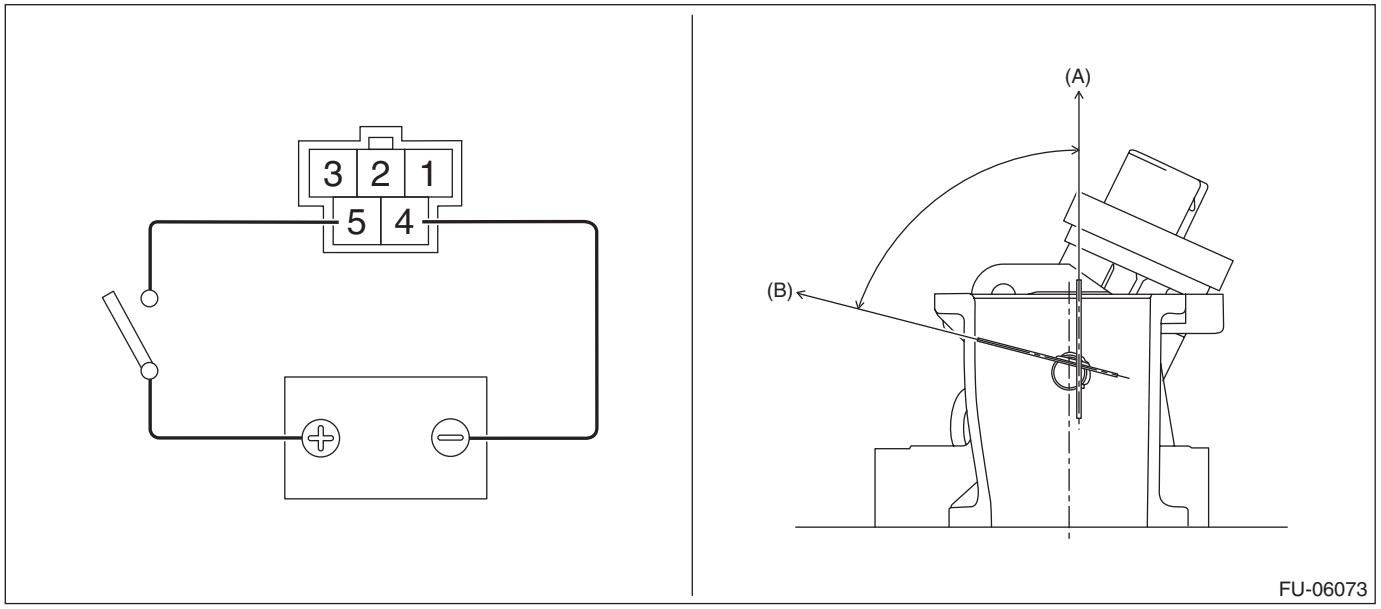
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

C: INSPECTION

1. CHECK MOTOR

1) Connect the battery positive terminal to terminal No. 5 and the battery ground terminal to terminal No. 4, and check that the valve is fully opened on LH side and the valve is fully closed on RH side.

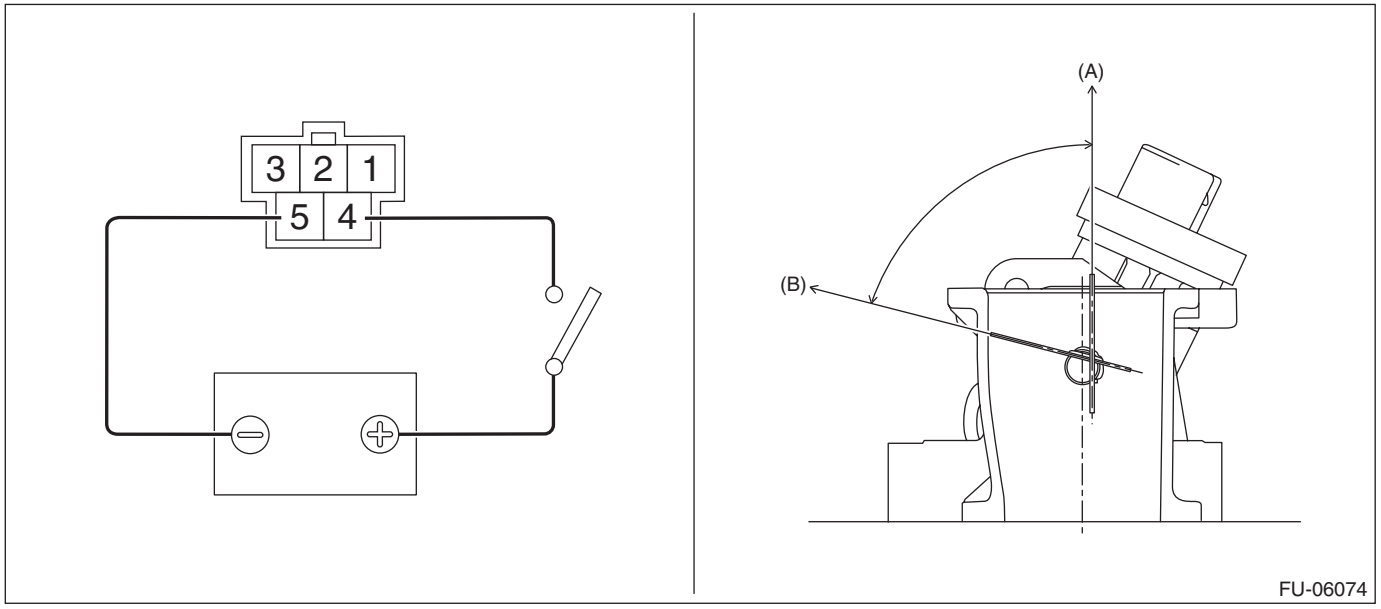
CAUTION:
Do not power the motor for more than 10 seconds.



(A) Full open (B) Full closed

2) Connect the battery positive terminal to terminal No. 4 and the battery ground terminal to terminal No. 5, and check that the valve is fully closed on LH side and the valve is fully opened on RH side.

CAUTION:
Do not power the motor for more than 10 seconds.



(A) Full open (B) Full closed

2. CHECK SENSORS

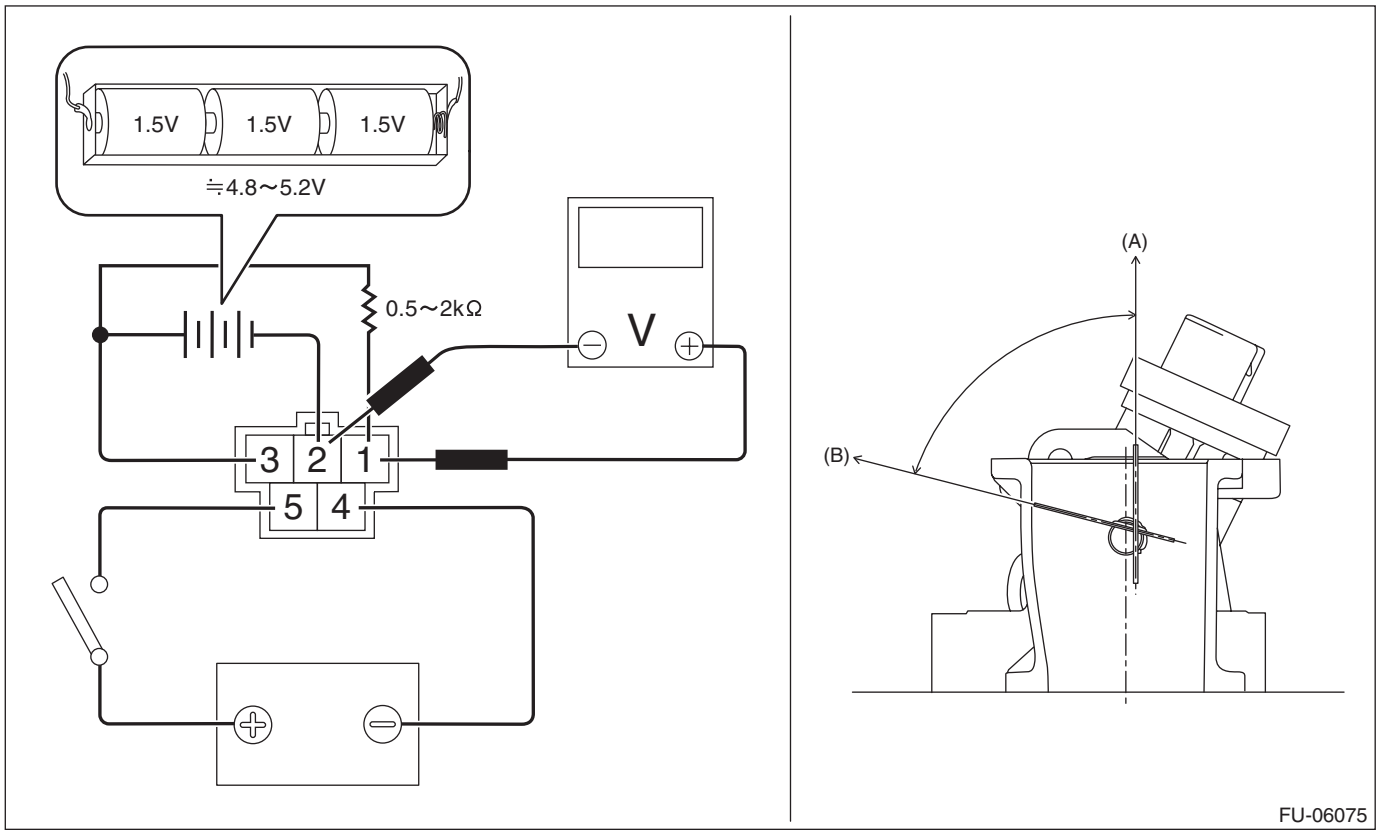
1) Connect dry-cell battery positive terminal to terminal No. 3 and dry-cell battery ground terminal to terminal No. 2, and connect the resistance (0.5 — 2 kΩ) between dry-cell battery positive terminal and terminal No. 1.

NOTE:
- Use new dry-cell batteries.
- Using circuit tester, check the voltage of a single dry-cell battery is 1.6 V or more. And also check the voltage of three batteries in series is between 4.8 V and 5.2 V.
- For power supply, 5 V DC voltage source can also be used.

2) Connect the circuit tester positive terminal to terminal No. 1, and the circuit tester negative terminal to terminal No. 2.

3) Connect the battery positive terminal to terminal No. 5 and the battery ground terminal to terminal No. 4, and measure the voltages with the valve fully opened on LH side and with the valve fully closed on RH side.

CAUTION:
Do not power the motor for more than 10 seconds.



(A) Full open (B) Full closed

Terminal No.	Standard
1 (+) and 2 (–)	LH side: Approx. 5 V (when 25°C (77°F)) RH side: Approx. 0 — 0.5 V (when 25°C (77°F))

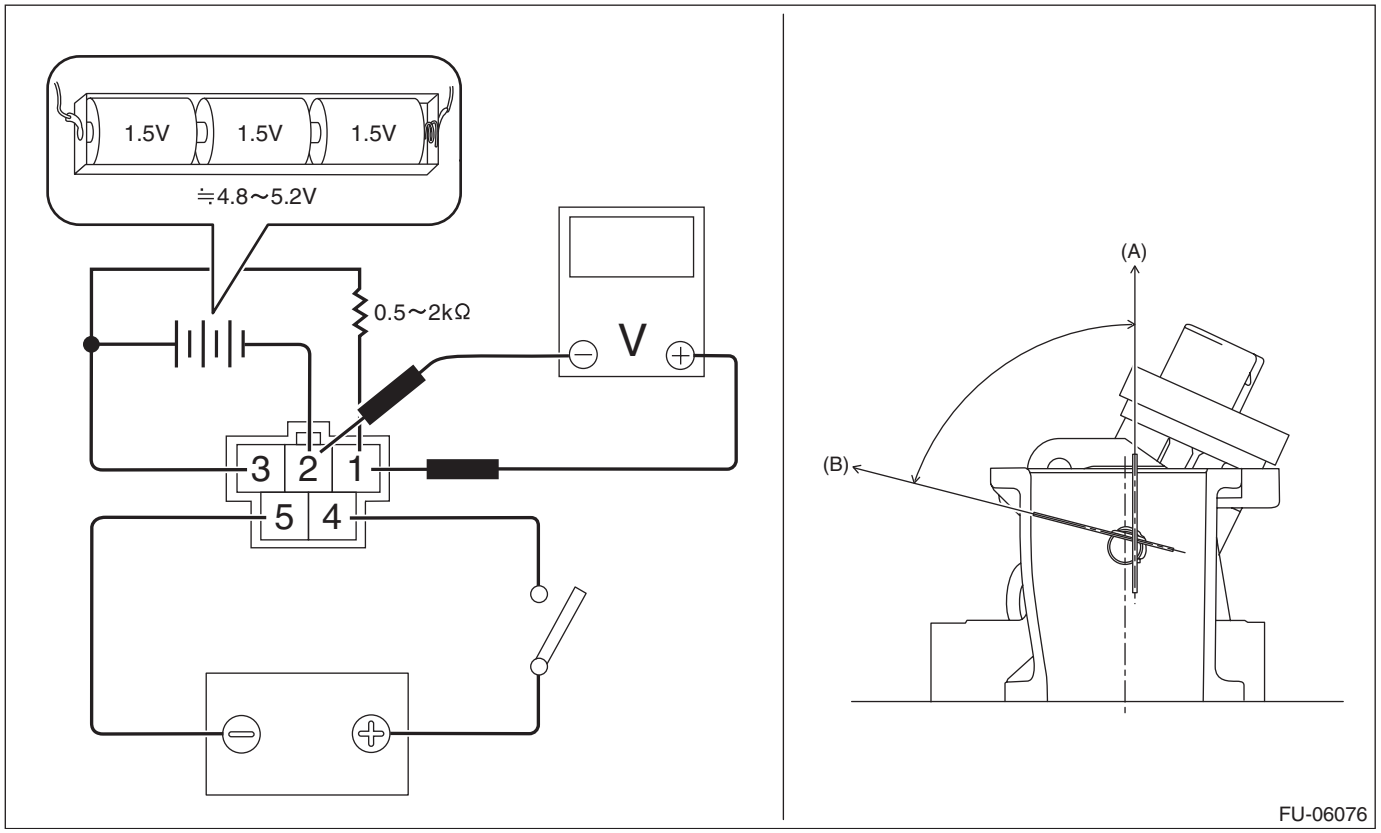
4) Connect dry-cell battery positive terminal to terminal No. 3 and dry-cell battery ground terminal to terminal No. 2, and connect the resistance (0.5 — 2 kΩ) between dry-cell battery positive terminal and terminal No. 1.

NOTE:
- Use new dry-cell batteries.
- Using circuit tester, check the voltage of a single dry-cell battery is 1.6 V or more. And also check the voltage of three batteries in series is between 4.8 V and 5.2 V.
- For power supply, 5 V DC voltage source can also be used.

5) Connect the circuit tester positive terminal to terminal No. 1, and the circuit tester negative terminal to terminal No. 2.

6) Connect the battery positive terminal to terminal No. 4 and the battery ground terminal to terminal No. 5, and measure the voltages with the valve fully closed on LH side and with the valve fully opened on RH side.

CAUTION:
Do not power the motor for more than 10 seconds.



(A) Full open (B) Full closed

Terminal No.	Standard
1 (+) and 2 (–)	LH side: Approx. 0 — 0.5 V (when 25°C (77°F)) RH side: Approx. 5 V (when 25°C (77°F))

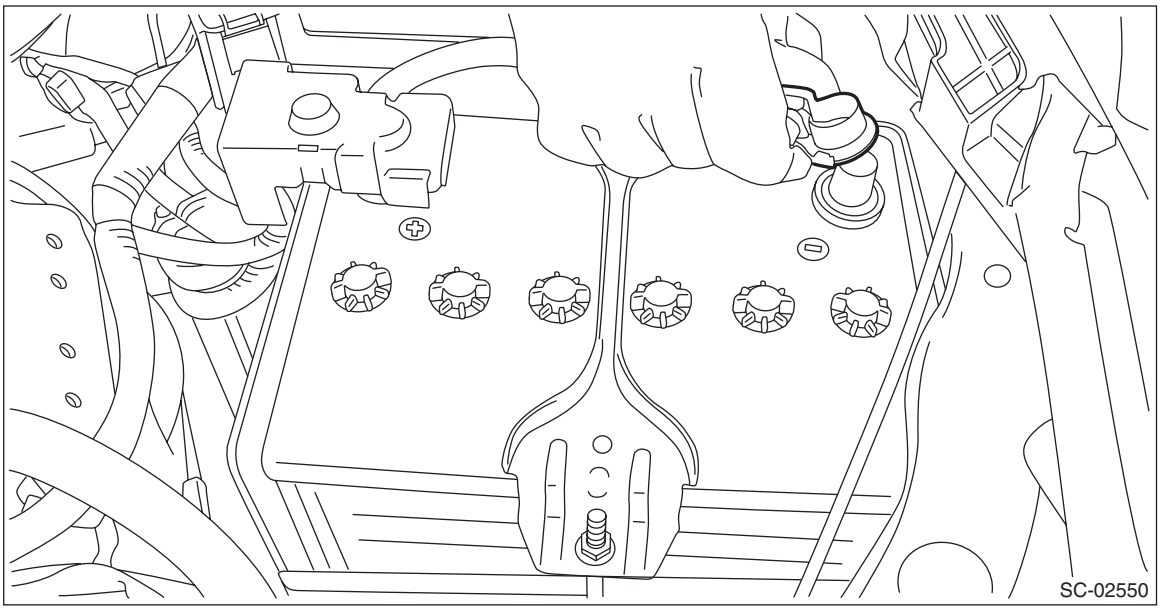
3. OTHER INSPECTIONS

1) Check that the tumble generator valve assembly has no deformation, cracks or other damages.
2) Check tumble generator valve assembly for contamination or clogging.

17.Tumble Generator Valve Actuator

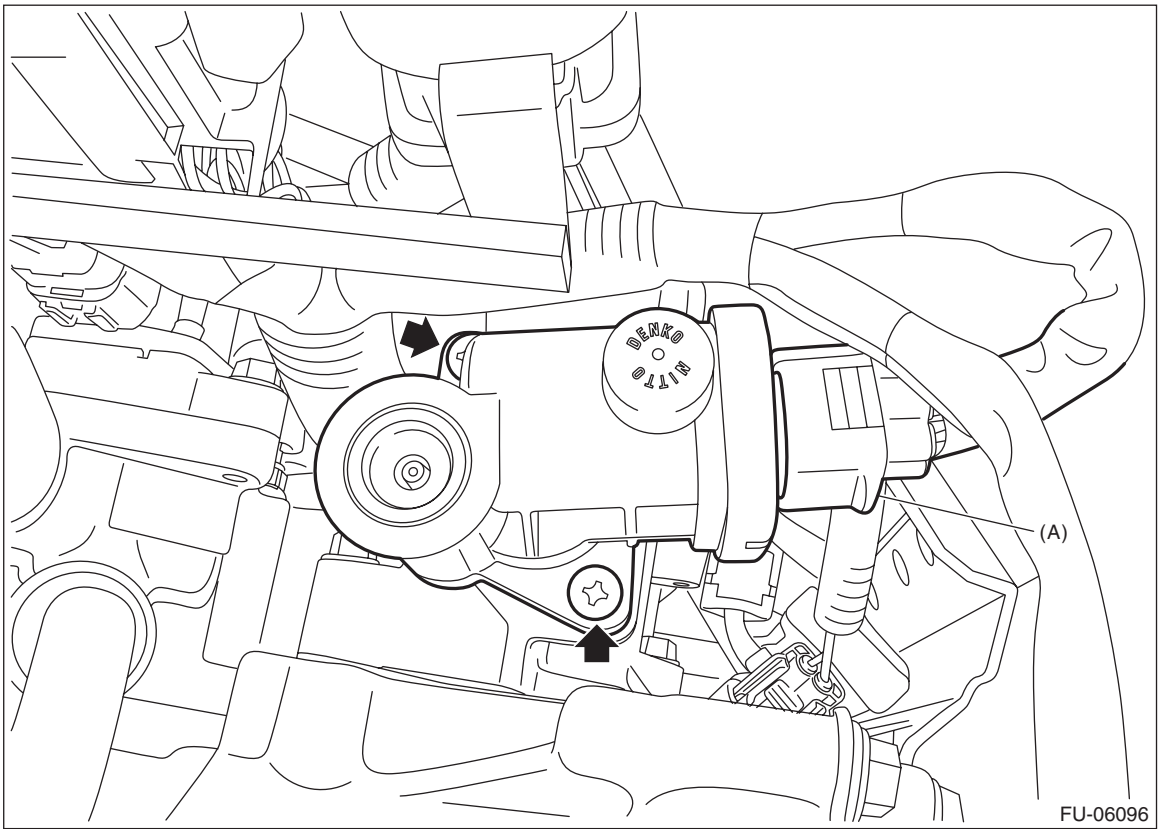
A: REMOVAL

1) Disconnect the ground cable from battery.

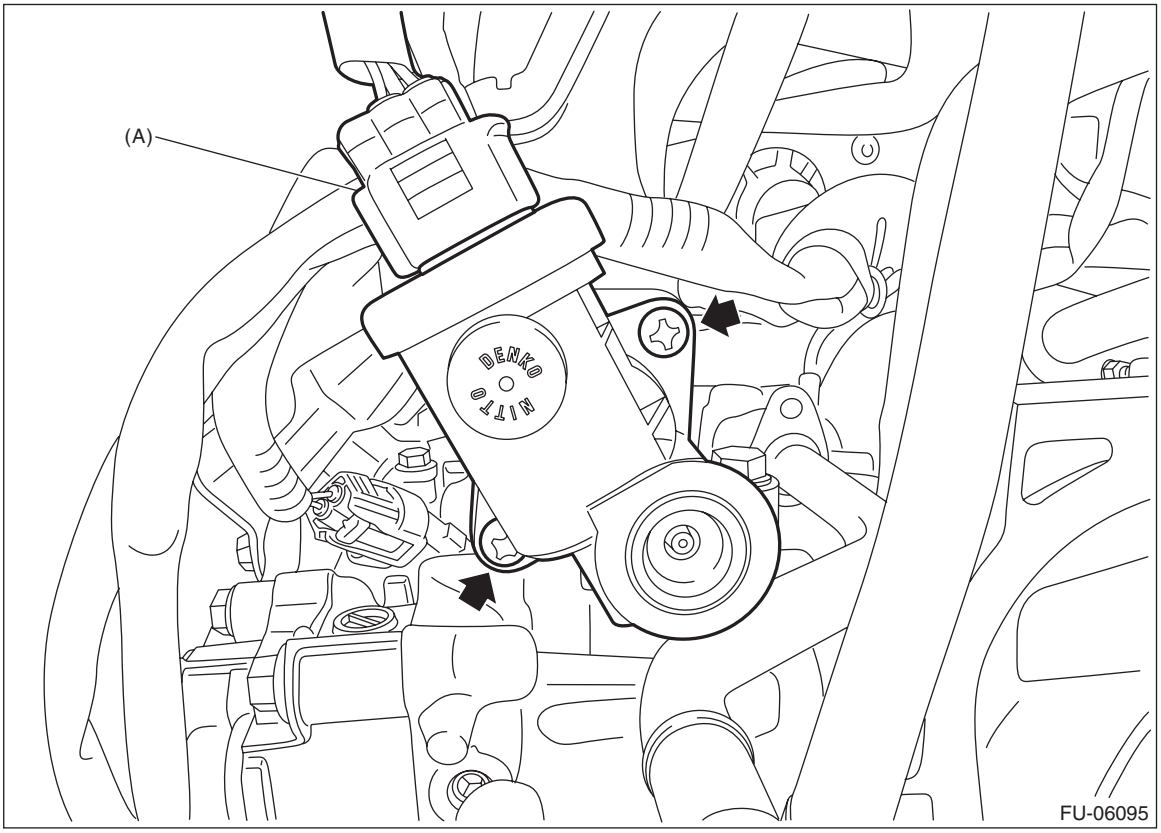


2) Disconnect the connector (A) from tumble generator valve assembly, and remove the tumble generator valve actuator.

- RH side



- LH side



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Use a new gasket.

Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)

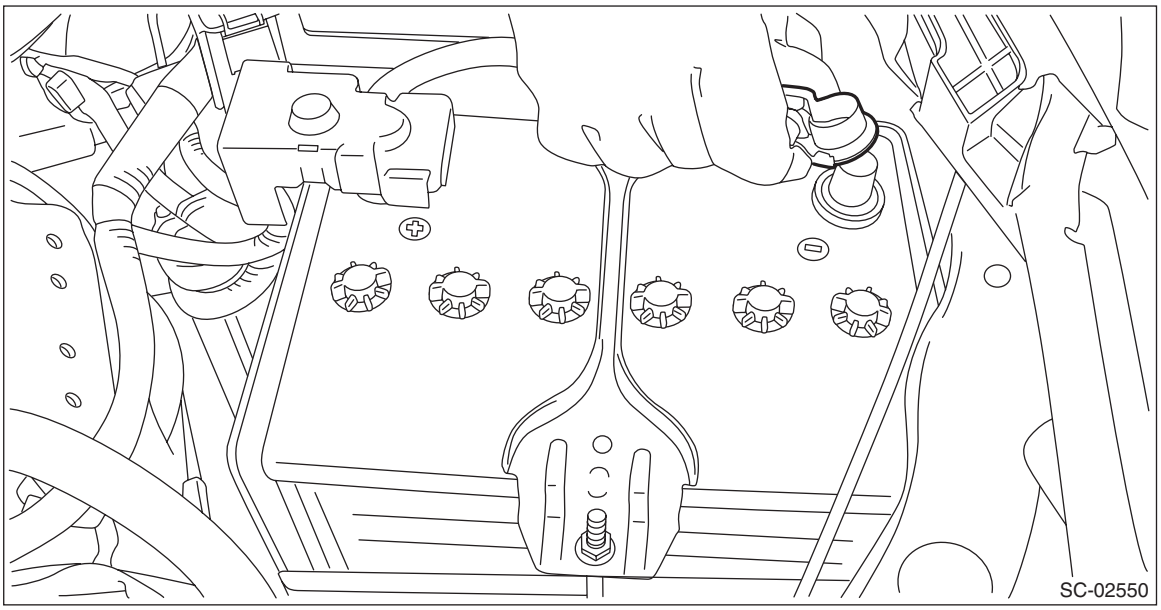
C: INSPECTION

1) Check that the tumble generator valve actuator has no deformation, cracks or other damages.
2) Check tumble generator valve actuator for contamination or clogging.

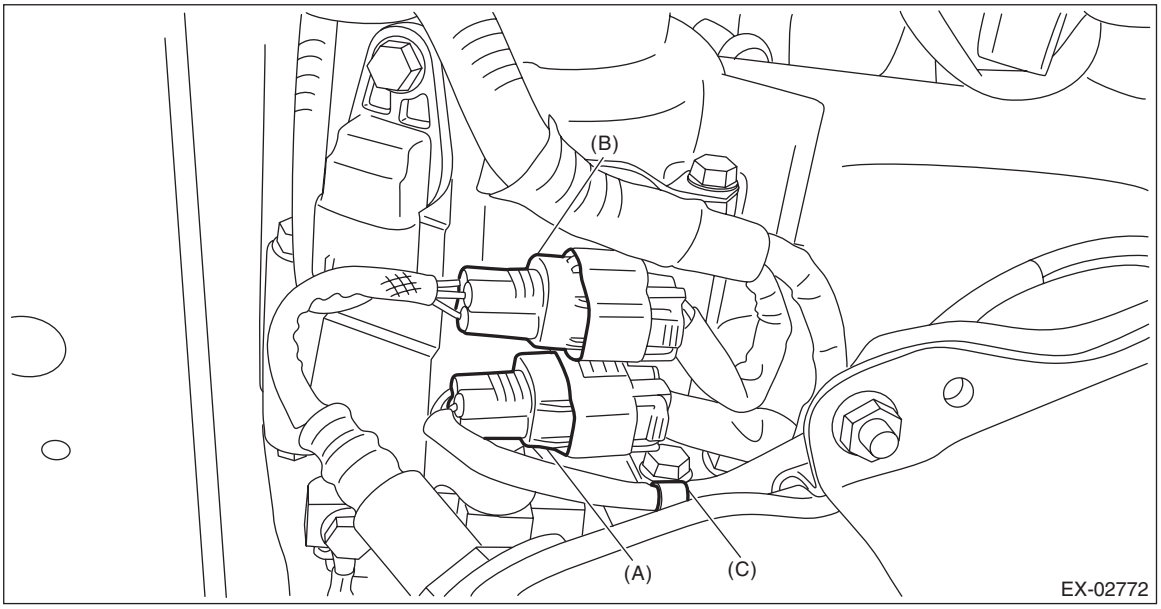
18.Front Oxygen (A/F) Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



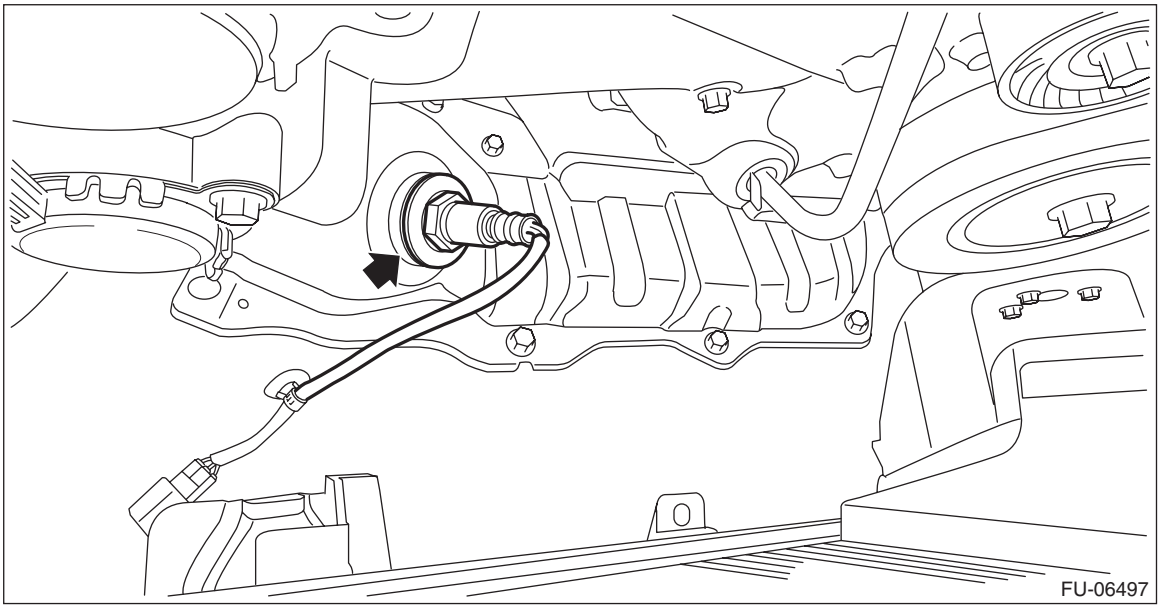
2) Remove the radiator sub fan and fan motor assembly. <Ref. to CO(H4DO(w/o HEV))-92, REMOVAL, Radiator Sub Fan and Fan Motor.>
3) Lift up the vehicle.
4) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
5) Disconnect the front oxygen (A/F) sensor connector, and remove the clip holding the front oxygen (A/F) sensor harness.



(A) Front oxygen (A/F) sensor connector
(B) Rear oxygen sensor connector
(C) Clip

6) Lower the vehicle.
7) Apply spray-type lubricant to the threaded portion of front oxygen (A/F) sensor, and leave it for one minute or more.
8) Remove the front oxygen (A/F) sensor.

CAUTION:
When removing the front oxygen (A/F) sensor, wait until exhaust pipe cools, otherwise it will damage the exhaust pipe.



B: INSTALLATION

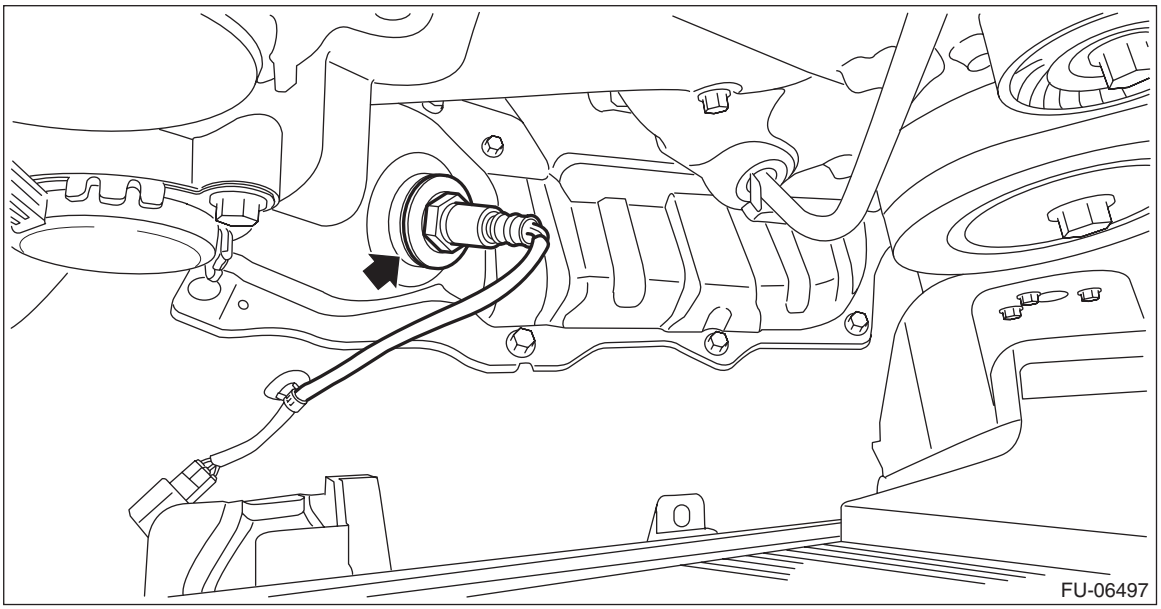
CAUTION:
If lubricant is spilt over the exhaust pipe, wipe it off with cloth to avoid emission of smoke or causing a fire.
1) Before installing front oxygen (A/F) sensor, apply anti-seize compound only to the threaded portion of front oxygen (A/F) sensor to make the next removal easier.

CAUTION:
Never apply anti-seize compound to the protector of front oxygen (A/F) sensor.

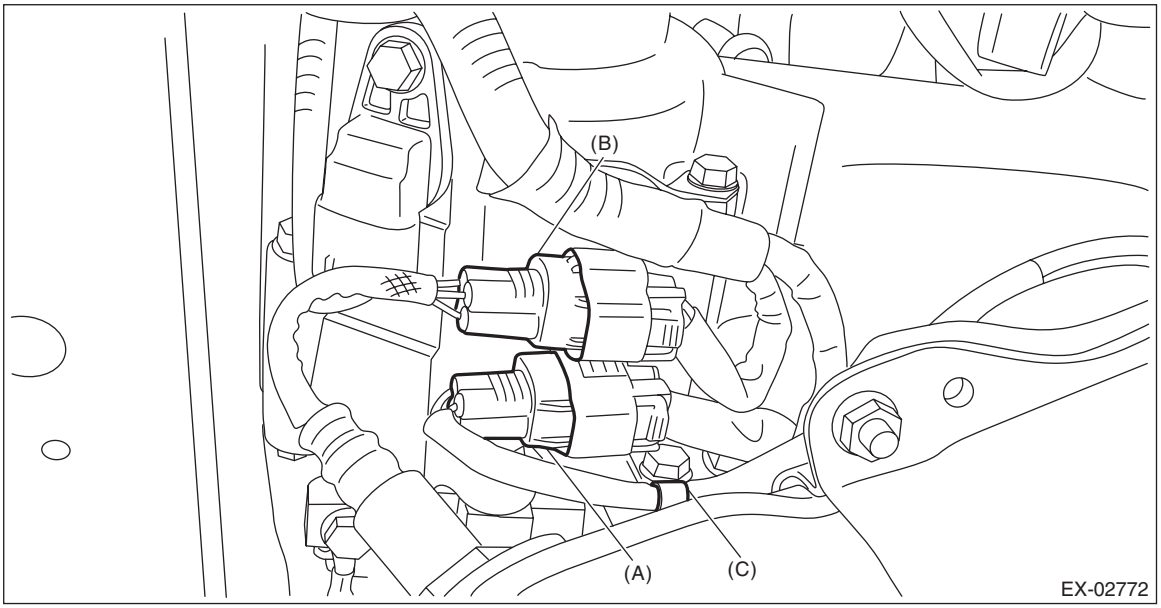
Anti-seize compound:
NEVER-SEEZ NSN, JET LUBE SS-30 or equivalent

2) Install the front oxygen (A/F) sensor.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



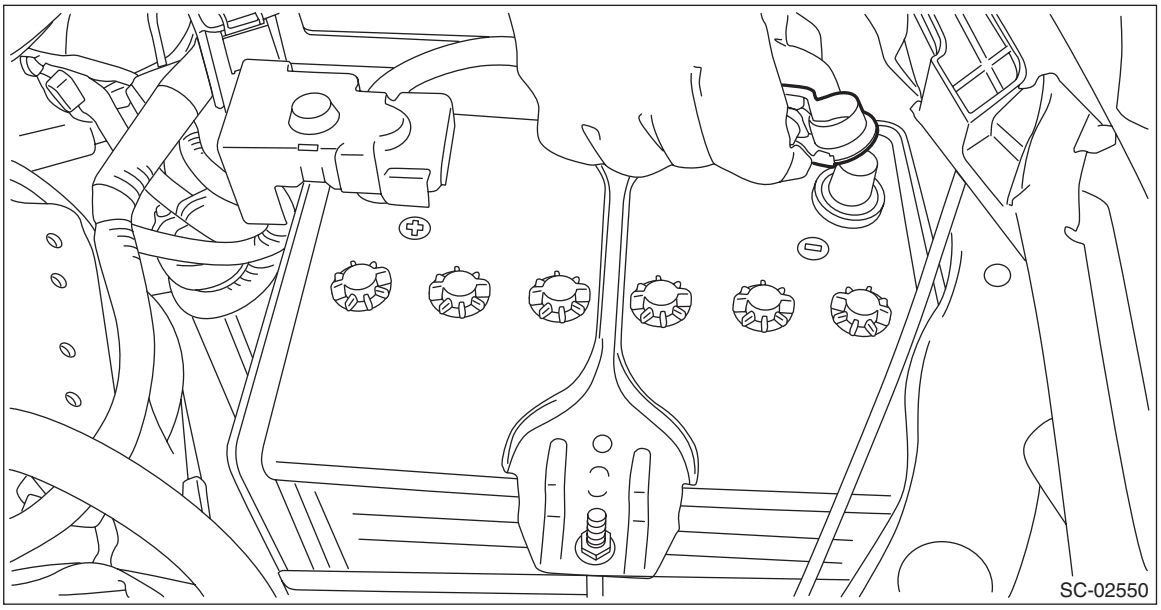
3) Lift up the vehicle.
4) Connect the front oxygen (A/F) sensor connector, and secure the front oxygen (A/F) sensor harness by using the clip.



(A) Front oxygen (A/F) sensor connector
(B) Rear oxygen sensor connector
(C) Clip

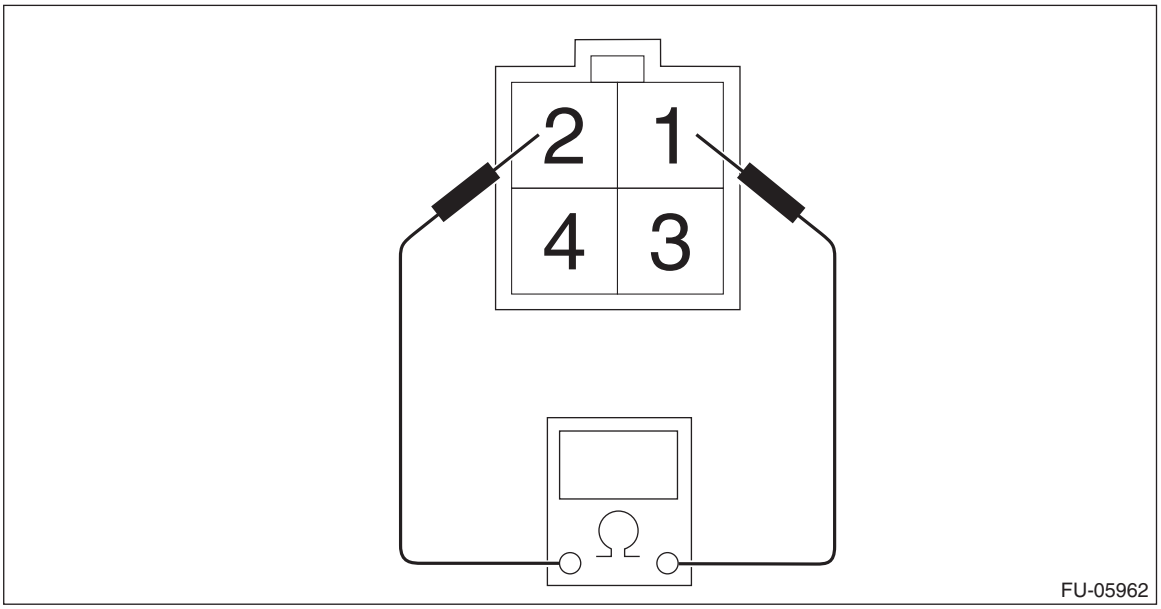
5) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
6) Lower the vehicle.
7) Install the radiator sub fan and fan motor assembly. <Ref. to CO(H4DO(w/o HEV))-93, INSTALLATION, Radiator Sub Fan and Fan Motor.>

8) Connect the battery ground terminal.



C: INSPECTION

1) Check that the front oxygen (A/F) sensor has no deformation, cracks or other damages.
2) Measure the resistance between front oxygen (A/F) sensor terminals.

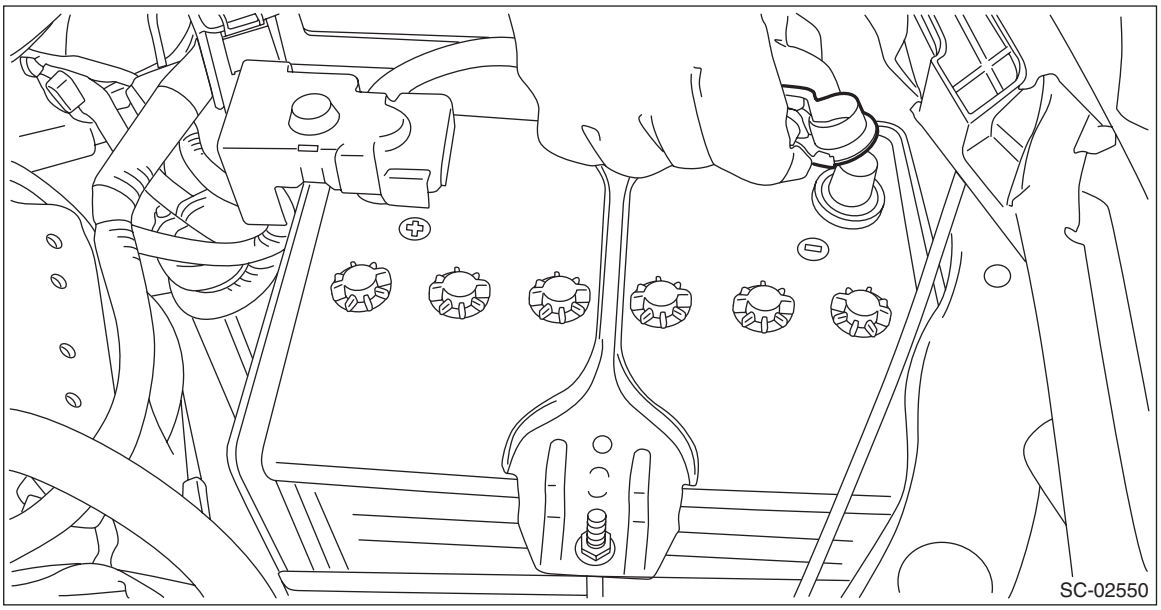


Terminal No.	Standard
1 and 2	$2.0^{+0.42}_{-0.2}$ Ω (when 20°C (68°F))

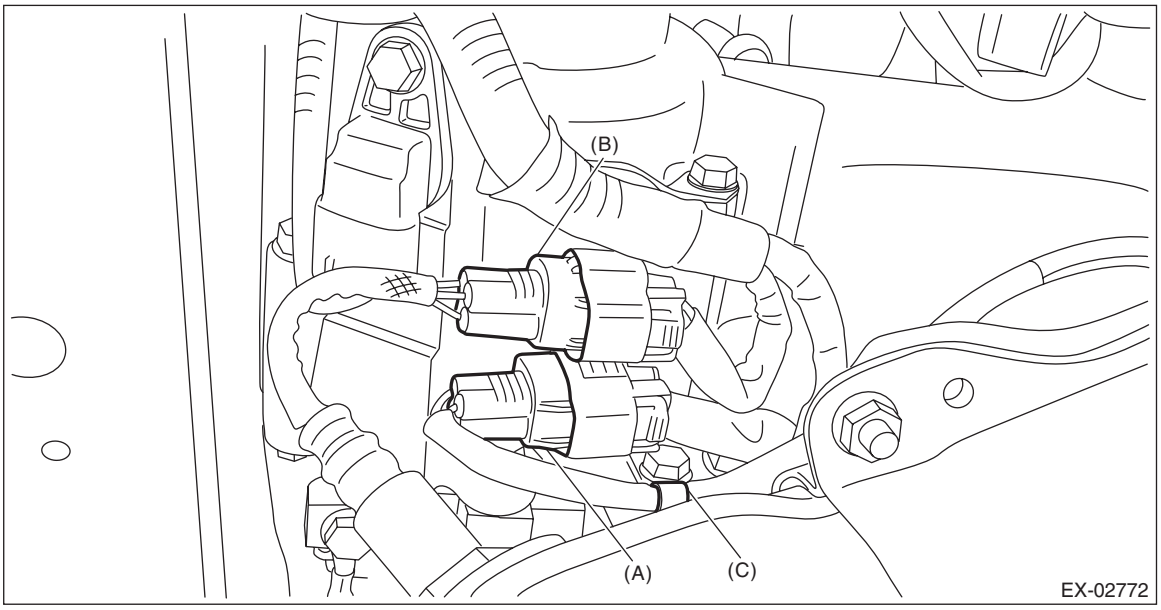
19.Rear Oxygen Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



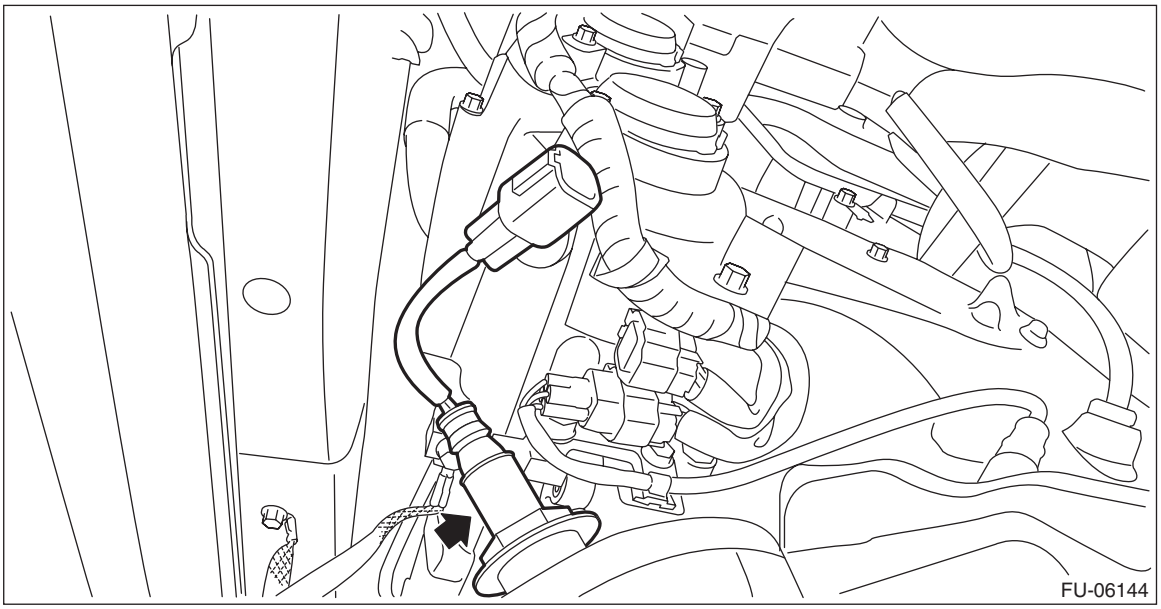
2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Disconnect the rear oxygen sensor connector.



(A) Front oxygen (A/F) sensor connector
(B) Rear oxygen sensor connector
(C) Clip

5) Apply spray-type lubricant to the threaded portion of rear oxygen sensor, and leave it for one minute or more.
6) Remove the rear oxygen sensor.

CAUTION:
When removing the rear oxygen sensor, wait until exhaust pipe cools, otherwise it will damage the exhaust pipe.



B: INSTALLATION

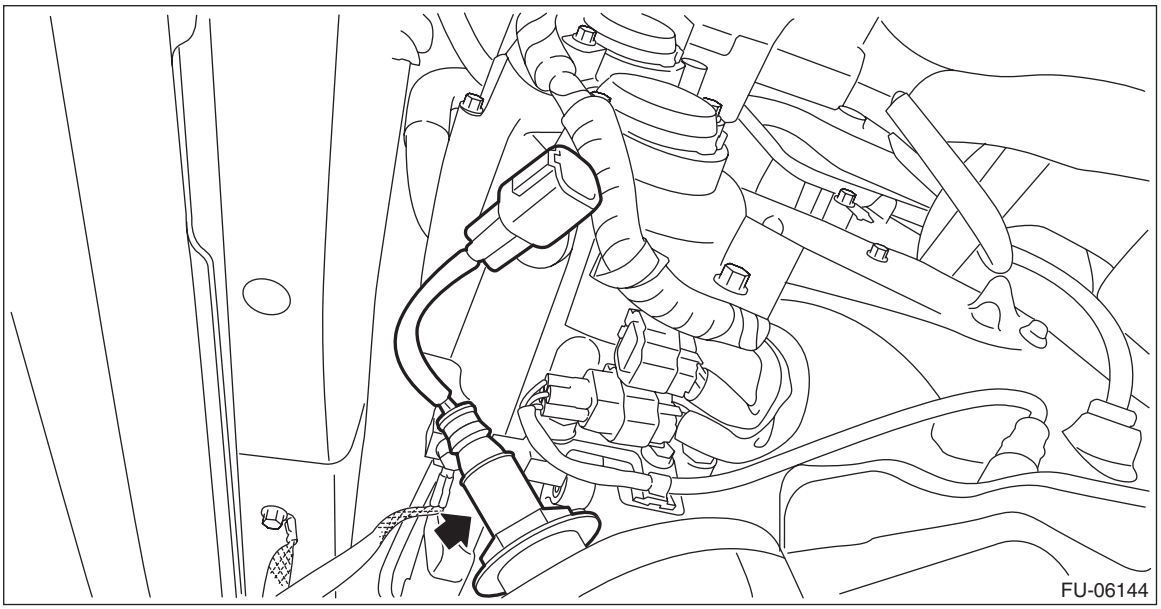
CAUTION:
If lubricant is spilt over the exhaust pipe, wipe it off with cloth to avoid emission of smoke or causing a fire.
1) Before installing rear oxygen sensor, apply the anti-seize compound only to the threaded portion of rear oxygen sensor to make the next removal easier.

CAUTION:
Never apply anti-seize compound to the protector of rear oxygen sensor.

Anti-seize compound:
NEVER-SEEZ NSN, JET LUBE SS-30 or equivalent

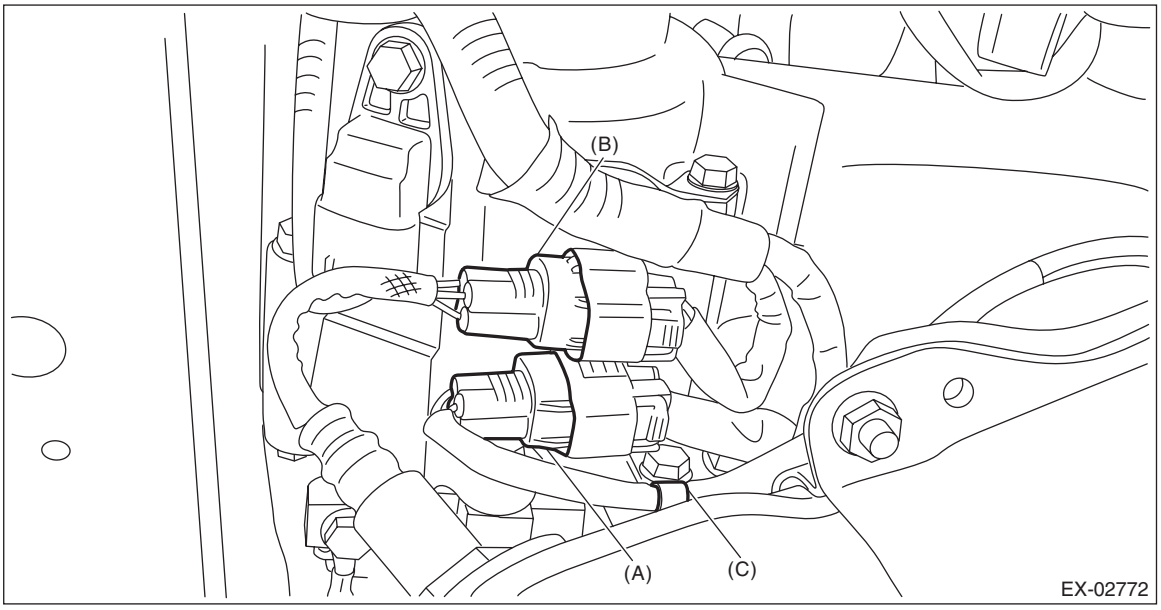
2) Install the rear oxygen sensor.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



3) Connect the rear oxygen sensor connector.

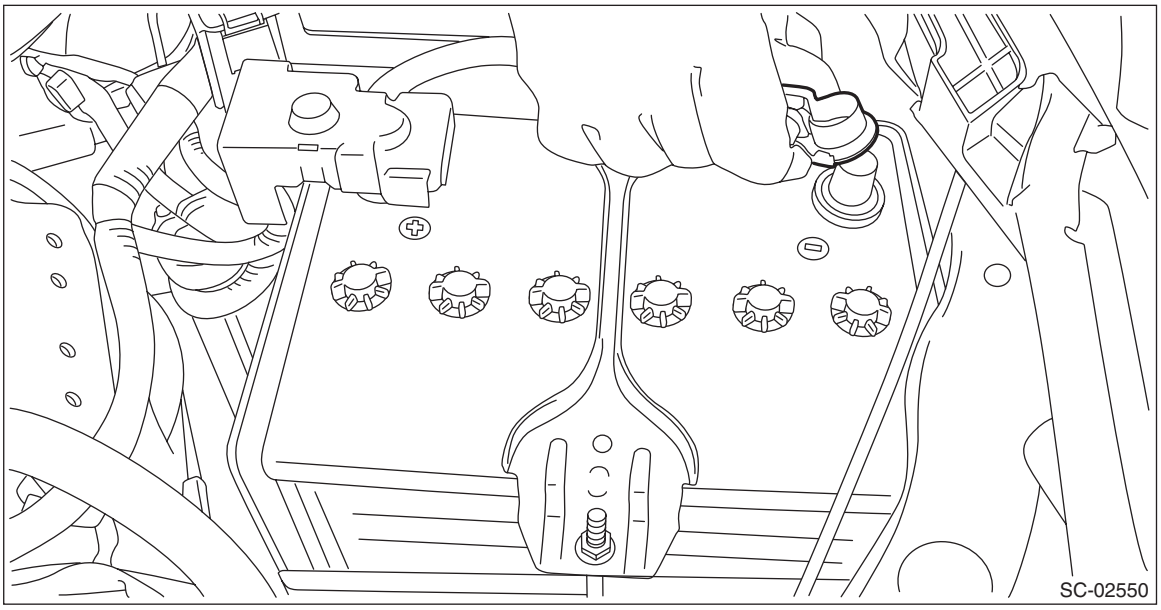
NOTE:
Be careful not to allow the rear oxygen sensor harness to interfere with the sensor unit and the front oxygen (A/F) sensor harness.



(A) Front oxygen (A/F) sensor connector
(B) Rear oxygen sensor connector
(C) Clip

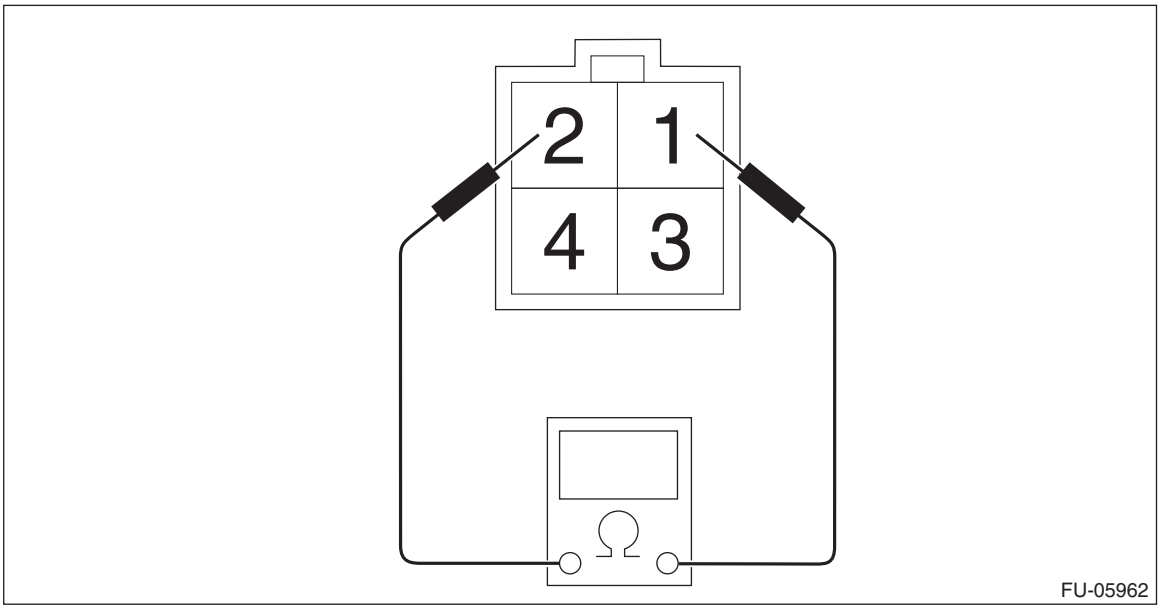
4) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
5) Lower the vehicle.

6) Connect the battery ground terminal.



C: INSPECTION

1) Check that the rear oxygen sensor has no deformation, cracks or other damages.
2) Measure the resistance between rear oxygen sensor terminals.

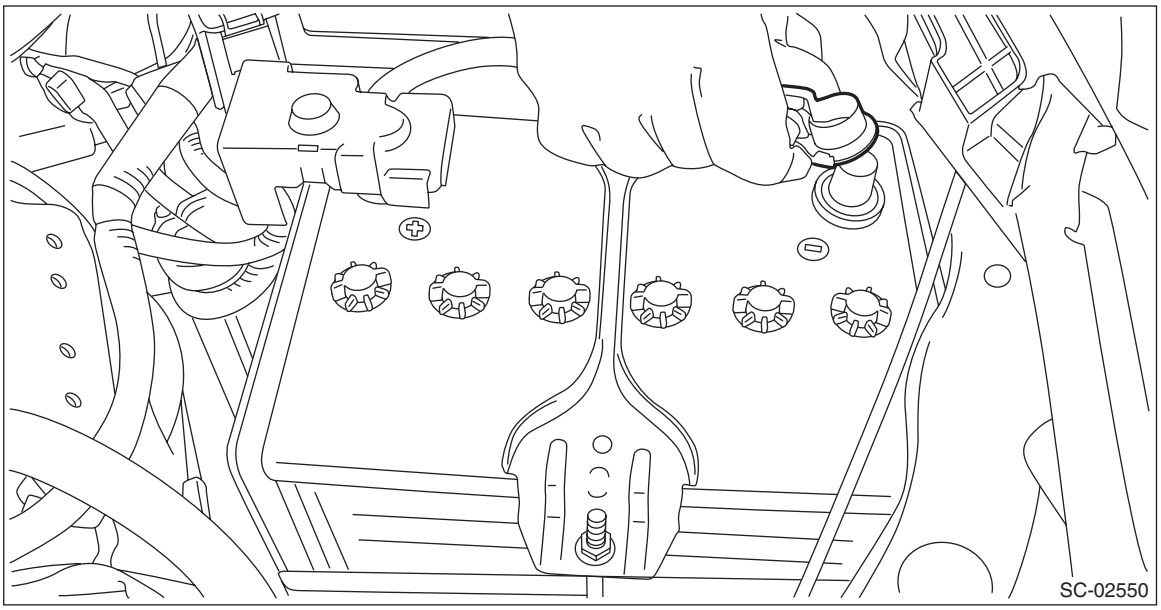


Terminal No.	Standard
1 and 2	$5.6^{+1.7}_{-0.6}$ Ω (when 20°C (68°F))

20.Engine Control Module (ECM)

A: REMOVAL

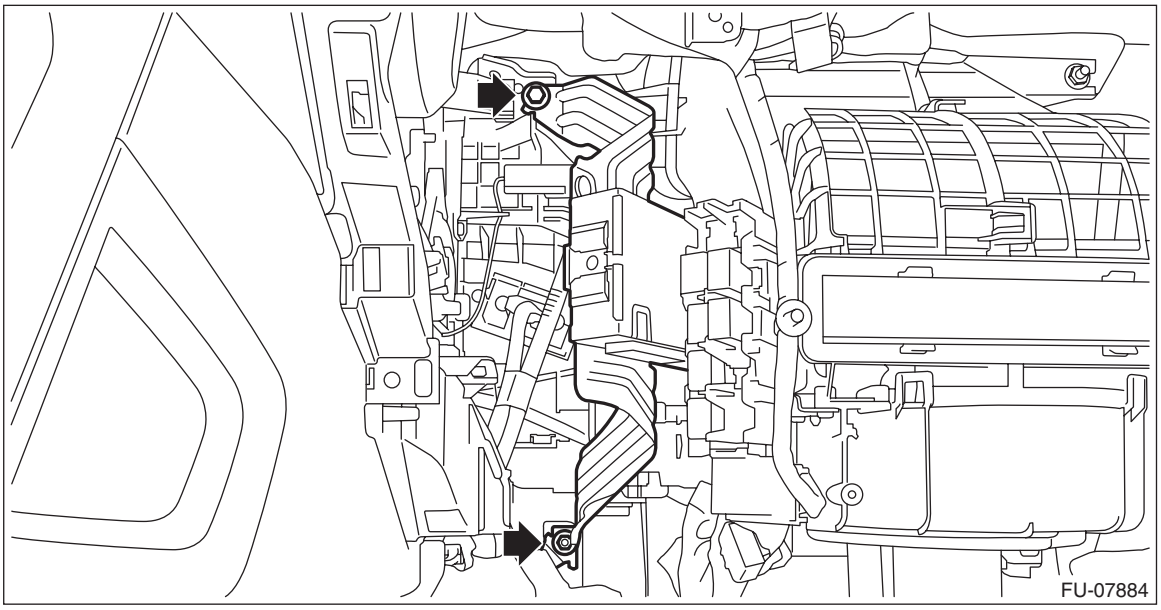
1) Disconnect the ground cable from battery.



2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Disconnect the connector from ECM.



4) Remove the bolts and nuts, and remove the ECM.



B: INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **When the ECM of model with immobilizer has been replaced, be sure to perform the registration of immobilizer system. (Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER".)**
- **If replacing ECM or the bracket, replace both parts with new parts at a time.**
- **After installing the bracket to ECM, do not separate the bracket.**
- **If the bracket has been installed to ECM in the wrong direction, replace both parts to new parts.**

NOTE:
When replacing the ECM, be careful not to use the wrong spec. ECM to avoid any damage on the fuel injection system.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

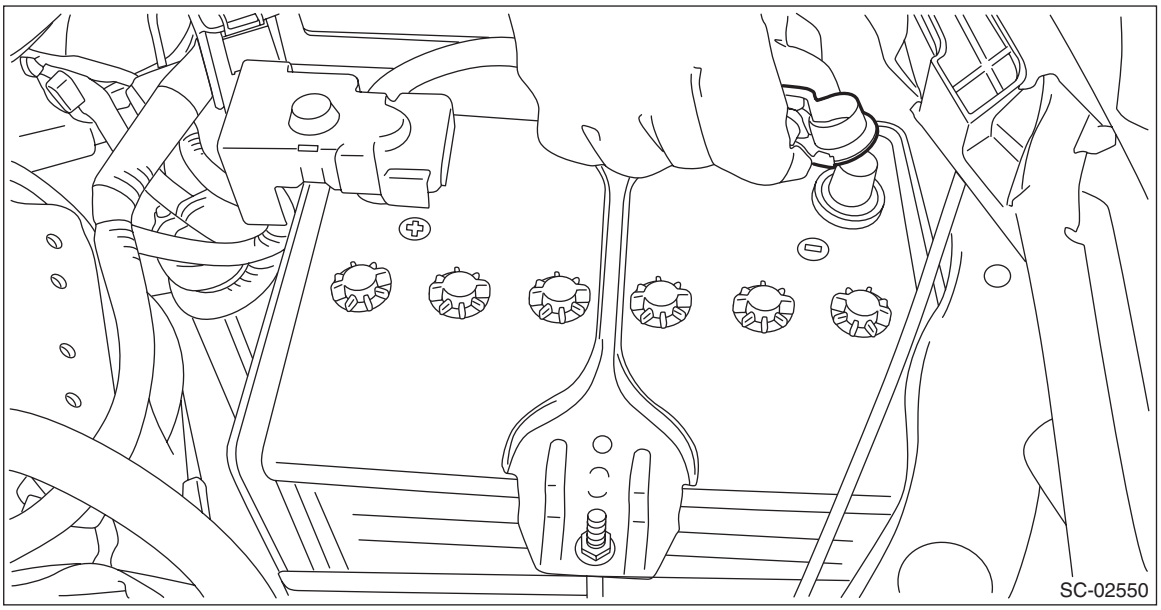
C: INSPECTION

Check that the ECM has no deformation, cracks or other damages.

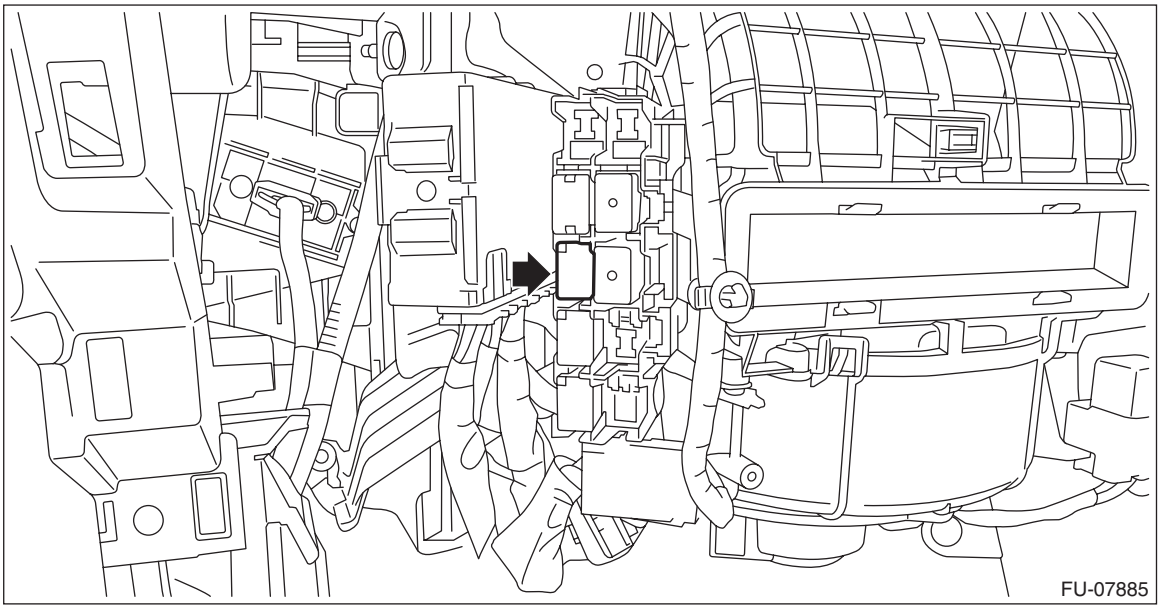
21.Main Relay

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the main relay from relay block.

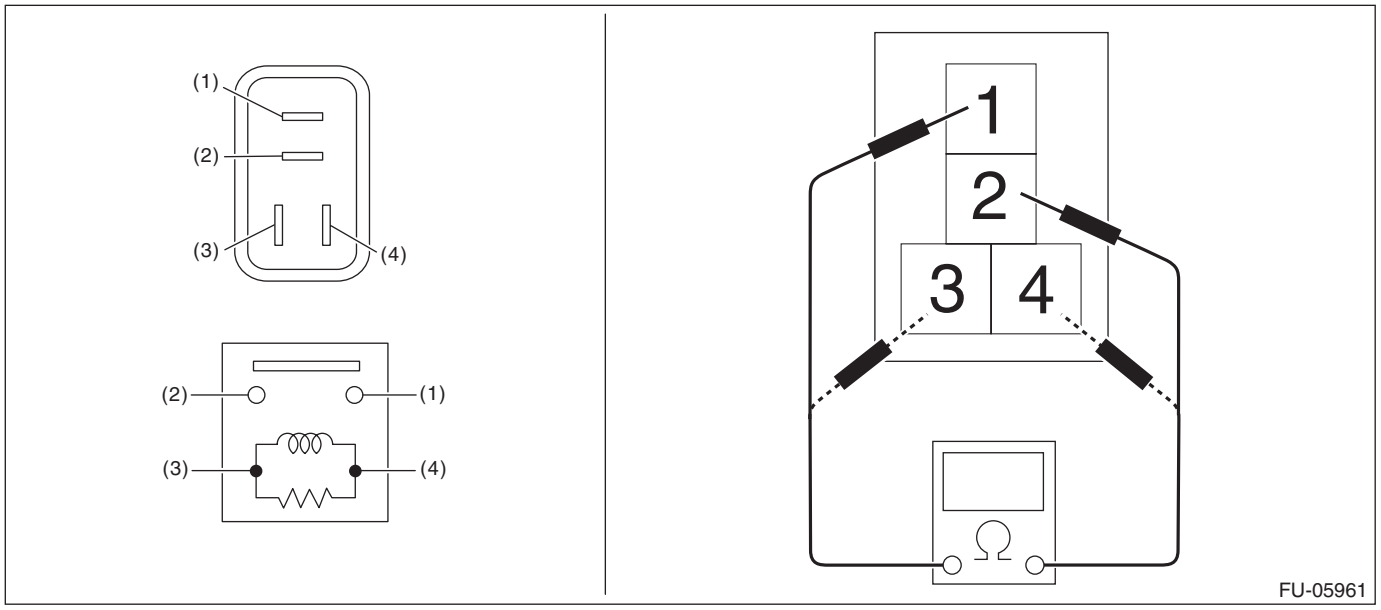


B: INSTALLATION

Install in the reverse order of removal.

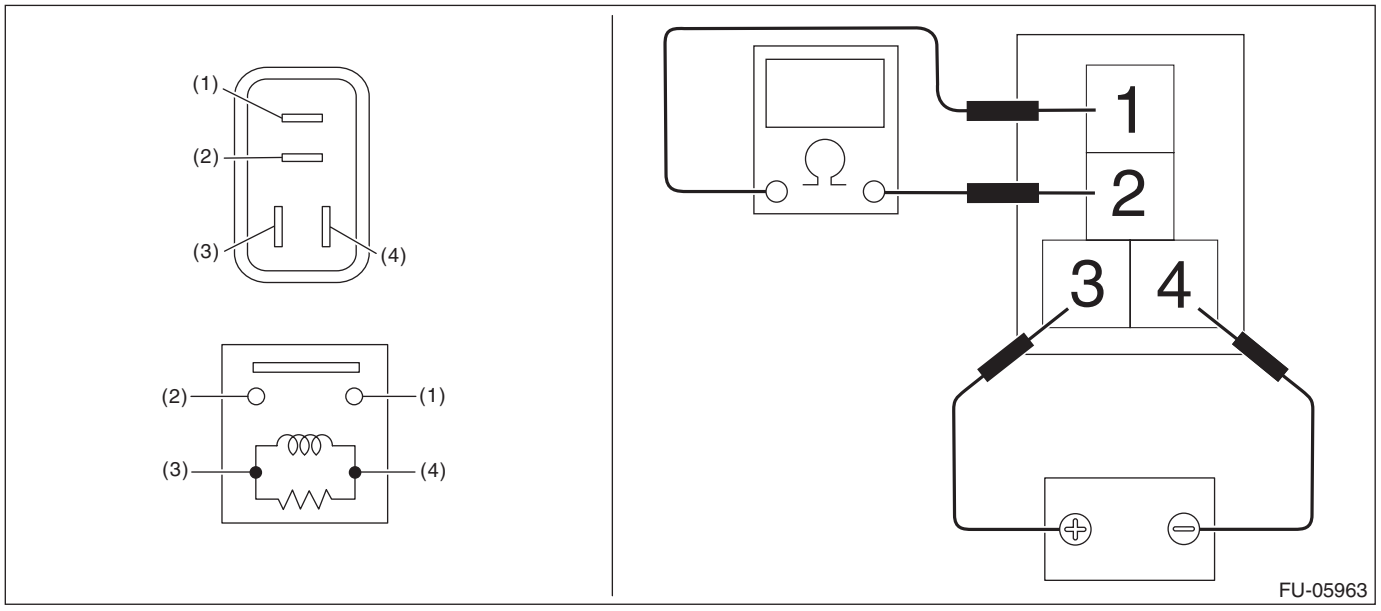
C: INSPECTION

1) Check that the main relay has no deformation, cracks or other damages.
2) Measure the resistance between main relay terminals.



Terminal No.	Standard
1 and 2	1 MΩ or more
3 and 4	130.4 — 230.8 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 3 and battery ground terminal to terminal No. 4, and measure the resistance between the main relay terminals.

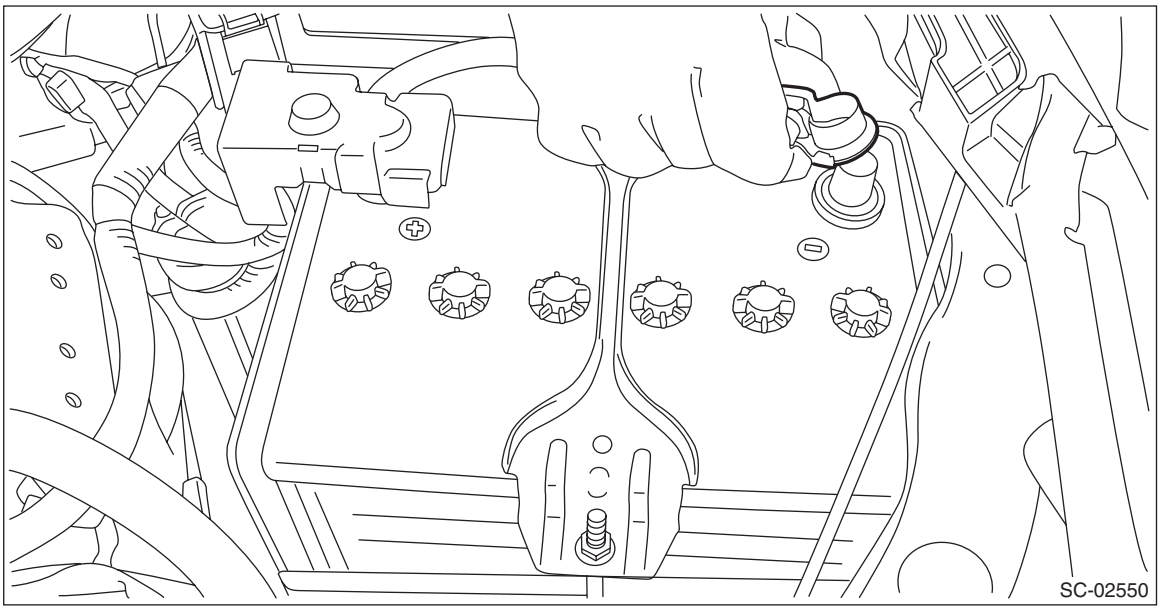


Terminal No.	Standard
1 and 2	Less than 1 Ω

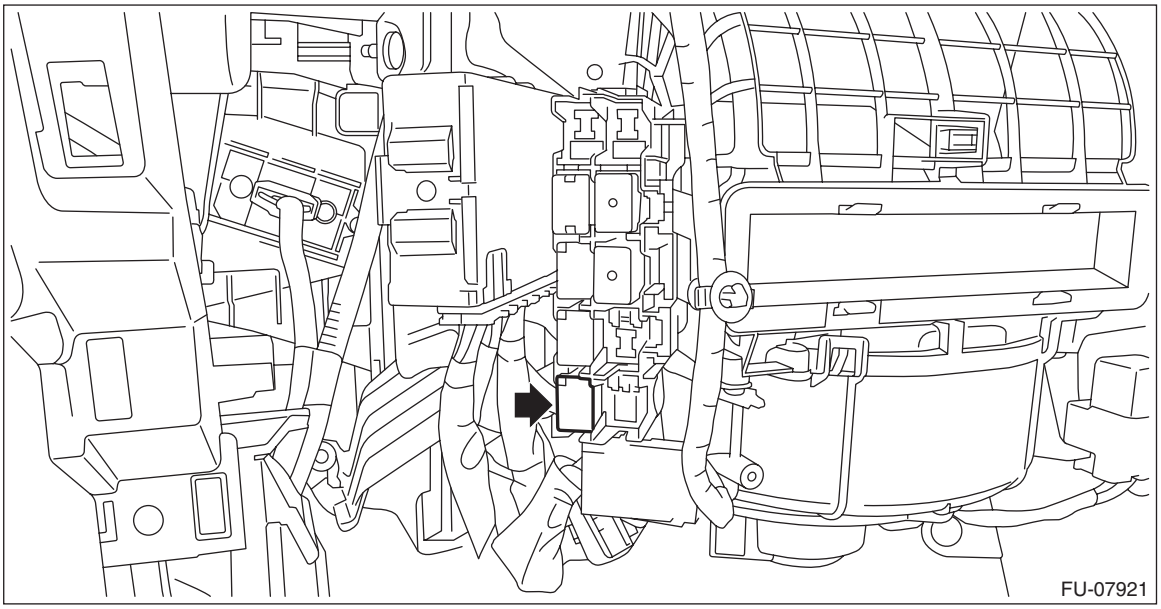
22.Fuel Pump Relay

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the fuel pump relay from relay block.

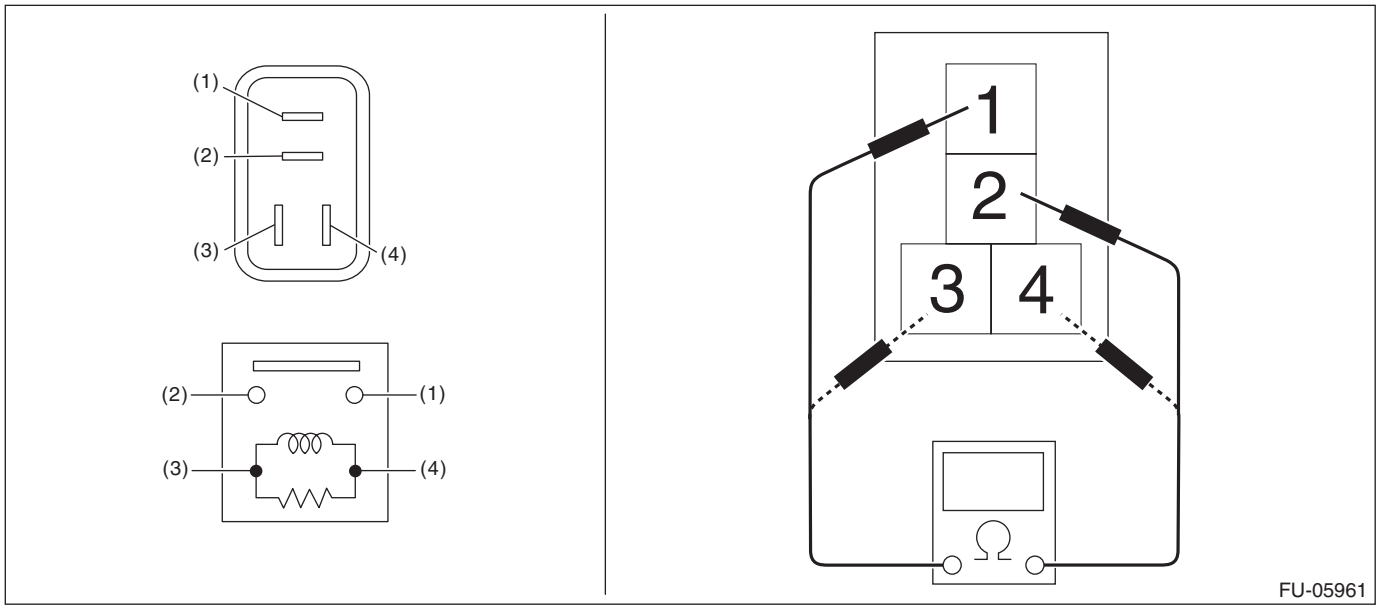


B: INSTALLATION

Install in the reverse order of removal.

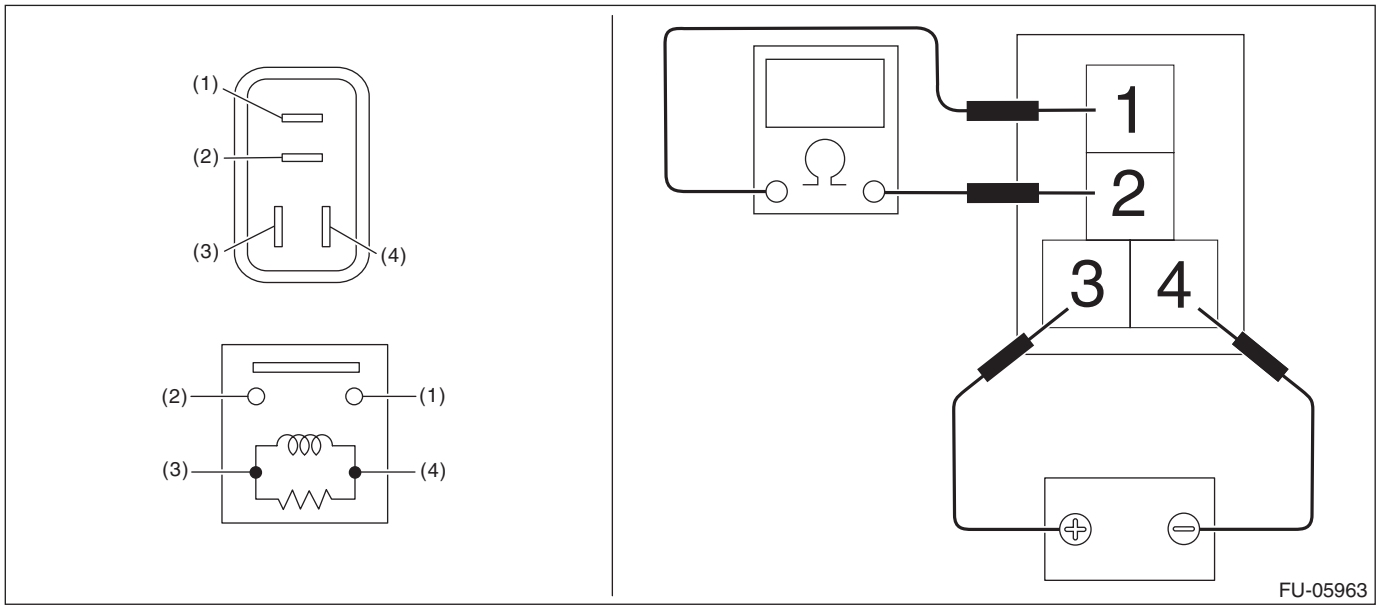
C: INSPECTION

1) Check that the fuel pump relay has no deformation, cracks or other damages.
2) Measure the resistance between fuel pump relay terminals.



Terminal No.	Standard
1 and 2	1 MΩ or more
3 and 4	93.8 — 136.4 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 3 and battery ground terminal to terminal No. 4, and measure the resistance between the fuel pump relay terminals.

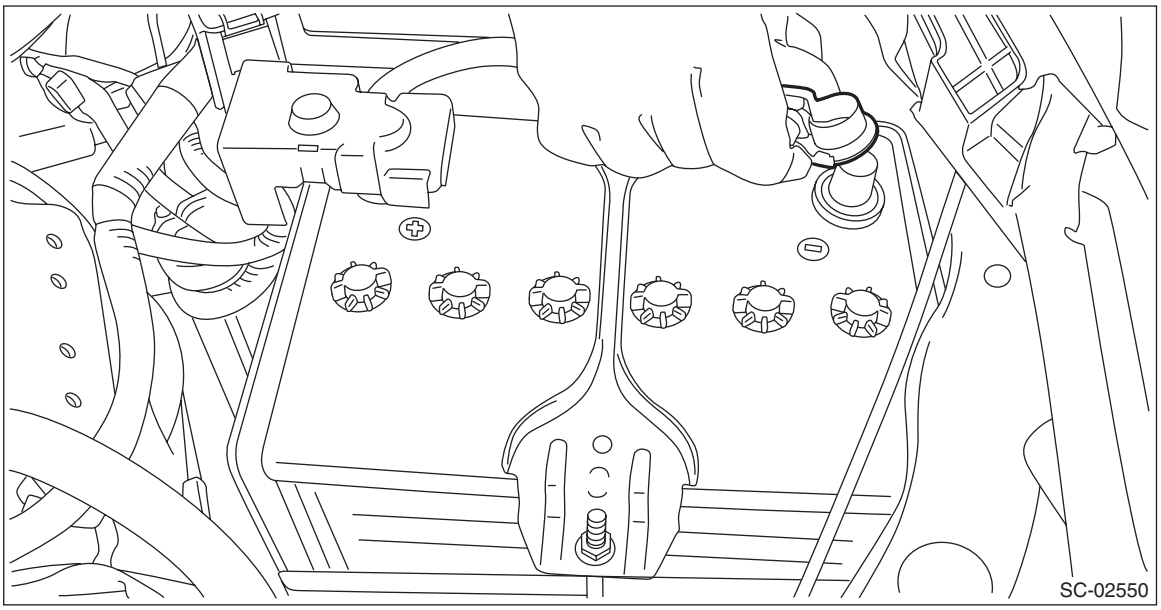


Terminal No.	Standard
1 and 2	Less than 1 Ω

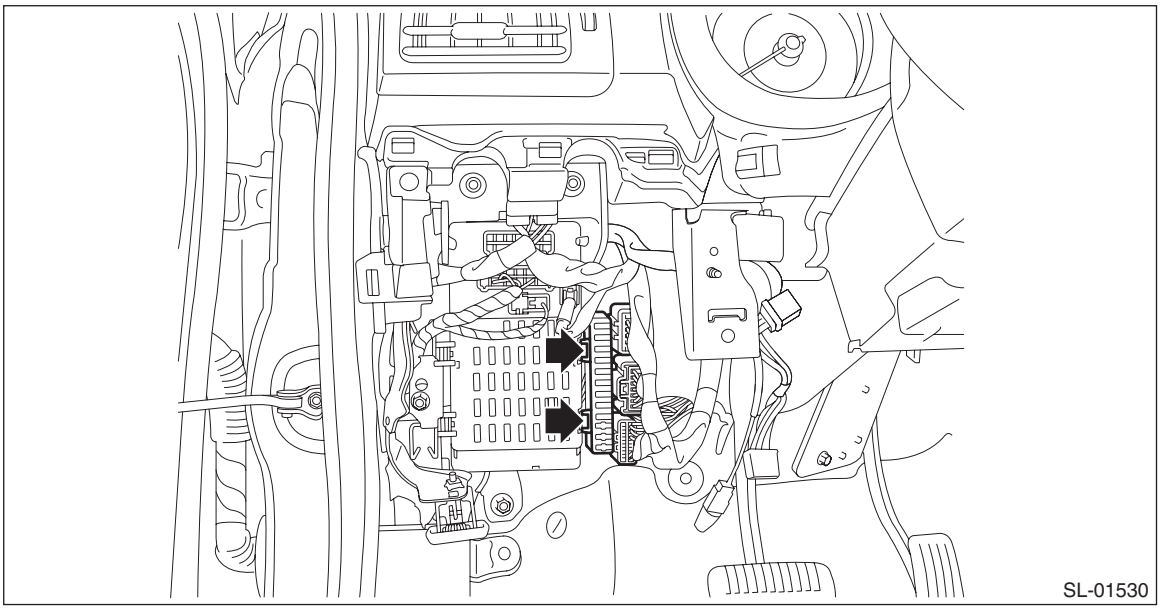
23.Electronic Throttle Control Relay

A: REMOVAL

1) Disconnect the ground cable from battery.

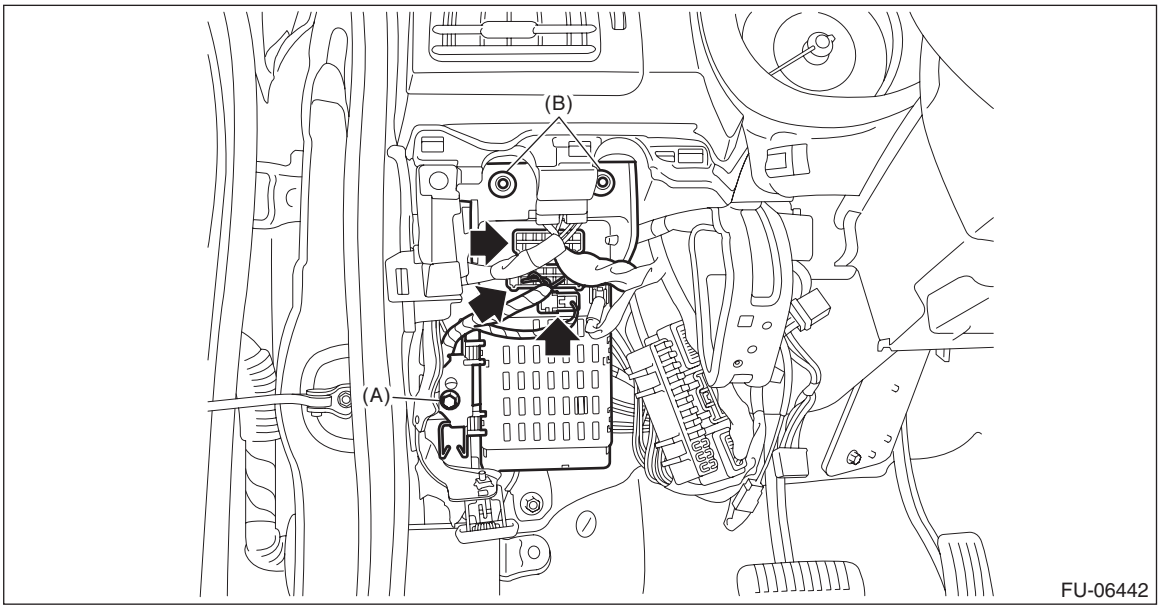


2) Release the lock and remove the fuse holder from the relay & fuse box.



3) Disconnect the connectors from the relay & fuse box.

4) Remove the bolts (A) and nuts (B), and remove the relay & fuse box.



5) Remove the electronic throttle control relay from the relay block on the back side of the fuse block.



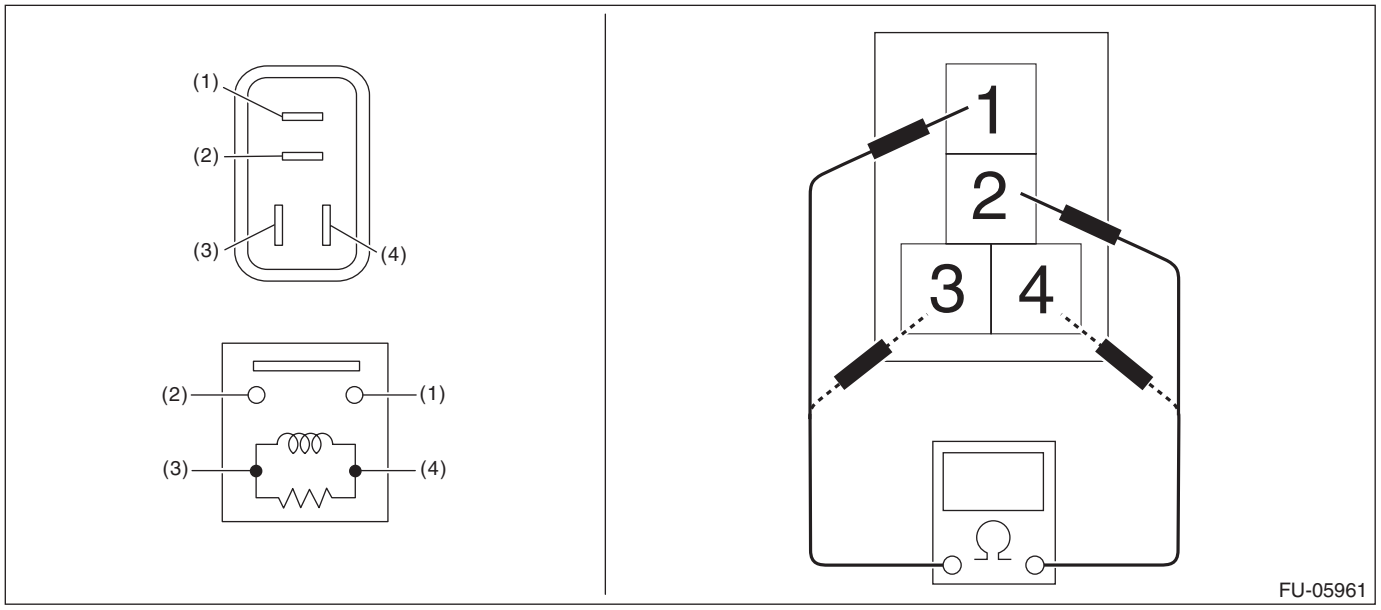
B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

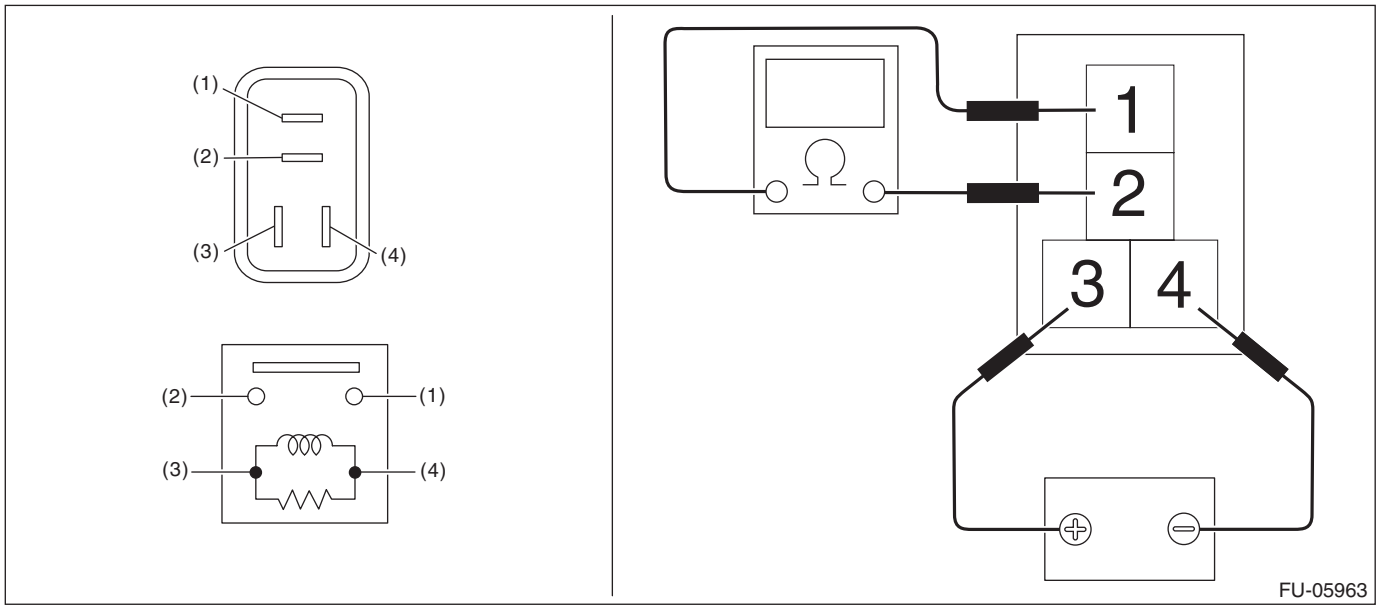
C: INSPECTION

1) Check that the electronic throttle control relay has no deformation, cracks or other damages.
2) Measure the resistance between electronic throttle control relay terminals.



Terminal No.	Standard
1 and 2	1 MΩ or more
3 and 4	93.8 — 136.4 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 3 and battery ground terminal to terminal No. 4, and measure the resistance between the electronic throttle control relay terminals.



Terminal No.	Standard
1 and 2	Less than 1 Ω

24.Fuel

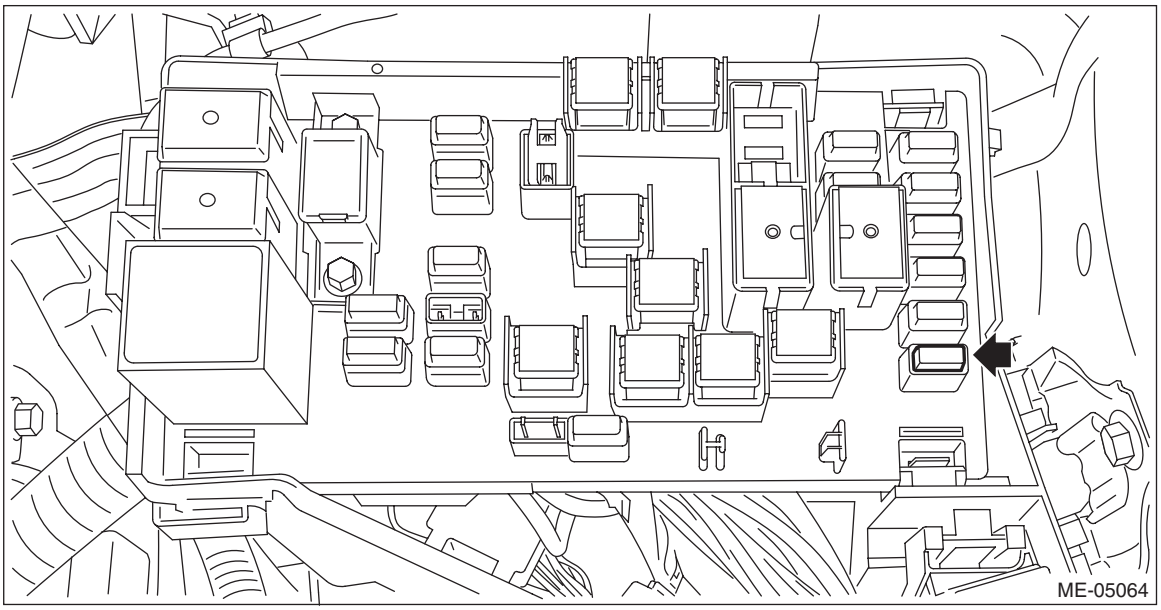
A: PROCEDURE

1. RELEASING OF FUEL PRESSURE

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
Be careful not to spill fuel.

1) Remove the fuse of fuel pump from main fuse box.



2) Start the engine and run it until it stalls.
3) After the engine stalls, crank it for five more seconds.
4) Turn the ignition switch to OFF.
5) Install the fuse of fuel pump to the main fuse box.

2. DRAINING FUEL (WITH SUBARU SELECT MONITOR)

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

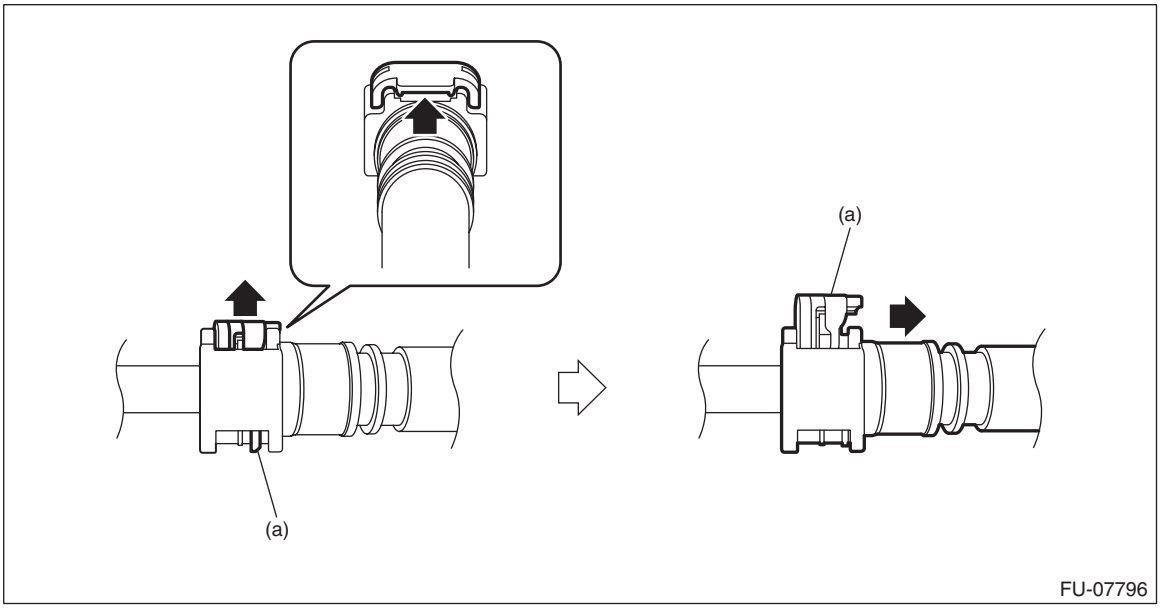
CAUTION:
Be careful not to spill fuel.

NOTE:
• If the fuel pump cannot be driven, refer to the procedures for draining from the fuel filler hose. <Ref. to FU(H4DO(w/o HEV))-112, DRAINING FUEL (THROUGH THE FUEL FILLER HOSE), PROCEDURE, Fuel.>
• Be careful not to let the battery run-out.
• Be aware that the fuel may remain in the fuel tank after draining the fuel.

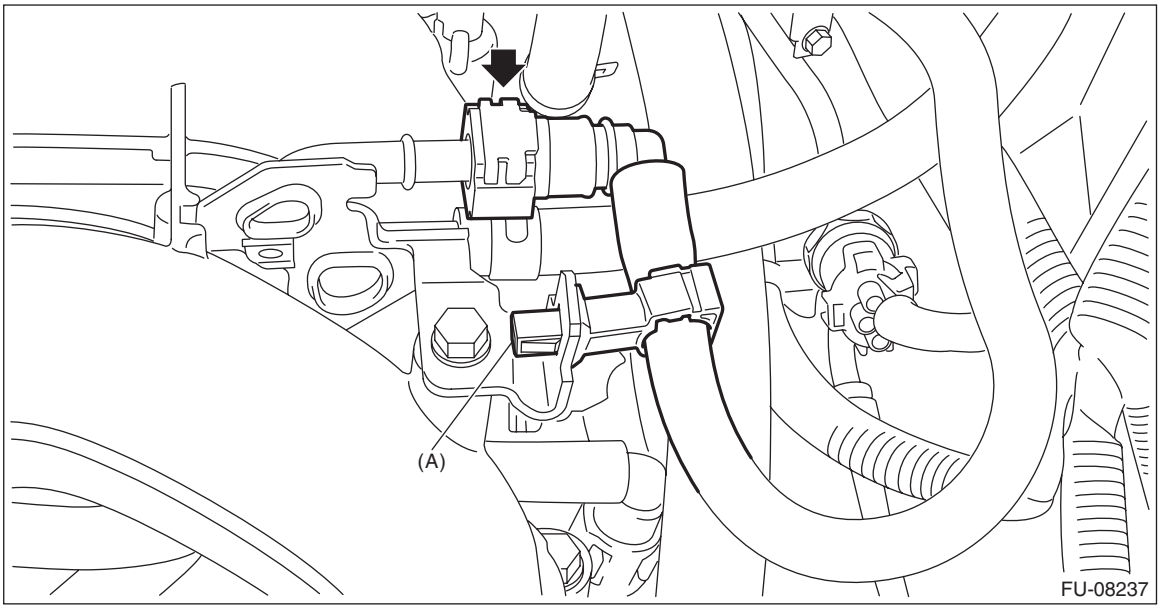
1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the quick connector on the fuel delivery tube from the fuel pipe assembly, and remove the clip (A) securing the fuel delivery tube to the fuel pipe assembly.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



3) Connect ST to the fuel delivery tube.
ST 18471AA000 FUEL PIPE ADAPTER
4) Connect the gasoline proof hose to ST and put the end of the hose in the container.
5) Drive the fuel pump and drain the fuel using Subaru Select Monitor.

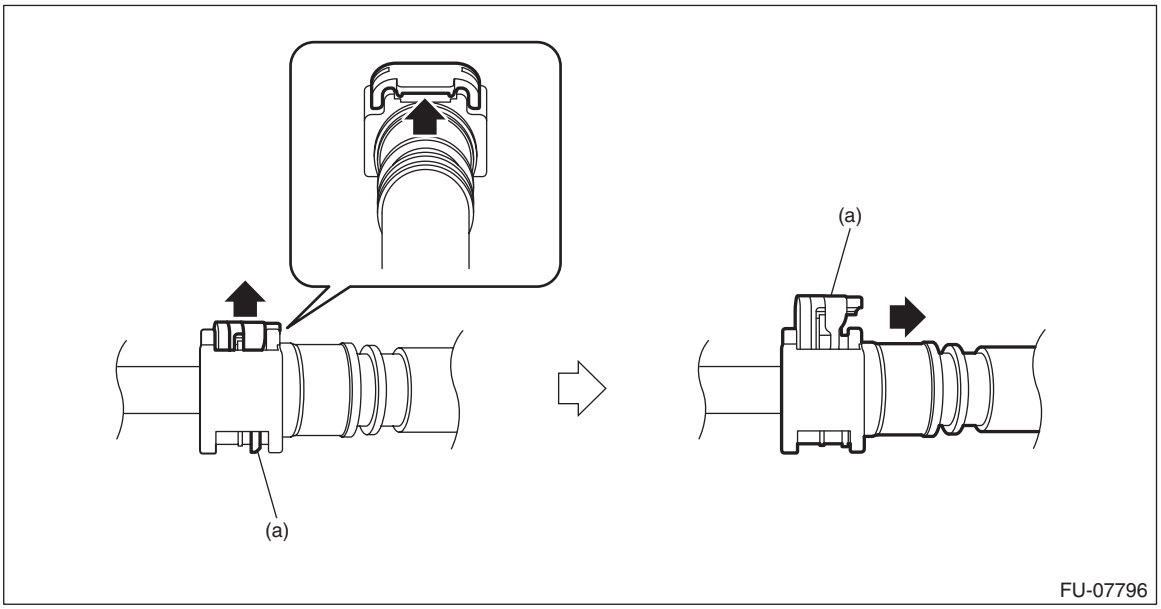
CAUTION:
Be careful not to spill fuel.

NOTE:
For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

6) Install the related parts in the reverse order after draining the fuel.

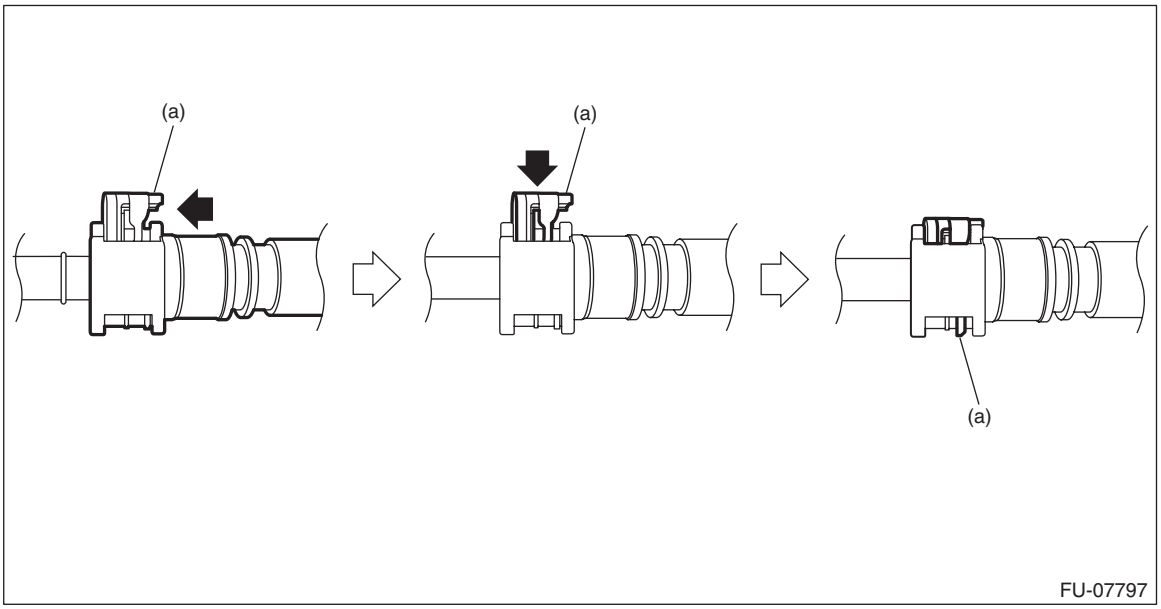
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check again that the quick connector is securely connected.**

NOTE:
- Disconnect the quick connector on the fuel delivery tube as shown in the figure.



(a) Slider

- Connect the quick connector on the fuel delivery tube as shown in the figure.



(a) Slider

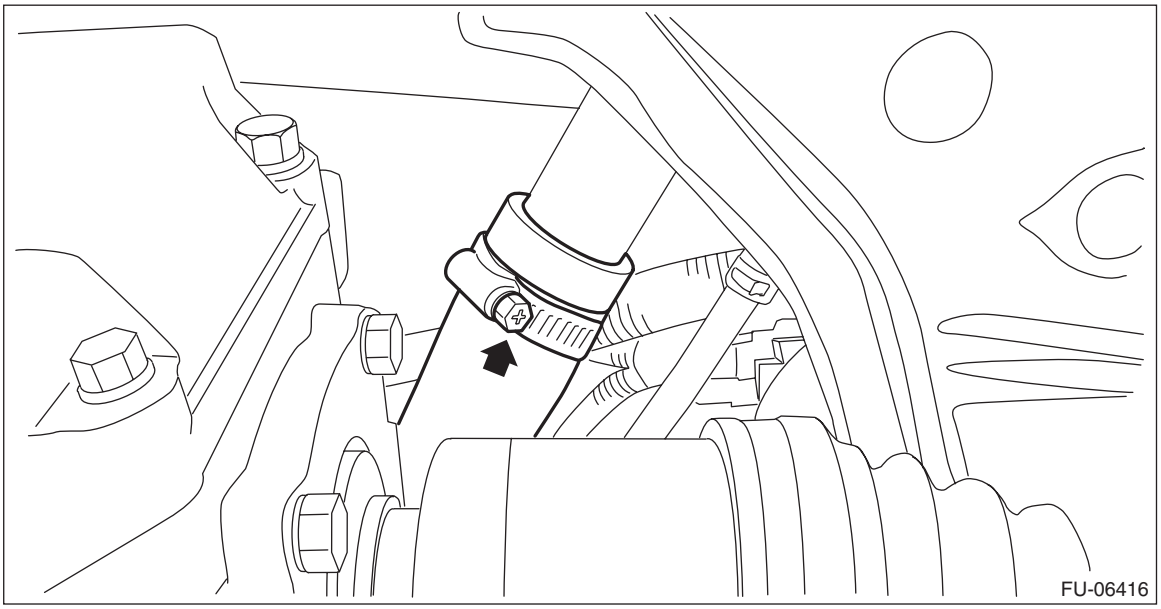
3. DRAINING FUEL (THROUGH THE FUEL FILLER HOSE)

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
- **Be careful not to spill fuel.**
- **Fuel may remain in the fuel filler pipe. Drain the fuel from the fuel filler pipe through the fill opening using the gasoline proof pump and the gasoline proof hose (ø10 or less) before the operation.**

NOTE:
Be aware that the fuel may remain in the fuel tank after draining the fuel.
1) Lift up the vehicle.
2) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DO(w/o HEV))-22, REMOVAL, Muffler.>
3) Open the fuel filler lid and remove the fuel filler cap.
4) Drain the fuel from the fuel filler pipe through the filler opening using the gasoline proof pump and the gasoline proof hose (ø10 or less).
5) Disconnect the fuel filler hose from the fuel filler pipe assembly.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from hoses using a container or cloth.**



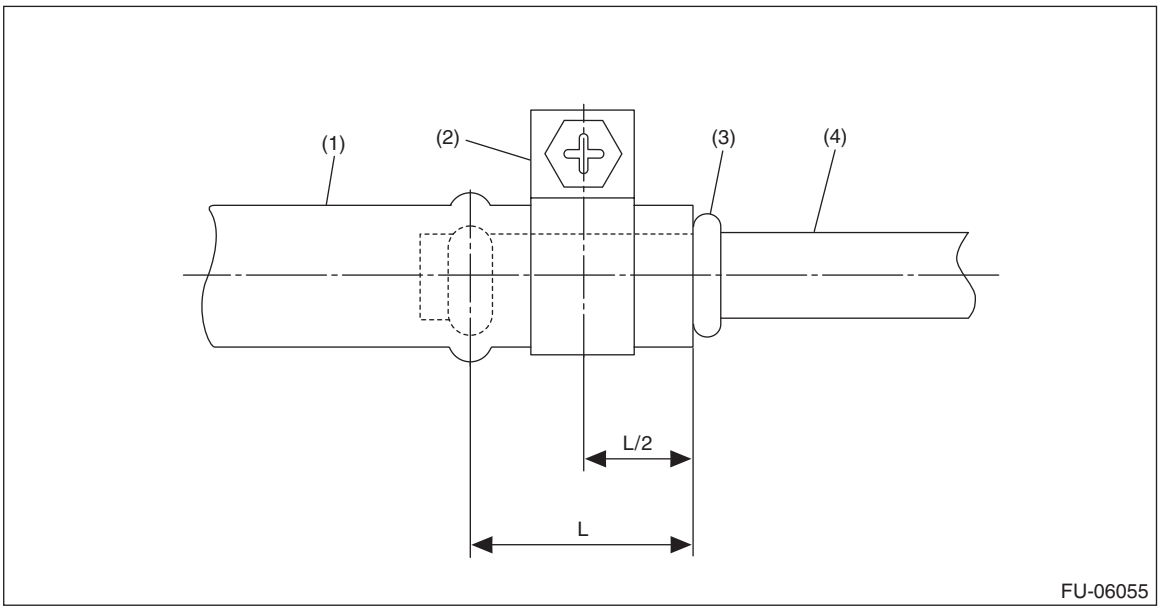
6) Set the container under the vehicle and insert the gasoline proof hose (ø10 or less) into the fuel filler hose to drain the fuel.

CAUTION:
Be careful not to spill fuel.

7) Install the related parts in the reverse order after draining the fuel.

NOTE:
Correctly insert the fuel filler hose to the spool, and then install the clamp as shown.

Tightening torque:
2.5 N·m (0.3 kgf-m, 1.8 ft-lb)



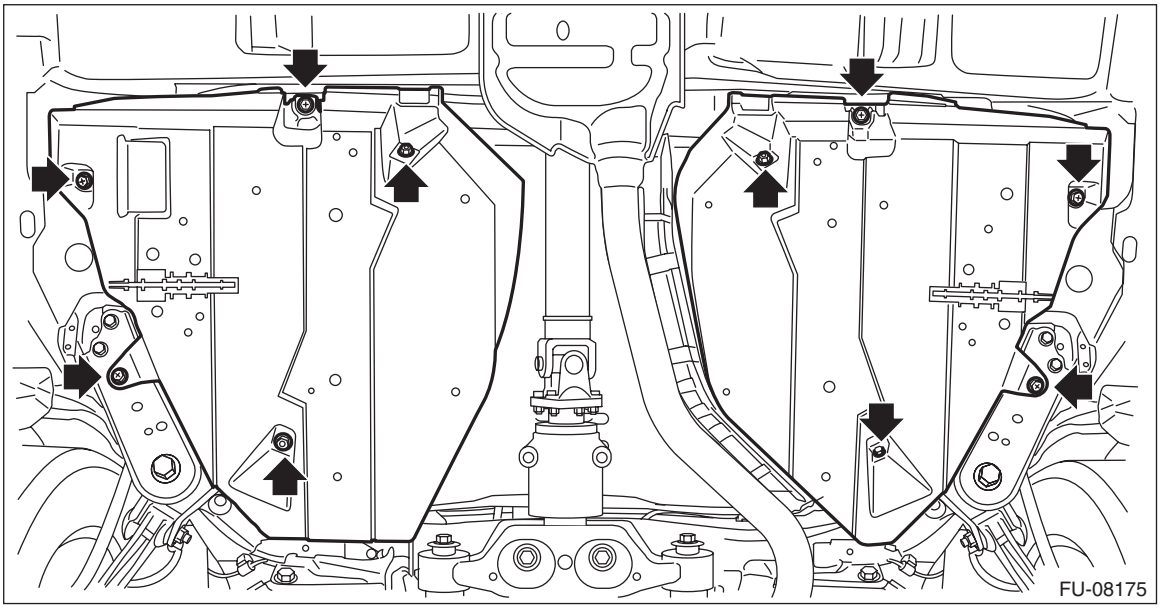
(1) Fuel filler hose
(2) Clamp
(3) Spool
(4) Fuel filler pipe

25.Fuel Tank Protector

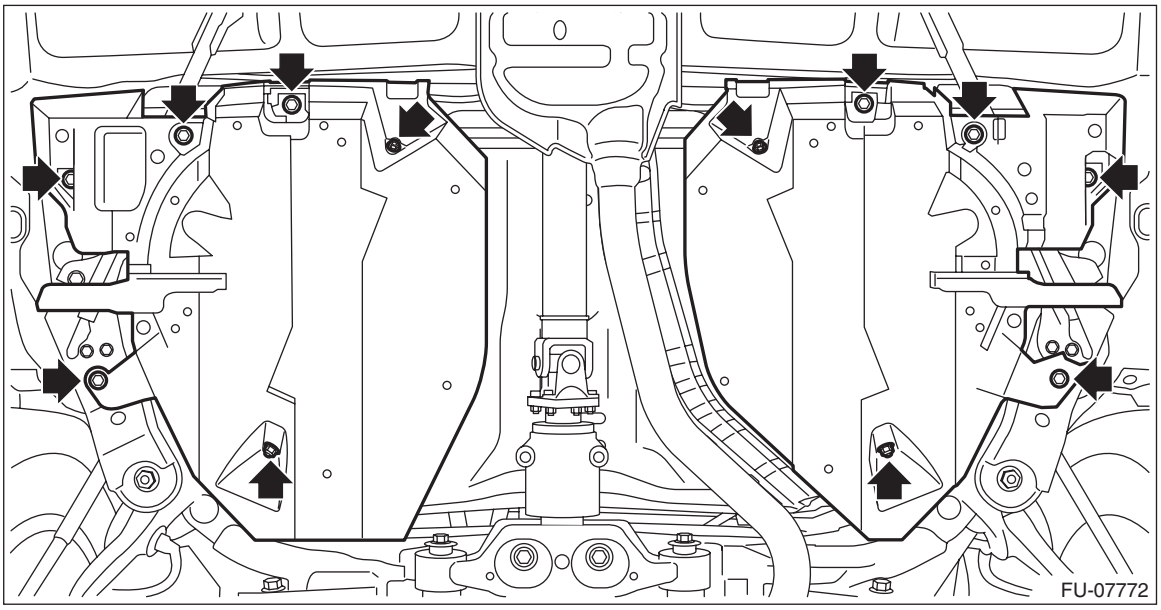
A: REMOVAL

1) Lift up the vehicle.
2) Remove the bolt and nuts and remove the fuel tank protector.

- Impreza model



- Crosstrek model



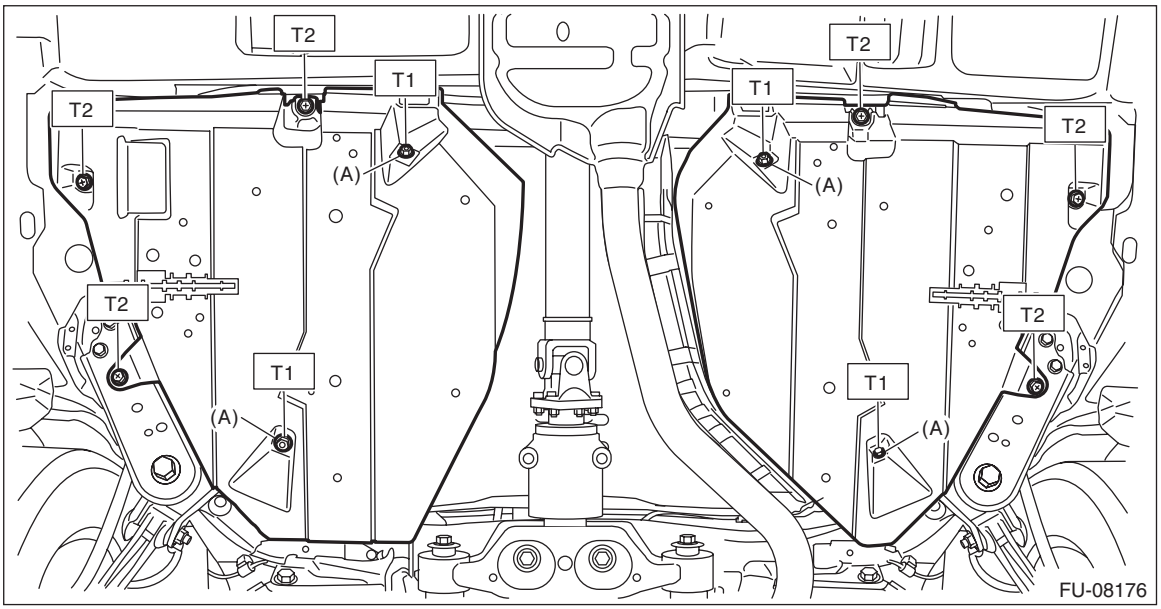
B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Use a new self-locking nut.

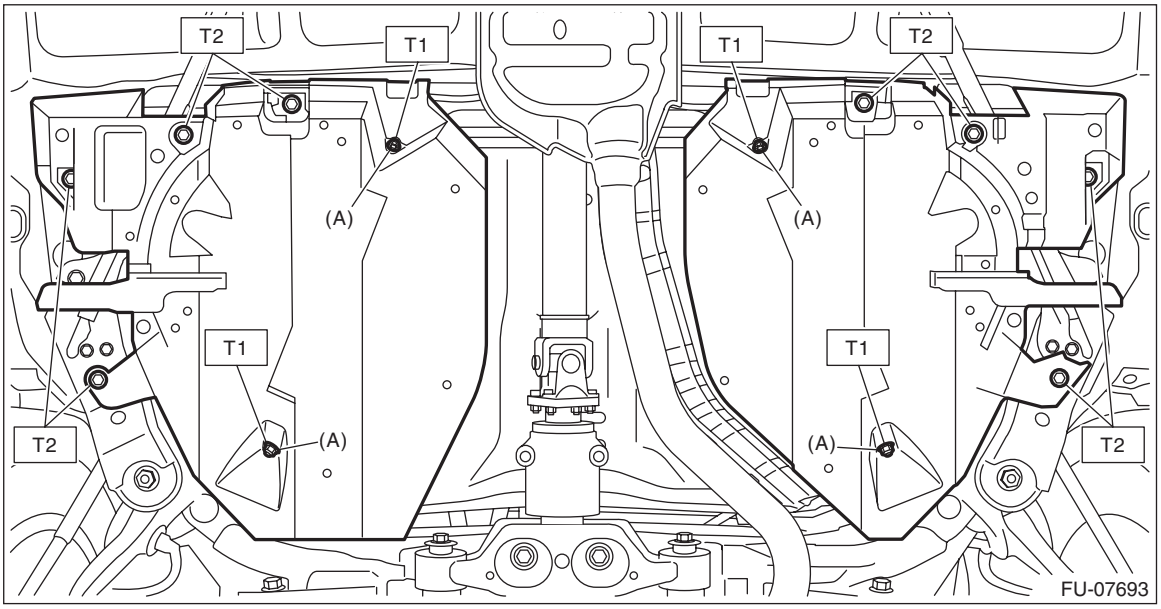
Tightening torque:
T1: 9 N·m (0.9 kgf-m, 6.6 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

- Impreza model



(A) Self-locking nut

- Crosstrek model



(A) Self-locking nut

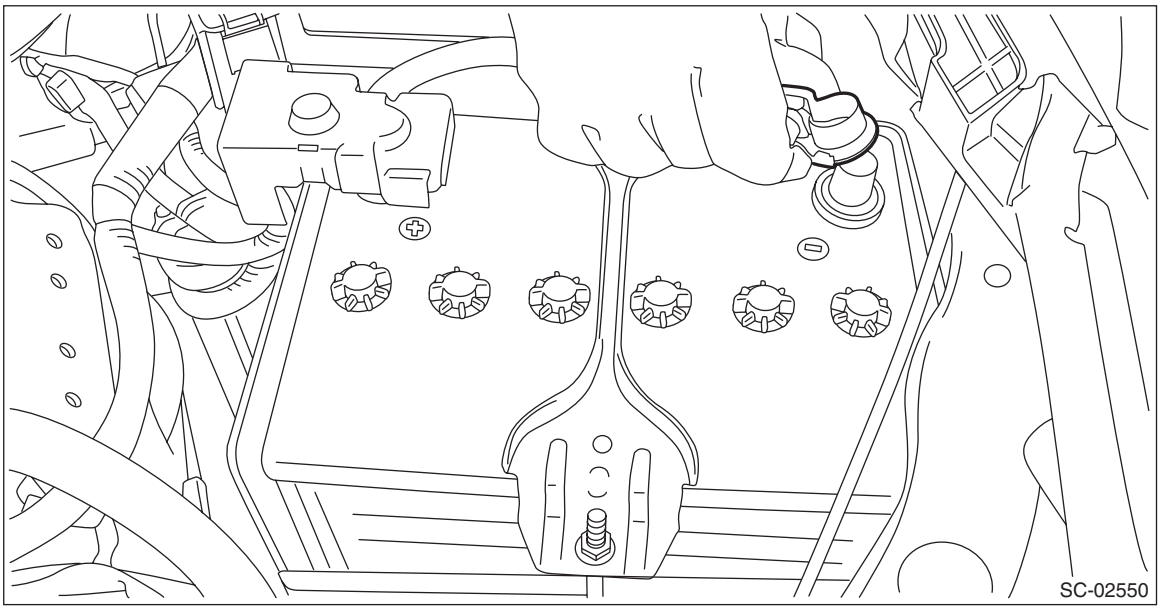
26.Fuel Tank

A: REMOVAL

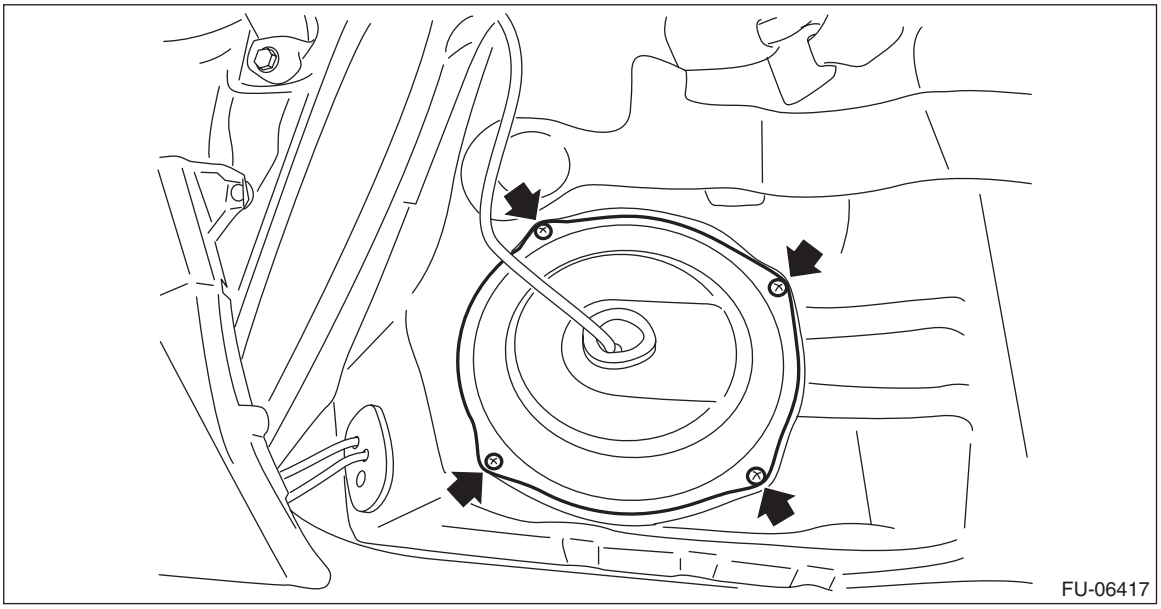
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

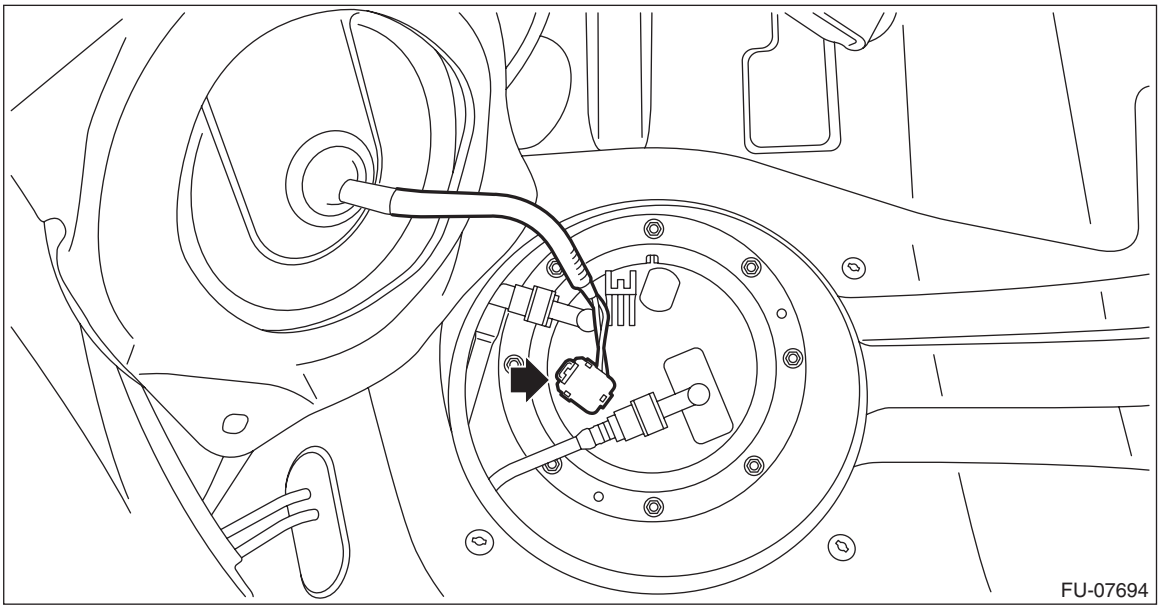
1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Drain fuel. <Ref. to FU(H4DO(w/o HEV))-109, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
3) Disconnect the ground cable from battery.



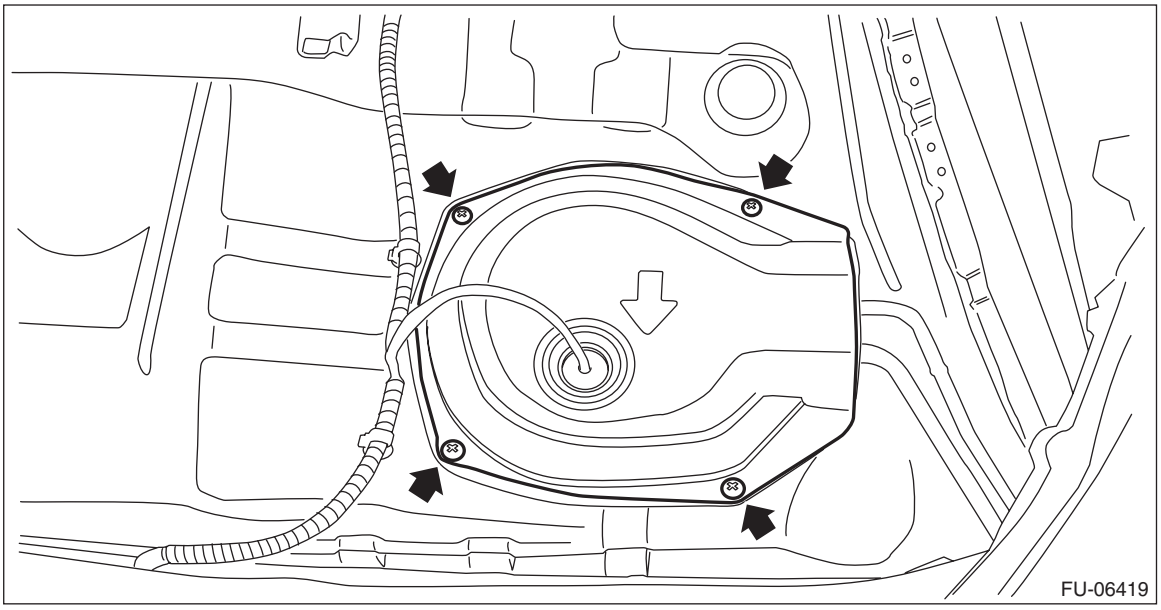
4) Remove the rear seat cushion. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the service hole cover of fuel pump.



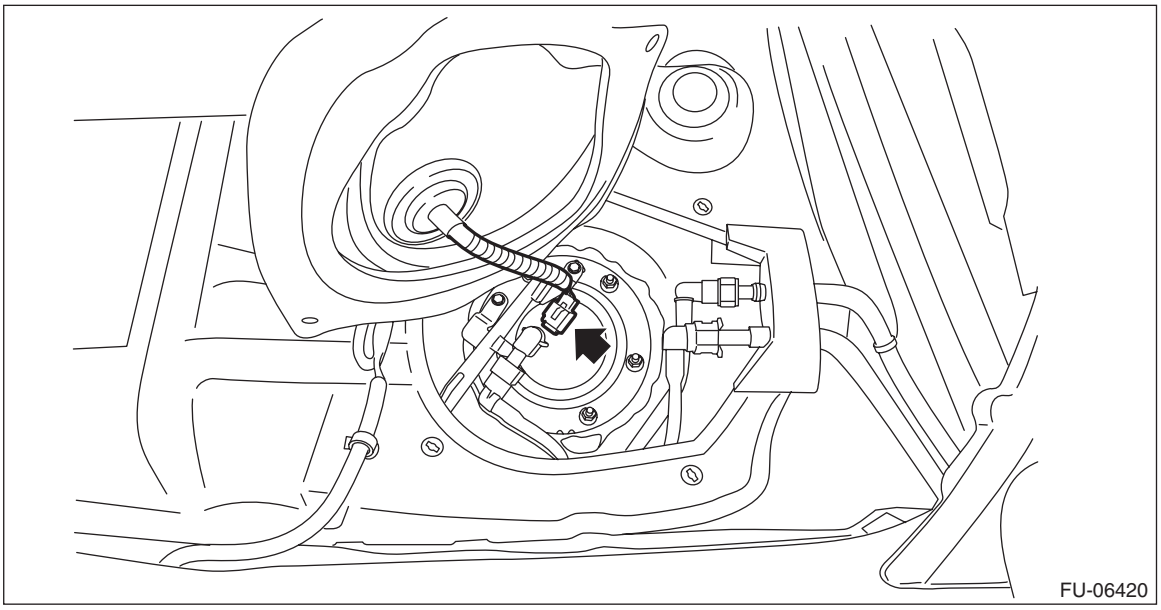
6) Disconnect connectors from the fuel pump, and move aside the service hole cover.



7) Remove the service hole cover of fuel sub level sensor.

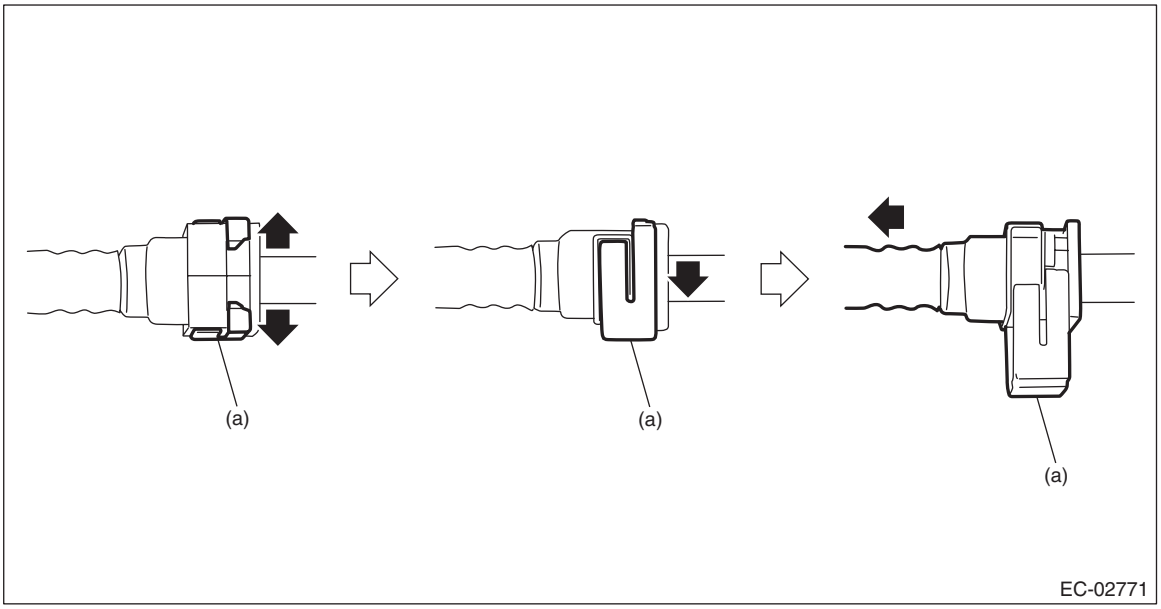


8) Disconnect connectors from the fuel sub level sensor, and move aside the service hole cover.

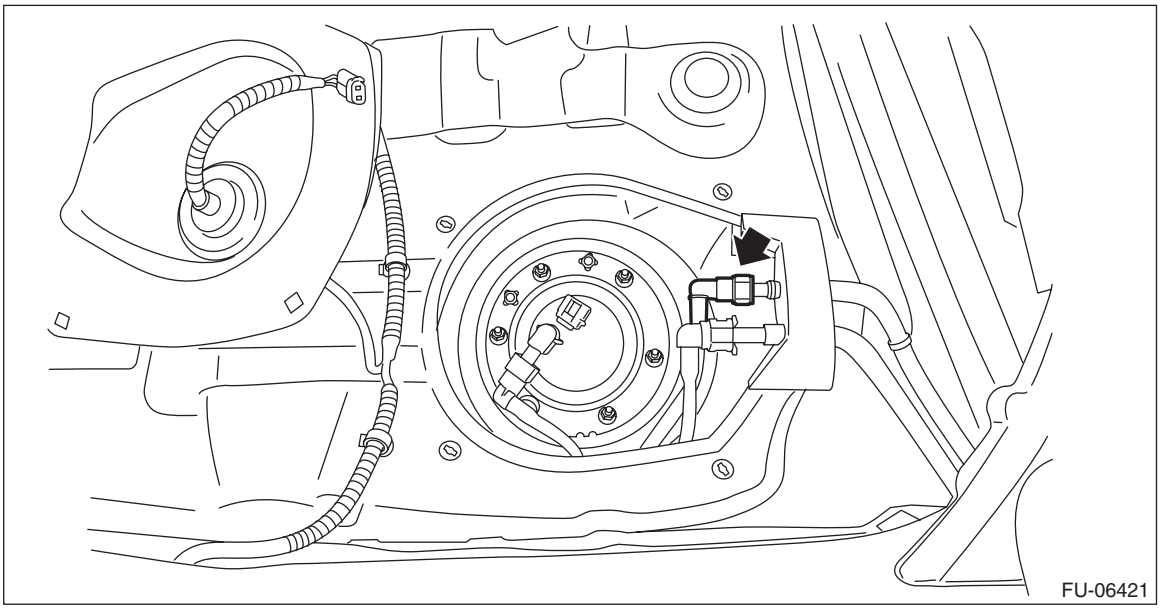


9) Disconnect the quick connector on the fuel delivery tube.

NOTE:
Disconnect the quick connector as shown in the figure.

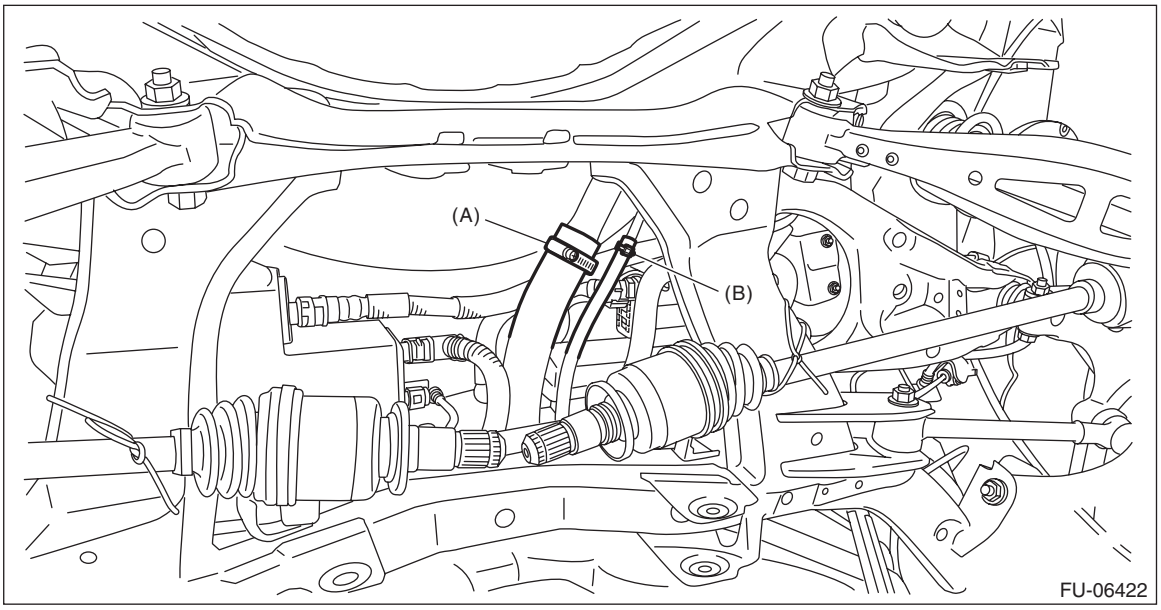


(a) Slider



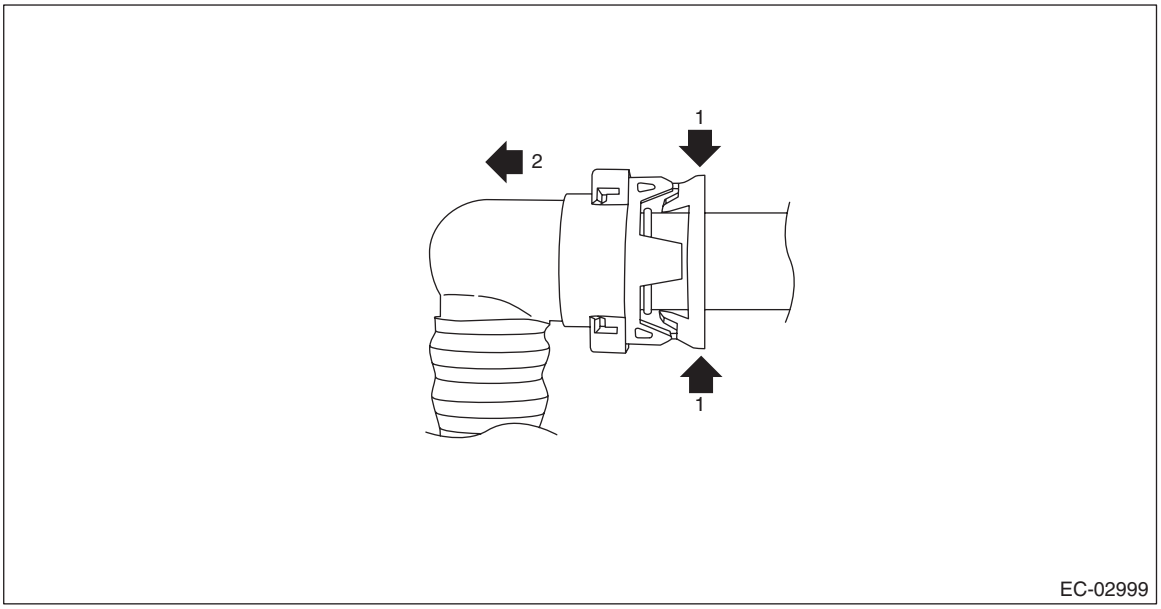
10) Lift up the vehicle.
11) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DO(w/o HEV))-22, REMOVAL, Muffler.>
12) Remove the rear differential. <Ref. to DI-23, REMOVAL, Rear Differential (T-type).> <Ref. to DI-43, REMOVAL, Rear Differential (VA-type).>

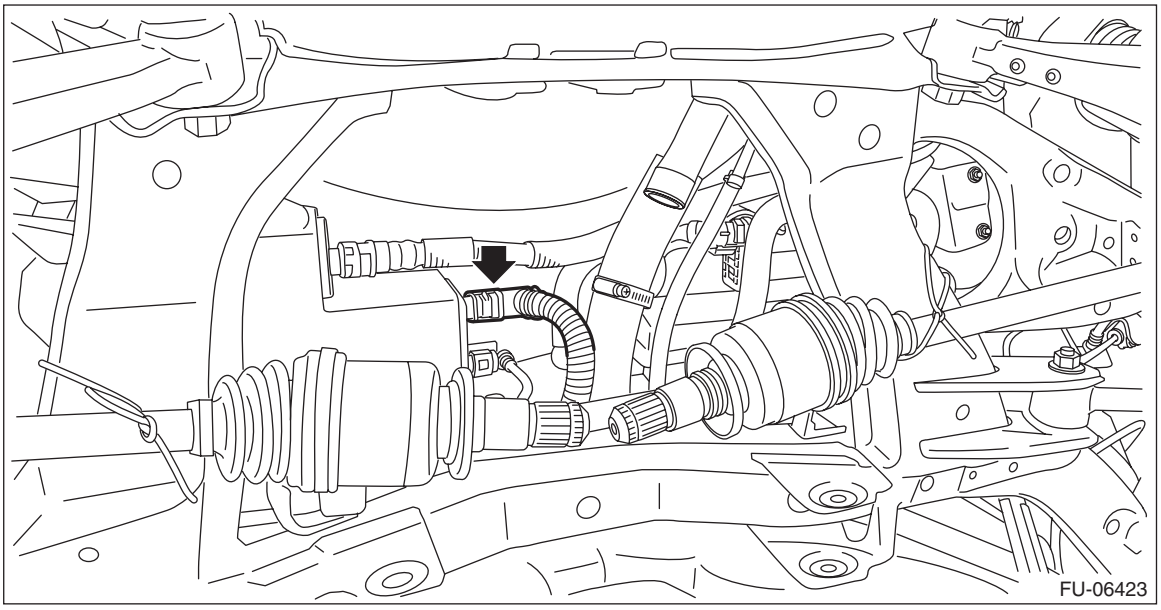
13) Disconnect the fuel filler hose (A) and evaporation hose (B) from the fuel filler pipe assembly.



14) Disconnect the vent tube from canister.

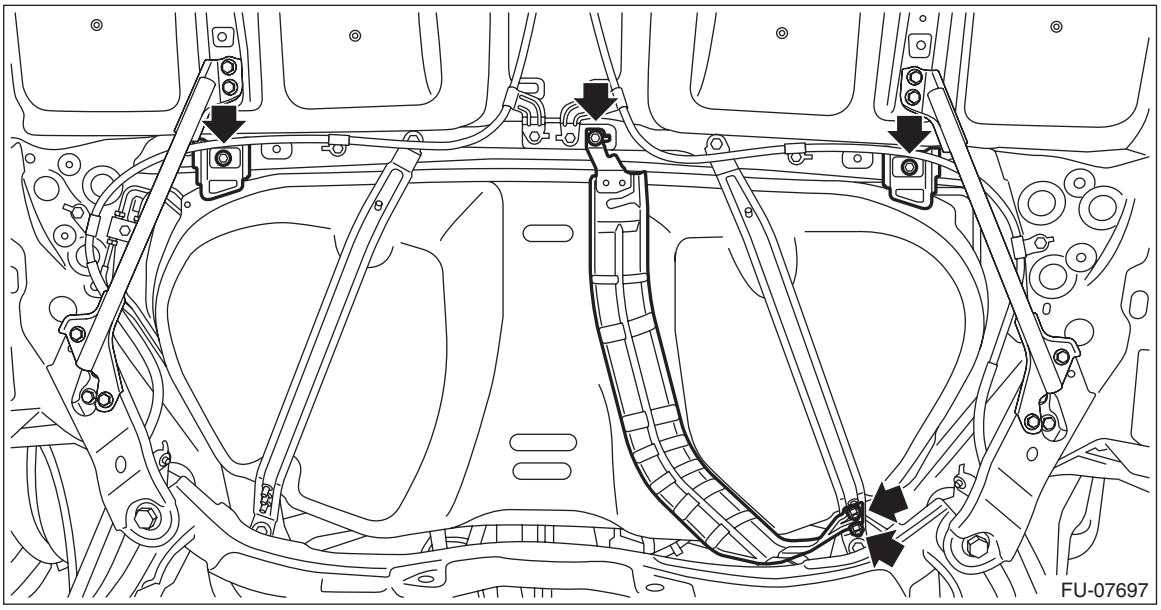
NOTE:
Disconnect the quick connector as shown in the figure.



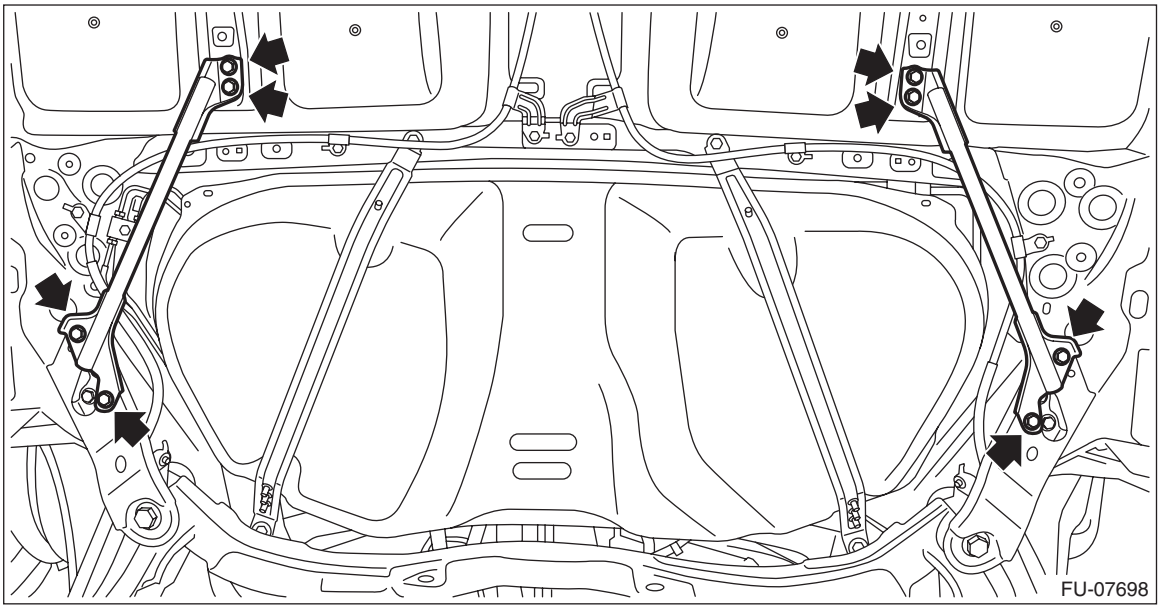


15) Remove the fuel tank protector. <Ref. to FU(H4DO(w/o HEV))-114, REMOVAL, Fuel Tank Protector.>

16) Remove the heat shield cover and stopper.

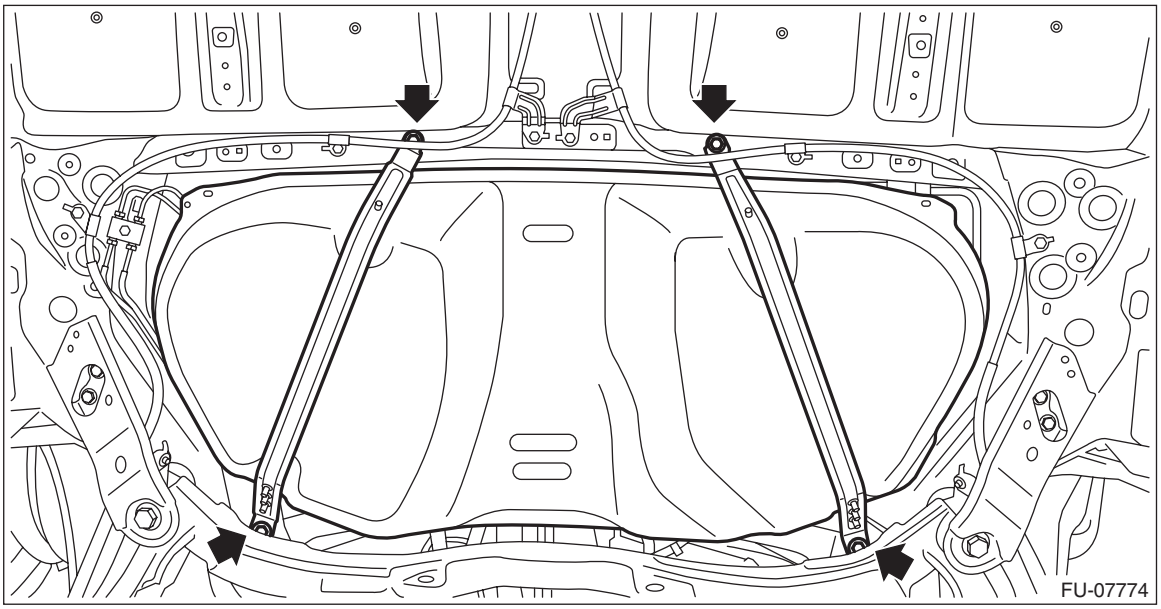


17) Remove the stay - rear frame COMPL. (Crosstrek model)



18) Support the fuel tank with a transmission jack, remove the bolts from the fuel tank band, and remove the fuel tank from the vehicle.

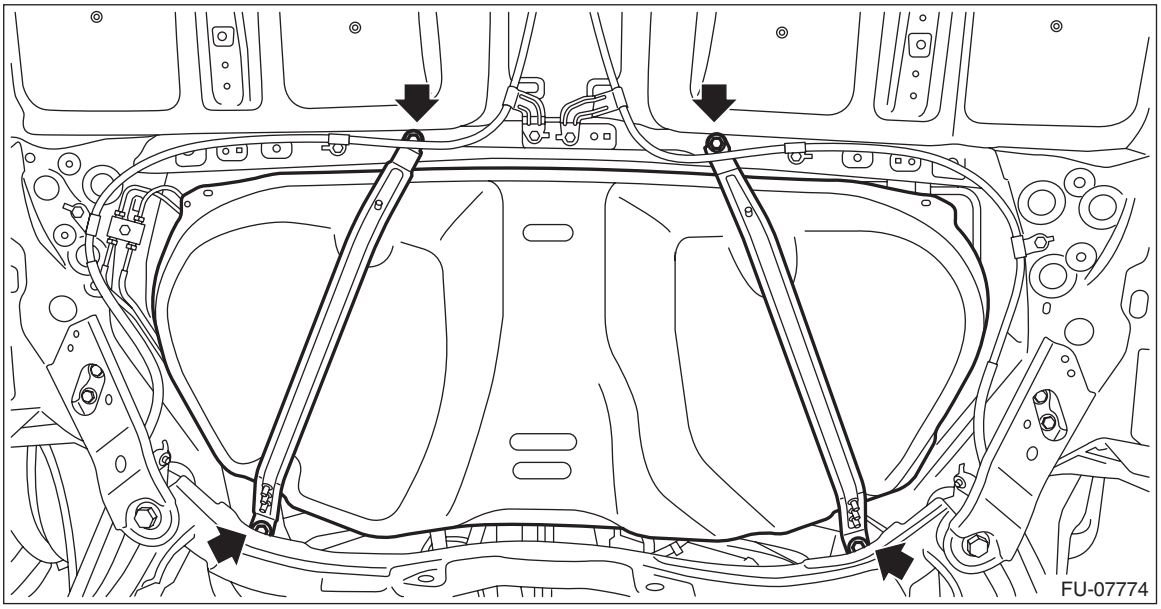
WARNING:
- **A helper is required to perform this work.**
- **Fuel may remain in the fuel tank. This will cause the left and right sides to be unbalanced. Be careful not to drop the fuel tank.**



B: INSTALLATION

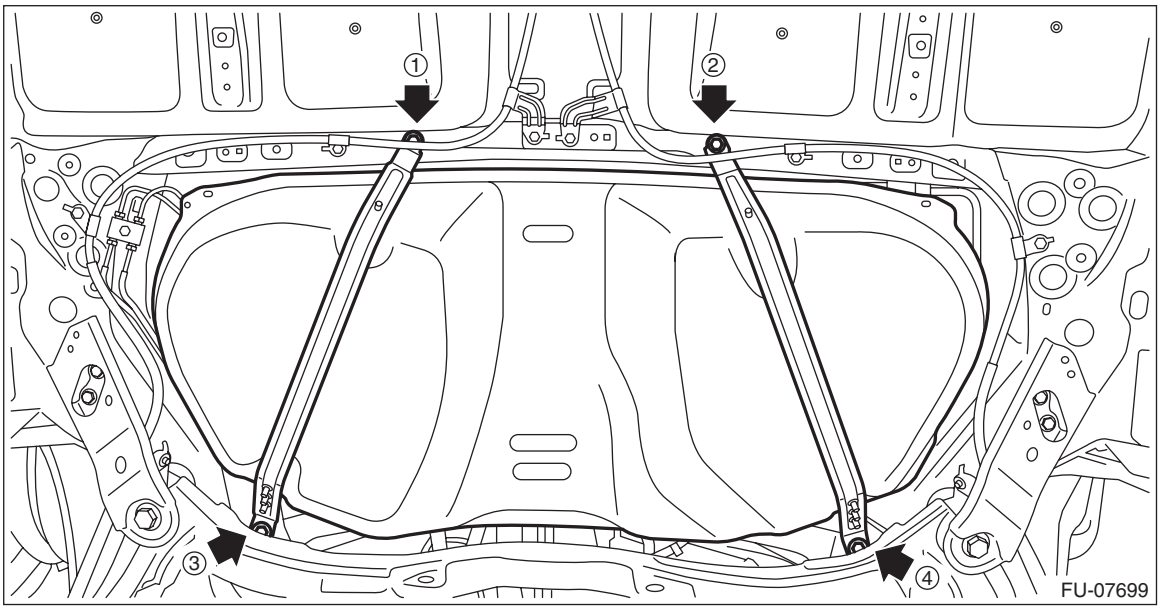
1) Support the fuel tank with a transmission jack, set the fuel tank in place, and temporarily tighten the bolts of the fuel tank band.

WARNING:
A helper is required to perform this work.



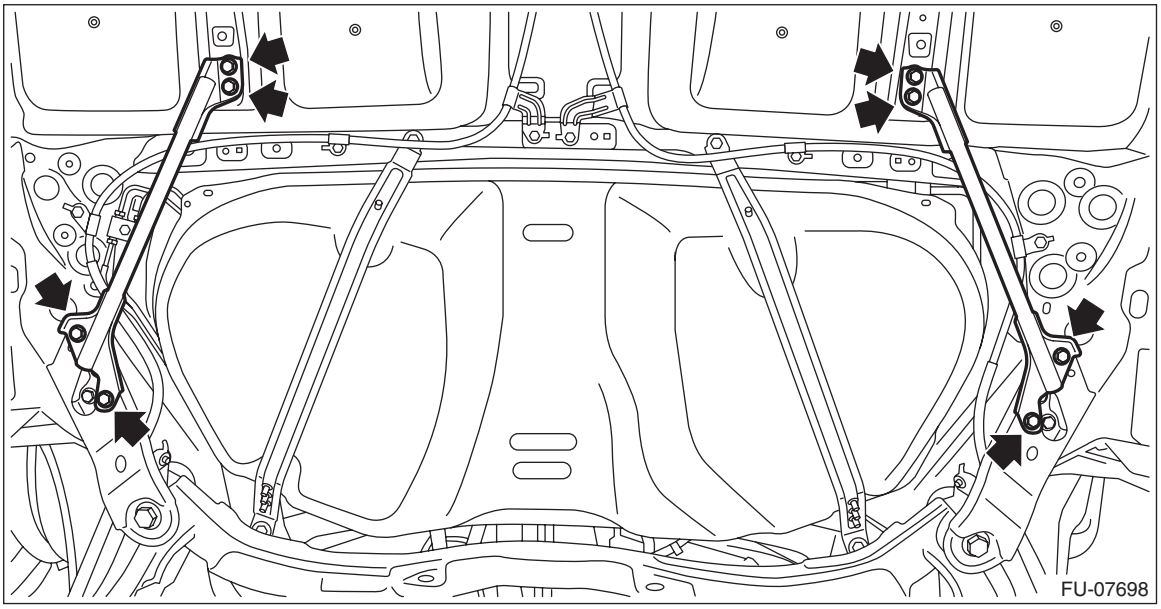
2) Tighten the bolts of the fuel tank band in the order shown in the figure.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



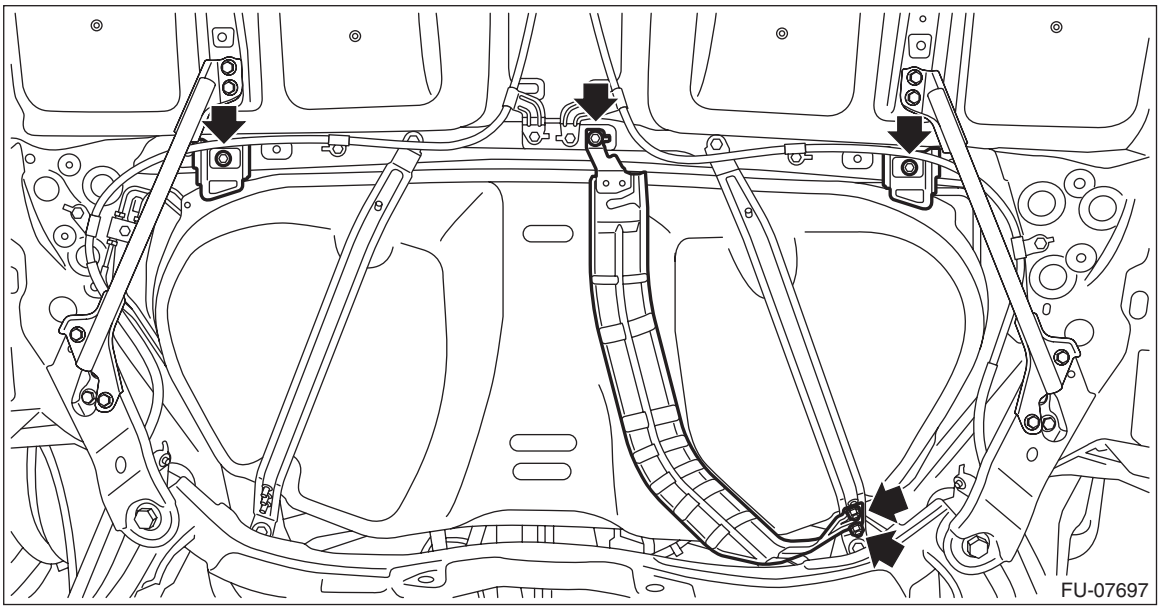
3) Install the stay - rear frame COMPL. (Crosstrek model)

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



4) Install the heat shield cover and stopper.

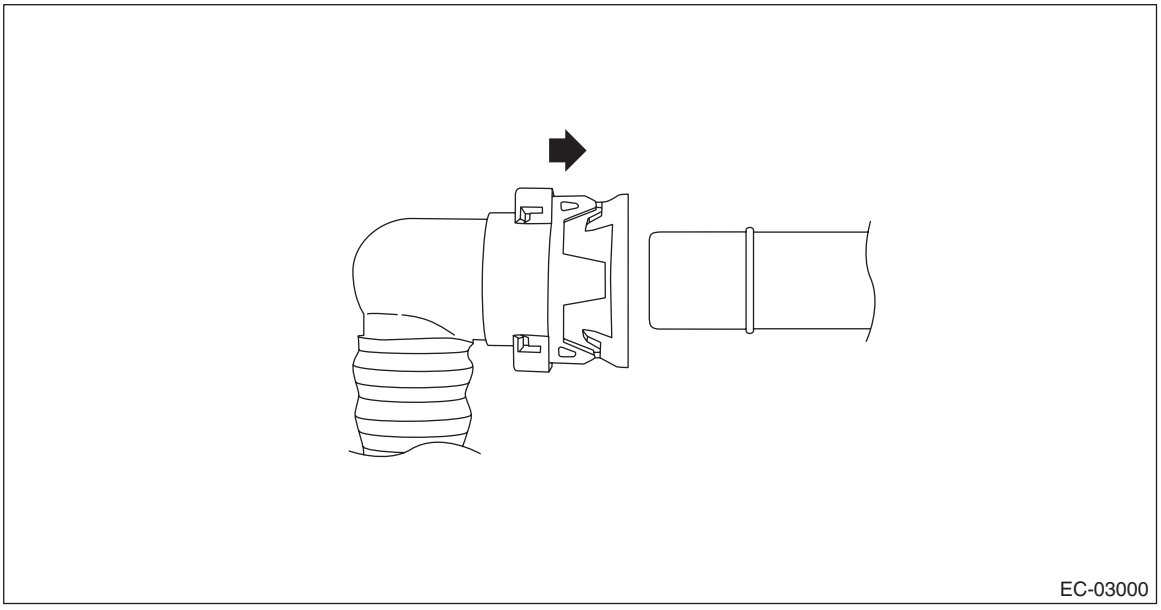
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

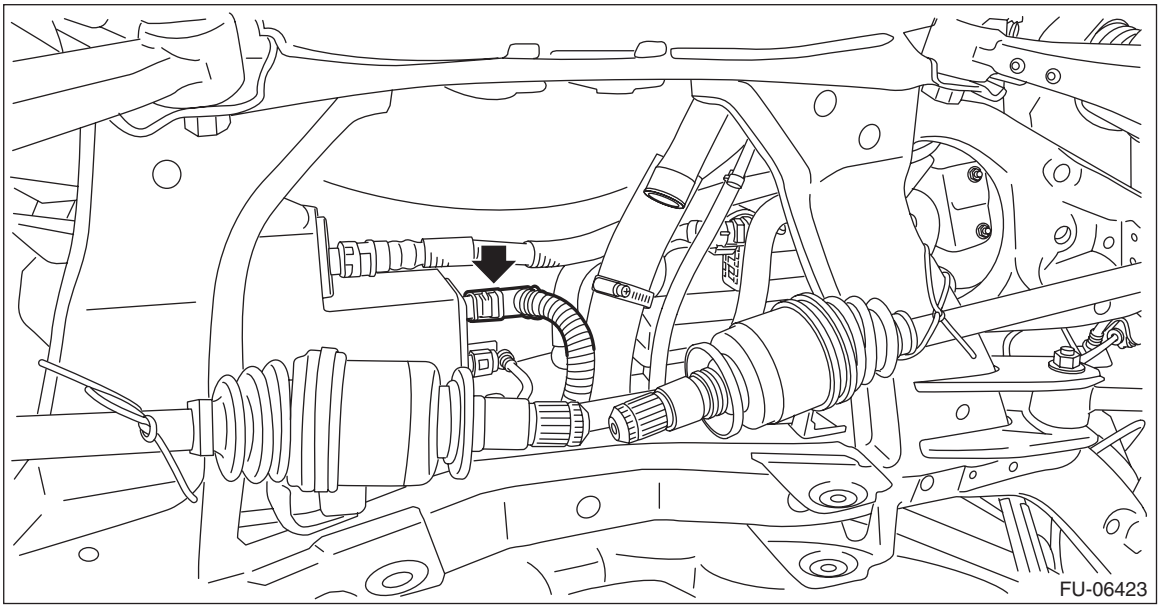


5) Install the fuel tank protector. <Ref. to FU(H4DO(w/o HEV))-115, INSTALLATION, Fuel Tank Protector.>
6) Connect the vent tube to the canister.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• Make sure that the quick connector is securely connected.

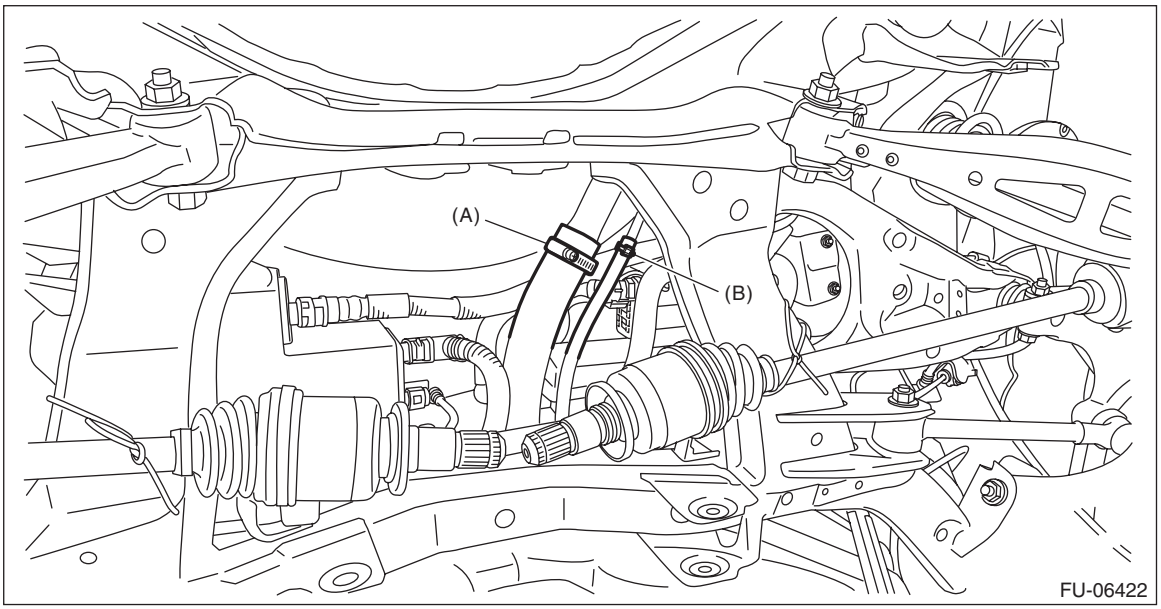
NOTE:
Connect the quick connector as shown in the figure.

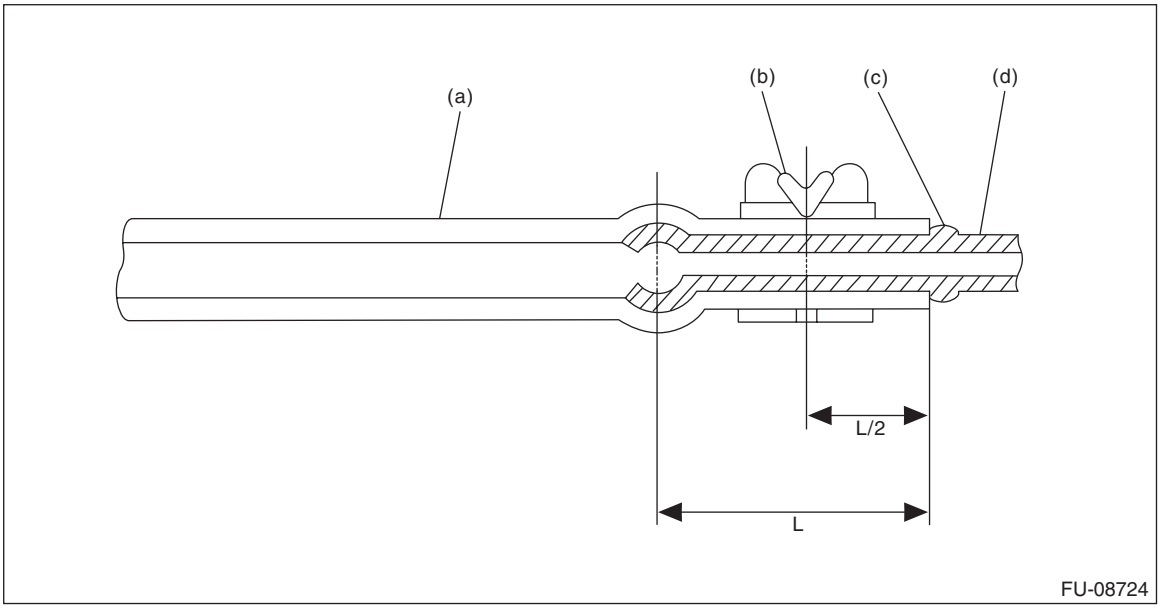

EC-03000


FU-06423

7) Securely insert the fuel filler hose (A) and evaporation hose (B) until the hose end contacts the spool, then attach the clamp or clip as shown in the figure.

Tightening torque:
2.5 N·m (0.3 kgf-m, 1.8 ft-lb)





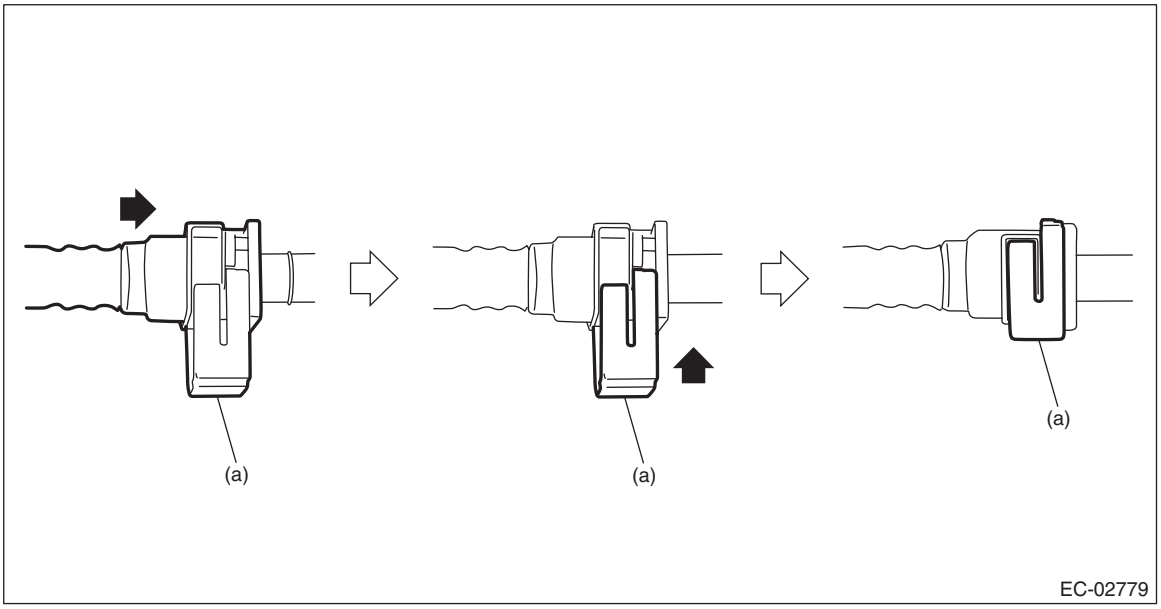
(a) Hose
(b) Clamp or clip
(c) Spool or bump
(d) Pipe

8) Install the rear differential. <Ref. to DI-25, INSTALLATION, Rear Differential (T-type).> <Ref. to DI-43, INSTALLATION, Rear Differential (VA-type).>
9) Install the rear exhaust pipe and muffler. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DO(w/o HEV))-25, INSTALLATION, Muffler.>

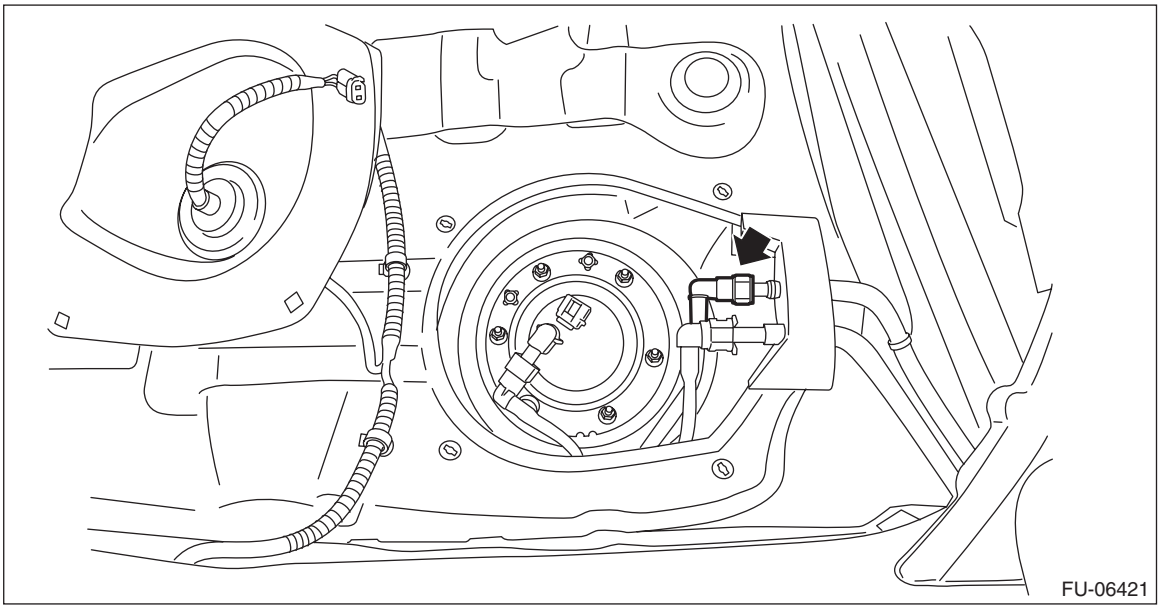
10) Connect the quick connector of the fuel delivery tube.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

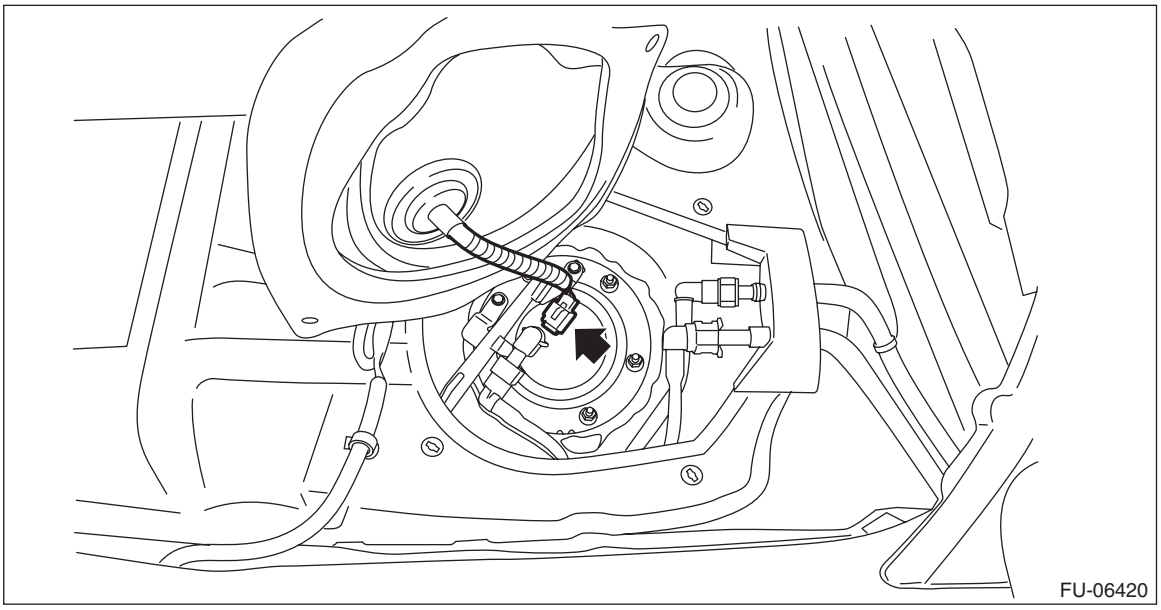
NOTE:
Connect the quick connector as shown in the figure.



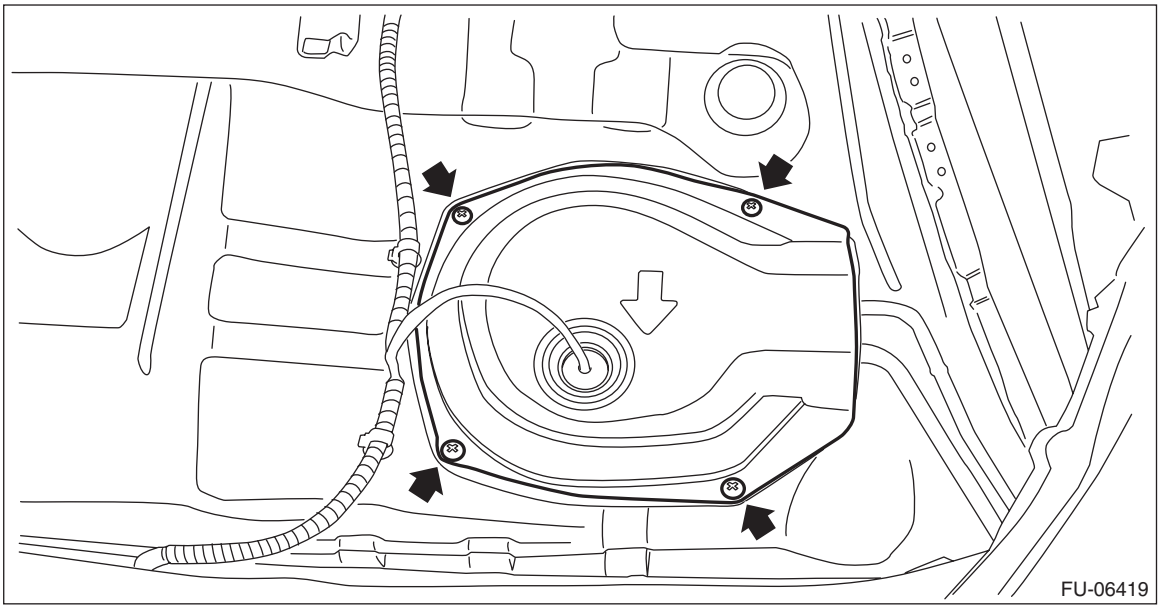
(a) Slider



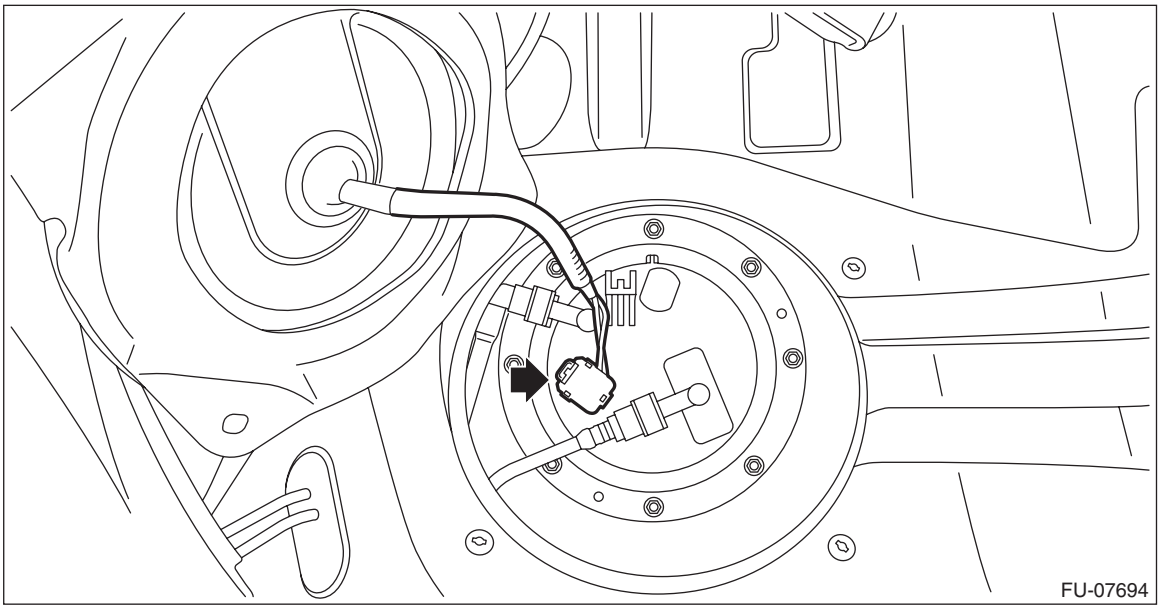
11) Connect the connector to the fuel sub level sensor.



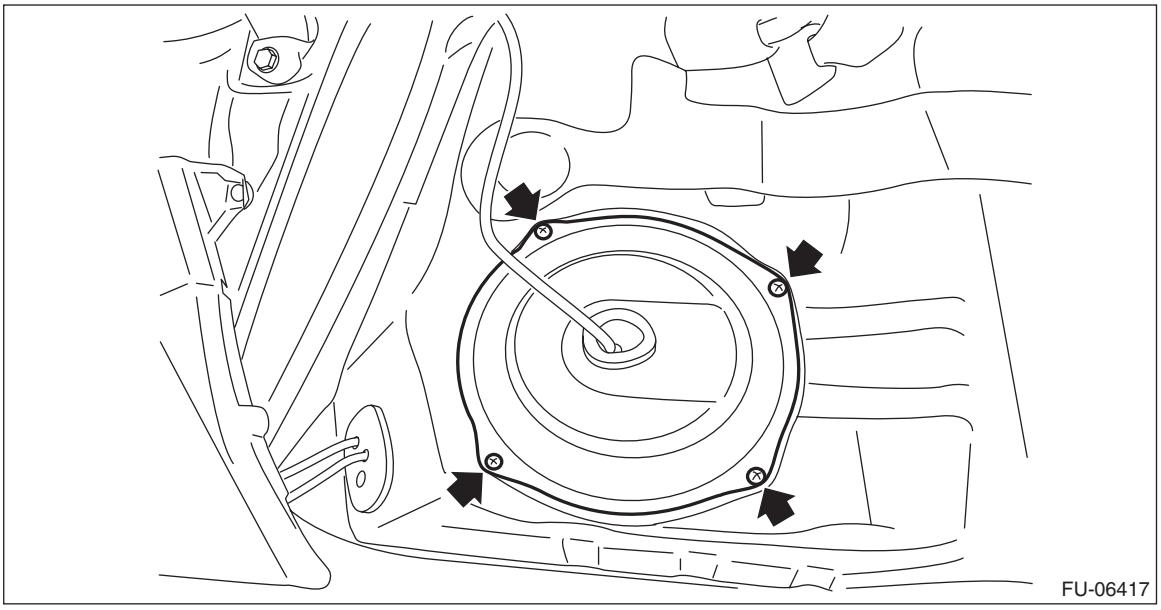
12) Install the service hole cover of fuel sub level sensor.



13) Connect the connector to the fuel pump.

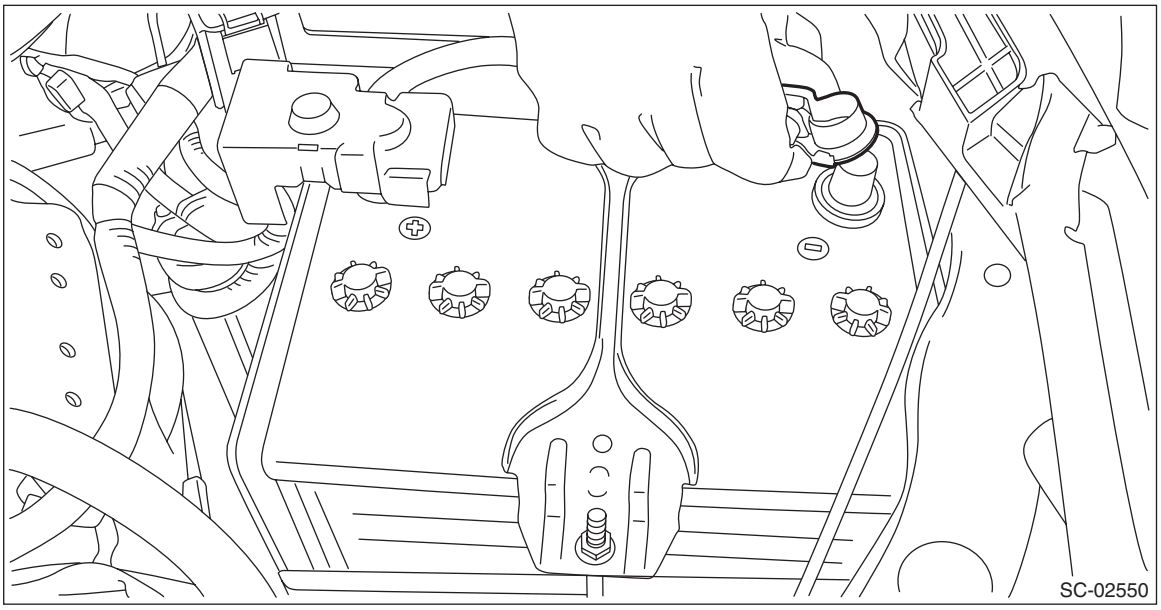


14) Install the service hole cover of fuel pump.



15) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>

16) Connect the battery ground terminal.



C: INSPECTION

1) Check that the fuel tank and fuel pipe have no deformation, cracks and other damages.
2) Check that the fuel hose and tube have no cracks, damage or loose part.

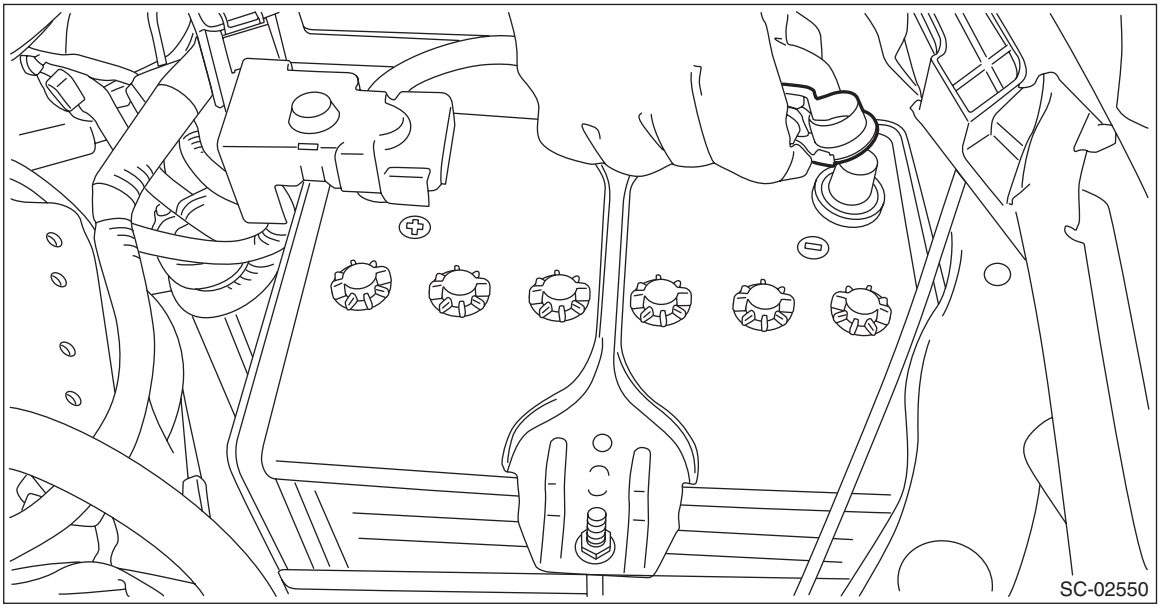
27.Fuel Filler Pipe

A: REMOVAL

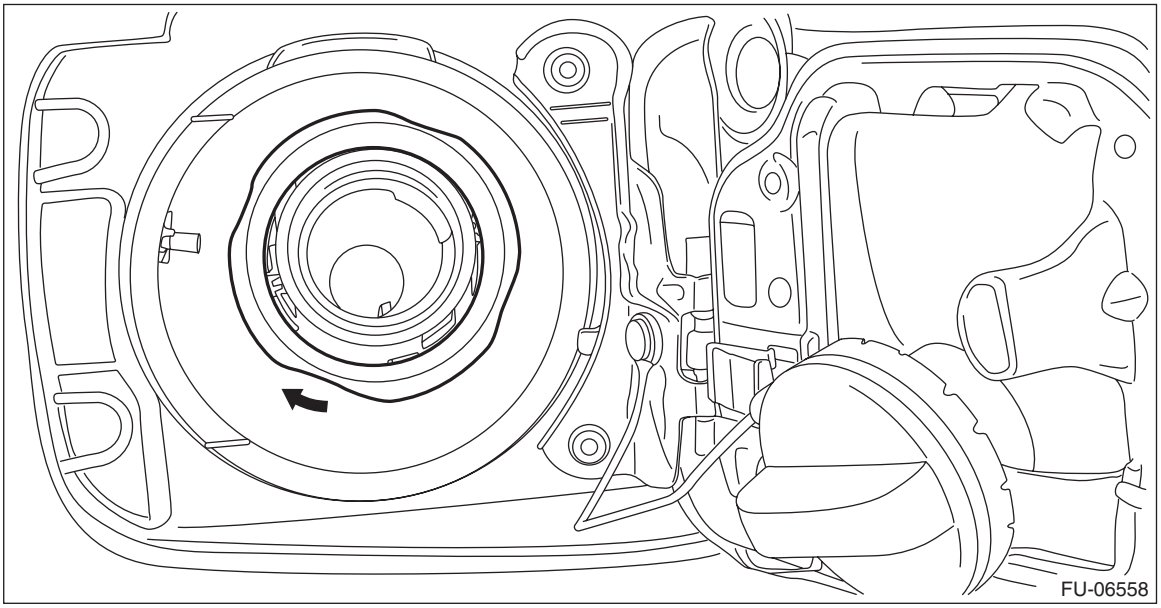
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
Be careful not to spill fuel.

1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Drain fuel. <Ref. to FU(H4DO(w/o HEV))-109, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
3) Disconnect the ground cable from battery.

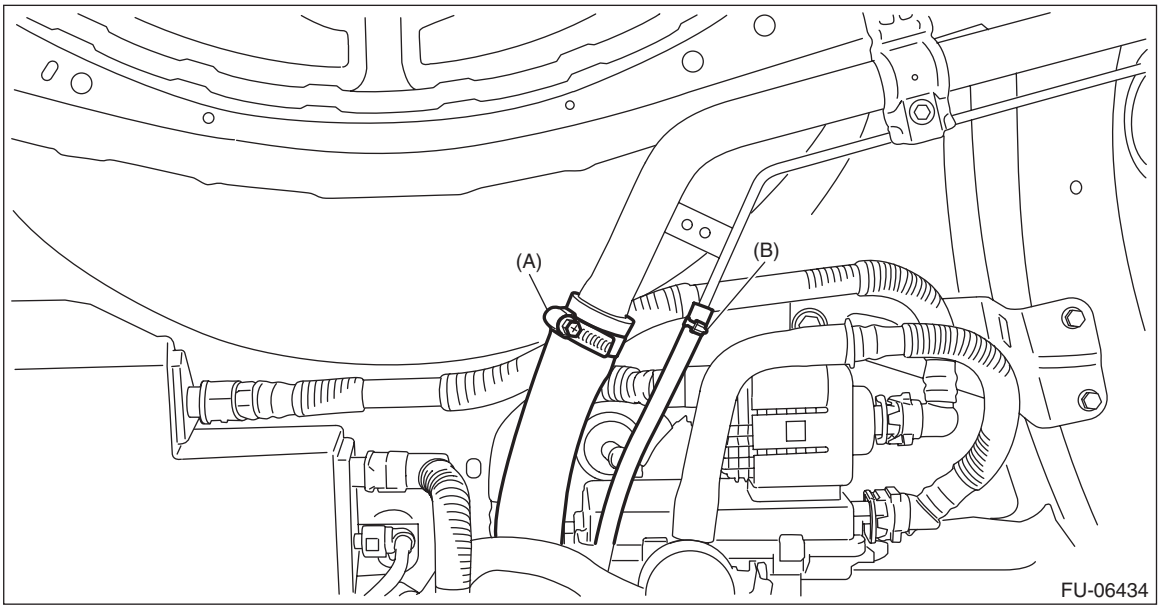


4) Open the fuel filler lid and remove the fuel filler cap.
5) Turn the fuel filler pipe protector in the direction of the arrow to unlock and remove it.

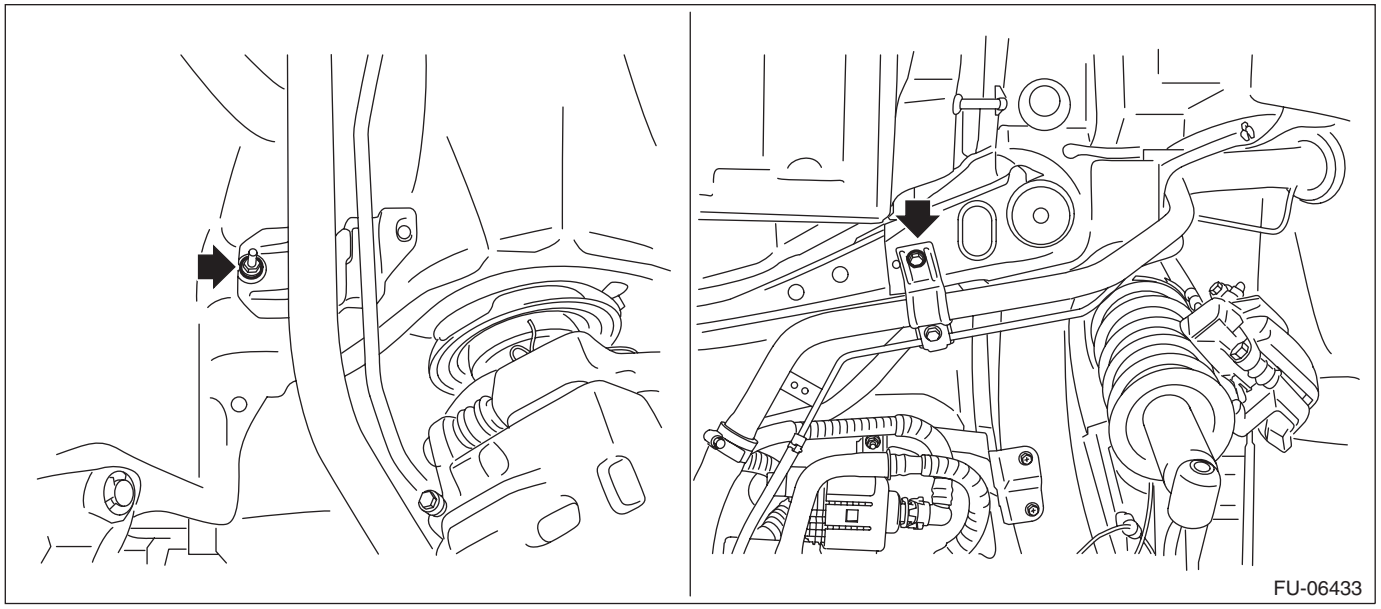


6) Remove the rear sub frame assembly. <Ref. to RS-10, REMOVAL, Rear Sub Frame.>
7) Remove the rear mud guard RH. <Ref. to EI-32, REMOVAL, Mud Guard.>

8) Disconnect the fuel filler hose (A) and evaporation hose (B) from the fuel filler pipe assembly.



9) Remove the bolts and nuts which secure the fuel filler pipe assembly to the vehicle.

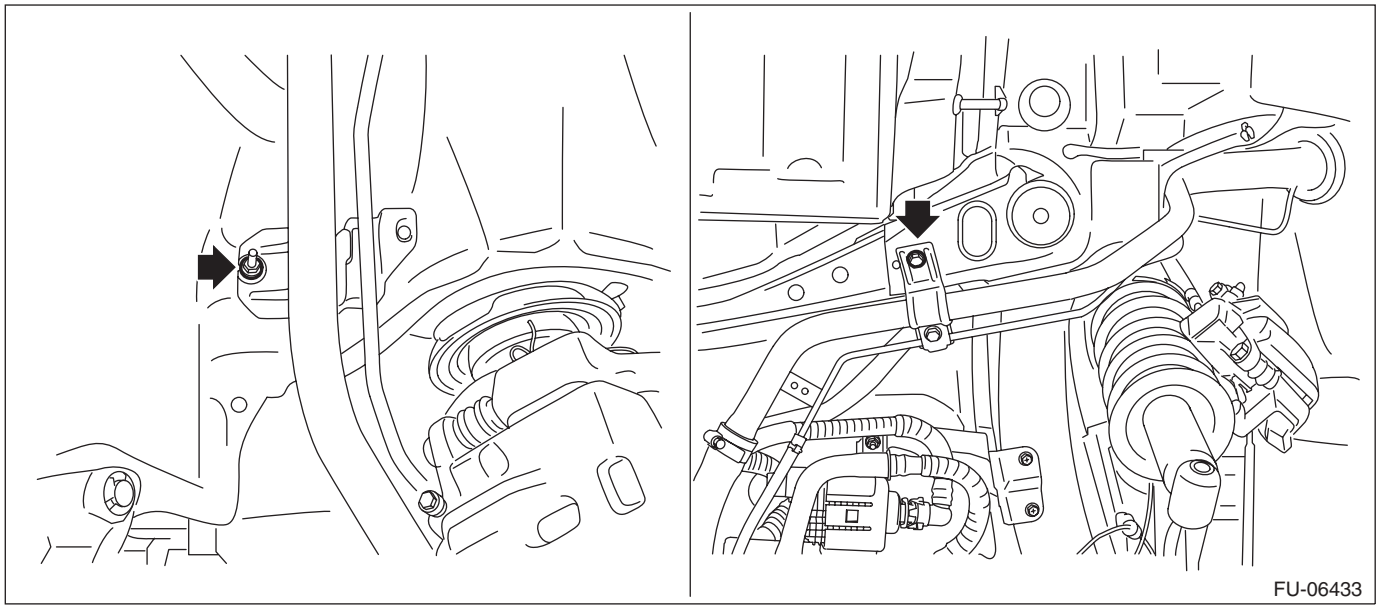


10) Remove the fuel filler pipe assembly from the underside of the vehicle.

B: INSTALLATION

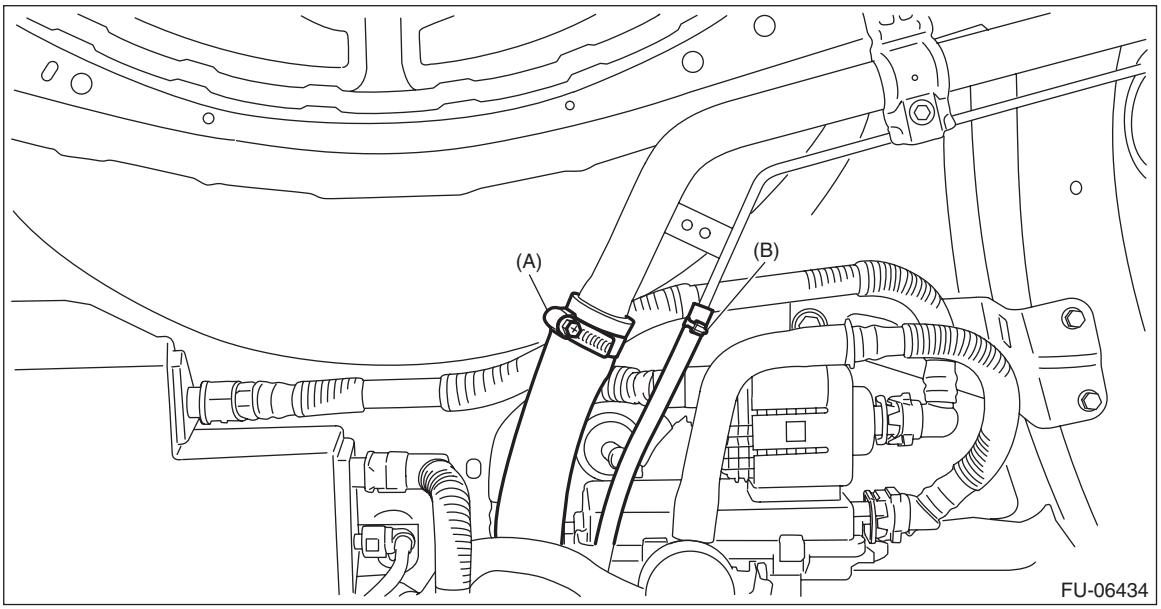
1) Open the fuel filler lid.
2) Insert the fuel filler pipe assembly into the rubber saucer from inside of the rear fender.
3) Install the fuel filler pipe assembly to the vehicle.

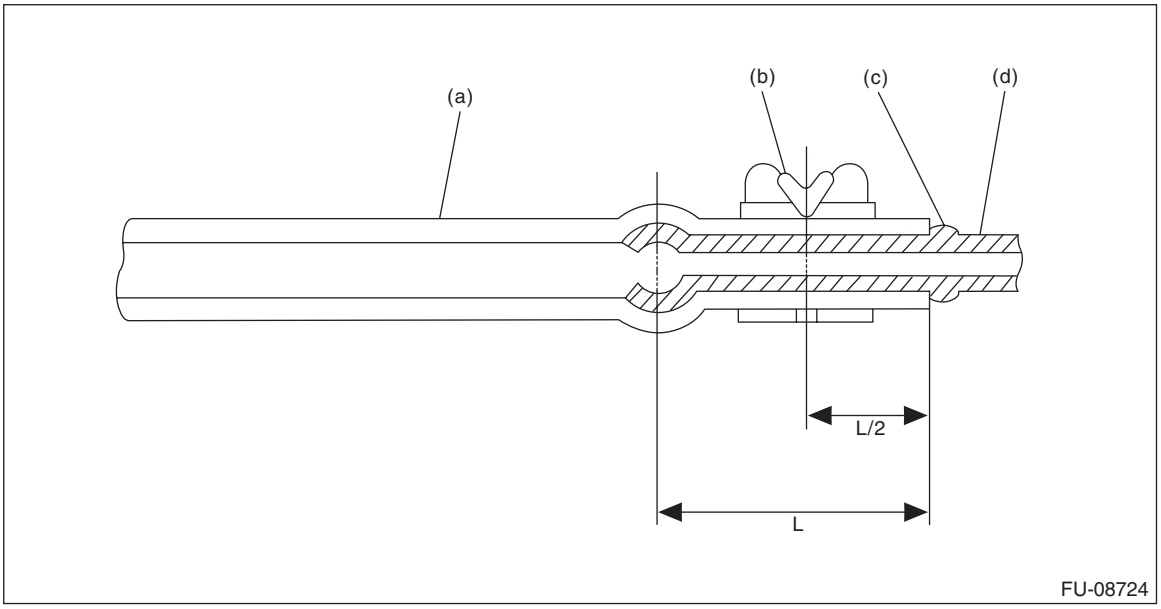
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



4) Securely insert the fuel filler hose (A) and evaporation hose (B) until the hose end contacts the spool, then attach the clamp or clip as shown in the figure.

Tightening torque:
2.5 N·m (0.3 kgf-m, 1.8 ft-lb)

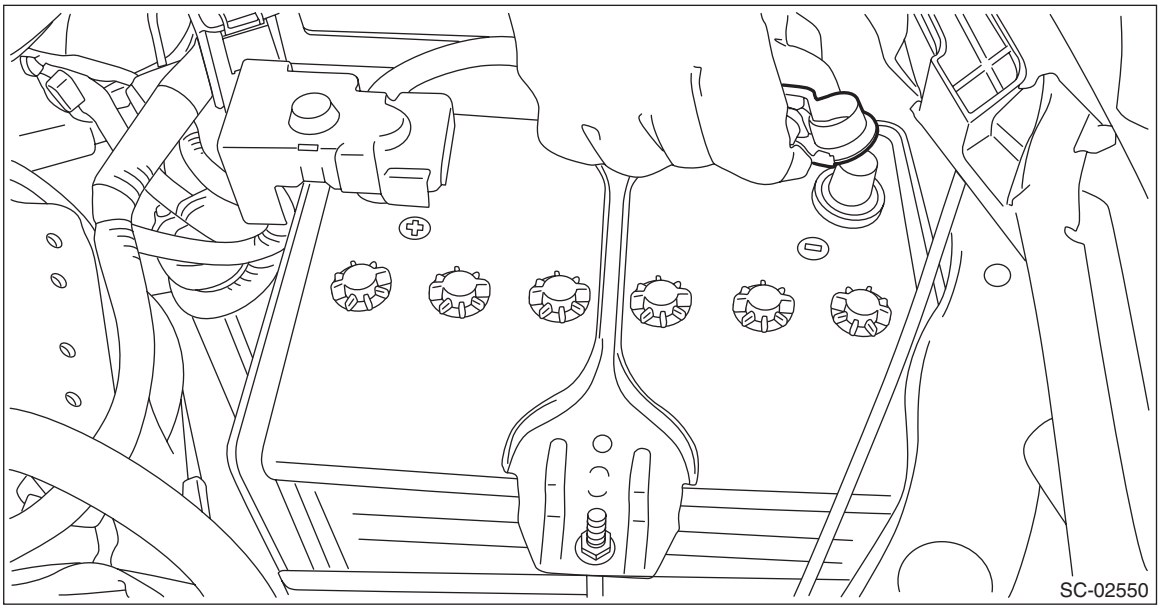




(a) Hose
(b) Clamp or clip
(c) Spool or bump
(d) Pipe

5) Install the rear mud guard RH. <Ref. to EI-32, INSTALLATION, Mud Guard.>
6) Install the rear sub frame assembly. <Ref. to RS-16, INSTALLATION, Rear Sub Frame.>

7) Connect the battery ground terminal.



8) Inspect the wheel alignment and adjust if necessary.
9) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>
10) Adjust the steering angle sensor. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

C: INSPECTION

1) Check that the fuel filler pipe assembly has no deformation, cracks or other damages.
2) Check that the fuel hose has no cracks, damage or loose part.

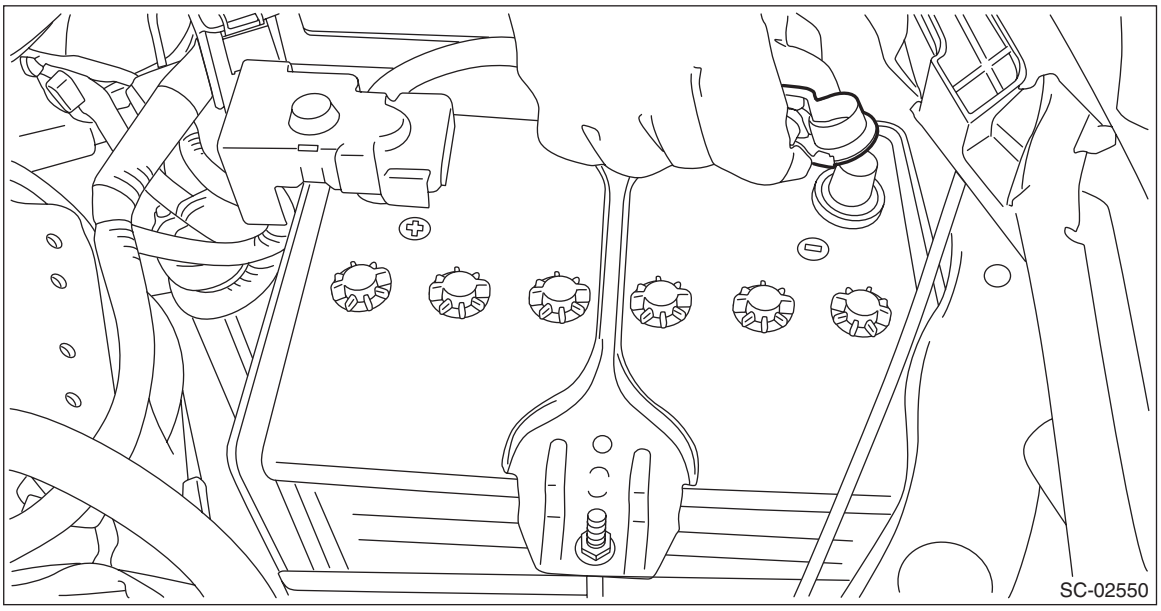
28.Fuel Pump

A: REMOVAL

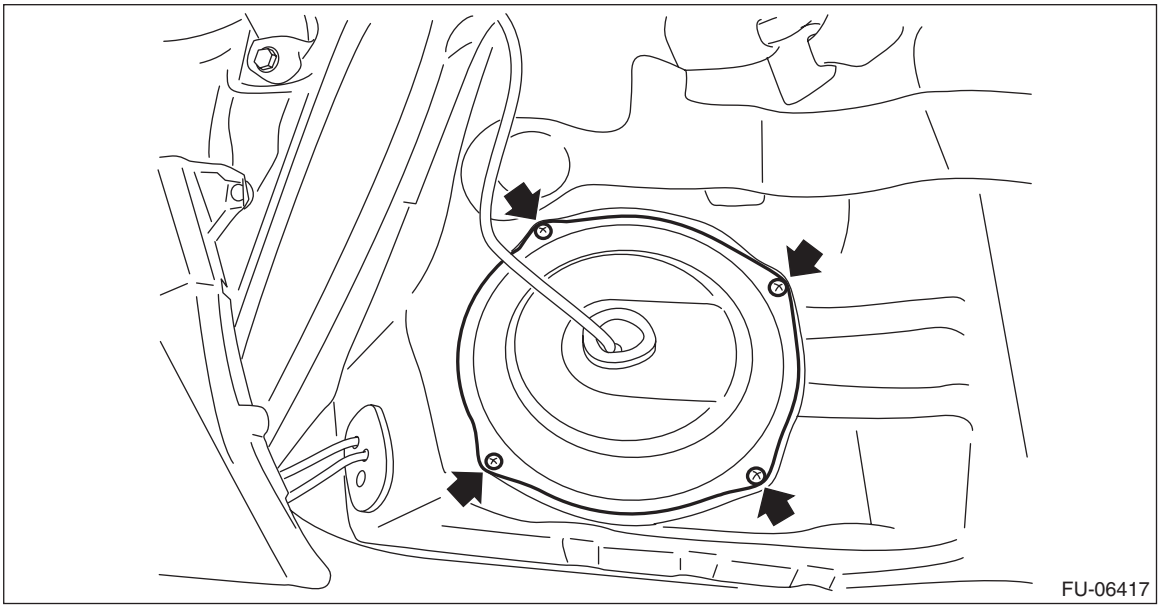
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
- **If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.**

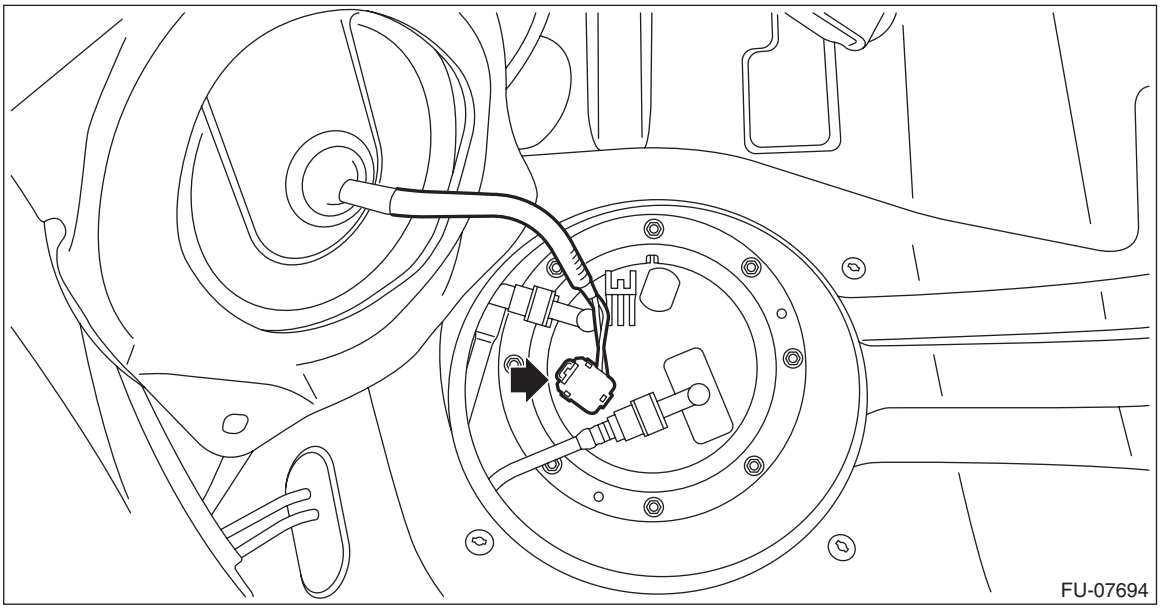
NOTE:
Fuel pump assembly consists of fuel pump, fuel filter and fuel level sensor.
1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Drain fuel. <Ref. to FU(H4DO(w/o HEV))-109, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
3) Disconnect the ground cable from battery.



4) Remove the rear seat cushion. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the service hole cover of fuel pump.

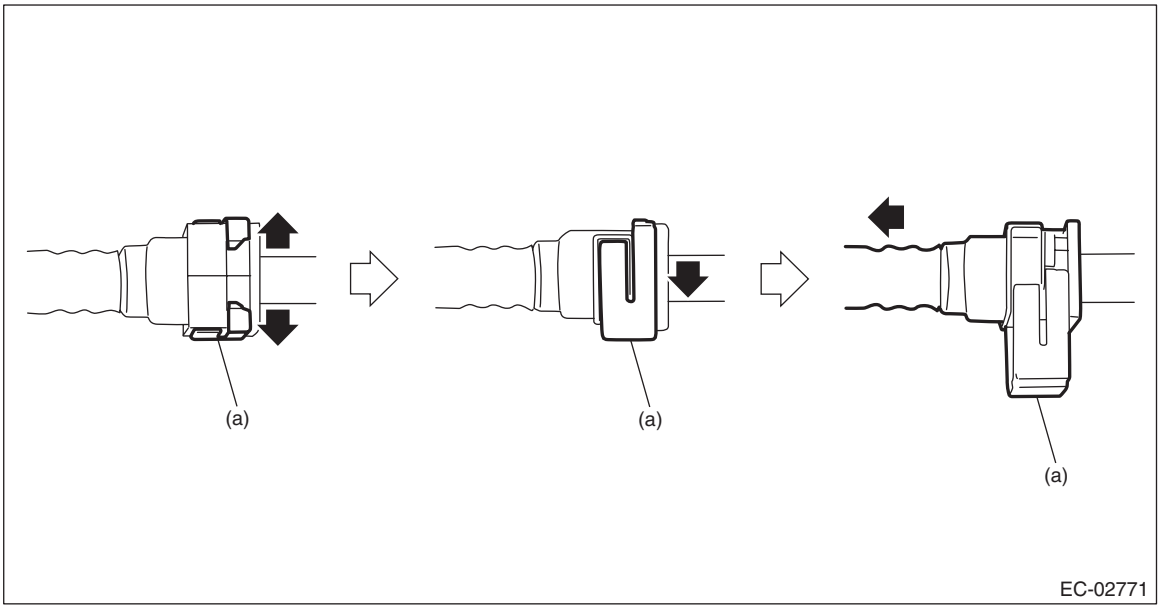


6) Disconnect connectors from the fuel pump, and move aside the service hole cover.

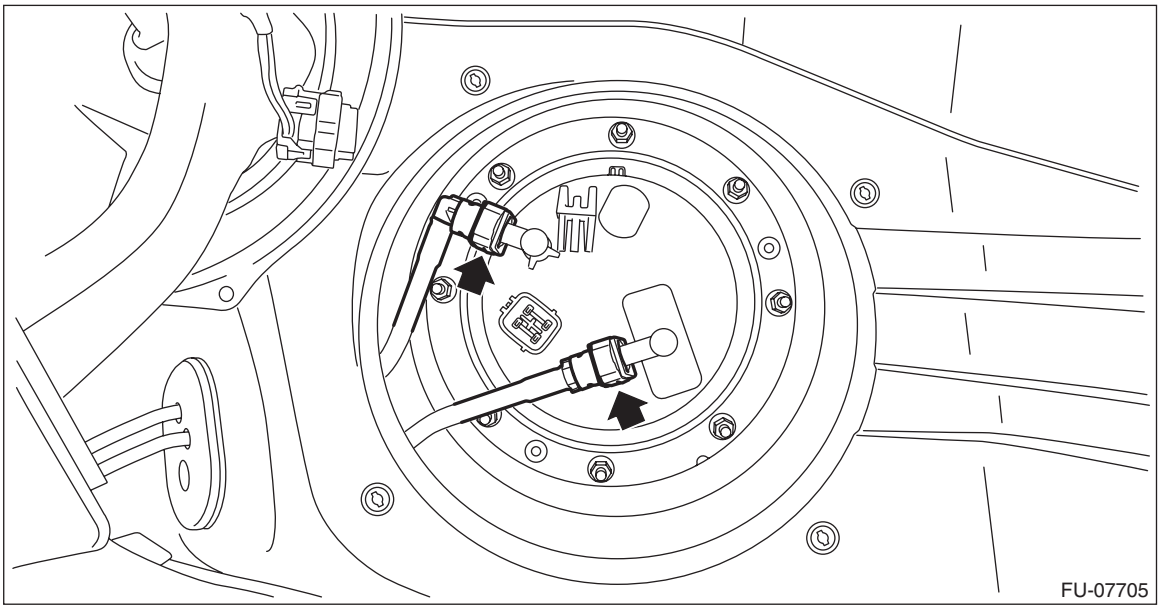


7) Disconnect the quick connector of fuel delivery tube and jet pump tube.

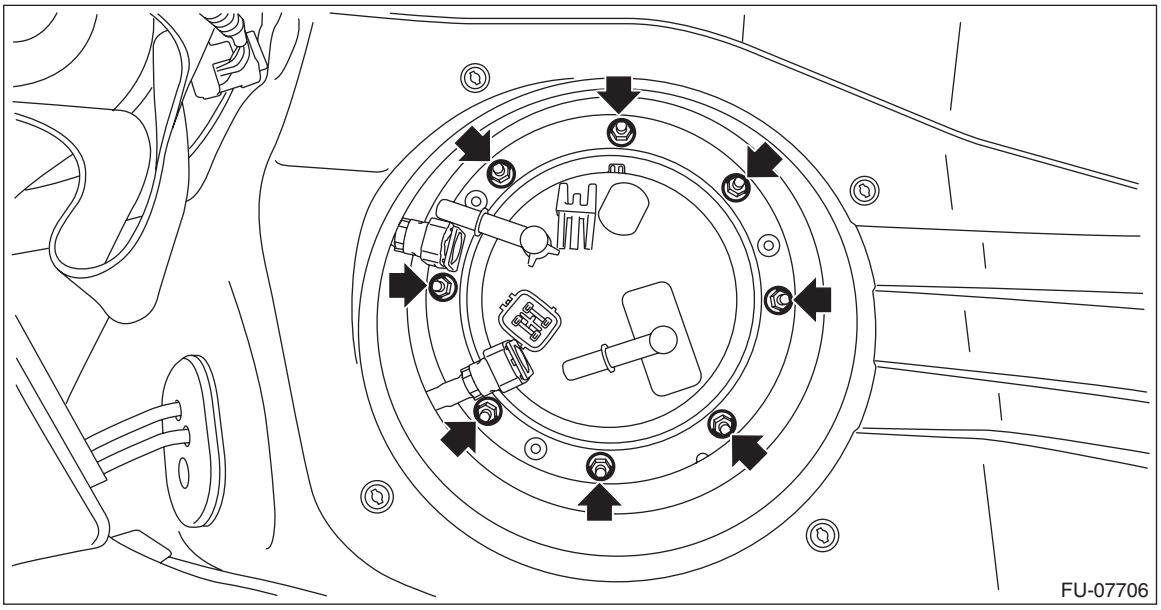
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



8) Remove the nuts which hold the fuel pump upper plate to the fuel tank.



9) Remove the fuel pump assembly from the fuel tank.

CAUTION:
Be careful not to let the arm and float of fuel level sensor contact the fuel tank.

B: INSTALLATION

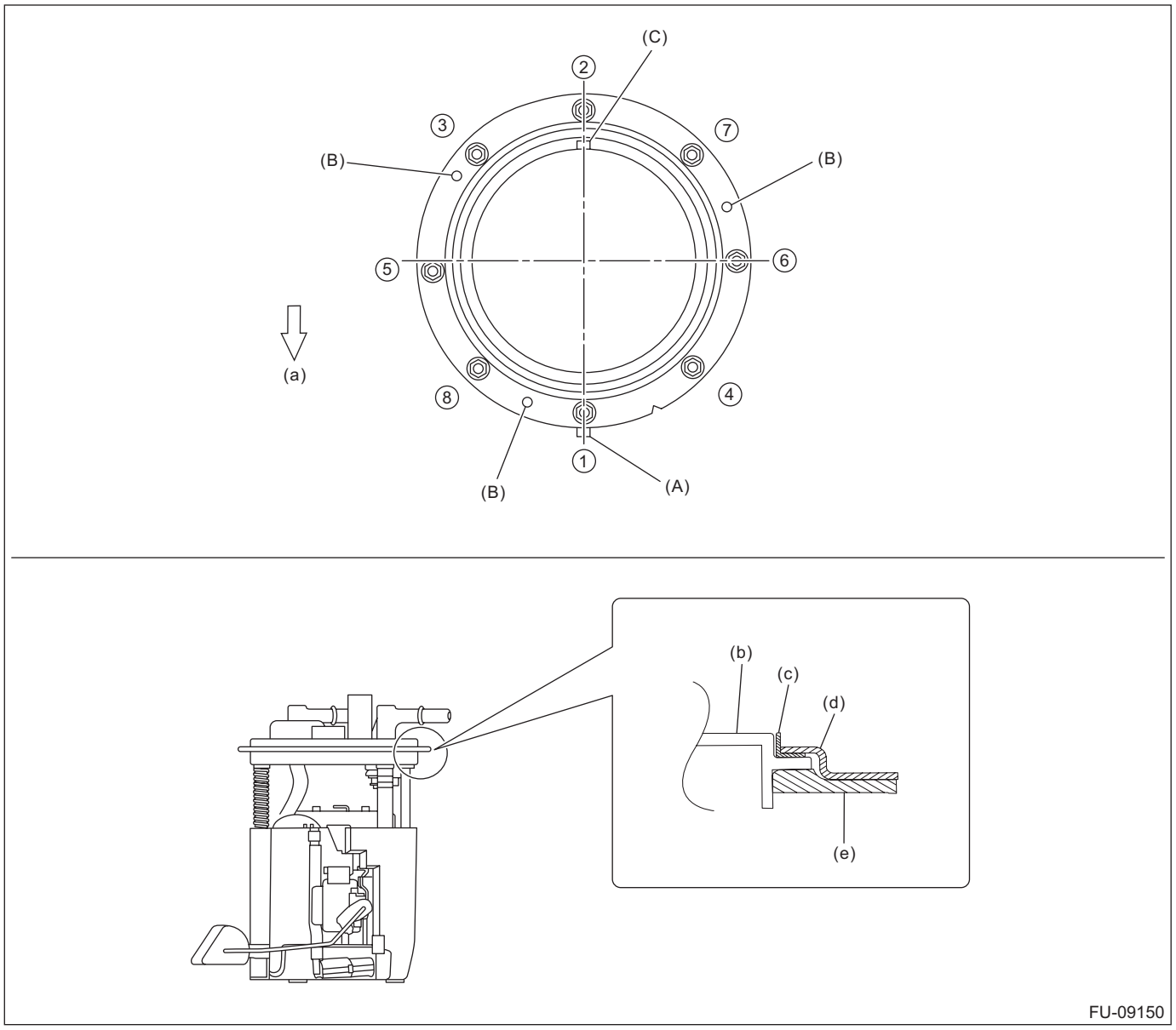
1) Install the fuel pump assembly to the fuel tank.
   (1) Make sure the sealing portion is free from fuel or foreign matter before installation.
   (2) Align the protrusion (A) of the gasket to the position shown in the figure, and install the gasket from the lower side of the fuel pump assembly.

NOTE:
Use a new gasket.

   (3) Align the protrusion (C) of fuel pump upper plate cushion with the protrusion (C) of the fuel pump assembly as shown in the figure, and install the fuel pump upper plate cushion from the upper side of the fuel pump assembly.
   (4) Align the cutout of the fuel pump upper plate with the protrusion (C), and install the fuel pump upper plate from the upper side of the fuel pump assembly so that the protrusions (B) (3 places) of the gasket fit the holes of the fuel pump upper plate.
   (5) Install the fuel pump assembly to the fuel tank in the direction shown in the figure, and tighten the nuts to the specified torque in the order as shown in the figure.

CAUTION:
Set the arm and float of the fuel level sensor while paying attention to prevent them from contacting the fuel tank. If the arm of the fuel level sensor is bent, the fuel gauge may not read correctly.

Tightening torque:
4.4 N·m (0.4 kgf-m, 3.2 ft-lb)

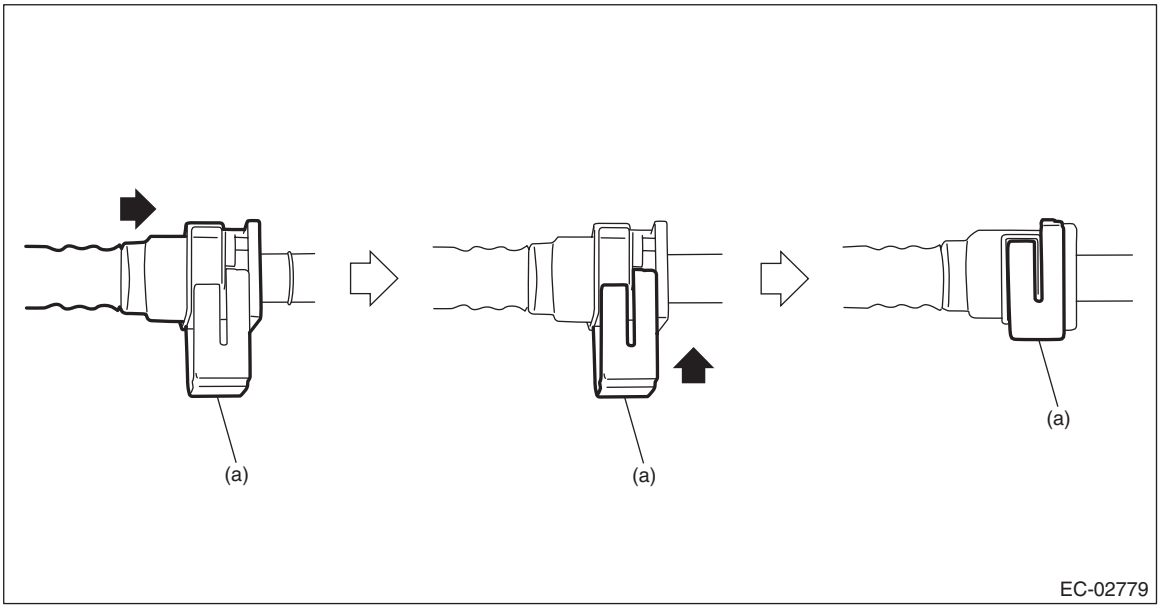


(a) Front side of vehicle
(b) Fuel pump ASSY
(c) Fuel pump upper plate cushion
(d) Fuel pump upper plate
(e) Gasket

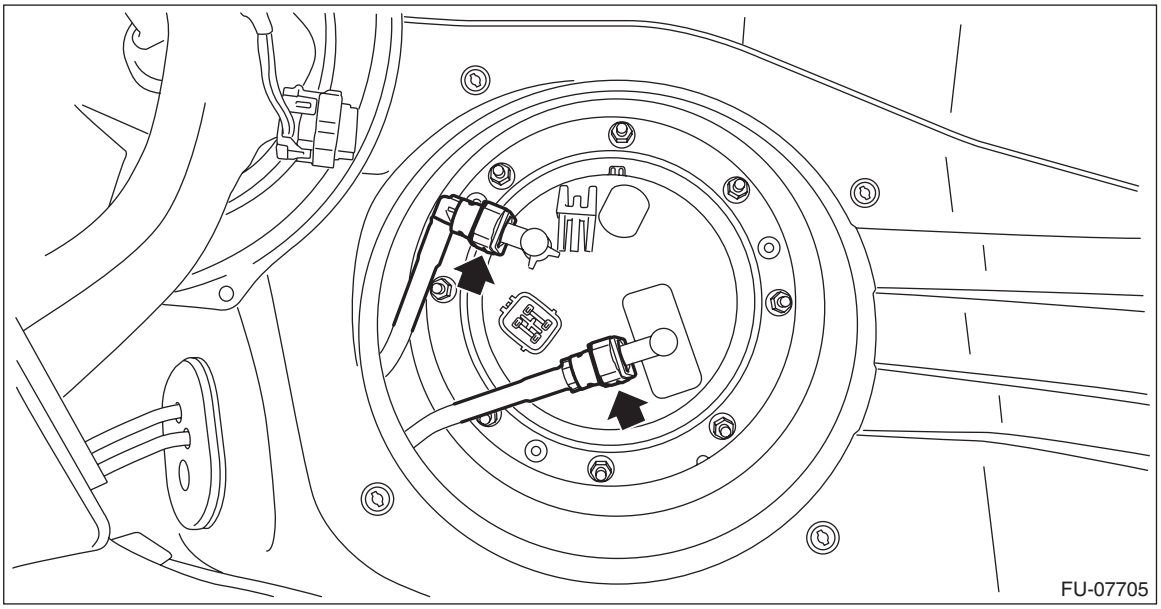
2) Connect the quick connector of the fuel delivery tube and the jet pump tube.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

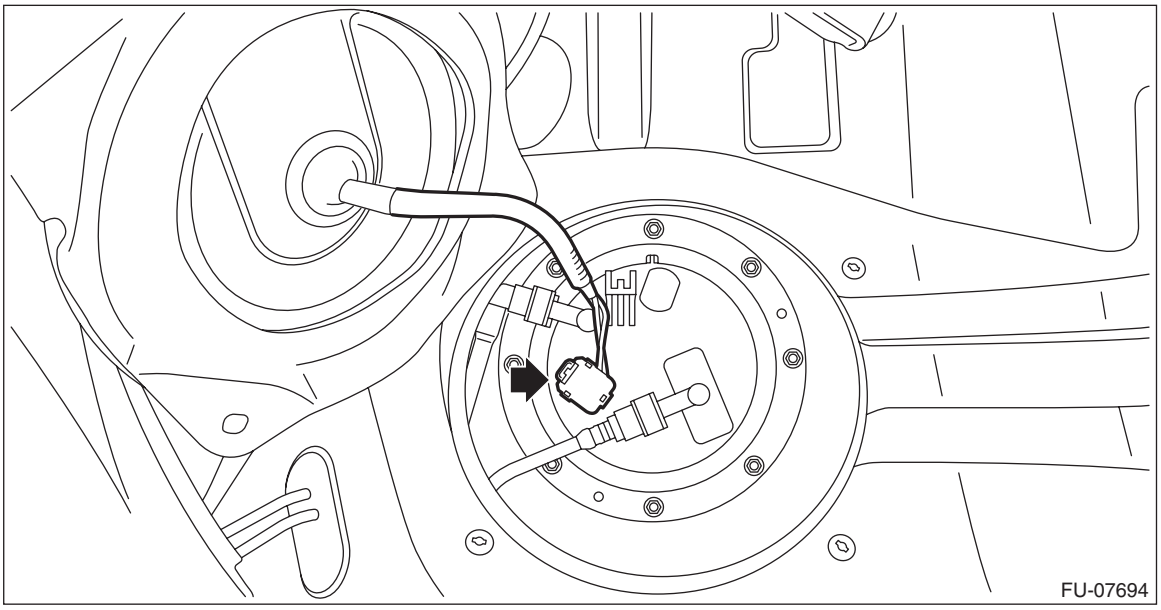
NOTE:
Connect the quick connector as shown in the figure.



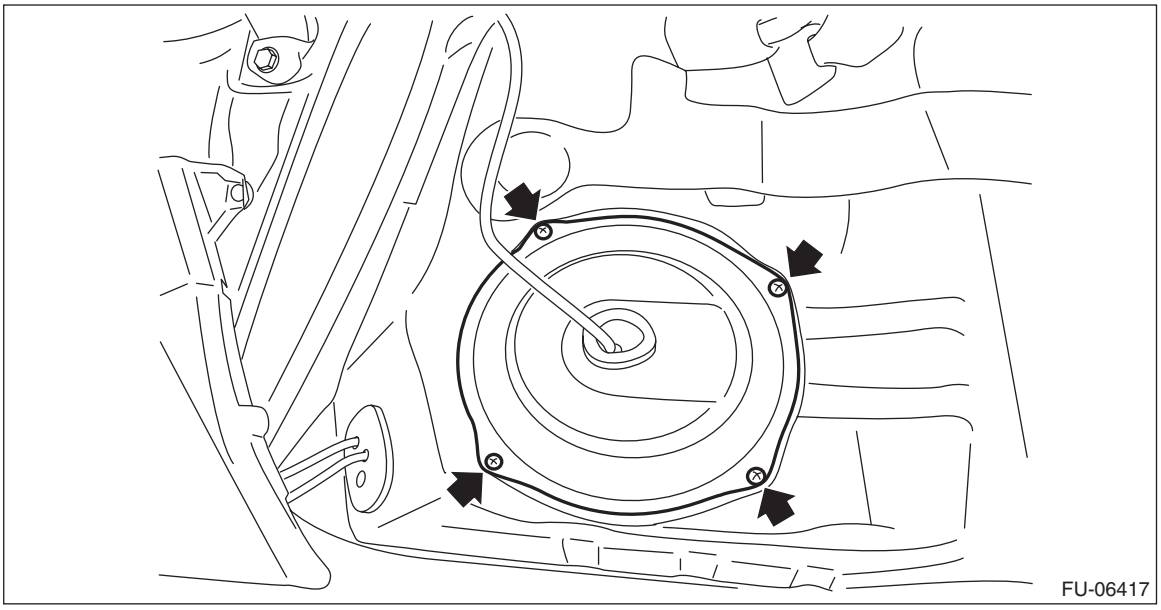
(a) Slider



3) Connect the connector to the fuel pump.

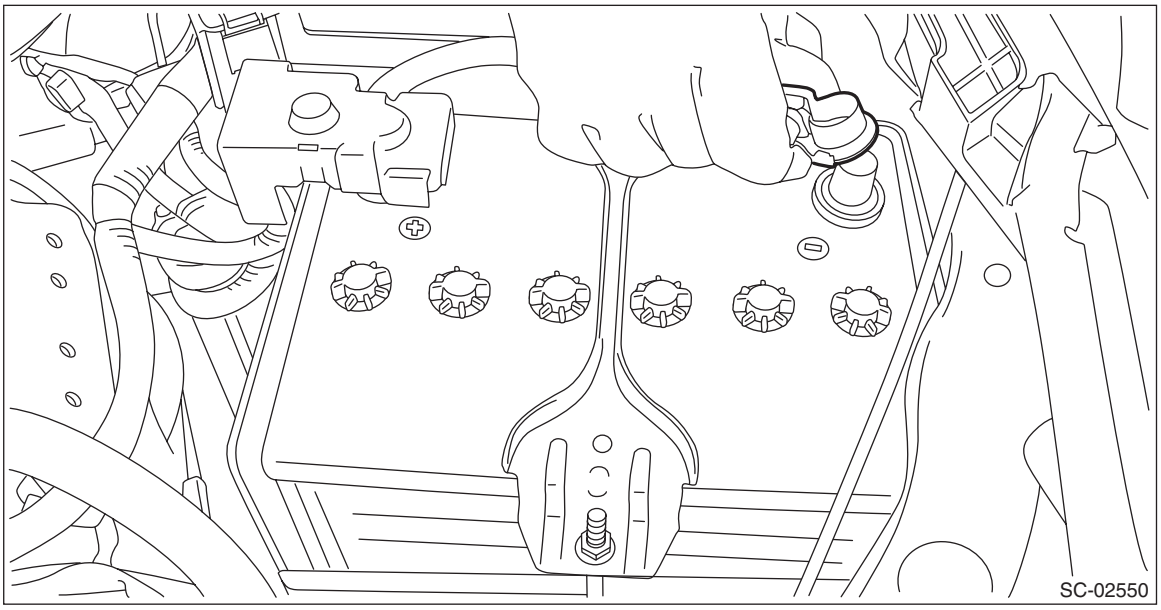


4) Install the service hole cover of fuel pump.



5) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>

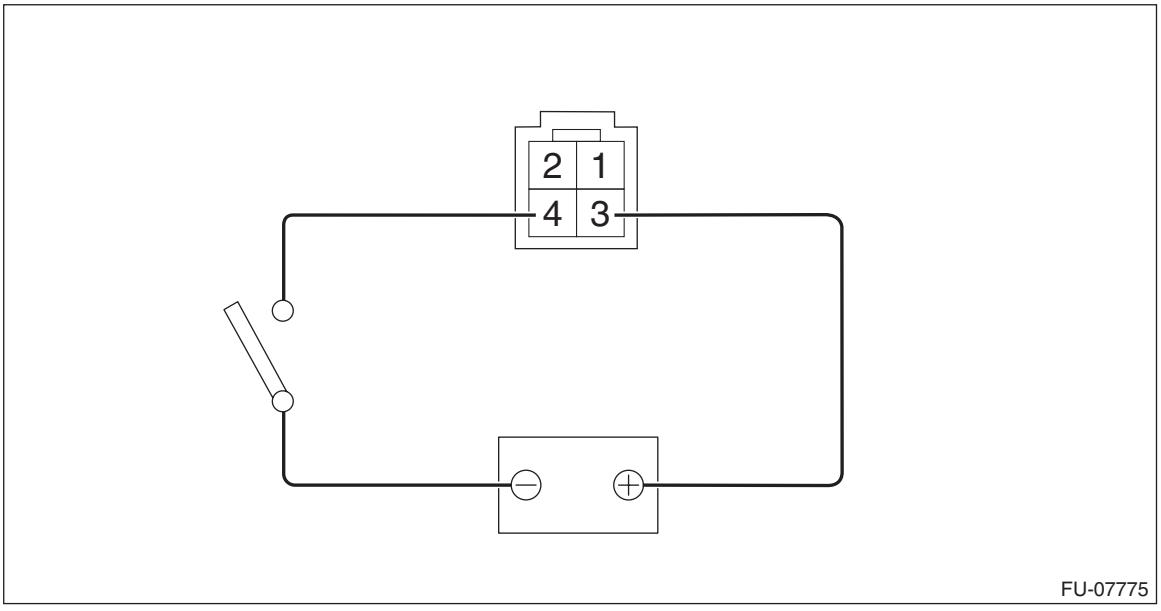
6) Connect the battery ground terminal.



C: INSPECTION

1) Check that the fuel pump has no deformation, cracks or other damages.
2) Connect the battery positive terminal to terminal No. 3 and the battery ground terminal to terminal No. 4, and inspect the fuel pump operation.

WARNING:
- **Wipe off fuel completely.**
- **Keep the battery as far apart from fuel pump as possible.**
- **Do not run the fuel pump for a long time under non-load condition.**



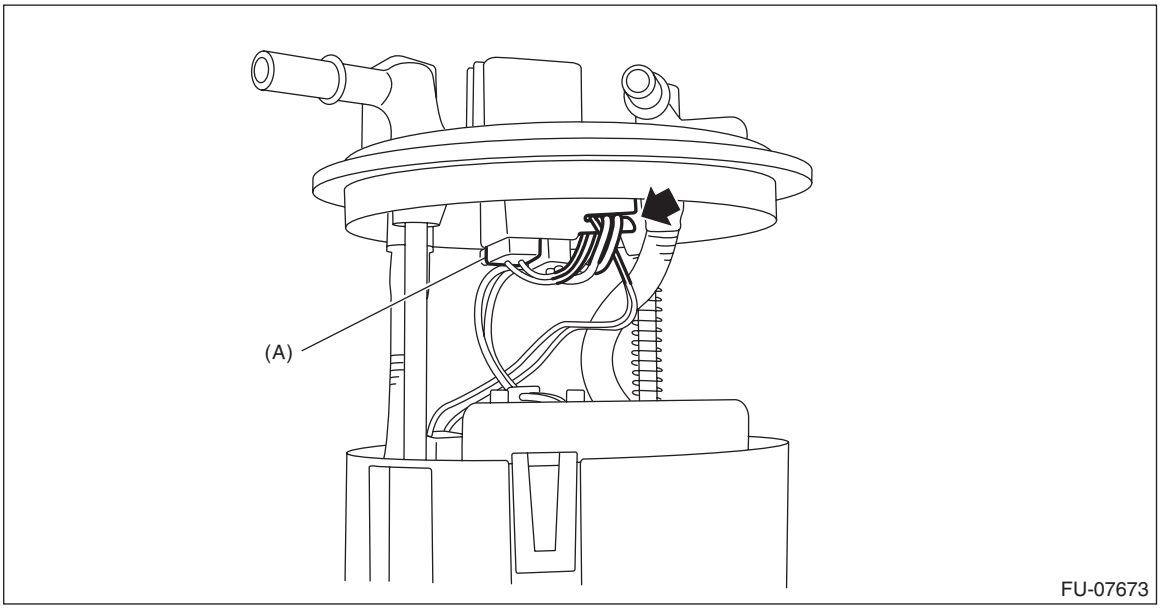
29.Fuel Level Sensor

A: REMOVAL

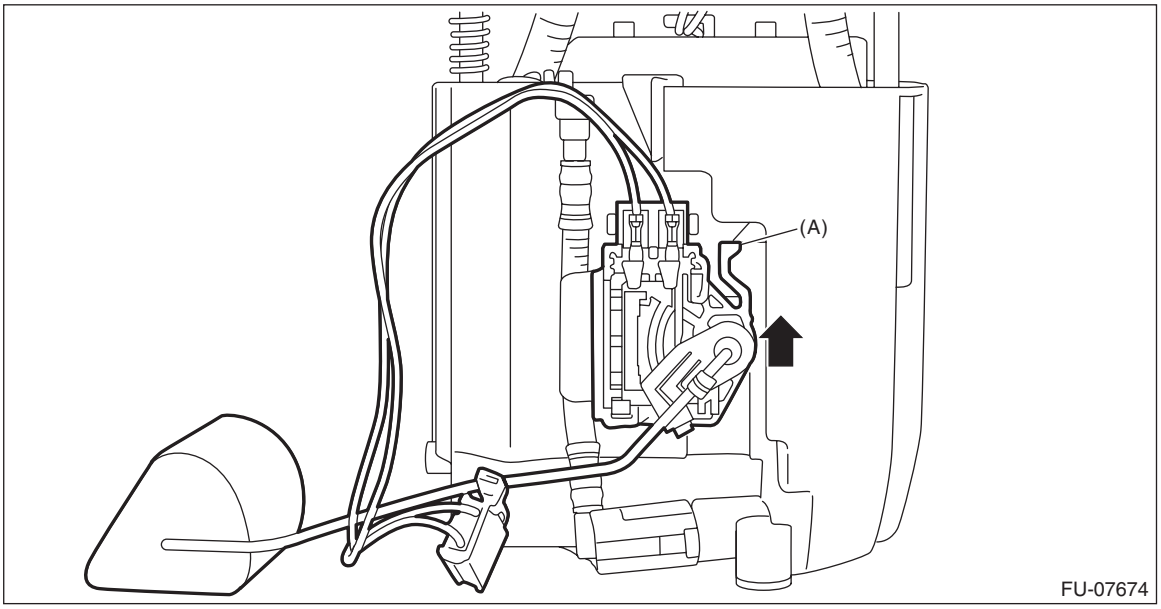
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
- **Be careful not to spill fuel.**
- **If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.**

NOTE:
The fuel level sensor is built in fuel pump assembly.
1) Remove the fuel pump assembly. <Ref. to FU(H4DO(w/o HEV))-137, REMOVAL, Fuel Pump.>
2) Disconnect the fuel level sensor connector (A), and pull out the connector cable and fuel level sensor harness from the clip.



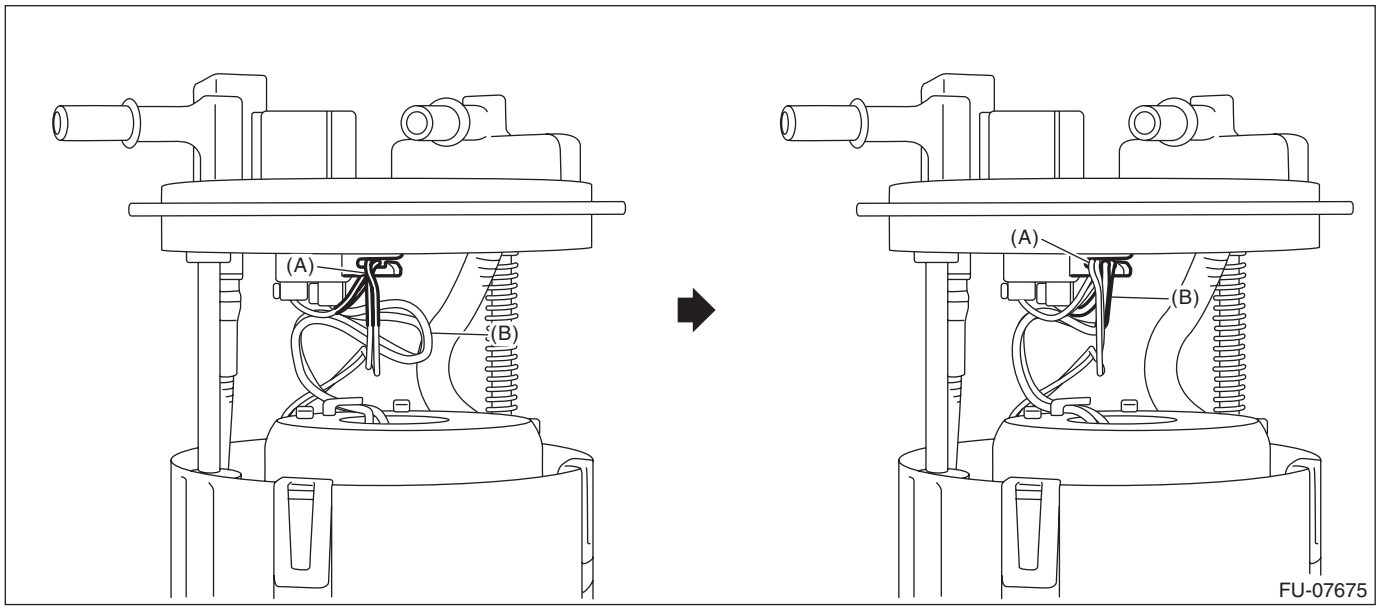
3) While pressing the claw (A) of the fuel level sensor, slide the fuel level sensor in the direction of the arrow, and remove the fuel level sensor.



B: INSTALLATION

Install in the reverse order of removal.

CAUTION:
Be sure to install the fuel level sensor harness to the clip first, then install the connector cable. Otherwise, malfunction may occur.

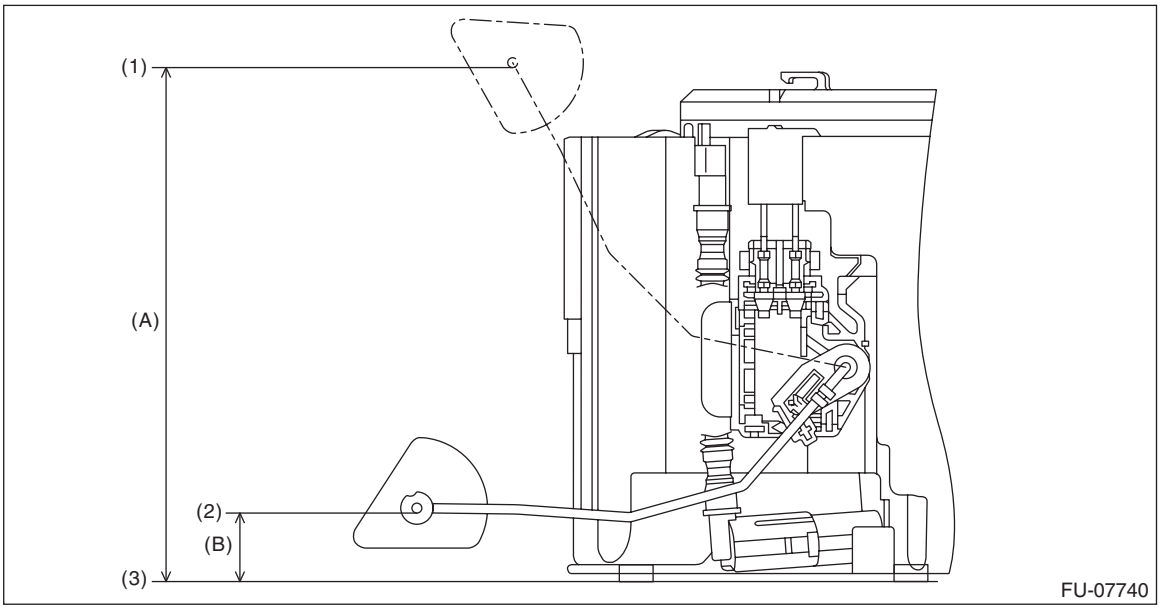


(A) Fuel level sensor harness (B) Connector cable

C: INSPECTION

1) Check that the fuel level sensor has no damage.
2) Measure the fuel level sensor float position.

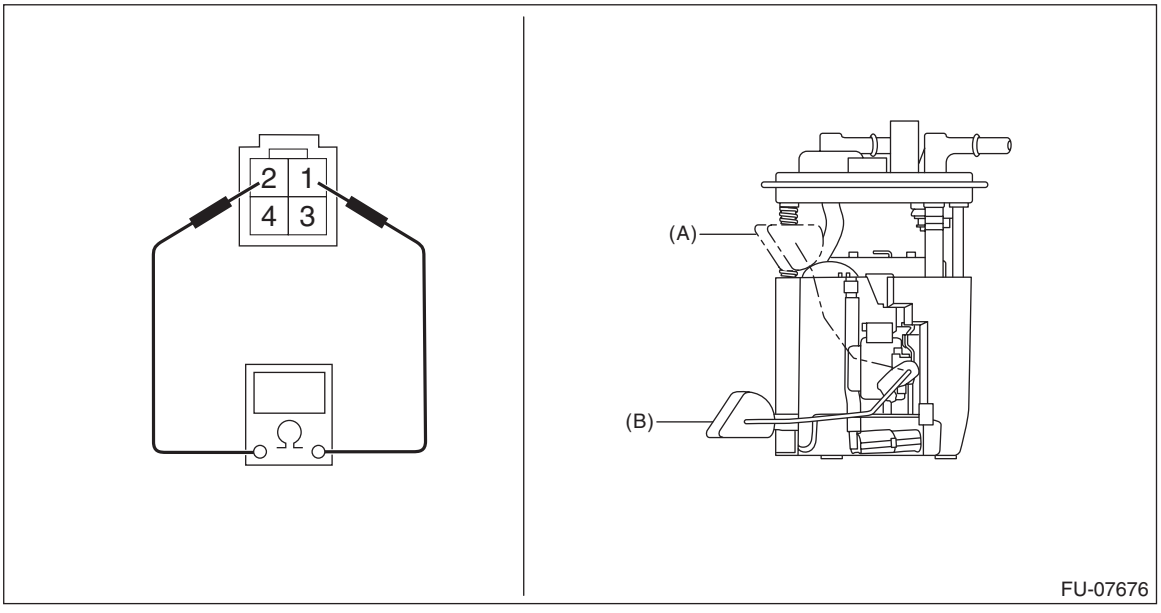
NOTE:
When inspecting the fuel level sensor, perform the work with the sensor installed to the fuel pump.



(1) FULL (2) EMPTY (3) Fuel tank seating surface

Float position	Standard
FULL to Fuel tank seating surface (A)	133.0±4 mm (5.236±0.157 in)
EMPTY to Fuel tank seating surface (B)	21.6±4 mm (0.850±0.157 in)

3) Check the resistance between fuel level sensor terminals by the connector on top of the fuel pump.



Float position	Terminal No.	Standard
FULL (A)	1 and 2	8.7±1.0 Ω
EMPTY (B)		139.1±2.0 Ω

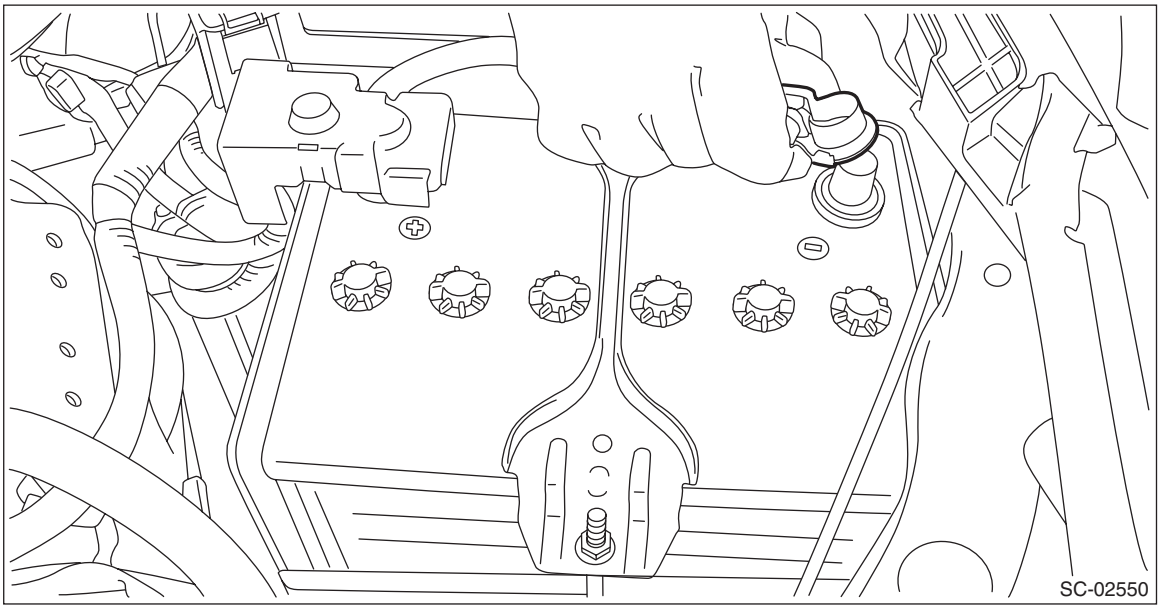
30.Fuel Sub Level Sensor

A: REMOVAL

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

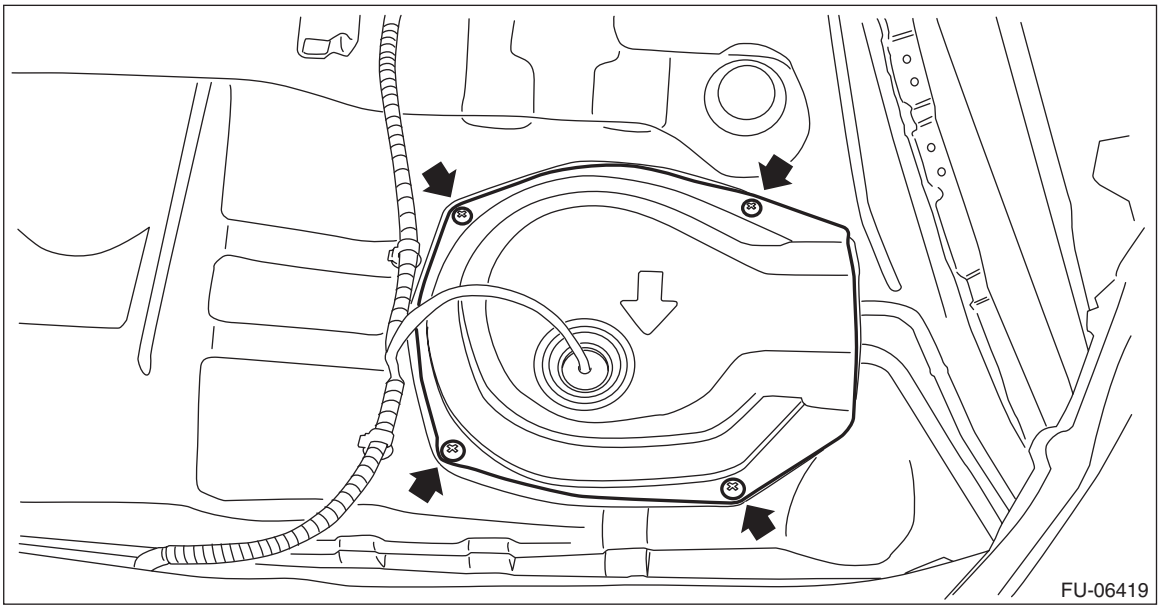
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
- **If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.**

1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Drain fuel. <Ref. to FU(H4DO(w/o HEV))-109, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
3) Disconnect the ground cable from battery.

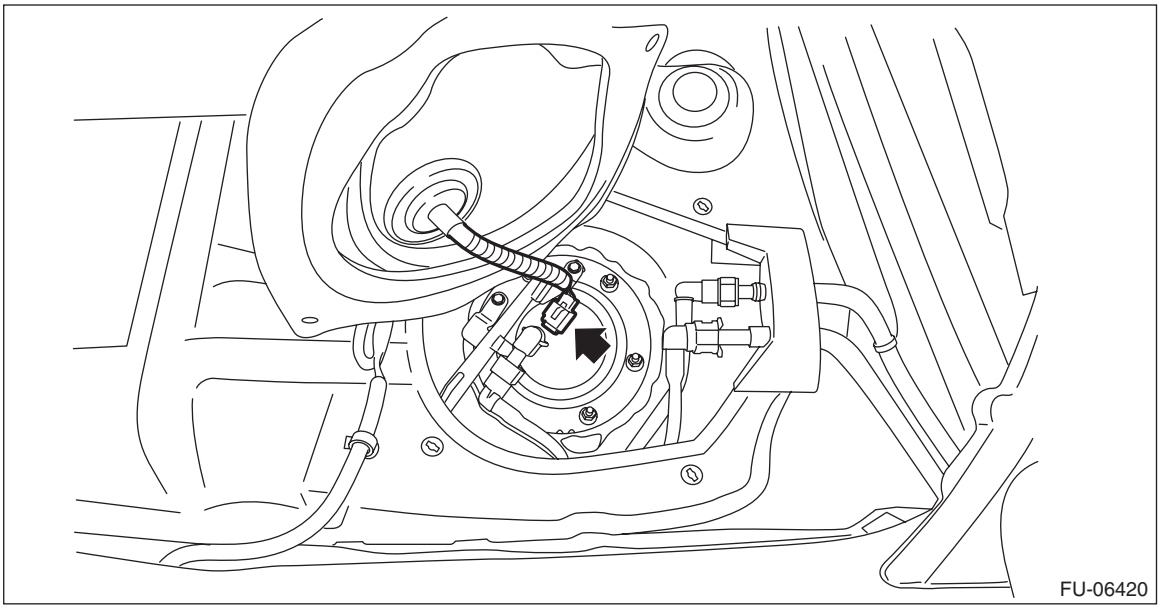


4) Remove the rear seat cushion. <Ref. to SE-24, REMOVAL, Rear Seat.>

5) Remove the service hole cover of fuel sub level sensor.

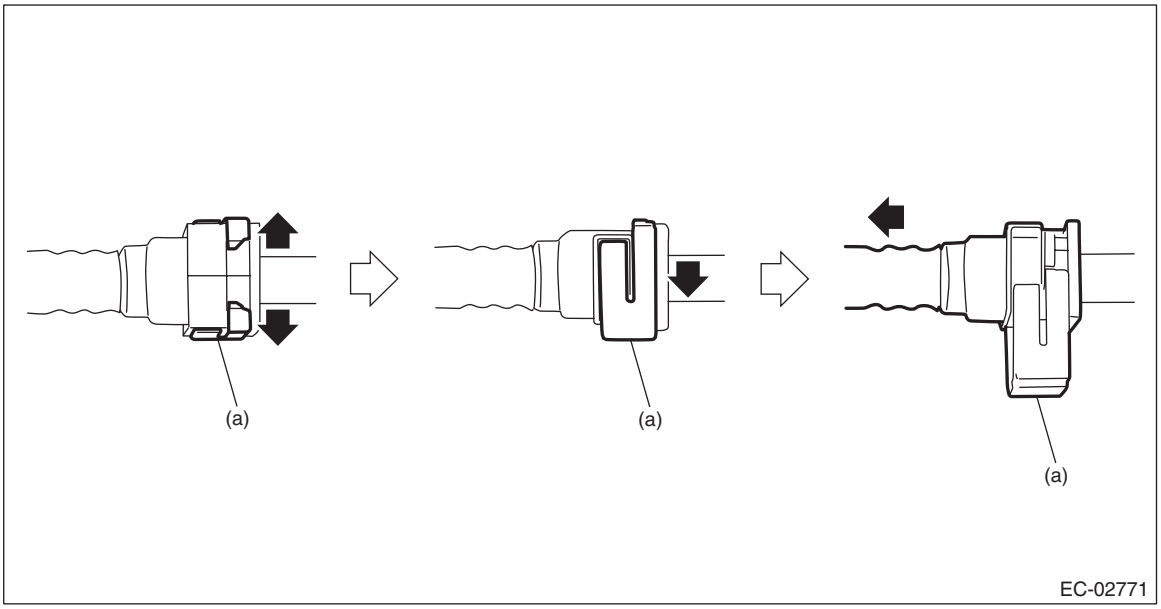


6) Disconnect connectors from the fuel sub level sensor, and move aside the service hole cover.

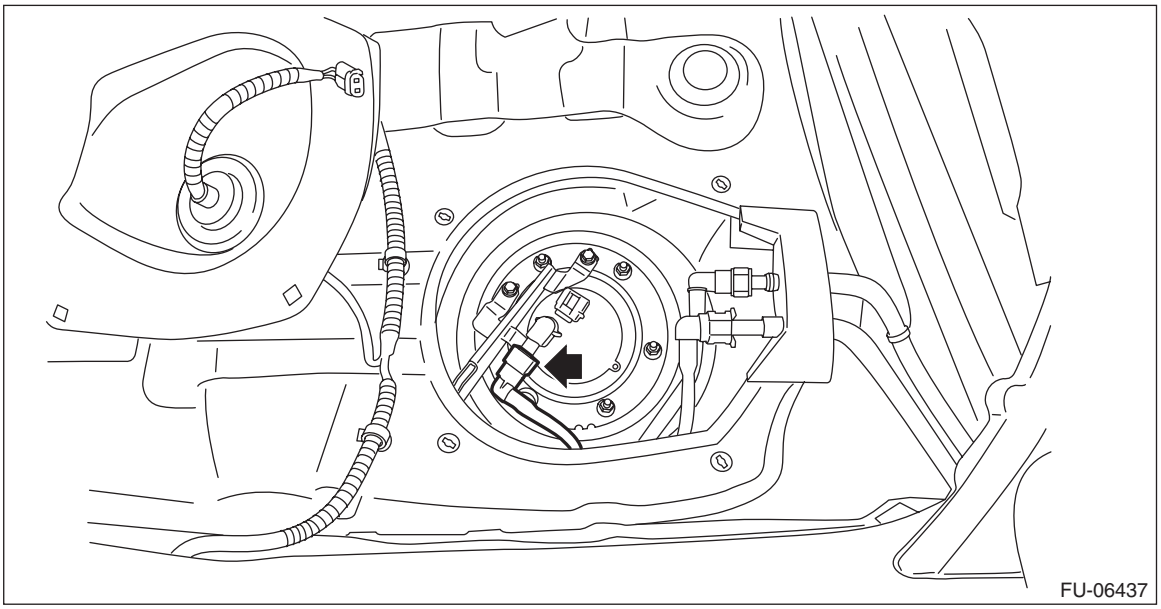


7) Disconnect the quick connector of the jet pump tube.

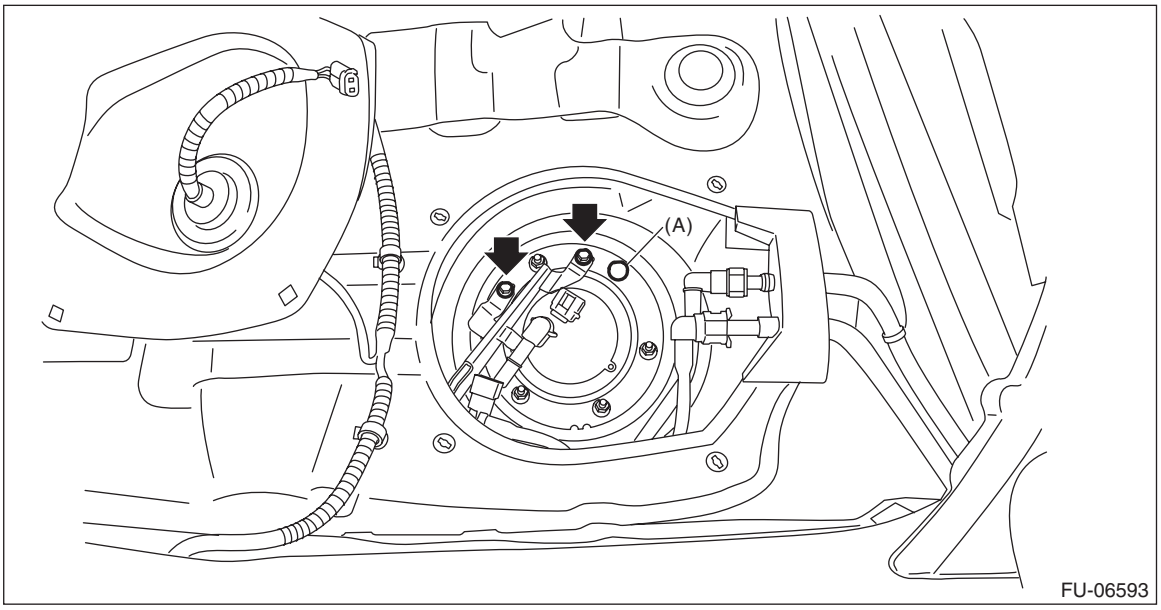
NOTE:
Disconnect the quick connector as shown in the figure.



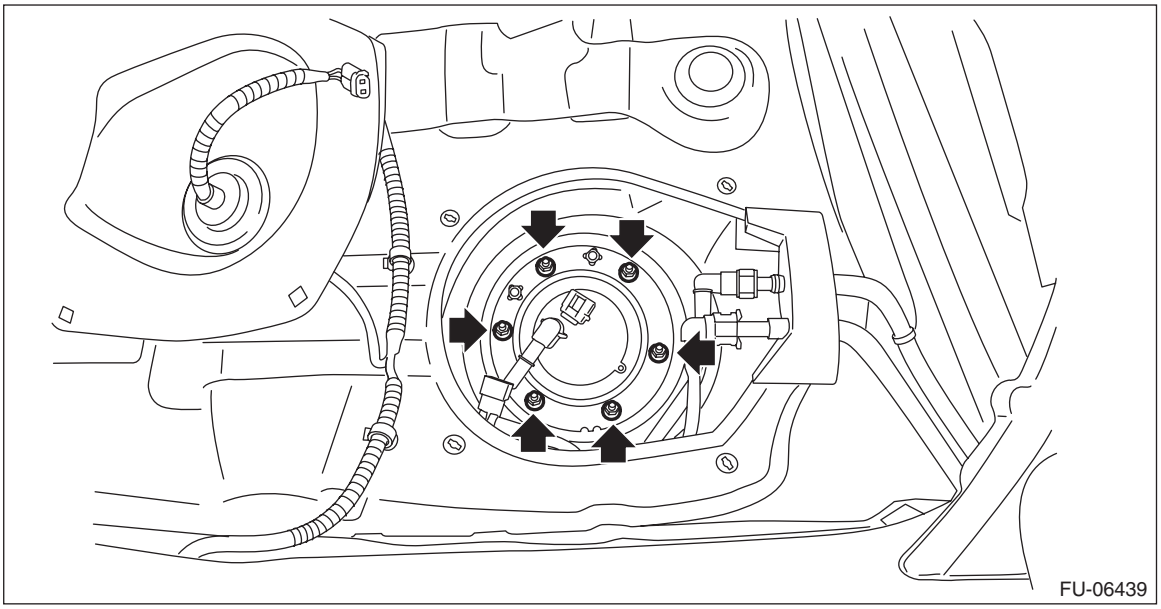
(a) Slider



8) Remove the fuel sub level sensor protector, and remove the rubber cap (A) from nut.



9) Remove the bolts and nuts which hold fuel sub level sensor protector and fuel sub level sensor upper plate to the fuel tank.



10) Remove the fuel sub level sensor from the fuel tank.

CAUTION:
Be careful not to let the arm and float of the fuel sub level sensor contact the fuel tank.

B: INSTALLATION

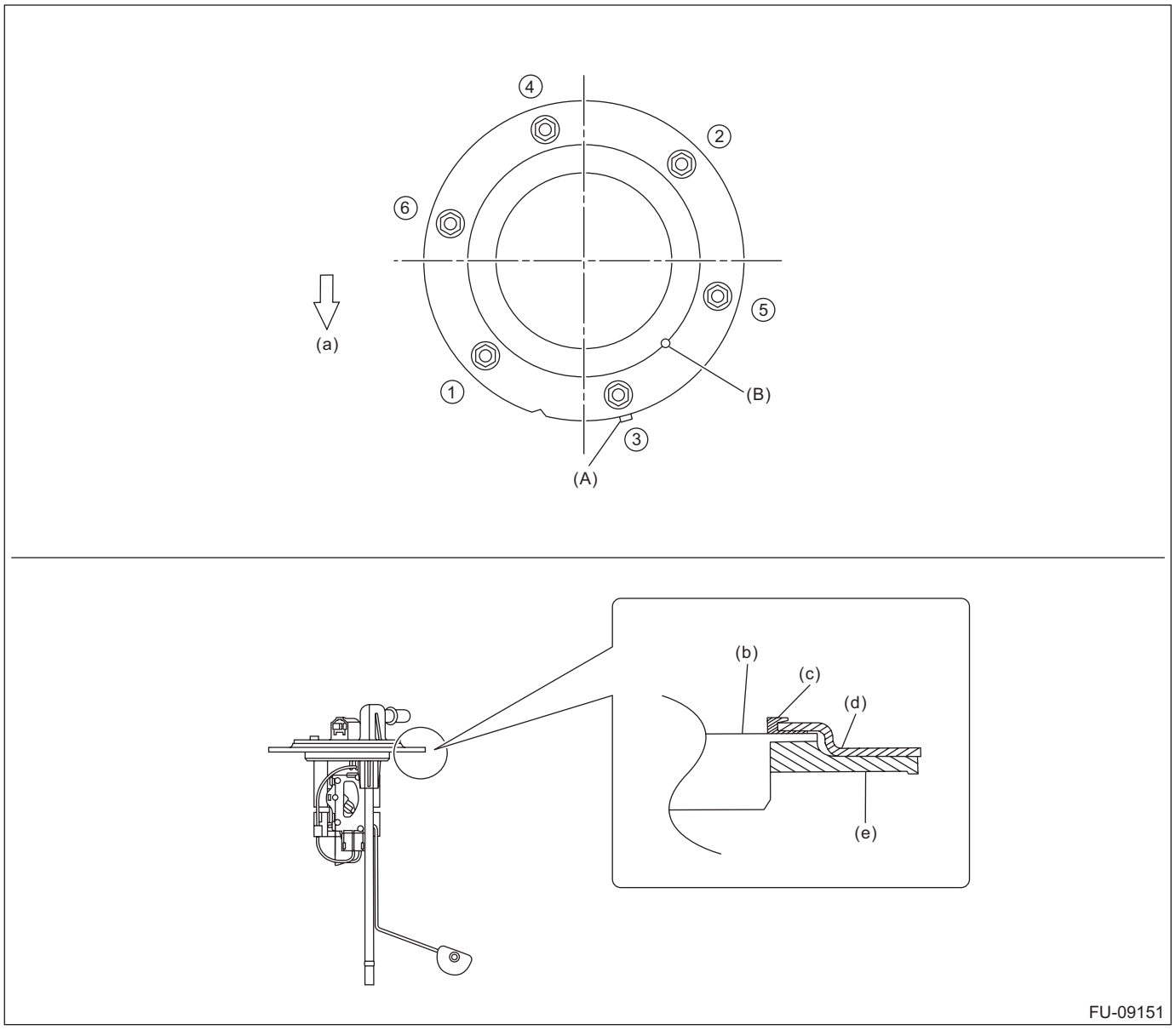
1) Install the fuel sub level sensor to the fuel tank.
   (1) Make sure the sealing portion is free from fuel or foreign matter before installation.
   (2) Align the cutout (B) as shown in the figure, and install the fuel sub level sensor upper plate cushion to the fuel sub level sensor upper plate.
   (3) Align the cutout of the fuel sub level sensor upper plate with the protrusion (B) of the fuel sub level sensor as shown in the figure, and install the fuel sub level sensor upper plate from the upper side of the fuel sub level sensor.
   (4) Install the gasket from the lower side of the fuel sub level sensor so that the protrusion (B) of the fuel sub level sensor and the protrusion (A) of the gasket are positioned as shown in the figure.

NOTE:
Use a new gasket.

   (5) Install the fuel sub level sensor to the fuel tank in the direction shown in the figure, and tighten the nuts to the specified torque in the order as shown in the figure.

CAUTION:
Set the arm and float of the fuel sub level sensor while paying attention to prevent them from contacting the fuel tank. If the arm of the fuel sub level sensor is bent, the fuel gauge may not read correctly.

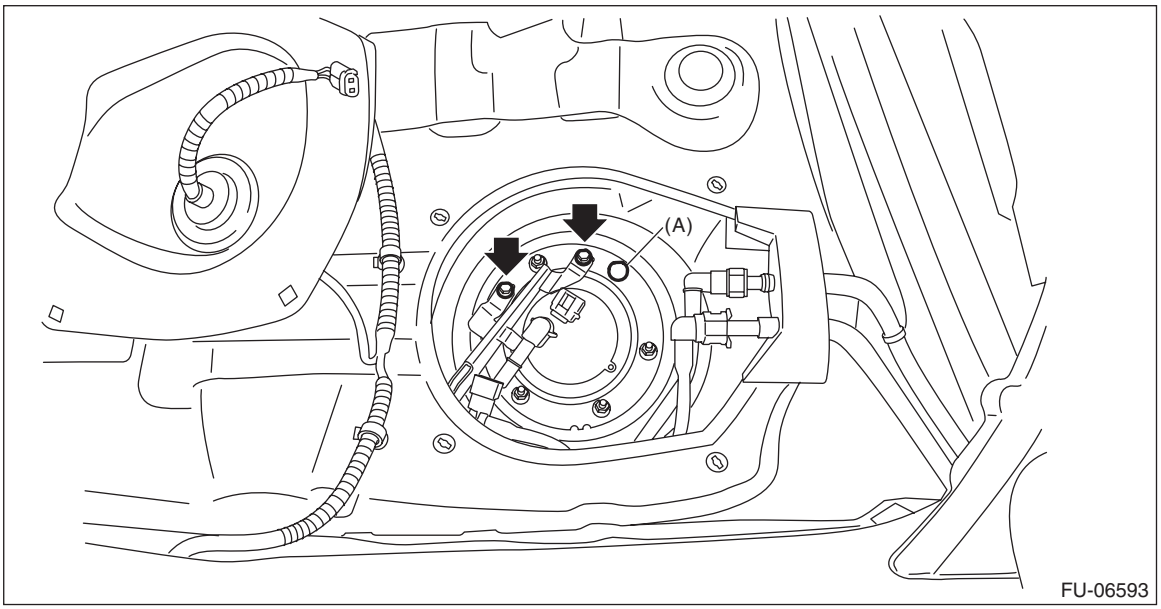
Tightening torque:
4.4 N·m (0.4 kgf-m, 3.2 ft-lb)



(a) Front side of vehicle
(b) Fuel sub level sensor
(c) Fuel sub level sensor upper plate cushion
(d) Fuel sub level sensor upper plate
(e) Gasket

2) Install the fuel sub level sensor protector, and install the rubber cap (A).

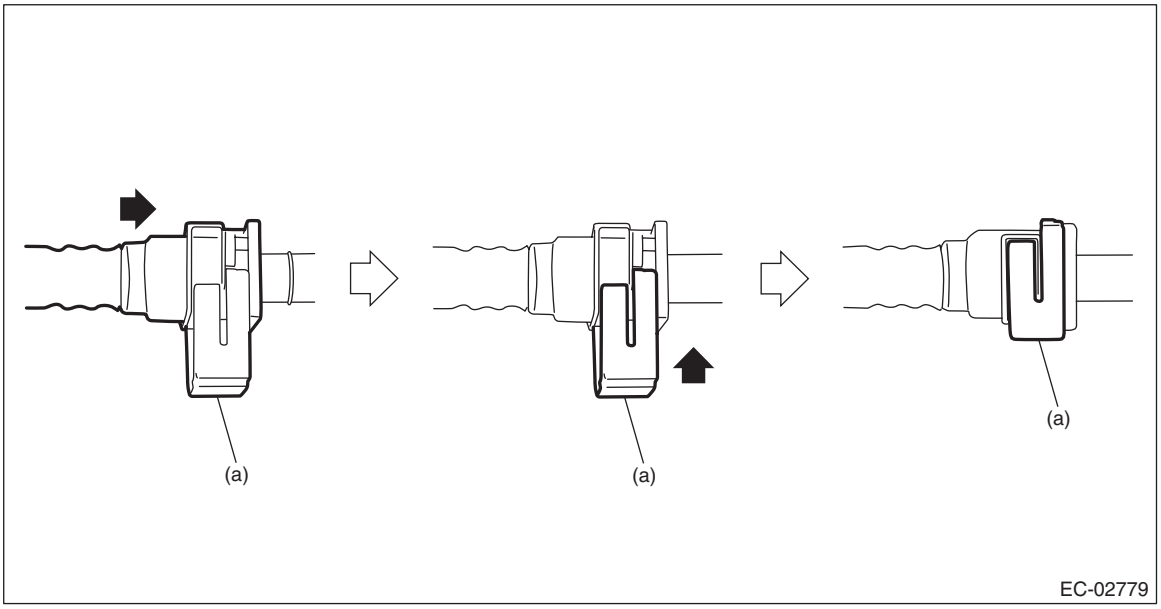
Tightening torque:
4.4 N·m (0.4 kgf-m, 3.2 ft-lb)



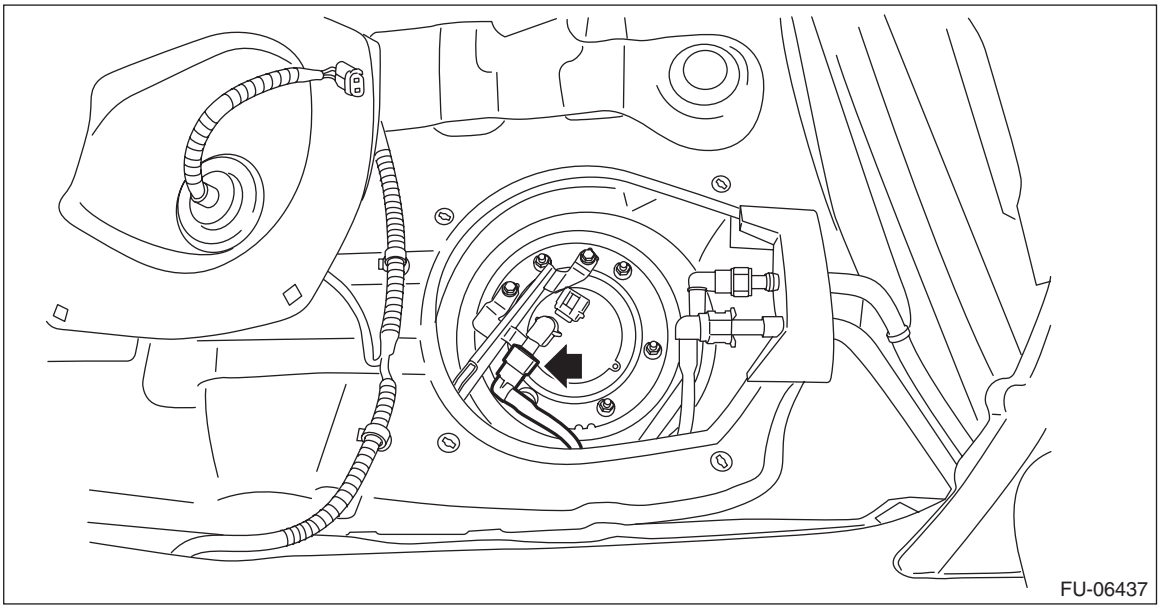
3) Connect the quick connector of the jet pump tube.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

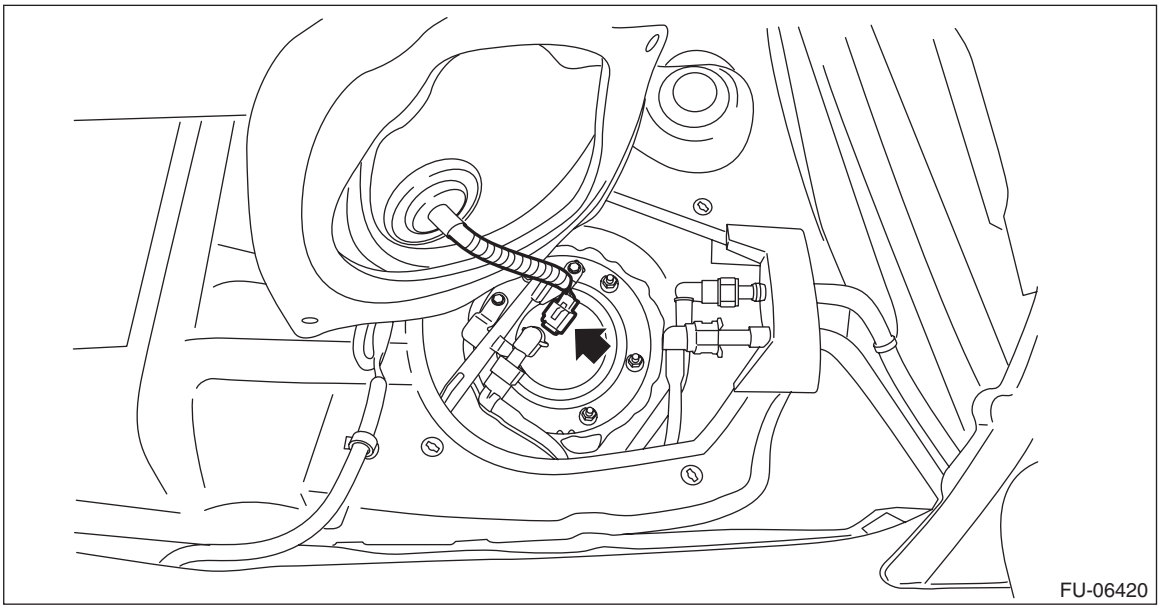
NOTE:
Connect the quick connector as shown in the figure.



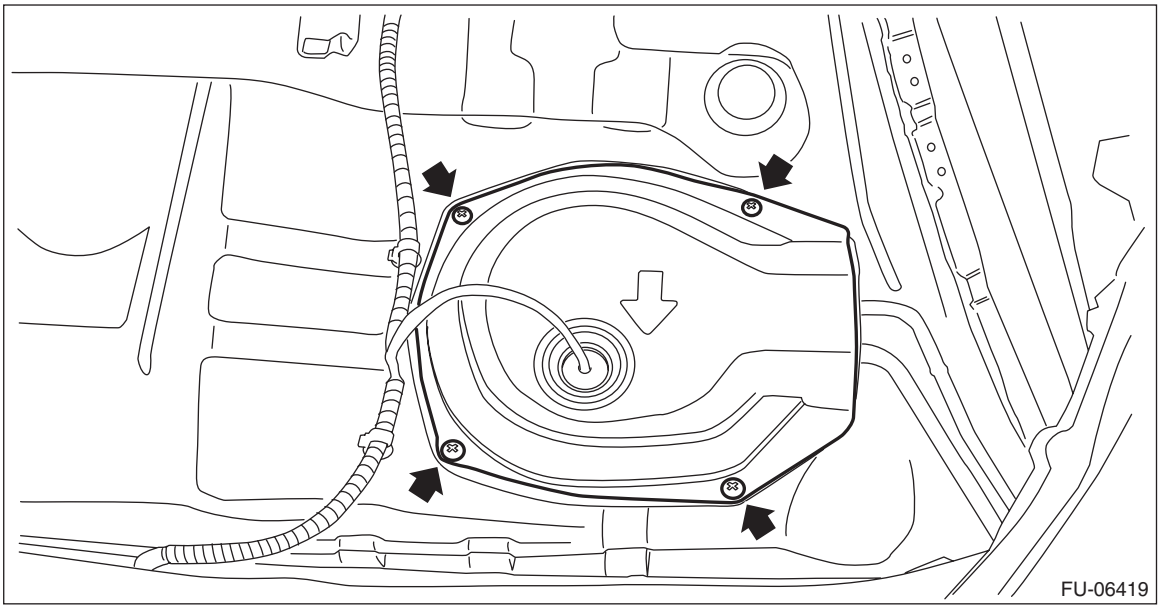
(a) Slider



4) Connect the connector to the fuel sub level sensor.

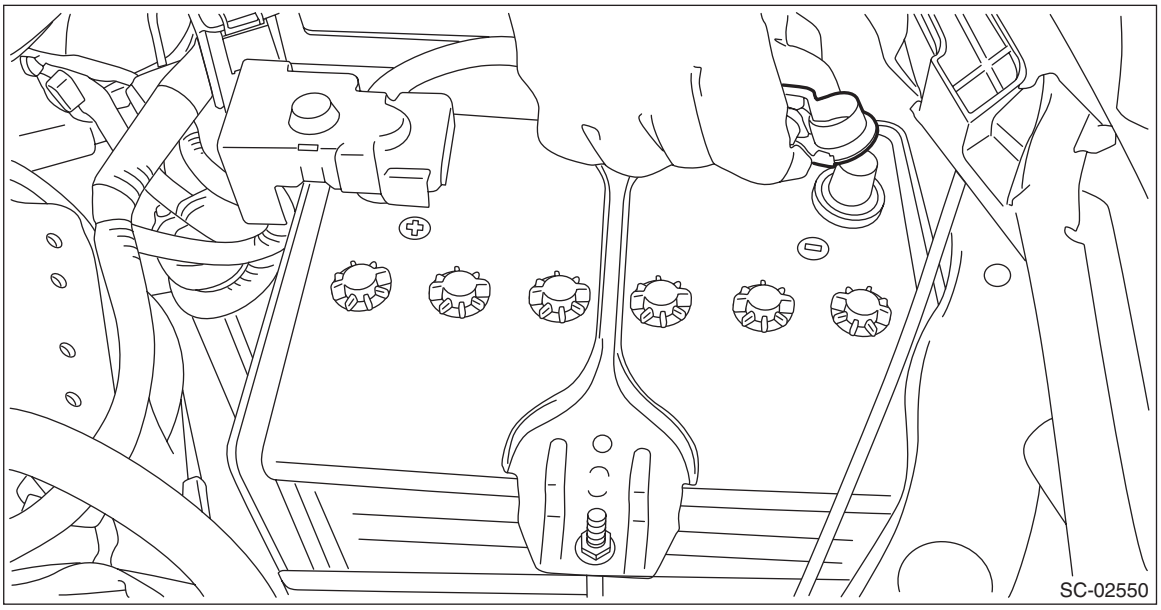


5) Install the service hole cover of fuel sub level sensor.



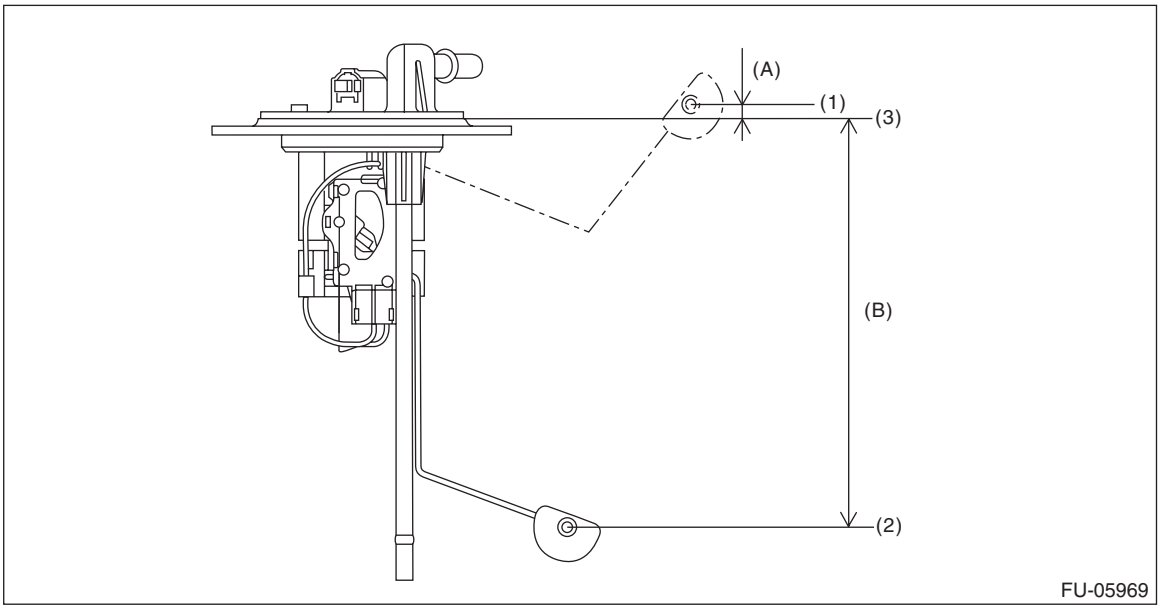
6) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>

7) Connect the battery ground terminal.



C: INSPECTION

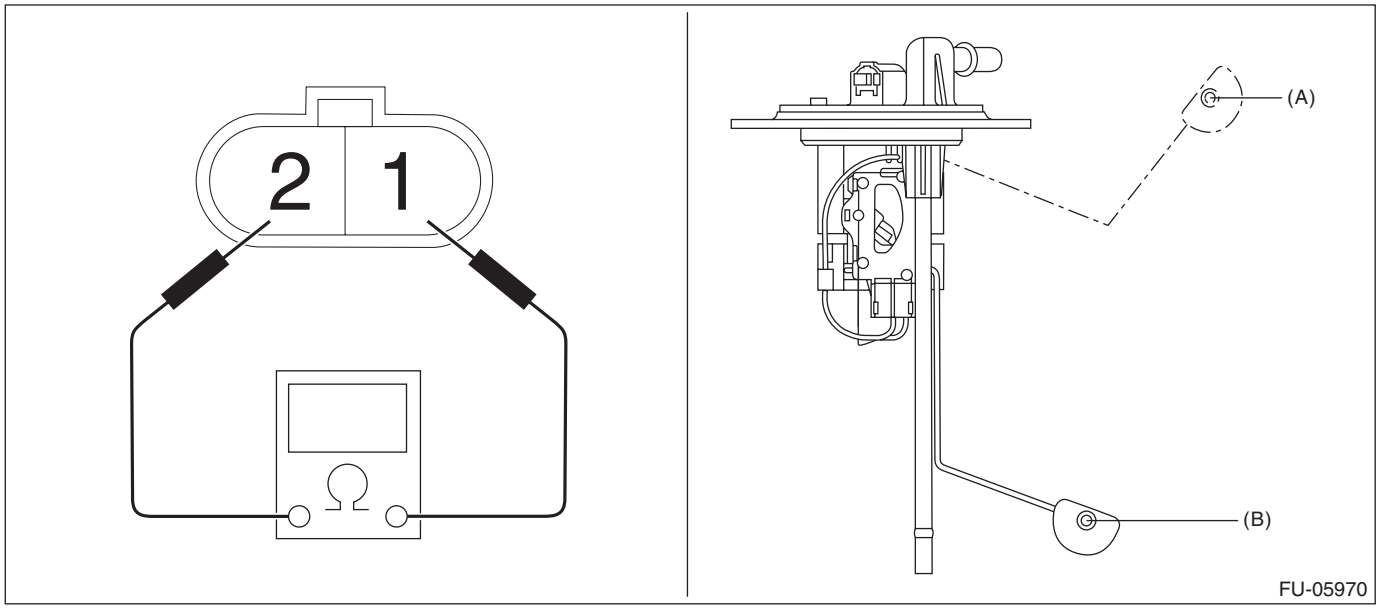
1) Check that the fuel sub level sensor has no damage.
2) Measure the fuel sub level sensor float position.



(1) FULL (2) EMPTY (3) Datum points

Float position	Standard
FULL to Datum point (A)	5.31±3.5 mm (0.209±0.138 in)
EMPTY to Datum point (B)	160.6±3.5 mm (6.32±0.138 in)

3) Measure the resistance between fuel sub level sensor terminals.



Float position	Terminal No.	Standard
FULL (A)	1 and 2	8.7±1.0 Ω
EMPTY (B)		270.9±4.0 Ω

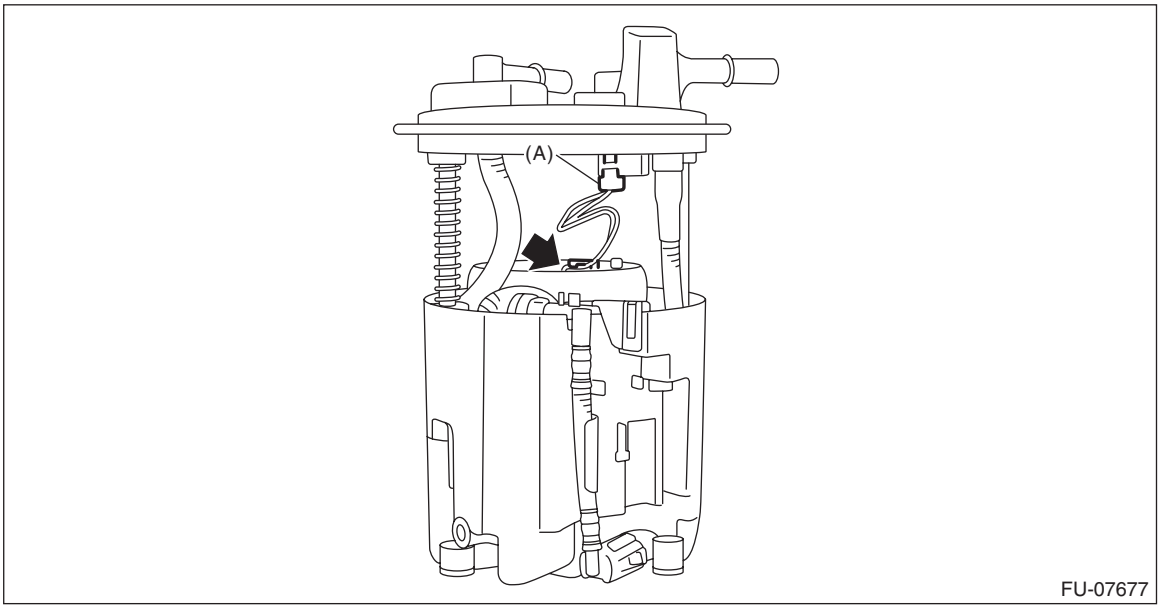
31.Fuel Filter

A: REMOVAL

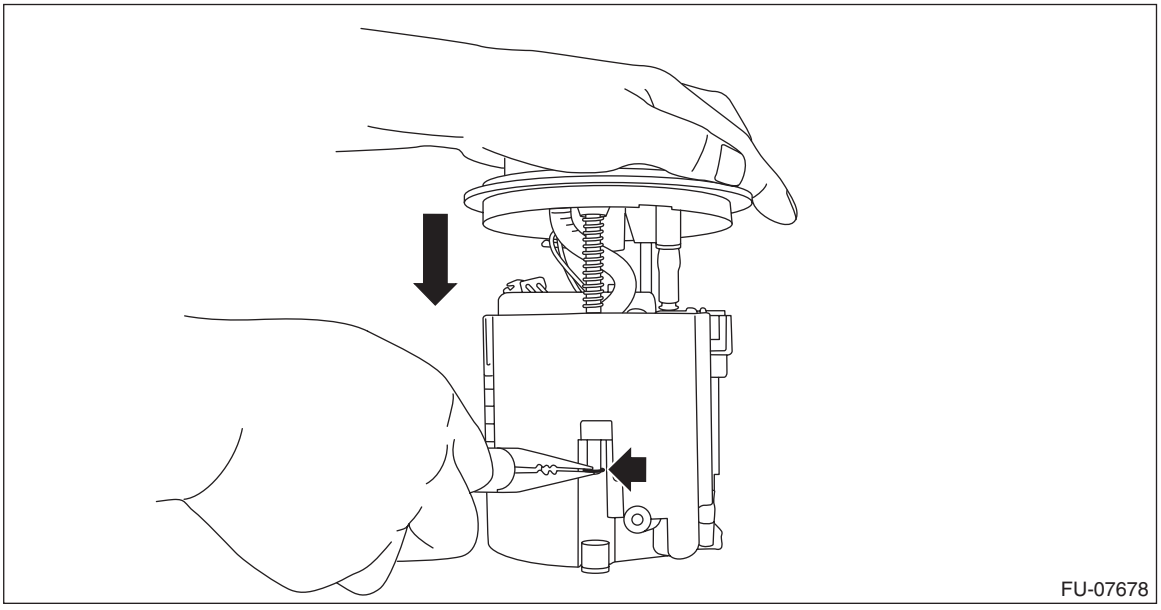
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
- **Be careful not to spill fuel.**
- **If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.**
- **Be careful not to drop or apply any impact to the fuel pump during work. This may deteriorate its performance.**

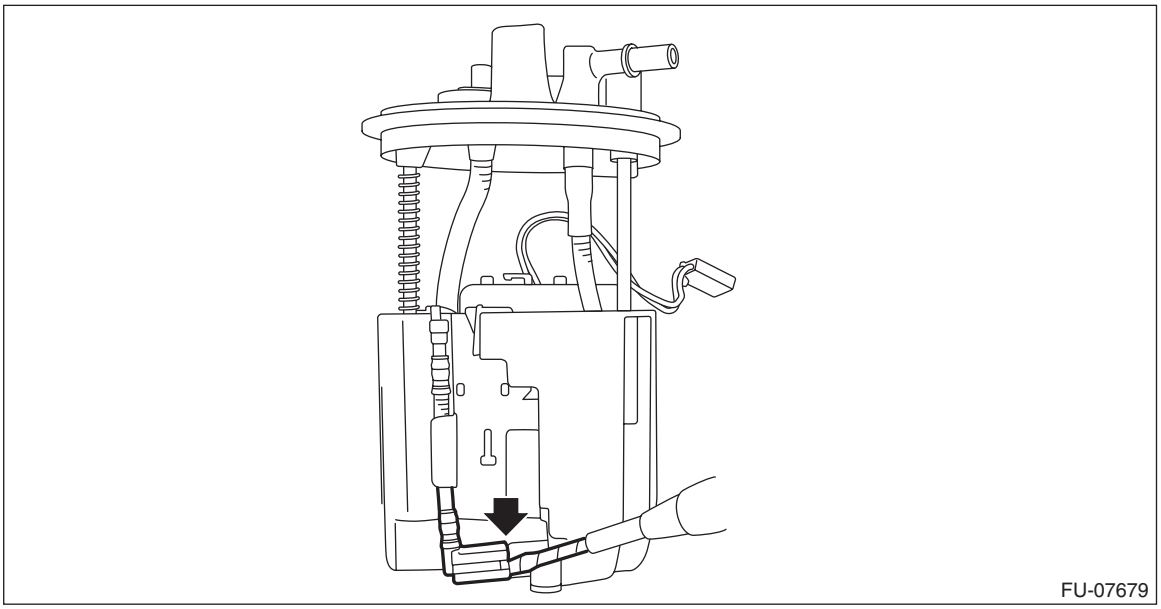
NOTE:
The fuel filter is built in fuel pump assembly.
1) Remove the fuel pump assembly. <Ref. to FU(H4DO(w/o HEV))-137, REMOVAL, Fuel Pump.>
2) Remove the fuel level sensor. <Ref. to FU(H4DO(w/o HEV))-145, REMOVAL, Fuel Level Sensor.>
3) Remove the connector cable from the clip, and disconnect the connector (A) of the connector cable.



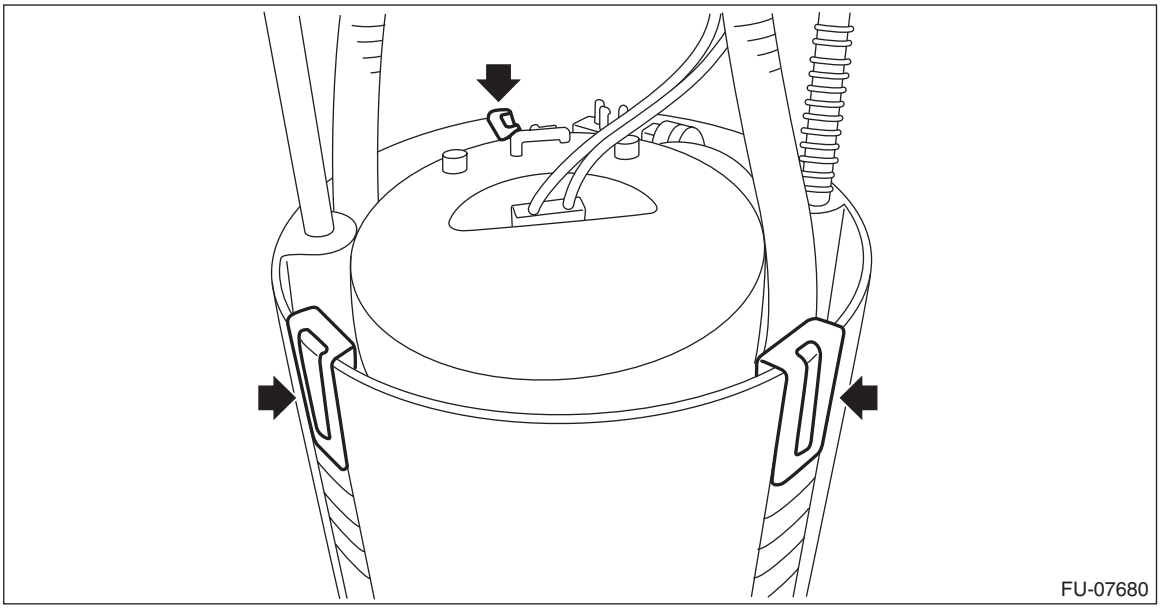
4) Push the fuel filter assembly in the direction of the arrow to compress, and detach the connecting clip.



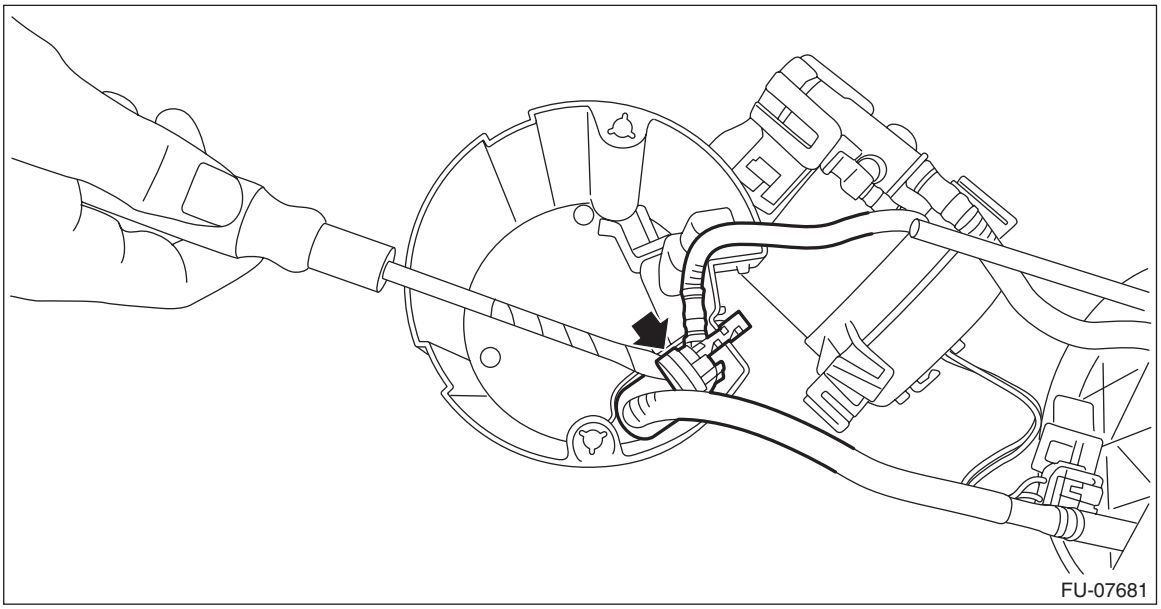
5) Release the claw using a flat tip screwdriver or similar tool wrapped with a protection tape, and remove the tube assembly from the fuel chamber assembly.



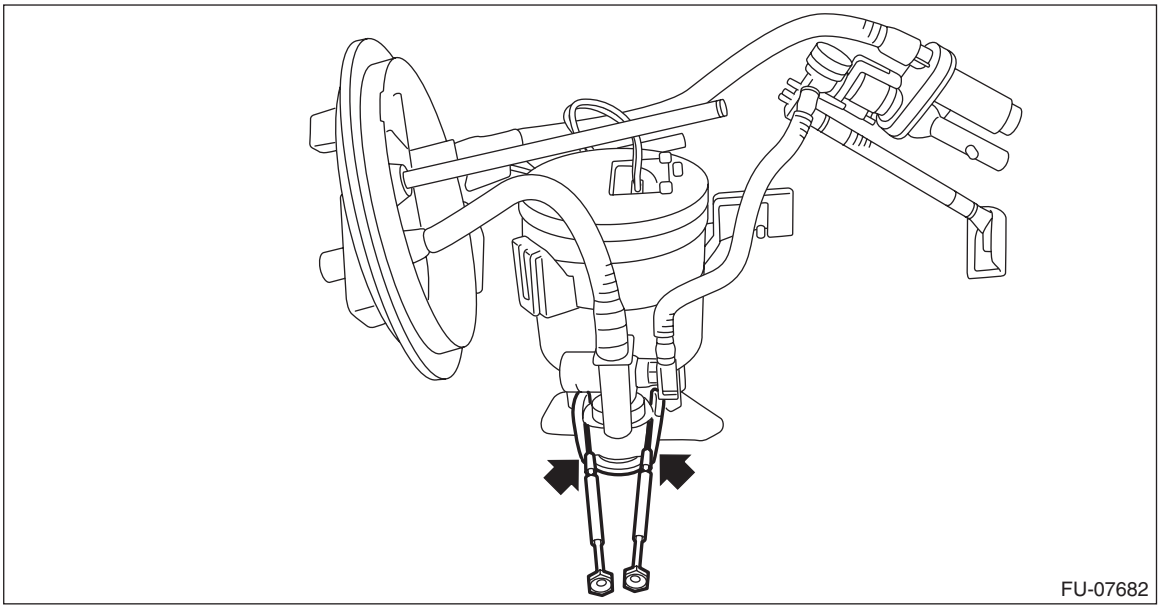
6) Release three claws on the fuel pump holder from the fuel chamber assembly, and raise the fuel filter assembly.



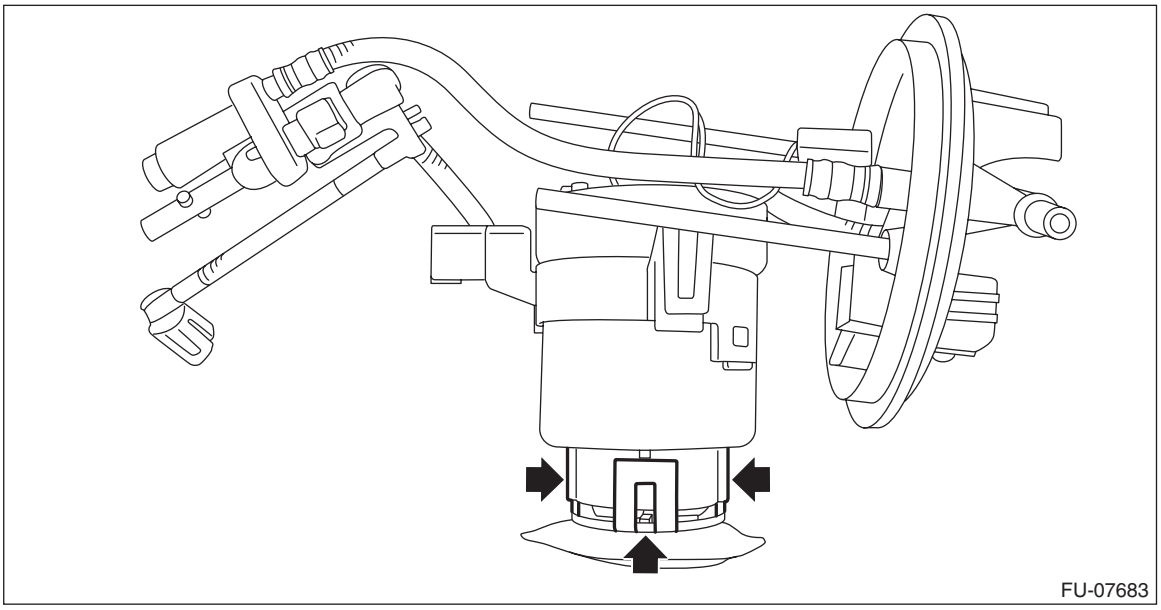
7) Using a flat tip screwdriver or similar tool wrapped with a protection tape, remove the tube assembly from the fuel chamber assembly, and separate the fuel filter assembly and fuel chamber assembly.



8) Using a precision driver or similar tool wrapped with a protection tape, expand the claws on the fuel pump.

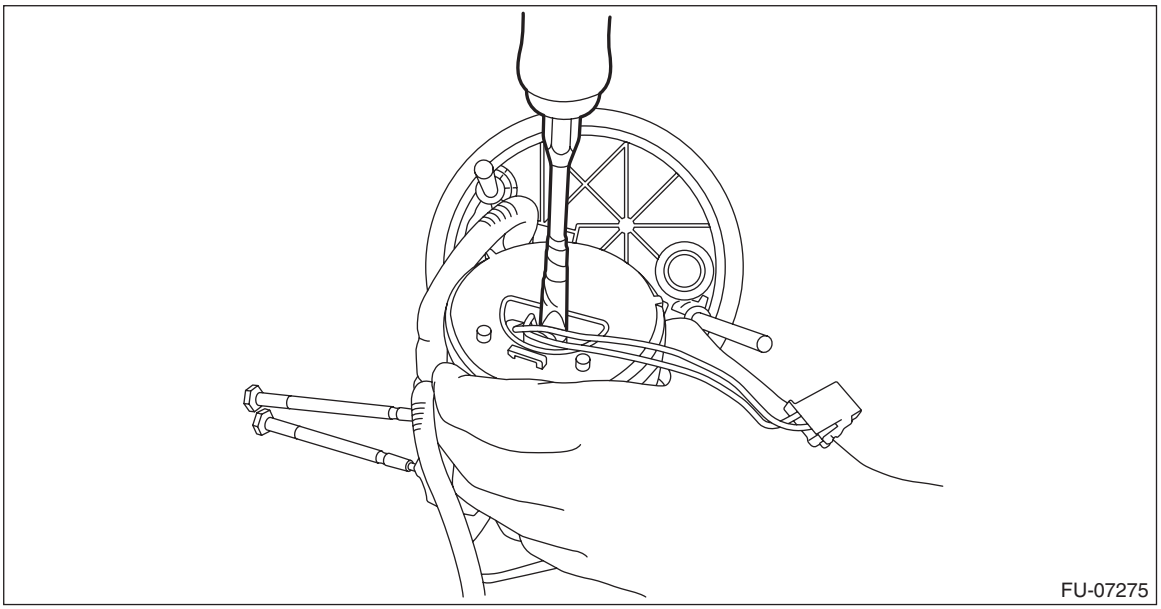


9) Release the claws on the fuel pump.

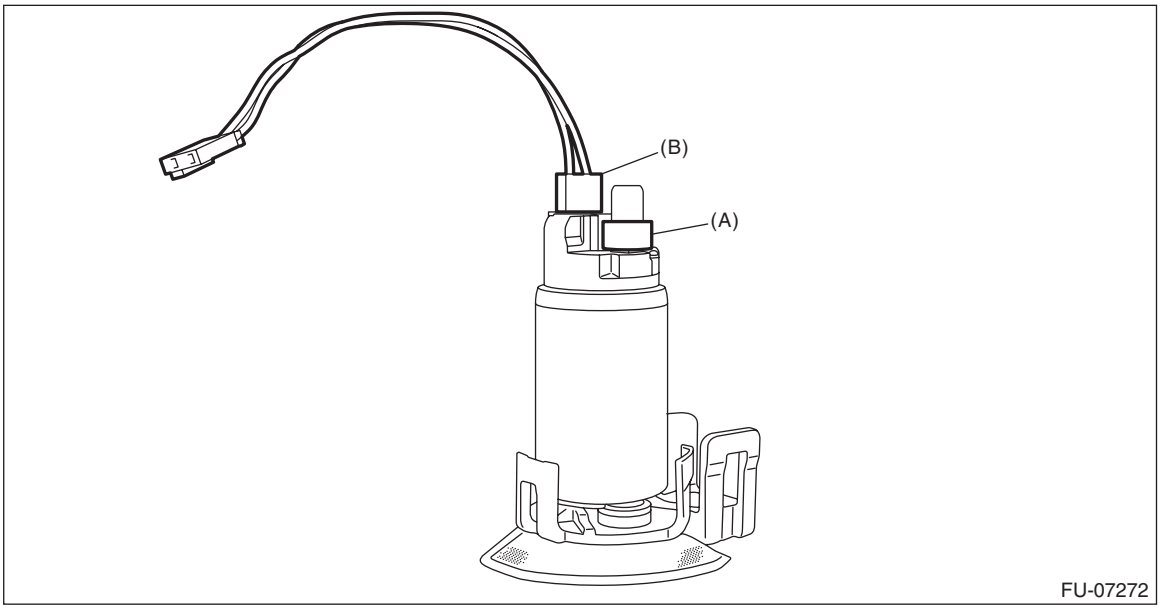


10) Using a flat tip screwdriver or similar tool wrapped with a protection tape, press on the fuel pump and remove the fuel pump together with the fuel pump holder from the fuel filter assembly.

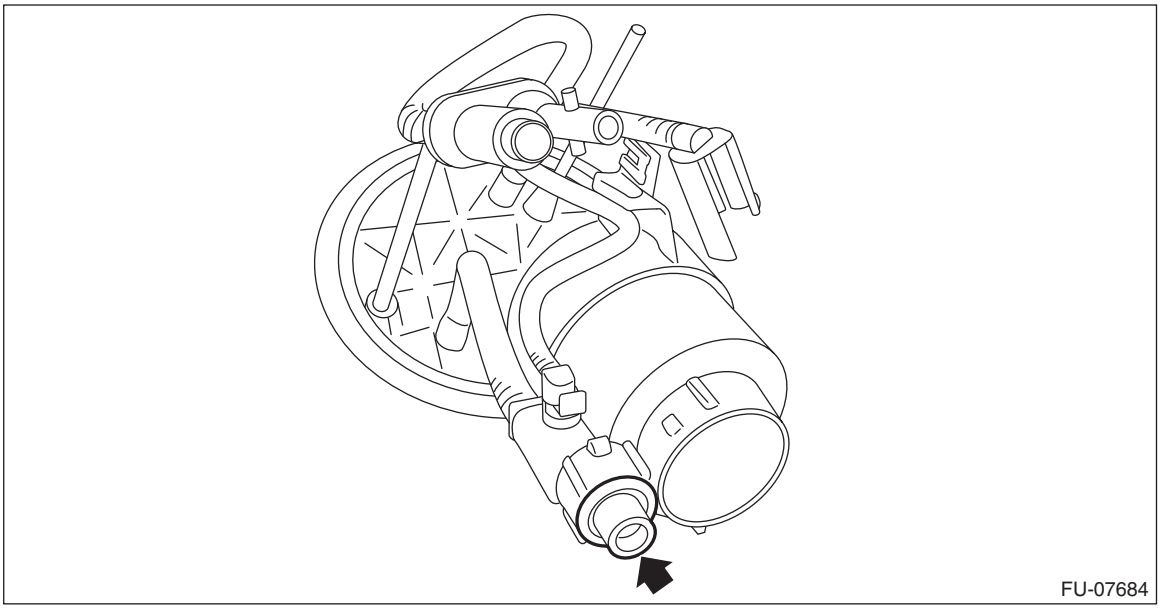
CAUTION:
If O-rings remain on the fuel filter assembly side, carefully remove them with a precision screwdriver or similar tool wrapped with a protection tape.



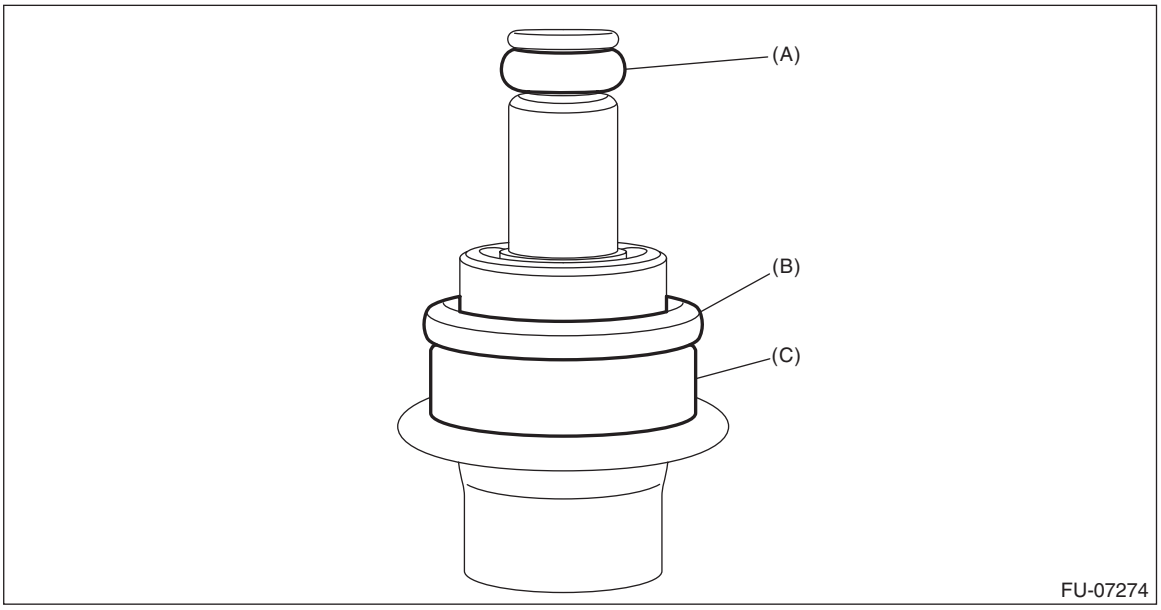
11) Remove the spacer (A) and connector cable (B) from the fuel pump.



12) Remove the pressure regulator from the fuel filter assembly.



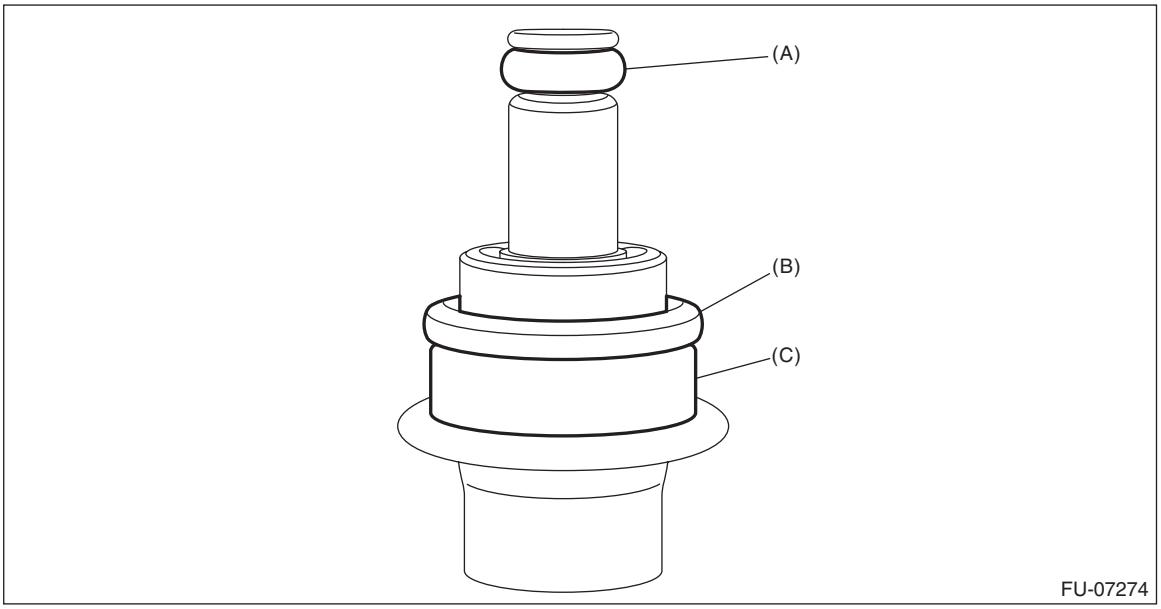
13) Remove O-ring (A), O-ring (B), and backup ring (C) from the pressure regulator.



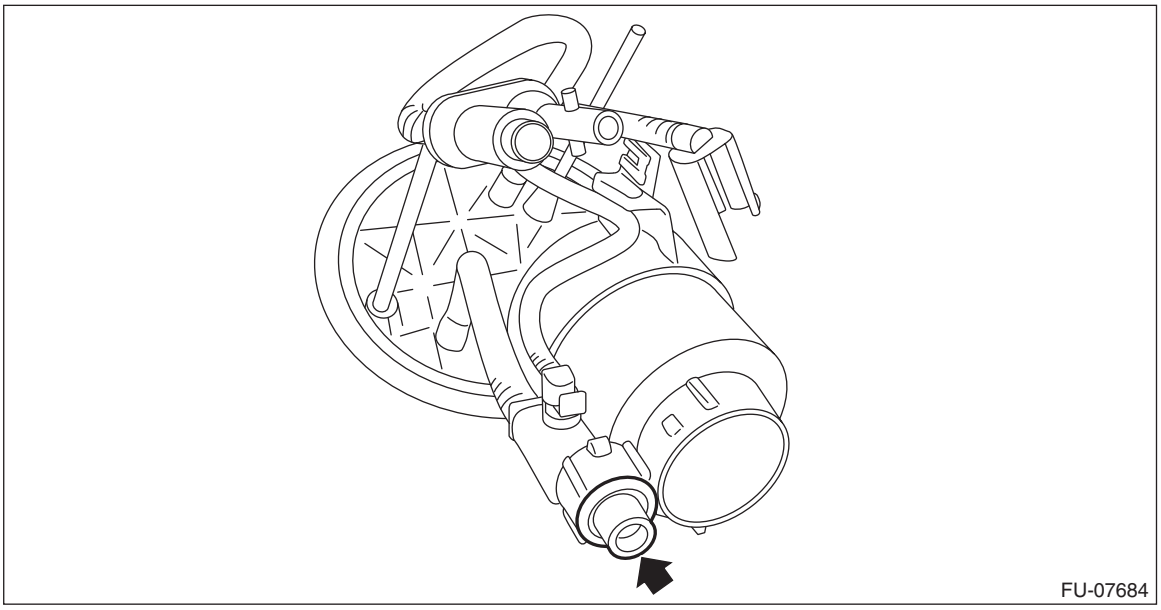
B: INSTALLATION

1) Install O-ring (A), O-ring (B), and backup ring (C) to the pressure regulator.

NOTE:
- Use new O-rings.
- Apply gasoline to the O-ring and backup ring.

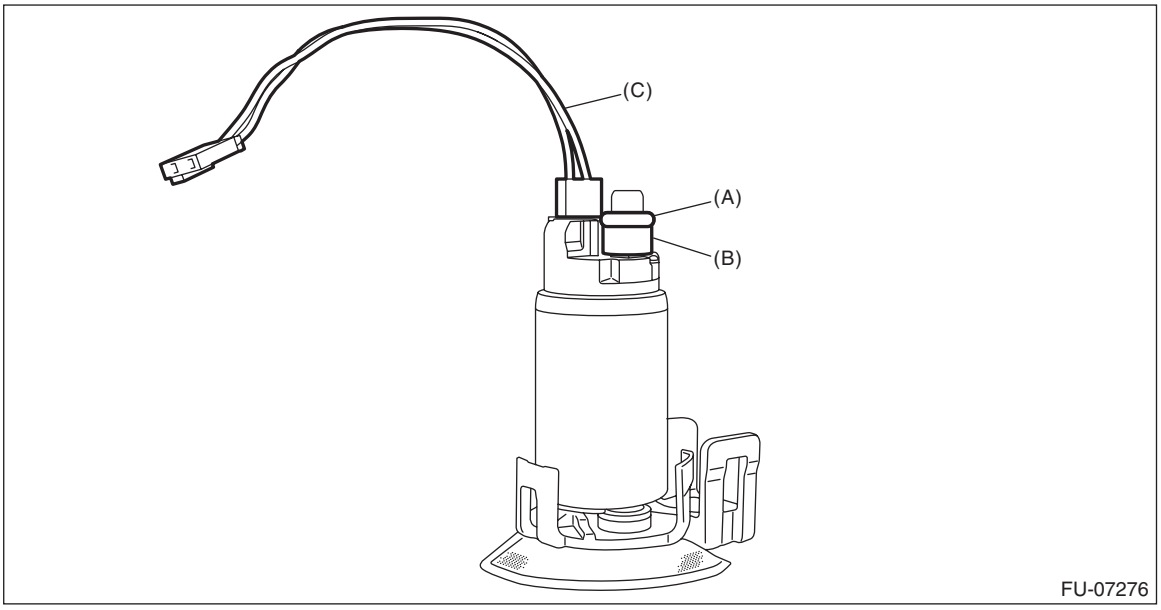


2) Install the pressure regulator to the fuel filter assembly.


FU-07684

3) Install O-ring (A), spacer (B), and connector cable (C) to the fuel pump.

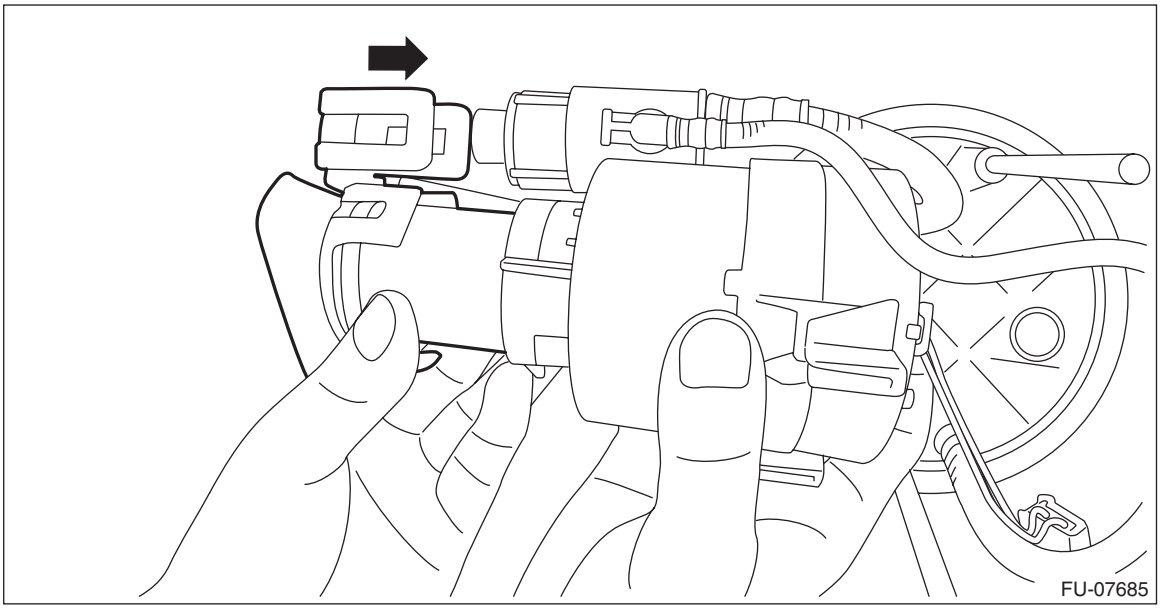
NOTE:
- Use new O-rings and the connector cable.
- Apply gasoline to the O-rings and the spacer.



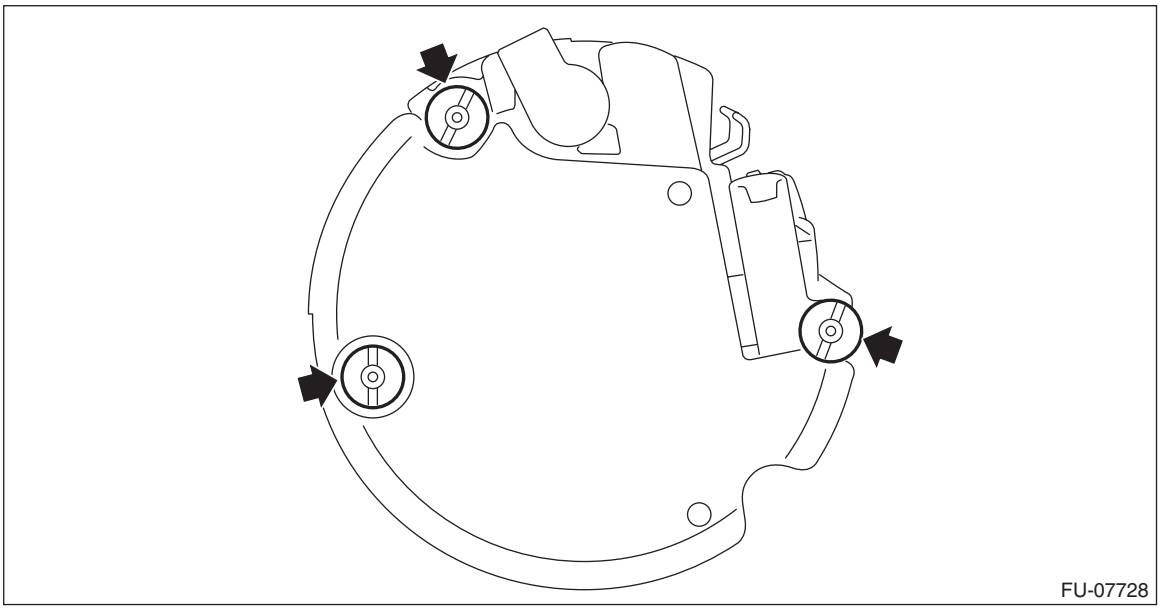
FU-07276

4) Install the fuel pump to the fuel filter assembly.

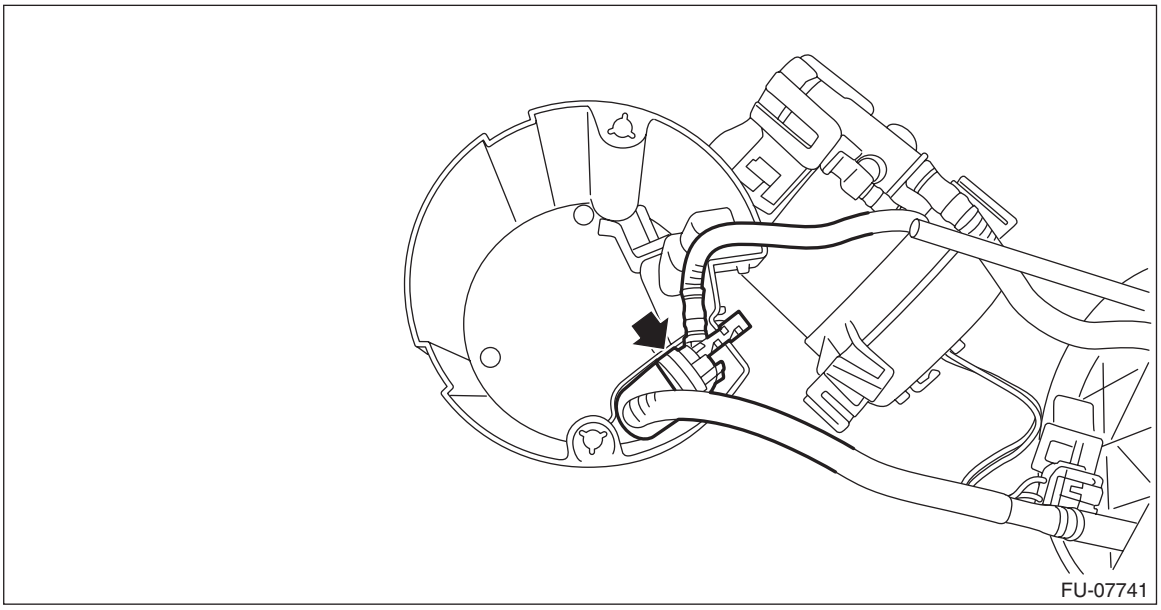
NOTE:
After installation, make sure five claws are correctly engaged in each position.



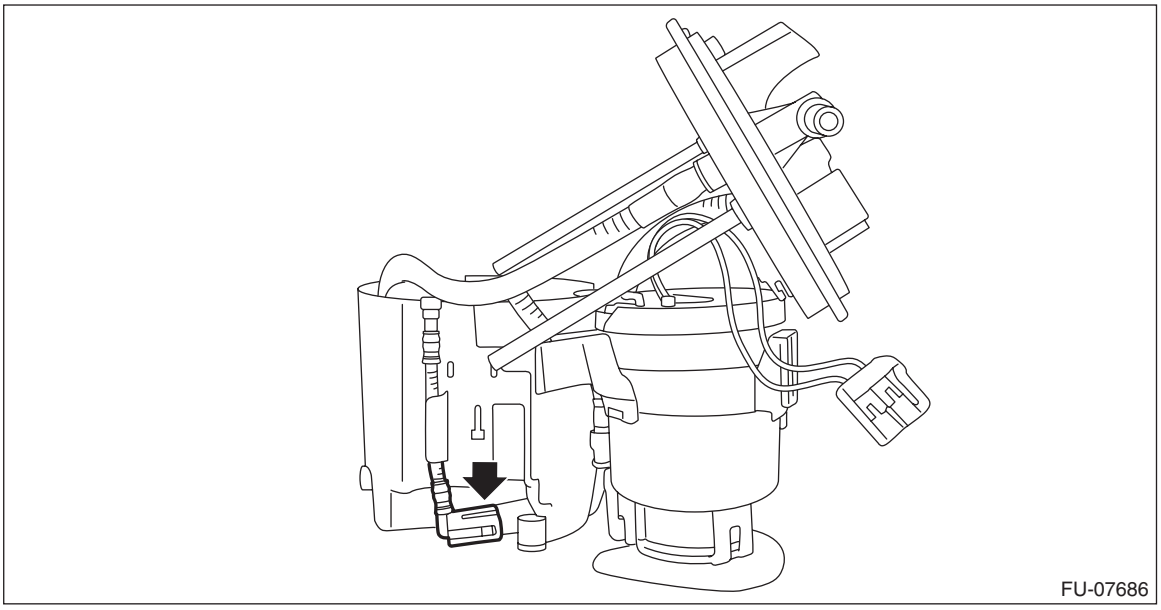
5) Check that the cushions of the fuel chamber assembly for dislocation. If any of them is dislocated, install a new cushion.



6) Slowly press in and install the tube assembly to the fuel chamber assembly until a clicking sound is heard.

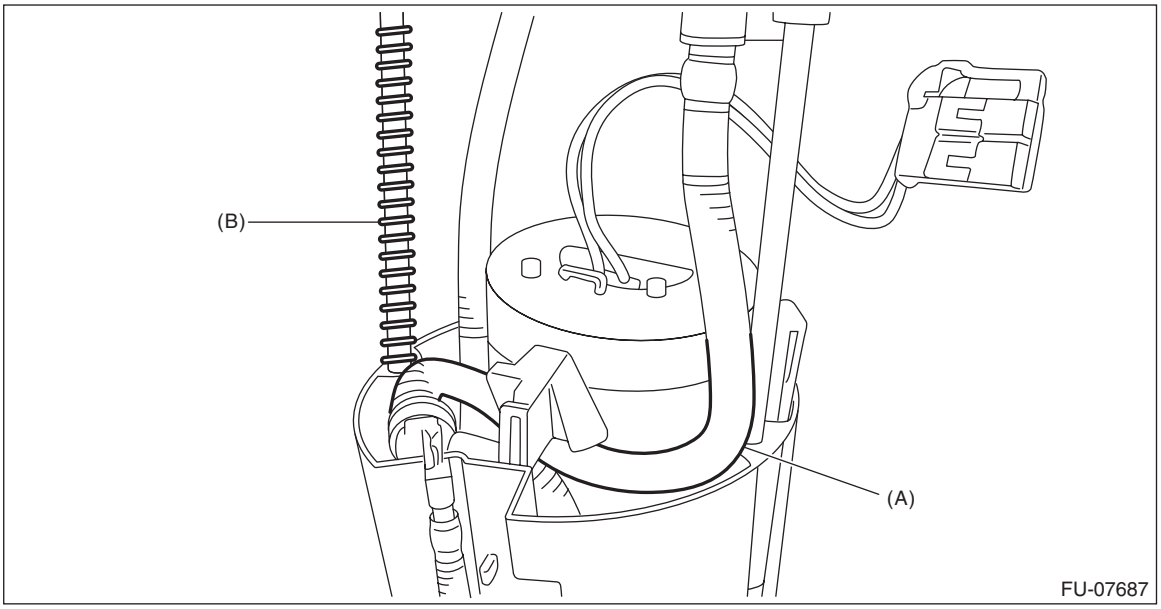


7) Connect the tube assembly to the fuel chamber assembly.

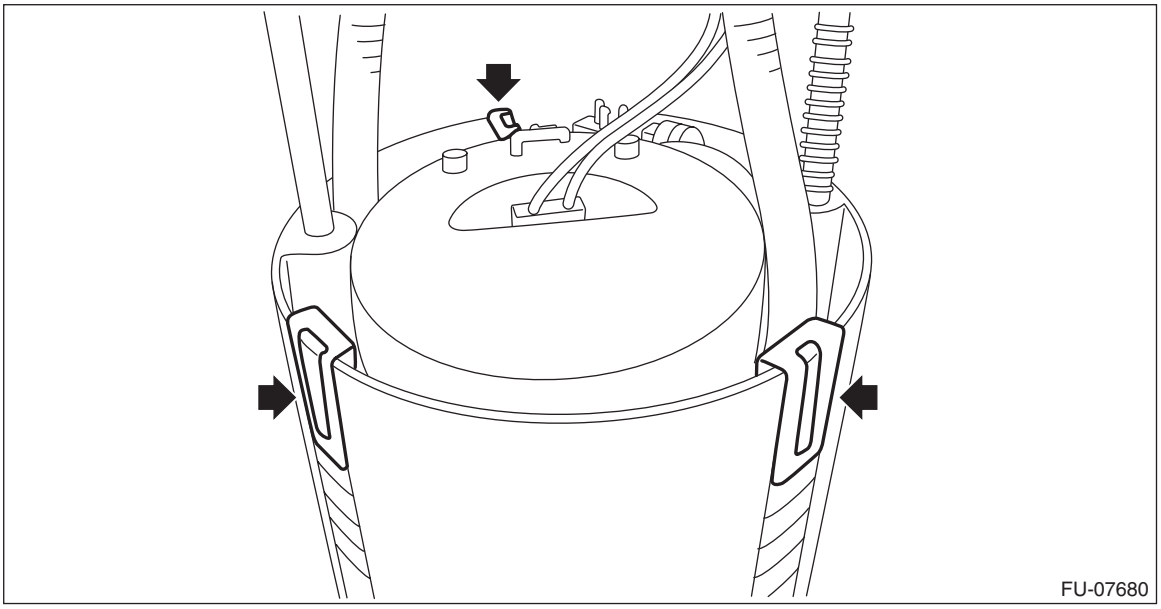


8) Install the fuel filter assembly to the fuel chamber assembly.

NOTE:
- Set the tube (A) and spring (B) for the fuel filter assembly as shown in the figure.

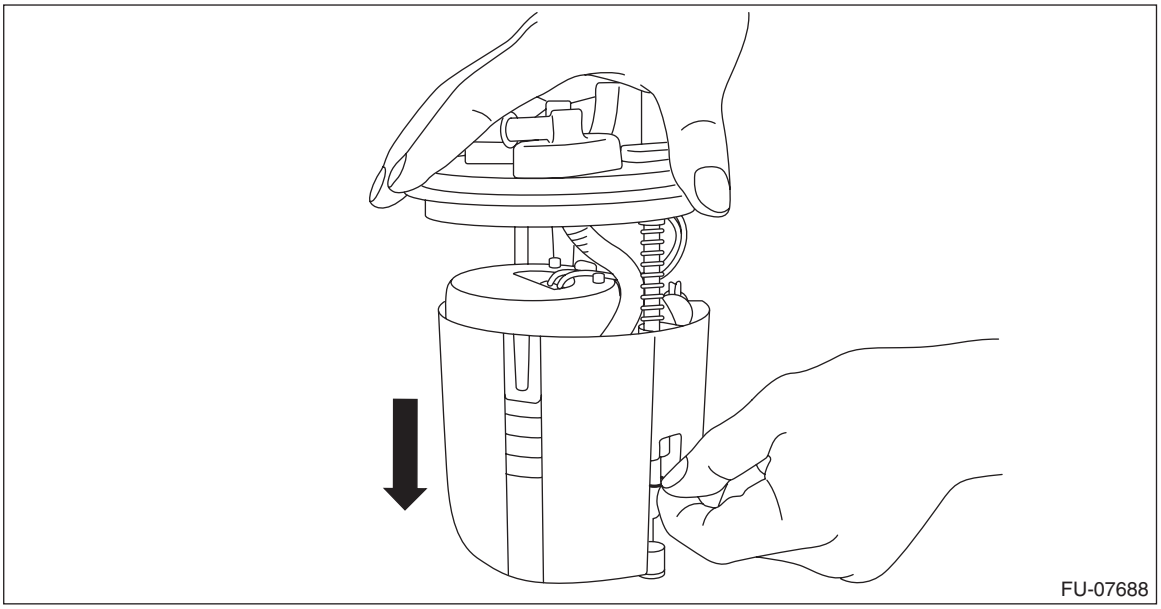


- Check that the claw connecting the fuel camber assembly and the fuel filter assembly is securely fastened.

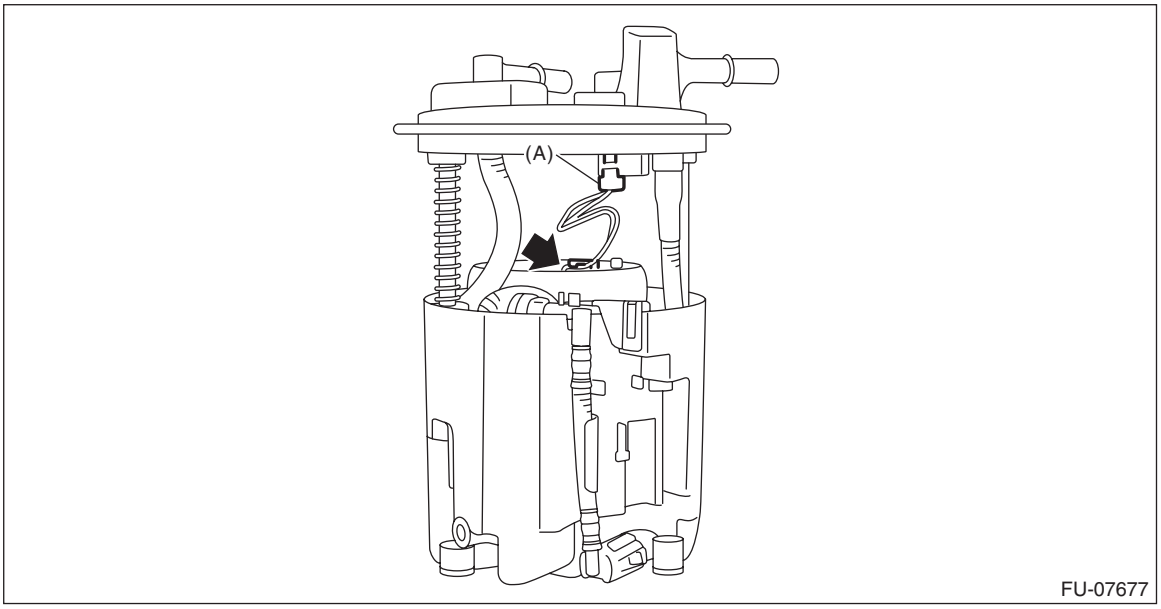


9) Push the fuel filter assembly in the direction of the arrow to compress, and attach the clip.

NOTE:
Use a new clip.



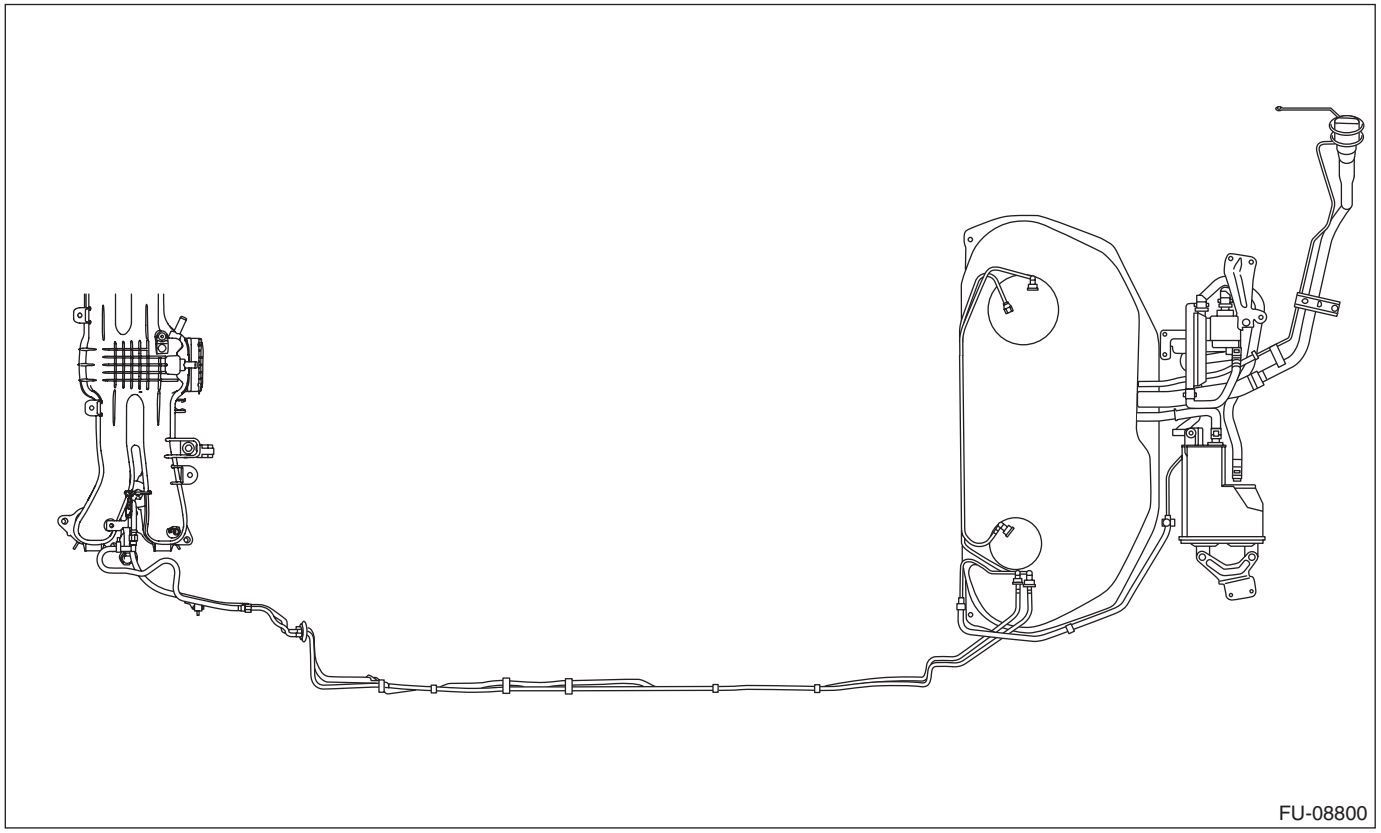
10) Secure the connector cable with the clip, and connect the connector (A) of the connector cable.



11) Install the fuel level sensor. <Ref. to FU(H4DO(w/o HEV))-146, INSTALLATION, Fuel Level Sensor.>
12) Inspect the fuel level sensor. <Ref. to FU(H4DO(w/o HEV))-147, INSPECTION, Fuel Level Sensor.>
13) Install the fuel pump assembly. <Ref. to FU(H4DO(w/o HEV))-140, INSTALLATION, Fuel Pump.>

32.Fuel Delivery and Evaporation Lines

A: REMOVAL



WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
Be careful not to spill fuel.

1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Open the fuel filler lid and remove the fuel filler cap.

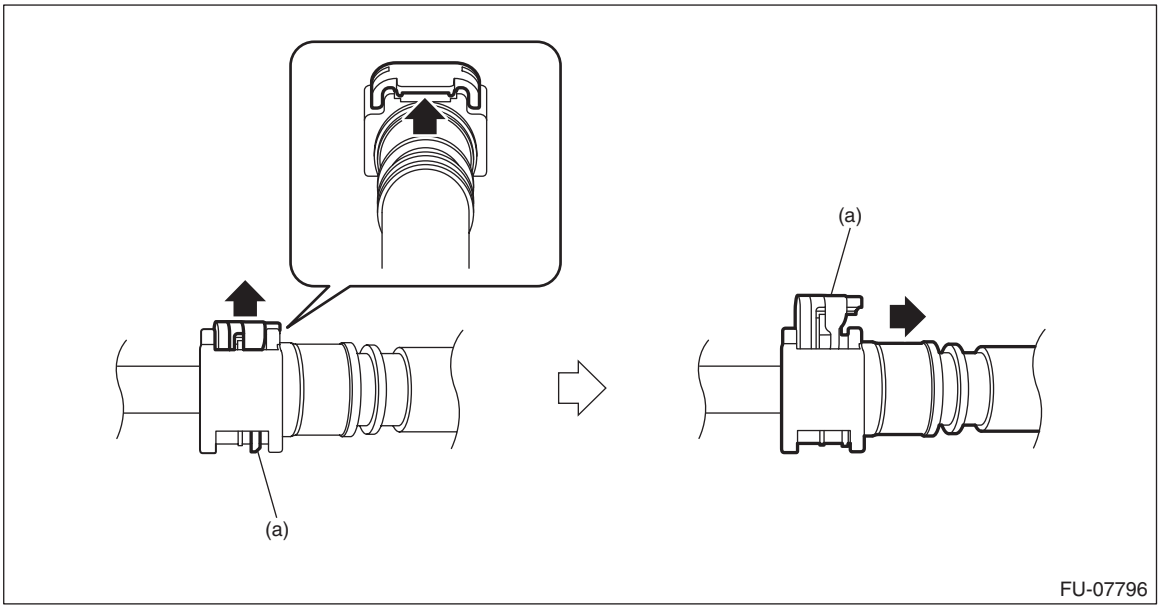
NOTE:
This operation is required to release the inner pressure of the fuel tank.

3) Remove the floor mat. <Ref. to EI-124, REMOVAL, Floor Mat.>

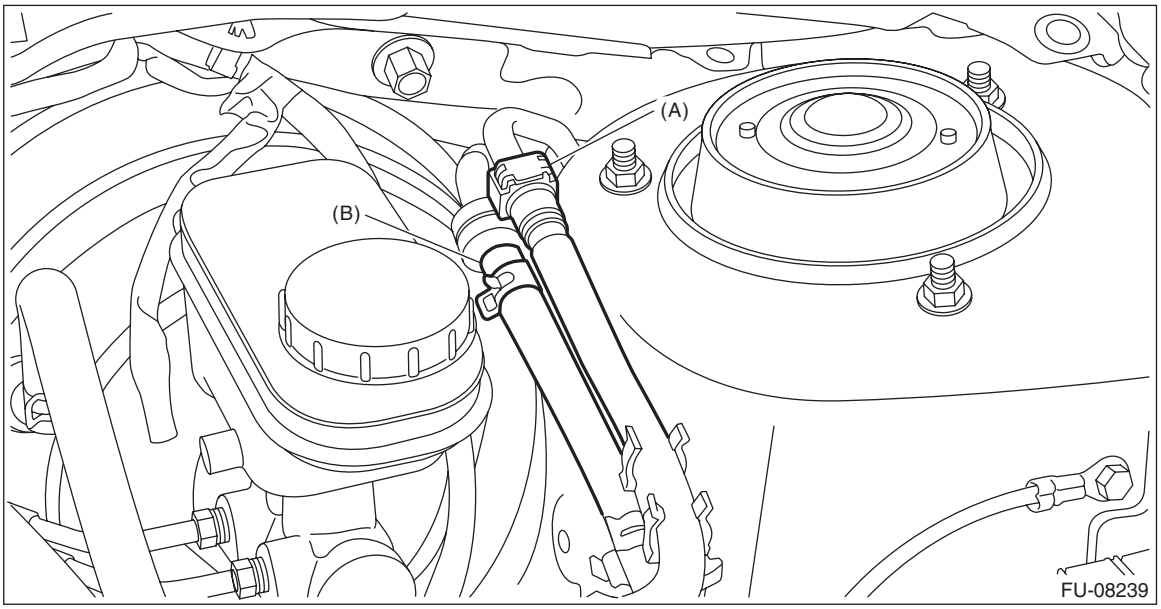
4) In the engine compartment, disconnect the fuel delivery tube (A) and evaporation hose (B).

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider

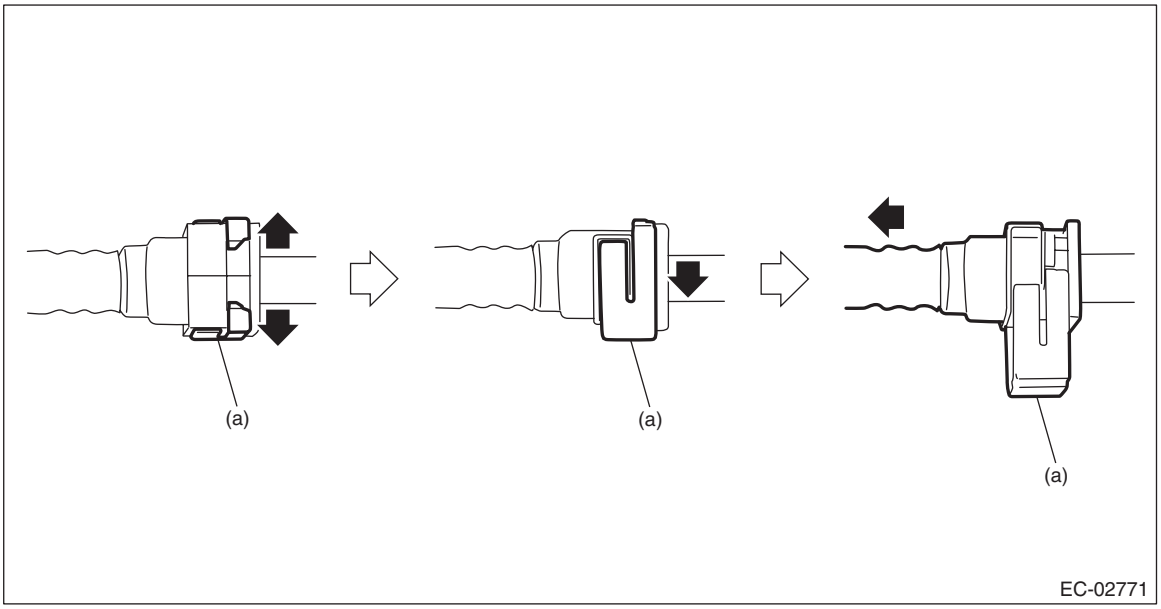


5) Remove the fuel tank. <Ref. to FU(H4DO(w/o HEV))-116, REMOVAL, Fuel Tank.>

6) Disconnect the quick connector, and remove the fuel delivery tube and jet pump tube from the fuel tank.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

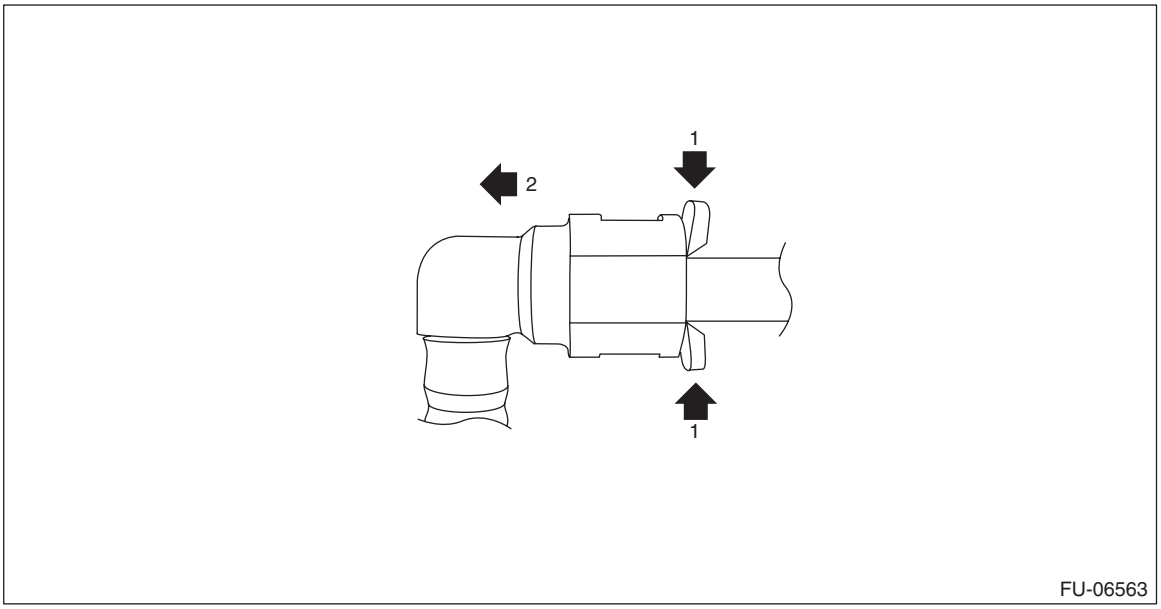
NOTE:
Disconnect the quick connector as shown in the figure.

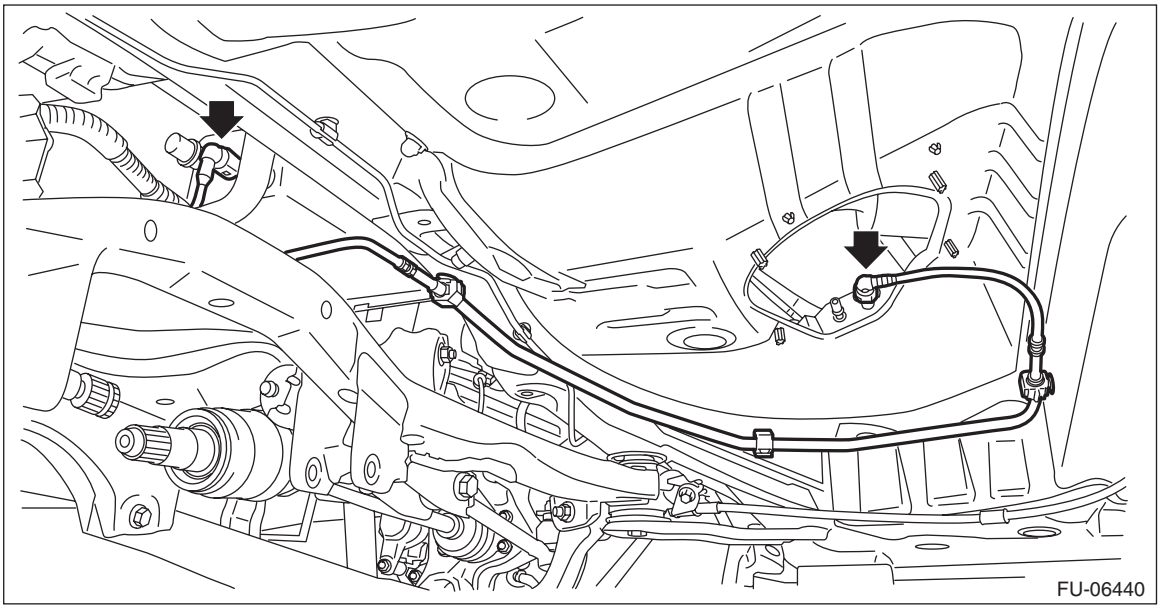


(a) Slider

7) Disconnect the quick connector and remove the purge pipe.

NOTE:
Disconnect the quick connector as shown in the figure.



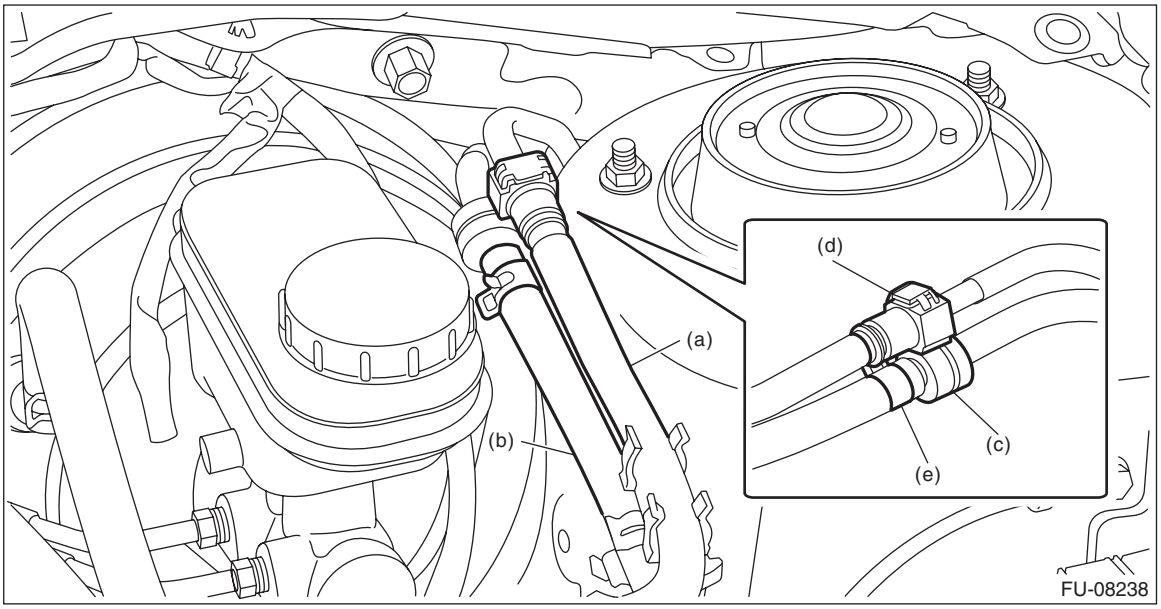


8) Remove the fuel pipe assembly from vehicle.

B: INSTALLATION

Install in the reverse order of removal while being careful of the following.

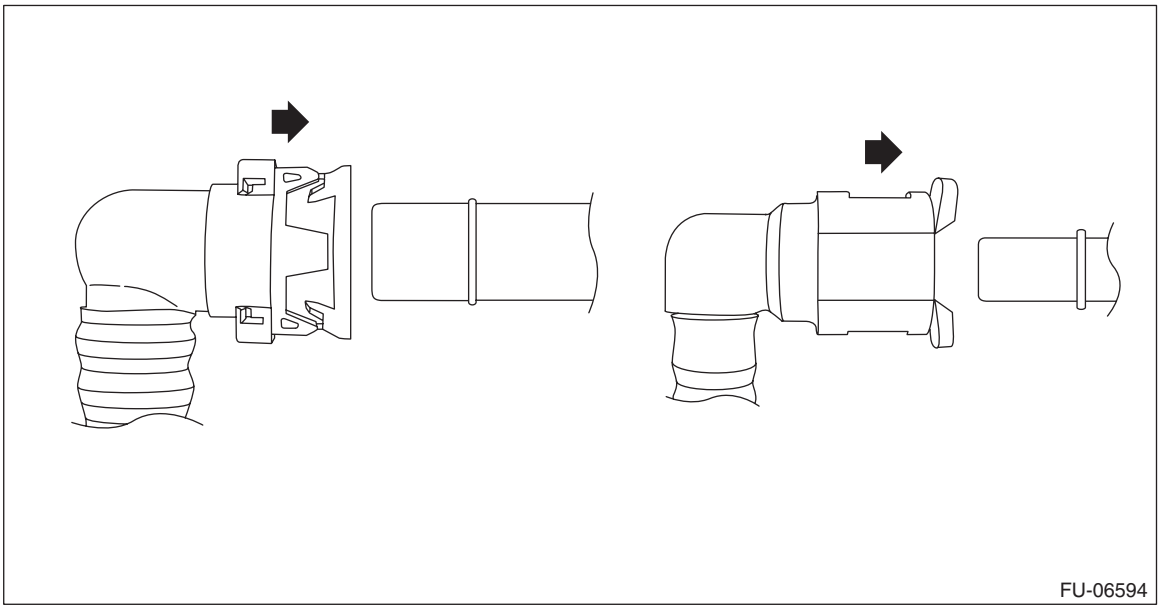
NOTE:
When connecting the fuel delivery tube (a) and evaporation hose (b), let the bushing (c) contact the quick connector (d) of fuel delivery tube to prevent the clip (e) from contacting the quick connector (d).



1. CONNECTING THE EVAPORATION LINE QUICK CONNECTOR

Connect the quick connector as shown in the figure.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• Make sure that the quick connector is securely connected.

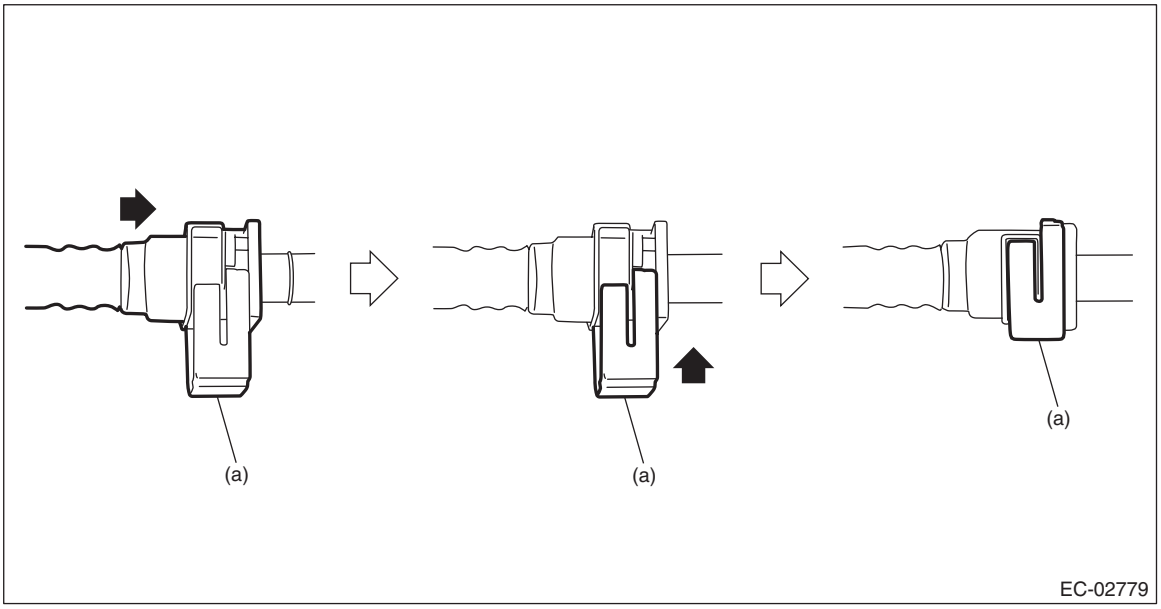


2. CONNECTING THE FUEL LINE QUICK CONNECTOR

Connect the quick connector as shown in the figure.

CAUTION:

- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check again that the quick connector is securely connected.**

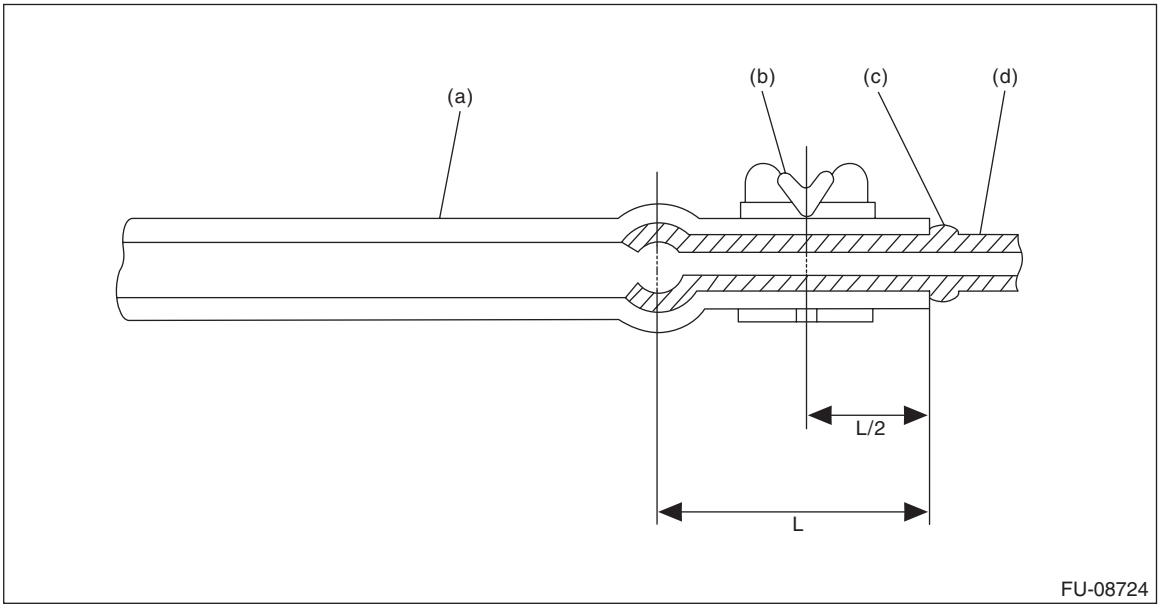


(a) Slider

3. EVAPORATION HOSE CONNECTION

Connect the evaporation hose by inserting it to the pipe until the hose reaches the spool or bump.

NOTE:
If there is no spool nor bump, connect the evaporation hose by inserting it at 28 mm (1.1 in) to the pipe.



(a) Hose
(b) Clip
(c) Spool or bump
(d) Pipe

C: INSPECTION

1) Check that the fuel pipe has no deformation, cracks or other damages.
2) Check that the hose and tube have no cracks, damage or loose part.

33.Fuel System Trouble in General

A: INSPECTION

Trouble	Possible cause	Corrective action
Insufficient fuel supply to fuel injector	a. Fuel pump does not operate.	
	❍ Defective terminal contact	Inspect contact, especially ground, and tighten it securely.
	❍ Trouble in electromagnetic or electronic circuit parts	Replace the faulty parts.
	b. Decline of fuel pump function	Replace the fuel pump.
	c. Clogged fuel filter	Replace the fuel filter. Clean or replace the fuel tank if necessary.
	d. Clogged or bent fuel line pipe, hose or tube	Clean, correct or replace the fuel line pipe, hose or tube.
	e. Air is mixed in fuel system.	Check the fuel line connections, correct or replace the defective part.
	f. Damaged diaphragm of pressure regulator	Replace the fuel filter assembly.
Leakage or blow out of fuel	a. Loose connections of fuel line pipe, hose or tube	Check the fuel line connections, correct or replace the defective part.
	b. Cracked fuel line pipe, hose or tube	Replace the fuel line pipe, hose or tube.
	c. Cracked fuel tank or defective welding part	Replace the fuel tank.
	d. Clogged or bent fuel line pipe, hose or tube	Clean, correct or replace the fuel line pipe, hose or tube.
Gasoline smell inside of compartment	a. Loose connections of fuel line pipe, hose or tube	Check the fuel line connections, correct or replace the defective part.
	b. Defective gasket of fuel saucer or fuel filler pipe assembly	Correct or replace the gasket.
	c. Defective canister	Replace the canister.
Defective fuel gauge	a. Defective operation of fuel level sensor	Replace the fuel level sensor.
	b. Defective operation of combination meter <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>	Replace the combination meter.
Noise	a. Large operation noise or vibration of fuel pump	Replace the fuel pump.

NOTE:
• When the vehicle is left unattended for an extended period of time, water may accumulate in the fuel tank. Fill fuel fully to prevent the problem.
• In snow-covered areas, mountainous areas, skiing areas, etc. where ambient temperatures drop to 0°C (32°F) or less throughout the winter season, use a water removing agent in the fuel system to prevent freezing fuel system and accumulating water.
• When water is accumulated in fuel filter, fill the water removing agent in the fuel tank.
• Before using water removing agent, follow the cautions noted on the bottle.

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)

EC(H4DO(w/o HEV))

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3.	Rear Catalytic Converter	9
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6.	EGR Control Valve	23
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12.	Leak Check Valve Assembly	43
13.	Drain Separator	63
14.	PCV Hose	65
15.	PCV Valve	66

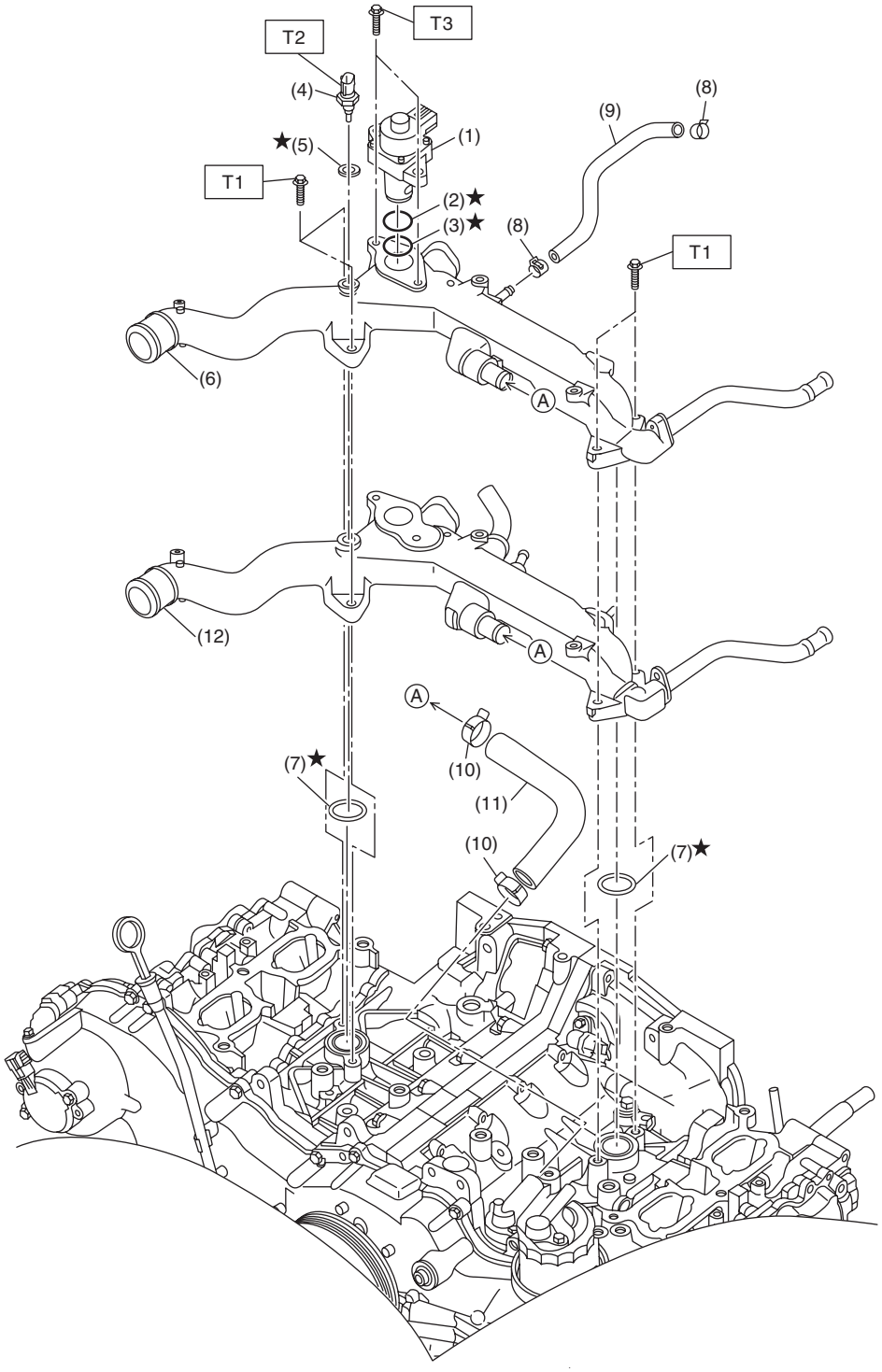
1. General Description

A: COMPONENT

1. CANISTER, LEAK CHECK VALVE ASSEMBLY AND DRAIN SEPARATOR

For structures of the canister, leak check valve assembly and drain separator, refer to “FU (H4DO (w/o HEV))”. <Ref. to FU(H4DO(w/o HEV))-3, COMPONENT, General Description.>

2. EGR SYSTEM 1

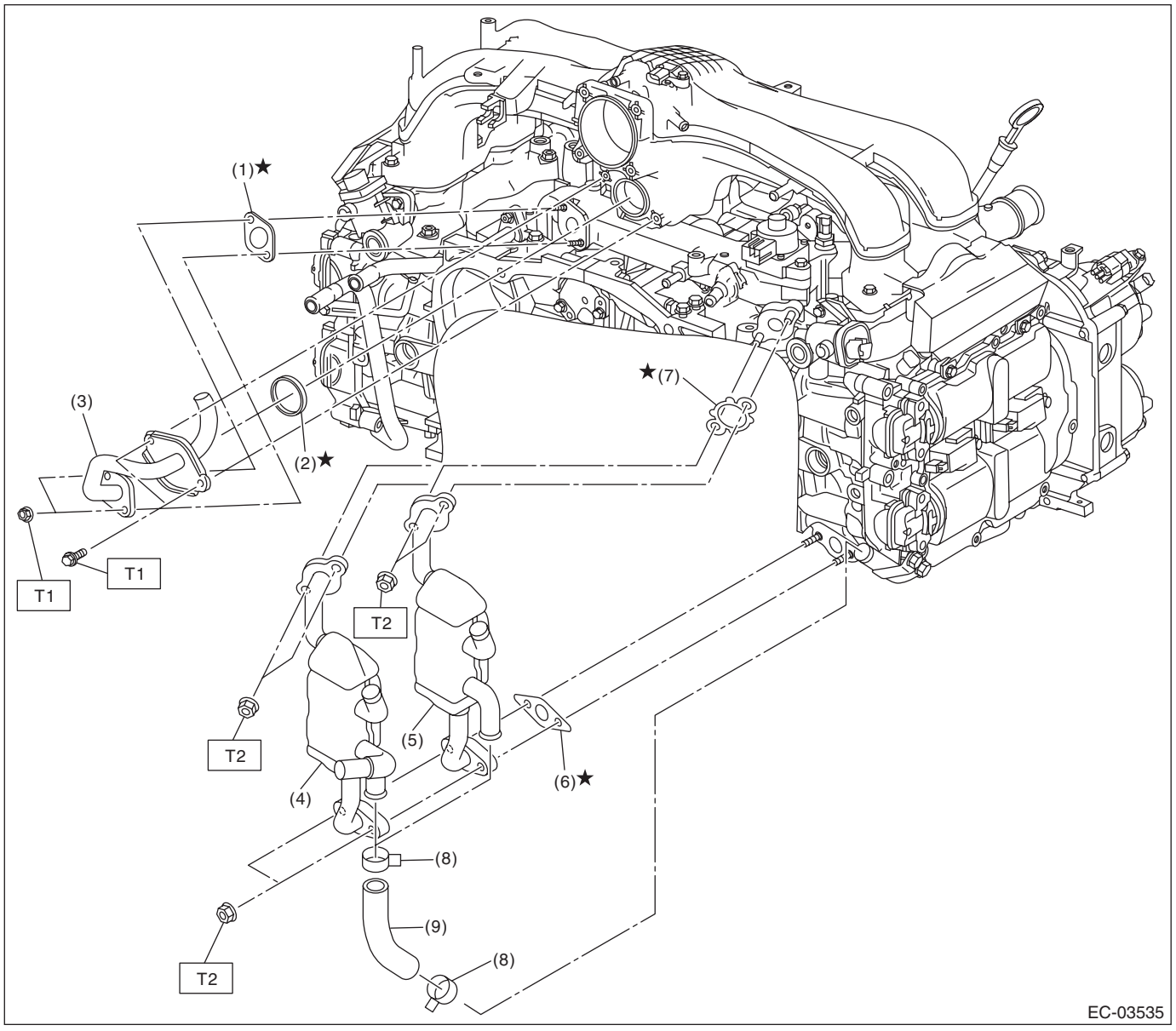


EC-03534

(1)	EGR control valve	(7)	O-ring
(2)	O-ring	(8)	Clip
(3)	Gasket	(9)	Preheater hose A
(4)	Engine coolant temperature sensor	(10)	Clip
(5)	Gasket	(11)	Preheater hose B
(6)	Water pipe ASSY (MT model)	(12)	Water pipe ASSY (CVT model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.7, 4.7)
T2: 18 (1.8, 13.3)
T3: 22 (2.2, 16.2)

3. EGR SYSTEM 2



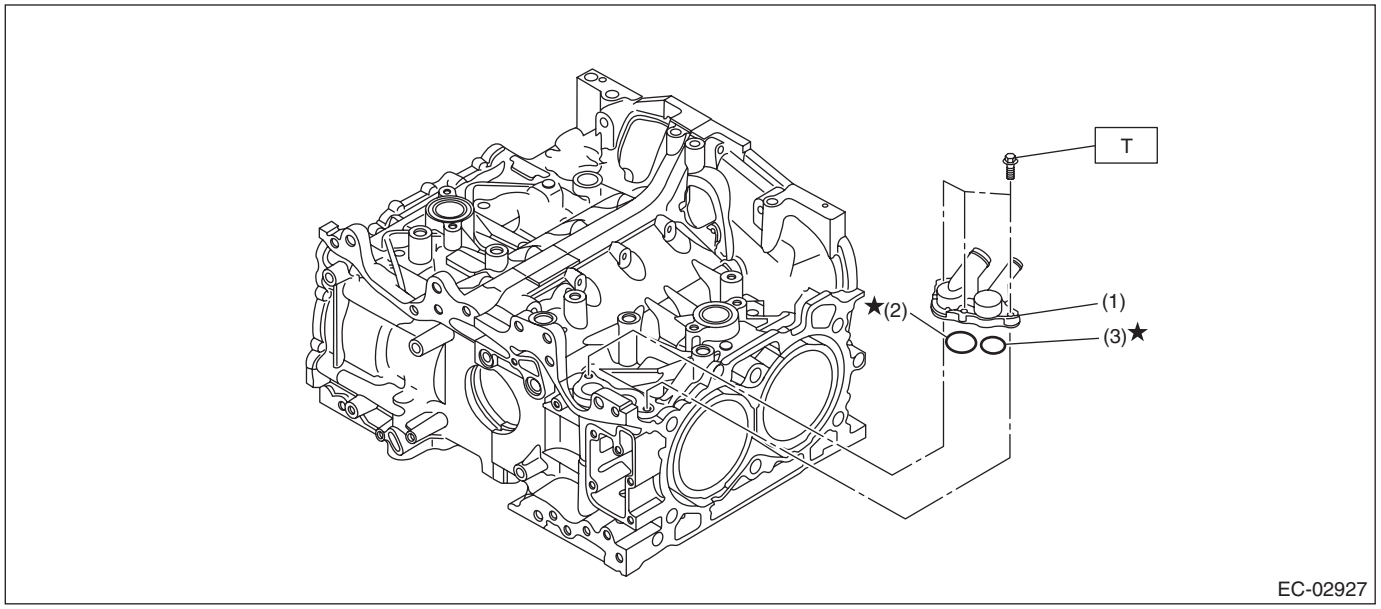
(1) Gasket
(2) Gasket
(3) EGR pipe
(4) EGR cooler (CVT model)
(5) EGR cooler (MT model)
(6) Gasket
(7) Gasket
(8) Clip
(9) Engine coolant hose

Tightening torque: N·m (kgf-m, ft-lb)

T1: <Ref. to EC(H4DO(w/o HEV))-30, INSTALLATION, EGR Pipe.>

T2: <Ref. to EC(H4DO(w/o HEV))-36, INSTALLATION, EGR Cooler.>

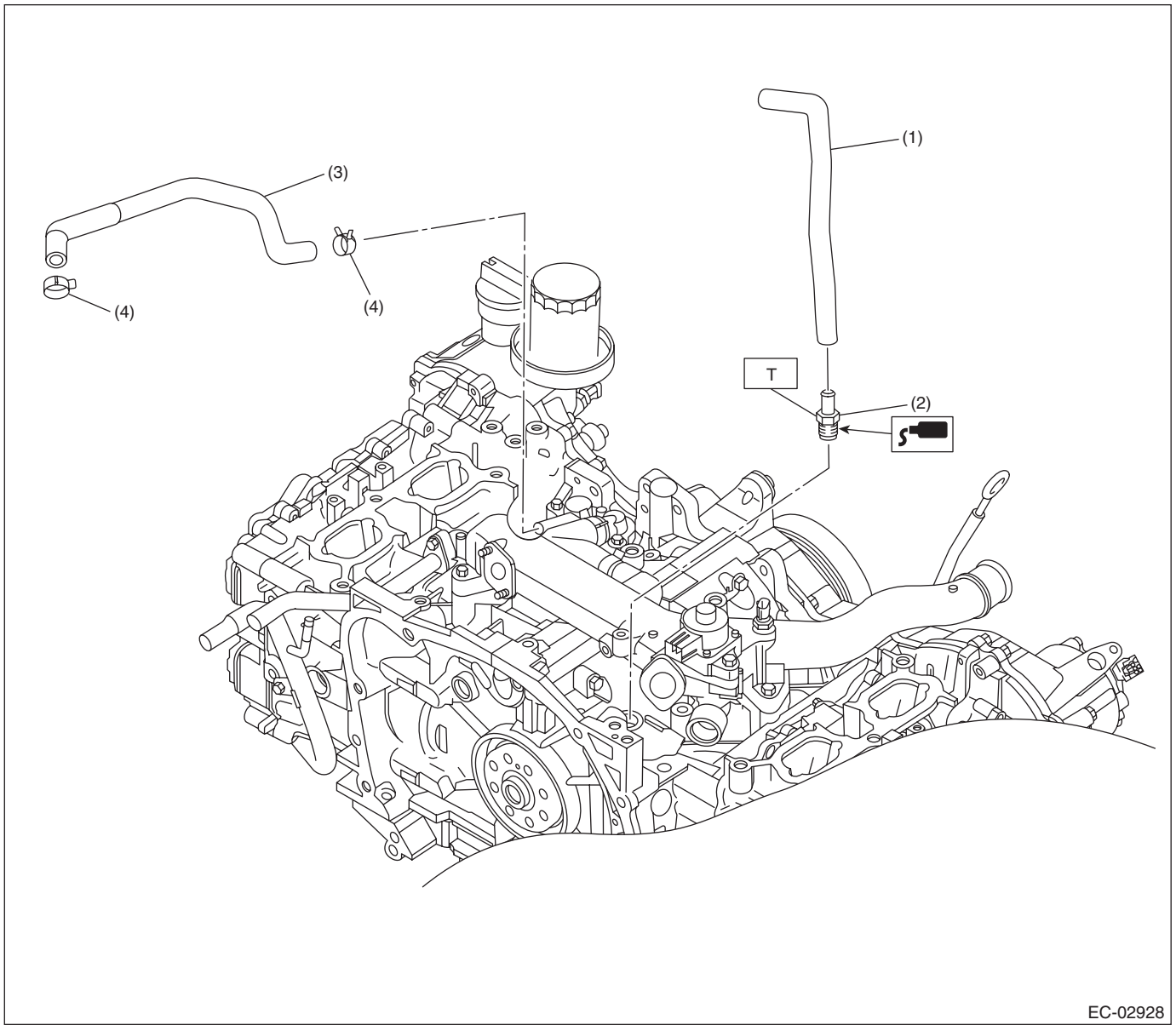
4. PCV SYSTEM 1



(1) PCV connector
(2) O-ring
(3) O-ring

Tightening torque: N·m (kgf-m, ft-lb)
T: 6.4 (0.7, 4.7)

5. PCV SYSTEM 2



(1) PCV hose A
(2) PCV valve
(3) PCV hose B
(4) Clip

Tightening torque: N·m (kgf-m, ft-lb)
T: 23 (2.3, 17.0)

B: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

C: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.

2. Front Catalytic Converter

A: REMOVAL

The front catalytic converter is integrated into the front exhaust pipe; therefore, refer to “Front Exhaust Pipe” for the removal procedure. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>

B: INSTALLATION

The front catalytic converter is integrated into the front exhaust pipe; therefore, refer to “Front Exhaust Pipe” for the installation procedure. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>

C: INSPECTION

1) Check the connections and welded parts for exhaust leaks.
2) Make sure there are no holes or rusting.

3. Rear Catalytic Converter

A: REMOVAL

The rear catalytic converter is integrated into the center exhaust pipe; therefore, refer to “Center Exhaust Pipe” for the removal procedure. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>

B: INSTALLATION

The rear catalytic converter is integrated into the center exhaust pipe; therefore, refer to “Center Exhaust Pipe” for the installation procedure. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>

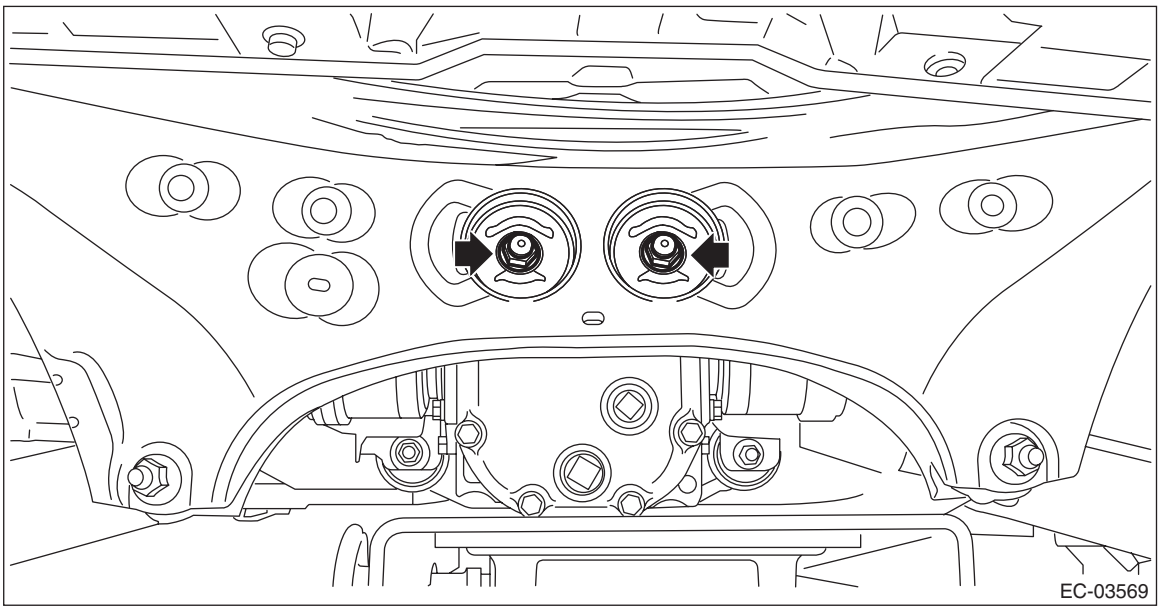
C: INSPECTION

1) Check the connections and welded parts for exhaust leaks.
2) Make sure there are no holes or rusting.

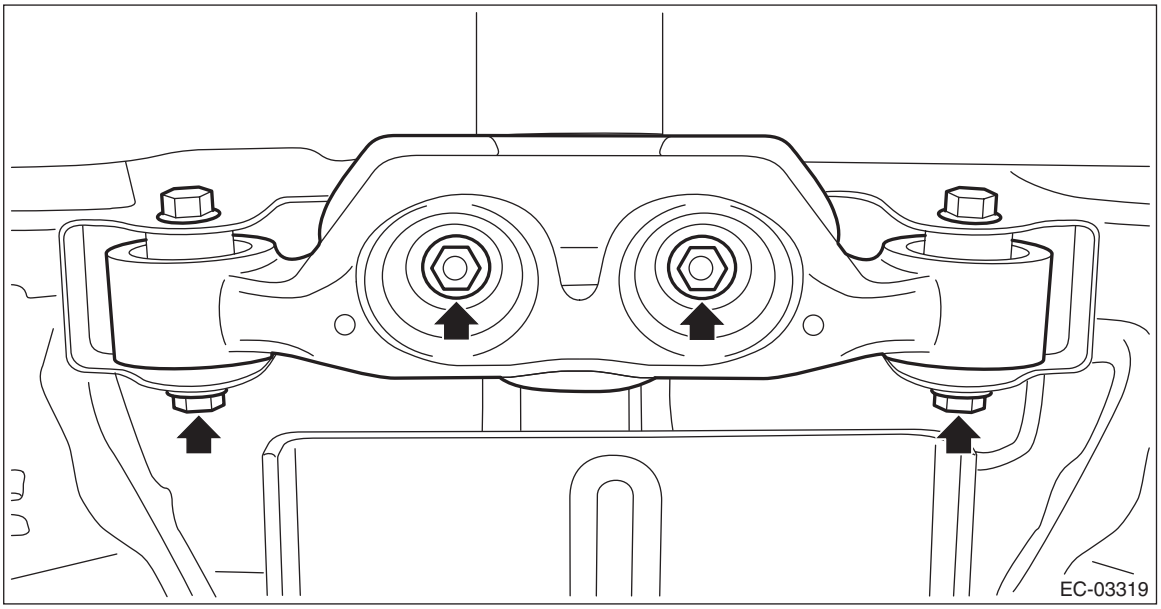
4. Canister

A: REMOVAL

1) Lift up the vehicle.
2) Remove the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
3) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
4) Support the rear differential with the transmission jack.
5) Remove the self-locking nuts which hold the rear differential to the rear sub frame assembly.



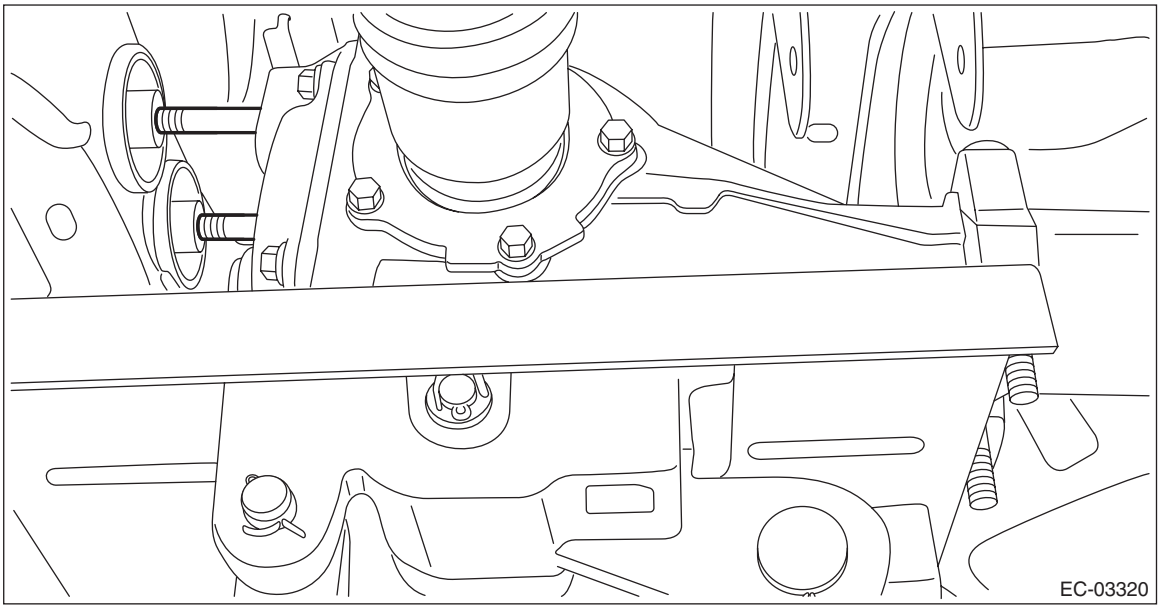
6) Remove the rear differential member from the rear sub frame assembly and the rear differential.



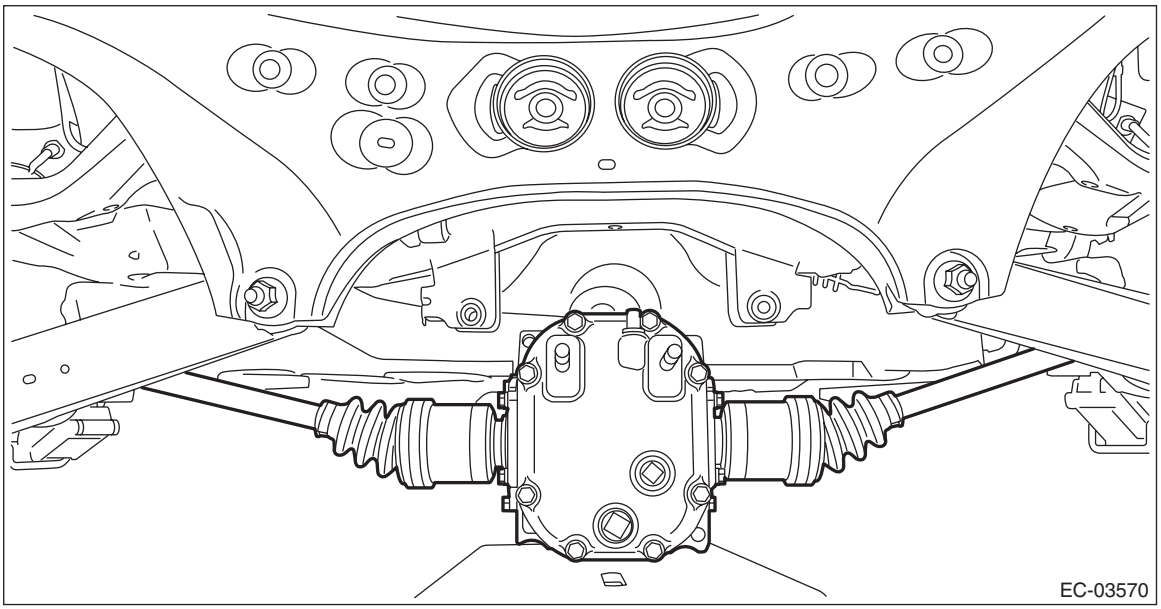
7) Lower the transmission jack gradually until the rear differential is at the position shown in the figure.

NOTE:

• When pulling out the stud bolt from the bushing portion of the rear sub frame assembly, adjust the angle and location of transmission jack and jack stand.

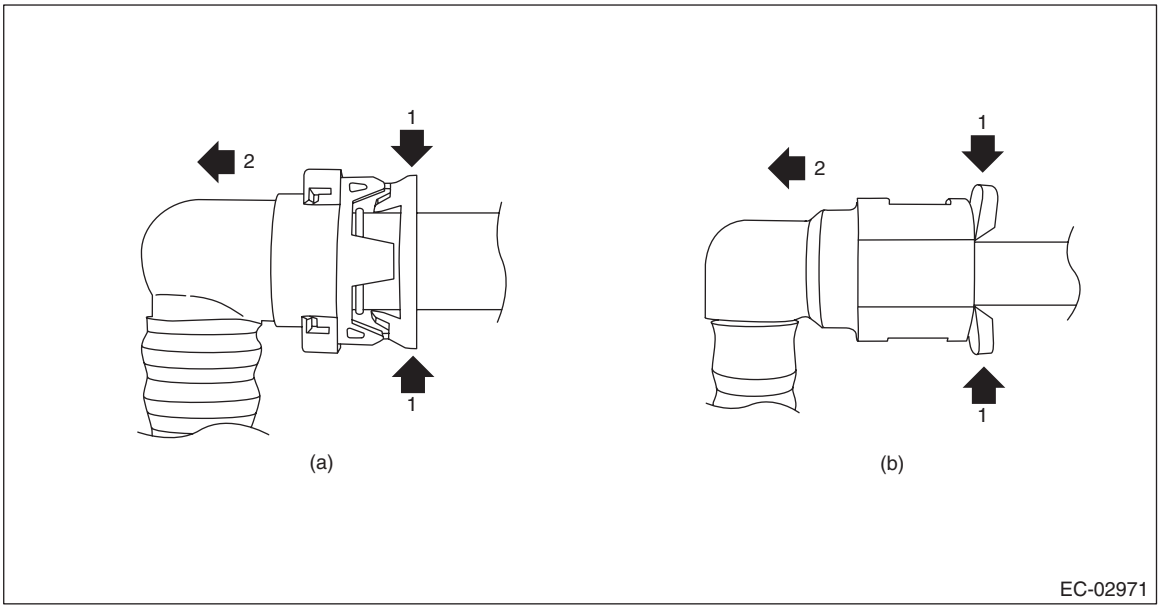


• Do not lower the rear differential excessively. Doing so may add extra load to the drive shaft or cause the falling-off of the drive shaft.

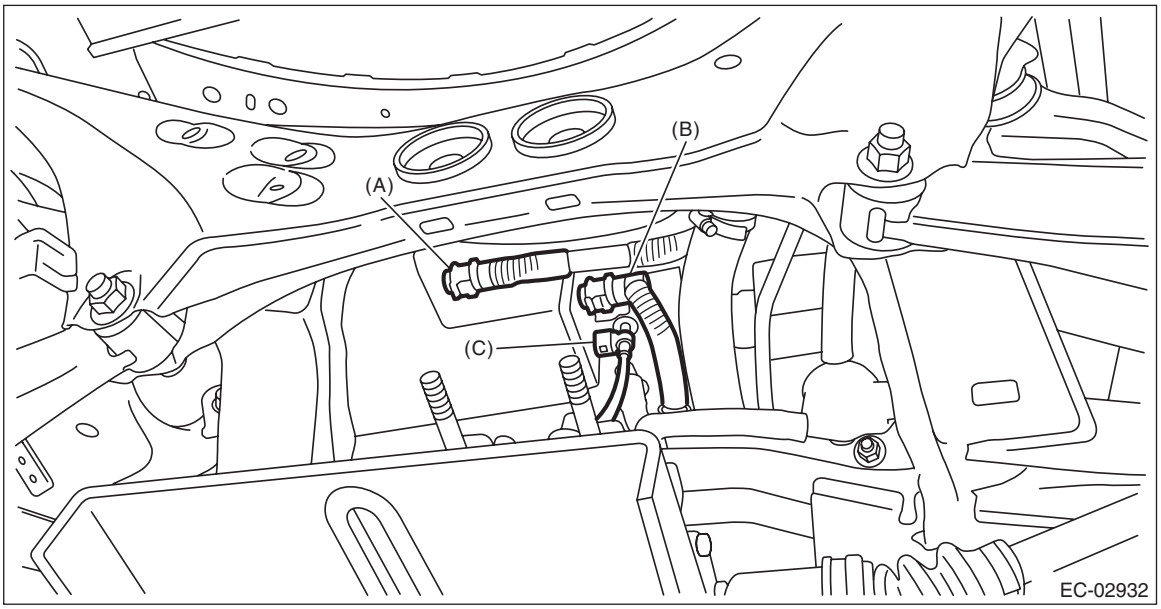


8) Disconnect the drain tube (A), vent tube (B) and purge tube (C) from the canister.

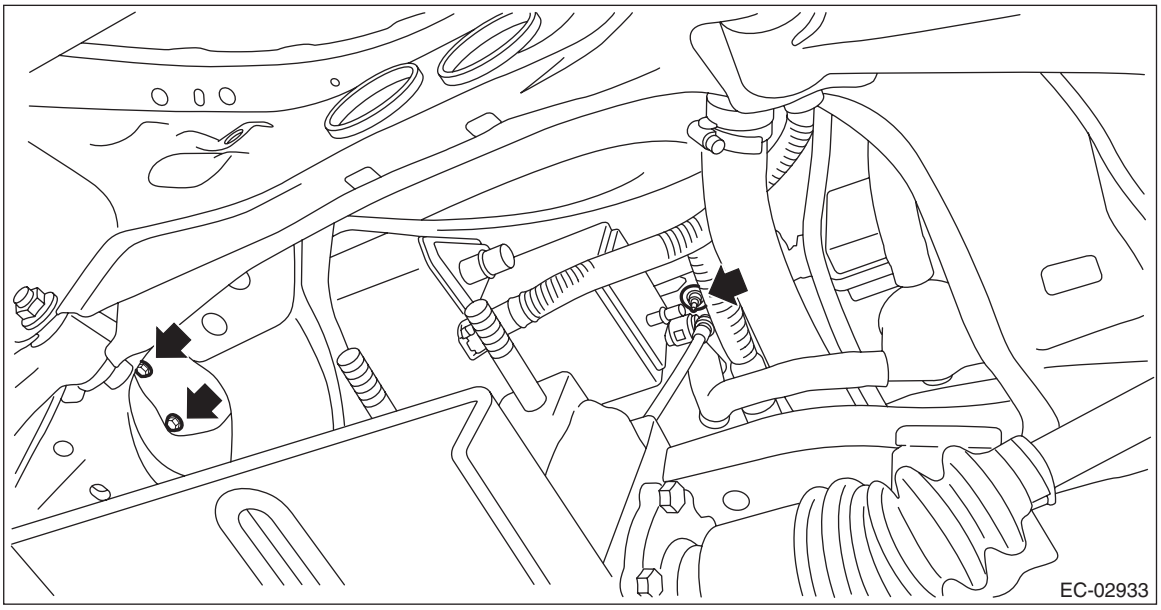
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Drain tube and vent tube (b) Purge tube



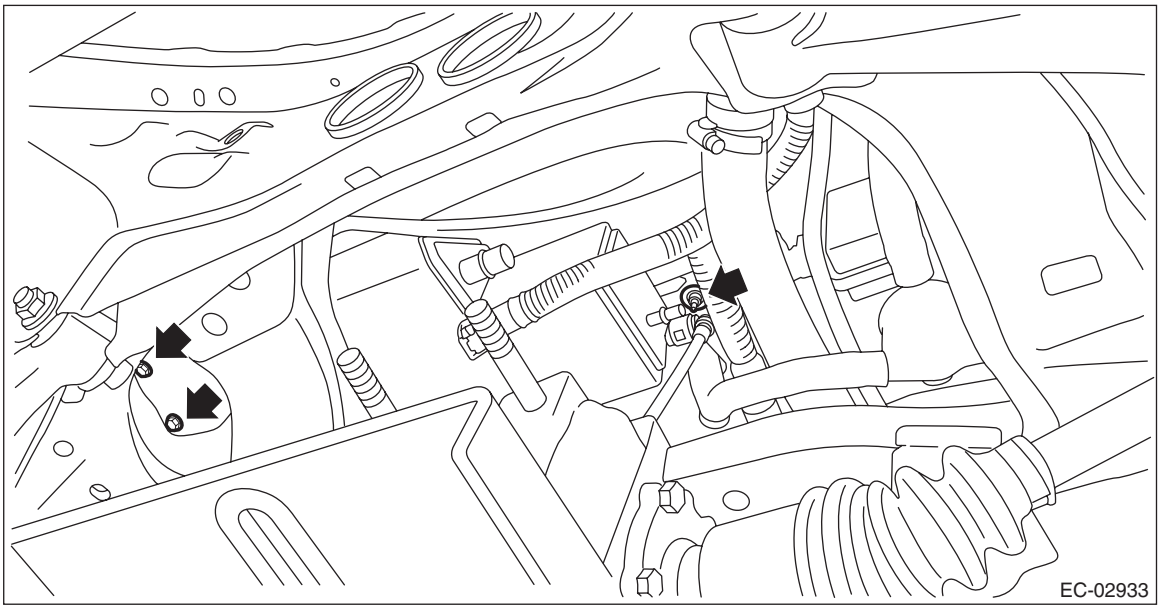
9) Remove the bolts and nuts securing the canister to the vehicle, and remove the canister.



B: INSTALLATION

1) Install the canister to the vehicle using bolts and nuts.

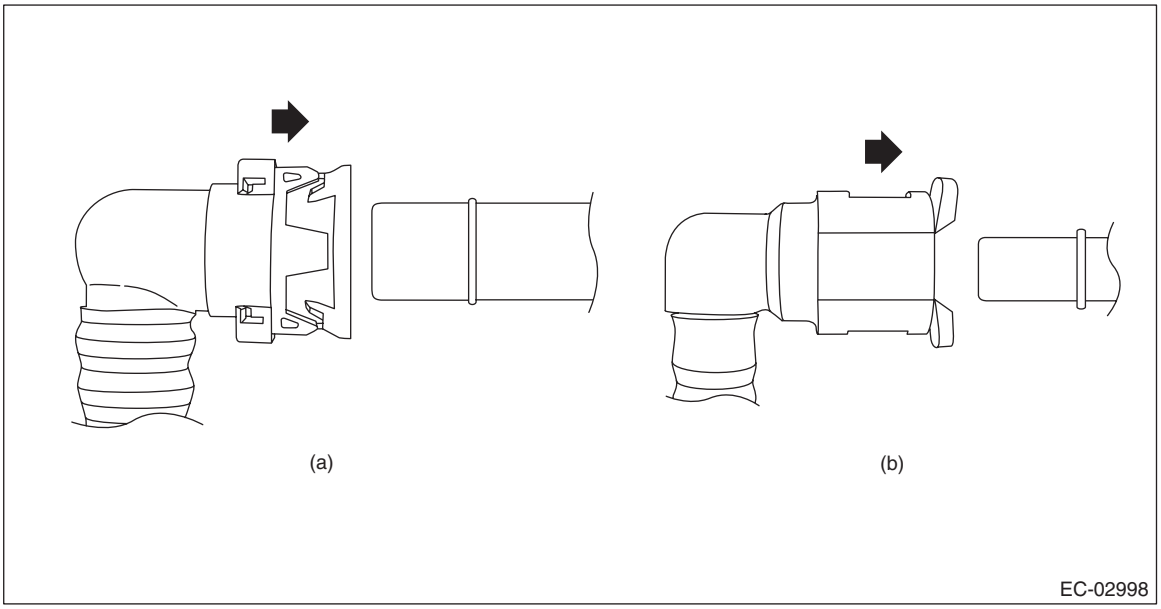
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



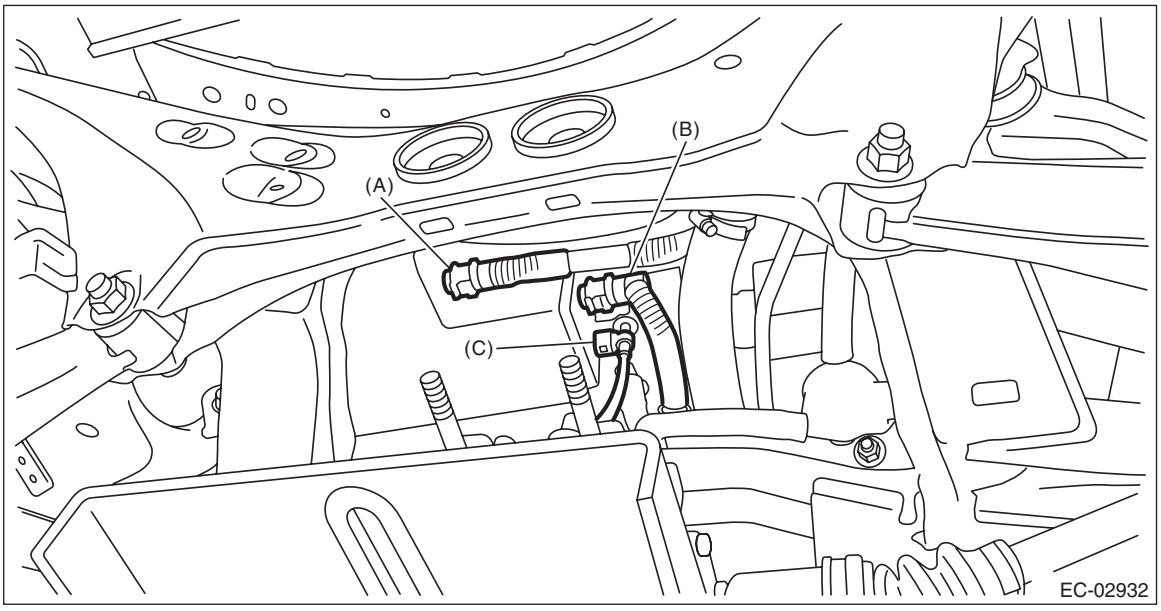
2) Install the drain tube (A), vent tube (B) and purge tube (C) to the canister.

CAUTION:
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **Make sure that the quick connector is securely connected.**

NOTE:
Install the quick connector as shown in the figure.

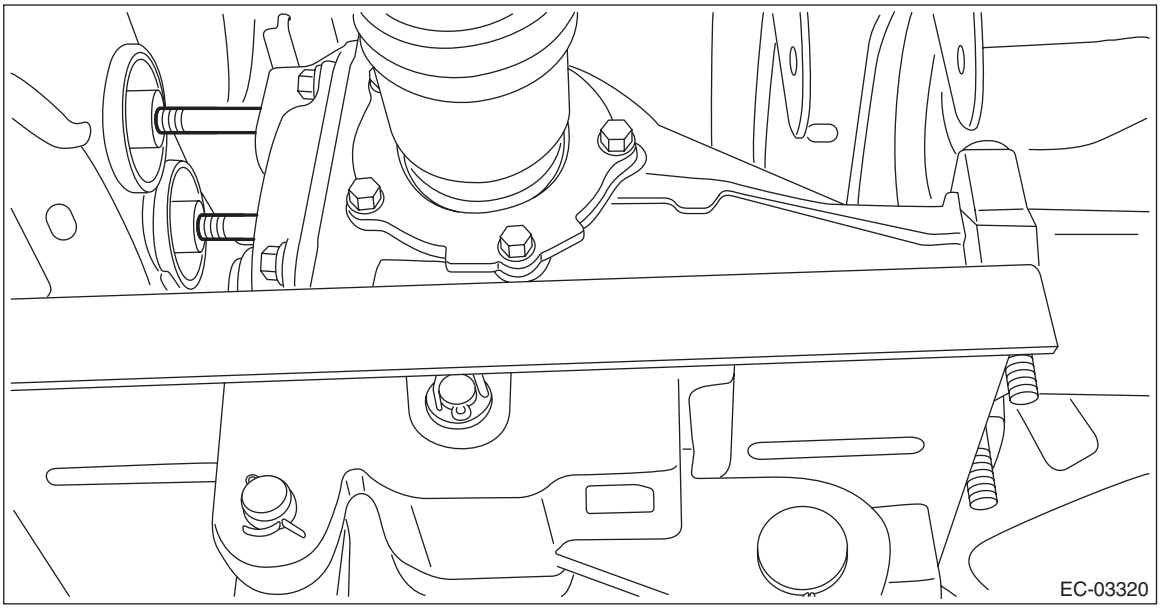


(a) Drain tube and vent tube (b) Purge tube



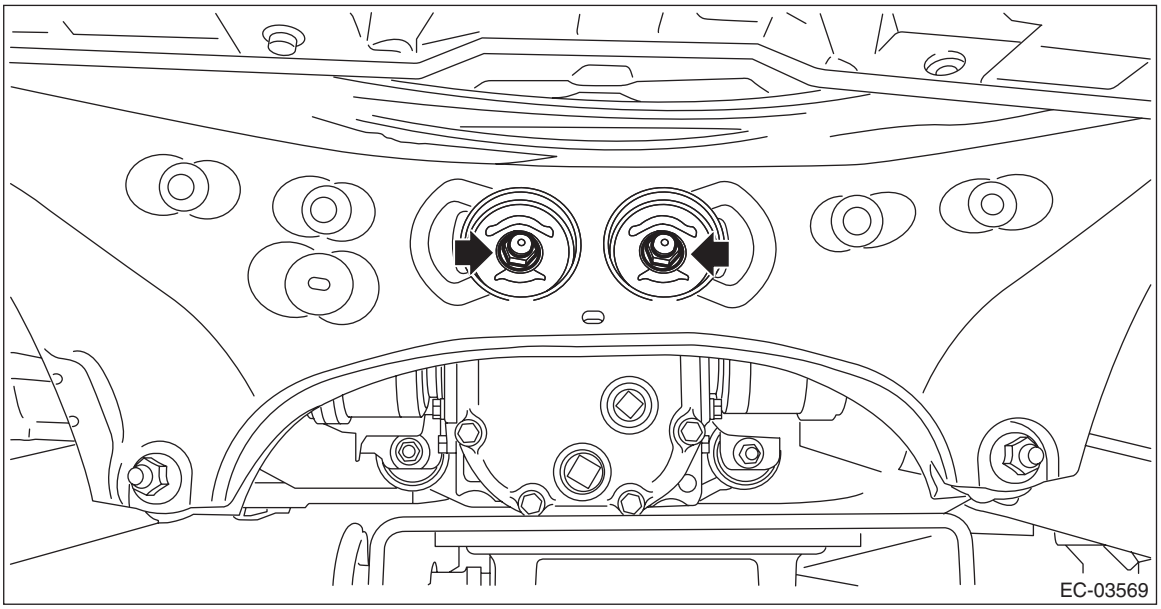
3) Lift up the transmission jack gradually, and set the rear differential to the rear sub frame assembly.

NOTE:
When inserting the stud bolt into the bushing portion of the rear sub frame assembly, adjust the angle and location of transmission jack and jack stand.



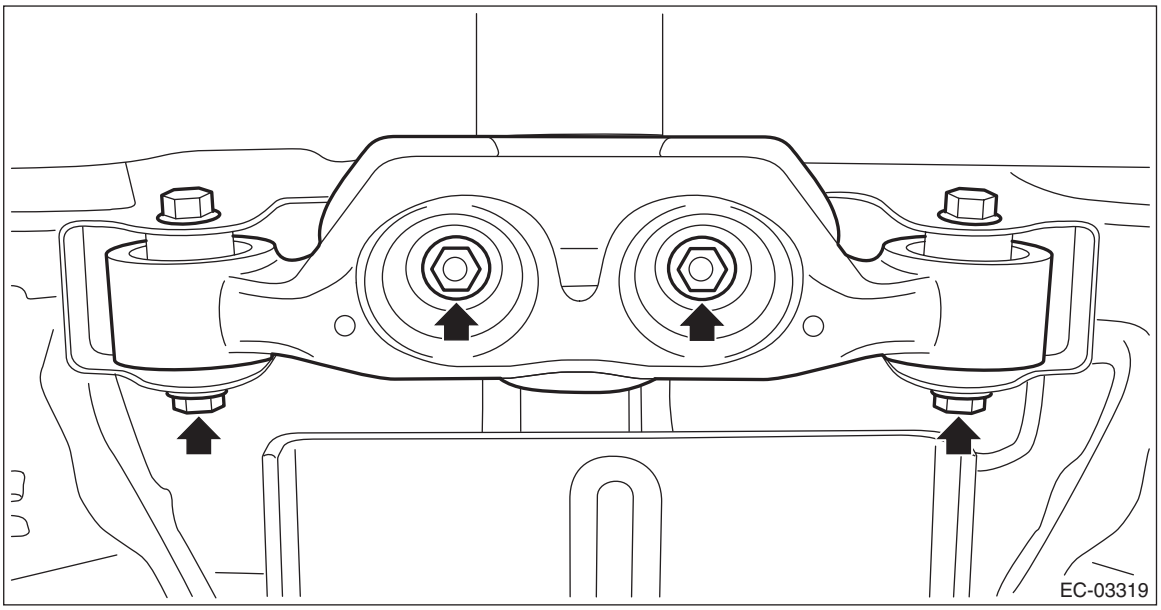
4) Temporarily tighten the self-locking nuts which hold the rear differential to the rear sub frame assembly.

NOTE:
Use a new self-locking nut.



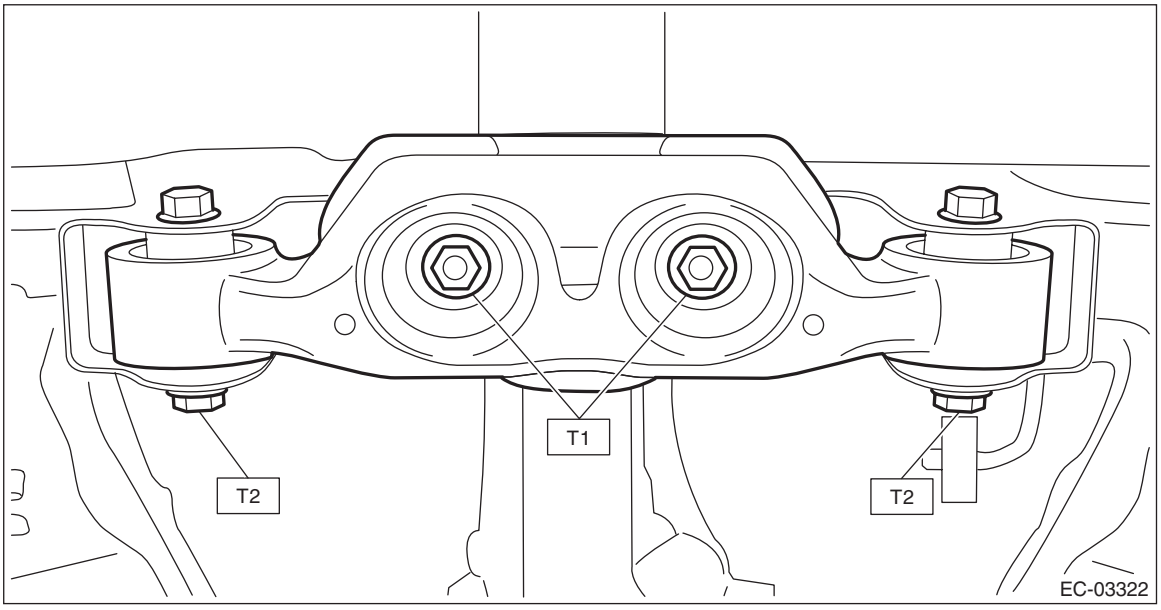
5) Set the rear differential member to the rear sub frame assembly and rear differential, and temporarily tighten the self-lock nuts which secure the rear differential member to the rear sub frame assembly and rear differential.

NOTE:
Use a new self-locking nut.



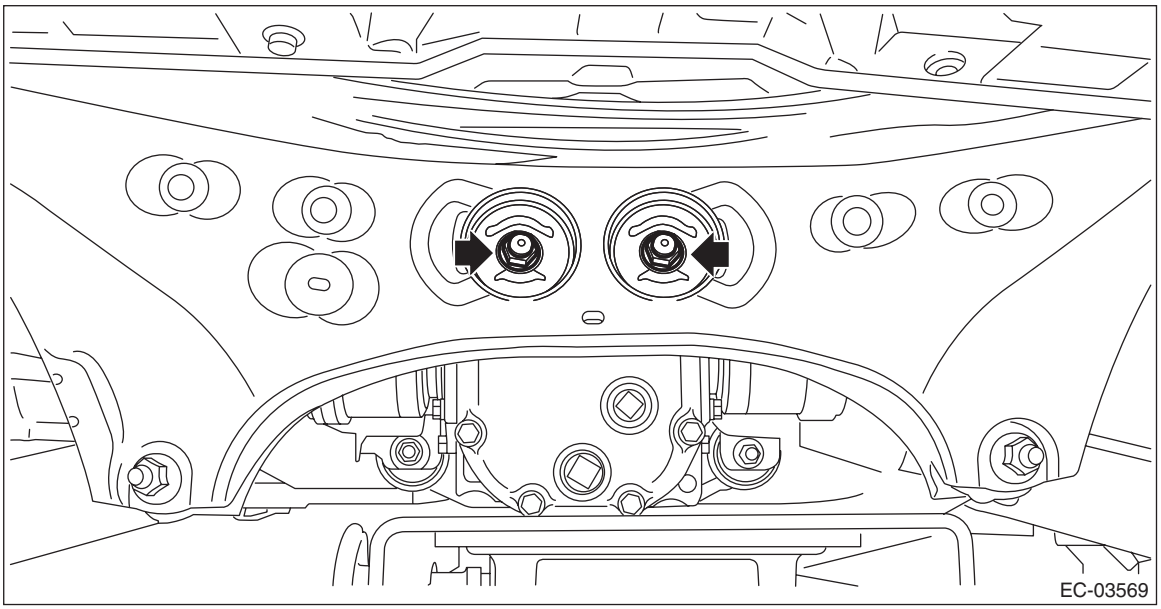
6) Remove the transmission jack from the rear differential.
7) Tighten the self-locking nuts which secure the rear differential member to the rear sub frame assembly and rear differential.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 110 N·m (11.2 kgf-m, 81.1 ft-lb)



8) Tighten the self-locking nuts which secure the rear differential to the rear sub frame assembly.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



9) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
10) Install the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.>
11) Lower the vehicle.

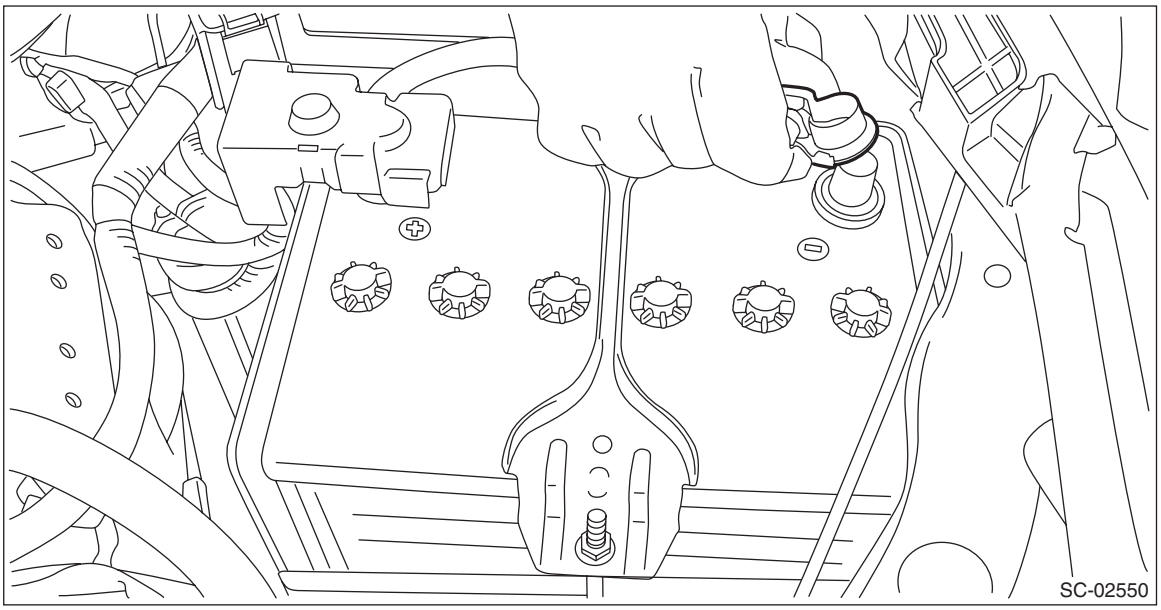
C: INSPECTION

1) Check that the canister has no deformation, cracks or other damages.
2) Check that the tube has no cracks, damage or loose part.

5. Purge Control Solenoid Valve

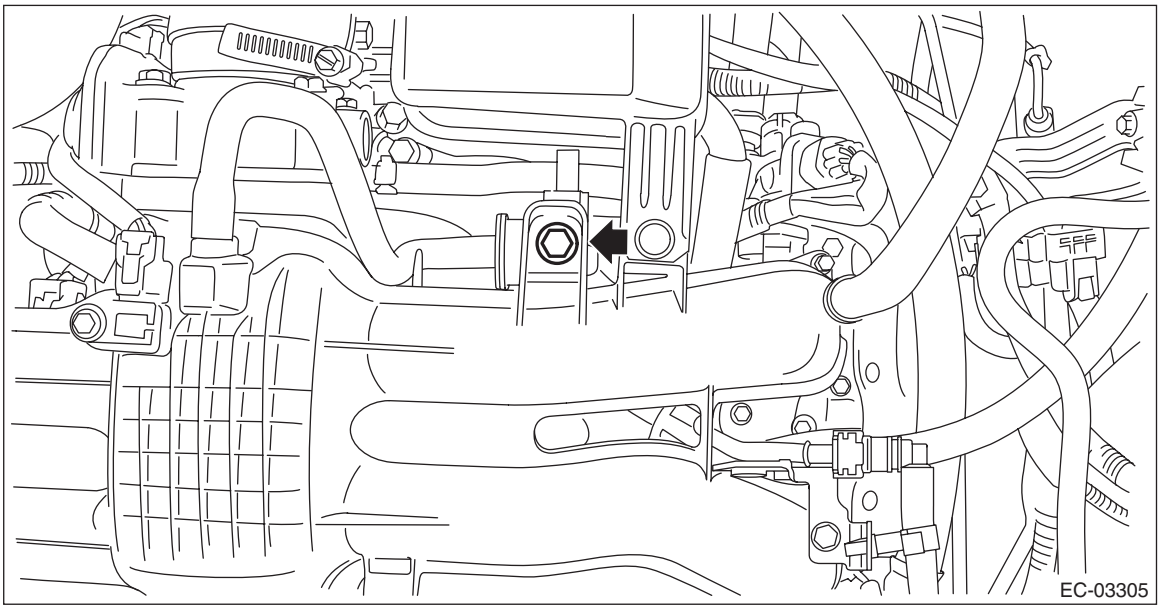
A: REMOVAL

1) Disconnect the ground cable from battery.

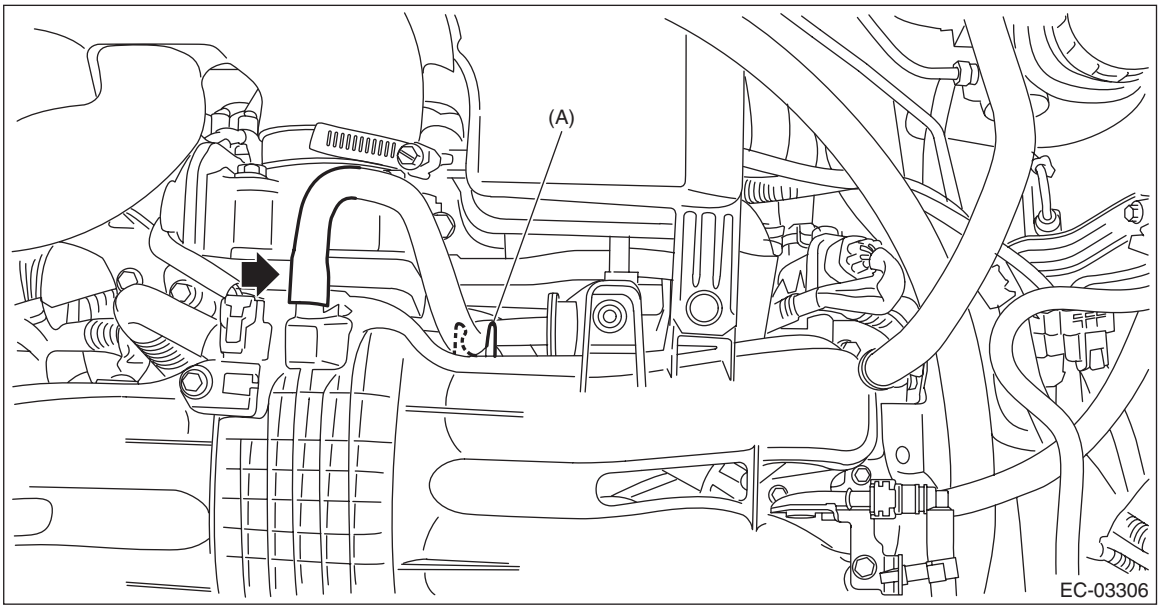


2) Remove the bolt which holds the purge control solenoid valve onto intake manifold.

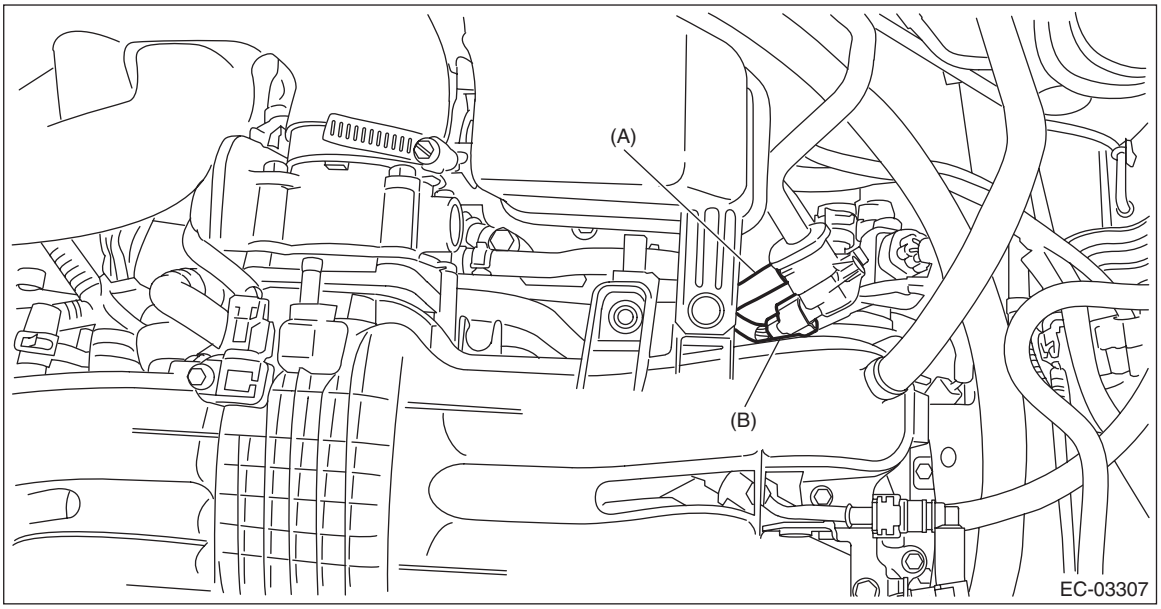
NOTE:
Hold the purge control solenoid valve unit by hand to prevent it from rotating together.



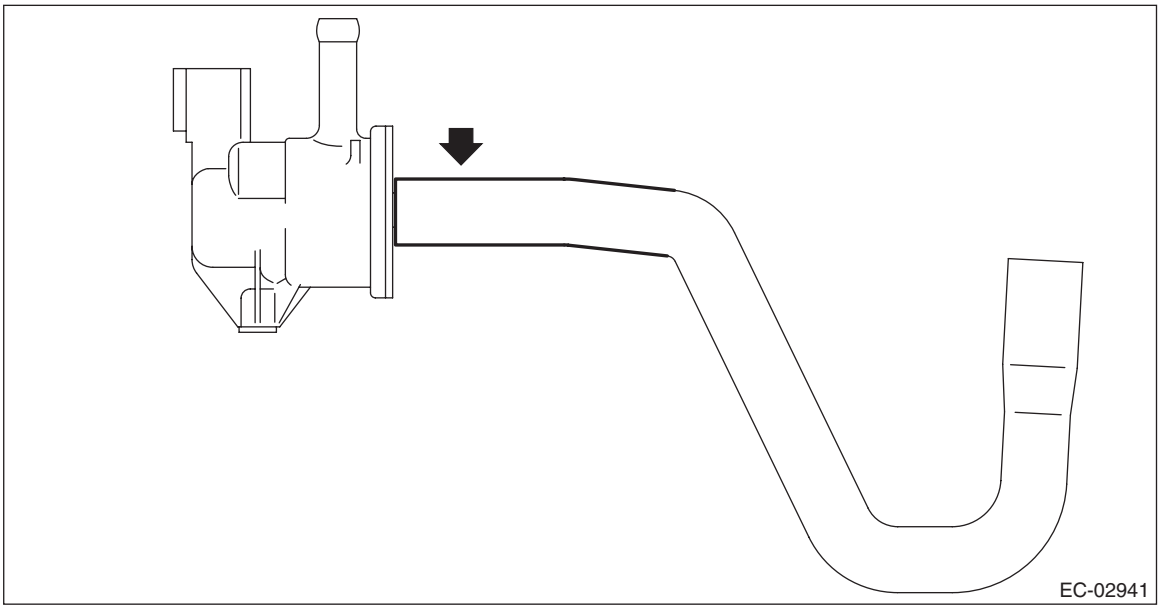
3) Disconnect the vacuum hose from the intake manifold and intake manifold clip (A).



4) Disconnect the vacuum hose (A) and connector (B) from the purge control solenoid valve, and remove the purge control solenoid valve.



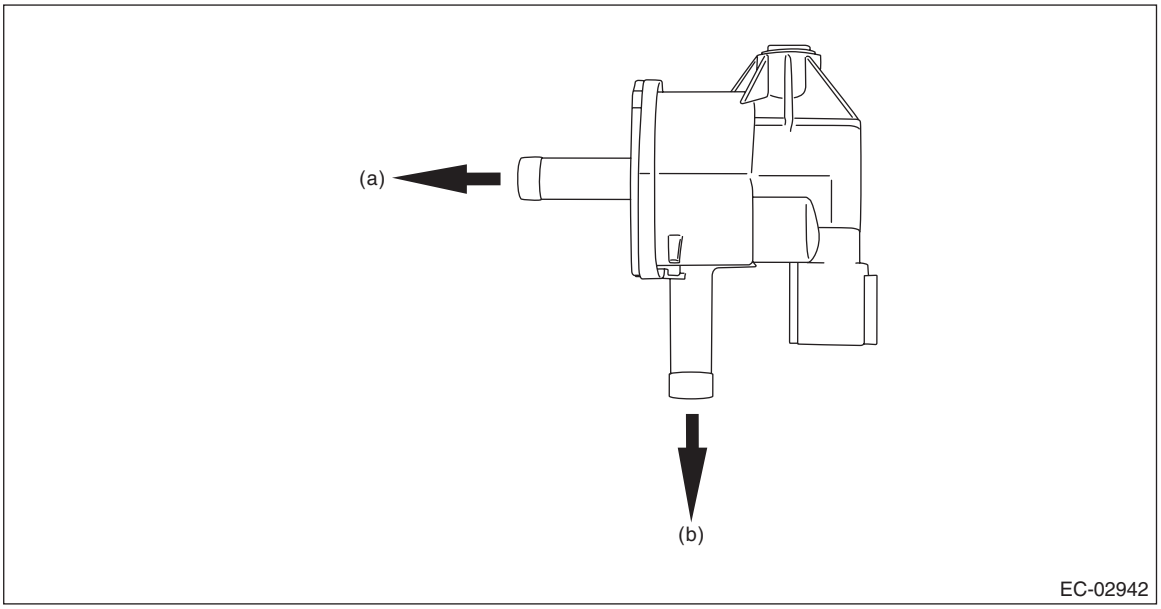
5) Remove the vacuum hose from the purge control solenoid valve.



B: INSTALLATION

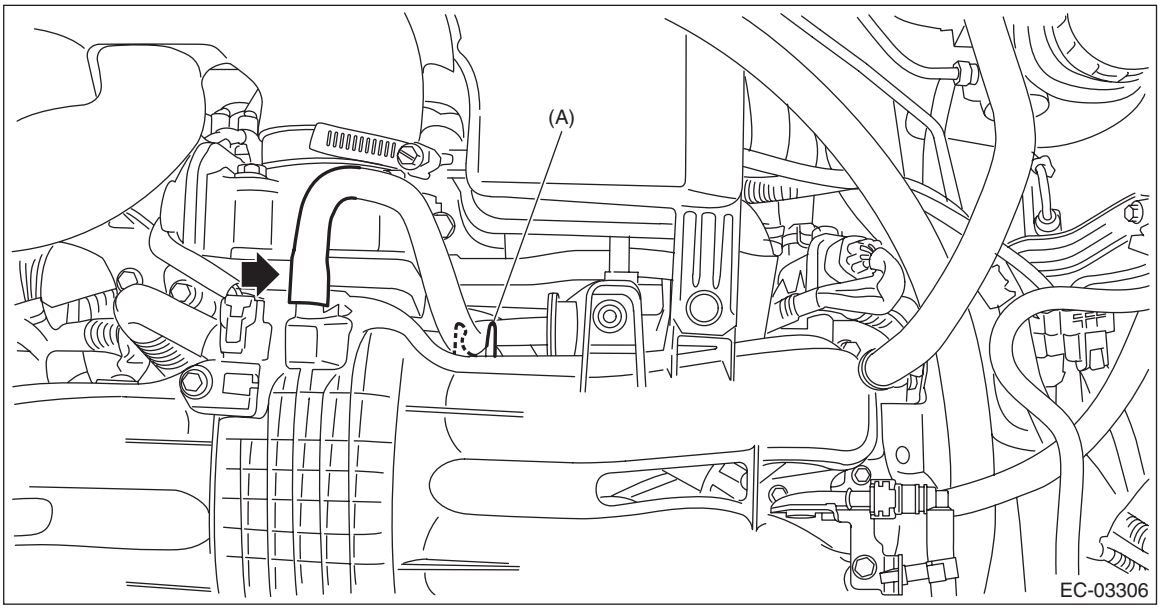
Install in the reverse order of removal.

NOTE:
- Hold the purge control solenoid valve unit by hand to prevent it from rotating together.
- Connect the vacuum hose as shown in the figure.



(a) To intake manifold (b) To fuel pipe

- Check that the vacuum hose is securely held to the intake manifold and intake manifold clip (A).

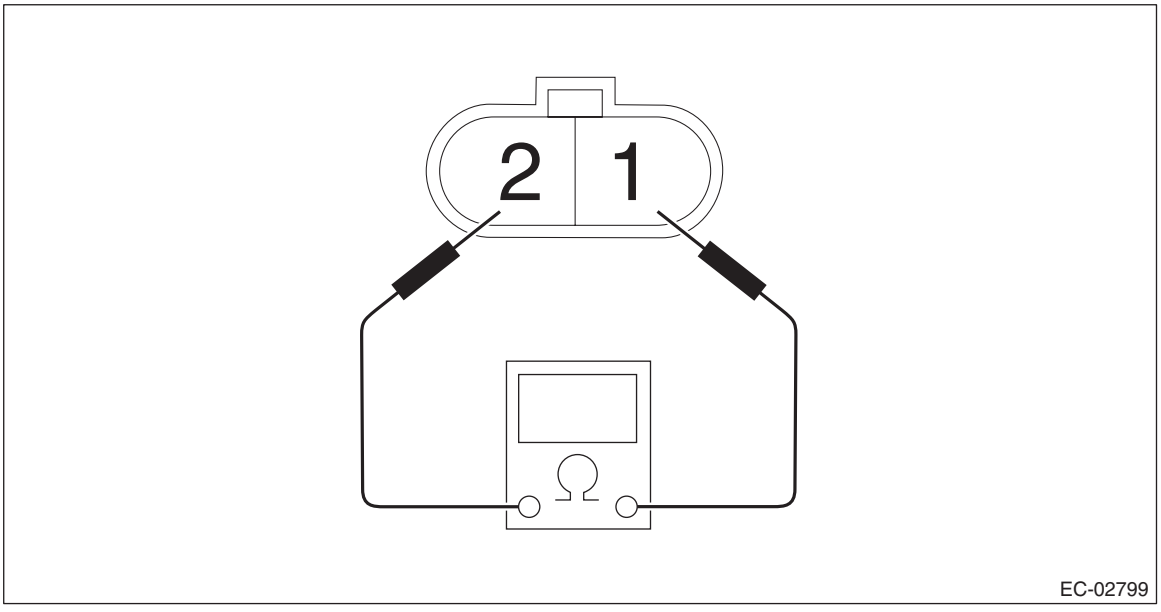


Tightening torque:
3.4 N·m (0.3 kgf-m, 2.5 ft-lb)

C: INSPECTION

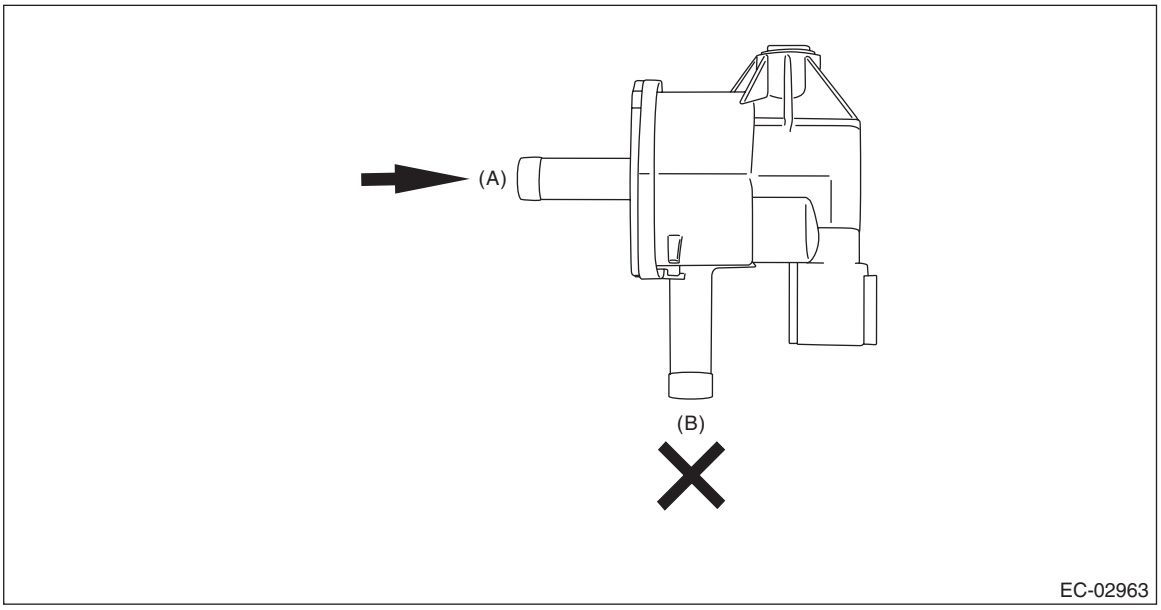
1. PURGE CONTROL SOLENOID VALVE

1) Check that the purge control solenoid valve has no deformation, cracks or other damages.
2) Measure the resistance between the purge control solenoid valve terminals.

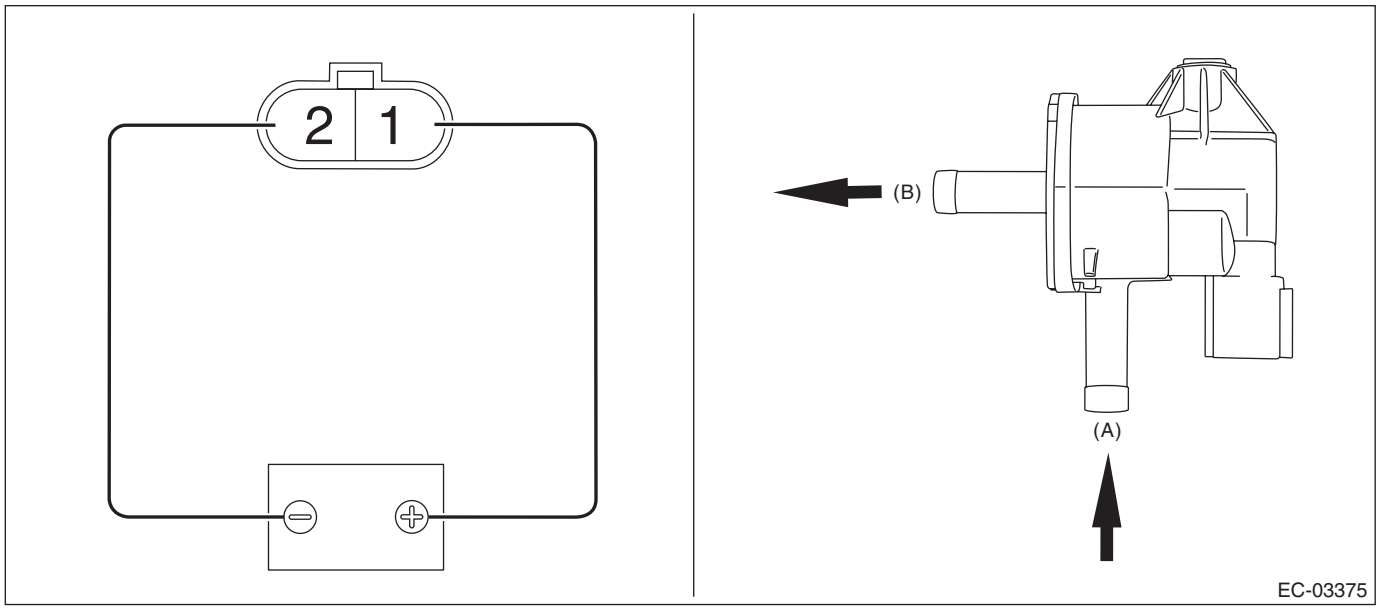


Terminal No.	Standard
1 and 2	24.5±1.5 Ω (20°C (68°F))

3) Check that air does not come out from (B) when air is blown into (A).



4) Connect the battery positive terminal to the terminal No. 1 and the battery negative terminal to the terminal No. 2. Check that air is discharged from (B), when supplying air to (A).



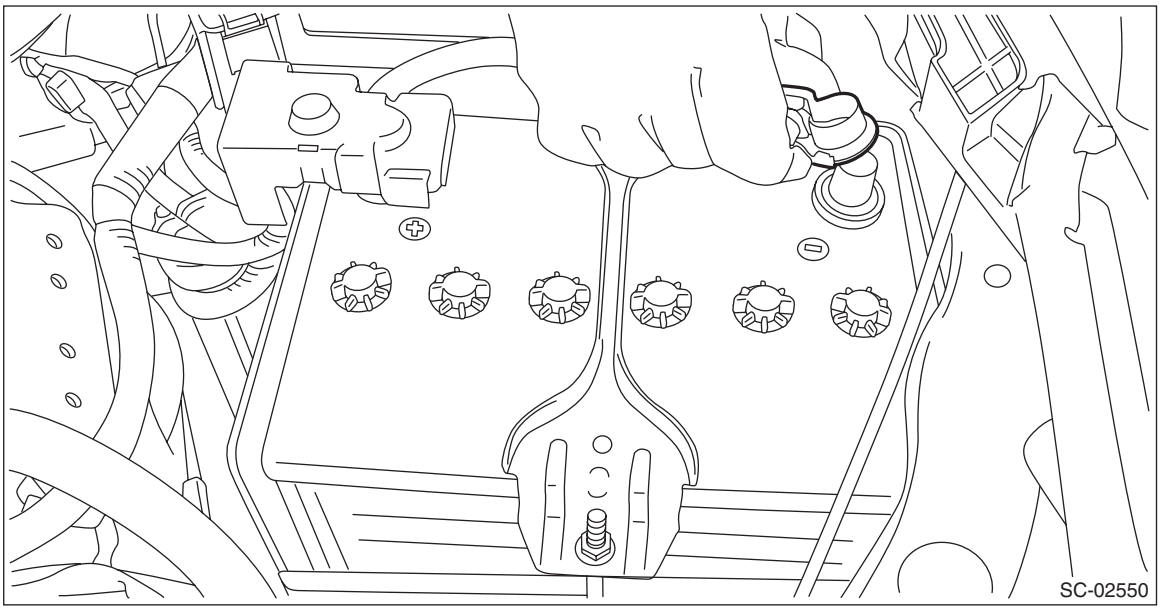
2. OTHER INSPECTIONS

Check the vacuum hose for cracks, damage or looseness.

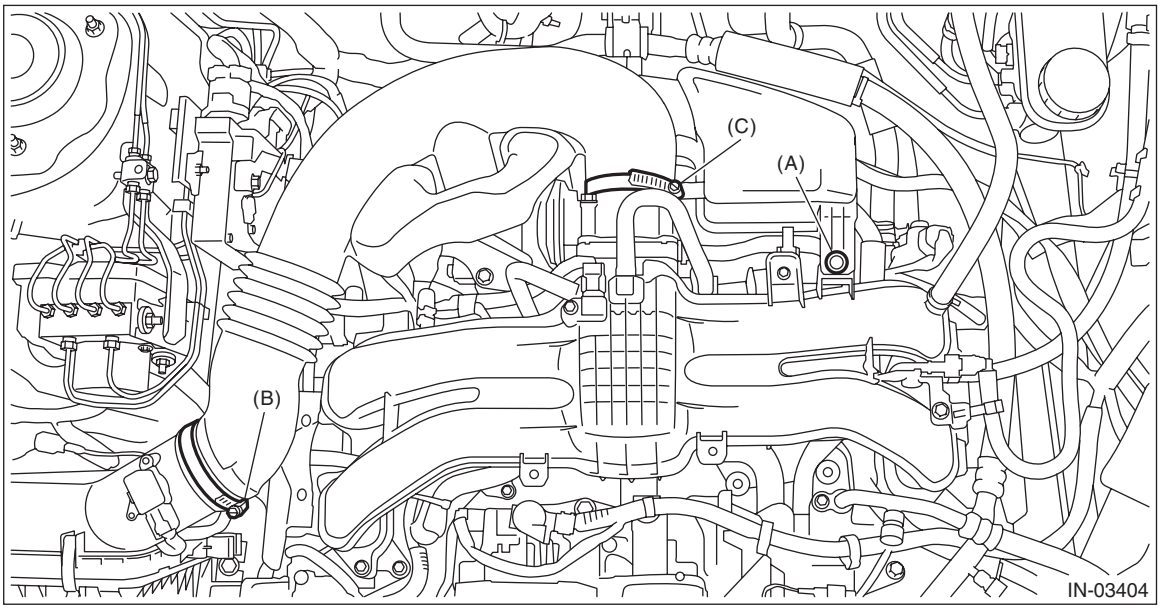
6. EGR Control Valve

A: REMOVAL

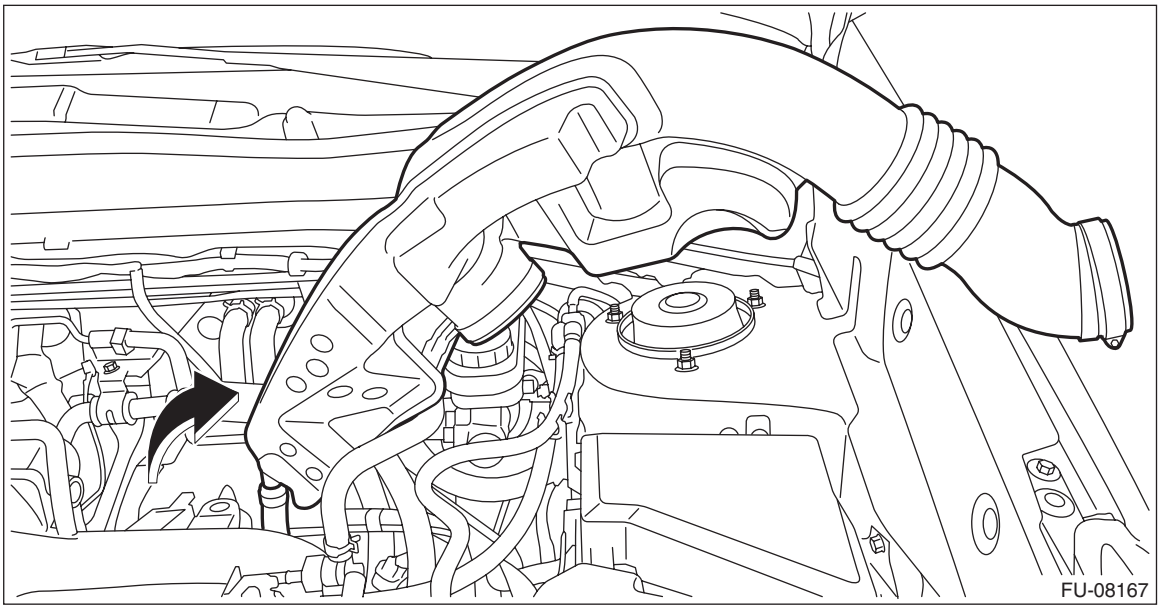
1) Disconnect the ground cable from battery.



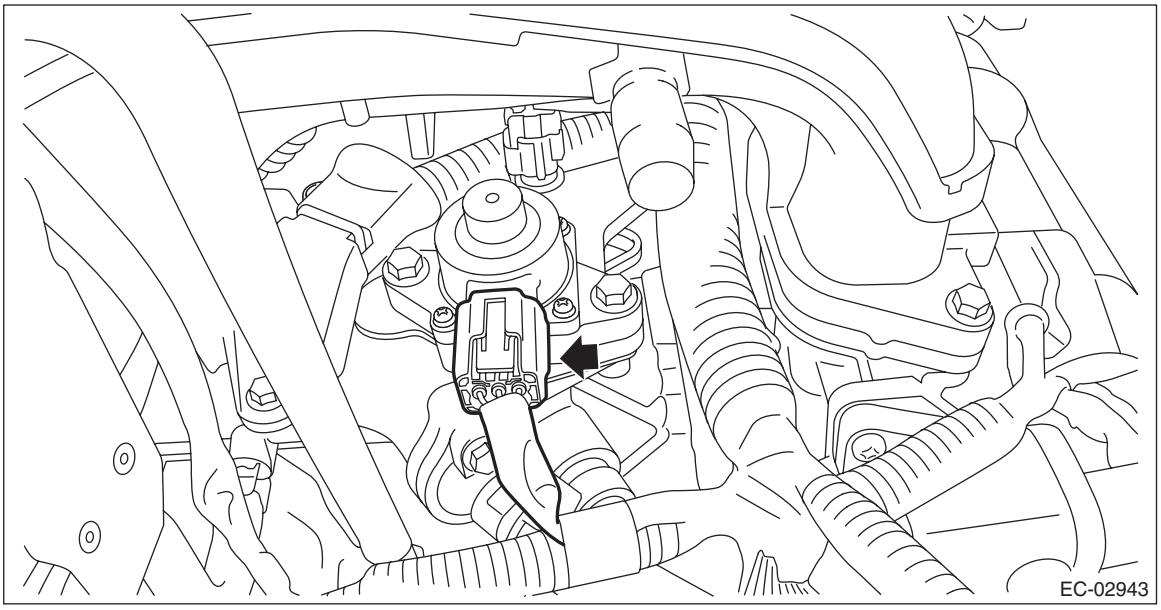
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



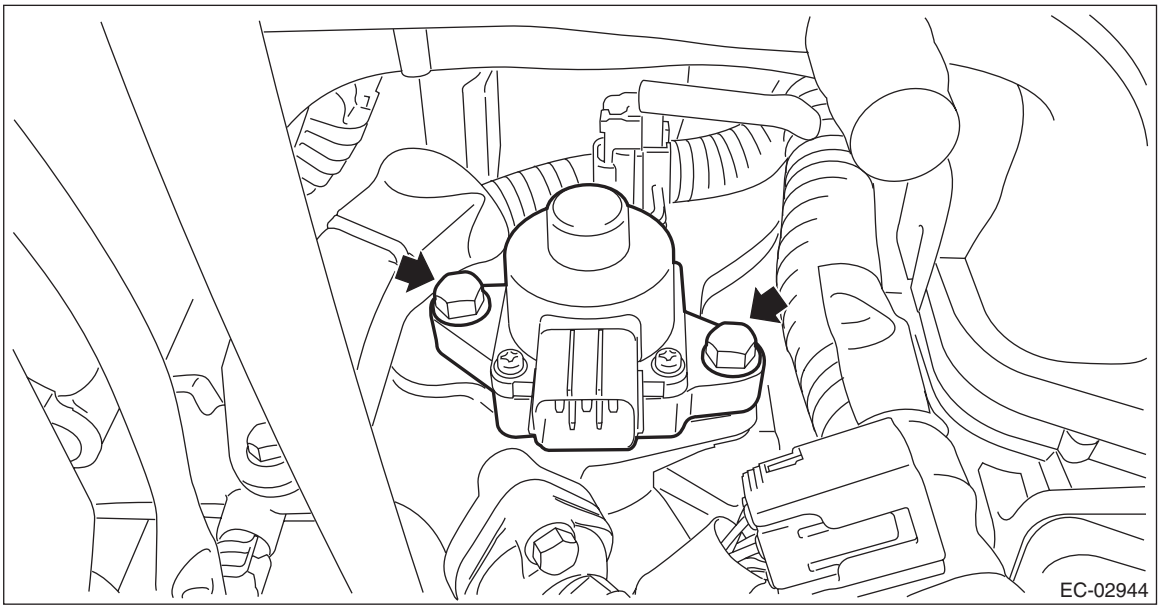
5) Remove the air intake boot from the throttle body, and move the air intake boot to the left side wheel apron.



6) Disconnect the connector from the EGR control valve.



7) Remove the EGR control valve from the water pipe assembly.

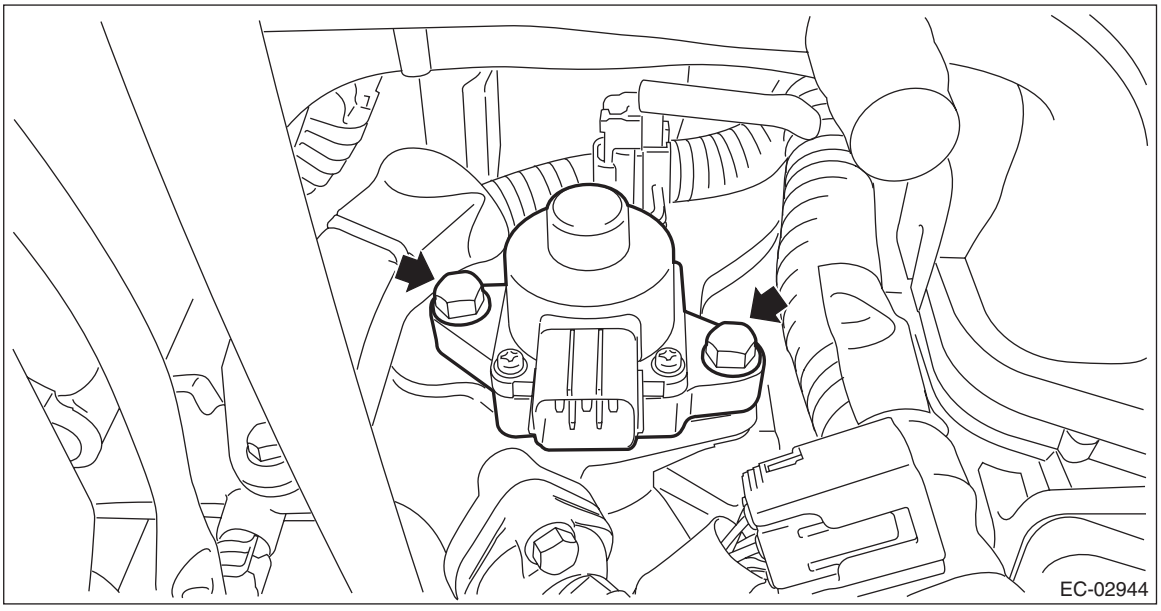


B: INSTALLATION

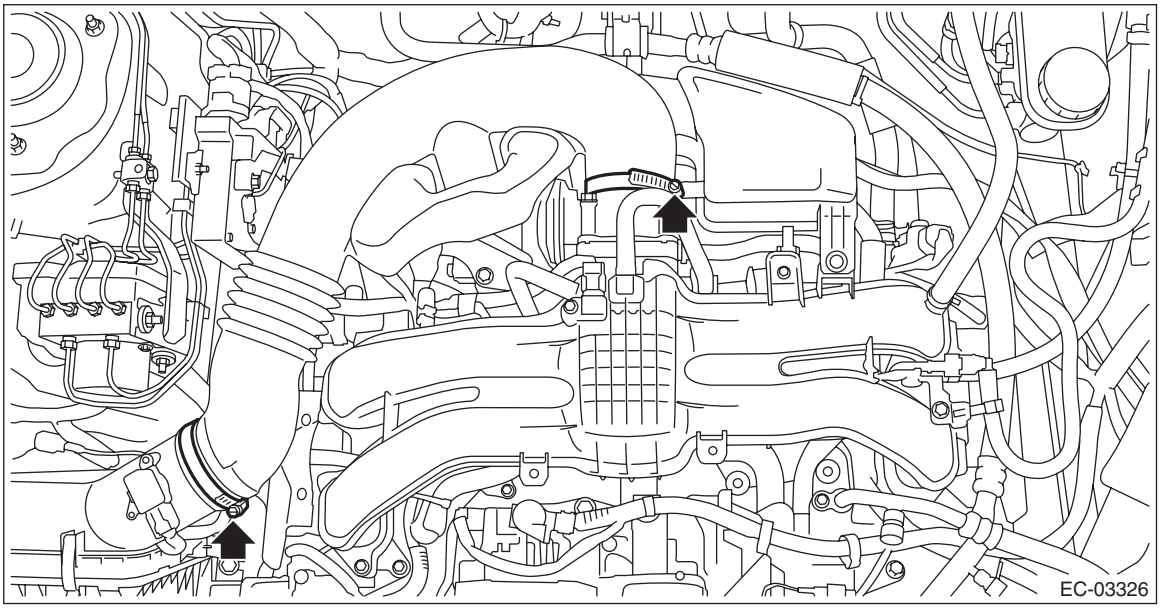
Install in the reverse order of removal.

NOTE:
Use new O-rings and gaskets.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

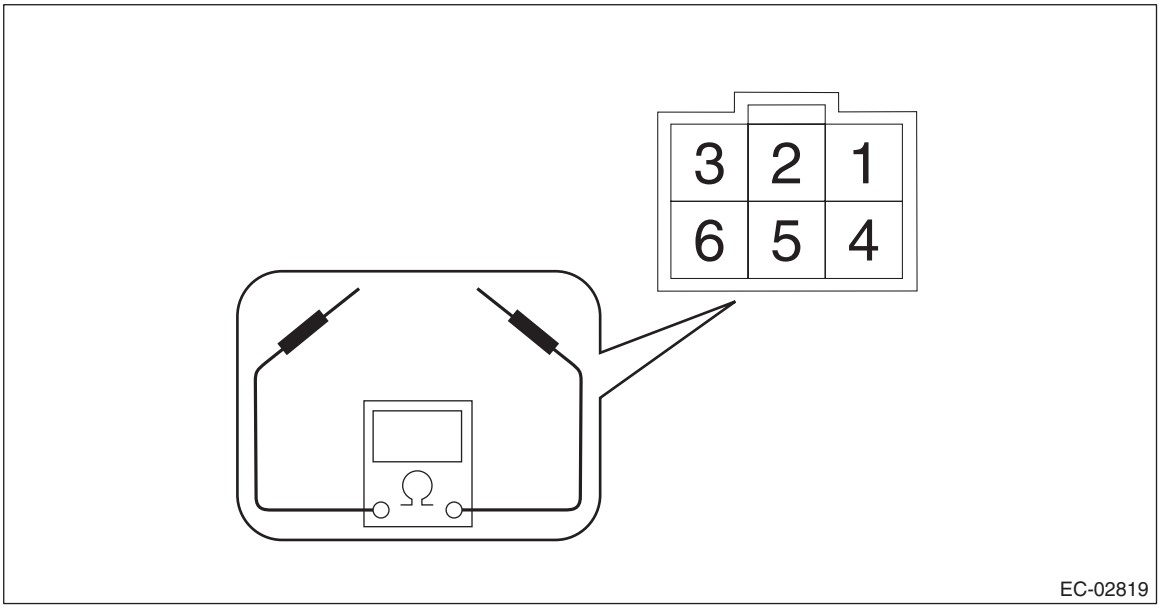


Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)



C: INSPECTION

1) Check that the EGR control valve has no deformation, cracks or other damages.
2) Measure the resistance between EGR control valve terminals.

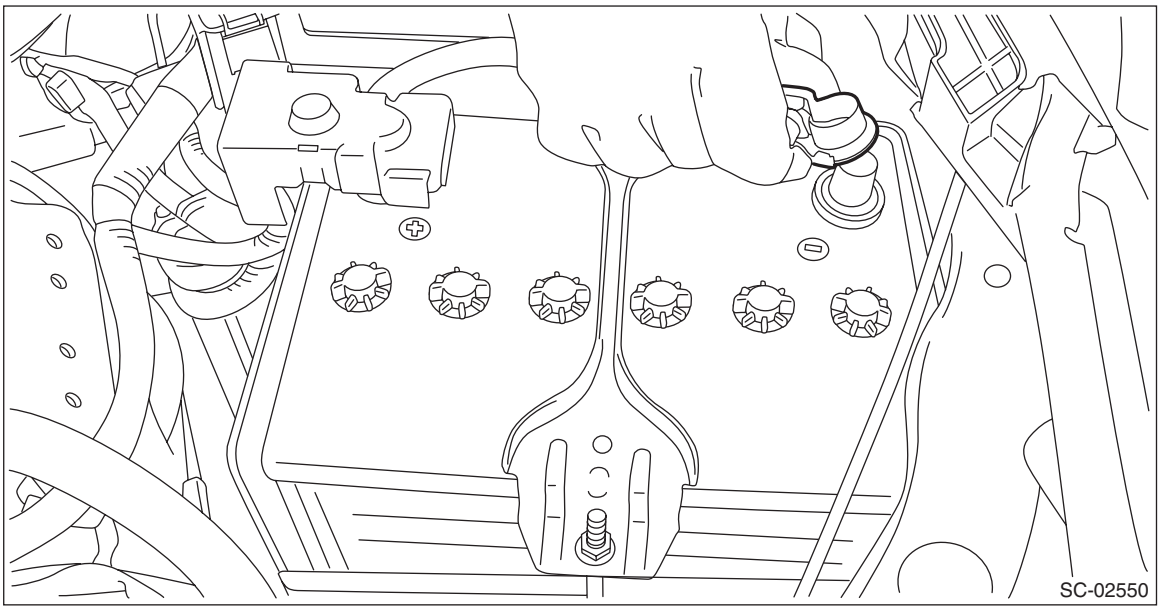


Terminal No.	Standard
2 and 1	22±2 Ω
2 and 3	22±2 Ω
5 and 4	22±2 Ω
5 and 6	22±2 Ω

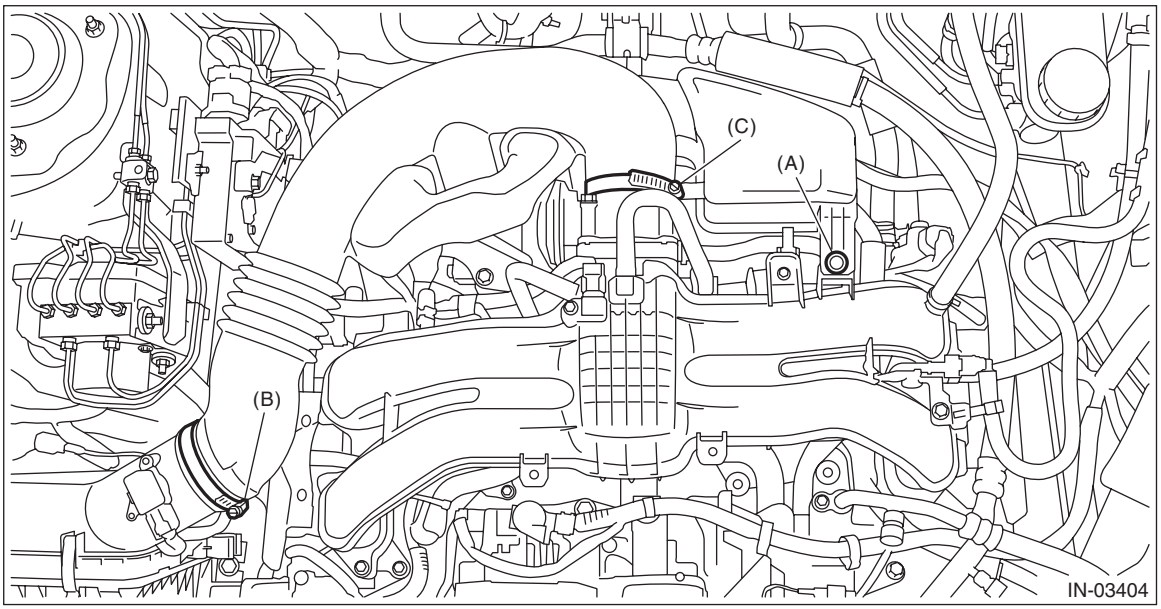
7. EGR Pipe

A: REMOVAL

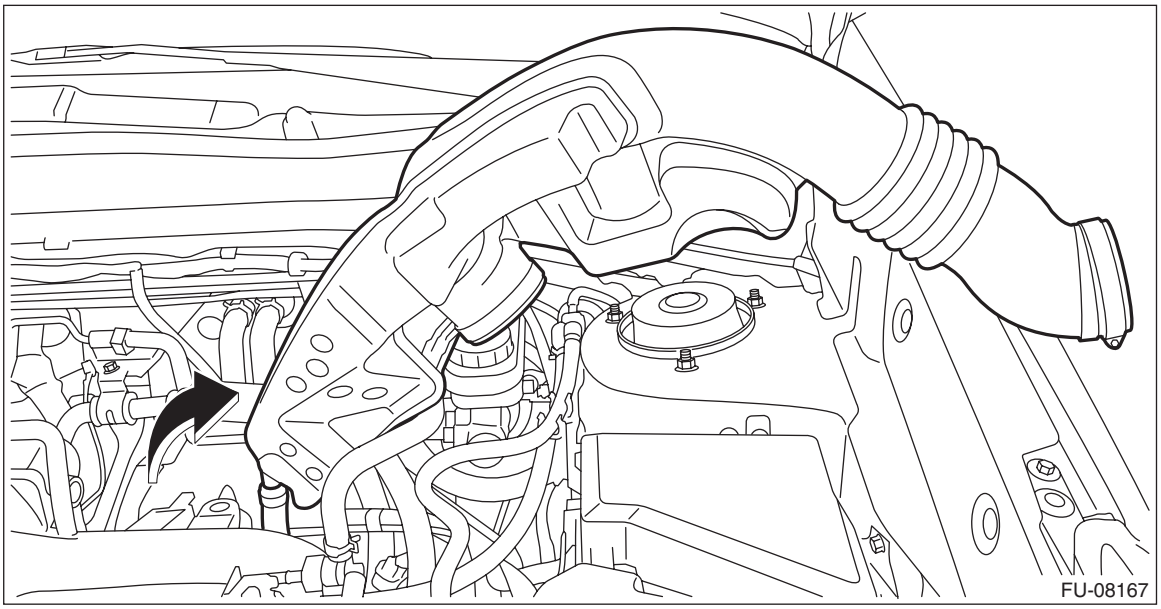
1) Disconnect the ground cable from battery.



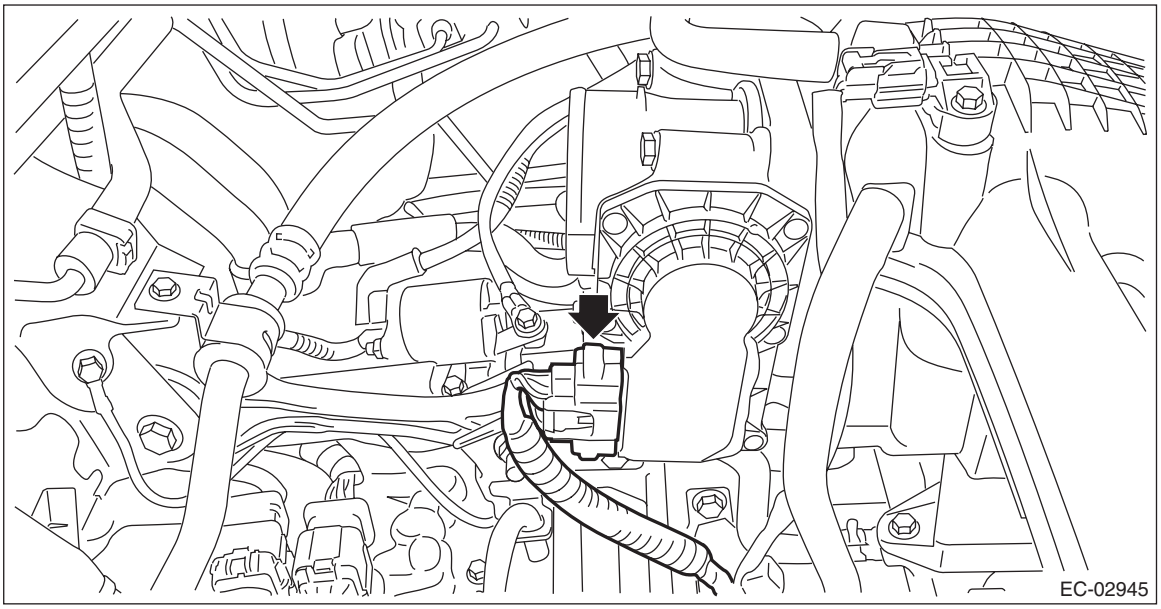
2) Remove the clip (A), and loosen the clamps (B) and (C) securing the air intake boot.



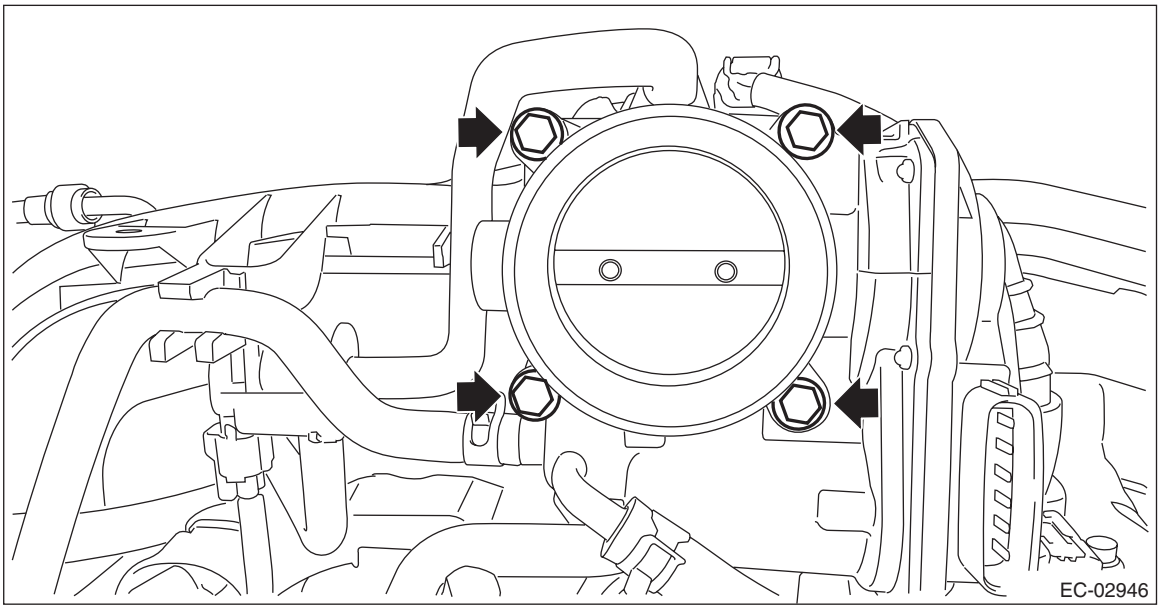
3) Remove the air intake boot from the air cleaner case (rear) and throttle body, and move it to the left side wheel apron.



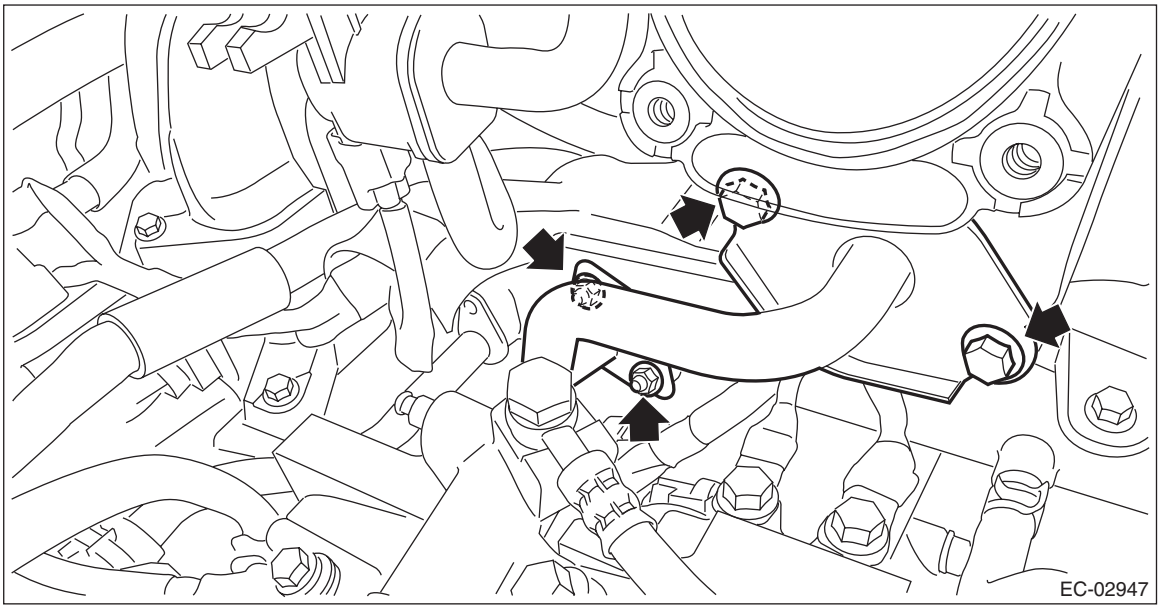
4) Disconnect the connector from the throttle body.



5) Remove the bolts which secure the throttle body to the intake manifold, and tilt the throttle body to the rear side of vehicle.



6) Remove the bolts and nuts that hold the EGR pipe to the intake manifold and the water pipe assembly, and remove the EGR pipe.

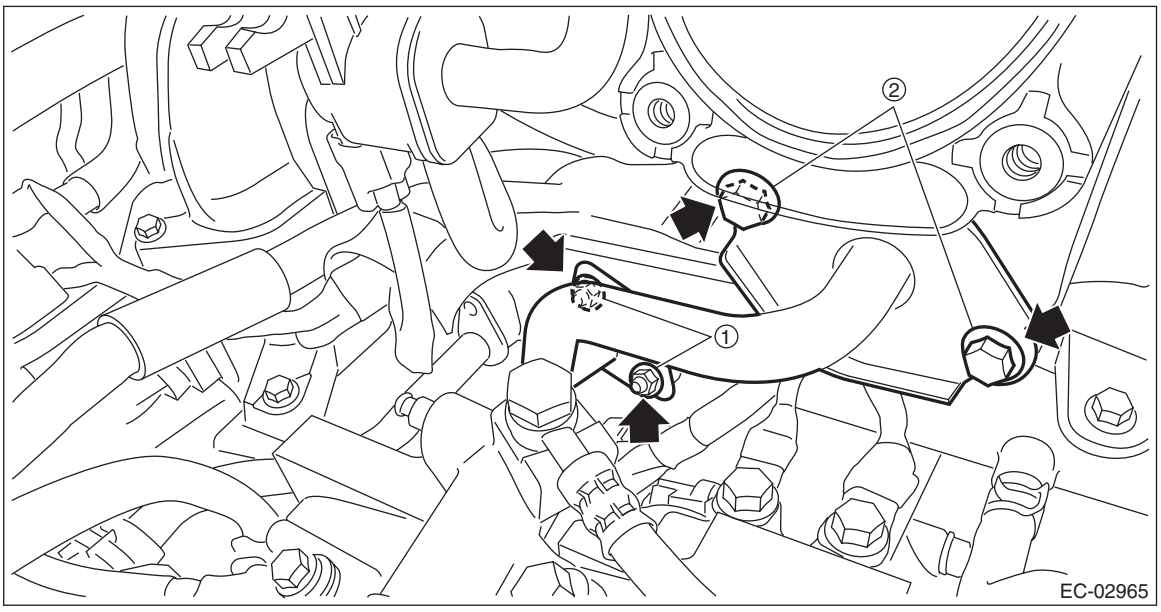


B: INSTALLATION

1) Temporarily install the EGR pipe to the intake manifold and water pipe assembly, and tighten the EGR pipe in numerical order as shown in the figure.

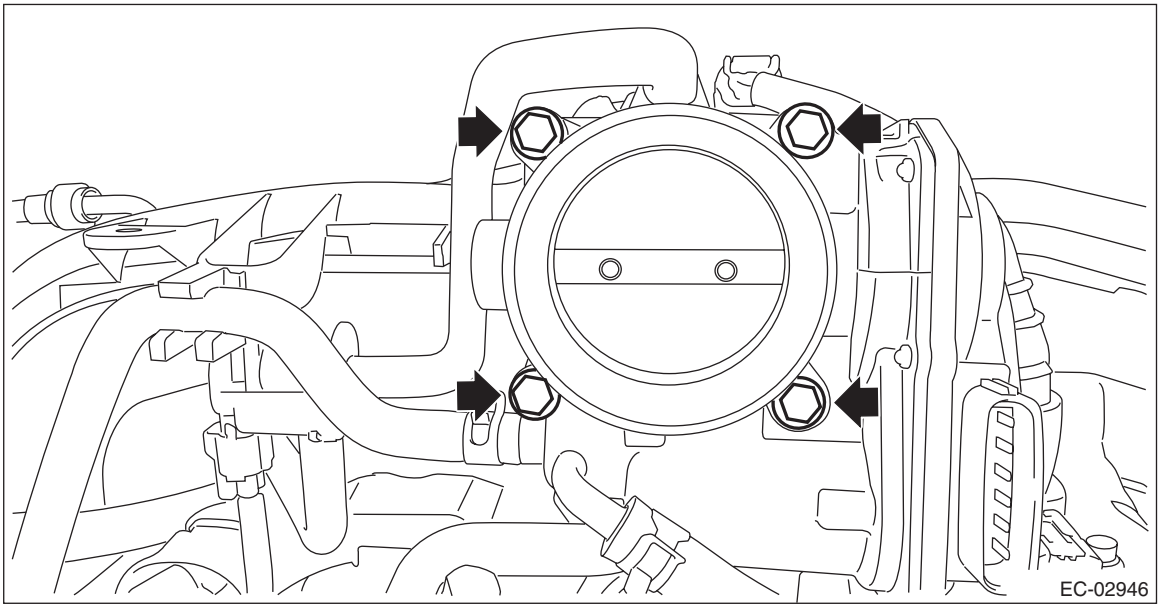
NOTE:
Use a new gasket.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

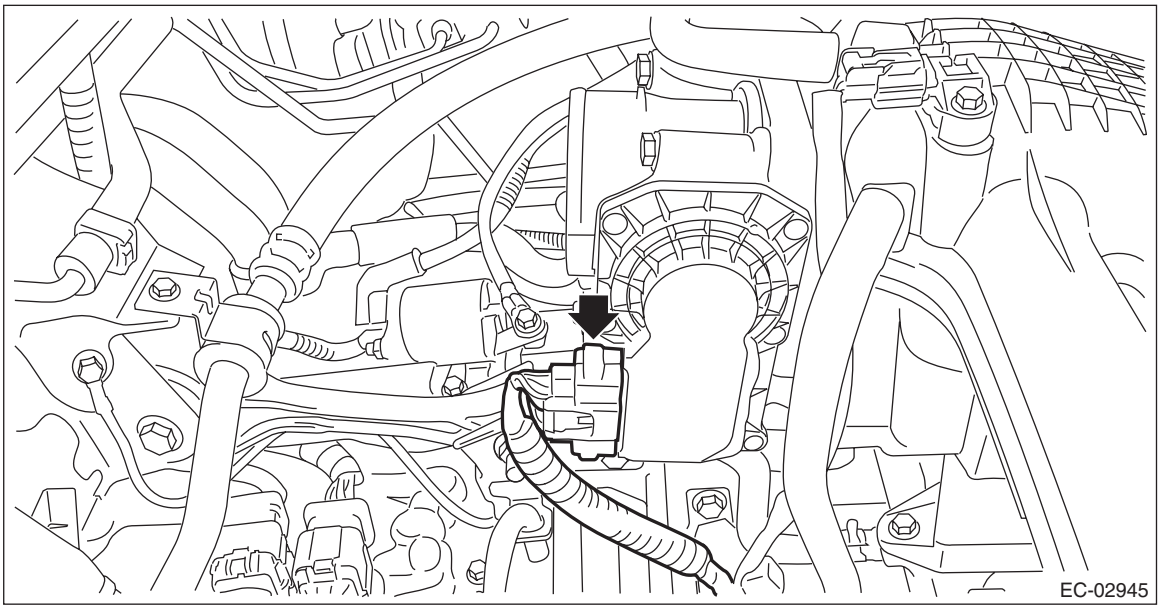


2) Install the throttle body to the intake manifold.

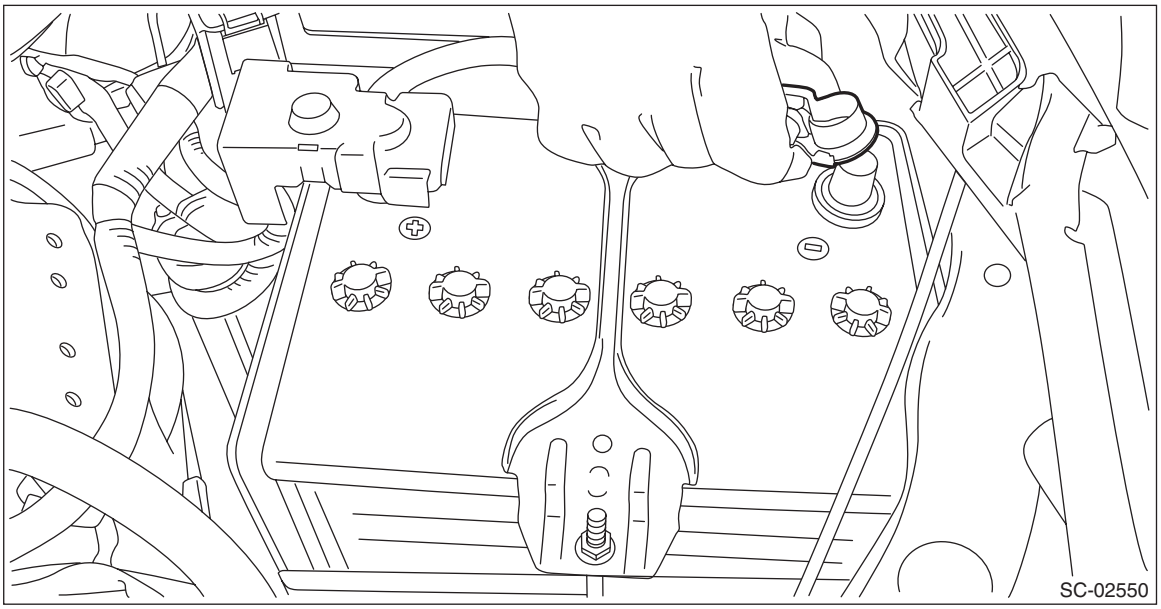
Tightening torque:
8.0 N·m (0.8 kgf-m, 5.9 ft-lb)



3) Connect the connector to the throttle body.



4) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
5) Connect the battery ground terminal.



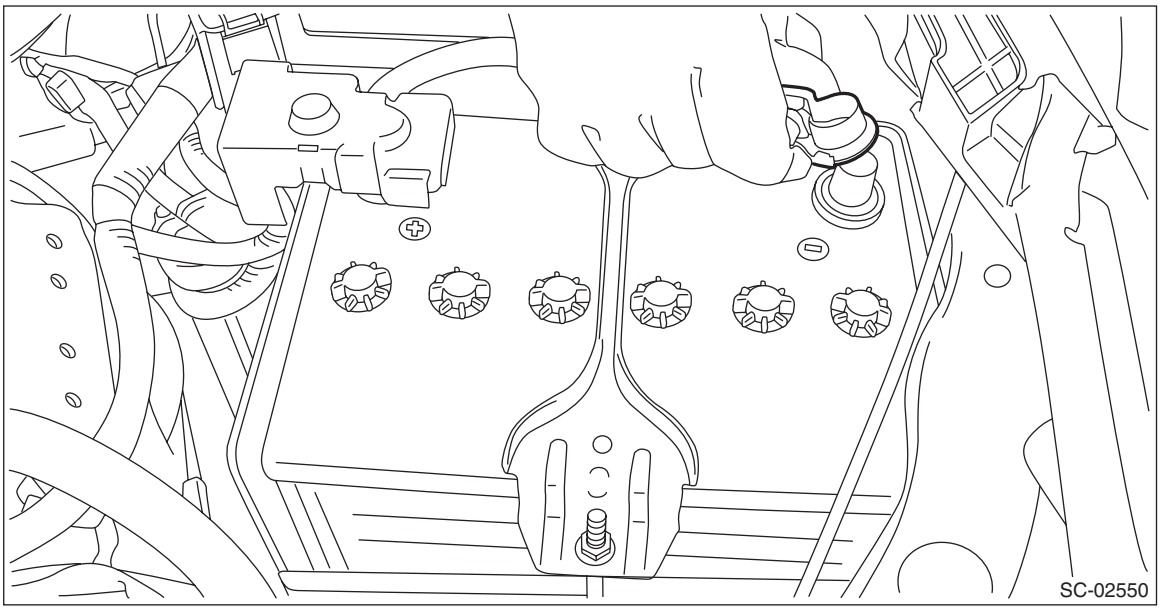
C: INSPECTION

Check that the EGR pipe has no deformation, cracks or other damages.

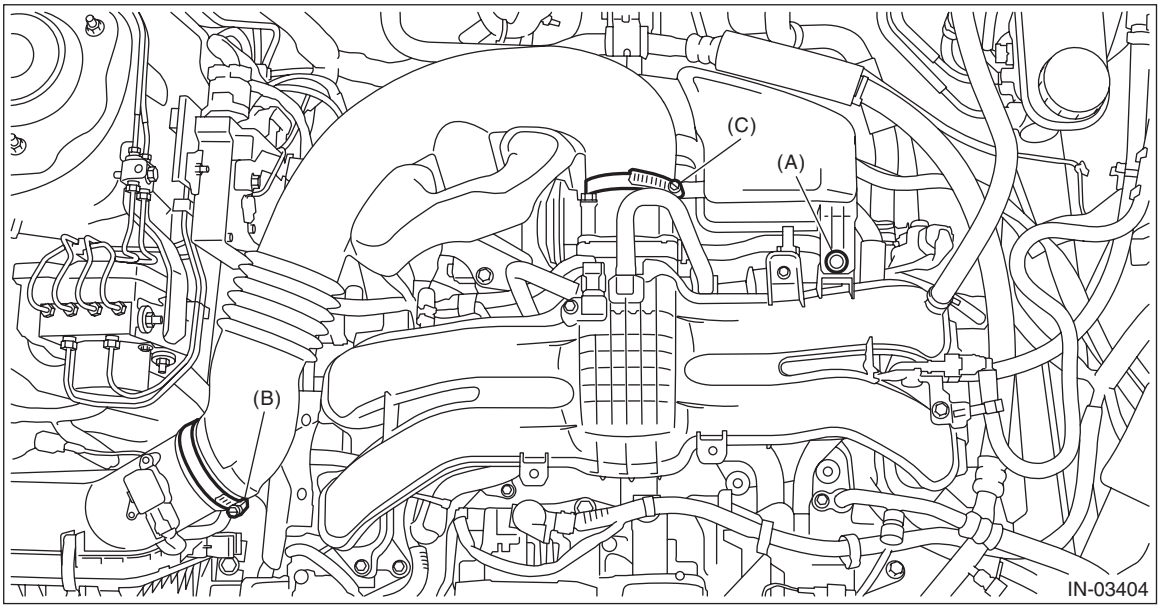
8. EGR Cooler

A: REMOVAL

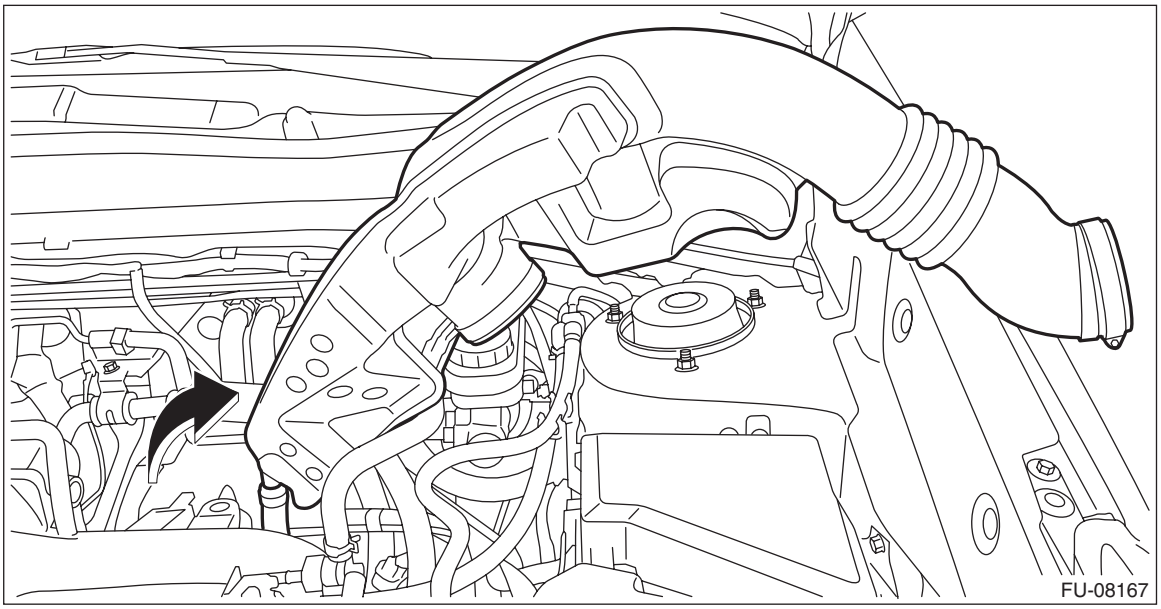
1) Disconnect the ground cable from battery.



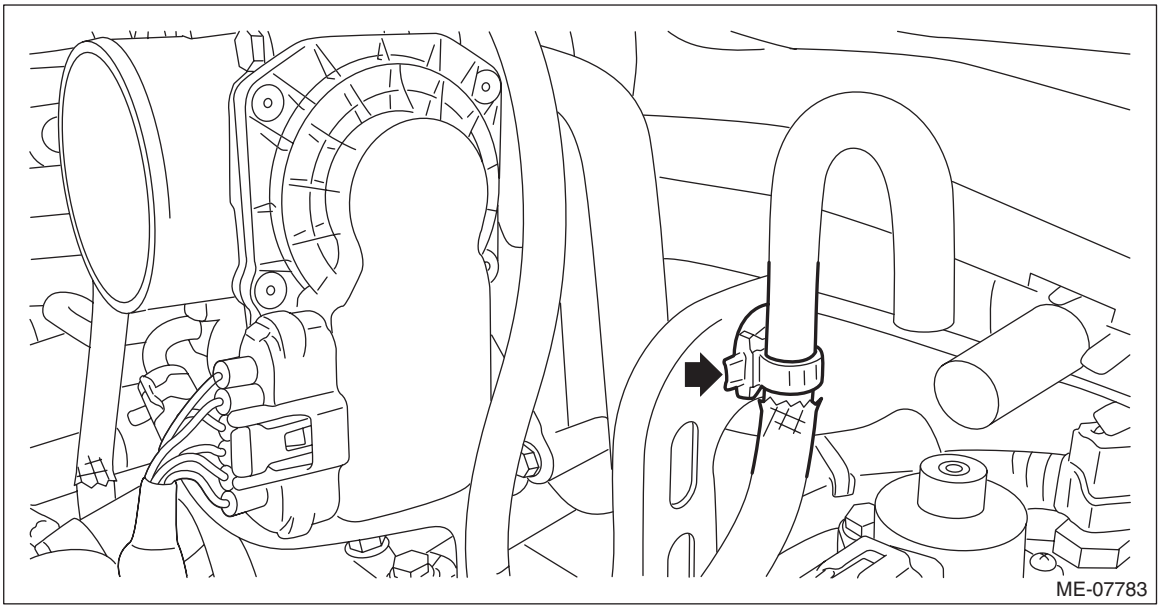
2) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Lower the vehicle.
5) Remove the clip (A), and loosen the clamps (B) and (C) securing the air intake boot.



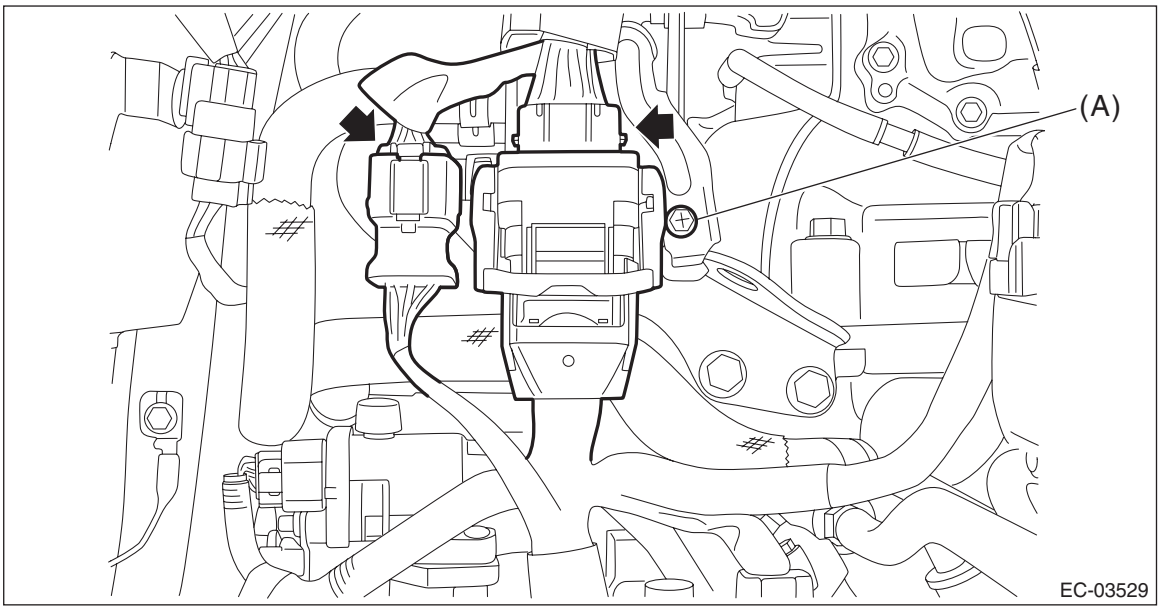
6) Remove the air intake boot from the air cleaner case (rear) and throttle body, and move it to the left side wheel apron.



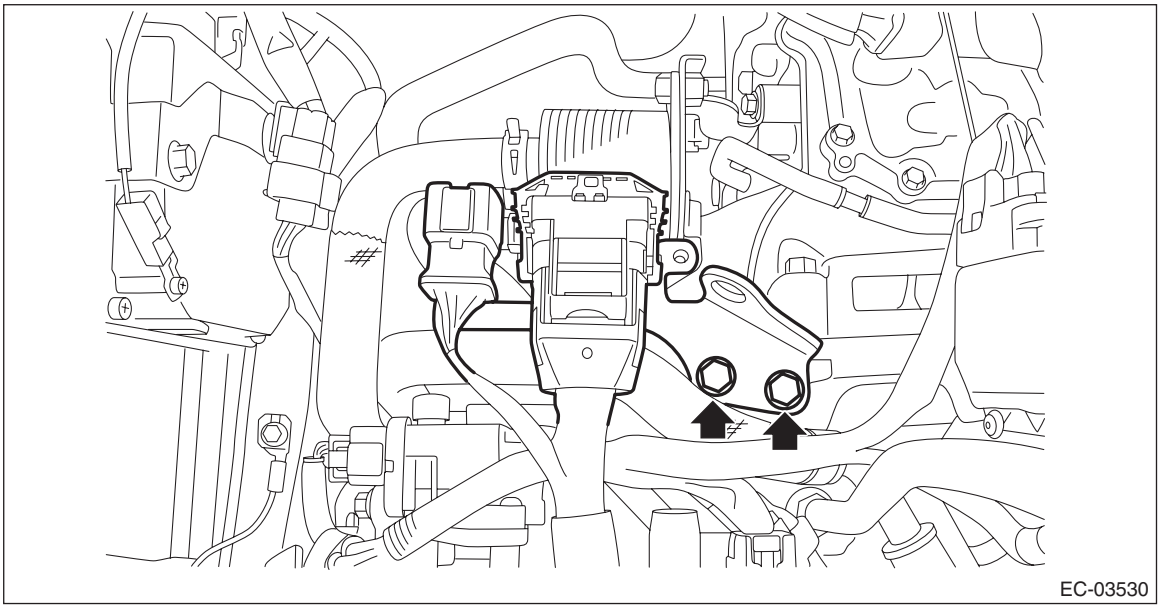
7) Remove the clip holding the air breather hose to the engine rear hanger. (MT model)



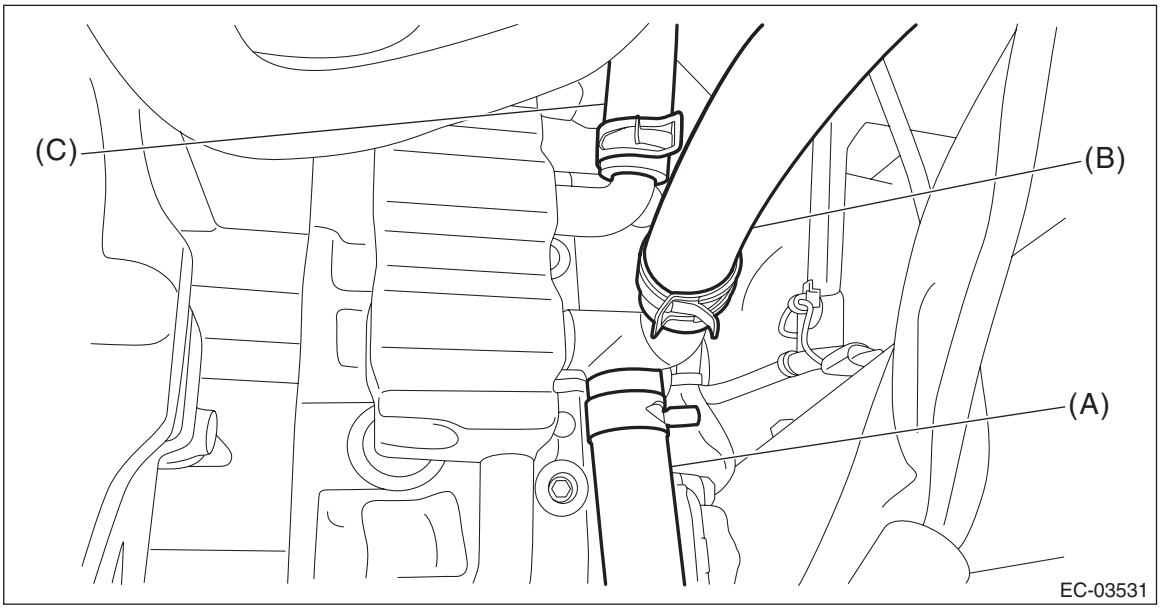
8) Disconnect the engine harness connector.
(1) Remove the bolt (A) securing the bulkhead harness connector bracket.
(2) Disconnect the bulkhead harness connector from the engine harness connector (black) and engine harness connector (brown).



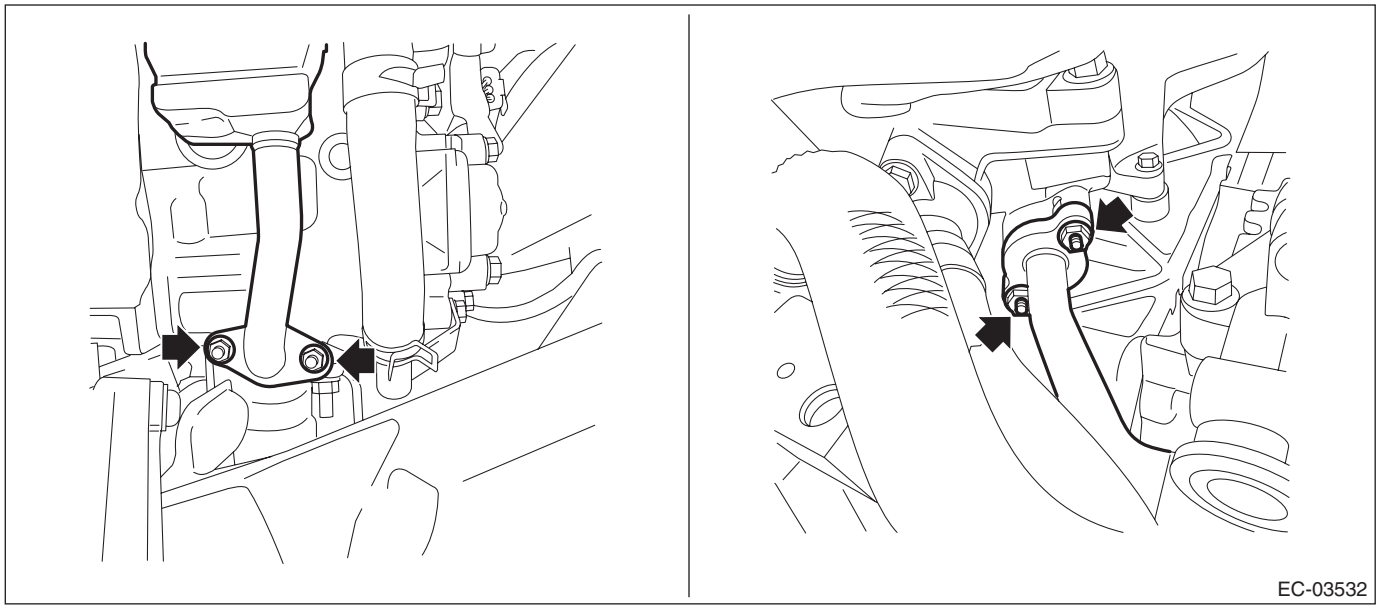
9) Remove the engine rear hanger.



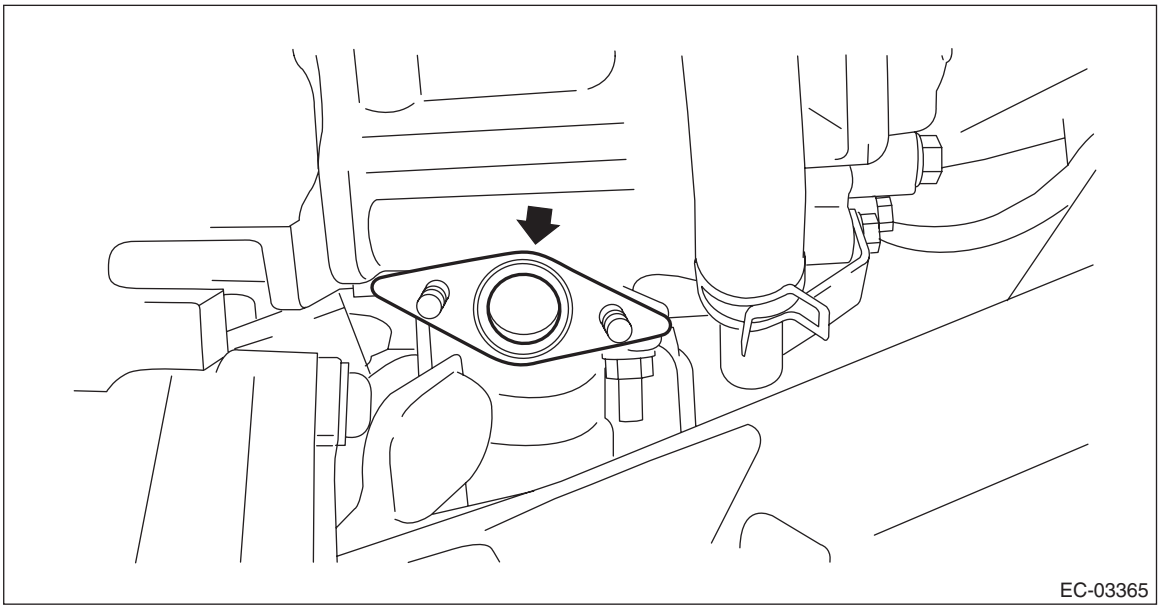
10) Disconnect the engine coolant hose (A), engine coolant hose (B) (CVT model) and engine coolant hose (C) from the EGR cooler.



11) Remove the nut which secures the EGR cooler to the cylinder head RH.
12) Remove the nuts securing the EGR cooler to the EGR control valve.



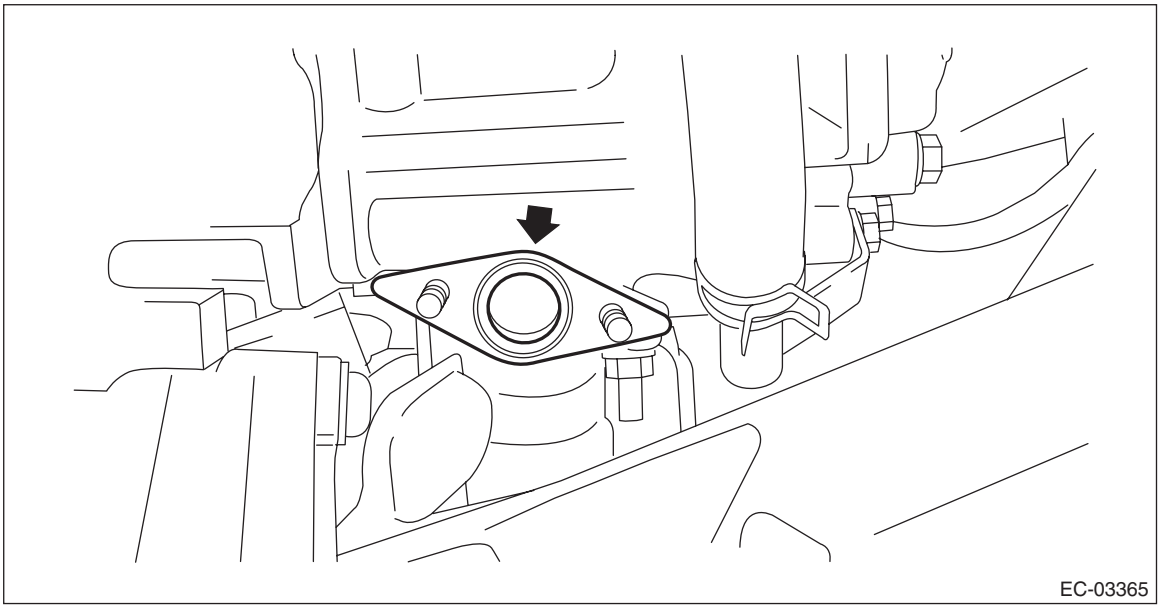
13) Remove the gasket from the stud bolt.



B: INSTALLATION

1) Set the gasket to the stud bolt.

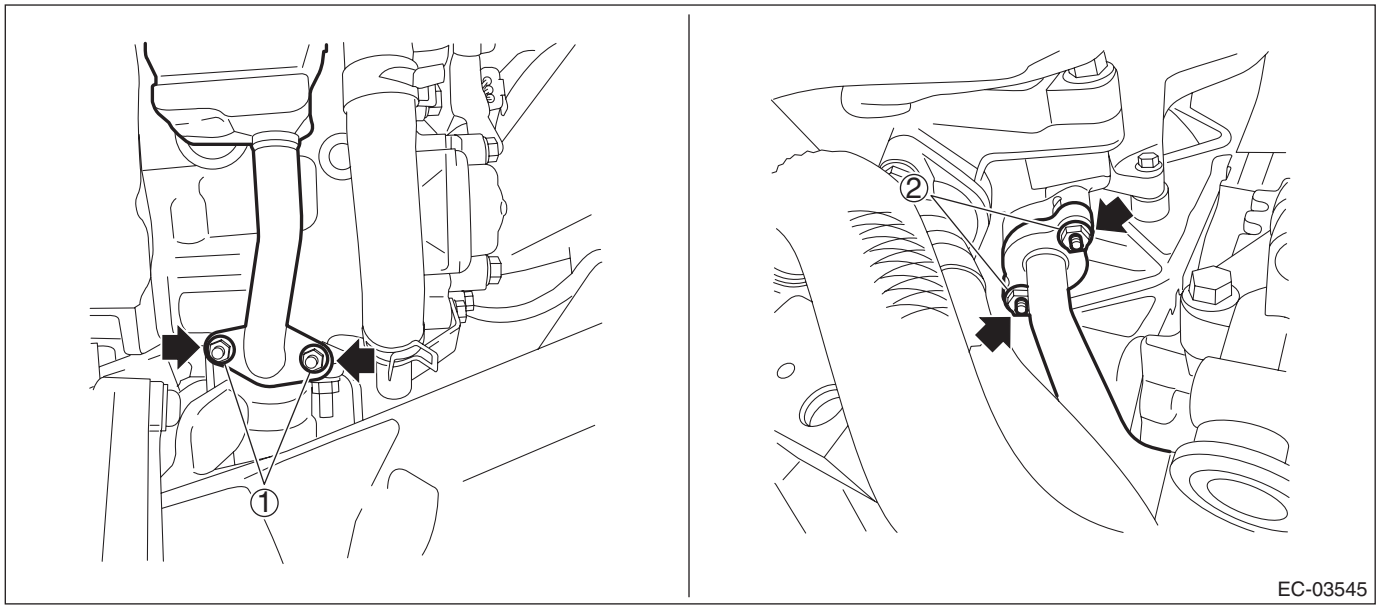
NOTE:
Use a new gasket.



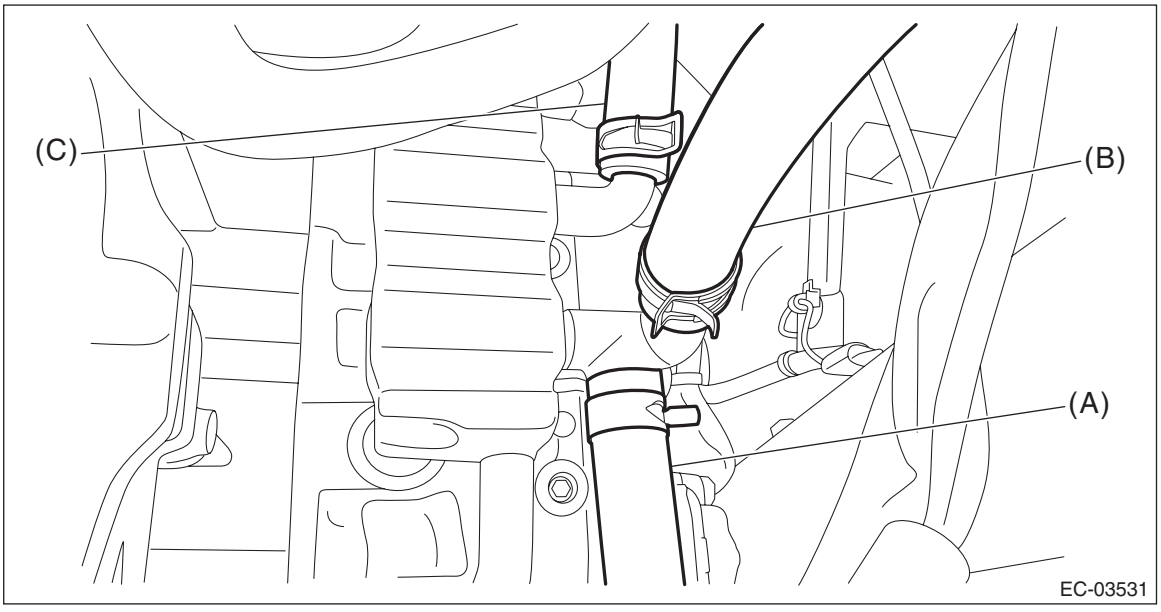
2) Temporarily install the EGR cooler to the EGR control valve and the cylinder head RH and tighten in the numerical order.

NOTE:
Use a new gasket.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)

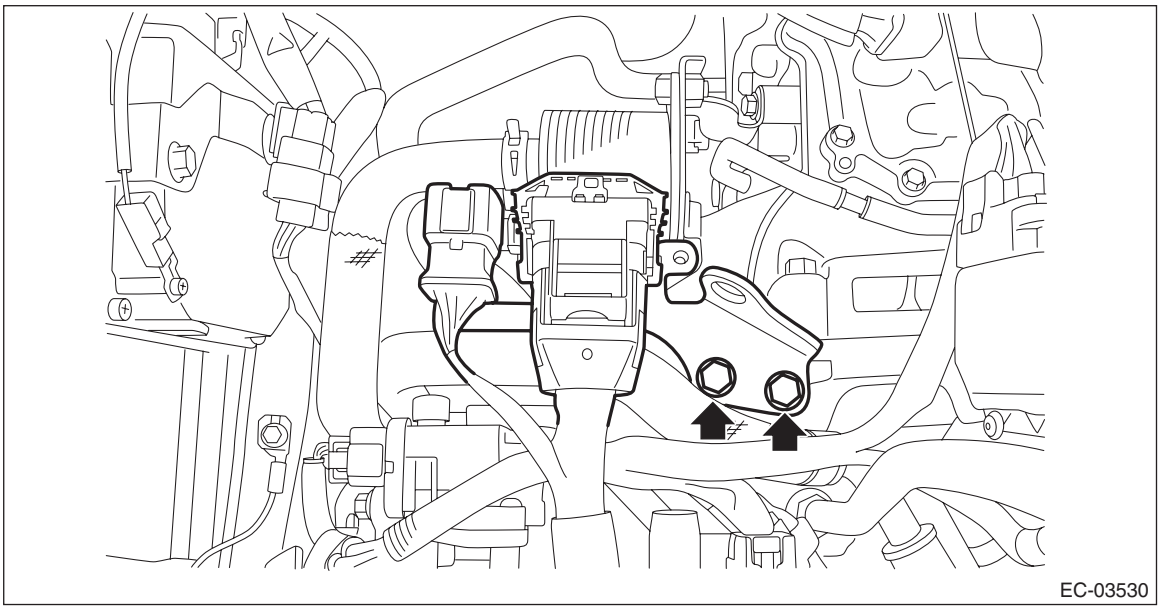


3) Connect the engine coolant hose (A), engine coolant hose (B) (CVT model) and engine coolant hose (C) to the EGR cooler.



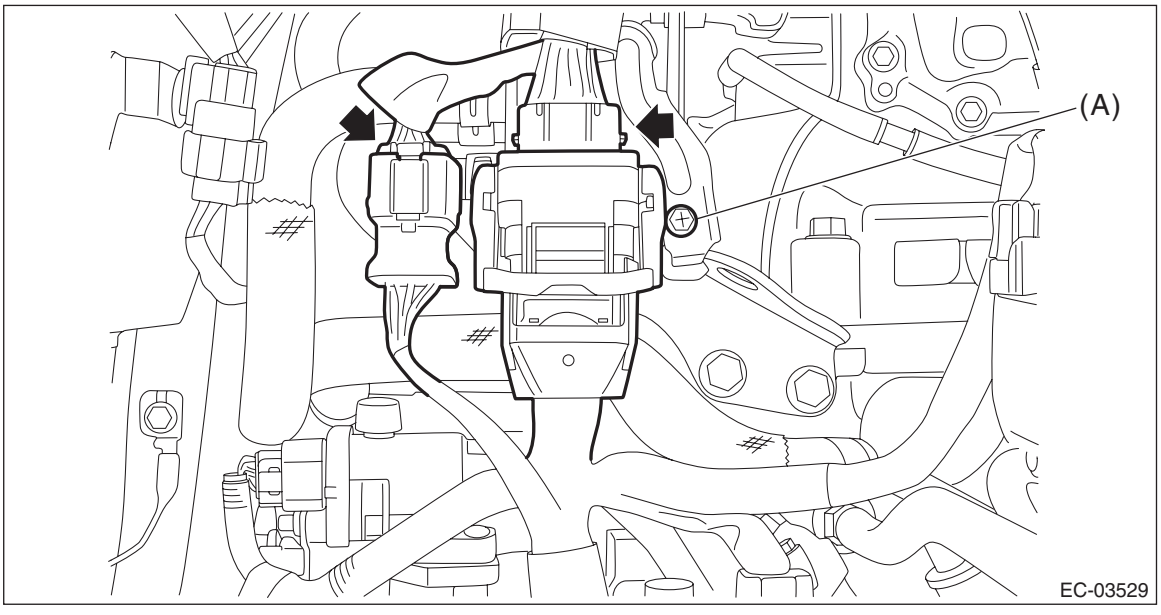
4) Install the engine rear hanger.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

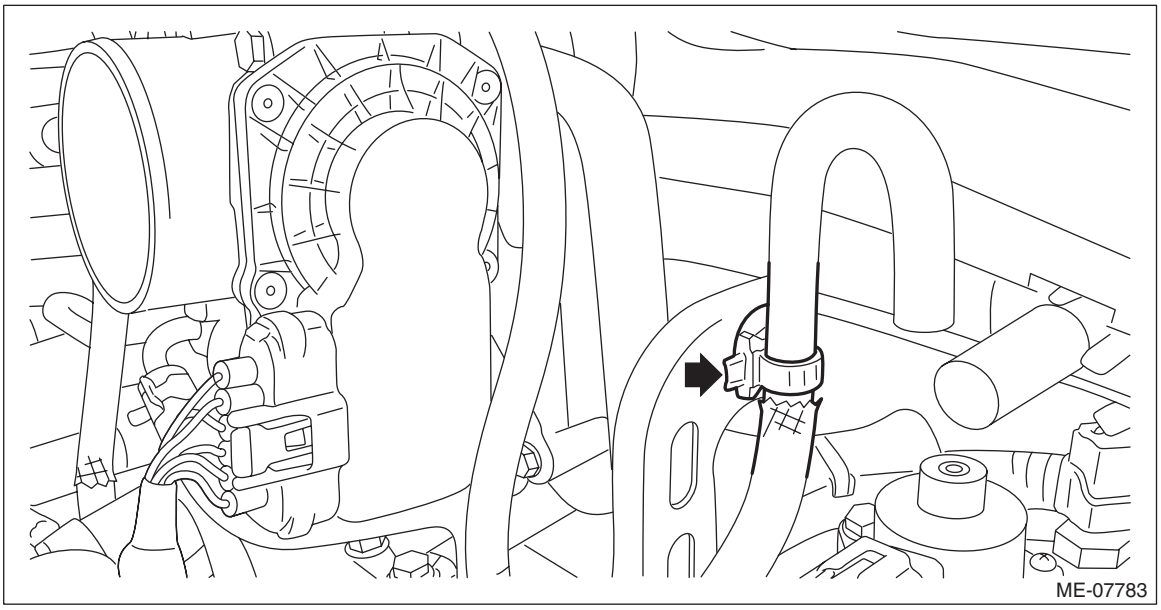


5) Connect the engine harness connector.
(1) Connect the bulkhead harness connector to the engine harness connector (black) and engine harness connector (brown).
(2) Install the bolt (A) which secures the bulkhead harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



6) Secure the air breather hose to the engine rear hanger using clip. (MT model)



7) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
8) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
9) Lower the vehicle.
10) Install the collector cover.
11) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
12) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

C: INSPECTION

1) Check that the EGR cooler has no deformation, cracks or other damages.
2) Check that the hose has no cracks, damage or loose part.

9. Fuel Level Sensor

A: REMOVAL

For removal procedures, refer to the “FU (H4DO (w/o HEV))” section. <Ref. to FU(H4DO(w/o HEV))-145, REMOVAL, Fuel Level Sensor.>

B: INSTALLATION

For installation procedures, refer to the “FU (H4DO (w/o HEV))” section. <Ref. to FU(H4DO(w/o HEV))-146, INSTALLATION, Fuel Level Sensor.>

C: INSPECTION

For inspection procedures, refer to the “FU (H4DO (w/o HEV))” section. <Ref. to FU(H4DO(w/o HEV))-147, INSPECTION, Fuel Level Sensor.>

10.Fuel Sub Level Sensor

A: REMOVAL

For removal procedures, refer to the “FU (H4DO (w/o HEV))” section. <Ref. to FU(H4DO(w/o HEV))-148, REMOVAL, Fuel Sub Level Sensor.>

B: INSTALLATION

For installation procedures, refer to the “FU (H4DO (w/o HEV))” section. <Ref. to FU(H4DO(w/o HEV))-152, INSTALLATION, Fuel Sub Level Sensor.>

C: INSPECTION

For inspection procedures, refer to the “FU (H4DO (w/o HEV))” section. <Ref. to FU(H4DO(w/o HEV))-157, INSPECTION, Fuel Sub Level Sensor.>

11.Drain Filter

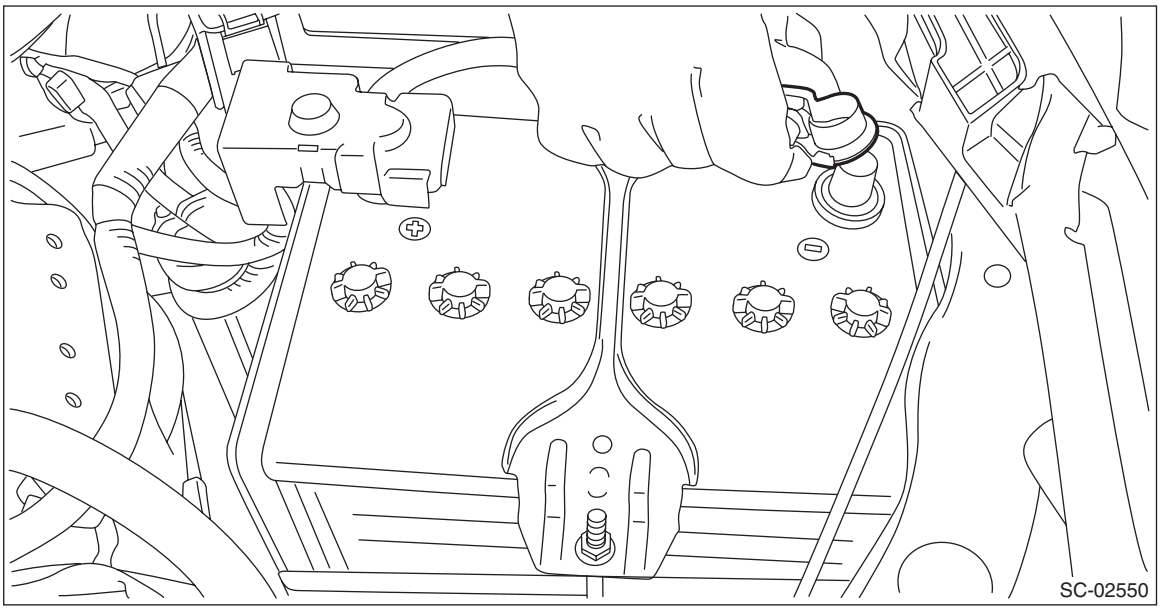
A: SPECIFICATION

The leak check valve assembly is a non-disassembled part. Do not remove the drain filter from the leak check valve assembly. Refer to “Leak Check Valve Assembly” for removal and installation procedures. <Ref. to EC(H4DO(w/o HEV))-43, REMOVAL, Leak Check Valve Assembly.> <Ref. to EC(H4DO(w/o HEV))-49, INSTALLATION, Leak Check Valve Assembly.>

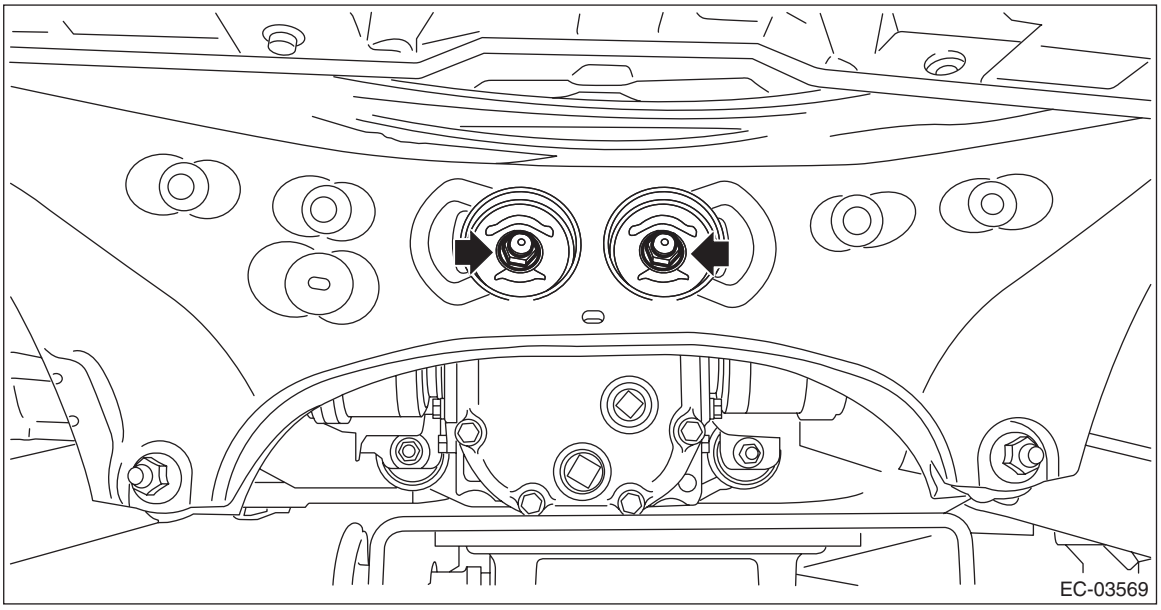
12.Leak Check Valve Assembly

A: REMOVAL

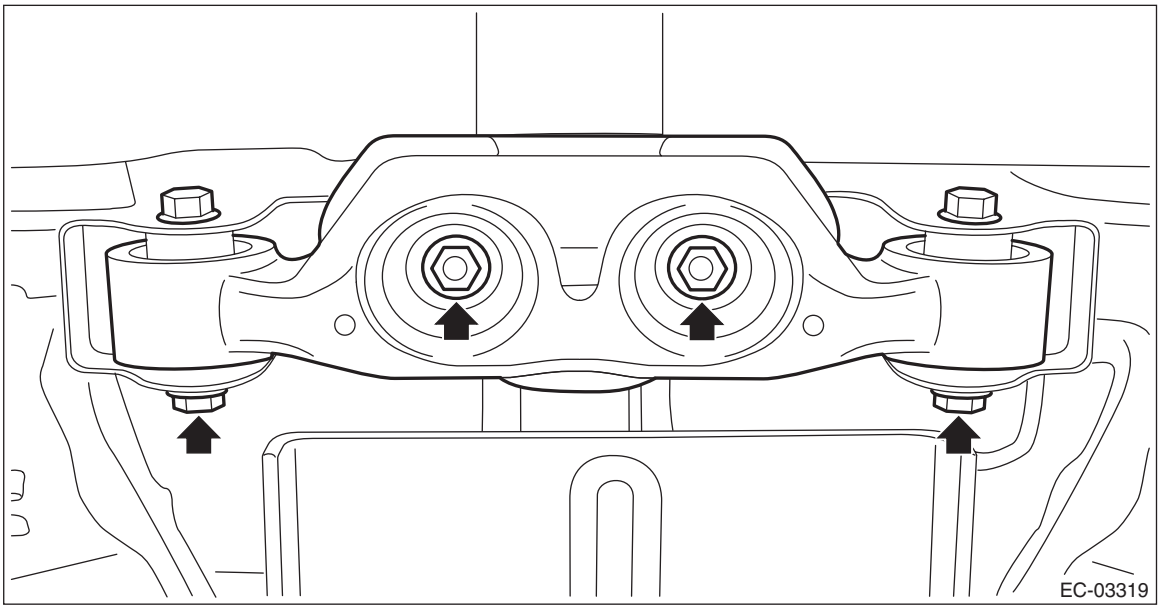
1) Disconnect the ground cable from battery.



2) Lift up the vehicle.
3) Remove the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
4) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
5) Support the rear differential with the transmission jack.
6) Remove the self-locking nuts which hold the rear differential to the rear sub frame assembly.

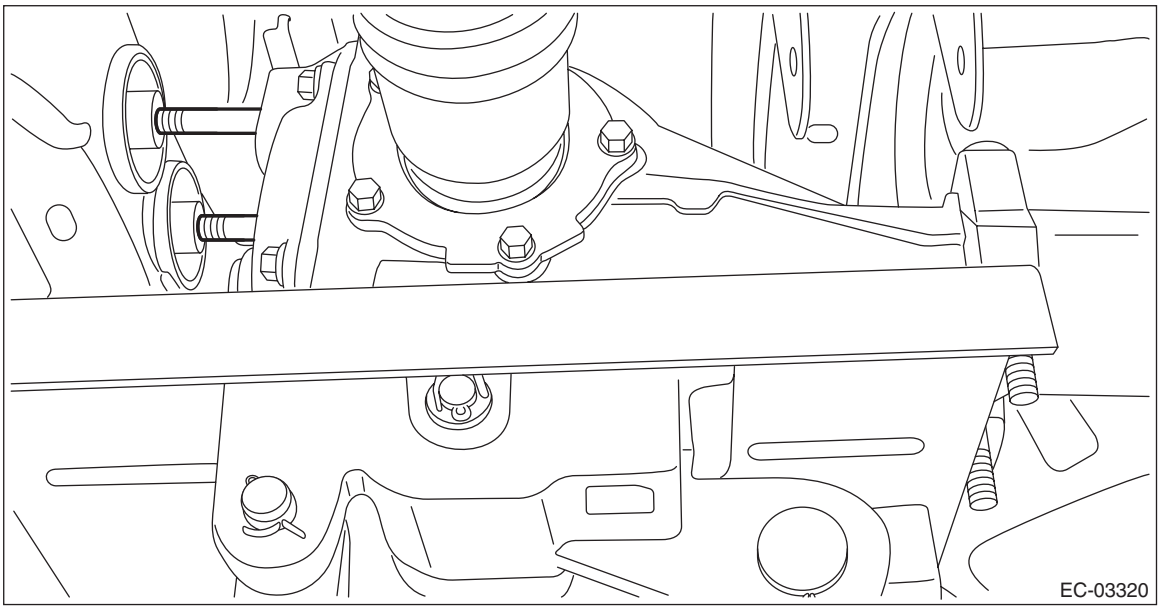


7) Remove the rear differential member from the rear sub frame assembly and the rear differential.

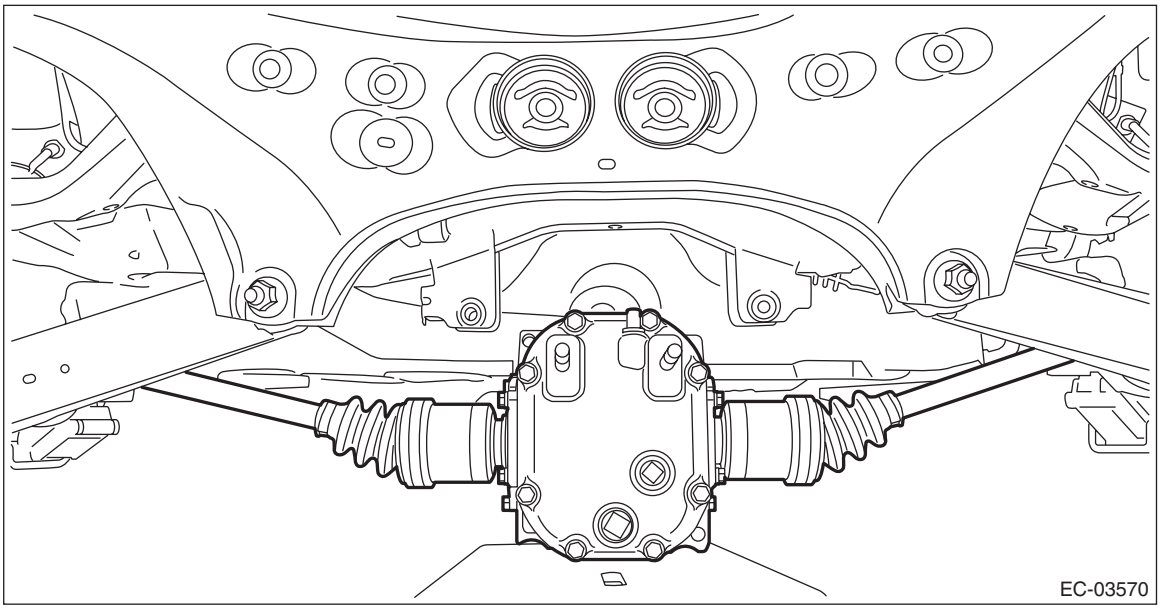


8) Lower the transmission jack gradually until the rear differential is at the position shown in the figure.

NOTE:
• When pulling out the stud bolt from the bushing portion of the rear sub frame assembly, adjust the angle and location of transmission jack and jack stand.

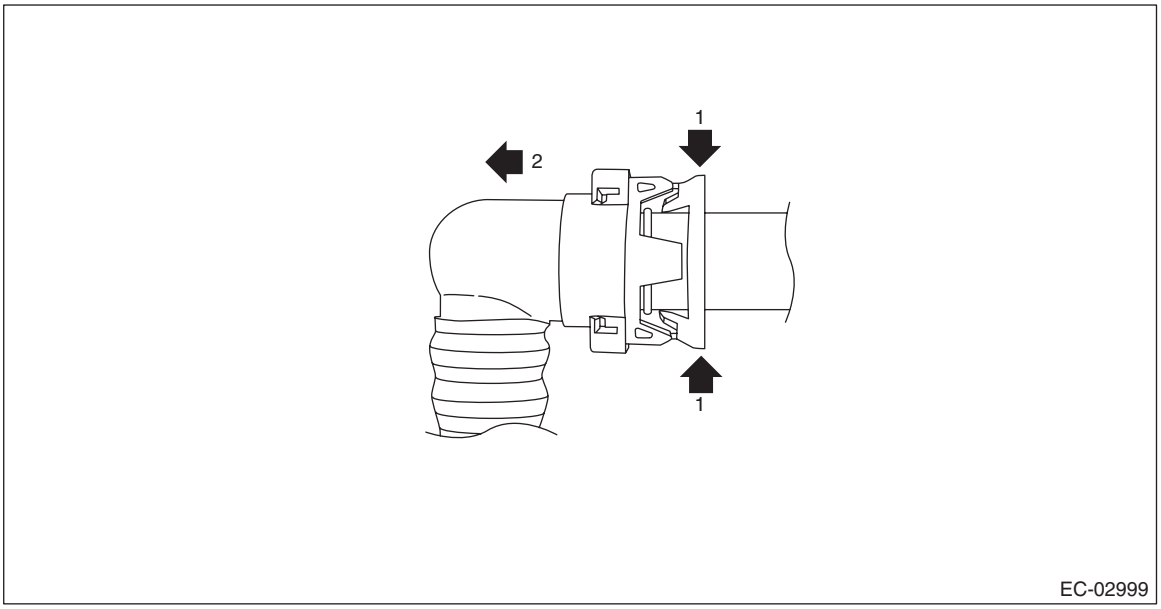


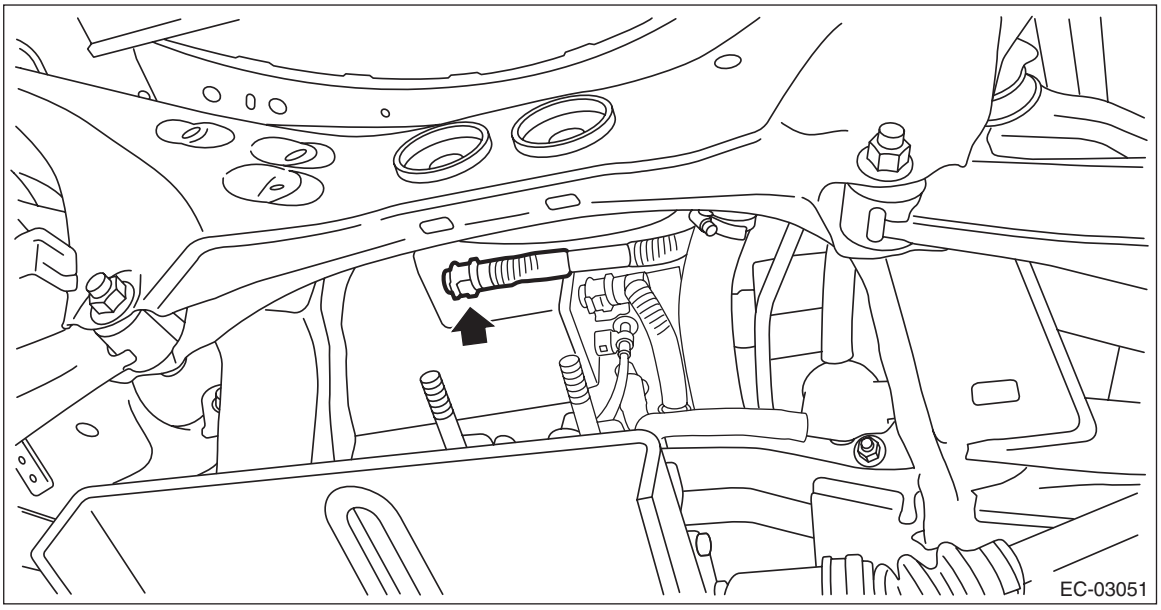
• Do not lower the rear differential excessively. Doing so may add extra load to the drive shaft or cause the falling-off of the drive shaft.



9) Disconnect the drain tube from the canister.

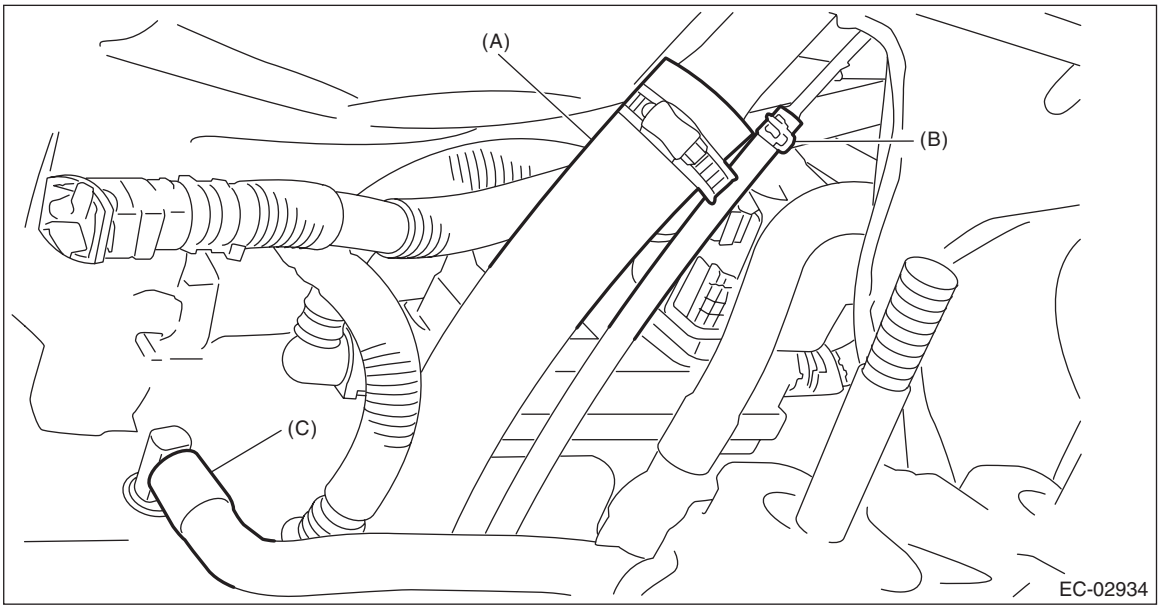
NOTE:
Disconnect the quick connector as shown in the figure.



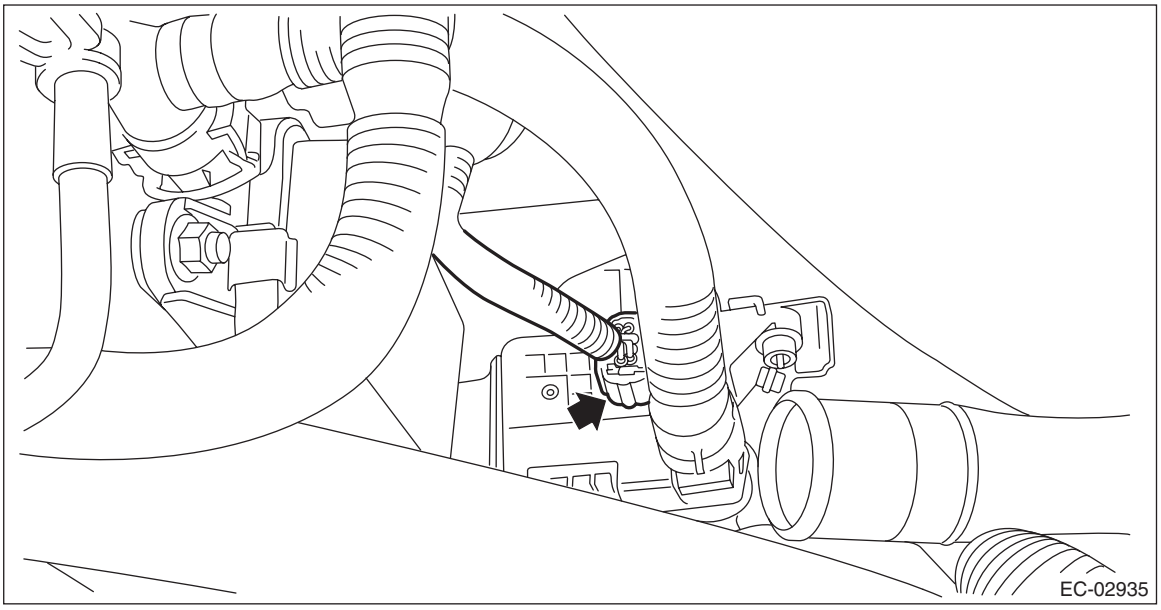


10) Disconnect the fuel filler hose (A) and evaporation hose (B).

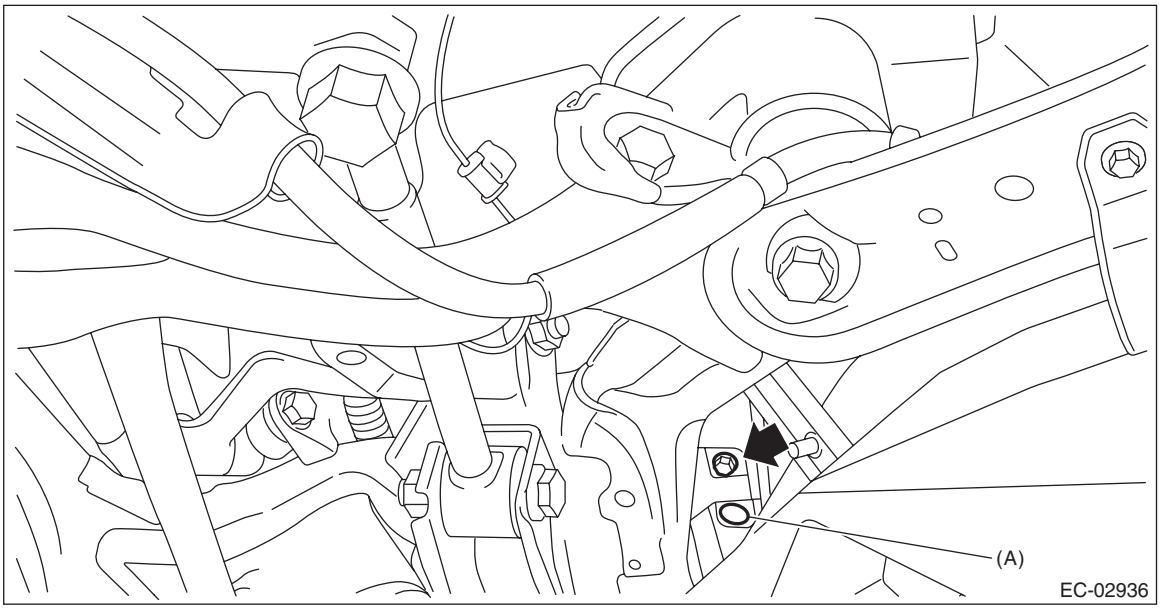
11) Disconnect the intake hose (C) from the connector.

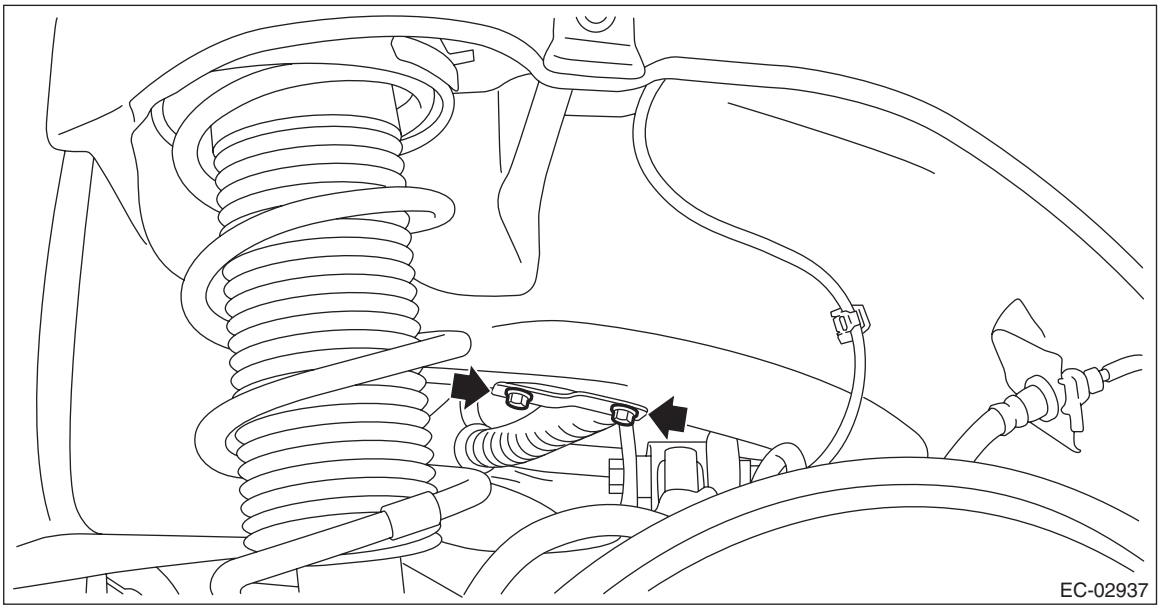


12) Disconnect the connector from the leak check valve assembly.



13) Remove the bolt and clip (A) which secure the leak check valve assembly to the vehicle, and remove the leak check valve assembly.

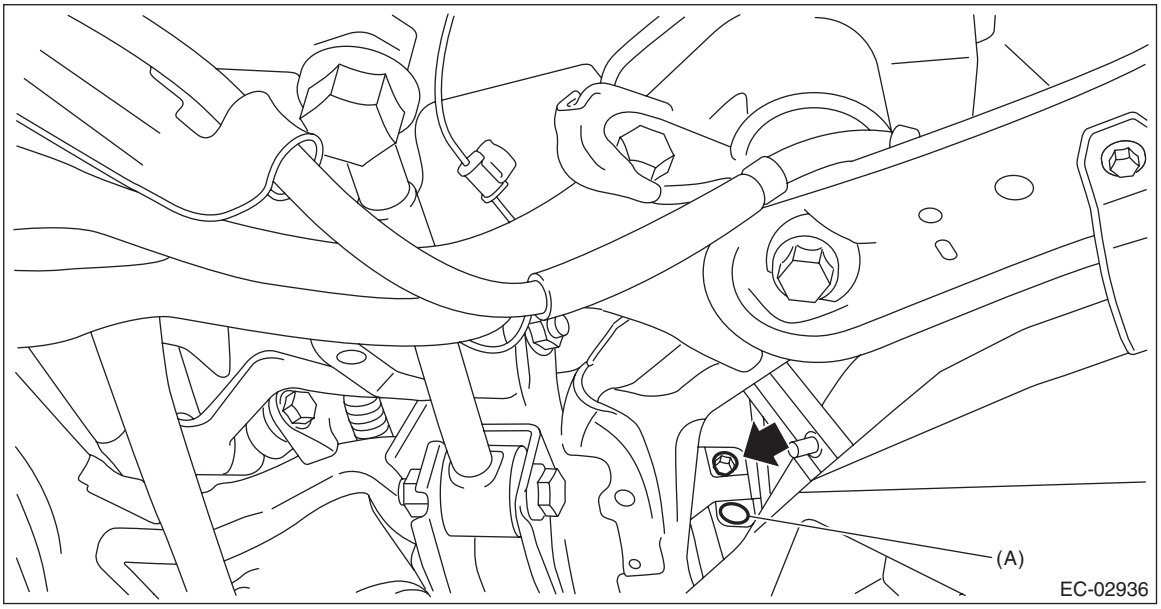


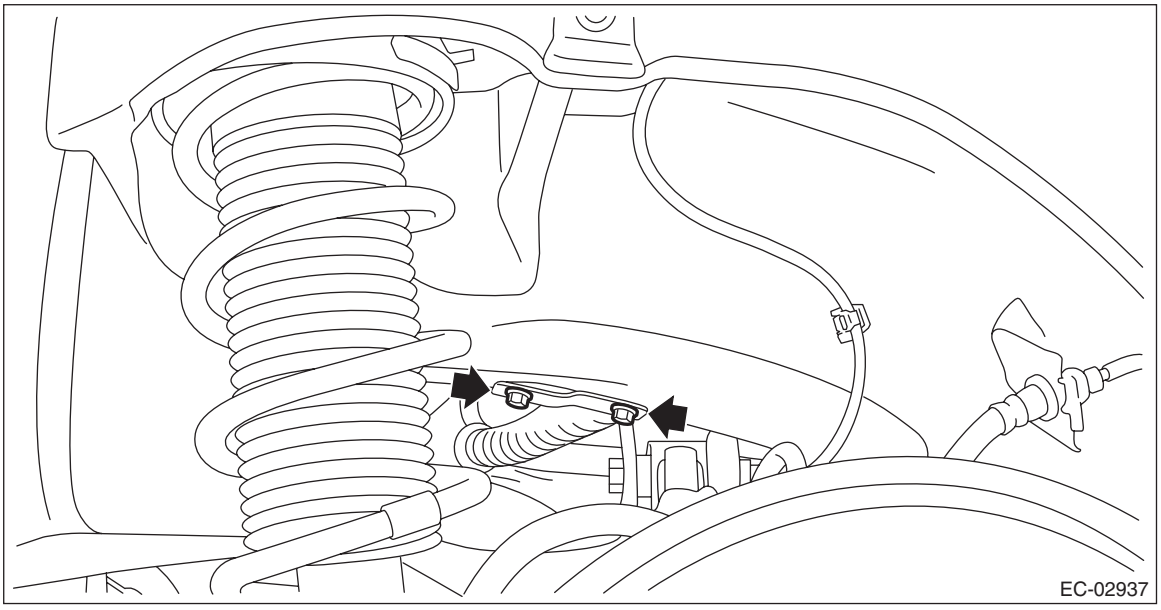


B: INSTALLATION

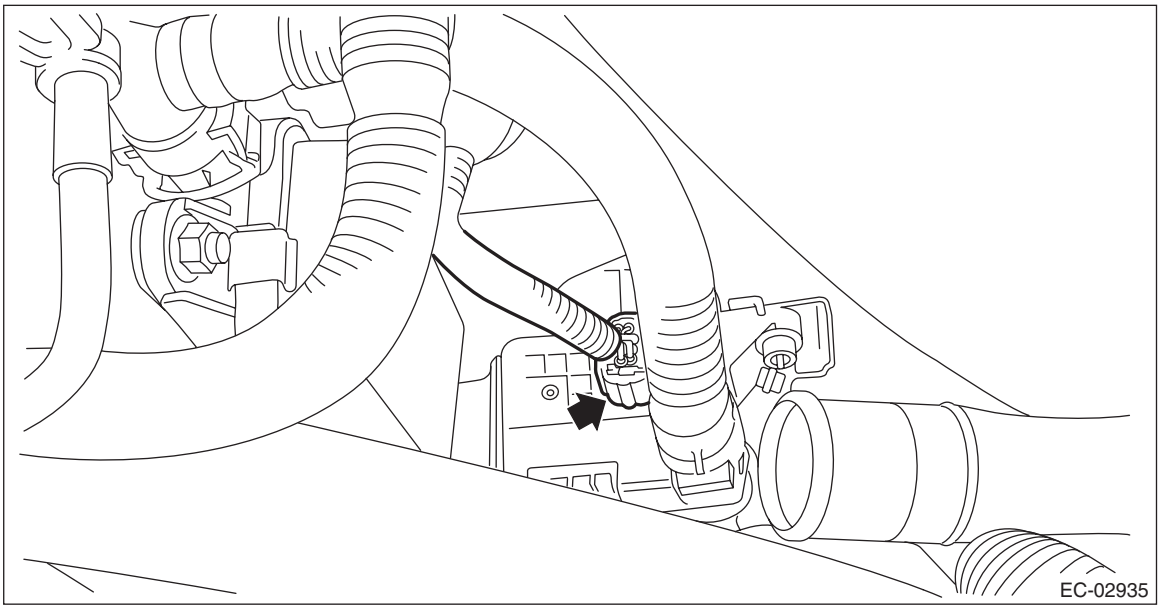
1) Install the leak check valve assembly to the vehicle with the bolt and clip (A).

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)





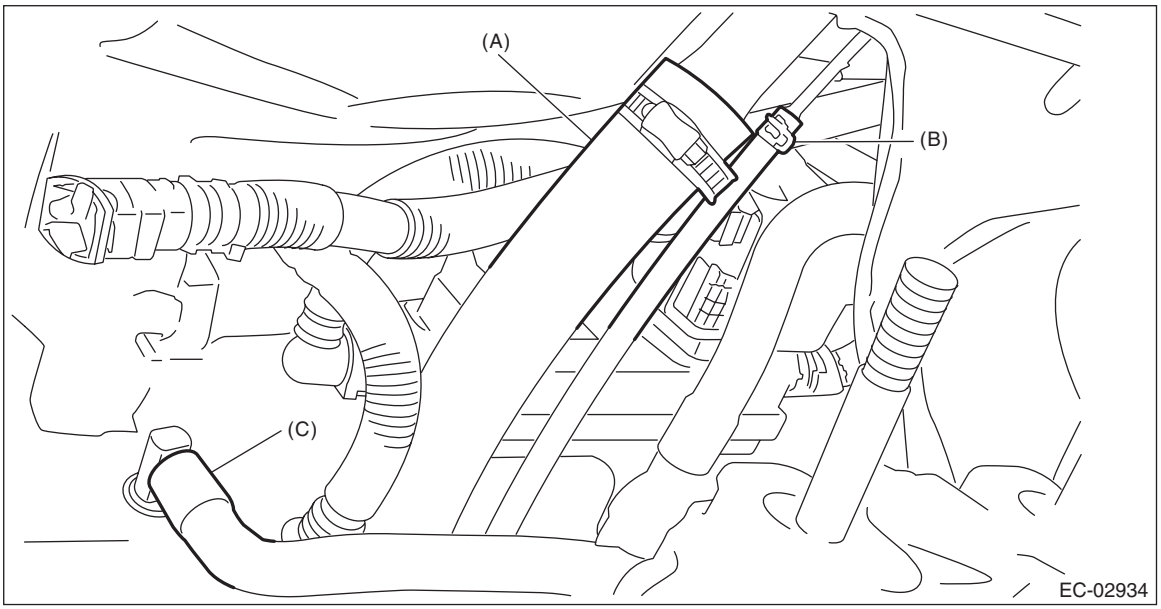
2) Connect the connector to the leak check valve assembly.

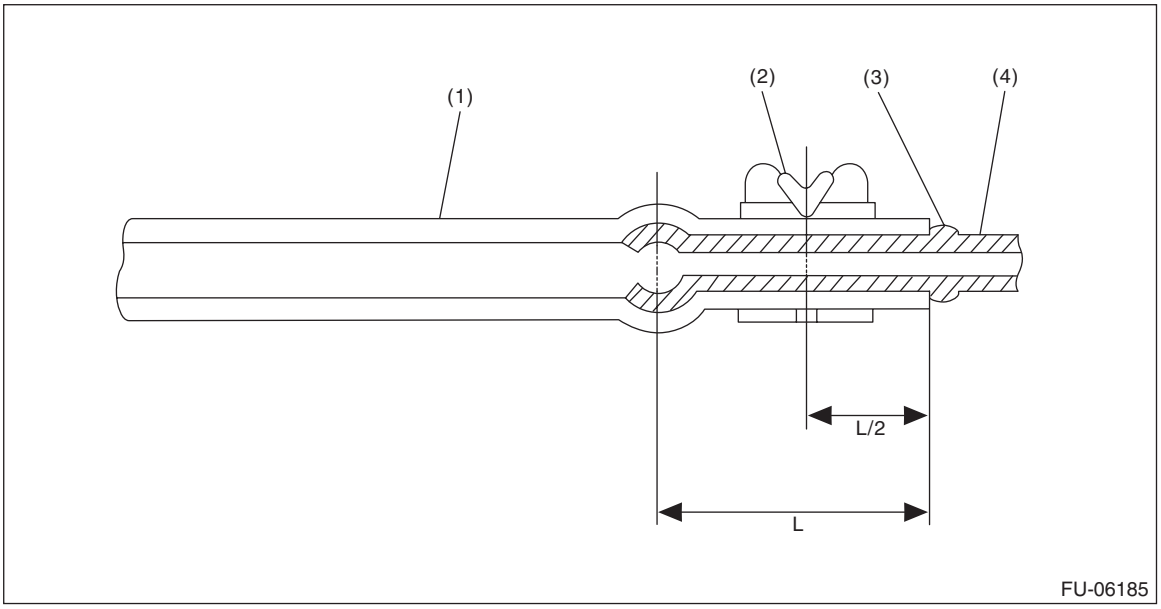


3) Connect the intake hose (C) to the connector.

4) Securely insert the fuel filler hose (A) and evaporation hose (B) until the hose end contacts the spool, then attach the clamp and clip as shown in the figure.

Tightening torque:
2.5 N·m (0.3 kgf-m, 1.8 ft-lb)

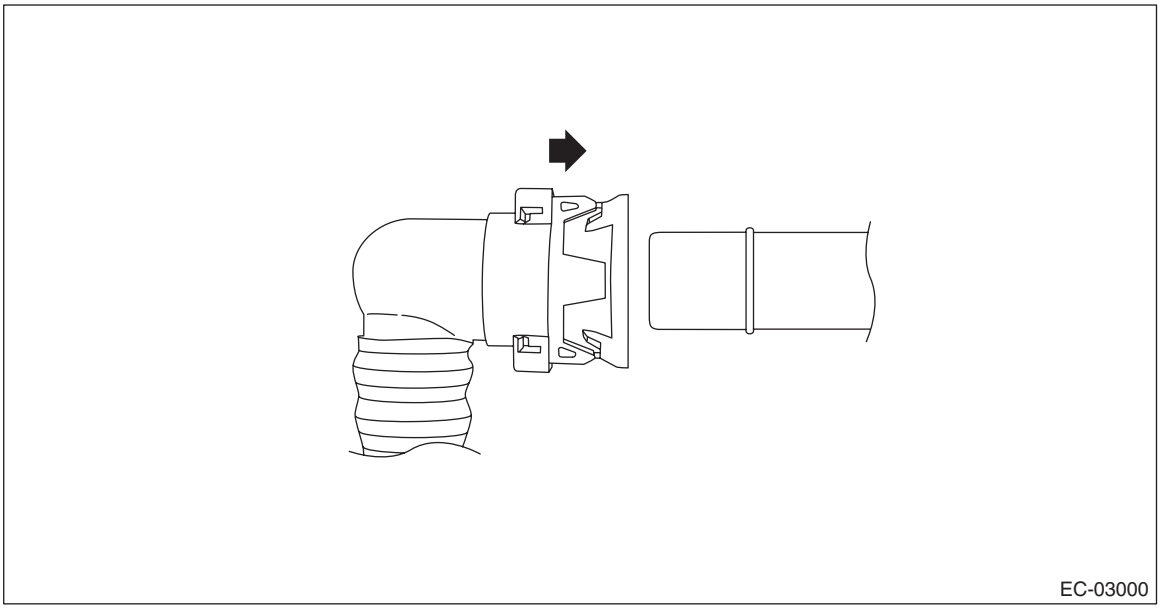


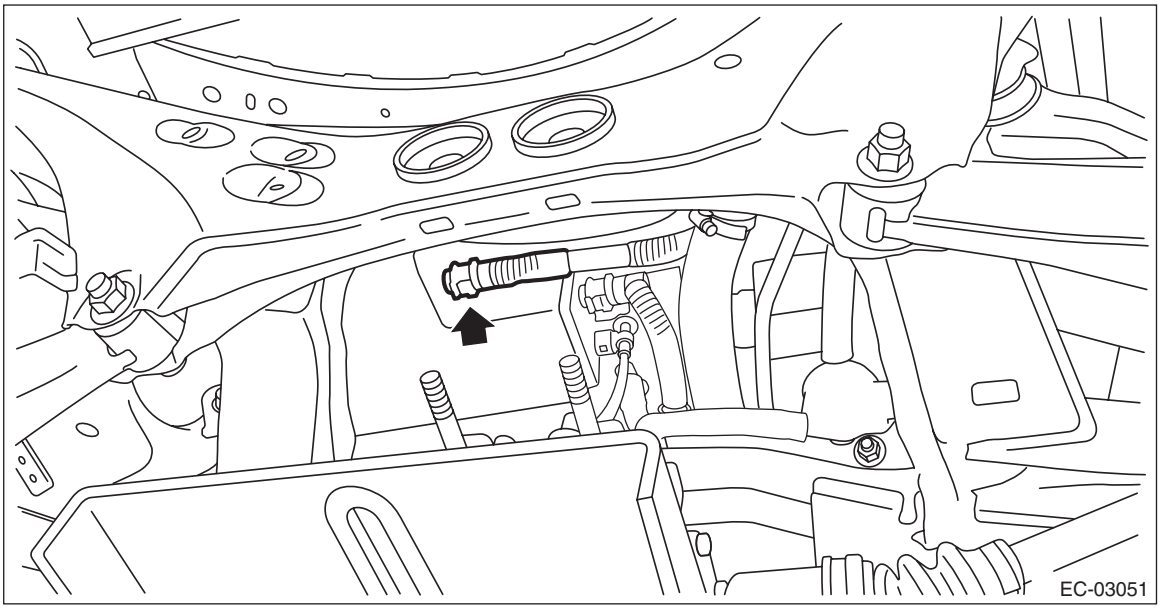


(1) Hose
(2) Clamp and clip
(3) Spool
(4) Pipe

5) Connect the drain tube to the canister.

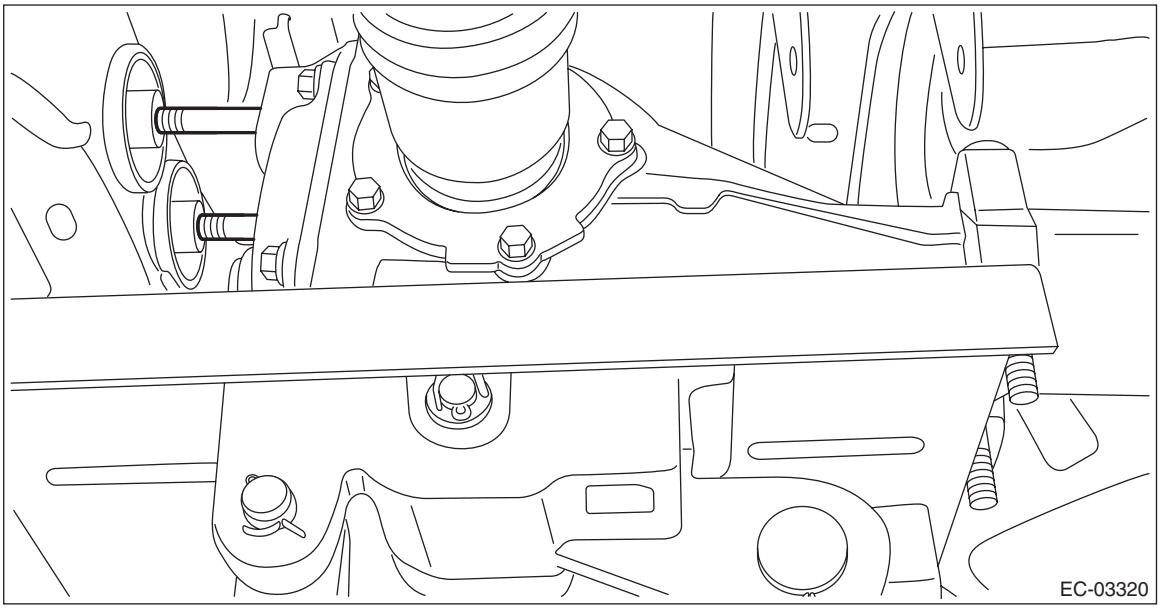
NOTE:
Connect the quick connector as shown in the figure.





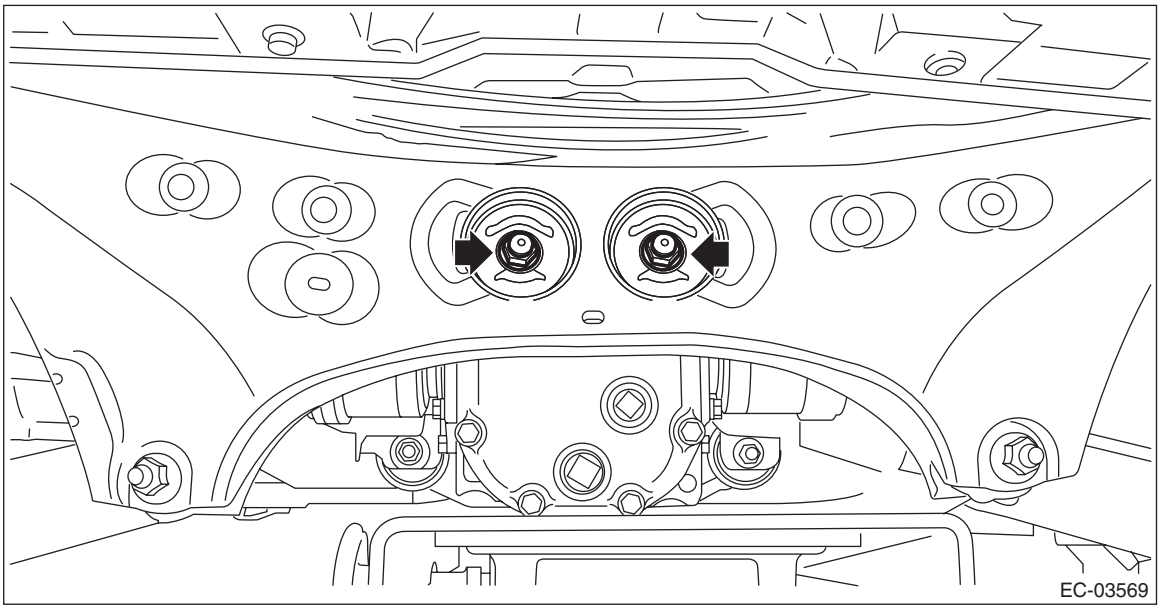
6) Lift up the transmission jack gradually, and set the rear differential to the rear sub frame assembly.

NOTE:
When inserting the stud bolt into the bushing portion of the rear sub frame assembly, adjust the angle and location of transmission jack and jack stand.



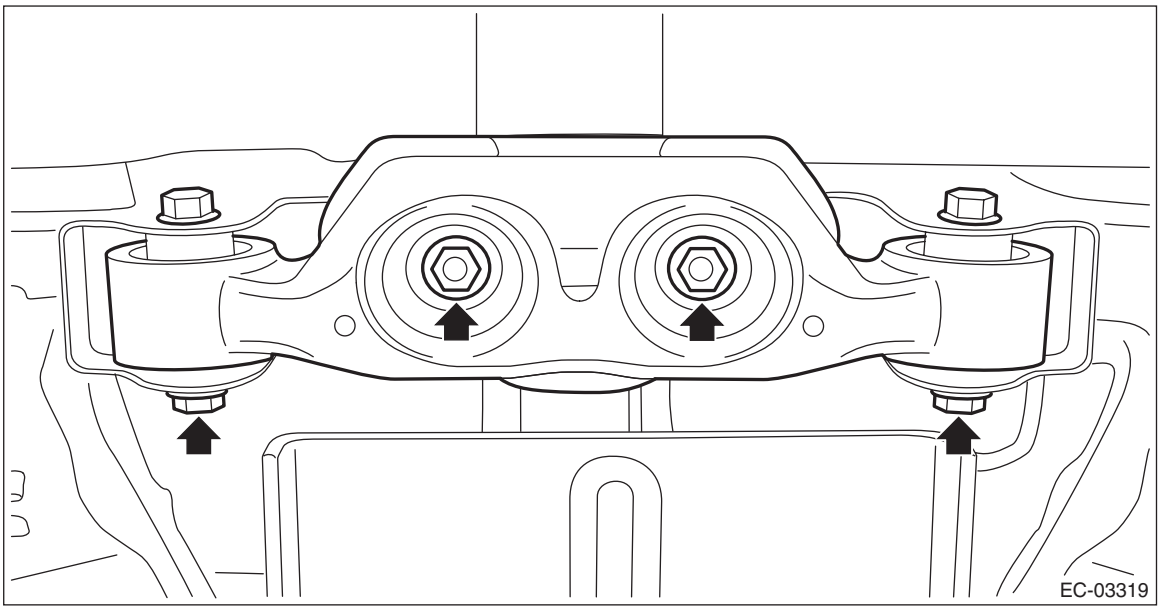
7) Temporarily tighten the self-locking nuts which hold the rear differential to the rear sub frame assembly.

NOTE:
Use a new self-locking nut.



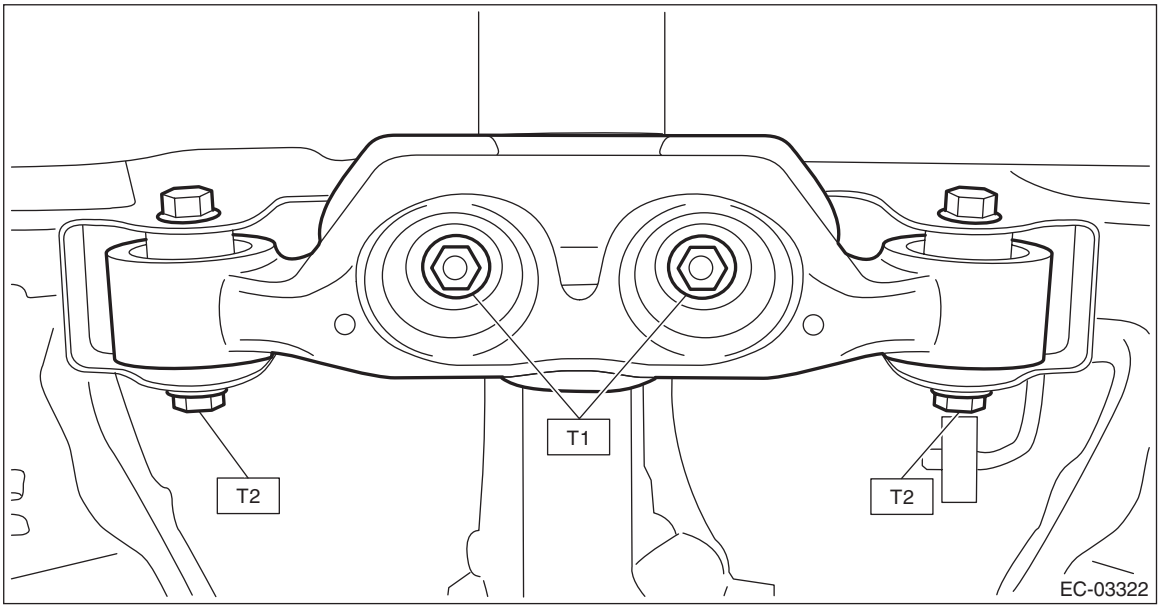
8) Set the rear differential member to the rear sub frame assembly and rear differential, and temporarily tighten the self-lock nuts which secure the rear differential member to the rear sub frame assembly and rear differential.

NOTE:
Use a new self-locking nut.



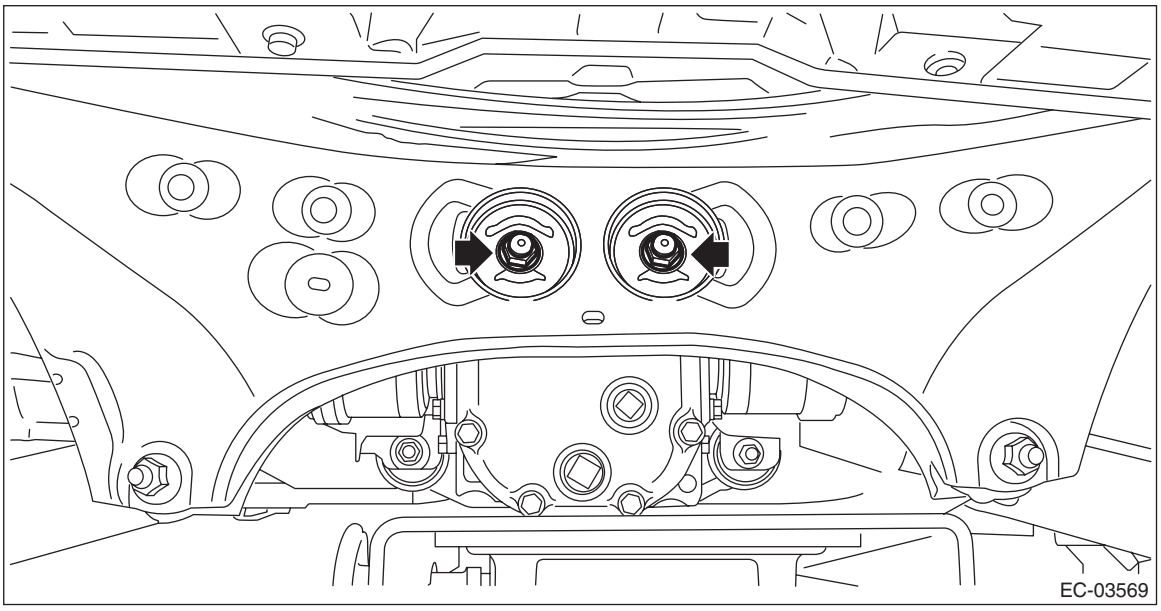
9) Remove the transmission jack from the rear differential.
10) Tighten the self-locking nuts which secure the rear differential member to the rear sub frame assembly and rear differential.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 110 N·m (11.2 kgf-m, 81.1 ft-lb)

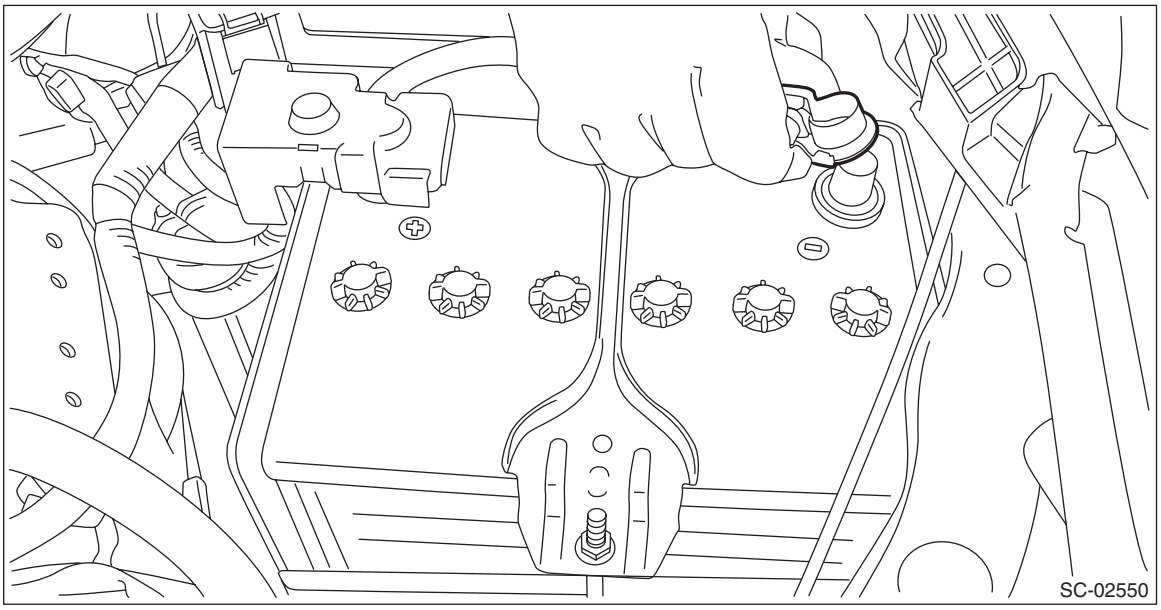


11) Tighten the self-locking nuts which secure the rear differential to the rear sub frame assembly.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



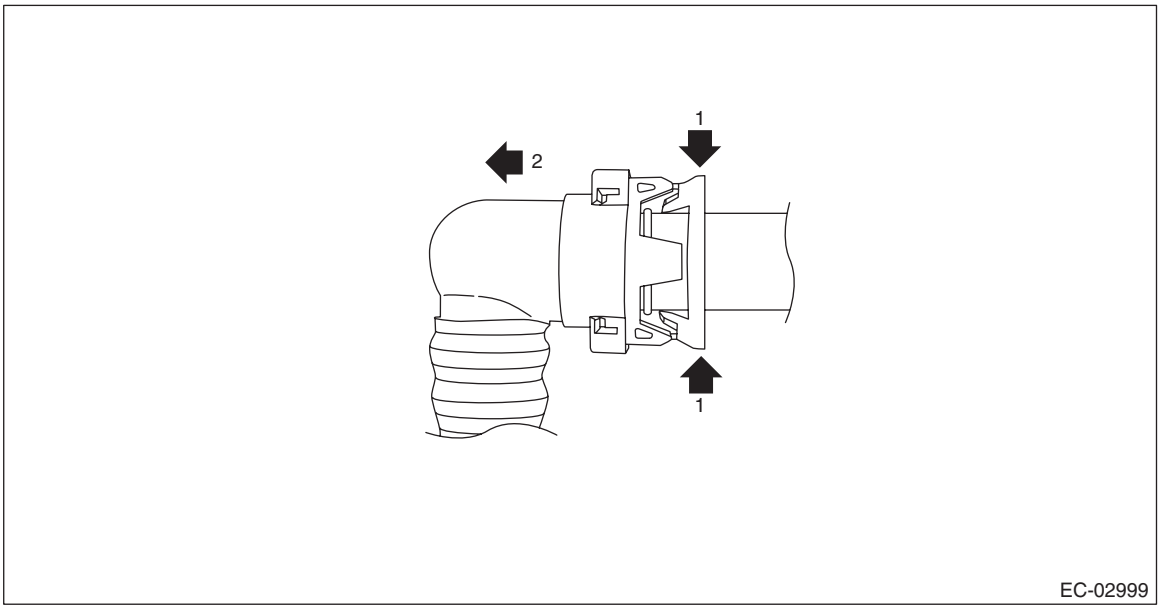
12) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
13) Install the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.>
14) Lower the vehicle.
15) Connect the battery ground terminal.

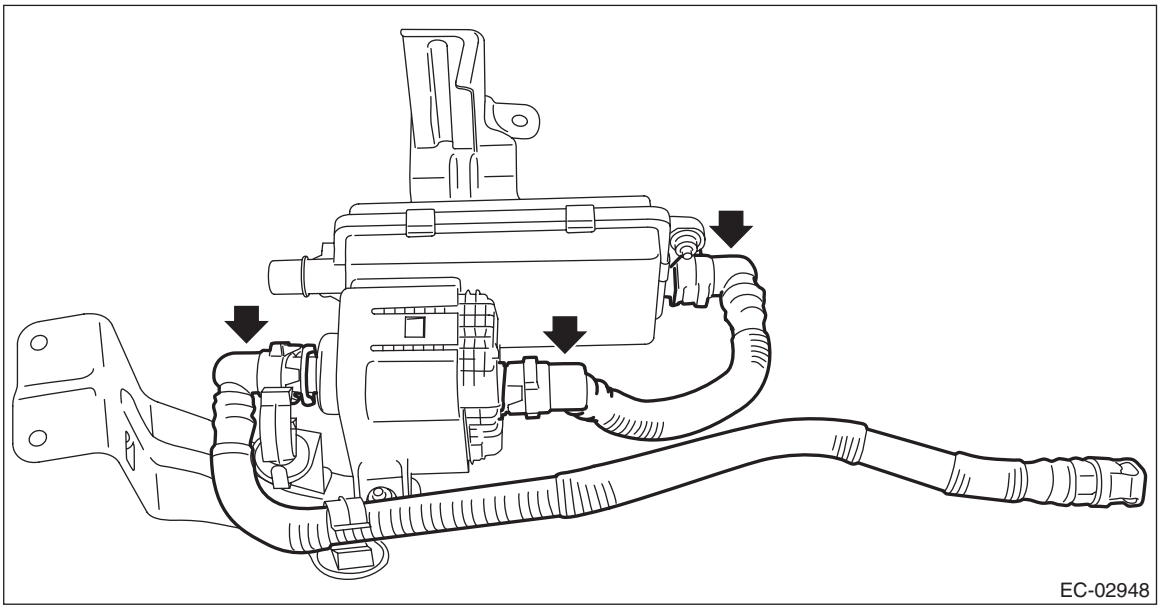


C: DISASSEMBLY

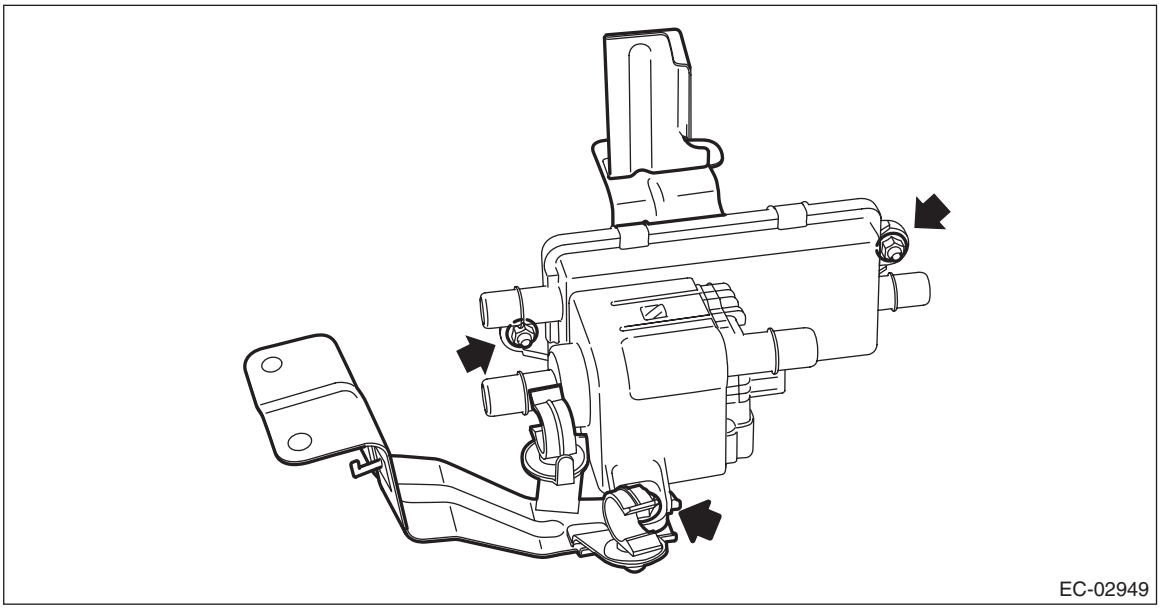
1) Remove the drain separator from the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-63, REMOVAL, Drain Separator.>
2) Disconnect the drain tube from the leak check valve assembly.

NOTE:
Disconnect the quick connector as shown in the figure.





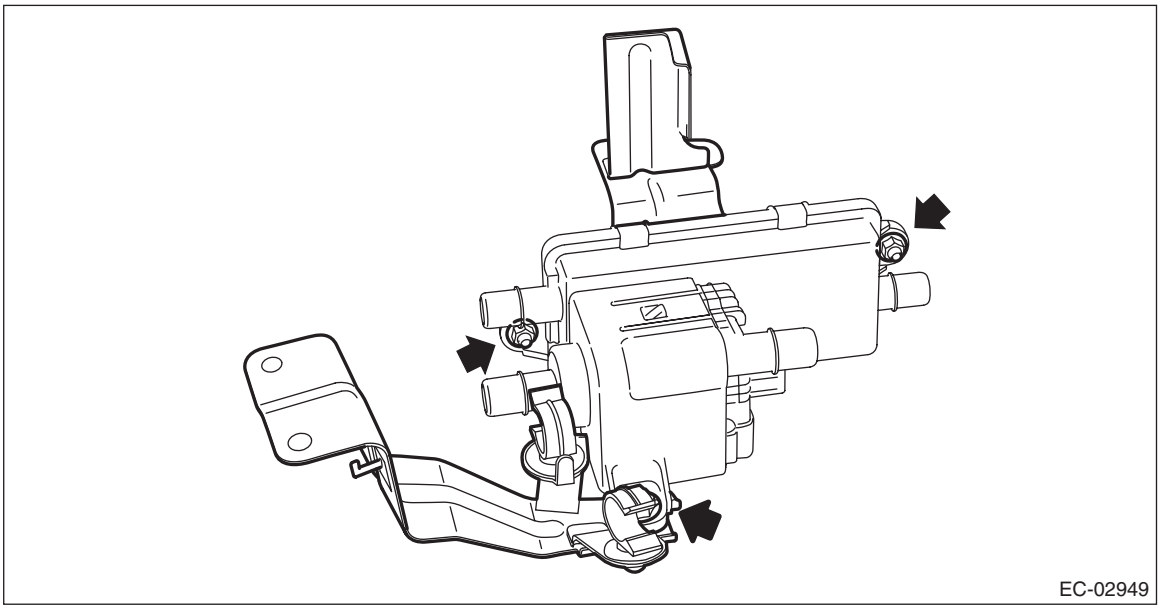
3) Remove the bracket from the leak check valve assembly.



D: ASSEMBLY

1) Install the bracket to the leak check valve assembly.

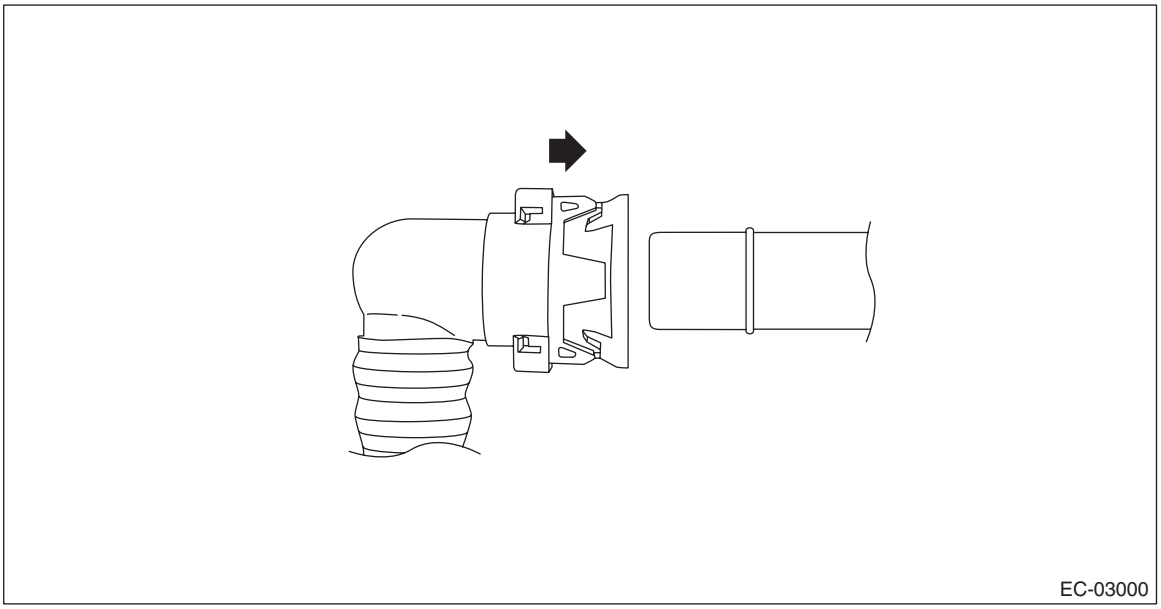
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

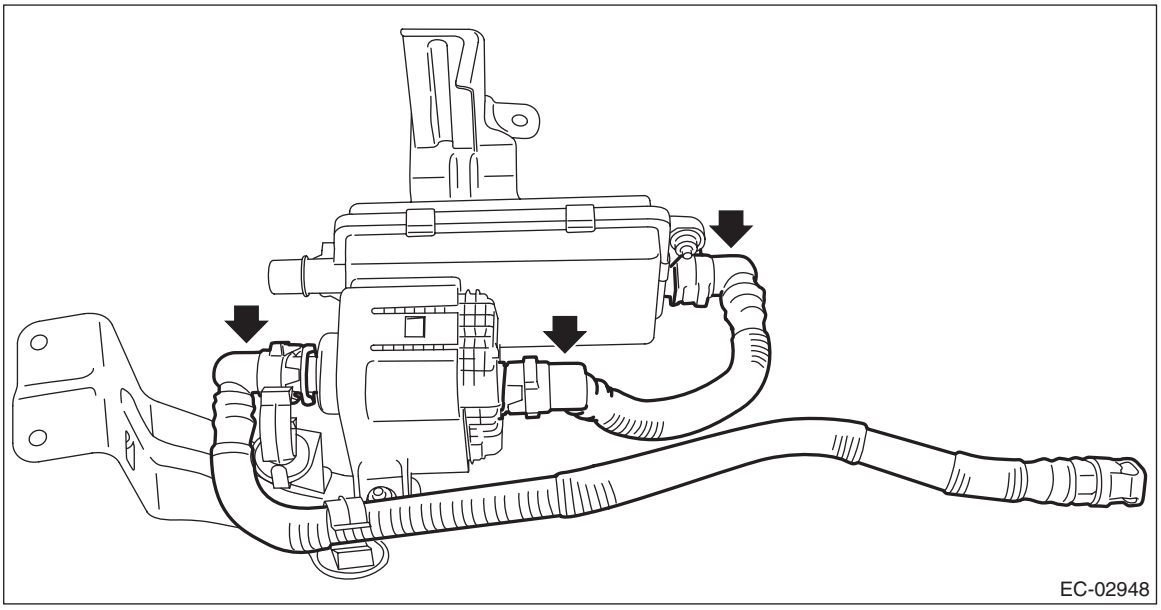


2) Install the drain tube to the leak check valve assembly.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• Make sure that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.



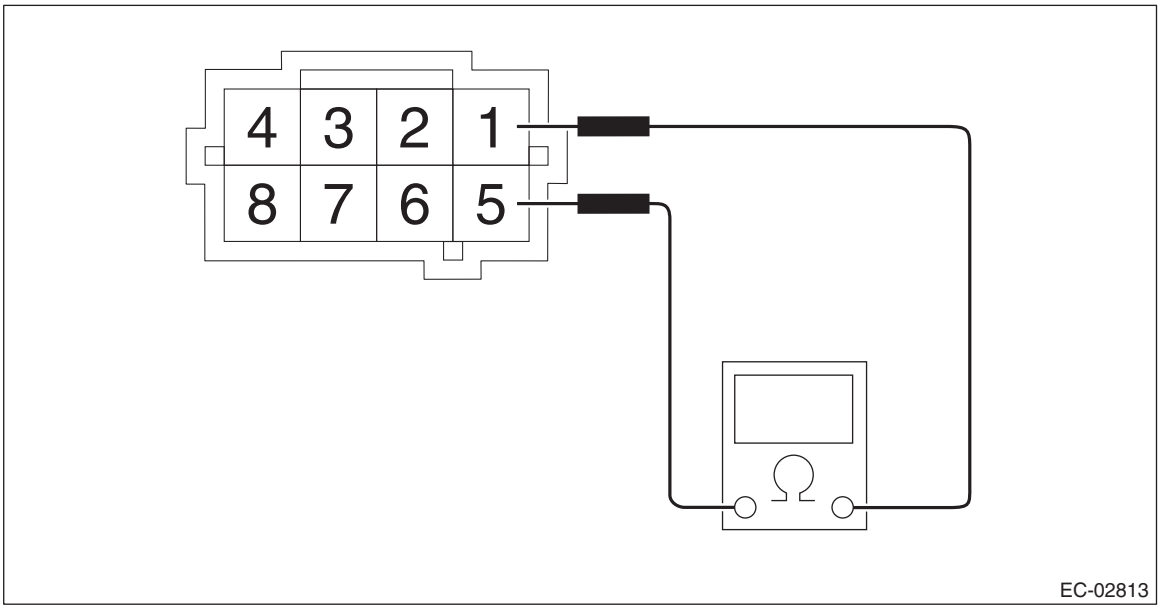


3) Install the drain separator to the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-63, INSTALLATION, Drain Separator.>

E: INSPECTION

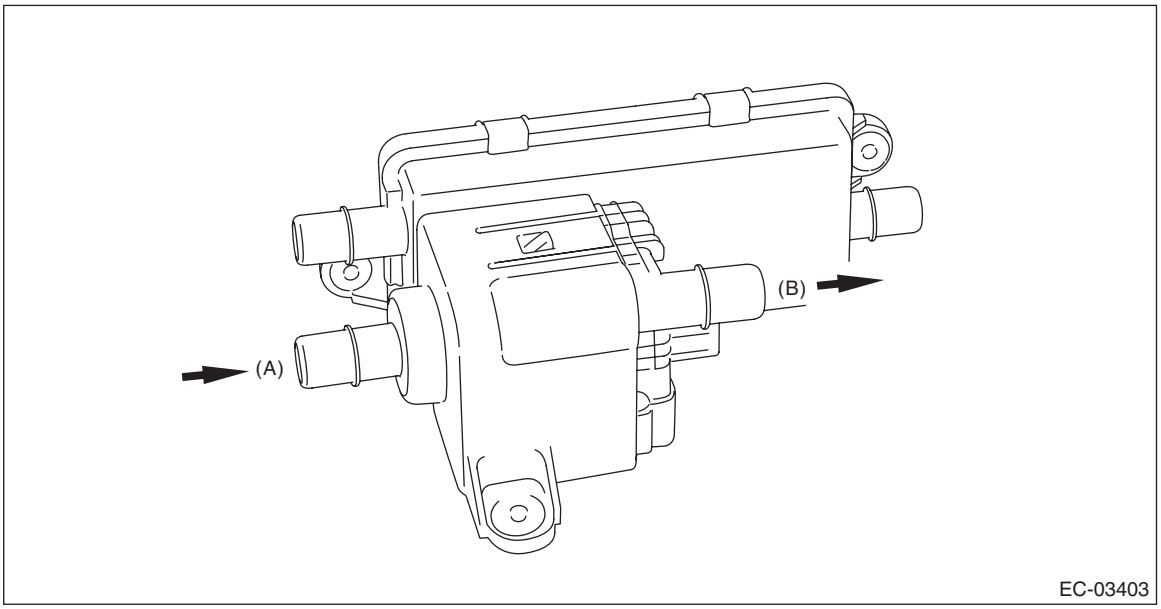
1. CHECK SWITCHING VALVE

1) Check the resistance between switching valve terminals.

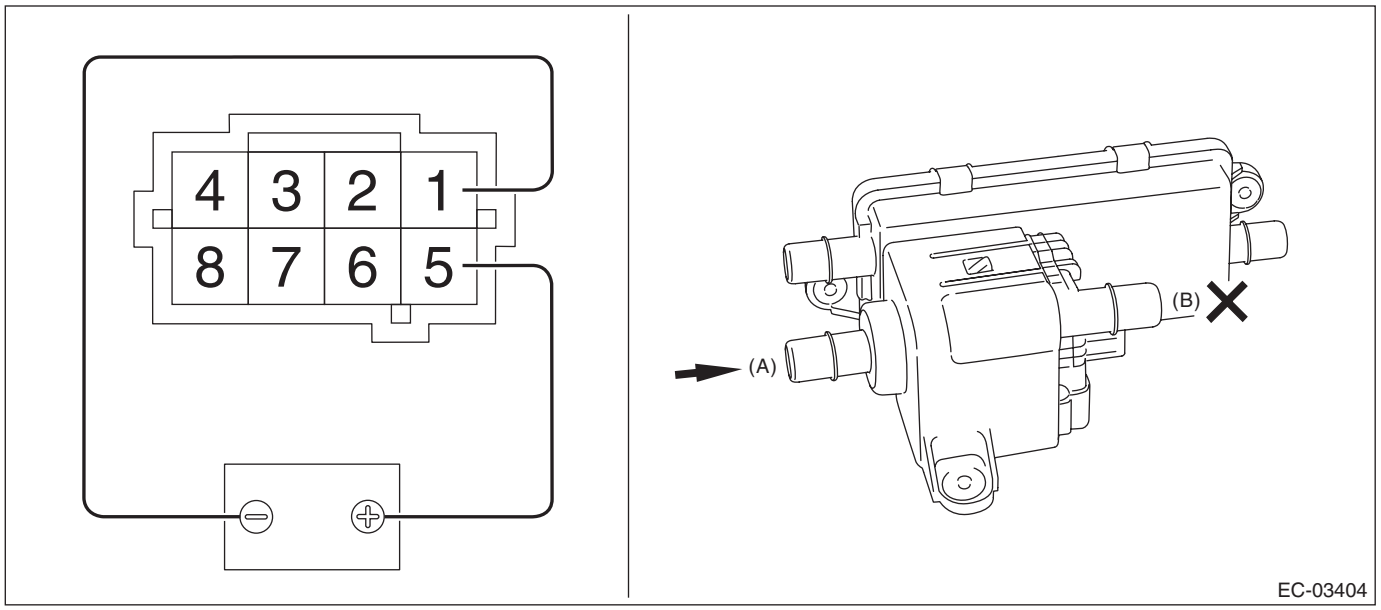


Terminal No.	Standard
1 and 5	27^{+3}_{-2} Ω (when 20°C (68°F))
	31±4 Ω (60°C (140°F))

2) Check that air is discharged from (B) when air is blown into (A).



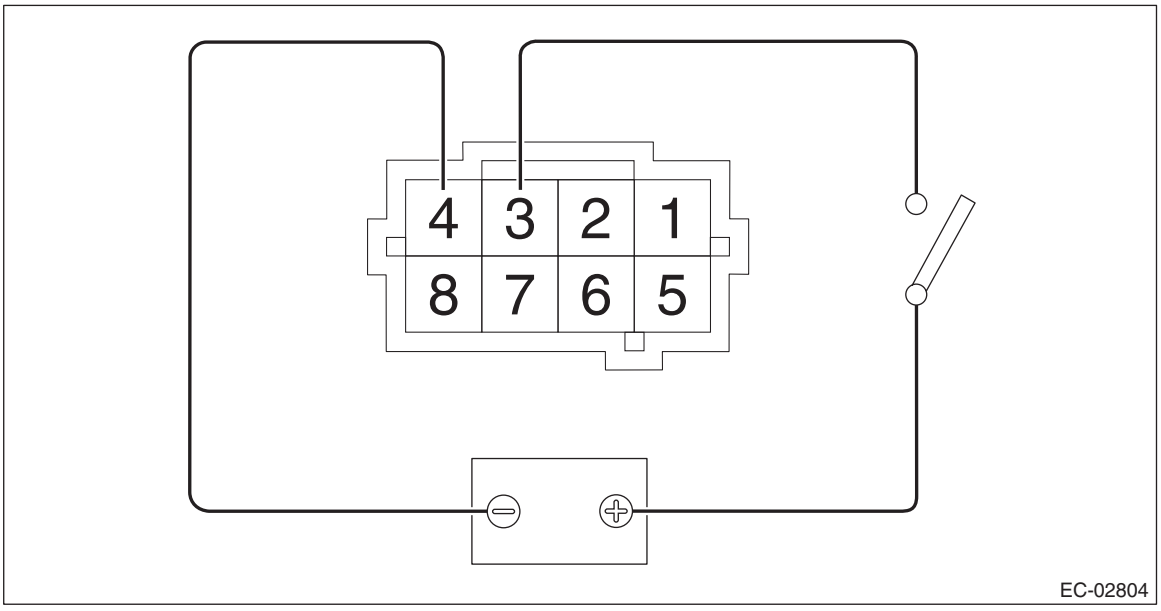
3) Connect the battery positive terminal to the terminal No. 5 and the battery negative terminal to the terminal No. 1. Check that air does not come out from (B) when air is blown into (A).



2. CHECK VACUUM PUMP

1) Connect the battery positive terminal to terminal No. 3 and the battery ground terminal to terminal No. 4, and inspect the vacuum pump operation.

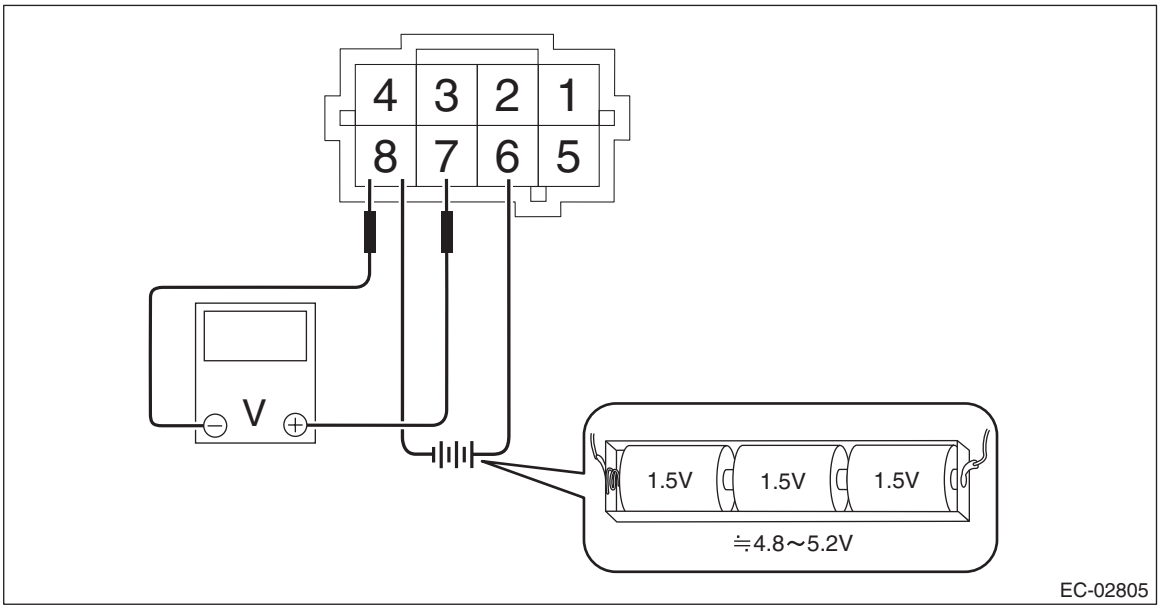
CAUTION:
Do not operate the vacuum pump for 5 minutes or more.



3. CHECK PRESSURE SENSOR

1) Connect dry-cell battery positive terminal to terminal No. 6 and dry-cell battery ground terminal to terminal No. 8, circuit tester positive terminal to terminal No. 7 and the circuit tester negative terminal to terminal No. 8.

NOTE:
- Use new dry-cell batteries.
- Using circuit tester, check the voltage of a single dry-cell battery is 1.6 V or more. And also check the voltage of three batteries in series is between 4.8 V and 5.2 V.
- For power supply, 5 V DC voltage source can also be used.

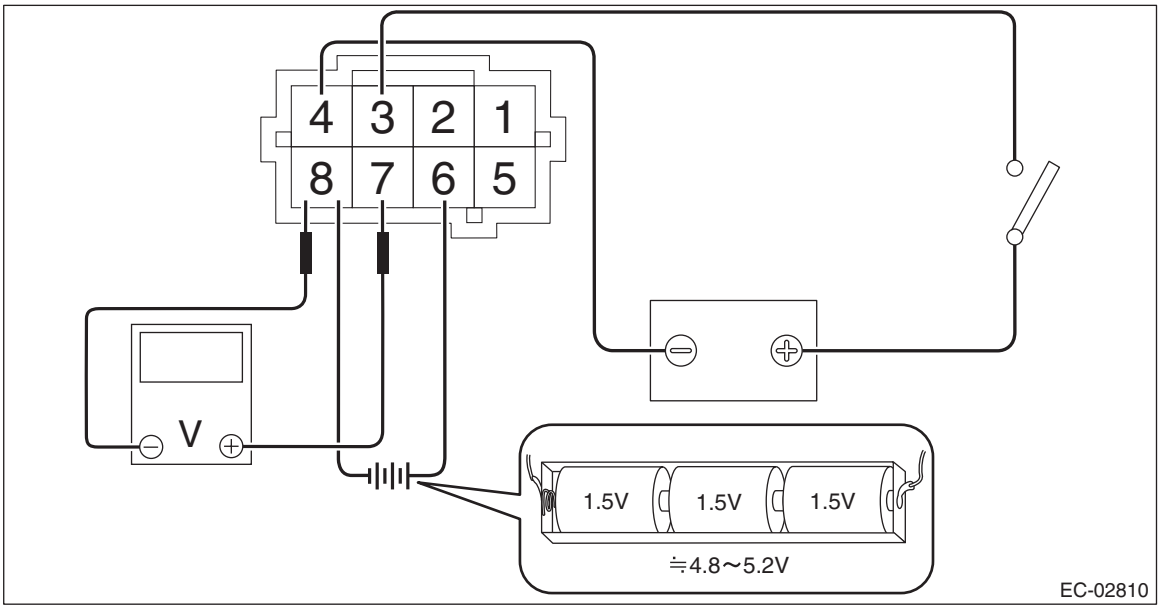


2) Check the voltage at a normal atmospheric pressure.

NOTE:
The atmospheric pressure at higher altitude is lower than normal. Therefore, the voltage is lower than the standard value.

Terminal No.	Standard
7 (+) and 8 (–)	Approx. 3.5 V (when 25°C (77°F))

3) Connect the battery positive terminal to terminal No. 3 and the battery ground terminal to terminal No. 4, and check that there is a voltage drop from the voltage measured in step 2) when the vacuum pump is operated.



4. OTHER INSPECTIONS

1) Check that the leak check valve assembly has no deformation, cracks or other damages.
2) Check that the tube or hose have no cracks, damage or loose part.

13.Drain Separator

A: REMOVAL

The drain separator is installed to the leak check valve assembly. Refer to “Leak Check Valve Assembly” for removal procedure. <Ref. to EC(H4DO(w/o HEV))-43, REMOVAL, Leak Check Valve Assembly.>

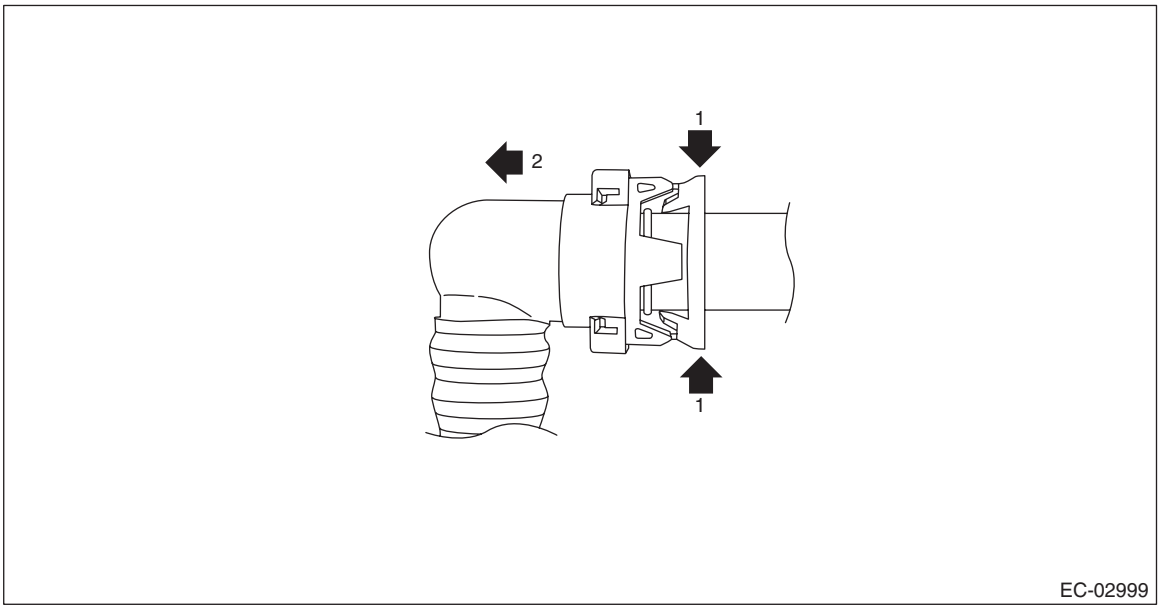
B: INSTALLATION

The drain separator is installed to the leak check valve assembly. Refer to “Leak Check Valve Assembly” for installation procedure. <Ref. to EC(H4DO(w/o HEV))-49, INSTALLATION, Leak Check Valve Assembly.>

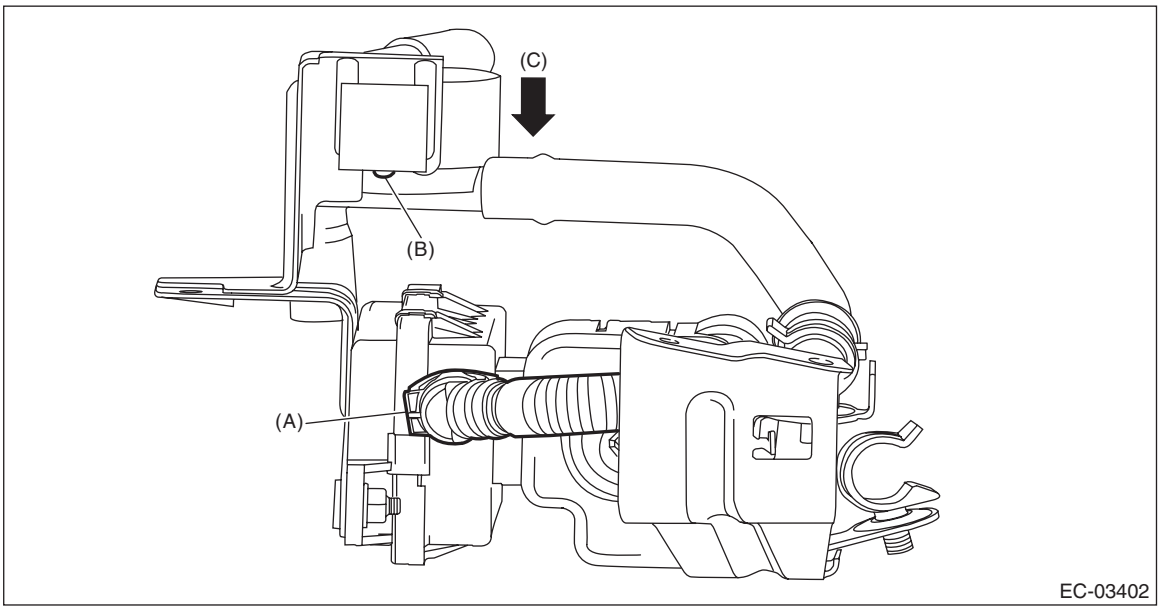
C: DISASSEMBLY

1) Disconnect the drain tube (A) from the leak check valve assembly.

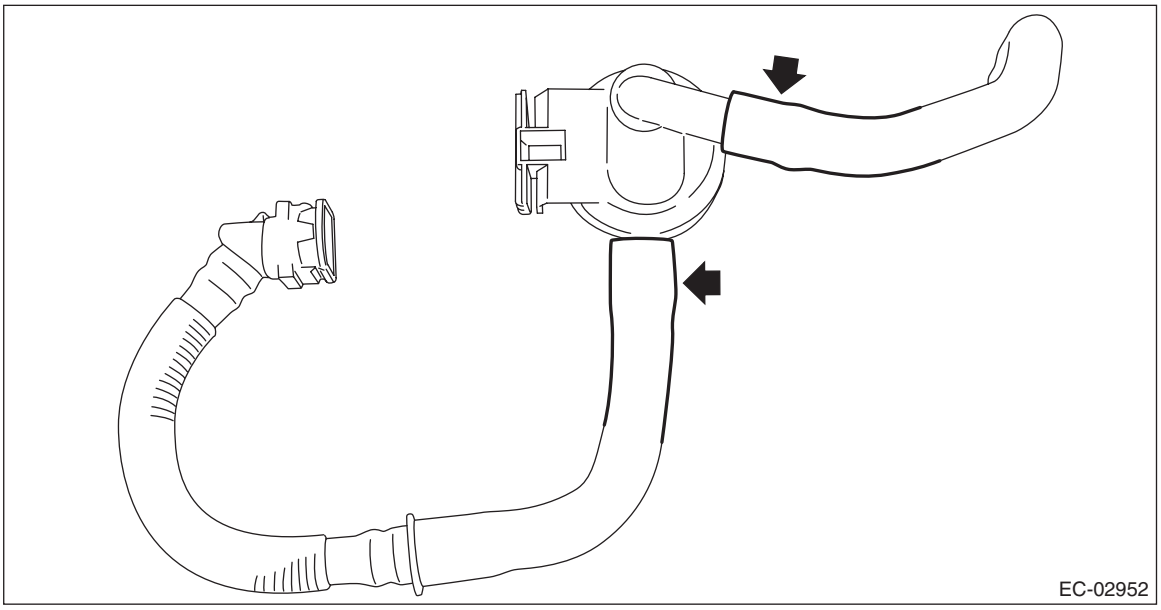
NOTE:
Disconnect the quick connector as shown in the figure.



2) Lift up the claw (B) of the drain separator and slide the drain separator in the direction of the arrow (C) to remove the drain separator.



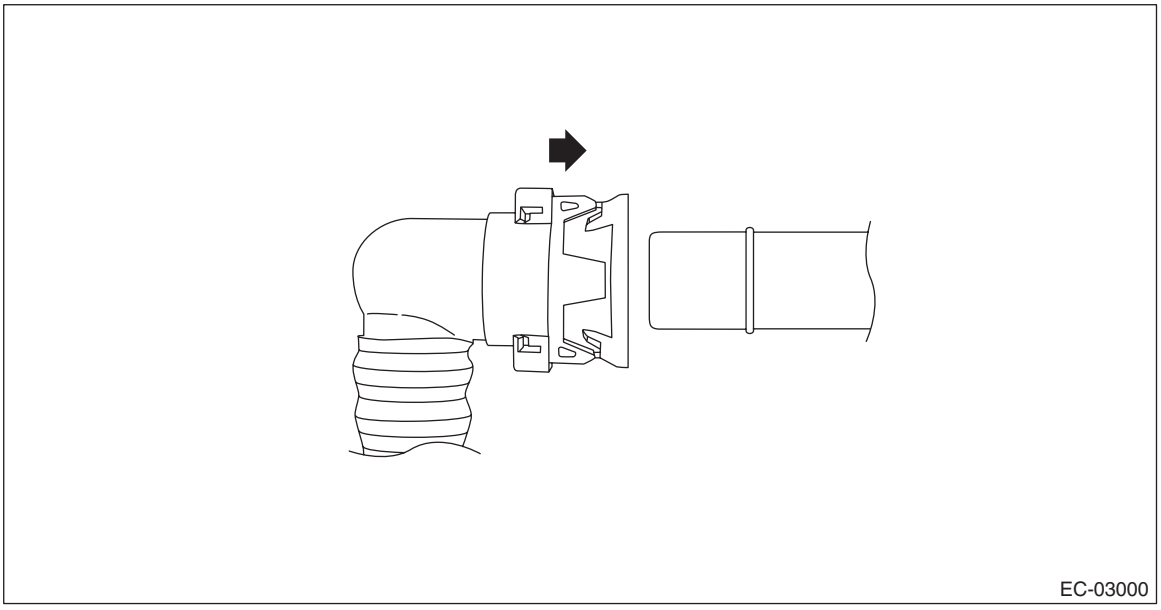
3) Remove the drain hose and drain tube from the drain separator.



D: ASSEMBLY

Assemble in the reverse order of disassembly.

NOTE:
Connect the quick connector as shown in the figure.



E: INSPECTION

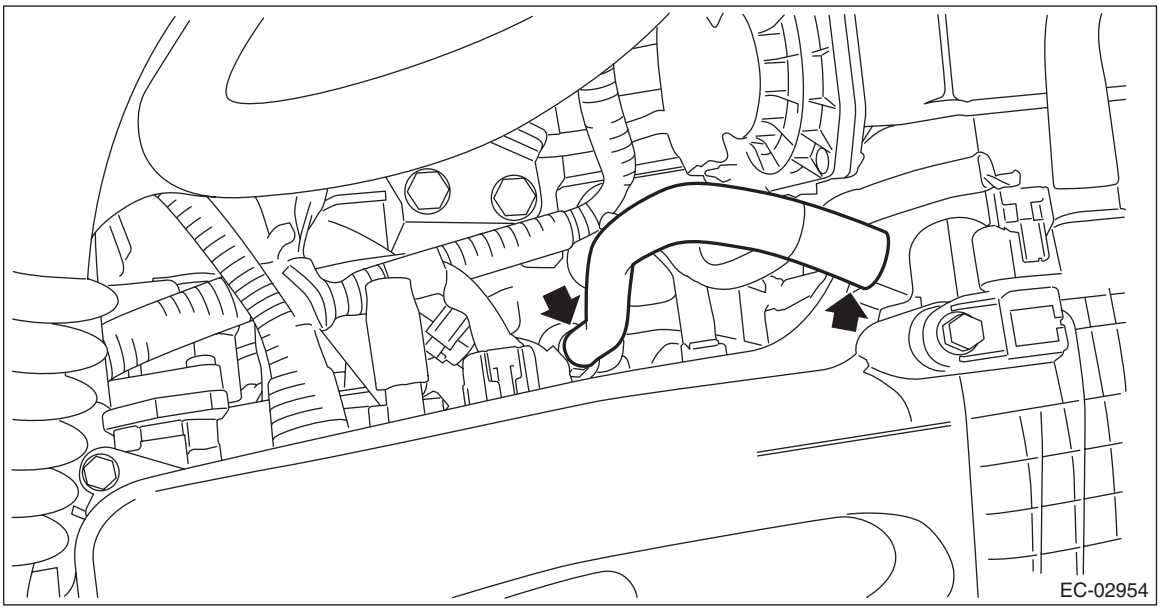
1) Check that the drain separator and drain separator bracket have no deformation, crack, or other damage.
2) Check that the drain hose and drain tube have no crack, damage, or looseness.
3) Check that no foreign substances are clogged in the drain separator.

14.PCV Hose

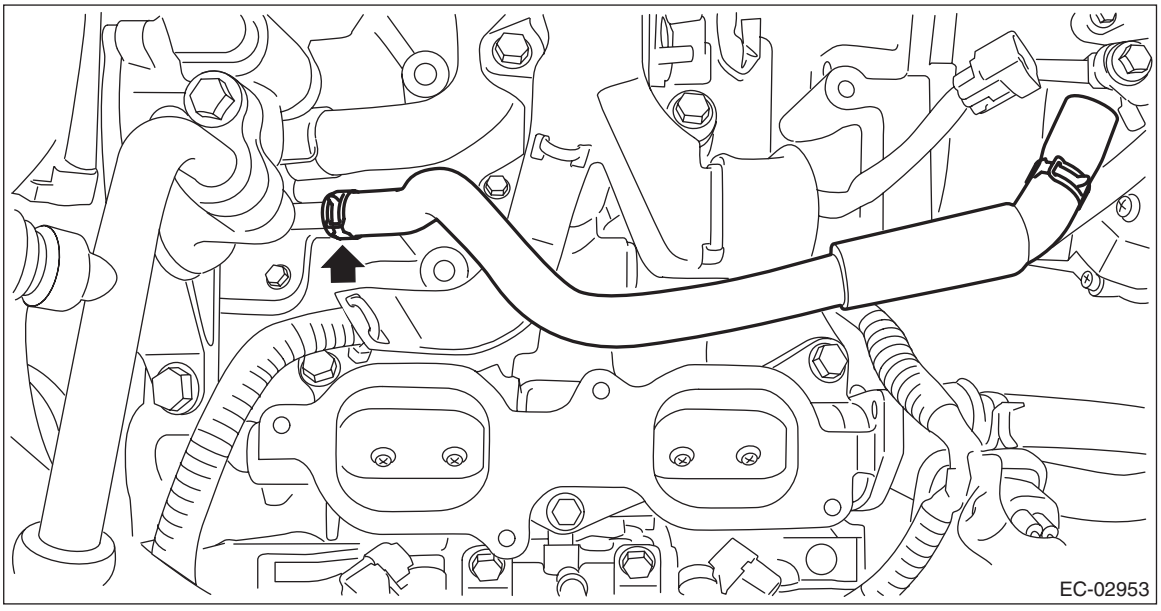
A: REMOVAL

CAUTION:
Do not remove except when the PCV hose is broken.

1) Disconnect the PCV hose A from the intake manifold and the PCV valve, and then remove the PCV hose A.



2) Remove the intake manifold. <Ref. to FU(H4DO(w/o HEV))-20, REMOVAL, Intake Manifold.>
3) Remove the PCV hose B from the PCV connector.



B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

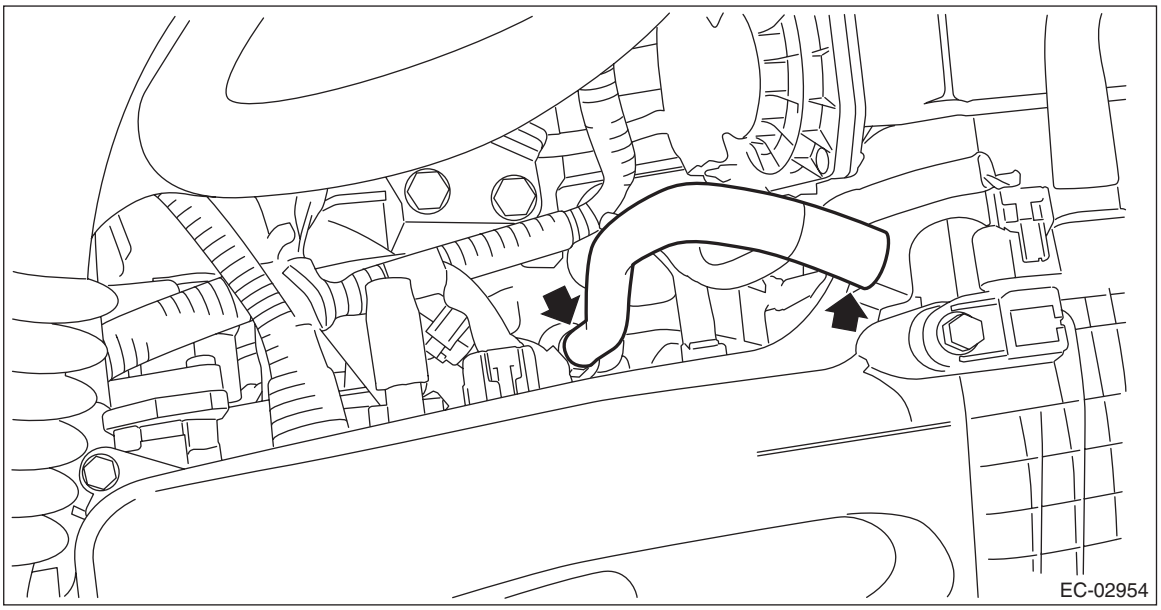
Check that the PCV hose has no cracks, damage or loose part.

15.PCV Valve

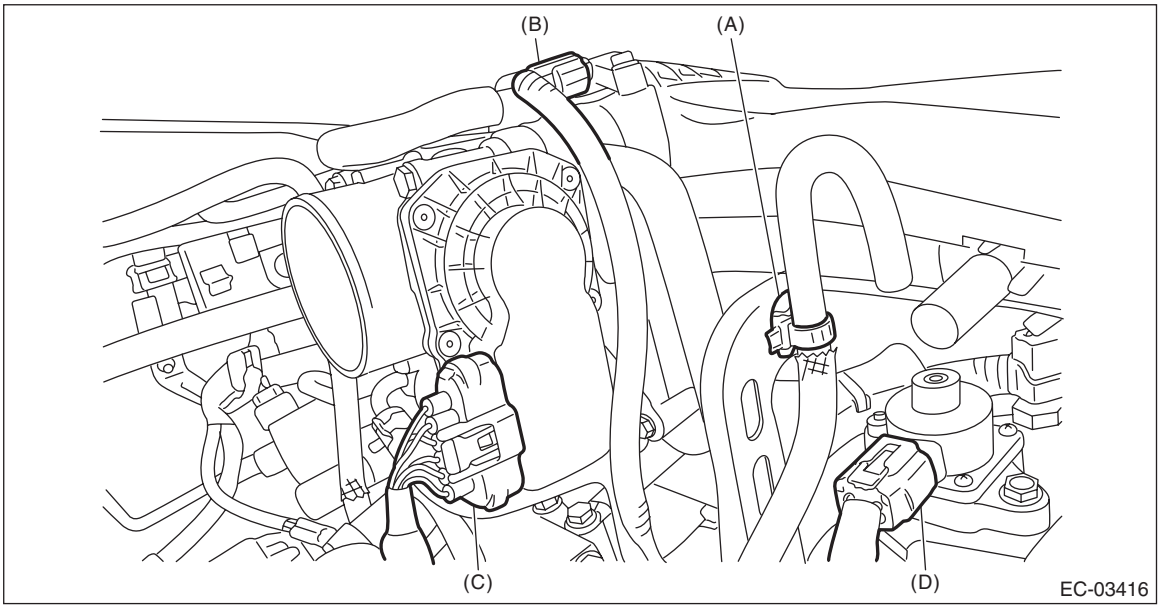
A: REMOVAL

CAUTION:
Do not remove unless the PCV valve is broken.

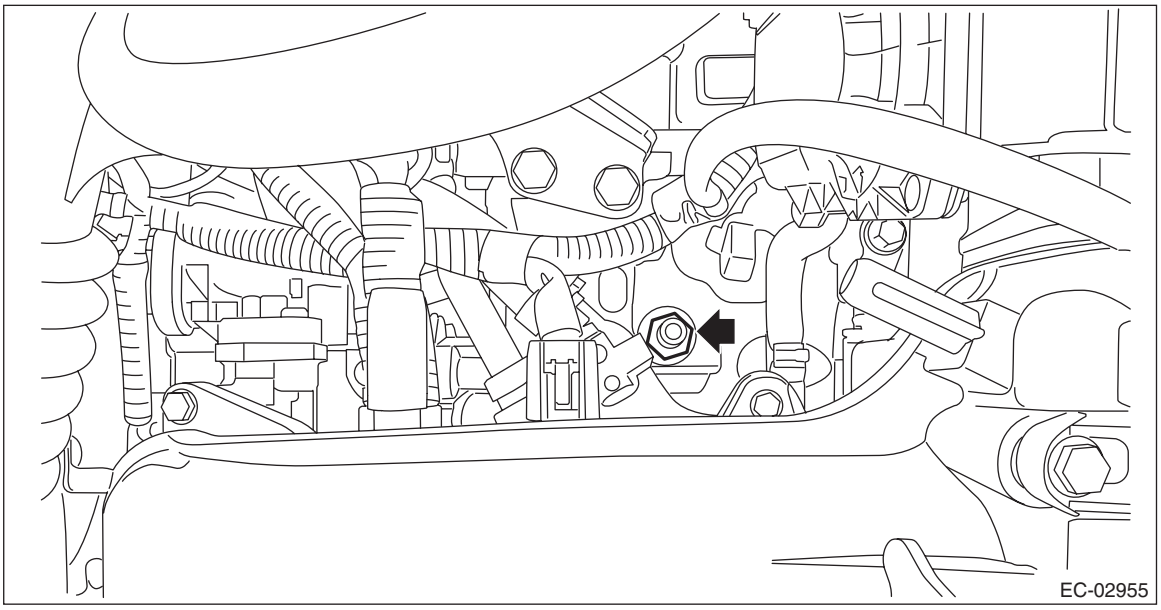
1) Disconnect the PCV hose from the intake manifold and the PCV valve, and then remove the PCV hose.



2) Remove the clip (A) holding the air breather hose from the engine hanger. (MT model)
3) Disconnect the connector (B) from manifold absolute pressure sensor. (MT model)
4) Disconnect the connector (C) from the throttle position sensor. (MT model)
5) Disconnect the connector (D) from the EGR control valve. (MT model)



6) Remove the PCV valve from the cylinder block RH.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Apply liquid gasket to the bolt threads of PCV valve.

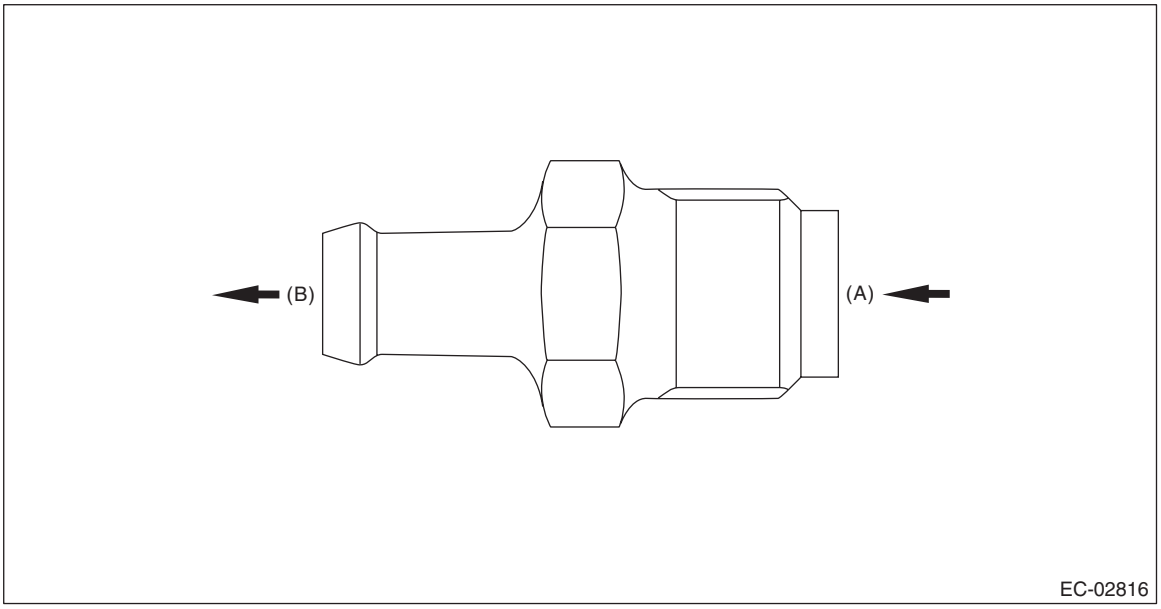
Liquid gasket:
THREE BOND 1324 (Part No. 004403042) or equivalent

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)

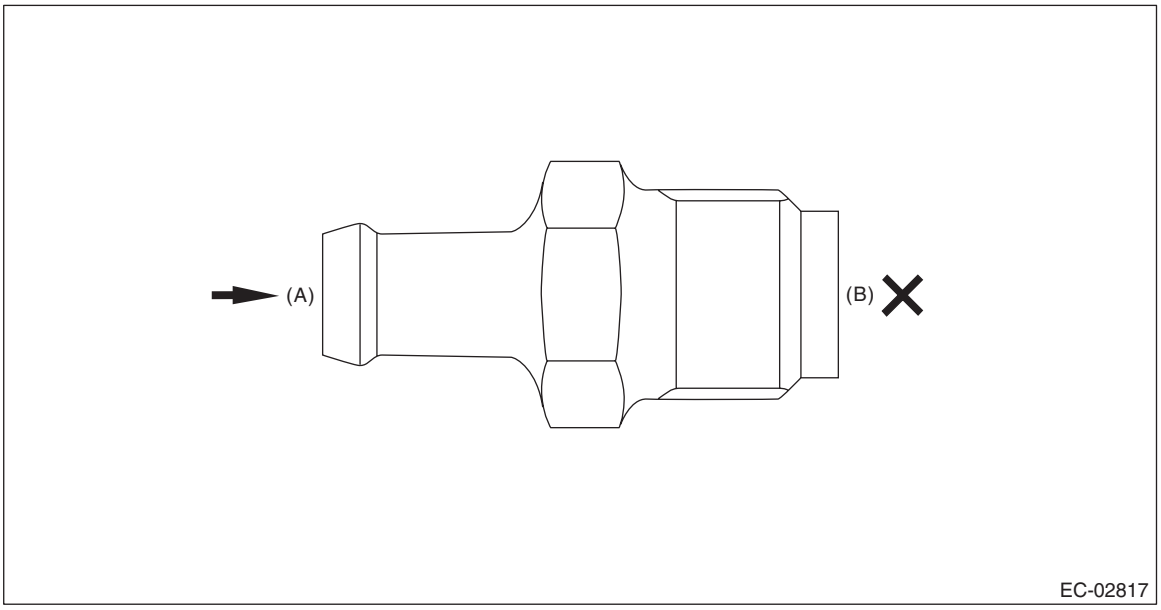
C: INSPECTION

1. PCV VALVE

1) Check that the PCV valve has no deformation, cracks or other damages.
2) Check that air is discharged from (B) when air is blown into (A).



3) Check that air does not come out from (B) when air is blown into (A).



2. OTHER INSPECTIONS

Check that the PCV hose has no cracks, damage or loose part.

INTAKE (INDUCTION)

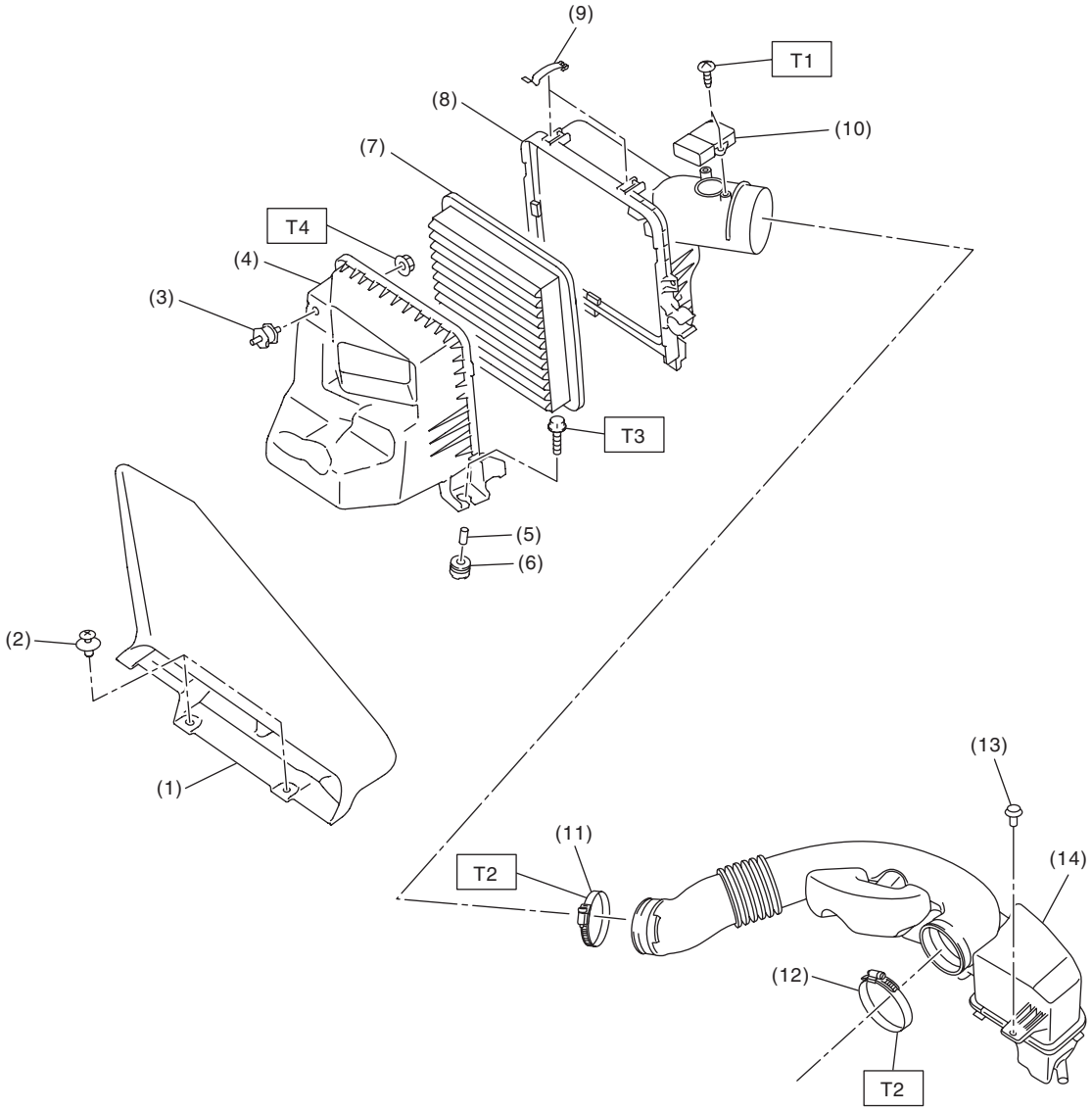
IN(H4DO(w/o HEV))

Page

1. General Description 2
2. Air Cleaner Element 4
3. Air Cleaner Case 7
4. Air Intake Boot 12
5. Air Intake Duct 13

1. General Description

A: COMPONENT



IN-03526

(1)	Air intake duct	(8)	Air cleaner case (rear)	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Clip	(9)	Clip	***T1: 1 (0.1, 0.7)***
(3)	Cushion	(10)	Mass air flow and intake air temperature sensor	***T2: 3 (0.3, 2.2)***
(4)	Air cleaner case (front)	(11)	Clamp	***T3: 6 (0.6, 4.4)***
(5)	Spacer	(12)	Clamp	***T4: 7.5 (0.8, 5.5)***
(6)	Cushion	(13)	Clip	
(7)	Air cleaner element	(14)	Air intake boot	

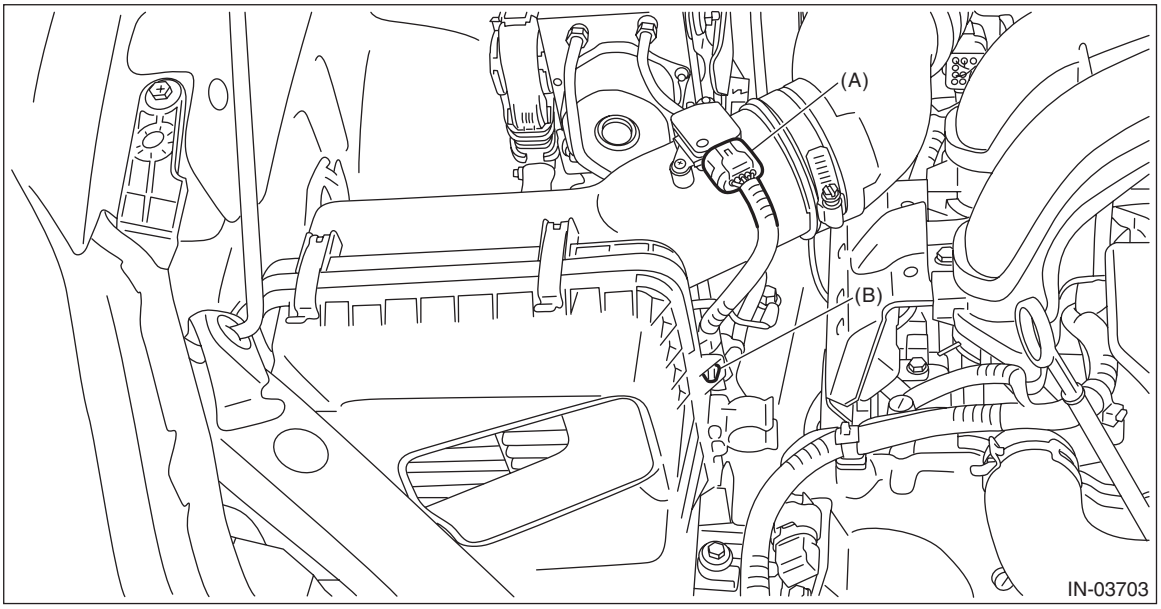
B: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

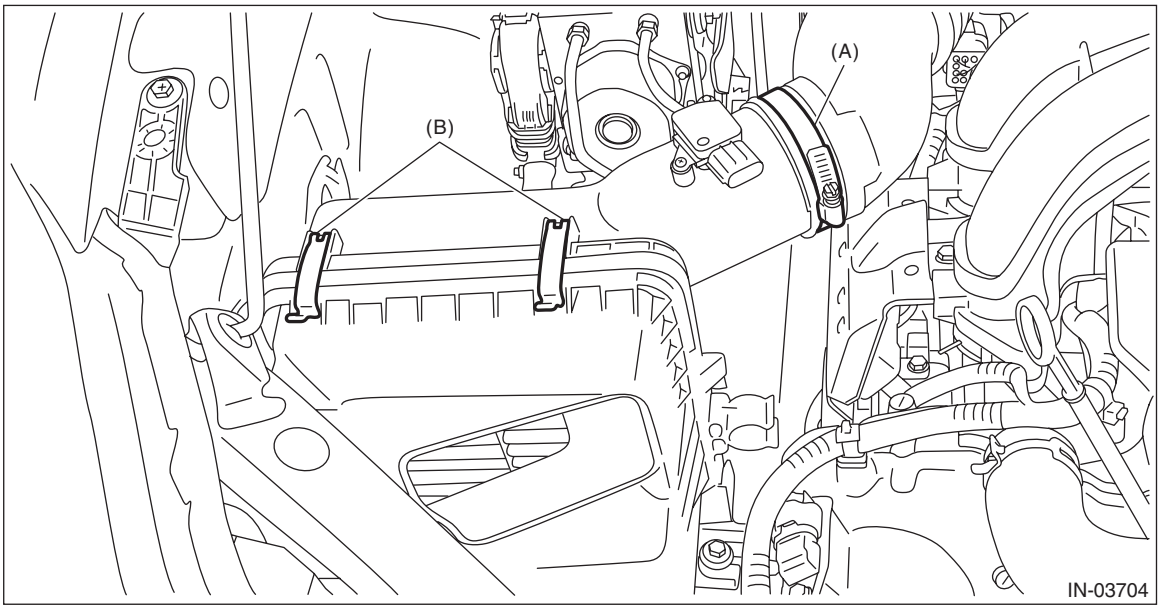
2. Air Cleaner Element

A: REMOVAL

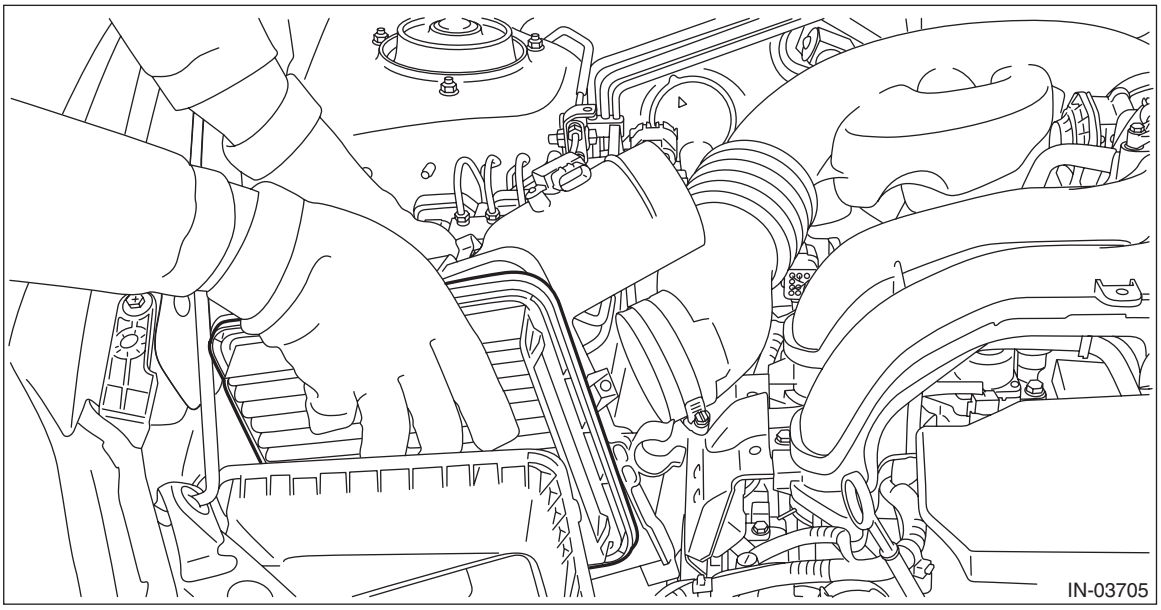
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
3) Disconnect the connector (A) from the mass air flow and intake air temperature sensor, and remove the clip (B).



4) Loosen the clamp (A) which secures the air intake boot to the air cleaner case (rear), and then remove the clip (B) from the air cleaner case (front).



5) Remove the air cleaner case (rear) and air cleaner element.

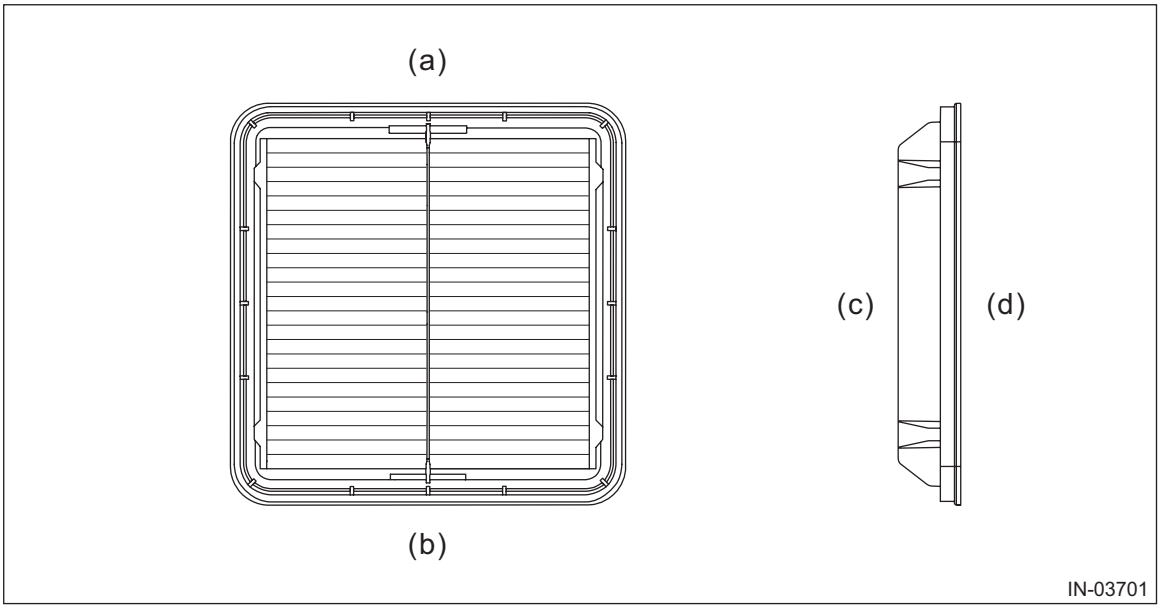


B: INSTALLATION

Install in the reverse order of removal.

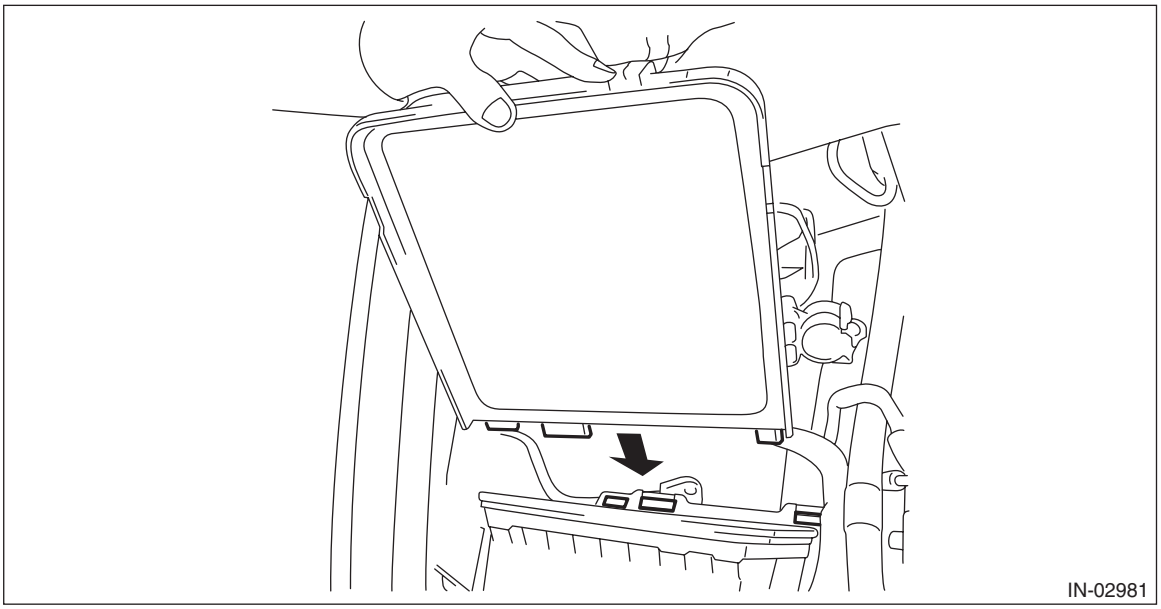
CAUTION:
Be sure to use SUBARU genuine air cleaner element depending on the engine type when replacing the air cleaner elements. Using other air cleaner element may affect the engine performance.

NOTE:
- Check that there is no dirt or dust within the air cleaner case. If any dirt or dust is found, clean it.
- Install the air cleaner element as shown in the figure.



(a) Upside
(b) Downside
(c) Air cleaner case (front) side
(d) Air cleaner case (rear) side

• When installing the air cleaner case (rear), align the protrusion of the air cleaner case (rear) to the hole on the air cleaner case (front) to install.



Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)

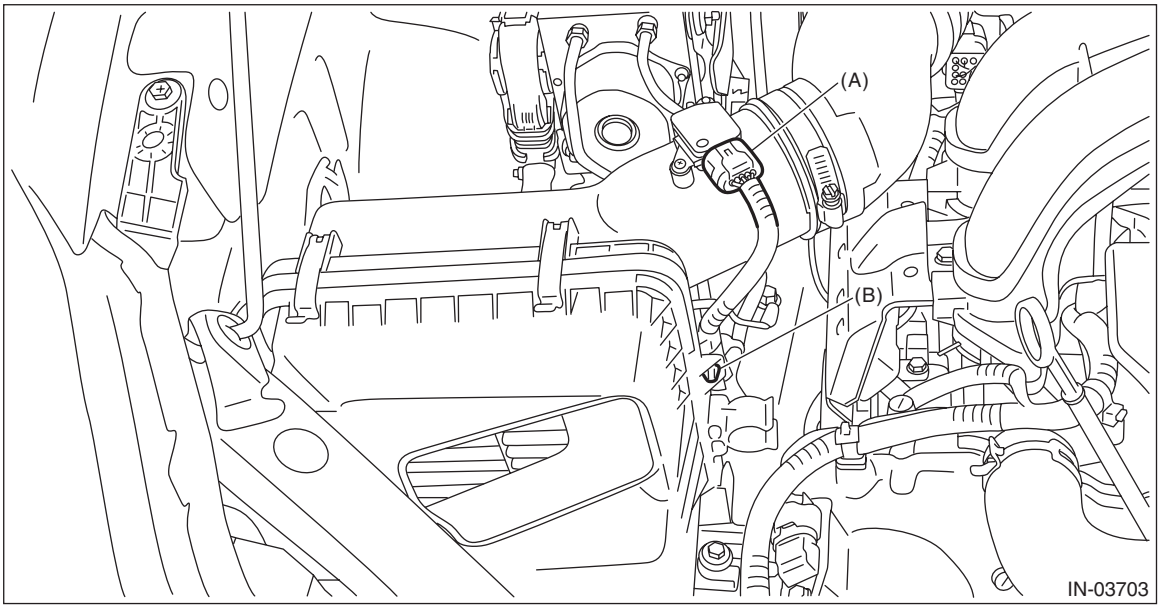
C: INSPECTION

1) Check that the air cleaner element has no deformation, cracks or other damages.
2) Check the air cleaner element for excessive dirt.
3) Replace the air cleaner case (rear) if the HC absorption filter is damaged.

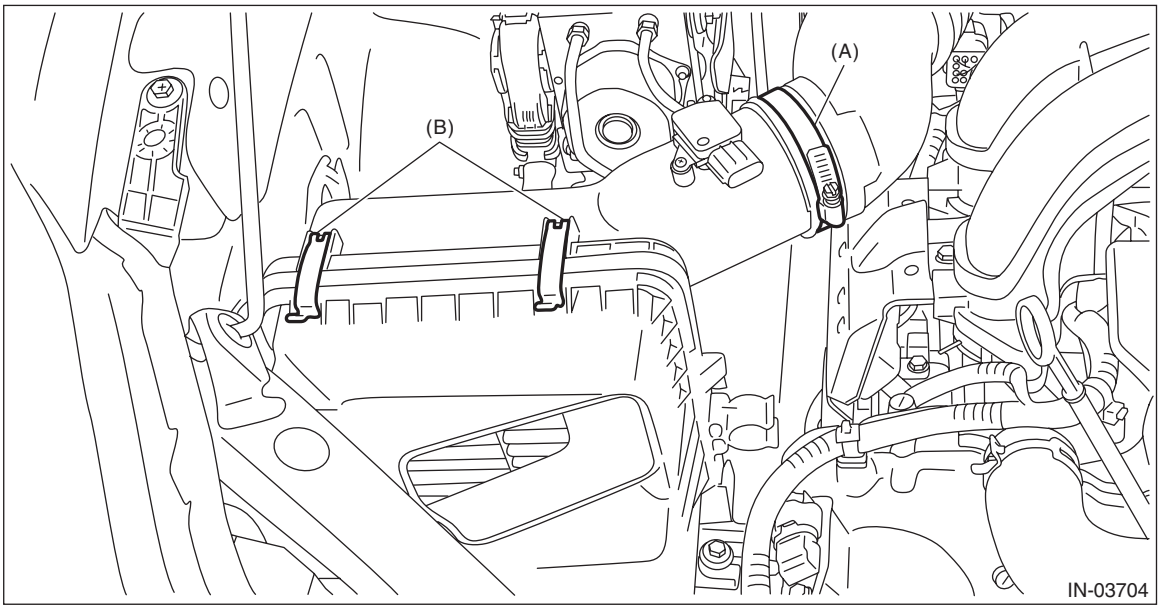
3. Air Cleaner Case

A: REMOVAL

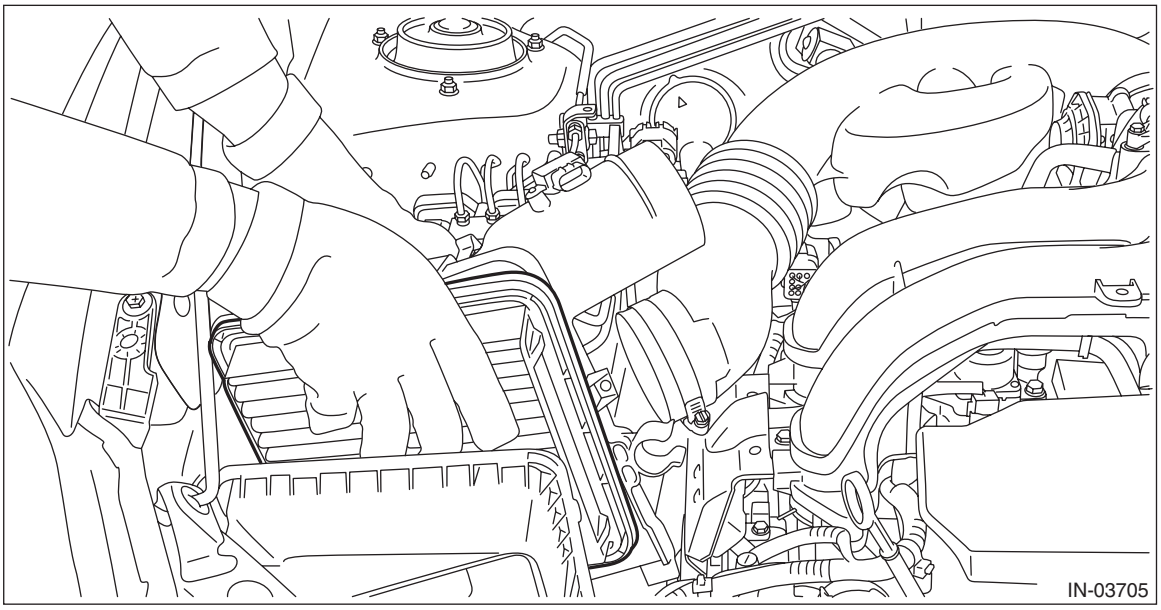
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
3) Disconnect the connector (A) from the mass air flow and intake air temperature sensor, and remove the clip (B).



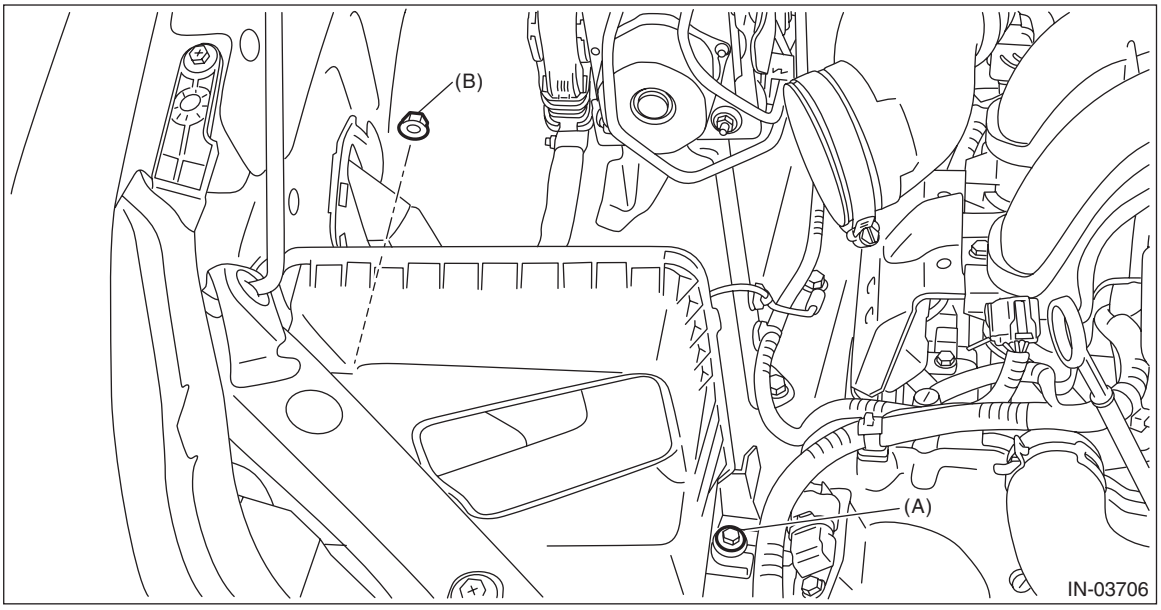
4) Loosen the clamp (A) which secures the air intake boot to the air cleaner case (rear), and then remove the clip (B) from the air cleaner case (front).



5) Remove the air cleaner case (rear) and air cleaner element.



6) Remove the bolt (A) and nut (B) which secure the air cleaner case (front) to the body.

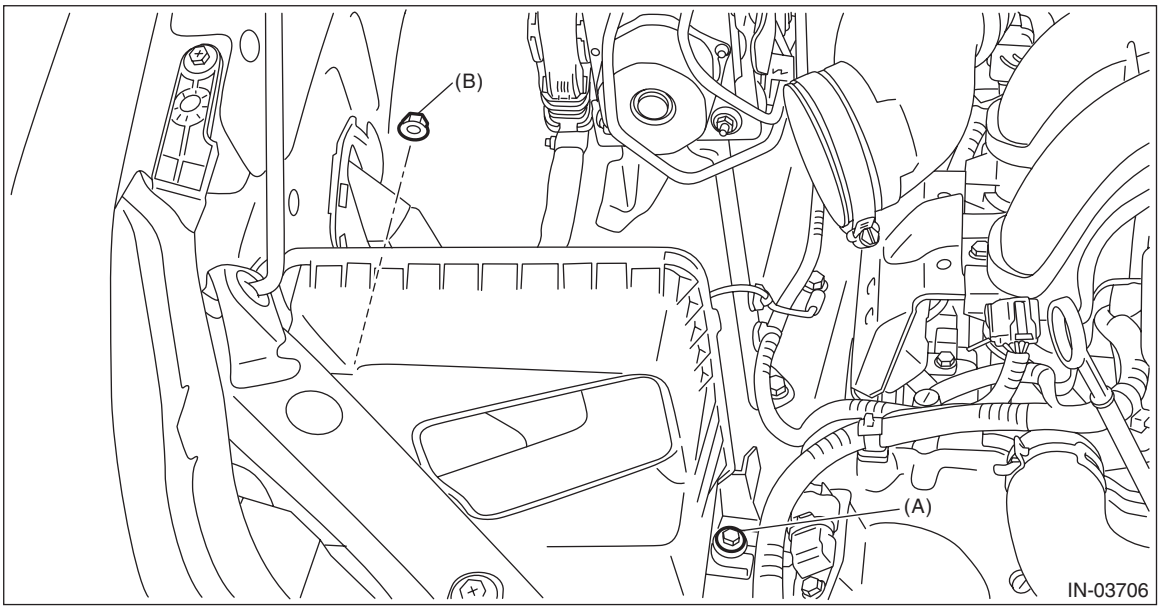


7) Remove the air cleaner case (front).

B: INSTALLATION

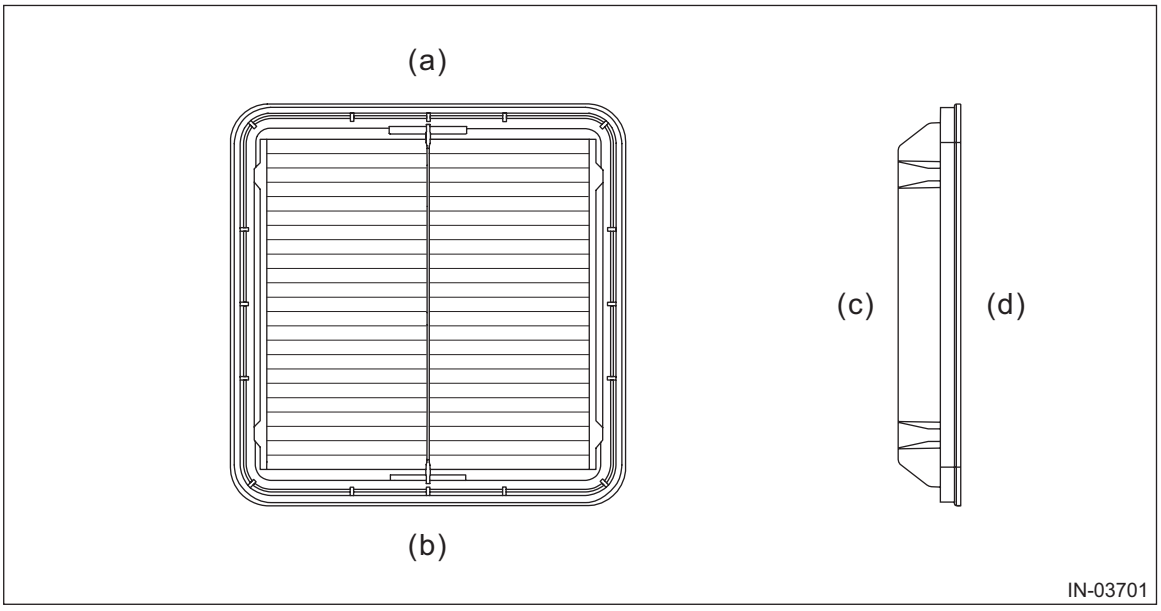
1) Install the bolt (A) and nut (B) which secure the air cleaner case (front) to the body.

Tightening torque:
Bolt (A)
6 N·m (0.6 kgf-m, 4.4 ft-lb)
Nut (B)
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



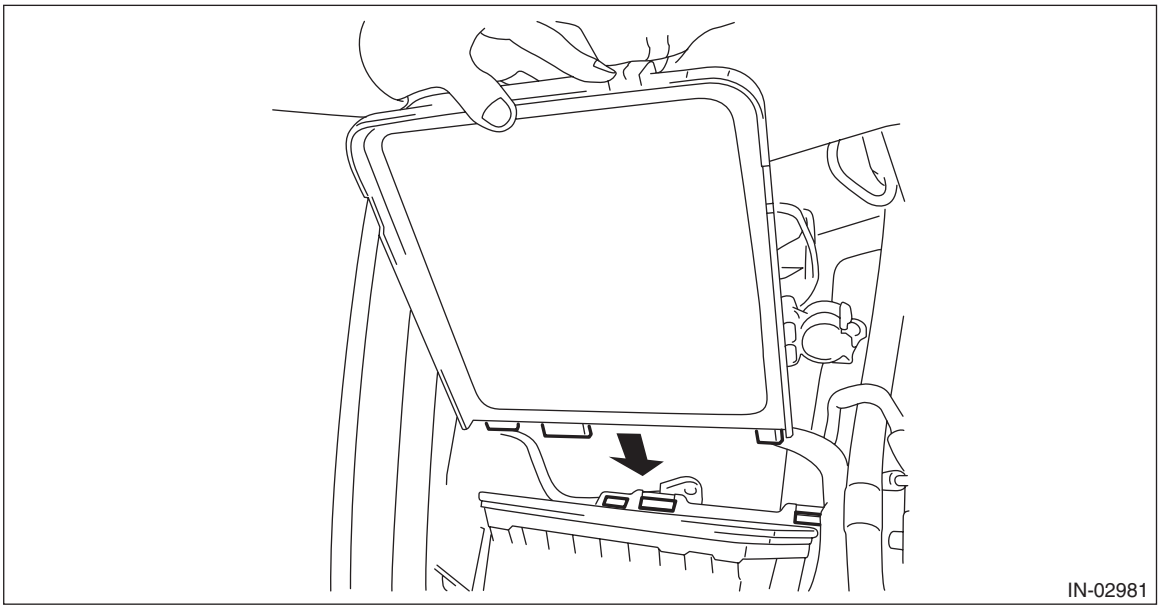
2) Install the air cleaner case (rear) and air cleaner element.

NOTE:
- Check that there is no dirt or dust within the air cleaner case. If any dirt or dust is found, clean it.
- Install the air cleaner element as shown in the figure.



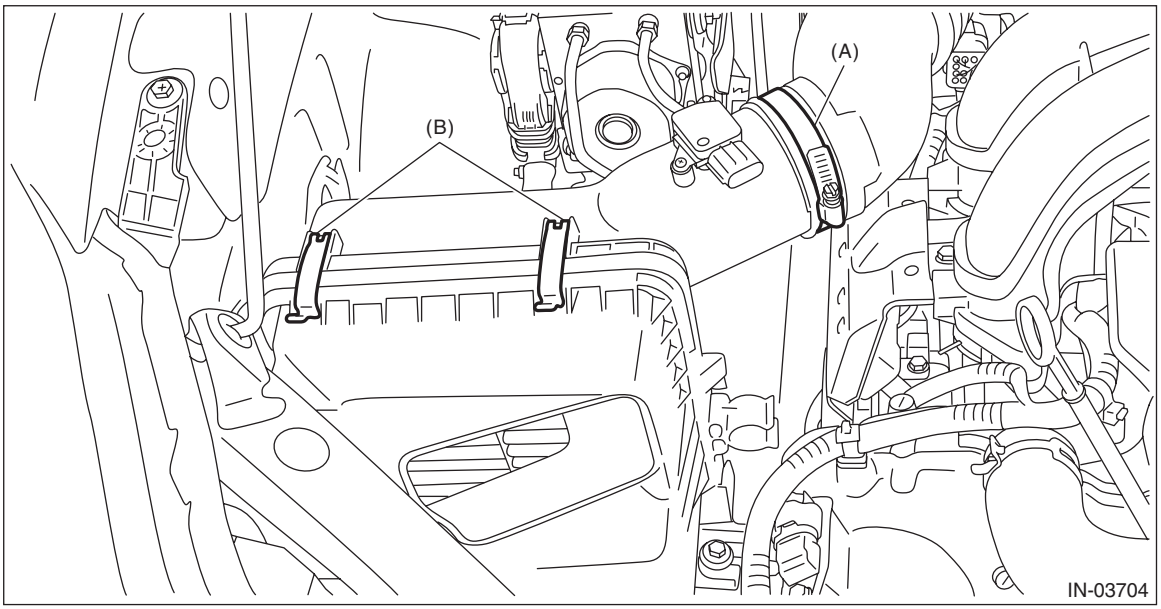
(a) Upside
(b) Downside
(c) Air cleaner case (front) side
(d) Air cleaner case (rear) side

• When installing the air cleaner case (rear), align the protrusion of the air cleaner case (rear) to the hole on the air cleaner case (front) to install.

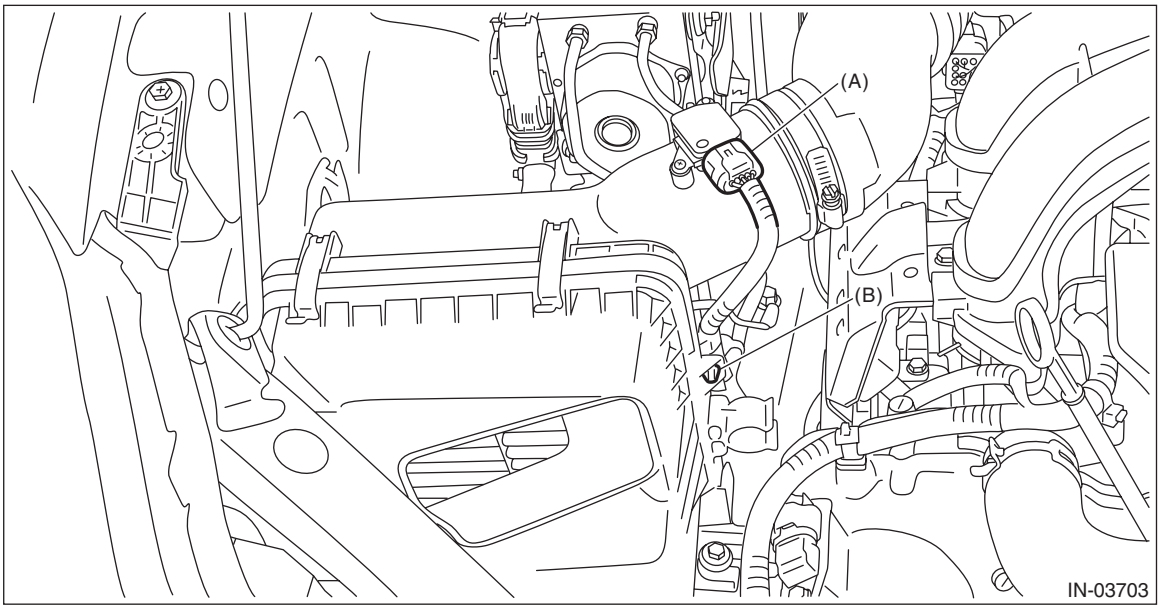


3) Install the clips (B) to the air cleaner case (front), then tighten the clamp (A) that secures the air intake boot to the air cleaner case (rear).

Tightening torque:
Clamp (A)
3 N·m (0.3 kgf-m, 2.2 ft-lb)



4) Connect the connector (A) to the mass air flow and intake air temperature sensor and secure the harness with clip (B).



5) Install the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, INSTALLATION, Air Intake Duct.>
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

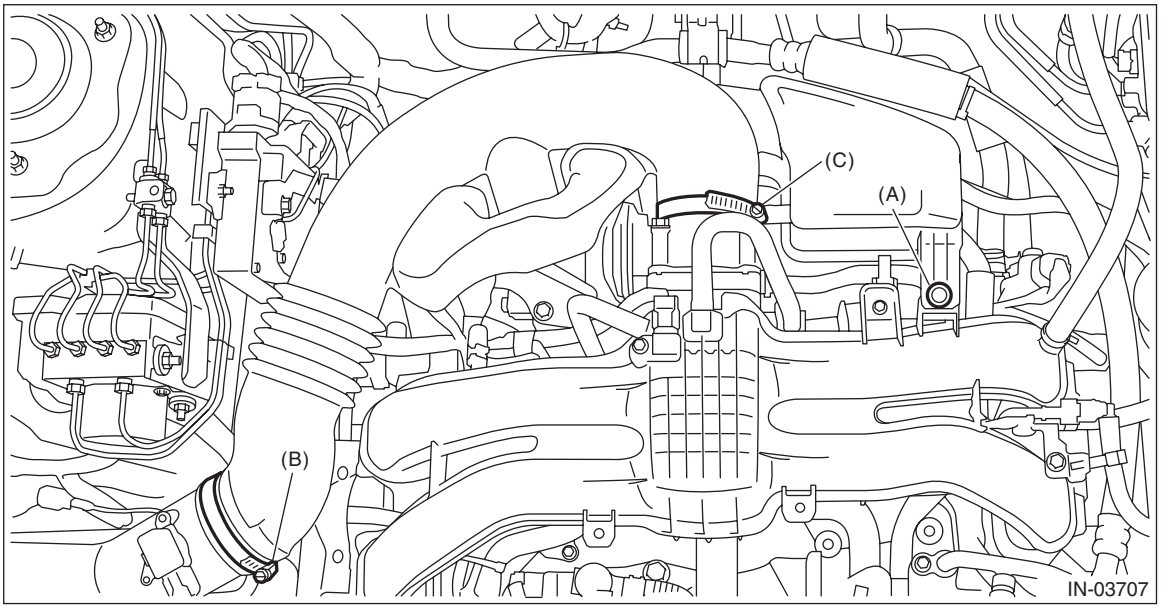
C: INSPECTION

1) Check that the air cleaner case has no deformation, cracks or other damages.
2) Check that the air intake boot has no cracks, damage or loose part.

4. Air Intake Boot

A: REMOVAL

1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) securing the air cleaner case (rear) to the air intake boot.
3) Loosen the clamp (C) which secures the throttle body to the air intake boot.



4) Disconnect the PCV hose and remove the air intake boot.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)

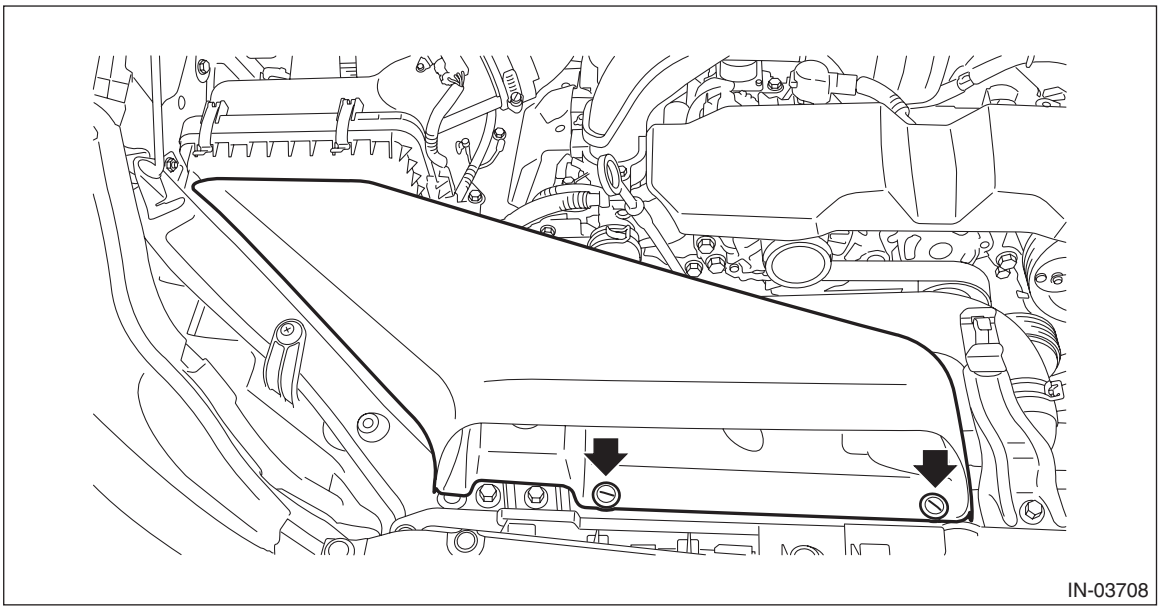
C: INSPECTION

1) Check that the air intake boot has no deformation, cracks or other damages.
2) Inspect that no foreign objects are mixed in the air intake boot.

5. Air Intake Duct

A: REMOVAL

1) Remove the clip which secures the air intake duct, and remove the air intake duct.



B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

1) Check that the air intake duct has no deformation, cracks or other damages.
2) Inspect that no foreign objects are mixed in the air intake duct.

MECHANICAL

ME(H4DO(w/o HEV))

		Page
1.	General Description	2
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1. General Description

A: SPECIFICATION

Engine	Model			2.0 L
	Cylinder arrangement			Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine
	Valve system mechanism			Chain driven, double overhead camshaft, 4-valve/cylinder
	Bore × Stroke mm (in)			84.0 × 90.0 (3.31 × 3.54)
	Displacement cm^3 (cu in)			1,995 (121.7)
	Compression ratio			Gasoline engine model: 10.5
				HEV model: 10.8
	Compression pressure (at 200 — 300 r/min) kPa (kg/cm^2, psi)		Standard	1,050 — 1,400 (11 — 14, 152 — 203)
	Number of piston rings			Compression ring: 2 Oil ring: 1
	Intake valve timing	Open	Max. retard	ATDC 25°
			Min. advance	BTDC 43°
		Close	Max. retard	ABDC 85°
			Min. advance	ABDC 17°
	Exhaust valve timing	Open	Max. retard	ABDC 3°
			Min. advance	BBDC 52°
		Close	Max. retard	ATDC 47°
			Min. advance	BTDC 8°
	Cam clearance mm (in)	Intake	Standard	$0.13^{+0.02}_{-0.03}$ ($0.0051^{+0.0008}_{-0.0012}$)
		Exhaust	Standard	0.22±0.02 (0.0087±0.0008)
	Idle speed (For CVT model, select lever in “P” or “N” range. For MT model, gear shift lever in neutral position.) r/min	No load	Standard	650±100
		A/C ON	Standard	800 — 900±50
	Ignition order			1 → 3 → 2 → 4
	Ignition timing BTDC/{r/min}		Standard	Gasoline engine CVT model: 16°±10°/650
				Gasoline engine MT model: 12°±10°/650
				HEV model: 10°±10°/650

NOTE:
OS: Oversize US: Undersize

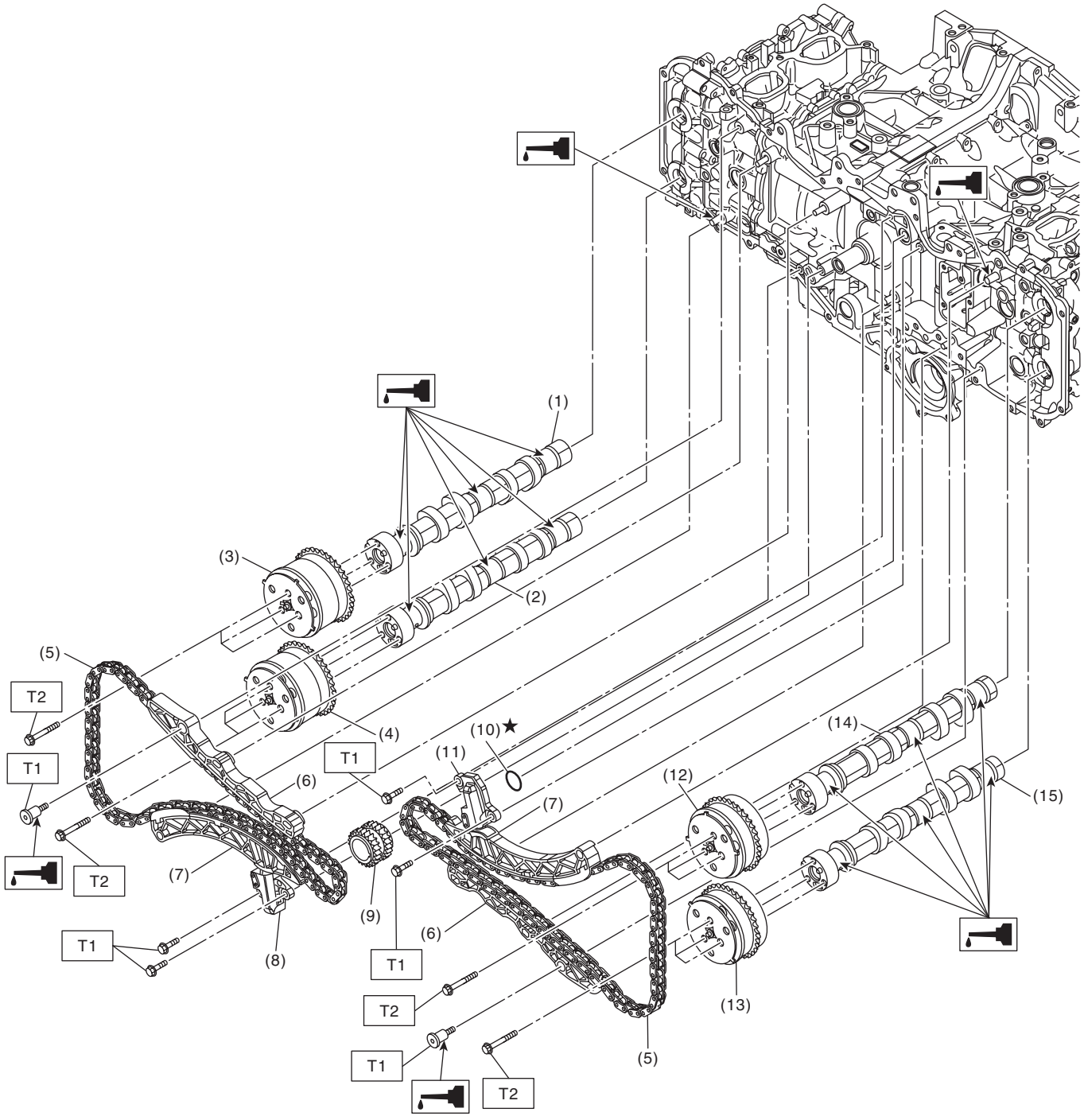
Camshaft	Bending			Limit	0.020 (0.0008)
	Cam lobe height mm (in)	Intake		Standard	40.34 — 40.44 (1.588 — 1.592)
		Exhaust		Standard	39.66 — 39.76 (1.561 — 1.565)
	Cam base circle diameter mm (in)			Standard	34.0 (1.339)
	Journal outer diameter mm (in)			Standard	25.946 — 25.963 (1.0215 — 1.0222)
	Thrust clearance mm (in)			Standard	0.068 — 0.116 (0.0027 — 0.0047)
	Oil clearance mm (in)			Standard	0.037 — 0.072 (0.0015 — 0.0028)
Cylinder head	Warpage (mating surface with cylinder block) mm (in)			Limit	0.020 (0.0008)
	Grinding limit mm (in)				To 98.4 (3.874)
	Height mm (in)			Standard	98.5 (3.878)
Valve & valve guide	Valve overall length mm (in)		Intake		104.95 (4.132)
			Exhaust		96.5 (3.799)
	Valve head edge thickness mm (in)	Intake		Standard	0.8 — 1.2 (0.031 — 0.047)
		Exhaust		Standard	1.0 — 1.4 (0.039 — 0.055)
	Valve stem outer diameter mm (in)	Intake		Standard	5.455 — 5.470 (0.2148 — 0.2154)
		Exhaust		Standard	5.445 — 5.460 (0.2144 — 0.2150)
	Valve guide inner diameter mm (in)			Standard	5.500 — 5.512 (0.2165 — 0.2170)
	Clearance between valve and valve guide mm (in)	Intake		Standard	0.030 — 0.057 (0.0012 — 0.0022)
		Exhaust		Standard	0.040 — 0.067 (0.0016 — 0.0026)
	Valve guide protrusion amount mm (in)			Standard	11.4 — 11.8 (0.449 — 0.465)
Valve & valve shim	Valve stem end outer diameter mm (in)	Intake		Standard	5.455 — 5.470 (0.2148 — 0.2154)
		Exhaust		Standard	5.445 — 5.460 (0.2144 — 0.2150)
	Valve shim inner diameter mm (in)			Standard	5.500 — 5.560 (0.2165 — 0.2189)
	Clearance between valve and valve shim mm (in)	Intake		Standard	0.030 — 0.105 (0.0012 — 0.0041)
		Exhaust		Standard	0.040 — 0.115 (0.0016 — 0.0045)
Valve seat	Seating width between valve and valve seat mm (in)	Intake		Standard	0.8 — 1.6 (0.031 — 0.063)
		Exhaust		Standard	1.1 — 1.7 (0.043 — 0.067)
	Seating angle between valve and valve seat				45°
	Seating position between valve and valve seat				Valve face center
Valve spring	Free length mm (in)			Standard	MT model: 41.06 (1.617)
					CVT model: 41.68 (1.641)
	Tension/spring height N (kgf, lb)/mm (in)		Set	Standard	182 — 210 (18.56 — 21.41, 40.92 — 47.22)/ 33.0 (1.299)
			Lift	Standard	MT model: 552 — 610 (56.29 — 62.20, 124.11 — 137.15)/ 22.0 (0.866)
					CVT model: 502 — 554 (51.19 — 56.49, 112.87 — 124.56)/ 22.0 (0.866)
	Squareness			Standard	2.5°, 1.8 mm (0.071 in) or less

Cylinder block & piston	Cylinder block warpage (Mating surface with cylinder head)			mm (in)	Limit	0.025 (0.0010)
	Grinding limit of cylinder block			mm (in)		To 204.9 (8.067)
	Height of cylinder block			mm (in)	Standard	205.0 (8.071)
	Inner diameter of cylinder liner	mm (in)	Cylinder bore size mark A		Standard	84.005 — 84.015 (3.3073 — 3.3077)
			Cylinder bore size mark B		Standard	83.995 — 84.005 (3.3069 — 3.3073)
	Cylindricality of cylinder liner			mm (in)	Limit	0.030 (0.0012)
	Out-of-roundness of cylinder liner			mm (in)	Limit	0.030 (0.0012)
	Piston grade point			mm (in)		38.0 (1.50)
	Piston outer diameter	mm (in)	Standard Size	Grade A	Standard	83.975 — 83.985 (3.3061 — 3.3065)
				Grade B	Standard	83.965 — 83.975 (3.3057 — 3.3061)
			0.25 (0.0098) OS		Standard	84.215 — 84.235 (3.3155 — 3.3163)
			0.50 (0.0197) OS		Standard	84.465 — 84.485 (3.3254 — 3.3262)
	Clearance between cylinder liner and piston			mm (in)	Standard	0.020 — 0.040 (0.0008 — 0.0016)
	Inner diameter of cylinder liner boring limit (diameter)			mm (in)		To 84.505 (3.3270)
Piston and piston pin	Degree of fit					Piston pin must be fitted into position with thumb at 20°C (68°F).
	Clearance between piston and piston pin			mm (in)	Standard	0.004 — 0.008 (0.0002 — 0.0003)
Piston ring	Closed gap mm (in)	Compression ring	Top ring		Standard	0.20 — 0.35 (0.0079 — 0.0138)
			Second ring		Standard	0.40 — 0.50 (0.0157 — 0.0197)
		Oil ring (Upper rail and lower rail)			Standard	0.10 — 0.35 (0.0039 — 0.0138)
	Clearance between compression ring and piston	mm (in)	Top ring		Standard	0.040 — 0.080 (0.0016 — 0.0031)
			Second ring		Standard	0.030 — 0.070 (0.0012 — 0.0028)
Connecting rod and connecting rod bearing	Bend or twist per 100 mm (3.94 in) in length			mm (in)	Limit	0.10 (0.0039)
	Thrust clearance			mm (in)	Standard	0.070 — 0.330 (0.0028 — 0.0130)
	Connecting rod bearing thickness (at center)	mm (in)	Standard size		Standard	1.492 — 1.508 (0.0587 — 0.0594)
			0.03 (0.0012) US		Standard	1.511 — 1.515 (0.0595 — 0.0596)
			0.05 (0.0020) US		Standard	1.521 — 1.525 (0.0599 — 0.0600)
			0.25 (0.0098) US		Standard	1.621 — 1.625 (0.0638 — 0.0640)
	Oil clearance			mm (in)	Standard	0.017 — 0.047 (0.0007 — 0.0019)
Piston pin & connecting rod bushing	Clearance between piston pin and connecting rod bushing			mm (in)	Standard	0.004 — 0.026 (0.0002 — 0.0010)

Crankshaft and crankshaft bearing	Bending			Limit	0.035 (0.0014)
	Crankshaft pin	Cylindricality mm (in)		Limit	0.006 (0.0002)
		Out-of-roundness mm (in)		Limit	0.005 (0.0002)
		Grinding limit (dia.)		mm (in)	To 47.726 (1.8790)
	Crankshaft journal	Cylindricality mm (in)		Limit	0.006 (0.0002)
		Out-of-roundness mm (in)		Limit	0.005 (0.0002)
		Grinding limit (dia.)		mm (in)	To 67.735 (2.6667)
	Crankshaft pin outer diameter mm (in)		Standard size	Standard	47.976 — 48.000 (1.8888 — 1.8898)
			0.03 (0.0012) US	Standard	47.946 — 47.970 (1.8876 — 1.8886)
			0.05 (0.0020) US	Standard	47.926 — 47.950 (1.8868 — 1.8878)
			0.25 (0.0098) US	Standard	47.726 — 47.750 (1.8790 — 1.8799)
	Crankshaft journal outer diameter mm (in)		Standard size	Standard	67.985 — 68.003 (2.6766 — 2.6773)
			0.03 (0.0012) US	Standard	67.955 — 67.979 (2.6754 — 2.6763)
			0.05 (0.0020) US	Standard	67.935 — 67.959 (2.6746 — 2.6755)
			0.25 (0.0098) US	Standard	67.735 — 67.759 (2.6667 — 2.6677)
	Crankshaft bearing thickness (at center) mm (in)	#1, #2, #3, #4	Standard size	Standard	2.498 — 2.513 (0.0983 — 0.0989)
			0.03 (0.0012) US	Standard	2.519 — 2.522 (0.0992 — 0.0993)
			0.05 (0.0020) US	Standard	2.529 — 2.532 (0.0996 — 0.0997)
			0.25 (0.0098) US	Standard	2.629 — 2.632 (0.1035 — 0.1036)
		#5	Standard size	Standard	2.496 — 2.511 (0.0983 — 0.0989)
			0.03 (0.0012) US	Standard	2.517 — 2.520 (0.0991 — 0.0992)
			0.05 (0.0020) US	Standard	2.527 — 2.530 (0.0995 — 0.0996)
			0.25 (0.0098) US	Standard	2.627 — 2.630 (0.1034 — 0.1035)
	Thrust clearance			Standard	0.130 — 0.308 (0.00512 — 0.01213)
	Oil clearance			Standard	0.013 — 0.031 (0.00051 — 0.00122)

B: COMPONENT

1. TIMING CHAIN

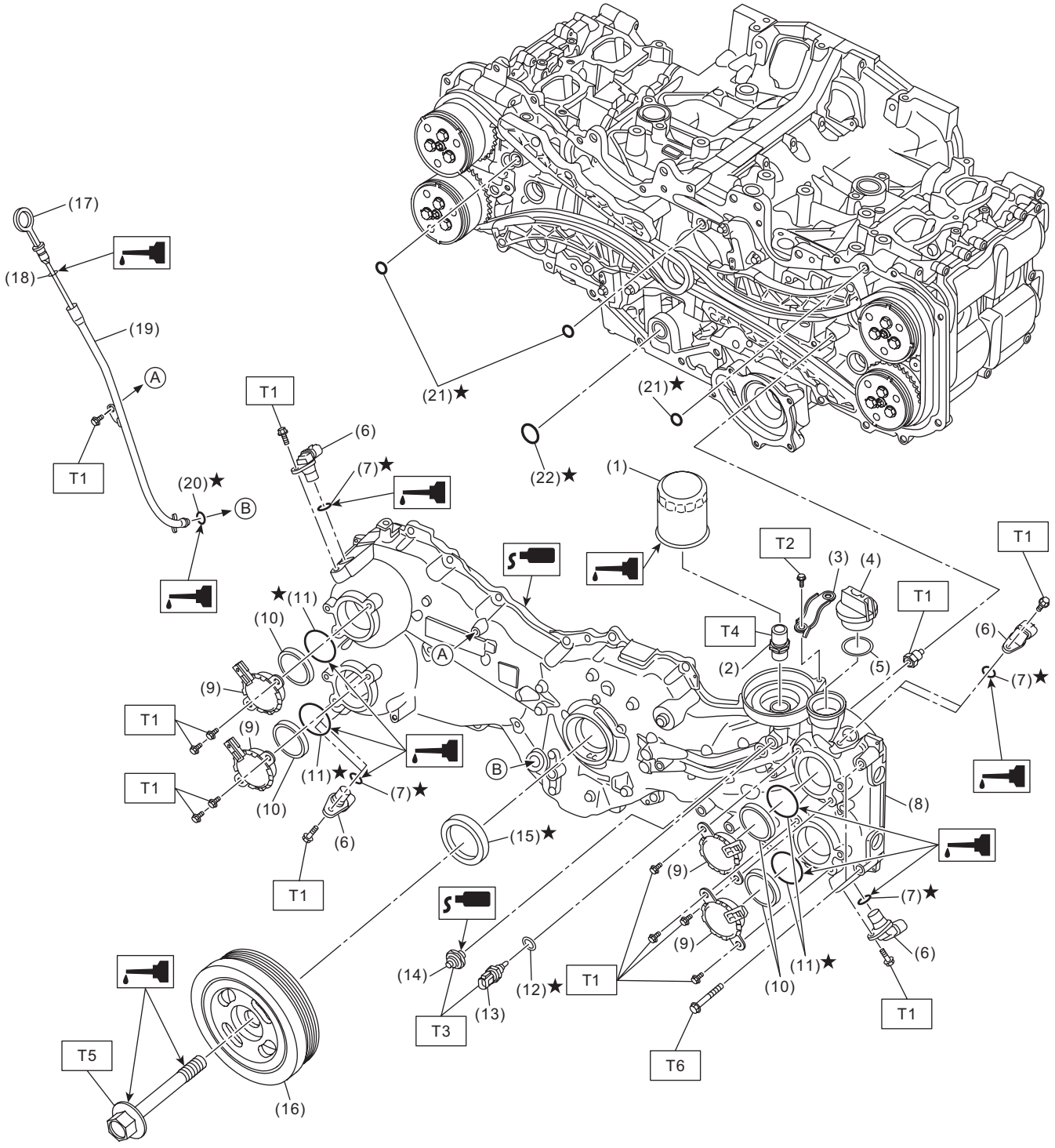


(1) Intake camshaft RH
(2) Exhaust camshaft RH
(3) Intake cam sprocket RH
(4) Exhaust cam sprocket RH
(5) Timing chain
(6) Chain guide
(7) Chain tension lever
(8) Chain tensioner RH
(9) Crank sprocket
(10) O-ring
(11) Chain tensioner LH
(12) Intake cam sprocket LH
(13) Exhaust cam sprocket LH
(14) Intake camshaft LH
(15) Exhaust camshaft LH

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.7, 4.7)
T2: 18 (1.8, 13.3)

2. CHAIN COVER

- Gasoline engine model



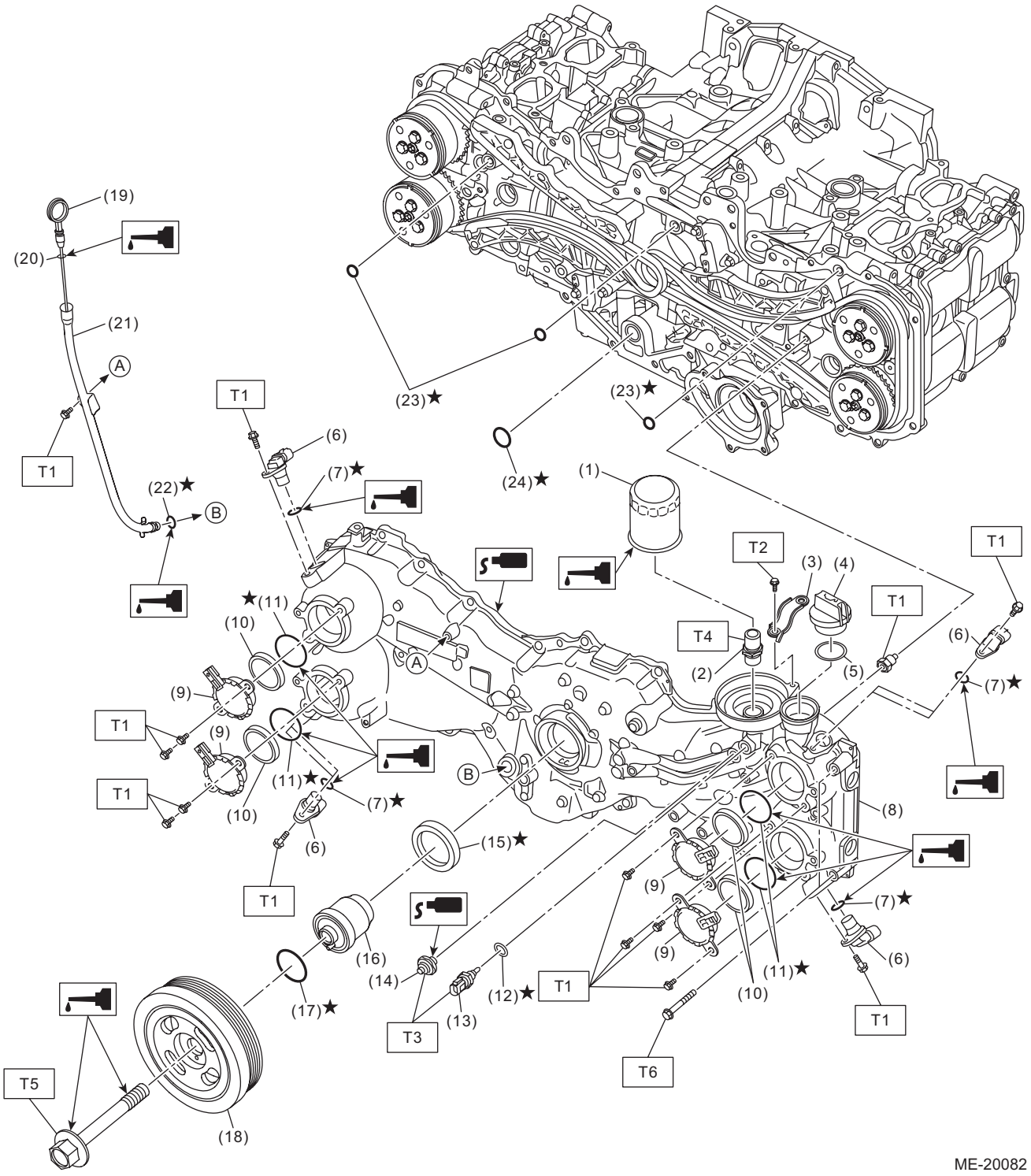
ME-20130

(1) Oil filter
(2) Oil pump union
(3) Generator cord stay
(4) Oil filler cap
(5) Gasket
(6) Camshaft position sensor
(7) O-ring
(8) Chain cover
(9) Oil control solenoid
(10) Back-up ring
(11) O-ring
(12) Gasket
(13) Engine oil temperature sensor
(14) Oil pressure switch
(15) Front oil seal
(16) Crank pulley
(17) Oil level gauge
(18) O-ring
(19) Oil level gauge guide
(20) O-ring
(21) O-ring
(22) O-ring

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)
T2: 8 (0.8, 5.9)
T3: 18 (1.8, 13.3)
T4: 45 (4.6, 33.2)
T5: <Ref. to ME(H4DO(w/o HEV))-143, INSTALLATION, Crank Pulley.>
T6: <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

- HEV model

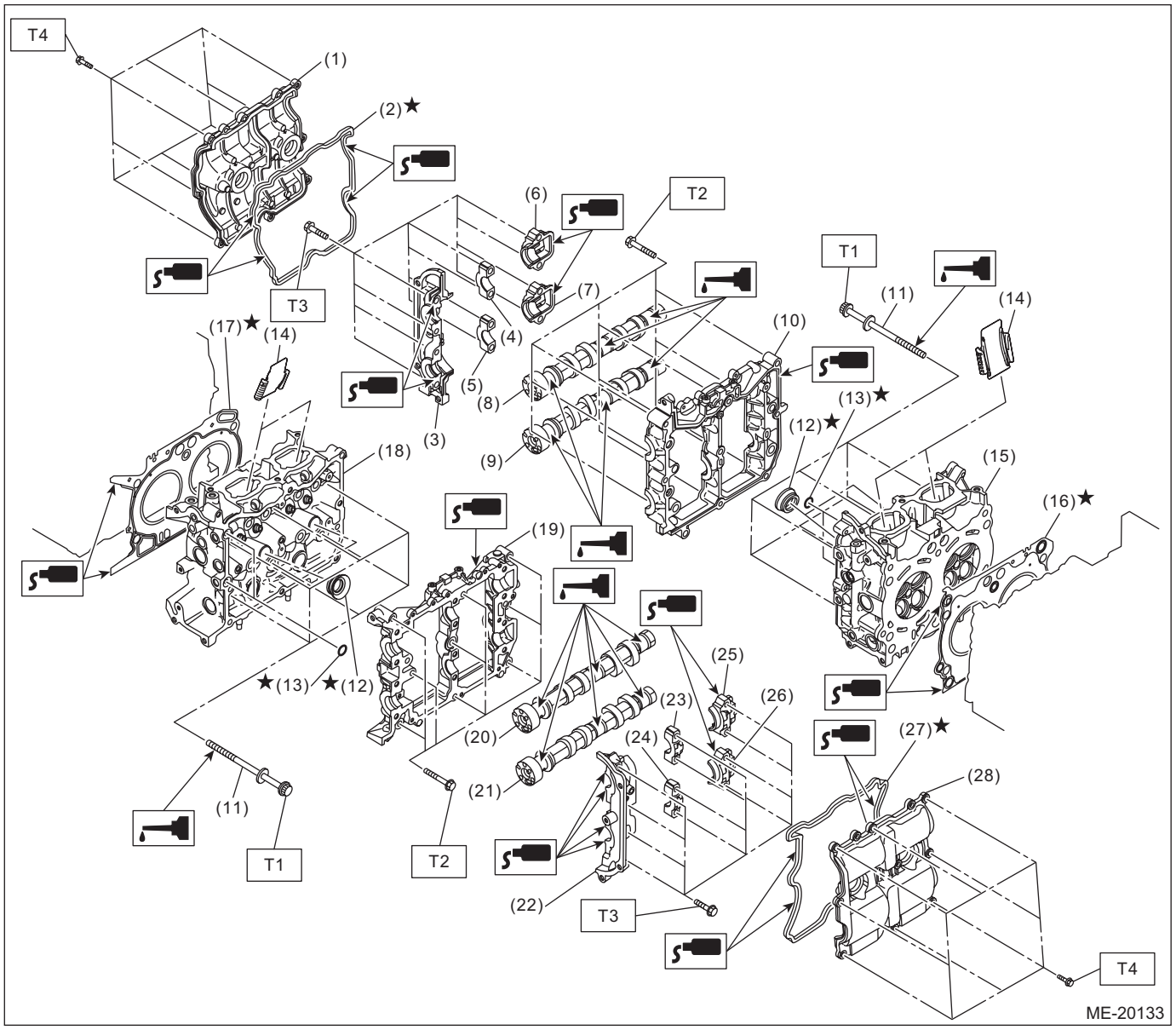

(19)
(20)
(21)
A
T1
(22)★
B
(23)★
(24)★
(1)
(2)
T2
(3)
(4)
(5)
T4
T1
(6)
(7)★
(8)
★(11)
(10)
(9)
(15)★
(16)
(14)
(17)★
(12)★
(13)
T3
T5
(18)
T6
(11)★
ME-20082

(1) Oil filter
(2) Oil pump union
(3) Battery cable stay
(4) Oil filler cap
(5) Gasket
(6) Camshaft position sensor
(7) O-ring
(8) Chain cover
(9) Oil control solenoid
(10) Back-up ring
(11) O-ring
(12) Gasket
(13) Engine oil temperature sensor
(14) Oil pressure switch
(15) Front oil seal
(16) Crank pulley boss
(17) O-ring
(18) Crank pulley
(19) Oil level gauge
(20) O-ring
(21) Oil level gauge guide
(22) O-ring
(23) O-ring
(24) O-ring

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)
T2: 8 (0.8, 5.9)
T3: 18 (1.8, 13.3)
T4: 45 (4.6, 33.2)
T5: <Ref. to ME(H4DO(w/o HEV))-143, INSTALLATION, Crank Pulley.>
T6: <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

3. CYLINDER HEAD AND CAMSHAFT



(1) Rocker cover RH
(2) Rocker cover gasket RH
(3) Front camshaft cap RH
(4) Intake center camshaft cap RH
(5) Exhaust center camshaft cap RH
(6) Intake rear camshaft cap RH
(7) Exhaust rear camshaft cap RH
(8) Intake camshaft RH
(9) Exhaust camshaft RH
(10) Cam carrier RH
(11) Cylinder head bolt
(12) Spark plug pipe gasket
(13) O-ring
(14) Cylinder head plate
(15) Cylinder head RH
(16) Cylinder head gasket RH
(17) Cylinder head gasket LH
(18) Cylinder head LH
(19) Cam carrier LH
(20) Intake camshaft LH
(21) Exhaust camshaft LH
(22) Front camshaft cap LH
(23) Intake center camshaft cap LH
(24) Exhaust center camshaft cap LH
(25) Intake rear camshaft cap LH
(26) Exhaust rear camshaft cap LH
(27) Rocker cover gasket LH
(28) Rocker cover LH

Tightening torque: N·m (kgf-m, ft-lb)

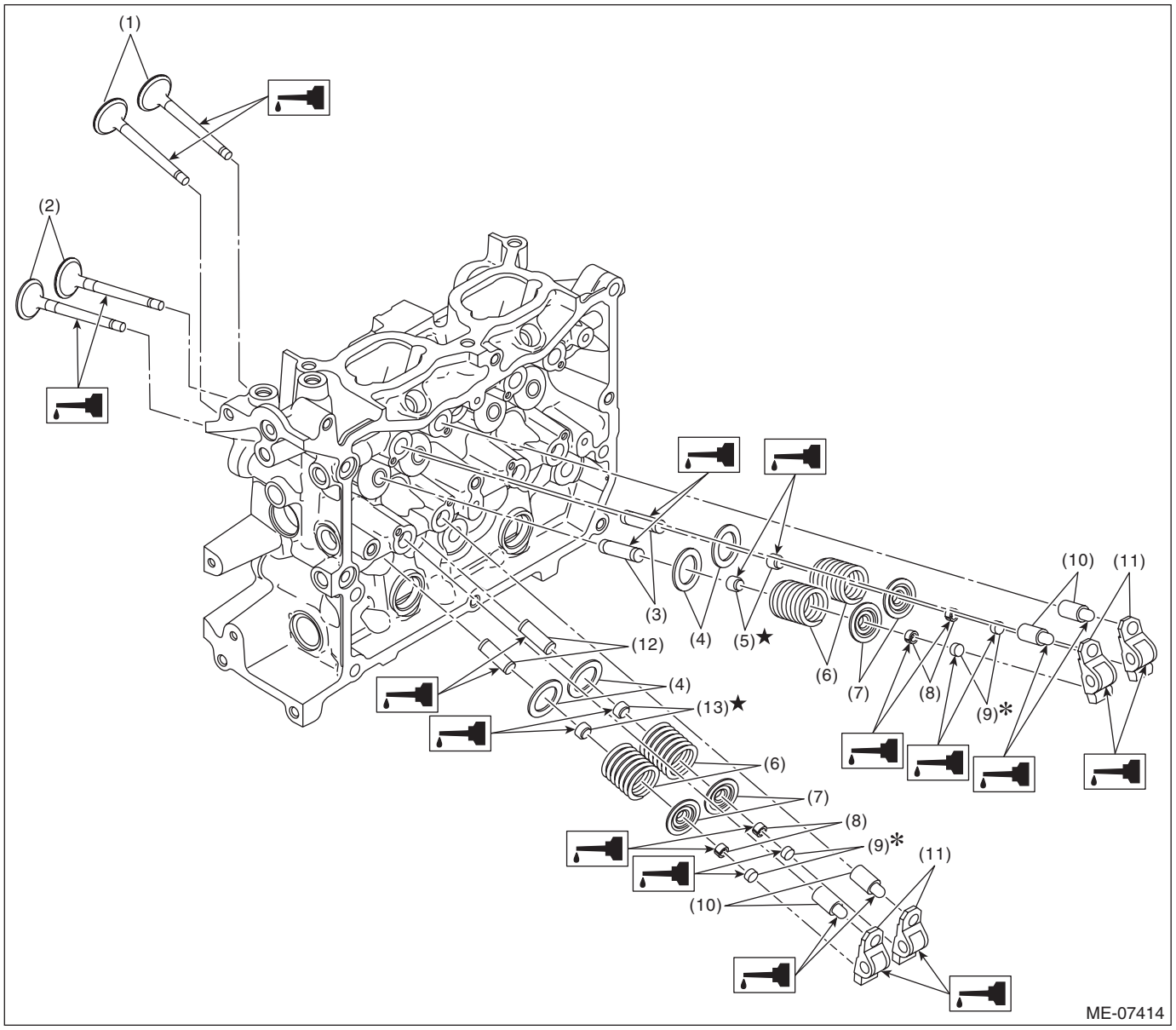
T1: ***<Ref. to ME(H4DO(w/o HEV))-269, INSTALLATION, Cylinder Head.>***

T2: ***<Ref. to ME(H4DO(w/o HEV))-233, INSTALLATION, Cam Carrier.>***

T3: ***<Ref. to ME(H4DO(w/o HEV))-256, ASSEMBLY, Cam Carrier.>***

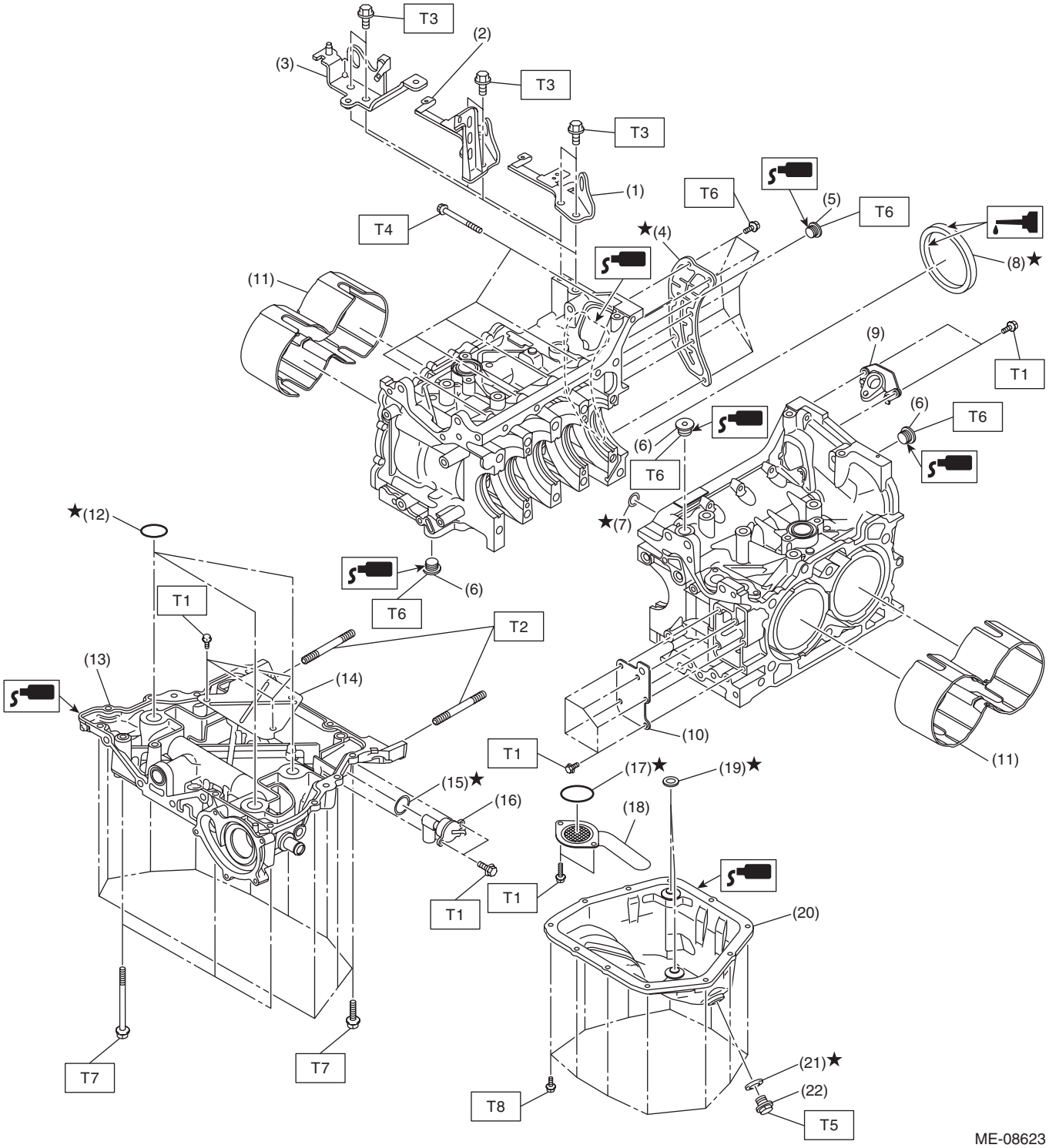
T4: ***<Ref. to ME(H4DO(w/o HEV))-213, INSTALLATION, Rocker Cover.>***

4. VALVE ASSY



(1) Exhaust valve
(2) Intake valve
(3) Intake valve guide
(4) Valve spring seat
(5) Intake valve oil seal
(6) Valve spring
(7) Valve spring retainer
(8) Valve collet
(9) Valve shim
(10) Roller rocker arm pivot
(11) Roller rocker arm
(12) Exhaust valve guide
(13) Exhaust valve oil seal

5. CYLINDER BLOCK 1

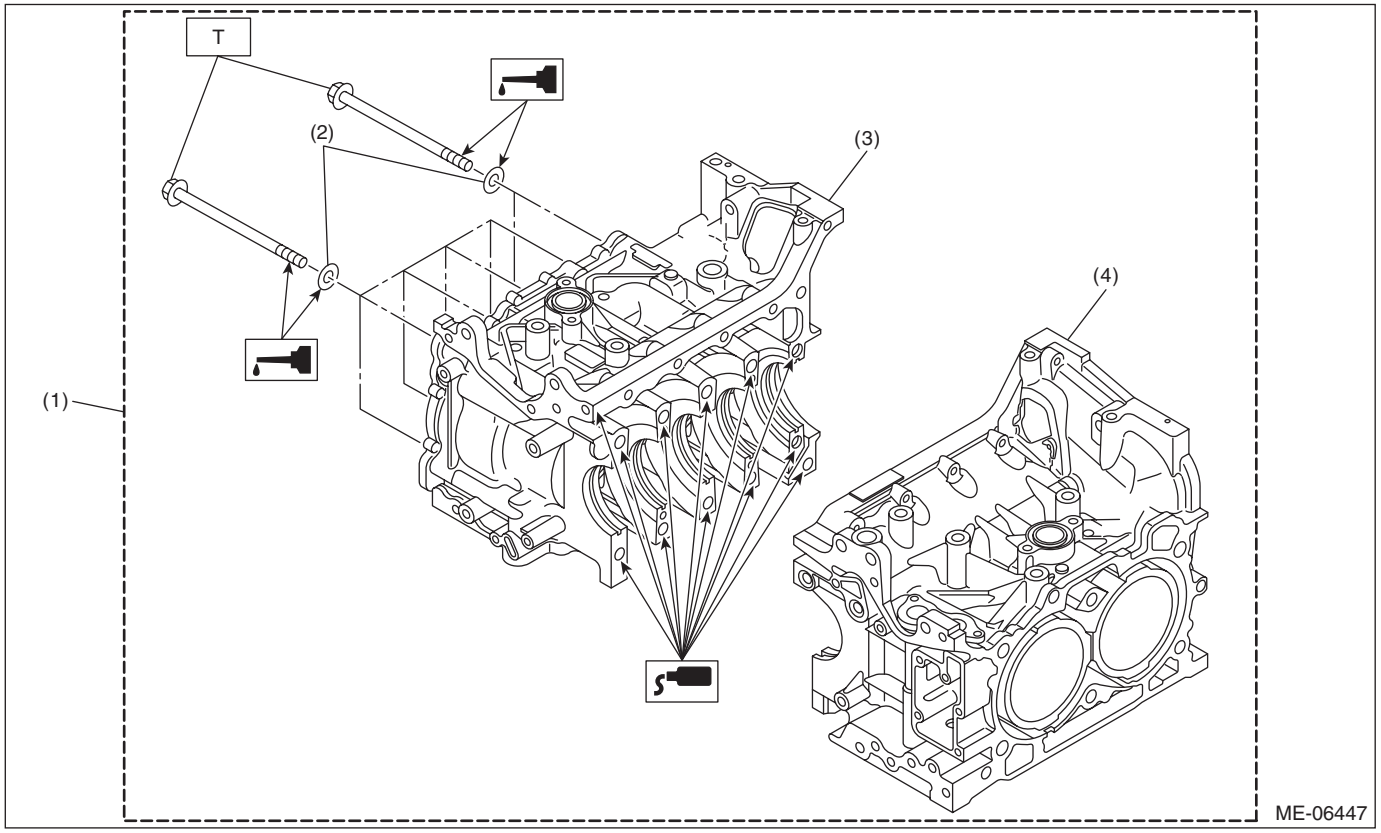


(1)	Engine rear hanger (gasoline engine CVT model)	(12)	O-ring	
(2)	Engine rear hanger (gasoline engine MT model)	(13)	Oil pan upper	
(3)	Engine rear hanger (HEV model)	(14)	Baffle plate	
(4)	Oil separator cover	(15)	O-ring	
(5)	Cylinder block plug	(16)	Oil level switch	
(6)	Main gallery plug	(17)	O-ring	
(7)	O-ring	(18)	Oil strainer	
(8)	Rear oil seal	(19)	Oil pan seal ring	
(9)	Crankshaft position sensor holder	(20)	Oil pan	
(10)	Cylinder block plate	(21)	Drain plug gasket	
(11)	Water jacket spacer	(22)	Drain plug	

Tightening torque: N·m (kgf-m, ft-lb)

- ***T1: 6.4 (0.7, 4.7)***
- ***T2: 10 (1.0, 7.4)***
- ***T3: 21 (2.1, 15.5)***
- ***T4: 25 (2.5, 18.4)***
- ***T5: 41.7 (4.3, 30.8)***
- ***T6: <Ref. to ME(H4DO(w/o HEV))-378, CYLINDER BLOCK, ASSEMBLY, Cylinder Block.>***
- ***T7: <Ref. to ME(H4DO(w/o HEV))-328, INSTALLATION, Cylinder Block.>***
- ***T8: <Ref. to LU(H4DO(w/o HEV))-19, OIL PAN, INSTALLATION, Oil Pan and Strainer.>***

6. CYLINDER BLOCK 2

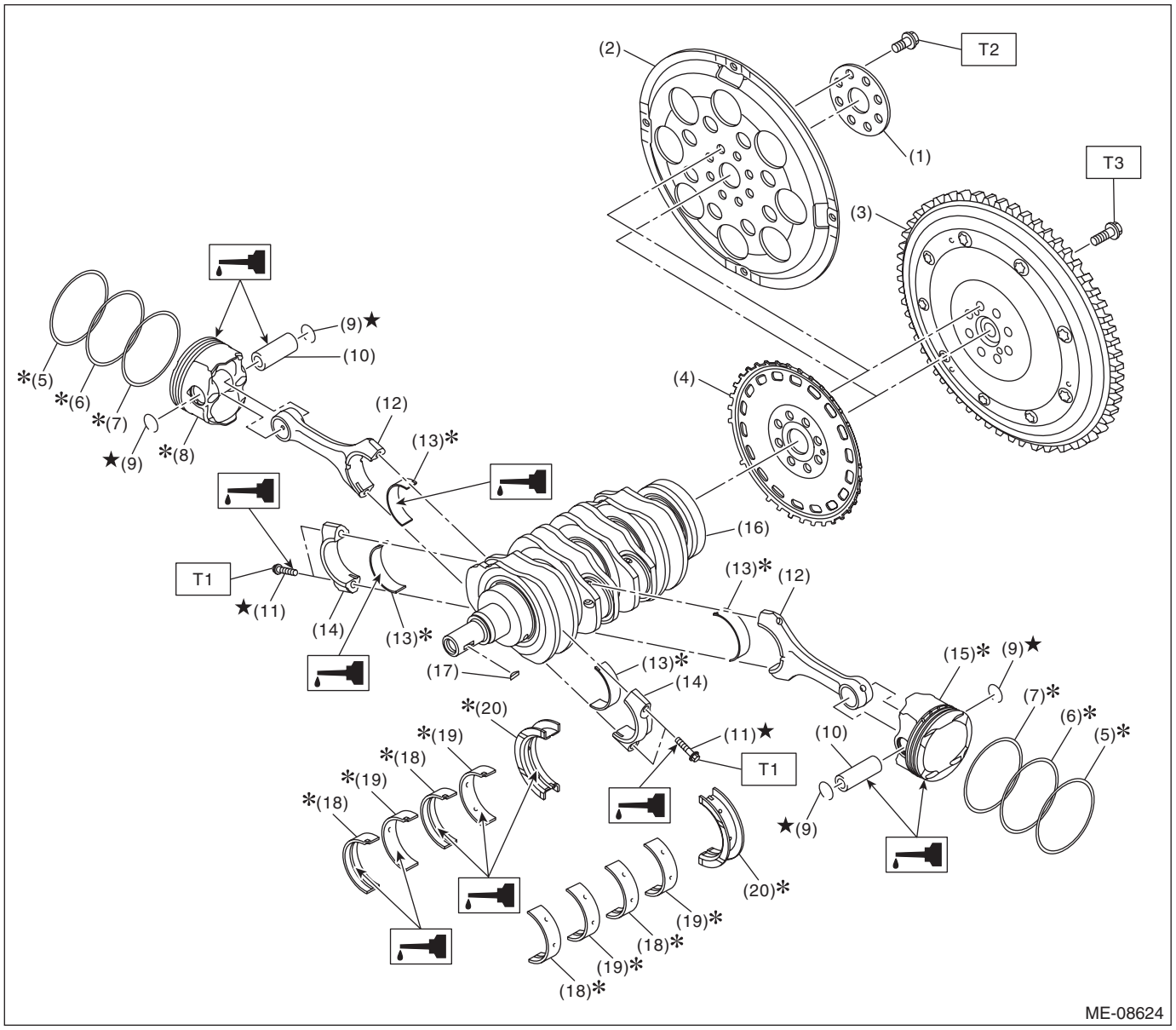


(1) Cylinder block ASSY
(2) Washer
(3) Cylinder block RH
(4) Cylinder block LH

Tightening torque: N·m (kgf-m, ft-lb)

T: <Ref. to ME(H4DO(w/o HEV))-328, INSTALLATION, Cylinder Block.>

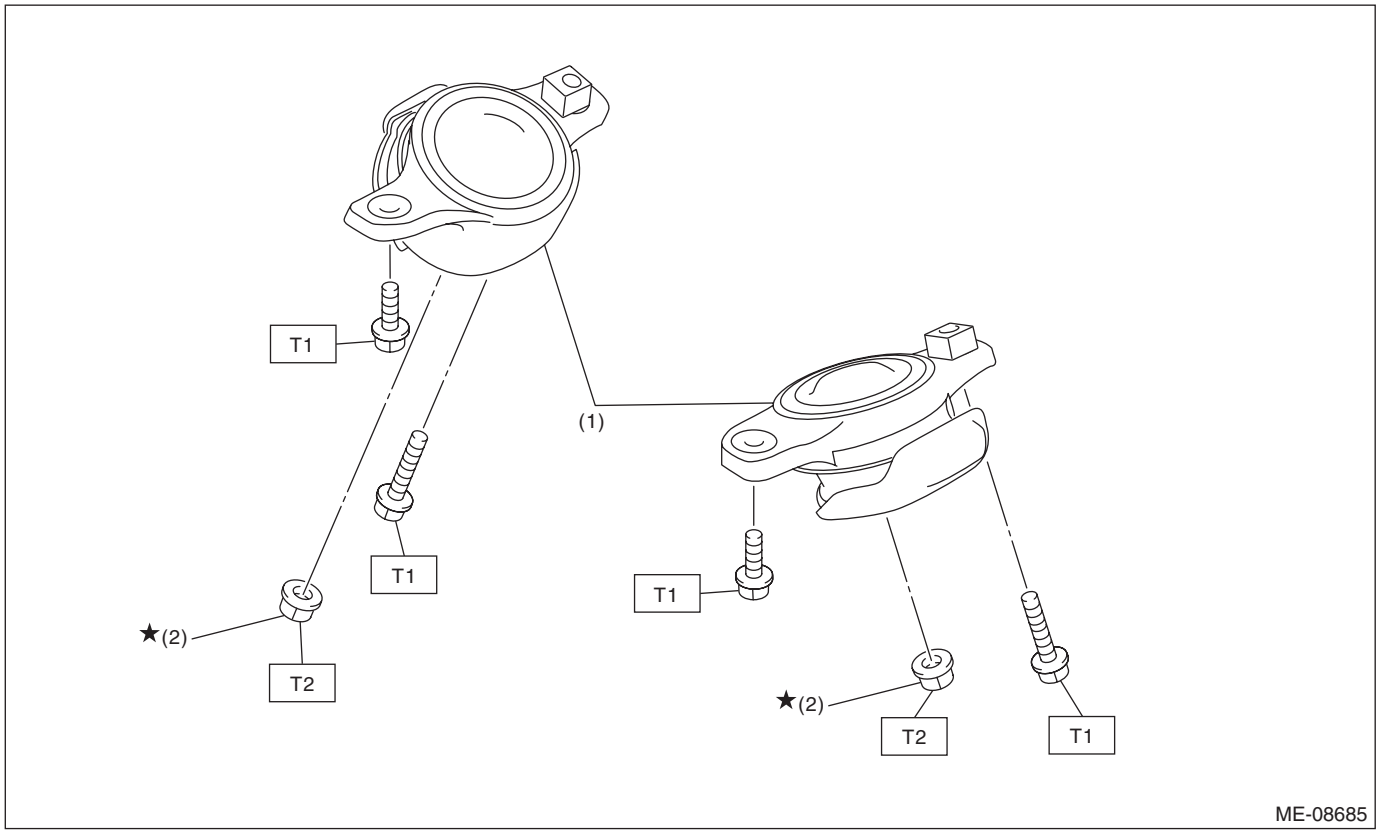
7. CRANKSHAFT AND PISTON



(1)	Reinforcement drive plate (CVT model)	(10)	Piston pin	(19)	Crankshaft bearing #2, #4
(2)	Drive plate (CVT model)	(11)	Connecting rod cap bolt	(20)	Crankshaft bearing #5
(3)	Flywheel (MT model)	(12)	Connecting rod		
(4)	Crankshaft position sensor plate	(13)	Connecting rod bearing	***Tightening torque: N·m (kgf-m, ft-lb)***	
(5)	Top ring	(14)	Connecting rod cap	***T1:***	***<Ref. to ME(H4DO(w/o HEV))-328, INSTALLATION, Cylinder Block.>***
(6)	Second ring	(15)	Piston LH	***T2:***	***<Ref. to CVT(TR580)-166, INSTALLATION, Drive Plate.> <Ref. to CVT(TH58A)-176, INSTALLATION, Drive Plate.>***
(7)	Oil ring	(16)	Crankshaft	***T3:***	***<Ref. to CL-13, INSTALLATION, Flywheel.>***
(8)	Piston RH	(17)	Woodruff key		
(9)	Circlip	(18)	Crankshaft bearing #1, #3		

8. ENGINE MOUNTING

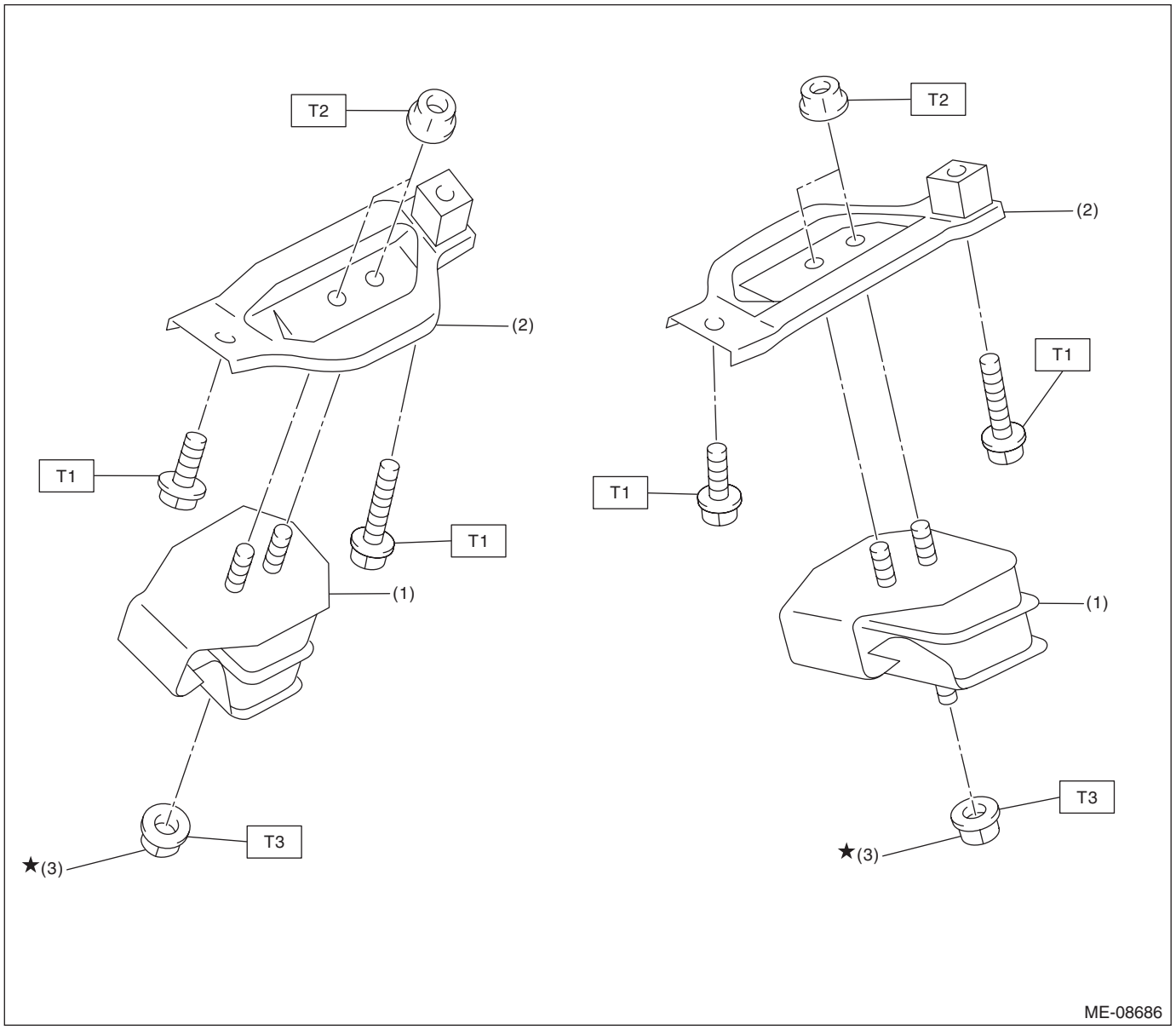
- CVT model



(1) Front cushion rubber
(2) Nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 60 (6.1, 44.3)

- MT model



(1) Front cushion rubber
(2) Front engine mounting bracket
(3) Nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 42 (4.3, 31.0)
T3: 60 (6.1, 44.3)

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove or install the engine in an area where chain hoists, lifting devices, etc. are available for ready use. When lifting up the vehicle, make sure to support the vehicle at the jack-up points.
- Be careful not to let any oil or grease contact the clutch disc or flywheel.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Rotating parts and sliding parts such as piston, bearing and gear should be coated with oil when being assembled.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

D: PREPARATION TOOL

1. SPECIAL TOOL

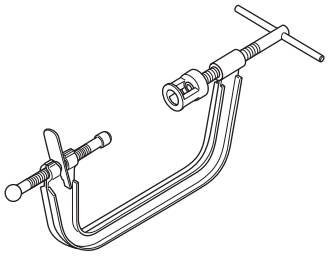
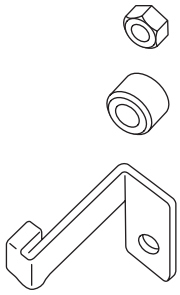
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST0920287002000	0920287002000	REMOVER AND REPLACER	Used for removing and installing valve spring.
 ST-498277200	498277200	STOPPER SET	Used for preventing the torque converter from falling when removing and installing the engine. (CVT model)

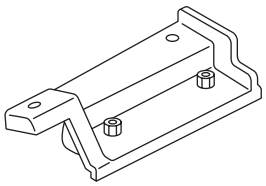
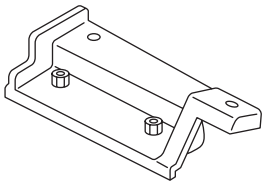
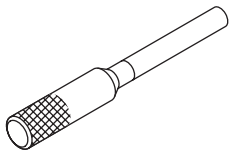
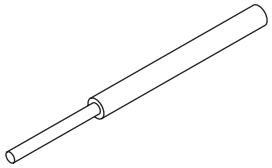
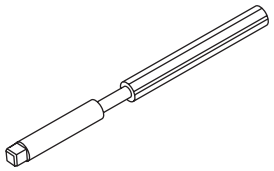
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498457000	498457000	ENGINE STAND ADAPTER RH	• Used for disassembling and assembling engine. • Used together with ENGINE STAND (499817100) and ADAPTER (18362AA020).
 ST-498457100	498457100	ENGINE STAND ADAPTER LH	• Used for disassembling and assembling engine. • Used together with ENGINE STAND (499817100) and ADAPTER (18362AA020).
 ST-499267300	499267300	STOPPER PIN	Used for removing and installing the V-belt tensioner assembly. (HEV model)
 ST-499765700	499765700	VALVE GUIDE REMOVER AND INSTALLER	Used for removing and installing valve guide.
 ST-499765900	499765900	VALVE GUIDE REAMER	Used for reaming valve guides.

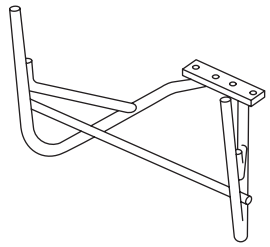
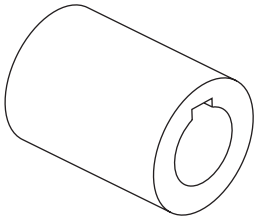
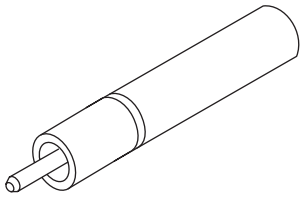
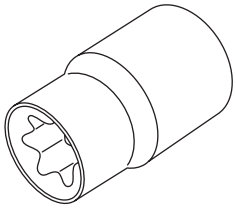
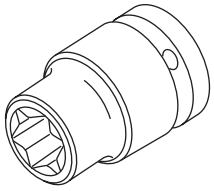
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499817100	499817100	ENGINE STAND	• Used for disassembling and assembling engine. • Used together with ADAPTER (18362AA020), ENGINE STAND ADAPTER RH (498457000) and LH (498457100).
 ST18252AA000	18252AA000	CRANKSHAFT SOCKET	Used for rotating crankshaft.
 ST18261AA010	18261AA010	VALVE OIL SEAL GUIDE	Used for press-fitting of intake valve guide stem seals and exhaust valve guide stem seals.
 ST18270AA020	18270AA020	SOCKET	Used for removing and installing connecting rod.
 ST18270KA010	18270KA010	SOCKET	Used for removing and installing cam sprocket.

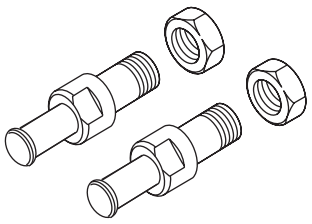
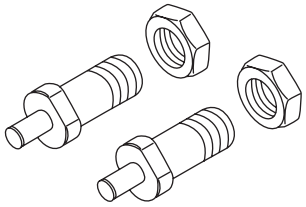
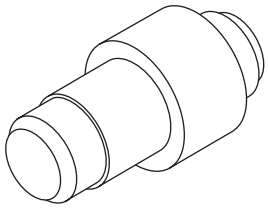
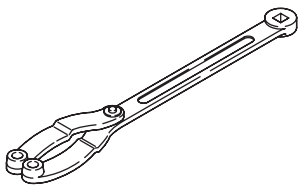
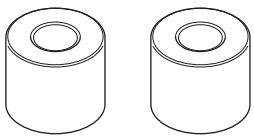
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18334AA000	18334AA000	PULLEY WRENCH PIN SET	• Used for removing and installing the crank pulley. • Used together with PULLEY WRENCH (18355AA000).
 ST18334AA020	18334AA020	PULLEY WRENCH PIN SET	• Used for rotating the intake cam sprocket LH. • Used for removing and installing cam sprocket. • Used together with PULLEY WRENCH (18355AA000).
 ST18350AA000	18350AA000	CONNECTING ROD BUSHING REMOVER AND INSTALLER	Used for removing and installing the connecting rod bushing at connecting rod small end.
 ST18355AA000	18355AA000	PULLEY WRENCH	• Used for removing and installing the crank pulley. • Used for rotating the intake cam sprocket LH. • Used for removing and installing cam sprocket. • Used together with PULLEY WRENCH PIN SET (18334AA000) or PULLEY WRENCH PIN SET (18334AA020).
 ST18362AA020	18362AA020	ADAPTER	• Used for disassembling and assembling engine. • Used together with STAND (499817100), ENGINE STAND ADAPTER RH (498457000) and LH (498457100). • Bolt used: M10 × 50 (SUBARU genuine Part No.: 010410500)

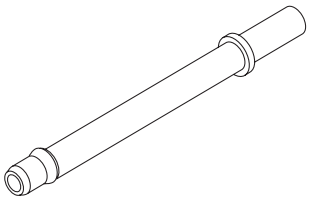
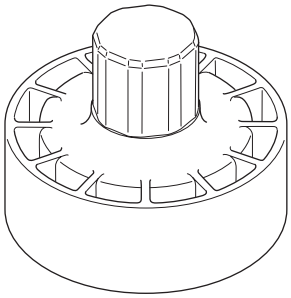
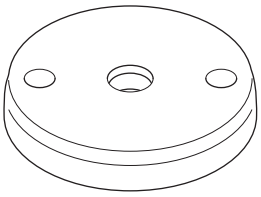
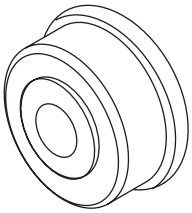
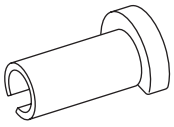
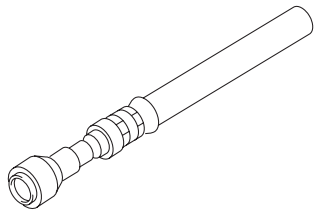
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18471AA000	18471AA000	FUEL PIPE ADAPTER	Used for inspecting the fuel pressure.
 ST18657AA030	18657AA030	OIL SEAL INSTALLER	• Used for installing the rear oil seal of engine. • Used together with OIL SEAL GUIDE (18671AA020).
 ST18671AA020	18671AA020	OIL SEAL GUIDE	• Used for installing the rear oil seal of engine. • Used together with OIL SEAL INSTALLER (18657AA030).
 ST41399FG020	41399FG020	SPECIAL TOOL B	Used for installing the front oil seal of engine.
 ST42099AE000	42099AE000	QUICK CONNECTOR RELEASE	Used for removing FUEL HOSE (42075AG690). NOTE: FUEL HOSE (42075AG690) is used for checking the fuel pressure.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST42075AG690	42075AG690	FUEL HOSE	Used for inspecting the fuel pressure. NOTE: This is the SUBARU genuine part.
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

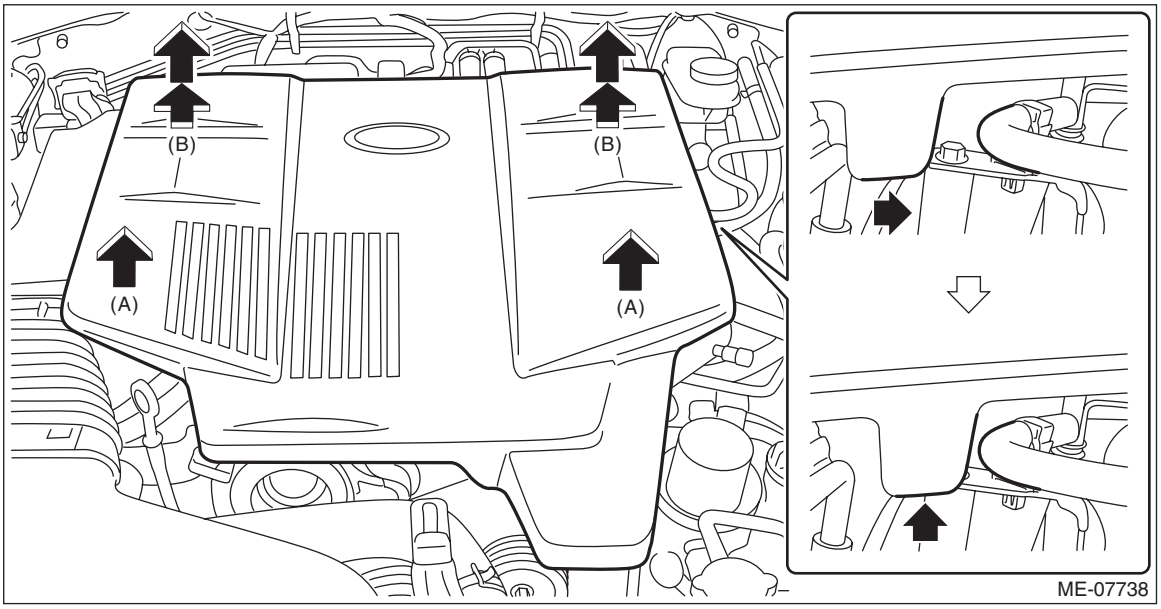
TOOL NAME	REMARKS
Compression gauge	Used for measuring compression.
Vacuum gauge	Used for measuring intake manifold vacuum.
Oil pressure gauge	Used for measuring engine oil pressure.
Fuel pressure gauge	Used for measuring fuel pressure.
Thickness gauge	Used for various inspections.
Angle gauge	Used for angle tightening.
Piston ring compressor	Used for installing the piston into the cylinder block.
DST-i	Used together with Subaru Select Monitor 4.

2. Compression

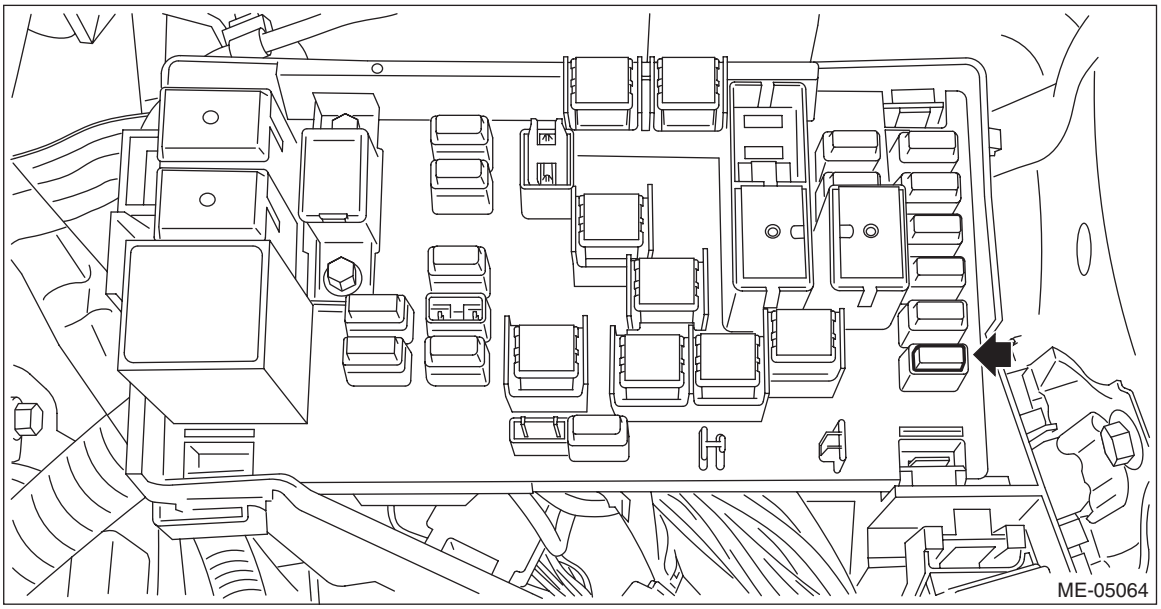
A: INSPECTION

CAUTION:
After warming-up, engine becomes very hot. Be careful not to burn yourself during measurement.
1) Turn the ignition switch to OFF.
2) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

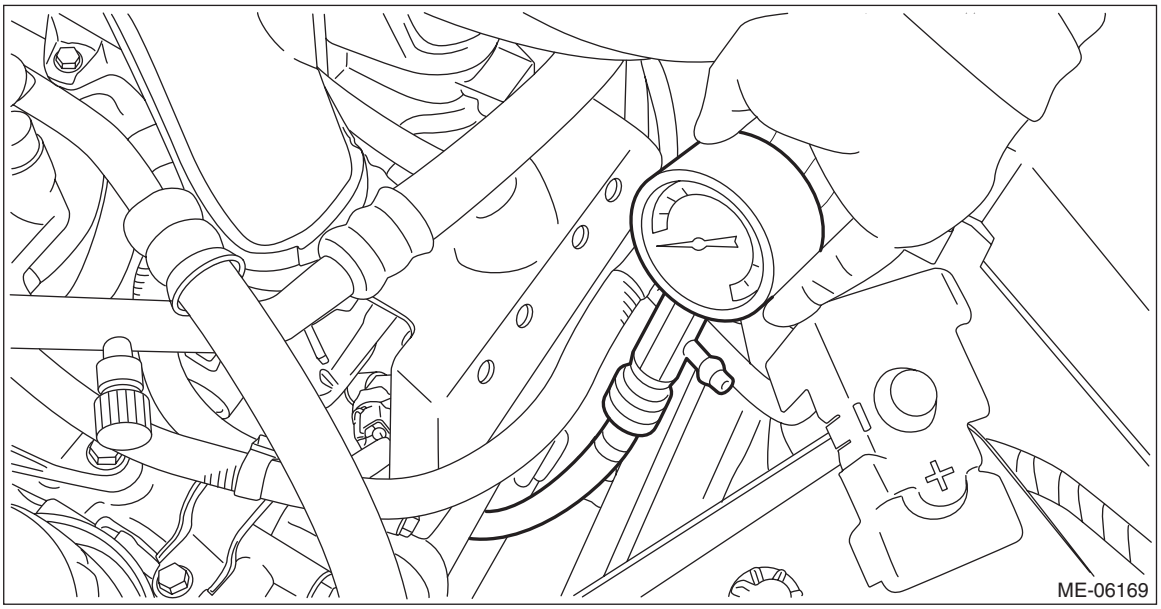


3) After warming-up the engine, turn the ignition switch to OFF.
4) Make sure that the battery (12 volt auxiliary battery) is fully charged.
5) Check the starter motor for satisfactory performance and operation.
6) Remove the fuse of fuel pump from main fuse box.



7) Start the engine and run it until it stalls.
8) After the engine stalls, crank it for five more seconds.
9) Turn the ignition switch to OFF.
10) Remove all spark plugs. <Ref. to IG(H4DO(w/o HEV))-4, REMOVAL, Spark Plug.>
11) Install the compression gauge to the spark plug hole.

NOTE:
When using a screw-in type compression gauge, the screw should be less than 25 mm (0.98 in) long.



12) Install the 12 volt engine restart battery. (HEV model) <Ref. to SC(H4DO(HEV))-43, 12 VOLT ENGINE RESTART BATTERY, INSTALLATION, Battery.>
13) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
14) Turn the ignition switch to ON.
15) Depress the accelerator pedal to full throttle.
16) Crank the engine by starter motor and read the value when the needle of the compression gauge becomes stable.

NOTE:
- Perform at least two measurements per cylinder, and make sure that the values are correct.
- If the compression pressure is out of standard, check or adjust the pistons, valves and cylinders.

Compression pressure (at 200 — 300 r/min):
Standard
1,050 — 1,400 kPa (11 — 14 kg/cm^2, 152 — 203 psi)
Difference between cylinders
100 kPa (1 kg/cm^2, 14 psi) or less

17) After inspection, install the related parts in the reverse order of removal.

3. Idle Speed

A: INSPECTION

1) Before checking the idle speed, check the following item:
   (1) Check the air cleaner element is free from clogging, ignition timing is correct, spark plugs are in good condition, and hoses are connected properly.
   (2) Check the malfunction indicator light does not illuminate.
2) Warm up the engine.
3) Read the engine idle speed using Subaru Select Monitor. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.> <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>

NOTE:
- Idle speed cannot be adjusted manually, because the idle speed is automatically adjusted.
- If idle speed is out of standard, refer to the General Diagnosis Table under “Engine Control System”. <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>

   (1) Check the idle speed when no-loaded. (Headlight, blower fan, rear defroster, radiator fan, A/C and etc. are OFF)

Idle speed (No load, and for CVT model, select lever in “P” or “N” range, for MT model, gear shift lever in neutral position.):

Standard

650±100 r/min

   (2) Check the idle speed when loaded. (Turn the A/C switch to ON and operate the compressor for at least one minute before measurement.)

Idle speed (A/C on, and for CVT model, select lever in “P” or “N” range, for MT model, gear shift lever in neutral position.):

Standard

800 — 900±50 r/min

4. Ignition Timing

A: INSPECTION

CAUTION:
After warming-up, engine becomes very hot. Be careful not to burn yourself at measurement.

1) Before checking the ignition timing, check the following item:
   (1) Check the air cleaner element is free from clogging, spark plugs are in good condition, and hoses are connected properly.
   (2) Check the malfunction indicator light does not illuminate.
2) Warm up the engine.
3) Read the ignition timing using Subaru Select Monitor. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.> <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>

NOTE:
If ignition timing is out of standard, check the ignition control system. Refer to “Engine Control System”. <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>

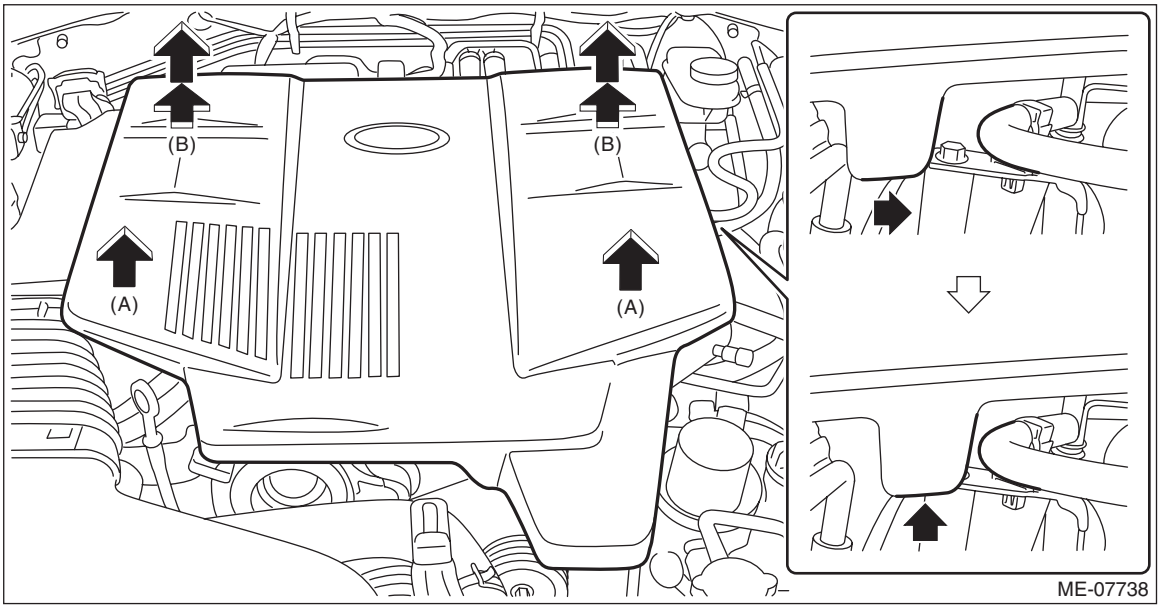
Ignition timing [BTDC/{r/min}]:
Standard
16°±10°/650 (gasoline engine CVT model)
12°±10°/650 (gasoline engine MT model)
10°±10°/650 (HEV model)

5. Intake Manifold Vacuum

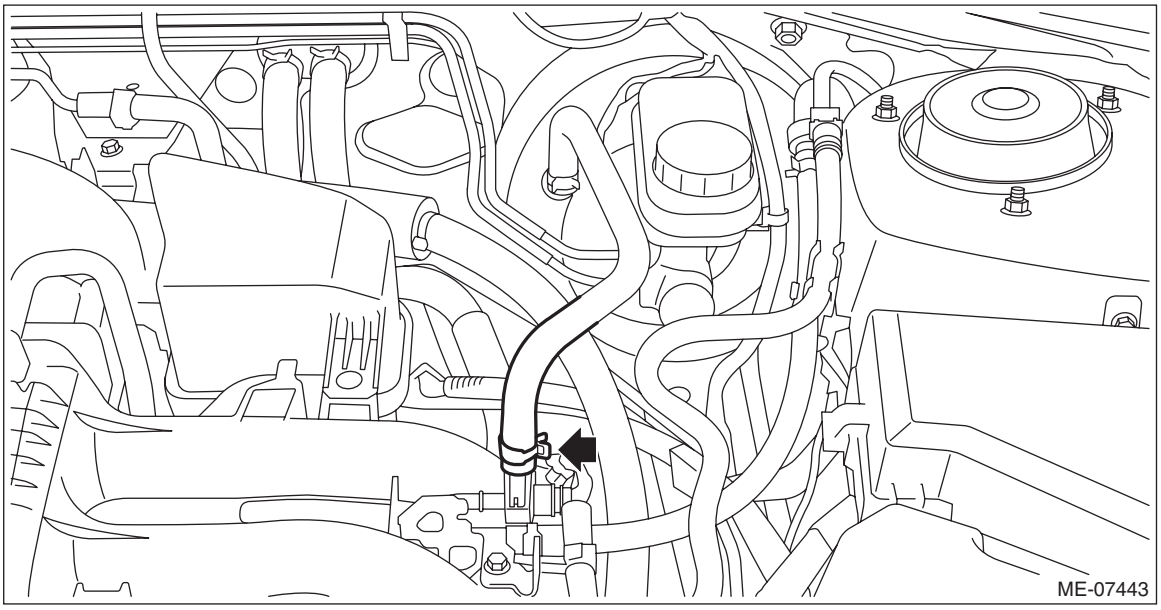
A: INSPECTION

1) Turn the ignition switch to OFF.
2) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

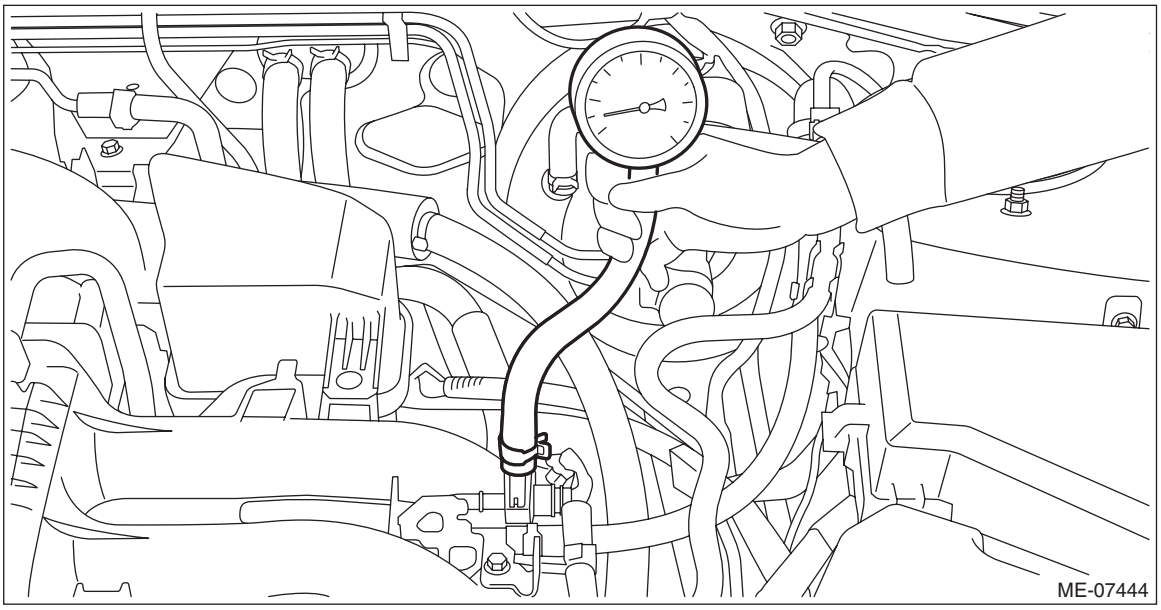
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Warm up the engine.
4) Install the vacuum gauge. (Gasoline engine model)
   (1) Remove the brake booster vacuum hose from the intake manifold.



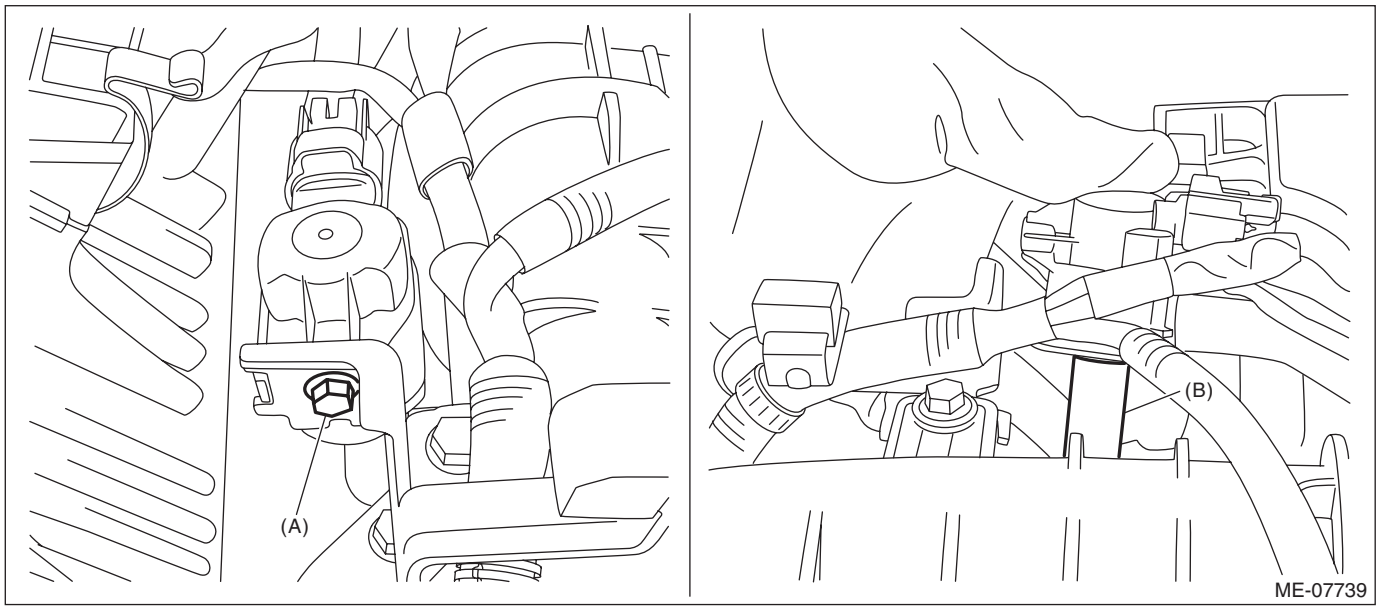
(2) Connect the vacuum gauge to the intake manifold.



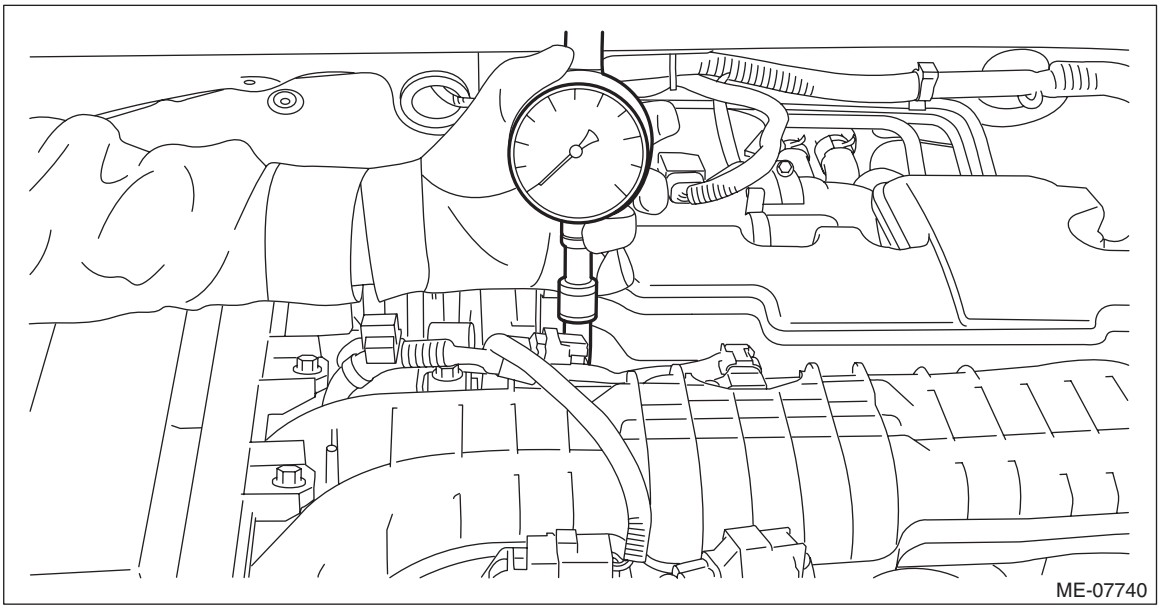
5) Install the vacuum gauge. (HEV model)

(1) Remove the nut (A) which secures purge control solenoid valve to the purge control solenoid valve bracket, and disconnect the vacuum hose (B) from the purge control solenoid valve.

NOTE:
Hold the purge control solenoid valve unit by hand to prevent it from rotating together.



(2) Connect the vacuum gauge to the vacuum hose.



6) Keep the engine at idle speed and read the vacuum gauge indication.

NOTE:
Condition of engine inside can be diagnosed by observing the behavior of the vacuum gauge needle as described in table below.

Intake manifold vacuum (at idling, A/C OFF):
Standard
–60.0 kPa (–450 mmHg, –17.72 inHg) or more

Diagnosis of engine condition by inspection of intake manifold vacuum	
Vacuum gauge needle behavior	Possible engine condition
1. Needle is steady but lower than standard value. This tendency becomes more evident as engine temperature rises.	Leakage around intake manifold gasket, disconnection or damage of vacuum hose
2. Needle intermittently drops to position lower than standard value.	Leakage around cylinder
3. Needle drops suddenly and intermittently from standard value.	Sticky valve
4. When engine speed is gradually increased, needle begins to vibrate rapidly at certain speed, and then vibration increases as engine speed increases.	Weak or broken valve springs
5. Needle vibrates above and below standard value in narrow range.	Defective ignition system

7) After inspection, install the related parts in the reverse order of removal.

NOTE:
When installing the purge control solenoid valve, hold the purge control solenoid valve unit by hand to prevent it from rotating together. (HEV model)

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

6. Engine Oil Pressure

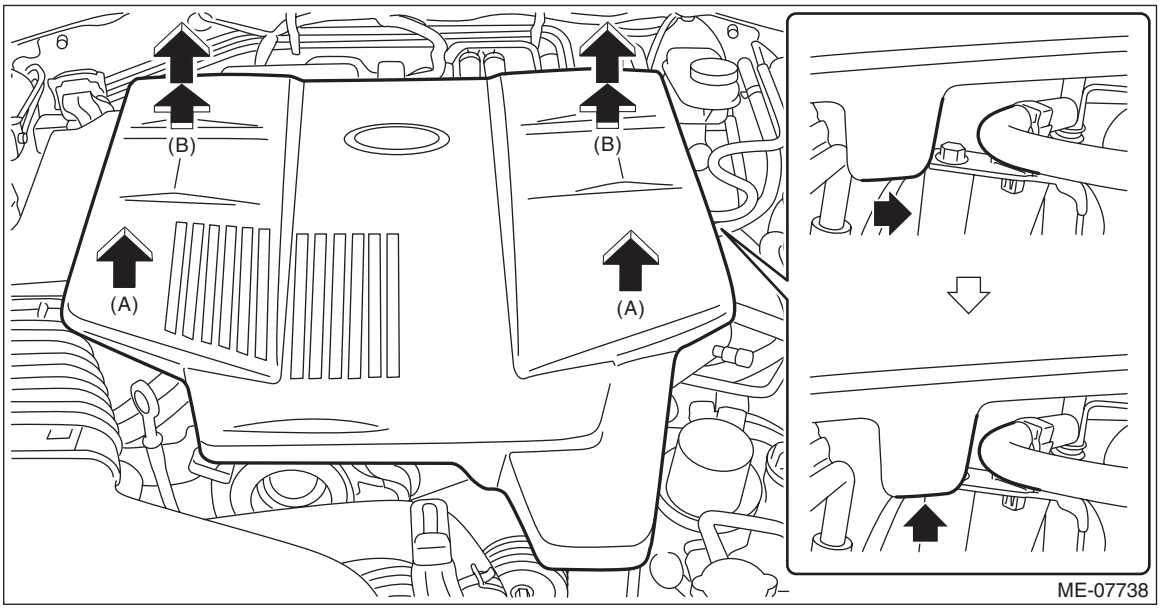
A: INSPECTION

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

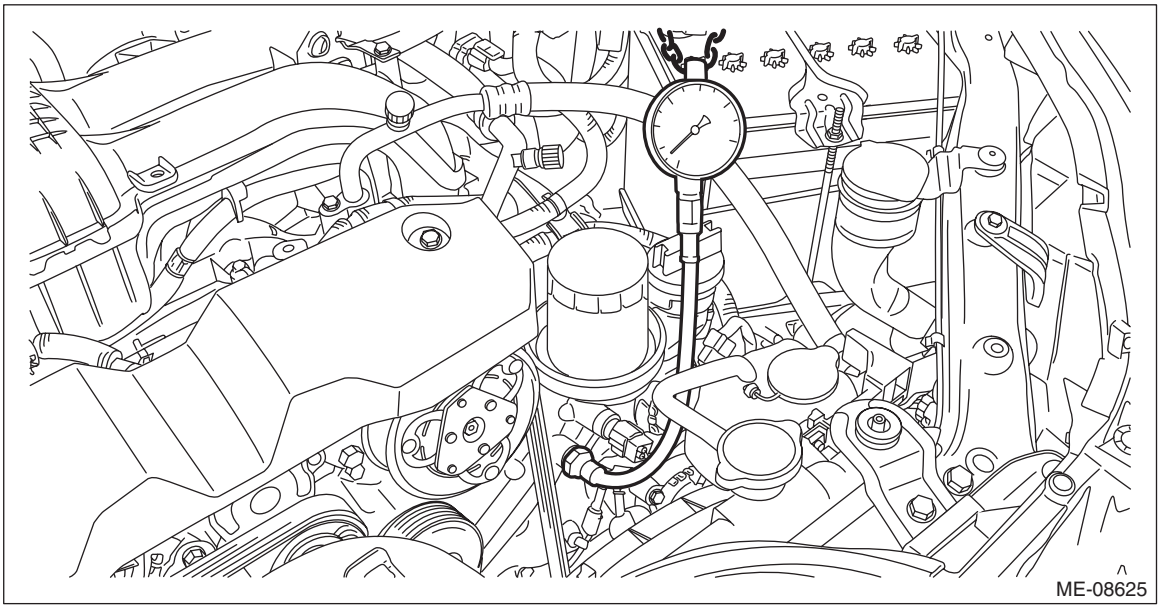
2) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

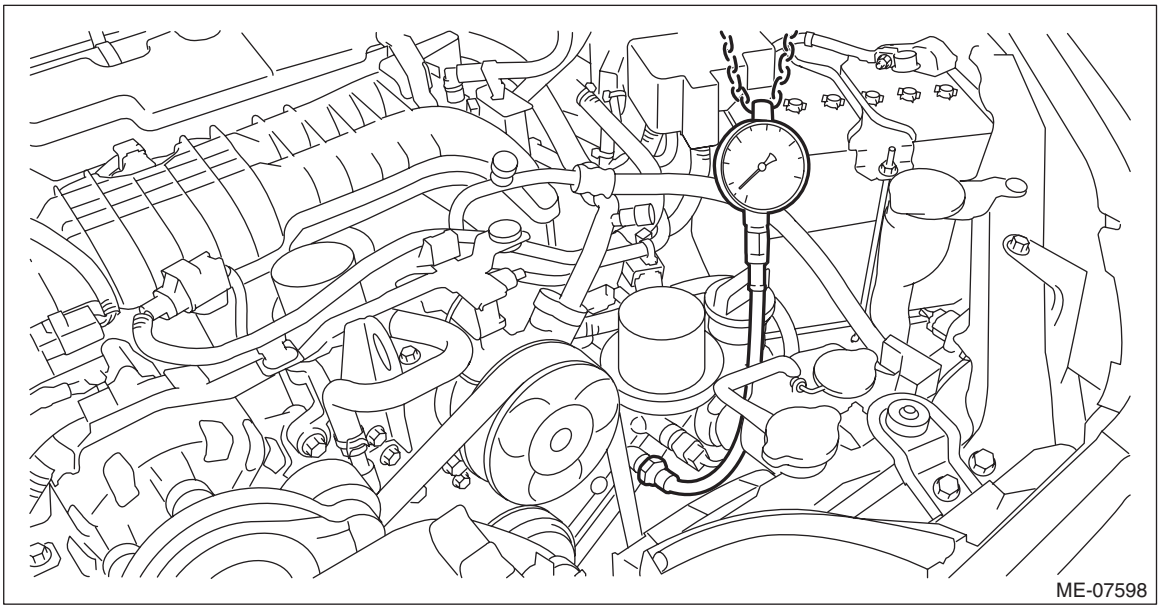


3) Remove the oil pressure switch. <Ref. to LU(H4DO(w/o HEV))-25, REMOVAL, Oil Pressure Switch.>
4) Install the oil pressure gauge to the chain cover.

- Gasoline engine model



- HEV model



5) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
6) Start the engine, and check the oil pressure.

NOTE:
- Standard value is based on an engine oil temperature of 80°C (176°F).
- If the oil pressure is out of specification, check oil pump, oil filter and lubrication line. <Ref. to LU(H4DO(w/o HEV))-73, INSPECTION, Engine Lubrication System Trouble in General.>
- If the oil pressure warning light is ON and oil pressure is within standard, check the oil pressure switch. <Ref. to LU(H4DO(w/o HEV))-73, INSPECTION, Engine Lubrication System Trouble in General.>

Engine oil pressure:
Standard
50 kPa (0.5 kg/cm^2, 7 psi) or more (at 600 r/min)
350 kPa (3.6 kg/cm^2, 51 psi) or more (at 6,000 r/min)

7) After inspection, install the related parts in the reverse order of removal.

7. Fuel Pressure

A: INSPECTION

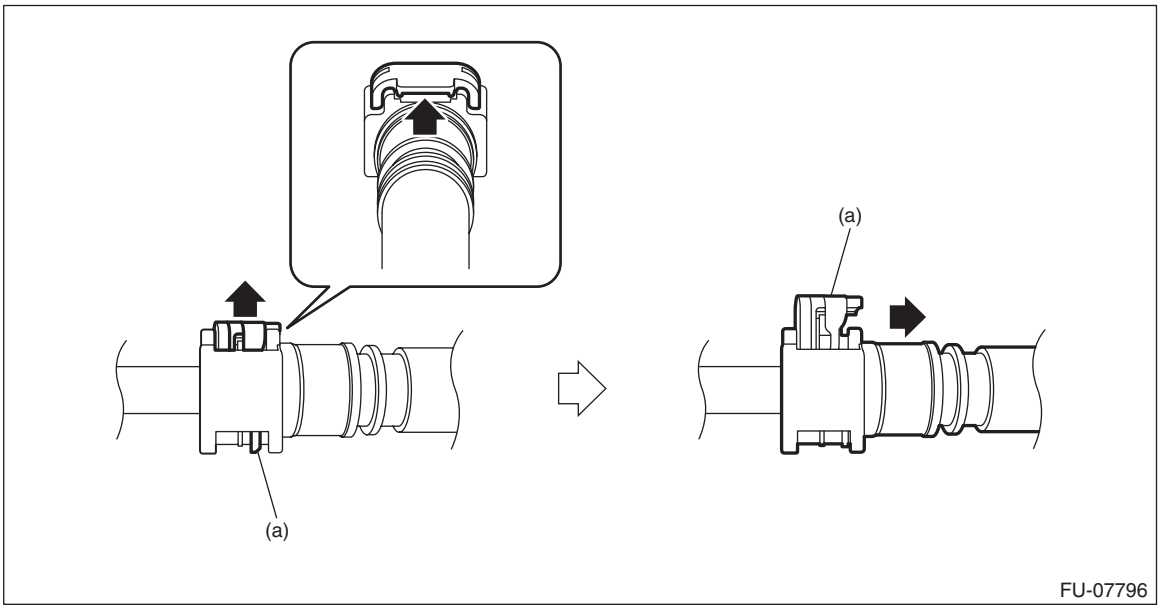
1. GASOLINE ENGINE MODEL

1) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Open the fuel filler lid and remove the fuel filler cap.

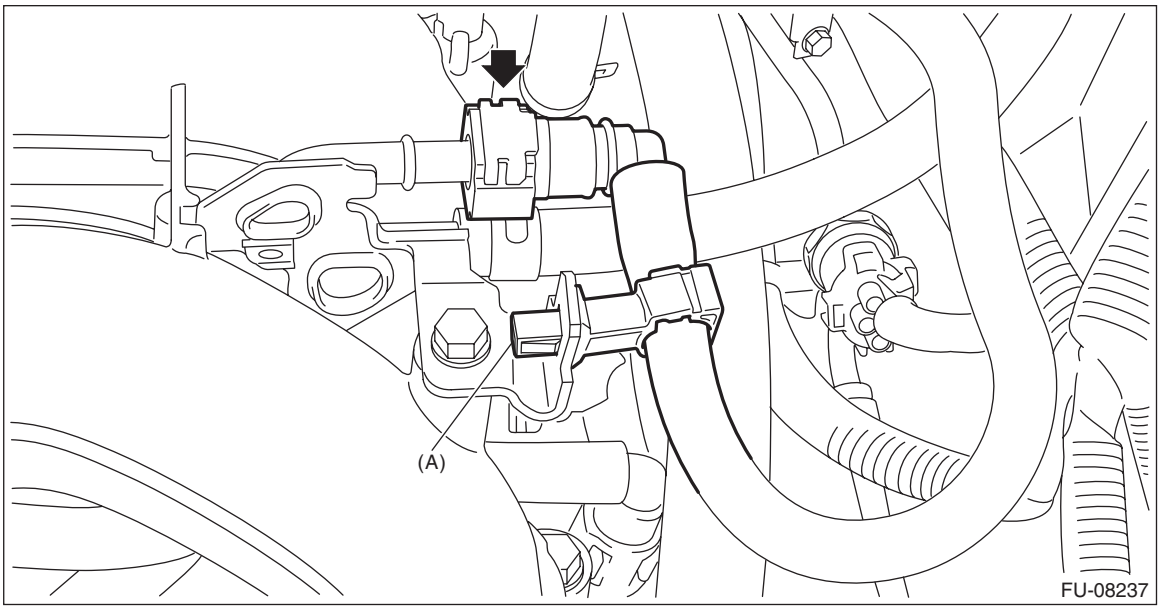
NOTE:
This operation is required to release the inner pressure of the fuel tank.
3) Disconnect the fuel delivery tube from the fuel delivery pipe, and connect the fuel pressure gauge.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
  (1) Disconnect the quick connector on the fuel delivery tube from the fuel pipe assembly, and remove the clip (A) securing the fuel delivery tube to the fuel pipe assembly.

NOTE:
Disconnect the quick connector as shown in the figure.



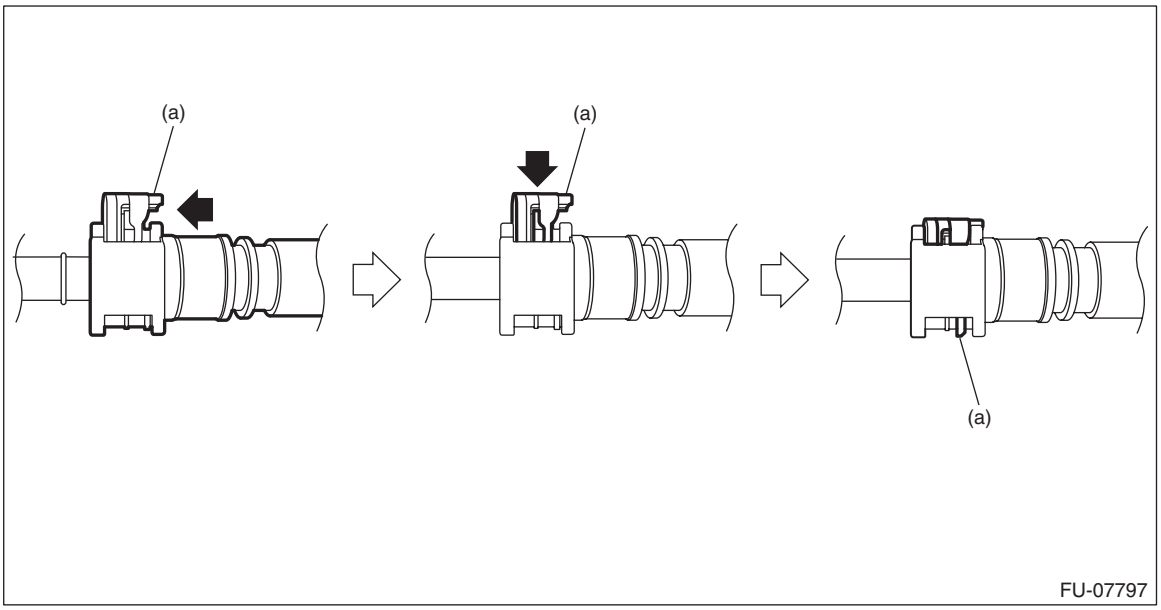
(a) Slider



(2) Connect the fuel pressure gauge with ST1 and ST2.

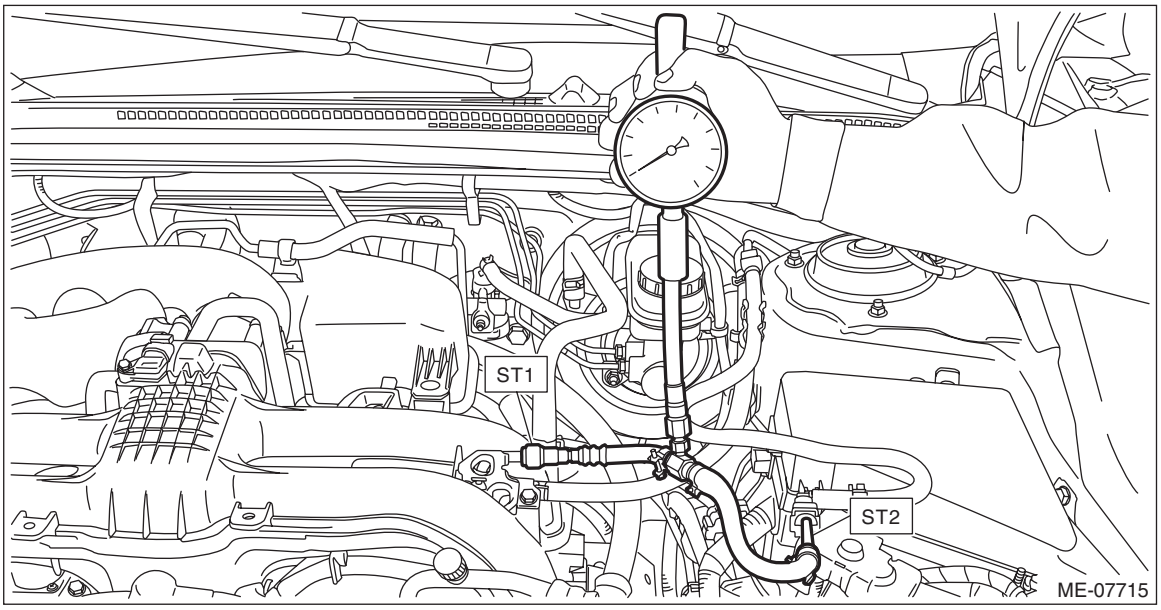
CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector with slider, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check that the quick connector is securely connected.

NOTE:
- ST1 is a SUBARU genuine part.
- When connecting the ST2 to the quick connector on the fuel delivery tube, connect as shown in the figure.



(a) Slider

ST1 42075AG690 FUEL HOSE
ST2 18471AA000 FUEL PIPE ADAPTER



4) Start the engine.
5) Check the fuel pressure after warming up the engine.

NOTE:
- The fuel pressure gauge registers 10 to 20 kPa (0.1 to 0.2 kg/cm^2, 1 to 3 psi) higher than standard values during high-altitude operations.
- Check or replace the fuel pump and fuel delivery line if the fuel pressure is out of the standard.

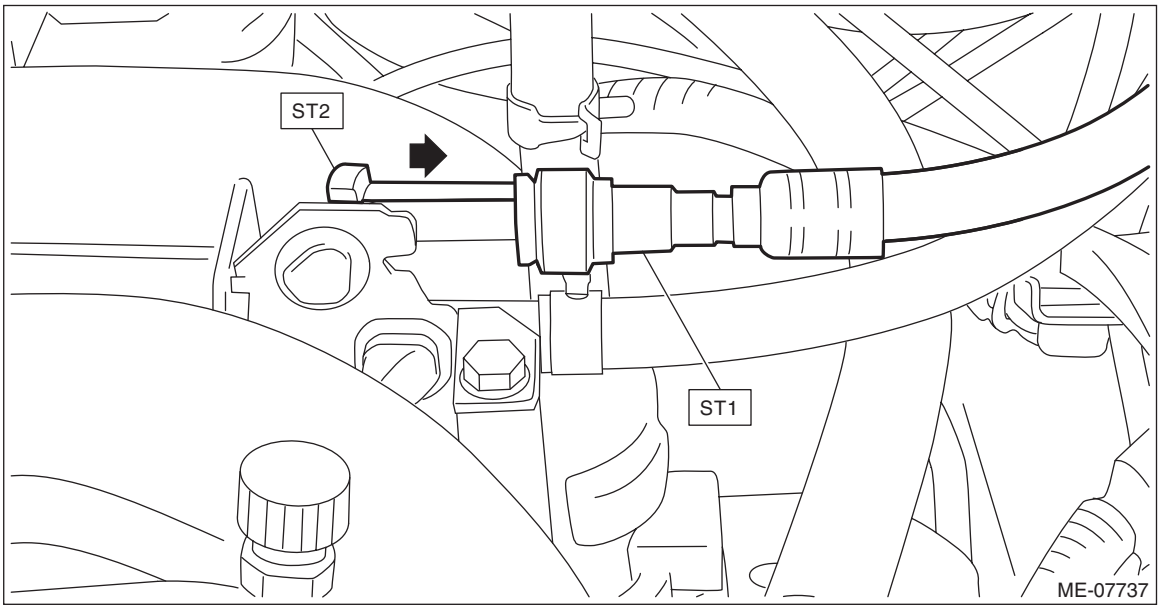
Fuel pressure:
Standard
340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)

6) After inspection, install the related parts in the reverse order of removal.

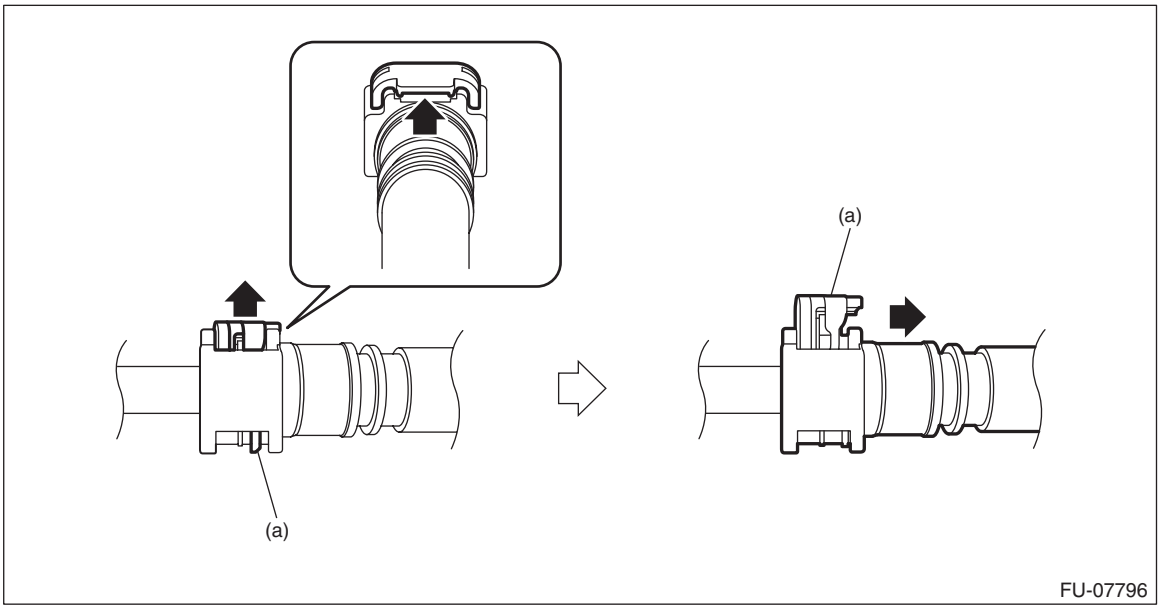
CAUTION:
- **Before removing the fuel pressure gauge, release the fuel pressure.**
- **Be careful not to spill fuel.**
- **Catch the fuel from hoses and tubes using a container or cloth.**
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector with slider, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check that the quick connector is securely connected.**

NOTE:
- When disconnecting the ST1, install the ST2 to the fuel pipe assembly, and press the ST2 in the direction of arrow to disconnect the quick connector on the ST1.

ST1 42075AG690 FUEL HOSE
ST2 42099AE000 QUICK CONNECTOR RELEASE

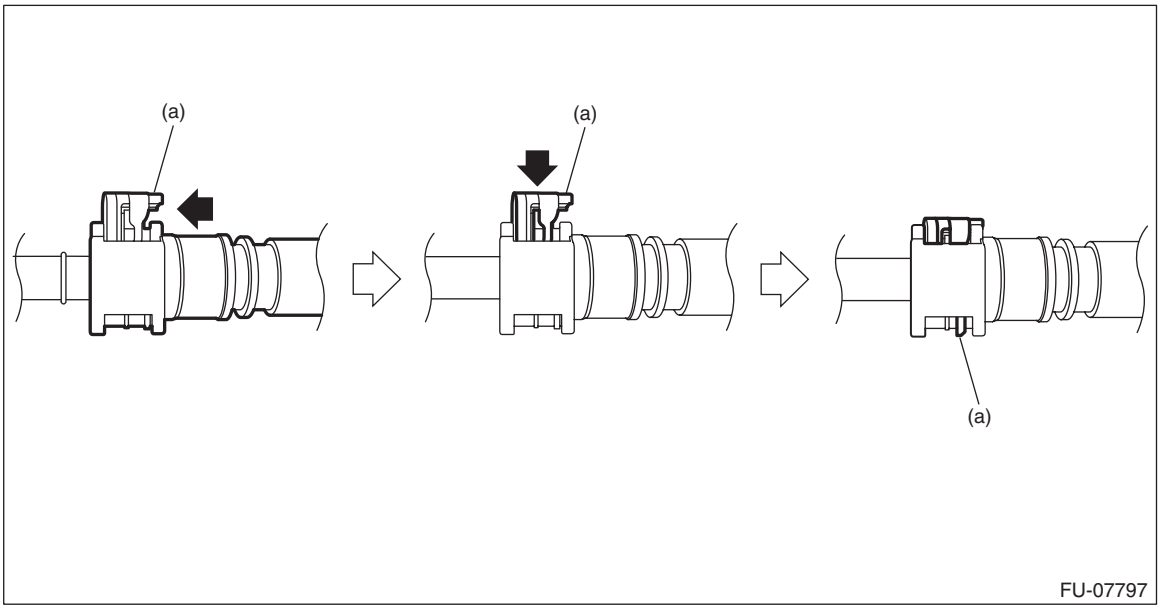


- Disconnect the quick connector on the fuel delivery tube as shown in the figure.



(a) Slider

- Connect the quick connector on the fuel delivery tube as shown in the figure.

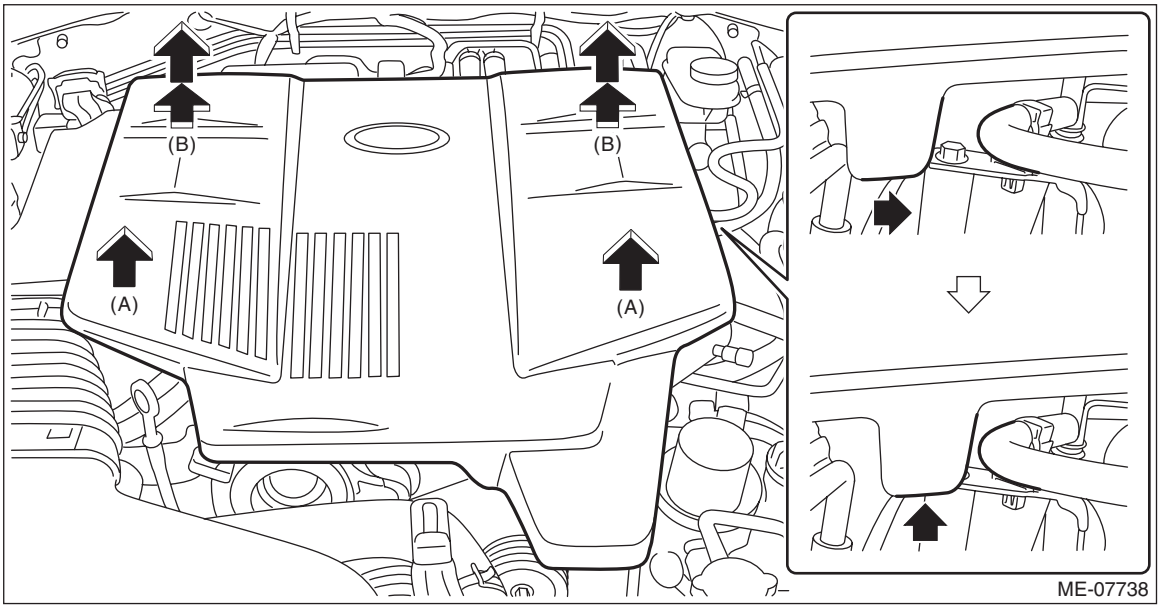


(a) Slider

2. HEV MODEL

1) Turn the ignition switch to OFF.
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



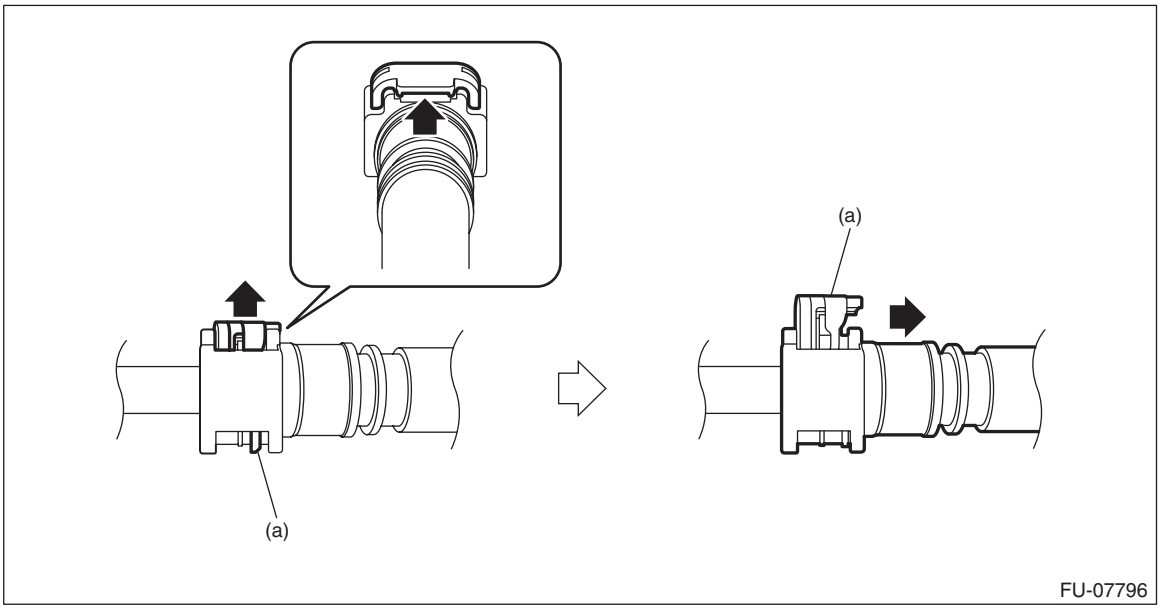
3) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
4) Open the fuel filler lid and remove the fuel filler cap.

NOTE:
This operation is required to release the inner pressure of the fuel tank.

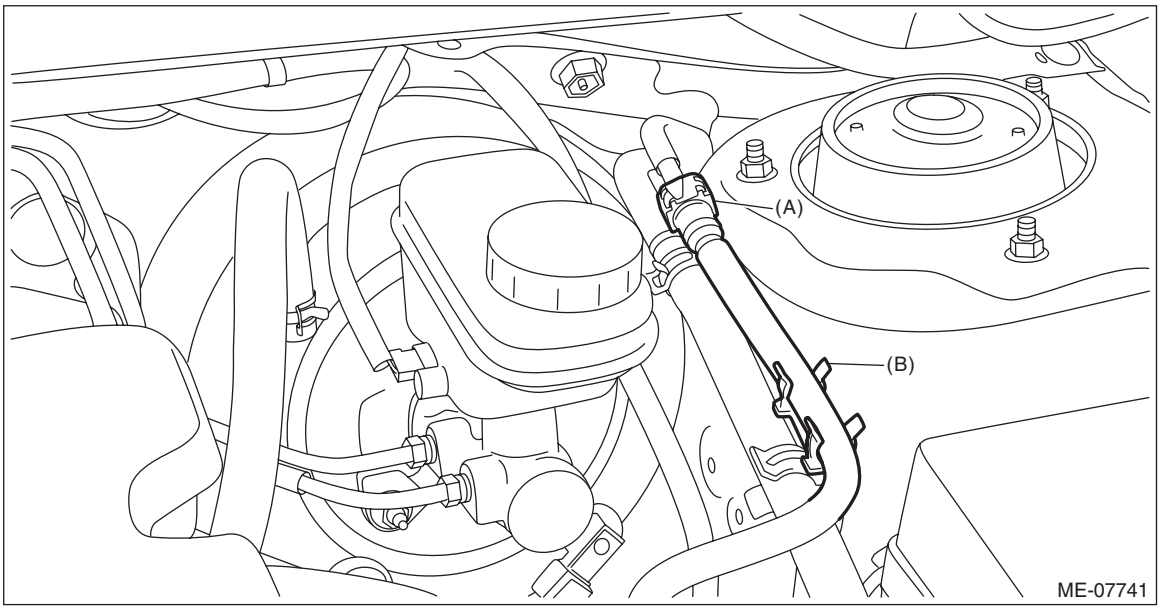
5) Disconnect the fuel delivery tube from the fuel pipe assembly, and connect the fuel pressure gauge.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
  (1) Disconnect the quick connector (A) of the fuel delivery tube from the fuel pipe assembly, and remove the fuel delivery tube from the hose clamp (B).

NOTE:
Disconnect the quick connector as shown in the figure.



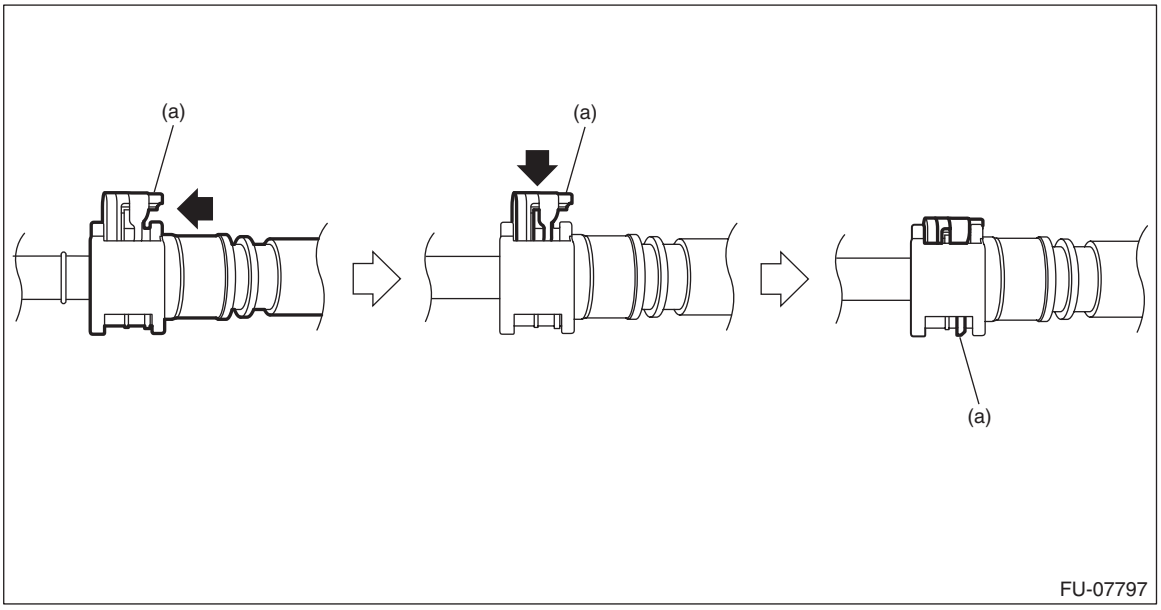
(a) Slider



(2) Connect the fuel pressure gauge with ST1 and ST2.

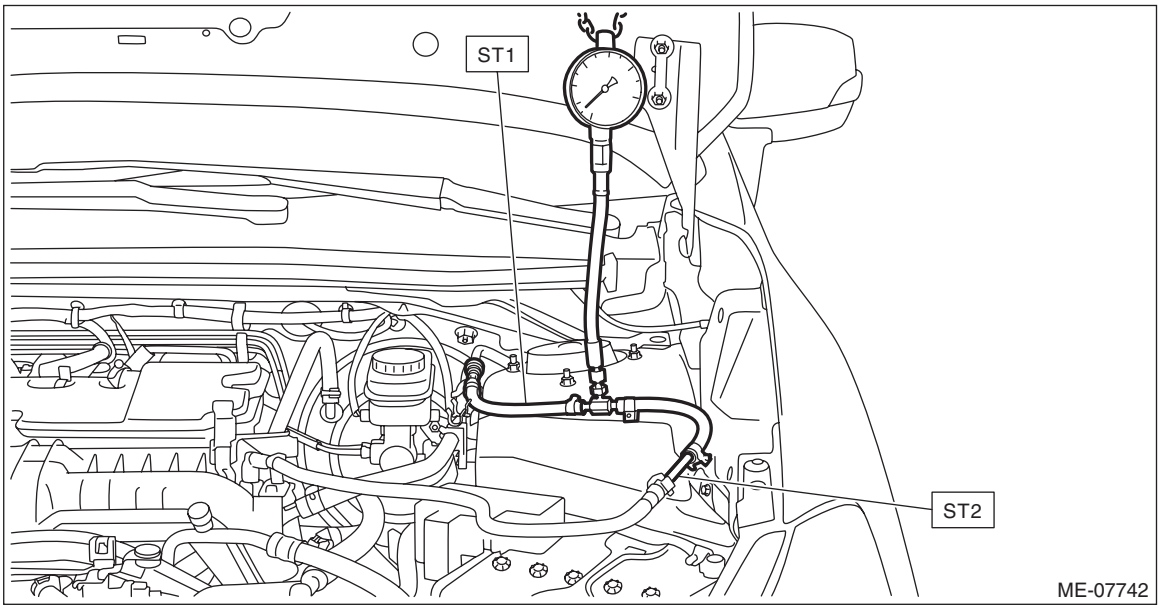
CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector with slider, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check that the quick connector is securely connected.

NOTE:
• ST1 is a SUBARU genuine part.
• When connecting the ST2 to the quick connector on the fuel delivery tube, connect as shown in the figure.



(a) Slider

ST1 42075AG690 FUEL HOSE
ST2 18471AA000 FUEL PIPE ADAPTER



6) Start the engine.
7) Check the fuel pressure after warming up the engine.

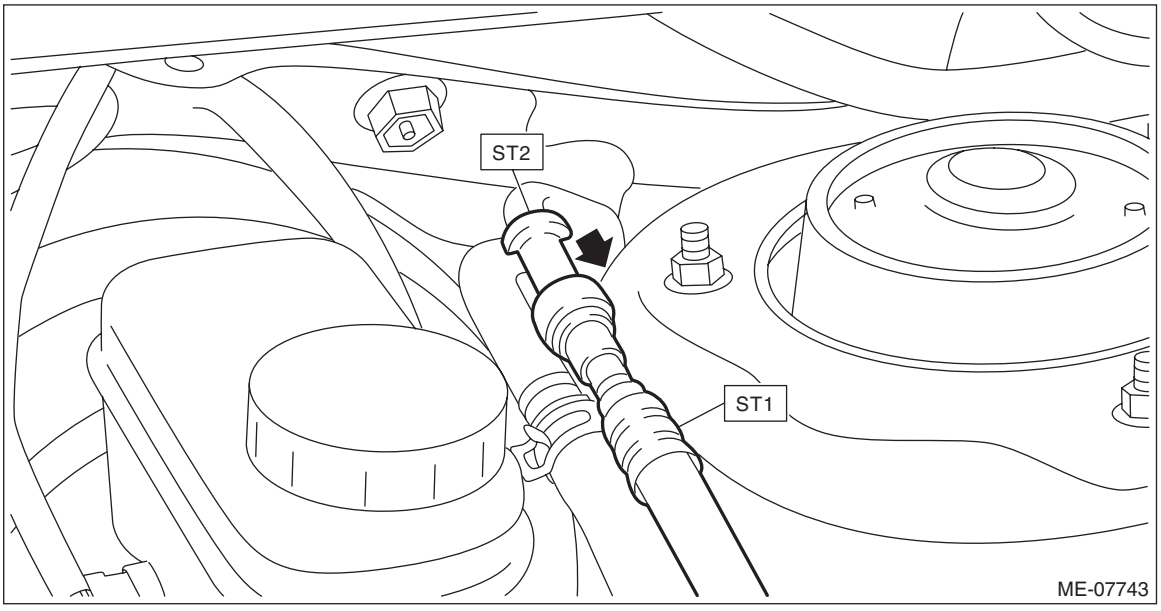
NOTE:
• The fuel pressure gauge registers 10 to 20 kPa (0.1 to 0.2 kg/cm^2, 1 to 3 psi) higher than standard values during high-altitude operations.
• Check or replace the fuel pump and fuel delivery line if the fuel pressure is out of the standard.

Fuel pressure:
Standard
340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)

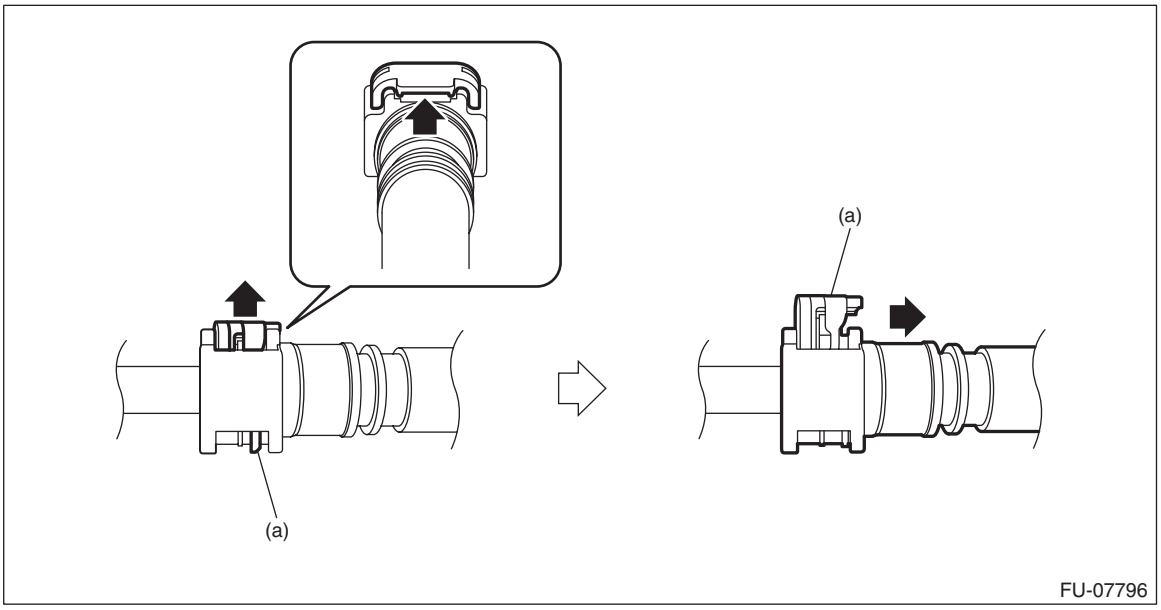
8) After inspection, install the related parts in the reverse order of removal.

CAUTION:
• Before removing the fuel pressure gauge, release the fuel pressure.
• Be careful not to spill fuel.
• Catch the fuel from hoses and tubes using a container or cloth.
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector with slider, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check that the quick connector is securely connected.

NOTE:
• When disconnecting the ST1, install the ST2 to the fuel pipe assembly, and press the ST2 in the direction of arrow to disconnect the quick connector on the ST1.
ST1 42075AG690 FUEL HOSE
ST2 42099AE000 QUICK CONNECTOR RELEASE

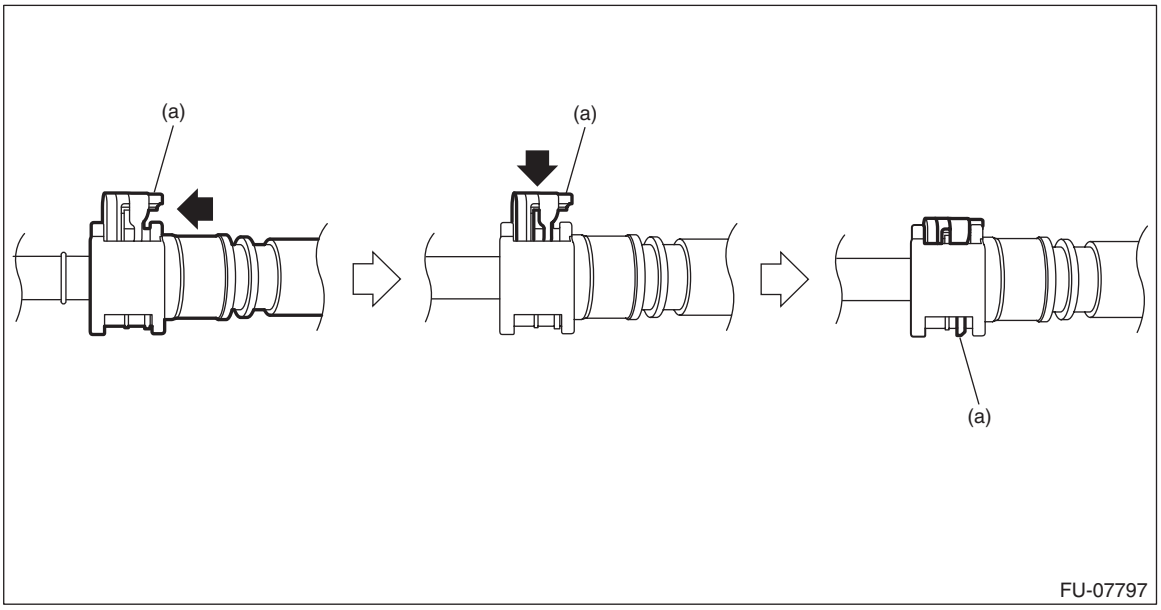


- Disconnect the quick connector on the fuel delivery tube as shown in the figure.



(a) Slider

- Connect the quick connector on the fuel delivery tube as shown in the figure.



(a) Slider

8. Cam Clearance

A: INSPECTION

1. WHEN TIMING CHAIN ASSEMBLY IS NOT REMOVED

CAUTION:
When working on the vehicle, if engine oil is spilt onto the exhaust pipe, wipe it off with cloth to avoid emission of smoke or causing a fire.

NOTE:
- Inspection of cam clearance should be performed while engine is cold.
- If the engine is removed from vehicle, performing the steps 1) to 3) is not necessary.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

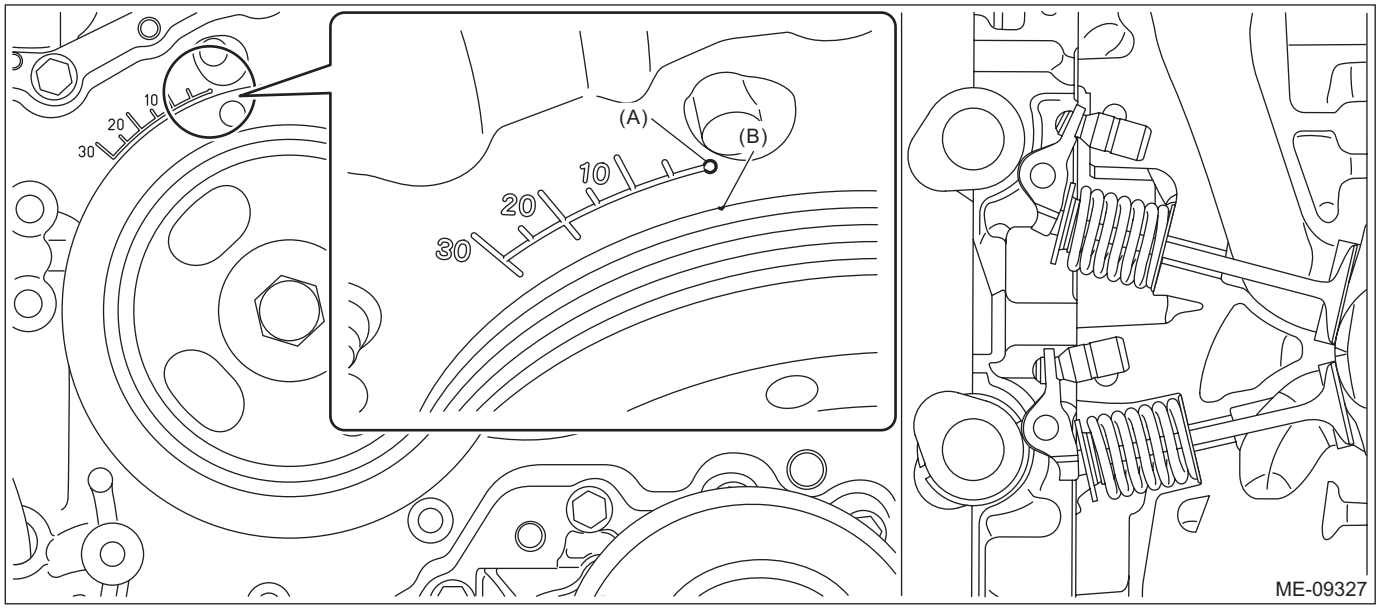
2) Remove the V-belts. (Gasoline engine model) <Ref. to ME(H4DO(w/o HEV))-124, GASOLINE ENGINE MODEL, REMOVAL, V-belt.>
3) Remove the air intake duct. (HEV model) <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
4) When inspecting #1 and #3 cylinders
   (1) Remove the rocker cover RH. <Ref. to ME(H4DO(w/o HEV))-205, ROCKER COVER RH, REMOVAL, Rocker Cover.>

NOTE:
When working on the vehicle, place a suitable container under the vehicle.

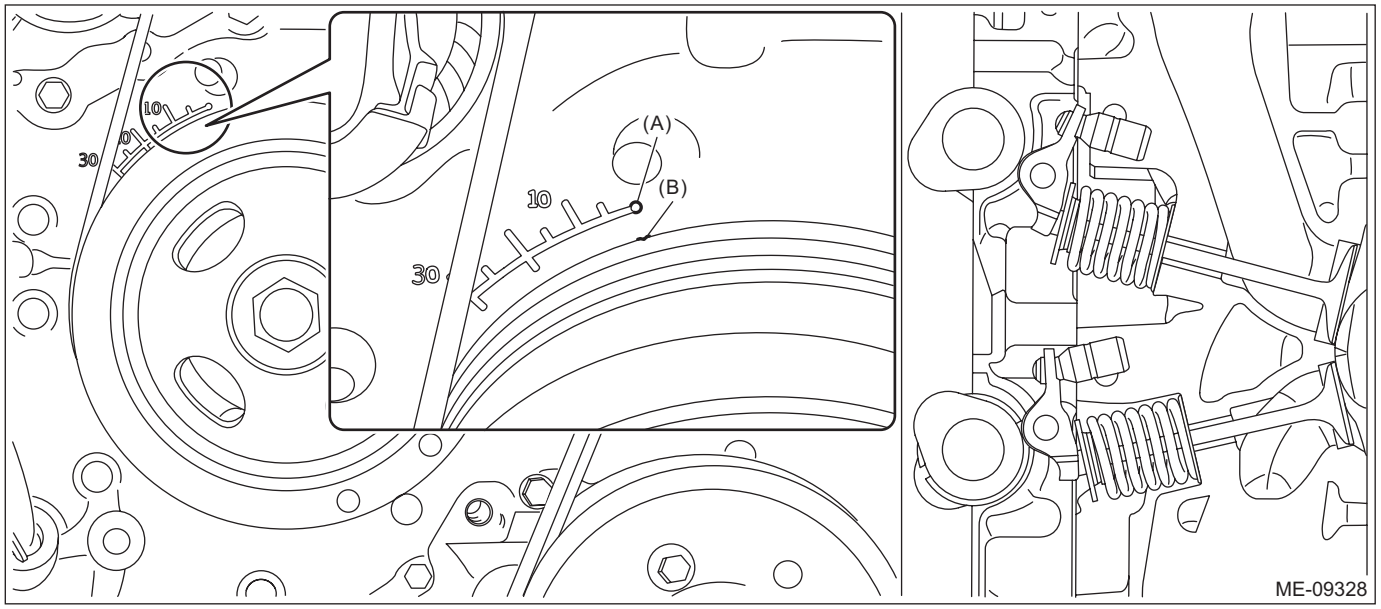
   (2) Set #1 cylinder piston to top dead center of compression stroke by rotating the crank pulley clockwise using the socket wrench.

NOTE:
When the timing mark (B) on crank pulley is aligned to the 0° in timing gauge (A) on chain cover as shown in the figure, the #1 cylinder piston is located at TDC of compression stroke if the intake camshaft and exhaust camshaft does not depress the #1 cylinder intake side roller rocker arm (intake valve) and exhaust side roller rocker arm (exhaust valve). If roller rocker arm (valve) is depressed, turn the crank pulley by 360° in order to make #1 cylinder piston at TDC of compression stroke.

- Gasoline engine model



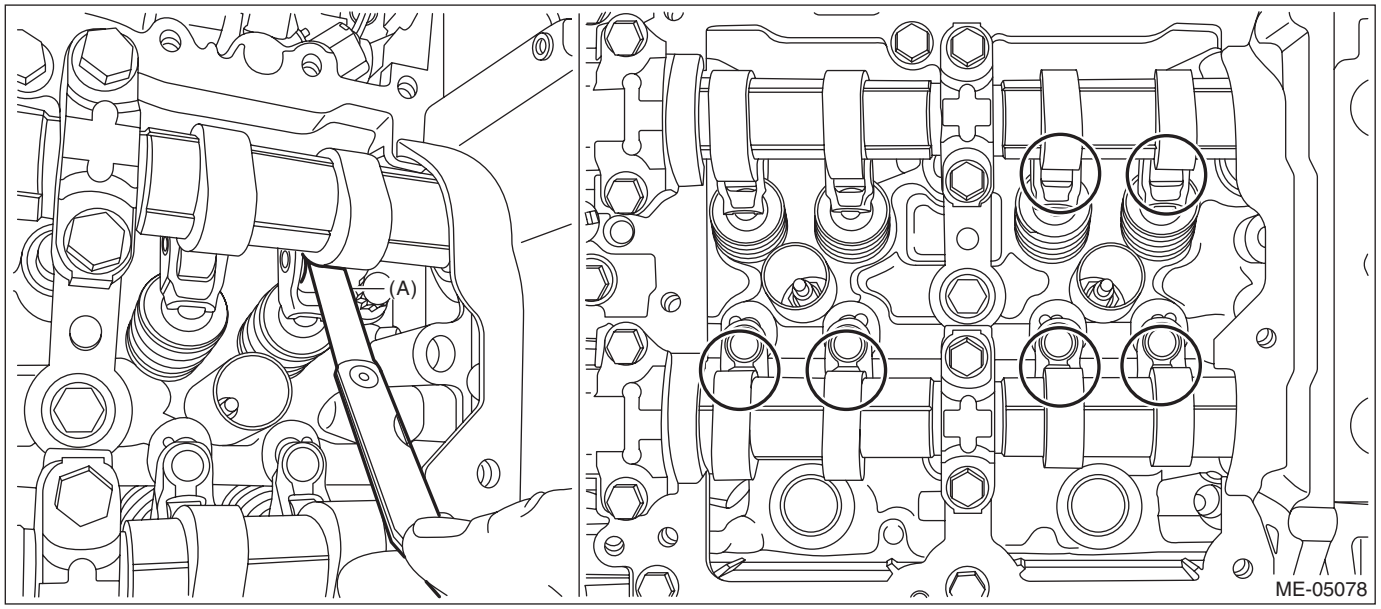
- HEV model



(3) Check the cam clearance for #1 cylinder intake, #1 cylinder exhaust and #3 cylinder exhaust.

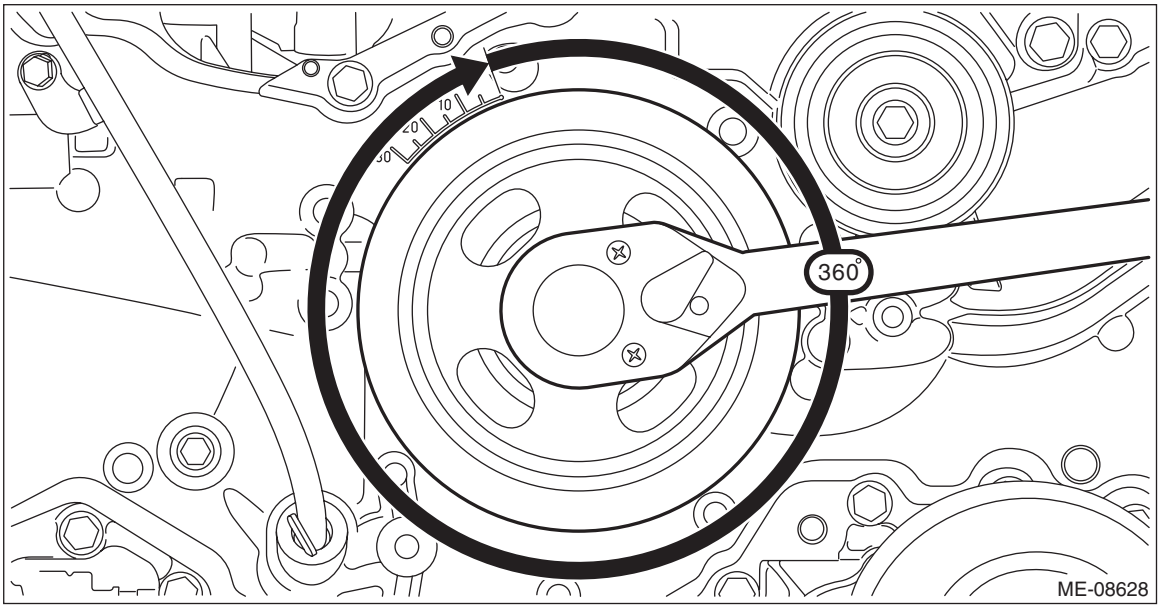
NOTE:
- Measure the roller surface of cam base circle and roller rocker arm using thickness gauge (A).
- If the measured value is out of standard, take notes of the value in order to adjust the cam clearance later on.

Cam clearance:
Intake
Standard
$0.13^{+0.02}_{-0.03}$ mm ($0.0051^{+0.0008}_{-0.0012}$ in)
Exhaust
Standard
0.22±0.02 mm (0.0087±0.0008 in)

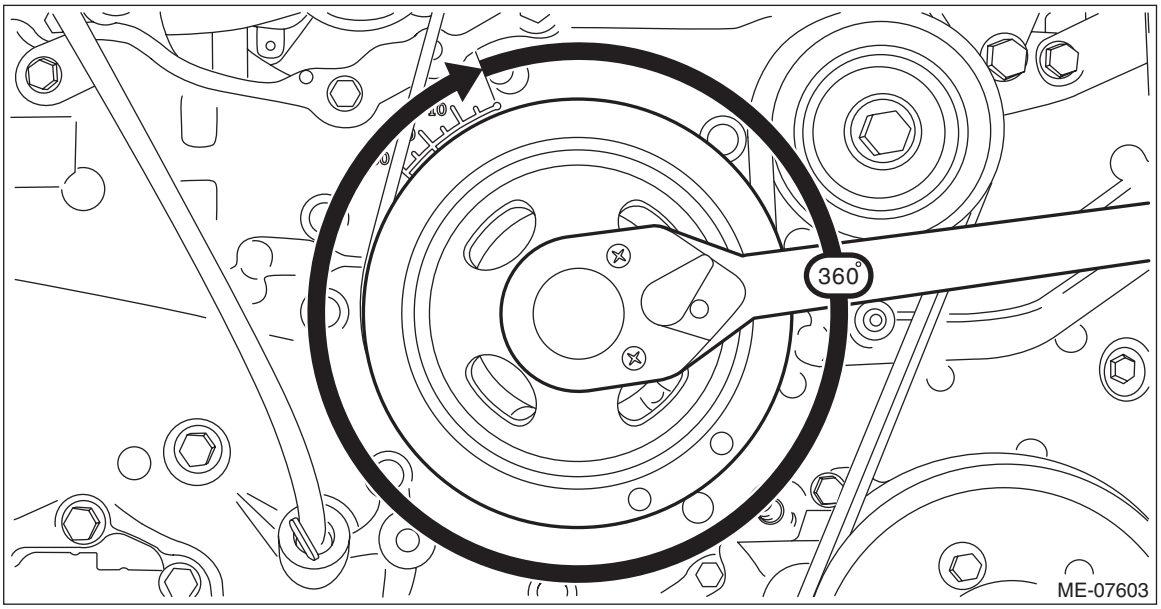


(4) Turn the crank pulley by 360°.

- Gasoline engine model



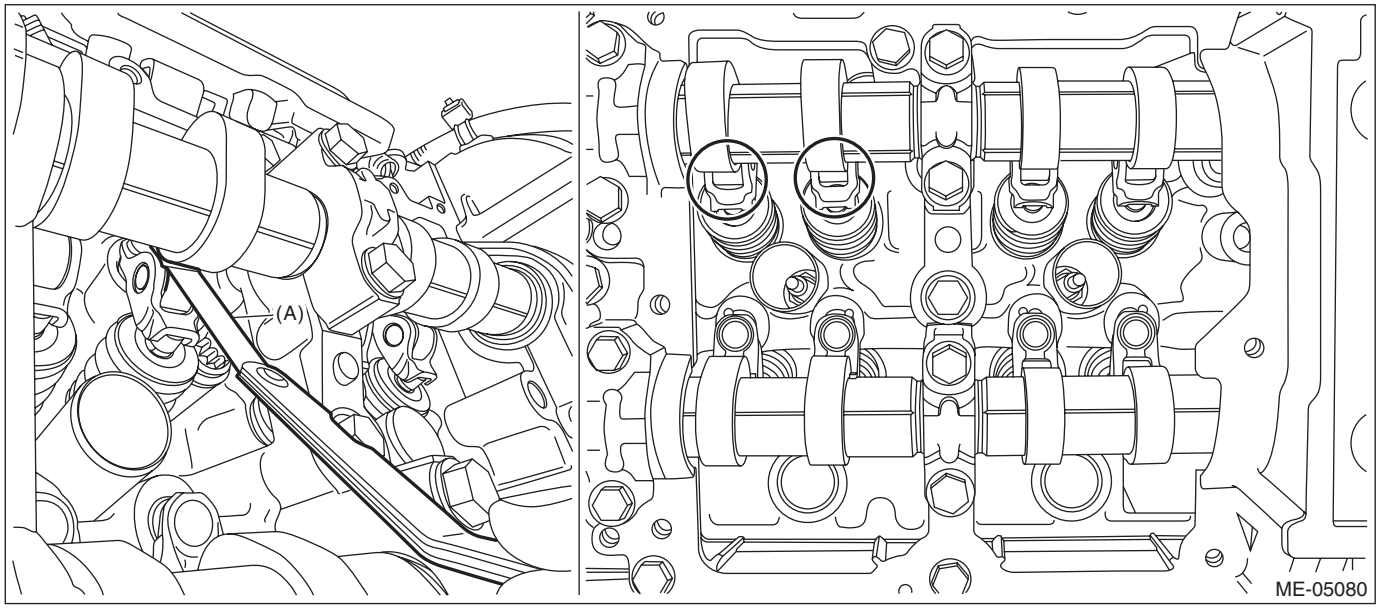
- HEV model



(5) Check the clearance of #3 cylinder intake.

NOTE:
- Measure the roller surface of cam base circle and roller rocker arm using thickness gauge (A).
- If the measured value is out of standard, take notes of the value in order to adjust the cam clearance later on.

Cam clearance:
Standard
$0.13^{+0.02}_{-0.03}$ mm ($0.0051^{+0.0008}_{-0.0012}$ in)

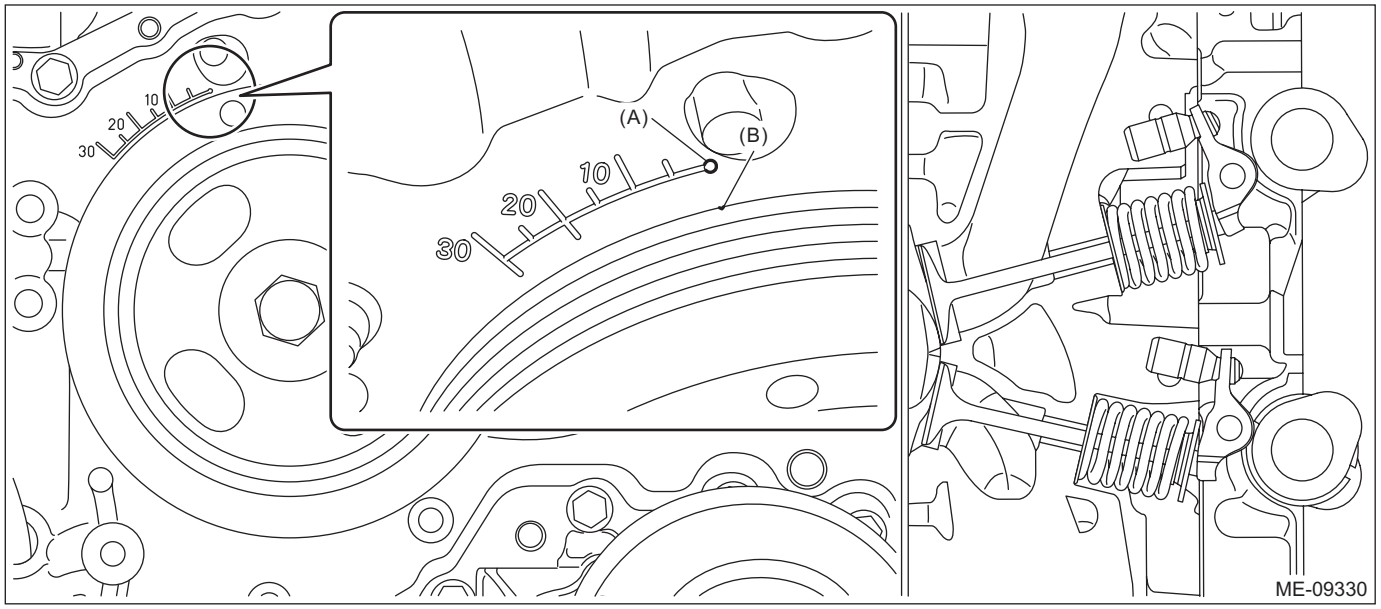


5) When inspecting #2 and #4 cylinders
(1) Remove the rocker cover LH. <Ref. to ME(H4DO(w/o HEV))-209, ROCKER COVER LH, REMOVAL, Rocker Cover.>

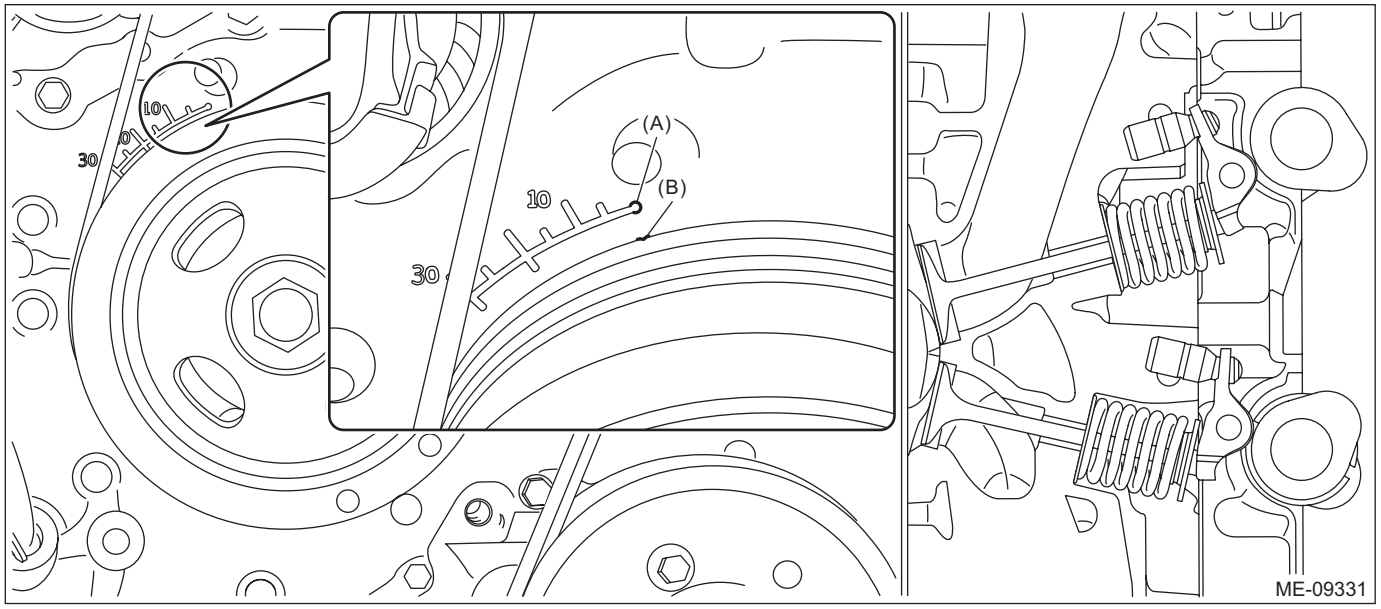
NOTE:
When working on the vehicle, place a suitable container under the vehicle.
(2) Set #2 cylinder piston to top dead center of compression stroke by rotating the crank pulley clockwise using the socket wrench.

NOTE:
When the timing mark (B) on crank pulley is aligned to the 0° in timing gauge (A) on chain cover as shown in the figure, the #2 cylinder piston is located at TDC of compression stroke if the intake camshaft and exhaust camshaft does not depress the #2 cylinder intake side roller rocker arm (intake valve) and exhaust side roller rocker arm (exhaust valve). If roller rocker arm (valve) is depressed, turn the crank pulley by 360° in order to make #2 cylinder piston at TDC of compression stroke.

- Gasoline engine model



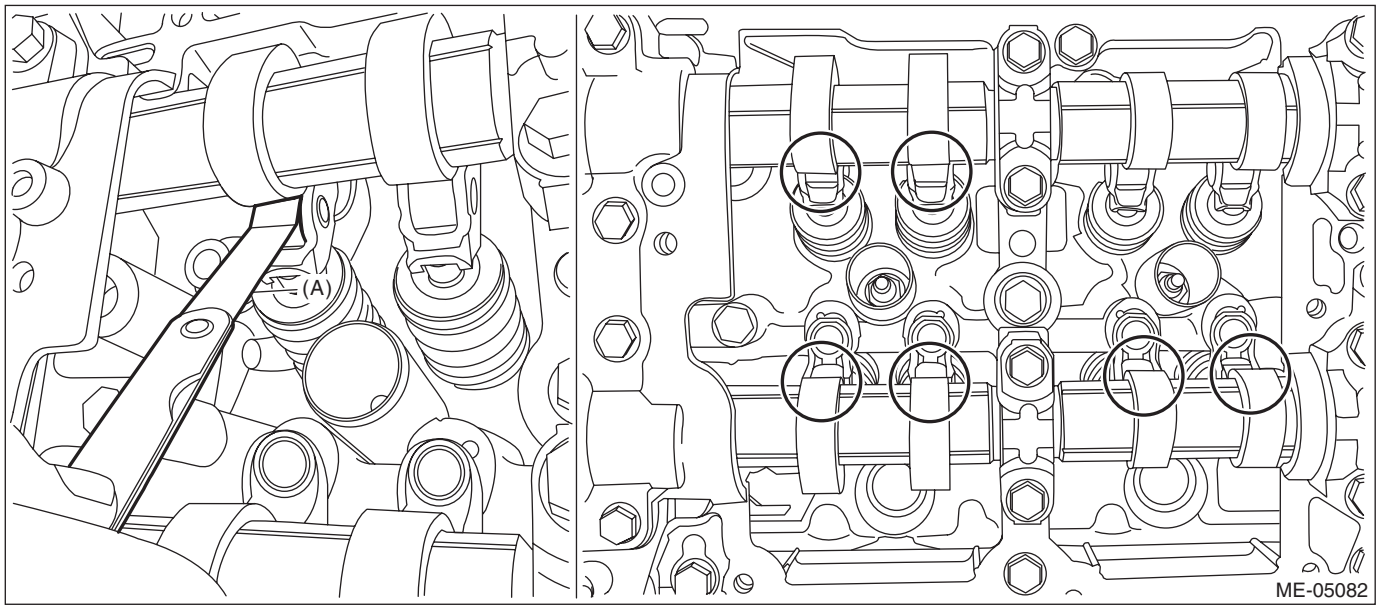
- HEV model



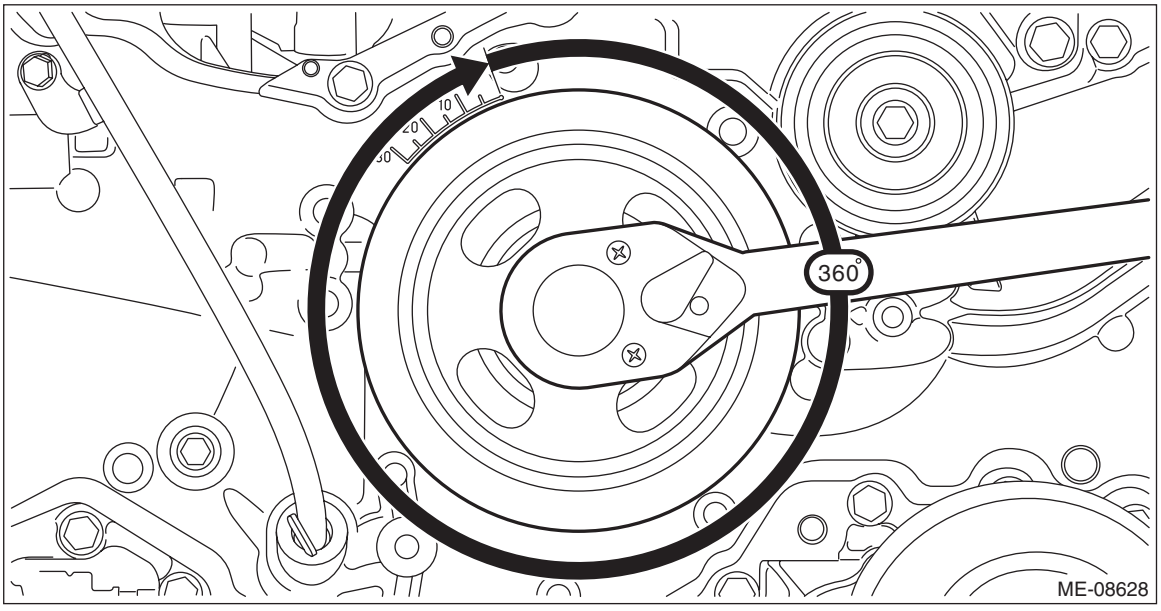
(3) Check the cam clearance for #2 cylinder intake, #2 cylinder exhaust and #4 cylinder exhaust.

NOTE:
- Measure the roller surface of cam base circle and roller rocker arm using thickness gauge (A).
- If the measured value is out of standard, take notes of the value in order to adjust the cam clearance later on.

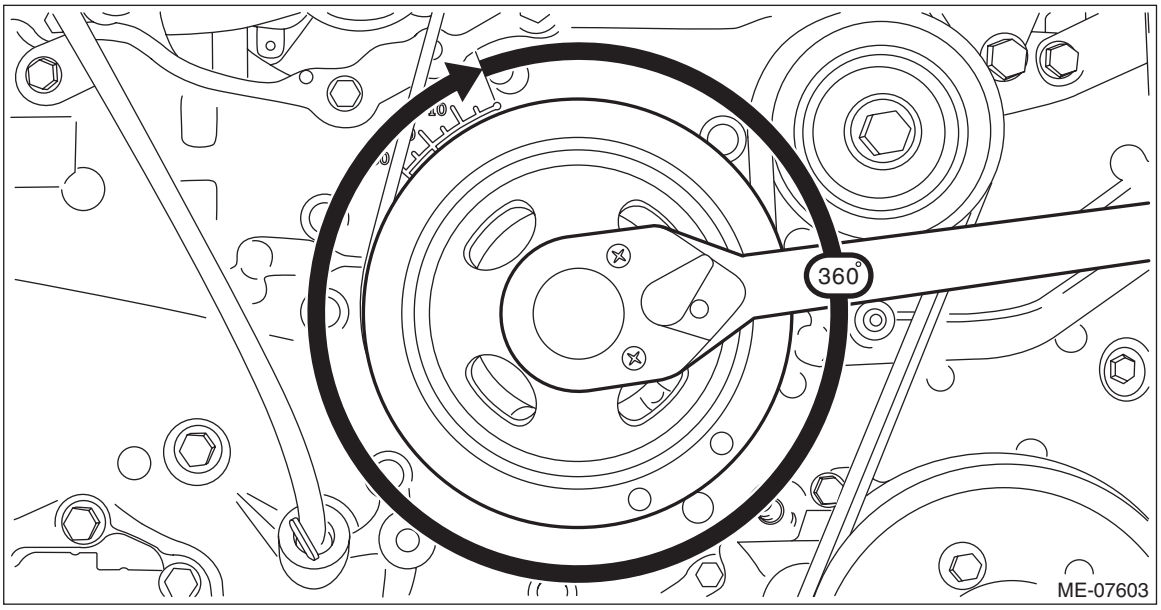
Cam clearance:
Intake
Standard
$0.13^{+0.02}_{-0.03}$ mm ($0.0051^{+0.0008}_{-0.0012}$ in)
Exhaust
Standard
0.22±0.02 mm (0.0087±0.0008 in)



(4) Turn the crank pulley by 360°.
- Gasoline engine model



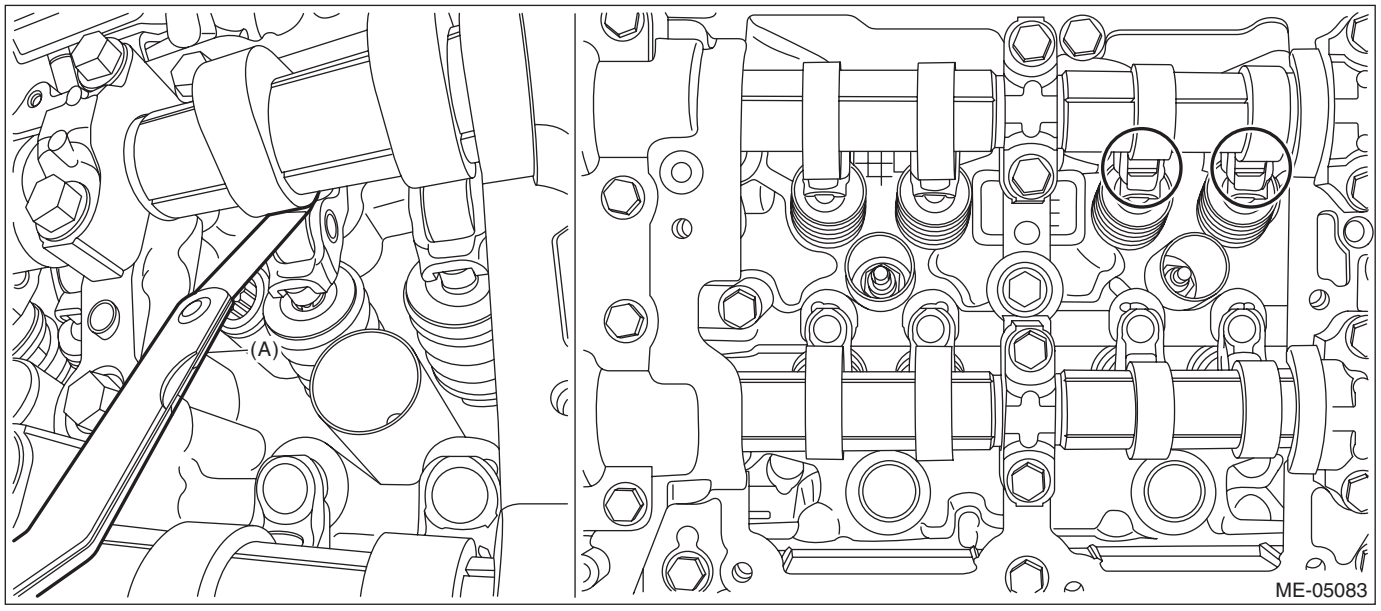
- HEV model



(5) Check the clearance of #4 cylinder intake.

NOTE:
- Measure the roller surface of cam base circle and roller rocker arm using thickness gauge (A).
- If the measured value is out of standard, take notes of the value in order to adjust the cam clearance later on.

Cam clearance:
Standard
$0.13^{+0.02}_{-0.03}$ mm ($0.0051^{+0.0008}_{-0.0012}$ in)



6) If necessary, adjust the cam clearance. <Ref. to ME(H4DO(w/o HEV))-55, ADJUSTMENT, Cam Clearance.>
7) After inspection, install the related parts in the reverse order of removal.

2. WHEN TIMING CHAIN ASSEMBLY IS REMOVED

NOTE:
Inspection of cam clearance should be performed while engine is cold.

1) When inspecting #1 and #3 cylinders
   (1) Remove the rocker cover RH. <Ref. to ME(H4DO(w/o HEV))-205, ROCKER COVER RH, REMOVAL, Rocker Cover.>

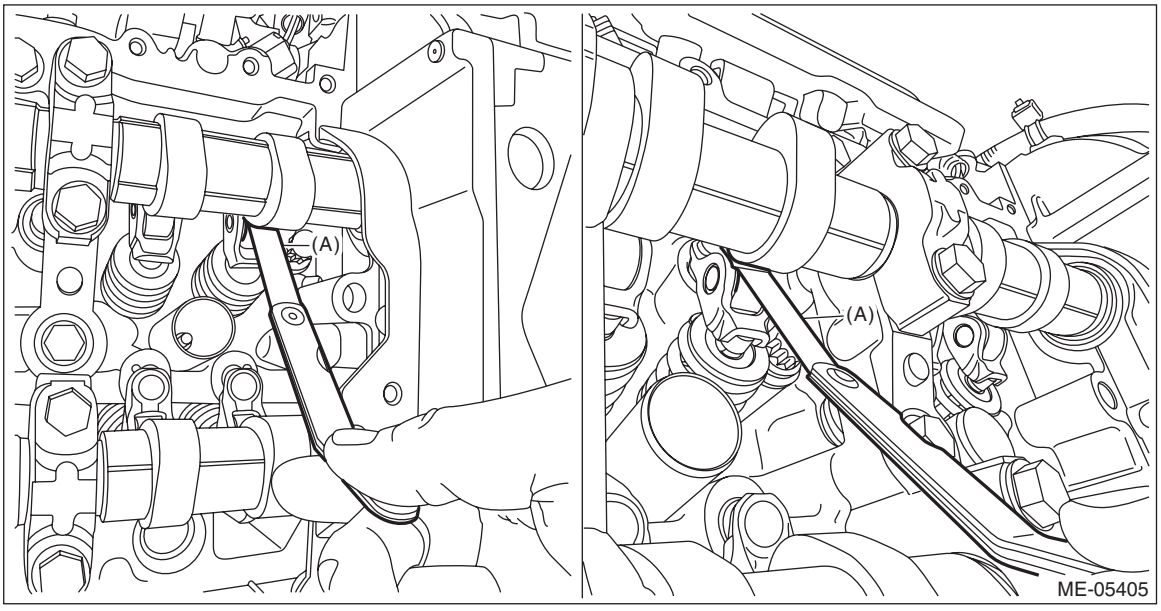
NOTE:
When working on the vehicle, place a suitable container under the vehicle.

   (2) Check the #1 and #3 cylinder cam clearance.

CAUTION:
Intake and exhaust camshafts can be independently rotated with the timing chain removed. When the intake valve and exhaust valve lift at the same time, the valve heads contact each other and valve stem may bend. Do not turn it to the outside of range of zero lift (cam base circle position) (in range where it can be turned lightly by hand).

NOTE:
- For cam clearance inspection, adjust the cam base circle position so that the thickness gauge (A) can be inserted easily by hand turning the camshaft (cam sprocket) to be measured.
- Measure the roller surface of cam base circle and roller rocker arm using thickness gauge (A).
- If the measured value is out of standard, take notes of the value in order to adjust the cam clearance later on.

Cam clearance:
Intake
Standard
$0.13^{+0.02}_{-0.03}$ mm ($0.0051^{+0.0008}_{-0.0012}$ in)
Exhaust
Standard
0.22±0.02 mm (0.0087±0.0008 in)



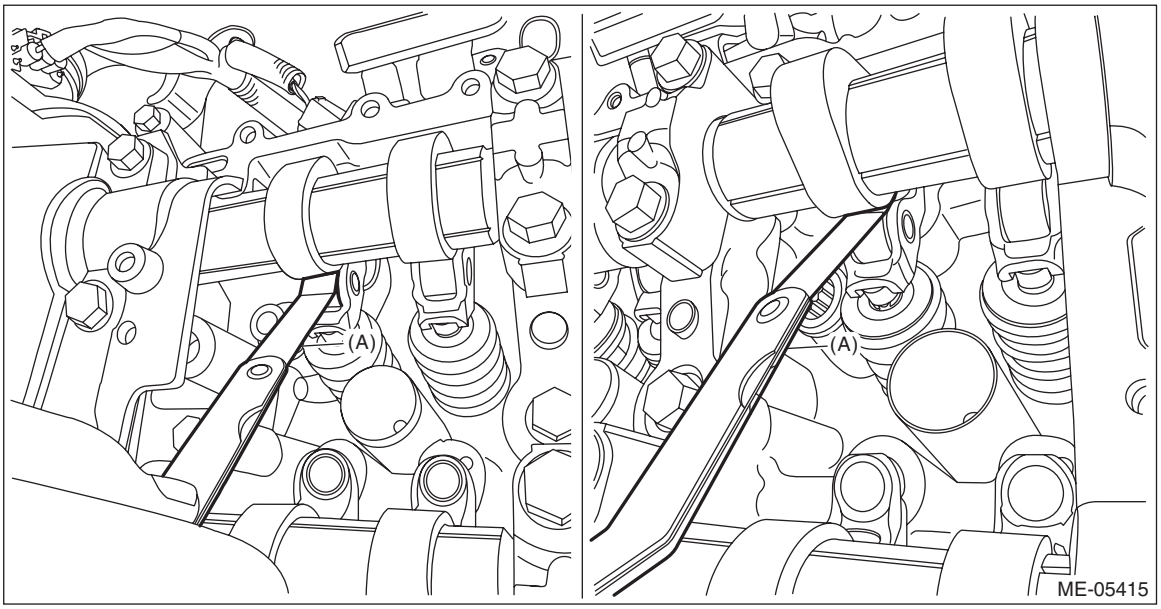
2) When inspecting #2 and #4 cylinders
(1) Remove the rocker cover LH. <Ref. to ME(H4DO(w/o HEV))-209, ROCKER COVER LH, REMOVAL, Rocker Cover.>

NOTE:
When working on the vehicle, place a suitable container under the vehicle.
(2) Check the #2 and #4 cylinder cam clearance.

CAUTION:
Intake and exhaust camshafts can be independently rotated with the timing chain removed. When the intake valve and exhaust valve lift at the same time, the valve heads contact each other and valve stem may bend. Do not turn it to the outside of range of zero lift (cam base circle position) (in range where it can be turned lightly by hand).

NOTE:
• For cam clearance inspection, adjust the cam base circle position so that the thickness gauge (A) can be inserted easily by hand turning the camshaft (cam sprocket) to be measured.
• Measure the roller surface of cam base circle and roller rocker arm using thickness gauge (A).
• If the measured value is out of standard, take notes of the value in order to adjust the cam clearance later on.

Cam clearance:
Intake
Standard
$0.13^{+0.02}_{-0.03}$ mm ($0.0051^{+0.0008}_{-0.0012}$ in)
Exhaust
Standard
0.22±0.02 mm (0.0087±0.0008 in)

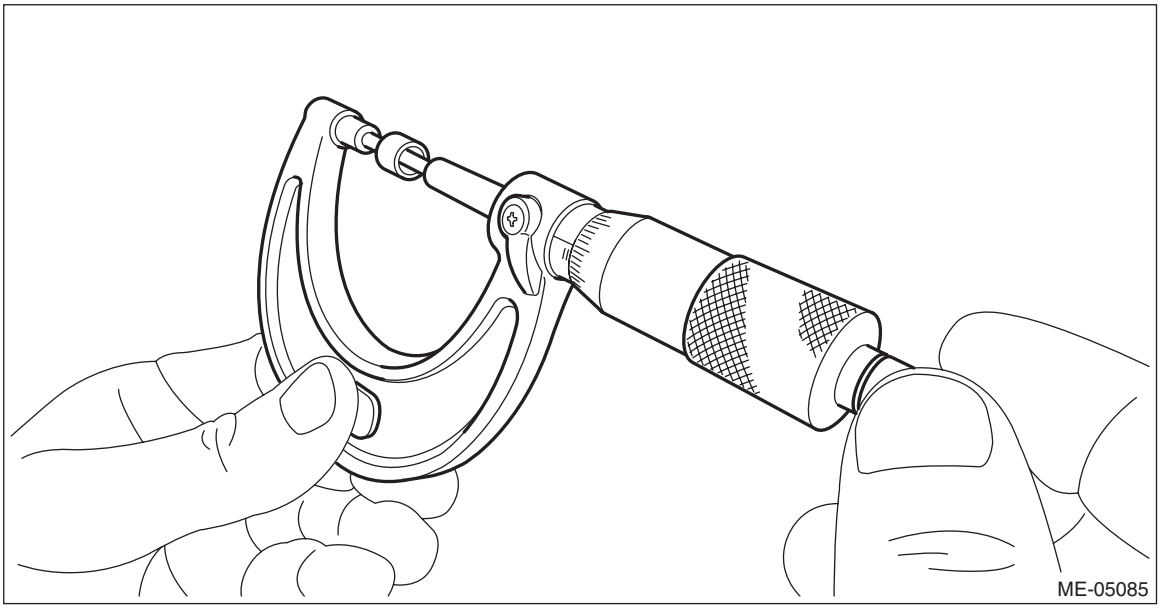


3) If necessary, adjust the cam clearance. <Ref. to ME(H4DO(w/o HEV))-55, ADJUSTMENT, Cam Clearance.>
4) After inspection, install the related parts in the reverse order of removal.

B: ADJUSTMENT

1) Remove the engine from the vehicle. <Ref. to ME(H4DO(w/o HEV))-58, REMOVAL, Engine Assembly.>
2) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
3) When adjusting #1 and #3 cylinders
   (1) Remove the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-171, TIMING CHAIN RH, REMOVAL, Timing Chain Assembly.>
   (2) Remove the cam carrier RH. <Ref. to ME(H4DO(w/o HEV))-223, CAM CARRIER RH, REMOVAL, Cam Carrier.>
   (3) Measure the thickness of valve shim using micrometer.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).



   (4) Select a valve shim of suitable thickness using the measured cam clearance and valve shim thickness.

NOTE:
Use a new valve shim.

Intake side: S = T + 1.69 × (V – 0.13 mm (0.0051 in)) Exhaust side: S = T + 1.87 × (V – 0.22 mm (0.0087 in))
S: Valve shim thickness required V: Measured cam clearance T: Current valve shim thickness

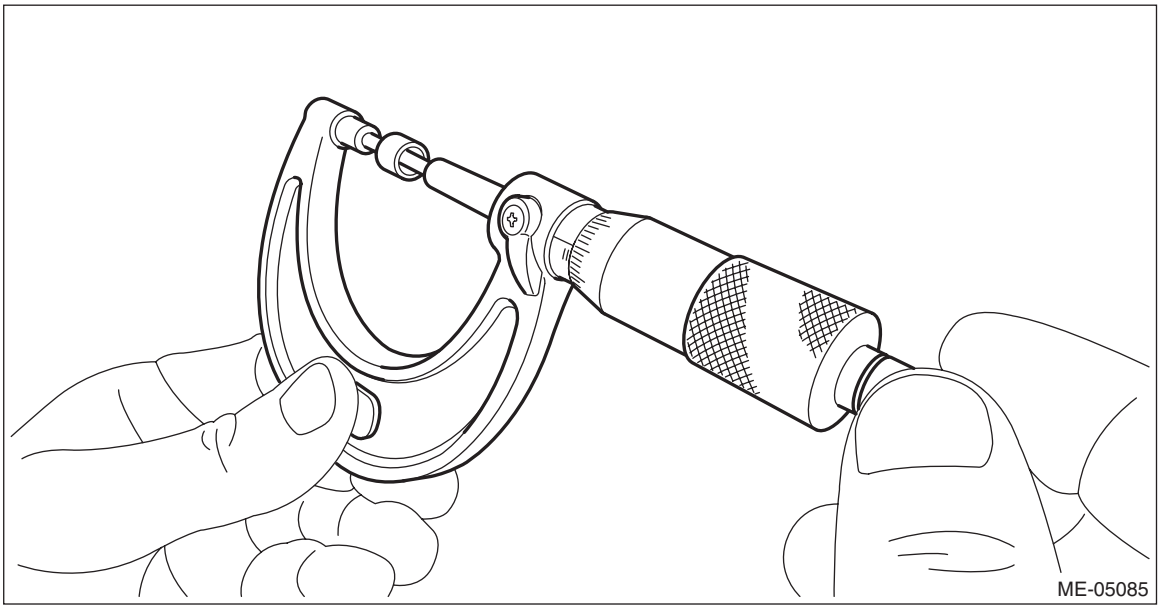
   (5) Install the cam carrier RH. <Ref. to ME(H4DO(w/o HEV))-233, CAM CARRIER RH, INSTALLATION, Cam Carrier.>
   (6) Check all the cam clearance of RH side at this time. If the cam clearance is not within the standard value, repeat the procedure over again from step 2).

NOTE:
When the removing/installing of cam carrier RH has been performed, cam clearance may be outside the standard value. Checking of all cam clearance of RH side is necessary. Refer to INSPECTION of "Cam Clearance" for the cam clearance inspection. <Ref. to ME(H4DO(w/o HEV))-53, WHEN TIMING CHAIN ASSEMBLY IS REMOVED, INSPECTION, Cam Clearance.>

Cam clearance:
Intake
Standard
$0.13^{+0.02}_{-0.03}$ mm ($0.0051^{+0.0008}_{-0.0012}$ in)
Exhaust
Standard
0.22±0.02 mm (0.0087±0.0008 in)

4) When adjusting #2 and #4 cylinders
(1) Remove the timing chain LH. <Ref. to ME(H4DO(w/o HEV))-173, TIMING CHAIN LH, REMOVAL, Timing Chain Assembly.>
(2) Remove the cam carrier LH. <Ref. to ME(H4DO(w/o HEV))-228, CAM CARRIER LH, REMOVAL, Cam Carrier.>
(3) Measure the thickness of valve shim using micrometer.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).



(4) Select a valve shim of suitable thickness using the measured cam clearance and valve shim thickness.

NOTE:
Use a new valve shim.

Intake side: S = T + 1.69 × (V – 0.13 mm (0.0051 in)) Exhaust side: S = T + 1.87 × (V – 0.22 mm (0.0087 in))
S: Valve shim thickness required V: Measured cam clearance T: Current valve shim thickness

(5) Install the cam carrier LH. <Ref. to ME(H4DO(w/o HEV))-243, CAM CARRIER LH, INSTALLATION, Cam Carrier.>
(6) Check all the cam clearance of LH side at this time. If the cam clearance is not within the standard value, repeat the procedure over again from step 2).

NOTE:
When the removing/installing of cam carrier LH has been performed, cam clearance may be outside the standard value. Checking of all cam clearance of LH side is necessary. Refer to INSPECTION of “Cam Clearance” for the cam clearance inspection. <Ref. to ME(H4DO(w/o HEV))-53, WHEN TIMING CHAIN ASSEMBLY IS REMOVED, INSPECTION, Cam Clearance.>

Cam clearance:
Intake
Standard
$0.13^{+0.02}_{-0.03}$ mm ($0.0051^{+0.0008}_{-0.0012}$ in)
Exhaust
Standard
0.22±0.02 mm (0.0087±0.0008 in)

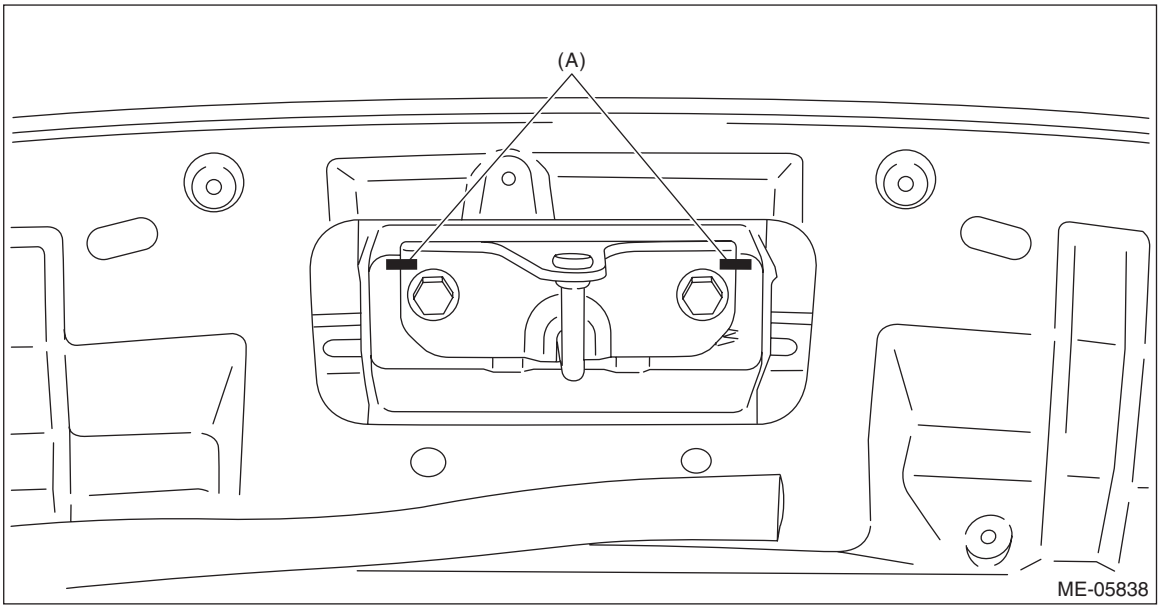
5) After adjustment, install the related parts in the reverse order of removal.

9. Engine Assembly

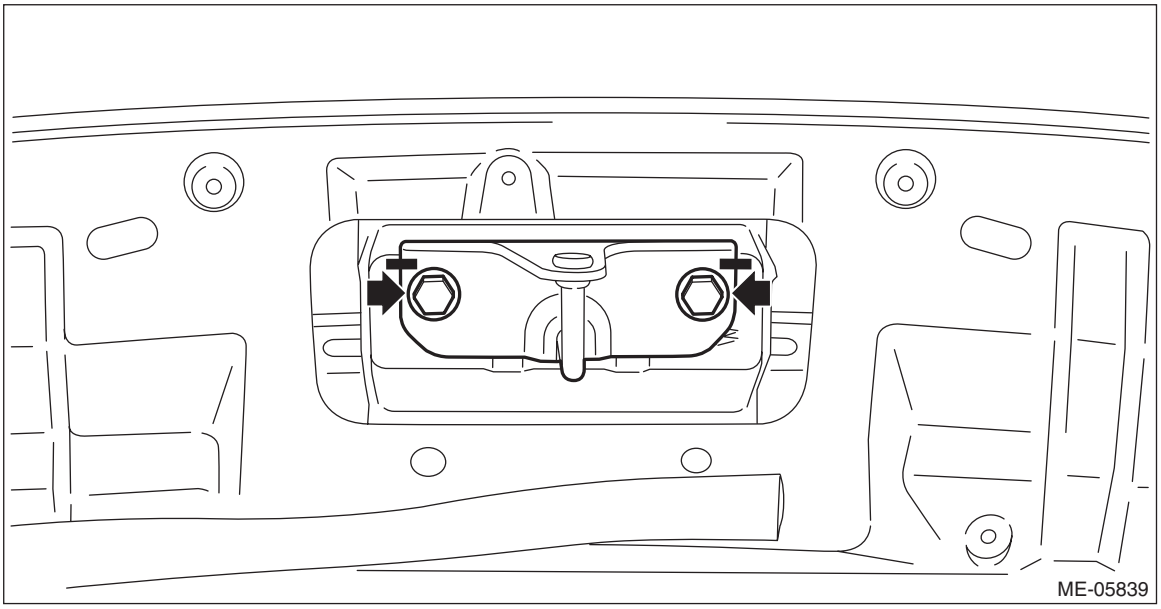
A: REMOVAL

1. GASOLINE ENGINE MODEL

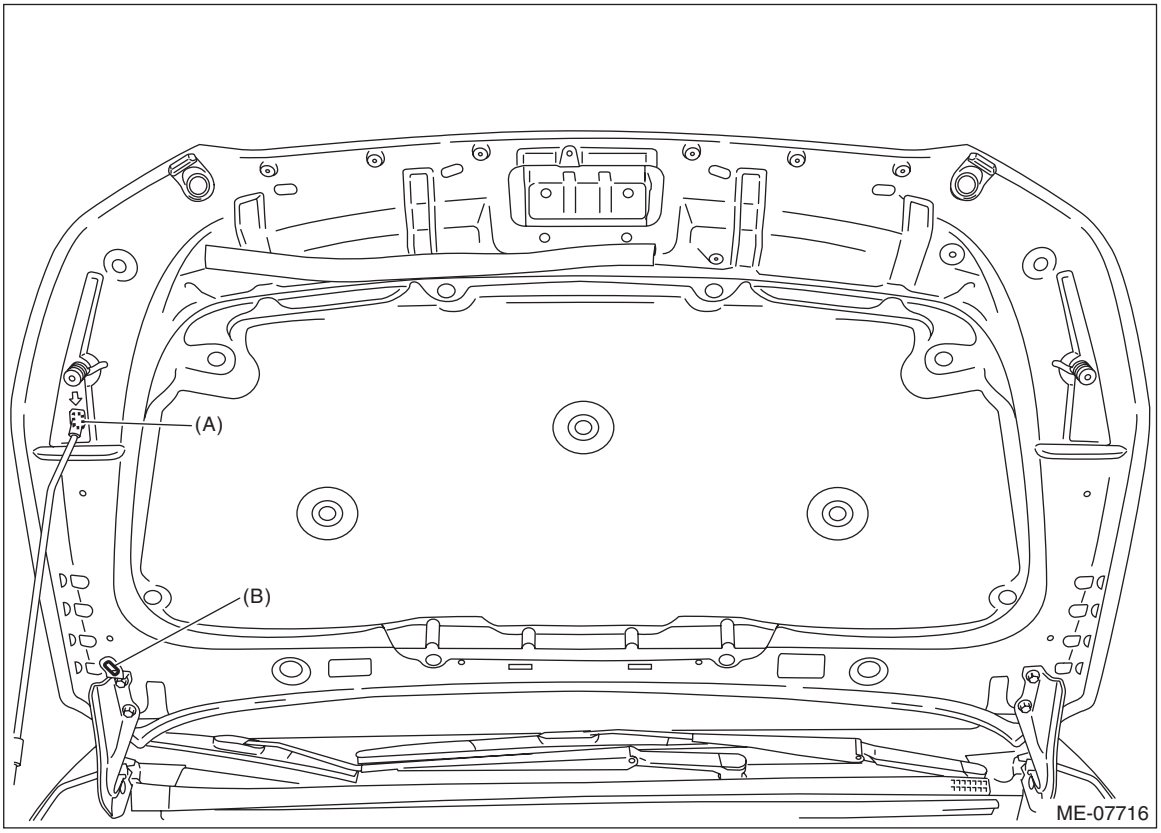
1) Open the front hood, and make alignment marks (A) on both the front hood and the front hood striker by using a marker pen.



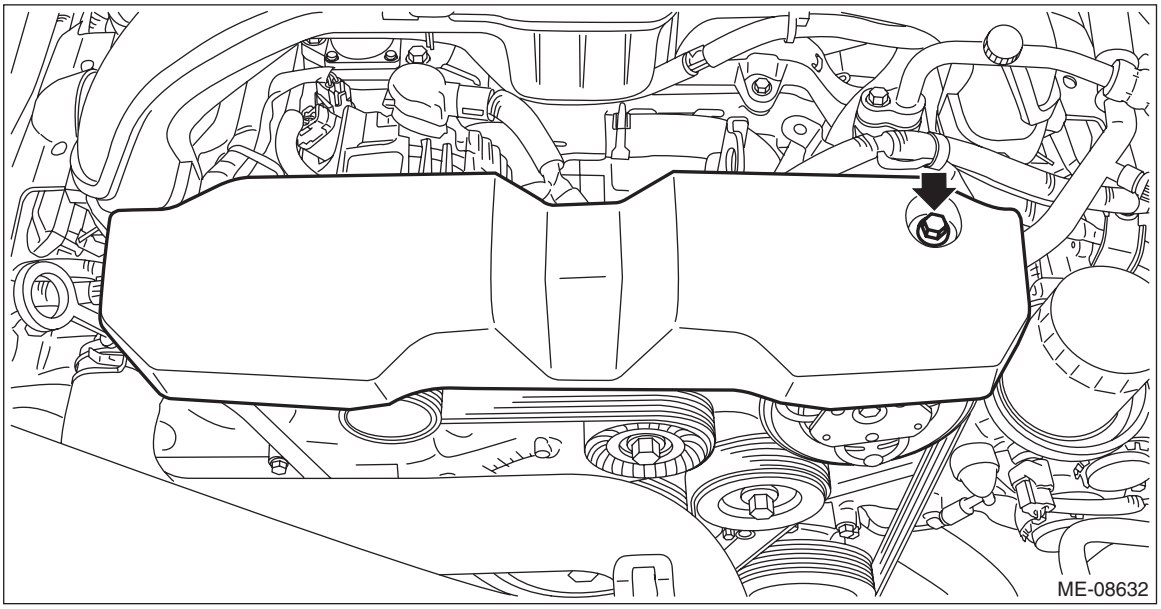
2) Remove the front hood striker from the front hood.



3) Change the front hood stay position from (A) to (B), and completely open the front hood.

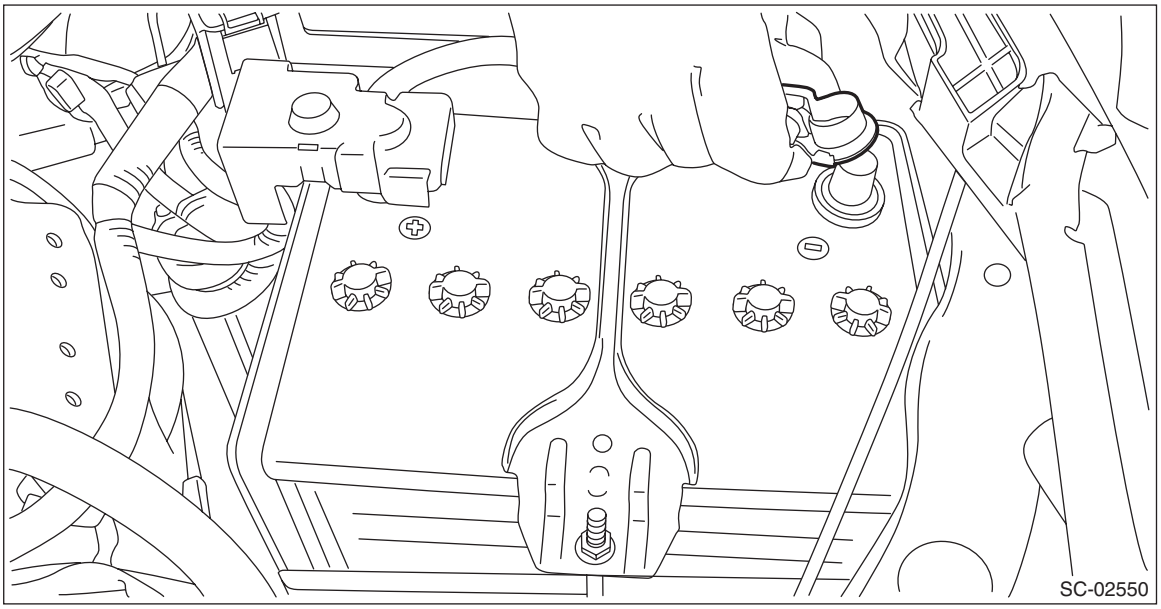


4) Remove the V-belt covers.

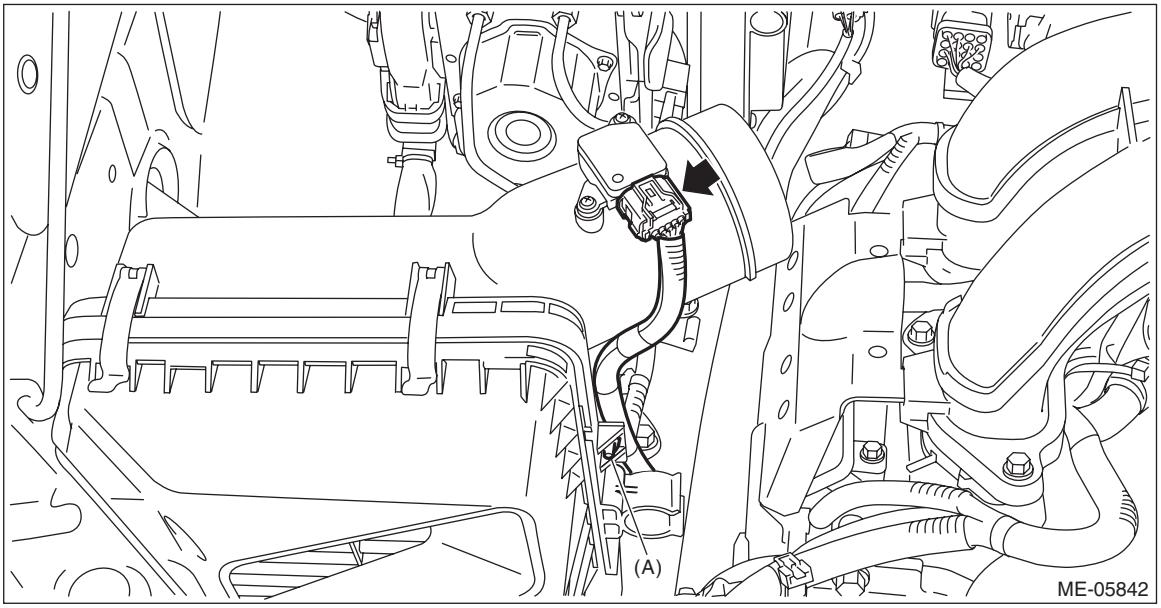


5) Collect the refrigerant from A/C system. <Ref. to AC-28, Refrigerant Recovery Procedure.>
6) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
7) Open the fuel filler lid and remove the fuel filler cap.

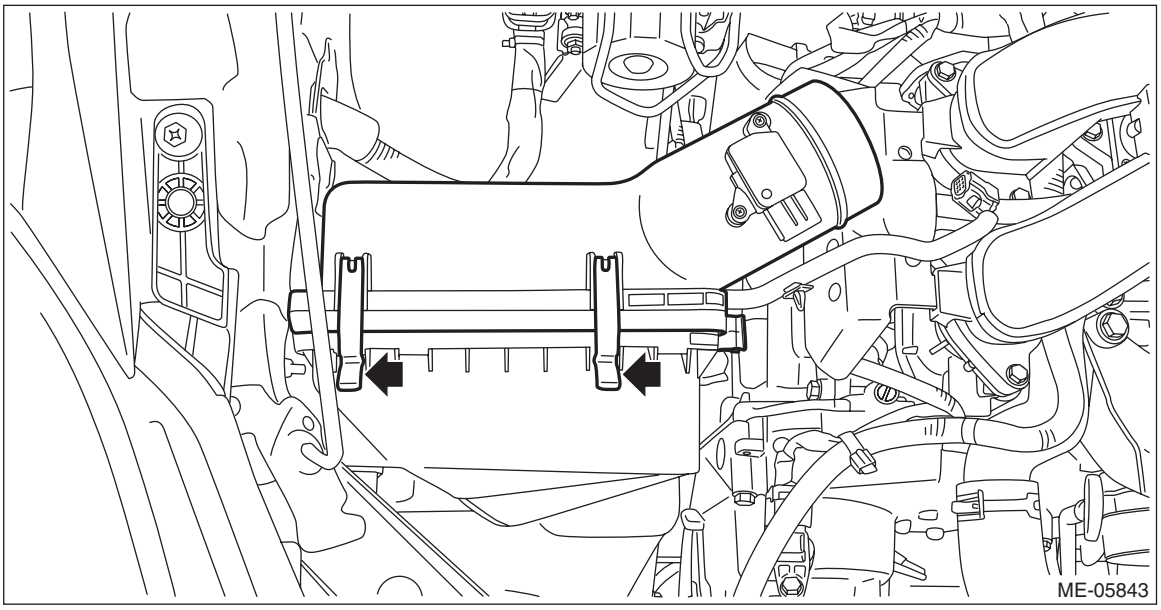
NOTE:
This operation is required to release the inner pressure of the fuel tank.
8) Disconnect the ground cable from battery.



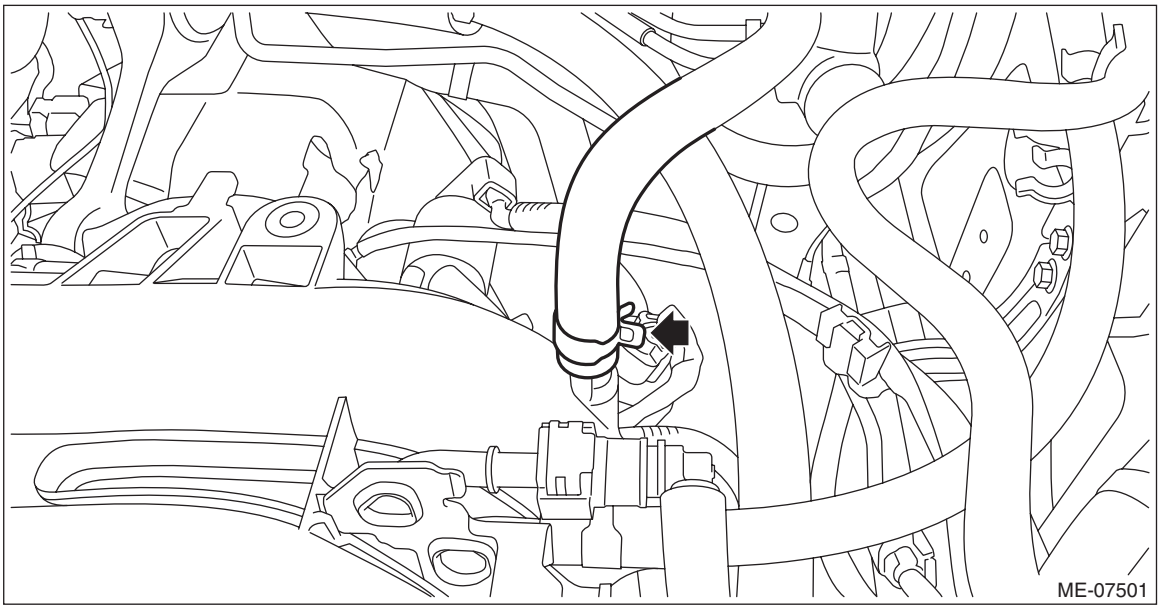
9) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
10) Remove the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, REMOVAL, Air Intake Boot.>
11) Disconnect the connector from the mass air flow and intake air temperature sensor, and remove the clip (A) securing the bulkhead wiring harness.



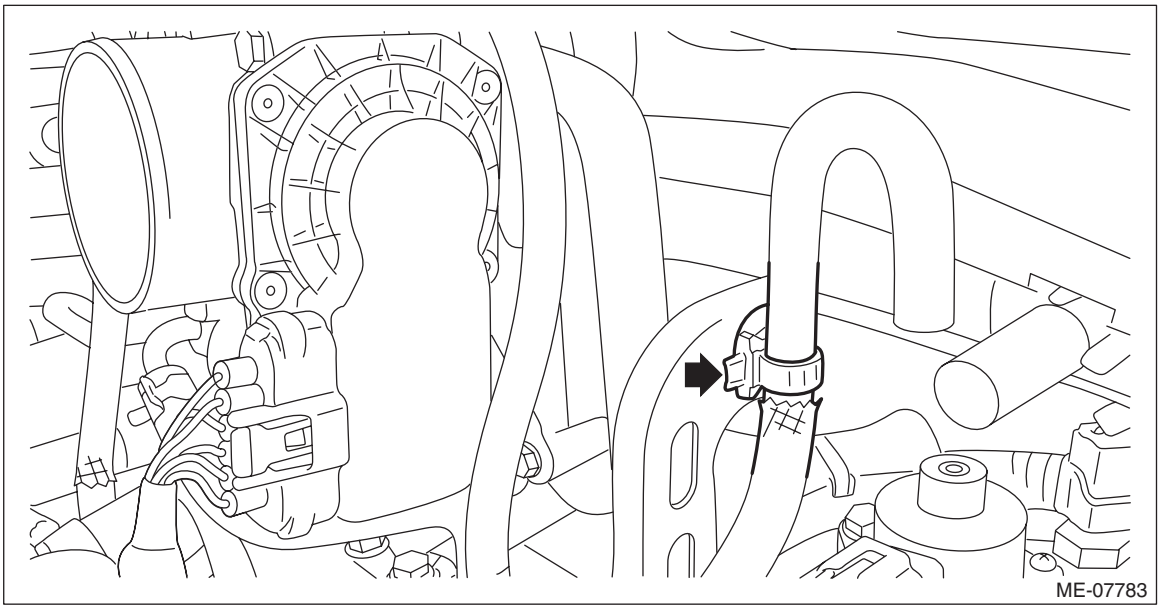
12) Remove the air cleaner case (rear) together with the air cleaner element.



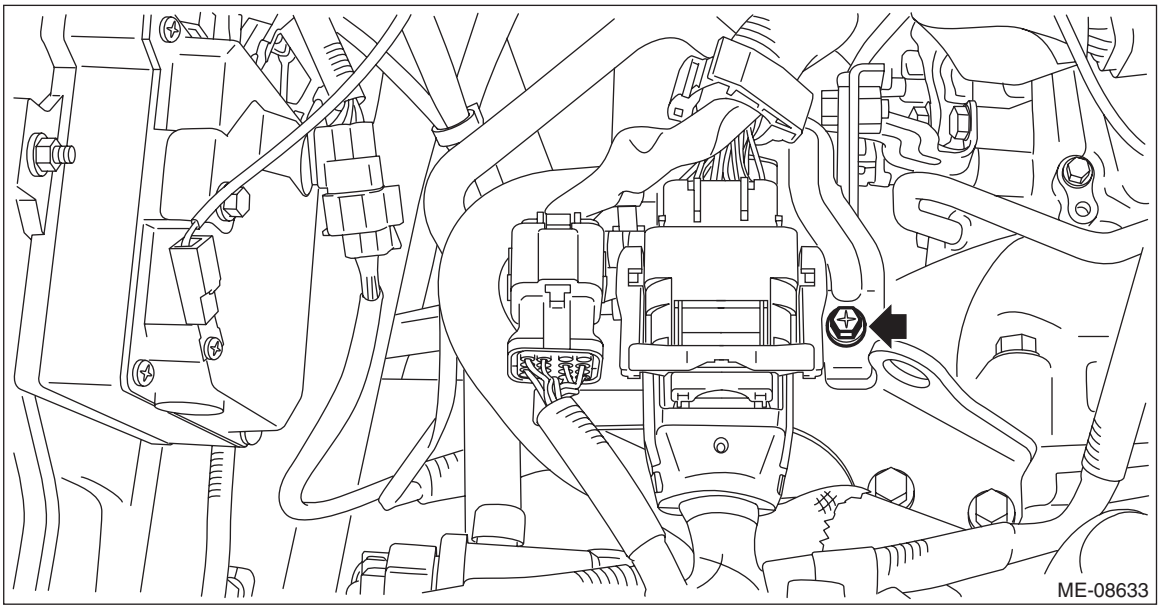
13) Remove the radiator. <Ref. to CO(H4DO(w/o HEV))-77, REMOVAL, Radiator.>
14) Disconnect the brake booster vacuum hose from the intake manifold.



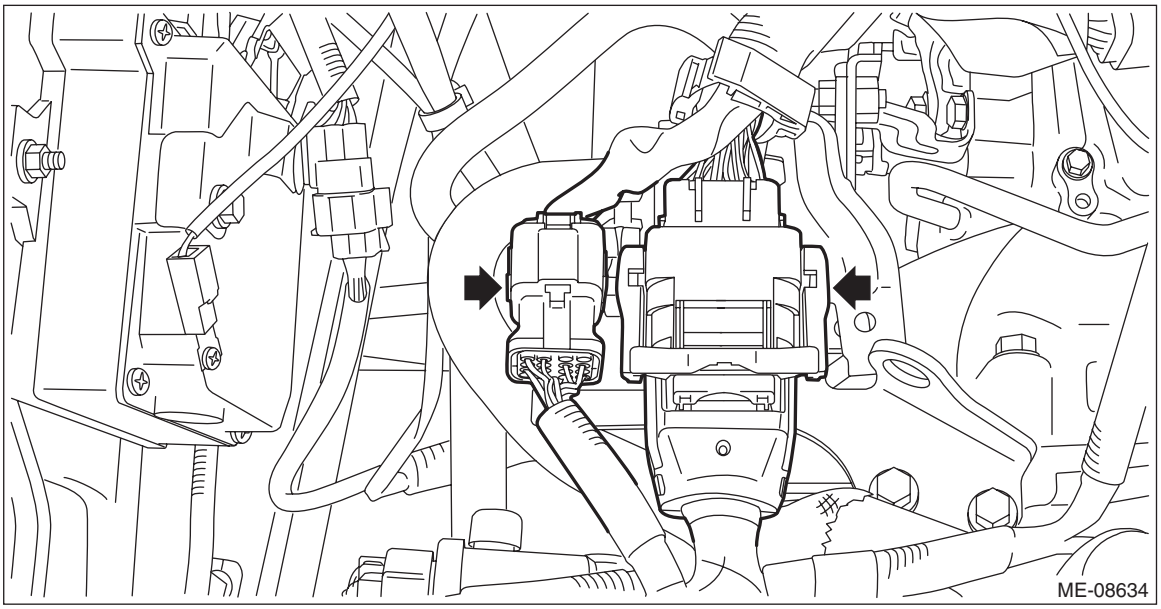
15) Remove the clip holding the air breather hose to the engine rear hanger. (MT model)



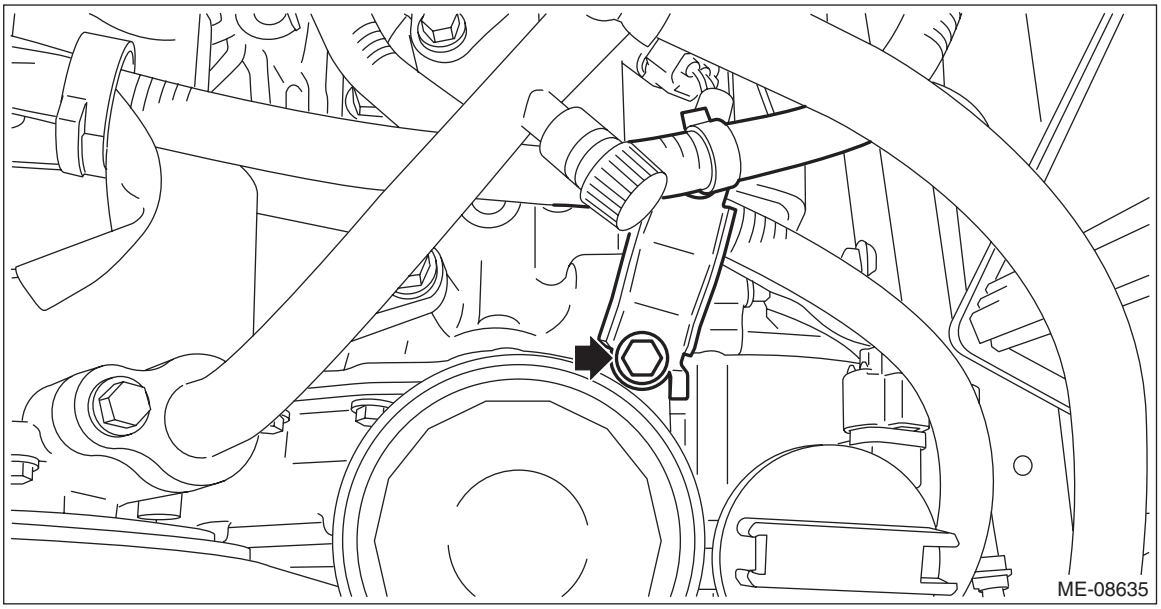
16) Disconnect the engine harness connector.
(1) Remove the bolt securing the bulkhead harness connector bracket.



(2) Disconnect the bulkhead harness connector from the engine harness connector (black) and engine harness connector (brown).

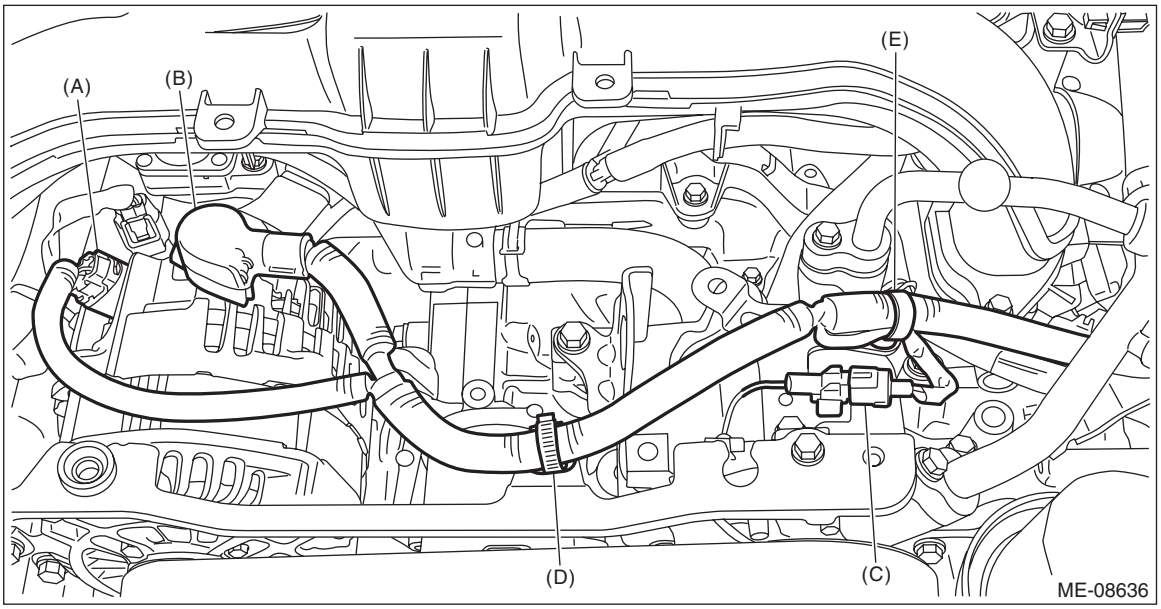


17) Remove the bolts which secure the generator cord stay to the chain cover.

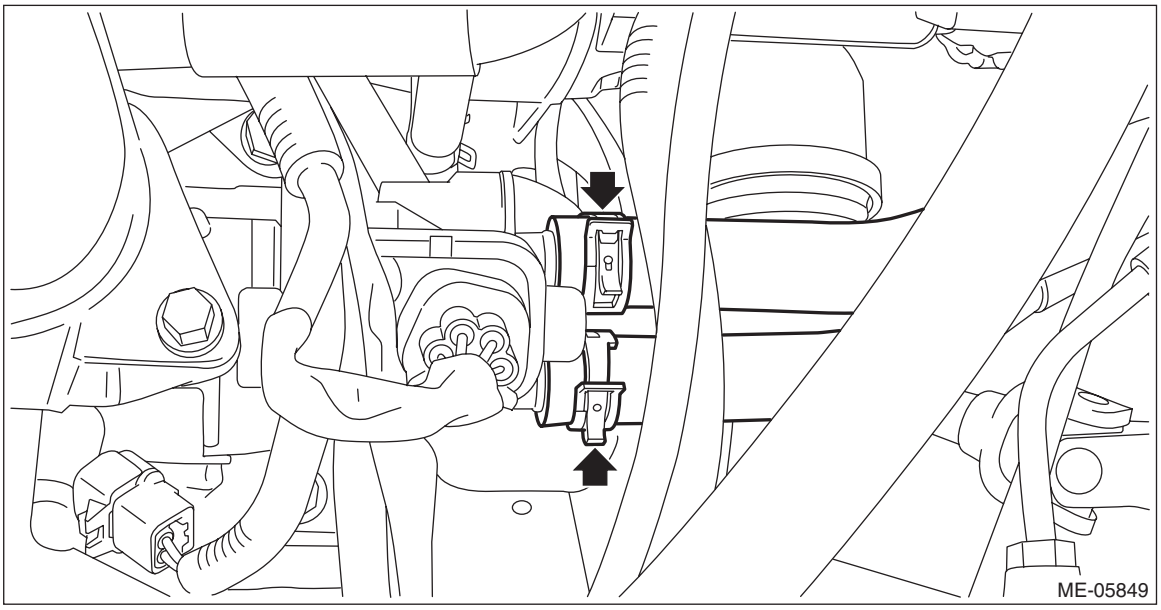


18) Disconnect connector (A) and terminal (B) from the generator, and disconnect connector (C) from A/C compressor.

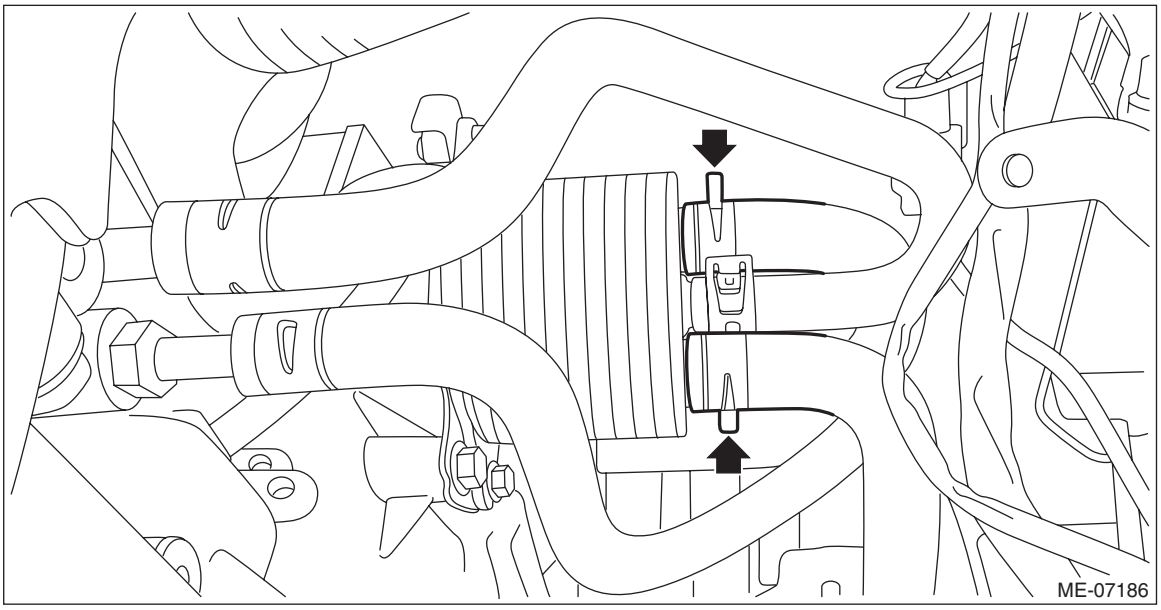
19) Remove the generator cord from the clip (D) and clip (E), and move the generator cord to the left side wheel apron.



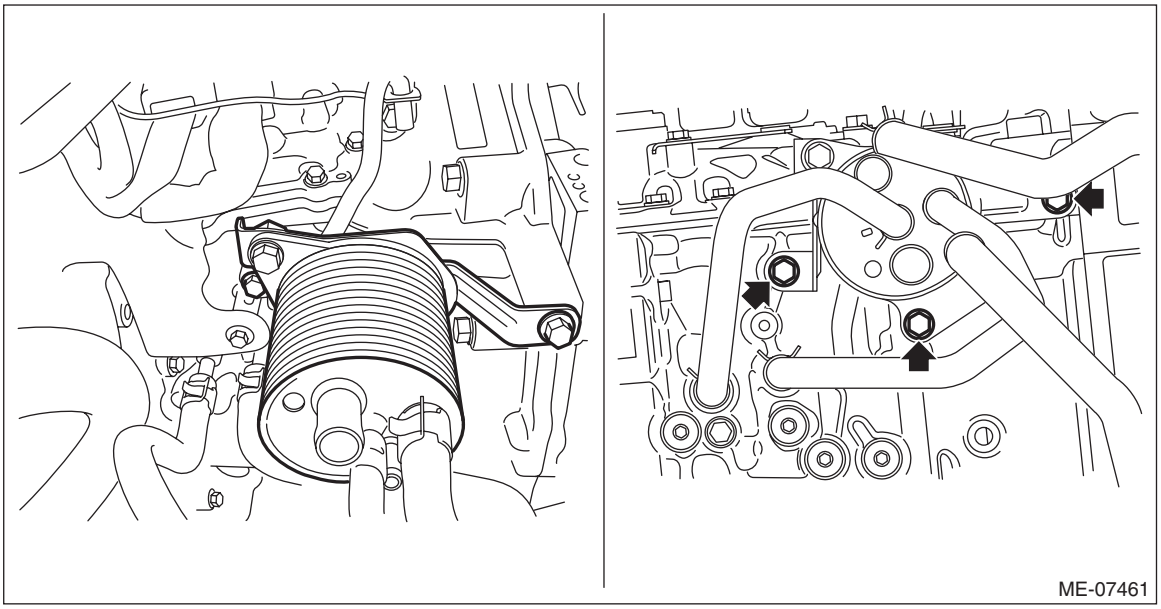
20) Disconnect the A/C pressure hoses from A/C compressor. <Ref. to AC-66, REMOVAL, Hose and Pipe.>
21) Disconnect the heater inlet hose and heater outlet hose.



22) Disconnect the water hose from CVTF cooler (with warmer feature). (CVT model)

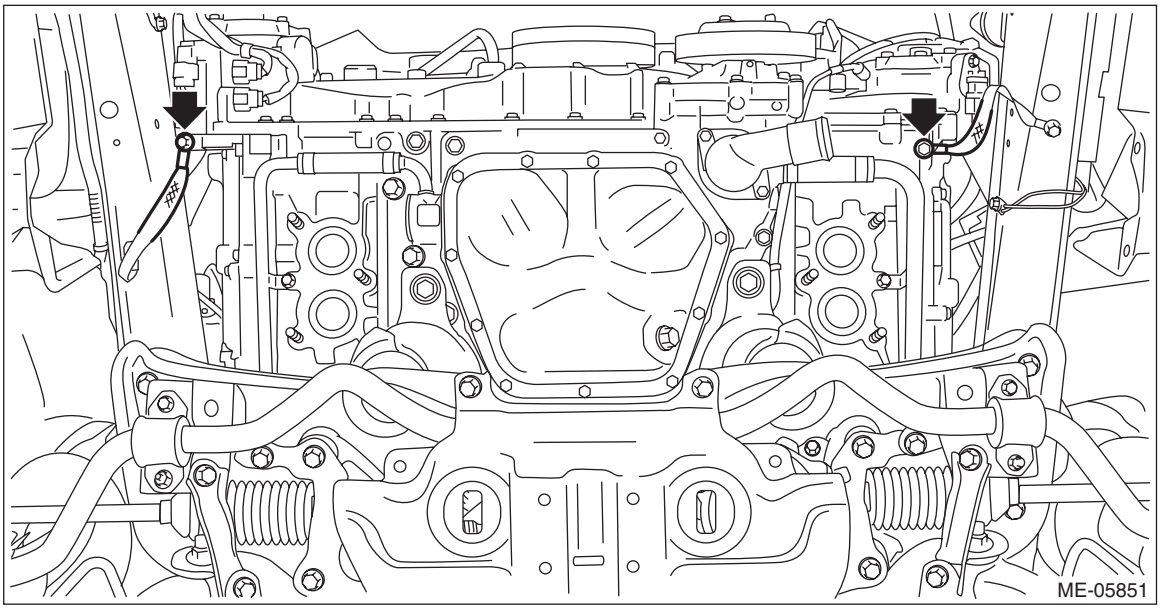


23) Remove the bolt which secures the CVTF cooler (with warmer feature) to the transmission, and move the CVTF cooler (with warmer feature) to the right side of the transmission. (CVT model)



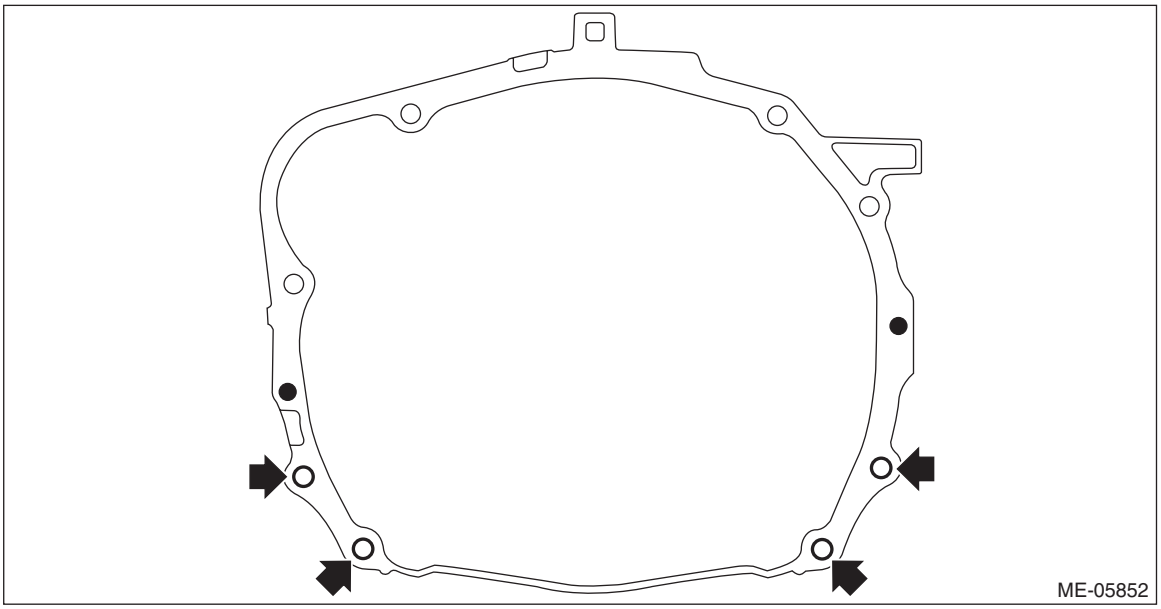
24) Lift up the vehicle.
25) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>

26) Disconnect the ground cable on the engine side.

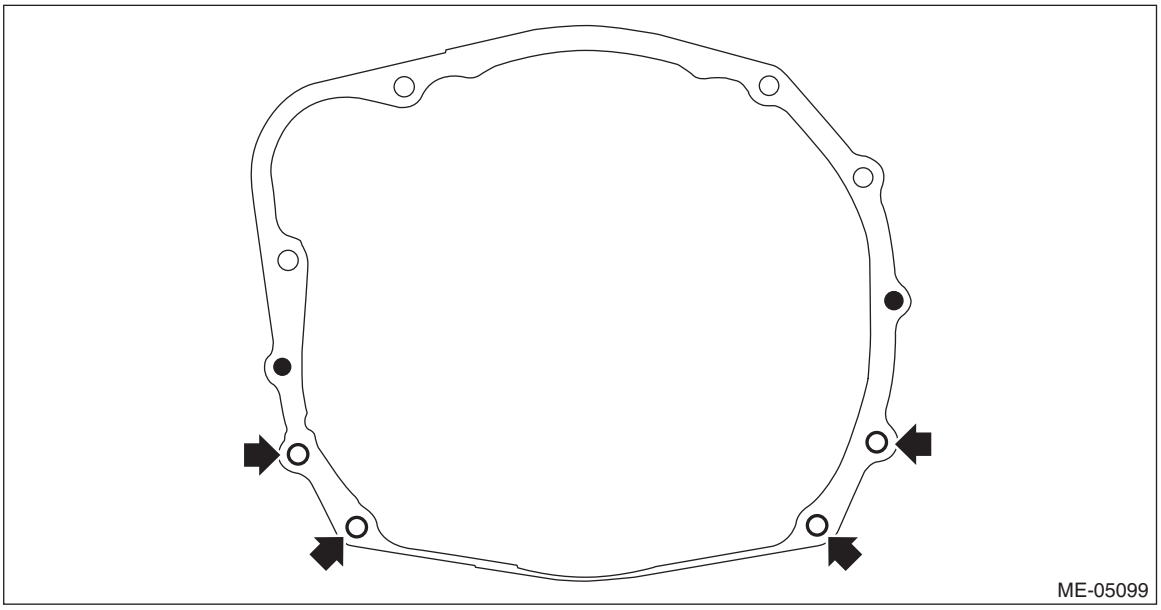


27) Remove the bolts and nuts which hold the lower side of transmission to the engine.

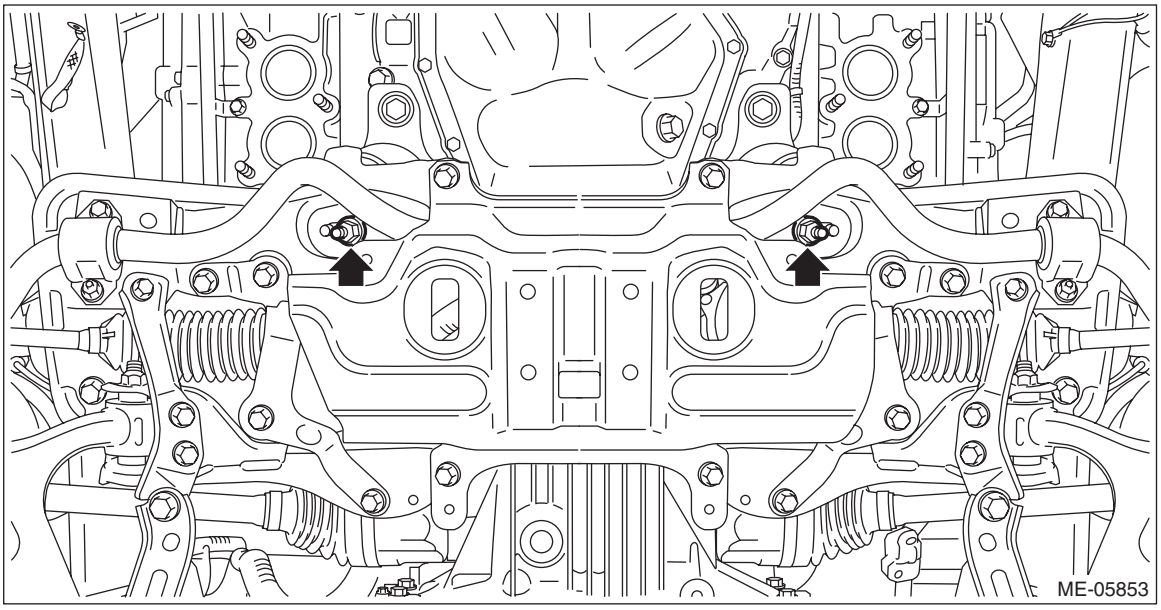
- CVT model



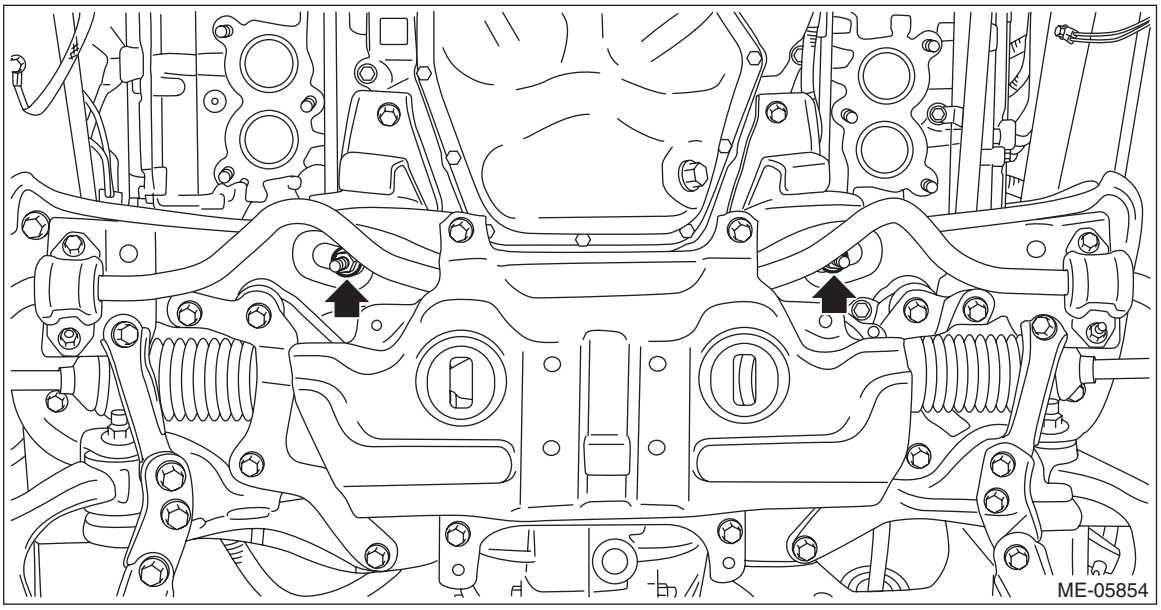
- MT model



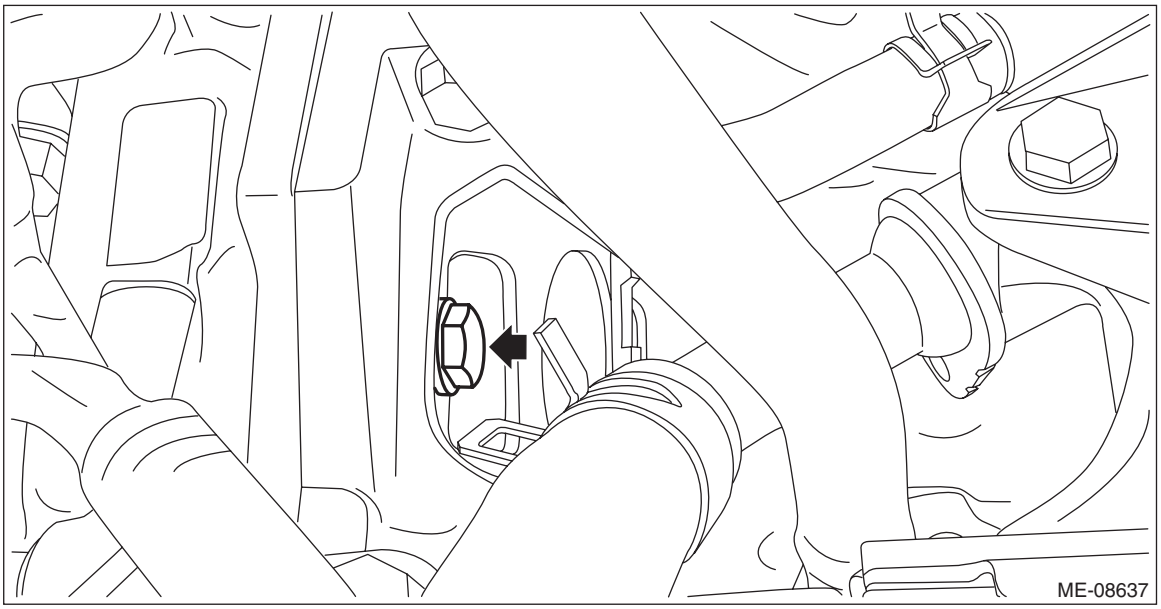
28) Remove the nuts which secure the engine mounting to the front crossmember. (CVT model)



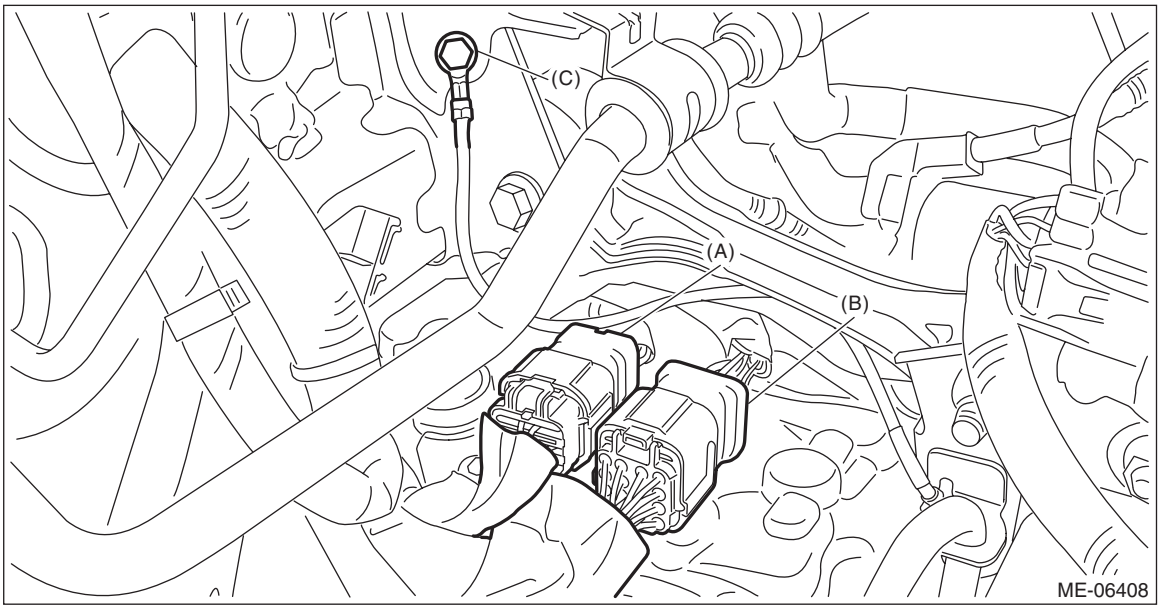
29) Remove the nuts which secure the engine mounting to the front crossmember. (MT model)



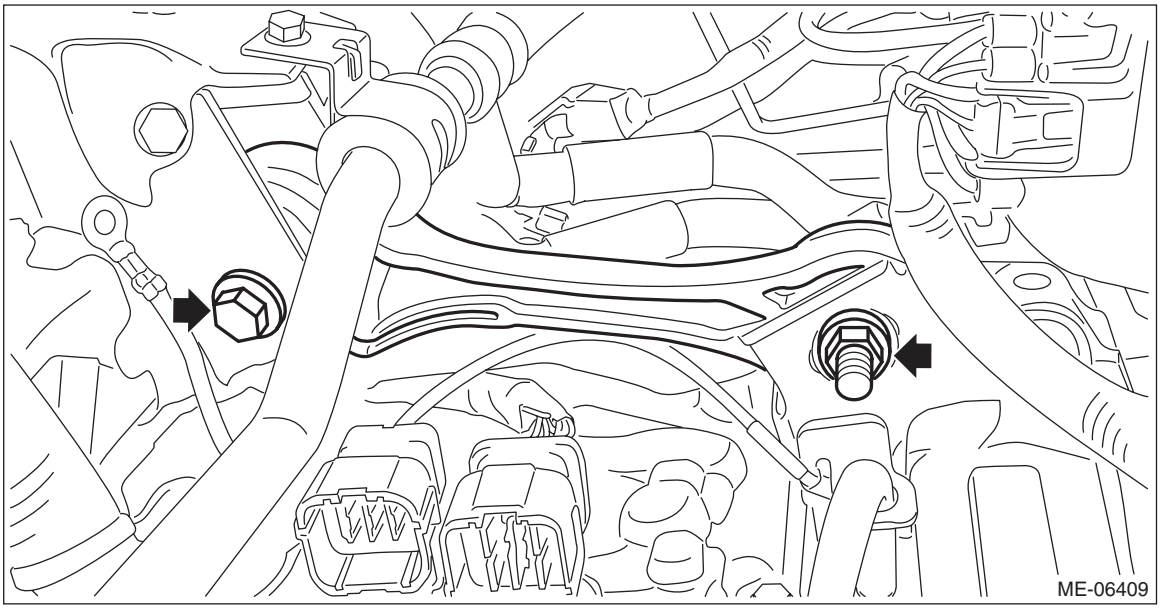
30) Lower the vehicle.
31) Separate the torque converter clutch from the drive plate. (CVT model)
(1) Remove the throttle body. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.>
(2) Remove the service hole plug.
(3) Insert the wrench into the crank pulley bolt, and rotate the crank pulley to remove the four bolts securing the torque converter clutch to the drive plate.



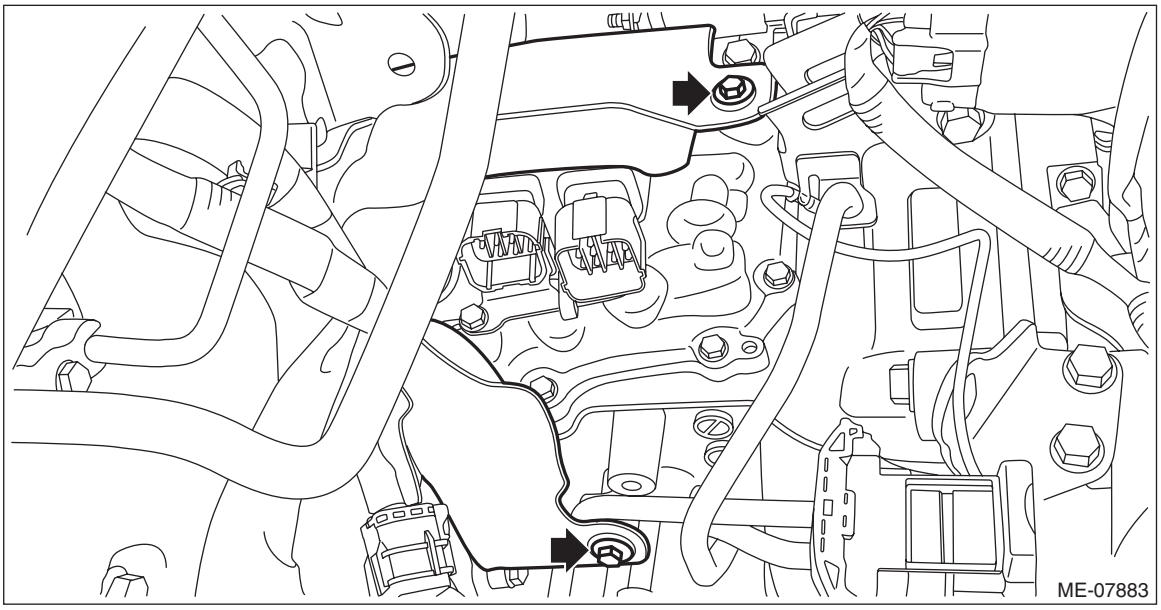
32) Disconnect the bulkhead harness connector from the transmission harness connector (A) and the inhibitor harness connector (B), and disconnect the transmission radio ground terminal (C) from the vehicle body. (CVT model)



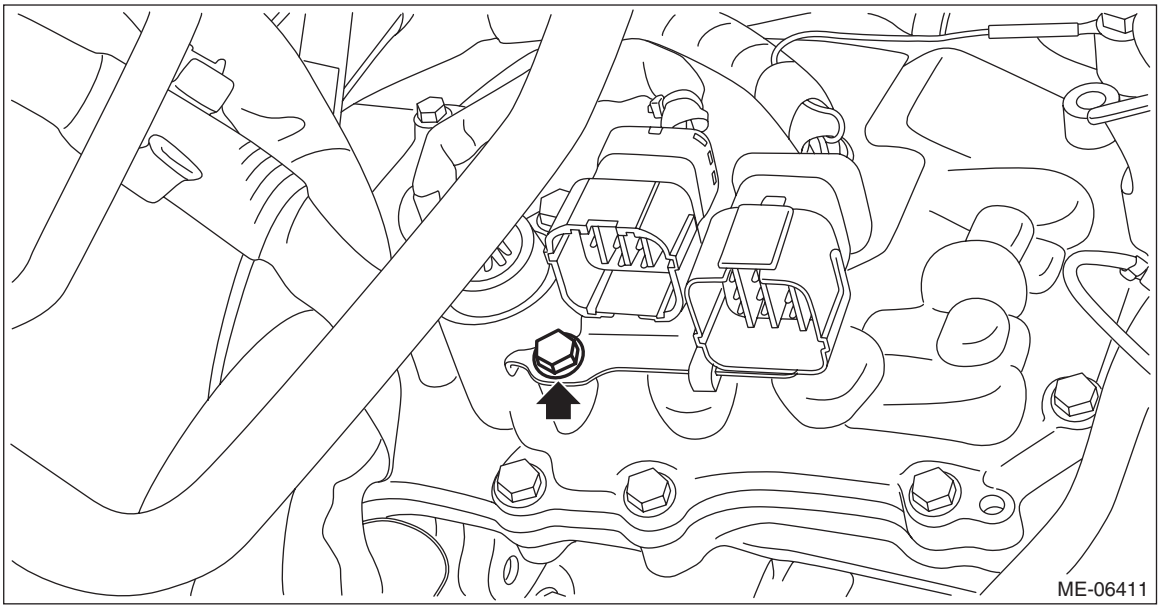
33) Remove the pitching stopper.



34) Remove the transmission case cover. (CVT model)

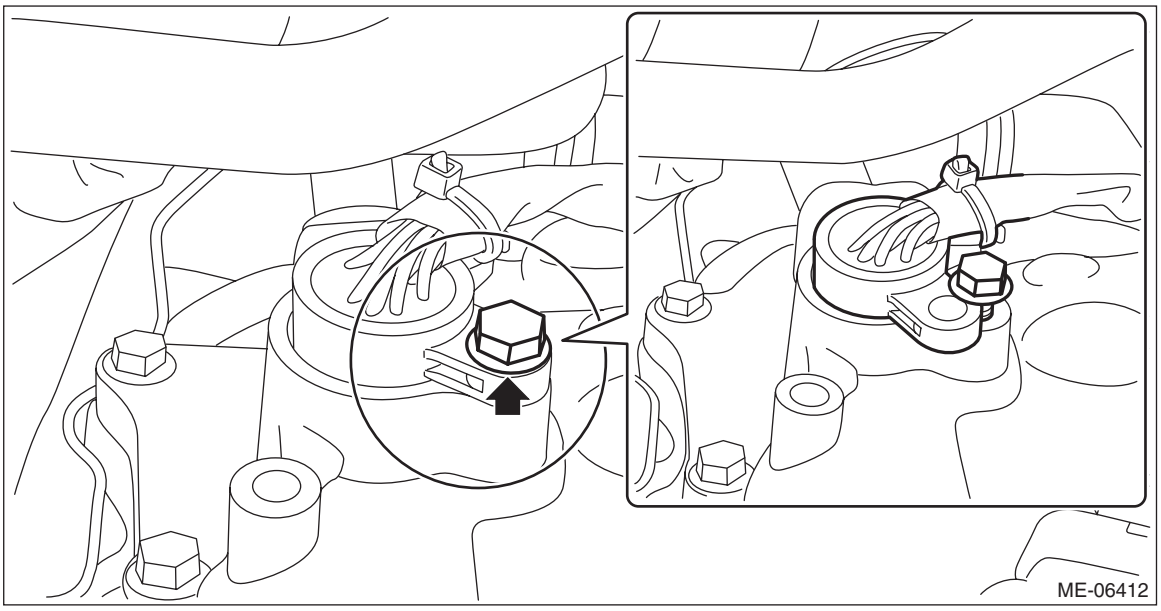


35) Remove the bolt which holds the transmission harness stay. (CVT model)



36) Remove the bolt which holds the transmission harness to the control valve body, and turn the transmission harness clockwise till the bolt hole can be seen as shown in the figure, and tighten the bolt to temporary lock the harness. (CVT model)

NOTE:
This procedure is required to prevent the transmission harness from touching the vehicle body during engine removal/installation.

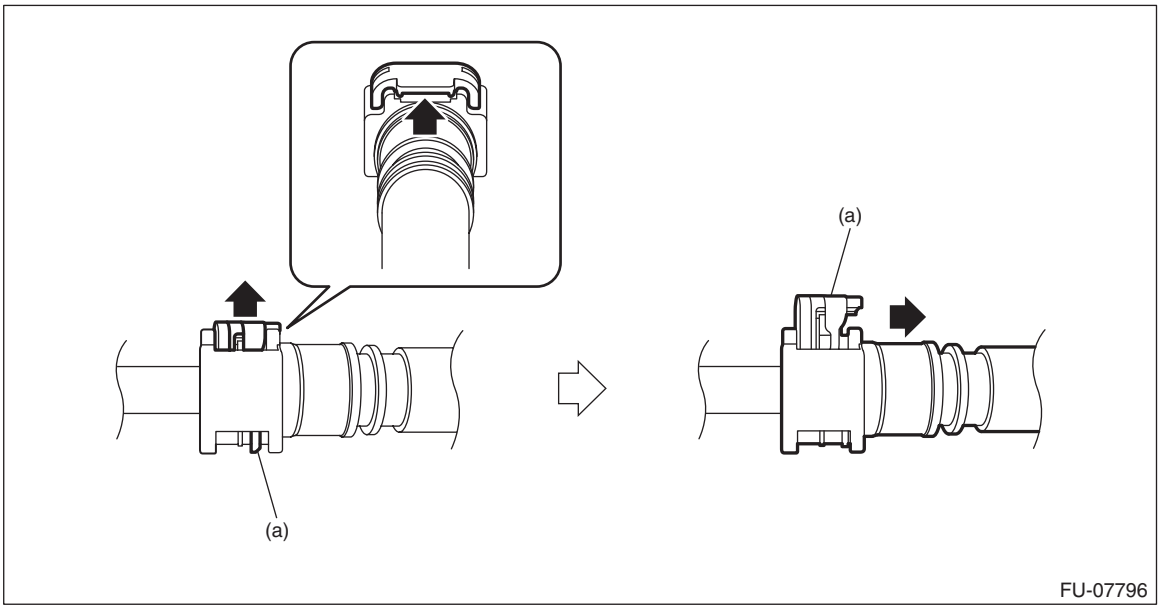


37) Disconnect the fuel delivery tube and evaporation hose.

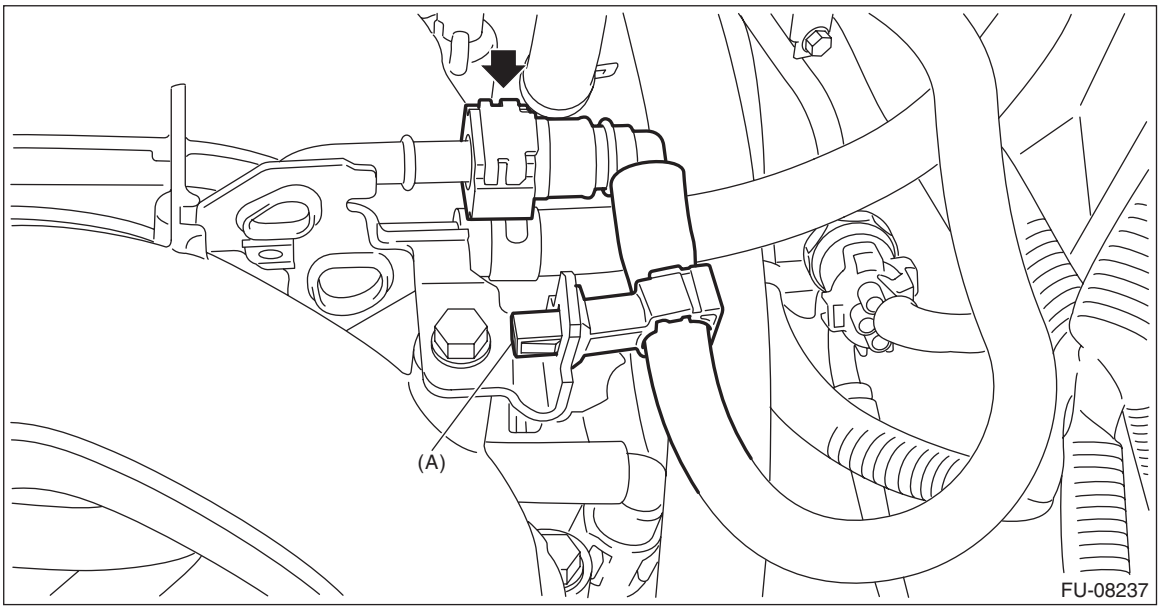
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

(1) Disconnect the quick connector on the fuel delivery tube from the fuel pipe assembly, and remove the clip (A) securing the fuel delivery tube.

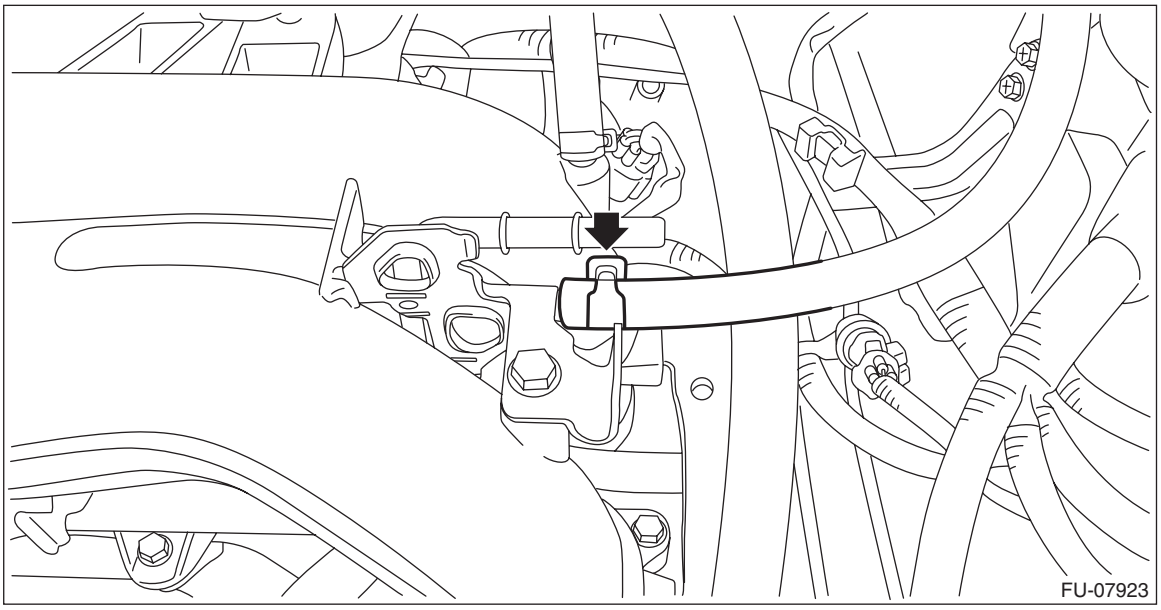
NOTE:
Disconnect the quick connector as shown in the figure.



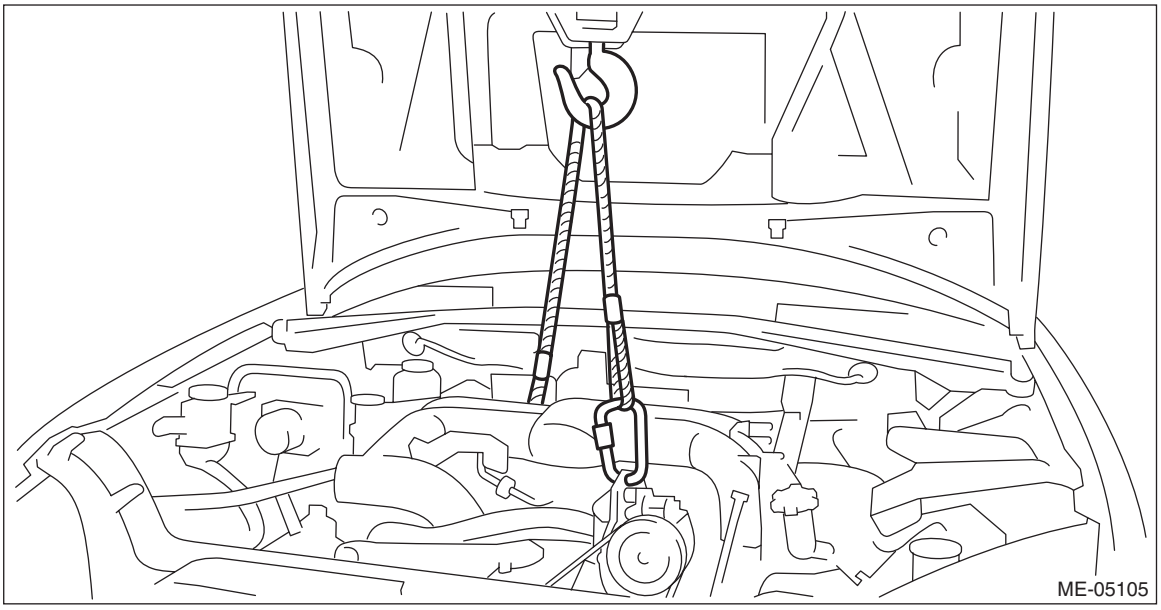
(a) Slider



(2) Disconnect the evaporation hose from the fuel pipe assembly.

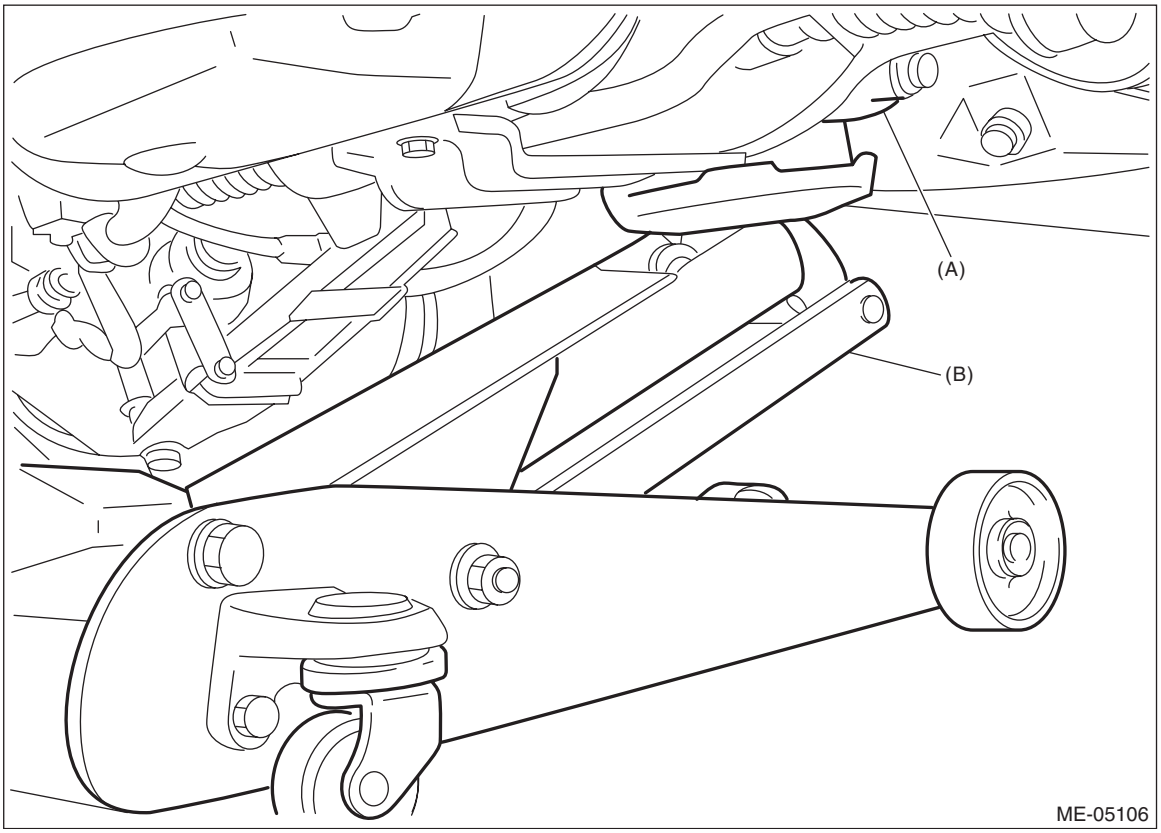


38) Support the engine with a lifting device and wire ropes.



39) Support the transmission with a garage jack.

CAUTION:
Be sure to perform this procedure to prevent the transmission from lowering by its own weight.



(A) Transmission (B) Garage jack

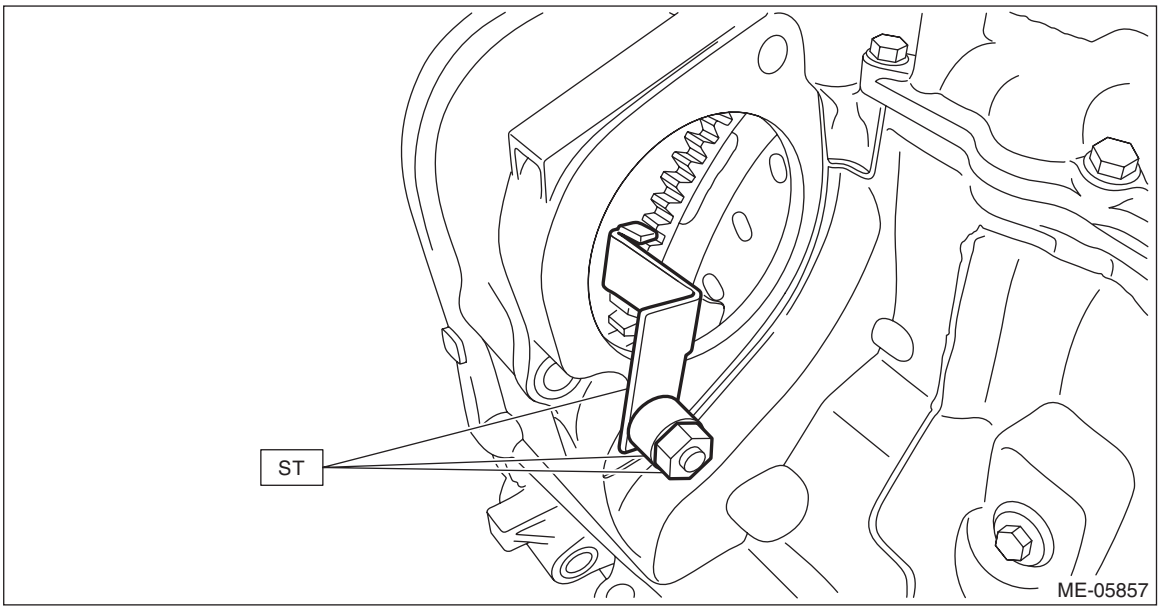
40) Separate the engine and transmission.

CAUTION:
Before removing the engine away from transmission, check to be sure no work has been overlooked.

(1) Remove the starter. <Ref. to SC(H4DO(w/o HEV))-8, REMOVAL, Starter.>

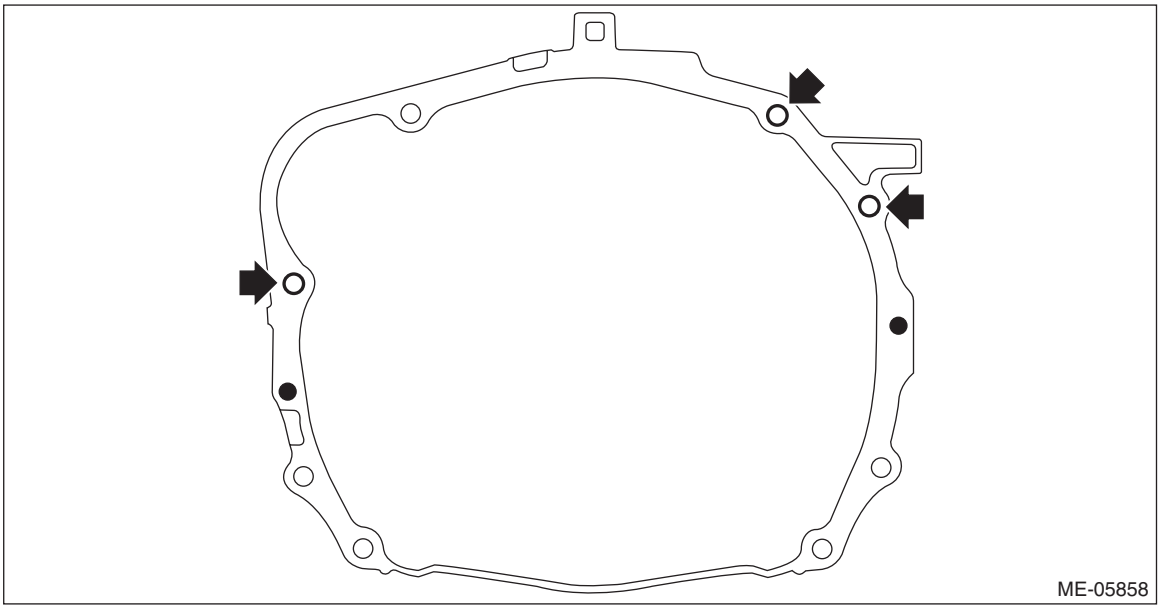
(2) Attach the ST to the torque converter clutch case. (CVT model)

ST 498277200 STOPPER SET

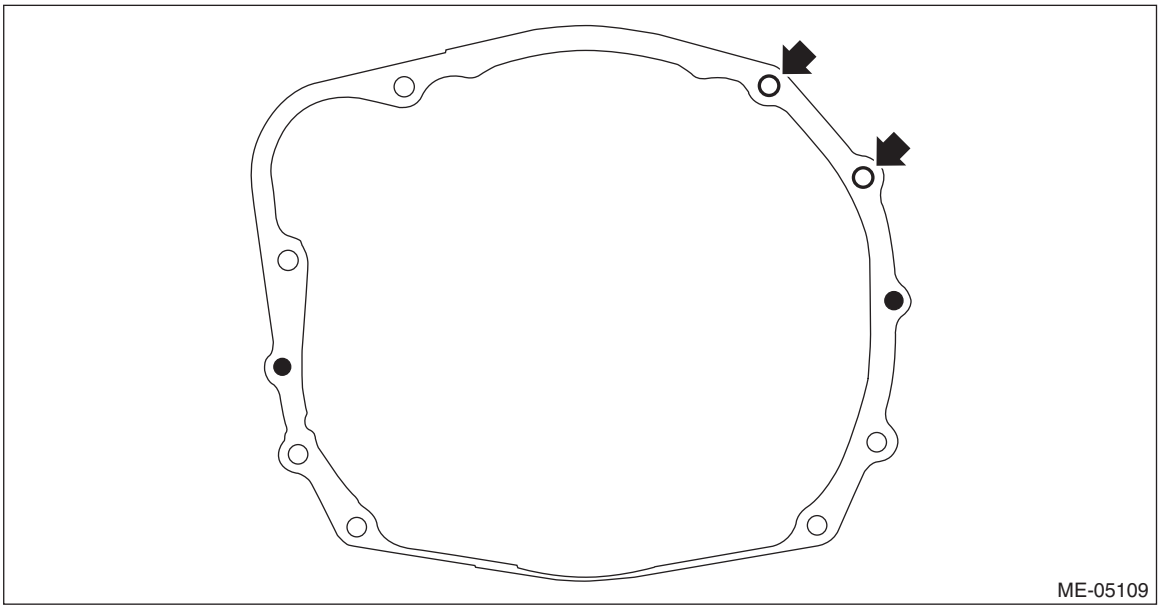


(3) Remove the bolts which hold the upper side of the transmission to the engine.

- CVT model



- MT model



41) Remove the engine from the vehicle.

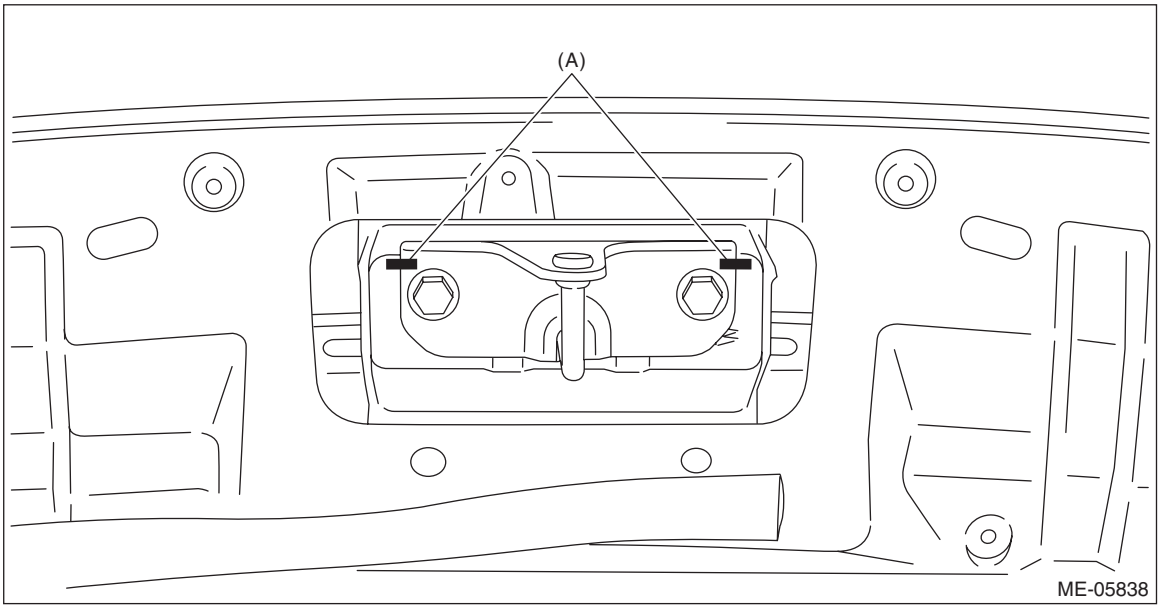
NOTE:
Be careful not to damage adjacent parts or body panels with crank pulley, oil level gauge, etc.

(1) Slightly raise the engine.
(2) Raise the transmission with garage jack.
(3) Move the engine horizontally until main shaft is withdrawn from clutch cover. (MT model)
(4) Slowly move the engine away from engine compartment.

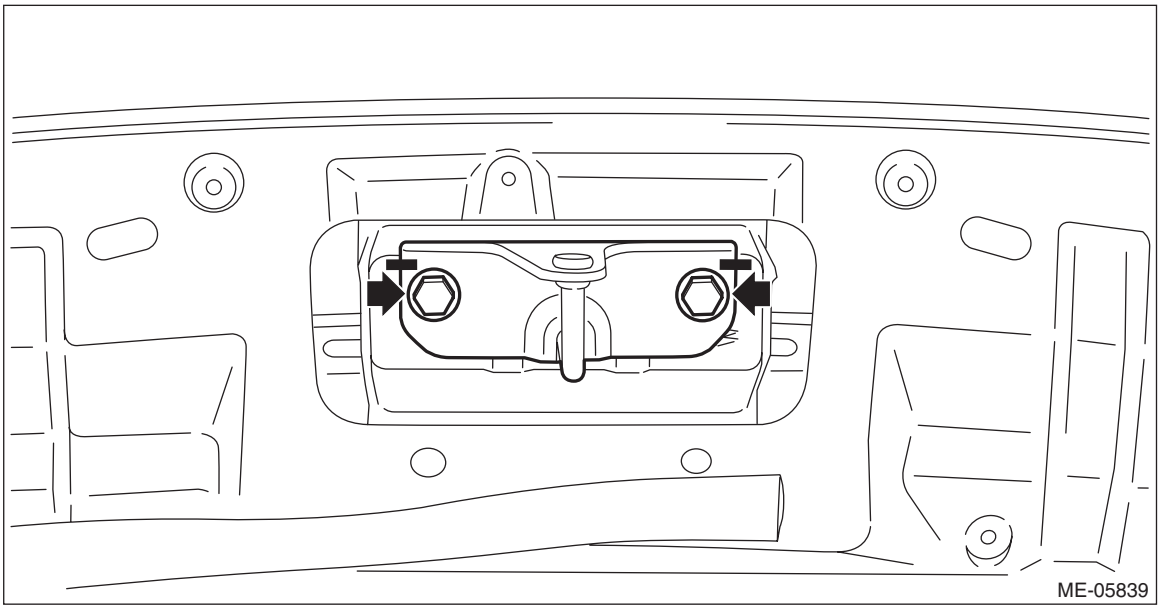
42) Remove the engine mounting from the engine.

2. HEV MODEL

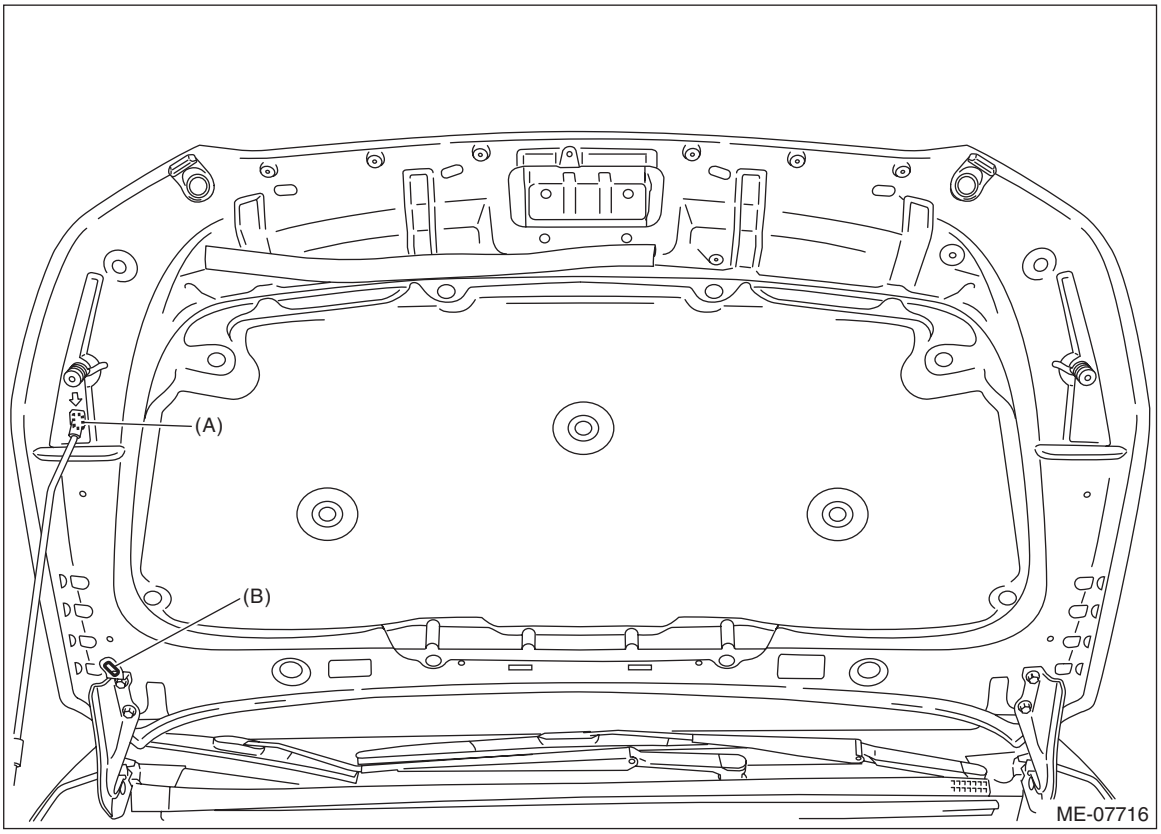
1) Turn the ignition switch to OFF.
2) Open the front hood, and make alignment marks (A) on both the front hood and the front hood striker by using a marker pen.



3) Remove the front hood striker from the front hood.

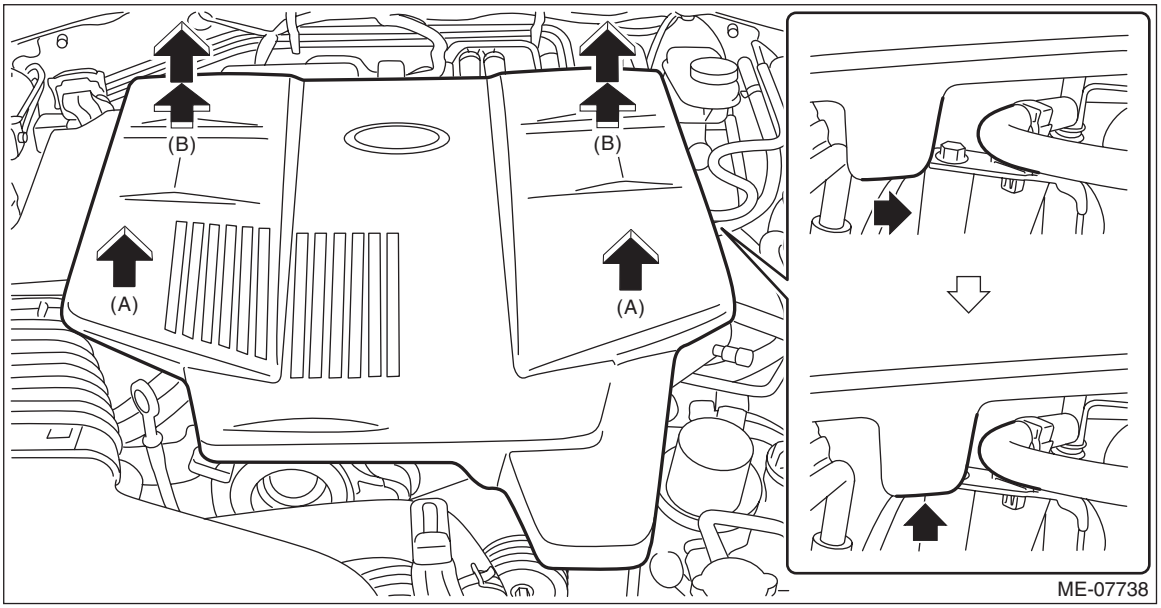


4) Change the front hood stay position from (A) to (B), and completely open the front hood.



5) Remove the collector cover.
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

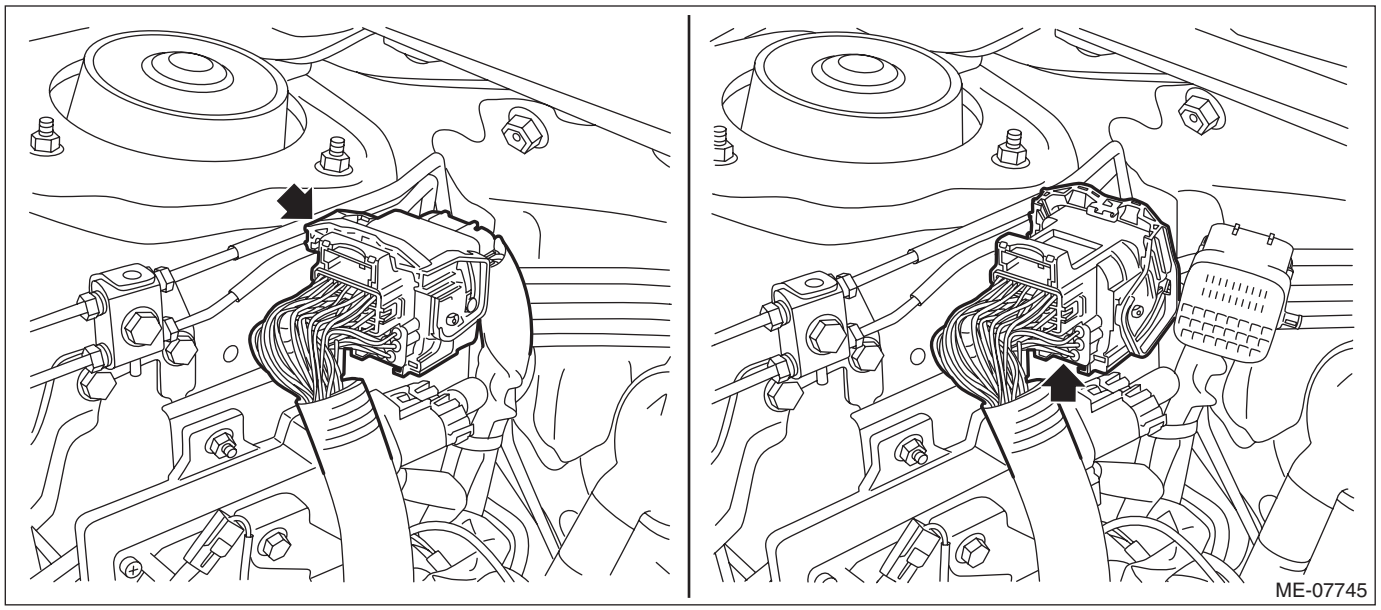


6) Collect the refrigerant from A/C system. <Ref. to AC-28, Refrigerant Recovery Procedure.>
7) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
8) Open the fuel filler lid and remove the fuel filler cap.

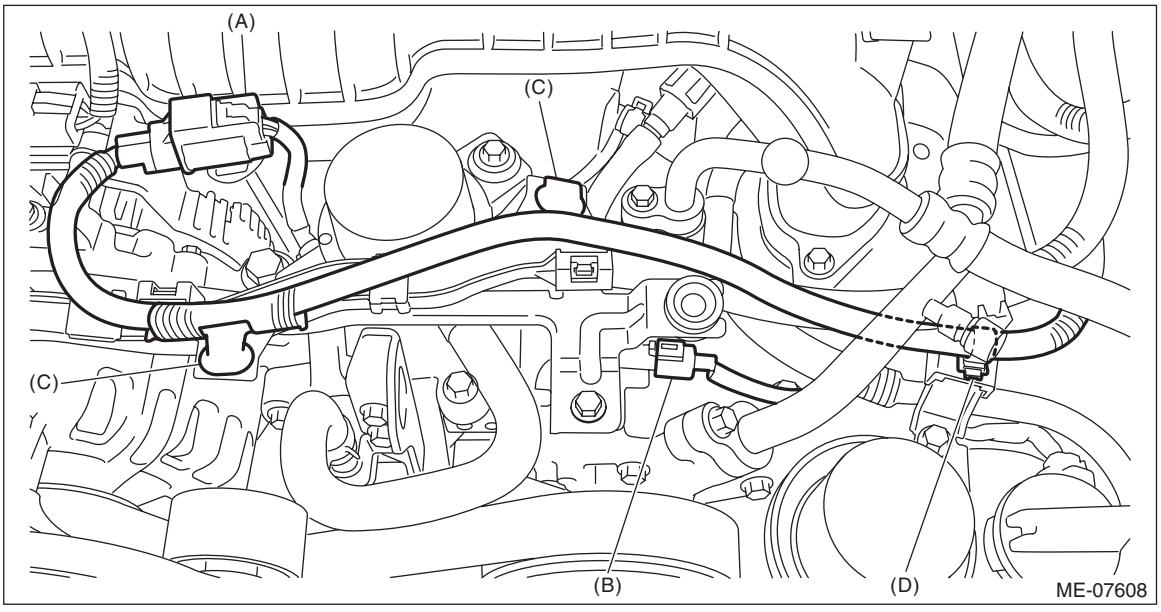
NOTE:
This operation is required to release the inner pressure of the fuel tank.
9) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
10) Remove the air intake duct. <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
11) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
12) Remove the radiator. <Ref. to CO(H4DO(w/o HEV))-77, REMOVAL, Radiator.>

13) Disconnect the bulkhead harness connector from the engine harness connector (black), then remove the engine harness connector (black) from the bracket.

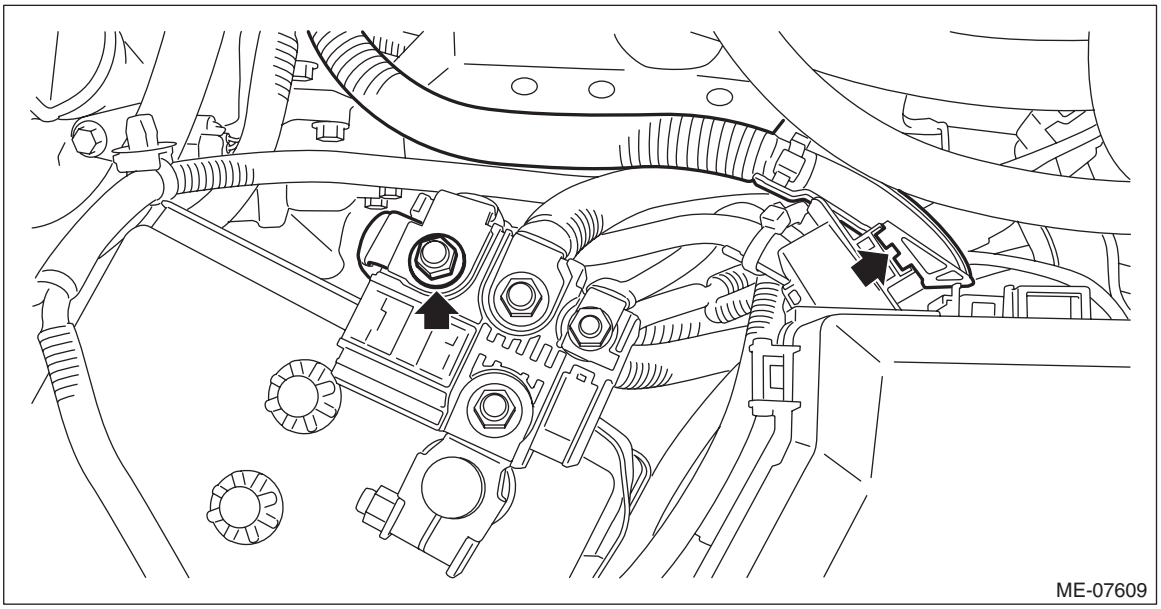


14) Disconnect the connector (A) from the brake vacuum pump, and disconnect the connector (B) from the A/C compressor.
15) Remove the clip (C) and the clip (D) securing the harness to the battery cable assembly, and move the harness to the left side wheel apron.

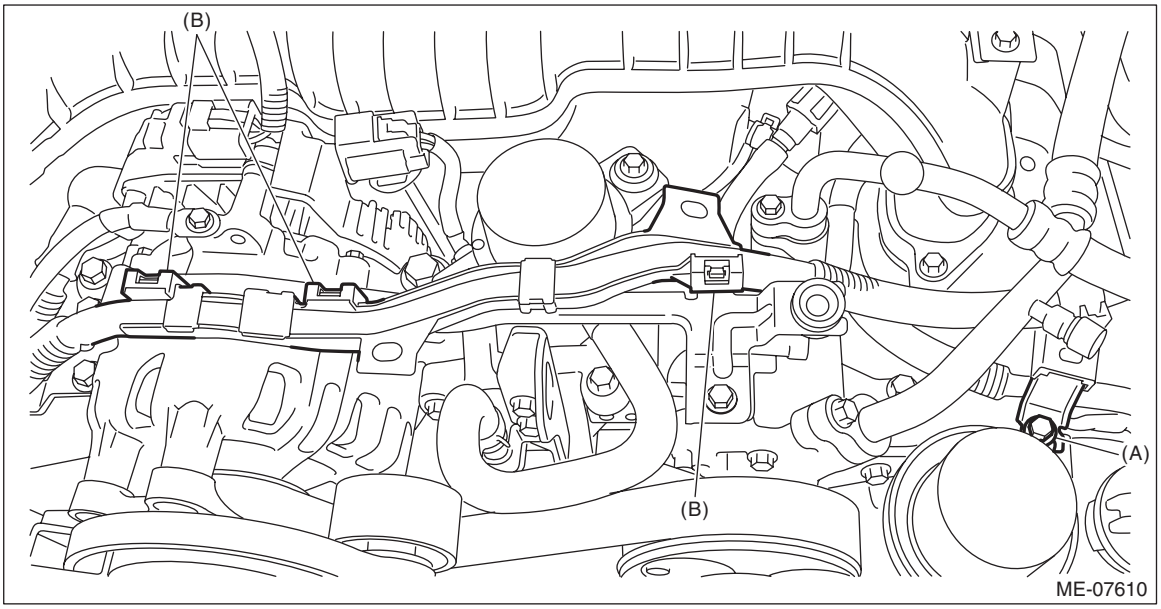


16) Remove the terminal boot from the positive terminal of the 12 volt auxiliary battery.

17) Remove the nuts fastening the battery cable assembly to the slow blow fuse (12 volt auxiliary battery), and remove the battery cable assembly from the main fuse box.

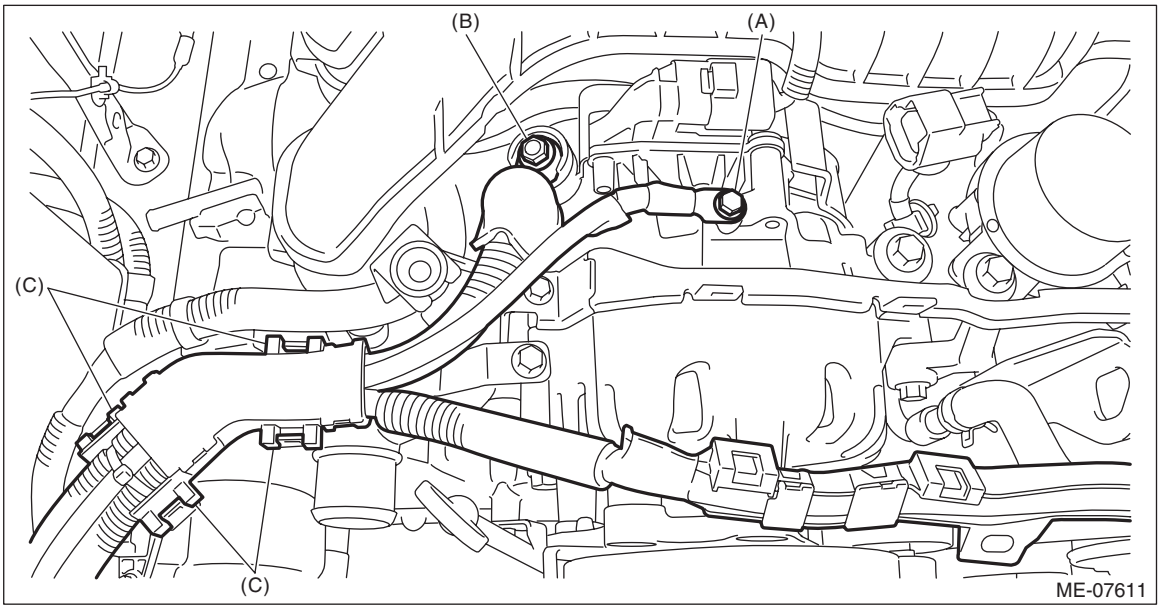


18) Remove the bolt (A) securing the battery cable stay to the chain cover, and remove the clip (B) securing the battery cable assembly to the collector cover bracket.

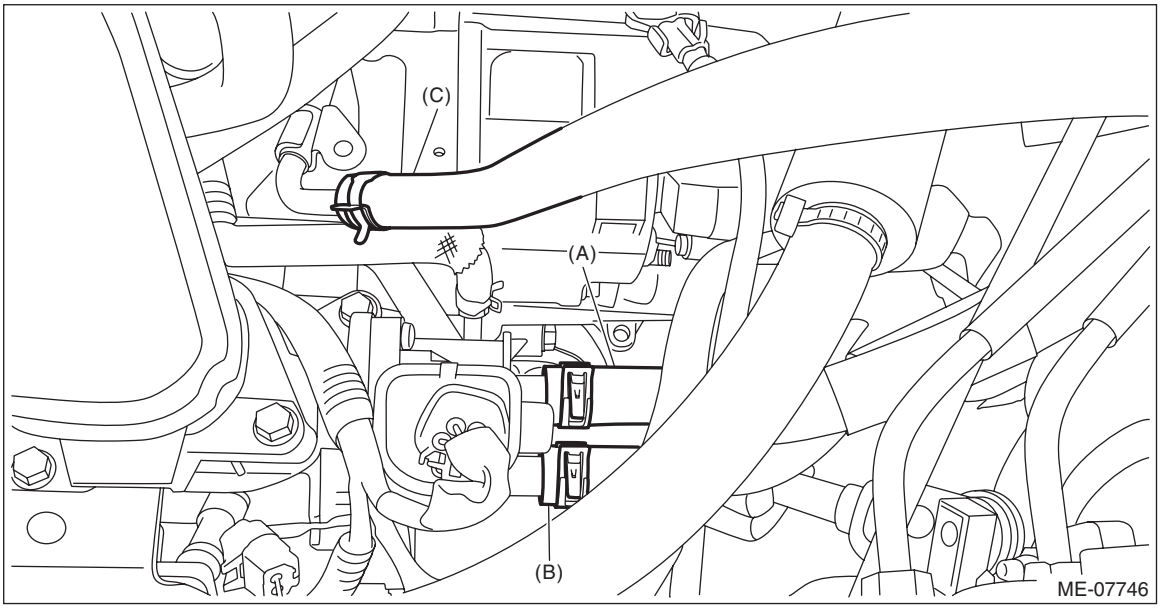


19) Disconnect the terminal (A) and the terminal (B) from ISG.

20) Remove the clip (C) securing the battery cable assembly to the battery cable bracket No. 1, and move the battery cable assembly to the right side wheel apron.

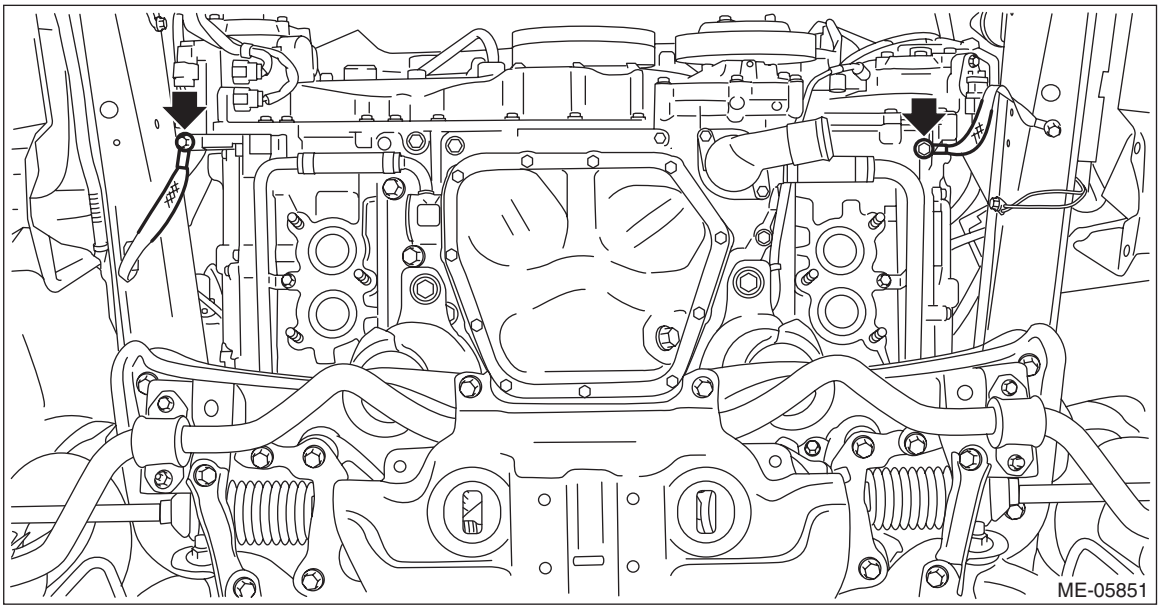


21) Disconnect the A/C pressure hoses from A/C compressor. <Ref. to AC-66, REMOVAL, Hose and Pipe.>
22) Disconnect the heater inlet hose (A) from the water pipe assembly, and disconnect the heater outlet hose (B) from the water pipe LH.
23) Disconnect the brake booster vacuum hose (C) from the brake vacuum pipe.

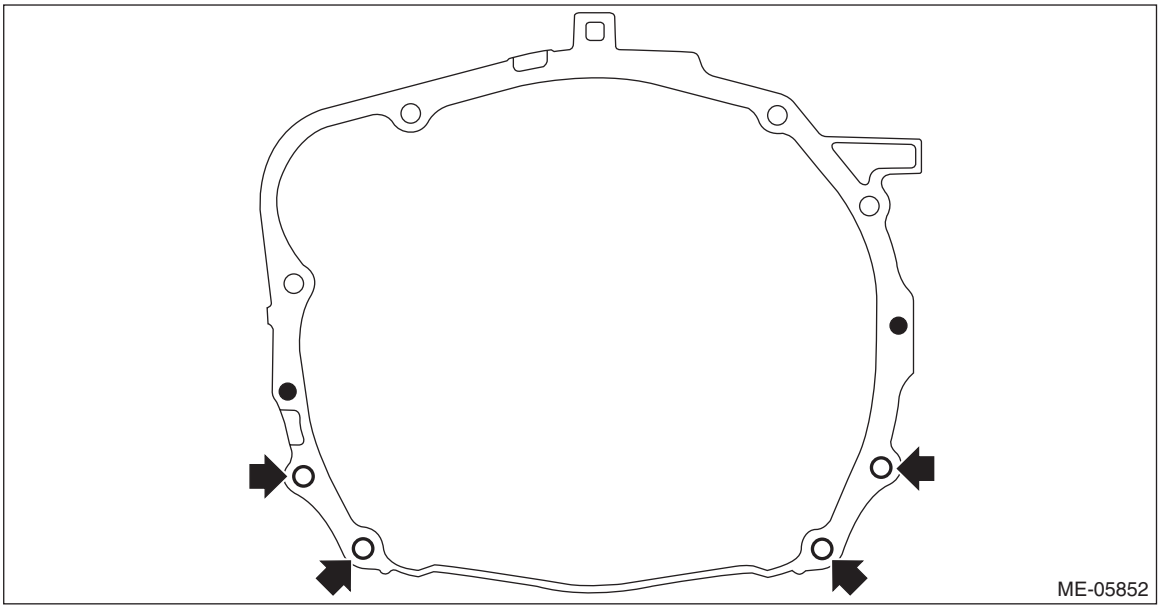


24) Lift up the vehicle.
25) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>

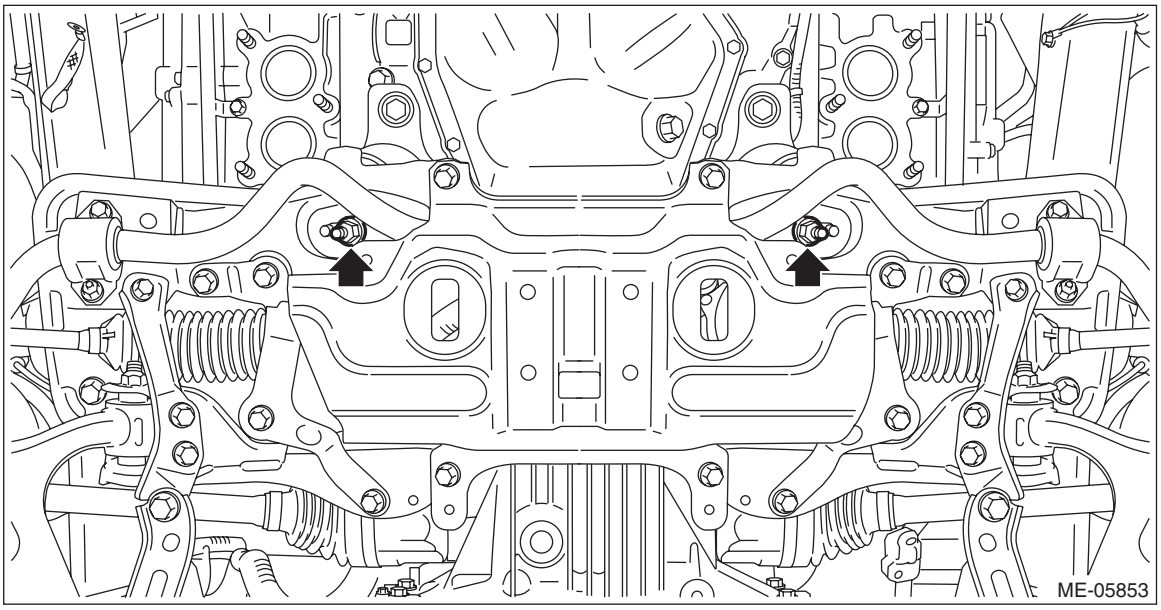
26) Disconnect the ground cable on the engine side.



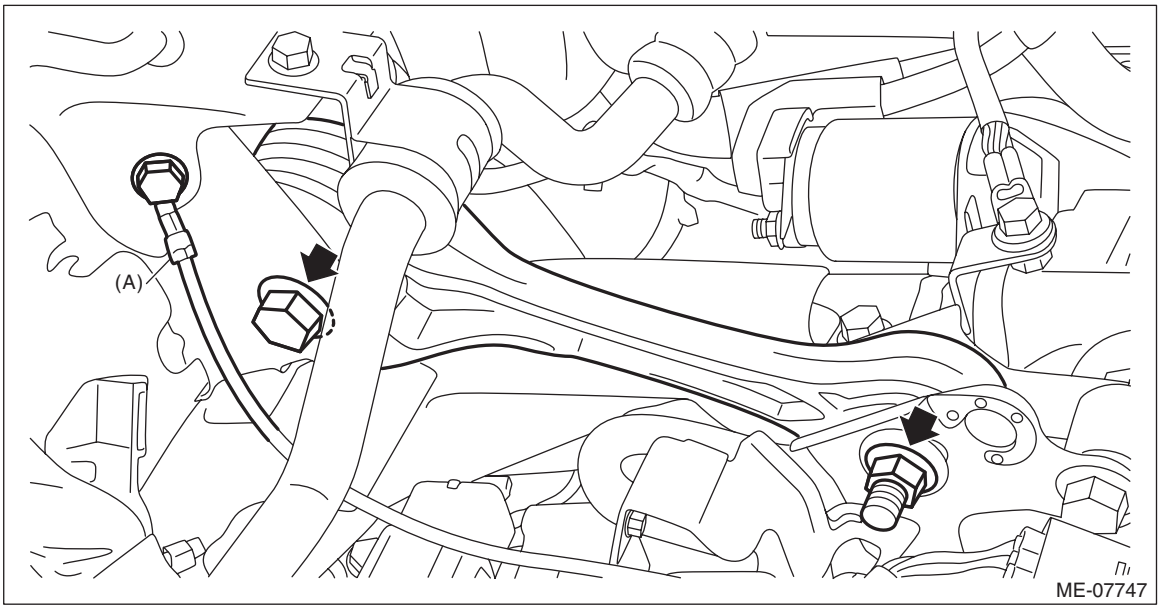
27) Remove the bolts and nuts which hold the lower side of transmission to the engine.



28) Remove the nuts which secure the engine mounting to the front crossmember.

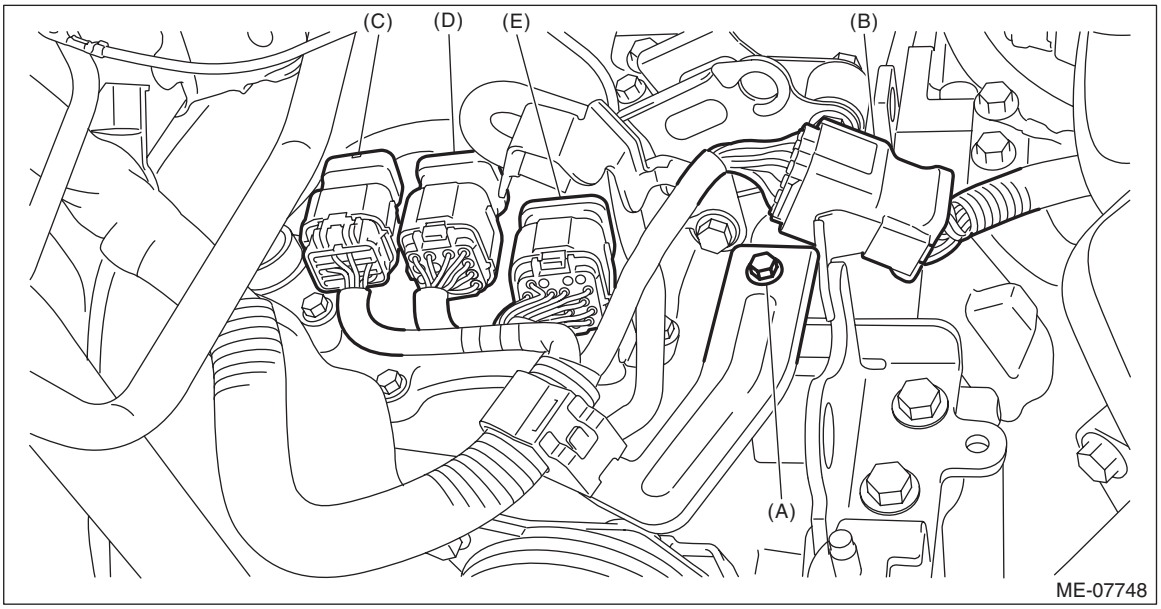


29) Lower the vehicle.
30) Disconnect the transmission radio ground terminal (A) from the vehicle, and remove the pitching stopper.

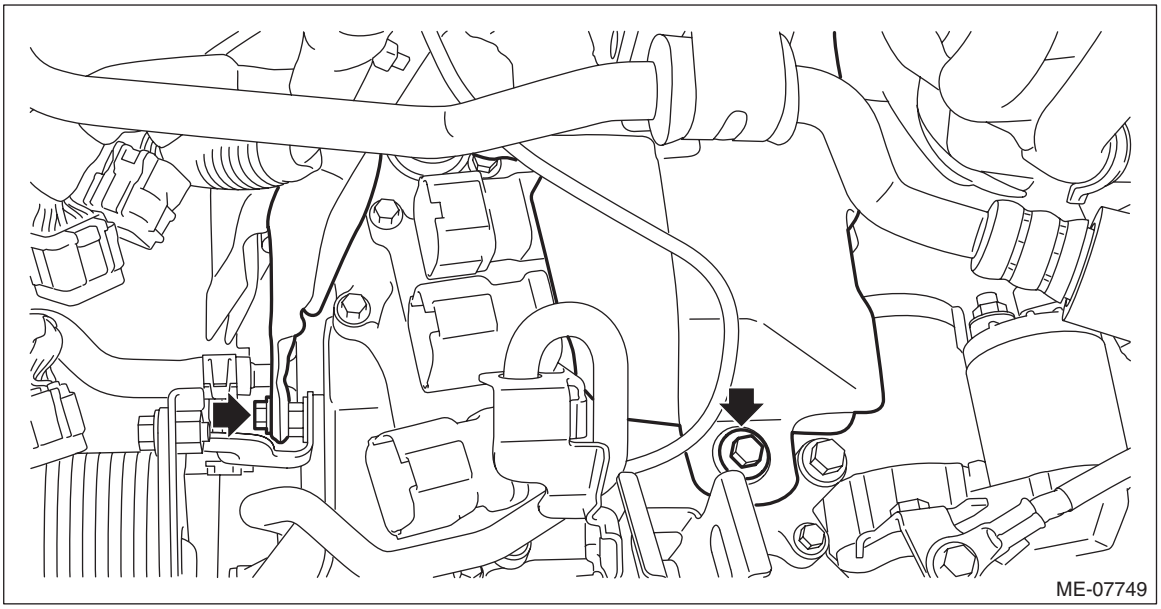


31) Remove the bolt (A) securing the bulkhead harness connector bracket, and disconnect the bulkhead harness connector from the engine harness connector (brown) (B).

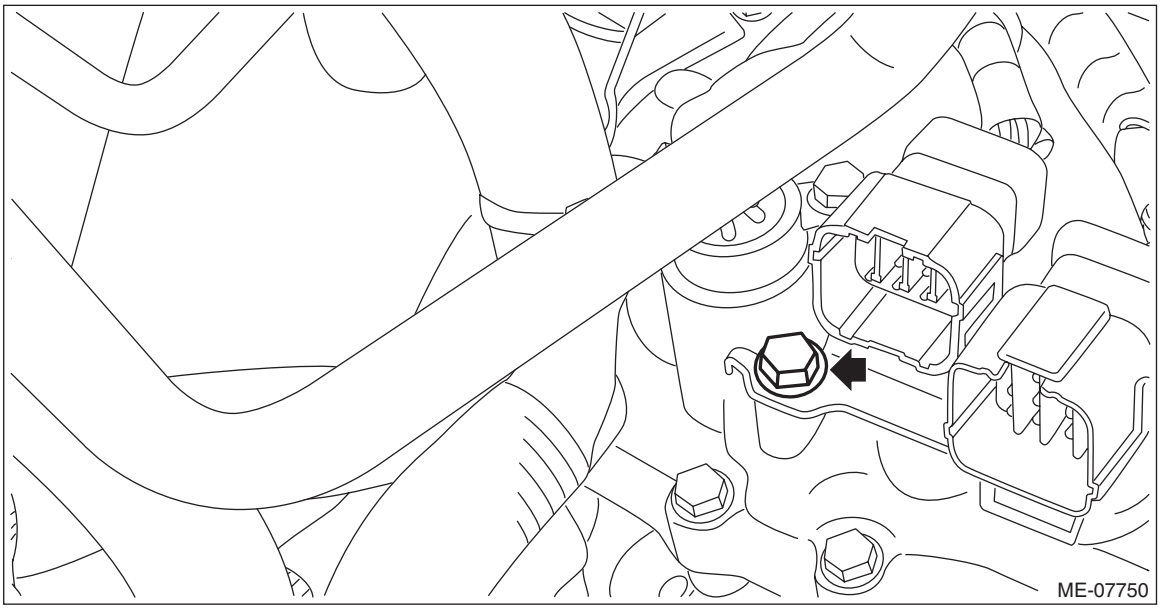
32) Disconnect the bulkhead harness connector from the transmission harness connector (C), inhibitor harness connector (D) and drive motor harness connector (E).



33) Remove the transmission case cover.

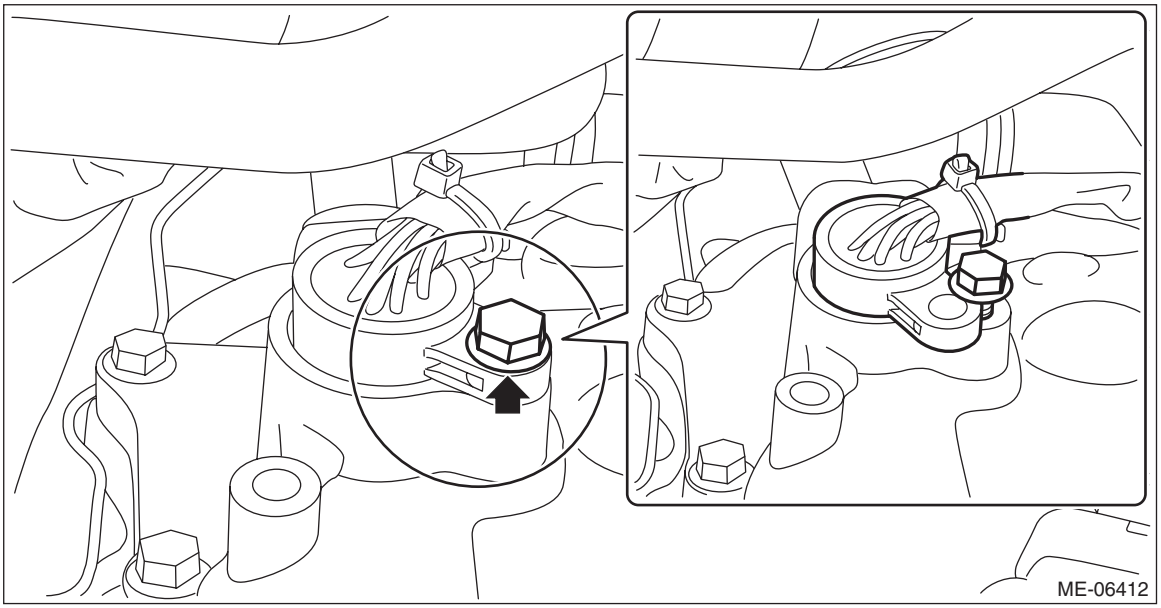


34) Remove the bolt which holds the transmission harness stay.



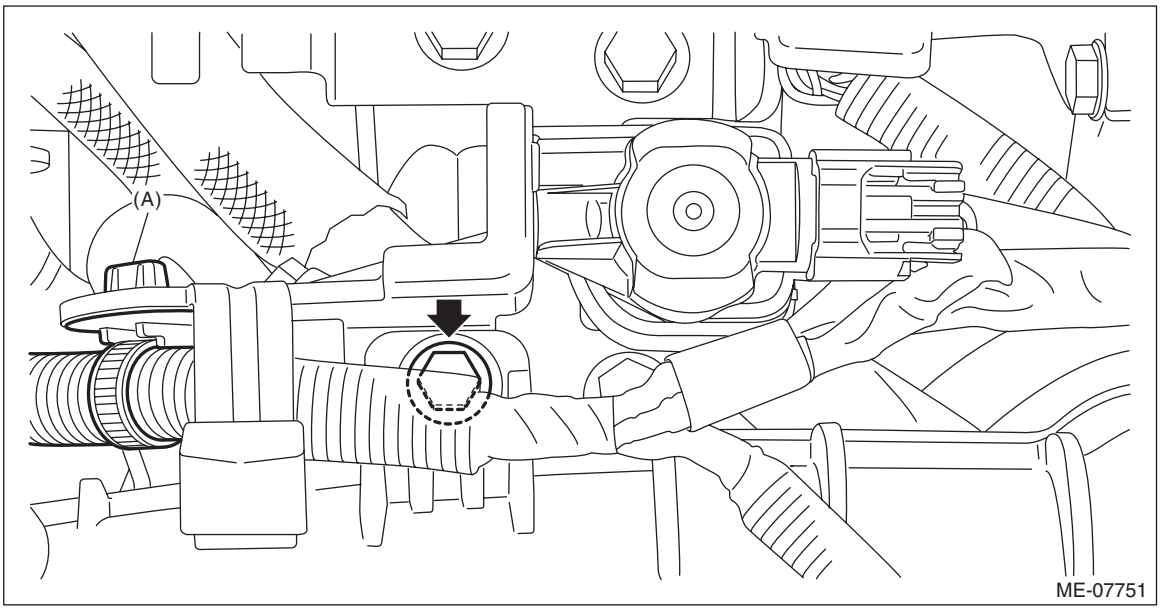
35) Remove the bolt which holds the transmission harness to the control valve body, and turn the transmission harness clockwise till the bolt hole can be seen as shown in the figure, and tighten the bolt to temporary lock the harness.

NOTE:
This procedure is required to prevent the transmission harness from touching the vehicle body during engine removal/installation.

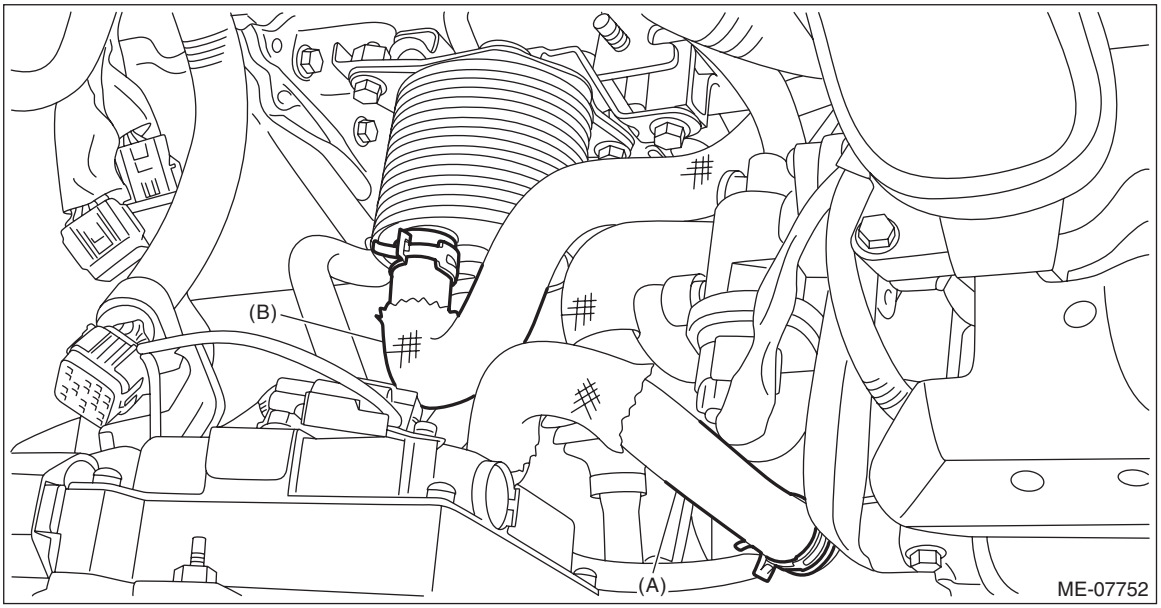


36) Remove the clip (A) securing the engine harness to the purge control solenoid valve bracket, and disconnect the bolt securing the purge control solenoid valve bracket to the intake manifold.

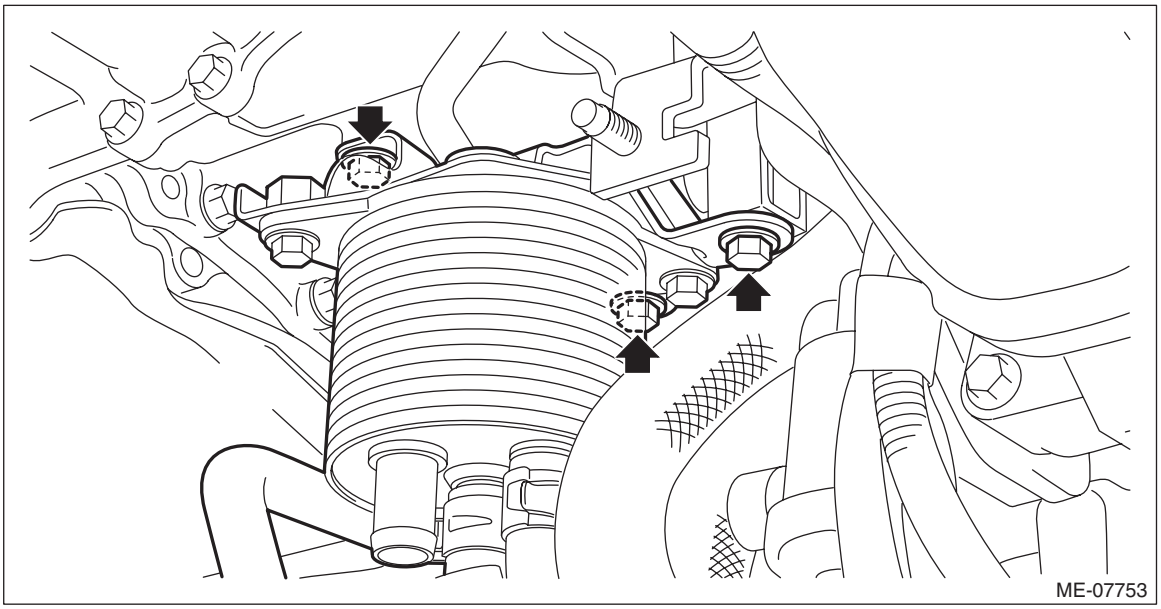
NOTE:
This procedure is required to prevent the wire rope from contacting the purge control solenoid valve during engine removal/installation.



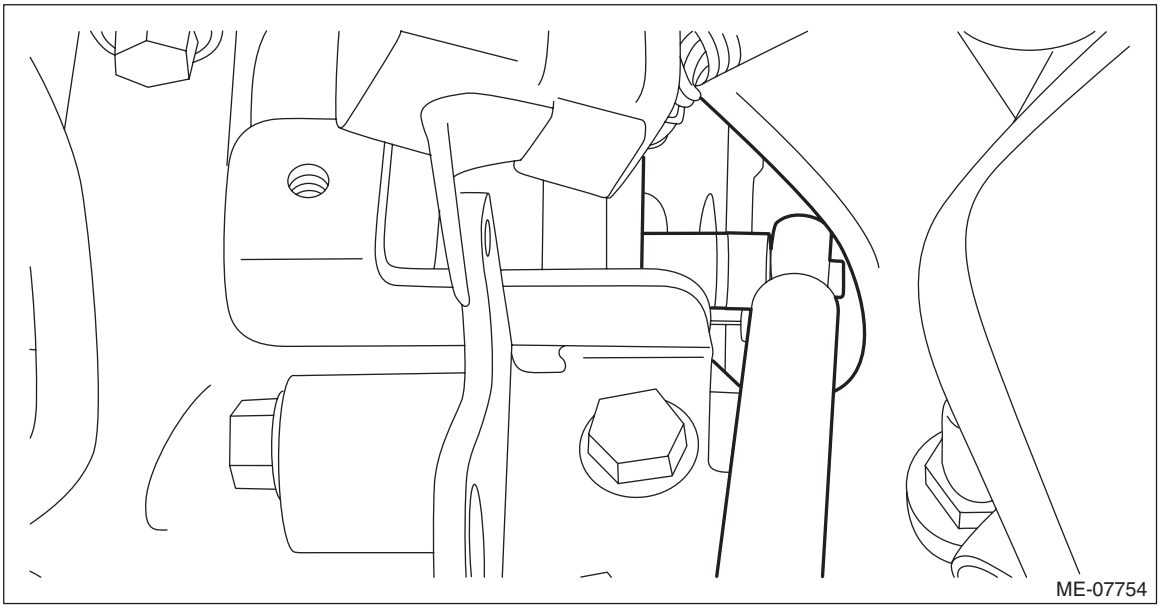
37) Disconnect the engine coolant inlet hose (A) from the EGR cooler, and disconnect the engine coolant outlet hose (B) from the CVTF cooler (with warmer feature).



38) Remove the bolt which secures the CVTF cooler (with warmer feature) to the transmission, and move it at the locations that do not interfere operation.



39) Separate the torque converter clutch from the drive plate.
(1) Remove the service hole plug.
(2) Insert the wrench into the crank pulley bolt and rotate the crank pulley to remove the bolts which hold torque converter clutch to drive plate.

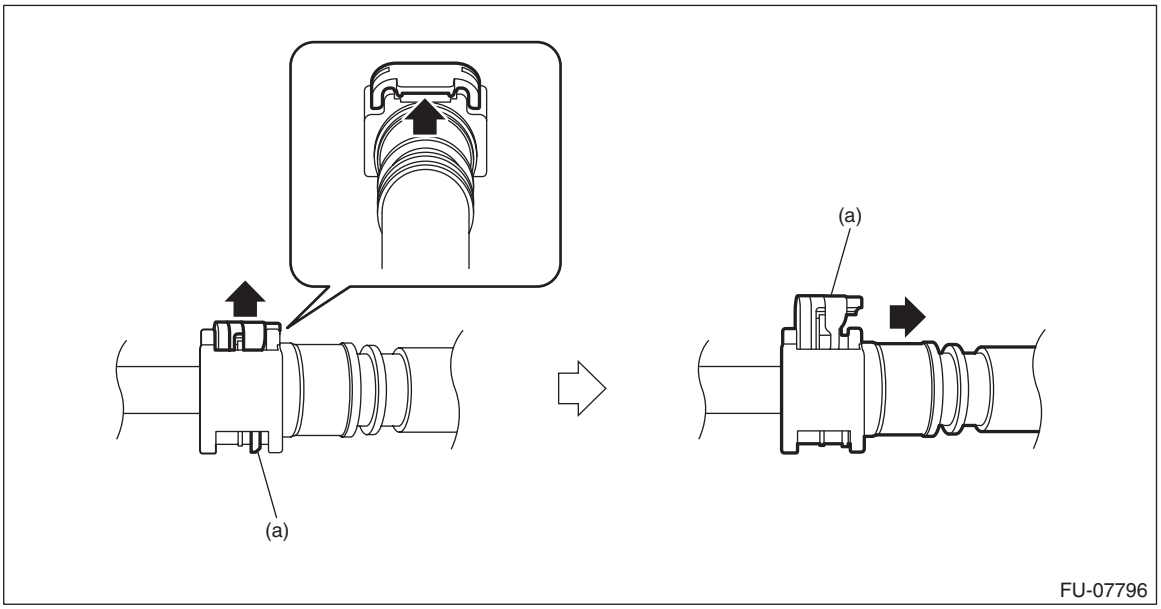


40) Disconnect the fuel delivery tube and evaporation hose.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

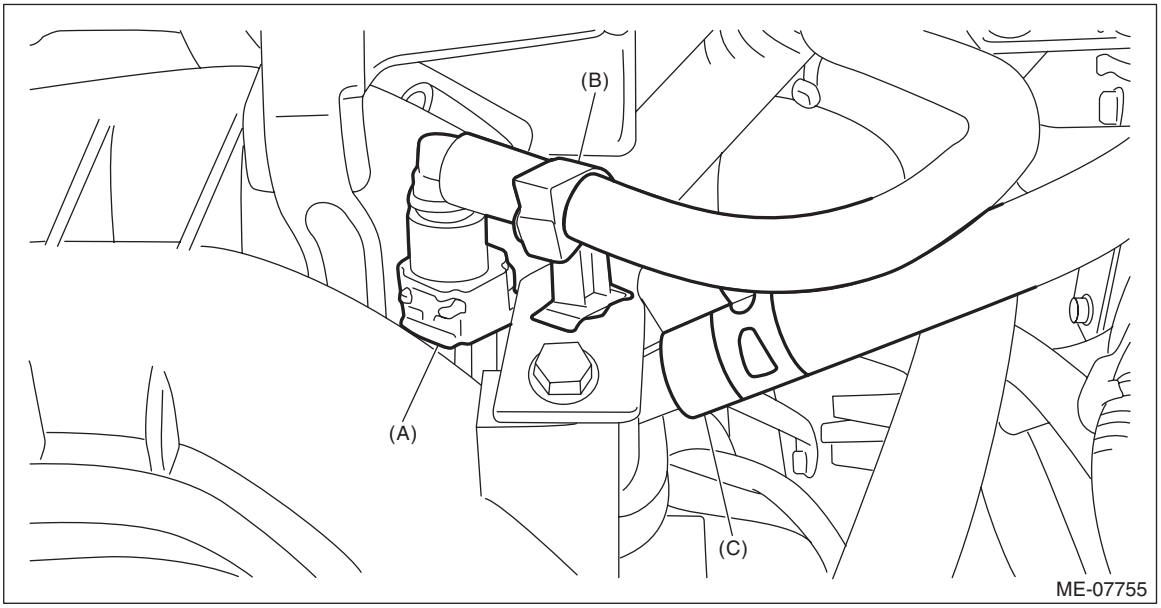
(1) Disconnect the quick connector (A) of the fuel delivery tube from the fuel pipe assembly, and remove the clip (B) securing the fuel delivery tube.

NOTE:
Disconnect the quick connector as shown in the figure.

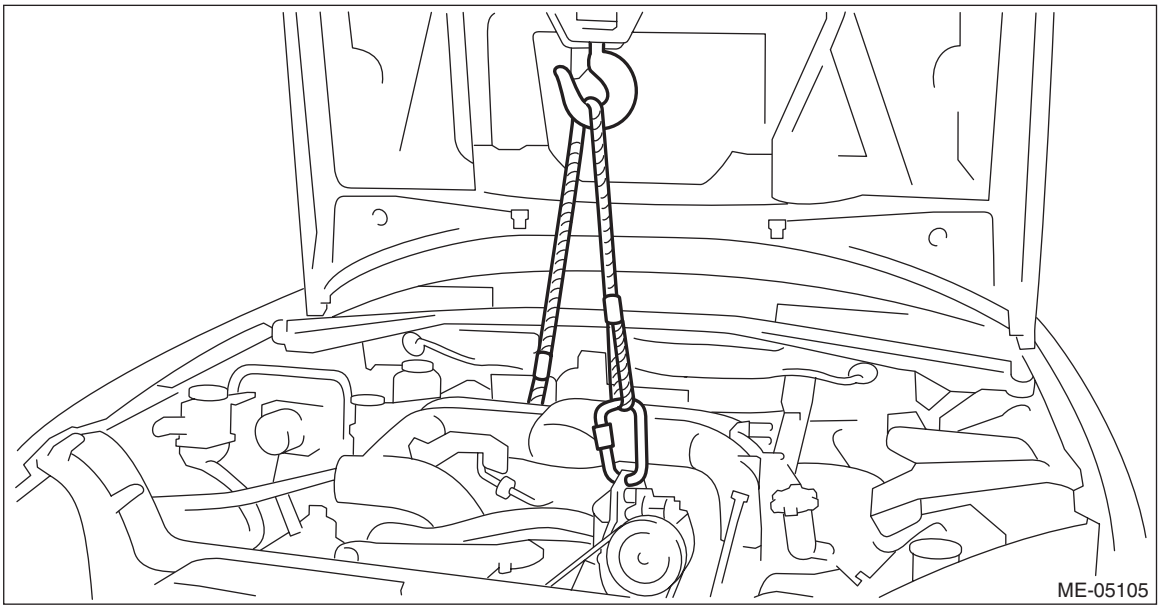


(a) Slider

(2) Disconnect the evaporation hose (C) from the fuel pipe assembly.

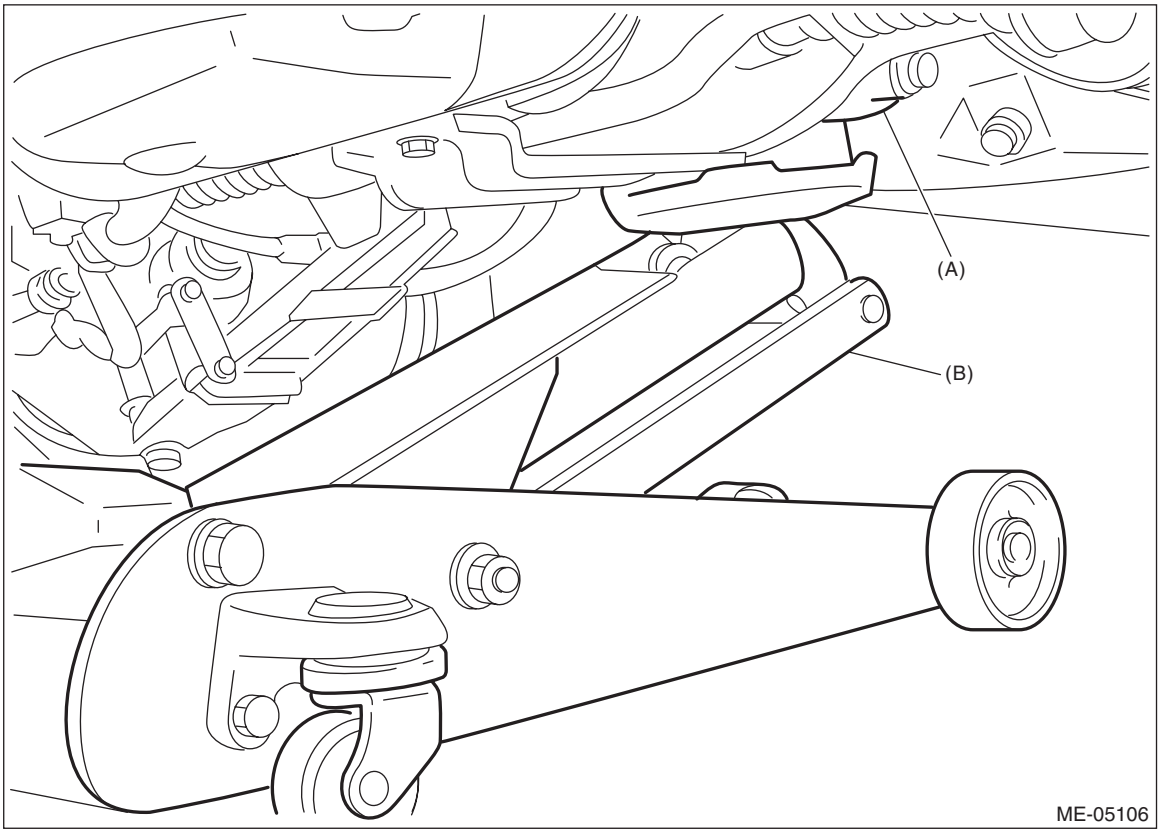


41) Support the engine with a lifting device and wire ropes.



42) Support the transmission with a garage jack.

CAUTION:
Be sure to perform this procedure to prevent the transmission from lowering by its own weight.



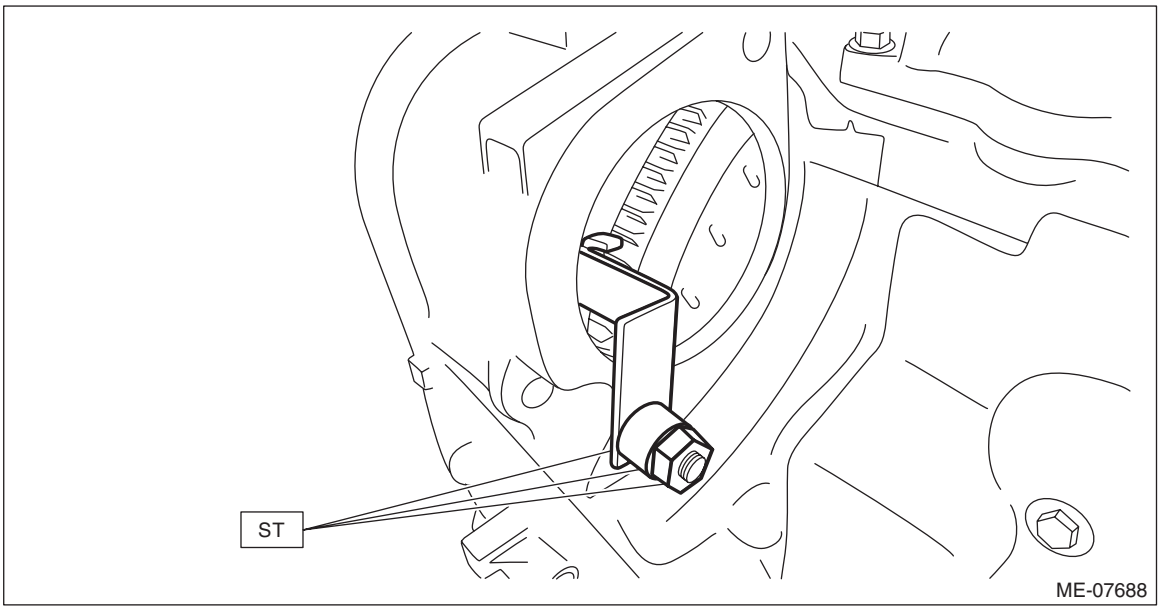
(A) Transmission
(B) Garage jack

43) Separate the engine and transmission.

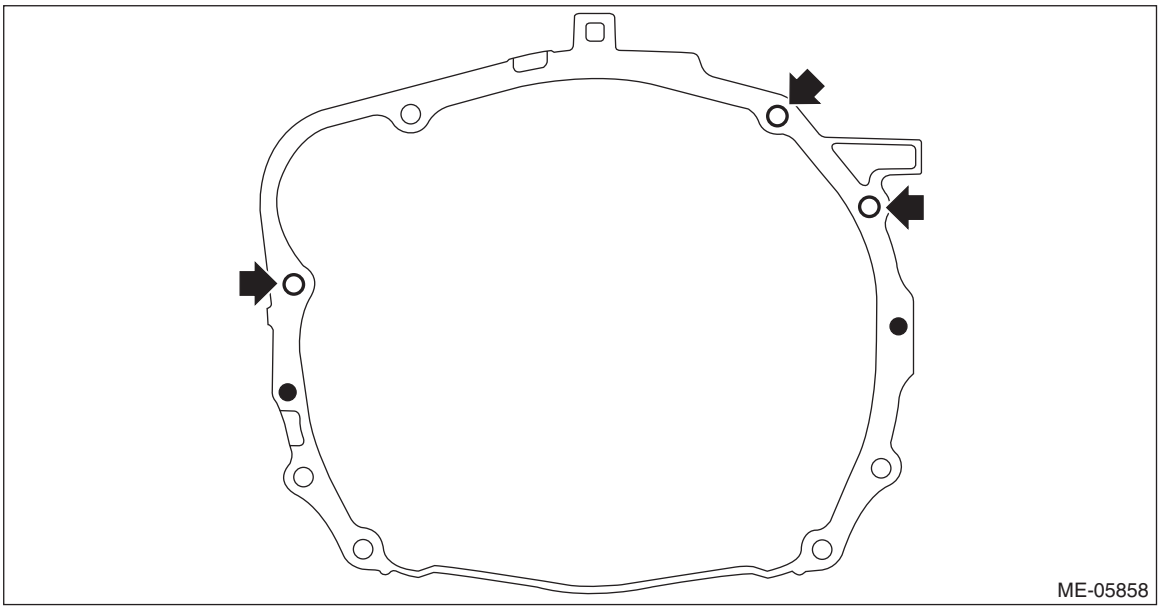
CAUTION:
Before removing the engine away from transmission, check to be sure no work has been overlooked.

(1) Remove the starter. <Ref. to SC(H4DO(HEV))-10, REMOVAL, Starter.>
(2) Attach the ST to the torque converter clutch case.

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(3) Remove the bolts which hold the upper side of the transmission to the engine.



44) Remove the engine from the vehicle.

NOTE:
Be careful not to damage adjacent parts or body panels with crank pulley, oil level gauge, etc.

(1) Slightly raise the engine.
(2) Raise the transmission with garage jack.
(3) Slowly move the engine away from engine compartment.

45) Remove the engine mounting from the engine.

B: INSTALLATION

1. GASOLINE ENGINE MODEL

1) Install the engine mounting onto the engine.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)

2) Apply a small amount of grease to splines of main shaft. (MT model)

Grease:
NICHIMOLY N-130 or equivalent

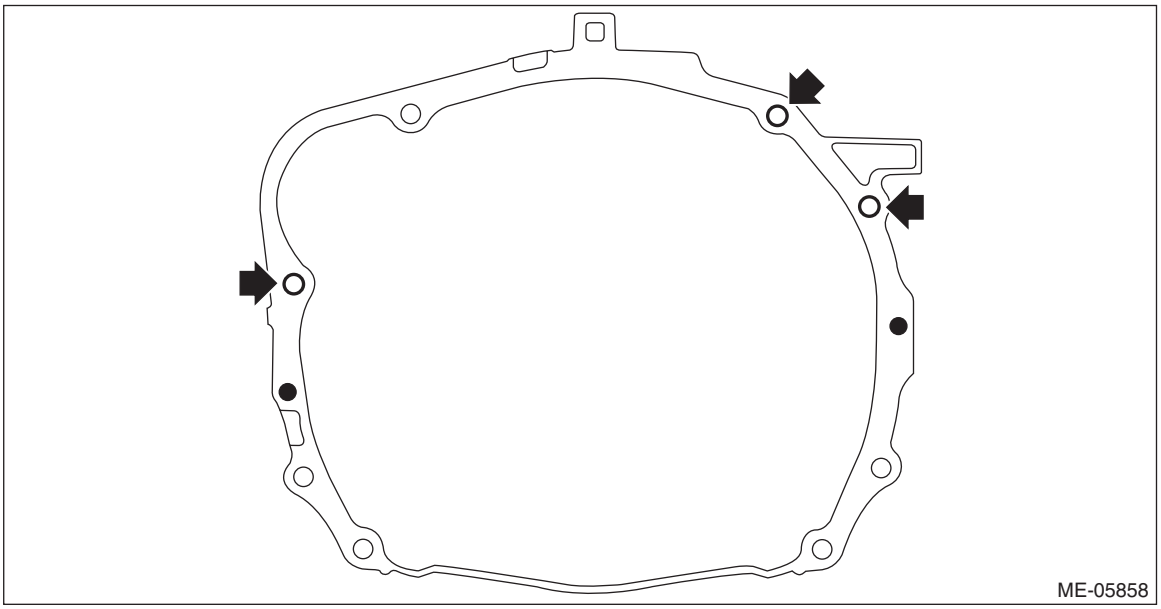
3) Position the engine in engine compartment and align it with transmission.

NOTE:
Be careful not to damage adjacent parts or body panels with crank pulley, oil level gauge, etc.

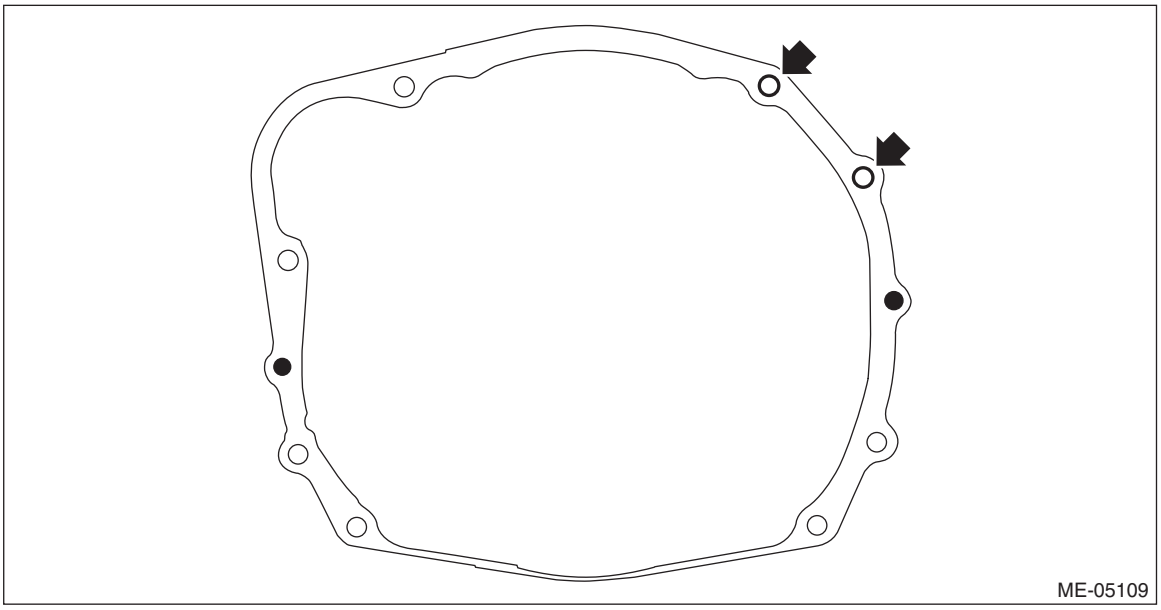
4) Install the bolts which hold upper side of transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

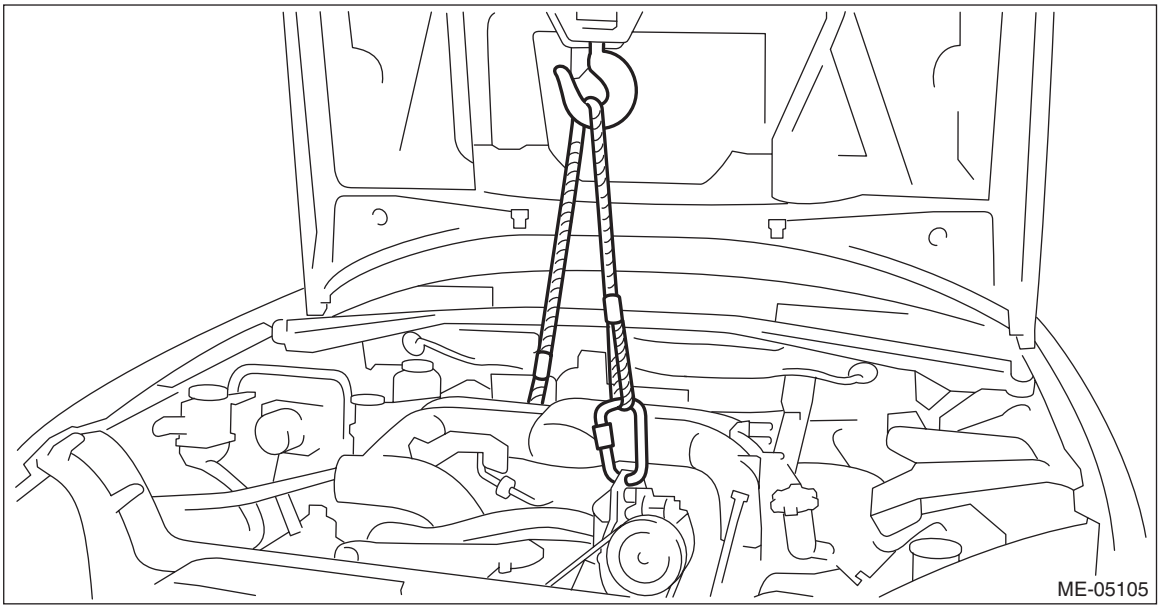
- CVT model



- MT model



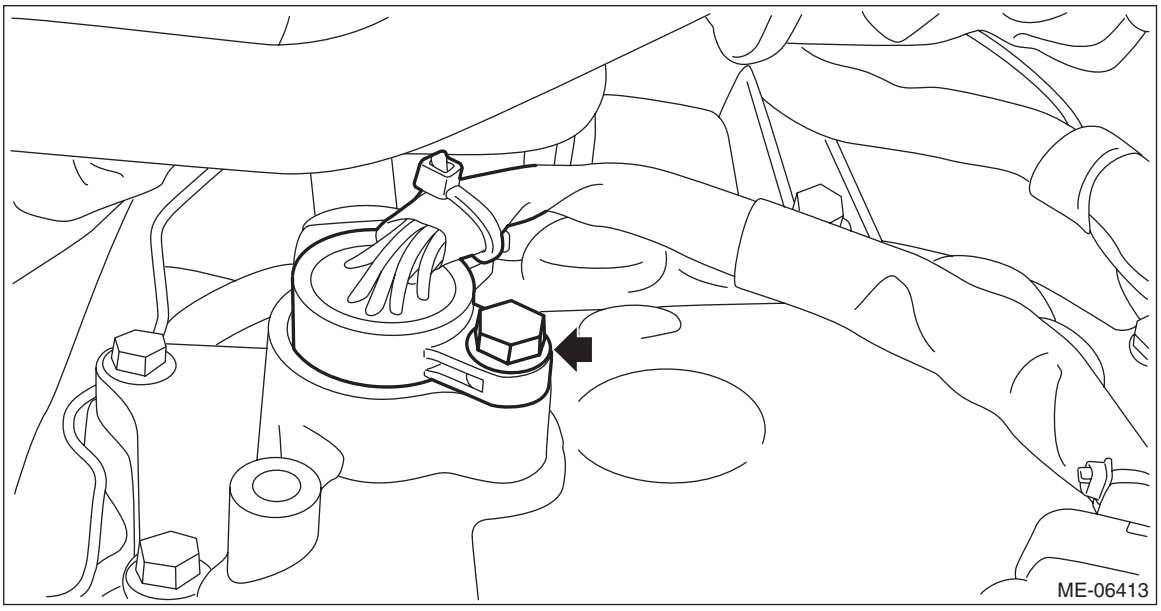
5) Remove the lifting device and wire ropes.



6) Remove the garage jack.

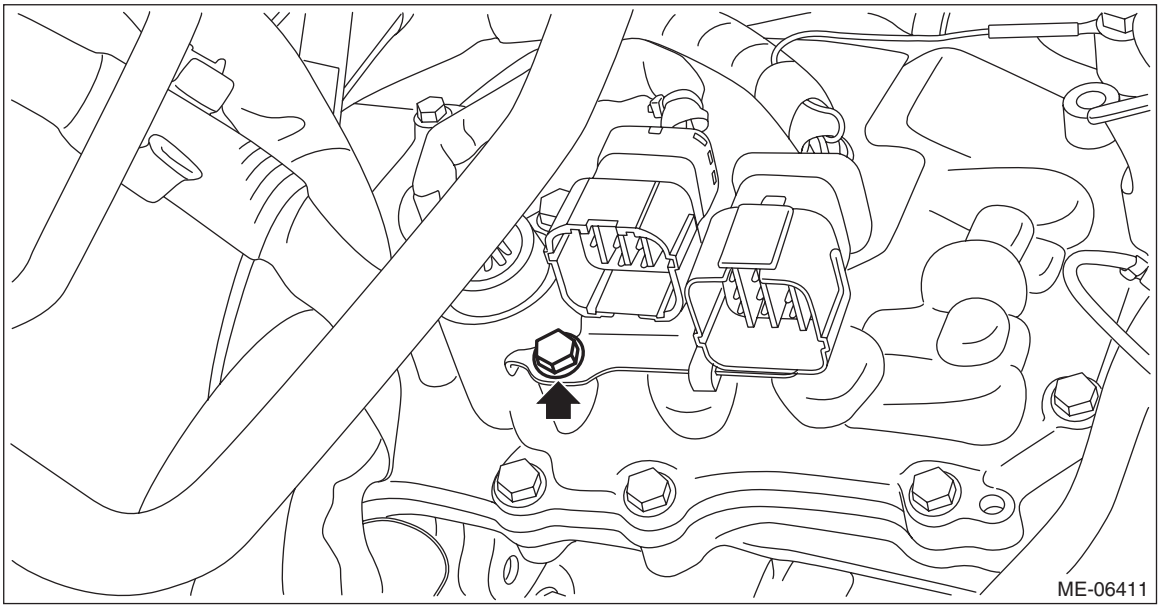
7) Remove the bolt and turn the transmission harness counterclockwise to install the transmission harness to the control valve body. (CVT model)

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



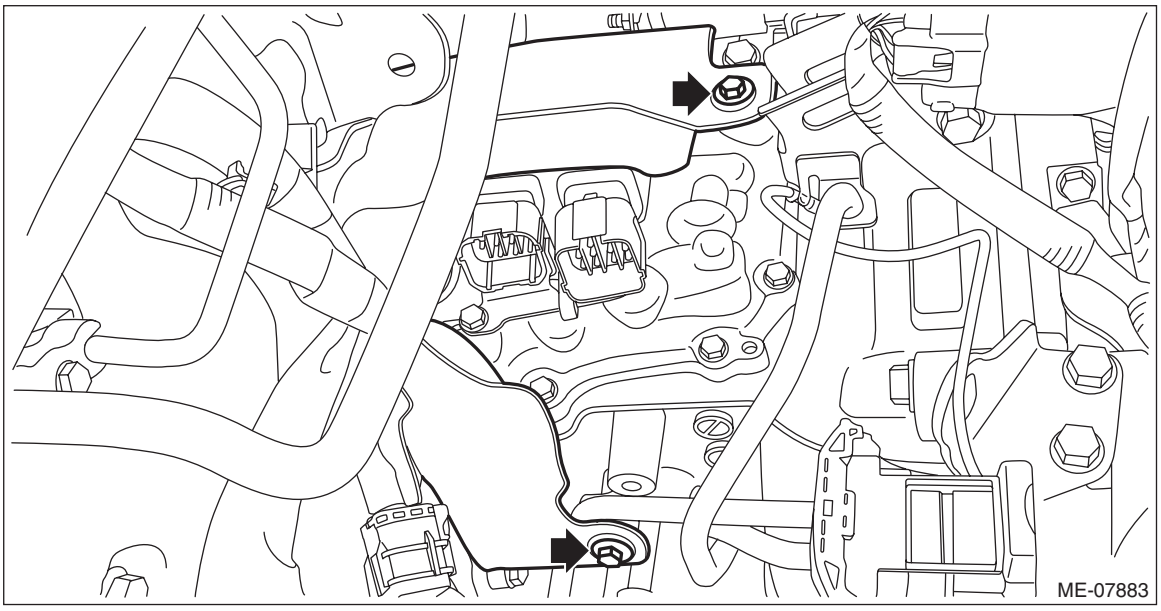
8) Install the bolt which holds the transmission harness stay. (CVT model)

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



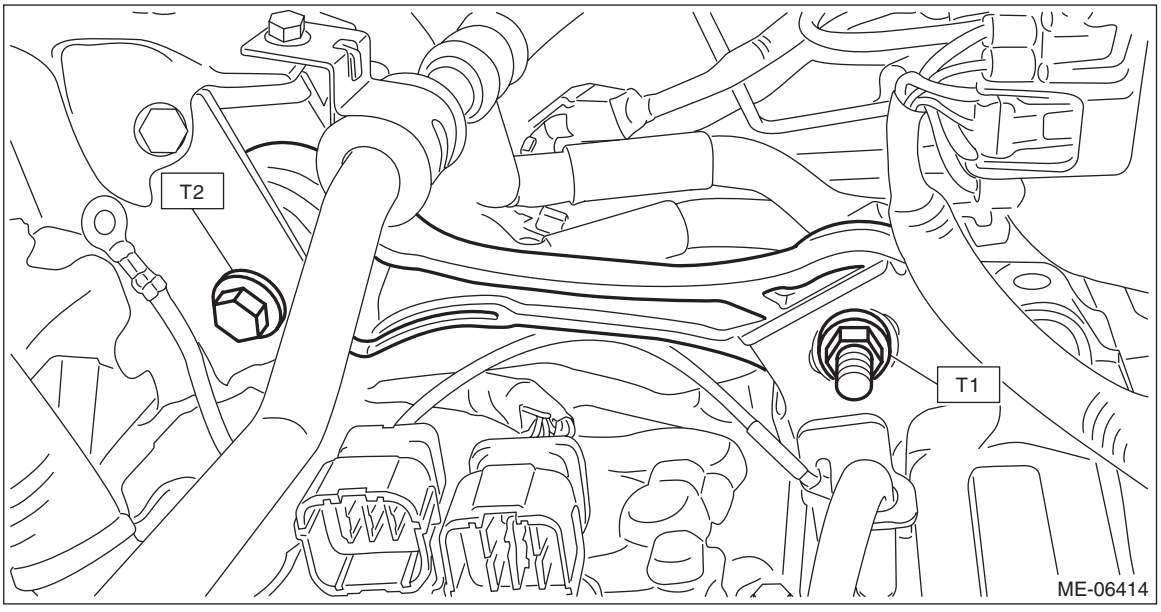
9) Install the transmission case cover. (CVT model)

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



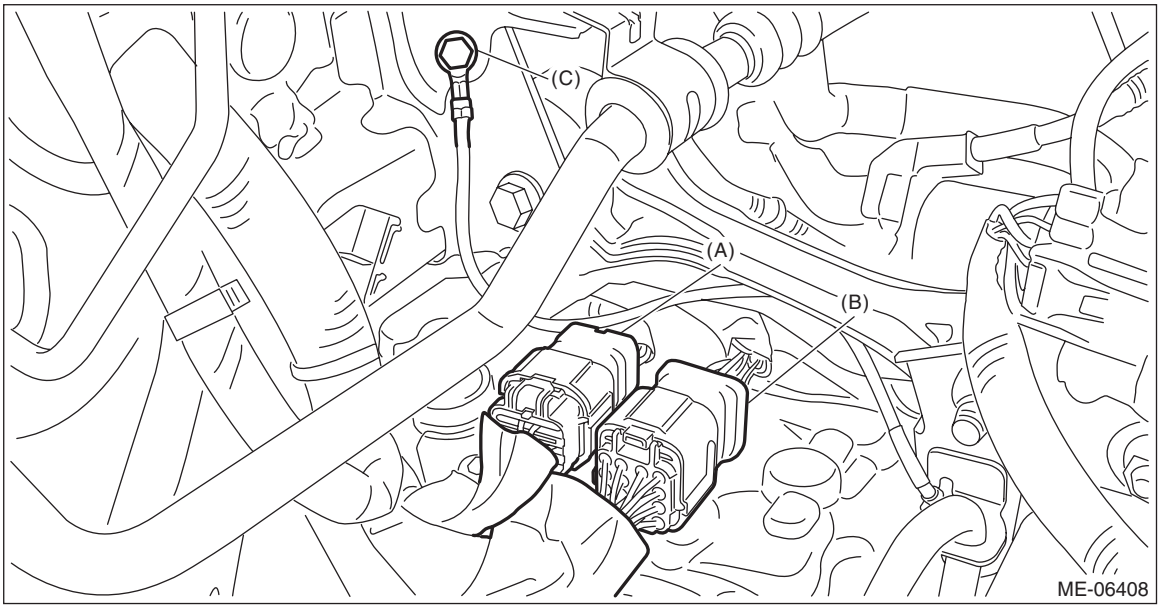
10) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



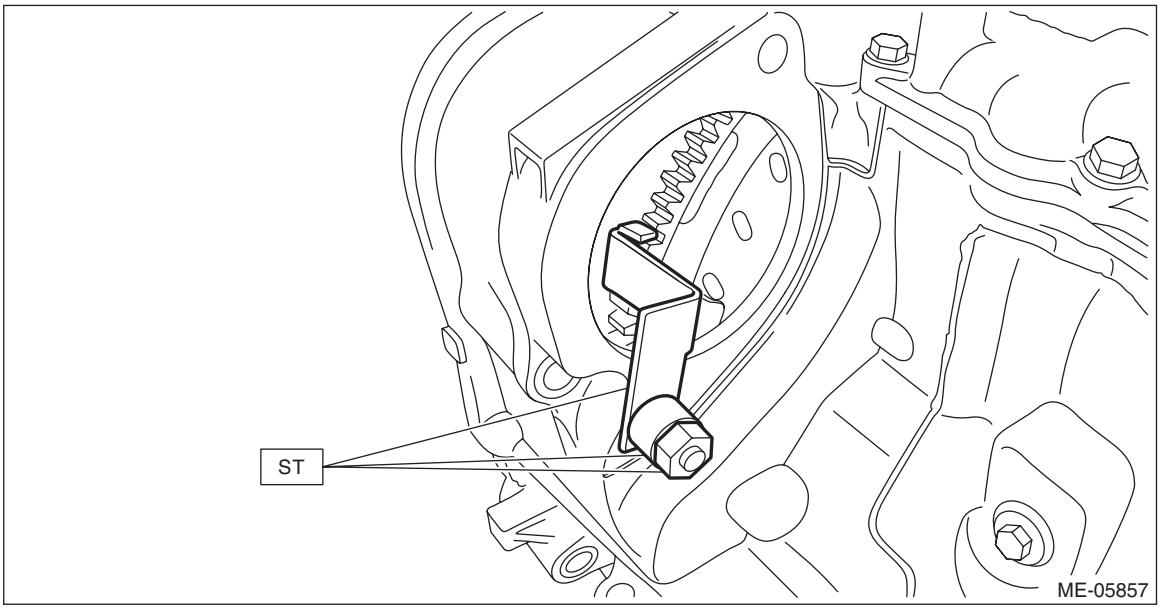
11) Connect the transmission radio ground terminal (C) to the vehicle body, and connect the bulkhead harness connector to the transmission harness connector (A) and the inhibitor harness connector (B). (CVT model)

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



12) Remove the ST from torque converter clutch case. (CVT model)

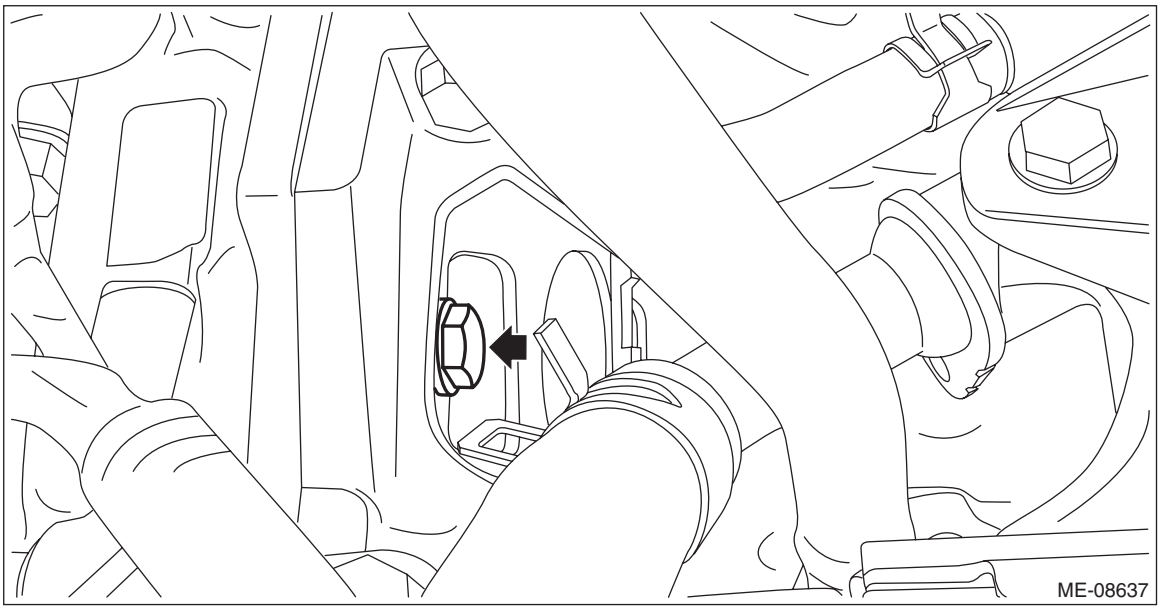
NOTE:
Be careful not to drop the ST into the torque converter clutch case when removing the ST.
ST 498277200 STOPPER SET



13) Install the torque converter clutch to drive plate. (CVT model)
(1) Insert the wrench into the crank pulley bolt, and rotate the crank pulley to attach the four bolts securing the torque converter clutch to the drive plate.

NOTE:
Be careful not to drop bolts into the torque converter clutch case.

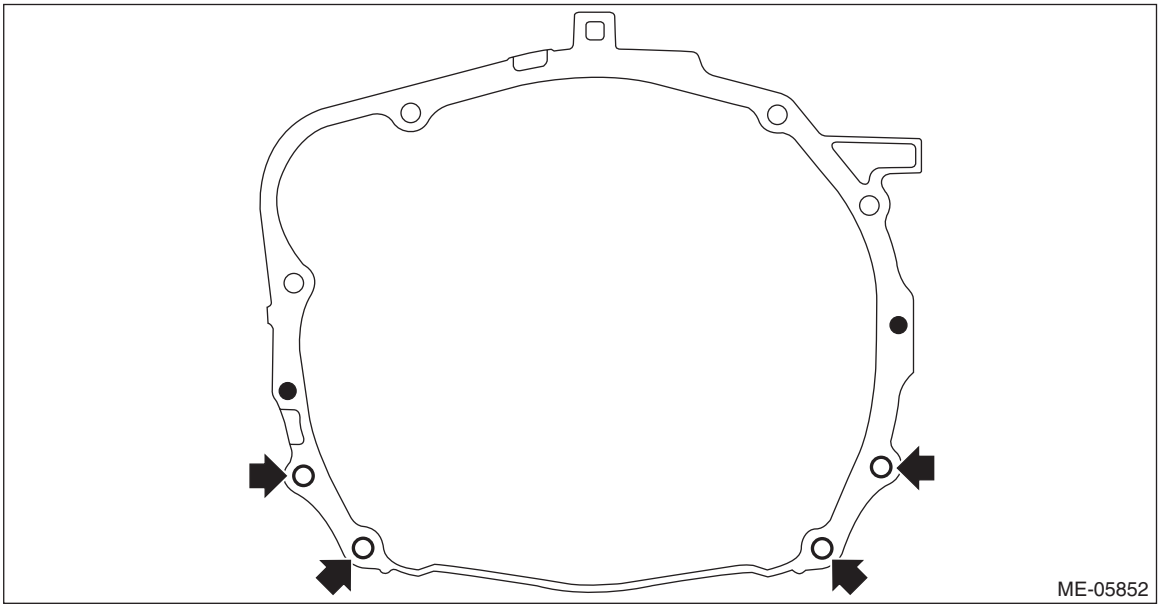
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



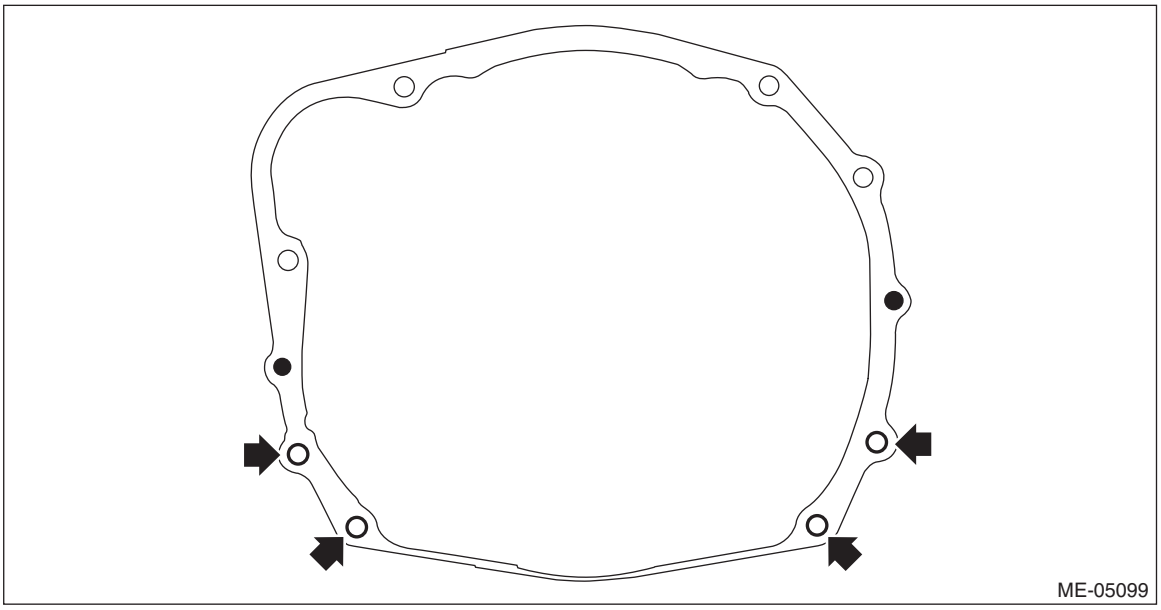
(2) Fit the plug to service hole.
(3) Install the throttle body. <Ref. to FU(H4DO(w/o HEV))-17, INSTALLATION, Throttle Body.>
14) Install the starter. <Ref. to SC(H4DO(w/o HEV))-10, INSTALLATION, Starter.>
15) Lift up the vehicle.
16) Install the bolts and nuts which hold lower side of the transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

- CVT model



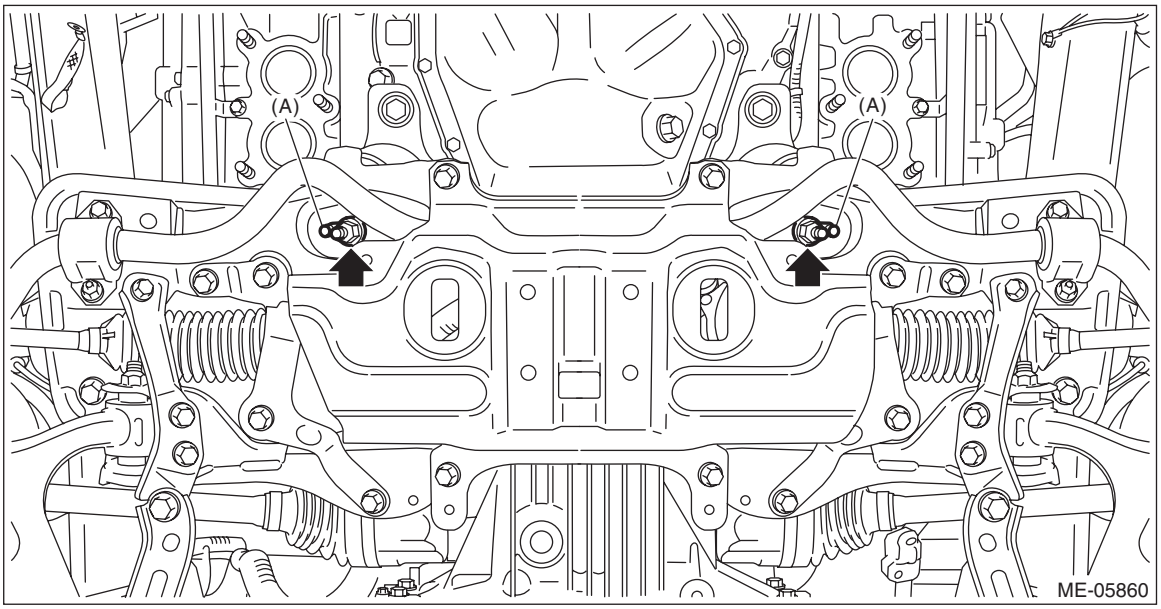
- MT model



17) Install the nuts which hold the engine mounting to the crossmember. (CVT model)

NOTE:
- Make sure that locators (A) of the engine mounting are securely inserted.
- Use a new nut.

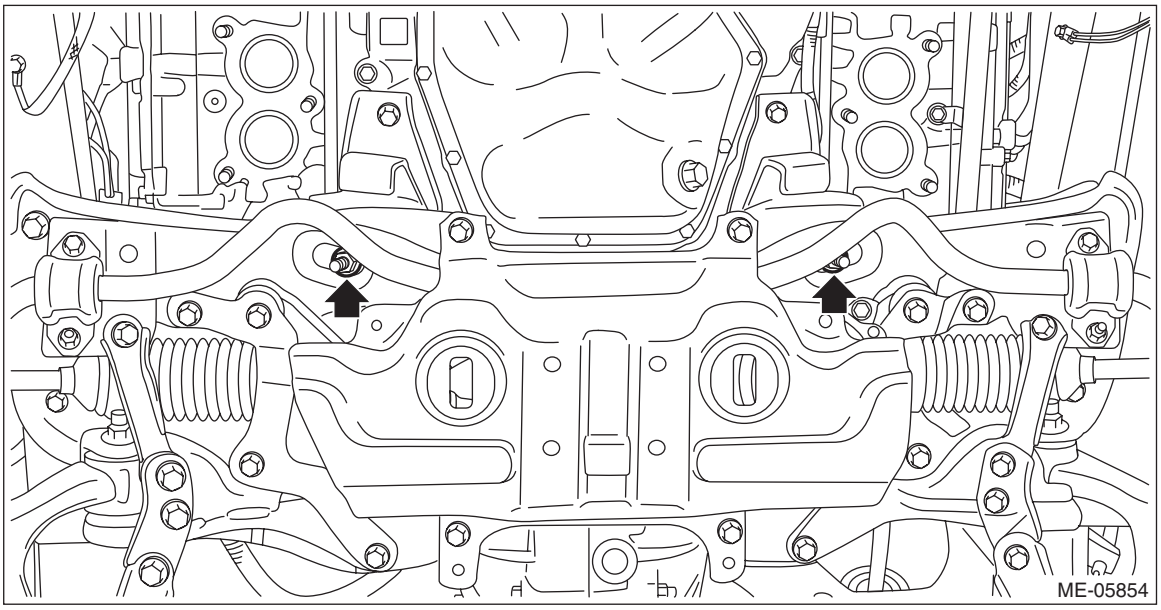
Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



18) Install the nuts which hold the engine mounting to the crossmember. (MT model)

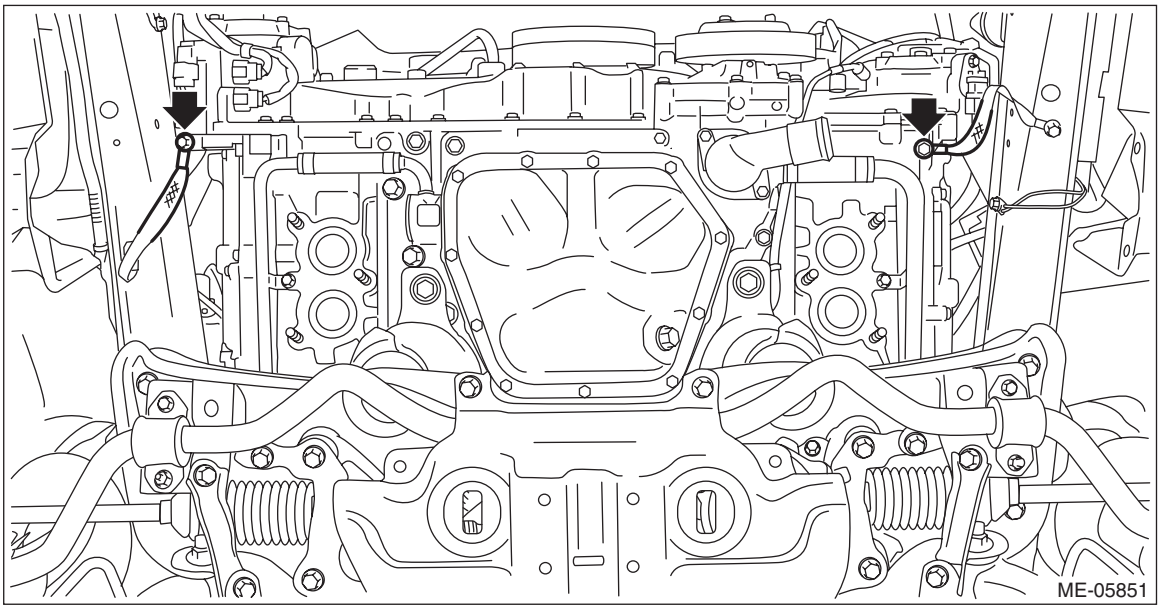
NOTE:
Use a new nut.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



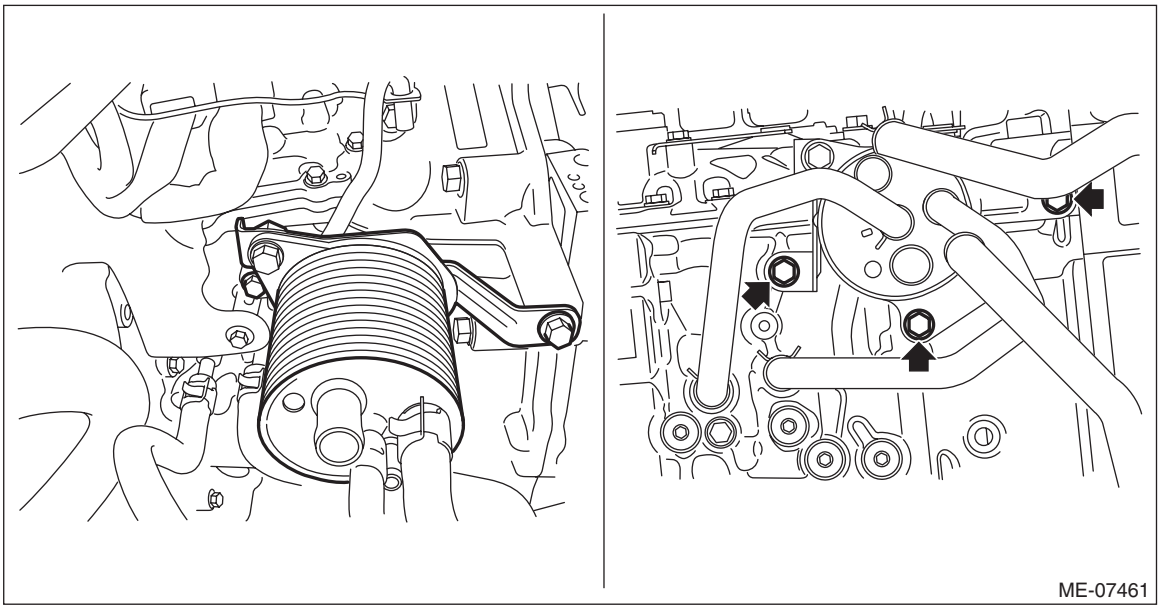
19) Connect the ground cable.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

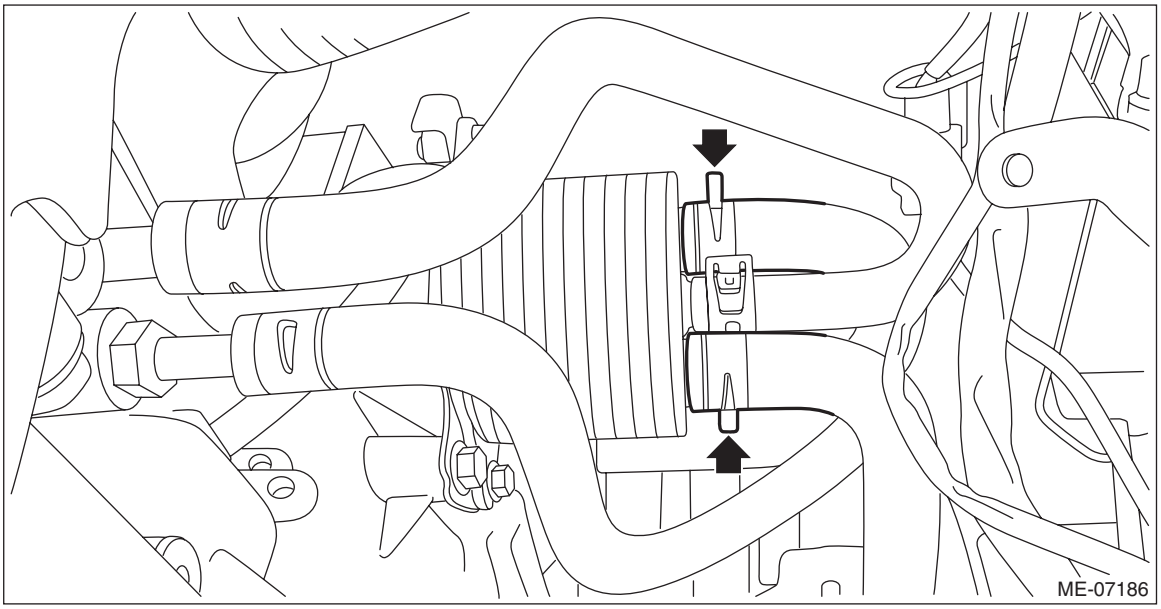


20) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
21) Lower the vehicle.
22) Install the CVTF cooler (with warmer feature) to the transmission. (CVT model)

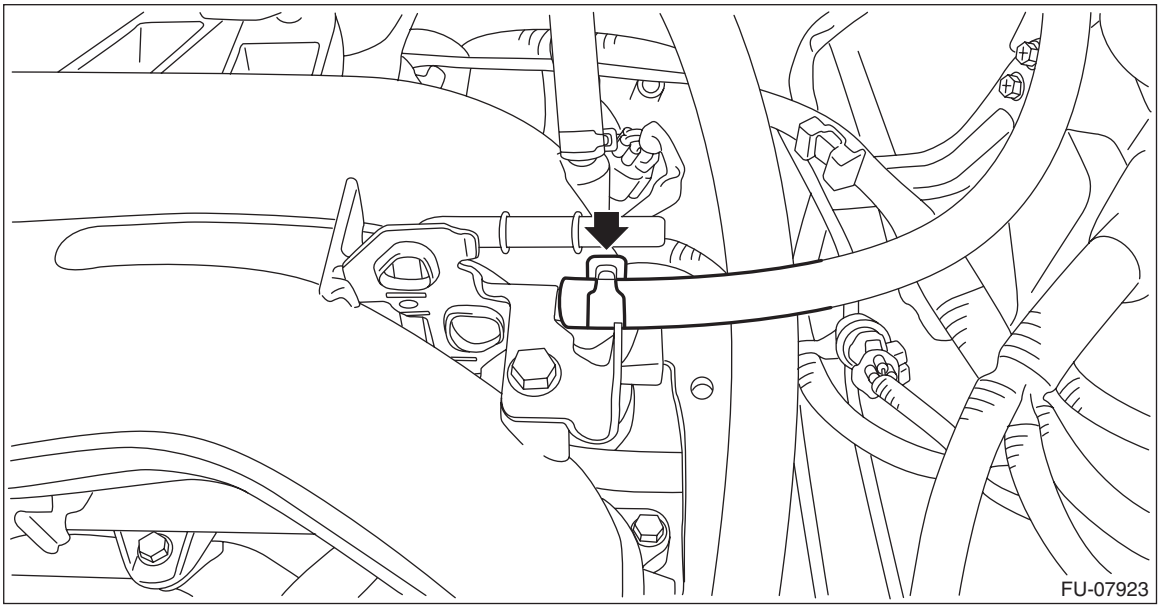
Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



23) Connect the water hose to the CVTF cooler (with warmer feature). (CVT model)



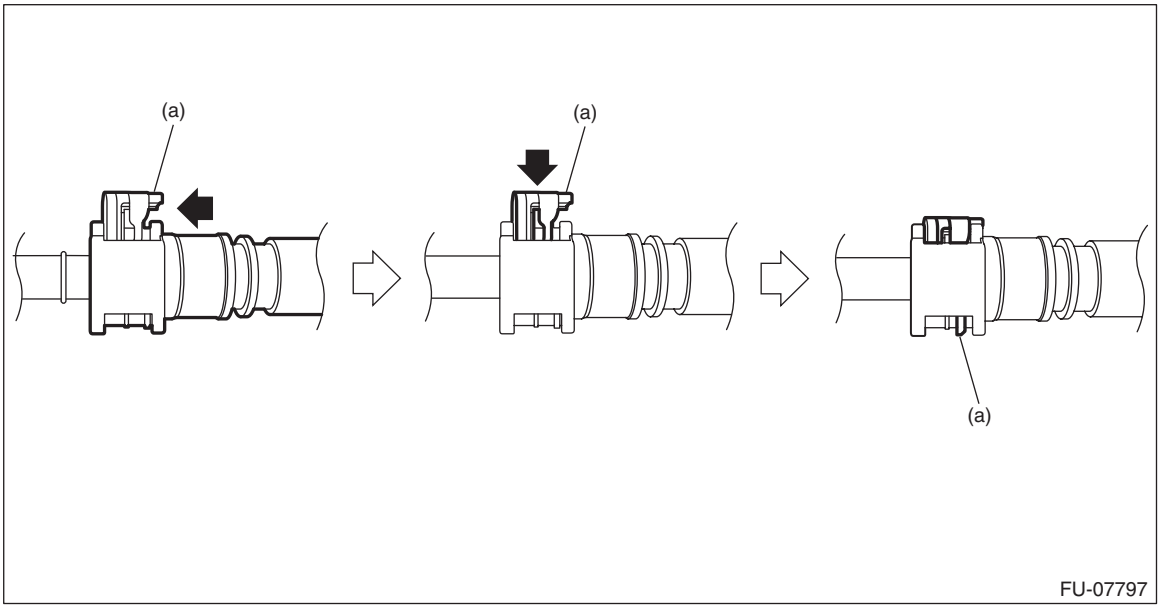
24) Connect the fuel delivery tube and evaporation hose.
(1) Connect the evaporation hose to fuel pipe assembly.



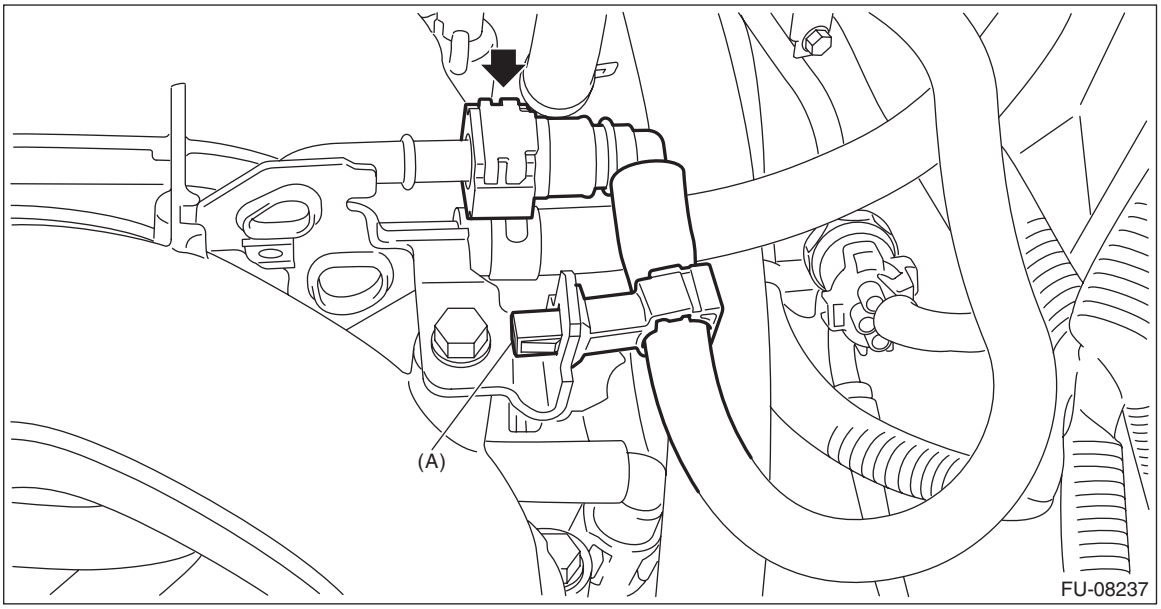
(2) Connect the quick connector on the fuel delivery tube to the fuel pipe assembly, and fix the fuel delivery tube using clip (A).

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.

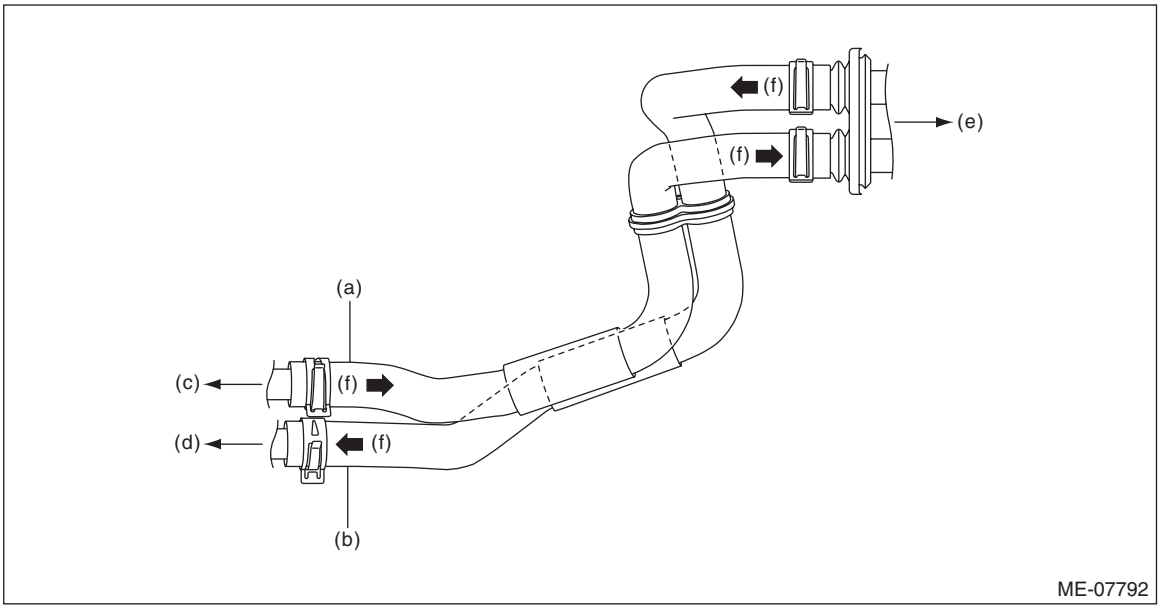


(a) Slider



25) Connect the heater inlet hose and heater outlet hose.

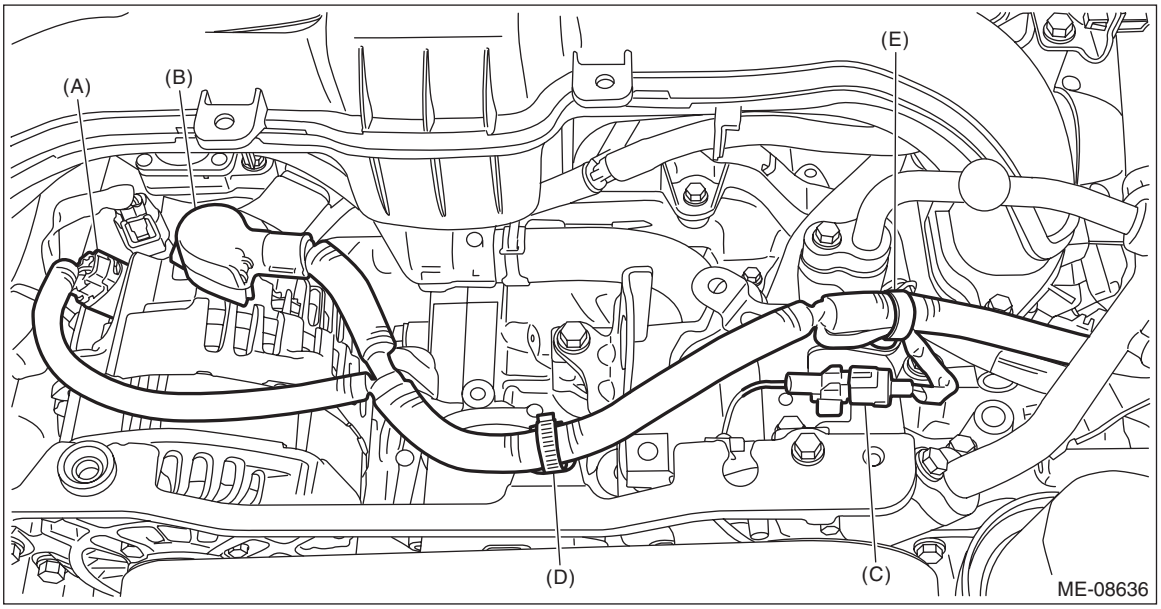
NOTE:
Be careful not to mix up the heater inlet hose and the heater outlet hose when connecting them.



(a)	Heater inlet hose	(c)	To water pipe ASSY	(e)	To heater core ASSY
(b)	Heater outlet hose	(d)	To water pipe LH	(f)	Engine coolant flow

26) Connect the A/C pressure hose to A/C compressor. <Ref. to AC-69, INSTALLATION, Hose and Pipe.>
27) Place the generator code and install the generator cord to the clip (D) and clip (E).
28) Connect connector (A) and terminal (B) to the generator, and connect connector (C) to A/C compressor.

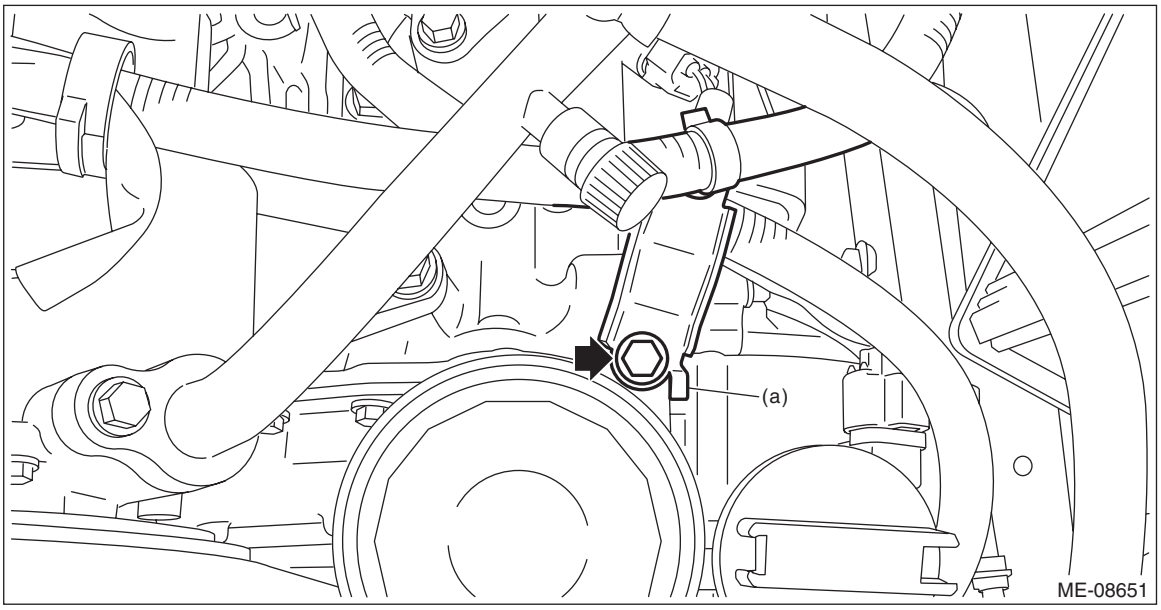
Tightening torque:
15 N·m (1.5 kgf-m, 11.1 ft-lb)



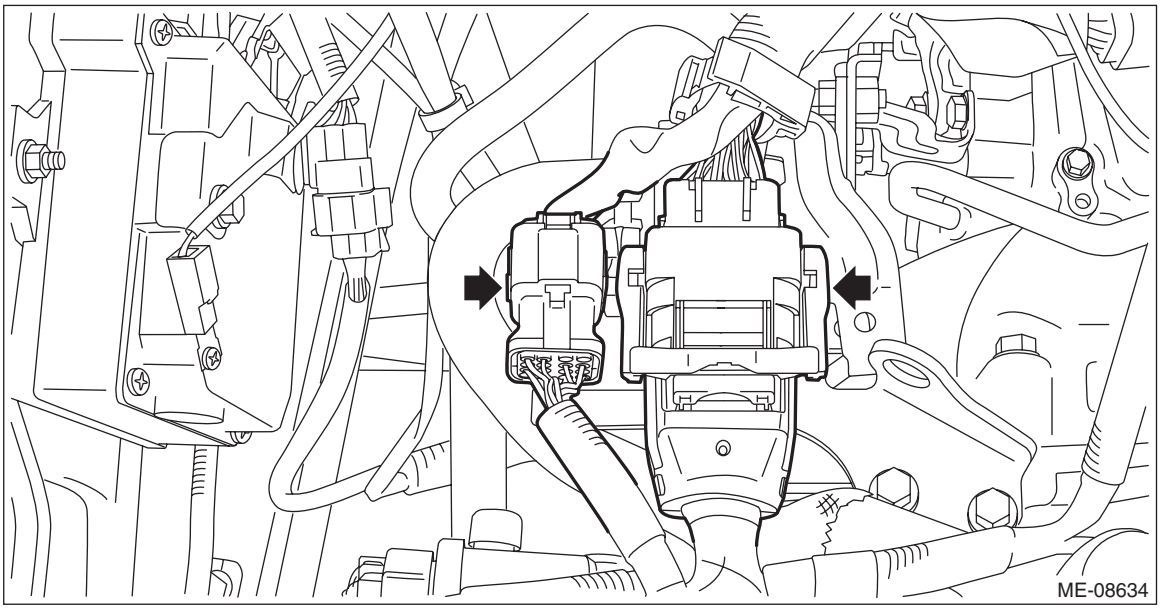
29) Install the generator cord stay to the chain cover.

NOTE:
Install the generator cord stay so that the folded end (a) touches the chain cover boss.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

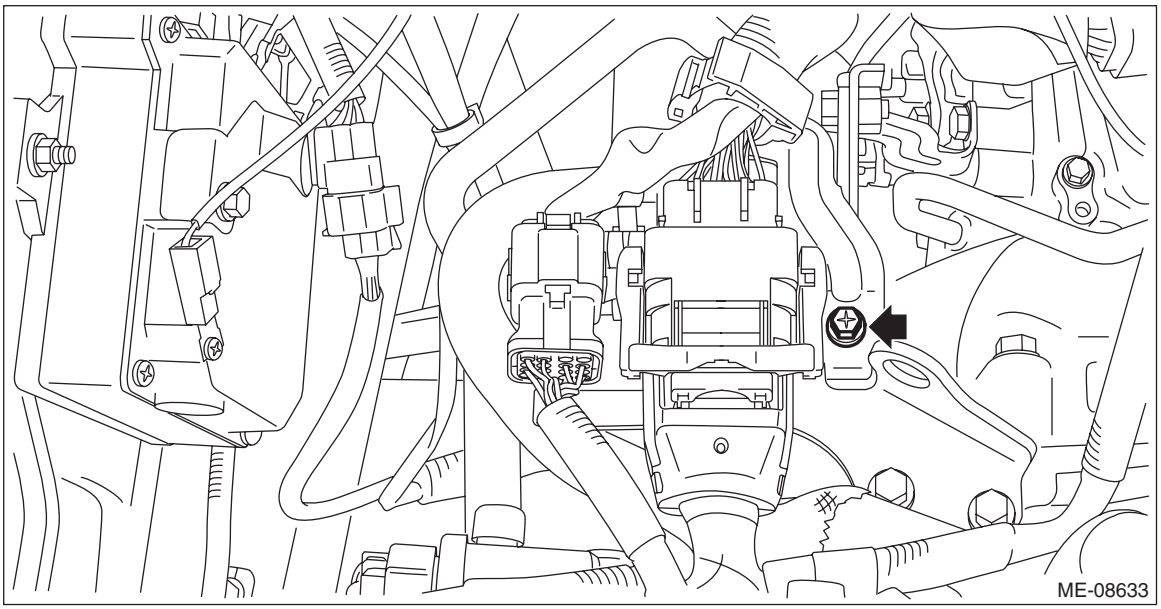


30) Connect the engine harness connector.
(1) Connect the bulkhead harness connector to the engine harness connector (black) and engine harness connector (brown).

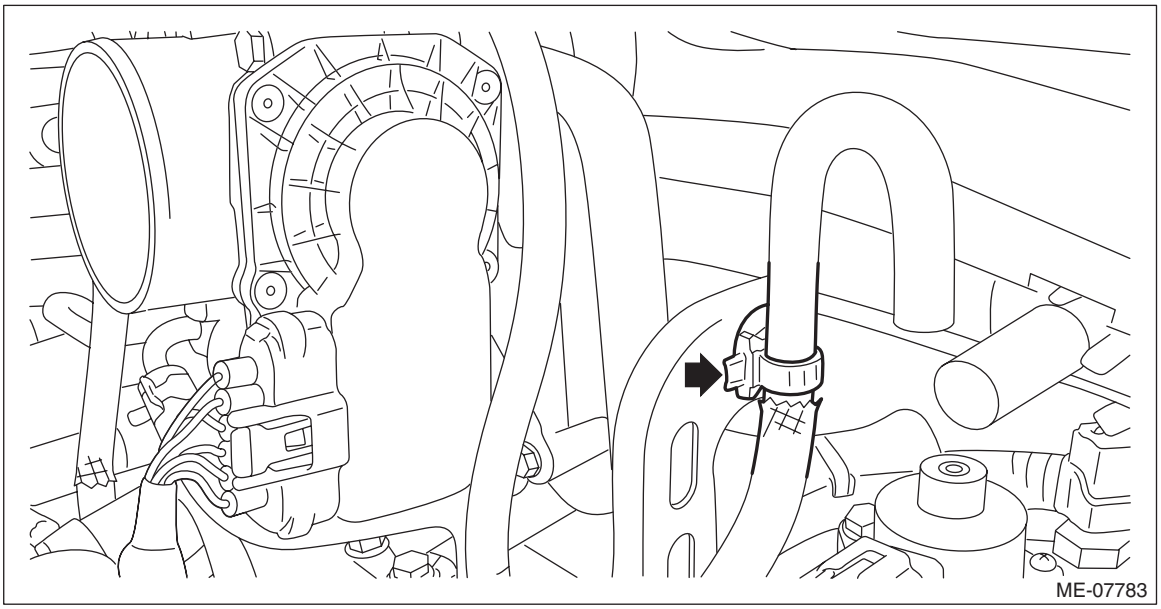


(2) Install the bolt which secures the bulkhead harness connector bracket.

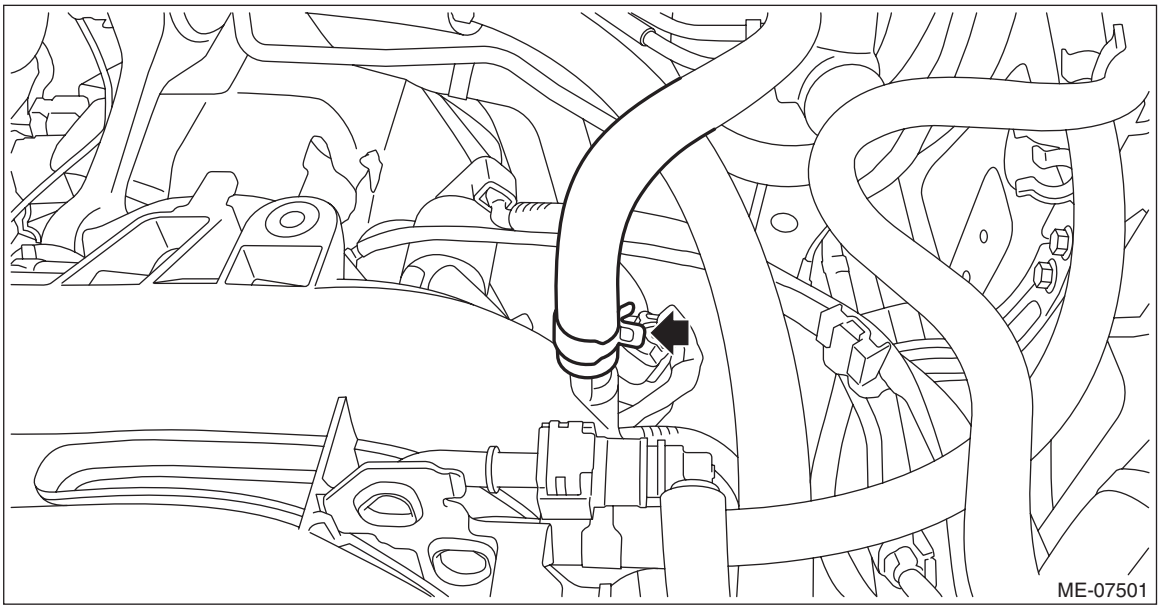
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



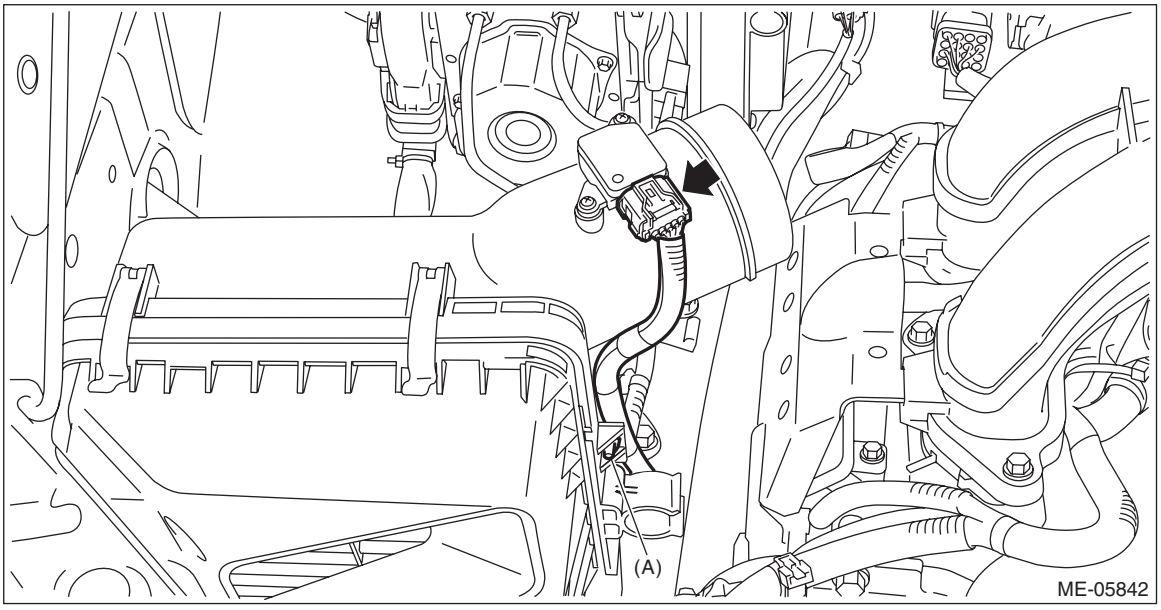
31) Secure the air breather hose to the engine rear hanger using clip. (MT model)



32) Connect the brake booster vacuum hose to the intake manifold.

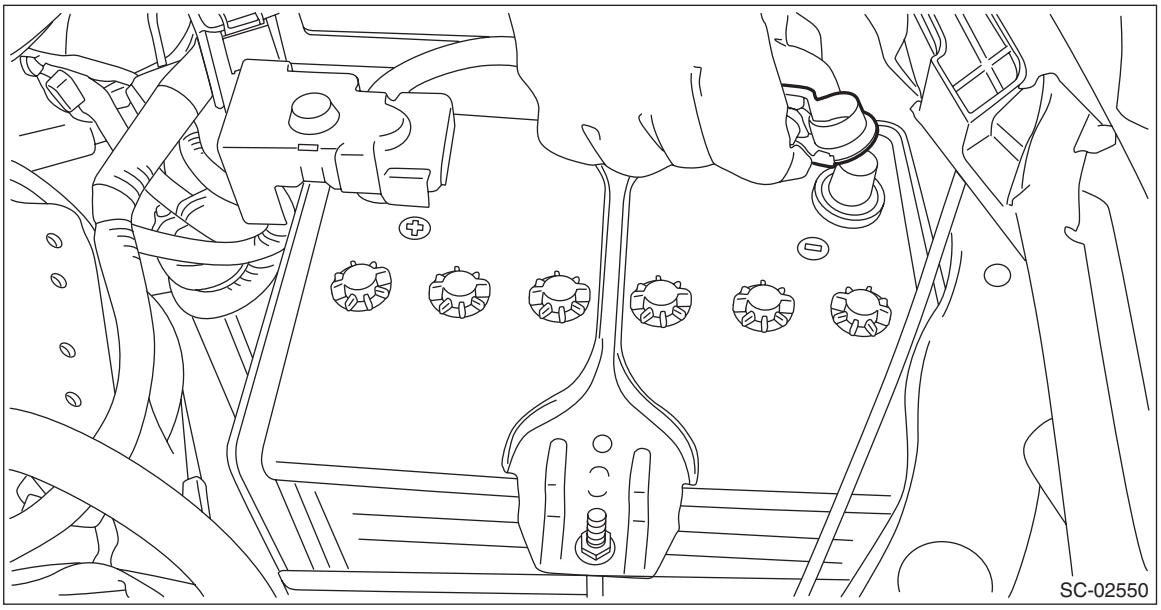


33) Install the radiator. <Ref. to CO(H4DO(w/o HEV))-81, INSTALLATION, Radiator.>
34) Install the air cleaner case (rear) together with the air cleaner element. <Ref. to IN(H4DO(w/o HEV))-9, INSTALLATION, Air Cleaner Case.>
35) Secure the bulkhead wiring harness with clip (A) and connect the connector to the mass air flow and intake air temperature sensor.



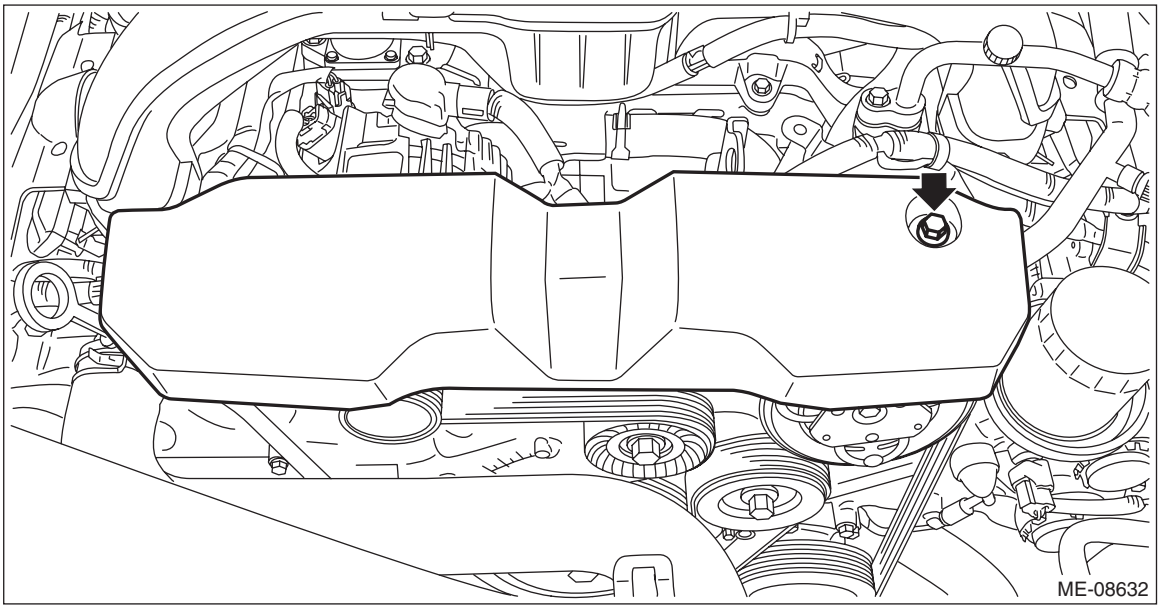
36) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
37) Install the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, INSTALLATION, Air Intake Duct.>

38) Connect the battery ground terminal.

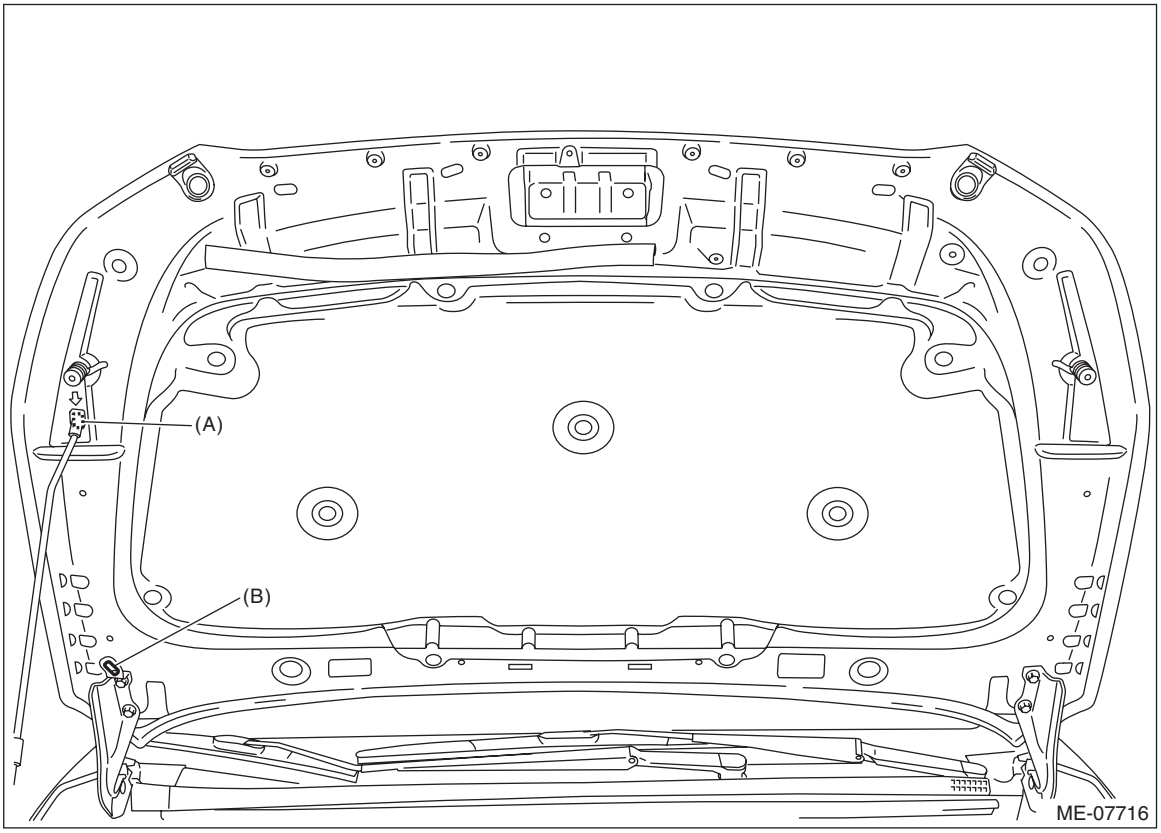


39) Charge the A/C system with refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>
40) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
41) Install the V-belt cover.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)

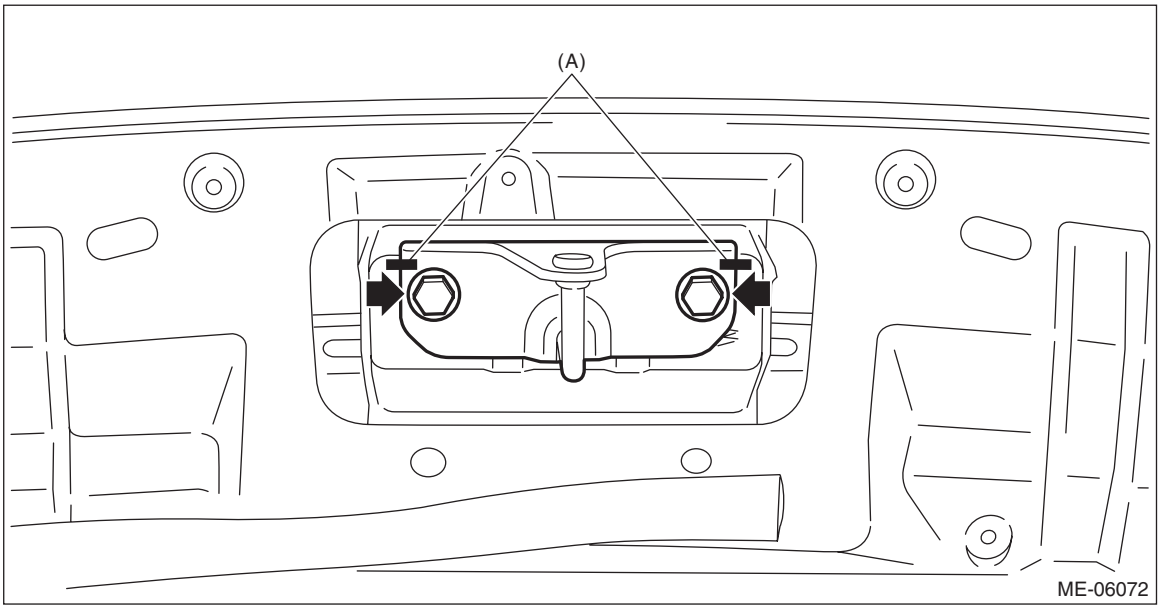


42) Change the front hood stay position from (B) to (A).



43) Install the front hood striker to the front hood by aligning the alignment marks (A), and close the front hood.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



2. HEV MODEL

1) Install the engine mounting onto the engine.

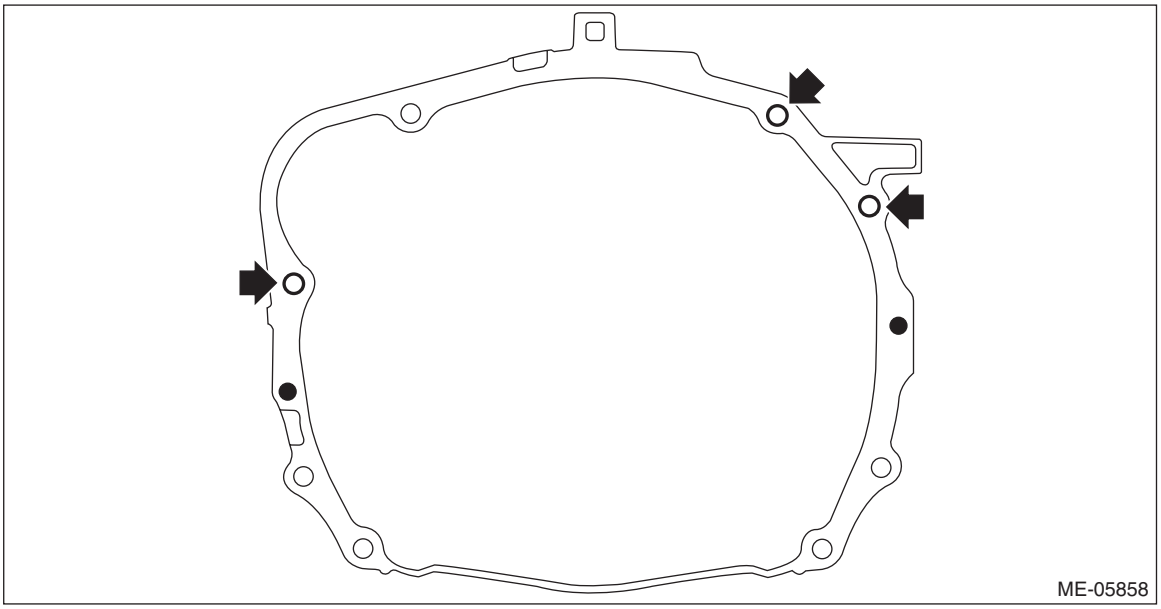
Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)

2) Position the engine in engine compartment and align it with transmission.

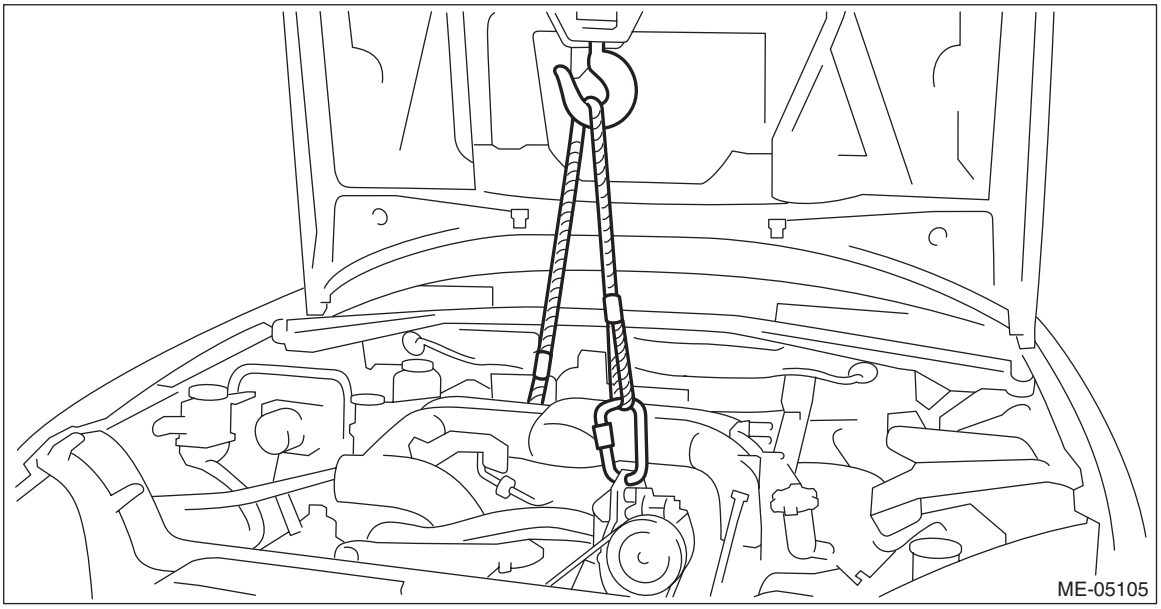
NOTE:
Be careful not to damage adjacent parts or body panels with crank pulley, oil level gauge, etc.

3) Install the bolts which hold upper side of transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



4) Remove the lifting device and wire ropes.

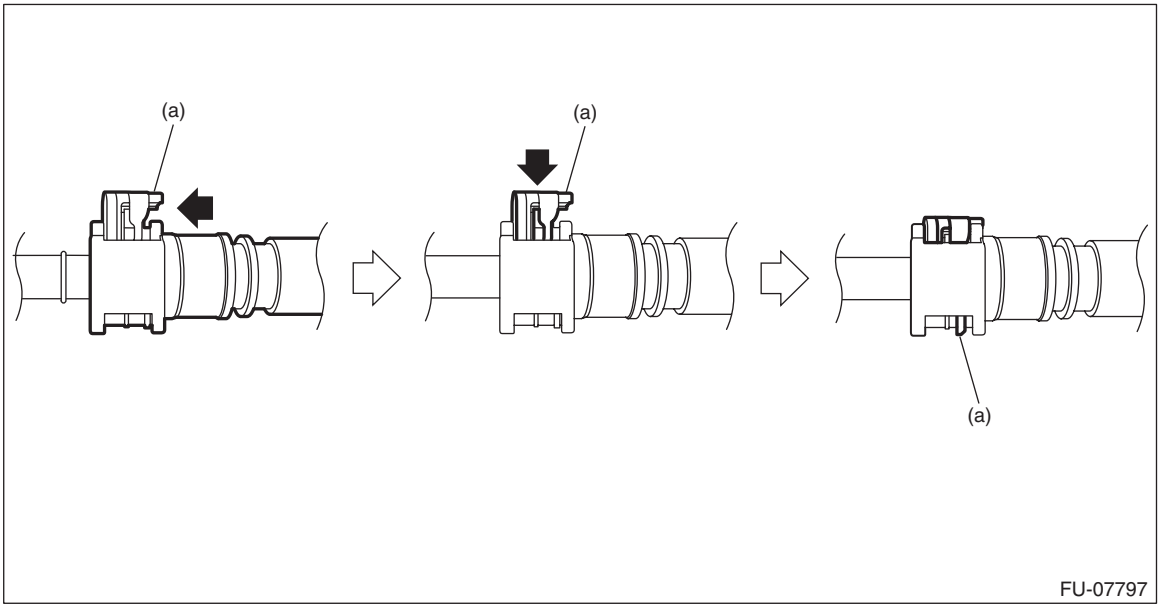


5) Remove the garage jack.

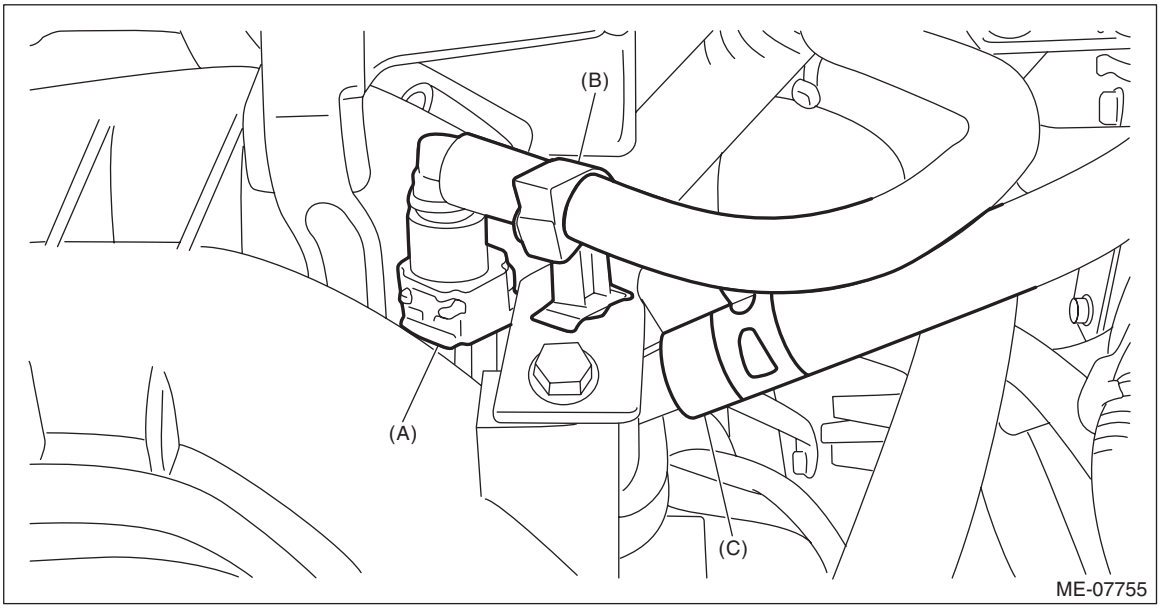
6) Connect the fuel delivery tube and evaporation hose.
(1) Connect the evaporation hose (C) to the fuel pipe assembly.
(2) Connect the quick connector (A) of the fuel delivery tube to the fuel pipe assembly, and secure the fuel delivery tube using clip (B).

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.

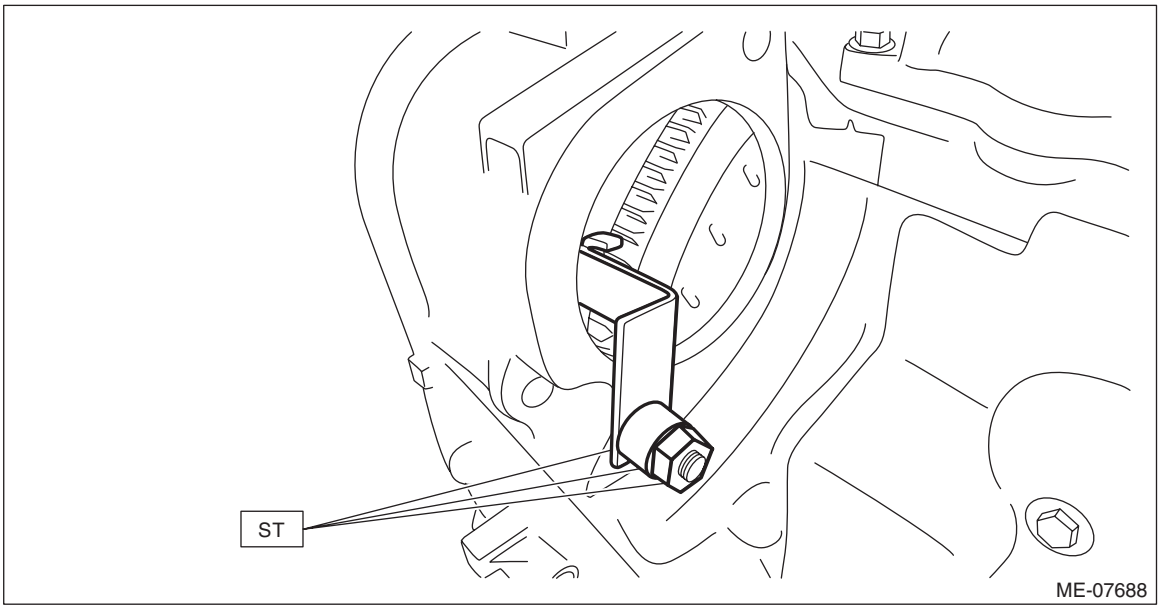


(a) Slider



7) Remove the ST from torque converter clutch case.

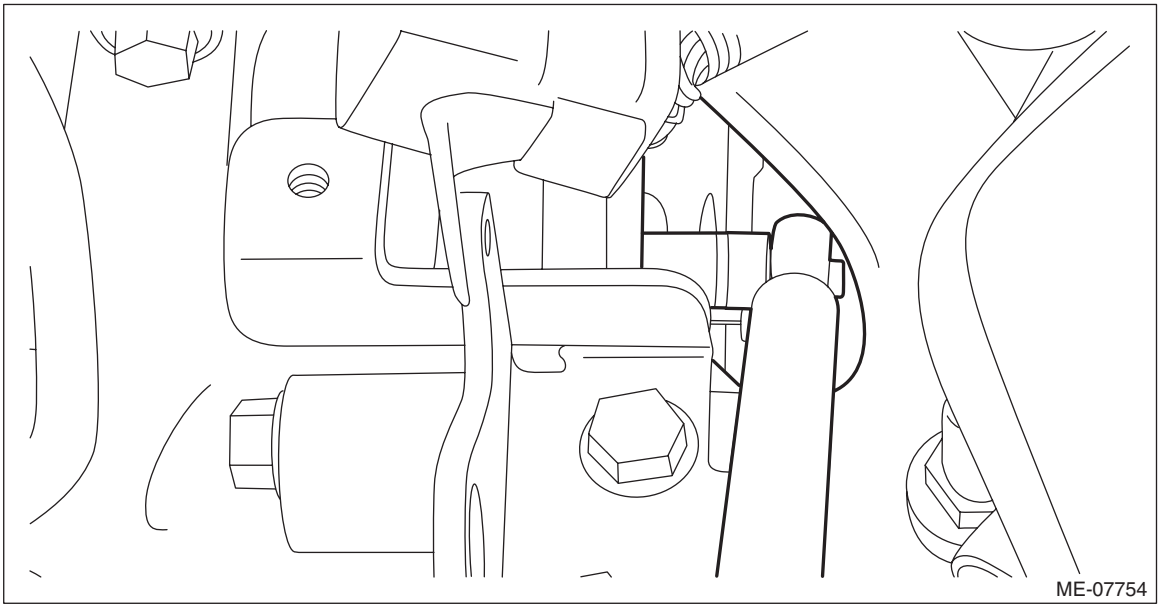
NOTE:
Be careful not to drop the ST into the torque converter clutch case when removing the ST.
ST 498277200 STOPPER SET



8) Install the torque converter clutch to drive plate.
(1) Insert the wrench into the crank pulley bolt and rotate the crank pulley to install the bolts which hold torque converter clutch to drive plate.

NOTE:
Be careful not to drop bolts into the torque converter clutch case.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

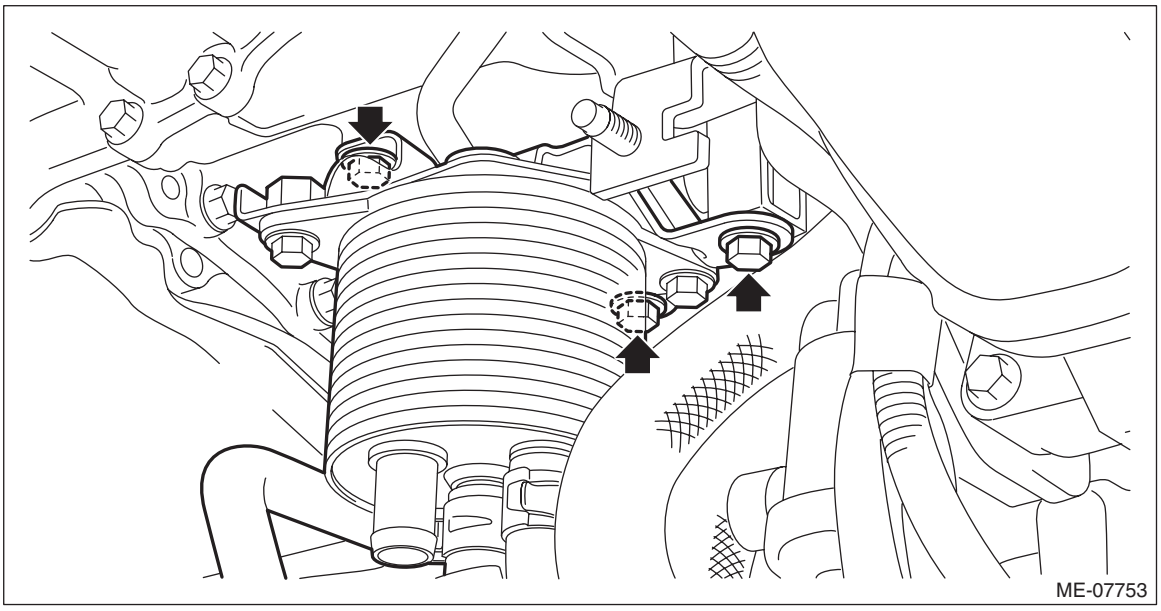


(2) Fit the plug to service hole.

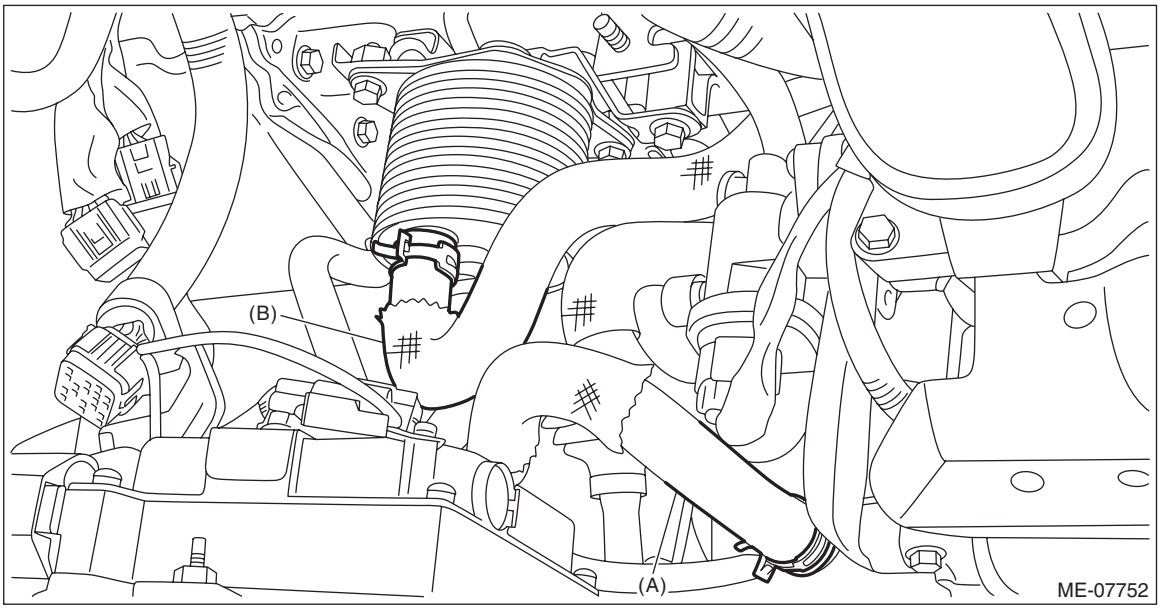
9) Install the starter. <Ref. to SC(H4DO(HEV))-11, INSTALLATION, Starter.>

10) Set the CVTF cooler (with warmer feature) to the transmission, and install the bolts which secure the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)

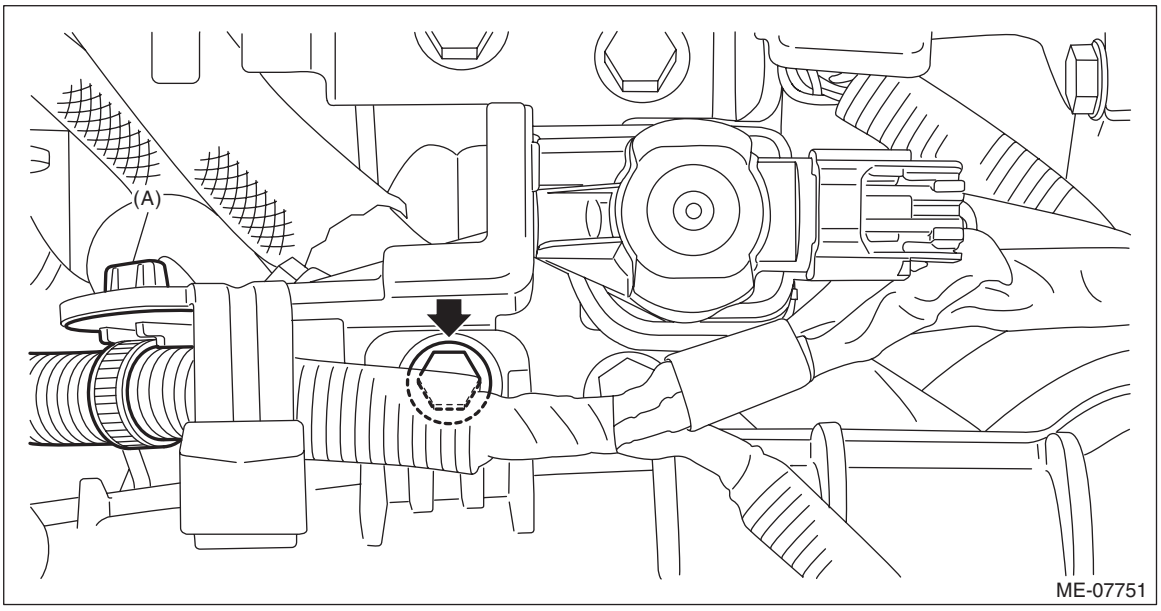


11) Connect the engine coolant inlet hose (A) to the EGR cooler, and connect the engine coolant outlet hose (B) to the CVTF cooler (with warmer feature).



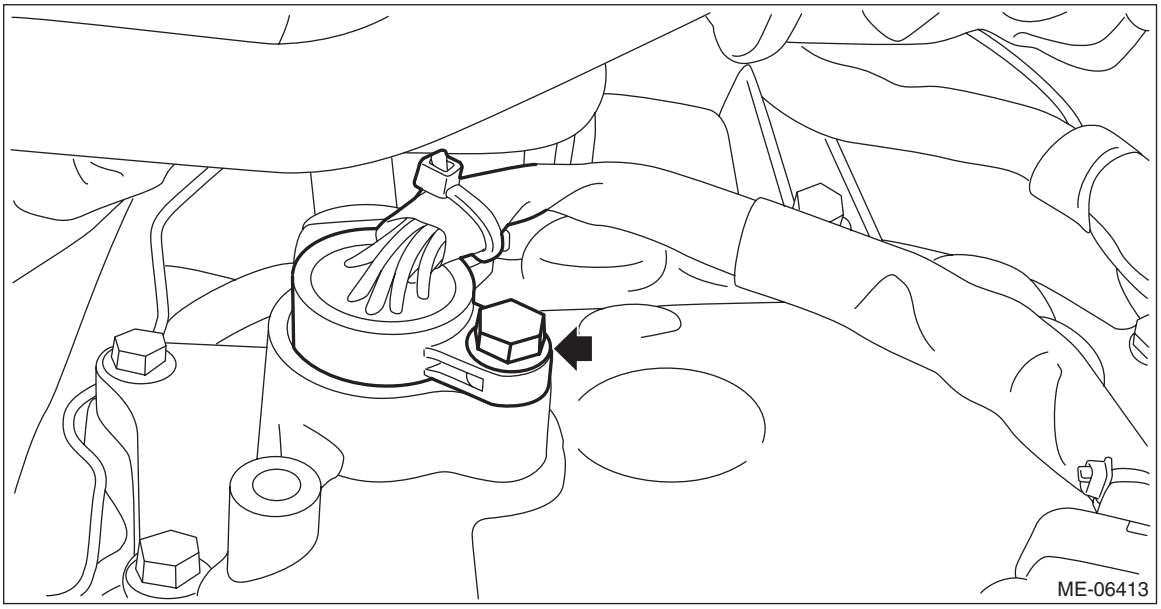
12) Install the bolts which secure the purge control solenoid valve bracket to the intake manifold, and secure the engine harness to the purge control solenoid valve bracket with the clip (A).

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



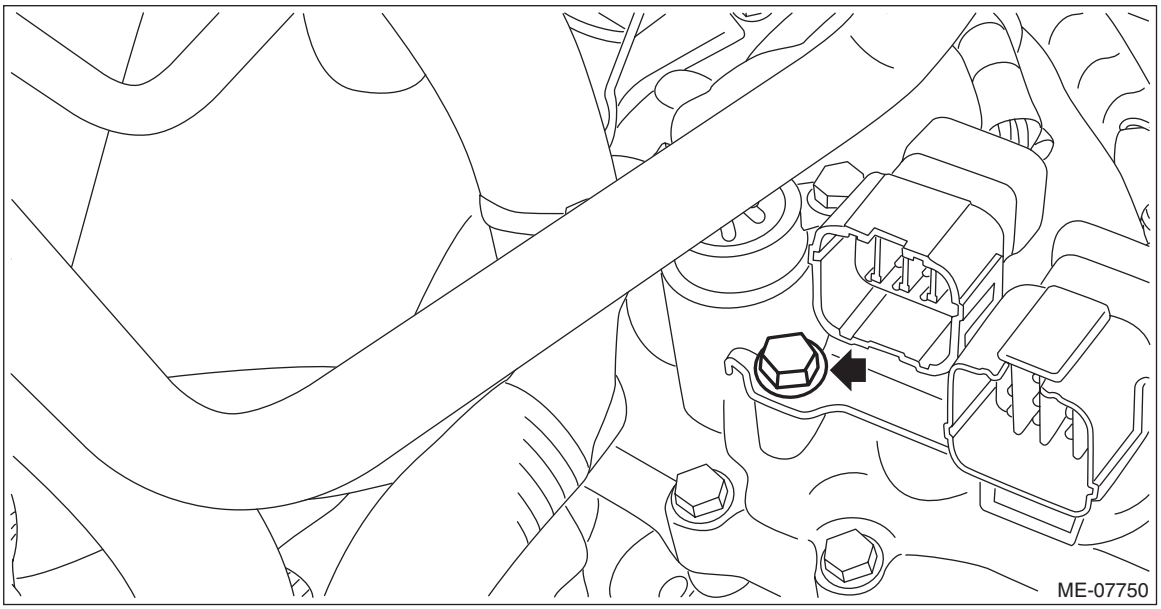
13) Remove the bolt and turn the transmission harness counterclockwise to install the transmission harness to the control valve body.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



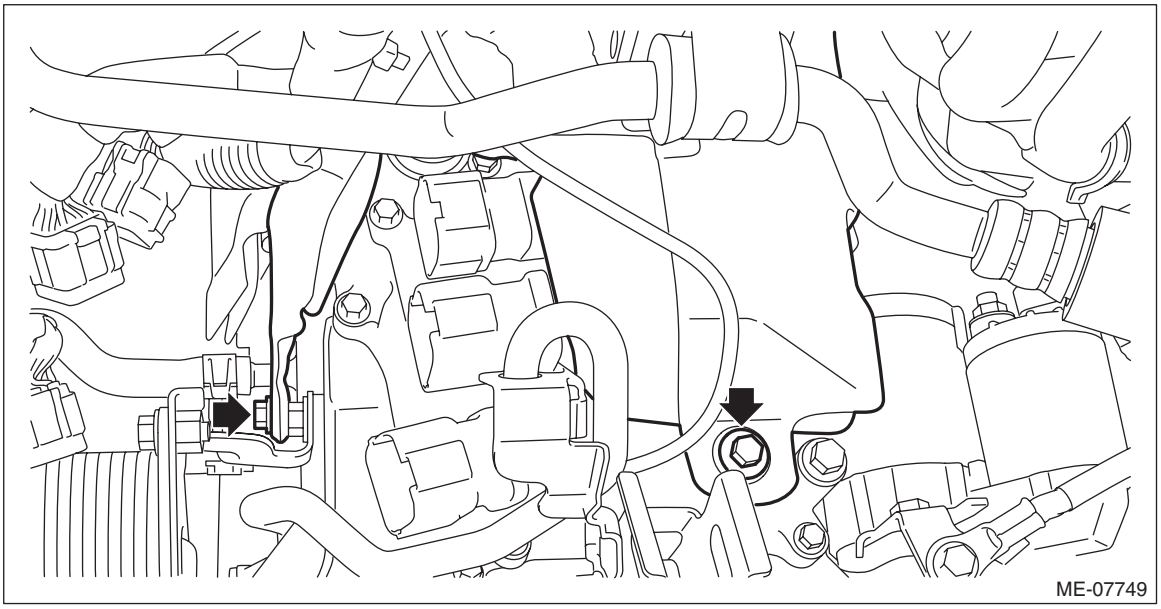
14) Install the bolt which holds the transmission harness stay.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



15) Install the transmission case cover.

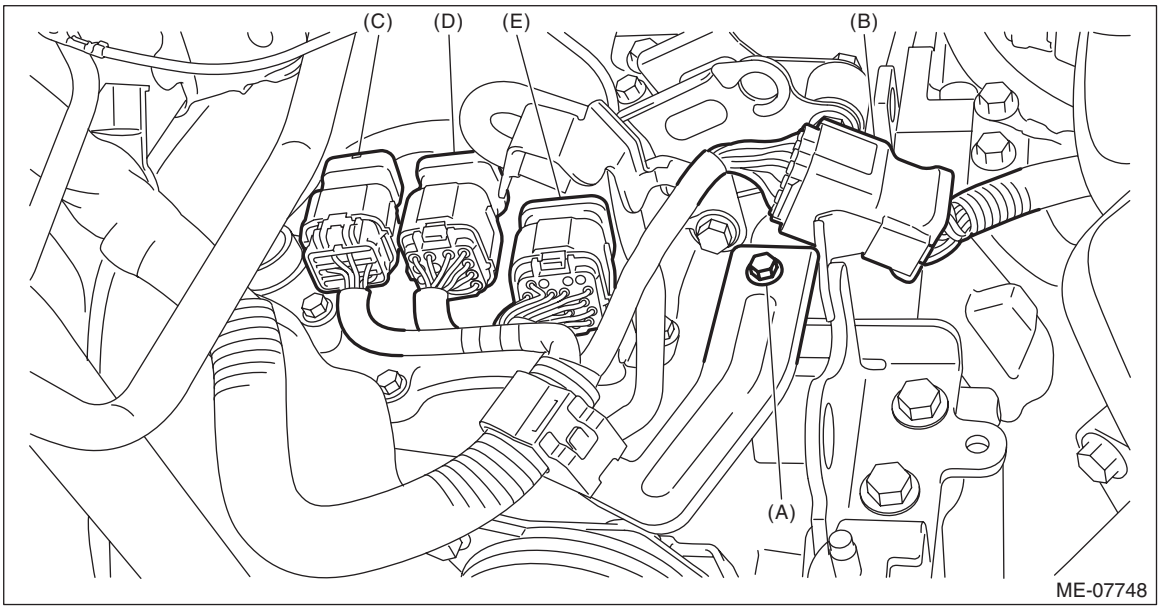
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



16) Connect the bulkhead harness connector to the transmission harness connector (C), inhibitor harness connector (D) and drive motor harness connector (E).

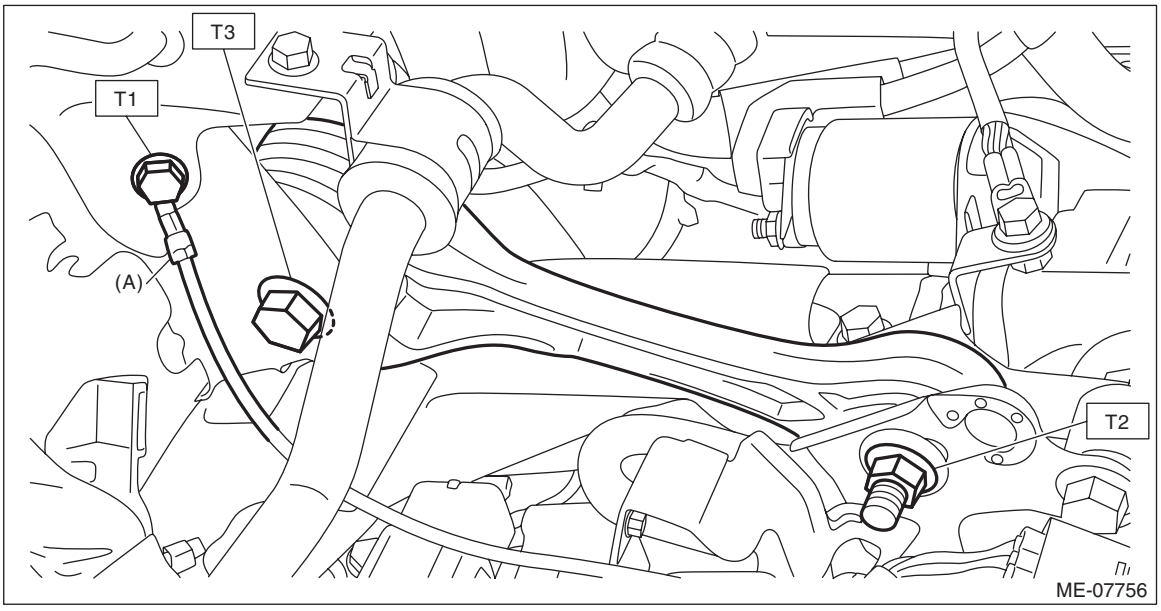
17) Connect the bulkhead harness connector to the engine harness connector (brown) (B), and install the bolt (A) securing the bulkhead harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



18) Install the pitching stopper, and connect the transmission radio ground terminal (A) to the vehicle.

Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T3: 58 N·m (5.9 kgf-m, 42.8 ft-lb)

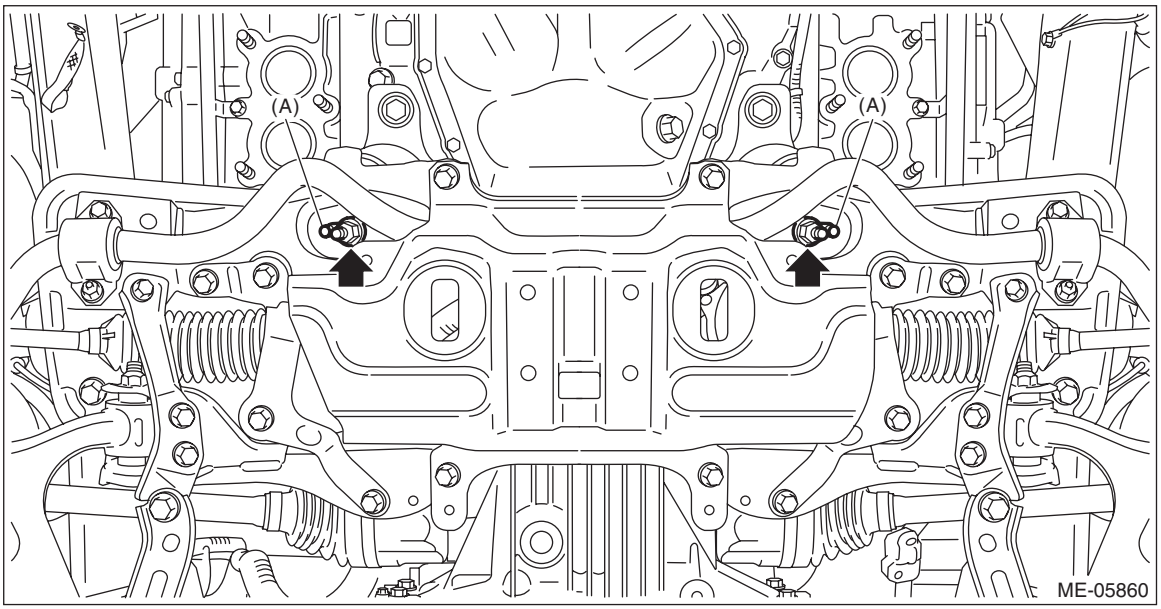


19) Lift up the vehicle.

20) Install the nuts which hold the engine mounting to the crossmember.

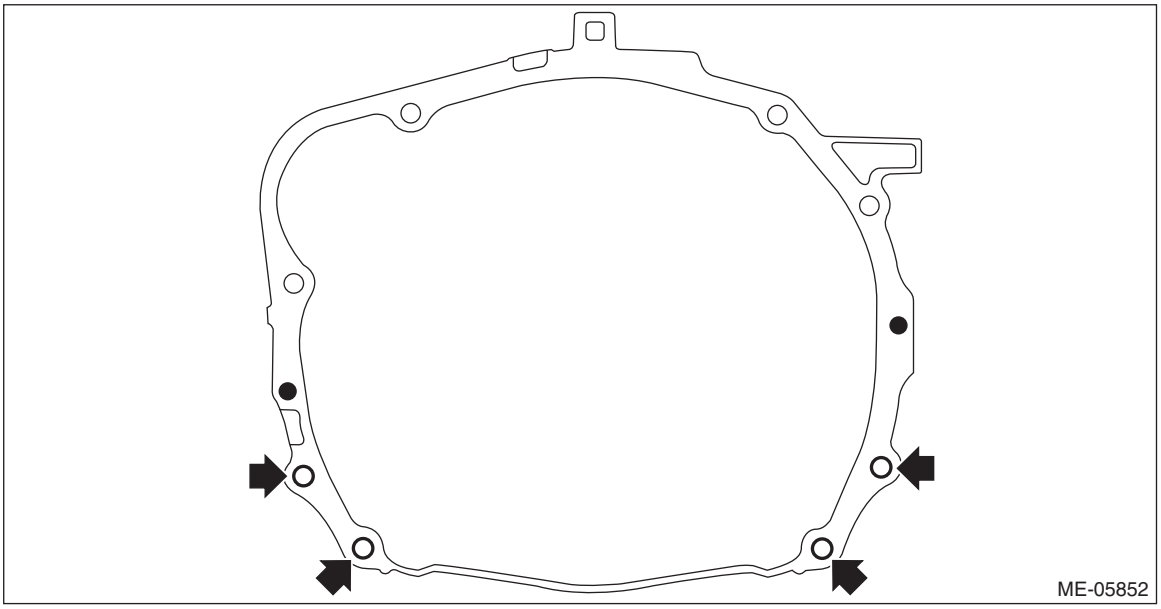
NOTE:
- Make sure that locators (A) of the engine mounting are securely inserted.
- Use a new nut.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



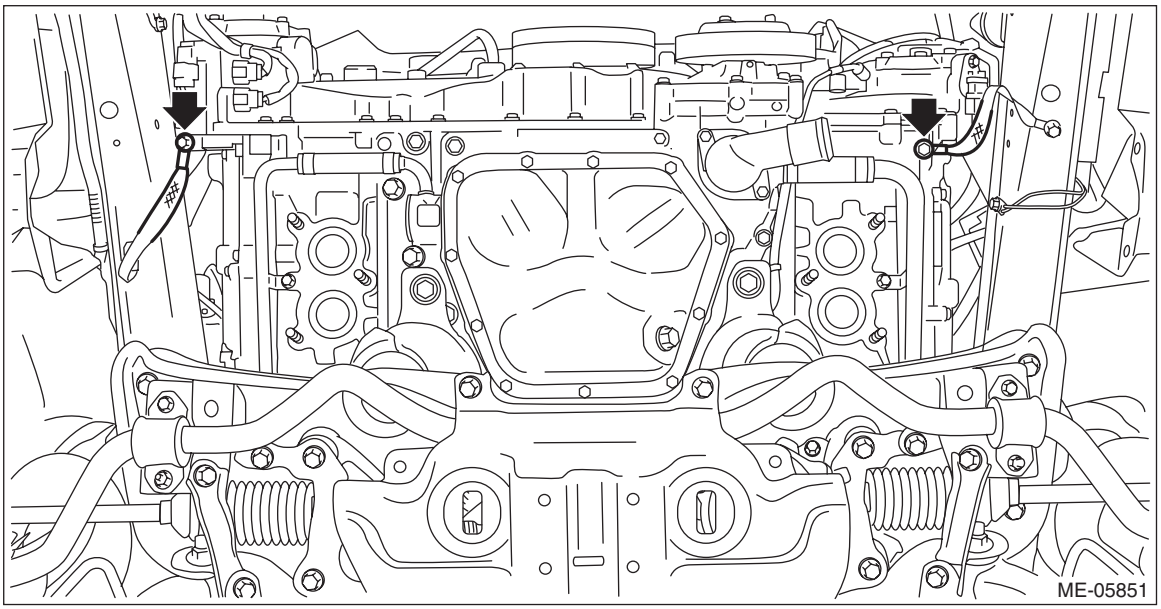
21) Install the bolts and nuts which hold lower side of the transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



22) Connect the ground cable.

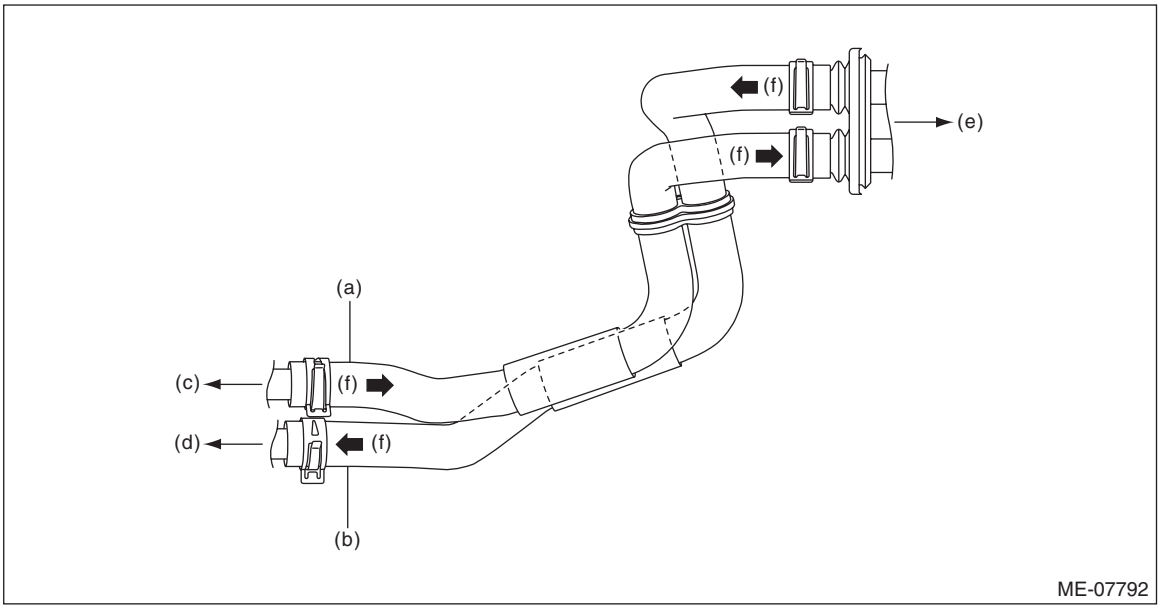
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



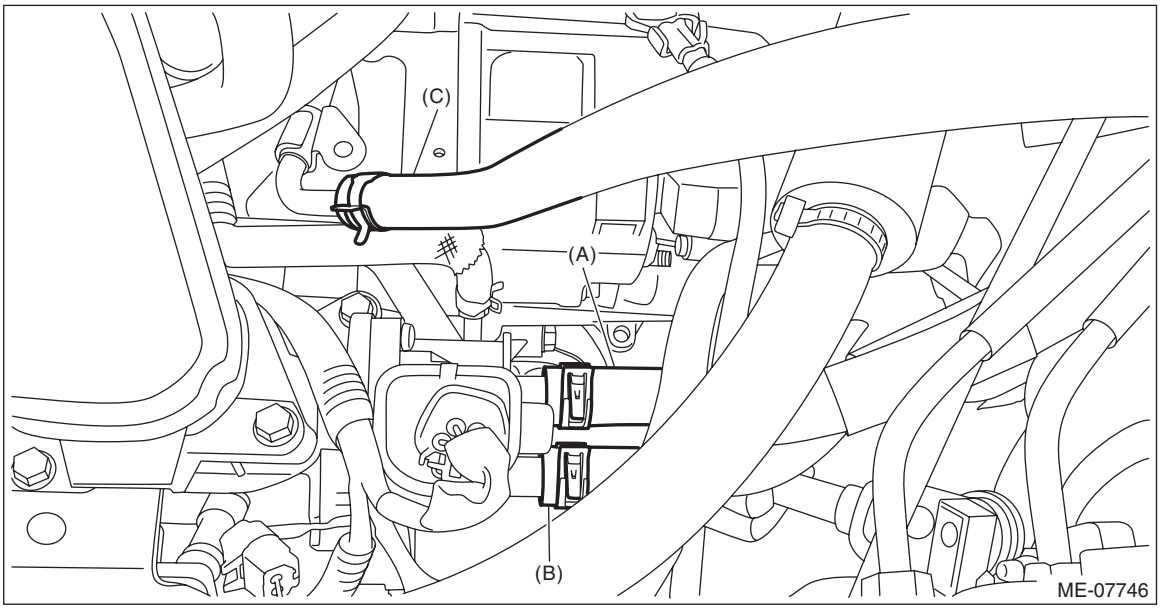
23) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
24) Lower the vehicle.
25) Connect the brake booster vacuum hose (C) to the brake vacuum pipe.

26) Connect the heater inlet hose (A) to the water pipe assembly, and connect the heater outlet hose (B) to the water pipe LH.

NOTE:
Be careful not to mix up the heater inlet hose and the heater outlet hose when connecting them.



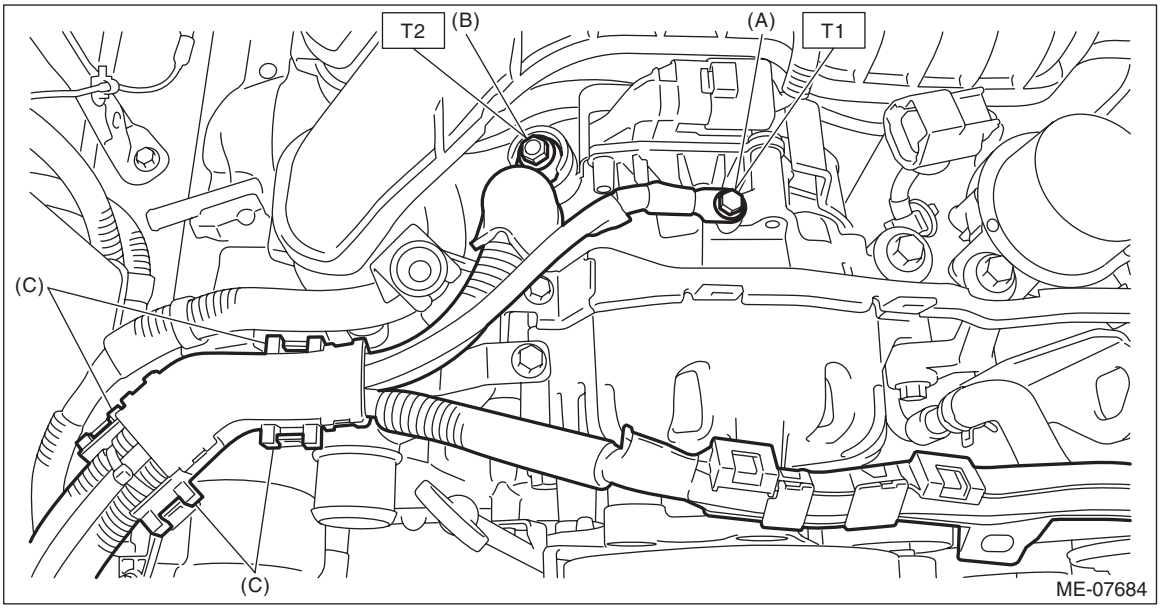
(a)	Heater inlet hose	(c)	To water pipe ASSY	(e)	To heater core ASSY
(b)	Heater outlet hose	(d)	To water pipe LH	(f)	Engine coolant flow



27) Connect the A/C pressure hose to A/C compressor. <Ref. to AC-66, REMOVAL, Hose and Pipe.>
28) Set the battery cable assembly, and secure the battery cable assembly to the battery cable bracket No. 1 with the clip (C).

29) Connect the terminal (A) and the terminal (B) to ISG.

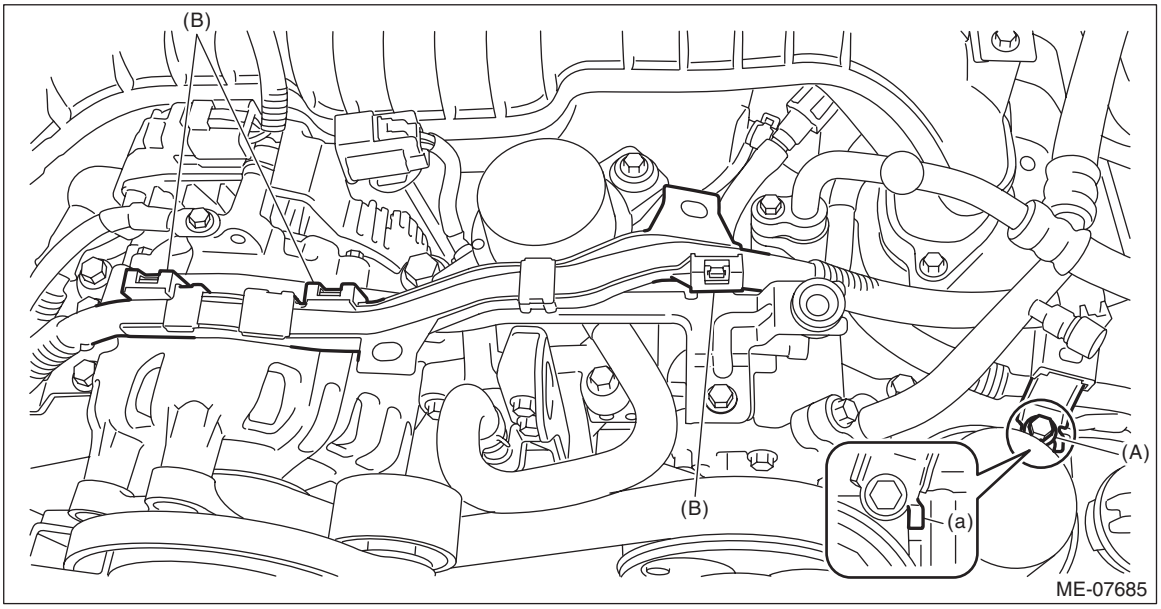
Tightening torque:
T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
T2: 15.5 N·m (1.6 kgf-m, 11.4 ft-lb)



30) Secure the battery cable assembly to the collector cover bracket with the clip (B), and install the bolt (A) which secures the battery cable stay to the chain cover.

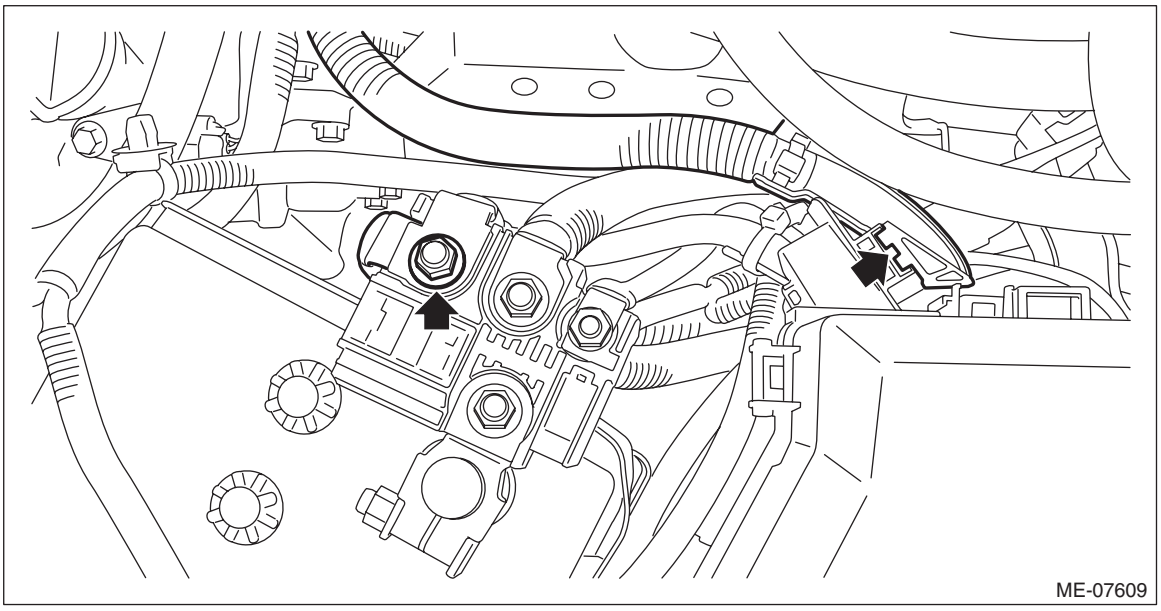
NOTE:
When installing the battery cable stay, install it by fitting the folded end (a) of the battery cable stay to the chain cover boss.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

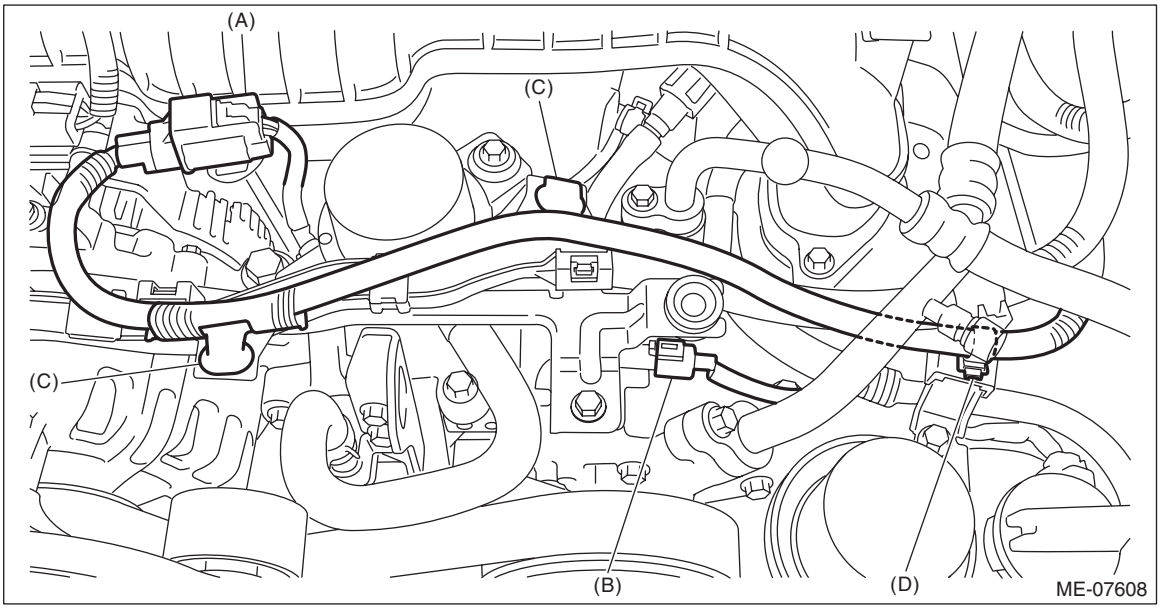


31) Install the battery cable assembly to the main fuse box, and install the nut which secures the battery cable assembly to the slow blow fuse (12 volt auxiliary battery).

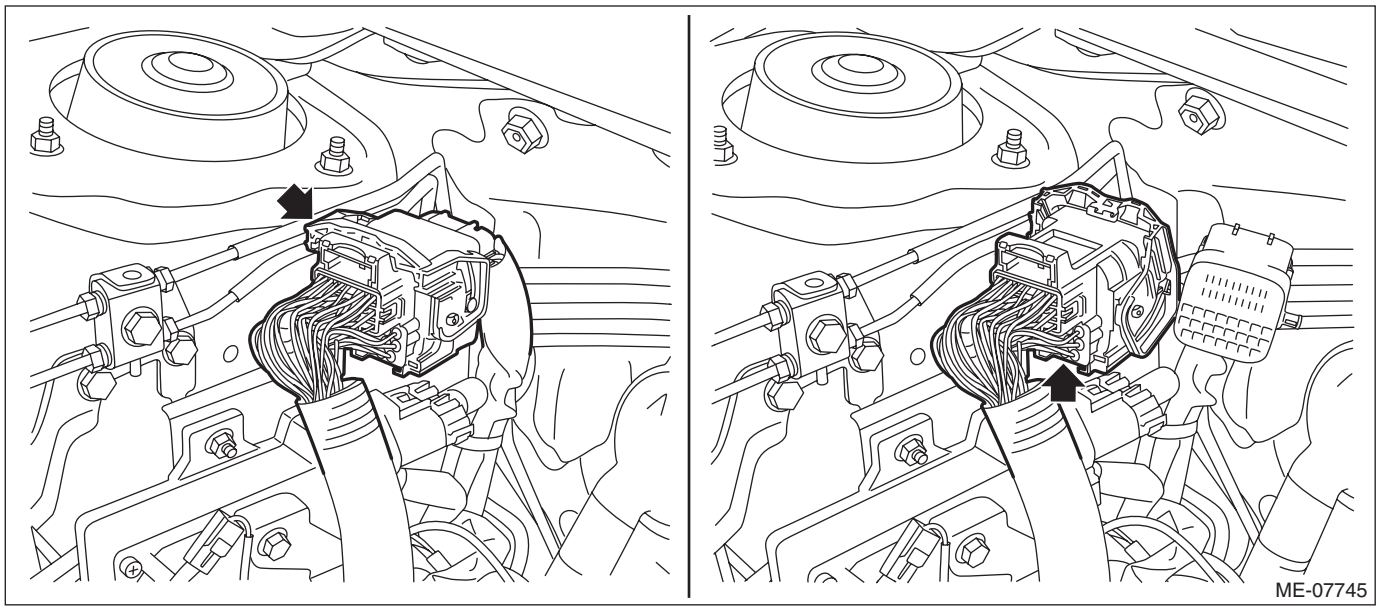
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



32) Install the terminal boot to the positive terminal of the 12 volt auxiliary battery.
33) Set the harness, and secure the harness to the battery cable assembly with the clip (C) and the clip (D).
34) Connect the connector (A) to the brake vacuum pump, and connect the connector (B) to the A/C compressor.

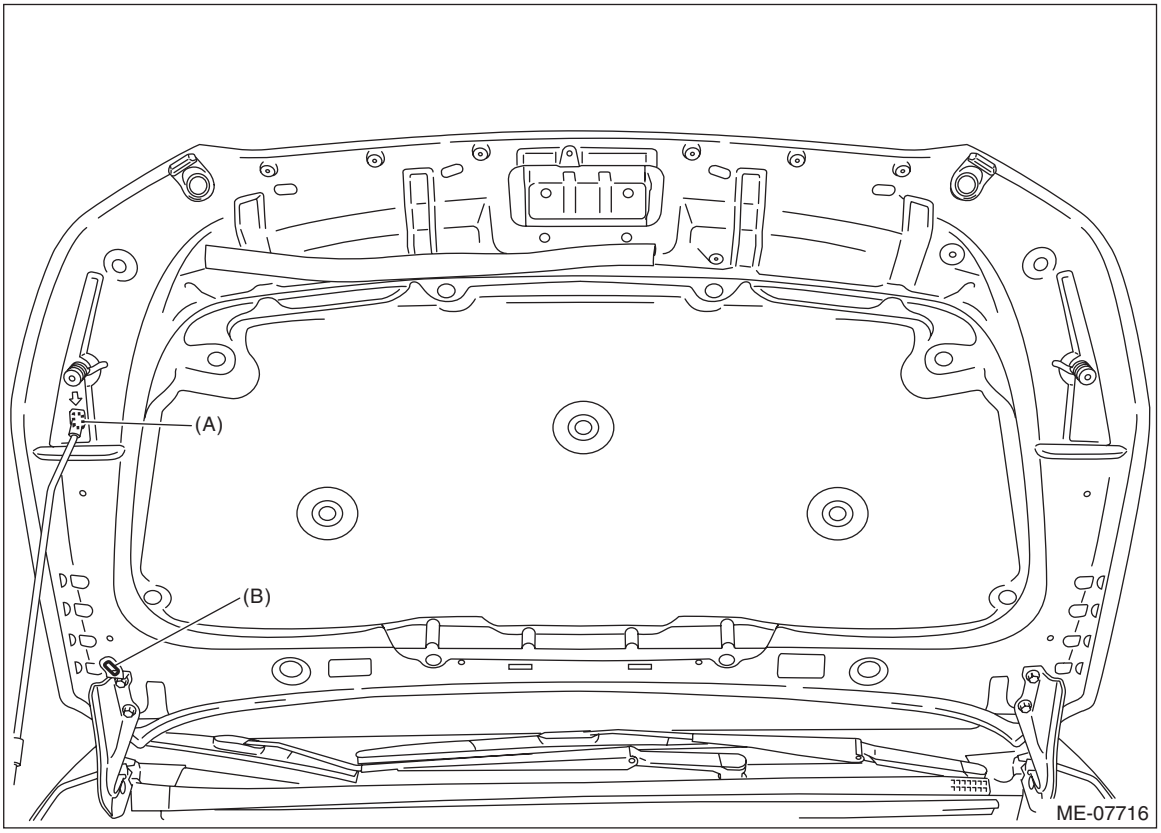


35) Install the engine harness connector (black) to bracket, then connect the bulkhead harness connector to the engine harness connector (black).



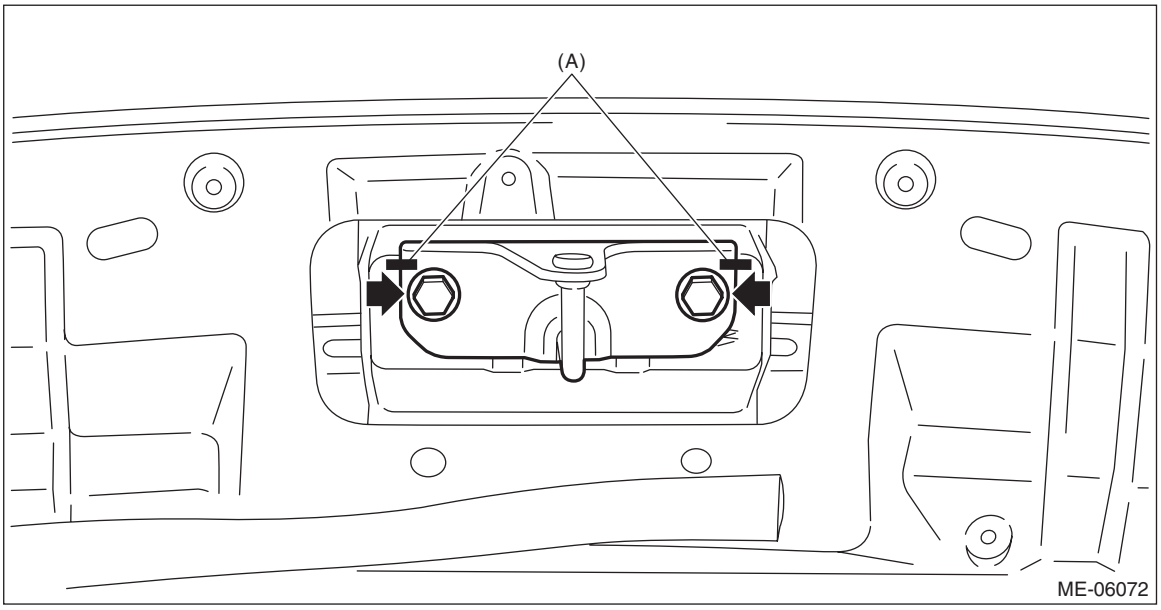
36) Install the radiator. <Ref. to CO(H4DO(w/o HEV))-81, INSTALLATION, Radiator.>
37) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
38) Install the air intake duct. <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
39) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
40) Charge the A/C system with refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>
41) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
42) Install the collector cover.

43) Change the front hood stay position from (B) to (A).



44) Install the front hood striker to the front hood by aligning the alignment marks (A), and close the front hood.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



C: INSPECTION

1) Check that pipes, hoses, connectors and clamps are installed firmly.
2) Check the engine coolant is at specified level.
3) Start the engine and check for exhaust gas, engine coolant, leaks of fuel, etc. Also check for noise and vibrations.

10.Engine Mounting

A: REMOVAL

1) Remove the front crossmember. <Ref. to FS-18, REMOVAL, Front Crossmember.>
2) Remove the engine mounting from the engine.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)

C: INSPECTION

Make sure that there are no cracks or other damages.

11.Preparation for Overhaul

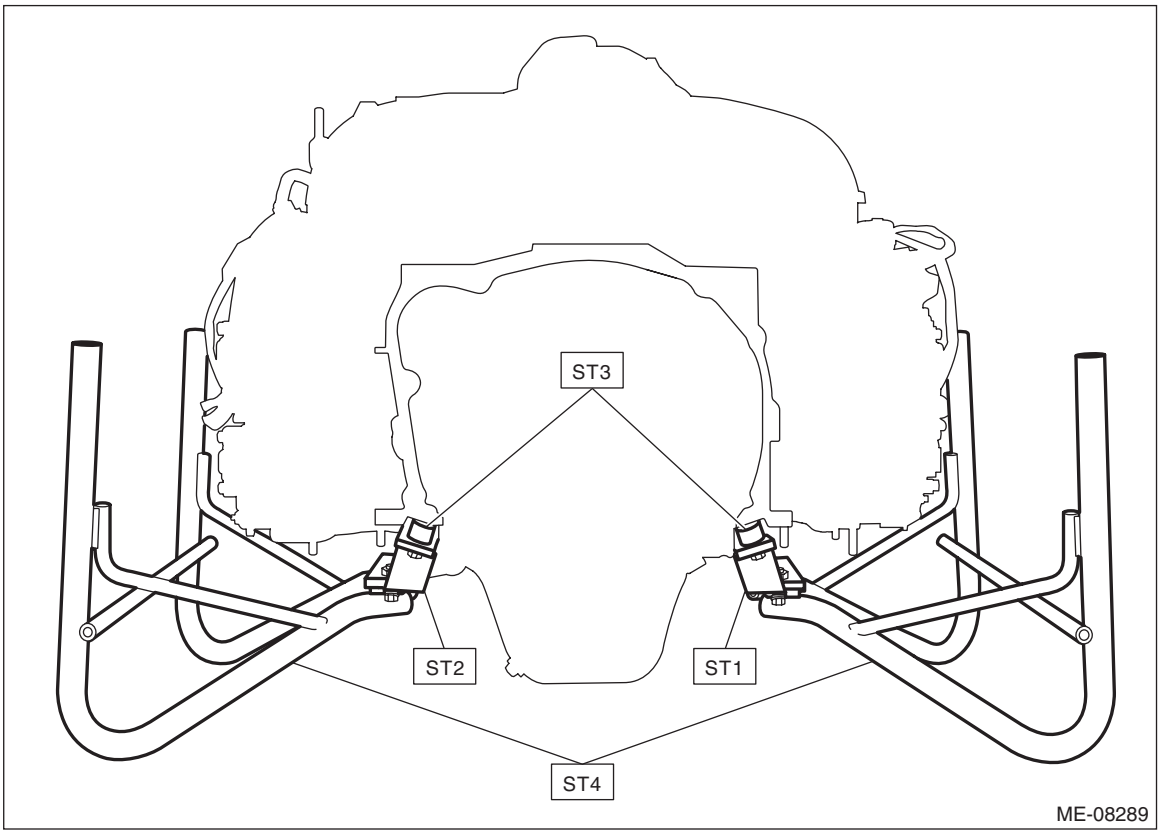
A: PROCEDURE

1) After removing the engine from the vehicle body, attach the ST to the engine as shown in the figure.

NOTE:
When using a commercially sold engine stand, follow the instructions of engine stand used.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)

ST1	498457000	ENGINE STAND ADAPTER RH
ST2	498457100	ENGINE STAND ADAPTER LH
ST3	18362AA020	ADAPTER
ST4	499817100	ENGINE STAND



2) In this section the procedures described under each index are all connected and stated in order. The procedure for overhauling of the engine will be completed when you go through all steps in the process. Therefore, in this section, to conduct the particular procedure within the flow of a section, you need to go back and conduct the procedure described previously in order to do that particular procedure.

12.V-belt

A: REMOVAL

NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.

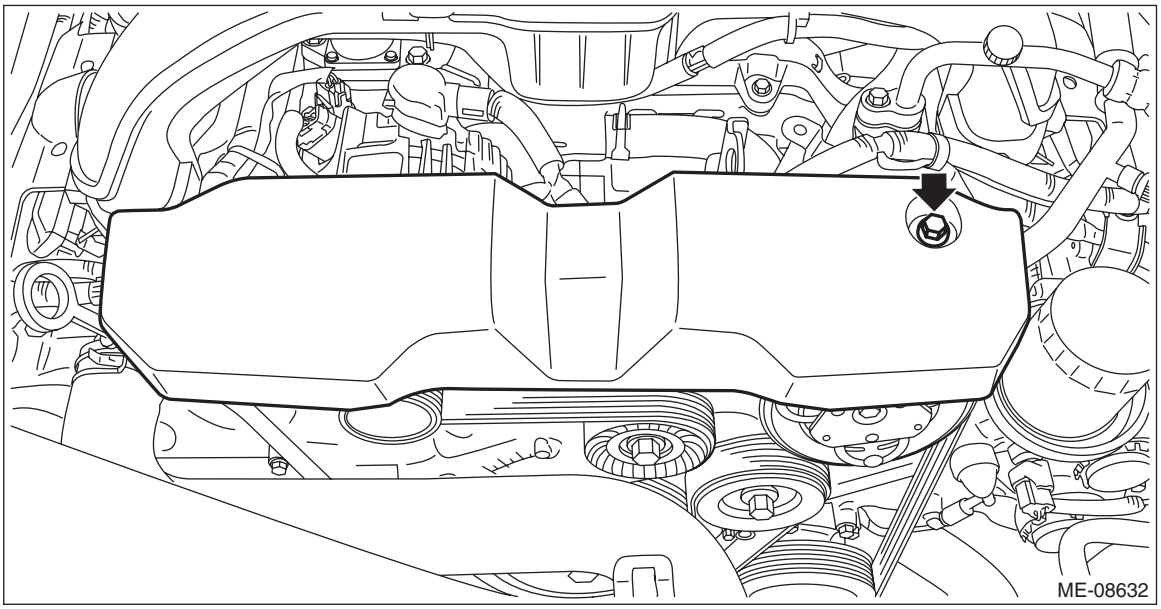
1. GASOLINE ENGINE MODEL

- **V-belt**

1) When working on the vehicle

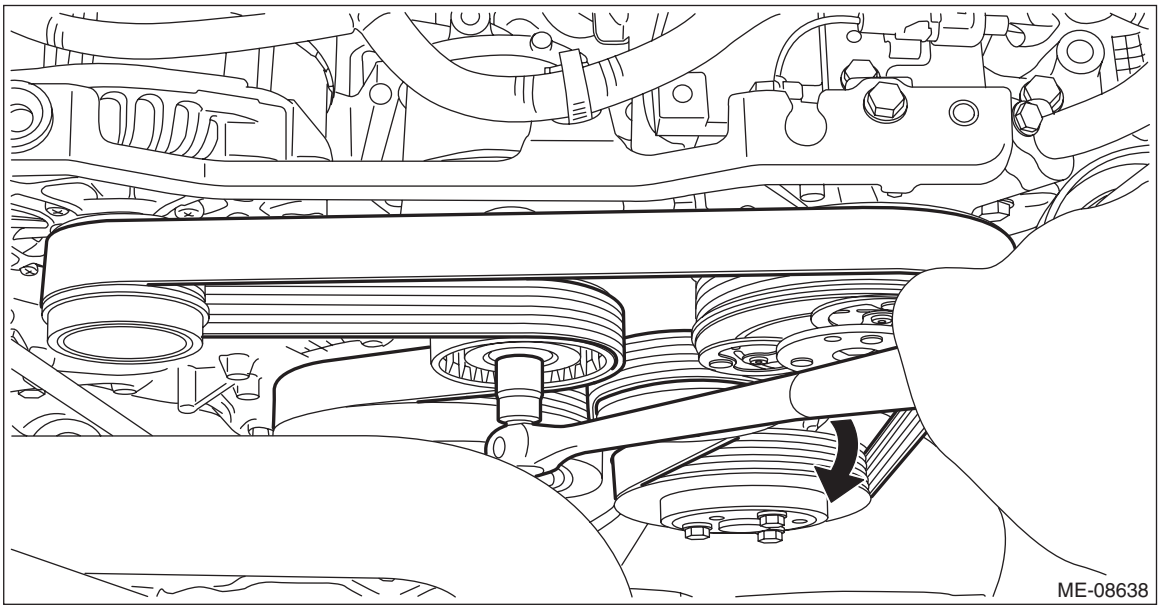
NOTE:
When working on the vehicle, perform the following steps also.

(1) Remove the V-belt covers.



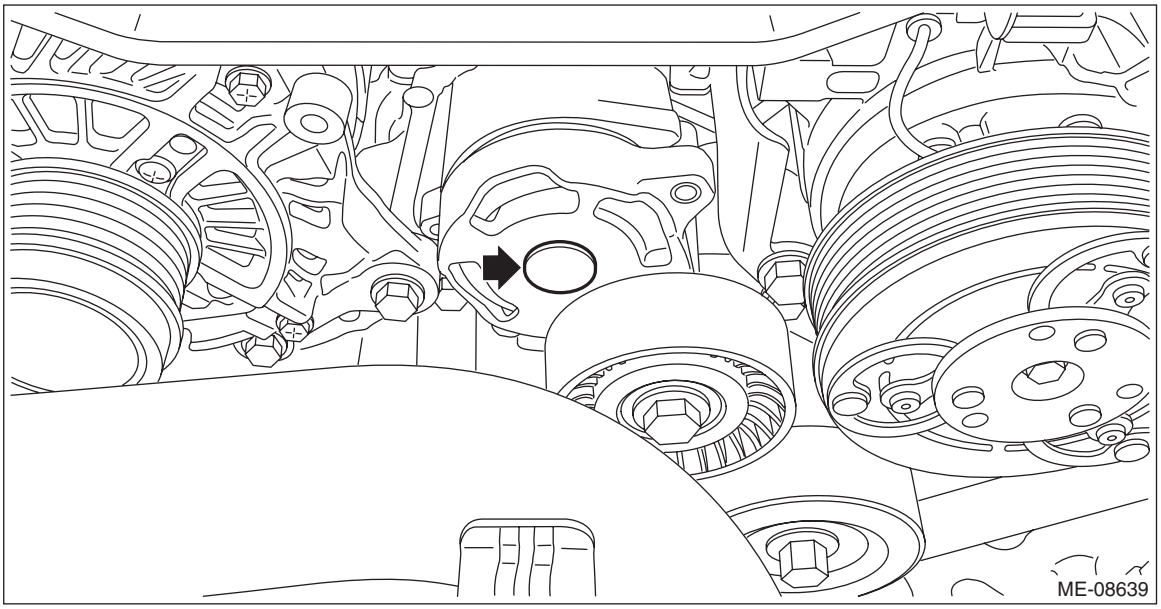
(2) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>

2) Attach the tool to the V-belt tensioner assembly, and rotate the tool clockwise to loosen and remove the V-belt.

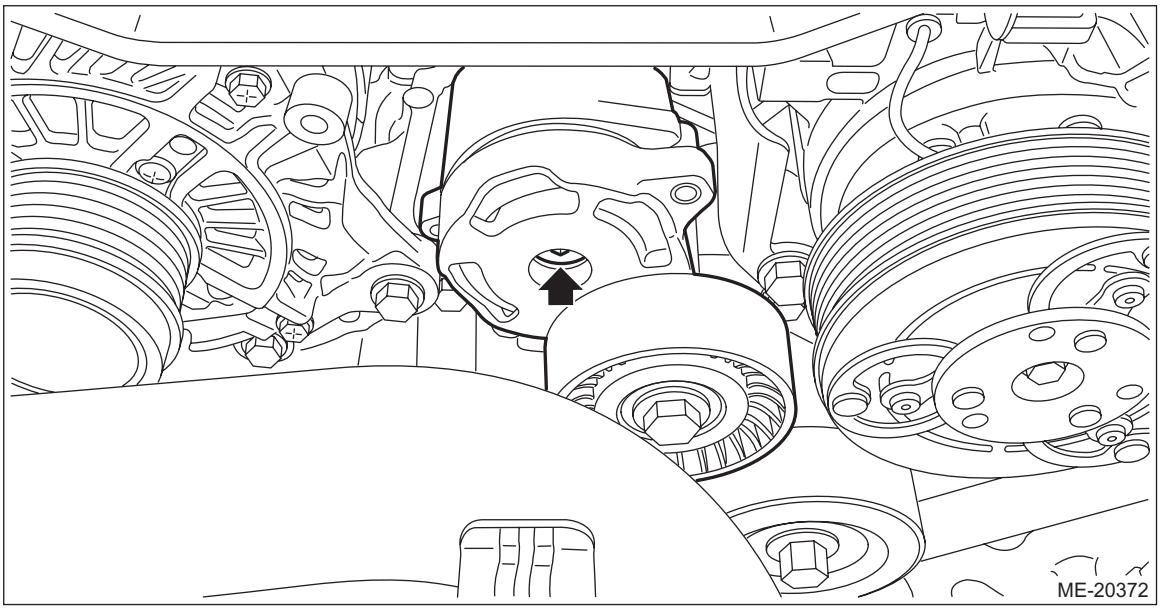


- **V-belt tensioner assembly and idler pulley**

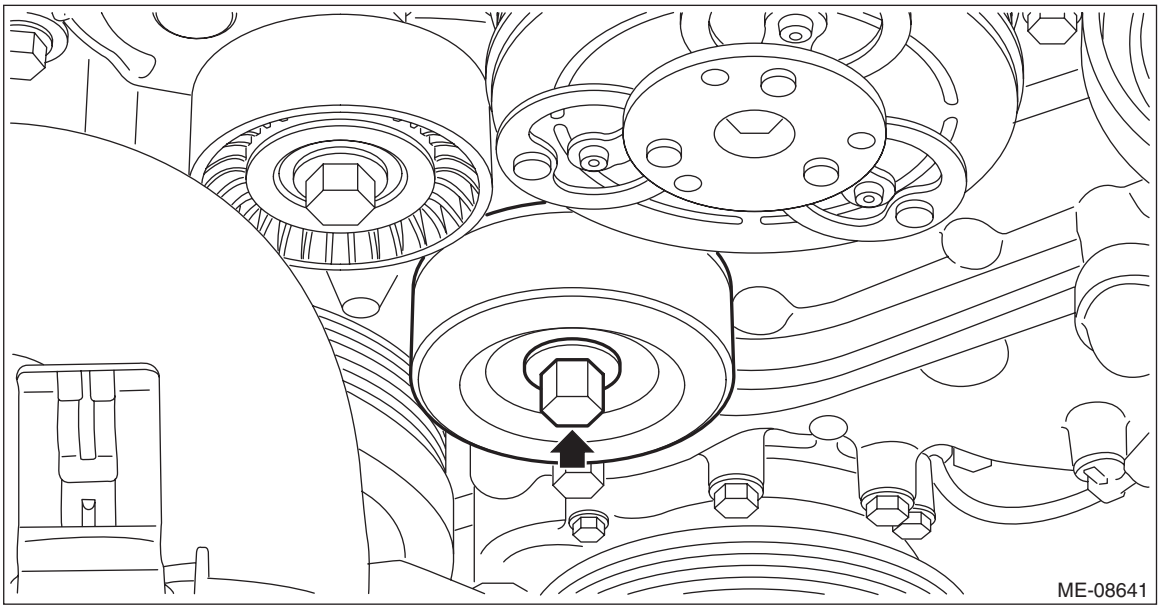
1) Remove the V-belts.
2) Remove the cap from V-belt tensioner assembly.



3) Remove the bolt securing the V-belt tensioner assembly to the generator bracket, and remove the V-belt tensioner assembly.



4) Remove the bolts which secure the idler pulley to the chain cover, and remove the idler pulley.



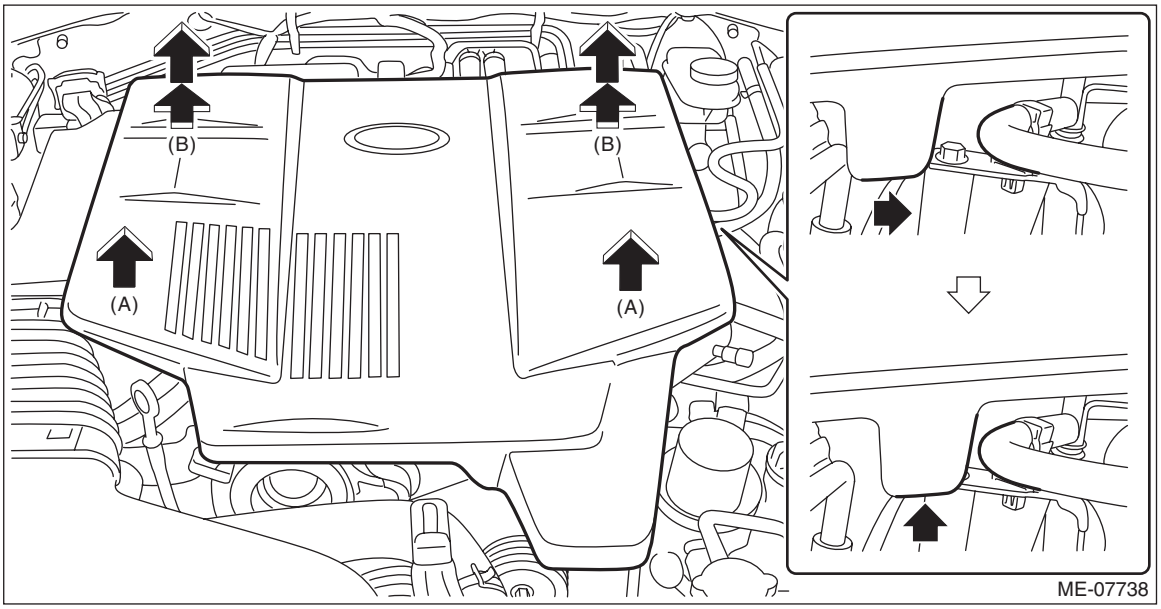
2. HEV MODEL

- **V-belt tensioner assembly and V-belt**

1) When working on the vehicle

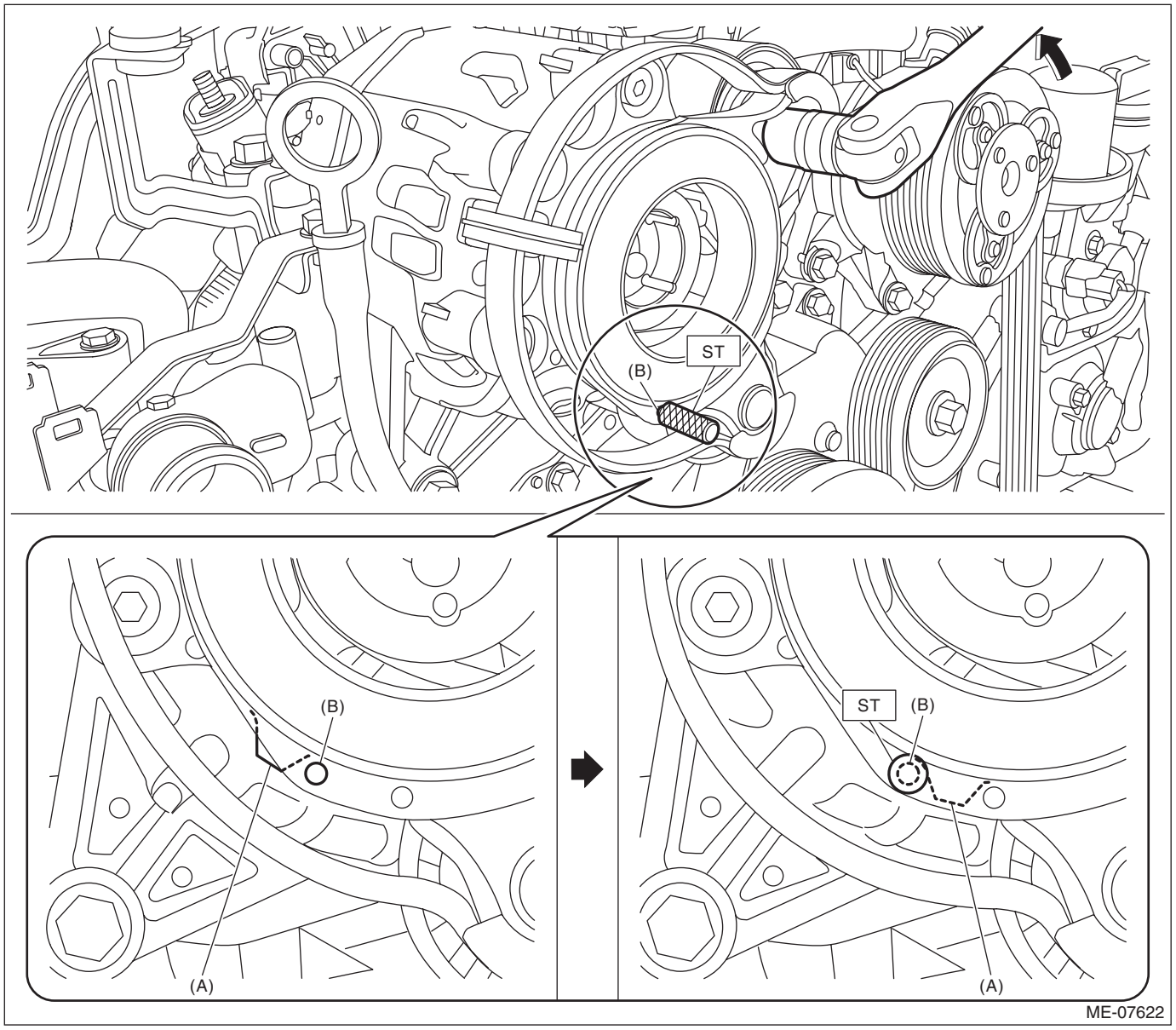
NOTE:
When working on the vehicle, perform the following steps also.
(1) Turn the ignition switch to OFF.
(2) Remove the collector cover.
1. Carefully pull up the front of collector cover at two positions (A).
2. Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



2) Prepare for removing the V-belt tensioner assembly. (The V-belt is not damaged.)
(1) Set the tool on the arm lever No. 1, turn the tool counterclockwise until the protrusion (A) of the arm lever No. 1 moves to the position shown in the figure, and insert the ST into the stopper pin hole (B) on the arm lever No. 2.

ST 499267300 STOPPER PIN



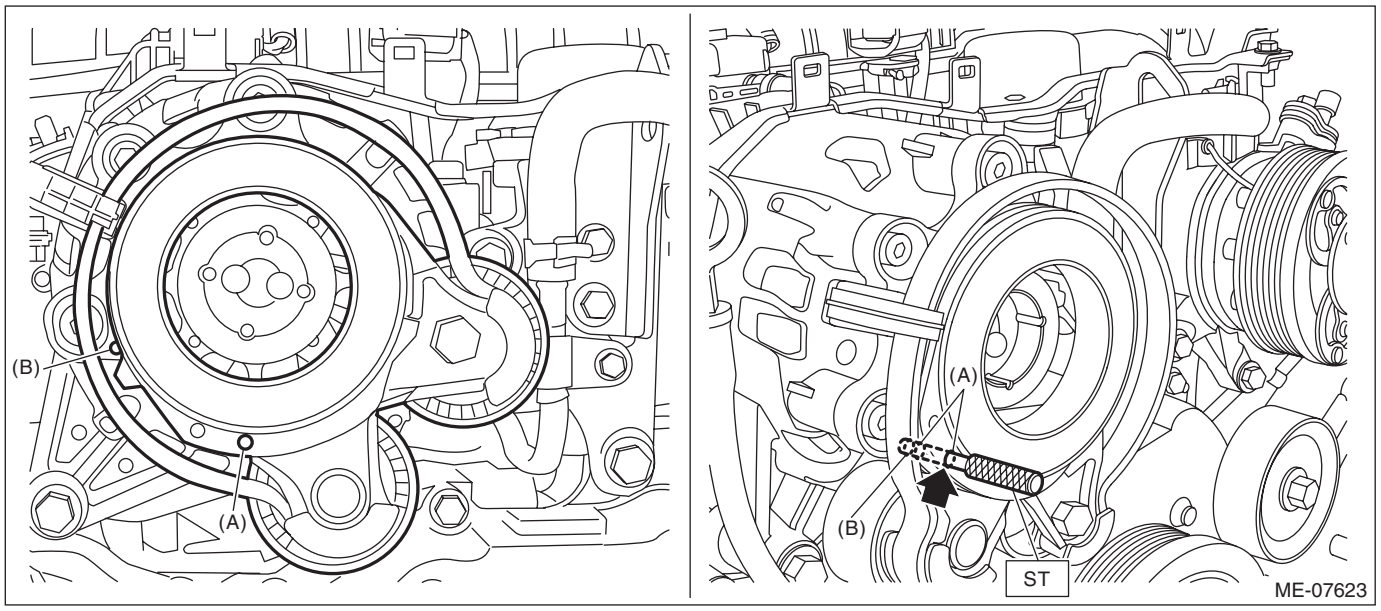
3) Prepare for removing the V-belt tensioner assembly. (The V-belt is damaged.)

NOTE:
This operation requires 2 pieces of ST: STOPPER PIN (499267300).

(1) Turn the arm lever until the stopper pin hole (A) of the arm lever No. 2 is aligned with the stopper pin hole (B) of the housing, and insert the ST through the stopper pin hole (A) of the arm lever No. 2 into the end of the stopper pin hole (B) of the housing.

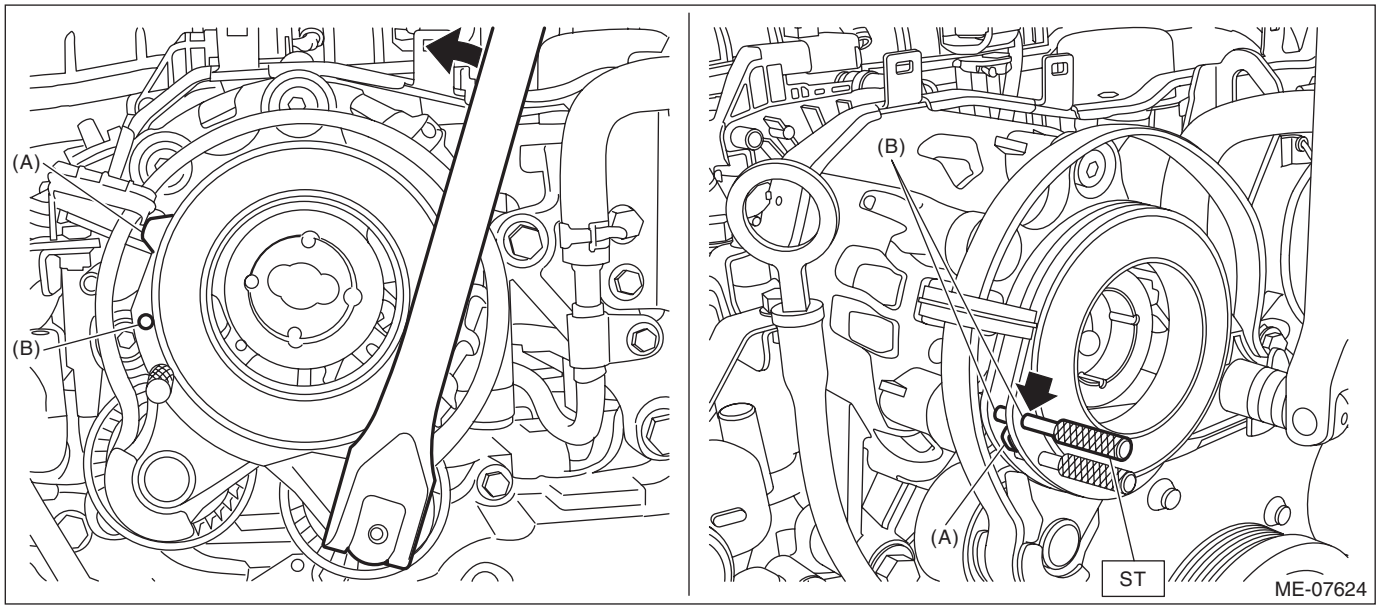
CAUTION:
Be sure to insert the ST into the end of the stopper pin hole (B) of the housing. If the ST is not inserted to the end, the ST may accidentally come off in the next procedure, resulting in an injury.

ST 499267300 STOPPER PIN

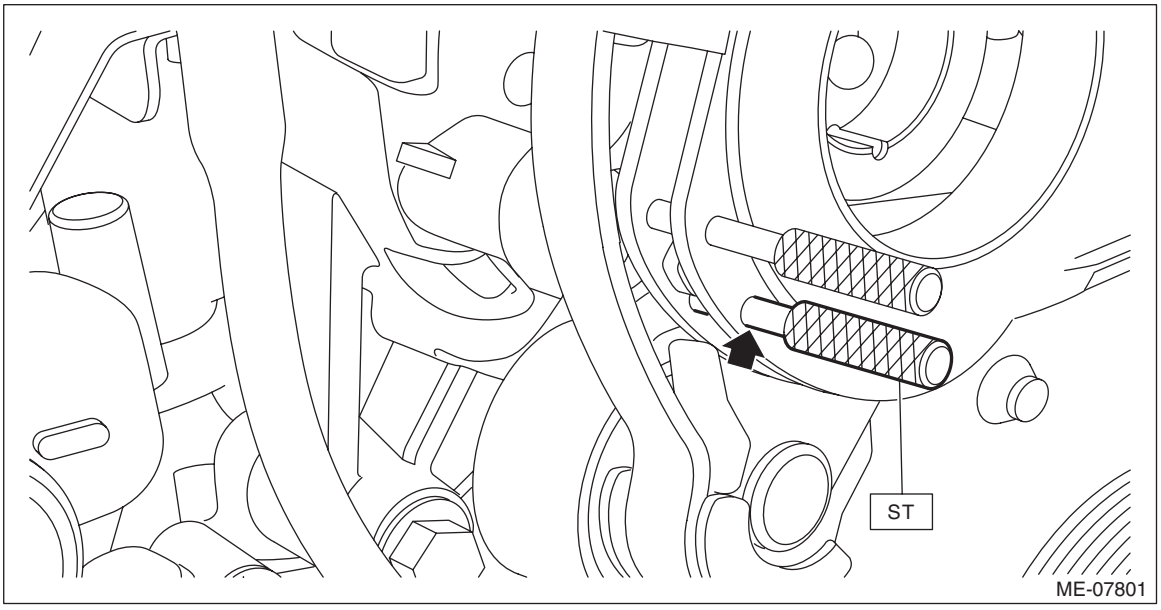


(2) Set the tool on the arm lever No. 1, turn the tool counterclockwise until the protrusion (A) of the arm lever No. 1 moves to the position shown in the figure, and insert the ST into the stopper pin hole (B) on the arm lever No. 2.

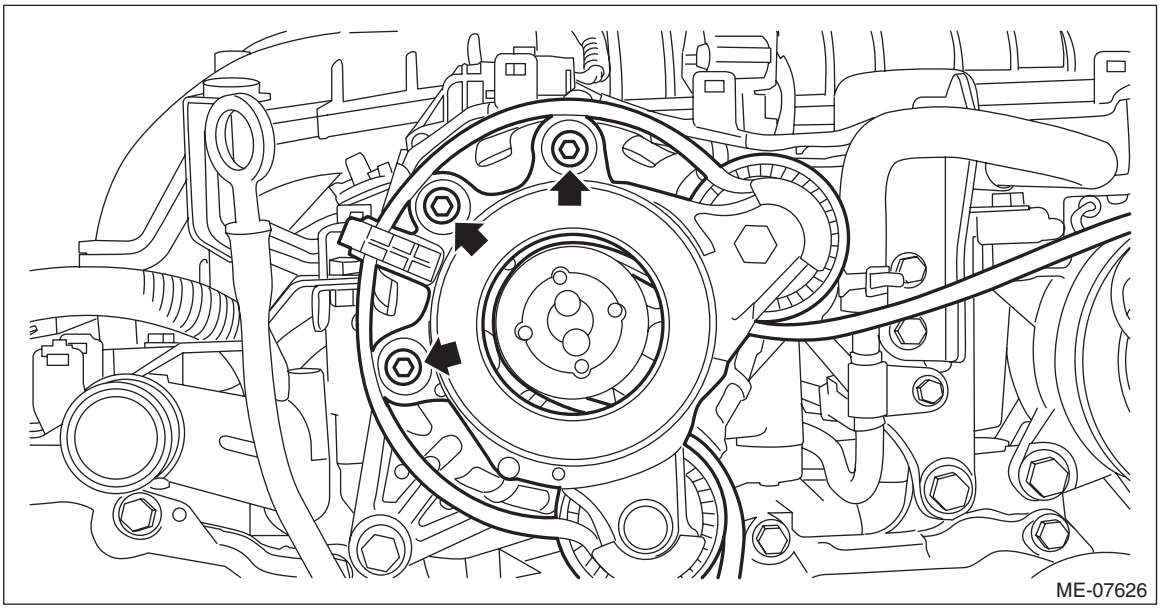
ST 499267300 STOPPER PIN



(3) Remove the ST inserted in procedure (1).
ST 499267300 STOPPER PIN



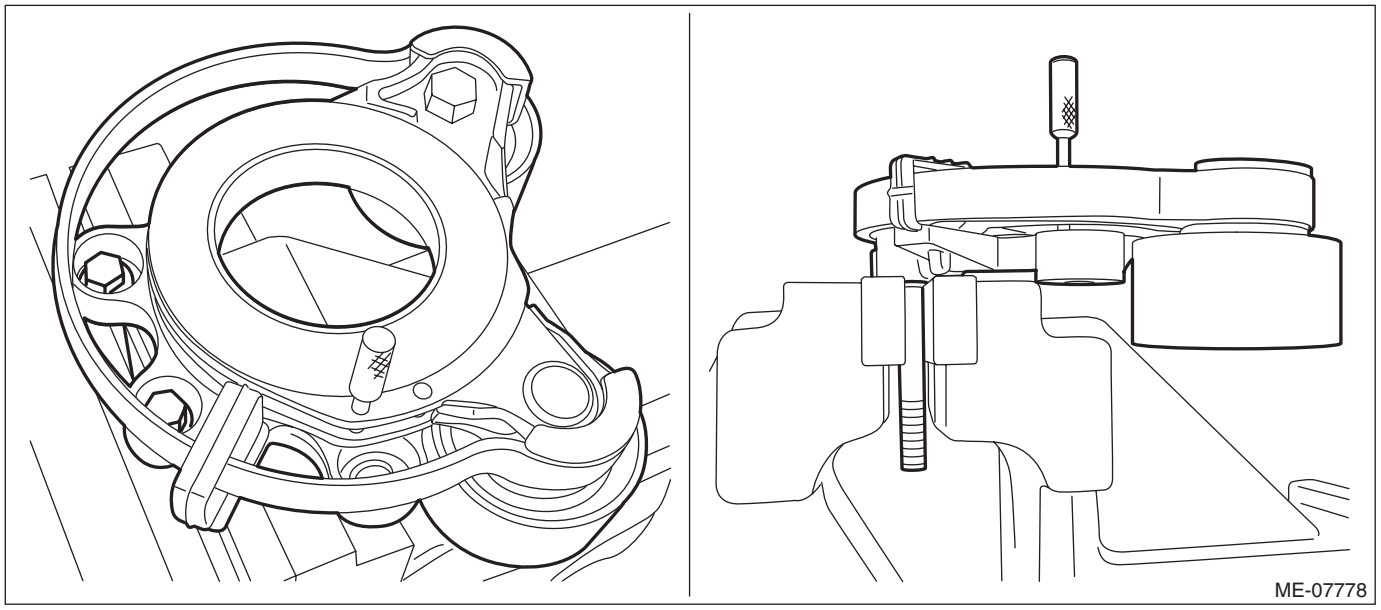
4) Remove the V-belt tensioner assembly and remove the V-belt.



5) The V-belt tensioner assembly is replaced.

NOTE:
- When replacing the V-belt tensioner assembly, also perform the following steps.
- This procedure is required to prepare 1 more piece of ST: STOPPER PIN (499267300).

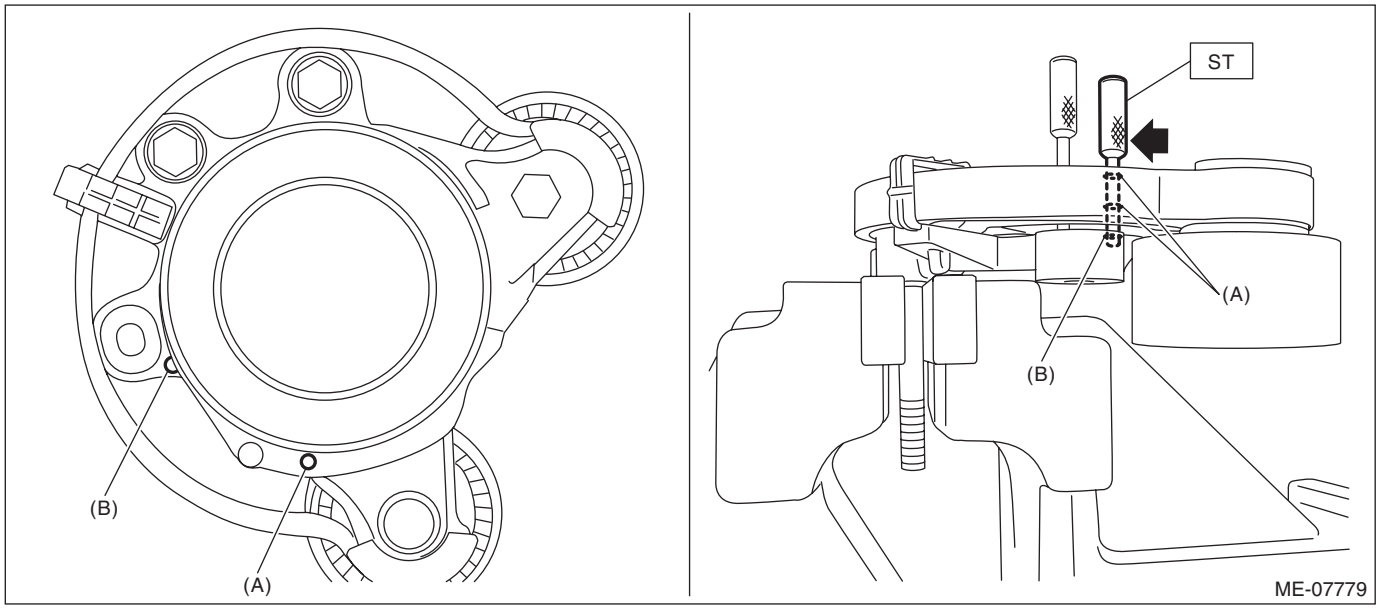
(1) Using a bolt (M8) of suitable length, secure the V-belt tensioner assembly on a vise.



(2) Turn the arm lever until the stopper pin hole (A) of the arm lever No. 2 is aligned with the stopper pin hole (B) of the housing, and insert the ST through the stopper pin hole (A) of the arm lever No. 2 into the end of the stopper pin hole (B) of the housing.

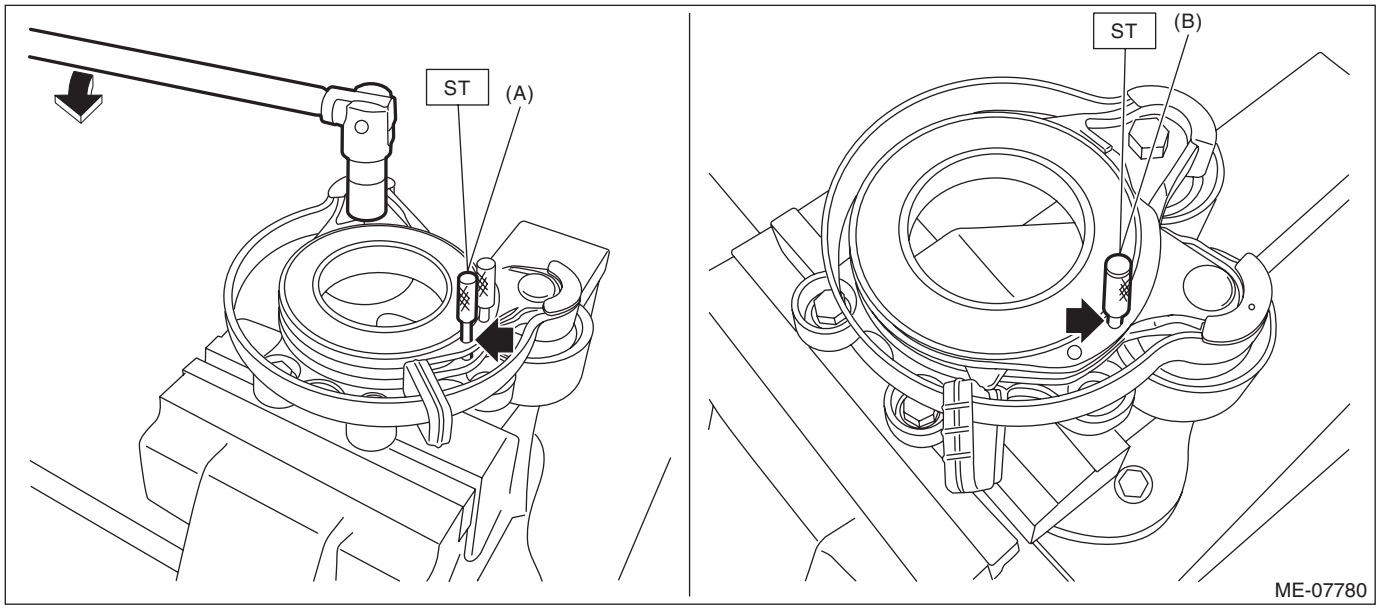
CAUTION:
Be sure to insert the ST into the end of the stopper pin hole (B) of the housing. If the ST is not inserted to the end, the ST may accidentally come off in the next procedure, resulting in an injury.

ST 499267300 STOPPER PIN



(3) Set the tool on the arm lever No. 1, turn the tool counterclockwise a little, remove the ST (A) from the arm lever No. 2, and remove the ST (B) inserted in step (2).

ST 499267300 STOPPER PIN

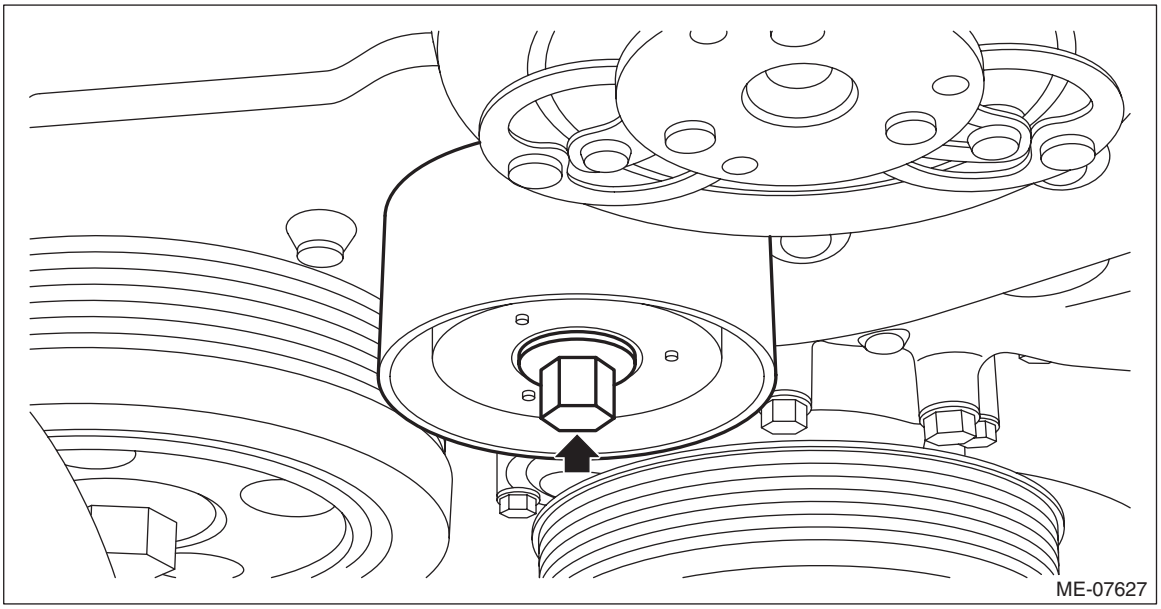


- **Idler pulley**

1) Loosen the V-belt, and remove the V-belt from the idler pulley.

NOTE:
- Refer to “V-belt tensioner assembly and V-belt” for the loosening procedure of V-belt.
- It is not necessary to remove the V-belt tensioner assembly and the V-belt from ISG.

2) Remove the bolts which secure the idler pulley to the chain cover, and remove the idler pulley.



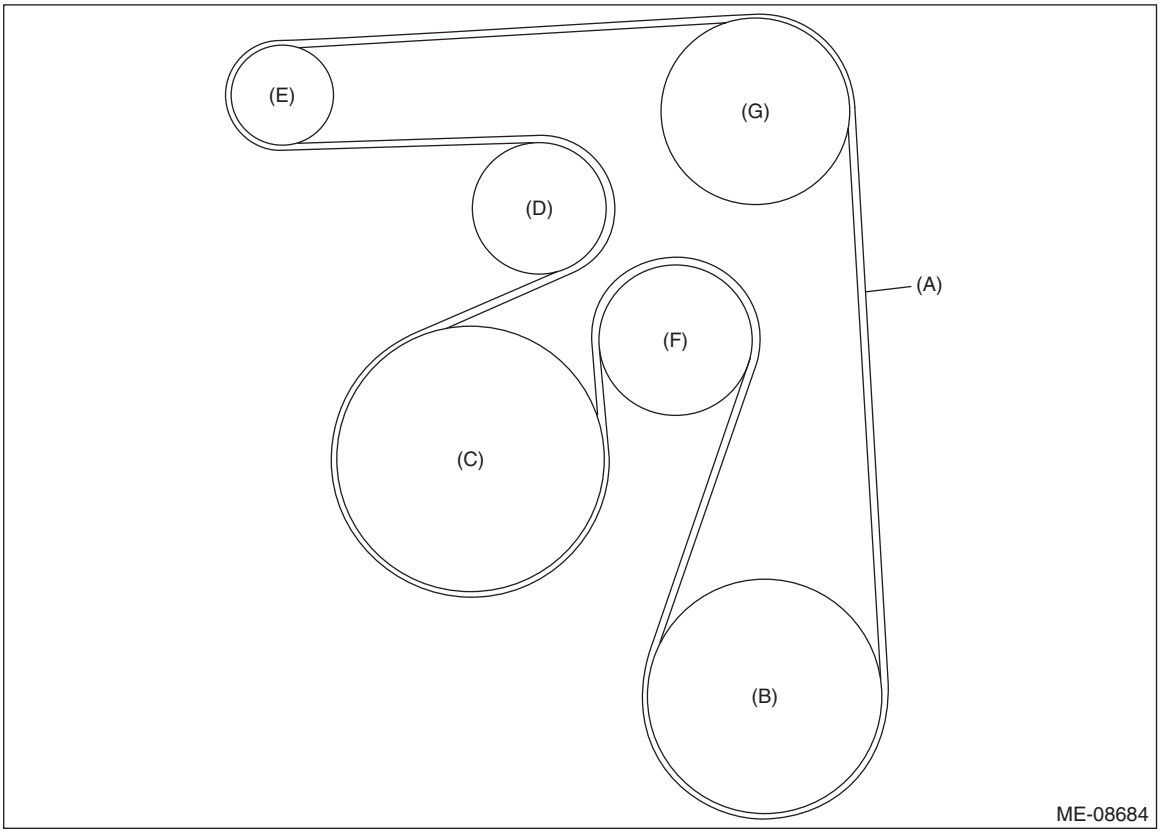
B: INSTALLATION

1. GASOLINE ENGINE MODEL

- **V-belt**

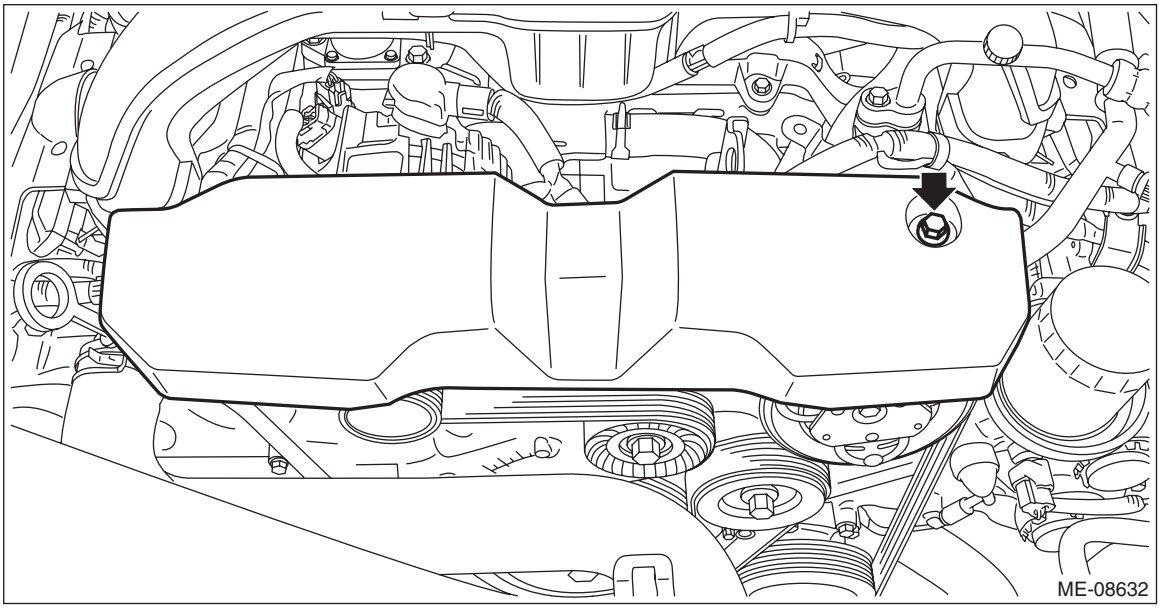
Install in the reverse order of removal.

CAUTION:
- **When reusing the V-belt, wipe off dust and water with cloth.**
- **Do not use the V-belt if there is any oil, grease or coolant on the belt.**
- **Be careful not to rub the V-belt end surface with bare hands; exposed core may cause injury.**
- **Wipe off any dust, oil and water on the groove of each pulley with cloth.**



(A) V-belt
(B) Water pump pulley
(C) Crank pulley
(D) V-belt tensioner ASSY
(E) Generator pulley
(F) Idler pulley
(G) A/C compressor pulley

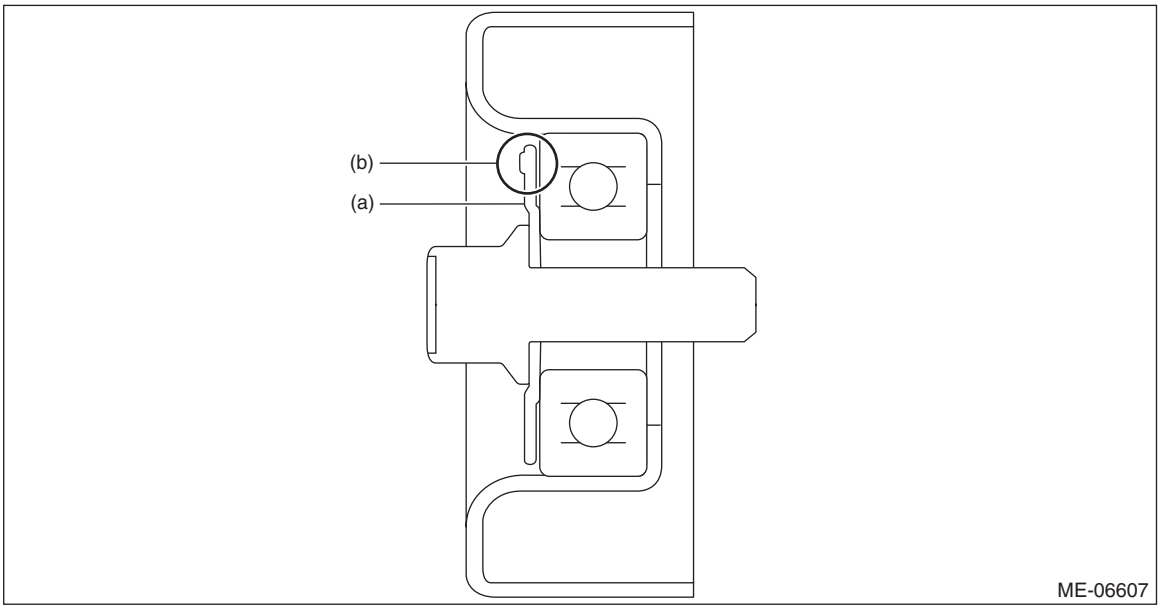
Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



- **V-belt tensioner assembly and idler pulley**

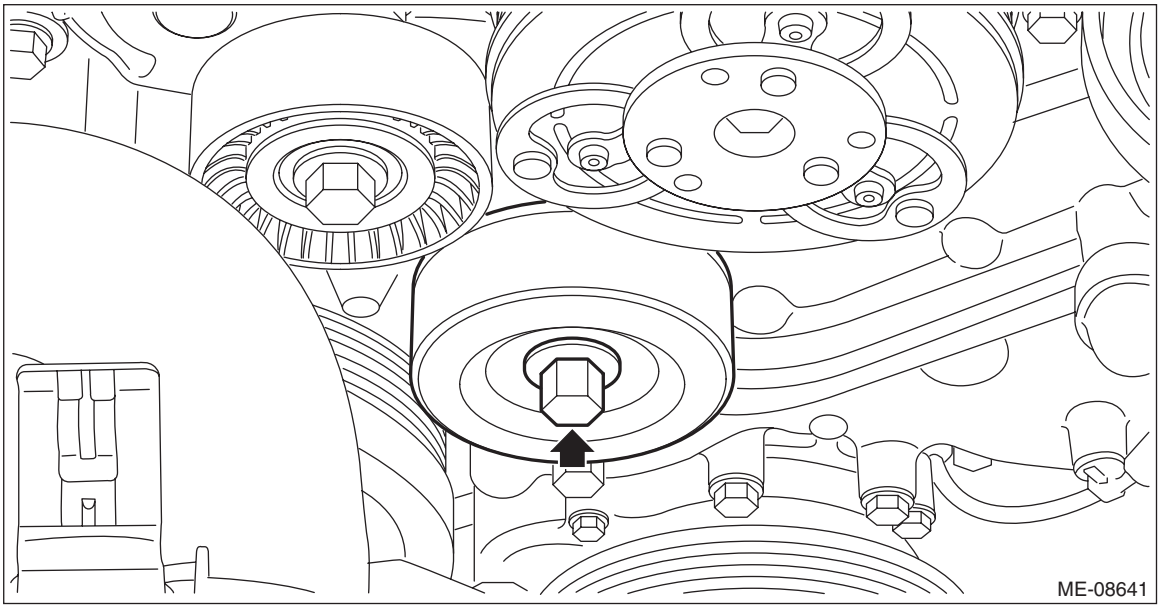
1) Install the idler pulley to the chain cover.

NOTE:
When installing the idler pulley, be careful of the idler pulley cover direction.



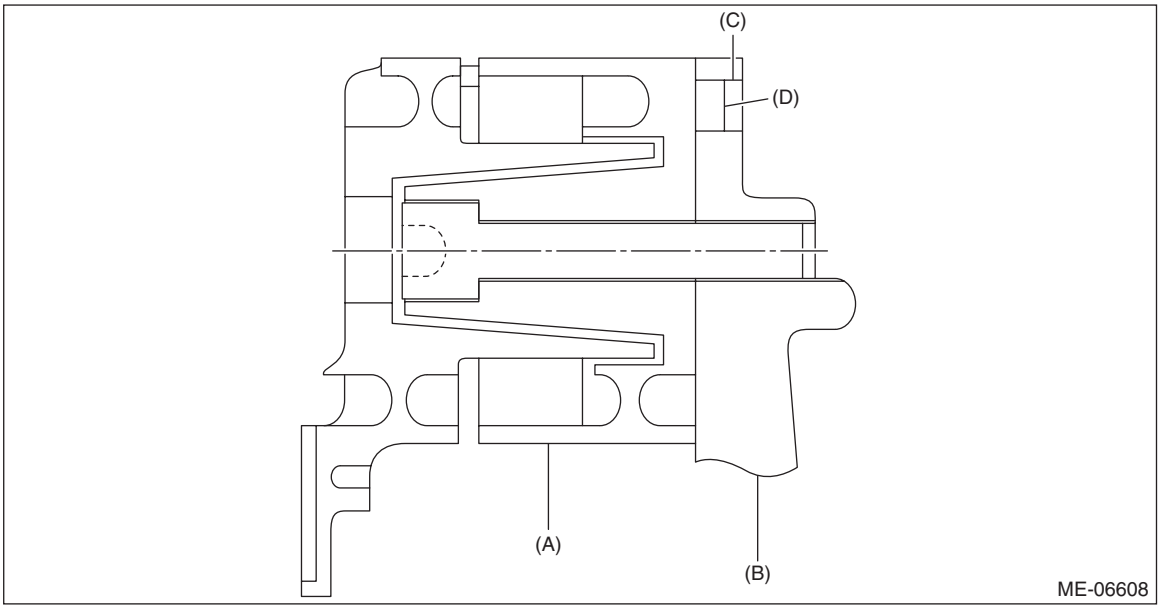
(a) Idler pulley cover (b) Protrusion (3 places)

Tightening torque:
36 N·m (3.7 kgf-m, 26.6 ft-lb)



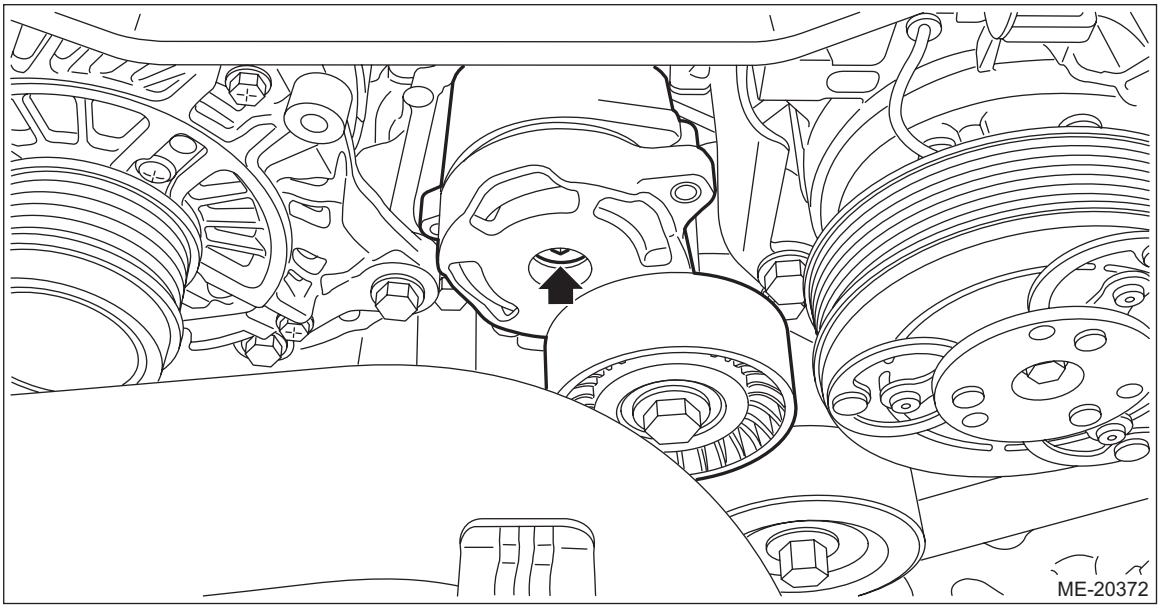
2) Install the V-belt tensioner assembly onto the generator bracket.

NOTE:
When installing the V-belt tensioner assembly, insert the protrusion of V-belt tensioner assembly into the hole for preventing rotation at the generator bracket.

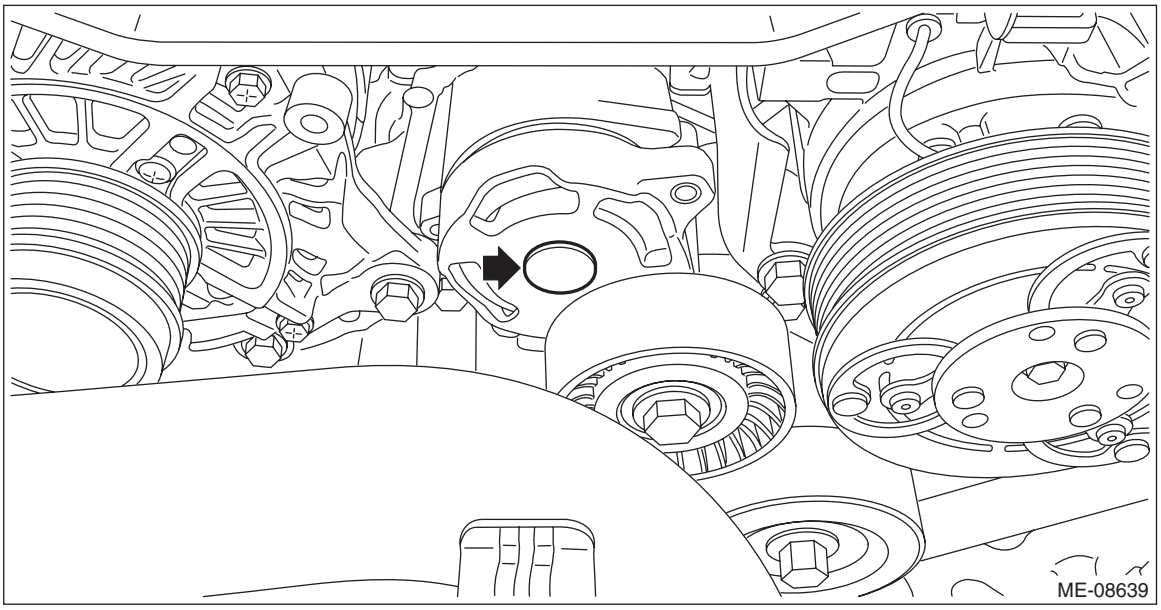


(A) V-belt tensioner ASSY
(B) Generator bracket
(C) Hole to prevent rotation
(D) Protrusion portion

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



3) Install the cap to the V-belt tensioner assembly.



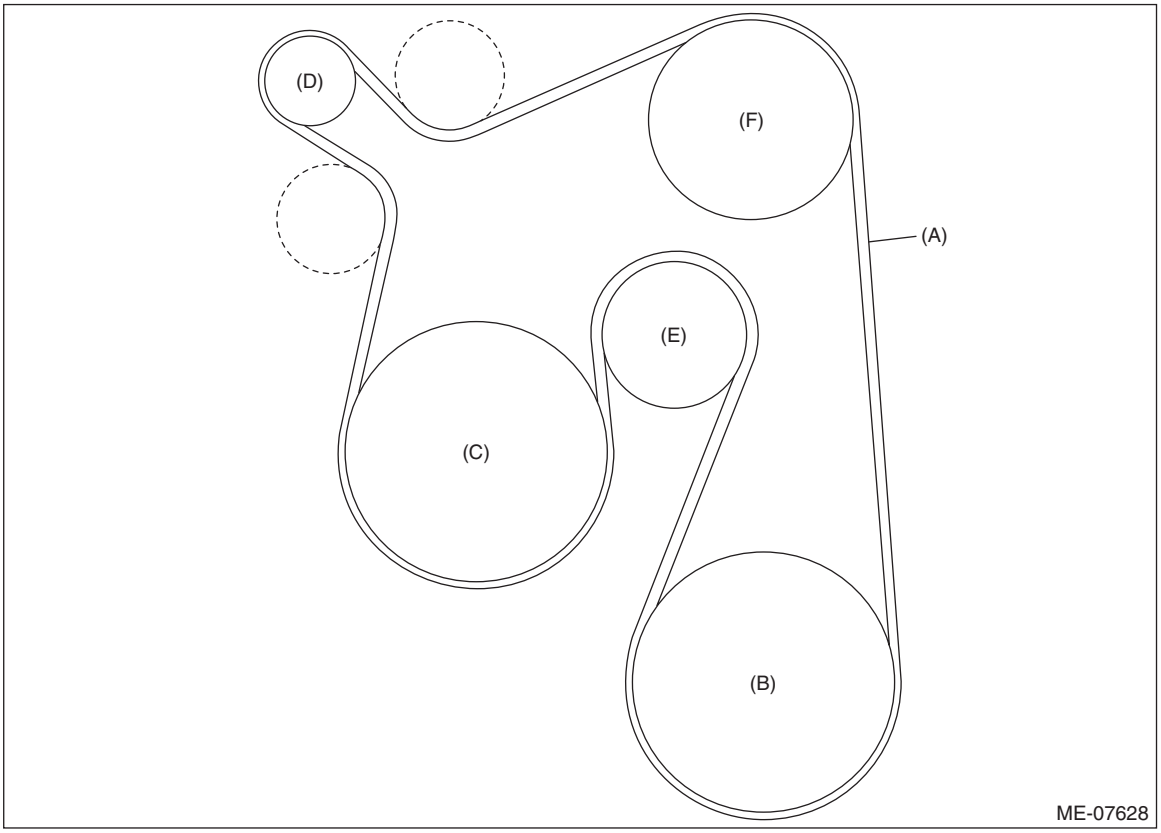
4) Install the V-belts.

2. HEV MODEL

• V-belt tensioner assembly and V-belt

1) Set the V-belt as shown in the figure.

CAUTION:
- **When reusing the V-belt, wipe off dust and water with cloth.**
- **Do not use the V-belt if there is any oil, grease or coolant on the belt.**
- **Be careful not to rub the V-belt end surface with bare hands; exposed core may cause injury.**
- **Wipe off any dust, oil and water on the groove of each pulley with cloth.**

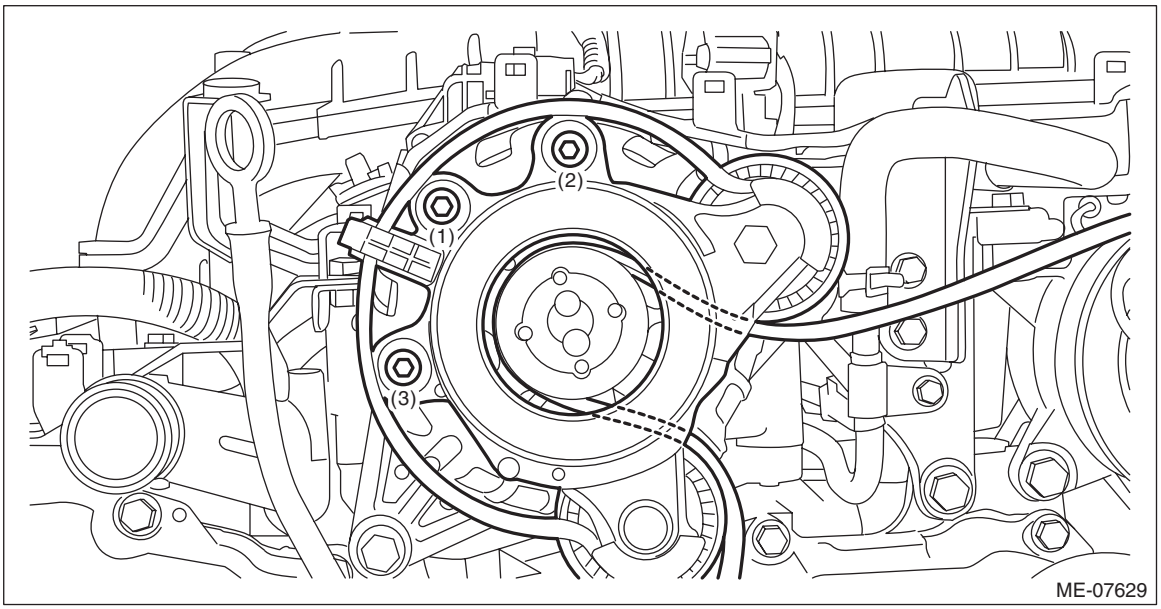


(A)	V-belt	(C)	Crank pulley	(E)	Idler pulley
(B)	Water pump pulley	(D)	ISG pulley	(F)	A/C compressor pulley

2) Set the V-belt tensioner assembly in the position shown in the figure, and temporarily tighten the bolts that hold the V-belt tensioner assembly.

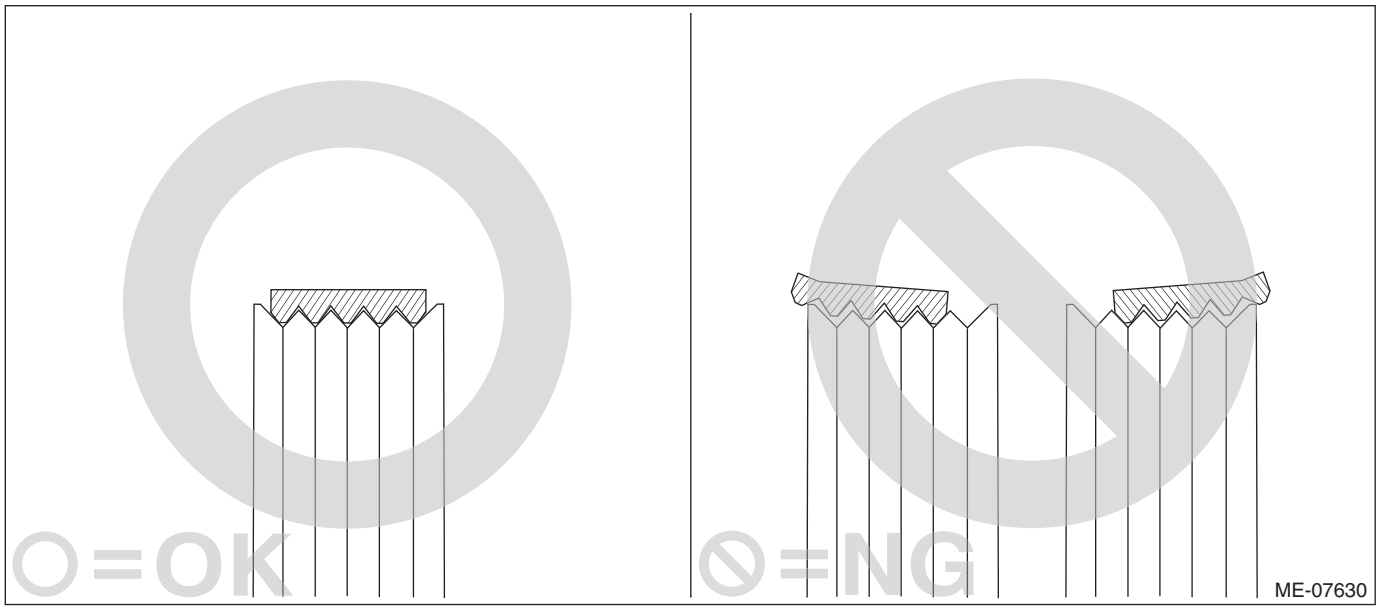
3) Tighten the bolts which hold the V-belt tensioner assembly in the numerical order shown in the figure.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

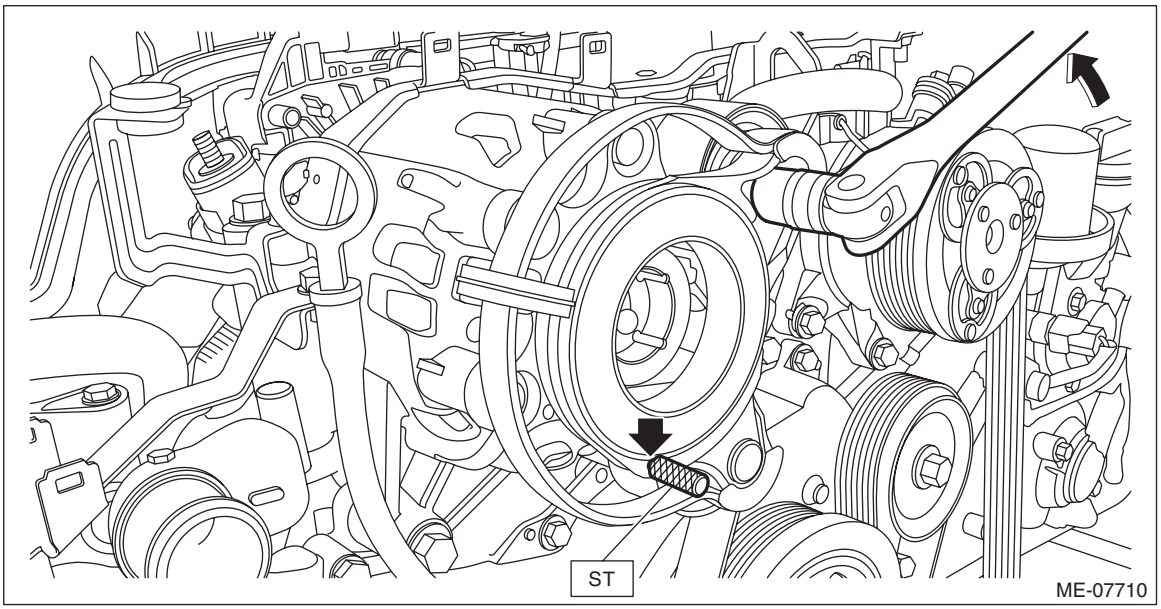


4) Set the tool on the arm lever No. 1, turn the tool counterclockwise a little, and remove the ST from the arm lever No. 2.

NOTE:
Before removing the ST, check that the V-belt ribs are securely placed on the rib grooves for each pulley.



ST 499267300 STOPPER PIN



5) When working on the vehicle

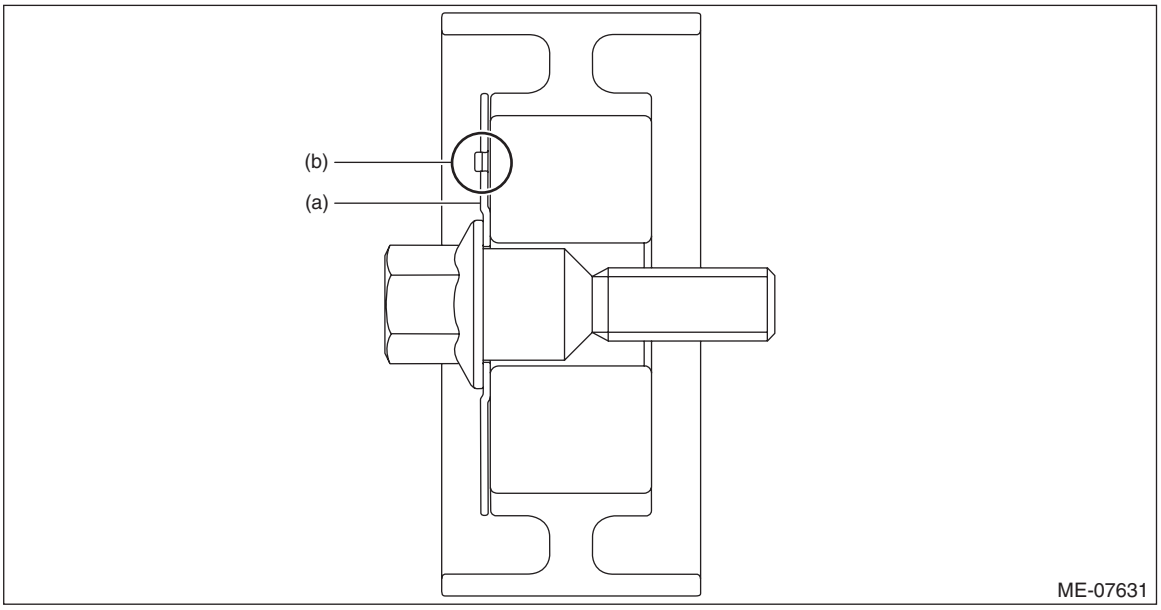
NOTE:
When working on the vehicle, perform the following steps also.

(1) Install the collector cover.

• **Idler pulley**

Install in the reverse order of removal.

NOTE:
When installing the idler pulley, be careful of the idler pulley cover direction.



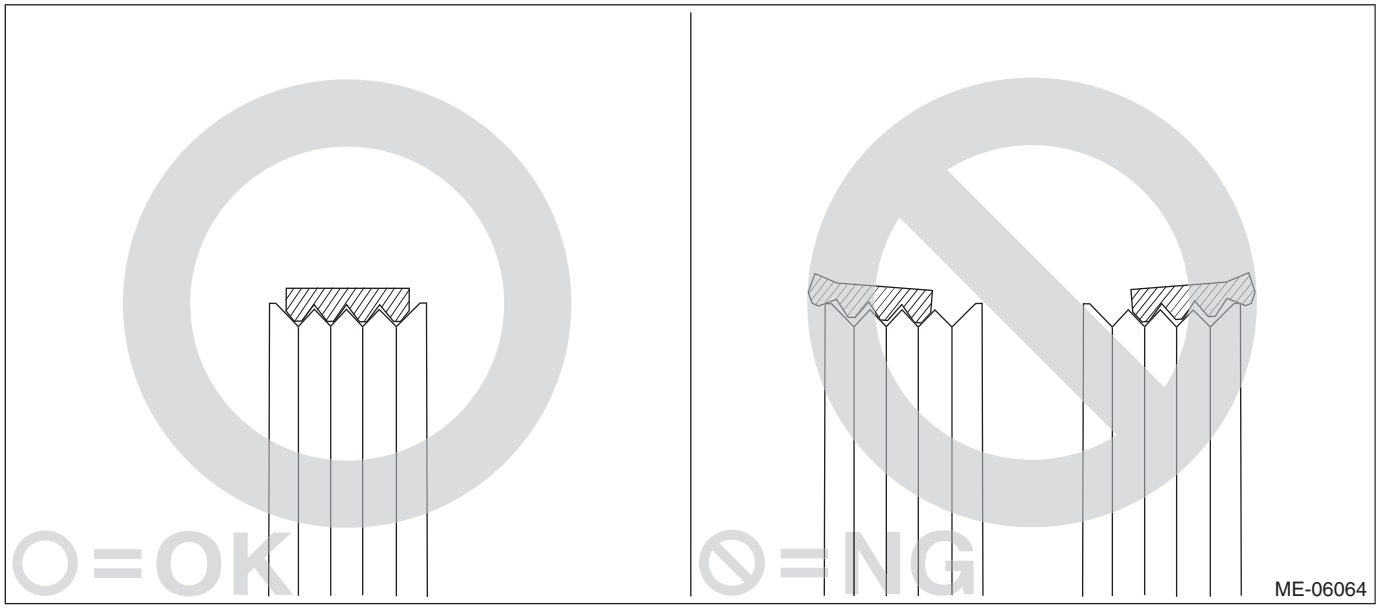
(a) Idler pulley cover (b) Protrusion (3 places)

Tightening torque:
36 N·m (3.7 kgf-m, 26.6 ft-lb)

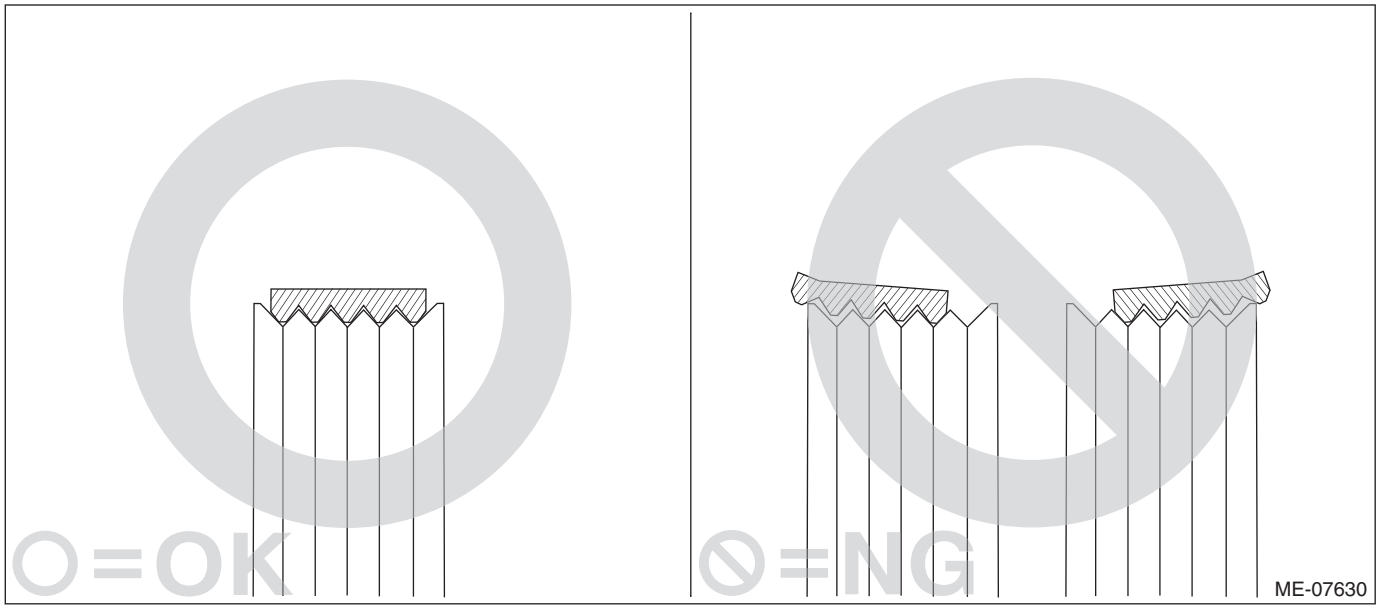
C: INSPECTION

1) Check the V-belt for cracks, tear or wear.
2) Check the V-belt tensioner assembly and idler pulley for deformation, cracks or other damages.
3) Check that the V-belt ribs are securely placed on the rib grooves for each pulley.

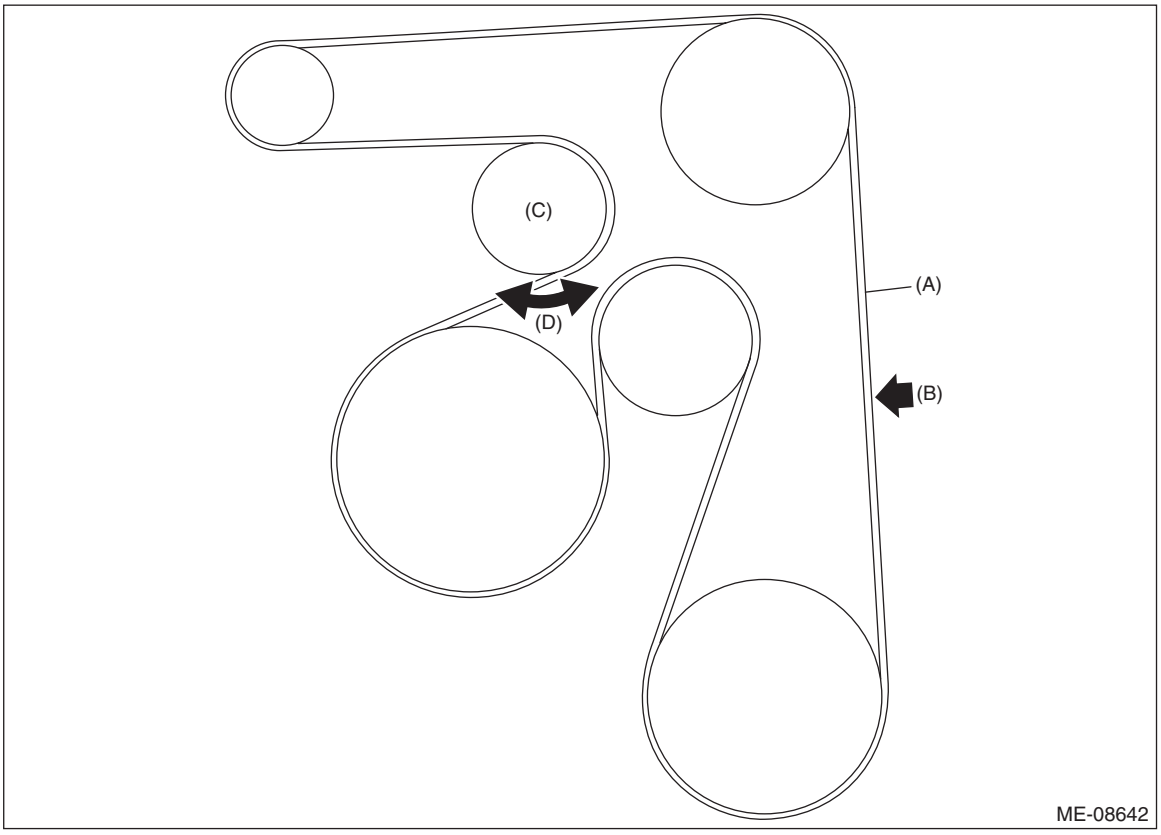
• Gasoline engine model



- HEV model



4) Check that the V-belt tensioner assembly (C) moves in the direction of arrow (D), when the V-belt (A) is pushed and released by the area indicated by the arrow (B). (Gasoline engine model)



5) Start the engine and confirm that the V-belt rotates smoothly and no abnormal noise is emitted.

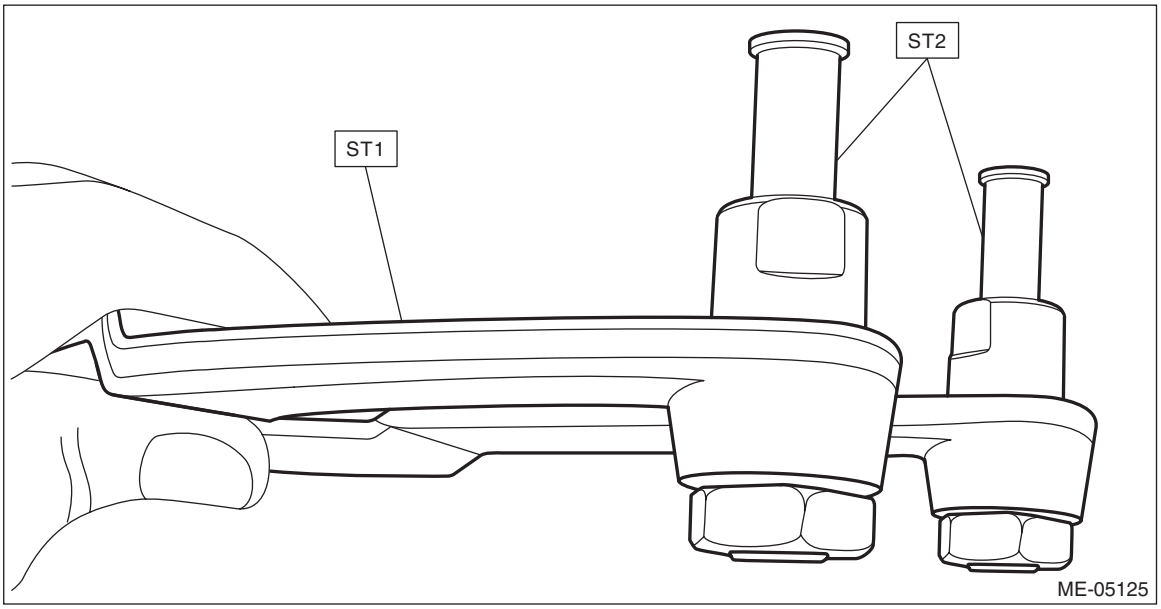
13.Crank Pulley

A: REMOVAL

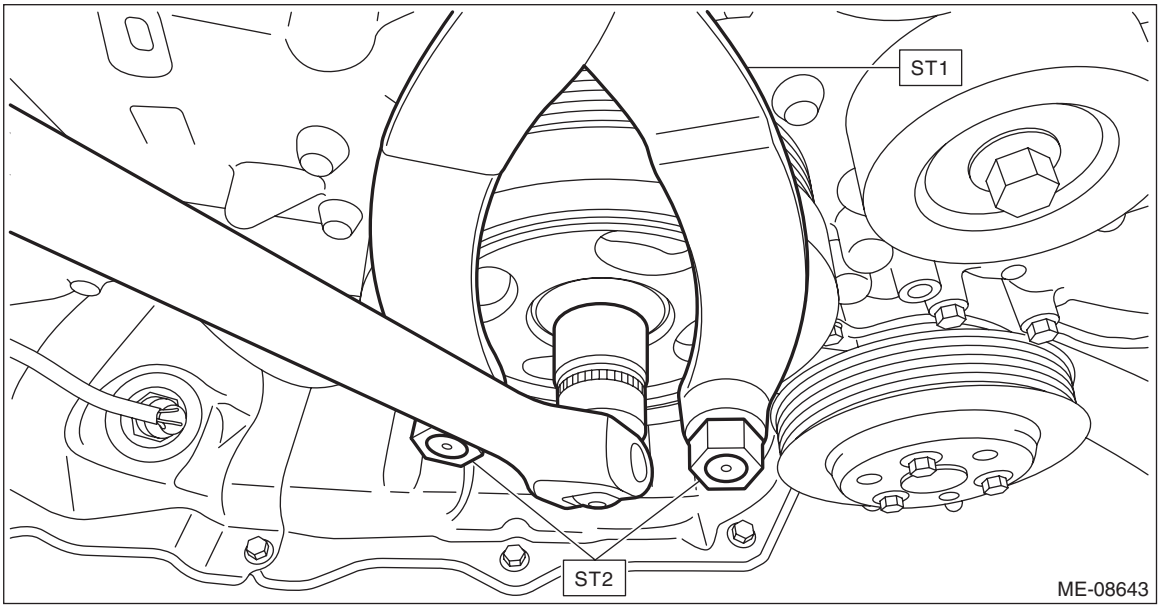
NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.
1) When working on the vehicle

NOTE:
When working on the vehicle, perform the following steps also.
(1) Remove the radiator main fan & fan motor assembly and radiator sub fan & fan motor assembly. <Ref. to CO(H4DO(w/o HEV))-88, REMOVAL, Radiator Main Fan and Fan Motor.> <Ref. to CO(H4DO(w/o HEV))-92, REMOVAL, Radiator Sub Fan and Fan Motor.>
2) Remove the V-belts. <Ref. to ME(H4DO(w/o HEV))-124, REMOVAL, V-belt.>
3) Use the ST to lock the crank pulley, and remove the crank pulley bolt.

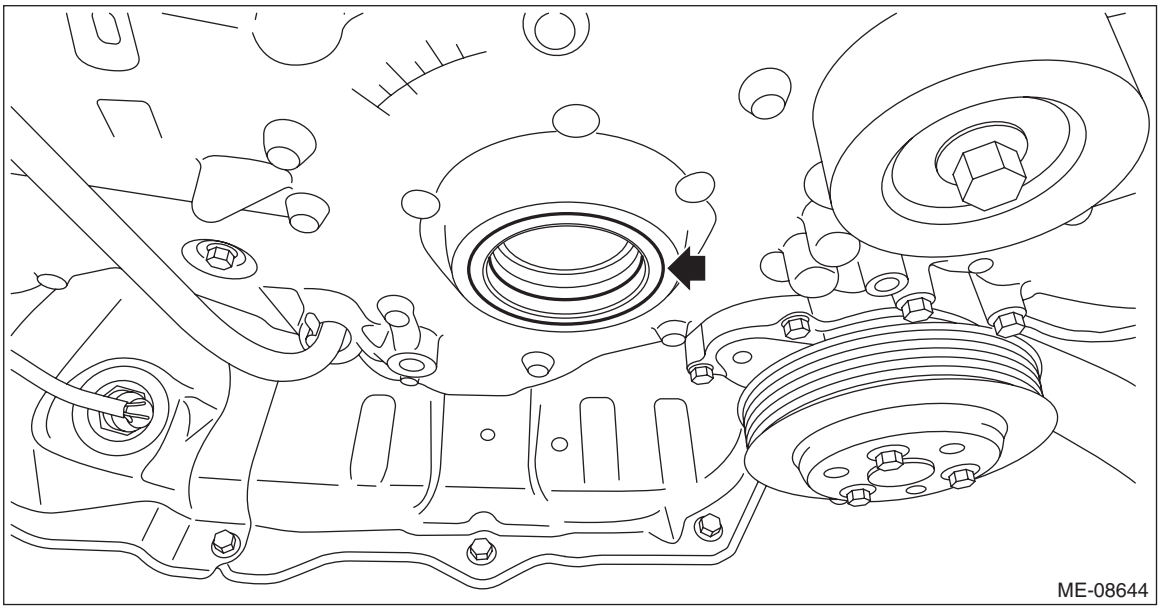
NOTE:
To prevent damaging ST1, attach the ST2 onto the ST1 as shown.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PULLEY WRENCH PIN SET



ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PULLEY WRENCH PIN SET



4) Remove the crank pulley.
5) Remove the front oil seal. (Gasoline engine model)



B: INSTALLATION

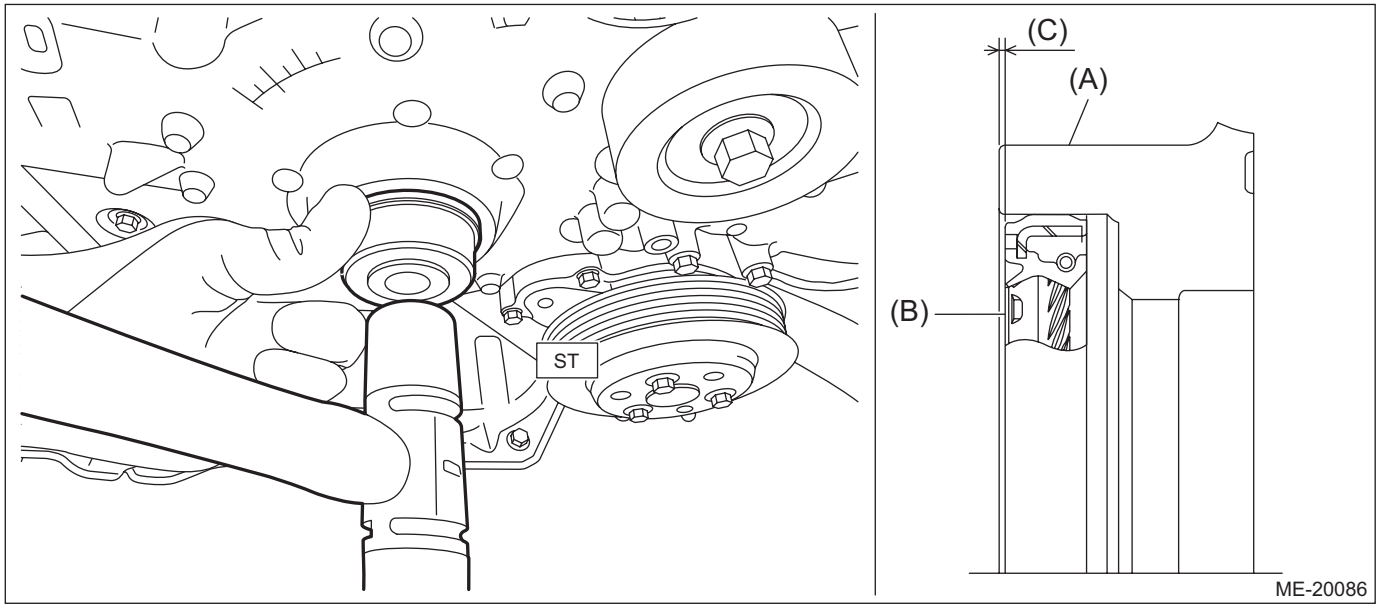
1) Degrease the press-fit section for the chain cover front oil seal, and install the front oil seal to the chain cover using ST. (Gasoline engine model)

CAUTION:
Do not apply fluid such as engine oil to the front oil seal and the chain cover; otherwise engine oil leakage may occur.

NOTE:
- Use a new front oil seal.
- When tapping the front oil seal in, protect the radiator fin with cardboards etc. so as not to damage the radiator fin by the plastic hammer.

ST 41399FG020 SPECIAL TOOL B

Front oil seal press-fit position:
1^{+0}_{-1} mm ($0.0039^{+0}_{-0.0039}$ in) position from chain cover end face

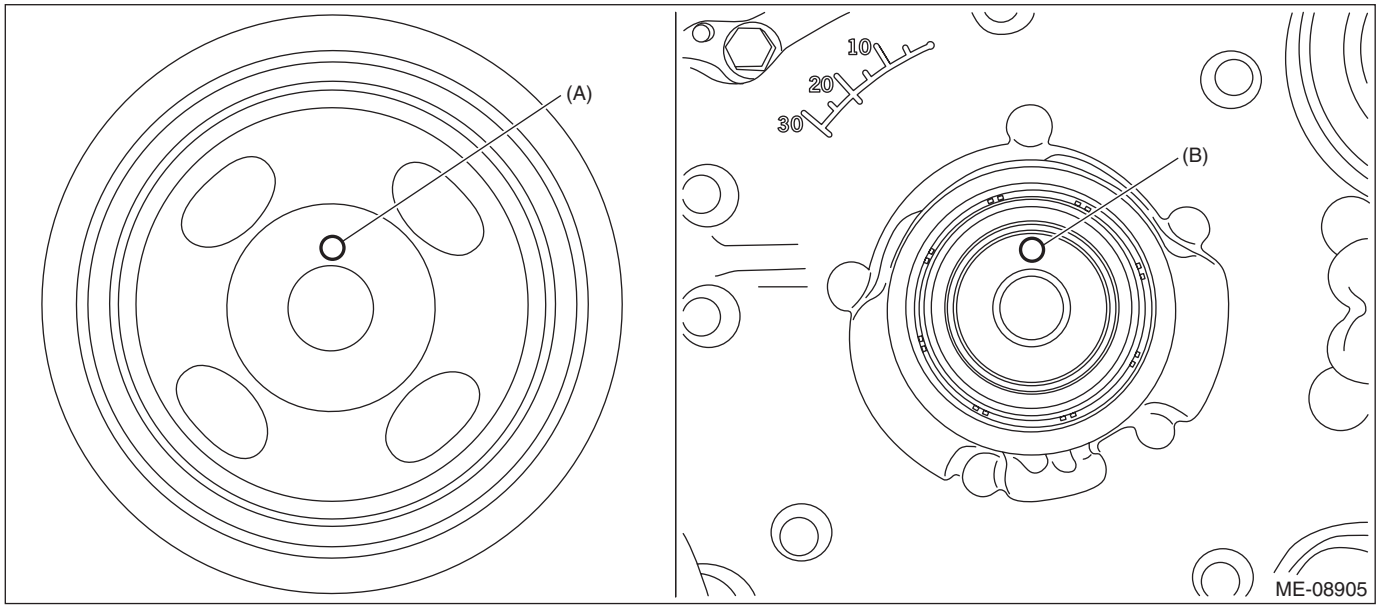


(A) Chain cover
(B) Oil seal
(C) Front oil seal press-fit position (1^{+0}_{-1} mm ($0.0039^{+0}_{-0.0039}$ in) position from chain cover end face)

2) Clean the crankshaft thread using compressed air.
3) Apply engine oil to the crank pulley bolt seat and thread.

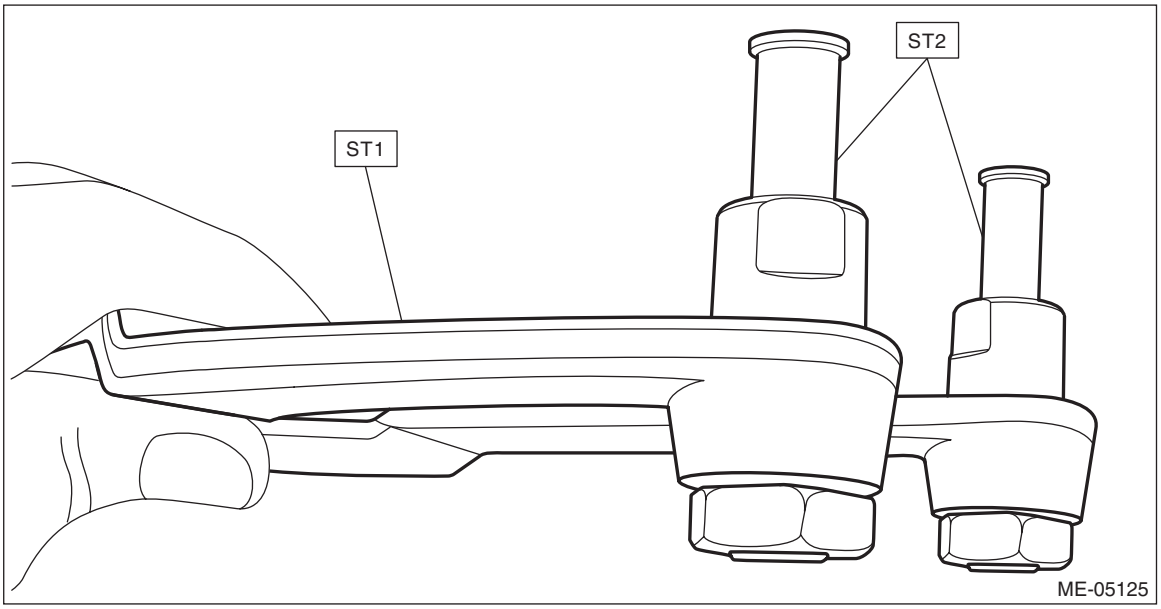
4) Install the crank pulley.
(1) Set the crank pulley to the chain cover. (Gasoline engine model)
(2) Set the crank pulley to the crank pulley boss. (HEV model)

NOTE:
- Use new O-rings.
- Install the crank pulley by aligning the crank pulley knock hole (A) and crank pulley boss knock pin (B).



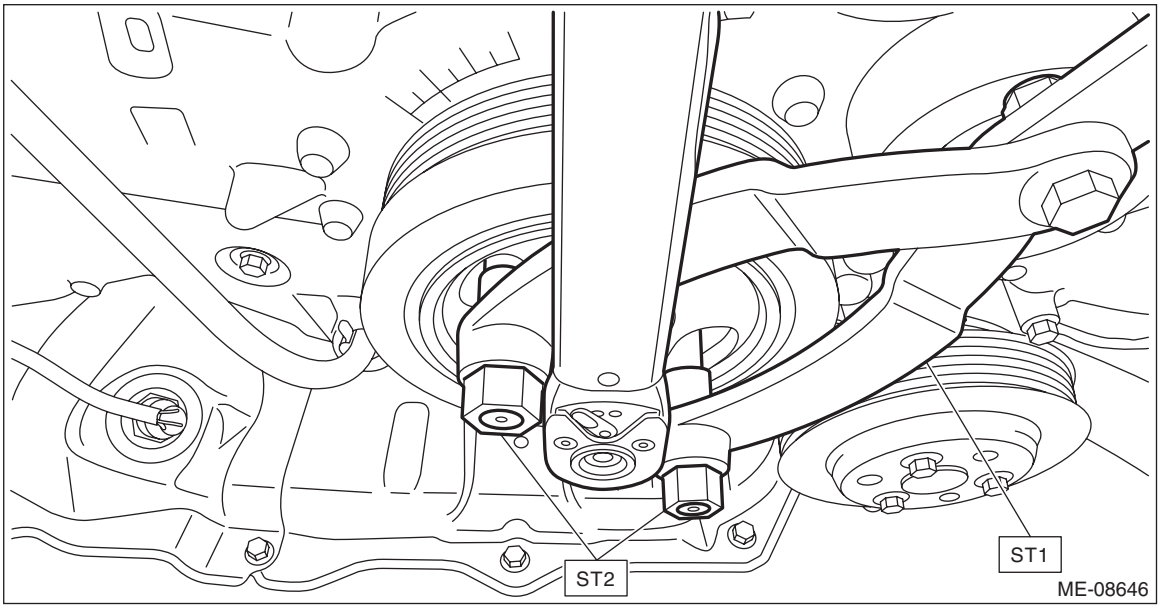
(3) Use the ST to lock the crank pulley, and temporarily tighten the crank pulley bolt.

NOTE:
To prevent damaging ST1, attach the ST2 onto the ST1 as shown.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PULLEY WRENCH PIN SET

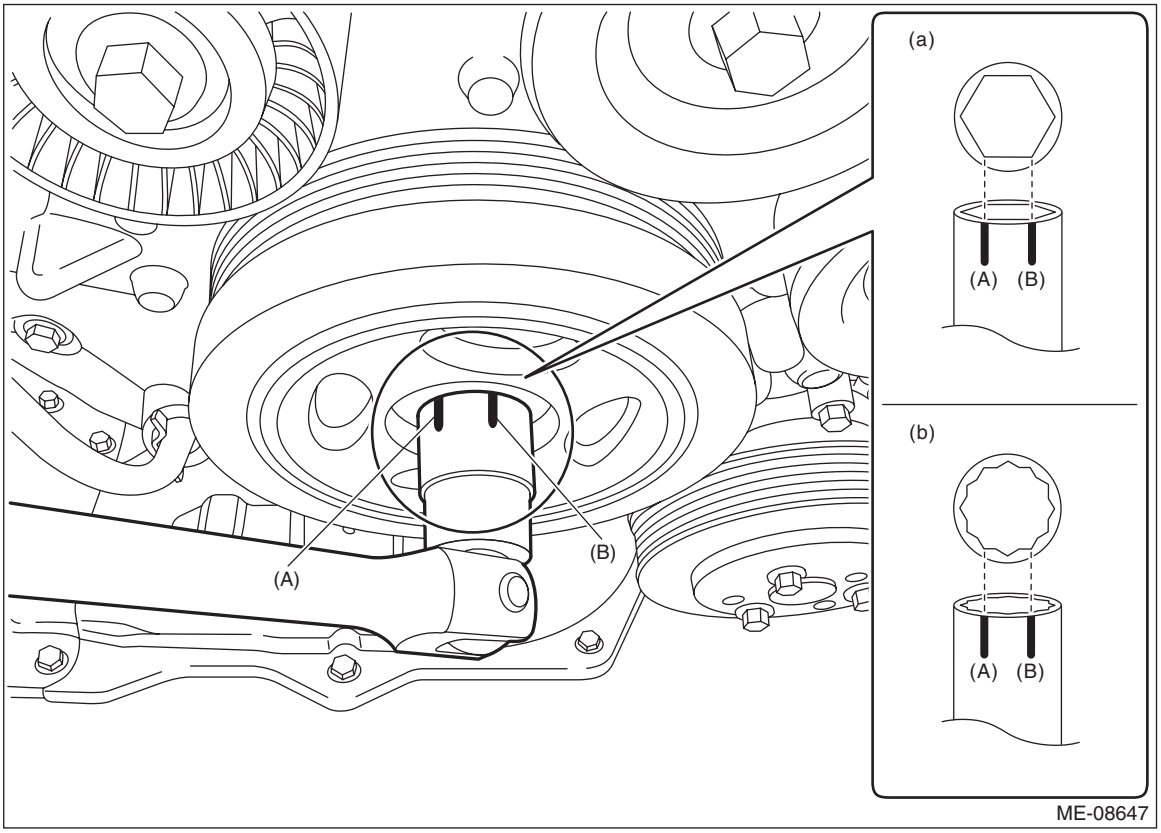


ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PULLEY WRENCH PIN SET

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)

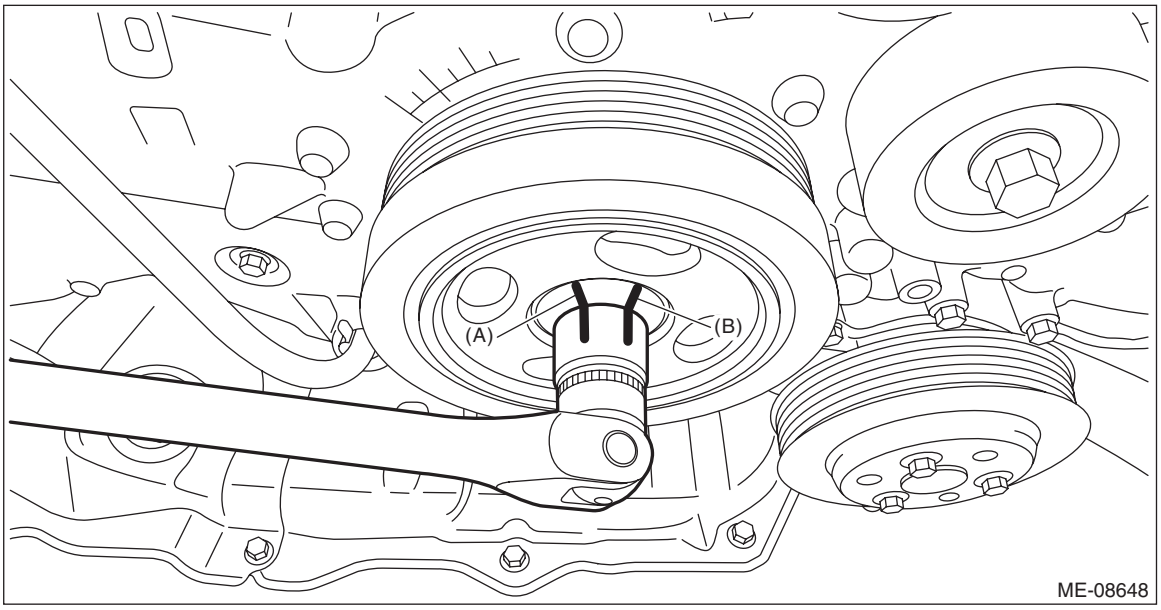


(4) Draw reference lines (A) and (B) using a marker to set the socket to the crank pulley bolt as shown in the figure.

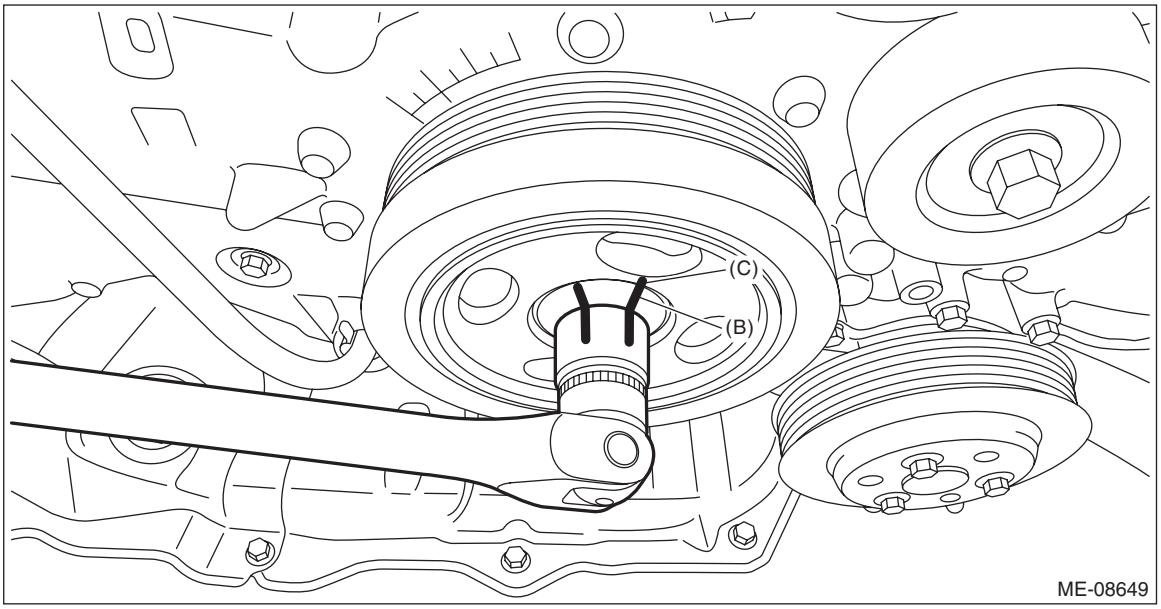


(a) When using 6-point socket (b) When using 12-point socket

(5) Draw reference lines (A) and (B) on the crank pulley bolt using a marker as shown in the figure.



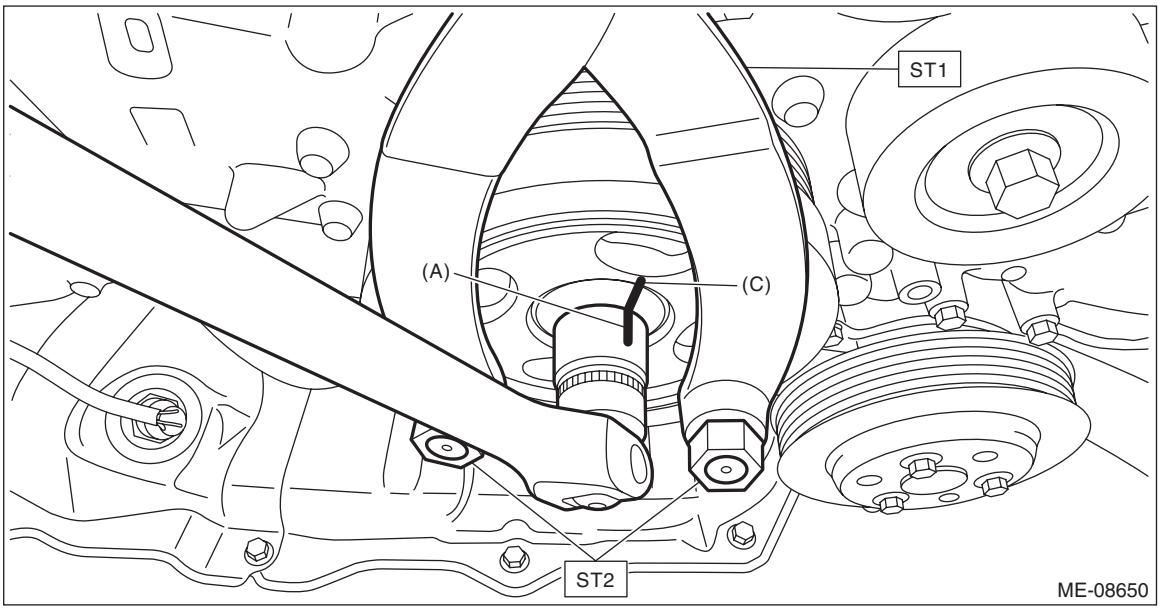
(6) Draw end line (C) on crank pulley using a marker at the same position as reference line (B) drawn on the crank pulley bolt in step (3).



(7) Use the ST to lock the crank pulley, and tighten the crank pulley bolt to the angle where reference line (A) and end line (C) are aligned.

NOTE:
It should be approx. 60° when reference line (A) and end line (C) are aligned.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PULLEY WRENCH PIN SET

Tightening angle:
60°±5°

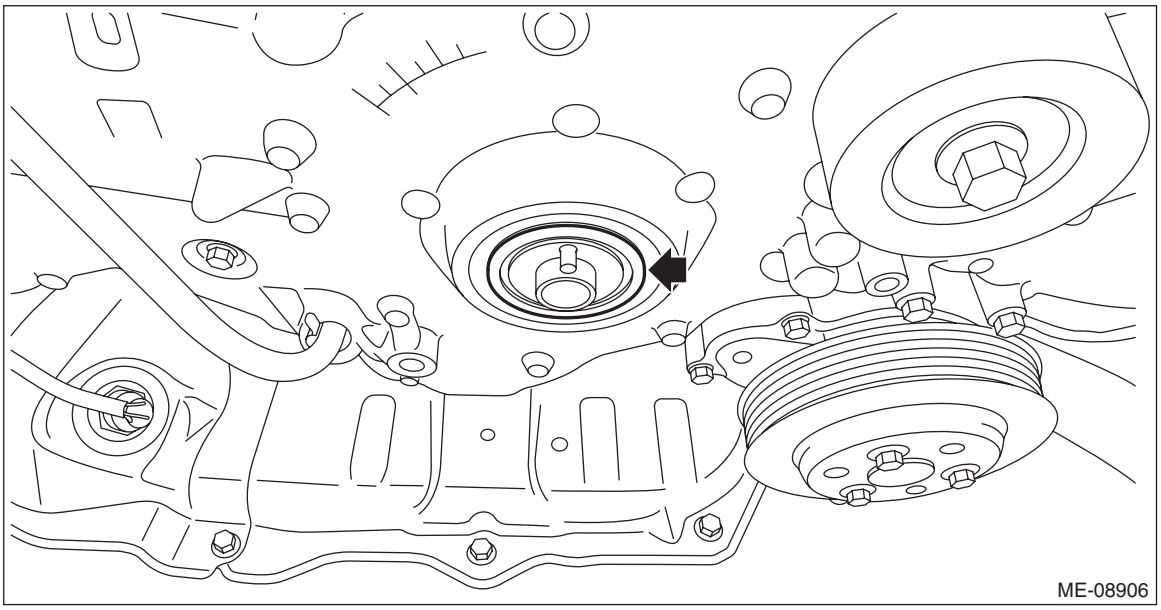


5) Install the V-belts. <Ref. to ME(H4DO(w/o HEV))-132, GASOLINE ENGINE MODEL, INSTALLATION, V-belt.>
6) When working on the vehicle

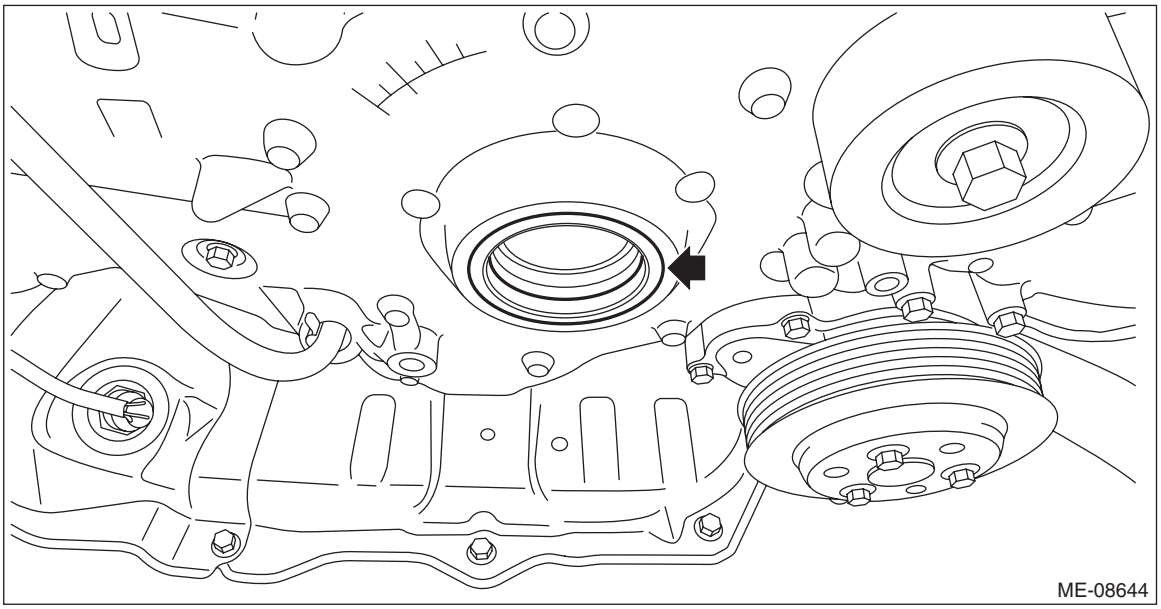
NOTE:
When working on the vehicle, perform the following steps also.
(1) Install the radiator main fan & fan motor assembly and radiator sub fan & fan motor assembly. <Ref. to CO(H4DO(w/o HEV))-89, INSTALLATION, Radiator Main Fan and Fan Motor.> <Ref. to CO(H4DO(w/o HEV))-93, INSTALLATION, Radiator Sub Fan and Fan Motor.>

C: INSPECTION

1) Check that the crank pulley and crank pulley boss (HEV model) have no deformation, cracks or other damages.
2) Inspect for oil leakage from the front oil seal. If there is an oil leak, replace the front oil seal with a new one. (Gasoline engine model) <Ref. to ME(H4DO(w/o HEV))-141, REMOVAL, Crank Pulley.>
3) Inspect for oil leakage from the front oil seal. If there is an oil leak, replace the front oil seal with a new part according to the following procedures. (HEV model)
   (1) Remove the crank pulley. <Ref. to ME(H4DO(w/o HEV))-141, REMOVAL, Crank Pulley.>
   (2) Remove the crank pulley boss from the chain cover.



   (3) Remove the front oil seal from the chain cover.

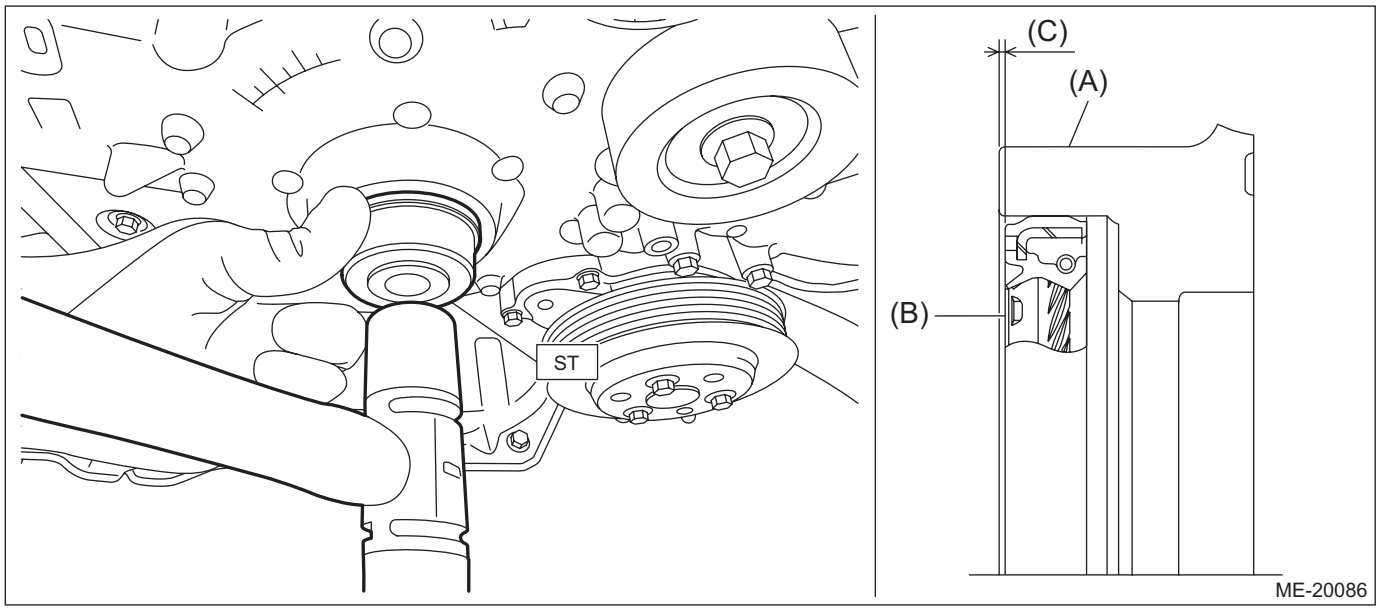


(4) Degrease the press-fit section for the chain cover front oil seal, and install the front oil seal to the chain cover using ST.

CAUTION:
Do not apply fluid such as engine oil to the front oil seal and the chain cover; otherwise engine oil leakage may occur.

NOTE:
When tapping the front oil seal in, protect the radiator fin with cardboards etc. so as not to damage the radiator fin by the plastic hammer.
ST 41399FG020 SPECIAL TOOL B

Front oil seal press-fit position:
1^{+0}_{-1} mm ($0.0039^{+0}_{-0.0039}$ in) position from chain cover end face



(A) Chain cover
(B) Oil seal
(C) Front oil seal press-fit position (1^{+0}_{-1} mm ($0.0039^{+0}_{-0.0039}$ in) position from chain cover end face)

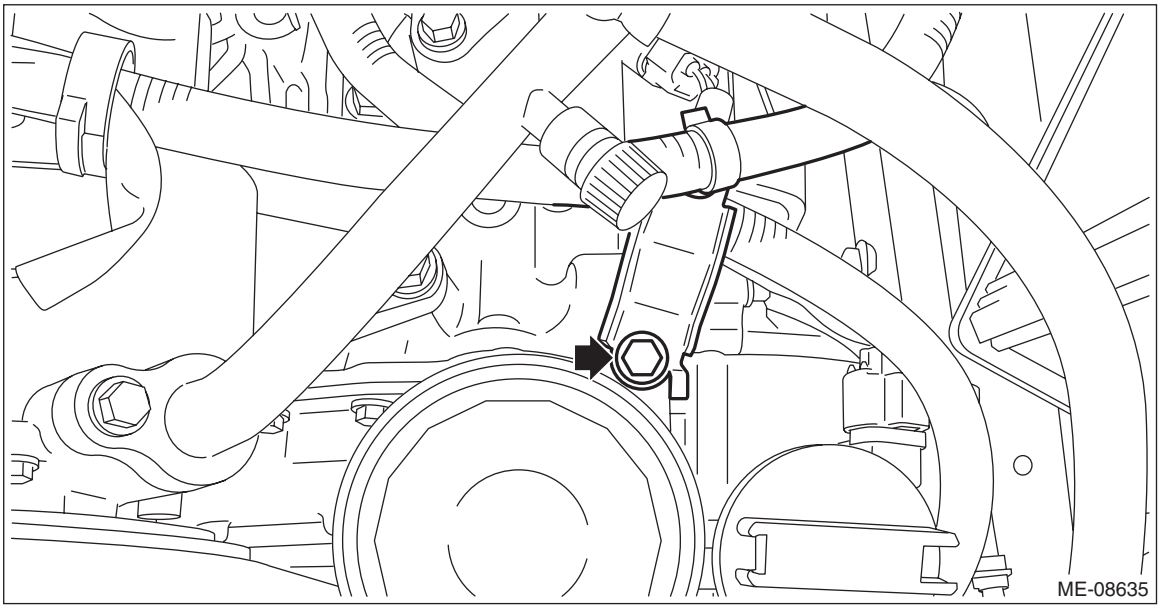
(5) Install in the reverse order of removal after replacement.

14.Chain Cover

A: REMOVAL

NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.
1) When working on the vehicle

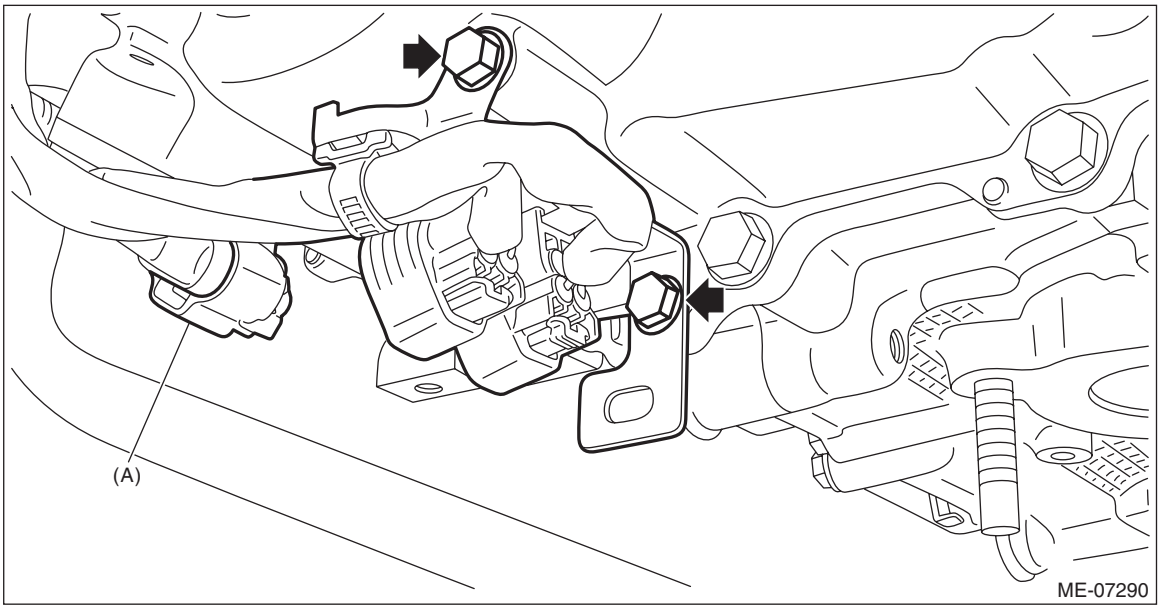
NOTE:
When working on the vehicle, perform the following steps also.
(1) Remove the radiator. <Ref. to CO(H4DO(w/o HEV))-77, REMOVAL, Radiator.>
(2) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
(3) Remove the bolts which secure the generator cord stay to the chain cover. (Gasoline engine model)



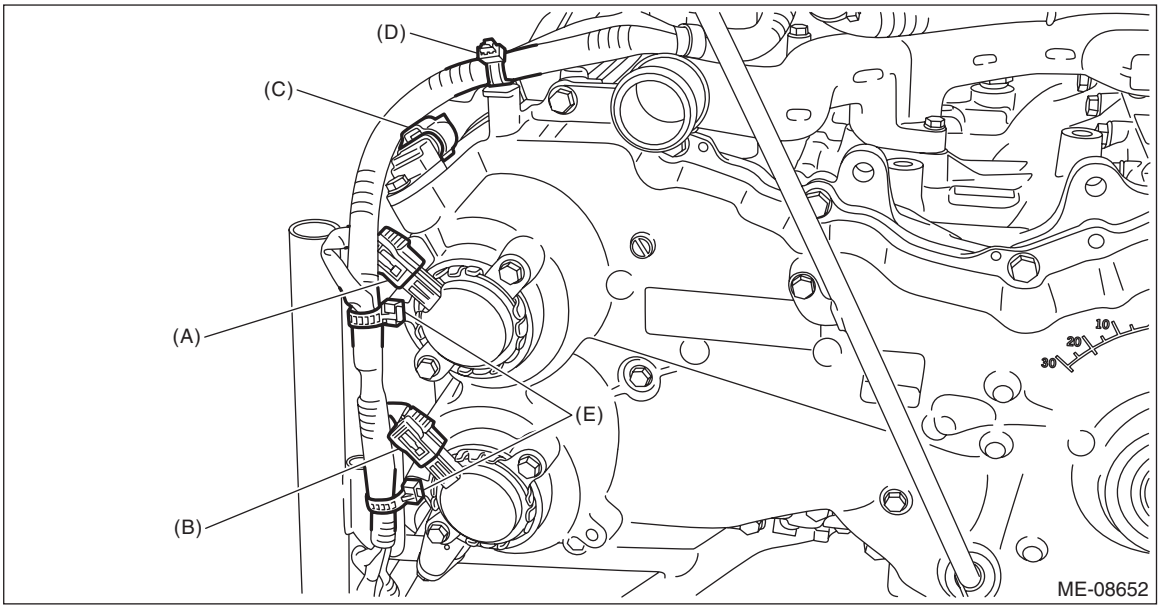
2) Drain the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
3) Remove the ISG. (HEV model) <Ref. to SC(H4DO(HEV))-33, REMOVAL, Integrated Starter Generator (ISG).>

NOTE:
When working on the vehicle, move the battery cable assembly at the locations that do not interfere operation after the ISG is removed.
4) Remove the generator. (Gasoline engine model) <Ref. to SC(H4DO(w/o HEV))-33, REMOVAL, Generator.>
5) Remove the water pump pulley. <Ref. to CO(H4DO(w/o HEV))-21, WATER PUMP, REMOVAL, Water Pump.>
6) Remove the crank pulley. <Ref. to ME(H4DO(w/o HEV))-141, REMOVAL, Crank Pulley.>

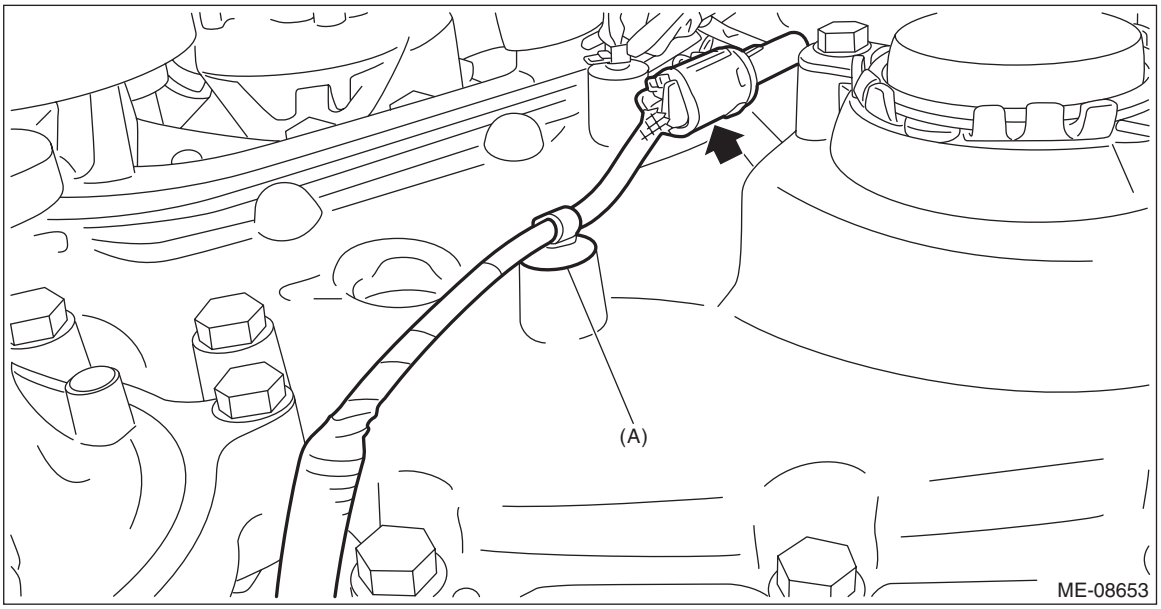
7) Disconnect the connector (A) from the exhaust camshaft position sensor RH, and remove the engine harness stay from the chain cover.



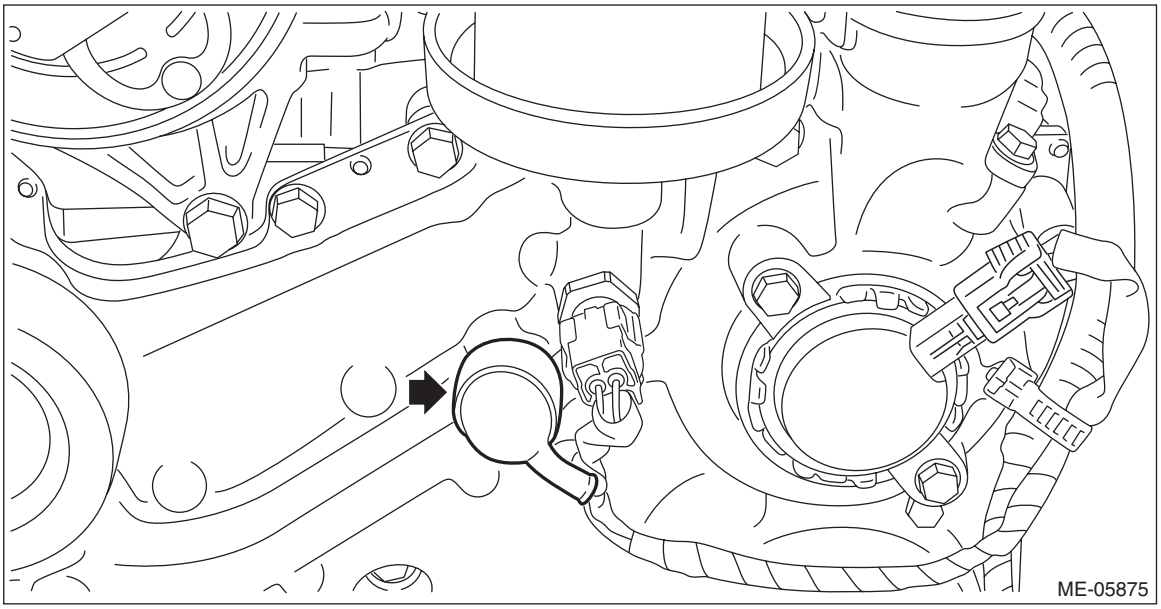
8) Disconnect the connector (A) from the intake oil control solenoid RH, connector (B) from the exhaust oil control solenoid RH, and the connector (C) from the intake camshaft position sensor RH, and then remove the clips (D) (gasoline engine model) and the clips (E) which secure the engine harness.



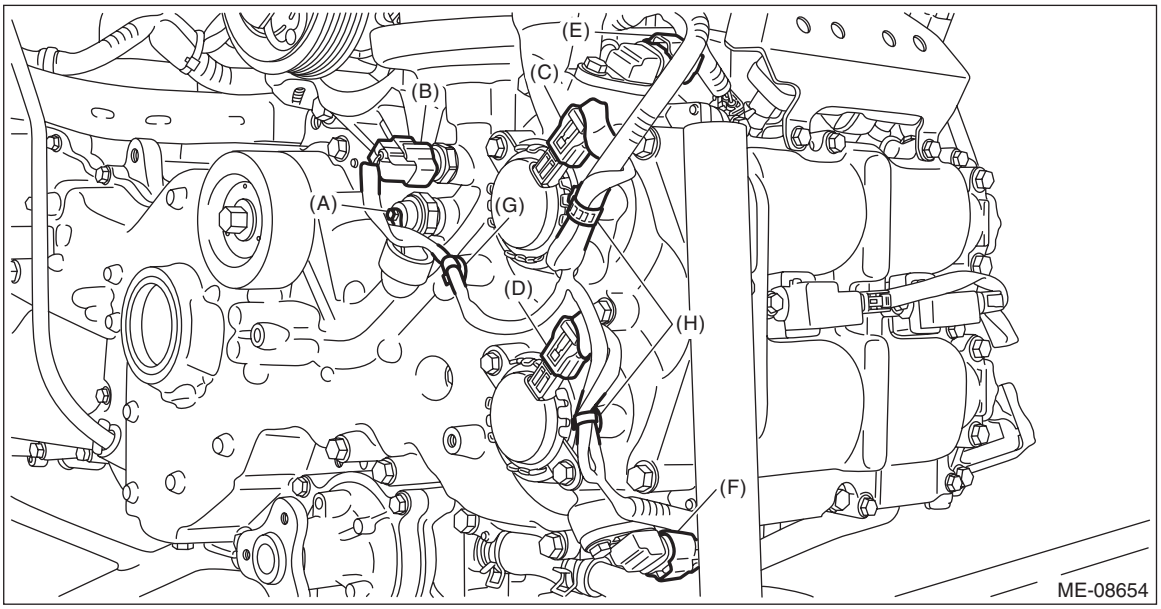
9) Disconnect the connectors from the oil level switch, and remove the clip (A) which secure the oil level switch harness.



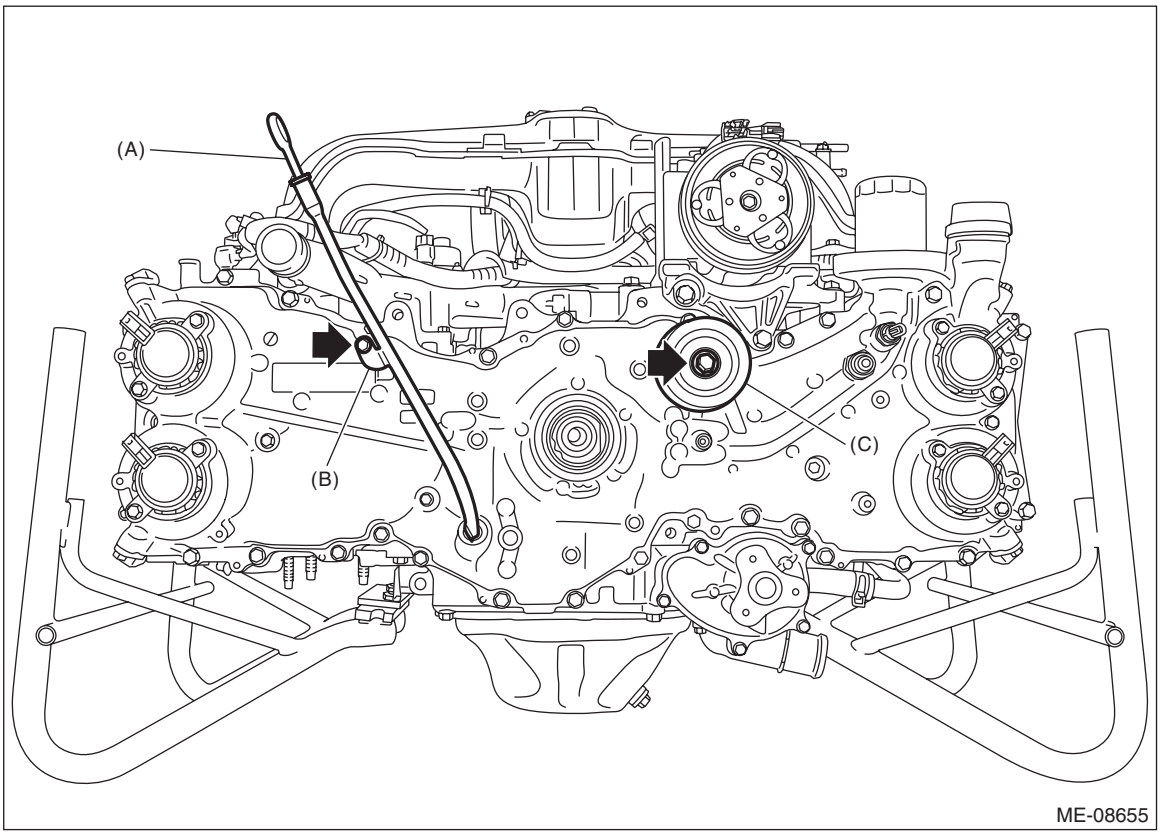
10) Remove the rubber cap from the oil pressure switch.



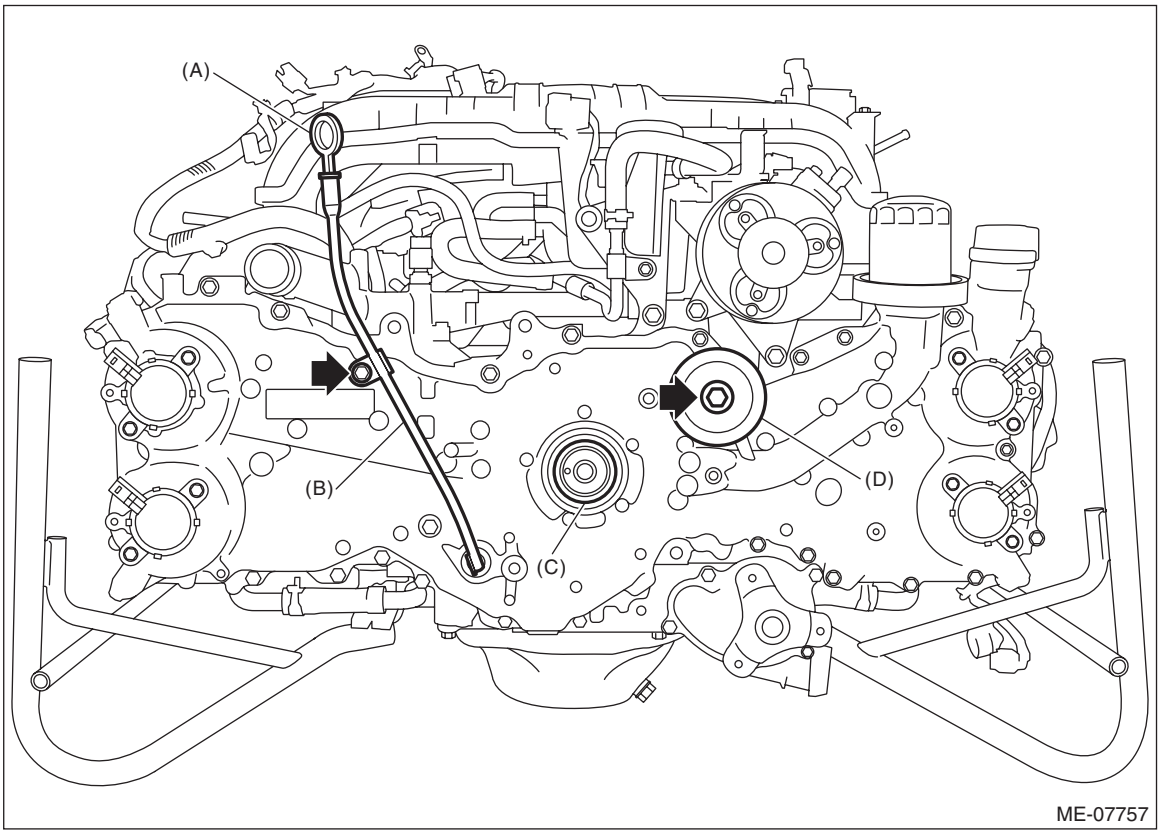
11) Disconnect the terminal (A) from the oil pressure switch, connector (B) from the engine oil temperature sensor, connector (C) from the intake oil control solenoid LH, connector (D) from the exhaust oil control solenoid LH, connector (E) from the intake camshaft position sensor LH, and connector (F) from the exhaust camshaft position sensor LH, and remove the clips (G) and (H) which secure the engine harness.



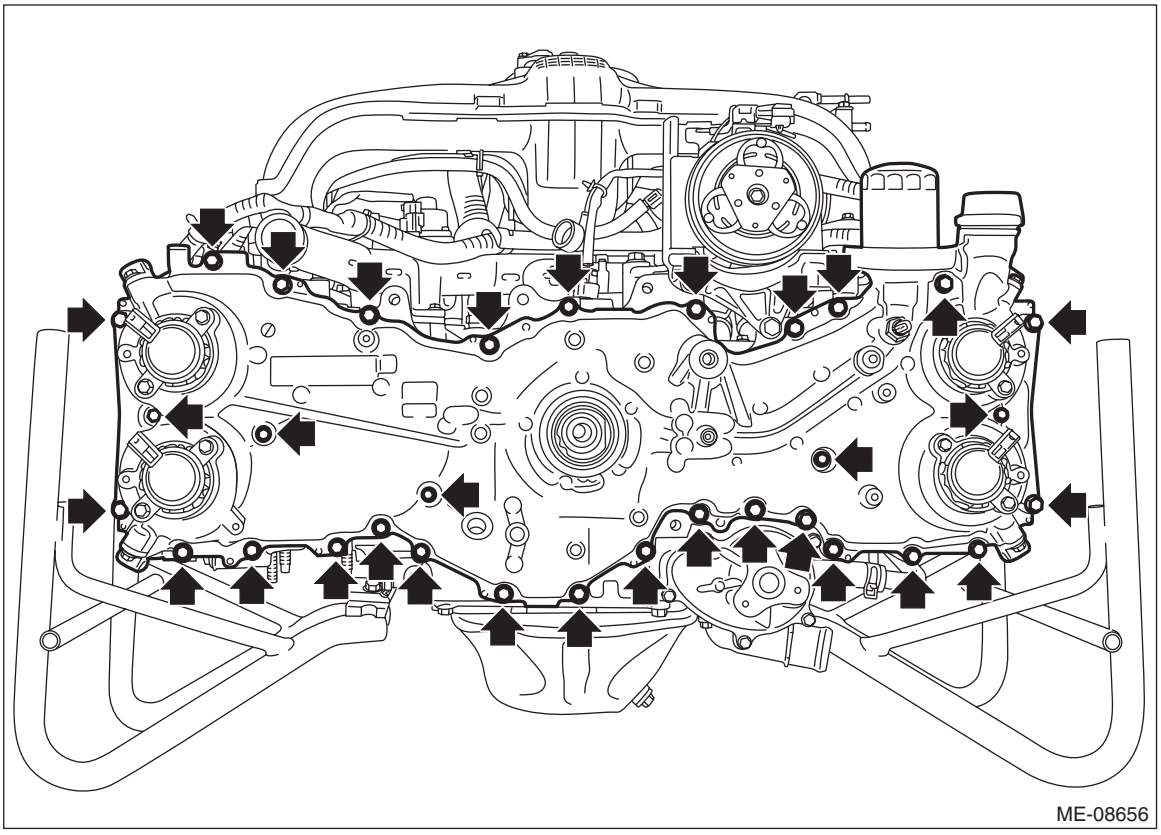
12) Pull out the oil level gauge (A), and remove the oil level gauge guide (B) and idler pulley (C). (Gasoline engine model)



13) Pull out the oil level gauge (A), and remove the oil level gauge guide (B), crank pulley boss (C), and idler pulley (D). (HEV model)

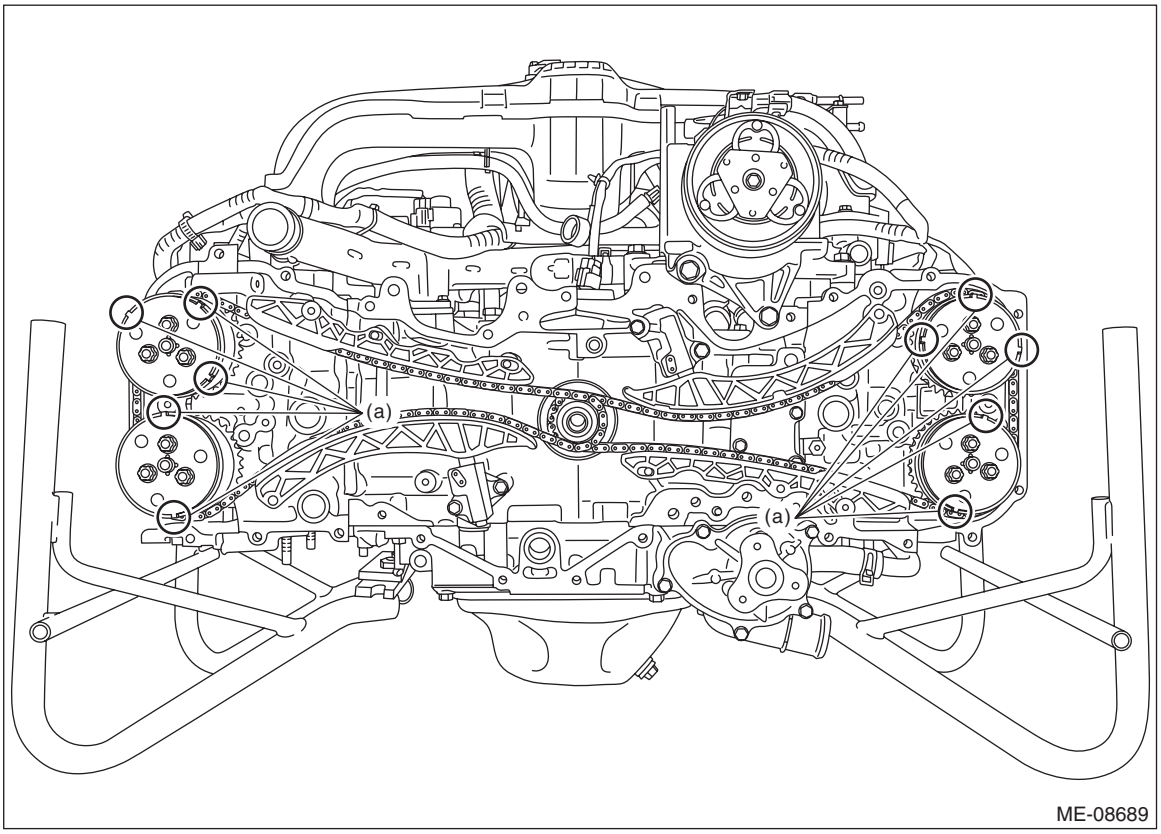


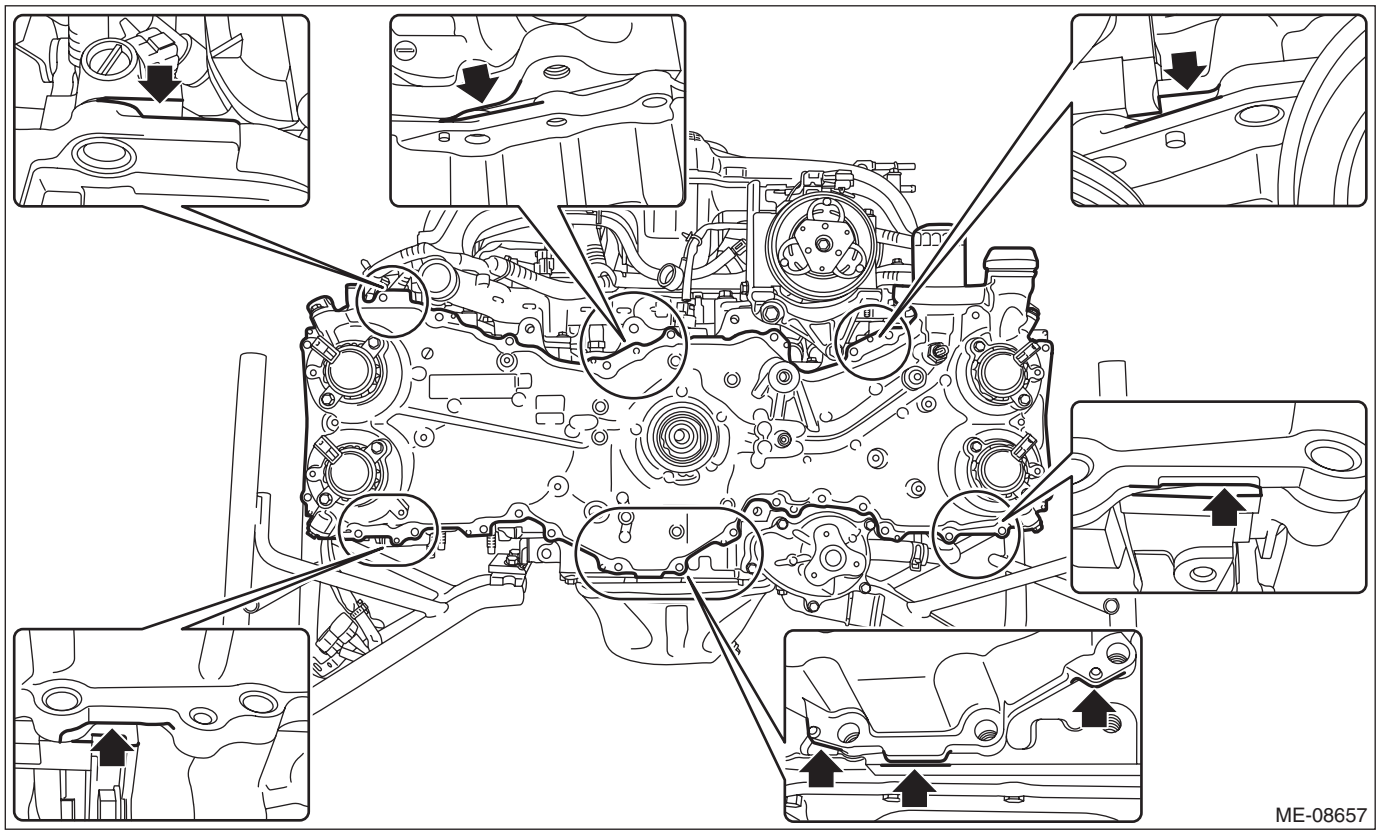
14) Remove the bolts securing the chain cover to the engine.



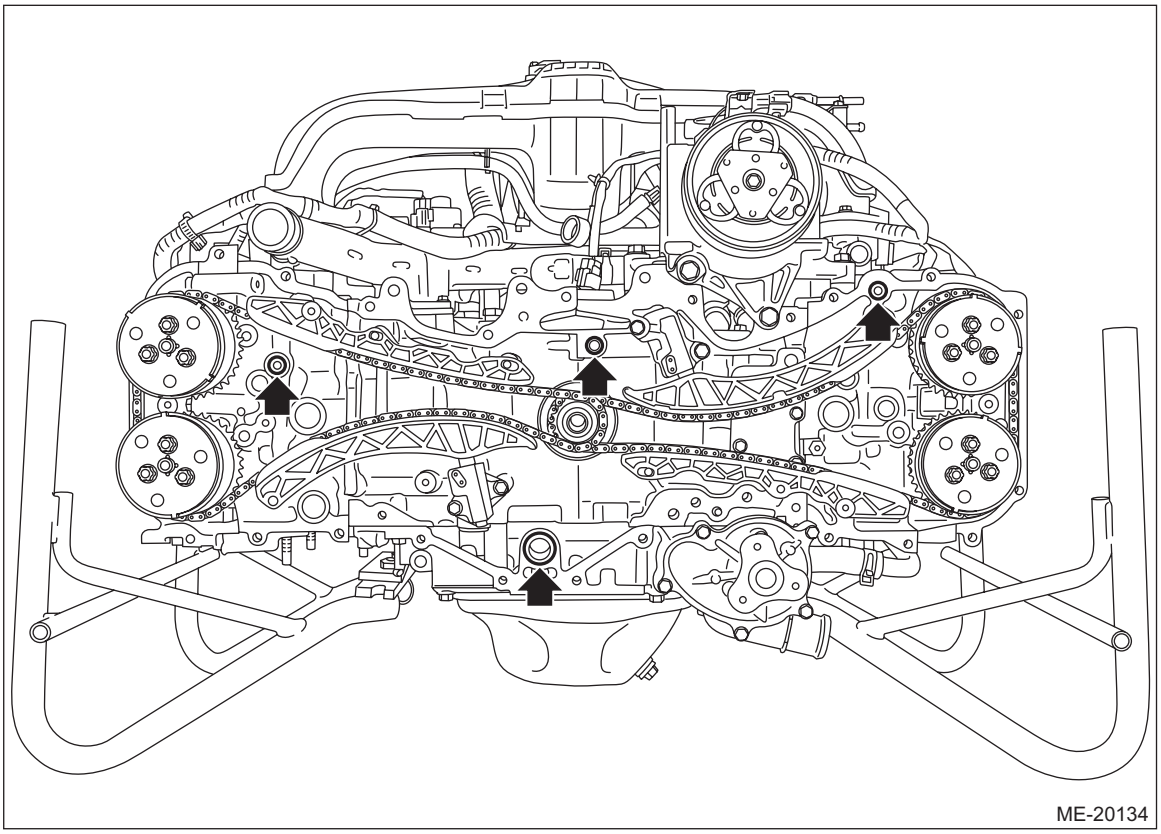
15) Expand the area shown in the figure using a crowbar or a similar tool wrapped in tape for protection, and remove the chain cover from the engine.

CAUTION:
The chain cover may contact the protrusion (a) of cam sprocket sensor plate and cause damage. When removing the chain cover, move the chain cover horizontally until it cannot contact with the cam sprocket, and then remove it carefully.

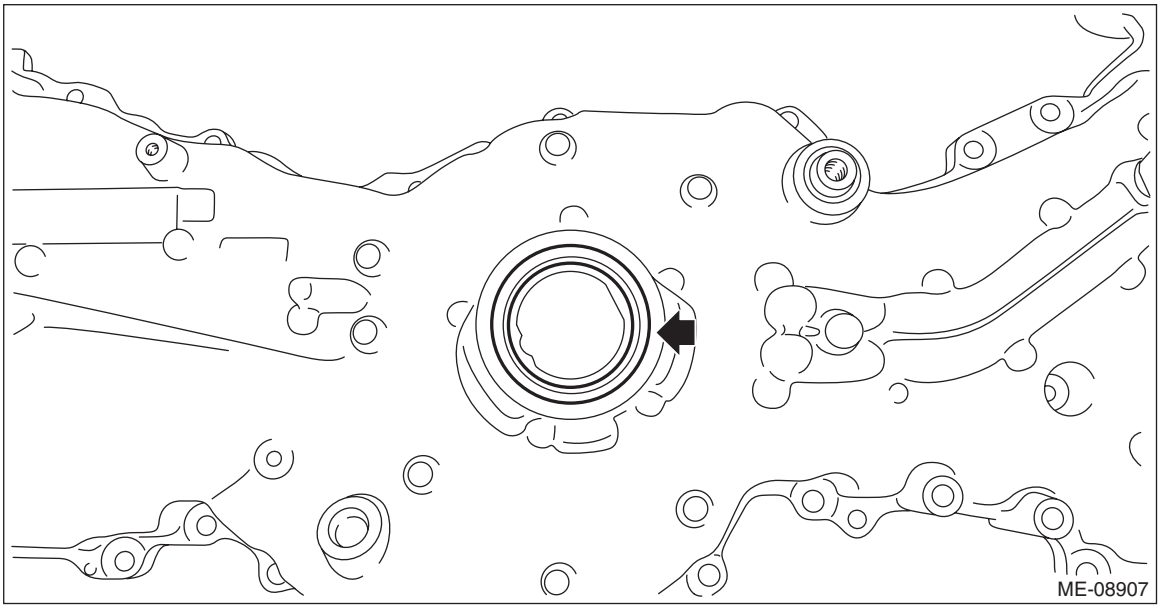




16) Remove the O-rings from cylinder head RH, cylinder head LH, cylinder block LH and oil pan upper.



17) Remove the liquid gasket from the chain cover and engine unit.
18) Remove the front oil seal from the chain cover. (HEV model)

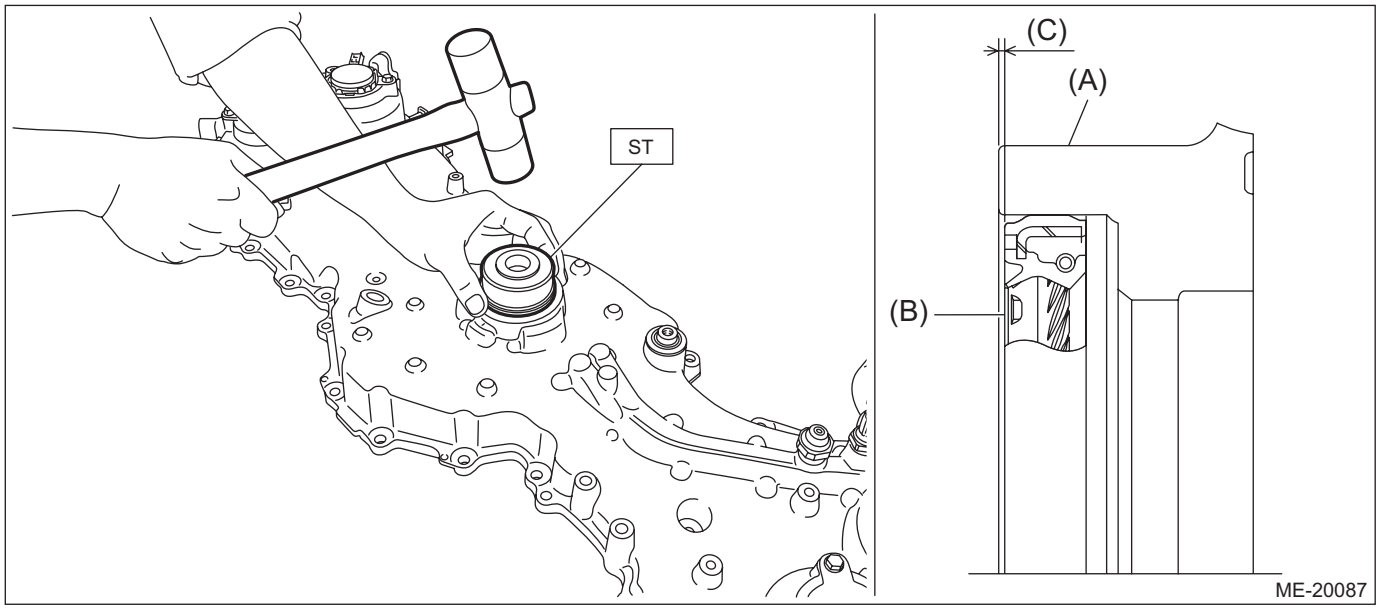


B: INSTALLATION

1) Degrease the press-fit section for the chain cover front oil seal, and install the front oil seal to the chain cover using ST. (HEV model)

NOTE:
Use a new front oil seal.
ST 41399FG020 SPECIAL TOOL B

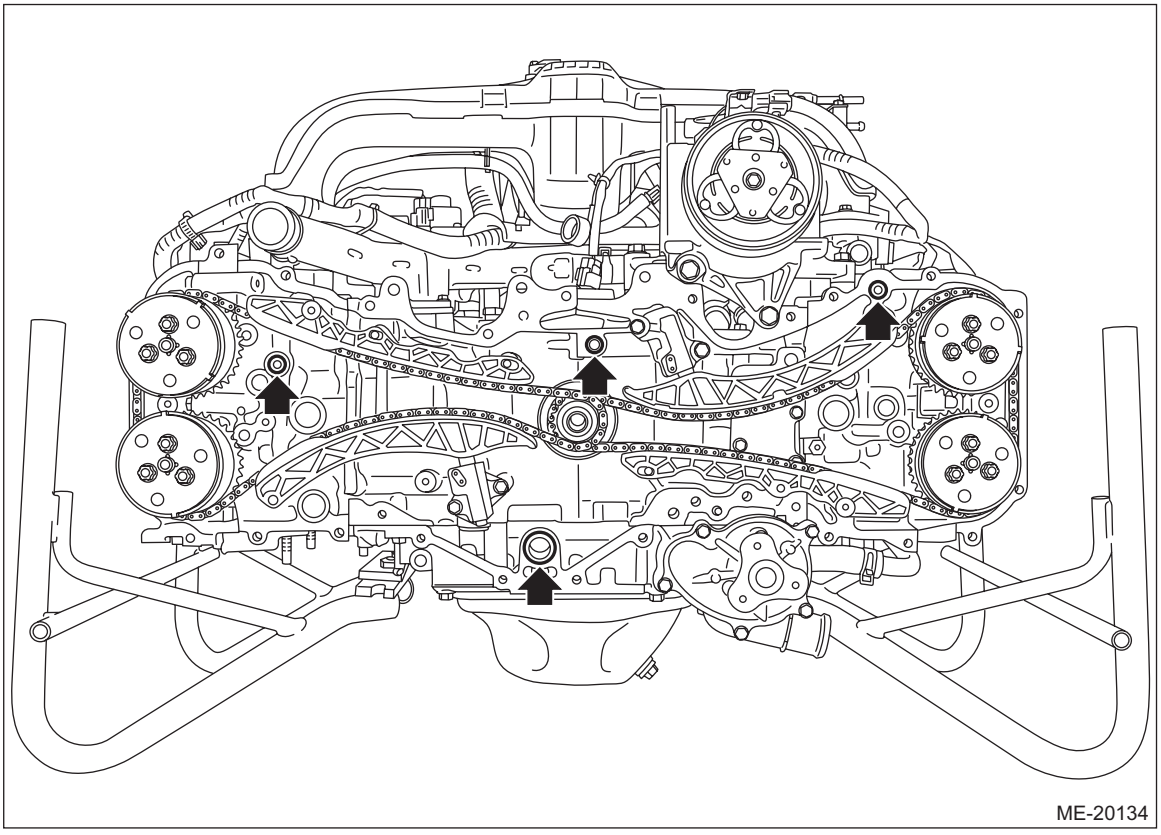
Front oil seal press-fit position:
1^{+0}_{-1} mm ($0.0039^{+0}_{-0.0039}$ in) position from chain cover end face



(A) Chain cover
(B) Oil seal
(C) Front oil seal press-fit position (1^{+0}_{-1} mm ($0.0039^{+0}_{-0.0039}$ in) position from chain cover end face)

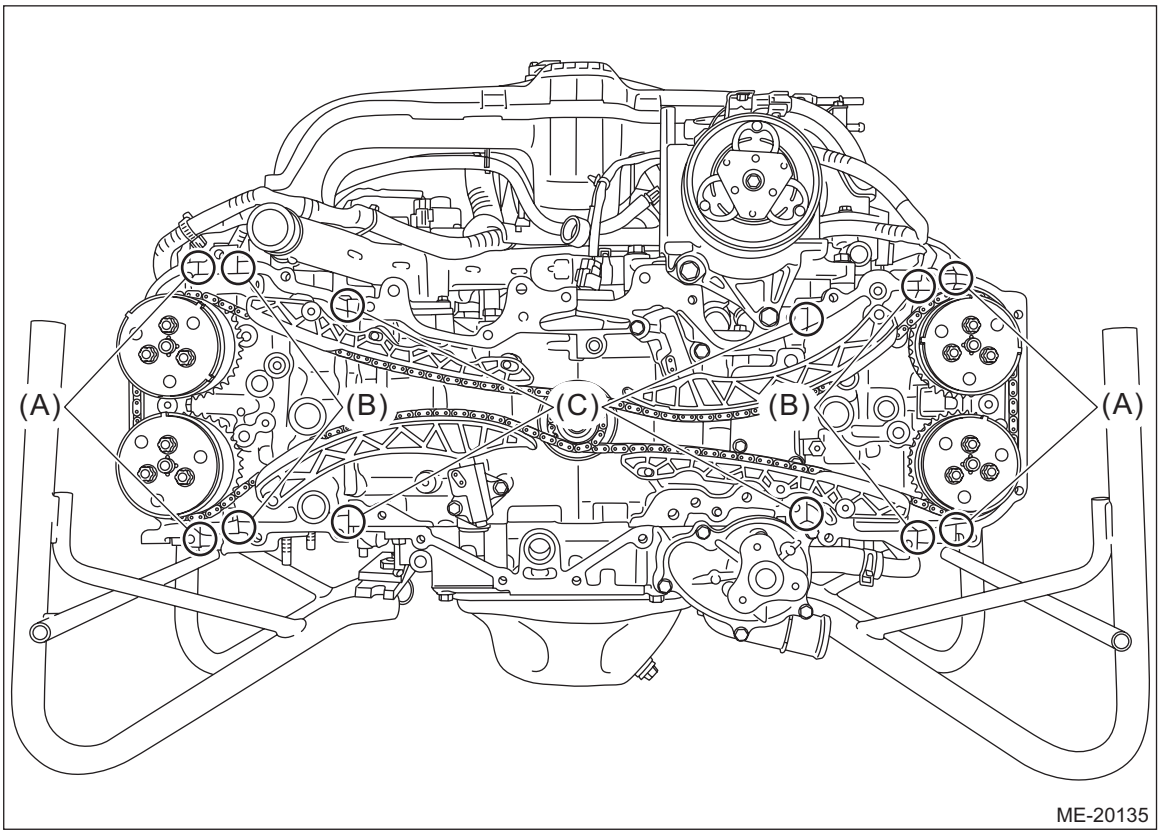
2) Install the O-rings to cylinder head RH, cylinder head LH, cylinder block LH and oil pan upper.

NOTE:
- Use new O-rings.
- Apply a coat of engine oil to the O-rings.



3) Apply liquid gasket if there are gaps between front camshaft cap and cam carrier (A), cam carrier and cylinder head (B), and cylinder head and cylinder block (C) as shown in the figure.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

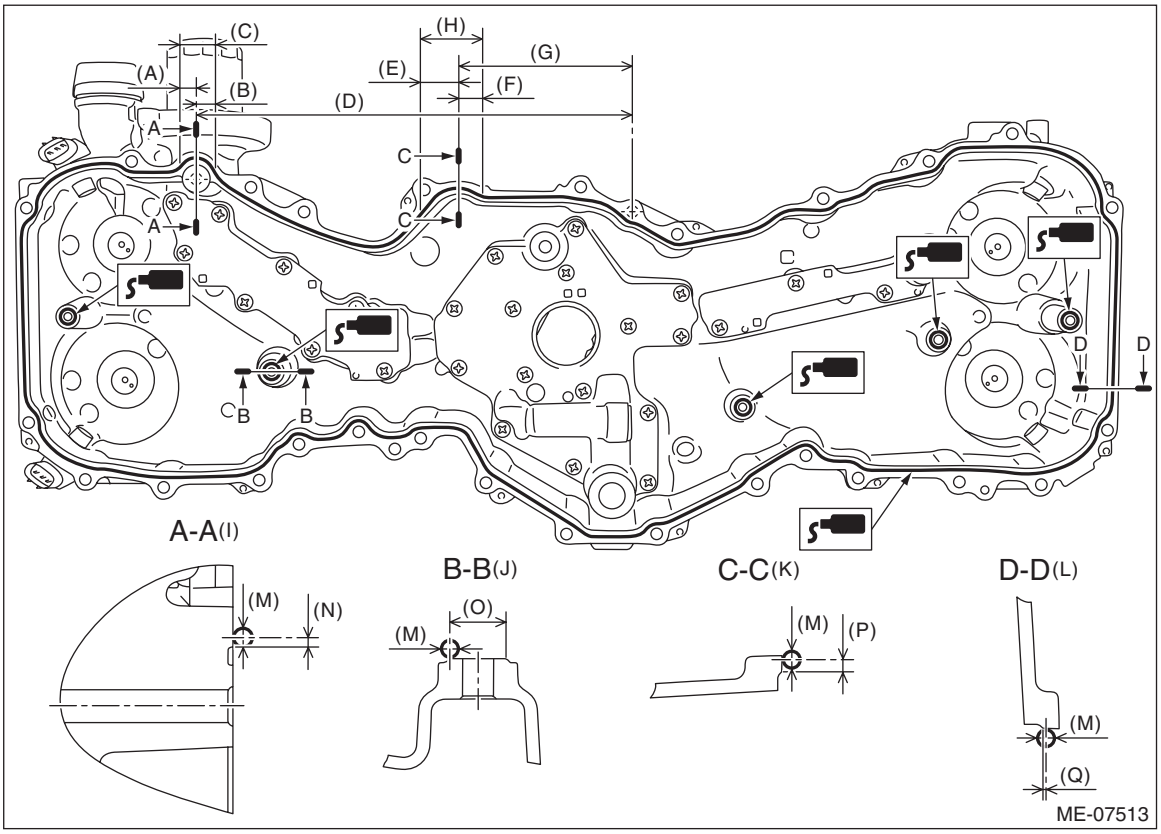


4) Apply liquid gasket to the chain cover mating surface and center boss (5 places) as shown in the figure.

NOTE:
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the engine and chain cover.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

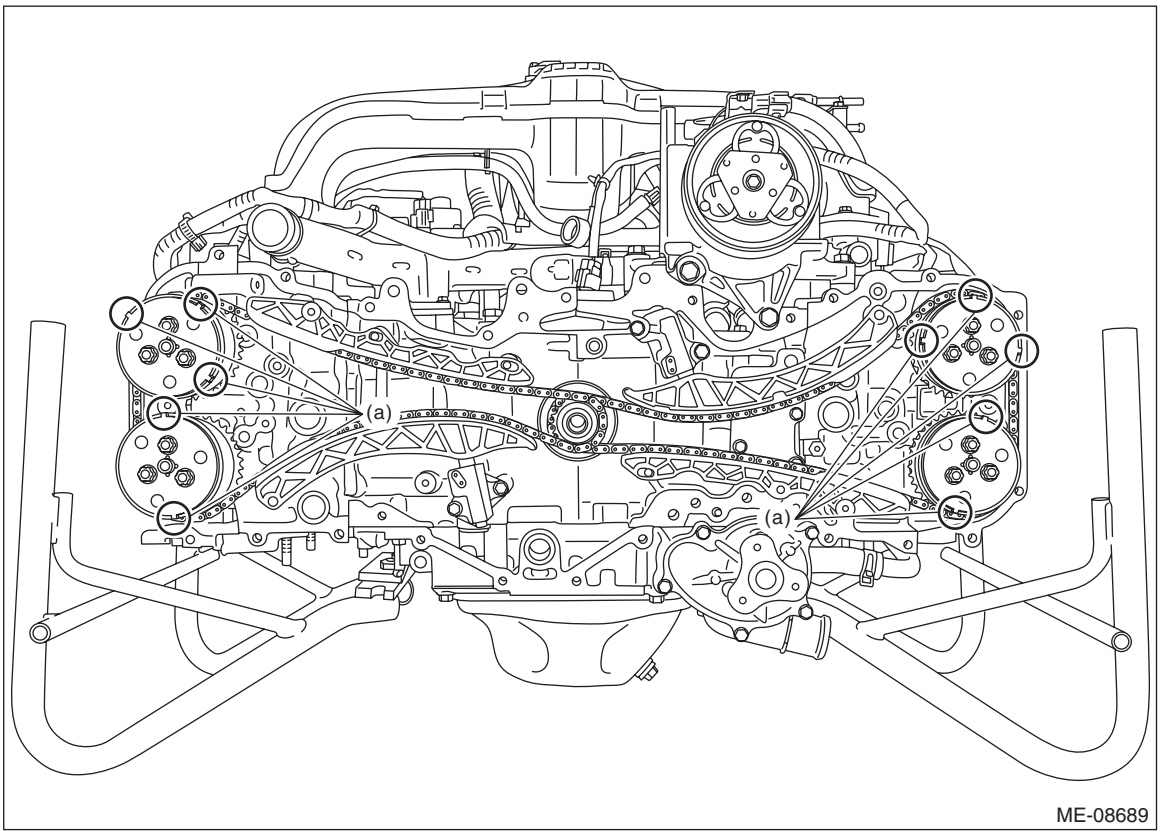
Liquid gasket applying diameter:
4±0.5 mm (0.1575±0.0197 in)



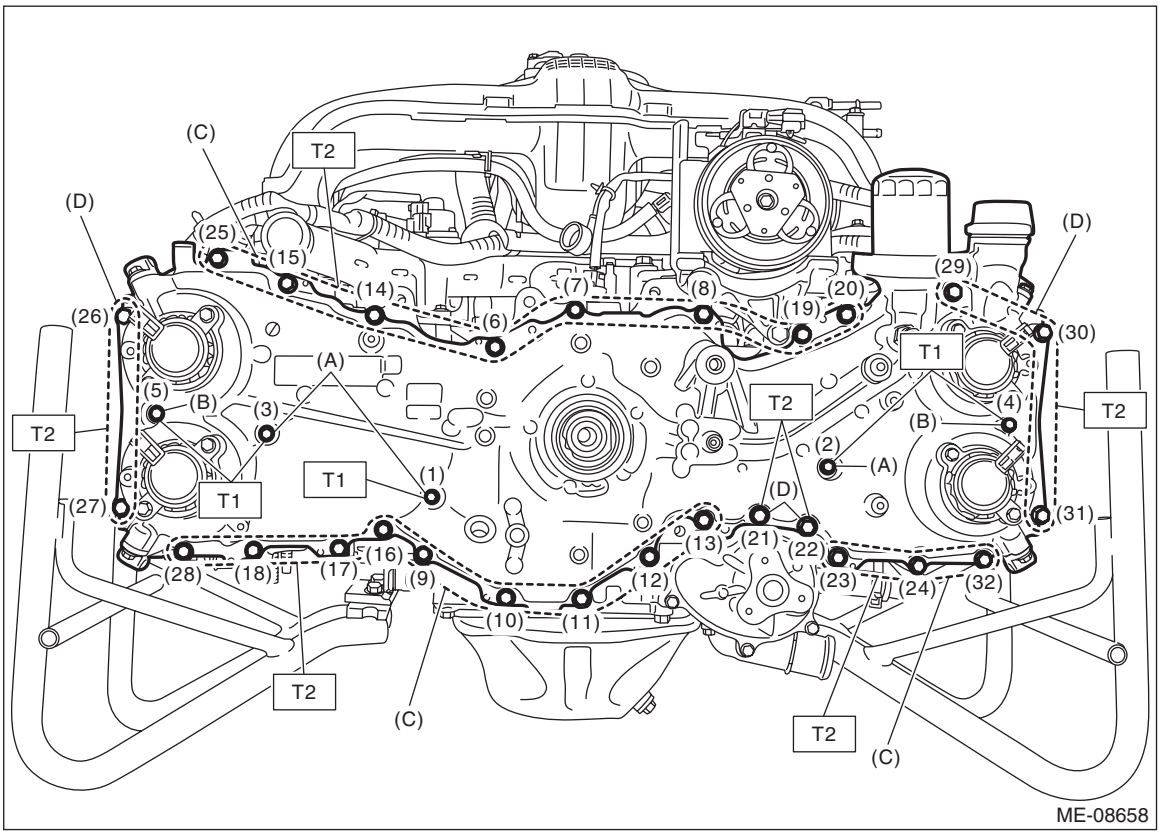
(A)	14.5 mm (0.5709 in)	(G)	127 mm (5.0000 in)	(M)	ϕ4±0.5 mm (0.1575±0.0197 in)
(B)	17.5 mm (0.6890 in)	(H)	Range B	(N)	2 mm (0.0787 in)
(C)	Range A	(I)	Liquid gasket applying position of mating surfaces of range A	(O)	ϕ12 mm (0.4724 in)
(D)	316.2 mm (12.4488 in)	(J)	Liquid gasket applying position of center boss (5 places)	(P)	2.5 mm (0.0984 in)
(E)	24.5 mm (0.9646 in)	(K)	Liquid gasket applying position of mating surfaces of range B	(Q)	0.5 mm (0.0197 in)
(F)	18.5 mm (0.7283 in)	(L)	Liquid gasket applying position of mating surfaces other than range A and range B		

5) Set the chain cover, and tighten the bolts in numerical order as shown in the figure.

CAUTION:
The chain cover may contact the protrusion (a) of cam sprocket sensor plate and cause damage. When setting the chain cover, move the chain cover horizontally and set it while taking care not to contact with the cam sprocket.



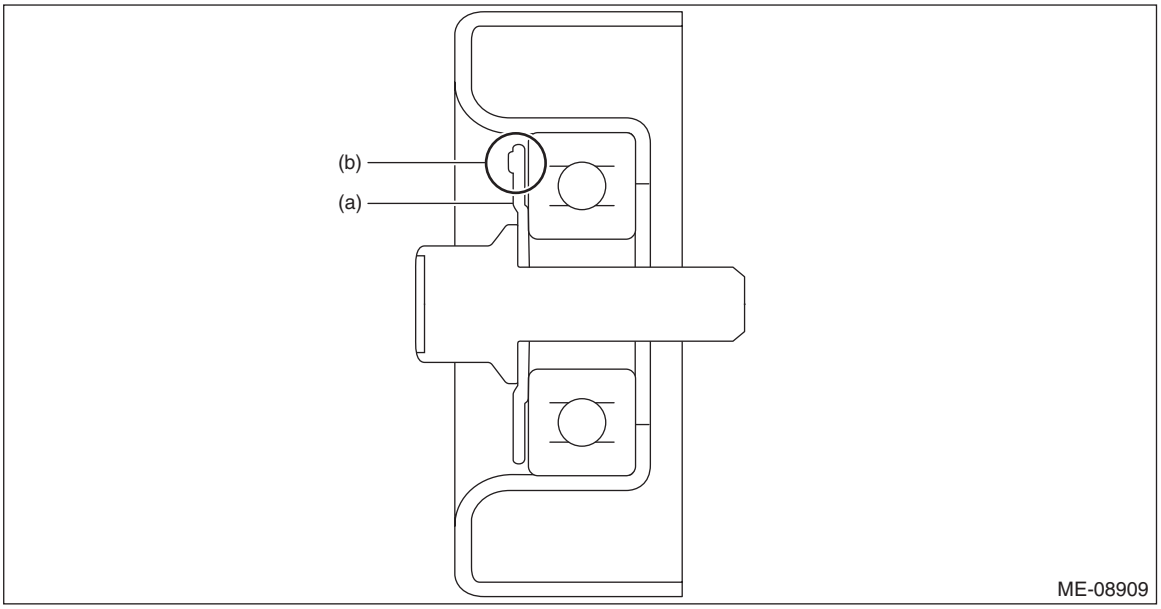
Tightening torque:
T1: 10 N·m (1.0 kgf-m, 7.4 ft-lb)
T2: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) M6 × 20
(B) M6 × 50
(C) M8 × 25
(D) M8 × 60

6) Install the idler pulley (C) and oil level gauge guide (B), and insert the oil level gauge (A). (Gasoline engine model)

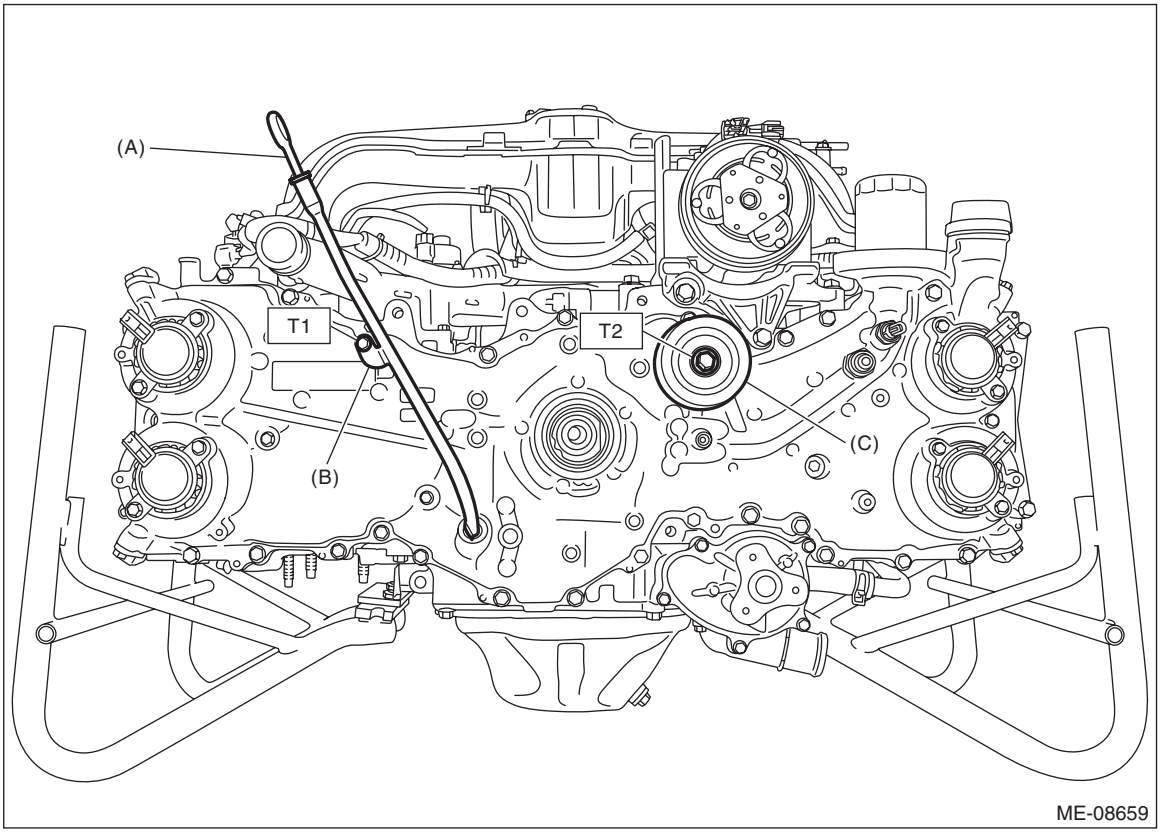
NOTE:
- When installing the idler pulley, be careful of the idler pulley cover direction.



(a) Idler pulley cover
(b) Protrusion (3 places)

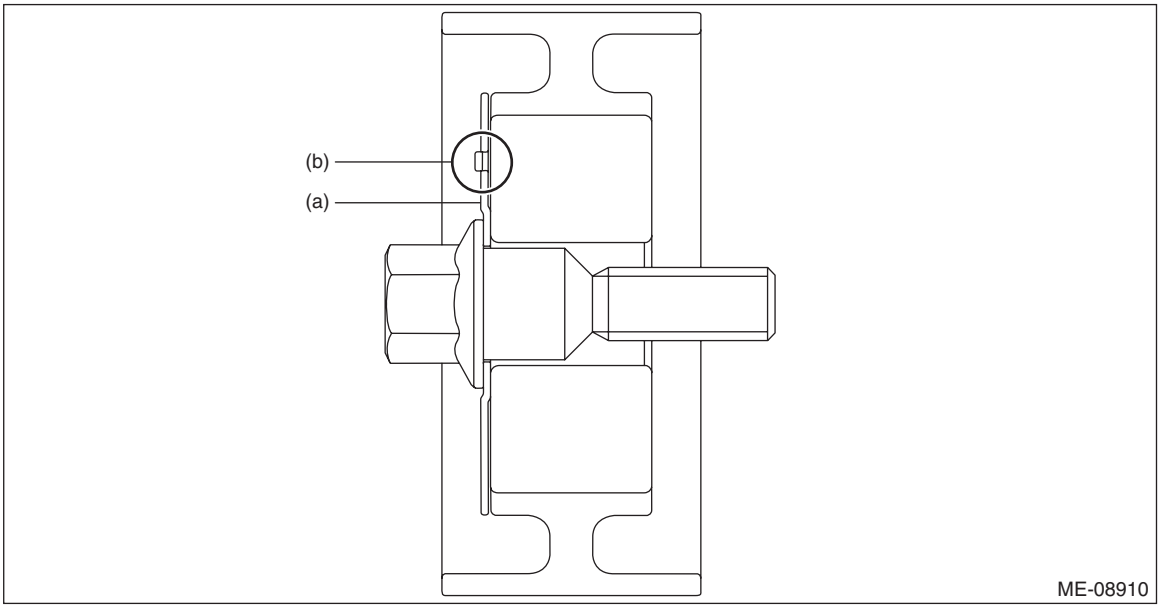
- Use a new O-ring to the oil level gauge guide.
- Apply a light coat of engine oil to the O-rings of the oil level gauge guide and the oil level gauge.

Tightening torque:
T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T2: 36 N·m (3.7 kgf-m, 26.6 ft-lb)



7) Install the idler pulley (D), crank pulley boss (C) and oil level gauge guide (B), and insert the oil level gauge (A). (HEV model)

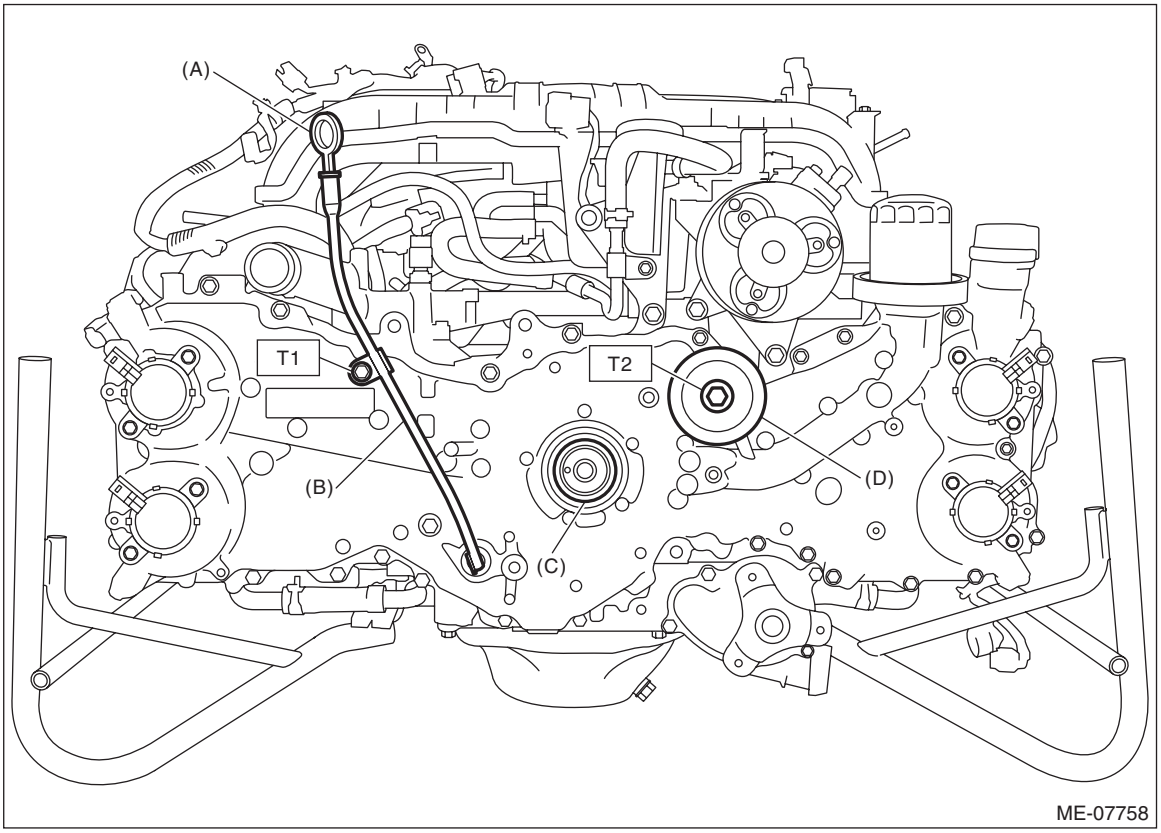
NOTE:
- When installing the idler pulley, be careful of the idler pulley cover direction.



(a) Idler pulley cover
(b) Protrusion (3 places)

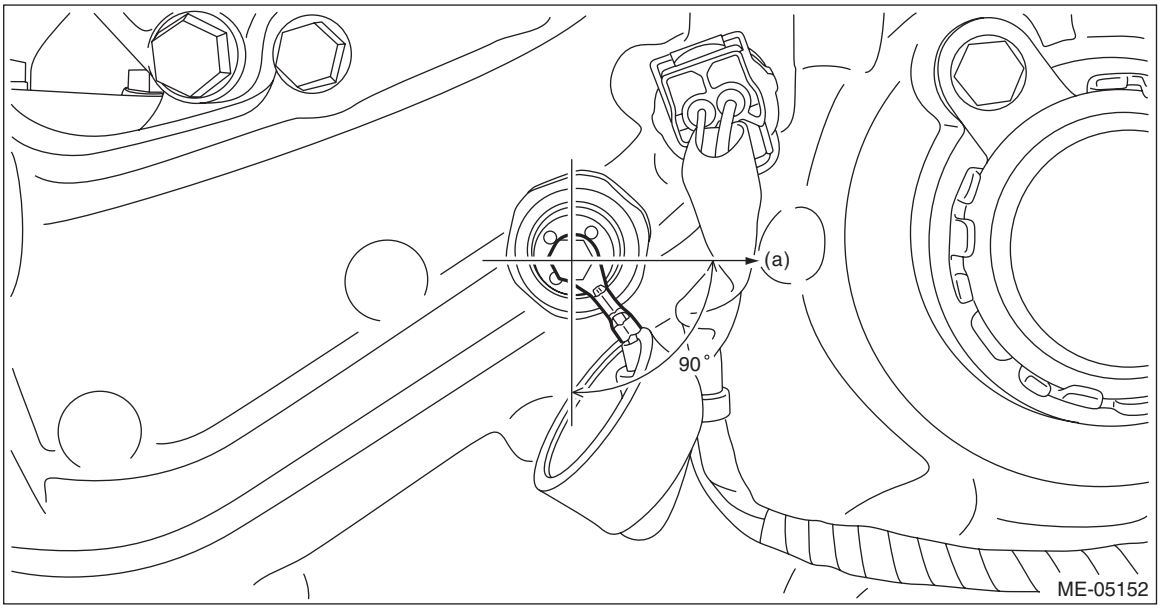
- Use a new O-ring to the oil level gauge guide.
- Apply a light coat of engine oil to the O-rings of the oil level gauge guide and the oil level gauge.

Tightening torque:
T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T2: 36 N·m (3.7 kgf-m, 26.6 ft-lb)



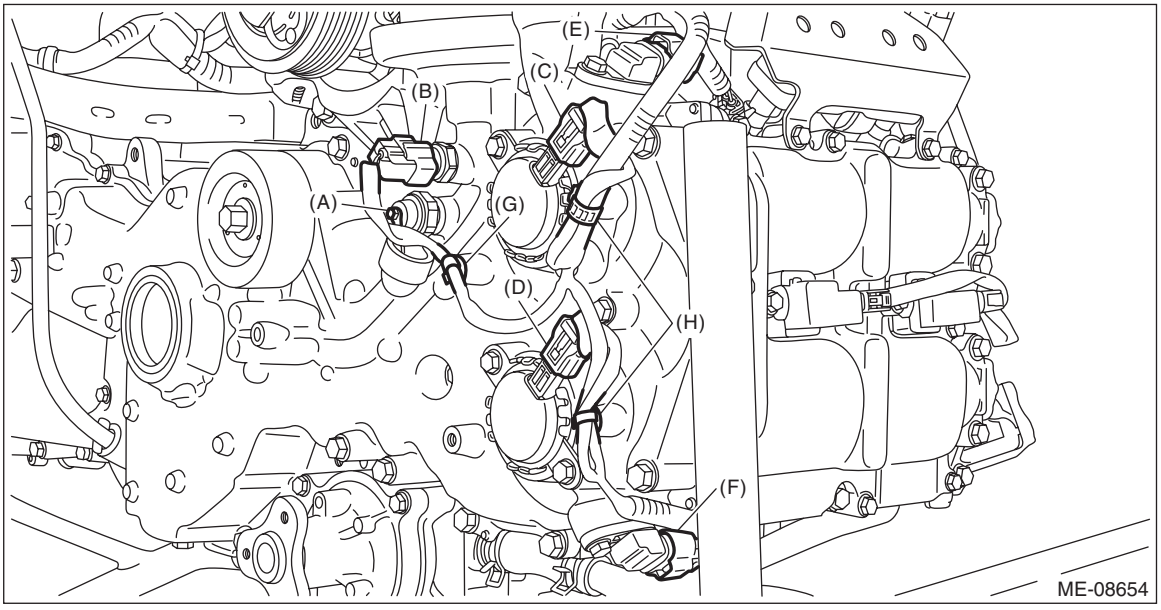
8) Connect the terminal (A) to the oil pressure switch, connector (B) to the engine oil temperature sensor, connector (C) to the intake oil control solenoid LH, connector (D) to the exhaust oil control solenoid LH, connector (E) to the intake camshaft position sensor LH, and connector (F) to the exhaust camshaft position sensor LH, and secure the engine harness with the clips (G) and (H).

NOTE:
The oil pressure switch harness must be positioned toward the left lower side of the vehicle within the range of 90°.

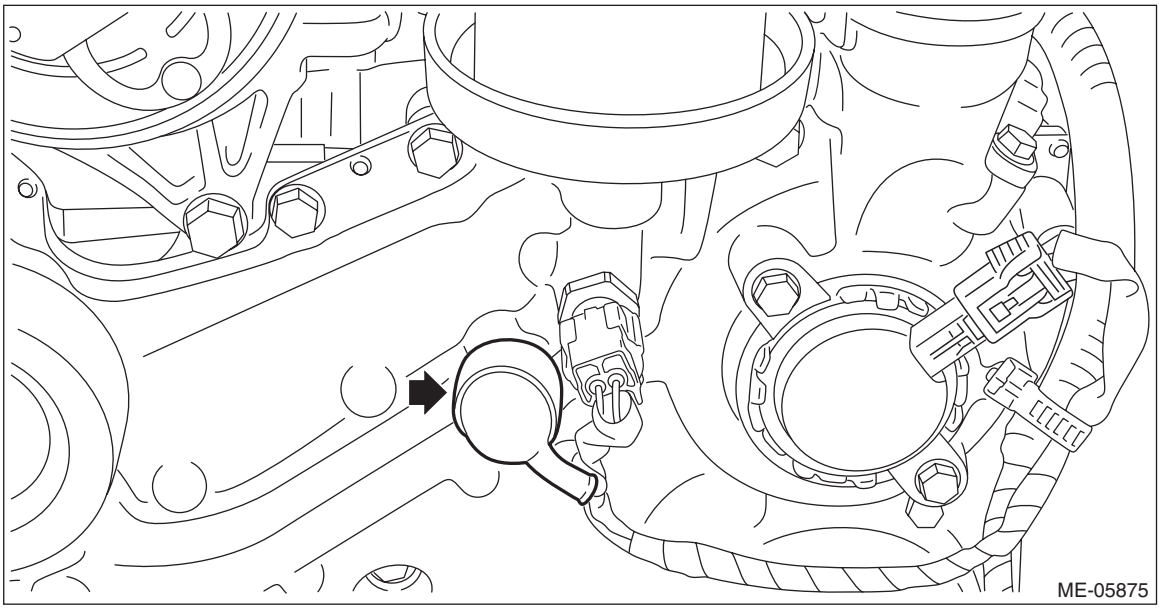


(a) Left side of vehicle

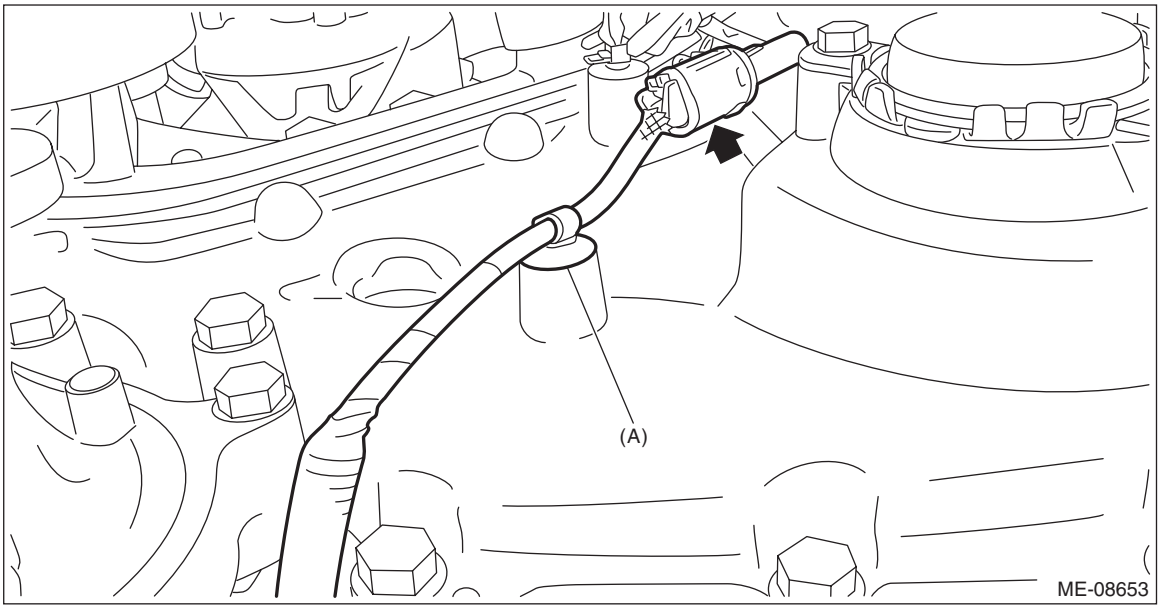
Tightening torque:
1.5 N·m (0.2 kgf-m, 1.1 ft-lb)



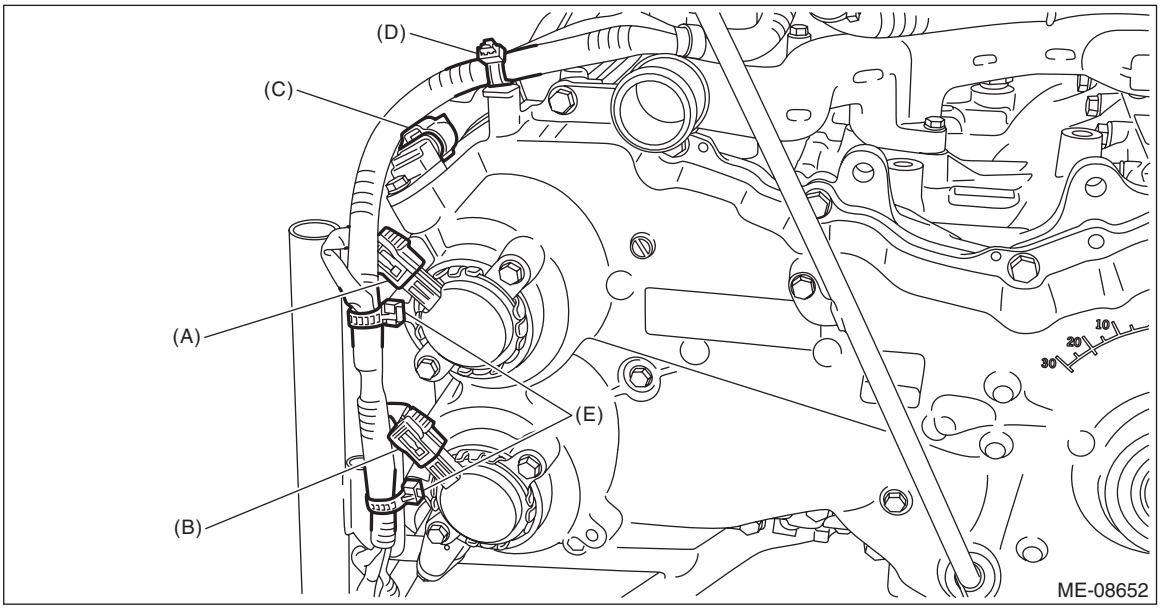
9) Attach the rubber cap to the oil pressure switch.



10) Secure the oil level switch harness with clips (A), and connect the connectors to the oil level switch.

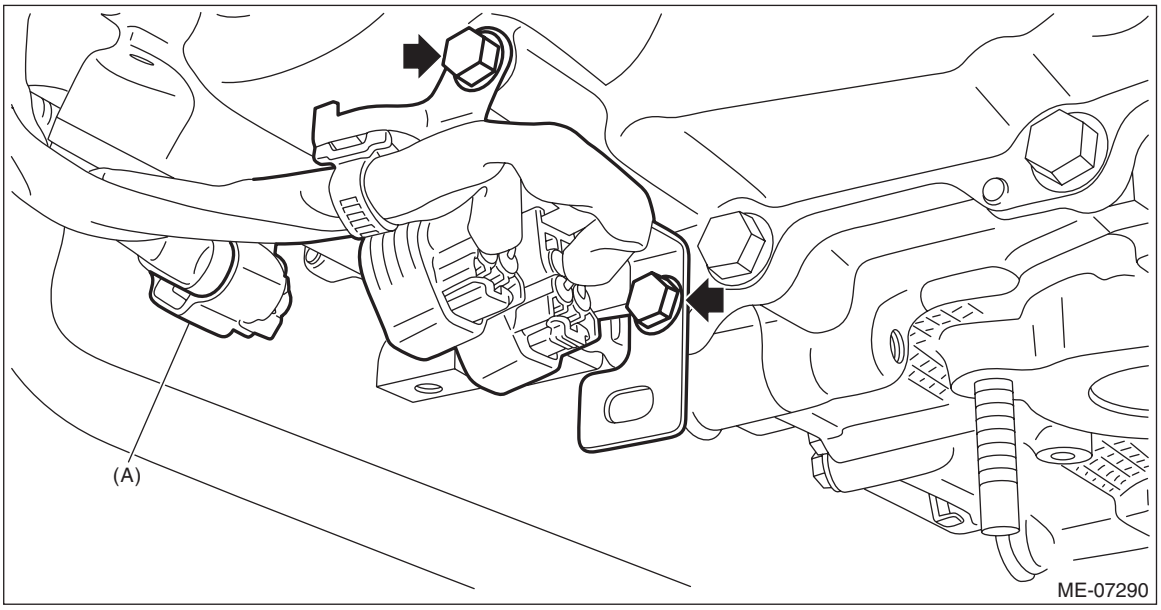


11) Connect the connector (A) to the intake oil control solenoid RH, connector (B) to the exhaust oil control solenoid RH, and connector (C) to the intake camshaft position sensor RH, and then secure the engine harness with the clips (D) (gasoline engine model) and the clips (E).



12) Connect the connector (A) to the exhaust camshaft position sensor RH, and install the engine harness stay to the chain cover.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



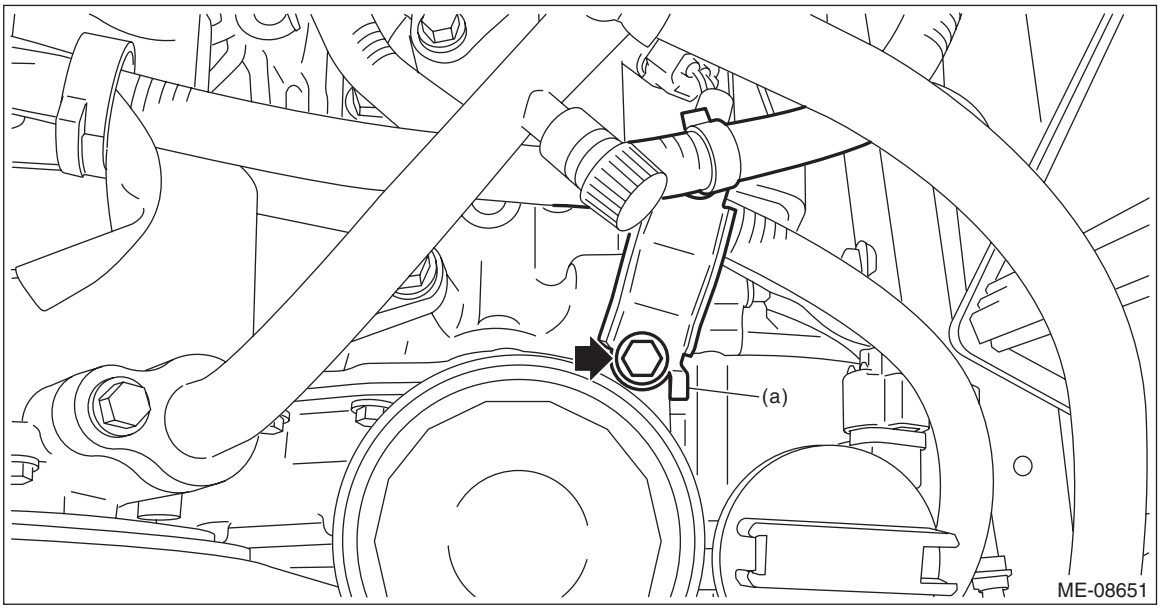
13) Install the crank pulley. <Ref. to ME(H4DO(w/o HEV))-143, INSTALLATION, Crank Pulley.>
14) Install the water pump pulley. <Ref. to CO(H4DO(w/o HEV))-23, WATER PUMP, INSTALLATION, Water Pump.>
15) Install the generator. (Gasoline engine model) <Ref. to SC(H4DO(w/o HEV))-35, INSTALLATION, Generator.>
16) Install the ISG. (HEV model) <Ref. to SC(H4DO(HEV))-36, INSTALLATION, Integrated Starter Generator (ISG).>
17) Fill engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>

18) When working on the vehicle

NOTE:
When working on the vehicle, perform the following steps also.
(1) Install the generator cord stay to the chain cover. (Gasoline engine model)

NOTE:
Install the generator cord stay so that the folded end (a) touches the chain cover boss.

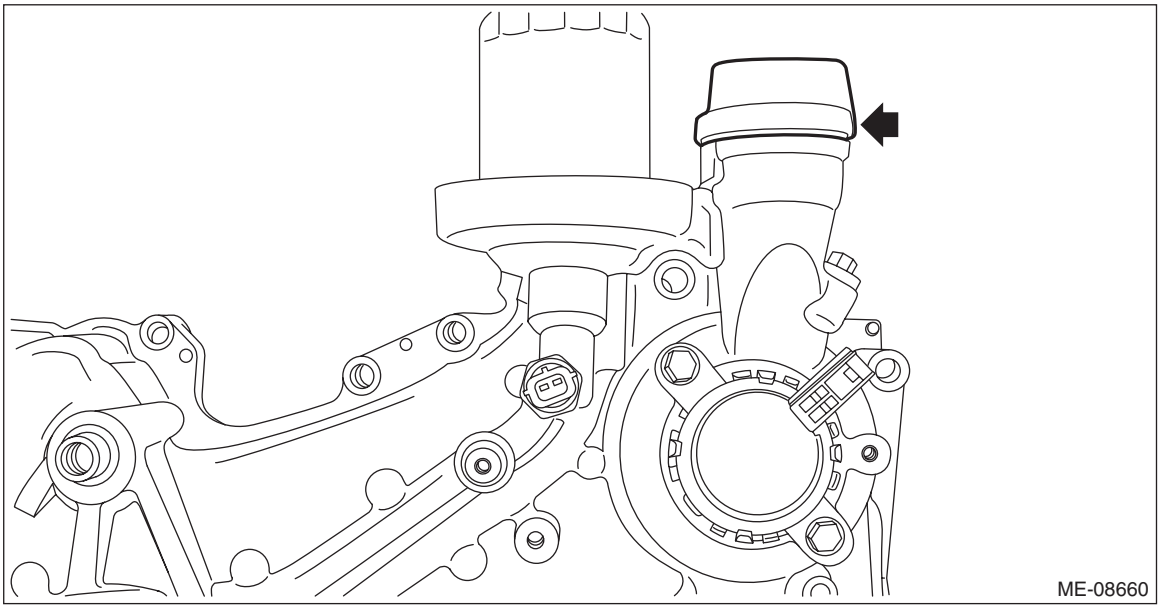
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



(2) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
(3) Install the radiator. <Ref. to CO(H4DO(w/o HEV))-81, INSTALLATION, Radiator.>

C: DISASSEMBLY

1) Remove the oil filler cap.

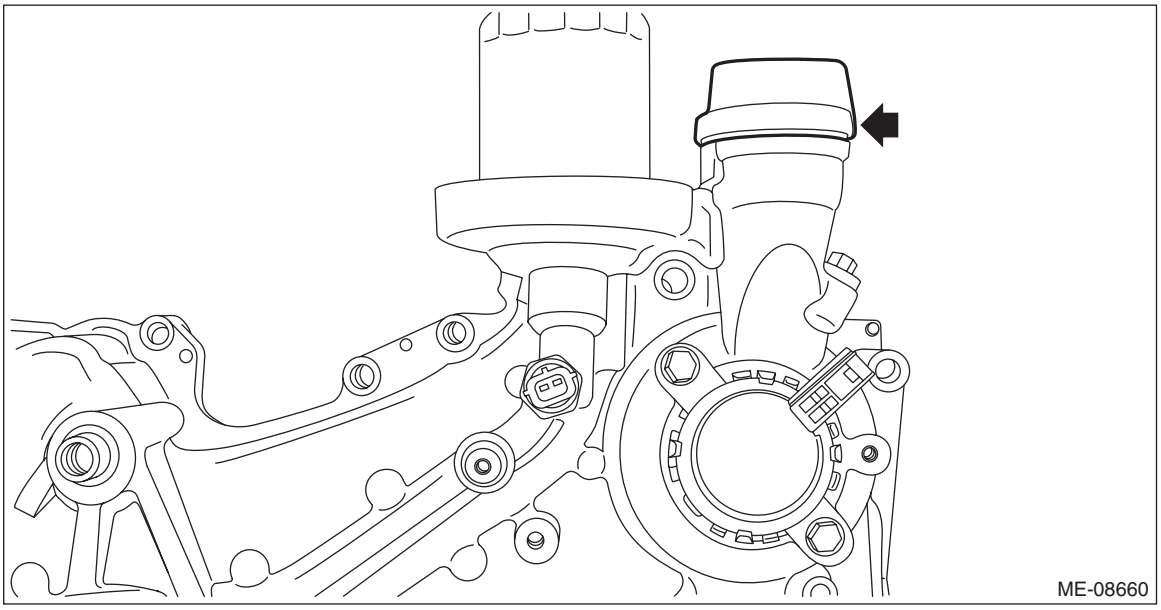


2) Remove the engine oil filter and the oil pump union. <Ref. to LU(H4DO(w/o HEV))-29, REMOVAL, Engine Oil Filter.>
3) Remove the oil pressure switch. <Ref. to LU(H4DO(w/o HEV))-25, REMOVAL, Oil Pressure Switch.>

4) Remove the engine oil temperature sensor. <Ref. to FU(H4DO(w/o HEV))-53, REMOVAL, Engine Oil Temperature Sensor.> <Ref. to FU(H4DO(HEV))-45, REMOVAL, Engine Oil Temperature Sensor.>
5) Remove the oil control solenoid. <Ref. to FU(H4DO(w/o HEV))-64, REMOVAL, Oil Control Solenoid.> <Ref. to FU(H4DO(HEV))-57, REMOVAL, Oil Control Solenoid.>
6) Remove the camshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-59, REMOVAL, Camshaft Position Sensor.> <Ref. to FU(H4DO(HEV))-53, REMOVAL, Camshaft Position Sensor.>

D: ASSEMBLY

1) Install the camshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-61, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.>
2) Install the oil control solenoid. <Ref. to FU(H4DO(w/o HEV))-66, INSTALLATION, Oil Control Solenoid.> <Ref. to FU(H4DO(HEV))-59, INSTALLATION, Oil Control Solenoid.>
3) Install the engine oil temperature sensor. <Ref. to FU(H4DO(w/o HEV))-53, INSTALLATION, Engine Oil Temperature Sensor.> <Ref. to FU(H4DO(HEV))-45, INSTALLATION, Engine Oil Temperature Sensor.>
4) Install the oil pressure switch. <Ref. to LU(H4DO(w/o HEV))-27, INSTALLATION, Oil Pressure Switch.>
5) Install the engine oil filter and the oil pump union. <Ref. to LU(H4DO(w/o HEV))-30, INSTALLATION, Engine Oil Filter.>
6) Install the oil filler cap.



E: INSPECTION

Check that the chain cover does not have deformation, cracks and any other damage.

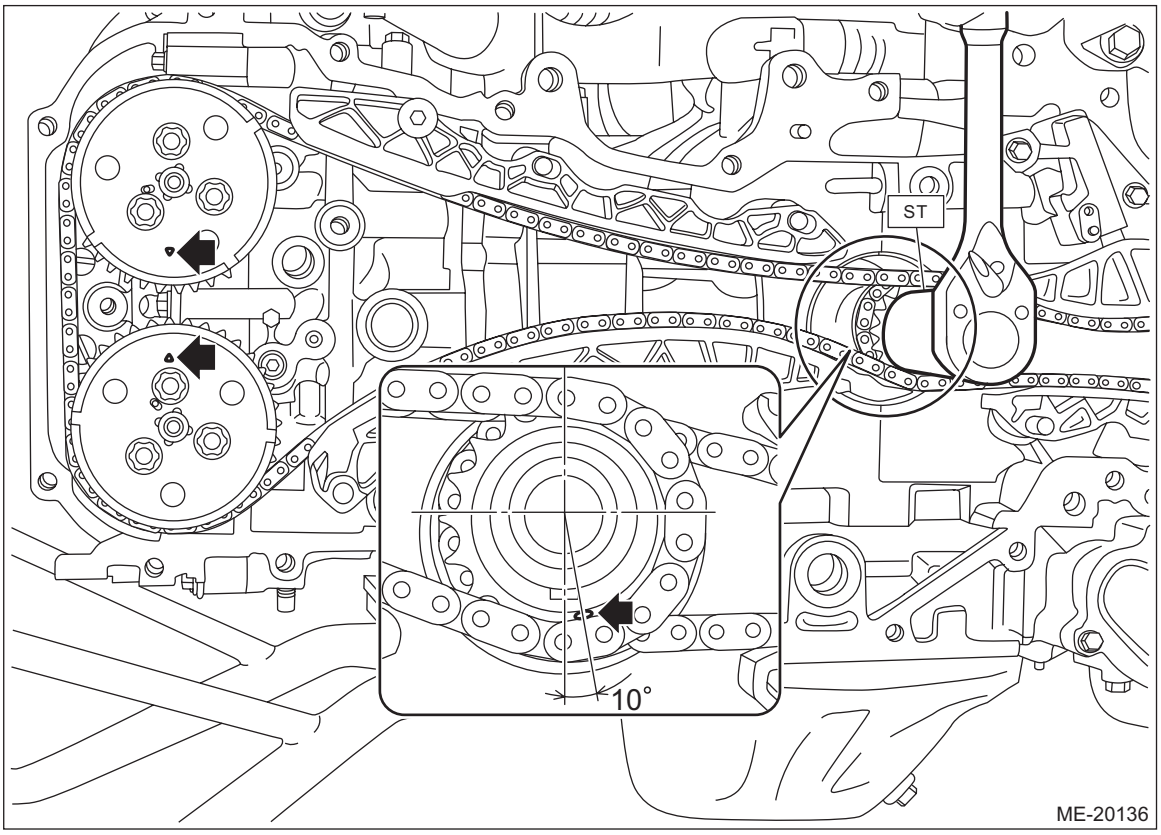
15.Timing Chain Assembly

A: REMOVAL

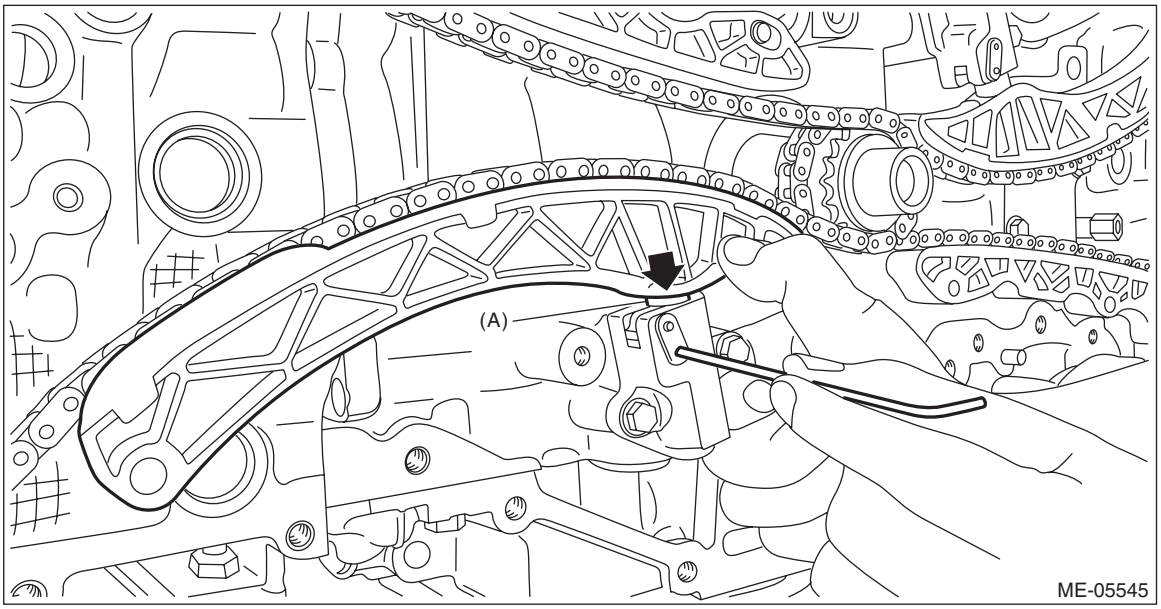
1. TIMING CHAIN RH

NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.
1) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
2) Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket RH and exhaust cam sprocket RH to the positions as shown in the figure.

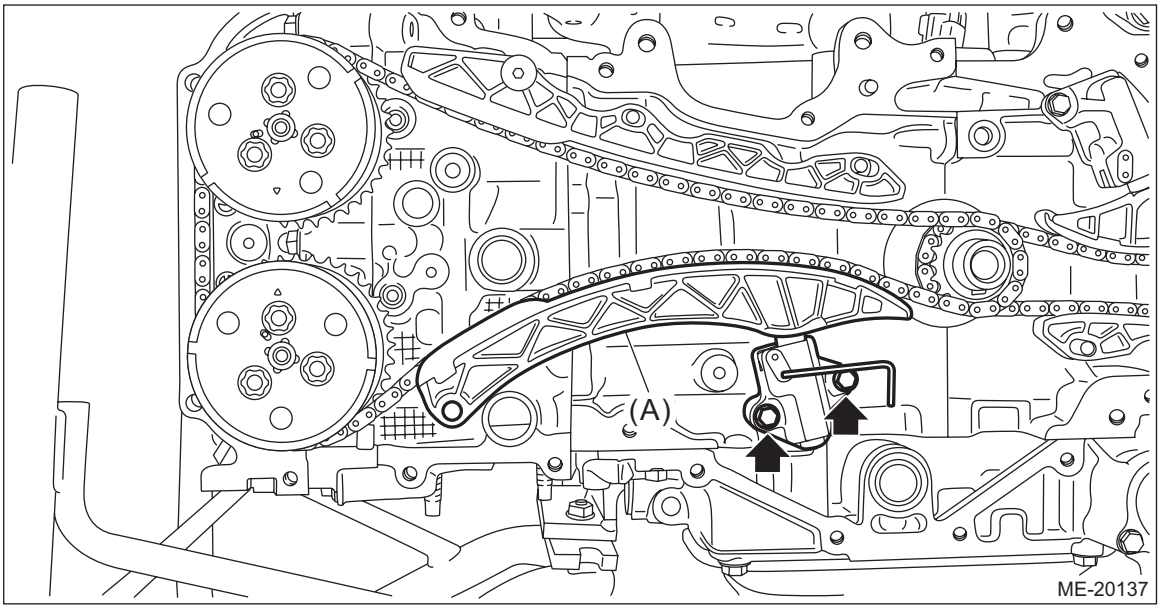
NOTE:
If the alignment marks are aligned to the positions as shown in the figure, the crankshaft key is located at six o'clock position.
ST 18252AA000 CRANKSHAFT SOCKET



3) Push down the chain lever tensioner RH, and with a 2.5 mm (0.098 in) dia. stopper pin or a 2.5 mm dia. hex wrench inserted into the stopper pin hole in the chain tensioner RH, secure the plunger (A).



4) Remove the chain tensioner RH, and remove the chain tensioner lever RH (A).



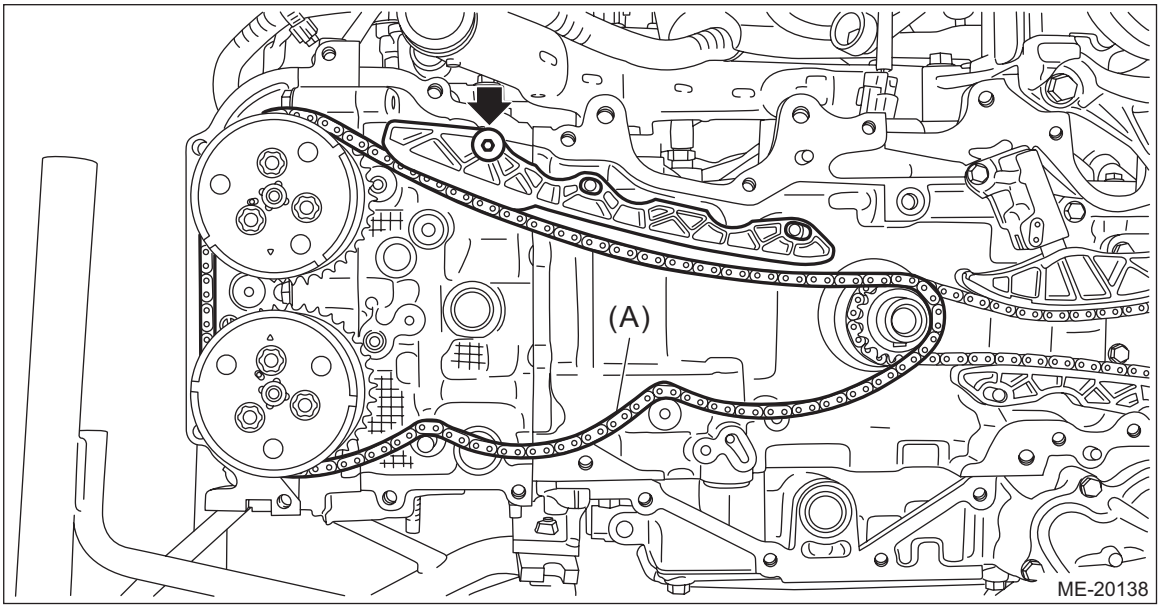
5) Remove the chain guide RH, and remove the timing chain RH (A).

CAUTION:

• If the timing chain RH is not installed, the intake camshaft RH and exhaust camshaft RH are kept at zero-lift position. All cams on the camshaft are not pressing down the roller rocker arm (intake valve and exhaust valve). (Under this condition, all valves remain unlifted.)

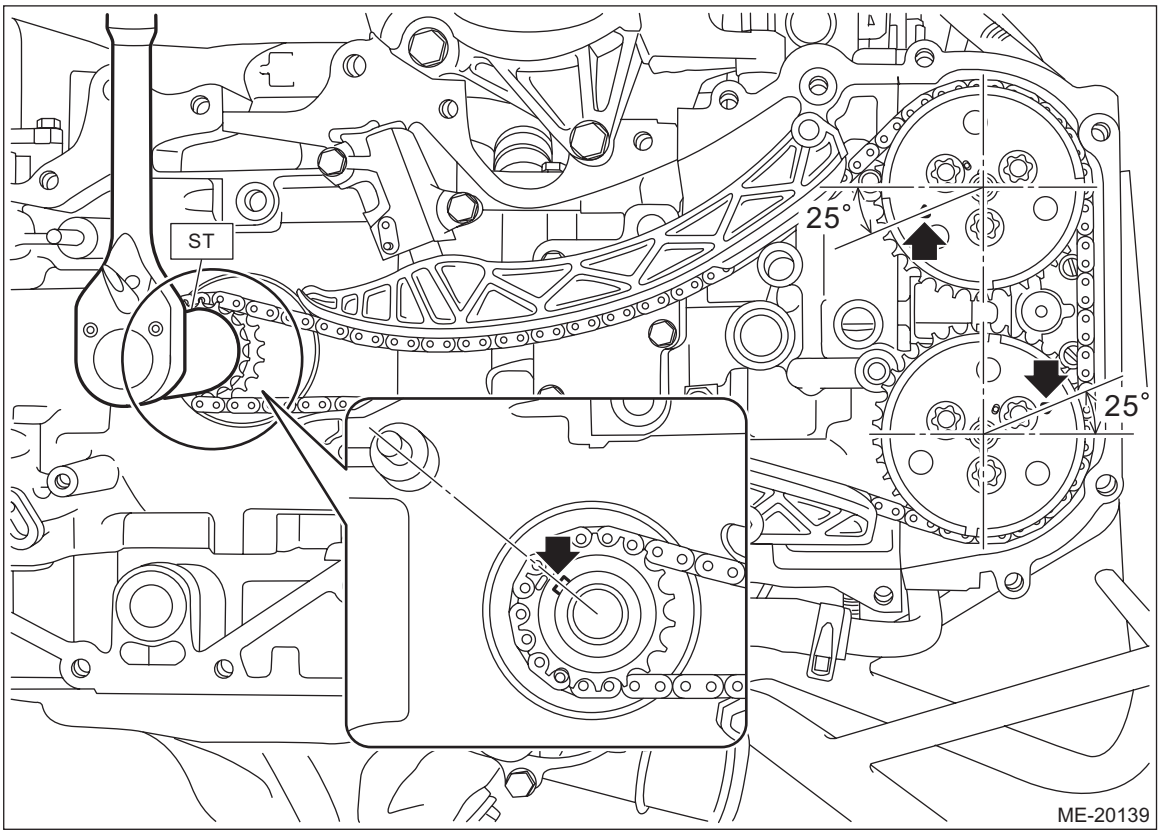
• Intake camshaft RH and exhaust camshaft RH can be independently rotated with the timing chain RH removed. When the intake valve and exhaust valve lift at the same time, the valve heads contact each other and valve stem may bend. Do not turn it to the outside of range of zero-lift (in range where it can be turned lightly by hand).

NOTE:
To avoid mixing with LH side, keep the removed part in order.

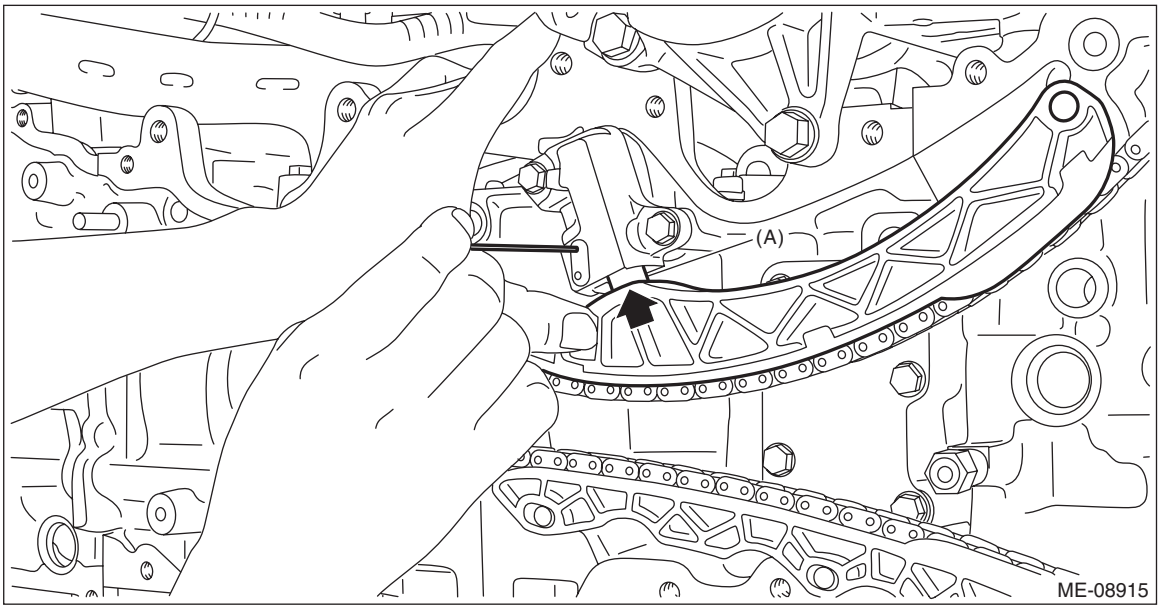


2. TIMING CHAIN LH

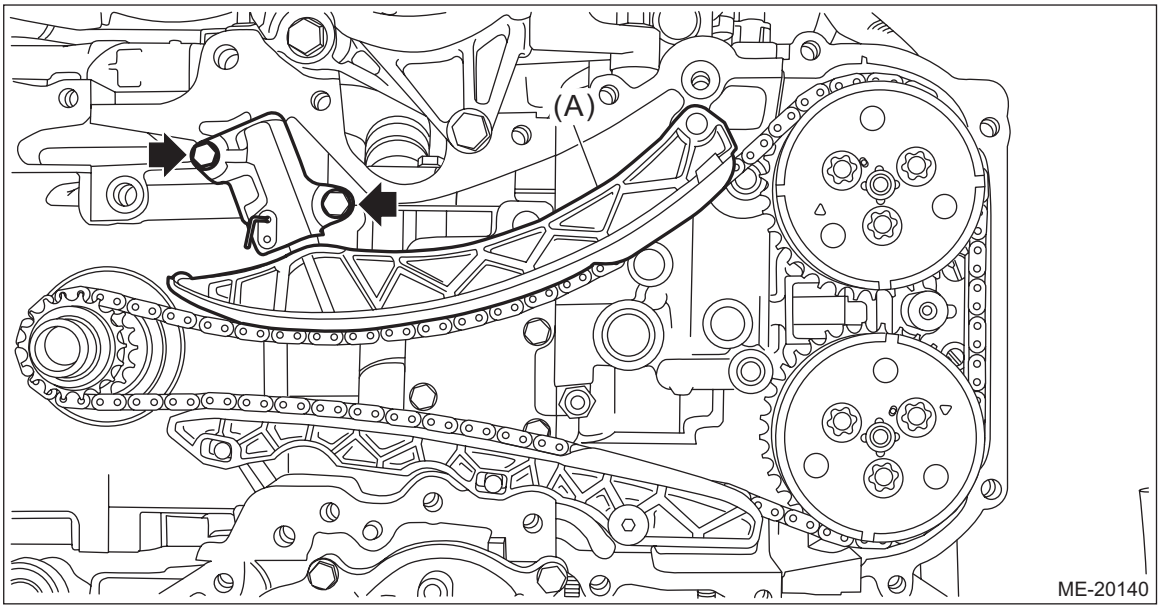
1) Remove the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-171, TIMING CHAIN RH, REMOVAL, Timing Chain Assembly.>
2) Using ST and by turning the crankshaft, align the alignment marks of crankshaft key, intake cam sprocket LH and exhaust cam sprocket LH to the positions as shown in the figure.
ST 18252AA000 CRANKSHAFT SOCKET



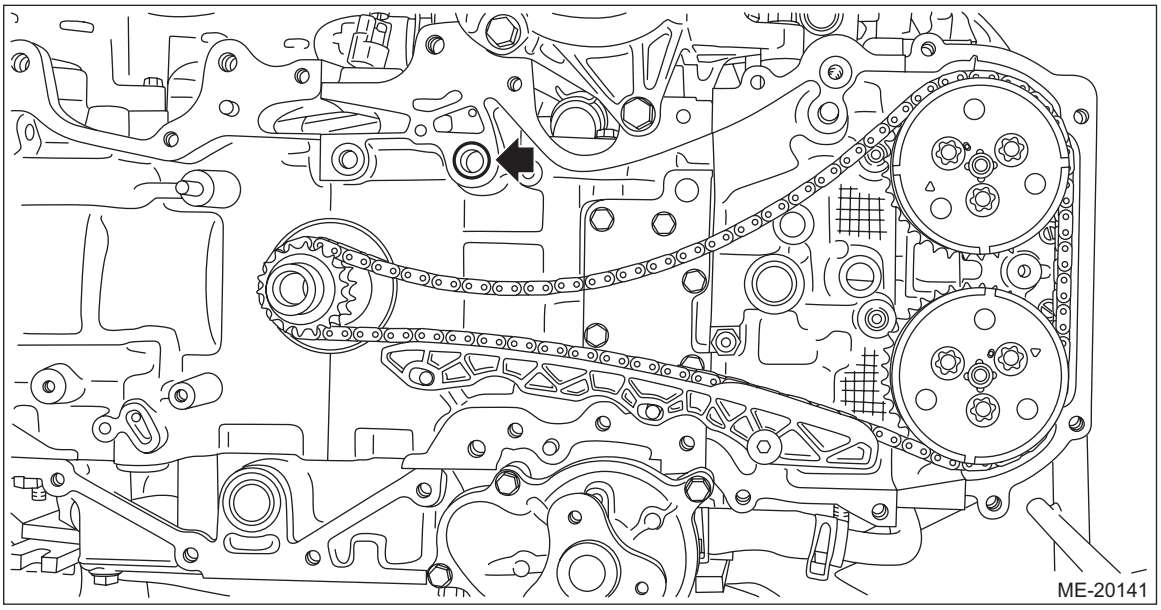
3) Push down the chain lever tensioner LH, and with a 1.3 mm (0.05 in) dia. stopper pin or a 1.3 mm dia. hex wrench inserted into the stopper pin hole in the chain tensioner LH, secure the plunger (A).



4) Remove the chain tensioner LH, and remove the chain tensioner lever LH (A).



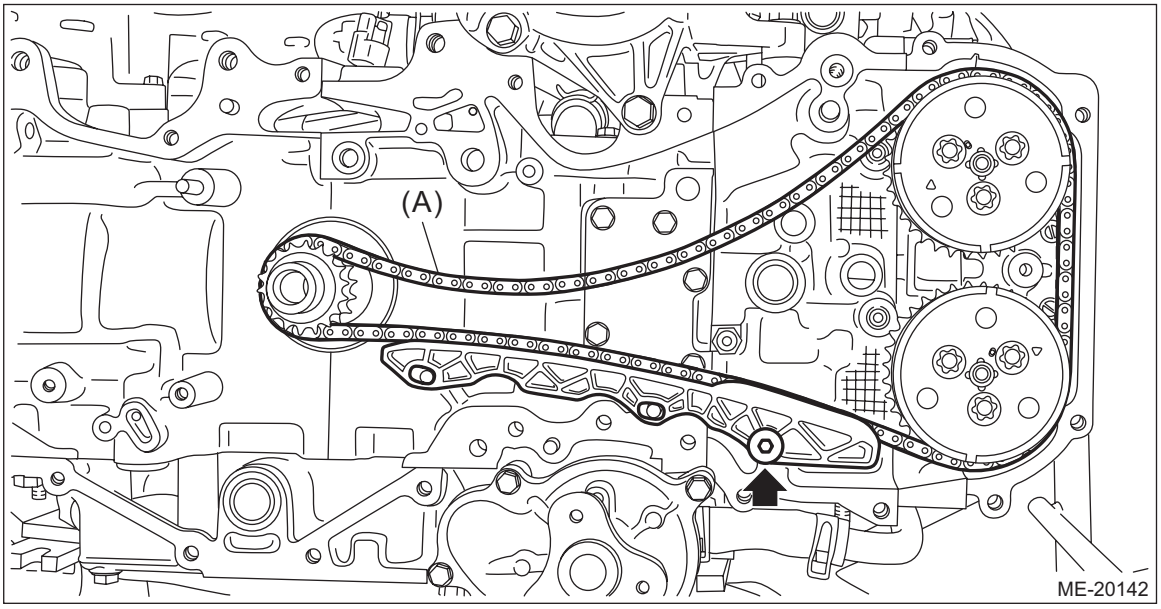
5) Remove the O-ring from the cylinder block LH.



6) Remove the chain guide LH, and remove the timing chain LH (A).

CAUTION:
• If the timing chain LH is not installed, the exhaust camshaft LH is kept at zero-lift position. All cams on the exhaust camshaft LH are not pressing down the roller rocker arm (exhaust valve). (Under this condition, exhaust valves remain unlifted.)
• Intake camshaft LH is kept at lift position. All cams on the intake camshaft LH are pressing down the roller rocker arm (intake valve). (Under this condition, intake valves remain lifted.)
• Intake camshaft LH and exhaust camshaft RH can be independently rotated with the timing chain LH removed. When the exhaust camshaft LH is turned, the valve heads contact each other and valve stem may bend as described in above. Do not turn the exhaust camshaft LH to the outside of range of zero-lift (in range where it can be turned lightly by hand).
• #1 piston and #4 piston are located near TDC. If the intake camshaft LH is turned, the valve and the piston may contact and valve stem may bend. Do not turn the intake camshaft LH at this time.

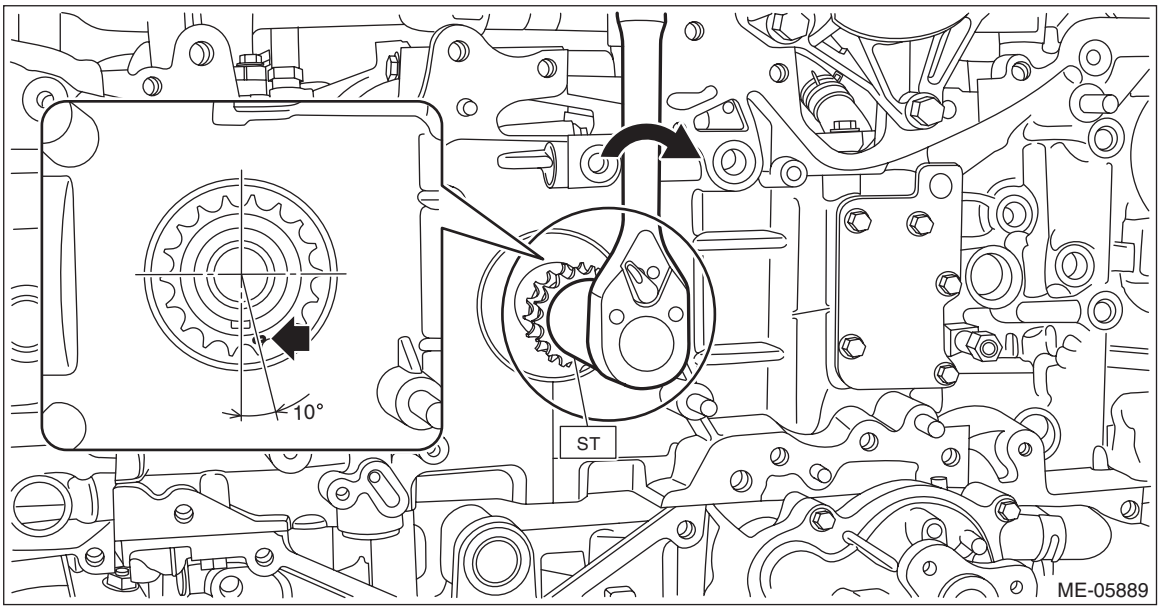
NOTE:
To avoid mixing with RH side, keep the removed part in order.



7) Using ST and by turning the crankshaft approximately 200° clockwise, align the alignment marks of crank sprocket to the positions as shown in the figure.

CAUTION:
• This procedure is required to prevent the valve and piston contacting with each other, by moving the all pistons to the middle of the cylinders.
• Never turn counterclockwise because the valve and piston may contact. Counterclockwise turn is allowed only when adjusting precisely the alignment marks, after turning the crank sprocket alignment mark clockwise near the position as shown in the figure.

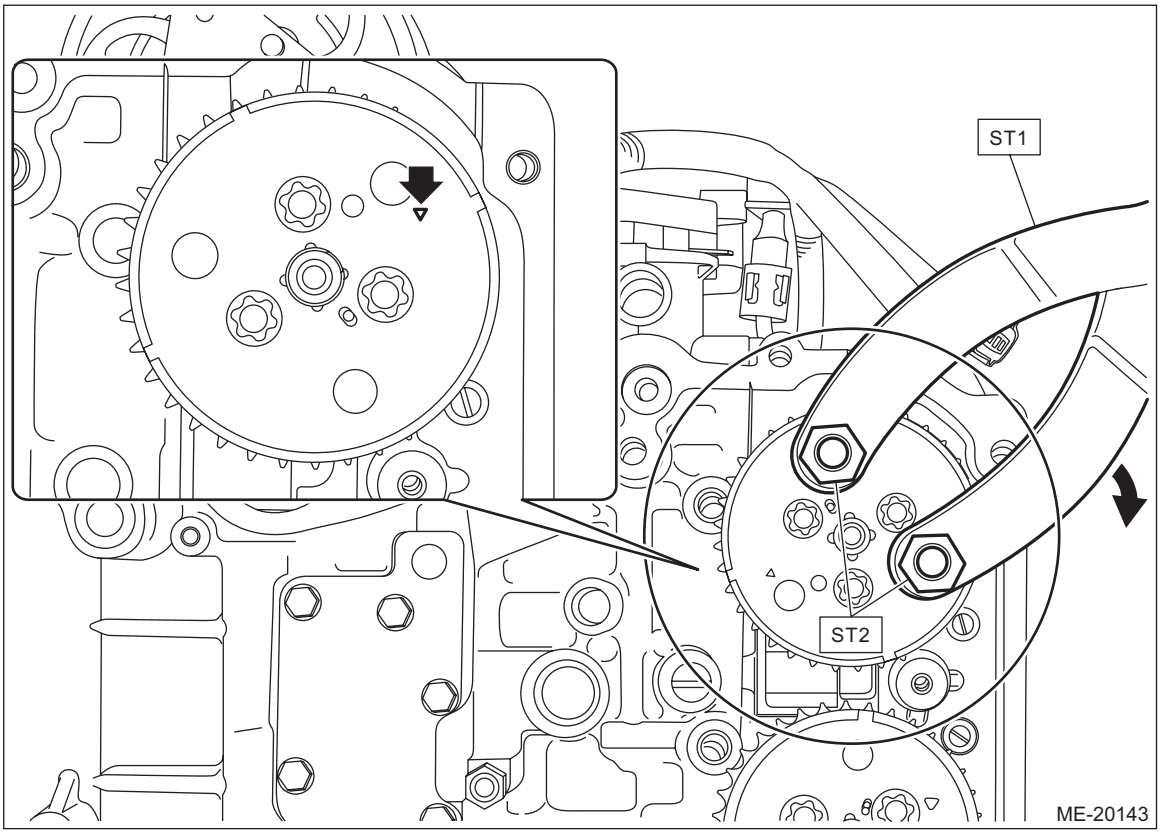
ST 18252AA000 CRANKSHAFT SOCKET



8) Using ST and by turning the intake cam sprocket LH approximately 180°, align the alignment marks of intake cam sprocket LH to the positions (zero-lift position) as shown in the figure.

CAUTION:
• After this work, when the intake valve and exhaust valve lift at the same time, the valve heads contact each other and valve stem may bend. Do not turn the intake camshaft LH and exhaust camshaft LH to the outside of range of zero-lift (in range where it can be turned lightly by hand).
• Perform the operation carefully since the ST comes off easily.

ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET

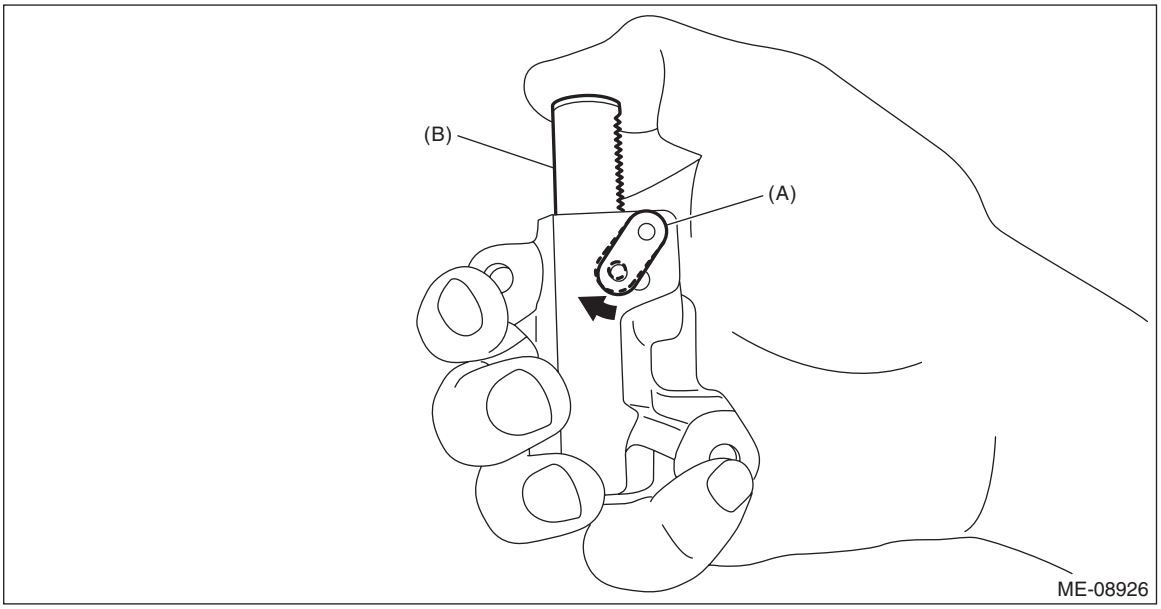


B: INSTALLATION

1. TIMING CHAIN LH

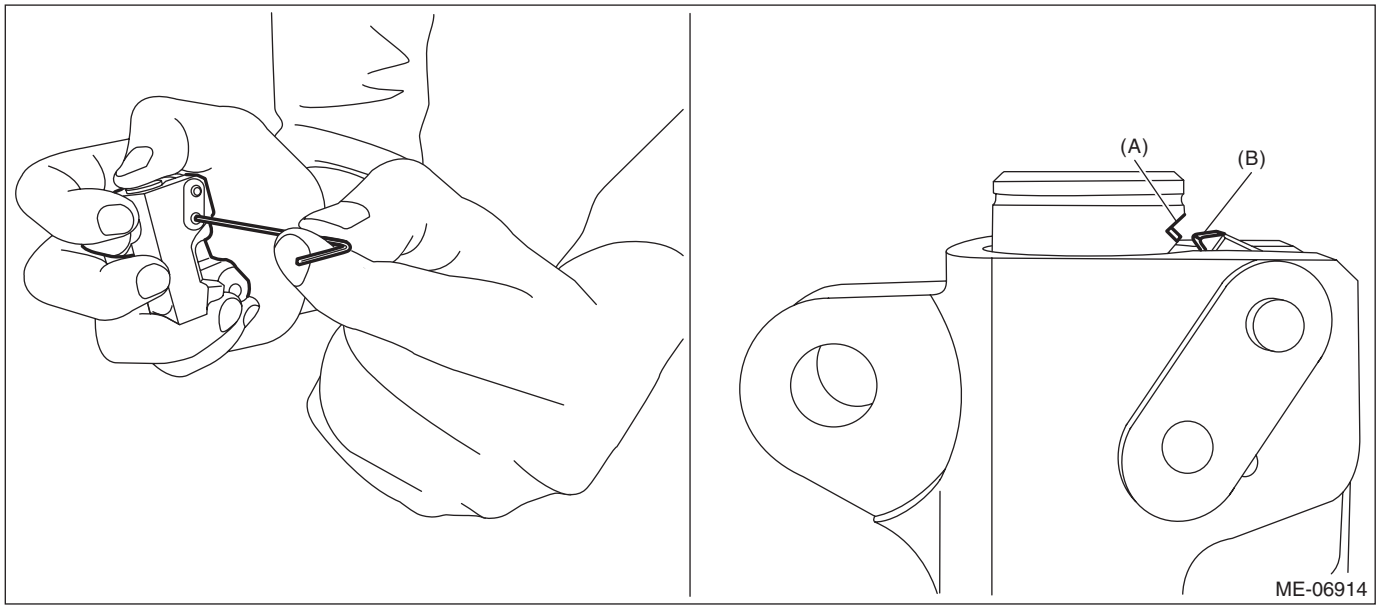
NOTE:
- Be careful that the foreign matter is not into or onto the assembled component during installation.
- Apply engine oil to all component parts of the timing chain.

1) Prepare to attach the chain tensioner LH.
   (1) Move the link plate (A) in the direction of arrow to press in the plunger (B).



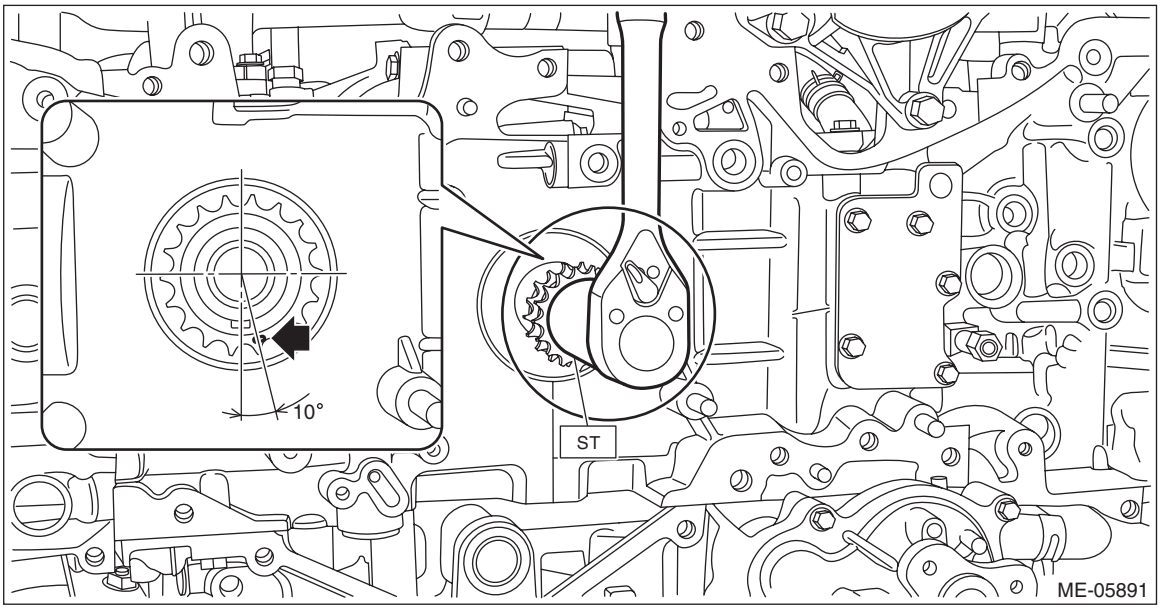
   (2) With a 1.3 mm (0.05 in) dia. stopper pin or a 1.3 mm dia. hex wrench inserted into the stopper pin hole, secure the plunger.

NOTE:
If the stopper pin hole on the link plate and the stopper pin hole on the chain tensioner are not aligned, check that the first notch of plunger rack (A) is engaged with the stopper tooth (B). If not engaged, retract the plunger a little so that the first notch of plunger rack (A) is engaged with the stopper tooth (B).



2) Check that the crank sprocket is located at the position shown in the figure. If not aligned, using ST turn the crankshaft to align the crank sprocket alignment mark to the position shown in the figure.

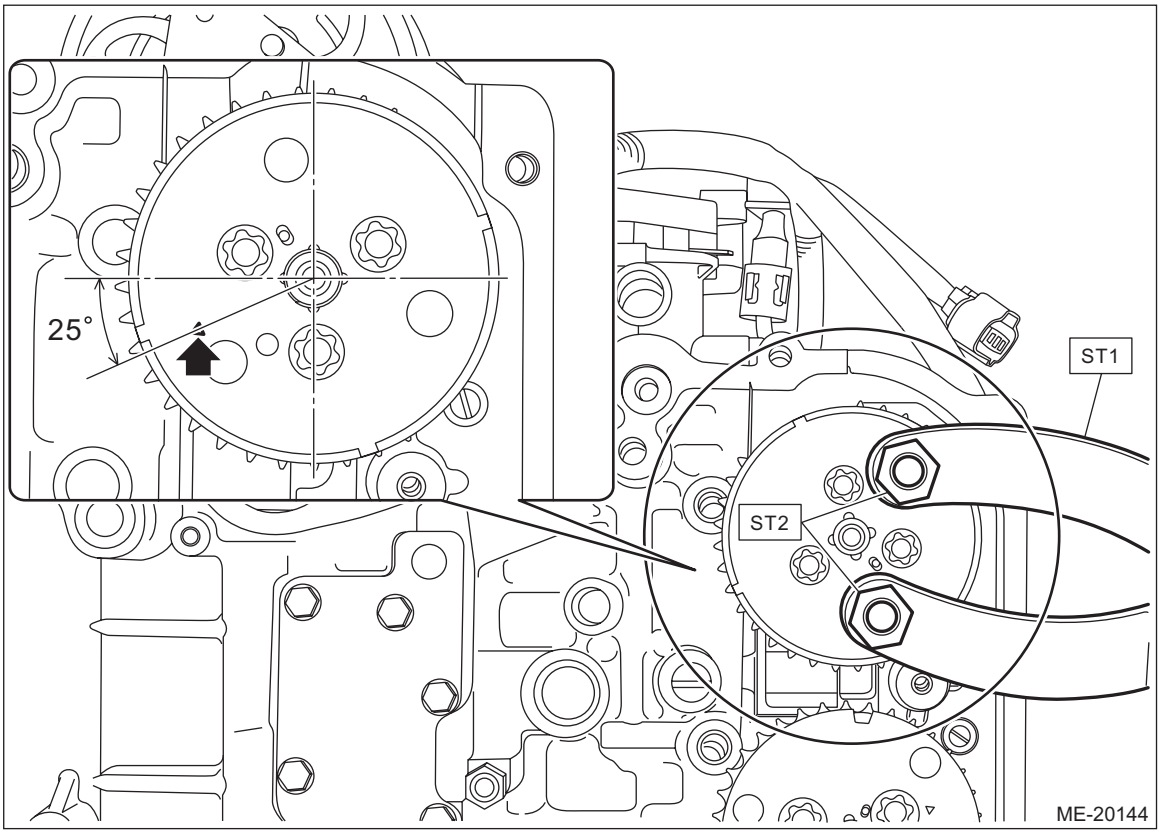
NOTE:
This procedure is required to prevent the valve and piston contacting with each other in the next step.
ST 18252AA000 CRANKSHAFT SOCKET



3) Using ST and by turning the intake cam sprocket LH, align the alignment marks to the positions as shown in the figure.

CAUTION:
• When the intake valve and exhaust valve lift at the same time, the valve heads contact each other and valve stem may bend. Do not turn the exhaust camshaft LH.
• Perform the operation carefully since the ST comes off easily.

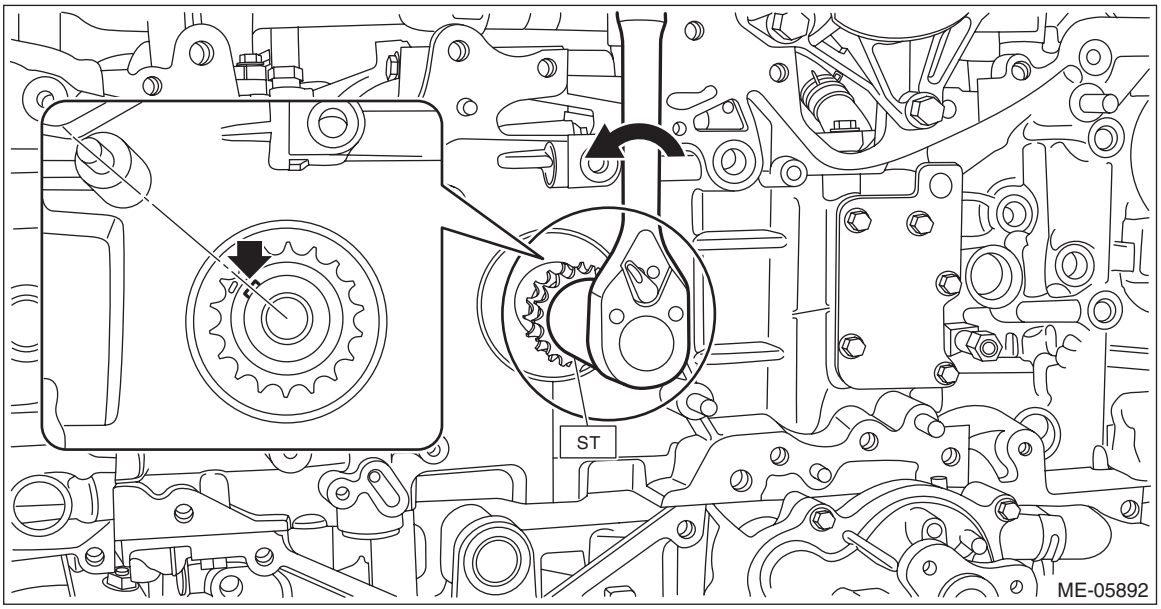
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET



4) Using ST and by turning the crankshaft approximately 200° counterclockwise, align the alignment marks of crankshaft key to the positions as shown in the figure.

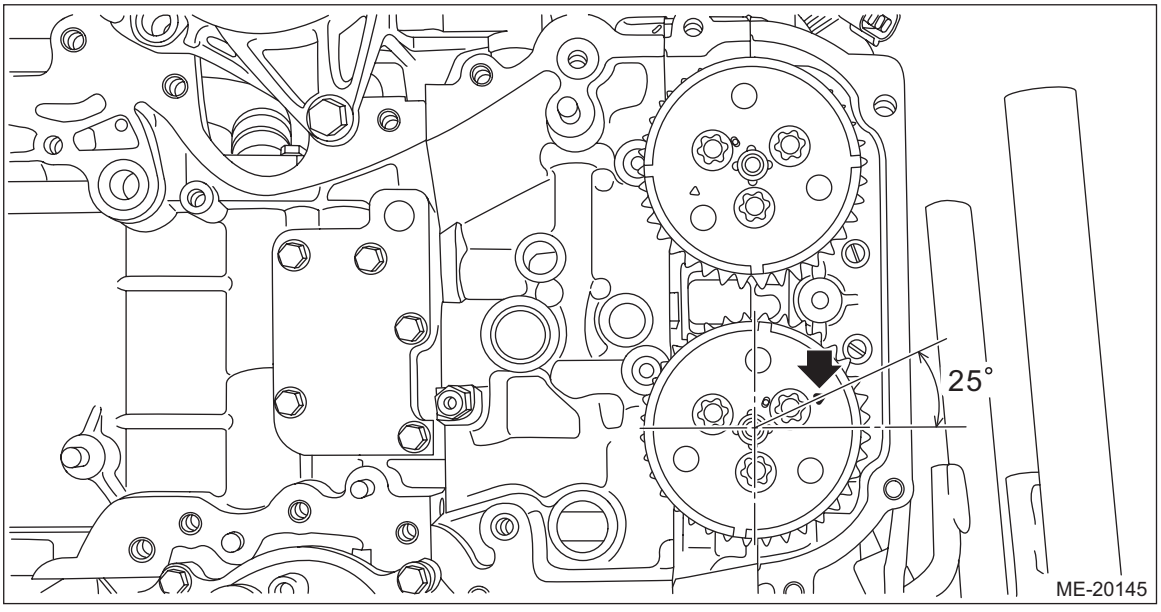
CAUTION:
Never turn clockwise because the valve and piston may contact. Clockwise turn is allowed only when adjusting the key position precisely, after turning the crankshaft counterclockwise to bring the key near the position as shown in the figure.

ST 18252AA000 CRANKSHAFT SOCKET



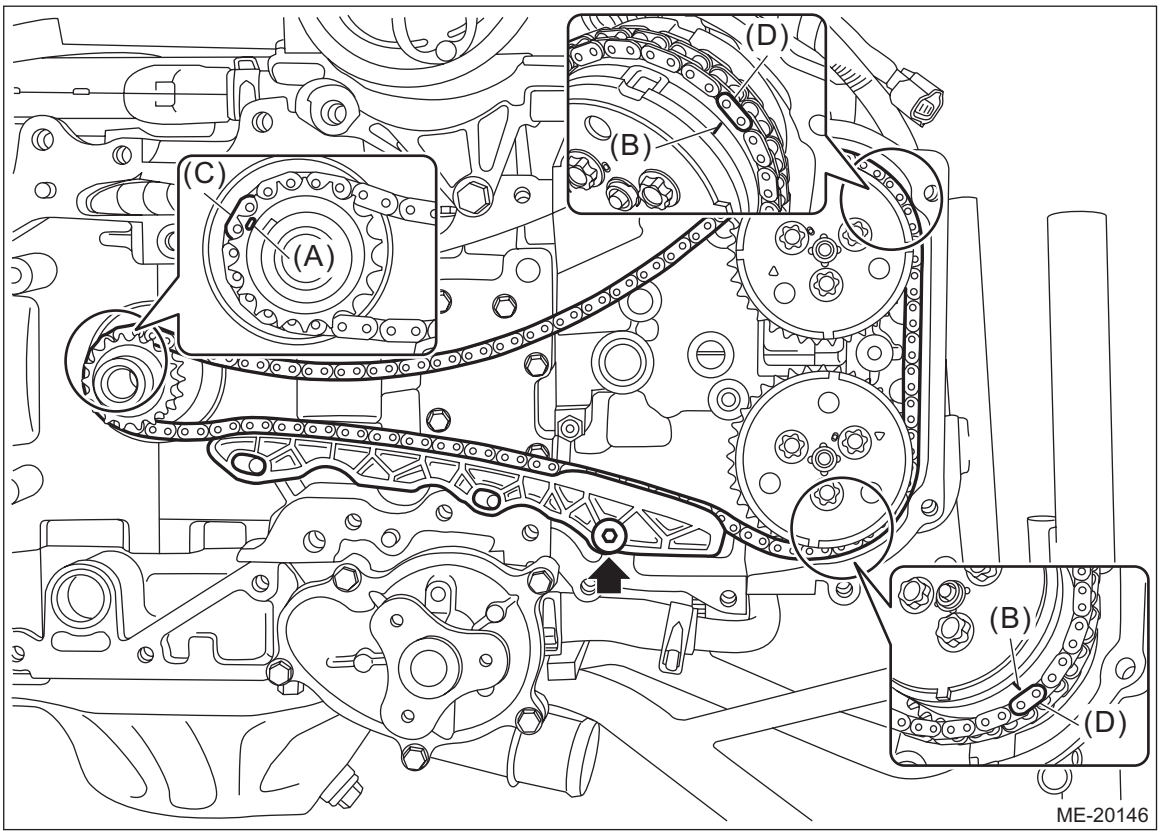
5) Align the alignment mark of exhaust cam sprocket LH to the position shown in the figure.

CAUTION:
To prevent valve damage, turn the exhaust cam sprocket LH only within the range of zero-lift (in range where it can be turned lightly by hand).



6) Install the timing chain LH and the timing chain guide LH.
   (1) Match the timing chain mark (blue) to the alignment mark of the crank sprocket.
   (2) Match the timing chain mark (pink) to the timing mark position of the intake cam sprocket LH.
   (3) Match the timing chain mark (pink) to the timing mark position of the exhaust cam sprocket LH.
   (4) Install timing chain guide LH.

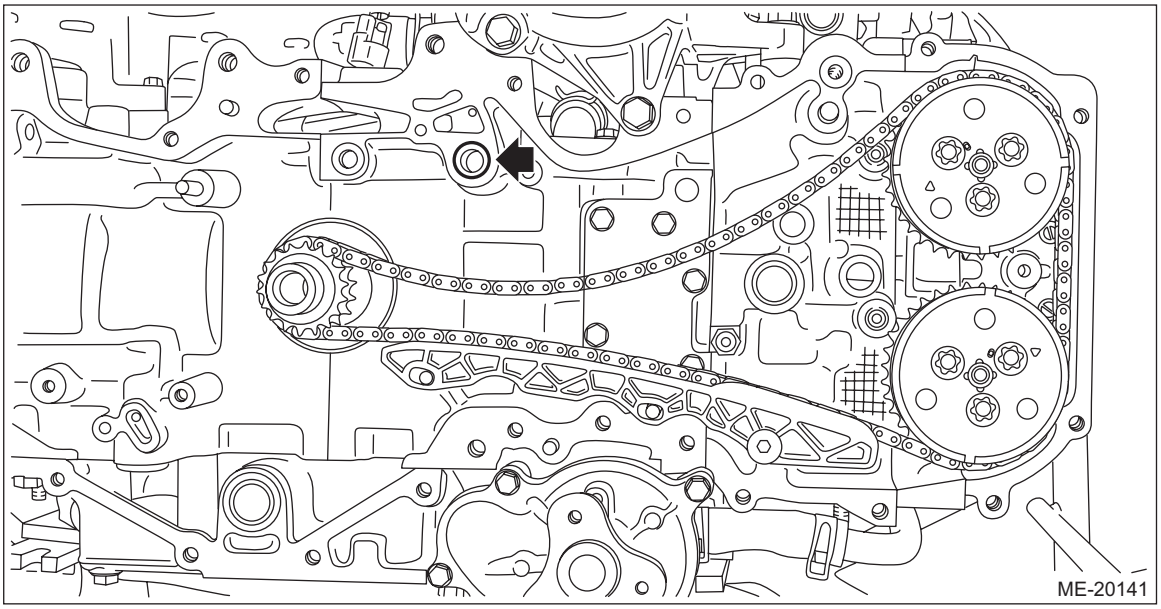
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



(A) Alignment mark
(B) Timing mark
(C) Blue
(D) Pink

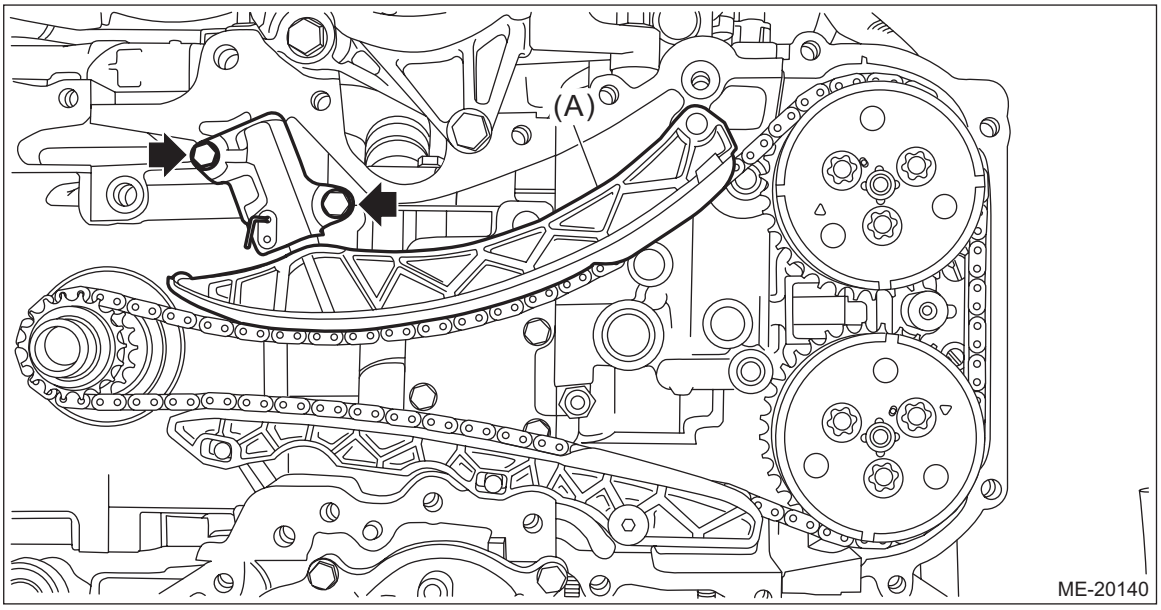
7) Install O-rings to the cylinder block LH.

NOTE:
Use new O-rings.



8) Install the chain tensioner lever LH (A) and chain tensioner LH.

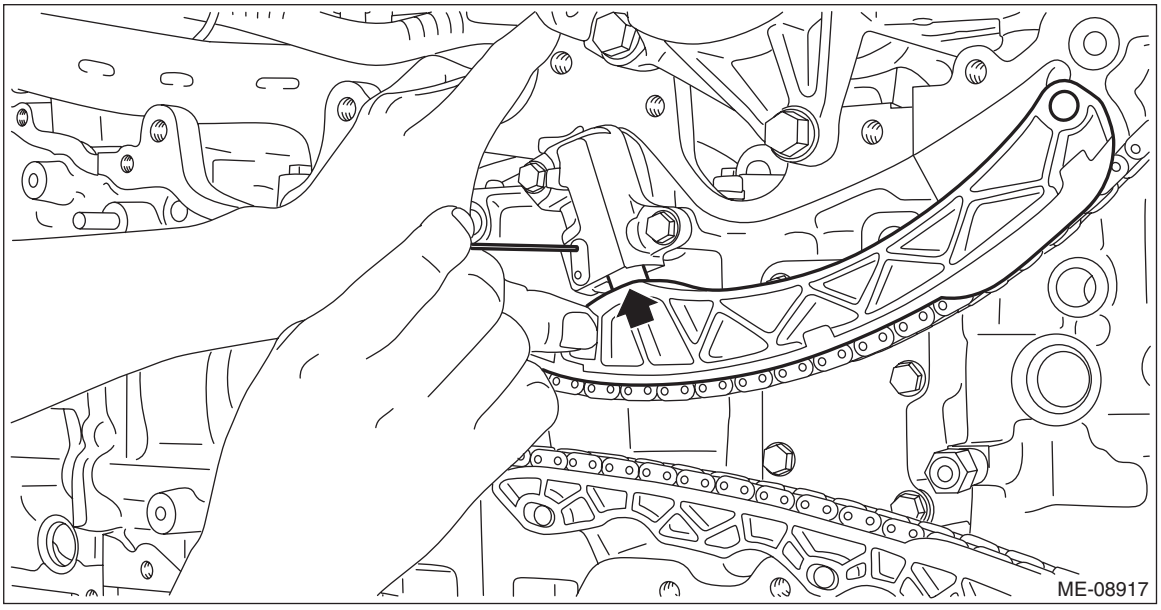
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

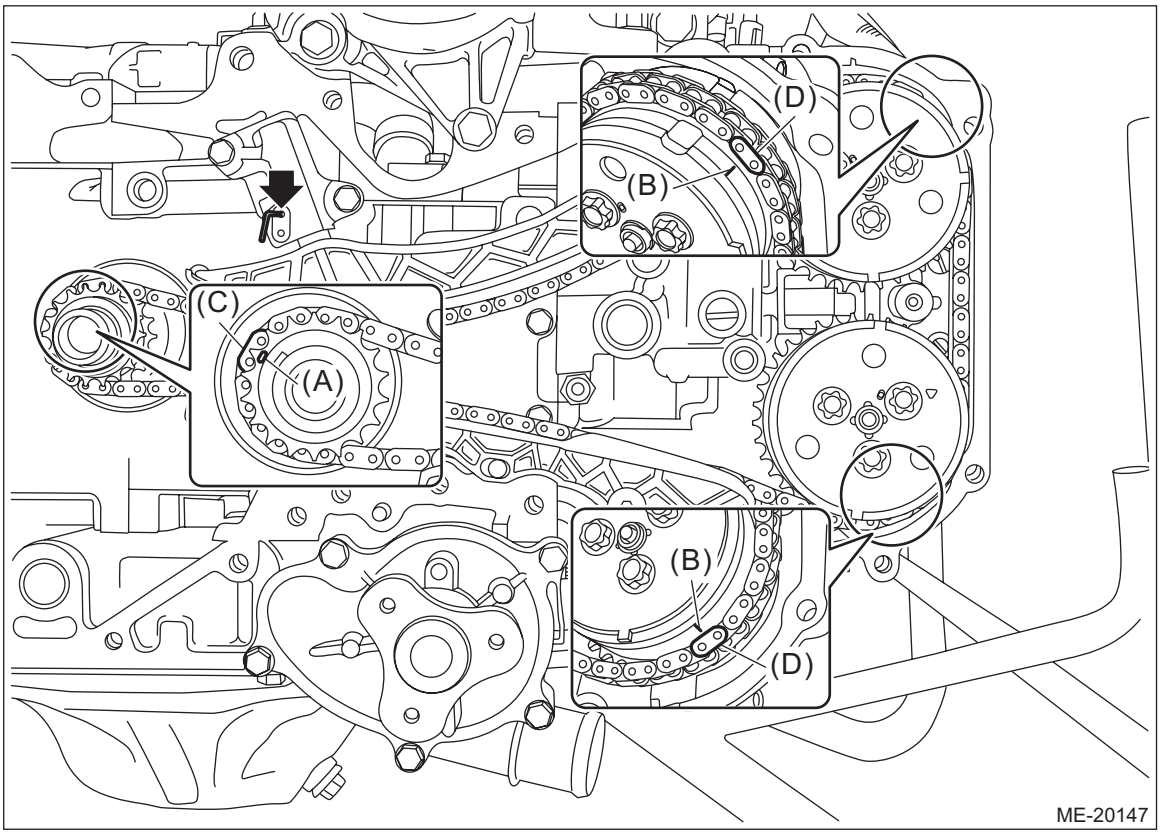


9) Pull out the stopper pin from the chain tensioner LH.

CAUTION:
Confirm the following before pulling out the stopper pin.
- **Matching of the timing chain mark (blue) to the alignment mark of the crank sprocket.**
- **Matching of the timing chain mark (pink) to the timing mark position of the intake cam sprocket LH.**
- **Matching of the timing chain mark (pink) to the timing mark position of the exhaust cam sprocket LH.**

NOTE:
If the stopper pin cannot be removed, lift the chain tension lever LH to remove as shown in the figure.

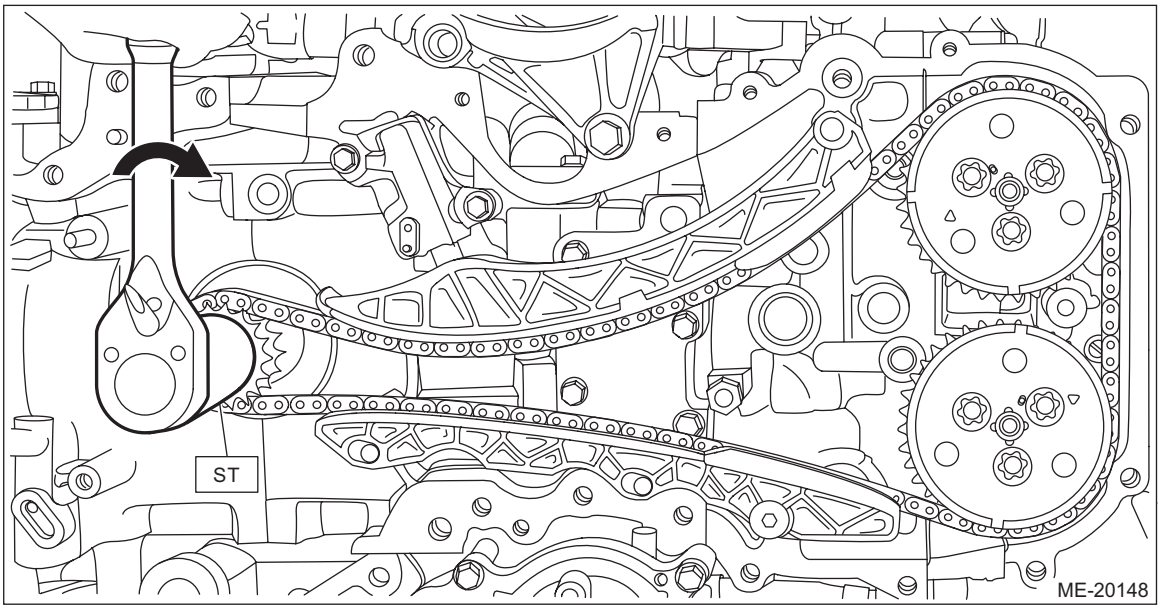




(A) Alignment mark
(B) Timing mark
(C) Blue
(D) Pink

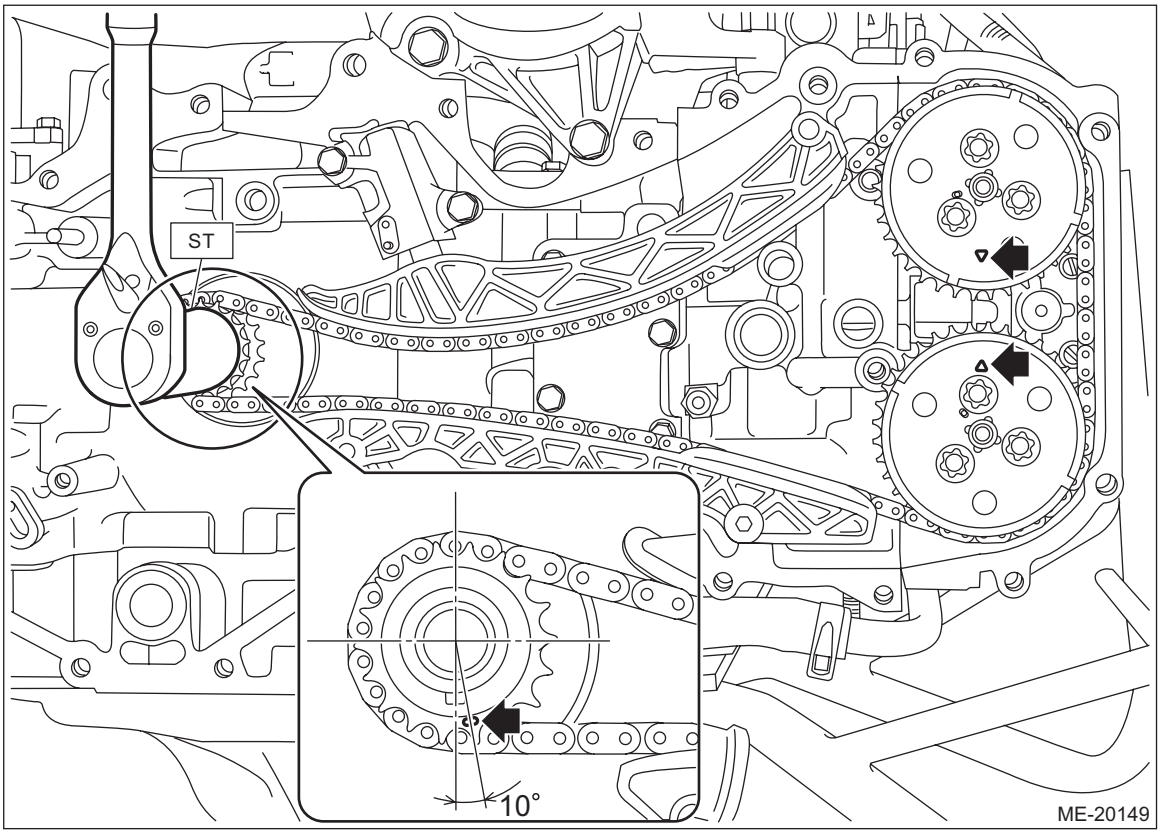
10) Using the ST, turn the crankshaft clockwise, and make sure that there are no abnormal conditions.

CAUTION:
Always make sure to perform this confirmation.
ST 18252AA000 CRANKSHAFT SOCKET



11) Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket LH and exhaust cam sprocket LH to the positions as shown in the figure.

NOTE:
If the alignment marks are aligned to the positions as shown in the figure, the crankshaft key is located at six o'clock position.
ST 18252AA000 CRANKSHAFT SOCKET

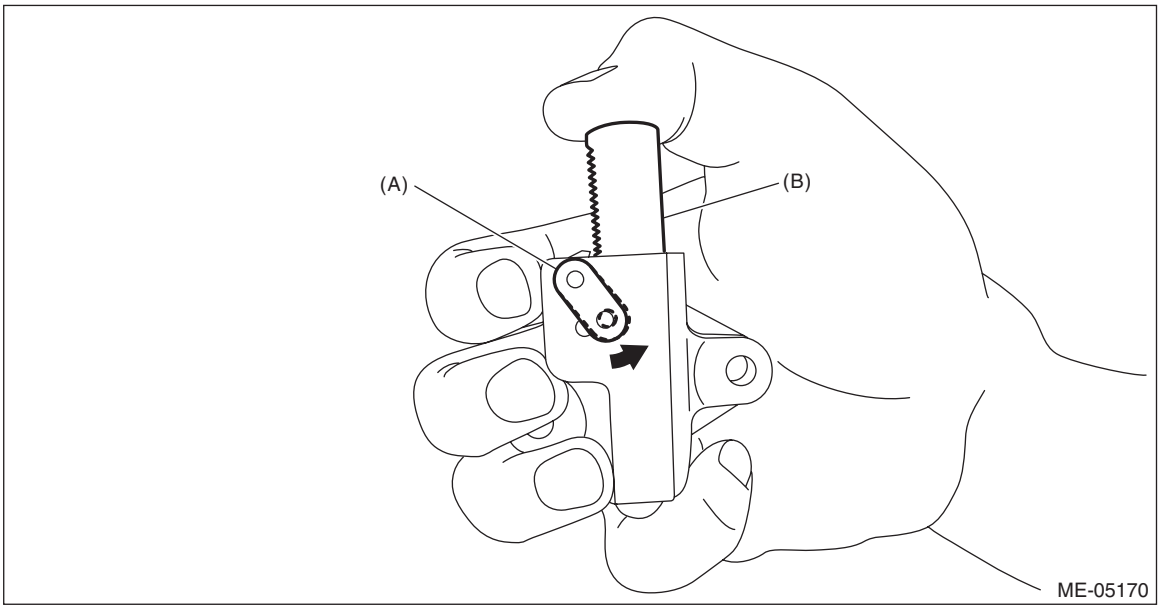


12) Install the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-186, TIMING CHAIN RH, INSTALLATION, Timing Chain Assembly.>

2. TIMING CHAIN RH

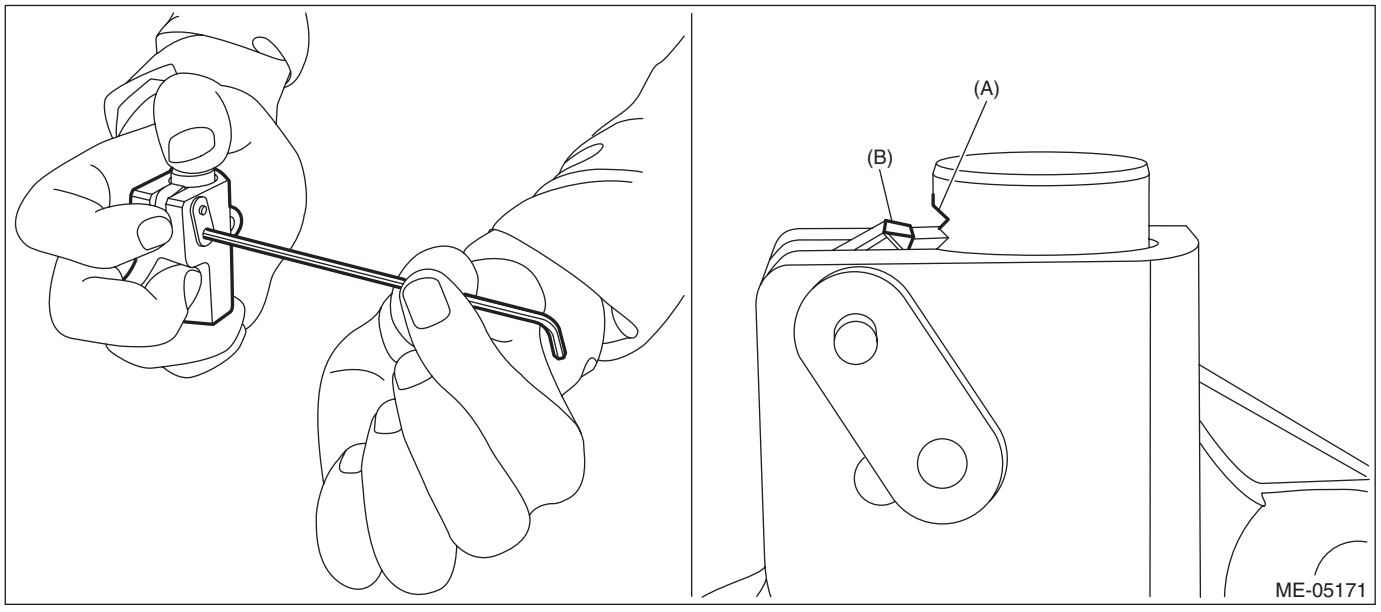
NOTE:
- Be careful that the foreign matter is not into or onto the assembled component during installation.
- Apply engine oil to all component parts of the timing chain.

1) Install timing chain LH. <Ref. to ME(H4DO(w/o HEV))-178, TIMING CHAIN LH, INSTALLATION, Timing Chain Assembly.>
2) Prepare to attach the chain tensioner RH.
   (1) Move the link plate (A) in the direction of arrow to press in the plunger (B).

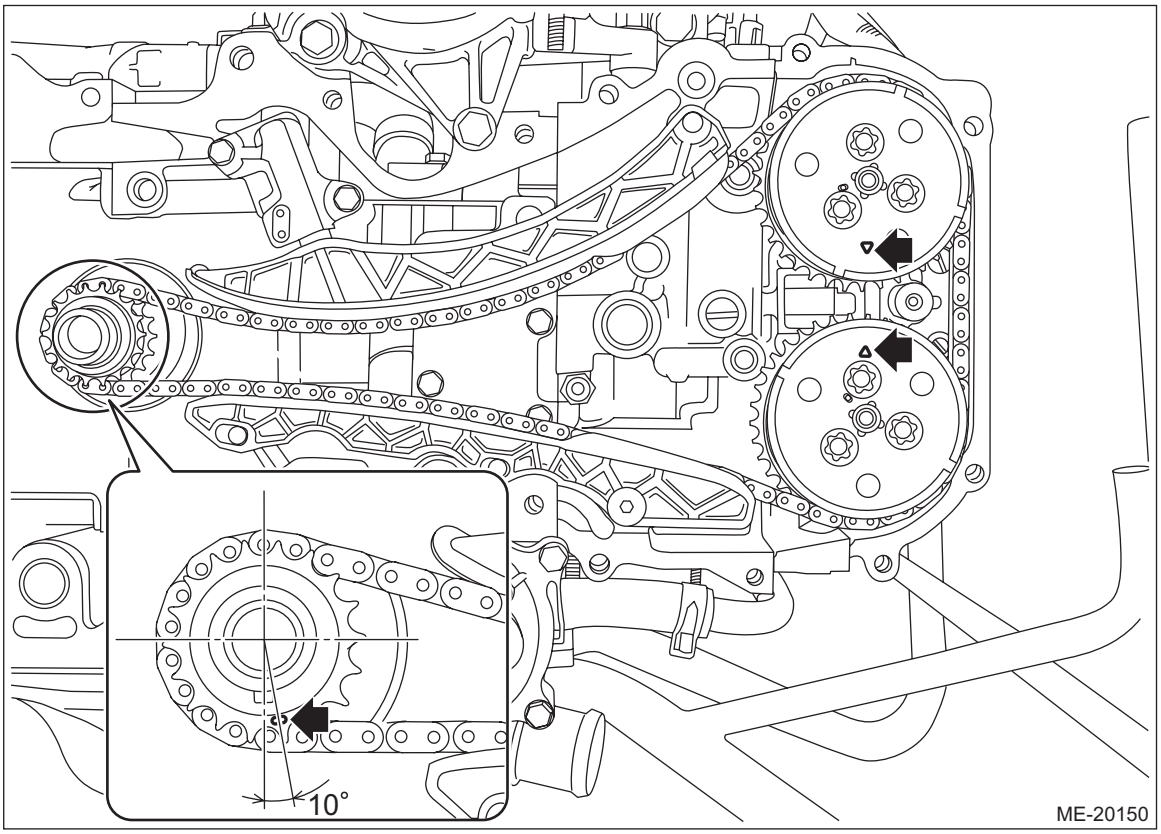


   (2) With a 2.5 mm (0.098 in) dia. stopper pin or a 2.5 mm dia. hex wrench inserted into the stopper pin hole, secure the plunger.

NOTE:
If the stopper pin hole on the link plate and the stopper pin hole on the chain tensioner are not aligned, check that the first notch of plunger rack (A) is engaged with the stopper tooth (B). If not engaged, retract the plunger a little so that the first notch of plunger rack (A) is engaged with the stopper tooth (B).

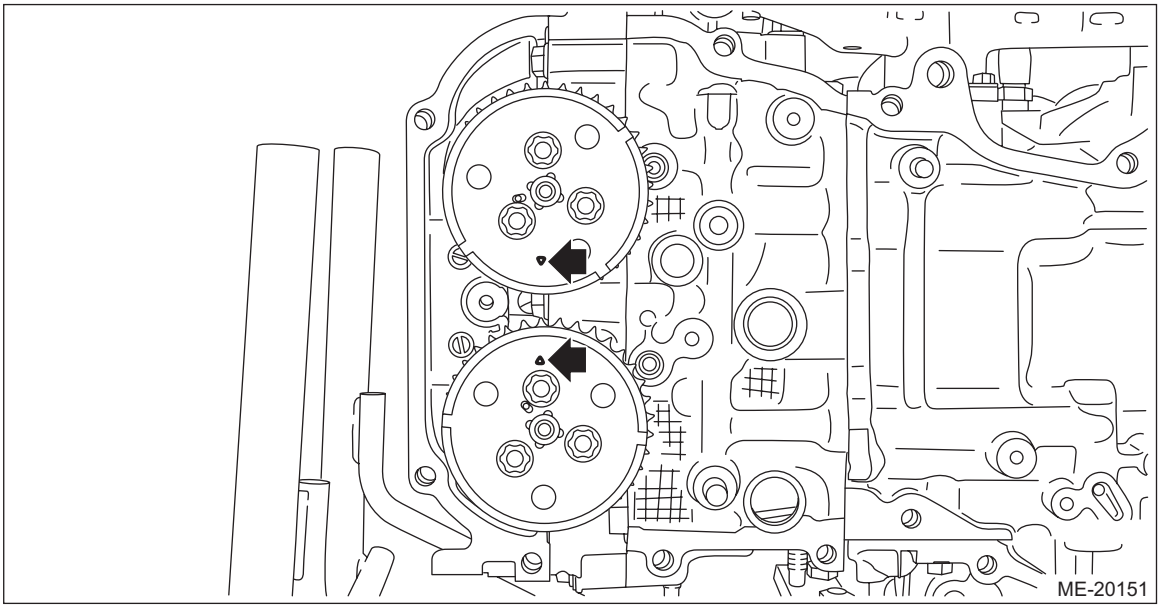


3) Make sure that the alignment marks of the crank sprocket, intake cam sprocket LH and exhaust cam sprocket LH are aligned to the positions as shown in the figure.



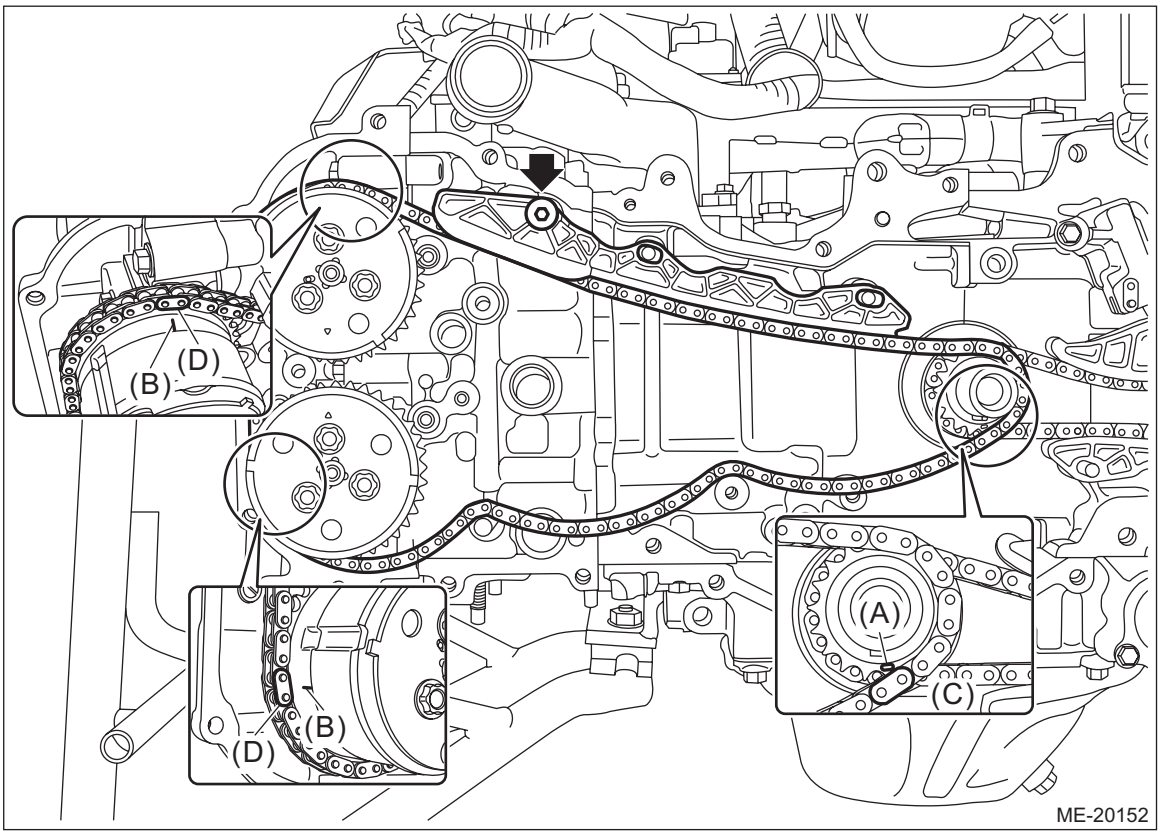
4) Align the alignment marks of intake cam sprocket RH and exhaust cam sprocket RH to the positions as shown in the figure.

CAUTION:
To prevent valve damage, turn the intake cam sprocket RH and exhaust cam sprocket RH only within the range of zero-lift (in range where it can be turned lightly by hand).



5) Install the timing chain RH and the timing chain guide RH.
   (1) Match the timing chain mark (blue) to the alignment mark of the crank sprocket.
   (2) Match the timing chain mark (pink) to the timing mark position of the intake cam sprocket RH.
   (3) Match the timing chain mark (pink) to the timing mark position of the exhaust cam sprocket RH.
   (4) Install the timing chain guide RH.

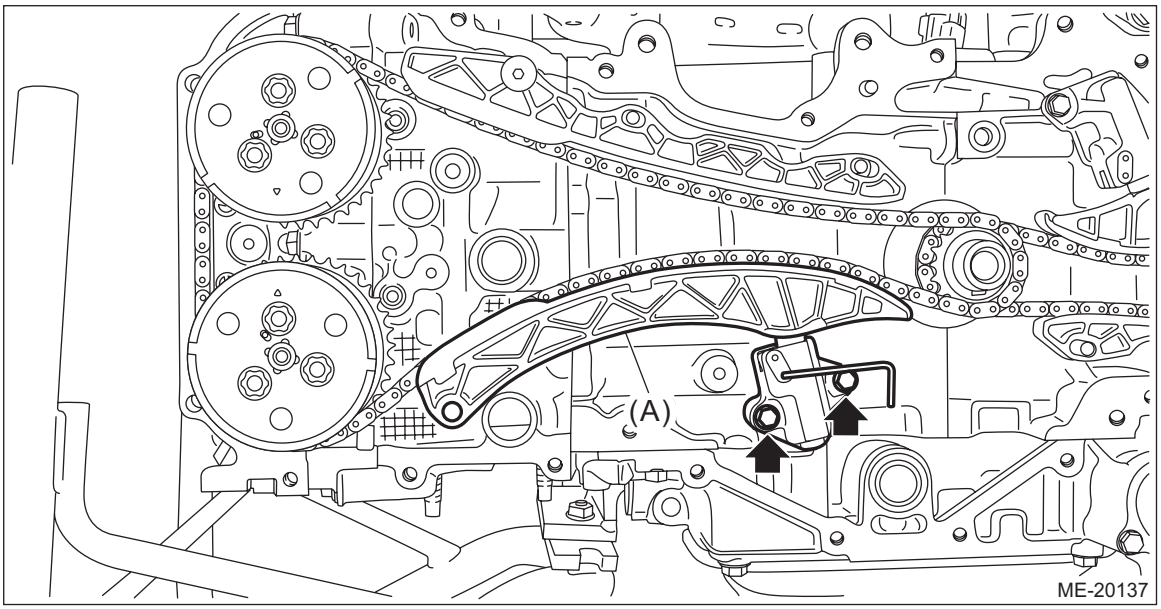
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



(A) Alignment mark
(B) Timing mark
(C) Blue
(D) Pink

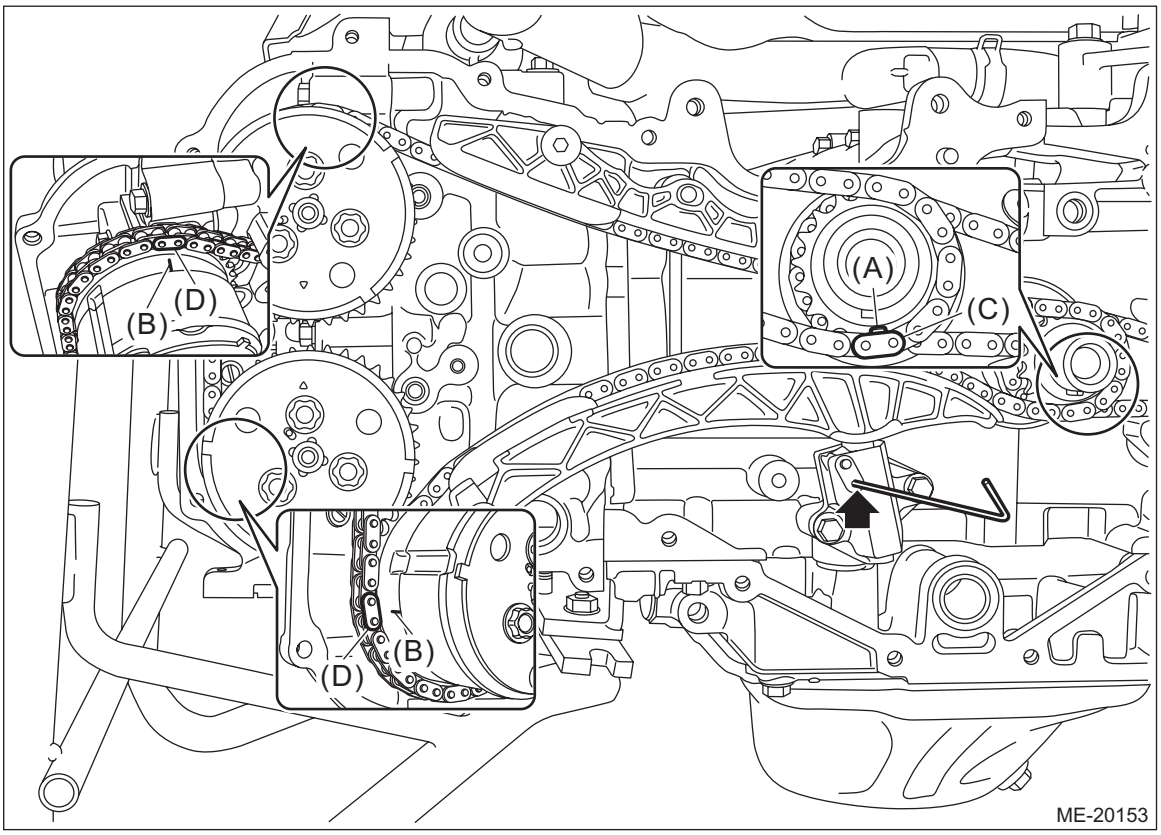
6) Install the chain tensioner lever RH (A) and chain tensioner RH.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



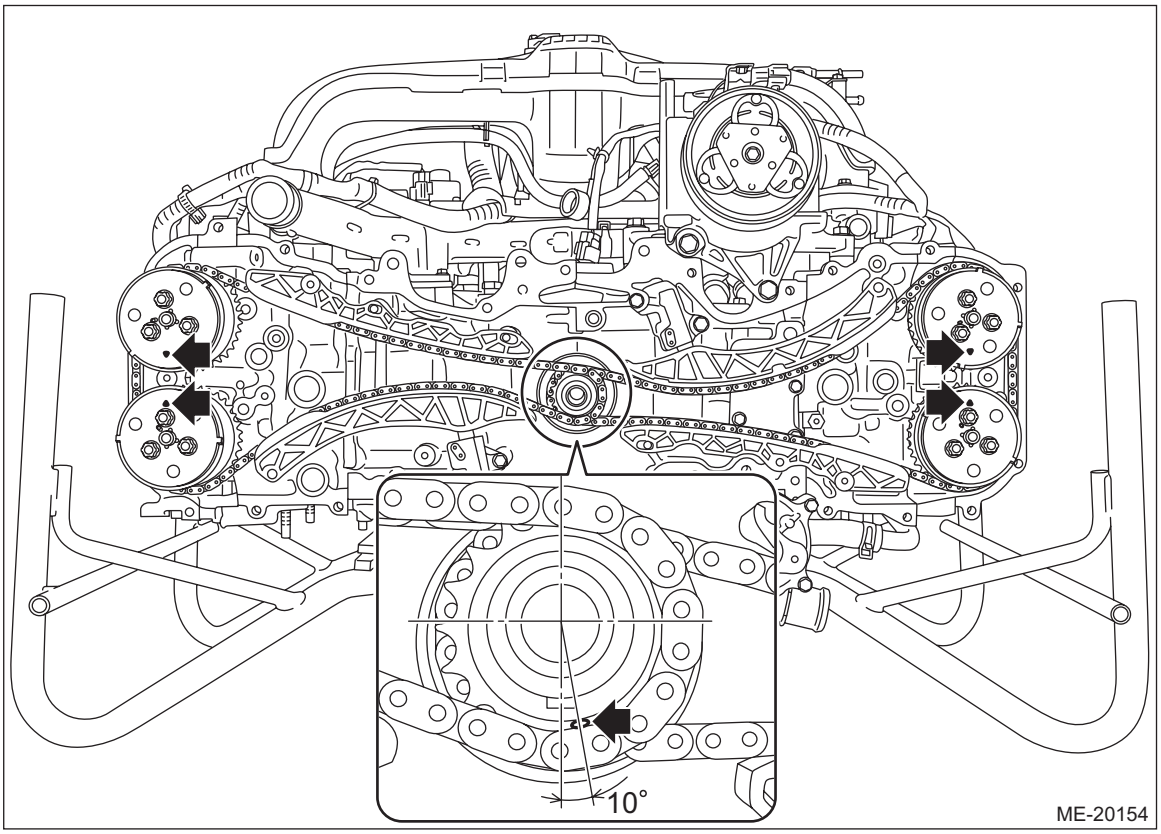
7) Pull out the stopper pin from the chain tensioner RH.

CAUTION:
Confirm the following before pulling out the stopper pin.
- **Matching of the timing chain mark (blue) to the alignment mark of the crank sprocket.**
- **Matching of the timing chain mark (pink) to the timing mark position of the intake cam sprocket RH.**
- **Matching of the timing chain mark (pink) to the timing mark position of the exhaust cam sprocket RH.**



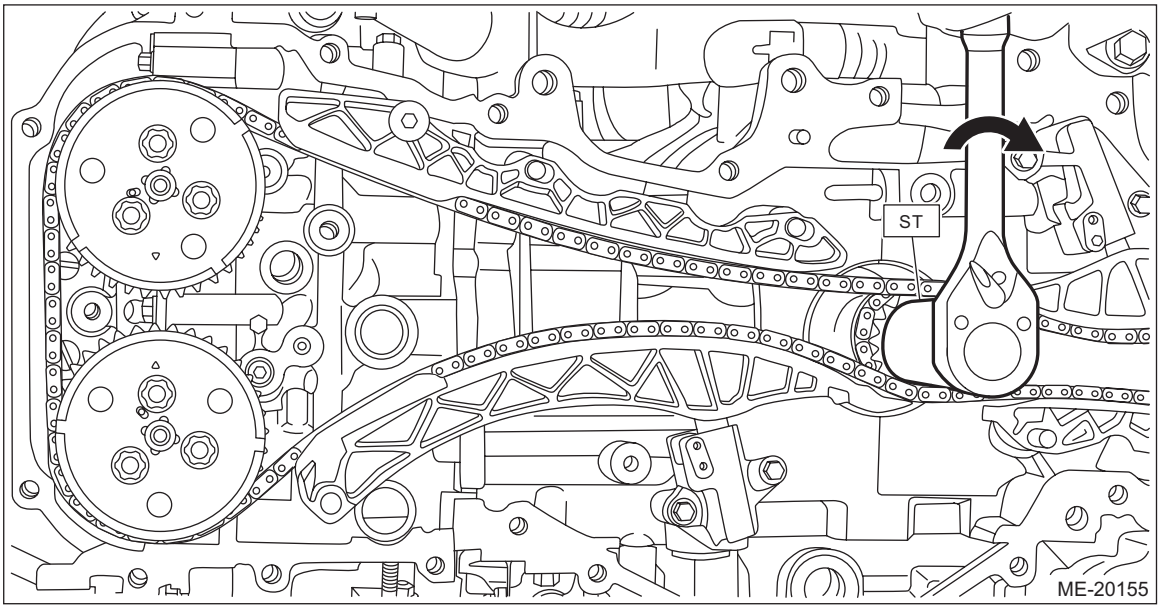
(A) Alignment mark
(B) Timing mark
(C) Blue
(D) Pink

8) Make sure that the alignment marks of the cam sprocket and crank sprocket are aligned to the positions as shown in the figure.



9) Using the ST, turn the crankshaft clockwise, and make sure that there are no abnormal conditions.

CAUTION:
Always make sure to perform this confirmation.
ST 18252AA000 CRANKSHAFT SOCKET



10) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

C: INSPECTION

1) Check the timing chain, chain guide, chain tensioner lever and chain tensioner for deformation, cracks or other damages.
2) Check the chain guide and chain tensioner lever for abnormal wear.

16.Cam Sprocket

A: REMOVAL

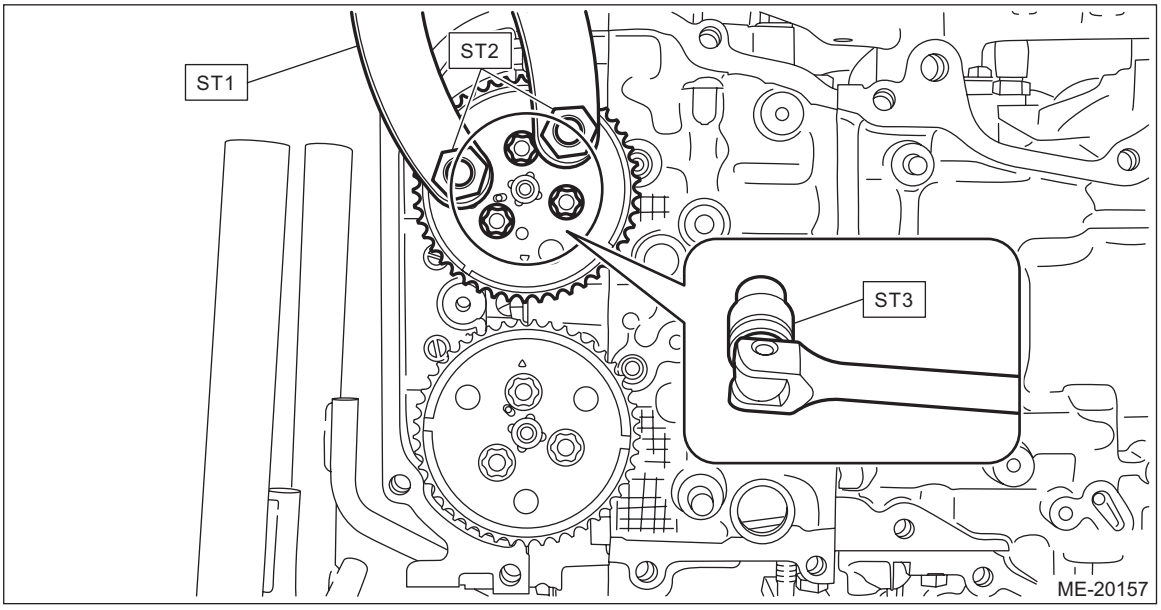
1. CAM SPROCKET RH

NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.

- **Intake cam sprocket RH**

1) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
2) Remove the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-171, TIMING CHAIN RH, REMOVAL, Timing Chain Assembly.>
3) Hold the intake cam sprocket RH using the ST1 and ST2, and remove the bolts using the ST3.

CAUTION:
Perform the operation carefully since the ST comes off easily.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET
ST3 18270KA010 SOCKET

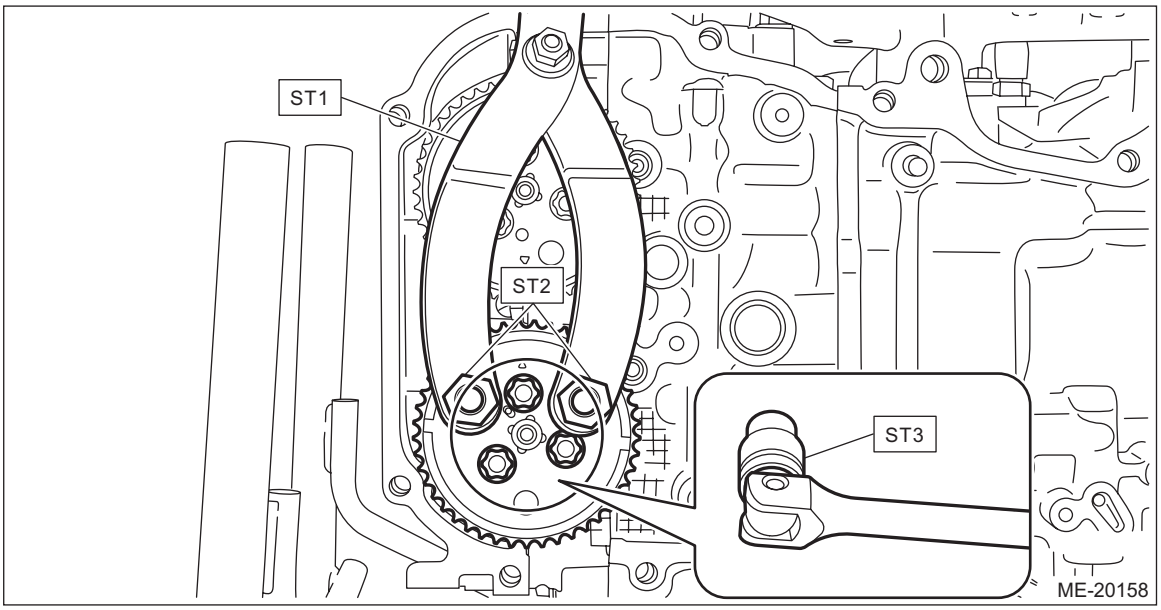


4) Remove the intake cam sprocket RH.

- **Exhaust cam sprocket RH**

1) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
2) Remove the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-171, TIMING CHAIN RH, REMOVAL, Timing Chain Assembly.>
3) Hold the exhaust cam sprocket RH using the ST1 and ST2, and remove the bolts using the ST3.

CAUTION:
Perform the operation carefully since the ST comes off easily.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET
ST3 18270KA010 SOCKET



4) Remove the exhaust cam sprocket RH.

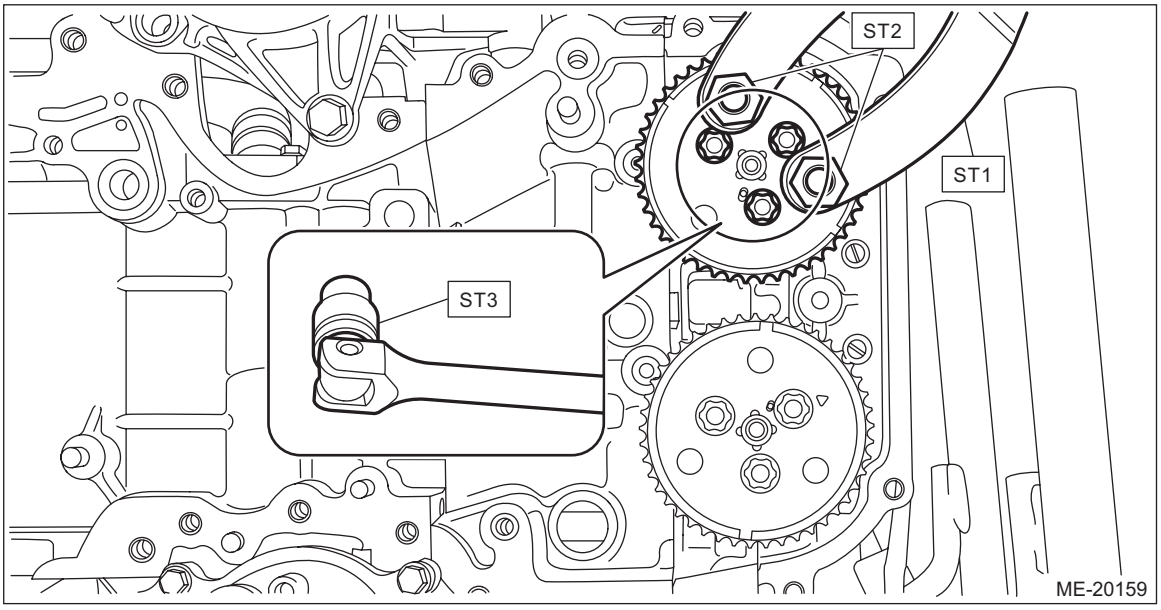
2. CAM SPROCKET LH

NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.

- **Intake cam sprocket LH**

1) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
2) Remove the timing chain LH. <Ref. to ME(H4DO(w/o HEV))-173, TIMING CHAIN LH, REMOVAL, Timing Chain Assembly.>
3) Hold the intake cam sprocket LH using the ST1 and ST2, and remove the bolts using the ST3.

CAUTION:
Perform the operation carefully since the ST comes off easily.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET
ST3 18270KA010 SOCKET

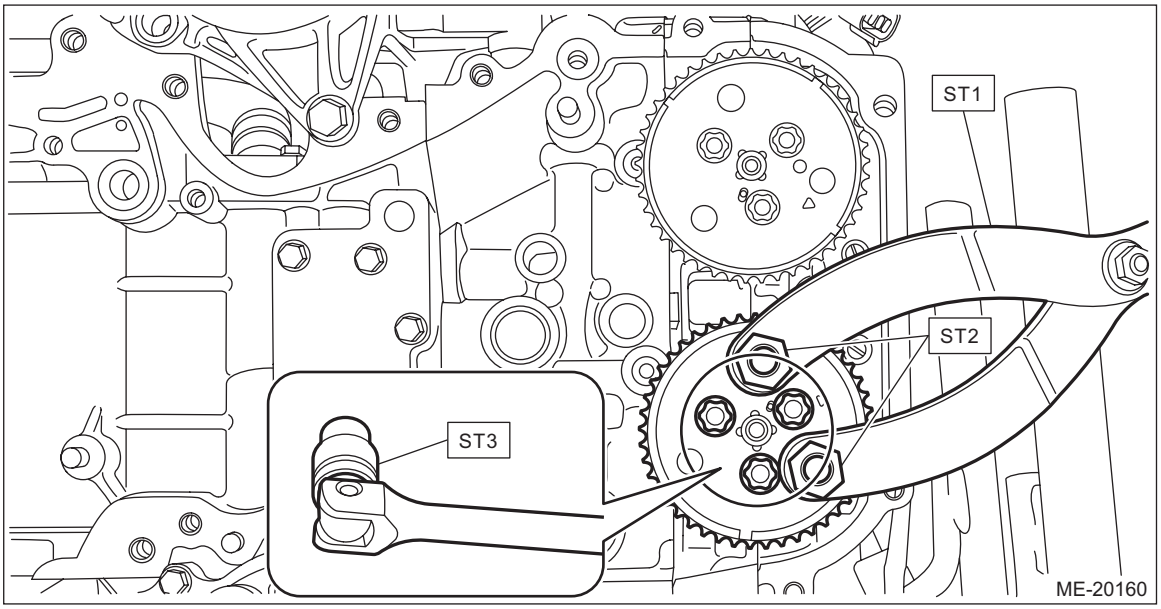


4) Remove the intake cam sprocket LH.

- **Exhaust cam sprocket LH**

1) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
2) Remove the timing chain LH. <Ref. to ME(H4DO(w/o HEV))-173, TIMING CHAIN LH, REMOVAL, Timing Chain Assembly.>
3) Hold the exhaust cam sprocket LH using the ST1 and ST2, and remove the bolts using the ST3.

CAUTION:
Perform the operation carefully since the ST comes off easily.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET
ST3 18270KA010 SOCKET



4) Remove the exhaust cam sprocket LH.

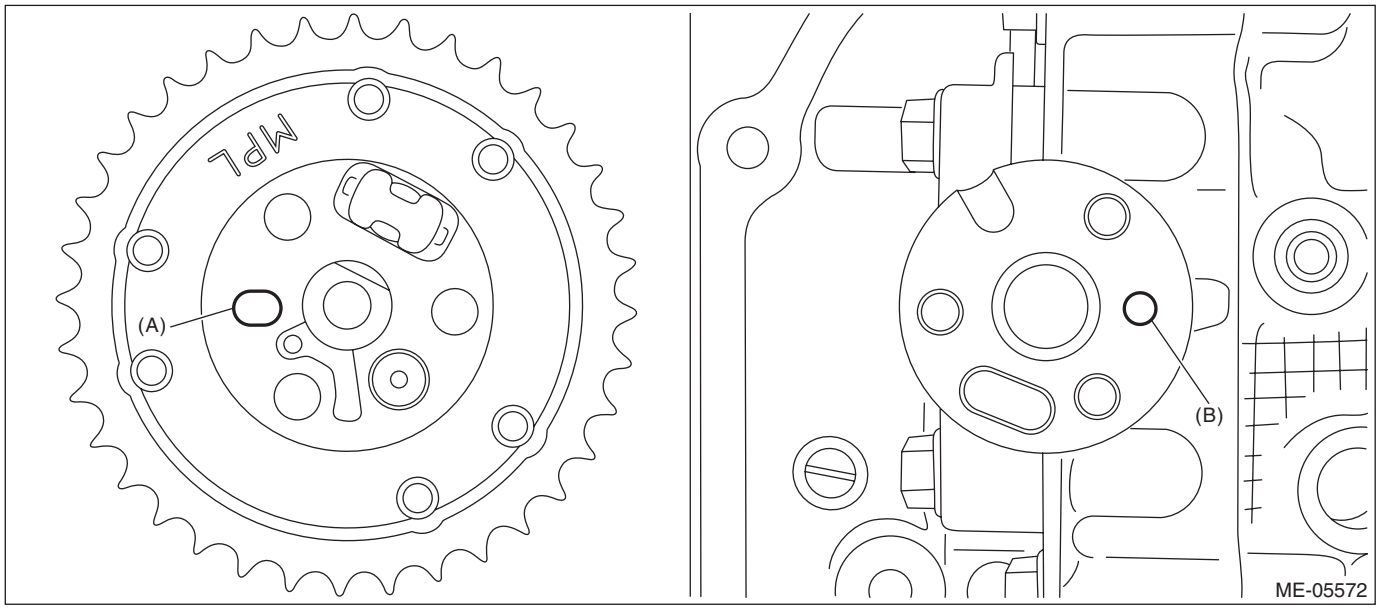
B: INSTALLATION

1. CAM SPROCKET RH

- **Intake cam sprocket RH**

1) Install the intake cam sprocket RH by aligning the knock hole (A) of intake cam sprocket RH and the knock pin (B) of intake camshaft RH.

NOTE:
Before installation, check that there is no foreign matter on the intake cam sprocket RH and intake camshaft RH.

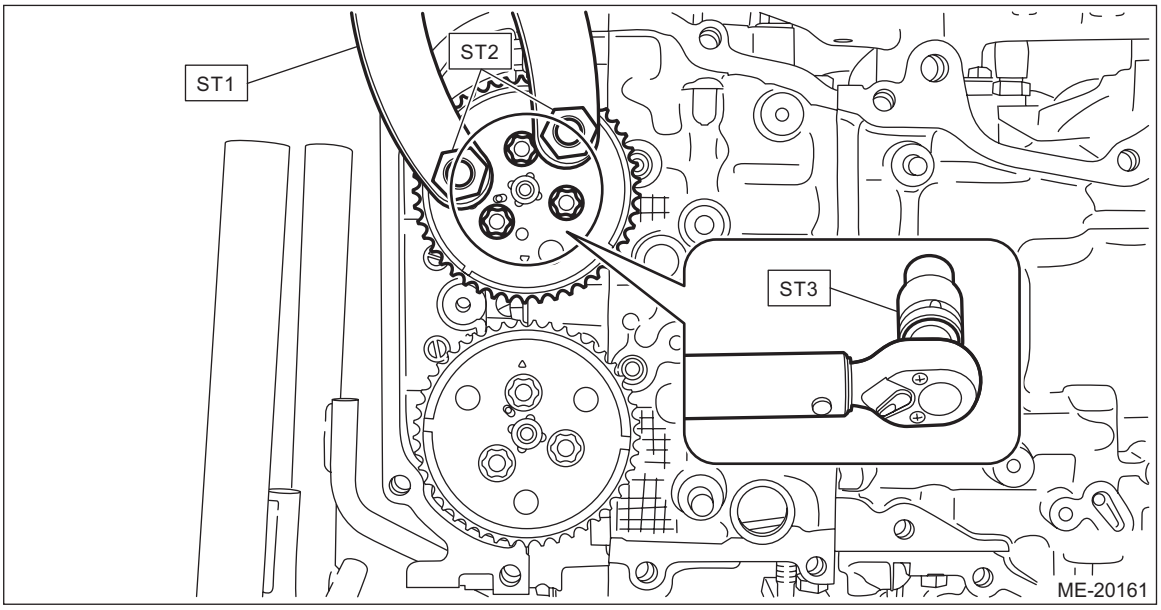


2) Hold the intake cam sprocket RH using the ST1 and ST2, and install the bolts using the ST3.

CAUTION:
Perform the operation carefully since the ST comes off easily.

ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET
ST3 18270KA010 SOCKET

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

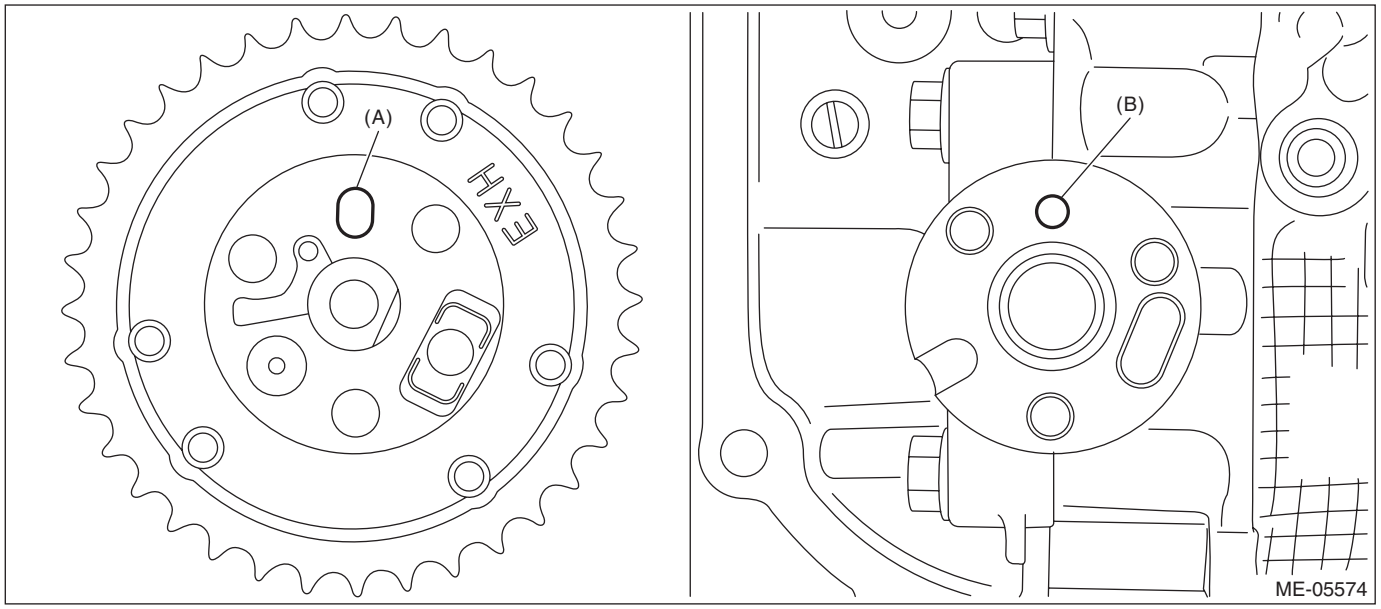


3) Install the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-186, TIMING CHAIN RH, INSTALLATION, Timing Chain Assembly.>
4) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

- **Exhaust cam sprocket RH**

1) Install the exhaust cam sprocket RH by aligning the knock hole (A) of exhaust cam sprocket RH and the knock pin (B) of exhaust camshaft RH.

NOTE:
Before installation, check that there is no foreign matter on the exhaust cam sprocket RH and exhaust camshaft RH.

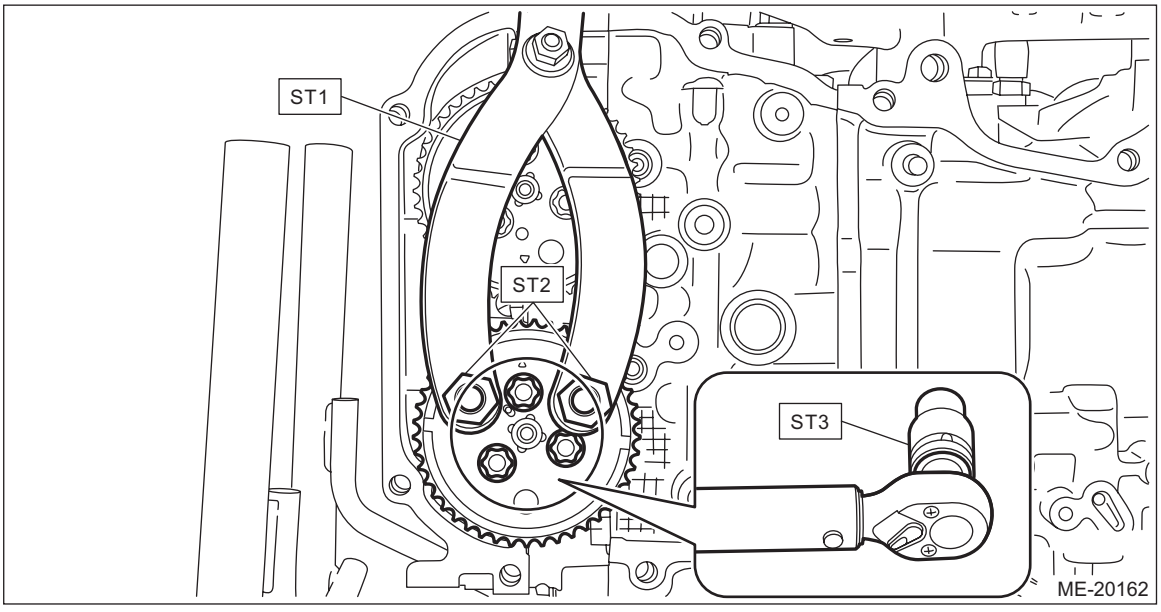


2) Hold the exhaust cam sprocket RH using ST1 and ST2, and install the bolts using ST3.

CAUTION:
Perform the operation carefully since the ST comes off easily.

ST1	18355AA000	PULLEY WRENCH
ST2	18334AA020	PULLEY WRENCH PIN SET
ST3	18270KA010	SOCKET

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



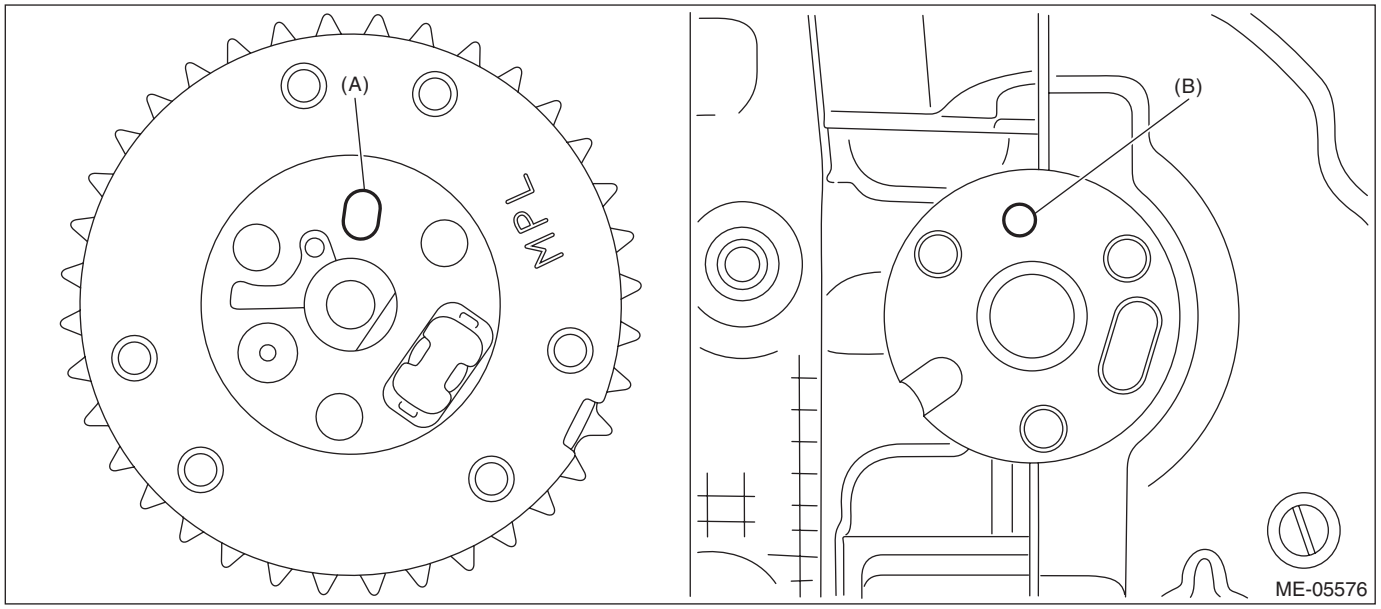
3) Install the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-186, TIMING CHAIN RH, INSTALLATION, Timing Chain Assembly.>
4) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

2. CAM SPROCKET LH

• Intake cam sprocket LH

1) Install the intake cam sprocket LH by aligning the knock hole (A) of intake cam sprocket LH and the knock pin (B) of intake camshaft LH.

NOTE:
Before installation, check that there is no foreign matter on the intake cam sprocket LH and intake camshaft LH.

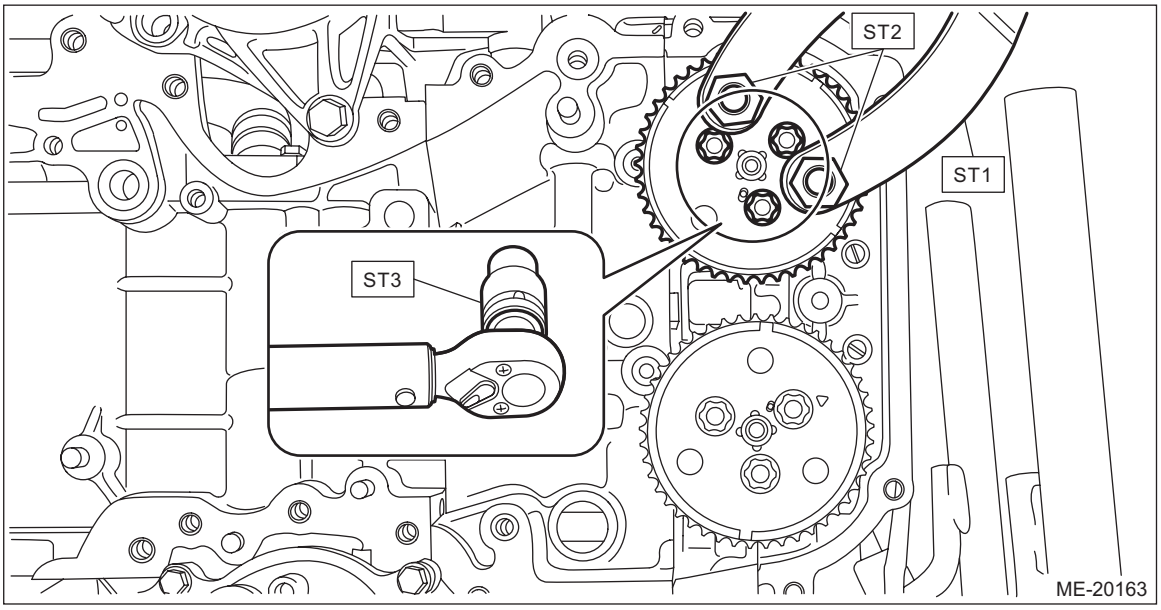


2) Hold the intake cam sprocket LH using the ST1 and ST2, and install the bolts using the ST3.

CAUTION:
Perform the operation carefully since the ST comes off easily.

ST1	18355AA000	PULLEY WRENCH
ST2	18334AA020	PULLEY WRENCH PIN SET
ST3	18270KA010	SOCKET

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

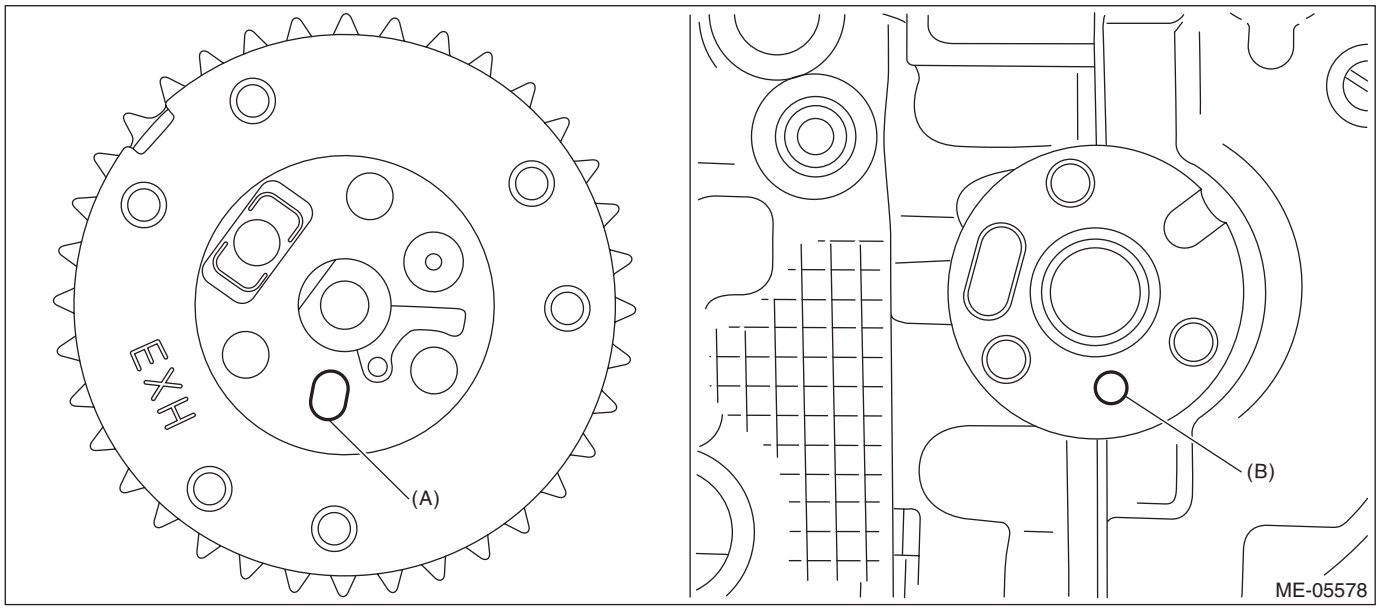


3) Install timing chain LH. <Ref. to ME(H4DO(w/o HEV))-178, TIMING CHAIN LH, INSTALLATION, Timing Chain Assembly.>
4) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

- **Exhaust cam sprocket LH**

1) Install the exhaust cam sprocket LH by aligning the knock hole (A) of exhaust cam sprocket LH and the knock pin (B) of exhaust camshaft LH.

NOTE:
Before installation, check that there is no foreign matter on the exhaust cam sprocket LH and exhaust camshaft LH.

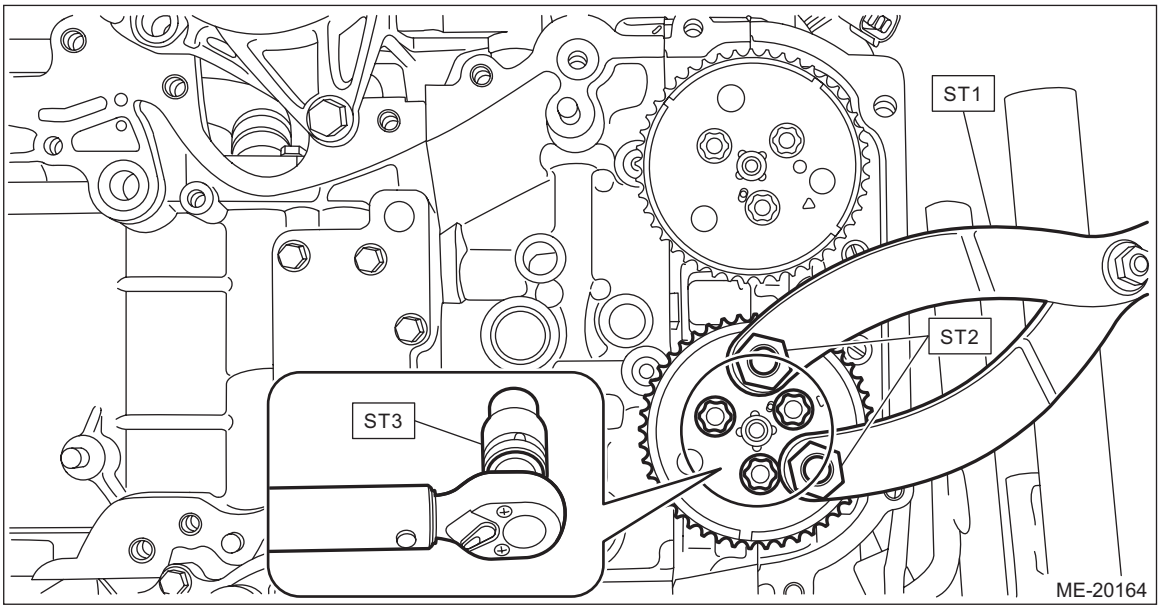


2) Hold the exhaust cam sprocket LH using the ST1 and ST2, and install the bolts using the ST3.

CAUTION:
Perform the operation carefully since the ST comes off easily.

ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET
ST3 18270KA010 SOCKET

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



3) Install timing chain LH. <Ref. to ME(H4DO(w/o HEV))-178, TIMING CHAIN LH, INSTALLATION, Timing Chain Assembly.>
4) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

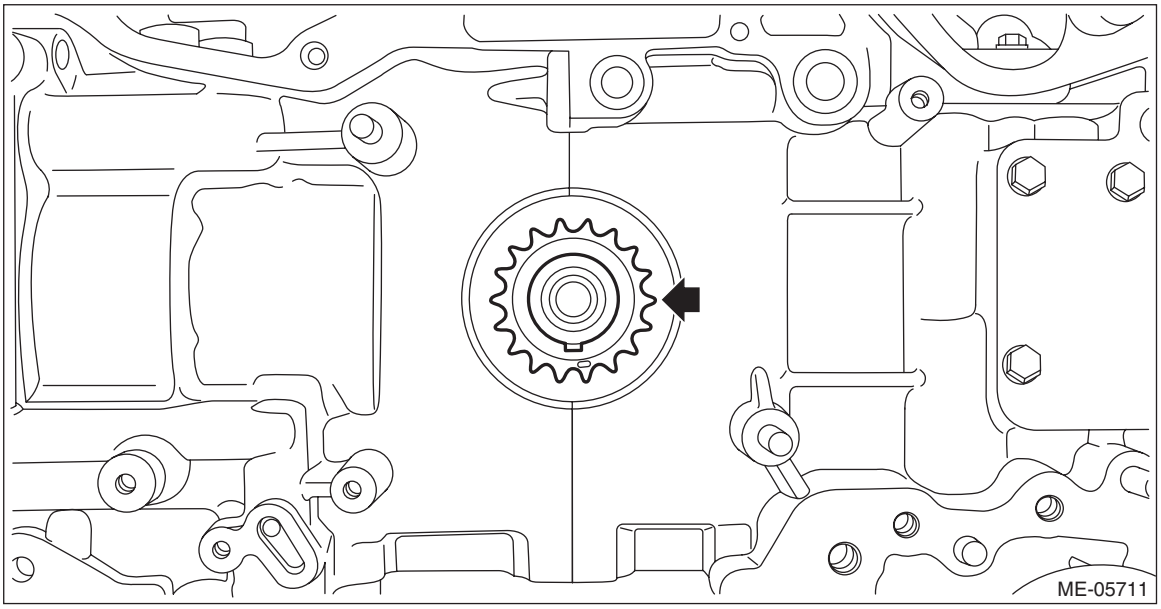
C: INSPECTION

Check the cam sprocket teeth for abnormal wear and scratches.

17.Crank Sprocket

A: REMOVAL

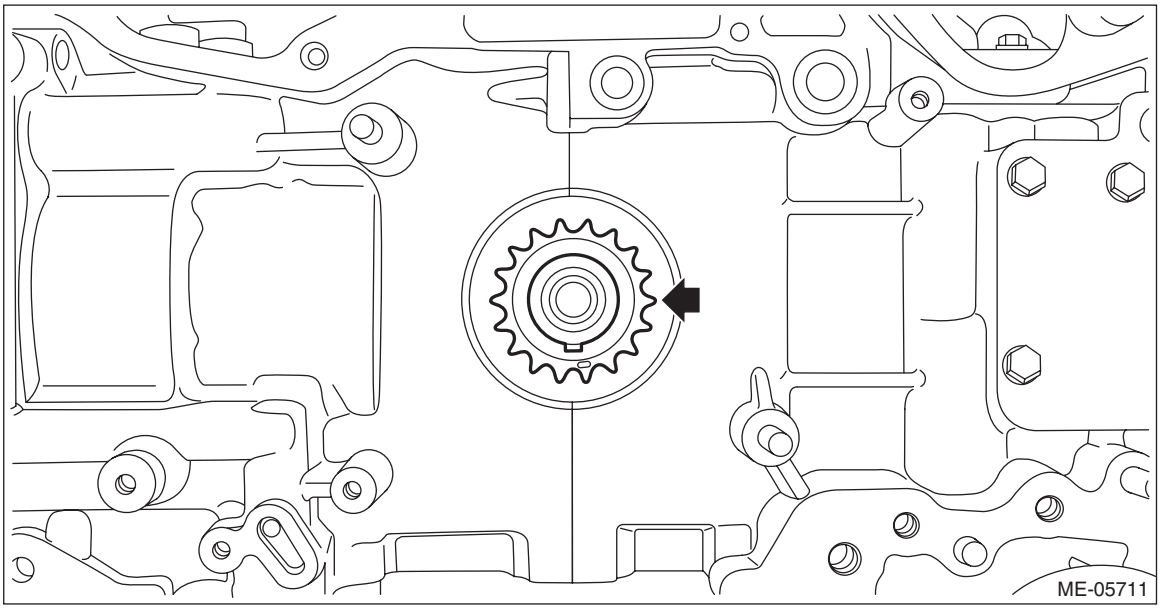
NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.
1) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
2) Remove the timing chain. <Ref. to ME(H4DO(w/o HEV))-171, REMOVAL, Timing Chain Assembly.>
3) Remove the crank sprocket.



B: INSTALLATION

1) Install the crank sprocket.

NOTE:
The direction of installation is not specified for the crank sprocket.



2) Install the timing chain. <Ref. to ME(H4DO(w/o HEV))-178, INSTALLATION, Timing Chain Assembly.>
3) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

C: INSPECTION

1) Check the crank sprocket teeth for abnormal wear and scratches.
2) Make sure there is no free play between crank sprocket and key.

18.Rocker Cover

A: REMOVAL

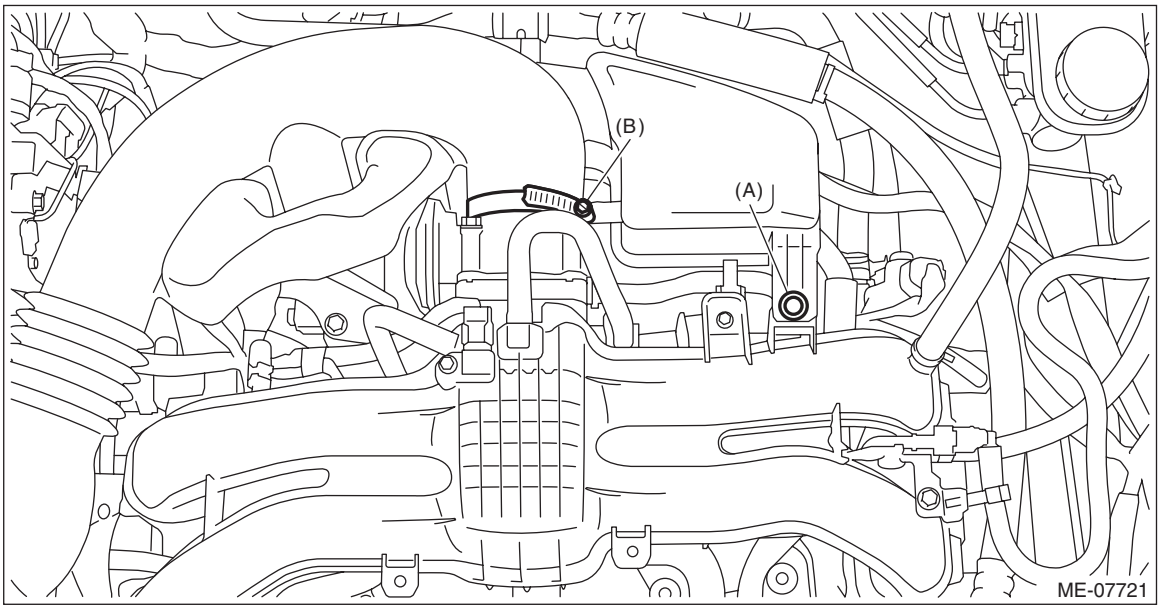
1. ROCKER COVER RH

NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.
1) When working on the vehicle

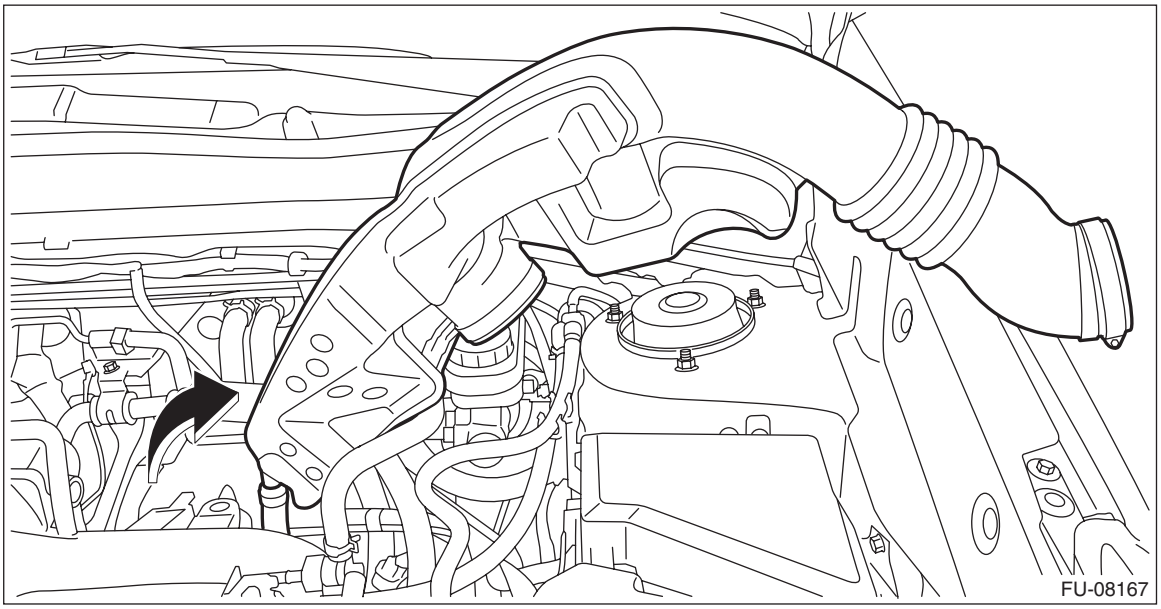
NOTE:
When working on the vehicle, perform the following steps also.

(1) Remove the air cleaner case. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-7, REMOVAL, Air Cleaner Case.>

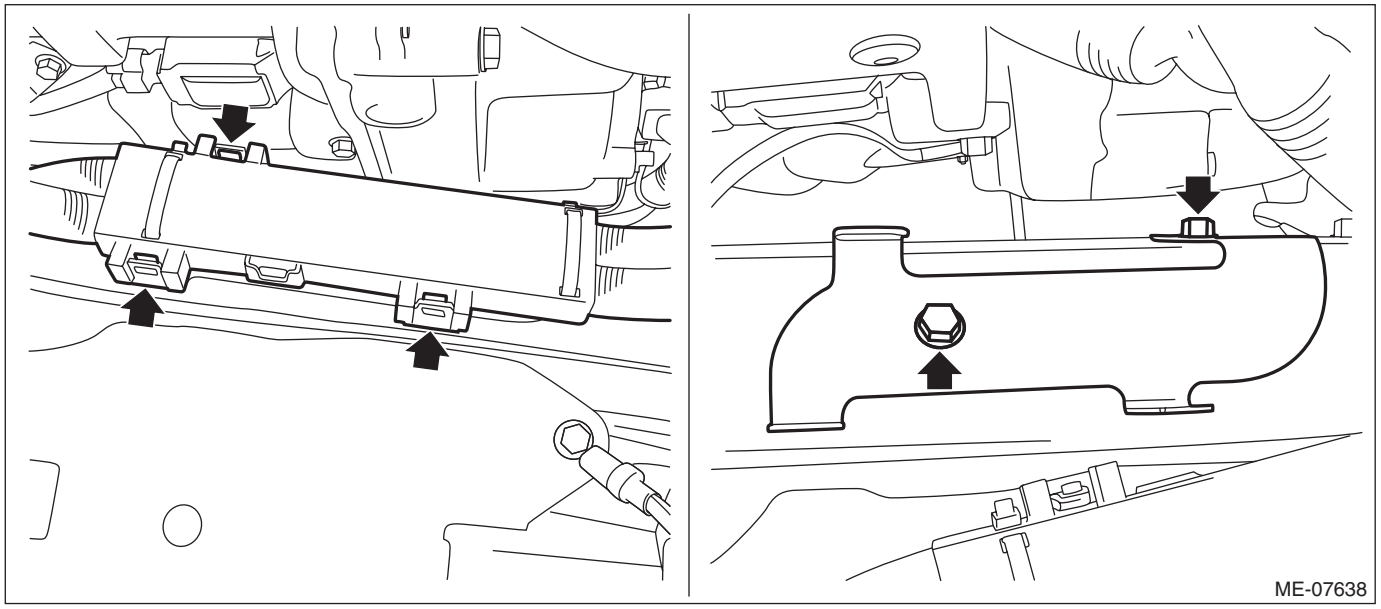
(2) Remove the clip (A) from the air intake boot, and loosen the clamp (B) securing the air intake boot to the throttle body. (Gasoline engine model)



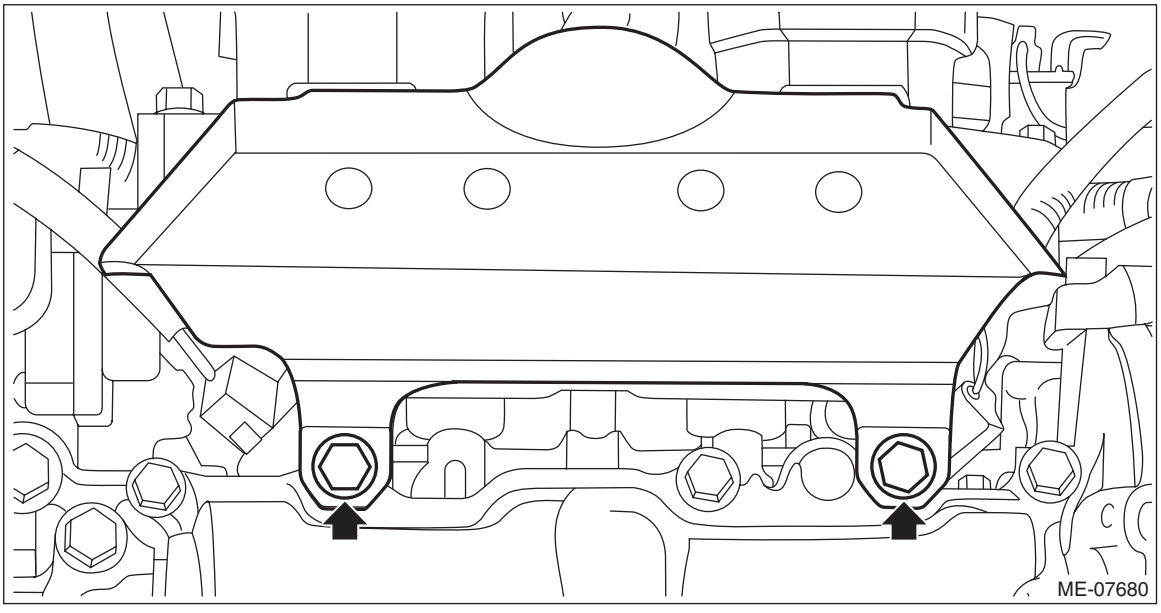
(3) Remove the air intake boot from the throttle body, and move it to the left side wheel apron. (Gasoline engine model)



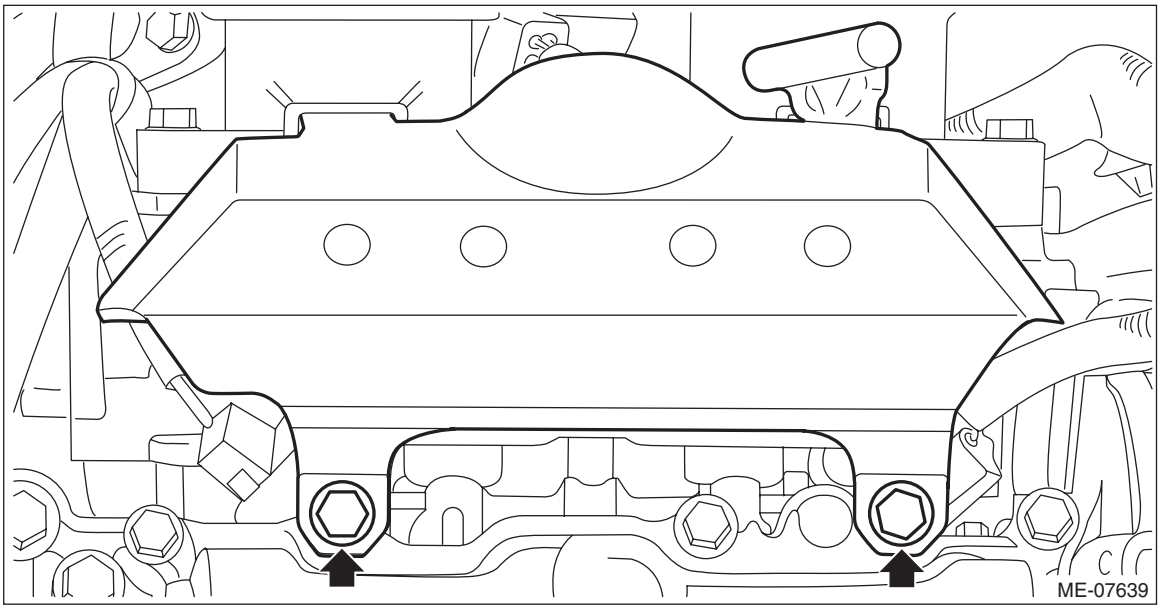
(4) Remove the intake duct. (HEV model) <Ref. to IN(H4DO(HEV))-16, REMOVAL, Intake Duct.>
(5) Remove the 12 volt engine restart battery. (HEV model) <Ref. to SC(H4DO(HEV))-40, 12 VOLT ENGINE RESTART BATTERY, REMOVAL, Battery.>
(6) Remove the battery cable assembly from the battery cable bracket No. 2, and remove the battery cable bracket No. 2 from the vehicle. (HEV model)



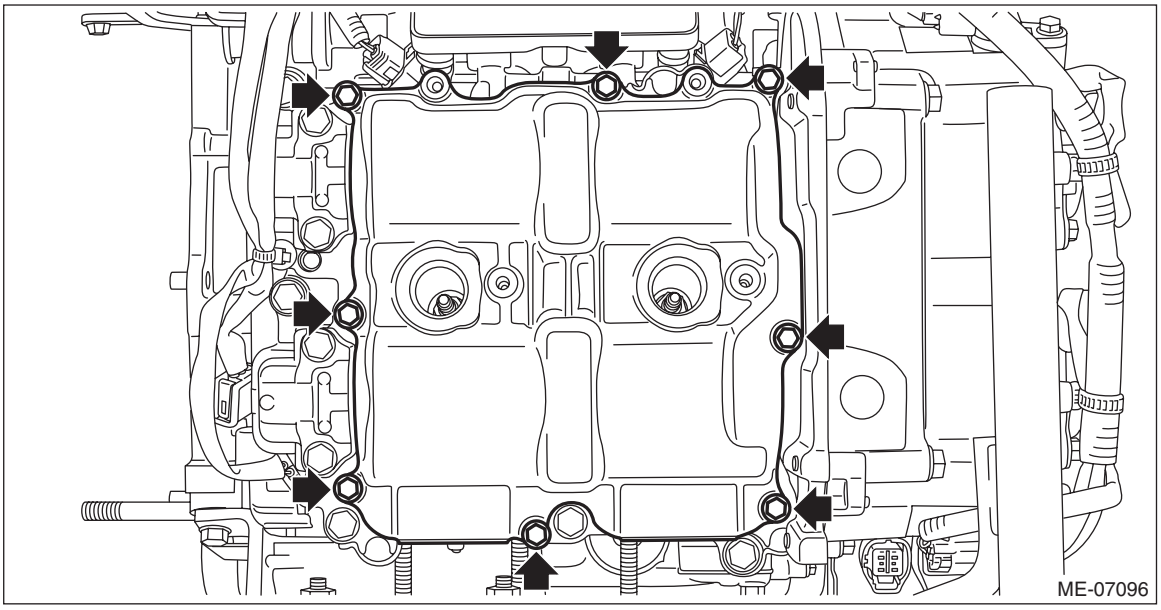
(7) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
2) Remove the #1 ignition coil and the #3 ignition coil. <Ref. to IG(H4DO(w/o HEV))-12, REMOVAL, Ignition Coil.>
3) Remove the intake manifold protector RH.
• Gasoline engine model



- HEV model

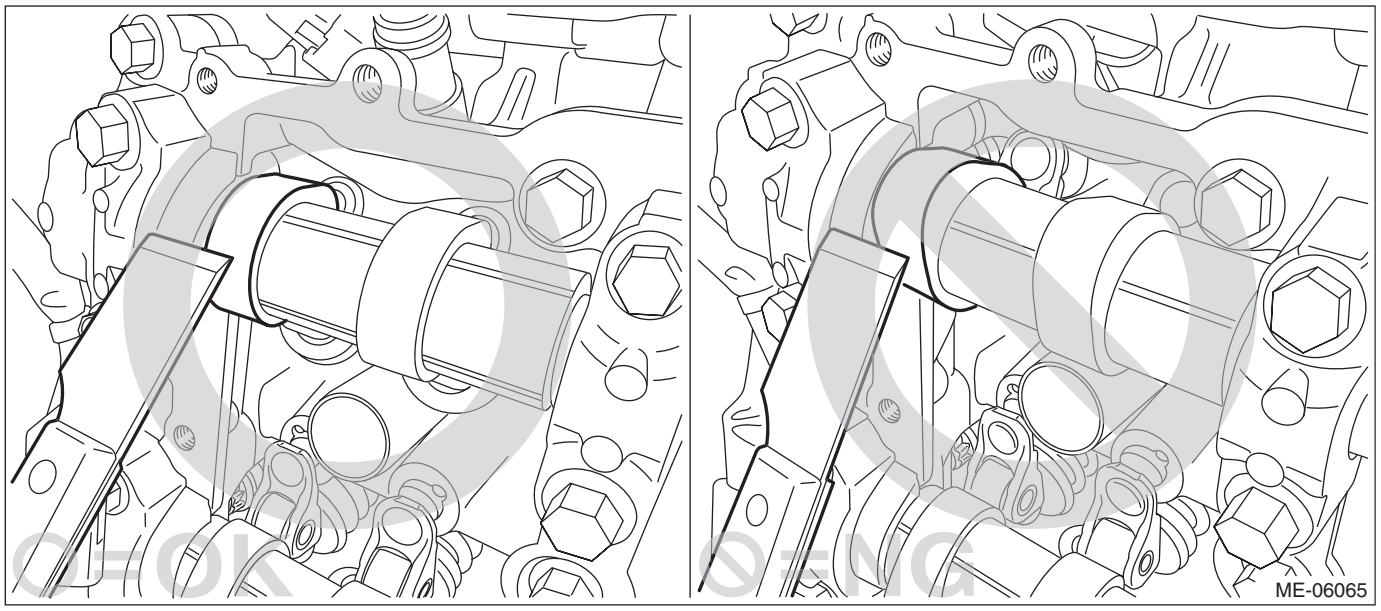


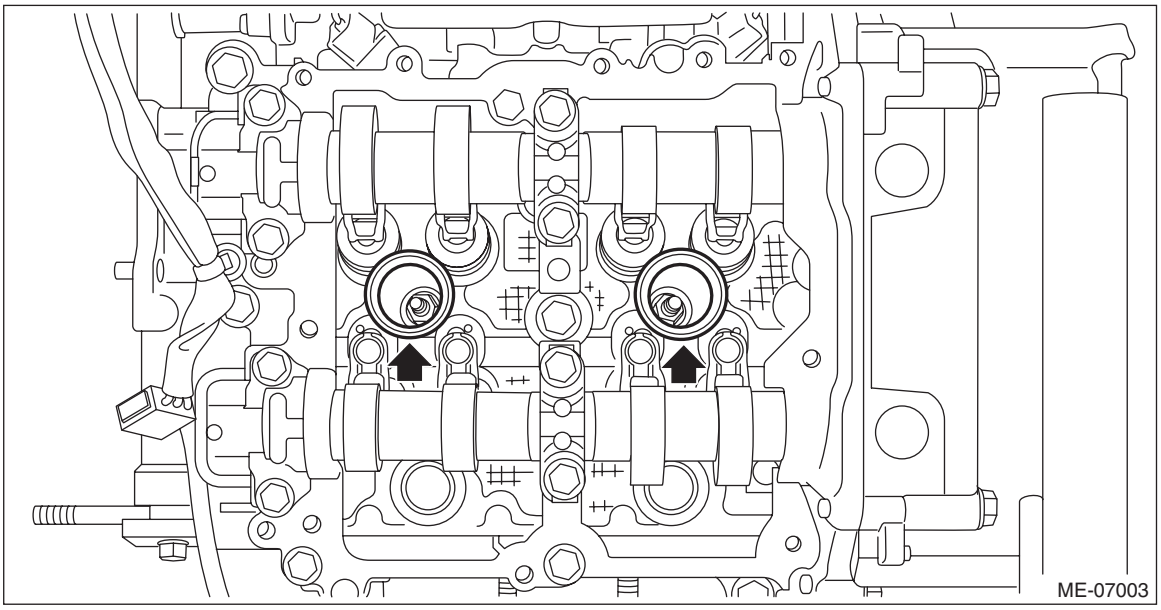
4) Remove the rocker cover RH.



5) Remove the rocker cover gasket RH, #1 spark plug pipe gasket and #3 spark plug pipe gasket, and remove the liquid gasket.

CAUTION:
• When removing the liquid gasket from engine unit using scraper, use special care not to damage the cam lobe of camshaft RH.
• If the cam lobe of camshaft RH interferes, turn the crankshaft to the position where the scraper does not touch.



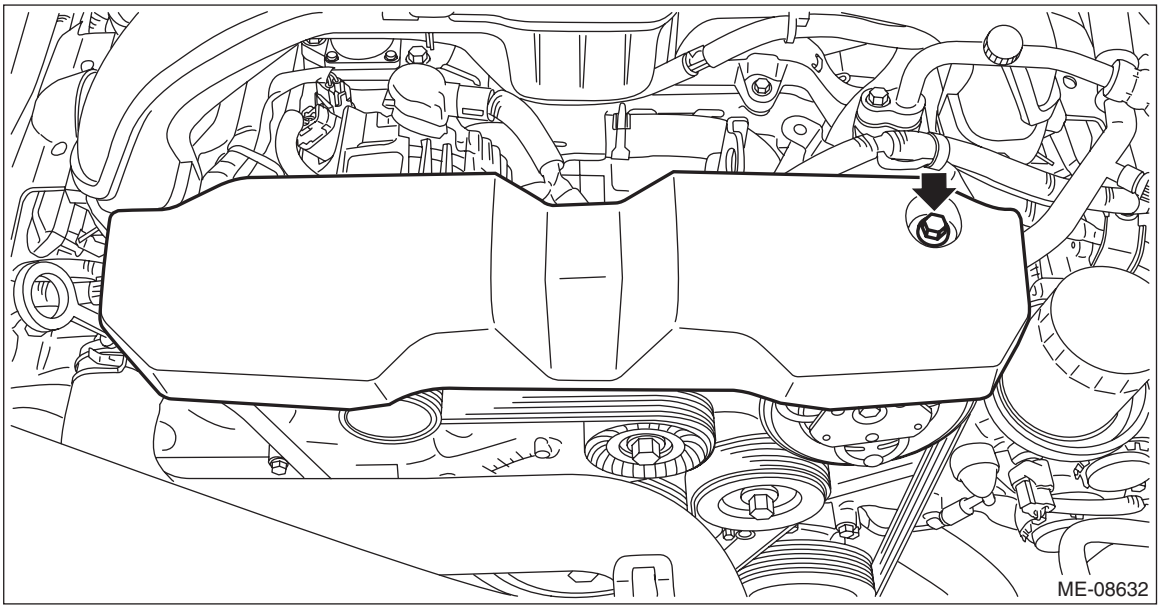


2. ROCKER COVER LH

NOTE:
When replacing a single part, perform the work with the engine assembly installed to body.
1) When working on the vehicle

NOTE:
When working on the vehicle, perform the following steps also.

(1) Remove the V-belt covers. (Gasoline engine model)



(2) Remove the V-belts. (Gasoline engine model) <Ref. to ME(H4DO(w/o HEV))-124, GASOLINE ENGINE MODEL, REMOVAL, V-belt.>

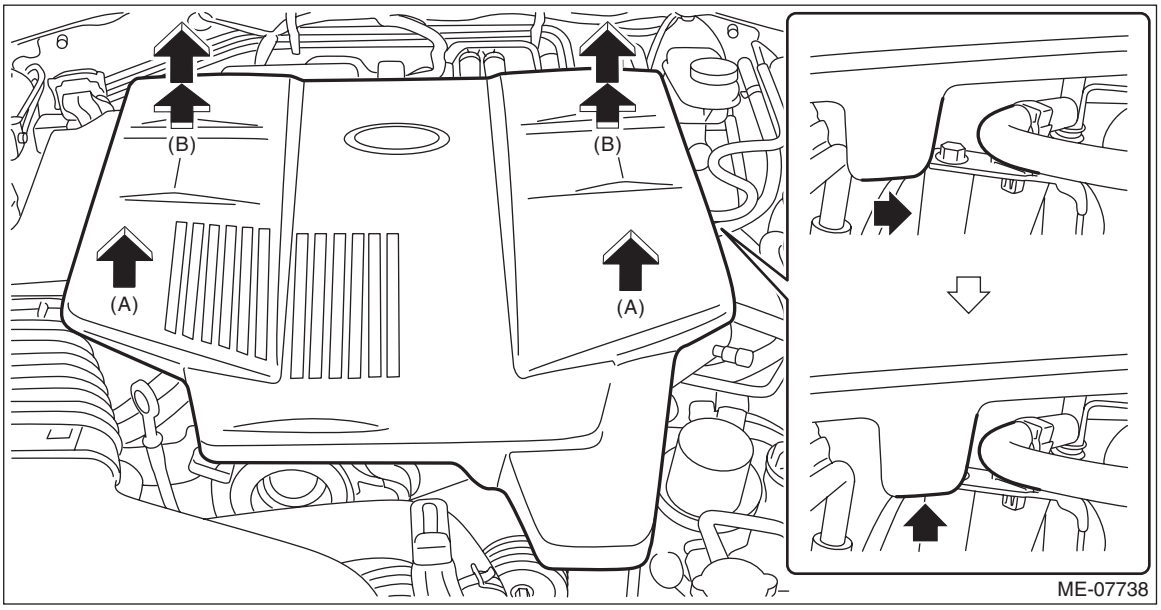
(3) Remove the battery. (Gasoline engine model) <Ref. to SC(H4DO(w/o HEV))-52, REMOVAL, Battery.>

(4) Turn the ignition switch to OFF. (HEV model)

(5) Remove the collector cover. (HEV model)

1. Carefully pull up the front of collector cover at two positions (A).
2. Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

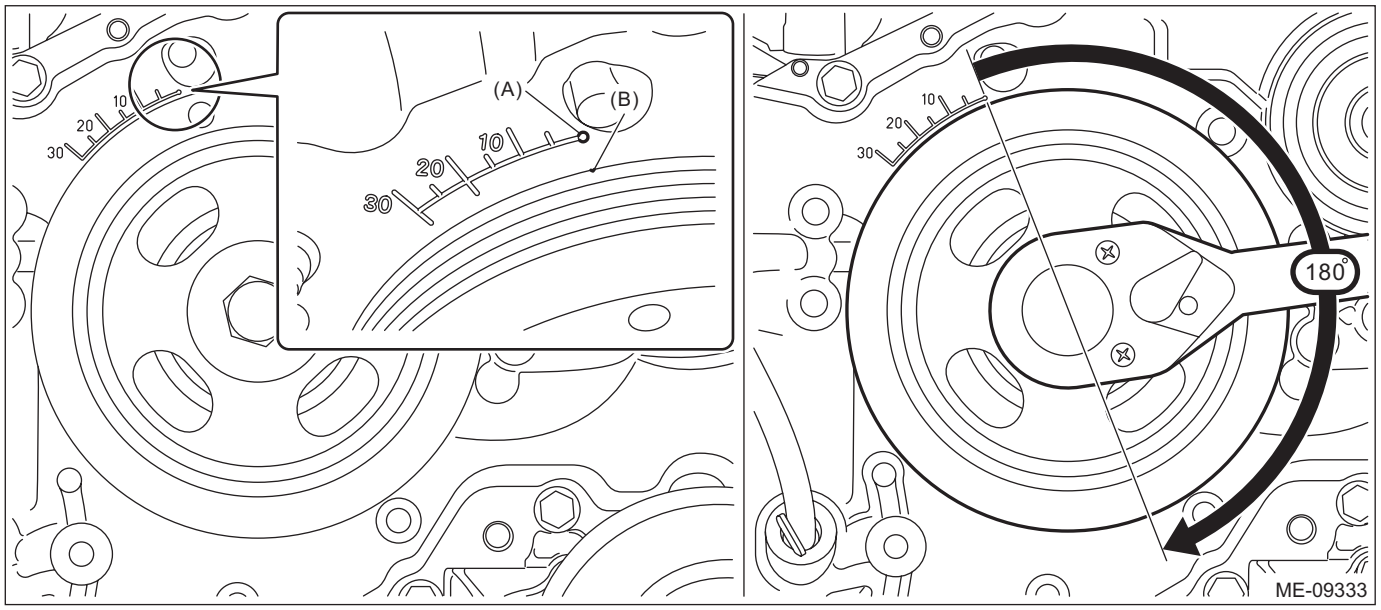
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



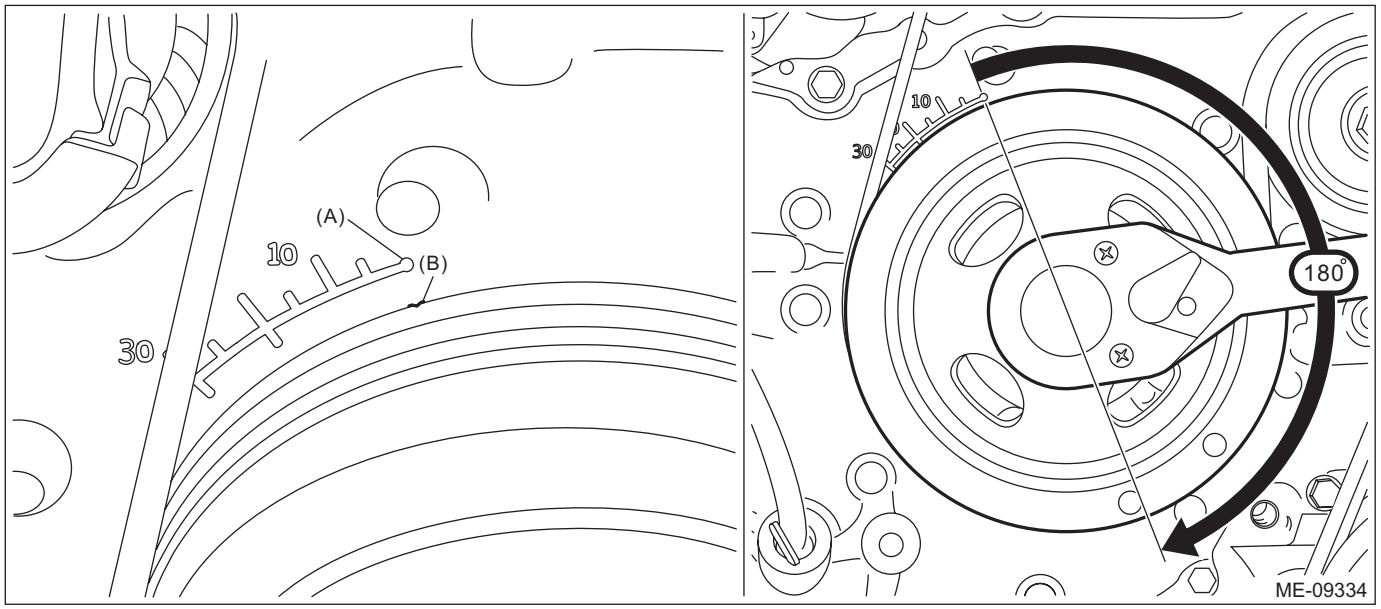
(6) Remove the 12 volt auxiliary battery. (HEV model) <Ref. to SC(H4DO(HEV))-40, 12 VOLT AUXILIARY BATTERY, REMOVAL, Battery.>
(7) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.> <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
(8) Align the timing mark (B) on crank pulley to the 0° in timing gauge (A) on chain cover as shown in the figure, and turn the crankshaft by 180° clockwise from that position.

NOTE:
This procedure is required to prevent the rocker cover LH and the cam lobe of camshaft LH contacting with each other when removing the rocker cover LH.

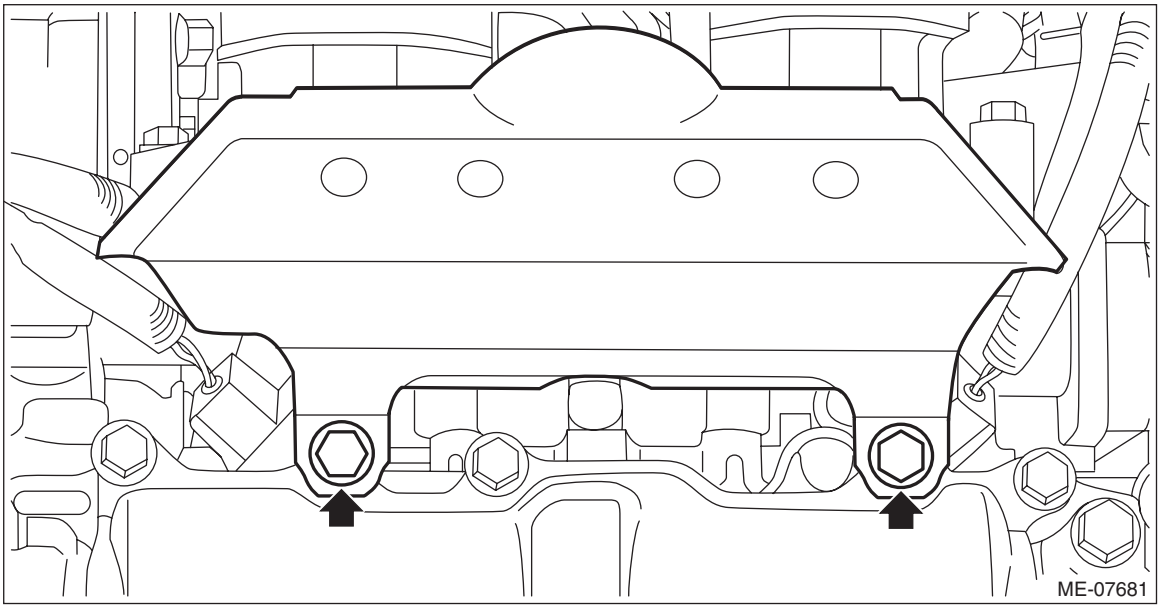
- Gasoline engine model



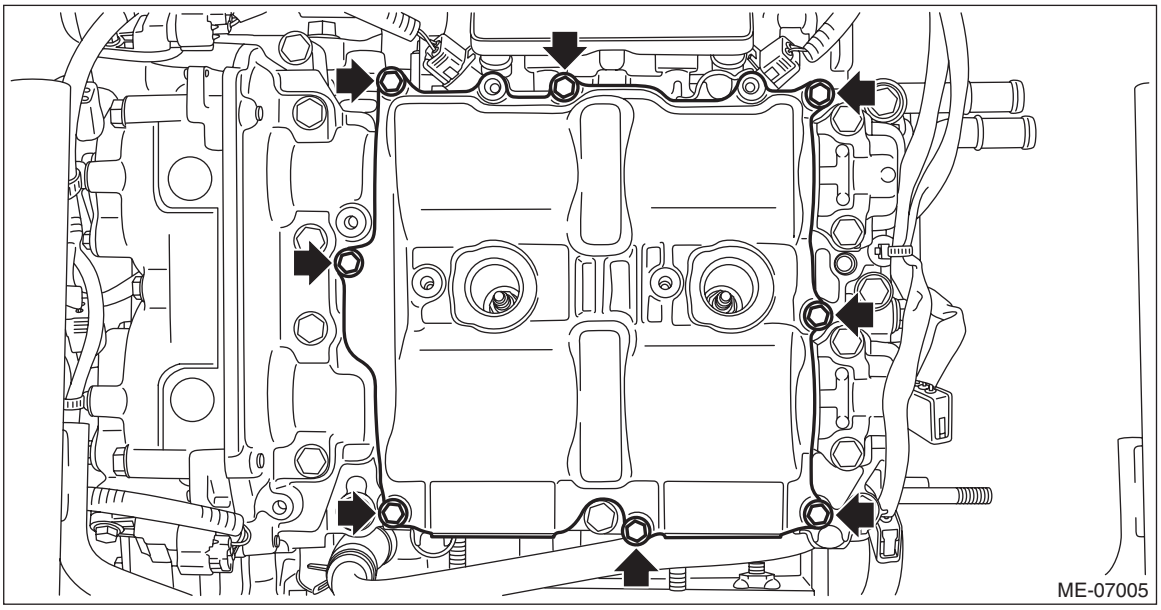
- HEV model



2) Remove the #2 ignition coil and the #4 ignition coil. <Ref. to IG(H4DO(w/o HEV))-12, REMOVAL, Ignition Coil.>
3) Remove the intake manifold protector LH.

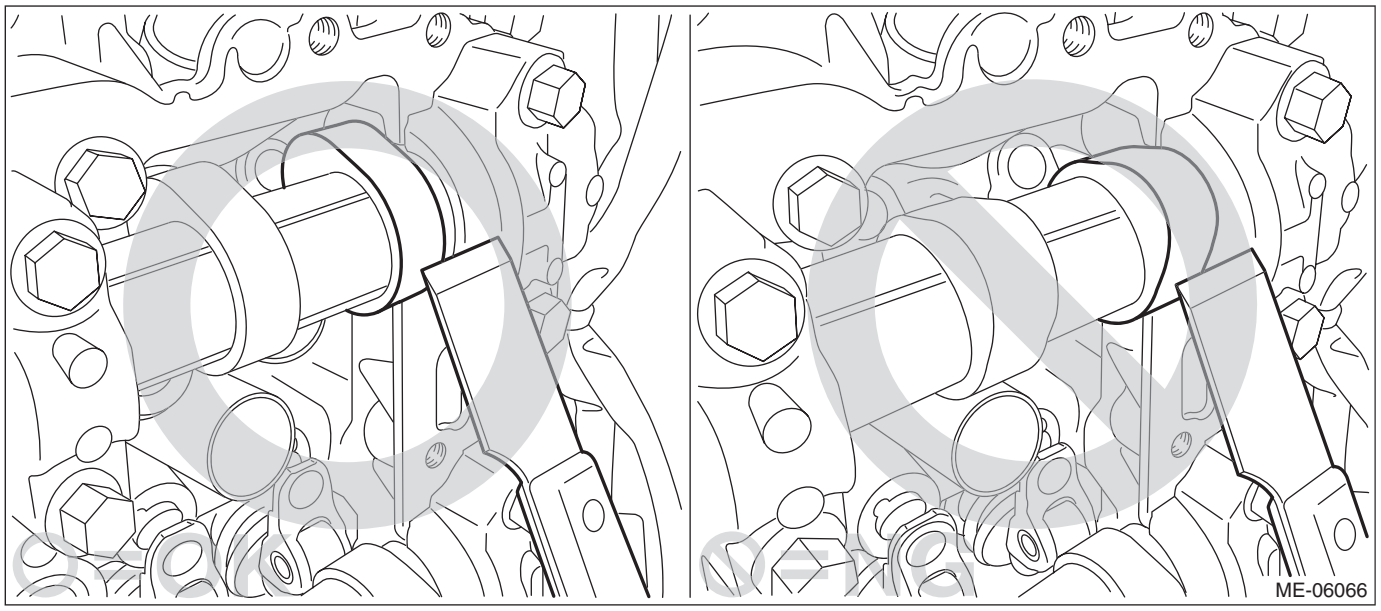


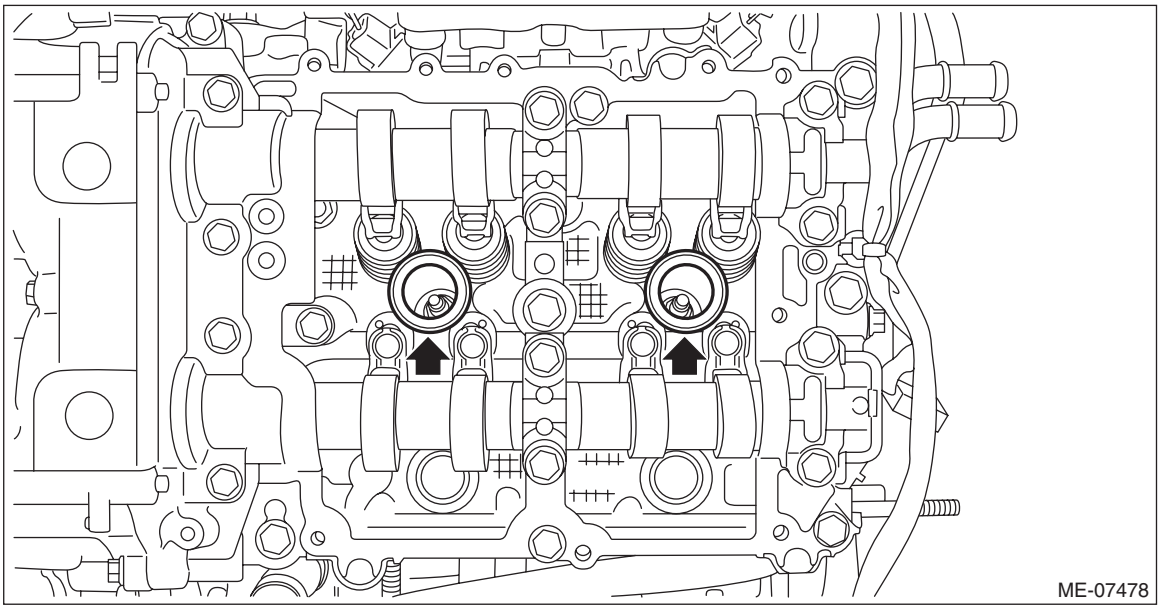
4) Remove the rocker cover LH.



5) Remove the rocker cover gasket LH, #2 spark plug pipe gasket and #4 spark plug pipe gasket, and remove the liquid gasket.

CAUTION:
• When removing the liquid gasket from engine unit using scraper, use special care not to damage the cam lobe of camshaft LH.
• If the cam lobe of camshaft LH interferes, turn the crankshaft to the position where the scraper does not touch.



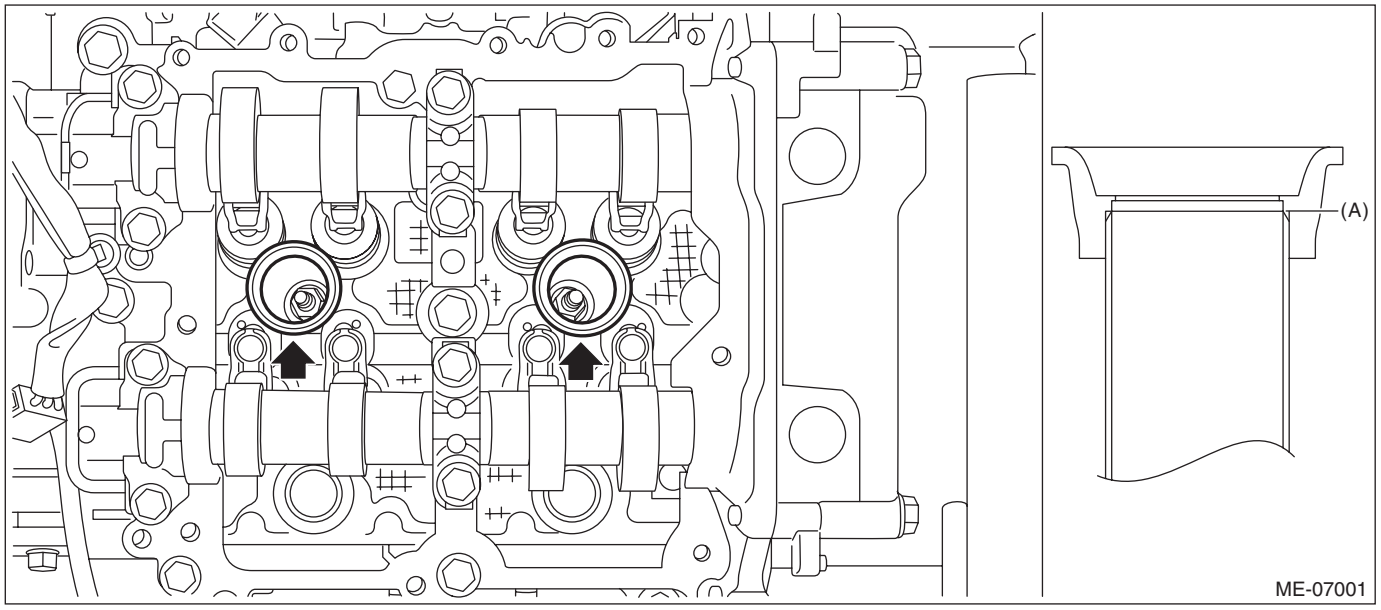


B: INSTALLATION

1. ROCKER COVER RH

1) Install the #1 spark plug pipe gasket and #3 spark plug pipe gasket to the #1 spark plug pipe and #3 spark plug pipe.

NOTE:
- Use a new #1 spark plug pipe gasket and #3 spark plug pipe gasket.
- Apply a light coat of engine oil to the #1 spark plug pipe gasket and #3 spark plug pipe gasket, and insert them onto the spark plug pipe edge (A).



2) Install the rocker cover gasket RH to the rocker cover RH.

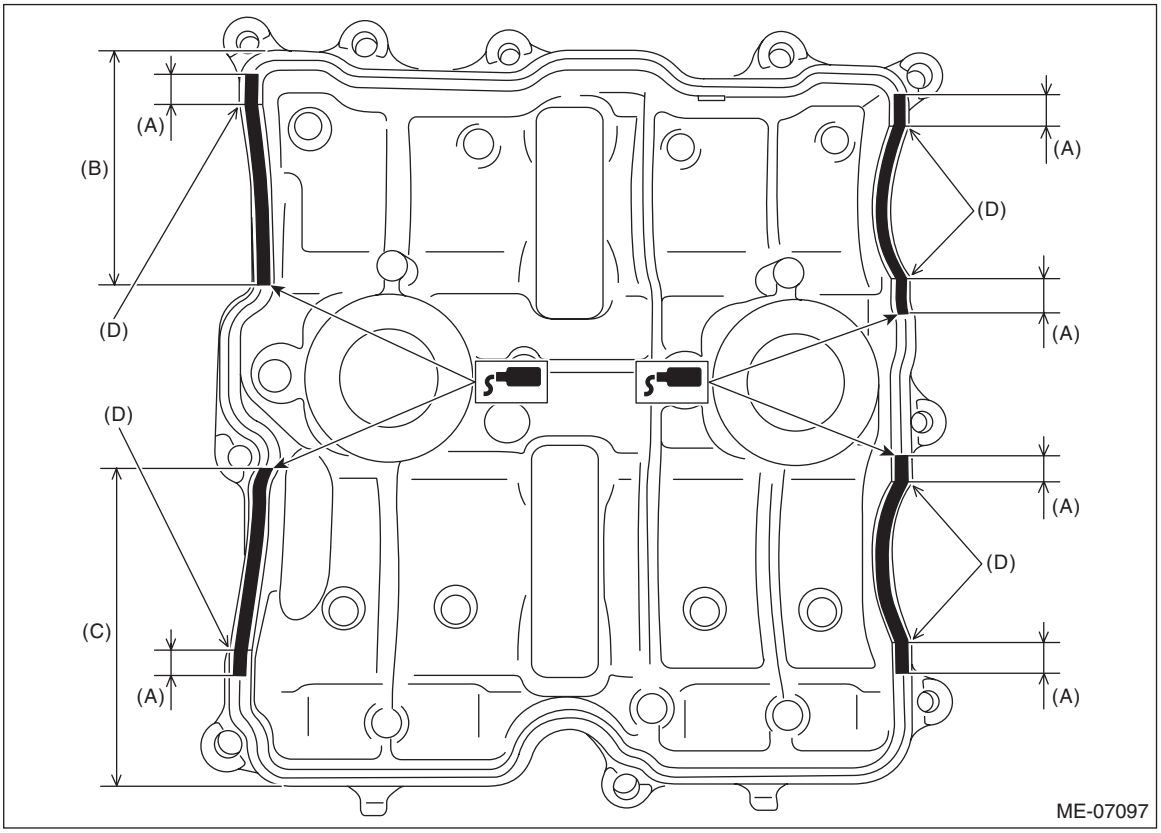
NOTE:
Use a new rocker cover gasket RH.

3) Apply liquid gasket to the mating surface of rocker cover RH as shown in the figure.

NOTE:
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the engine.
- Be careful not to allow liquid gasket to be squeezed out from rocker cover RH.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

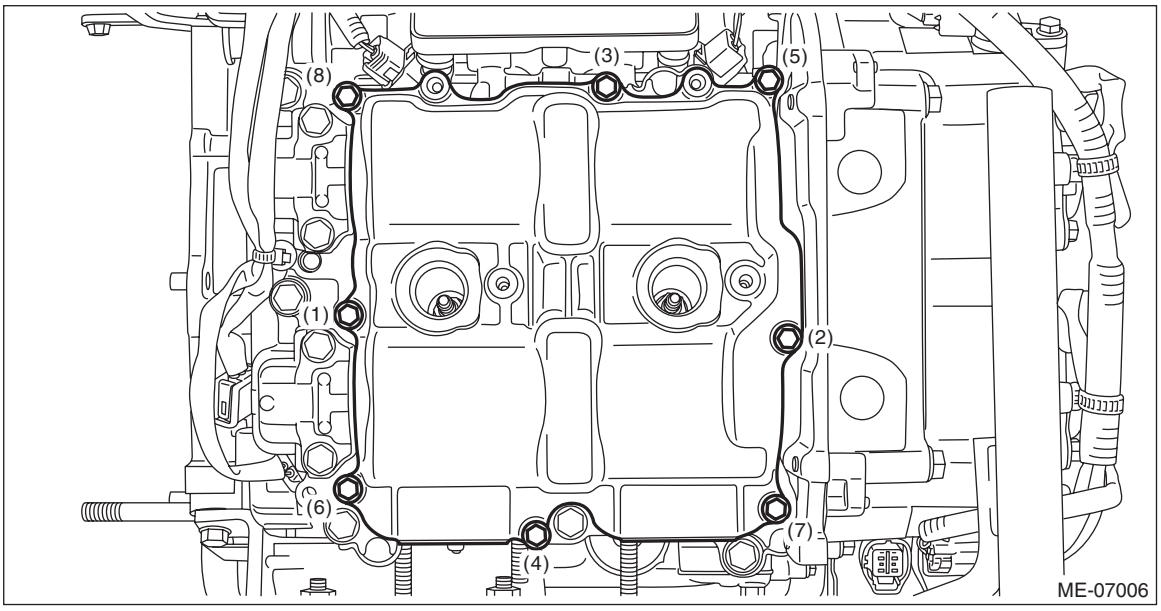
Liquid gasket applying diameter:
3.5±0.5 mm (0.1378±0.0197 in)



(A) 10 mm (0.394 in) or more
(B) 68 mm (2.677 in) or more
(C) 89 mm (3.504 in) or more
(D) Arch starting point

4) Set the rocker cover RH, and tighten the bolts in numerical order as shown in the figure.

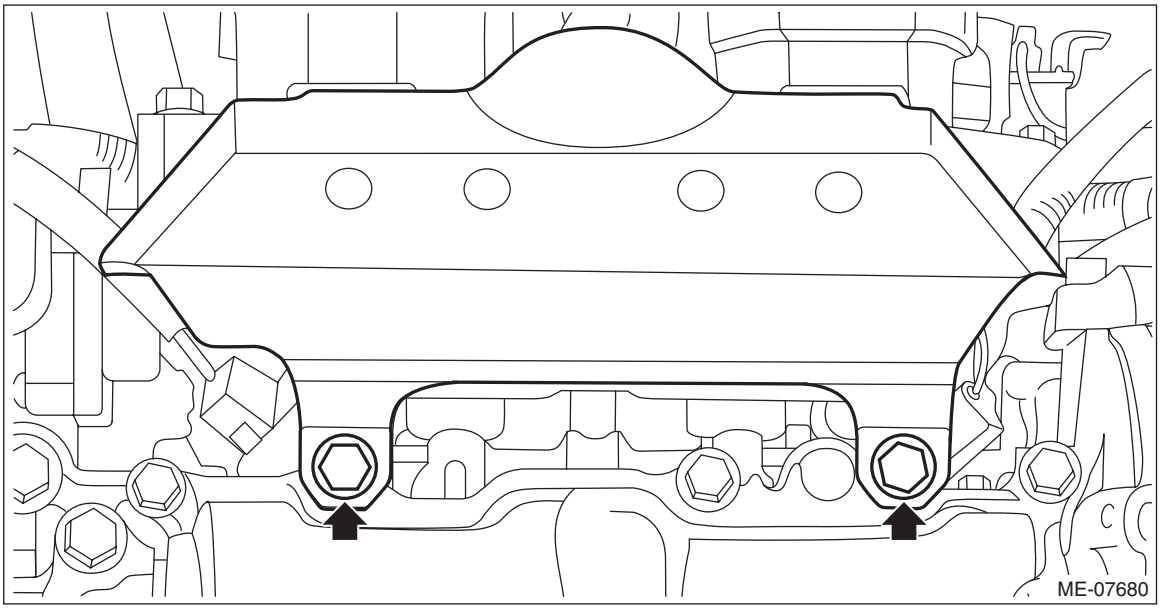
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



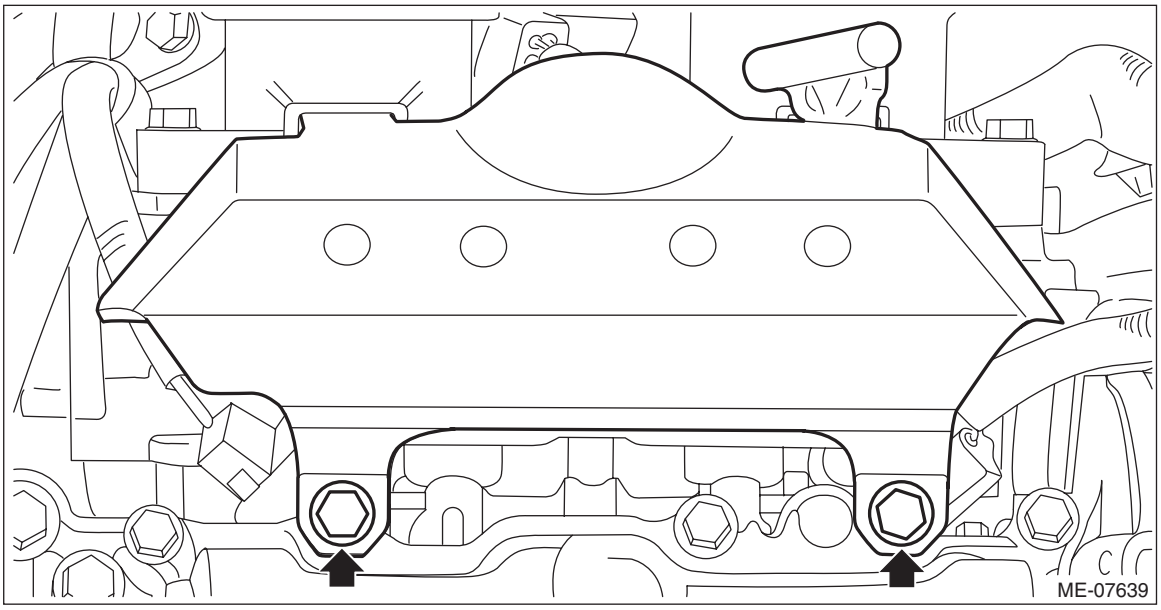
5) Install the intake manifold protector RH.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

- Gasoline engine model



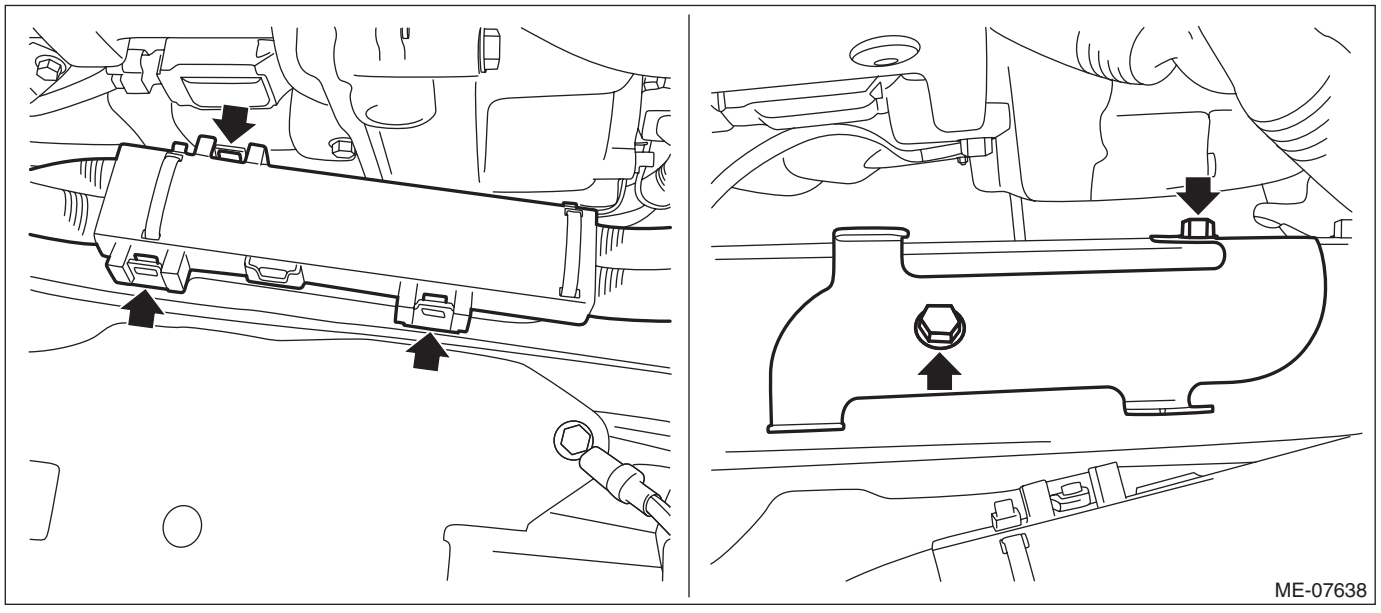
- HEV model



6) Install the #1 ignition coil and the #3 ignition coil. <Ref. to IG(H4DO(w/o HEV))-12, INSTALLATION, Ignition Coil.>
7) When working on the vehicle

NOTE:
When working on the vehicle, perform the following steps also.
(1) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
(2) Install the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
(3) Install the air cleaner case. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-9, INSTALLATION, Air Cleaner Case.>
(4) Install the battery cable bracket No. 2 to the vehicle, and install the battery cable assembly to battery cable bracket No. 2. (HEV model)

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



(5) Install the 12 volt engine restart battery. (HEV model) <Ref. to SC(H4DO(HEV))-43, 12 VOLT ENGINE RESTART BATTERY, INSTALLATION, Battery.>
(6) Install the intake duct. (HEV model) <Ref. to IN(H4DO(HEV))-17, INSTALLATION, Intake Duct.>

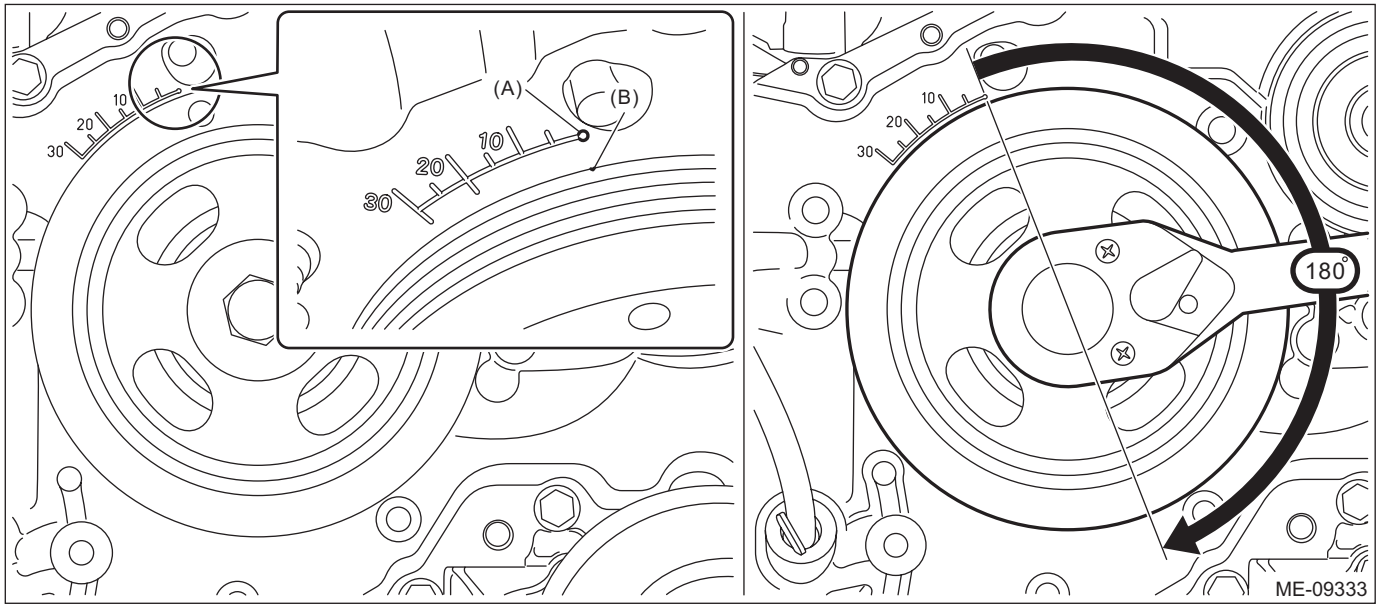
2. ROCKER COVER LH

1) When working on the vehicle

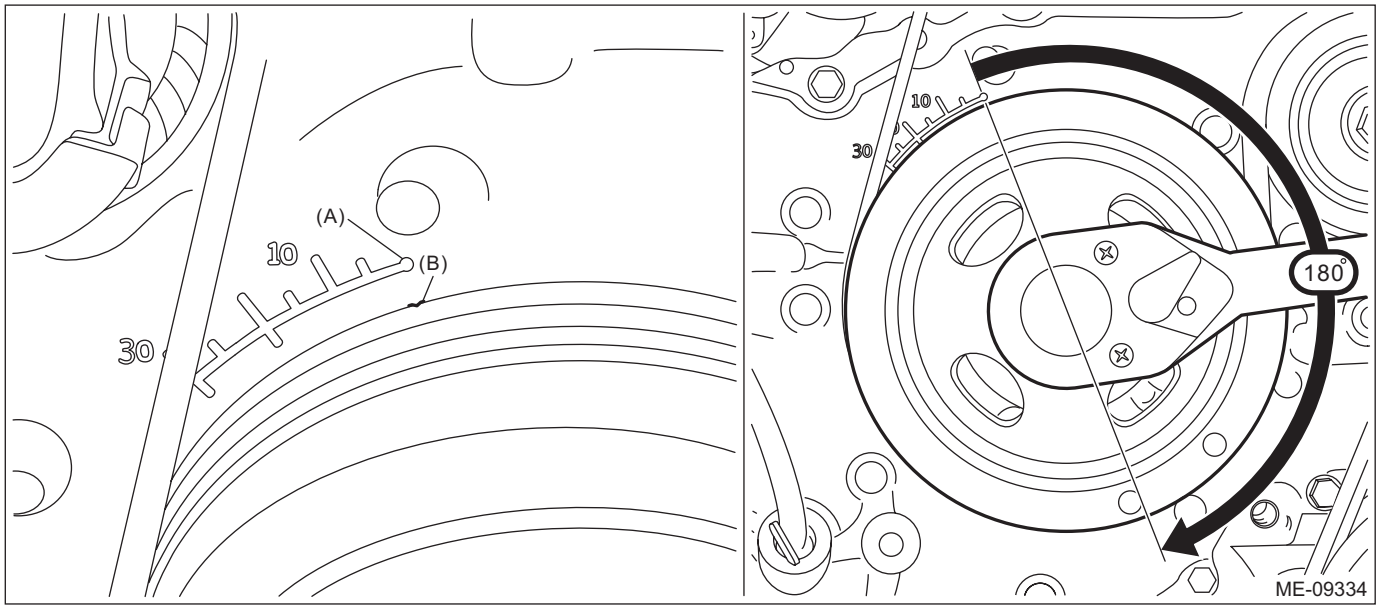
NOTE:
When working on the vehicle, perform the following steps also.
(1) Align the timing mark (B) on crank pulley to the 0° in timing gauge (A) on chain cover as shown in the figure, and turn the crankshaft by 180° clockwise from that position.

NOTE:
This procedure is required to prevent the rocker cover LH and the cam lobe of camshaft LH contacting with each other when installing the rocker cover LH.

- Gasoline engine model

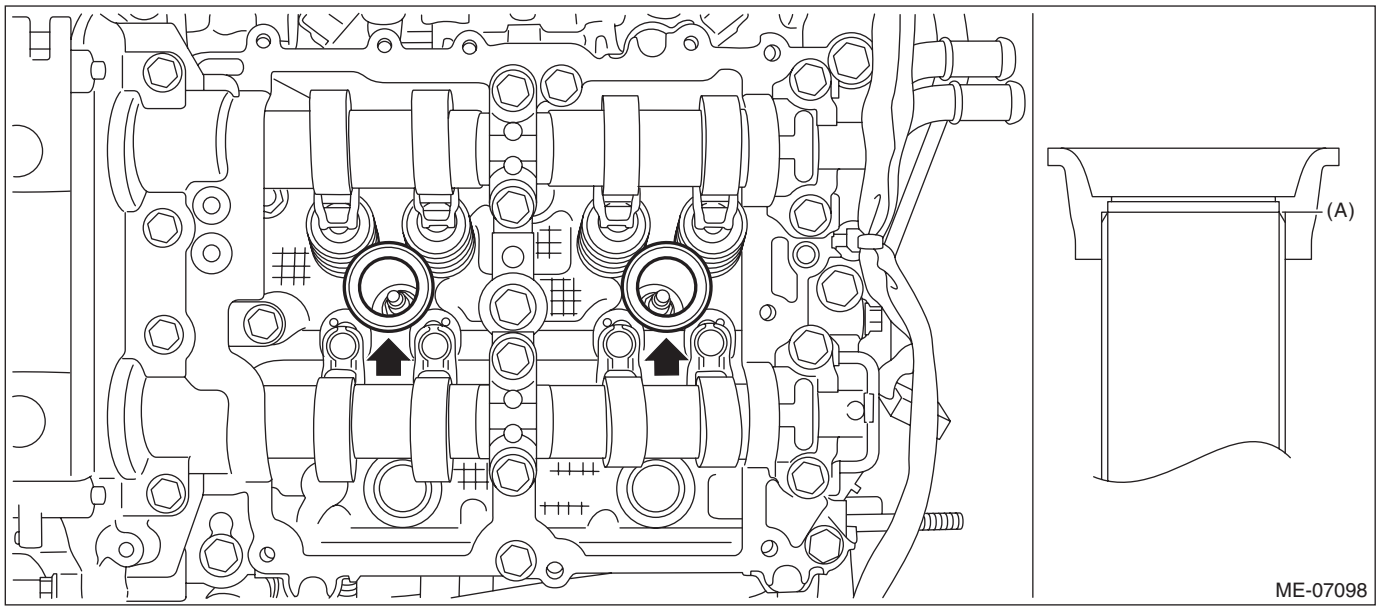


- HEV model



2) Install the #2 spark plug pipe gasket and #4 spark plug pipe gasket to the #2 spark plug pipe and #4 spark plug pipe.

NOTE:
- Use a new #2 spark plug pipe gasket and #4 spark plug pipe gasket.
- Apply a light coat of engine oil to the #2 spark plug pipe gasket and #4 spark plug pipe gasket, and insert them onto the spark plug pipe edge (A).



3) Install the rocker cover gasket LH to the rocker cover LH.

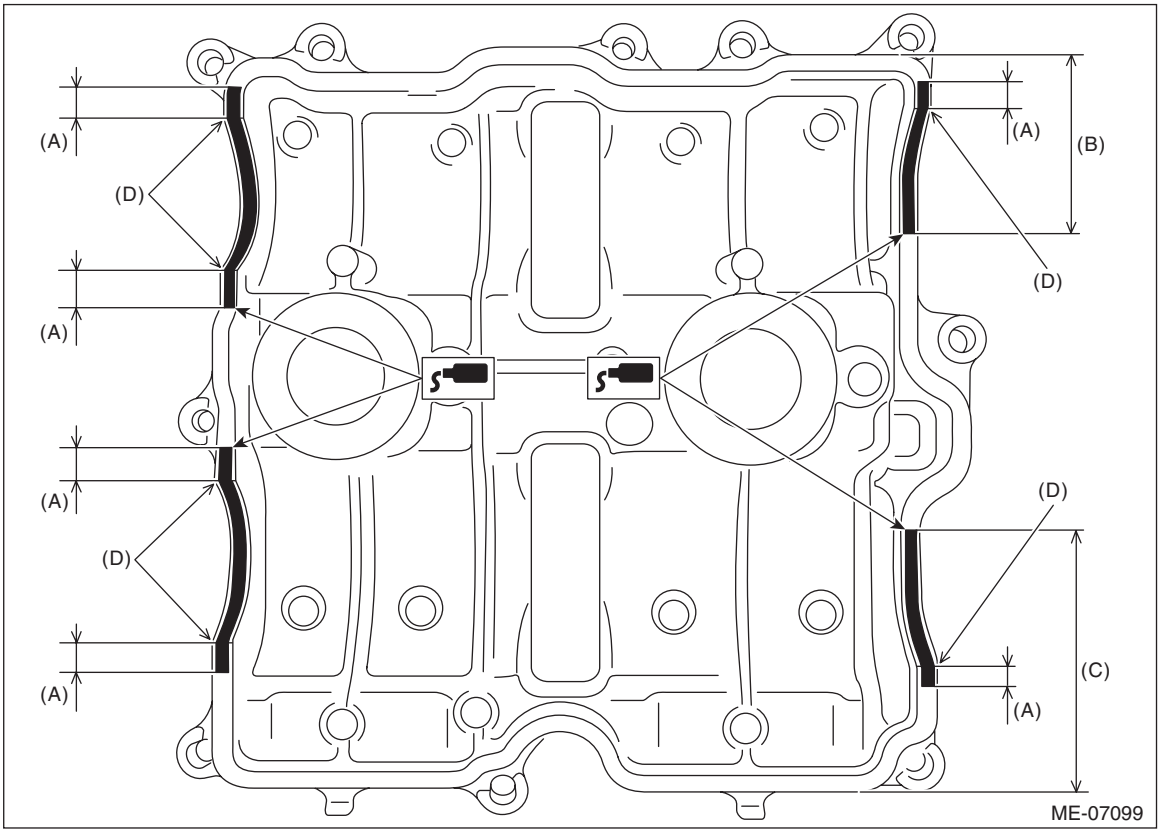
NOTE:
Use a new rocker cover gasket LH.

4) Apply liquid gasket to the mating surface of rocker cover LH as shown in the figure.

NOTE:
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the engine.
- Be careful not to allow liquid gasket to be squeezed out from rocker cover LH.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

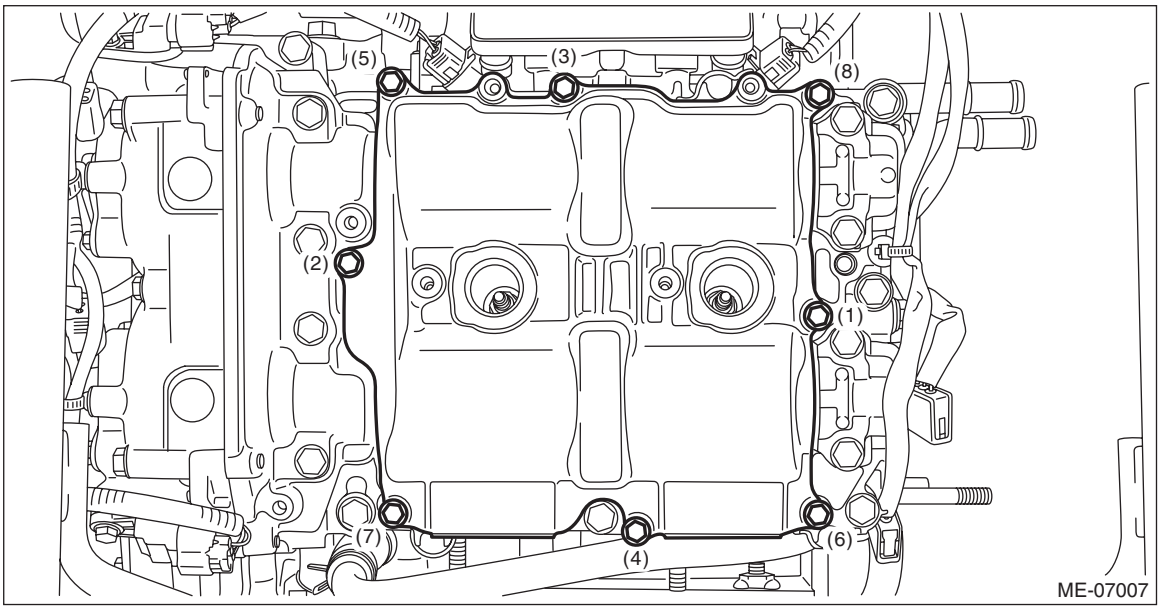
Liquid gasket applying diameter:
3.5±0.5 mm (0.1378±0.0197 in)



(A) 10 mm (0.394 in) or more
(B) 51 mm (2.008 in) or more
(C) 73 mm (2.874 in) or more
(D) Arch starting point

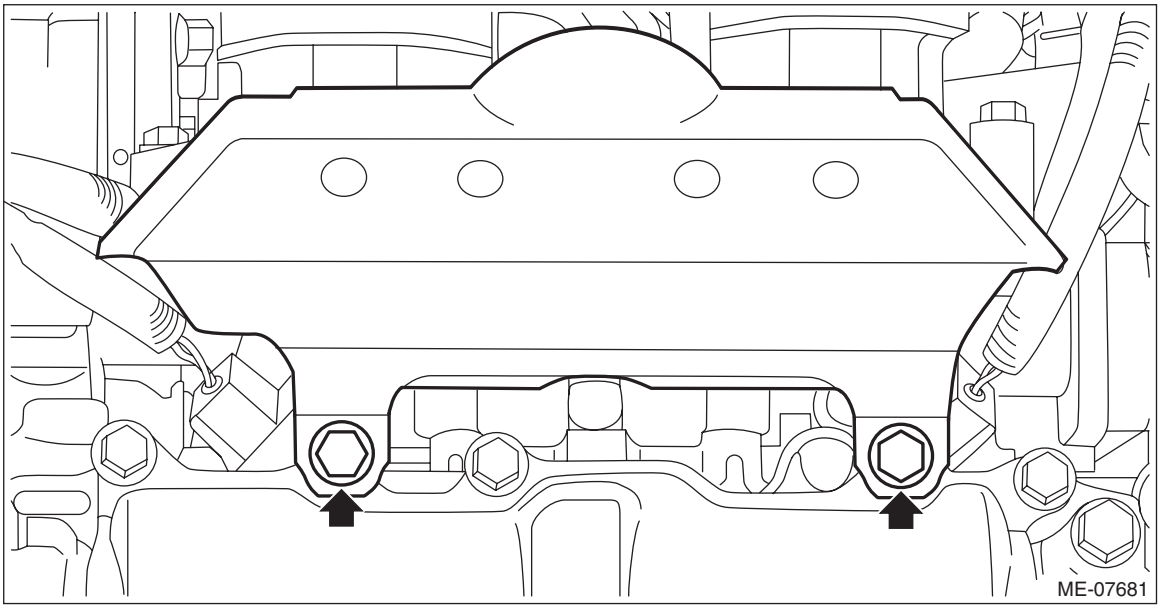
5) Set the rocker cover LH, and tighten the bolts in numerical order as shown in the figure.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



6) Install the intake manifold protector LH.

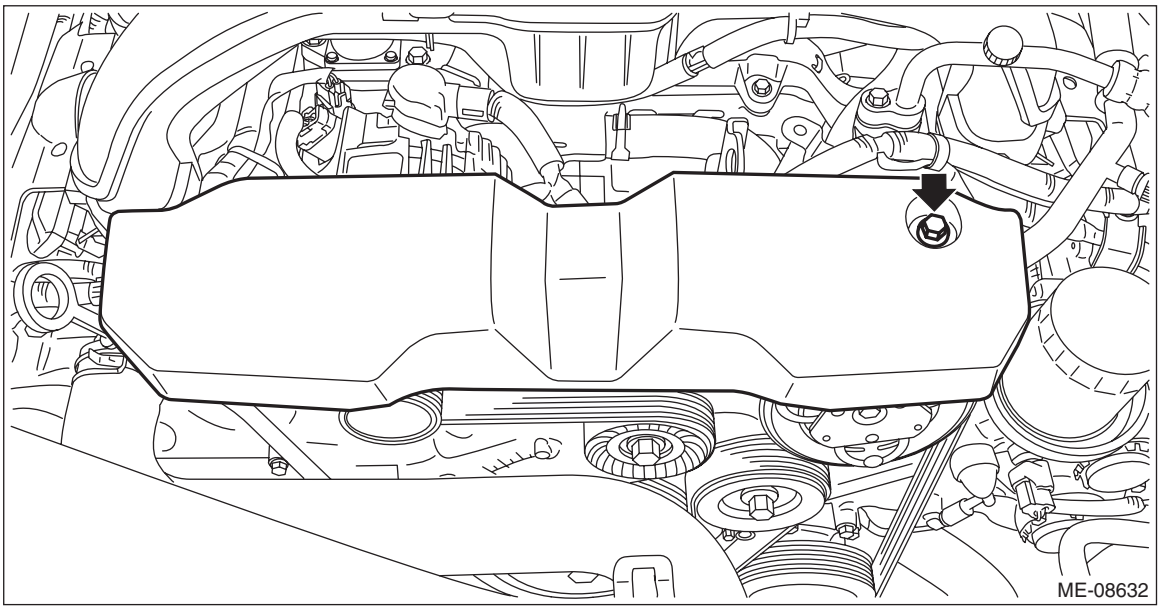
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



7) Install the #2 ignition coil and the #4 ignition coil. <Ref. to IG(H4DO(w/o HEV))-12, INSTALLATION, Ignition Coil.>
8) When working on the vehicle

NOTE:
When working on the vehicle, perform the following steps also.
(1) Install the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, INSTALLATION, Air Intake Duct.> <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
(2) Install the battery. (Gasoline engine model) <Ref. to SC(H4DO(w/o HEV))-52, INSTALLATION, Battery.>
(3) Install the V-belt cover. (Gasoline engine model)

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



(4) Install the 12 volt auxiliary battery. (HEV model) <Ref. to SC(H4DO(HEV))-41, 12 VOLT AUXILIARY BATTERY, INSTALLATION, Battery.>
(5) Install the collector cover. (HEV model)

C: INSPECTION

Check that the rocker cover does not have deformation, cracks and any other damage.

19.Camshaft

A: REMOVAL

1. CAMSHAFT RH

The camshaft RH and cam carrier are designed as removing as a unit. Refer to “Cam Carrier” for removal procedures of camshaft RH. <Ref. to ME(H4DO(w/o HEV))-223, CAM CARRIER RH, REMOVAL, Cam Carrier.> <Ref. to ME(H4DO(w/o HEV))-253, CAM CARRIER RH, DISASSEMBLY, Cam Carrier.>

2. CAMSHAFT LH

The camshaft LH and cam carrier are designed as removing as a unit. Refer to “Cam Carrier” for removal procedures of camshaft LH. <Ref. to ME(H4DO(w/o HEV))-228, CAM CARRIER LH, REMOVAL, Cam Carrier.> <Ref. to ME(H4DO(w/o HEV))-254, CAM CARRIER LH, DISASSEMBLY, Cam Carrier.>

B: INSTALLATION

1. CAMSHAFT RH

The camshaft RH and cam carrier are designed as installing as a unit. Refer to “Cam Carrier” for installation procedures of camshaft RH. <Ref. to ME(H4DO(w/o HEV))-256, CAM CARRIER RH, ASSEMBLY, Cam Carrier.> <Ref. to ME(H4DO(w/o HEV))-233, CAM CARRIER RH, INSTALLATION, Cam Carrier.>

2. CAMSHAFT LH

The camshaft LH and cam carrier are designed as installing as a unit. Refer to “Cam Carrier” for installation procedures of camshaft LH. <Ref. to ME(H4DO(w/o HEV))-259, CAM CARRIER LH, ASSEMBLY, Cam Carrier.> <Ref. to ME(H4DO(w/o HEV))-243, CAM CARRIER LH, INSTALLATION, Cam Carrier.>

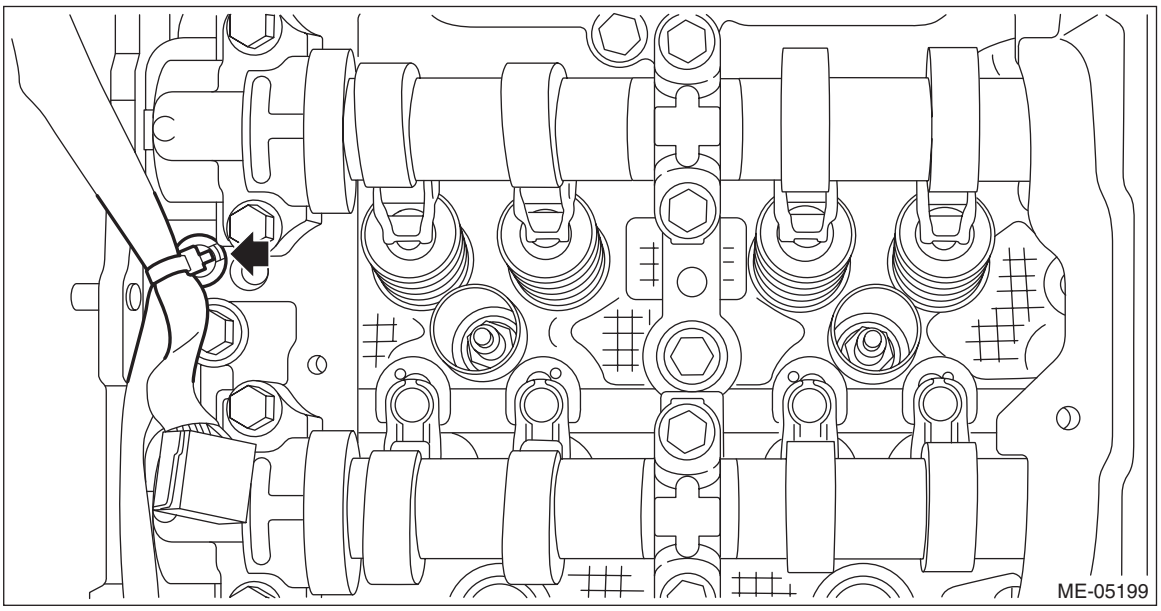
20.Cam Carrier

A: REMOVAL

1. CAM CARRIER RH

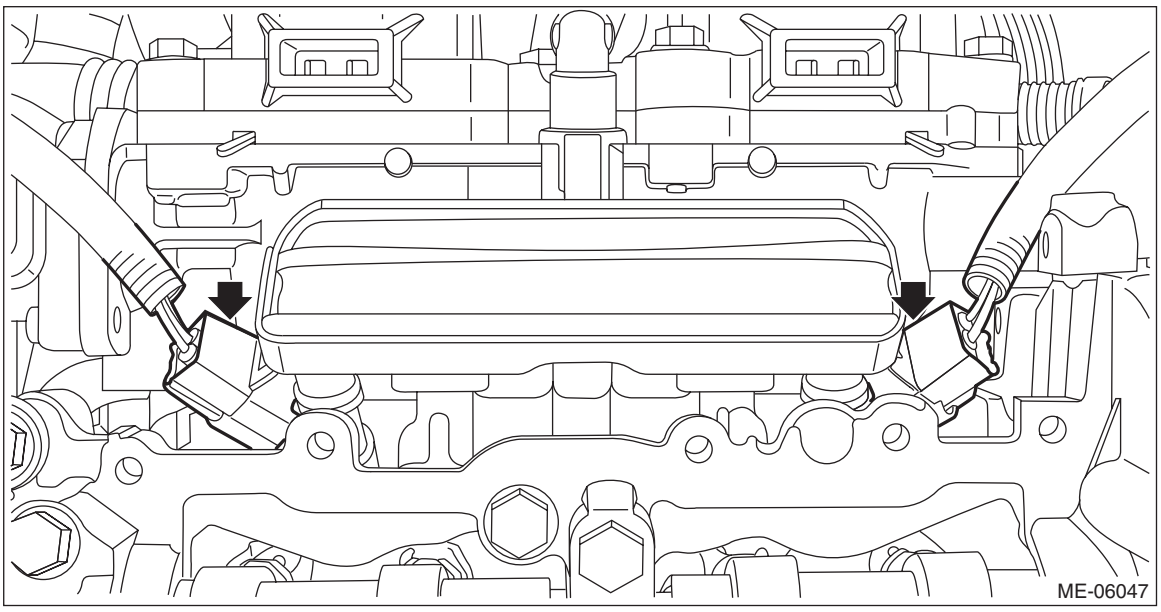
1) Remove the engine from the vehicle. <Ref. to ME(H4DO(w/o HEV))-58, REMOVAL, Engine Assembly.>
2) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
3) Remove the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-171, TIMING CHAIN RH, REMOVAL, Timing Chain Assembly.>
4) Remove the cam sprocket RH. <Ref. to ME(H4DO(w/o HEV))-193, CAM SPROCKET RH, REMOVAL, Cam Sprocket.>

NOTE:
This operation is required only when disassembling the cam carrier RH.
5) Remove the rocker cover RH. <Ref. to ME(H4DO(w/o HEV))-205, ROCKER COVER RH, REMOVAL, Rocker Cover.>
6) Remove the clip holding the engine harness from cam carrier RH.



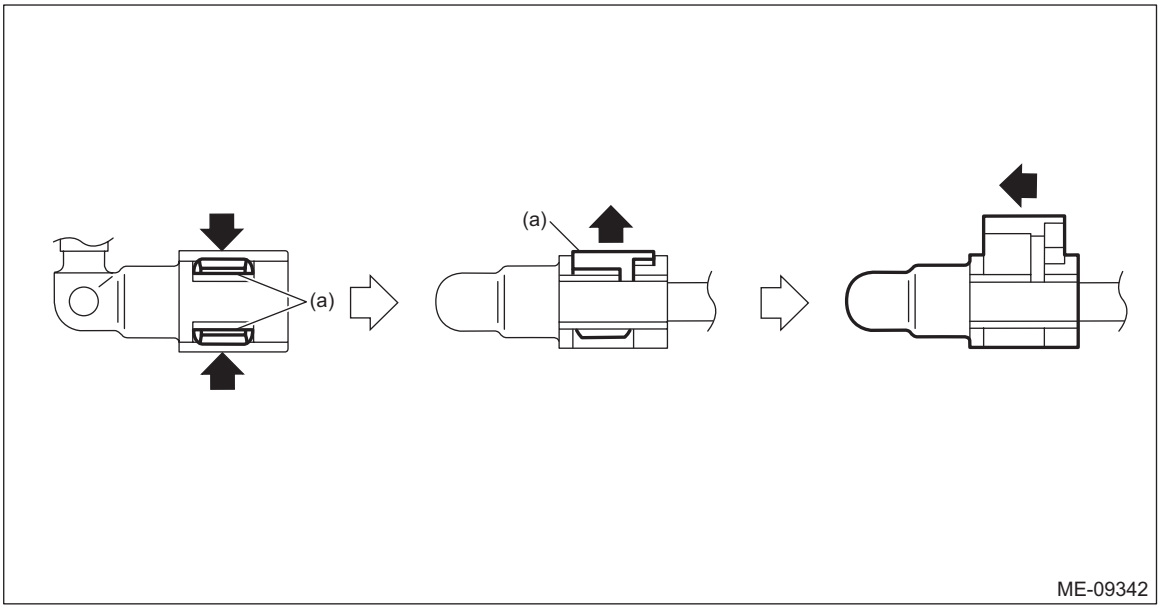
7) Remove the water pipe assembly RH. <Ref. to CO(H4DO(w/o HEV))-24, WATER PIPE ASSEMBLY RH, REMOVAL, Water Pipe Assembly.>

8) Remove the fuel pipe RH and the fuel injector RH.
(1) Disconnect the connector from fuel injector RH.

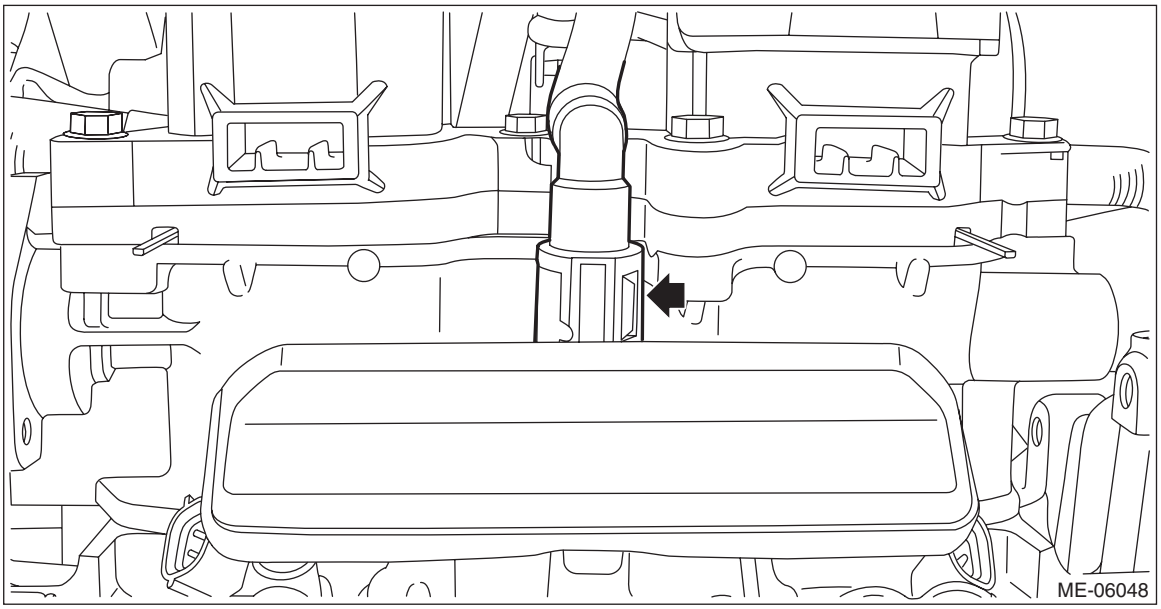


(2) Disconnect the quick connector from fuel pipe RH.

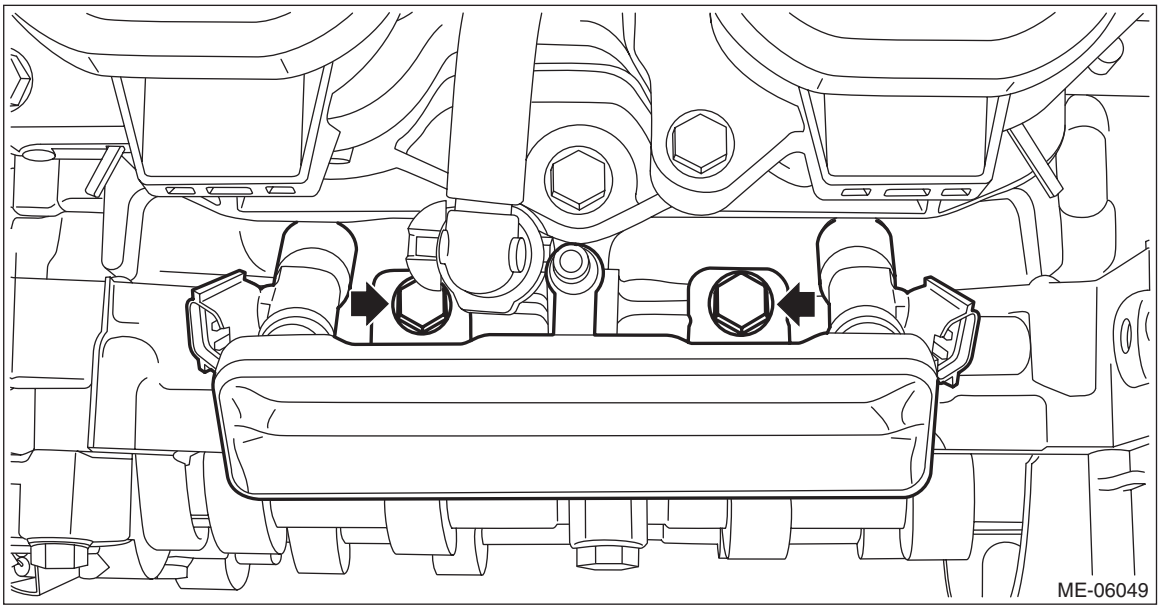
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



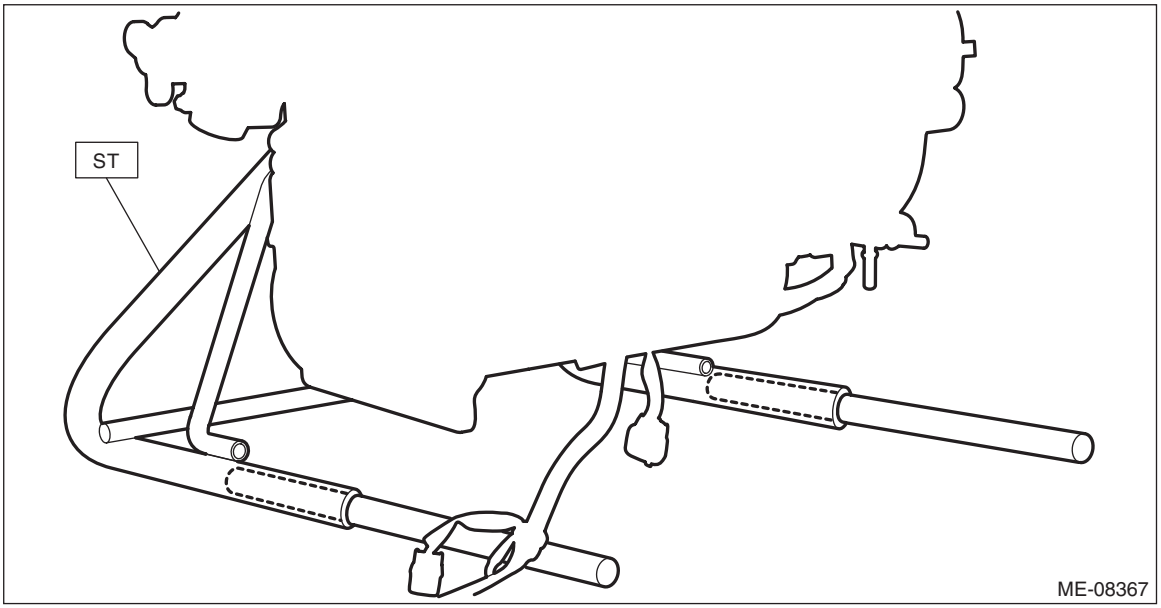
(3) Remove the bolts securing the fuel pipe RH, and remove the fuel pipe RH and the fuel injector RH.



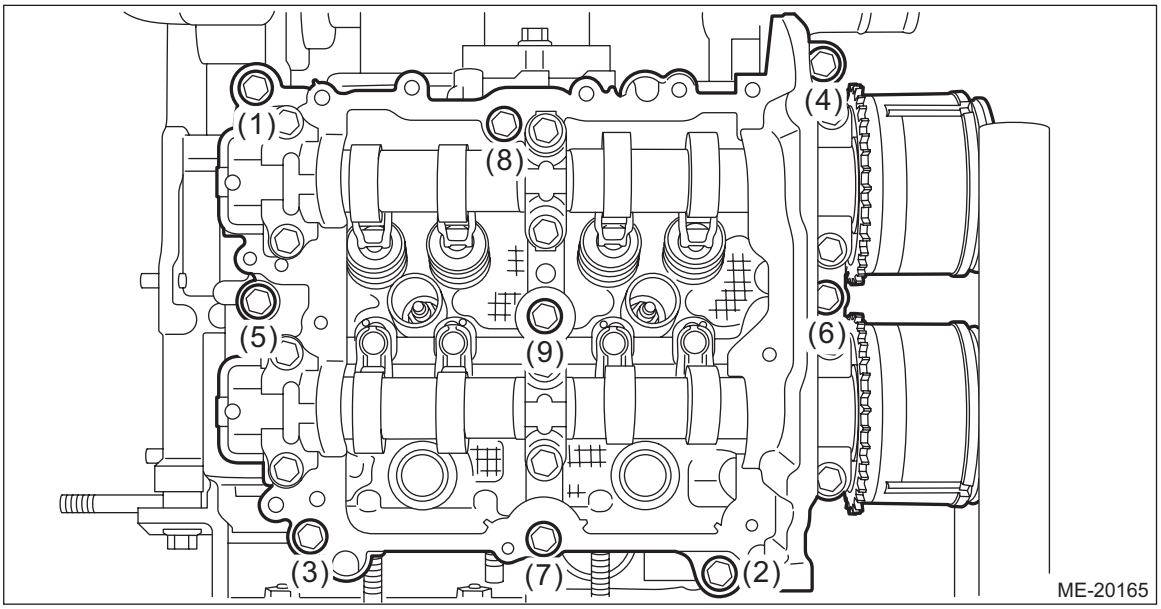
9) Insert the steel rods into ST, and set the engine so that the camshaft RH is facing up.

CAUTION:
• If the engine is standing on one side without inserting the steel rod into ST, engine may lose balance and fall down. Be sure to insert the steel rod into ST to extend the length.
• Use the steel rod with enough strength.
• Be careful not to pinch the engine harness with ST.

ST 499817100 ENGINE STAND

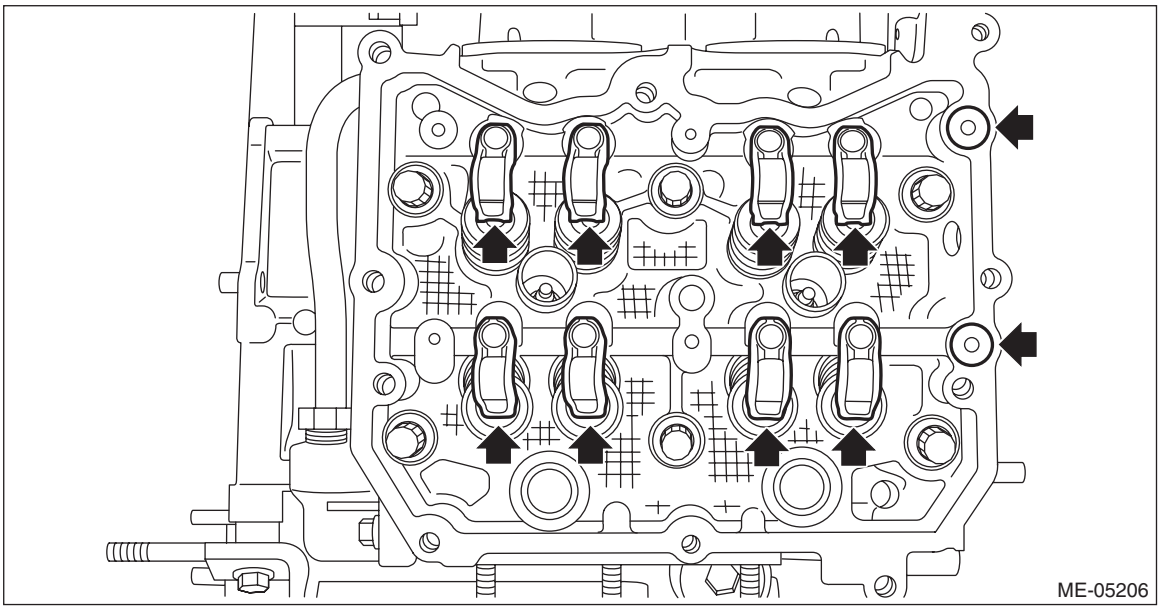


10) Loosen the bolts holding the cam carrier RH equally, a little at a time in numerical sequence as shown in the figure and remove the cam carrier RH.



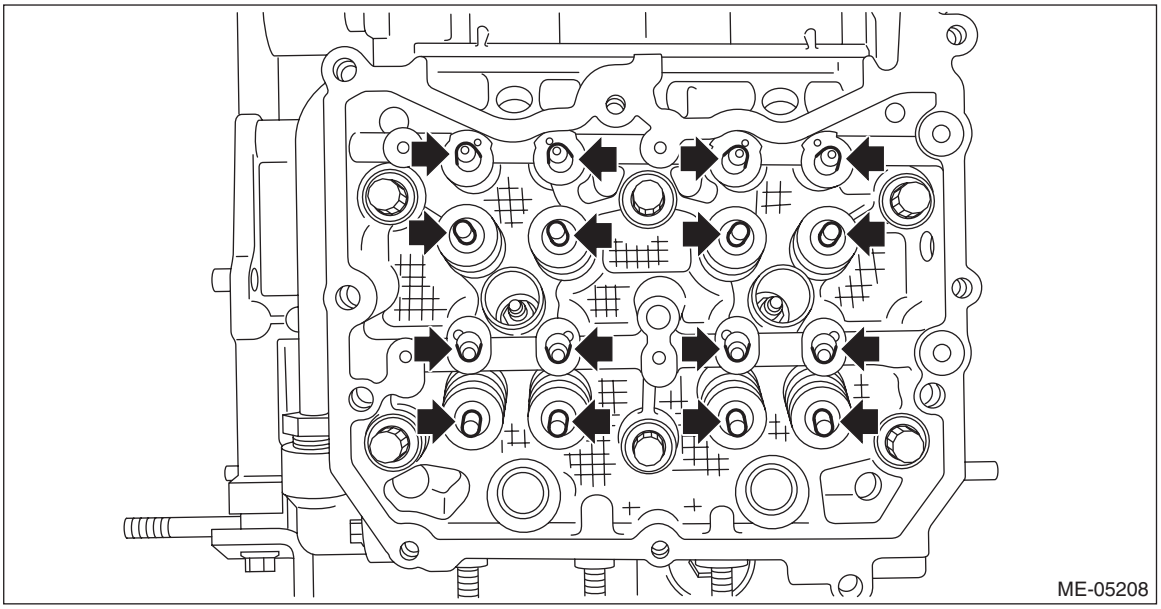
11) Remove the O-ring and the roller rocker arm from cylinder head RH.

NOTE:
Be careful not to confuse the roller rocker arms.



12) Remove the valve shim and the roller rocker arm pivot from cylinder head RH.

NOTE:
Be careful not to confuse the valve shim and the roller rocker arm pivot.



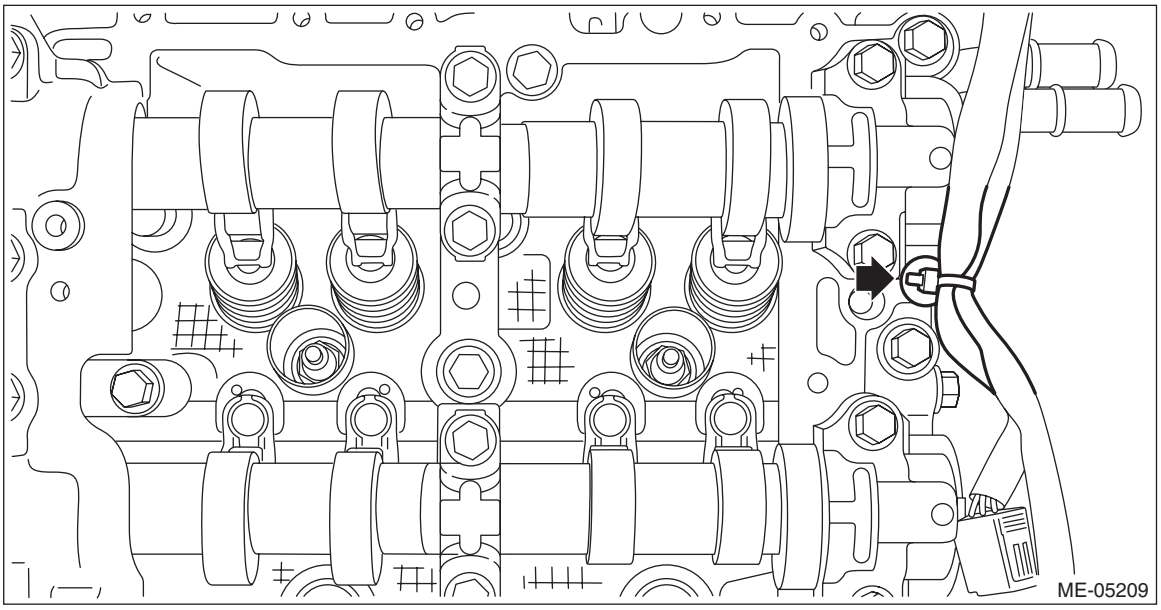
13) Remove the liquid gasket from cam carrier RH and cylinder head RH.

2. CAM CARRIER LH

1) Remove the engine from the vehicle. <Ref. to ME(H4DO(w/o HEV))-58, REMOVAL, Engine Assembly.>
2) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
3) Remove the timing chain LH. <Ref. to ME(H4DO(w/o HEV))-173, TIMING CHAIN LH, REMOVAL, Timing Chain Assembly.>
4) Remove the cam sprocket LH. <Ref. to ME(H4DO(w/o HEV))-195, CAM SPROCKET LH, REMOVAL, Cam Sprocket.>

NOTE:
This operation is required only when disassembling the cam carrier LH.
5) Remove the rocker cover LH. <Ref. to ME(H4DO(w/o HEV))-209, ROCKER COVER LH, REMOVAL, Rocker Cover.>

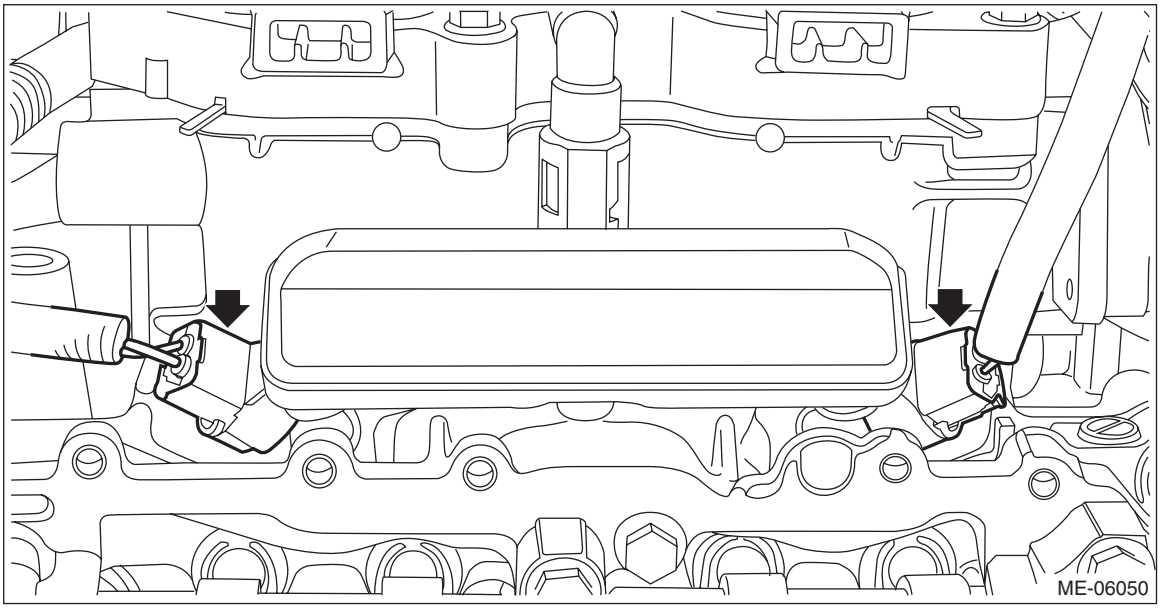
6) Remove the clip holding the engine harness from cam carrier LH.



7) Remove the water pipe assembly LH. <Ref. to CO(H4DO(w/o HEV))-25, WATER PIPE ASSEMBLY LH, REMOVAL, Water Pipe Assembly.>

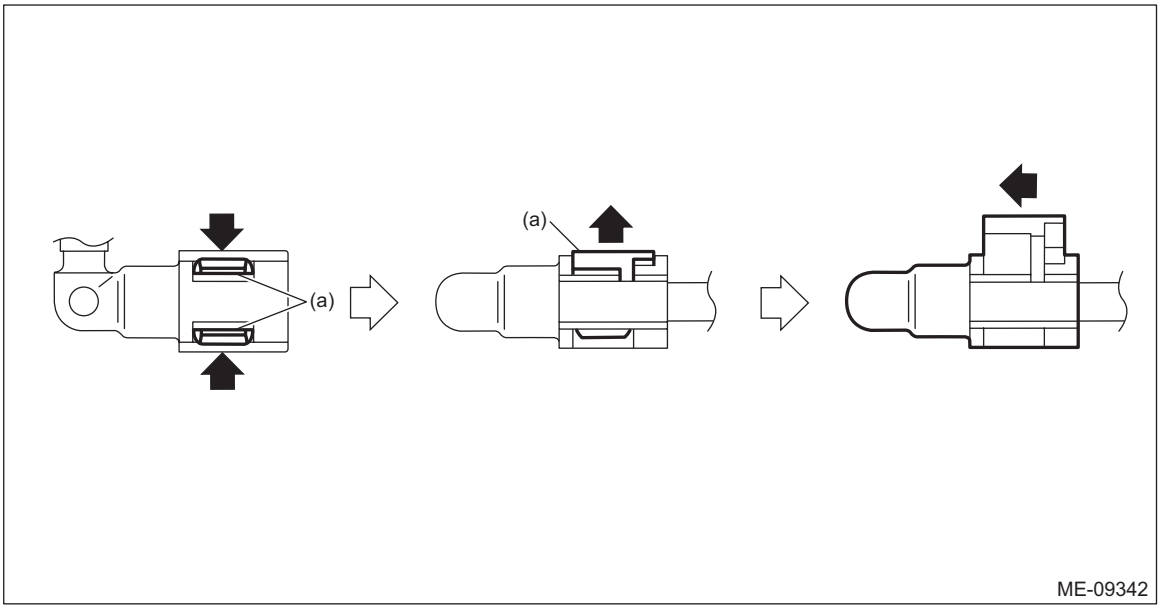
8) Remove the fuel pipe LH and the fuel injector LH.

(1) Disconnect the connector from fuel injector LH.

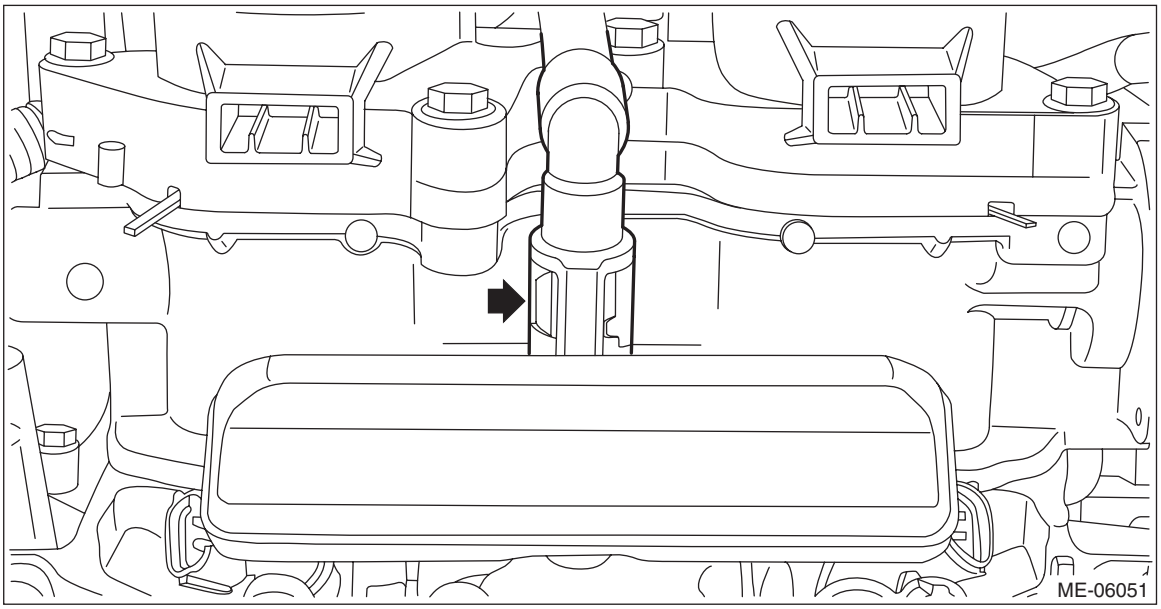


(2) Disconnect the quick connector from fuel pipe LH.

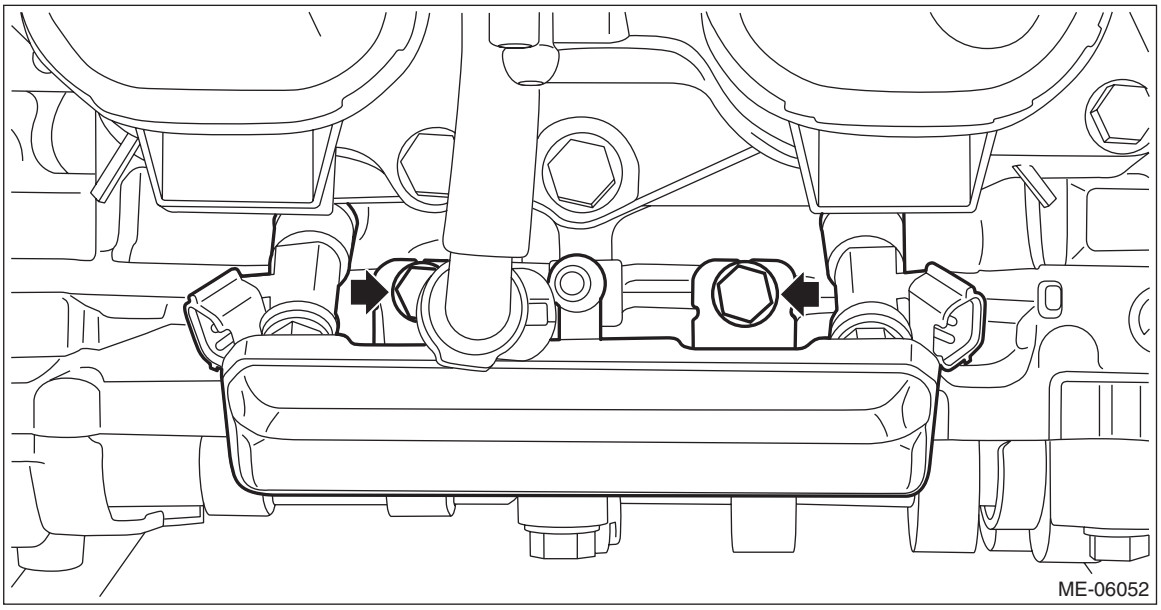
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



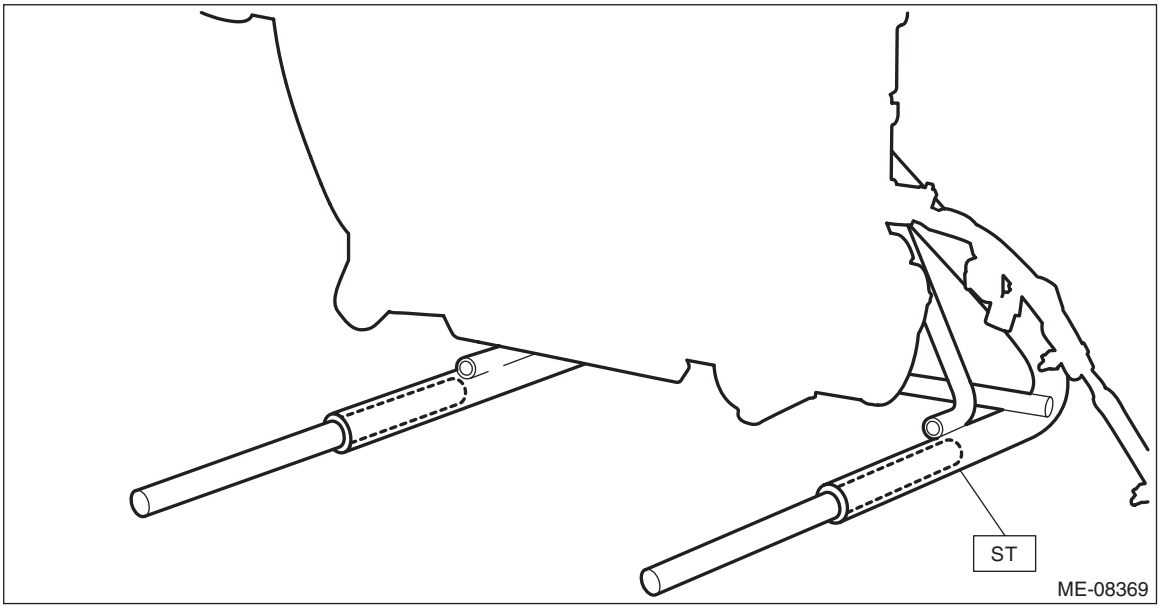
(3) Remove the bolts securing the fuel pipe LH, and remove the fuel pipe LH and the fuel injector LH.



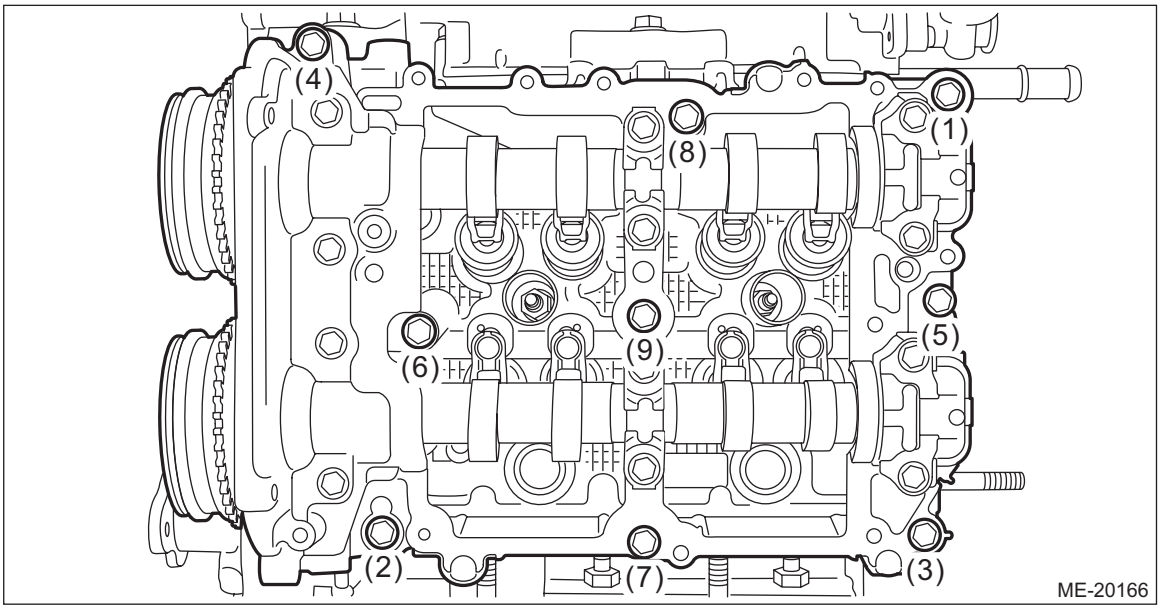
9) Insert the steel rods into ST, and set the engine so that the camshaft LH is facing up.

CAUTION:
• If the engine is standing on one side without inserting the steel rod into ST, engine may lose balance and fall down. Be sure to insert the steel rod into ST to extend the length.
• Use the steel rod with enough strength.
• Be careful not to pinch the engine harness with ST.

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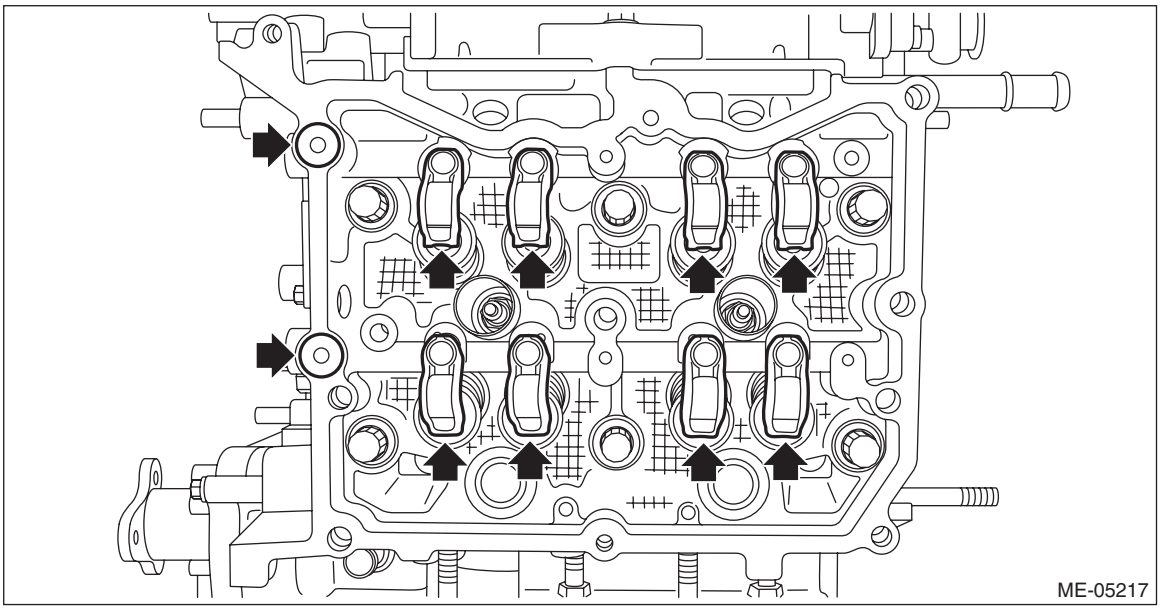


10) Loosen the bolts holding the cam carrier LH equally, a little at a time in numerical sequence as shown in the figure and remove the cam carrier LH.



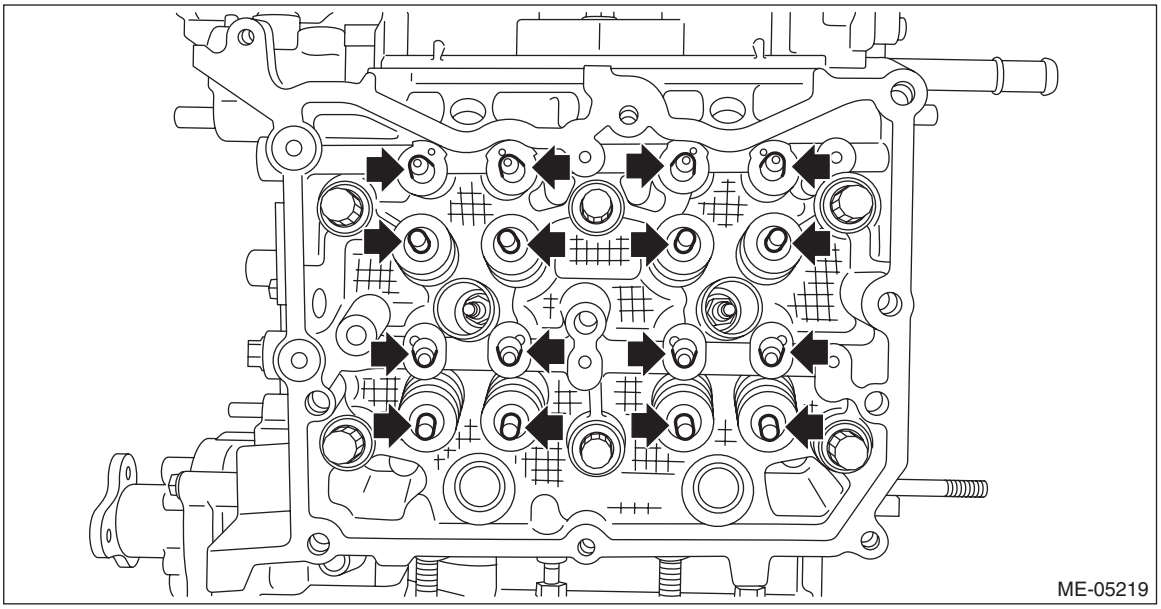
11) Remove the O-ring and the roller rocker arm from cylinder head LH.

NOTE:
Be careful not to confuse the roller rocker arms.



12) Remove the valve shim and the roller rocker arm pivot from cylinder head LH.

NOTE:
Be careful not to confuse the valve shim and the roller rocker arm pivot.



13) Remove the liquid gasket from cam carrier LH and cylinder head LH.

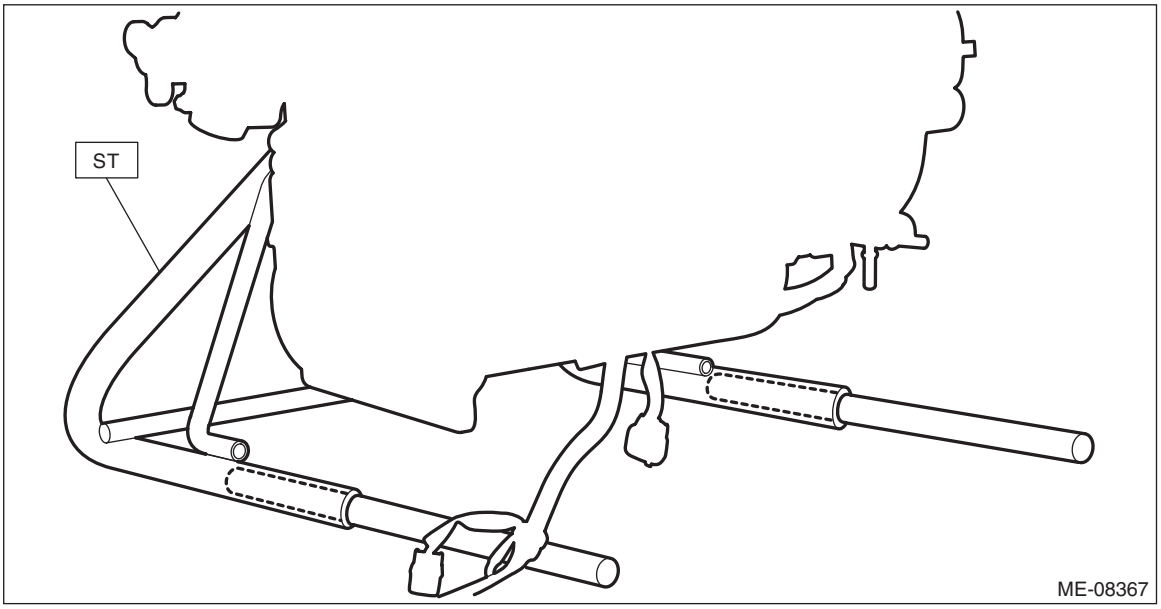
B: INSTALLATION

1. CAM CARRIER RH

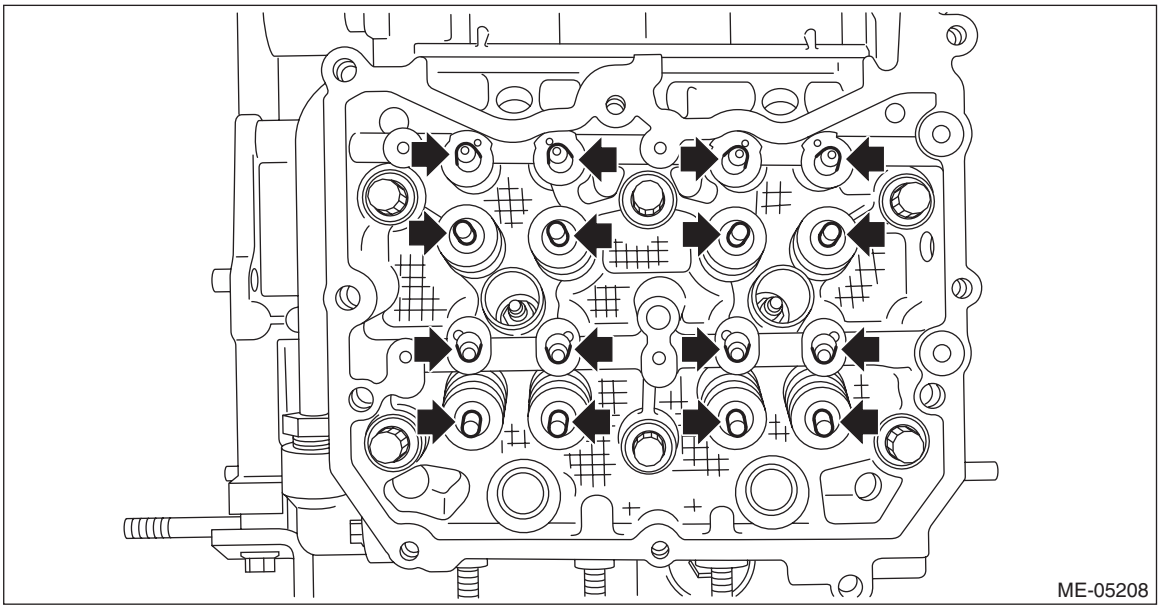
1) Insert the steel rods into ST, and set the engine so that the camshaft RH is facing up.

CAUTION:
• If the engine is standing on one side without inserting the steel rod into ST, engine may lose balance and fall down. Be sure to insert the steel rod into ST to extend the length.
• Use the steel rod with enough strength.
• Be careful not to pinch the engine harness with ST.

ST 499817100 ENGINE STAND

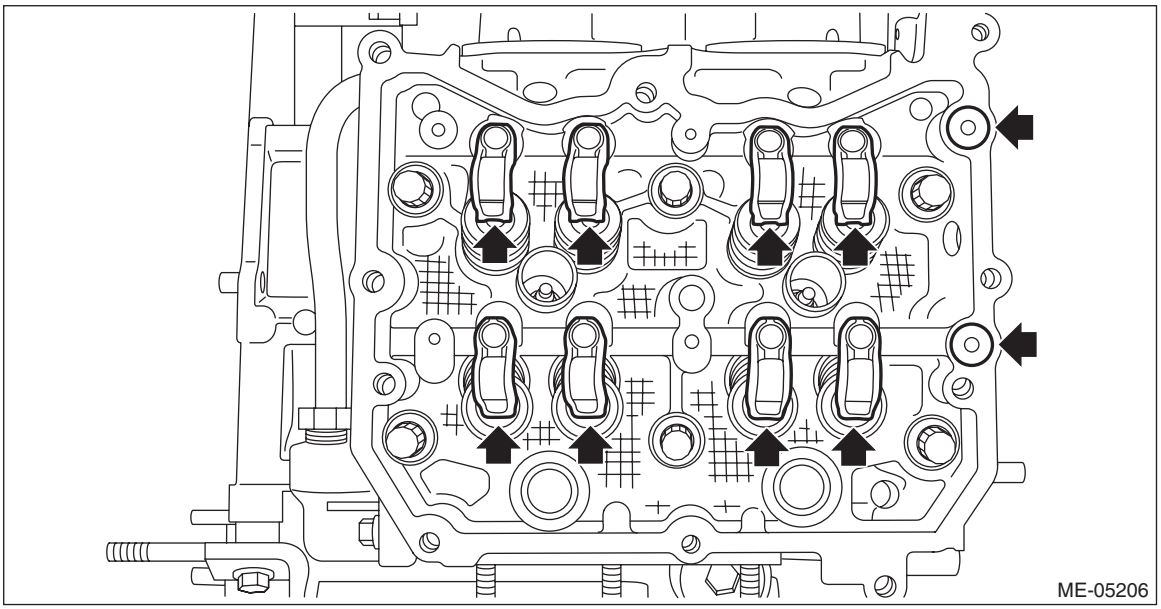


2) Apply engine oil to the valve shim and the roller rocker arm pivot, and install the valve shim and the roller rocker arm pivot to the cylinder head RH.



3) Apply engine oil to the O-ring and the roller rocker arm, and install the O-ring and the roller rocker arm to the cylinder head RH.

NOTE:
Use new O-rings.

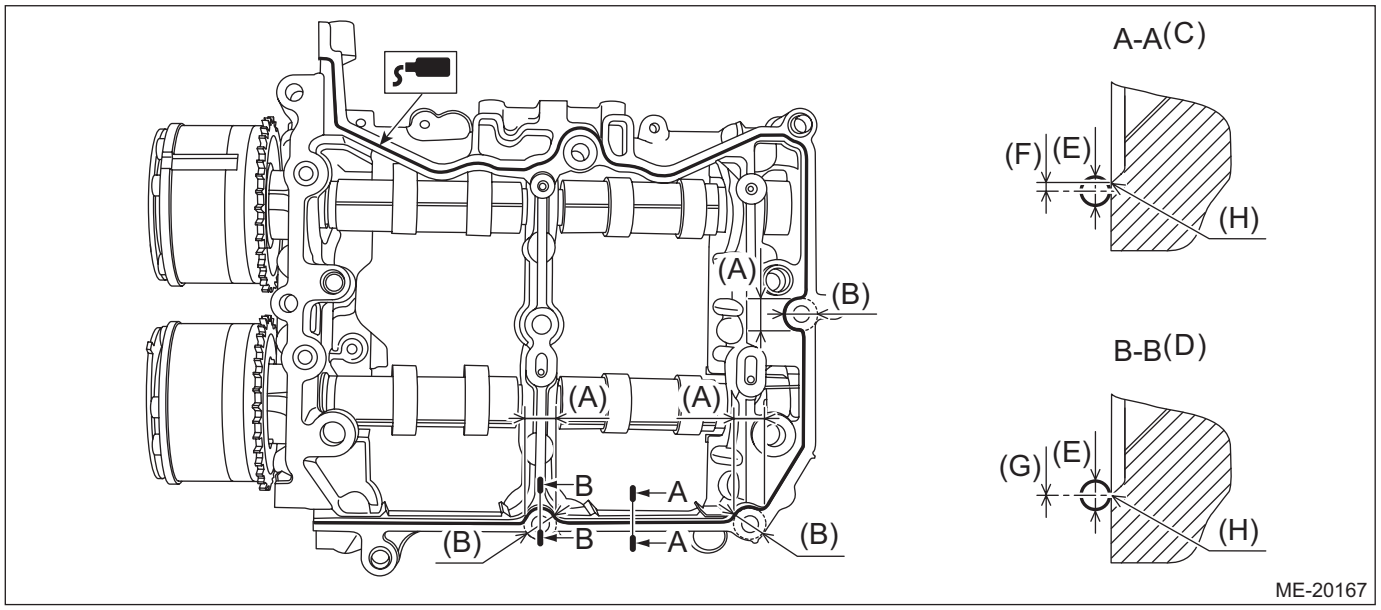


4) Apply liquid gasket to the mating surface of cam carrier RH as shown in the figure.

NOTE:
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the cylinder head RH and cam carrier RH.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

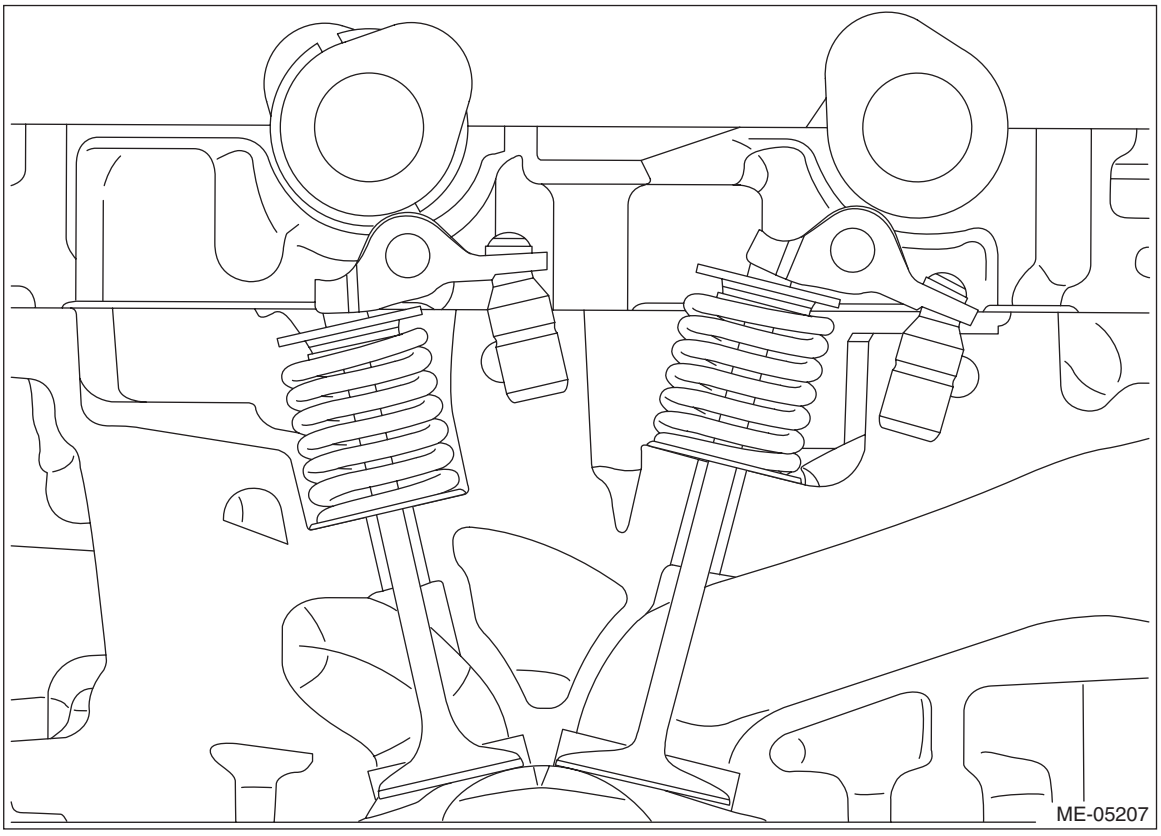
Liquid gasket applying diameter:
3.1±0.5 mm (0.1220±0.0197 in)

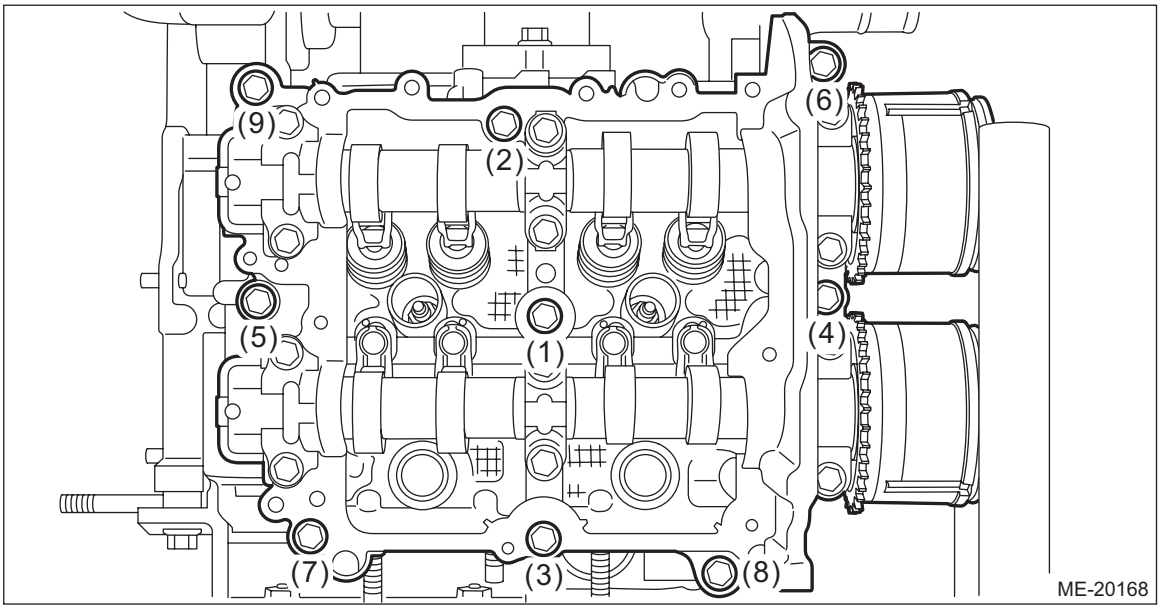


(A)	Range A	(D)	Liquid gasket applying position of mating surfaces of range A	(G)	0±0.5 mm (0±0.0197 in)
(B)	ϕ18 mm (0.7087 in)	(E)	ϕ3.1±0.5 mm (0.1220±0.0197 in)	(H)	Chamfer edge
(C)	Liquid gasket applying position of mating surfaces other than range A	(F)	1 mm (0.0394 in) or less		

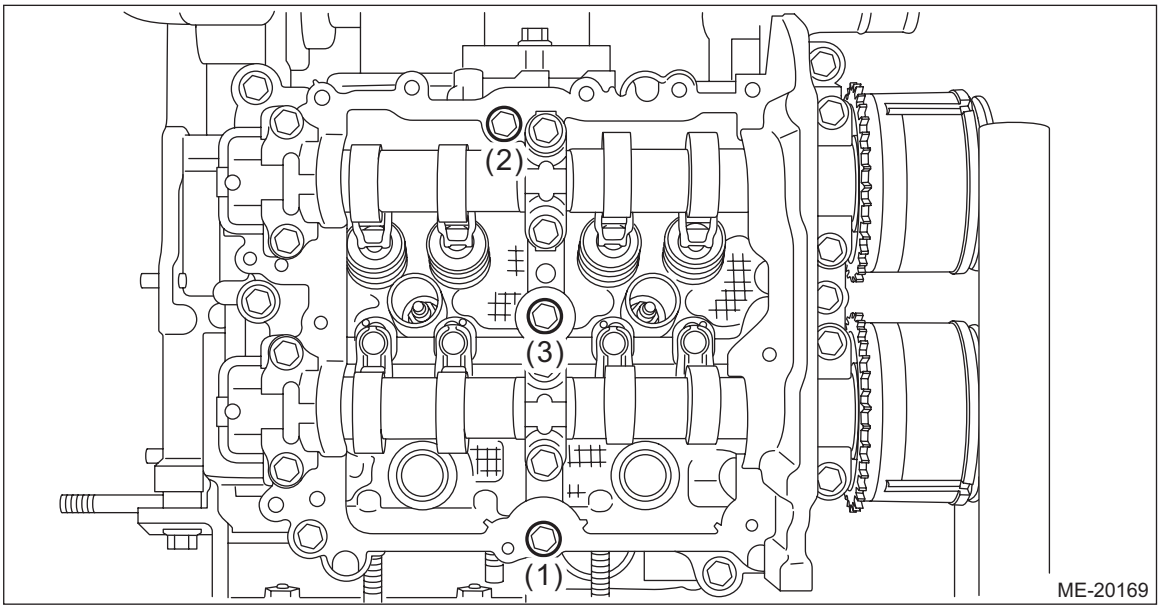
5) Install the cam carrier RH to the cylinder head RH.
   (1) Mount the cam carrier RH, then tighten all bolts with a torque of 18 N·m (1.8 kgf-m, 13.3 ft-lb) in numerical order as shown in the figure.

NOTE:
Set the intake camshaft RH and the exhaust camshaft RH to the zero-lift position.

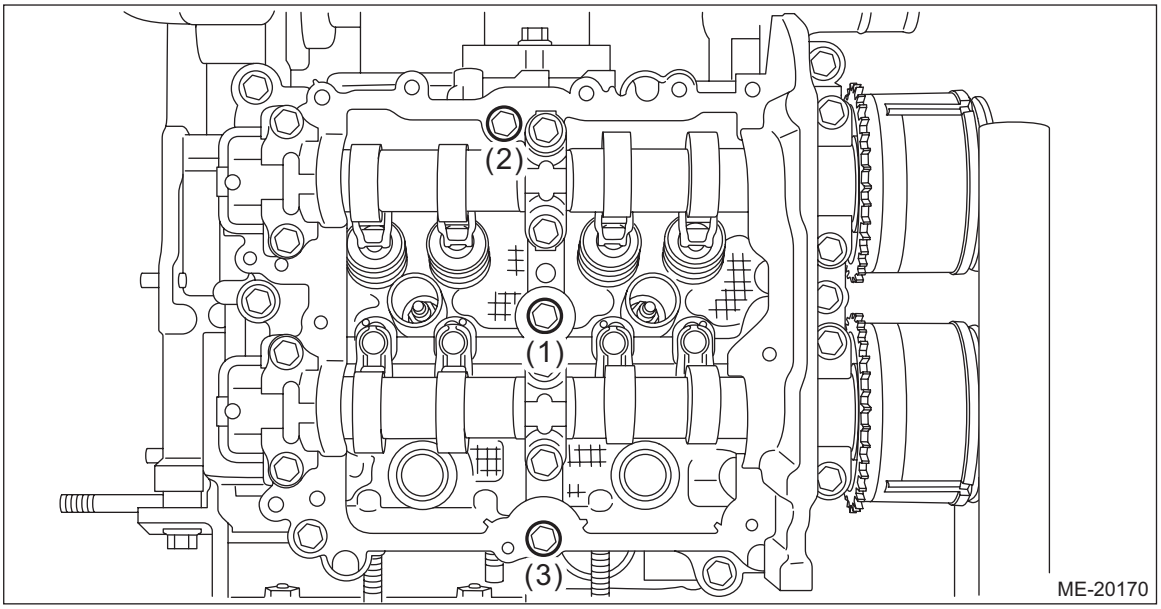




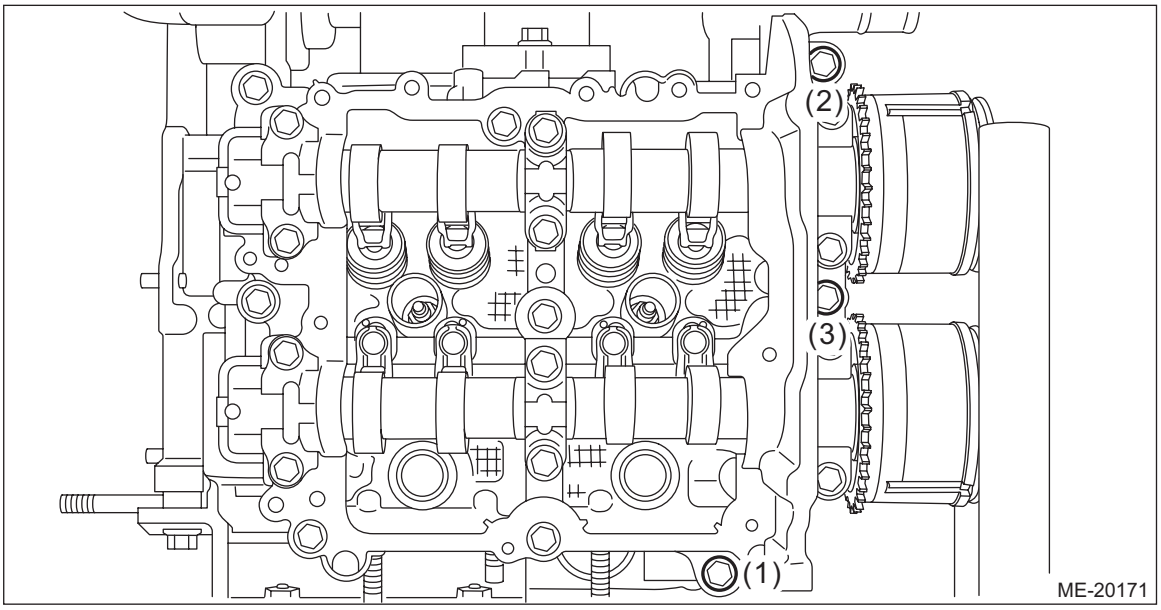
(2) Loosen the bolts (3 places) by 180° in numerical order as shown in the figure.



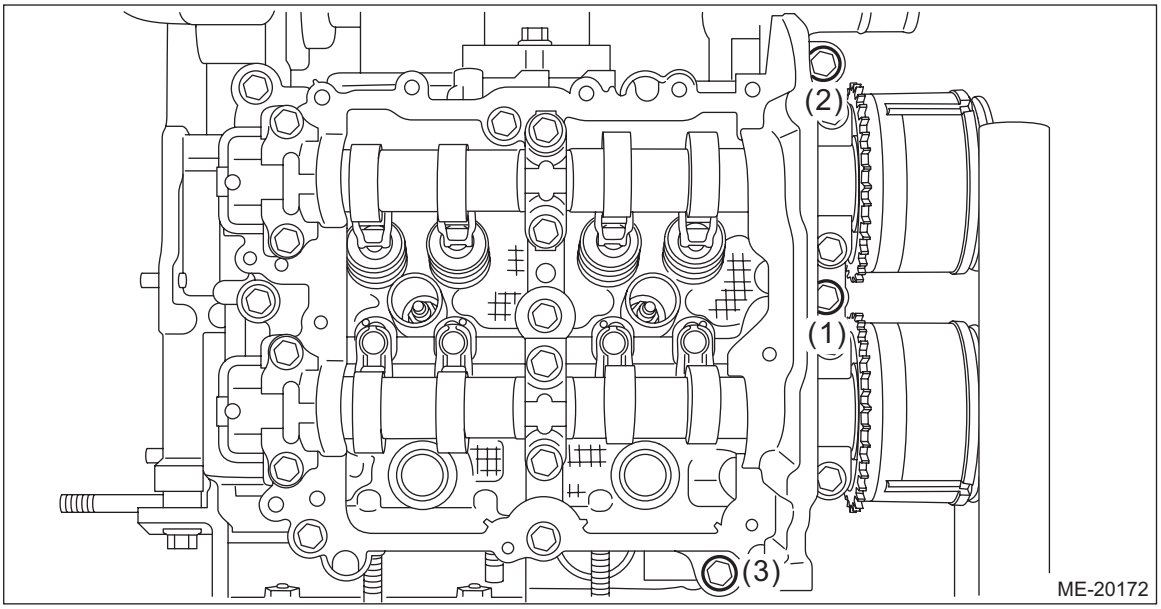
(3) Tighten the bolts (3 places) with a torque of 18 N·m (1.8 kgf-m, 13.3 ft-lb) in numerical order as shown in the figure.



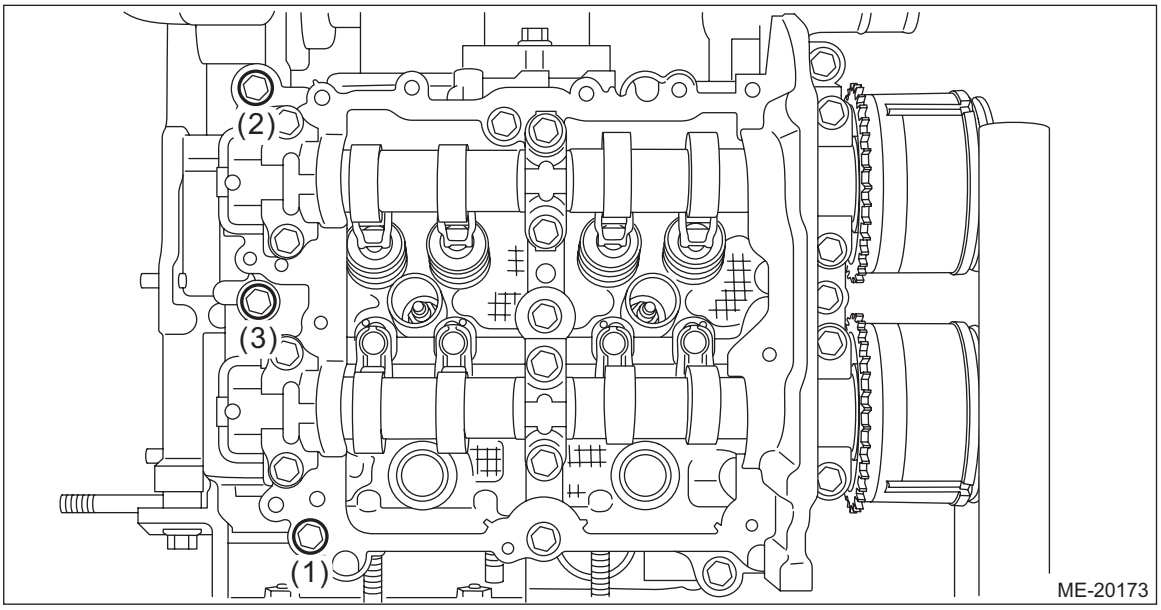
(4) Loosen the bolts (3 places) by 180° in numerical order as shown in the figure.



(5) Tighten the bolts (3 places) with a torque of 18 N·m (1.8 kgf-m, 13.3 ft-lb) in numerical order as shown in the figure.

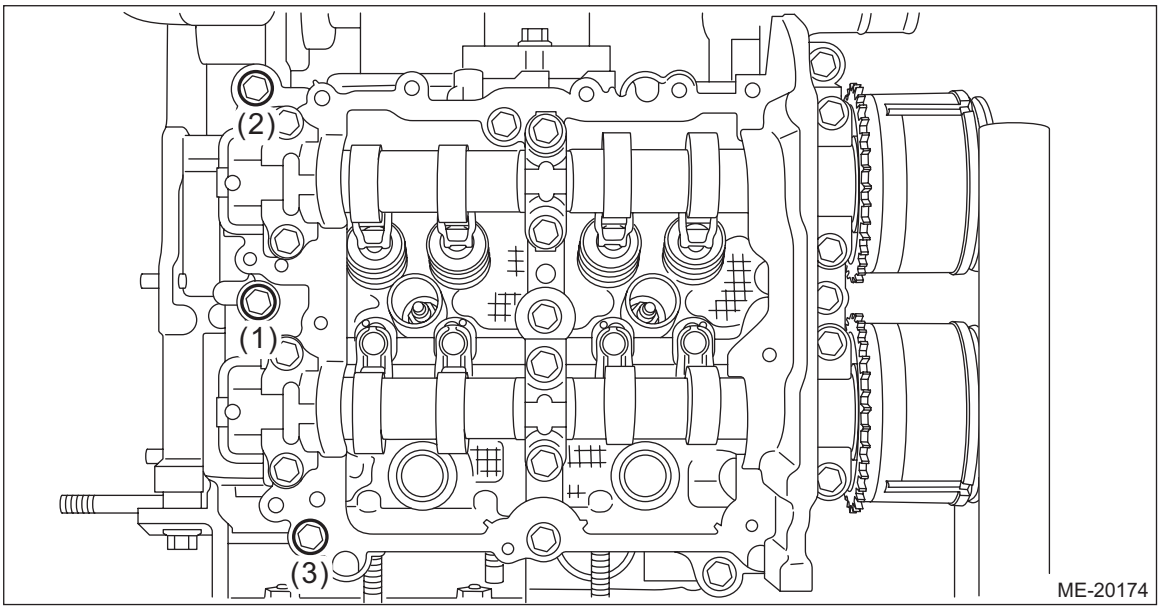


(6) Loosen the bolts (3 places) by 180° in numerical order as shown in the figure.



(7) Tighten the bolts (3 places) with a torque of 18 N·m (1.8 kgf-m, 13.3 ft-lb) in numerical order as shown in the figure.

NOTE:
After tightening, if the liquid gasket is squeezed out onto the seal surface of the chain cover, completely remove any squeezed-out liquid gasket.



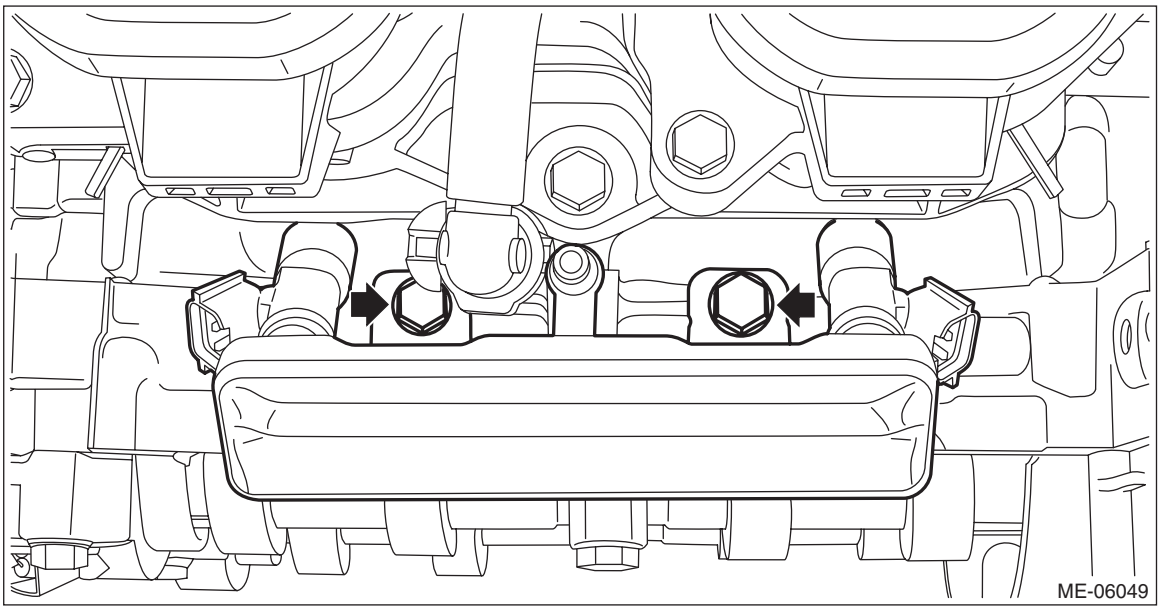
6) Set the part so that the intake manifold is on the upper side.
7) Install the cam sprocket RH. <Ref. to ME(H4DO(w/o HEV))-197, CAM SPROCKET RH, INSTALLATION, Cam Sprocket.>

NOTE:
This procedure is required only when the cam carrier RH is removed for disassembly.
8) Check the cam clearance. <Ref. to ME(H4DO(w/o HEV))-53, WHEN TIMING CHAIN ASSEMBLY IS REMOVED, INSPECTION, Cam Clearance.>
9) Install the timing chain RH. <Ref. to ME(H4DO(w/o HEV))-186, TIMING CHAIN RH, INSTALLATION, Timing Chain Assembly.>

10) Install the fuel pipe RH and the fuel injector RH.
(1) Install the fuel pipe RH and the fuel injector RH, and install the bolts which secure the fuel pipe RH.

NOTE:
- Use new O-rings, rubbers, seal rings and fuel injector holder.
- Refer to “Fuel Injector” for fuel injector holder removal and installation. <Ref. to FU(H4DO(HEV))-70, REMOVAL, Fuel Injector.> <Ref. to FU(H4DO(HEV))-73, INSTALLATION, Fuel Injector.>

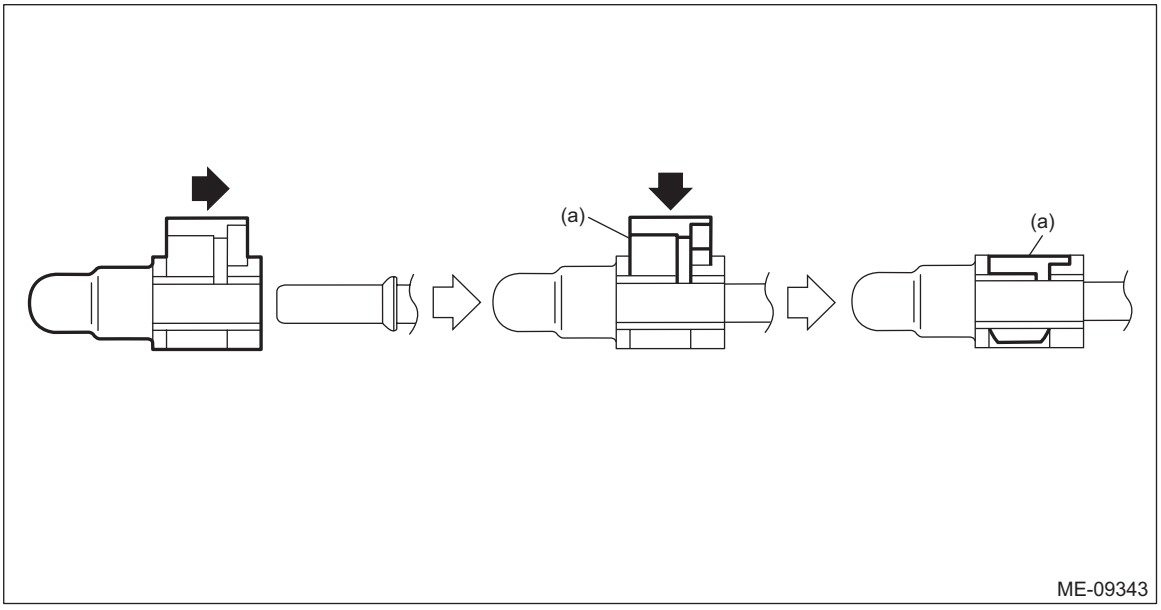
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



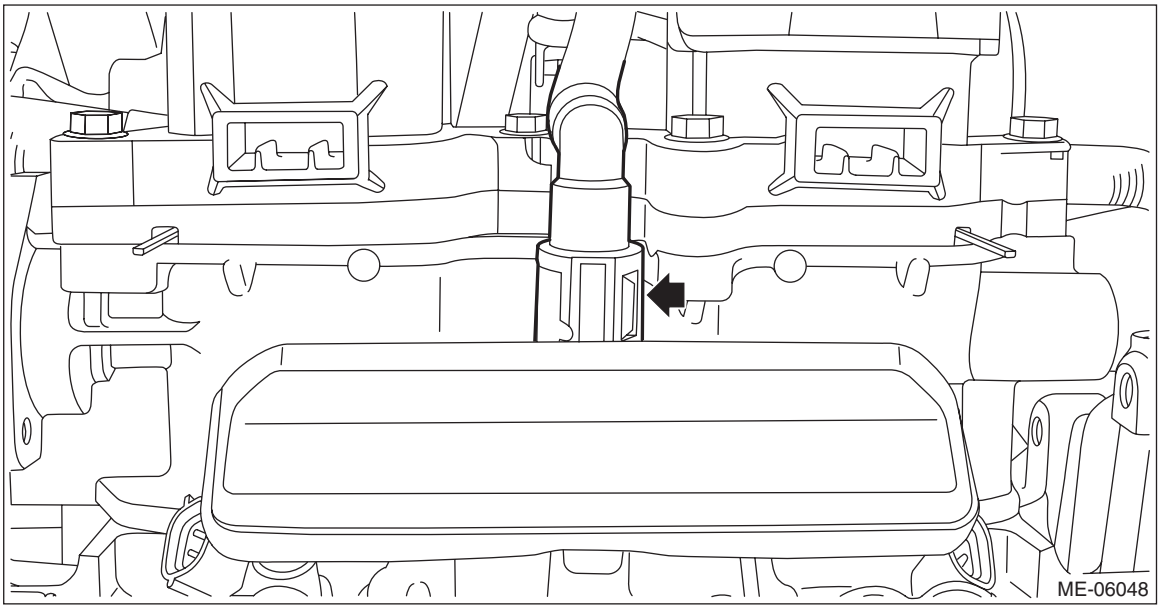
(2) Connect the quick connector to the fuel pipe RH.

CAUTION:
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check that the quick connector is securely connected.**

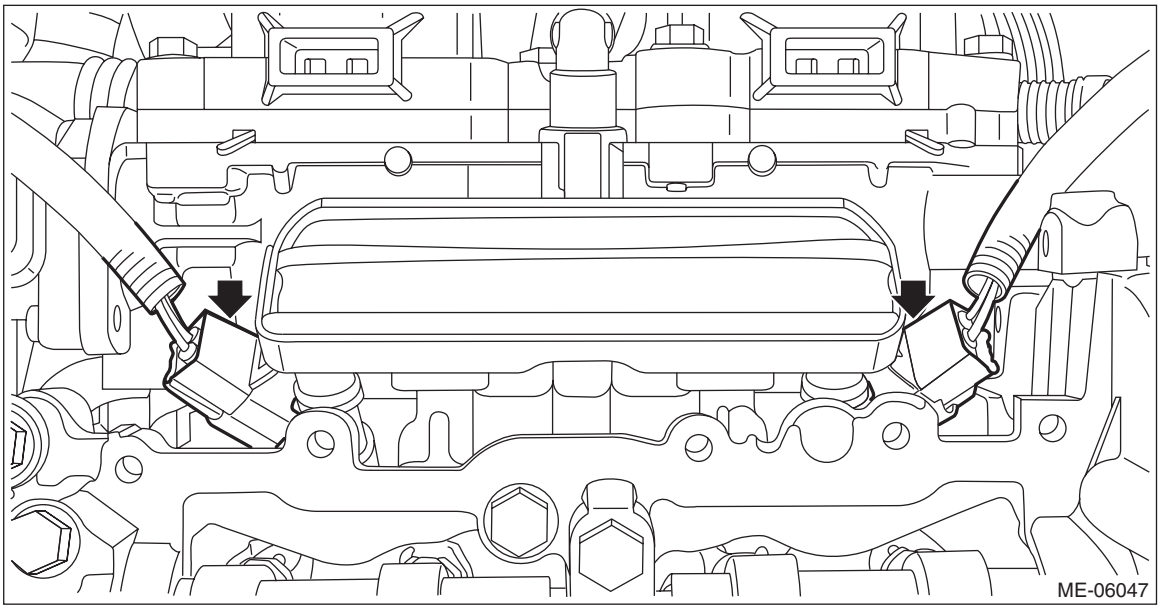
NOTE:
Connect the quick connector as shown in the figure.



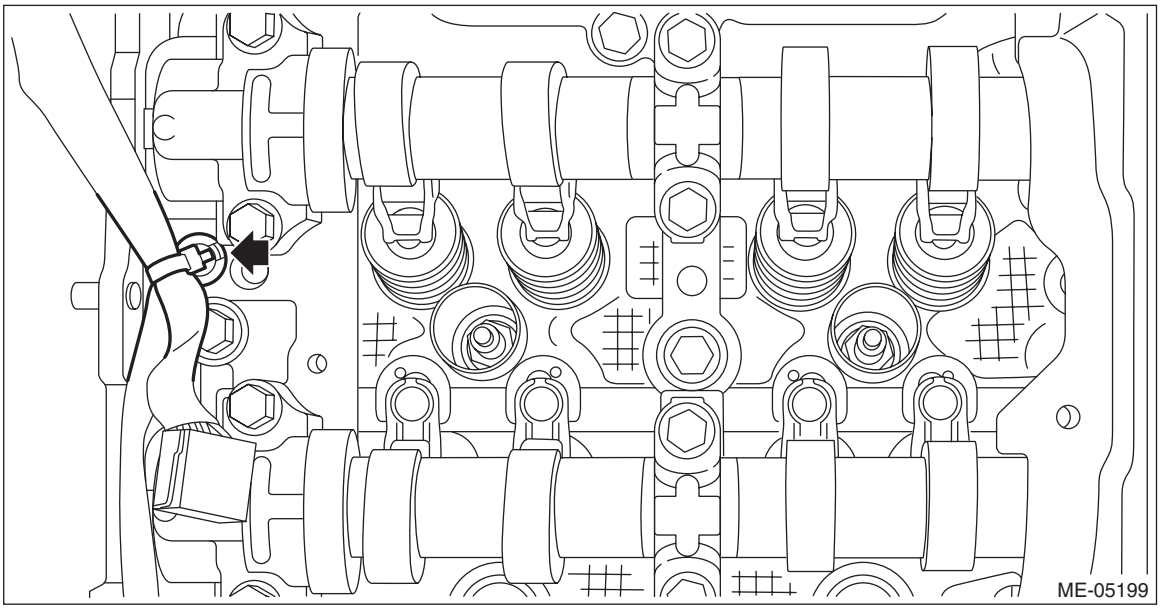
(a) Slider



(3) Connect the connectors to the fuel injector RH.



11) Install the water pipe assembly RH. <Ref. to CO(H4DO(w/o HEV))-44, WATER PIPE ASSEMBLY RH, INSTALLATION, Water Pipe Assembly.>
12) Secure the engine harness to the cam carrier RH with a clip.



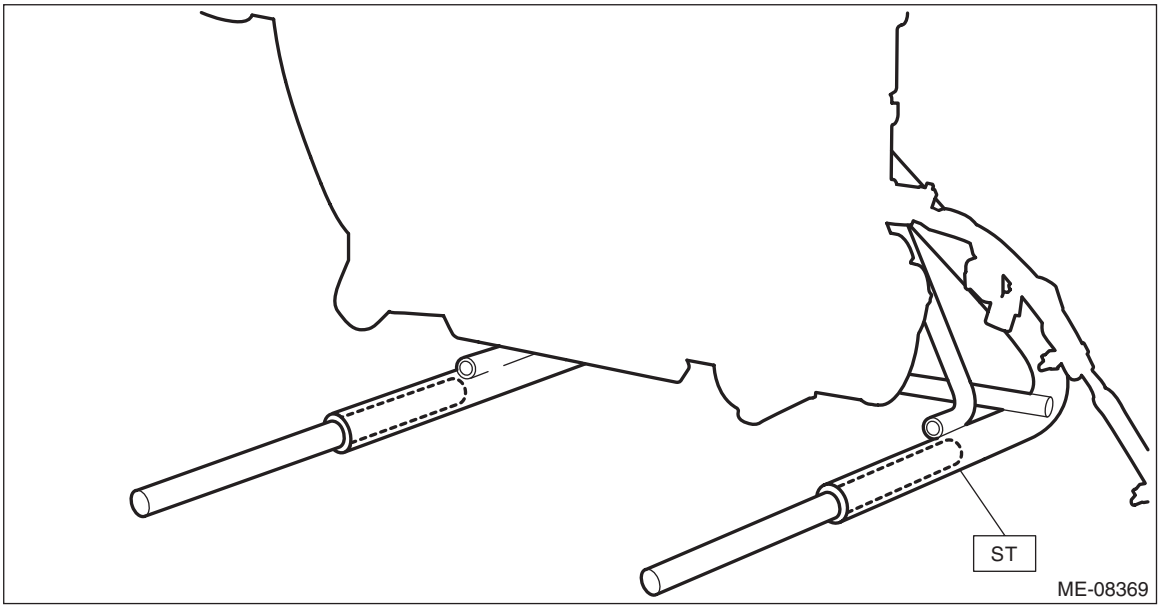
13) Install the rocker cover RH. <Ref. to ME(H4DO(w/o HEV))-213, ROCKER COVER RH, INSTALLATION, Rocker Cover.>
14) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>
15) Install the engine to the vehicle. <Ref. to ME(H4DO(w/o HEV))-91, INSTALLATION, Engine Assembly.>

2. CAM CARRIER LH

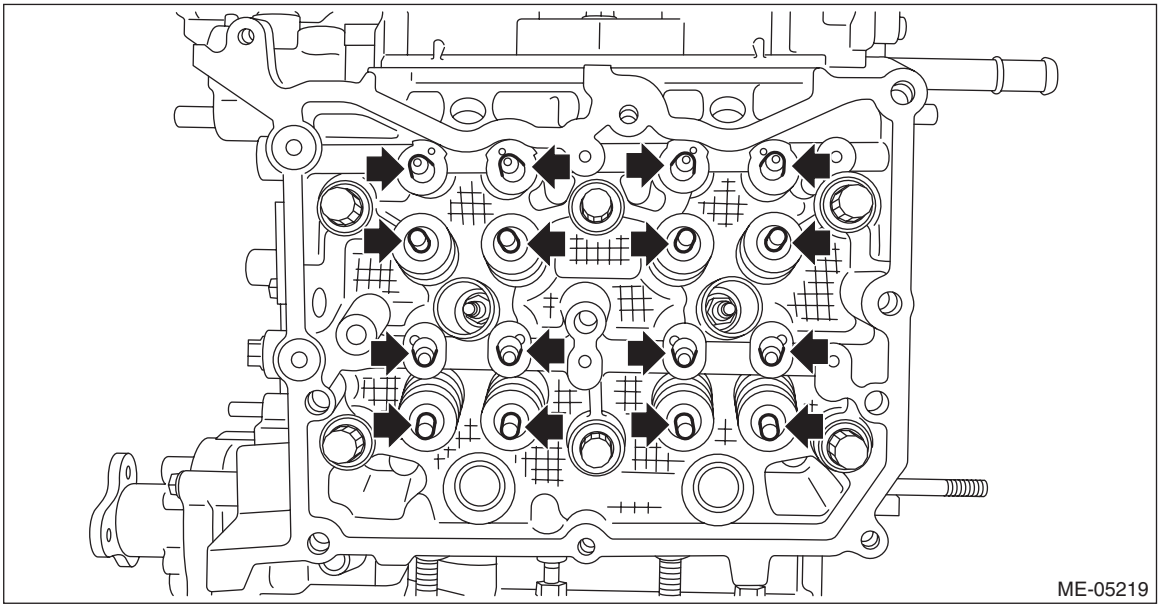
1) Insert the steel rods into ST, and set the engine so that the camshaft LH is facing up.

CAUTION:
• If the engine is standing on one side without inserting the steel rod into ST, engine may lose balance and fall down. Be sure to insert the steel rod into ST to extend the length.
• Use the steel rod with enough strength.
• Be careful not to pinch the engine harness with ST.

ST 499817100 ENGINE STAND

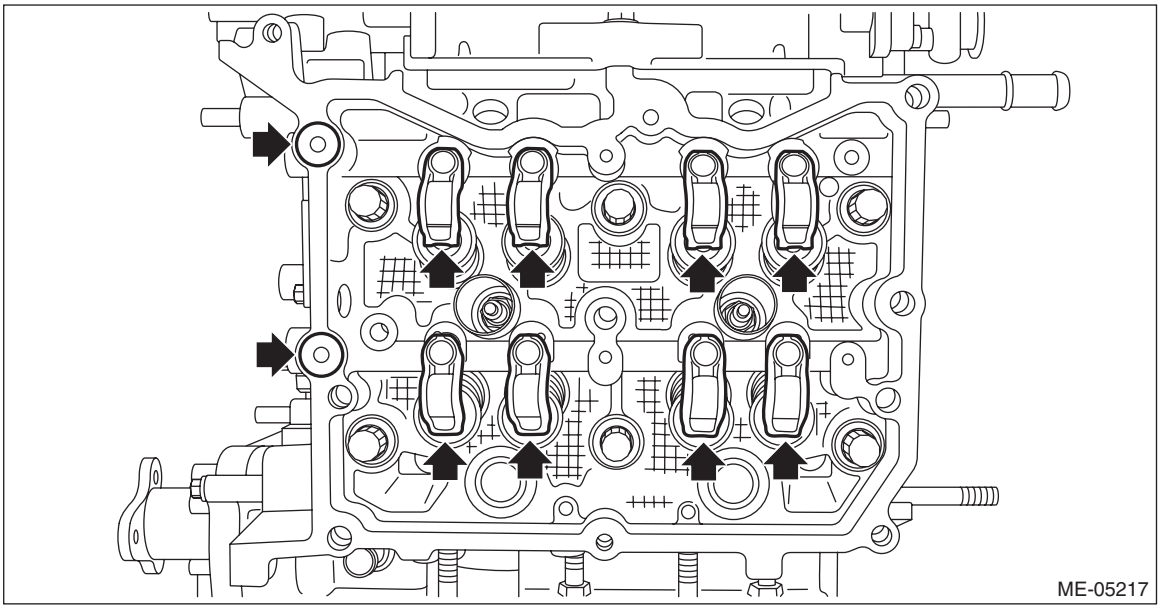


2) Apply engine oil to the valve shim and the roller rocker arm pivot, and install the valve shim and the roller rocker arm pivot to the cylinder head LH.



3) Apply engine oil to the O-ring and the roller rocker arm, and install the O-ring and the roller rocker arm to the cylinder head LH.

NOTE:
Use new O-rings.

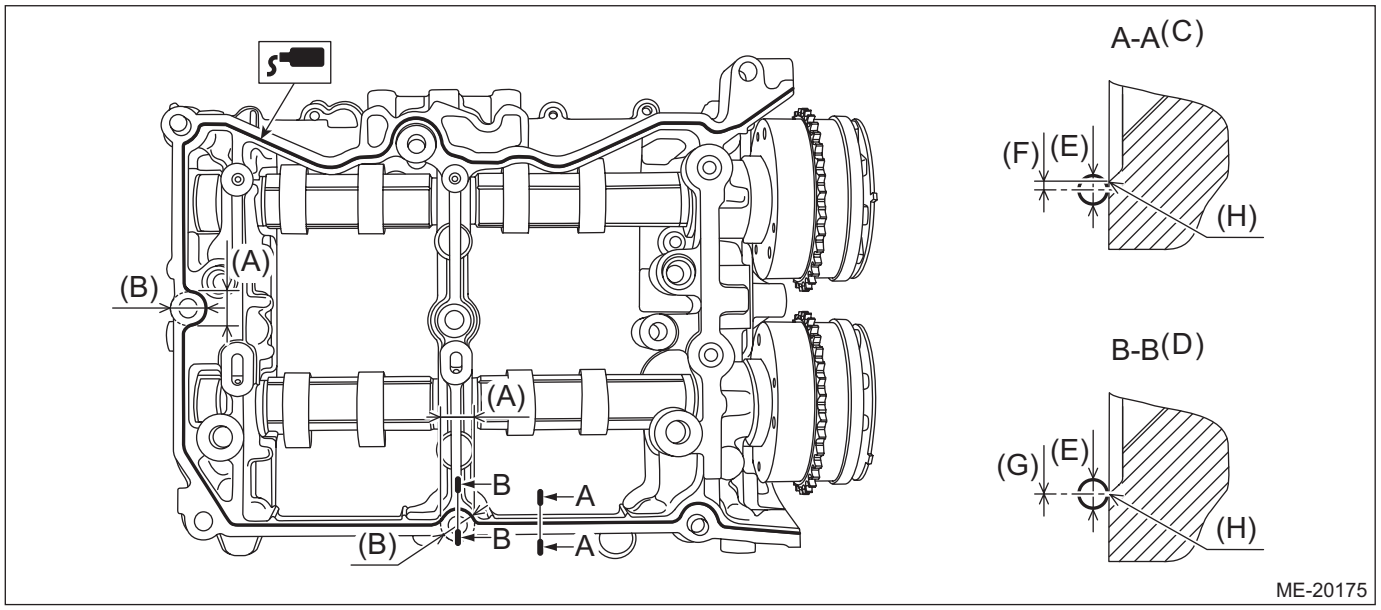


4) Apply liquid gasket to the mating surface of cam carrier LH as shown in the figure.

NOTE:
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the cylinder head LH and cam carrier LH.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

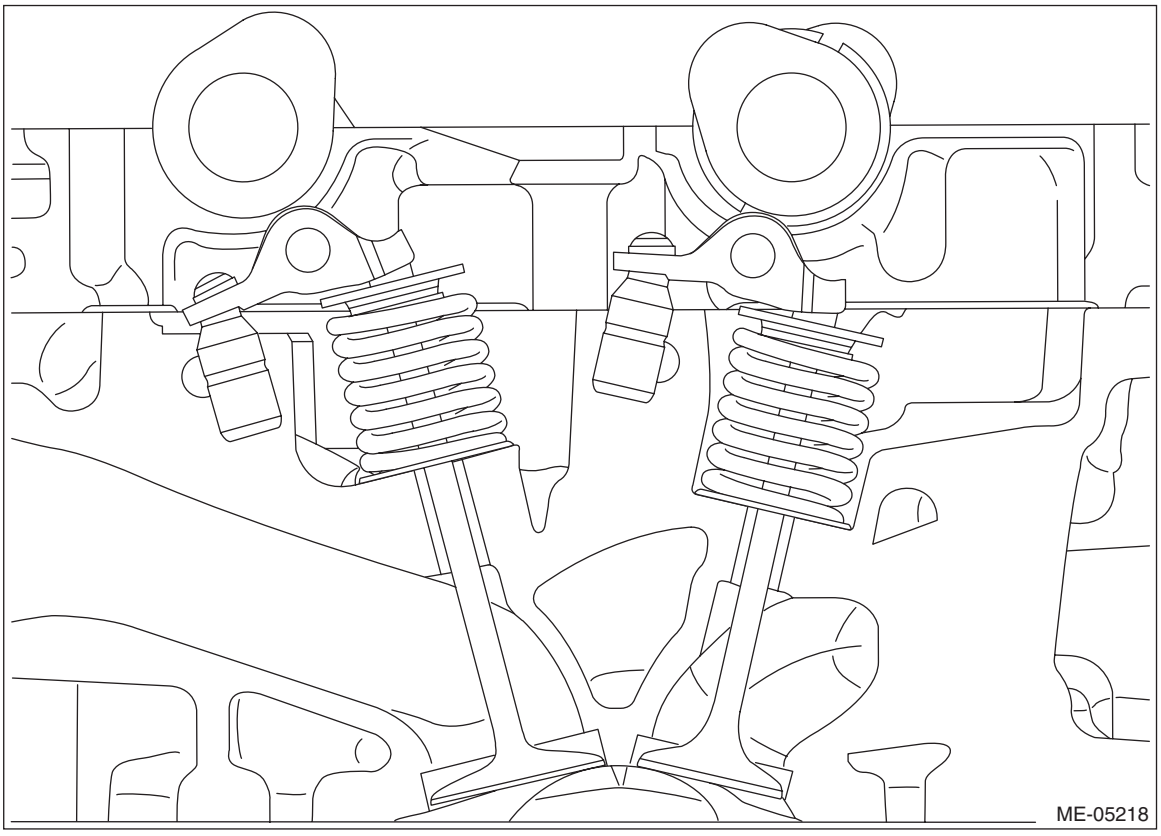
Liquid gasket applying diameter:
3.1±0.5 mm (0.1220±0.0197 in)

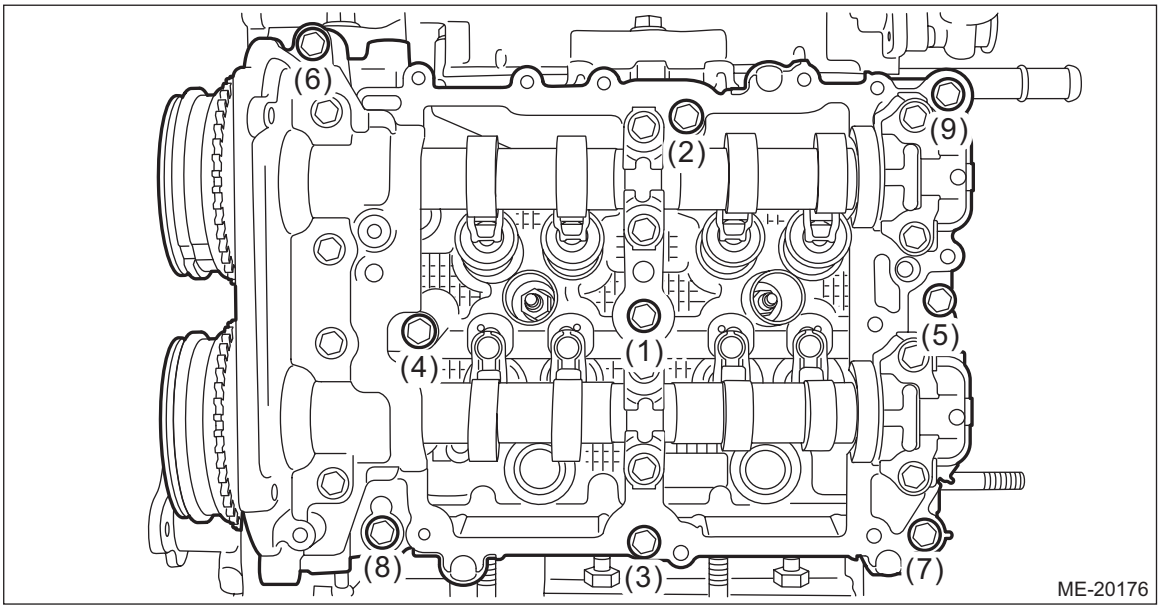


(A)	Range A	(D)	Liquid gasket applying position of mating surfaces of range A	(G)	0±0.5 mm (0±0.0197 in)
(B)	ϕ18 mm (0.7087 in)	(E)	ϕ3.1±0.5 mm (0.1220±0.0197 in)	(H)	Chamfer edge
(C)	Liquid gasket applying position of mating surfaces other than range A	(F)	1 mm (0.0394 in) or less		

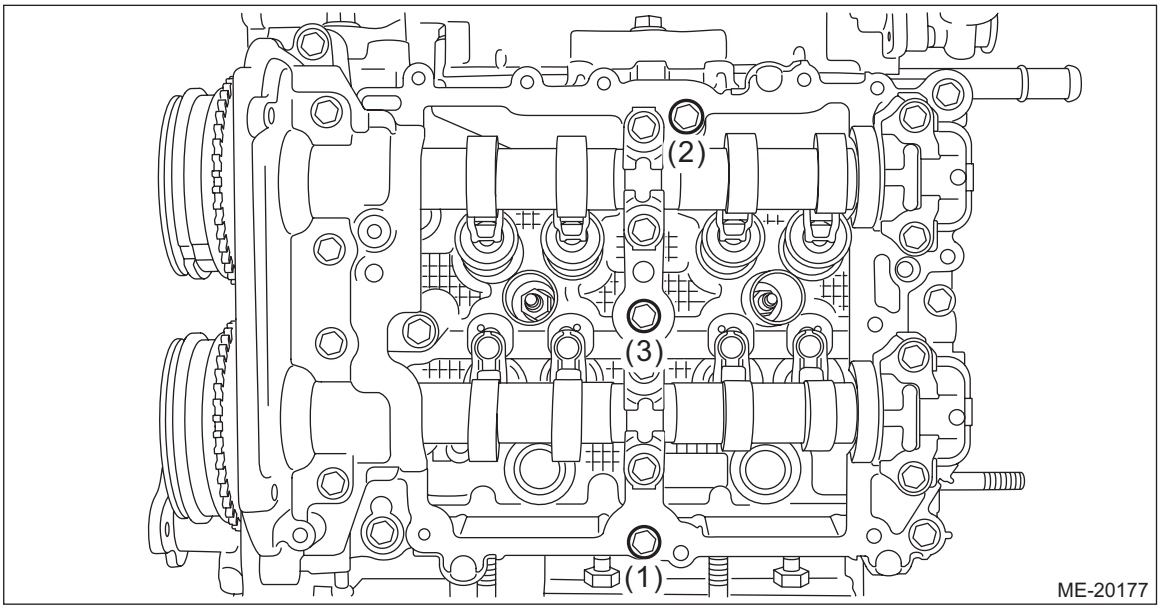
5) Install the cam carrier LH to the cylinder head LH.
   (1) Mount the cam carrier LH, then tighten all bolts with a torque of 18 N·m (1.8 kgf-m, 13.3 ft-lb) in numerical order as shown in the figure.

NOTE:
Set the intake camshaft LH and the exhaust camshaft LH to the zero-lift position.

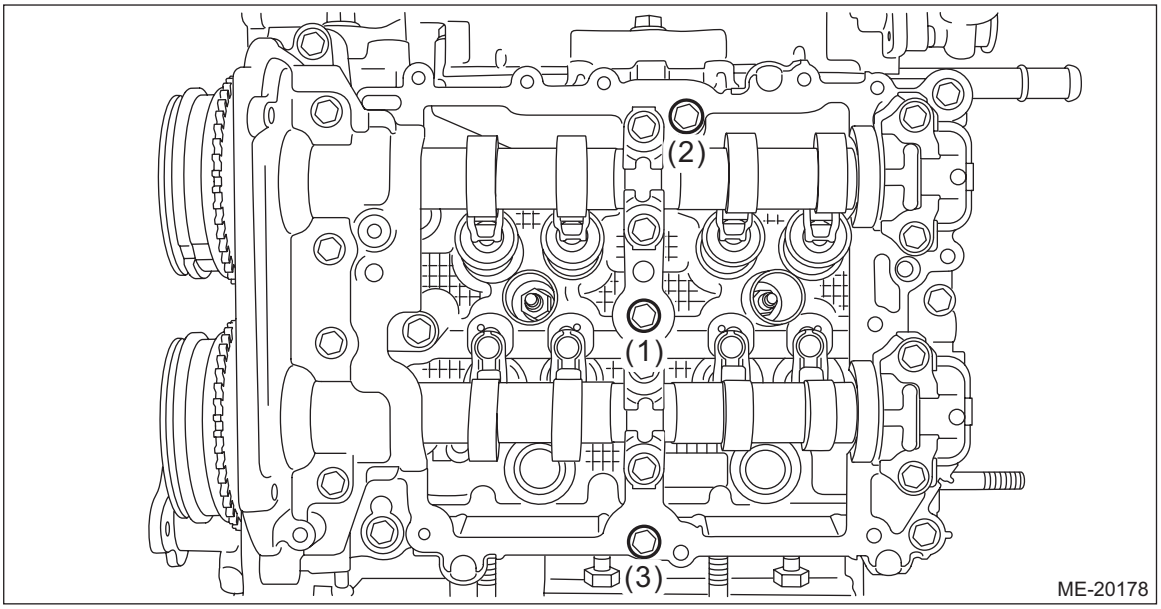




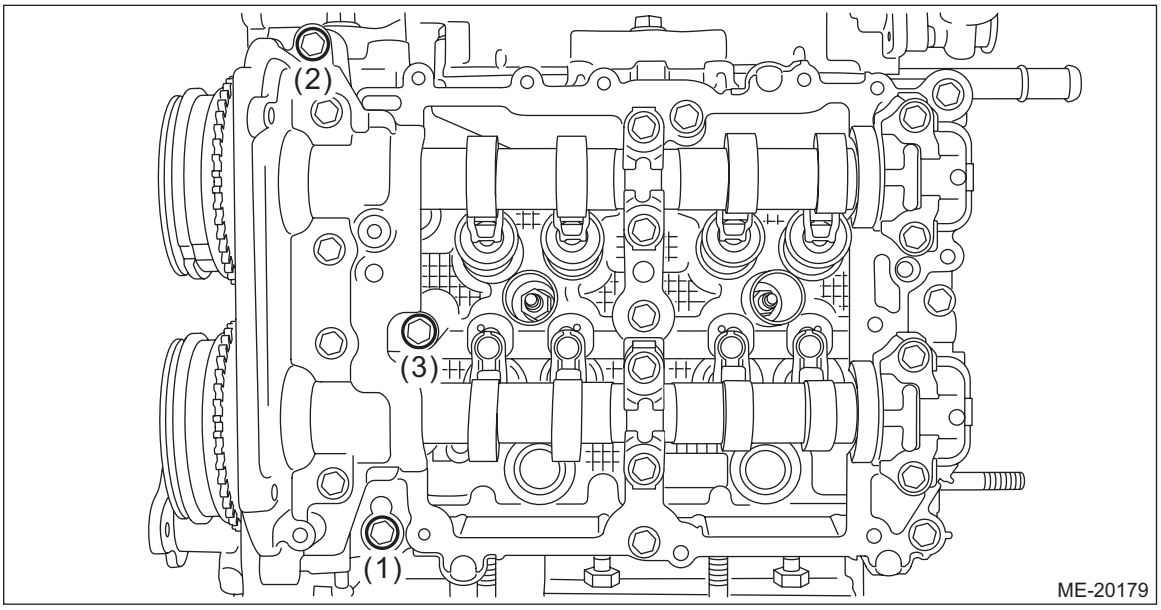
(2) Loosen the bolts (3 places) by 180° in numerical order as shown in the figure.



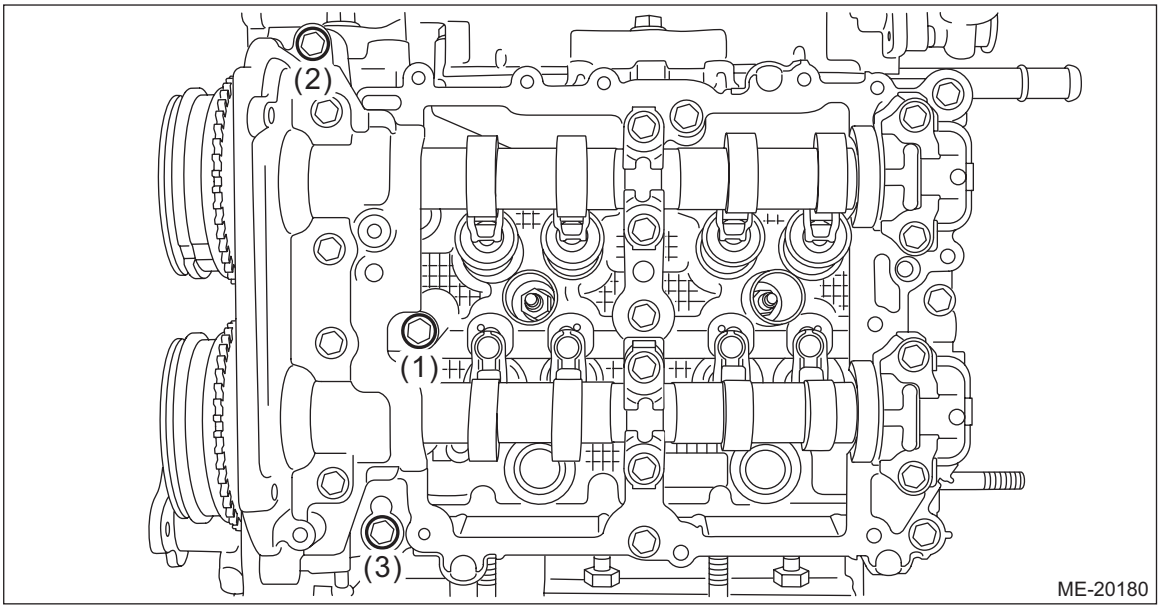
(3) Tighten the bolts (3 places) with a torque of 18 N·m (1.8 kgf-m, 13.3 ft-lb) in numerical order as shown in the figure.



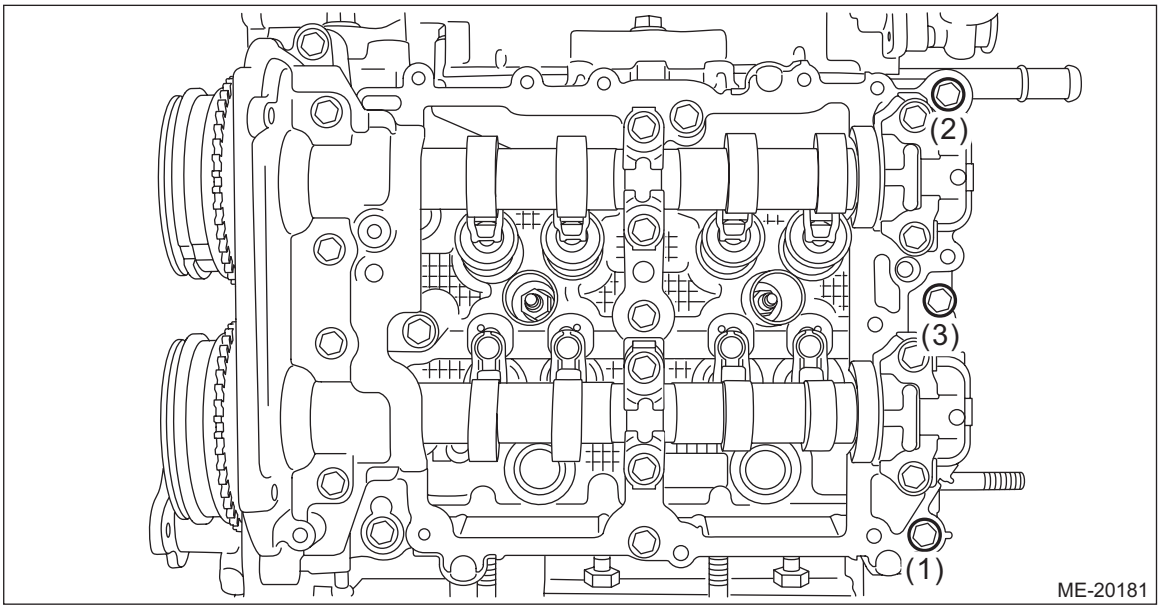
(4) Loosen the bolts (3 places) by 180° in numerical order as shown in the figure.



(5) Tighten the bolts (3 places) with a torque of 18 N·m (1.8 kgf-m, 13.3 ft-lb) in numerical order as shown in the figure.

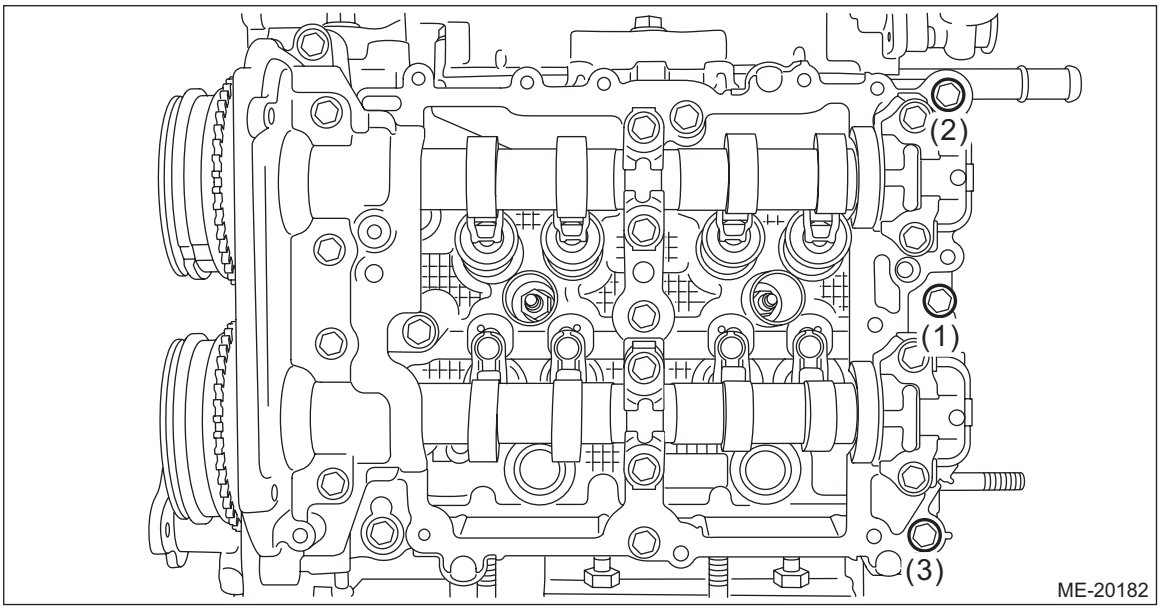


(6) Loosen the bolts (3 places) by 180° in numerical order as shown in the figure.



(7) Tighten the bolts (3 places) with a torque of 18 N·m (1.8 kgf-m, 13.3 ft-lb) in numerical order as shown in the figure.

NOTE:
After tightening, if the liquid gasket is squeezed out onto the seal surface of the chain cover, completely remove any squeezed-out liquid gasket.

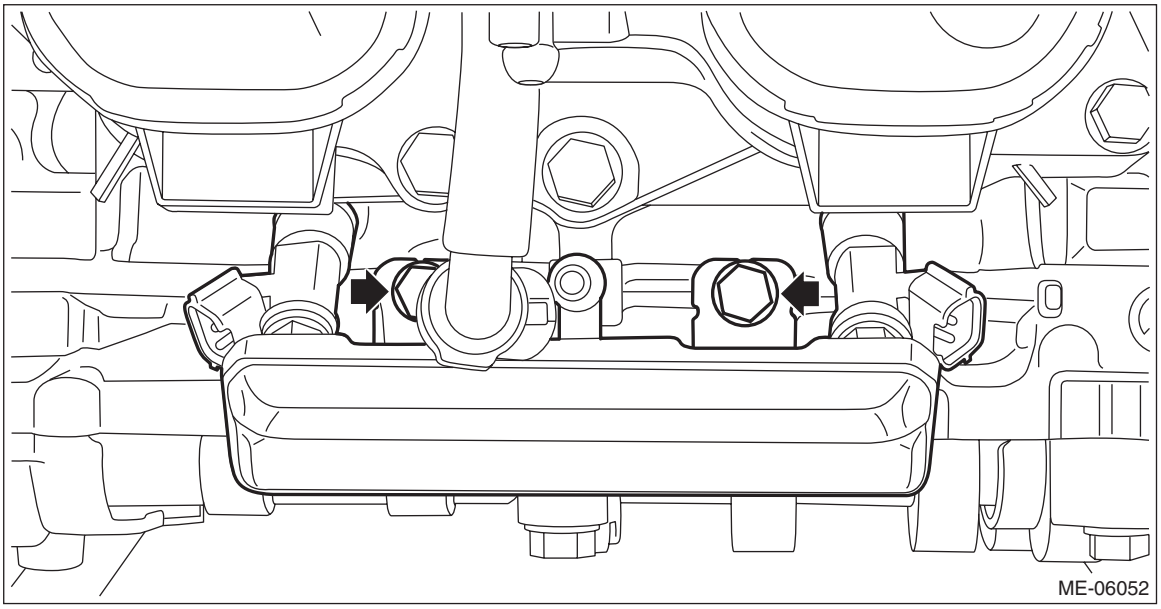


6) Set the part so that the intake manifold is on the upper side.
7) Install the cam sprocket LH. <Ref. to ME(H4DO(w/o HEV))-200, CAM SPROCKET LH, INSTALLATION, Cam Sprocket.>

NOTE:
This procedure is required only when the cam carrier LH is removed for disassembly.
8) Check the cam clearance. <Ref. to ME(H4DO(w/o HEV))-53, WHEN TIMING CHAIN ASSEMBLY IS REMOVED, INSPECTION, Cam Clearance.>
9) Install timing chain LH. <Ref. to ME(H4DO(w/o HEV))-178, TIMING CHAIN LH, INSTALLATION, Timing Chain Assembly.>

10) Install the fuel pipe LH and the fuel injector LH.
(1) Install the fuel pipe LH and the fuel injector LH, and install the bolts which secure the fuel pipe LH.
- Use new O-rings, rubbers, seal rings and fuel injector holder.
- Refer to “Fuel Injector” for fuel injector holder removal and installation. <Ref. to FU(H4DO(HEV))-70, REMOVAL, Fuel Injector.> <Ref. to FU(H4DO(HEV))-73, INSTALLATION, Fuel Injector.>

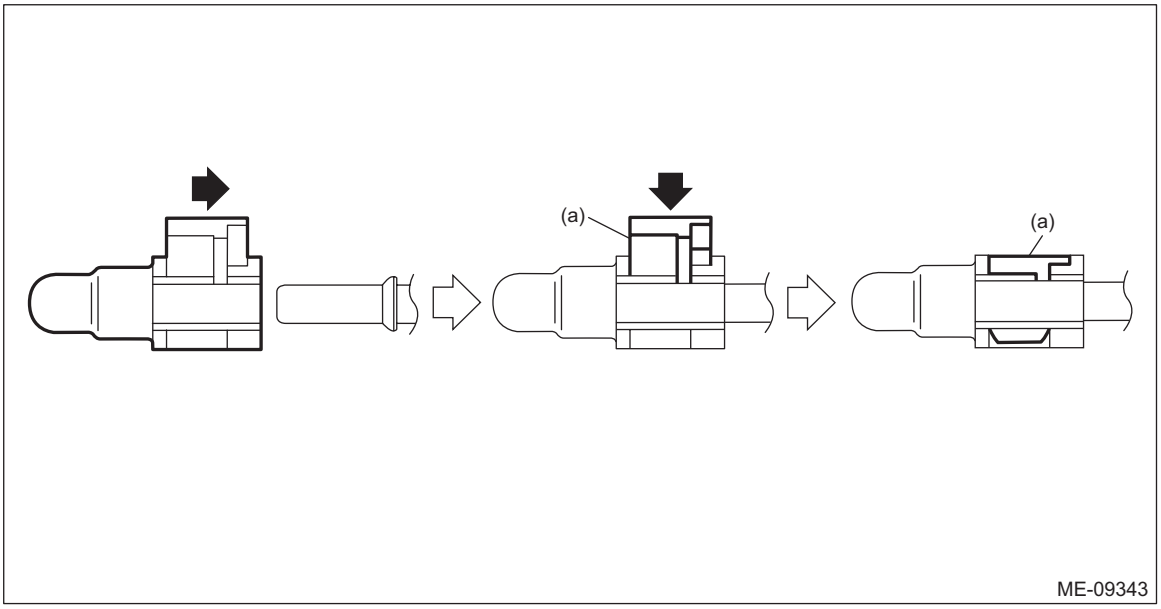
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



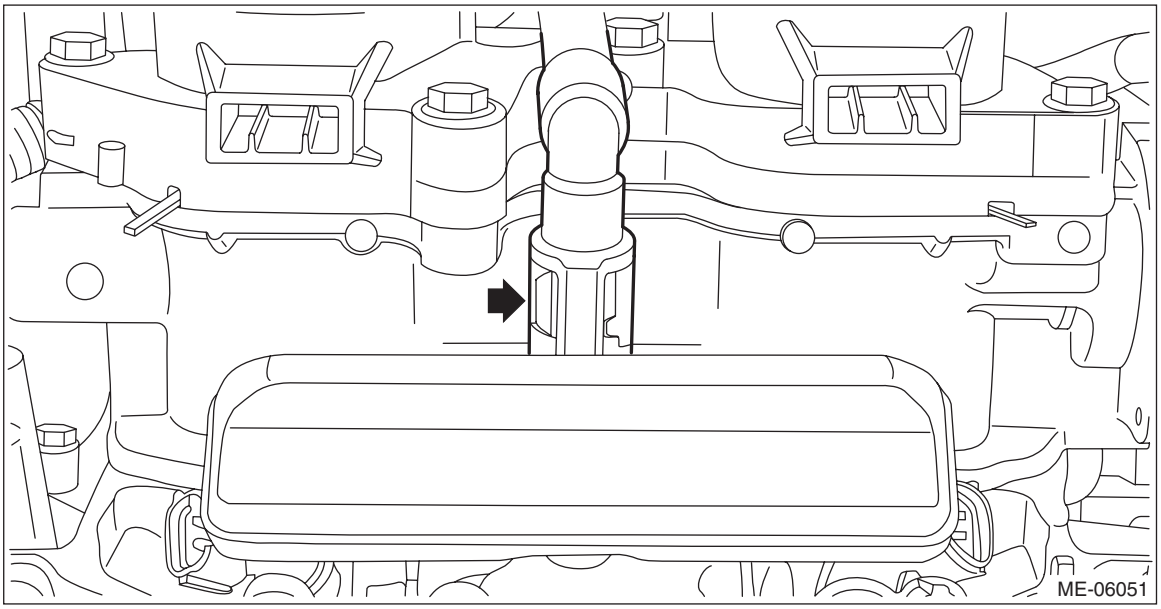
(2) Connect the quick connector to the fuel pipe LH.

CAUTION:
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check that the quick connector is securely connected.**

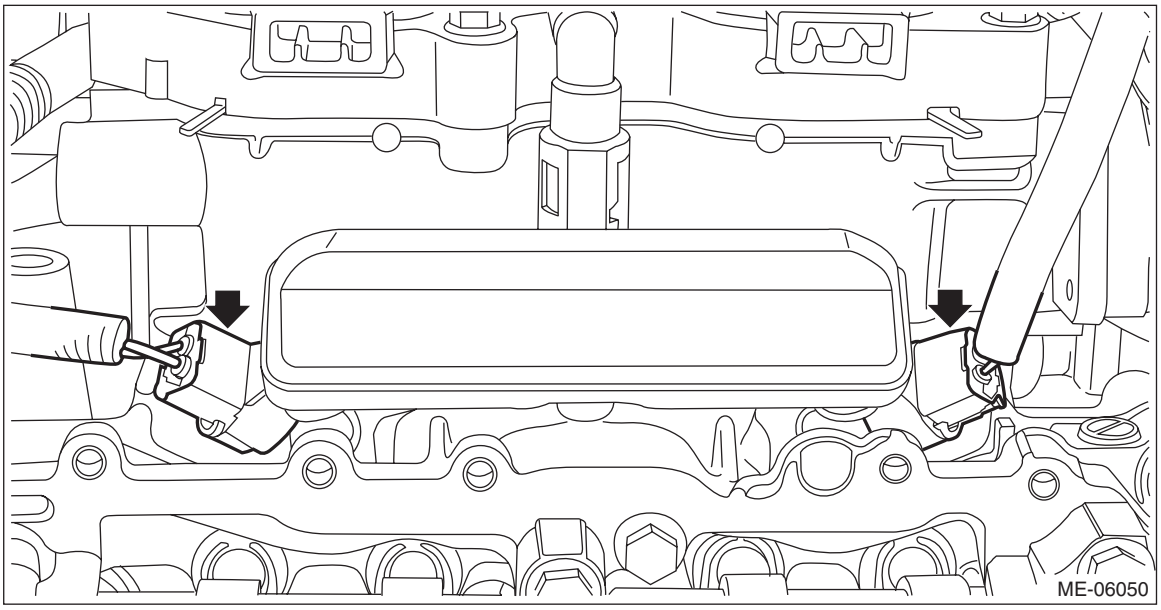
NOTE:
Connect the quick connector as shown in the figure.



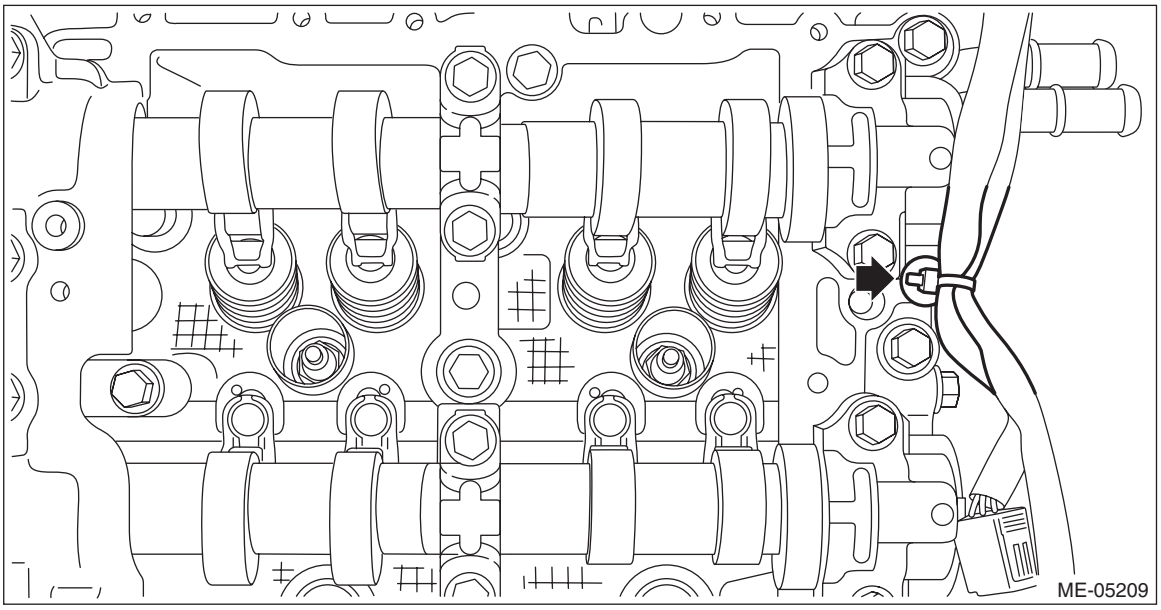
(a) Slider



(3) Connect the connectors to the fuel injector LH.



11) Install the water pipe assembly LH. <Ref. to CO(H4DO(w/o HEV))-45, WATER PIPE ASSEMBLY LH, INSTALLATION, Water Pipe Assembly.>
12) Secure the engine harness to the cam carrier LH with a clip.



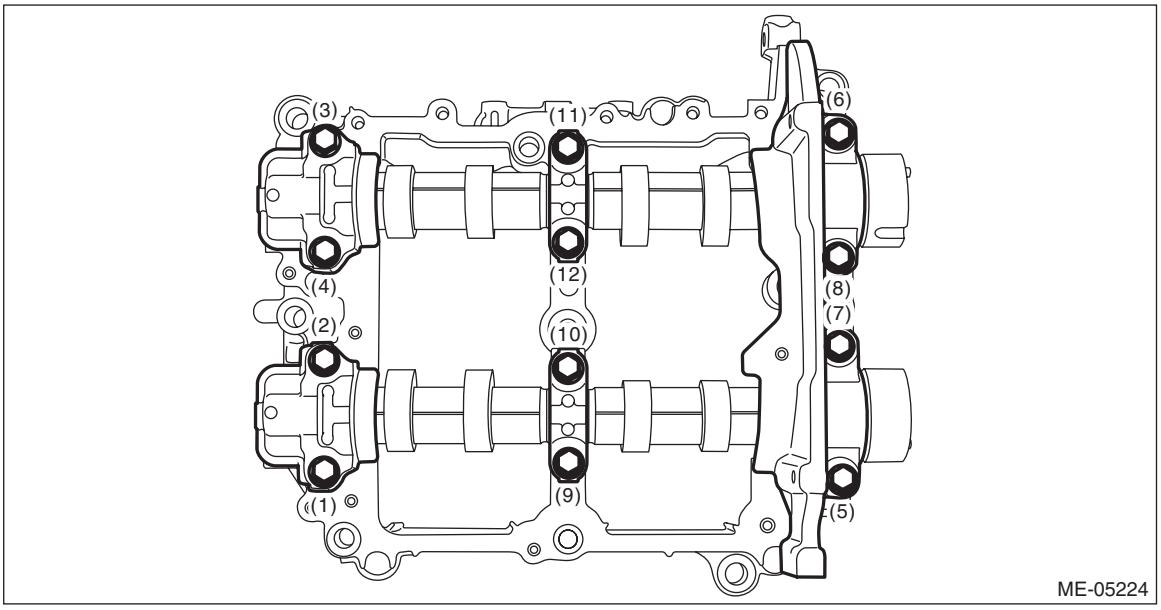
13) Install the rocker cover LH. <Ref. to ME(H4DO(w/o HEV))-217, ROCKER COVER LH, INSTALLATION, Rocker Cover.>
14) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>
15) Install the engine to the vehicle. <Ref. to ME(H4DO(w/o HEV))-91, INSTALLATION, Engine Assembly.>

C: DISASSEMBLY

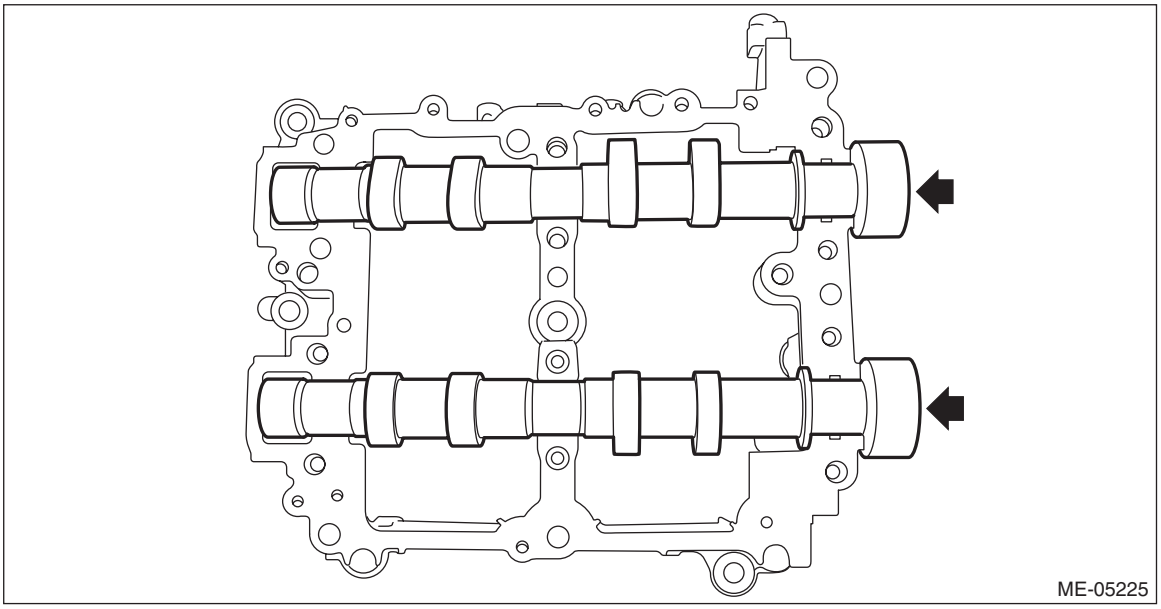
1. CAM CARRIER RH

1) Loosen the bolts (front camshaft cap RH, intake center camshaft cap RH, intake rear camshaft cap RH, exhaust center camshaft cap RH, and exhaust rear camshaft cap RH) equally, a little at a time in numerical sequence as shown in the figure, and remove each camshaft cap.

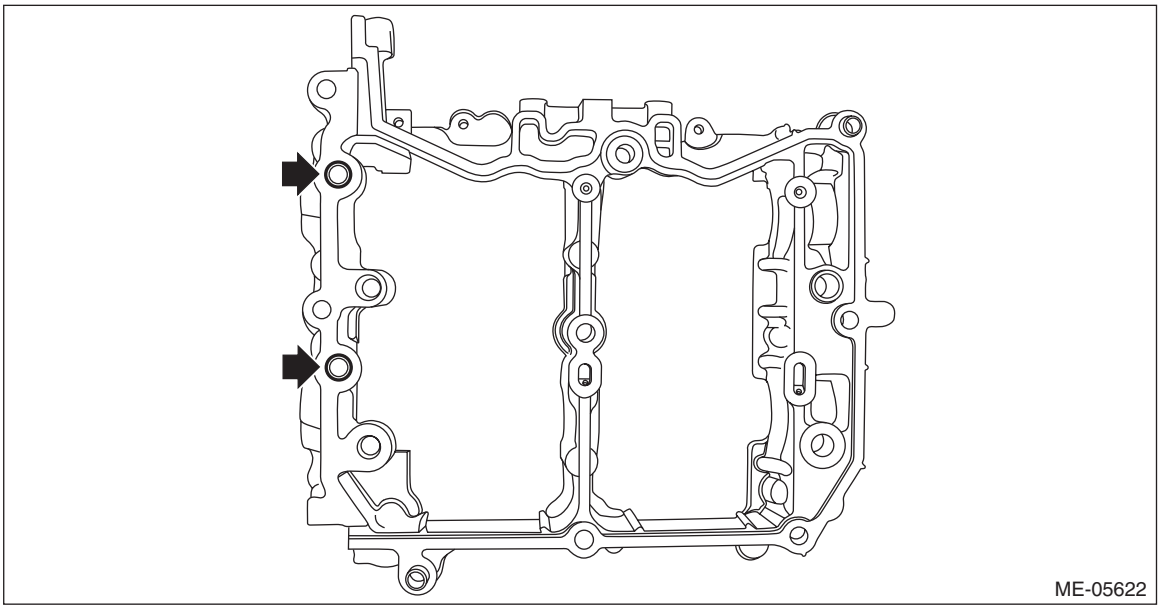
NOTE:
Arrange camshaft caps in order so that they can be installed in their original positions.



2) Remove the intake camshaft RH and the exhaust camshaft RH from cam carrier RH.



3) Remove the filter from cam carrier RH.

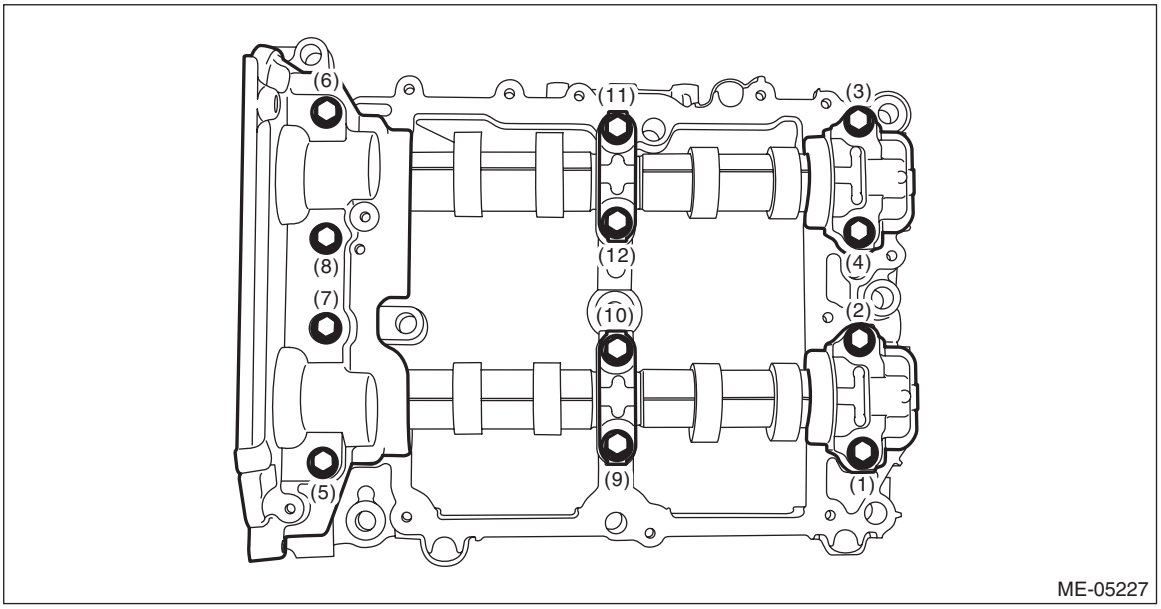


4) Remove the liquid gasket from cam carrier RH and front camshaft cap RH, intake rear camshaft cap RH and exhaust rear camshaft cap RH.

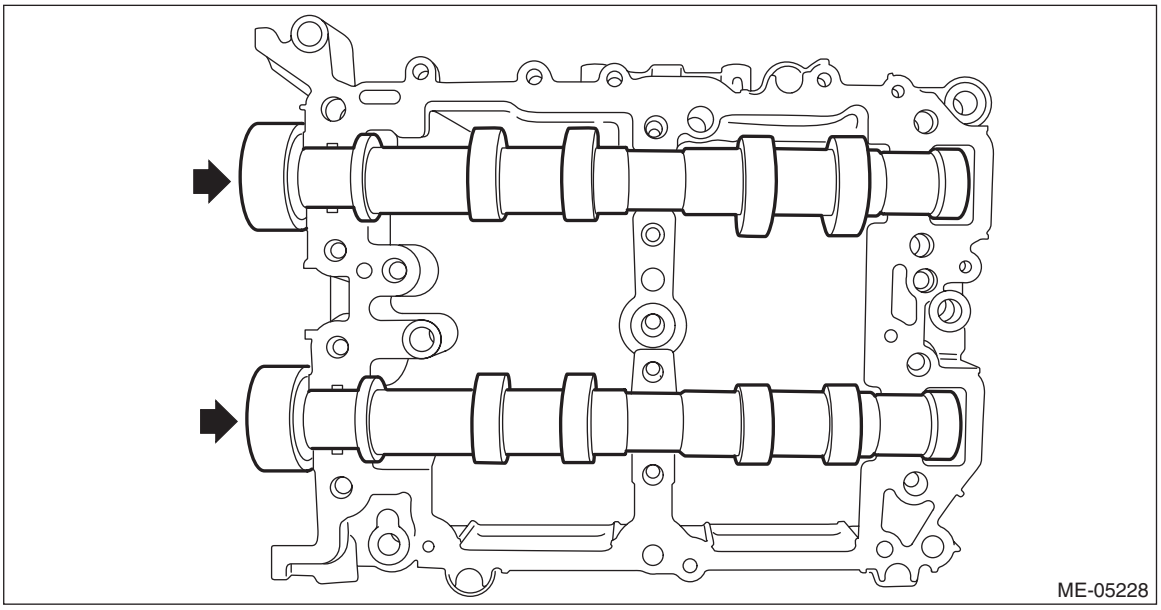
2. CAM CARRIER LH

1) Loosen the bolts (front camshaft cap LH, intake center camshaft cap LH, intake rear camshaft cap LH, exhaust center camshaft cap LH and exhaust rear camshaft cap LH) equally, a little at a time in numerical sequence as shown in the figure, and remove each camshaft cap.

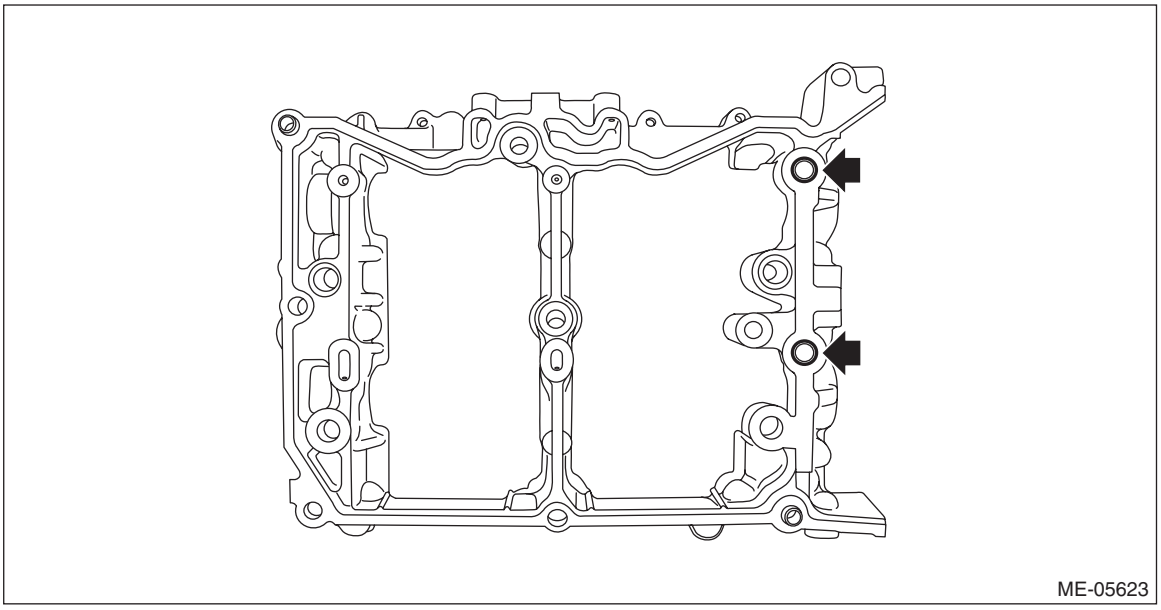
NOTE:
Arrange camshaft caps in order so that they can be installed in their original positions.



2) Remove the intake camshaft LH and the exhaust camshaft LH from cam carrier LH.



3) Remove the filter from cam carrier LH.



4) Remove the liquid gasket from cam carrier LH and front camshaft cap LH, intake rear camshaft cap LH and exhaust rear camshaft cap LH.

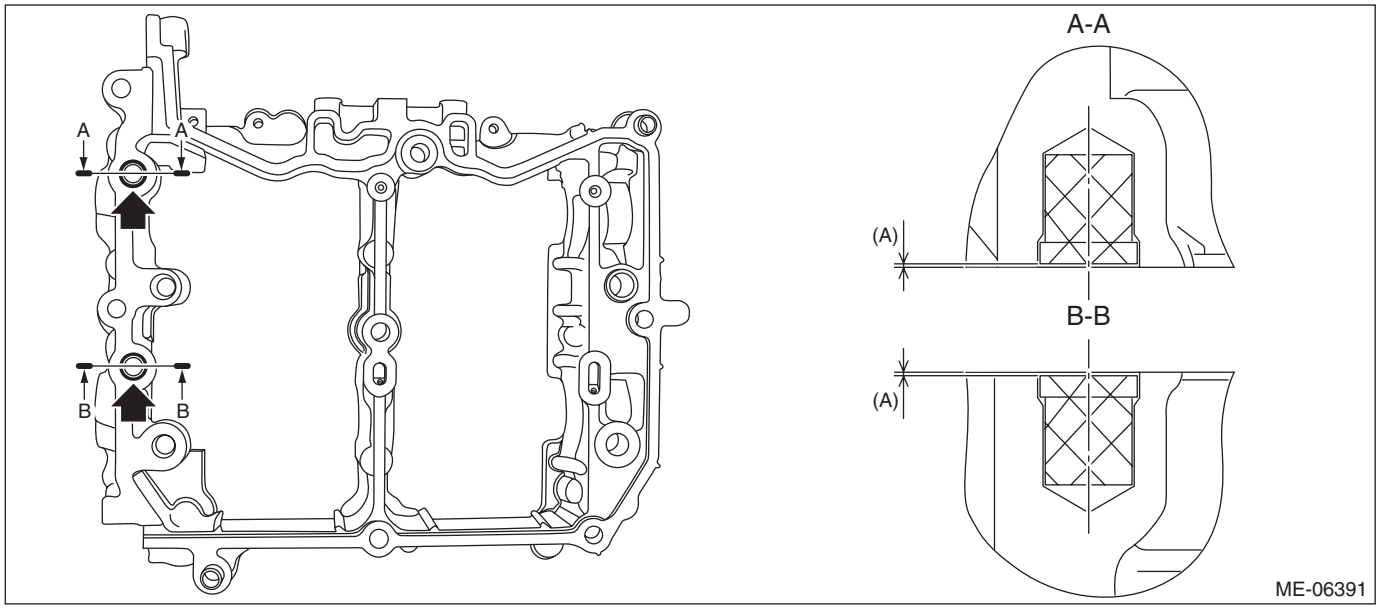
D: ASSEMBLY

1. CAM CARRIER RH

1) Install the filter to the cam carrier RH.

NOTE:
Use a new filter.

Filter insert position:
Cam carrier RH end face $0^{+0}_{-0.5}$ mm ($^{+0}_{-0.0197}$ in) position



(A) 0 — 0.5 mm (0 — 0.0197 in)

2) Set the intake camshaft RH and the exhaust camshaft RH to the cam carrier RH.

NOTE:
Apply engine oil to the journals of cam carrier RH before setting the intake camshaft RH and exhaust camshaft RH.

3) Install the front camshaft cap RH, intake center camshaft cap RH, intake rear camshaft cap RH, exhaust center camshaft cap RH and exhaust rear camshaft cap RH.

(1) Apply liquid gasket to the mating surface of front camshaft cap RH, intake rear camshaft cap RH and exhaust rear camshaft cap RH as shown in the figure.

CAUTION:

• Do not apply liquid gasket excessively. Applying excessively may cause excess gasket to flow toward camshaft journal, resulting in engine seizure.

• Do not apply liquid gasket excessively to the intake center camshaft cap RH and exhaust center camshaft cap RH.

NOTE:

• Before applying liquid gasket, degrease the old liquid gasket seal surface of the front camshaft cap RH, intake rear camshaft cap RH, exhaust rear camshaft cap RH, and cam carrier RH.

• Install within 5 min. after applying liquid gasket.

Liquid gasket:

THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

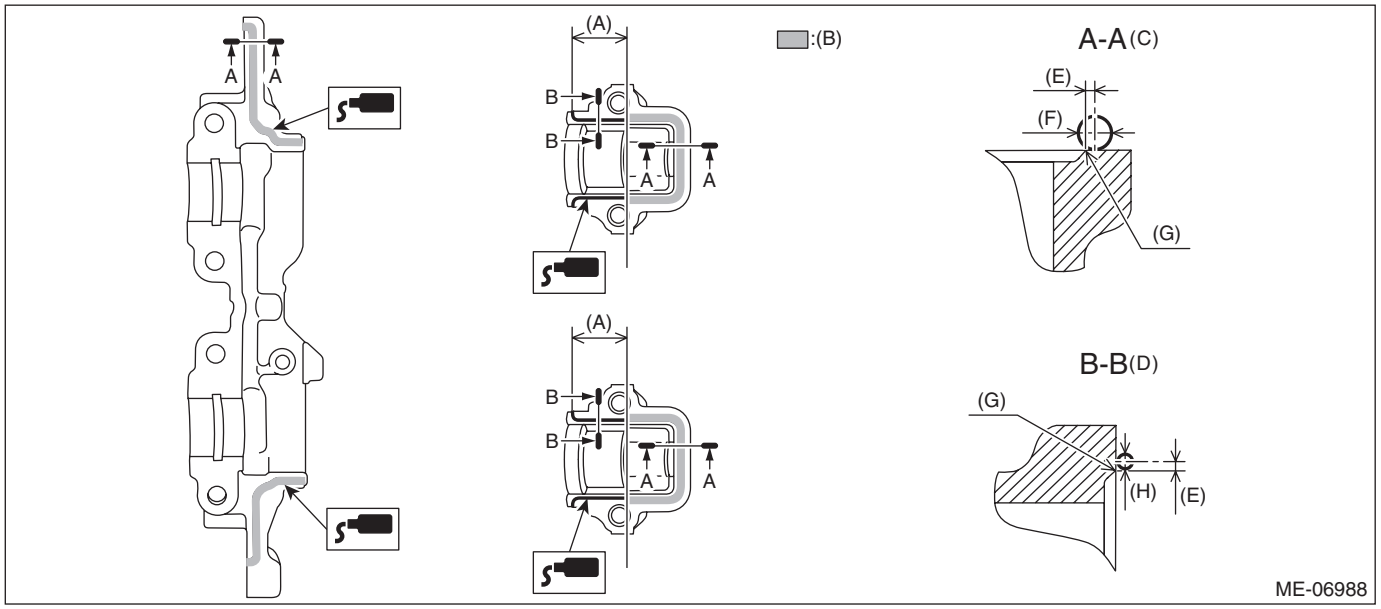
Liquid gasket applying diameter:

Mating surfaces other than range A

2±0.5 mm (0.0787±0.0197 in)

Mating surfaces of range A

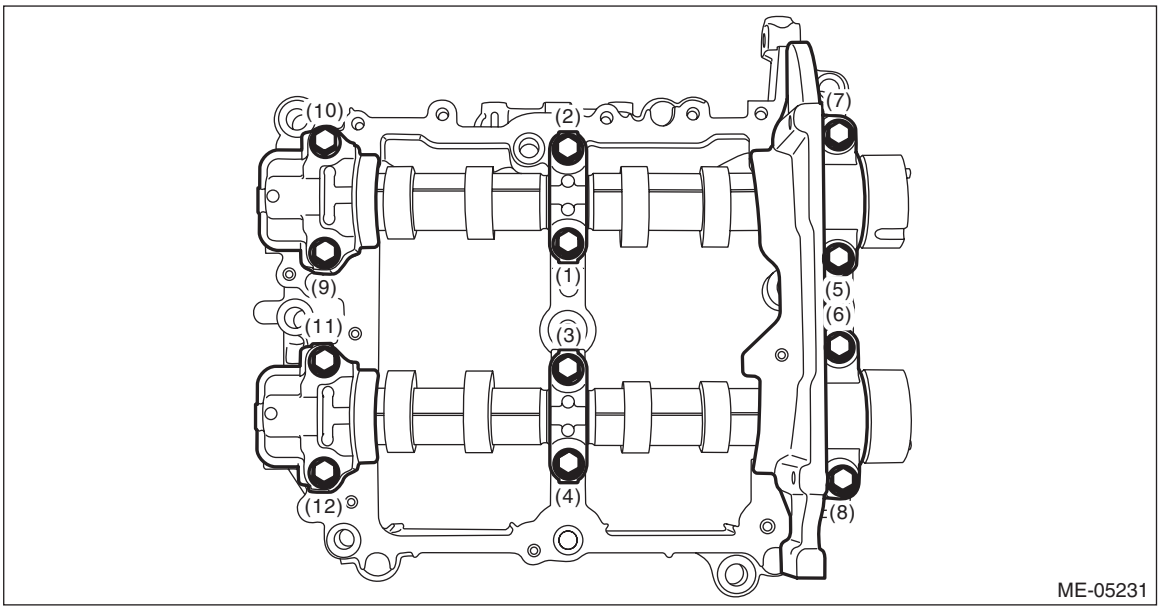
3.5±0.5 mm (0.1378±0.0197 in)



(A)	28.5 mm (1.122 in)	(D)	Liquid gasket applying position of mating surfaces other than range A	(G)	Chamfer edge
(B)	Range A	(E)	1 mm (0.0394 in) or less	(H)	ϕ2±0.5 mm (0.0787±0.0197 in)
(C)	Liquid gasket applying position of mating surfaces of range A	(F)	ϕ3.5±0.5 mm (0.1378±0.0197 in)		

(2) Apply engine oil to the journals of each camshaft cap before setting the camshaft cap.
(3) Tighten the bolts which secure front camshaft cap RH, intake center camshaft cap RH, intake rear camshaft cap RH, exhaust center camshaft cap RH and exhaust rear camshaft cap RH in numerical order as shown in the figure.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

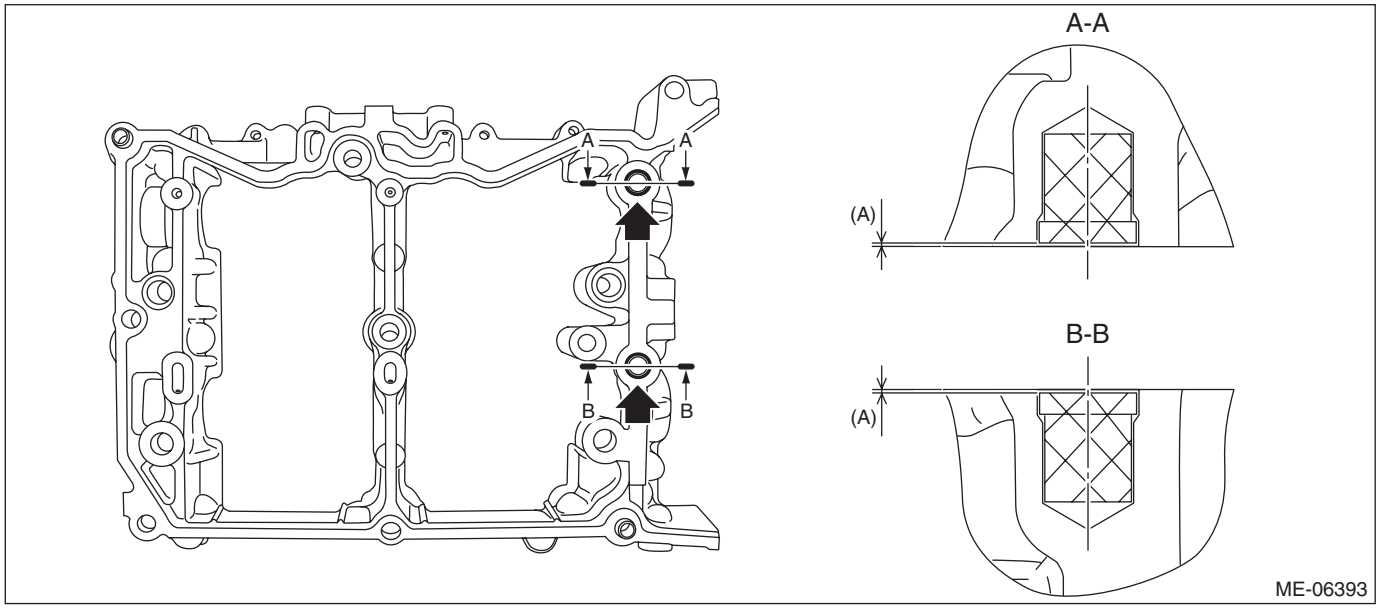


2. CAM CARRIER LH

1) Install the filter to the cam carrier LH.

NOTE:
Use a new filter.

Filter insert position:
Cam carrier LH end face $0^{+0}_{-0.5}$ mm ($^{+0}_{-0.0197}$ in) position



(A) 0 — 0.5 mm (0 — 0.0197 in)

2) Set the intake camshaft LH and the exhaust camshaft LH to the cam carrier LH.

NOTE:
Apply engine oil to the journals of cam carrier LH before setting the intake camshaft LH and exhaust camshaft LH.

3) Install the front camshaft cap LH, intake center camshaft cap LH, intake rear camshaft cap LH, exhaust center camshaft cap LH and exhaust rear camshaft cap LH.

(1) Apply liquid gasket to the mating surface of front camshaft cap LH, intake rear camshaft cap LH and exhaust rear camshaft cap LH as shown in the figure.

CAUTION:

• Do not apply liquid gasket excessively. Applying excessively may cause excess gasket to flow toward camshaft journal, resulting in engine seizure.

• Do not apply liquid gasket excessively to the intake center camshaft cap LH and exhaust center camshaft cap LH.

NOTE:

• Before applying liquid gasket, degrease the old liquid gasket seal surface of the front camshaft cap LH, intake rear camshaft cap LH, exhaust rear camshaft cap LH, and cam carrier LH.

• Install within 5 min. after applying liquid gasket.

Liquid gasket:

THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

Liquid gasket applying diameter:

Mating surfaces other than ranges A, B and C

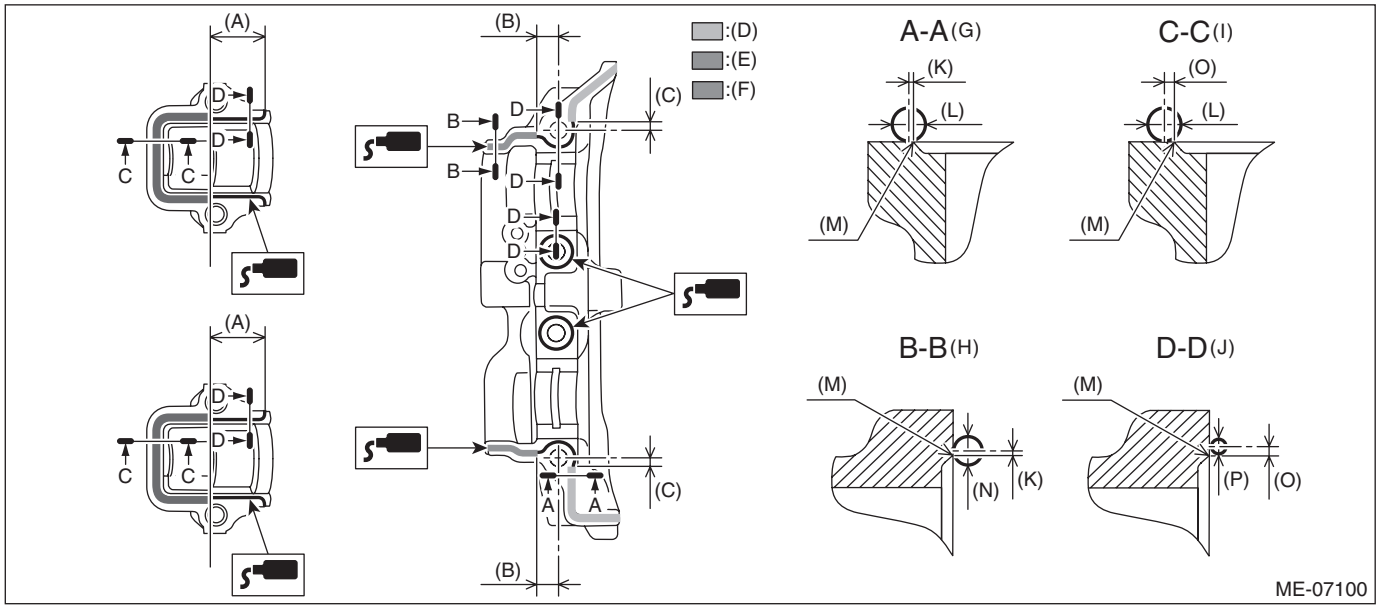
2±0.5 mm (0.0787±0.0197 in)

Mating surfaces of ranges A and C

3.5±0.5 mm (0.1378±0.0197 in)

Mating surfaces of range B

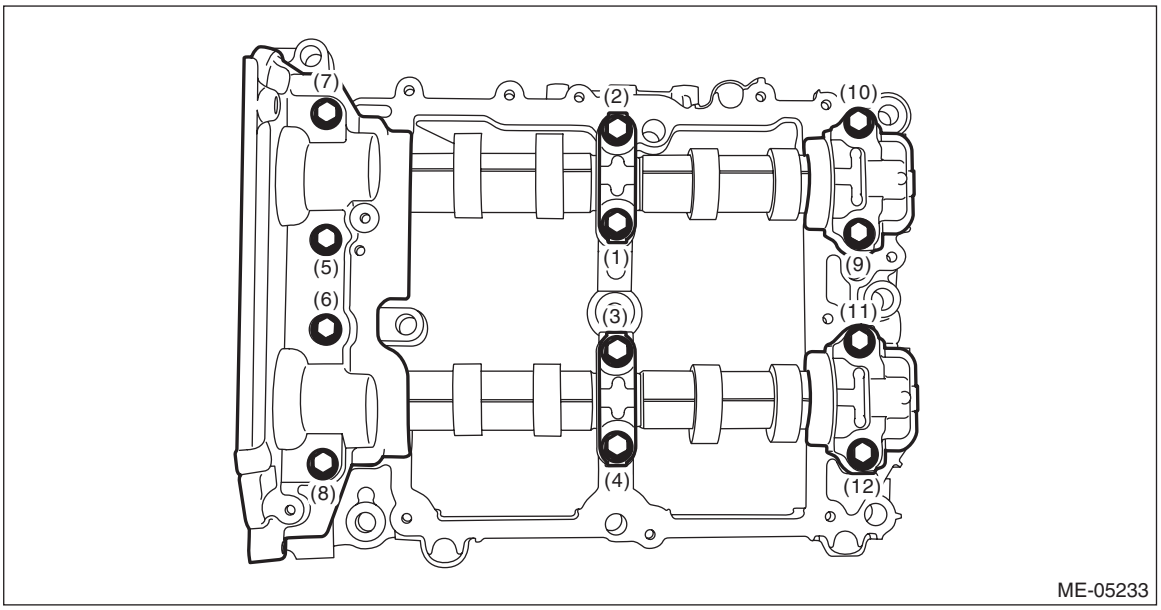
$3^{+0.5}_{-0}$ mm ($0.1181^{+0.0197}_{-0}$ in)



(A)	28.5 mm (1.122 in)	(G)	Liquid gasket applying position of mating surfaces of range A	(M)	Chamfer edge
(B)	11.6 mm (0.4567 in)	(H)	Liquid gasket applying position of mating surfaces of range B	(N)	$\phi 3^{+0.5}_{-0}$ mm ($^{+0.0197}_{-0}$ in)
(C)	5.1 mm (0.2008 in)	(I)	Liquid gasket applying position of mating surfaces of range C	(O)	1 mm (0.0394 in) or less
(D)	Range A	(J)	Liquid gasket applying position of mating surfaces other than range A, range B and range C	(P)	ϕ2±0.5 mm (0.0787±0.0197 in)
(E)	Range B	(K)	0.5 mm (0.0197 in)		
(F)	Range C	(L)	ϕ3.5±0.5 mm (0.1378±0.0197 in)		

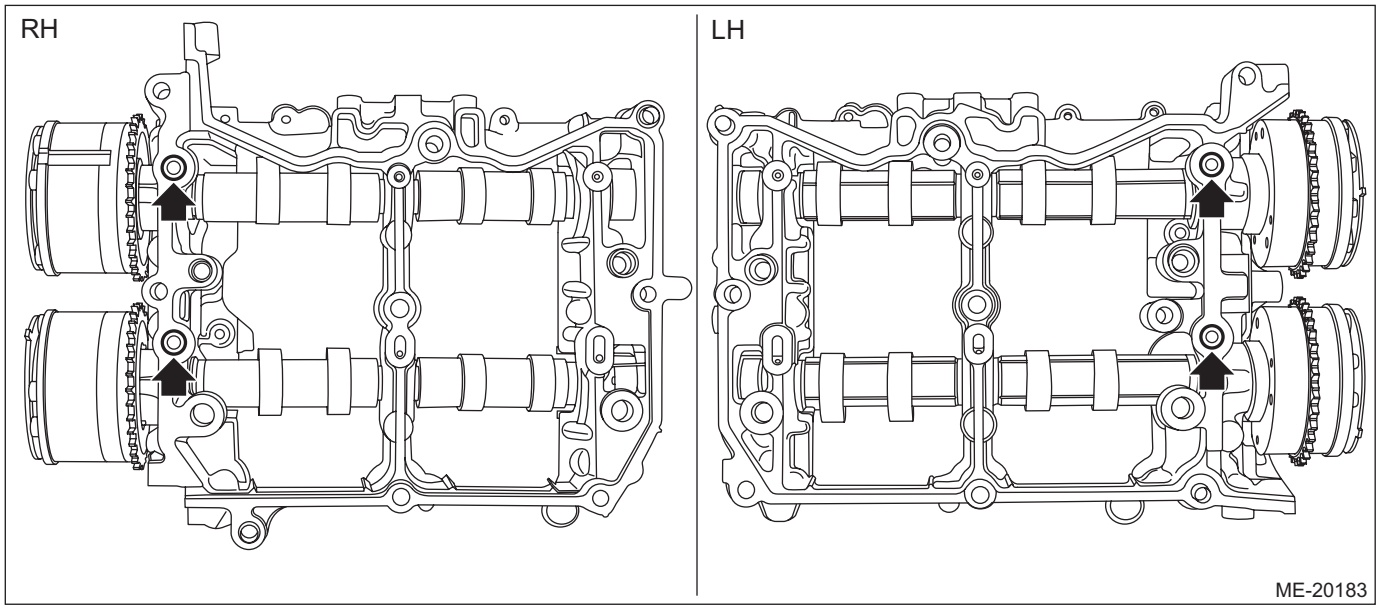
(2) Apply engine oil to the journals of each camshaft cap before setting the camshaft cap.
(3) Tighten the bolts which secure front camshaft cap LH, intake center camshaft cap LH, intake rear camshaft cap LH, exhaust center camshaft cap LH and exhaust rear camshaft cap LH in numerical order as shown in the figure.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



E: INSPECTION

1) Visually check the cam carrier filter, and if clogging is found, replace with a new part.

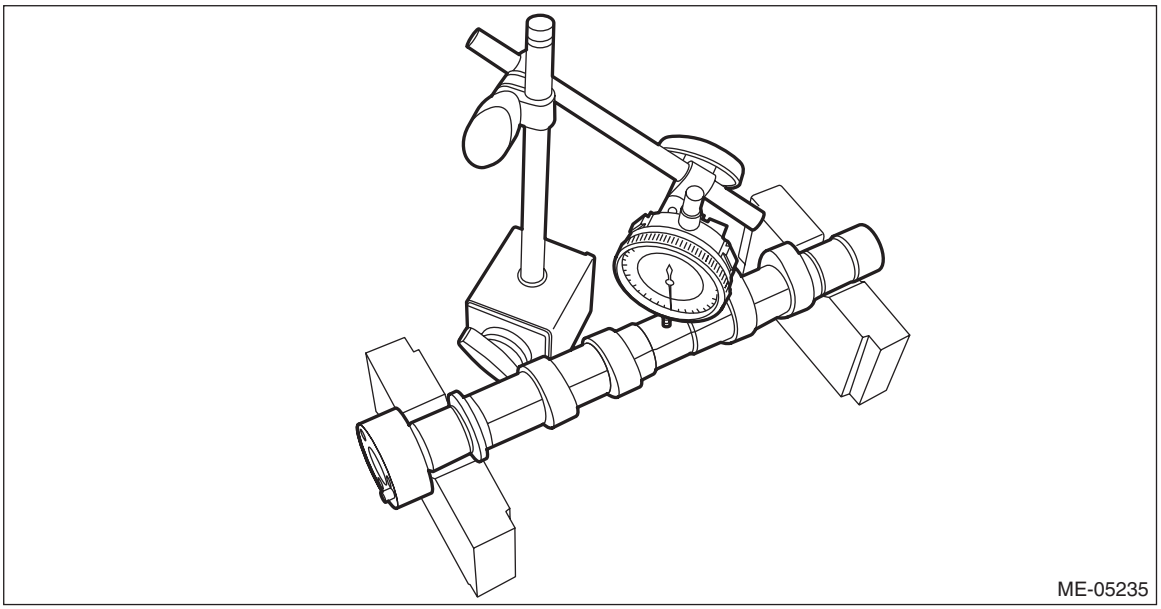


2) Check the camshaft journals for damage and wear. Replace the camshaft if faulty.
3) Check the cam face condition of camshaft, and remove the minor faults by grinding with oil stone. Replace the camshaft if uneven wear is found.

4) Using a dial gauge, check the camshaft bend. If it exceeds the limit, replace the camshaft.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

Camshaft bend:
Limit
0.020 mm (0.0008 in)

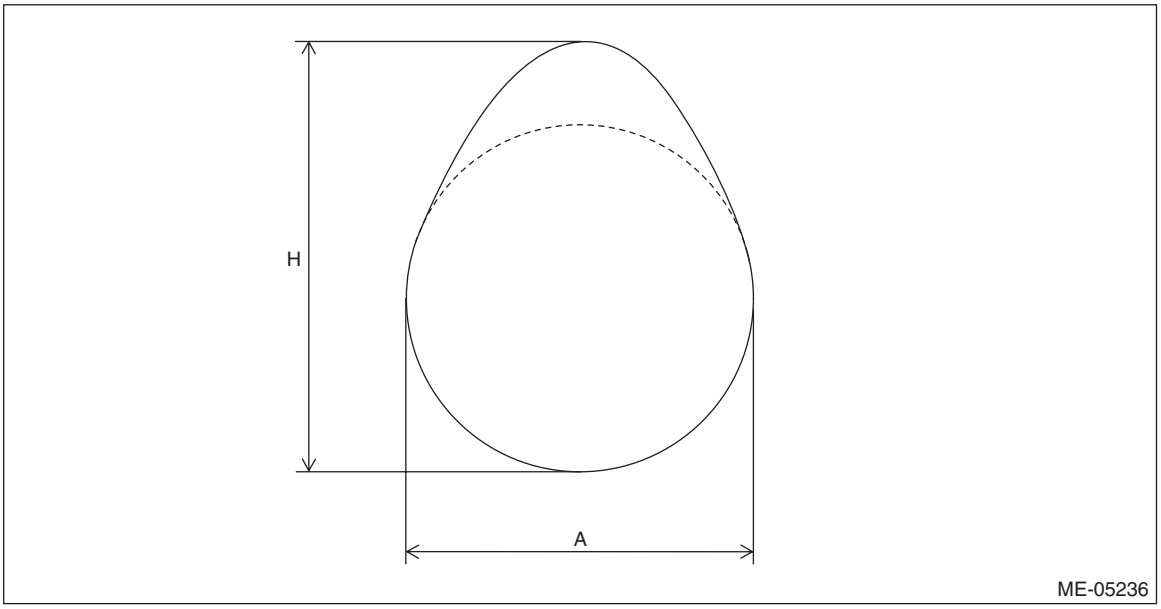


5) Check the cam lobe height “H” and cam base circle diameter “A” of camshaft as shown in the figure, using micrometer. If it is not within the standard, replace the camshaft.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

Camshaft cam lobe overall height H:
Intake
Standard
40.34 — 40.44 mm (1.588 — 1.592 in)
Exhaust
Standard
39.66 — 39.76 mm (1.561 — 1.565 in)

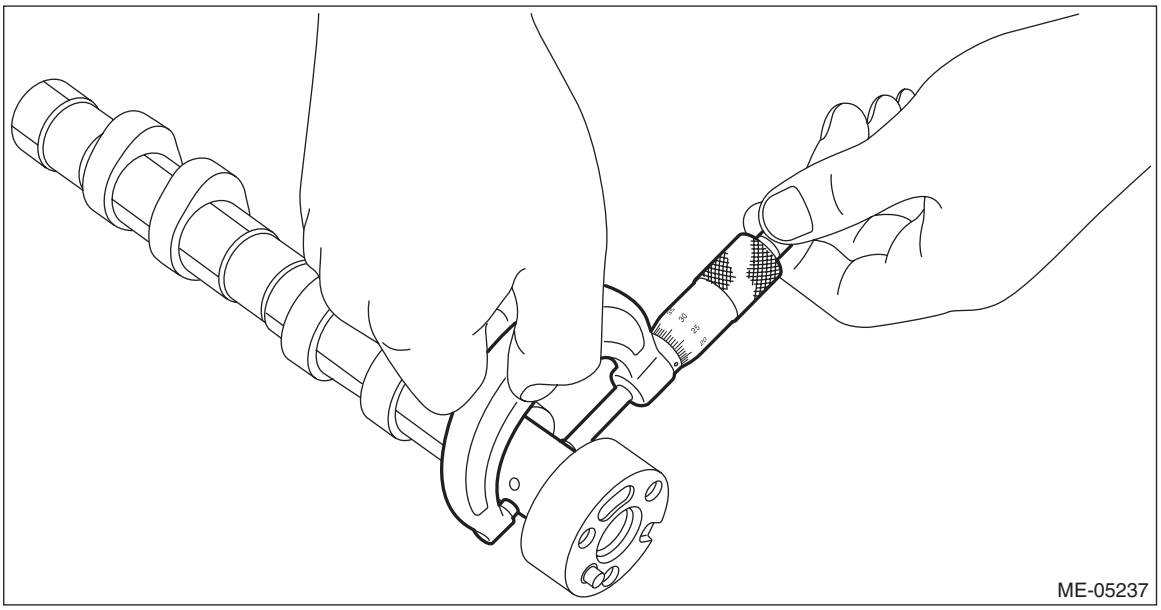
Camshaft cam base circle diameter A:
Standard
34.0 mm (1.339 in)



6) Check the camshaft journal outer diameter using micrometer. If it is not within the standard, replace the camshaft.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure outer diameter of each journal at several points, and read the value of most worn location.

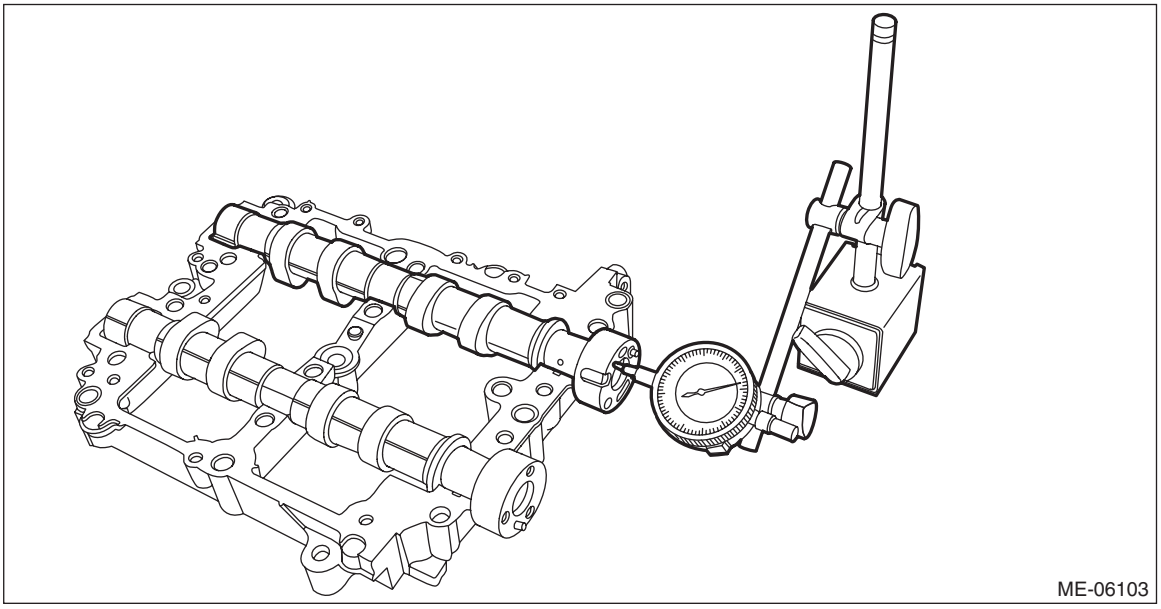
Camshaft journal outer diameter:
Standard
25.946 — 25.963 mm (1.0215 — 1.0222 in)



7) Using a dial gauge, check the thrust clearance of the camshaft. If it is not within the standard or if uneven wear is found, replace each camshaft cap and cam carrier as a set. If necessary replace the camshaft.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Set the dial gauge at end surface of camshaft.

Camshaft thrust clearance:
Standard
0.068 — 0.116 mm (0.0027 — 0.0047 in)

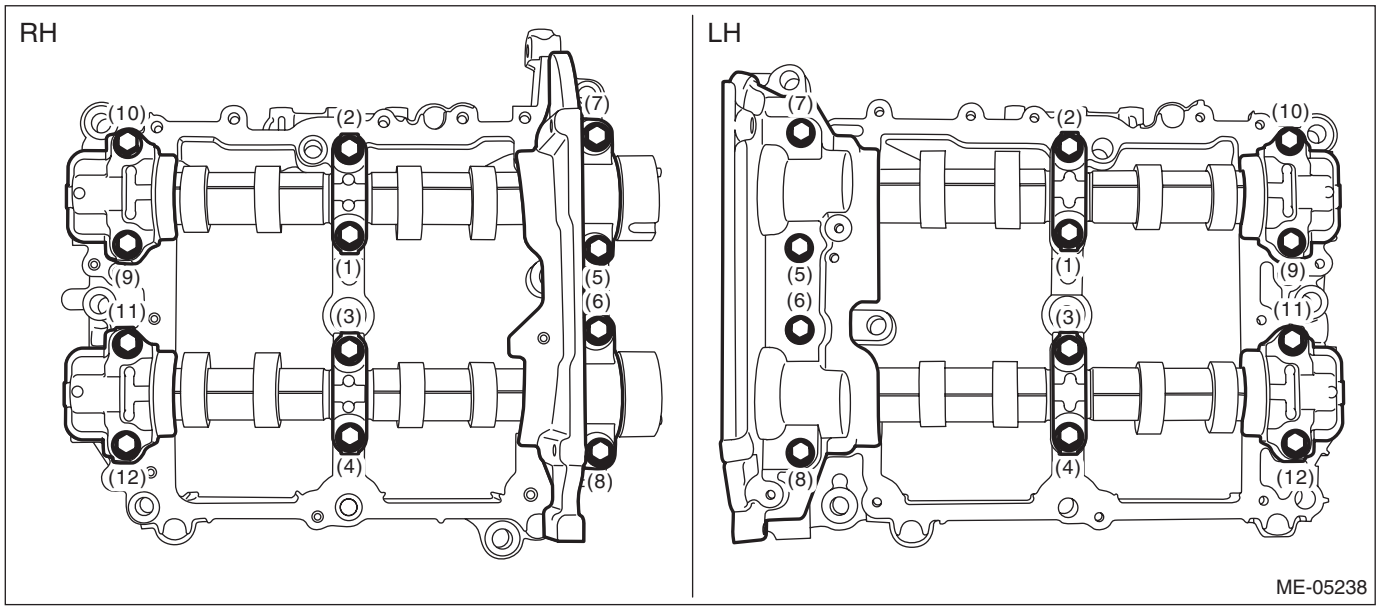


8) Check the oil clearance on the camshaft using a plastigauge.

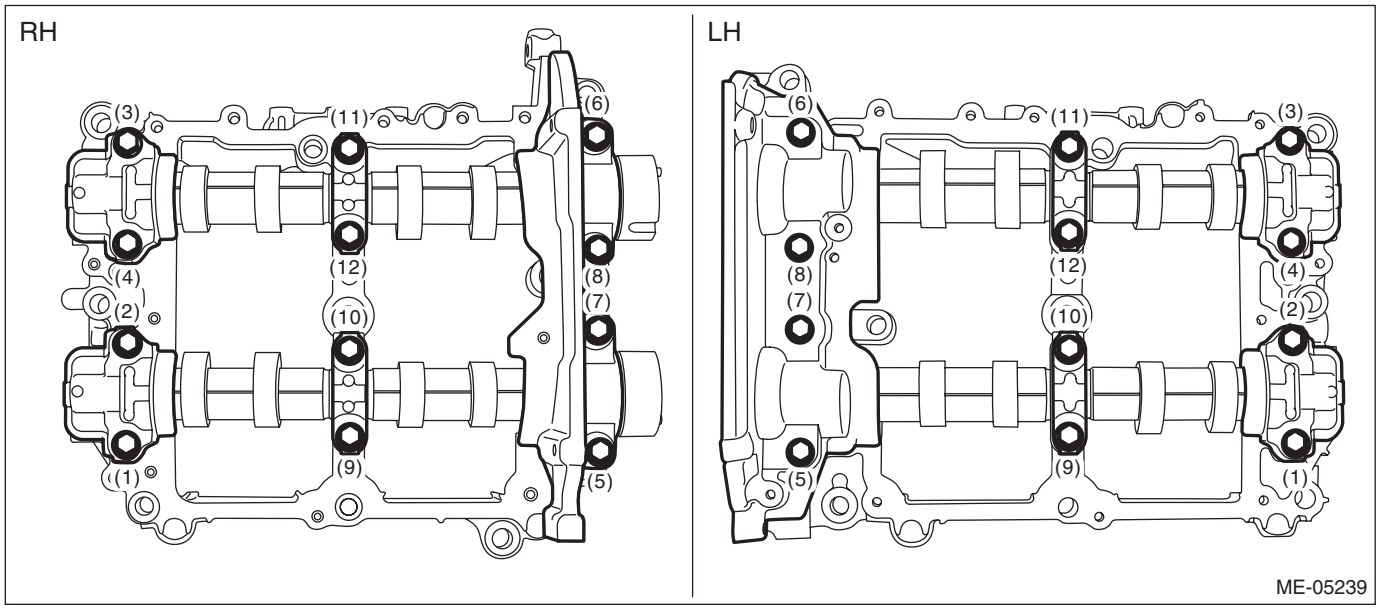
NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

(1) Remove the liquid gasket from cam carrier and front camshaft cap, intake rear camshaft cap and exhaust rear camshaft cap.
(2) Clean each camshaft cap and cam carrier journals.
(3) Set the camshaft to the cam carrier.
(4) Place a plastigauge across the camshaft journals of each camshaft and set the camshaft caps.
(5) Tighten the bolts which secure front camshaft cap, intake center camshaft cap, intake rear camshaft cap, exhaust center camshaft cap and exhaust rear camshaft cap in numerical order as shown in the figure.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

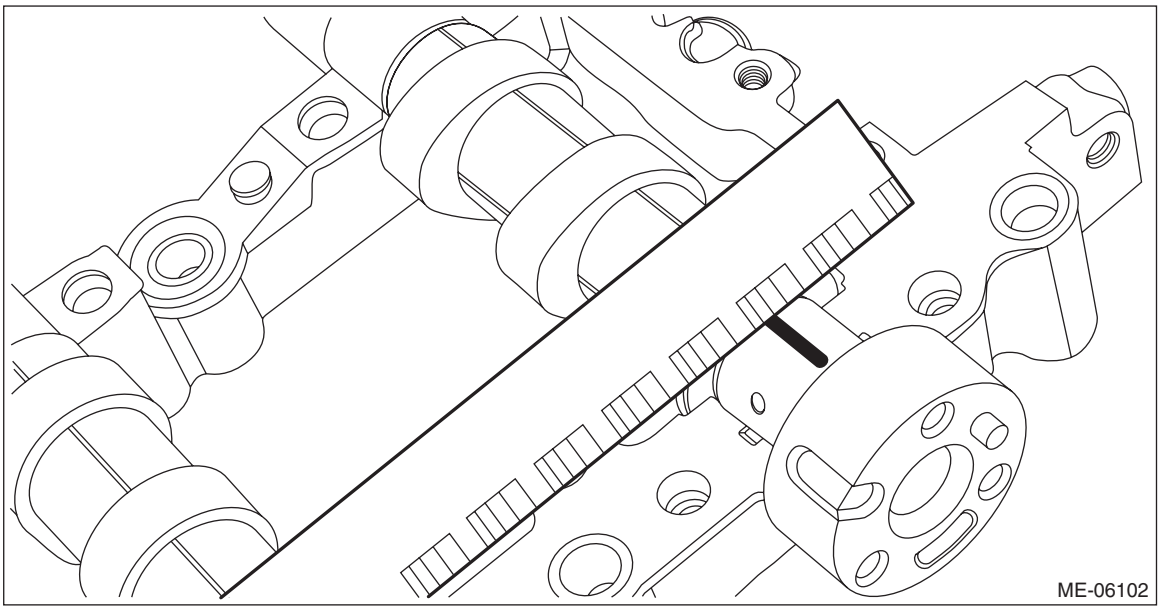


(6) Loosen the bolts (front camshaft cap, intake center camshaft cap, intake rear camshaft cap, exhaust center camshaft cap and exhaust rear camshaft cap) equally, a little at a time in numerical sequence as shown in the figure, and remove each camshaft cap.



(7) Determine camshaft oil clearance by matching the widest point of plastigauge on each journal against scale printed on a package of plastigauge. If it is not within the standard, replace each camshaft cap and cam carrier as a set. If necessary replace the camshaft.

Camshaft oil clearance:
Standard
0.037 — 0.072 mm (0.0015 — 0.0028 in)



(8) Completely remove the plastigauge.

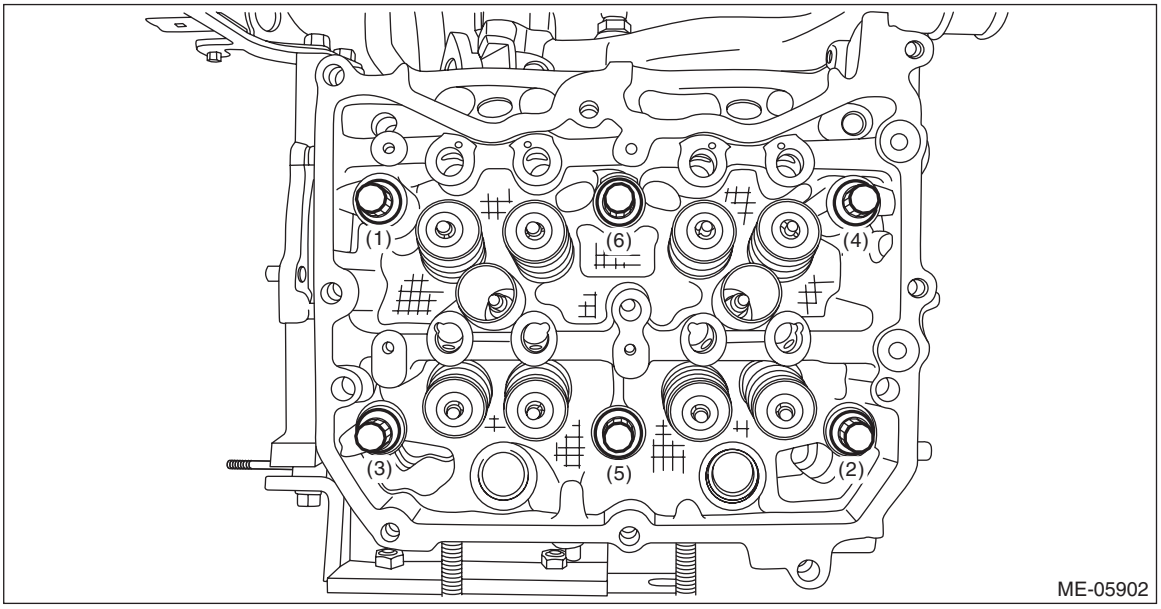
21.Cylinder Head

A: REMOVAL

1. CYLINDER HEAD RH

1) Remove the engine from the vehicle. <Ref. to ME(H4DO(w/o HEV))-58, REMOVAL, Engine Assembly.>
2) Remove the intake manifold. <Ref. to FU(H4DO(w/o HEV))-20, REMOVAL, Intake Manifold.> <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
3) Remove the engine wiring harness. <Ref. to FU(H4DO(w/o HEV))-43, REMOVAL, Engine Wiring Harness.> <Ref. to FU(H4DO(HEV))-35, REMOVAL, Engine Wiring Harness.>
4) Remove the tumble generator valve assembly RH. <Ref. to FU(H4DO(w/o HEV))-85, REMOVAL, Tumble Generator Valve Assembly.> <Ref. to FU(H4DO(HEV))-74, REMOVAL, Tumble Generator Valve Assembly.>
5) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
6) Remove the rocker cover RH. <Ref. to ME(H4DO(w/o HEV))-205, ROCKER COVER RH, REMOVAL, Rocker Cover.>
7) Remove the cam carrier RH. <Ref. to ME(H4DO(w/o HEV))-223, CAM CARRIER RH, REMOVAL, Cam Carrier.>
8) Remove the EGR cooler. <Ref. to EC(H4DO(w/o HEV))-32, REMOVAL, EGR Cooler.> <Ref. to EC(H4DO(HEV))-31, REMOVAL, EGR Cooler.>
9) Loosen the bolts holding the cylinder head RH equally, a little at a time in numerical sequence as shown in the figure, and while leaving the cylinder head bolts (1) and (4) engaged by three or four threads, remove the other cylinder head bolts.

NOTE:
Leaving the cylinder head bolts (1) and (4) engaged by three or four threads prevents the cylinder head RH from falling.



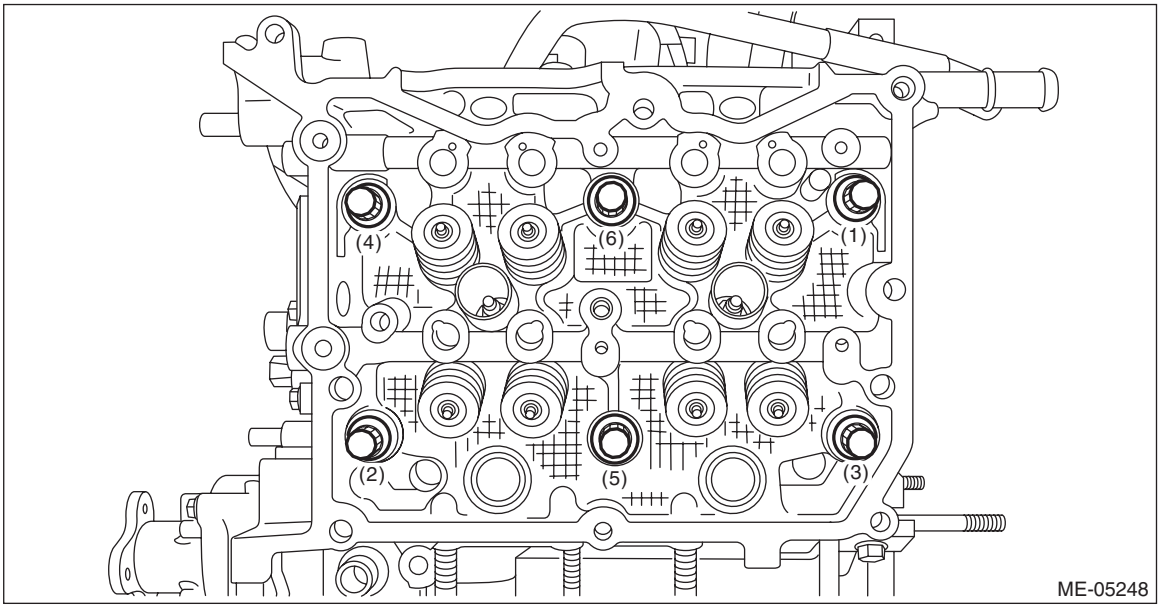
10) While tapping the cylinder head RH with a plastic hammer, separate it from cylinder block RH.
11) Remove the bolts (1) and (4) to remove cylinder head RH.
12) Remove the cylinder head gasket RH.

CAUTION:
Be careful not to scratch the mating surface of cylinder head and cylinder block.
13) Remove the liquid gasket from cylinder head RH and cam carrier RH.

2. CYLINDER HEAD LH

1) Remove the engine from the vehicle. <Ref. to ME(H4DO(w/o HEV))-58, REMOVAL, Engine Assembly.>
2) Remove the intake manifold. <Ref. to FU(H4DO(w/o HEV))-20, REMOVAL, Intake Manifold.> <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
3) Remove the engine wiring harness. <Ref. to FU(H4DO(w/o HEV))-43, REMOVAL, Engine Wiring Harness.> <Ref. to FU(H4DO(HEV))-35, REMOVAL, Engine Wiring Harness.>
4) Remove the tumble generator valve assembly LH. <Ref. to FU(H4DO(w/o HEV))-85, REMOVAL, Tumble Generator Valve Assembly.> <Ref. to FU(H4DO(HEV))-74, REMOVAL, Tumble Generator Valve Assembly.>
5) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
6) Remove the rocker cover LH. <Ref. to ME(H4DO(w/o HEV))-209, ROCKER COVER LH, REMOVAL, Rocker Cover.>
7) Remove the cam carrier LH. <Ref. to ME(H4DO(w/o HEV))-228, CAM CARRIER LH, REMOVAL, Cam Carrier.>
8) Remove the A/C compressor. <Ref. to AC-50, REMOVAL, Compressor.>
9) Loosen the bolts holding the cylinder head LH equally, a little at a time in numerical sequence as shown in the figure, and while leaving the cylinder head bolts (1) and (4) engaged by three or four threads, remove the other cylinder head bolts.

NOTE:
Leaving the cylinder head bolts (1) and (4) engaged by three or four threads prevents the cylinder head LH from falling.



10) While tapping the cylinder head LH with a plastic hammer, separate it from cylinder block LH.
11) Remove the cylinder head bolts (1) and (4) to remove cylinder head LH.
12) Remove the cylinder head gasket LH.

CAUTION:
Be careful not to scratch the mating surface of cylinder head and cylinder block.
13) Remove the liquid gasket from cylinder head LH and cam carrier LH.

B: INSTALLATION

1. CYLINDER HEAD RH

1) Clean the bolt holes in the cylinder block RH.

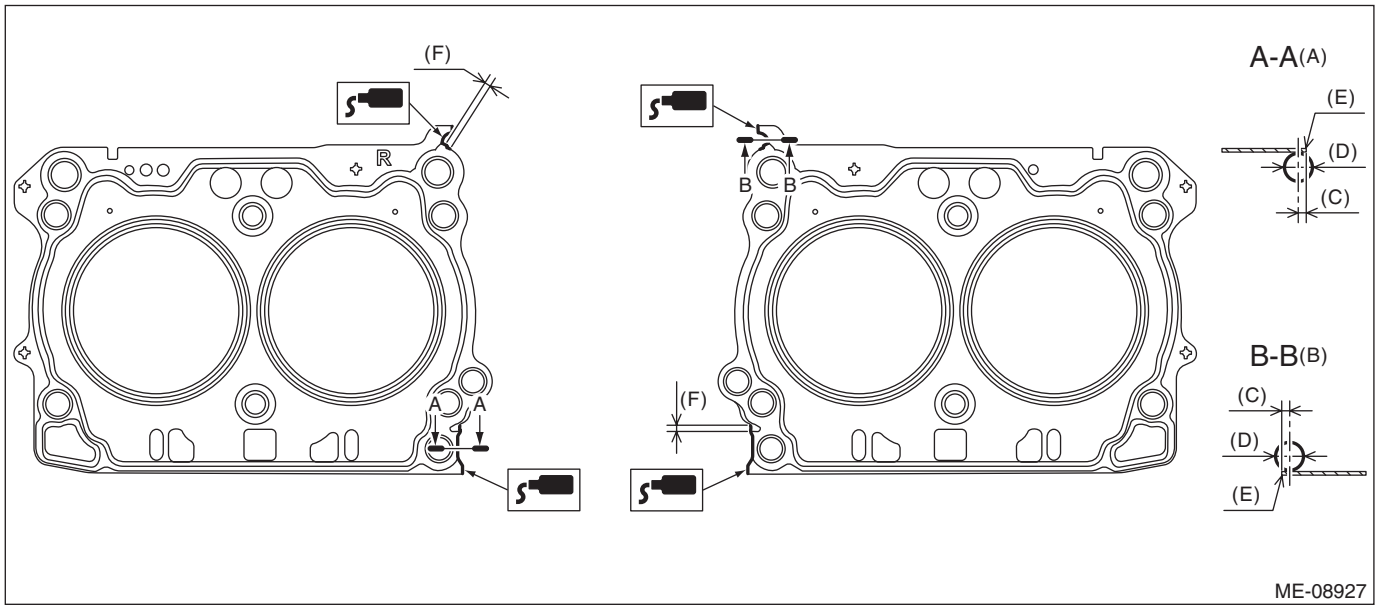
CAUTION:
To avoid erroneous tightening of the bolts, clean out the bolt holes sufficiently by blowing with compressed air to eliminate engine coolant etc.

2) Apply liquid gasket to both sides of the cylinder head gasket RH as shown in the figure.

NOTE:
- Use a new cylinder head gasket RH.
- Before applying liquid gasket, degrease the mating surface of cylinder blocks RH and cylinder head RH.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

Liquid gasket applying diameter:
3±1 mm (0.1181±0.0394 in)



(A)	Liquid gasket applying position to the cylinder head side	(C)	1 mm (0.0394 in) or less	(E)	Cylinder head gasket edge
(B)	Liquid gasket applying position to the cylinder block side	(D)	ϕ3±1 mm (0.1181±0.0394 in)	(F)	Overlap margin of bead end and liquid gasket: 3 — 10 mm (0.1181 — 0.3937 in)

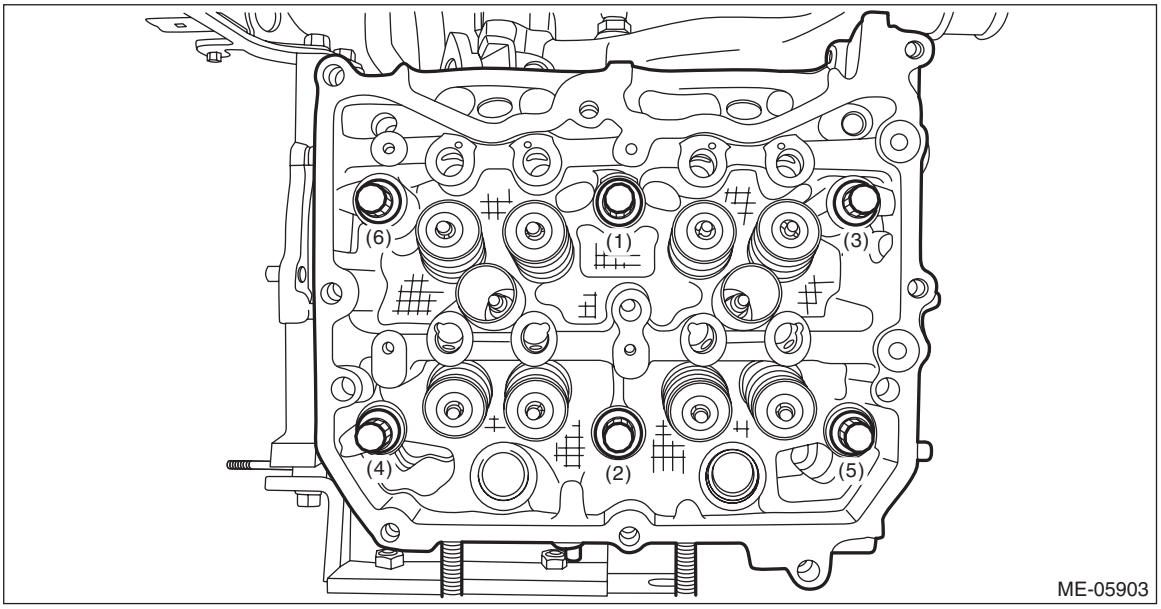
3) Attach the cylinder head gasket RH.

NOTE:
Check that liquid gasket RH is squeezed out from the cylinder head gasket.
4) Install the cylinder head RH to the cylinder block RH.

CAUTION:
Be careful not to scratch the mating surface of cylinder head RH and cylinder block RH.

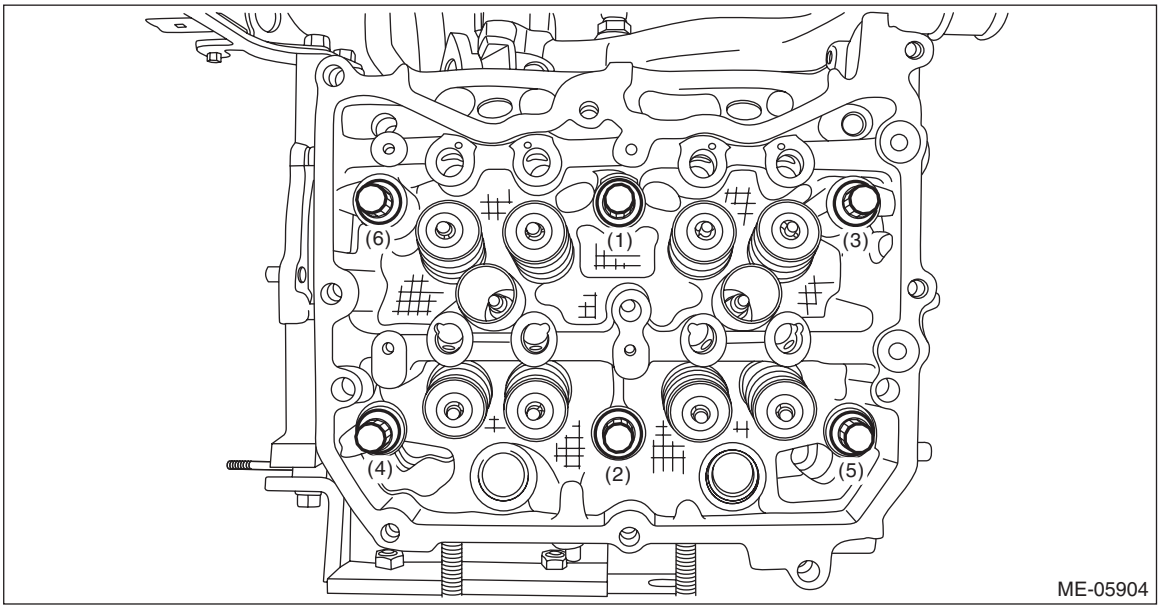
(1) Clean the cylinder head bolt threads and apply sufficient engine oil to the washer and cylinder head bolts threads.

(2) Mount the cylinder head RH onto the cylinder block RH, and tighten all bolts with a torque of 29 N·m (3.0 kgf-m, 21.4 ft-lb) in numerical order as shown in the figure.

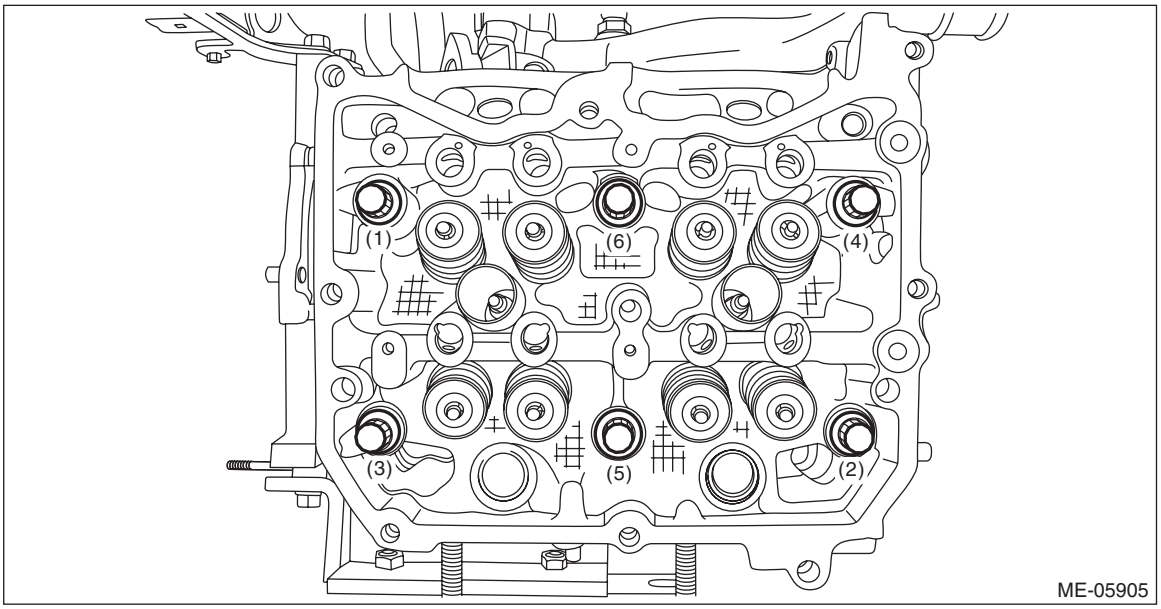


(3) Tighten all cylinder head bolts further with a torque of 100 N·m (10.2 kgf-m, 73.8 ft-lb) in numerical order as shown in the figure.

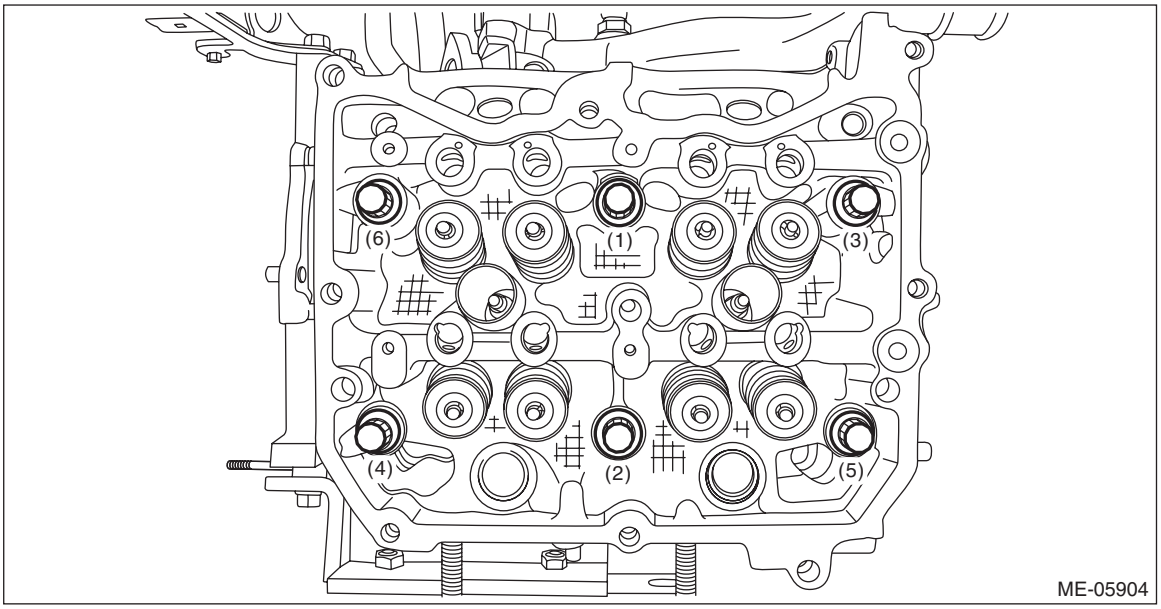
CAUTION:
If the bolt makes stick-slip sound during tightening, repeat the procedure from step 1). In that case, the cylinder head gasket RH can be reused. But it is necessary to remove liquid gasket completely from cylinder block RH, cylinder head RH and cylinder head gasket RH and re-apply to them.



(4) Loosen all cylinder head bolts 180° in numerical order as shown in the figure, and then loosen all cylinder head bolts 180° further in numerical order as shown in the figure.



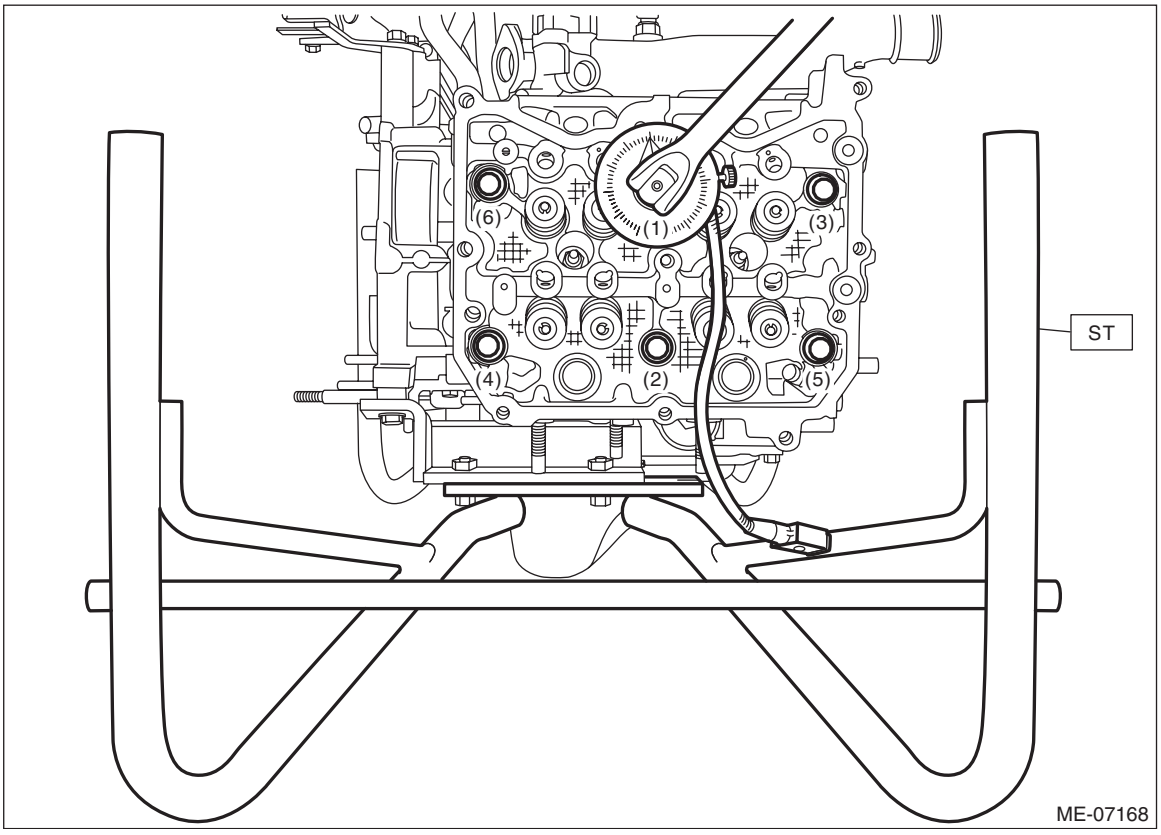
(5) Tighten all cylinder head bolts with a torque of 42 N·m (4.3 kgf-m, 31.0 ft-lb) in numerical order as shown in the figure.



(6) Using angle gauge, tighten all cylinder head bolts with specified angle in numerical order as shown in the figure.

ST 499817100 ENGINE STAND

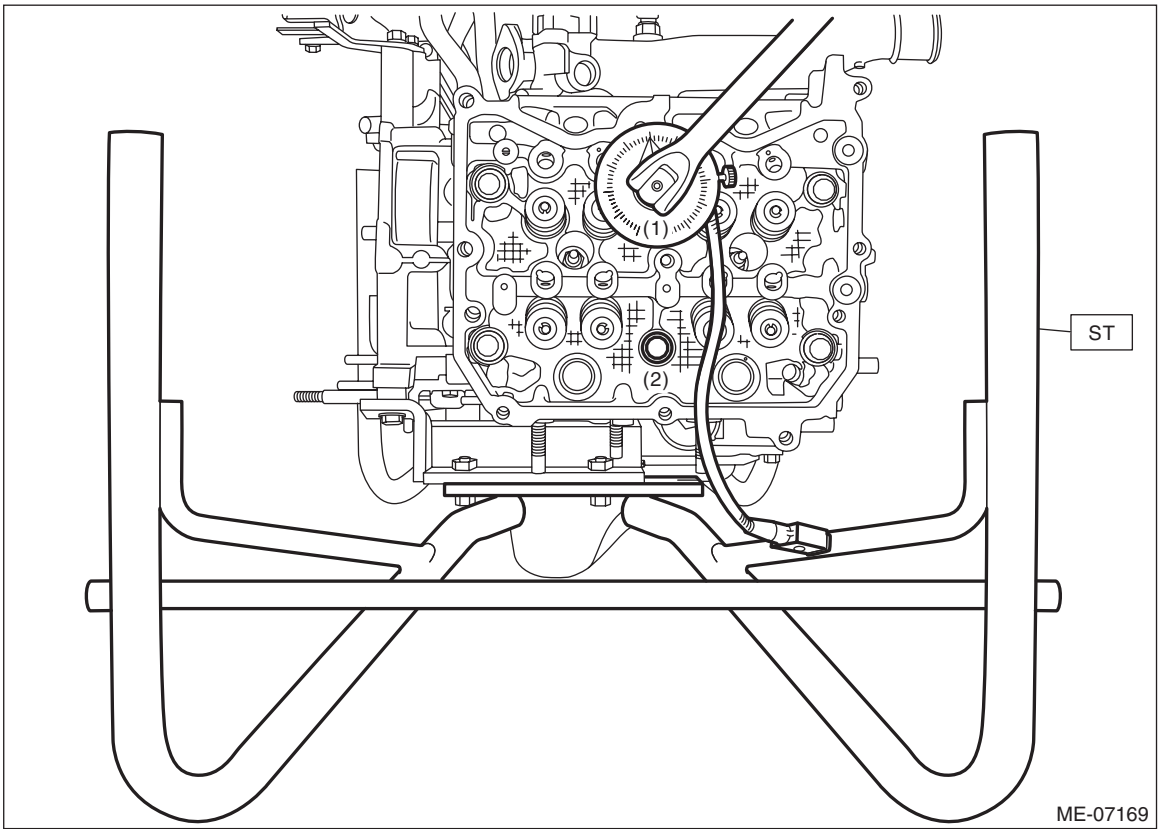
Tightening angle:
80°±2°



(7) Using angle gauge, tighten the cylinder head bolts (2 places) with specified angle in numerical order as shown in the figure.

ST 499817100 ENGINE STAND

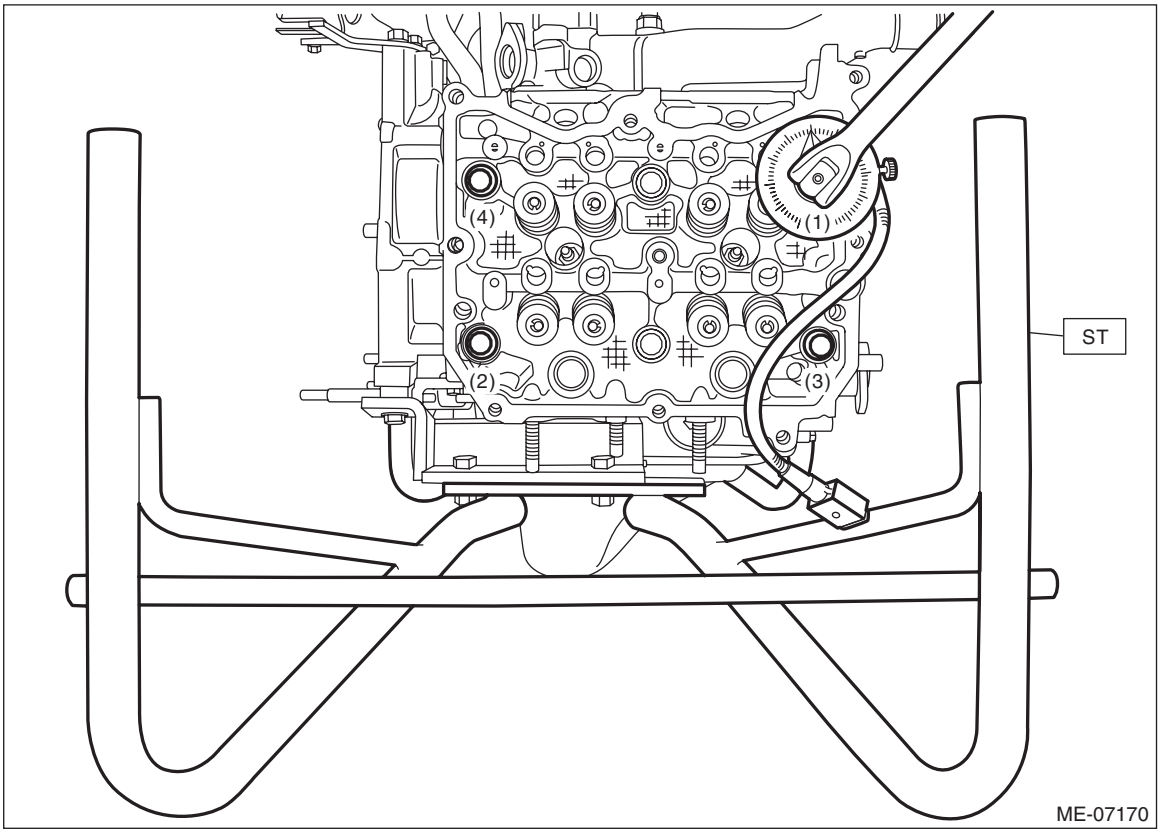
Tightening angle:
75°±2°



(8) Using angle gauge, tighten the cylinder head bolts (4 places) with specified angle in numerical order as shown in the figure.

NOTE:
After tightening, if the liquid gasket is squeezed out onto the seal surface of the chain cover, completely remove any squeezed-out liquid gasket.
ST 499817100 ENGINE STAND

Tightening angle:
30°±2°



5) Install the EGR cooler. <Ref. to EC(H4DO(w/o HEV))-36, INSTALLATION, EGR Cooler.> <Ref. to EC(H4DO(HEV))-33, INSTALLATION, EGR Cooler.>
6) Install the cam carrier RH. <Ref. to ME(H4DO(w/o HEV))-233, CAM CARRIER RH, INSTALLATION, Cam Carrier.>
7) Install the rocker cover RH. <Ref. to ME(H4DO(w/o HEV))-213, ROCKER COVER RH, INSTALLATION, Rocker Cover.>
8) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>
9) Install the tumble generator valve assembly RH. <Ref. to FU(H4DO(w/o HEV))-86, INSTALLATION, Tumble Generator Valve Assembly.> <Ref. to FU(H4DO(HEV))-75, INSTALLATION, Tumble Generator Valve Assembly.>
10) Install the engine wiring harness. <Ref. to FU(H4DO(w/o HEV))-47, INSTALLATION, Engine Wiring Harness.> <Ref. to FU(H4DO(HEV))-39, INSTALLATION, Engine Wiring Harness.>
11) Install the intake manifold. <Ref. to FU(H4DO(w/o HEV))-30, INSTALLATION, Intake Manifold.> <Ref. to FU(H4DO(HEV))-26, INSTALLATION, Intake Manifold.>
12) Install the engine to the vehicle. <Ref. to ME(H4DO(w/o HEV))-91, INSTALLATION, Engine Assembly.>

2. CYLINDER HEAD LH

1) Clean the bolt holes in the cylinder block LH.

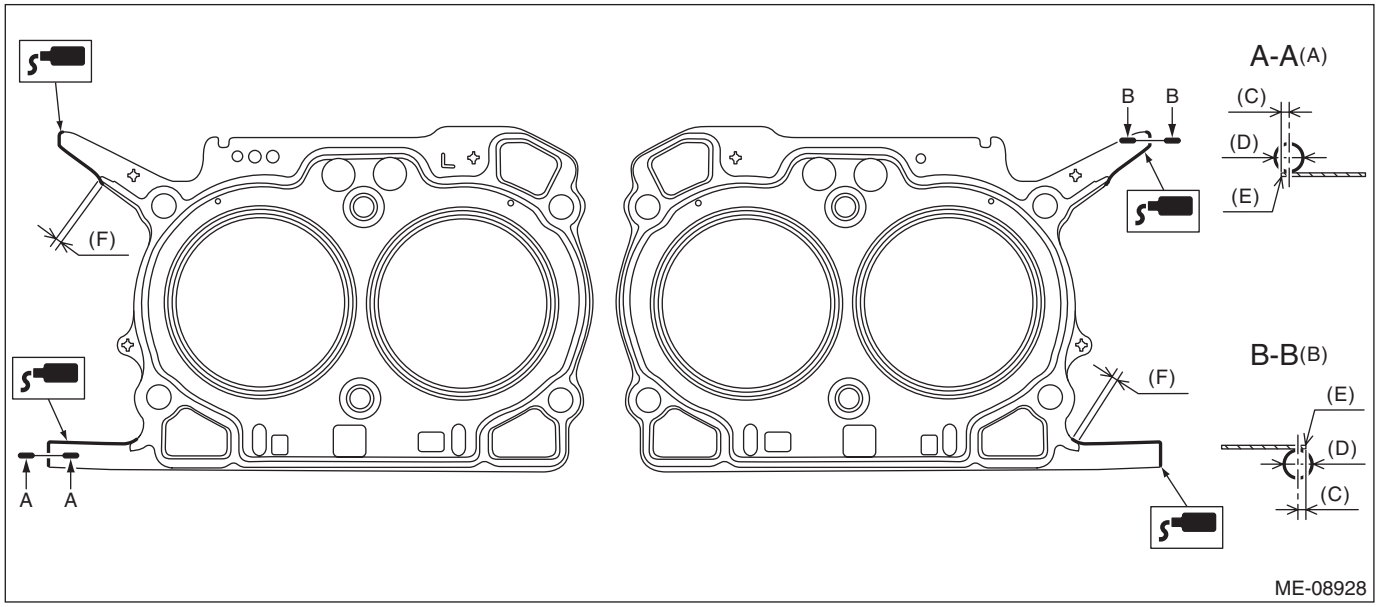
CAUTION:
To avoid erroneous tightening of the bolts, clean out the bolt holes sufficiently by blowing with compressed air to eliminate engine coolant etc.

2) Apply liquid gasket to both sides of the cylinder head gasket LH as shown in the figure.

NOTE:
- Use a new cylinder head gasket LH.
- Before applying liquid gasket, degrease the mating surface of cylinder blocks LH and cylinder head LH.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

Liquid gasket applying diameter:
3±1 mm (0.1181±0.0394 in)



(A)	Liquid gasket applying position to the cylinder head side	(C)	1 mm (0.0394 in) or less	(E)	Cylinder head gasket edge
(B)	Liquid gasket applying position to the cylinder block side	(D)	ϕ3±1 mm (0.1181±0.0394 in)	(F)	Overlap margin of bead end and liquid gasket: 3 — 10 mm (0.1181 — 0.3937 in)

3) Attach the cylinder head gasket LH.

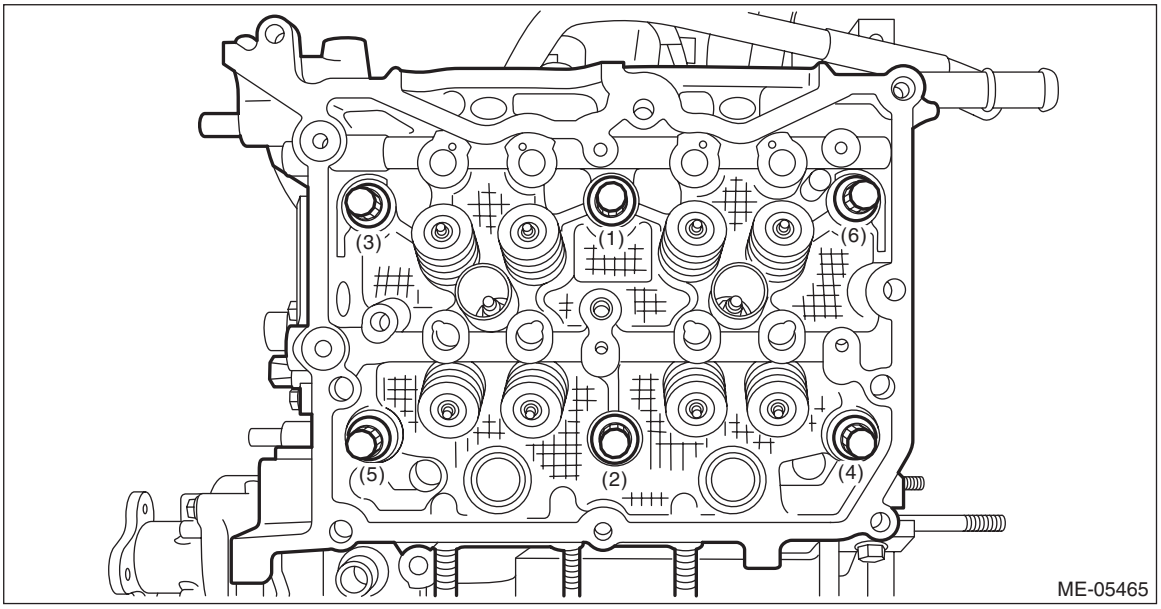
NOTE:
Check that liquid gasket is squeezed out from the cylinder head gasket LH.

4) Install the cylinder head LH to the cylinder block LH.

CAUTION:
Be careful not to scratch the mating surface of cylinder head LH and cylinder block LH.

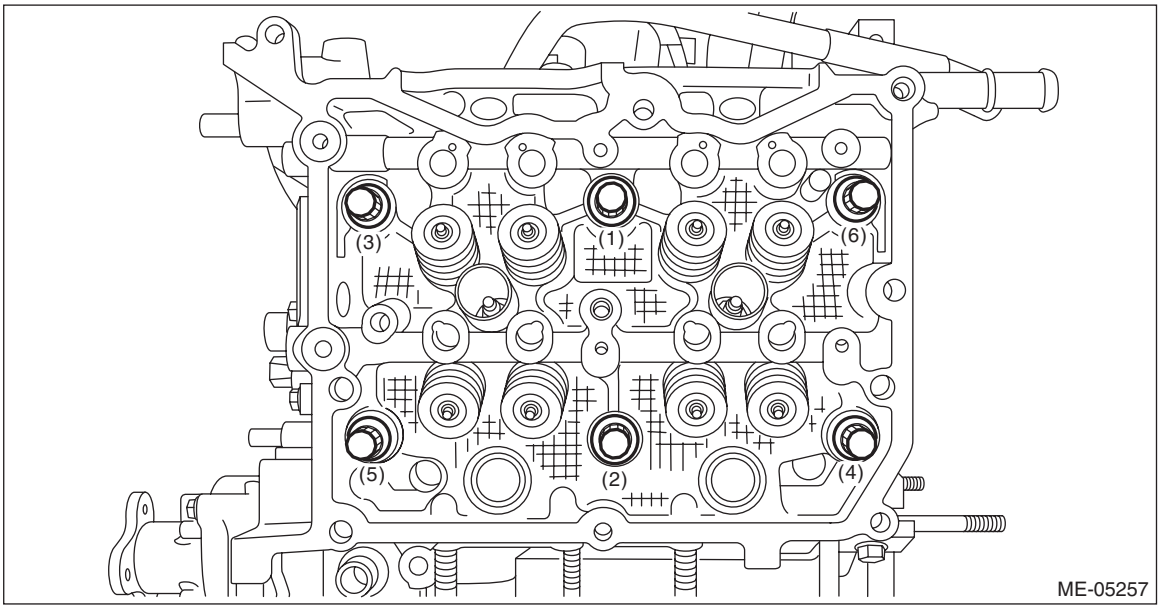
(1) Clean the cylinder head bolt threads and apply sufficient engine oil to the washer and cylinder head bolts threads.

(2) Mount the cylinder head LH onto the cylinder block LH, then tighten all bolts with a torque of 29 N·m (3.0 kgf-m, 21.4 ft-lb) in numerical order as shown in the figure.

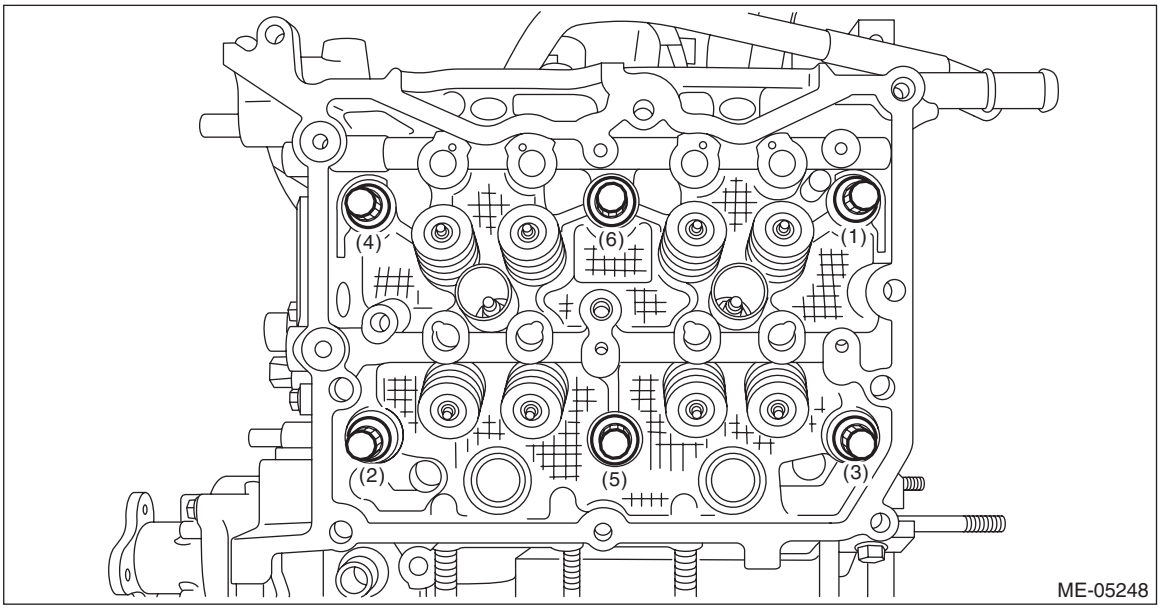


(3) Tighten all cylinder head bolts further with a torque of 100 N·m (10.2 kgf-m, 73.8 ft-lb) in numerical order as shown in the figure.

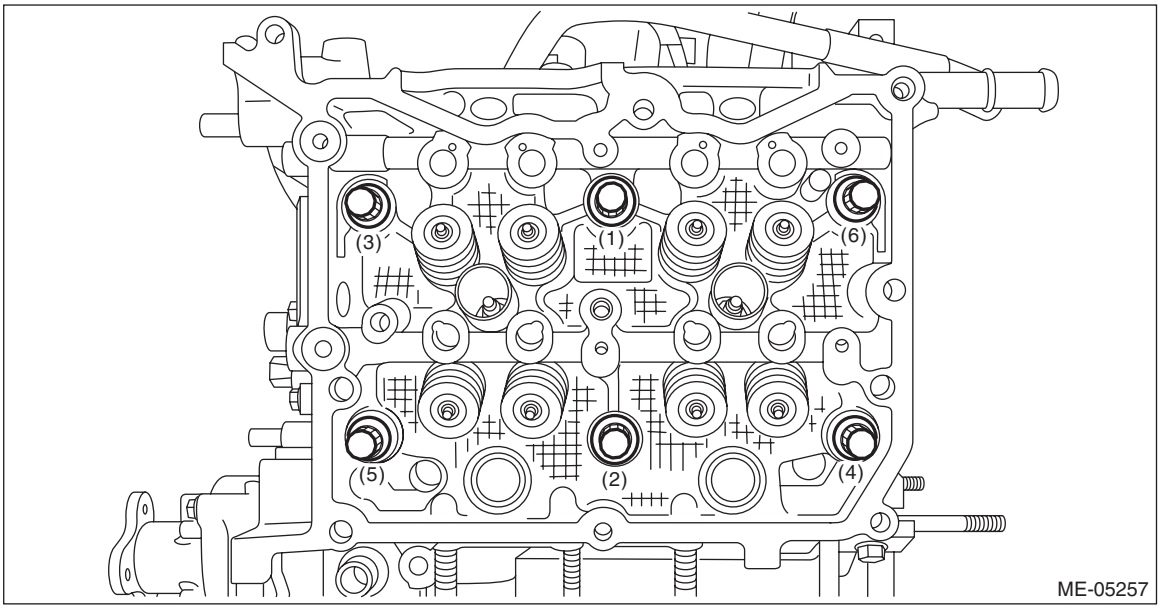
CAUTION:
If the bolt makes stick-slip sound during tightening, repeat the procedure from step 1). In that case, the cylinder head gasket LH can be reused. But it is necessary to remove liquid gasket completely from cylinder block LH, cylinder head LH and cylinder head gasket LH and re-apply to them.



(4) Loosen all cylinder head bolts 180° in numerical order as shown in the figure, and then loosen all cylinder head bolts 180° further in numerical order as shown in the figure.



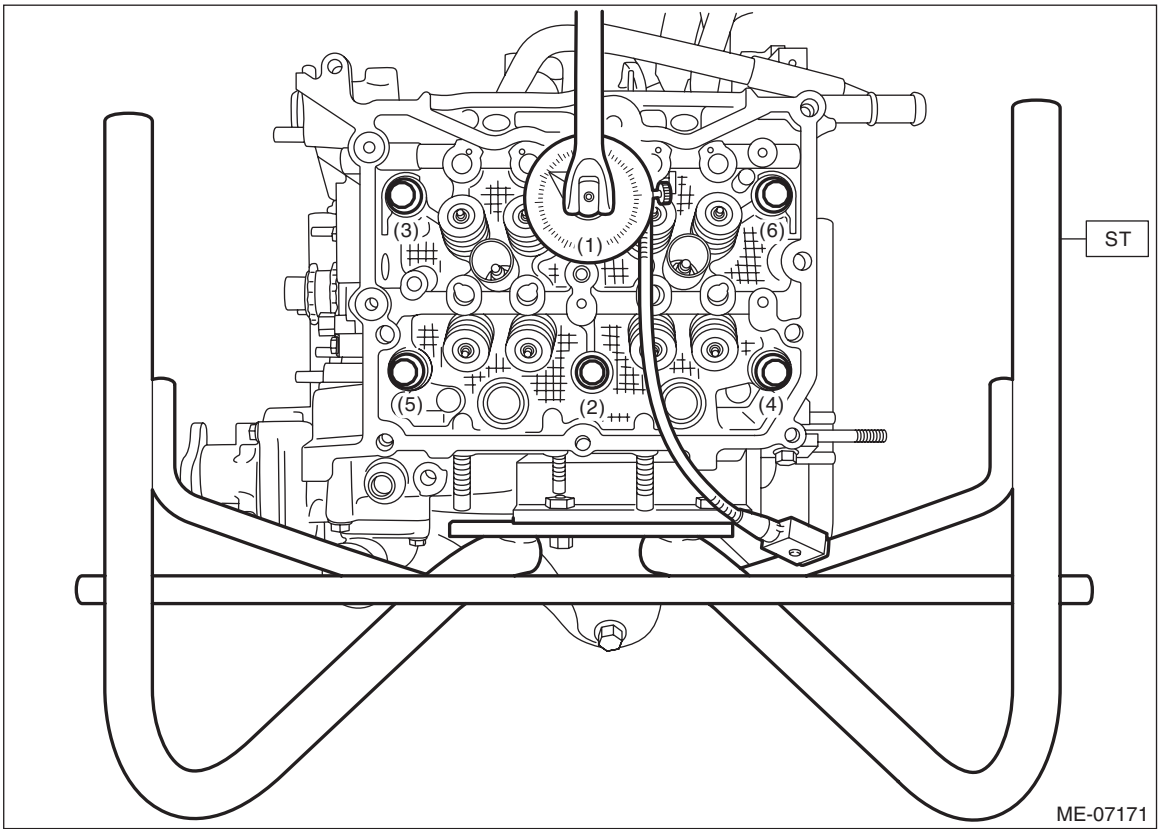
(5) Tighten all cylinder head bolts with a torque of 42 N·m (4.3 kgf-m, 31.0 ft-lb) in numerical order as shown in the figure.



(6) Using angle gauge, tighten all cylinder head bolts with specified angle in numerical order as shown in the figure.

ST 499817100 ENGINE STAND

Tightening angle:
80°±2°

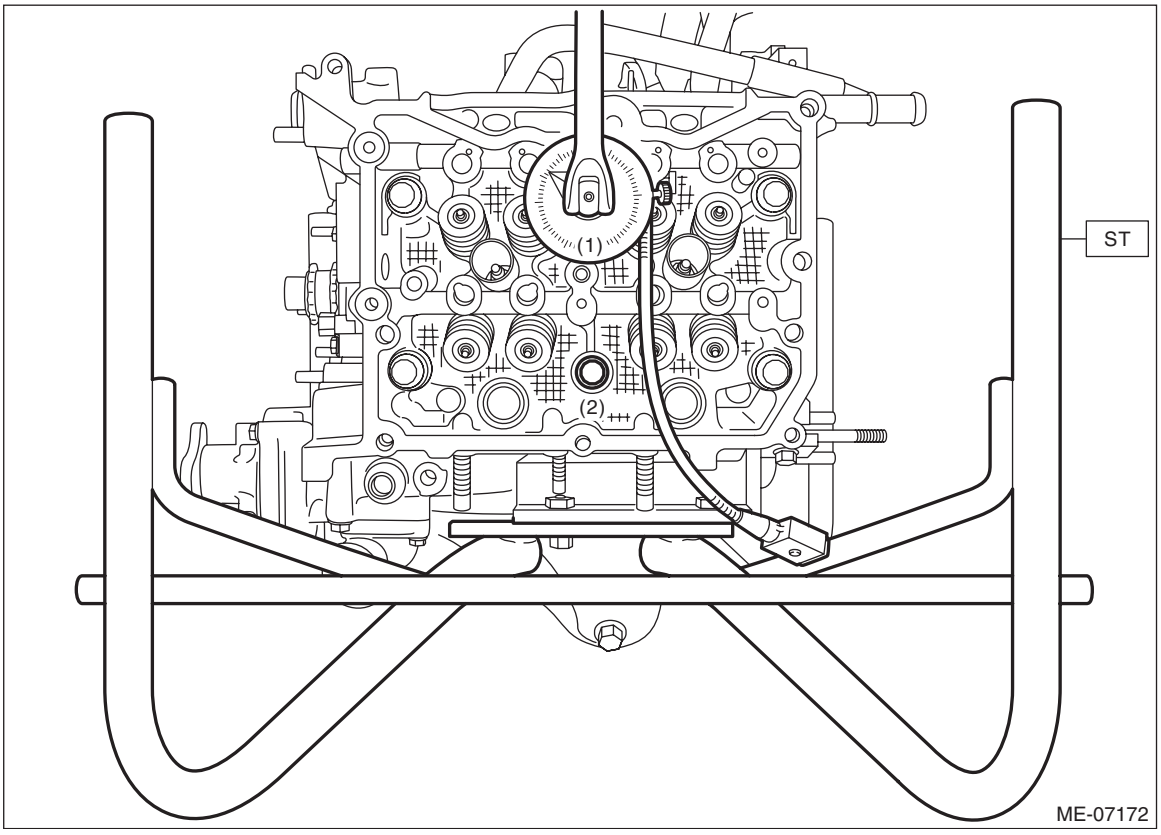


(7) Using angle gauge, tighten the cylinder head bolts (2 places) with specified angle in numerical order as shown in the figure.

ST 499817100 ENGINE STAND

Tightening angle:

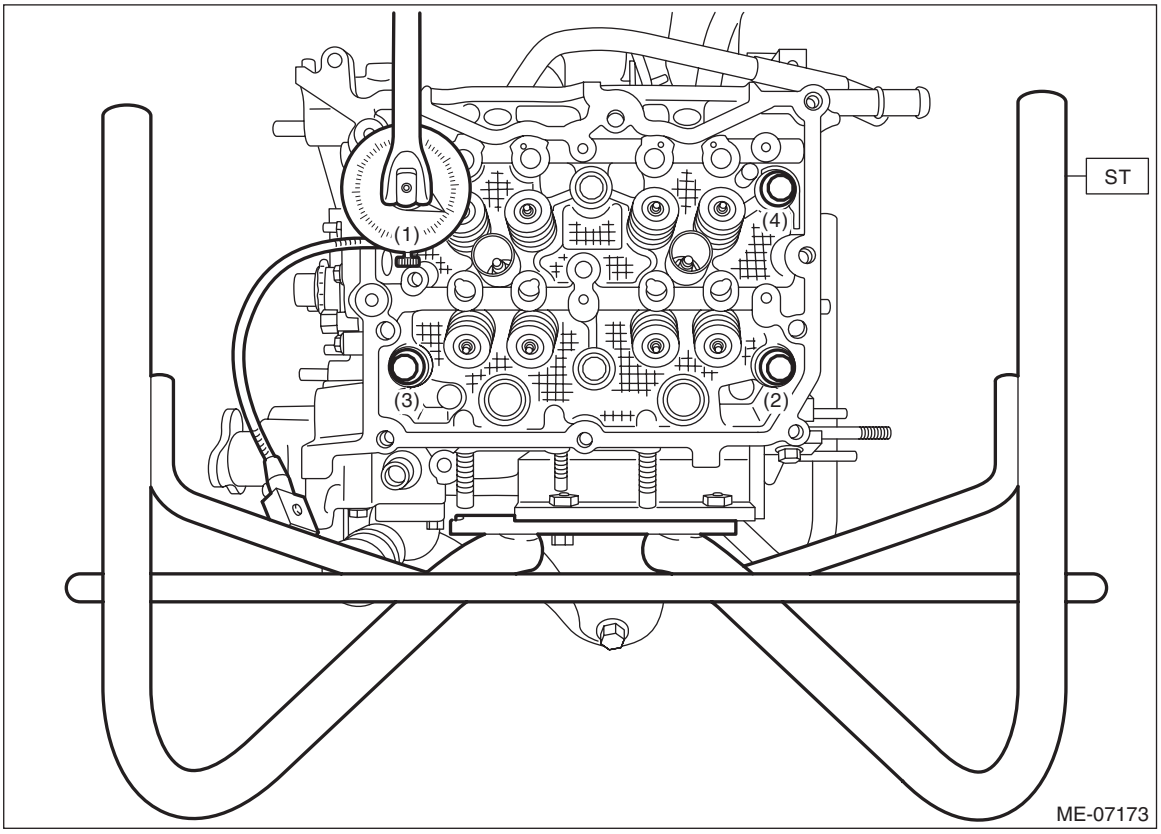
75°±2°



(8) Using angle gauge, tighten the cylinder head bolts (4 places) with specified angle in numerical order as shown in the figure.

NOTE:
After tightening, if the liquid gasket is squeezed out onto the seal surface of the chain cover, completely remove any squeezed-out liquid gasket.
ST 499817100 ENGINE STAND

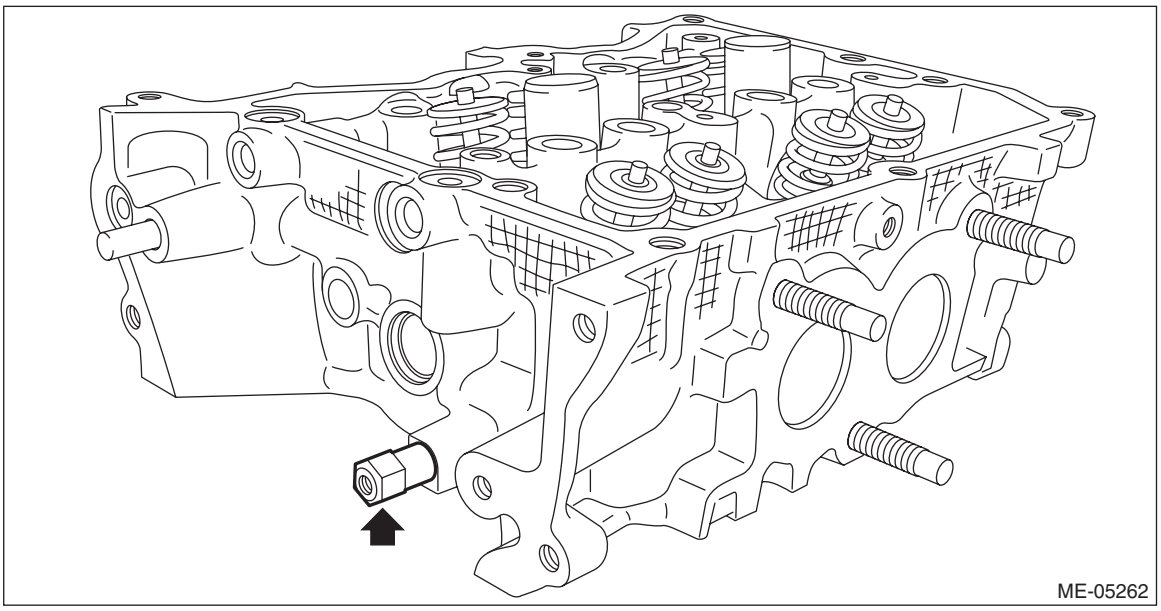
Tightening angle:
30°±2°



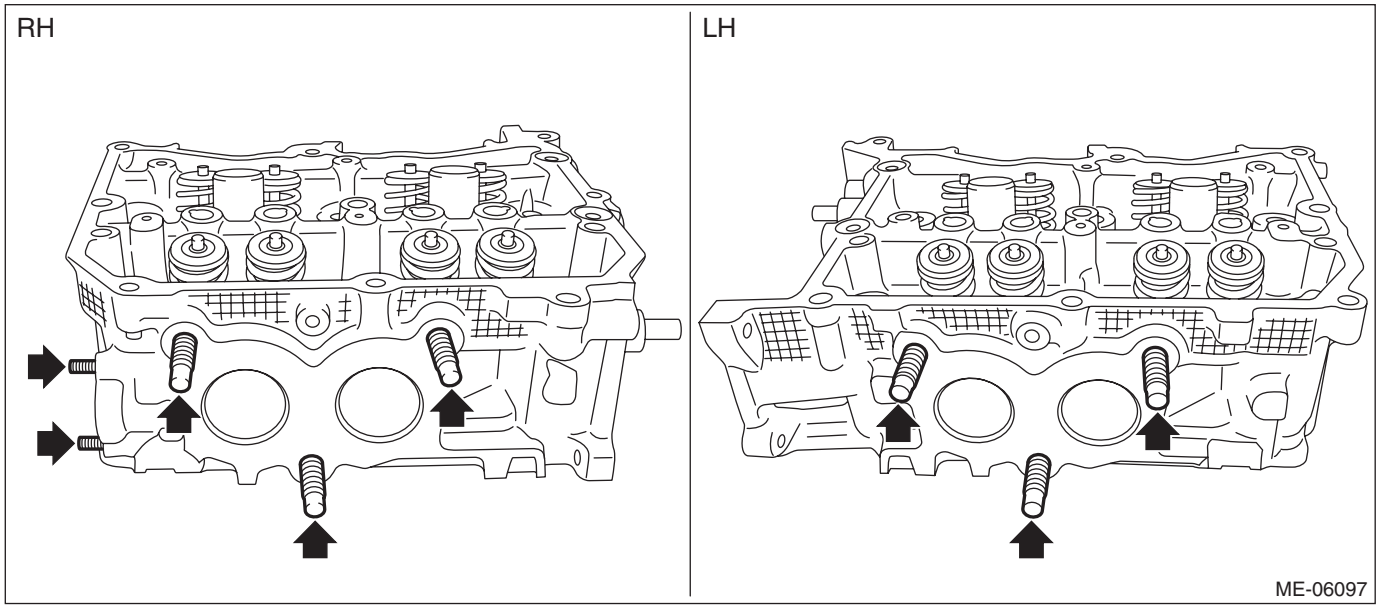
5) Install the A/C compressor. <Ref. to AC-53, INSTALLATION, Compressor.>
6) Install the cam carrier LH. <Ref. to ME(H4DO(w/o HEV))-243, CAM CARRIER LH, INSTALLATION, Cam Carrier.>
7) Install the rocker cover LH. <Ref. to ME(H4DO(w/o HEV))-217, ROCKER COVER LH, INSTALLATION, Rocker Cover.>
8) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>
9) Install the tumble generator valve assembly LH. <Ref. to FU(H4DO(w/o HEV))-86, INSTALLATION, Tumble Generator Valve Assembly.> <Ref. to FU(H4DO(HEV))-75, INSTALLATION, Tumble Generator Valve Assembly.>
10) Install the engine wiring harness. <Ref. to FU(H4DO(w/o HEV))-47, INSTALLATION, Engine Wiring Harness.> <Ref. to FU(H4DO(HEV))-39, INSTALLATION, Engine Wiring Harness.>
11) Install the intake manifold. <Ref. to FU(H4DO(w/o HEV))-30, INSTALLATION, Intake Manifold.> <Ref. to FU(H4DO(HEV))-26, INSTALLATION, Intake Manifold.>
12) Install the engine to the vehicle. <Ref. to ME(H4DO(w/o HEV))-91, INSTALLATION, Engine Assembly.>

C: DISASSEMBLY

1) Remove the chain cover securing bolt from the cylinder head LH.



2) Remove the stud bolts from the cylinder head.



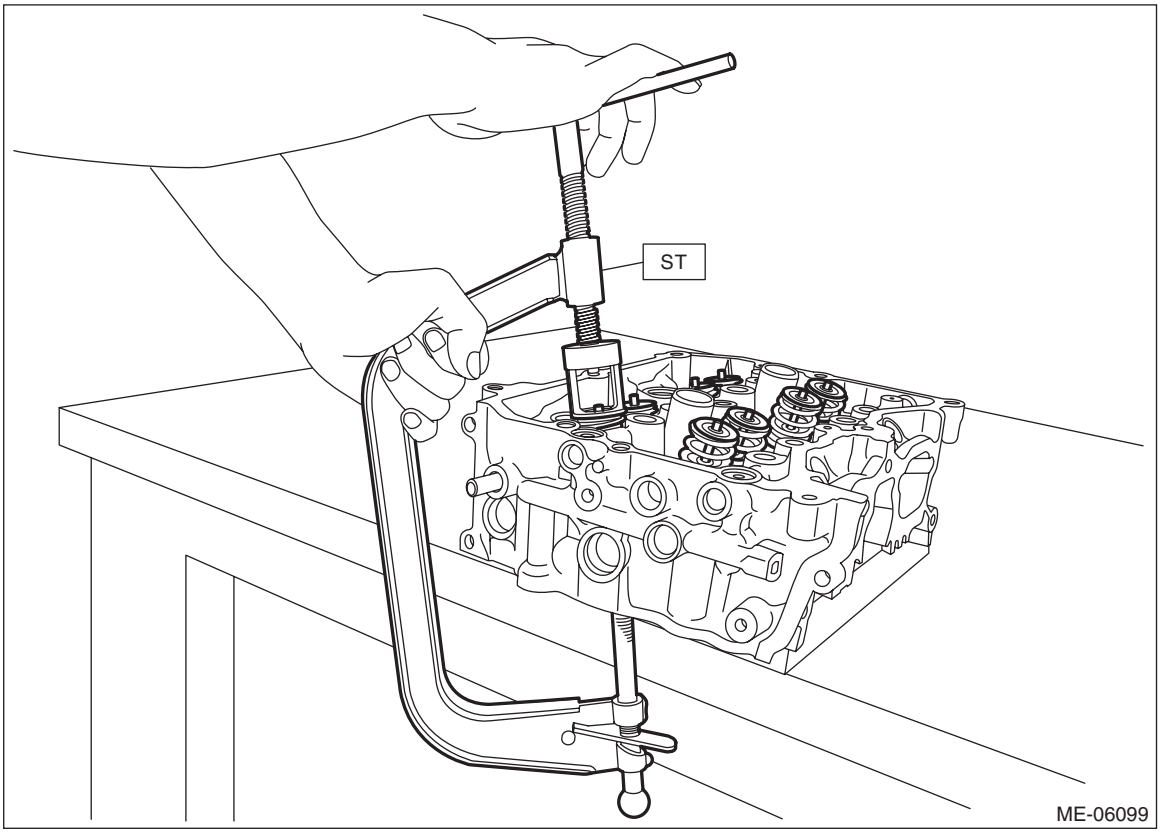
3) Remove the valve collet, valve, valve spring retainer, valve spring and valve spring seat from the cylinder head RH.

CAUTION:
During work, place a waste cloth, etc. to avoid scratching the mating surface of the cylinder head RH.

NOTE:
- Mark each part to prevent confusion.
- Keep all the removed parts in order for re-installing in their original positions.

(1) Compress the valve spring and remove the valve collet using ST.

ST 0920287002000 REMOVER AND REPLACER

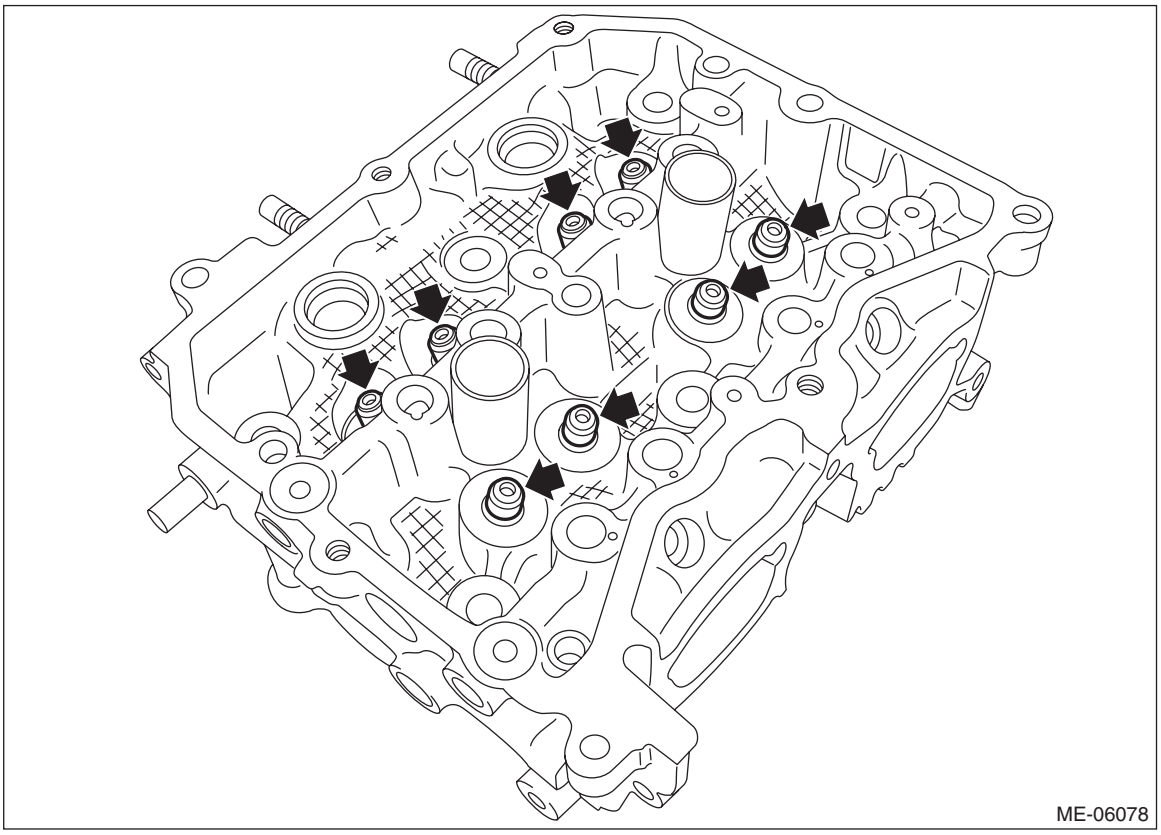


(2) Remove valve, valve spring retainer, valve spring and valve spring seat.

4) Remove the valve collet, valve, valve spring retainer, valve spring and valve spring seat from the cylinder head LH.
5) Remove the valve oil seals from valve guides of cylinder head RH.

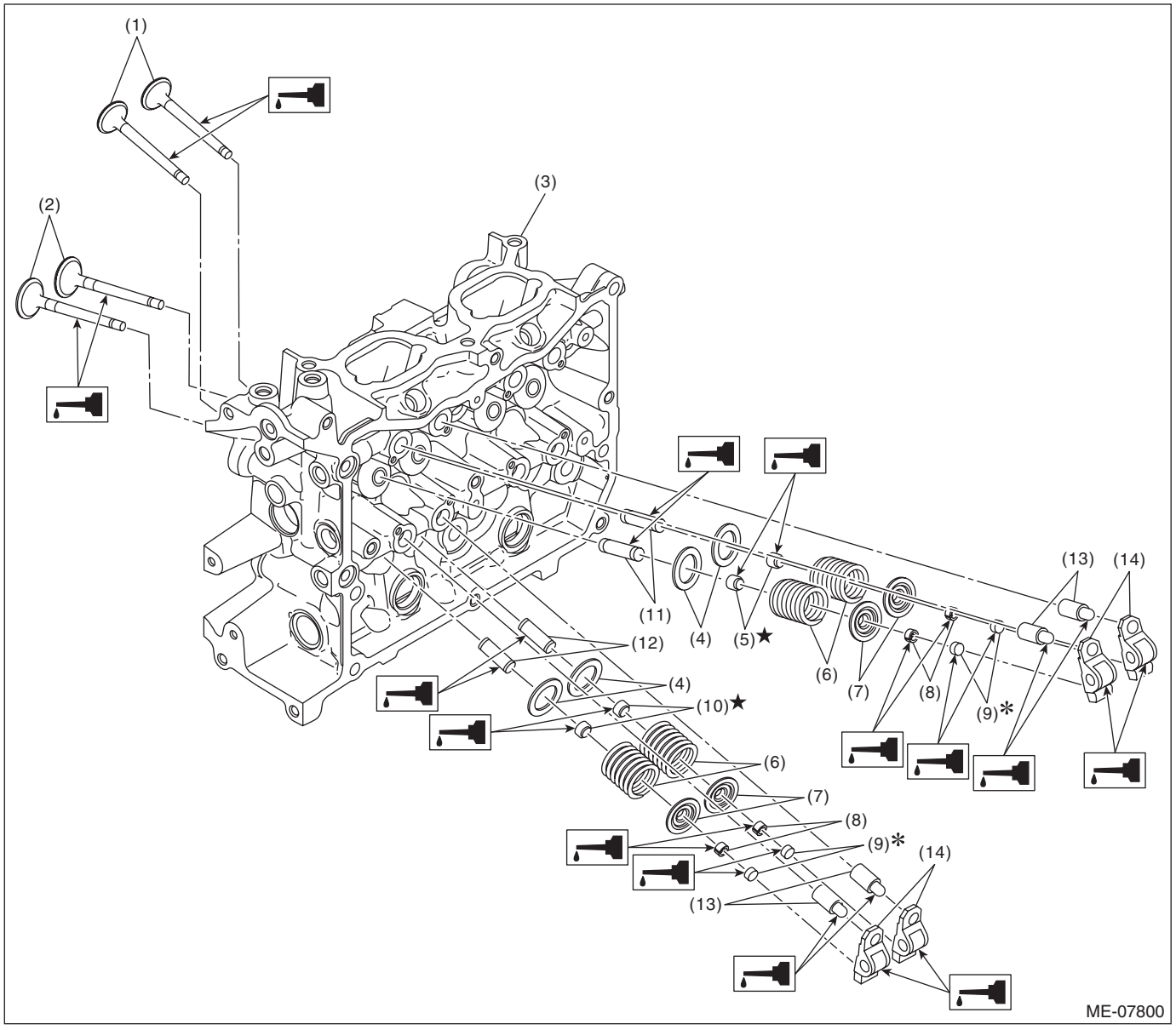
CAUTION:
• During work, place a waste cloth, etc. to avoid scratching the mating surface of the cylinder head RH.
• Use special care not to damage the cylinder head RH and guide during work.

NOTE:
For removal of valve guide, refer to INSPECTION. <Ref. to ME(H4DO(w/o HEV))-290, VALVE & VALVE GUIDE, INSPECTION, Cylinder Head.>



6) For cylinder head LH, remove the valve oil seal in the same manner.

D: ASSEMBLY



(1) Exhaust valve
(2) Intake valve
(3) Cylinder head
(4) Valve spring seat
(5) Intake valve oil seal
(6) Valve spring
(7) Valve spring retainer
(8) Valve collet
(9) Valve shim
(10) Exhaust valve oil seal
(11) Intake valve guide
(12) Exhaust valve guide
(13) Roller rocker arm pivot
(14) Roller rocker arm

1) Using the ST, install the valve oil seals to valve guides of cylinder head RH.

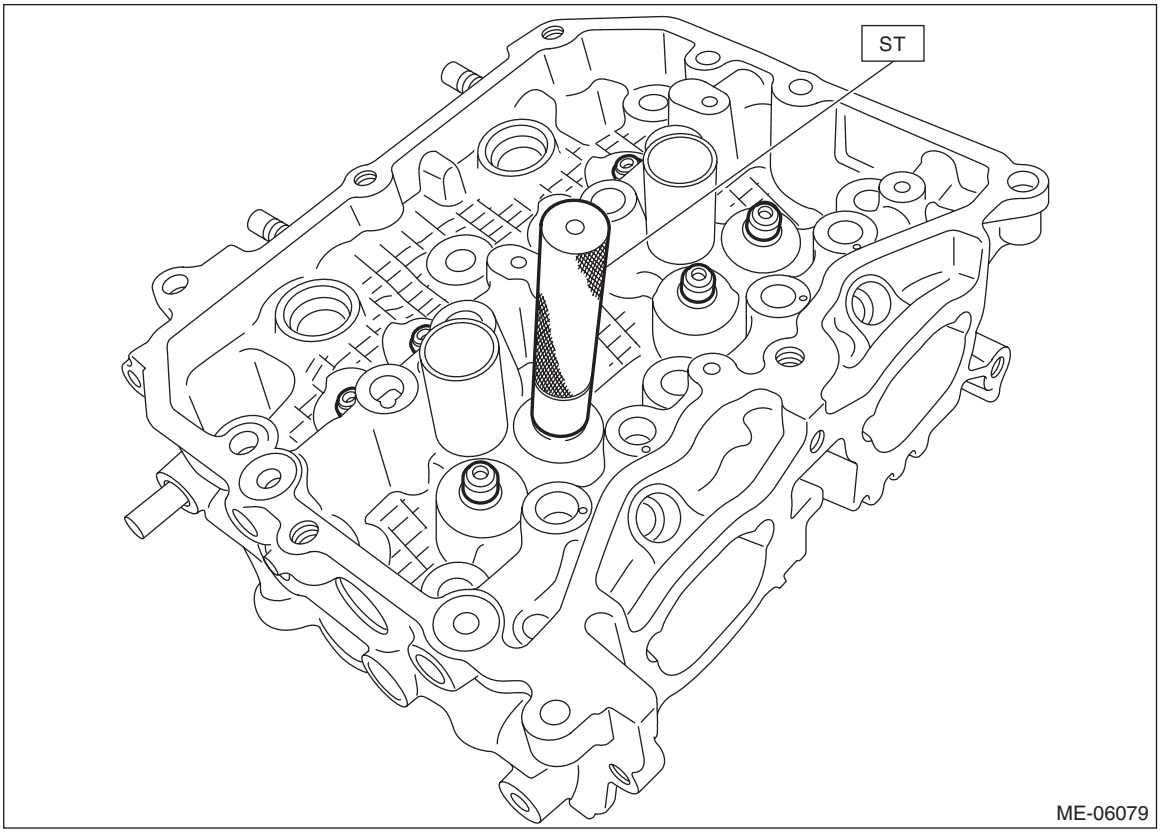
CAUTION:
• During work, place a waste cloth, etc. to avoid scratching the mating surface of the cylinder head RH.
• Use special care not to damage the cylinder head RH and guide during work.
• When installing the valve oil seal, press the ST with hands to install it and never drive the ST with a plastic hammer, otherwise the valve oil seal can be damaged.

NOTE:
- Use a new valve oil seal.
- Apply engine oil to valve oil seal before installing.
- The intake valve oil seals and exhaust valve oil seals are distinguished by their colors.

Identification colors:
Intake [Gray]
Exhaust [Green]

- For installation of valve guide, refer to INSPECTION. <Ref. to ME(H4DO(w/o HEV))-290, VALVE & VALVE GUIDE, INSPECTION, Cylinder Head.>

ST 18261AA010 VALVE OIL SEAL GUIDE



2) For cylinder head LH, install the valve oil seal in the same manner.
3) Install the valve spring seat, valve spring, valve spring retainer, valve and valve collet to the cylinder head RH.

CAUTION:
During work, place a waste cloth, etc. to avoid scratching the mating surface of the cylinder head RH.

(1) Set the valve spring seat, valve spring and valve spring retainer onto the cylinder head RH.

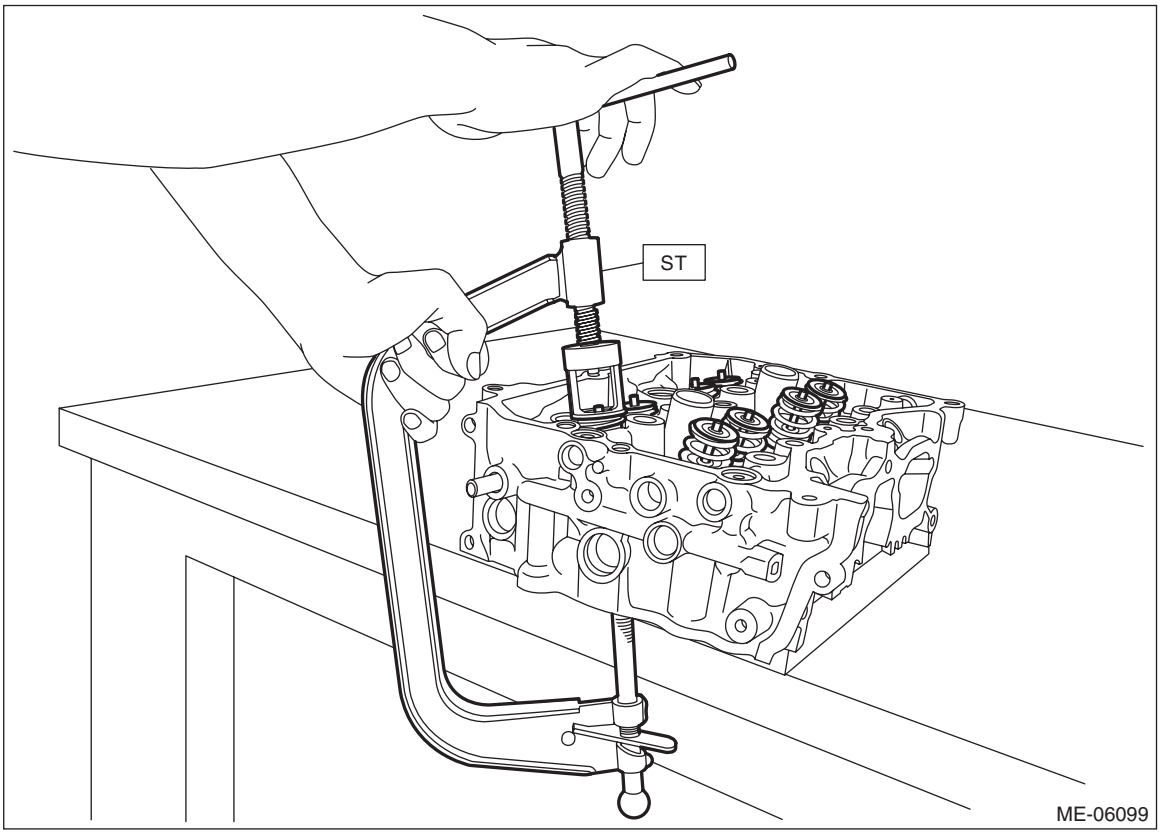
NOTE:
Be sure to install the valve spring with its close-coiled end facing the cylinder head side.

(2) Coat the valve stem of each valve with engine oil and insert the valve into valve guide.

NOTE:
When inserting the valve into valve guide, use special care not to damage the oil seal lip.

(3) Compress the valve spring and install the valve collet using ST.

ST 0920287002000 REMOVER AND REPLACER

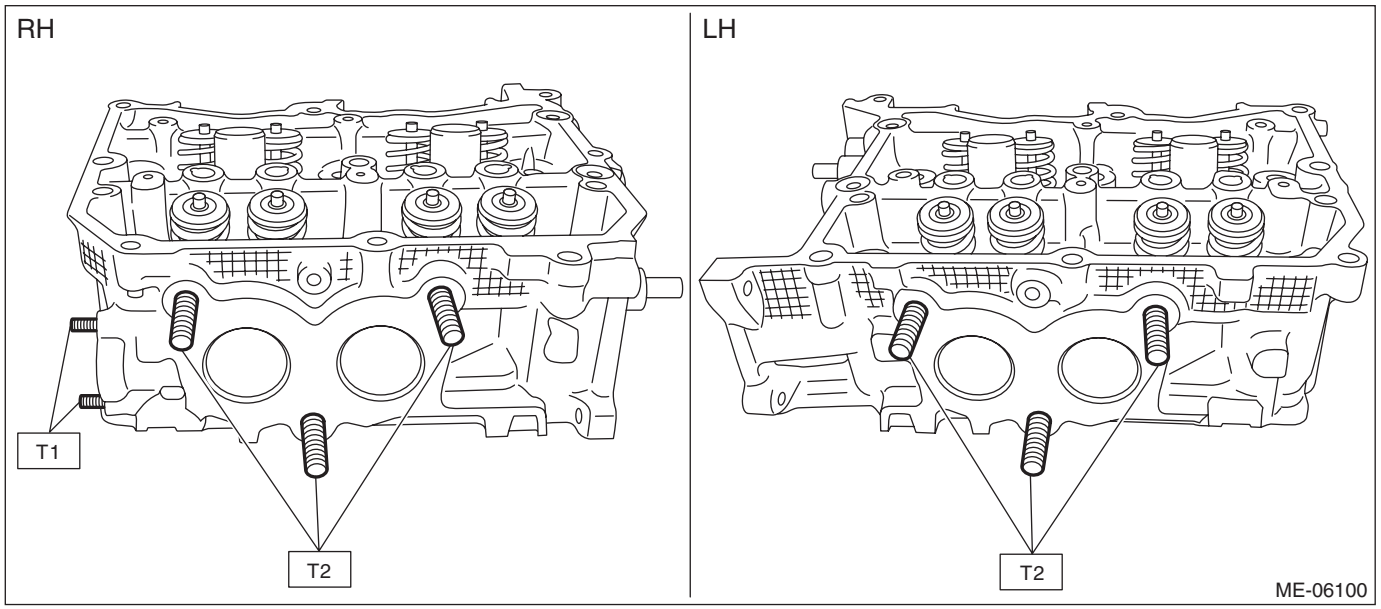


4) Install the valve spring seat, valve spring, valve spring retainer, valve and valve collet to the cylinder head LH.

5) Lightly tap the valve spring retainer with a plastic hammer, and make sure that the valve collet is securely attached.

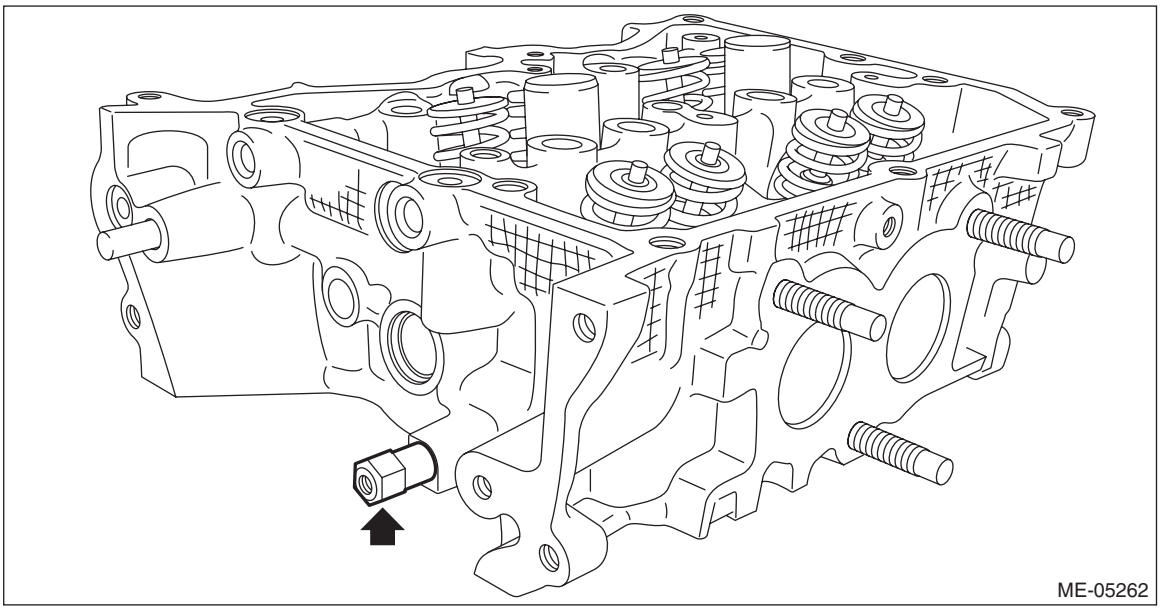
6) Install the stud bolts onto cylinder heads.

Tightening torque:
T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)



7) Install the chain cover securing bolt to the cylinder head LH.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



E: INSPECTION

1. CYLINDER HEAD

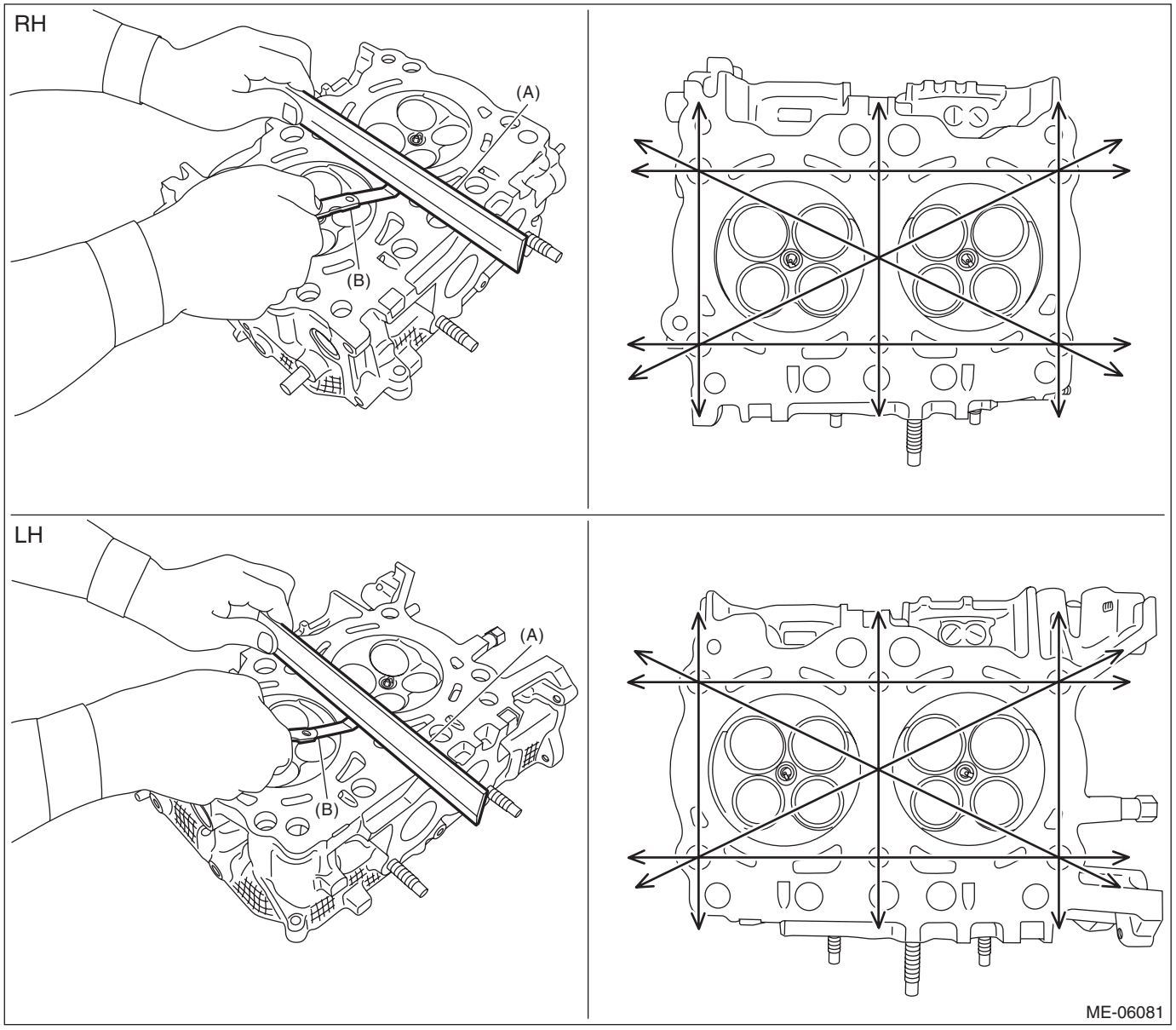
1) Visually inspect to make sure that there are no cracks, scratches or other damage.
2) Use liquid penetrant tester on the important sections to check for fissures.
3) Check that there are no marks of gas leaking or water leaking on gasket attachment surface.
4) Check the warping of the cylinder head mating surface that mates with cylinder block at the locations shown in the figure using a straight edge (A) and thickness gauge (B). If it exceeds the limit, correct the surface by grinding it with a surface grinder or replace the cylinder head.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- If there is warpage on the cylinder head mating surface, the cylinder head bolt tightening torque and angle tightening may be improper. When installing the cylinder head, make sure that tightening torque and angle tightening work is performed precisely according to the operation procedures.
- When the cylinder head is replaced, lap each valve. Refer to “VALVE SEAT” for lapping. <Ref. to ME(H4DO(w/o HEV))-300, VALVE SEAT, INSPECTION, Cylinder Head.>

Cylinder head warpage:
Limit
0.020 mm (0.0008 in)

Cylinder head grinding limit:
To 98.4 mm (3.874 in)

Cylinder head height:
Standard
98.5 mm (3.878 in)


RH
(A)
(B)
LH
(A)
(B)
ME-06081

2. VALVE & VALVE GUIDE

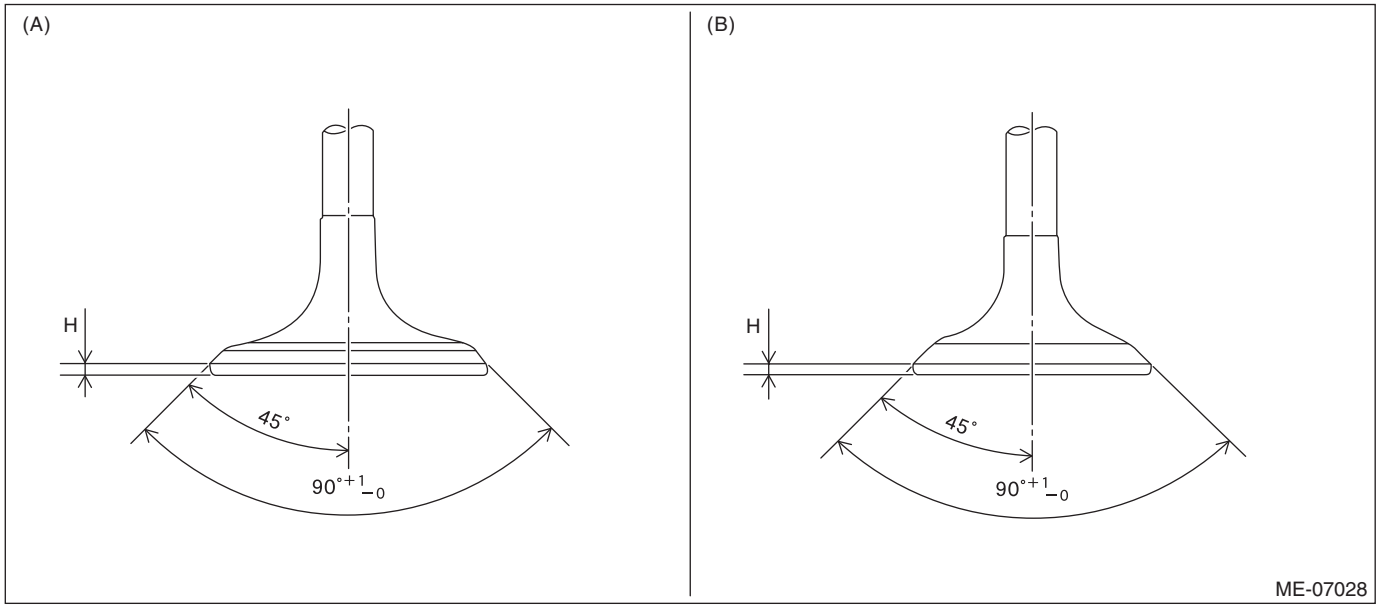
1) Check the valve flange and stem for damage, wear or deformation.
2) Measure the thickness “H” of valve head edge as shown in the figure using a caliper gauge. If it is not within the standard, replace the valve.

NOTE:
- It is possible to differentiate between the intake valve and the exhaust valve by their overall length.

Valve overall length:
Intake
104.95 mm (4.132 in)
Exhaust
96.5 mm (3.799 in)

- When the valve is replaced, lap the valve. Refer to “VALVE SEAT” for lapping. <Ref. to ME(H4DO(w/o HEV))-300, VALVE SEAT, INSPECTION, Cylinder Head.>

Valve head edge thickness H:
Intake (A)
Standard
0.8 — 1.2 mm (0.031 — 0.047 in)
Exhaust (B)
Standard
1.0 — 1.4 mm (0.039 — 0.055 in)



3) Check the clearance between valve and valve guide. Check the clearance between valve and valve guide by measuring the outer diameter of valve stem and the inner diameter of valve guide respectively.

(1) Measure the outer diameter of valve stem with a micrometer. If it is not within the standard, replace the valve.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the outer diameter of the valve stem at the six locations as shown in the figure, and read the value of most worn location.
- When the valve is replaced, lap the valve. Refer to “VALVE SEAT” for lapping. <Ref. to ME(H4DO(w/o HEV))-300, VALVE SEAT, INSPECTION, Cylinder Head.>

Valve stem outer diameter:

Intake

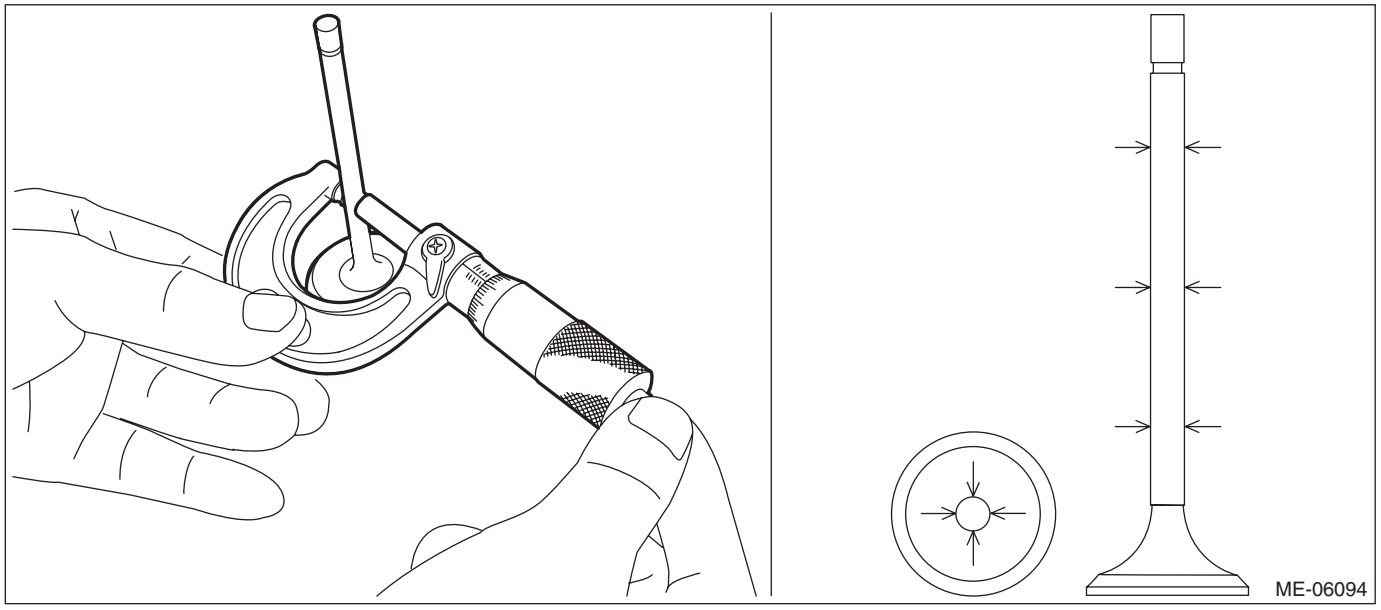
Standard

5.455 — 5.470 mm (0.2148 — 0.2154 in)

Exhaust

Standard

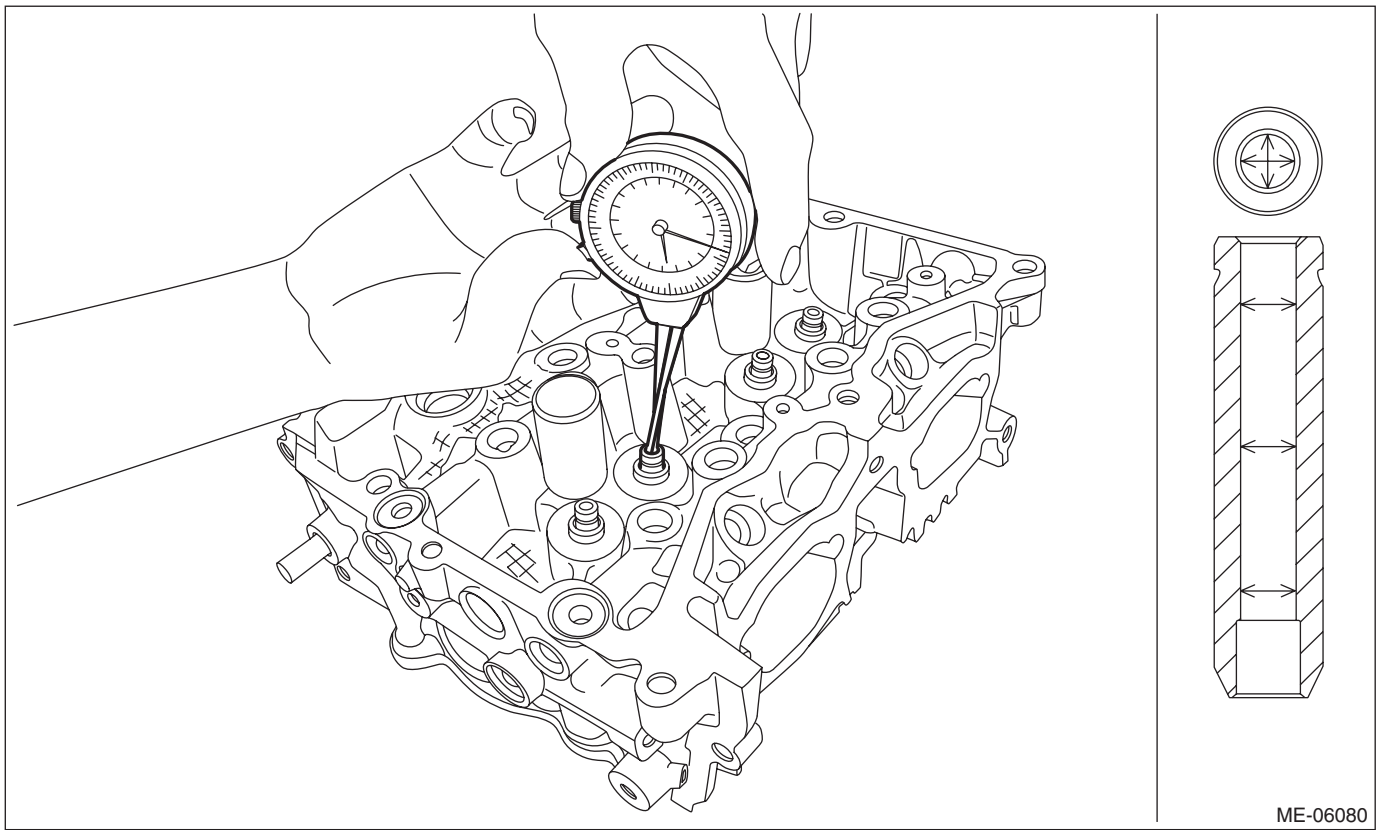
5.445 — 5.460 mm (0.2144 — 0.2150 in)



(2) Using a caliper gauge, measure the inner diameter of valve guide. If it is not within the standard, replace the valve guide. For replacement procedure, refer to step 4).

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the inner diameter of the valve guide at the six locations as shown in the figure, and read the value of most worn location.

Valve guide inner diameter:
Standard
5.500 — 5.512 mm (0.2165 — 0.2170 in)



(3) Calculate the clearance between valve and valve guide.

Clearance between valve and valve guide:
Intake
Standard
0.030 — 0.057 mm (0.0012 — 0.0022 in)
Exhaust
Standard
0.040 — 0.067 mm (0.0016 — 0.0026 in)

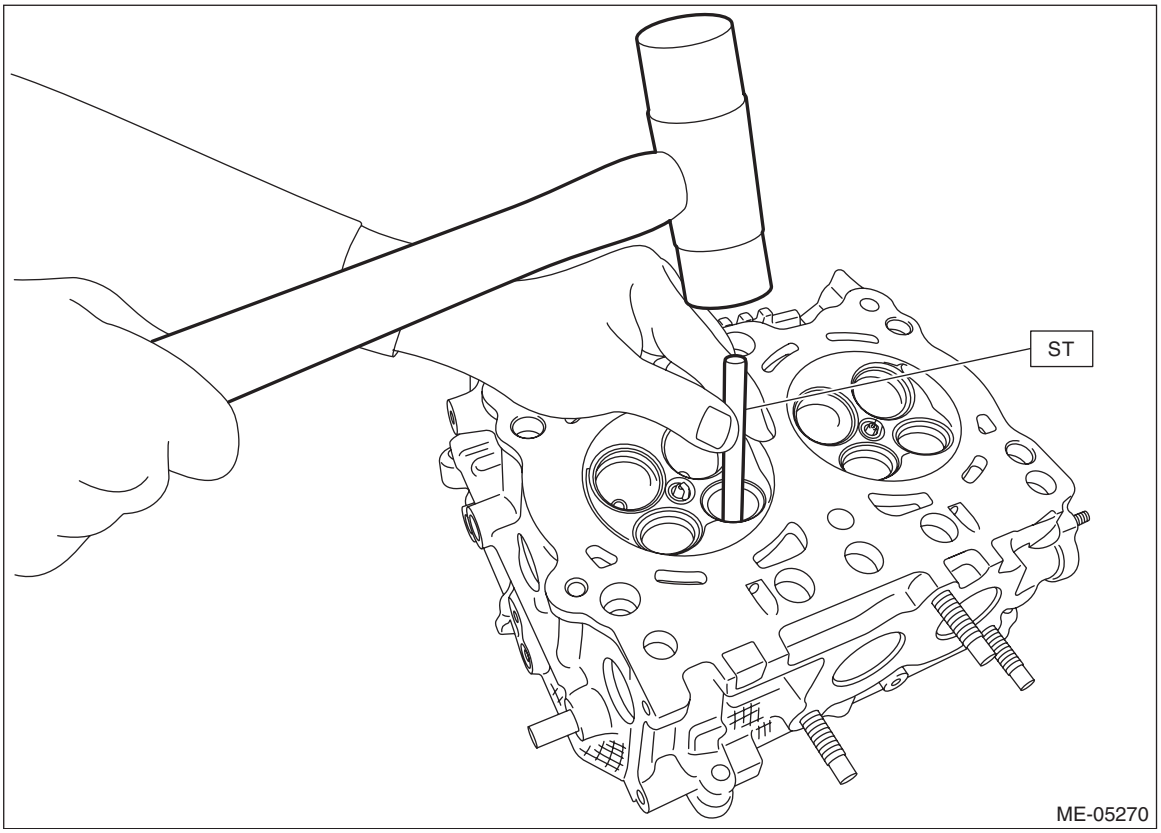
4) If the clearance between valve and valve guide exceeds the standard, replace the valve or valve guide, whichever shows the greater amount of wear or damage. For replacement procedure of valve guide, refer to the following.

NOTE:
When the valve is replaced, lap the valve. Refer to “VALVE SEAT” for lapping. <Ref. to ME(H4DO(w/o HEV))-300, VALVE SEAT, INSPECTION, Cylinder Head.>

(1) Insert ST into the valve guide with the combustion chamber upward and remove the valve guide using plastic hammer.

CAUTION:
- **Place a wood board wrapped with a waste cloth to stabilize the cylinder head before work.**
- **Use special care not to damage the cylinder head during work.**
- **Always strike the ST vertically with a plastic hammer. Otherwise, the ST can be damaged.**

ST 499765700 VALVE GUIDE REMOVER AND INSTALLER

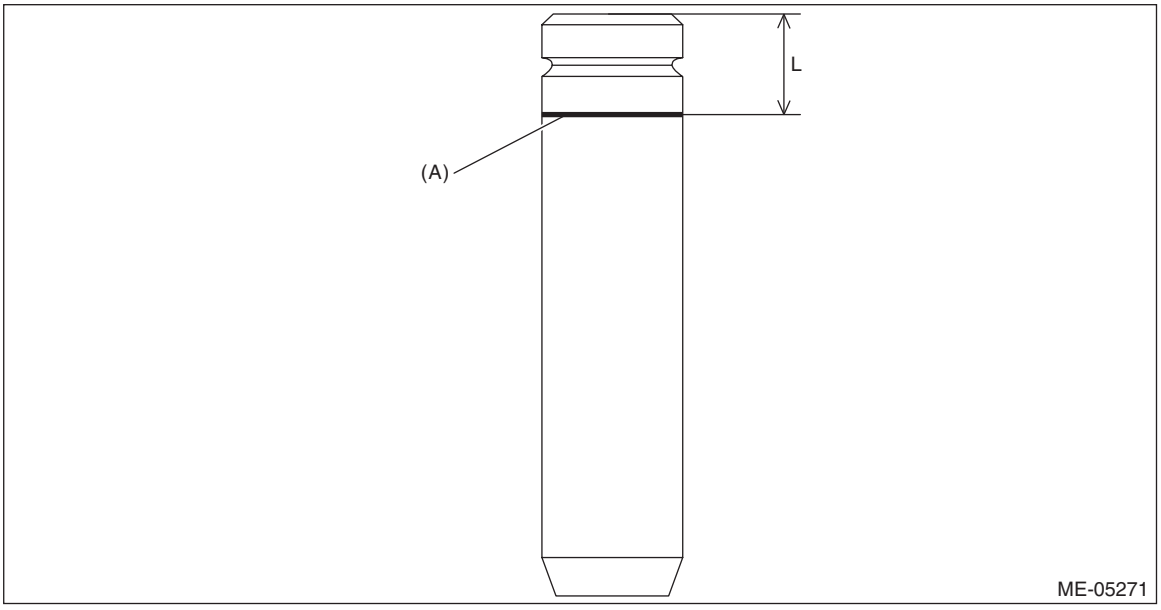


(2) Before installing the valve guide, make sure that neither scratches nor damages exist on the inner surface of valve guide installation holes of cylinder head.

(3) Draw a reference line (A) for insert on the valve guide using a marker as shown in the figure.

NOTE:
- Use a new valve guide.
- A reference line for insert is used as a guide when tapping-in the valve guide.

Valve guide inserting reference line position L:
15 mm (0.5906 in)

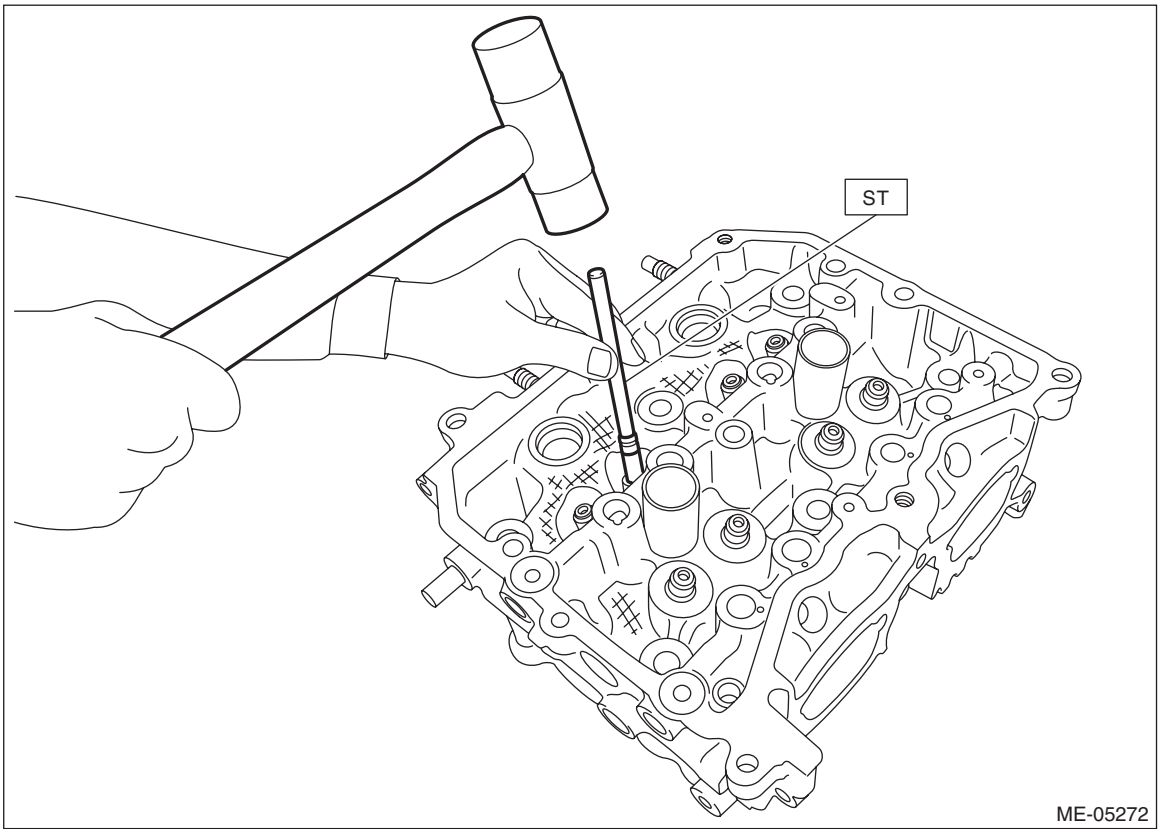


(4) Apply a enough coat of engine oil to the valve guide, and set the valve guide on the cylinder head with the combustion chamber downward.

(5) Insert the ST into the valve guide, and tap-in the valve guide to the reference line (A) for insert using plastic hammer.

CAUTION:
- **During work, place a waste cloth, etc. to avoid scratching the mating surface of the cylinder head.**
- **Use special care not to damage the cylinder head during work.**
- **Always strike the ST vertically with a plastic hammer. Otherwise, the ST can be damaged.**

ST 499765700 VALVE GUIDE REMOVER AND INSTALLER



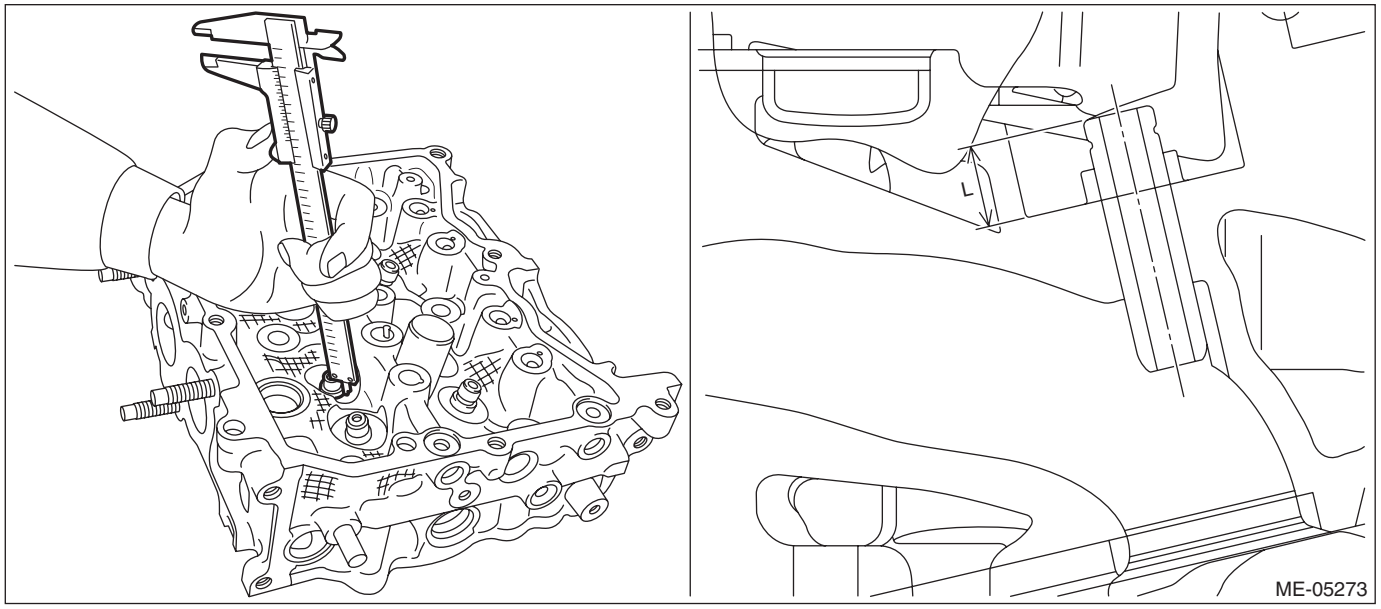
(6) Measure the valve guide protrusion amount “L” as shown in the figure using a caliper gauge. Insert the ST into the valve guide again, and tap-in the valve guide so that it is positioned within standard by referring to the measured value using plastic hammer.

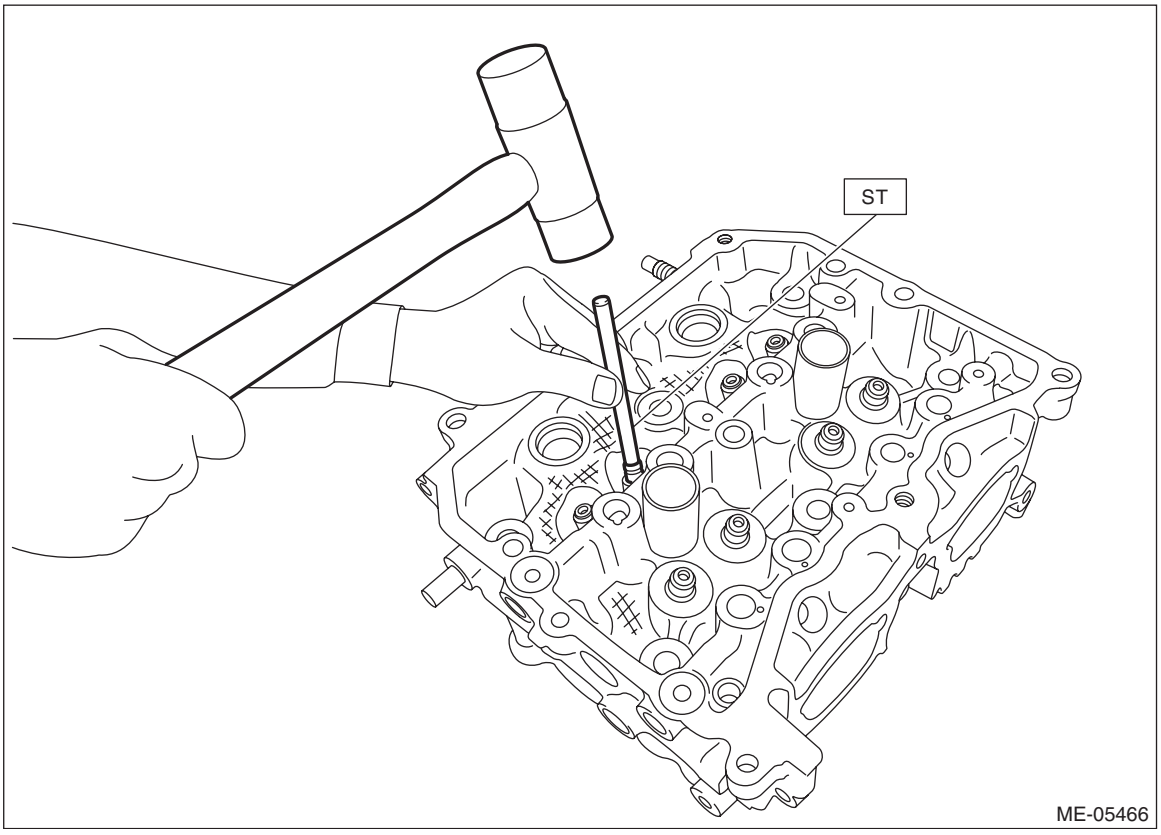
CAUTION:
- **During work, place a waste cloth, etc. to avoid scratching the mating surface of the cylinder head.**
- **Use special care not to damage the cylinder head during work.**
- **Always strike the ST vertically with a plastic hammer. Otherwise, the ST can be damaged.**

NOTE:
Be careful not to tap-in excessively by repeating the steps of Tapping-in → Measurement → Tapping-in → Measurement … when installing the valve guide.

ST 499765700 VALVE GUIDE REMOVER AND INSTALLER

Valve guide protrusion amount L:
Standard
11.4 — 11.8 mm (0.449 — 0.465 in)



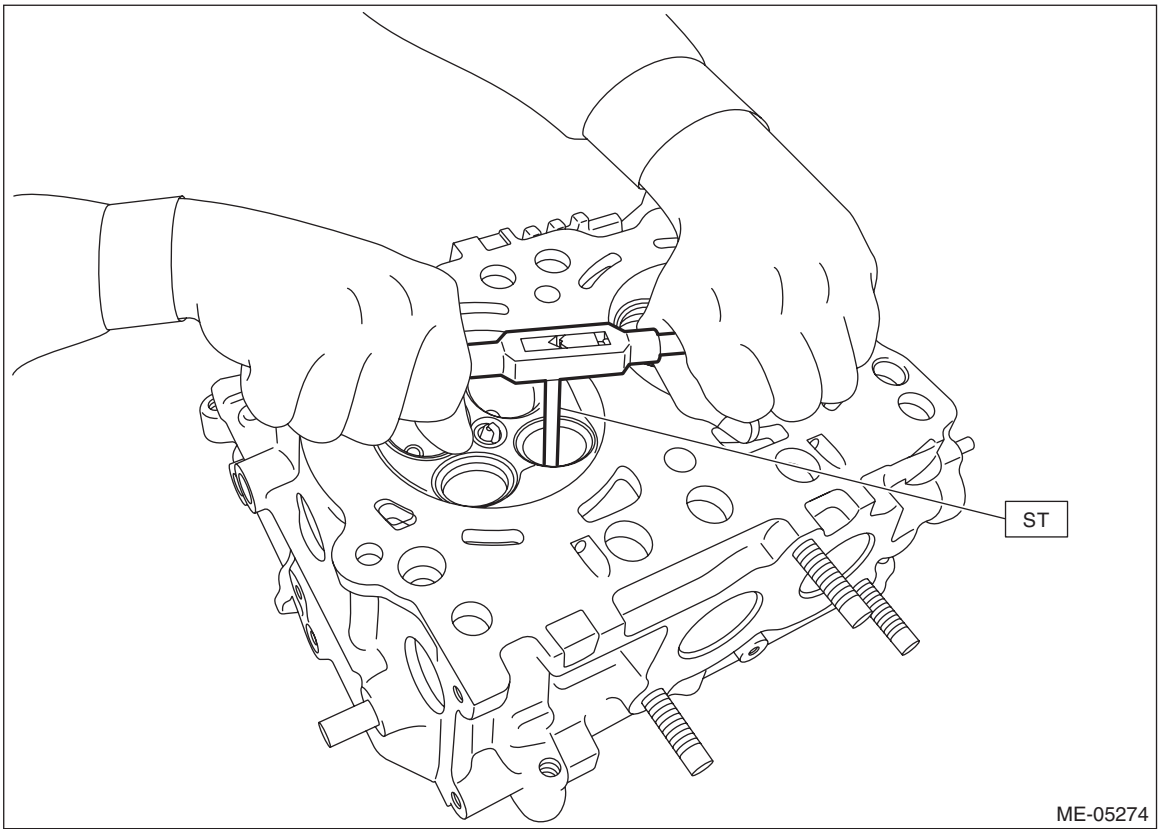


(7) Ream the inside of valve guide with the combustion chamber upward using the ST. Put the ST in valve guide, and rotate the ST slowly clockwise while pushing it lightly. Bring the ST back while rotating it clockwise.

CAUTION:
- **Place a wood board wrapped with a waste cloth to stabilize the cylinder head before work.**
- **Use special care not to damage the cylinder head during work.**

NOTE:
- Apply engine oil to the ST.
- If the inner surface of valve guide is damaged, the edge of ST should be slightly ground with oil stone.
- If the inner surface of valve guide becomes lustrous and the ST does not chip, use a new ST or remedy the ST.

ST 499765900 VALVE GUIDE REAMER



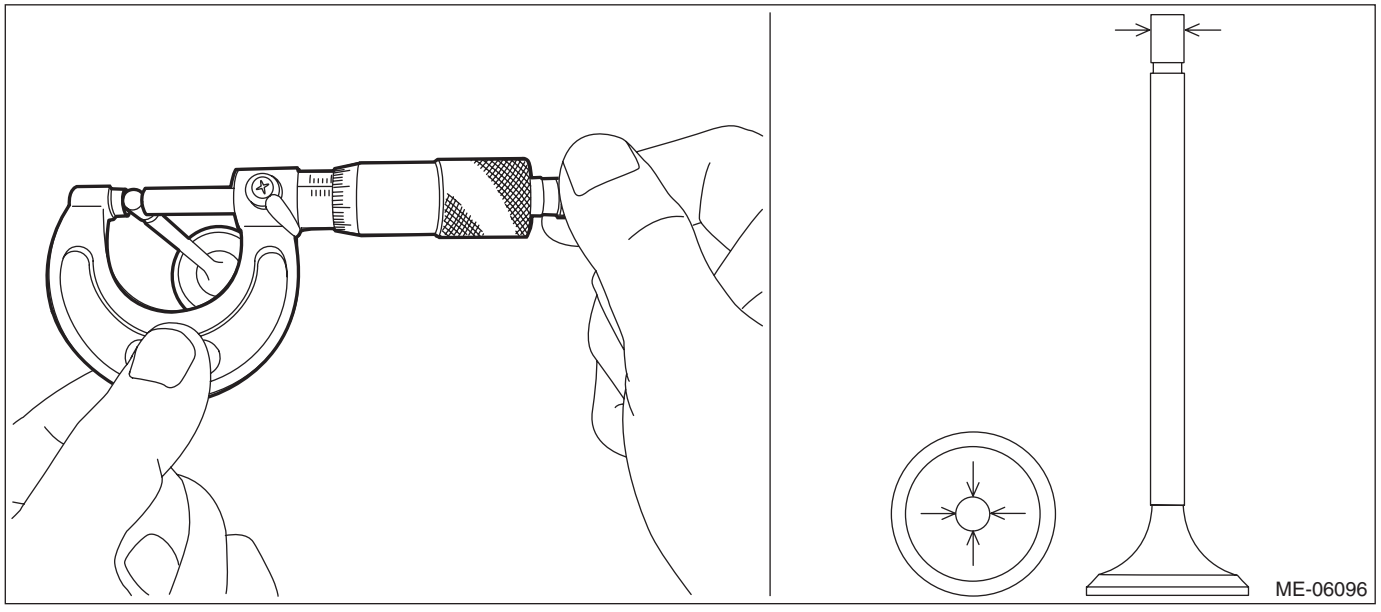
(8) After reaming, clean the valve guide to remove chips.
(9) Check the seating width between valve and valve seat. <Ref. to ME(H4DO(w/o HEV))-300, VALVE SEAT, INSPECTION, Cylinder Head.>

3. VALVE & VALVE SHIM

1) Visually check the valve shim for damage.
2) Check the clearance between valve and valve shim. Check the clearance between valve and valve shim by measuring the outer diameter of valve stem end and the inner diameter of valve shim respectively.
   (1) Measure the outer diameter of valve stem end with a micrometer. If it is not within the standard, replace the valve.

NOTE:
• Measurement should be performed at a temperature of 20°C (68°F).
• Measure the outer diameter of the valve stem end at the two locations as shown in the figure, and read the value of most worn location.
• When the valve is replaced, lap the valve. Refer to "VALVE SEAT" for lapping. <Ref. to ME(H4DO(w/o HEV))-300, VALVE SEAT, INSPECTION, Cylinder Head.>

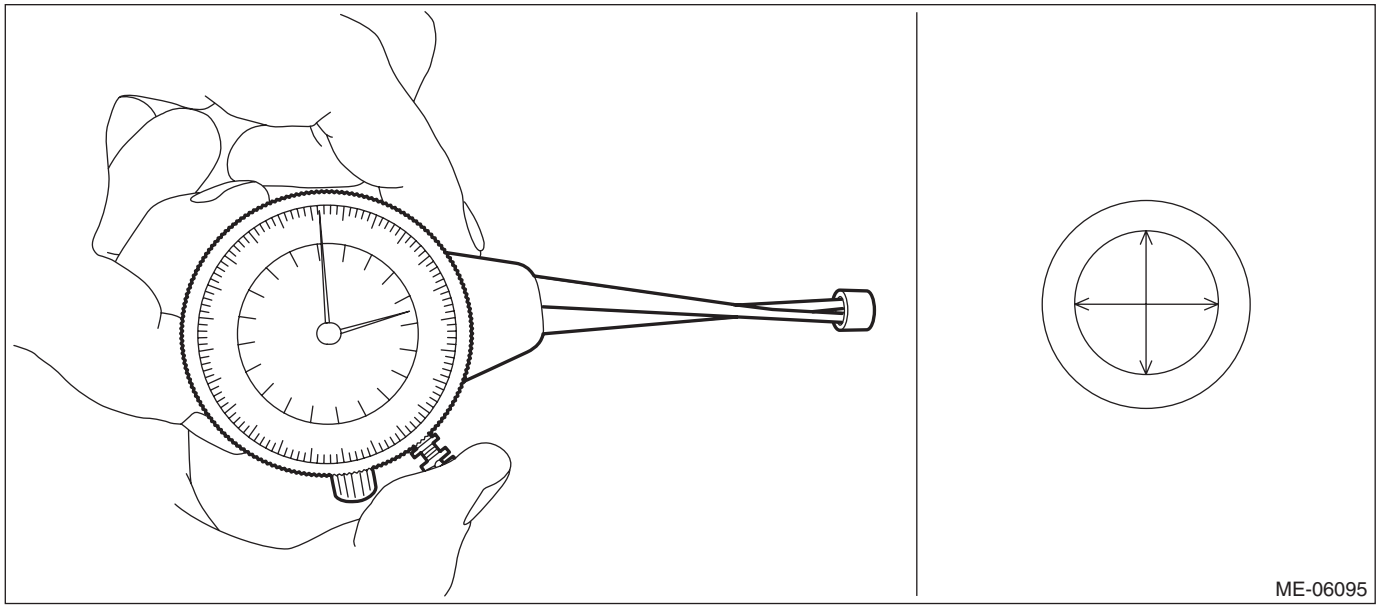
Valve stem end outer diameter:
Intake
Standard
5.455 — 5.470 mm (0.2148 — 0.2154 in)
Exhaust
Standard
5.445 — 5.460 mm (0.2144 — 0.2150 in)



   (2) Using a caliper gauge, measure the inner diameter of valve shim. If it is not within the standard, replace the valve shim.

NOTE:
• Measurement should be performed at a temperature of 20°C (68°F).
• Measure the inner diameter of the valve shim at the two locations as shown in the figure, and read the value of most worn location.
• If the valve shim has to be replaced, check the cam clearance and replace with the suitable valve shim. <Ref. to ME(H4DO(w/o HEV))-53, WHEN TIMING CHAIN ASSEMBLY IS REMOVED, INSPECTION, Cam Clearance.>

Valve shim inner diameter:
Standard
5.500 — 5.560 mm (0.2165 — 0.2189 in)



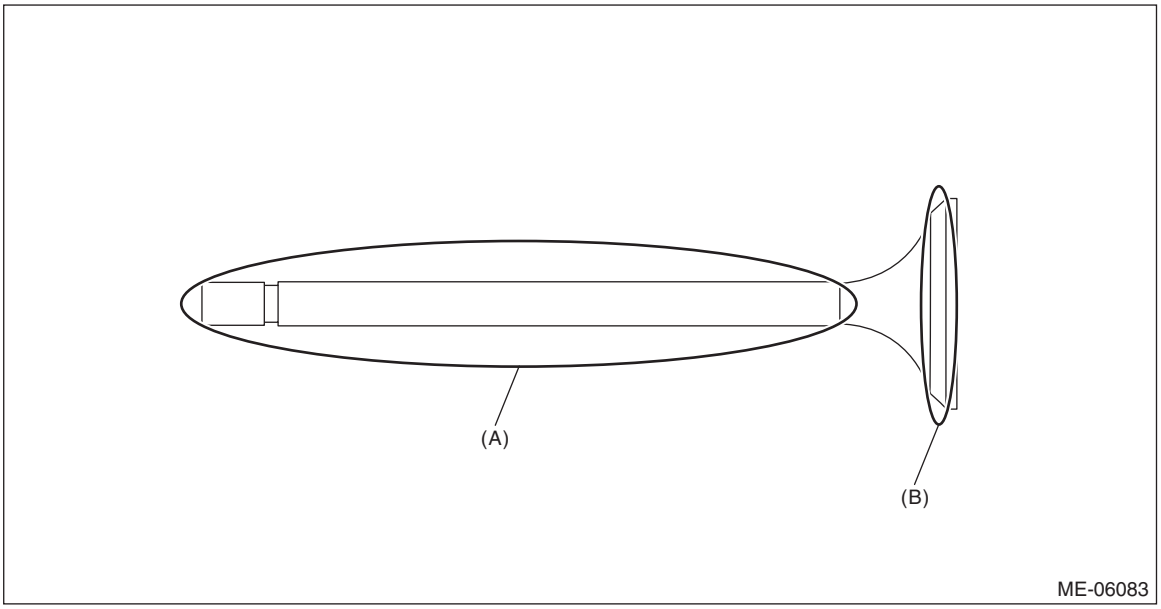
(3) Calculate the clearance between valve and valve shim. If the clearance exceeds the standard, replace the valve or valve shim, whichever shows the greater amount of wear or damage.

NOTE:
• When the valve is replaced, lap the valve. Refer to “VALVE SEAT” for lapping. <Ref. to ME(H4DO(w/o HEV))-300, VALVE SEAT, INSPECTION, Cylinder Head.>
• If the valve shim has to be replaced, check the cam clearance and replace with the suitable valve shim. <Ref. to ME(H4DO(w/o HEV))-53, WHEN TIMING CHAIN ASSEMBLY IS REMOVED, INSPECTION, Cam Clearance.>

Clearance between valve and valve shim:
Intake
Standard
0.030 — 0.105 mm (0.0012 — 0.0041 in)
Exhaust
Standard
0.040 — 0.115 mm (0.0016 — 0.0045 in)

4. VALVE SEAT

1) Check the valve seat for damage and deformation.
2) Check the seating width and seating position between valve and valve seat for the intake valve seat and exhaust valve seat.
   (1) Clean the valve and valve seat.
   (2) Coat the stem (A) of the valve lightly with engine oil and apply red dye evenly on the valve face (B).



   (3) Using the valve lapper, slowly insert the valve with red dye applied into the valve guide. Lightly press the valve against the valve seat without turning the valve, and then slowly pull out the valve.
   (4) Check the seating width “W” of valve seat as shown in the figure, using a caliper gauge. Check the seating width “W” between valve and valve seat by measuring the width of red dye on the seating surface of valve seat. If the seating width “W” between valve and valve seat is out of the standard, correct the seating surface of valve seat using the valve seat cutter. For correcting procedures of the valve seat seating surface, refer to step 3).

NOTE:
• When the red dye does not appear seamlessly on the valve seat seating surface, lap the valve. For lapping procedure, refer to step 4).
• When the red dye does not appear seamlessly on the valve seat seating surface even after lapping the valve, correct the valve seat seating surface using the valve seat cutter. For correcting procedures of the valve seat seating surface, refer to step 3).

Seating width W between valve and valve seat:

Intake

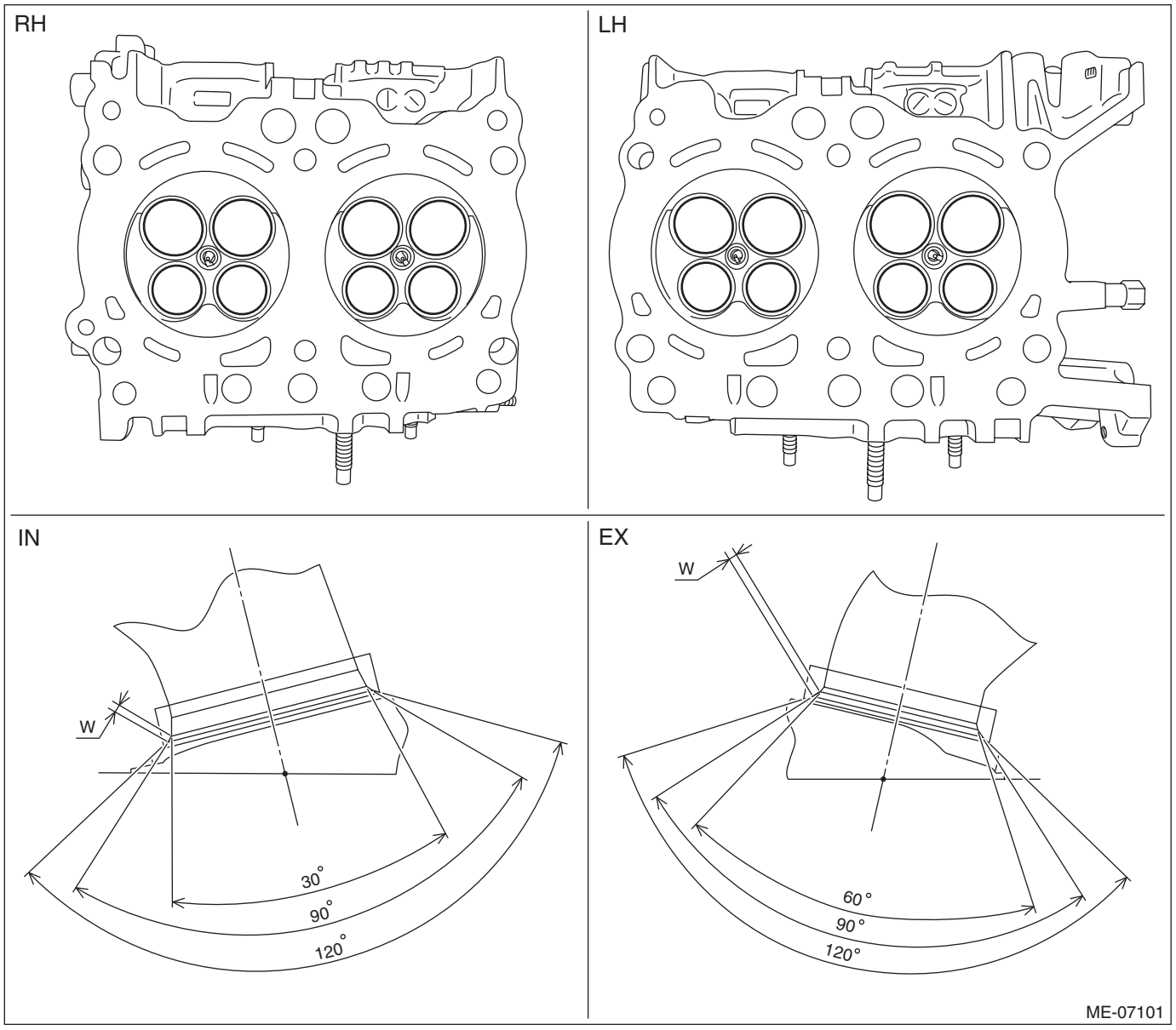
Standard

0.8 — 1.6 mm (0.031 — 0.063 in)

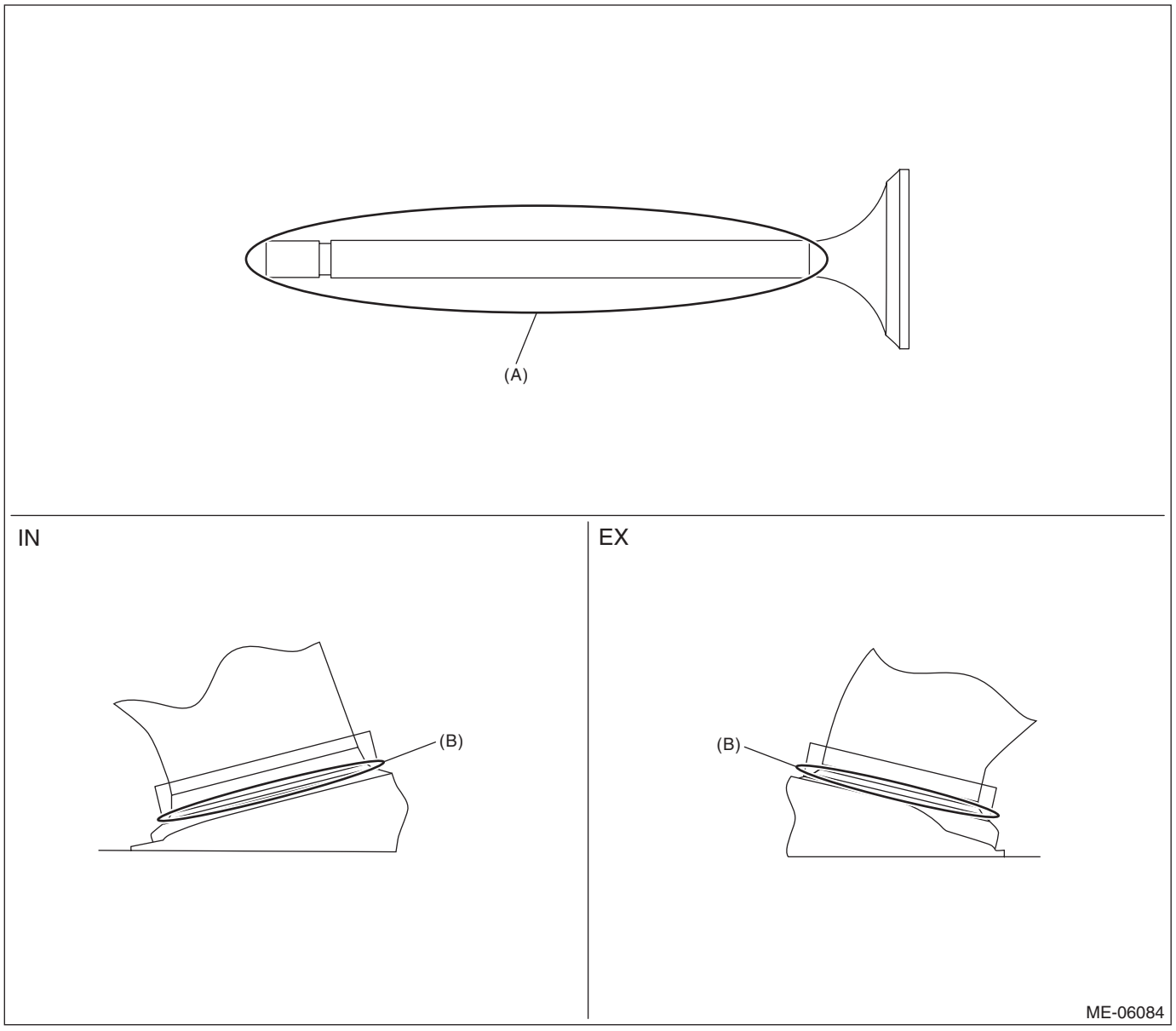
Exhaust

Standard

1.1 — 1.7 mm (0.043 — 0.067 in)

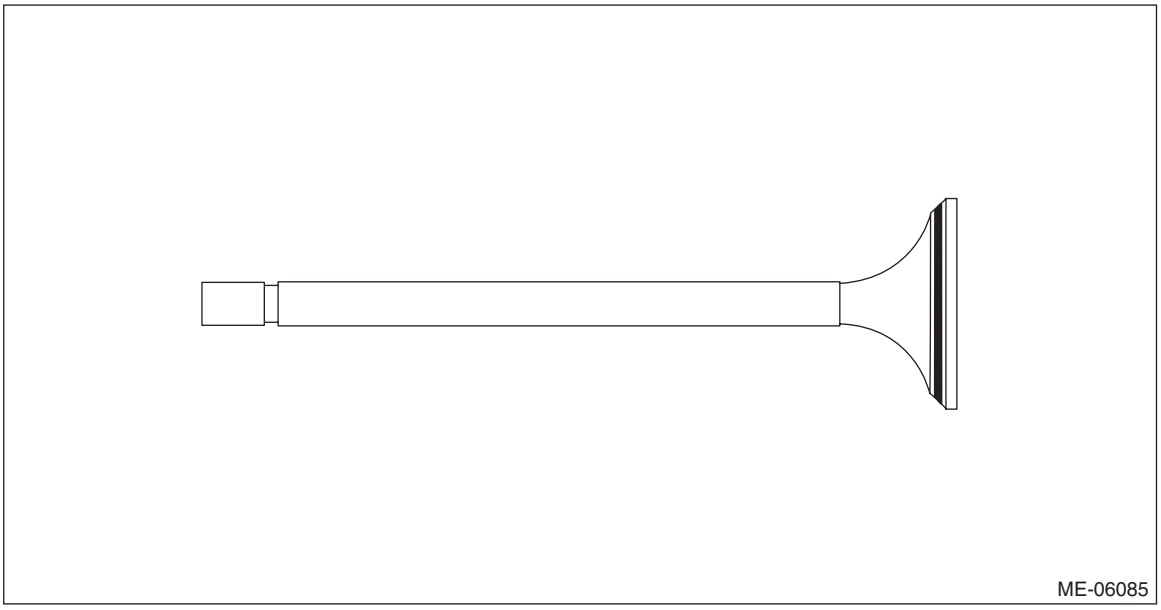


(5) Wipe off the red dye on the valve and valve seat completely.
(6) Coat the stem (A) of the valve lightly with engine oil and apply red dye evenly on the seating surface (B) between valve and valve seat.



(7) Using the valve lapper, slowly insert the valve into the valve guide. Lightly press the valve against the valve seat without turning the valve, and then slowly pull out the valve.
(8) Check the seating position between valve and valve seat. Check the seating position between valve and valve seat by checking the position of red dye on the valve face. If the seating position between valve and valve seat is not at the center of valve face, correct the seating surface of valve seat using the valve seat cutter. For correcting procedures of the valve seat seating surface, refer to step 3).

Seating position between valve and valve seat:
Valve face center

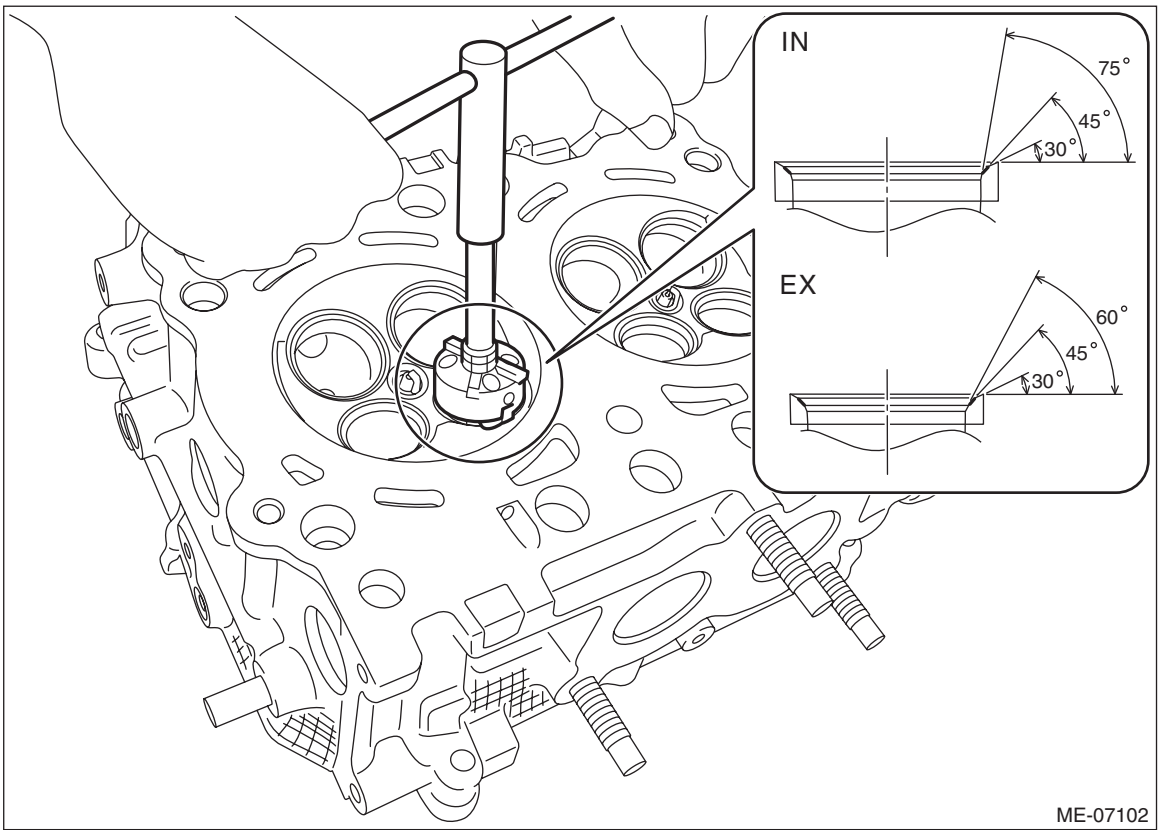


(9) After inspection, wipe off the red dye completely.

3) When correcting the seating surfaces of valve seat
(1) Correct the seating angle between valve and valve seat using the 45° valve seat cutter.

NOTE:
• Grind the seating surface so that the seating width between valve and valve seat becomes slightly larger than the standard value.
• Gradually reduce pressure at the end of grinding process in order to avoid creating a gap on the valve seat correcting surface.

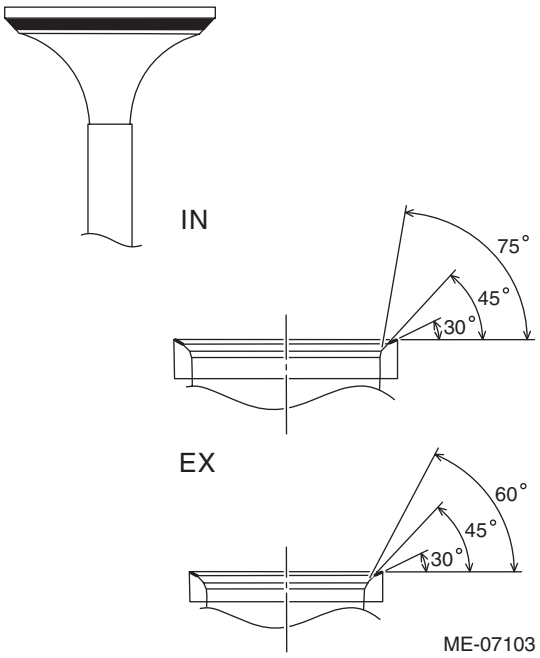
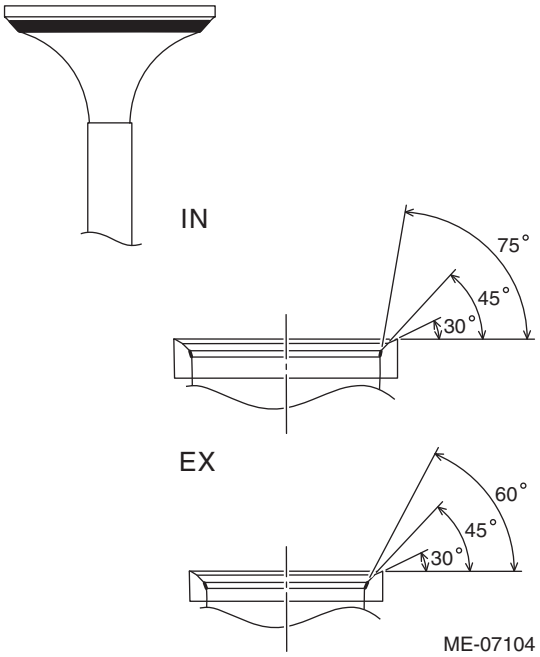
Seating angle between valve and valve seat:
45°

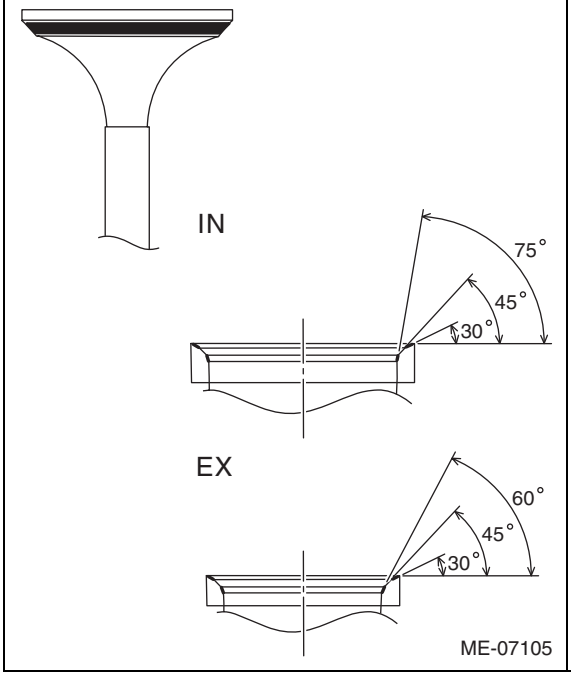


(2) Lap the valve. For lapping procedure of the valve, refer to step 4).
(3) Check the seating position between valve and valve seat. For inspection of the seating position between valve and valve seat, refer to step 2).

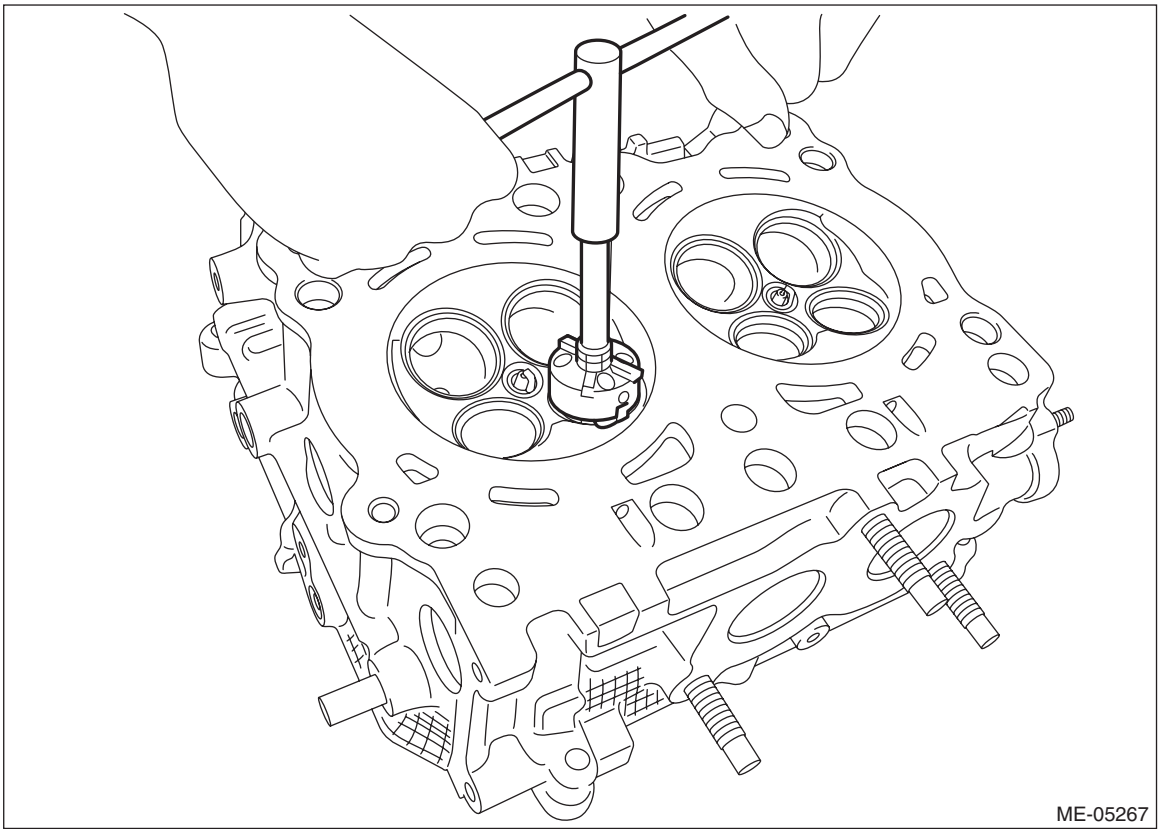
NOTE:
This procedure is necessary to select a seat cutter to be used in step (4).
(4) Using a seat cutter, correct the valve seat so that the seating width between valve and valve seat becomes the standard value.

NOTE:
- Select a proper valve seat cutter according to the following table.

Seating position between valve and valve seat	Seat cutter selection
	When the seating position of valve face is high, grind the surface using the 30° seat cutter until seating width between valve and valve seat becomes the standard value.
	When the seating position of valve face is low, grind the surface using the 75° (IN) or 60° (EX) seat cutter until seating width between valve and valve seat becomes the standard value.

Seating position between valve and valve seat	Seat cutter selection
	When the seating position of valve face is at center, grind the surface evenly using the 30° and 75° (IN) or 60° (EX) seat cutters until seating width between valve and valve seat becomes the standard value.

• Gradually reduce pressure at the end of grinding process in order to avoid creating a gap on the valve seat correcting surface.



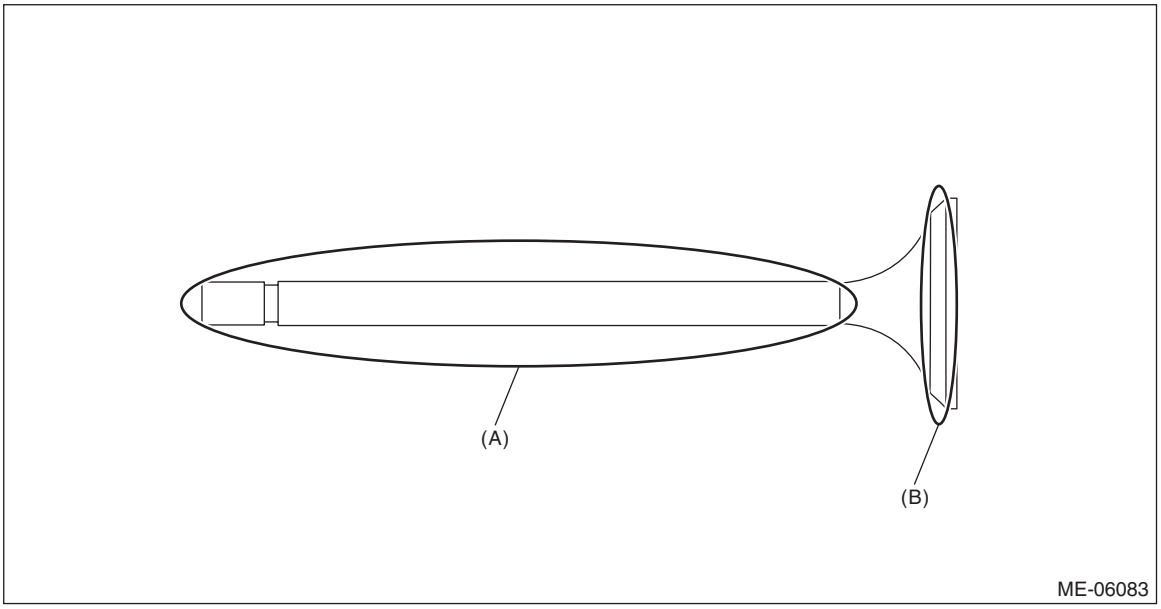
(5) Lap the valve. For lapping procedure of the valve, refer to step 4).

4) When lapping the valve

(1) Coat the stem (A) of the valve lightly with engine oil and put a small amount of valve compound evenly on the valve face (B).

NOTE:

- Be careful not to put the valve compound more than necessary.
- To avoid damaging the valve guide and valve stem, be careful not to let the valve compound contact the valve stem.



(2) Using the valve lapper, slowly insert the valve with the valve compound applied into the valve guide, and lap the seating surface between valve and valve seat. First, lift the valve and strike it against the valve seat twice, and then slightly turn the valve once. Repeat these steps as one set.

NOTE:

- To prevent the seating width between valve and valve seat from exceeding the standard value, be careful not to keep turning the valve while pressing it against the valve seat during lapping.
- Be careful not to lift the valve too far during lapping in order to prevent the valve from coming off the valve guide.

(3) Wipe off the valve compound on the valve and valve seat completely after lapping.

NOTE:

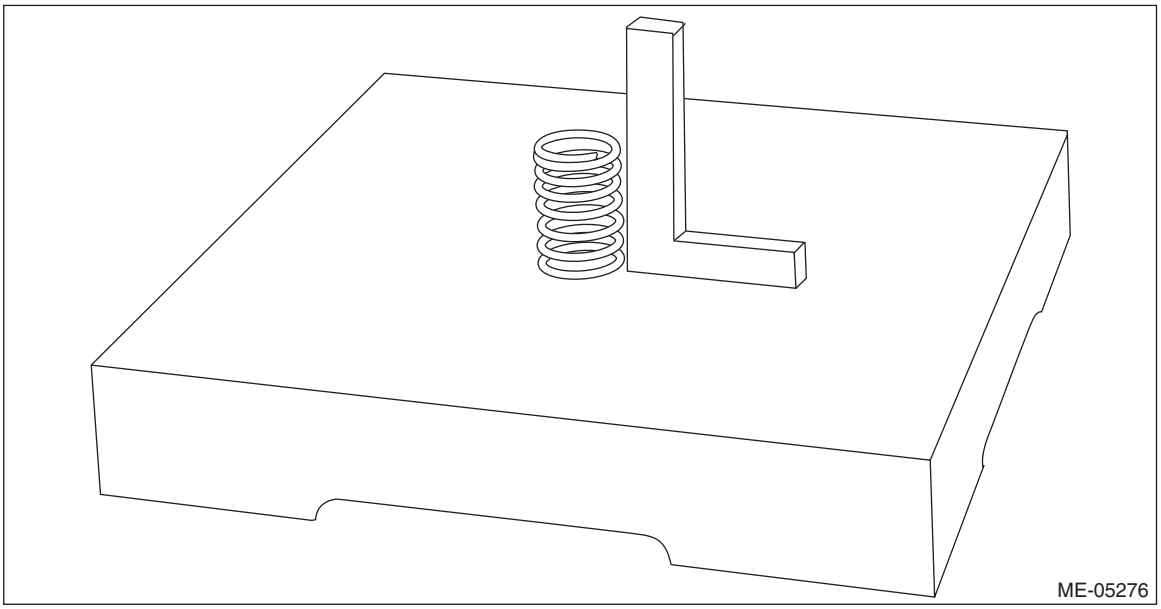
Be careful not to leave any valve compound in order to avoid malfunction.

(4) Check the seating width and seating position between valve and valve seat.

5. VALVE SPRING

1) Check the valve spring for damage and deformation.
2) Using a caliper gauge, valve spring tester, surface plate and try square, check the valve spring free length, tension/spring height and squareness. If it is not within the standard, replace the valve spring.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- To check the squareness of the valve spring, stand the valve spring on a surface plate and check its deflection at the top of the valve spring using a try square.



Valve spring free length:

MT model
Standard
41.06 mm (1.617 in)

CVT model
Standard
41.68 mm (1.641 in)

Valve spring tension/spring height:

MT model
Set
Standard
182 — 210 N (18.56 — 21.41 kgf, 40.92 — 47.22 lbf)/33.0 mm (1.299 in)
Lift
Standard
552 — 610 N (56.29 — 62.20 kgf, 124.11 — 137.15 lbf)/22.0 mm (0.866 in)

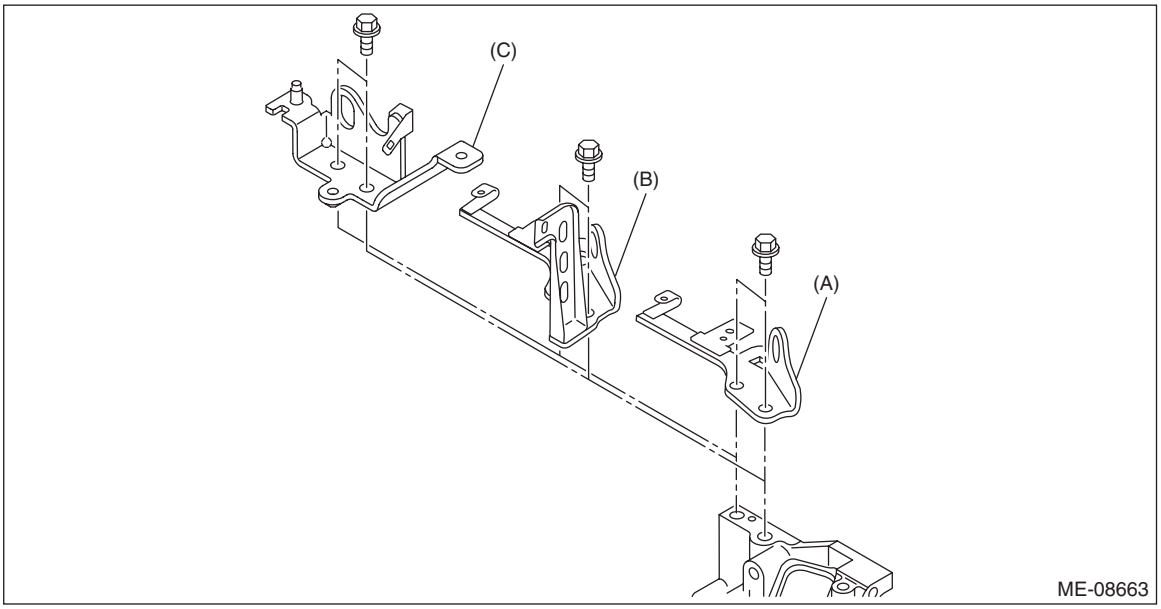
CVT model
Set
Standard
182 — 210 N (18.56 — 21.41 kgf, 40.92 — 47.22 lbf)/33.0 mm (1.299 in)
Lift
Standard
502 — 554 N (51.19 — 56.49 kgf, 112.87 — 124.56 lbf)/22.0 mm (0.866 in)

Valve spring squareness:
Standard
2.5°, 1.8 mm (0.071 in) or less

22.Cylinder Block

A: REMOVAL

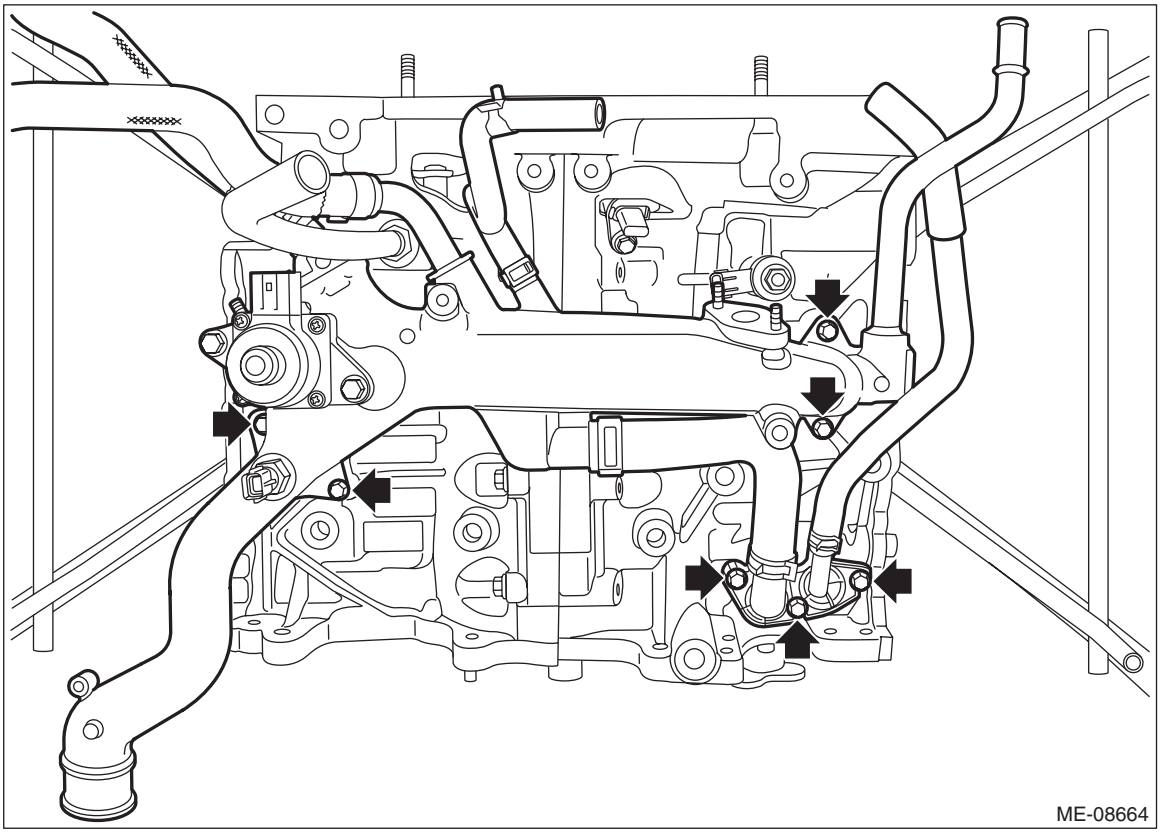
1) Remove the engine from the vehicle. <Ref. to ME(H4DO(w/o HEV))-58, REMOVAL, Engine Assembly.>
2) Remove the intake manifold. <Ref. to FU(H4DO(w/o HEV))-20, REMOVAL, Intake Manifold.> <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
3) Remove the engine wiring harness. <Ref. to FU(H4DO(w/o HEV))-43, REMOVAL, Engine Wiring Harness.> <Ref. to FU(H4DO(HEV))-35, REMOVAL, Engine Wiring Harness.>
4) Remove the tumble generator valve assembly. <Ref. to FU(H4DO(w/o HEV))-85, REMOVAL, Tumble Generator Valve Assembly.> <Ref. to FU(H4DO(HEV))-74, REMOVAL, Tumble Generator Valve Assembly.>
5) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
6) Remove the rocker cover. <Ref. to ME(H4DO(w/o HEV))-205, REMOVAL, Rocker Cover.>
7) Remove the cam carrier. <Ref. to ME(H4DO(w/o HEV))-223, REMOVAL, Cam Carrier.>
8) Remove the cylinder head. <Ref. to ME(H4DO(w/o HEV))-267, REMOVAL, Cylinder Head.>
9) Remove the crank sprocket. <Ref. to ME(H4DO(w/o HEV))-203, REMOVAL, Crank Sprocket.>
10) Remove the engine rear hanger from cylinder block RH.



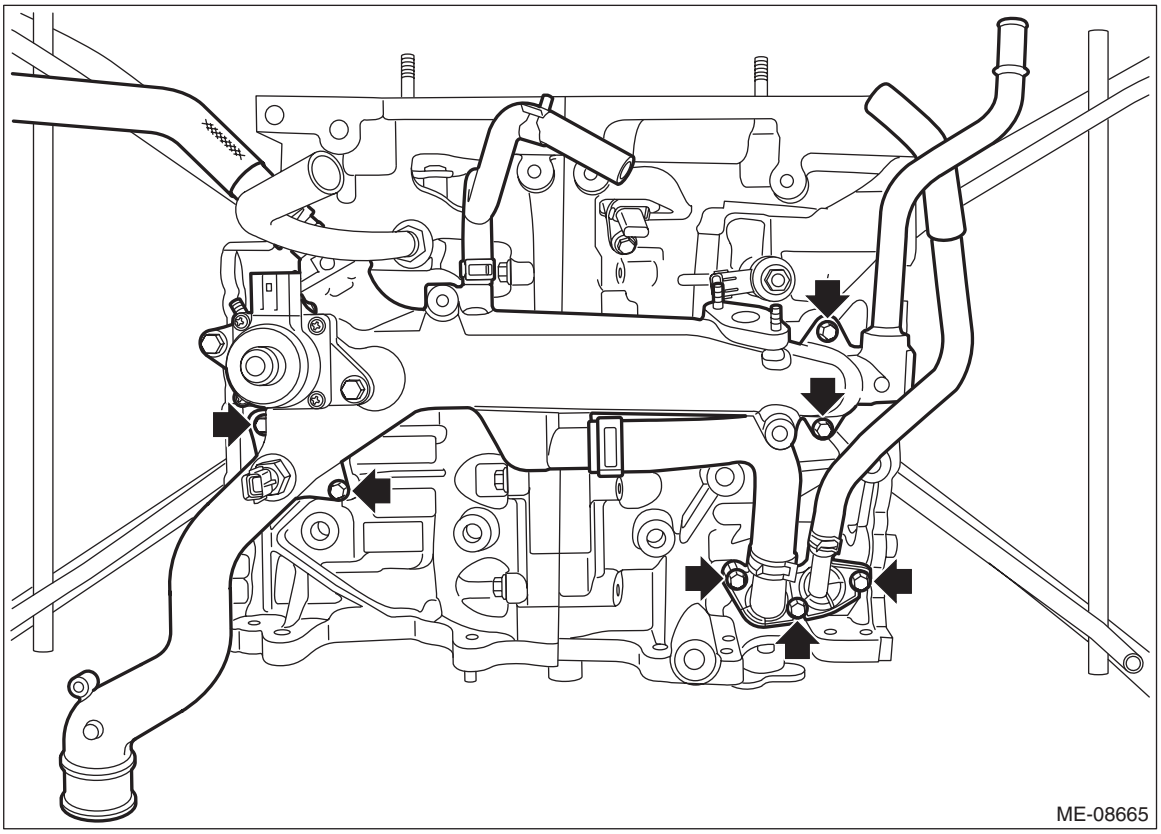
(A) Gasoline engine CVT model (B) Gasoline engine MT model (C) HEV model

11) Remove the bolts securing the water pipe assembly and PCV connector to the cylinder block, and remove the water pipe assembly, PCV connector and brake vacuum pipe (HEV model) as a set from cylinder block.

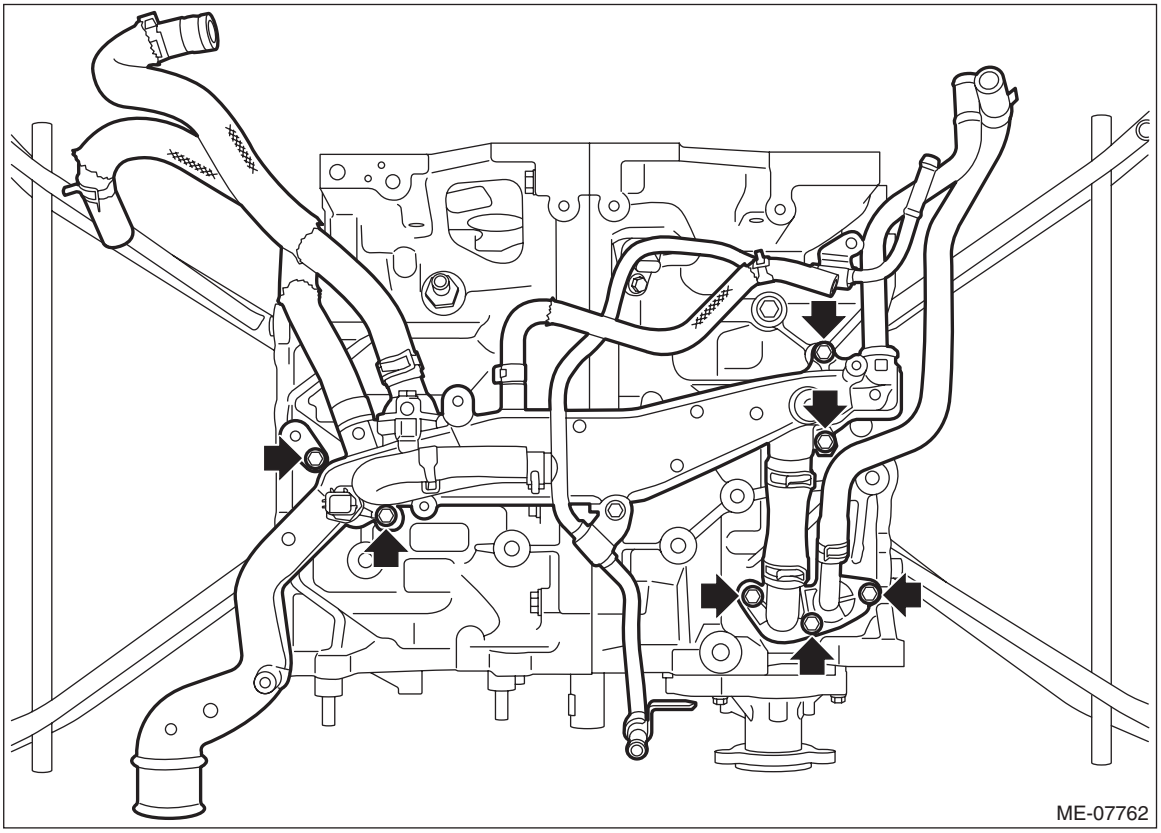
- Gasoline engine CVT model



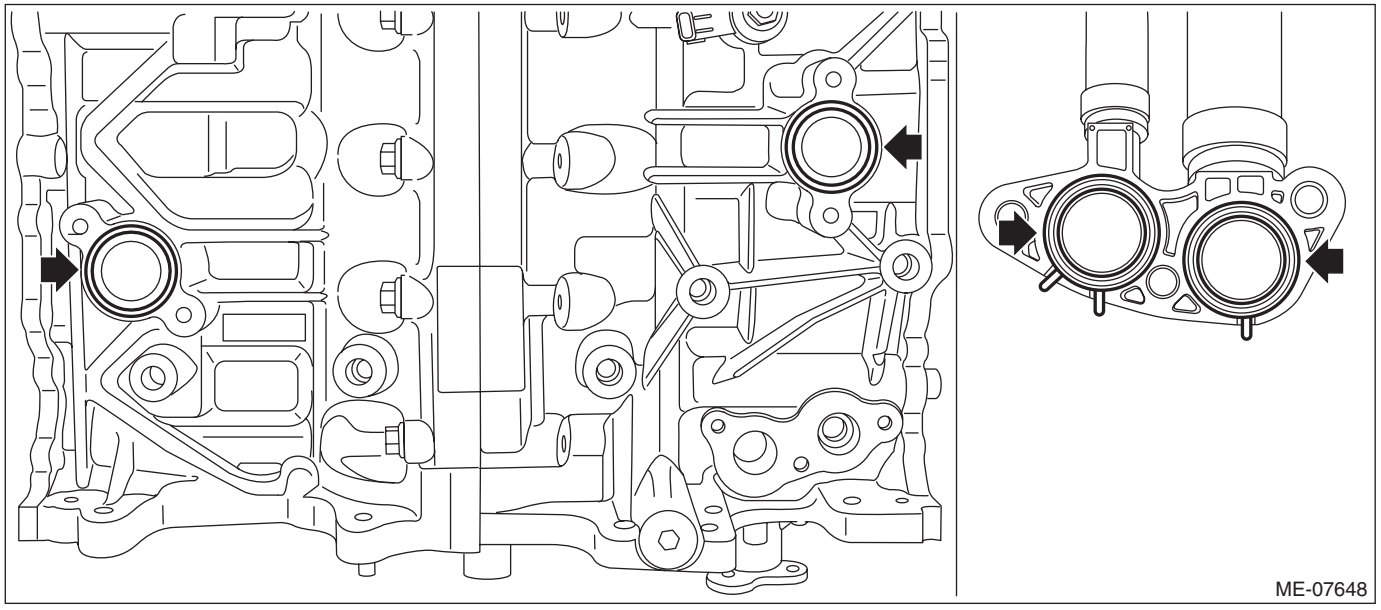
- Gasoline engine MT model



- HEV model

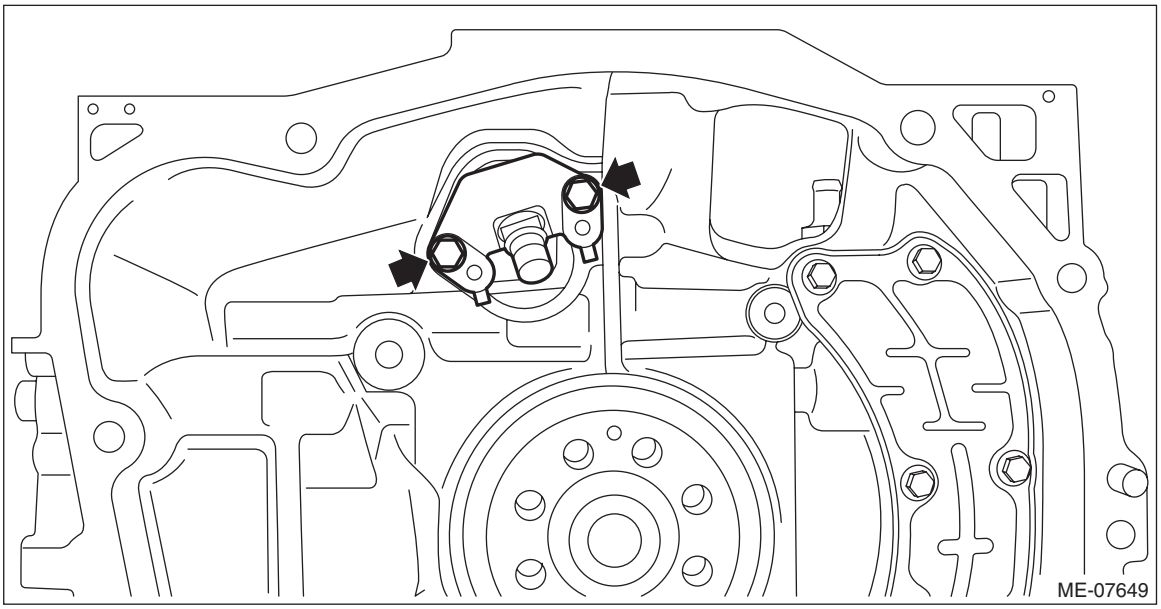


12) Remove the O-ring from the cylinder block and PCV connector.

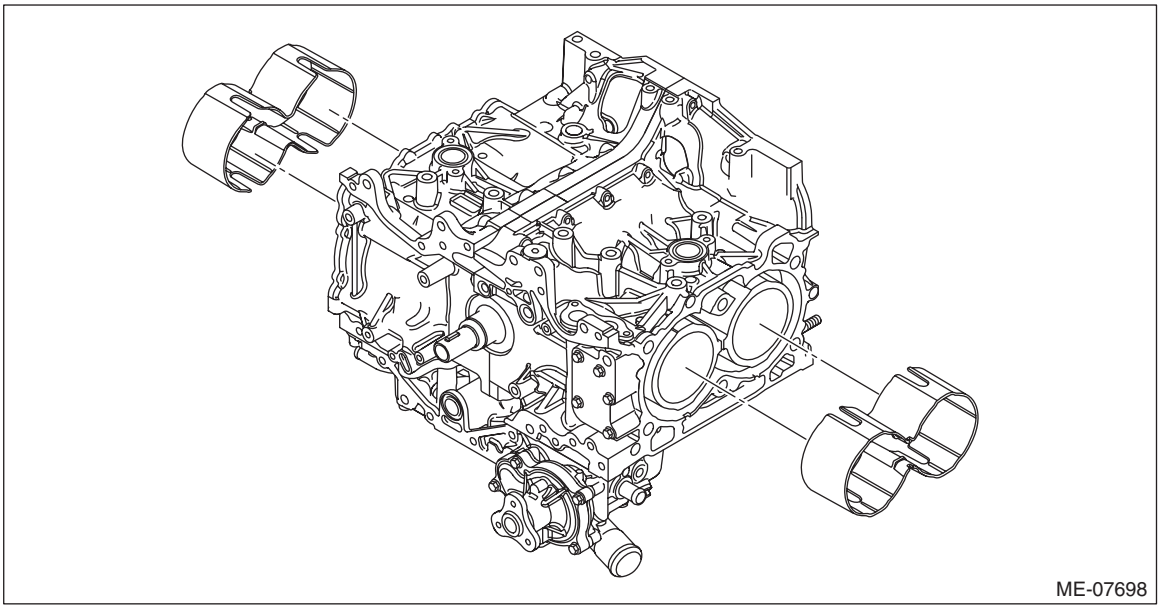


13) Remove the knock sensor. <Ref. to FU(H4DO(w/o HEV))-68, REMOVAL, Knock Sensor.> <Ref. to FU(H4DO(HEV))-60, REMOVAL, Knock Sensor.>
14) Remove the PCV valve. <Ref. to EC(H4DO(w/o HEV))-66, REMOVAL, PCV Valve.> <Ref. to EC(H4DO(HEV))-53, REMOVAL, PCV Valve.>
15) Remove the crankshaft position sensor plate with drive plate. (CVT model) <Ref. to CVT(TR580)-166, REMOVAL, Drive Plate.> <Ref. to CVT(TH58A)-175, REMOVAL, Drive Plate.>
16) Remove the clutch disc and cover. (MT model) <Ref. to CL-10, REMOVAL, Clutch Disc and Cover.>
17) Remove the crankshaft position sensor plate with flywheel. (MT model) <Ref. to CL-13, REMOVAL, Flywheel.>

18) Remove the bolts securing the crankshaft position sensor holder from the cylinder block LH, and remove the crankshaft position sensor with crankshaft position sensor holder.

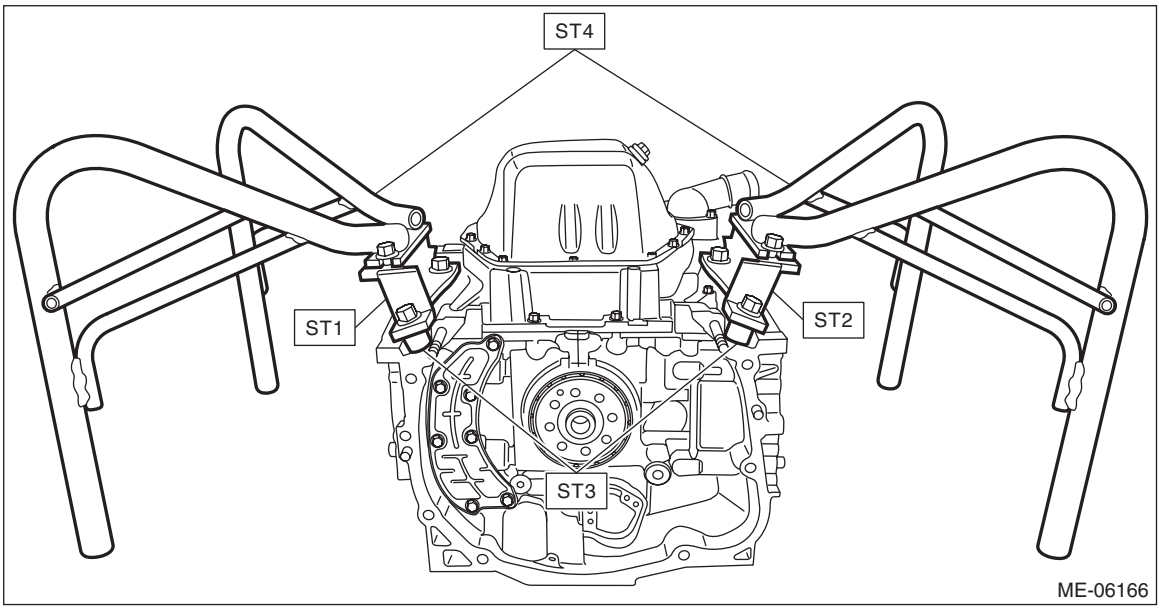


19) Remove the water jacket spacer from the cylinder block RH and cylinder block LH.

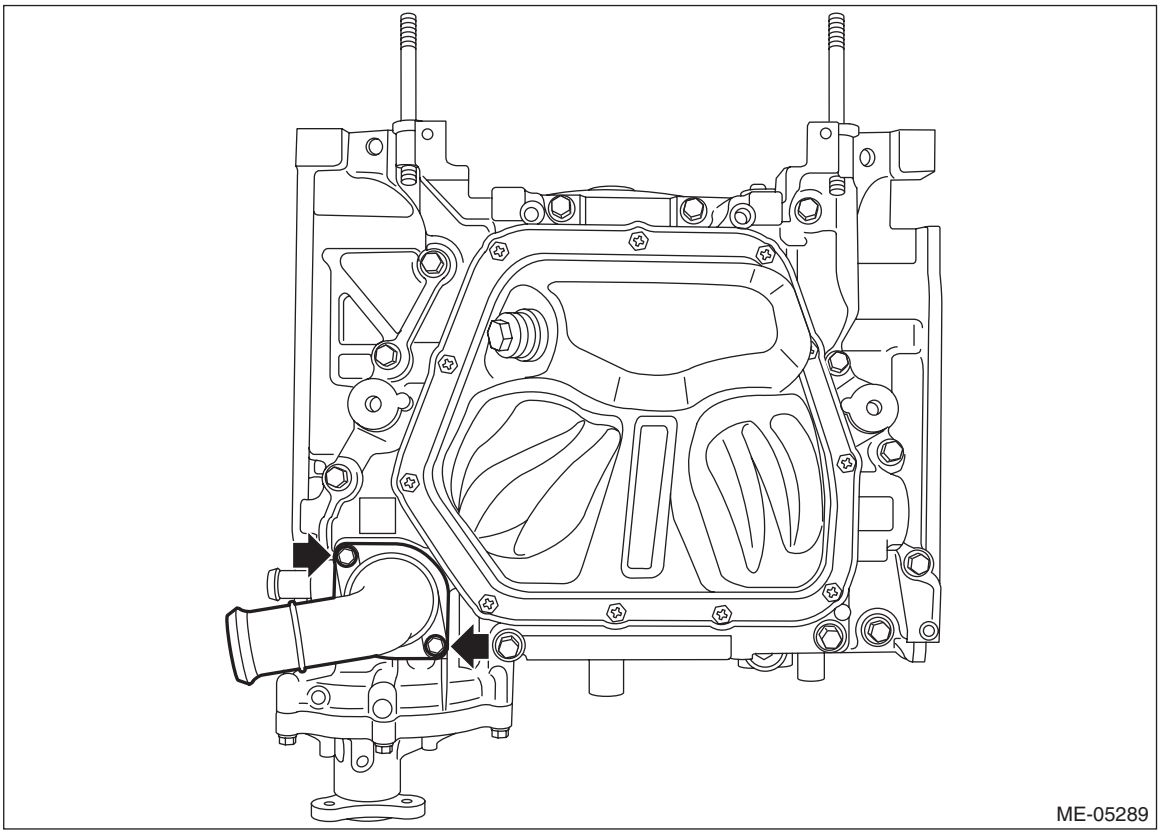


20) Set the cylinder block so that the oil pan is on the upper side, remove the ST1, ST2, ST3 and ST4 from cylinder block and oil pan upper.

ST1	498457000	ENGINE STAND ADAPTER RH
ST2	498457100	ENGINE STAND ADAPTER LH
ST3	18362AA020	ADAPTER
ST4	499817100	ENGINE STAND

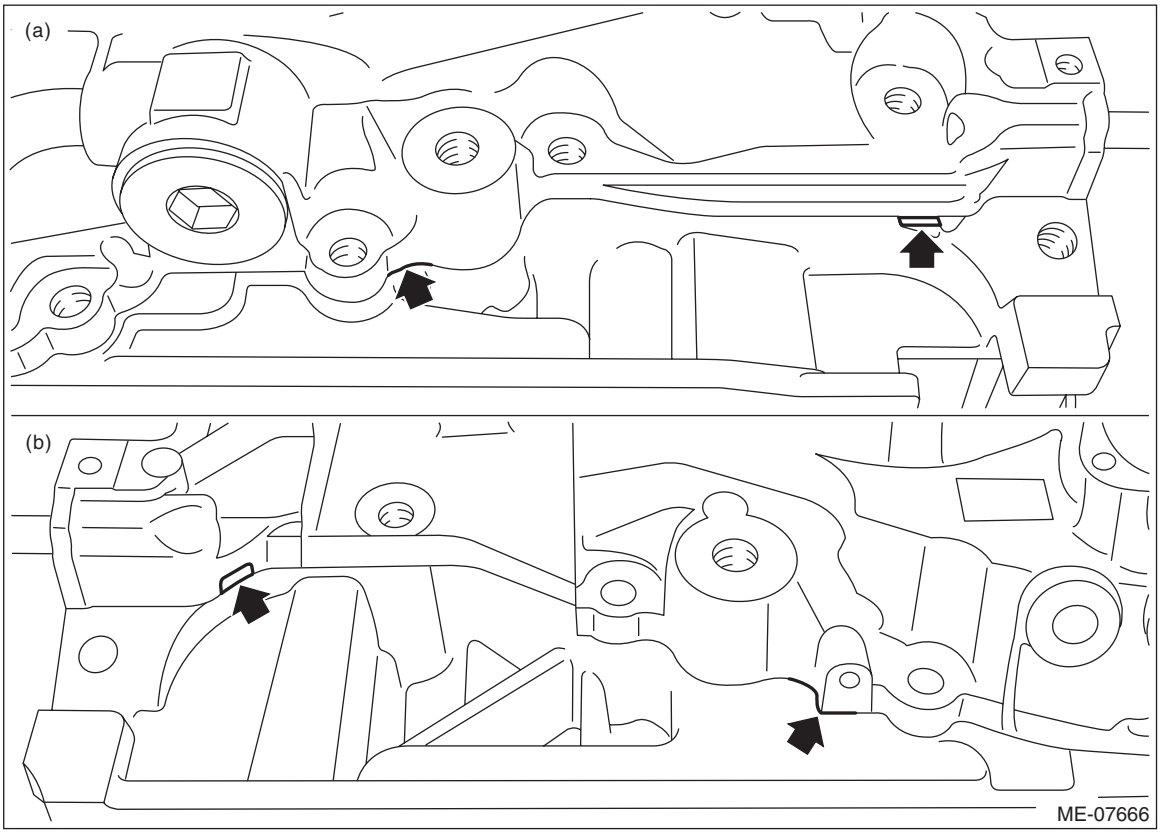


21) Remove the thermostat cover from oil pan upper, and then remove the thermostat.

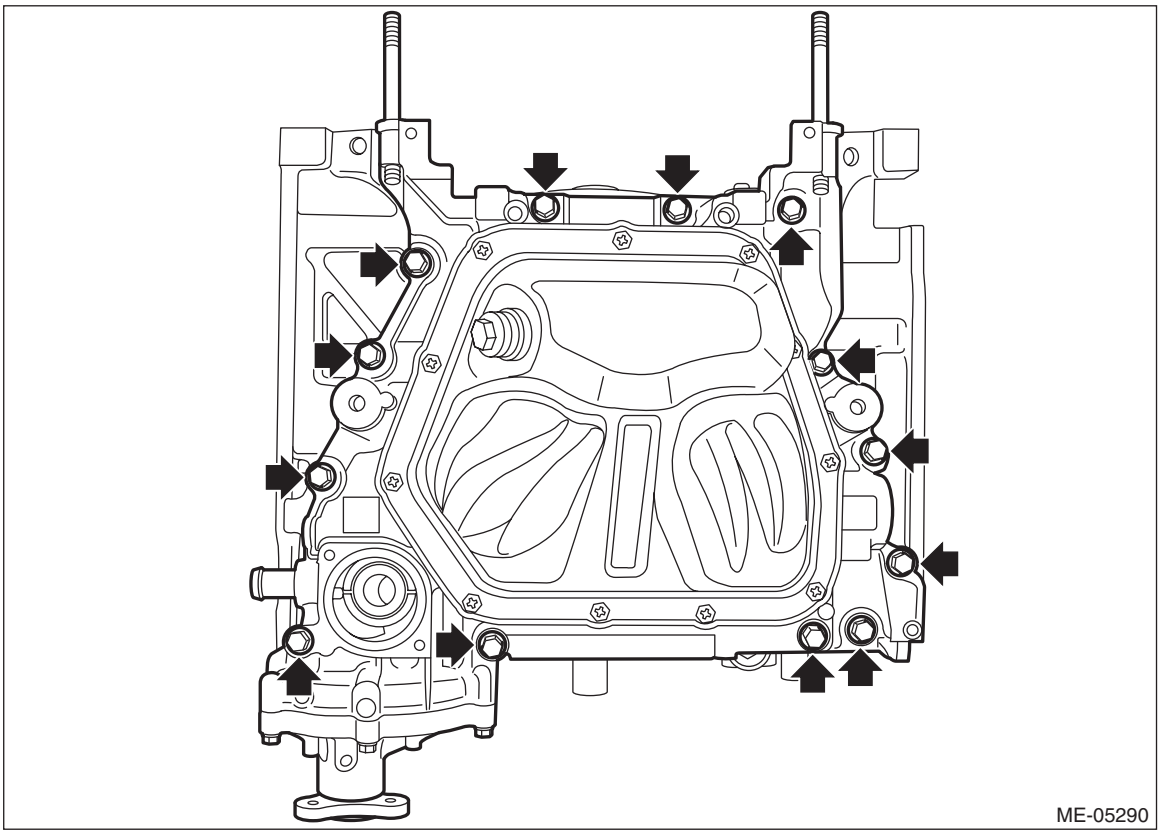


22) Remove the oil pan upper with oil pan from cylinder block.

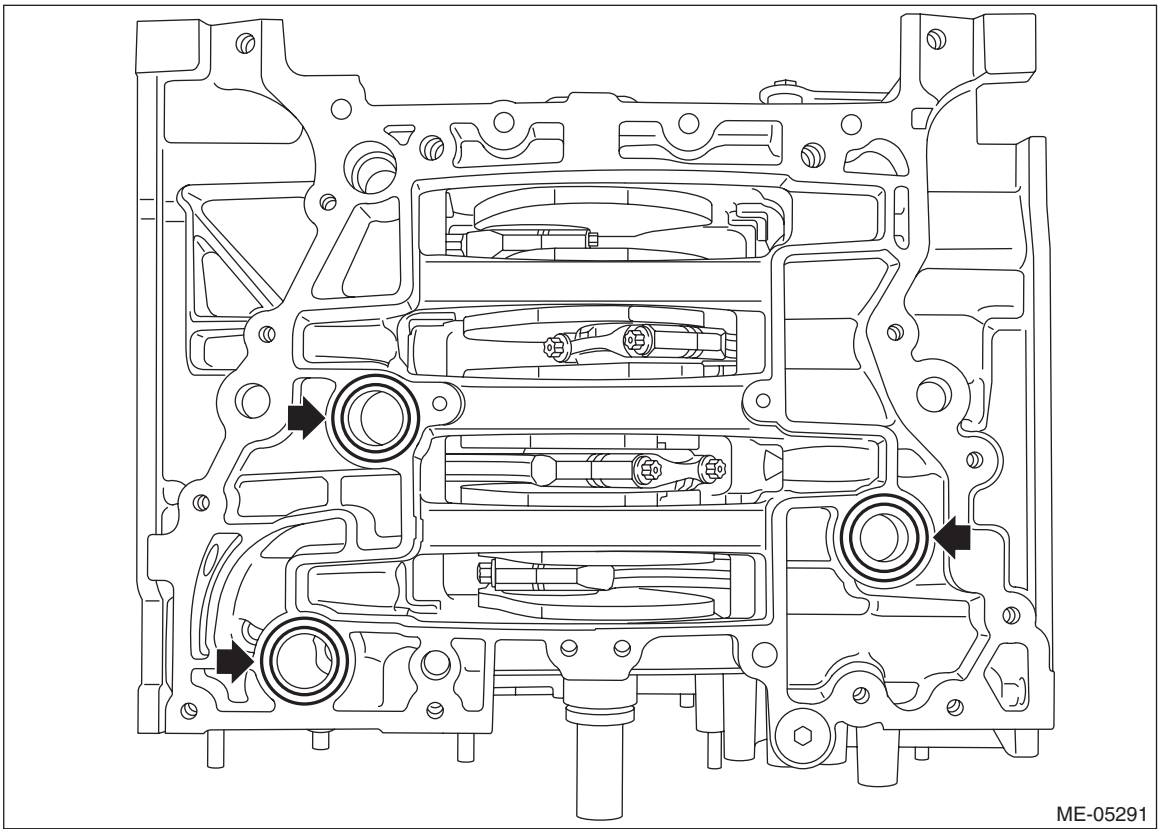
NOTE:
Pry the points shown in the figure with a crowbar wrapped by protective tape, and then remove the oil pan upper.



(a) RH side (b) LH side

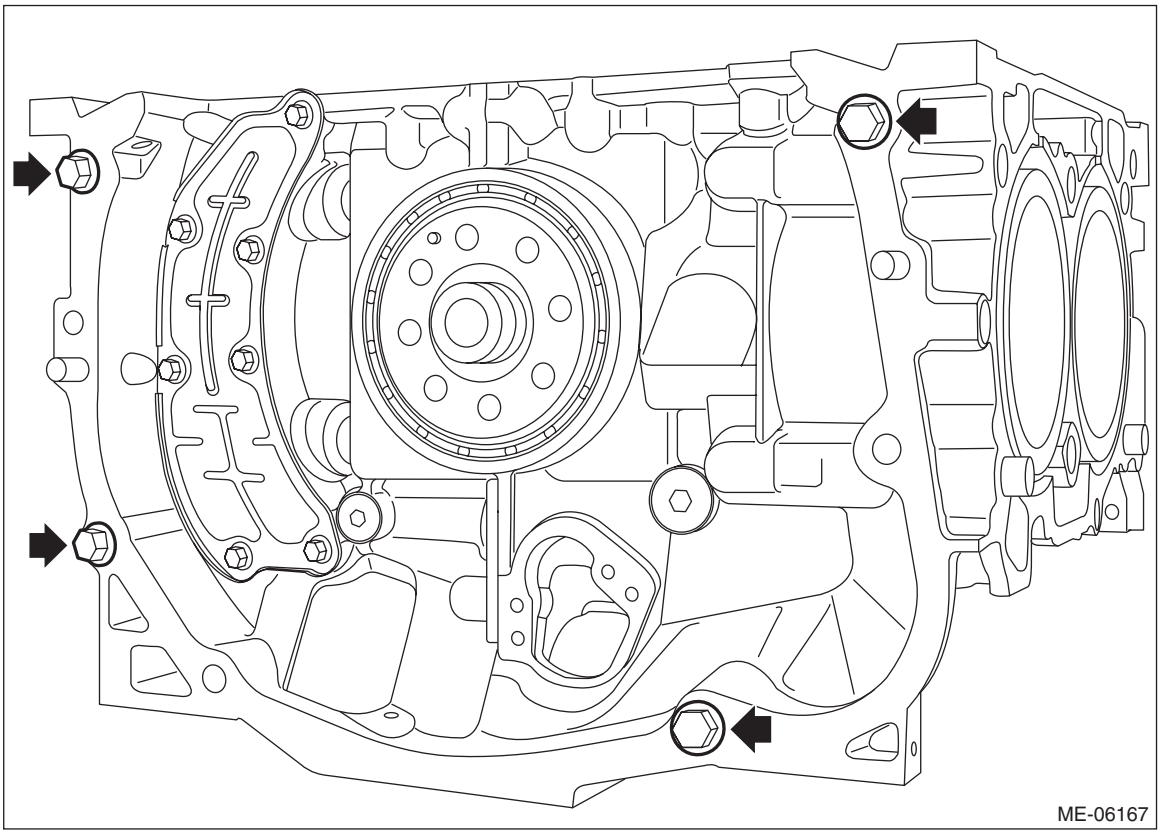


23) Remove the O-ring from the cylinder block.



24) Install a bolt of suitable length (M10 × P1.25) at the locations shown in the figure.

NOTE:
- This procedure is required to prevent the knock pin damage when the cylinder block is raised in the next step.
- Use the same length of bolt for the four bolts.



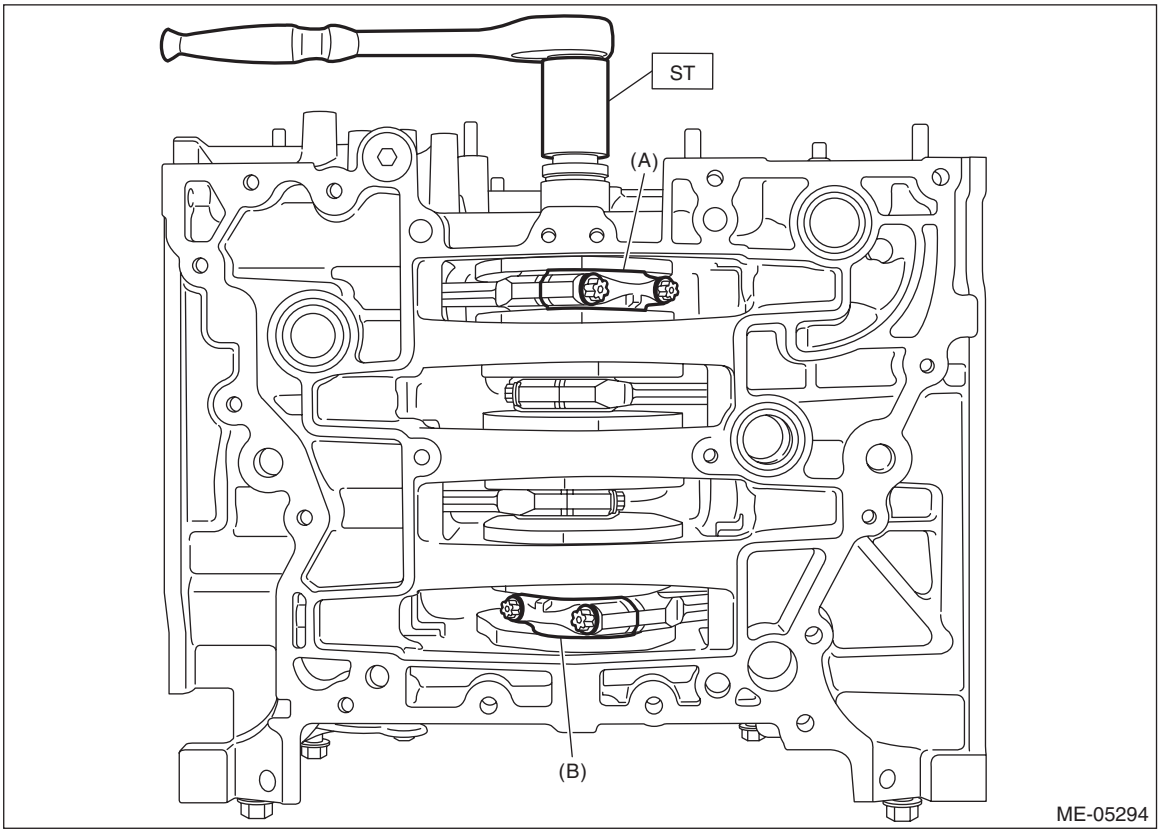
25) Raise the cylinder block so that the rear oil seal is on the lower side.

26) Remove the #1 and #4 connecting rod caps and pistons from the cylinder block.

NOTE:
Mark each connecting rod cap and piston with a cylinder number.

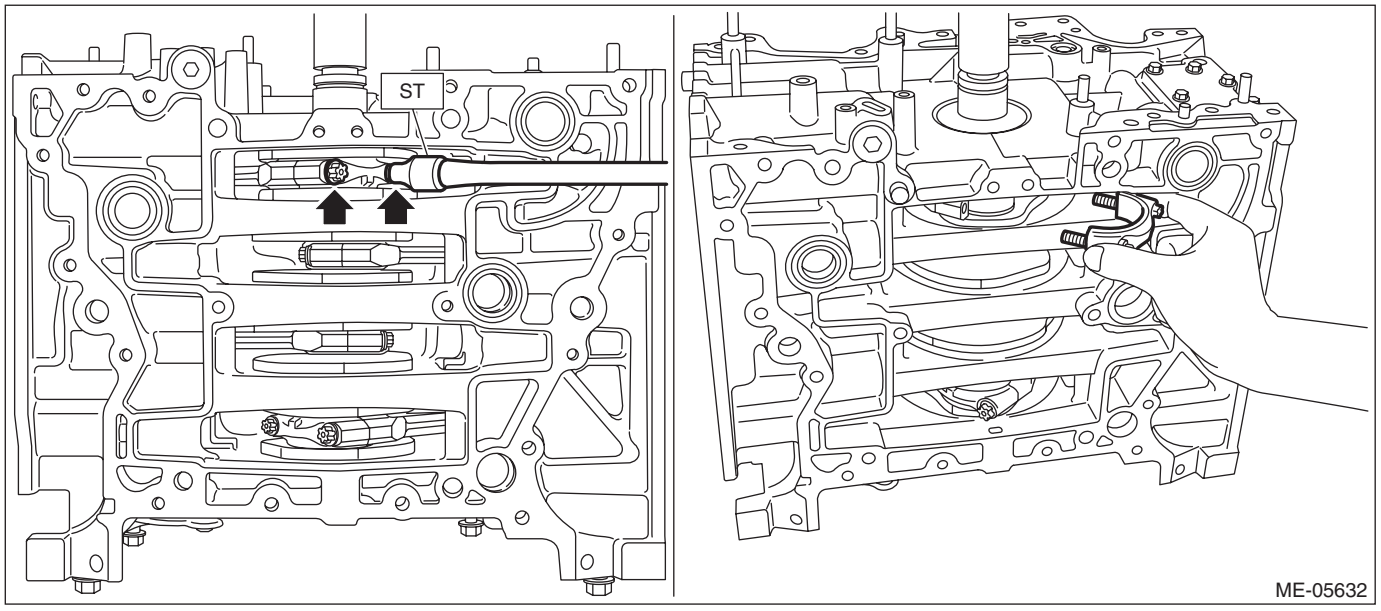
(1) Turn the crankshaft so that the #1 connecting rod cap (A) and #4 connecting rod cap (B) is located at the position shown in the figure using ST.

ST 18252AA000 CRANKSHAFT SOCKET



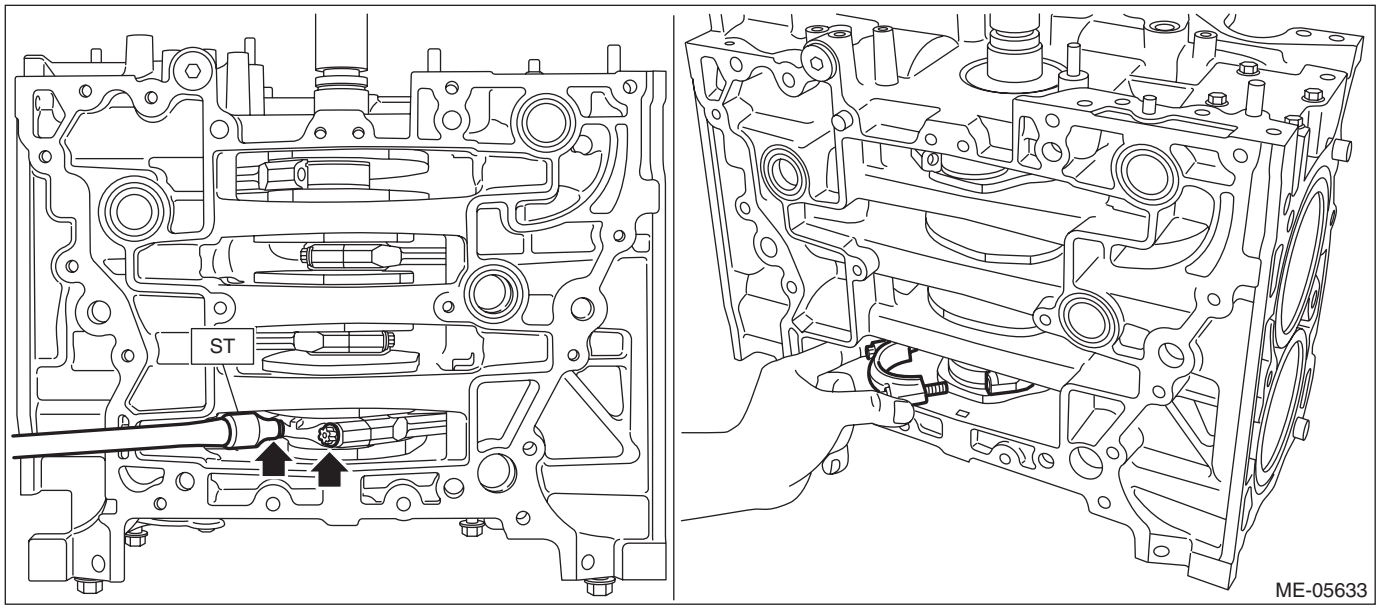
(2) Using ST, loosen the #1 connecting rod cap bolt, and remove the #1 connecting rod cap bolt and #1 connecting rod cap.

ST 18270AA020 SOCKET



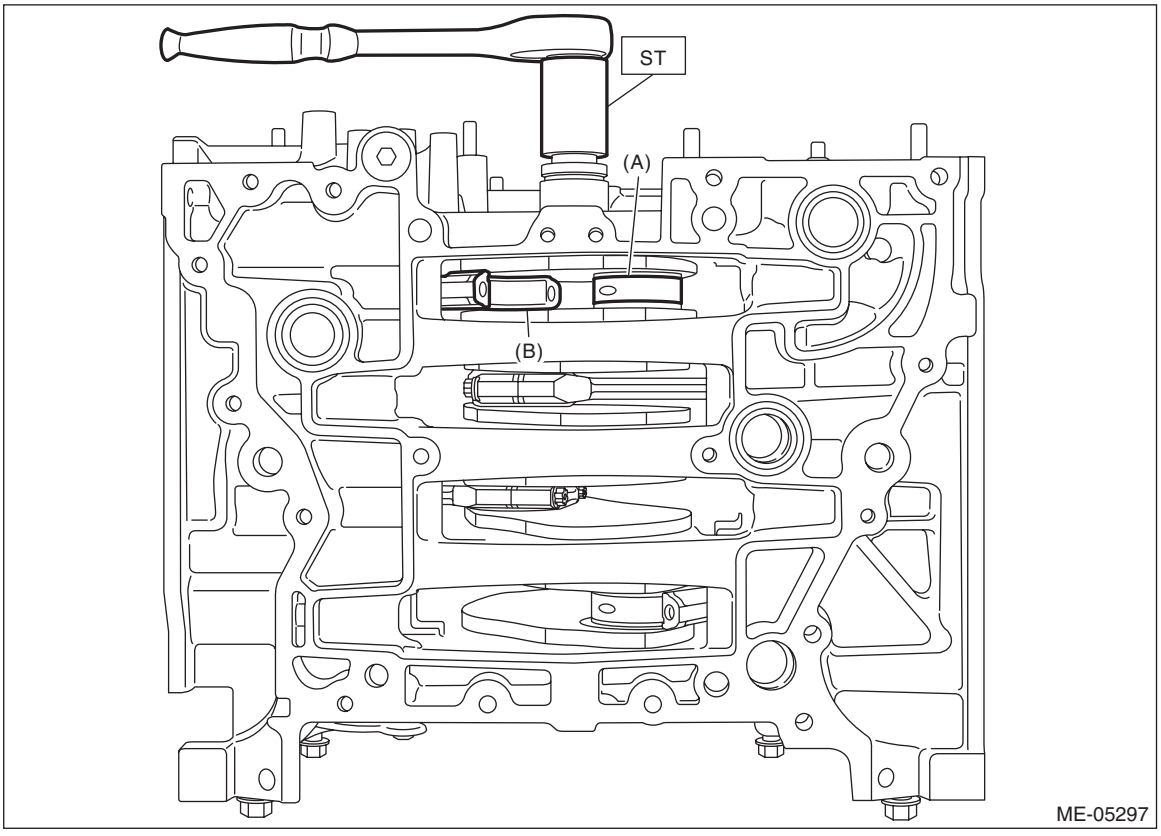
(3) Using ST, loosen the #4 connecting rod cap bolt, and remove the #4 connecting rod cap bolt and #4 connecting rod cap.

ST 18270AA020 SOCKET

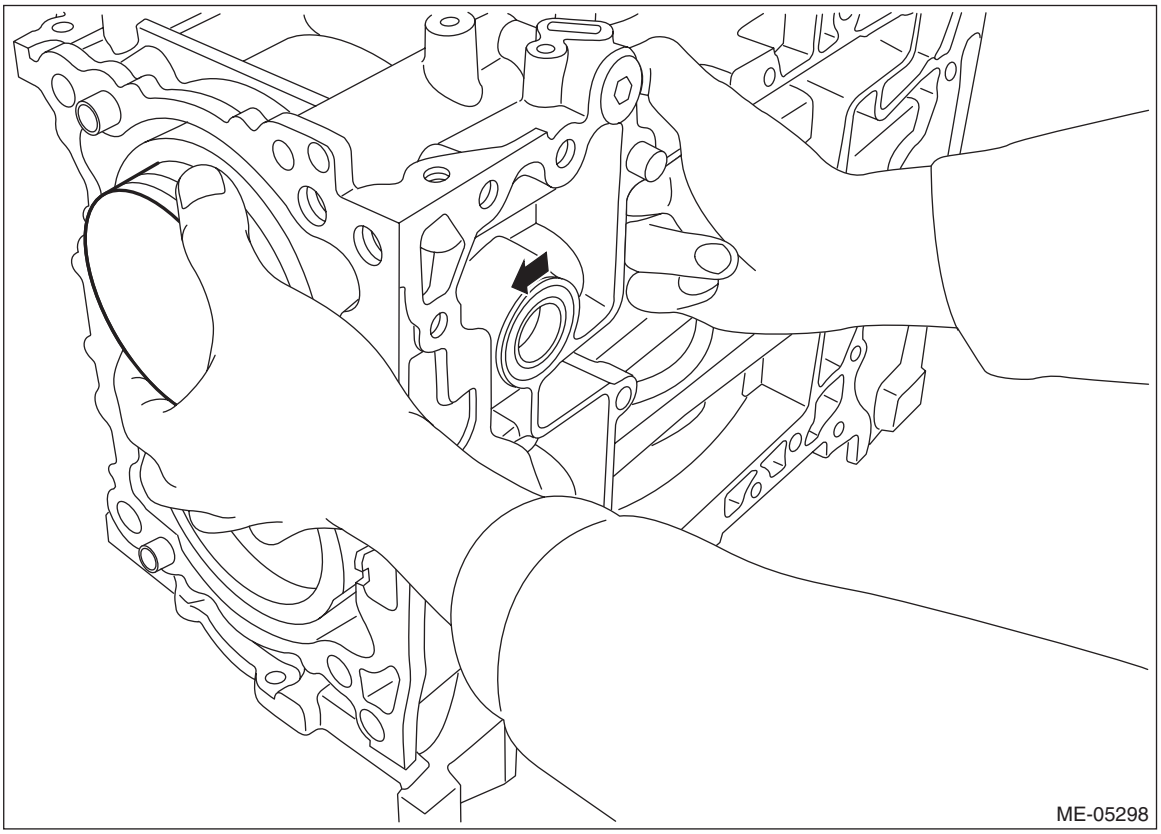


(4) Using the ST, turn the crankshaft counterclockwise and separate the positions of the #1 pin (A) of crankshaft and the large end (B) of #1 connecting rod.

ST 18252AA000 CRANKSHAFT SOCKET

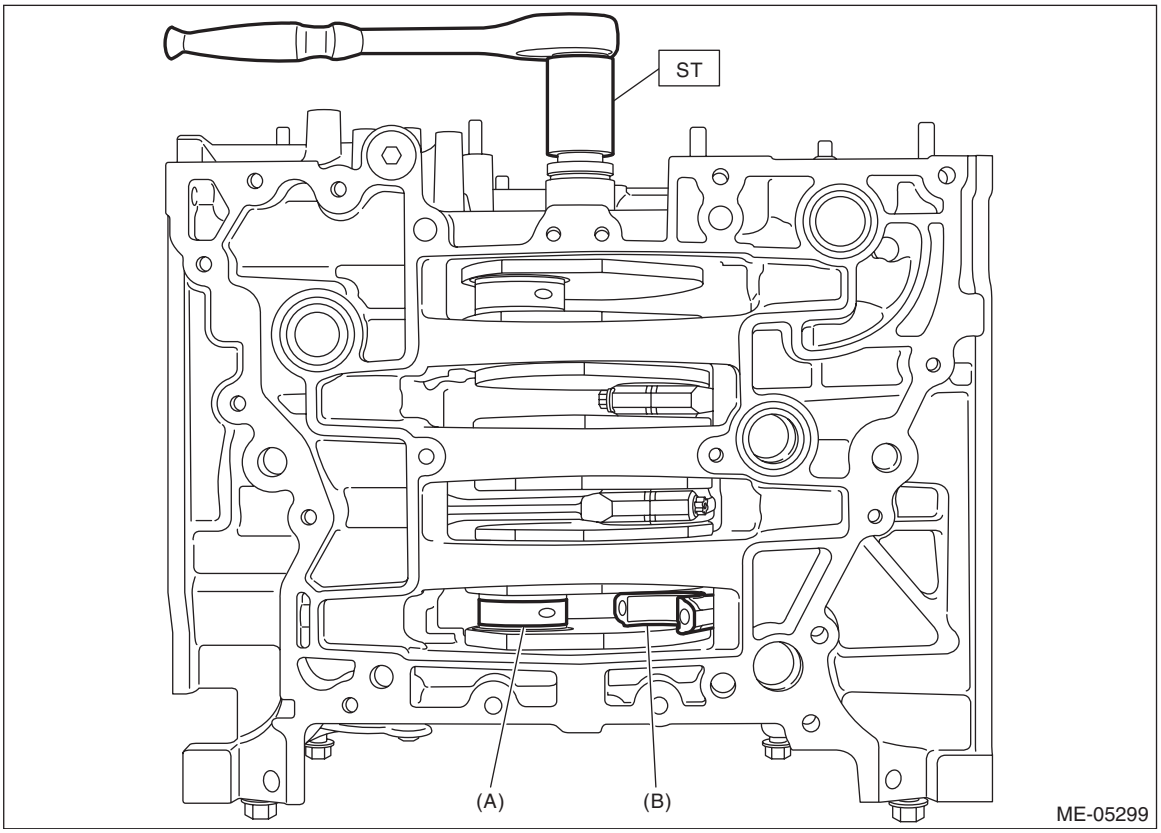


(5) Push the #1 connecting rod in the direction of the arrow, and remove the #1 piston with #1 connecting rod from the cylinder block.

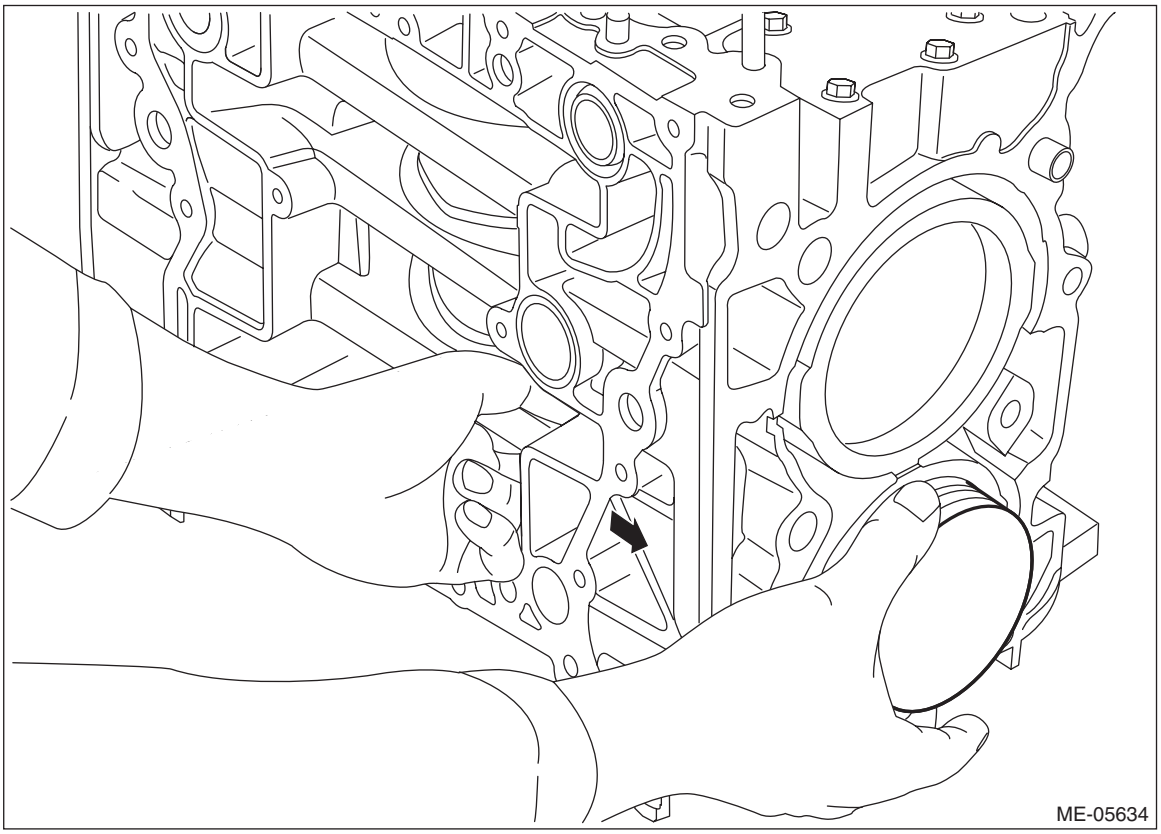


(6) Using the ST, turn the crankshaft clockwise and separate the positions of the #4 pin (A) of crankshaft and the large end (B) of #4 connecting rod.

ST 18252AA000 CRANKSHAFT SOCKET



(7) Push the #4 connecting rod in the direction of the arrow, and remove the #4 piston with #4 connecting rod from the cylinder block.

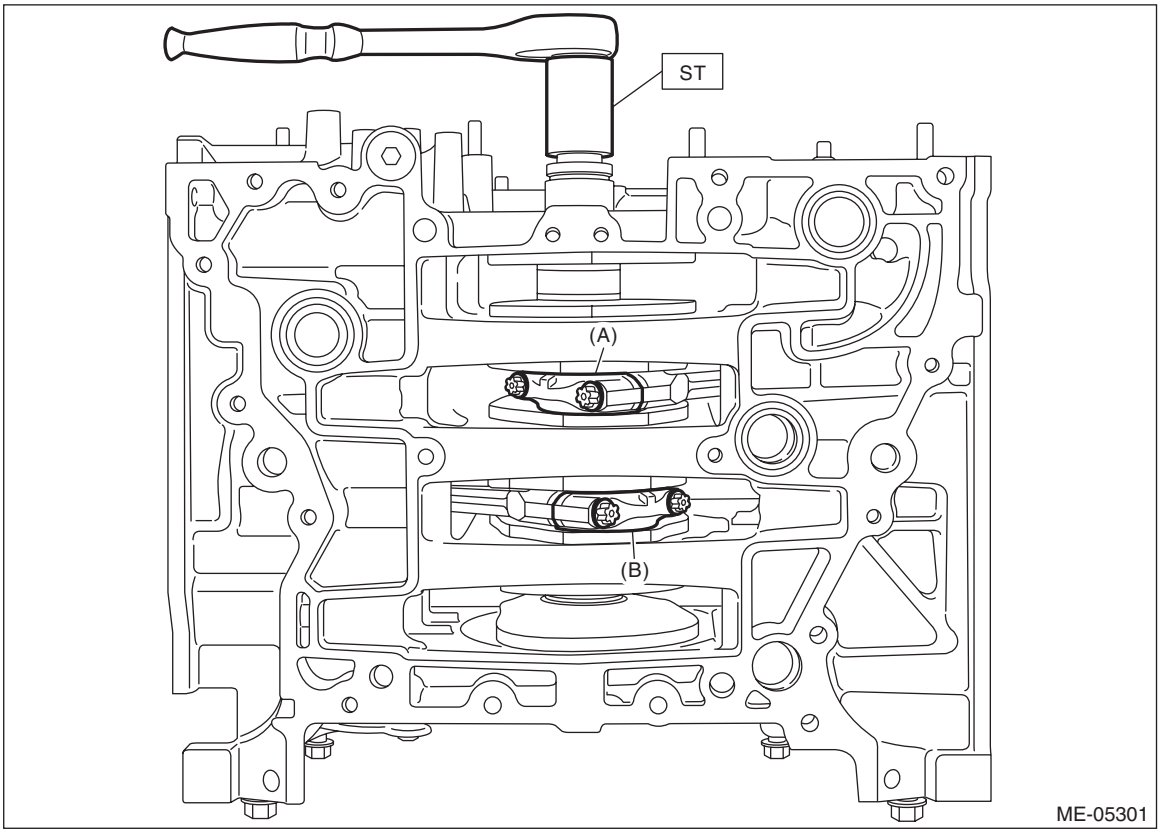


27) Remove the #2 and #3 connecting rod caps and pistons from the cylinder block.

NOTE:
Mark each connecting rod cap and piston with a cylinder number.

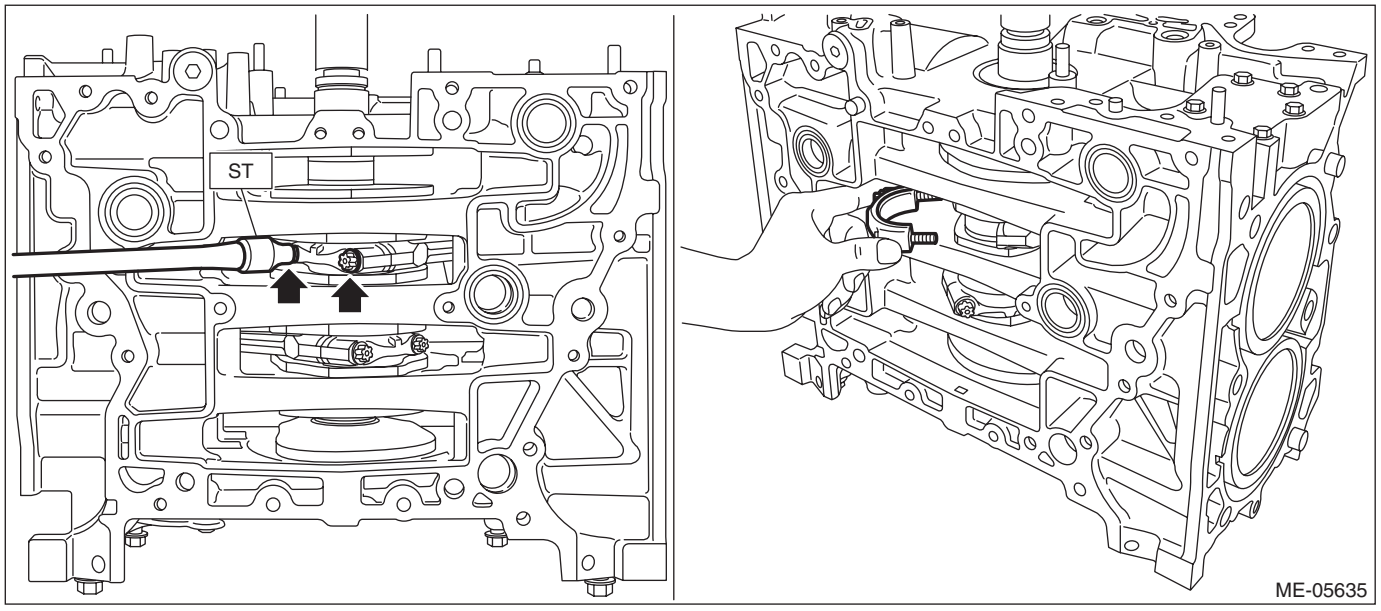
(1) Turn the crankshaft so that the #2 connecting rod cap (A) and #3 connecting rod cap (B) is located at the position shown in the figure using ST.

ST 18252AA000 CRANKSHAFT SOCKET



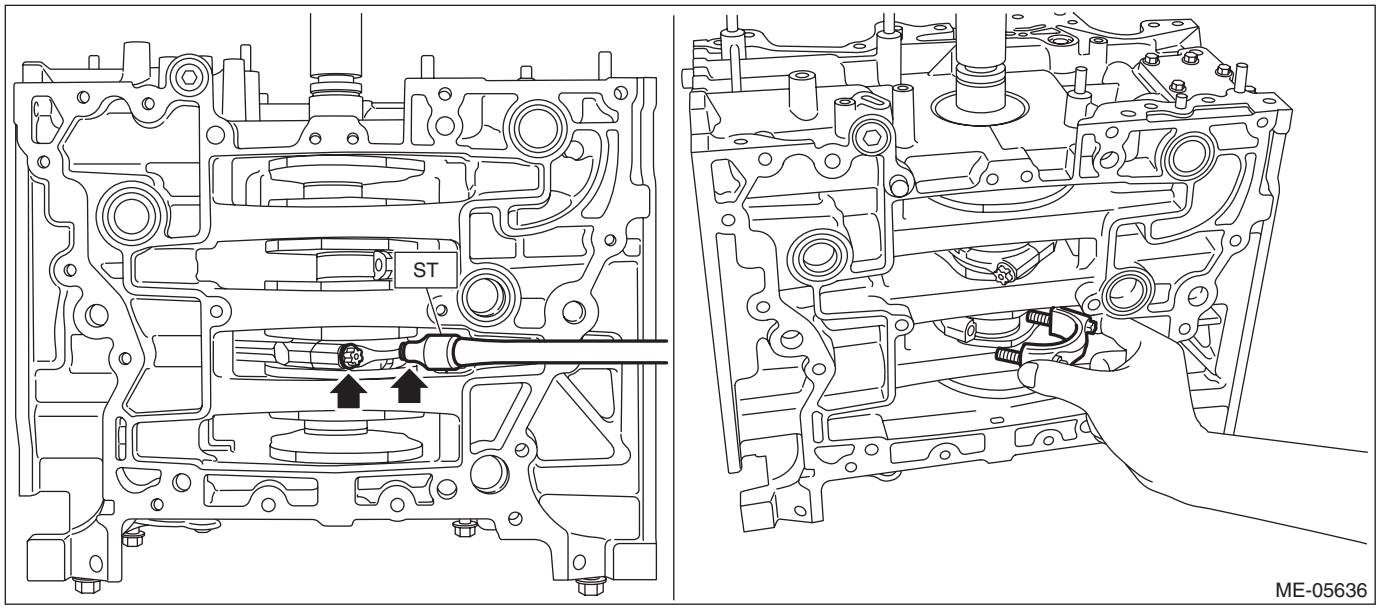
(2) Using ST, loosen the #2 connecting rod cap bolt, and remove the #2 connecting rod cap bolt and #2 connecting rod cap.

ST 18270AA020 SOCKET



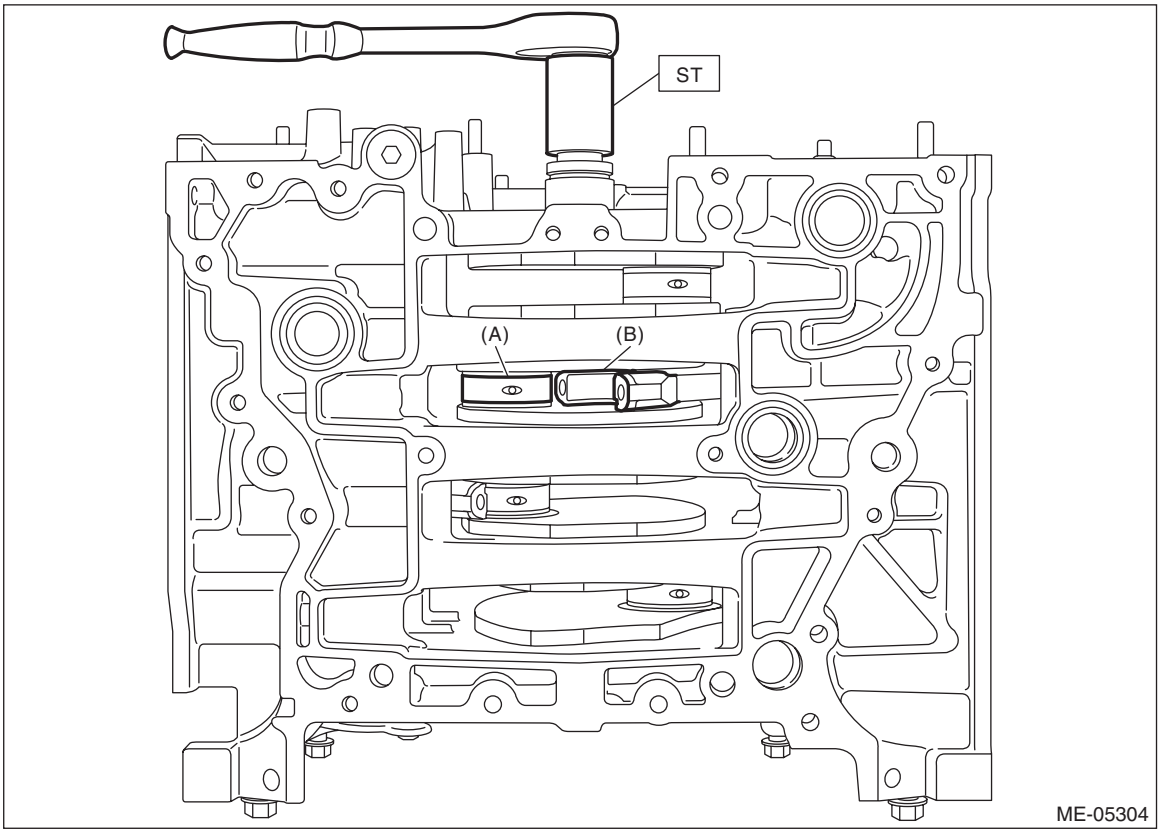
(3) Using ST, loosen the #3 connecting rod cap bolt, and remove the #3 connecting rod cap bolt and #3 connecting rod cap.

ST 18270AA020 SOCKET

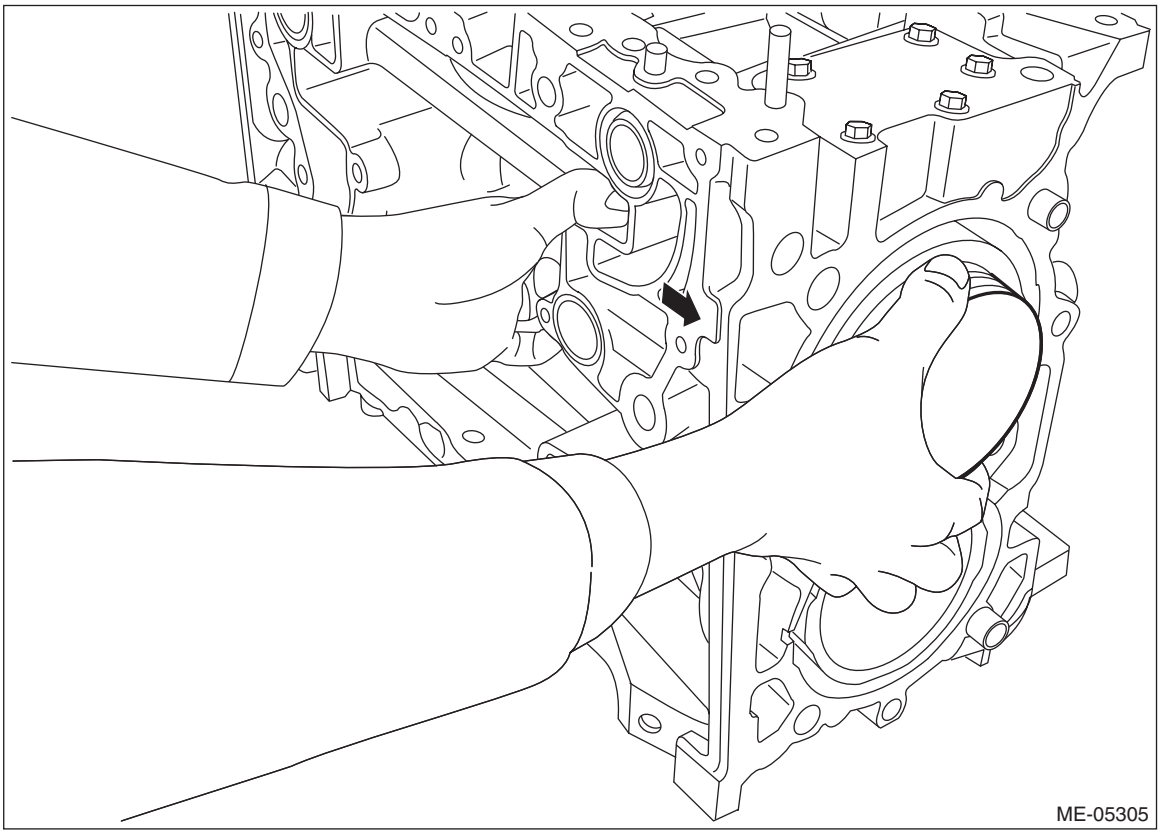


(4) Using the ST, turn the crankshaft clockwise and separate the positions of the #2 pin (A) of crankshaft and the large end (B) of #2 connecting rod.

ST 18252AA000 CRANKSHAFT SOCKET

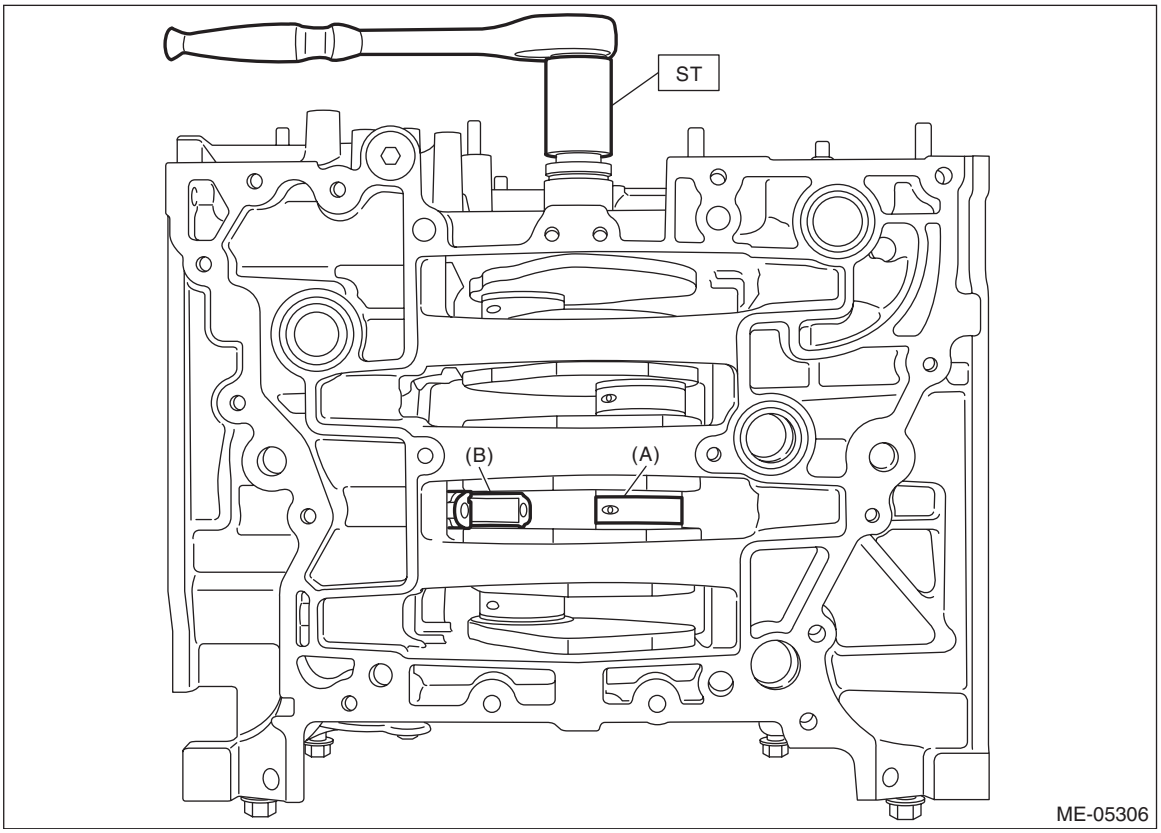


(5) Push the #2 connecting rod in the direction of the arrow, and remove the #2 piston with #2 connecting rod from the cylinder block.

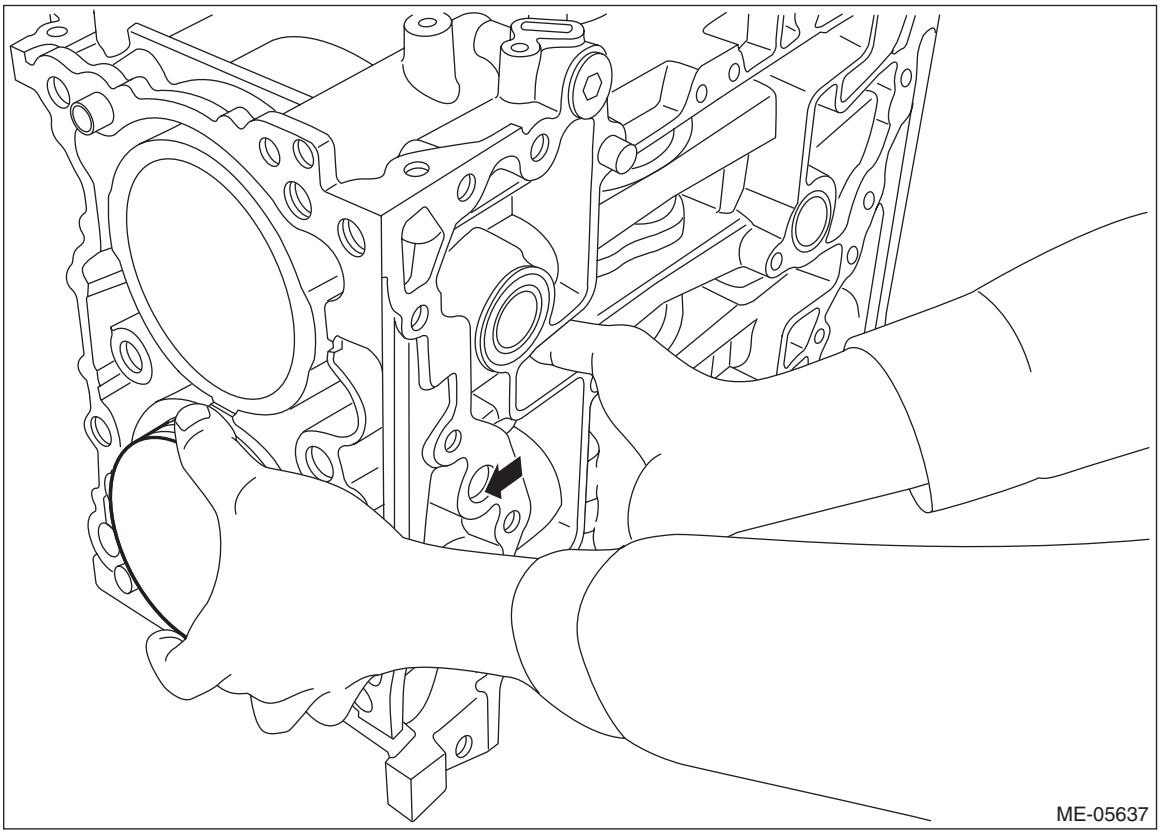


(6) Using the ST, turn the crankshaft counterclockwise and separate the positions of the #3 pin (A) of crankshaft and the large end (B) of #3 connecting rod.

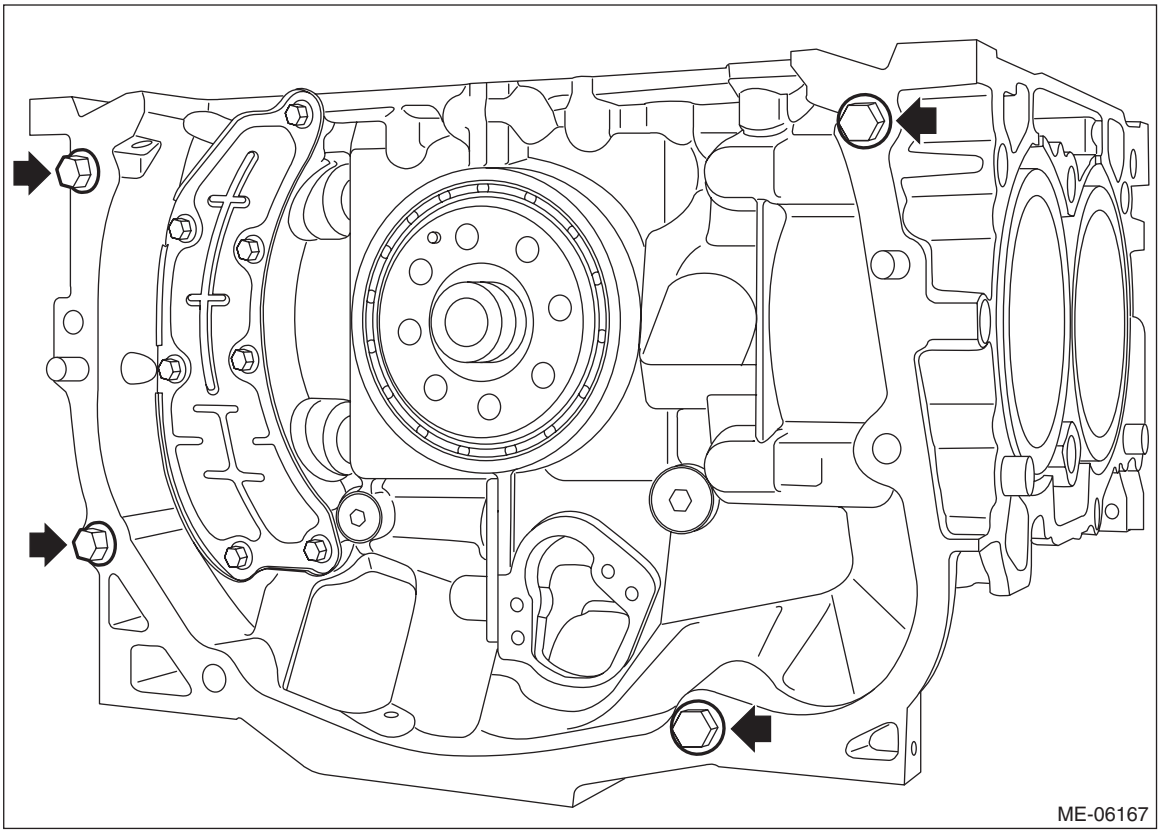
ST 18252AA000 CRANKSHAFT SOCKET



(7) Push the #3 connecting rod in the direction of the arrow, and remove the #3 piston with #3 connecting rod from the cylinder block.



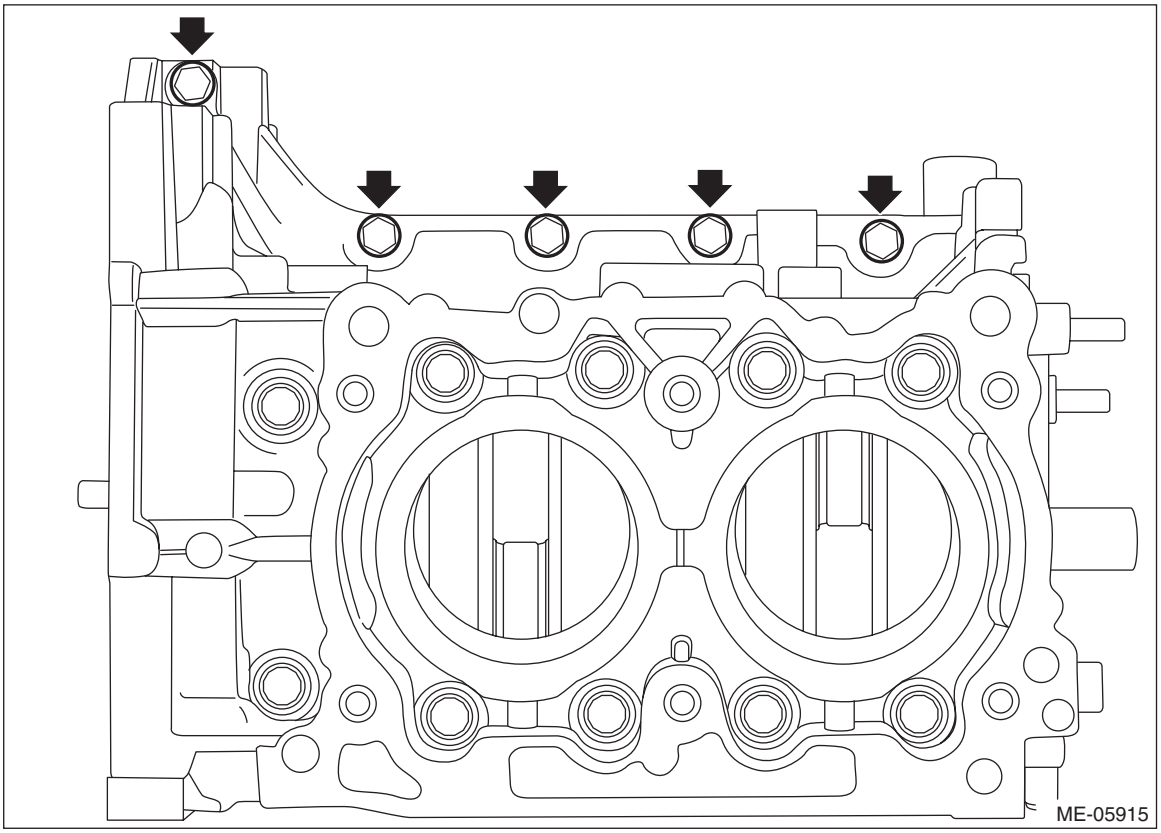
28) Set the cylinder block so that the oil pan side faces upward, and remove the mounting bolts attached to the locations shown in the figure.



29) Set the part so that the cylinder block RH is on the upper side, and separate the cylinder block.

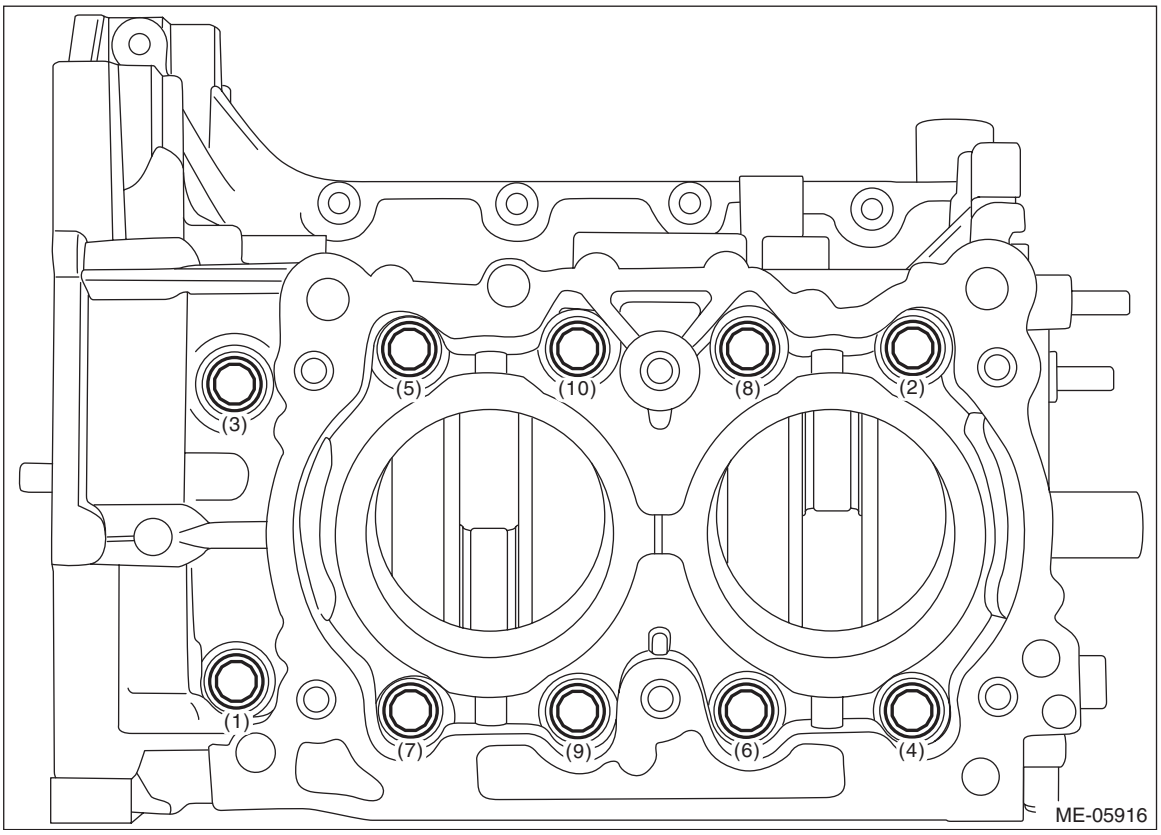
CAUTION:
• Place a wood board wrapped with a waste cloth to prevent the knock pin damage and to stabilize the cylinder block before work.
• Be careful not to scratch the mating surface of cylinder block during work.

(1) Remove the bolt shown in the figure.



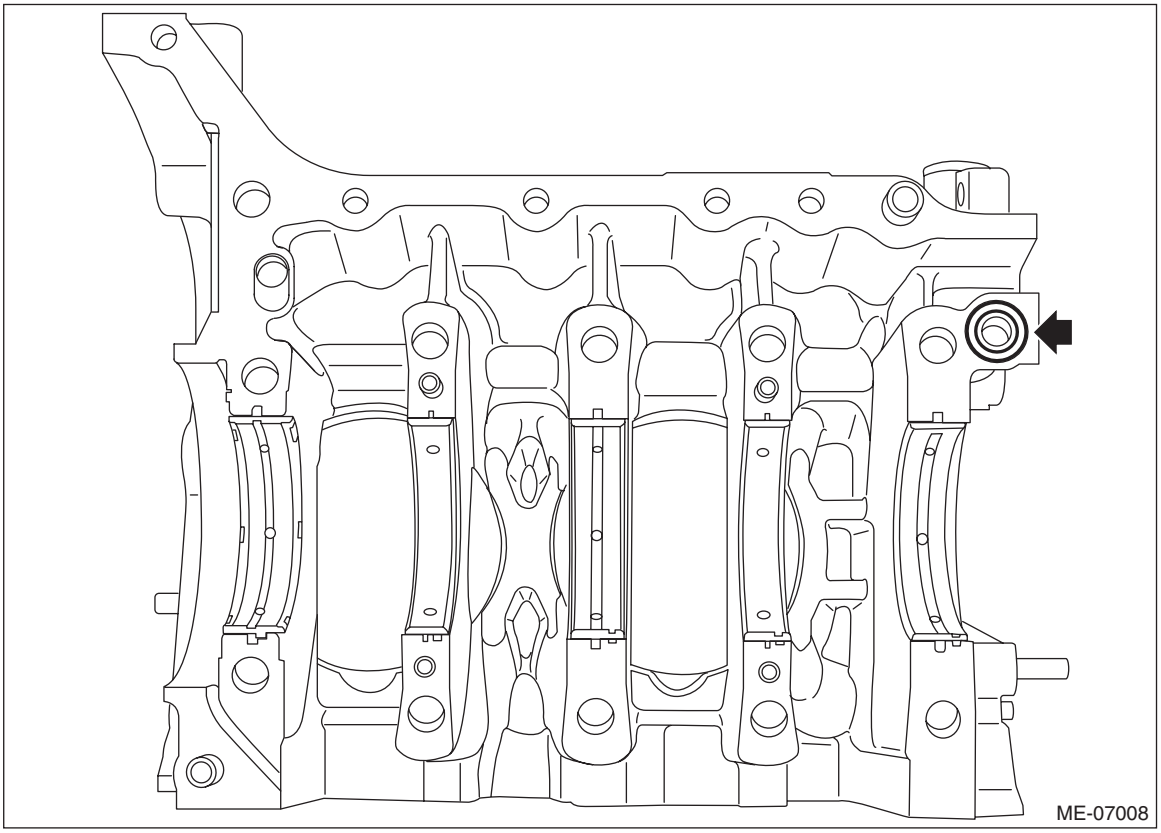
(2) Loosen the cylinder block mounting bolts in numerical order as shown in the figure, and separate the cylinder block RH and LH.

NOTE:
Lift the cylinder block RH slightly, and confirm that the crankshaft is remaining in the cylinder block LH. If the cylinder block RH is lifted carelessly when separating, the crankshaft may stick to cylinder block RH, then fall off.



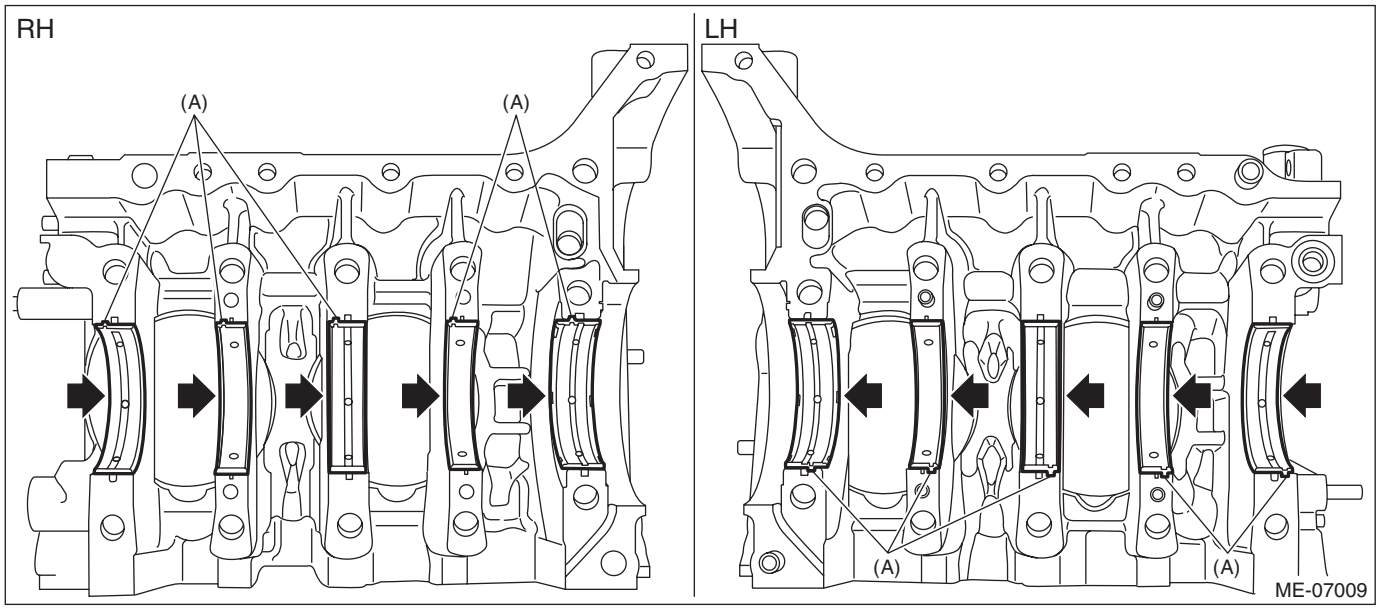
30) Remove the crankshaft from cylinder block LH, and remove the rear oil seal.

31) Remove the O-ring from the cylinder block LH.



32) Remove the crankshaft bearings from the cylinder block.

NOTE:
- Be careful not to confuse the crankshaft bearing combination.
- Press the bearing at the end opposite to locking lip (A).

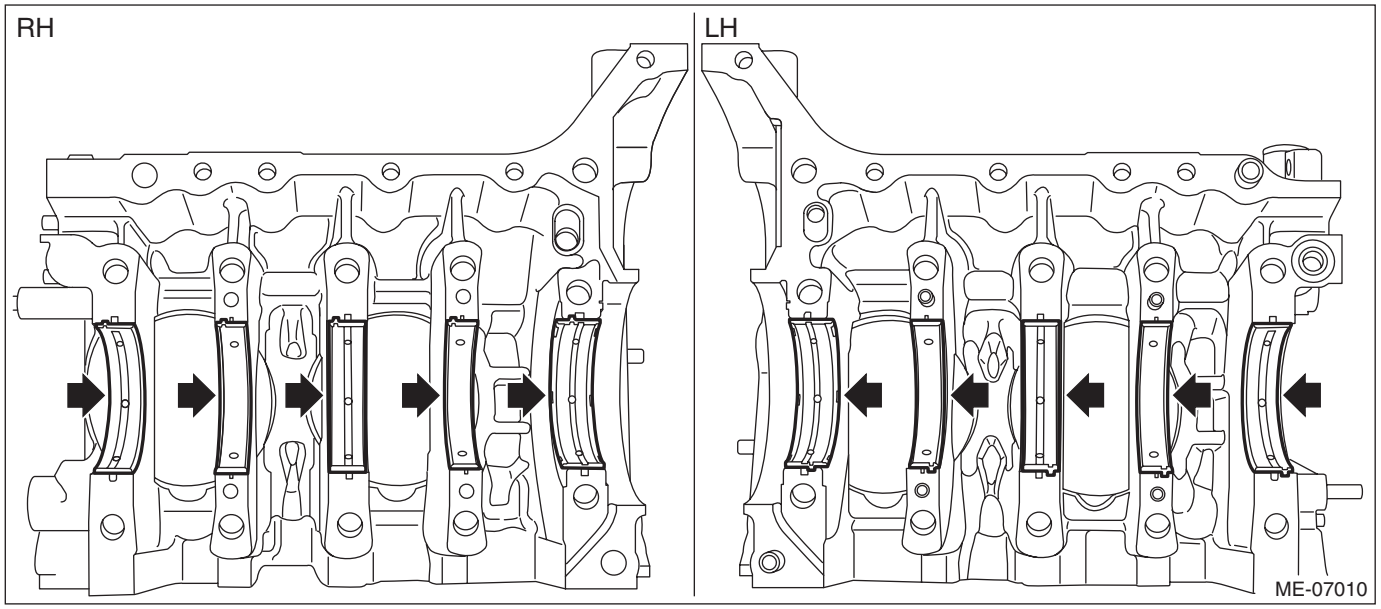


33) Remove the liquid gasket from cylinder block.

B: INSTALLATION

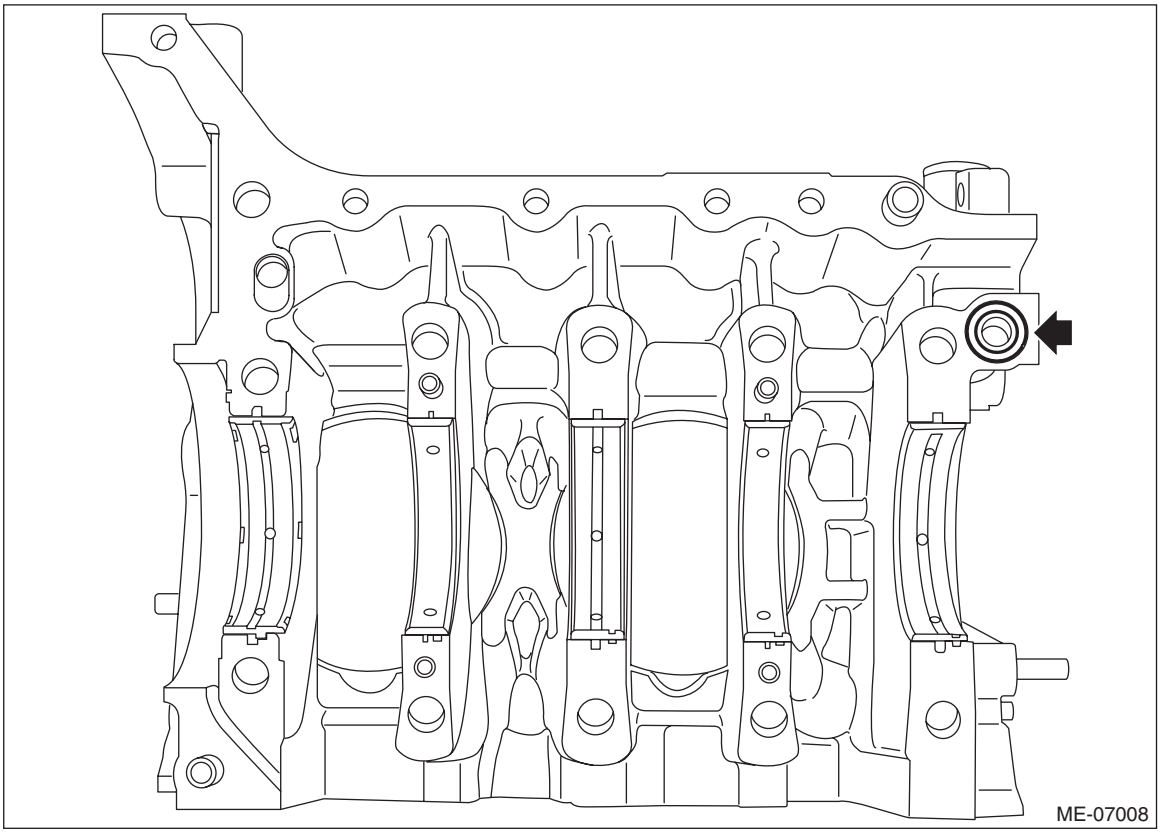
1) Apply engine oil to the crankshaft bearing, and install the crankshaft bearing to the cylinder block.

CAUTION:
• Place a wood board wrapped with a waste cloth to prevent the knock pin damage and to stabilize the cylinder block before work.
• Be careful not to scratch the mating surface of cylinder block during work.

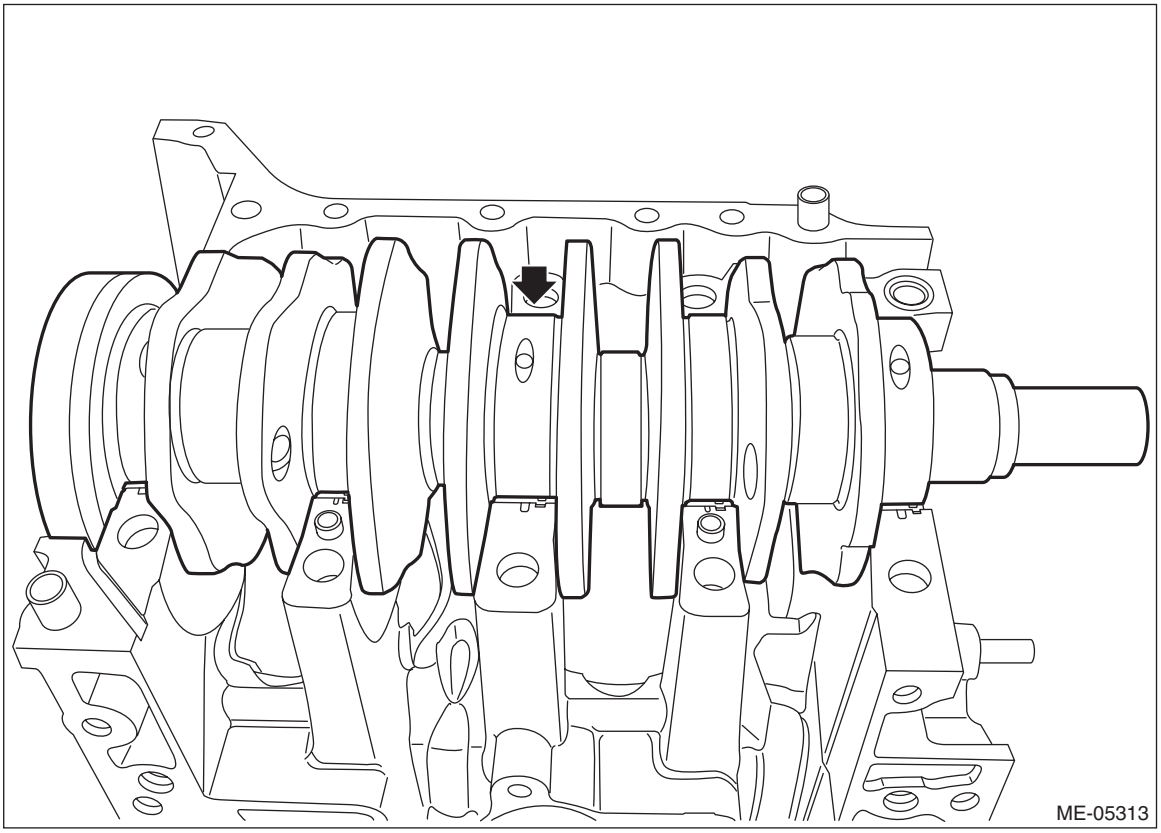


2) Install O-rings to the cylinder block LH.

NOTE:
Use new O-rings.



3) Apply engine oil to the crankshaft journal, and set the crankshaft to cylinder block LH.



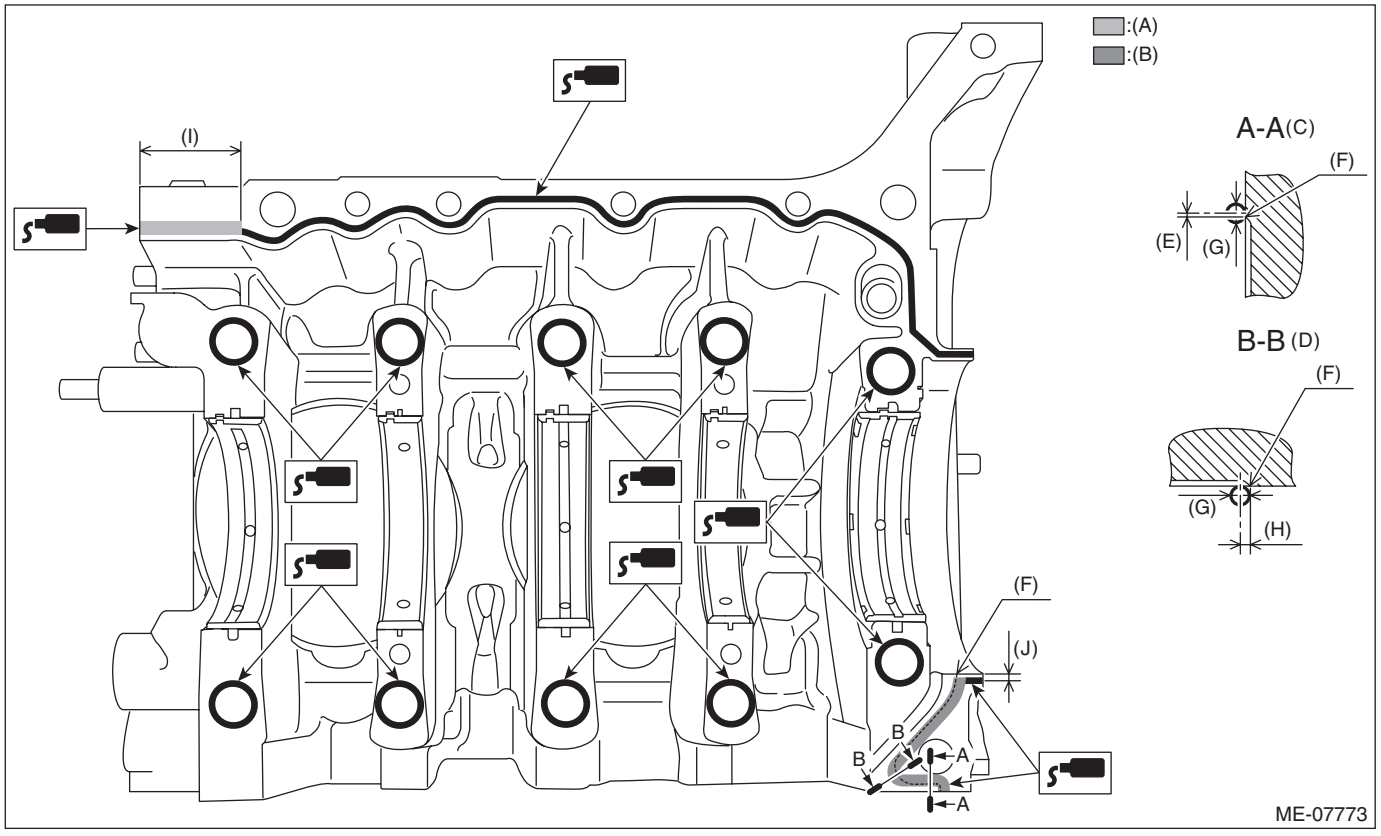
4) Apply liquid gasket to the mating surface of cylinder block RH as shown in the figure.

CAUTION:
Do not let the liquid gasket overflow to the oil passage and crankshaft bearing portions, because the engine seizure may result.

NOTE:
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the cylinder block RH and cylinder block LH.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

Liquid gasket applying diameter:
Mating surfaces other than ranges A and B
1±0.5 mm (0.0394±0.0197 in)
Mating surfaces of ranges A and B
4±0.5 mm (0.1575±0.0197 in)

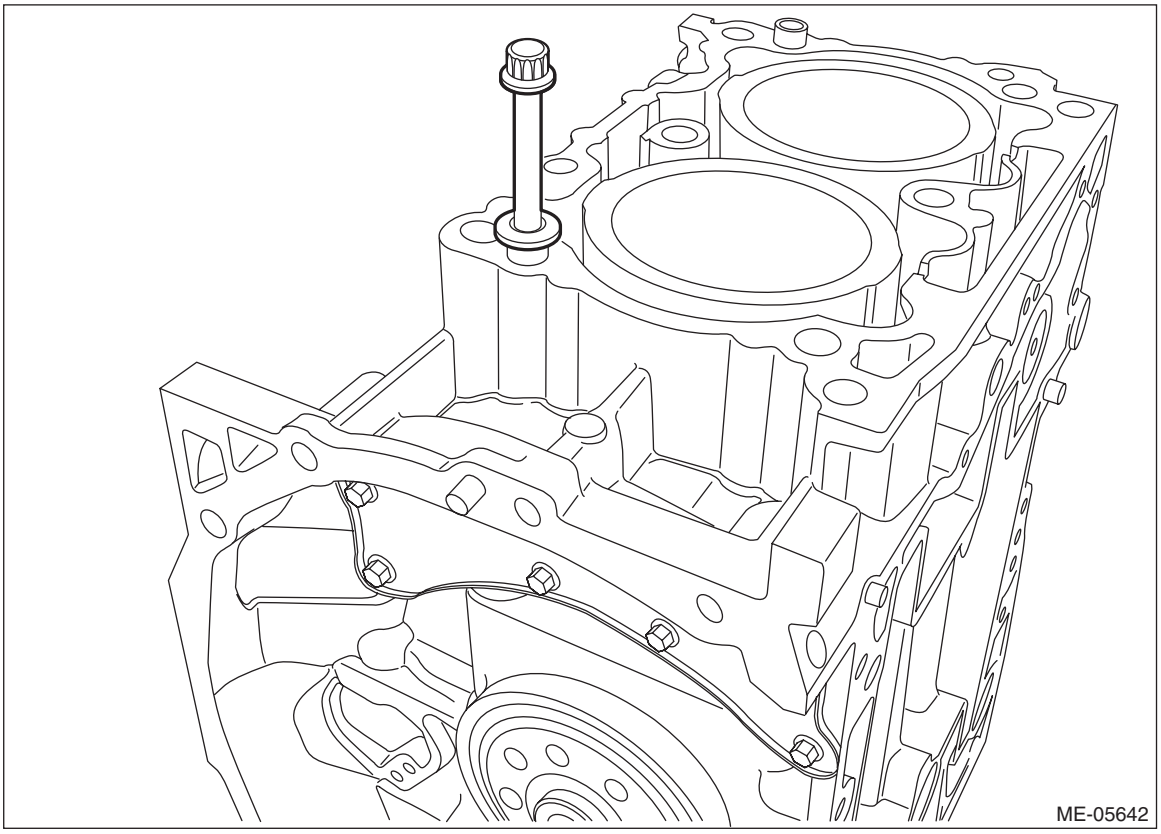


(A)	Range A	(E)	1 mm (0.0394 in) or less	(I)	36 mm (1.4173 in)
(B)	Range B	(F)	Chamfer edge	(J)	2.5 mm (0.0984 in)
(C)	Liquid gasket applying position of mating surfaces (other than the edge) of range B	(G)	ϕ4±0.5 mm (0.1575±0.0197 in)		
(D)	Liquid gasket applying position of mating surfaces (the edge) of range B	(H)	2 mm (0.0787 in)		

5) Install the cylinder block RH to the cylinder block LH.
6) Join the cylinder blocks.
    (1) Apply a coat of engine oil to the washers and cylinder block mounting bolt threads.

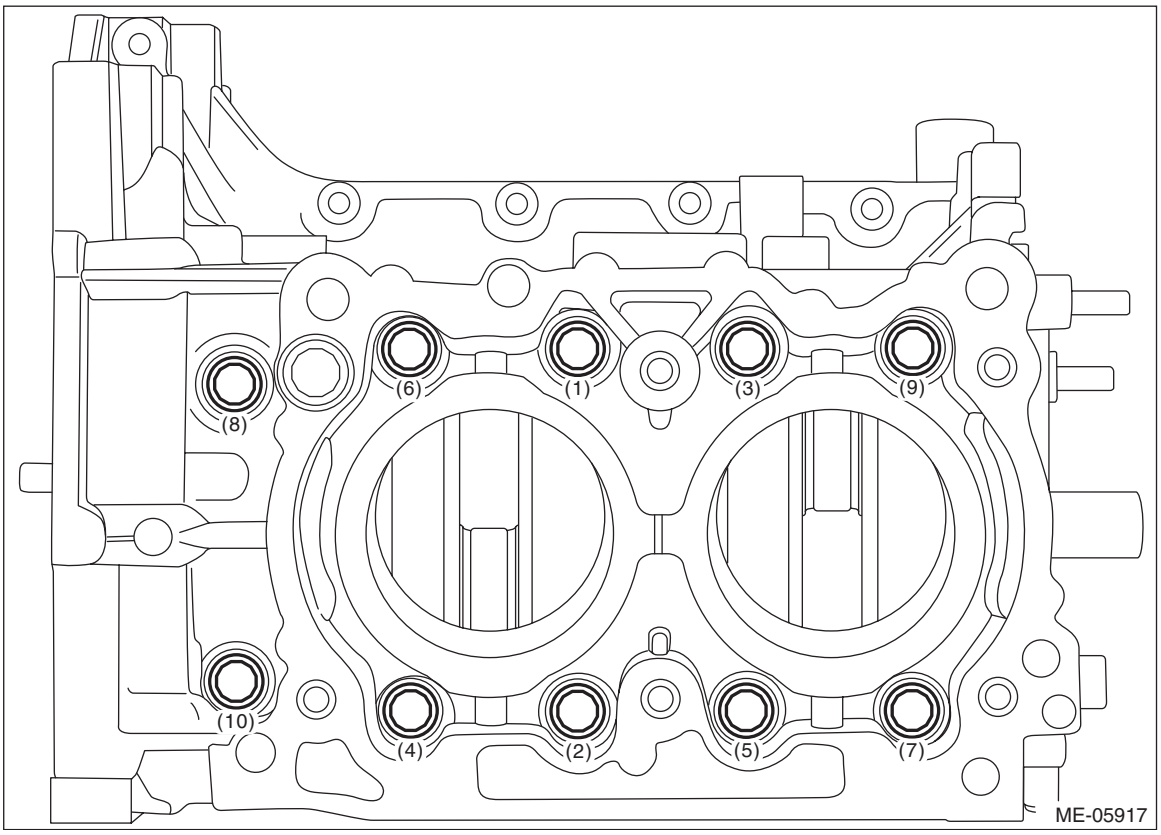
NOTE:
To prevent mixture of engine oil into the water jacket, do not apply a large amount.
    (2) Install the cylinder head bolt at the locations shown in the figure.

NOTE:
This procedure is required to tighten the cylinder block mounting bolts with specified angle using ST.



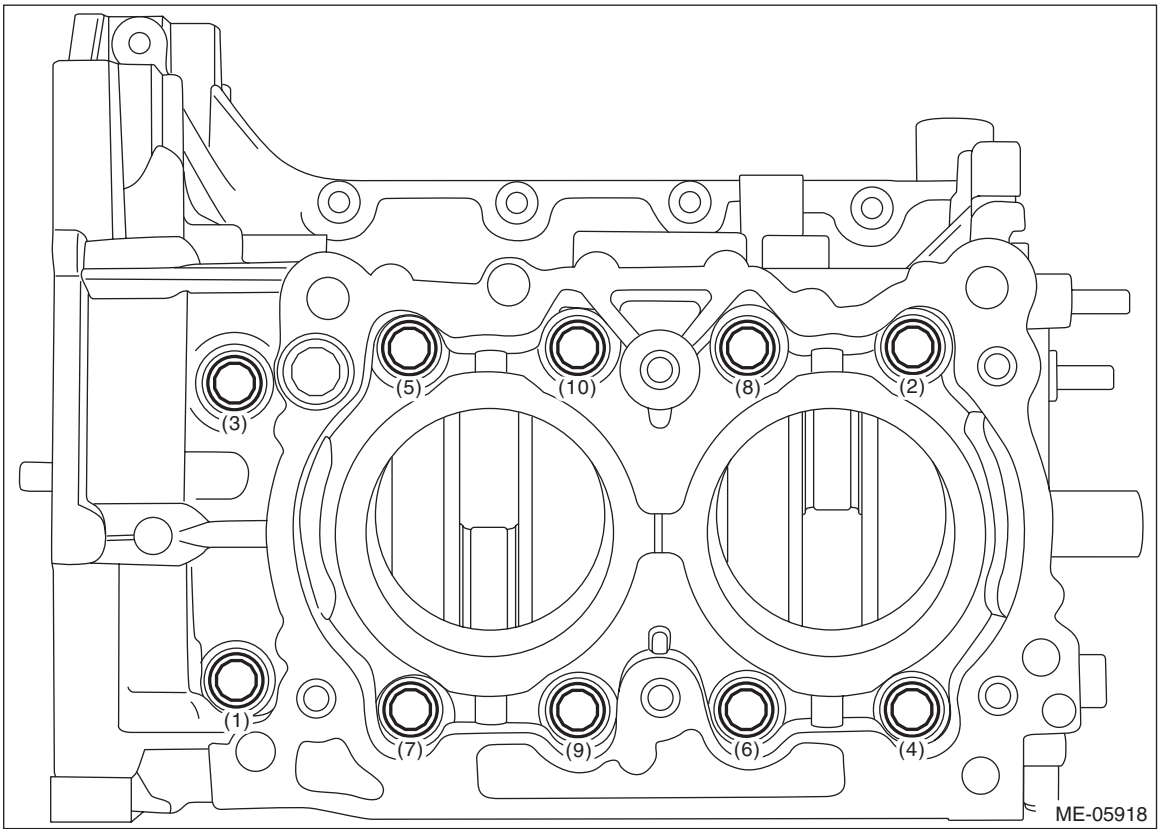
(3) Tighten all mounting bolts with a torque of 35 N·m (3.6 kgf-m, 25.8 ft-lb) in numerical order as shown in the figure.

CAUTION:
When tightening the mounting bolts with specified torque, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



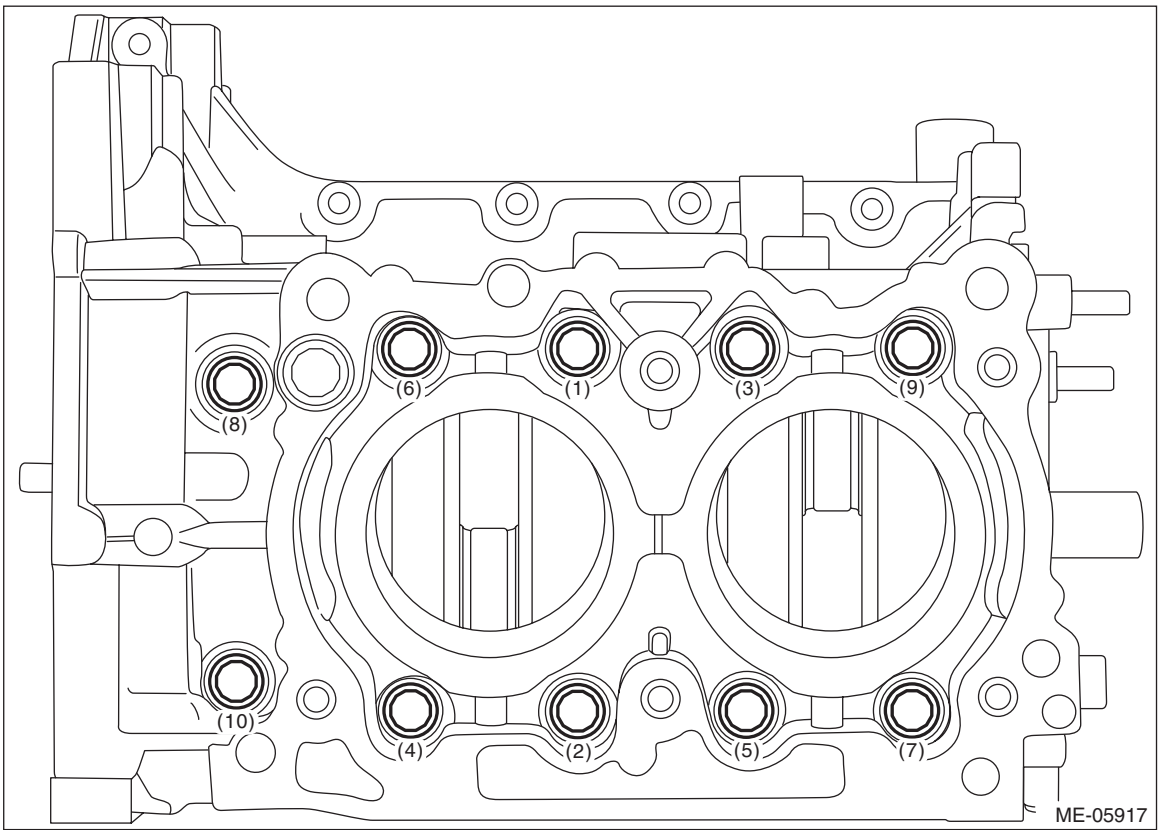
(4) Loosen all mounting bolts by 180° in numerical order as shown in the figure.

CAUTION:
When loosening the mounting bolts, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



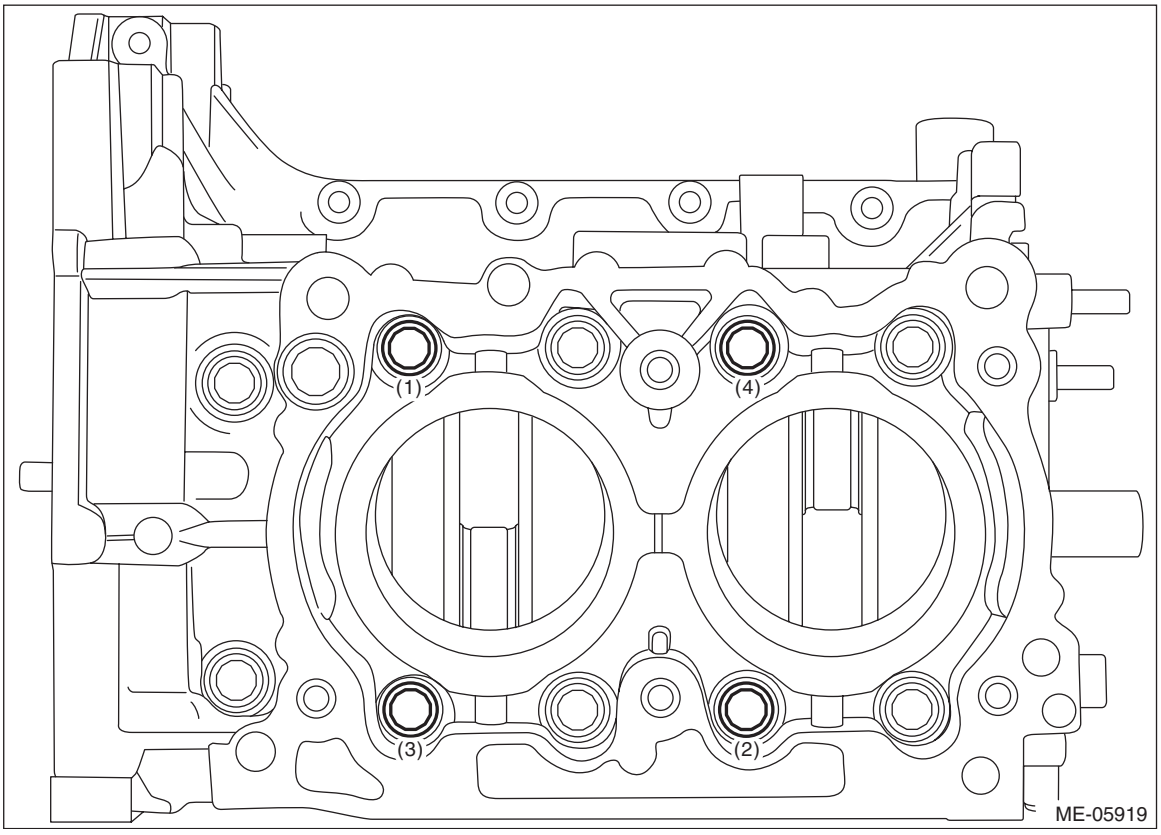
(5) Tighten all mounting bolts with a torque of 35 N·m (3.6 kgf-m, 25.8 ft-lb) in numerical order as shown in the figure.

CAUTION:
When tightening the mounting bolts with specified torque, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



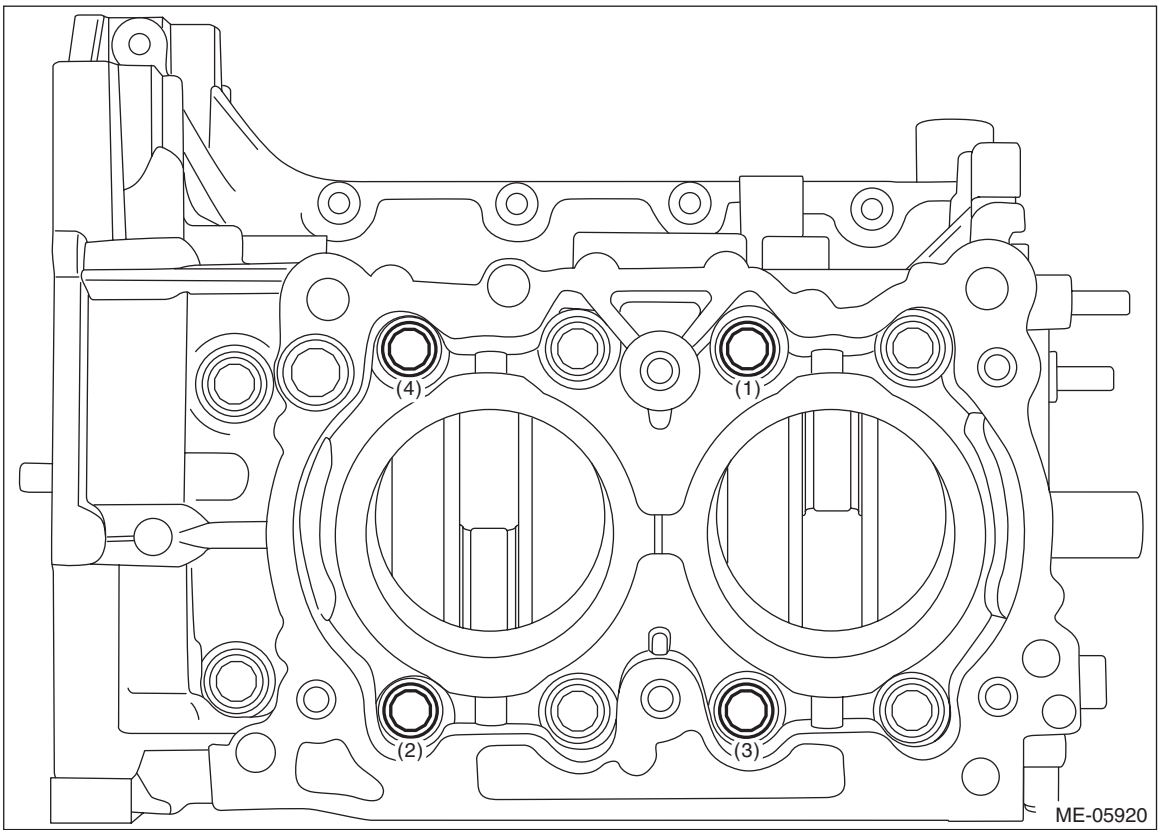
(6) Loosen the mounting bolts (4 places) by 180° in numerical order as shown in the figure.

CAUTION:
When loosening the mounting bolts, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



(7) Tighten the mounting bolts (4 places) with a torque of 17 N·m (1.7 kgf-m, 12.5 ft-lb) in numerical order as shown in the figure.

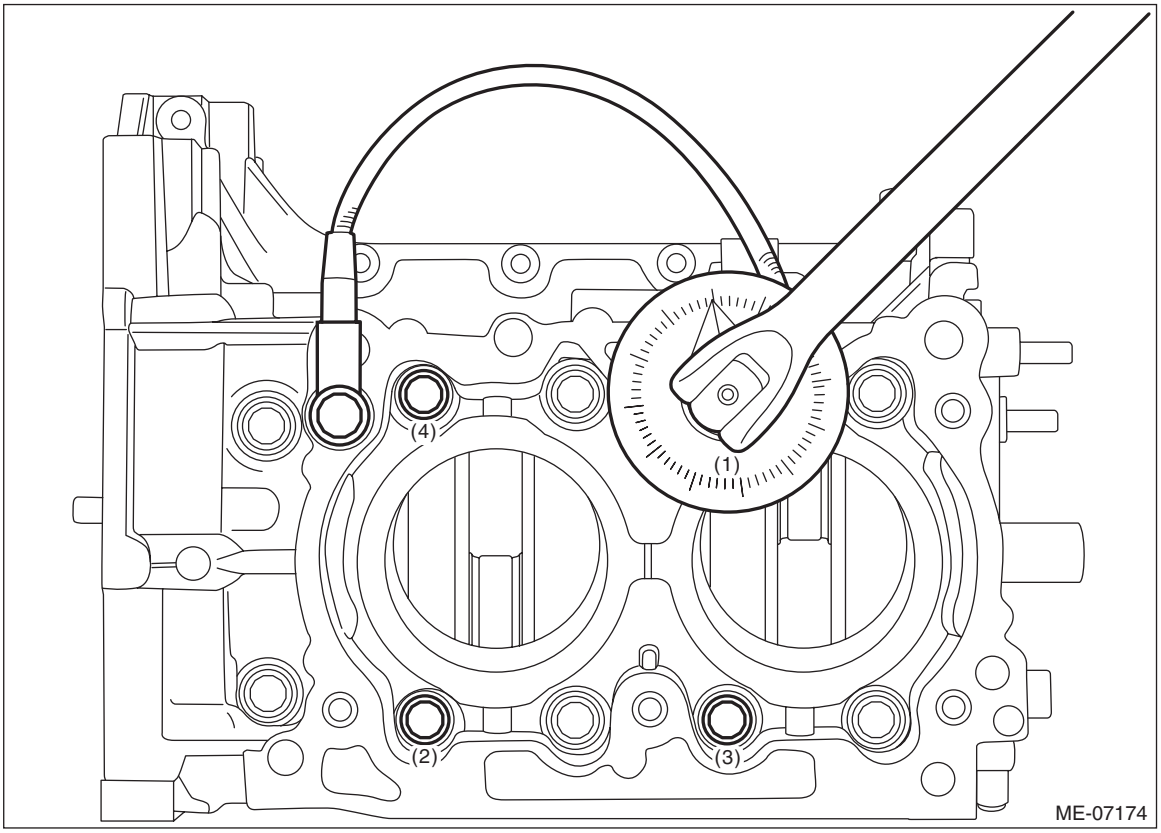
CAUTION:
When tightening the mounting bolts with specified torque, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



(8) Using angle gauge, tighten the mounting bolts (4 places) with specified angle in numerical order as shown in the figure.

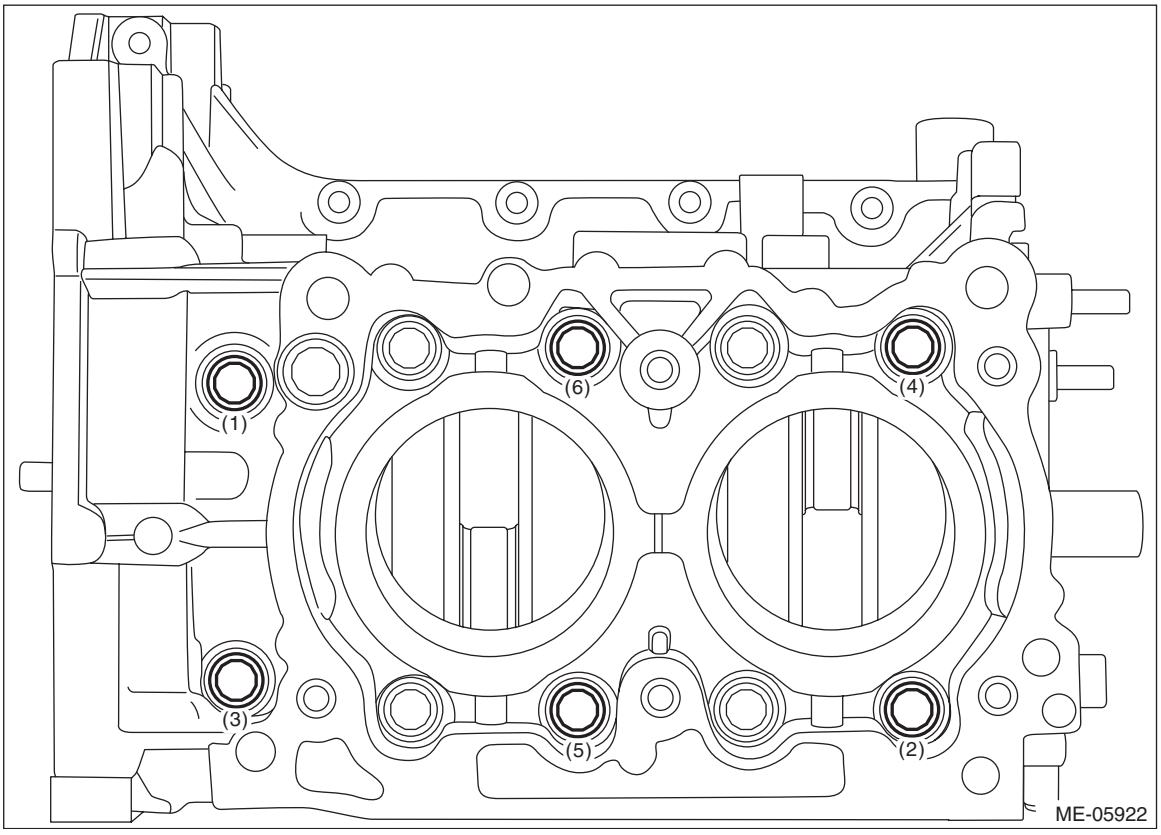
CAUTION:
When tightening the mounting bolts with specified angle, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.

Tightening angle:
60°±2°



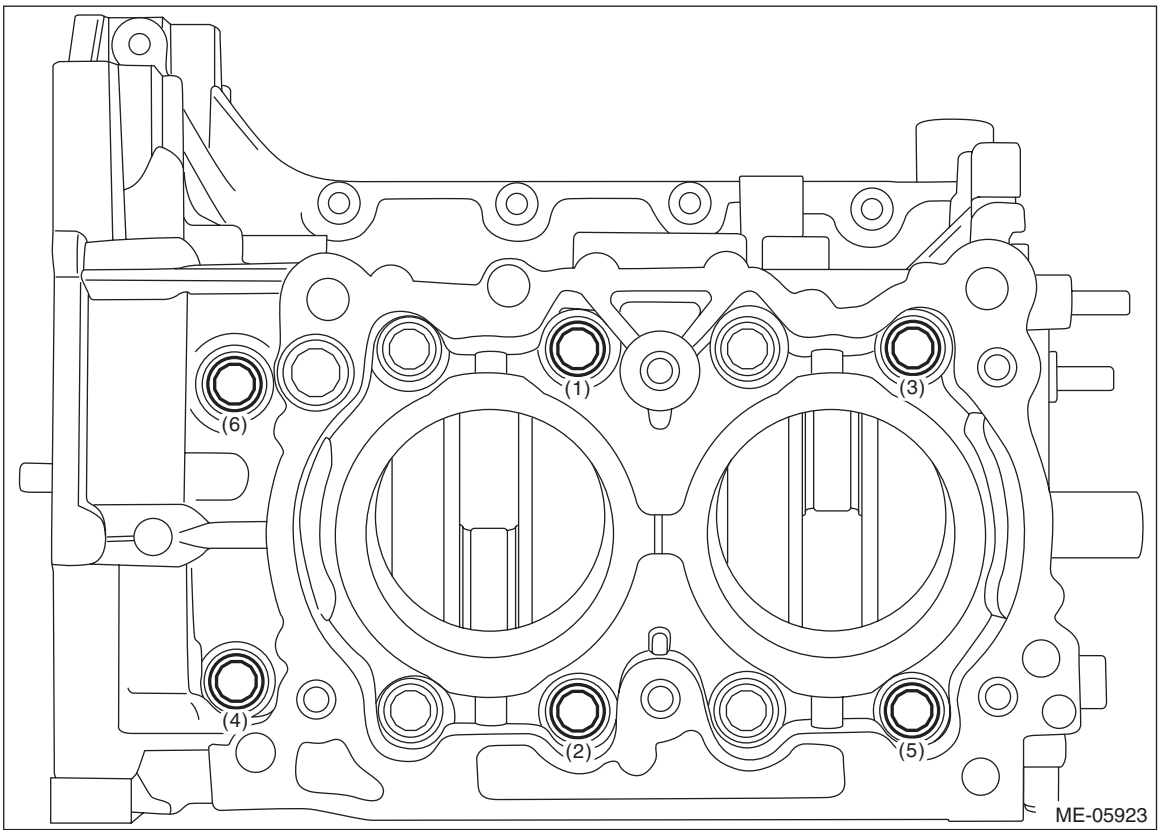
(9) Loosen the mounting bolts (6 places) by 180° in numerical order as shown in the figure.

CAUTION:
When loosening the mounting bolts, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



(10) Tighten the mounting bolts (6 places) with a torque of 17 N·m (1.7 kgf-m, 12.5 ft-lb) in numerical order as shown in the figure.

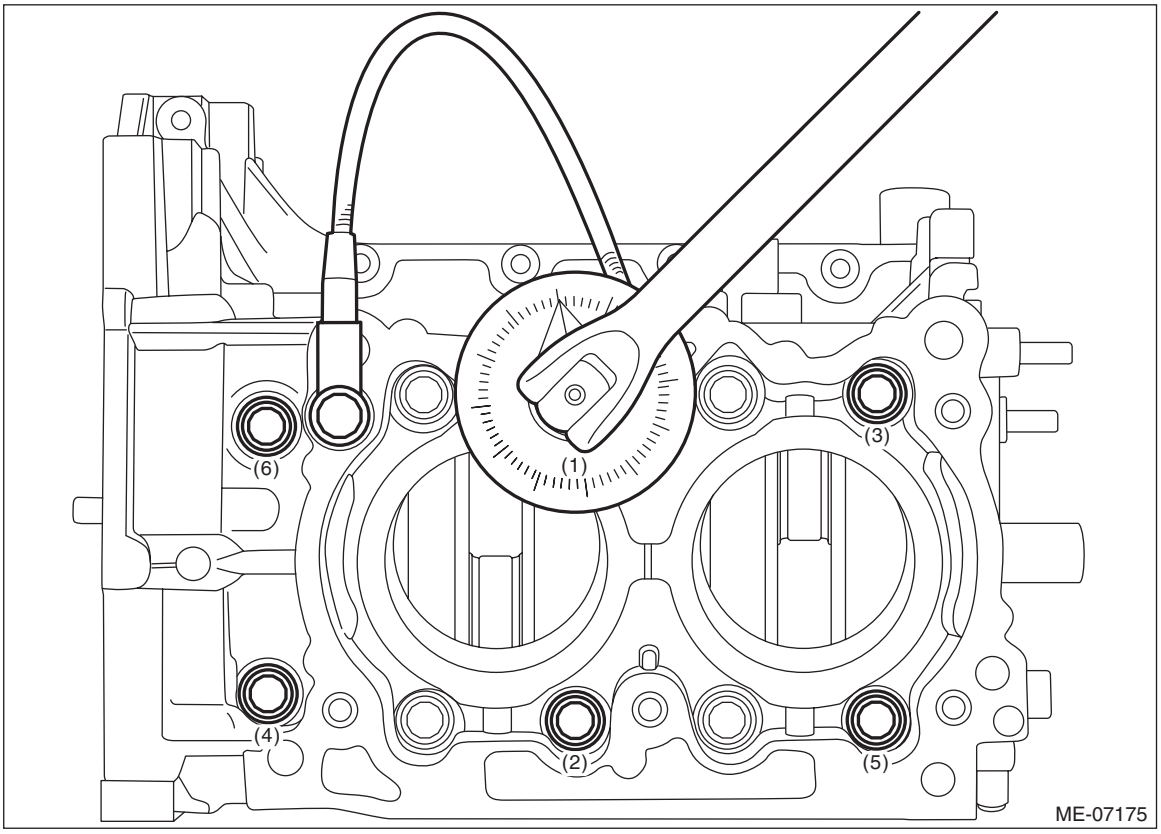
CAUTION:
When tightening the mounting bolts with specified torque, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



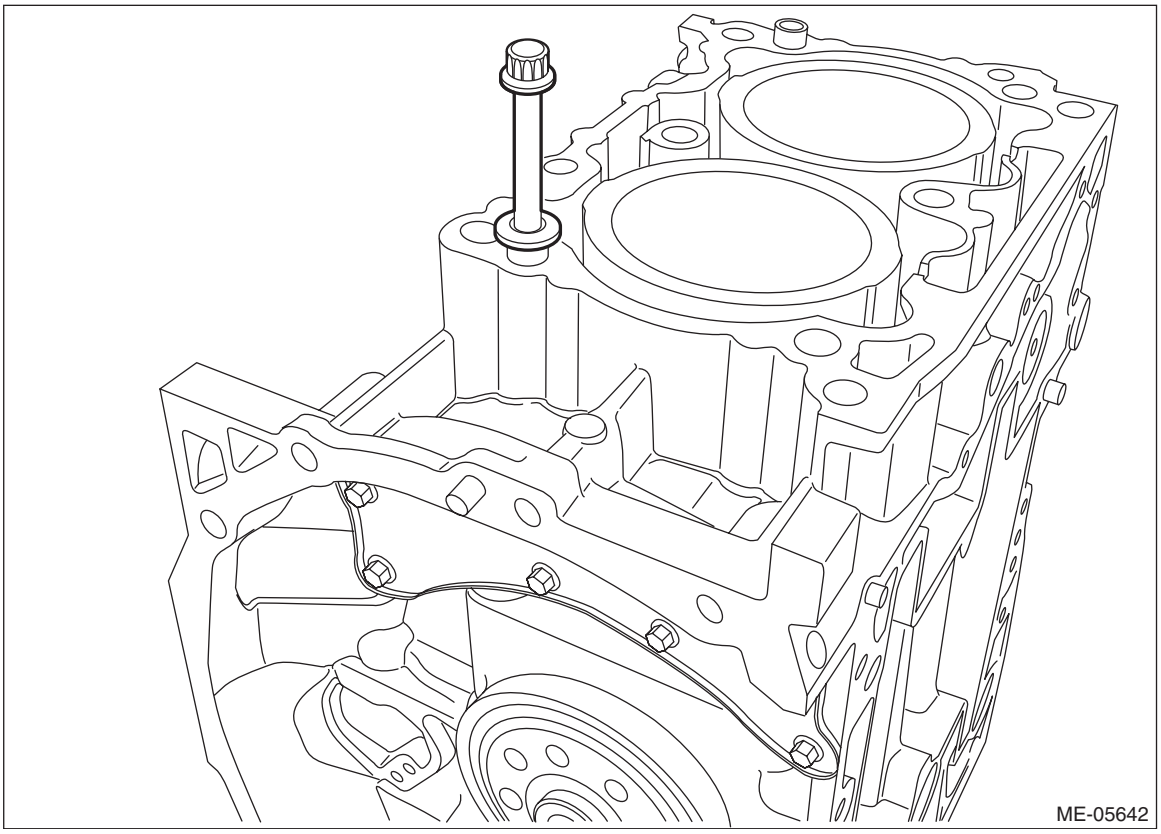
(11) Using angle gauge, tighten the mounting bolts (6 places) with specified angle in numerical order as shown in the figure.

CAUTION:
When tightening the mounting bolts with specified angle, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.

Tightening angle:
60°±2°



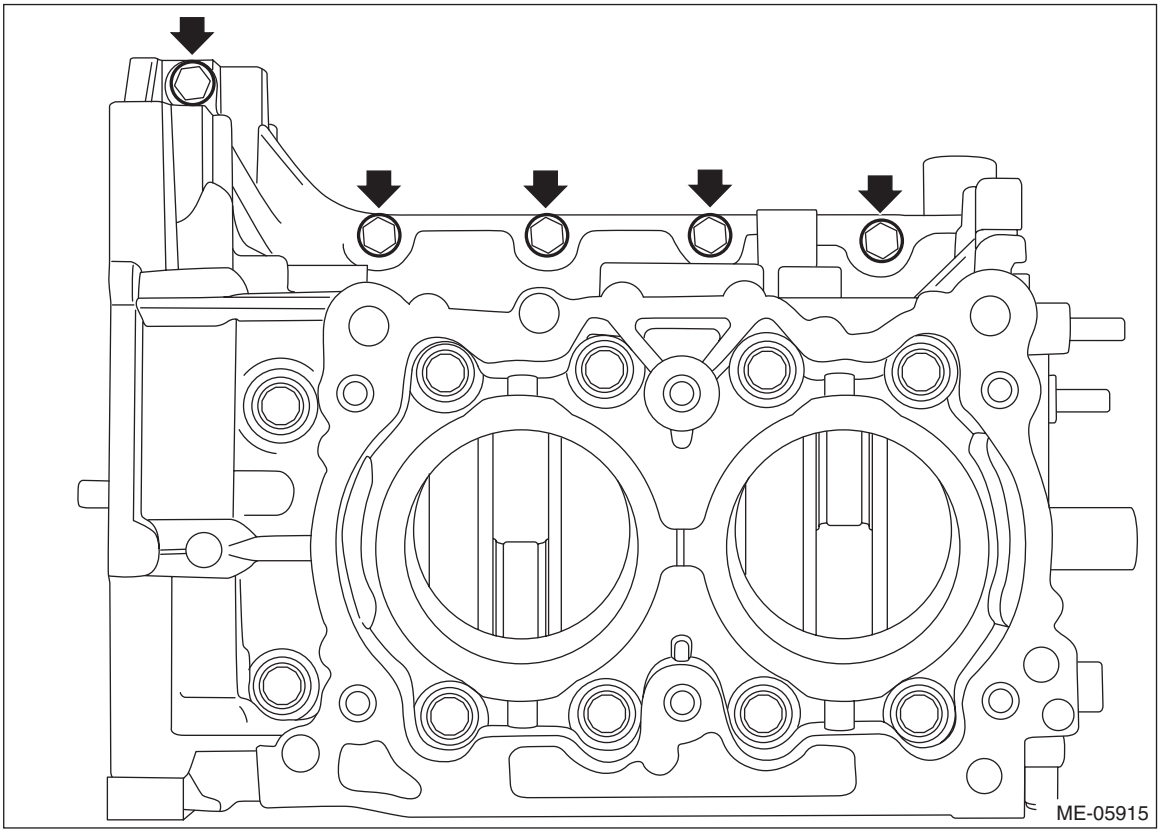
(12) Remove the cylinder head bolt attached at the locations shown in the figure.



(13) Install the bolt shown in the figure.

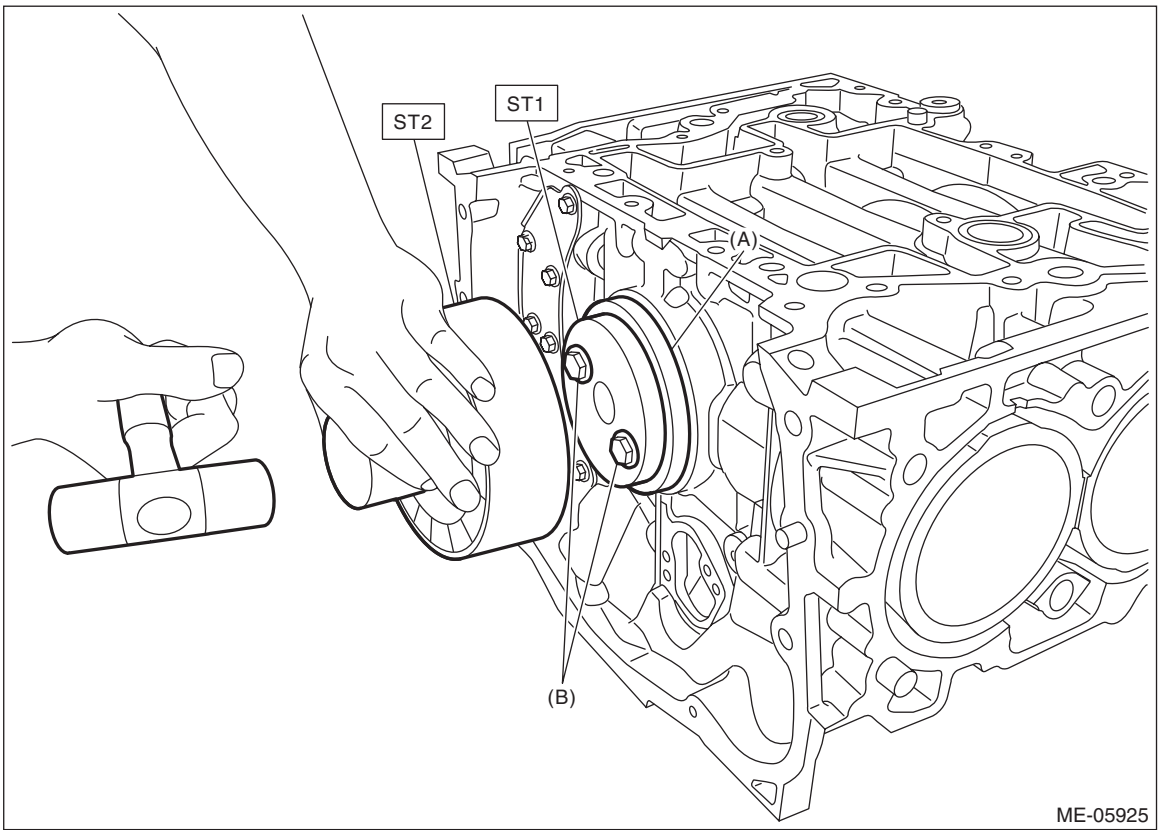
NOTE:
After tightening, if the liquid gasket is squeezed out in the seal surface area of the chain cover and oil pan upper, completely remove any liquid gasket that is squeezed out. Any liquid gasket on the chamfer area, however, should not be removed.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



7) Set the part so that the oil pan side of cylinder block is on the upper side.
8) Apply a coat of engine oil to the oil seal inner periphery and outer periphery, and install the rear oil seal using ST1 and ST2.

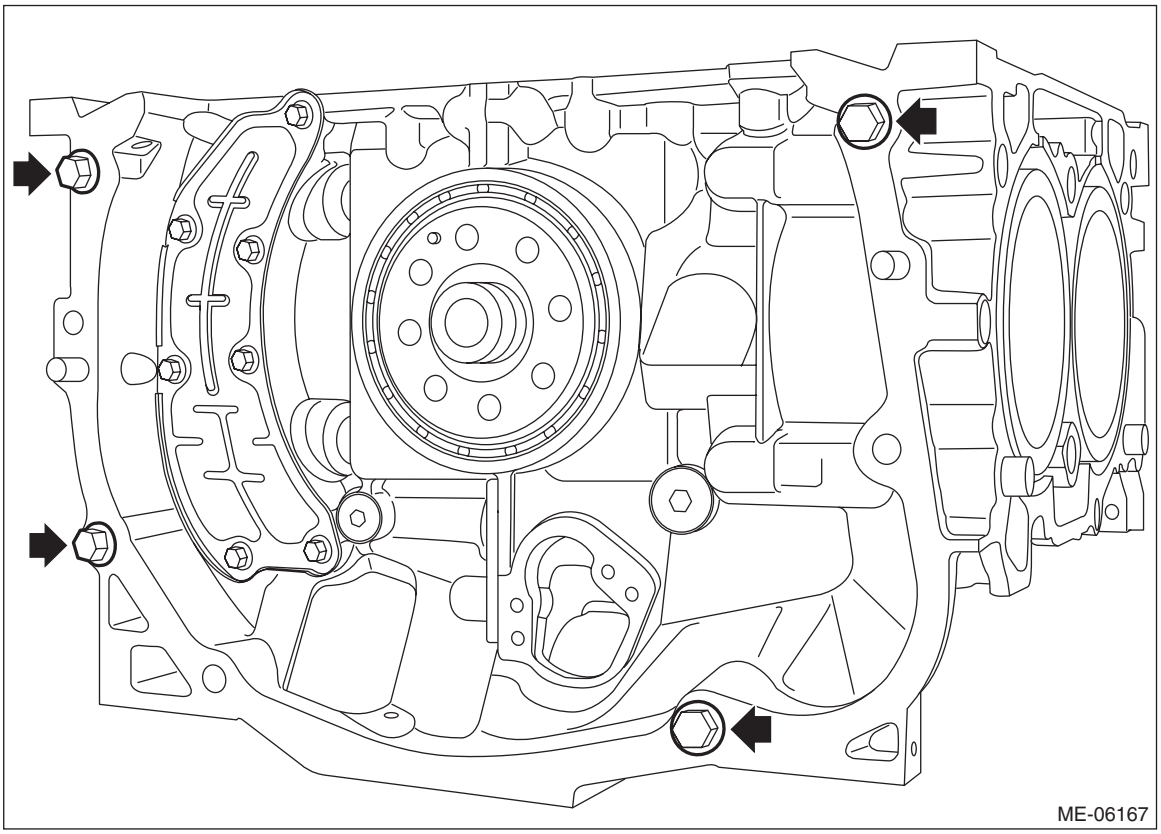
NOTE:
Use a new rear oil seal.
ST1 18671AA020 OIL SEAL GUIDE
ST2 18657AA030 OIL SEAL INSTALLER



(A) Rear oil seal
(B) Drive plate or flywheel mounting bolt

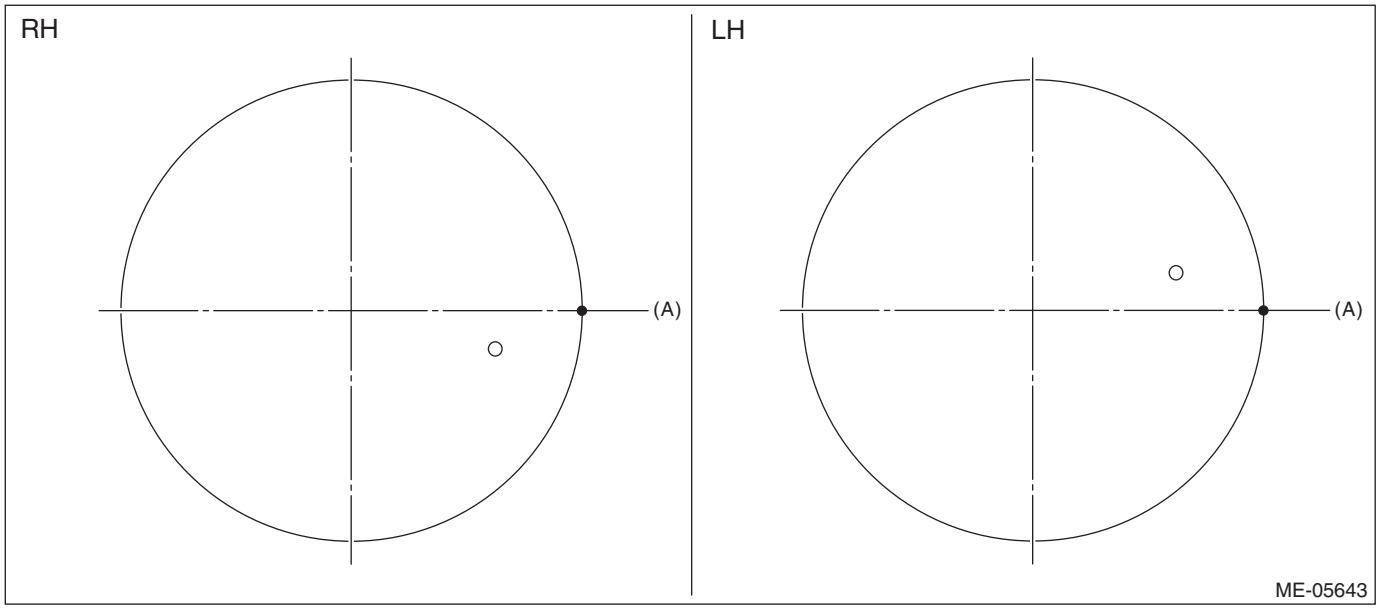
9) Install a bolt of suitable length (M10 × P1.25) at the locations shown in the figure.

NOTE:
• This procedure is required to prevent the knock pin damage when the cylinder block is raised in the next step.
• Use the same length of bolt for the four bolts.

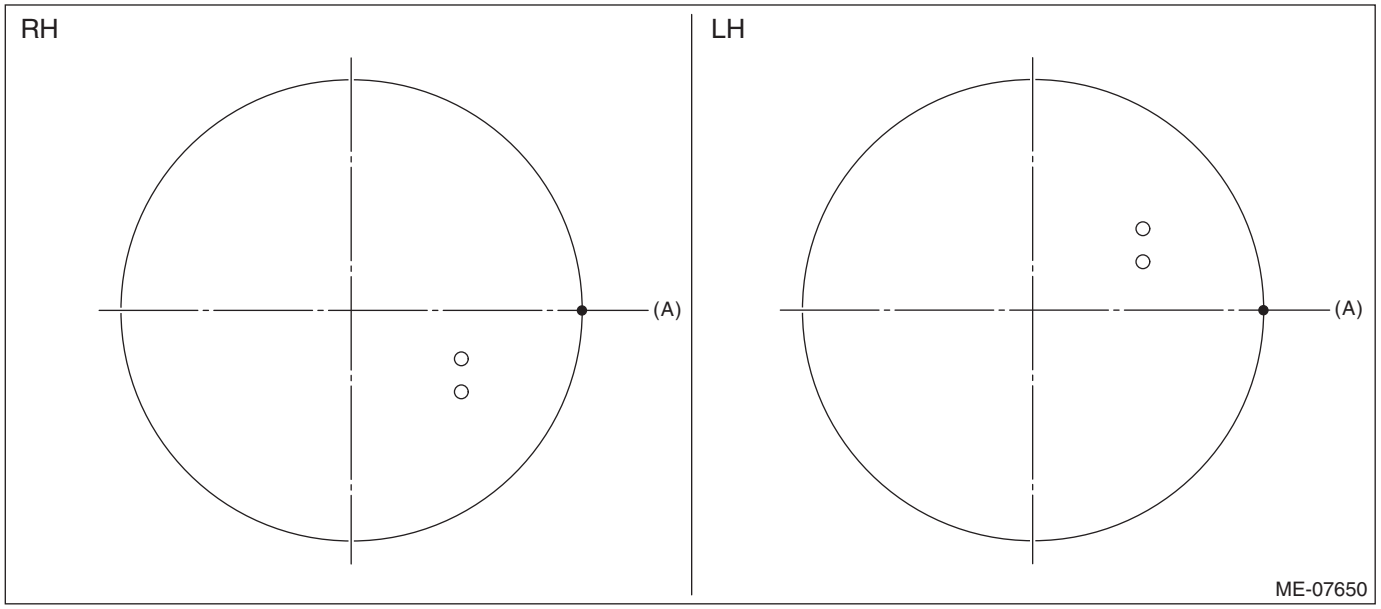


10) Raise the cylinder block so that the rear oil seal is on the lower side.
11) Adjust the positions of piston ring gap for each piston.

NOTE:
Check that the piston ring mark of compression ring faces the top side of the piston.
(1) Set the ring gap of the top ring to the position (A) in the figure.
• Gasoline engine model

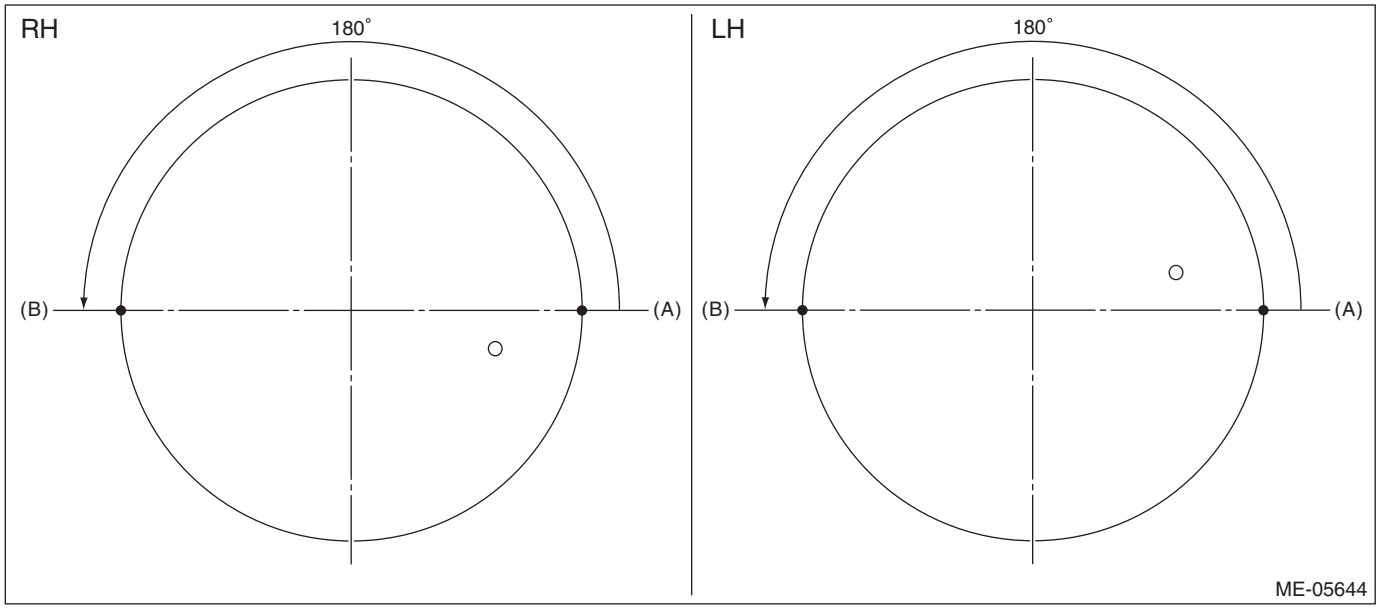


- HEV model

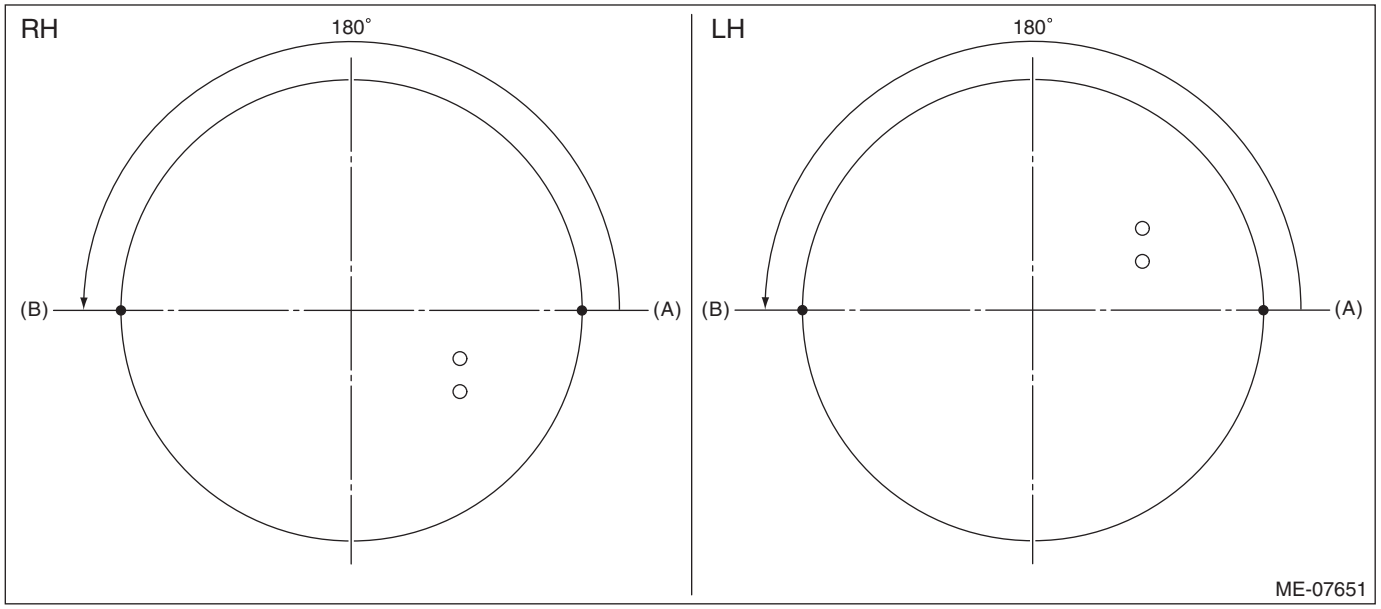


(2) Position the ring gap of second ring at (B) in the figure on the 180° opposite direction of (A).

- Gasoline engine model

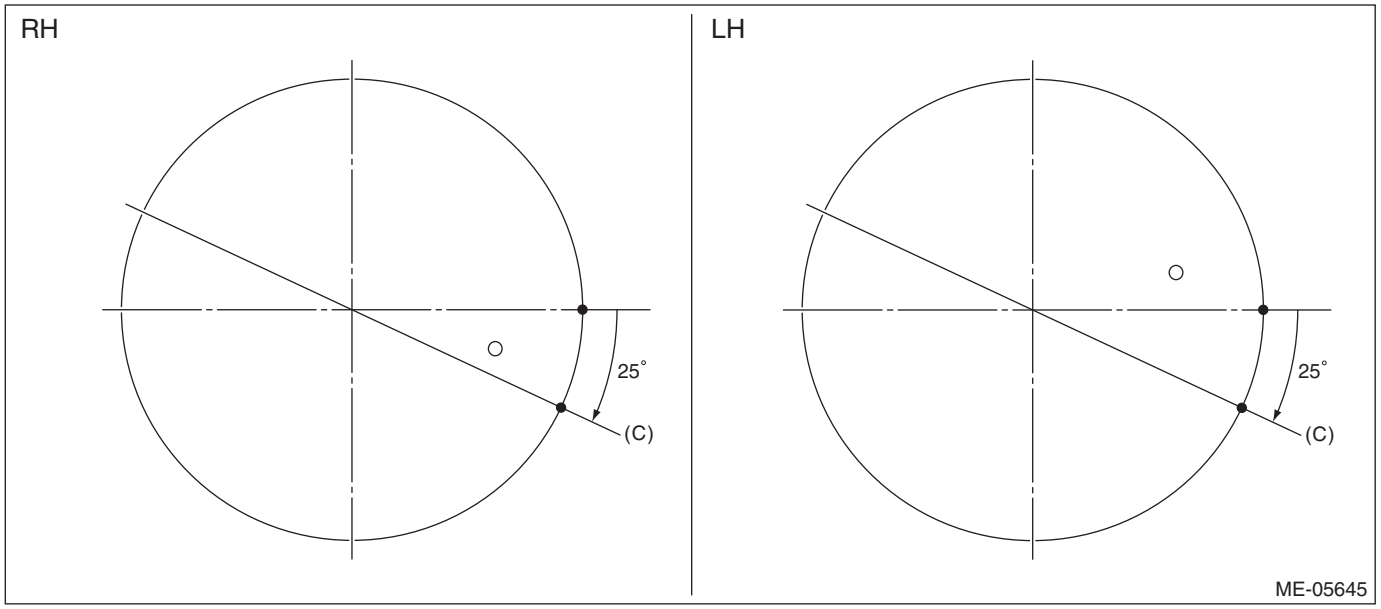


- HEV model

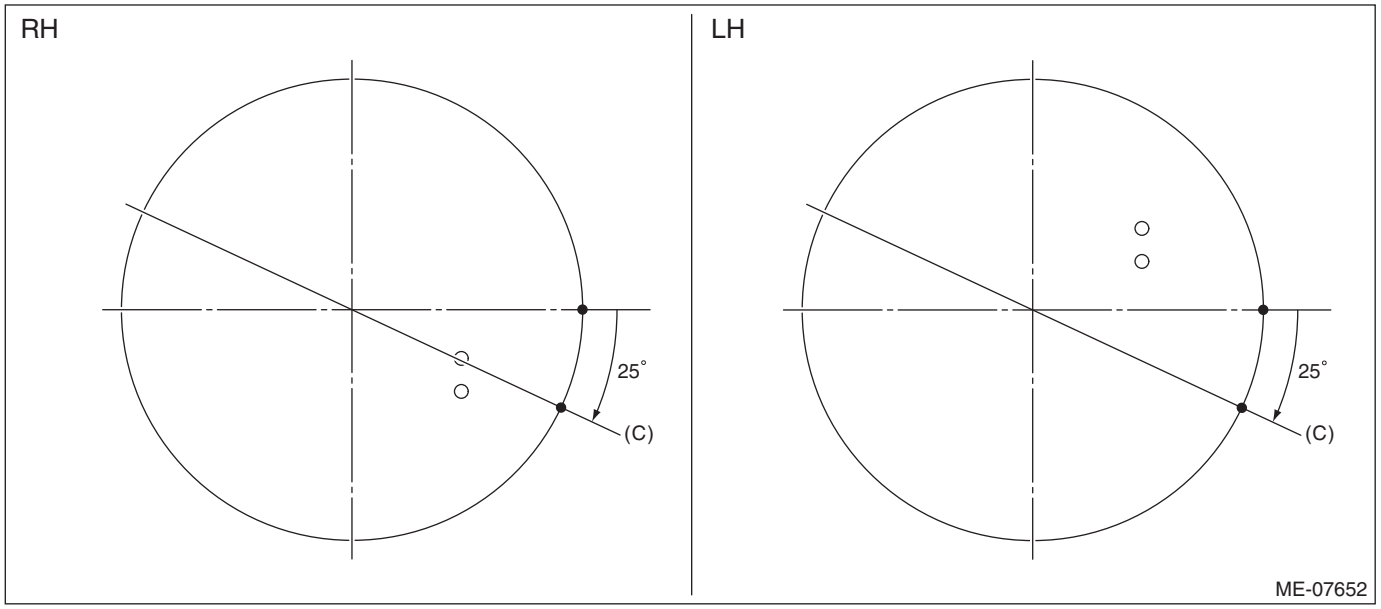


(3) Set the ring gap of the upper rail to the position (C) in the figure.

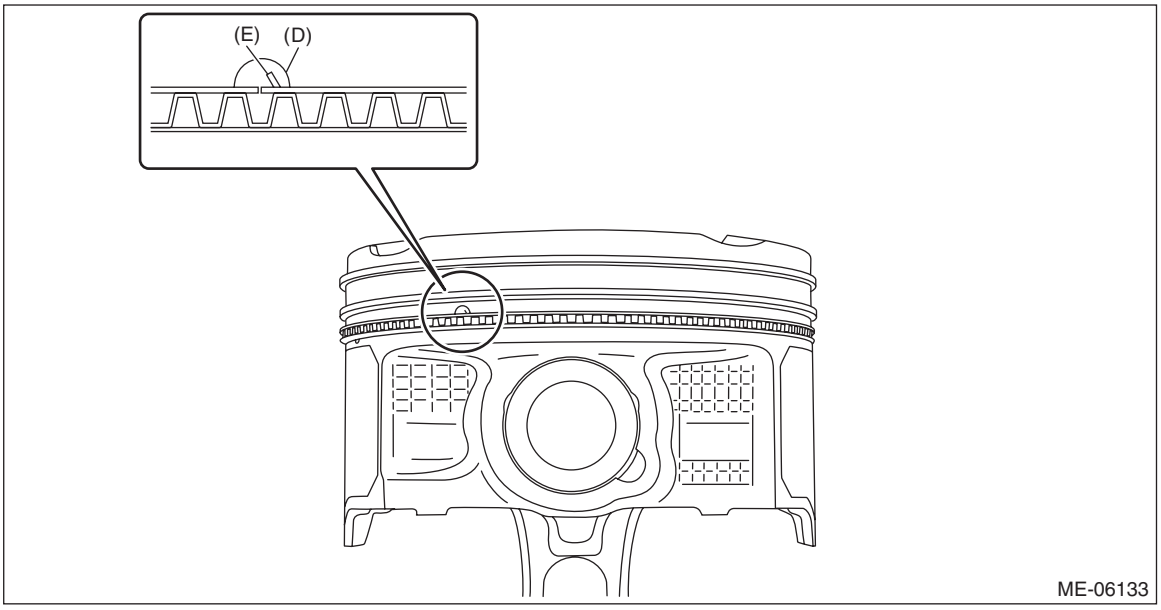
- Gasoline engine model



- HEV model

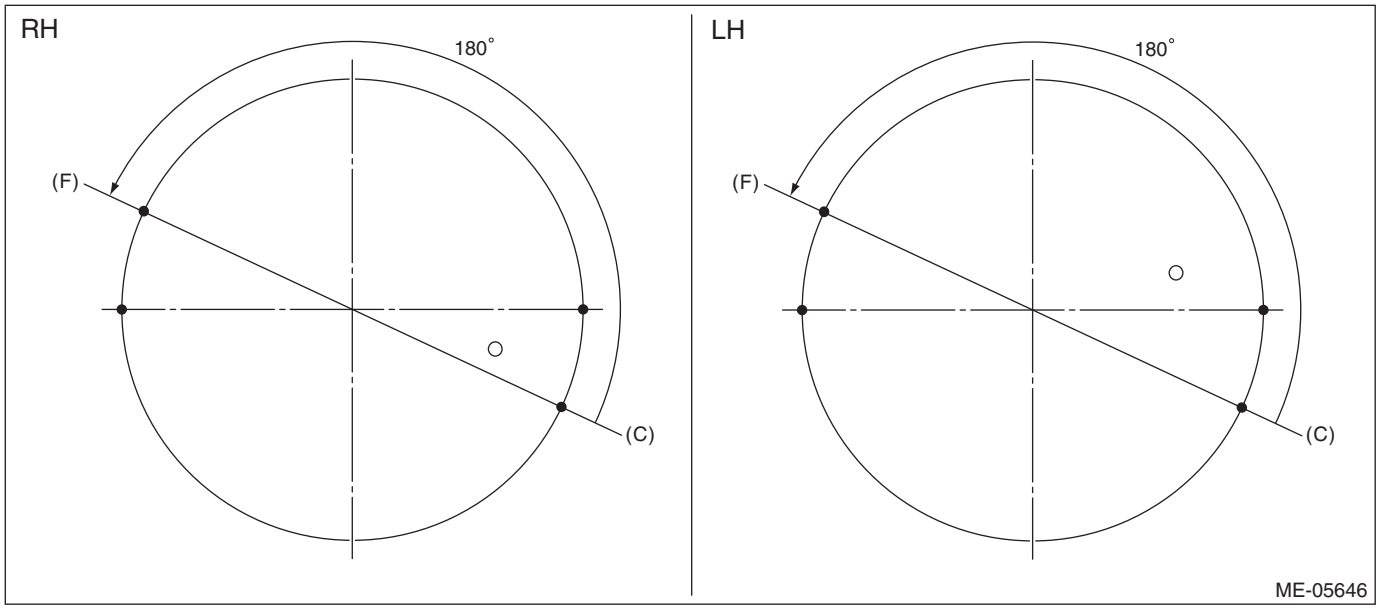


(4) Align the upper rail spin stopper (E) to the side hole (D) on the piston.

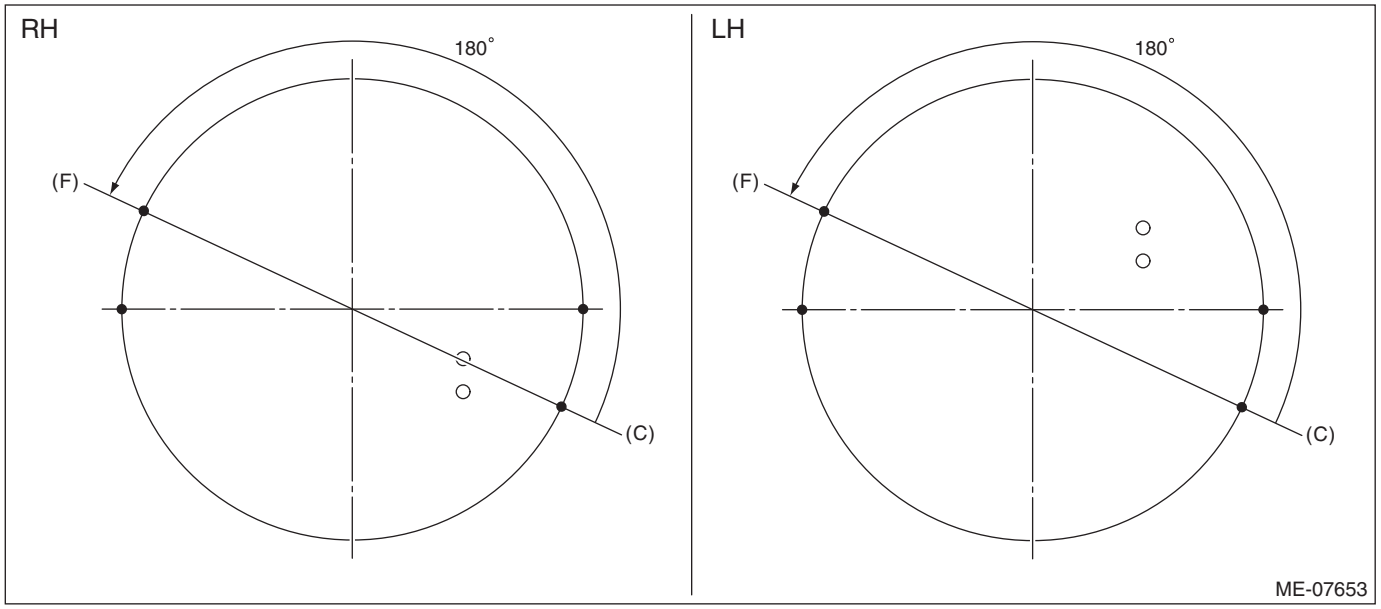


(5) Position the ring gap of expander at (F) in the figure on the 180° opposite direction of (C).

- Gasoline engine model

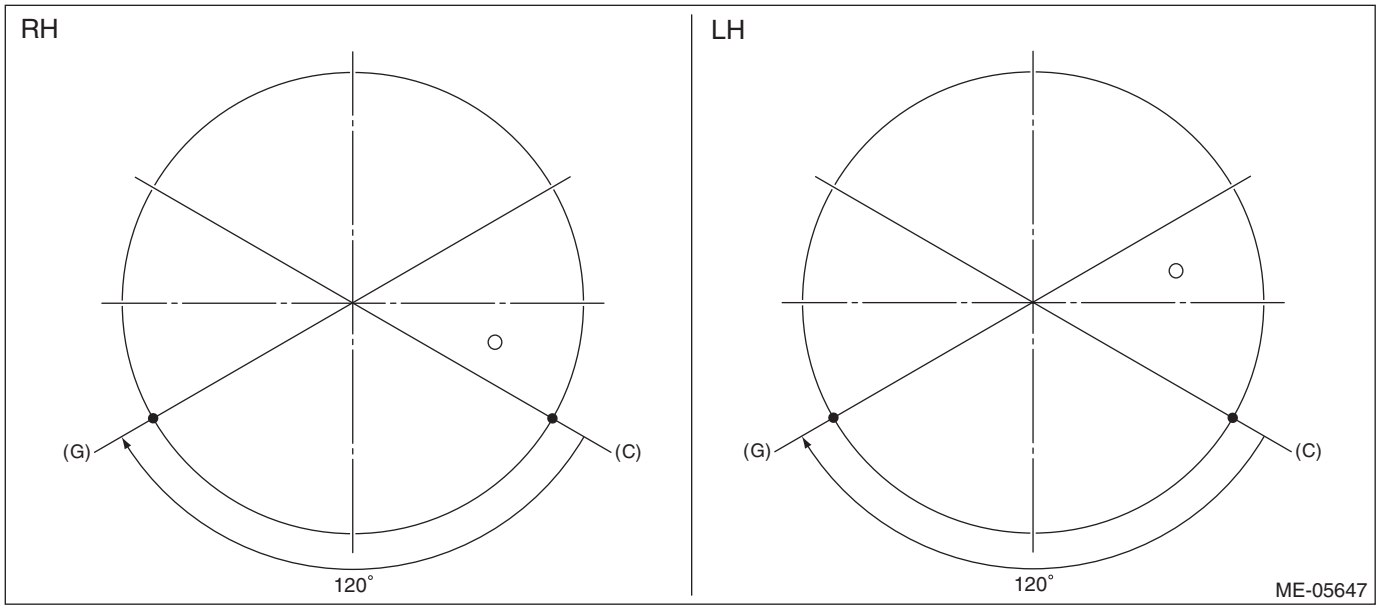


- HEV model

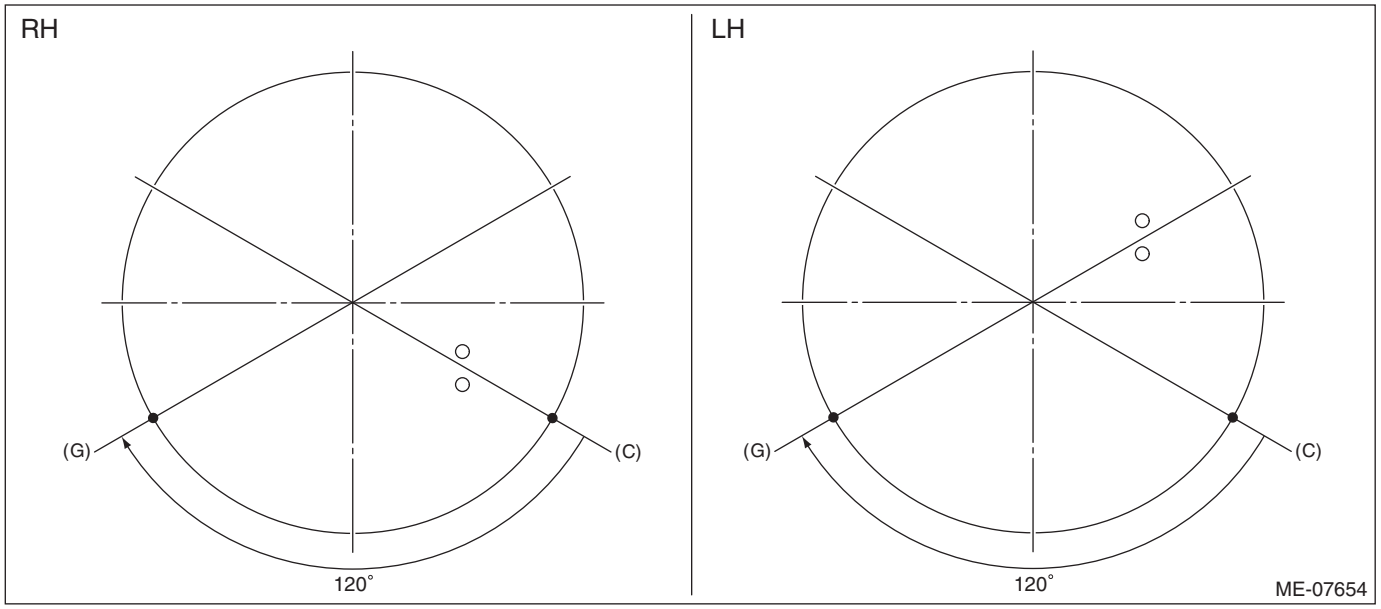


(6) Set the ring gap of lower rail at position (G), located 120° clockwise from (C) in the figure.

- Gasoline engine model



- HEV model



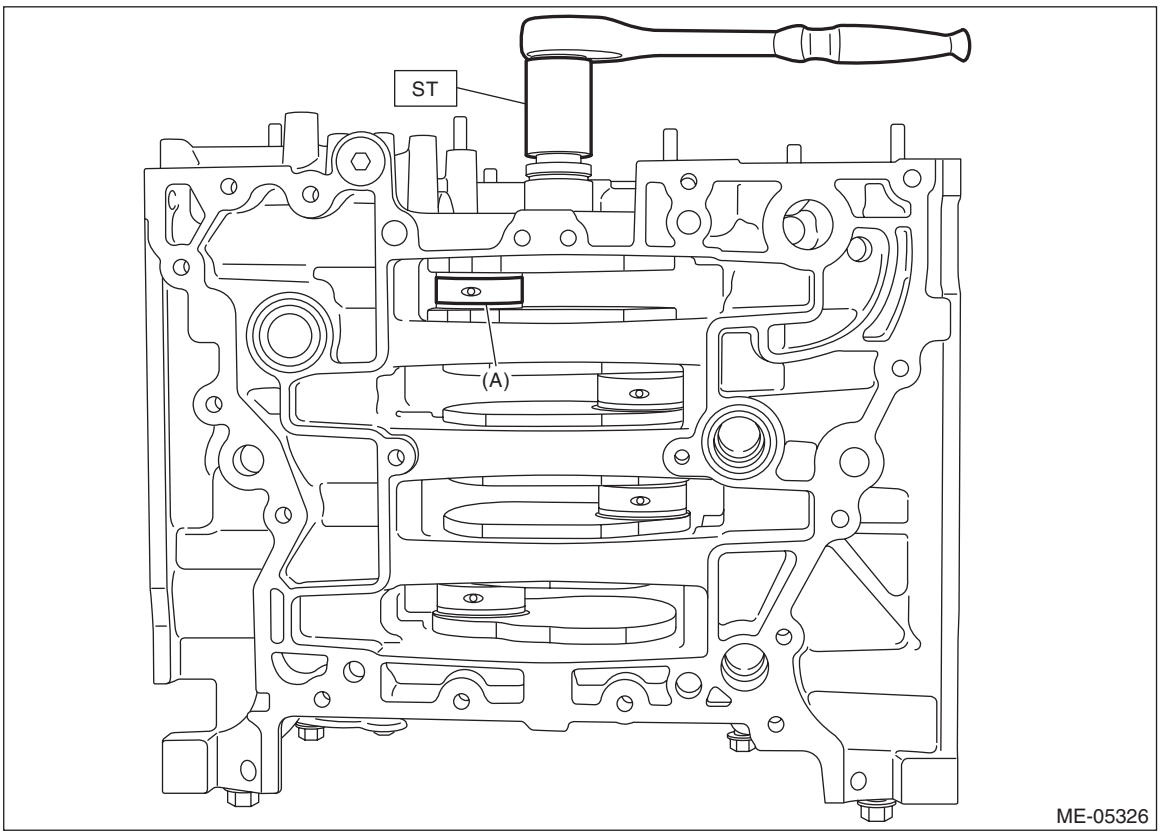
(7) Check that the positions of piston ring gap are properly adjusted.

NOTE:
When checking the positions of piston ring gap, also check that the piston ring gaps are not positioned within the range of piston skirt extended line.

12) Install the piston and connecting rod to the cylinder block.

(1) Apply engine oil to the outer circumference of each piston, crankshaft pin, and in the cylinder block.

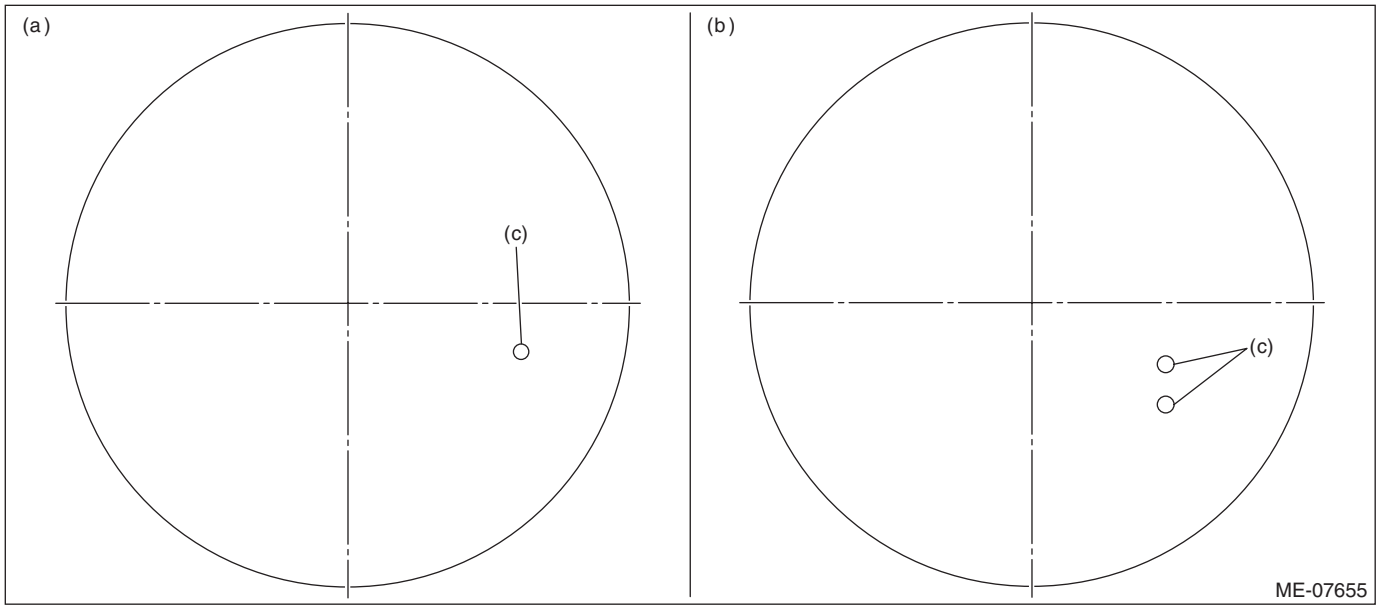
(2) Turn the crankshaft so that the #1 pin (A) of crankshaft is positioned at TDC using ST.
ST 18252AA000 CRANKSHAFT SOCKET



(3) Compress the piston ring using piston ring compressor, and insert the #1 connecting rod with #1 piston into cylinder block.

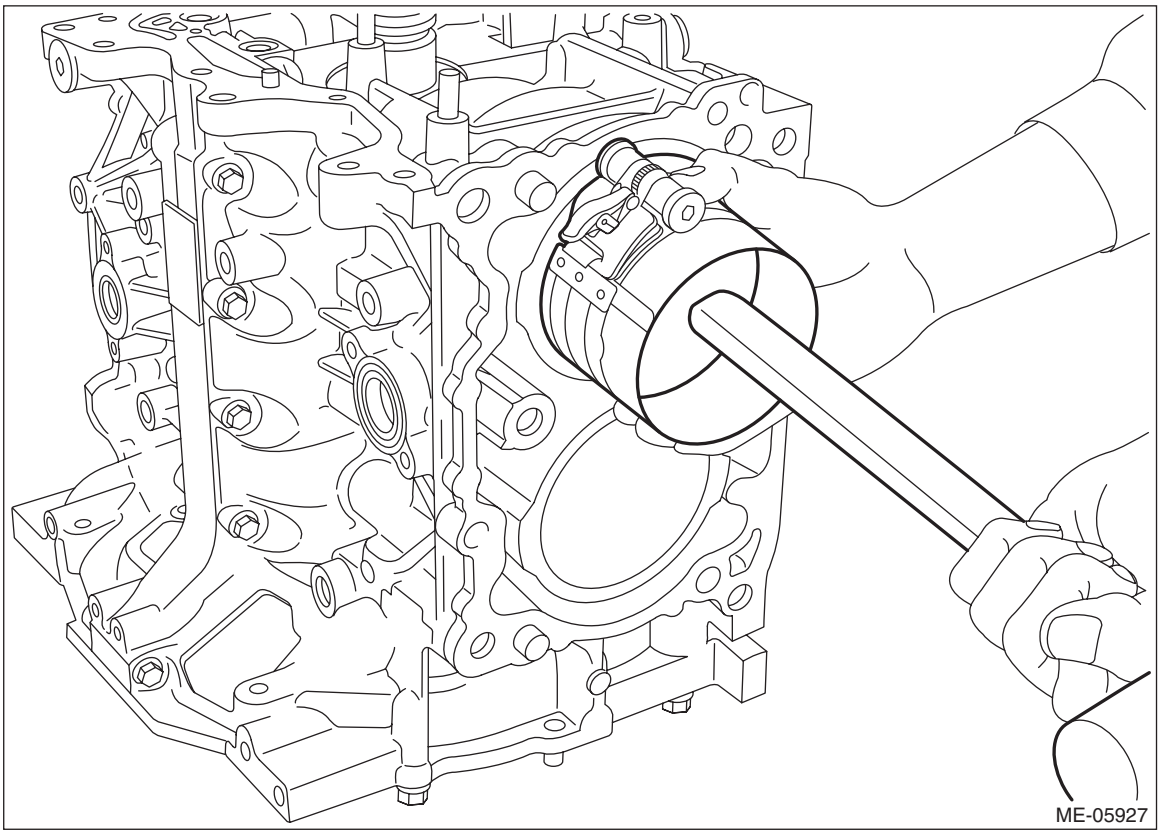
CAUTION:
• Be careful not to damage the cylinder liner and #1 pin of crankshaft by the #1 connecting rod large end.
• Be careful not to apply strong impact when inserting to prevent connecting rod bearing from falling off.

NOTE:
- Face the piston front mark (round mark) towards the front of the engine.



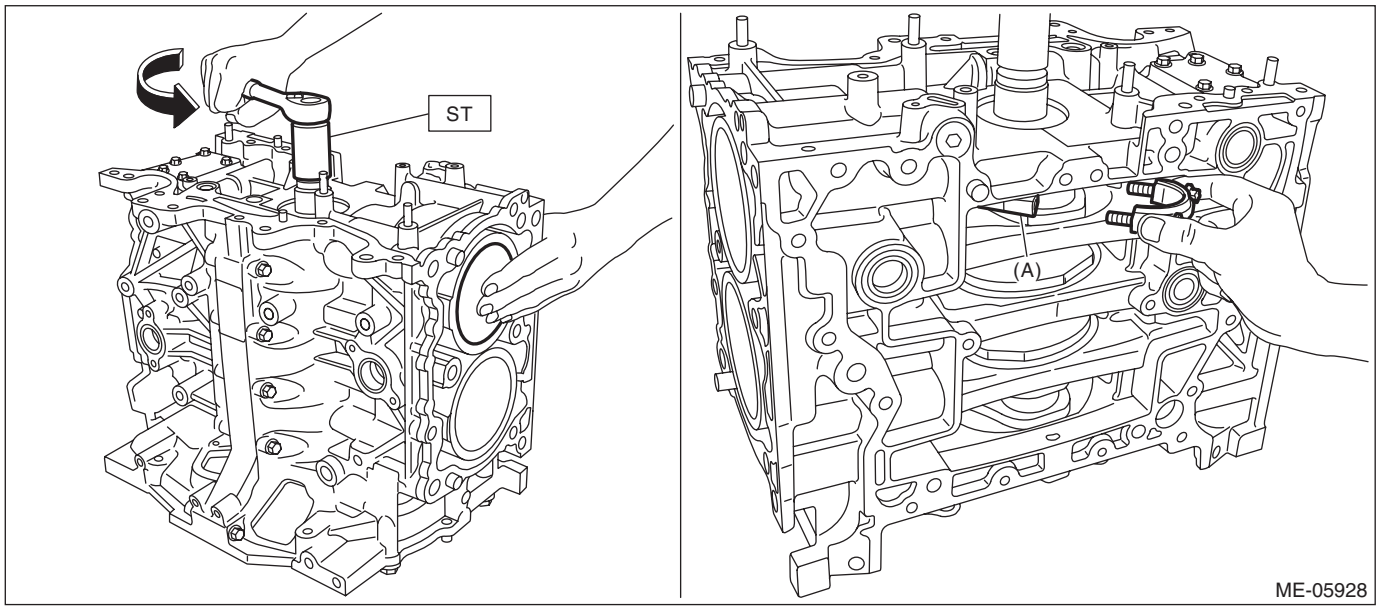
(a) Gasoline engine model (b) HEV model (c) Front mark

- Insert while lightly tapping the crown of the piston with the handle of a plastic hammer.



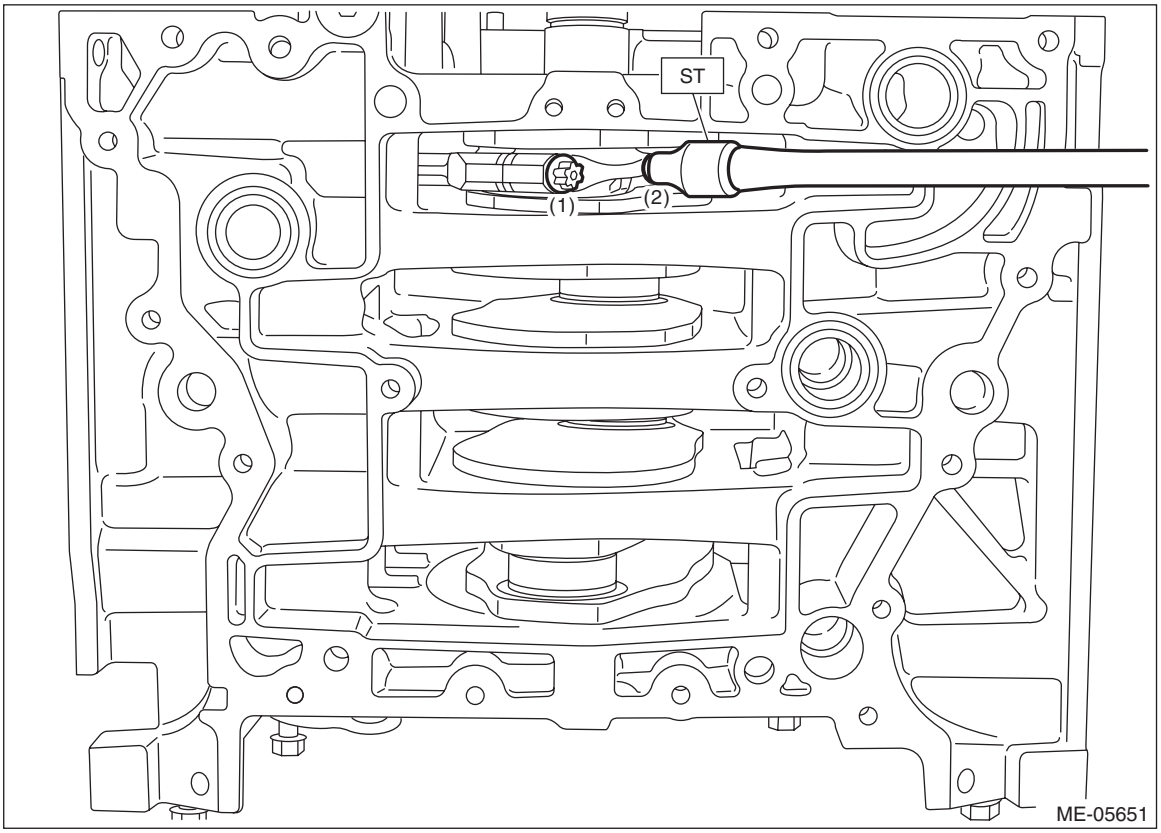
(4) Turn the crankshaft counterclockwise so that the #1 pin of crankshaft and the large end (A) of #1 connecting rod are positioned as shown in the figure using ST, while pressing the #1 piston crown, and then set the #1 connecting rod cap and #1 connecting rod cap bolt.

NOTE:
• Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching symbol.
• Use a new connecting rod cap bolt.
• Apply a coat of engine oil to the #1 connecting rod cap seat and the connecting rod cap bolt threads.
ST 18252AA000 CRANKSHAFT SOCKET



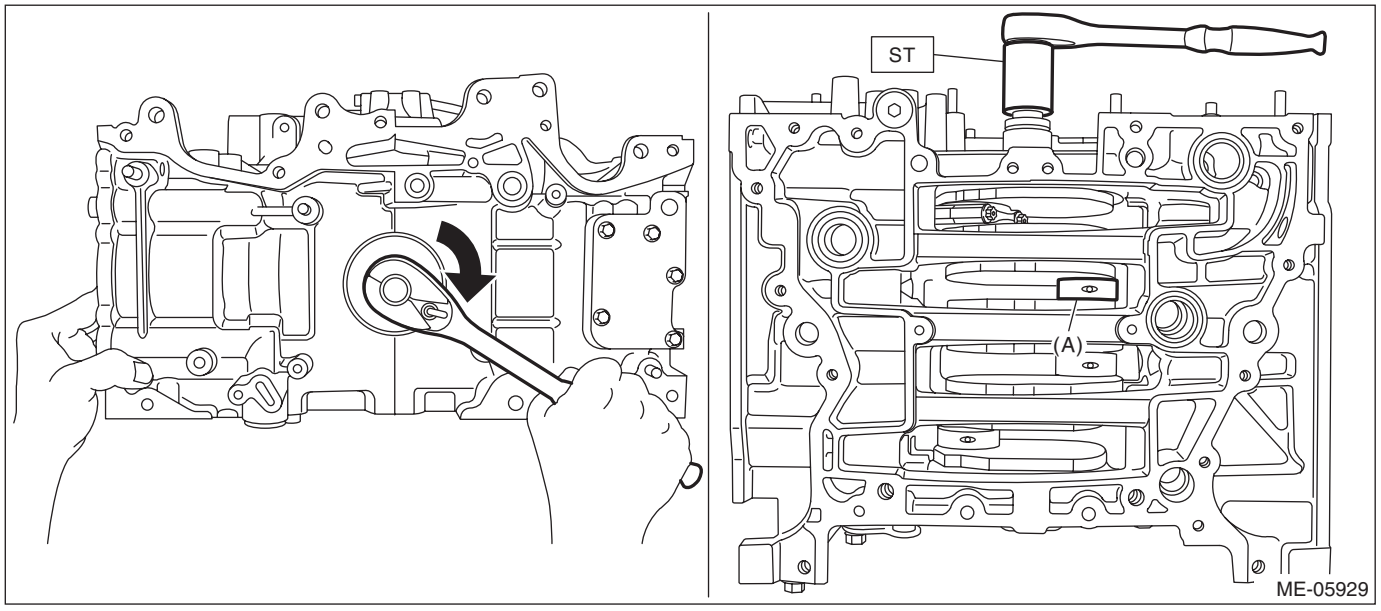
(5) Using ST, tighten the #1 connecting rod cap bolts to 10 N·m (1.0 kgf-m, 7.4 ft-lb) in numerical order as shown in the figure, then retighten the bolts to 22 N·m (2.2 kgf-m, 16.2 ft-lb) in numerical order as shown in the figure.

ST 18270AA020 SOCKET



(6) Turn the crankshaft clockwise so that the #2 pin (A) of crankshaft is positioned at TDC using ST.

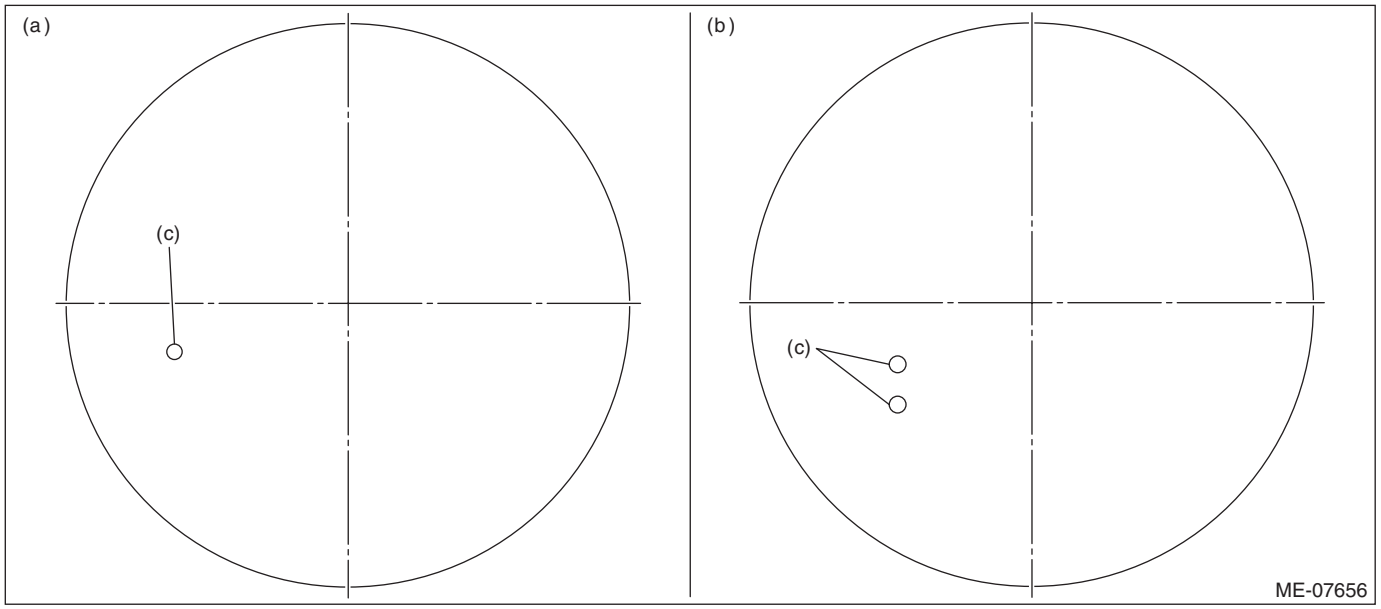
ST 18252AA000 CRANKSHAFT SOCKET



(7) Compress the piston ring using piston ring compressor, and insert the #2 connecting rod with #2 piston into cylinder block.

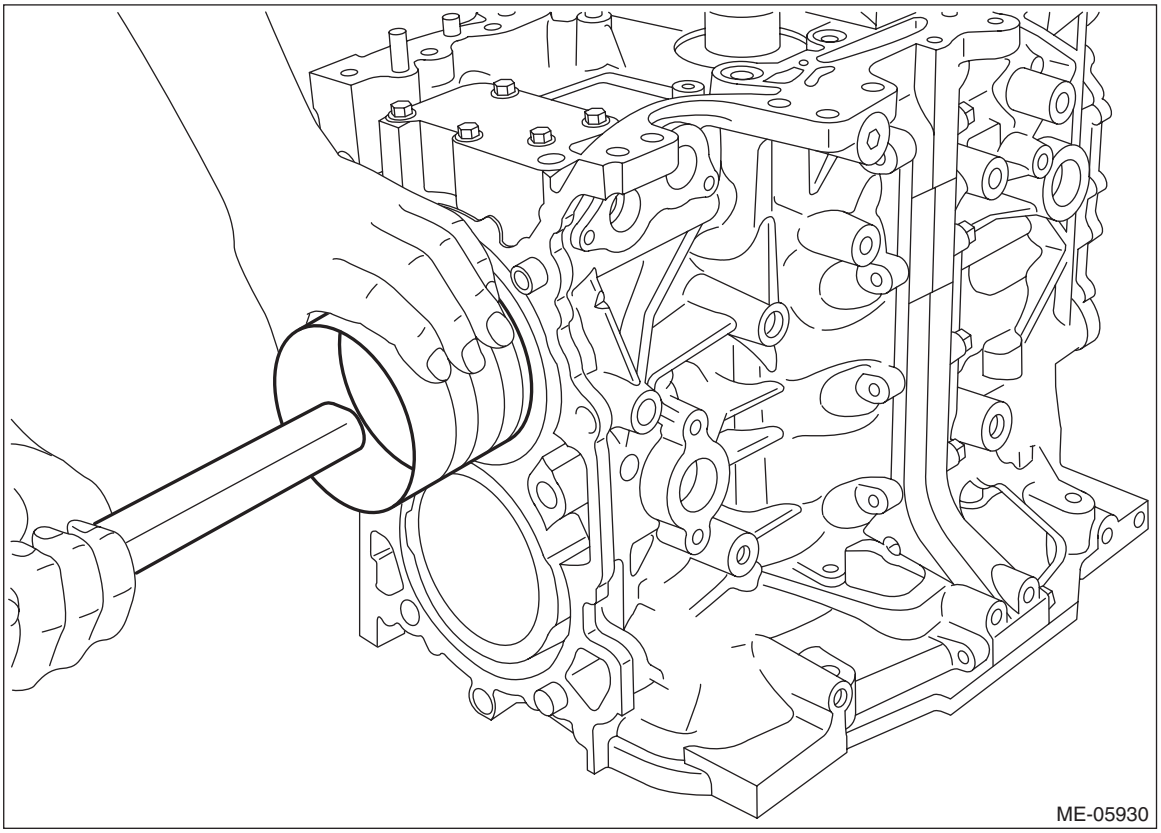
CAUTION:
• Be careful not to damage the cylinder liner and #2 pin of crankshaft by the #2 connecting rod large end.
• Be careful not to apply strong impact when inserting to prevent connecting rod bearing from falling off.

NOTE:
• Face the piston front mark (round mark) towards the front of the engine.



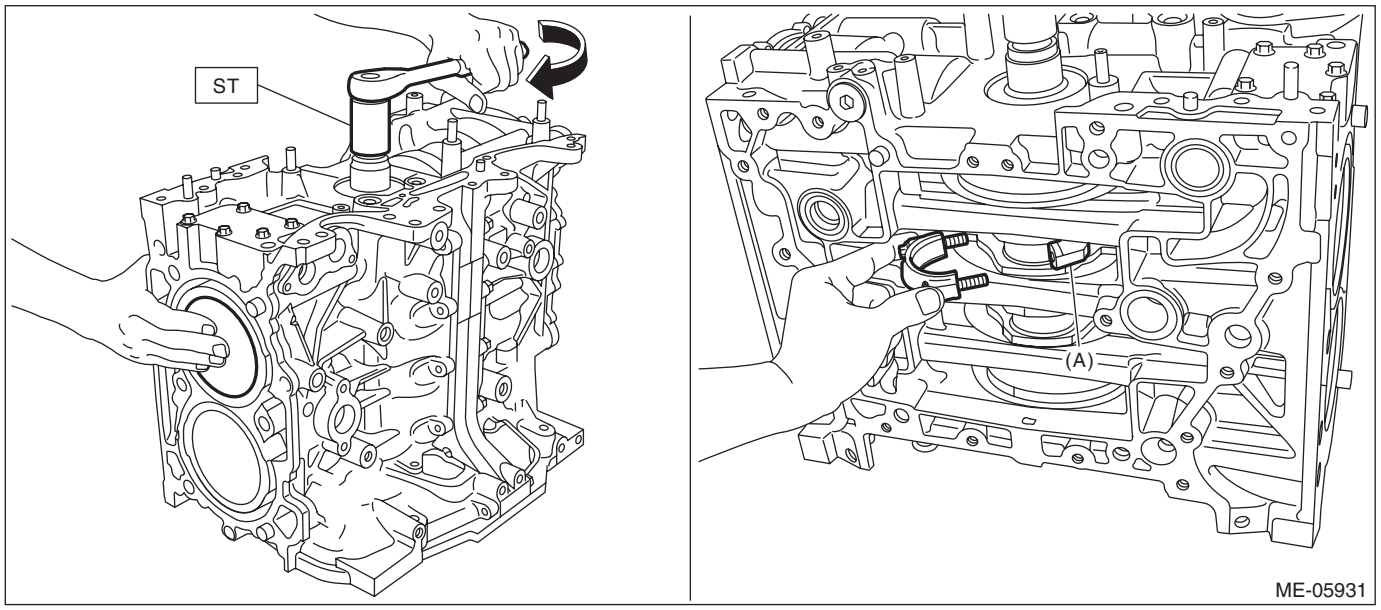
(a) Gasoline engine model (b) HEV model (c) Front mark

• Insert while lightly tapping the crown of the piston with the handle of a plastic hammer.



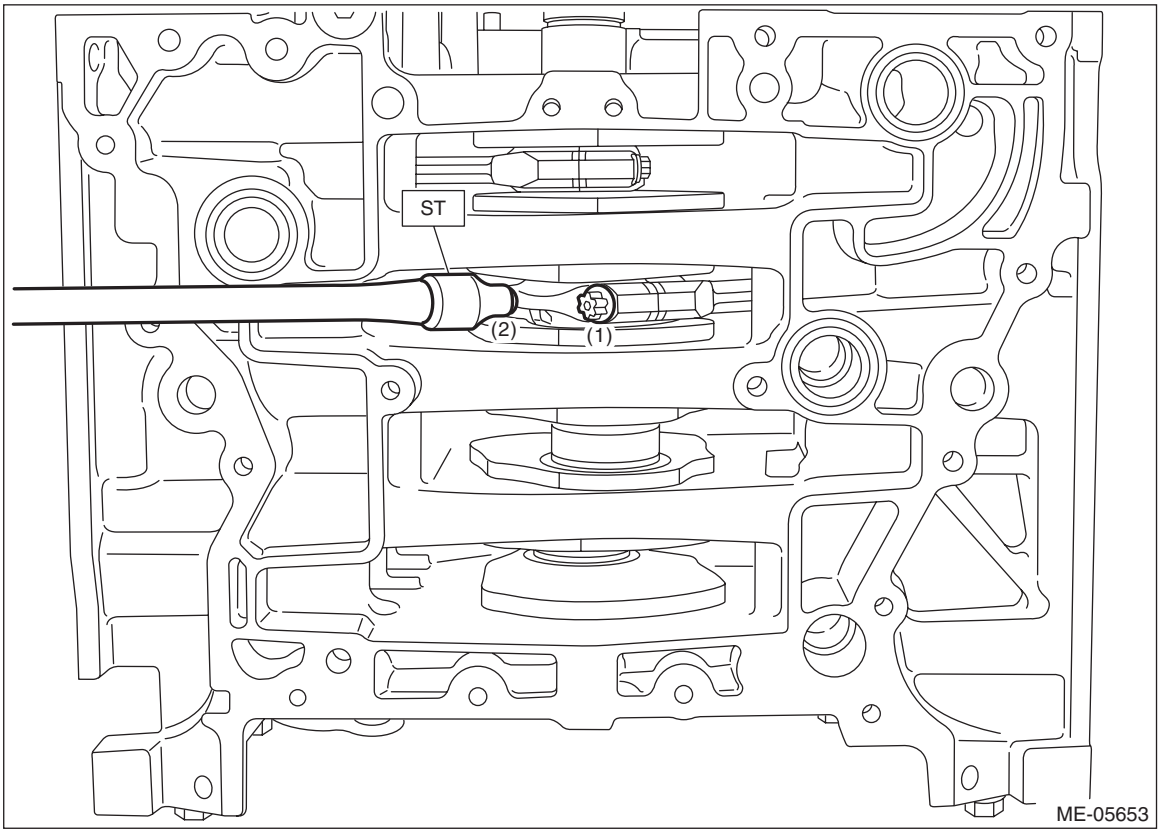
(8) Turn the crankshaft clockwise so that the #2 pin of crankshaft and the large end (A) of #2 connecting rod are positioned as shown in the figure using ST, while pressing the #2 piston crown, and then set the #2 connecting rod cap and #2 connecting rod cap bolt.

NOTE:
• Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching symbol.
• Use a new connecting rod cap bolt.
• Apply a coat of engine oil to the #2 connecting rod cap seat and the connecting rod cap bolt threads.
ST 18252AA000 CRANKSHAFT SOCKET



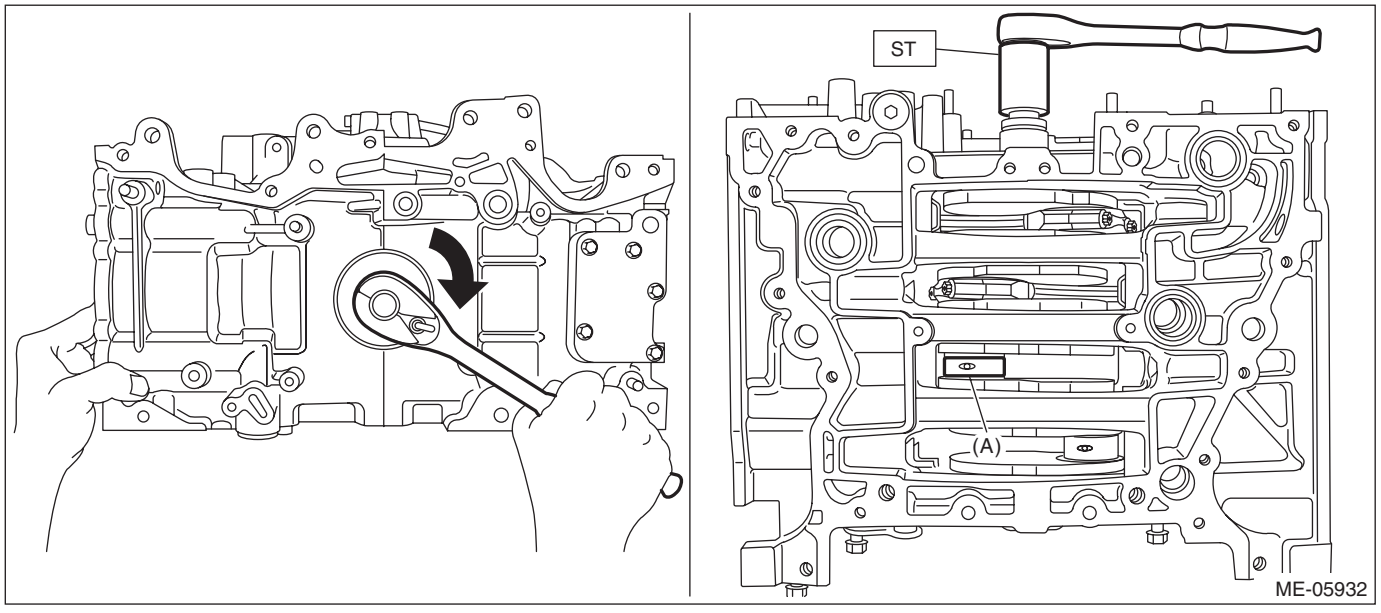
(9) Using ST, tighten the #2 connecting rod cap bolts to 10 N·m (1.0 kgf-m, 7.4 ft-lb) in numerical order as shown in the figure, then retighten the bolts to 22 N·m (2.2 kgf-m, 16.2 ft-lb) in numerical order as shown in the figure.

ST 18270AA020 SOCKET



(10) Turn the crankshaft clockwise so that the #3 pin (A) of crankshaft is positioned at TDC using ST.

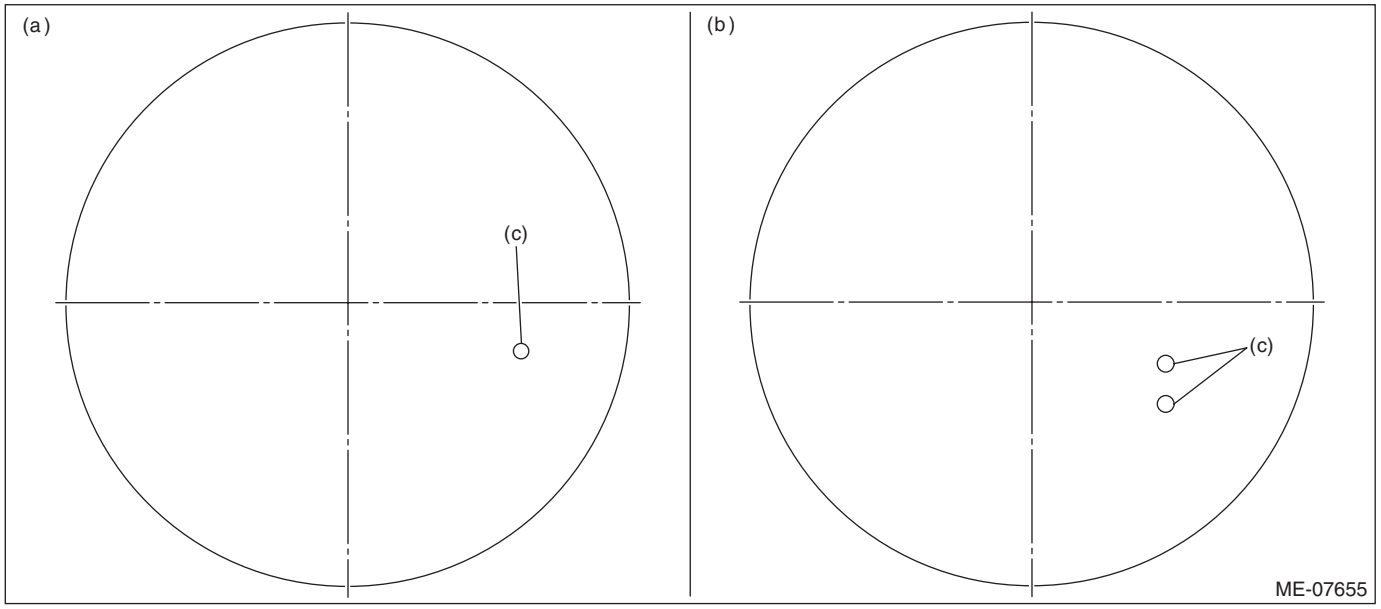
ST 18252AA000 CRANKSHAFT SOCKET



(11) Compress the piston ring using piston ring compressor, and insert the #3 connecting rod with #3 piston into cylinder block.

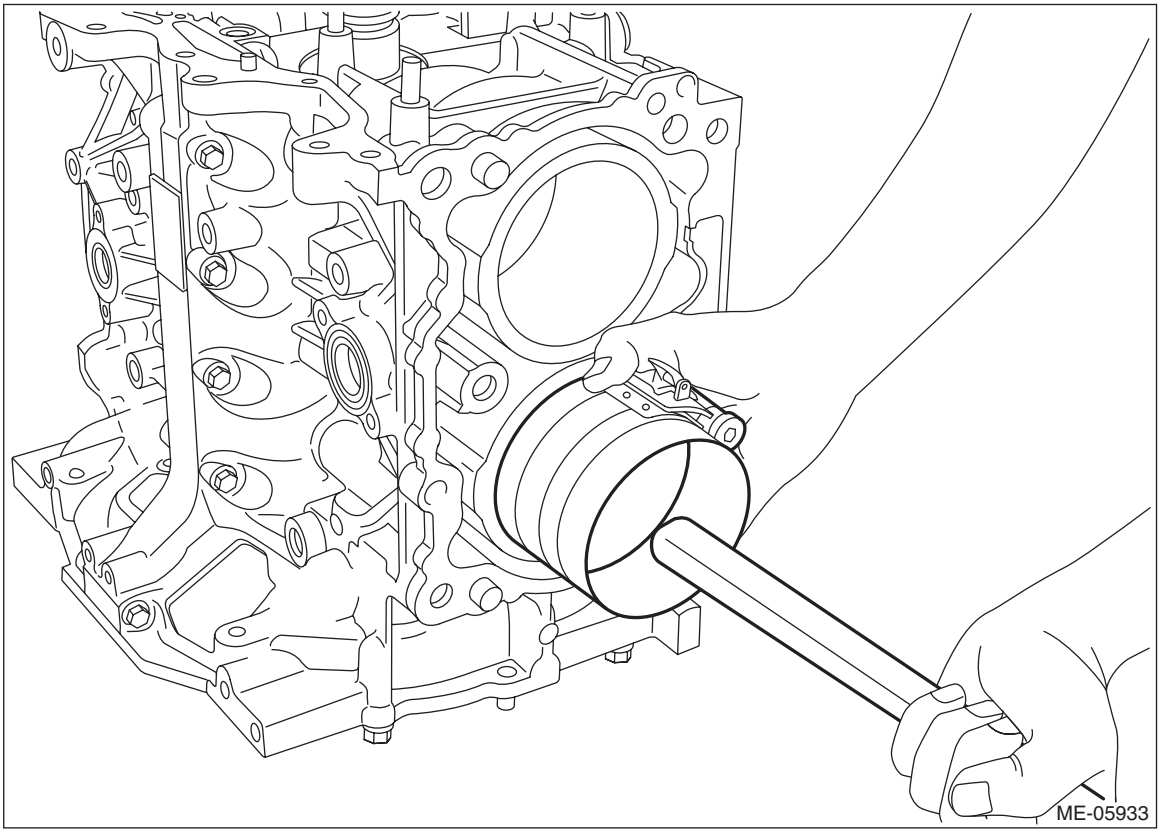
CAUTION:
• Be careful not to damage the cylinder liner and #3 pin of crankshaft by the #3 connecting rod large end.
• Be careful not to apply strong impact when inserting to prevent connecting rod bearing from falling off.

NOTE:
• Face the piston front mark (round mark) towards the front of the engine.



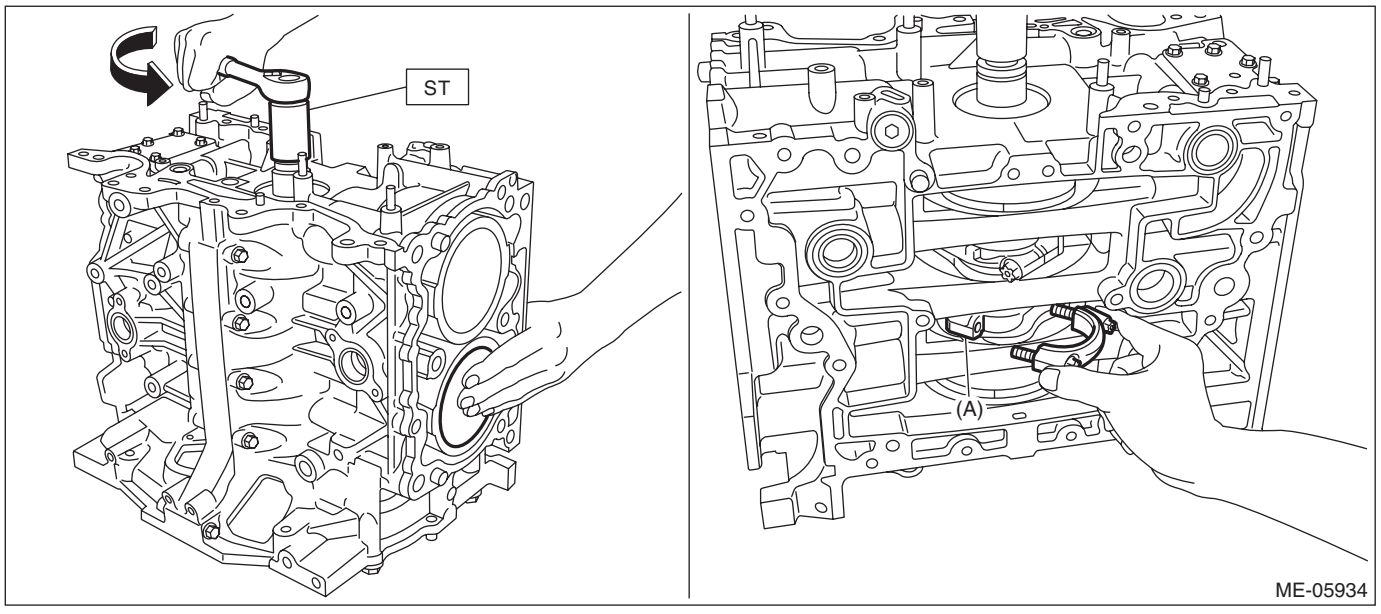
(a) Gasoline engine model (b) HEV model (c) Front mark

• Insert while lightly tapping the crown of the piston with the handle of a plastic hammer.



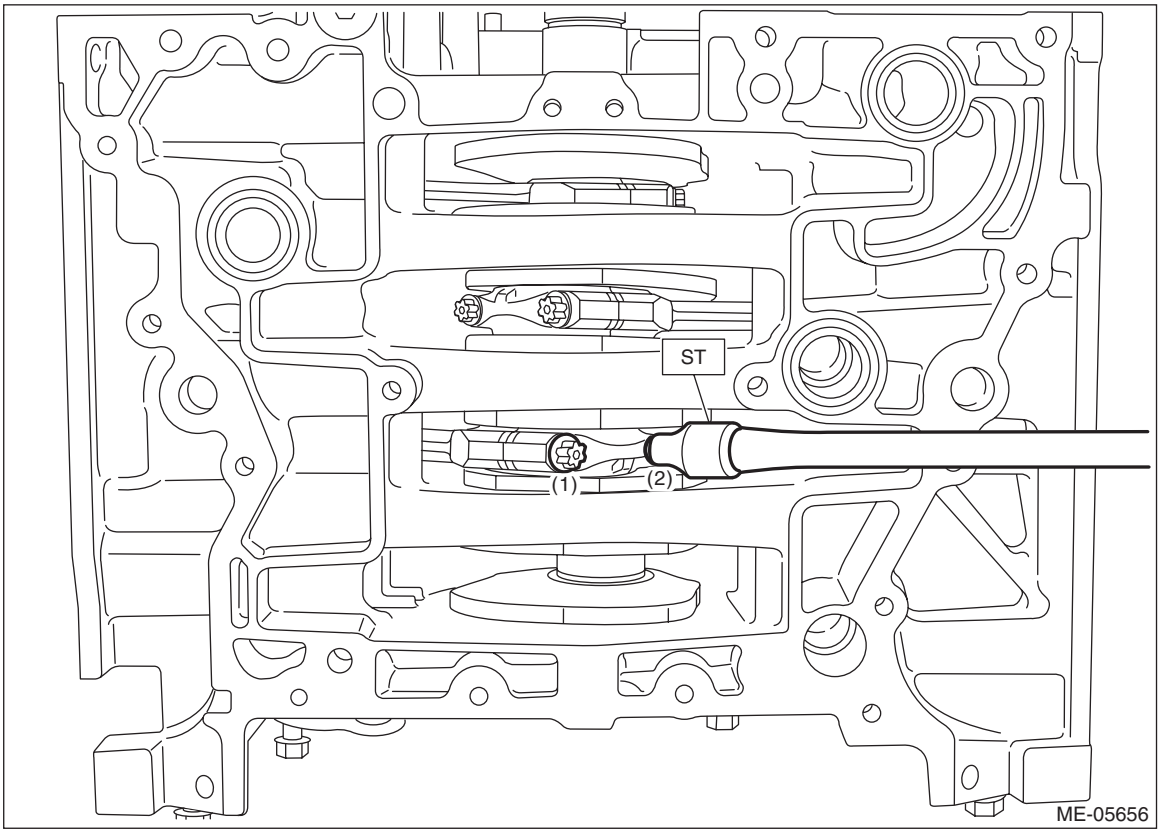
(12) Turn the crankshaft counterclockwise so that the #3 pin of crankshaft and the large end (A) of #3 connecting rod are positioned as shown in the figure using ST, while pressing the #3 piston crown, and then set the #3 connecting rod cap and #3 connecting rod cap bolt.

NOTE:
• Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching symbol.
• Use a new connecting rod cap bolt.
• Apply a coat of engine oil to the #3 connecting rod cap seat and the connecting rod cap bolt threads.
ST 18252AA000 CRANKSHAFT SOCKET



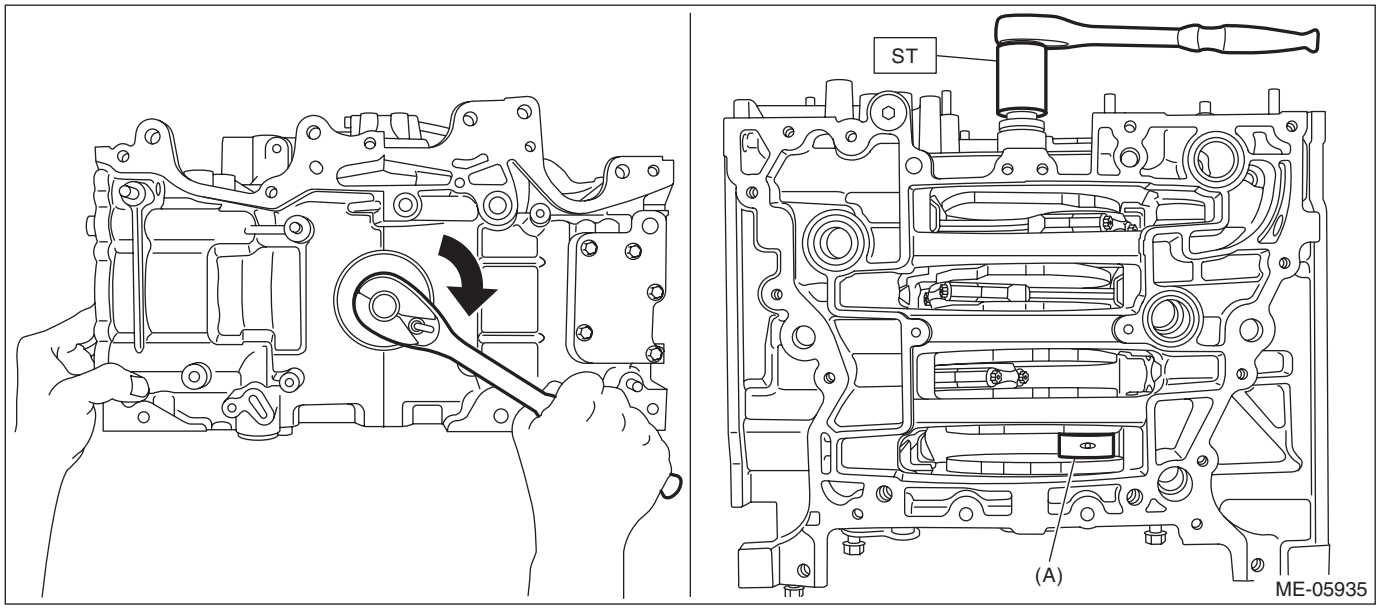
(13) Using ST, tighten the #3 connecting rod cap bolts to 10 N·m (1.0 kgf-m, 7.4 ft-lb) in numerical order as shown in the figure, then retighten the bolts to 22 N·m (2.2 kgf-m, 16.2 ft-lb) in numerical order as shown in the figure.

ST 18270AA020 SOCKET



(14) Turn the crankshaft clockwise so that the #4 pin (A) of crankshaft is positioned at TDC using ST.

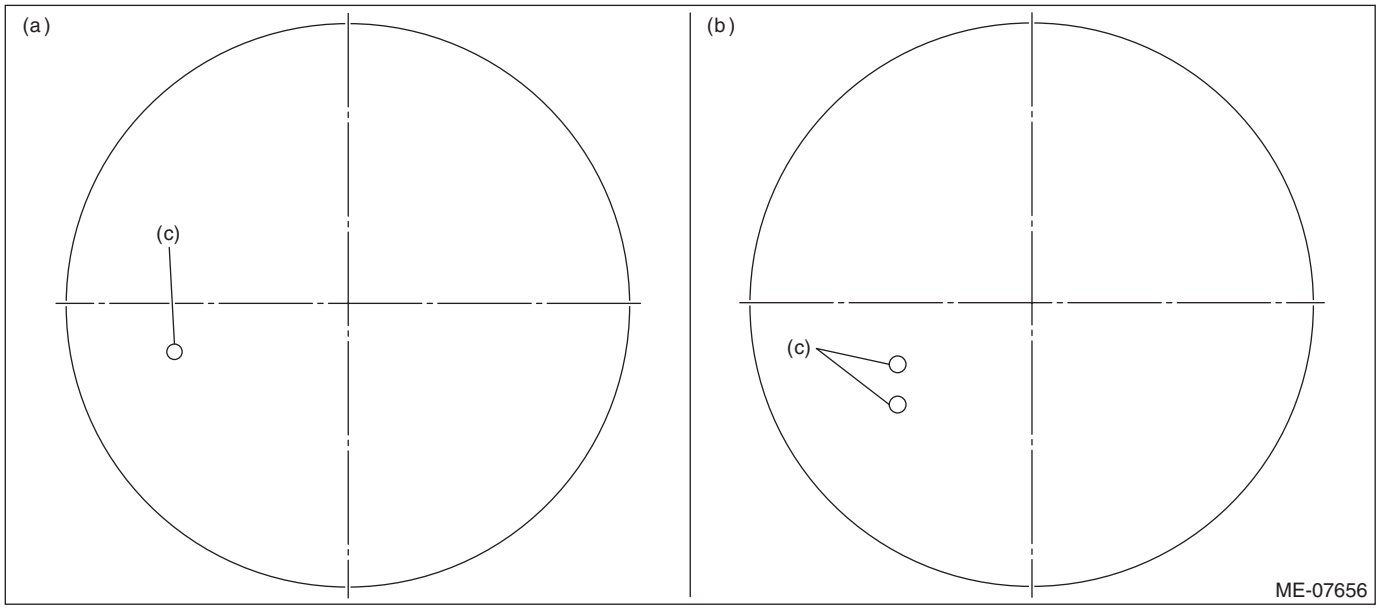
ST 18252AA000 CRANKSHAFT SOCKET



(15) Compress the piston ring using piston ring compressor, and insert the #4 connecting rod with #4 piston into cylinder block.

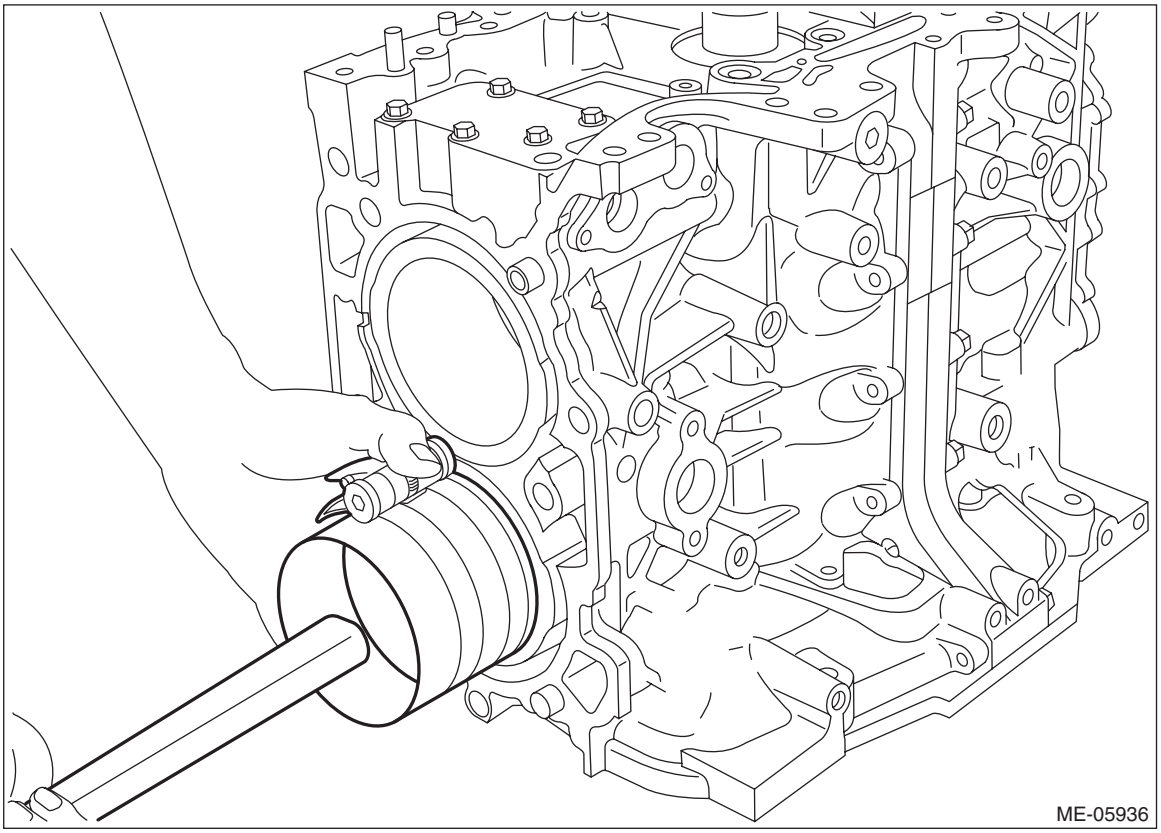
CAUTION:
• Be careful not to damage the cylinder liner and #4 pin of crankshaft by the #4 connecting rod large end.
• Be careful not to apply strong impact when inserting to prevent connecting rod bearing from falling off.

NOTE:
• Face the piston front mark (round mark) towards the front of the engine.



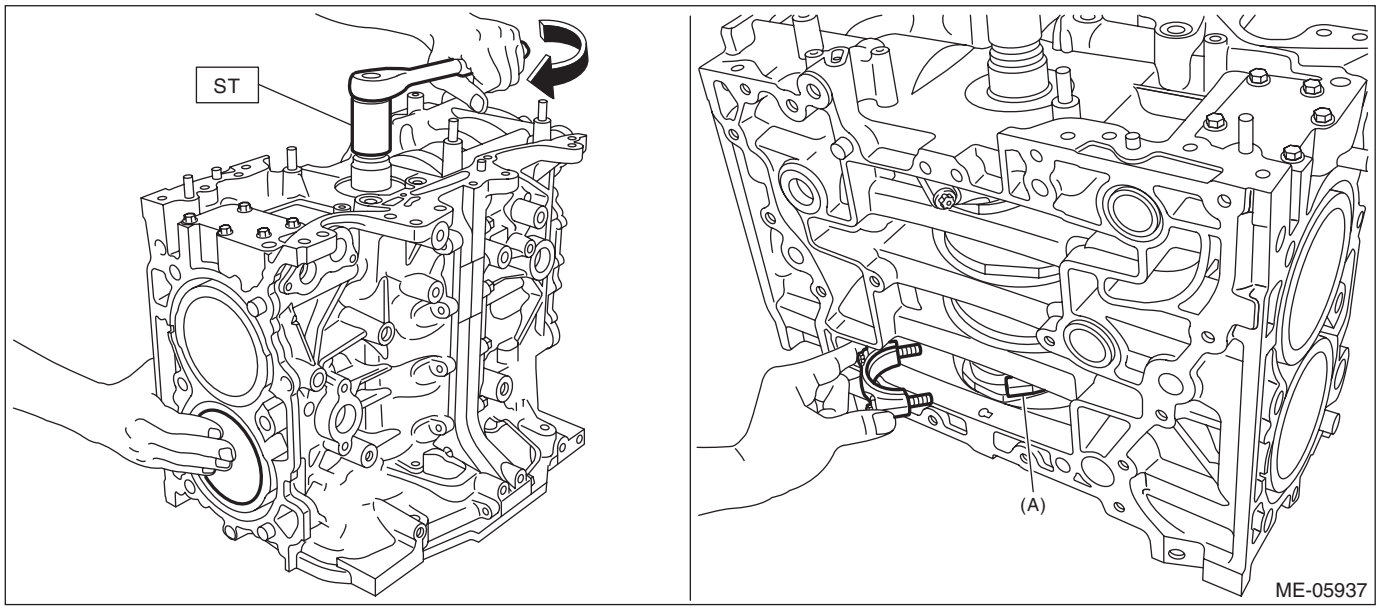
(a) Gasoline engine model (b) HEV model (c) Front mark

• Insert while lightly tapping the crown of the piston with the handle of a plastic hammer.



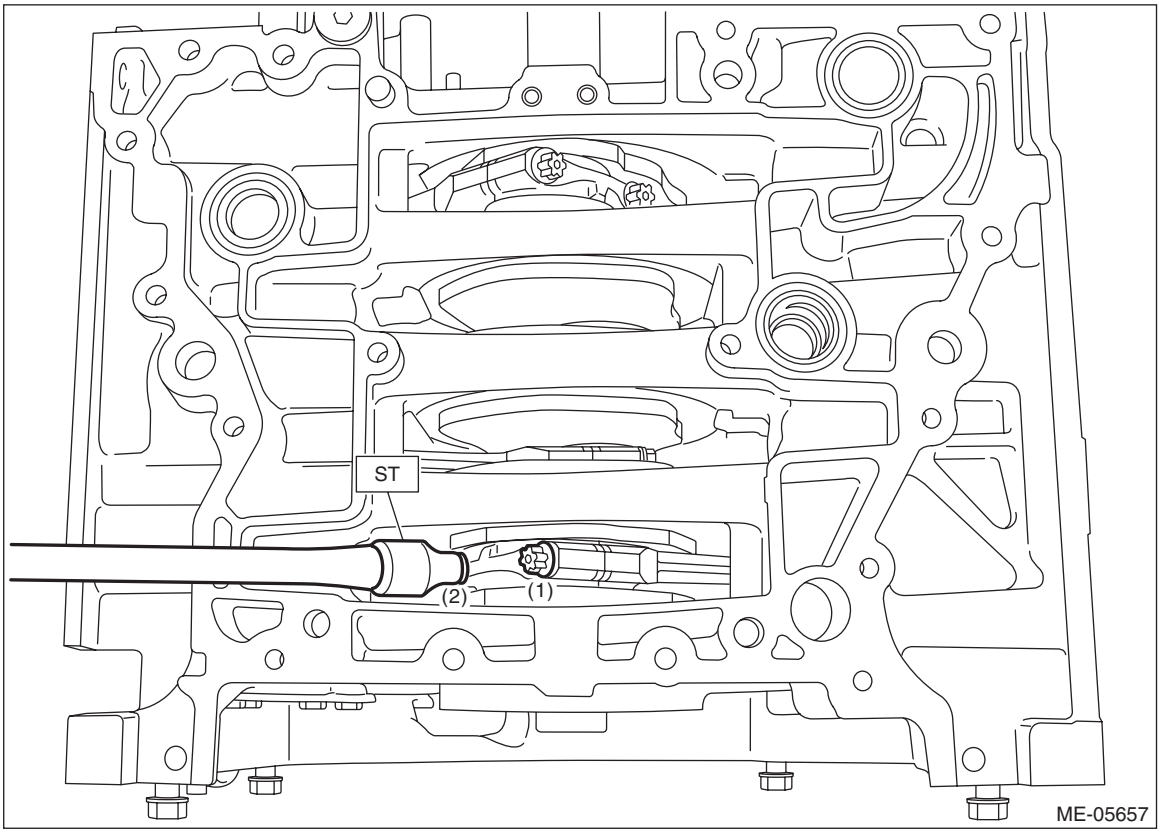
(16) Turn the crankshaft clockwise so that the #4 pin of crankshaft and the large end (A) of #4 connecting rod are positioned as shown in the figure using ST, while pressing the #4 piston crown, and then set the #4 connecting rod cap and #4 connecting rod cap bolt.

NOTE:
• Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching symbol.
• Use a new connecting rod cap bolt.
• Apply a coat of engine oil to the #4 connecting rod cap seat and the connecting rod cap bolt threads.
ST 18252AA000 CRANKSHAFT SOCKET



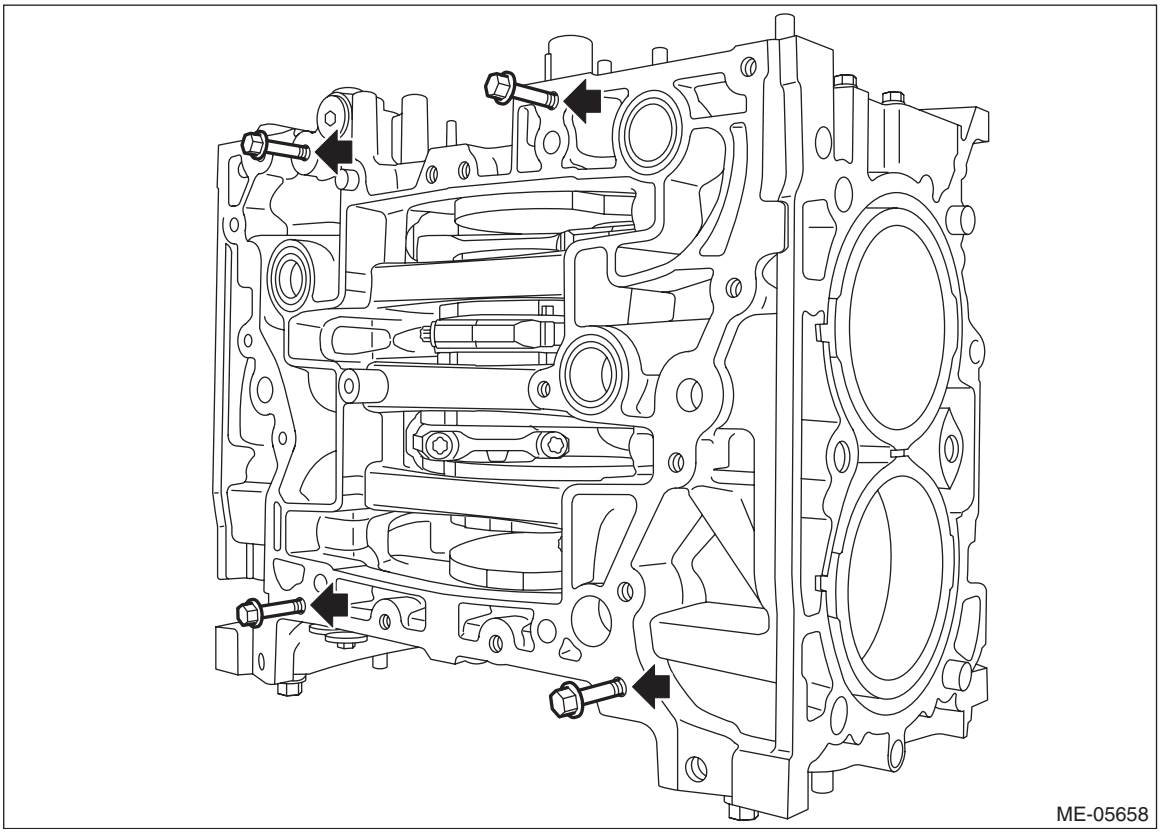
(17) Using ST, tighten the #4 connecting rod cap bolts to 10 N·m (1.0 kgf-m, 7.4 ft-lb) in numerical order as shown in the figure, then retighten the bolts to 22 N·m (2.2 kgf-m, 16.2 ft-lb) in numerical order as shown in the figure.

ST 18270AA020 SOCKET



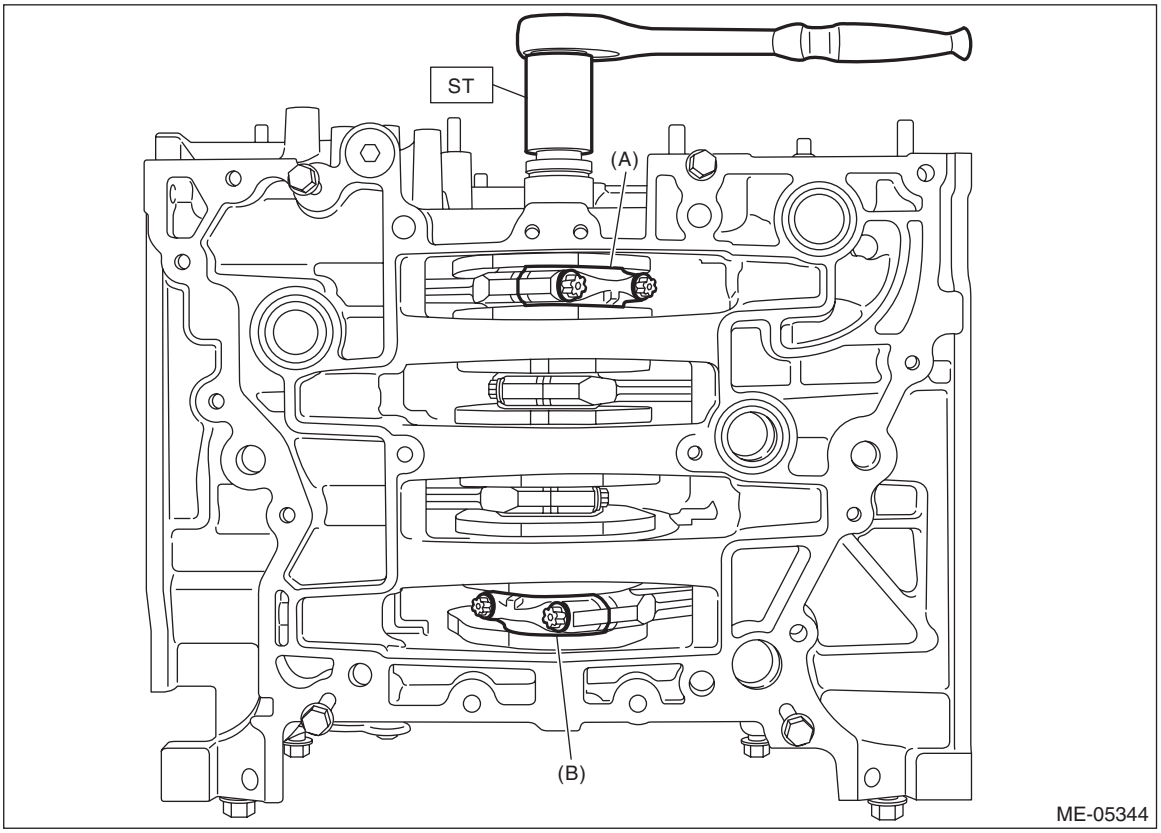
(18) Install the cam carrier mounting bolts at the locations shown in the figure.

NOTE:
This procedure is required to tighten the connecting rod cap bolts with specified angle using ST.



(19) Turn the crankshaft so that the #1 connecting rod cap (A) and #4 connecting rod cap (B) is located at the position shown in the figure using ST.

ST 18252AA000 CRANKSHAFT SOCKET

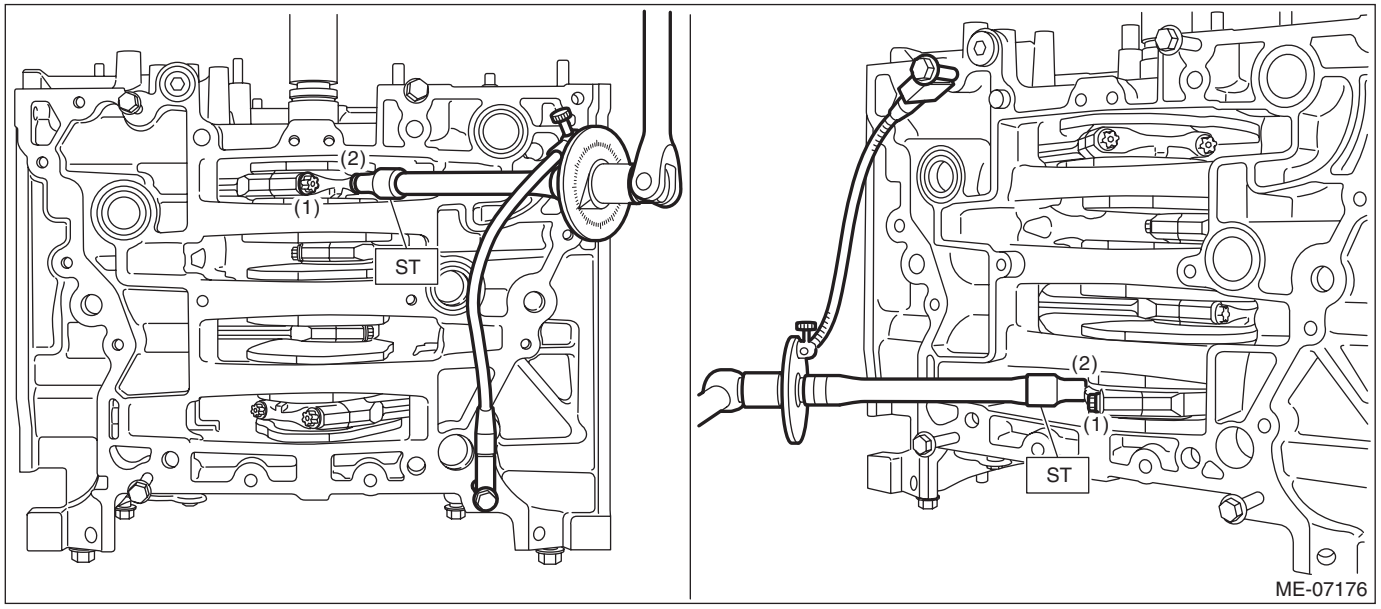


(20) Using ST and angle gauge, tighten the #1 connecting rod cap bolts and #4 connecting rod cap bolts with specified angle in numerical order as shown in the figure.

ST 18270AA020 SOCKET

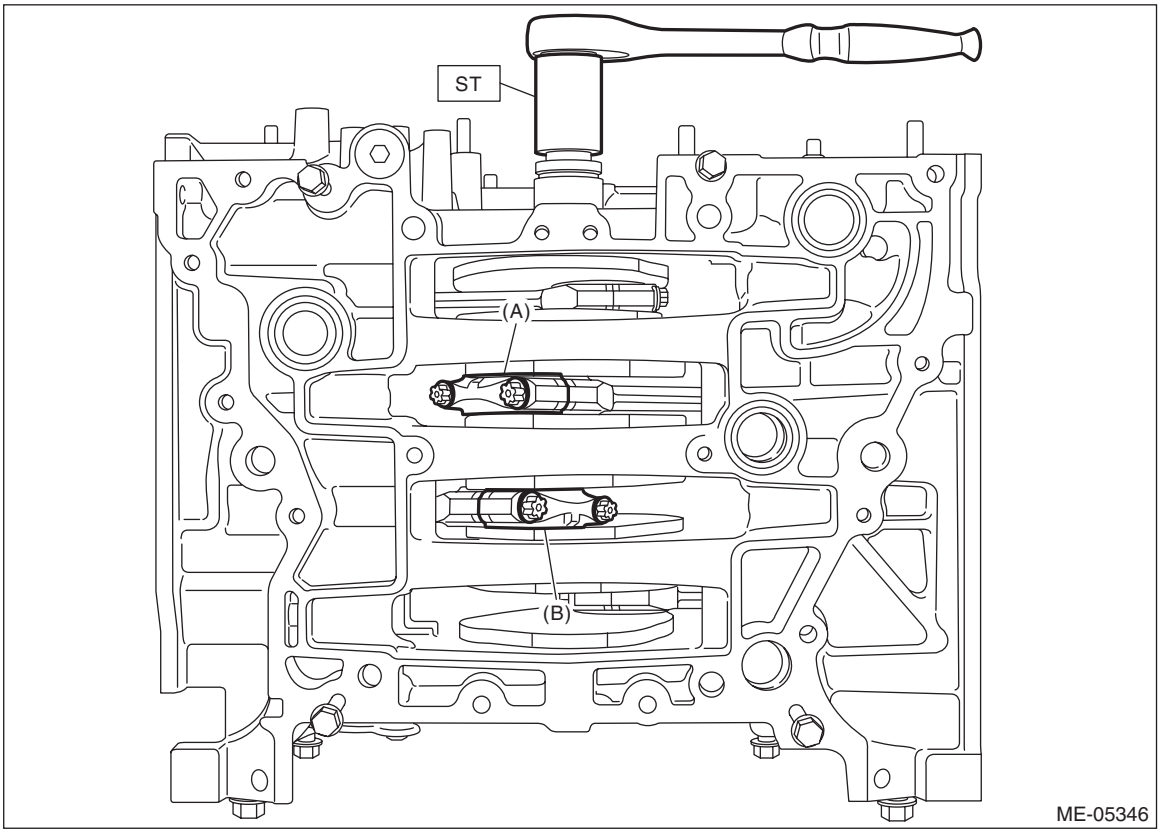
Tightening angle:

137°+3° –2°



(21) Turn the crankshaft so that the #2 connecting rod cap (A) and #3 connecting rod cap (B) is located at the position shown in the figure using ST.

ST 18252AA000 CRANKSHAFT SOCKET

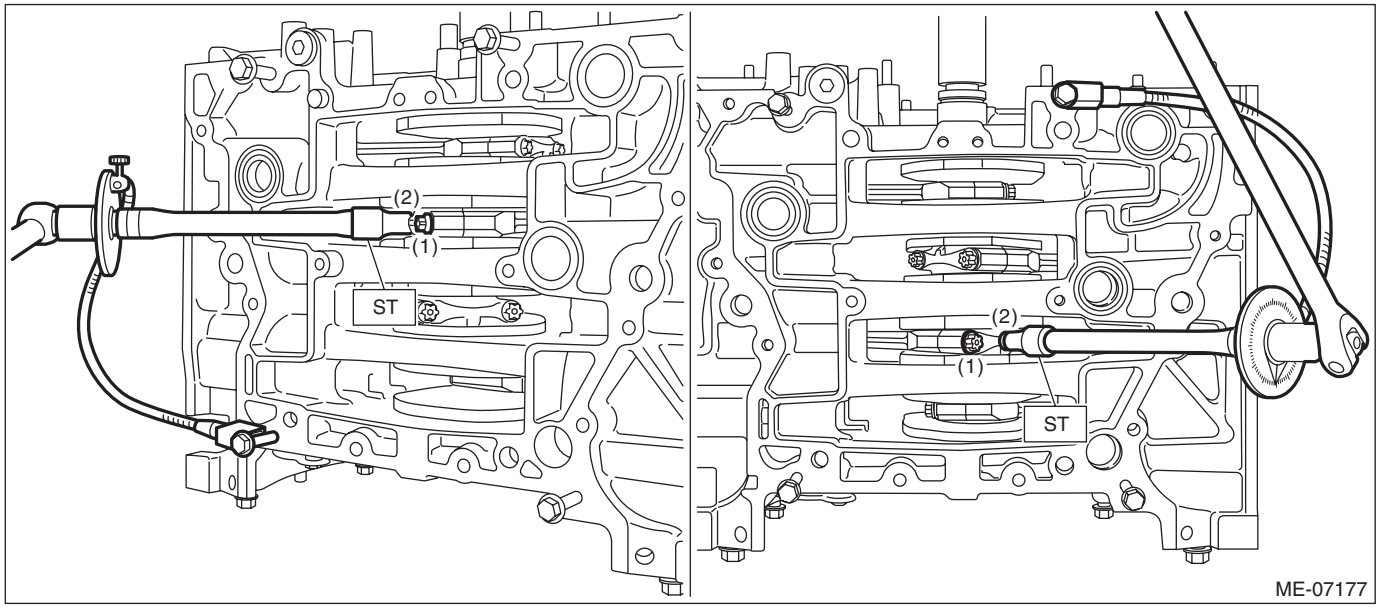


(22) Using ST and angle gauge, tighten the #2 connecting rod cap bolts and #3 connecting rod cap bolts with specified angle in numerical order as shown in the figure.

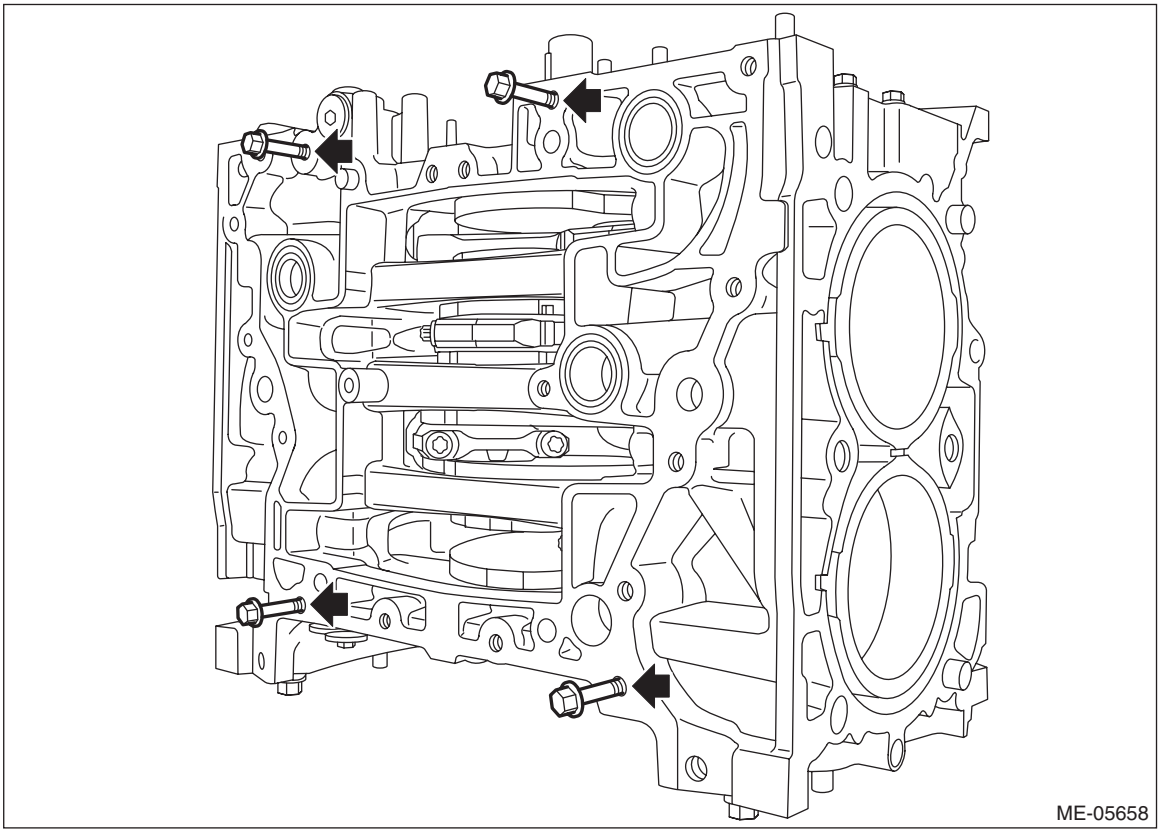
ST 18270AA020 SOCKET

Tightening angle:

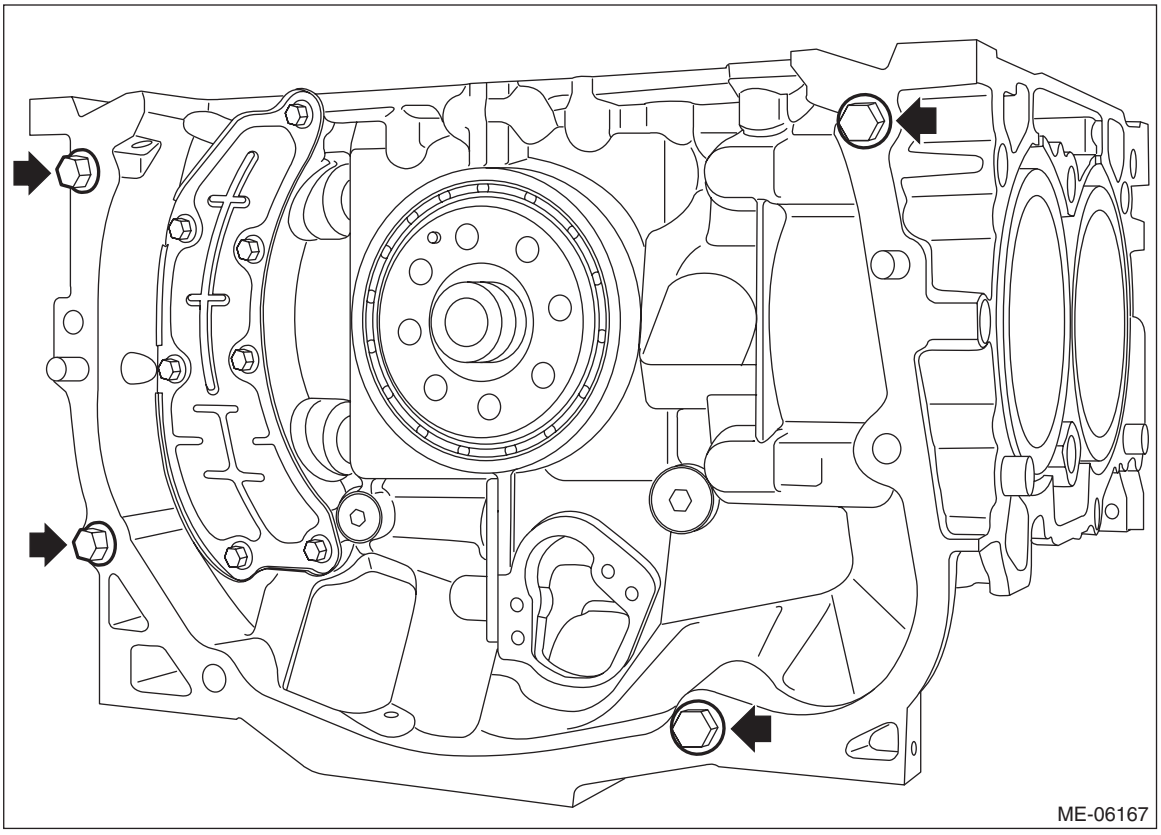
137°+3° –2°



(23) Remove the cam carrier mounting bolts attached at the locations shown in the figure.



13) Set the cylinder block so that the oil pan side faces upward, and remove the mounting bolts attached to the locations shown in the figure.

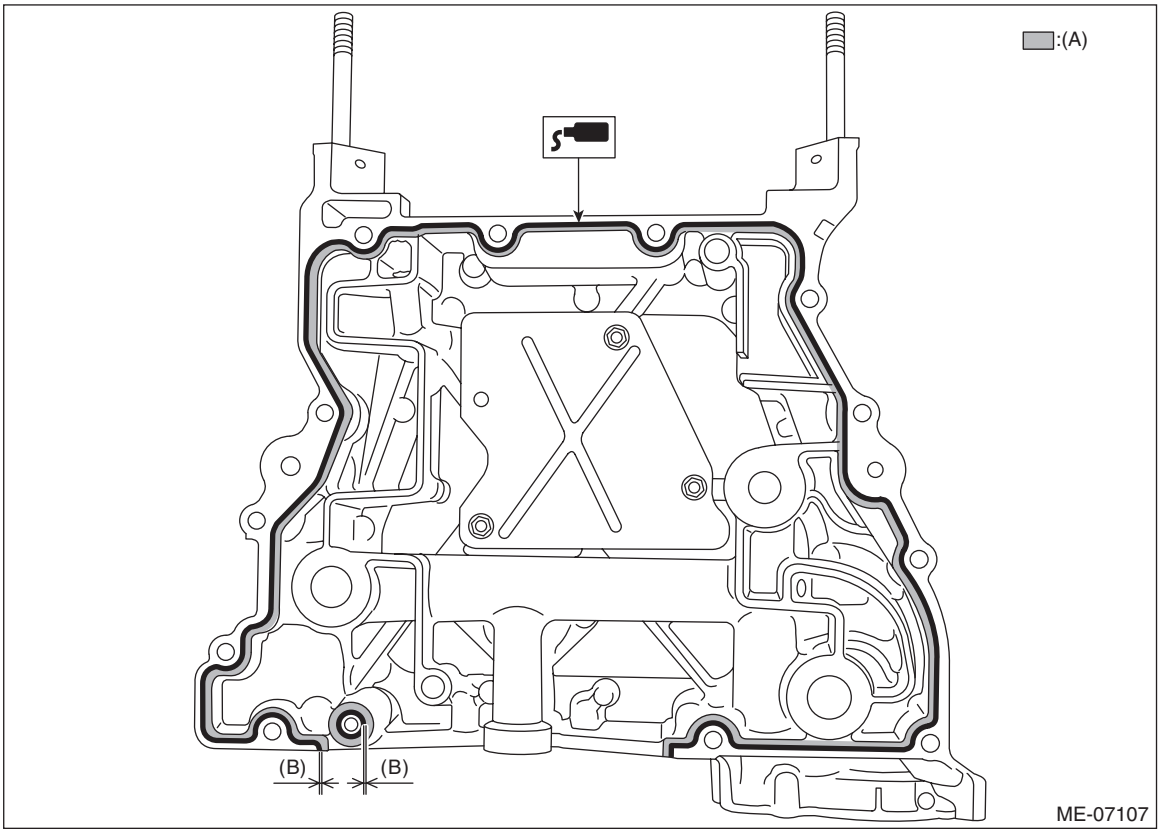


14) Install the oil pan upper with oil pan to the cylinder block.
(1) Apply liquid gasket to the mating surface of oil pan upper as shown in the figure.

NOTE:
• Before applying liquid gasket, degrease the old liquid gasket seal surface of the cylinder block and the oil pan upper.
• Install within 5 min. after applying liquid gasket.
• Apply liquid gasket 1.5 mm (0.0591 in) outside from the chamfer surface. However, application of liquid gasket on the chamfer surface around the bolt hole is allowed.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

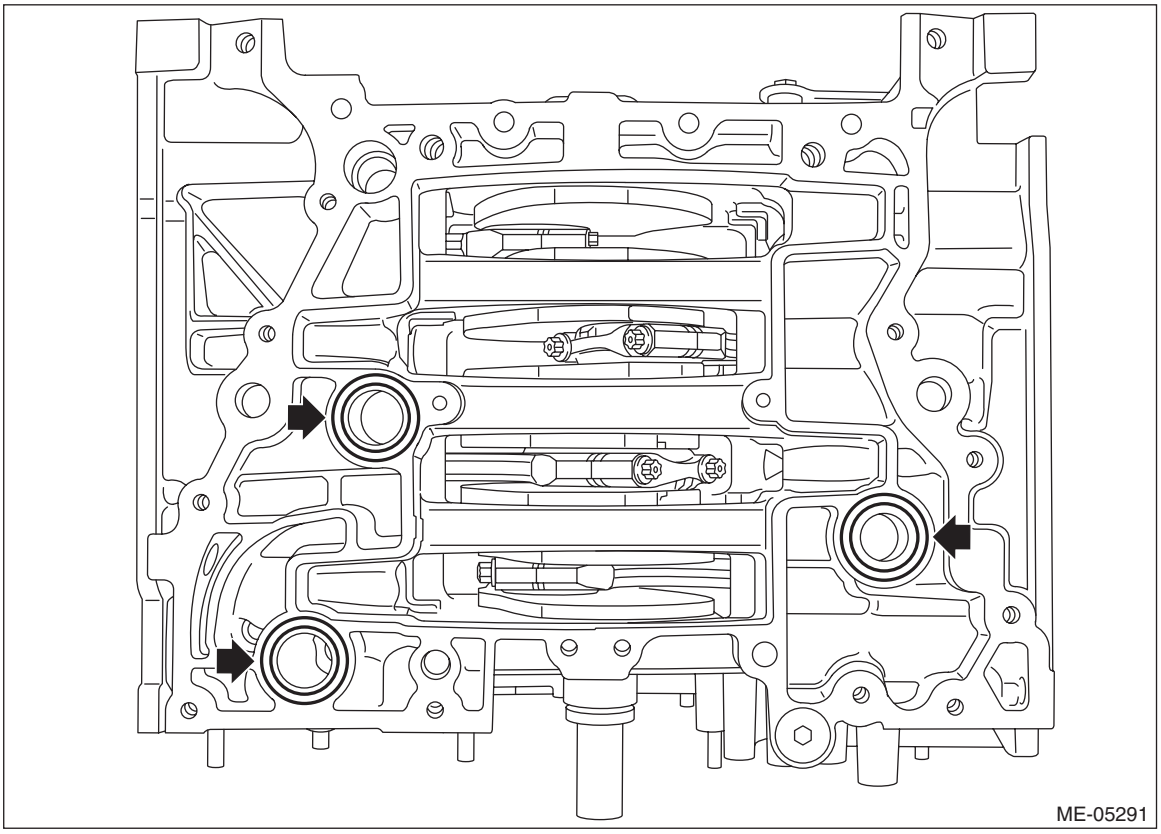
Liquid gasket applying diameter:
5±1 mm (0.1969±0.0394 in)



(A) Chamfer surface (B) 1.5 mm (0.0591 in)

(2) Install the O-ring to the cylinder block.

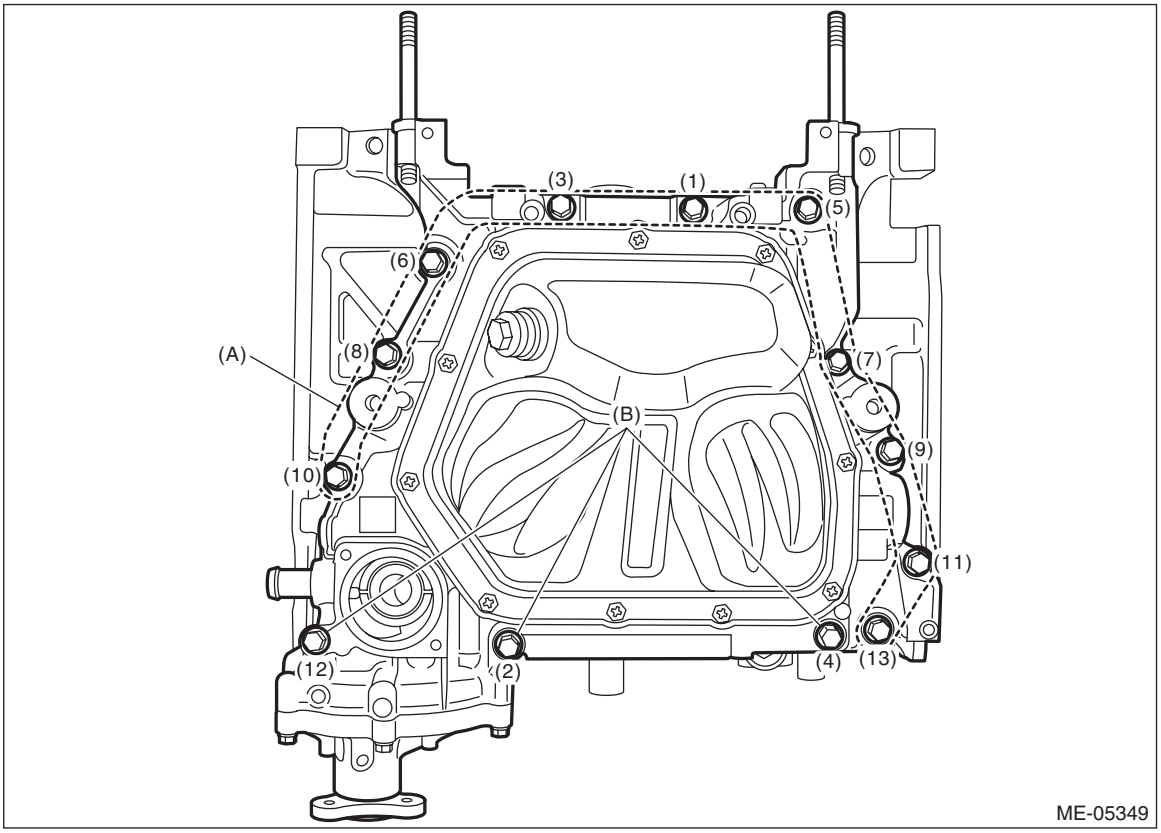
NOTE:
Use new O-rings.



(3) Set the oil pan with oil pan upper to the cylinder block, and tighten the bolts in numerical order as shown in the figure.

NOTE:
After tightening, if the liquid gasket is squeezed out onto the seal surface of the chain cover, completely remove any squeezed-out liquid gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

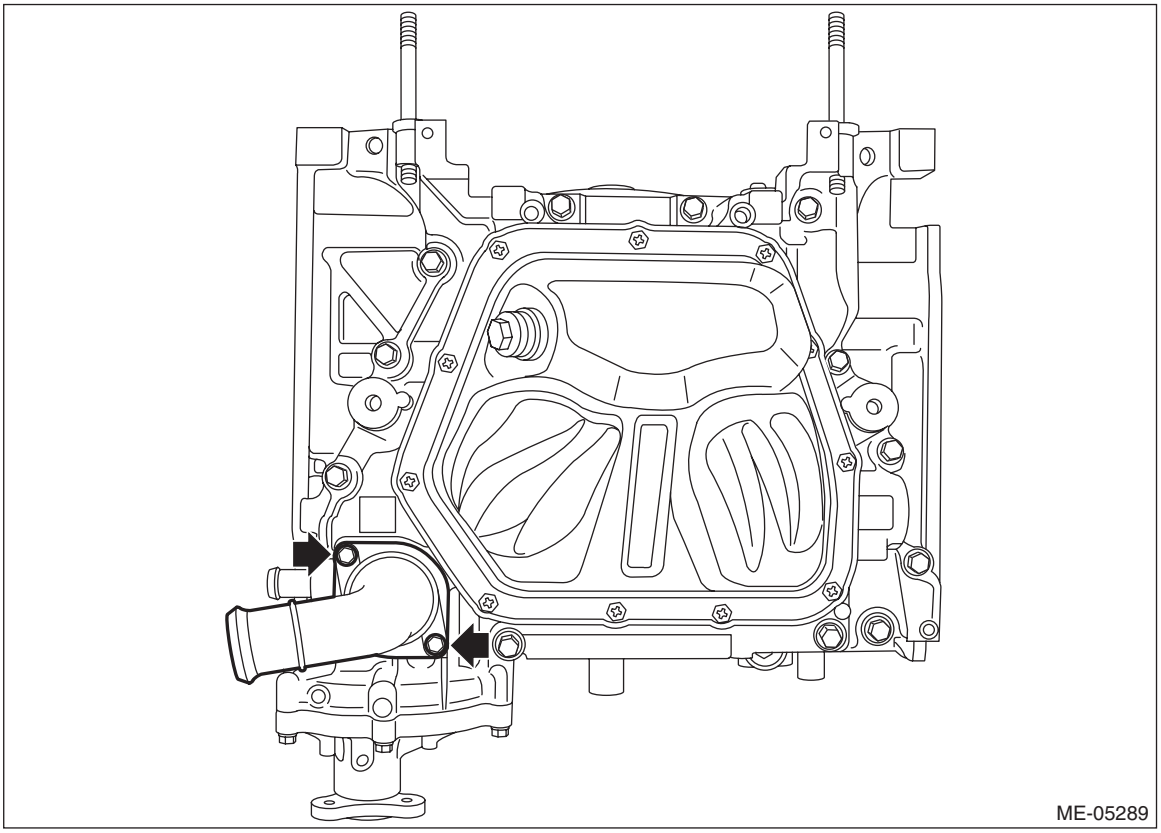


(A) M8 × 25 (B) M8 × 75

15) Set the thermostat to the oil pan upper, and install the thermostat cover.

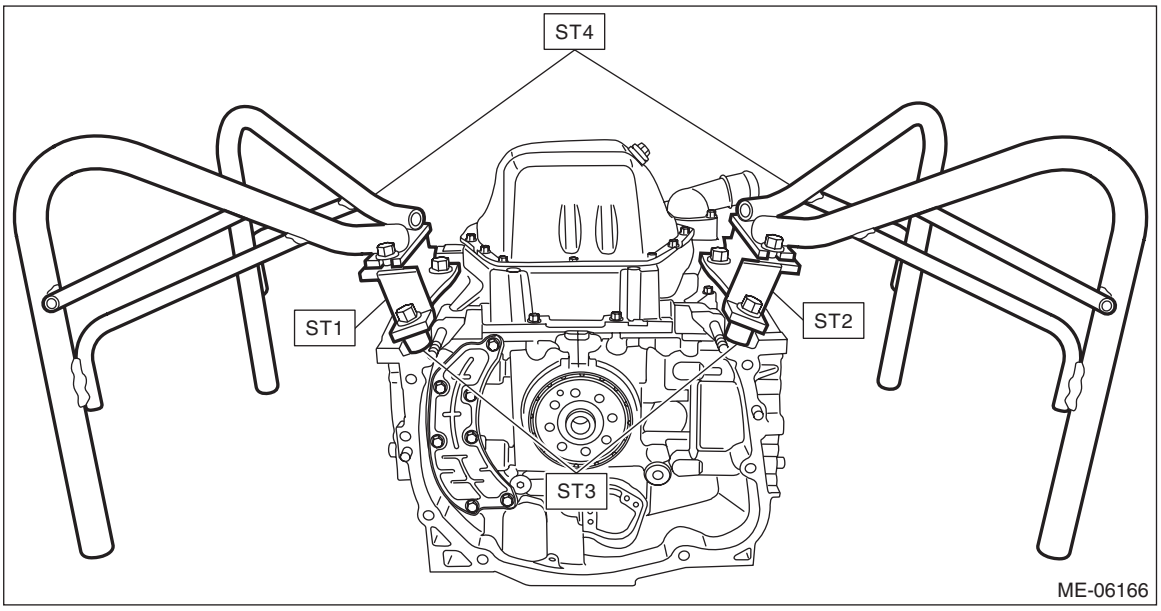
NOTE:
Use a new gasket.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

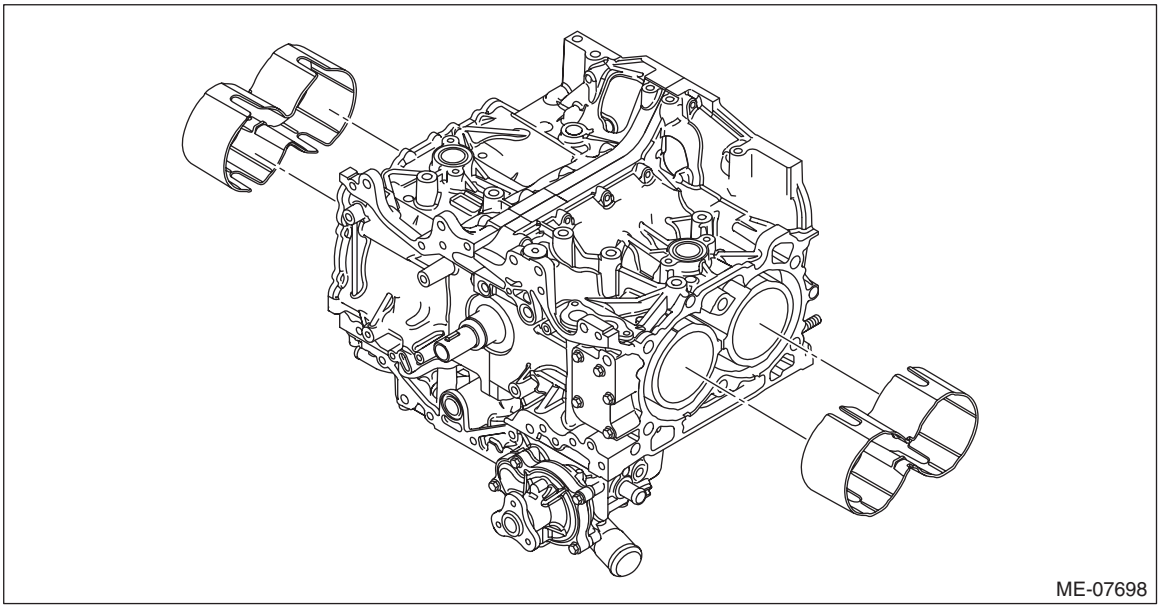


16) Install the ST1, ST2, ST3 and ST4 to the cylinder block and oil pan upper.
ST1 498457000 ENGINE STAND ADAPTER RH
ST2 498457100 ENGINE STAND ADAPTER LH
ST3 18362AA020 ADAPTER
ST4 499817100 ENGINE STAND

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)

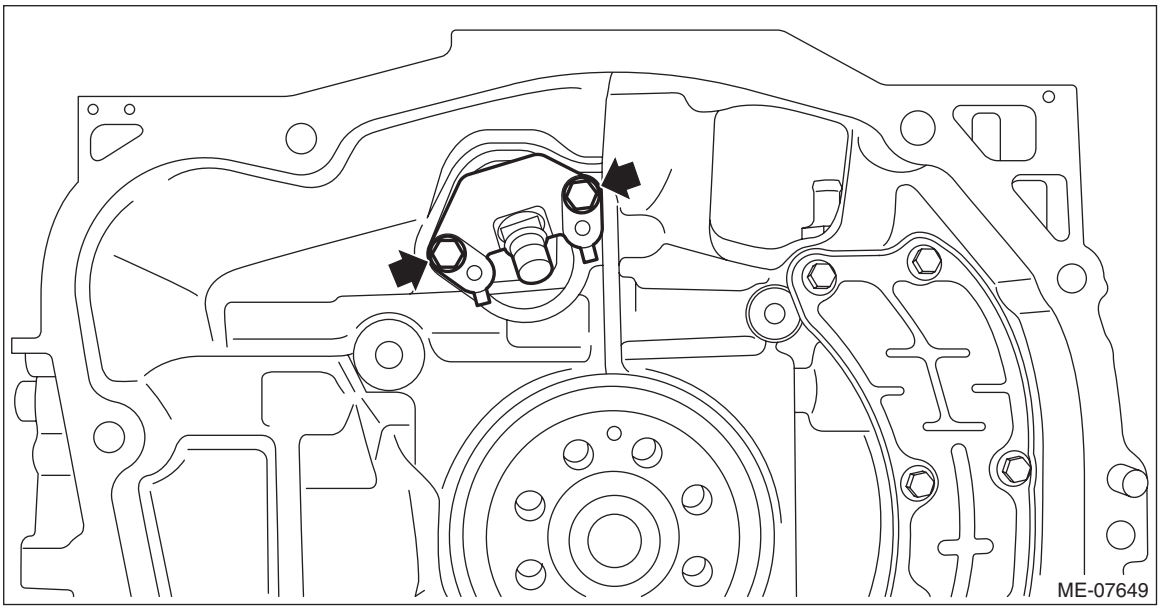


17) Install the water jacket spacer to the cylinder block RH and cylinder block LH.



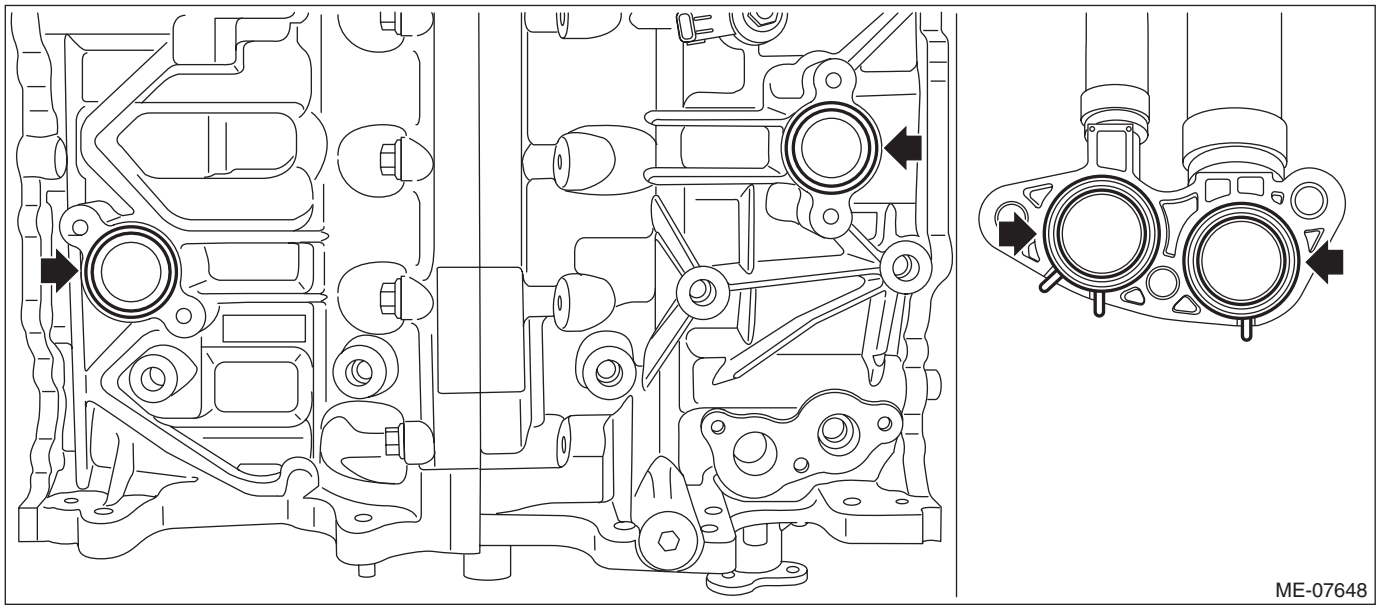
18) Install the crankshaft position sensor with crankshaft position sensor holder to the cylinder block LH.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



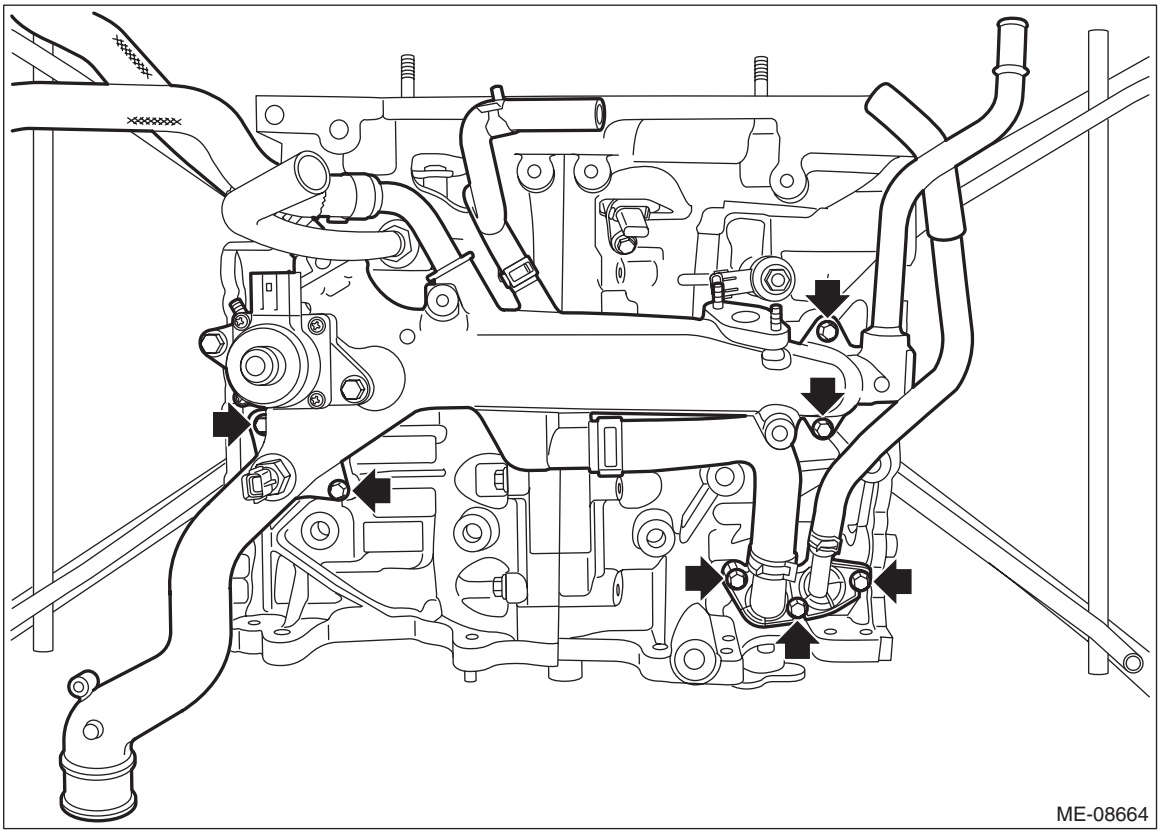
19) Install the crankshaft position sensor plate with drive plate. (CVT model) <Ref. to CVT(TR580)-166, INSTALLATION, Drive Plate.> <Ref. to CVT(TH58A)-176, INSTALLATION, Drive Plate.>
20) Install the crankshaft position sensor plate with flywheel. (MT model) <Ref. to CL-13, INSTALLATION, Flywheel.>
21) Install the clutch disc and cover. (MT model) <Ref. to CL-10, INSTALLATION, Clutch Disc and Cover.>
22) Install the PCV valve. <Ref. to EC(H4DO(w/o HEV))-67, INSTALLATION, PCV Valve.> <Ref. to EC(H4DO(HEV))-54, INSTALLATION, PCV Valve.>
23) Install the knock sensor. <Ref. to FU(H4DO(w/o HEV))-70, INSTALLATION, Knock Sensor.> <Ref. to FU(H4DO(HEV))-61, INSTALLATION, Knock Sensor.>
24) Install the O-ring to the cylinder block and PCV connector.

NOTE:
Use new O-rings.

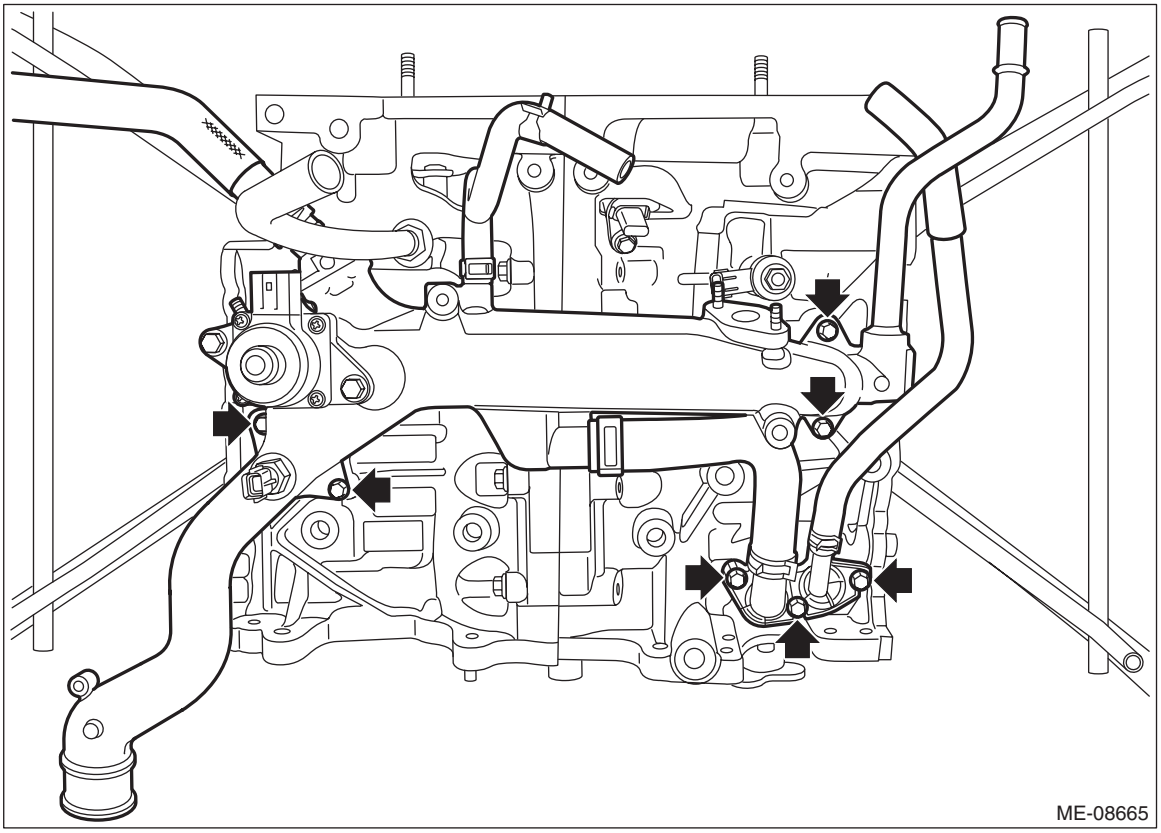


25) Set the water pipe assembly, PCV connector and brake vacuum pipe (HEV model) to the cylinder block, and install the bolts which secure the water pipe assembly and PCV connector to the cylinder block.

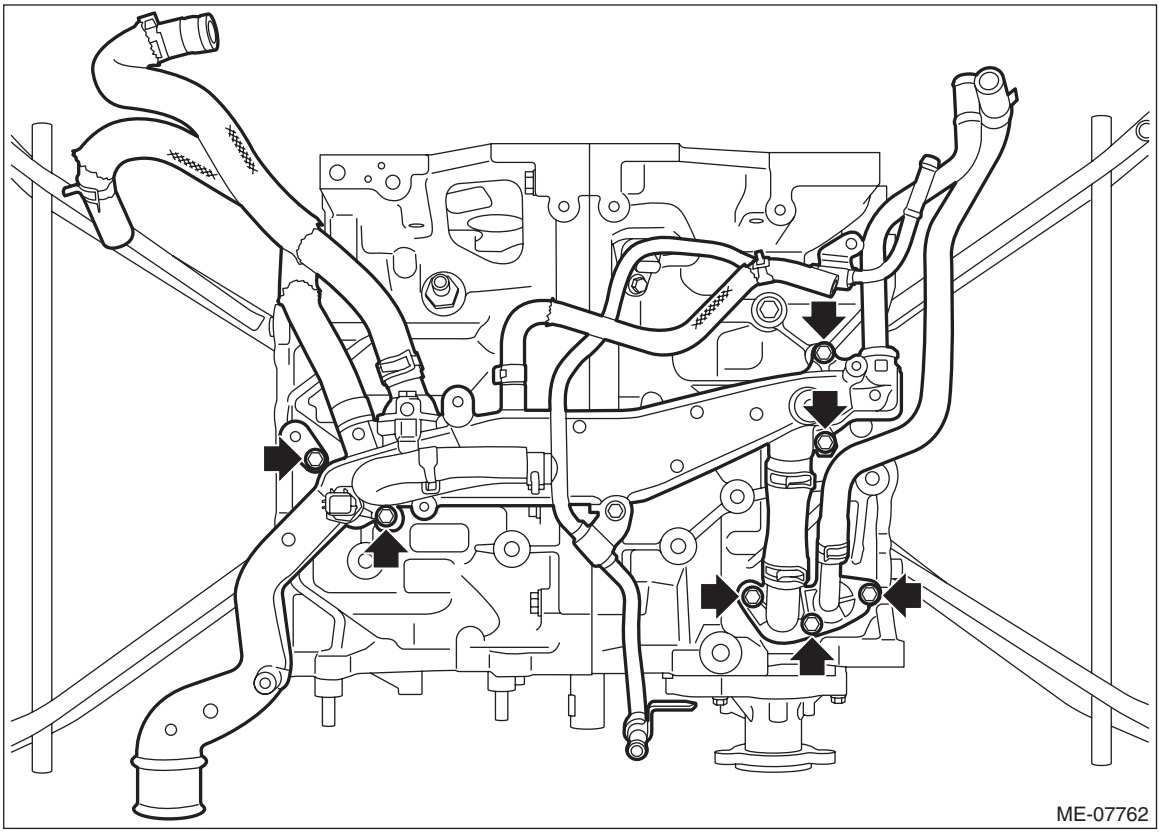
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
- Gasoline engine CVT model



- Gasoline engine MT model

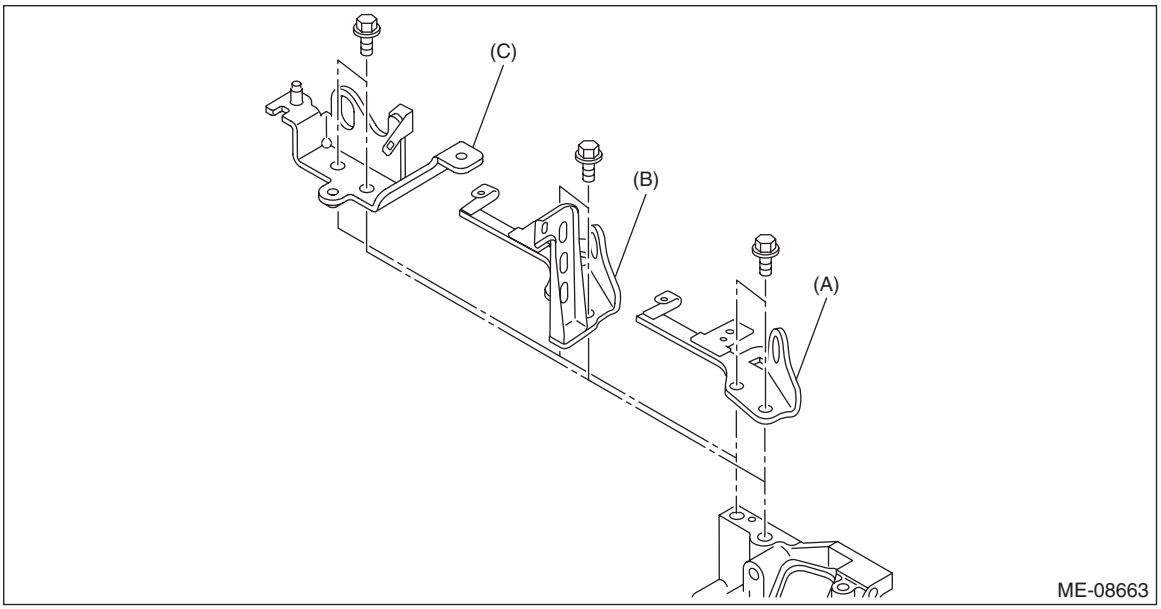


- HEV model



26) Install the engine rear hanger to the cylinder block RH.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



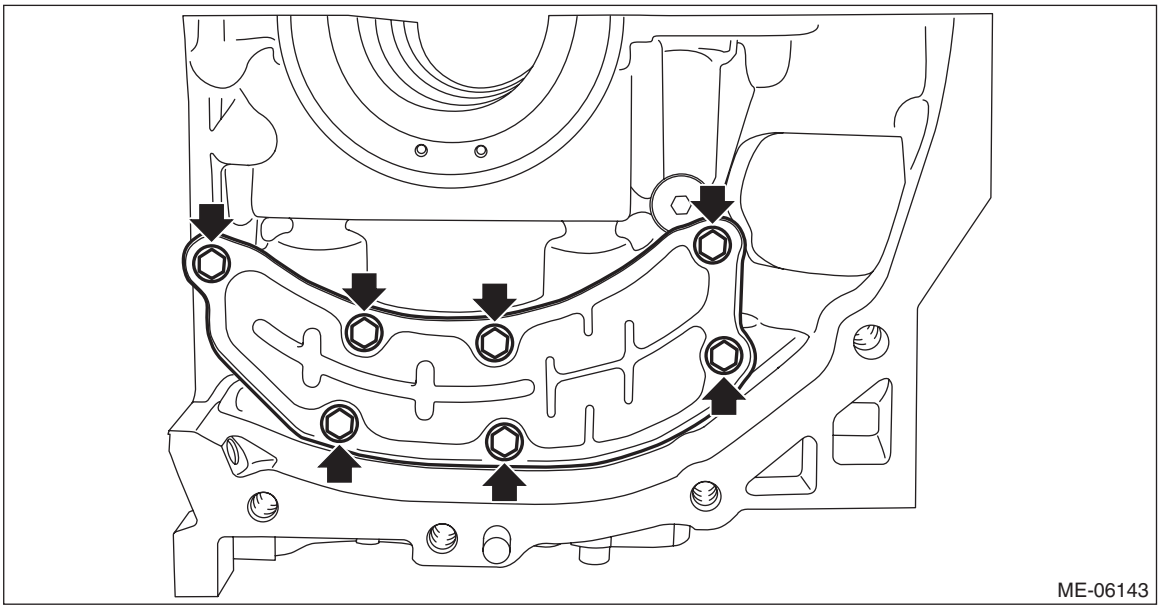
(A) Gasoline engine CVT model (B) Gasoline engine MT model (C) HEV model

27) Install the crank sprocket. <Ref. to ME(H4DO(w/o HEV))-203, INSTALLATION, Crank Sprocket.>
28) Install the cylinder head. <Ref. to ME(H4DO(w/o HEV))-269, INSTALLATION, Cylinder Head.>
29) Install the cam carrier. <Ref. to ME(H4DO(w/o HEV))-233, INSTALLATION, Cam Carrier.>
30) Install the rocker cover. <Ref. to ME(H4DO(w/o HEV))-213, INSTALLATION, Rocker Cover.>
31) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>
32) Install the tumble generator valve assembly. <Ref. to FU(H4DO(w/o HEV))-86, INSTALLATION, Tumble Generator Valve Assembly.> <Ref. to FU(H4DO(HEV))-75, INSTALLATION, Tumble Generator Valve Assembly.>
33) Install the engine wiring harness. <Ref. to FU(H4DO(w/o HEV))-47, INSTALLATION, Engine Wiring Harness.> <Ref. to FU(H4DO(HEV))-39, INSTALLATION, Engine Wiring Harness.>
34) Install the intake manifold. <Ref. to FU(H4DO(w/o HEV))-30, INSTALLATION, Intake Manifold.> <Ref. to FU(H4DO(HEV))-26, INSTALLATION, Intake Manifold.>
35) Install the engine to the vehicle. <Ref. to ME(H4DO(w/o HEV))-91, INSTALLATION, Engine Assembly.>

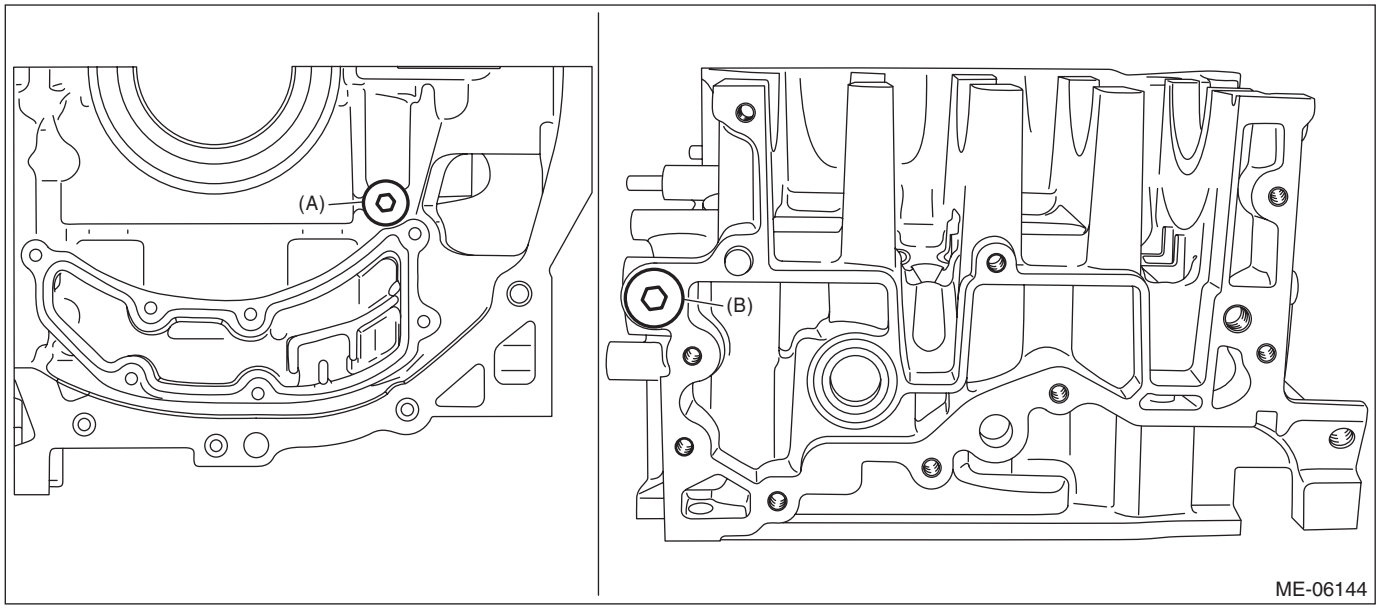
C: DISASSEMBLY

1. CYLINDER BLOCK

1) Remove the oil separator cover from cylinder block RH.

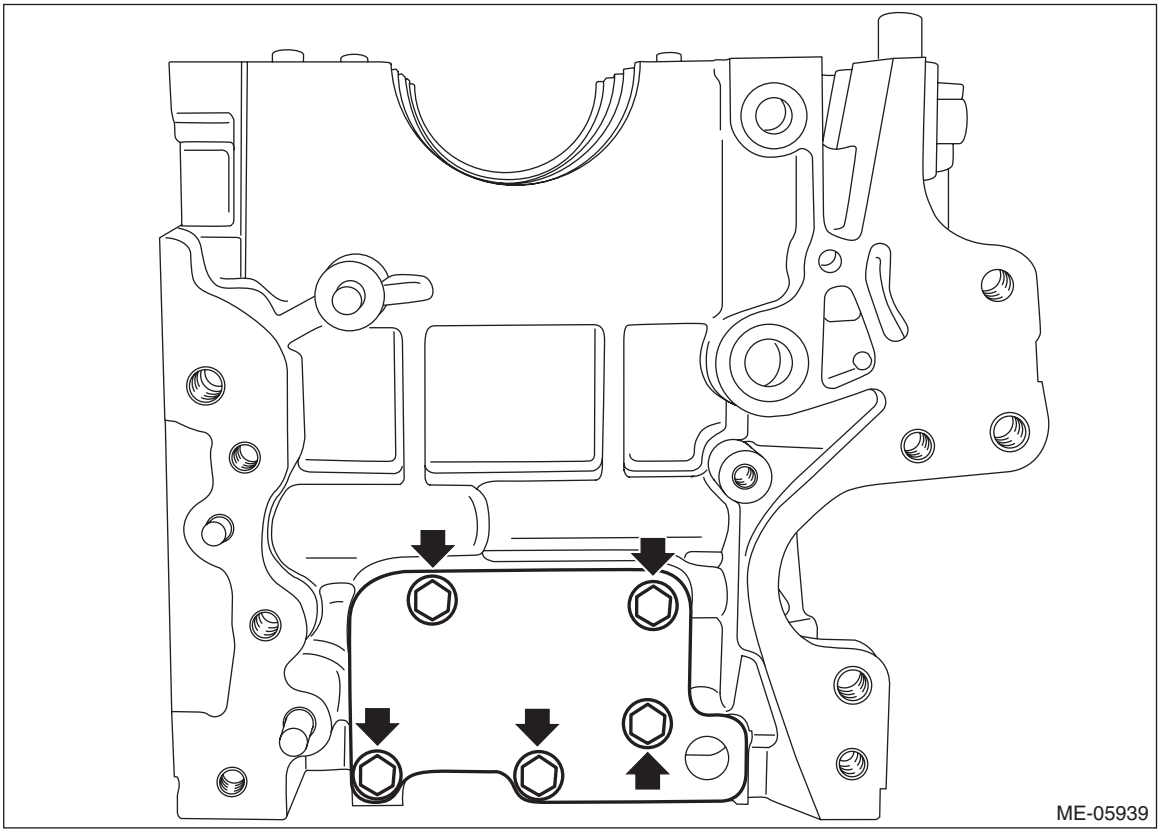


2) Remove the liquid gasket from cylinder block RH.
3) Remove the cylinder block plug (A) and the main gallery plug (B) from cylinder block RH.

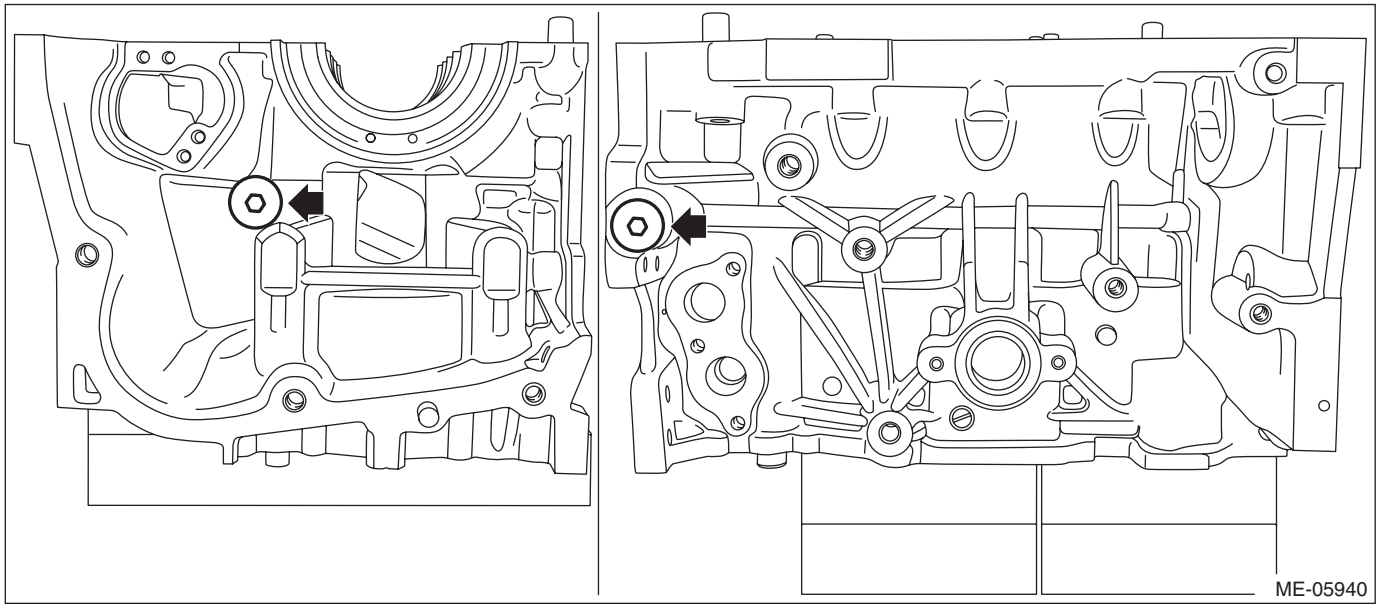


4) Remove the liquid gasket from the thread holes of the cylinder block RH, and from the threaded portions of cylinder block plug and main gallery plug.

5) Remove the cylinder block plate from cylinder block LH.

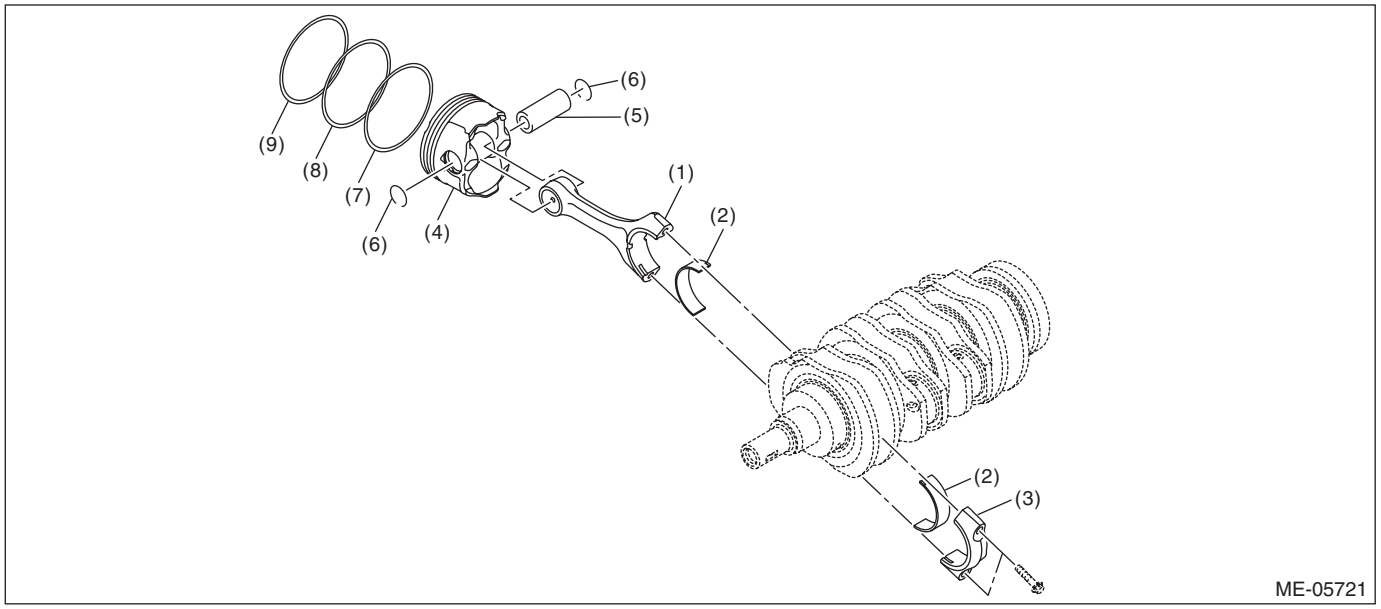


6) Remove the main gallery plug from cylinder block LH.



7) Remove the liquid gasket from the thread holes of the cylinder block LH and main gallery plug.

2. PISTON AND CONNECTING ROD



(1)	Connecting rod	(4)	Piston	(7)	Oil ring
(2)	Connecting rod bearing	(5)	Piston pin	(8)	Second ring
(3)	Connecting rod cap	(6)	Circlip	(9)	Top ring

NOTE:
To prevent confusion of various parts, mark each part.
1) Remove the connecting rod bearing from connecting rod and connecting rod cap.
2) Remove the piston rings from the piston.

NOTE:
Arrange the piston rings in order so that they can be installed in their original positions without confusion.
(1) Remove the compression rings in the order of top ring and second ring, using piston ring expander.
(2) Remove the oil rings in the order of upper rail, lower rail and expander by hand.

3) Remove the circlip on one end from the piston using a flat tip screwdriver.

NOTE:
Be careful not damage the piston and piston pin, by wrapping the tip of flat tip screwdriver with tape.
4) Remove the piston pin from piston, and remove the connecting rod from piston.
5) Remove the circlip on other end from the piston using a flat tip screwdriver.

NOTE:
Be careful not damage the piston and piston pin, by wrapping the tip of flat tip screwdriver with tape.

D: ASSEMBLY

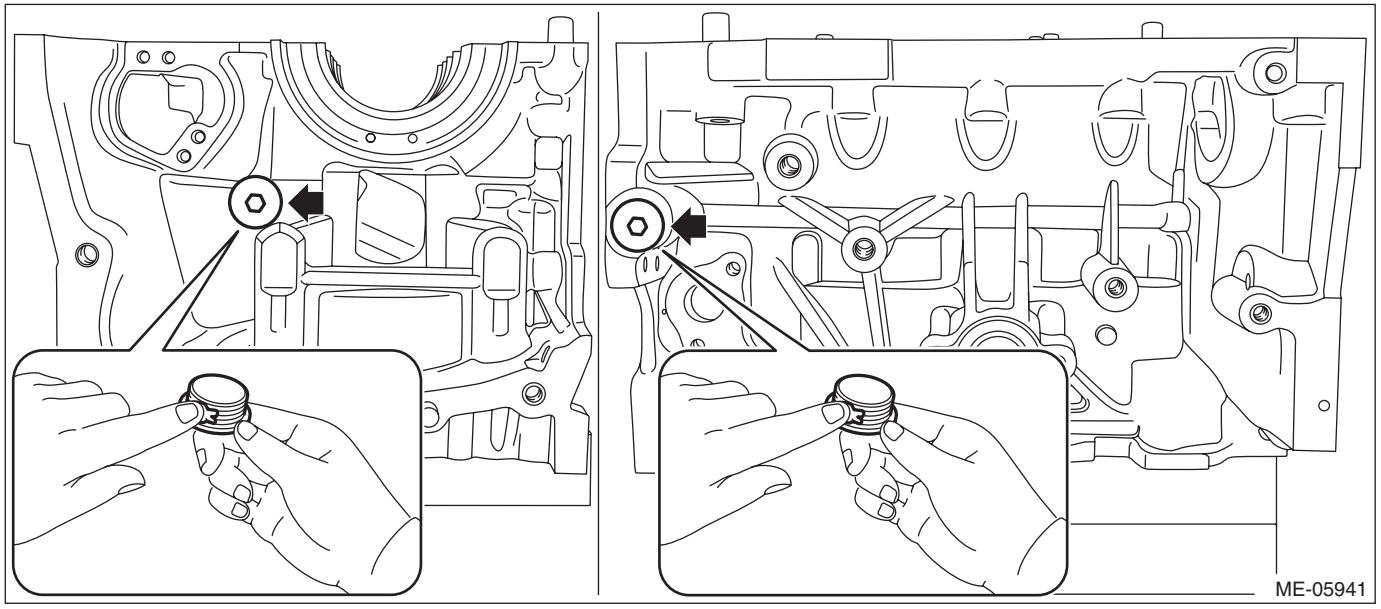
1. CYLINDER BLOCK

1) Apply liquid gasket to the threaded portion of the main gallery plug, and install the main gallery plug to the cylinder block LH.

NOTE:
Before applying liquid gasket, degrease the thread holes of the cylinder block LH and main gallery plug.

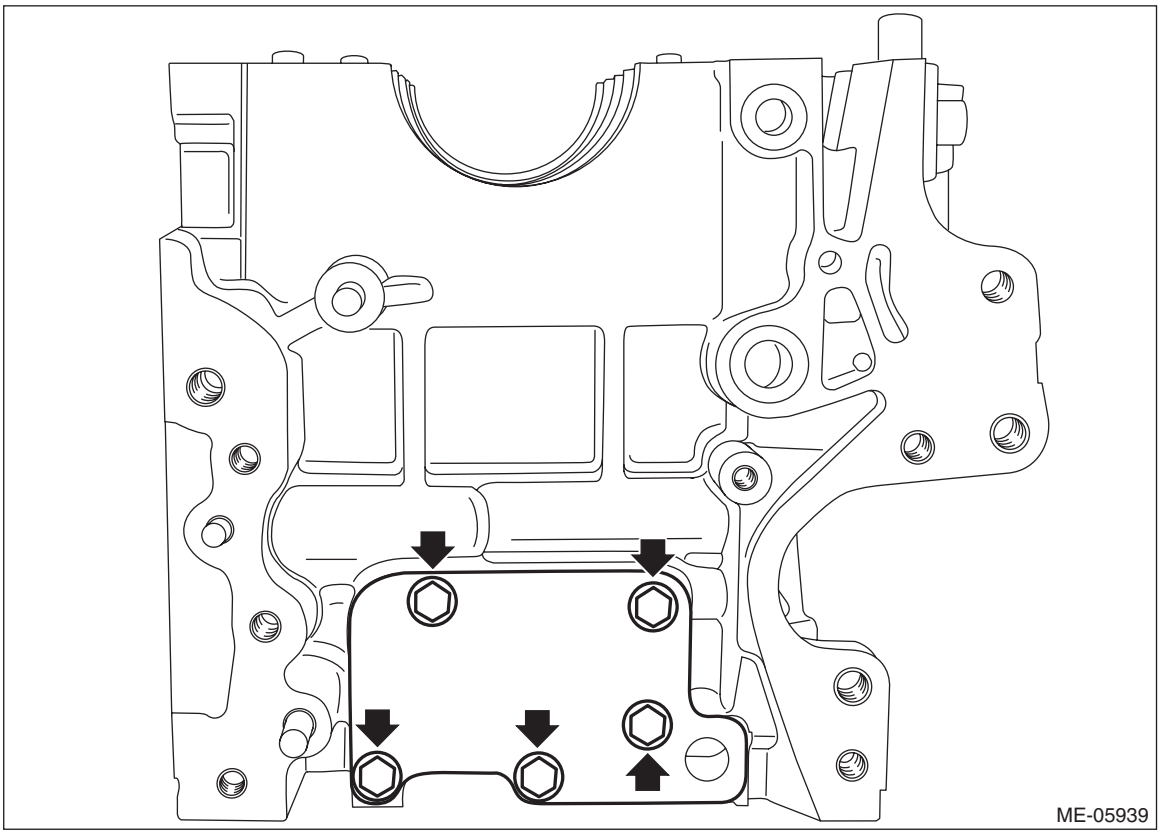
Liquid gasket:
THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)



2) Install the cylinder block plate onto cylinder block LH.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

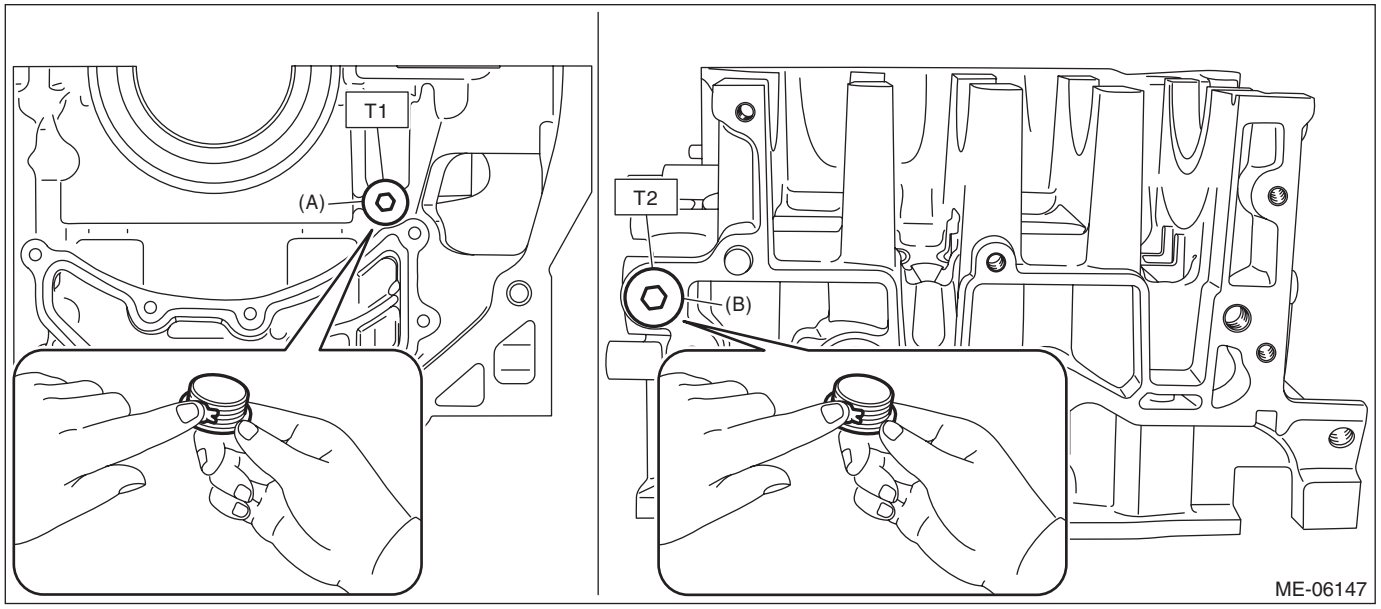


3) Apply liquid gasket to the threaded portions of cylinder block plug and main gallery plug, and install the cylinder block plug (A) and main gallery plug (B) to cylinder block RH.

NOTE:
Before applying liquid gasket, degrease the thread holes of the cylinder block RH, and the threaded portions of cylinder block plug and main gallery plug.

Liquid gasket:
THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:
T1: 16 N·m (1.6 kgf-m, 11.8 ft-lb)
T2: 37 N·m (3.8 kgf-m, 27.3 ft-lb)

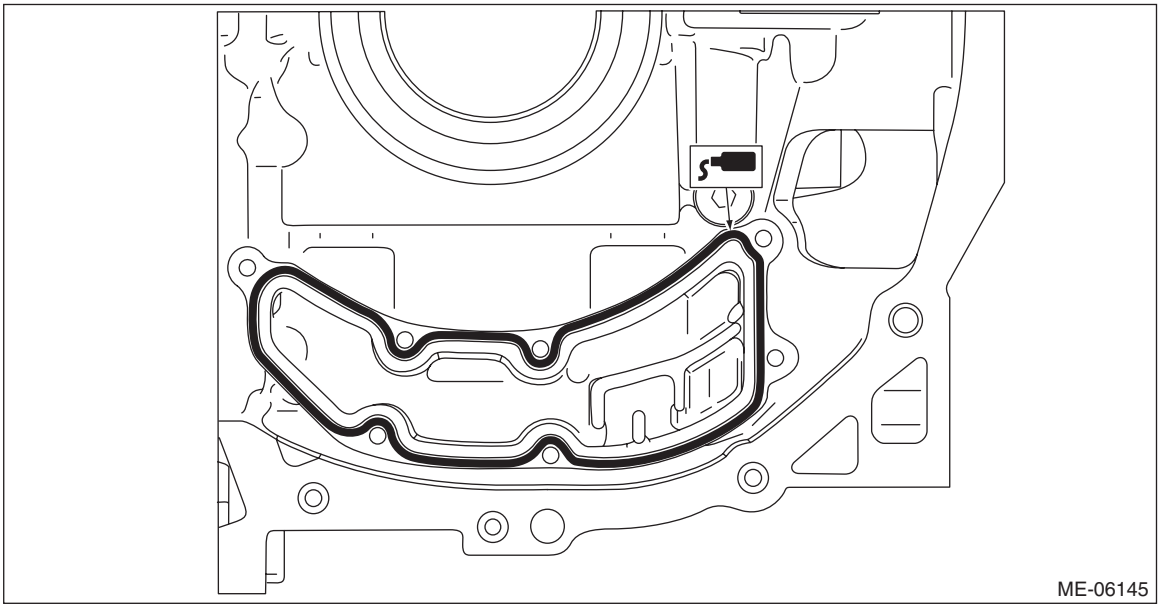


4) Install the oil separator cover to the cylinder block RH.
(1) Apply liquid gasket to the mating surfaces of oil separator cover.

NOTE:
- Use new oil separator cover.
- Before applying liquid gasket, degrease the old liquid gasket seal surface of cylinder block RH.
- Install within 5 min. after applying liquid gasket.

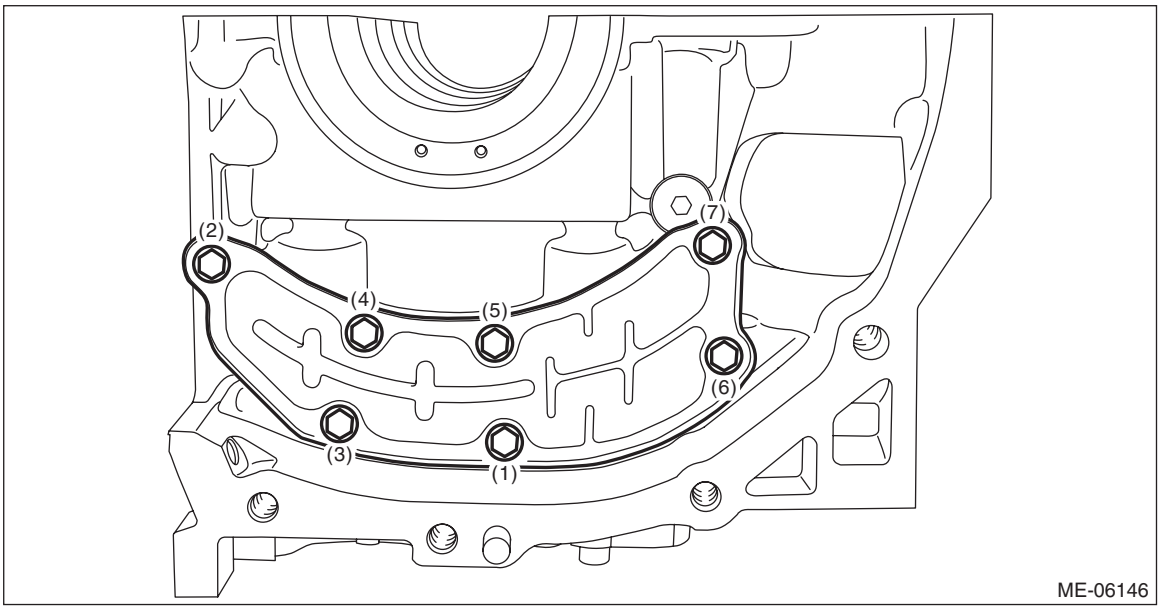
Liquid gasket:
Mating surface
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

Liquid gasket applying diameter:
4±1 mm (0.1772±0.0197 in)

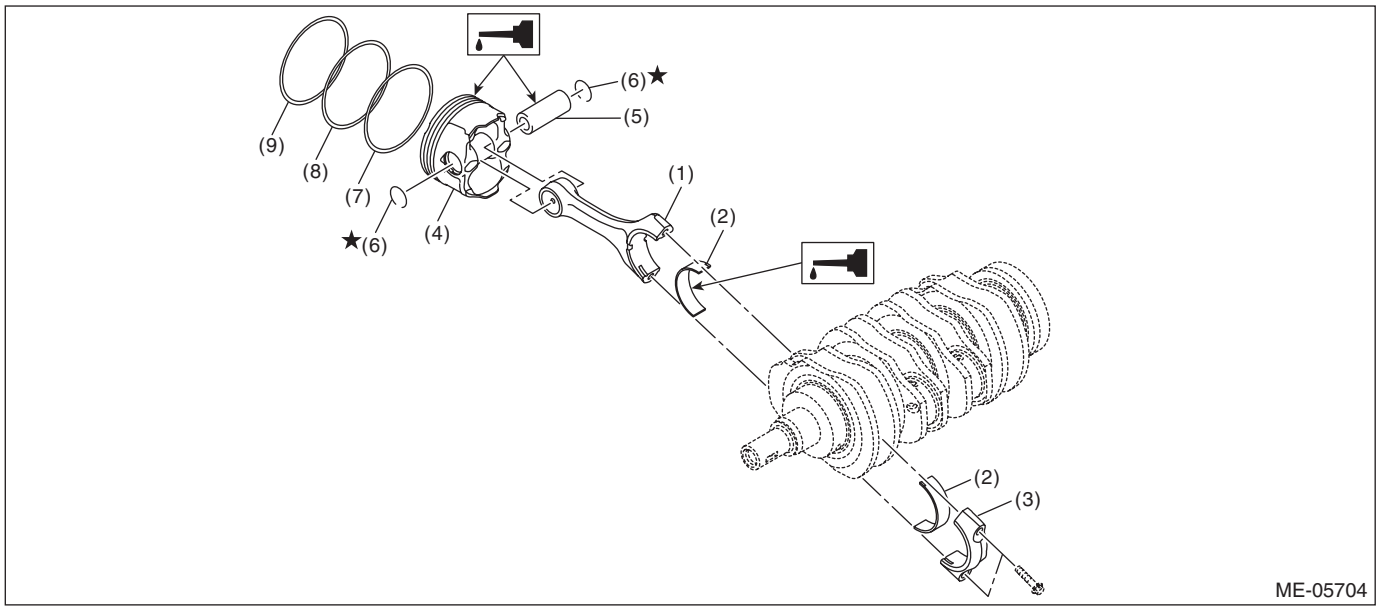


(2) Install the oil separator cover to the cylinder block RH, and tighten the oil separator cover bolts in numerical order as shown in the figure.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



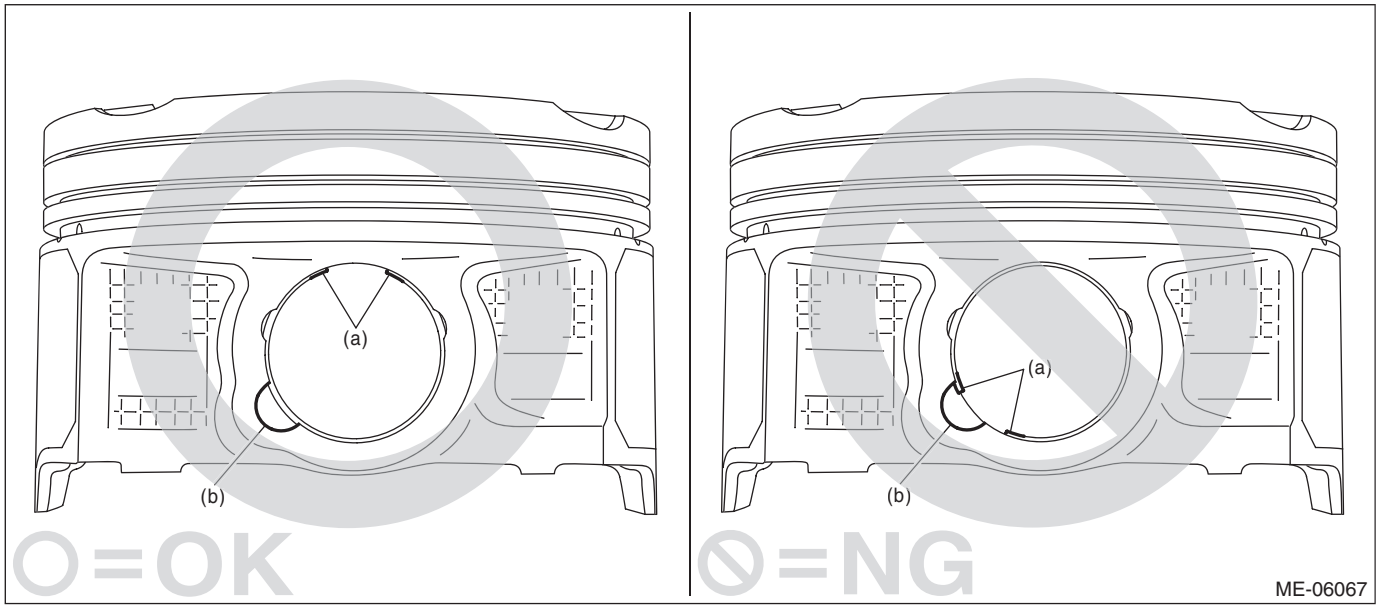
2. PISTON AND CONNECTING ROD



(1) Connecting rod
(2) Connecting rod bearing
(3) Connecting rod cap
(4) Piston
(5) Piston pin
(6) Circlip
(7) Oil ring
(8) Second ring
(9) Top ring

1) Install the connecting rod bearing to the connecting rod and connecting rod cap.
2) Install the circlip on one end of the piston using a flat tip screwdriver.

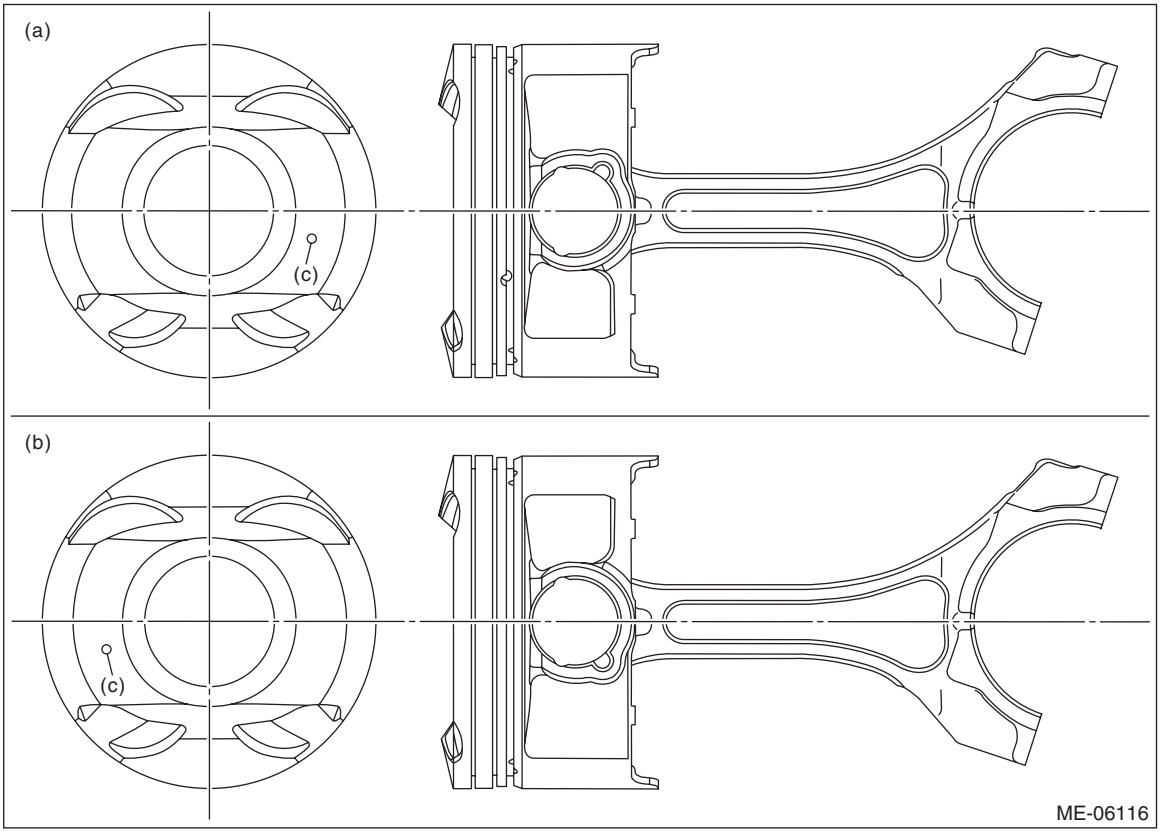
NOTE:
- Be careful not damage the piston, by wrapping the tip of flat tip screwdriver with tape.
- Make sure the circlip is firmly inserted into the circlip groove.
- After installing the circlip, rotate the circlip so that its end part (a) and the cutout portion of circlip groove (b) do not match.



3) Set the piston to the connecting rod.

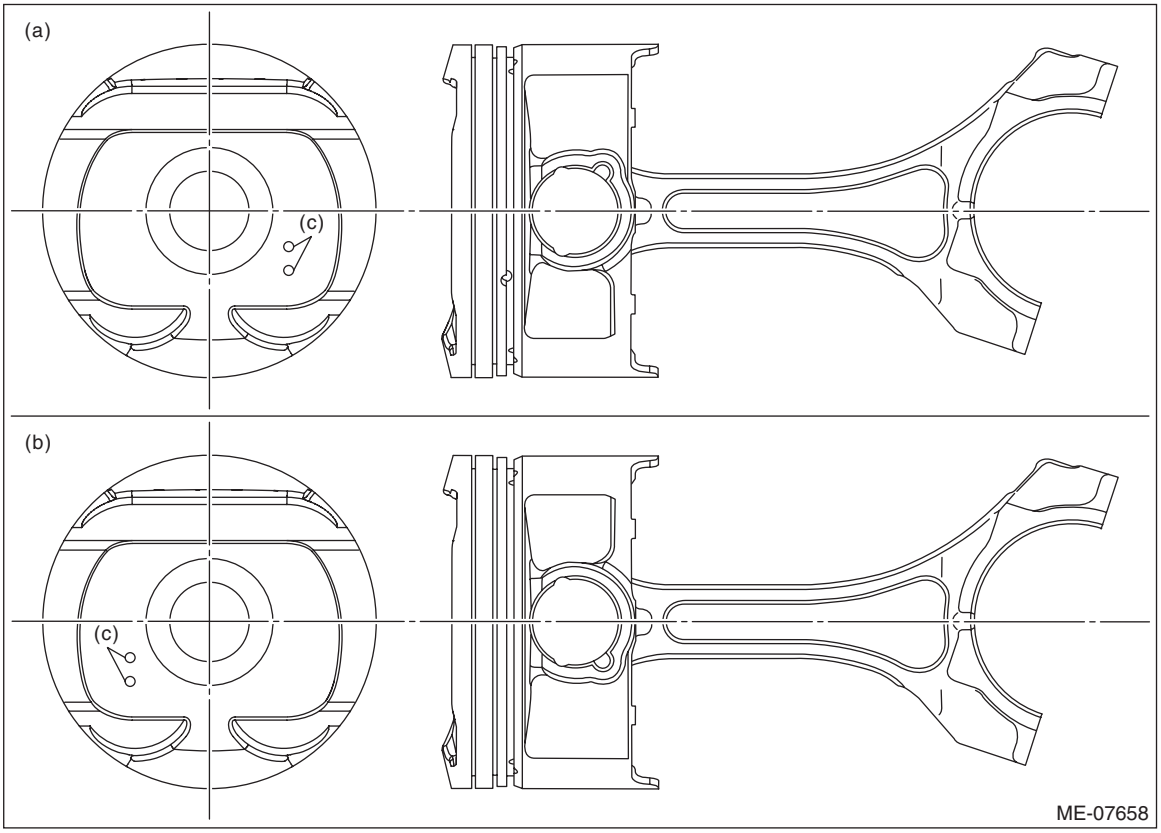
NOTE:
Align the front mark of piston and the connecting rod direction correctly as shown in the figure.

- Gasoline engine model



(a) RH side (#1 and #3) (b) LH side (#2 and #4) (c) Front mark

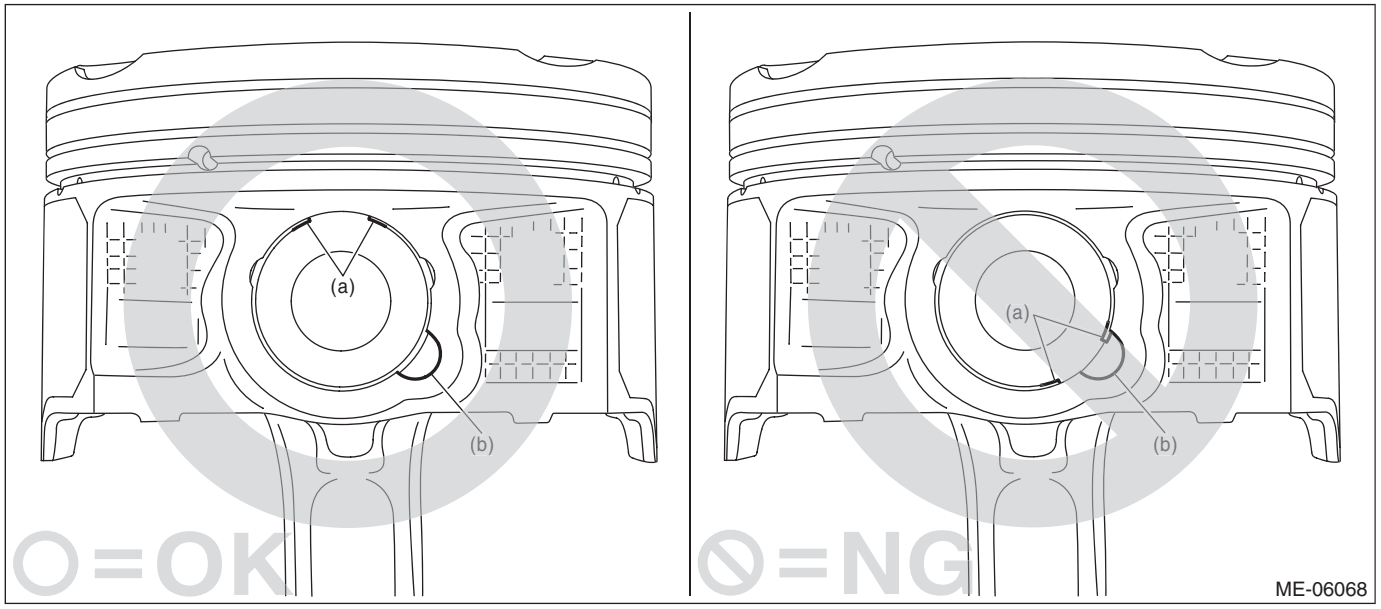
- HEV model



(a) RH side (#1 and #3) (b) LH side (#2 and #4) (c) Front mark

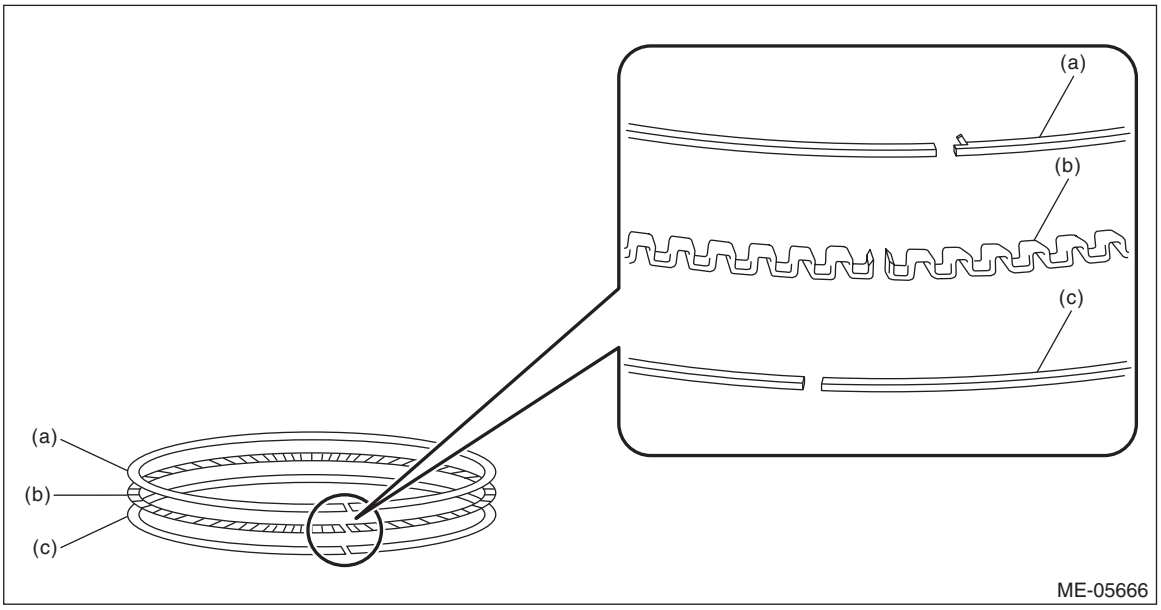
4) Apply engine oil to the piston pin, and attach the piston pin.
5) Install the circlip on the piston using a flat tip screwdriver.

NOTE:
- Be careful not damage the piston and piston pin, by wrapping the tip of flat tip screwdriver with tape.
- Make sure the circlip is firmly inserted into the circlip groove.
- After installing the circlip, rotate the circlip so that its end part (a) and the cutout portion of circlip groove (b) do not match.



6) Install the piston rings onto the piston.
(1) Install the oil rings in the order of expander, lower rail and upper rail by hand.

NOTE:
Oil ring consists of the upper rail, expander and lower rail.



(a) Upper rail (b) Expander (c) Lower rail

(2) Install the compression rings in the order of second ring and top ring, using piston ring expander.

NOTE:
Install so that the compression ring mark faces the top side of the piston.

E: INSPECTION

1. CYLINDER BLOCK & PISTON

1) Visually inspect to make sure that there are no cracks, scratches or other damage.
2) Use liquid penetrant tester on the important sections to check for fissures.
3) Check that there are no traces of gas leaking or water leaking on the gasket attachment surface.
4) Check the oil passages for clogging.
5) Check for warpage of mating surfaces of the cylinder block that contacts cylinder head using a straight edge and thickness gauge. If it exceeds the limit, correct the surface by grinding it with a surface grinder or replace the cylinder block.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

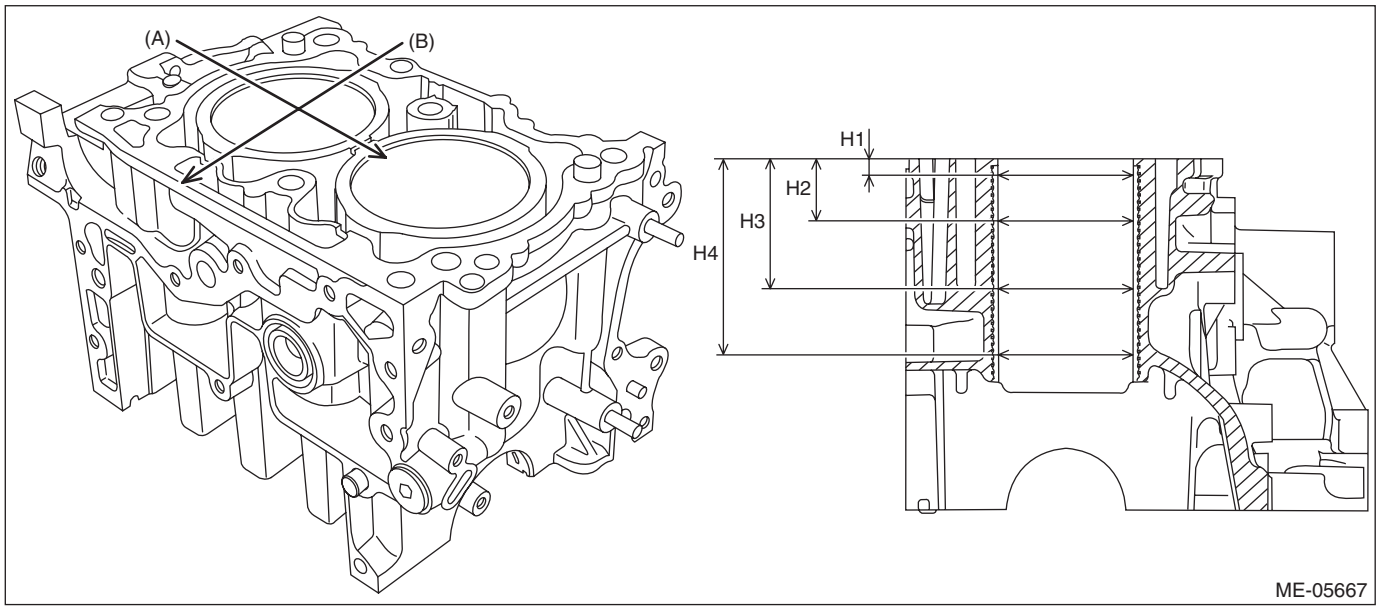
Cylinder block warpage:
Limit
0.025 mm (0.0010 in)

Grinding limit of cylinder block :
To 204.9 mm (8.067 in)

Height of cylinder block:
Standard
205.0 mm (8.071 in)

6) Using a cylinder bore gauge, check the cylindricality and out-of-roundness of cylinder liner. If it is not within the standard, perform reboring (including honing), or replace the cylinder block and piston as a set. For reboring and honing procedure, refer to step 8).

NOTE:
- Measure the cylinder liner with cylinder blocks separated (into cylinder block RH and cylinder block LH).
- Measurement should be performed at a temperature of 20°C (68°F).
- Write down all measurement values as the values are used in the next procedure.
- Measure the inner diameter of each cylinder liner in both the thrust and piston pin directions at the heights as shown in the figure.



(A) Piston pin direction (B) Thrust direction

H1: 10 mm (0.3937 in) H2: 45 mm (1.7717 in) H3: 80 mm (3.1496 in)
H4: 105 mm (4.1339 in)

- Calculate the cylindricality of cylinder liner by using the following formula.

Calculation formula
C = The larger value between the calculation values C' and C'' C' = (D(a)–D(b))/2 C'' = (D(c)–D(d))/2
C: Cylindricality of cylinder liner D(a): The largest value of all the values obtained by measuring the cylinder liner inner diameter in the direction of the piston pin D(b): The smallest value of all the values obtained by measuring the cylinder liner inner diameter in the direction of the piston pin D(c): The largest value of all the values obtained by measuring the cylinder liner inner diameter in the thrust direction D(d): The smallest value of all the values obtained by measuring the cylinder liner inner diameter in the thrust direction

• Calculate the out-of-roundness of cylinder liner at each measurement height by using the following formula.

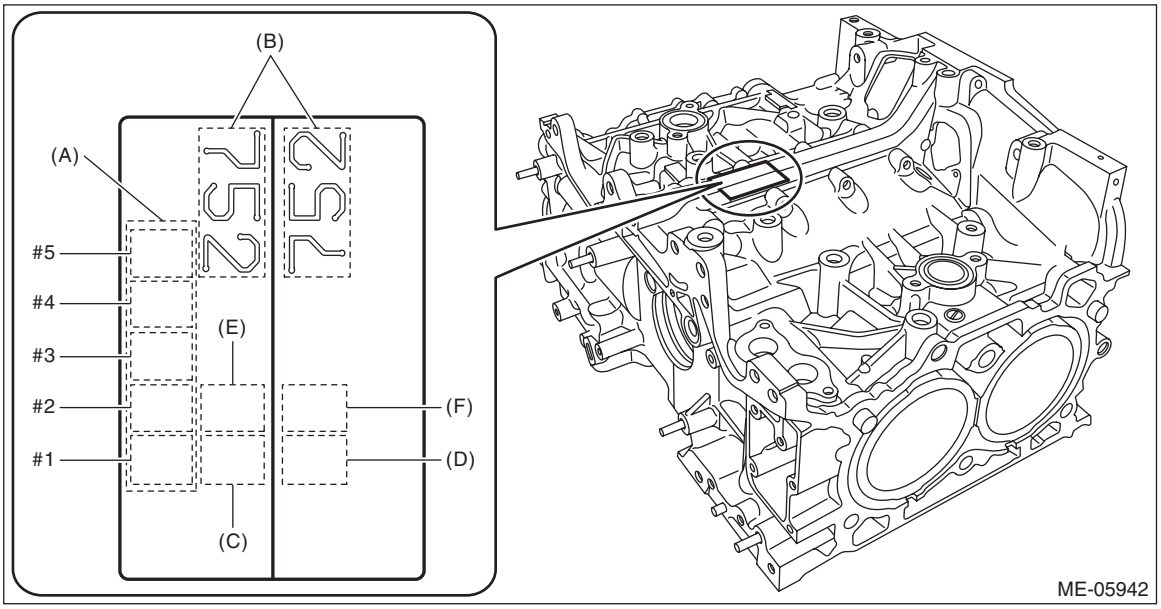
Calculation formula
R = (D(e)–D(f))/2
R: Out-of-roundness of cylinder liner D(e): The larger value between the measurement values in the piston pin direction and in the thrust direction of cylinder liner inner diameter D(f): The smaller value between the measurement values in the piston pin direction and in the thrust direction of cylinder liner inner diameter

Cylindricality of cylinder liner:
Limit
0.030 mm (0.0012 in)

Out-of-roundness of cylinder liner:
Limit
0.030 mm (0.0012 in)

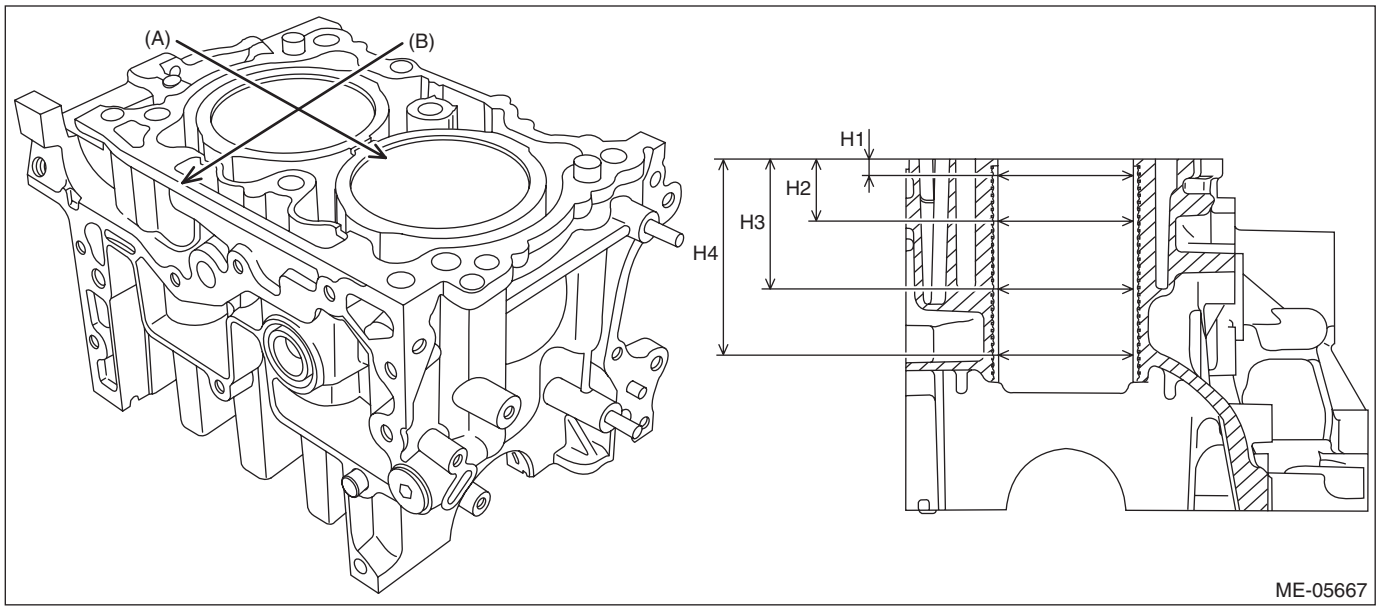
7) Check the clearance between cylinder liner and piston. Check the clearance between cylinder liner and piston by measuring the inner diameter of cylinder liner and the outer diameter of piston respectively.
(1) Measure the inner diameter of cylinder liner. If it is not within the standard, perform reboring (including honing), or replace the cylinder block and piston as a set. For reboring and honing procedure, refer to step 8).

NOTE:
• Measure the cylinder liner with cylinder blocks separated (into cylinder block RH and cylinder block LH).
• Measurement should be performed at a temperature of 20°C (68°F).
• The cylinder bore size mark is stamped on the upper face of the cylinder block.



(A) Main journal size mark
(B) Cylinder block (RH) – (LH) combination mark
(C) #1 cylinder bore size mark
(D) #2 cylinder bore size mark
(E) #3 cylinder bore size mark
(F) #4 cylinder bore size mark

• Measure the inner diameter of each cylinder liner in both the thrust and piston pin directions at the heights as shown in the figure and read the value of the most worn location.



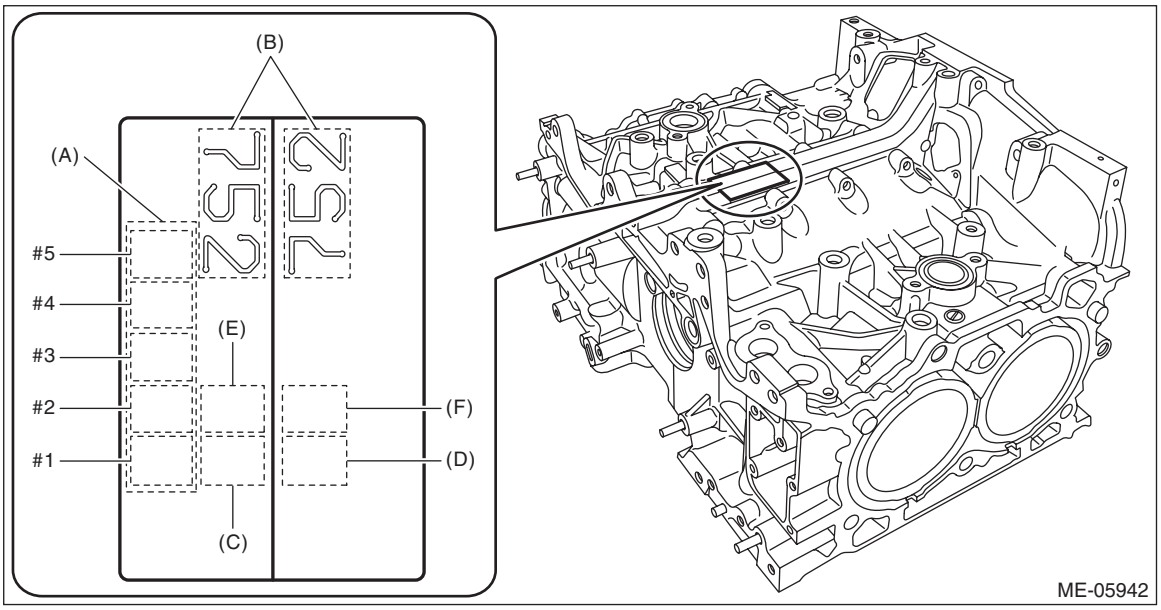
(A) Piston pin direction (B) Thrust direction

H1: 10 mm (0.3937 in) H2: 45 mm (1.7717 in) H3: 80 mm (3.1496 in)
H4: 105 mm (4.1339 in)

Inner diameter of cylinder liner:
Cylinder bore size mark A
Standard
84.005 — 84.015 mm (3.3073 — 3.3077 in)
Cylinder bore size mark B
Standard
83.995 — 84.005 mm (3.3069 — 3.3073 in)

(2) Check the outer diameter of piston with a micrometer. If it is not within the standard, replace the piston.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the outer diameter of each piston in thrust direction at the height as shown in the figure.
- Standard sized pistons are classified into two grades, “A” and “B”. These grades should be used as guide lines in selecting a standard piston.
- The grade can be judged by the stamp of cylinder bore size mark on the upper face of the cylinder block.

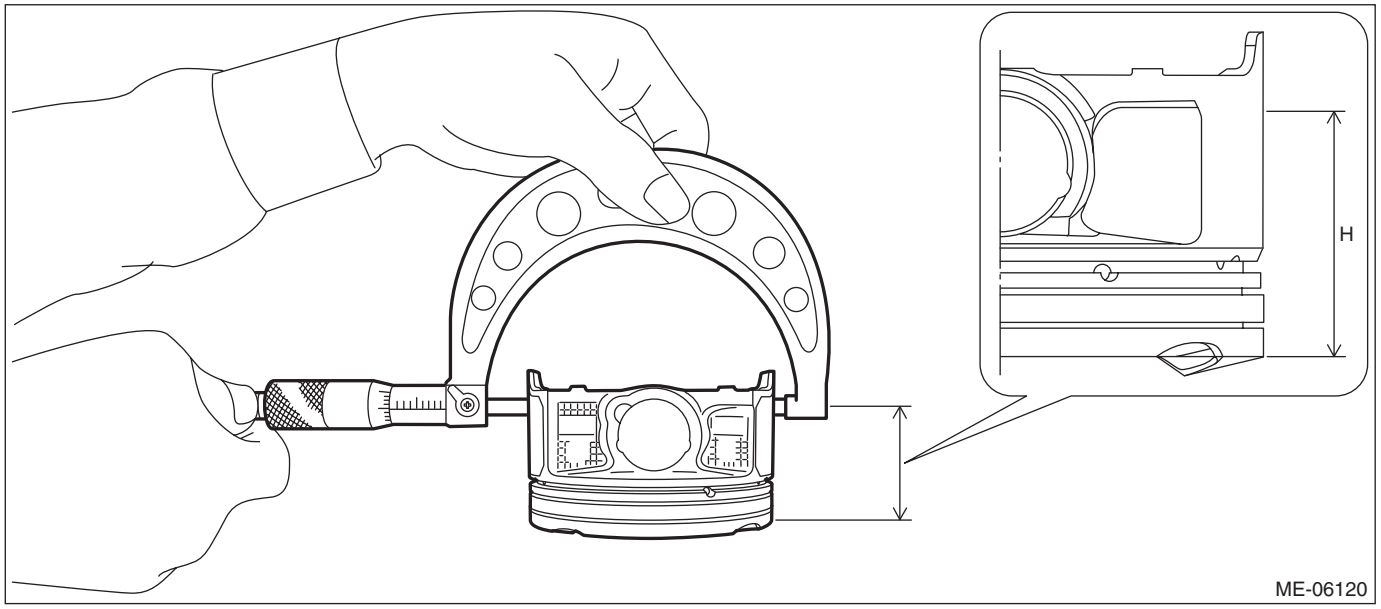


(A) Main journal size mark
(B) Cylinder block (RH) – (LH) combination mark
(C) #1 cylinder bore size mark
(D) #2 cylinder bore size mark
(E) #3 cylinder bore size mark
(F) #4 cylinder bore size mark

• If the piston is replaced, check the clearance between cylinder liner and piston in the step (3), and select a suitable sized piston.

Piston grade point H:
38.0 mm (1.50 in)

Piston outer diameter:
Standard size (grade A = cylinder bore size mark A)
Standard
83.975 — 83.985 mm (3.3061 — 3.3065 in)
Standard size (grade B = cylinder bore size mark B)
Standard
83.965 — 83.975 mm (3.3057 — 3.3061 in)



(3) Calculate the clearance between cylinder liner and piston. If it is not within the standard, perform reboring (including honing), or replace the cylinder block and piston as a set. For reboring and honing procedure, refer to step 8).

NOTE:
The clearance between cylinder liner and piston is decided by matching the cylinder block bore size mark and the grade of piston outer diameter (grade A or B).

Clearance between cylinder liner and piston:
Standard
0.020 — 0.040 mm (0.0008 — 0.0016 in)

8) Reboring and honing
(1) If any of the cylindricality, out-of-roundness, inner diameter or clearance between cylinder liner and piston is out of standard or if there is any damage on the cylinder liner, perform reboring (including honing).

CAUTION:
When any of the cylinder liner needs reboring, all other cylinder liners must be rebored at the same time, and replaced with proper size pistons.

Oversize piston outer diameter:
0.25 mm (0.0098 in) oversize
Standard
84.215 — 84.235 mm (3.3155 — 3.3163 in)
0.50 mm (0.0197 in) oversize
Standard
84.465 — 84.485 mm (3.3254 — 3.3262 in)

(2) If the inner diameter of cylinder liner exceeds the limit after reboring (including honing), replace the cylinder block and piston as a set.

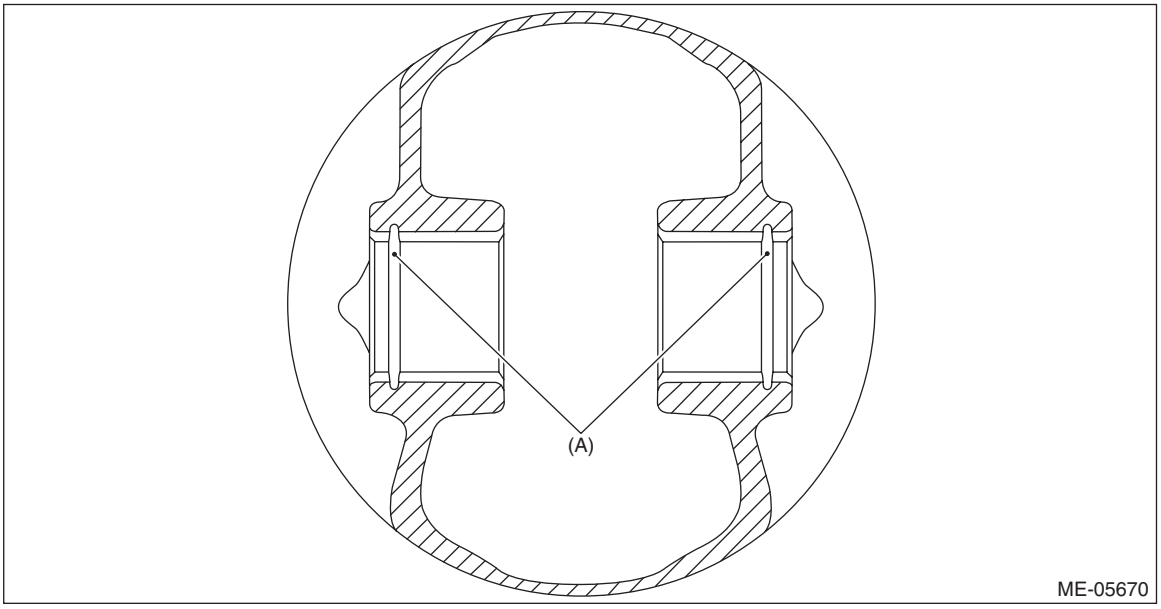
NOTE:
• Immediately after reboring (including honing), the inner diameter of cylinder liner may differ from its real diameter due to temperature rise. Thus, when measuring the inner diameter of cylinder liner, wait until the temperature has cooled to 20°C (68°F).
• For the measurement of the inner diameter of cylinder liner, refer to step 7).

Inner diameter of cylinder liner boring limit (diameter):
To 84.505 mm (3.3270 in)

2. PISTON AND PISTON PIN

1) Check the piston and piston pin for wear or crack.
2) Check the snap ring for distortion or wear.
3) Check the piston ring groove for damage.
4) Check the circlip groove (A) for burr.

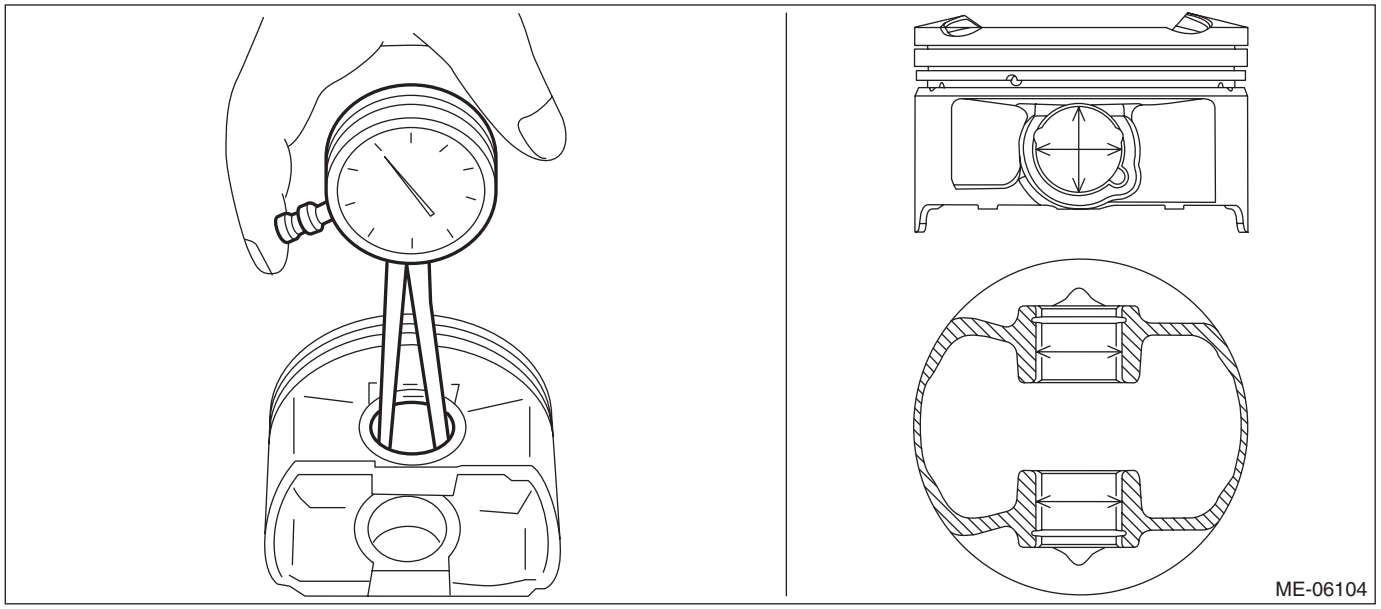
NOTE:
If the burr is found, remove the burr from groove.



5) Check that the piston pin can be inserted into the piston with a thumb at 20°C (68°F).
6) Check the clearance between piston and piston pin. Check the clearance between piston and piston pin by measuring the inner diameter of piston pin hole and the outer diameter of piston pin respectively.
(1) Using a caliper gauge, measure the inner diameter of piston pin hole.

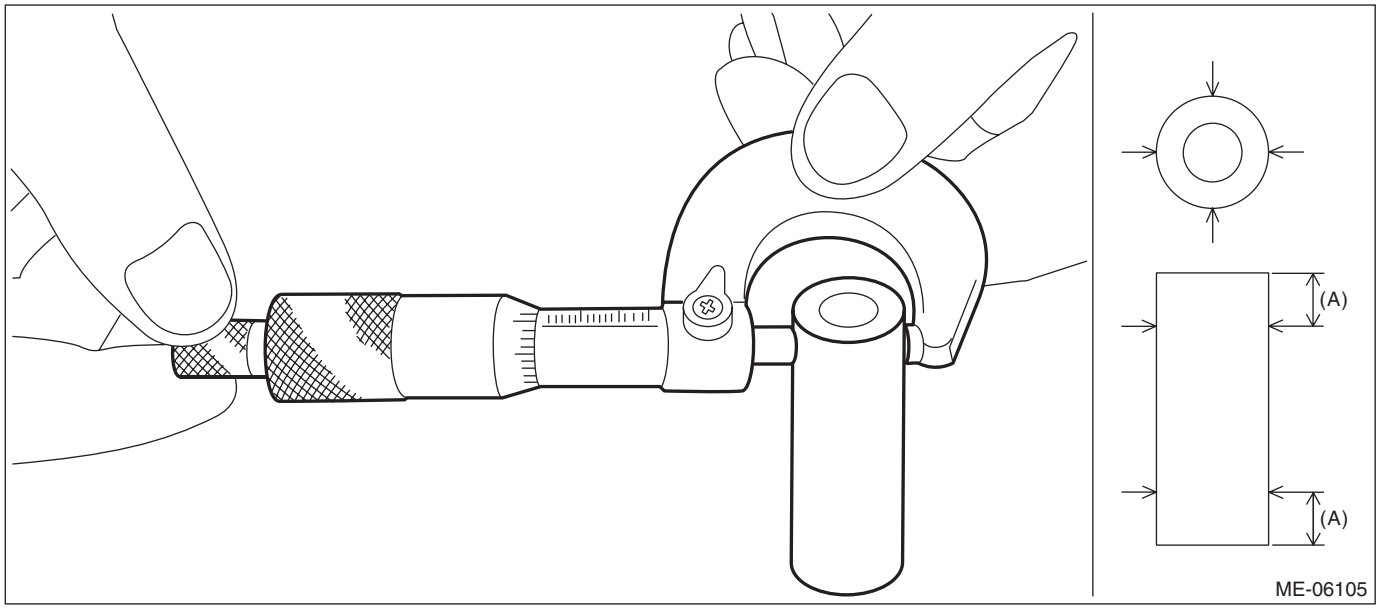
NOTE:
• Measurement should be performed at a temperature of 20°C (68°F).
• Measure the inner diameter of the piston pin hole at the four locations as shown in the figure, and read the value of most worn location.

- Record the measured value.



(2) Measure the outer diameter of piston pin with a micrometer.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the outer diameter of the piston pin at the four locations as shown in the figure, and read the value of most worn location.
- Record the measured value.



(A) 10 mm (0.394 in)

(3) Calculate the clearance between piston and piston pin. If it is not within the standard, replace the piston and piston pin as a set.

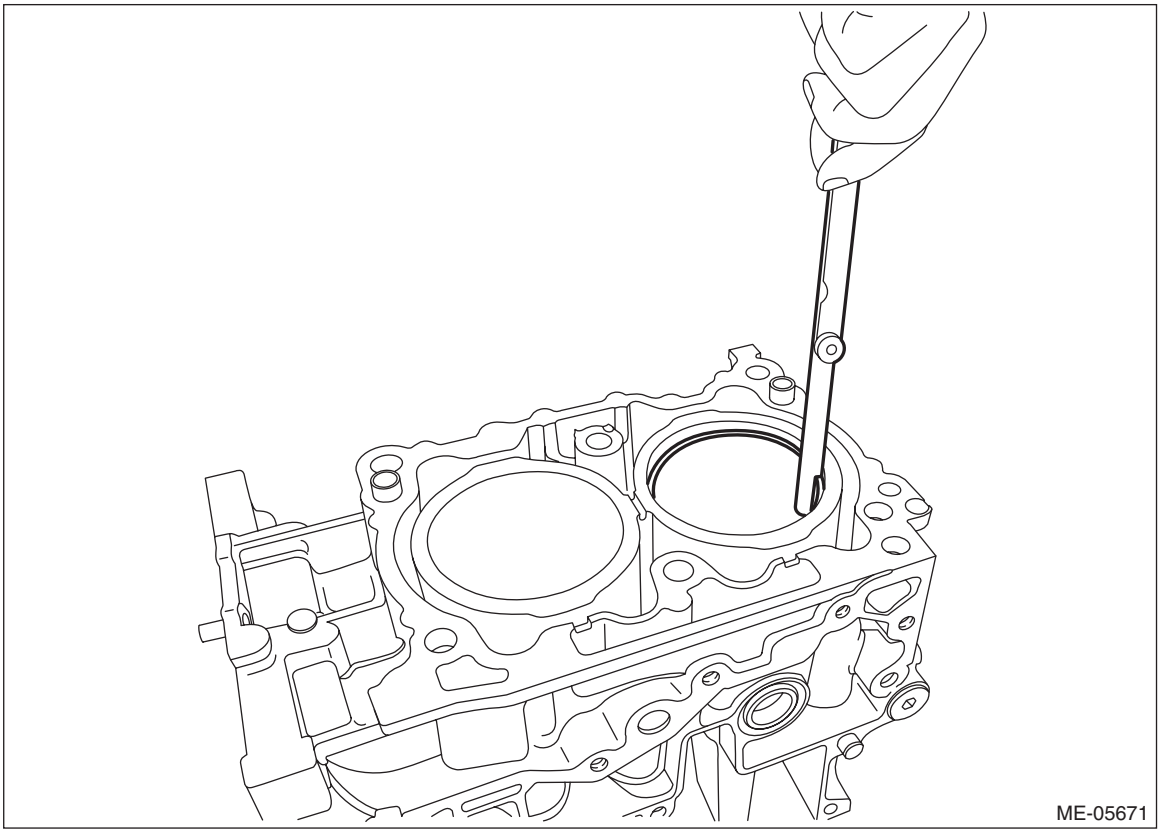
Clearance between piston and piston pin:
Standard
0.004 — 0.008 mm (0.0002 — 0.0003 in)

3. PISTON RING

1) Make sure the piston ring is not broken or damaged.
2) Using a cylindrical guide, insert the piston ring into the cylinder liner so that they are perpendicular to the cylinder wall, and check the piston ring gap using a thickness gauge. If it is not within the standard, replace the piston ring.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Use piston ring with same size as piston when replacing piston ring.

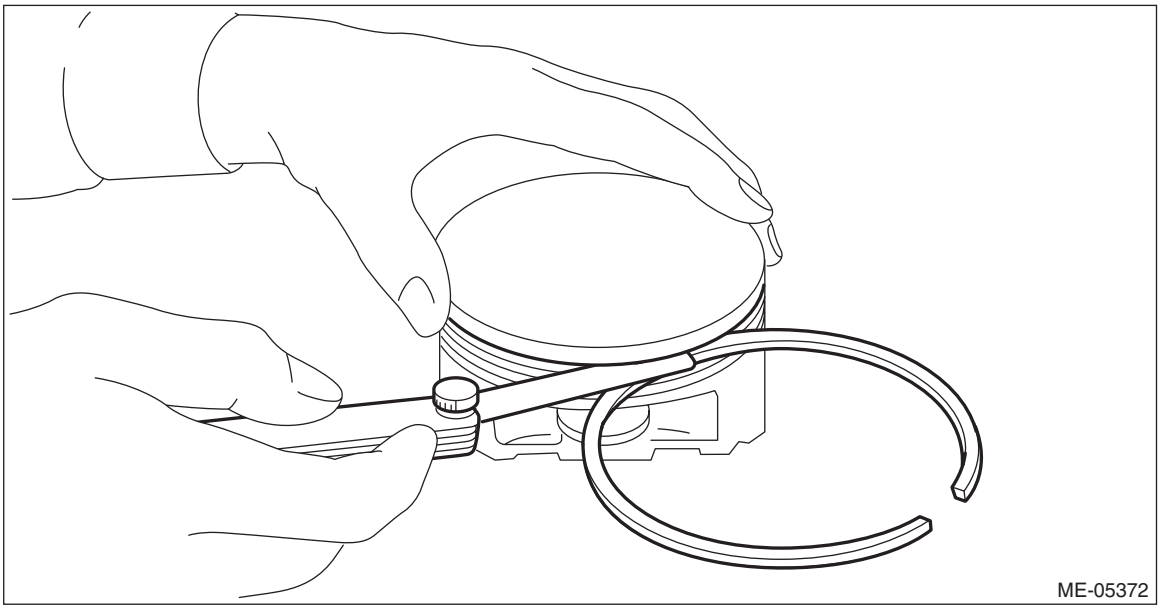
Piston ring gap:
Compression ring (top ring)
Standard
0.20 — 0.35 mm (0.0079 — 0.0138 in)
Compression ring (second ring)
Standard
0.40 — 0.50 mm (0.0157 — 0.0197 in)
Oil ring (upper rail and lower rail)
Standard
0.10 — 0.35 mm (0.0039 — 0.0138 in)



3) Fit the compression ring straight into the piston ring groove, then check the clearance between compression ring and piston with a thickness gauge. If it is not within the standard, replace the compression ring.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Before inspecting the clearance, clean the piston ring groove and compression ring.
- Use compression ring with same size as piston when replacing compression ring.

Clearance between compression ring and piston:
Top ring
Standard
0.040 — 0.080 mm (0.0016 — 0.0031 in)
Second ring
Standard
0.030 — 0.070 mm (0.0012 — 0.0028 in)

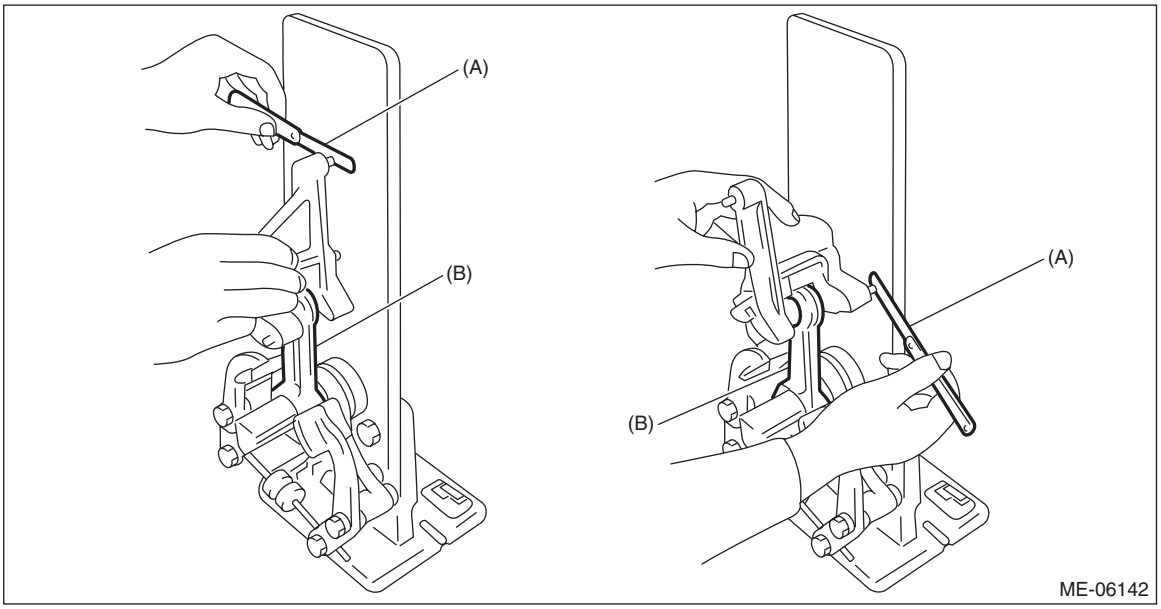


4. CONNECTING ROD AND CONNECTING ROD BEARING

1) Check for bend or twist using a connecting rod aligner. If it exceeds the limit, replace the connecting rod.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

Bend or twist per 100 mm (3.94 in) in length:
Limit
0.10 mm (0.0039 in)



(A) Thickness gauge (B) Connecting rod

2) Check that the large or small end thrust surface of each connecting rod is not damaged.
3) Check each connecting rod bearing for scar, peeling, seizure, melting or wear, etc.
4) Check the thrust clearance of each connecting rod using a thickness gauge.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

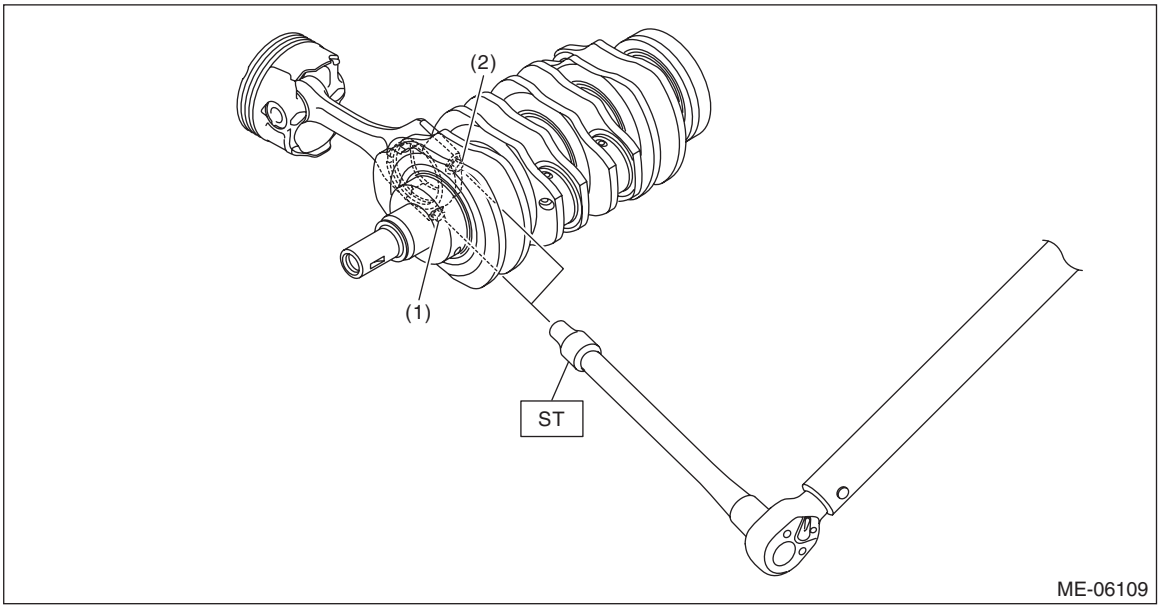
(1) Clean the #1 connecting rod bearing and the #1 pin of crankshaft, and apply engine oil to the #1 pin of crankshaft.
(2) Set the #1 connecting rod bearing to the #1 connecting rod and #1 connecting rod cap.
(3) Set the #1 connecting rod, #1 connecting rod cap and #1 connecting rod cap bolt to the #1 pin of crankshaft.

NOTE:
• Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching symbol.
• Use a new connecting rod cap bolt.
• Apply a coat of engine oil to the #1 connecting rod cap bolt thread.

(4) Using ST, tighten the #1 connecting rod cap bolts to 10 N·m (1.0 kgf-m, 7.4 ft-lb) in numerical order as shown in the figure, then retighten the bolts to 22 N·m (2.2 kgf-m, 16.2 ft-lb) in numerical order as shown in the figure.

CAUTION:
- **Make sure to hold the crankshaft securely during work.**
- **When holding the crankshaft, be careful not to damage the crankshaft.**

ST 18270AA020 SOCKET

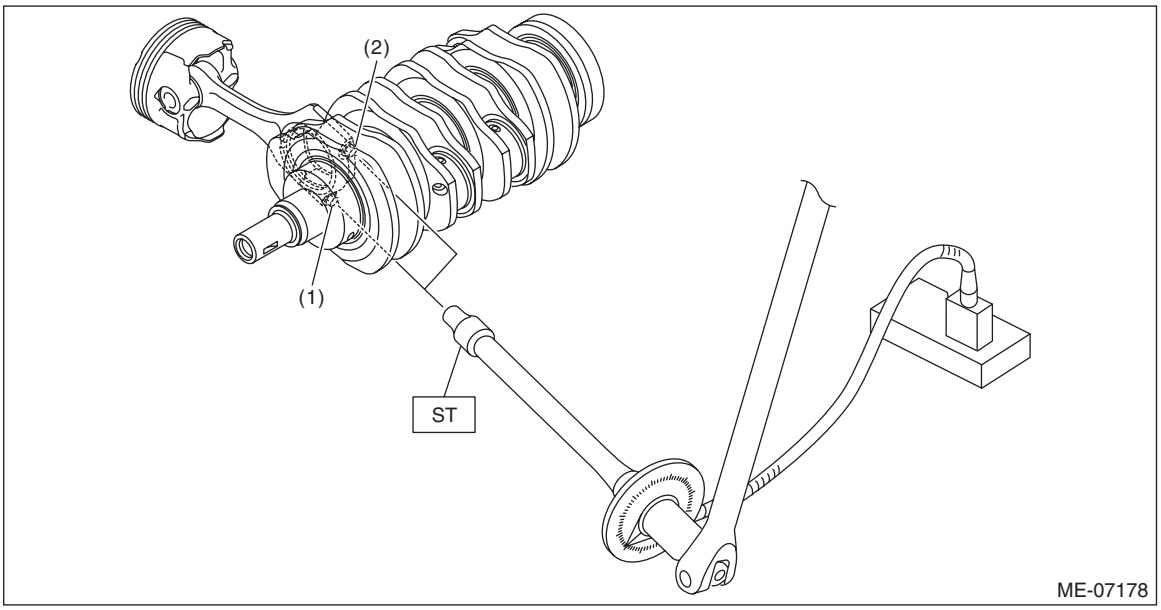


(5) Using ST and angle gauge, tighten the #1 connecting rod cap bolts with specified angle in numerical order as shown in the figure.

CAUTION:
- **Make sure to hold the crankshaft securely during work.**
- **When holding the crankshaft, be careful not to damage the crankshaft.**

ST 18270AA020 SOCKET

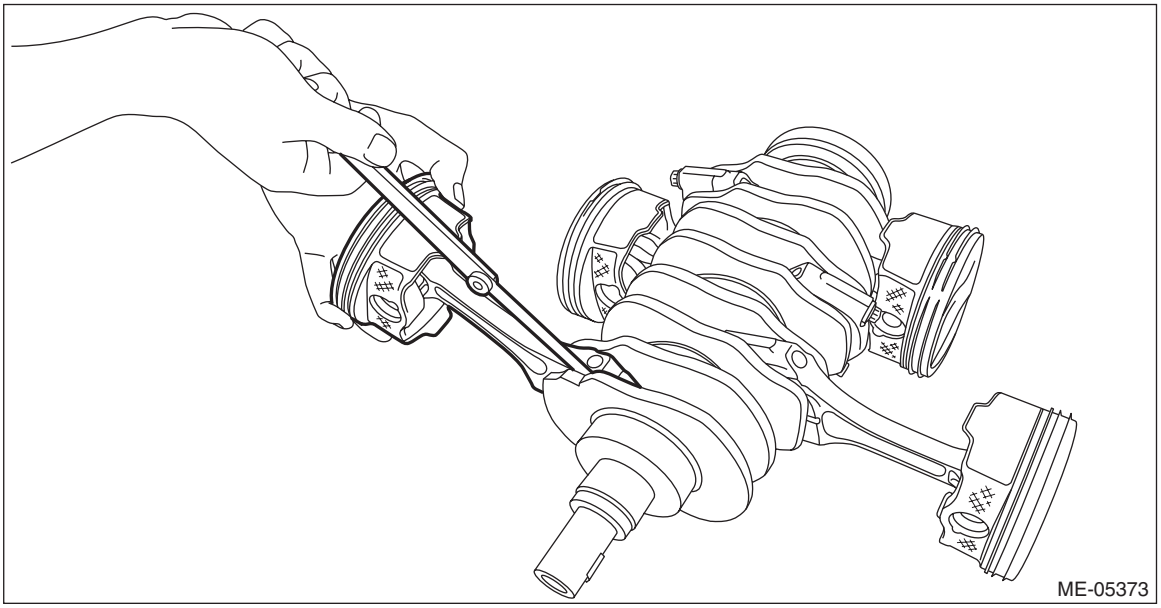
Tightening angle:
137°+3° –2°



(6) In the same manner, install the #2, #3 and #4 connecting rods.
(7) Check the thrust clearance of each connecting rod using a thickness gauge. If it is not within the standard, replace the connecting rod.

NOTE:
Measure the thrust clearance of each connecting rod at several points, and replace the connecting rod if there is uneven wear.

Connecting rod thrust clearance:
Standard
0.070 — 0.330 mm (0.0028 — 0.0130 in)



5) Check the oil clearance on each connecting rod bearing using plastigauge.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

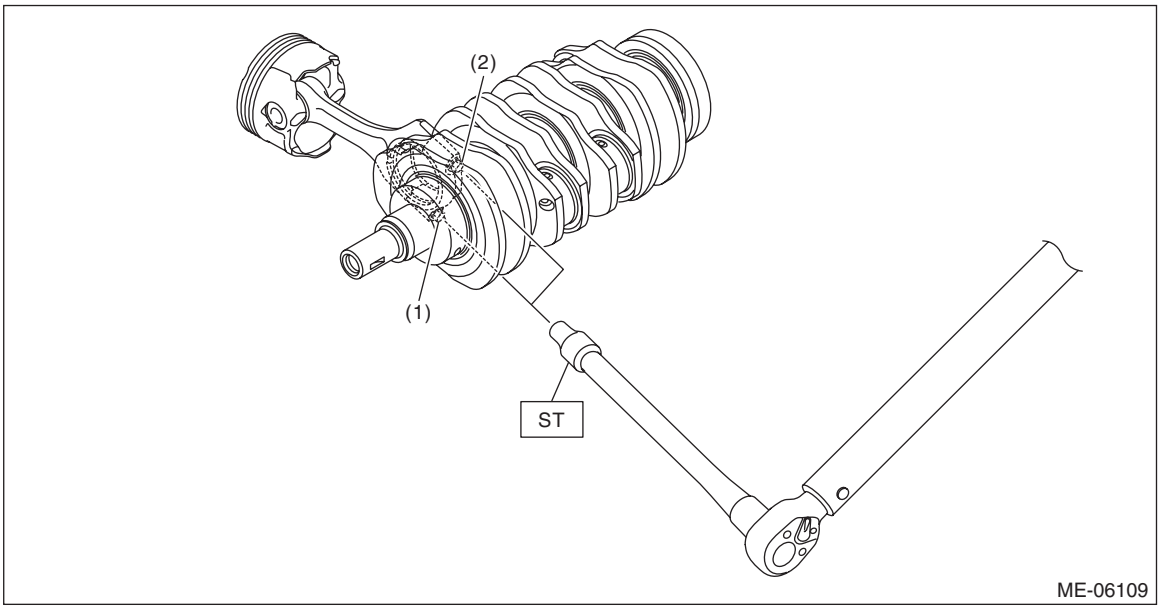
(1) Clean the #1 connecting rod bearing and the #1 pin of crankshaft.
(2) Set the #1 connecting rod bearing to the #1 connecting rod and #1 connecting rod cap.
(3) Place a plastigauge across the #1 pin of crankshaft, and set the #1 connecting rod, #1 connecting rod cap and #1 connecting rod cap bolt to the #1 pin of crankshaft.

NOTE:
• Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching symbol.
• Use a new connecting rod cap bolt.
• Apply a coat of engine oil to the #1 connecting rod cap bolt thread.

(4) Using ST, tighten the #1 connecting rod cap bolts to 10 N·m (1.0 kgf-m, 7.4 ft-lb) in numerical order as shown in the figure, then retighten the bolts to 22 N·m (2.2 kgf-m, 16.2 ft-lb) in numerical order as shown in the figure.

CAUTION:
- **Make sure to hold the crankshaft securely during work.**
- **When holding the crankshaft, be careful not to damage the crankshaft.**
- **During tightening, be careful not to move the #1 connecting rod and the #1 connecting rod cap.**

ST 18270AA020 SOCKET

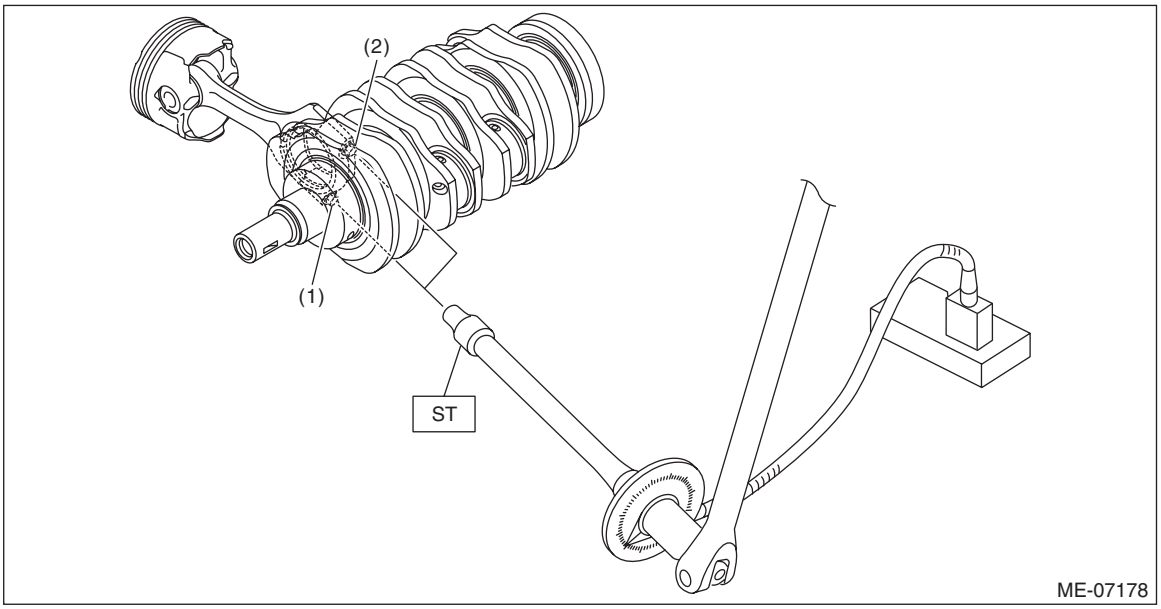


(5) Using ST and angle gauge, tighten the #1 connecting rod cap bolts with specified angle in numerical order as shown in the figure.

CAUTION:
- **Make sure to hold the crankshaft securely during work.**
- **When holding the crankshaft, be careful not to damage the crankshaft.**
- **During tightening, be careful not to move the #1 connecting rod and the #1 connecting rod cap.**

ST 18270AA020 SOCKET

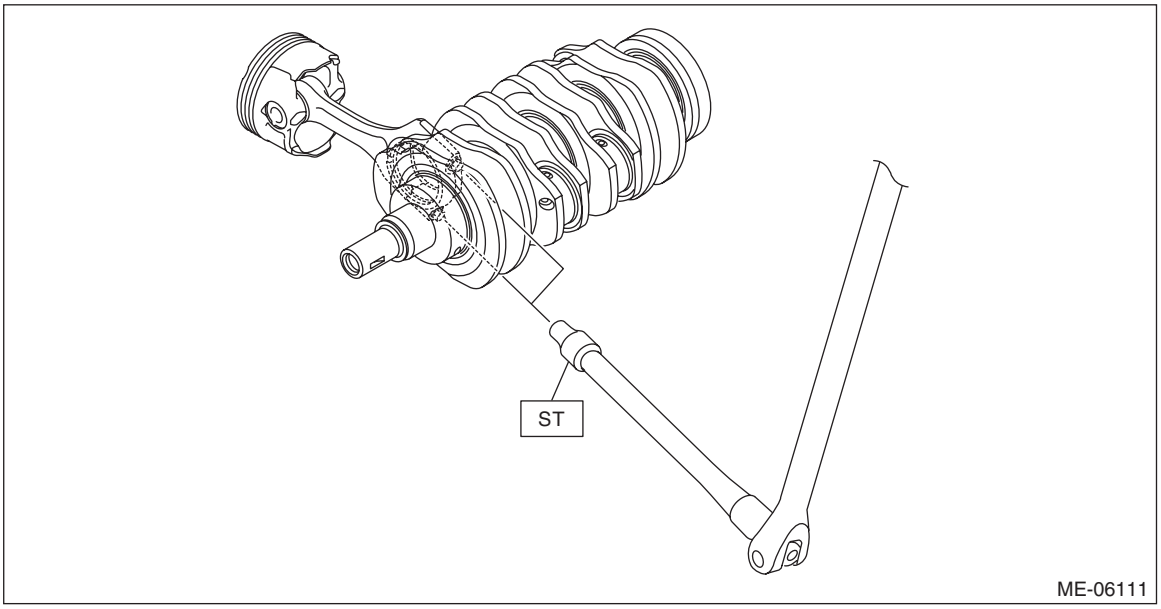
Tightening angle:
137°+3° –2°



(6) Using ST, loosen the #1 connecting rod cap bolt, and remove the #1 connecting rod cap bolt and #1 connecting rod cap.

CAUTION:
- **Make sure to hold the crankshaft securely during work.**
- **When holding the crankshaft, be careful not to damage the crankshaft.**
- **During removal, be careful not to move the #1 connecting rod and the #1 connecting rod cap.**

ST 18270AA020 SOCKET



(7) Determine oil clearance of the #1 connecting rod bearing by matching the widest point of the plastigauge on #1 pin of crankshaft against scale printed on a package of the plastigauge. If it is not within the standard, replace the #1 connecting rod bearing.

NOTE:
Measure the outer diameter of crankshaft pin using micrometer, and select the suitable size connecting rod bearing when replacing the connecting rod bearing.

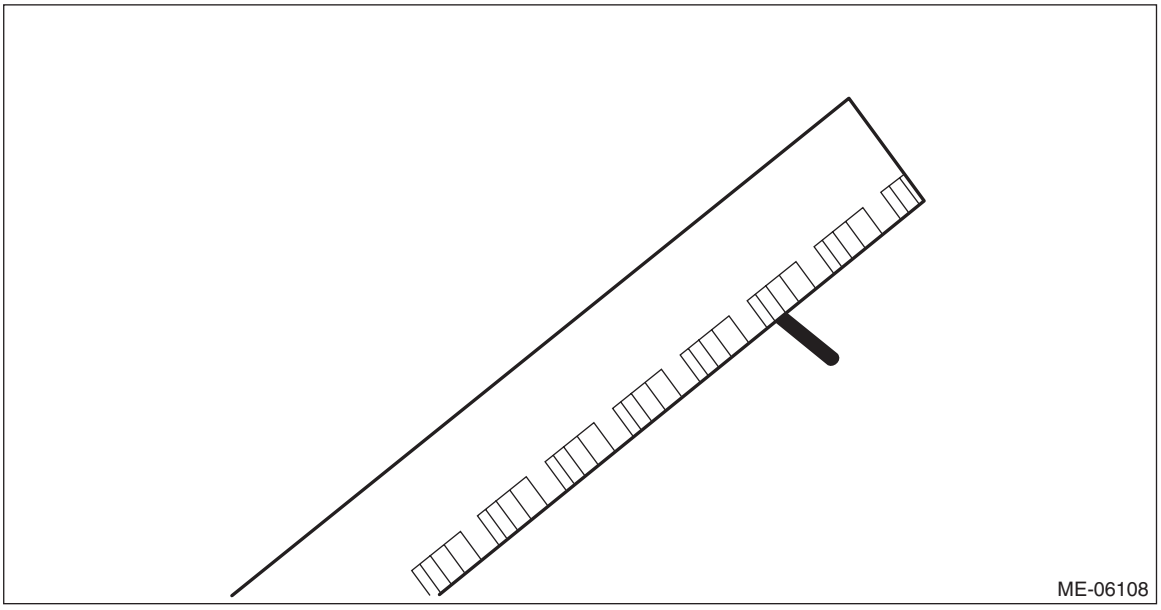
Unit: mm (in)

Bearing	Connecting rod bearing thickness (at center)	Crankshaft pin outer diameter
	Standard	Standard
Standard size	1.492 — 1.508 (0.0587 — 0.0594)	47.976 — 48.000 (1.8888 — 1.8898)
0.03 (0.0012) Undersize	1.511 — 1.515 (0.0595 — 0.0596)	47.946 — 47.970 (1.8876 — 1.8886)
0.05 (0.0020) Undersize	1.521 — 1.525 (0.0599 — 0.0600)	47.926 — 47.950 (1.8868 — 1.8878)
0.25 (0.0098) Undersize	1.621 — 1.625 (0.0638 — 0.0640)	47.726 — 47.750 (1.8790 — 1.8799)

Connecting rod bearing oil clearance:

Standard

0.017 — 0.047 mm (0.0007 — 0.0019 in)

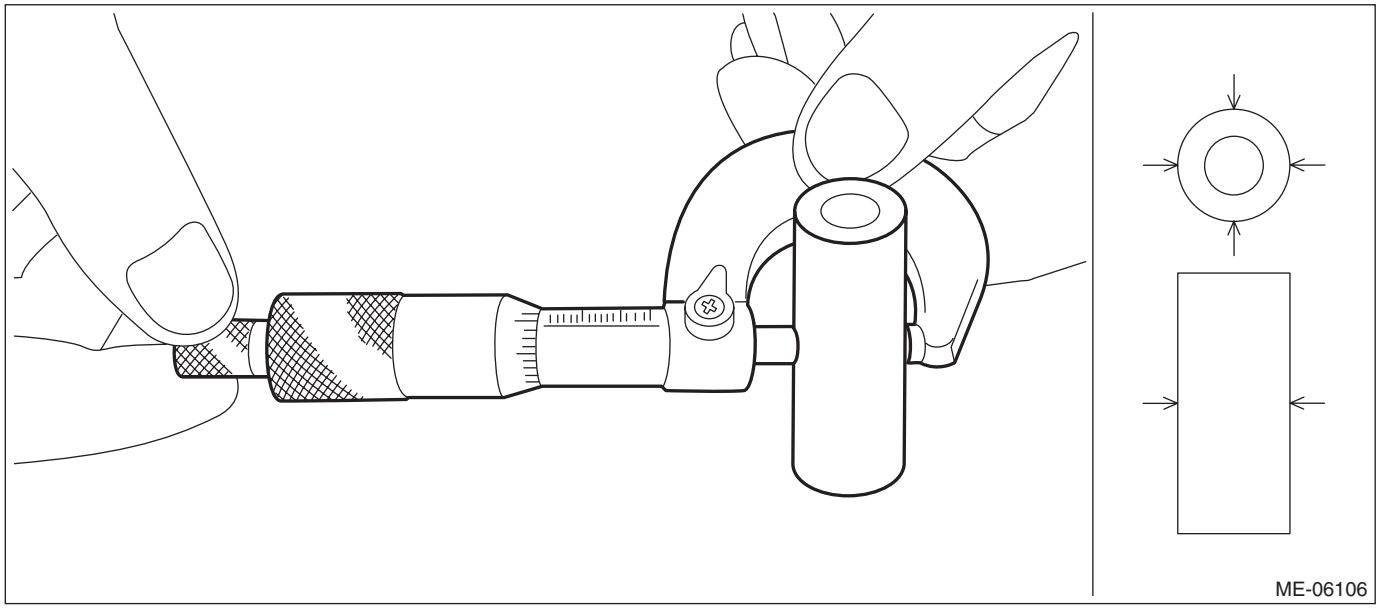


(8) Completely remove the plastigauge.
(9) In the same manner, check oil clearance of the #2, #3 and #4 connecting rod bearings.

5. PISTON PIN & CONNECTING ROD BUSHING

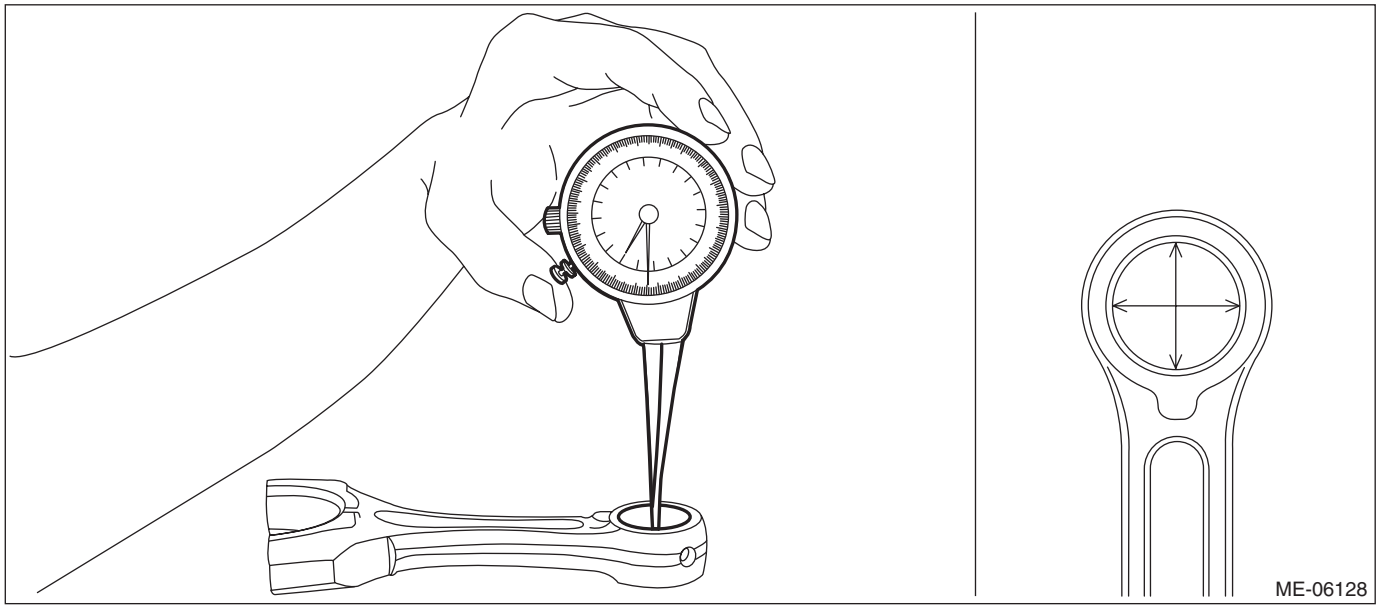
1) Check that the connecting rod bushing is not damaged.
2) Check the clearance between piston pin and connecting rod bushing. Check the clearance between piston pin and connecting rod bushing by measuring the outer diameter of piston pin and the inner diameter of connecting rod bushing respectively.
(1) Measure the outer diameter of piston pin with a micrometer.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the outer diameter of the piston pin at the two locations as shown in the figure, and read the value of most worn location.
- Record the measured value.



(2) Using a caliper gauge, measure the inner diameter of connecting rod bushing.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the inner diameter of the connecting rod bushing at the two locations as shown in the figure, and read the value of most worn location.
- Record the measured value.



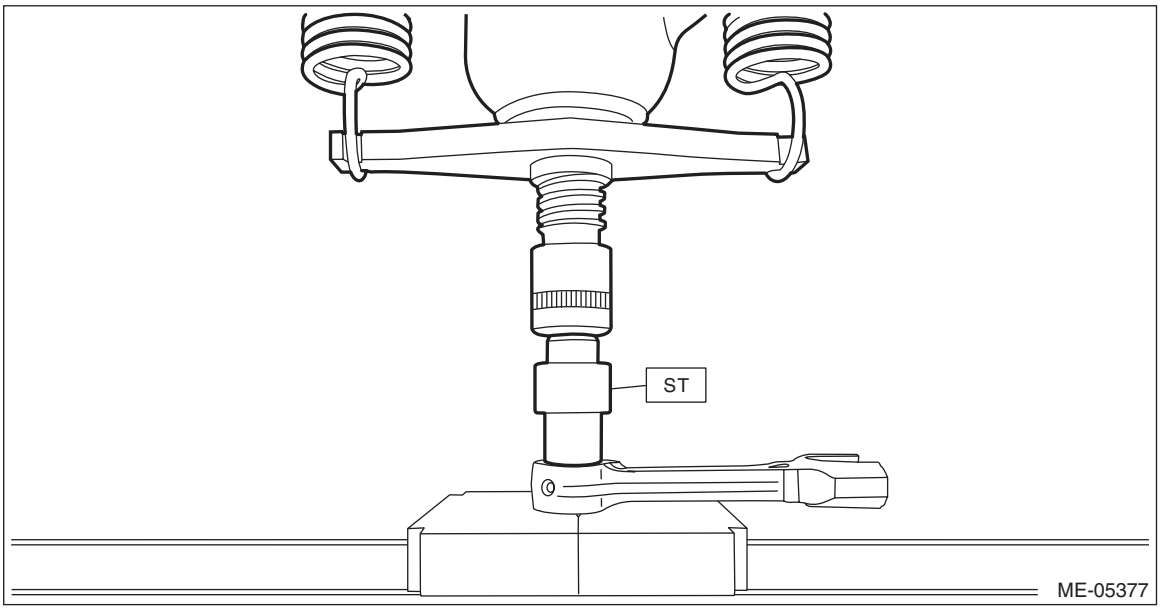
(3) Calculate the clearance between piston pin and connecting rod bushing.

Clearance between piston pin and connecting rod bushing:
Standard
0.004 — 0.026 mm (0.0002 — 0.0010 in)

3) If the clearance between piston pin and connecting rod bushing is not within the standard, replace the connecting rod bushing and piston pin as a set. For replacement procedure of connecting rod bushing, refer to the following.

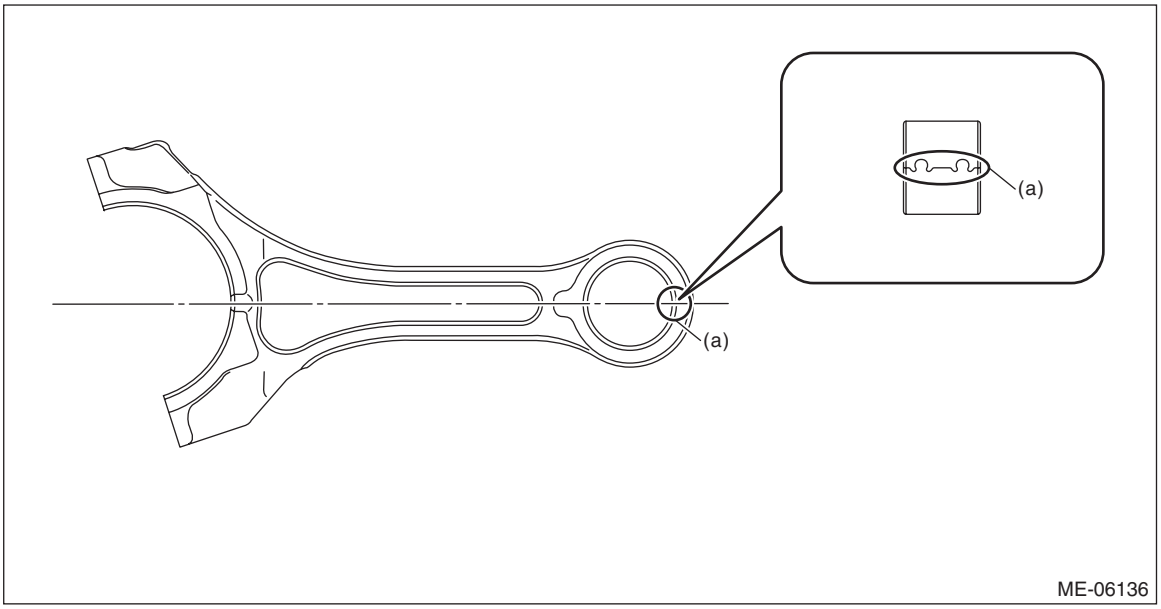
(1) Using the ST and a press, pull out the connecting rod bushing from the small end of the connecting rod.

NOTE:
The direction of ST for pulling out and for press fitting is different. Therefore, attention must be paid to the direction of usage for ST.
ST 18350AA000 CONNECTING ROD BUSHING REMOVER AND INSTALLER



(2) Press the connecting rod bushing with ST and the press, after applying engine oil on the periphery of connecting rod bushing.

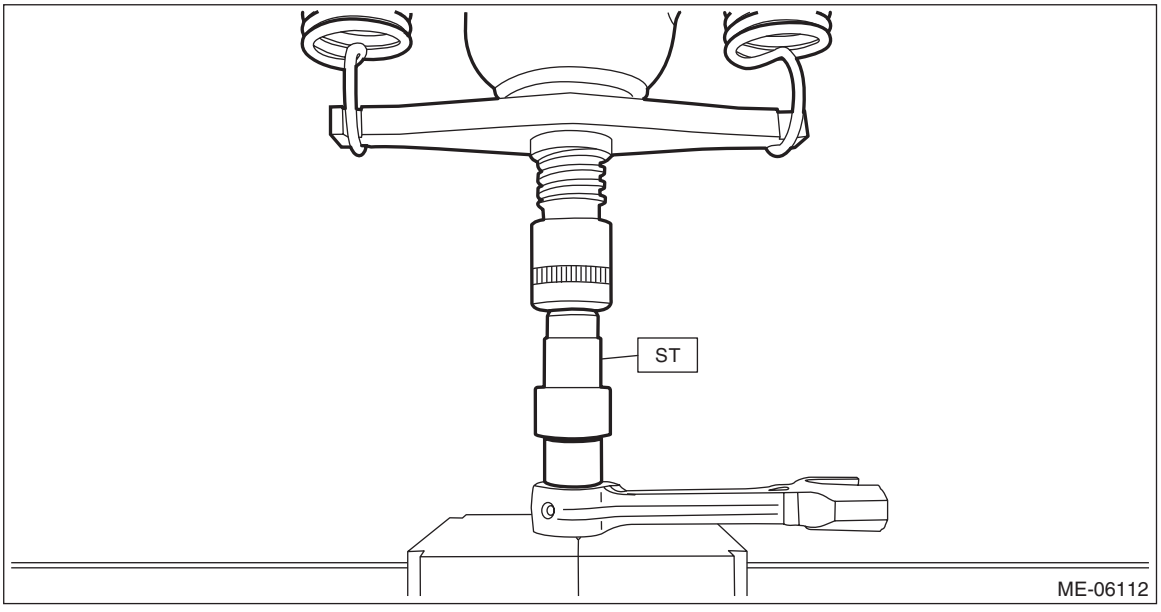
NOTE:
- Clinch area of the connecting rod bushing is as shown in the figure.



(a) Clinch area of connecting rod bushing

- The direction of ST for pulling out and for press fitting is different. Therefore, attention must be paid to the direction of usage for ST.

ST 18350AA000 CONNECTING ROD BUSHING REMOVER AND INSTALLER



(3) Make two 3 mm (0.12 in) holes in the pressed connecting rod bushing by aligning with the pre-manufactured holes provided on the small end of the connecting rod.

(4) Using a reamer, ream the inside surface of the connecting rod bushing. Insert the reamer in the connecting rod bushing, and turn slowly clockwise while pushing lightly. Bring the reamer back while rotating it clockwise.

NOTE:
• Use a reamer with a diameter of ϕ22.
• Apply engine oil to the reamer.
• If the inner surface of connecting rod bushing is damaged, the edge of reamer should be slightly ground with oil stone.
• If the inner surface of connecting rod bushing becomes lustrous and the reamer does not chip, use a new reamer or remedy the reamer.

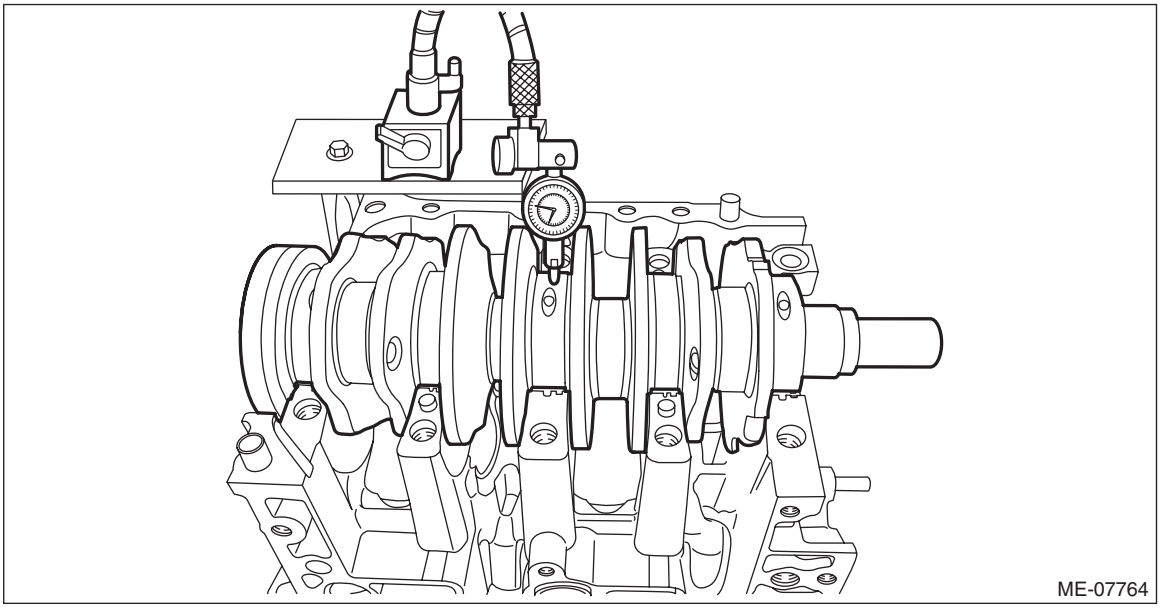
(5) After completion of reaming, clean the connecting rod bushing to remove chips.

6. CRANKSHAFT AND CRANKSHAFT BEARING

1) Clean the crankshaft completely, and check it for cracks using liquid penetrant tester.
2) Using a dial gauge, check the crankshaft bend. If it exceeds the limit, grind to correct the crankshaft journal or replace the crankshaft.

NOTE:
• Measurement should be performed at a temperature of 20°C (68°F).
• If a suitable V-block is not available, using just the #1 and #5 crankshaft bearings on cylinder block, position the crankshaft on cylinder block. Then, measure the crankshaft bend using a dial gauge.
• When grinding to correct the crankshaft journal, refer to step 3).

Crankshaft bend:
Limit
0.035 mm (0.0014 in)



3) Using a micrometer, check the outer diameter of crankshaft pin, outer diameter of journal, cylindricality, and out-of-roundness. If it is not within the standard, replace the connecting rod bearing or crankshaft bearing, and grind to correct the crankshaft pin or journal or replace the crankshaft as required.

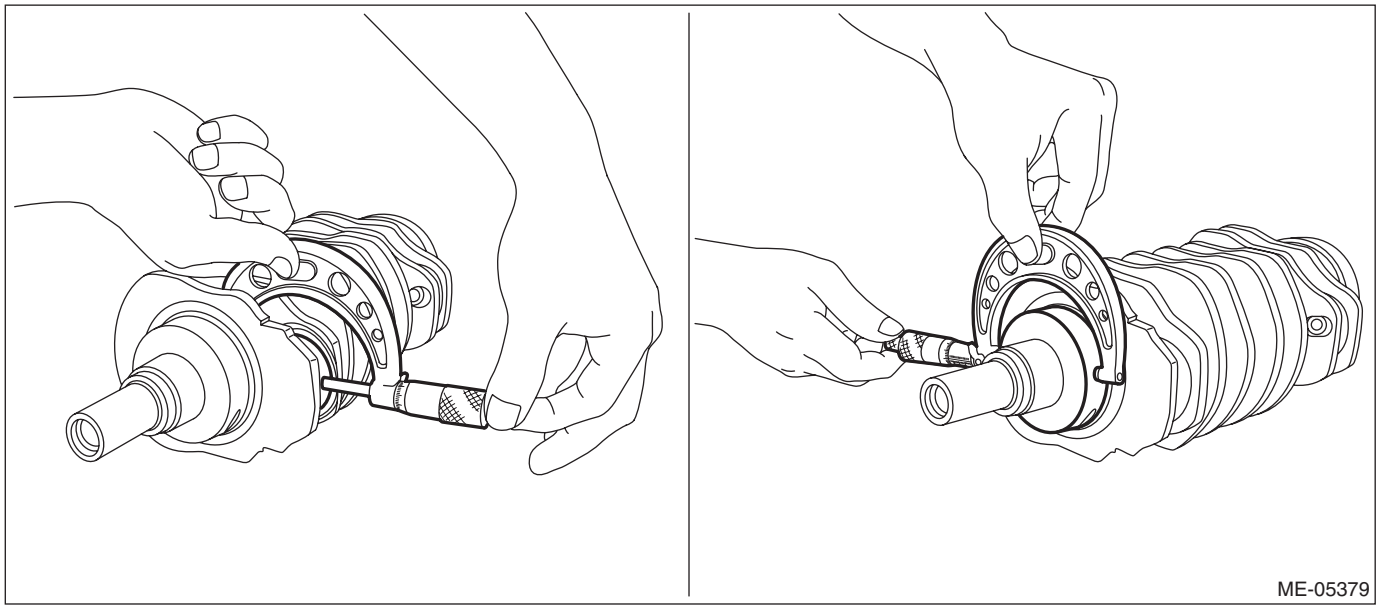
NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Select the suitable size connecting rod bearing or crankshaft bearing when replacing the connecting rod bearing or crankshaft bearing.
- When grinding to correct the crankshaft pin or journal, finish them to the suitable outer diameter as shown in the table below according to the undersize bearing to be used.

Unit: mm (in)

Bearing	Connecting rod bearing thickness (at center)	Crankshaft pin outer diameter	Crankshaft bearing thickness (at center)		Crankshaft journal outer diameter	
			#1, #2, #3, #4	#5	#1, #2, #3, #4	#5
	Standard	Standard	Standard	Standard	Standard	Standard
Standard size	1.492 — 1.508 (0.0587 — 0.0594)	47.976 — 48.000 (1.8888 — 1.8898)	2.498 — 2.513 (0.0983 — 0.0989)	2.496 — 2.511 (0.0983 — 0.0989)	67.985 — 68.003 (2.6766 — 2.6773)	67.985 — 68.003 (2.6766 — 2.6773)
0.03 (0.0012) Undersize	1.511 — 1.515 (0.0595 — 0.0596)	47.946 — 47.970 (1.8876 — 1.8886)	2.519 — 2.522 (0.0992 — 0.0993)	2.517 — 2.520 (0.0991 — 0.0992)	67.955 — 67.979 (2.6754 — 2.6763)	67.955 — 67.979 (2.6754 — 2.6763)
0.05 (0.0020) Undersize	1.521 — 1.525 (0.0599 — 0.0600)	47.926 — 47.950 (1.8868 — 1.8878)	2.529 — 2.532 (0.0996 — 0.0997)	2.527 — 2.530 (0.0995 — 0.0996)	67.935 — 67.959 (2.6746 — 2.6755)	67.935 — 67.959 (2.6746 — 2.6755)
0.25 (0.0098) Undersize	1.621 — 1.625 (0.0638 — 0.0640)	47.726 — 47.750 (1.8790 — 1.8799)	2.629 — 2.632 (0.1035 — 0.1036)	2.627 — 2.630 (0.1034 — 0.1035)	67.735 — 67.759 (2.6667 — 2.6677)	67.735 — 67.759 (2.6667 — 2.6677)

Crankshaft pin:
Cylindricality
Limit
0.006 mm (0.0002 in)
Out-of-roundness
Limit
0.005 mm (0.0002 in)
Grinding limit (dia.)
To 47.726 mm (1.8790 in)

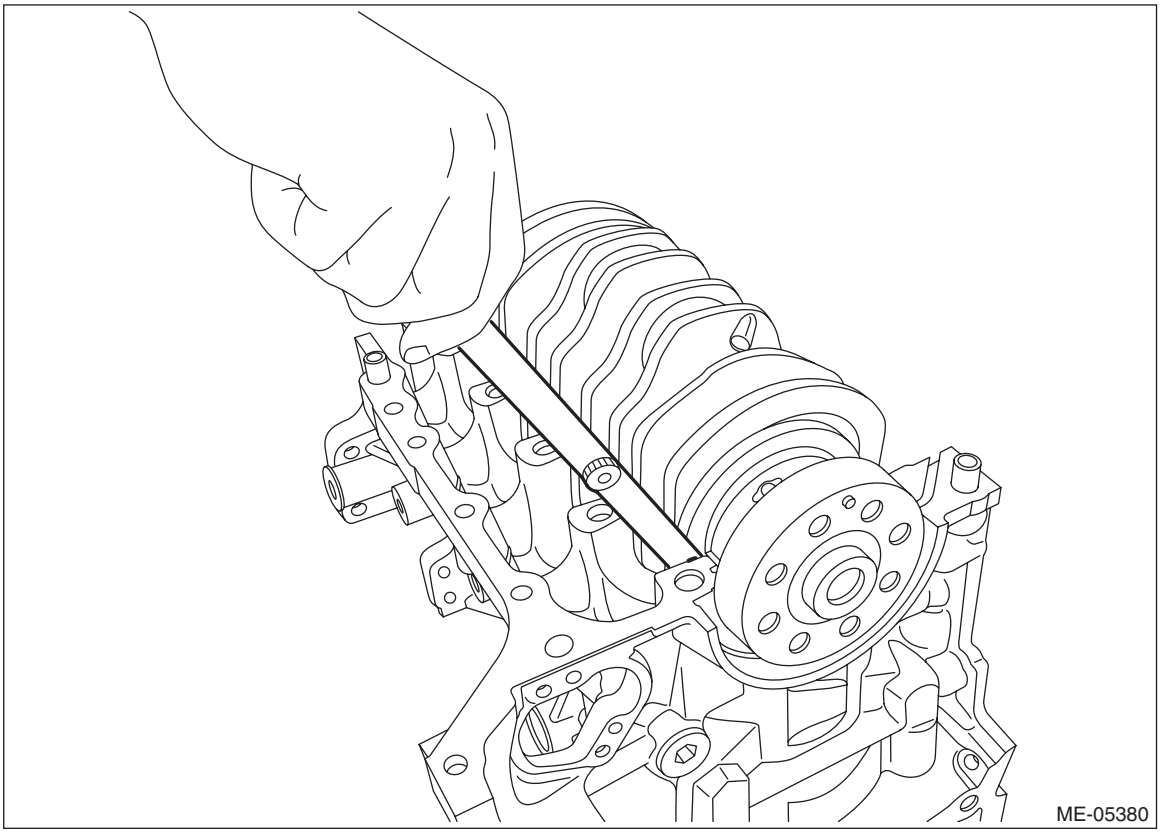
Crankshaft journal:
Cylindricality
Limit
0.006 mm (0.0002 in)
Out-of-roundness
Limit
0.005 mm (0.0002 in)
Grinding limit (dia.)
To 67.735 mm (2.6667 in)



4) Inspect the crankshaft bearing for scar, peeling, seizure, melting or wear, etc.
5) Use a thickness gauge to check the thrust clearance of crankshaft at thrust of #5 crankshaft bearing. If it is not within the standard, replace the #5 crankshaft bearing.

NOTE:
- Measurement should be performed at a temperature of 20°C (68°F).
- Set all the crankshaft bearings onto the cylinder block, then mount the crankshaft on the cylinder block, and use a thickness gauge to measure the thrust clearance of crankshaft.
- Select the #5 crankshaft bearing of suitable size by referring to step 3) when replacing #5 crankshaft bearing.

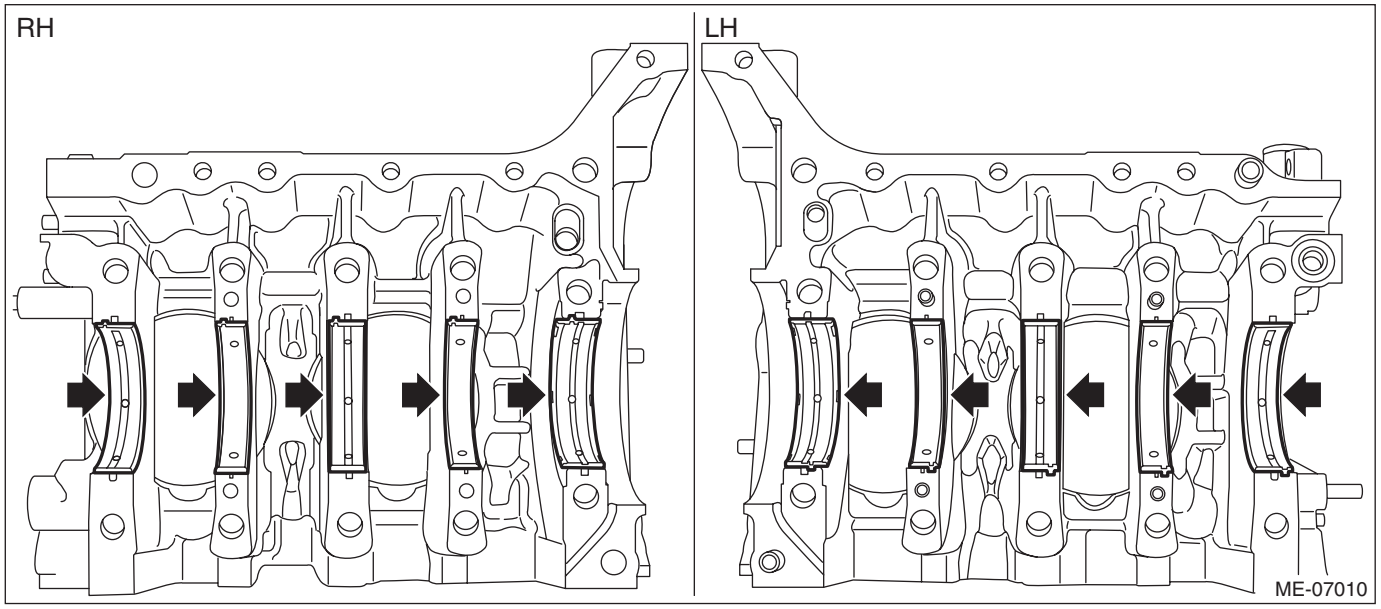
Crankshaft thrust clearance:
Standard
0.130 — 0.308 mm (0.00512 — 0.01213 in)



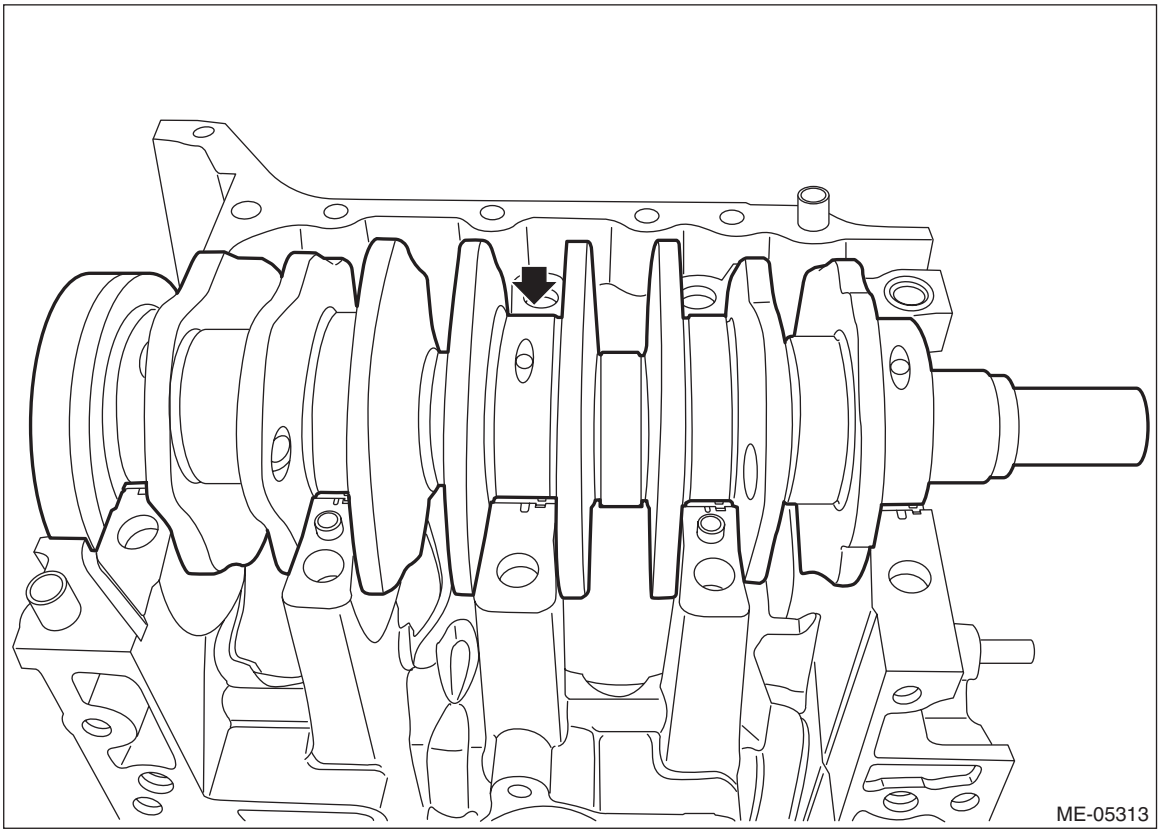
6) Check the oil clearance on each crankshaft bearing using plastigauge.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).
(1) Remove the liquid gasket from cylinder block.
(2) Clean each crankshaft bearing and crankshaft journal.
(3) Set each crankshaft bearing to the cylinder block.

CAUTION:
• Place a wood board wrapped with a waste cloth to prevent the knock pin damage and to stabilize the cylinder block before work.
• Be careful not to scratch the mating surface of cylinder block during work.



(4) Set the crankshaft to the cylinder block LH.

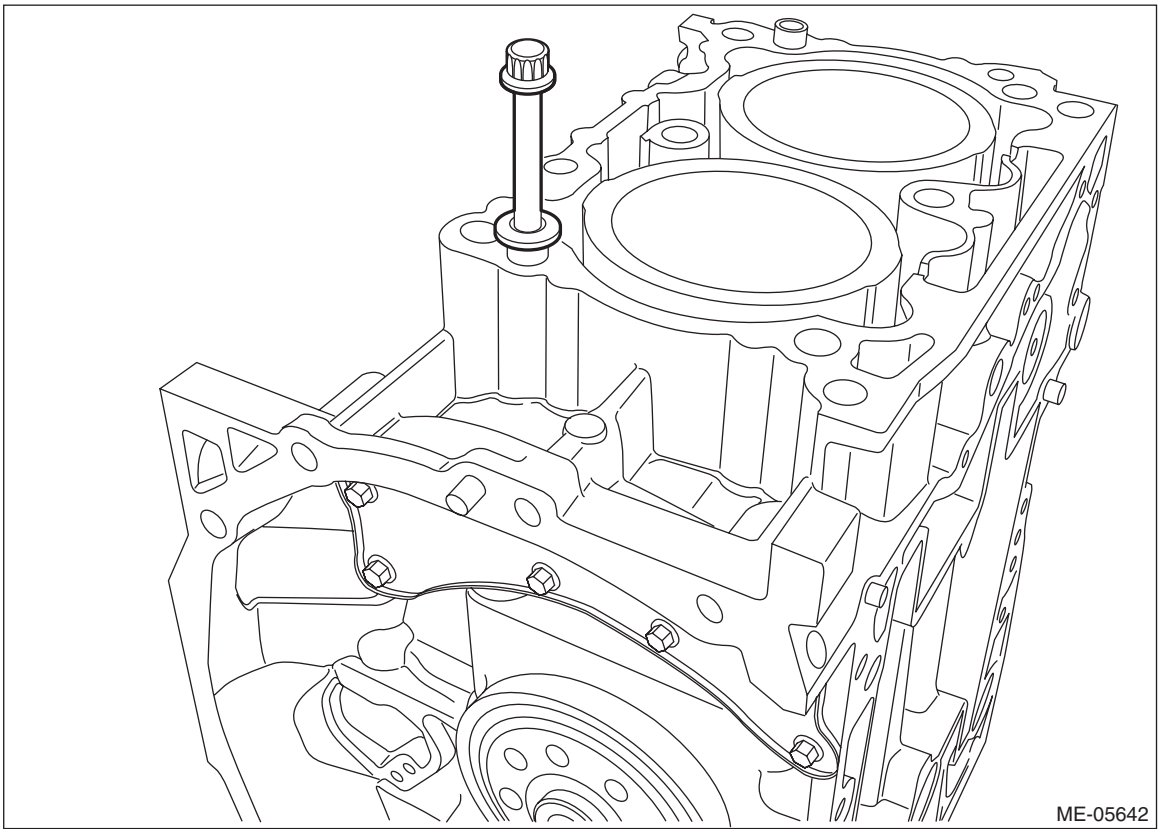


(5) Place a plastigauge across the crankshaft journals and set the cylinder block RH to the cylinder block LH.
(6) Apply a coat of engine oil to the washers and cylinder block mounting bolt threads.

NOTE:
To prevent mixture of engine oil into the water jacket, do not apply a large amount.

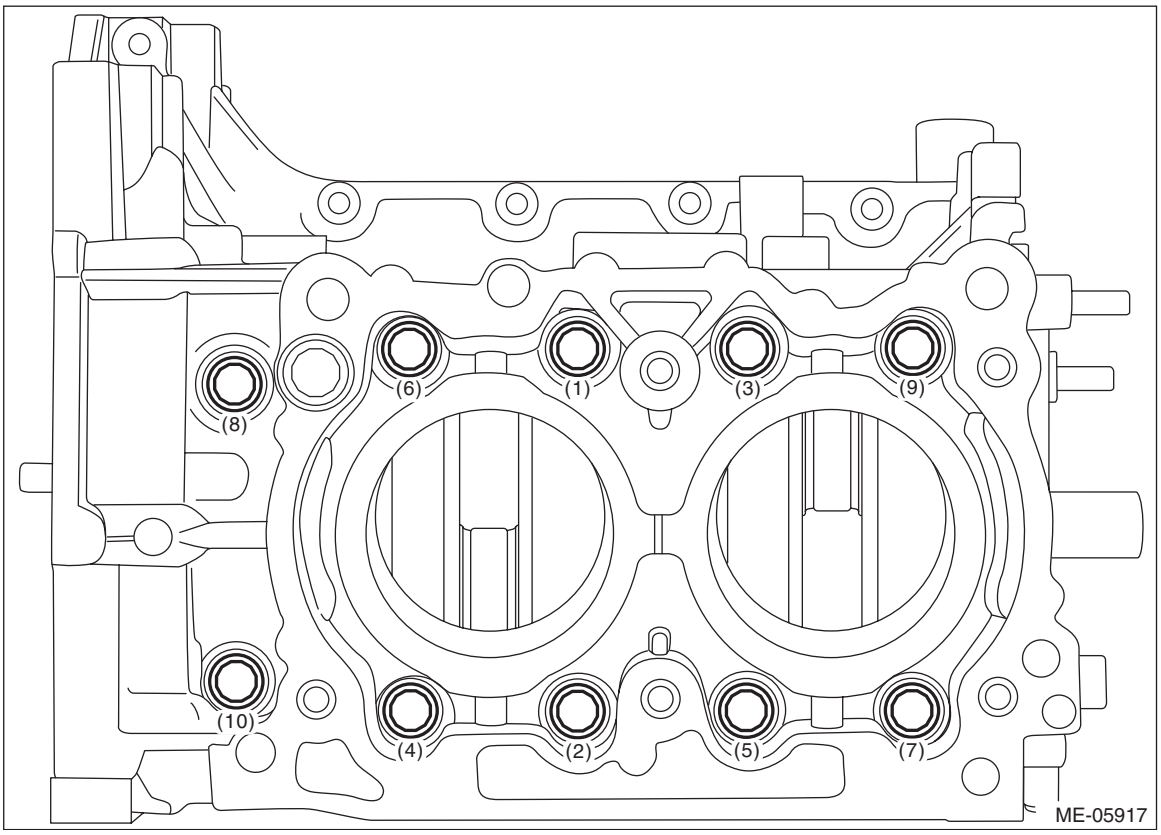
(7) Install the cylinder head bolt at the locations shown in the figure.

NOTE:
This procedure is required to tighten the cylinder block mounting bolts with specified angle using ST.



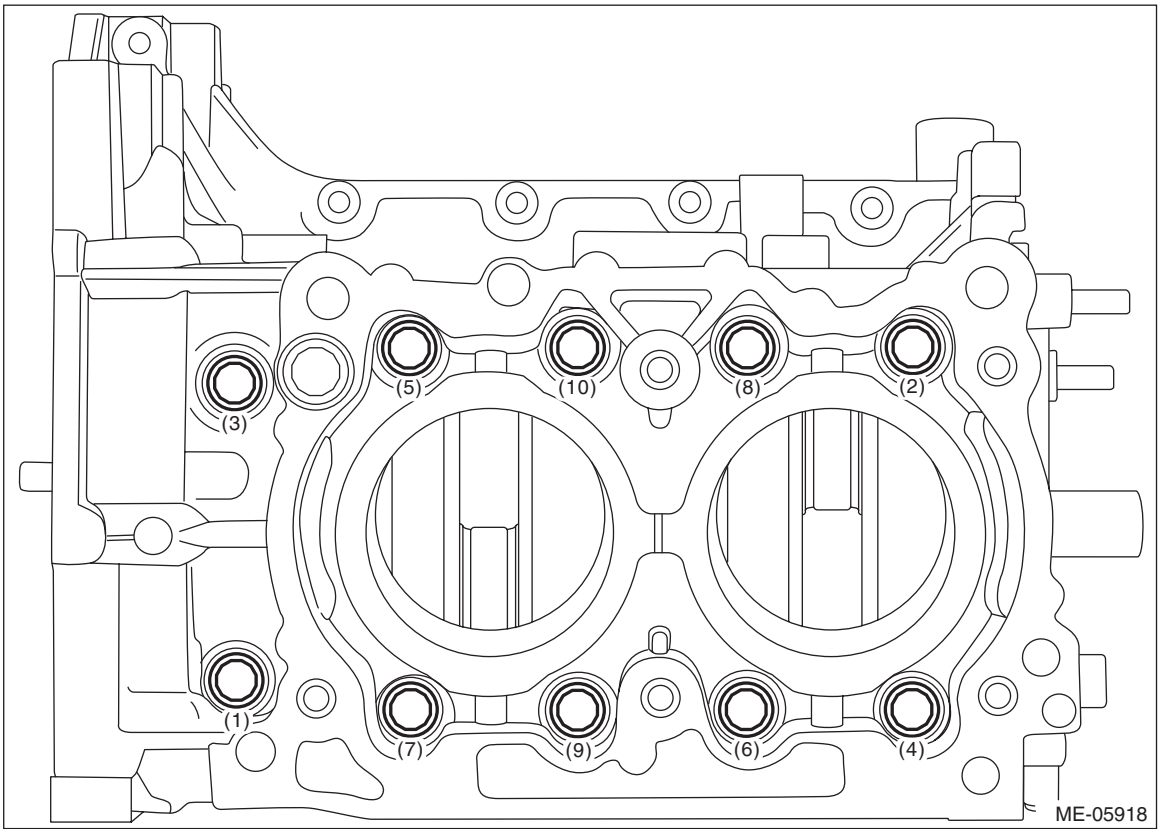
(8) Tighten all mounting bolts with a torque of 35 N·m (3.6 kgf-m, 25.8 ft-lb) in numerical order as shown in the figure.

CAUTION:
When tightening the mounting bolts with specified torque, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



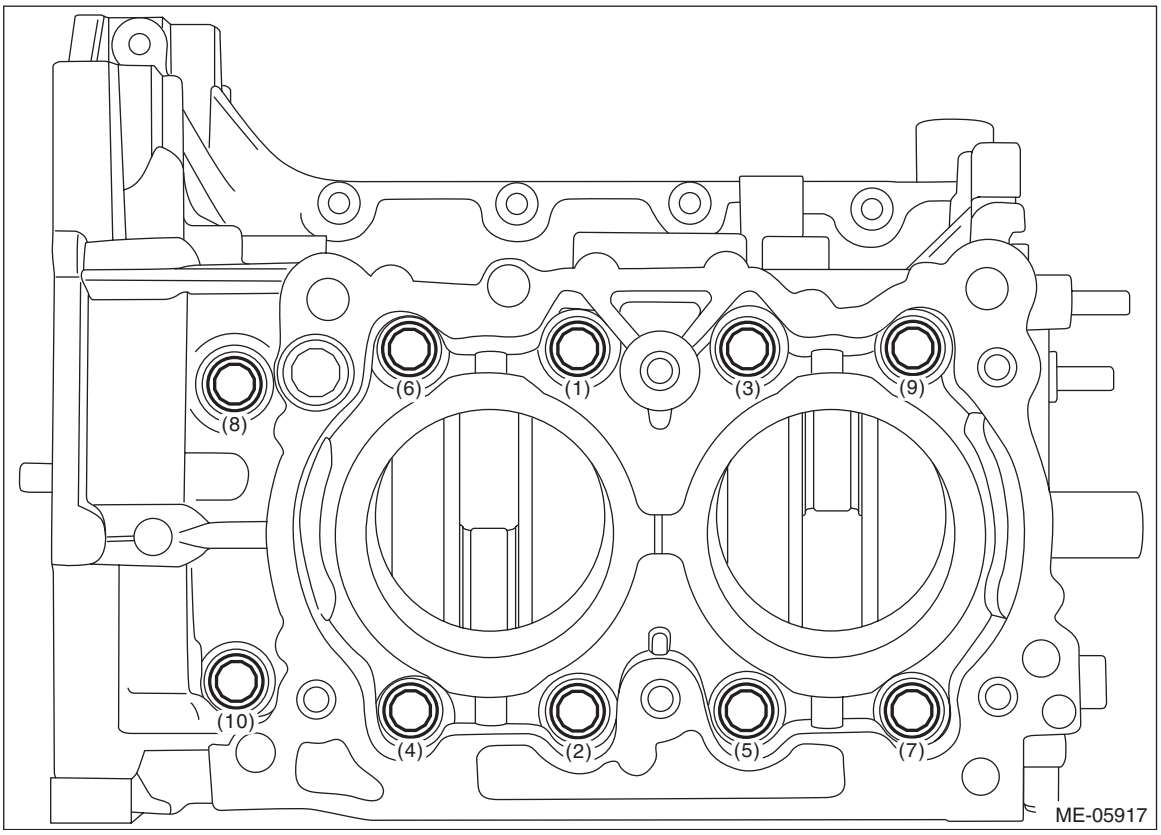
(9) Loosen all mounting bolts by 180° in numerical order as shown in the figure.

CAUTION:
When loosening the mounting bolts, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



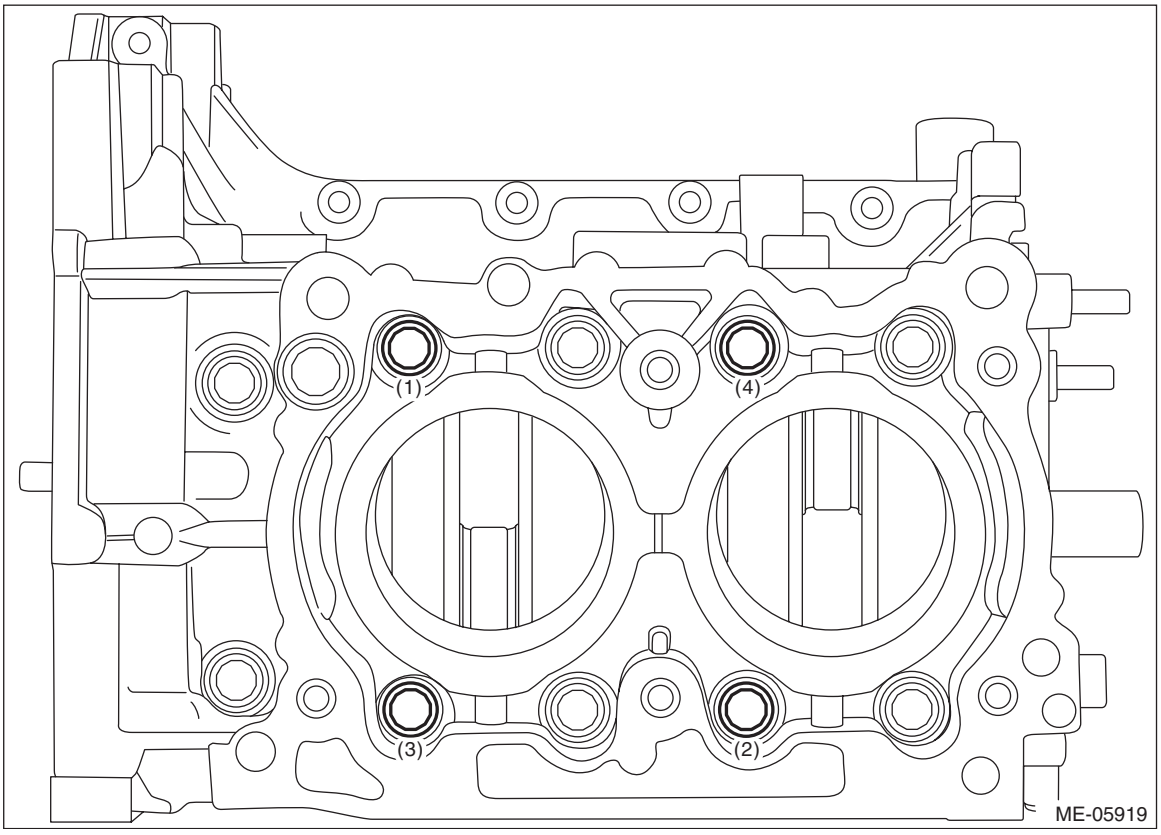
(10) Tighten all mounting bolts with a torque of 35 N·m (3.6 kgf-m, 25.8 ft-lb) in numerical order as shown in the figure.

CAUTION:
When tightening the mounting bolts with specified torque, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



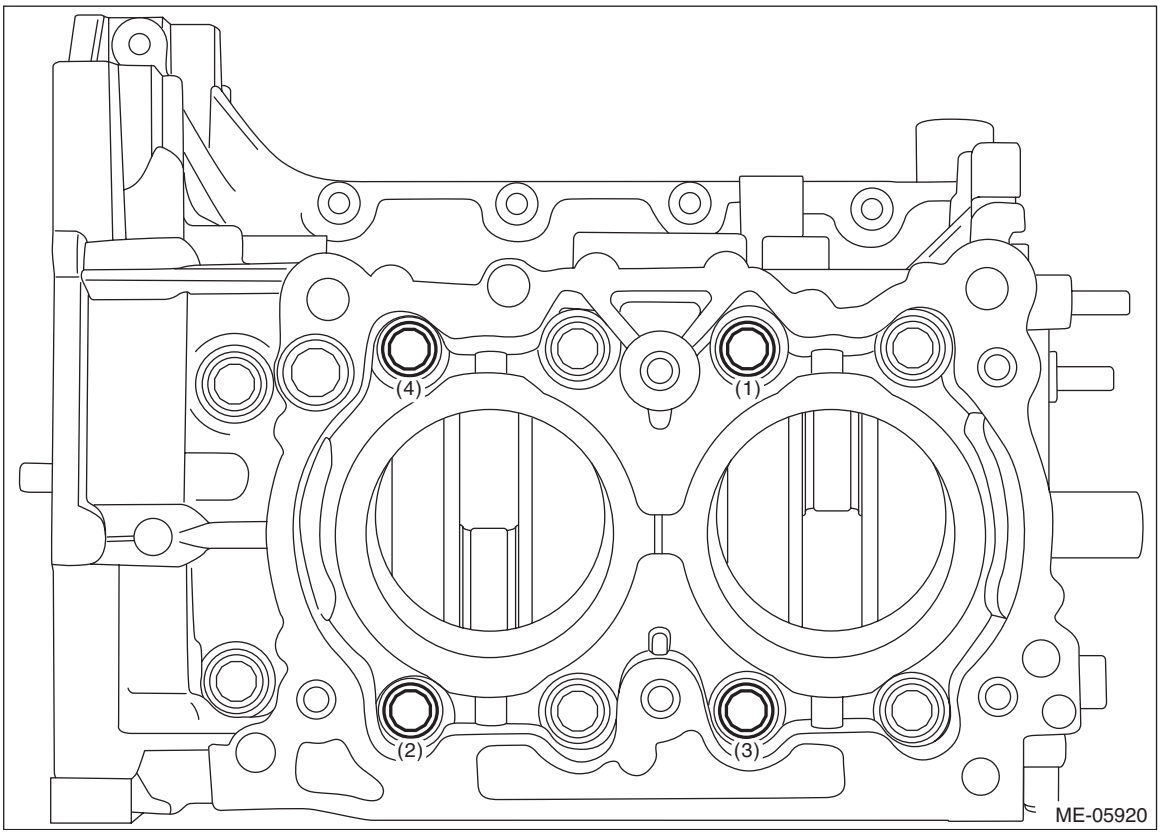
(11) Loosen the mounting bolts (4 places) by 180° in numerical order as shown in the figure.

CAUTION:
When loosening the mounting bolts, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



(12) Tighten the mounting bolts (4 places) with a torque of 17 N·m (1.7 kgf-m, 12.5 ft-lb) in numerical order as shown in the figure.

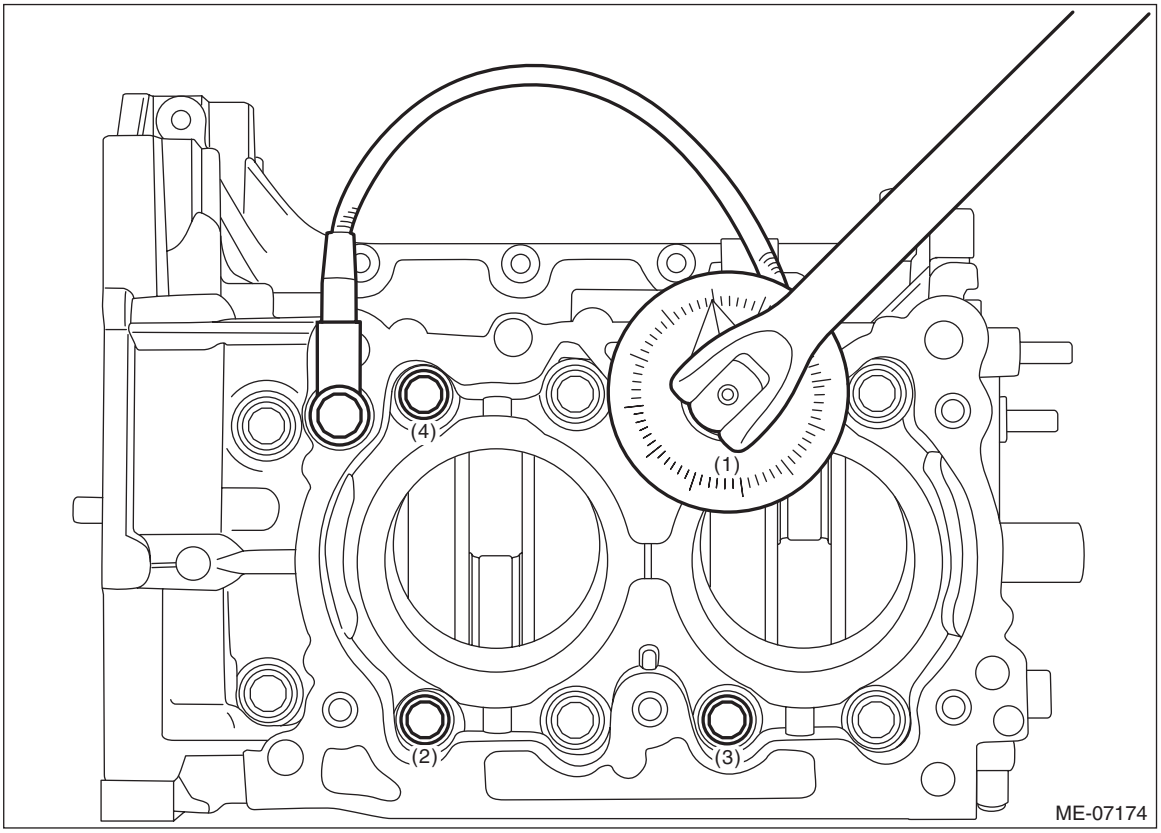
CAUTION:
When tightening the mounting bolts with specified torque, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



(13) Using angle gauge, tighten the mounting bolts (4 places) with specified angle in numerical order as shown in the figure.

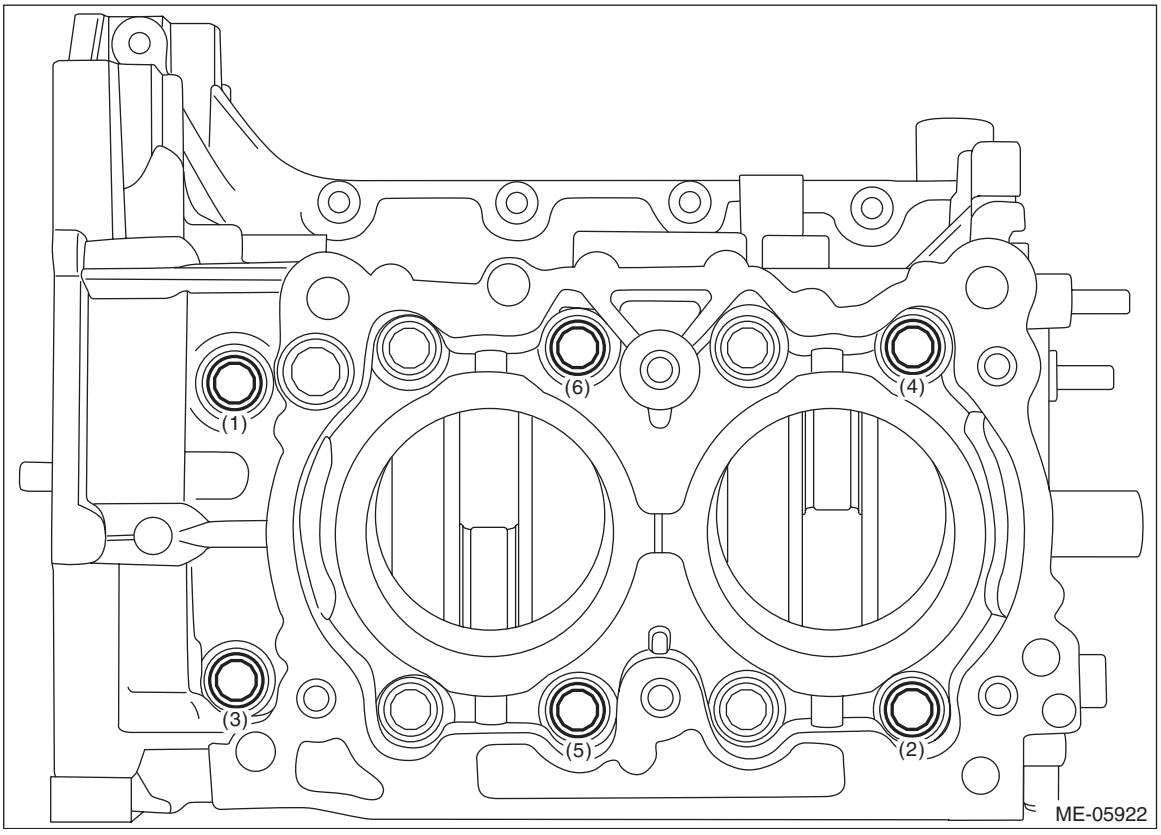
CAUTION:
When tightening the mounting bolts with specified angle, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.

Tightening angle:
60°±2°



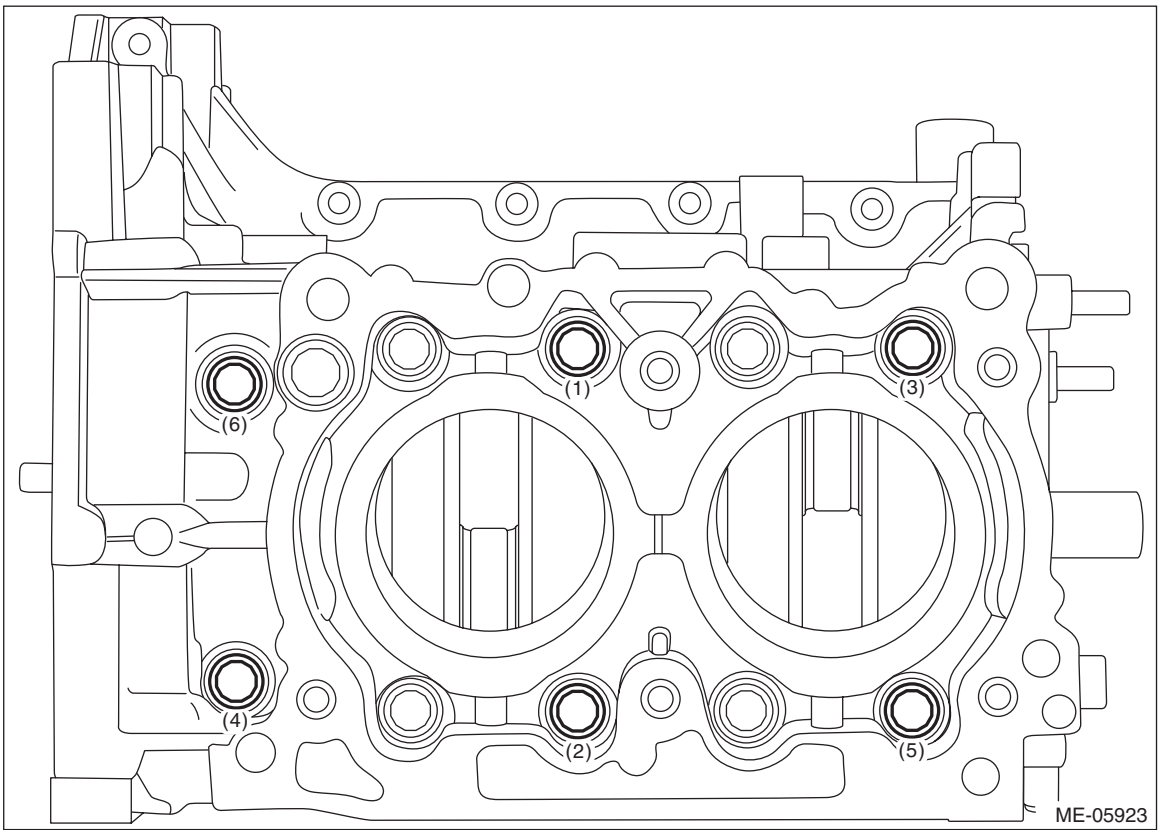
(14) Loosen the mounting bolts (6 places) by 180° in numerical order as shown in the figure.

CAUTION:
When loosening the mounting bolts, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



(15) Tighten the mounting bolts (6 places) with a torque of 17 N·m (1.7 kgf-m, 12.5 ft-lb) in numerical order as shown in the figure.

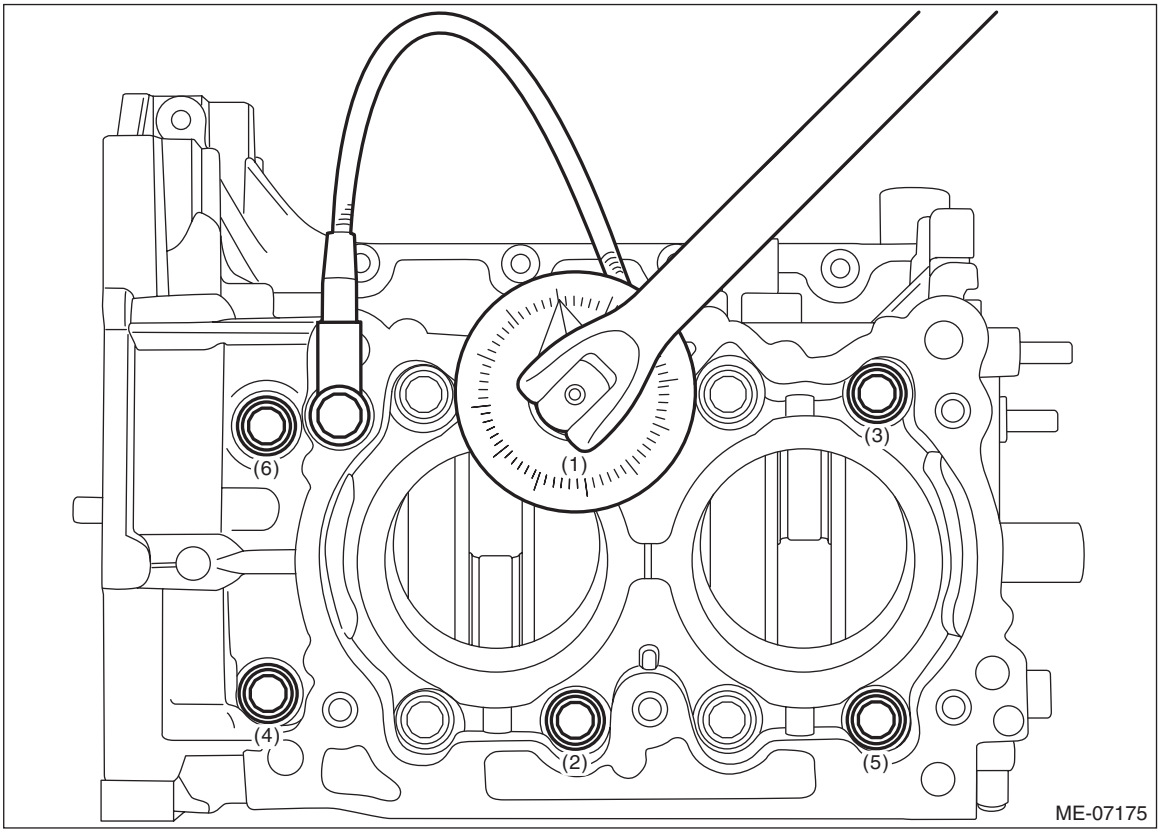
CAUTION:
When tightening the mounting bolts with specified torque, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.



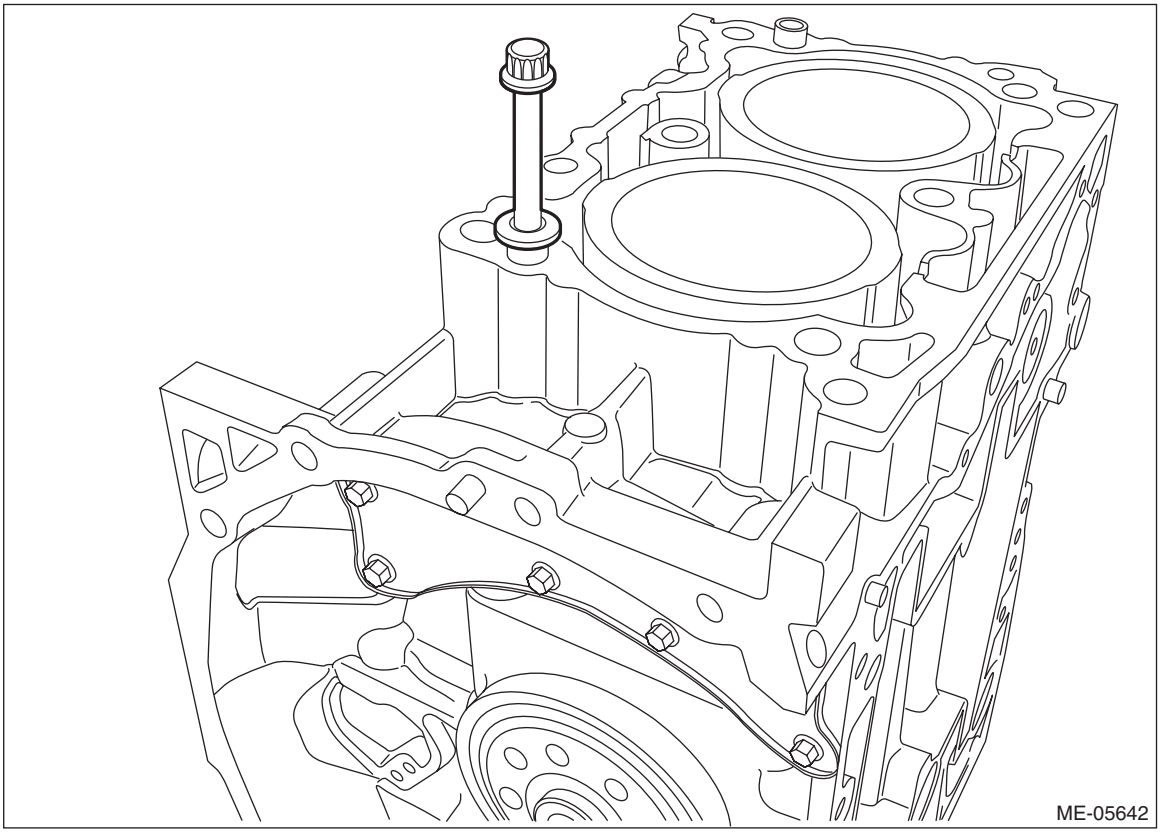
(16) Using angle gauge, tighten the mounting bolts (6 places) with specified angle in numerical order as shown in the figure.

CAUTION:
When tightening the mounting bolts with specified angle, hold the cylinder block LH while not holding the cylinder block RH to ensure the joint accuracy of the cylinder block.

Tightening angle:
60°±2°

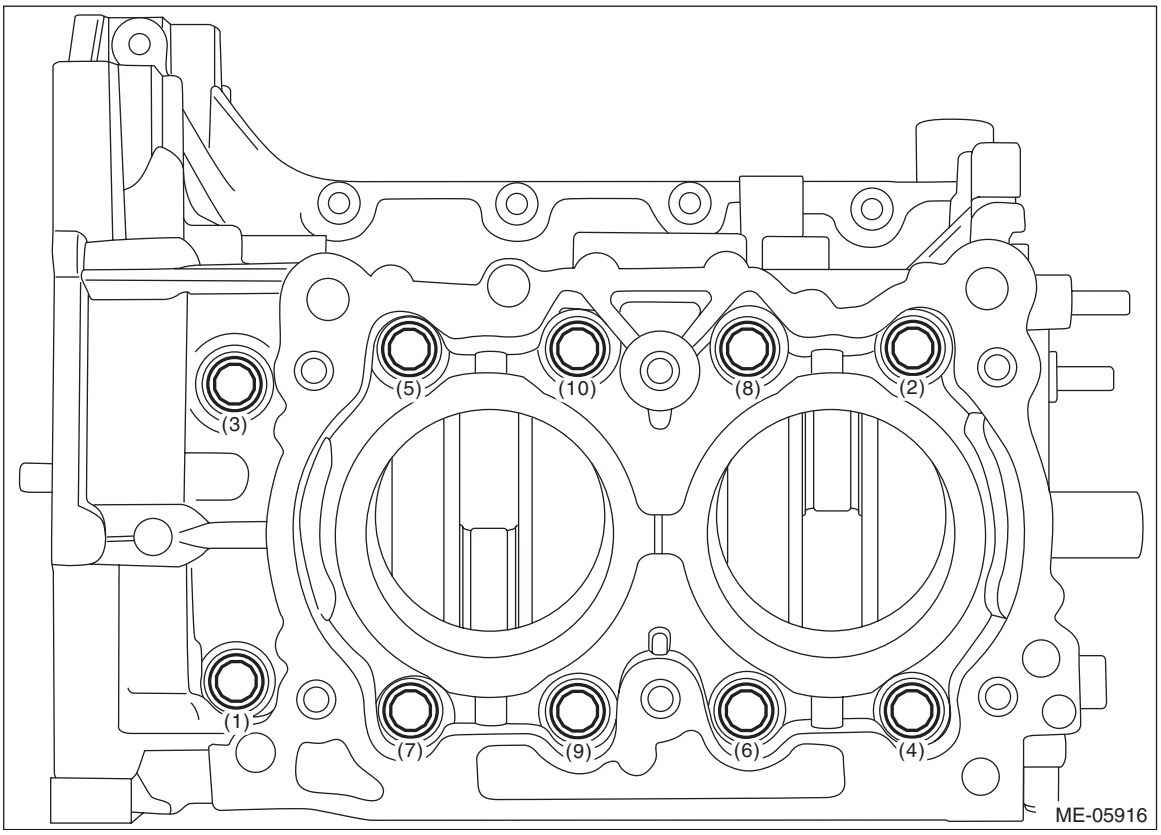


(17) Remove the cylinder head bolt attached at the locations shown in the figure.



(18) Loosen the cylinder block mounting bolts in numerical order as shown in the figure, and separate the cylinder block RH and LH.

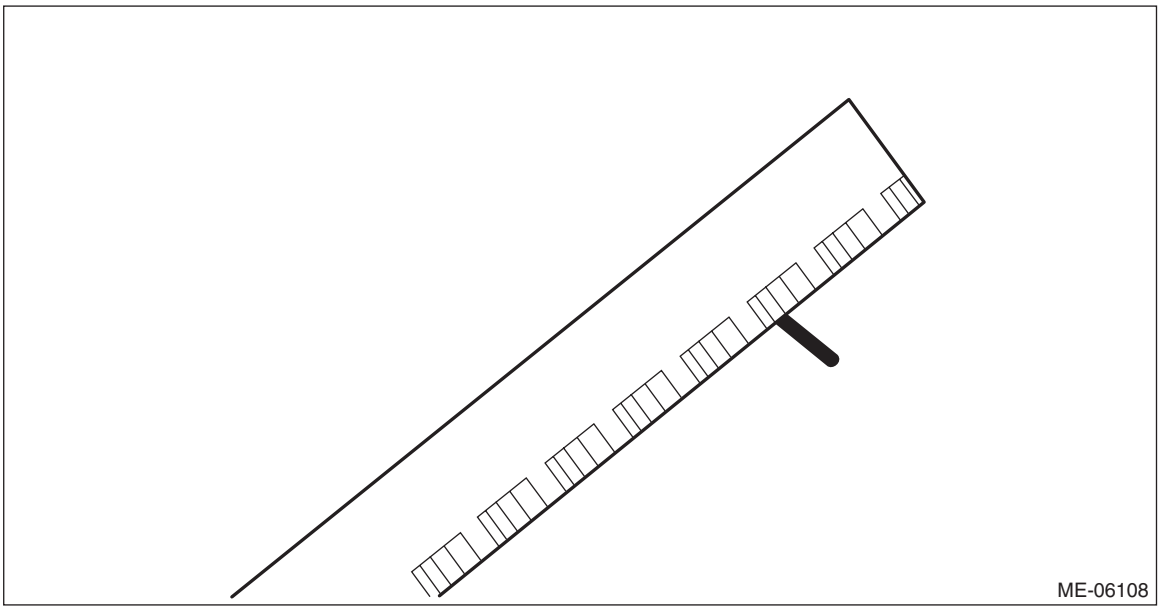
NOTE:
Lift the cylinder block RH slightly, and confirm that the crankshaft is remaining in the cylinder block LH. If the cylinder block RH is lifted carelessly when separating, the crankshaft may stick to cylinder block RH, then fall off.



(19) Determine the crankshaft oil clearance by matching the widest point of the plastigauge on each journal against scale printed on a package of the plastigauge. If it is not within the standard, replace the crankshaft bearing, and grind to correct the crankshaft journal or replace the crankshaft as required.

NOTE:
- Select the crankshaft bearing of suitable size by referring to step 3) when replacing crankshaft bearing.
- When grinding to correct the crankshaft journal, finish it to the suitable outer diameter by referring to step 3) according to the undersize bearing to be used.

Crankshaft oil clearance:
Standard
0.013 — 0.031 mm (0.00051 — 0.00122 in)



(20) Completely remove the plastigauge.

23.Intake and Exhaust Valve

A: SPECIFICATION

Refer to “Cylinder Head” for removal and installation procedures of the intake and exhaust valves. <Ref. to ME(H4DO(w/o HEV))-267, REMOVAL, Cylinder Head.> <Ref. to ME(H4DO(w/o HEV))-269, INSTALLATION, Cylinder Head.>

24.Piston

A: SPECIFICATION

Refer to “Cylinder Block” for removal and installation procedures of pistons. <Ref. to ME(H4DO(w/o HEV))-309, REMOVAL, Cylinder Block.> <Ref. to ME(H4DO(w/o HEV))-328, INSTALLATION, Cylinder Block.>

25.Connecting Rod

A: SPECIFICATION

Refer to “Cylinder Block” for removal and installation procedures of connecting rod.
<Ref. to ME(H4DO(w/o HEV))-309, REMOVAL, Cylinder Block.> <Ref. to ME(H4DO(w/o HEV))-328, INSTALLATION, Cylinder Block.>

26.Crankshaft

A: SPECIFICATION

Refer to “Cylinder Block” for removal and installation procedures of the crankshaft. <Ref. to ME(H4DO(w/o HEV))-309, REMOVAL, Cylinder Block.> <Ref. to ME(H4DO(w/o HEV))-328, INSTALLATION, Cylinder Block.>

27.Engine Trouble in General

A: INSPECTION

NOTE:
The “RANK” shown in the chart shows the possibilities of the cause of trouble in order from “Very often” to “Rarely”.
A — Very often
B — Sometimes
C — Rarely

Symptoms	Problem parts etc.	Possible cause	RANK
1. Engine does not start.			
1) Starter does not turn.	Starter	Defective battery-to-starter harness	B
		Defective starter switch	C
		Defective inhibitor switch	C
		Defective starter	B
	Battery	Improper connection of terminal	A
		Run-down battery	A
		Defective charging system	B
	Friction	Seizure of crankshaft and connecting rod bearing	C
		Seized camshaft	C
		Seized or stuck piston and cylinder	C
	Immobilizer system <Ref. to IM(diag)-2, Basic Diagnostic Procedure.>		A
2) Initial combustion does not occur.	Starter	Defective starter	C
	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Fuel line	Defective fuel pump and relay	A
		Clogged fuel line	C
		Lack of fuel or insufficient fuel	B
	Timing chain	Trouble	B
		Defective timing	B
	Compression	Incorrect cam clearance	C
		Loosened spark plug or defective gasket	C
		Loosened cylinder head bolt or defective cylinder head gasket	C
		Improper valve sealing	C
		Defective valve stem	C
		Worn or broken valve spring	B
		Worn or stuck piston rings, cylinder liner and piston	C
		Incorrect valve timing	B
		Improper engine oil (low viscosity)	B

Symptoms	Problem parts etc.	Possible cause	RANK
3) Initial combustion occurs.	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Defective intake manifold gasket	B
		Defective throttle body gasket	B
	Fuel line	Defective fuel pump and relay	C
		Clogged fuel line	C
		Lack of fuel or insufficient fuel	B
	Timing chain	Trouble	B
		Defective timing	B
	Compression	Incorrect cam clearance	C
		Loosened spark plug or defective gasket	C
		Loosened cylinder head bolt or defective cylinder head gasket	C
		Improper valve sealing	C
		Defective valve stem	C
		Worn or broken valve spring	B
		Worn or stuck piston rings, cylinder liner and piston	C
		Incorrect valve timing	B
		Improper engine oil (low viscosity)	B
4) Engine stalls after initial combustion.	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Loosened or cracked intake duct	B
		Loosened or cracked PCV hose	C
		Loosened or cracked vacuum hose	C
		Defective intake manifold gasket	B
		Defective throttle body gasket	B
		Dirty air cleaner element	C
	Fuel line	Clogged fuel line	C
		Lack of fuel or insufficient fuel	B
	Timing chain	Trouble	B
		Defective timing	B
	Compression	Incorrect cam clearance	C
		Loosened spark plug or defective gasket	C
		Loosened cylinder head bolt or defective cylinder head gasket	C
		Improper valve sealing	C
		Defective valve stem	C
		Worn or broken valve spring	B
		Worn or stuck piston rings, cylinder and piston	C
		Incorrect valve timing	B
		Improper engine oil (low viscosity)	B

Symptoms	Problem parts etc.	Possible cause	RANK
2. Rough idle and engine stall	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Loosened or cracked intake duct	A
		Loosened or cracked PCV hose	A
		Loosened or cracked vacuum hose	A
		Defective intake manifold gasket	B
		Defective throttle body gasket	B
		Defective PCV valve	C
		Loosened oil filler cap	B
		Dirty air cleaner element	C
	Fuel line	Defective fuel pump and relay	C
		Clogged fuel line	C
		Lack of fuel or insufficient fuel	B
	Timing chain	Defective timing	C
	Compression	Incorrect cam clearance	B
		Loosened spark plug or defective gasket	B
		Loosened cylinder head bolt or defective cylinder head gasket	B
		Improper valve sealing	B
		Defective valve stem	C
		Worn or broken valve spring	B
		Worn or stuck piston rings, cylinder and piston	B
		Incorrect valve timing	A
		Improper engine oil (low viscosity)	B
	Lubrication system	Incorrect oil pressure	B
		Defective rocker cover gasket	C
	Cooling system	Over-heating	C
	Other	Evaporative emission control system malfunction	A
		Stuck or damaged throttle valve	B

Symptoms	Problem parts etc.	Possible cause	RANK
3. Low output, hesitation and poor acceleration	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Loosened or cracked intake duct	A
		Loosened or cracked PCV hose	A
		Loosened or cracked vacuum hose	B
		Defective intake manifold gasket	B
		Defective throttle body gasket	B
		Defective PCV valve	B
		Loosened oil filler cap	B
		Dirty air cleaner element	A
	Fuel line	Defective fuel pump and relay	B
		Clogged fuel line	B
		Lack of fuel or insufficient fuel	C
	Timing chain	Defective timing	B
	Compression	Incorrect cam clearance	B
		Loosened spark plug or defective gasket	B
		Loosened cylinder head bolt or defective cylinder head gasket	B
		Improper valve sealing	B
		Defective valve stem	C
		Worn or broken valve spring	B
		Worn or stuck piston rings, cylinder and piston	C
		Incorrect valve timing	A
		Improper engine oil (low viscosity)	B
	Lubrication system	Incorrect oil pressure	B
	Cooling system	Over-heating	C
		Over-cooling	C
	Other	Evaporative emission control system malfunction	A

Symptoms	Problem parts etc.	Possible cause	RANK
4. Surging	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Loosened or cracked intake duct	A
		Loosened or cracked PCV hose	A
		Loosened or cracked vacuum hose	A
		Defective intake manifold gasket	B
		Defective throttle body gasket	B
		Defective PCV valve	B
		Loosened oil filler cap	B
		Dirty air cleaner element	B
	Fuel line	Defective fuel pump and relay	B
		Clogged fuel line	B
		Lack of fuel or insufficient fuel	C
	Timing chain	Defective timing	B
	Compression	Incorrect cam clearance	B
		Loosened spark plug or defective gasket	C
		Loosened cylinder head bolt or defective cylinder head gasket	C
		Improper valve sealing	C
		Defective valve stem	C
		Worn or broken valve spring	C
		Worn or stuck piston rings, cylinder and piston	C
		Incorrect valve timing	A
		Improper engine oil (low viscosity)	B
	Cooling system	Over-heating	B
	Other	Evaporative emission control system malfunction	C
5. Engine does not return to idle	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Loosened or cracked vacuum hose	A
	Other	Stuck or damaged throttle valve	A
6. Dieseling (run-on)	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Cooling system	Over-heating	B
	Other	Evaporative emission control system malfunction	B

Symptoms	Problem parts etc.	Possible cause	RANK
7. After burning in exhaust system	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Loosened or cracked intake duct	C
		Loosened or cracked PCV hose	C
		Loosened or cracked vacuum hose	B
		Defective PCV valve	B
		Loosened oil filler cap	C
	Timing chain	Defective timing	B
	Compression	Incorrect cam clearance	B
		Loosened spark plug or defective gasket	C
		Loosened cylinder head bolt or defective cylinder head gasket	C
		Improper valve sealing	B
		Defective valve stem	C
		Worn or broken valve spring	C
		Worn or stuck piston rings, cylinder and piston	C
		Incorrect valve timing	A
	Lubrication system	Incorrect oil pressure	C
	Cooling system	Over-cooling	C
	Other	Evaporative emission control system malfunction	C
8. Knocking	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Loosened oil filler cap	B
	Timing chain	Defective timing	B
	Compression	Incorrect cam clearance	C
		Incorrect valve timing	B
	Cooling system	Over-heating	A
9. Excessive engine oil consumption	Intake system	Loosened or cracked PCV hose	A
		Defective PCV valve	B
		Loosened oil filler cap	C
	Compression	Defective valve stem	A
		Worn or stuck piston rings, cylinder and piston	A
	Lubrication system	Loosened chain cover attaching bolts and defective gasket	B
		Defective oil filter gasket	B
		Defective crankshaft oil seal	B
		Defective rocker cover gasket	B
		Loosened oil drain plug or defective gasket	B
		Loosened oil pan mounting bolt or defective oil pan	B

Symptoms	Problem parts etc.	Possible cause	RANK
10. Excessive fuel consumption	Engine control system <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>		A
	Intake system	Dirty air cleaner element	A
	Timing chain	Defective timing	B
	Compression	Incorrect cam clearance	B
		Loosened spark plug or defective gasket	C
		Loosened cylinder head bolt or defective cylinder gasket	C
		Improper valve sealing	B
		Defective valve stem	C
		Worn or broken valve spring	C
		Worn or stuck piston rings, cylinder and piston	B
		Incorrect valve timing	B
	Lubrication system	Incorrect oil pressure	C
	Cooling system	Over-cooling	C

28.Engine Noise

A: INSPECTION

Type of sound	Condition	Possible cause
Regular clicking sound	Sound increases as engine speed increases.	• Valve mechanism is defective • Incorrect cam clearance • Worn camshaft • Broken valve spring • Defective valve shim
Heavy and dull clank	Oil pressure is low.	• Worn crankshaft bearing • Worn connecting rod bearing
	Oil pressure is normal.	• Loosened flywheel mounting bolt • Damaged engine mounting
High-pitched clank	Sound is noticeable when accelerating with an overload condition.	• Ignition timing advanced • Accumulation of carbon inside combustion chamber • Wrong heat range of spark plug • Improper octane value gasoline
Clank noise when engine speed is between 1,000 and 2,000 r/min	Sound is reduced when the fuel injector connector of the noisy cylinder is disconnected.*	• Worn crankshaft bearing • Worn connecting rod bearing
Knocking sound when engine is operating under idling speed and engine is warm	Sound is reduced when the fuel injector connector of the noisy cylinder is disconnected.*	• Worn cylinder liner and piston ring • Broken or stuck piston ring • Worn piston pin and piton pin hole of piston
	Sound is not reduced if each fuel injector connector is disconnected in turn.*	• Unusually worn valve rocker • Unusually worn valve shim • Worn cam sprocket • Worn journal of cam carrier and camshaft cap
Squeaky sound	—	• Insufficient generator lubrication
Rubbing sound	—	• Poor contact of generator brush and rotor
Gear scream when starting engine	—	• Defective ignition starter switch • Worn gear and starter pinion
Sound like polishing glass with a dry cloth	—	• Defective V-belt tensioner assembly (loose V-belt) • Defective water pump shaft
Hissing sound	—	• Insufficient compression • Air leakage in air intake system, hose, connection or manifold
Timing chain noise	—	• Loose timing chain • Timing chain contacting with adjacent part
Valve noise	—	• Incorrect cam clearance

* When disconnecting the fuel injector connector, the malfunction indicator light illuminates and DTC is stored in ECM memory. Therefore, perform the Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.> <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.> after connecting the fuel injector connector.

EXHAUST

EX(H4DO(w/o HEV))

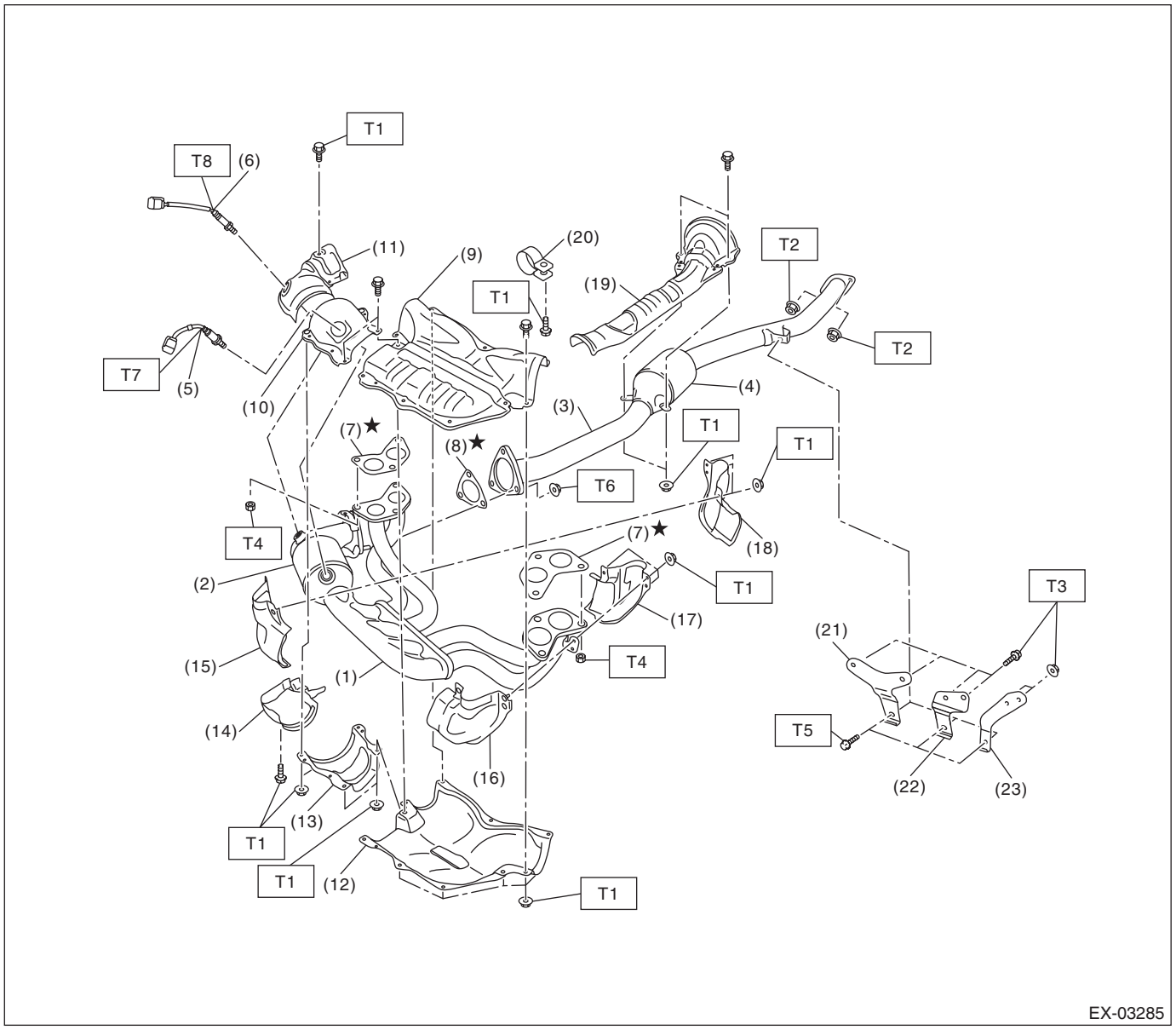
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2. Front Exhaust Pipe 6
3. Center Exhaust Pipe 14
4. Rear Exhaust Pipe 18
5. Muffler 22

1. General Description

A: COMPONENT

1. FRONT EXHAUST PIPE AND CENTER EXHAUST PIPE



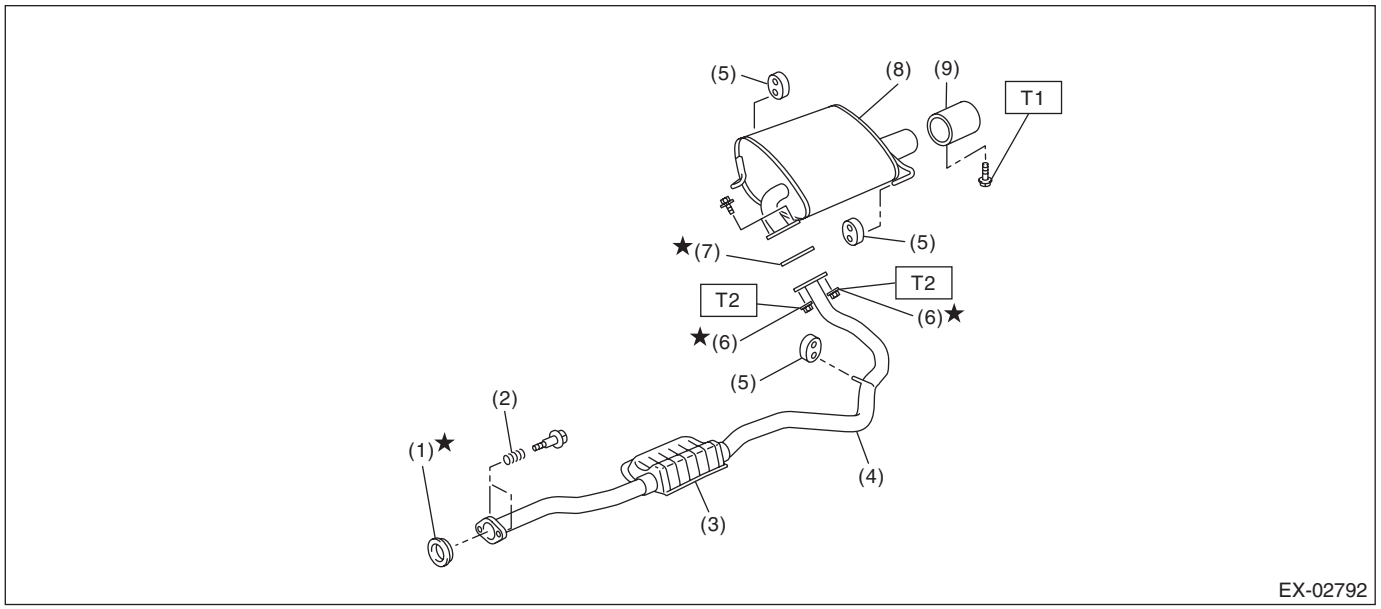
(1) Front exhaust pipe
(2) Front catalytic converter
(3) Center exhaust pipe
(4) Rear catalytic converter
(5) Front oxygen (A/F) sensor
(6) Rear oxygen sensor
(7) Gasket
(8) Gasket
(9) Front exhaust pipe upper cover
(10) Front catalytic converter upper cover LH
(11) Front catalytic converter upper cover RH
(12) Front exhaust pipe lower cover
(13) Front catalytic converter lower cover LH
(14) Front catalytic converter lower cover RH
(15) Front exhaust pipe side cover RH (front)
(16) Front exhaust pipe side cover LH (front)
(17) Front exhaust pipe side cover LH (rear)
(18) Front exhaust pipe side cover RH (rear)
(19) Center exhaust pipe upper cover
(20) Band
(21) Hanger bracket (HEV model)
(22) Hanger bracket (gasoline engine CVT model)
(23) Hanger bracket (MT model)

Tightening torque: N·m (kgf-m, ft-lb)

T1: 13 (1.3, 9.6)
T2: 18 (1.8, 13.3)
T3: 23 (2.3, 17.0)
T4: 30 (3.1, 22.1)
T5: 35 (3.6, 25.8)
T6: 42.5 (4.3, 31.3)
T7: <Ref. to FU(H4DO(w/o HEV))-93, INSTALLATION, Front Oxygen (A/F) Sensor.> <Ref. to FU(H4DO(HEV))-80, INSTALLATION, Front Oxygen (A/F) Sensor.>
T8: <Ref. to FU(H4DO(w/o HEV))-97, INSTALLATION, Rear Oxygen Sensor.> <Ref. to FU(H4DO(HEV))-84, INSTALLATION, Rear Oxygen Sensor.>

2. REAR EXHAUST PIPE AND MUFFLER

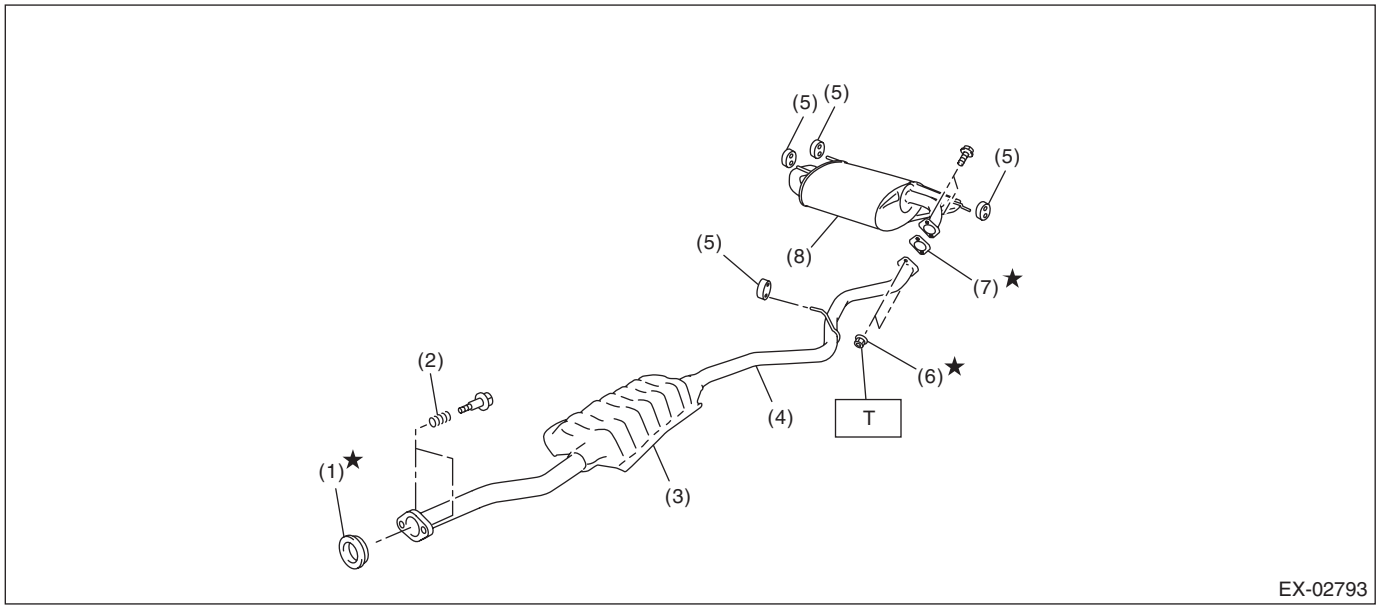
- 4 door model



(1) Gasket
(2) Spring
(3) Chamber
(4) Rear exhaust pipe
(5) Cushion rubber
(6) Self-locking nut
(7) Gasket
(8) Muffler
(9) Muffler cutter (models with muffler cutter)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.8, 5.5)
T2: 48 (4.9, 35.4)

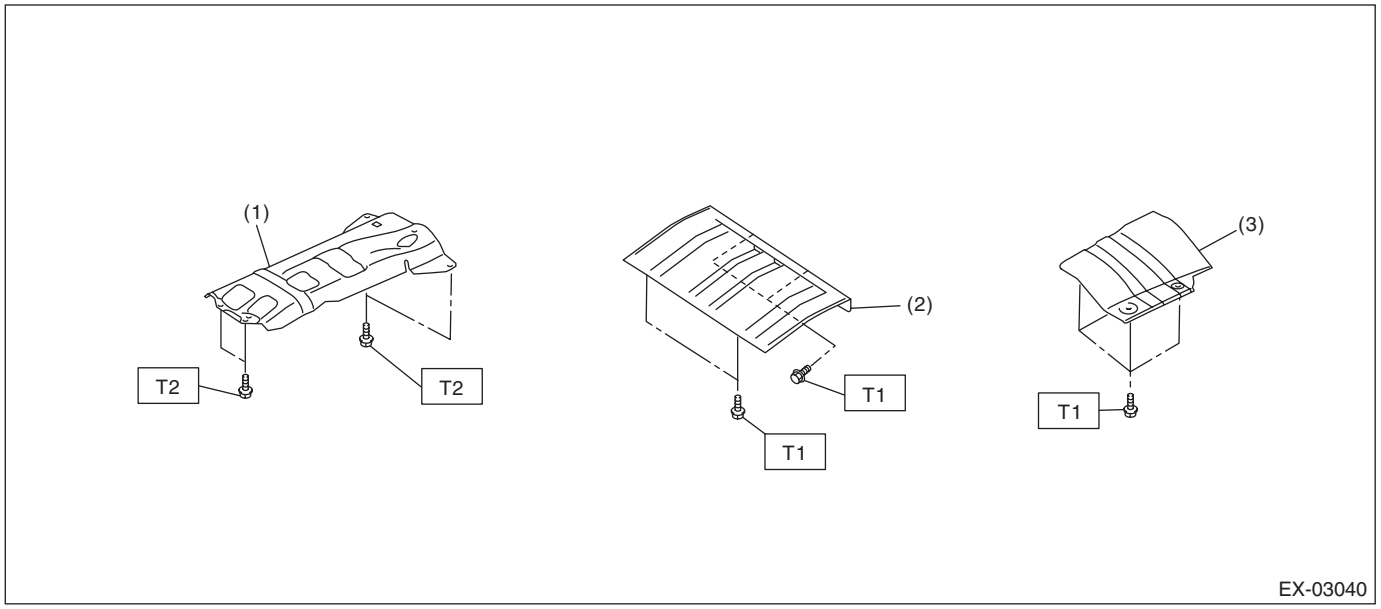
- 5 door model



(1) Gasket
(2) Spring
(3) Chamber
(4) Rear exhaust pipe
(5) Cushion rubber
(6) Self-locking nut
(7) Gasket
(8) Muffler

Tightening torque: N·m (kgf-m, ft-lb)
T: 48 (4.9, 35.4)

3. HEAT SHIELD COVER



(1) Center exhaust cover
(2) Rear exhaust cover (5 door model)
(3) Rear exhaust cover (4 door model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 10 (1.0, 7.4)
T2: 18 (1.8, 13.3)

B: CAUTION

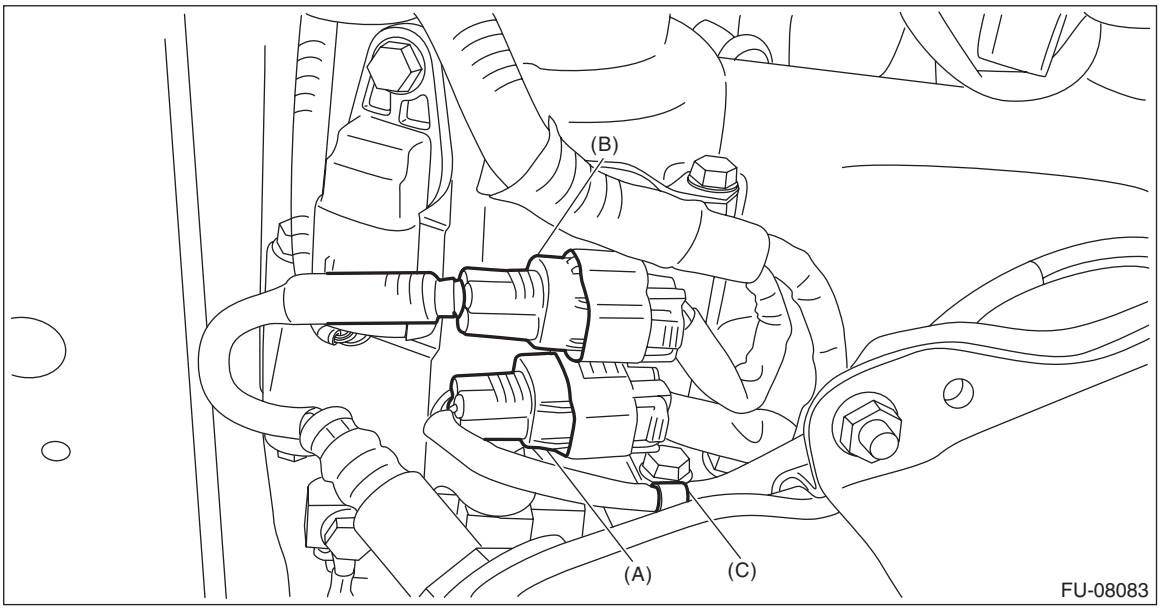
- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.
- If any grease adheres to the exhaust pipe, wipe it off. Otherwise a fire may happen.

2. Front Exhaust Pipe

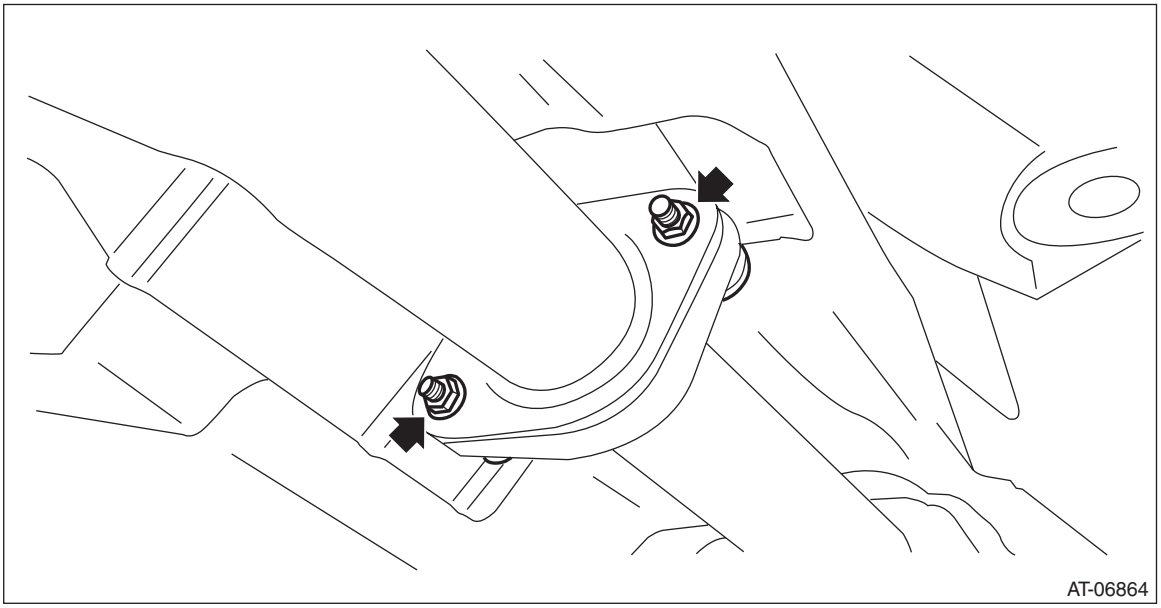
A: REMOVAL

CAUTION:
Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

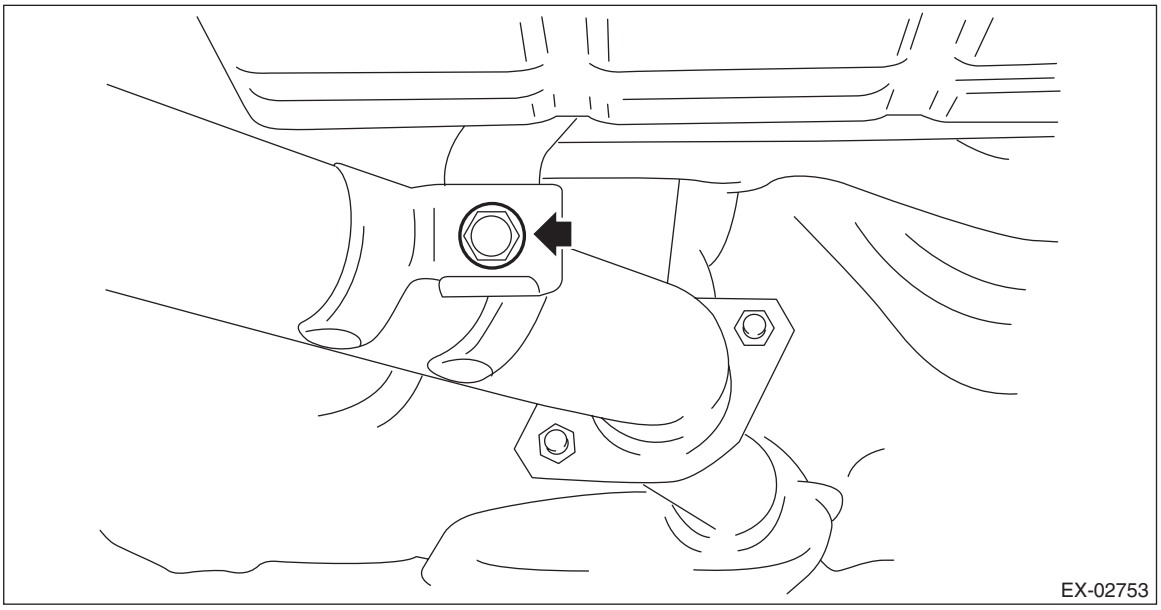
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Disconnect the front oxygen (A/F) sensor connector (A) and rear oxygen sensor connector (B) and remove the clip (C) fastening the harness.



5) Remove the bolts, springs, and nuts securing the rear exhaust pipe to the center exhaust pipe.

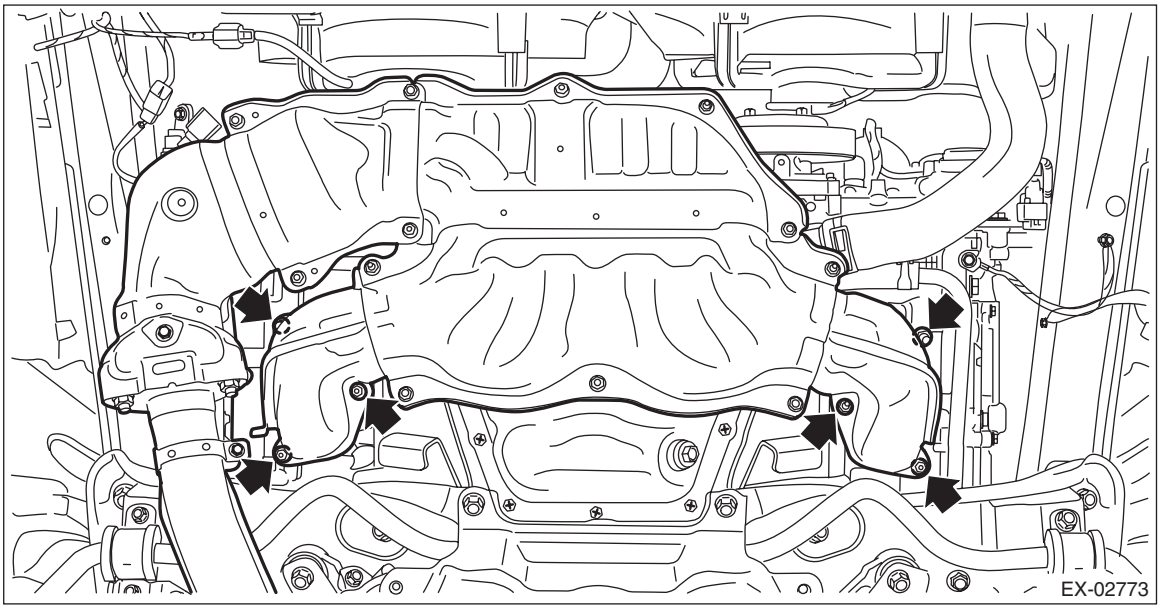


6) Remove the bolt which holds center exhaust pipe to hanger bracket.



7) Remove the front exhaust pipe and center exhaust pipe from vehicle as a unit.

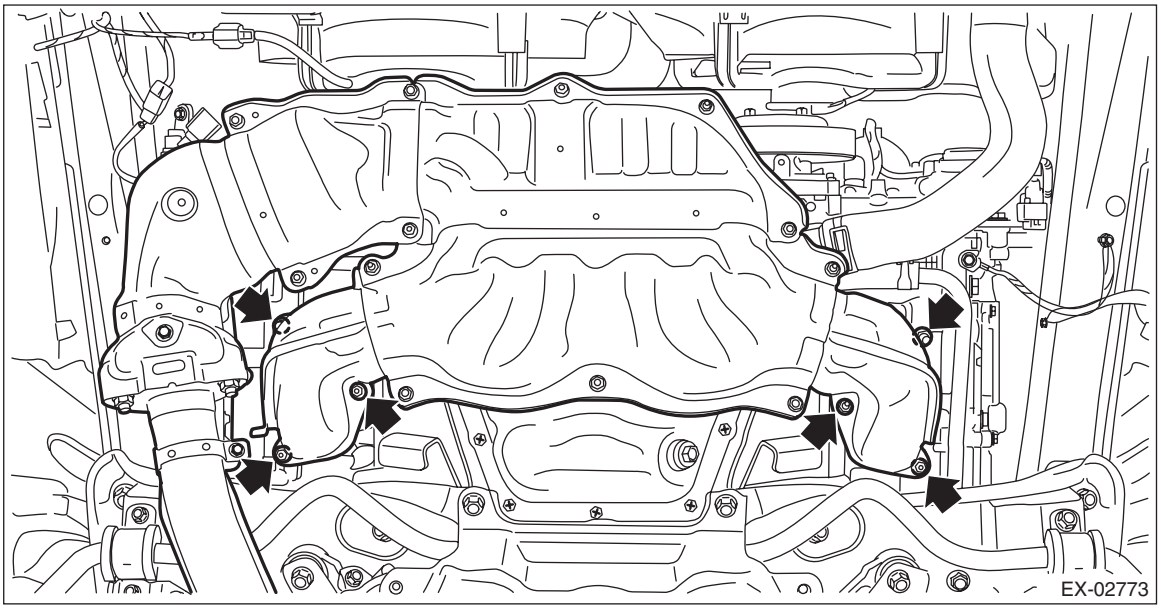
CAUTION:
• The front exhaust pipe and center exhaust pipe assembly are very heavy. Be careful not to drop the exhaust pipes when removing.
• After removing the front exhaust pipe and center exhaust pipe assembly, do not pull the rear exhaust pipe with excessive force.



B: INSTALLATION

1) Set the front exhaust pip and center exhaust pipe to the vehicle, and temporally tighten the nuts which secure the front exhaust pipe to cylinder head.

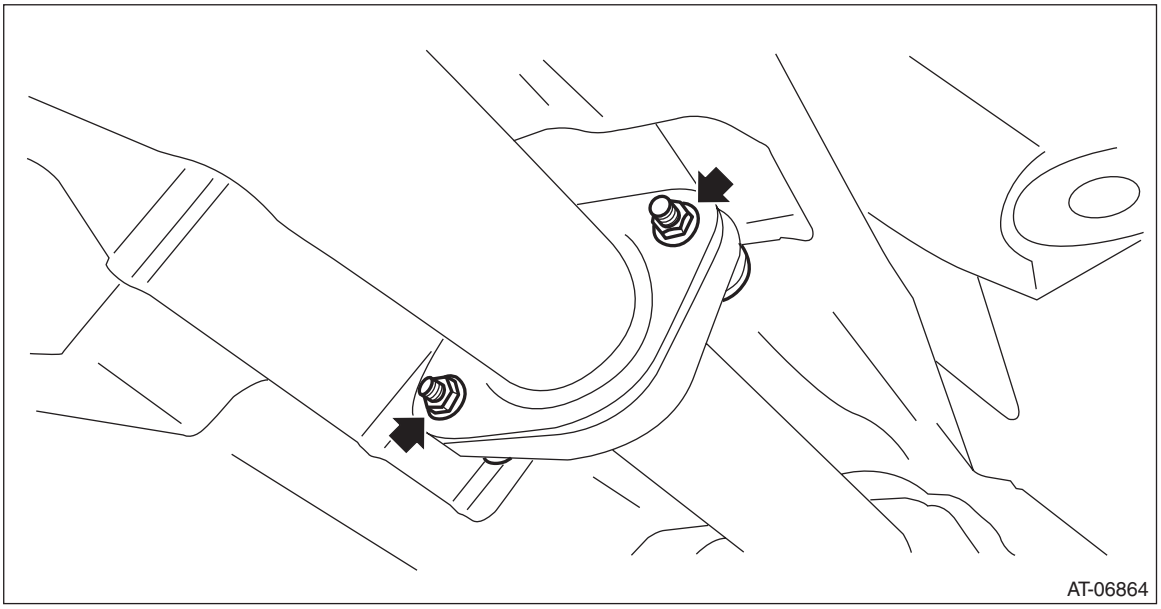
NOTE:
Use a new gasket.



2) Install the bolts, springs, and nuts which secure the rear exhaust pipe to the center exhaust pipe.

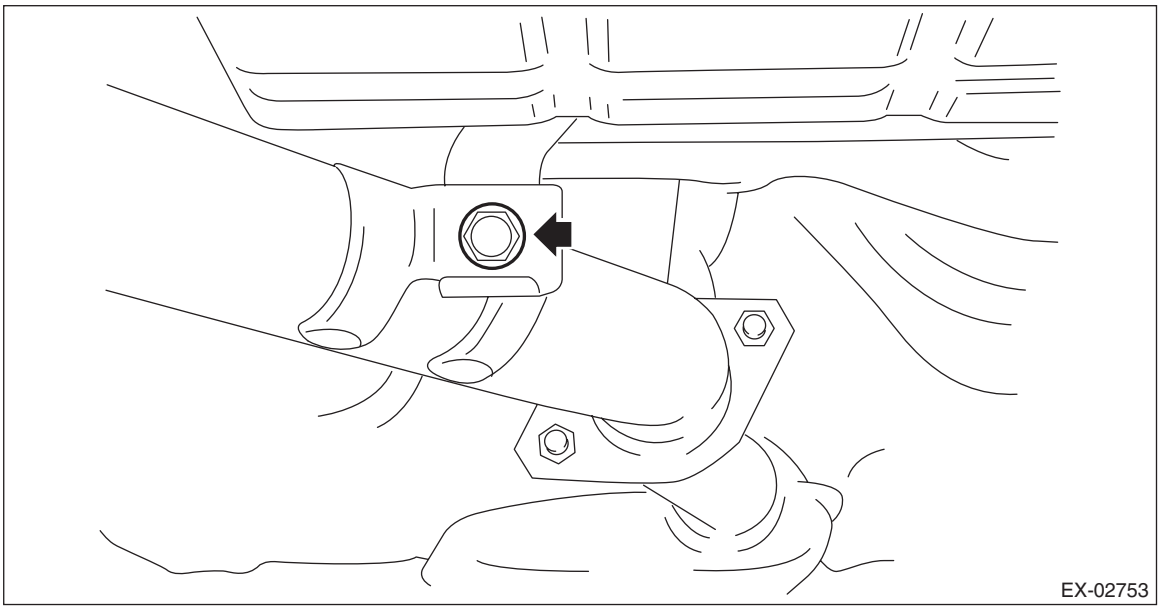
NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



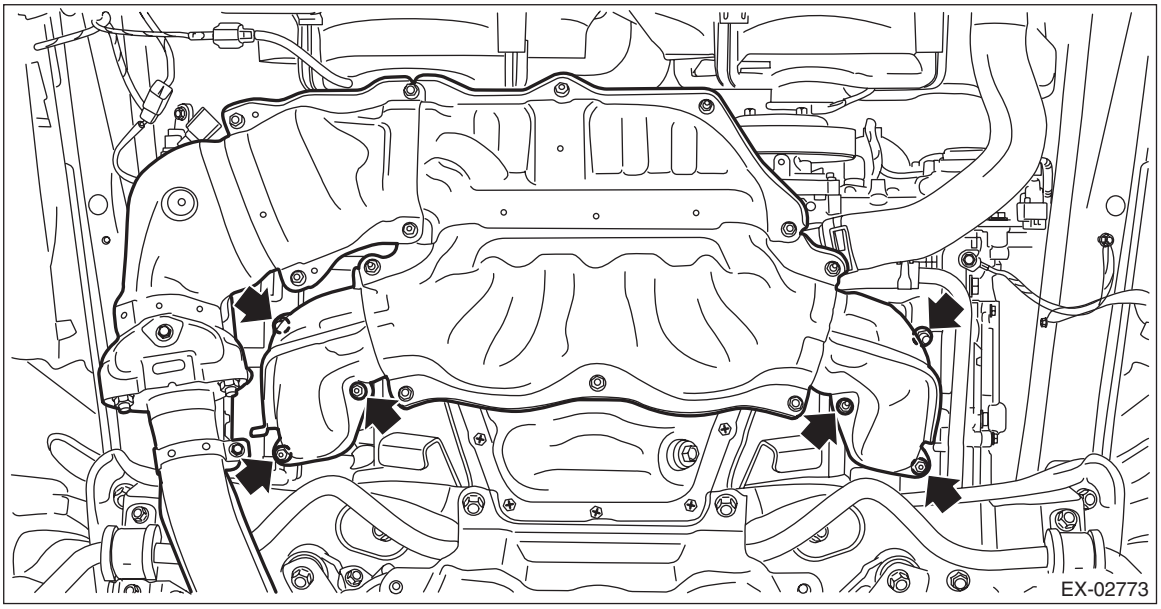
3) Tighten the bolts which secure the center exhaust pipe to the hanger bracket.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)

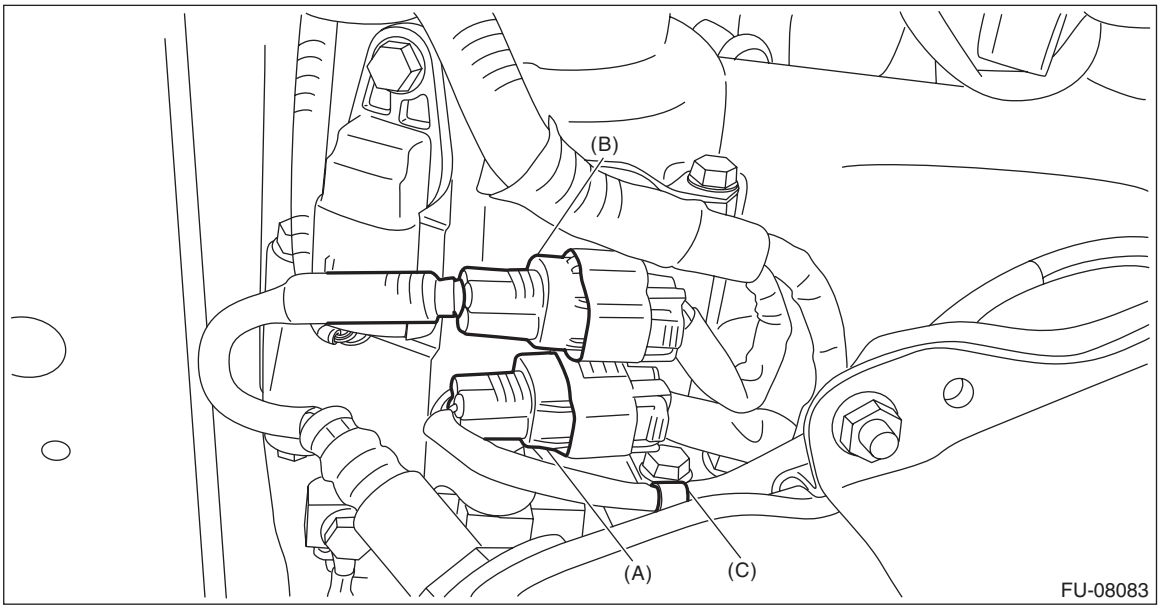


4) Tighten the nuts which hold front exhaust pipe to cylinder heads.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)



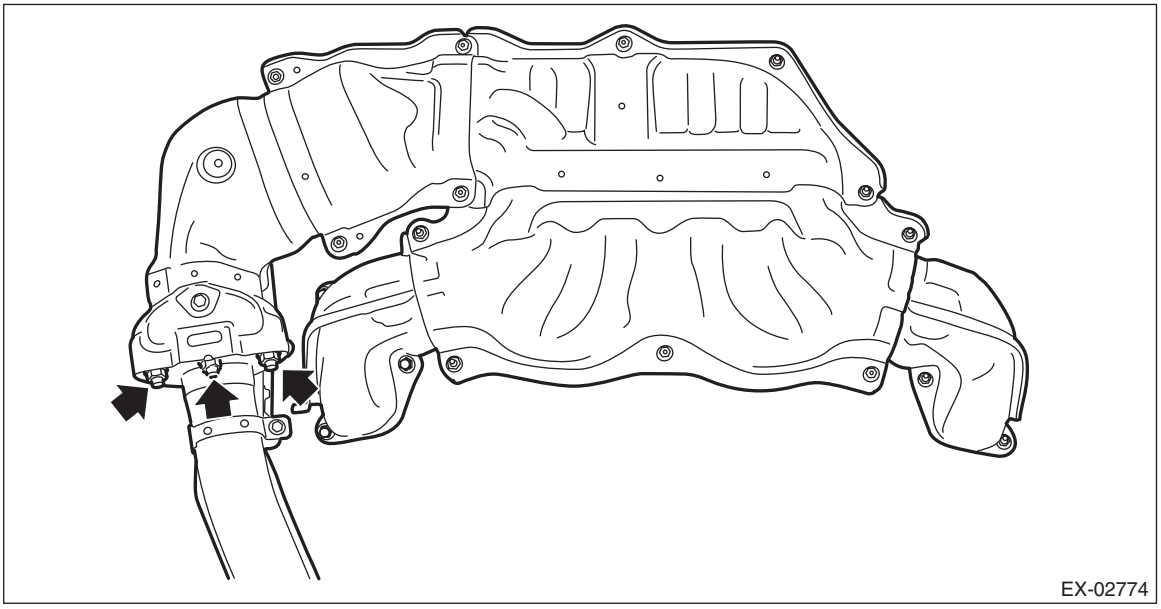
5) Connect the front oxygen (A/F) sensor connector (A) and rear oxygen sensor connector (B), and fasten the harness with the clip (C).



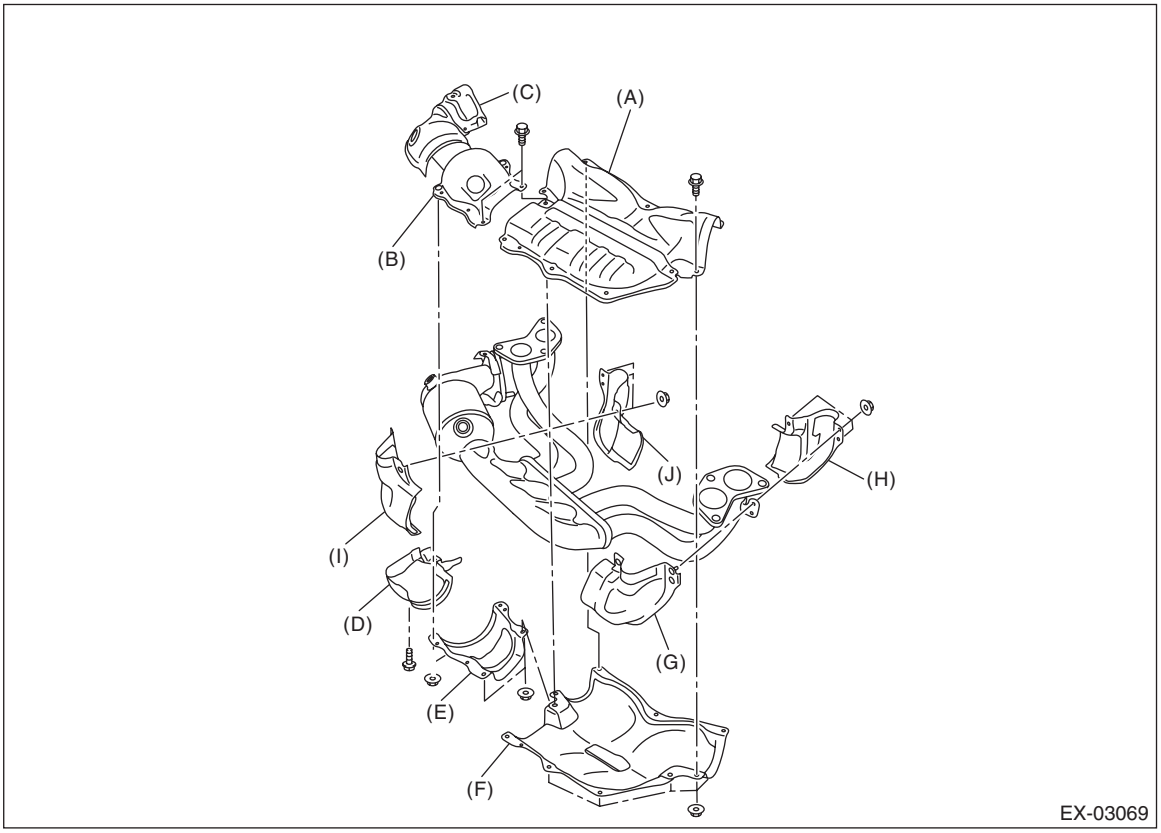
6) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
7) Lower the vehicle.
8) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: DISASSEMBLY

1) Remove the front oxygen (A/F) sensor and rear oxygen sensor from front exhaust pipe. <Ref. to FU(H4DO(w/o HEV))-92, REMOVAL, Front Oxygen (A/F) Sensor.> <Ref. to FU(H4DO(w/o HEV))-96, REMOVAL, Rear Oxygen Sensor.> <Ref. to FU(H4DO(HEV))-79, REMOVAL, Front Oxygen (A/F) Sensor.> <Ref. to FU(H4DO(HEV))-83, REMOVAL, Rear Oxygen Sensor.>
2) Remove the center exhaust pipe from the front exhaust pipe.



3) Remove each cover from the front exhaust pipe.

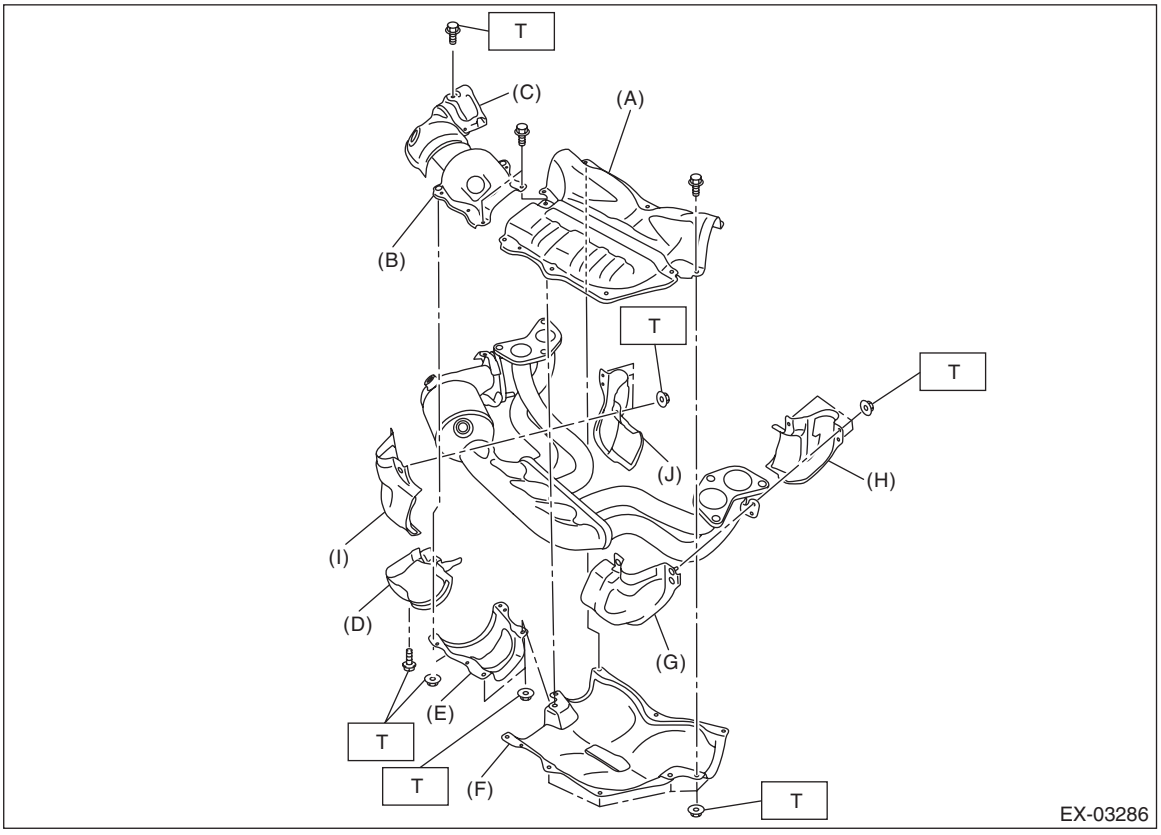


(A) Front exhaust pipe upper cover
(B) Front catalytic converter upper cover LH
(C) Front catalytic converter upper cover RH
(D) Front catalytic converter lower cover RH
(E) Front catalytic converter lower cover LH
(F) Front exhaust pipe lower cover
(G) Front exhaust pipe side cover LH (front)
(H) Front exhaust pipe side cover LH (rear)
(I) Front exhaust pipe side cover RH (front)
(J) Front exhaust pipe side cover RH (rear)

D: ASSEMBLY

1) Install each cover to the front exhaust pipe.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)

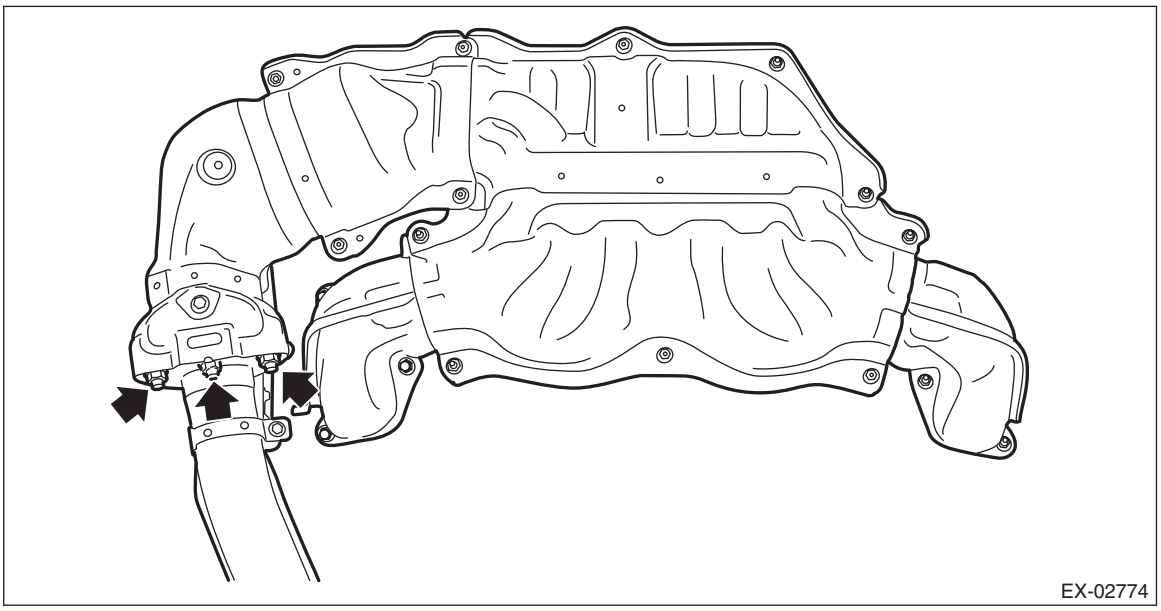


(A) Front exhaust pipe upper cover
(B) Front catalytic converter upper cover LH
(C) Front catalytic converter upper cover RH
(D) Front catalytic converter lower cover RH
(E) Front catalytic converter lower cover LH
(F) Front exhaust pipe lower cover
(G) Front exhaust pipe side cover LH (front)
(H) Front exhaust pipe side cover LH (rear)
(I) Front exhaust pipe side cover RH (front)
(J) Front exhaust pipe side cover RH (rear)

2) Install the center exhaust pipe to front exhaust pipe.

NOTE:
Use a new gasket.

Tightening torque:
42.5 N·m (4.3 kgf-m, 31.3 ft-lb)



3) Install the front oxygen (A/F) sensor and rear oxygen sensor to the front exhaust pipe. <Ref. to FU(H4DO(w/o HEV))-93, INSTALLATION, Front Oxygen (A/F) Sensor.> <Ref. to FU(H4DO(w/o HEV))-97, INSTALLATION, Rear Oxygen Sensor.> <Ref. to FU(H4DO(HEV))-80, INSTALLATION, Front Oxygen (A/F) Sensor.> <Ref. to FU(H4DO(HEV))-84, INSTALLATION, Rear Oxygen Sensor.>

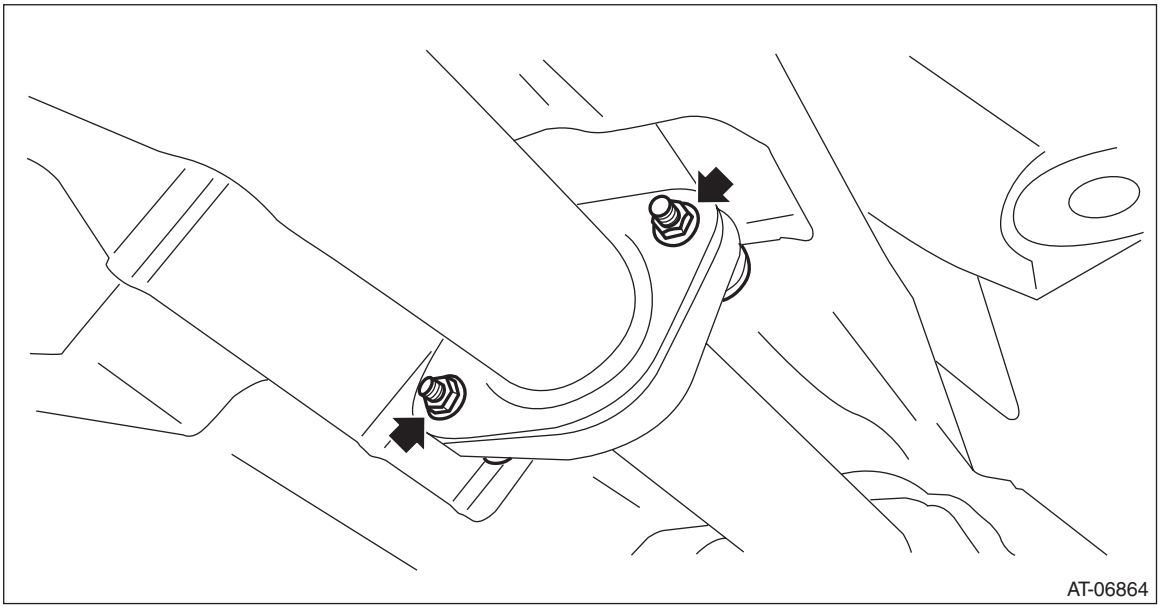
E: INSPECTION

1) Check the connections and welded parts for exhaust leaks.
2) Make sure there are no holes or rusting.

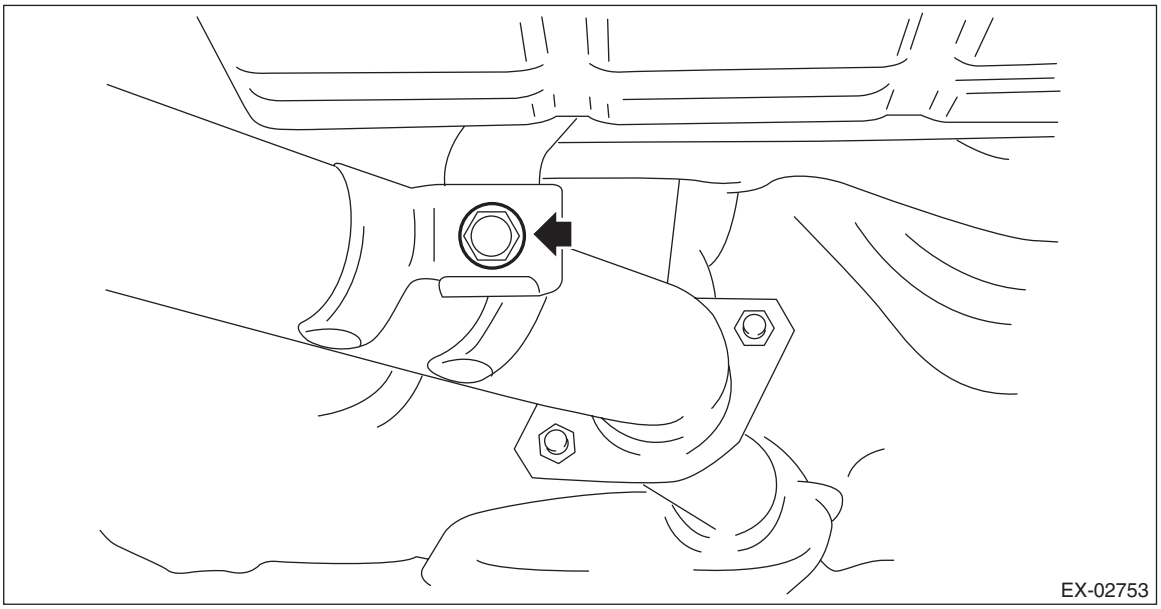
3. Center Exhaust Pipe

A: REMOVAL

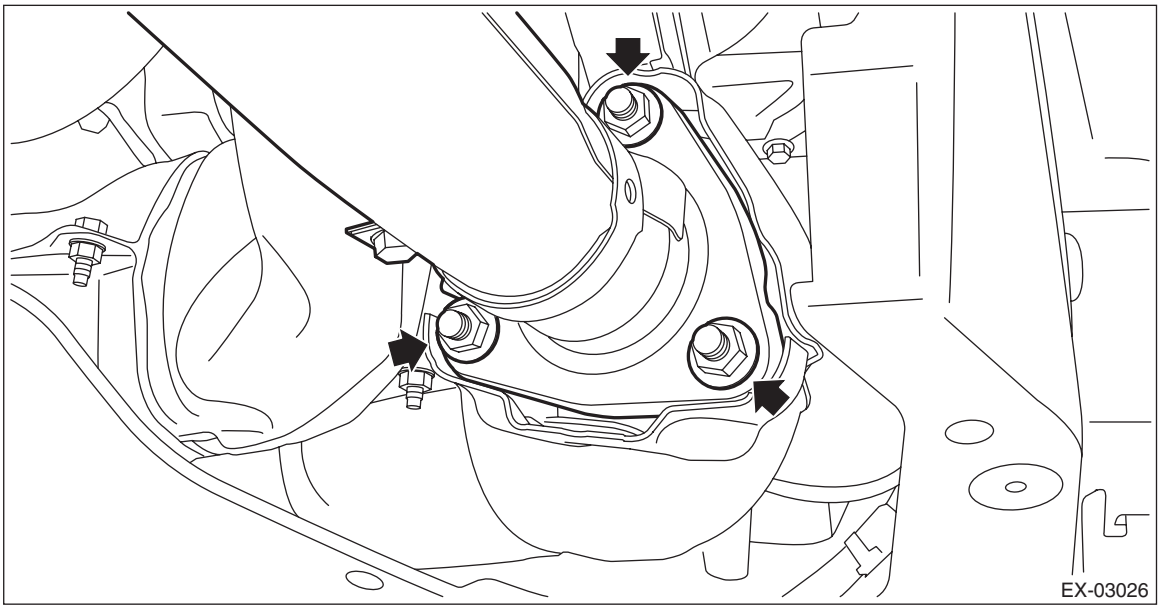
CAUTION:
Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
1) Turn the ignition switch to OFF.
2) Lift up the vehicle.
3) Remove the bolts, springs, and nuts securing the rear exhaust pipe to the center exhaust pipe.



4) Remove the bolt which holds center exhaust pipe to hanger bracket.



5) Remove the center exhaust pipe from the front exhaust pipe.



6) Remove the center exhaust pipe upper cover from the center exhaust pipe.

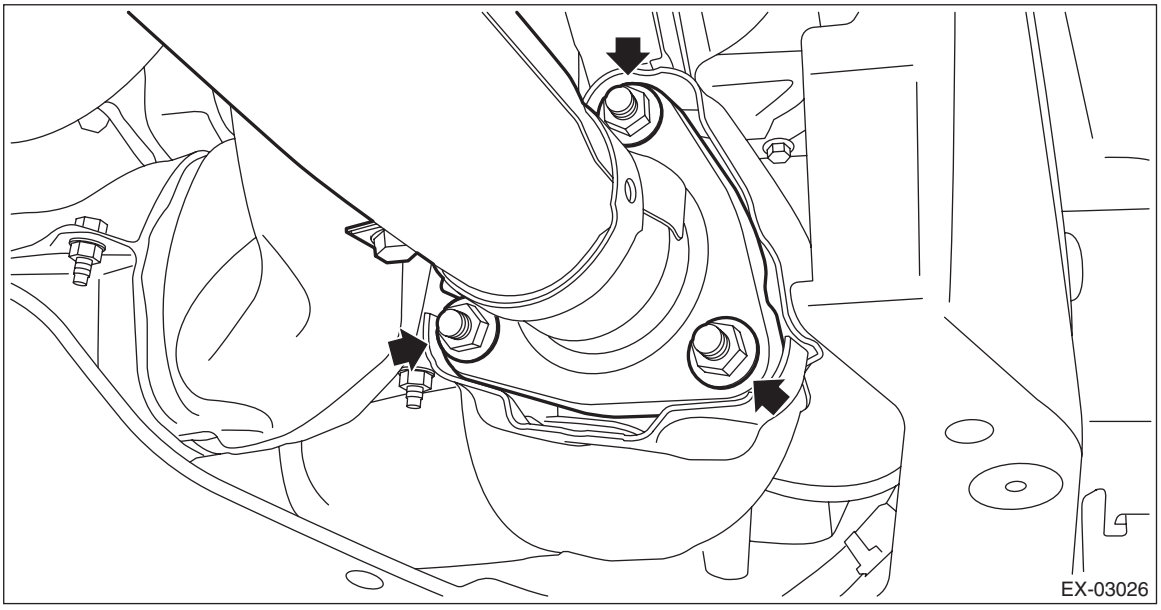
B: INSTALLATION

1) Install the center exhaust pipe upper cover to the center exhaust pipe.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)

2) Temporarily tighten the nuts which secure the center exhaust pipe to the front exhaust pipe.

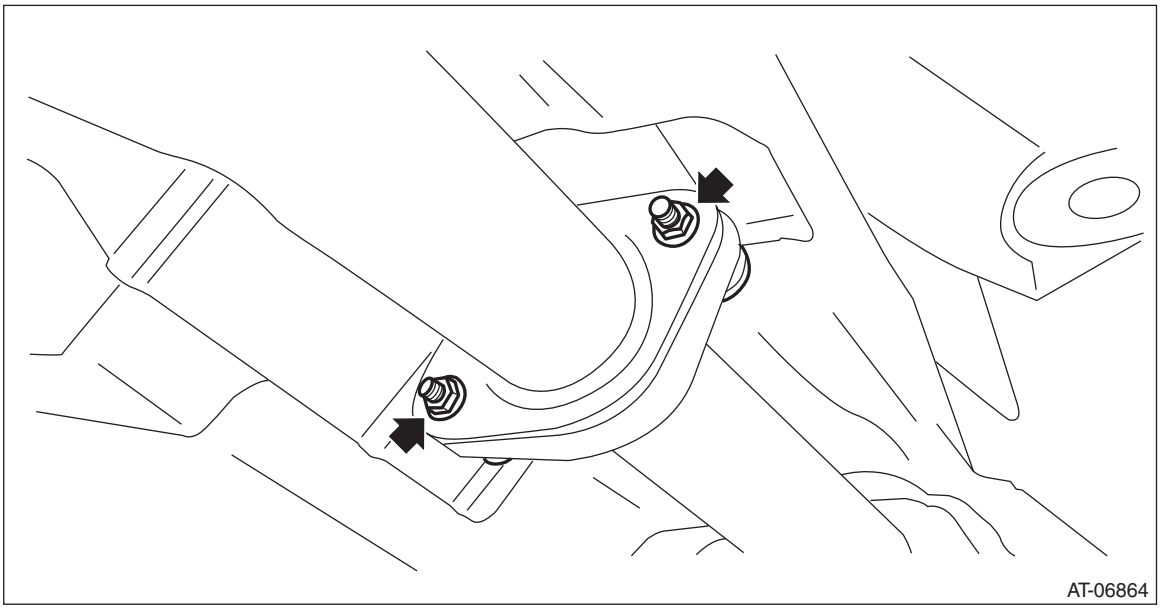
NOTE:
Use a new gasket.



3) Install the bolts, springs, and nuts which secure the rear exhaust pipe to the center exhaust pipe.

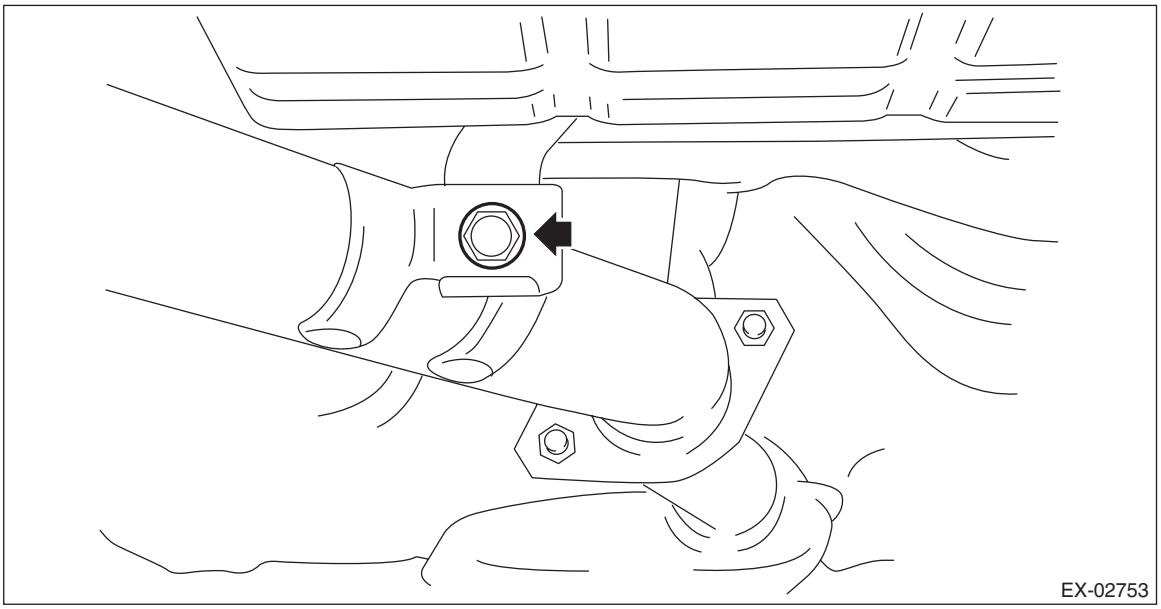
NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



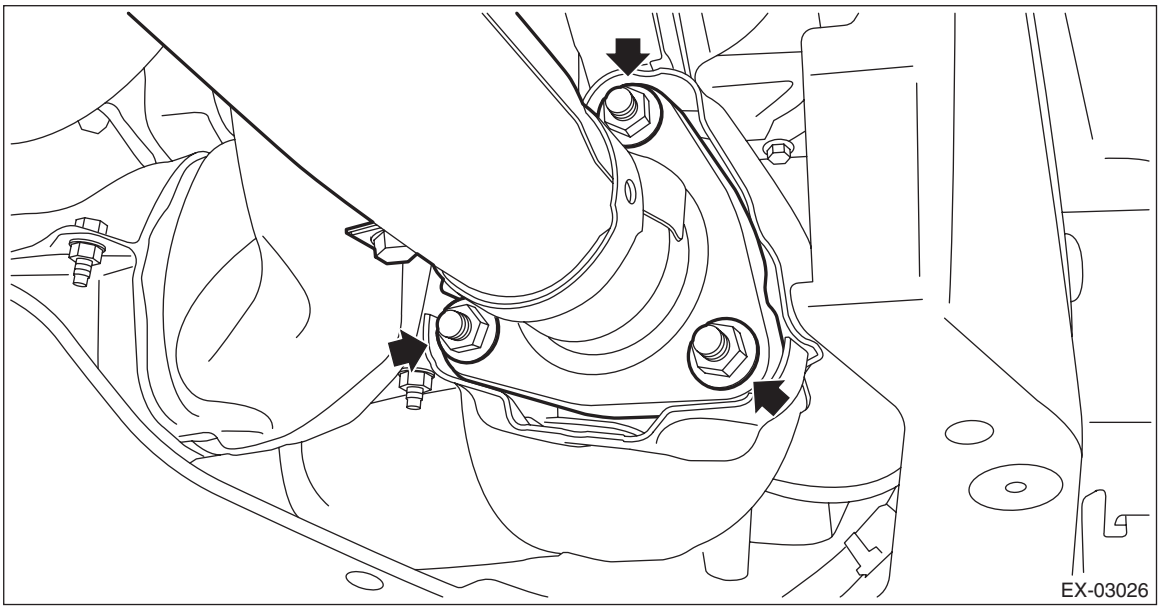
4) Tighten the bolts which secure the center exhaust pipe to the hanger bracket.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)



5) Tighten the nuts which secure the center exhaust pipe to the front exhaust pipe.

Tightening torque:
42.5 N·m (4.3 kgf-m, 31.3 ft-lb)



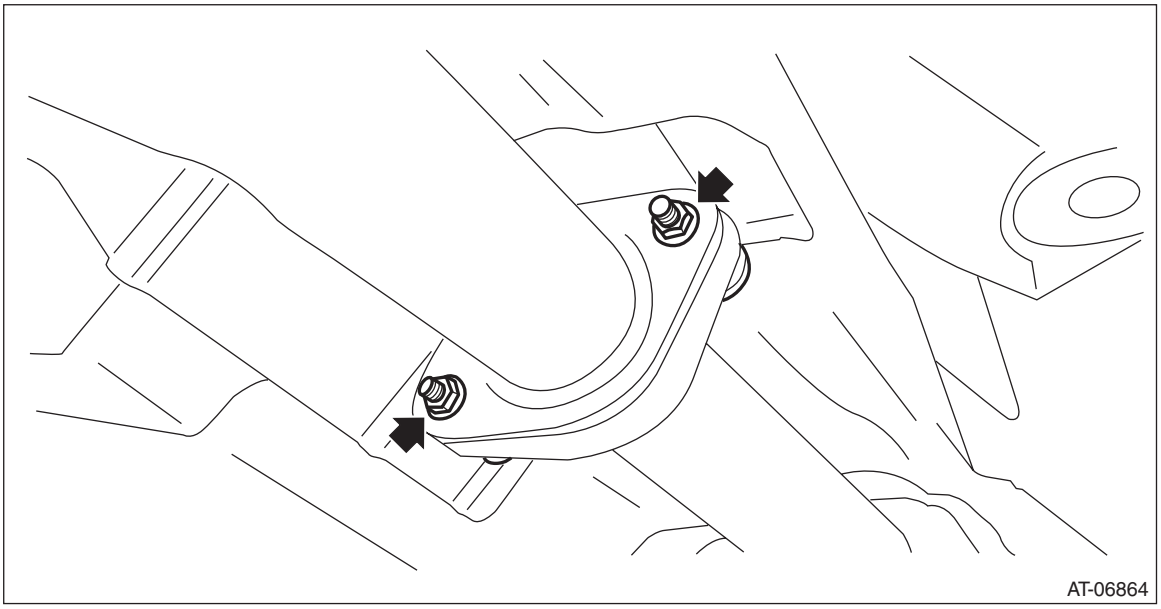
C: INSPECTION

1) Check the connections and welded parts for exhaust leaks.
2) Make sure there are no holes or rusting.

4. Rear Exhaust Pipe

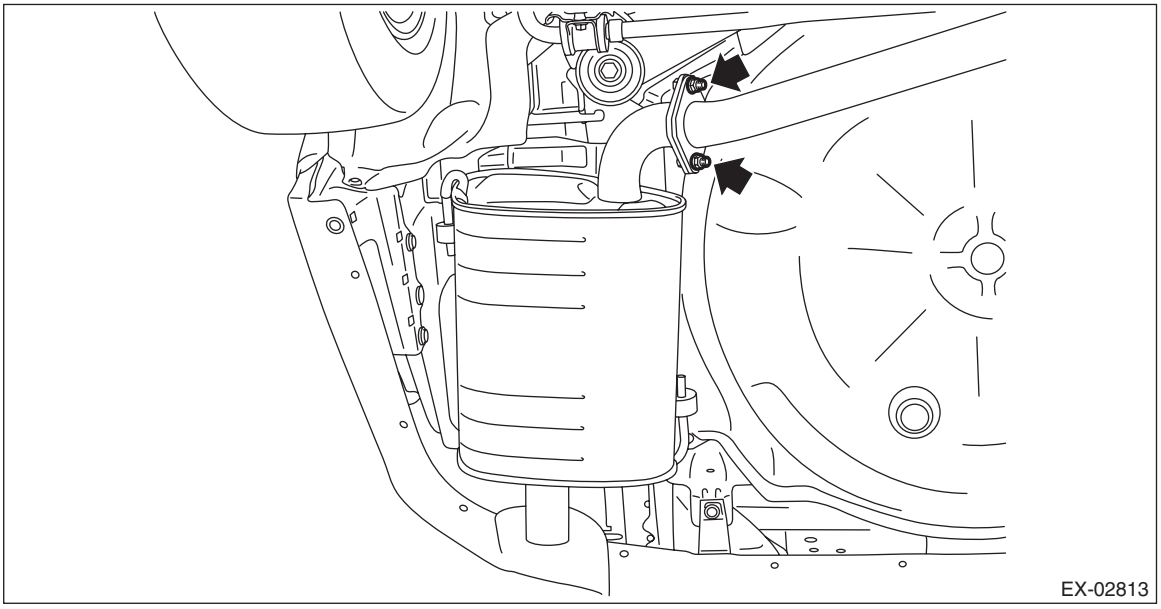
A: REMOVAL

CAUTION:
Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
1) Turn the ignition switch to OFF.
2) Lift up the vehicle.
3) Remove the bolts, springs, and nuts securing the center exhaust pipe to the rear exhaust pipe.

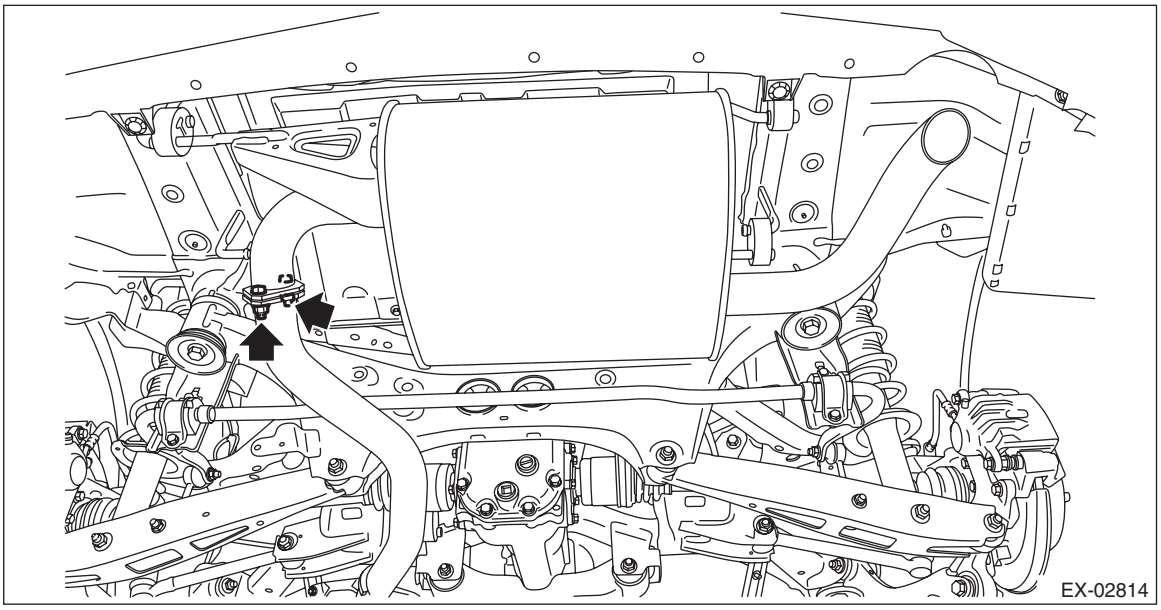


4) Remove the bolts and self-locking nuts securing the mufflers to the rear exhaust pipes.

CAUTION:
Be careful not to drop the rear exhaust pipe.
- 4 door model

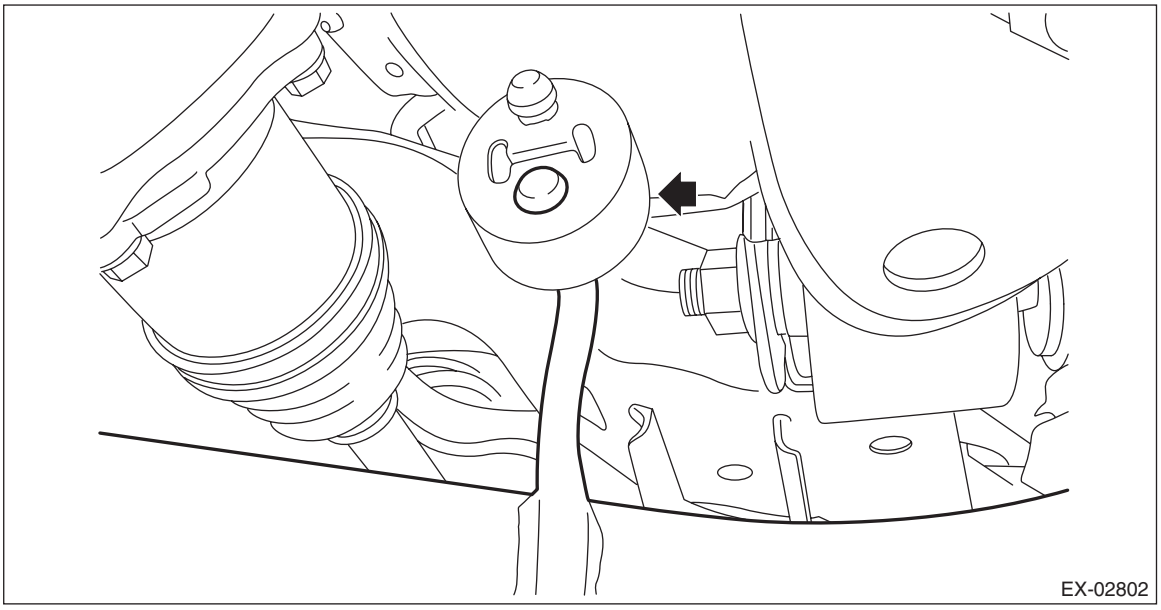


- 5 door model



5) Apply a coat of spray type lubricant to the mating area of cushion rubber.
6) Remove the rear exhaust pipe from the cushion rubber.

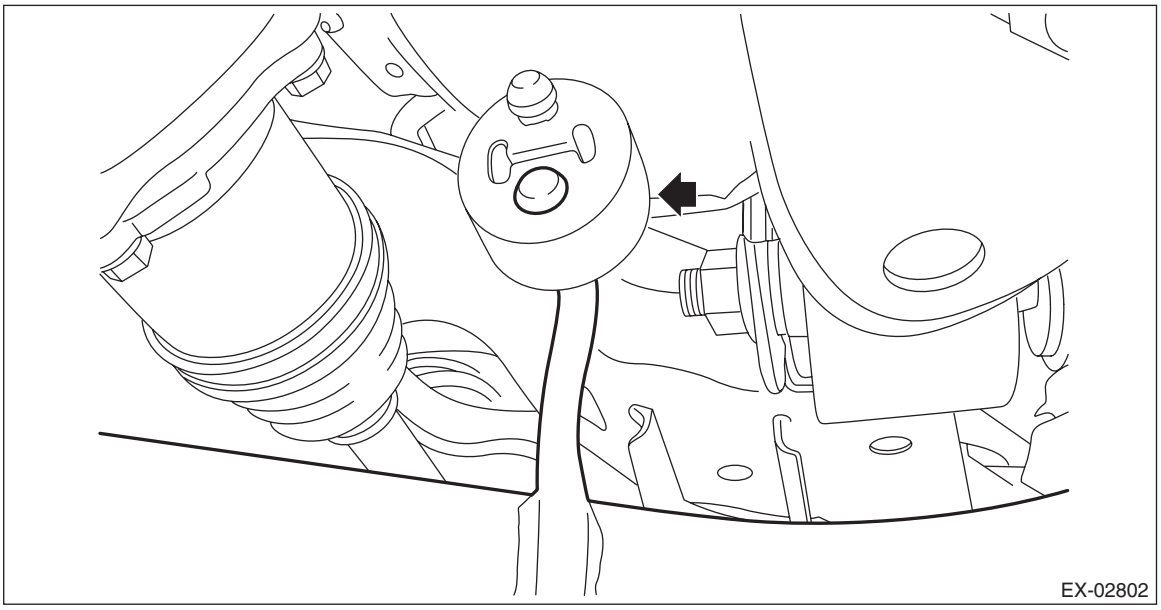
CAUTION:
Be careful not to let the muffler contact the rear bumper.



B: INSTALLATION

1) Apply a coat of spray type lubricant to the mating area of cushion rubber.
2) Install the rear exhaust pipe to cushion rubber.

NOTE:
After assembling, degrease the lubricant which was applied to the cushion rubber while removing/installing.

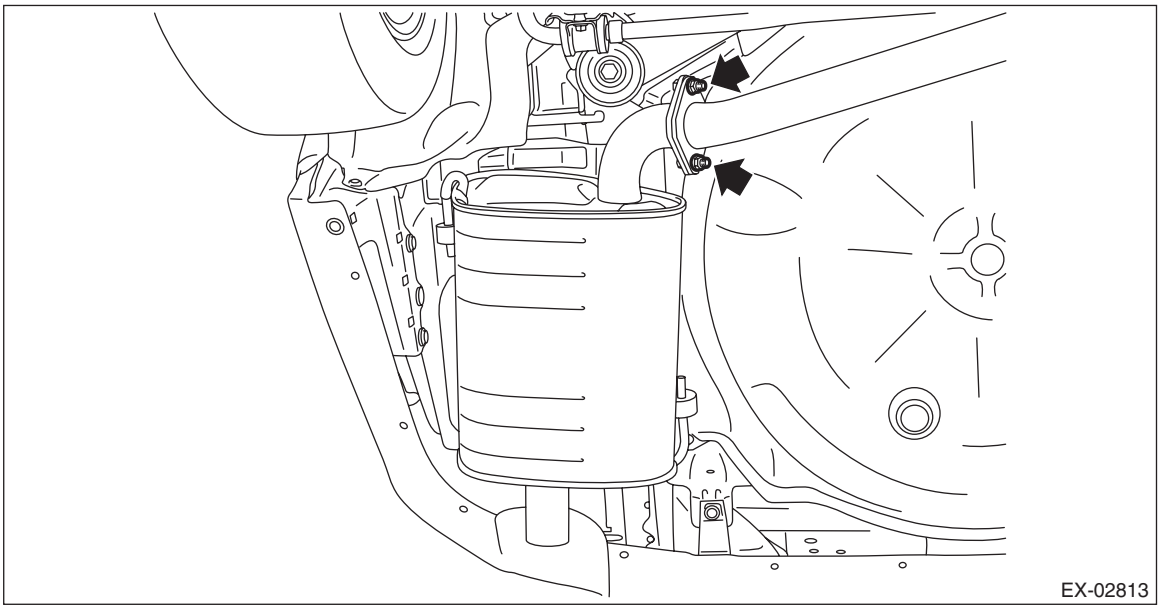


3) Install the bolts and self-locking nuts which secure the muffler to the rear exhaust pipe.

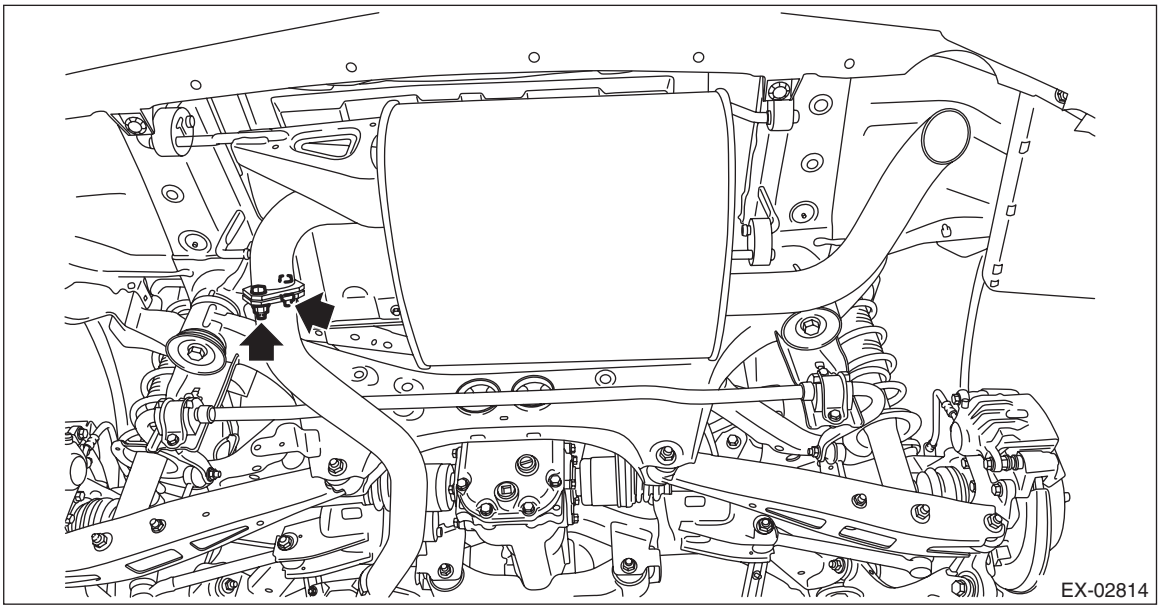
NOTE:
Use a new gasket and self-locking nut.

Tightening torque:
48 N·m (4.9 kgf-m, 35.4 ft-lb)

- 4 door model



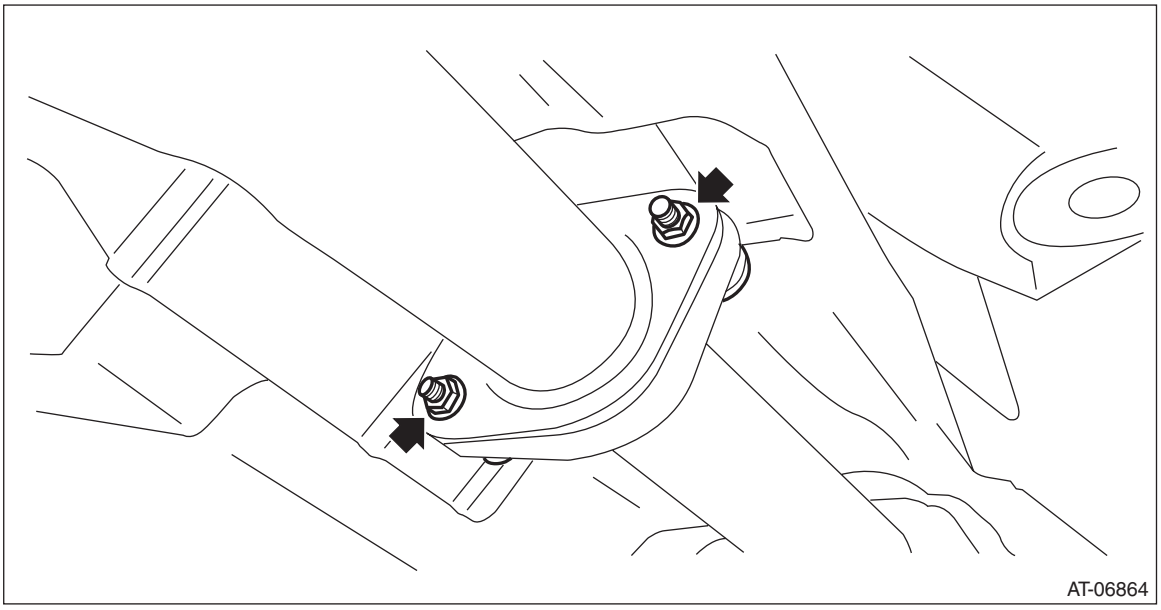
- 5 door model



4) Install the bolts, springs, and nuts which secure the center exhaust pipe to the rear exhaust pipe.

NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



5) Lower the vehicle.

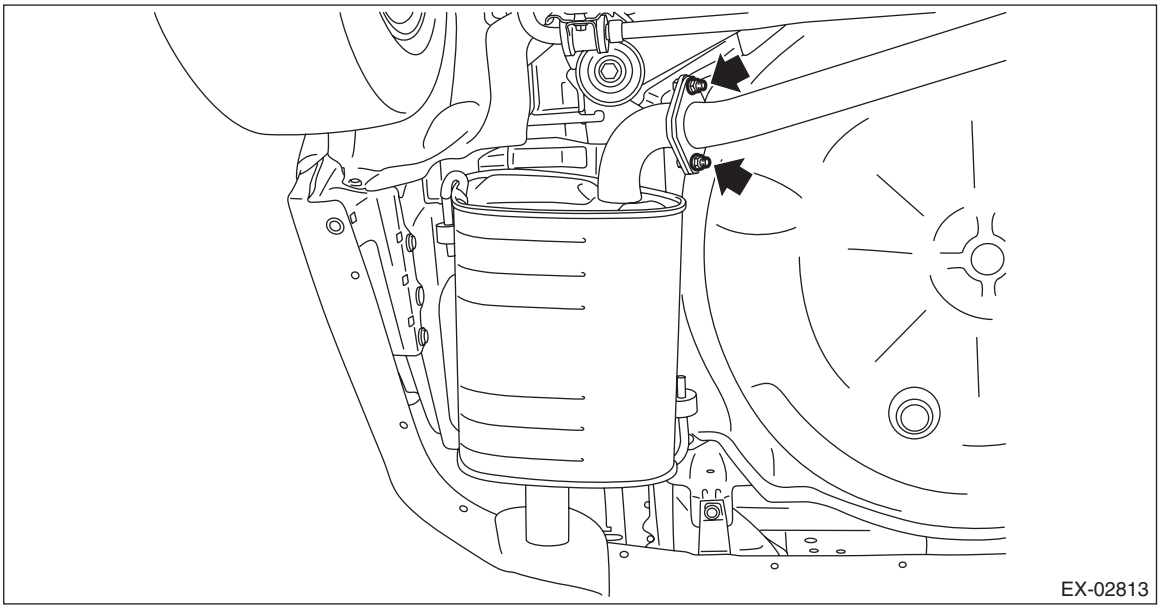
C: INSPECTION

1) Check the connections and welded parts for exhaust leaks.
2) Make sure there are no holes or rusting.
3) Check the cushion rubber for wear or crack.

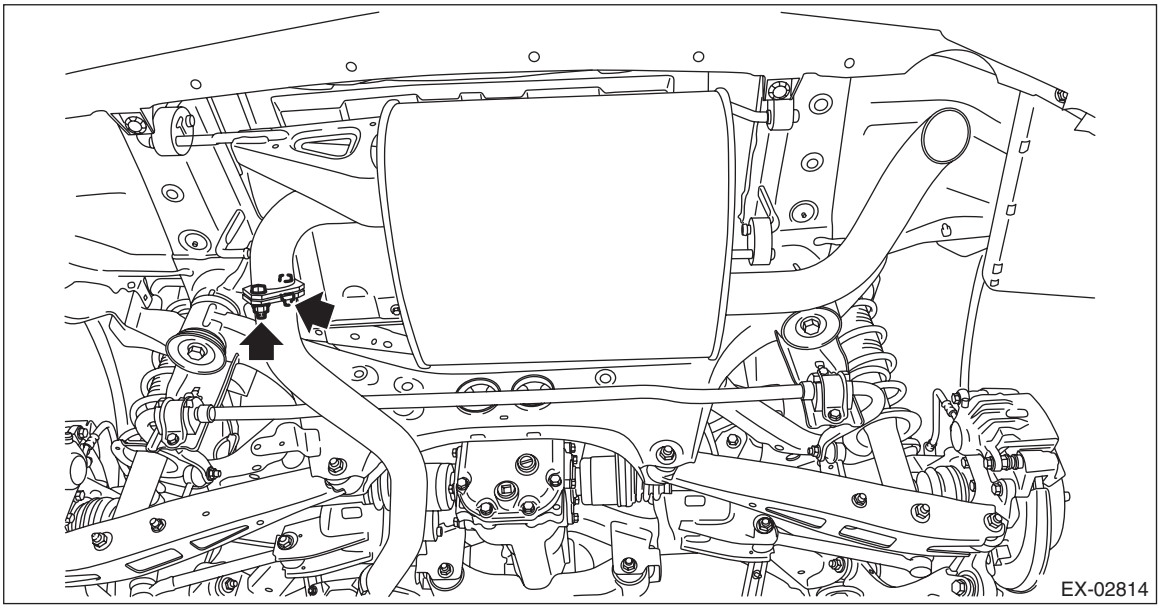
5. Muffler

A: REMOVAL

CAUTION:
Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
1) Turn the ignition switch to OFF.
2) Lift up the vehicle.
3) Remove the bolts and self-locking nuts which secure the rear exhaust pipe to the muffler.
- 4 door model



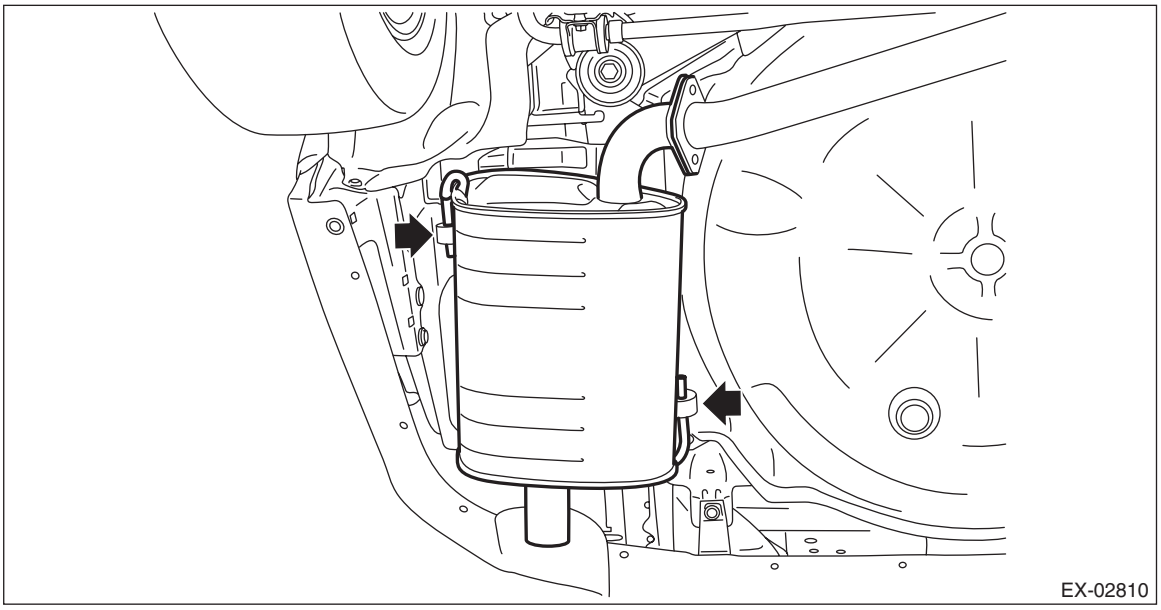
- 5 door model



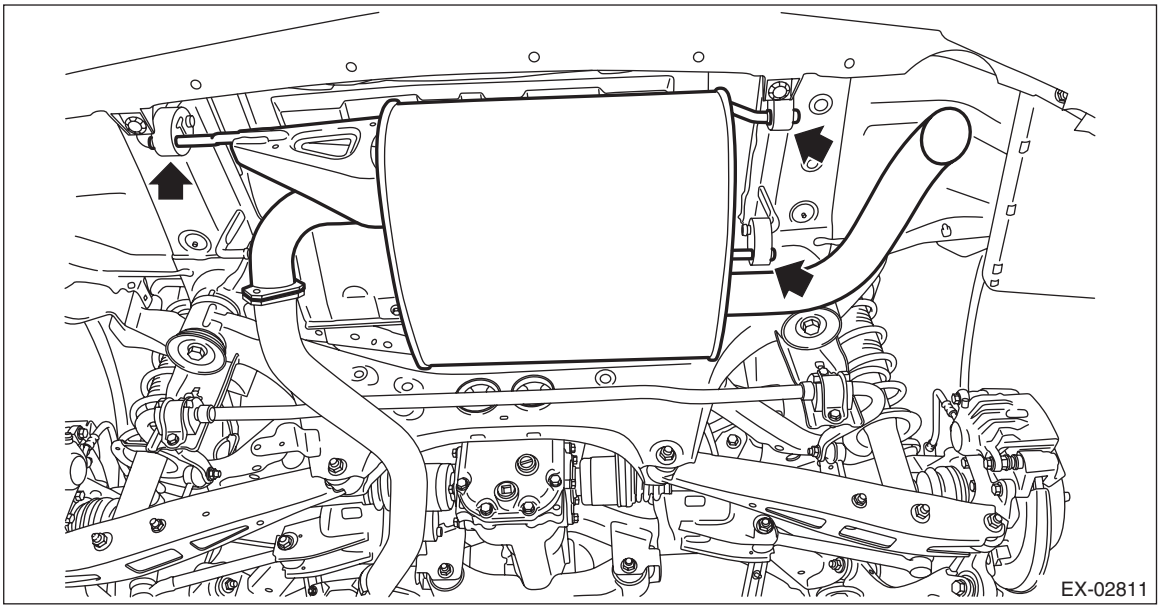
4) Apply a coat of spray type lubricant to the mating area of cushion rubber.
5) Remove the muffler from the cushion rubber.

CAUTION:
Be careful not to drop the muffler during removal.

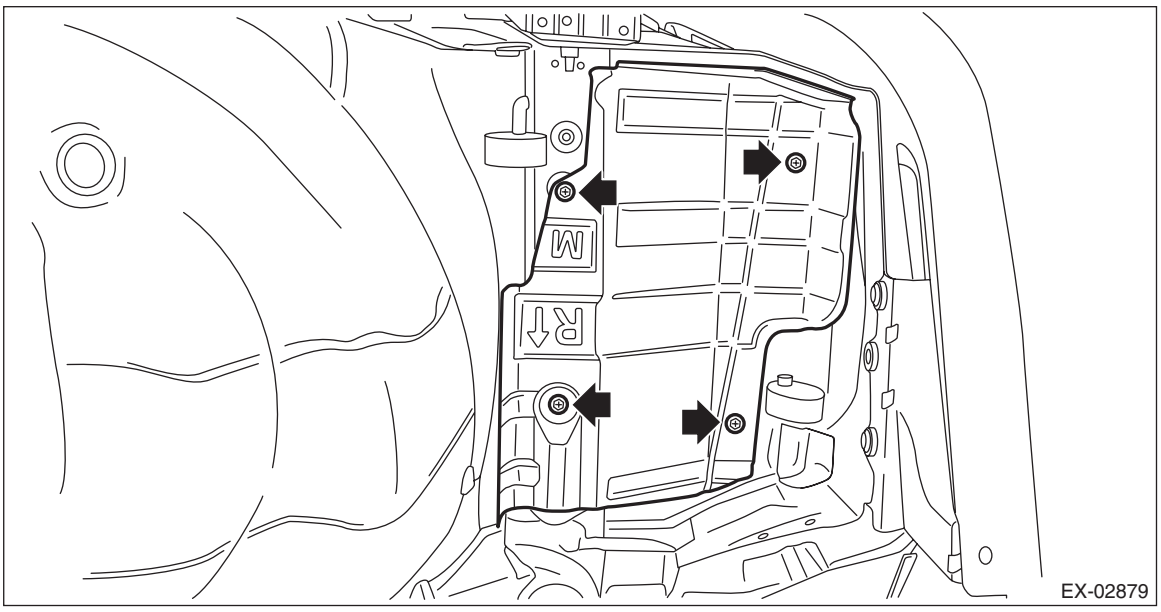
- 4 door model



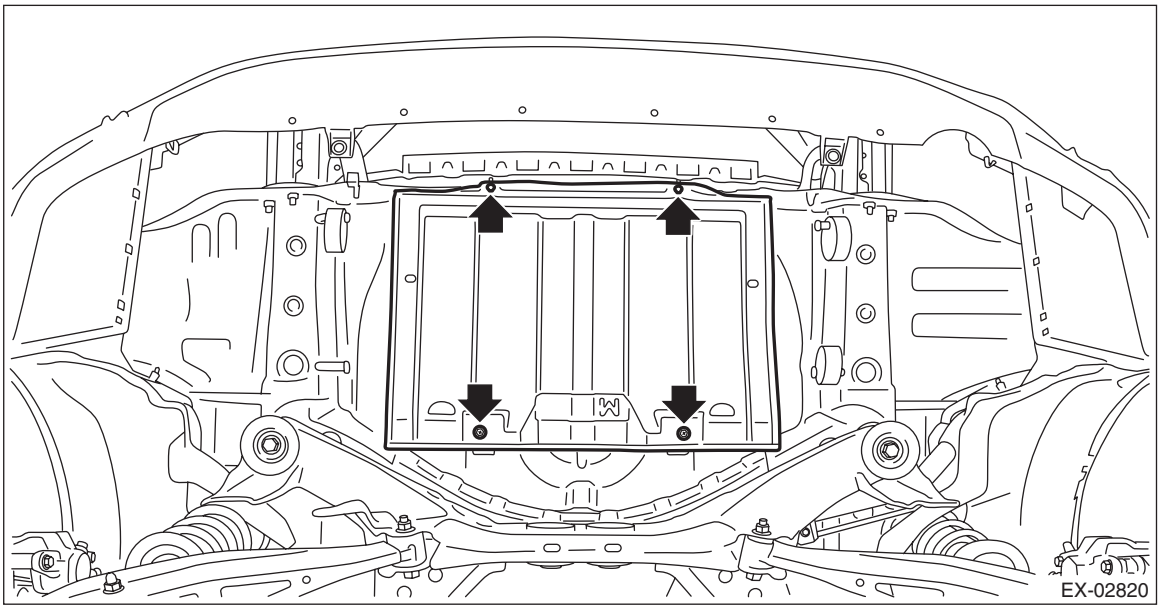
- 5 door model



6) Remove the heat shield cover from the vehicle.
- 4 door model



- 5 door model



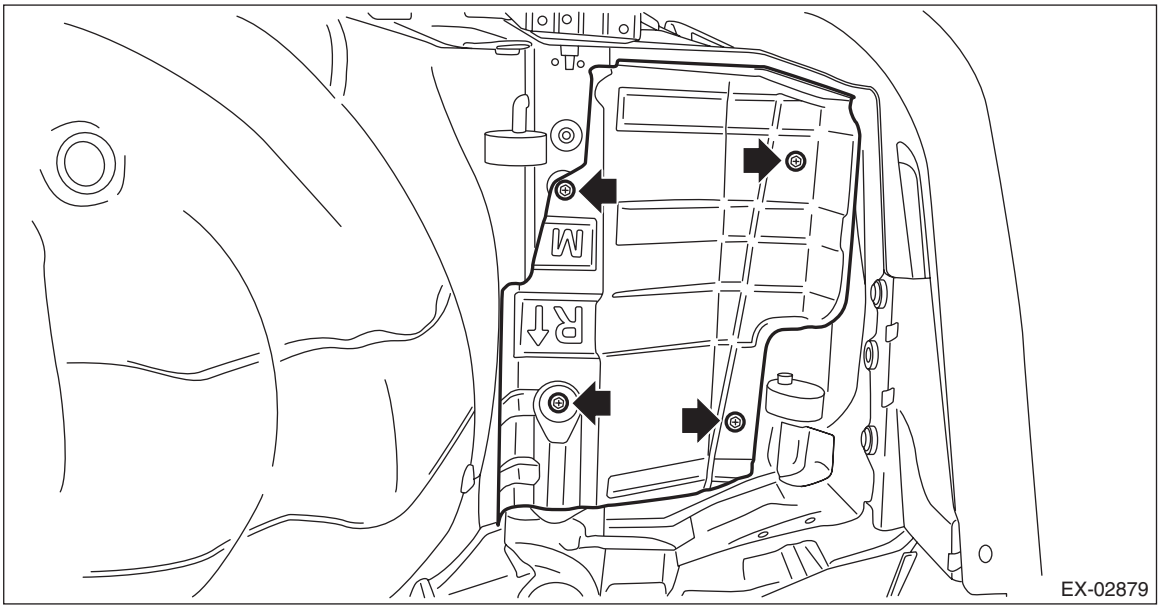
B: INSTALLATION

Install in the reverse order of removal.

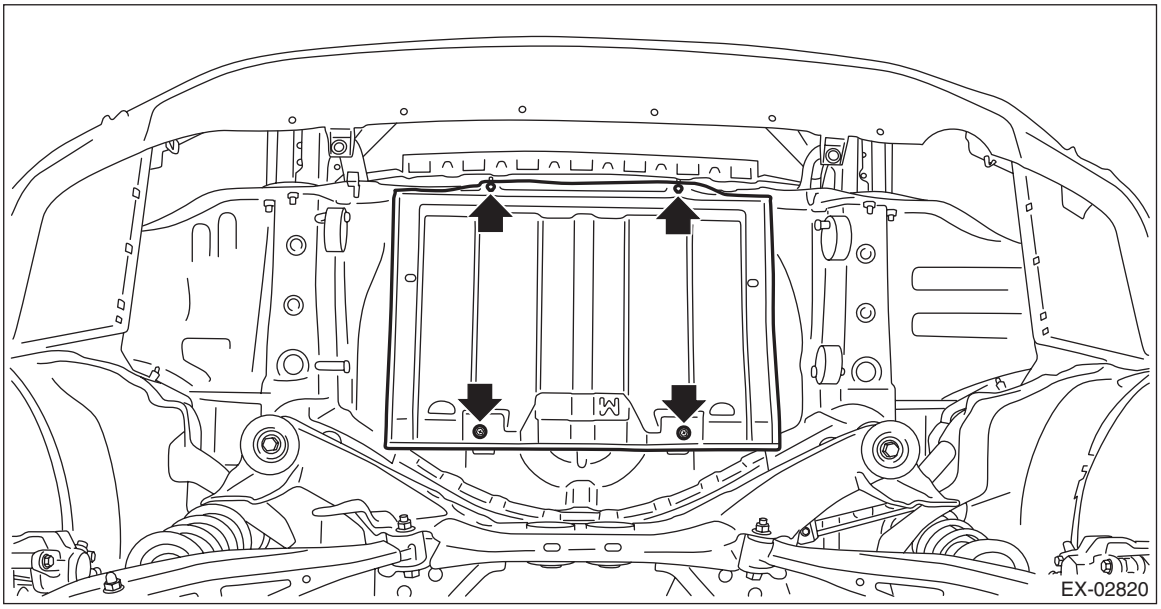
NOTE:
- Use a new gasket and self-locking nut.
- After assembling, degrease the lubricant which was applied to the cushion rubber while removing/installing.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

- 4 door model

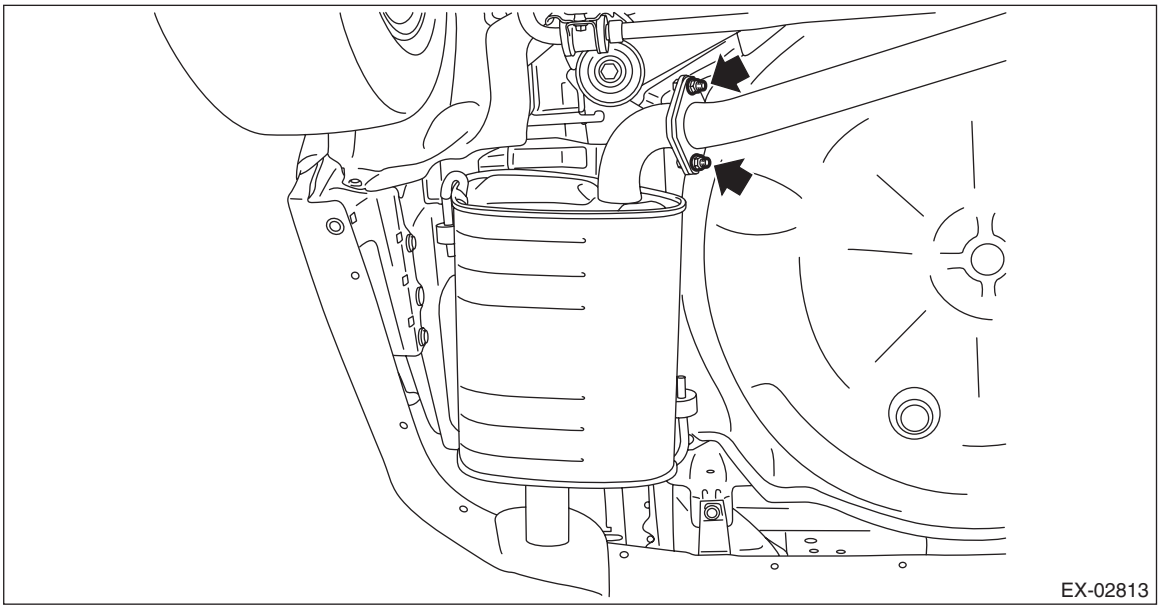


- 5 door model

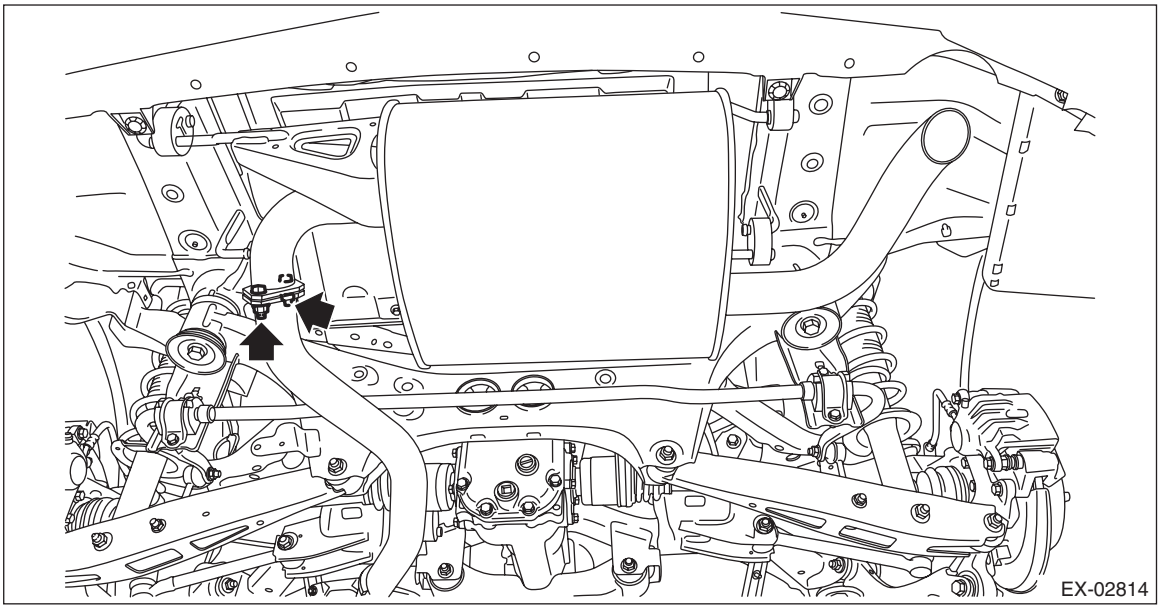


Tightening torque:
48 N·m (4.9 kgf-m, 35.4 ft-lb)

- 4 door model



- 5 door model



C: INSPECTION

1) Check the connections and welded parts for exhaust leaks.
2) Make sure there are no holes or rusting.
3) Check the cushion rubber for wear or crack.

COOLING

CO(H4DO(w/o HEV))

		Page
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10.	Radiator Sub Fan and Fan Motor	92
11.	Reservoir Tank	96
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1. General Description

A: SPECIFICATION

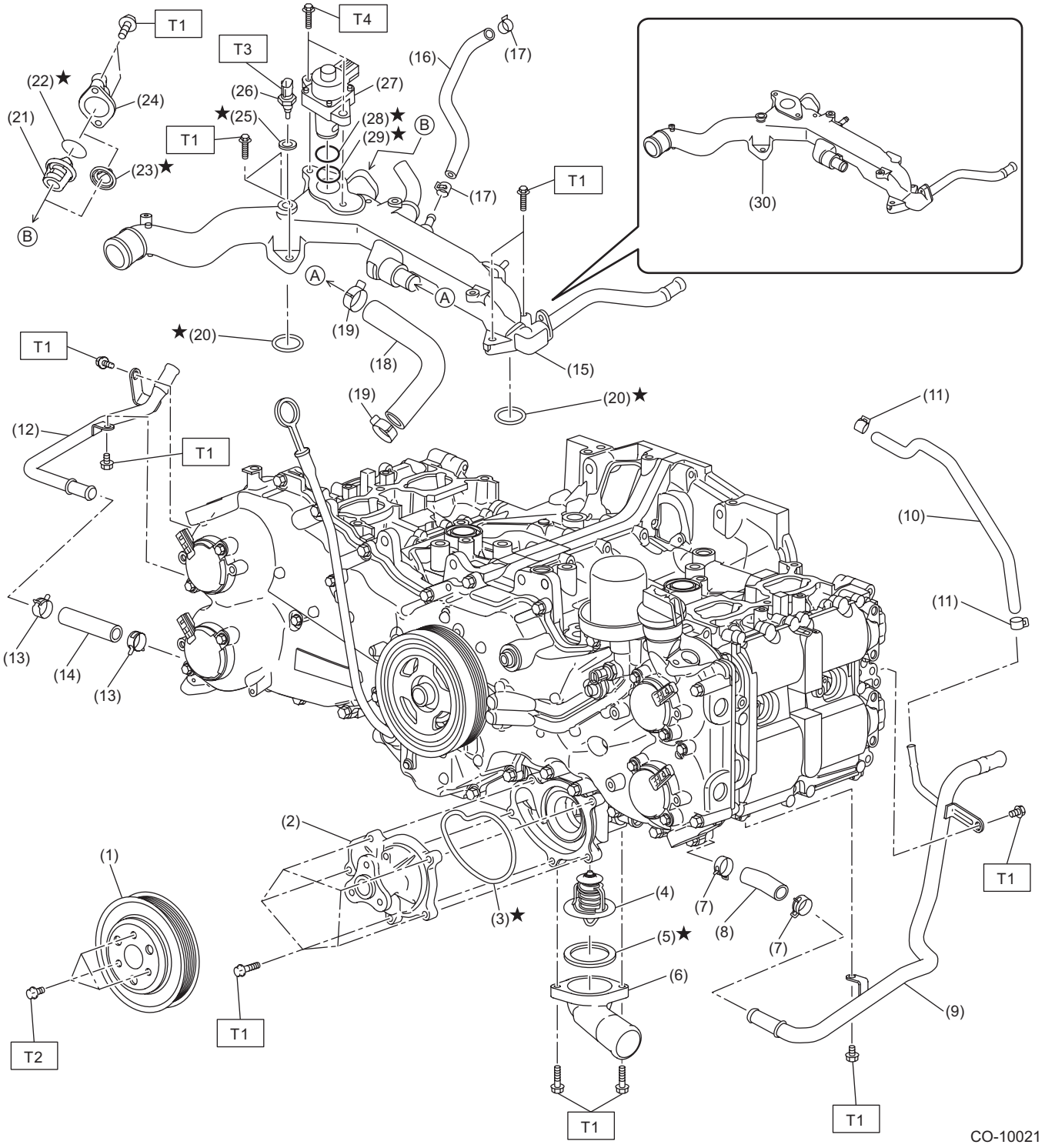
Cooling system					Electric fan + Forced engine coolant circulation system
Total engine coolant capacity L (US qt, Imp qt)		Gasoline engine model	CVT model		Approx. 8.4 (8.9, 7.4)
			MT model		Approx. 8.0 (8.5, 7.0)
		HEV model			Approx. 8.2 (8.7, 7.2)
Water pump	Type				Centrifugal impeller type
	Discharge performance	Discharge rate L (US gal, Imp gal)/min			230 (60.8, 50.6)
		Pump speed — Discharge pressure			6,600 r/min — 211.0 kPa (22 mAq)
		Engine coolant temperature			80°C (176°F)
	Impeller diameter mm (in)				60 (2.36)
	Number of impeller vanes				7
	Pump pulley diameter mm (in)	Gasoline engine model			130 (5.12)
		HEV model			143 (5.63)
Thermostat	Type				Wax pellet type
	Starting temperature to open	Engine side	Gasoline engine model		90 — 94°C (194 — 201°F)
			HEV model		87 — 91°C (189 — 196°F)
		CVTF cooler (with warmer feature) side (CVT model)			48 — 52°C (118 — 126°F)
	Fully opens	Engine side	Gasoline engine model		100°C (212°F)
			HEV model		98°C (208°F)
		CVTF cooler (with warmer feature) side (CVT model)			63°C (145°F)
	Valve lift mm (in)	Engine side			8.0 (0.315) or more
		CVTF cooler (with warmer feature) side (CVT model)			6.0 (0.236) or more
	Valve opening size mm (in)	Engine side			32 (1.26)
		CVTF cooler (with warmer feature) side (CVT model)			22 (0.87)
Radiator fan	Motor input	Main fan W			120
		Sub fan W			120
	Fan diameter / Blade	Main fan			320 mm (12.6 in)/9
		Sub fan			320 mm (12.6 in)/11
Radiator	Type				Down flow, pressure type
	Core dimensions	Width × Height × Thickness mm (in)			687.4 × 340 × 16 (27.06 × 13.39 × 0.63)
	Pressure range in which cap valve is open kPa (kg/cm^2, psi)		Positive pressure side	Standard	93 — 123 (0.95 — 1.25, 14 — 18)
				Limit	83 (0.85, 12)
			Negative pressure side	Standard	–1.0 to –4.9 or less (–0.01 — –0.05, –0.1 — –0.7)
	Fins				Corrugated fin type
Reservoir tank	Capacity L (US qt, Imp qt)				0.45 (0.48, 0.40)

	Recommended materials	Item number	Alternative
Coolant	SUBARU SUPER COOLANT (concentrated type)	—	—
	SUBARU SUPER COOLANT (diluted type)	K0670Y0001	
Water for dilution	Distilled water	—	Soft water or tap water
Cooling system protective agent	Cooling system conditioner	SOA345001	—

B: COMPONENT

1. WATER PUMP

- Gasoline engine model

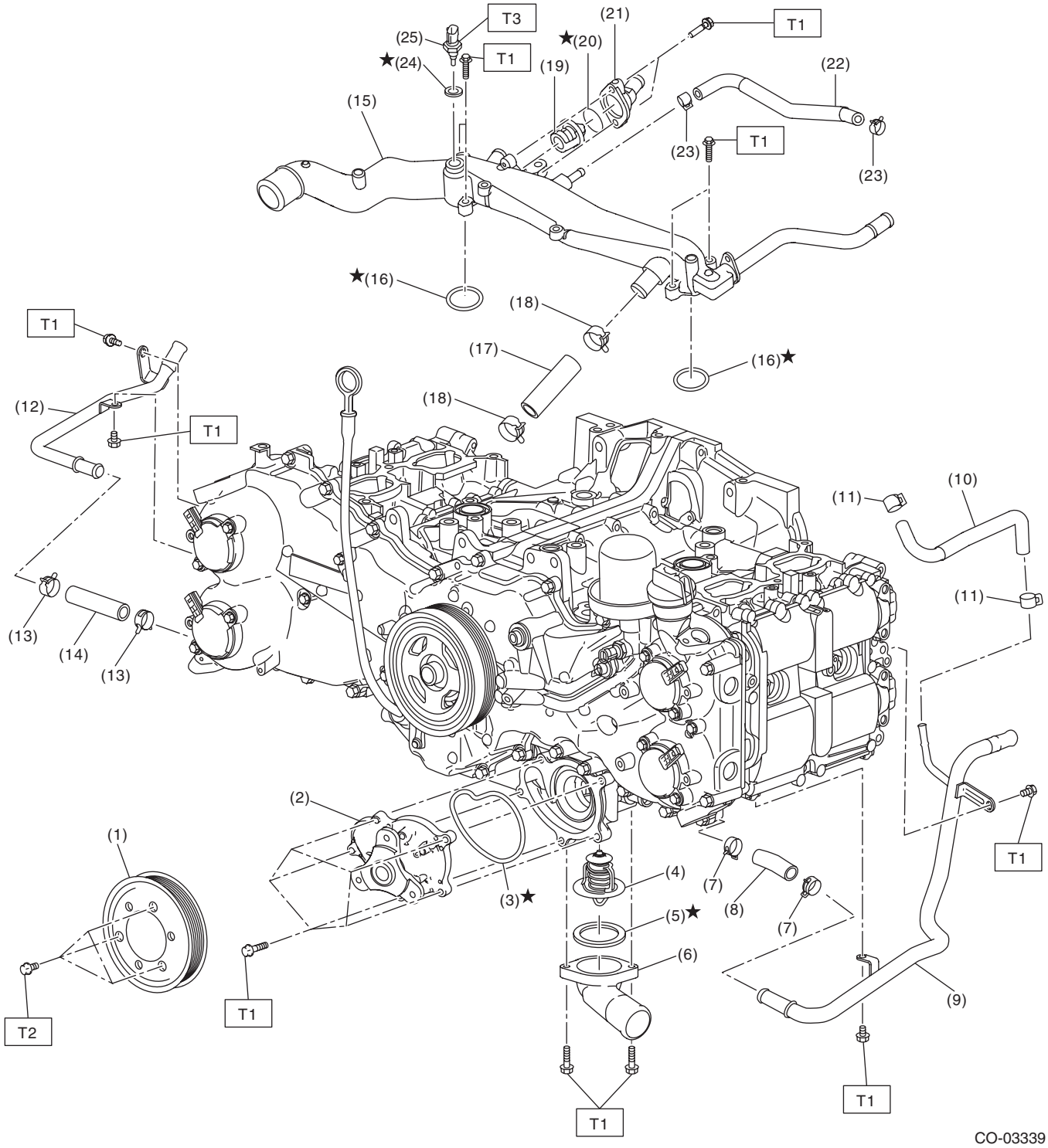


(1) Water pump pulley
(2) Water pump ASSY
(3) Gasket
(4) Thermostat (engine side)
(5) Gasket (engine side)
(6) Thermostat cover (engine side)
(7) Clip
(8) Water pipe hose LH
(9) Water pipe LH
(10) Preheater hose
(11) Clip
(12) Water pipe RH
(13) Clip
(14) Water pipe hose RH
(15) Water pipe ASSY (CVT model)
(16) Preheater hose A
(17) Clip
(18) Preheater hose B
(19) Clip
(20) O-ring
(21) Thermostat (CVTF cooler (with warmer feature) side)
(22) Gasket (CVTF cooler (with warmer feature) side)
(23) Gasket (MT model)
(24) Thermostat cover (CVTF cooler (with warmer feature) side)
(25) Gasket
(26) Engine coolant temperature sensor
(27) EGR control valve
(28) O-ring
(29) Gasket
(30) Water pipe ASSY (MT model)

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)
T2: 14 (1.4, 10.3)
T3: 18 (1.8, 13.3)
T4: 22 (2.2, 16.2)

- HEV model

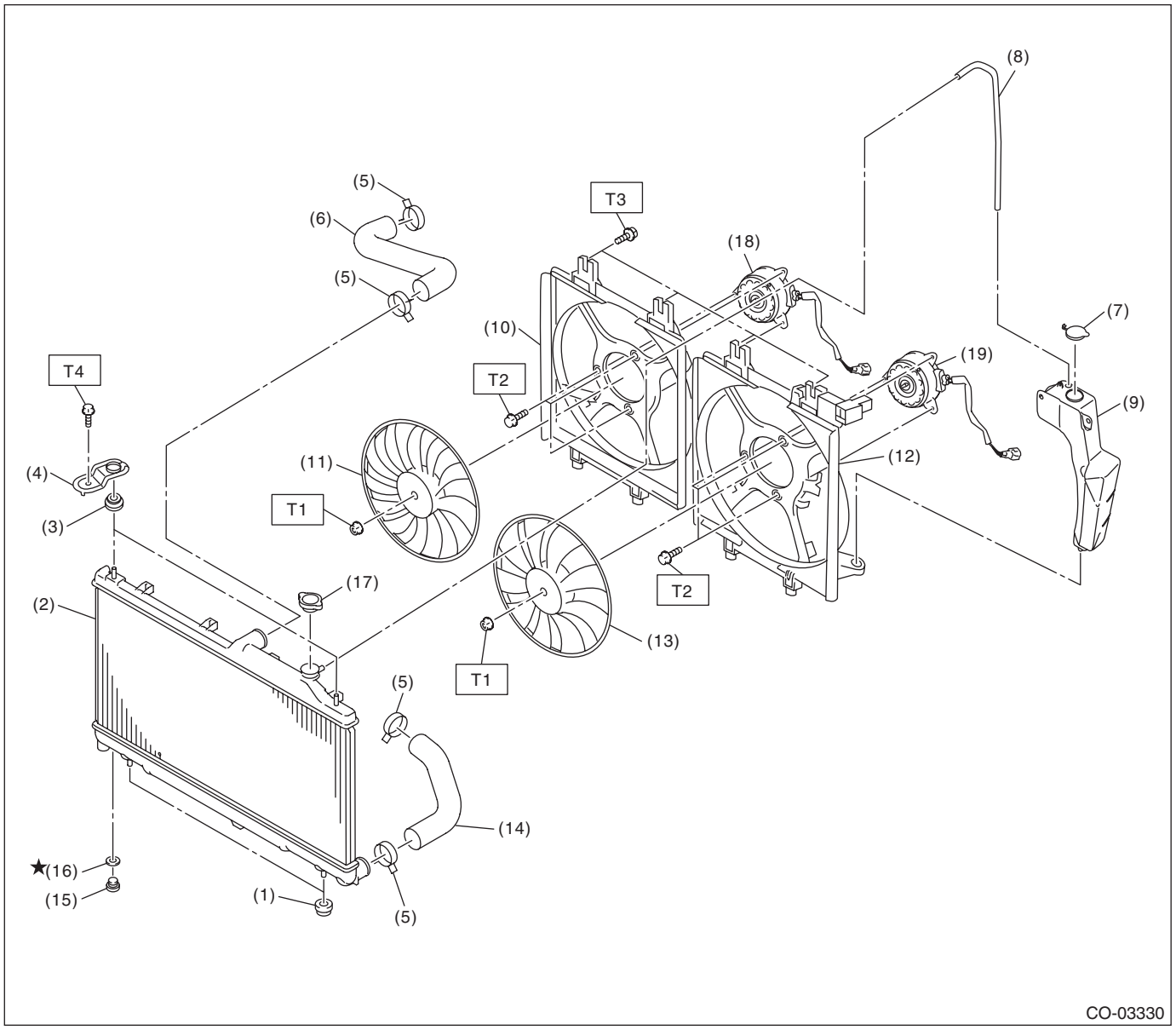

T3
(25)
T1
★(24)
(19)
(21)
★(20)
T1
(22)
(15)
(23)
T1
(23)
★(16)
(18)
T1
(17)
(16)★
(18)
(12)
T1
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(11)
(11)
(13)
(14)
(13)
(2)
(1)
(4)
(7)
(8)
(7)
T1
(3)★
(5)★
(6)
(9)
T2
T1
T1
T1
CO-03339

(1) Water pump pulley
(2) Water pump ASSY
(3) Gasket
(4) Thermostat (engine side)
(5) Gasket (engine side)
(6) Thermostat cover (engine side)
(7) Clip
(8) Water pipe hose LH
(9) Water pipe LH
(10) Preheater hose
(11) Clip
(12) Water pipe RH
(13) Clip
(14) Water pipe hose RH
(15) Water pipe ASSY
(16) O-ring
(17) Preheater hose B
(18) Clip
(19) Thermostat (CVTF cooler (with warmer feature) side)
(20) Gasket (CVTF cooler (with warmer feature) side)
(21) Thermostat cover (CVTF cooler (with warmer feature) side)
(22) Preheater hose A
(23) Clip
(24) Gasket
(25) Engine coolant temperature sensor

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)
T2: 14 (1.4, 10.3)
T3: 18 (1.8, 13.3)

2. RADIATOR & RADIATOR FAN



(1) Radiator lower cushion
(2) Radiator
(3) Radiator upper cushion
(4) Radiator upper bracket
(5) Clip
(6) Radiator inlet hose
(7) Engine coolant reservoir tank cap
(8) Over flow hose
(9) Engine coolant reservoir tank
(10) Radiator sub fan shroud
(11) Radiator sub fan
(12) Radiator main fan shroud
(13) Radiator main fan
(14) Radiator outlet hose
(15) Radiator drain plug
(16) O-ring
(17) Radiator cap
(18) Sub fan motor
(19) Main fan motor

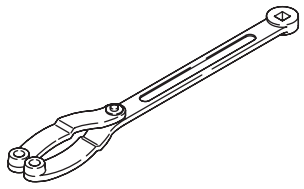
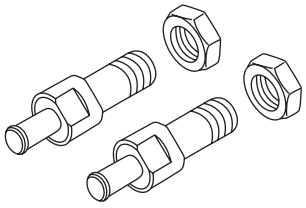
Tightening torque: N·m (kgf-m, ft-lb)
T1: 3.4 (0.3, 2.5)
T2: 4.41 (0.45, 3.25)
T3: 7.5 (0.8, 5.5)
T4: 12 (1.2, 8.9)

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Prepare a container and cloth to prevent scattering of engine coolant when performing work where engine coolant can be spilled. If the oil spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.
- Follow all government and local regulations concerning disposal of refuse when disposing engine coolant.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18355AA000	18355AA000	PULLEY WRENCH	• Used for removing and installing water pump pulley. • Used with PULLEY WRENCH PIN SET (18334AA030).
 ST18334AA030	18334AA030	PULLEY WRENCH PIN SET	• Used for removing and installing water pump pulley. • Used together with PULLEY WRENCH (18355AA000).
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

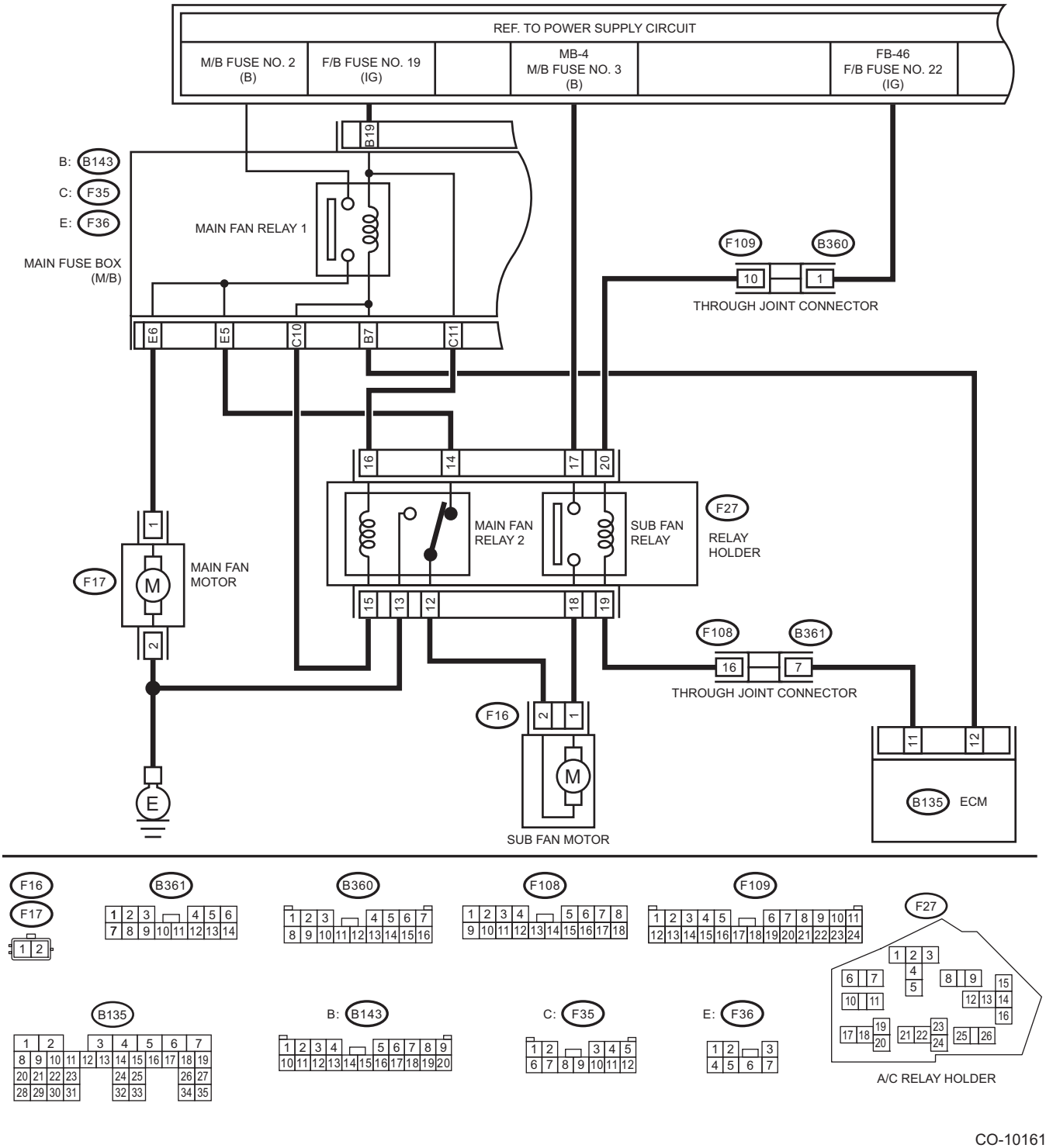
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Radiator cap tester	Used for checking radiator and radiator cap.
DST-i	Used together with Subaru Select Monitor 4.

2. Radiator Fan System

A: WIRING DIAGRAM

Radiator fan system <Ref. to WI(w/o HEV)-190, WIRING DIAGRAM, Radiator Fan System.> <Ref. to WI(HEV)-169, WIRING DIAGRAM, Radiator Fan System.>



CO-10161

B: INSPECTION

OPERATING CONDITION:

Vehicle speed	A/C compressor load	Engine coolant temperature		
		Increase: 98°C (208°F) or less Decrease: 96°C (205°F) or less	Increase: 99 — 101°C (210 — 214°F) Decrease: 97 — 98°C (207 — 208°F)	Increase: 102°C (216°F) or more Decrease: 99°C (210°F) or more
		Radiator fan operation	Radiator fan operation	Radiator fan operation
During acceleration: 19 km/h (12 MPH) or less During deceleration: 10 km/h (6 MPH) or less	OFF	OFF	Low-Speed	High-Speed
	Low	Low-Speed	Low-Speed	High-Speed
	High	High-Speed	High-Speed	High-Speed
During acceleration: 20 — 69 km/h (12 — 43 MPH) During deceleration: 11 — 64 km/h (7 — 40 MPH)	OFF	OFF	Low-Speed	High-Speed
	Low	High-Speed	High-Speed	High-Speed
	High	High-Speed	High-Speed	High-Speed
During acceleration: 70 — 134 km/h (43 — 83 MPH) During deceleration: 65 — 129 km/h (40 — 80 MPH)	OFF	OFF	Low-Speed	High-Speed
	Low	OFF	Low-Speed	High-Speed
	High	Low-Speed	High-Speed	High-Speed
During acceleration: 135 km/h (84 MPH) or more During deceleration: 130 km/h (81 MPH) or more	OFF	OFF	OFF	High-Speed
	Low	OFF	Low-Speed	High-Speed
	High	OFF	Low-Speed	High-Speed

DIAGNOSIS:

Radiator main fan and radiator sub fan do not rotate under the above operating conditions.

	Step	Check	Yes	No
1	**CHECK OPERATION OF RADIATOR FAN.** 1) Install the delivery (test) mode fuse. 2) Turn the ignition switch to ON. 3) Perform the compulsory operation check for the radiator fan relay using Subaru Select Monitor. NOTE: • When performing the compulsory operation check for the radiator fan relay using the Subaru Select Monitor, the radiator main fan and radiator sub fan will repeat low speed revolution → high speed revolution → OFF in this order. • Subaru Select Monitor For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.	Do the radiator main fans and radiator sub fans rotate at low speed?	Go to step **2**.	Go to step **3**.
2	**CHECK OPERATION OF RADIATOR FAN.** 1) Install the delivery (test) mode fuse. 2) Turn the ignition switch to ON. 3) Perform the compulsory operation check for the radiator fan relay using Subaru Select Monitor. NOTE: • When performing the compulsory operation check for the radiator fan relay using the Subaru Select Monitor, the radiator main fan and radiator sub fan will repeat low speed revolution → high speed revolution → OFF in this order. • Subaru Select Monitor For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.	Do the radiator main fans and radiator sub fans rotate at high speed?	Radiator main fan system is normal.	Go to step **27**.

	Step	Check	Yes	No
3	**CHECK POWER SUPPLY TO SUB FAN RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the sub fan relay from the relay holder. 3) Measure the voltage between the sub fan relay terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Go to step **5**.
4	**CHECK POWER SUPPLY TO SUB FAN RELAY.** 1) Turn the ignition switch to ON. 2) Measure the voltage between the sub fan relay terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 20 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **7**.	Go to step **6**.
5	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse No. 3. 3) Check the condition of fuse.	Is the fuse blown out?	Replace the fuse.	Repair the power supply line.
6	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse No. 22. 3) Check the condition of fuse.	Is the fuse blown out?	Replace the fuse.	Repair the power supply line.
7	**CHECK SUB FAN RELAY.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between sub fan relay terminals. ***Terminals*** ***No. 17 — No. 18:***	Is the resistance 1 MΩ or more?	Go to step **8**.	Replace the sub fan relay. <Ref. to AC-35, Relay and Fuse.>
8	**CHECK SUB FAN RELAY.** 1) Connect the battery to terminals No. 20 and No. 19 of the sub fan relay. 2) Measure the resistance between sub fan relay terminals. ***Terminals*** ***No. 17 — No. 18:***	Is the resistance less than 1 Ω?	Go to step **9**.	Replace the sub fan relay. <Ref. to AC-35, Relay and Fuse.>
9	**CHECK HARNESS BETWEEN SUB FAN RELAY TERMINAL AND SUB FAN MOTOR CONNECTOR.** 1) Disconnect the connector from the sub fan motor. 2) Measure the resistance of harness between the sub fan relay terminal and sub fan motor connector. ***Connector & terminal*** ***(F16) No. 1 — (F27) No. 18:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair the open circuit of harness between sub fan relay terminal and sub fan motor connector.
10	**CHECK HARNESS BETWEEN SUB FAN MOTOR CONNECTOR AND MAIN FAN RELAY 2 CONNECTOR.** 1) Remove main fan relay 2 from the relay holder. 2) Measure the resistance of harness between sub fan motor connector and main fan relay 2 connector. ***Connector & terminal*** ***(F16) No. 2 — (F27) No. 12:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of the harness between sub fan motor connector and main fan relay 2 connector.

	Step	Check	Yes	No
11	**CHECK FOR POOR CONTACT.** Check poor contact of sub fan motor connector.	Is there poor contact of the sub fan motor connector?	Repair the poor contact of sub fan motor connector.	Go to step **12**.
12	**CHECK SUB FAN MOTOR.** Connect the battery positive (+) terminal to terminal No. 1 of the sub fan motor, and the ground (–) terminal to terminal No. 2.	Does the radiator sub fan rotate?	Go to step **13**.	Replace the sub fan motor. <Ref. to CO(H4DO(w/o HEV))-92, Radiator Sub Fan and Fan Motor.>
13	**CHECK MAIN FAN RELAY 2.** Measure the resistance of main fan relay 2. ***Terminals*** ***No. 14 — No. 12:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the main fan relay 2. <Ref. to AC-35, Relay and Fuse.>
14	**CHECK HARNESS BETWEEN MAIN FAN RELAY 2 AND MAIN FAN MOTOR CONNECTOR.** 1) Disconnect the connector from the main fan motor. 2) Measure the resistance of the harness between main fan relay 2 terminal and main fan motor connector. ***Connector & terminal*** ***(F17) No. 1 — (F27) No. 14:***	Is the resistance less than 1 Ω?	Go to step **15**.	Repair the open circuit of the harness between main fan relay 2 terminal and main fan motor connector.
15	**CHECK GROUND CIRCUIT OF MAIN FAN MOTOR.** Measure the resistance between main fan motor connector and chassis ground. ***Connector & terminal*** ***(F17) No. 2 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **16**.	Repair the open circuit of the harness between main fan motor connector and chassis ground.
16	**CHECK FOR POOR CONTACT.** Check poor contact of main fan motor connector.	Is there poor contact of the main fan motor connector?	Repair the poor contact of main fan motor connector.	Go to step **17**.
17	**CHECK MAIN FAN MOTOR.** Connect the battery positive (+) terminal to terminal No. 1 of the main fan motor, and the ground (–) terminal to terminal No. 2.	Does the radiator main fan rotate?	Go to step **18**.	Replace the main fan motor. <Ref. to CO(H4DO(w/o HEV))-88, Radiator Main Fan and Fan Motor.>
18	**CHECK HARNESS BETWEEN SUB FAN RELAY AND ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance between the sub fan relay terminal and ECM connector. ***Connector & terminal*** ***(B135) No. 11 — (F27) No. 19:***	Is the resistance less than 1 Ω?	Go to step **19**.	Repair the open circuit of harness between sub fan relay terminal and ECM.
19	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Check the DTC. Repair the trouble cause. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>

	Step	Check	Yes	No
20	**CHECK MAIN FAN RELAY 1.** 1) Turn the ignition switch to OFF. 2) Remove main fan relay 1 from the main fuse box. 3) Measure the resistance between terminals of main fan relay 1 switch.	Is the resistance 1 MΩ or more?	Go to step **21**.	Replace the main fan relay 1. <Ref. to AC-35, Relay and Fuse.>
21	**CHECK MAIN FAN RELAY 1.** 1) Connect the main fan relay 1 coil side terminal to the battery. 2) Measure the resistance between terminals of main fan relay 1 switch.	Is the resistance less than 1 Ω?	Go to step **22**.	Replace the main fan relay 1. <Ref. to AC-35, Relay and Fuse.>
22	**CHECK HARNESS BETWEEN MAIN FAN RELAY 1 AND MAIN FAN MOTOR CONNECTOR.** 1) Disconnect the connector from the main fan motor. 2) Measure the resistance of the harness between main fan relay 1 terminal and main fan motor connector. ***Connector & terminal*** ***(F17) No. 1 — (F36) No. 6:***	Is the resistance less than 1 Ω?	Go to step **23**.	Repair the open circuit of the harness between main fan relay 1 terminal and main fan motor connector.
23	**CHECK HARNESS BETWEEN MAIN FAN RELAY 1 AND ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance between main fan relay 1 terminal and ECM connector. ***Connector & terminal*** ***(B135) No. 12 — (B143) No. 7:***	Is the resistance less than 1 Ω?	Go to step **24**.	Repair the open circuit of the harness between main fan relay 1 terminal and ECM.
24	**CHECK HARNESS BETWEEN MAIN FAN RELAY 2 AND ECM.** Measure the resistance between main fan relay 2 terminal and ECM connector. ***Connector & terminal*** ***(B135) No. 12 — (F27) No. 15:***	Is the resistance less than 1 Ω?	Go to step **25**.	Repair the open circuit of the harness between main fan relay 2 terminal and ECM.
25	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse No. 2 and No. 26. 3) Check the condition of fuse.	Is the fuse blown out?	Replace the fuse.	Go to step **26**.
26	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Repair the power supply circuit to the main fuse box.
27	**CHECK OPERATION OF RADIATOR FAN.** If the both fans do not rotate at high speed in the condition of step 2, check whether the radiator sub fan is rotating.	Does the radiator sub fan rotate?	Go to step **20**.	Go to step **28**.
28	**CHECK GROUND CIRCUIT OF MAIN FAN RELAY 2.** 1) Remove the main fan relay 2 from A/C relay holder. 2) Measure the resistance between main fan relay 2 terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 13 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **29**.	Repair the open circuit of harness between main fan relay 2 and chassis ground.

	Step	Check	Yes	No
29	**CHECK POWER SUPPLY TO MAIN FAN RELAY 2.** 1) Turn the ignition switch to ON. 2) Measure the voltage between main fan relay 2 terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **30**.	Repair the power supply line.
30	**CHECK MAIN FAN RELAY 2.** 1) Turn the ignition switch to OFF. 2) Remove the main fan relay 2. 3) Measure the resistance of main fan relay 2. ***Terminals*** ***(F27) No. 12 — (F27) No. 13:***	Is the resistance 1 MΩ or more?	Go to step **31**.	Replace the main fan relay 2. <Ref. to AC-35, Relay and Fuse.>
31	**CHECK MAIN FAN RELAY 2.** 1) Connect the battery to terminals No. 16 and No. 15 of the main fan relay 2. 2) Measure the resistance of main fan relay 2. ***Terminals*** ***(F27) No. 12 — (F27) No. 13:***	Is the resistance less than 1 Ω?	Go to step **23**.	Replace the main fan relay 2. <Ref. to AC-35, Relay and Fuse.>

3. Engine Coolant

A: INSPECTION

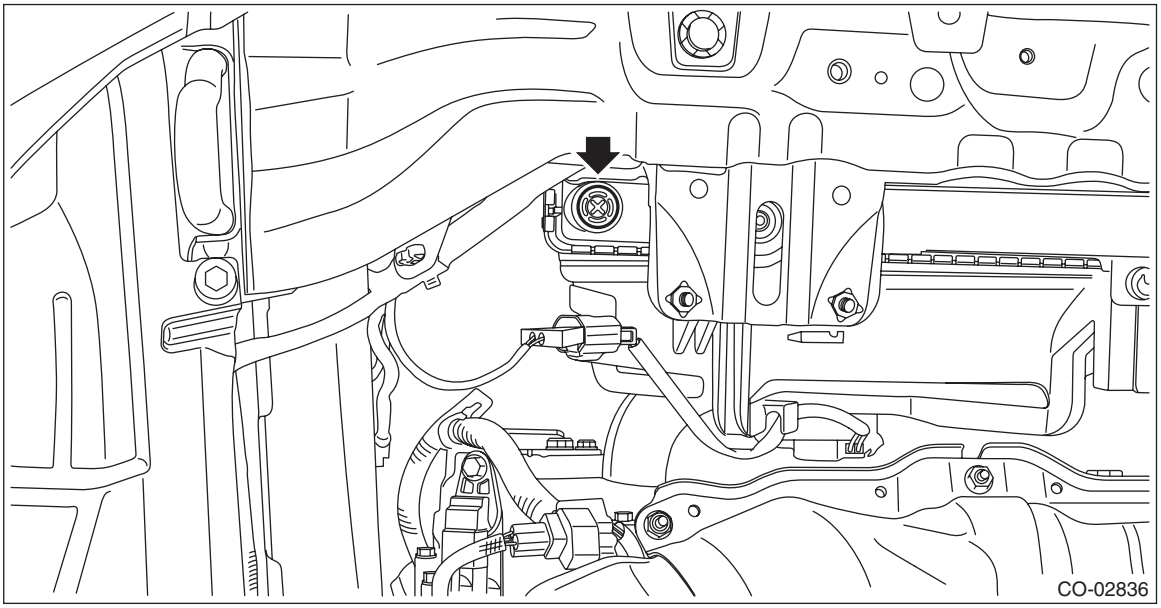
NOTE:
When adding the engine coolant, always use SUBARU Super Coolant.
1) Park the vehicle on a level surface.
2) Turn the ignition switch to OFF.
3) Check the engine coolant amount, and if the coolant level is low, check for the coolant leakage, and then add the engine coolant.
   (1) Make sure the engine coolant level in the reservoir tank is between “FULL” and “LOW” with the engine in a cold condition.
   (2) Open the radiator cap and make sure that the radiator is filled with the engine coolant up to its filler neck position.

B: REPLACEMENT

1. DRAINING OF ENGINE COOLANT

1) Turn the ignition switch to OFF.
2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Remove the drain plug to drain engine coolant into container.

NOTE:
Remove the radiator cap so that engine coolant will drain faster.



5) Install the drain plug.

NOTE:
Use new O-rings.
6) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>

2. FILLING OF ENGINE COOLANT

CAUTION:
For CVT models, set the select lever to “P” or “N” range (for MT models, the shift lever in neutral) during work, and do not shift the lever.
1) Pour cooling system conditioner through the filler neck.

Cooling system protective agent:
Refer to “SPECIFICATION” for cooling system protective agent. <Ref. to CO(H4DO(w/o HEV))-2, SPECIFICATION, General Description.>

2) Pour engine coolant into the radiator up to the filler neck position.

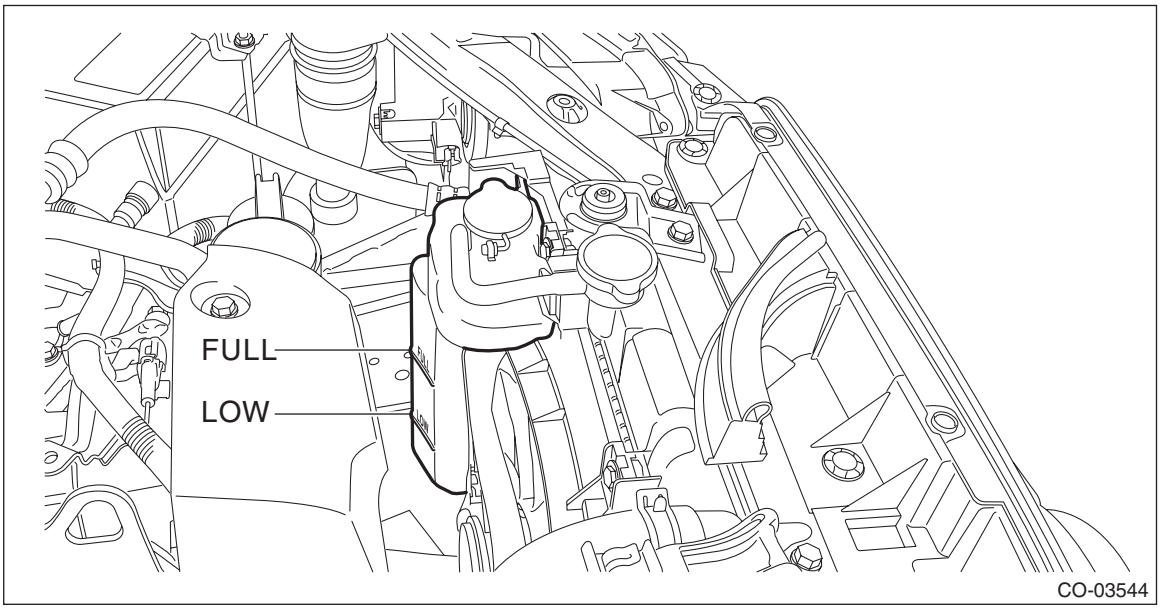
Recommended engine coolant:
Refer to "SPECIFICATION" for recommended engine coolant. <Ref. to CO(H4DO(w/o HEV))-2, SPECIFICATION, General Description.>

Engine coolant level:
Refer to "SPECIFICATION" for engine coolant level. <Ref. to CO(H4DO(w/o HEV))-2, SPECIFICATION, General Description.>

Engine coolant concentration:
Refer to "ADJUSTMENT" for the recommended engine coolant concentration. <Ref. to CO(H4DO(w/o HEV))-18, ADJUSTMENT, Engine Coolant.>

NOTE:
The SUBARU Super Coolant contains anti-freeze and anti-rust agents, and is especially made for Subaru engines with an aluminum cylinder block. Be sure to use SUBARU Super Coolant, since other coolant may cause corrosion.

3) Fill engine coolant into the reservoir tank up to "FULL" level.



4) Close the radiator cap and start the engine. Race 5 to 6 times at 3,000 r/min or less, then stop the engine. (Complete this operation within 40 seconds.)
5) Wait for one minute after the engine stops (ignition OFF), and open the radiator cap. If the engine coolant level drops, add engine coolant into radiator up to the filler neck position.
6) Perform the procedures 4) and 5) again.
7) Attach the radiator cap and reservoir tank cap properly.
8) Start the engine and operate the heater at maximum hot position and the blower speed setting to "LO". (A/C OFF)
9) Run the engine at 3,000 r/min or less until radiator fan starts and stops.

NOTE:
Be careful with the engine coolant temperature to prevent overheating.

10) Stop the engine (ignition OFF) and wait until the engine coolant temperature lowers to 30°C (86°F) or less.
11) Open the radiator cap. If the engine coolant level drops, add engine coolant into the radiator up to the filler neck position and the reservoir tank to "FULL" level.
12) Attach the radiator cap and reservoir tank cap properly.
13) Set the heater setting to maximum hot position and the blower speed setting to "LO" and start the engine. Perform racing at 3,000 r/min or less. If the flowing sound is heard from heater core at this time, perform the procedures from 9) again.

C: ADJUSTMENT

1. PROCEDURE TO ADJUST THE SUBARU SUPER COOLANT CONCENTRATION

CAUTION:
Use the SUBARU Super Coolant with a 50 — 60% concentration in order to obtain maximum anti-freeze and anti-rust performance.
To adjust the concentration of SUBARU Super Coolant according to temperature, find the proper SUBARU Super Coolant concentration in the table, and add dilution water to the SUBARU Super Coolant (concentrated type) until it reaches the proper dilution.

Relationship of SUBARU Super Coolant concentration and freezing temperature			
SUBARU Super Coolant concentration	50%	55%	60%
Freezing temperature	–36°C (–33°F)	–41°C (–42°F)	–50°C (–58°F)

Engine coolant and diluting water:
Refer to "SPECIFICATION" for recommended engine coolant and diluting water. <Ref. to CO(H4DO(w/o HEV))-2, SPECIFICATION, General Description.>

4. Water Pump

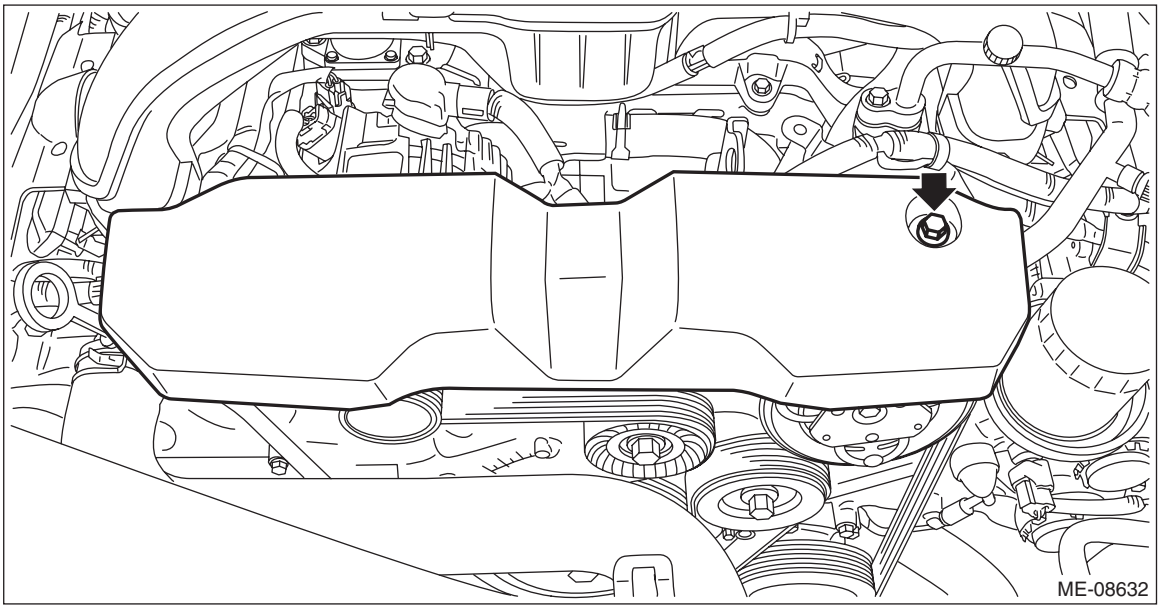
A: REMOVAL

1. WATER PUMP PULLEY

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

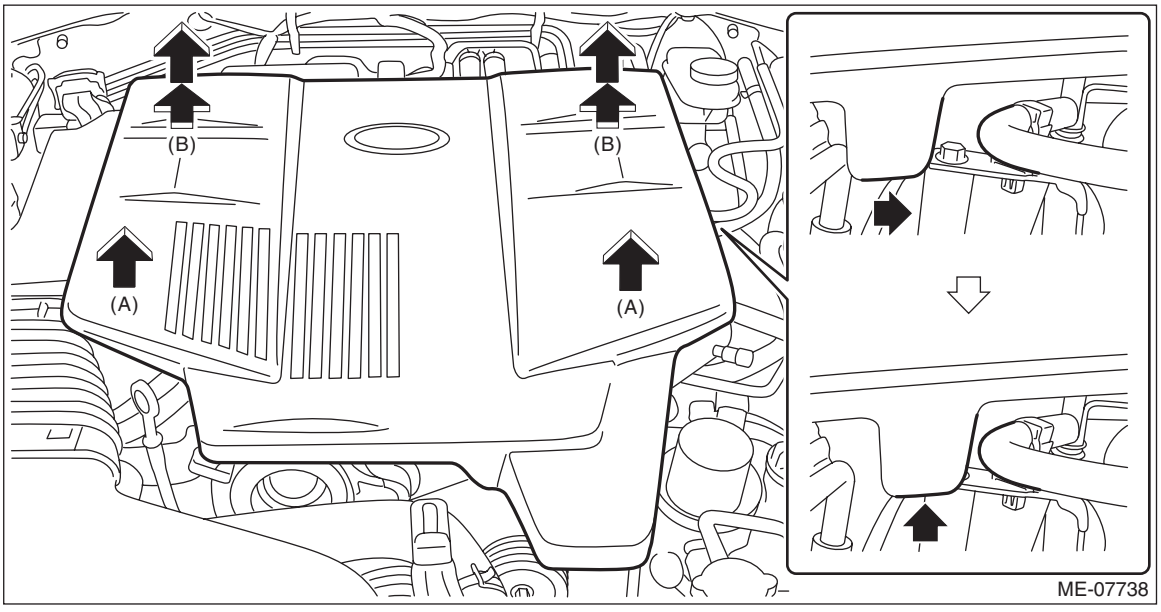
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the V-belt covers. (Gasoline engine model)



3) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

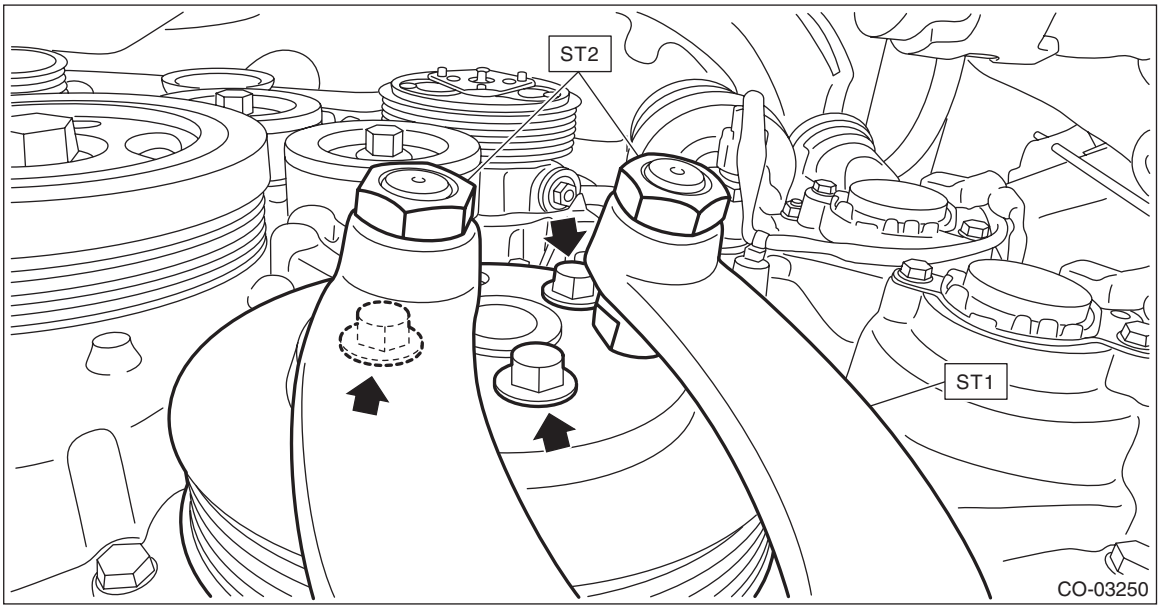


4) Remove the V-belts. (Gasoline engine model) <Ref. to ME(H4DO(w/o HEV))-124, GASOLINE ENGINE MODEL, REMOVAL, V-belt.>

5) Loosen the V-belt, and remove the V-belt from the water pump pulley. (HEV model) <Ref. to ME(H4DO(w/o HEV))-126, HEV MODEL, REMOVAL, V-belt.>

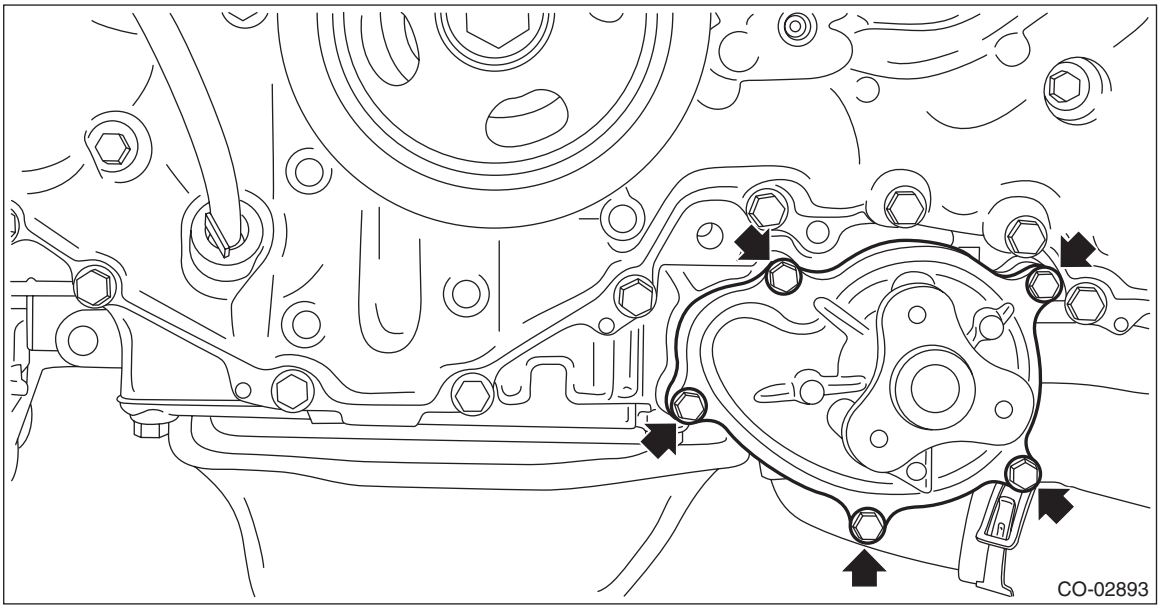
NOTE:
It is not necessary to remove the V-belt tensioner assembly and the V-belt from ISG.

6) Remove the radiator main fan & fan motor assembly. <Ref. to CO(H4DO(w/o HEV))-88, REMOVAL, Radiator Main Fan and Fan Motor.>
7) Lift up the vehicle.
8) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
9) Remove the water pump pulley using the ST.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA030 PULLEY WRENCH PIN SET



2. WATER PUMP

1) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
2) Remove the water pump pulley. <Ref. to CO(H4DO(w/o HEV))-19, WATER PUMP PULLEY, REMOVAL, Water Pump.>
3) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
4) Remove the water pump from the oil pan upper.

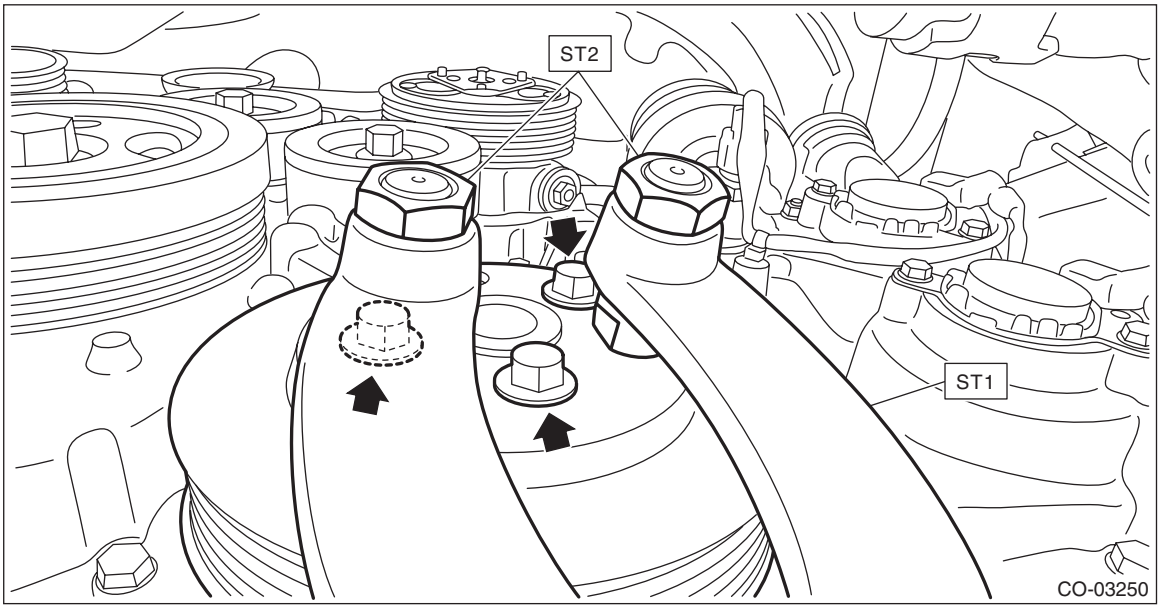


B: INSTALLATION

1. WATER PUMP PULLEY

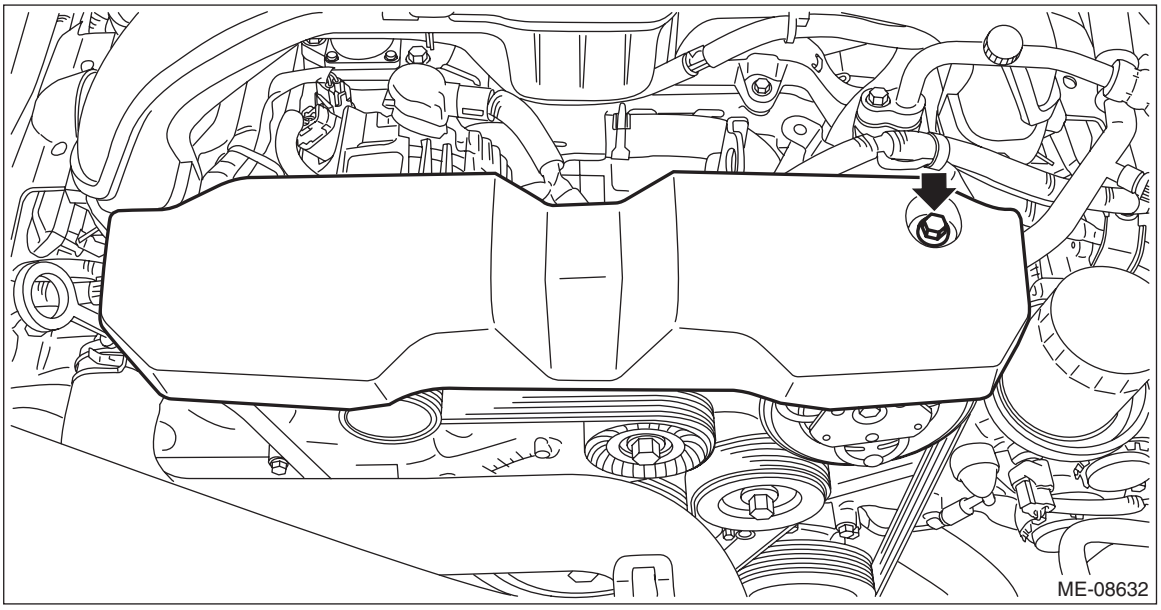
1) Using the ST, install the water pump pulley.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA030 PULLEY WRENCH PIN SET

Tightening torque:
14 N·m (1.4 kgf-m, 10.3 ft-lb)



2) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
3) Lower the vehicle.
4) Install the radiator main fan & fan motor assembly. <Ref. to CO(H4DO(w/o HEV))-89, INSTALLATION, Radiator Main Fan and Fan Motor.>
5) Install the V-belts. <Ref. to ME(H4DO(w/o HEV))-132, GASOLINE ENGINE MODEL, INSTALLATION, V-belt.> <Ref. to ME(H4DO(w/o HEV))-136, HEV MODEL, INSTALLATION, V-belt.>
6) Install the V-belt cover. (Gasoline engine model)

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



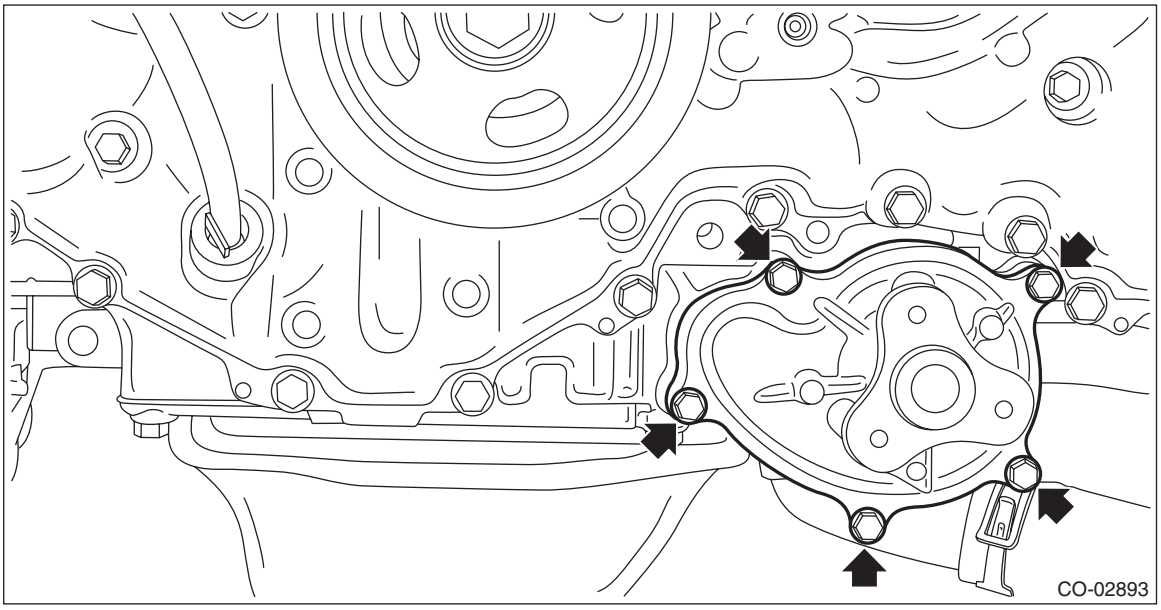
7) Install the collector cover. (HEV model)
8) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

2. WATER PUMP

1) Install the water pump to oil pan upper.

NOTE:
Use a new gasket.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



2) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
3) Install the water pump pulley. <Ref. to CO(H4DO(w/o HEV))-21, WATER PUMP PULLEY, INSTALLATION, Water Pump.>
4) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

C: INSPECTION

1) Check the water pump bearing for smooth rotation.
2) Check the water pump pulley for abnormalities.
3) Make sure the impeller is not abnormally deformed or damaged.

5. Water Pipe Assembly

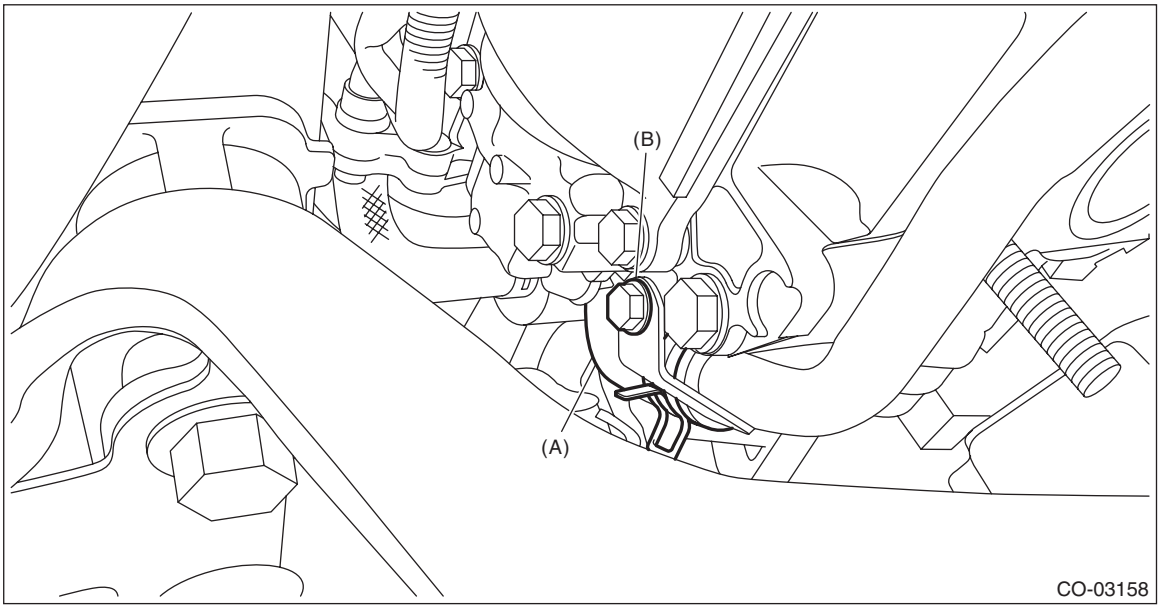
A: REMOVAL

1. WATER PIPE ASSEMBLY RH

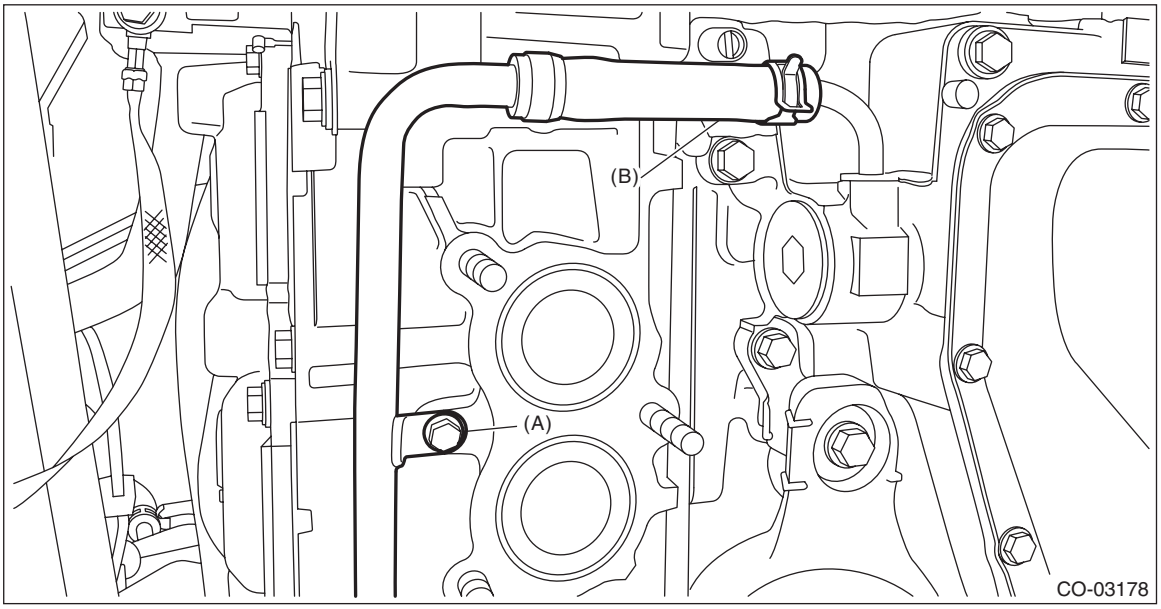
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
3) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
4) Disconnect the water hose (A) from the water pipe assembly RH, and remove the bolt (B) securing the water pipe assembly RH to the cam carrier RH.



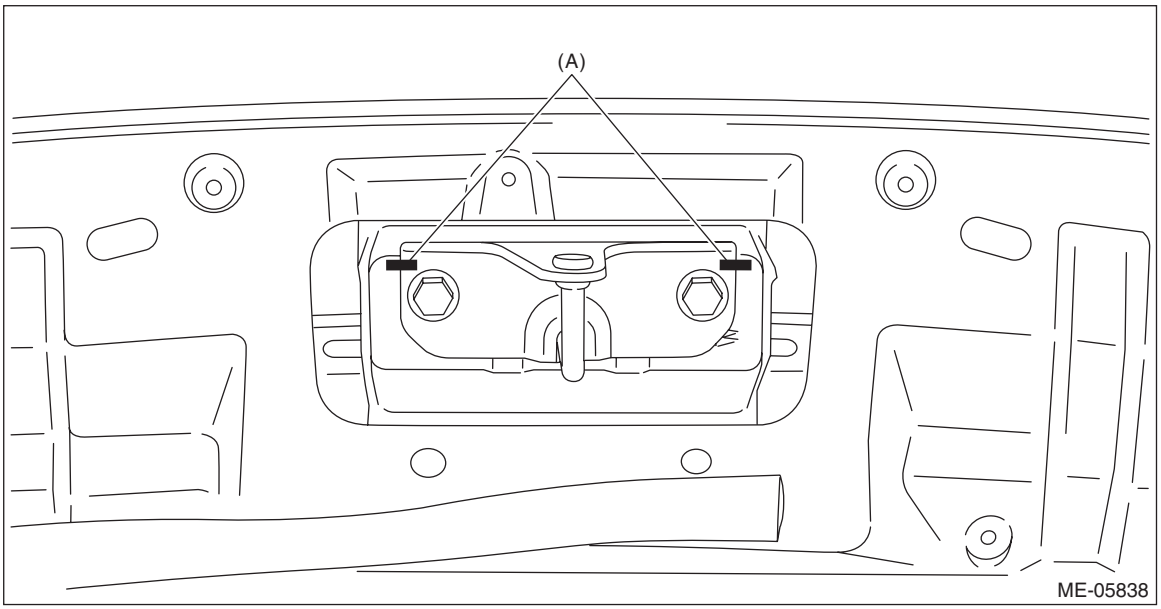
5) Remove the bolt (A) which secures the water pipe assembly RH to the cylinder head RH.
6) Disconnect the water pipe hose RH (B) from oil pan upper, and remove the water pipe assembly RH.



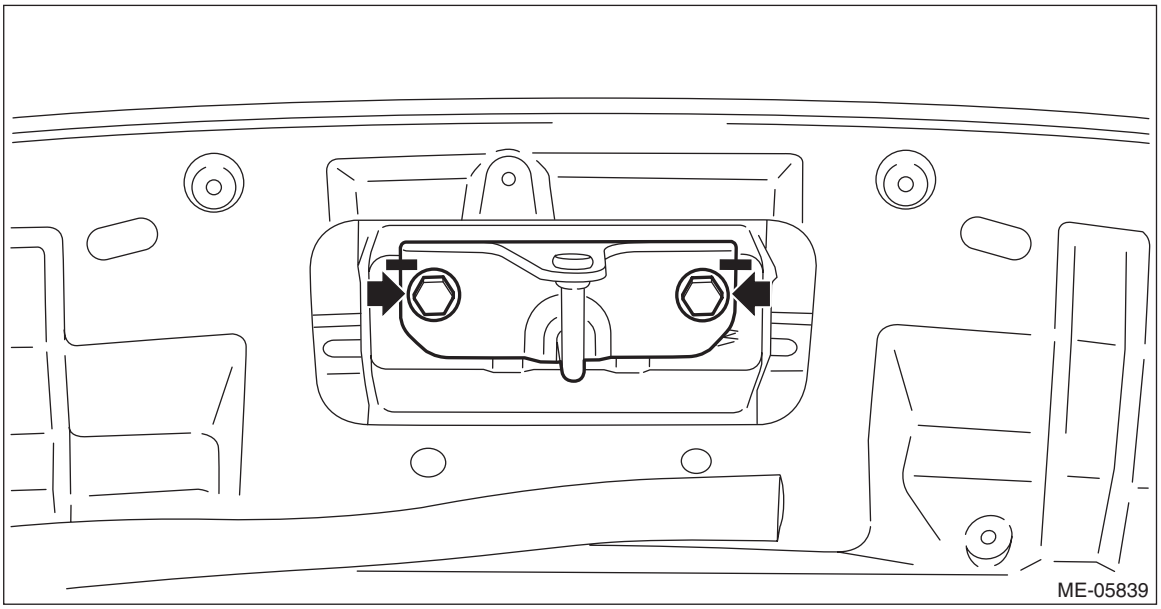
2. WATER PIPE ASSEMBLY LH

• Gasoline engine model

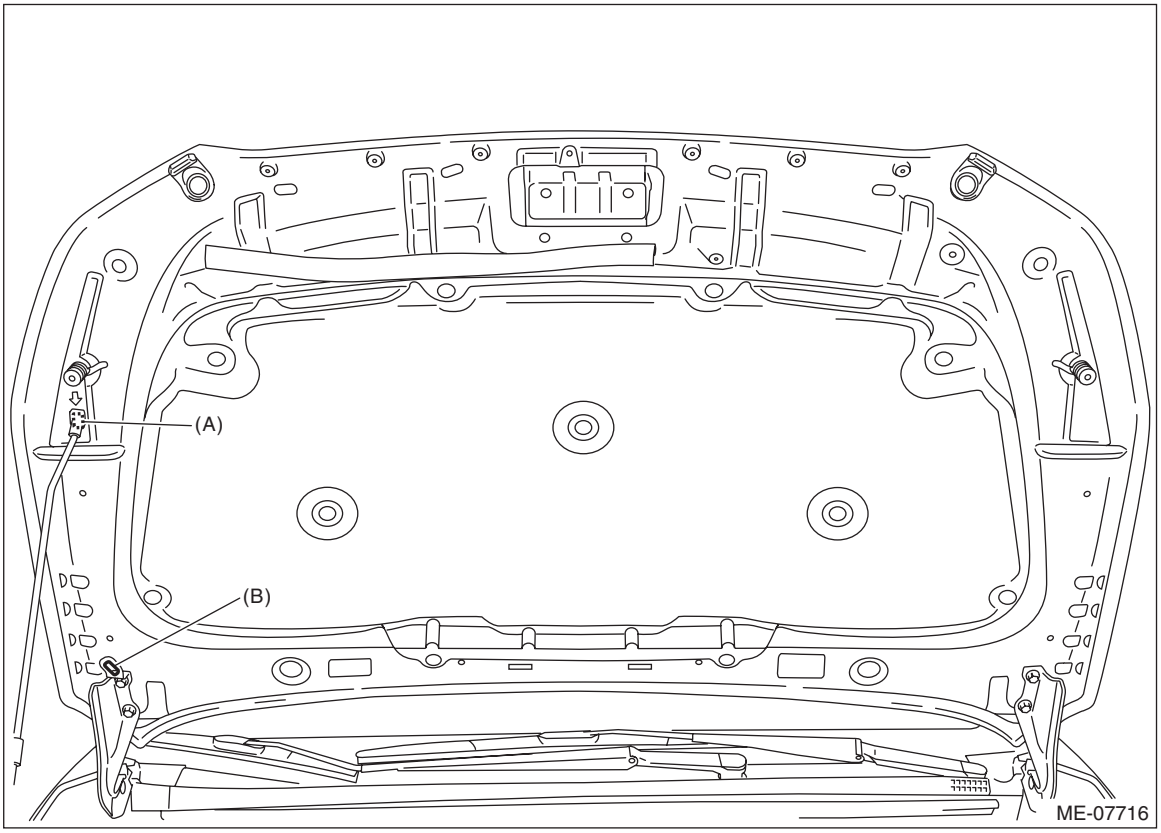
1) Open the front hood, and make alignment marks (A) on both the front hood and the front hood striker by using a marker pen.



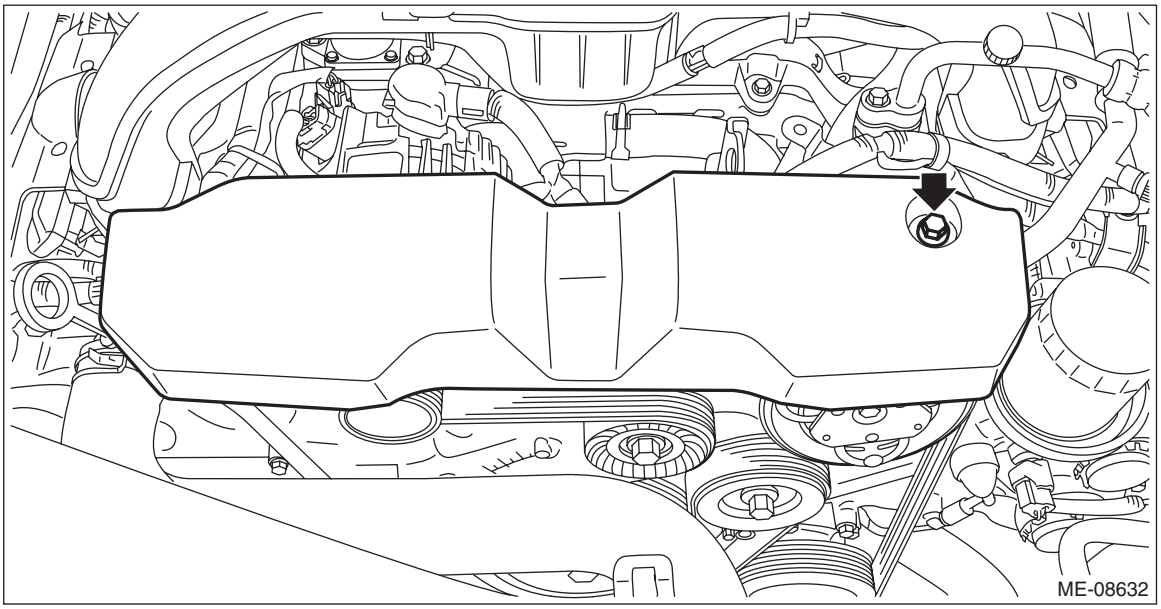
2) Remove the front hood striker from the front hood.



3) Change the front hood stay position from (A) to (B), and completely open the front hood.

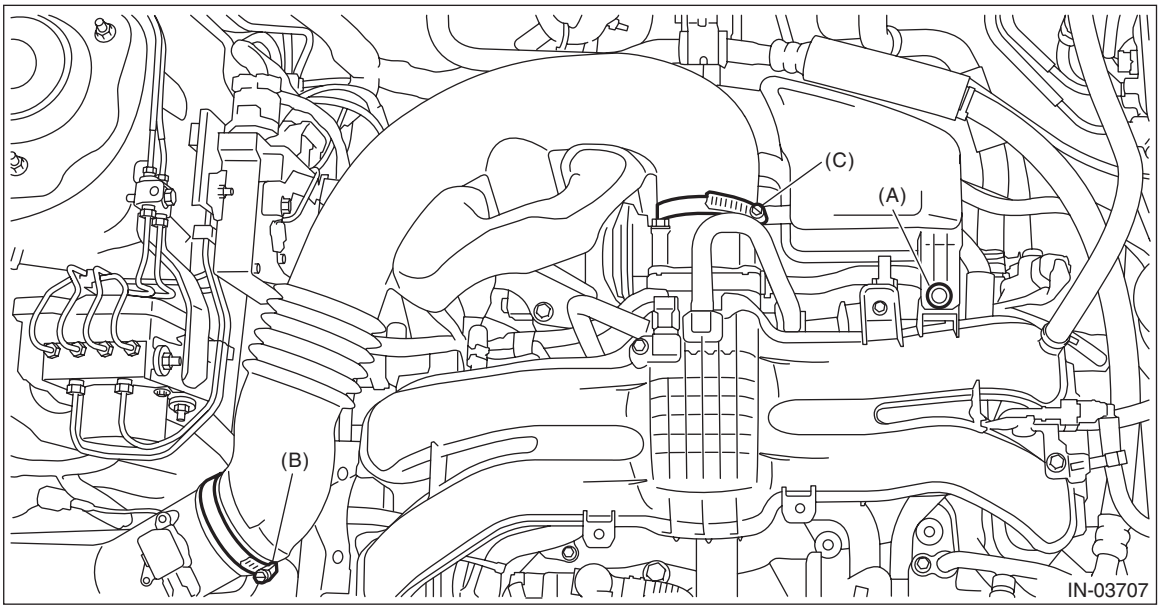


4) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
5) Remove the V-belt covers.

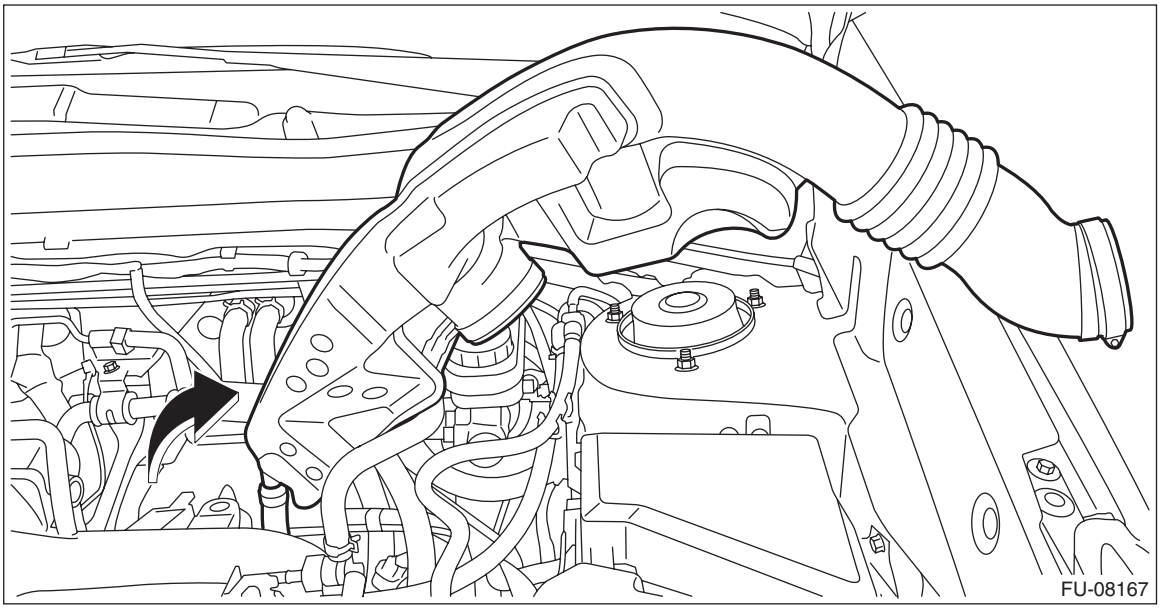


6) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
7) Remove the clip (A) from the air intake boot.
8) Loosen the clamp (B) securing the air cleaner case (rear) to the air intake boot.

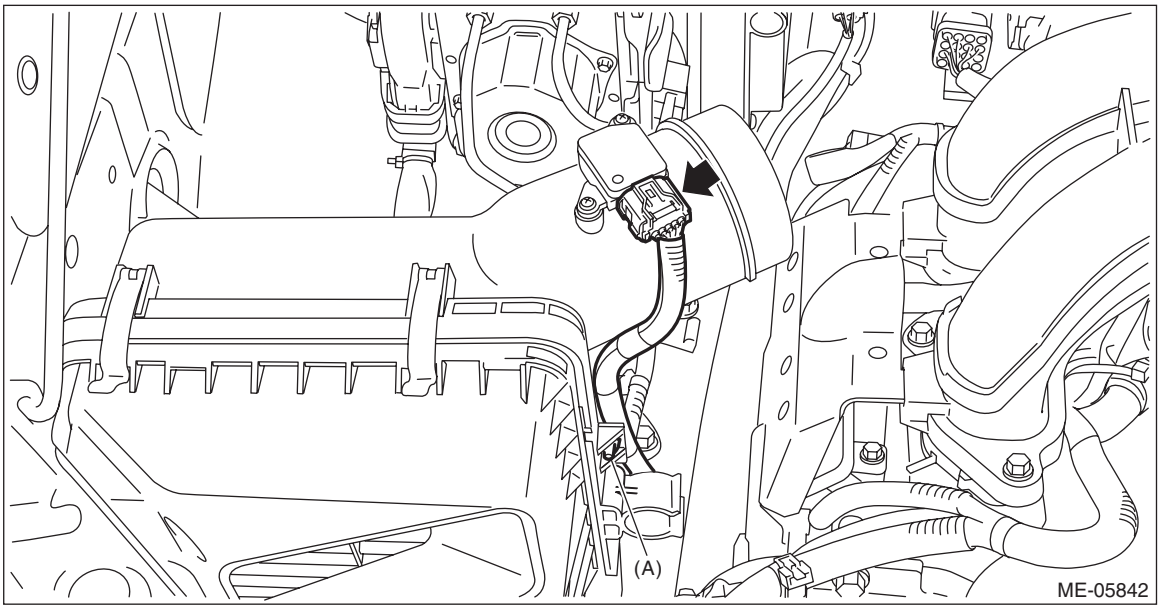
9) Loosen the clamp (C) which secures the throttle body to the air intake boot.



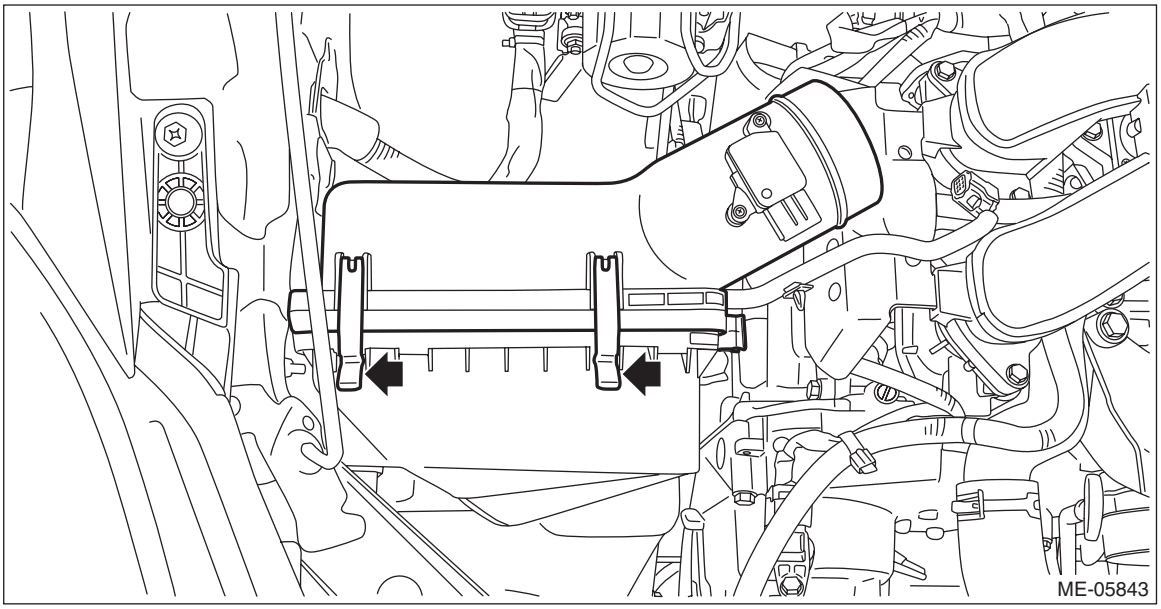
10) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



11) Disconnect the connector from the mass air flow and intake air temperature sensor, and remove the clip (A) which holds the mass air flow and intake air temperature sensor harness.

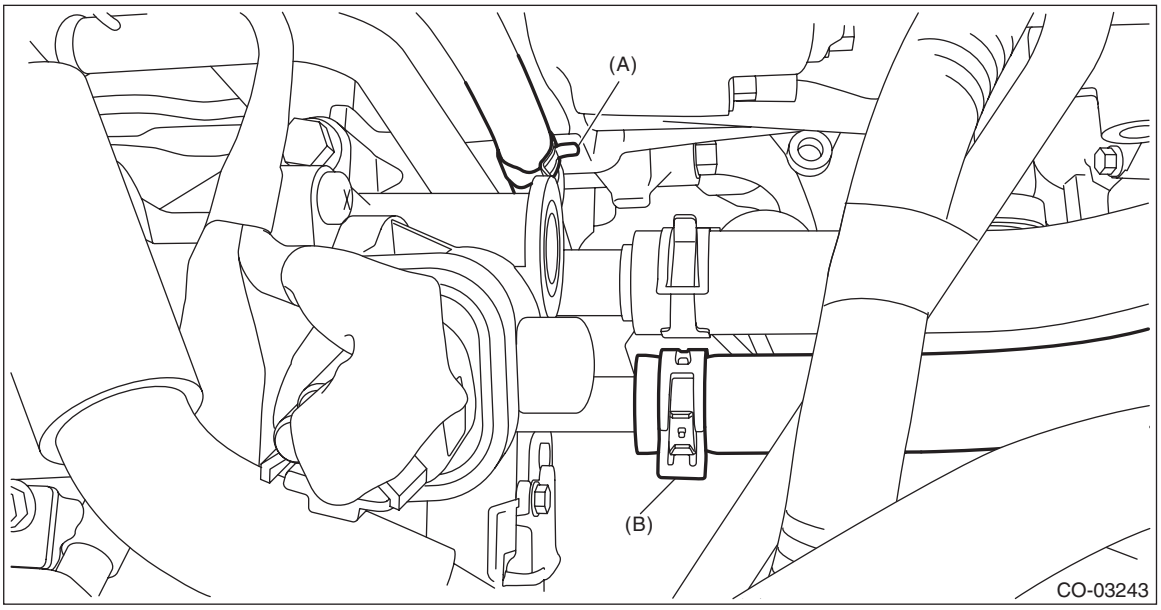


12) Remove the air cleaner case (rear).

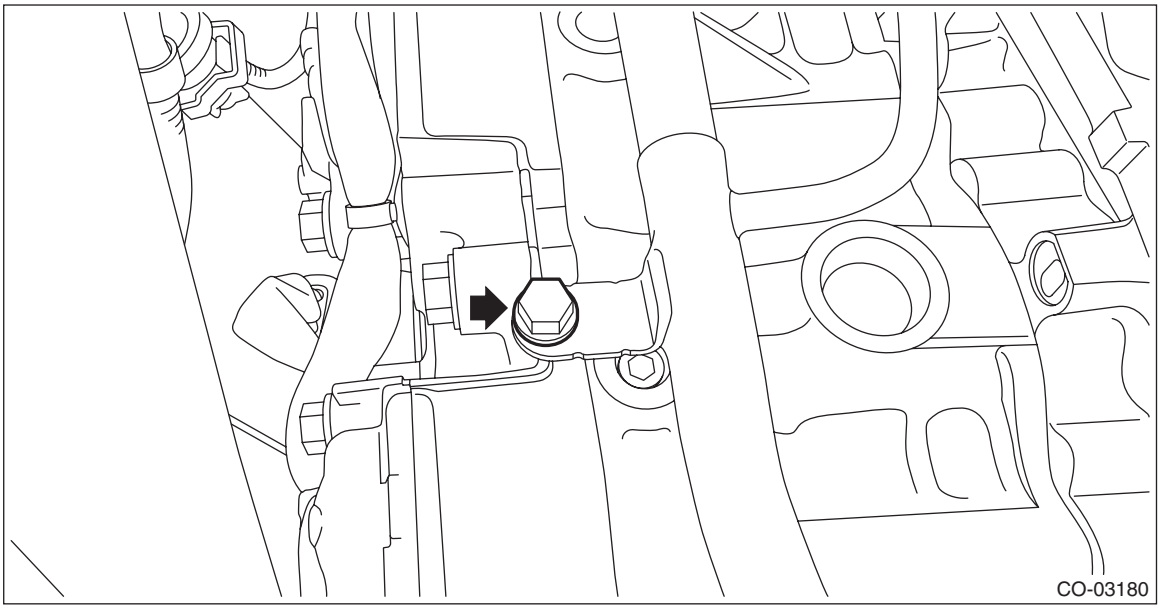


13) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

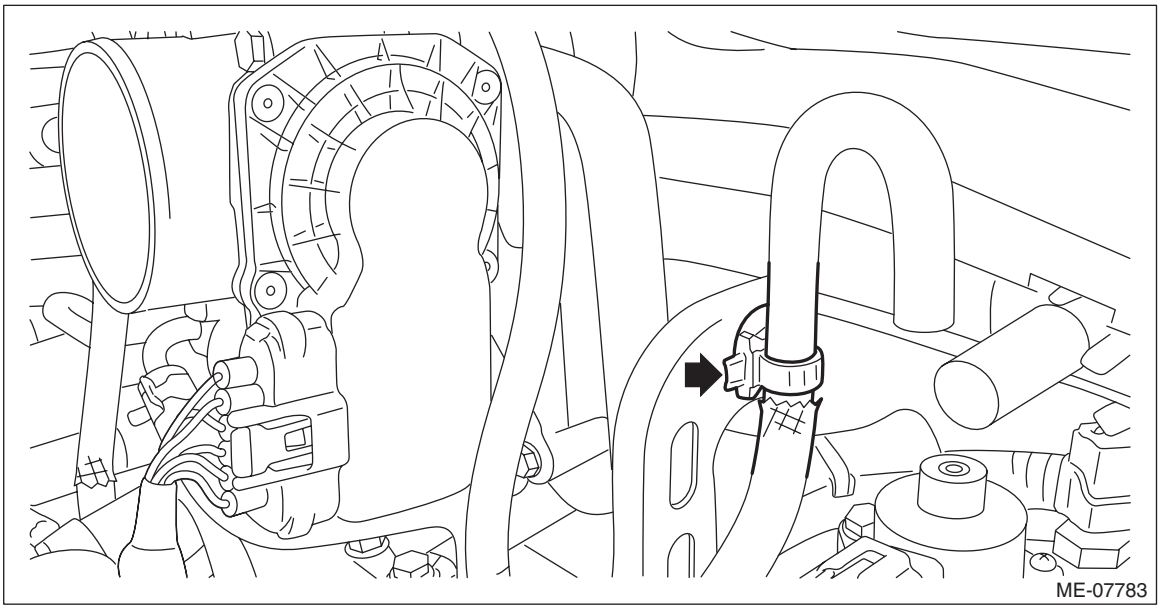
14) Disconnect the preheater hose (A) and the heater outlet hose (B) from the water pipe assembly LH.



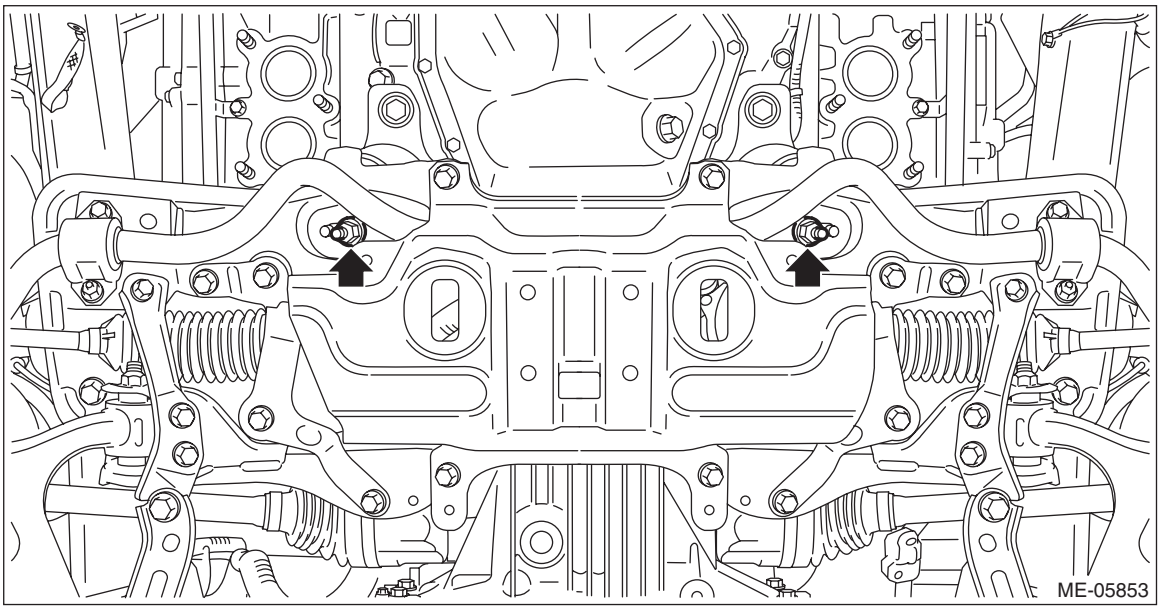
15) Remove the bolt which holds the water pipe assembly LH from the cylinder head LH.



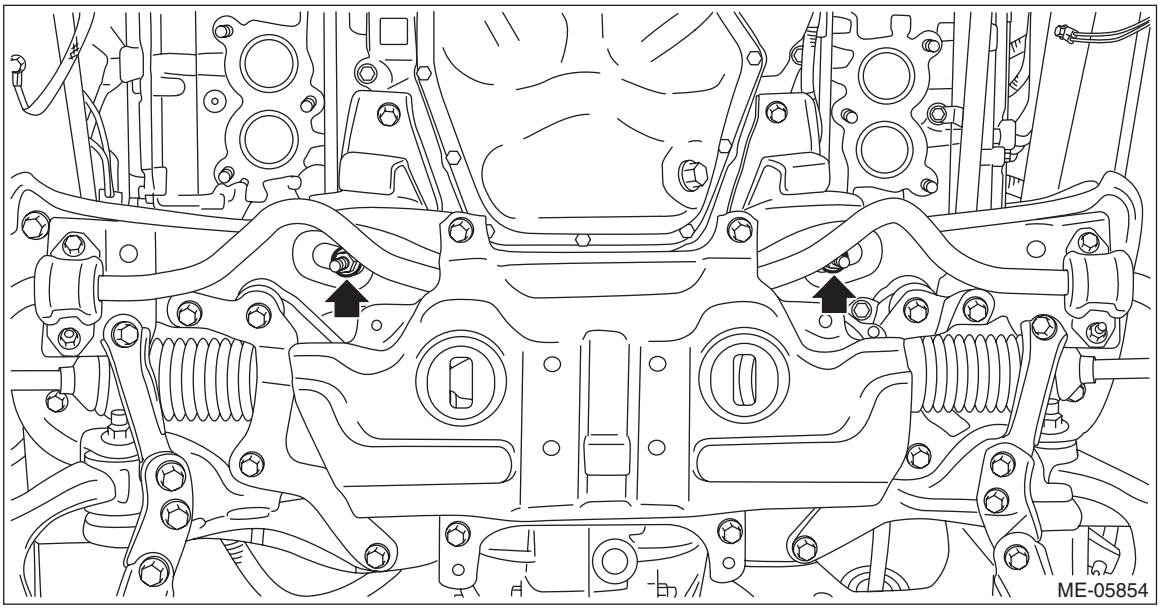
16) Remove the clip holding the air breather hose to the engine rear hanger. (MT model)



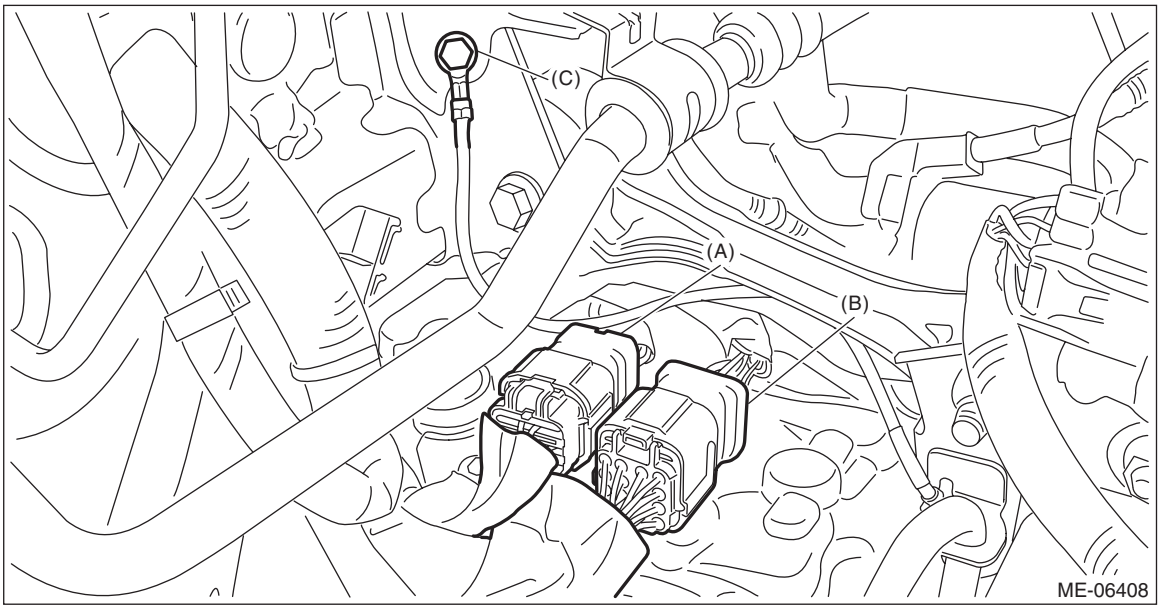
17) Lift up the vehicle.
18) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
19) Remove the nuts which secure the engine mounting to the front crossmember. (CVT model)



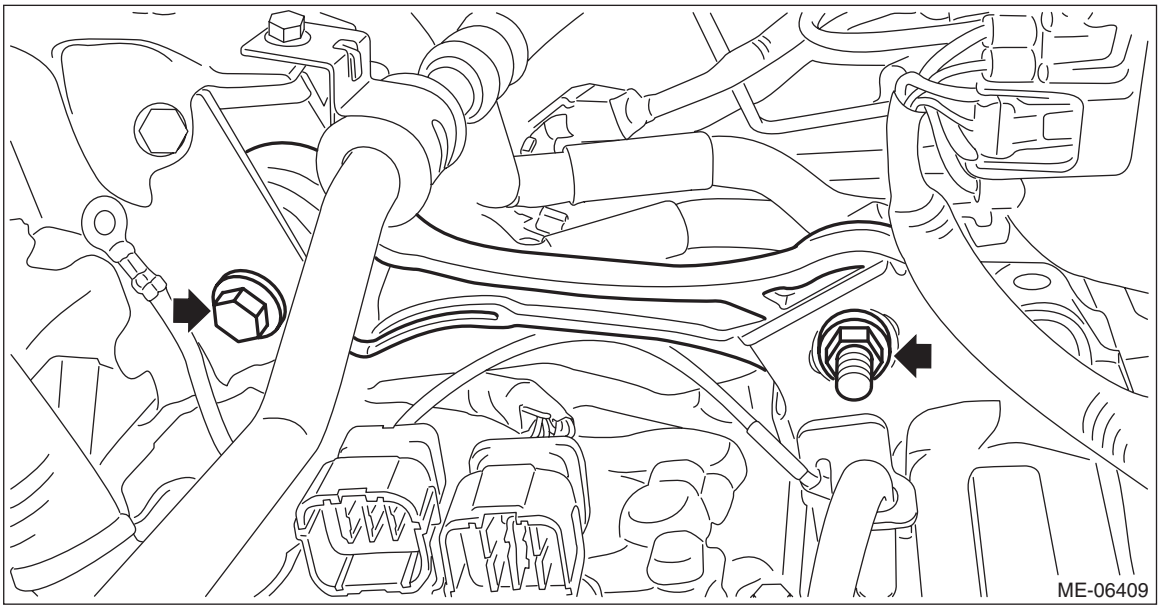
20) Remove the nuts which secure the engine mounting to the front crossmember. (MT model)



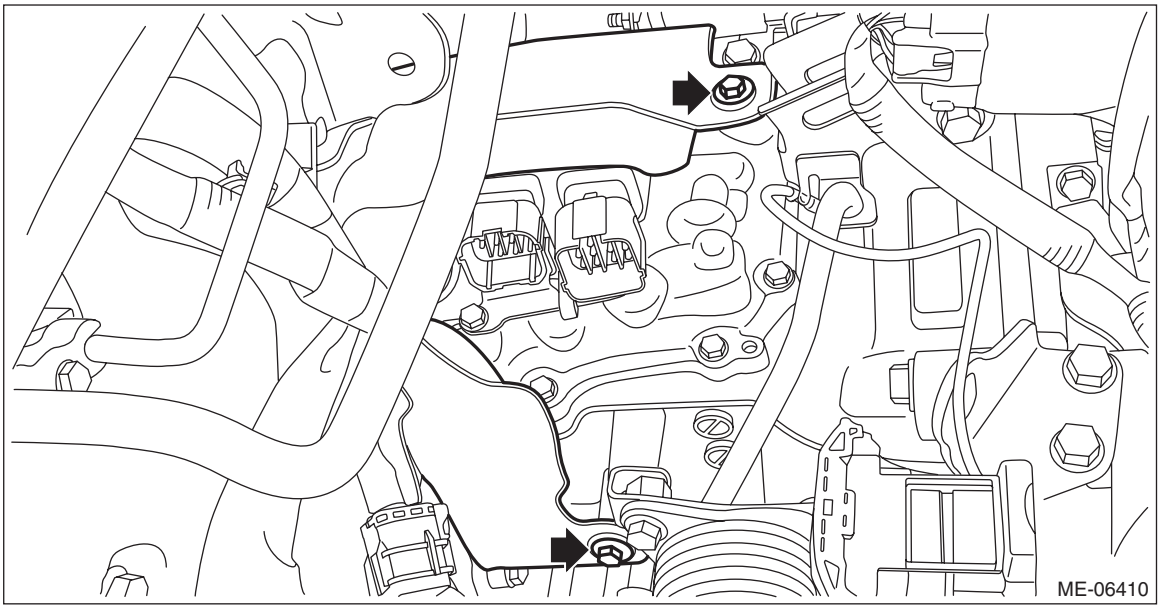
21) Lower the vehicle.
22) Disconnect the bulkhead harness connector from the transmission harness connector (A) and the inhibitor harness connector (B), and disconnect the transmission radio ground terminal (C) from the vehicle body. (CVT model)



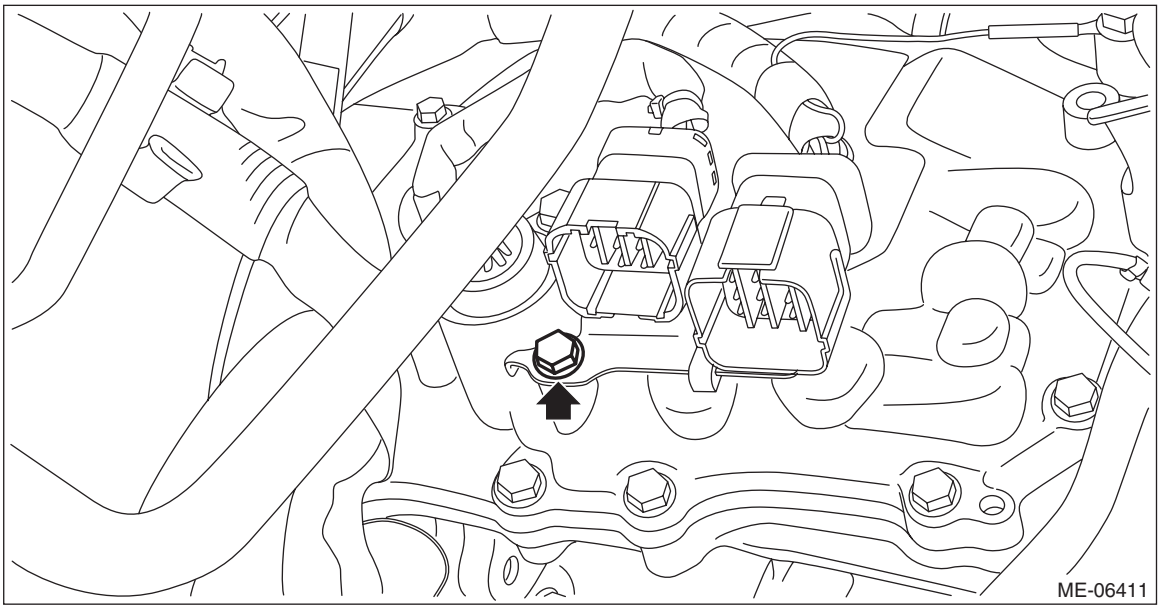
23) Remove the pitching stopper.



24) Remove the transmission case cover. (CVT model)

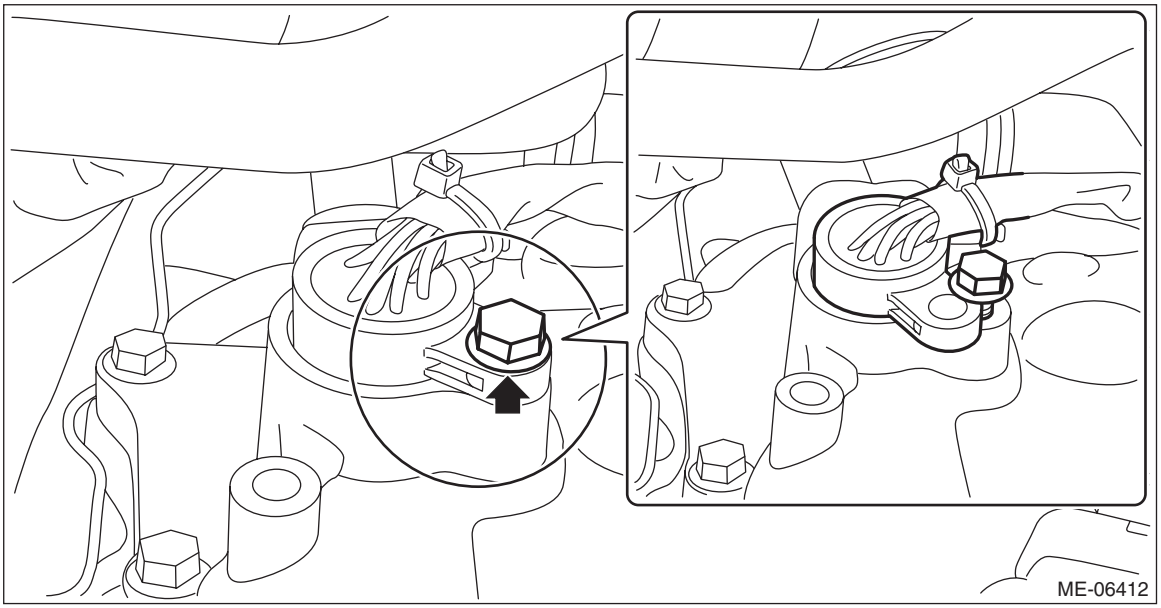


25) Remove the bolt which holds the transmission harness stay. (CVT model)



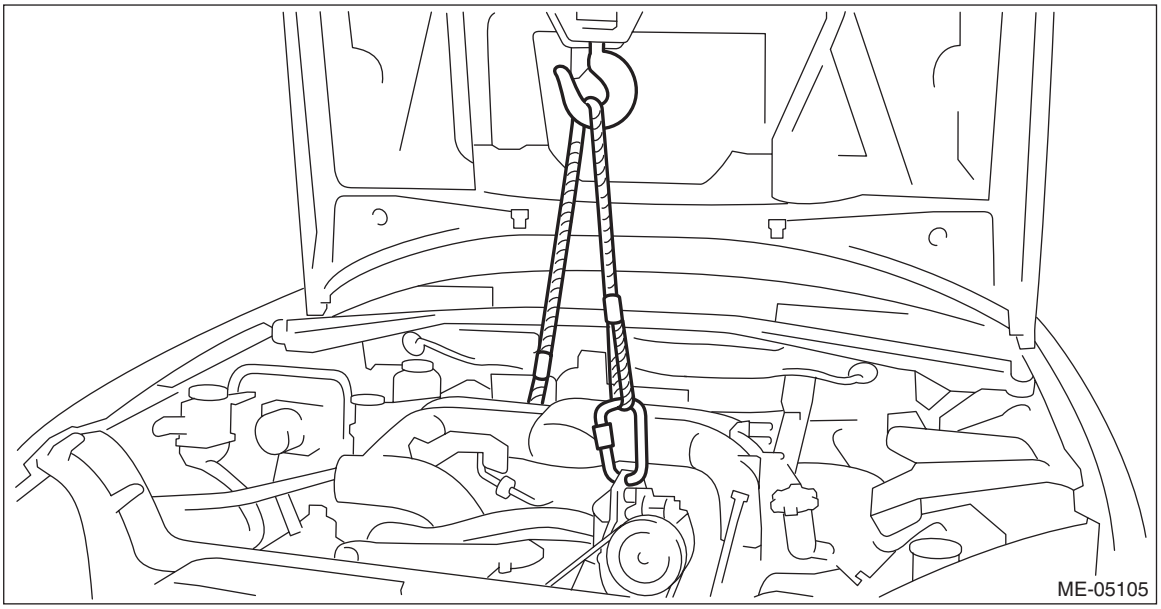
26) Remove the bolt which holds the transmission harness to the control valve body, and turn the transmission harness clockwise till the bolt hole can be seen as shown in the figure, and tighten the bolt to temporary lock the harness. (CVT model)

NOTE:
This procedure is required to prevent the transmission harness from touching the vehicle body during engine lift-up.

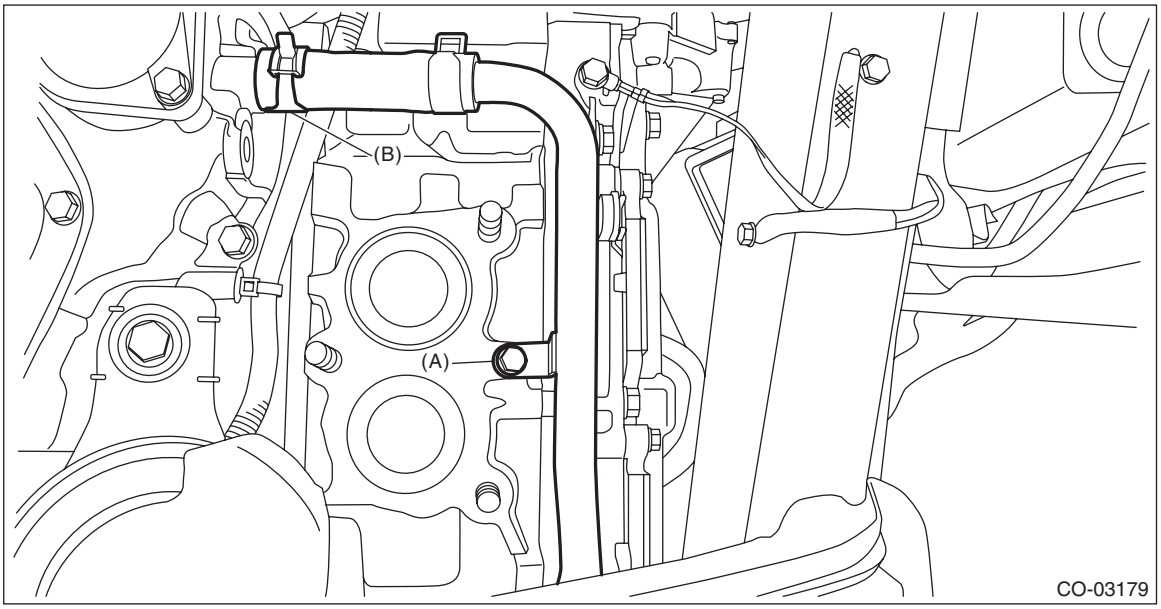


27) Lift up the engine with a lifting device and wire ropes.

CAUTION:
When lifting up the engine, pay attention to the clearance of each part and be careful not to lift the engine too much, in order to prevent damaging the vehicle.

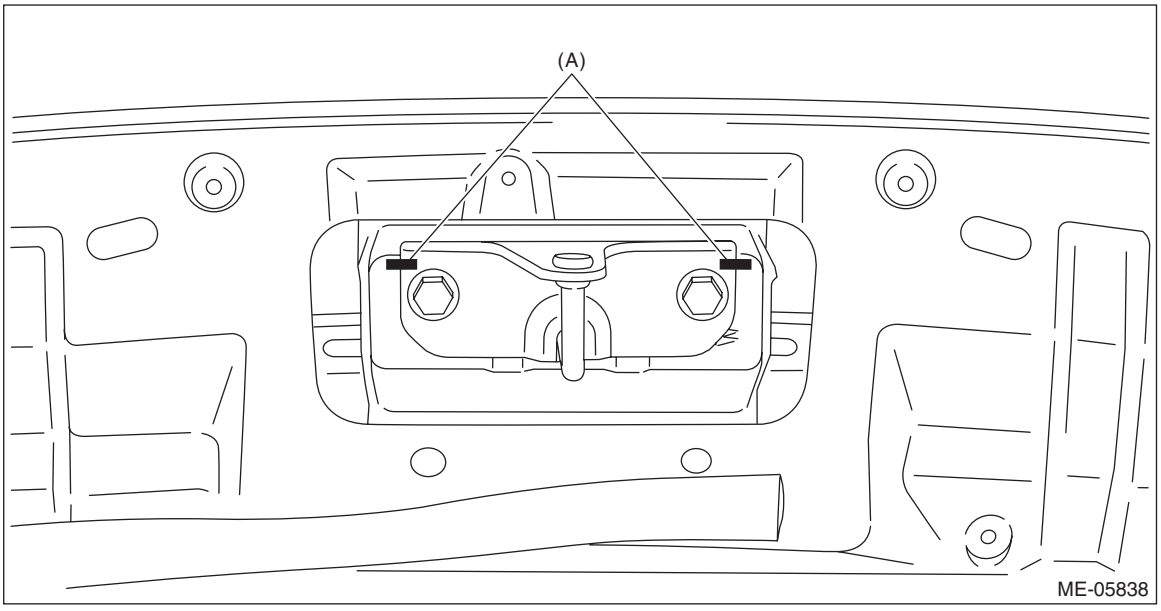


28) Remove the bolt (A) which secures the water pipe assembly LH to the cylinder head LH.
29) Disconnect the water pipe hose LH (B) from oil pan upper, and remove the water pipe assembly LH.

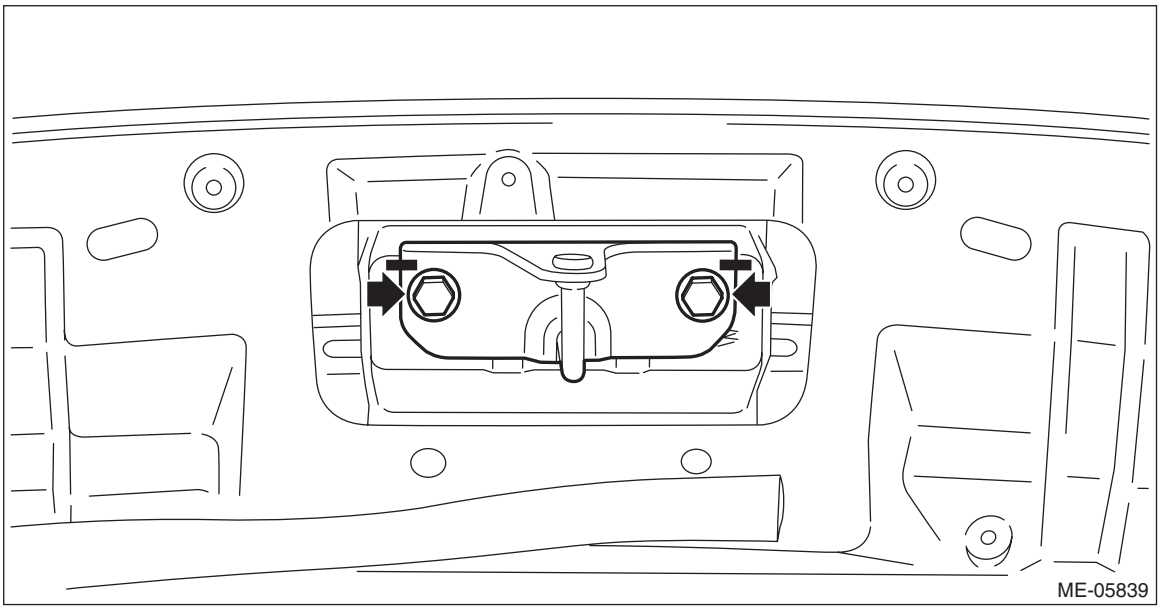


• **HEV model**

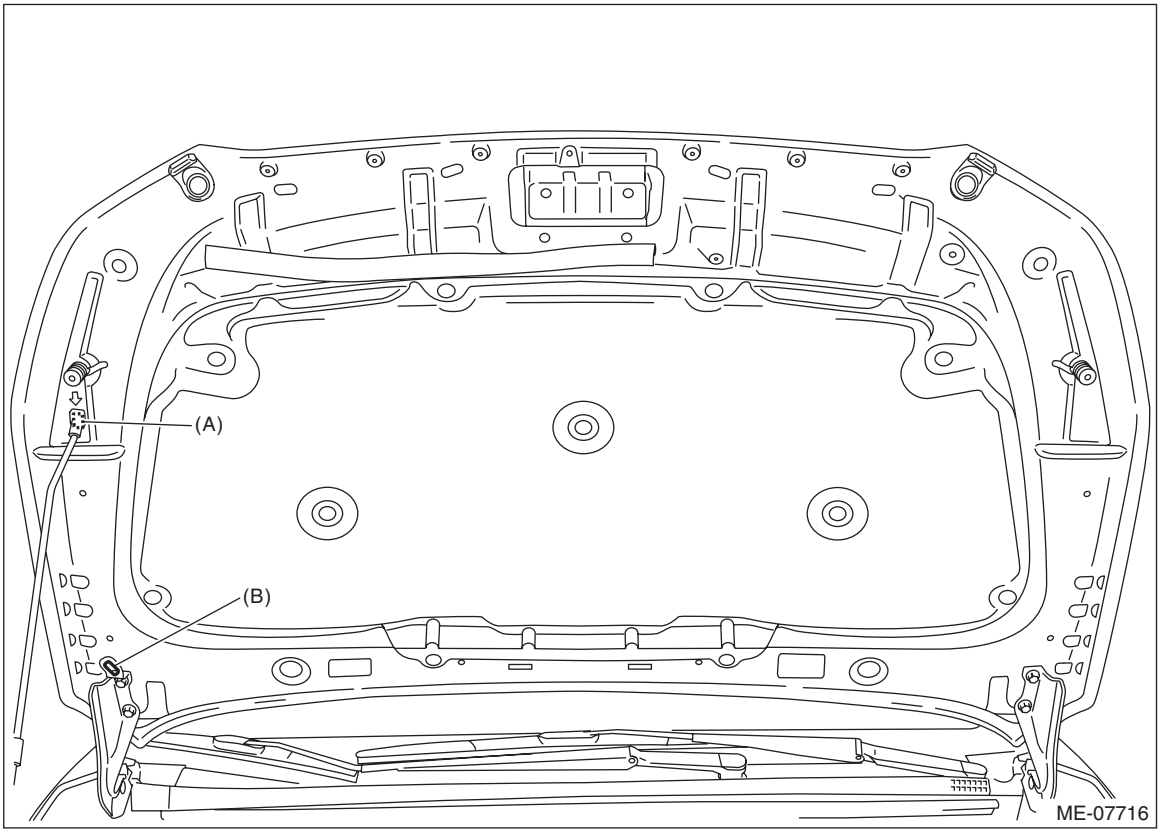
1) Turn the ignition switch to OFF.
2) Open the front hood, and make alignment marks (A) on both the front hood and the front hood striker by using a marker pen.



3) Remove the front hood striker from the front hood.



4) Change the front hood stay position from (A) to (B), and completely open the front hood.

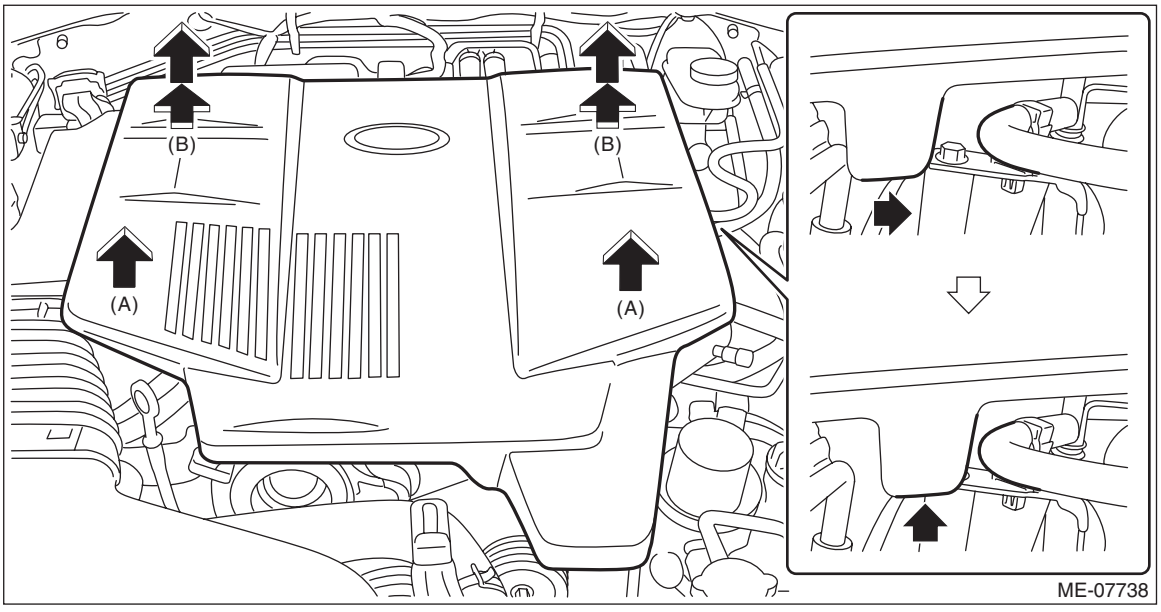


5) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

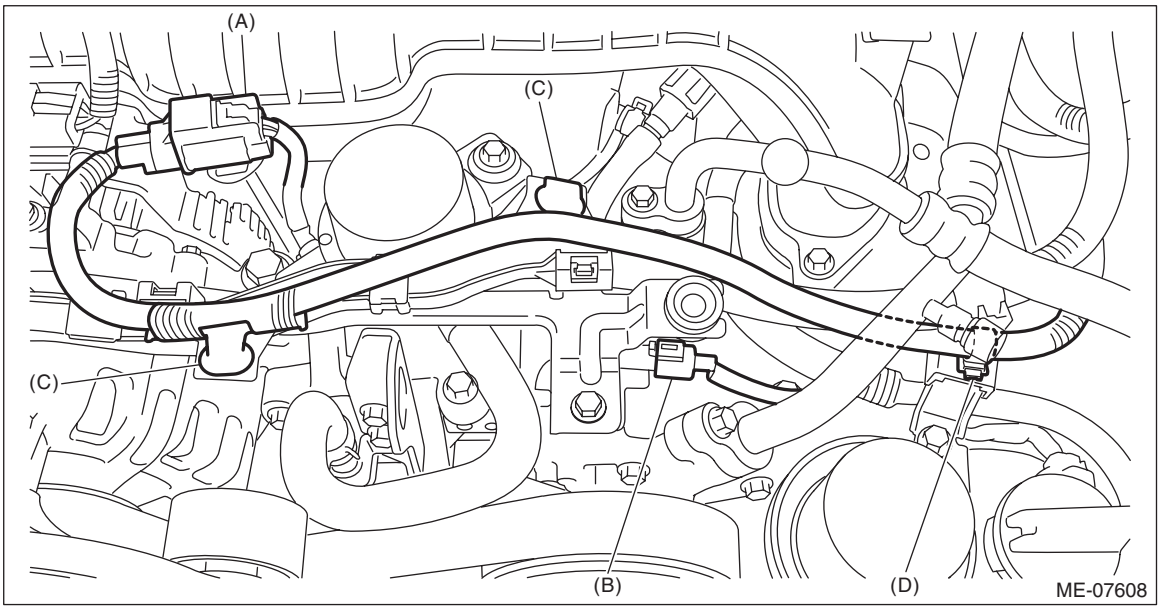
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

6) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

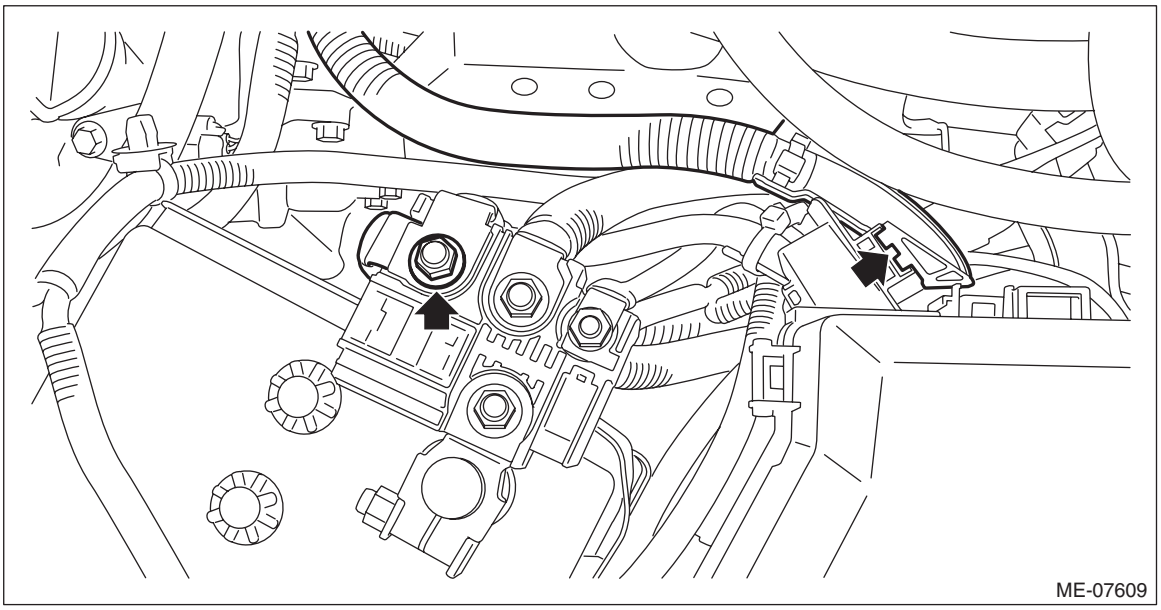
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



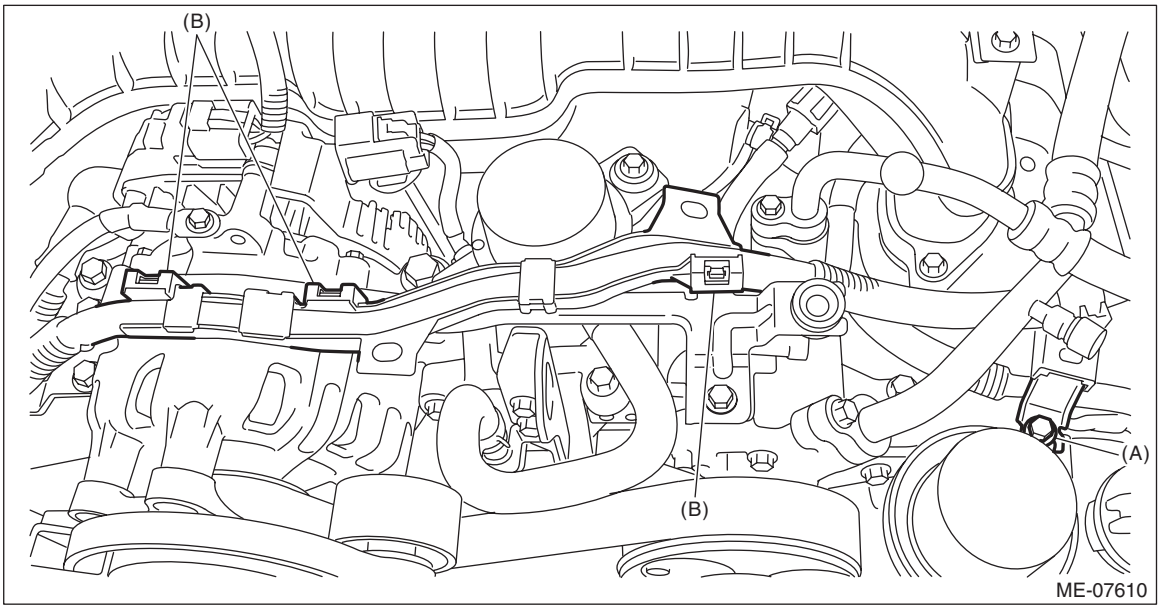
7) Remove the air intake duct. <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
8) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
9) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
10) Disconnect the connector (A) from the brake vacuum pump, and disconnect the connector (B) from the A/C compressor.
11) Remove the clip (C) and the clip (D) securing the harness to the battery cable assembly, and move the harness to the left side wheel apron.



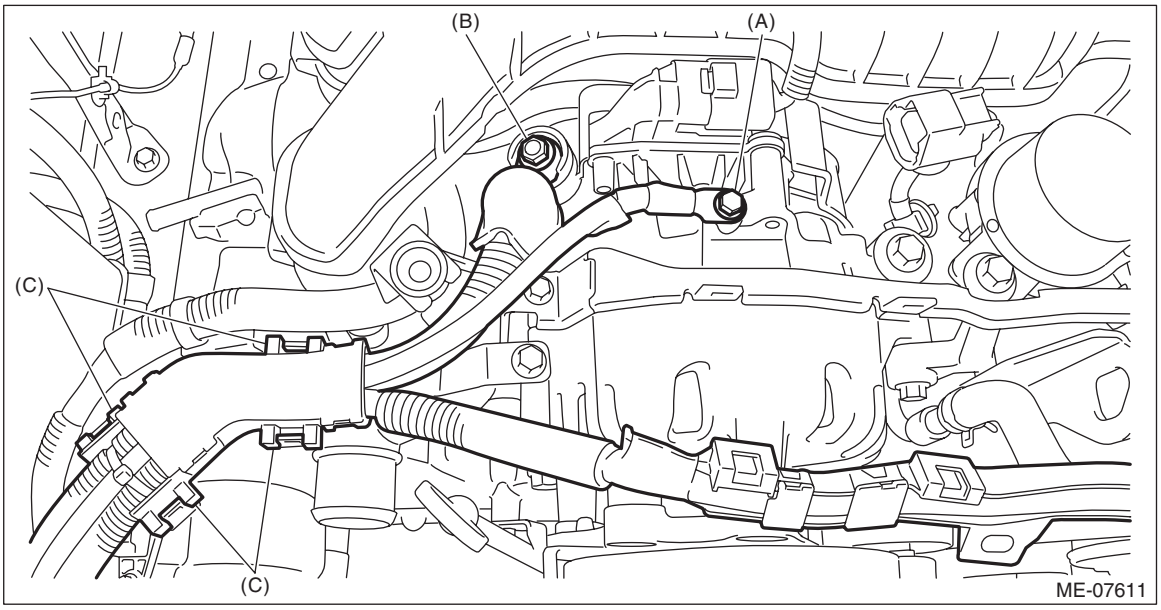
12) Remove the terminal boot from the positive terminal of the 12 volt auxiliary battery.
13) Remove the nuts fastening the battery cable assembly to the slow blow fuse (12 volt auxiliary battery), and remove the battery cable assembly from the main fuse box.



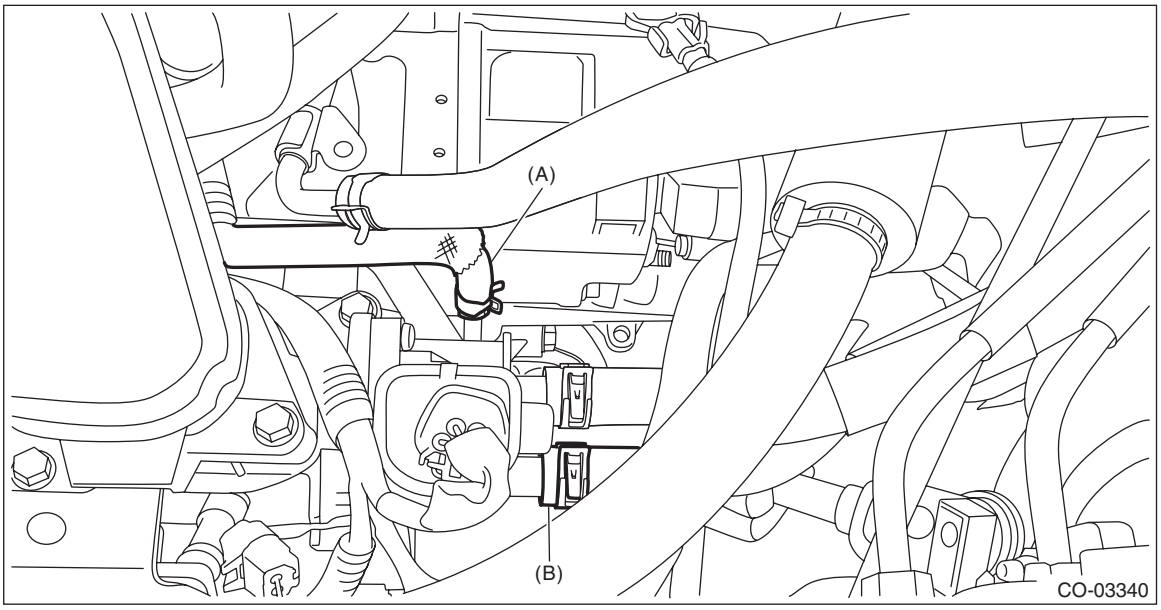
14) Remove the bolt (A) securing the battery cable stay to the chain cover, and remove the clip (B) securing the battery cable assembly to the collector cover bracket.



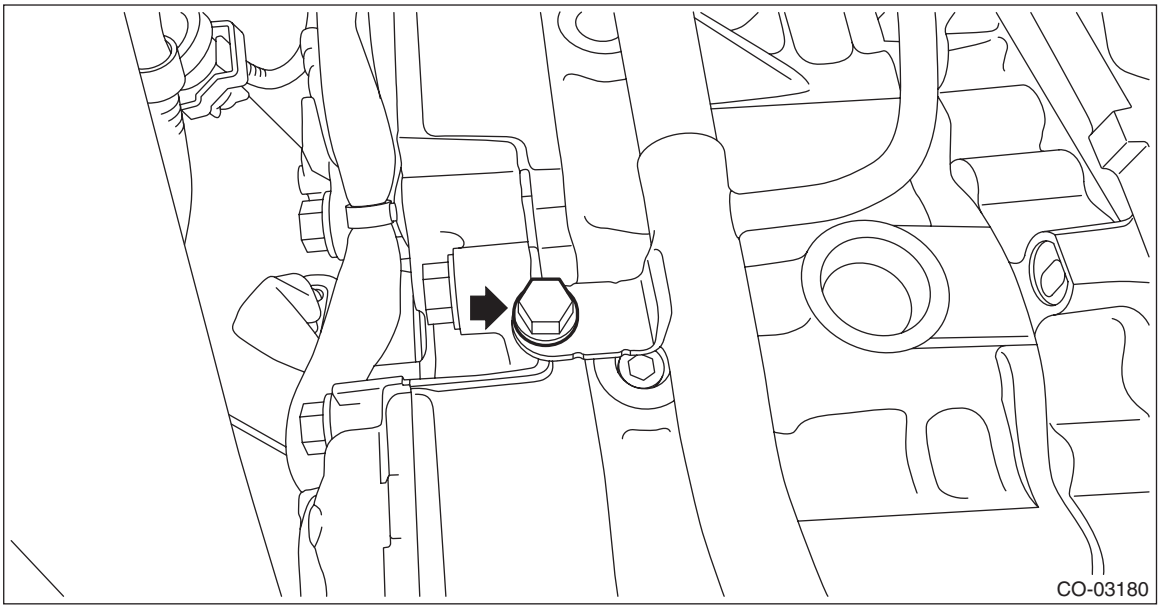
15) Disconnect the terminal (A) and the terminal (B) from ISG.
16) Remove the clip (C) securing the battery cable assembly to the battery cable bracket No. 1, and move the battery cable assembly to the right side wheel apron.



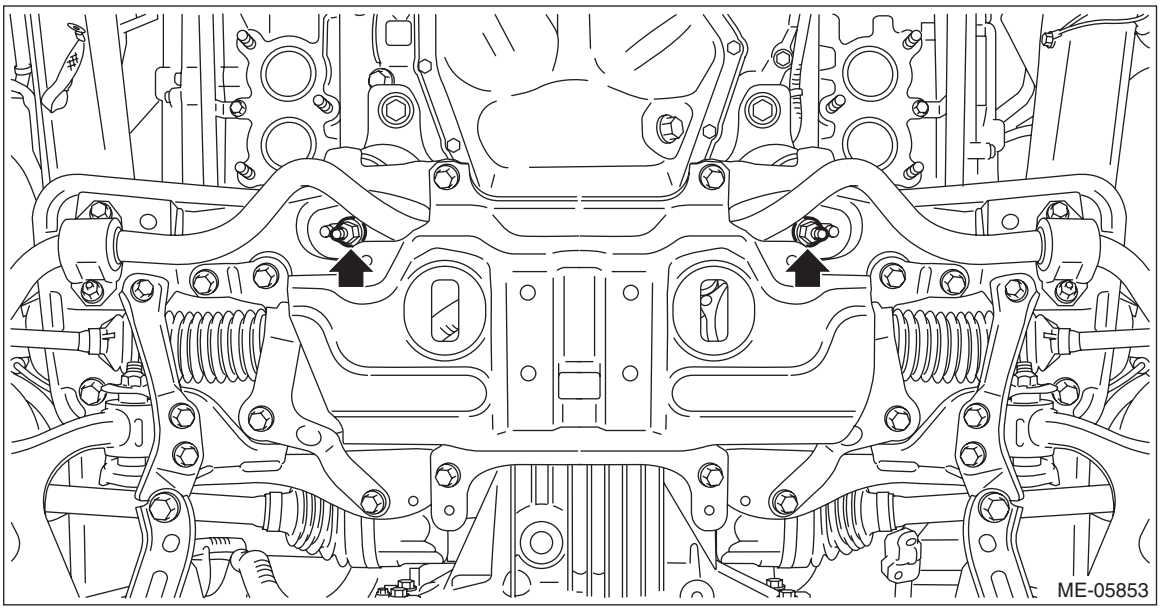
17) Disconnect the preheater hose (A) and the heater outlet hose (B) from the water pipe assembly LH.



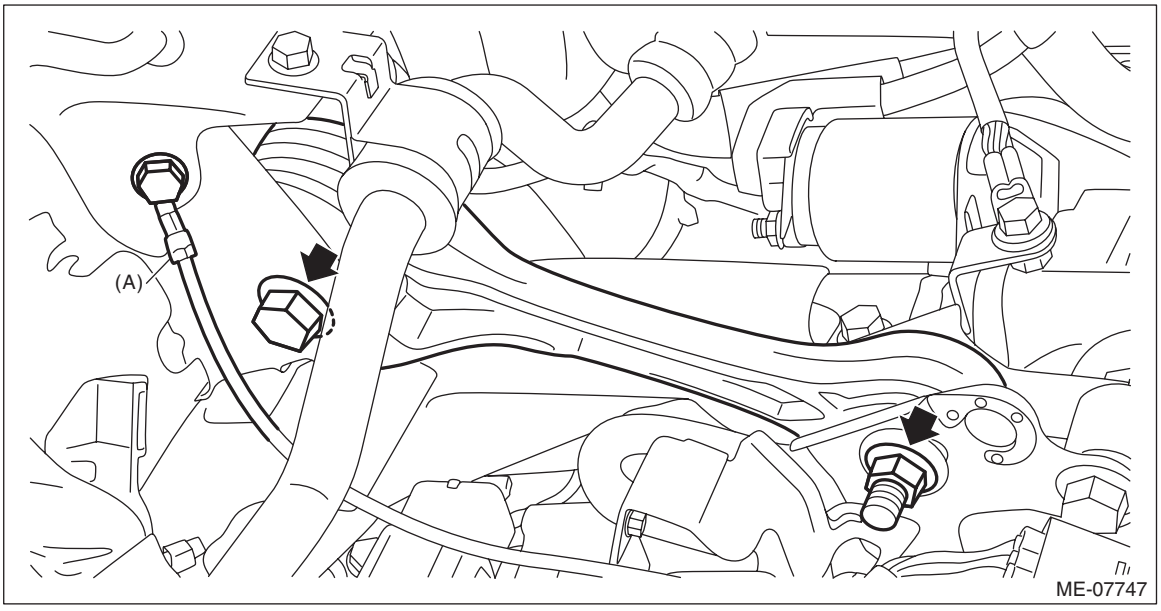
18) Remove the bolt which holds the water pipe assembly LH from the cylinder head LH.



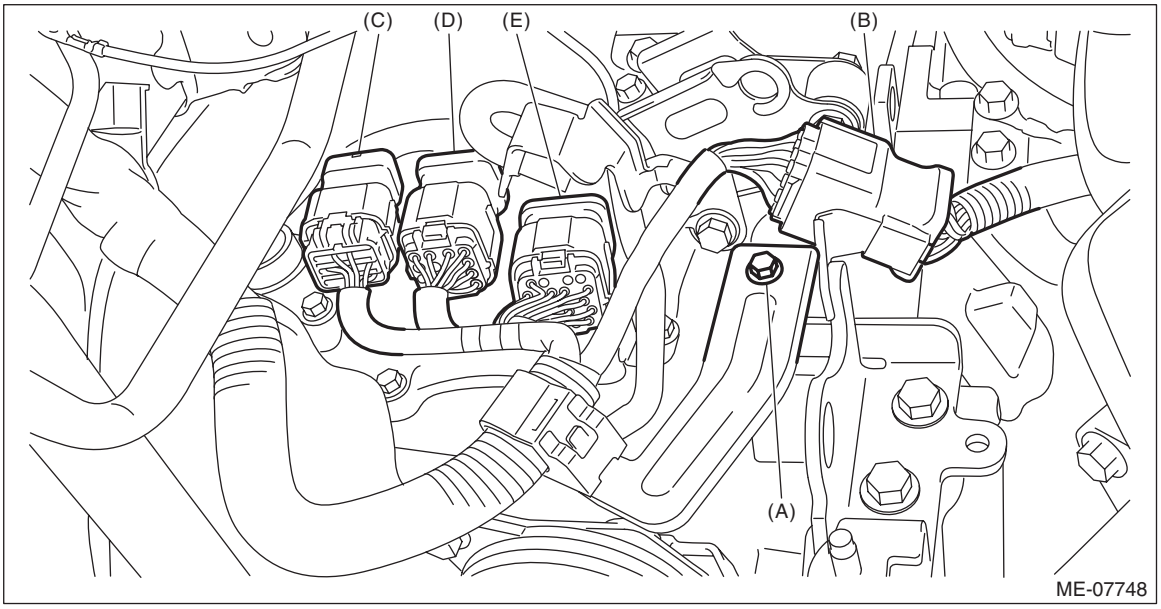
19) Lift up the vehicle.
20) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
21) Remove the nuts which secure the engine mounting to the front crossmember.



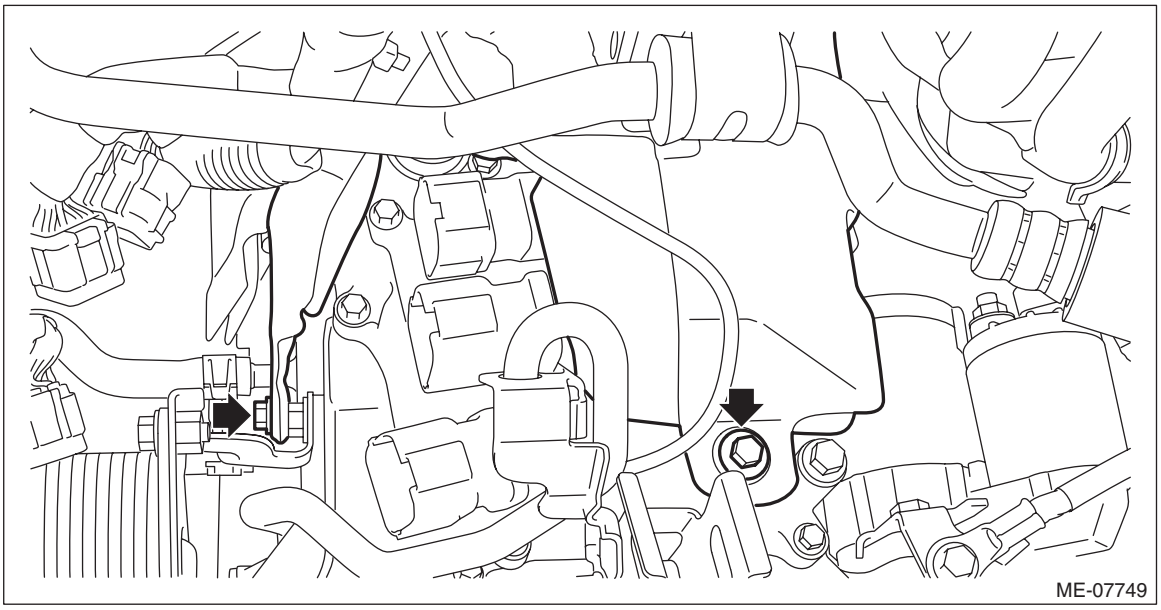
22) Lower the vehicle.
23) Disconnect the transmission radio ground terminal (A) from the vehicle, and remove the pitching stopper.



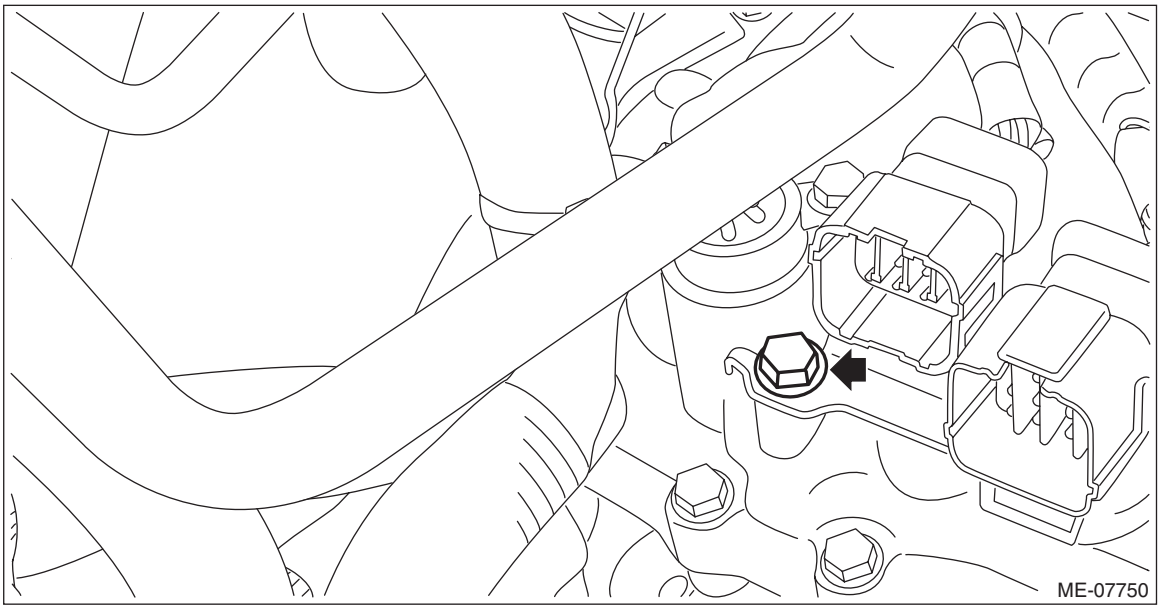
24) Remove the bolt (A) securing the bulkhead harness connector bracket, and disconnect the bulkhead harness connector from the engine harness connector (brown) (B).
25) Disconnect the bulkhead harness connector from the transmission harness connector (C), inhibitor harness connector (D) and drive motor harness connector (E).



26) Remove the transmission case cover.

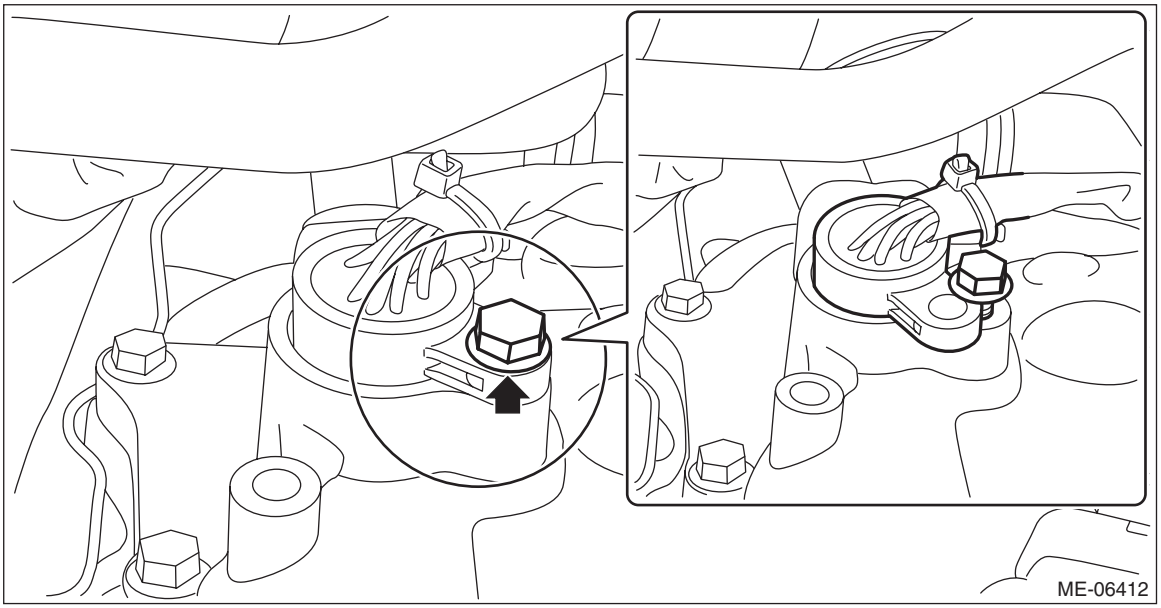


27) Remove the bolt which holds the transmission harness stay.



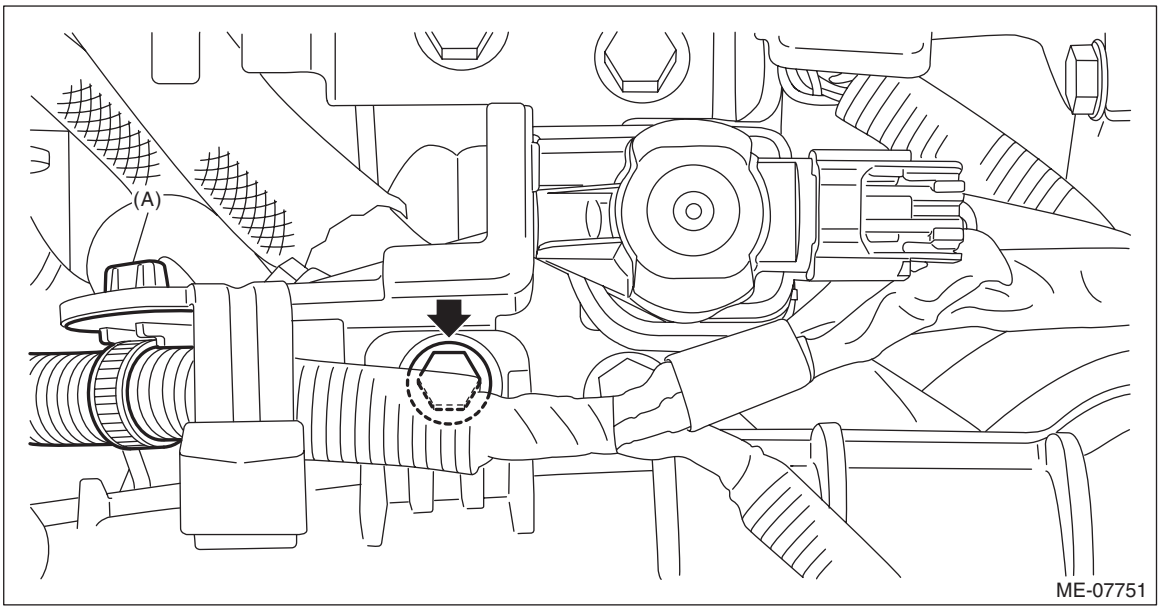
28) Remove the bolt which holds the transmission harness to the control valve body, and turn the transmission harness clockwise till the bolt hole can be seen as shown in the figure, and tighten the bolt to temporary lock the harness.

NOTE:
This procedure is required to prevent the transmission harness from touching the vehicle body during engine lift-up.

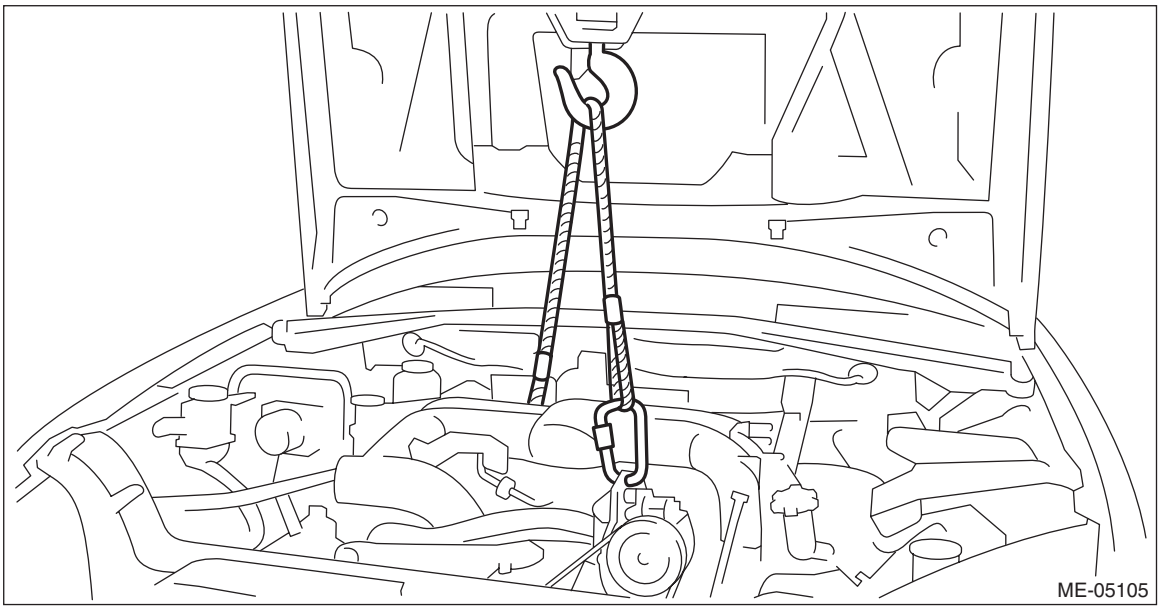


29) Remove the clip (A) securing the engine harness to the purge control solenoid valve bracket, and disconnect the bolt securing the purge control solenoid valve bracket to the intake manifold.

NOTE:
This operation is required to prevent the wire rope from contacting the purge control solenoid valve while lifting the engine.

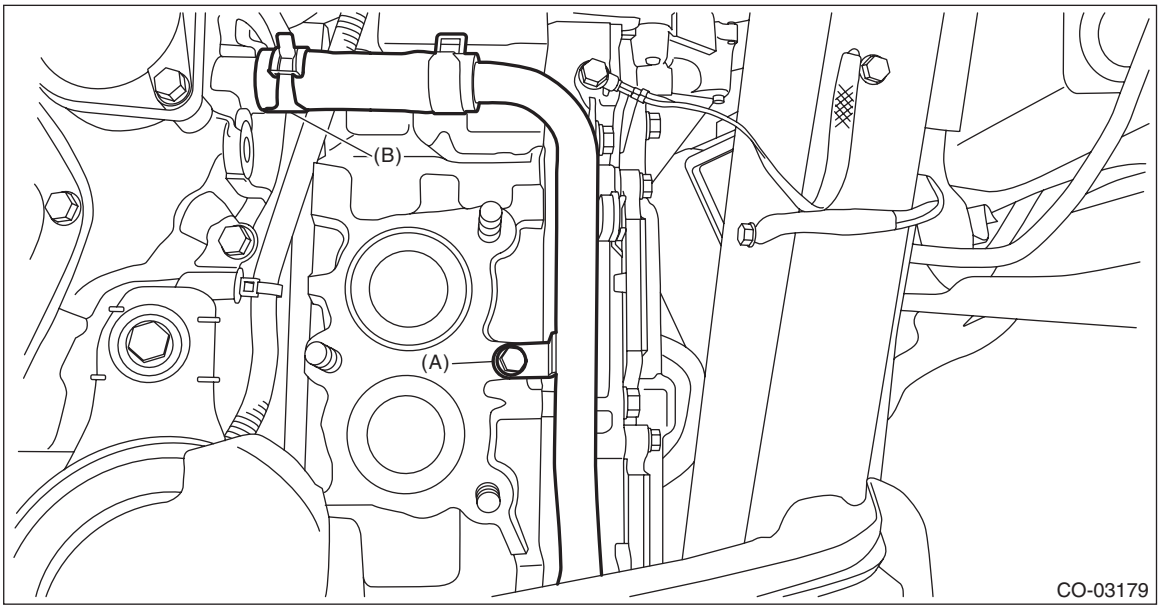


30) Lift up the engine with a lifting device and wire ropes.



31) Remove the bolt (A) which secures the water pipe assembly LH to the cylinder head LH.

32) Disconnect the water pipe hose LH (B) from oil pan upper, and remove the water pipe assembly LH.

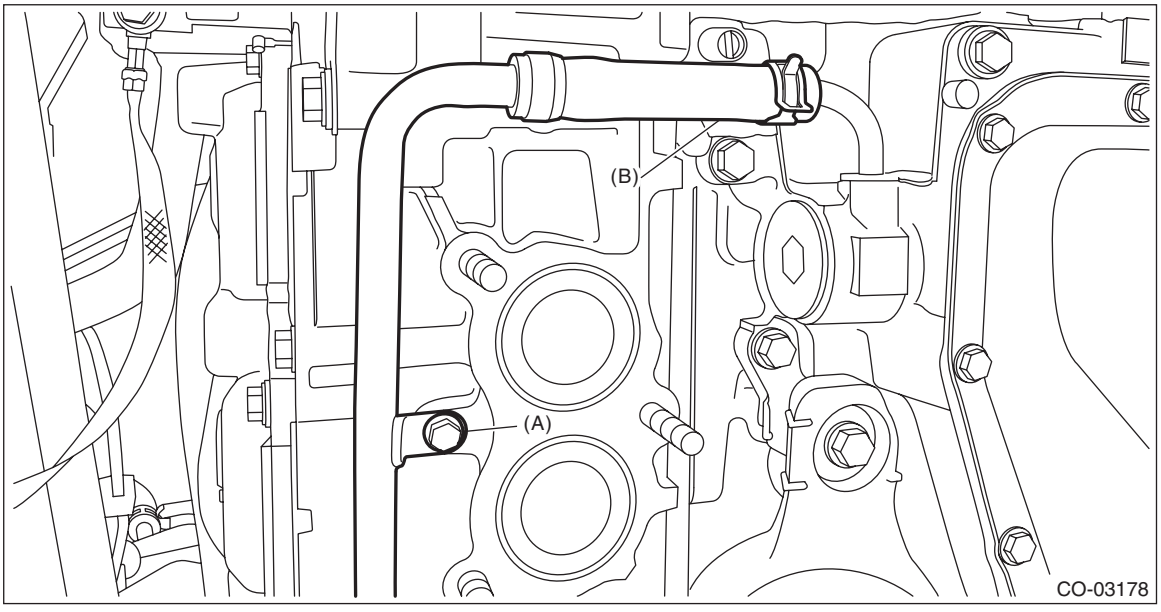


B: INSTALLATION

1. WATER PIPE ASSEMBLY RH

1) Set the water pipe assembly RH on the engine, and connect the water pipe hose RH (B) to the oil pan upper.
2) Secure the water pipe assembly RH to the cylinder head RH with bolt (A).

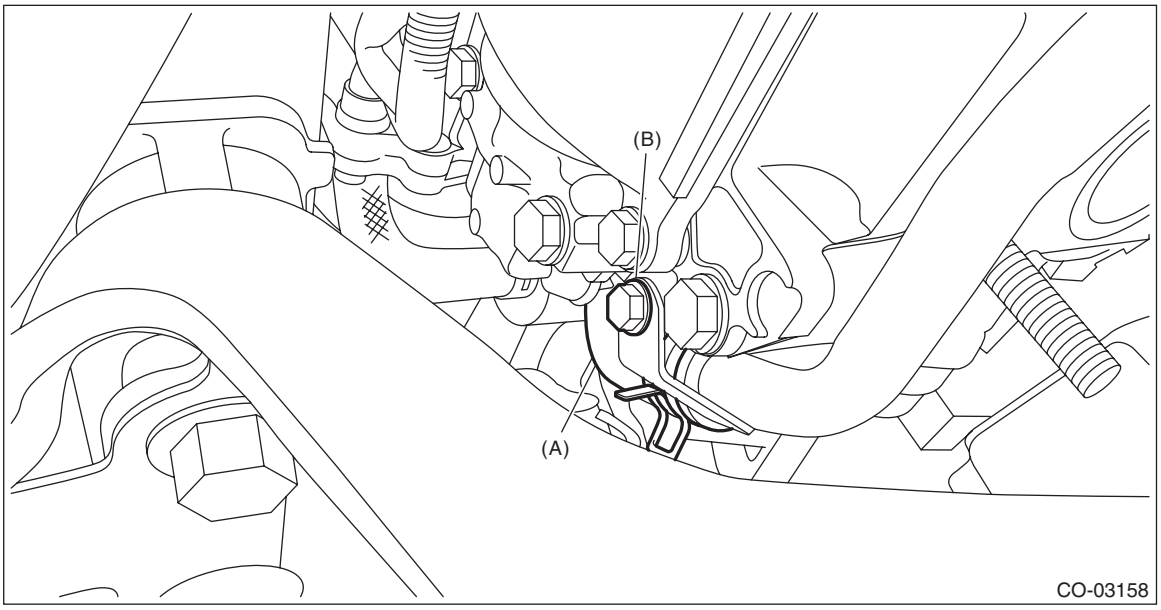
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



3) Install the bolt (B) which secures the water pipe assembly RH to the cam carrier RH.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

4) Connect the water hose (A) to the water pipe assembly RH.



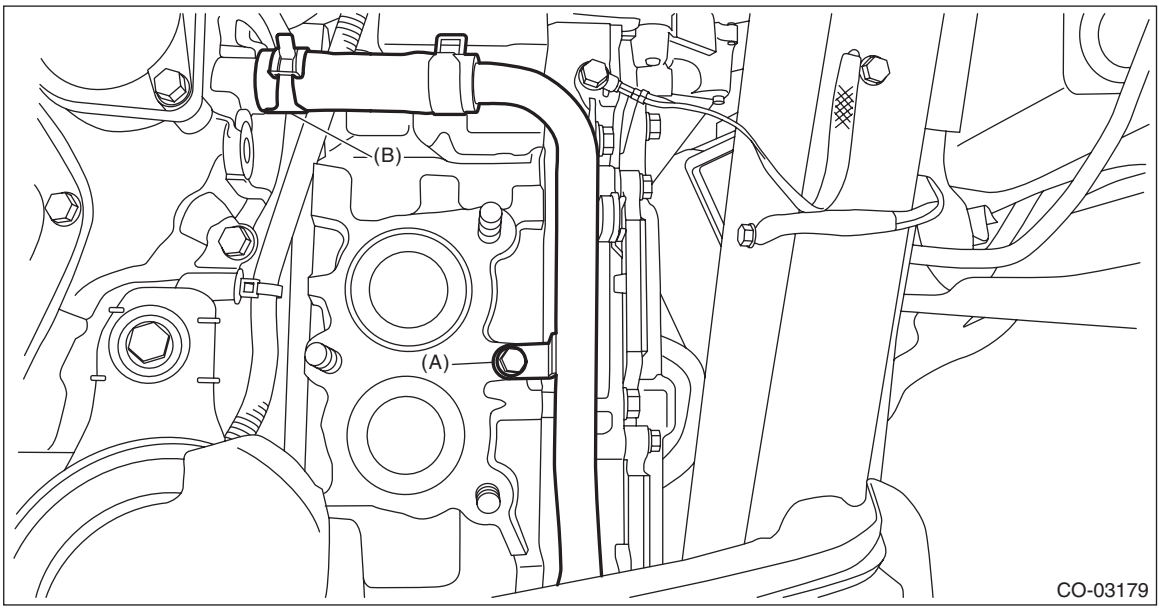
5) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
7) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

2. WATER PIPE ASSEMBLY LH

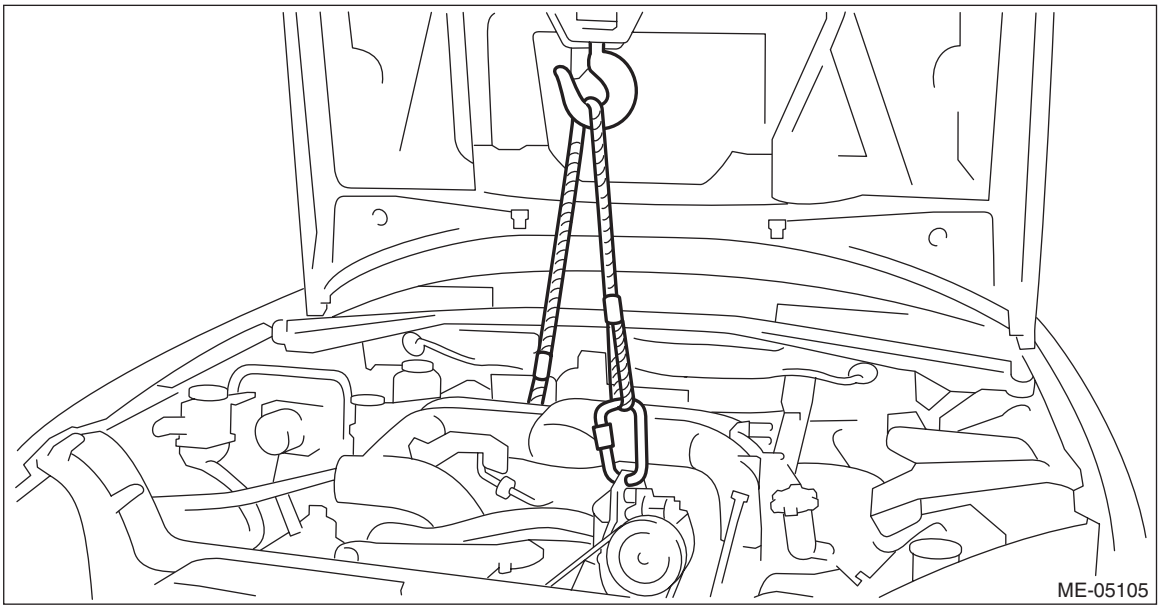
• Gasoline engine model

1) Set the water pipe assembly LH on the engine, and connect the water pipe hose LH (B) to the oil pan upper.
2) Secure the water pipe assembly LH to the cylinder head LH with bolt (A).

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

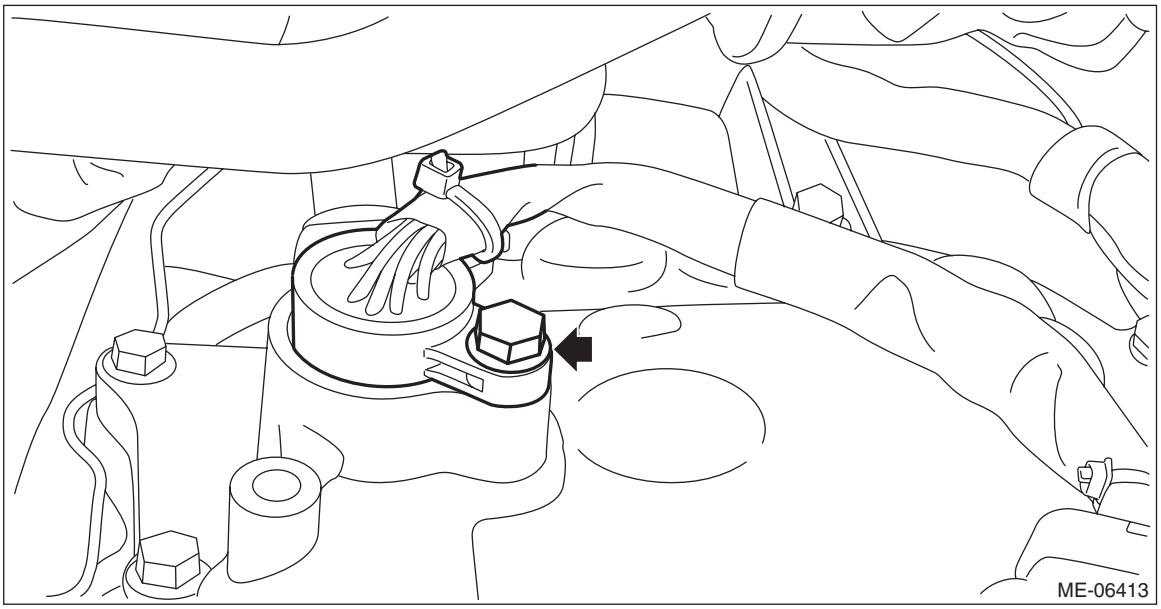


3) Lower the engine and remove the lifting device and wire ropes.



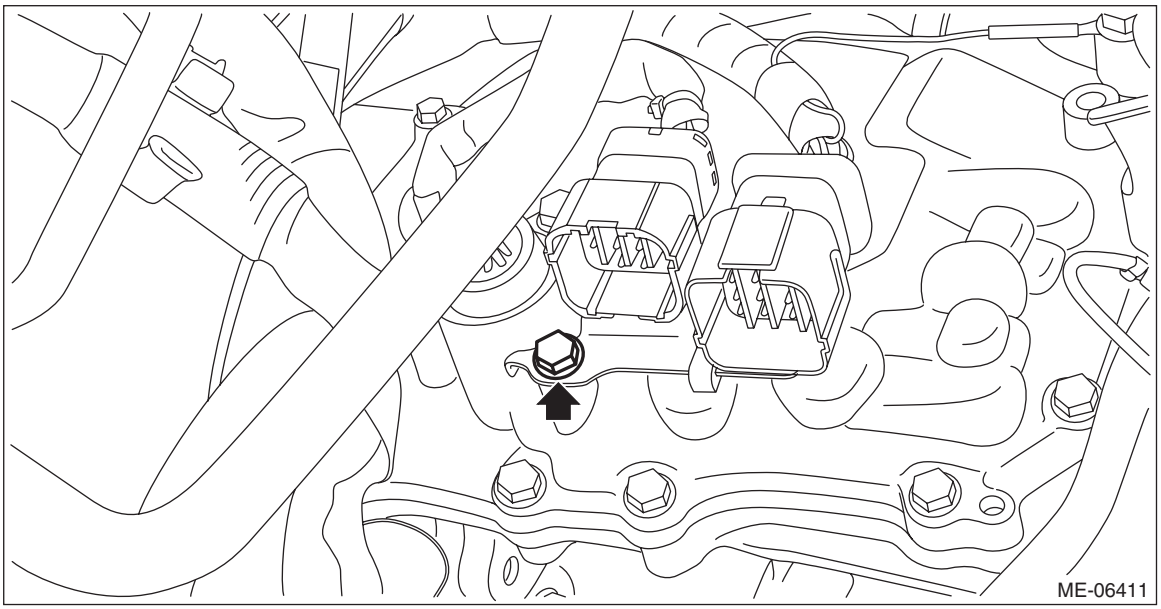
4) Remove the bolt and turn the transmission harness counterclockwise to install the transmission harness to the control valve body. (CVT model)

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



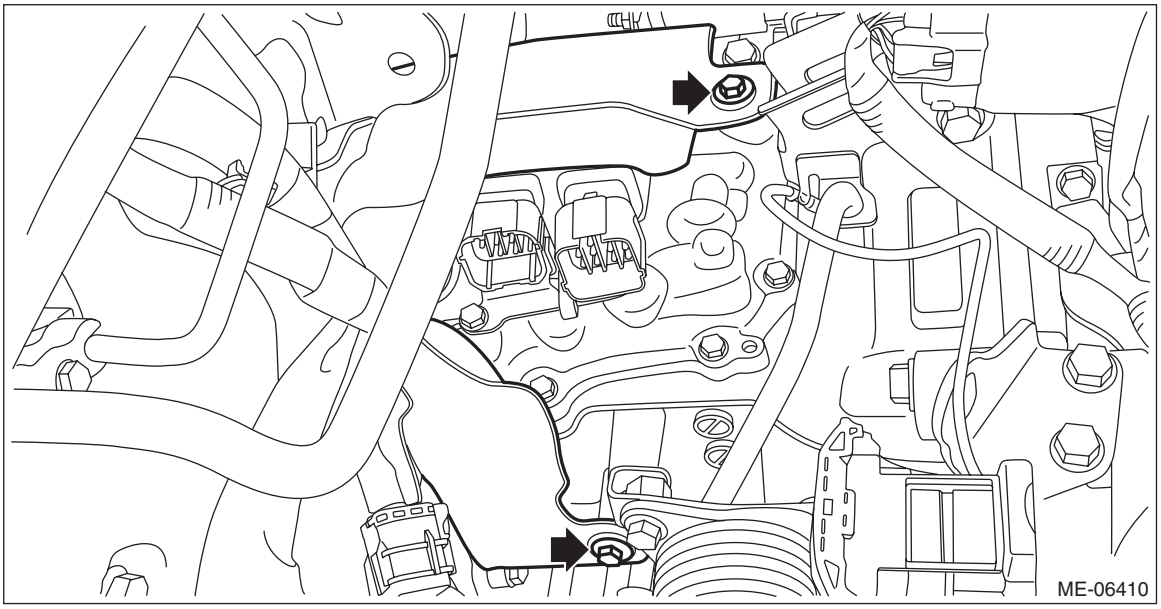
5) Install the bolt which holds the transmission harness stay. (CVT model)

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



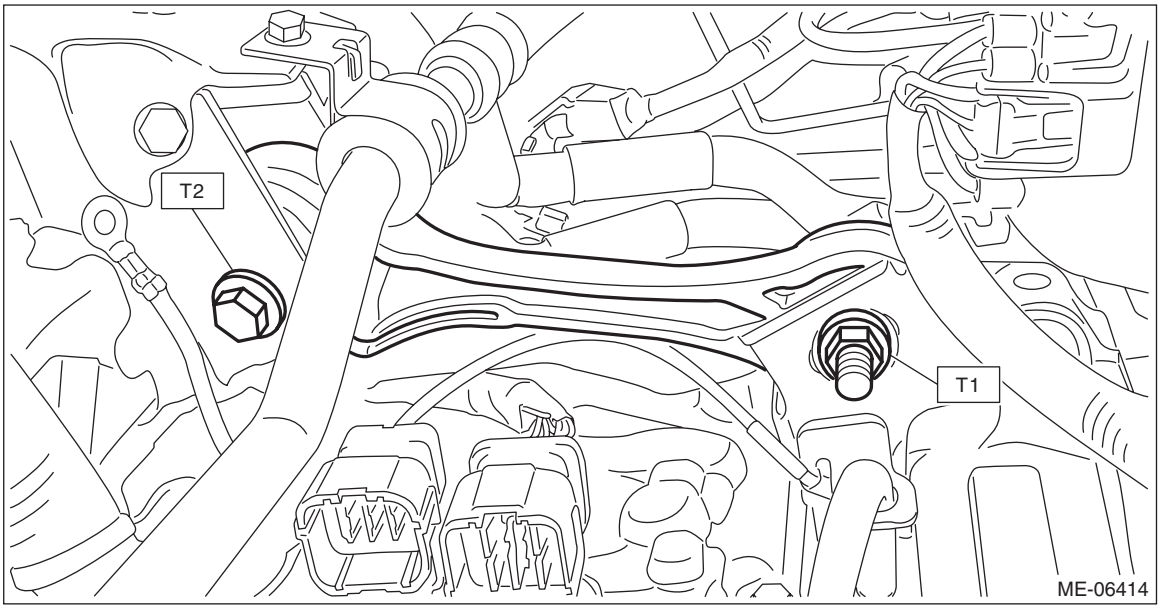
6) Install the transmission case cover. (CVT model)

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



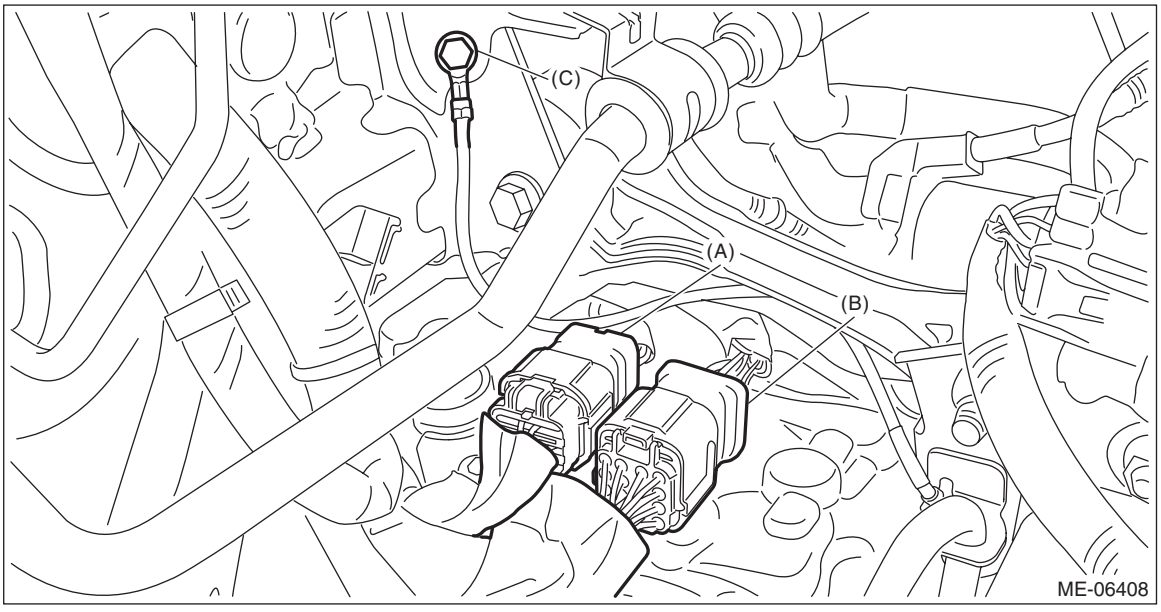
7) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



8) Connect the transmission radio ground terminal (C) to the vehicle body, and connect the bulkhead harness connector to the transmission harness connector (A) and the inhibitor harness connector (B). (CVT model)

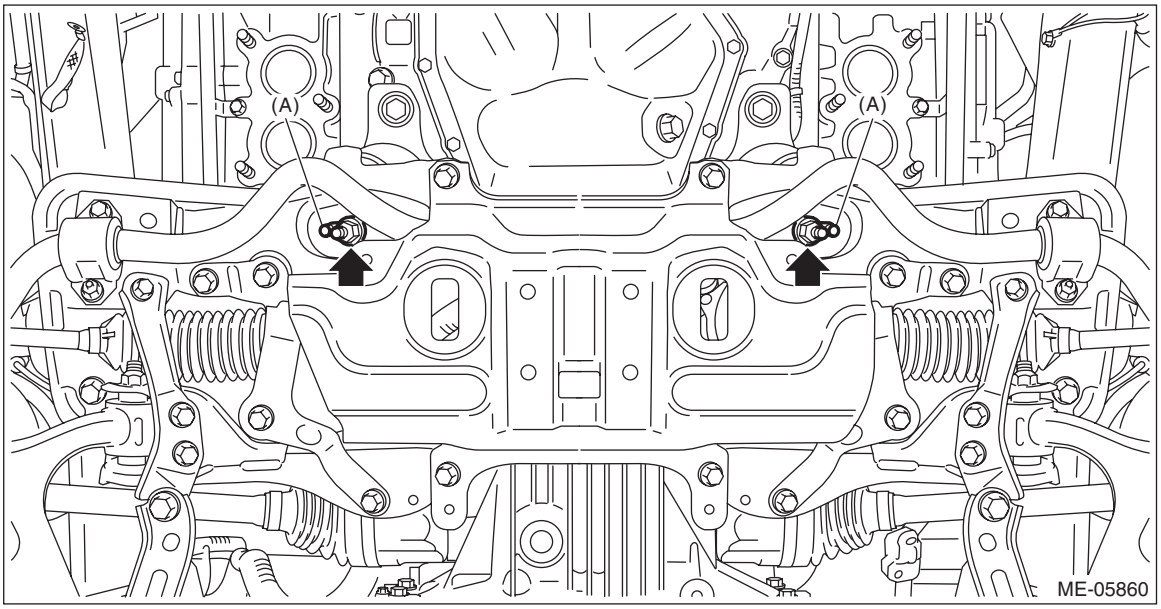
Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



9) Lift up the vehicle.
10) Install the nuts which hold the engine mounting to the crossmember. (CVT model)

NOTE:
- Make sure that locators (A) of the engine mounting are securely inserted.
- Use a new nut.

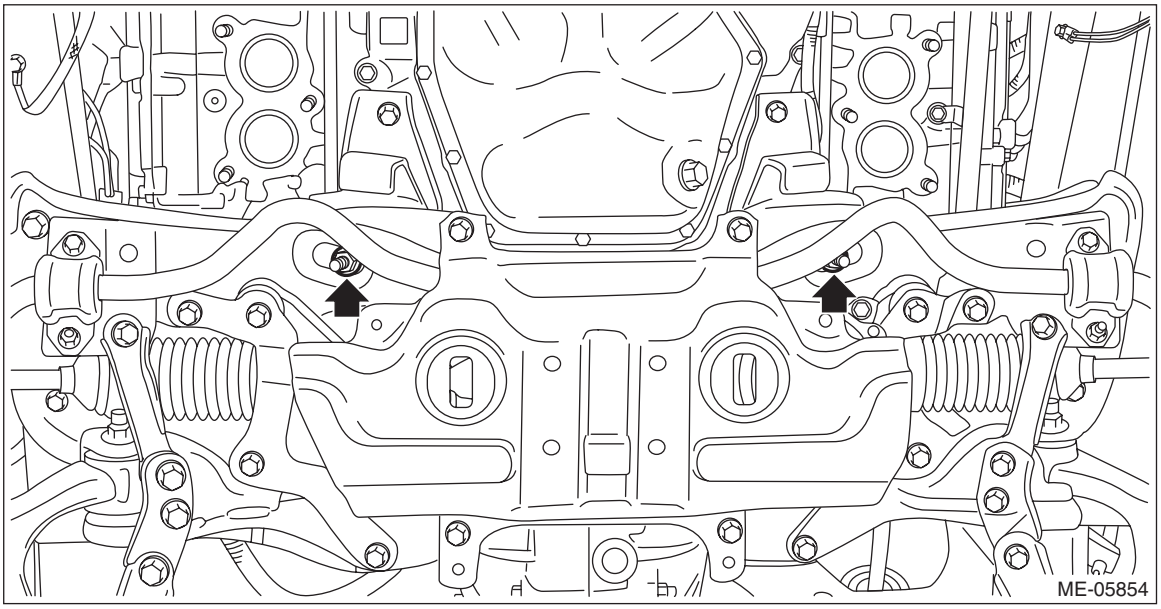
Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



11) Install the nuts which hold the engine mounting to the crossmember. (MT model)

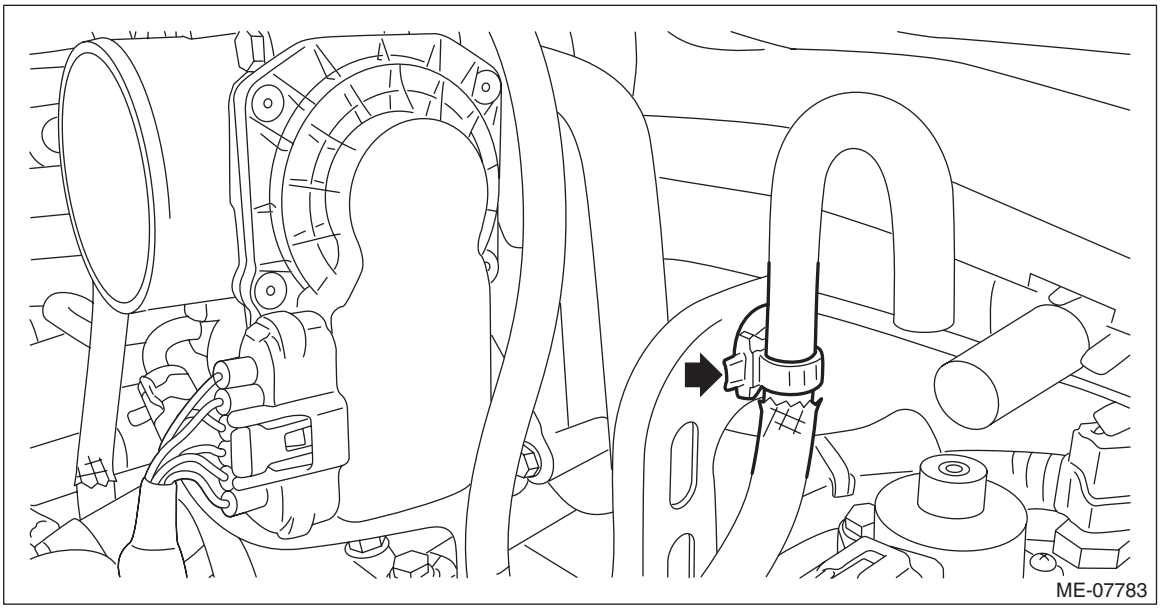
NOTE:
Use a new nut.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



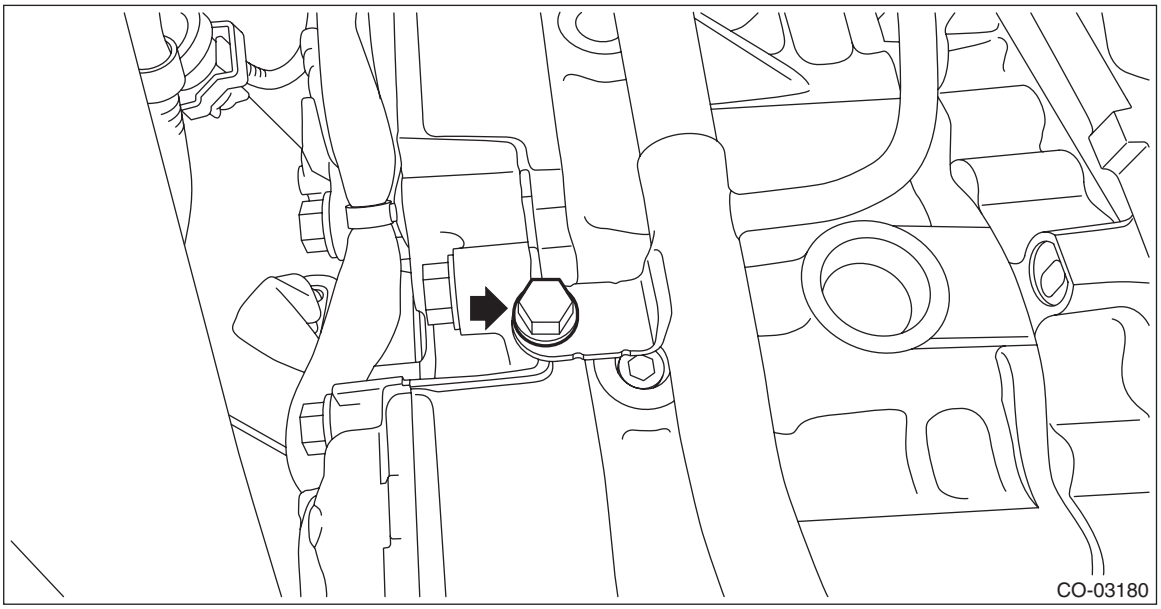
12) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
13) Lower the vehicle.

14) Secure the air breather hose to the engine rear hanger using clip. (MT model)

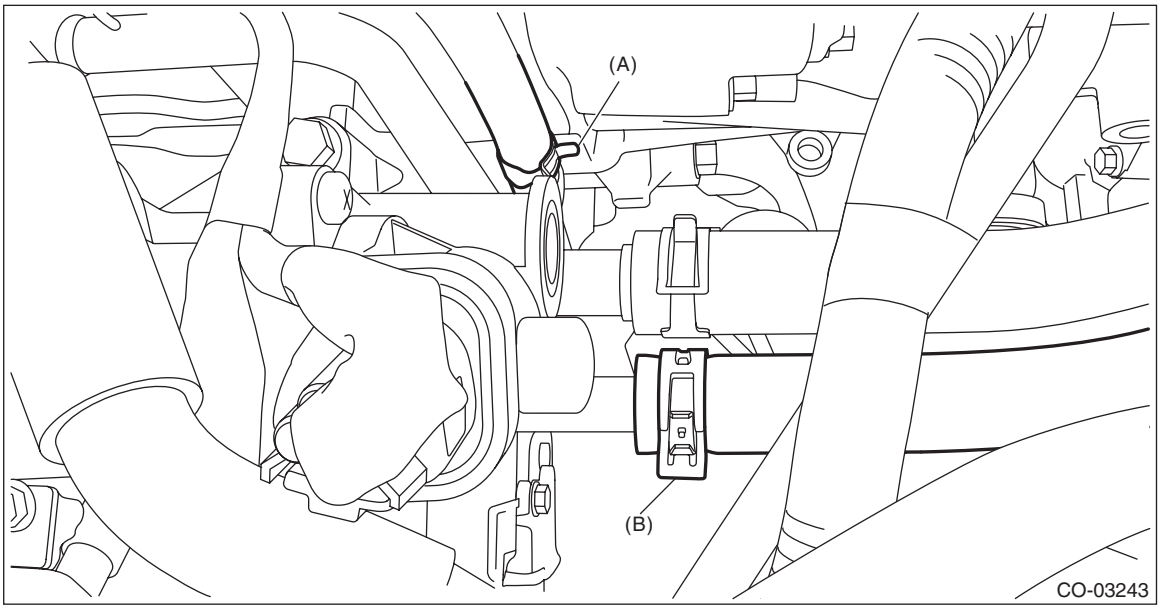


15) Install the bolt which secures the water pipe assembly LH to the cylinder head LH.

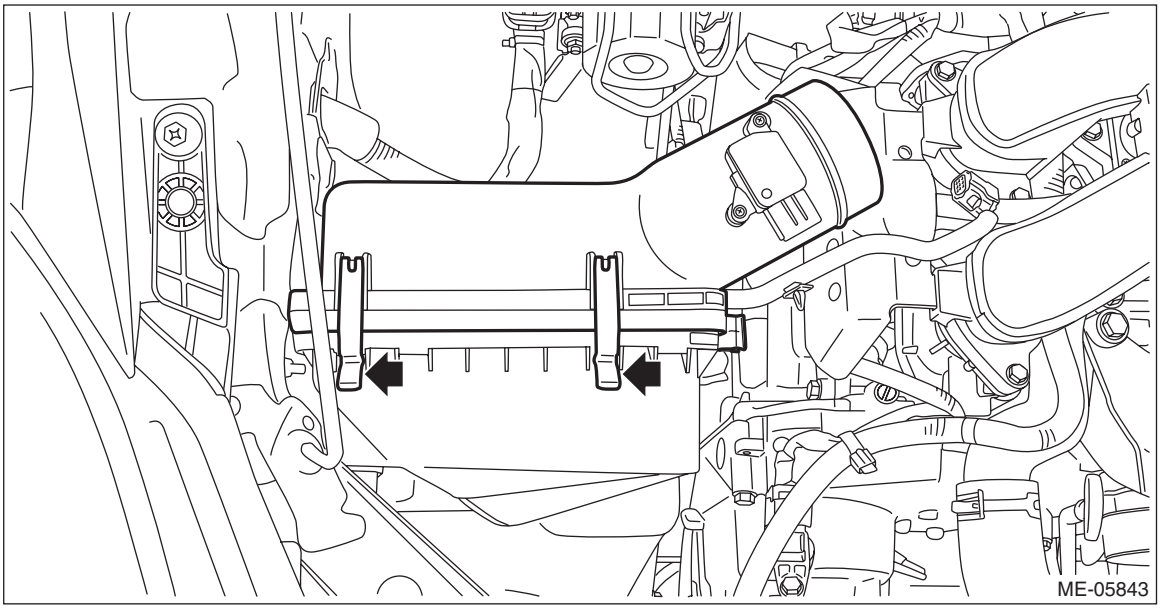
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



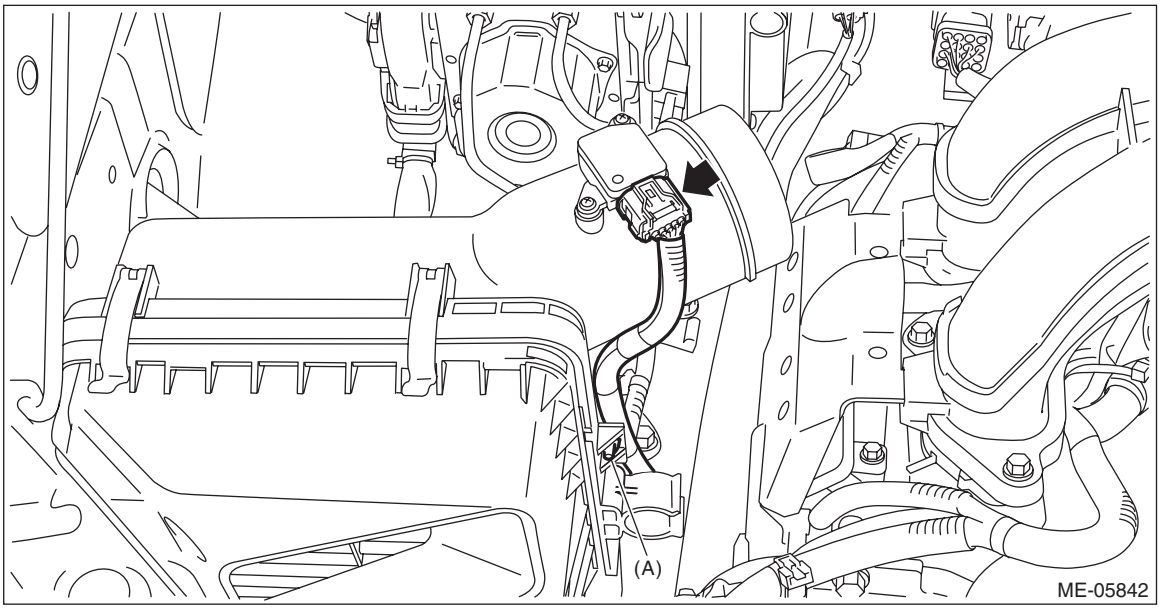
16) Connect the preheater hose (A) and the heater outlet hose (B) to the water pipe assembly LH.



17) Install the air intake case (rear).

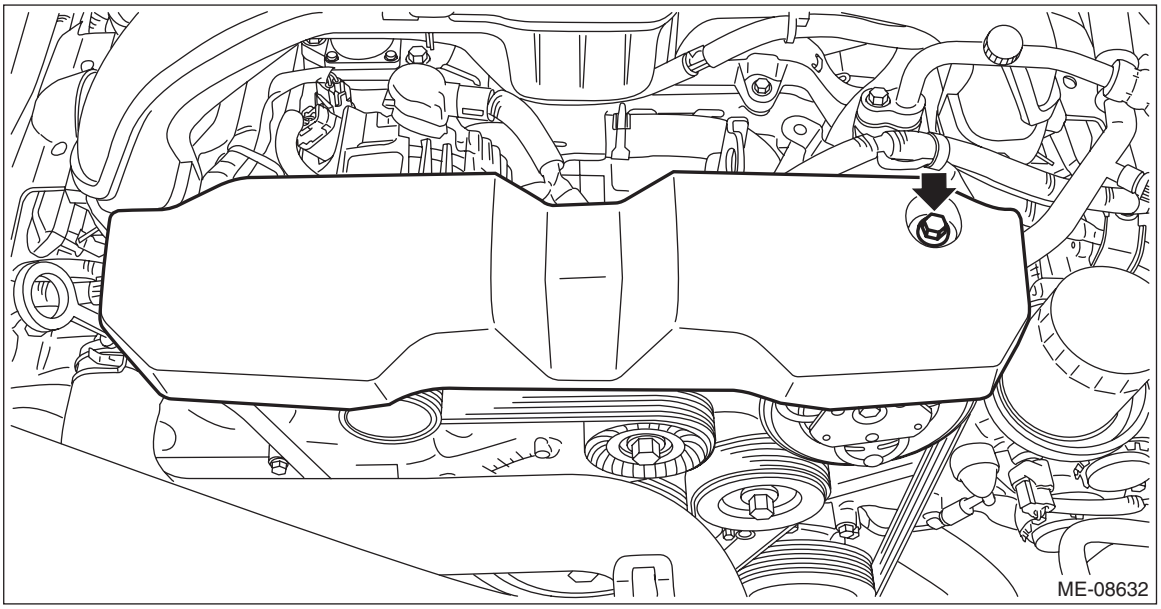


18) Install the clip (A) which secures the air flow and intake air temperature sensor harness, and connect the connector to the air flow and intake air temperature sensor.



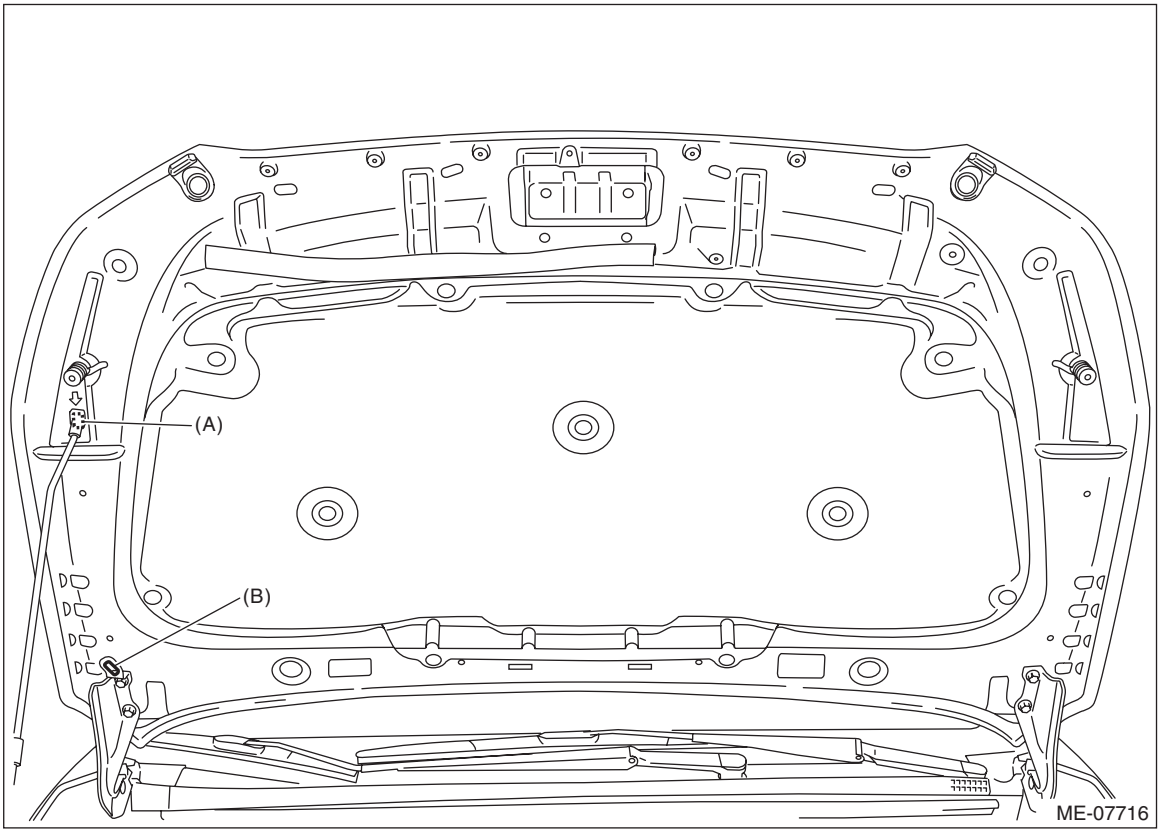
19) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
20) Install the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, INSTALLATION, Air Intake Duct.>
21) Install the V-belt cover.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



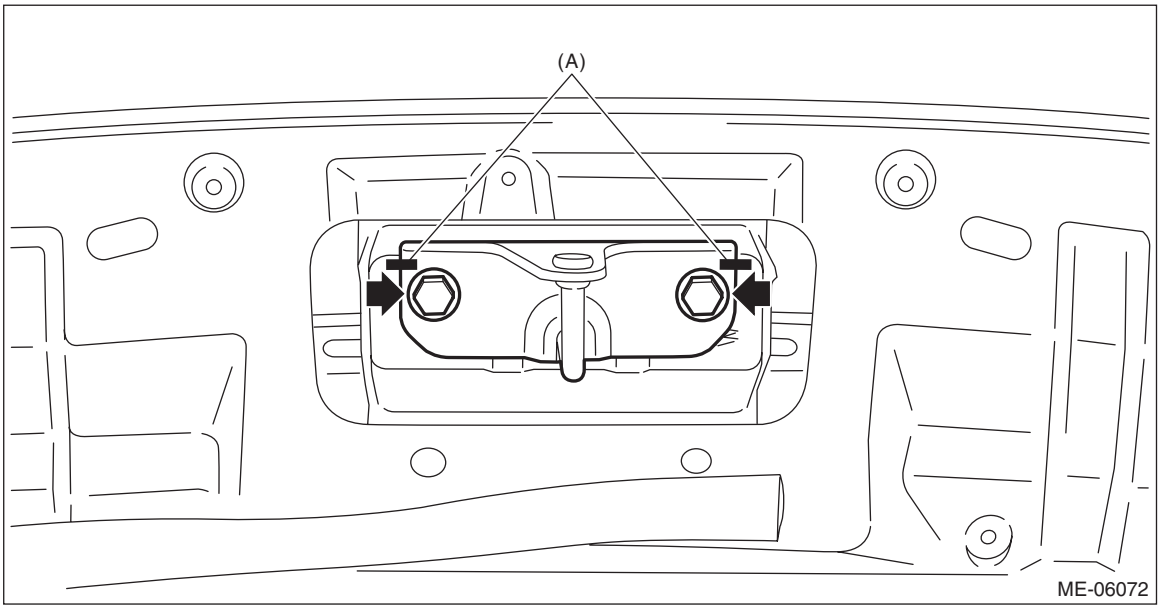
22) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
23) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

24) Change the front hood stay position from (B) to (A).



25) Install the front hood striker to the front hood by aligning the alignment marks (A), and close the front hood.

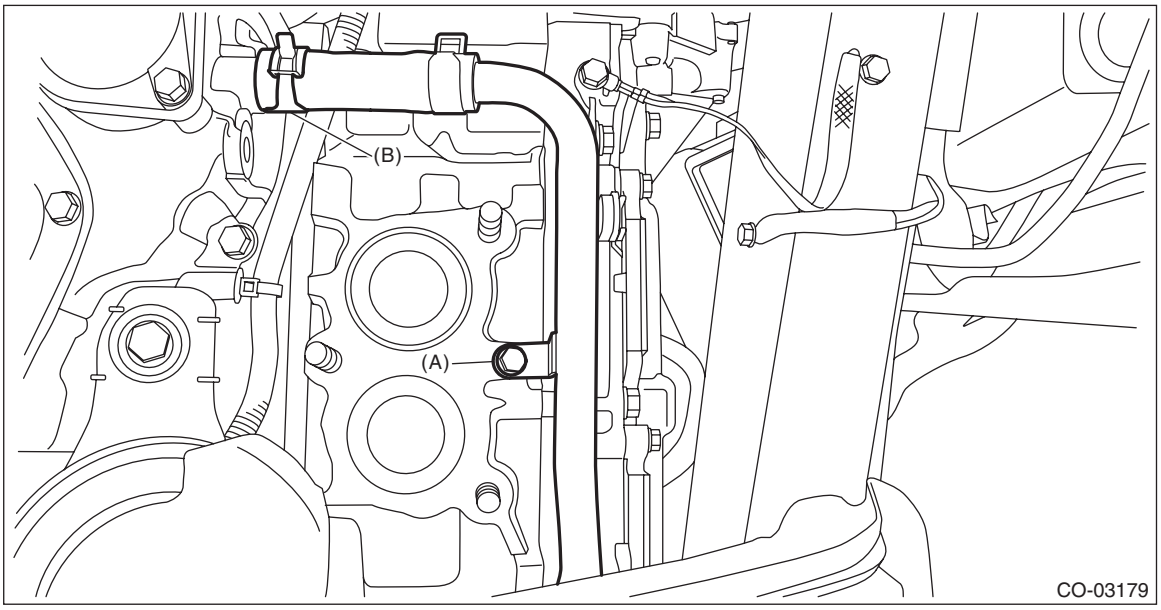
Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



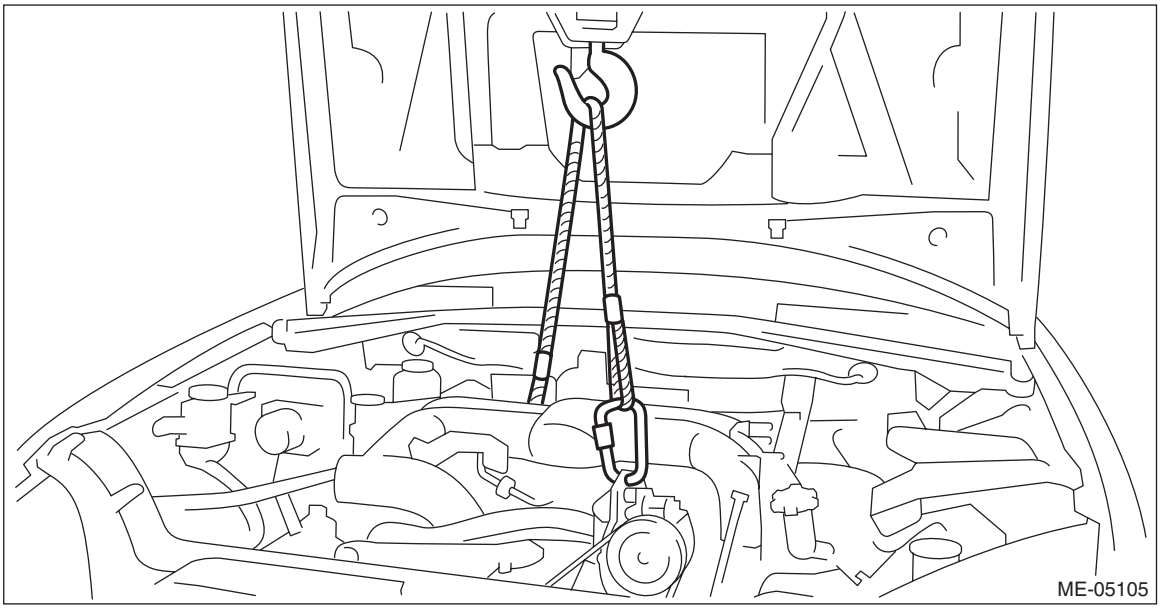
- **HEV model**

1) Set the water pipe assembly LH on the engine, and connect the water pipe hose LH (B) to the oil pan upper.
2) Secure the water pipe assembly LH to the cylinder head LH with bolt (A).

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

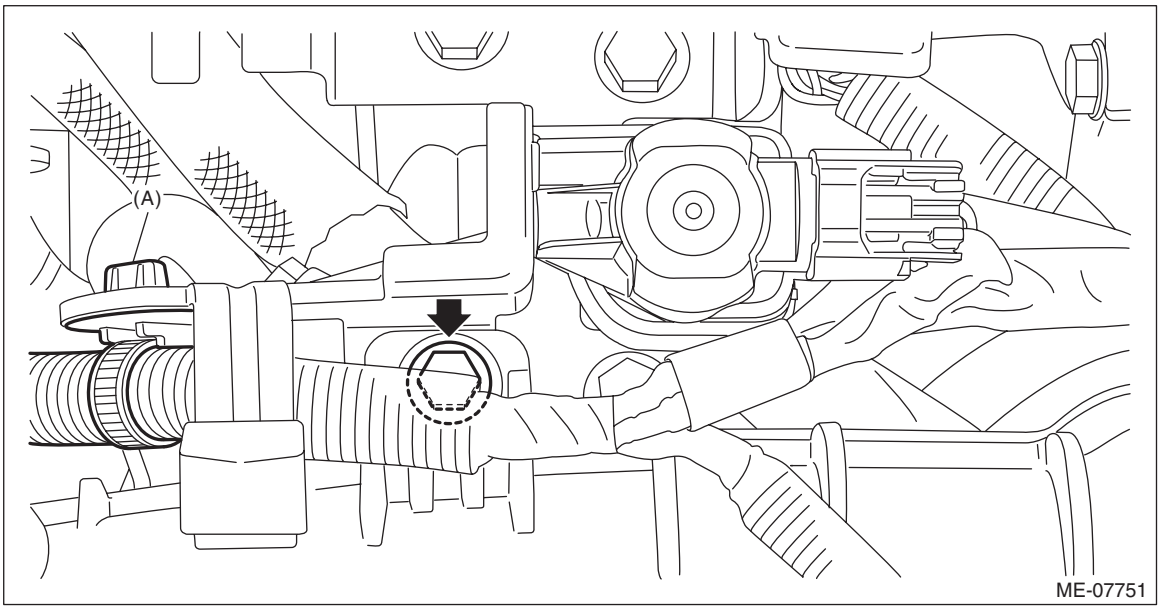


3) Remove the lifting device and wire ropes.



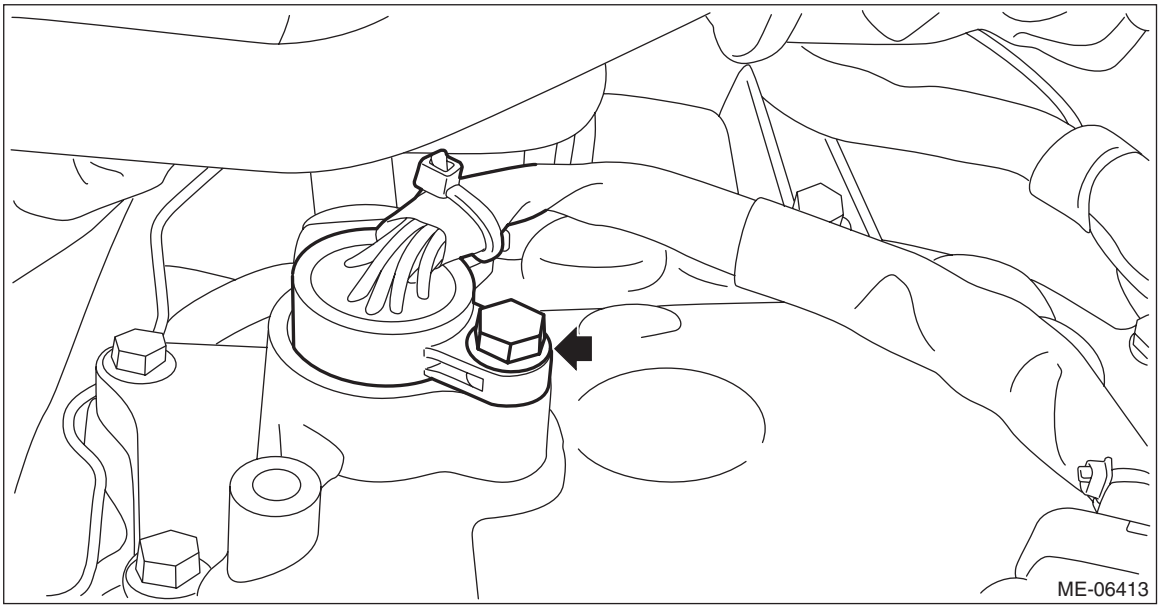
4) Install the bolts which secure the purge control solenoid valve bracket to the intake manifold, and secure the engine harness to the purge control solenoid valve bracket with the clip (A).

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



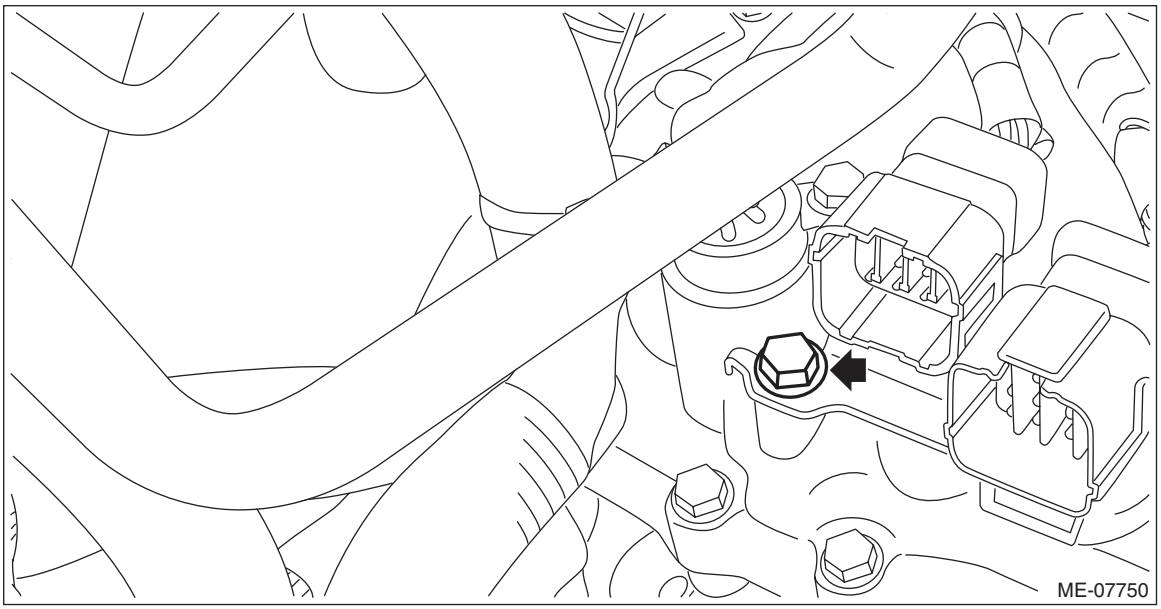
5) Remove the bolt and turn the transmission harness counterclockwise to install the transmission harness to the control valve body.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



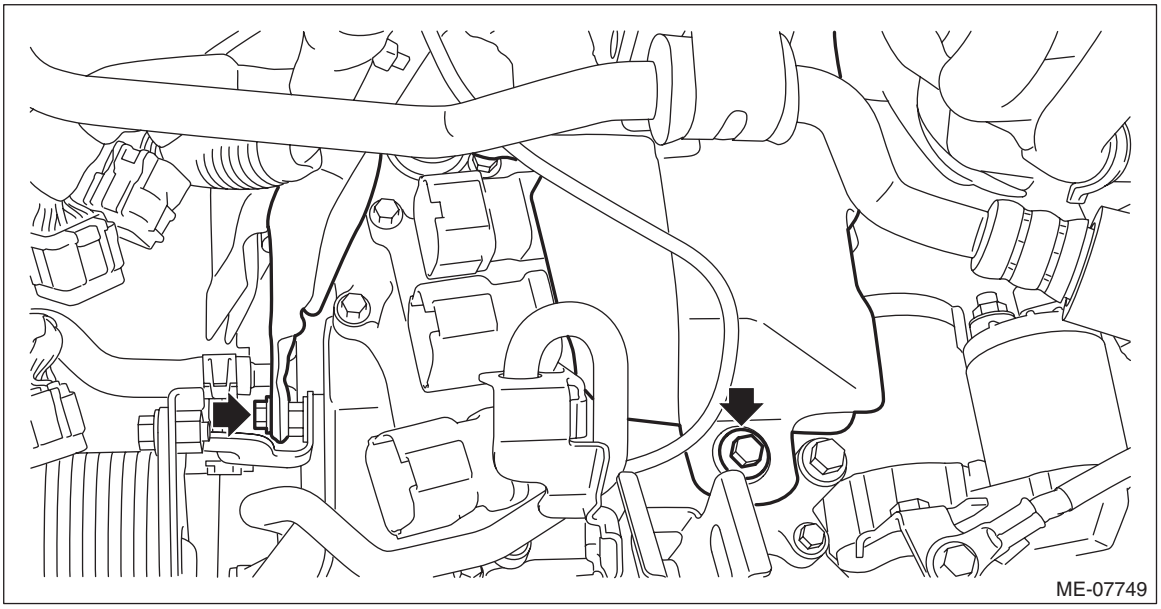
6) Install the bolt which holds the transmission harness stay.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



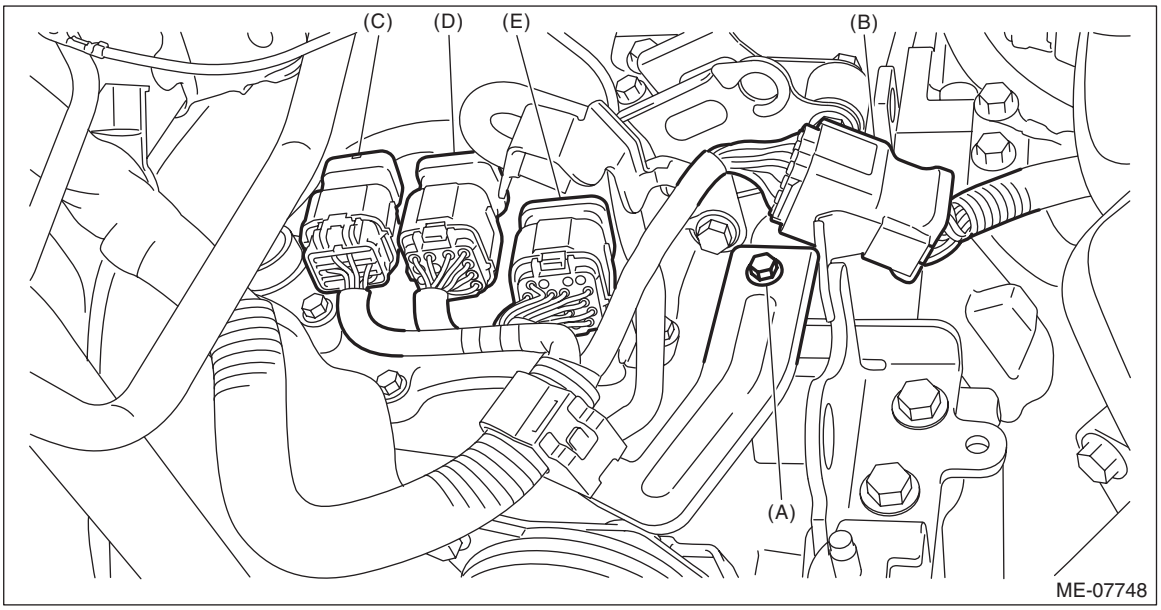
7) Install the transmission case cover.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



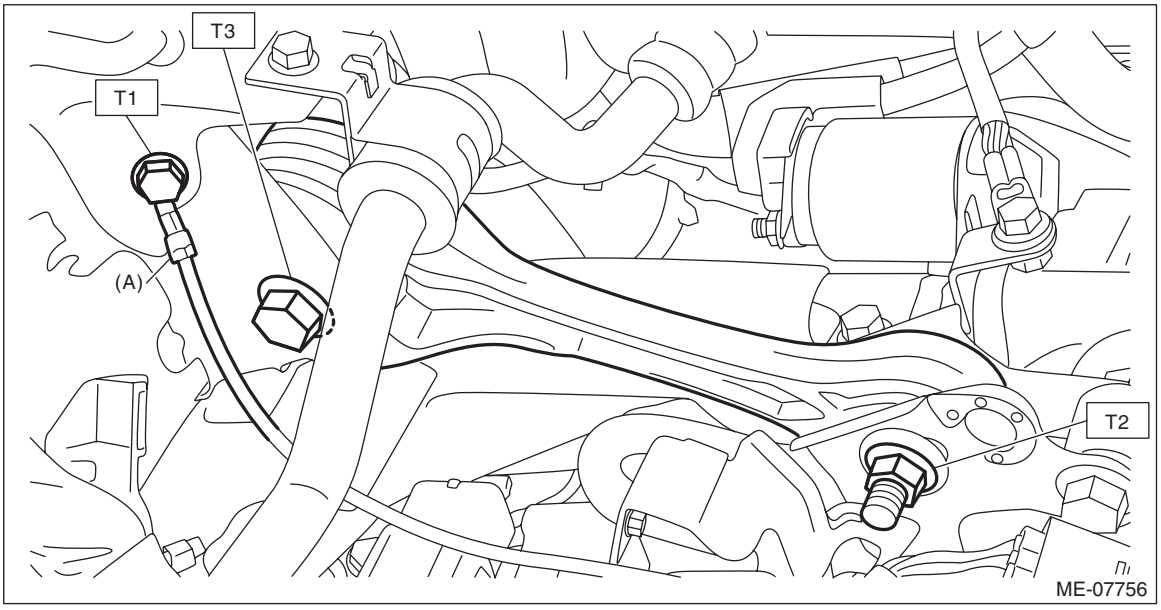
8) Connect the bulkhead harness connector to the transmission harness connector (C), inhibitor harness connector (D) and drive motor harness connector (E).
9) Connect the bulkhead harness connector to the engine harness connector (brown) (B), and install the bolt (A) securing the bulkhead harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



10) Install the pitching stopper, and connect the transmission radio ground terminal (A) to the vehicle.

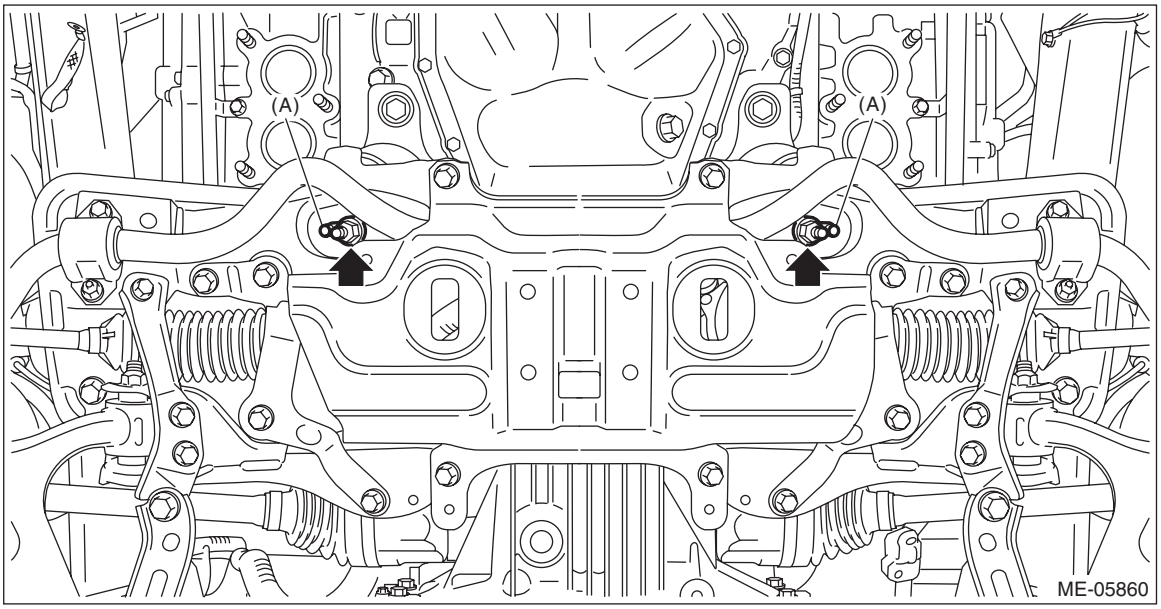
Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T3: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



11) Lift up the vehicle.
12) Install the nuts which hold the engine mounting to the crossmember.

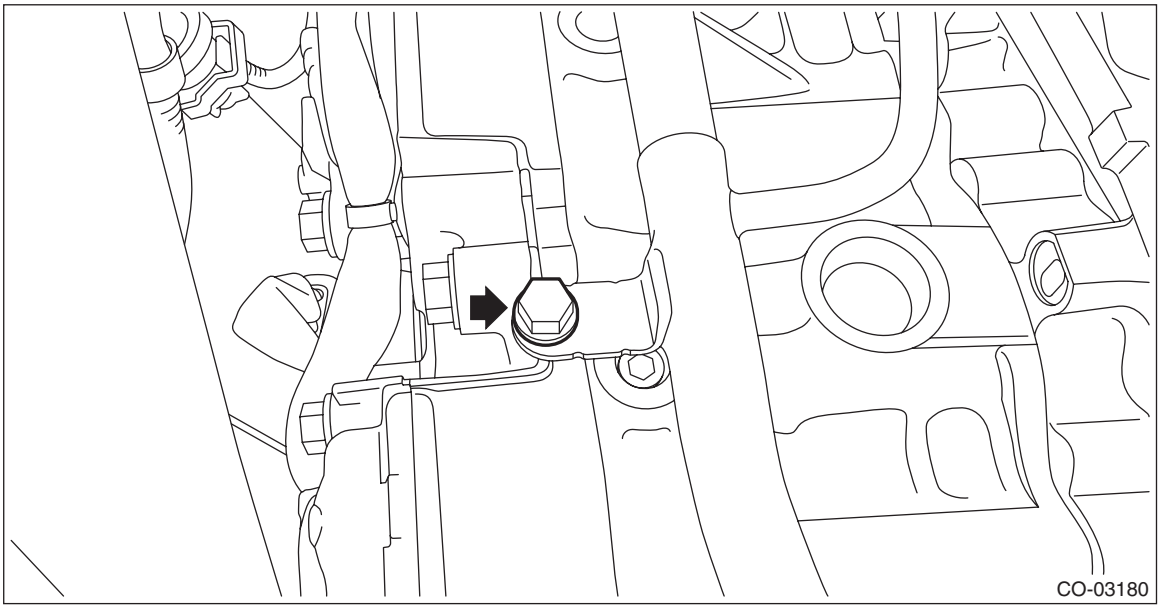
NOTE:
- Make sure that locators (A) of the engine mounting are securely inserted.
- Use a new nut.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)

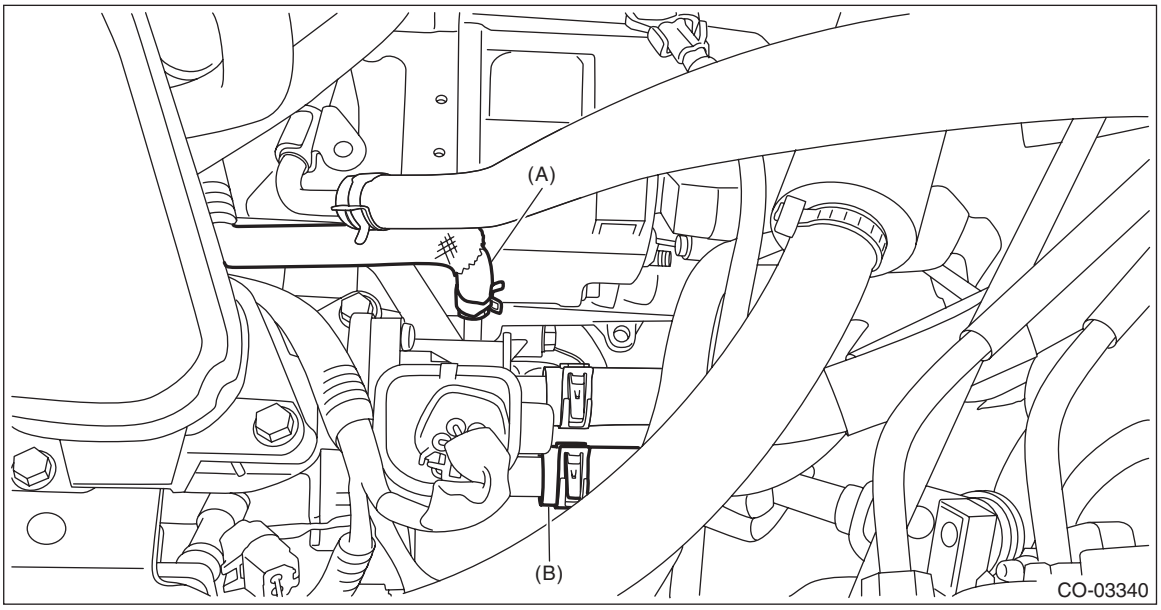


13) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
14) Lower the vehicle.
15) Install the bolt which secures the water pipe assembly LH to the cylinder head LH.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

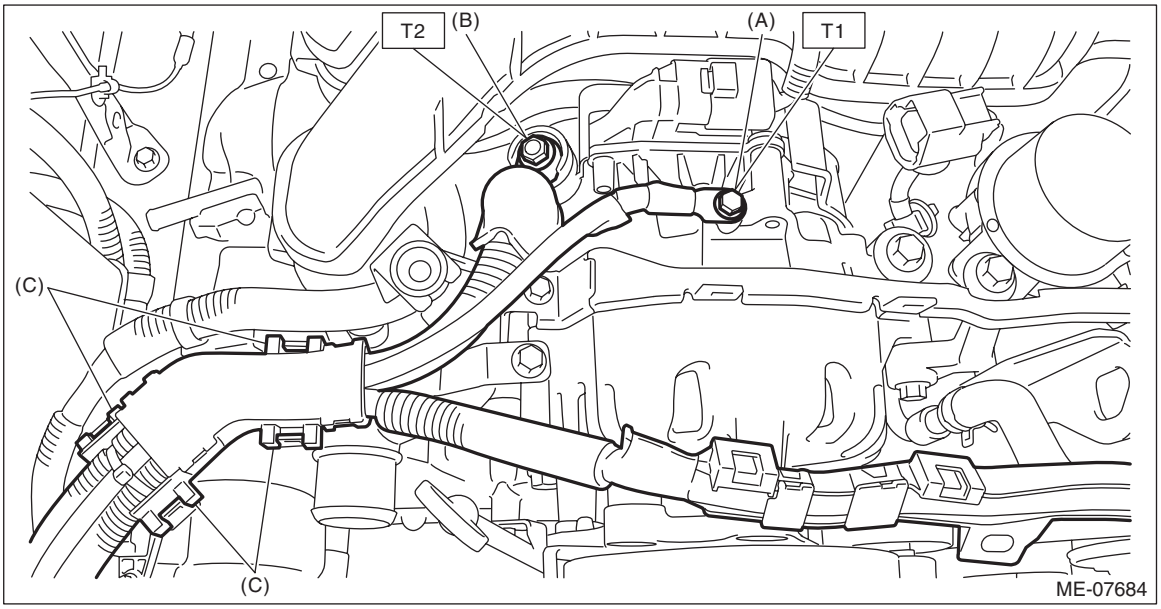


16) Connect the preheater hose (A) and the heater outlet hose (B) to the water pipe assembly LH.



17) Set the battery cable assembly, and install the clip (C) which secures the battery cable assembly to the battery cable bracket No. 1.
18) Connect the terminal (A) and the terminal (B) to ISG.

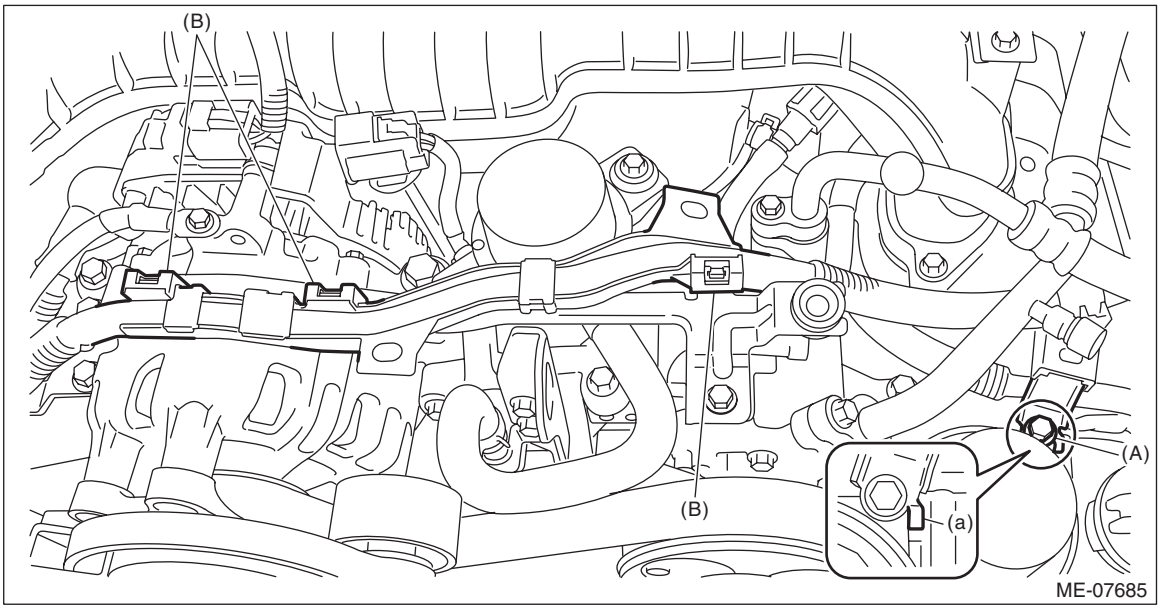
Tightening torque:
T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
T2: 15.5 N·m (1.6 kgf-m, 11.4 ft-lb)



19) Secure the battery cable assembly to the collector cover bracket with the clip (B), and install the bolt (A) which secures the battery cable stay to the chain cover.

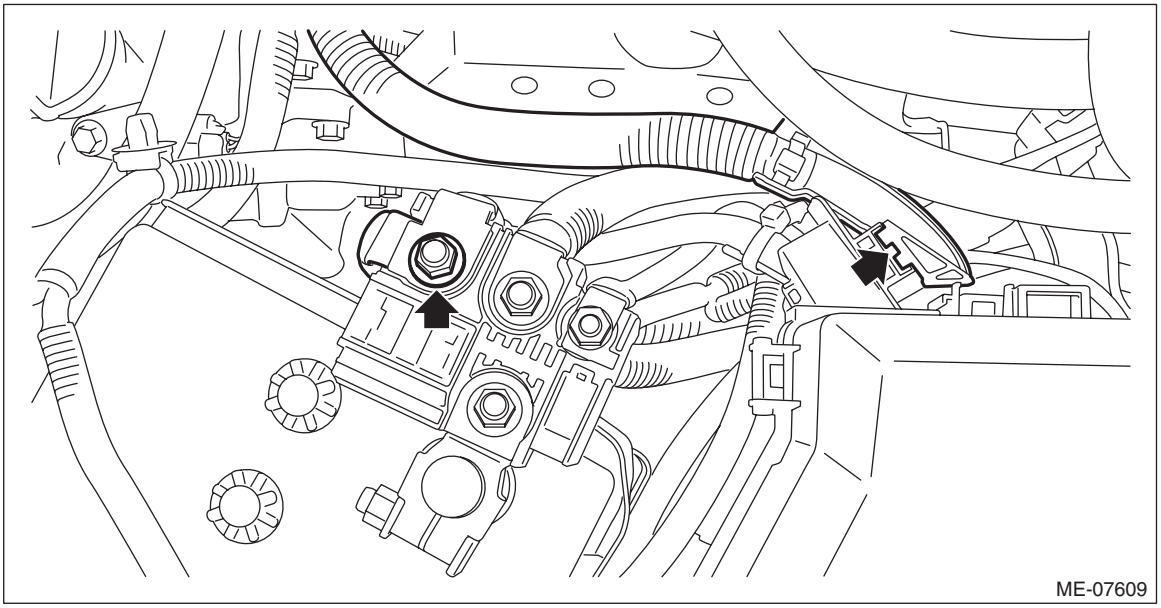
NOTE:
When installing the battery cable stay, install it by fitting the folded end (a) of the battery cable stay to the chain cover boss.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



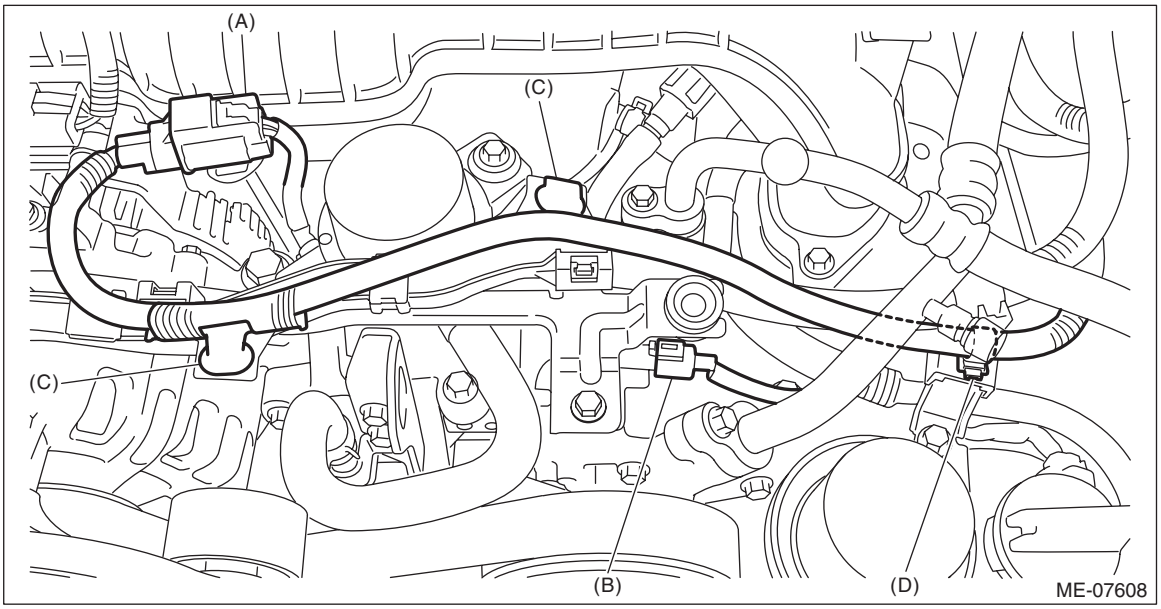
20) Install the battery cable assembly to the main fuse box, and install the nut which secures the battery cable assembly to the slow blow fuse (12 volt auxiliary battery).

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

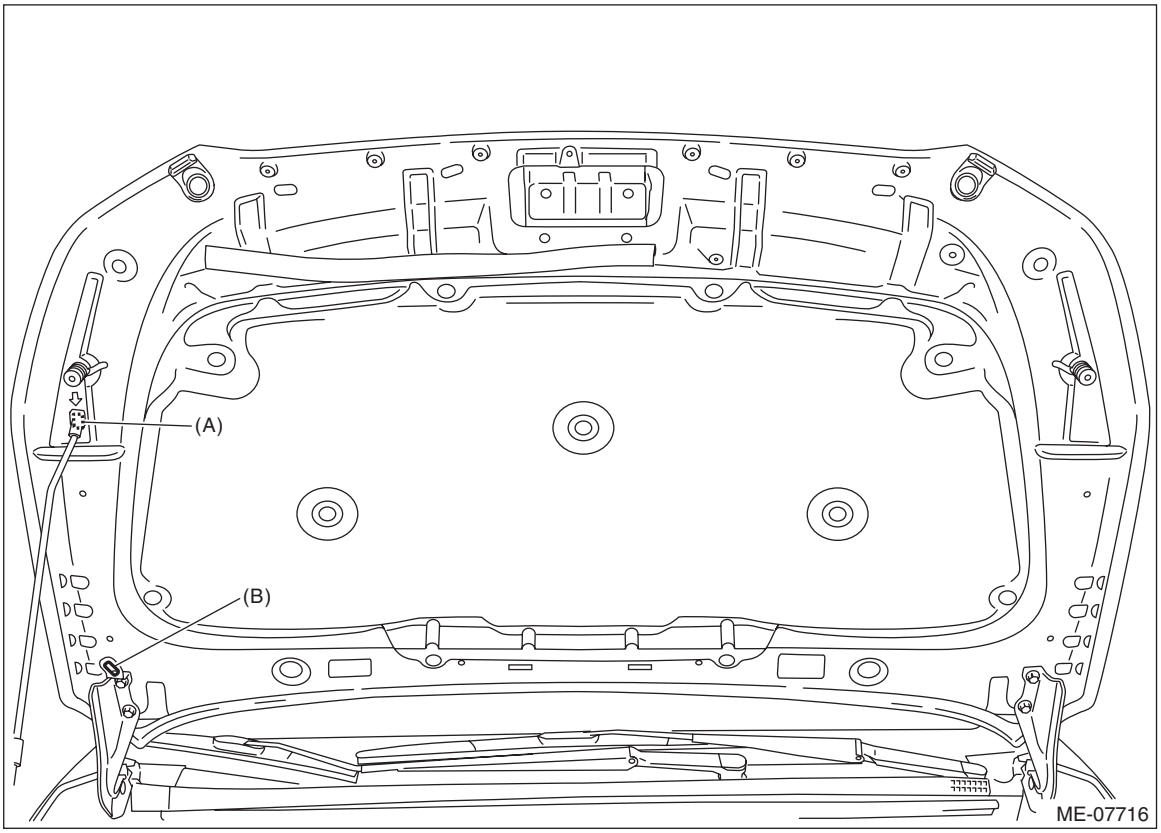


21) Install the terminal boot to the positive terminal of the 12 volt auxiliary battery.
22) Set the harness, and secure the harness to the battery cable assembly with the clip (C) and the clip (D).

23) Connect the connector (A) to the brake vacuum pump, and connect the connector (B) to the A/C compressor.

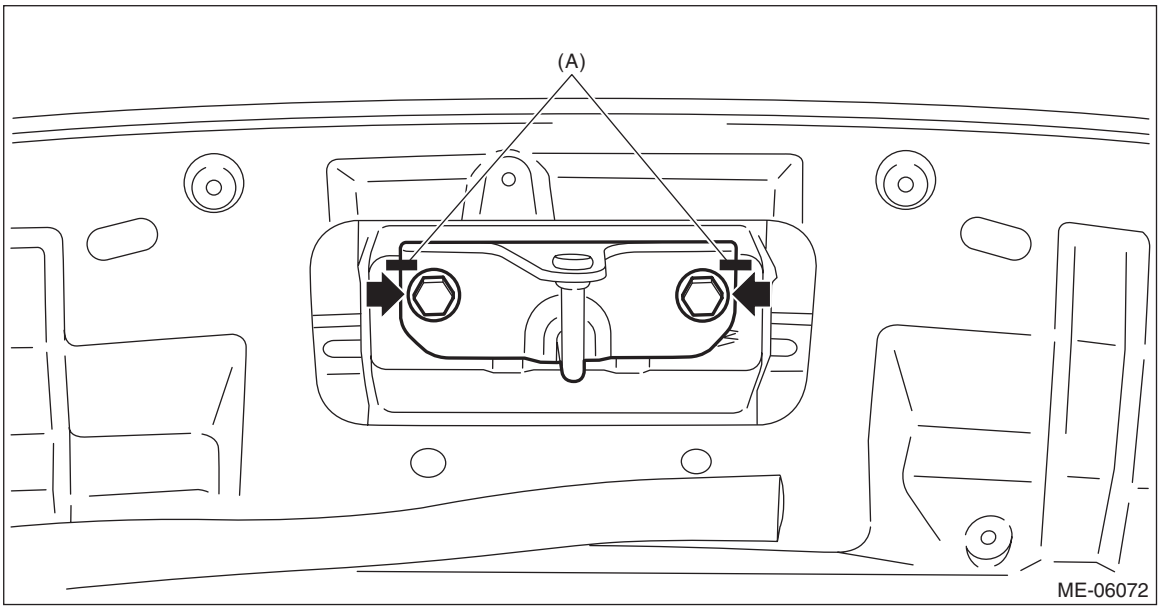


24) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
25) Install the air intake duct. <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
26) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
27) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
28) Install the collector cover.
29) Change the front hood stay position from (B) to (A).



30) Install the front hood striker to the front hood by aligning the alignment marks (A), and close the front hood.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



C: INSPECTION

1) Check that the water pipe assembly has no deformation, cracks or other damages.
2) Check that the hose has no cracks, damage or loose part.

6. Thermostat

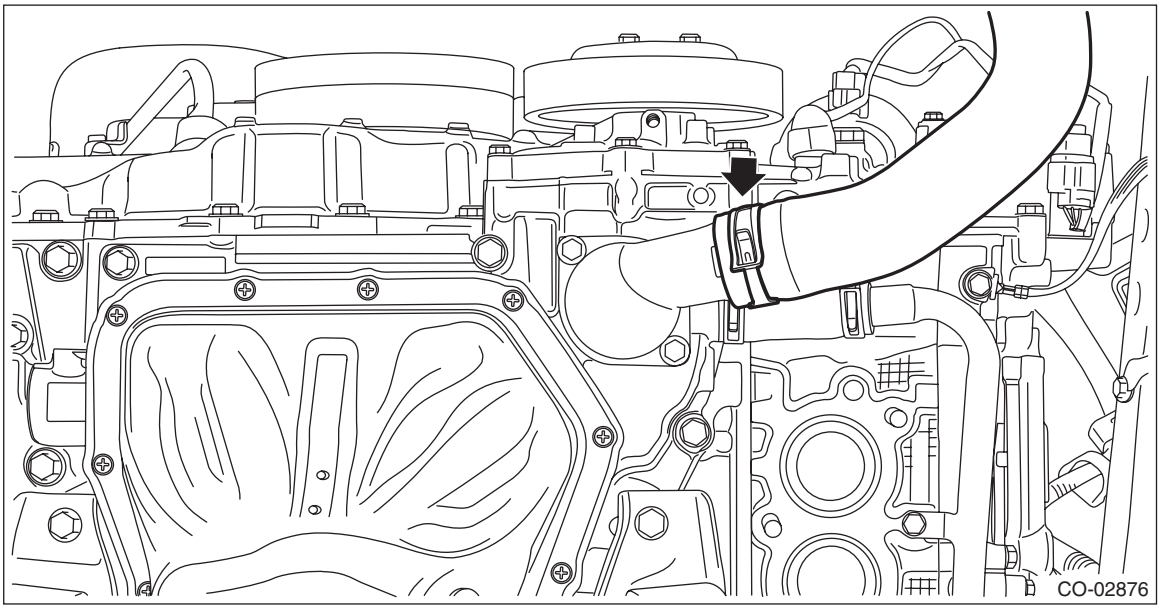
A: REMOVAL

1. ENGINE SIDE

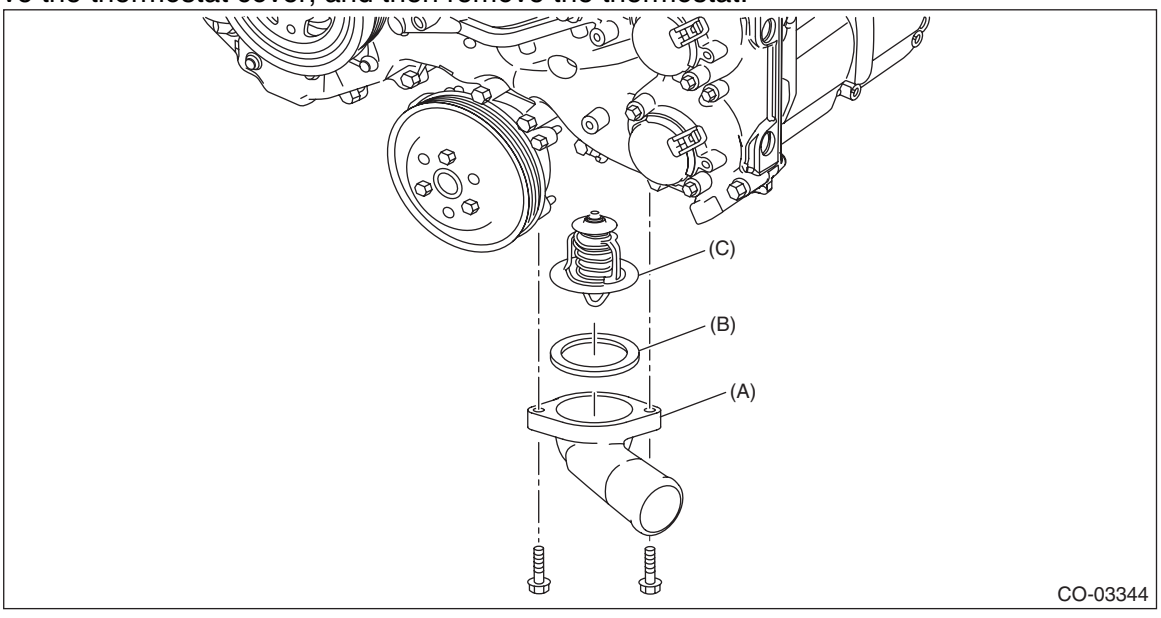
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
5) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
6) Disconnect the radiator outlet hose from thermostat cover.



7) Remove the thermostat cover, and then remove the thermostat.



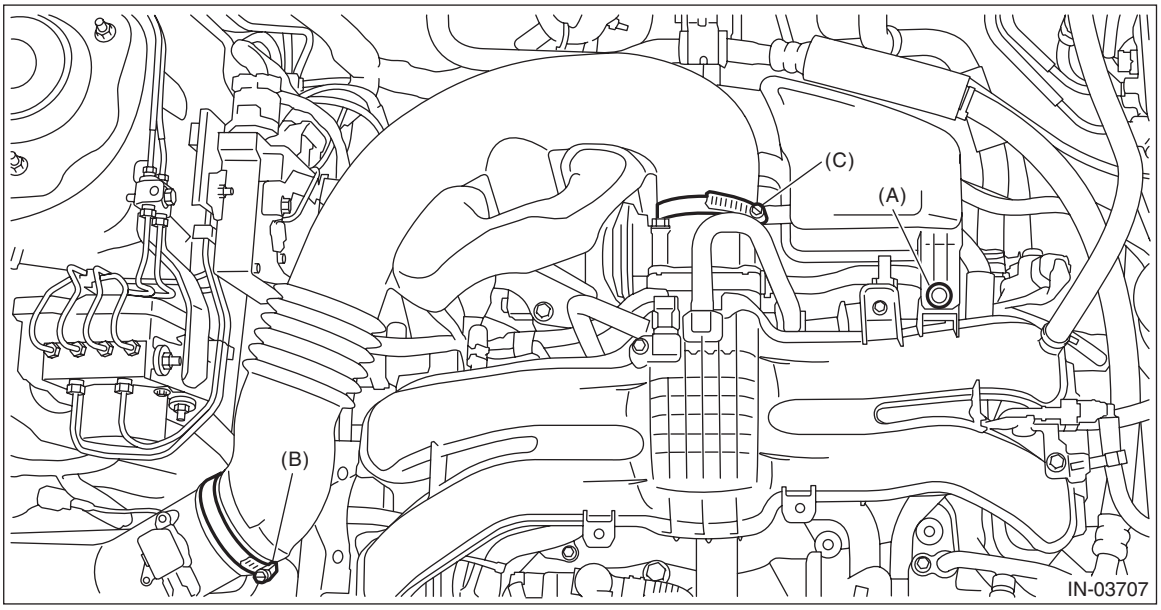
(A) Thermostat cover (B) Gasket (C) Thermostat

8) Remove the gasket from thermostat.

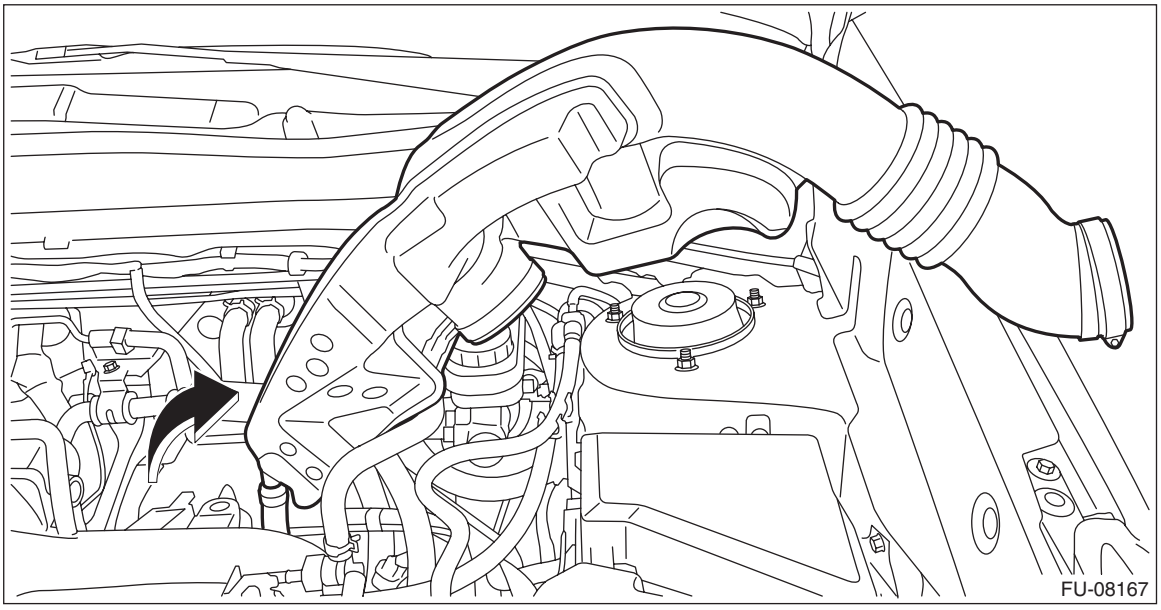
2. CVTF COOLER (WITH WARMER FEATURE) SIDE

• Gasoline engine model

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
5) Lower the vehicle.
6) Remove the clip (A) from the air intake boot.
7) Loosen the clamp (B) securing the air cleaner case (rear) to the air intake boot.
8) Loosen the clamp (C) which secures the throttle body to the air intake boot.

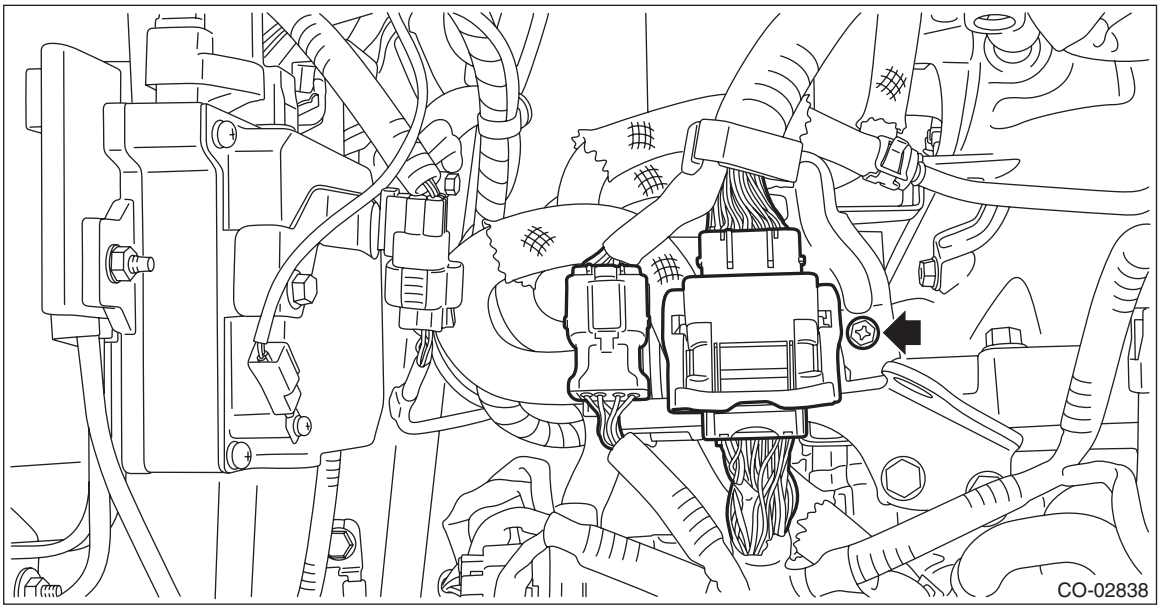


9) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

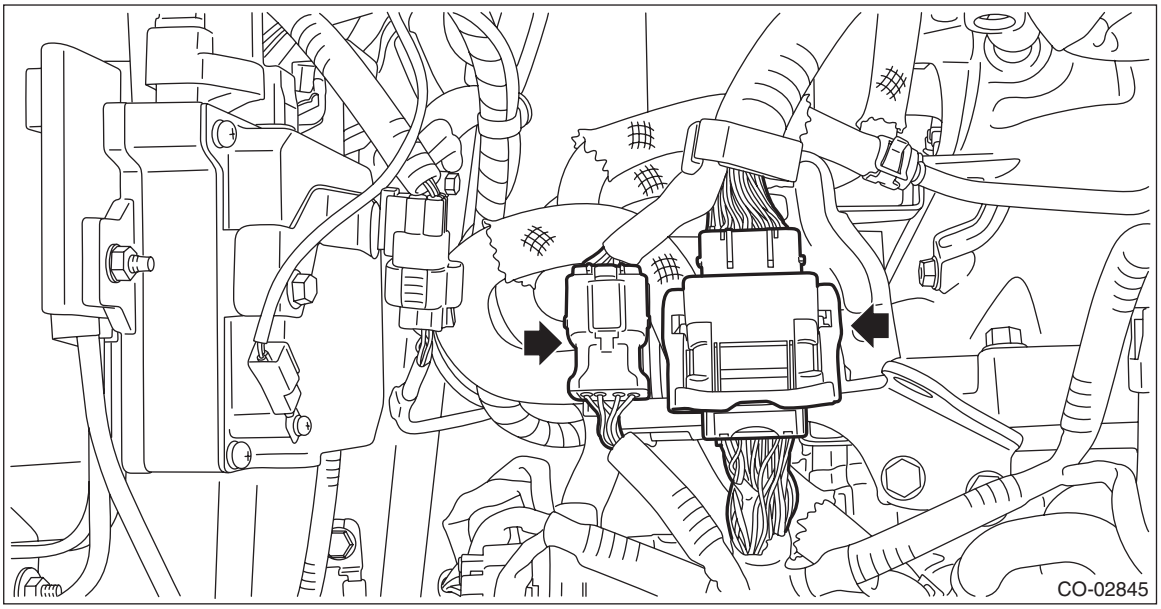


10) Disconnect the engine harness connector.

(1) Remove the bolt securing the bulkhead harness connector bracket.

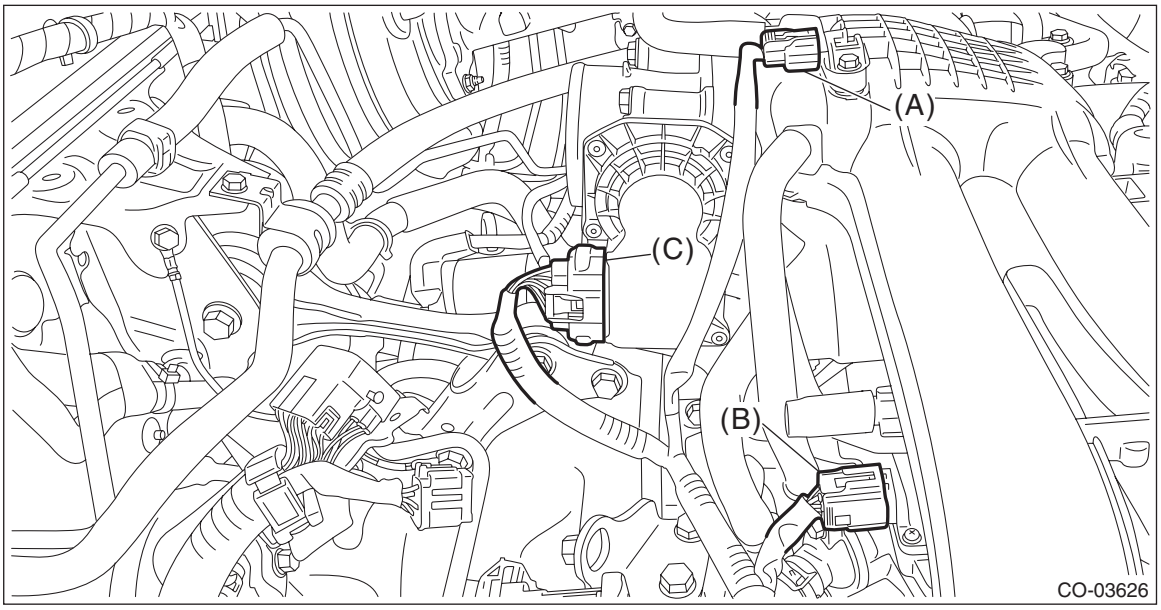


(2) Disconnect the bulkhead harness connector from the engine harness connector (black) and engine harness connector (brown).

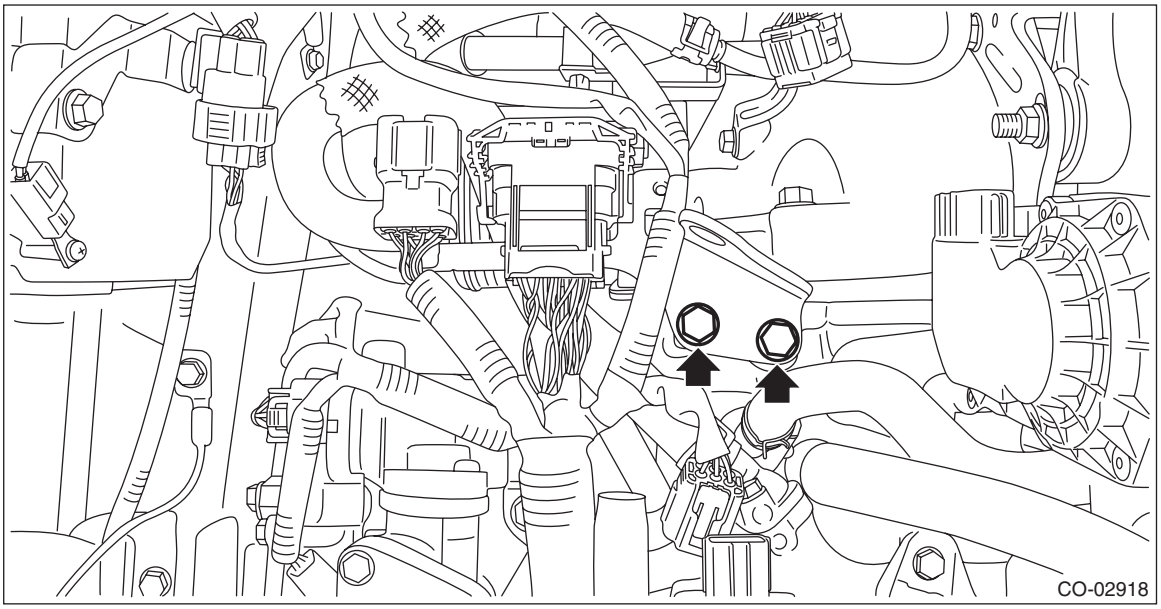


11) Disconnect the connector (A) from manifold absolute pressure sensor.
12) Disconnect the connector (B) from the throttle position sensor.

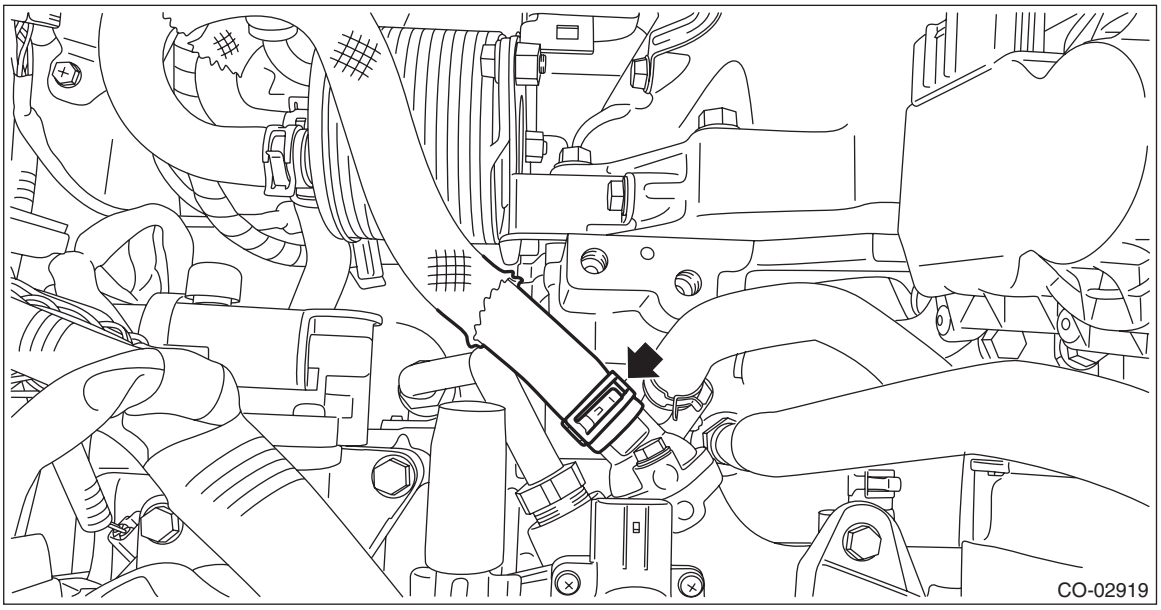
13) Disconnect the connector (C) from the EGR control valve.



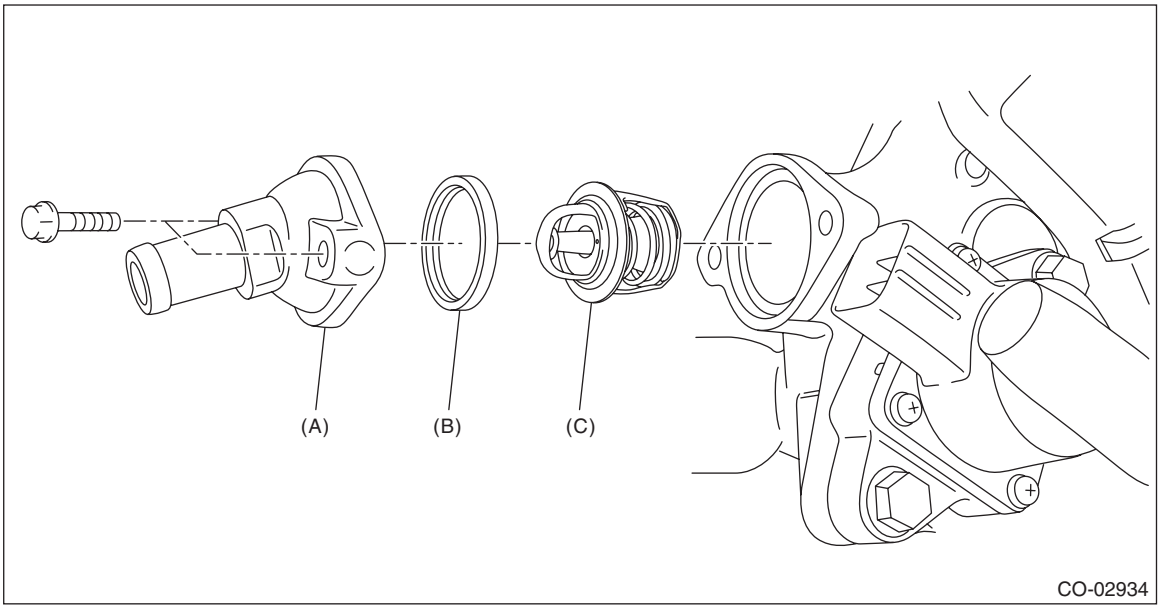
14) Remove the bolt securing the engine hanger from the cylinder block RH, and move the hanger to the right side wheel apron.



15) Disconnect the engine coolant hose from the thermostat cover.



16) Remove the thermostat cover, and then remove the thermostat.



(A) Thermostat cover (B) Gasket (C) Thermostat

17) Remove the gasket from thermostat.

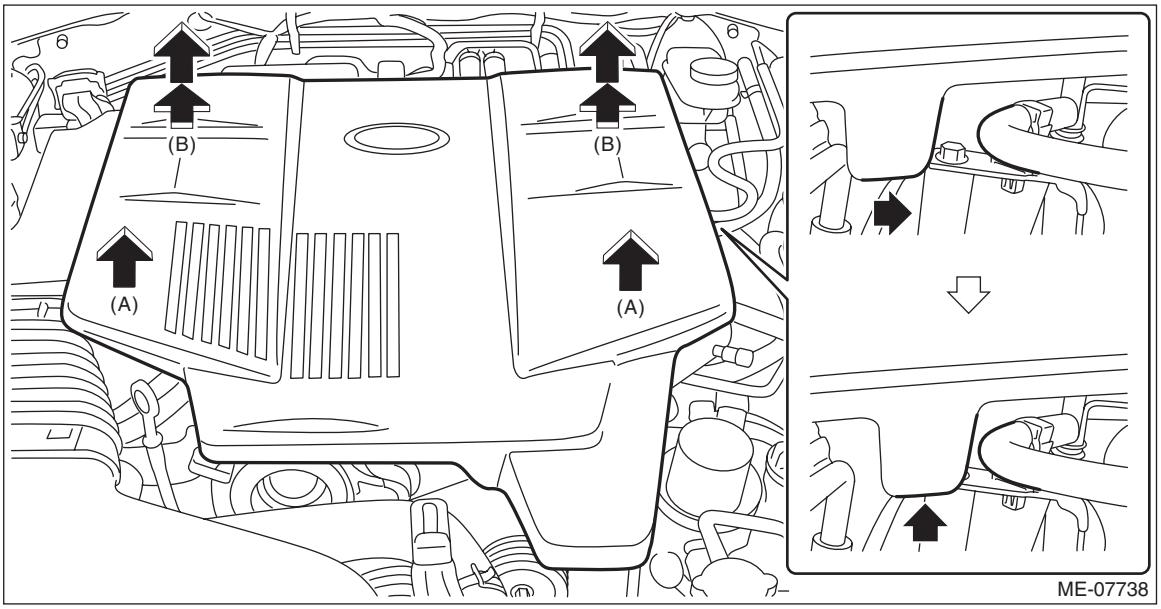
• **HEV model**

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

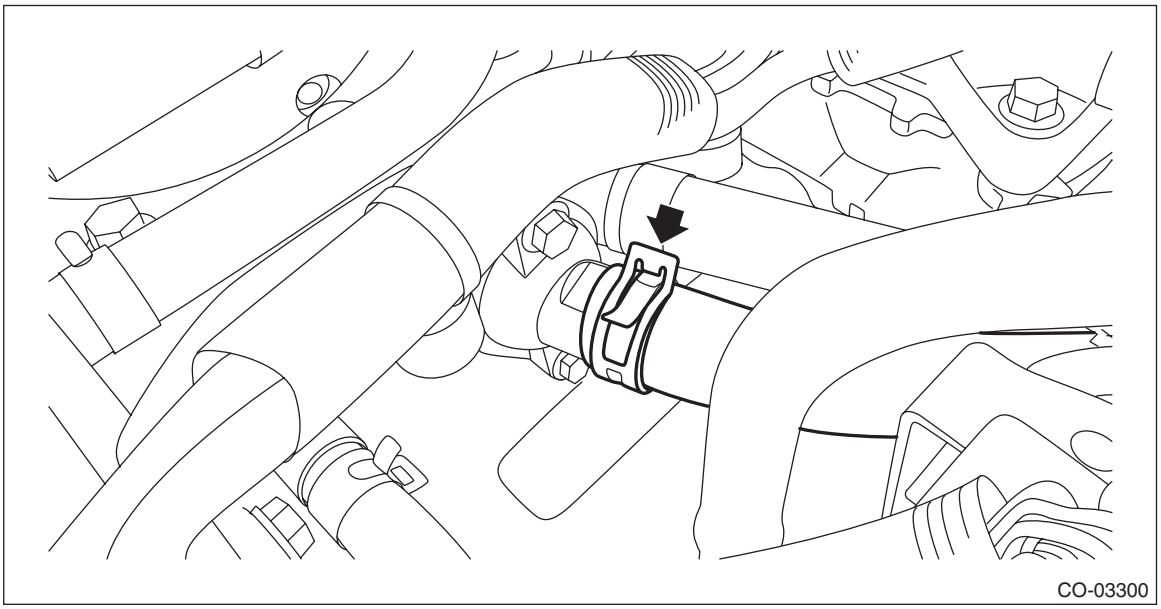
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

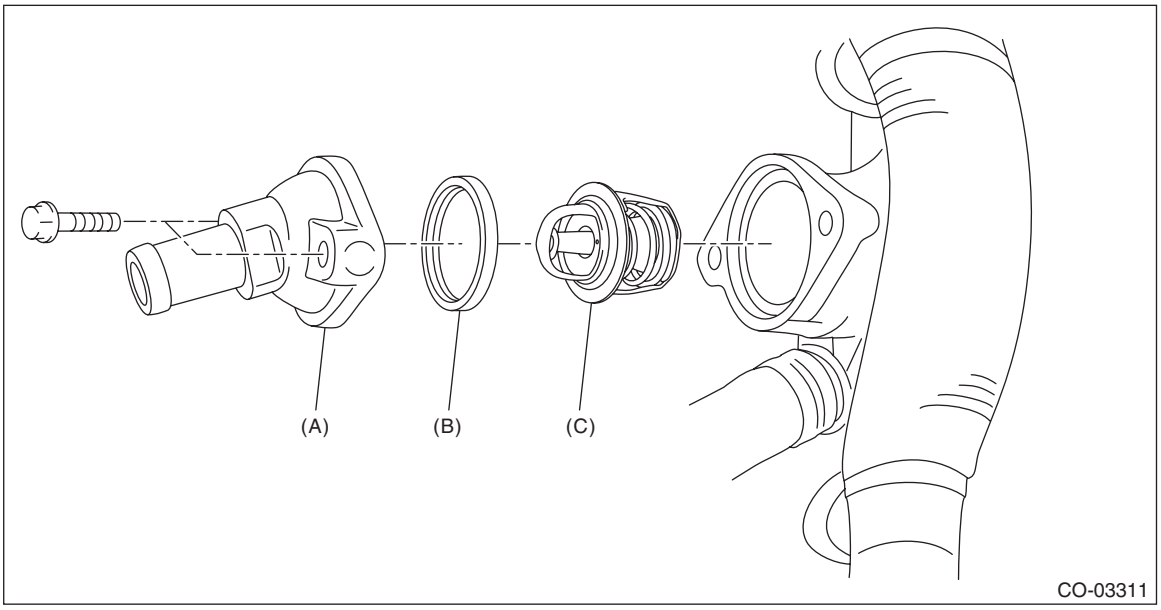
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Lift up the vehicle.
4) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
5) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
6) Lower the vehicle.
7) Remove the intake manifold. <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
8) Disconnect the engine coolant hose from the thermostat cover.



9) Remove the thermostat cover, and then remove the thermostat.



(A) Thermostat cover (B) Gasket (C) Thermostat

10) Remove the gasket from thermostat.

B: INSTALLATION

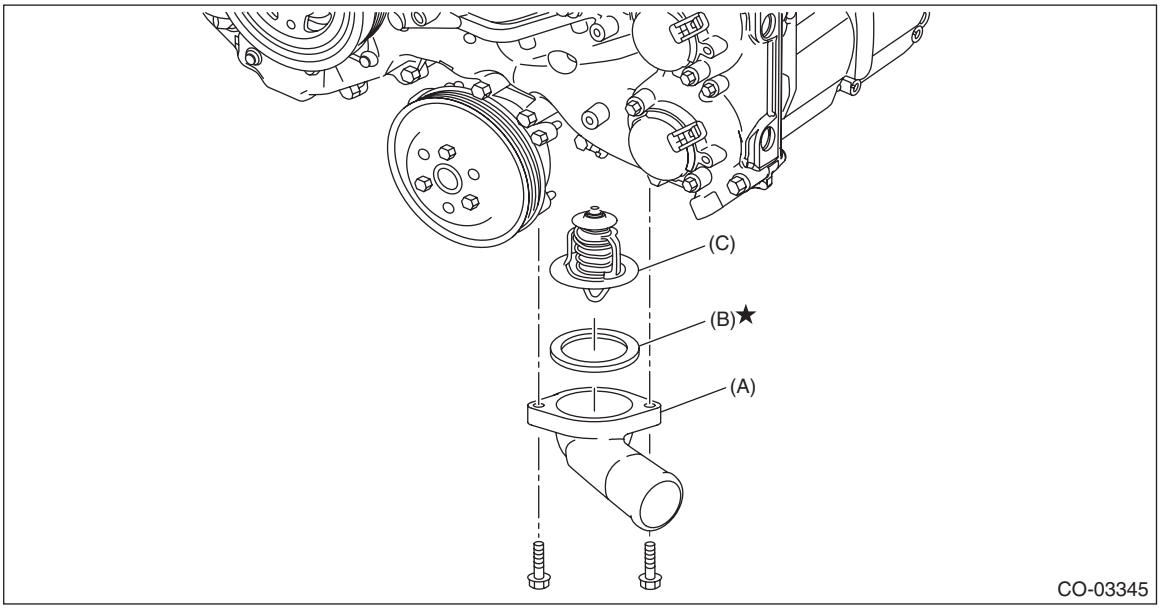
1. ENGINE SIDE

1) Install a gasket to thermostat.

NOTE:
Use a new gasket.

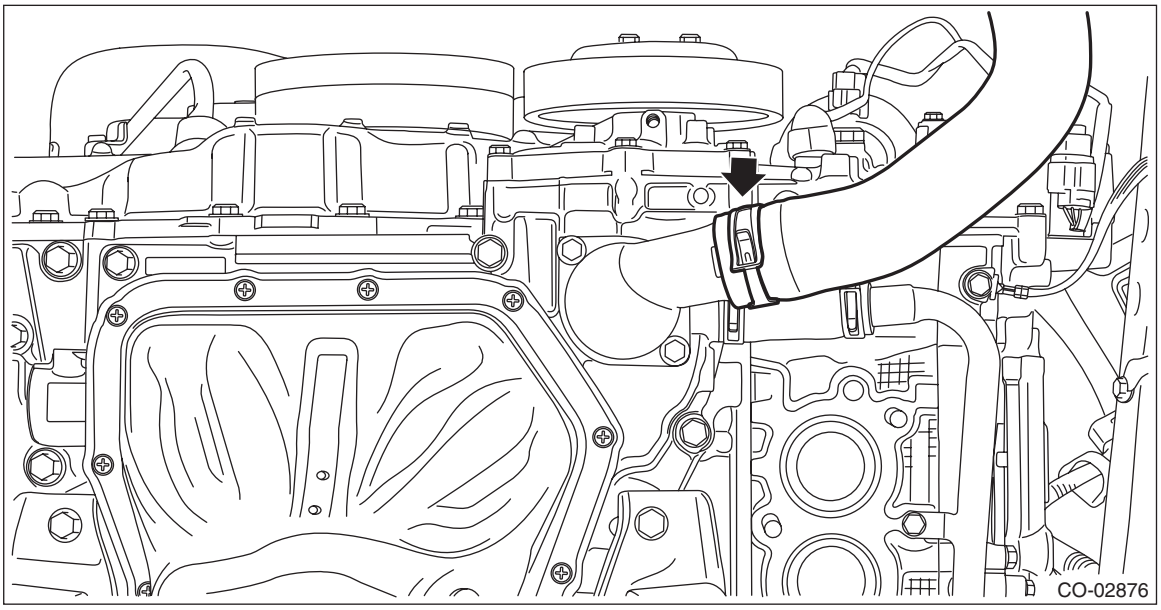
2) Install the thermostat and thermostat cover.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



(A) Thermostat cover (B) Gasket (C) Thermostat

3) Connect the radiator outlet hose to thermostat cover.



4) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
5) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
6) Lower the vehicle.
7) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
8) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

2. CVTF COOLER (WITH WARMER FEATURE) SIDE

- **Gasoline engine model**

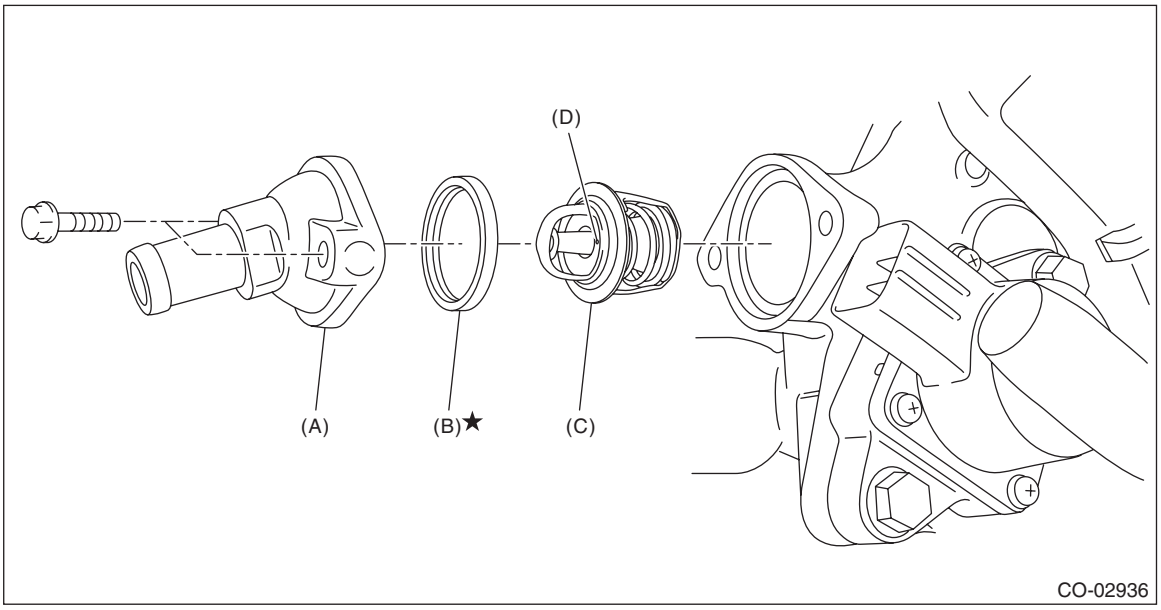
1) Install a gasket to thermostat.

NOTE:
Use a new gasket.

2) Install the thermostat and thermostat cover.

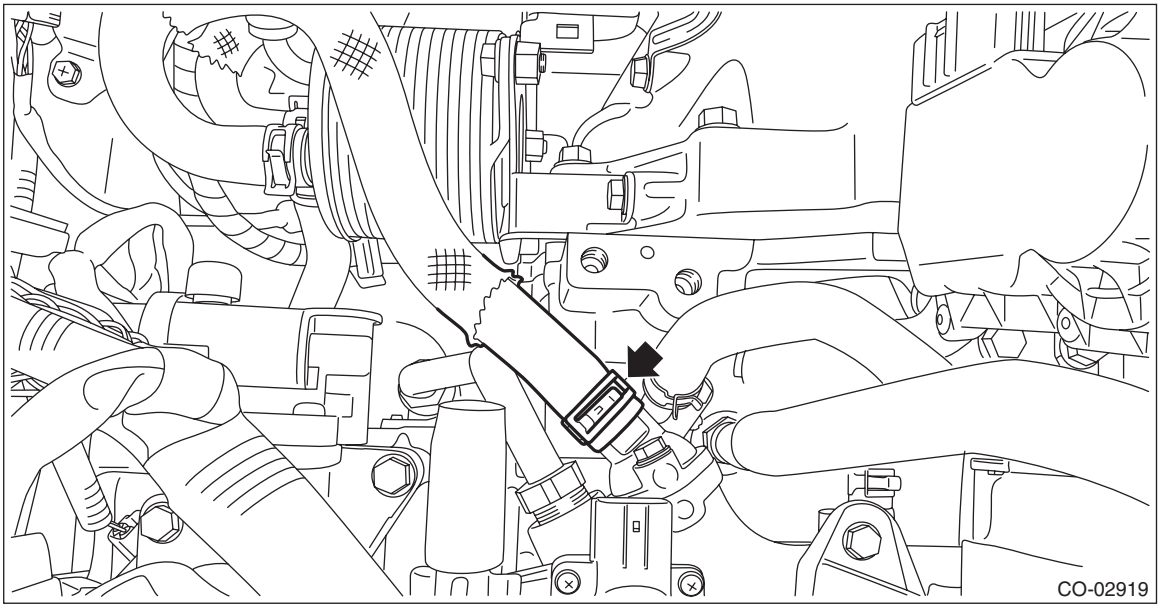
NOTE:
Install the parts with the air vent hole facing upward.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



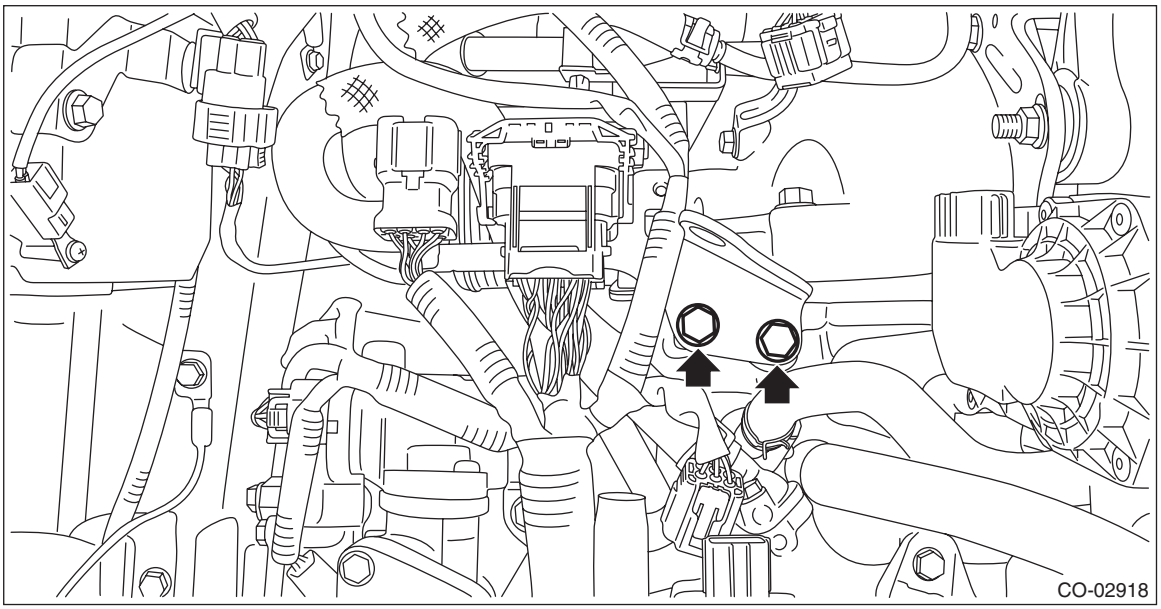
(A) Thermostat cover (B) Gasket (C) Thermostat
(D) Air vent hole

3) Connect the engine coolant hose to the thermostat cover.

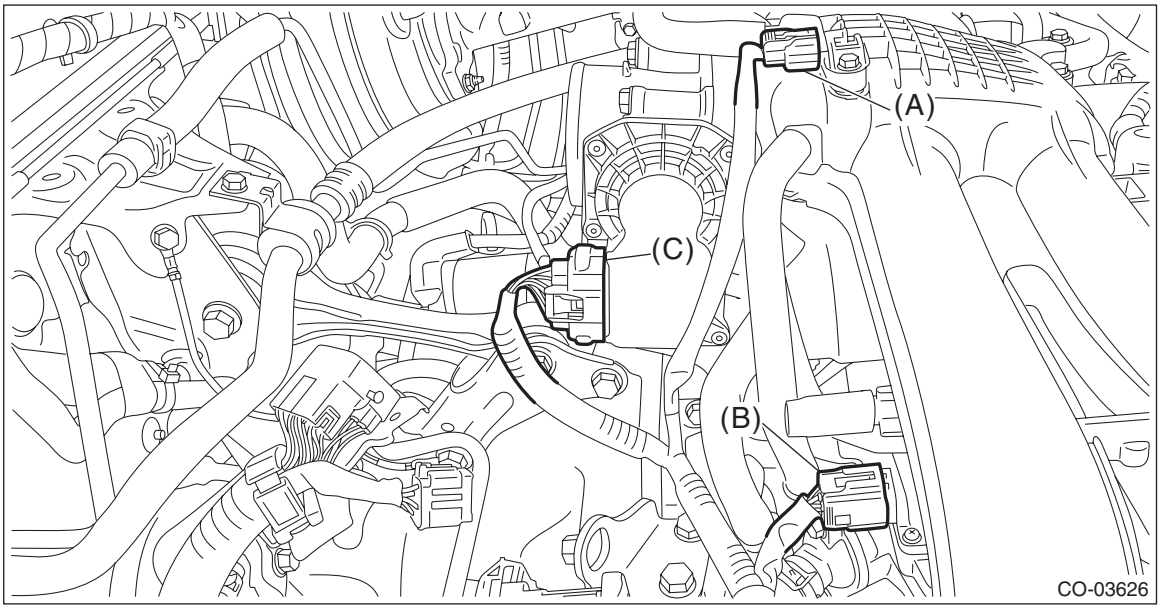


4) Install the engine hanger to the cylinder block RH.

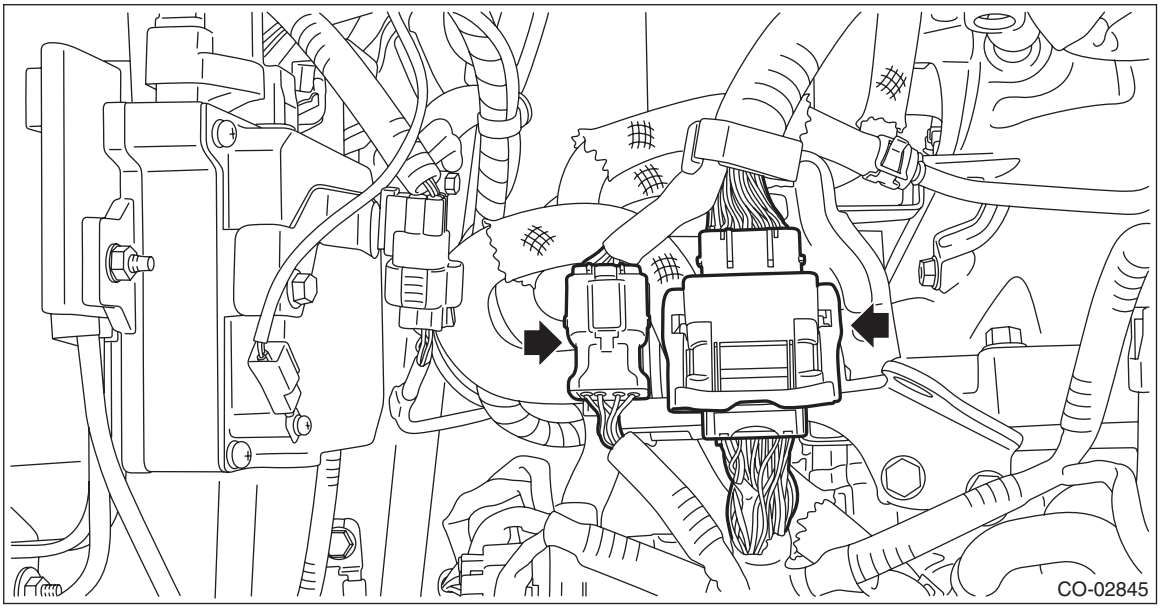
Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



5) Connect the connector (A) to the manifold absolute pressure sensor.
6) Connect the connector (B) to the throttle position sensor.
7) Connect the connector (C) to the EGR control valve.

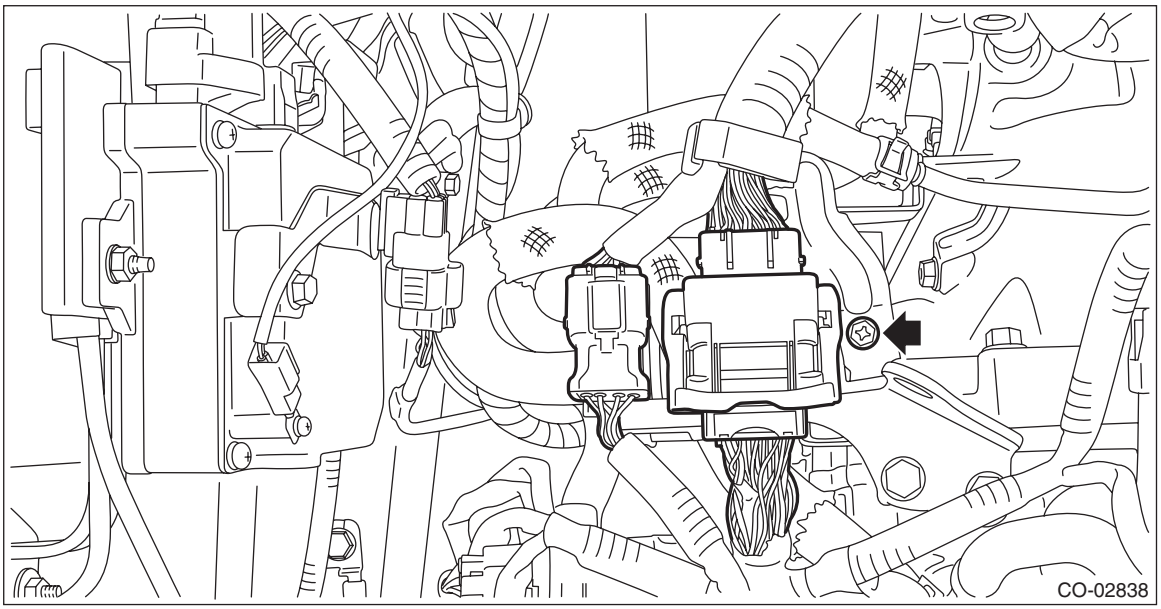


8) Connect the engine harness connector.
(1) Connect the bulkhead harness connector to the engine harness connector (black) and engine harness connector (brown).



(2) Install the bolt which secures the bulkhead harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



9) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
10) Lift up the vehicle.
11) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
12) Lower the vehicle.
13) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
14) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

- **HEV model**

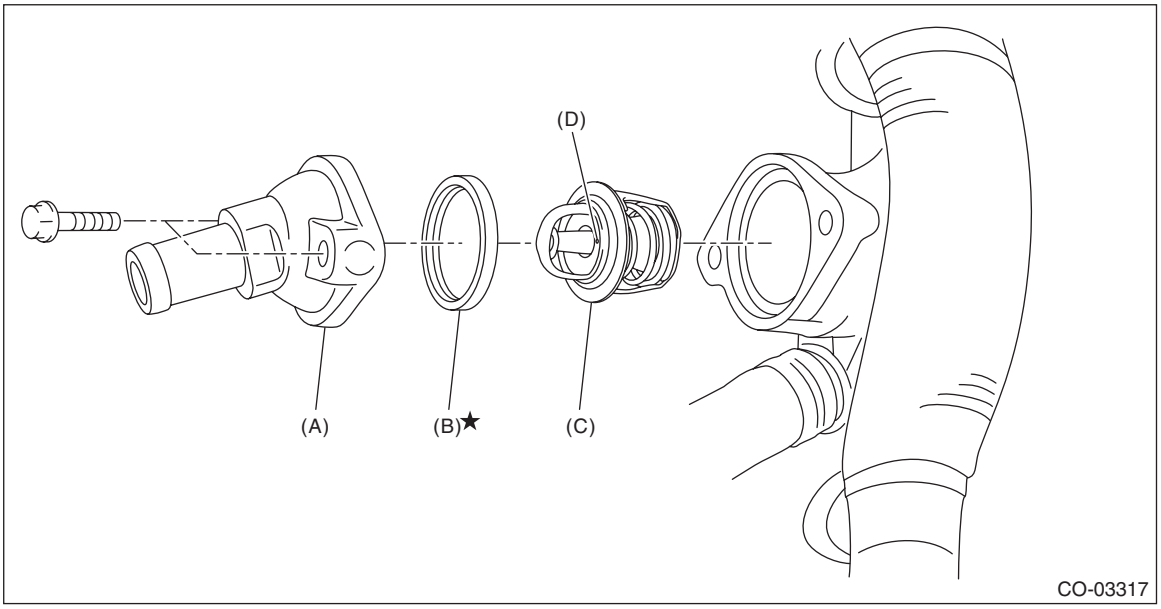
1) Install a gasket to thermostat.

NOTE:
Use a new gasket.

2) Install the thermostat and thermostat cover.

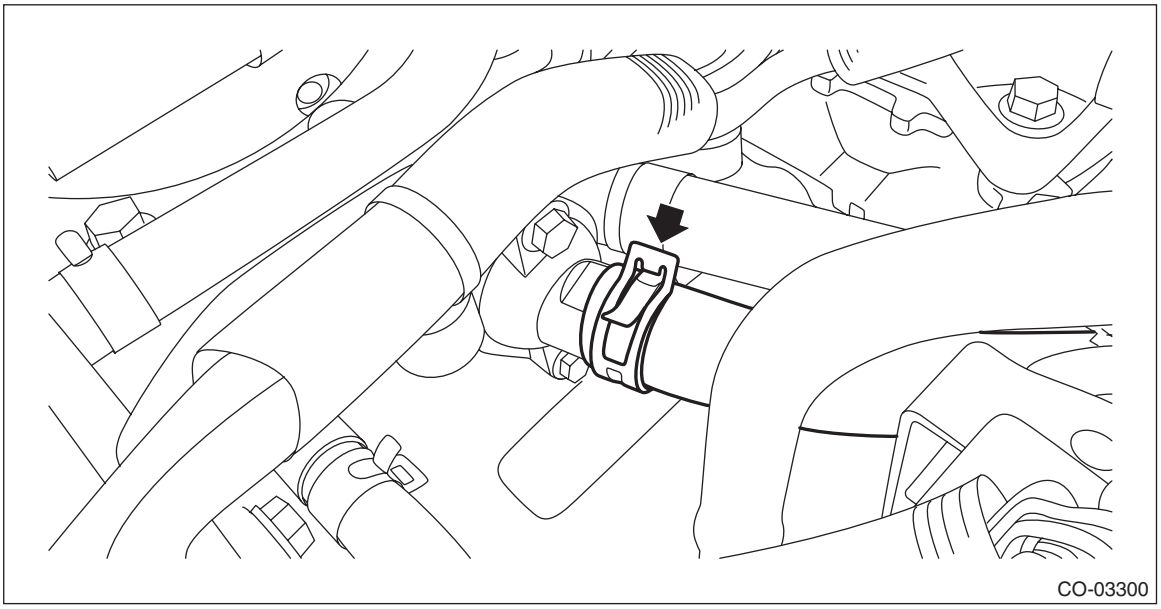
NOTE:
Install the parts with the air vent hole facing upward.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



(A) Thermostat cover (B) Gasket (C) Thermostat
(D) Air vent hole

3) Connect the engine coolant hose to the thermostat cover.



4) Install the intake manifold. <Ref. to FU(H4DO(HEV))-26, INSTALLATION, Intake Manifold.>
5) Install the collector cover.
6) Lift up the vehicle.

7) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
8) Lower the vehicle.
9) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
10) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

C: INSPECTION

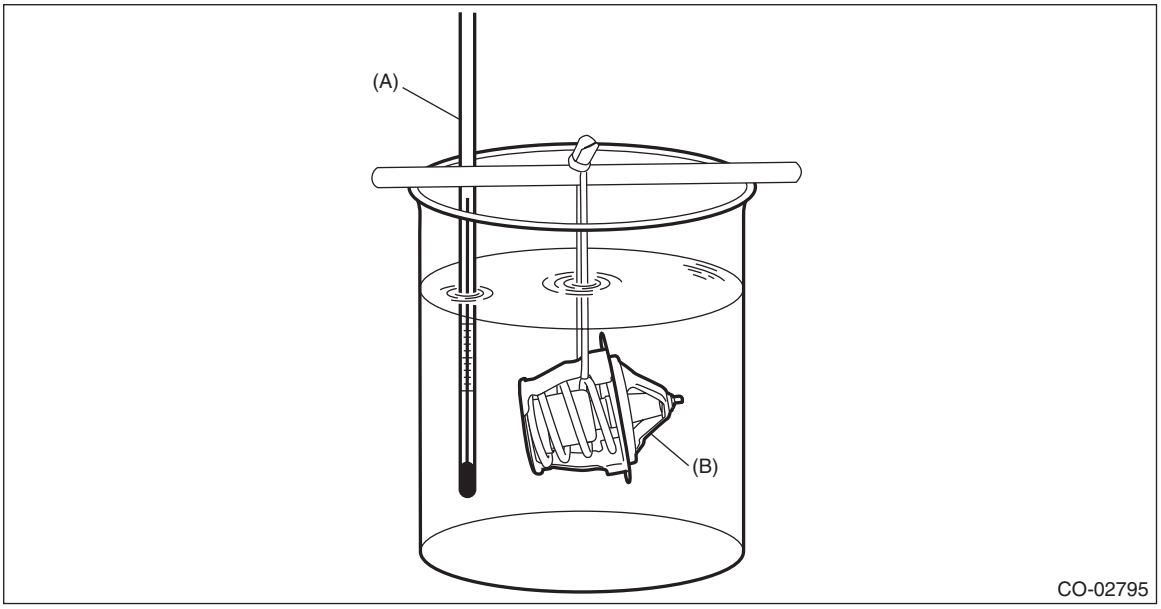
1) Check that the thermostat does not have deformation, cracks or damage.
2) Check that the thermostat valve closes completely at an ambient temperature.
3) Immerse the thermostat and a thermometer in water. Raise water temperature gradually, and check the temperature and valve lift when the valve begins to open and when the valve is fully opened. Replace the thermostat if faulty.

NOTE:
- During the test, agitate the water for even temperature distribution.
- Leave the thermostat in the boiling water for five minutes or more before measuring the valve lift.
- Hold the thermostat with a wire or the like to avoid contacting with container bottom.

Starting temperature to open:
Engine side
Gasoline engine model
90 — 94°C (194 — 201°F)
HEV model
87 — 91°C (189 — 196°F)
CVTF cooler (with warmer feature) side
48 — 52°C (118 — 126°F)

Full open temperature:
Engine side
Gasoline engine model
100°C (212°F)
HEV model
98°C (208°F)
CVTF cooler (with warmer feature) side
63°C (145°F)

Total valve lift:
Engine side
8.0 mm (0.315 in) or more
CVTF cooler (with warmer feature) side
6.0 mm (0.236 in) or more



(A) Thermometer
(B) Thermostat

7. Radiator

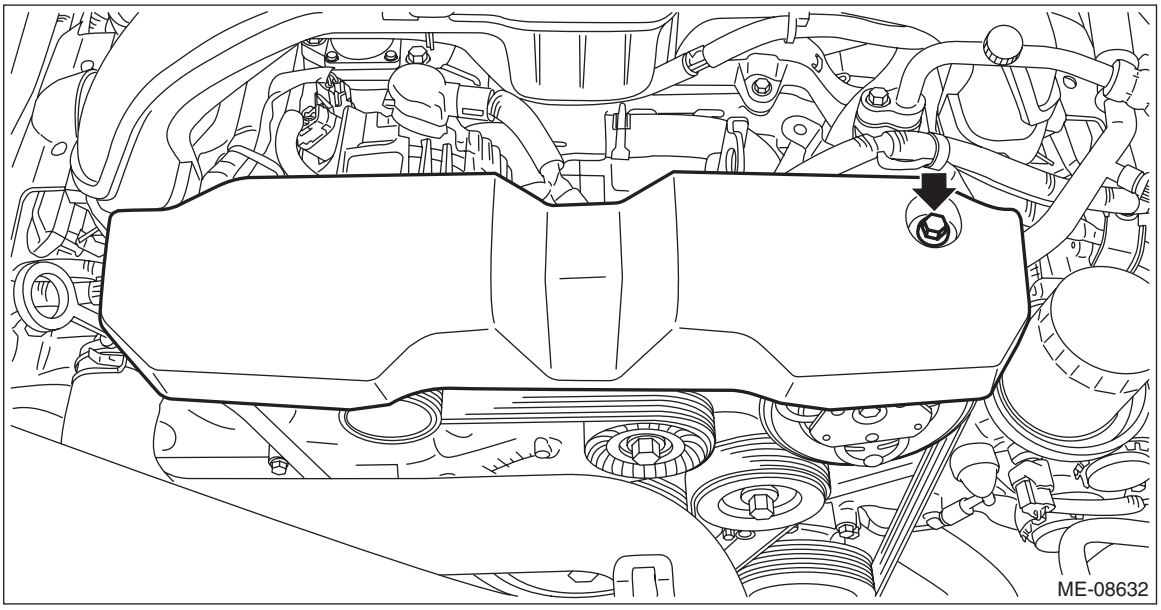
A: REMOVAL

CAUTION:
The radiator is pressurized when the engine and radiator are hot. Wait until engine and radiator cool down before working on the radiator.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

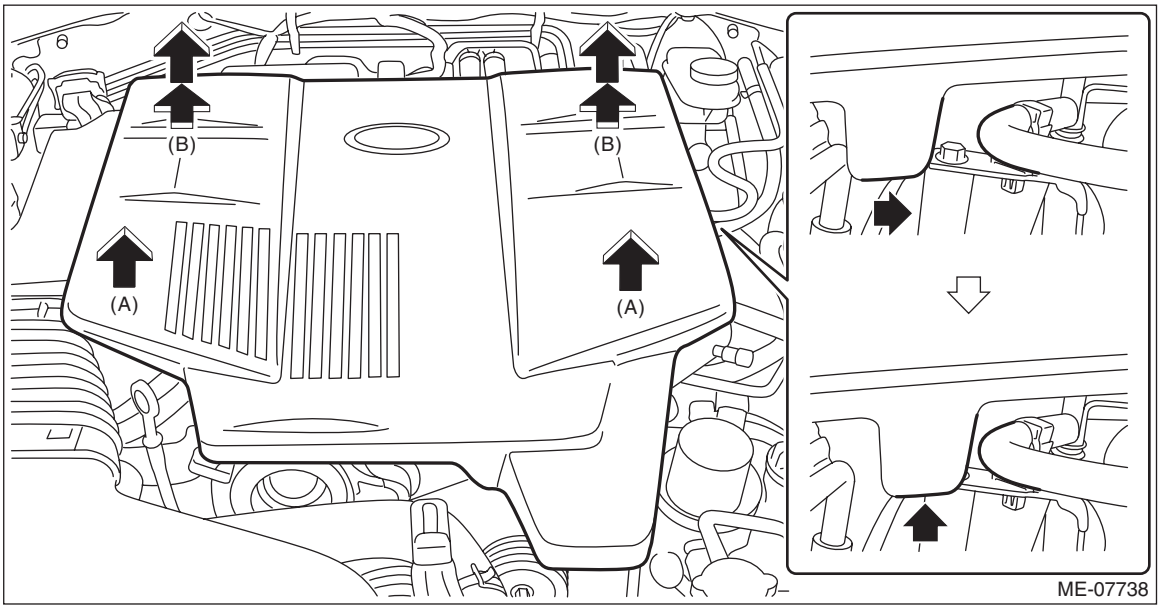
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the V-belt covers. (Gasoline engine model)



3) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

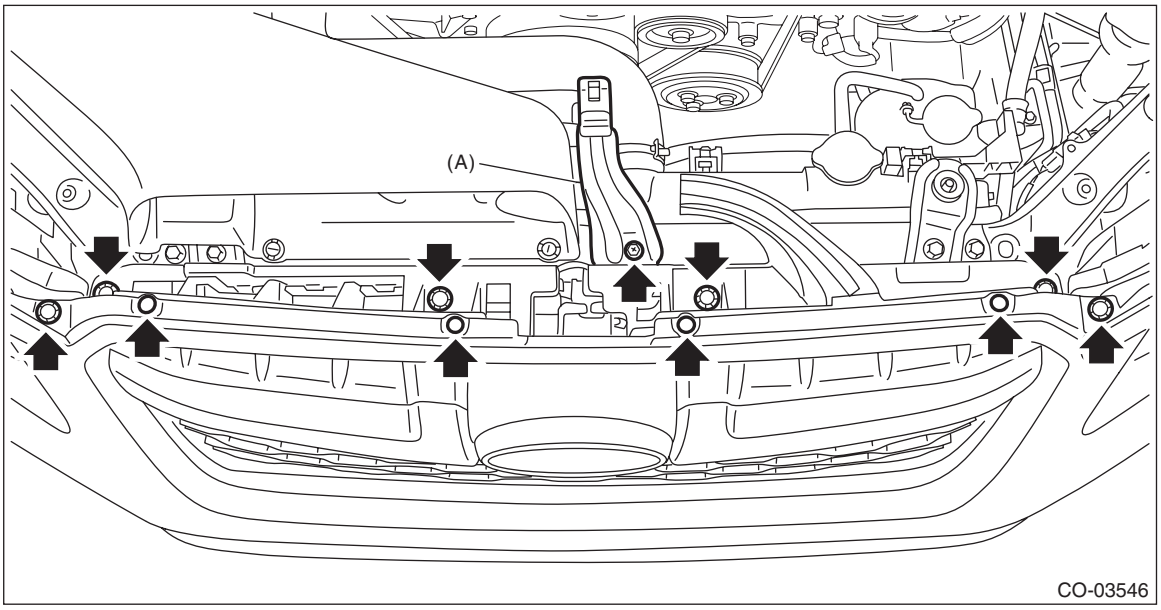
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



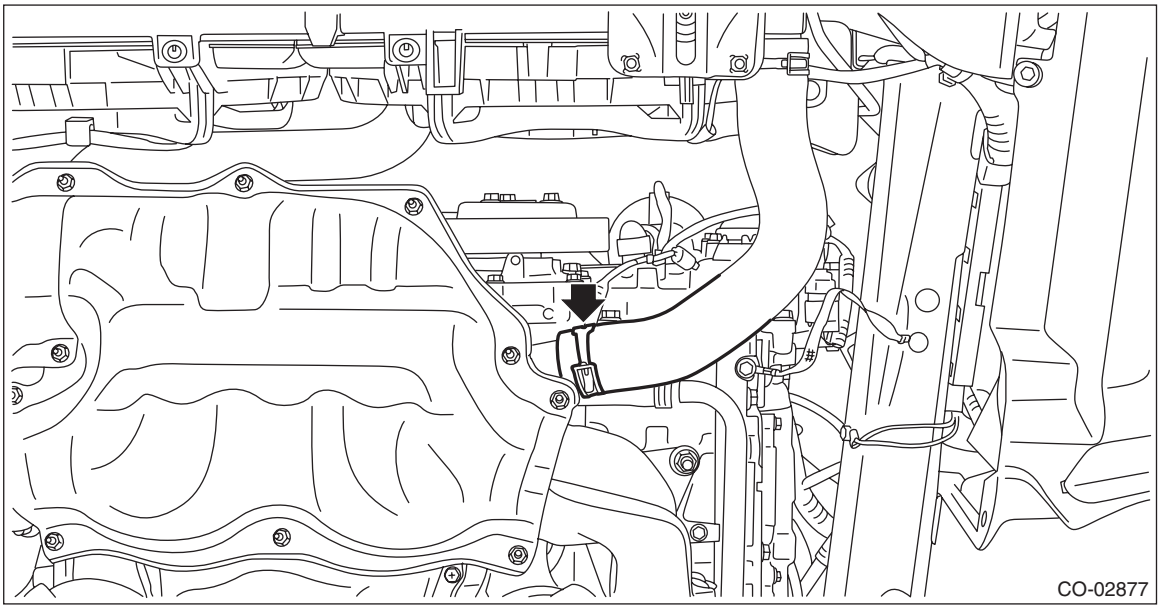
4) Remove the grille bracket.

NOTE:
Remove the ten clips.

5) Remove the bolts, and remove the bracket - plate (A).

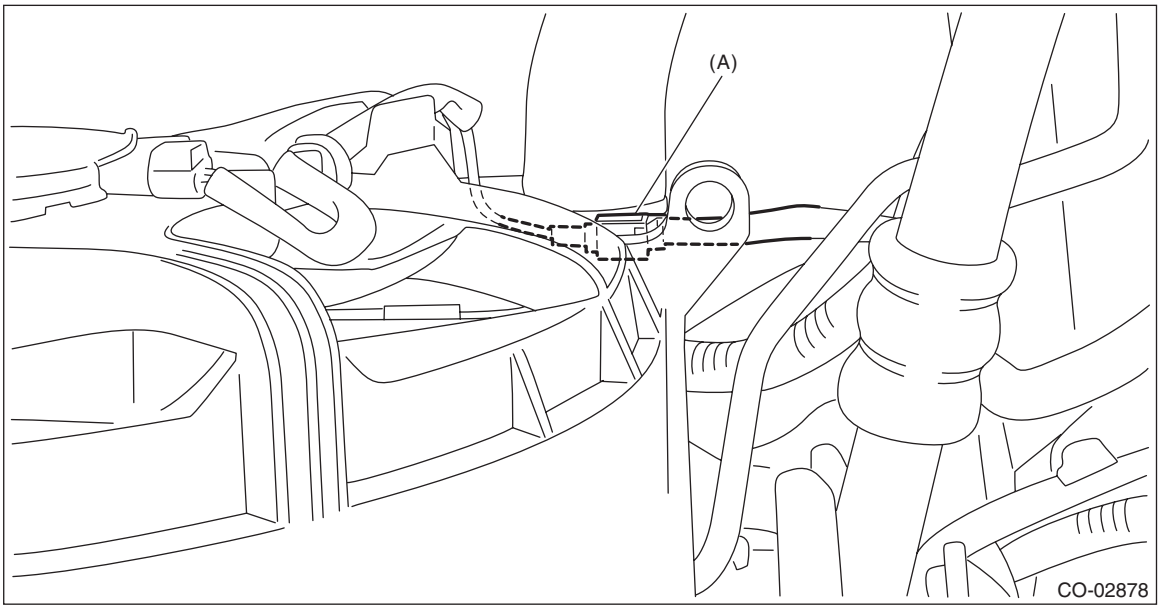


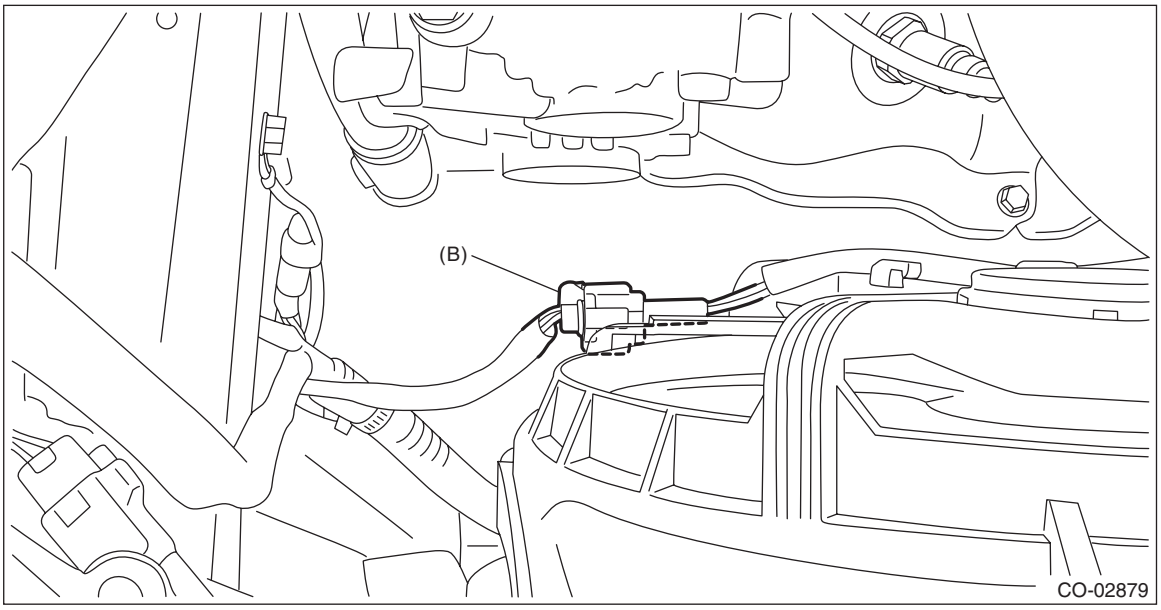
6) Lift up the vehicle.
7) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
8) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
9) Disconnect the radiator outlet hose from thermostat cover.



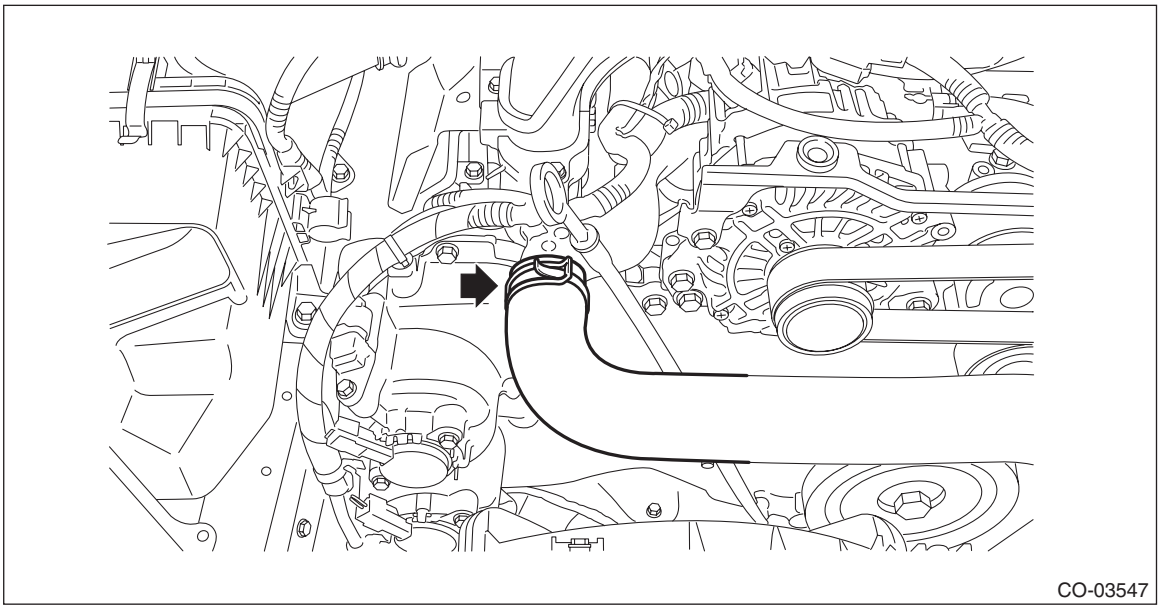
10) Lower the vehicle.
11) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.> <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
12) Remove the air intake boot No. 1. (HEV model) <Ref. to IN(H4DO(HEV))-10, AIR INTAKE BOOT NO. 1, REMOVAL, Air Intake Boot.>
13) Remove the reservoir tank. <Ref. to CO(H4DO(w/o HEV))-96, REMOVAL, Reservoir Tank.>

14) Disconnect the connector (A) from the main fan motor assembly and the connector (B) from the sub fan motor assembly.

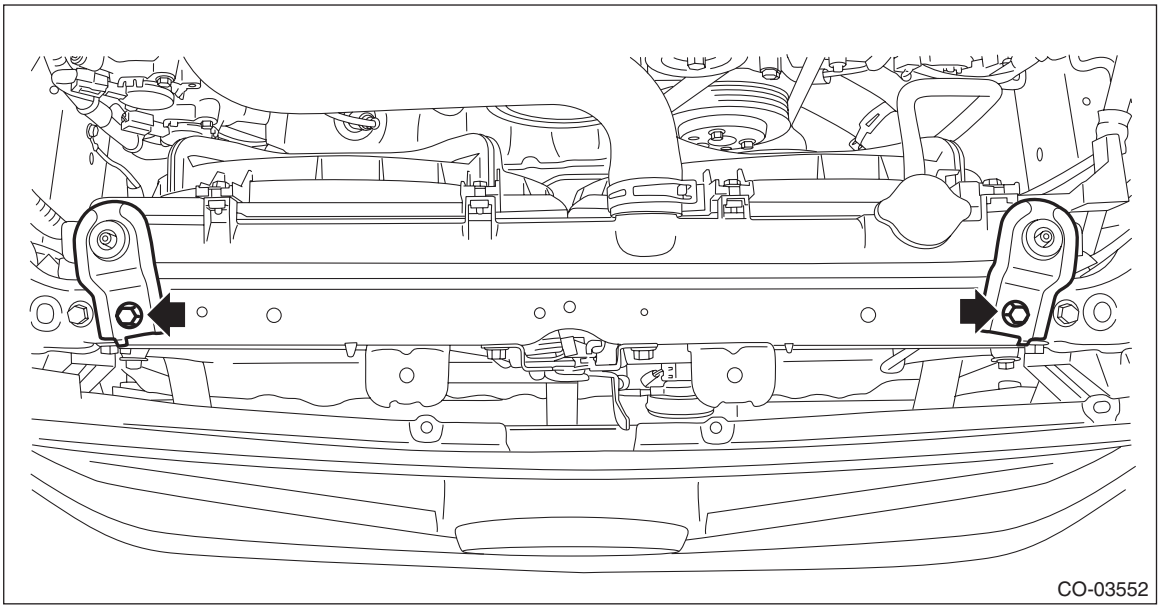




15) Disconnect the radiator inlet hose from the water pipe assembly.

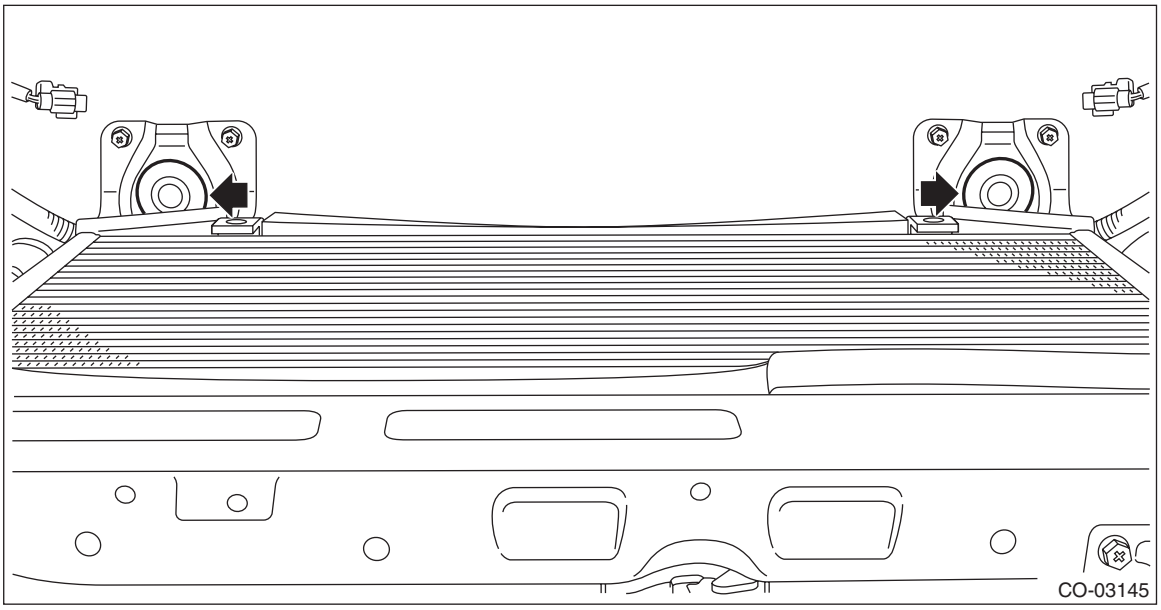


16) Remove the radiator upper brackets.



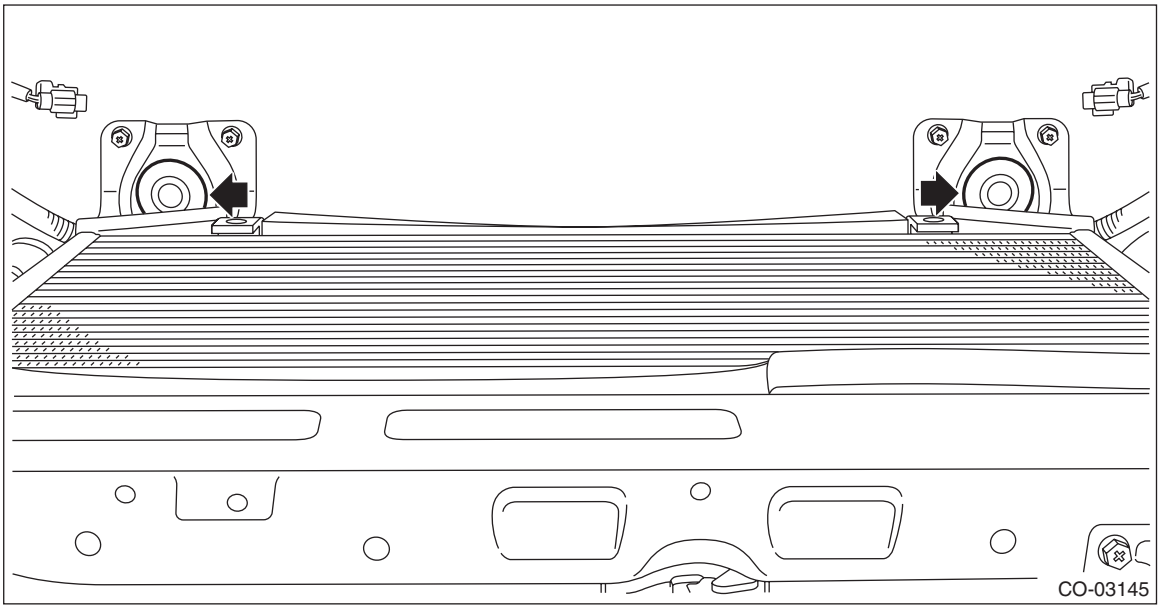
17) Remove the radiator from vehicle.

18) Remove the radiator lower cushion from the radiator lower bracket.



B: INSTALLATION

1) Attach the radiator lower cushion to the radiator lower bracket.

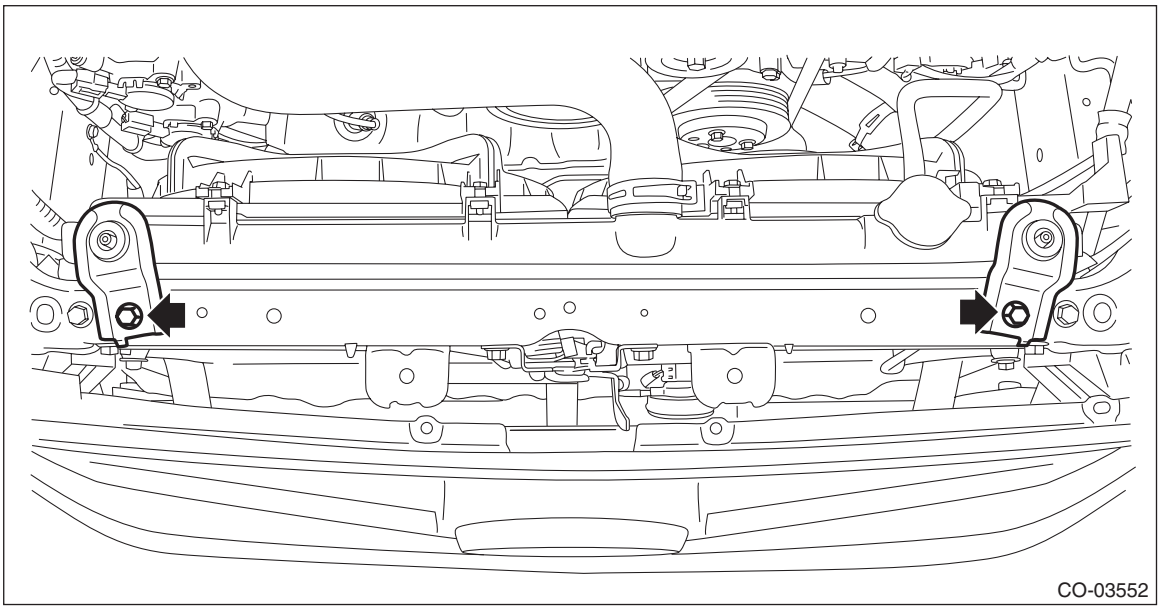


2) Install the radiator to vehicle.

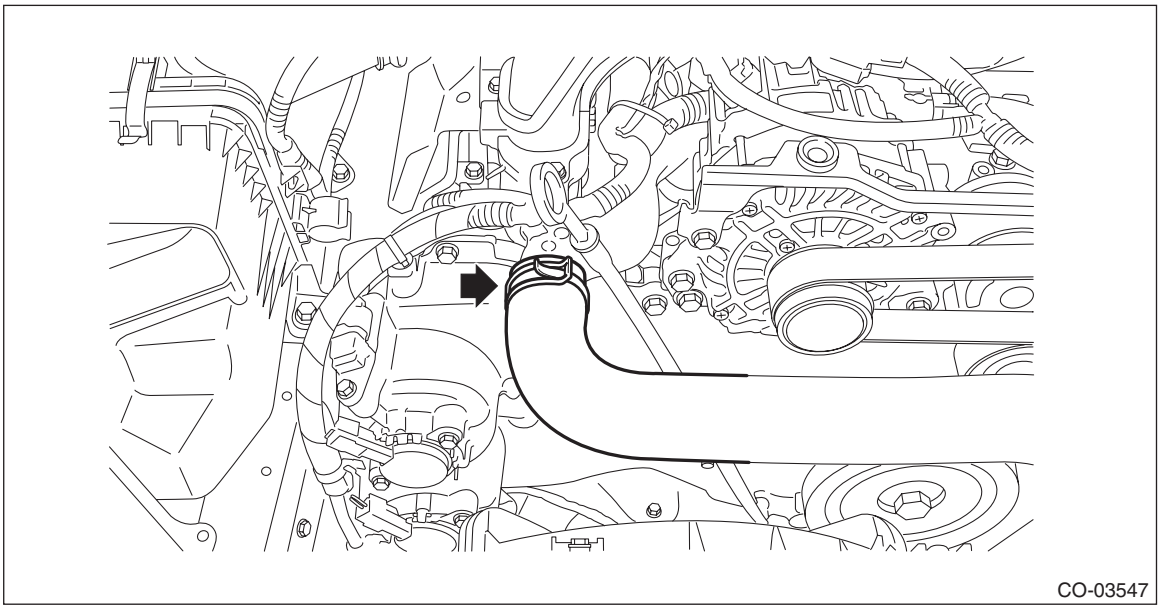
NOTE:
Make pins on the lower side of radiator be fitted into the radiator lower cushions.

3) Install the radiator upper brackets.

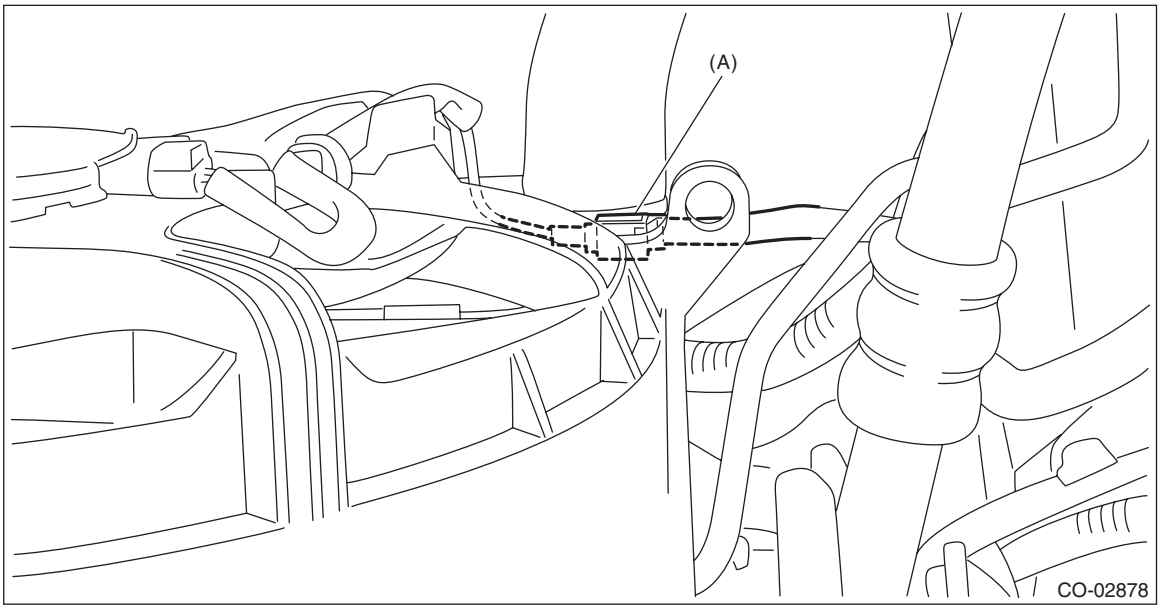
Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)

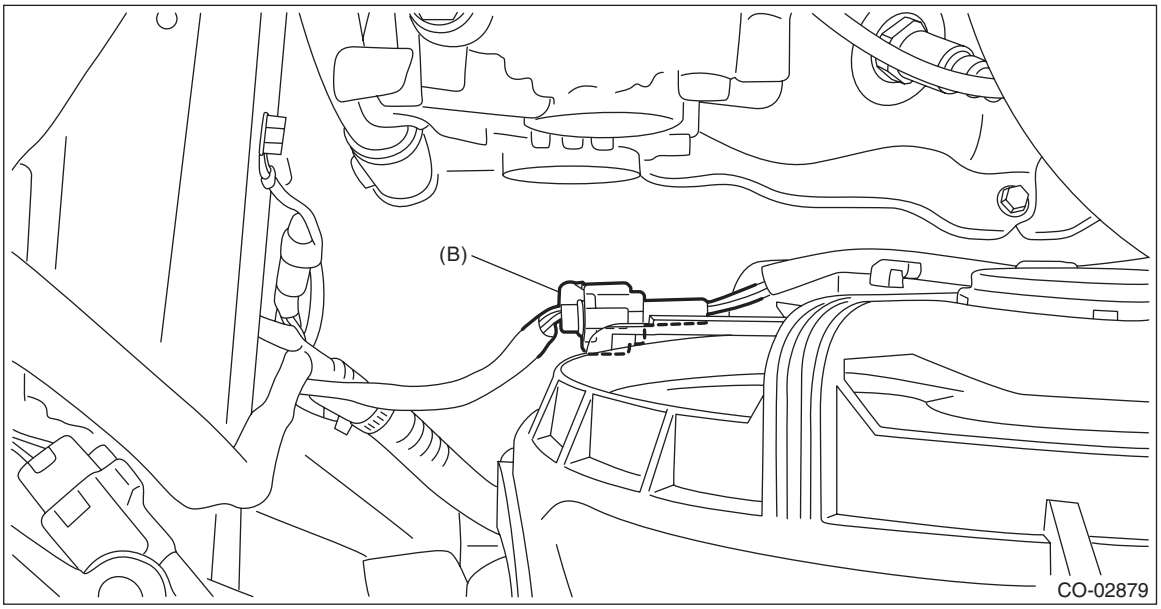

CO-03552

4) Connect the radiator inlet hose to the water pipe assembly.


CO-03547

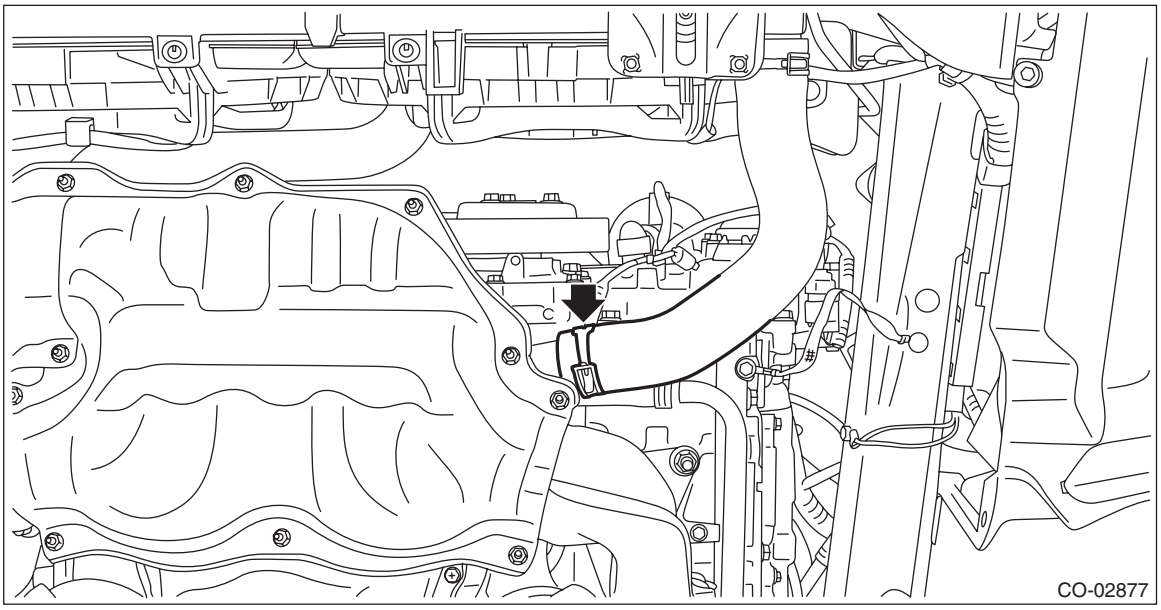
5) Connect the connector (A) to the main fan motor assembly and the connector (B) to the sub fan motor assembly.





6) Install the reservoir tank. <Ref. to CO(H4DO(w/o HEV))-96, INSTALLATION, Reservoir Tank.>
7) Install the air intake boot No. 1. (HEV model) <Ref. to IN(H4DO(HEV))-13, AIR INTAKE BOOT NO. 1, INSTALLATION, Air Intake Boot.>
8) Install the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, INSTALLATION, Air Intake Duct.> <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
9) Lift up the vehicle.

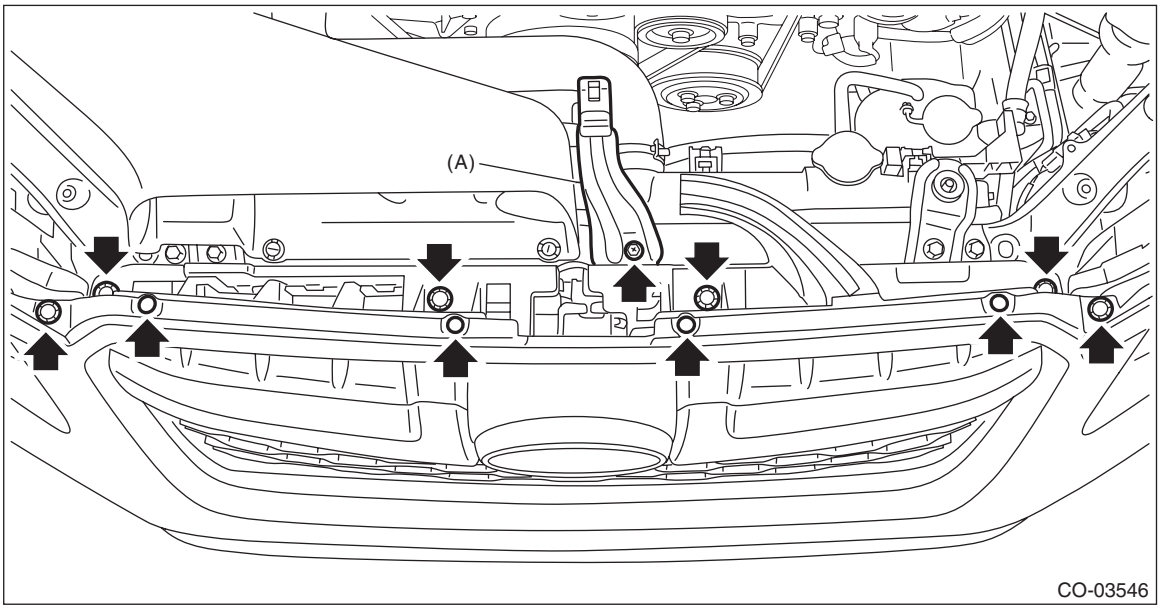
10) Connect the radiator outlet hose to thermostat cover.



11) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
12) Lower the vehicle.
13) Attach the bracket - plate (A).

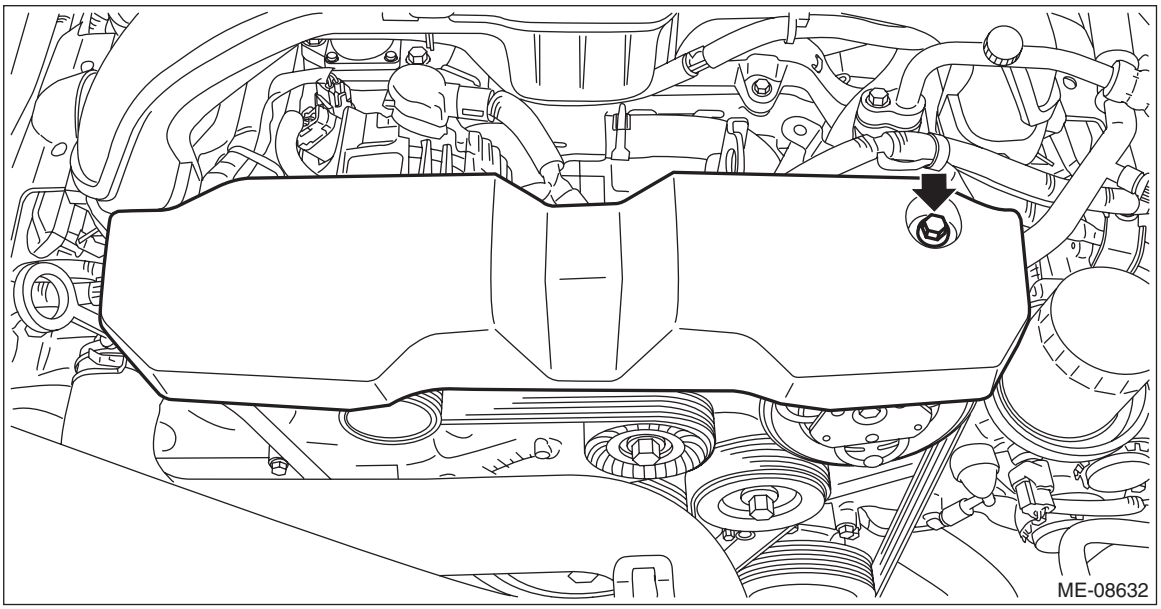
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

14) Attach the grille bracket.



15) Install the V-belt cover. (Gasoline engine model)

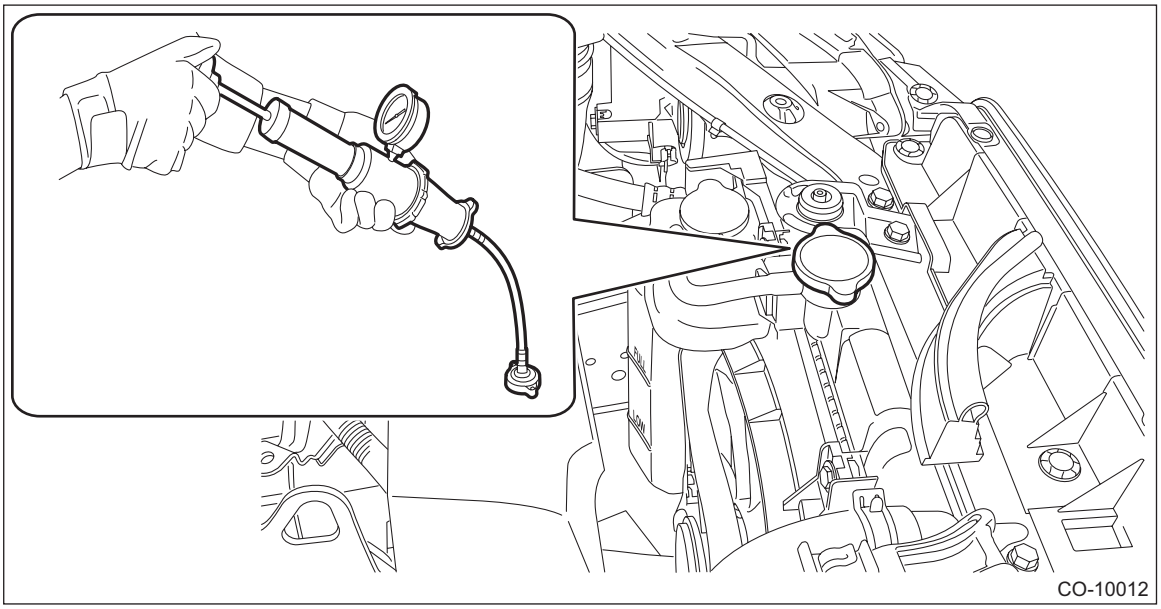
Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



16) Install the collector cover. (HEV model)
17) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
18) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

C: INSPECTION

1) Check that the radiator does not have deformation, cracks or damage.
2) Check that the hose has no cracks, damage or loose part.
3) Remove the radiator cap, fill the radiator with engine coolant, and then install the radiator cap tester to the filler neck of radiator.



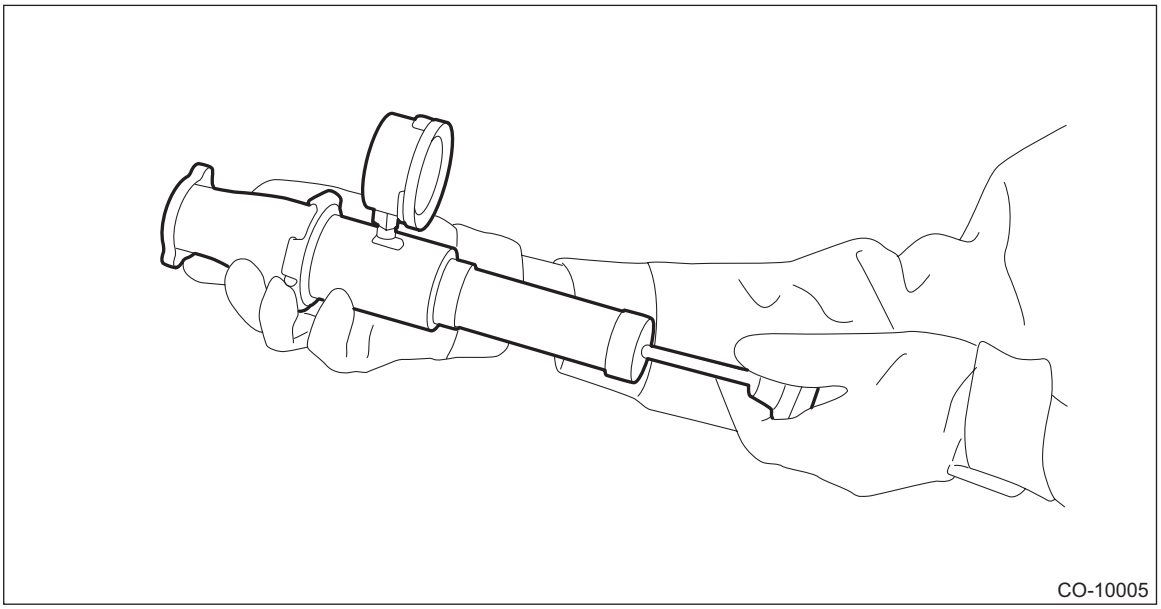
4) Apply a pressure of 157 kPa (1.6 kg/cm^2, 23 psi) to the radiator and check the following points:
- Leakage from the radiator or its vicinity
- Leakage from the hose or its connections

CAUTION:
- **Engine should be turned off.**
- **Wipe engine coolant from check points in advance.**
- **Be careful not to deform the filler neck of radiator when installing and removing the radiator cap tester.**
- **Be careful of engine coolant from spurting out when removing the radiator cap tester.**

8. Radiator Cap

A: INSPECTION

1) Check that the radiator cap does not have deformation, cracks or damage.
2) Attach the radiator cap tester to radiator cap.



3) Increase pressure until the radiator cap tester gauge needle stops. Radiator cap is functioning properly if it holds the service limit pressure for 5 — 6 seconds. Replace the radiator cap if its valve opens at less than the service limit.

CAUTION:
Be sure to remove foreign matter and rust from the cap in advance. Otherwise, results of pressure test will be incorrect.

Standard:
93 — 123 kPa (0.95 — 1.25 kg/cm^2, 14 — 18 psi)

Service limit:
83 kPa (0.85 kg/cm^2, 12 psi)

9. Radiator Main Fan and Fan Motor

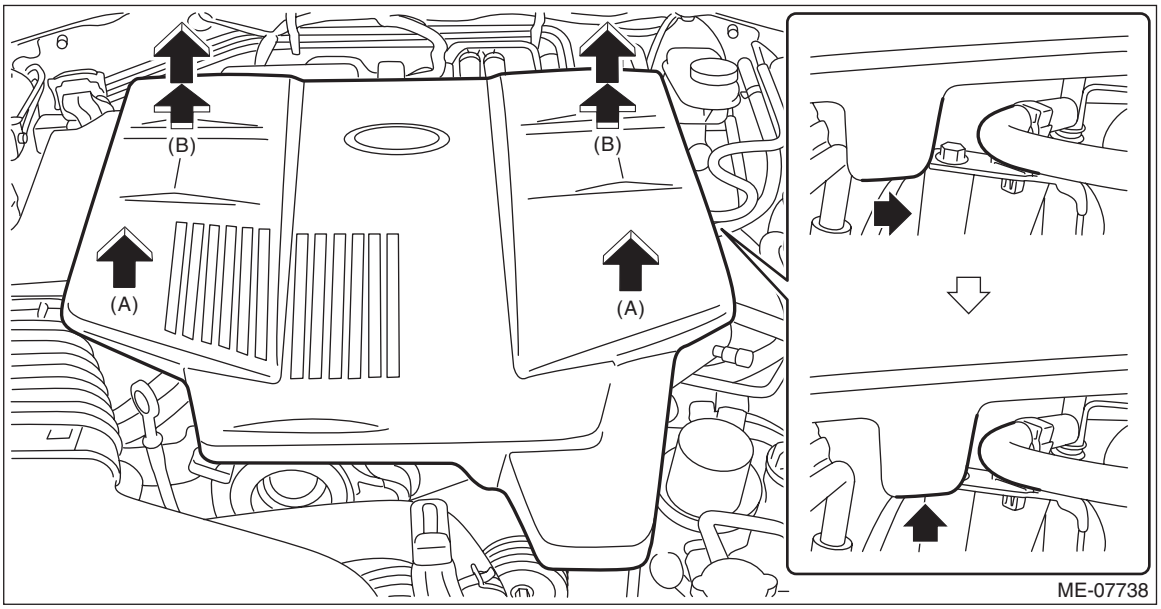
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

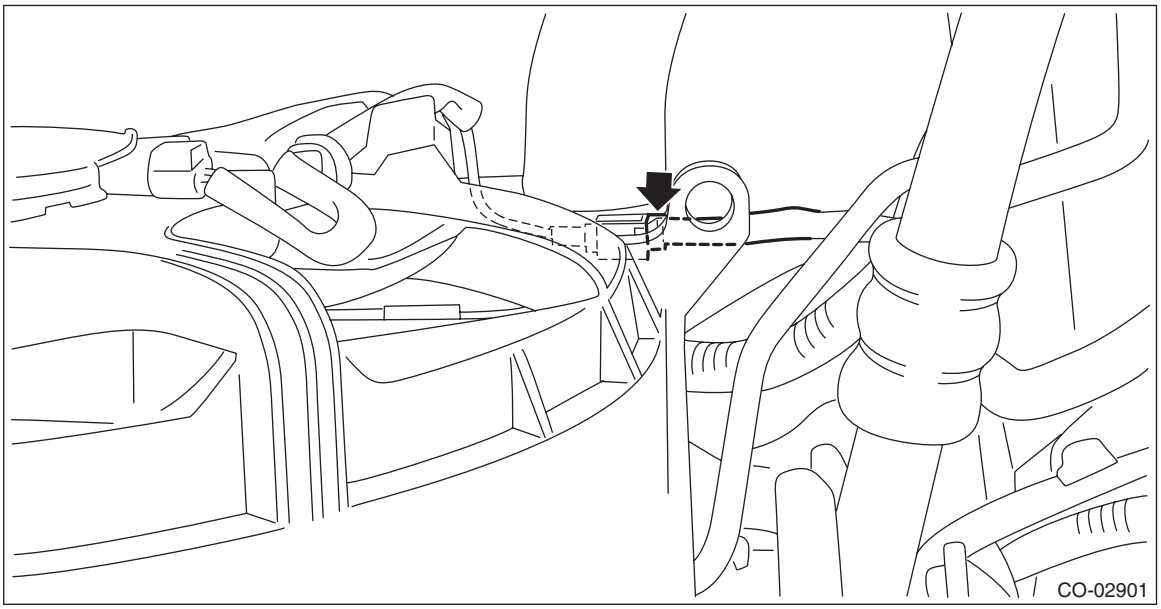
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

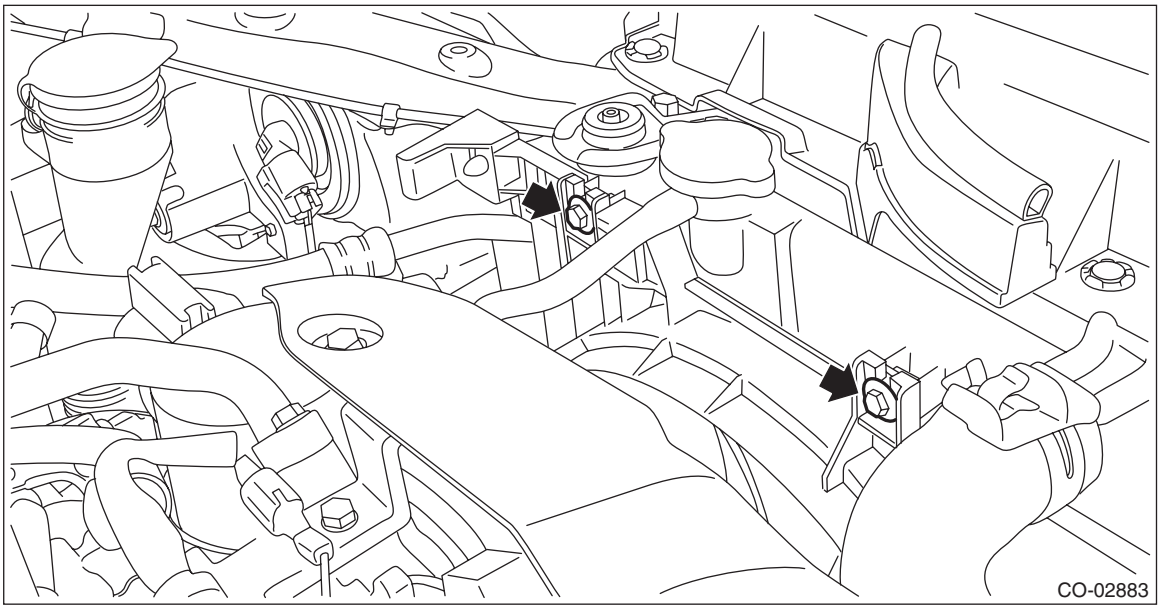
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the reservoir tank. <Ref. to CO(H4DO(w/o HEV))-96, REMOVAL, Reservoir Tank.>
4) Disconnect the connector from the main fan motor assembly.



5) Remove the bolts which hold the radiator main fan shroud onto the radiator.



6) Remove the radiator main fan and fan motor from the vehicle.

B: INSTALLATION

Install in the reverse order of removal.

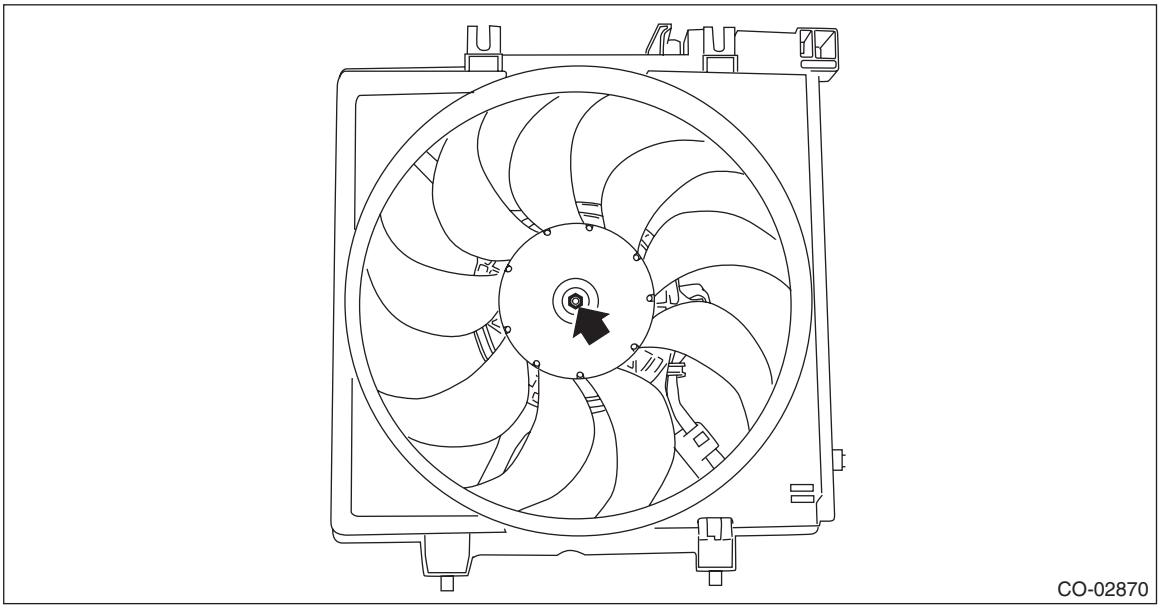
CAUTION:
Confirm that the radiator hose is securely connected.

NOTE:
If the installation of the radiator main fan and fan motor is difficult, attempt installation after loosening the bolts which hold the radiator sub fan shroud to the radiator.

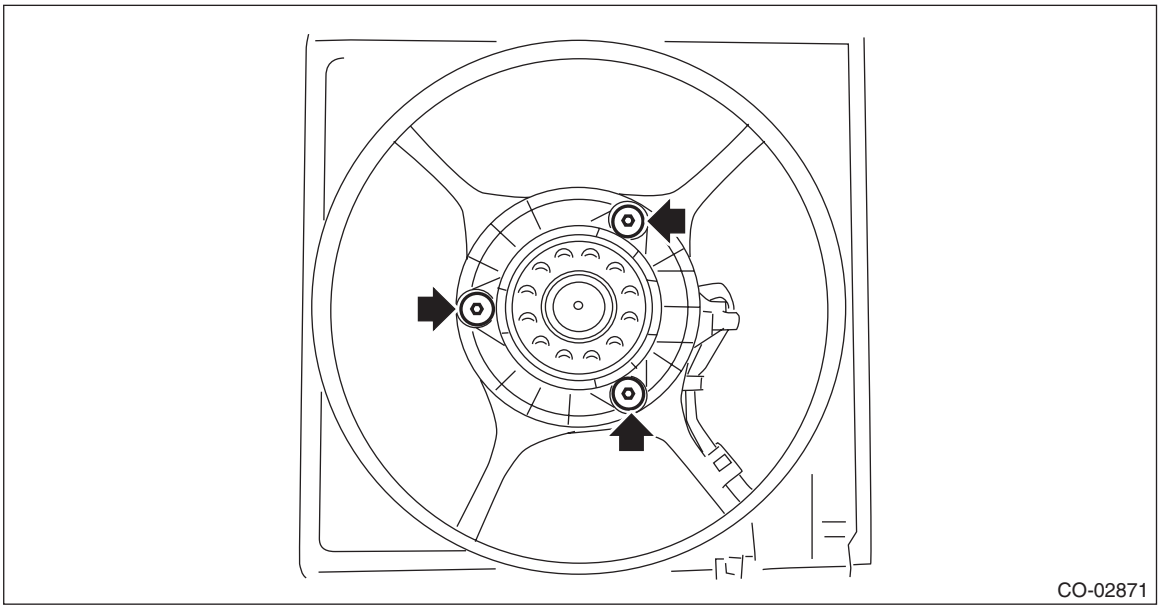
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

C: DISASSEMBLY

1) Remove the clip which holds the main fan motor connector onto the radiator main fan shroud.
2) Disconnect the radiator main fan from the main fan motor.



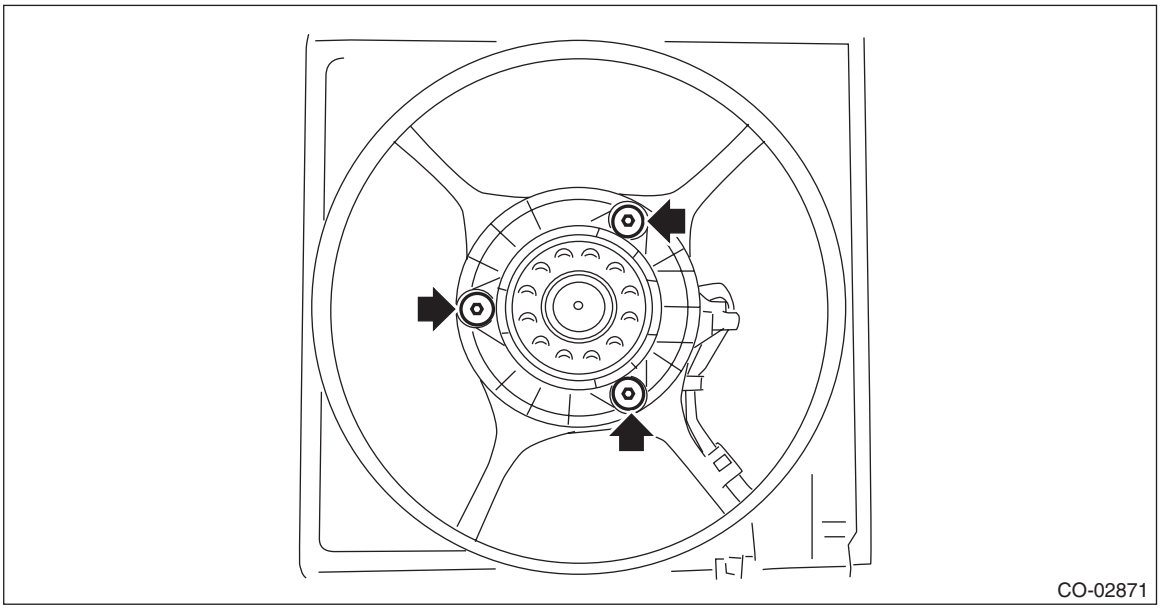
3) Disconnect the main fan motor from the radiator main fan shroud.



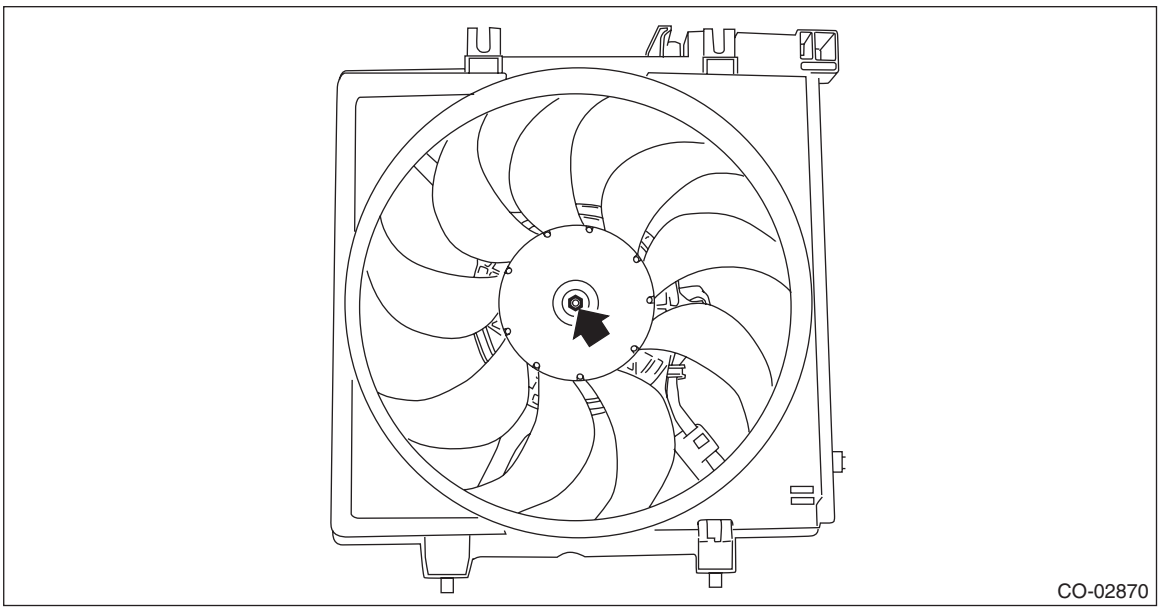
D: ASSEMBLY

Assemble in the reverse order of disassembly.

Tightening torque:
4.41 N·m (0.45 kgf-m, 3.25 ft-lb)



Tightening torque:
3.4 N·m (0.3 kgf-m, 2.5 ft-lb)



E: INSPECTION

Check that the radiator main fan, radiator main fan shroud and main fan motor assembly do not have deformation, cracks or damage.

10.Radiator Sub Fan and Fan Motor

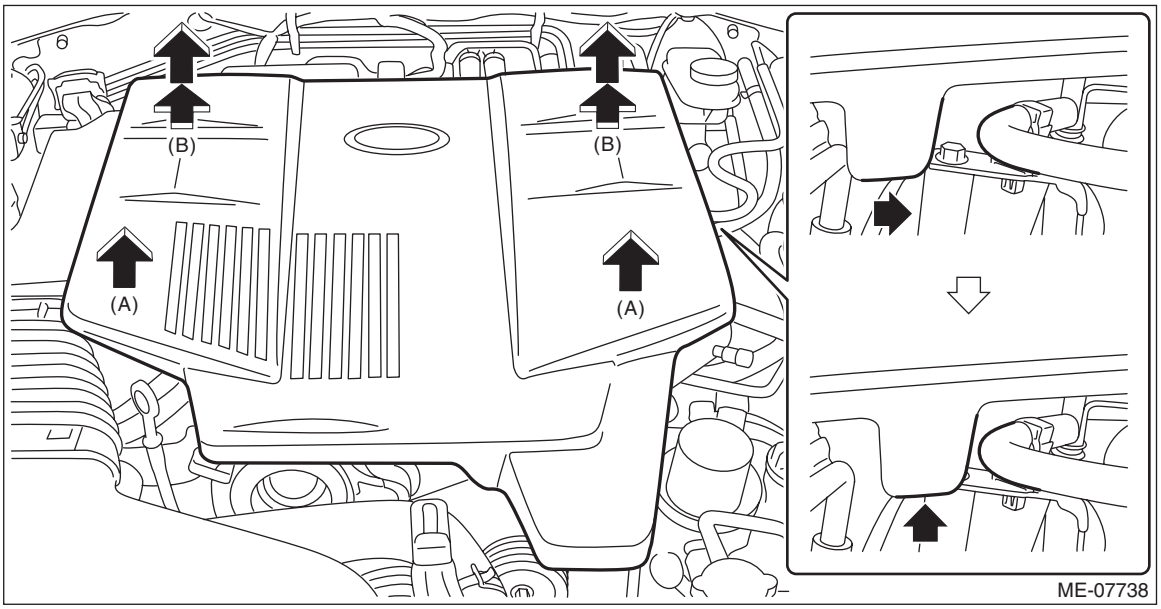
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

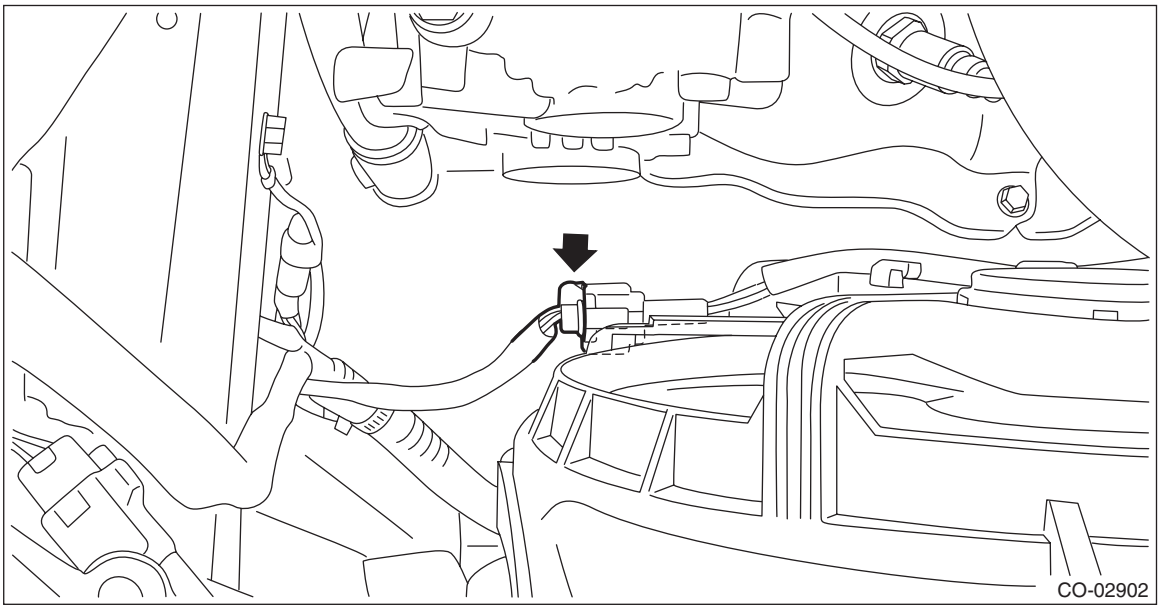
2) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

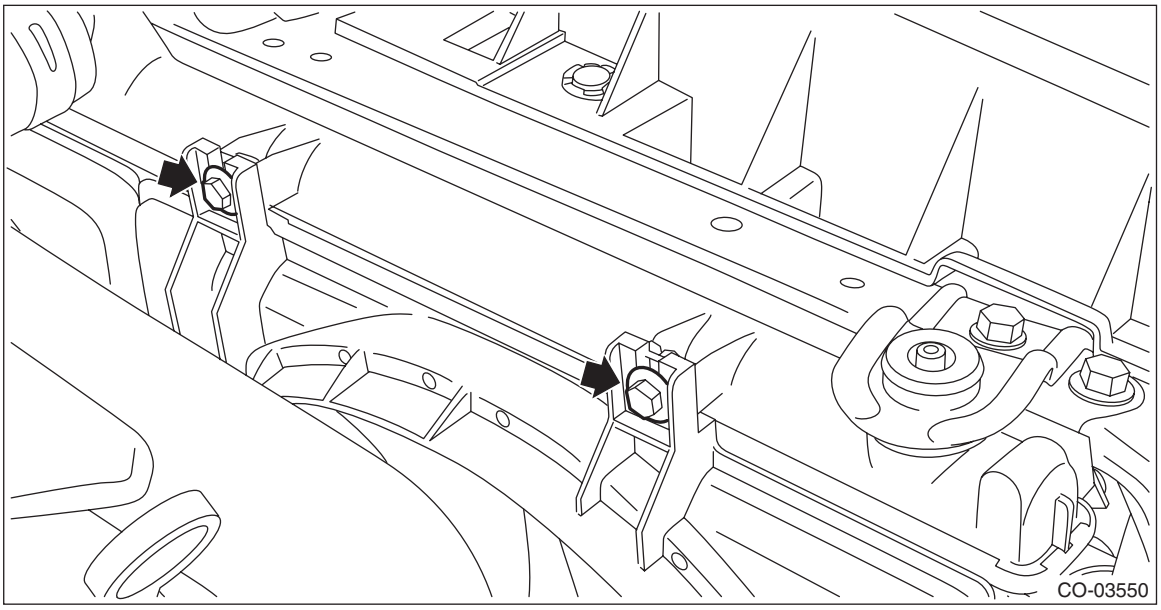


3) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.> <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>

4) Disconnect the connector from the sub fan motor assembly.



5) Remove the bolts which hold the radiator sub fan shroud onto the radiator.



6) Remove the radiator sub fan and fan motor from vehicle.

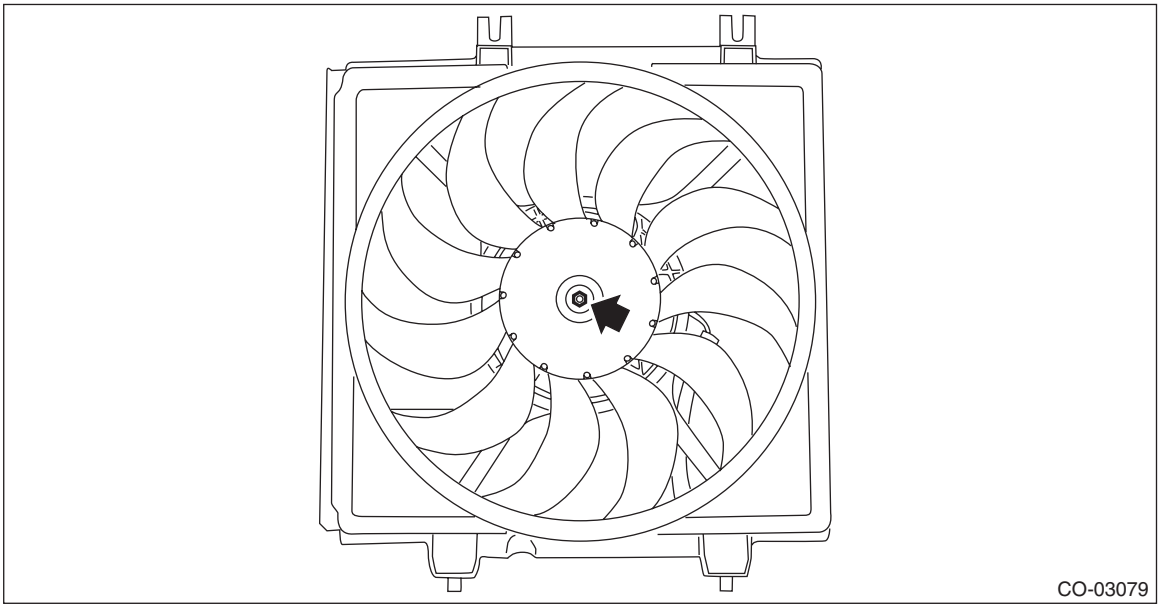
B: INSTALLATION

CAUTION:
Confirm that the radiator hose is securely connected.
Install in the reverse order of removal.

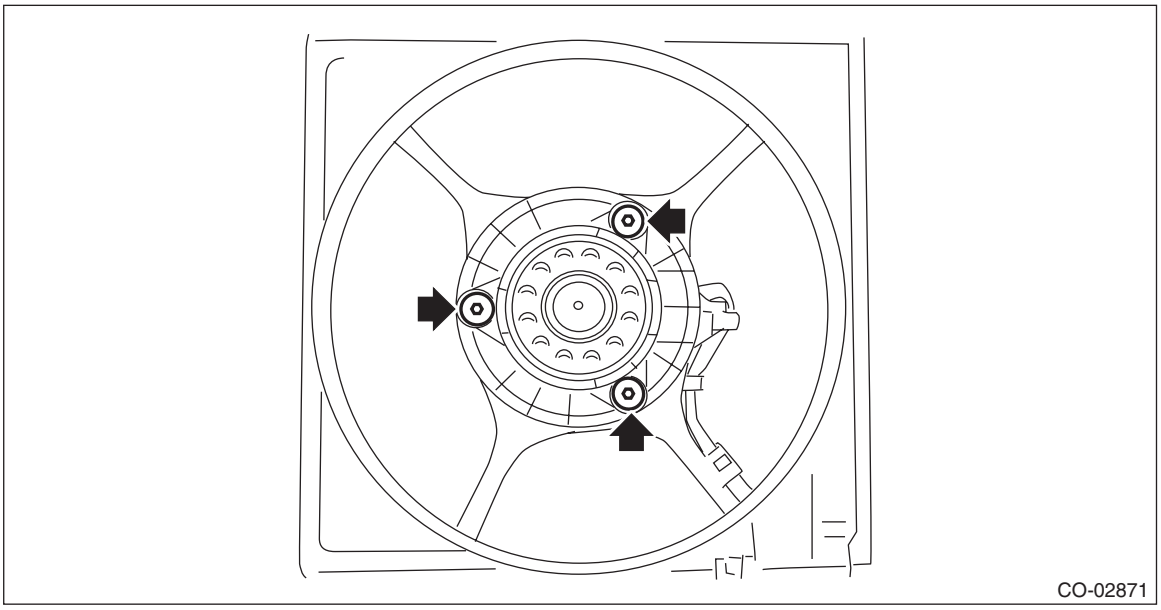
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

C: DISASSEMBLY

1) Remove the clip which holds the sub fan motor connector onto the radiator sub fan shroud.
2) Disconnect the radiator sub fan from the sub fan motor.



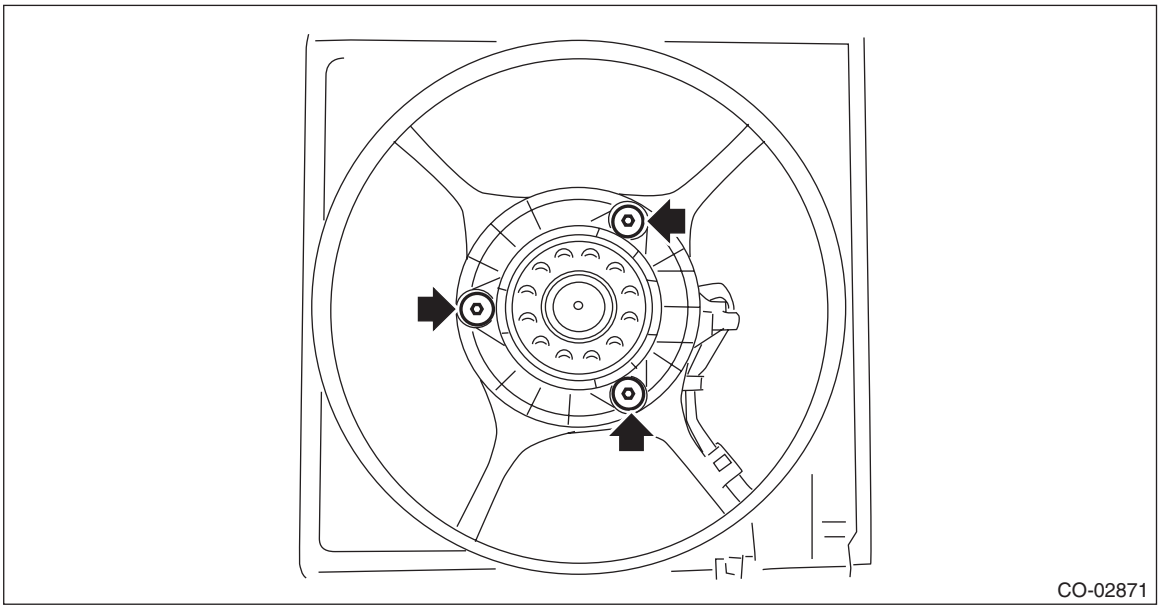
3) Disconnect the sub fan motor from the radiator sub fan shroud.



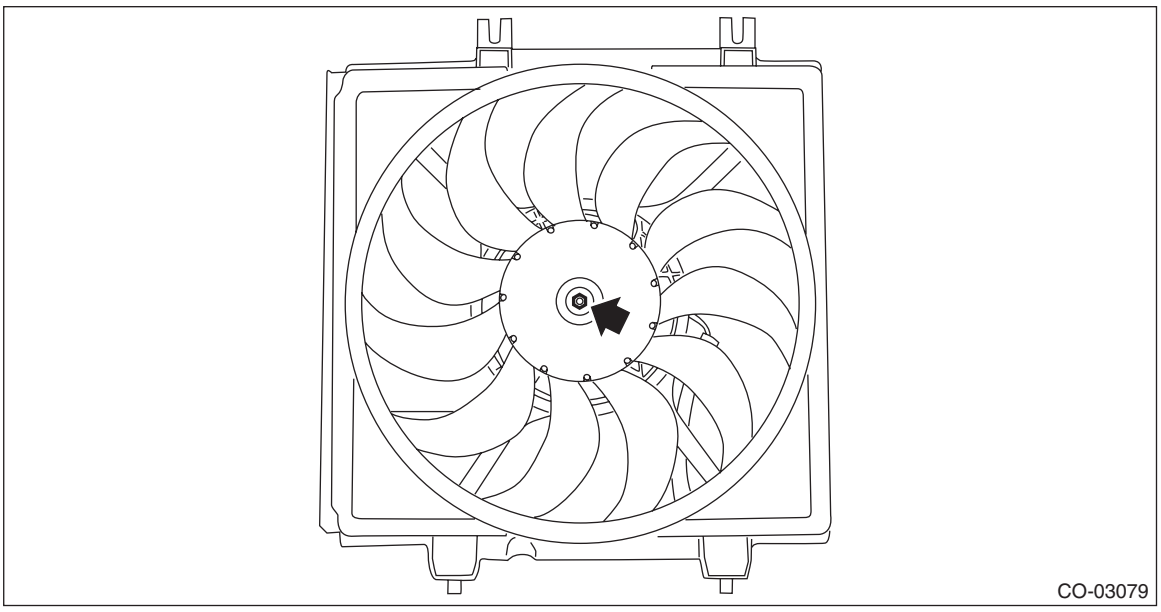
D: ASSEMBLY

Assemble in the reverse order of disassembly.

Tightening torque:
4.41 N·m (0.45 kgf-m, 3.25 ft-lb)



Tightening torque:
3.4 N·m (0.3 kgf-m, 2.5 ft-lb)



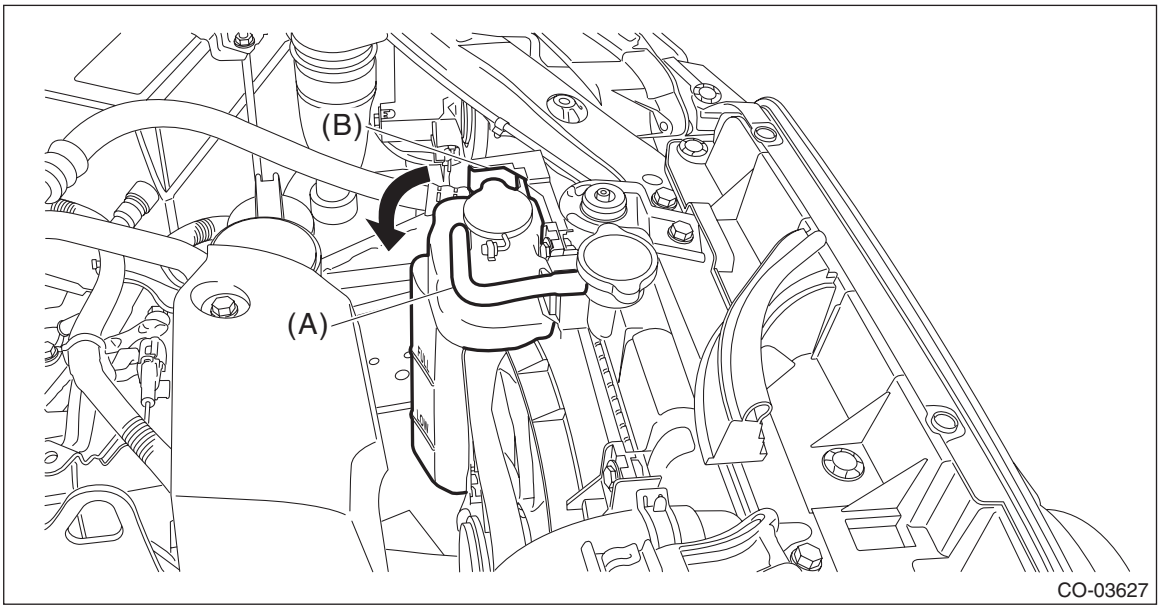
E: INSPECTION

Check that the radiator sub fan, radiator sub fan shroud and sub fan motor assembly do not have deformation, cracks or damage.

11.Reservoir Tank

A: REMOVAL

1) Disconnect the over flow hose (A) connected to the radiator filler neck from the reservoir tank.
2) Pull out the reservoir tank to the arrow direction while pushing the claw (B).



B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

1) Check that the reservoir tank does not have deformation, cracks or damage.
2) Make sure the over flow hoses are not cracked, damaged or loose.
3) Make sure the engine coolant level is between “FULL” and “LOW”.

12.Engine Cooling System Trouble in General

A: INSPECTION

Trouble	Possible cause	Corrective action
Over-heating	a. Insufficient engine coolant	Replenish engine coolant, inspect for leakage, and repair it if necessary.
	b. Defective thermostat	Replace.
	c. Malfunction of water pump	Replace.
	d. Clogged engine coolant passage	Clean.
	e. Improper ignition timing	Inspect and repair ignition control system. <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>
	f. Clogged or leaking radiator	Clean, repair or replace.
	g. Defective radiator cap	Replace.
	h. Improper engine oil in engine coolant	Replace the engine coolant. If ineffective, check, repair or replace engine components.
	i. Air/fuel mixture ratio too lean	Inspect and repair the fuel injection system. <Ref. to EN(H4DO w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, Basic Diagnostic Procedure.>
	j. Excessive back pressure in exhaust system	Clean or replace.
	k. Insufficient clearance between piston and cylinder	Adjust or replace.
	l. Slipping clutch	Repair or replace.
	m. Dragging brake	Adjust.
	n. Malfunction of radiator fan	Inspect the radiator fan relay, engine coolant temperature sensor or fan motor and replace them.
Over-cooling	a. Ambient temperature extremely low	Partly cover radiator front area.
	b. Defective thermostat	Replace.
Engine coolant leaks	a. Loosened or damaged connecting units on hoses	Repair or replace.
	b. Leakage from water pump	Replace.
	c. Leakage from water pipe	Repair or replace.
	d. Leakage around cylinder head gasket	Retighten cylinder head bolts or replace cylinder head gasket.
	e. Damaged or cracked cylinder head and cylinder block	Repair or replace.
	f. Damaged or cracked thermostat cover	Repair or replace.
	g. Leakage from radiator	Repair or replace.
Noise	a. Defective radiator fan	Replace.
	b. Defective water pump bearing	Replace water pump.
	c. Defective water pump mechanical seal	Replace water pump.

LUBRICATION

LU(H4DO(w/o HEV))

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5. Oil Pan and Strainer 16
6. Oil Pressure Switch 25
7. Engine Oil Filter 29
8. Oil Level Switch 31
9. Engine Lubrication System Trouble in General 73

1. General Description

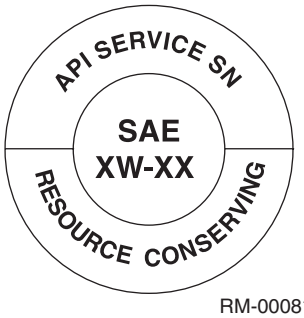
A: SPECIFICATION

Lubrication method					Forced lubrication
Oil pump	Pump type				Trochoid type
	Number of teeth	Inner rotor			11
		Outer rotor			12
	Outer rotor diameter × Thickness			mm (in)	77 × 12 (3.03 × 0.47)
	Performance (Oil temperature 120°C (248°F))	600 r/min	Discharge pressure	kPa (kg/cm^2, psi)	40 (0.4, 5.8)
			Discharge rate	L (US qt, Imp qt)/min	5.8 (6.1, 5.1) or more
		6,000 r/min	Discharge pressure	kPa (kg/cm^2, psi)	323 (3.3, 46.8)
			Discharge rate	L (US qt, Imp qt)/min	55 (58.1, 48.4) or more
	Relief valve working pressure (2-step relief)	1st opening pressure		kPa (kg/cm^2, psi)	150 (1.5, 21.7)
		Main opening pressure		kPa (kg/cm^2, psi)	570 (5.8, 82.6)
Oil filter	Filter type				Full-flow filter type
	Filtration area cm^2 (sq in)		Outer diameter: 68 mm (2.68 in) (black)		1,100 (171)
			Outer diameter: 67.4 mm (2.65 in) (blue)		867 (134.3)
	By-pass valve opening pressure			kPa (kg/cm^2, psi)	160 (1.6, 23.2)
	Outer diameter × Width mm (in)		Outer diameter: 68 mm (2.68 in) (black)		68 × 85 (2.68 × 3.35)
			Outer diameter: 67.4 mm (2.65 in) (blue)		67.4 × 87.1 (2.65 × 3.43)
	Installation screw specifications				M 20 × 1.5
Oil pressure switch	Type				Immersed contact point type
	Operating voltage				12 V
	Warning light operating pressure			kPa (kg/cm^2, psi)	14.7 (0.1, 2.1)
	Proof pressure			kPa (kg/cm^2, psi)	981 (10, 142.2)
Engine oil	Total capacity (at overhaul)			L (US qt, Imp qt)	5.7 (6.0, 5.0)
	When replacing engine oil and oil filter			L (US qt, Imp qt)	4.8 (5.1, 4.2)
	When replacing engine oil only			L (US qt, Imp qt)	4.6 (4.9, 4.0)

Specified oil:

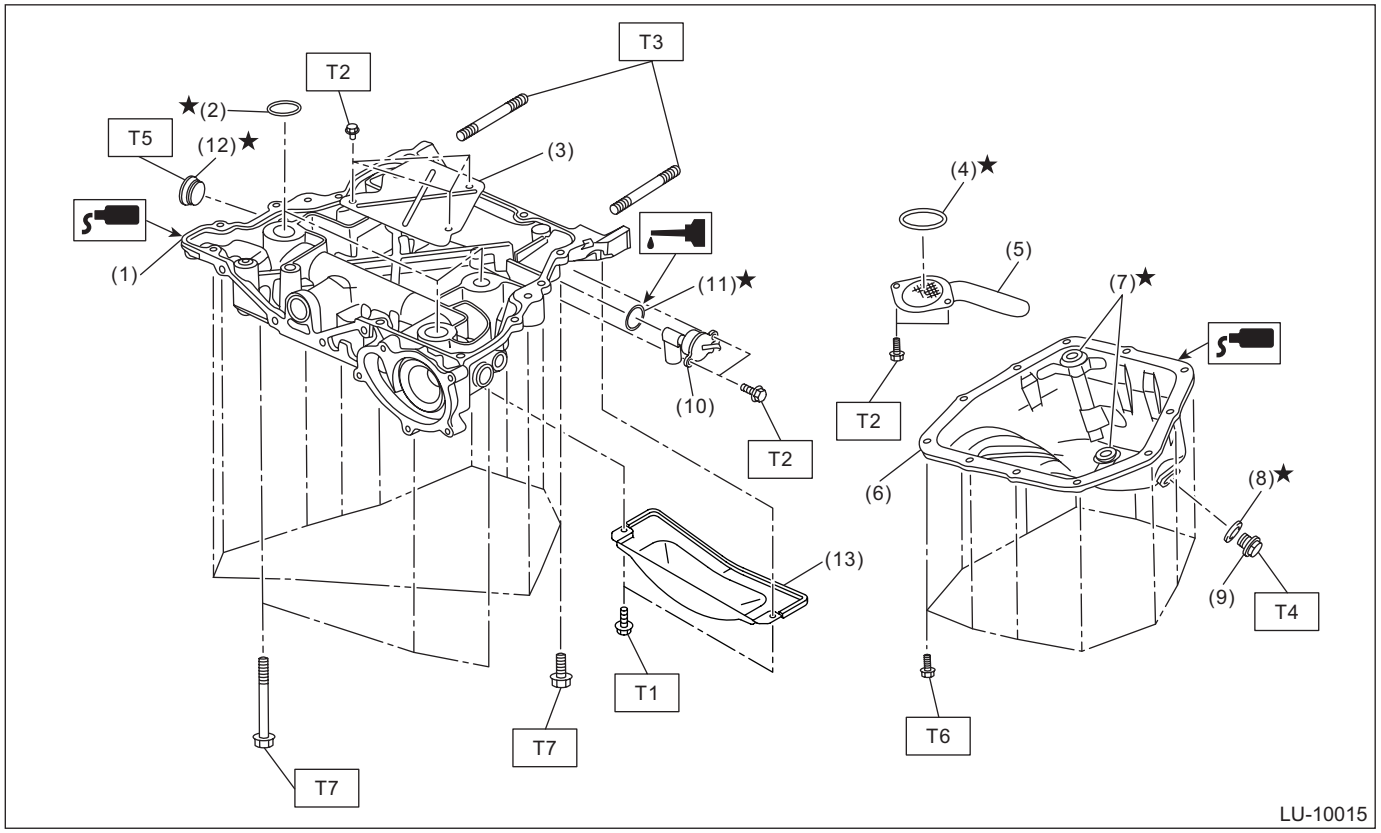
CAUTION:
- **Use 0W-20 (synthetic oil).**
- **It is acceptable to fill an engine with oil of another brand when replacing the oil, but make sure to use the following engine oil specified by Subaru.**

NOTE:
The proper viscosity oil helps the engine maintain its ideal temperature, and cranking speed increased by reducing viscosity friction in hot condition.

Engine oil standard	SAE viscosity No.
 RM-00081 Those with SN “Resource Conserving” logo in case of API standard. or  RM-00002 Those with GF-5 “starburst mark” displayed on top of the container in case of ILSAC standard.	0W-20 (synthetic oil)

B: COMPONENT

1. OIL PAN AND STRAINER



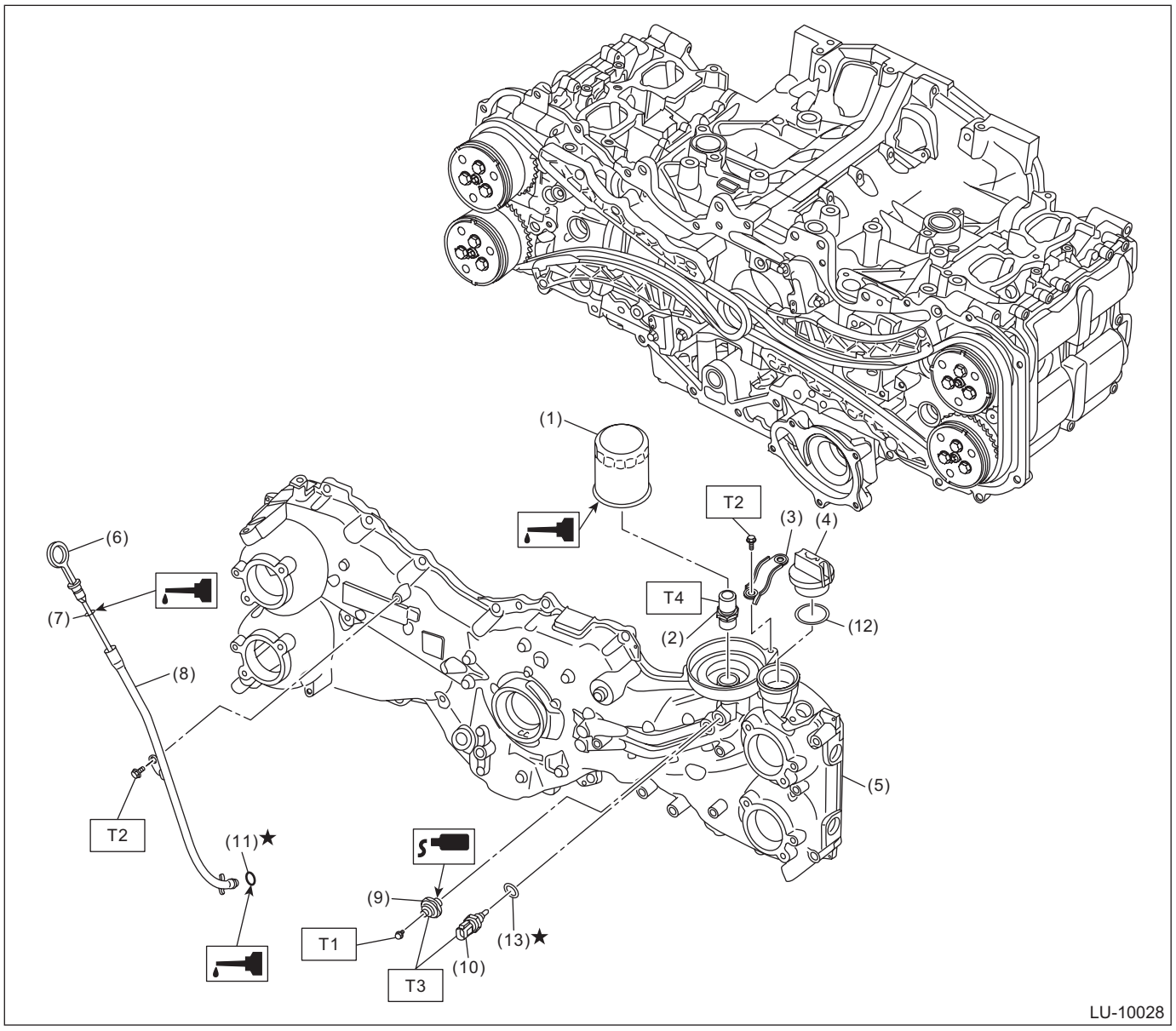
(1) Oil pan upper
(2) O-ring
(3) Baffle plate
(4) O-ring
(5) Oil strainer
(6) Oil pan
(7) Oil pan seal ring
(8) Drain plug gasket
(9) Drain plug
(10) Oil level switch
(11) O-ring
(12) Plug
(13) Clutch housing cover (MT model)

Tightening torque: N·m (kgf-m, ft-lb)

T1: 5 (0.5, 3.7)
T2: 6.4 (0.7, 4.7)
T3: 10 (1.0, 7.4)
T4: 41.7 (4.3, 30.8)
T5: 90 (9.2, 66.4)
T6: <Ref. to LU(H4DO(w/o HEV))-19, OIL PAN, INSTALLATION, Oil Pan and Strainer.>
T7: <Ref. to LU(H4DO(w/o HEV))-21, OIL PAN UPPER, INSTALLATION, Oil Pan and Strainer.>

2. OIL FILTER AND OIL LEVEL GAUGE

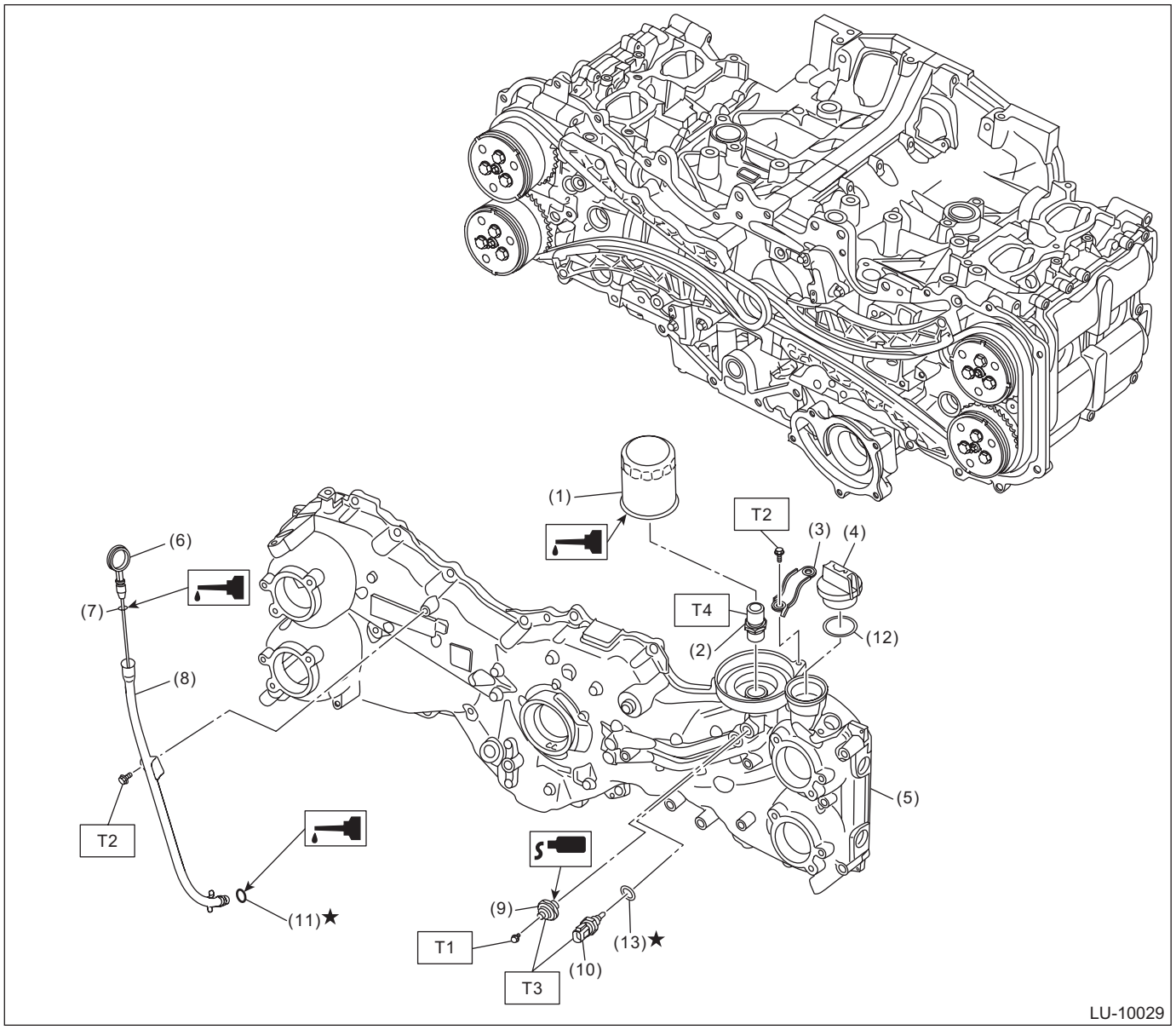
- Gasoline engine model



(1) Oil filter
(2) Oil pump union
(3) Generator cord stay
(4) Oil filler cap
(5) Chain cover
(6) Oil level gauge
(7) O-ring
(8) Oil level gauge guide
(9) Oil pressure switch
(10) Engine oil temperature sensor
(11) O-ring
(12) Gasket
(13) Gasket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 1.5 (0.2, 1.1)
T2: 6.4 (0.7, 4.7)
T3: 18 (1.8, 13.3)
T4: 45 (4.6, 33.2)

- HEV model



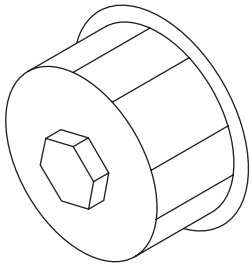
(1)	Oil filter	(8)	Oil level gauge guide	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Oil pump union	(9)	Oil pressure switch	***T1: 1.5 (0.2, 1.1)***
(3)	Battery cable stay	(10)	Engine oil temperature sensor	***T2: 6.4 (0.7, 4.7)***
(4)	Oil filler cap	(11)	O-ring	***T3: 18 (1.8, 13.3)***
(5)	Chain cover	(12)	Gasket	***T4: 45 (4.6, 33.2)***
(6)	Oil level gauge	(13)	Gasket	
(7)	O-ring			

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Prepare a container and cloth when performing work which oil possibly spills. If oil spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.
- If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emitting smoke or causing a fire.
- Follow all government and local regulations concerning disposal of refuse when disposing of oil.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18332AA000	18332AA000	OIL FILTER WRENCH	Used for removing and installing oil filter (black). (Outer diameter: 68 mm (2.68 in))
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

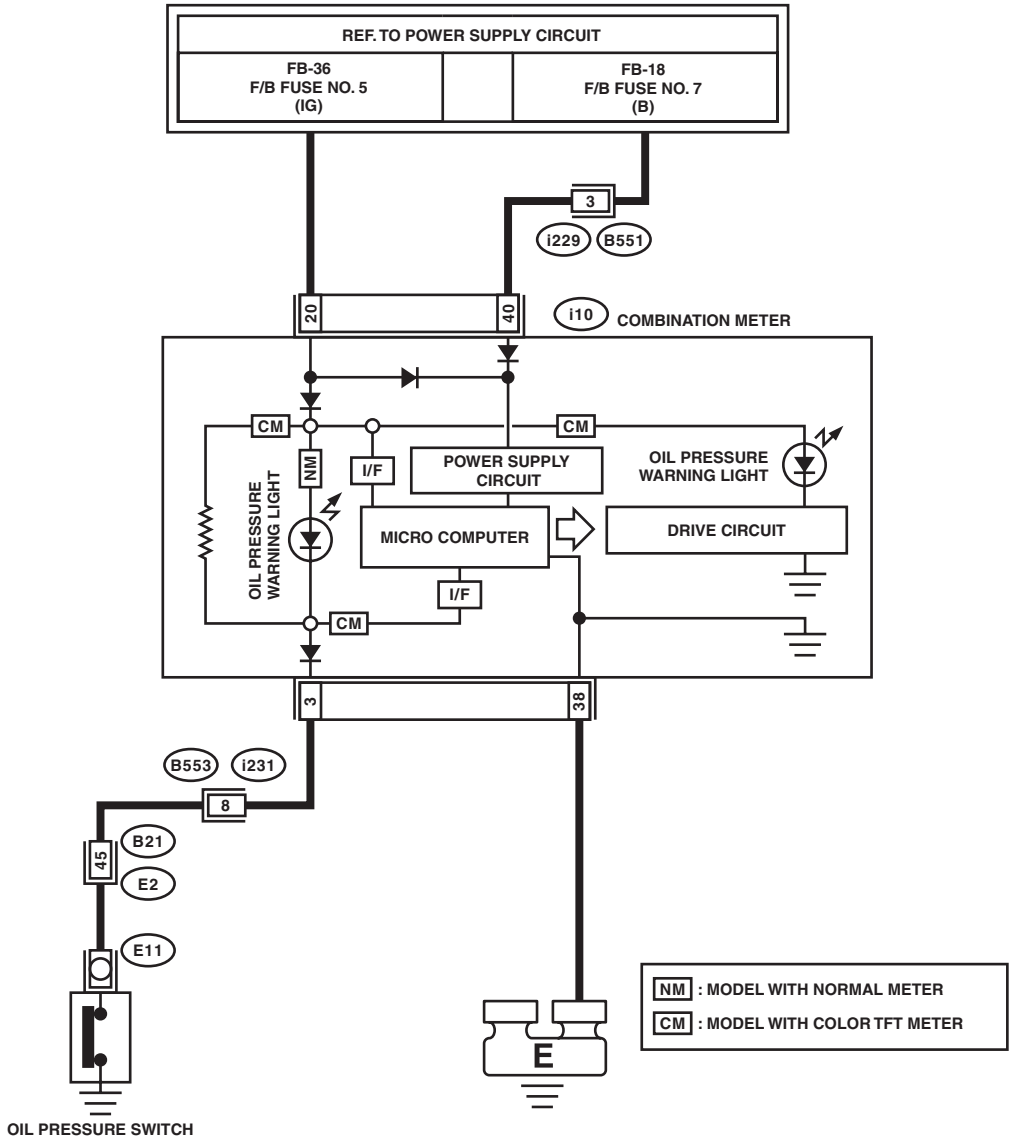
TOOL NAME	REMARKS
Oil filter wrench (65/67 mm 14 Flutes)	Used for removing and installing oil filter (blue). (Outer diameter: 67.4 mm (2.65 in))
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

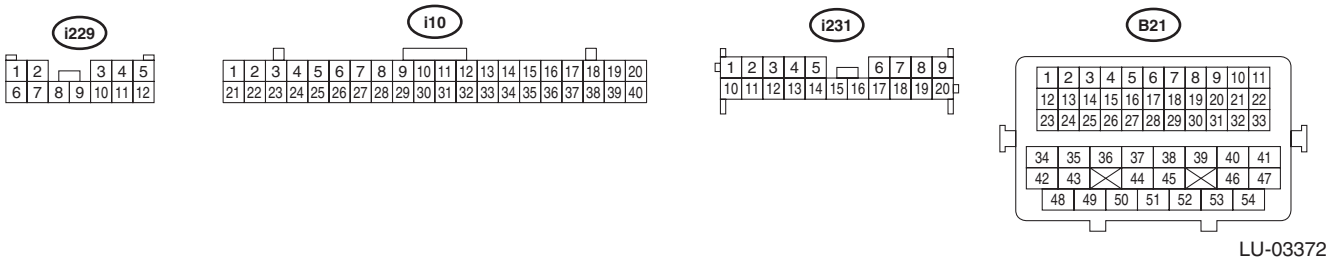
2. Oil Pressure System

A: WIRING DIAGRAM

Oil pressure warning system <Ref. to WI(w/o HEV)-180, WIRING DIAGRAM, Oil Pressure Warning Light System.> <Ref. to WI(HEV)-159, WIRING DIAGRAM, Oil Pressure Warning Light System.>

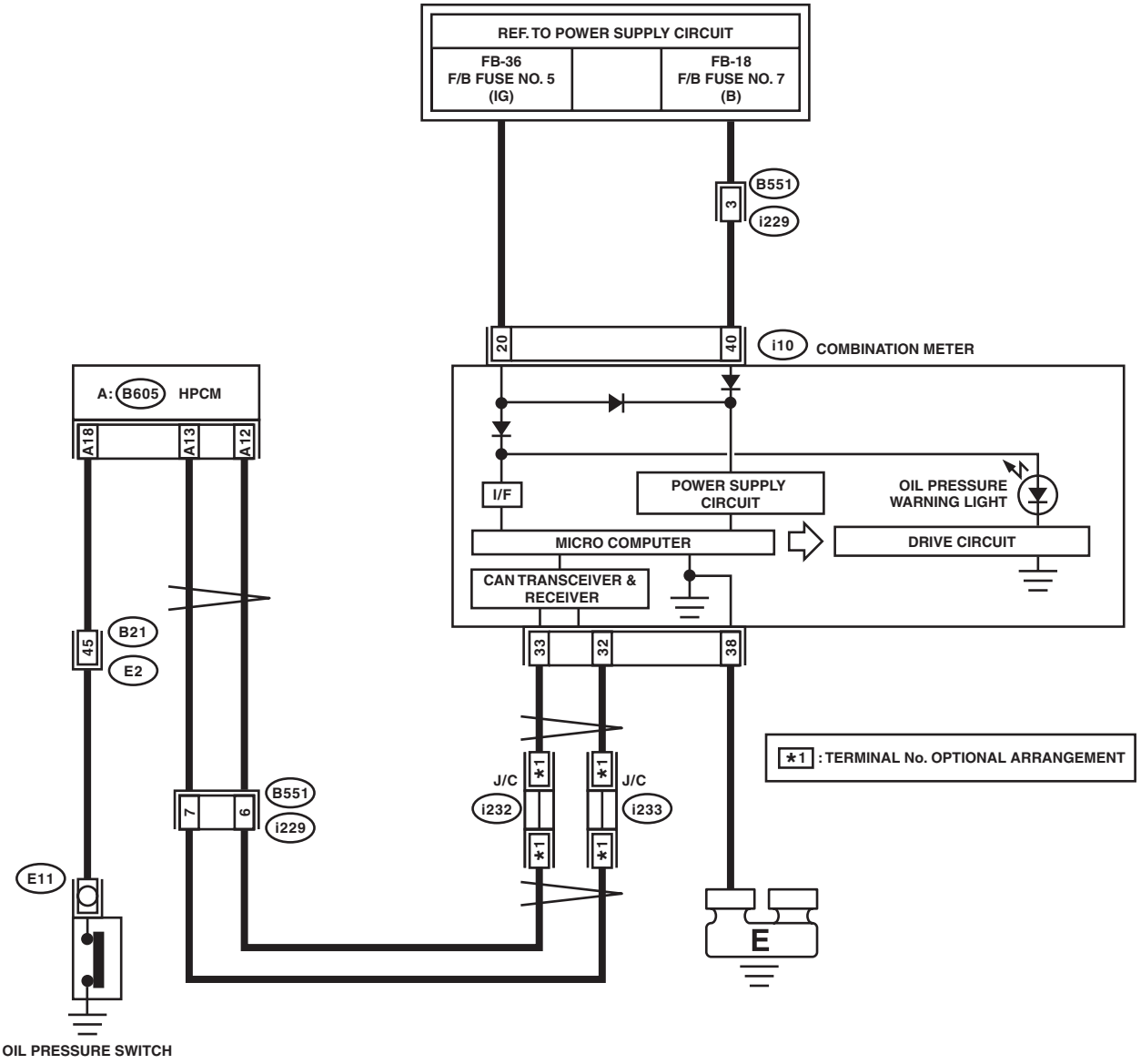
- Gasoline engine model

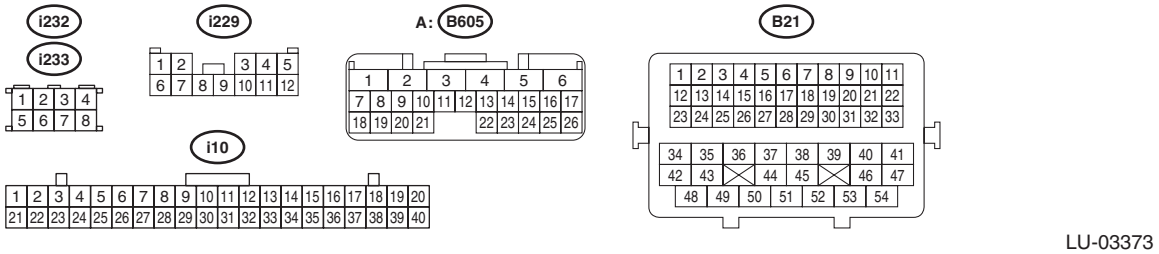




LU-03372

- HEV model





LU-03373

B: INSPECTION

1. GASOLINE ENGINE MODEL

	Step	Check	Yes	No
1	**CHECK COMBINATION METER.** 1) Turn the ignition switch to ON. (engine OFF) 2) Check the warning light in the combination meter.	Does the warning light illuminate?	Go to step **2**.	Repair or replace the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>
2	**CHECK POWER SUPPLY TO OIL PRESSURE SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the terminal from oil pressure switch. 3) Turn the ignition switch to ON. 4) Measure the voltage between oil pressure switch harness terminal and chassis ground. ***Terminals*** ***(E11) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the oil pressure switch. <Ref. to LU(H4DO(w/o HEV))-25, Oil Pressure Switch.>	Go to step **3**.
3	**CHECK COMBINATION METER.** 1) Turn the ignition switch to OFF. 2) Remove the combination meter. 3) Measure the resistance of combination meter. ***Terminals*** ***No. 20 — No. 3:***	Is the resistance less than 10 Ω?	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between combination meter and oil pressure switch • Poor contact of combination meter connector • Poor contact of oil pressure switch terminal • Poor contact of coupling connector	Repair or replace the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>

2. HEV MODEL

	Step	Check	Yes	No
1	**CHECK DTC.**	Is DTC of engine, HEV and CAN communication line displayed? <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).> <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).> <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> <Ref. to IDI(diag)-25, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK COMBINATION METER.** 1) Turn the ignition switch to ON. (engine OFF) 2) Check the warning light in the combination meter.	Does the warning light illuminate?	Go to step **3**.	Repair or replace the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>
3	**CHECK POWER SUPPLY TO OIL PRESSURE SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the terminal from oil pressure switch. 3) Turn the ignition switch to ON. 4) Measure the voltage between oil pressure switch harness terminal and chassis ground. ***Terminals*** ***(E11) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the oil pressure switch. <Ref. to LU(H4DO(w/o HEV))-25, Oil Pressure Switch.>	Go to step **4**.
4	**CHECK COMBINATION METER.** Perform the self-diagnosis of combination meter to check if there are any faults in the combination meter. <Ref. to IDI-8, OPERATION, Combination Meter System.>	Is combination meter OK?	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between hybrid powertrain control module and oil pressure switch • Poor contact of oil pressure switch terminal • Poor contact of coupling connector	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

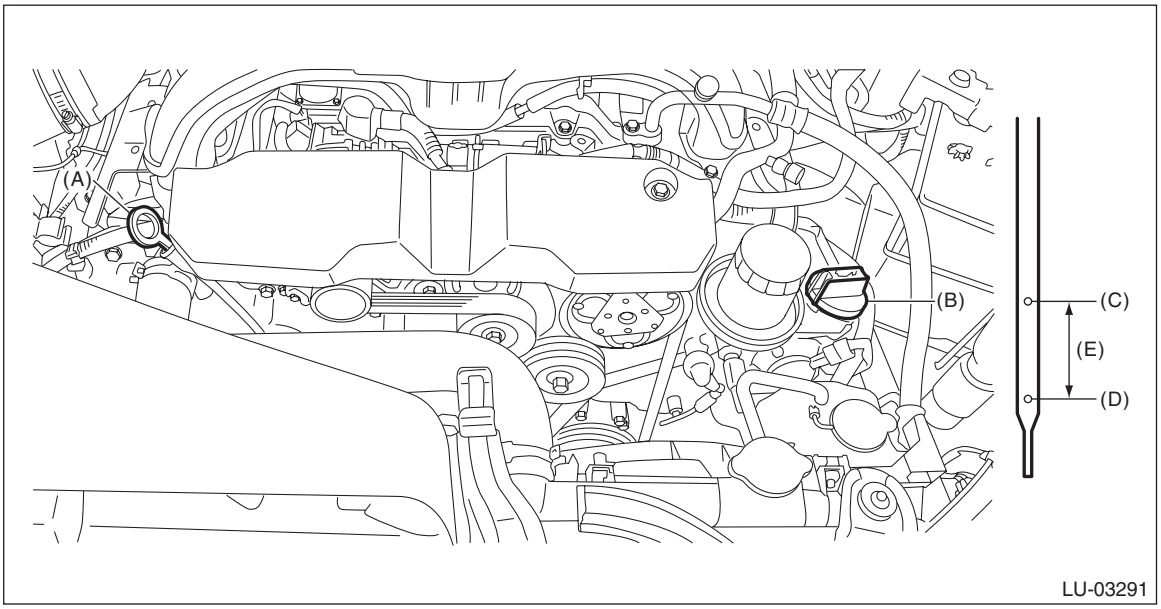
3. Engine Oil

A: INSPECTION

CAUTION:
If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emitting smoke or causing a fire.

1) Park the vehicle on a level surface.
2) Turn the ignition switch to OFF.
3) Remove the oil level gauge and wipe away the oil.
4) Reinsert the oil level gauge all the way. Be sure that the oil level gauge is correctly inserted and properly orientated.
5) Pull out the oil level gauge again, and check both sides of the oil level gauge. Use a lower side to determine the engine oil level. If the engine oil level is below “L” line, check for oil leakage from engine and add oil to bring the level up to “F” line.
6) Start the engine to circulate the oil in engine.
7) After turning off the engine (ignition OFF), wait a few minutes for the oil to return to the oil pan before checking the level.

NOTE:
- To prevent overfilling of engine oil, do not add oil above “F” line when the engine is cold.
- As the oil level gauge is used for daily maintenance, “F” line and “L” line is set assuming that the engine is cold.



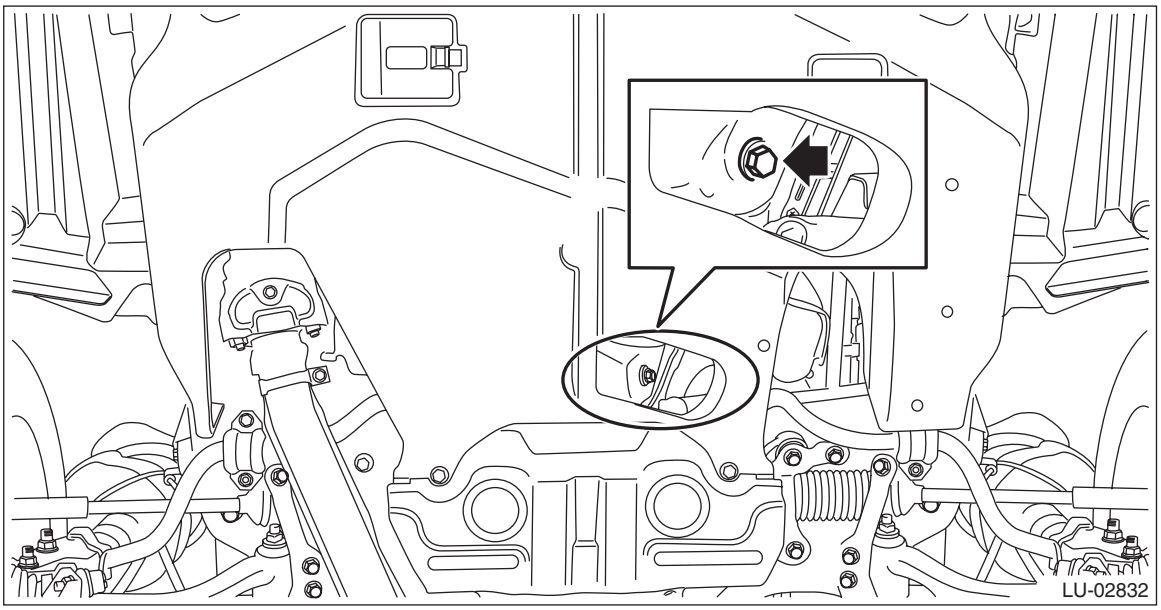
(A) Oil level gauge
(B) Oil filler cap
(C) “F” line
(D) “L” line
(E) Approx. 1.0 L (1.1 US qt, 0.9 Imp qt)

B: REPLACEMENT

CAUTION:
If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emitting smoke or causing a fire.

1) Turn the ignition switch to OFF.
2) Open the oil filler cap for quick draining of engine oil.
3) Lift up the vehicle.
4) Drain engine oil by loosening the drain plug.

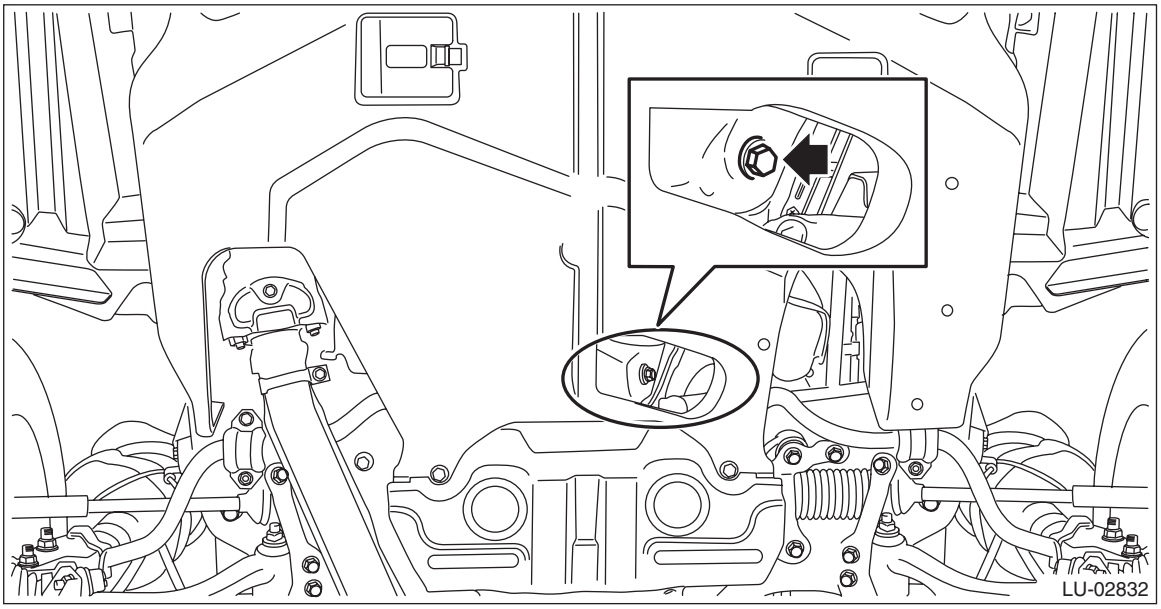
NOTE:
Prepare the container for draining of engine oil.



5) After draining the engine oil, tighten the engine oil drain plug.

NOTE:
Use a new drain plug gasket.

Tightening torque:
41.7 N·m (4.3 kgf-m, 30.8 ft-lb)



6) Lower the vehicle.

7) Select engine oil of adequate quality and viscosity and fill it through the chain cover to the “F” line on the oil level gauge. Make sure that the vehicle is parked on a level surface when checking oil level.

Recommended oil:

Refer to “SPECIFICATION” for recommended oil. <Ref. to LU(H4DO(w/o HEV))-2, SPECIFICATION, General Description.>

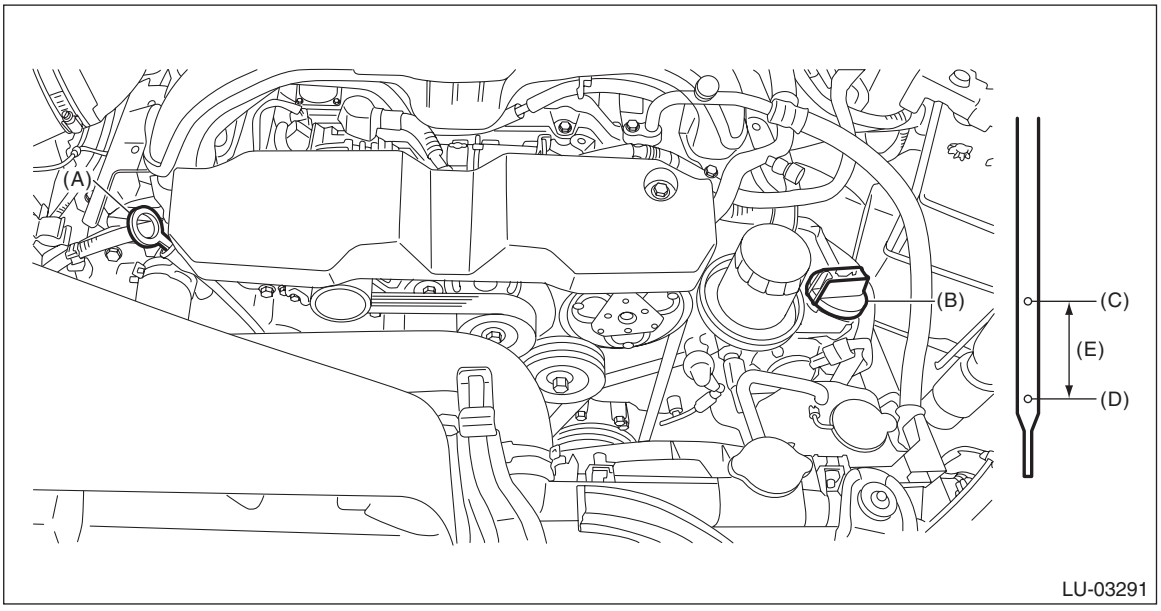
Engine oil capacity:

Refer to “SPECIFICATION” for engine oil capacity. <Ref. to LU(H4DO(w/o HEV))-2, SPECIFICATION, General Description.>

8) Close the oil filler cap.

9) Start the engine to circulate the oil in engine.

10) Stop the engine (ignition OFF) and pull out the oil level gauge again, and check both sides of the oil level gauge. Use a lower side to check the engine oil level. If necessary, add engine oil up to the “F” line on oil level gauge.



(A) Oil level gauge
(B) Oil filler cap
(C) “F” line
(D) “L” line
(E) Approx. 1.0 L (1.1 US qt, 0.9 Imp qt)

4. Oil Pump

A: SPECIFICATION

The oil pump cannot be disassembled.
Refer to “Chain Cover” for removal and installation procedures. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.> <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>

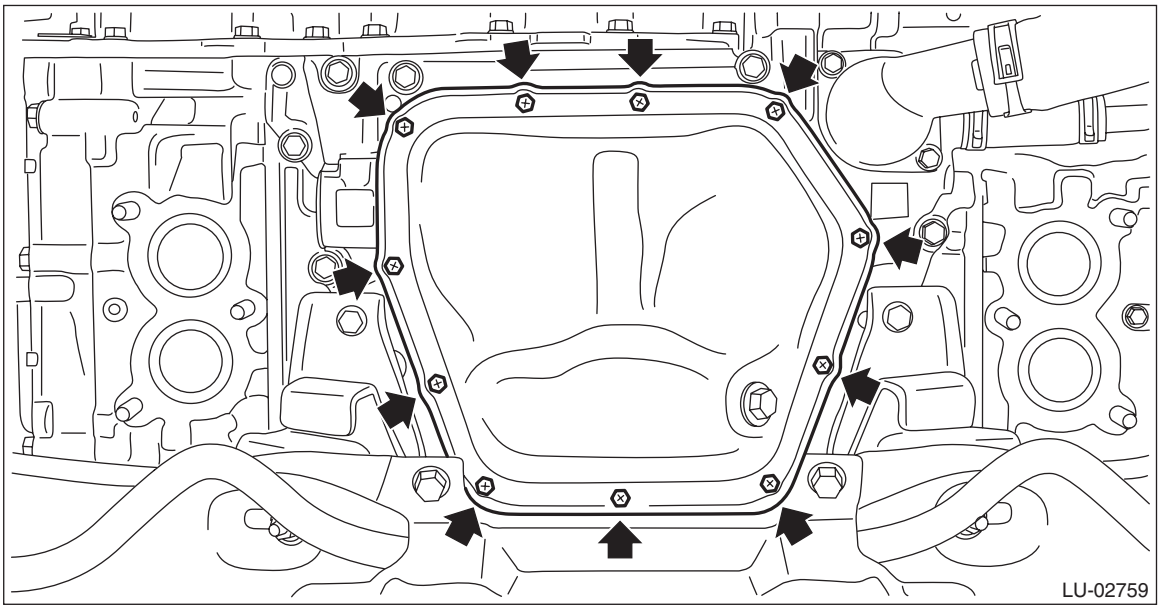
5. Oil Pan and Strainer

A: REMOVAL

1. OIL PAN

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Drain the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
5) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
6) Remove the bolts which secure oil pan to oil pan upper.

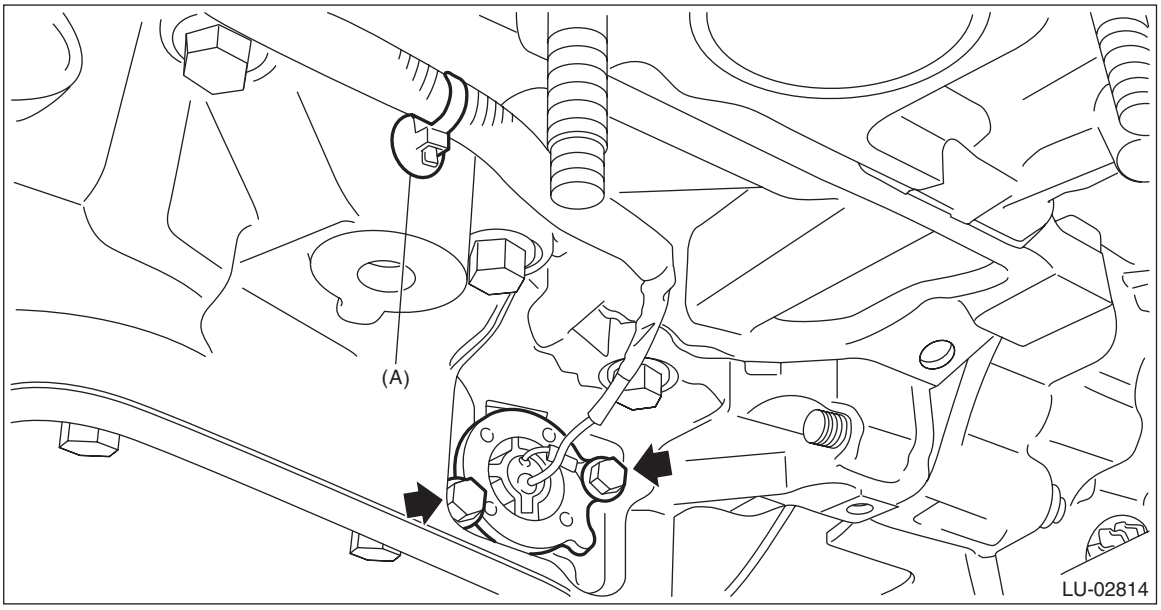


7) Insert an oil pan cutter blade into the gap between oil pan upper and oil pan, and remove the oil pan.

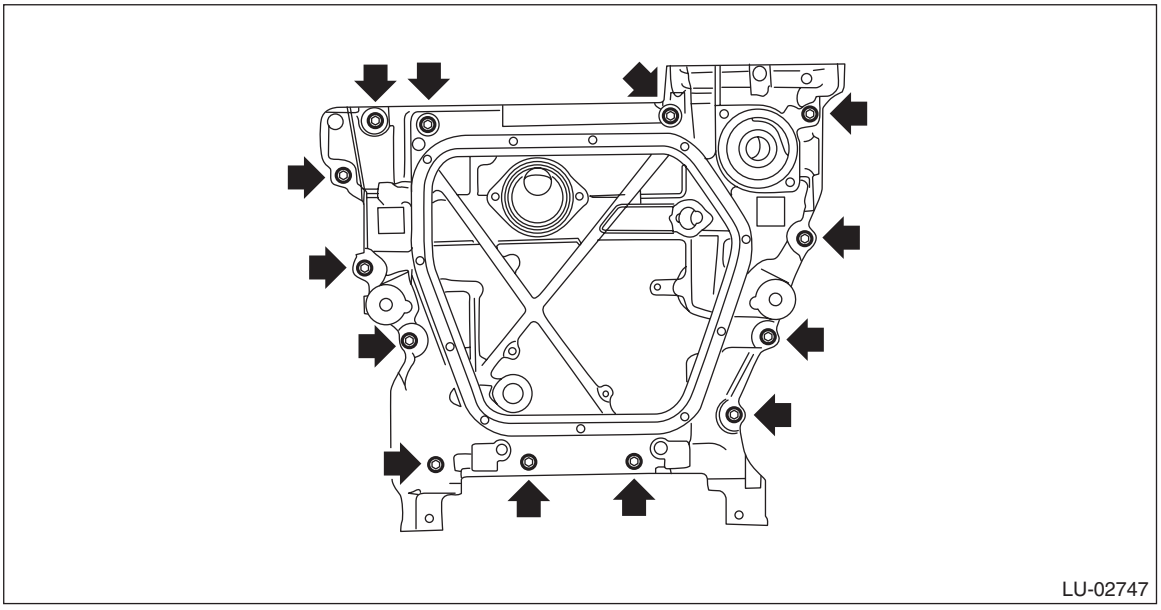
CAUTION:
Do not use a screwdriver or similar tool in place of oil pan cutter.
8) Remove the liquid gasket from oil pan and oil pan upper.

2. OIL PAN UPPER

1) Remove the engine from the vehicle. <Ref. to ME(H4DO(w/o HEV))-58, REMOVAL, Engine Assembly.>
2) Remove the water pump. <Ref. to CO(H4DO(w/o HEV))-19, REMOVAL, Water Pump.>
3) Remove the thermostat cover. <Ref. to CO(H4DO(w/o HEV))-63, REMOVAL, Thermostat.>
4) Remove the water pipe assembly. <Ref. to CO(H4DO(w/o HEV))-24, REMOVAL, Water Pipe Assembly.>
5) Remove the chain cover. <Ref. to ME(H4DO(w/o HEV))-150, REMOVAL, Chain Cover.>
6) Remove the oil pan. <Ref. to LU(H4DO(w/o HEV))-16, OIL PAN, REMOVAL, Oil Pan and Strainer.>
7) Remove clip (A) from the oil pan upper, and remove the oil level switch.

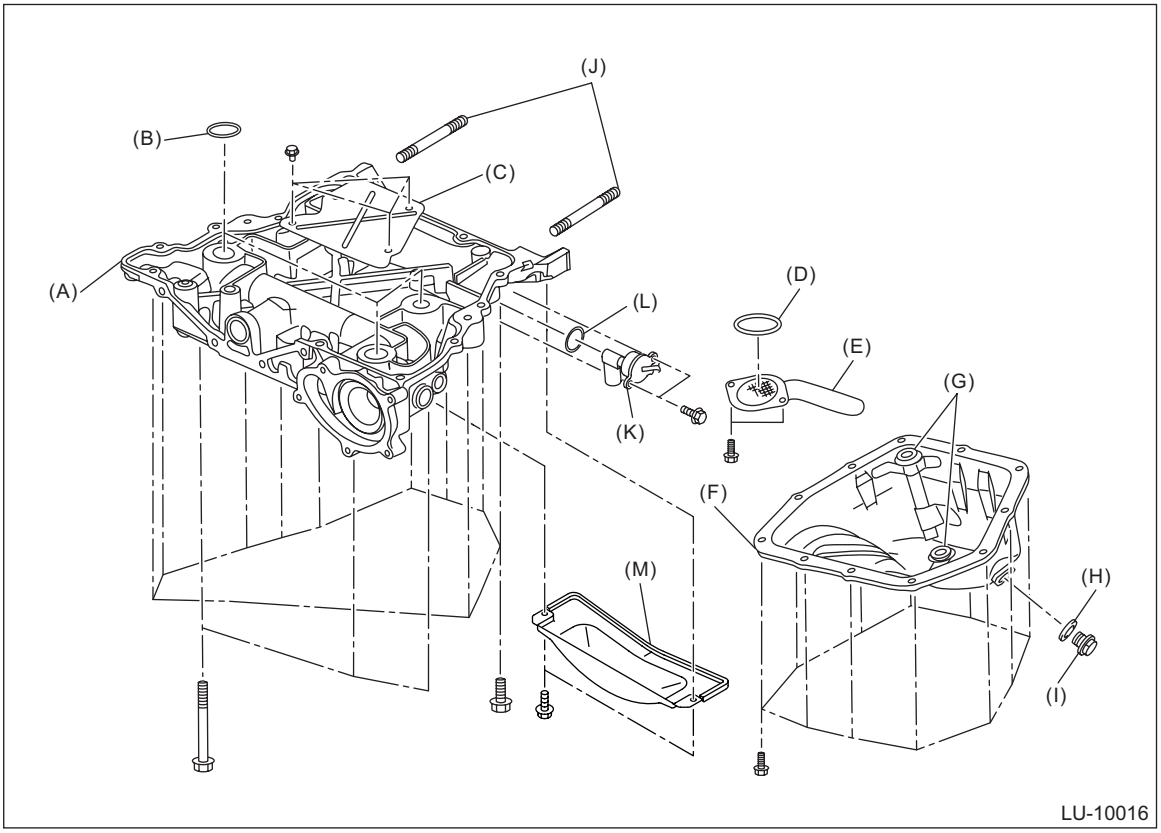


8) Remove the bolts which secure oil pan upper to cylinder block, and remove the oil pan upper.



9) Remove the baffle plate from the oil pan upper.
10) Remove the oil strainer from the oil pan upper.
11) Remove stud bolts from the oil pan upper.
12) Remove the O-ring from the cylinder block.

13) Remove the clutch housing cover from the oil pan upper. (MT model)



(A)	Oil pan upper	(B)	O-ring	(C)	Baffle plate
(D)	O-ring	(E)	Oil strainer	(F)	Oil pan
(G)	Oil pan seal ring	(H)	Drain plug gasket	(I)	Drain plug
(J)	Stud bolt	(K)	Oil level switch	(L)	O-ring
(M)	Clutch housing cover (MT model)				

14) Remove the liquid gasket from oil pan upper and cylinder block.

B: INSTALLATION

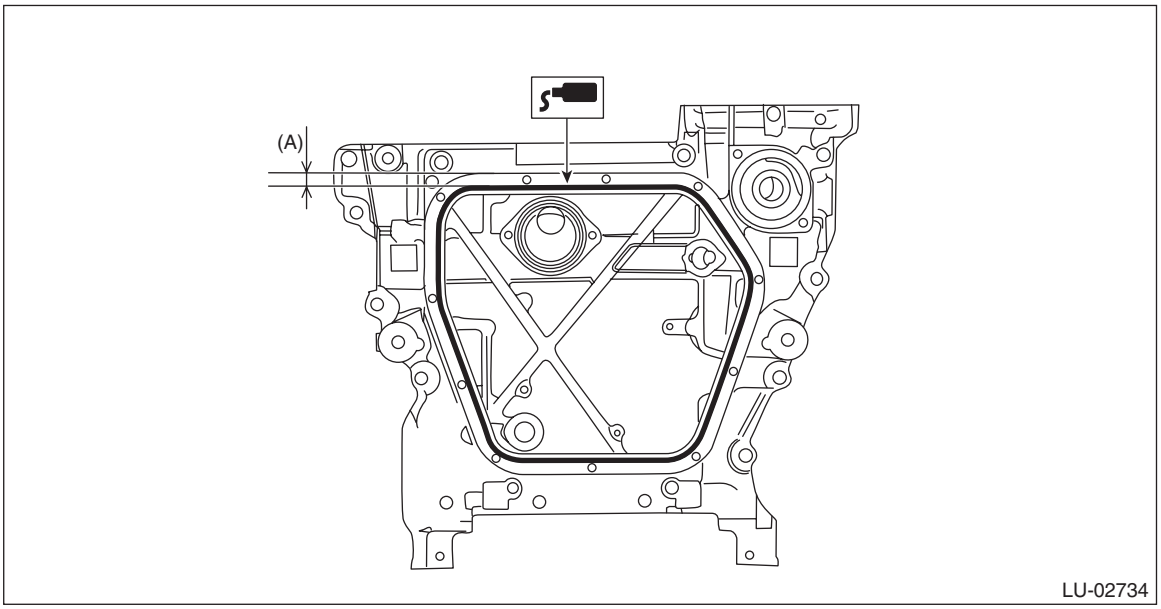
1. OIL PAN

1) Apply liquid gasket to the mating surface of the oil pan upper as shown in the figure, and install the oil pan.

NOTE:
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the oil pan and the oil pan upper.
- Use a new oil pan seal ring.
- Install within 5 min. after applying liquid gasket.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

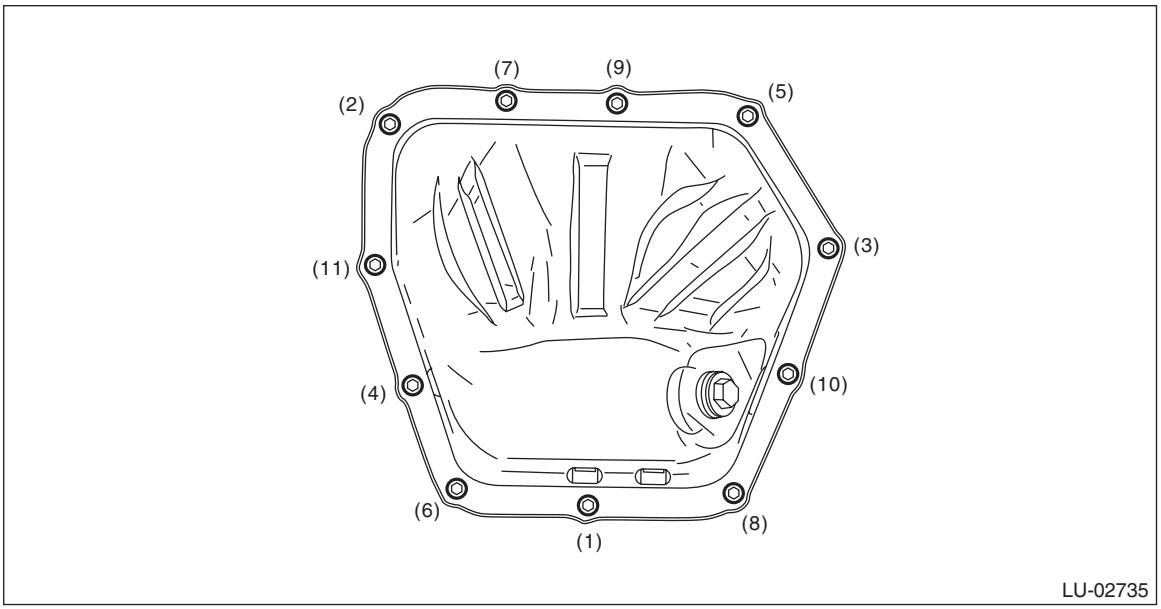
Liquid gasket applying diameter:
5±1 mm (0.1969±0.0394 in)



(A) 7.5 mm (0.295 in)

2) Tighten the bolts to install the oil pan to the oil pan upper in the numerical order.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



3) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
4) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
5) Lower the vehicle.
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
7) Refill the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>

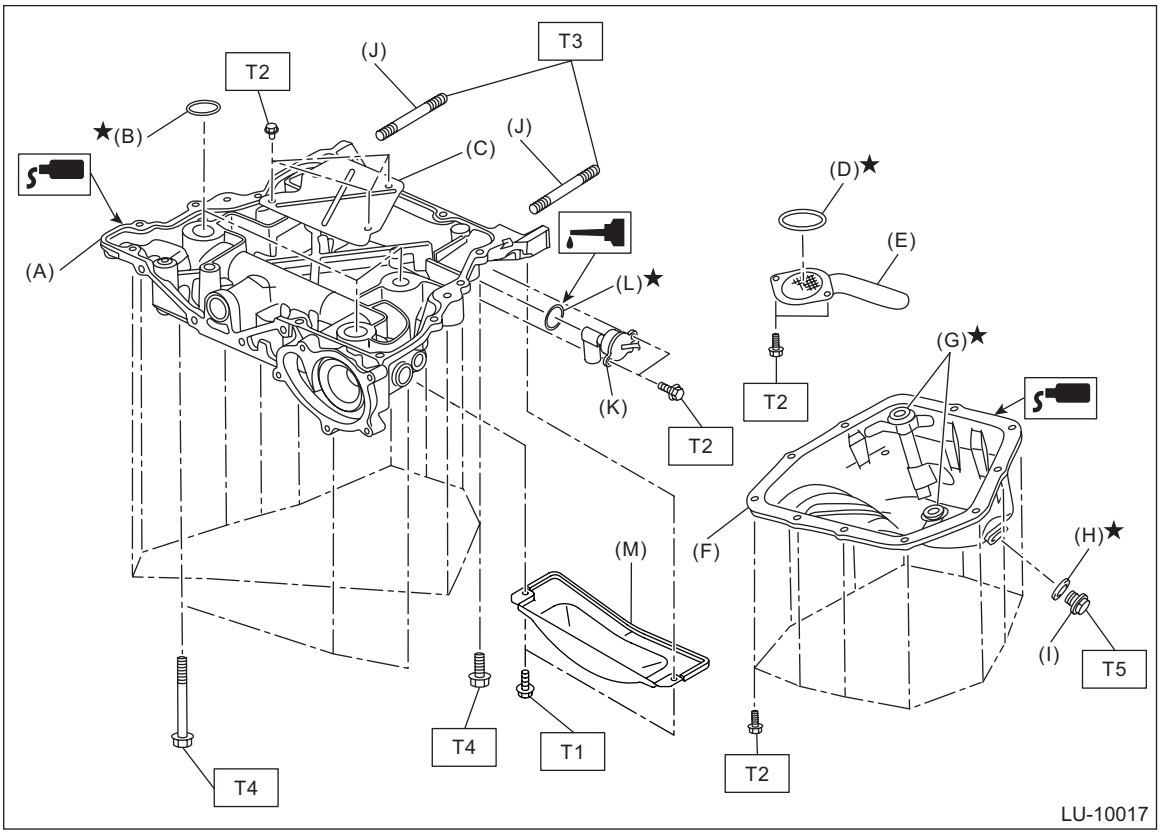
2. OIL PAN UPPER

1) Attach the clutch housing cover to the oil pan upper. (MT model)
2) Install the O-ring to the cylinder block.

NOTE:
Use new O-rings.
3) Attach the stud bolts to the oil pan upper.
4) Attach the oil strainer to the oil pan upper.

NOTE:
Use new O-rings.
5) Attach the baffle plate to the oil pan upper.

Tightening torque:
T1: 5 N·m (0.5 kgf-m, 3.7 ft-lb)
T2: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T3: 10 N·m (1.0 kgf-m, 7.4 ft-lb)
T4: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T5: 41.7 N·m (4.3 kgf-m, 30.8 ft-lb)



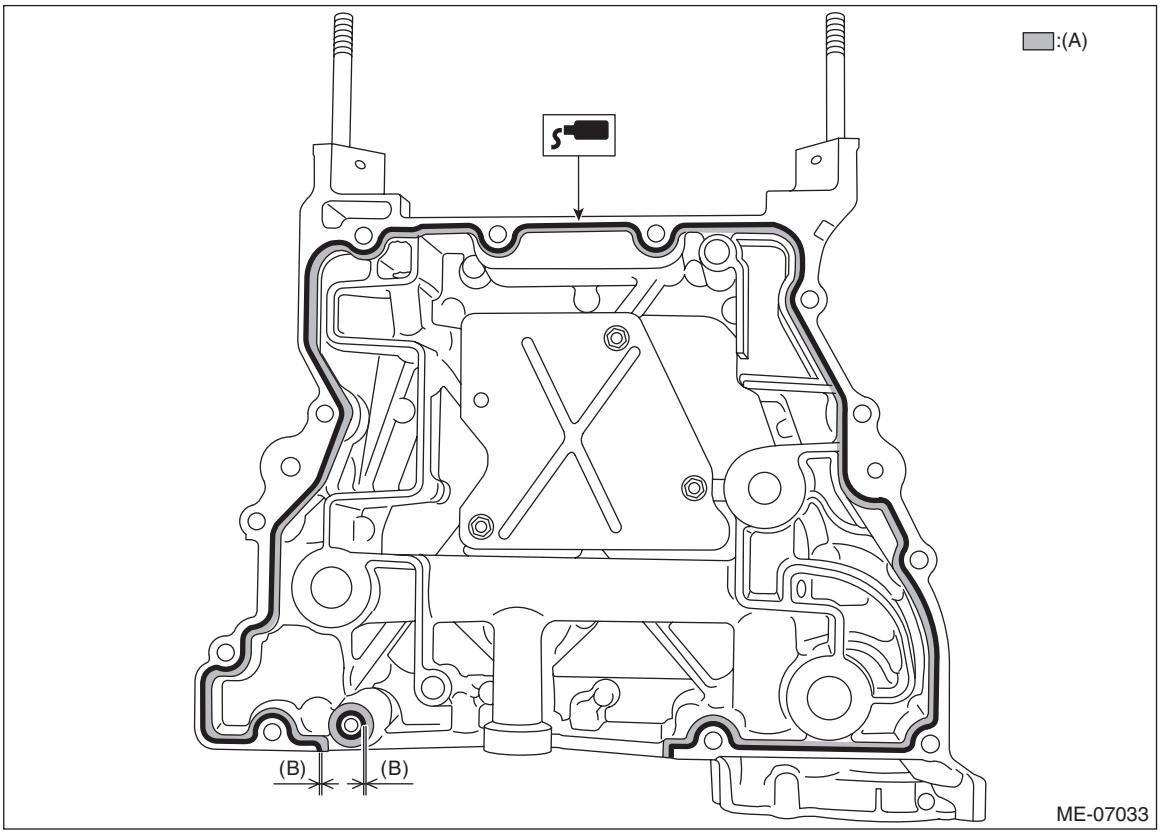
(A) Oil pan upper
(B) O-ring
(C) Baffle plate
(D) O-ring
(E) Oil strainer
(F) Oil pan
(G) Oil pan seal ring
(H) Drain plug gasket
(I) Drain plug
(J) Stud bolt
(K) Oil level switch
(L) O-ring
(M) Clutch housing cover (MT model)

6) Apply liquid gasket to the mating surface of the oil pan upper as shown in the figure, and install the oil pan upper to the cylinder block.

NOTE:
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the oil pan upper and cylinder block.
- Install within 5 min. after applying liquid gasket.
- Apply liquid gasket 1.5 mm (0.0591 in) outside from the chamfer surface. However, application of liquid gasket on the chamfer surface around the bolt hole is allowed.

Liquid gasket:
THREE BOND 1217G (Part No. K0877Y0100), THREE BOND 1217H or equivalent

Liquid gasket applying diameter:
5±1 mm (0.1969±0.0394 in)

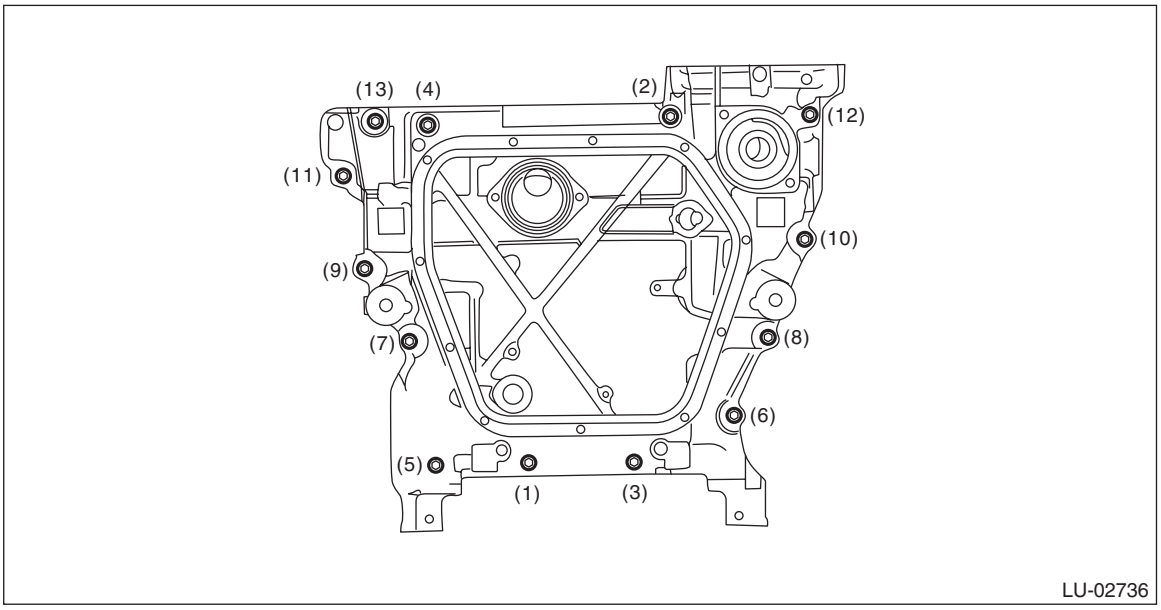


(A) Chamfer surface (B) 1.5 mm (0.0591 in)

7) Tighten the bolts to secure the oil pan upper to the cylinder block in the numerical order.

NOTE:
After tightening, if the liquid gasket is squeezed out onto the seal surface of the chain cover, completely remove any squeezed-out liquid gasket.

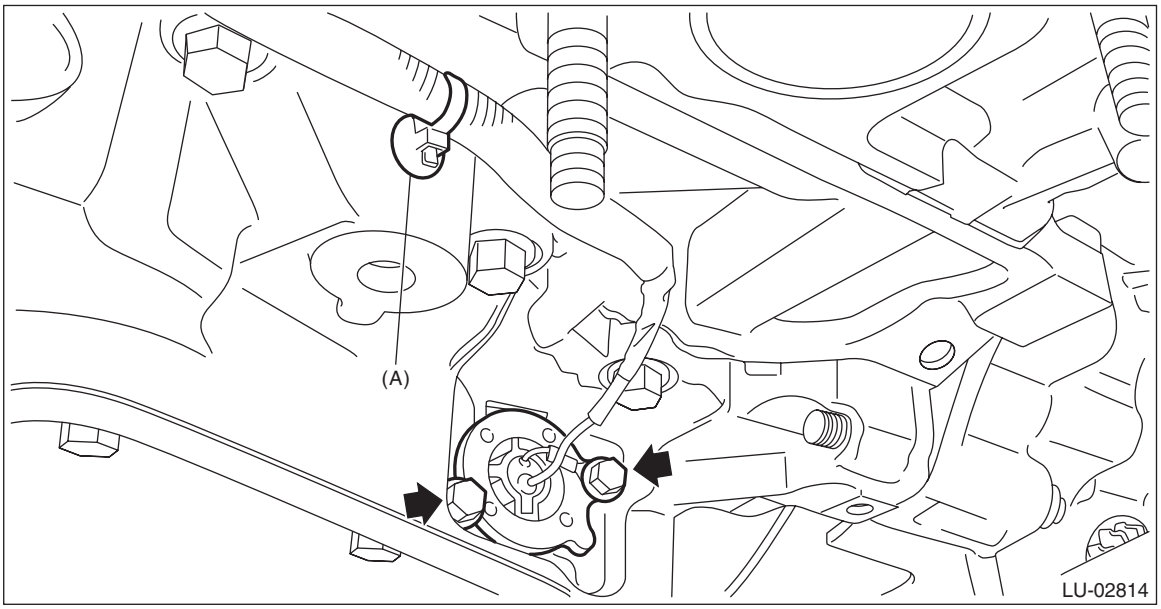
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



8) Install the oil level switch on the oil pan upper, and secure the harness with clips (A).

NOTE:
- Use new O-rings.
- Apply a coat of engine oil to the O-rings.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



9) Install the oil pan. <Ref. to LU(H4DO(w/o HEV))-19, OIL PAN, INSTALLATION, Oil Pan and Strainer.>
10) Install the chain cover. <Ref. to ME(H4DO(w/o HEV))-157, INSTALLATION, Chain Cover.>
11) Install the water pipe assembly. <Ref. to CO(H4DO(w/o HEV))-44, INSTALLATION, Water Pipe Assembly.>
12) Install the thermostat cover. <Ref. to CO(H4DO(w/o HEV))-69, INSTALLATION, Thermostat.>
13) Install the water pump. <Ref. to CO(H4DO(w/o HEV))-21, INSTALLATION, Water Pump.>
14) Install the engine to the vehicle. <Ref. to ME(H4DO(w/o HEV))-91, INSTALLATION, Engine Assembly.>
15) Refill the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>

C: INSPECTION

Check that the oil pan, oil pan upper, oil strainer and baffle plate do not have deformation, cracks or damage.

6. Oil Pressure Switch

A: REMOVAL

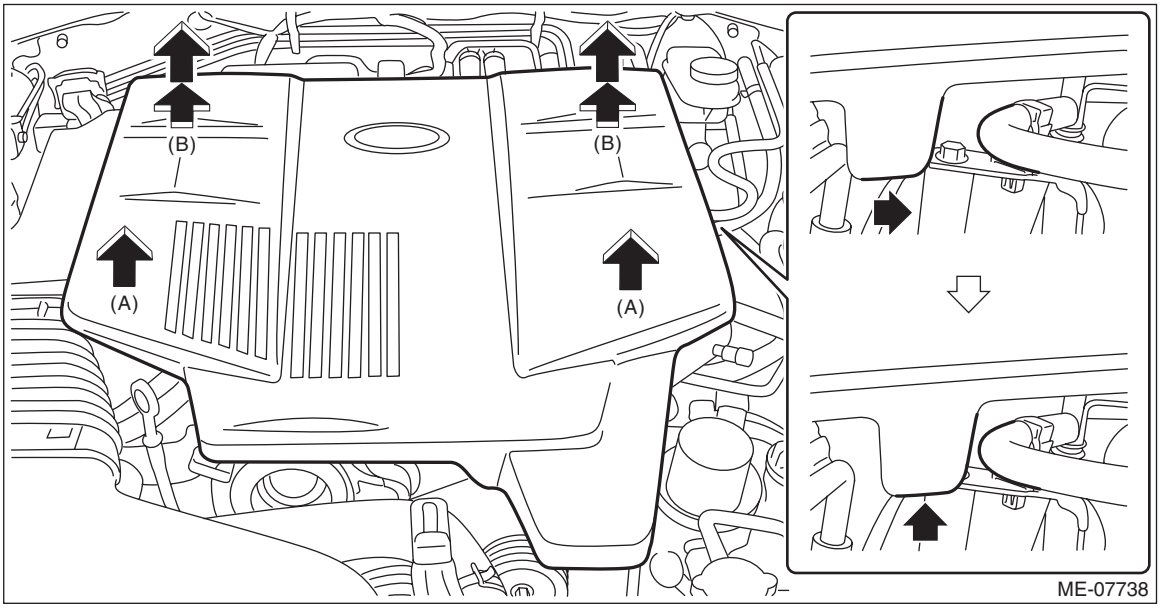
CAUTION:
If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emitting smoke or causing a fire.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

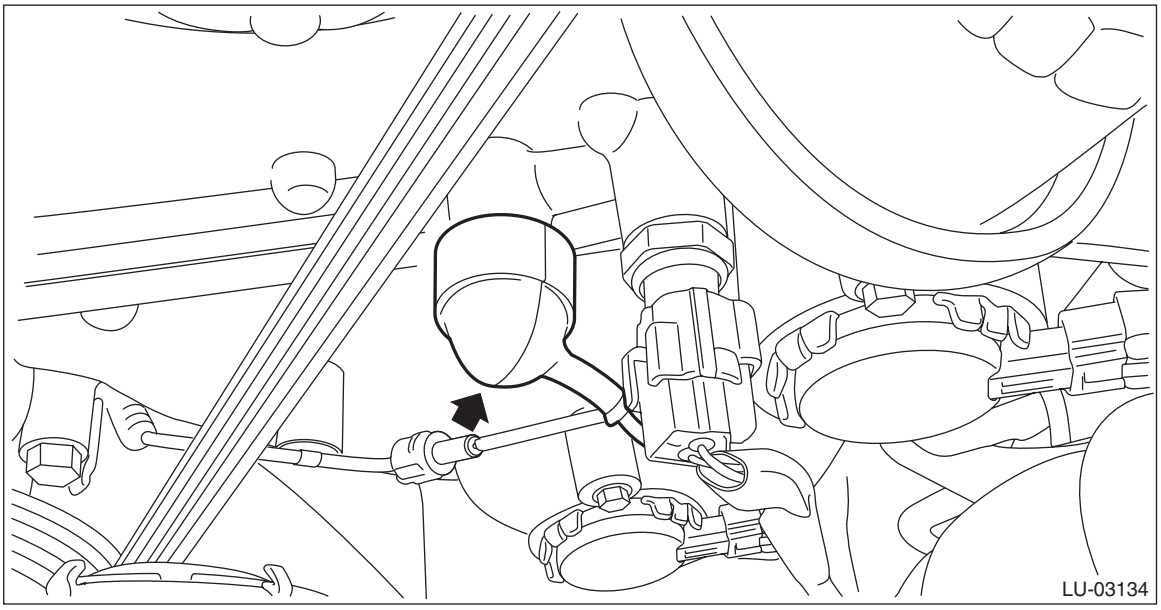
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

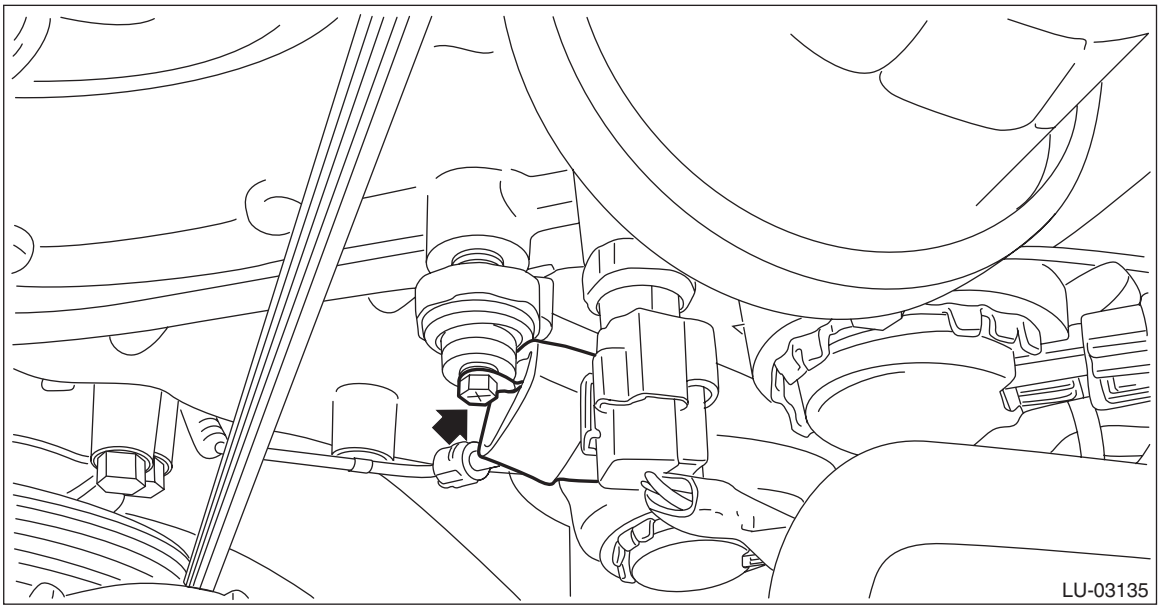
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the rubber cap.

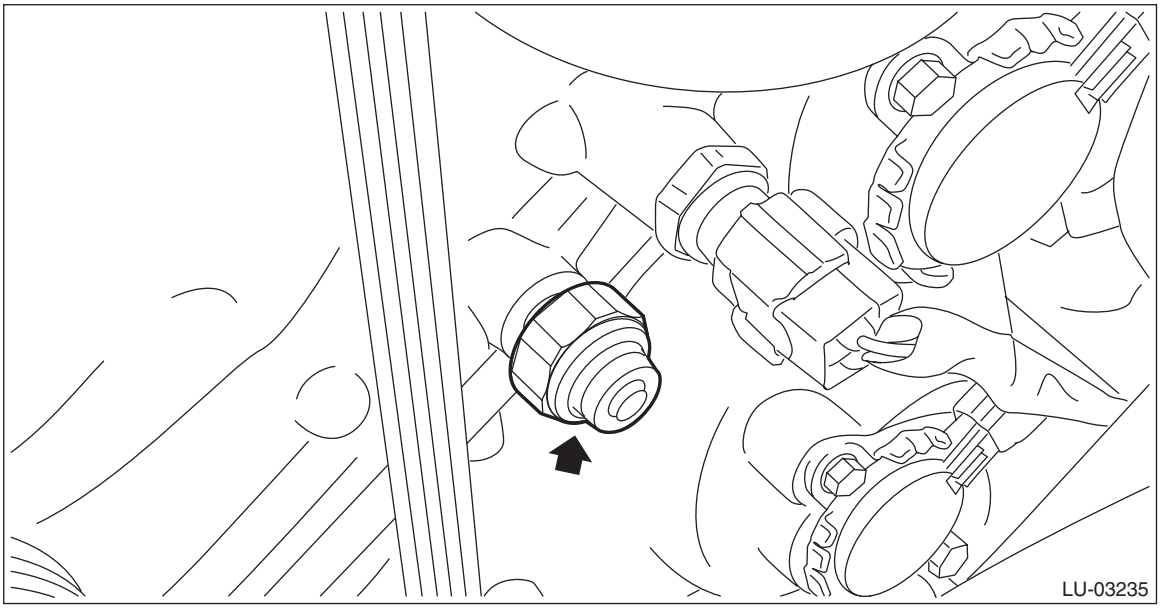


4) Disconnect the terminal from oil pressure switch.



5) Remove the oil pressure switch.

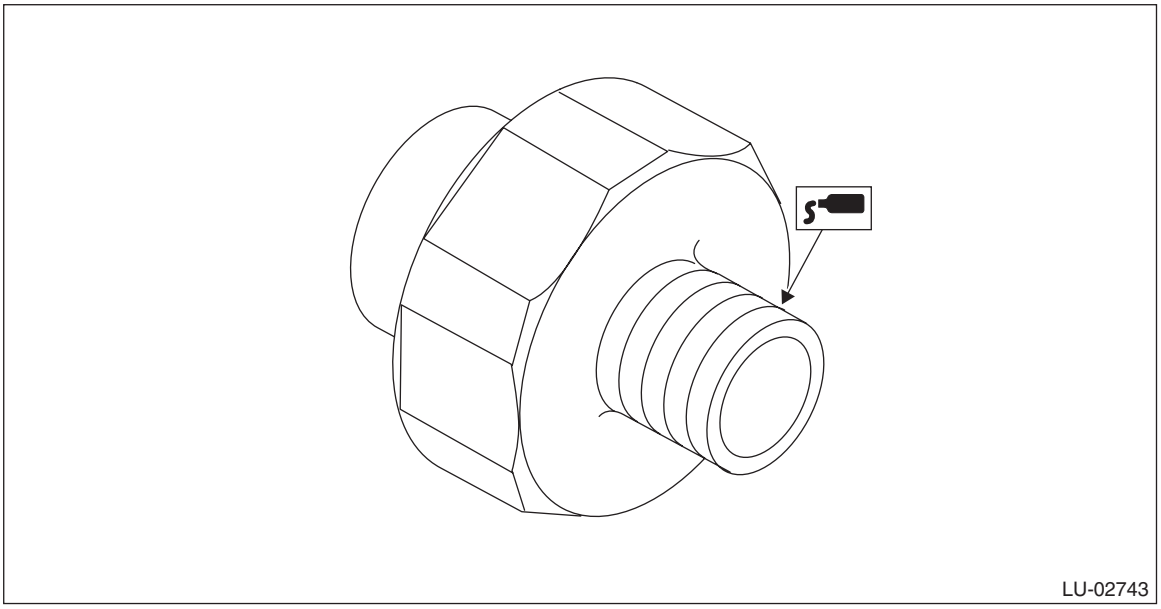
CAUTION:
Catch the engine oil using cloth to prevent it from splashing.



B: INSTALLATION

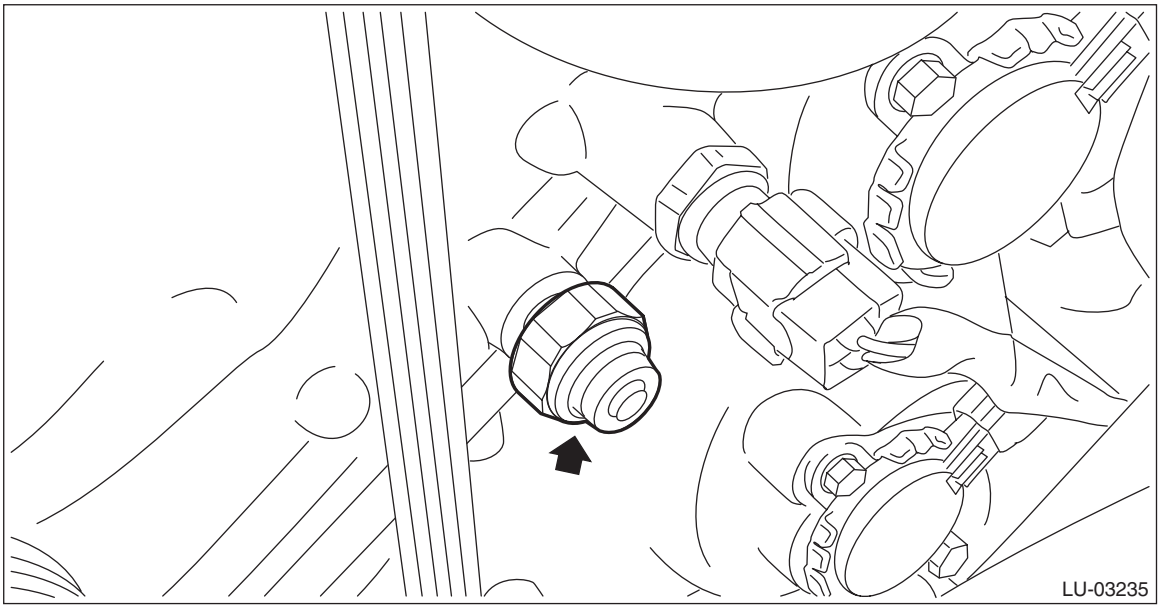
1) Apply liquid gasket to the oil pressure switch threads.

Liquid gasket:
THREE BOND 1324 (Part No. 004403042) or equivalent



2) Install the oil pressure switch to the chain cover.

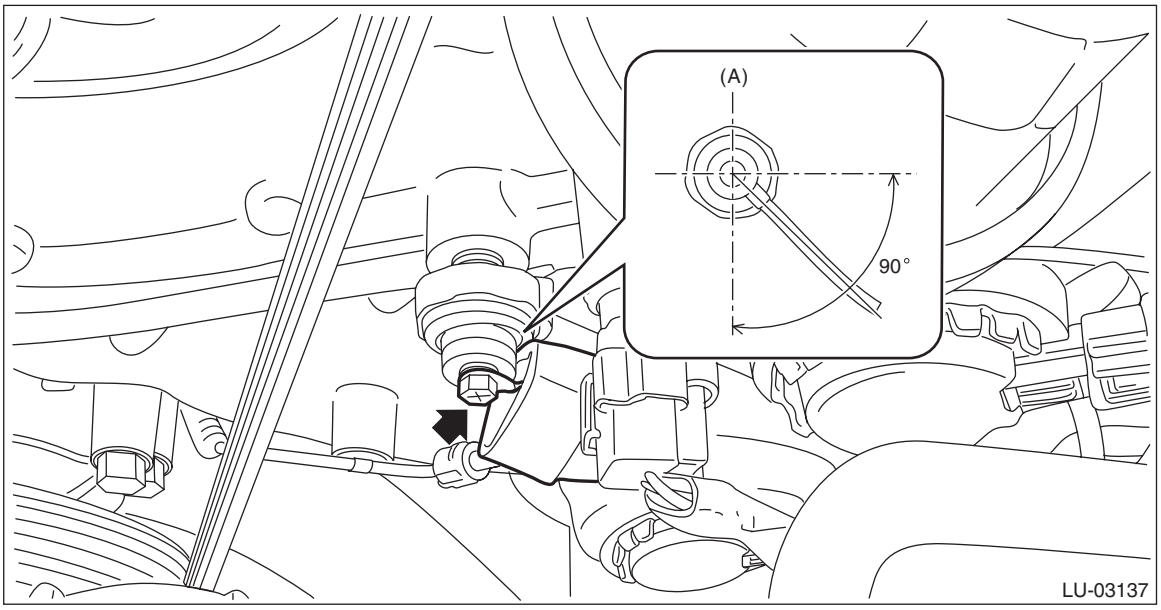
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



3) Connect the terminal to the oil pressure switch.

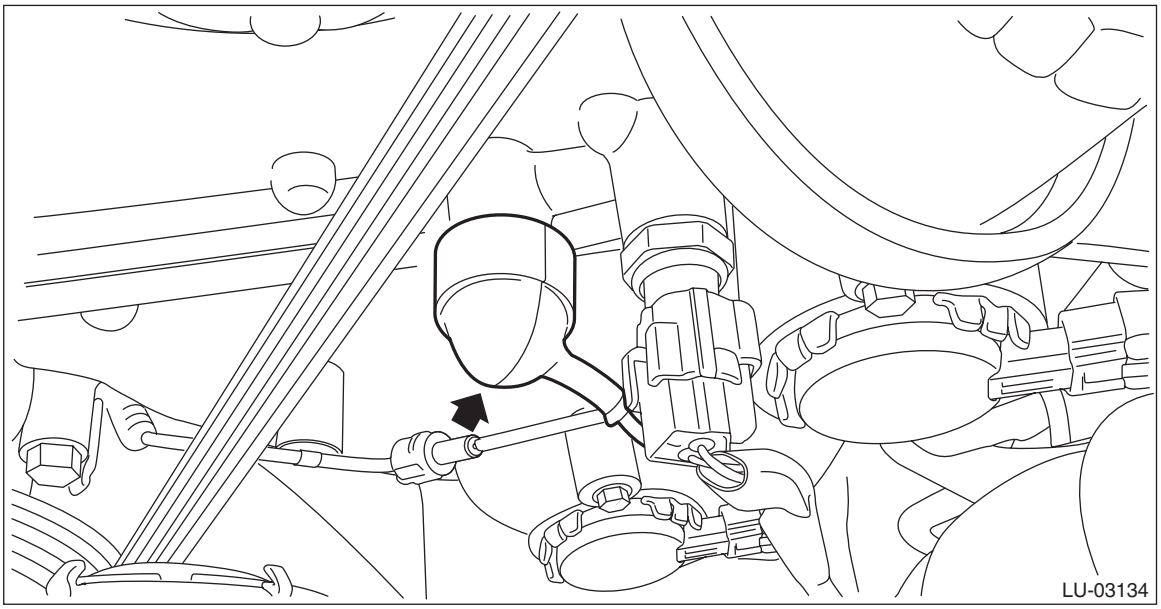
NOTE:
The oil pressure switch harness must be tightened within the range of a 90° angle as shown below.

Tightening torque:
1.5 N·m (0.2 kgf-m, 1.1 ft-lb)



(A) Upper side of the engine

4) Attach the rubber cap.



5) Install the collector cover. (HEV model)
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Check that the oil pressure switch does not have deformation, cracks or damage.
2) Check that there are no oil leaks or oil oozing from the oil pressure switch installation portion.

7. Engine Oil Filter

A: REMOVAL

CAUTION:
If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emitting smoke or causing a fire.

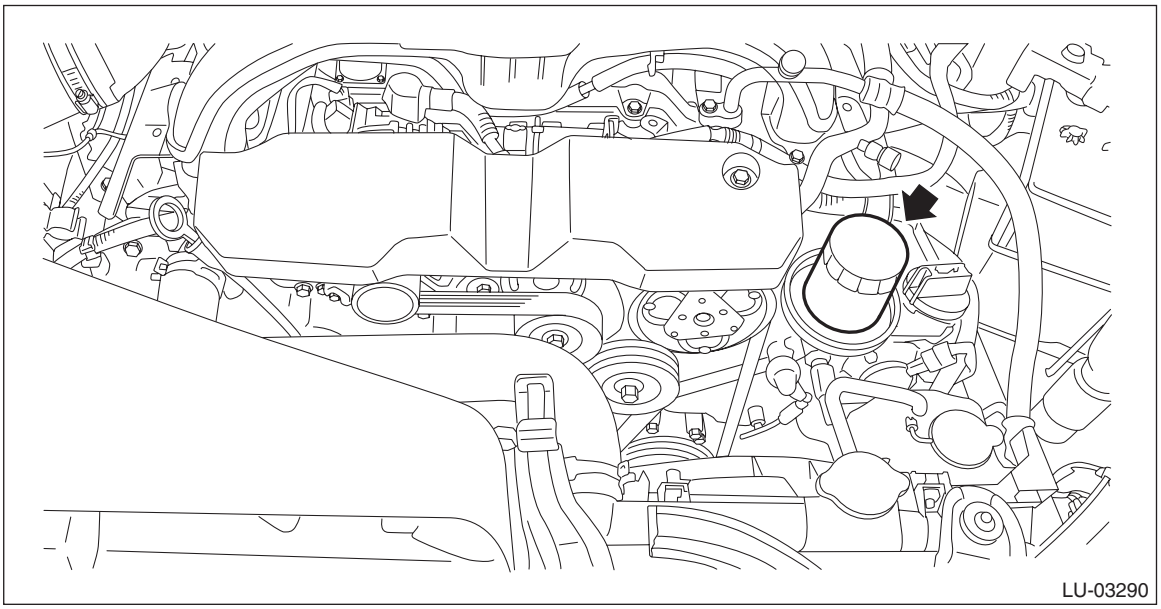
1. OIL FILTER

1) Turn the ignition switch to OFF.
2) Remove the oil filter.

NOTE:
Clean off water or dust from the oil element mating surface using air.
- Oil filter (black)

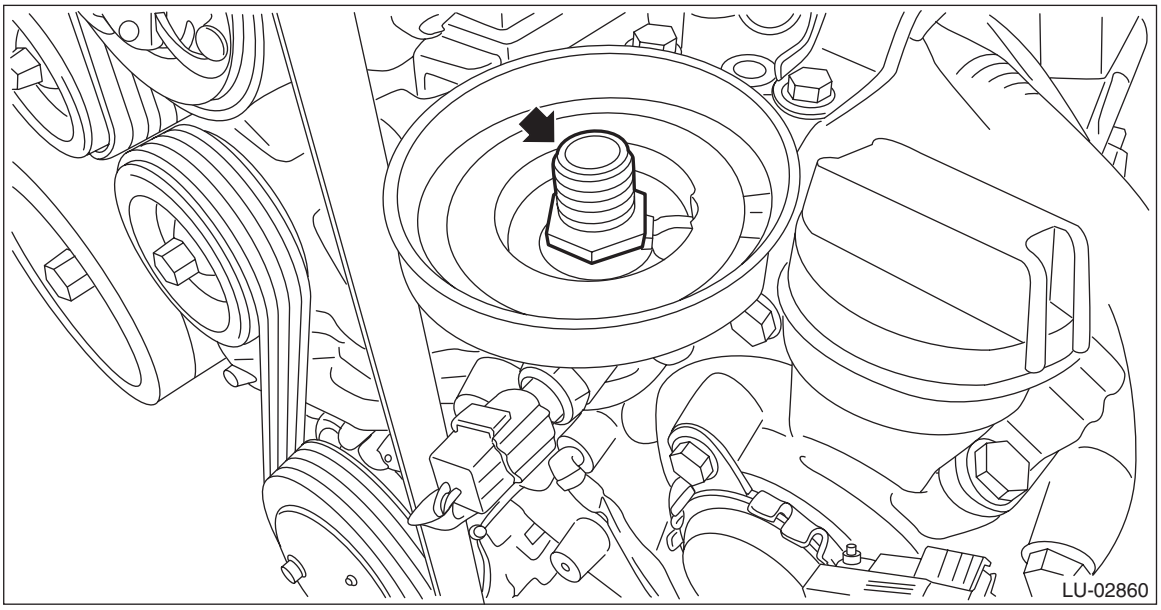
Remove the oil filter using ST.
ST 18332AA000 OIL FILTER WRENCH (outer diameter: 68 mm (2.68 in) for oil filter)
- Oil filter (blue)

Remove using a general tool (65/67 mm 14 Flutes).



2. OIL PUMP UNION

1) Remove the oil filter. <Ref. to LU(H4DO(w/o HEV))-29, OIL FILTER, REMOVAL, Engine Oil Filter.>
2) Remove the oil pump union from the chain cover.



B: INSTALLATION

1. OIL FILTER

CAUTION:
Do not tighten excessively, or oil may leak.
1) Clean the oil filter installing surface on the chain cover.
2) Obtain a new oil filter and apply a thin coat of engine oil to the seal rubber.
3) Install the oil filter by turning it by hand, being careful not to damage the seal rubber of the oil filter.
• Tighten the oil filter (Black) with an outer diameter of 68 mm (2.68 in) (approx. 1 rotation) after the seal rubber of the oil filter comes in contact with chain cover. When using a torque wrench, tighten to 14 N·m (1.4 kgf-m, 10.3 ft-lb).
• Tighten the oil filter (Blue) with an outer diameter of 67.4 mm (2.65 in) (approx. 7/8 rotation) after the seal rubber of the oil filter comes in contact with chain cover. When using a torque wrench, tighten to 12 N·m (1.2 kgf-m, 8.9 ft-lb).
4) After installing, check the engine oil level and replenish it if necessary. <Ref. to LU(H4DO(w/o HEV))-12, INSPECTION, Engine Oil.>

2. OIL PUMP UNION

Install in the reverse order of removal.

Tightening torque:
45 N·m (4.6 kgf-m, 33.2 ft-lb)

C: INSPECTION

1) After installing the oil filter, run the engine and check for oil leakage.

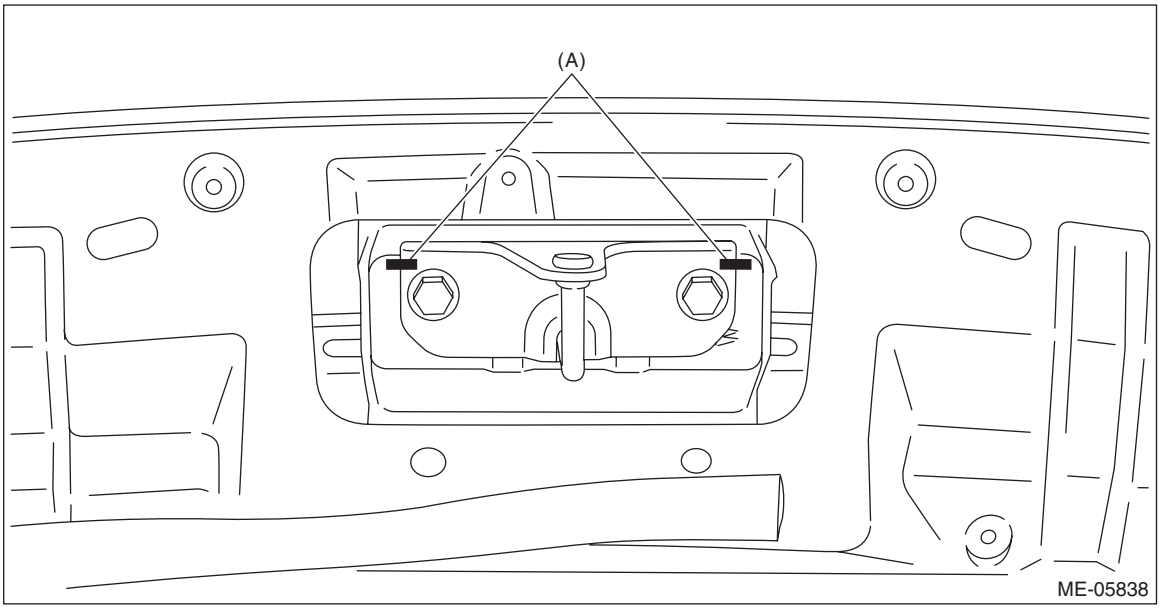
NOTE:
The filter element and filter case are permanently jointed; therefore, interior cleaning is not necessary.
2) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, INSPECTION, Engine Oil.>

8. Oil Level Switch

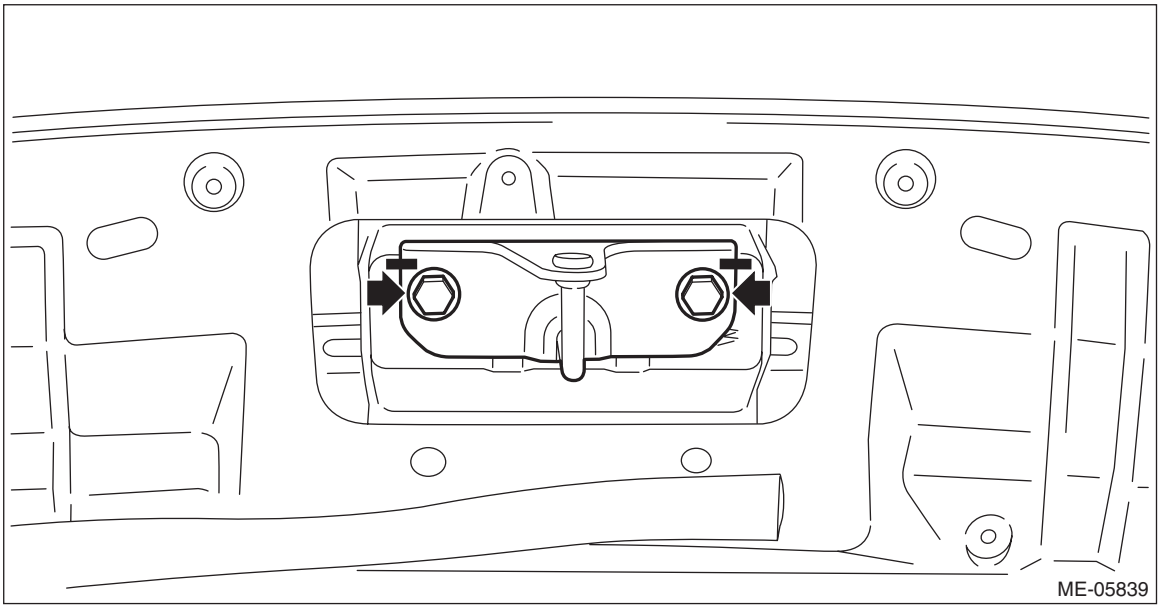
A: REMOVAL

1. GASOLINE ENGINE MODEL

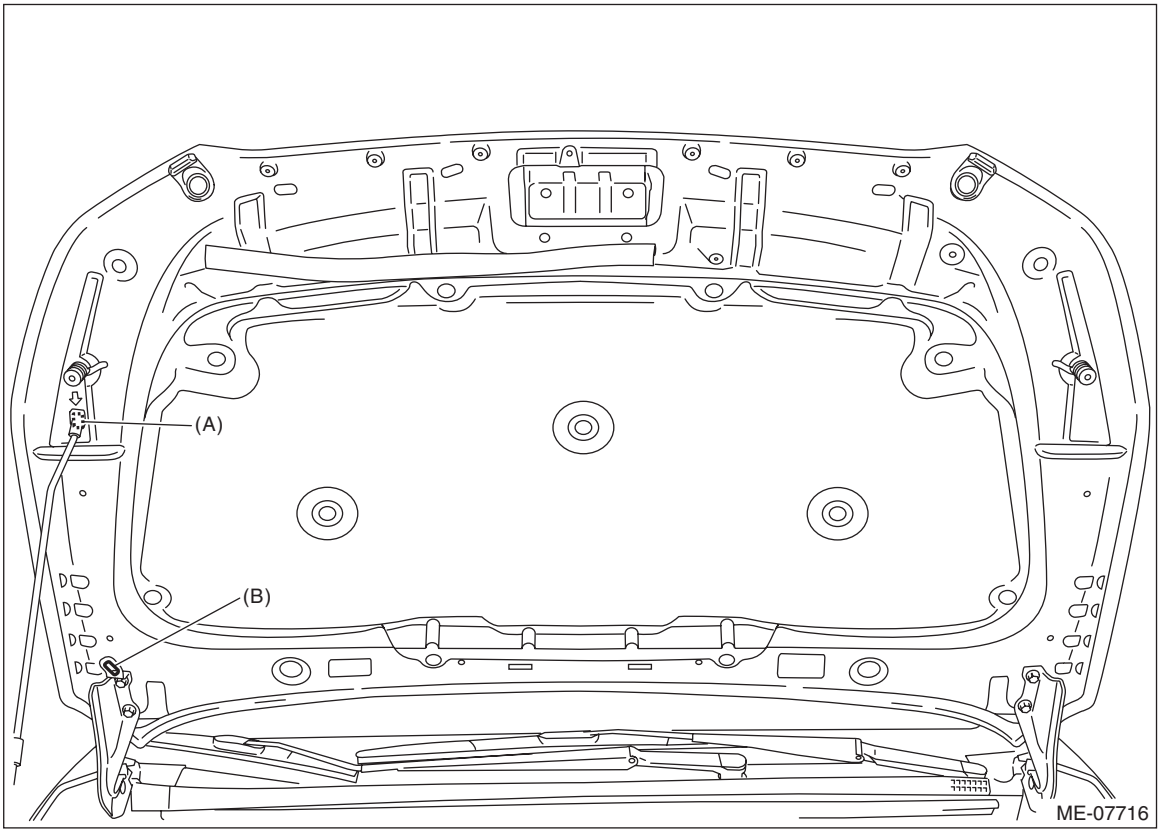
1) Open the front hood, and make alignment marks (A) on the front hood striker and the front hood using a marker pen.



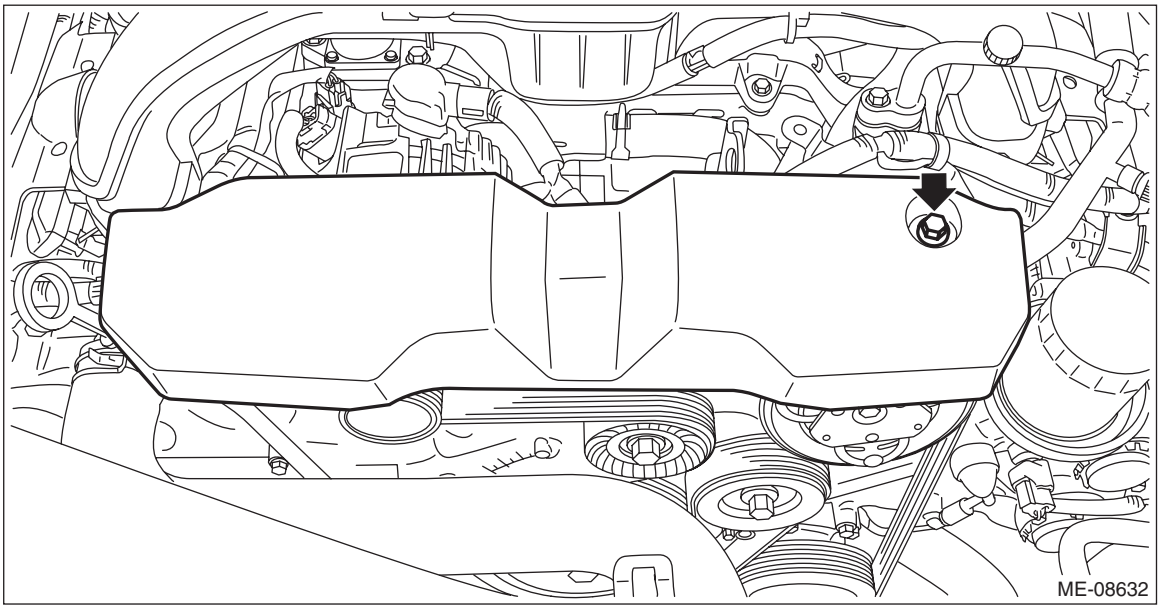
2) Remove the front hood striker from the front hood.



3) Change the front hood stay position from (A) to (B), and completely open the front hood.

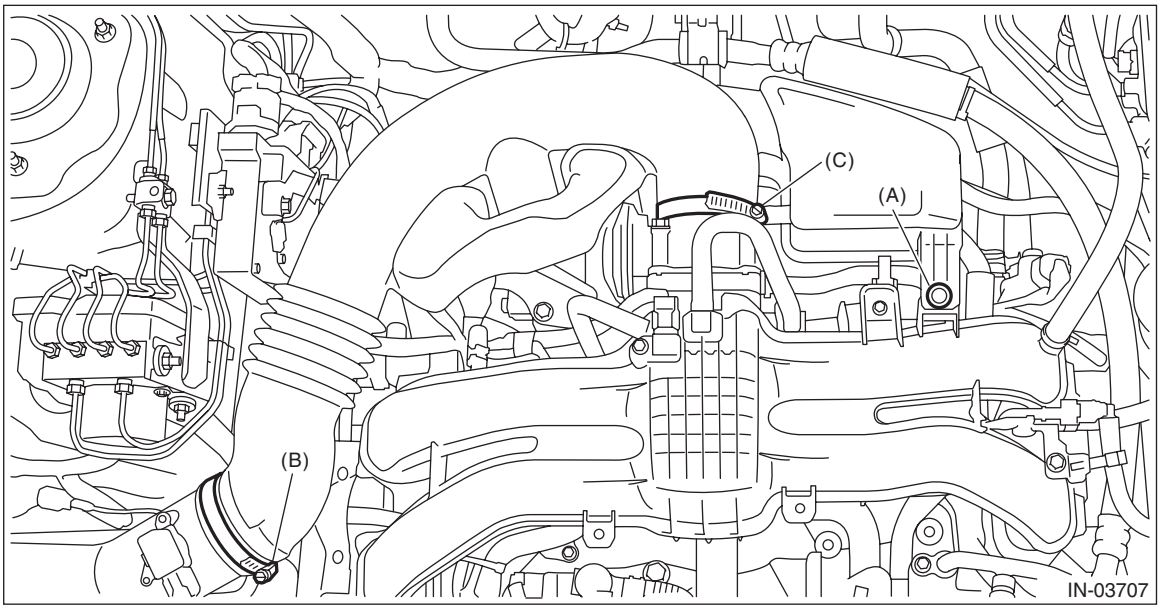


4) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
5) Remove the V-belt covers.

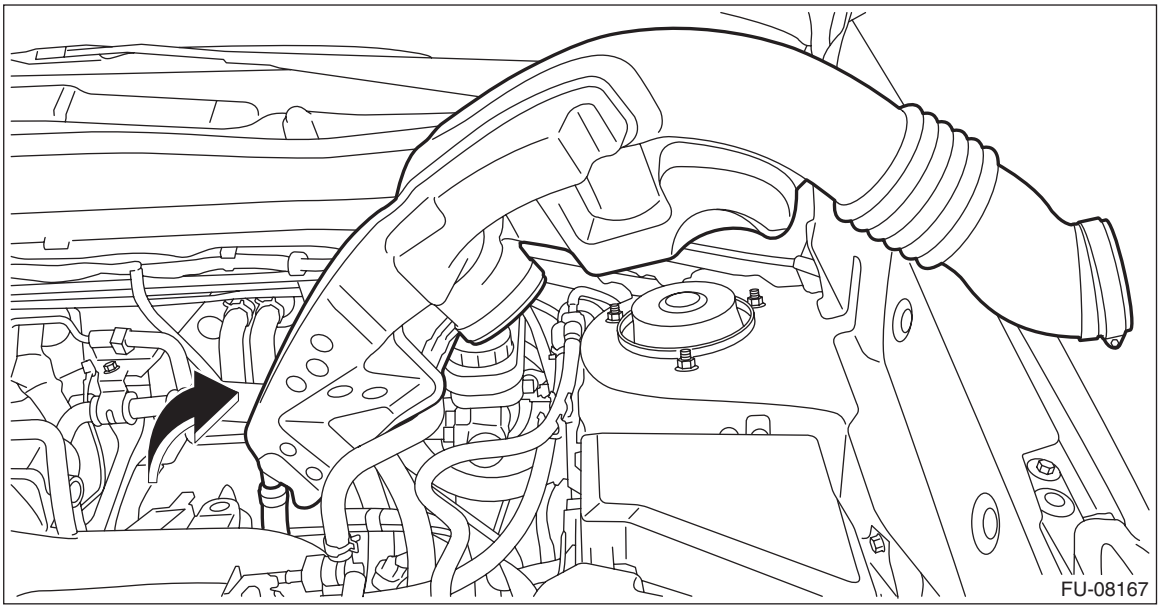


6) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
7) Remove the clip (A) from the air intake boot.
8) Loosen the clamp (B) securing the air cleaner case (rear) to the air intake boot.

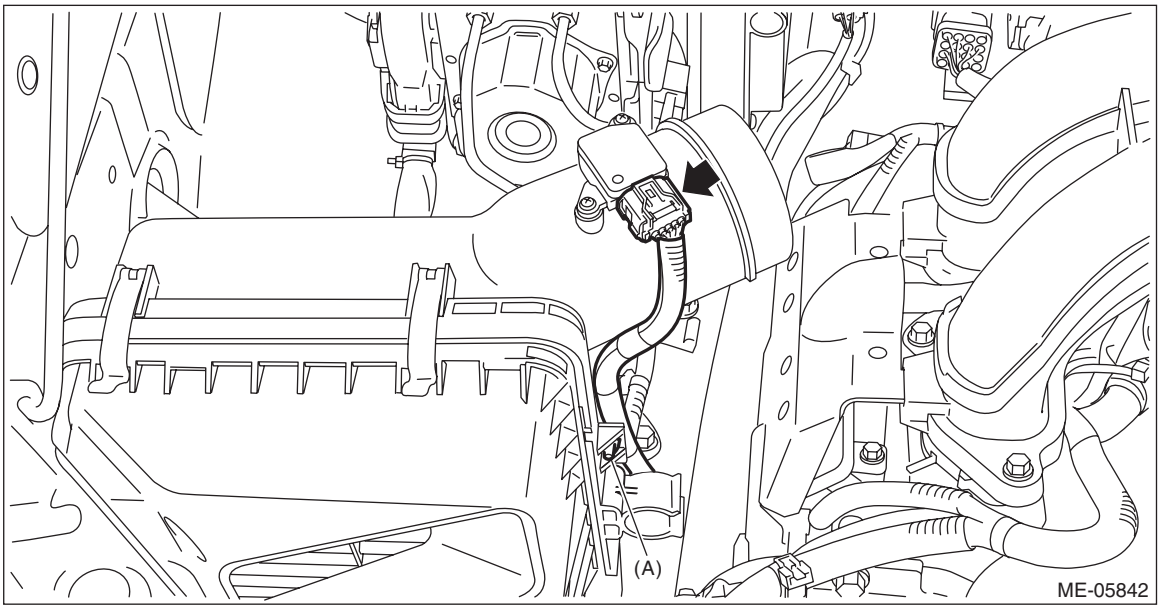
9) Loosen the clamp (C) which secures the throttle body to the air intake boot.



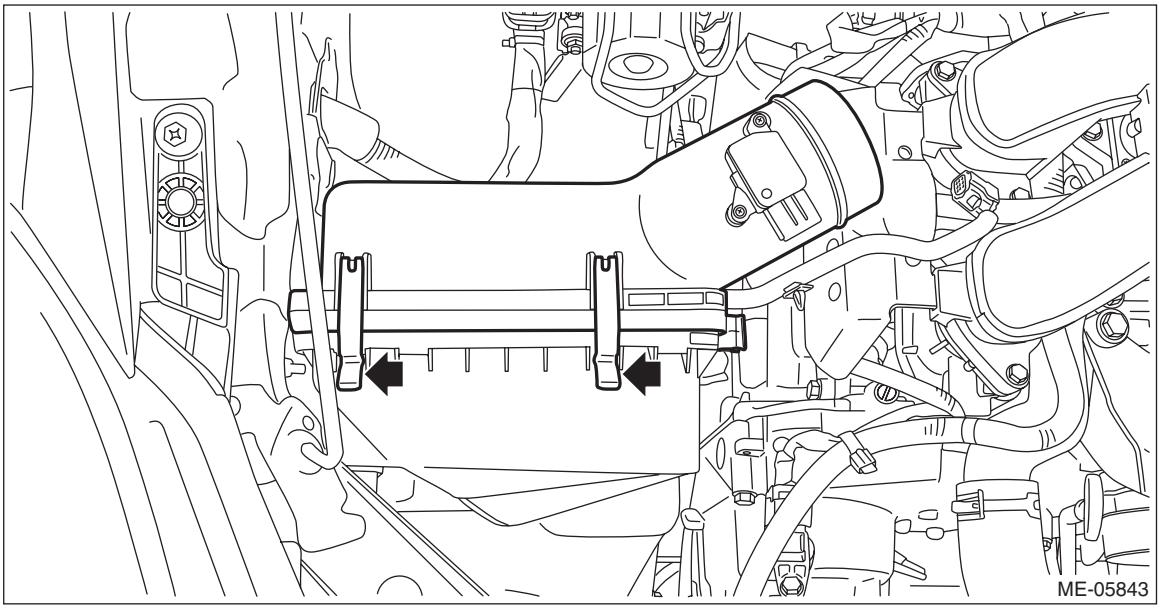
10) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



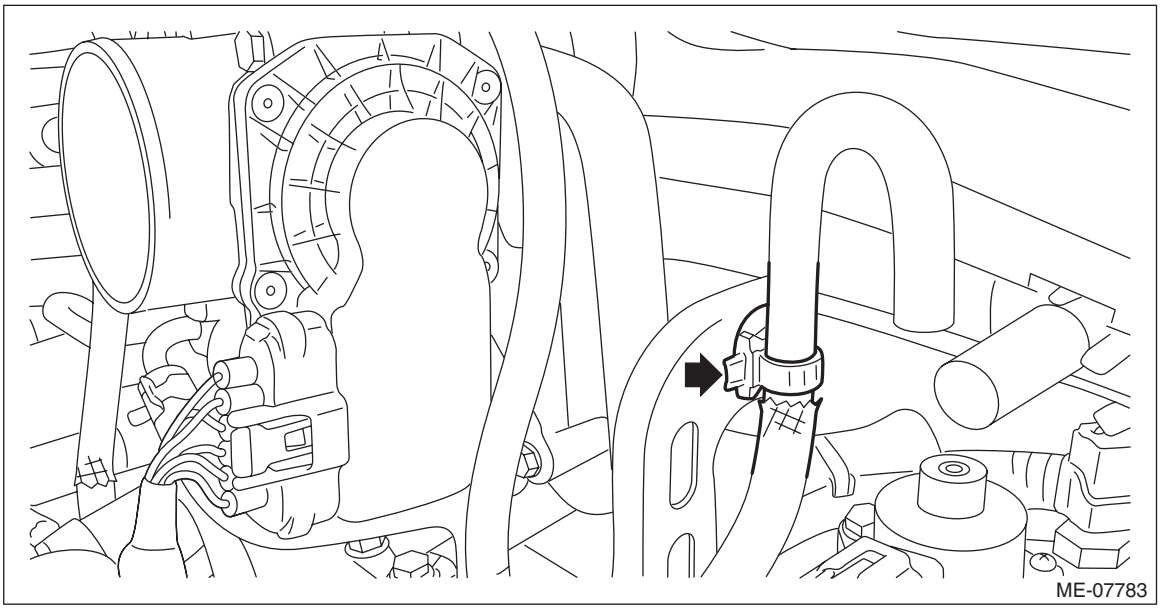
11) Disconnect the connector from the mass air flow and intake air temperature sensor, and remove the clip (A) which holds the mass air flow and intake air temperature sensor harness.



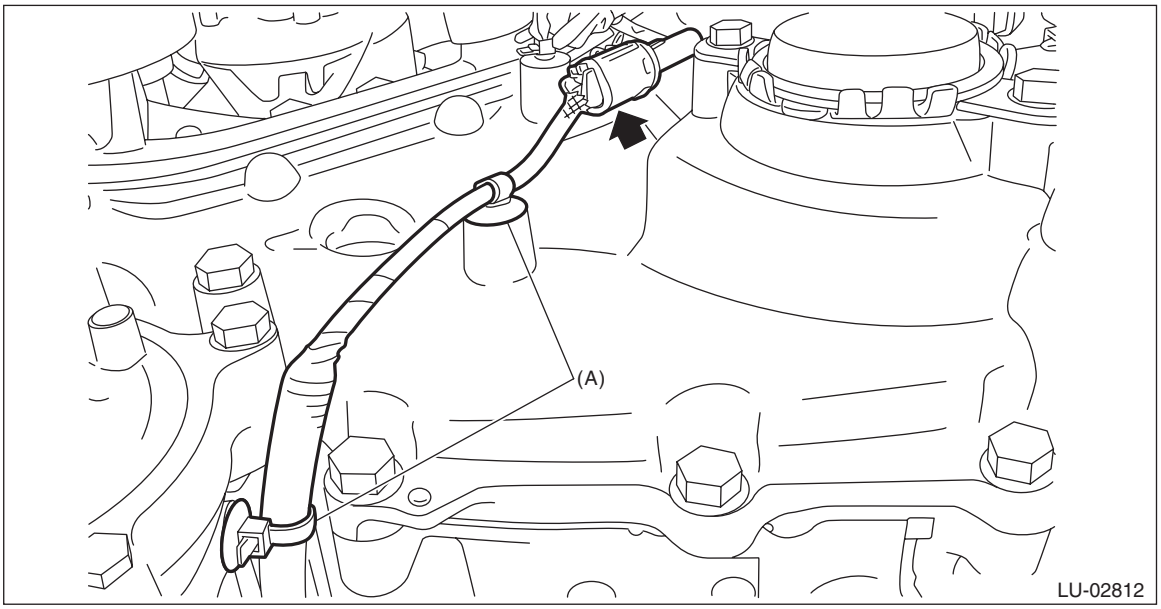
12) Remove the air cleaner case (rear).



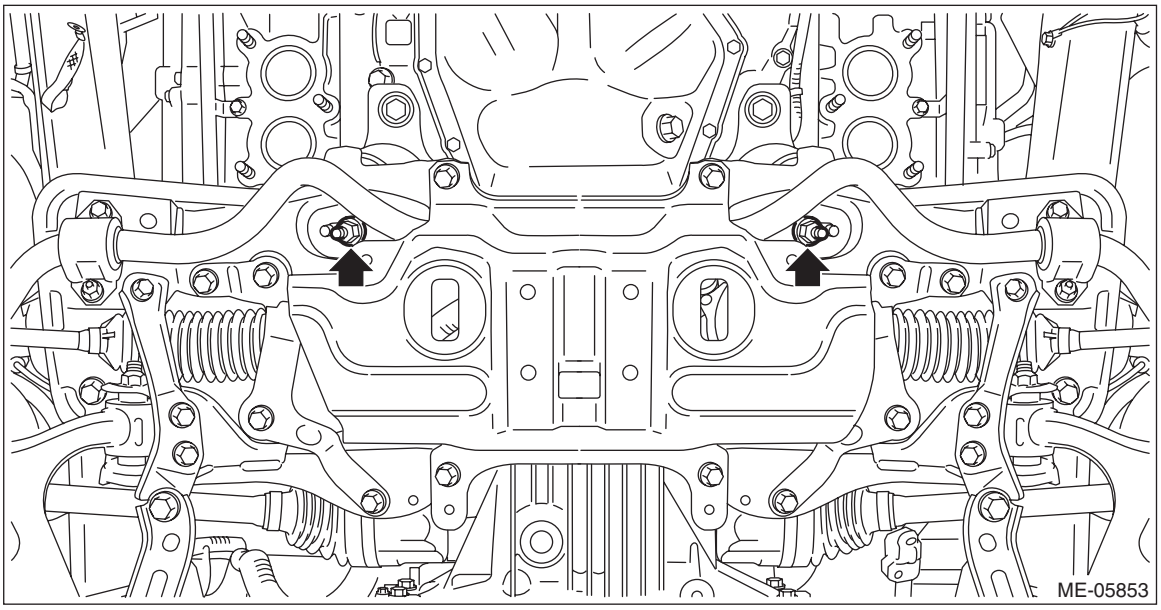
13) Remove the clip holding the air breather hose to the engine rear hanger. (MT model)



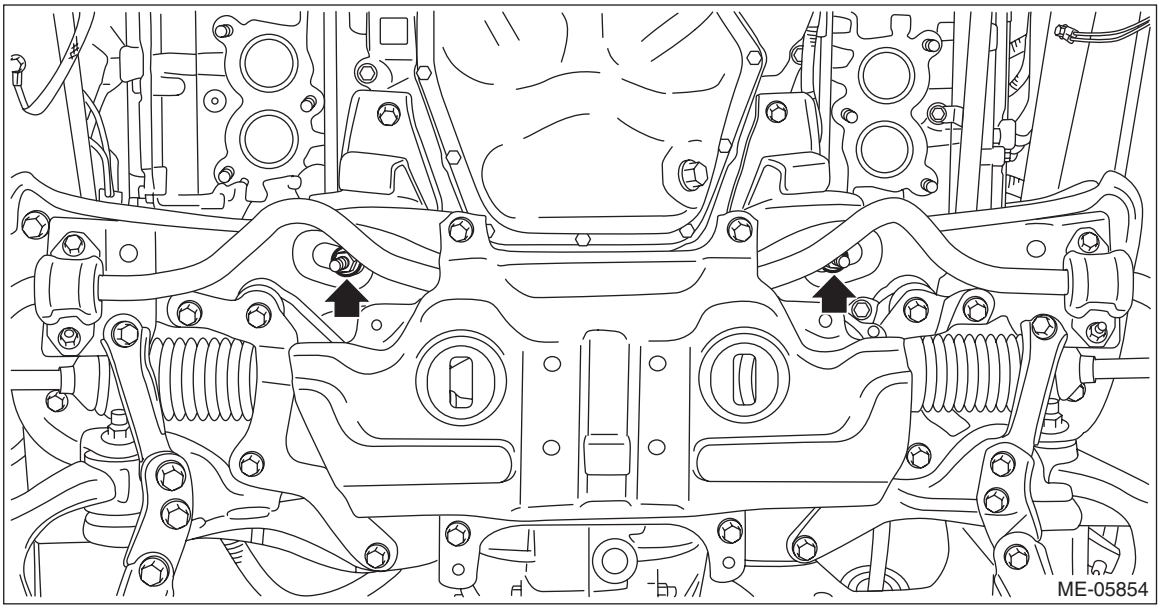
14) Lift up the vehicle.
15) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
16) Drain the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
17) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
18) Disconnect the oil level switch connector from the engine harness, and remove the clip (A) securing the harness.



19) Remove the nuts which secure the engine mounting to the front crossmember. (CVT model)

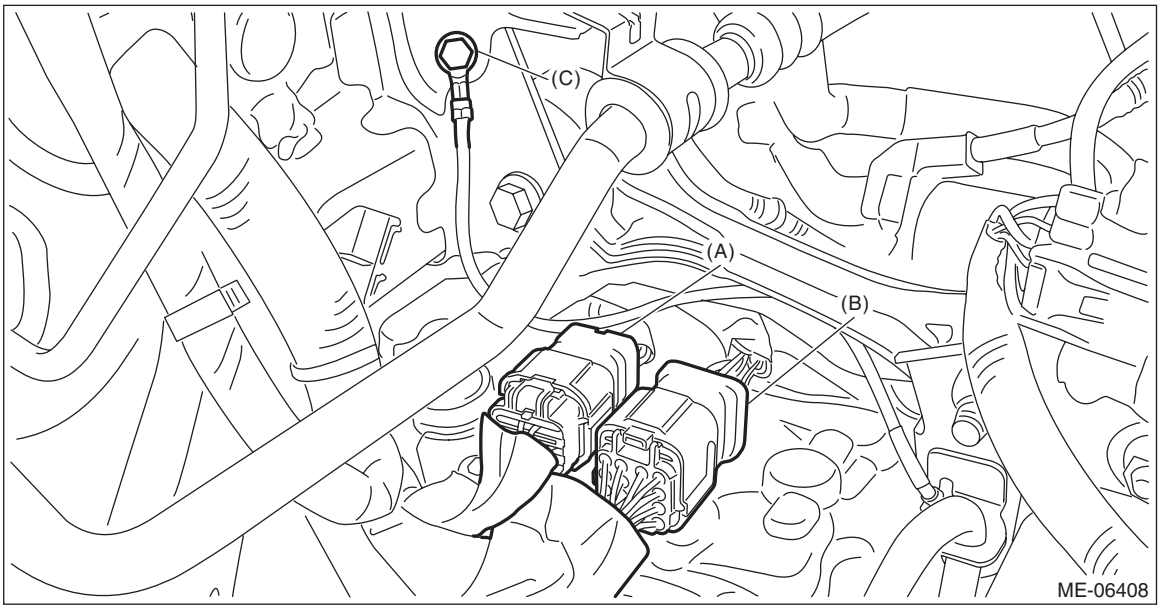


20) Remove the nuts which secure the engine mounting to the front crossmember. (MT model)

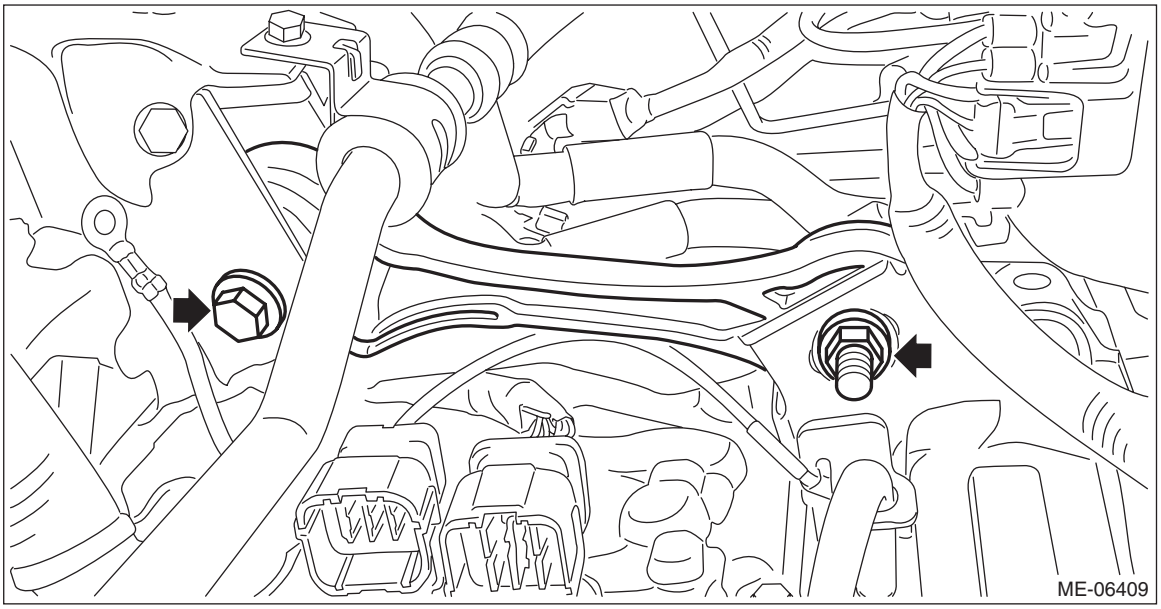


21) Remove the electric power steering gearbox. <Ref. to PS-25, REMOVAL, Electric Power Steering Gearbox.>
22) Remove the front drive shaft LH. <Ref. to DS-54, REMOVAL, Front Drive Shaft.>
23) Lower the vehicle.

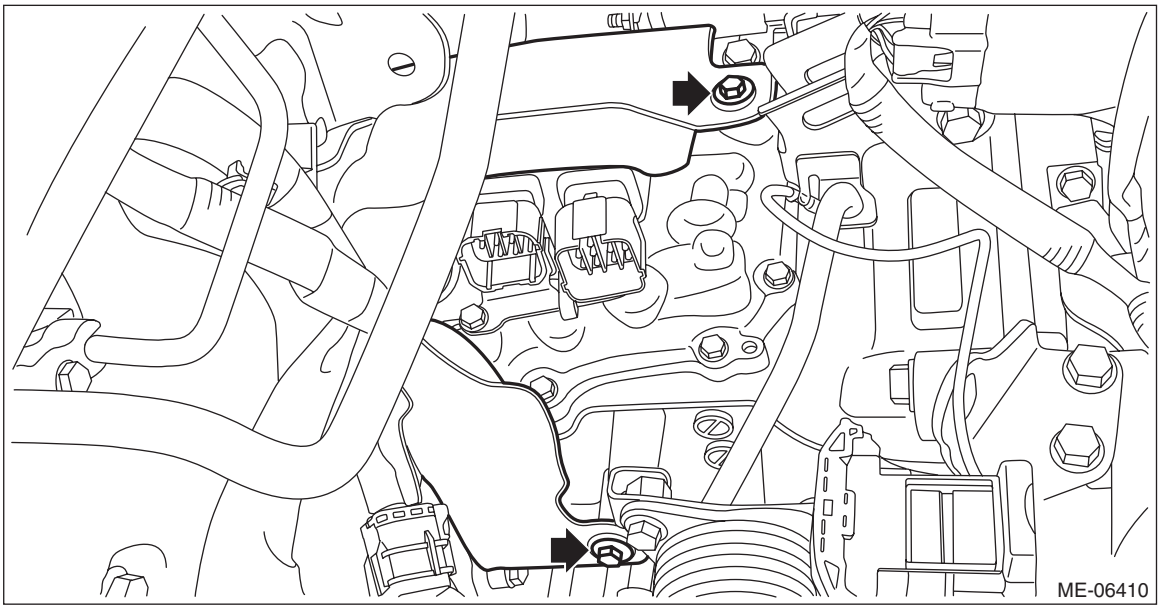
24) Disconnect the bulkhead harness connector from the transmission harness connector (A) and the inhibitor harness connector (B), and disconnect the transmission radio ground terminal (C) from the vehicle body. (CVT model)



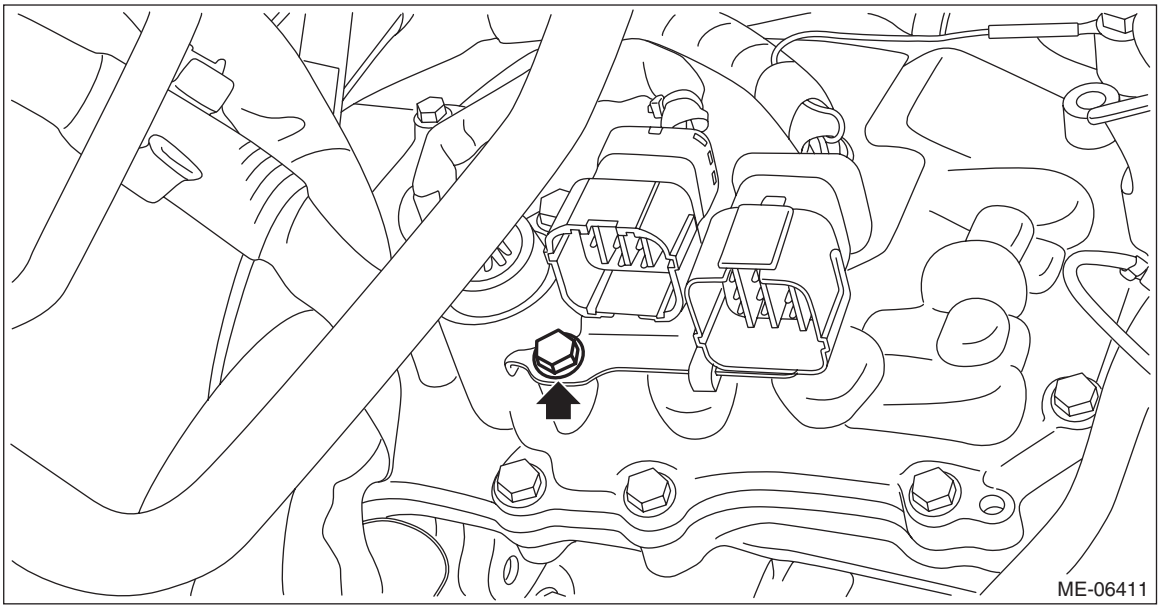
25) Remove the pitching stopper.



26) Remove the transmission cover. (CVT model)

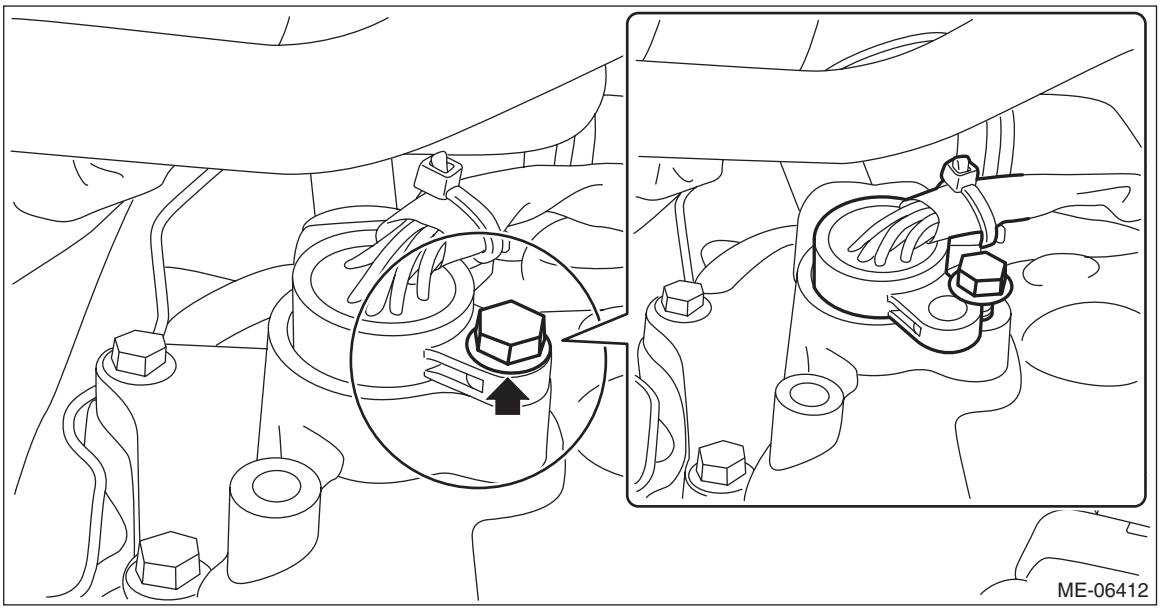


27) Remove the bolt which holds the transmission harness stay. (CVT model)



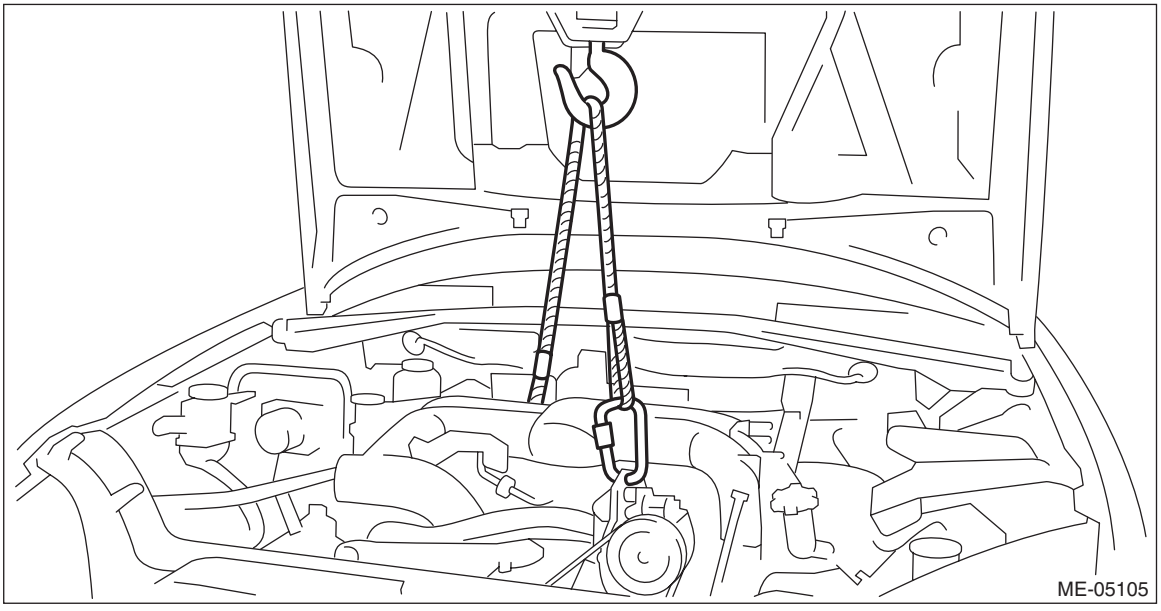
28) Remove the bolt which holds the transmission harness to the control valve body, and turn the transmission harness clockwise till the bolt hole can be seen as shown in the figure, and tighten the bolt to temporary lock the harness. (CVT model)

NOTE:
This procedure is required to prevent the transmission harness from touching the vehicle body during engine removal/installation.

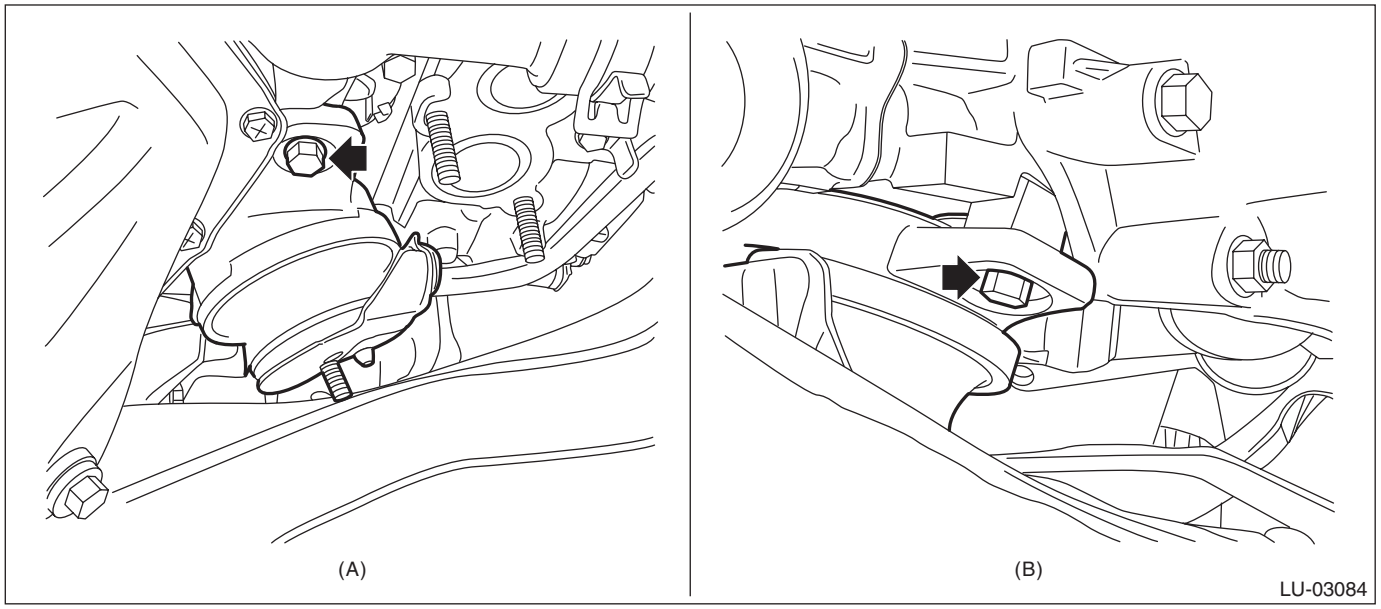


29) Lift up the engine with a lifting device and wire ropes.

CAUTION:
When lifting up the engine, pay attention to the clearance of each part and be careful not to lift the engine too much, in order to prevent damaging the vehicle.

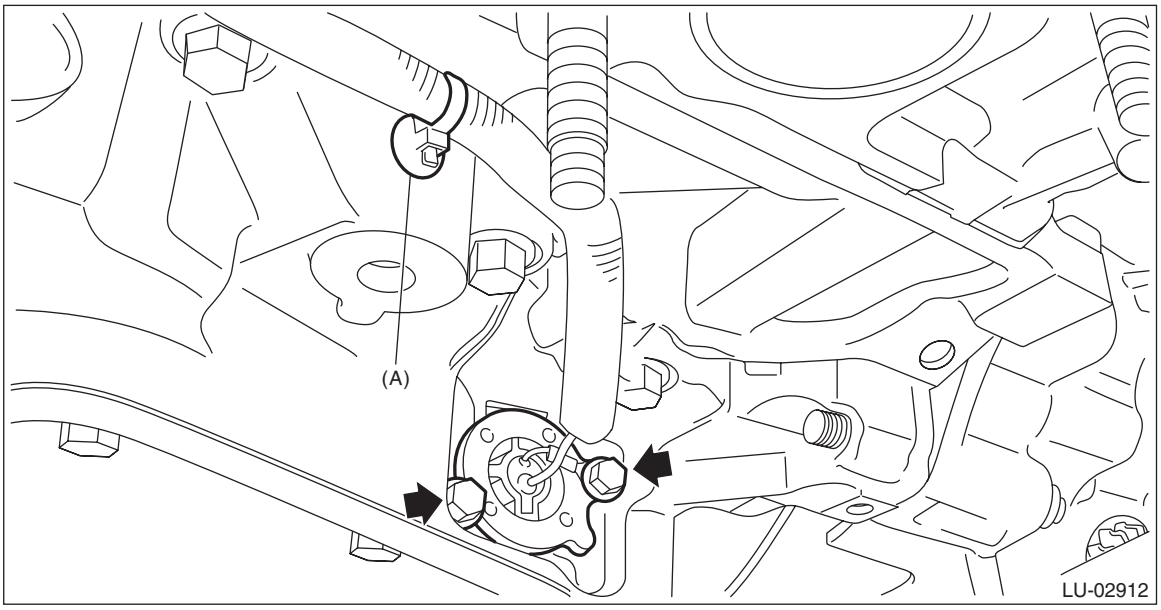


30) Remove the engine mounting LH from the engine.



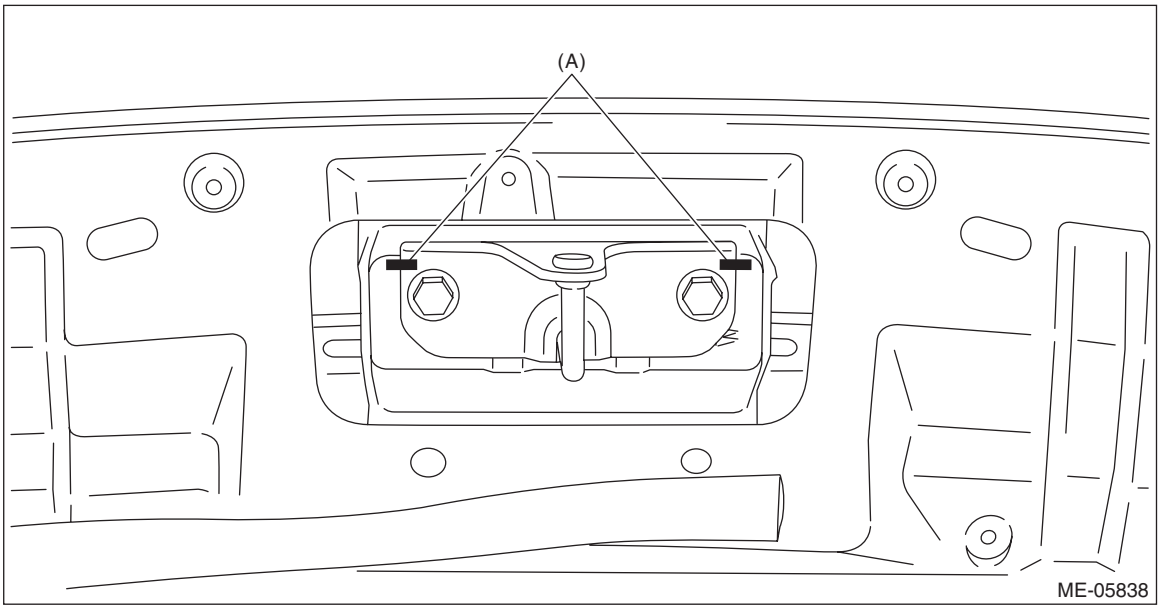
(A) Front side (B) Rear side

31) Remove clip (A) from the oil pan upper, and remove the oil level switch.

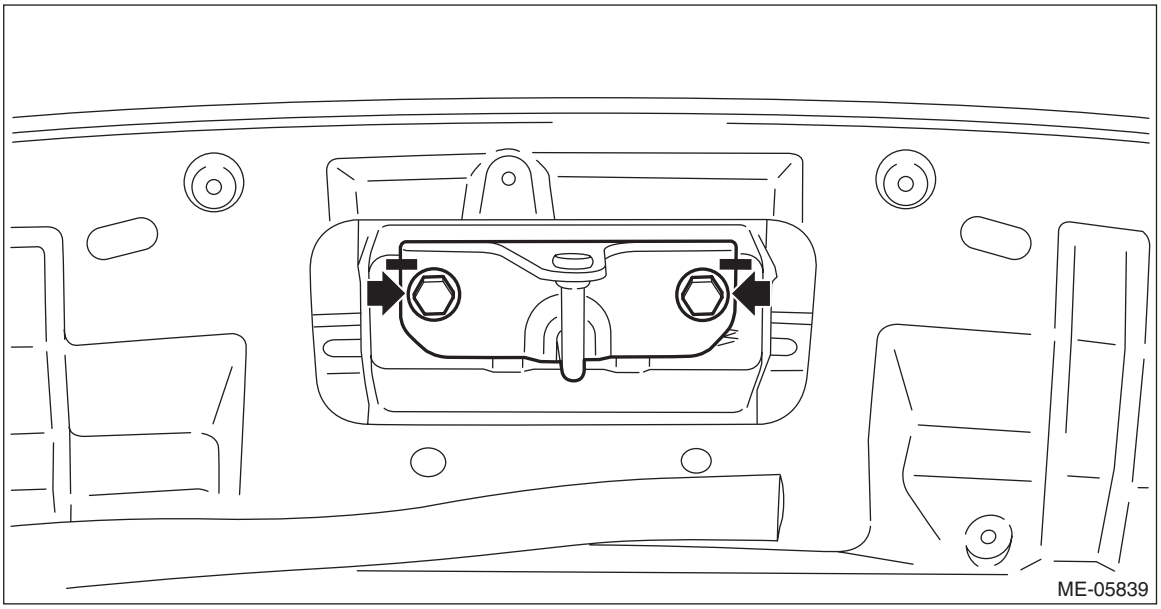


2. HEV MODEL

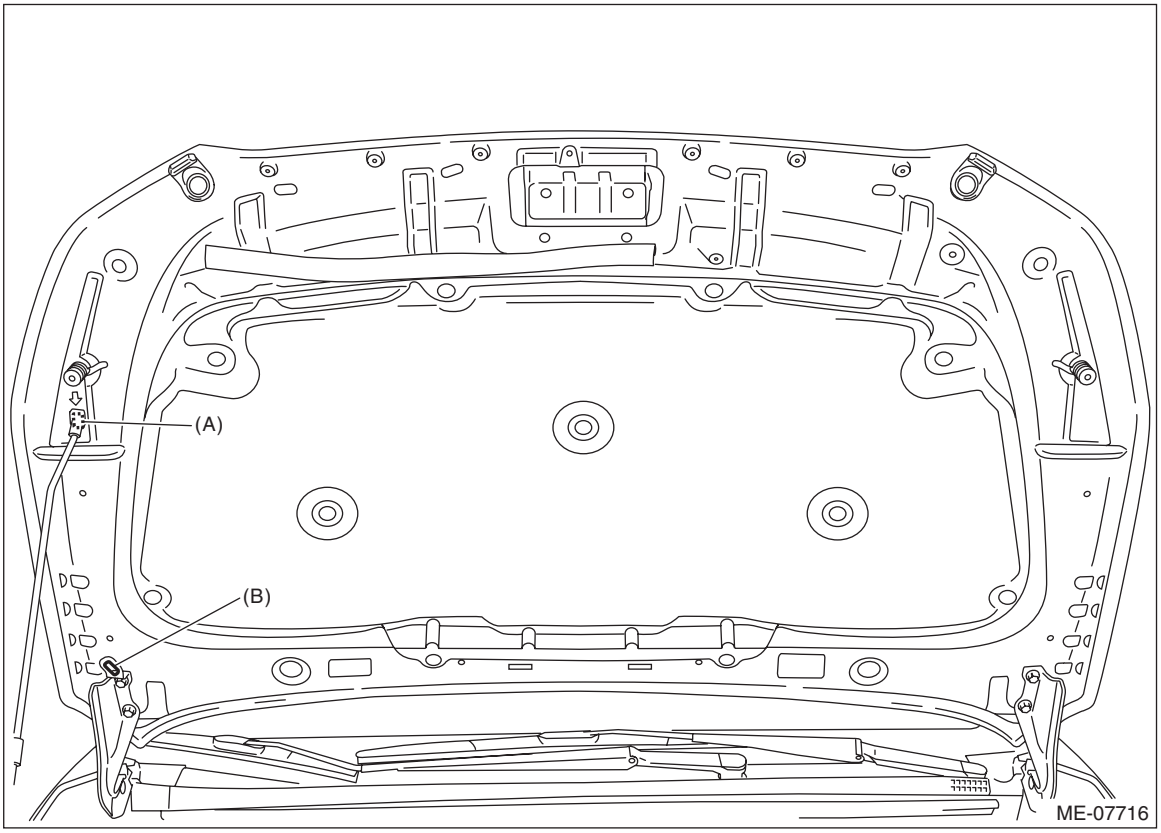
1) Turn the ignition switch to OFF.
2) Open the front hood, and make alignment marks (A) on the front hood striker and the front hood using a marker pen.



3) Remove the front hood striker from the front hood.



4) Change the front hood stay position from (A) to (B), and completely open the front hood.

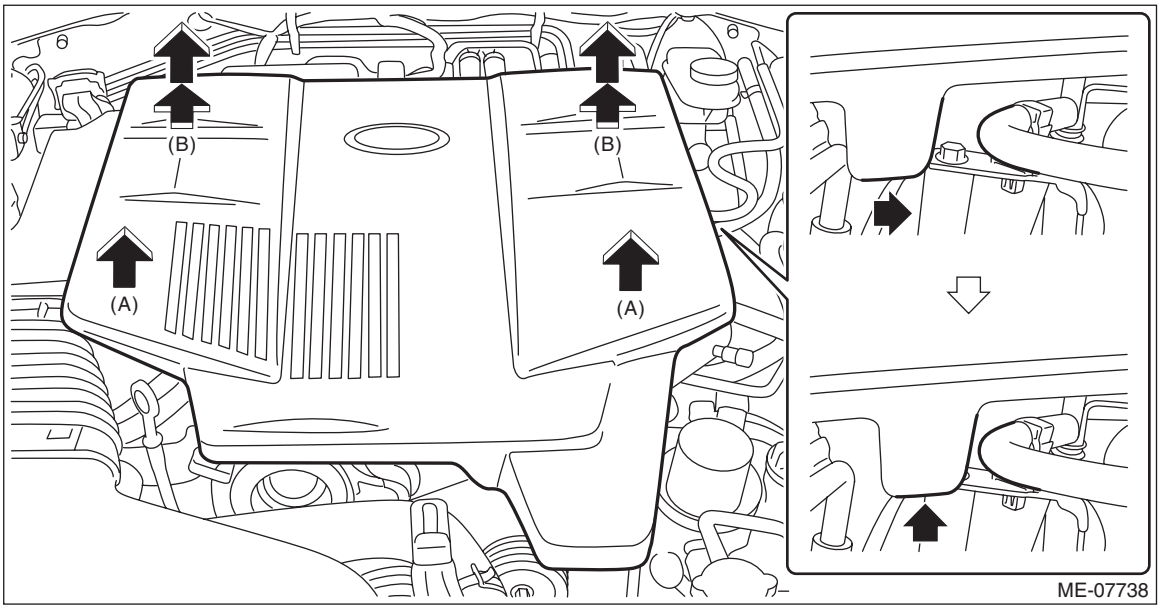


5) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

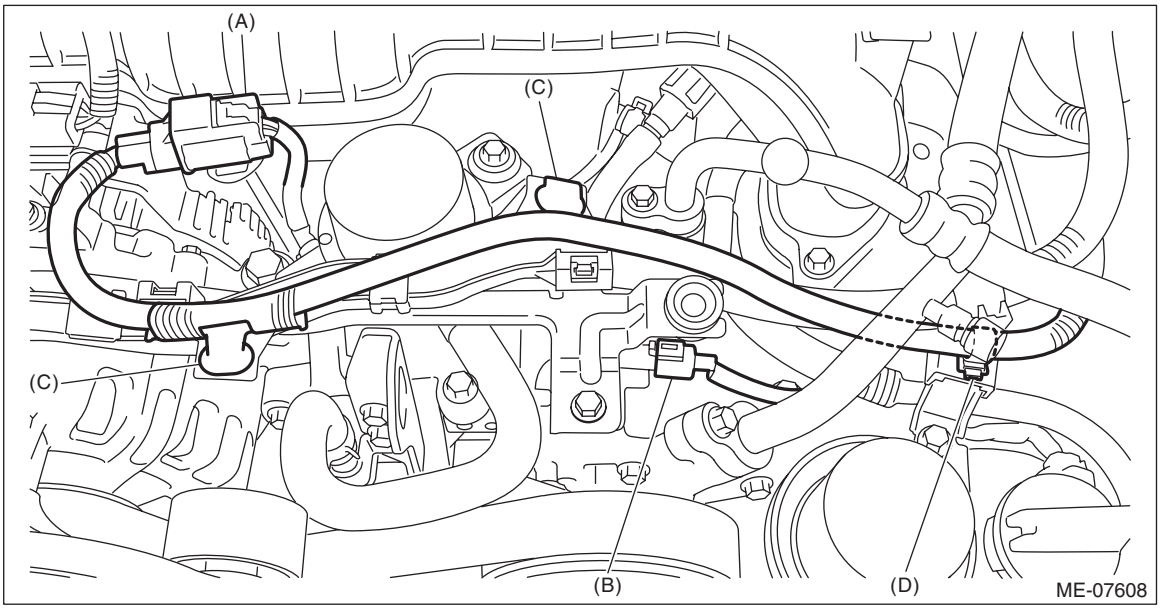
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

6) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

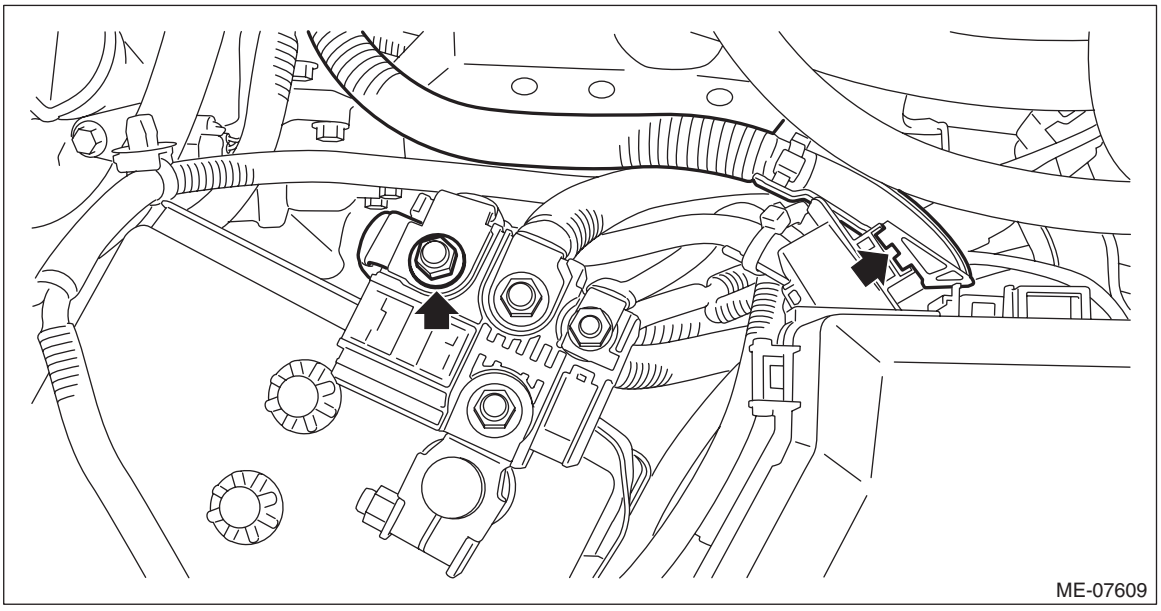
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



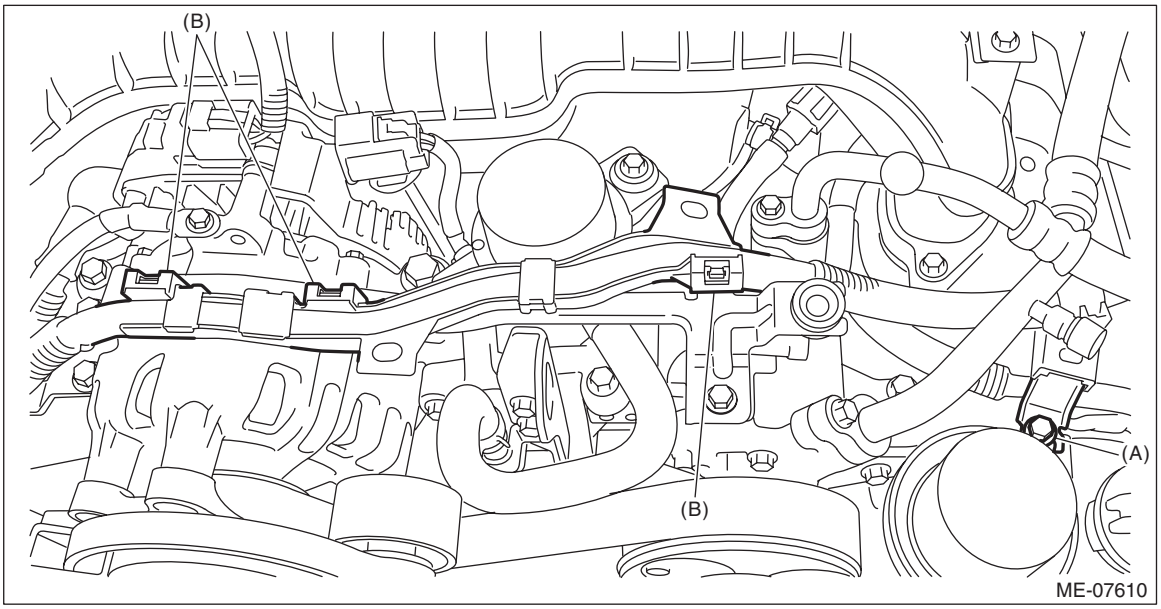
7) Remove the air intake duct. <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
8) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
9) Disconnect the connector (A) from the brake vacuum pump, and disconnect the connector (B) from the A/C compressor.
10) Remove the clip (C) and the clip (D) securing the harness to the battery cable assembly, and move the harness to the left side wheel apron.



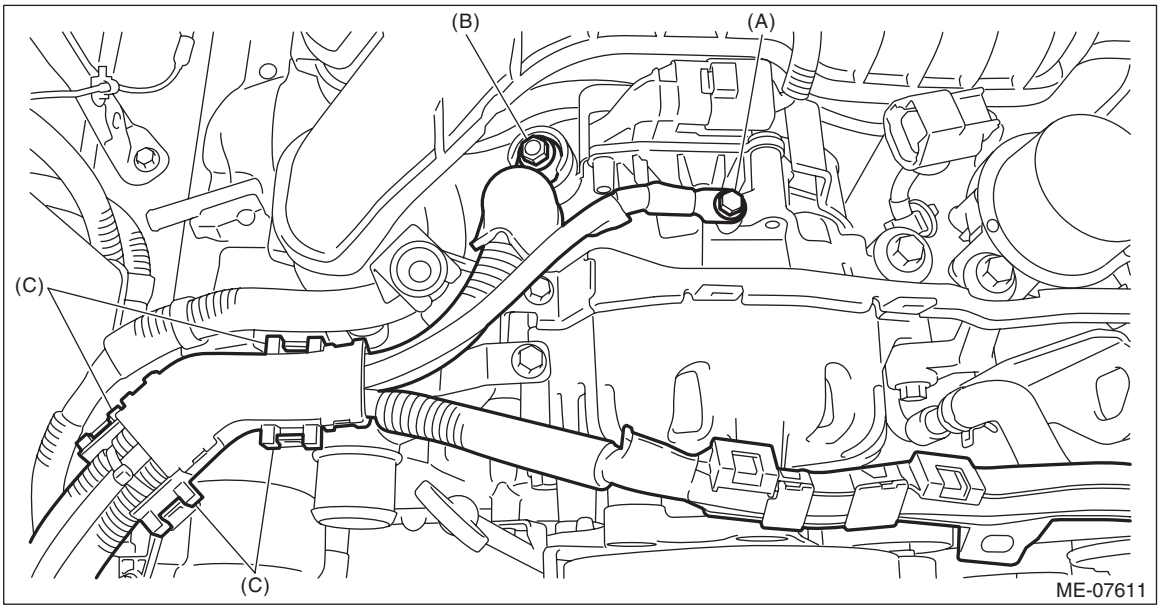
11) Remove the terminal boot from the positive terminal of the 12 volt auxiliary battery.
12) Remove the nuts fastening the battery cable assembly to the slow blow fuse (12 volt auxiliary battery), and remove the battery cable assembly from the main fuse box.



13) Remove the bolt (A) securing the battery cable stay to the chain cover, and remove the clip (B) securing the battery cable assembly to the collector cover bracket.

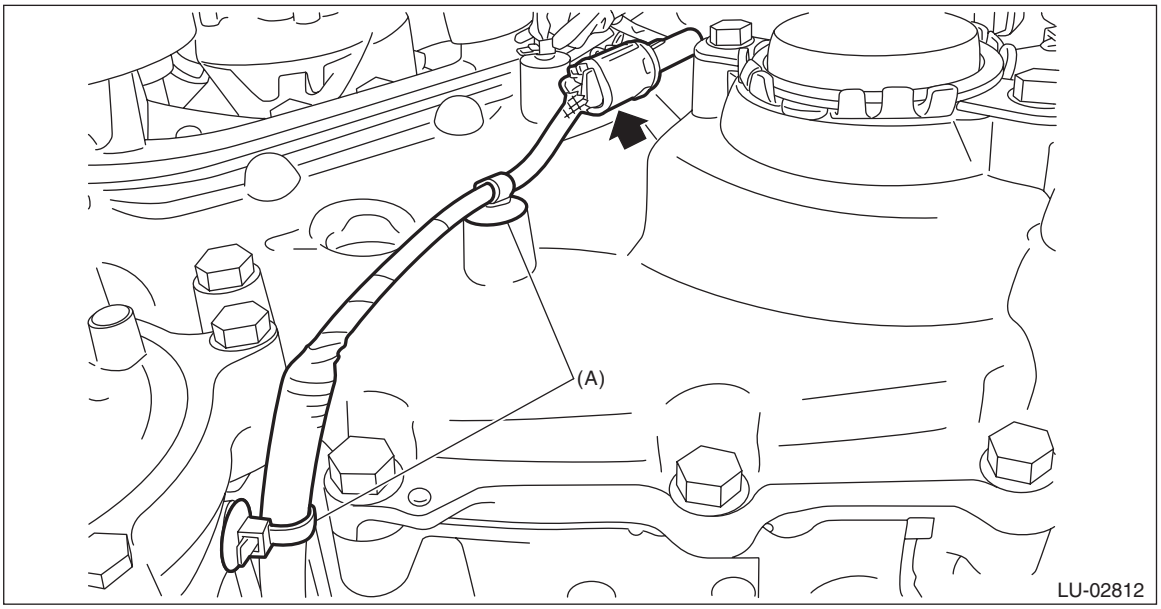


14) Disconnect the terminal (A) and the terminal (B) from ISG.
15) Remove the clip (C) securing the battery cable assembly to the battery cable bracket No. 1, and move the battery cable assembly to the right side wheel apron.

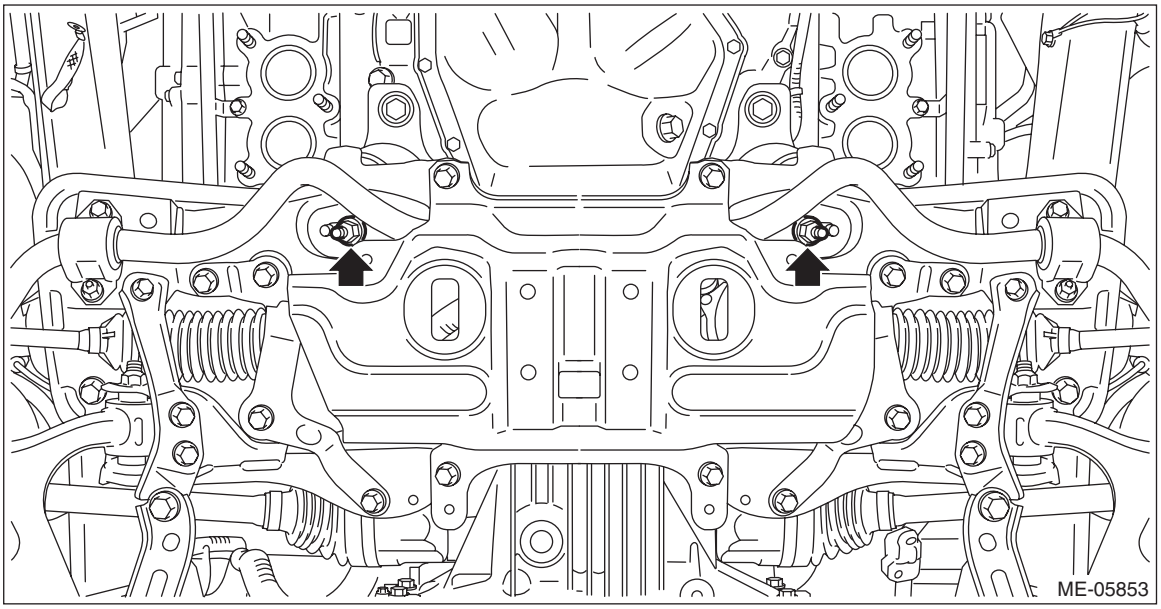


16) Lift up the vehicle.
17) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
18) Drain the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
19) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>

20) Disconnect the oil level switch connector from the engine harness, and remove the clip (A) securing the harness.

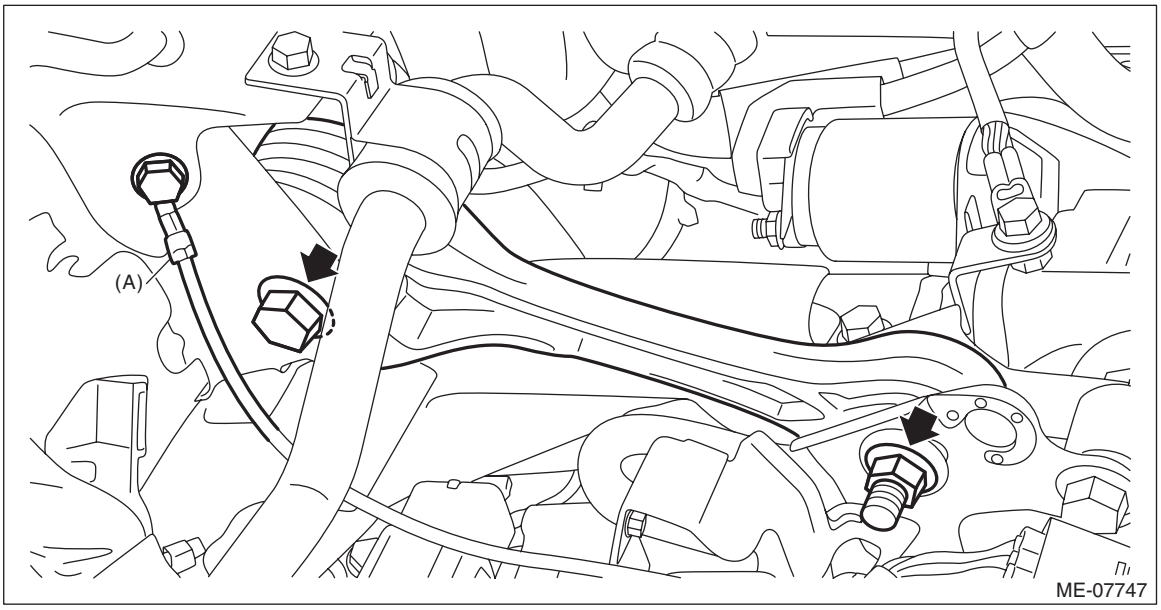


21) Remove the nuts which secure the engine mounting to the front crossmember.

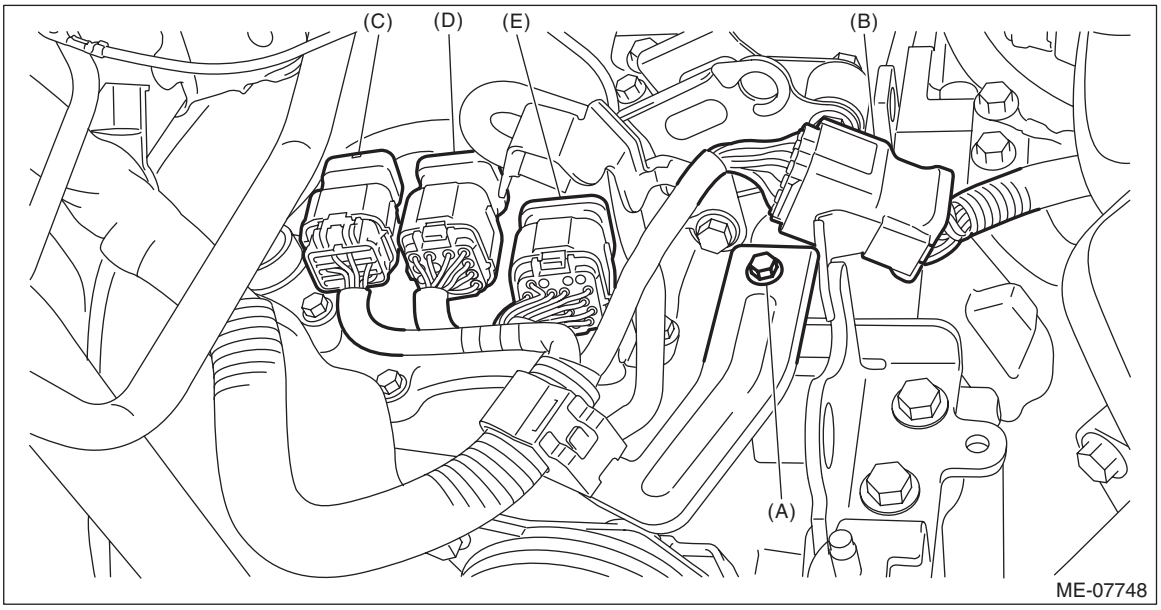


22) Remove the electric power steering gearbox. <Ref. to PS-25, REMOVAL, Electric Power Steering Gearbox.>
23) Remove the front drive shaft LH. <Ref. to DS-54, REMOVAL, Front Drive Shaft.>
24) Lower the vehicle.

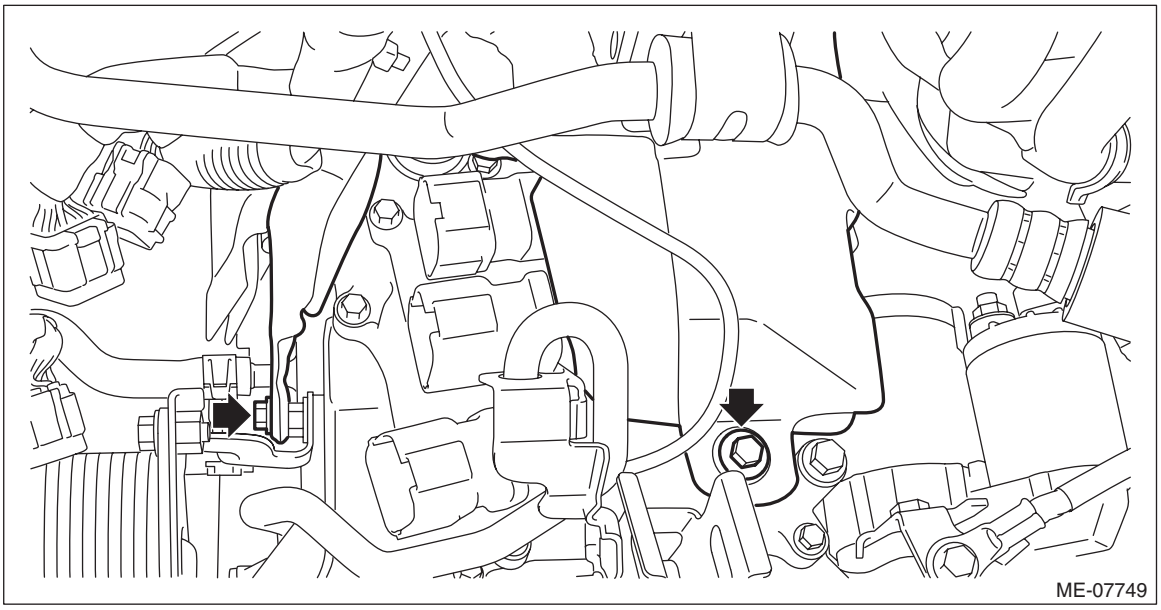
25) Disconnect the transmission radio ground terminal (A) from the vehicle, and remove the pitching stopper.



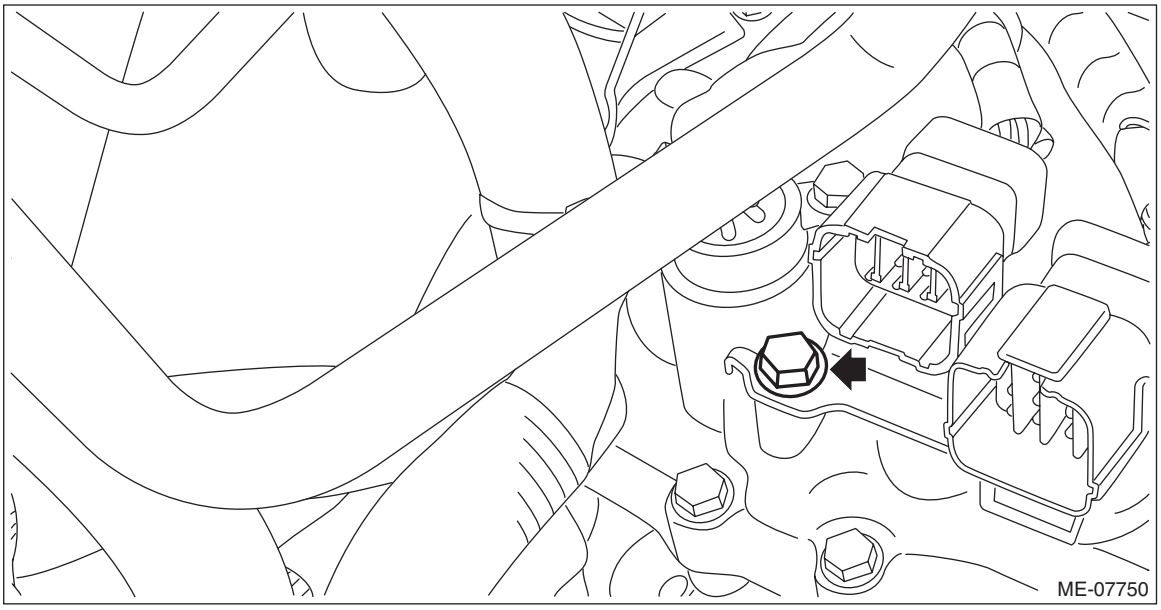
26) Remove the bolt (A) securing the bulkhead harness connector bracket, and disconnect the bulkhead harness connector from the engine harness connector (brown) (B).
27) Disconnect the bulkhead harness connector from the transmission harness connector (C), inhibitor harness connector (D) and drive motor harness connector (E).



28) Remove the transmission case cover.

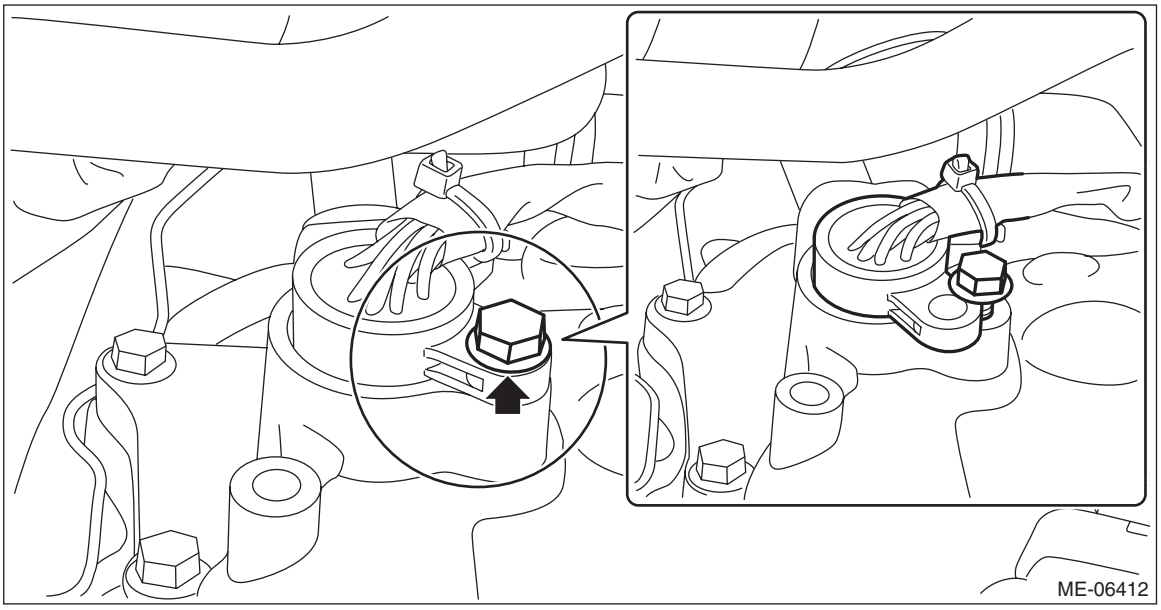


29) Remove the bolt which holds the transmission harness stay.



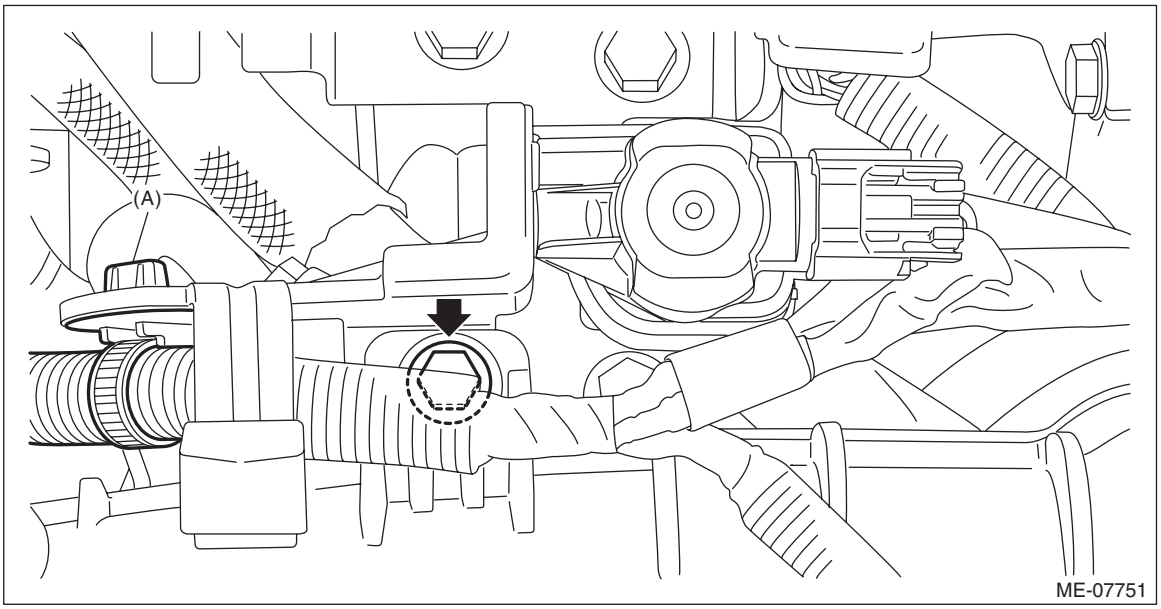
30) Remove the bolt which holds the transmission harness to the control valve body, and turn the transmission harness clockwise till the bolt hole can be seen as shown in the figure, and tighten the bolt to temporary lock the harness. (CVT model)

NOTE:
This procedure is required to prevent the transmission harness from touching the vehicle body during engine removal/installation.



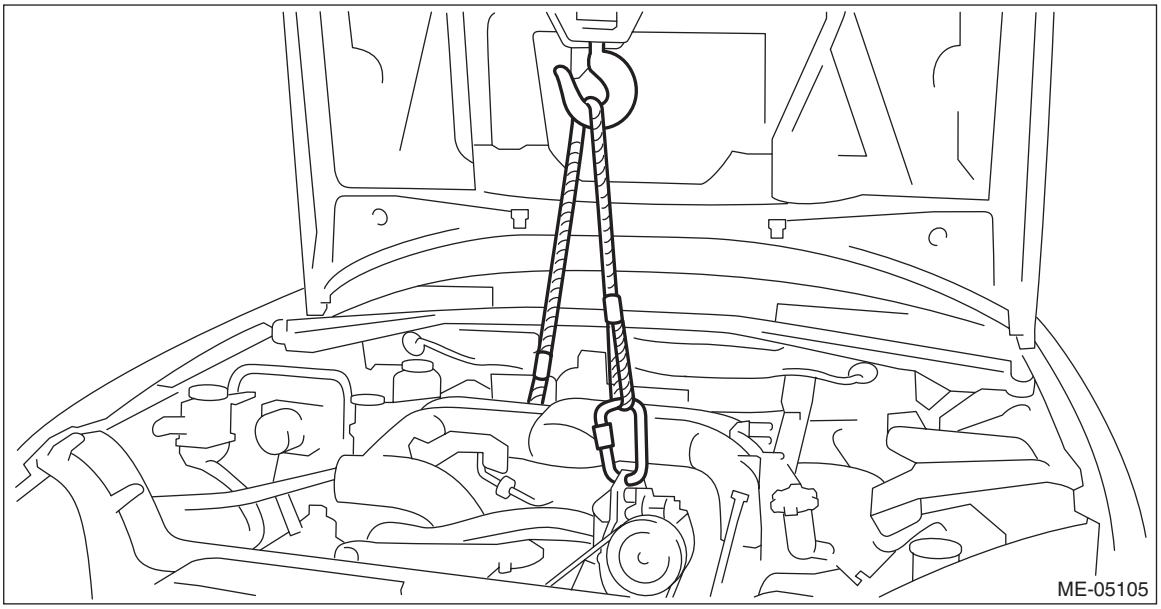
31) Remove the clip (A) securing the engine harness to the purge control solenoid valve bracket, and disconnect the bolt securing the purge control solenoid valve bracket to the intake manifold.

NOTE:
This operation is required to prevent the wire rope from contacting the purge control solenoid valve while lifting the engine.

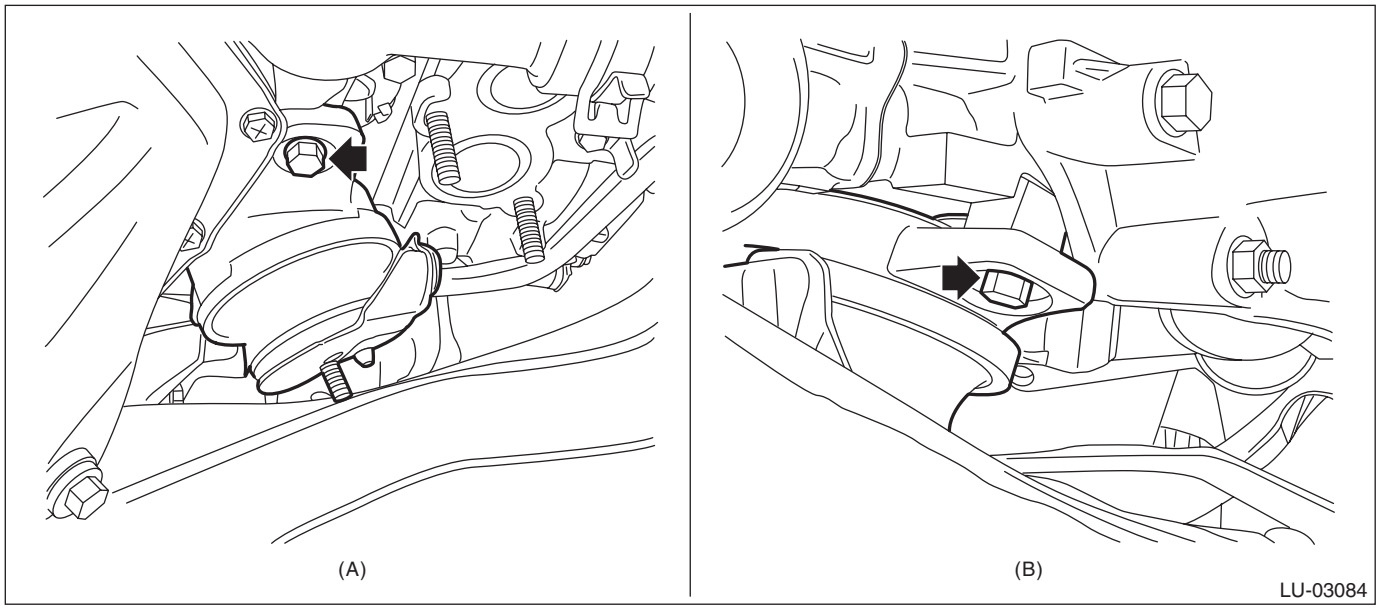


32) Lift up the engine with a lifting device and wire ropes.

CAUTION:
When lifting up the engine, pay attention to the clearance of each part and be careful not to lift the engine too much, in order to prevent damaging the vehicle.

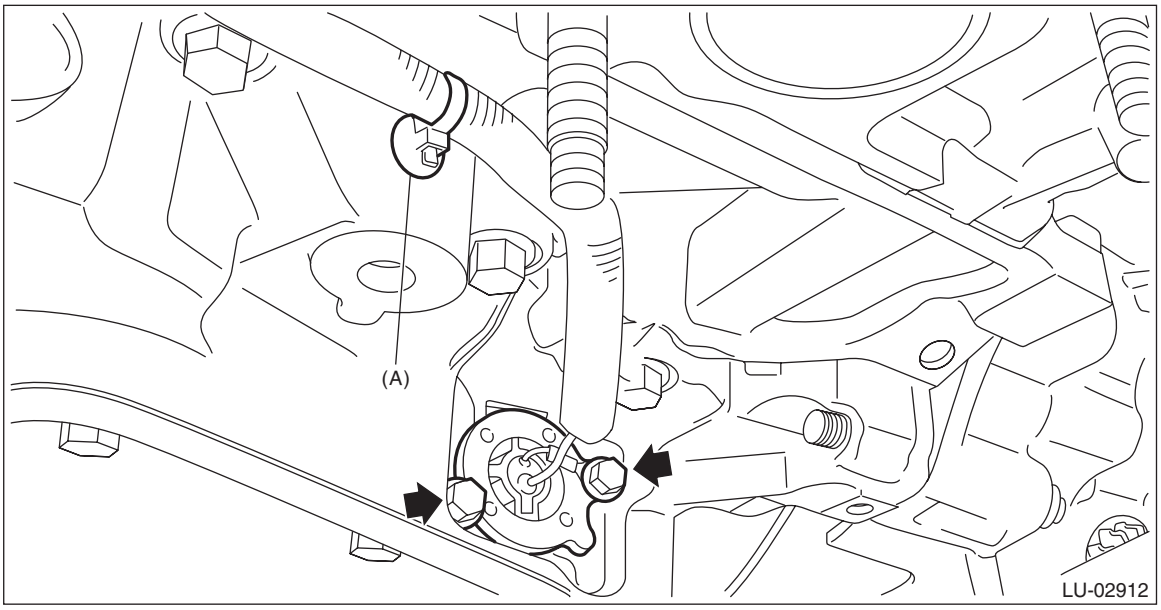


33) Remove the engine mounting LH from the engine.



(A) Front side (B) Rear side

34) Remove clip (A) from the oil pan upper, and remove the oil level switch.



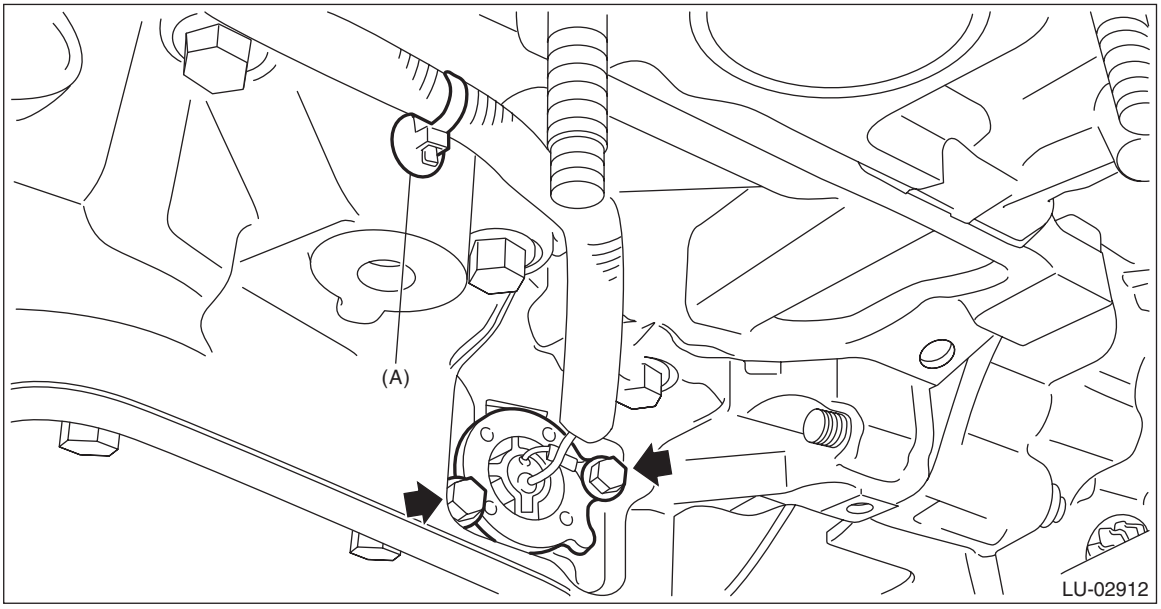
B: INSTALLATION

1. GASOLINE ENGINE MODEL

1) Install the oil level switch and the clip (A) to the oil pan upper.

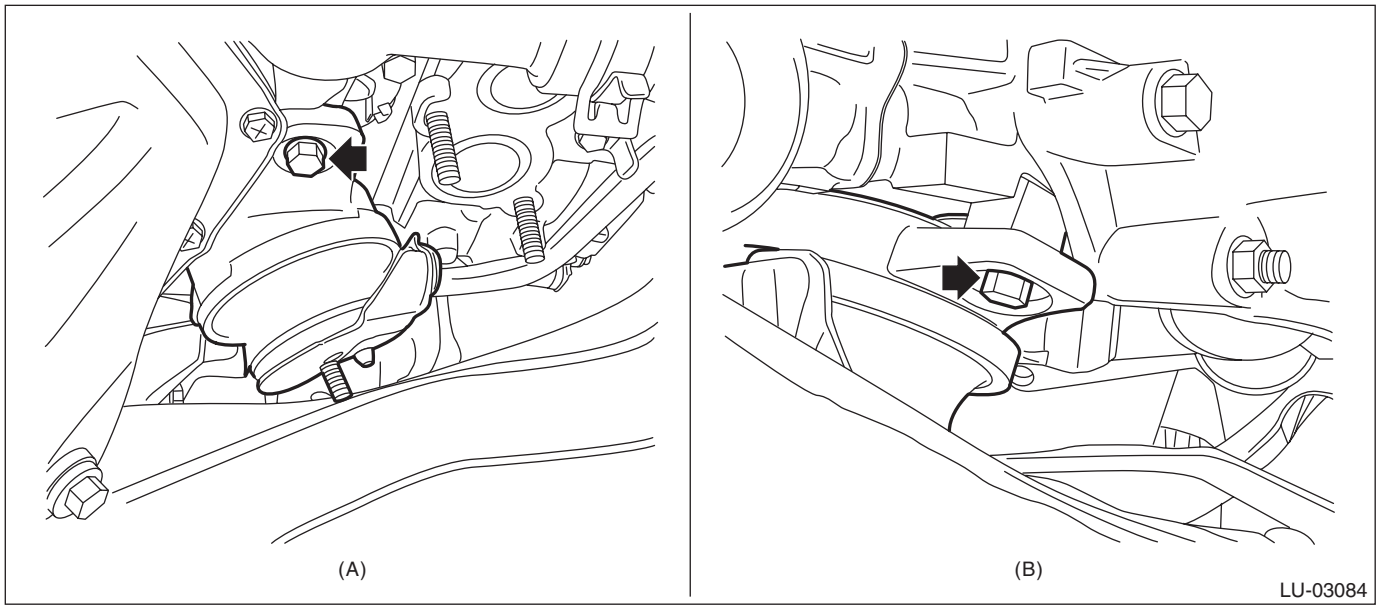
NOTE:
- Use new O-rings.
- Apply a coat of engine oil to the O-rings.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



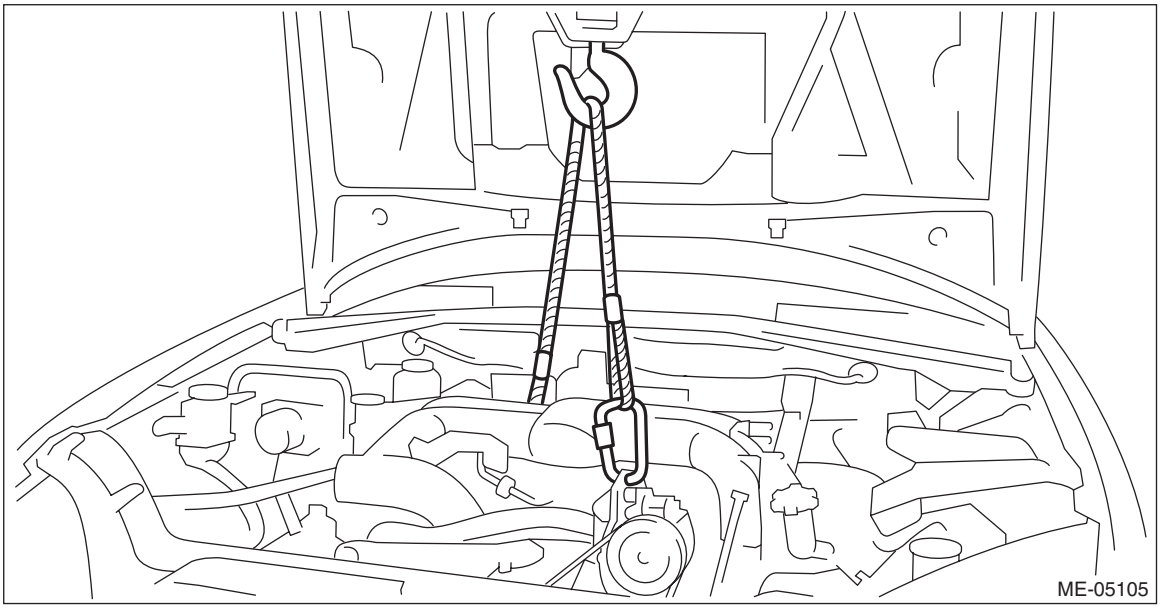
2) Install the engine mounting LH onto the engine.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)



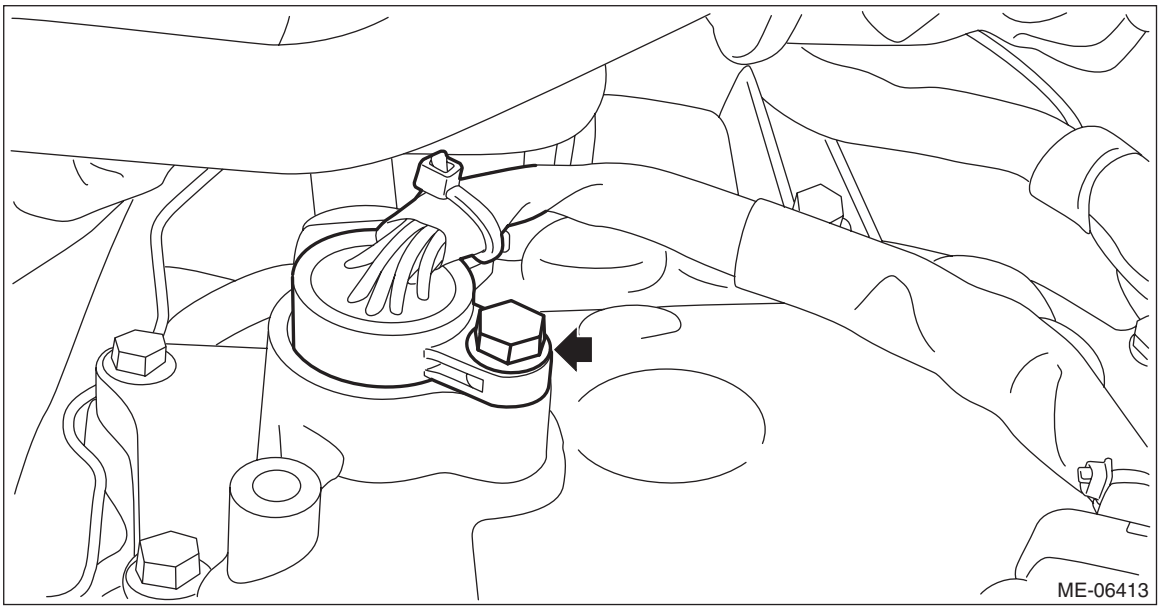
(A) Front side (B) Rear side

3) Lower the engine and remove the lifting device and wire ropes.



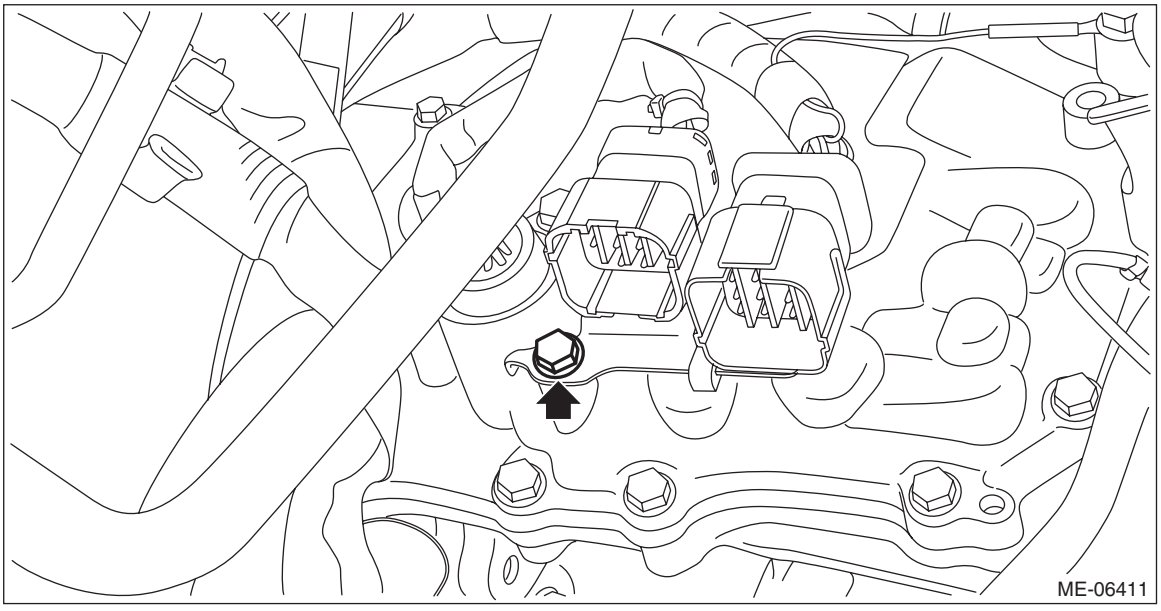
4) Remove the bolt and turn the transmission harness counterclockwise to install the transmission harness to the control valve body. (CVT model)

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



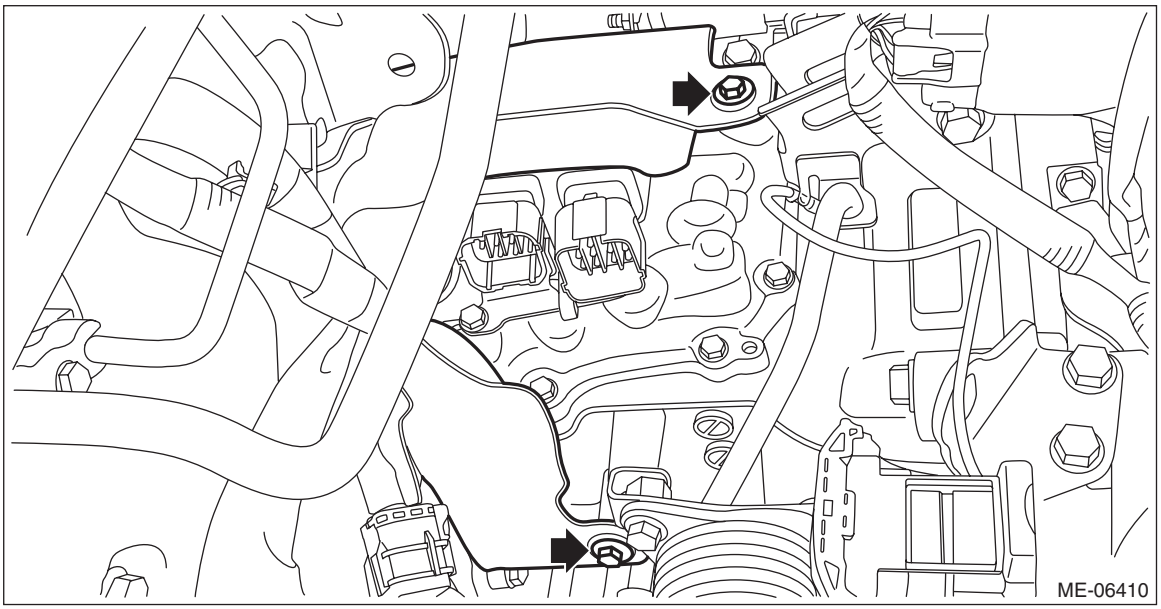
5) Install the bolt which holds the transmission harness stay. (CVT model)

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



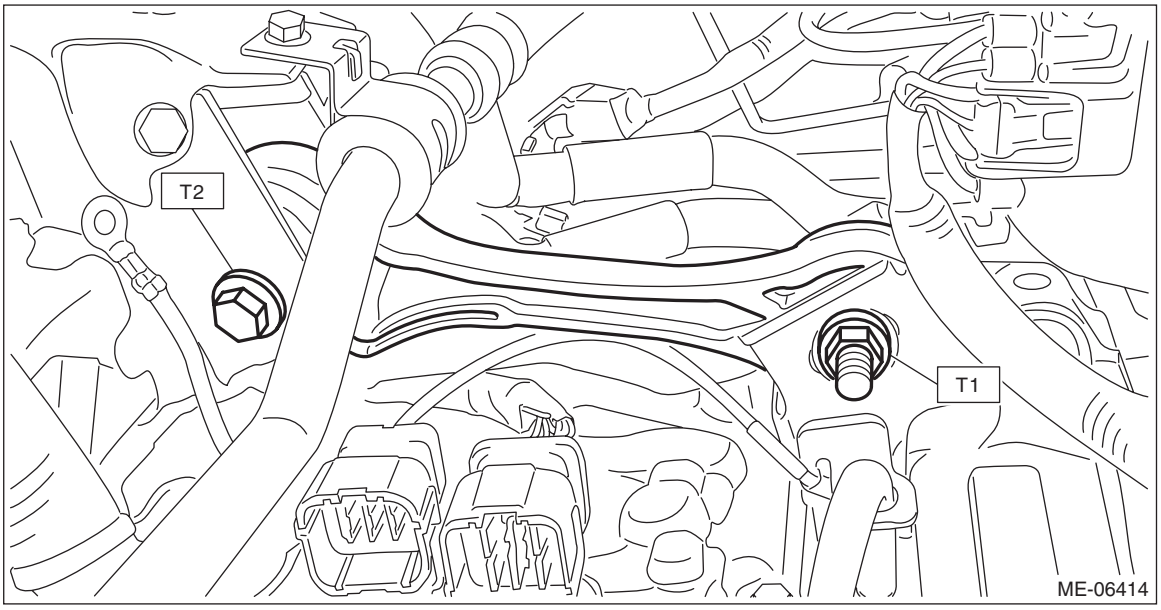
6) Install the transmission case cover. (CVT model)

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



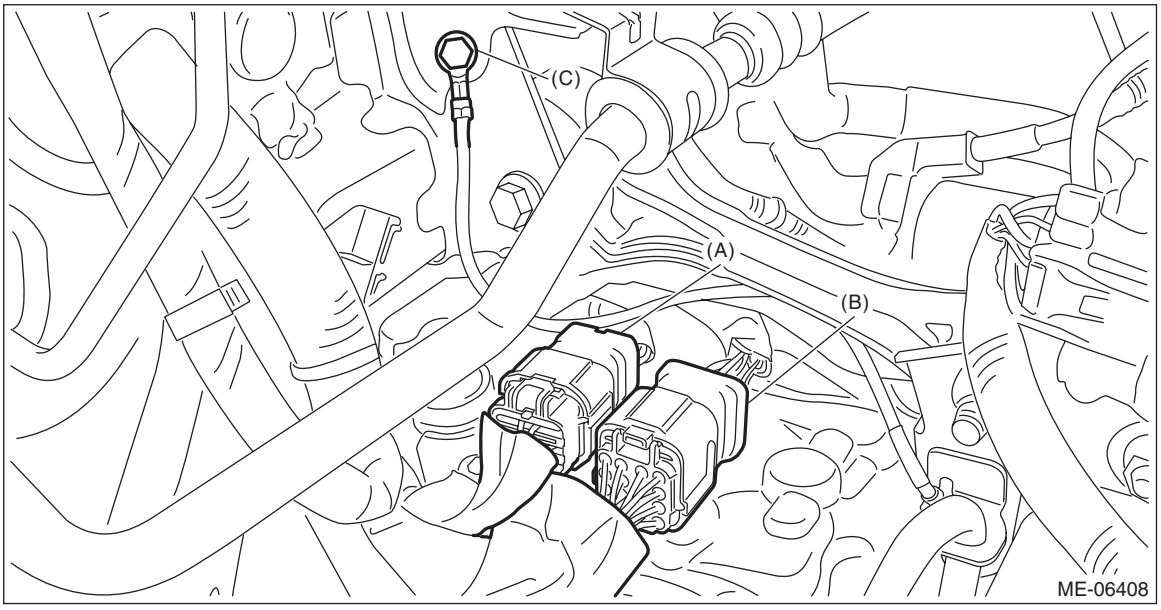
7) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



8) Connect the transmission radio ground terminal (C) to the vehicle body, and connect the bulkhead harness connector to the transmission harness connector (A) and the inhibitor harness connector (B). (CVT model)

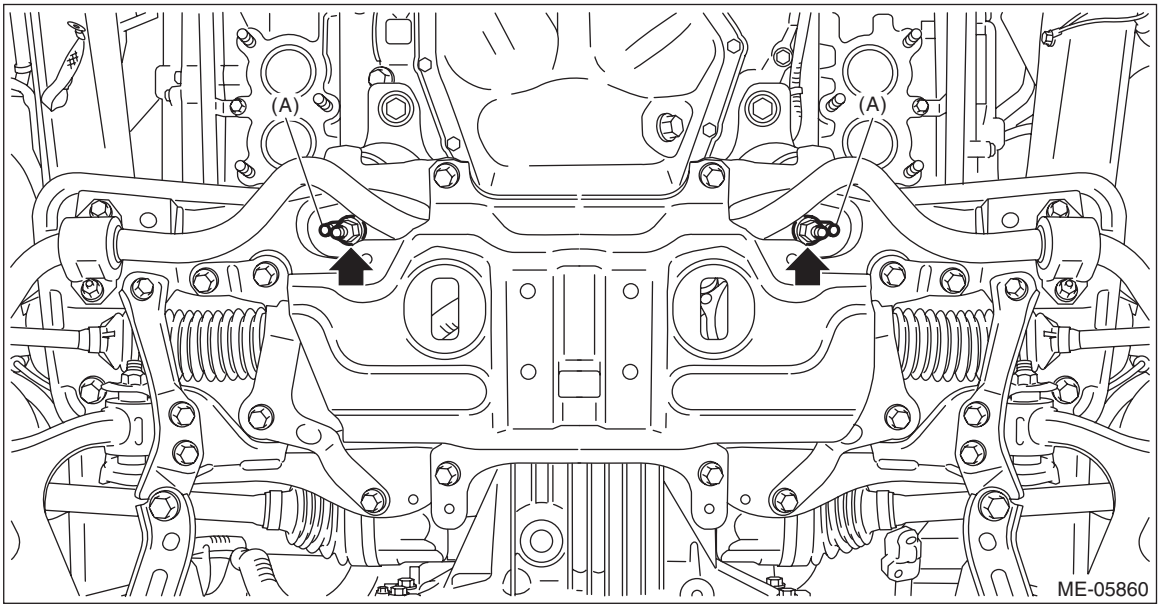
Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



9) Install the electric power steering gearbox. <Ref. to PS-28, INSTALLATION, Electric Power Steering Gearbox.>
10) Install the front drive shaft LH. <Ref. to DS-55, INSTALLATION, Front Drive Shaft.>
11) Install the nuts which hold the engine mounting to the crossmember. (CVT model)

NOTE:
- Make sure that locators (A) of the engine mounting are securely inserted.
- Use a new nut.

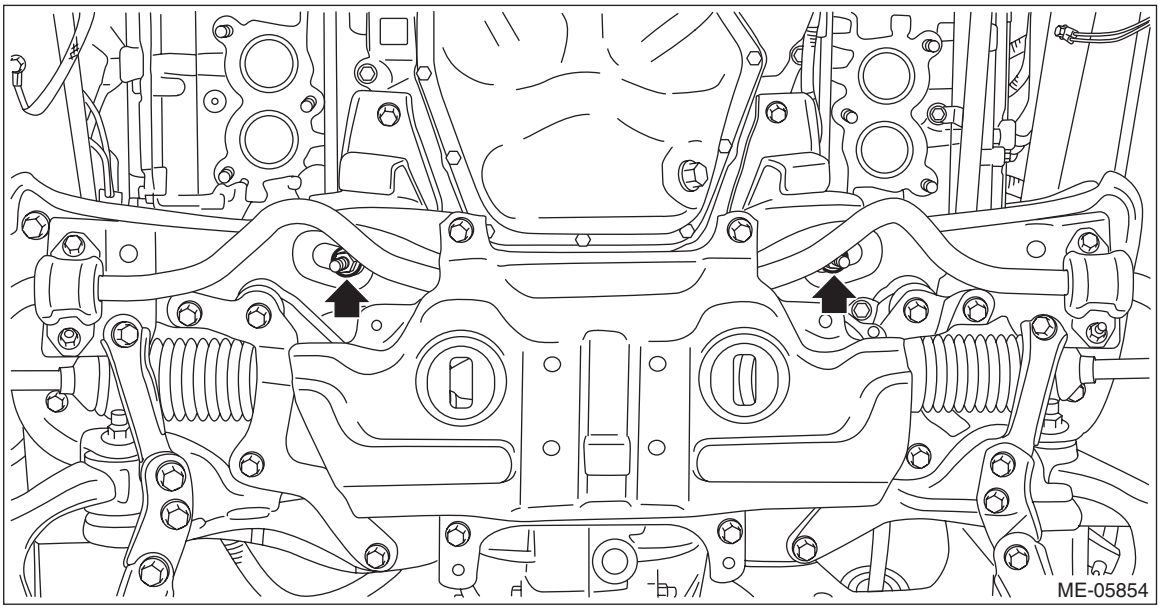
Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



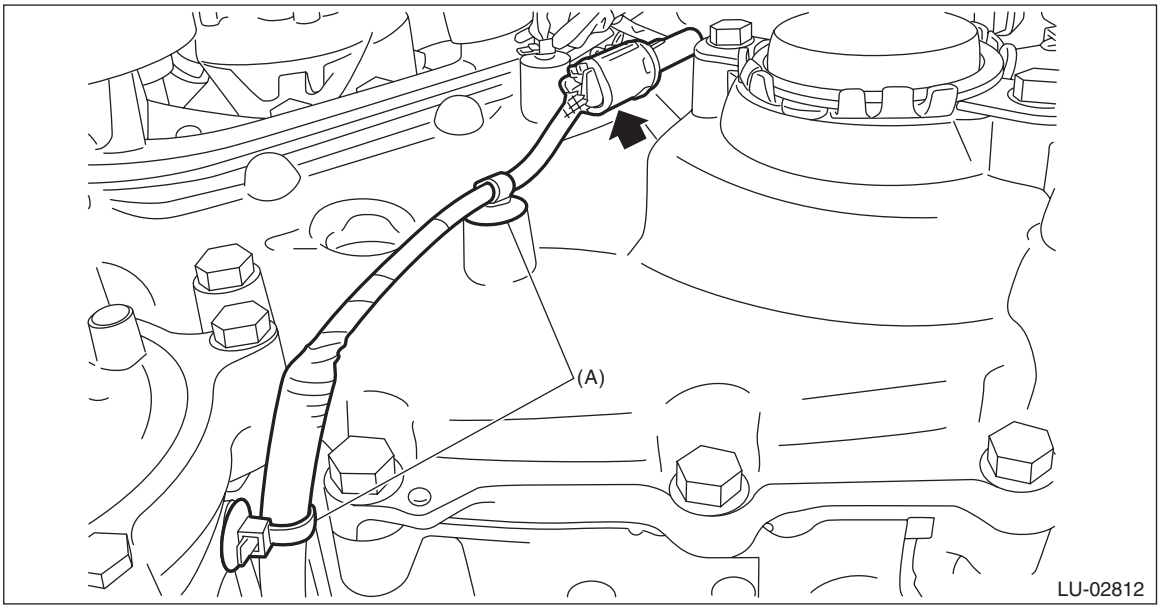
12) Install the nuts which hold the engine mounting to the crossmember. (MT model)

NOTE:
Use a new nut.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)

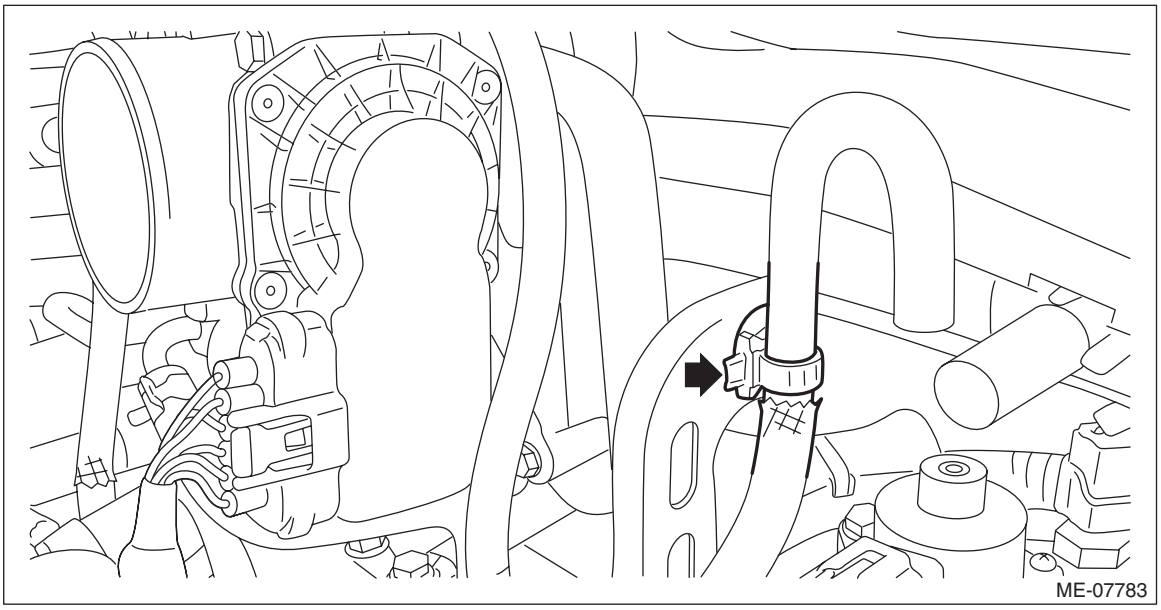


13) Connect the connector of oil level switch to the engine harness, and install the clip (A) securing the harness.

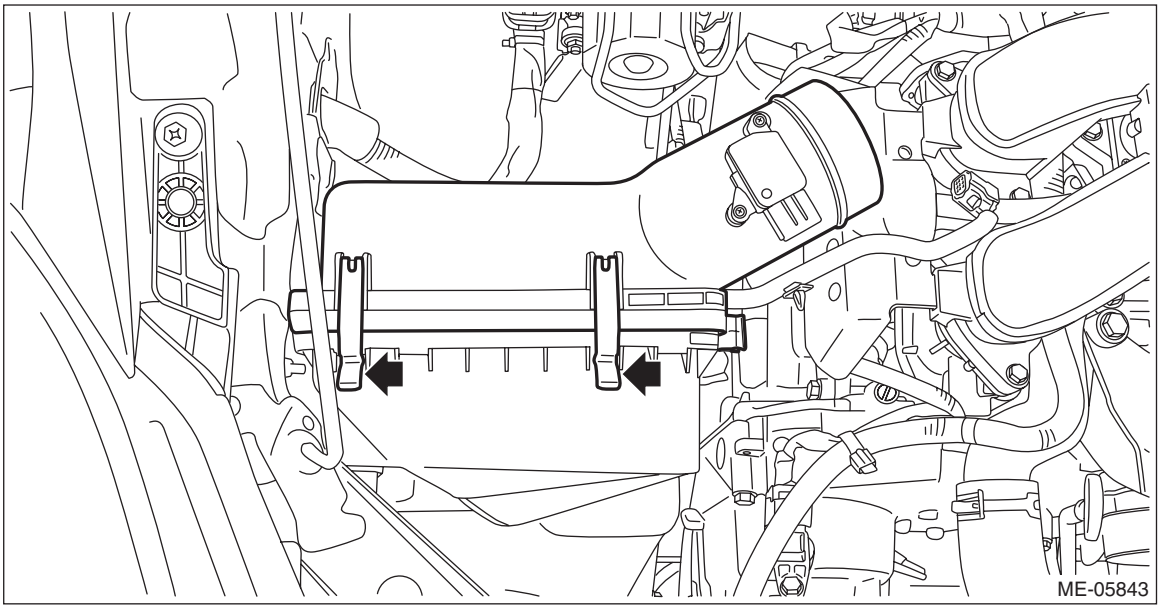


14) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
15) Install the under cover.
16) Lower the vehicle.

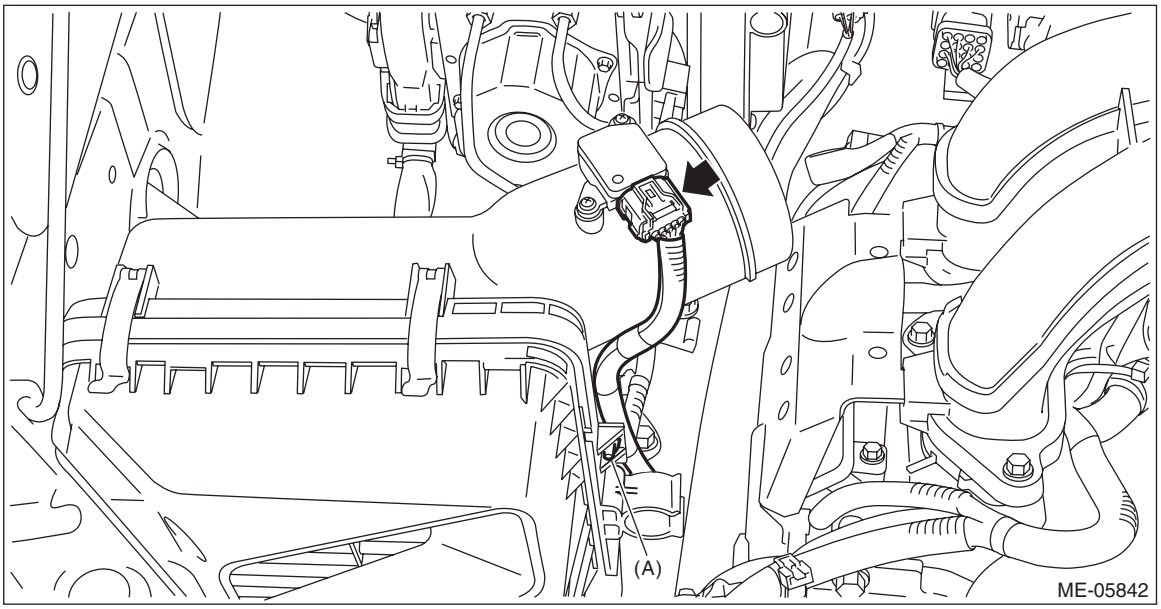
17) Secure the air breather hose to the engine rear hanger using clip. (MT model)



18) Install the air intake case (rear).

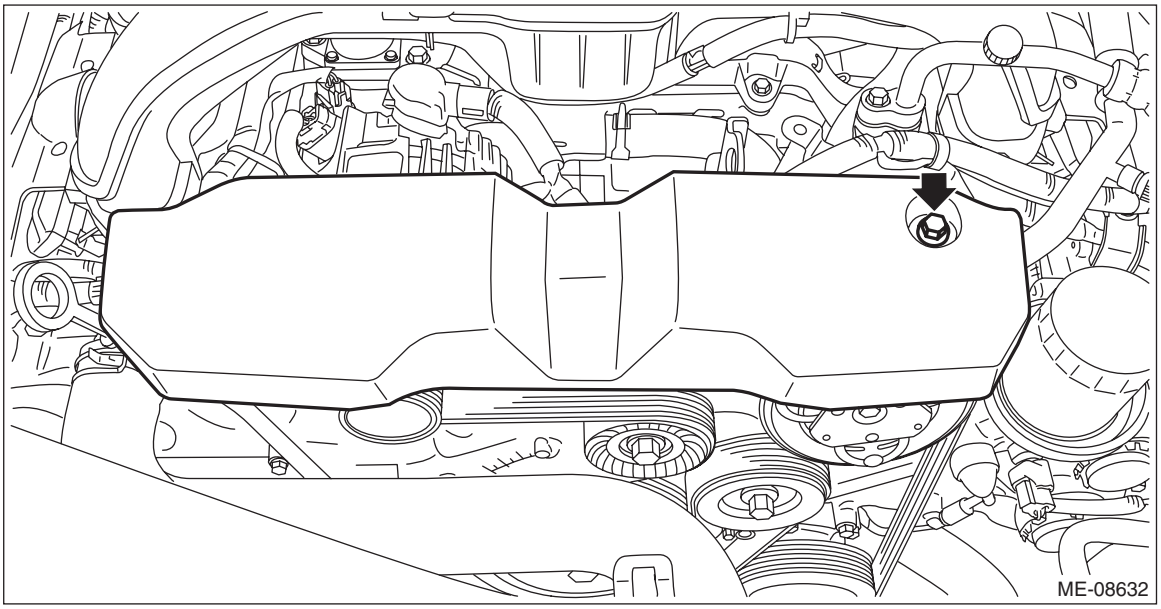


19) Install the clip (A) which secures the air flow and intake air temperature sensor harness, and connect the connector to the air flow and intake air temperature sensor.



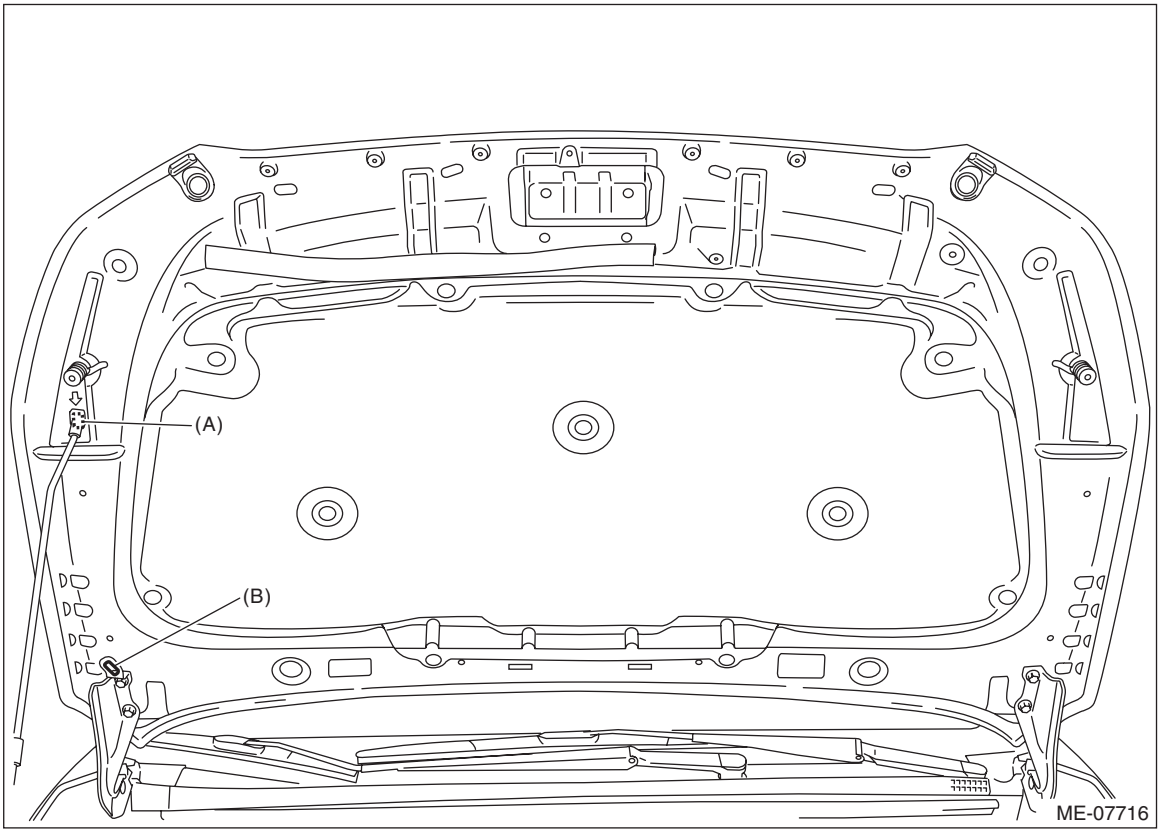
20) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
21) Install the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, INSTALLATION, Air Intake Duct.>
22) Install the V-belt cover.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



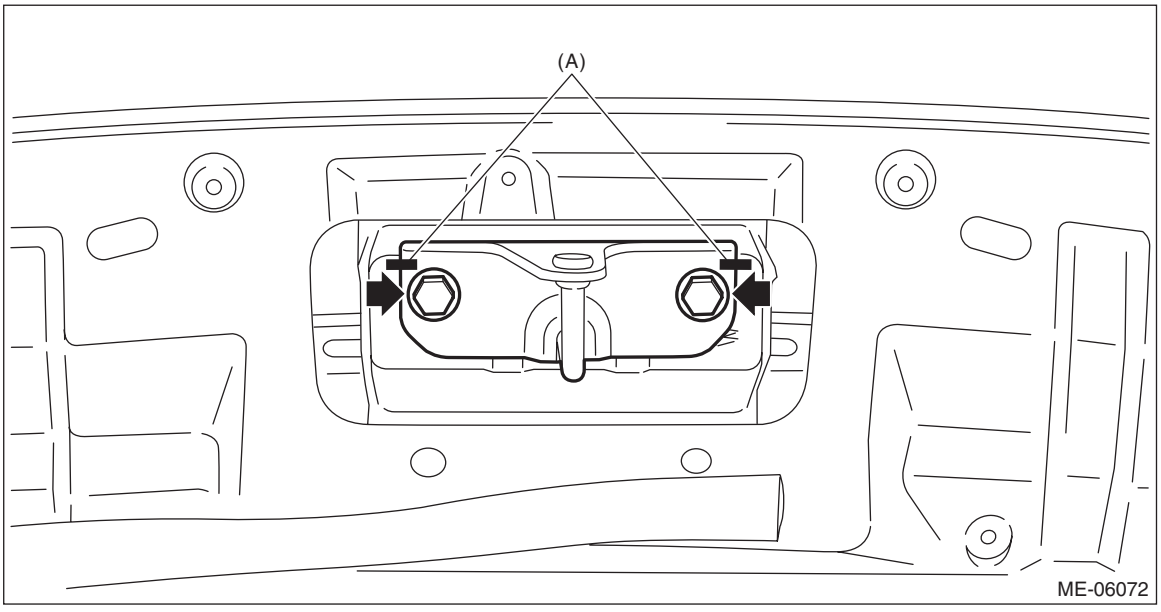
23) Refill the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
24) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

25) Change the front hood stay position from (B) to (A).



26) Install the front hood striker to the front hood by aligning the alignment marks (A), and close the front hood.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)

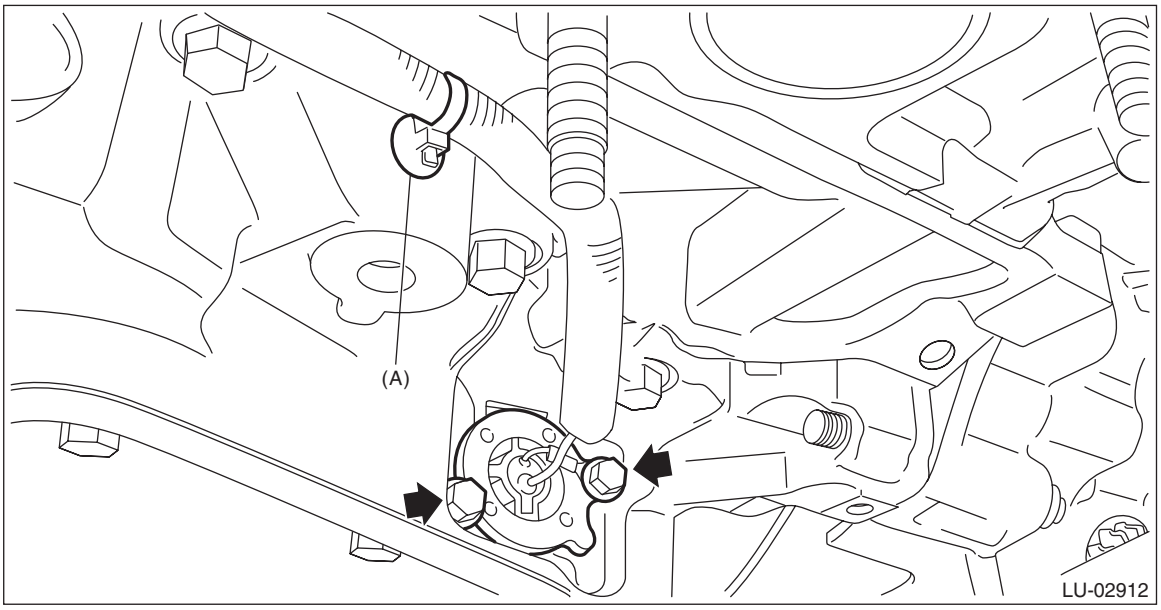


2. HEV MODEL

1) Install the oil level switch and the clip (A) to the oil pan upper.

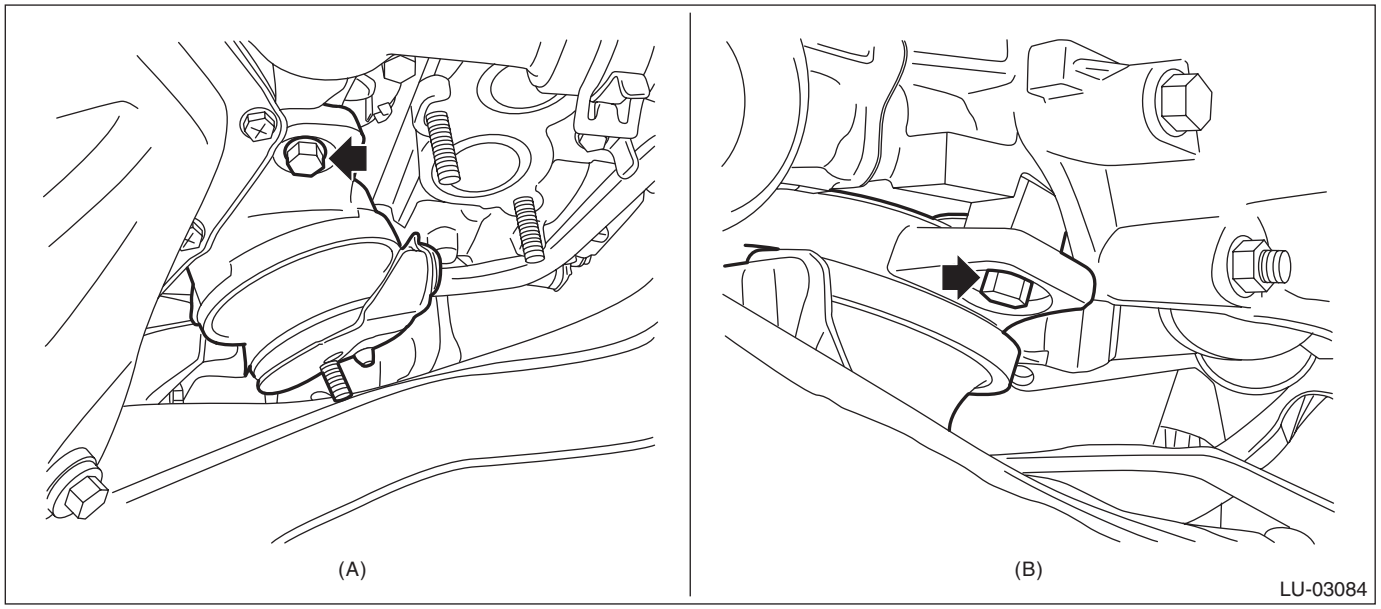
NOTE:
- Use new O-rings.
- Apply a coat of engine oil to the O-rings.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



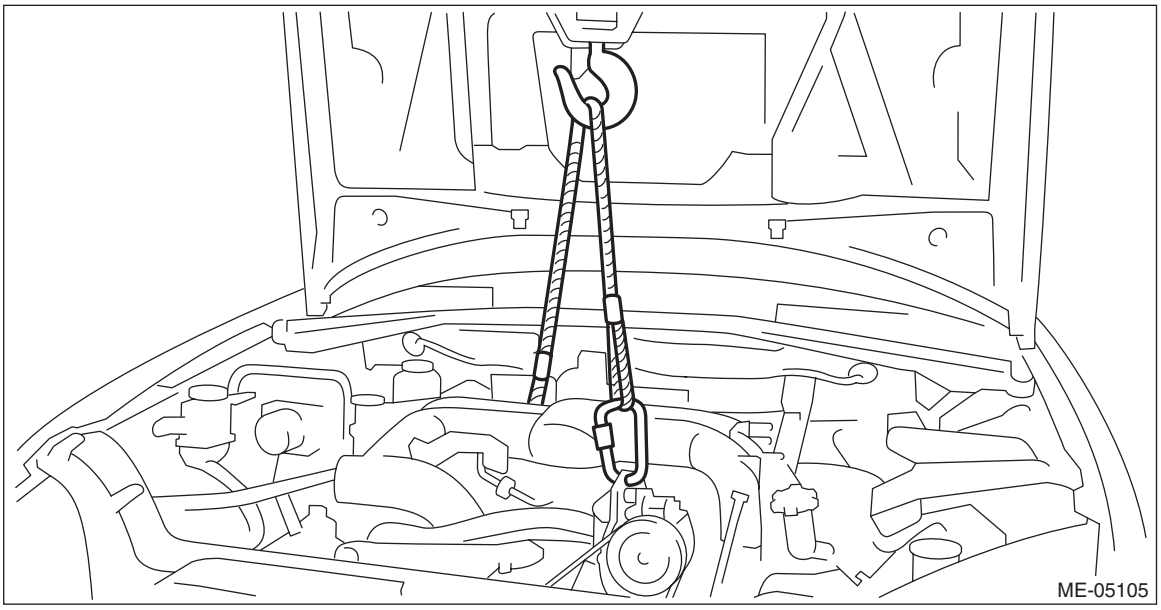
2) Install the engine mounting LH onto the engine.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)



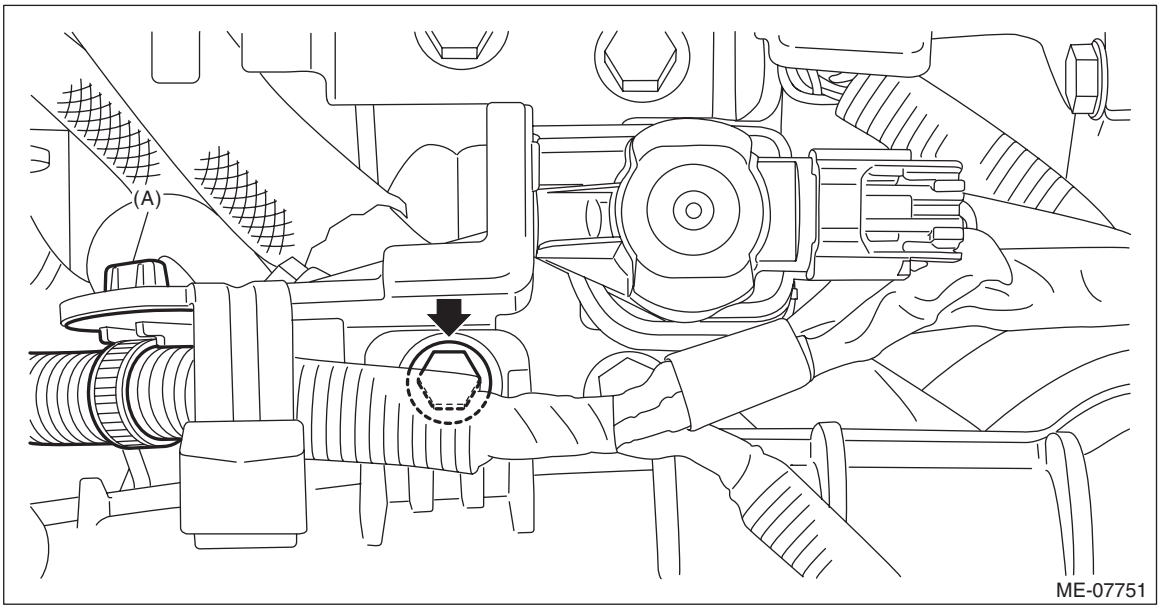
(A) Front side (B) Rear side

3) Lower the engine and remove the lifting device and wire ropes.



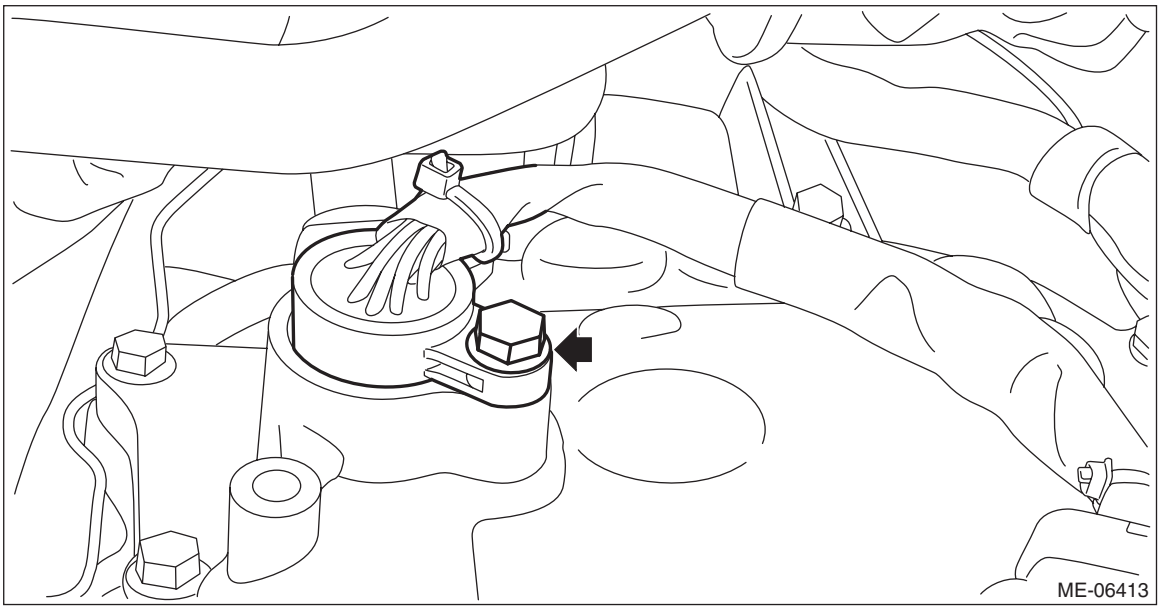
4) Install the bolts which secure the purge control solenoid valve bracket to the intake manifold, and secure the engine harness to the purge control solenoid valve bracket with the clip (A).

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



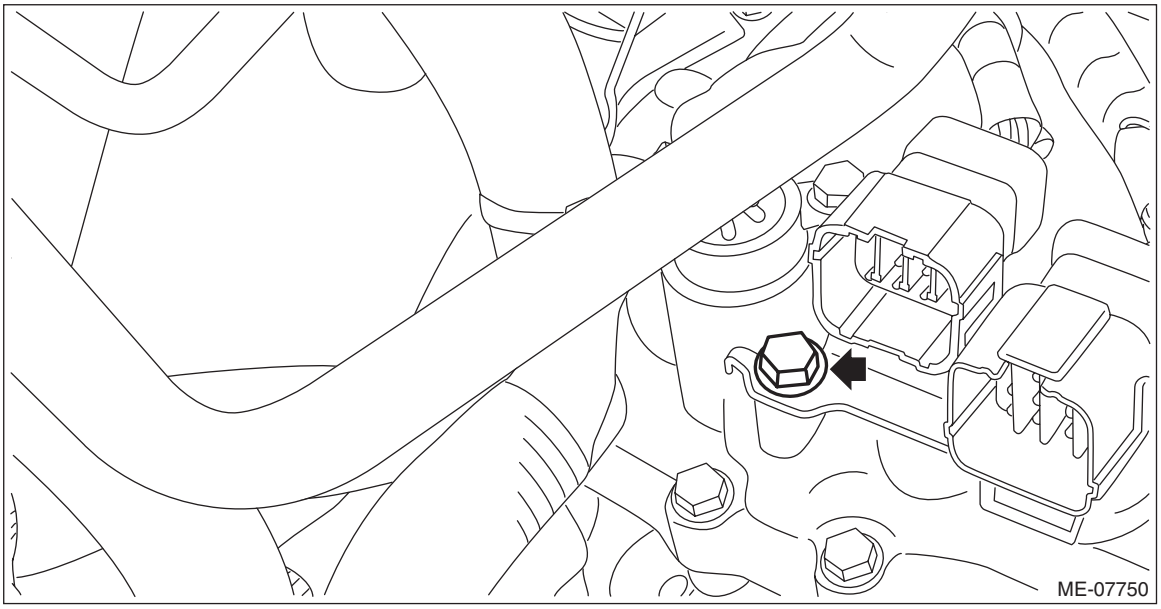
5) Remove the bolt and turn the transmission harness counterclockwise to install the transmission harness to the control valve body.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



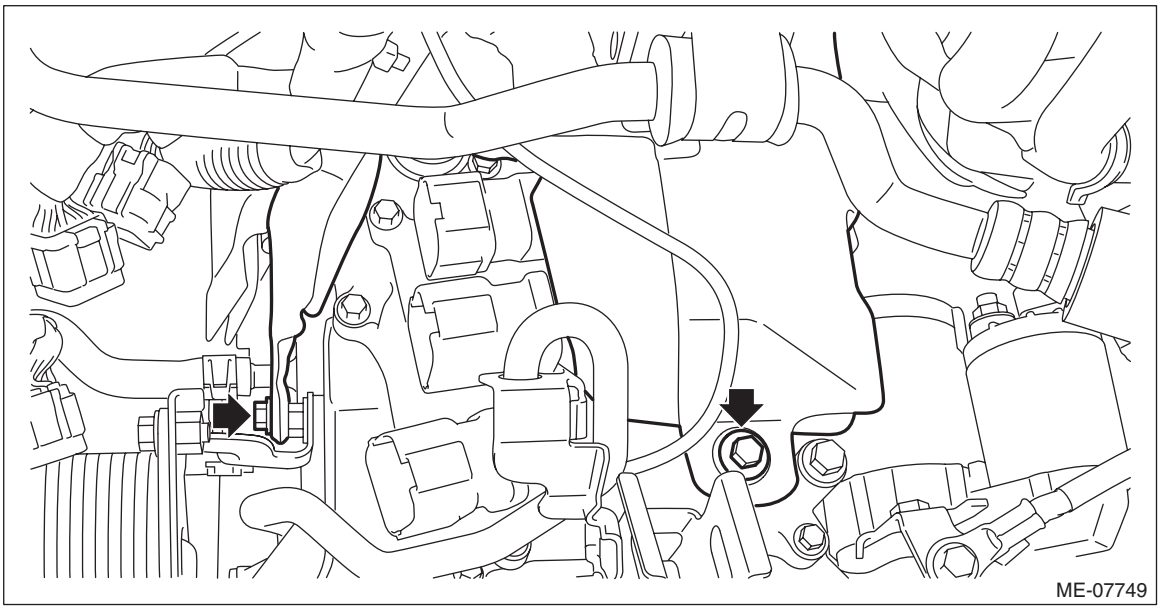
6) Install the bolt which holds the transmission harness stay.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



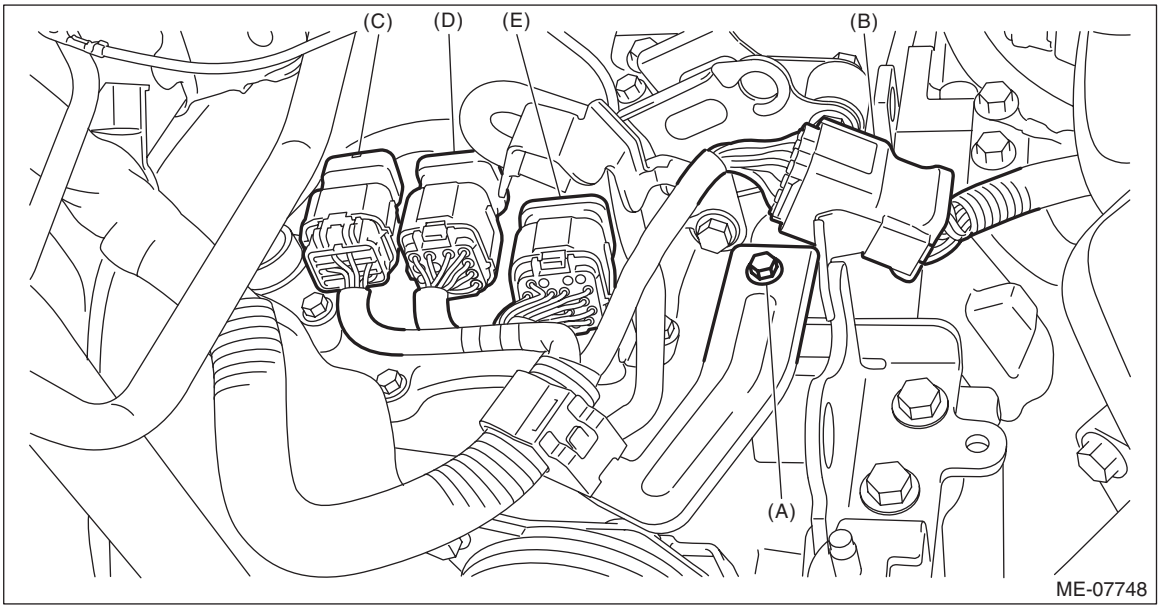
7) Install the transmission case cover.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



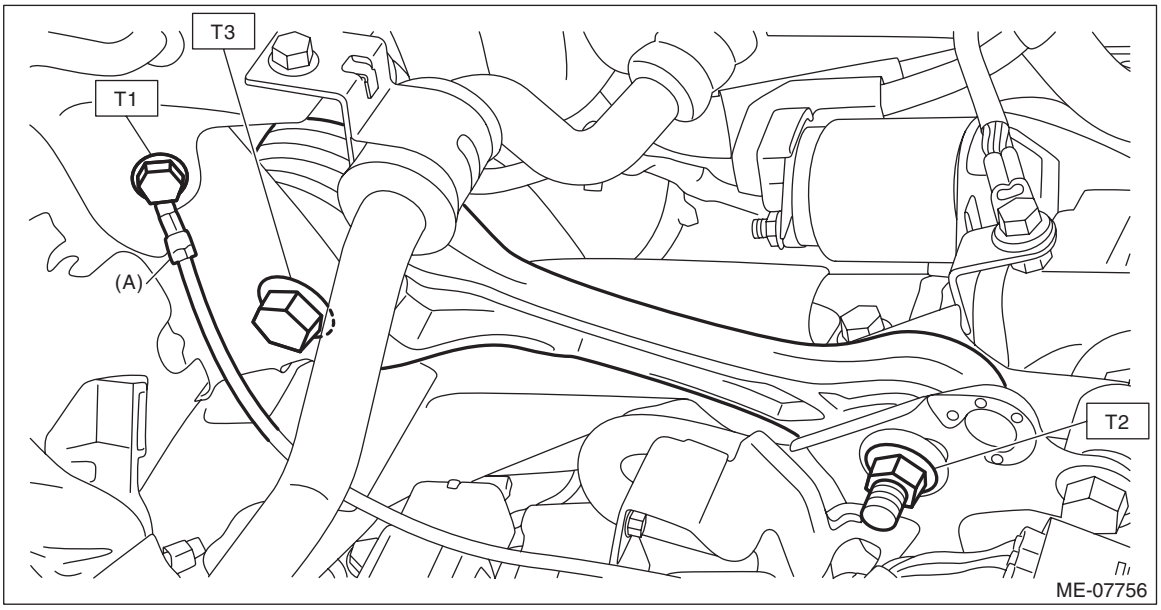
8) Connect the bulkhead harness connector to the transmission harness connector (C), inhibitor harness connector (D) and drive motor harness connector (E).
9) Connect the bulkhead harness connector to the engine harness connector (brown) (B), and install the bolt (A) securing the bulkhead harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



10) Install the pitching stopper, and connect the transmission radio ground terminal (A) to the vehicle.

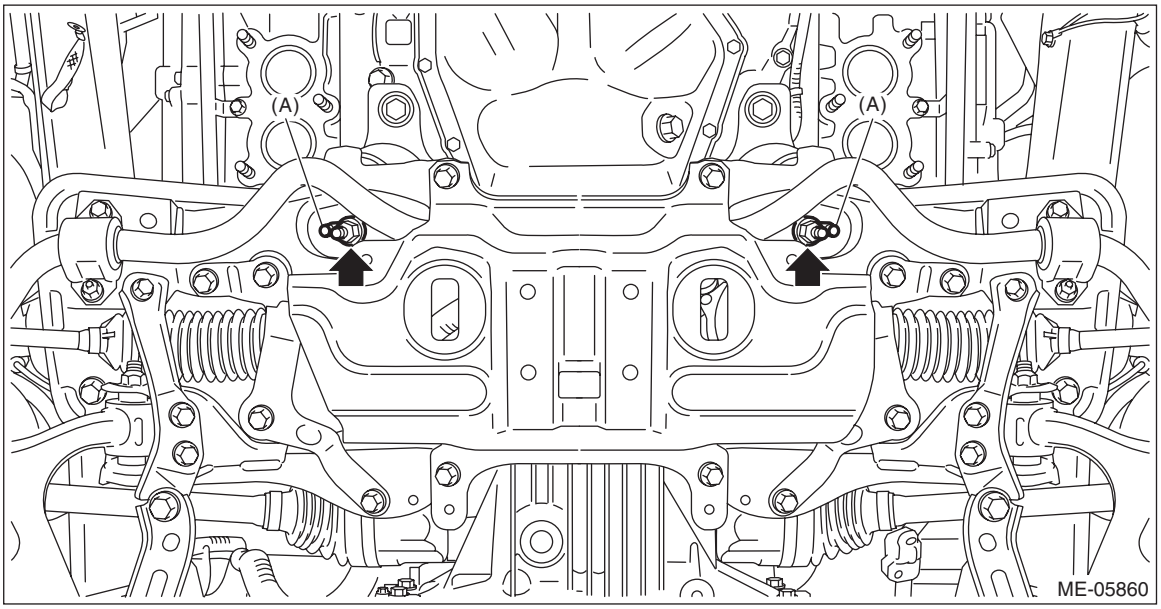
Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T3: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



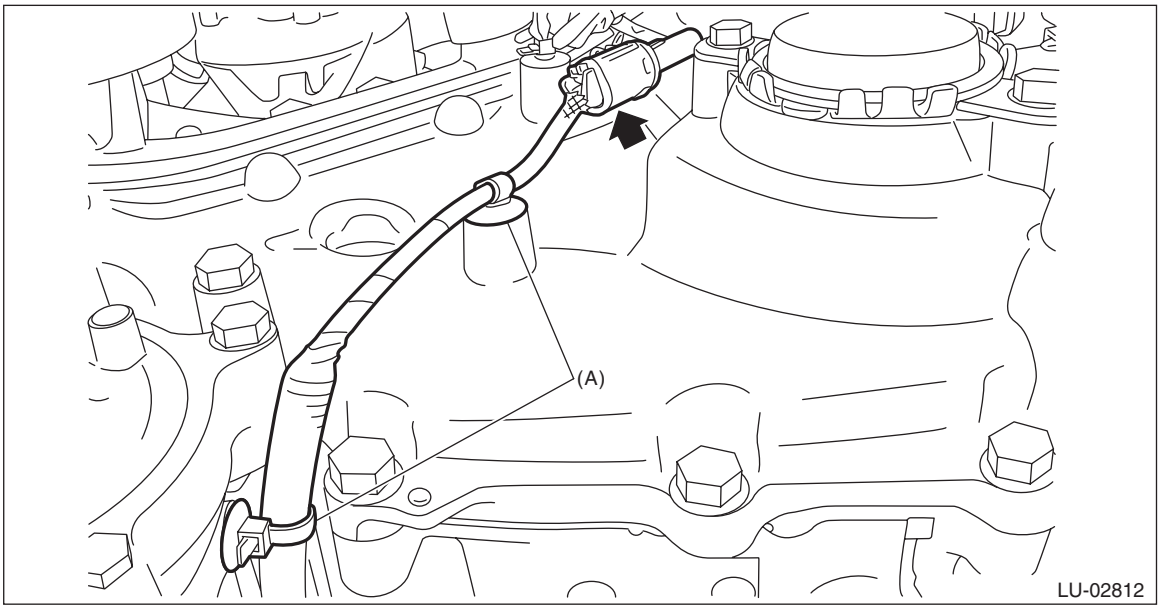
11) Install the electric power steering gearbox. <Ref. to PS-28, INSTALLATION, Electric Power Steering Gearbox.>
12) Install the front drive shaft LH. <Ref. to DS-55, INSTALLATION, Front Drive Shaft.>
13) Install the nuts which hold the engine mounting to the crossmember.

NOTE:
- Make sure that locators (A) of the engine mounting are securely inserted.
- Use a new nut.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)

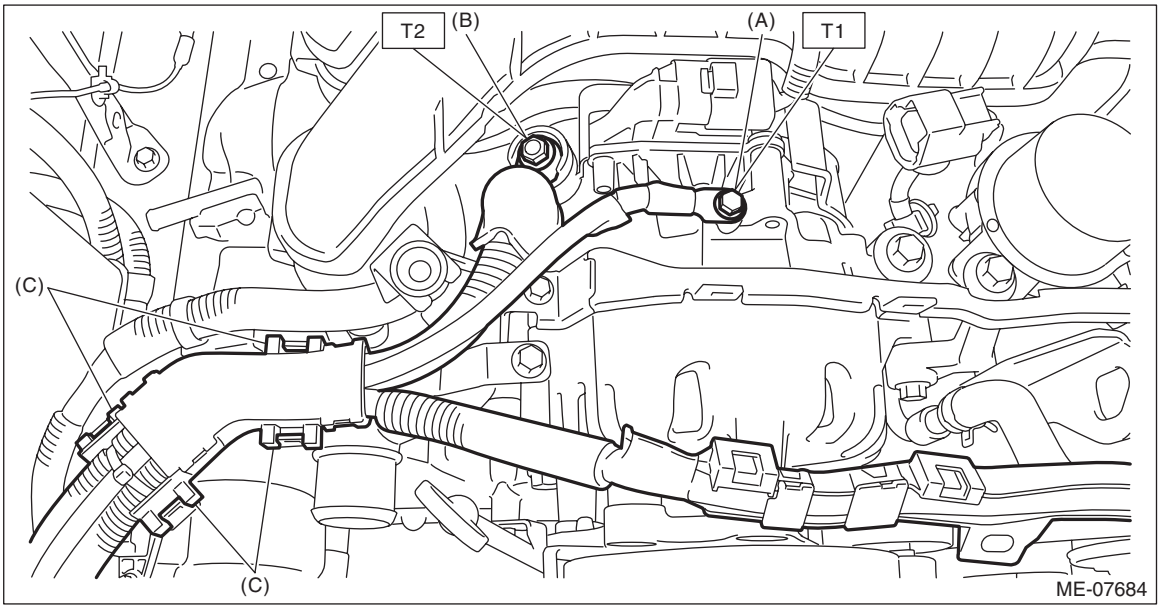


14) Connect the connector of oil level switch to the engine harness, and install the clip (A) securing the harness.



15) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
16) Install the under cover.
17) Lower the vehicle.
18) Set the battery cable assembly, and install the clip (C) which secures the battery cable assembly to the battery cable bracket No. 1.
19) Connect the terminal (A) and the terminal (B) to ISG.

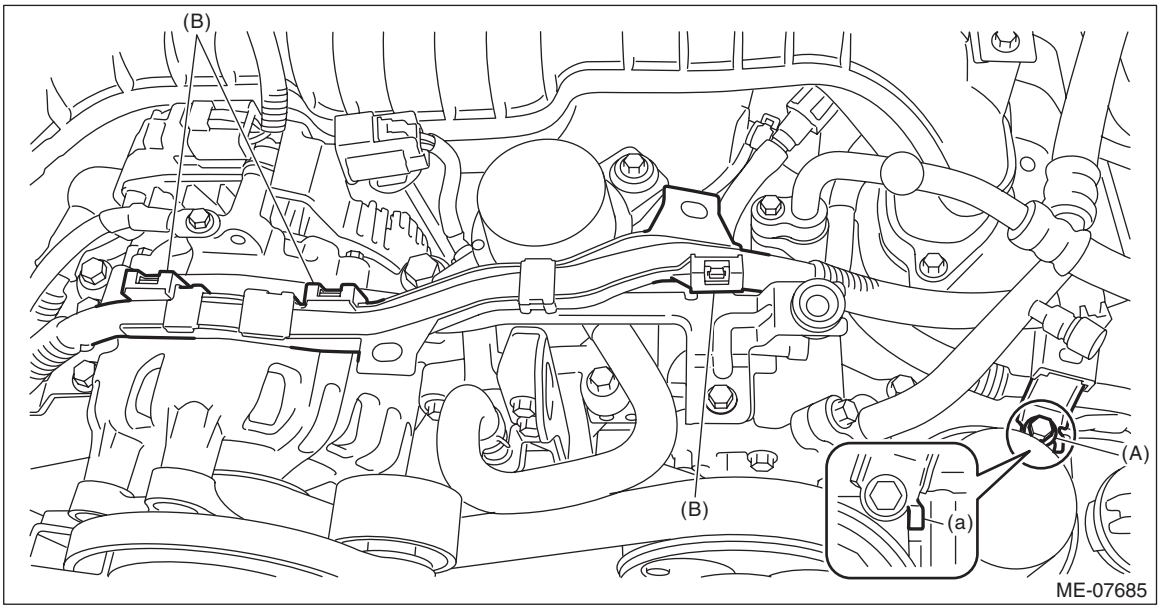
Tightening torque:
T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
T2: 15.5 N·m (1.6 kgf-m, 11.4 ft-lb)



20) Install the clip (B) which secures the battery cable assembly to the collector cover bracket, and install the bolt (A) which secures the battery cable stay to the chain cover.

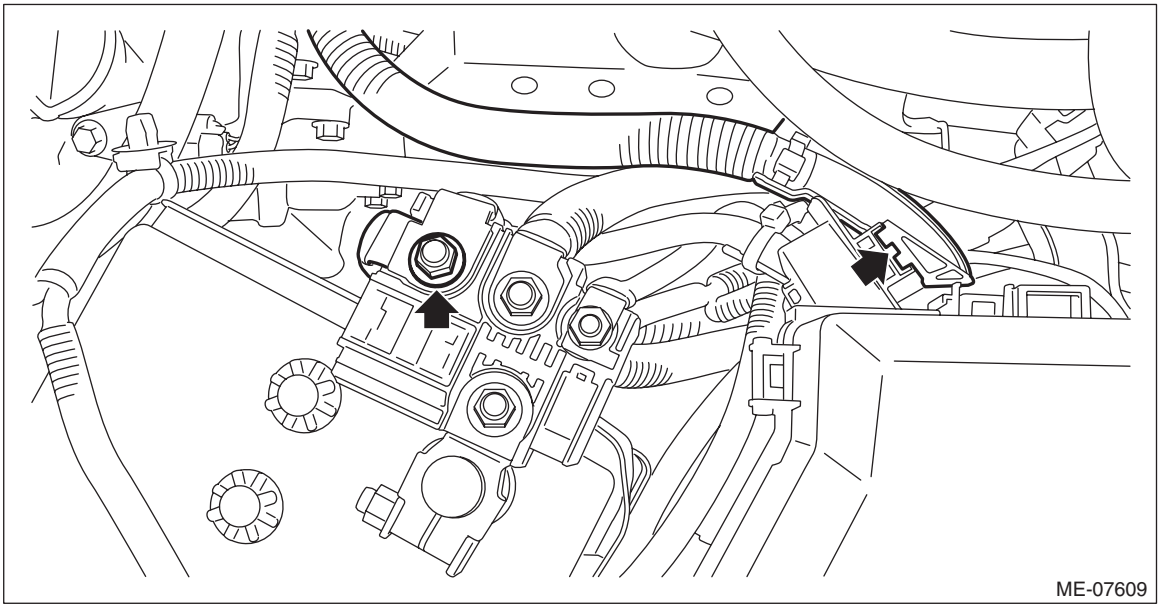
NOTE:
When installing the battery cable stay, install it by fitting the folded end (a) of the battery cable stay to the chain cover boss.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



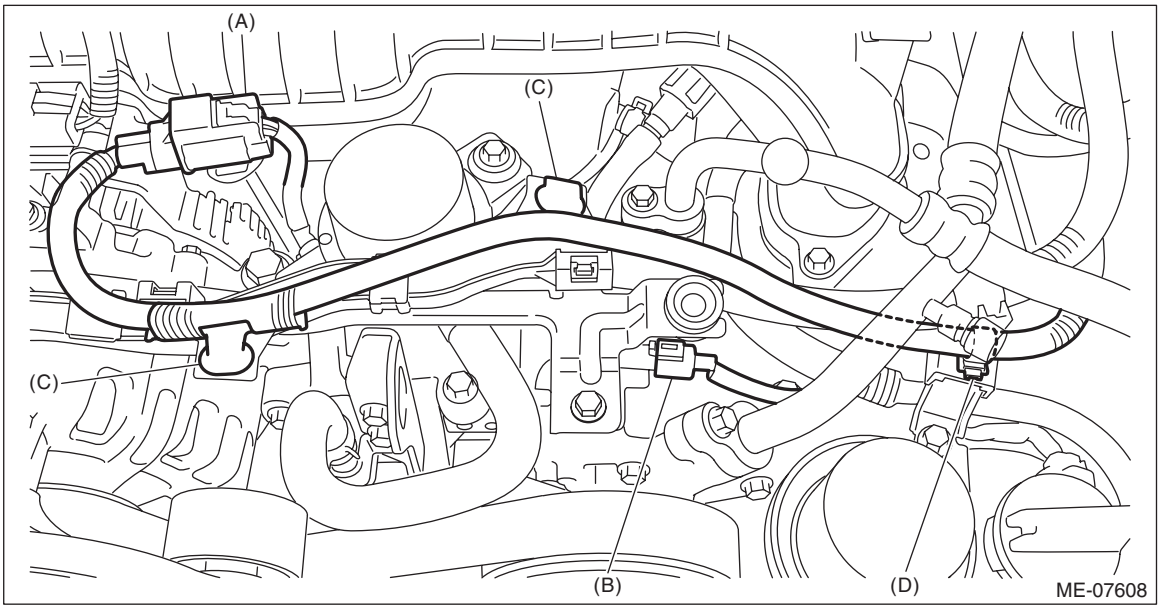
21) Install the battery cable assembly to the main fuse box, and install the nut which secures the battery cable assembly to the slow blow fuse (12 volt auxiliary battery).

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

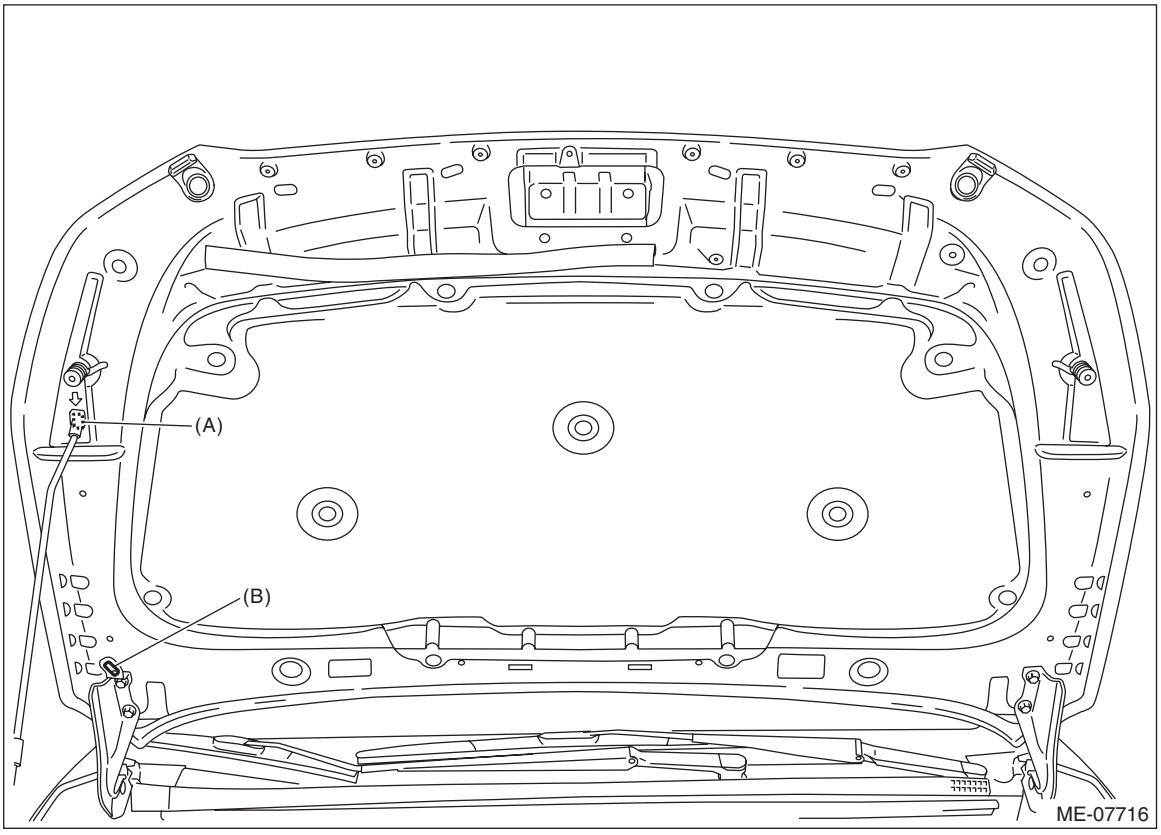


22) Install the terminal boot to the positive terminal of the 12 volt auxiliary battery.
23) Set the harness, and install the clip (C) and the clip (D) which secure the harness to the battery cable assembly.

24) Connect the connector (A) to the brake vacuum pump, and connect the connector (B) to the A/C compressor.

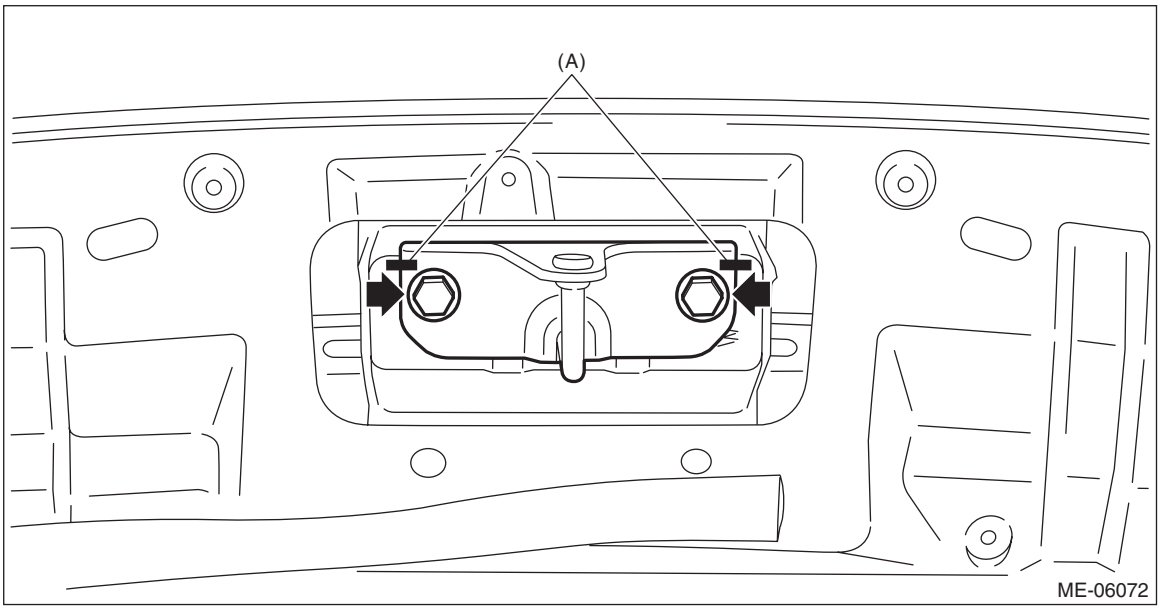


25) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
26) Install the air intake duct. <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
27) Install the collector cover.
28) Refill the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
29) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
30) Change the front hood stay position from (B) to (A).



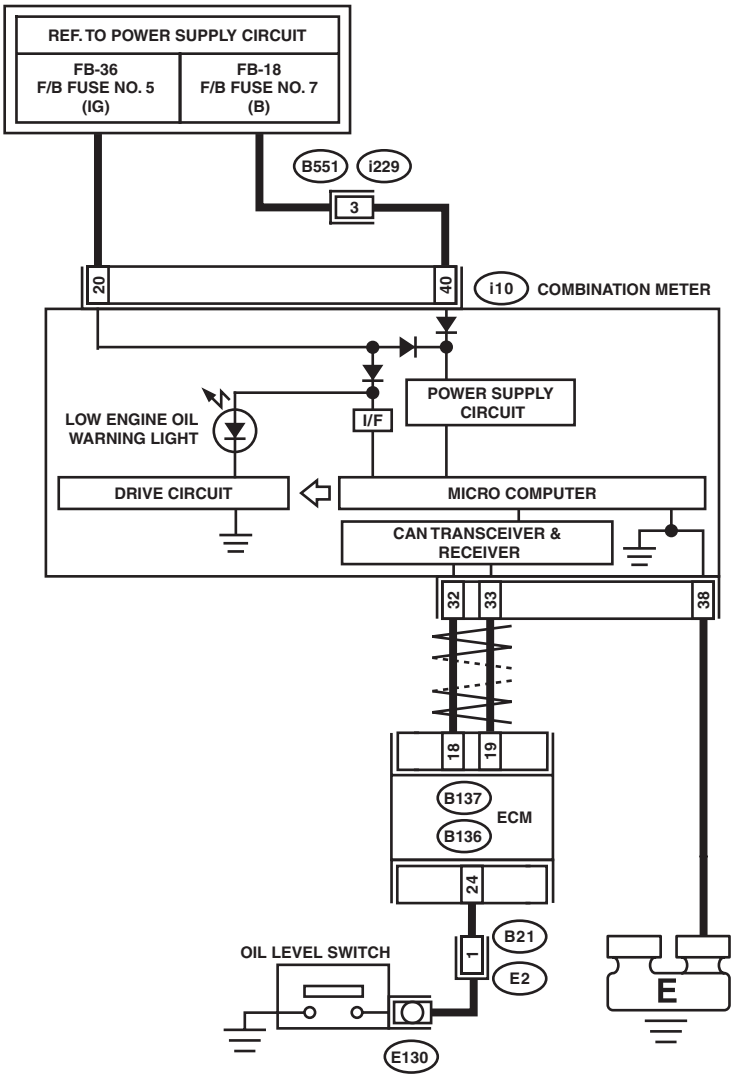
31) Install the front hood striker to the front hood by aligning the alignment marks (A), and close the front hood.

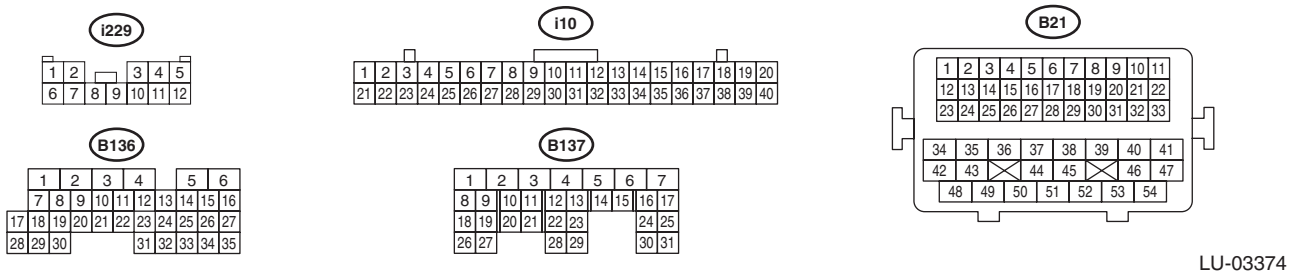
Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



C: WIRING DIAGRAM

• Engine electrical system <Ref. to WI(w/o HEV)-102, WIRING DIAGRAM, Engine Electrical System.> <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>
• CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.> <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>





LU-03374

D: INSPECTION

1. INSPECTION WHEN LOW ENGINE OIL WARNING LIGHT IS ILLUMINATED

Step	Check	Yes	No
1 **CHECK ENGINE OIL LEVEL.**	Is engine oil level normal?	Go to step **2**.	Replace engine oil or refill, and check again while the oil level is normal condition. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> To turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.
2 **CHECK LAN SYSTEM.**	Has a DTC of the LAN system been input?	Perform the diagnosis according to DTC.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK OIL LEVEL SWITCH CIRCUIT.** 1) Turn the ignition switch to ON (engine OFF). 2) Read the current data for engine in the Subaru Select Monitor to confirm the item for "Oil level switch". <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.> <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>	Is the "Oil level switch" signal displayed in Subaru Select Monitor HIGH?	To turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.	Go to step **4**.
4	**CHECK COMBINATION METER.** Perform the self-diagnosis of combination meter to check if there are any faults in the combination meter. <Ref. to IDI-8, OPERATION, Combination Meter System.>	Is combination meter OK?	Go to step **5**.	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>
5	**CHECK SECURE CONNECTION OF CONNECTOR BETWEEN ENGINE HARNESS AND OIL LEVEL SWITCH.**	Is there any insecure connection?	Remedy the connection condition. Then, to turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.	Go to step **6**.

	Step	Check	Yes	No
6	**CHECK OIL LEVEL SWITCH.** 1) Deliberately short circuits by connecting the engine harness connector terminal and chassis ground. 2) Turn the ignition switch to ON (engine OFF). 3) Read the current data for engine in the Subaru Select Monitor to confirm the item for "Oil level switch". <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.> <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.> ***Connector & terminal*** ***(E130) No. 1 — Chassis ground:***	Is the "Oil level switch" signal displayed in Subaru Select Monitor HIGH?	Replace the oil level switch. <Ref. to LU(H4DO(w/o HEV))-31, REMOVAL, Oil Level Switch.>	Go to step **7**.
7	**CHECK SECURE CONNECTION OF CONNECTOR BETWEEN BULKHEAD HARNESS AND ENGINE HARNESS.**	Is there any insecure connection?	Remedy the connection condition. Then, to turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.	Go to step **8**.
8	**CHECK ENGINE HARNESS.** 1) Disconnect the connector on the oil level switch side for the engine harness. 2) Disconnect the connector on the bulkhead harness side for the engine harness. 3) Measure the resistance between connector terminals. ***Connector & terminal*** ***(E2) No. 1 — (E130) No. 1:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair or replace the open circuit of engine harness.

	Step	Check	Yes	No
9	**CHECK SECURE CONNECTION OF CONNECTOR BETWEEN ENGINE CONTROL MODULE (ECM) AND BULKHEAD HARNESS.** Remove the glove box lid assembly. <Ref. to EI-74, REMOVAL, Glove Box.>	Is there any insecure connection?	Remedy the connection condition. Then, to turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.	Go to step **10**.
10	**CHECK BULKHEAD HARNESS.** 1) Remove the glove box lid assembly. <Ref. to EI-74, REMOVAL, Glove Box.> 2) Disconnect the engine control module (ECM) side connector for the bulkhead harness. 3) Disconnect the engine harness connectors from the bulkhead harness. 4) Measure the resistance between connector terminals. ***Connector & terminal*** ***(B136) No. 24 — (B21) No. 1:***	Is the resistance less than 1 Ω?	Replace the engine control module (ECM). <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).>	Repair or replace the open circuit of the bulkhead harness.

2. OTHER INSPECTIONS

1) Check that the oil level switch does not have deformation, cracks, or damage.
2) Check the oil level switch installation part for oil leakage and oil seepage.

9. Engine Lubrication System Trouble in General

A: INSPECTION

Before performing diagnostics, make sure that the engine oil level is correct and no oil leakage exists.

Trouble	Possible cause	Corrective action
Warning light remains ON.	a. Oil pressure switch failure	
	❍ Cracked diaphragm or oil leakage within switch	Replace.
	❍ Broken spring or seized contacts	Replace.
	b. Low oil pressure	
	❍ Clogging of oil filter	Replace.
	❍ Malfunction of oil by-pass valve in oil filter	Replace.
	❍ Clogged oil passage	Clean.
	❍ Excessive tip clearance and side clearance of oil pump rotor	Replace.
	❍ Clogged oil strainer or broken pipe	Clean or replace.
	c. No oil pressure	
	❍ Insufficient engine oil (degradation, etc.)	Replace.
	❍ Broken pipe of oil strainer	Replace.
	❍ Stuck oil pump rotor	Replace.
Warning light does not illuminate.	a. Malfunction of combination meter	Replace.
	b. Poor contact of switch contact points	Replace.
	c. Disconnection of wiring	Repair.
Warning light flickers momentarily.	a. Defective terminal contact	Repair.
	b. Defective wiring harness	Repair.
	c. Oil pressure switch failure	
	❍ Cracked diaphragm or oil leakage within switch	Replace.
	❍ Broken spring or seized contacts	Replace.
	d. Low oil pressure	
	❍ Clogging of oil filter	Replace.
	❍ Malfunction of oil by-pass valve in oil filter	Replace.
	❍ Clogged oil passage	Clean.
	❍ Excessive tip clearance and side clearance of oil pump rotor	Replace.
	❍ Clogged oil strainer or broken pipe	Clean or replace.

SPEED CONTROL SYSTEMS

SP(H4DO(w/o HEV))

Page

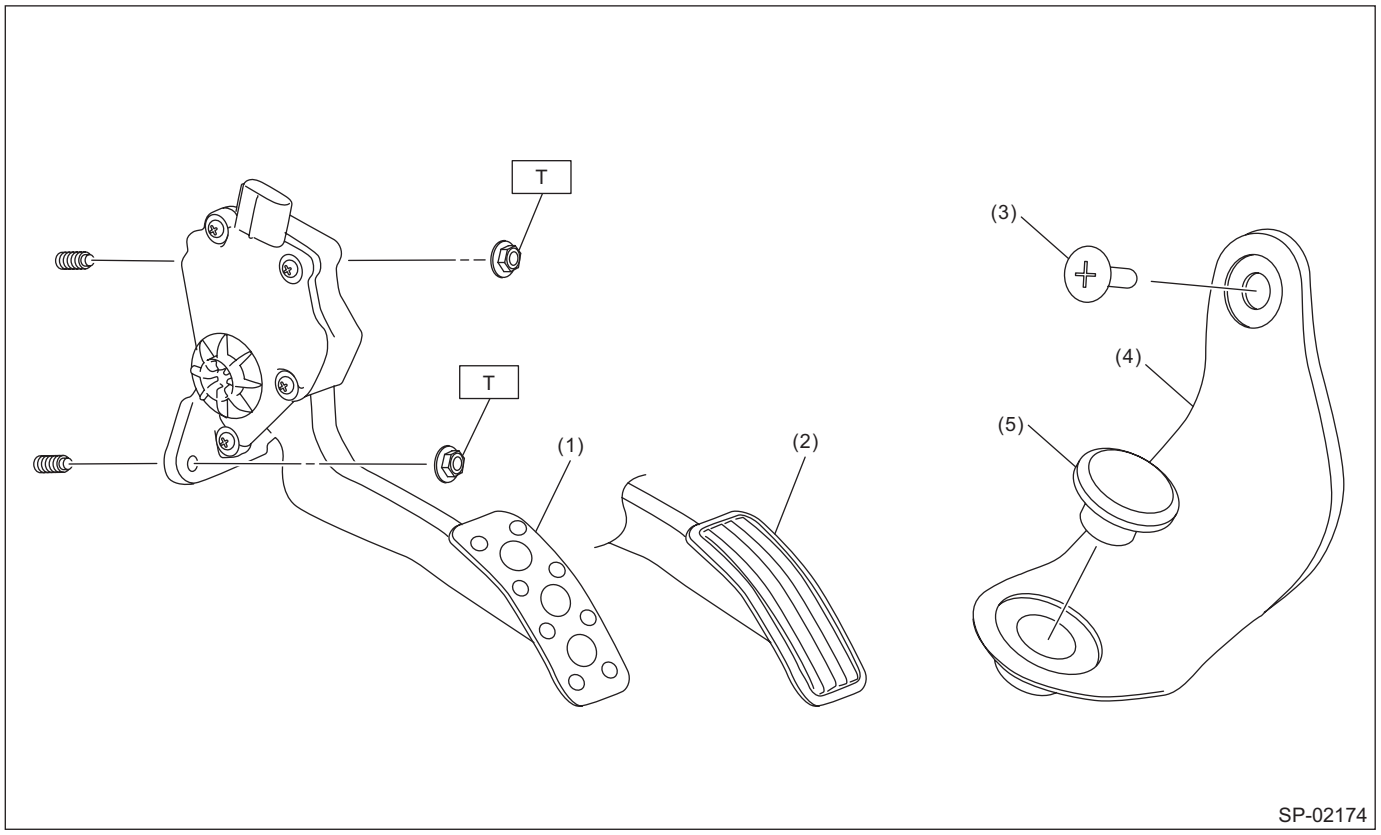
1. General Description 2
2. Accelerator Pedal 5

1. General Description

A: SPECIFICATION

Accelerator pedal	Stroke	At pedal pad	50 — 59 mm (1.97 — 2.32 in)

B: COMPONENT



(1) Accelerator pedal ASSY (sport type)
(2) Accelerator pedal ASSY (normal type)
(3) Clip
(4) Accelerator plate
(5) Accelerator stopper

Tightening torque: N·m (kgf-m, ft-lb)

T: 7.5 (0.8, 5.5)

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

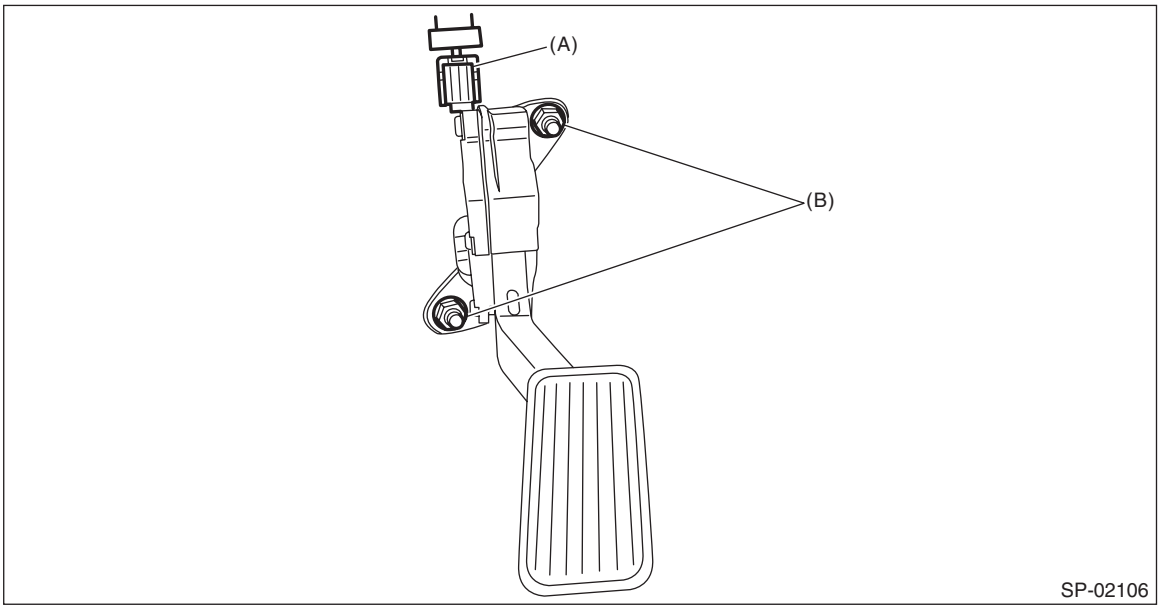
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

2. Accelerator Pedal

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Disconnect the connector (A).
3) Remove the nut (B) securing accelerator pedal assembly, and remove the accelerator pedal assembly.



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

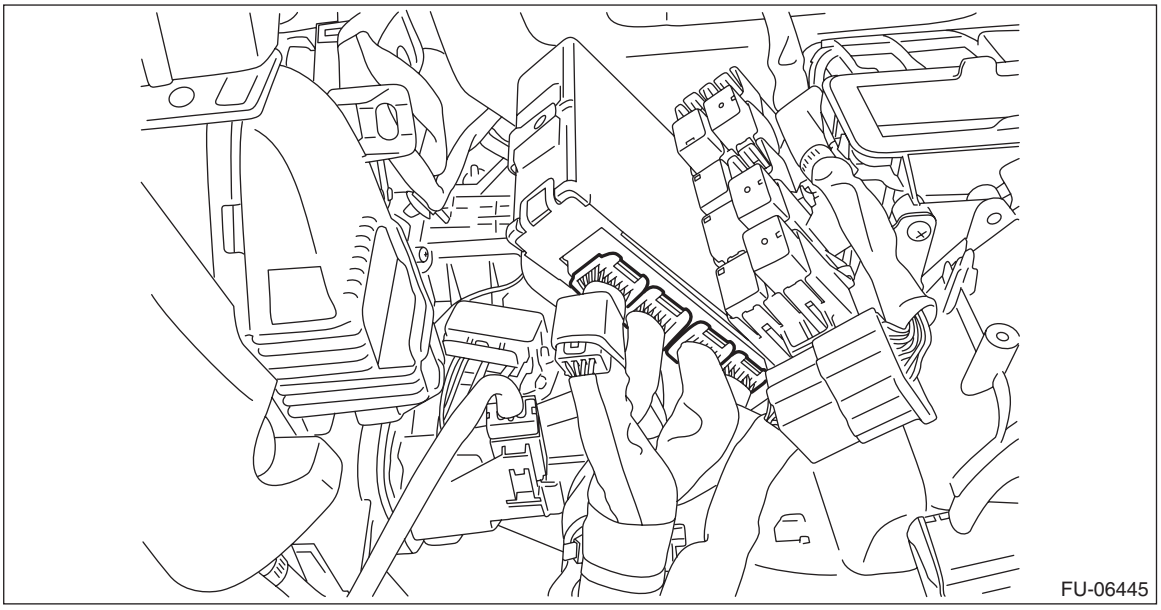
C: DISASSEMBLY

NOTE:
The accelerator pedal cannot be disassembled.

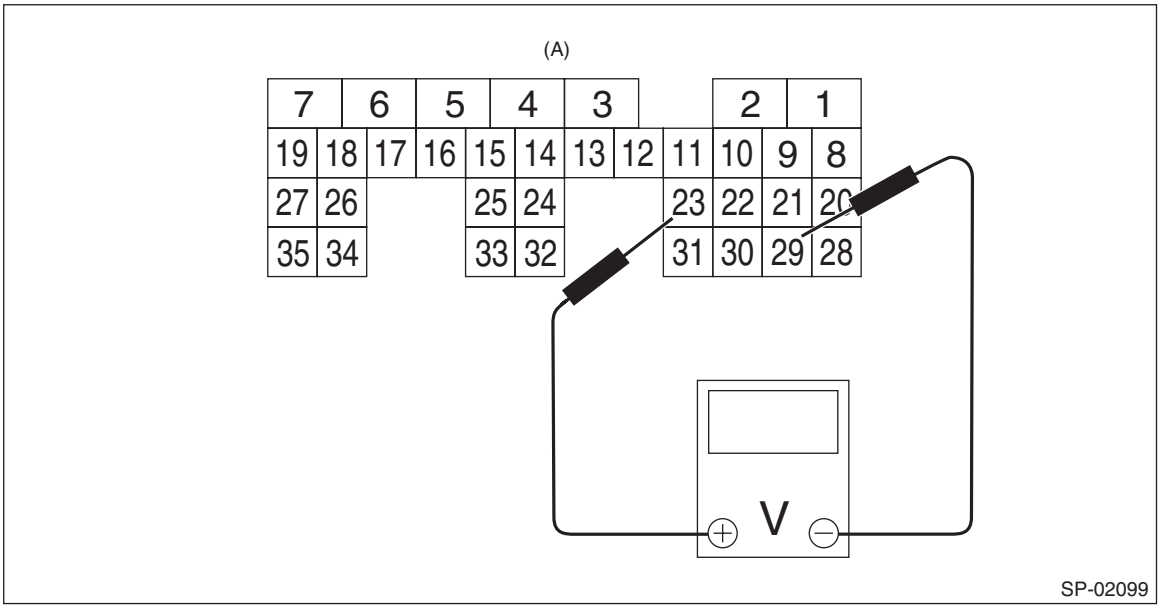
D: INSPECTION

1. CHECK ACCELERATOR PEDAL SENSOR AREA (METHOD WITH CIRCUIT TESTER)

1) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
2) Turn the ignition switch to ON. (Engine OFF)
3) Measure the voltage between ECM connector terminals.


FU-06445

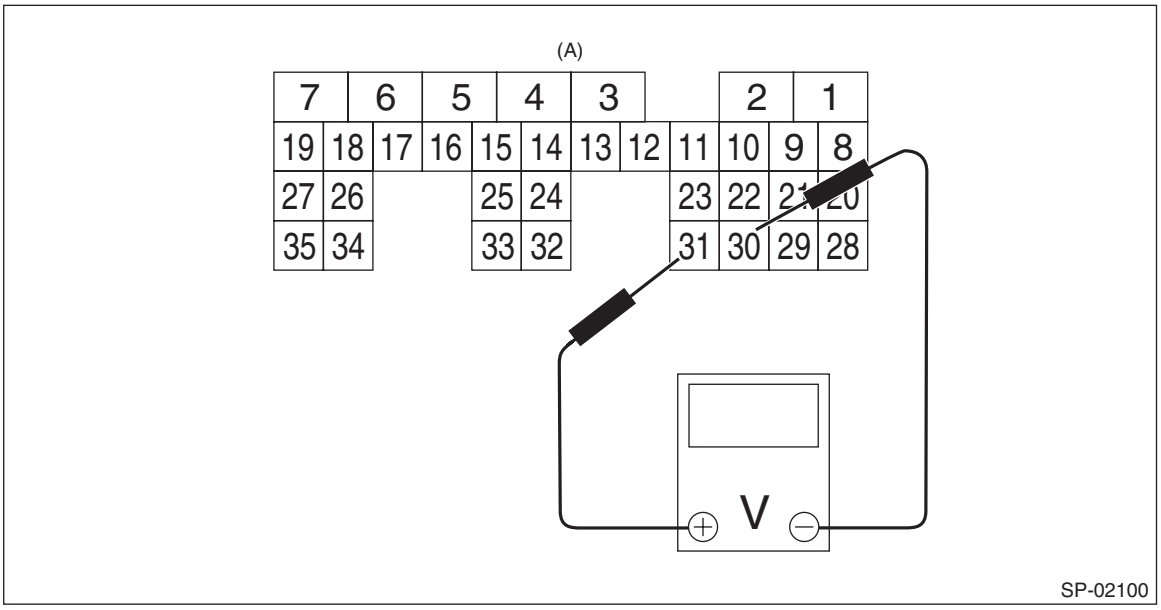
- Main sensor side



SP-02099

(A) To ECM connector

- Sub sensor side



(A) To ECM connector

Accelerator pedal sensor	Accelerator pedal	Terminal No.	Standard
Main	Not depressed (full closed)	23 (+) and 29 (–)	0.4 — 1.0 V
	Depressed (full opened)		2.4 — 3.7 V
Sub	Not depressed (full closed)	31 (+) and 30 (–)	0.3 — 1.1 V
	Depressed (full opened)		2.3 — 3.8 V

4) After inspection, install the related parts in the reverse order of removal.

2. CHECK ACCELERATOR PEDAL SENSOR AREA (METHOD WITH SUBARU SELECT MONITOR)

1) Turn the ignition switch to ON. (engine OFF)
2) Read the accelerator pedal opening angle signal and voltage of accelerator pedal sensor using Subaru Select Monitor. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.> <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>

Accelerator pedal sensor	Accelerator pedal opening angle signal	Standard
Main	0.0%	0.4 — 1.0 V
	100.0%	2.4 — 3.7 V
Sub	0.0%	0.3 — 1.1 V
	100.0%	2.3 — 3.8 V

3. OTHER INSPECTIONS

1) Check that the accelerator pedal does not have deformation, cracks or damage.
2) Check for smooth operation when the accelerator pedal is depressed.
3) Check if the accelerator pedal returns to its original position smoothly when the pedal is released.

IGNITION

IG(H4DO(w/o HEV))

Page

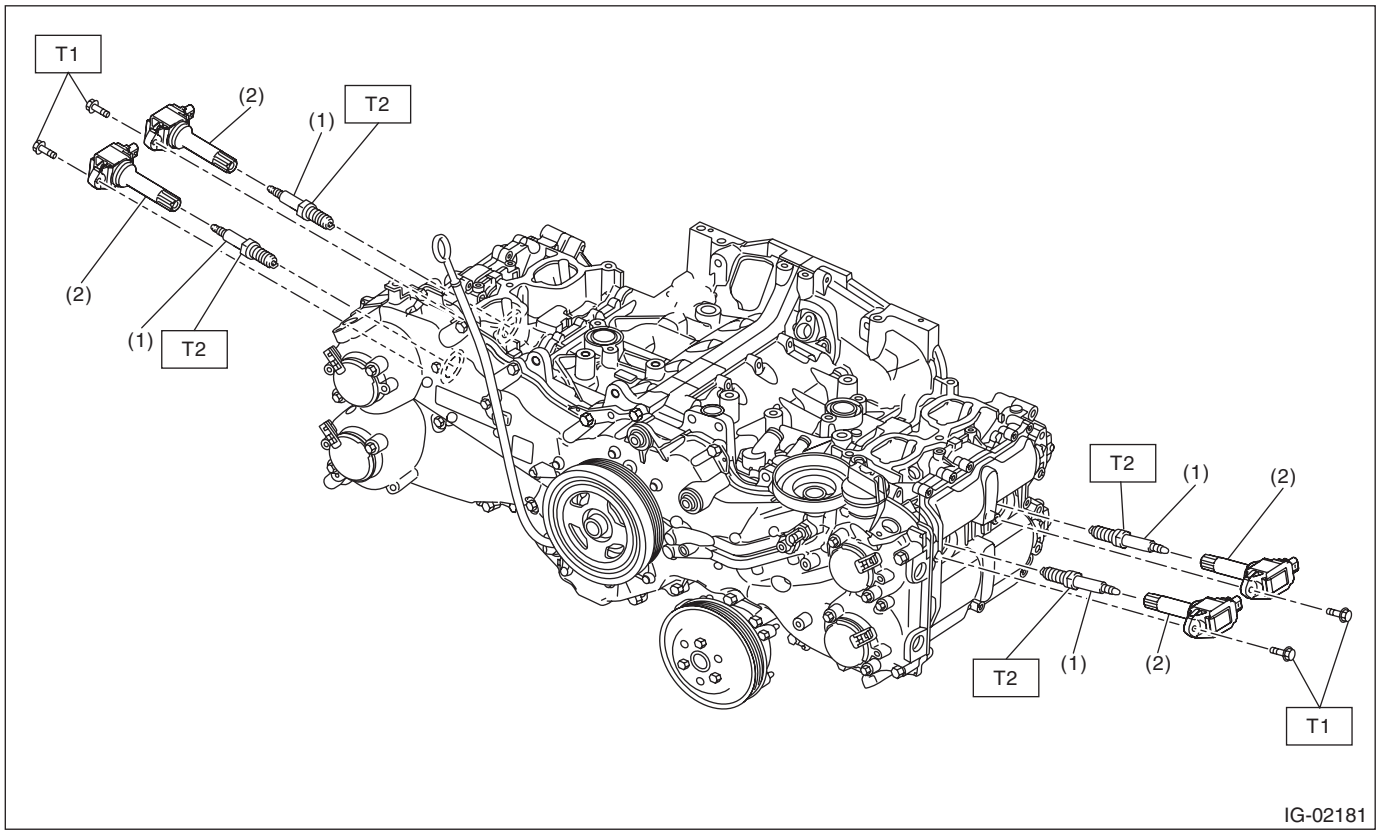
1. General Description 2
2. Spark Plug 4
3. Ignition Coil 12

1. General Description

A: SPECIFICATION

Item				Specifications
Ignition coil	Manufacturer and type	Gasoline engine model		Hitachi: EIC-2230
		HEV model		Diamond Electric: FK0438
	Ignition system			Independent ignition coil
Spark plug	Manufacturer and type	Gasoline engine model		NGK: SILZKAR7B11
		HEV model		NGK: DILZKAR7B11
	Thread size (diameter, pitch, length) mm			12, 1.25, 26.5
	Spark plug gap mm (in)		Standard	1.0 — 1.1 (0.039 — 0.043)
	Electrode			Iridium

B: COMPONENT



(1) Spark plug
(2) Ignition coil

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8.5 (0.9, 6.3)
T2: 17.5 (1.8, 12.9)

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

2. Spark Plug

A: REMOVAL

Spark plug:

Refer to "SPECIFICATION" for spark plug. <Ref. to IG(H4DO(w/o HEV))-2, SPECIFICATION, General Description.>

1. RH SIDE

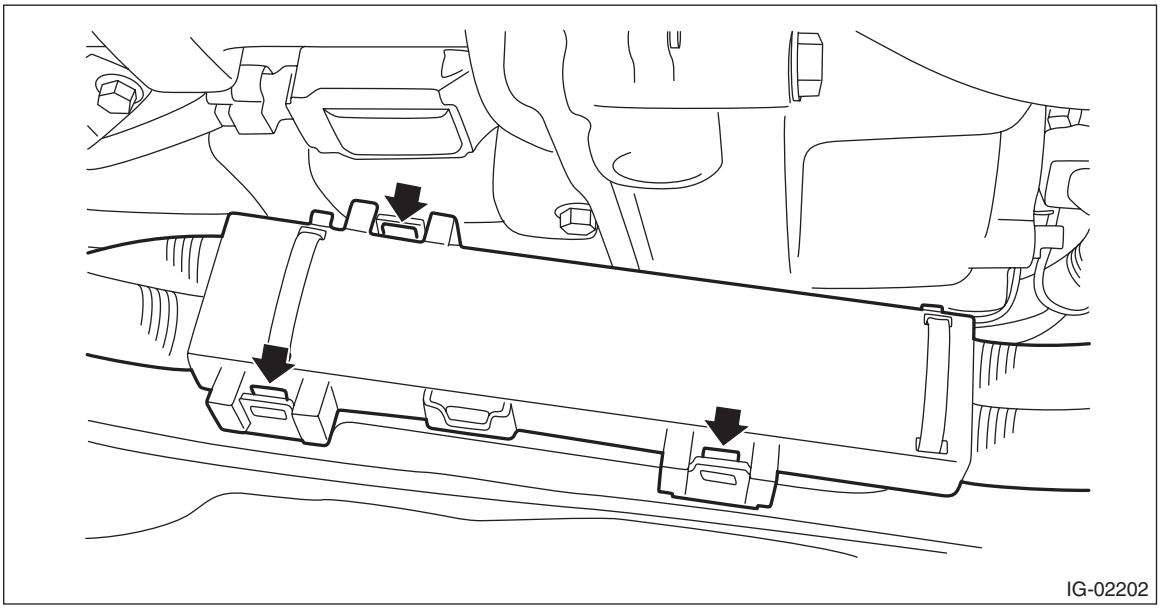
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the air cleaner case. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-7, REMOVAL, Air Cleaner Case.>

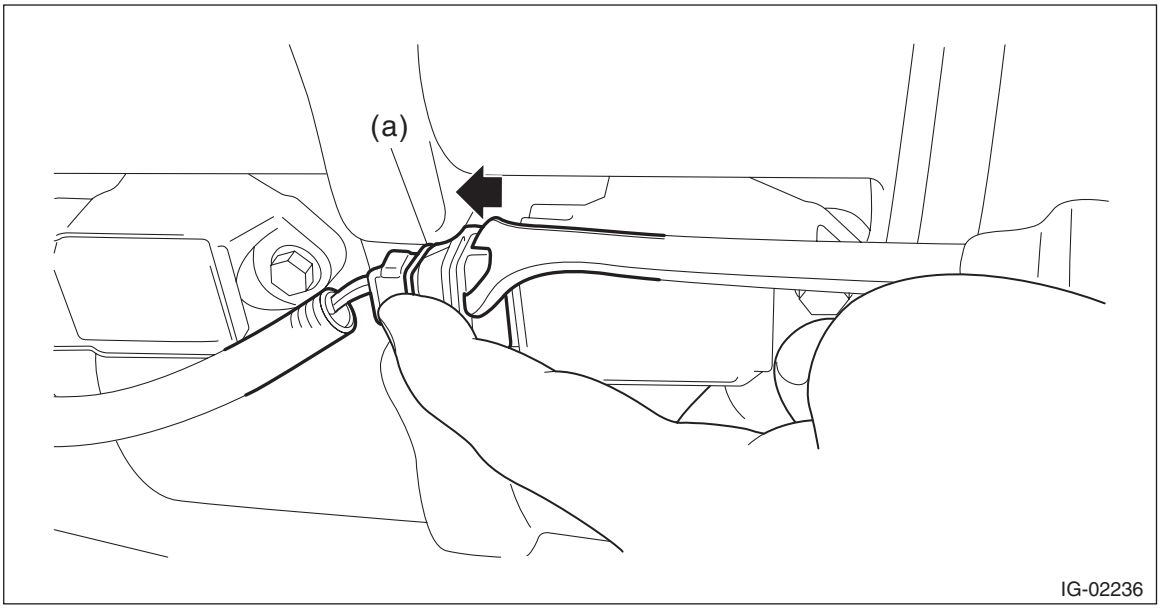
3) Remove the 12 volt engine restart battery. (HEV model) <Ref. to SC(H4DO(HEV))-40, 12 VOLT ENGINE RESTART BATTERY, REMOVAL, Battery.>

4) Remove the battery cable assembly from the battery cable bracket No. 2. (HEV model)

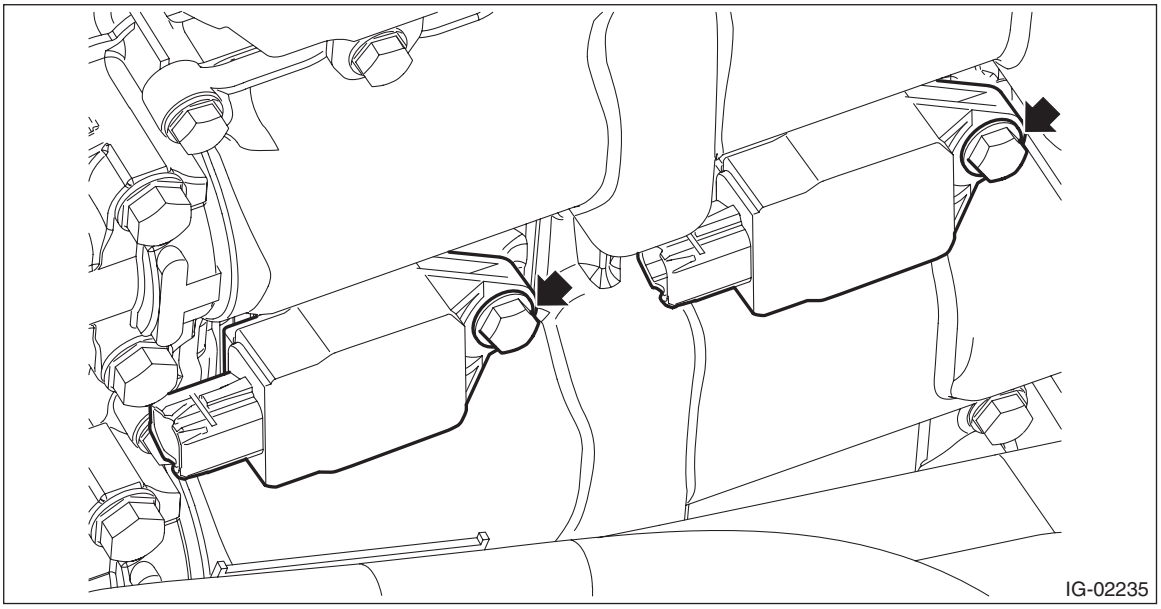


5) Disconnect the connector from ignition coil.

NOTE:
While pressing the spring (a) shown in the figure, slide it in the direction of the arrow with a clip remover.



6) Remove the ignition coil.



7) Remove the spark plug with a spark plug socket.

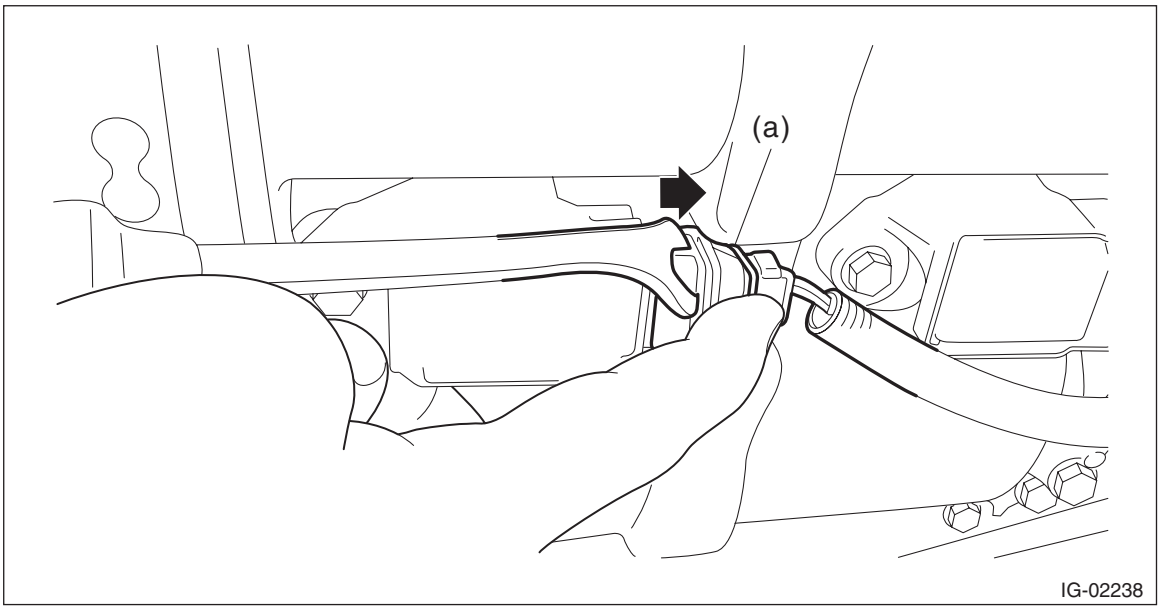
2. LH SIDE

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

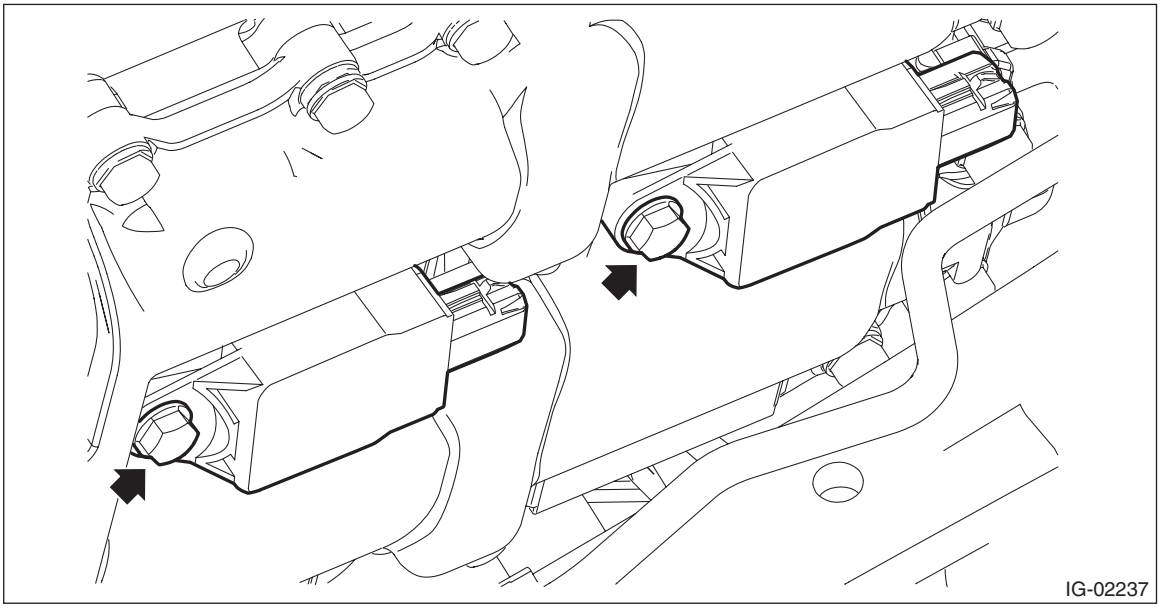
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Disconnect the connector from ignition coil.

NOTE:
While pressing the spring (a) shown in the figure, slide it in the direction of the arrow with a clip remover.



3) Remove the ignition coil.



4) Remove the spark plug with a spark plug socket.

B: INSTALLATION

1. RH SIDE

Install in the reverse order of removal.

CAUTION:
Degrease the ignition coil installation portion and the mounting bolts.

Tightening torque:
Spark plug
17.5 N·m (1.8 kgf-m, 12.9 ft-lb)
Ignition coil
8.5 N·m (0.9 kgf-m, 6.3 ft-lb)

2. LH SIDE

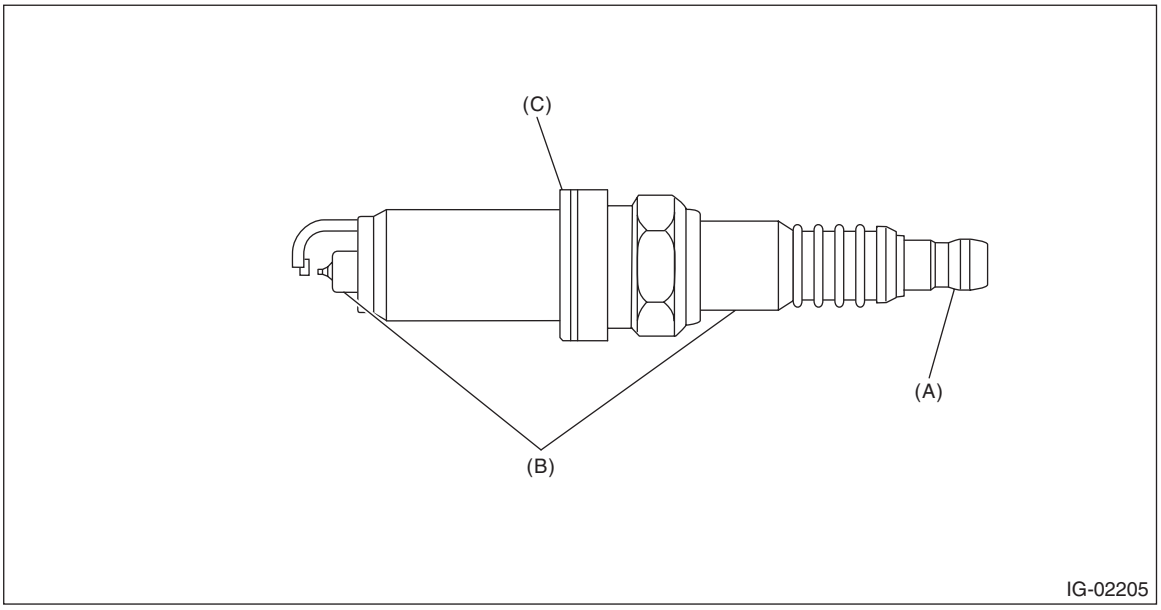
Install in the reverse order of removal.

CAUTION:
Degrease the ignition coil installation portion and the mounting bolts.

Tightening torque:
Spark plug
17.5 N·m (1.8 kgf-m, 12.9 ft-lb)
Ignition coil
8.5 N·m (0.9 kgf-m, 6.3 ft-lb)

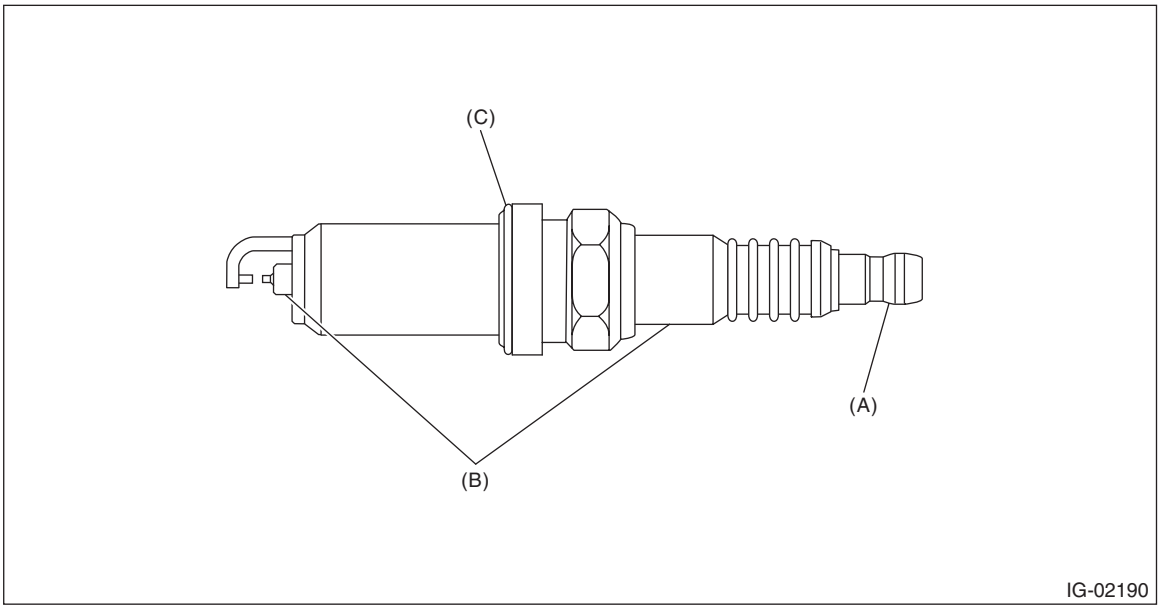
C: INSPECTION

1) Check the spark plug for abnormalities. If defective, replace the spark plug.
- Gasoline engine model



(A) Terminal damage (B) Crack or damage in insulator (C) Damaged gasket

- HEV model

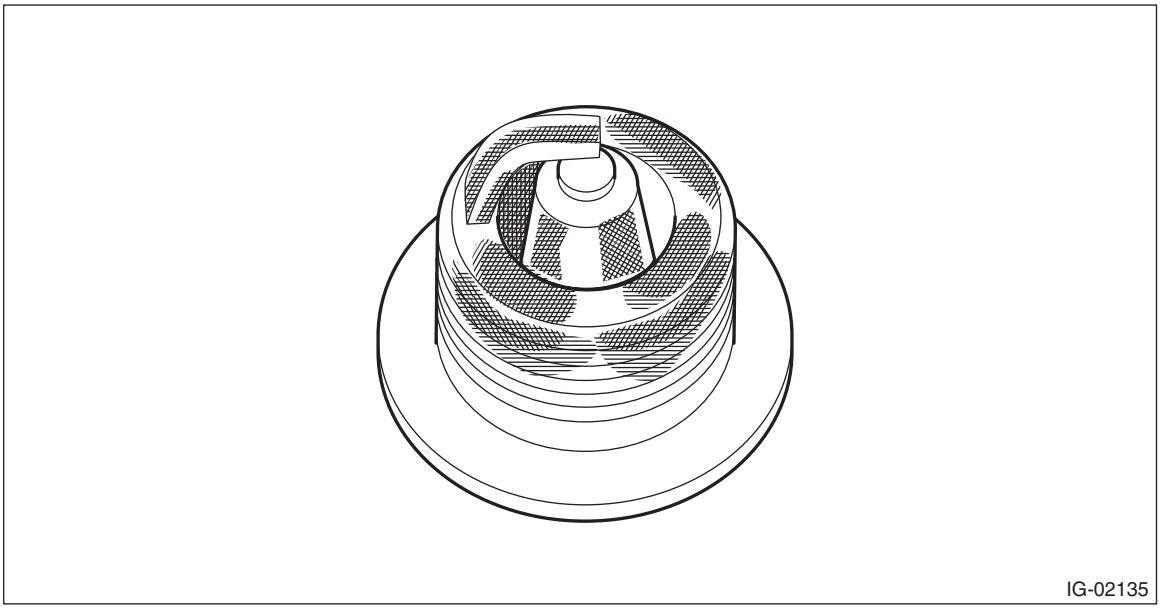


(A) Terminal damage (B) Crack or damage in insulator (C) Damaged gasket

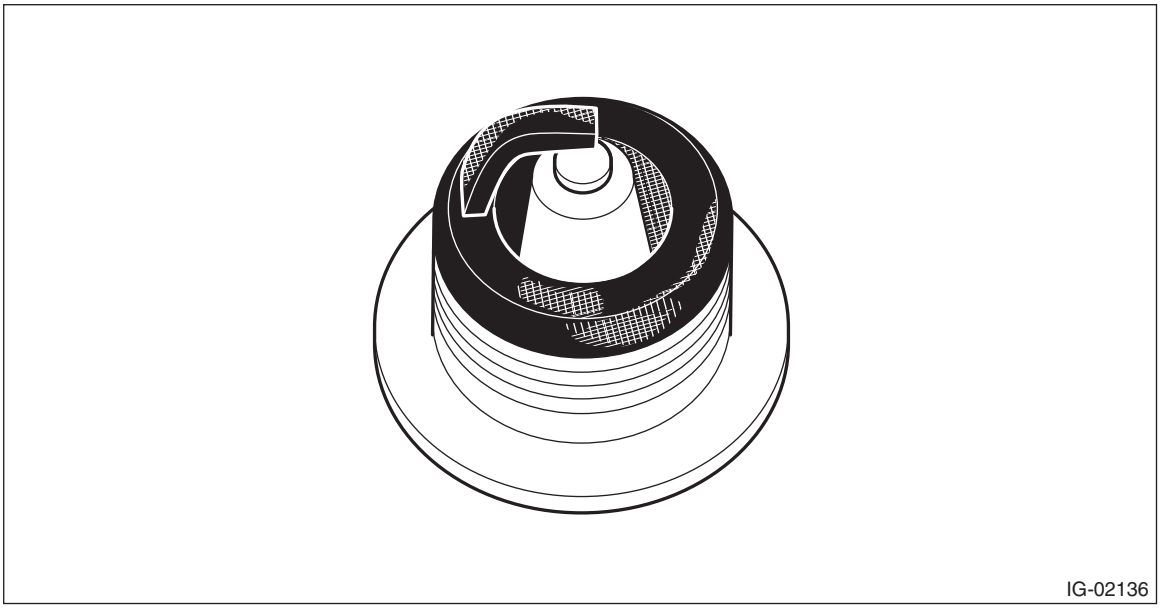
2) Check the spark plug electrode and condition of the insulator. If abnormal, check and repair the cause and replace the spark plug.

(1) Normal:

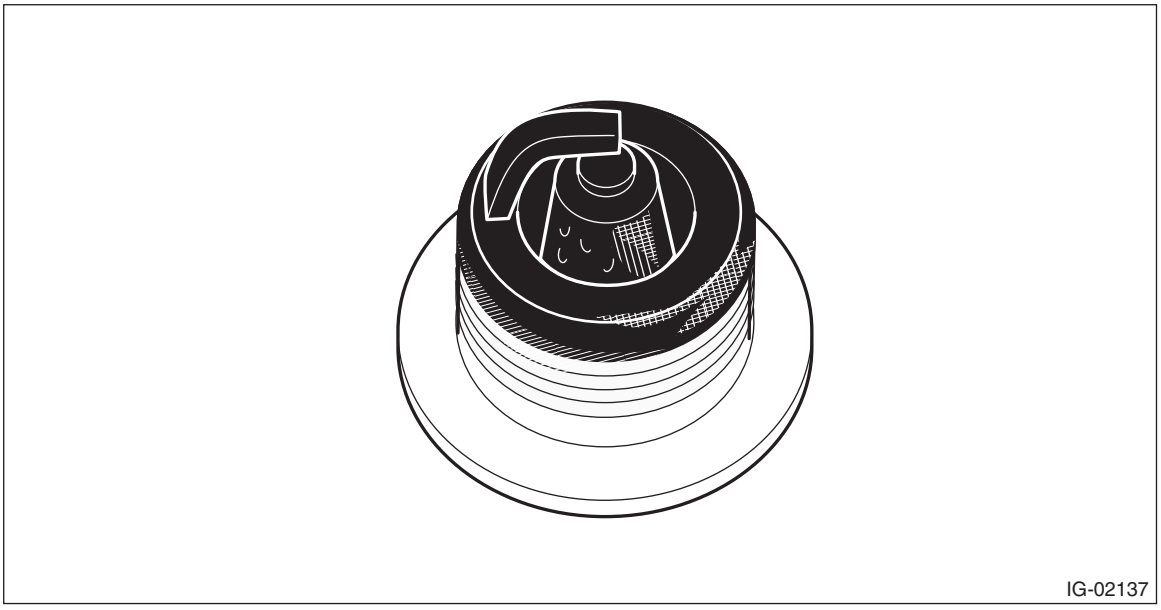
Brown to grayish-tan deposits and slight electrode wear indicate correct spark plug heat range.



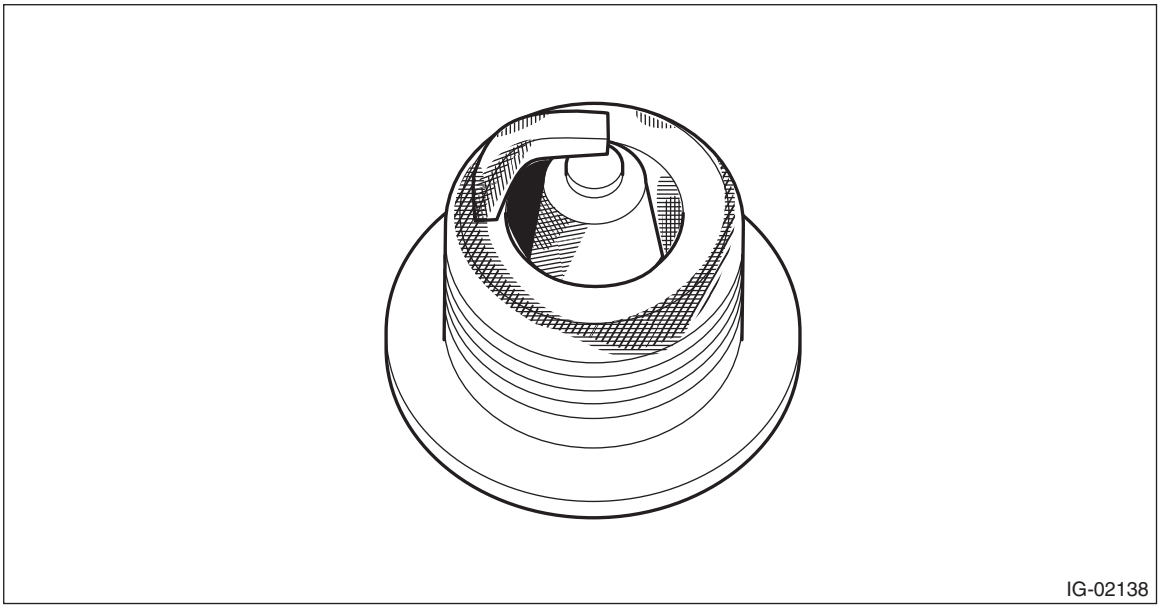
(2) Carbon fouled:
Dry fluffy carbon deposits on the insulator and electrode are mostly caused by slow-speed driving in town, weak ignition, too rich fuel mixture, etc.



(3) Oil fouled:
Wet black deposits show oil entrance into combustion chamber through worn piston rings or increased clearance between valve guides and valve stems.



(4) Overheating:
A white or light gray insulator with black or brown spots and bluish burnt electrodes indicate engine overheating, wrong selection of fuel, or loose spark plugs.

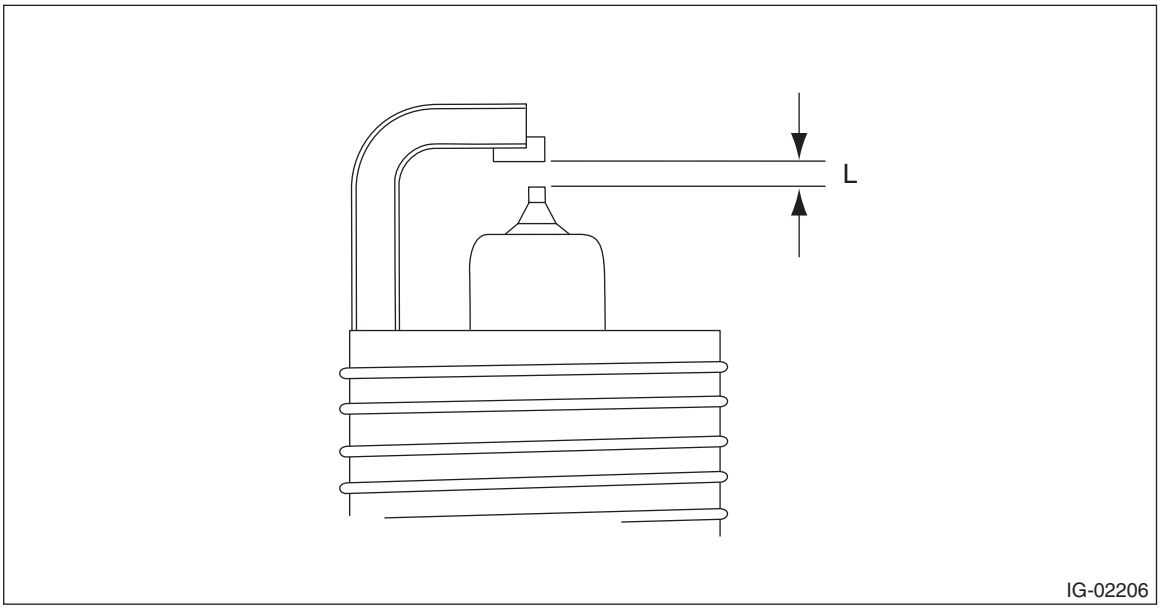


3) Using a nylon brush, etc., clean and remove the carbon or oxide deposits from the spark plug. If deposits are too stubborn, replace the spark plugs. After cleaning the spark plugs, check the spark plug gap “L” using a gap gauge. If it is not within the standard, replace the spark plug.

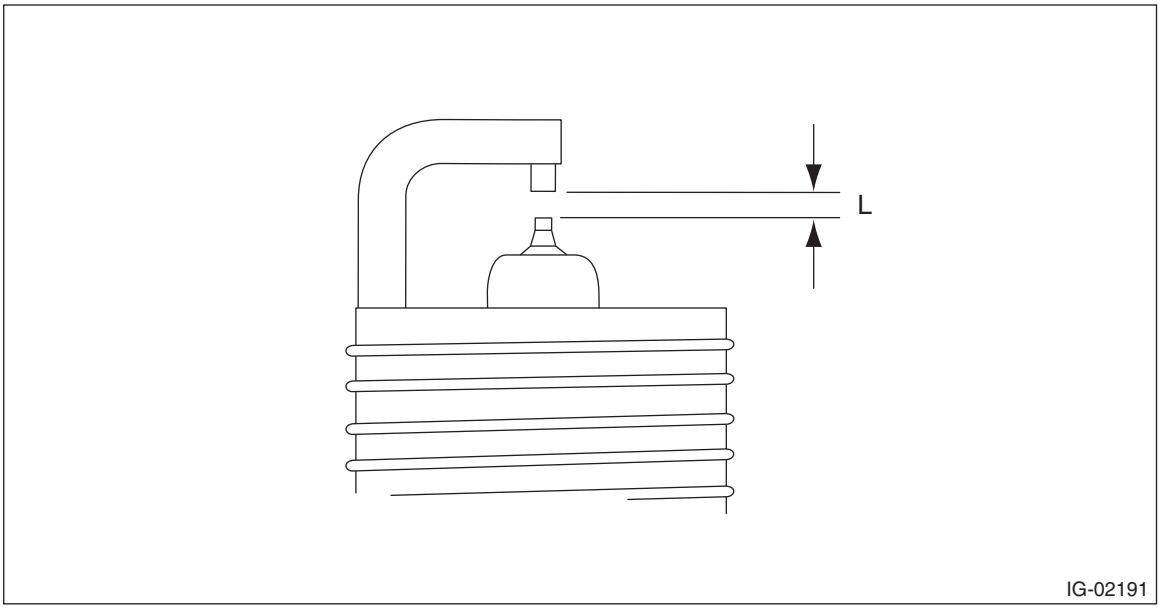
NOTE:
- Never use a plug cleaner.
- Do not use a metal brush as it may damage the electrode area.

Spark plug gap L:
Standard
1.0 — 1.1 mm (0.039 — 0.043 in)

- Gasoline engine model



- HEV model



3. Ignition Coil

A: REMOVAL

Direct ignition type is adopted. Refer to “Spark Plug” for removal procedure. <Ref. to IG(H4DO(w/o HEV))-4, REMOVAL, Spark Plug.>

B: INSTALLATION

Direct ignition type is adopted. Refer to “Spark Plug” for the installation procedure. <Ref. to IG(H4DO(w/o HEV))-7, INSTALLATION, Spark Plug.>

C: INSPECTION

For inspection procedure, refer to “Diagnostics for Engine Starting Failure”. <Ref. to EN(H4DO w/o HEV)(diag)-89, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.> <Ref. to EN(H4DO HEV)(diag)-86, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>

STARTING/CHARGING SYSTEMS

SC(H4DO(w/o HEV))

		Page
1.	General Description	2
2.	Starter	8
3.	Generator	33
4.	Battery	52
5.	Battery Current & Temperature Sensor	60

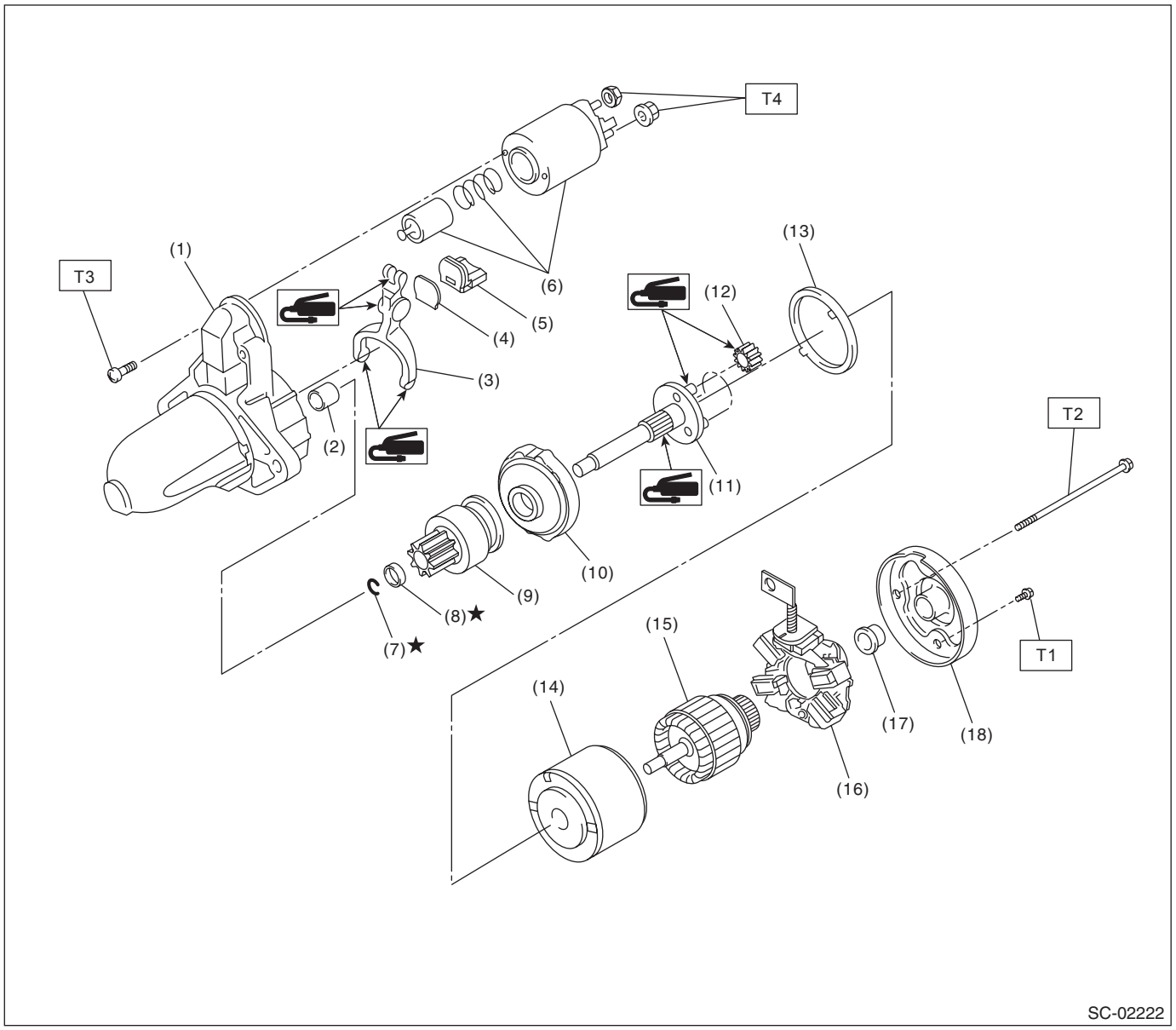
1. General Description

A: SPECIFICATION

Item			Specifications	
Vehicle model			CVT	MT
Starter	Type		Reduction type	
	Model		M000T38571	M000T33176
	Manufacturer		Mitsubishi Electric	
	Voltage and output		12 V — 1.2 kW	12 V — 1.0 kW
	Direction of rotation		Counterclockwise (when observed from pinion)	
	Number of pinion teeth		9	8
	Armature commutator runout	Standard	0.05 mm (0.0020 in)	
		Limit	0.10 mm (0.0039 in)	
	Armature depth of segment mold	Standard	0.50 mm (0.020 in)	
	Brush length	Standard	12.3 mm (0.484 in)	
		Limit	7.0 mm (0.276 in)	
	Brush spring force	Standard	15.9 — 19.5 N (1.62 — 1.99 kgf, 3.57 — 4.38 lbf)	
		Limit	2.5 N (0.25 kgf, 0.56 lbf)	
	No-load characteristics	Voltage	11 V	
		Current	90 A or less	95 A or less
Generator	Type		Rotating-field three-phase type, voltage regulator built-in type, with load response control system	
	Model		A2TX5081	
	Manufacturer		Mitsubishi Electric	
	Voltage and output		12 V — 130 A	
	Polarity on ground side		Negative	
	Direction of rotation		Clockwise (when observed from pulley side)	
	Stator connection		3-phase △ type	
	Output current		1,500 r/min — 50 A or more 2,500 r/min — 111 A or more 5,000 r/min — 133 A or more	
	Regulated voltage		14.1 — 14.8 V [20°C (68°F)]	
	Rotor slip ring outer diameter	Standard	22.7 mm (0.894 in)	
		Limit	22.1 mm (0.870 in)	
	Brush length	Standard	22.5 mm (0.886 in)	
		Limit	5.0 mm (0.197 in)	
Battery	Type and capacity		12 V — 48 AH (55D23L)	
	CCA		390 A	

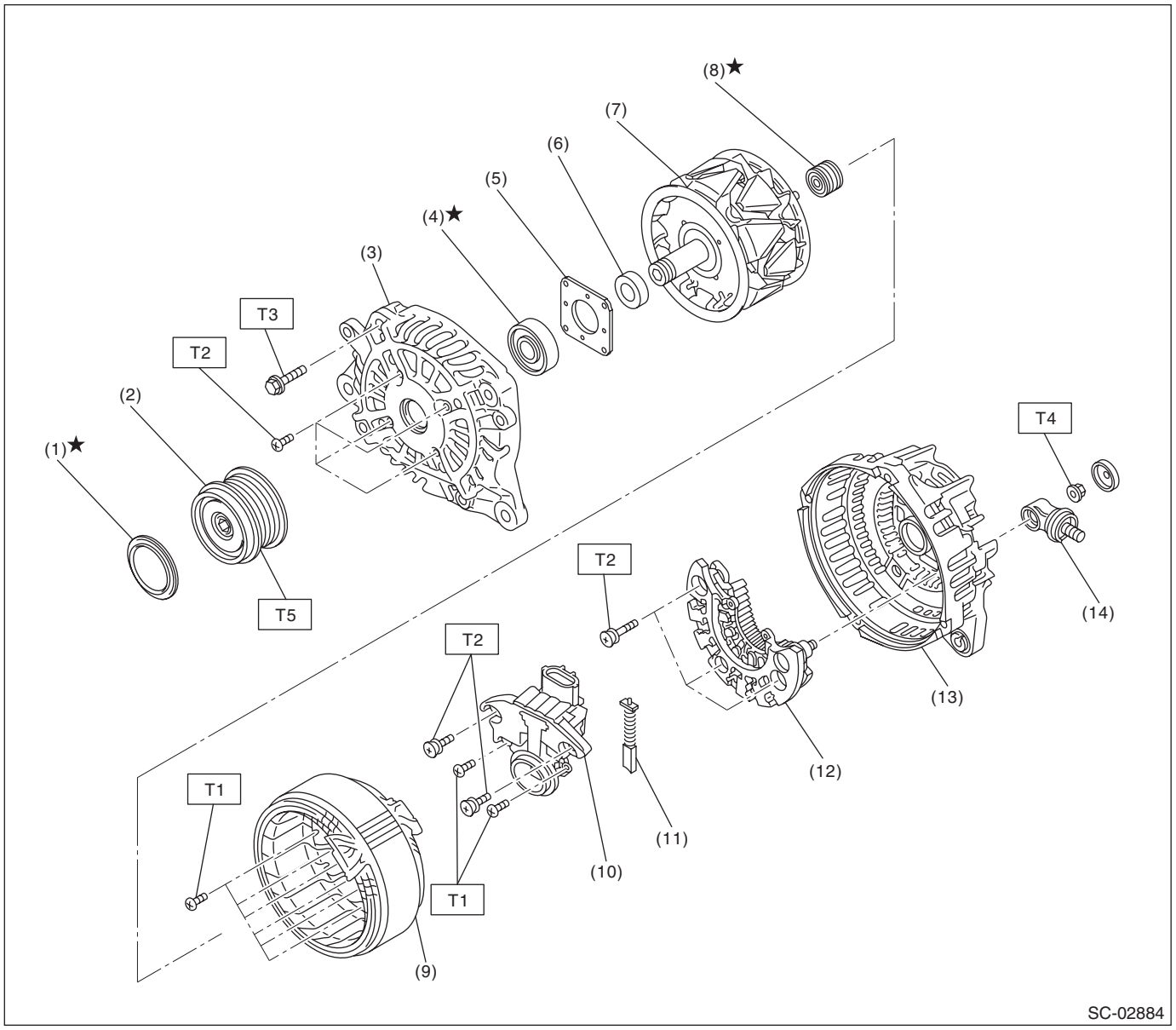
B: COMPONENT

1. STARTER



(1)	Starter housing ASSY	(9)	Overrunning clutch	(17)	Sleeve bearing
(2)	Sleeve bearing	(10)	Internal gear ASSY	(18)	Starter cover ASSY
(3)	Shift lever	(11)	Shaft		
(4)	Plate	(12)	Pinion gear	***Tightening torque: N·m (kgf-m, ft-lb)***	
(5)	Seal rubber	(13)	Seal rubber	***T1:***	***1.4 (0.1, 1.0)***
(6)	Magnet switch ASSY	(14)	Yoke ASSY	***T2:***	***6 (0.6, 4.4)***
(7)	Snap ring	(15)	Armature ASSY	***T3:***	***7.5 (0.8, 5.5)***
(8)	Stopper	(16)	Brush holder ASSY	***T4:***	***10 (1.0, 7.4)***

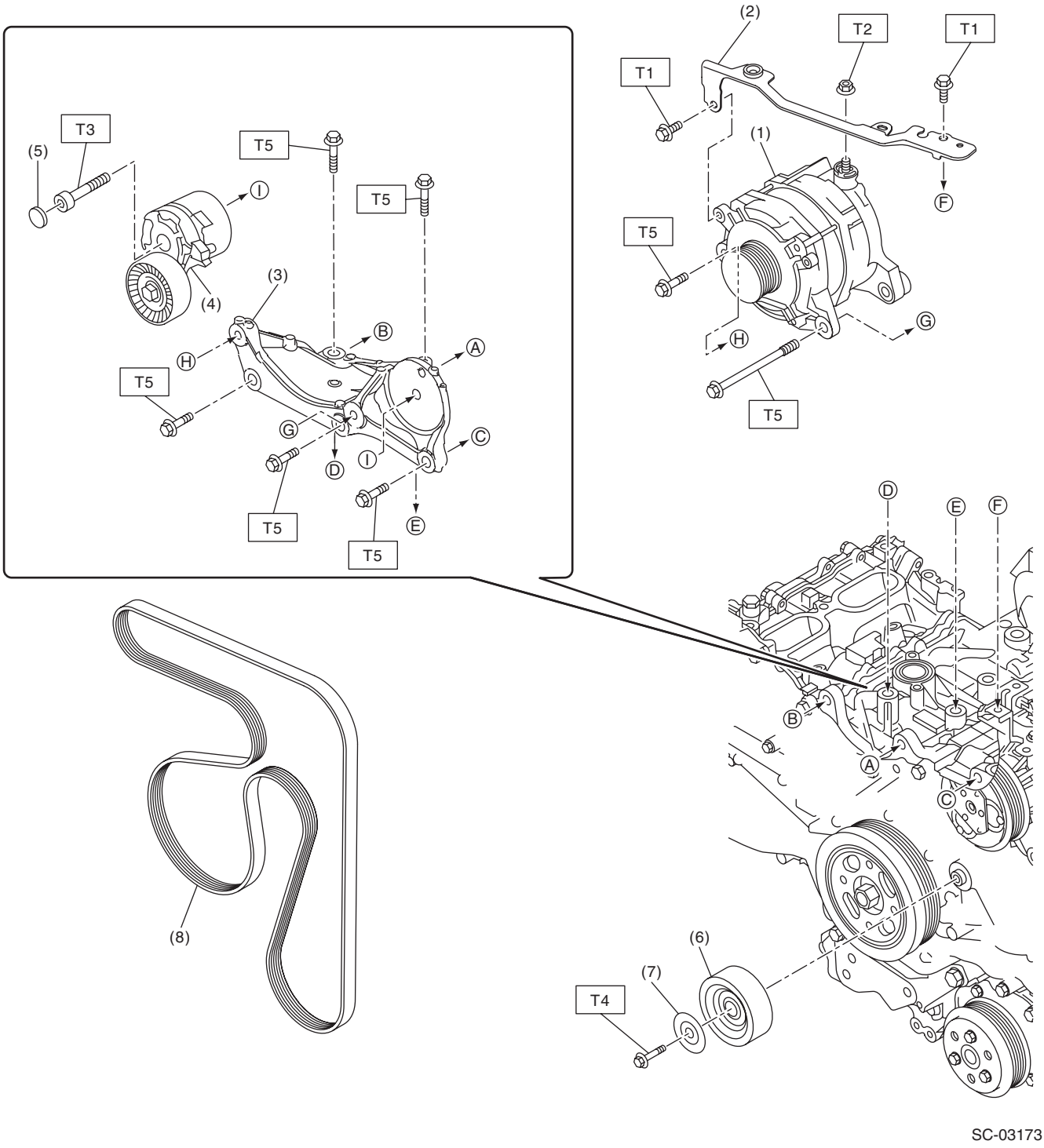
2. GENERATOR



(1)	Cap	(8)	Bearing
(2)	Pulley	(9)	Stator coil
(3)	Front cover	(10)	IC regulator
(4)	Ball bearing	(11)	Brush
(5)	Bearing retainer	(12)	Rectifier
(6)	Spacer	(13)	Rear cover
(7)	Rotor	(14)	Terminal B

Tightening torque: N·m (kgf-m, ft-lb)
T1: 2 (0.2, 1.5)
T2: 3.9 (0.4, 2.9)
T3: 4.4 (0.4, 3.2)
T4: 8.9 (0.9, 6.6)
T5: 108 (11.0, 79.8)

3. GENERATOR BRACKET

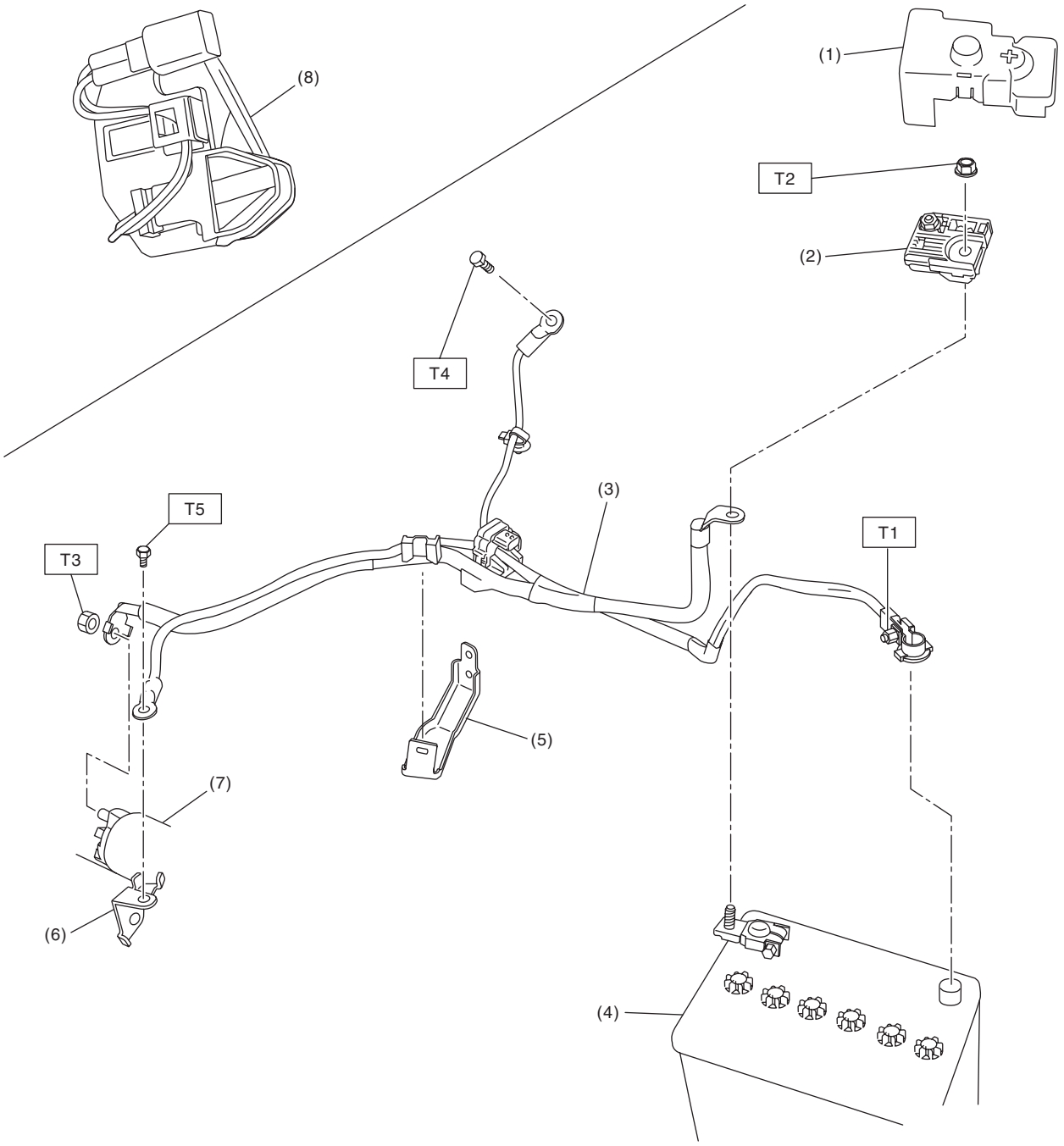


SC-03173

(1) Generator
(2) V-belt cover bracket
(3) Generator bracket
(4) V-belt tensioner ASSY
(5) Cap
(6) Idler pulley
(7) Idler pulley cover
(8) V-belt

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.7, 4.7)
T2: 15 (1.5, 11.1)
T3: 25 (2.5, 18.4)
T4: 36 (3.7, 26.6)
T5: <Ref. to SC(H4DO(w/o HEV))-35, INSTALLATION, Generator.>

4. BATTERY CURRENT & TEMPERATURE SENSOR



SC-02563

(1)	Terminal boot	(7)	Starter
(2)	Terminal fuse ASSY	(8)	Battery temperature sensor
(3)	Battery cable ASSY		
(4)	Battery		
(5)	Battery cable bracket		
(6)	Battery cable stay		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6 (0.6, 4.4)
T2: 7.5 (0.8, 5.5)
T3: 11 (1.1, 8.1)
T4: 13 (1.3, 9.6)
T5: 14 (1.4, 10.3)

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

D: PREPARATION TOOL

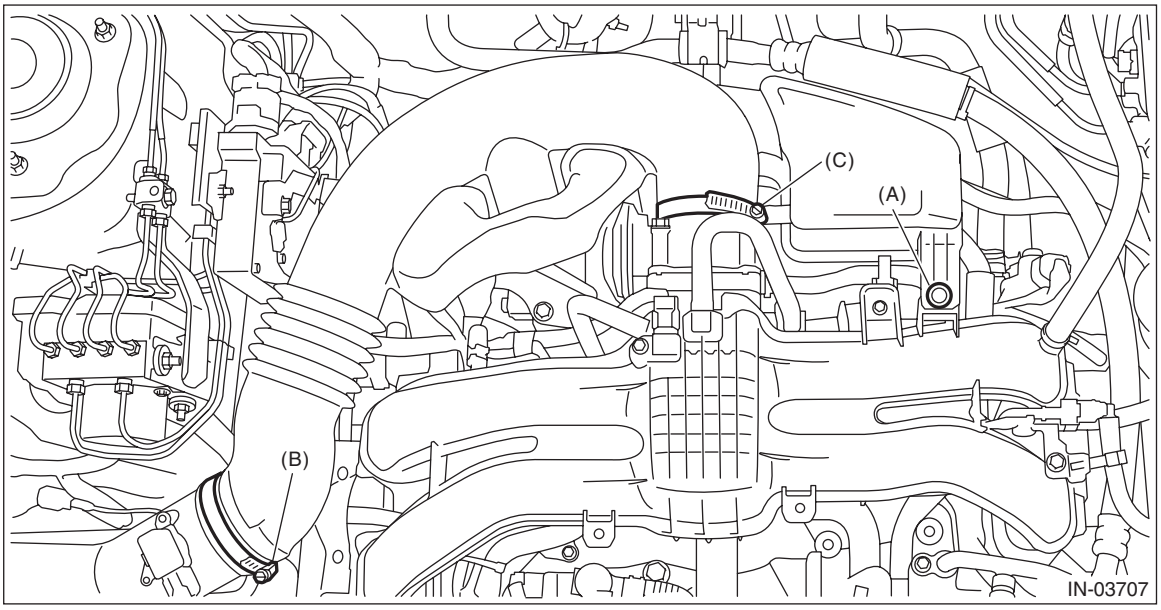
1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current. NOTE: • For measuring standby current, prepare a circuit tester that can measure by 1 mA unit. • For measuring standby current in the models with keyless access, prepare an analog type circuit tester.

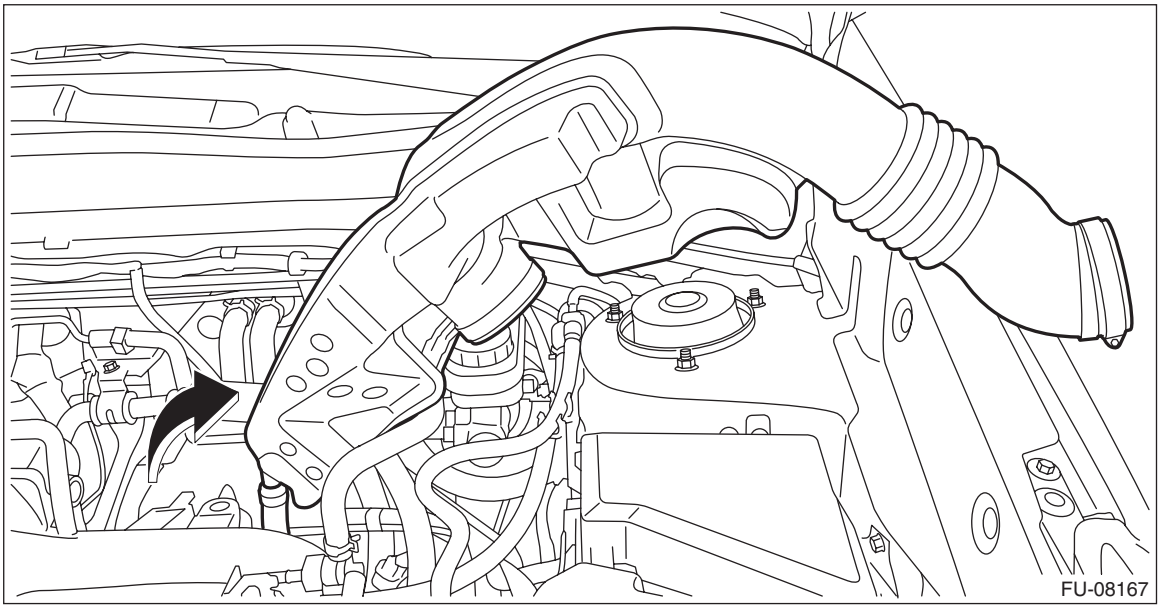
2. Starter

A: REMOVAL

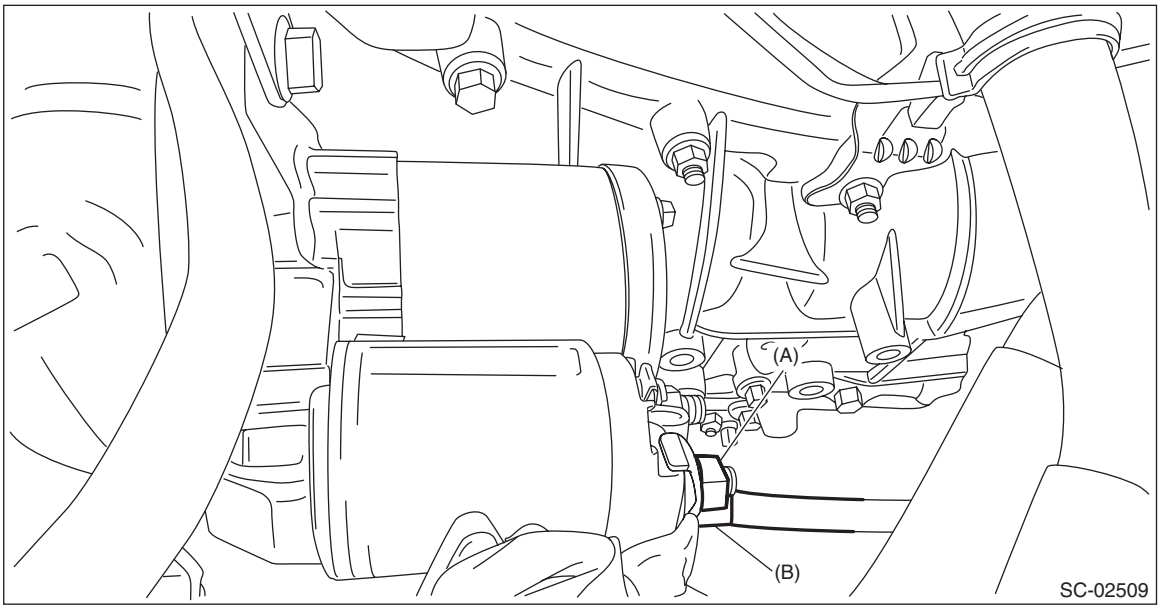
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) securing the air cleaner case (rear) to the air intake boot.
4) Loosen the clamp (C) which secures the throttle body to the air intake boot.



5) Remove the air intake boot from the throttle body, and move the air intake boot to the left side wheel apron.

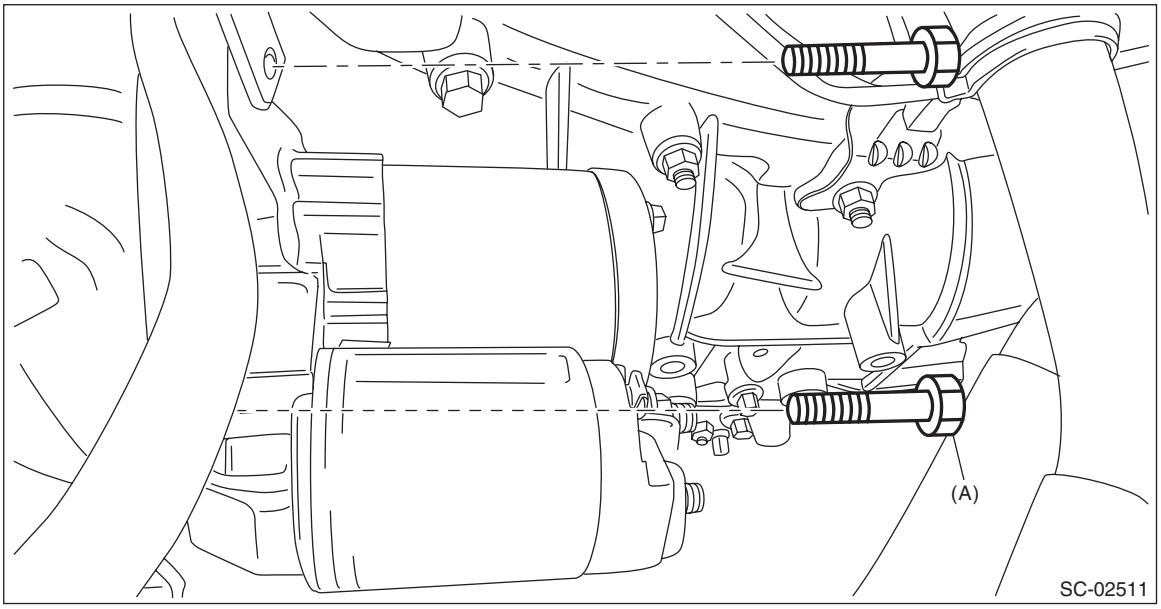


6) Disconnect the connector (B) and terminal (A) from starter.



7) Remove the starter from transmission.

NOTE:
For CVT model, a nut is used at (A).

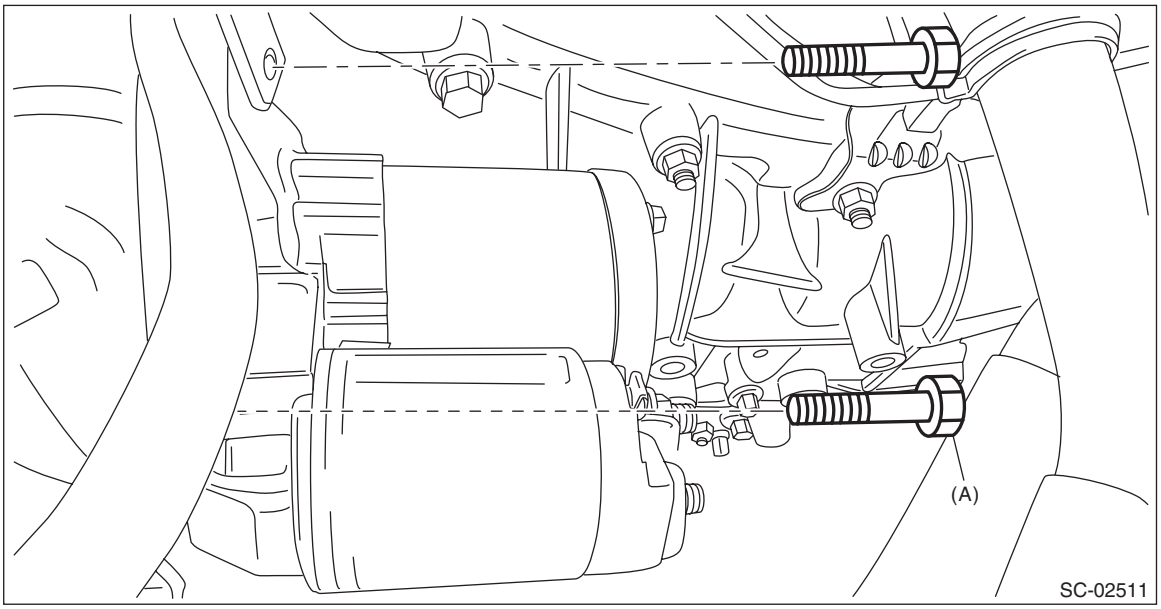


B: INSTALLATION

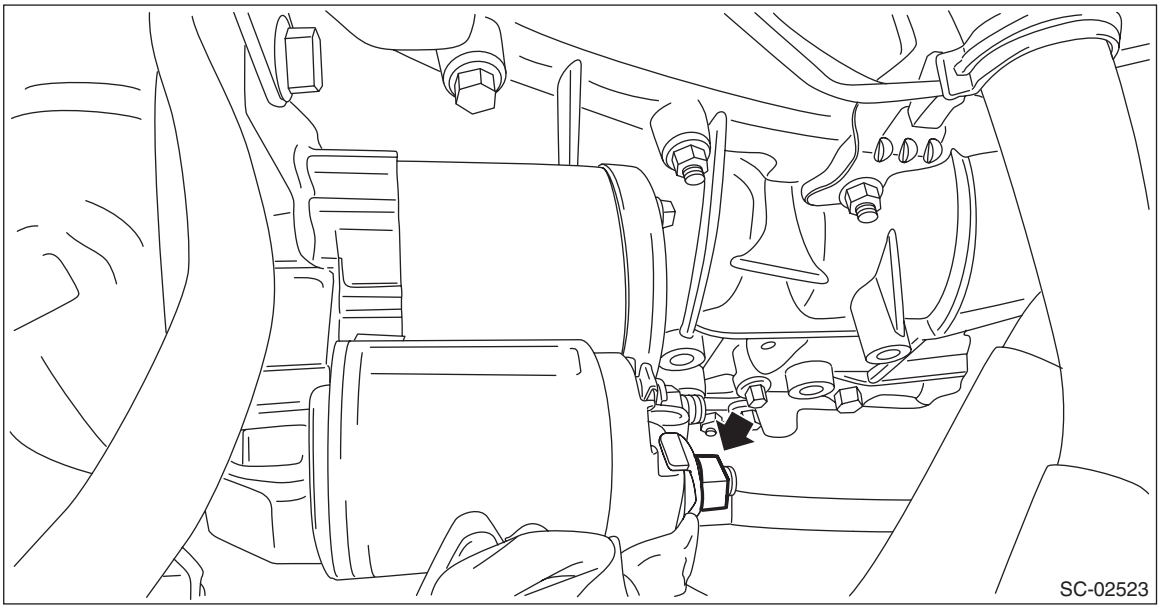
Install in the reverse order of removal.

NOTE:
For CVT model, a nut is used at (A).

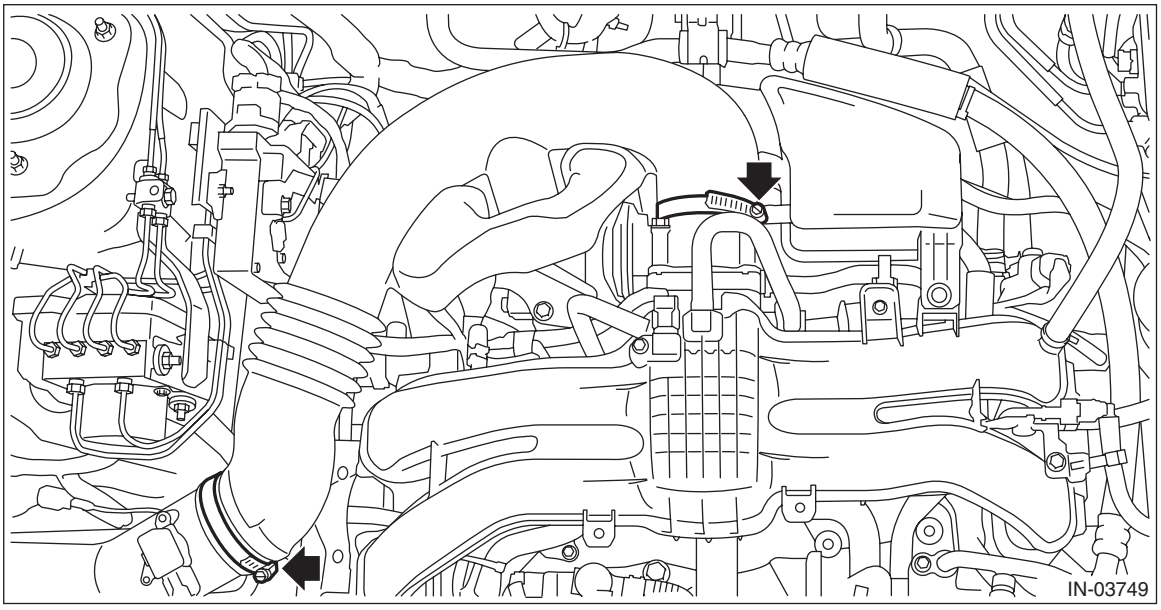
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

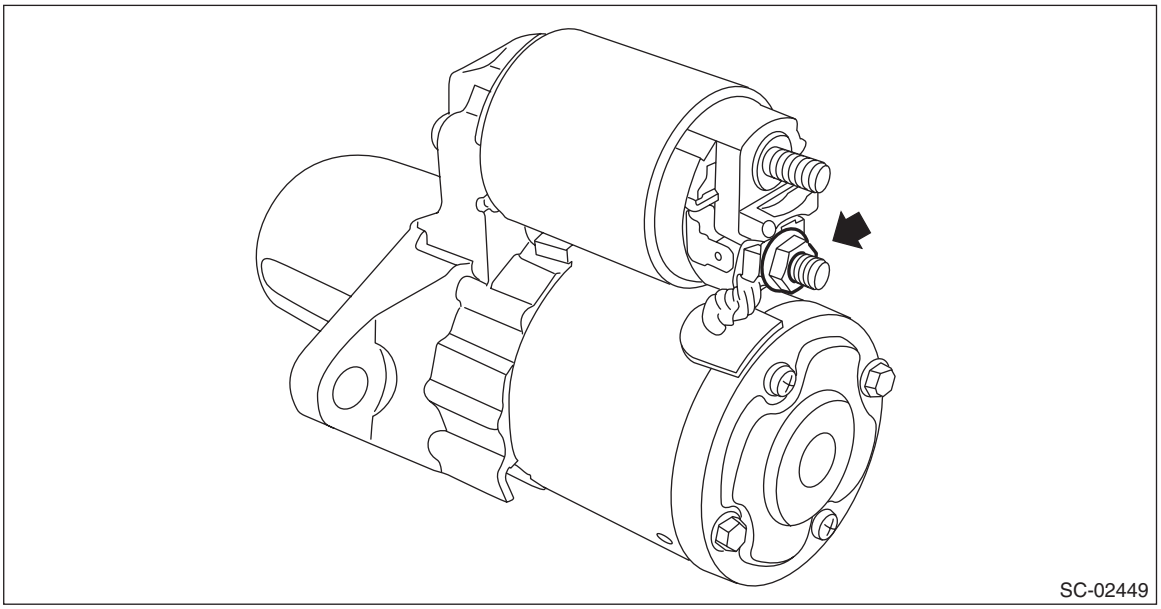


Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)

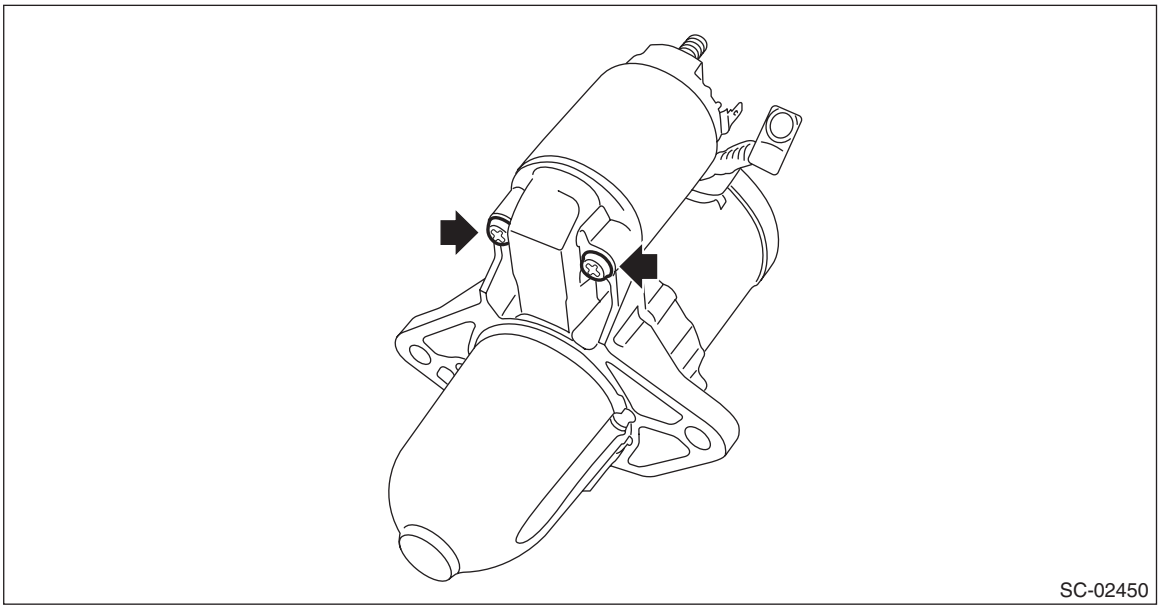


C: DISASSEMBLY

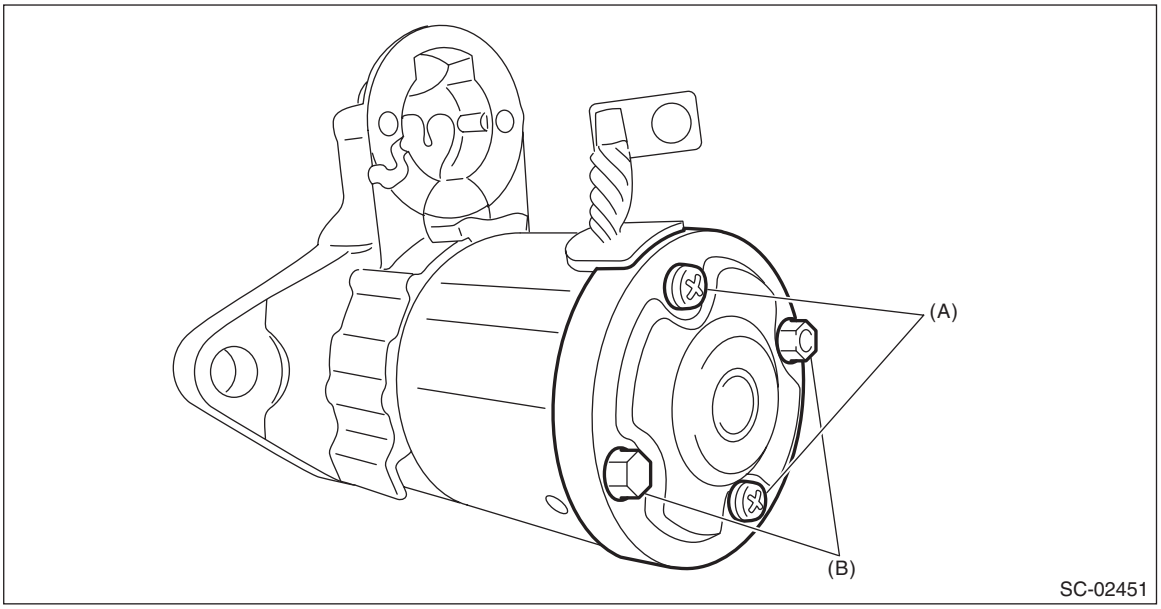
1) Disconnect the terminal M from the magnet switch assembly.



2) Remove the magnet switch assembly from the starter housing assembly.

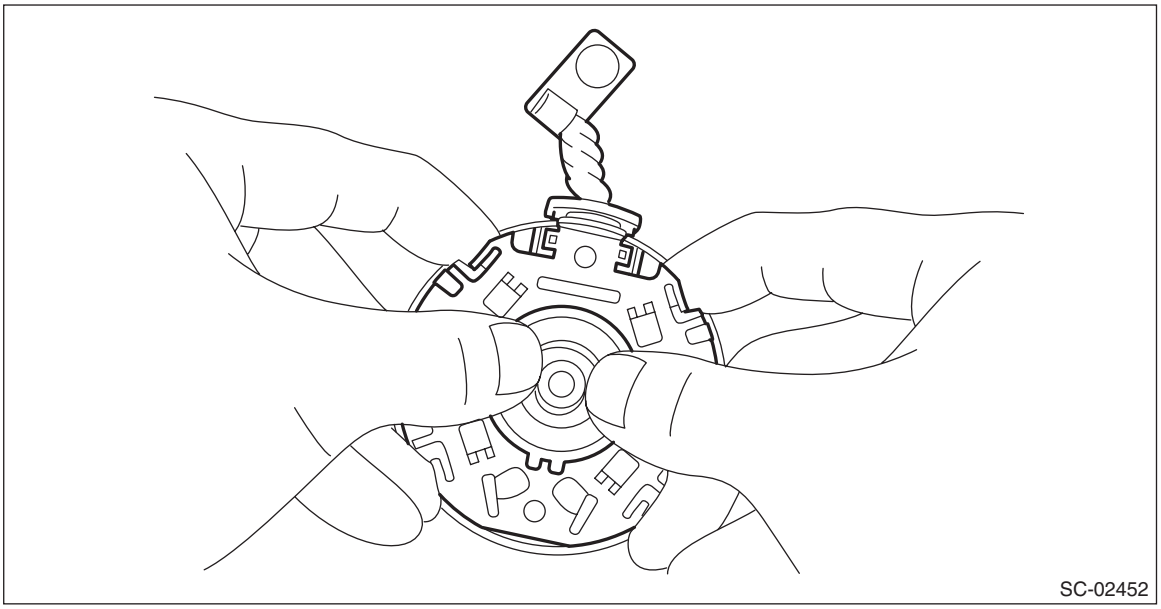


3) Remove screws (A) of the brush holder assembly, and through bolts (B) on both sides, and remove the starter cover assembly.

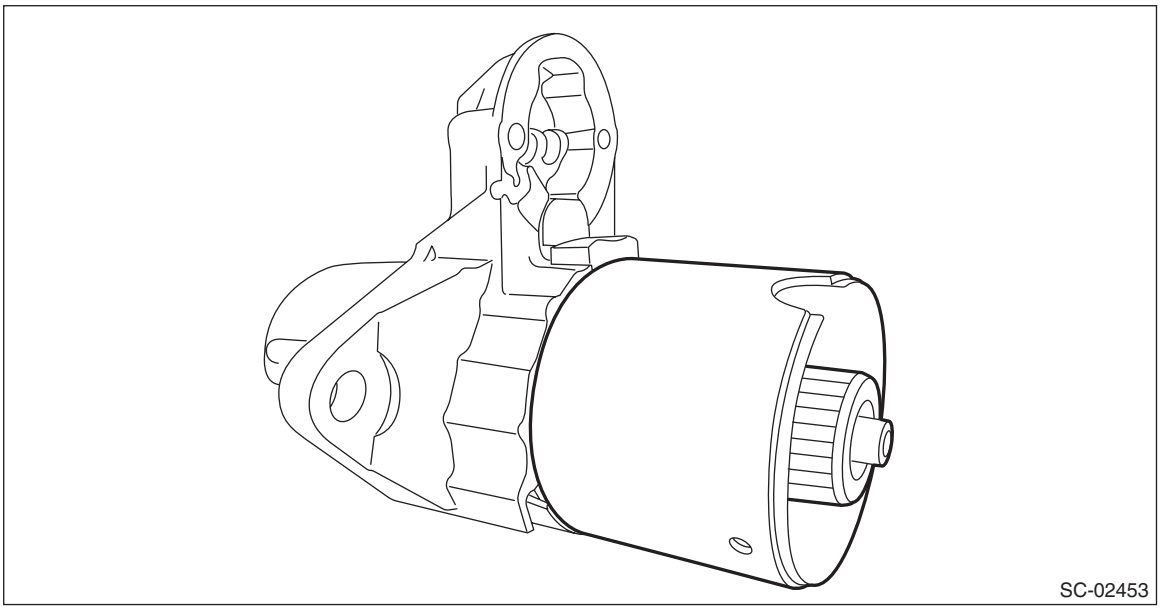


4) Remove the brush holder assembly from the armature assembly.

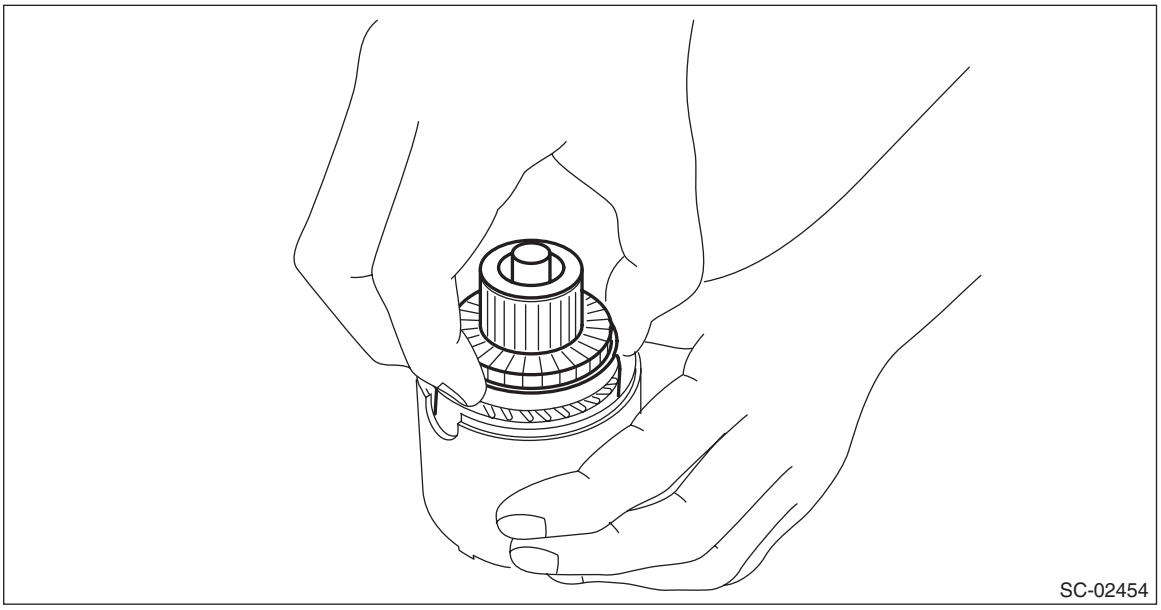
NOTE:
Hold the brush with your fingers so that the brush spring does not come flying out.


SC-02452

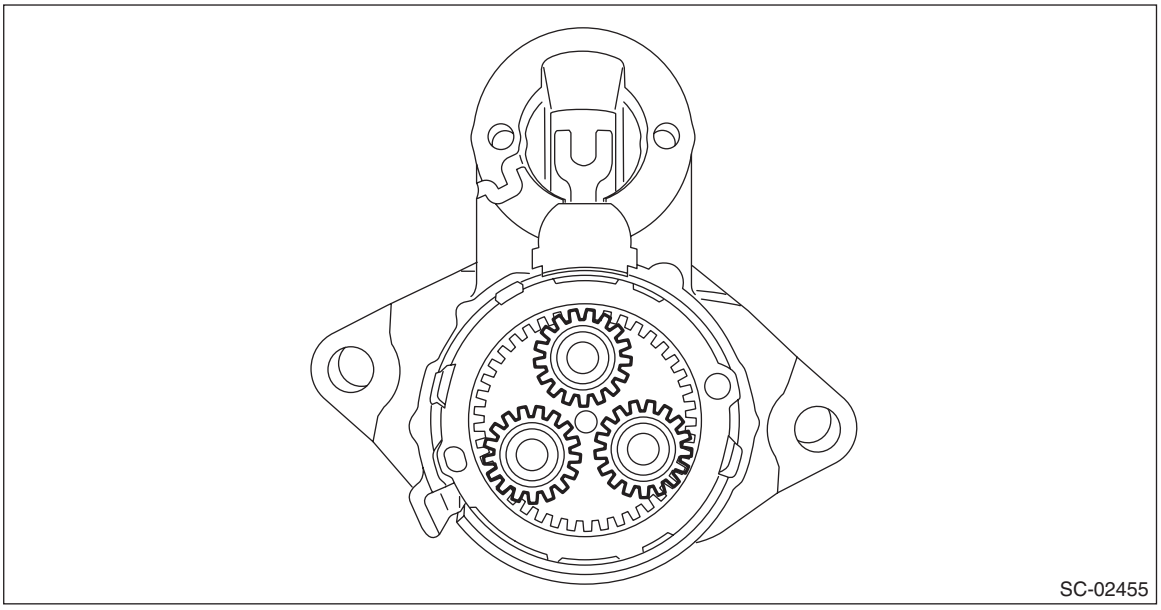
5) Remove the armature assembly and yoke assembly from the starter housing assembly together as a single unit.


SC-02453

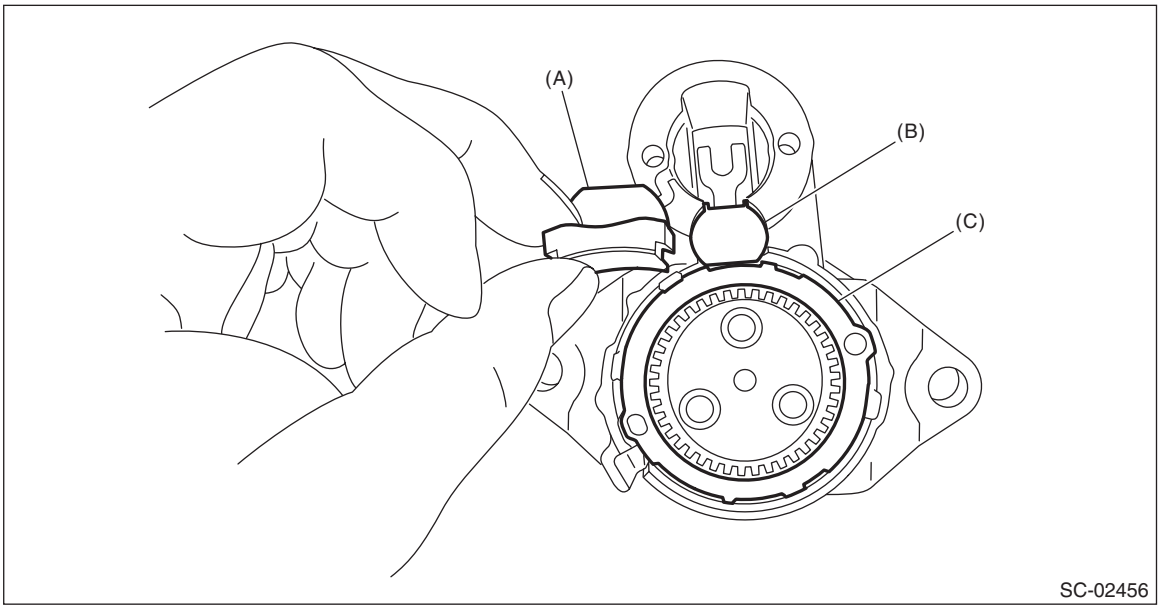
6) Separate the armature assembly and yoke assembly.


SC-02454

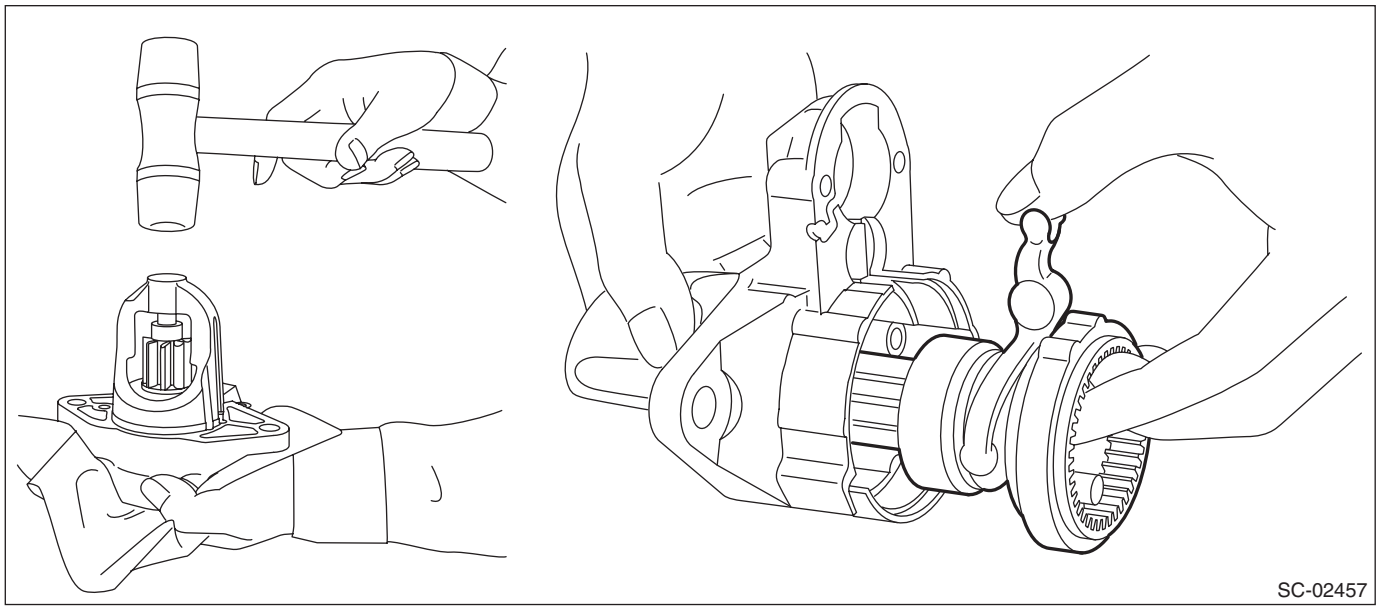
7) Remove the pinion gear from the internal gear assembly.


SC-02455

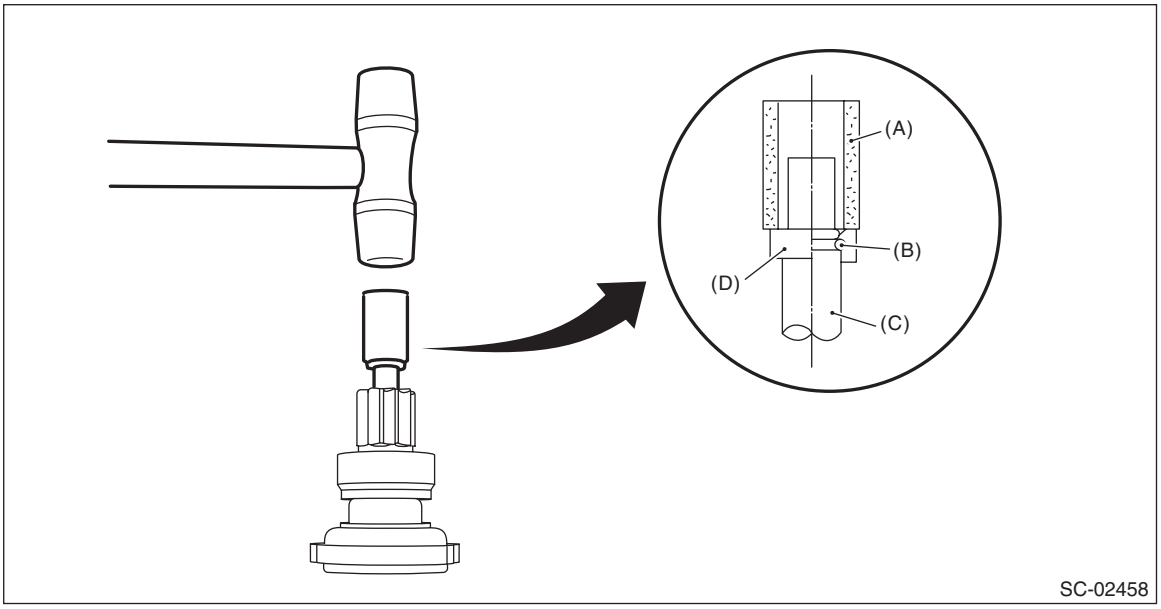
8) Remove seal rubber (A), plate (B), and seal rubber (C).



9) Lightly tap the starter housing assembly with a plastic hammer as shown in the figure, and remove the overrunning clutch, internal gear assembly, shaft and shift lever together as one unit.

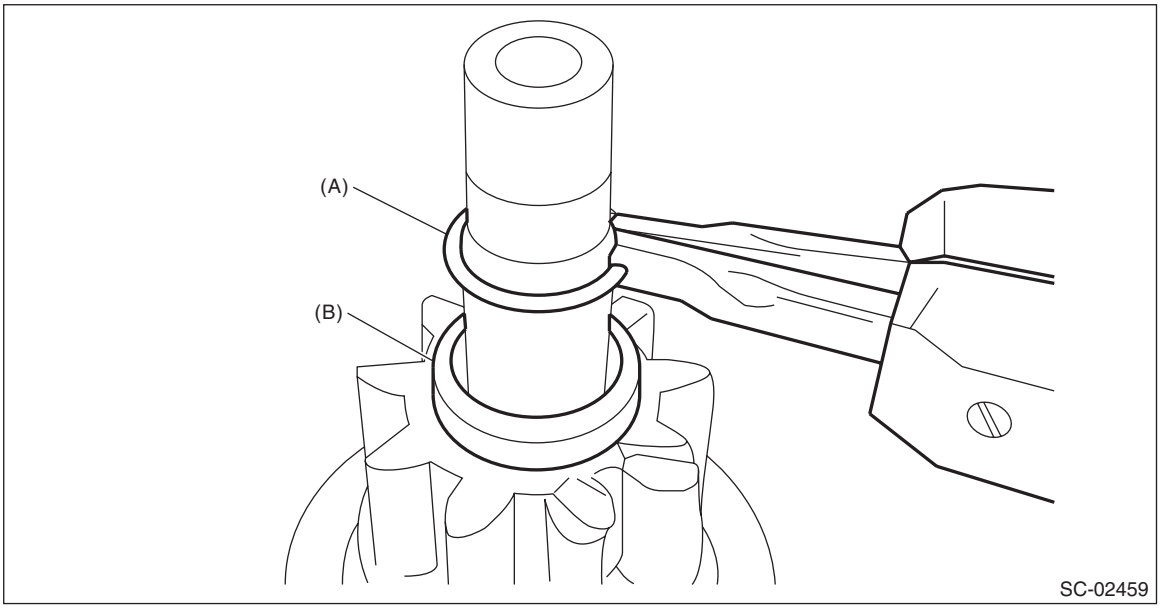


10) Use the following procedures to remove the overrunning clutch from the shaft.
(1) Use an appropriate tool (such as a fit socket wrench), and remove the stopper from snap ring by lightly tapping the stopper with a plastic hammer.

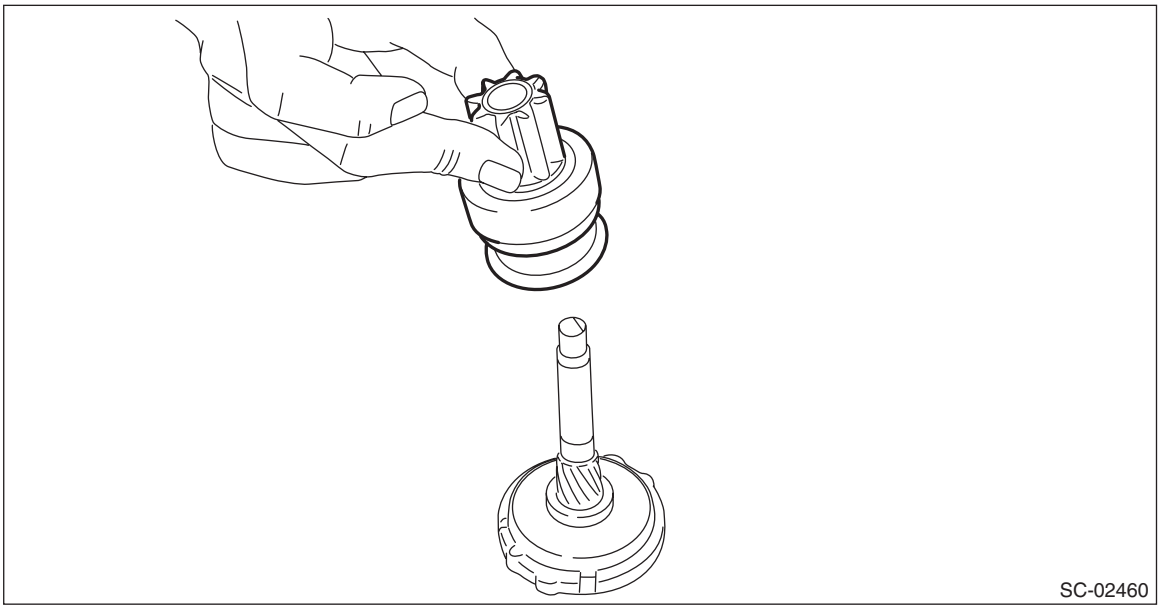


(A) Appropriate tool (B) Snap ring (C) Shaft
(D) Stopper

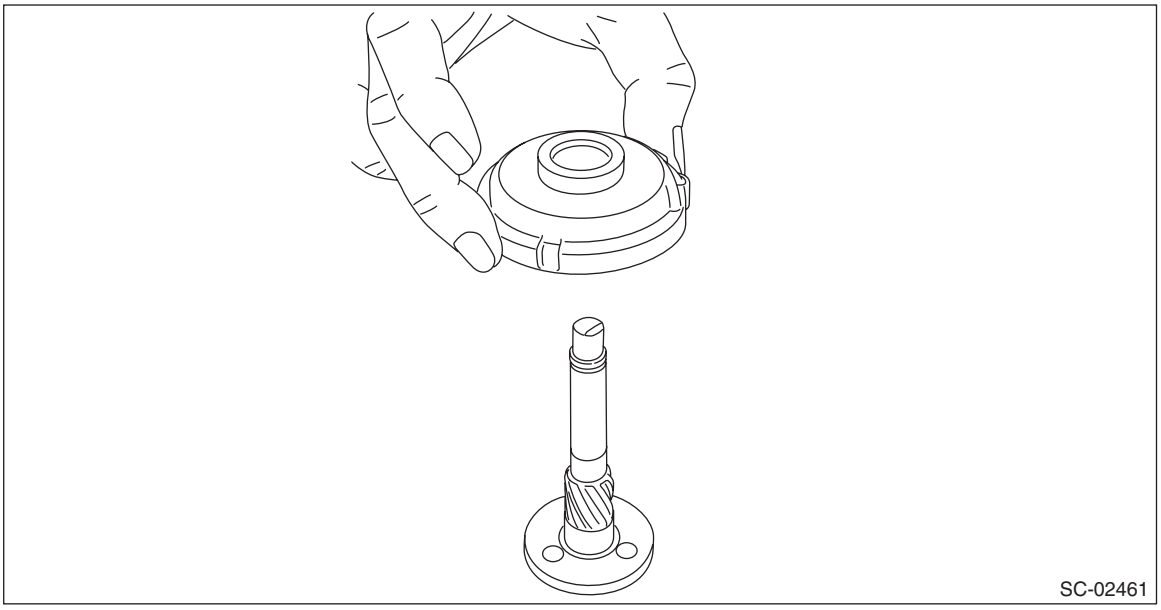
(2) Remove snap ring (A) from the shaft, and remove stopper (B).



(3) Remove the overrunning clutch from the shaft.


SC-02460

11) Separate the internal gear assembly and shaft.

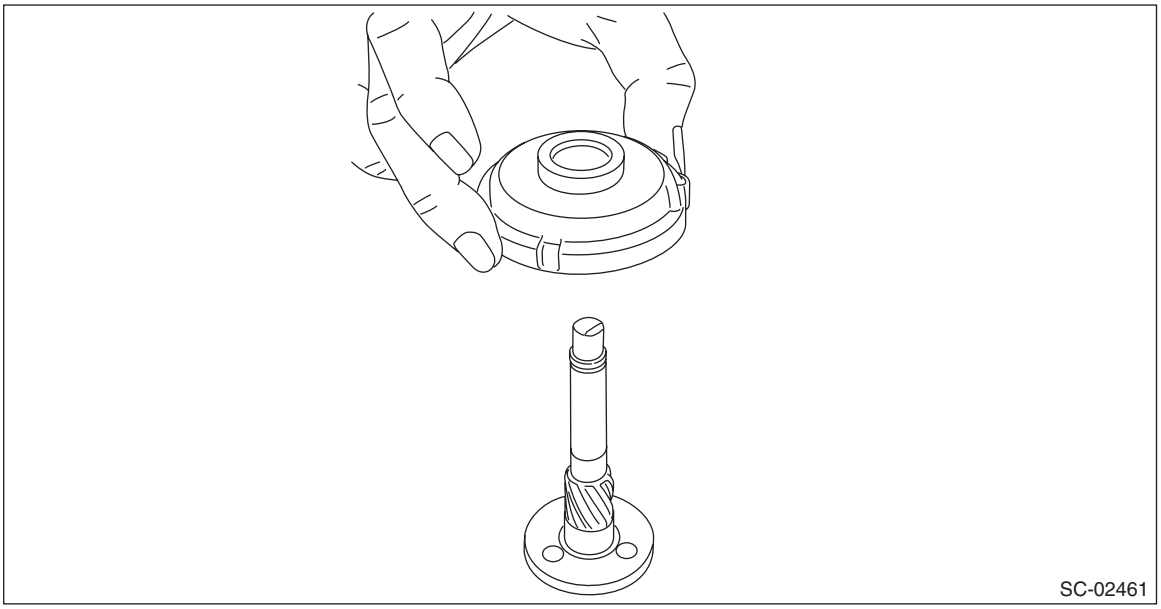

SC-02461

D: ASSEMBLY

1) Apply grease to the shaft sliding surfaces of the internal gear assembly.

Grease:
Multemp #6129 or equivalent

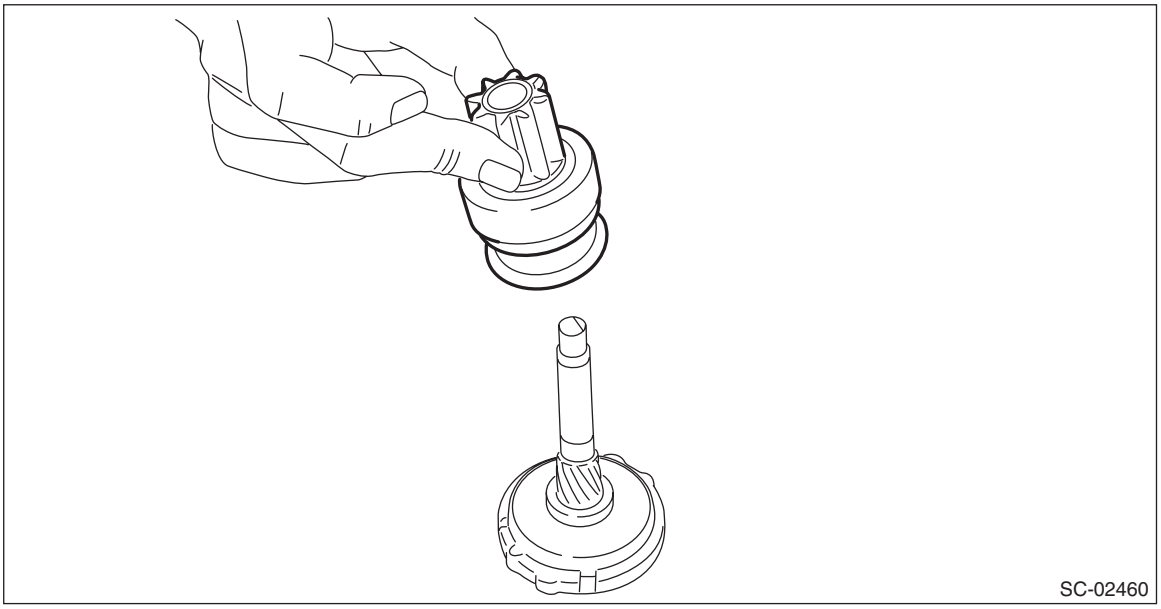
2) Assemble the shaft to the internal gear assembly.



3) Assemble the overrunning clutch as follows:
(1) Apply grease to the spline portion of the shaft.

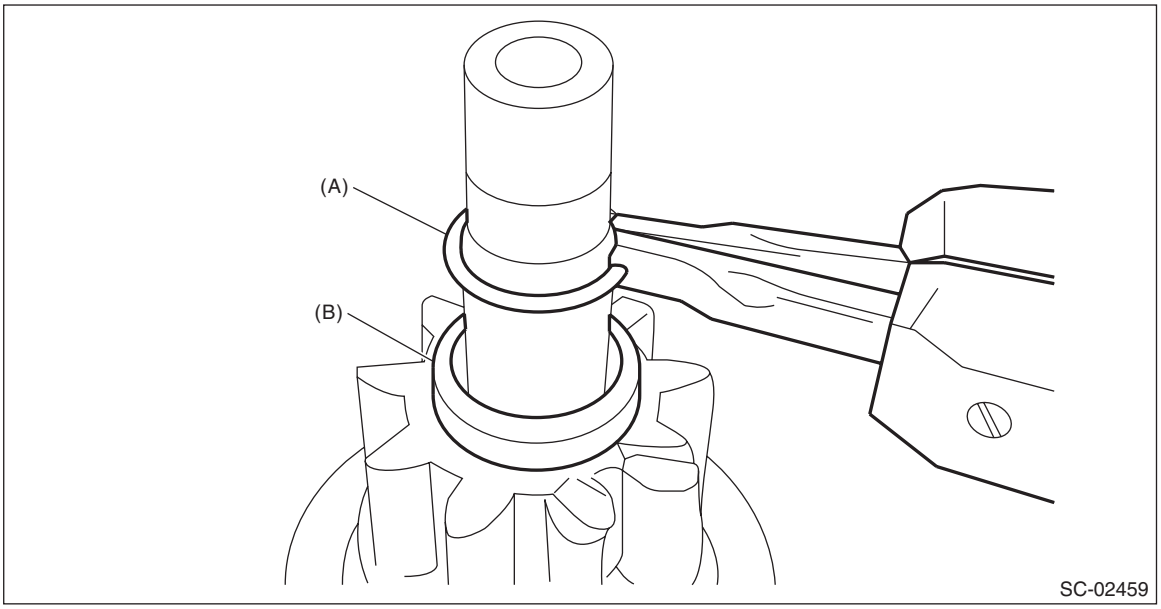
Grease:
Multemp #6129 or equivalent

(2) Install the overrunning clutch to shaft.

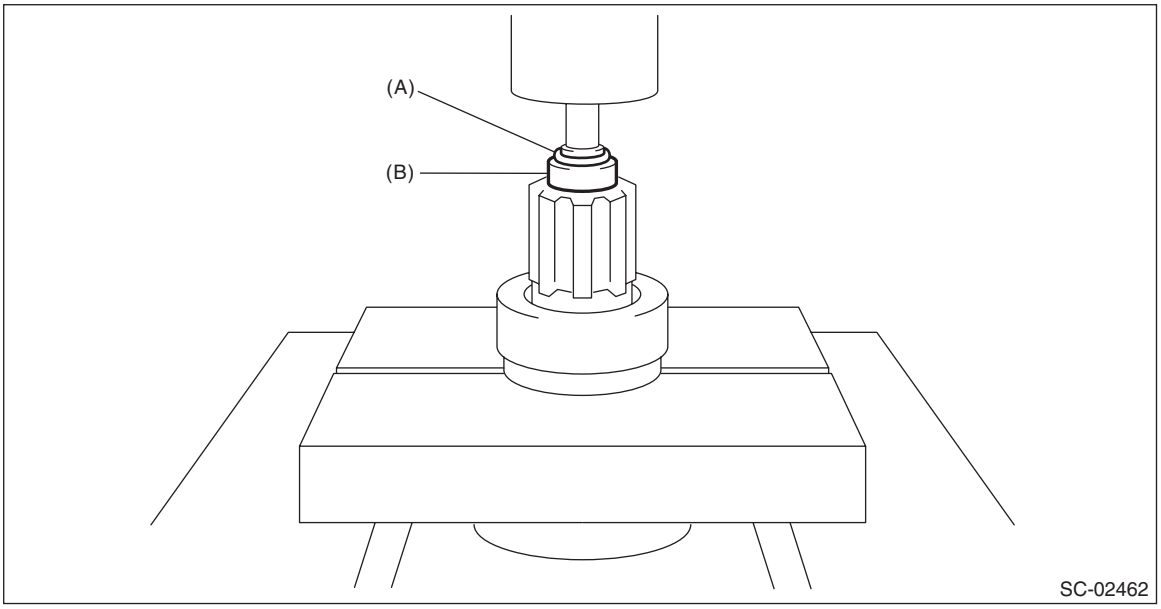


(3) Pass stopper (B) through the shaft assembly, and attach snap ring (A).

NOTE:
Use new stoppers and snap rings.



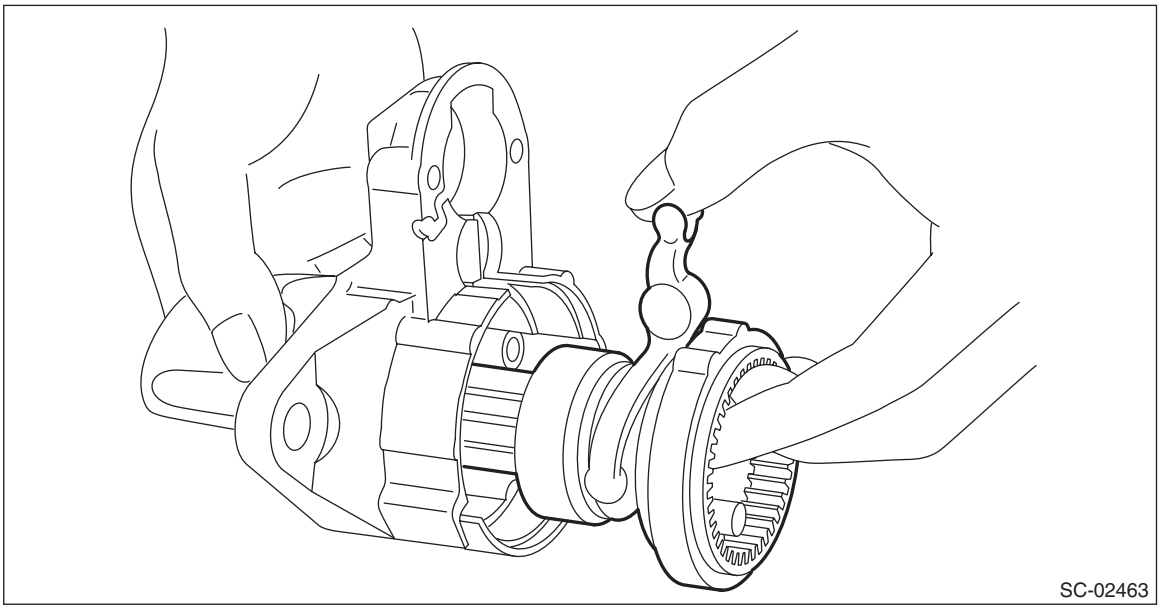
(4) Using a press, pressure fit stopper (B) into snap ring (A).



4) Assemble the overrunning clutch, internal gear assembly, shaft and shift lever as a single unit into the starter housing assembly.

NOTE:
Apply grease to the moving parts of the shift lever.

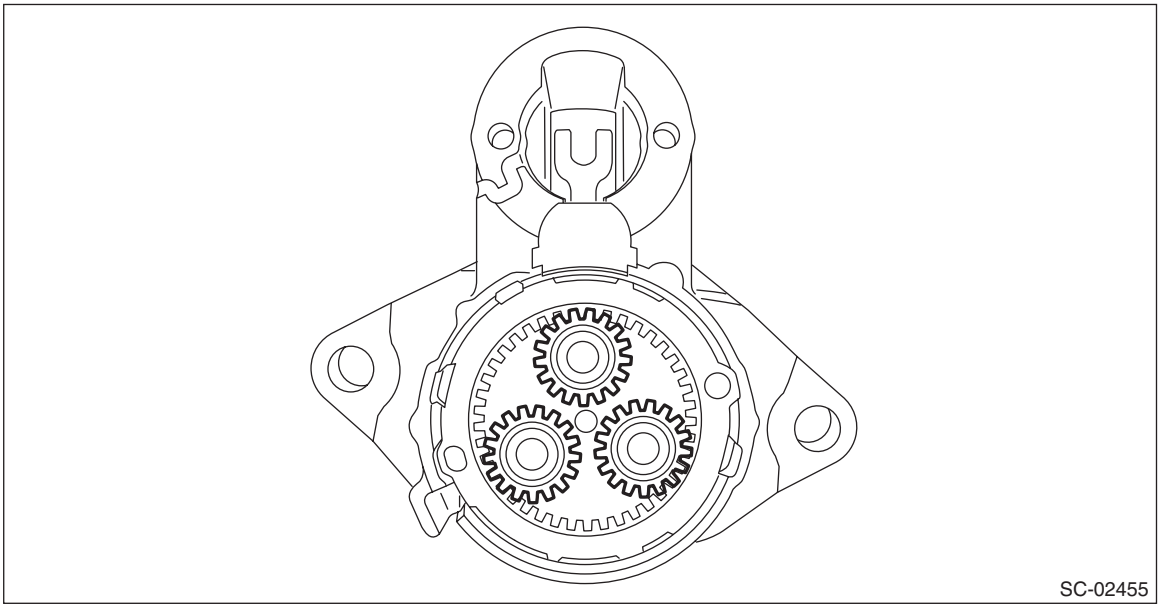
Grease:
Multemp #6129 or equivalent



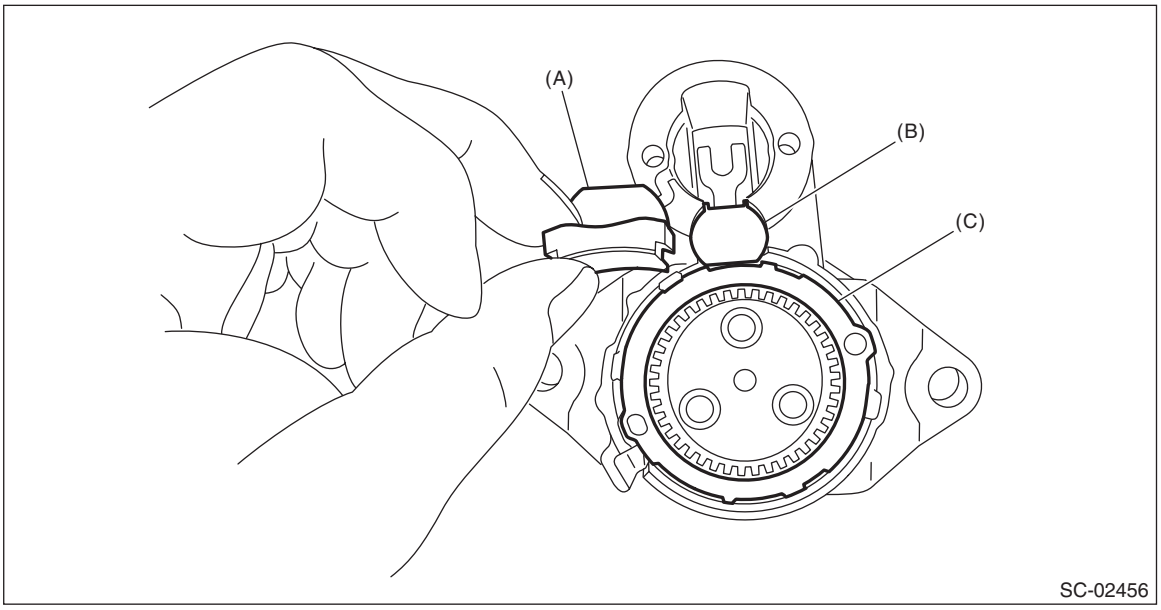
5) Apply grease to the inside of the internal gear assembly and pinion gear, and attach the pinion gear to the internal gear assembly.

NOTE:
- Apply grease evenly to the contact surfaces of each gear.
- Be careful that no debris becomes attached.

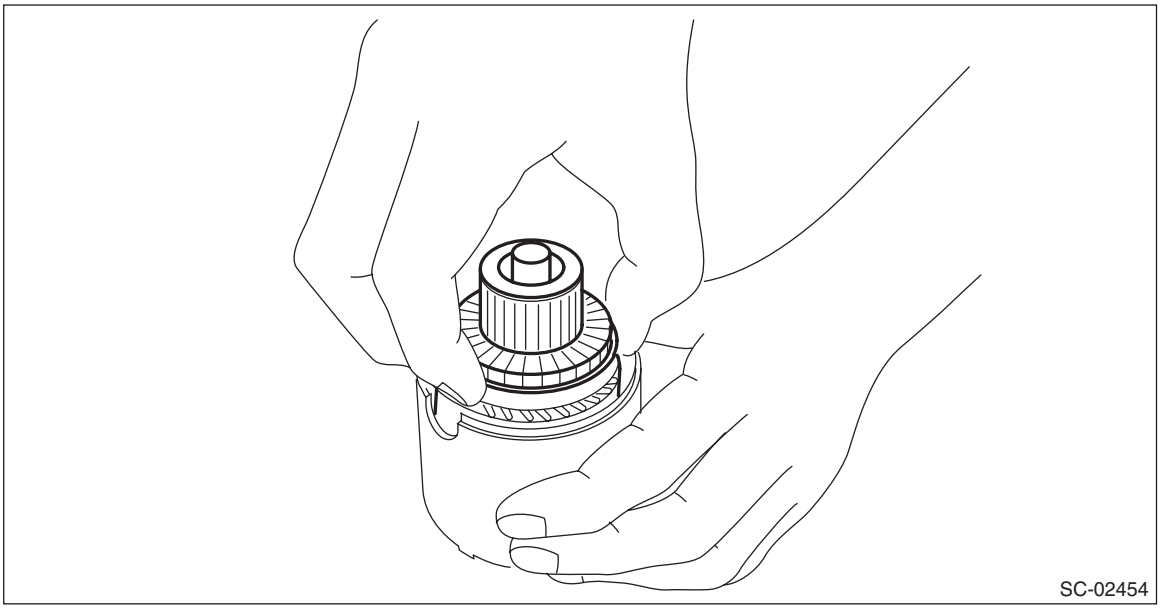
Grease:
Molykote® AG650 or equivalent



6) Install seal rubber (A), plate (B), and seal rubber (C).

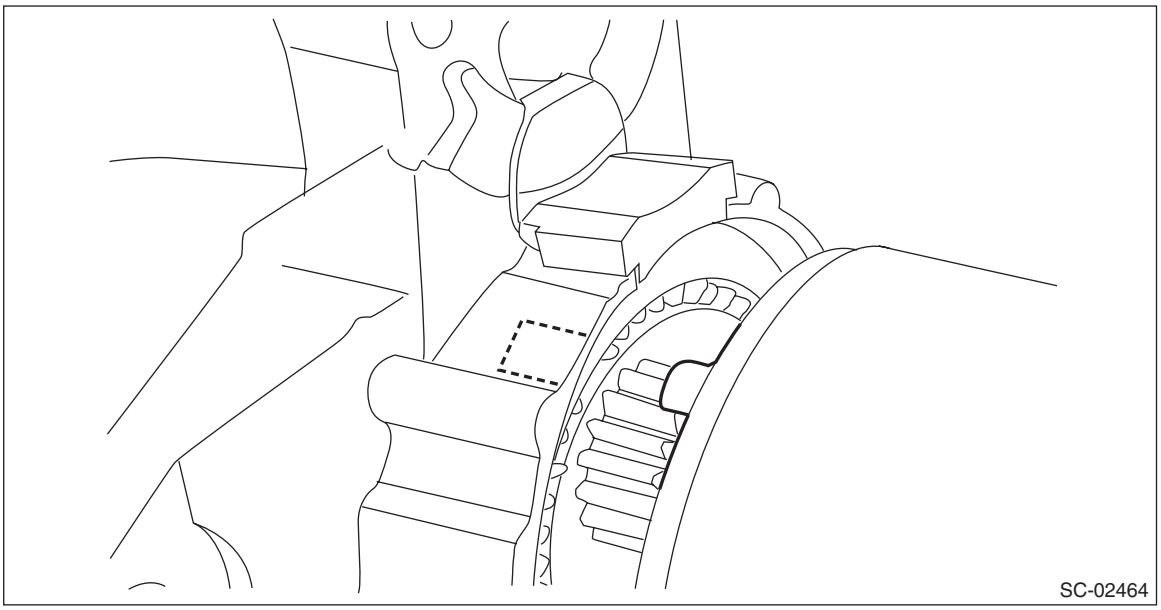


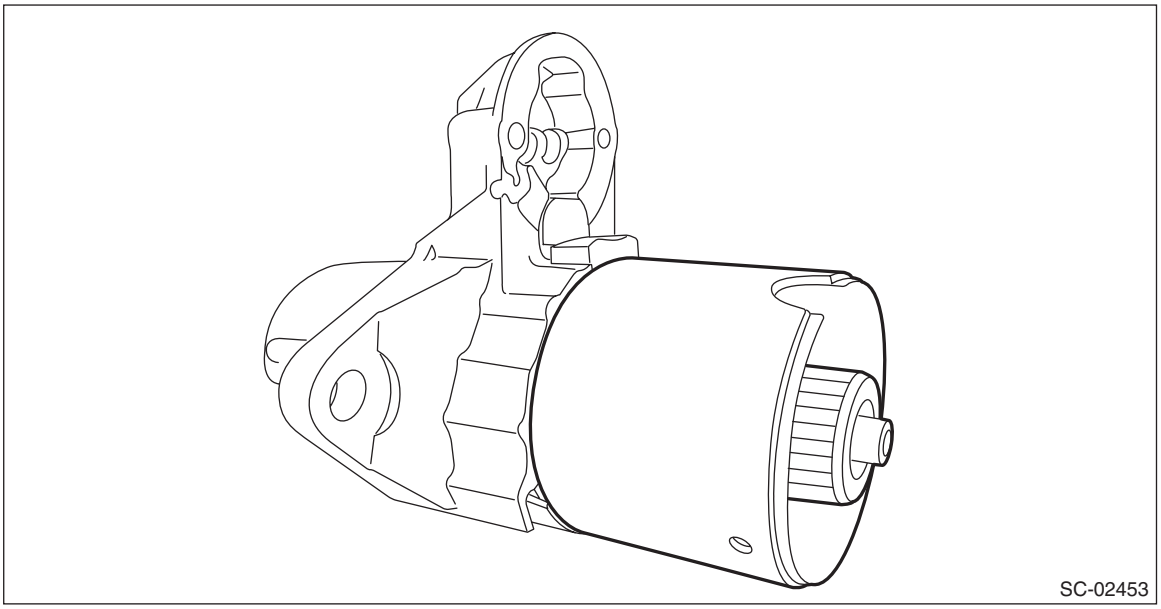
7) Assemble the armature assembly to the yoke assembly.



8) Attach the armature assembly and yoke assembly to the starter housing assembly together as a single unit.

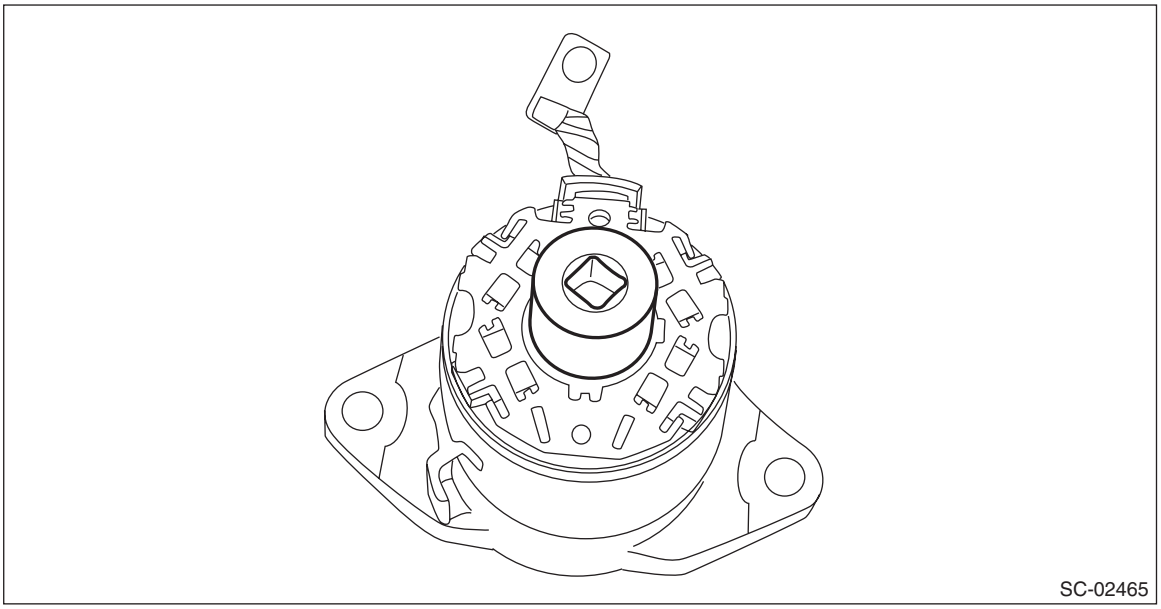
NOTE:
As shown in the figure, match the protrusion of the yoke assembly to the cut out of the starter housing assembly.


SC-02464


SC-02453

9) Use an appropriate tool (such as correctly sized socket wrenches) and attach the brush holder assembly to the armature assembly.

NOTE:
Be careful not to damage the brushes.

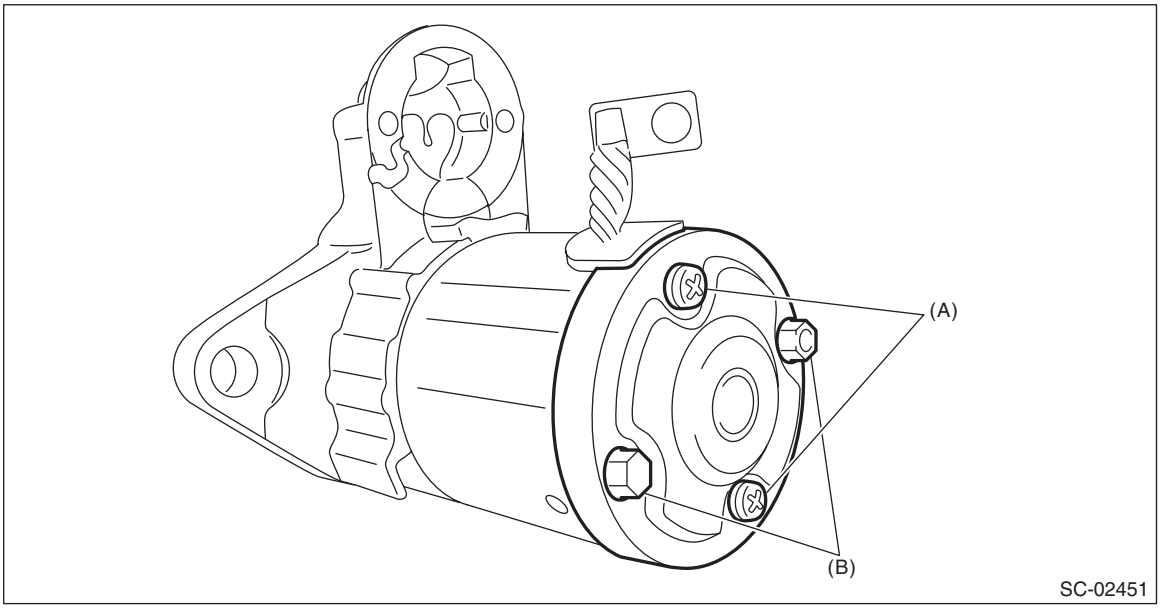


10) Secure starter cover assembly to the brush holder assembly with screws (A).

Tightening torque:
1.4 N·m (0.1 kgf-m, 1.0 ft-lb)

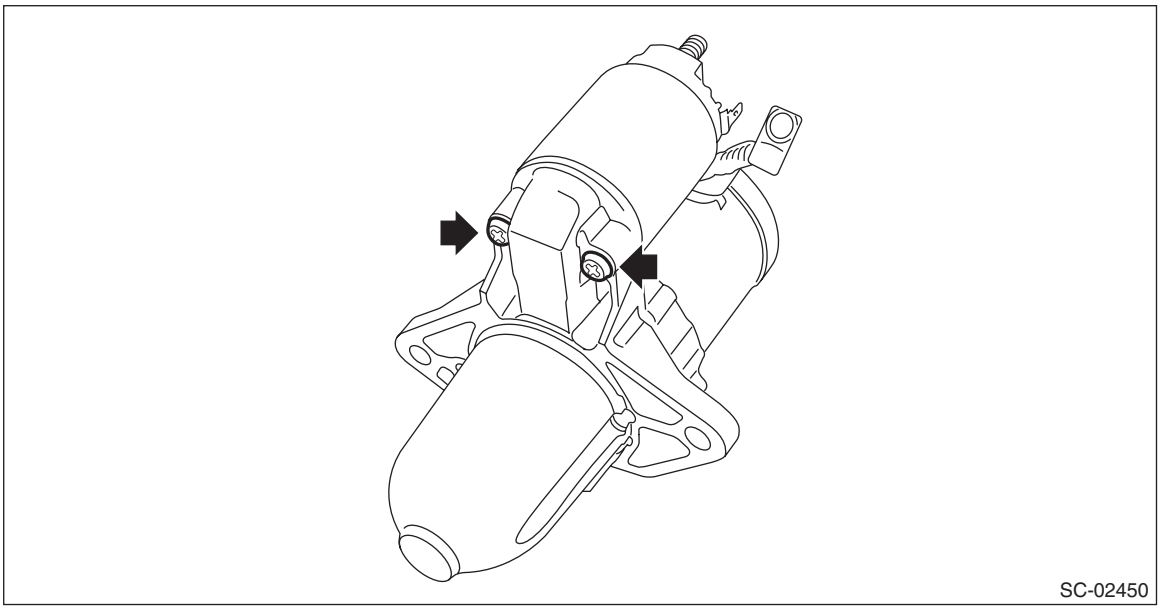
11) Tighten through bolts (B) on both sides.

Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



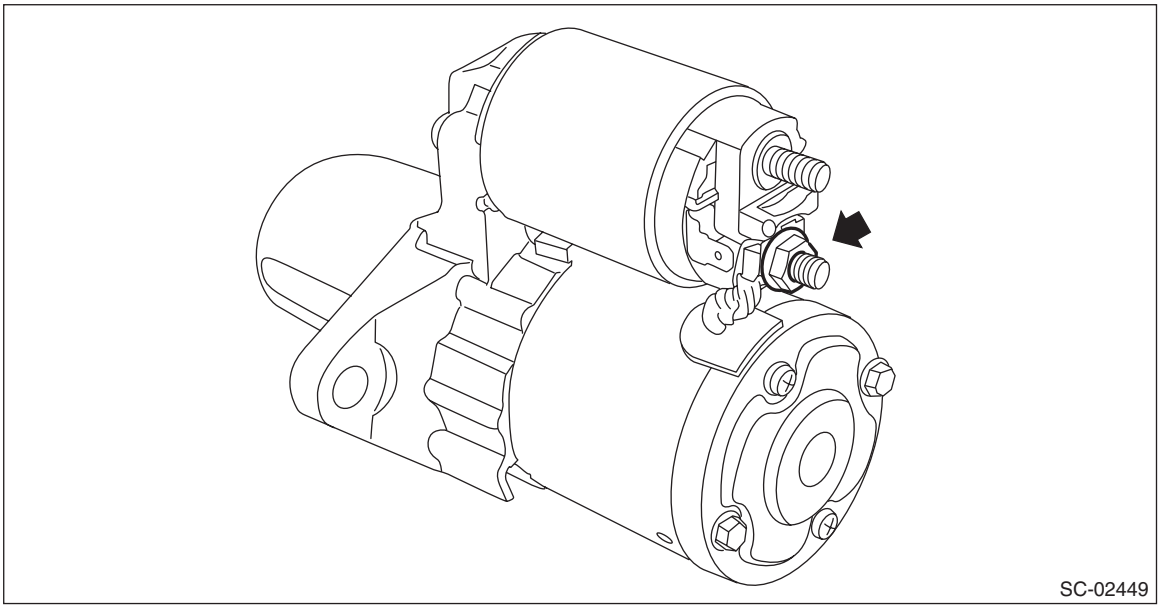
12) Attach the magnet switch assembly to the starter housing assembly.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



13) Attach the cable to the terminal M of the magnet switch assembly, and secure with nuts.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

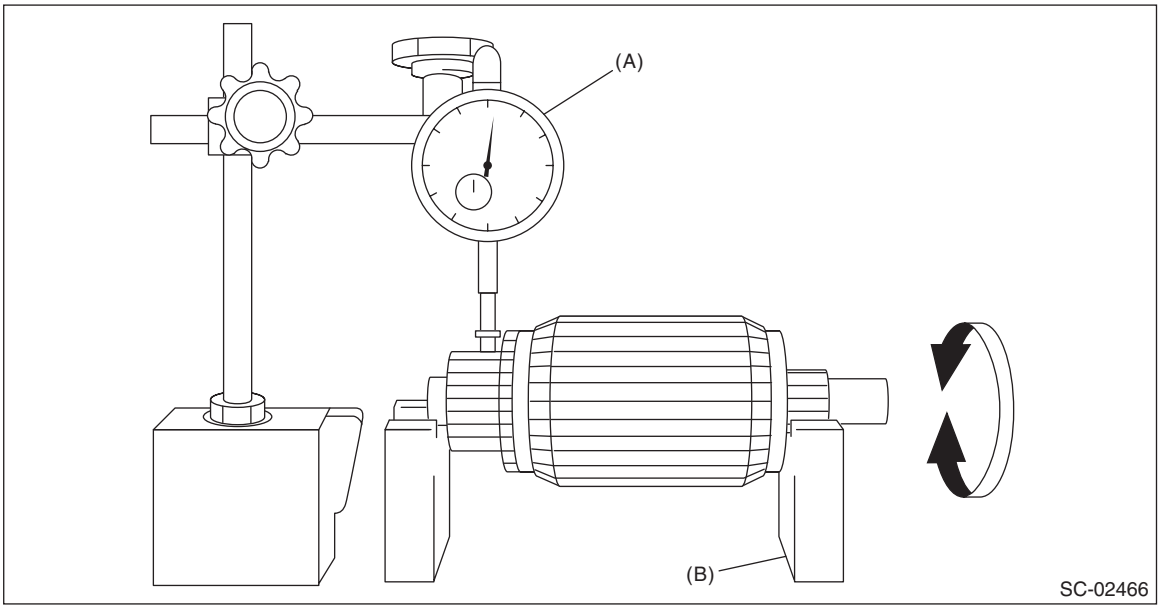


E: INSPECTION

1. ARMATURE

1) Check the commutator for signs of seizure or stepped wear caused by roughness of the surface. If there is light wear, use sandpaper to repair.
2) Check for runout on the commutator. If excessive, replace the armature.

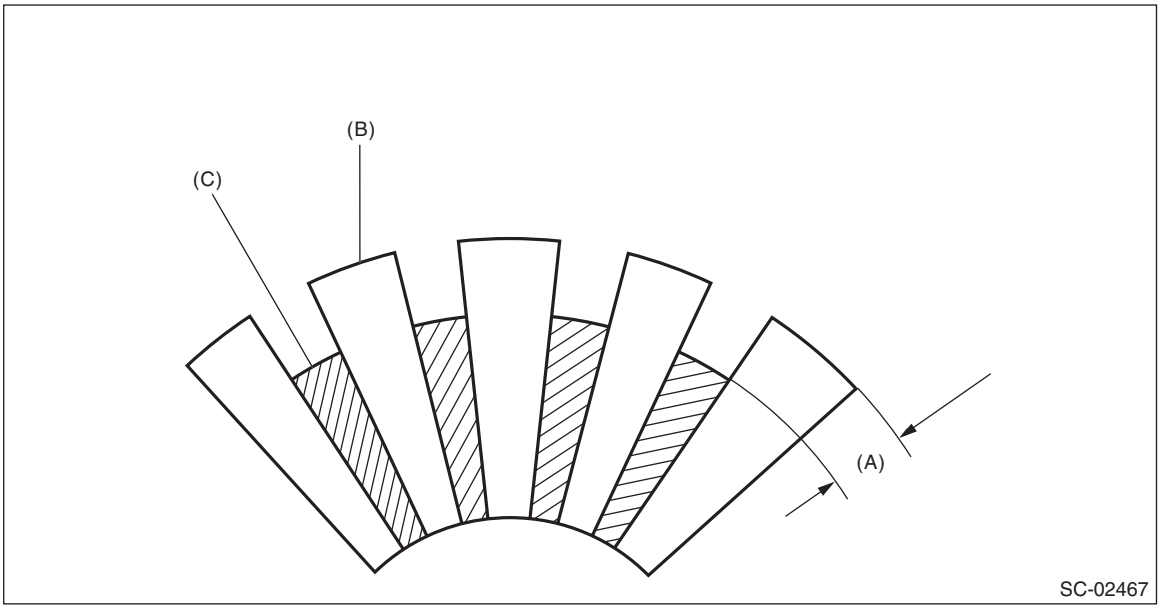
Commutator runout:
Standard
0.05 mm (0.0020 in)
Limit
0.10 mm (0.0039 in)



(A) Dial gauge
(B) V-block

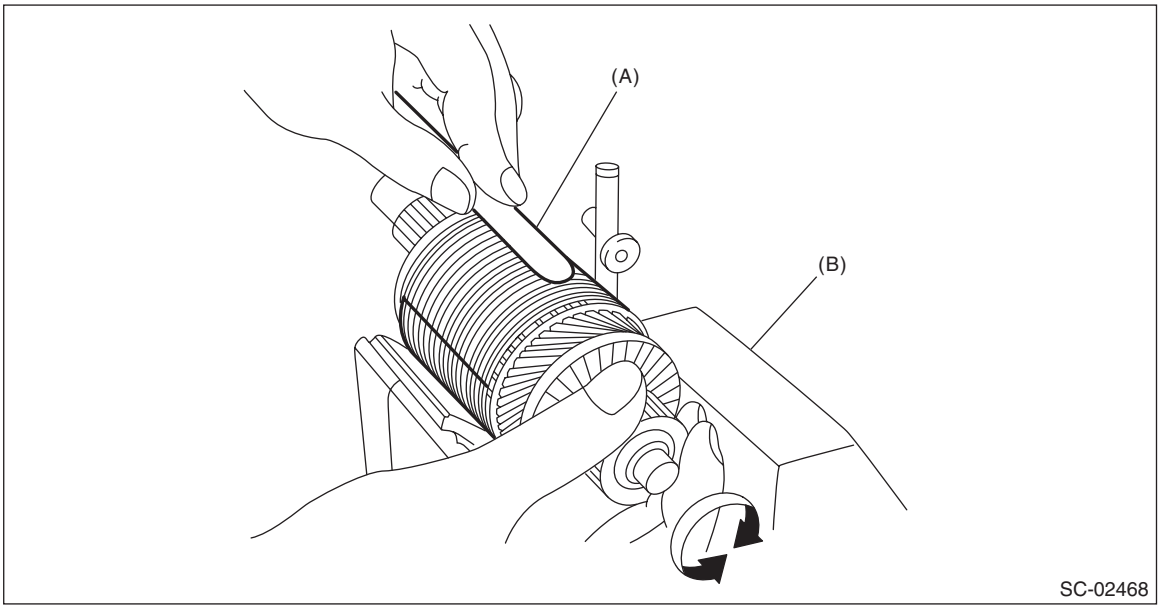
3) Check the depth of the segment mold. If it is not within the standard, replace the armature.

Depth of segment mold:
Standard
0.50 mm (0.020 in)



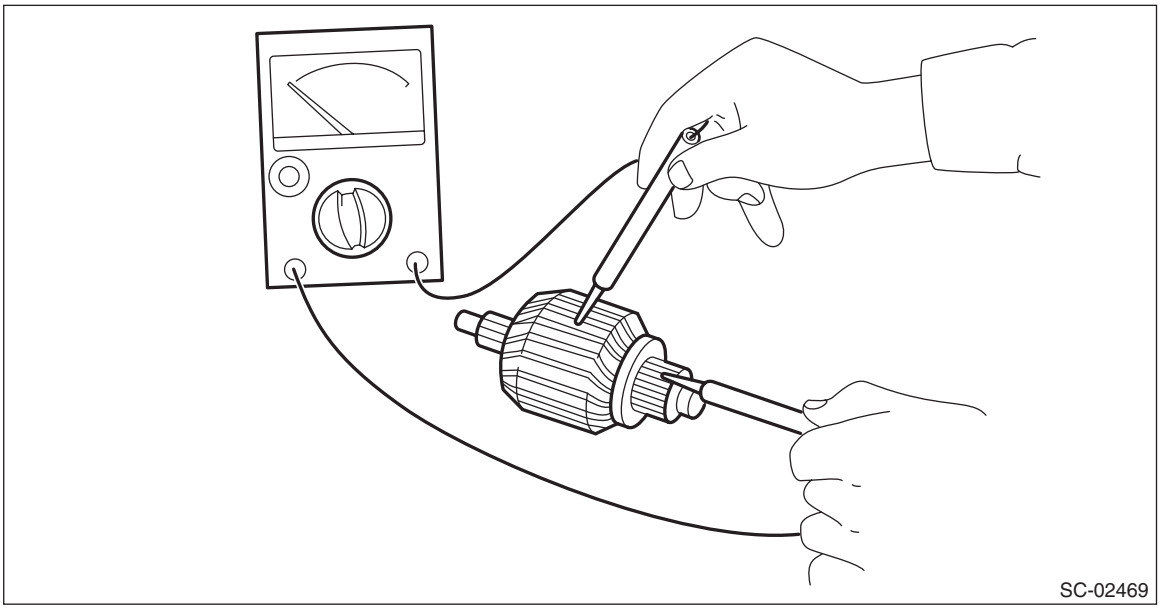
(A) Depth of mold (B) Segment (C) Mold

4) Place the armature on the growler tester to check for short circuits. While slowly turning the armature, support the steel sheet for the armature core. If the circuit of the armature is shorted, the steel sheet will vibrate, causing it to move towards the core. When the steel sheet has moved or vibrated, replace the armature.



(A) Steel sheet (B) Growler tester

5) Use a circuit tester to touch the probe of one side to the commutator segment, and the other probe to the shaft. If there is continuity, replace the armature.



2. YOKE

Make sure that the pole is set at the predetermined position.

3. OVERRUNNING CLUTCH

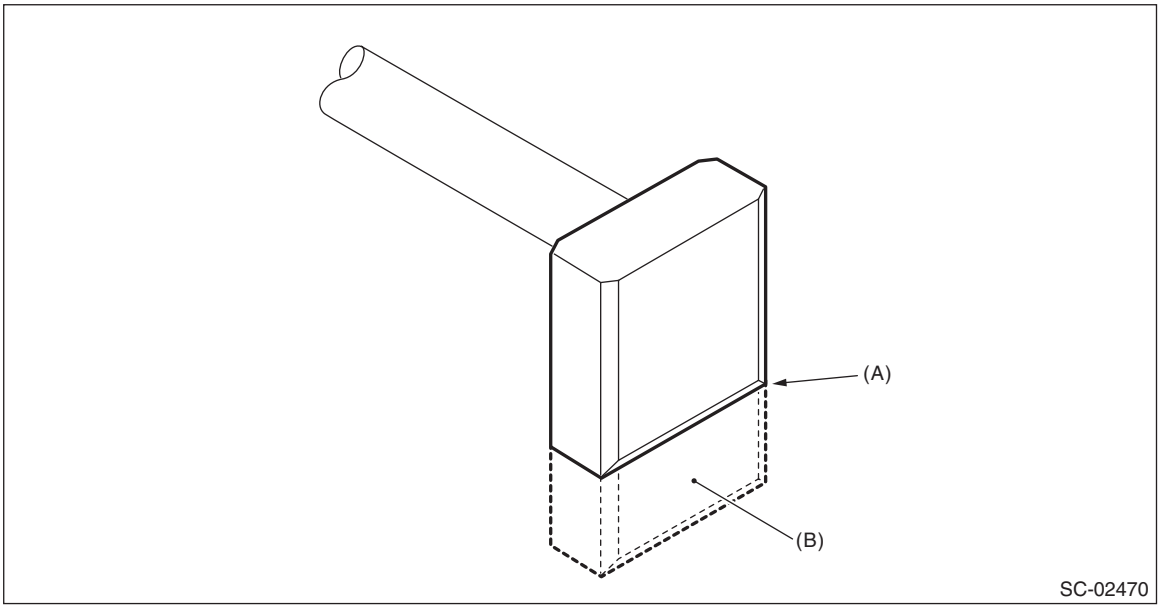
Inspect the pinion, and if there is any wear or damage, replace the overrunning clutch. Also, check that the pinion rotates counterclockwise smoothly and does not rotate clockwise. If there is any fault, replace the overrunning clutch.

CAUTION:
To prevent spilling of grease, do not clean the overrunning clutch with oil.

4. BRUSH AND BRUSH HOLDER

1) Visually check the brush. If there is any abnormal wear or cracks, replace the brush.
2) Measure the length of the brush. If it exceeds service limits, replace the brush.

Brush length:
Standard
12.3 mm (0.484 in)
Limit
7.0 mm (0.276 in)



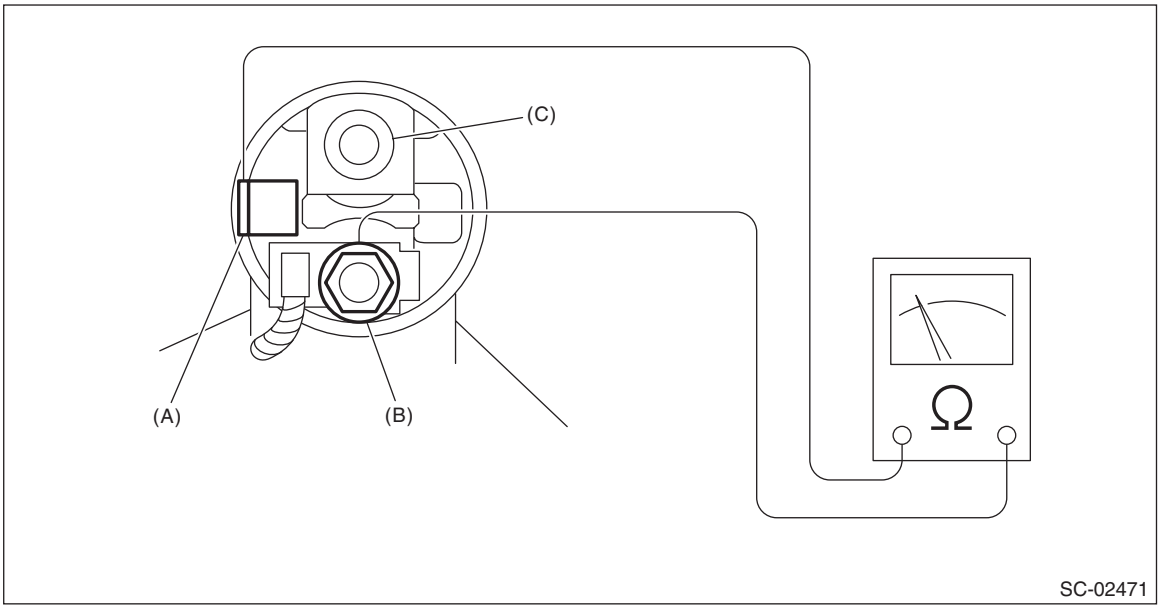
(A) Service limit line (B) Brush

3) Check that the brush moves smoothly in the brush holder.
4) Measure the brush spring force with a spring scale. Replace the brush holder if below the service limit.

Brush spring force:
Standard
15.9 — 19.5 N (1.62 — 1.99 kgf, 3.57 — 4.38 lbf) (when new)
Limit
2.5 N (0.25 kgf, 0.56 lbf)

5. SWITCH ASSEMBLY

Using a circuit tester, check there is continuity between S terminal and M terminal, and between S terminal and ground. Also, check that there is no continuity between M terminal and B terminal.



(A) Terminal S (B) Terminal M (C) Terminal B

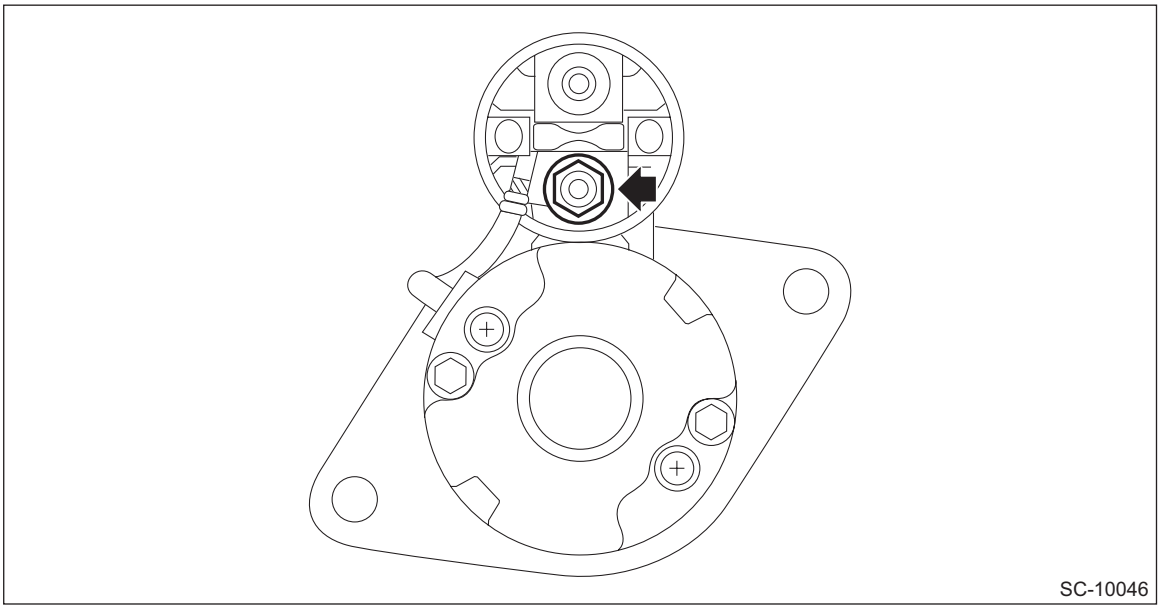
Terminals	Standard
Terminal S — terminal M	1 Ω or less
Terminal S — Ground	1 Ω or less
Terminal M — terminal B	1 MΩ or more

6. SWITCH ASSEMBLY OPERATION

CAUTION:
Perform the inspection in a short period of time. (Within 3 to 5 seconds)

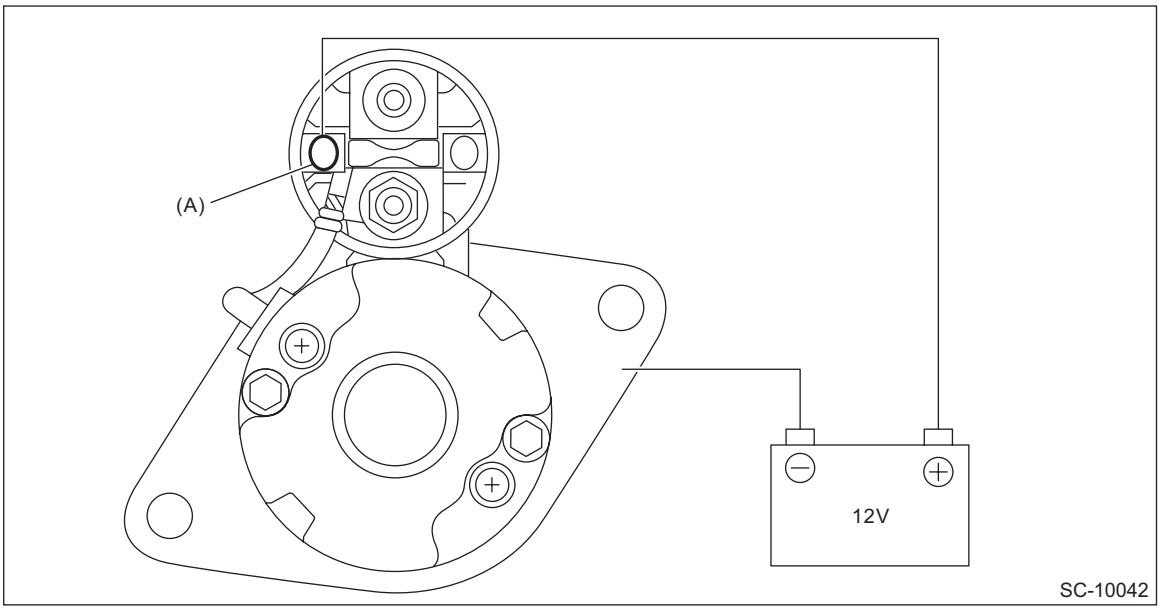
1) Loosen the nut which holds the M terminal to the starter body.

NOTE:
This procedure is required to facilitate the harness removal from the M terminal.



2) Connect the battery positive terminal to the switch assembly S terminal, and connect the battery negative terminal to the starter body. Then, if the pinion protrudes, it is normal.

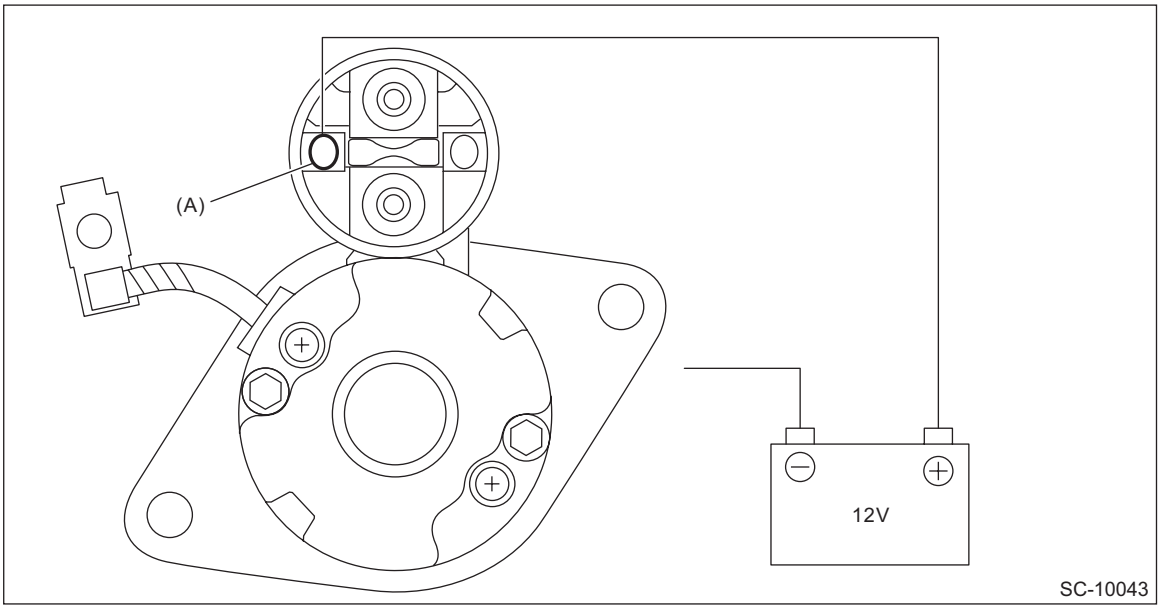
NOTE:
The starter motor may rotate while the pinion protrudes. This occurs due to current that flows to the motor via pull-in coil. This is not a problem.



(A) Terminal S

3) Disconnect the harness from the M terminal. Check that the pinion is being protruded at this time.

CAUTION:
Hold the disconnected harness so that it does not contact the terminal or wiring.
4) Disconnect the battery negative terminal from the starter body. Then, if the pinion returns to its original position, it is normal.



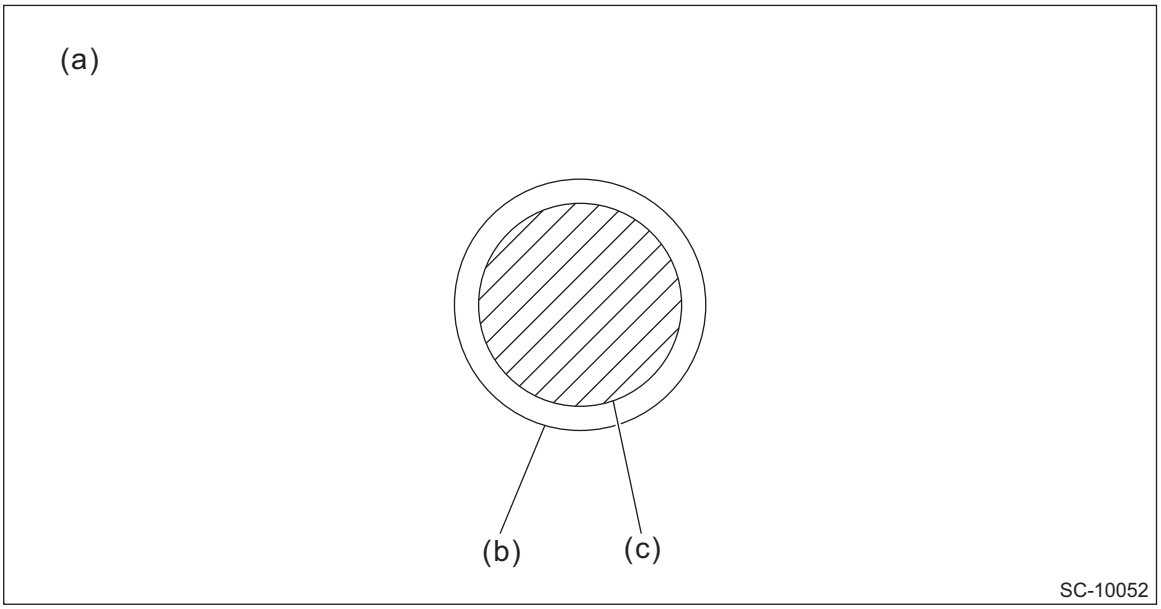
(A) Terminal S

7. NO-LOAD TEST

The starter should be placed through a no-load test whenever it has been overhauled.
For no-load test, use the circuit shown in figure.

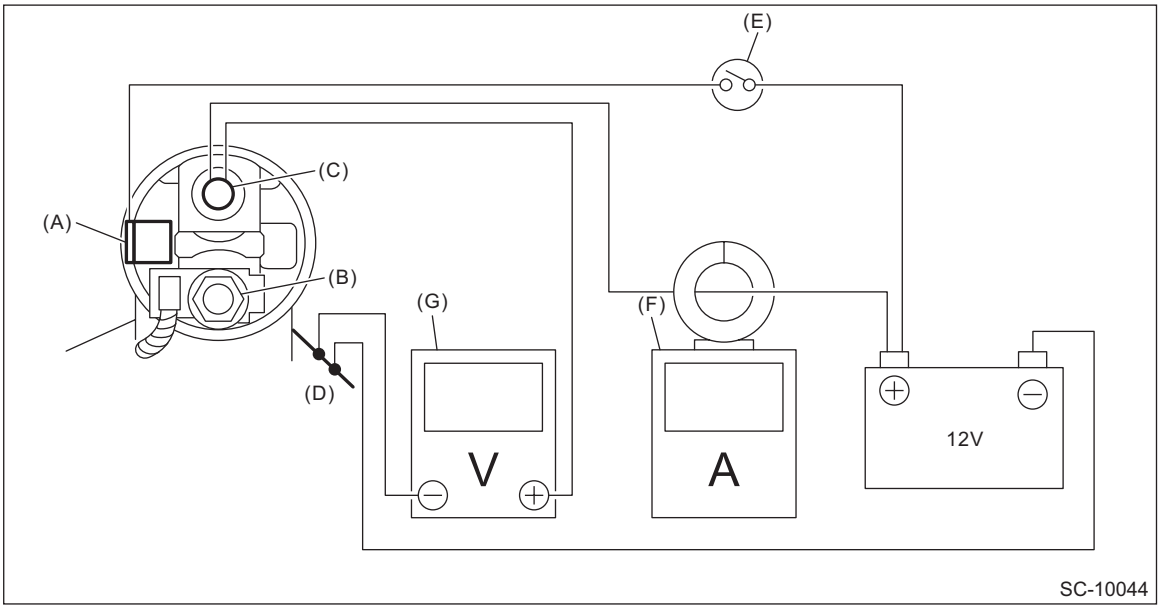
CAUTION:

- **Use a thick cable due to large current flowing through the cable.**
  - **For B terminal and ground, it is recommended that the cross-section area of continuity part (shaded part) should be 20 mm ^{2} (0.00310 sq in) or more. For S terminal, 1.25 mm ^{2} (0.00194 sq in) or more.**



(a) Cable cross-section (b) Cable shield part (c) Cable continuity part

  - **It is possible to use a booster cable instead of wiring.**
- **Be careful not to burn yourself and cause a fire due to heat.**
- **Perform the no-load test in a short period of time. (Within 3 to 5 seconds)**



(A) Terminal S (B) Terminal M (C) Terminal B
(D) Magnet switch (E) Switch (F) Circuit tester with clamp-type ammeter
(G) Circuit tester

1) Using a vise, secure the starter.

CAUTION:
Be careful not to deform or damage the starter.
2) Turn the switch ON, and check that the pinion protrudes rapidly into the specified position and rotates powerfully without noise.
3) Check the current and voltage after its rotation speed stabilizes.

Current/Voltage
CVT model
90 A or less (approx. 11 V)
MT model
95 A or less (approx. 11 V)

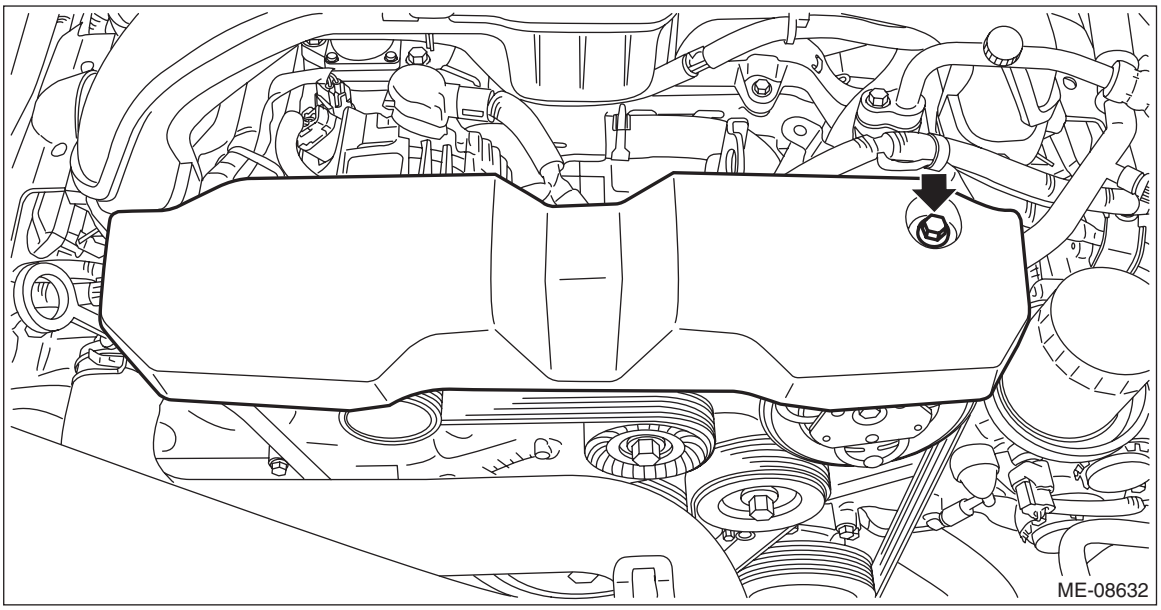
8. OTHER INSPECTIONS

Check that the starter does not have deformation, cracks and any other damage.

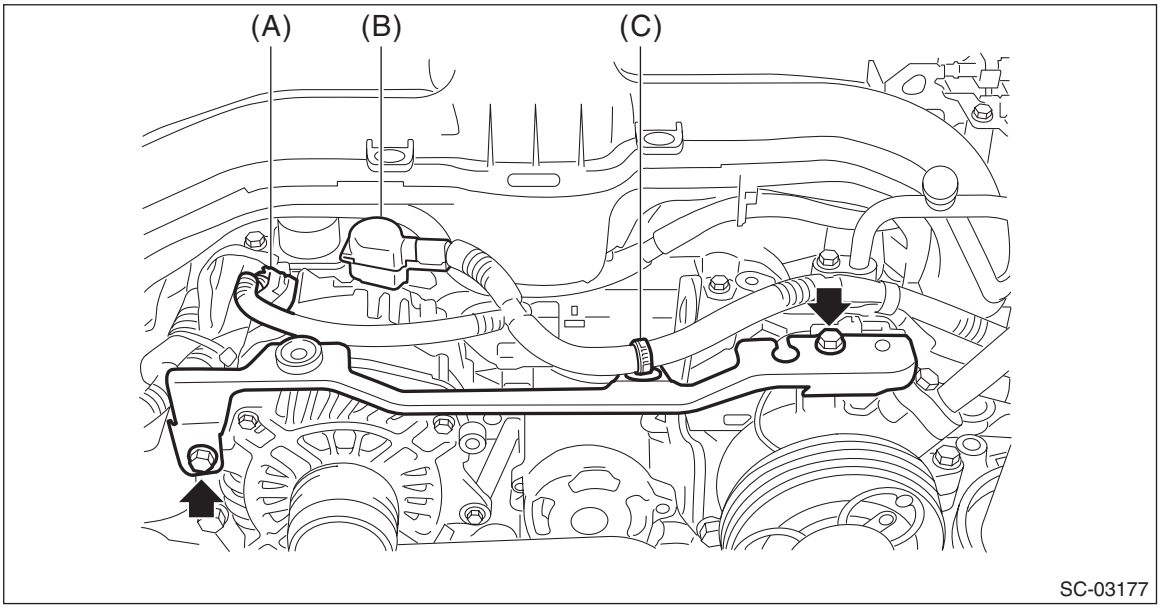
3. Generator

A: REMOVAL

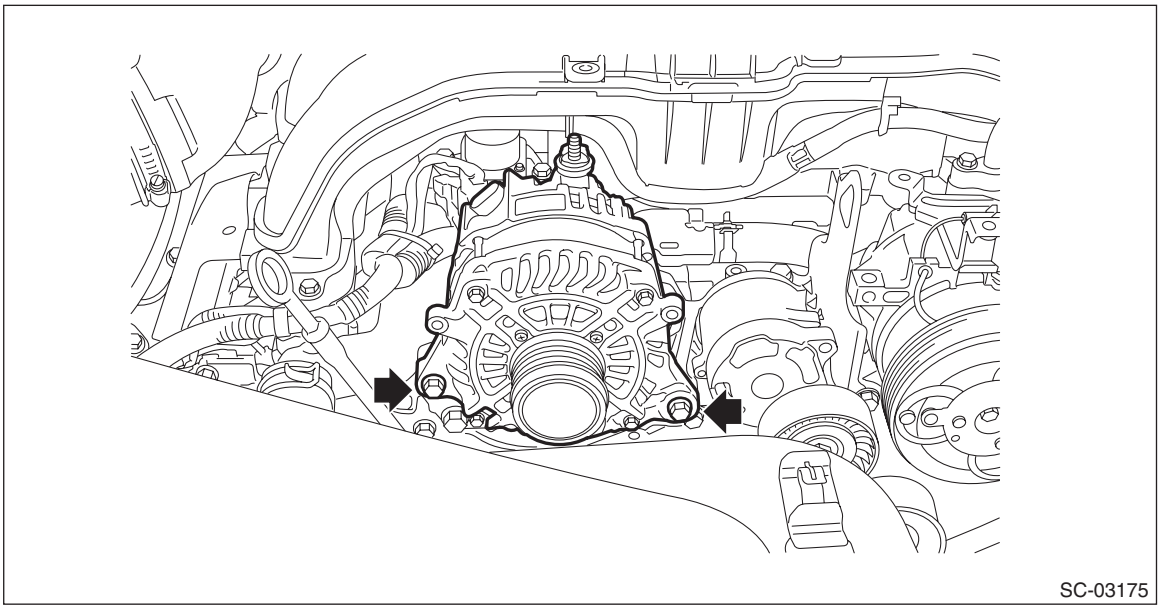
1) Remove the V-belt covers.



2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
3) Remove the V-belts. <Ref. to ME(H4DO(w/o HEV))-124, GASOLINE ENGINE MODEL, REMOVAL, V-belt.>
4) Disconnect the connector (A) and terminal (B) from the generator, and remove the clip (C).
5) Remove the V-belt cover bracket.

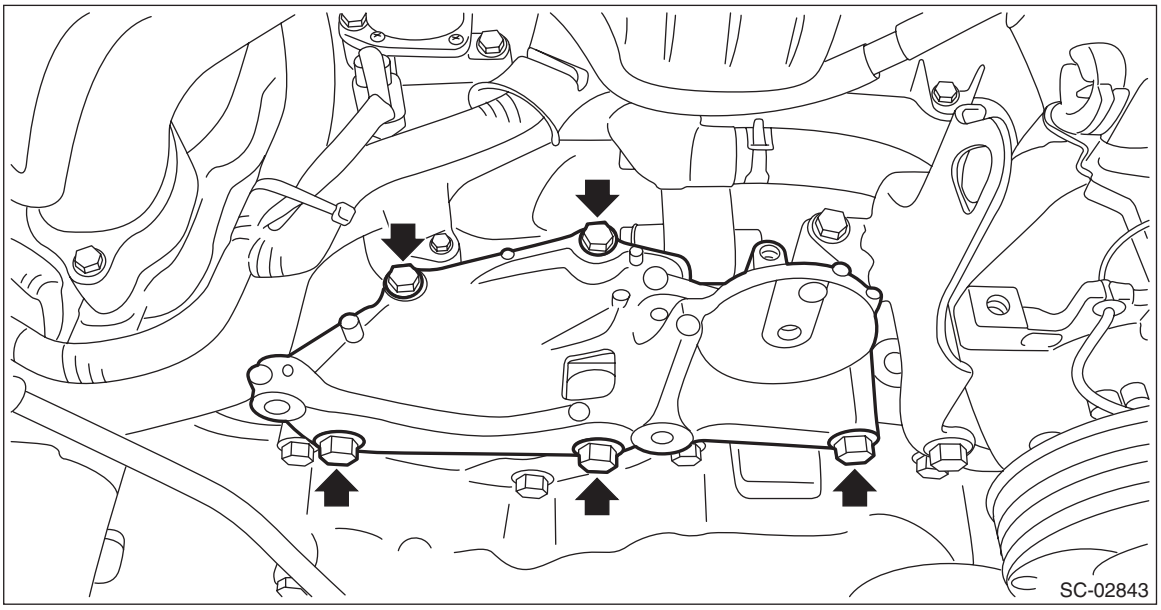


6) Remove the generator from the generator bracket.



7) Remove the V-belt tensioner. <Ref. to ME(H4DO(w/o HEV))-124, GASOLINE ENGINE MODEL, REMOVAL, V-belt.>

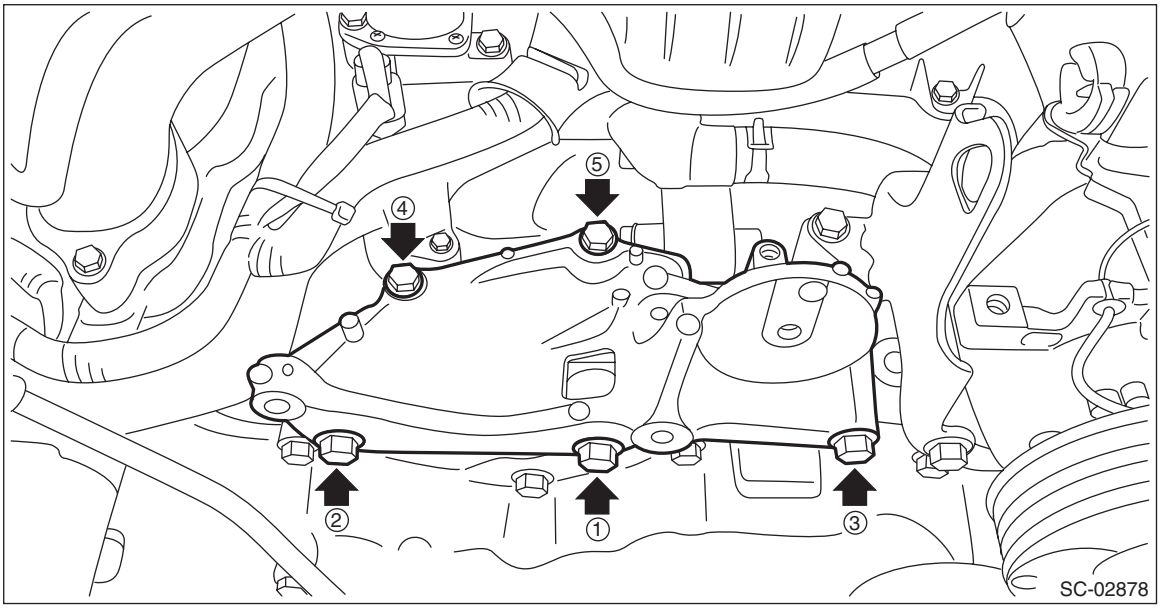
8) Remove the generator bracket from the engine.



B: INSTALLATION

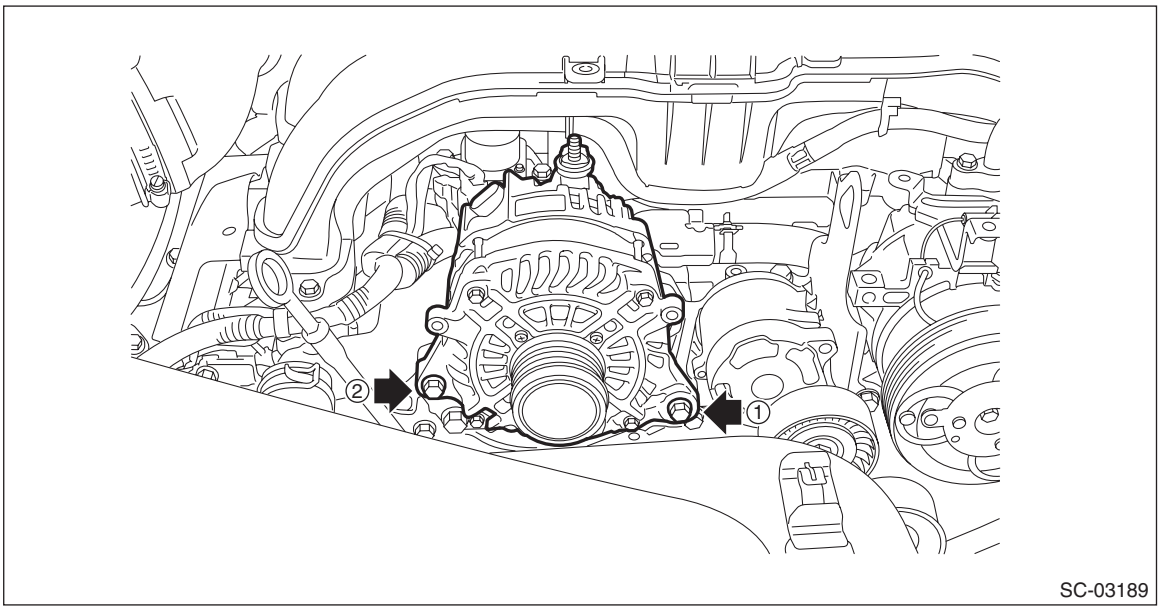
1) Temporarily install the generator bracket to the engine and tighten the bolts in the numerical order.

Tightening torque:
36 N·m (3.7 kgf-m, 26.6 ft-lb)



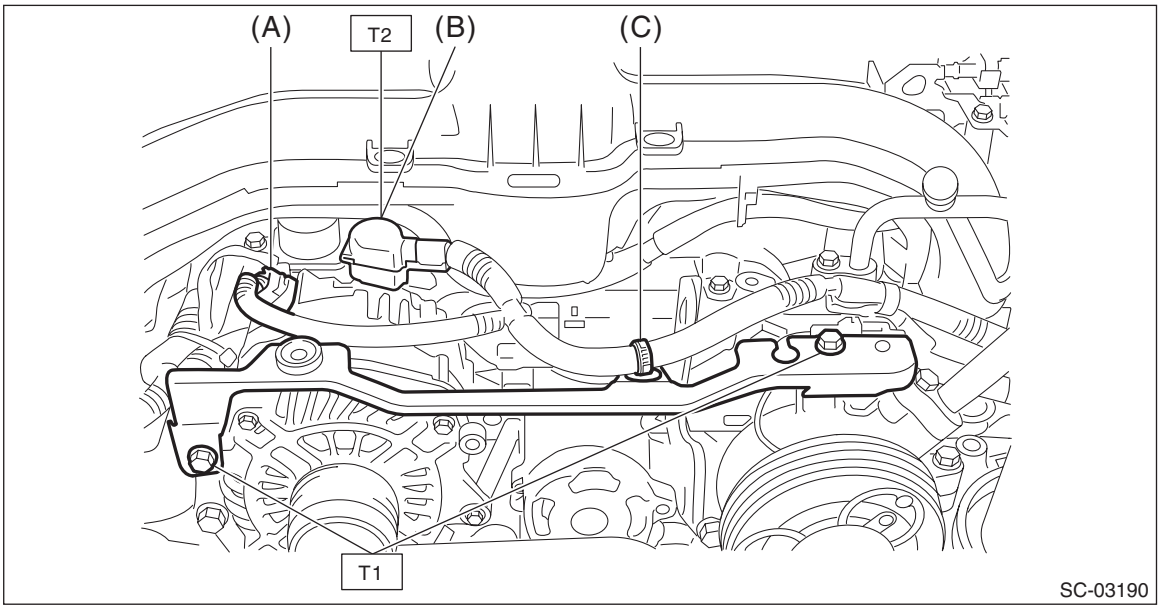
2) Install the V-belt tensioner. <Ref. to ME(H4DO(w/o HEV))-132, GASOLINE ENGINE MODEL, INSTALLATION, V-belt.>
3) Temporarily install the generator bracket to the generator and tighten the bolts in the numerical order.

Tightening torque:
36 N·m (3.7 kgf-m, 26.6 ft-lb)



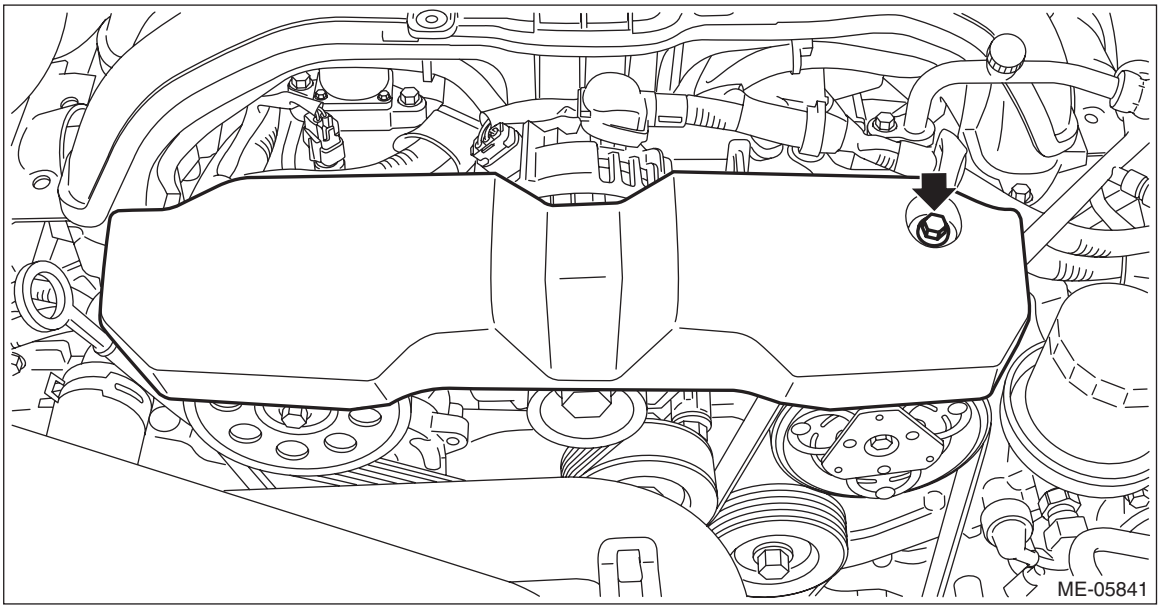
4) Install the V-belt cover bracket.
5) Connect the connector (A) and terminal (B) to the generator, and attach the clip (C).

Tightening torque:
T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T2: 15 N·m (1.5 kgf-m, 11.1 ft-lb)



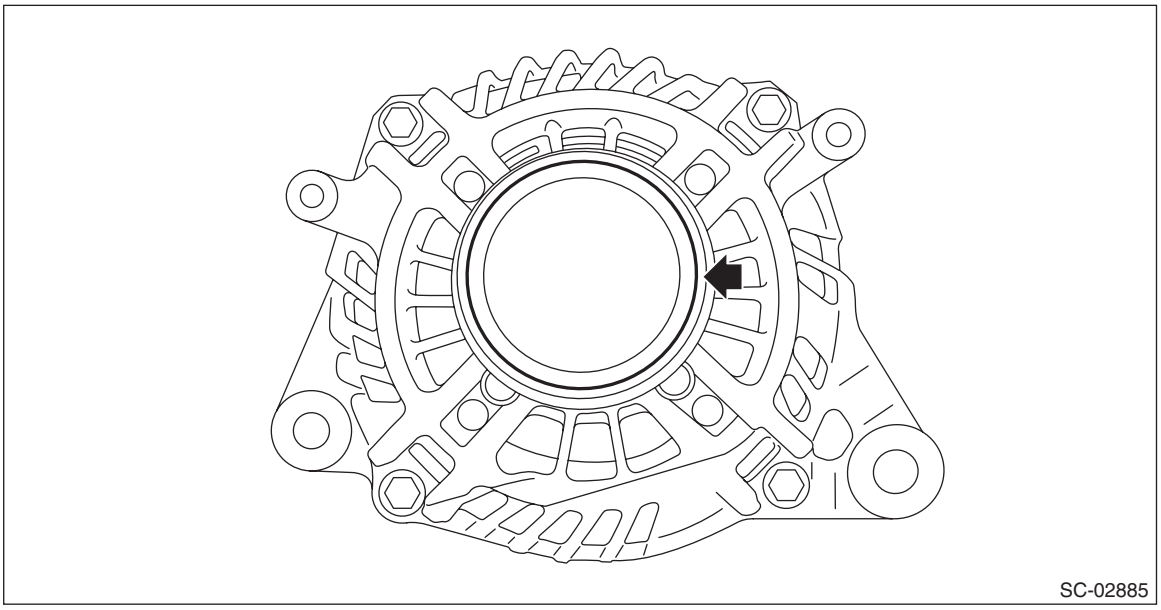
6) Install the V-belts. <Ref. to ME(H4DO(w/o HEV))-132, GASOLINE ENGINE MODEL, INSTALLATION, V-belt.>
7) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
8) Install the V-belt cover.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)

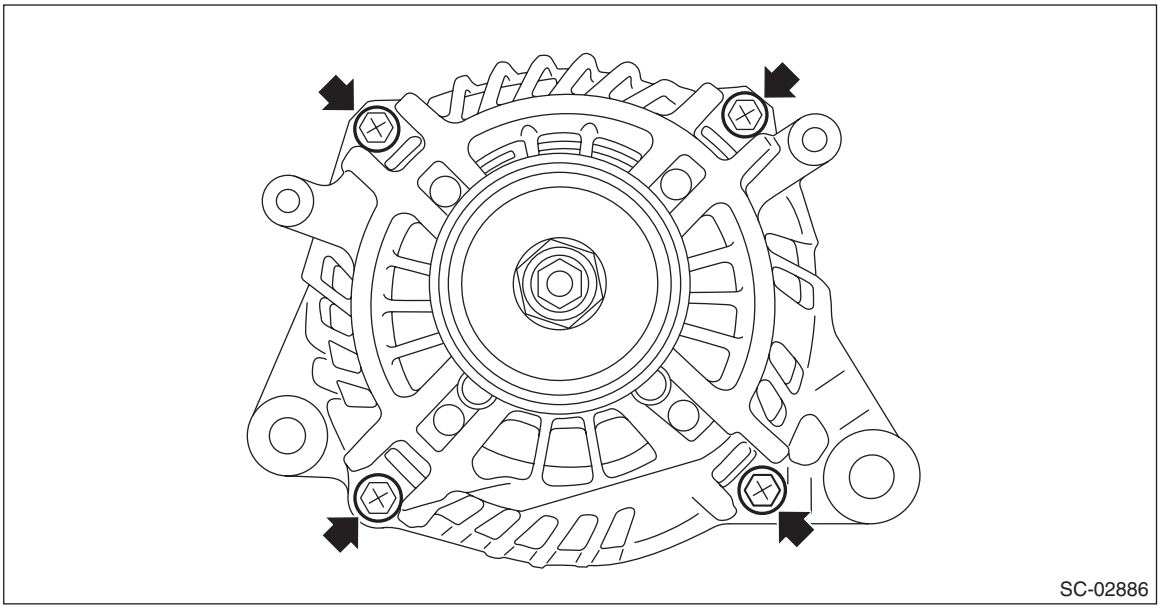


C: DISASSEMBLY

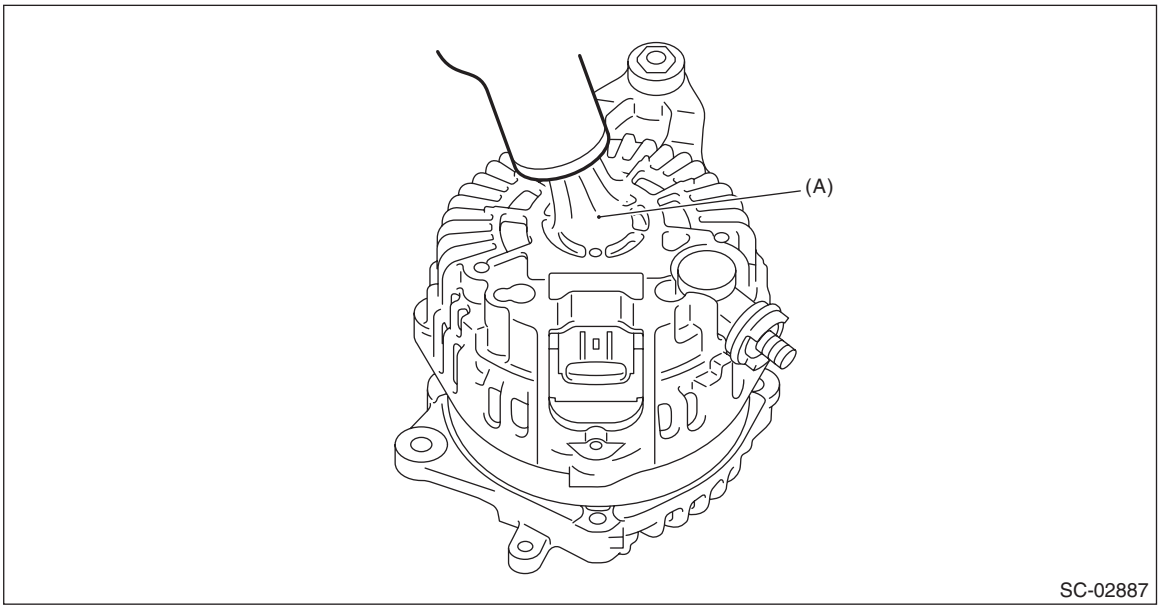
1) Remove the cap from the generator.



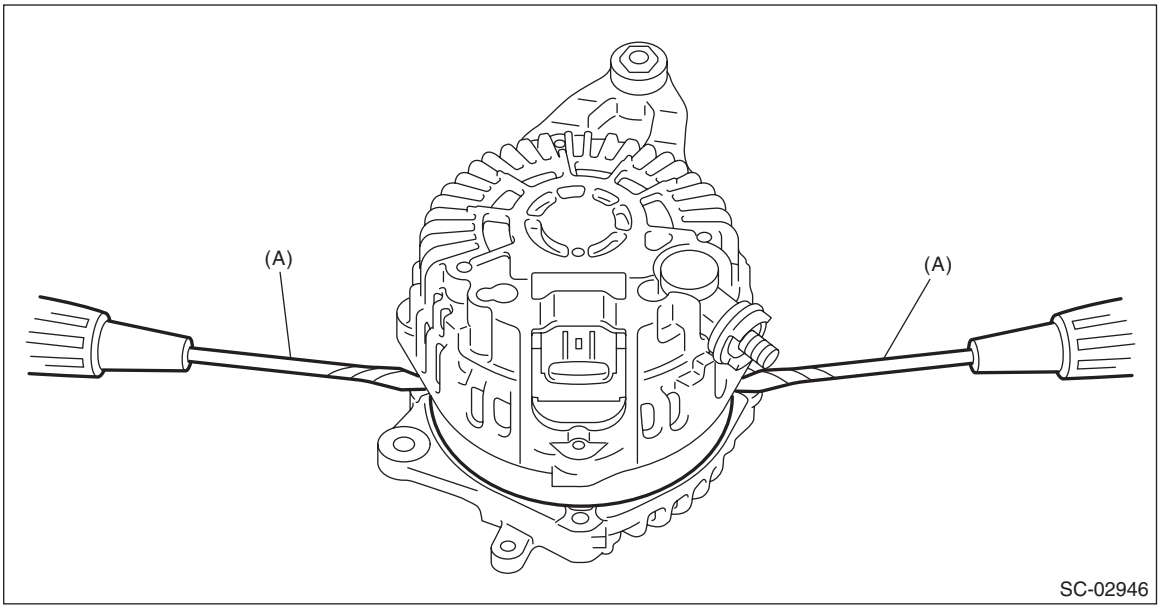
2) Remove four bolts.



3) Use a drier to heat the rear cover (A) portion to 50 — 60°C (122 — 140°F).



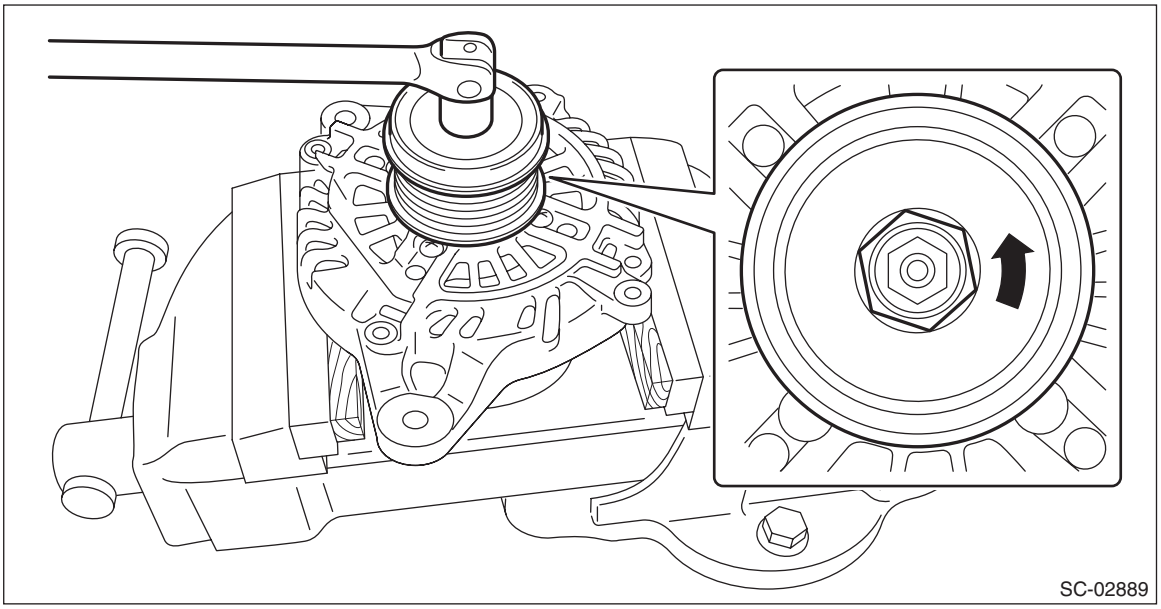
4) Insert a flat tip screwdriver or similar tool wrapped with protective tape into the gap between stator core and the front cover to disassemble.



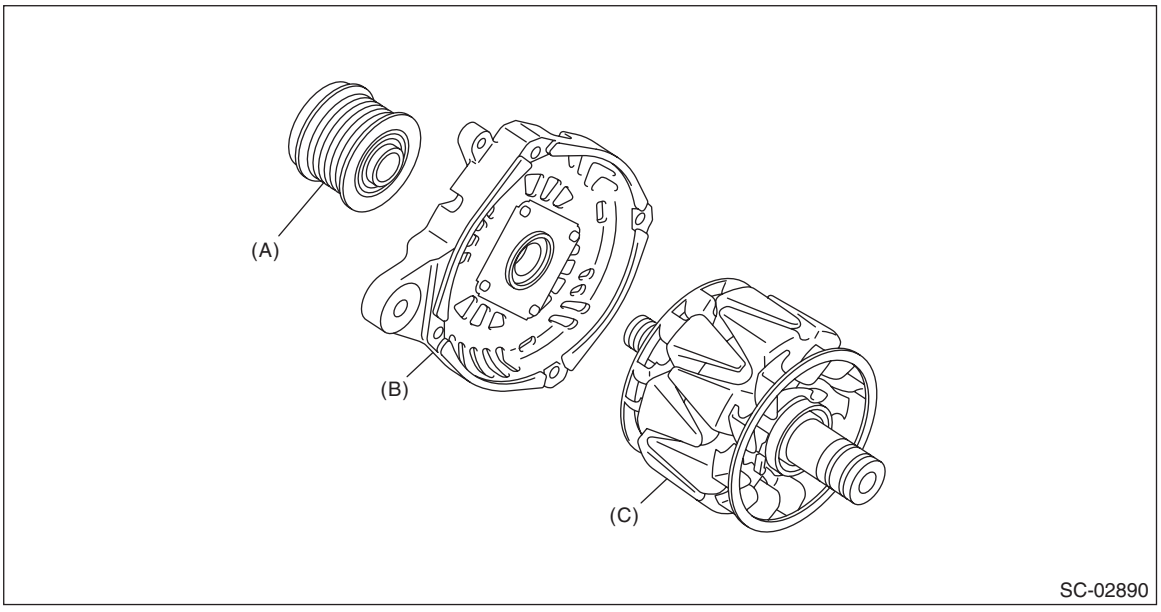
(A) Flat tip screwdriver

5) Hold the rotor on a vise and remove the pulley.

CAUTION:
When holding the rotor with a vise, place aluminum plates or wooden pieces on the vise jaws to prevent rotor from damage.

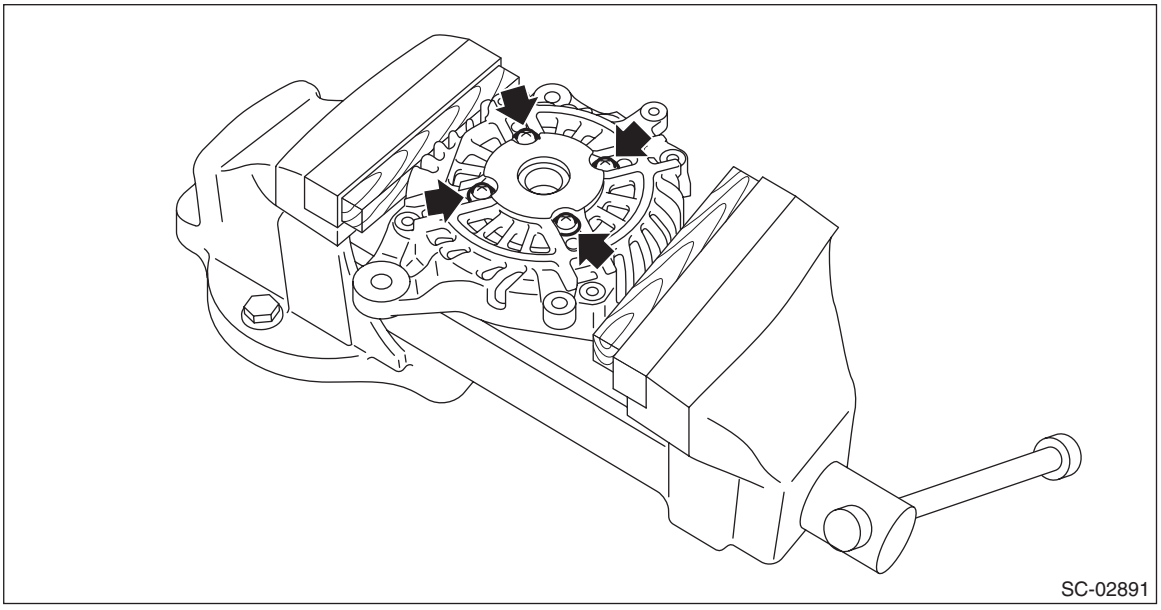


6) Remove the rotor from the front cover.

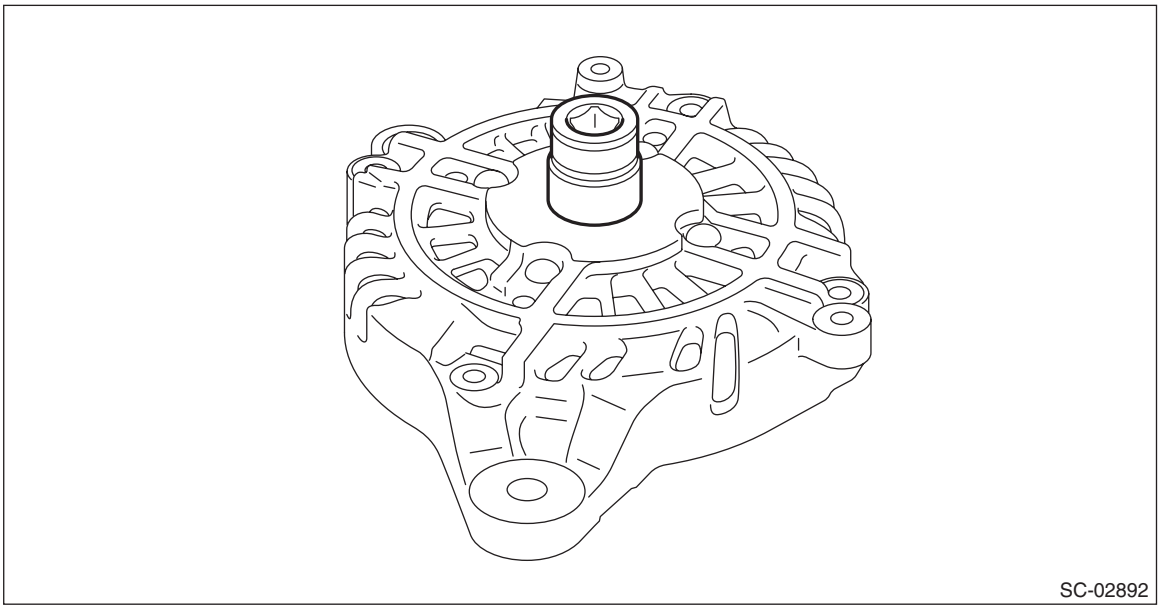


(A) Pulley (B) Front cover (C) Rotor

7) Use the following procedures to remove the ball bearings.
(1) Remove the bolt, and then detach the bearing retainer.

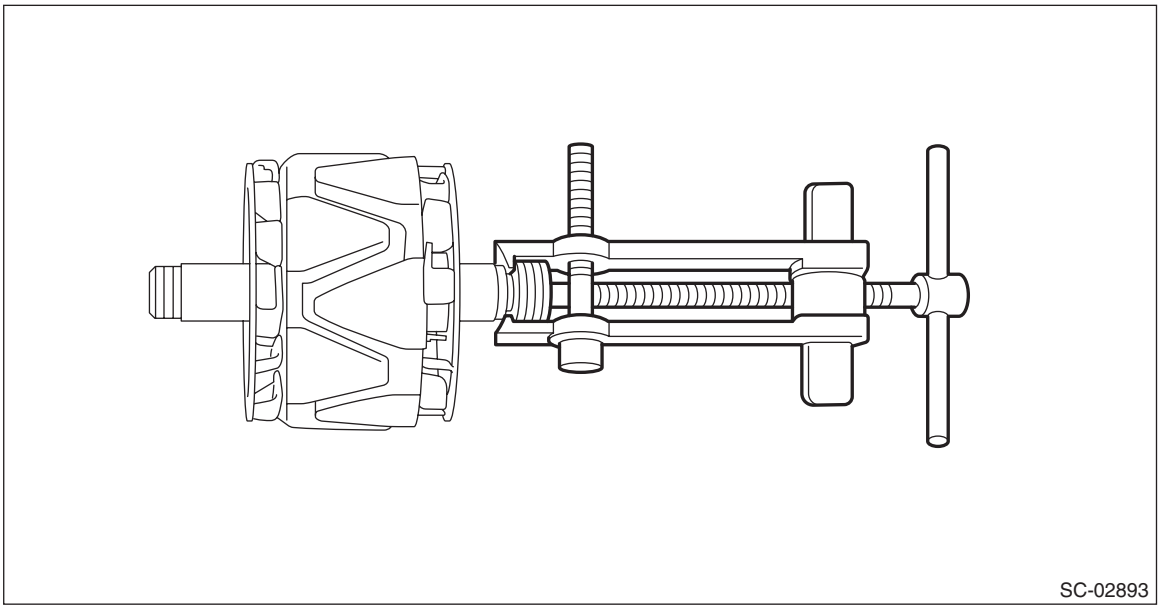

SC-02891

(2) Firmly attach an appropriate tool (such as a correct size socket wrench) to the bearing inner race.

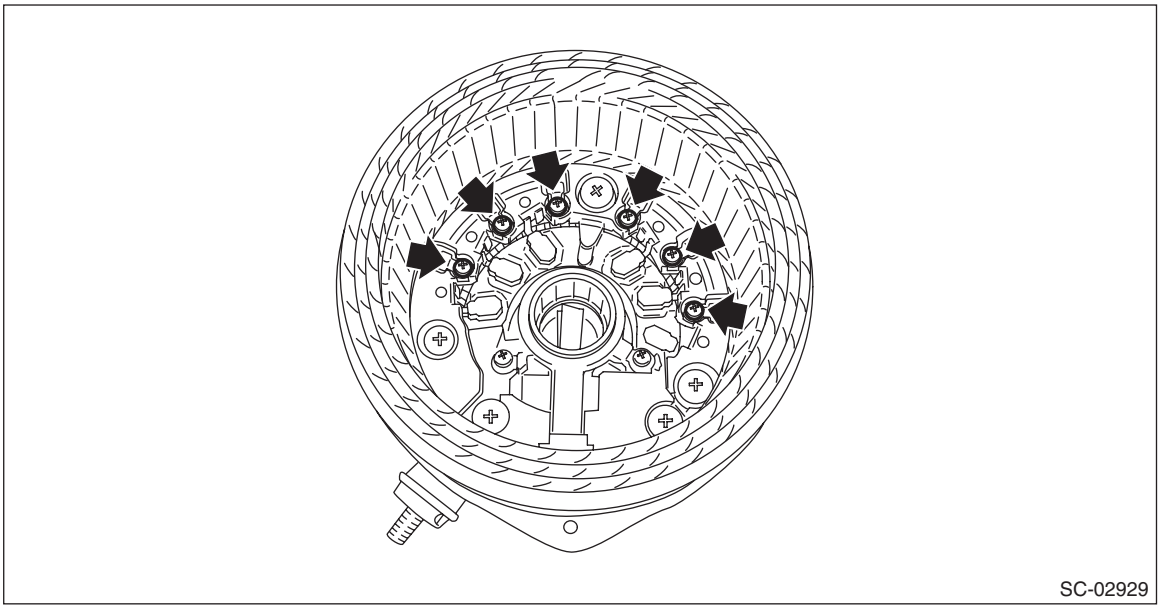

SC-02892

(3) Use the press to push the ball bearings out from the front cover.

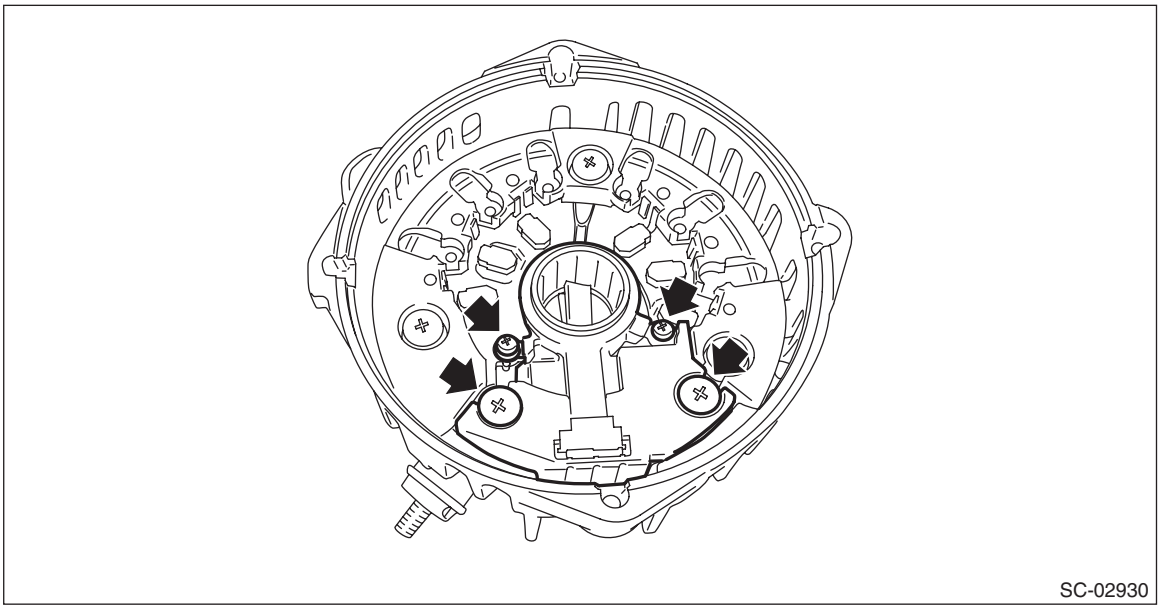
8) Using the bearing puller, remove the bearings from the rotor.


SC-02893

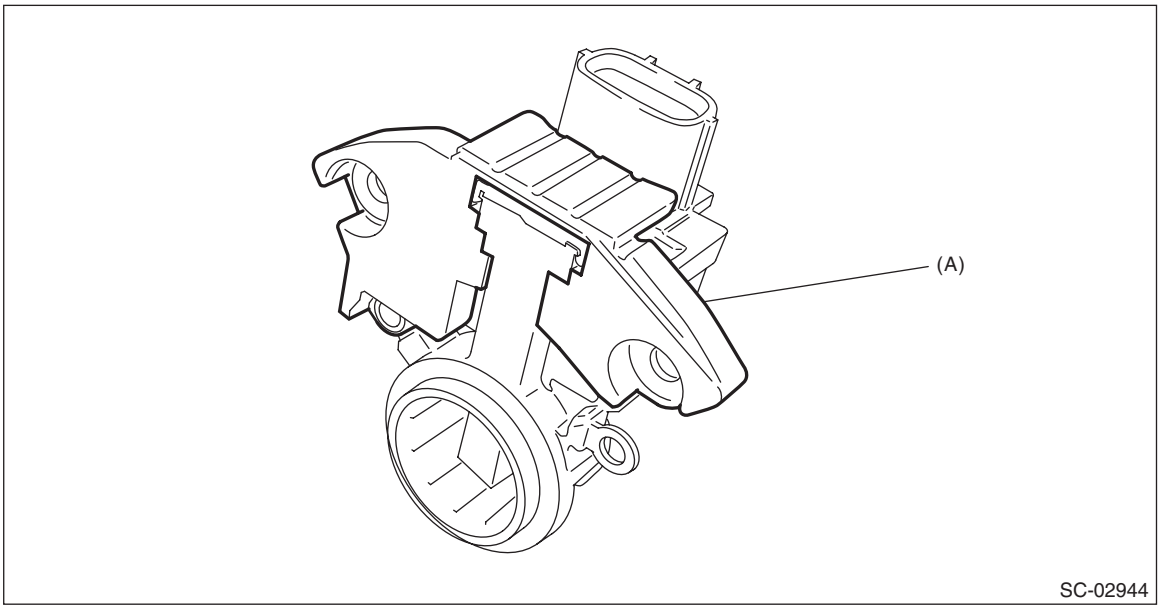
9) Remove six bolts which connect the rectifier and stator coil, then remove the stator coil.


SC-02929

10) Remove four screws which secure the IC regulator to the rear cover, then remove the IC regulator.


SC-02930

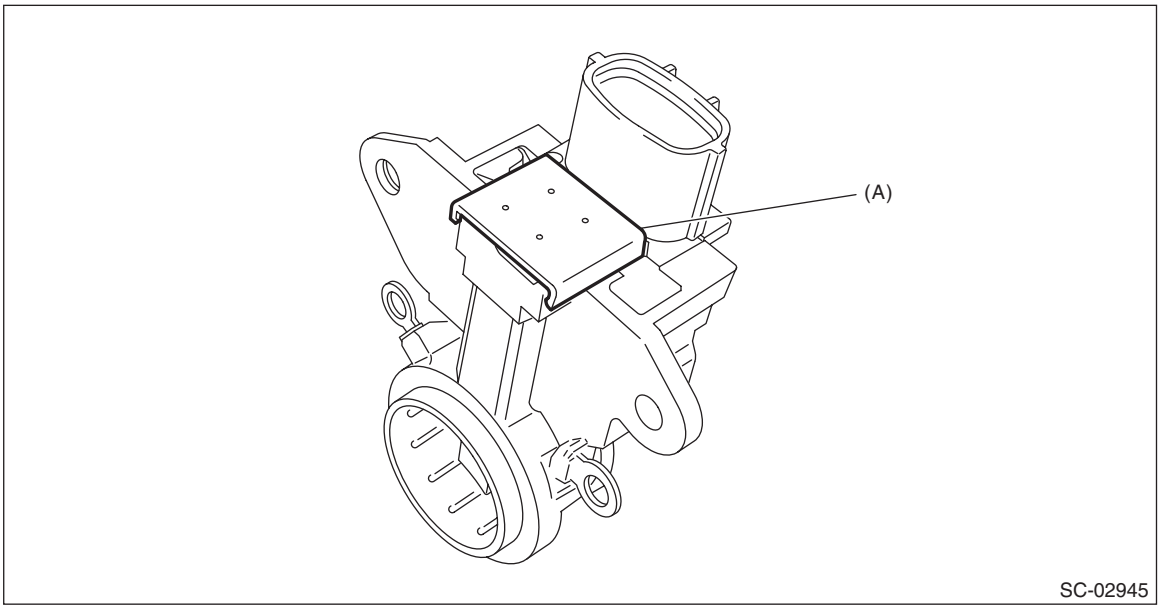
11) Use the following procedures to remove the brush.
(1) Remove the cover A.



SC-02944

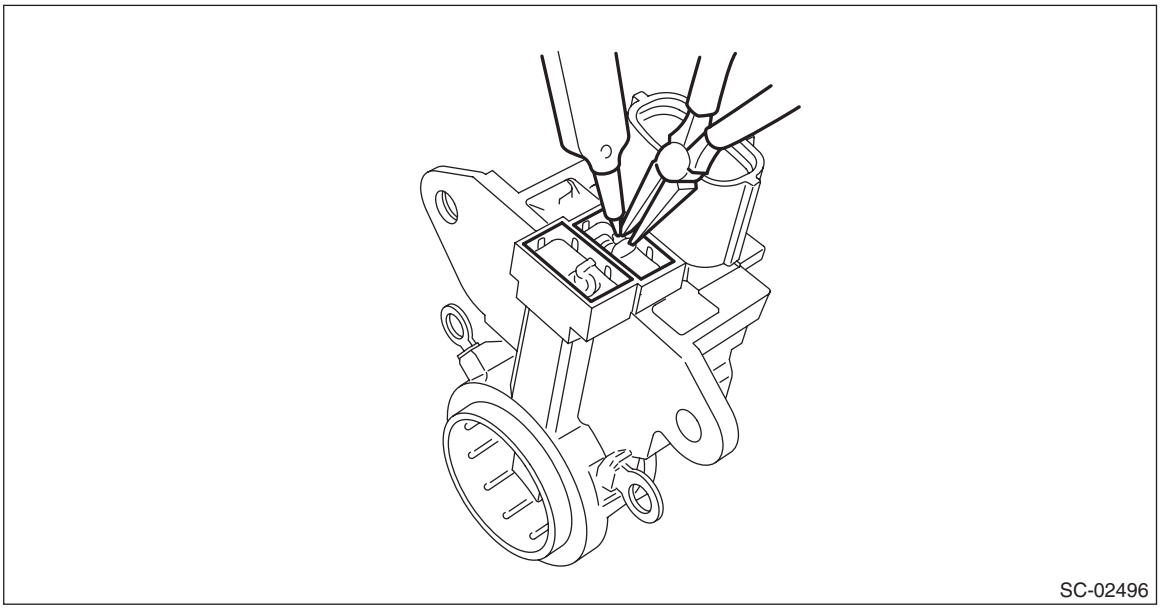
(A) Cover A

(2) Remove the cover B.

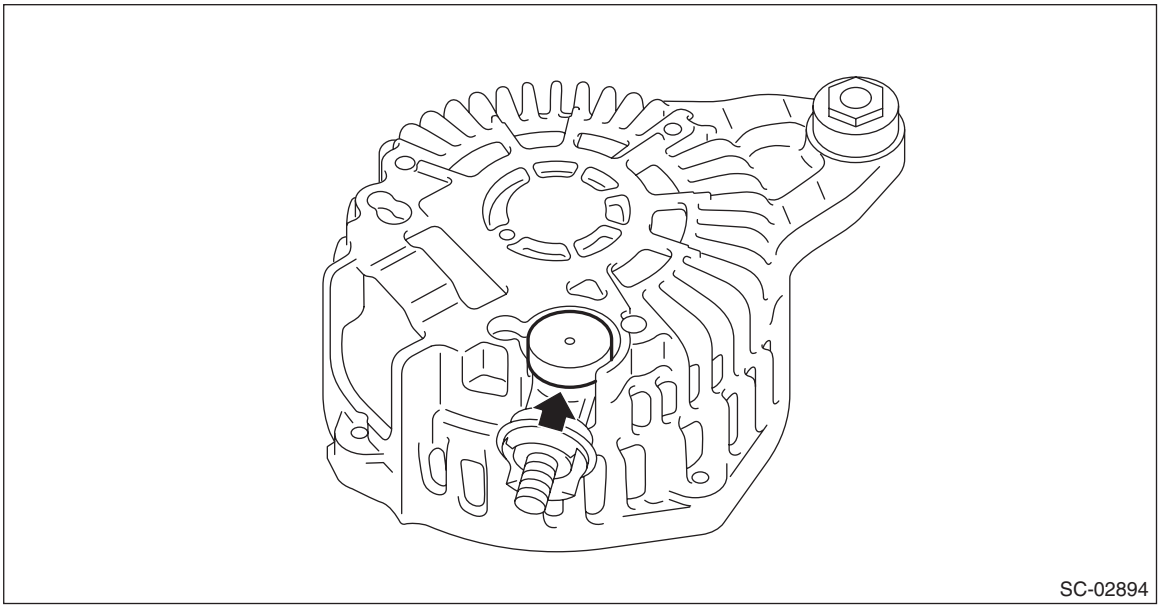


(A) Cover B

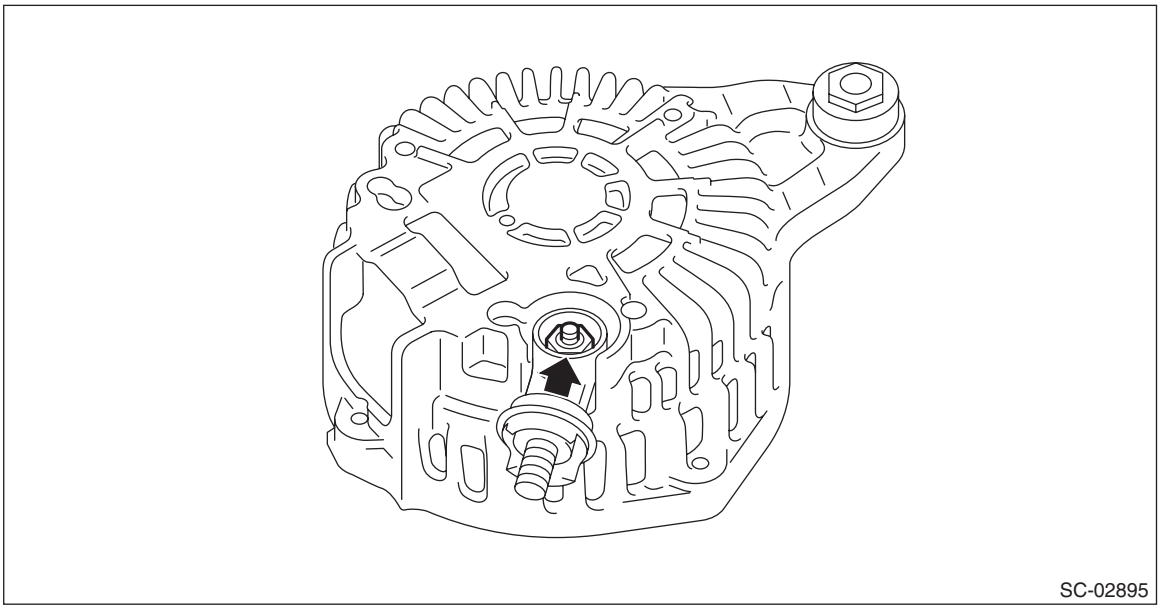
(3) Disconnect the connection and remove the brush.



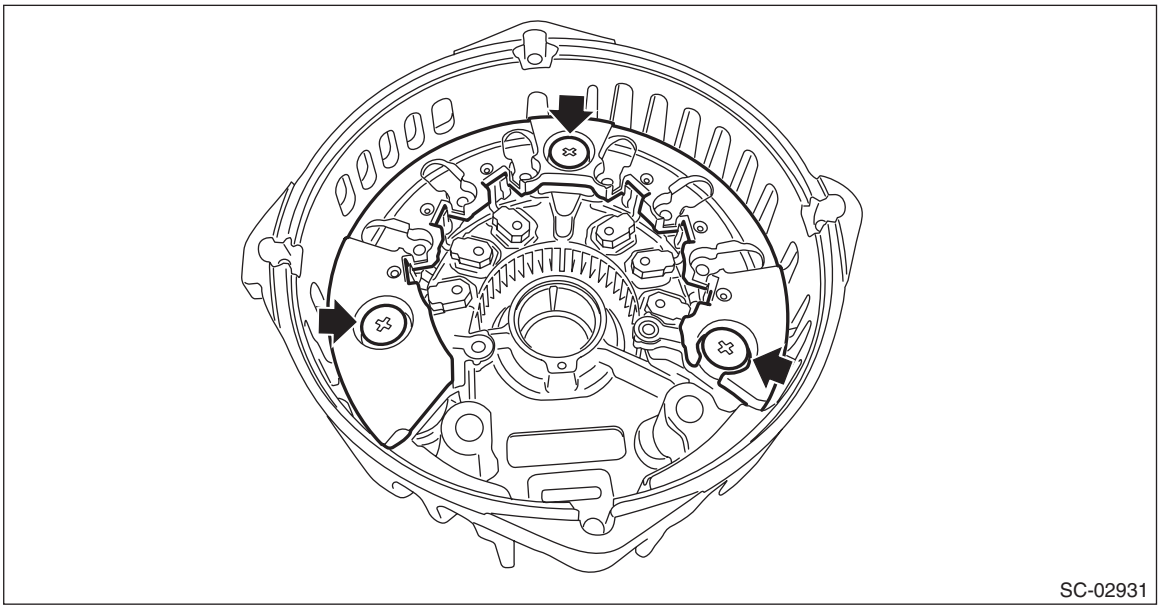
12) Remove the rectifier as follows.
(1) Remove the cover on terminal B.


SC-02894

(2) Remove the nut on terminal B.


SC-02895

(3) Remove the bolts which secure the rectifier, and remove the rectifier.



D: ASSEMBLY

Assemble in the reverse order of disassembly.

NOTE:

- Refer to component for tightening torque of each part. <Ref. to SC(H4DO(w/o HEV))-4, GENERATOR, COMPONENT, General Description.>
- After assembling, manually turn the pulley to check that the rotor rotates smoothly.

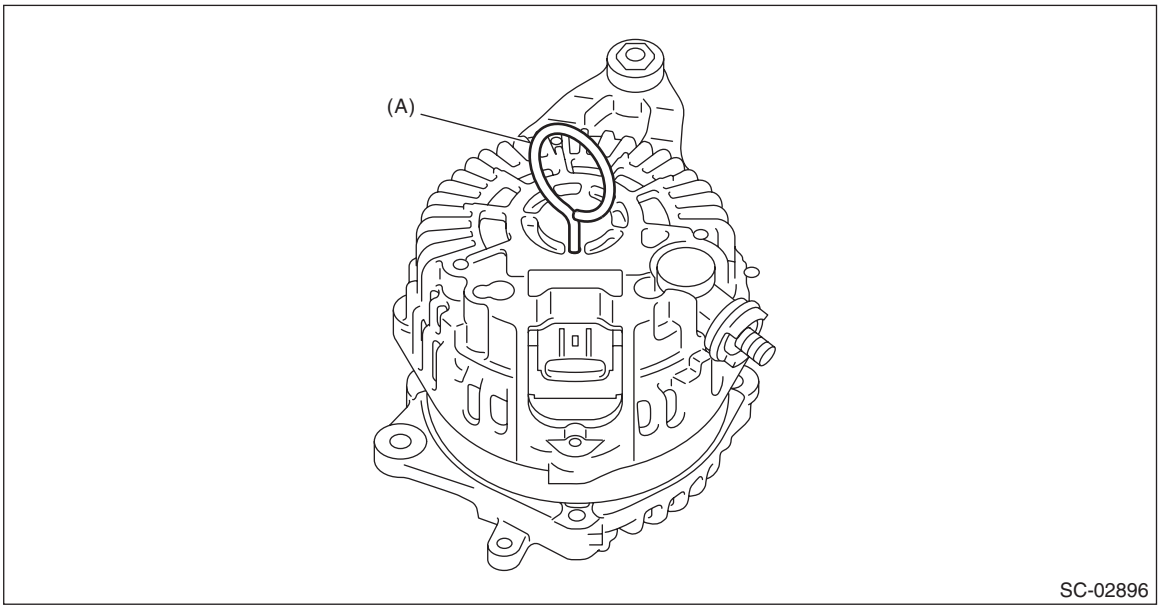
1) Assembling the rear cover and rectifier

Remove old silicone grease on the mating surface of rear cover and rectifier and apply new silicone grease.

CAUTION:
Do not apply silicone grease to the attachment threads of rectifier.

2) Push of the brush
Before assembling the front and rear parts, press the brush down into the brush holder, then fix the brush in that position by inserting a [1 mm (0.0394 in) dia., 40 — 50 mm (1.5748 — 1.9685 in) long] wire through the hole as shown in the figure.

CAUTION:
After assembling, remove the wire.



(A) Wire

3) Install the ball bearings.
(1) Set the ball bearings in the front cover, then securely install an appropriate tool (such as a socket wrench of proper size) to the bearing outer race.
(2) Using a press to press the ball bearings into the specified location.
(3) Install the bearing retainer.
4) Install the bearings.

CAUTION:
Do not apply grease to the bearings. If there is any oil on the bearing box, remove it completely.
(1) Use a press to install the bearings to the rotor shaft.
(2) Heat the bearing box in rear cover at 50 to 60°C (122 to 140°F), and then press the bearing into rear cover.

E: INSPECTION

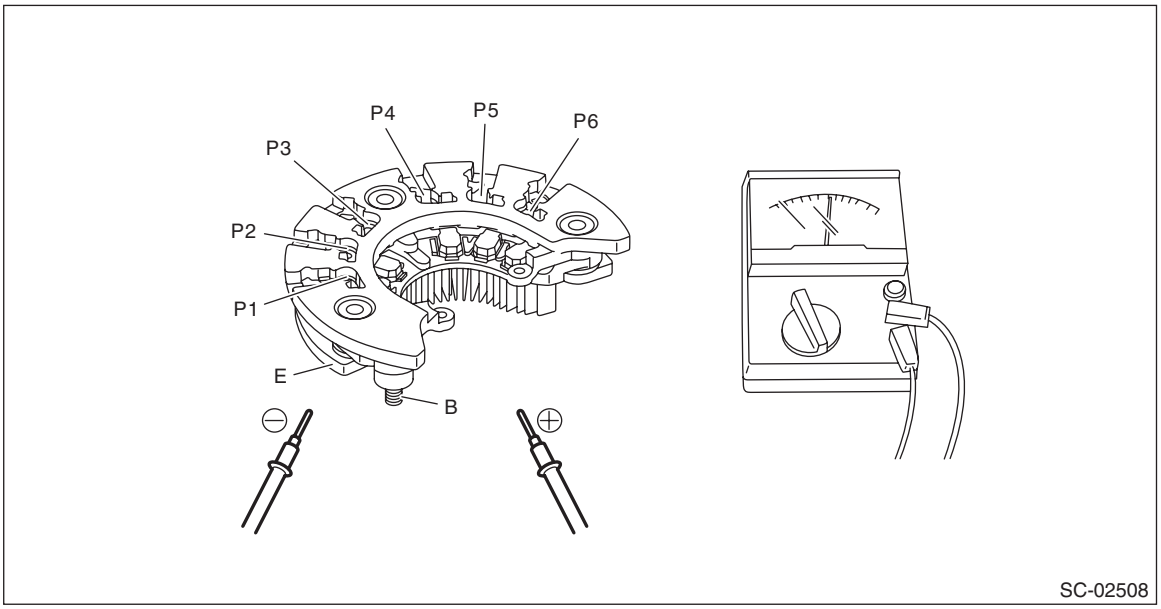
1. DIODE

CAUTION:
There is the possibility of damaging the diodes if a mega-tester (used to measure high voltages) or a similar measuring instrument is used. Never use a mega tester or equivalent for this test.
1) Check for continuity between the diode lead and terminal E or B. If continuity is not as shown in the table, replace the rectifier.
- At analog type tester

Tester lead		Continuity
–lead	+lead	
E	P1, P2, P3, P4, P5, P6	Yes
B		No
P1, P2, P3, P4, P5, P6	E	No
	B	Yes

- At digital type tester

Tester lead		Continuity
–lead	+lead	
E	P1, P2, P3, P4, P5, P6	No
B		Yes
P1, P2, P3, P4, P5, P6	E	Yes
	B	No



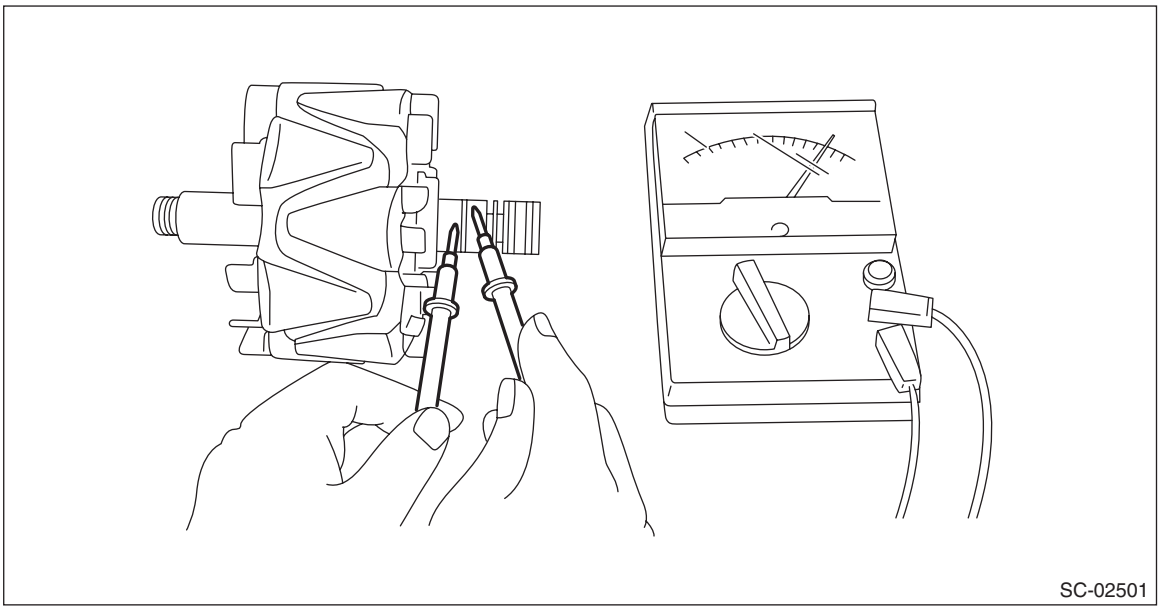
2. ROTOR

1) Slip ring surface
Inspect the slip rings for contamination or any roughness on the sliding surface. Repair the slip ring surface using a lathe or sand paper.
2) Slip ring outer diameter
Measure the slip ring outer diameter. Replace the rotor if the slip ring is worn.

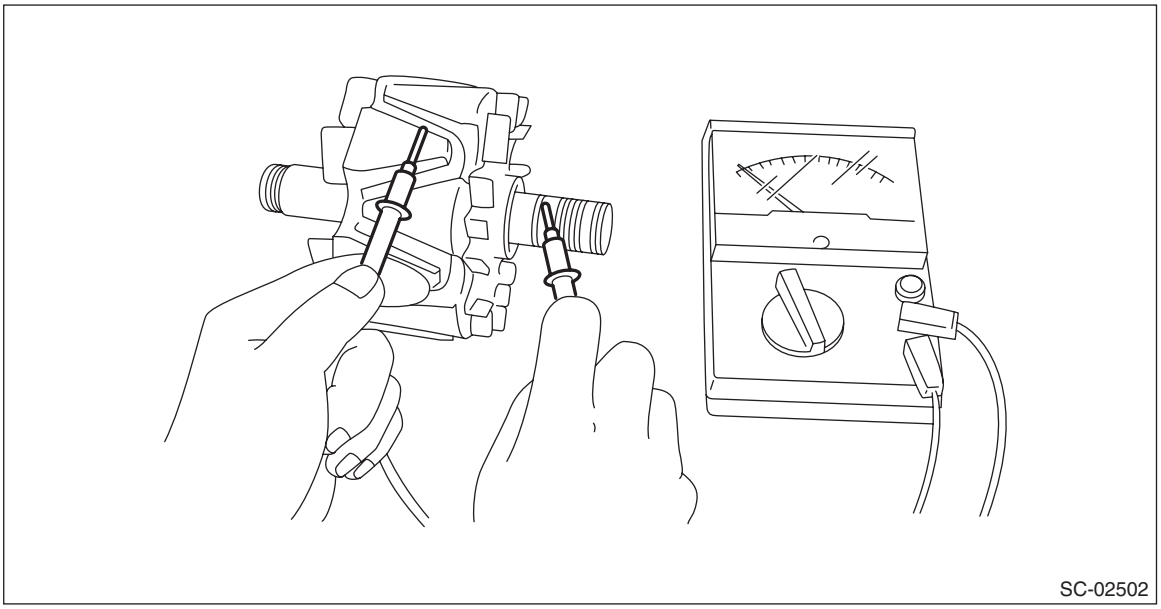
Slip ring outer diameter:
Standard
22.7 mm (0.894 in)
Limit
22.1 mm (0.870 in)

3) Continuity test
Using a circuit tester, check the resistance between slip rings. If the resistance is not within the standard, replace the rotor.

Standard:
Approx. 2.0 — 2.4 Ω


SC-02501

4) Insulation test
Check the continuity between slip ring and rotor core or shaft. If there is continuity, replace the rotor because the rotor coil is grounded.

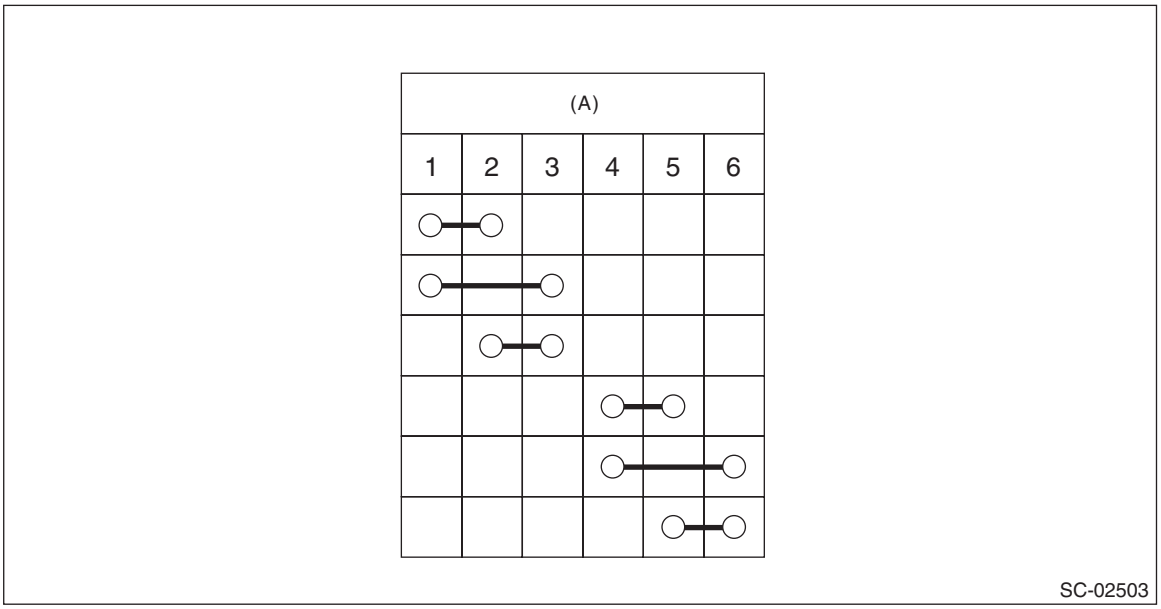

SC-02502

5) Bearing
Check the bearings. If there is any noise, or the rotor does not rotate smoothly, replace the bearings.

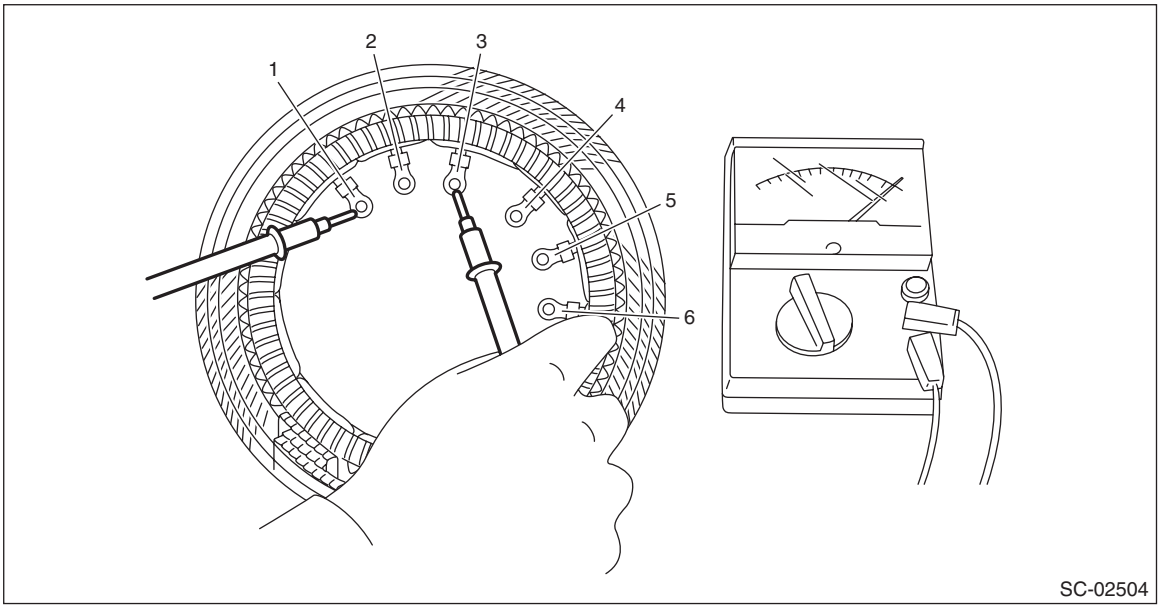
3. STATOR COIL

1) Continuity test

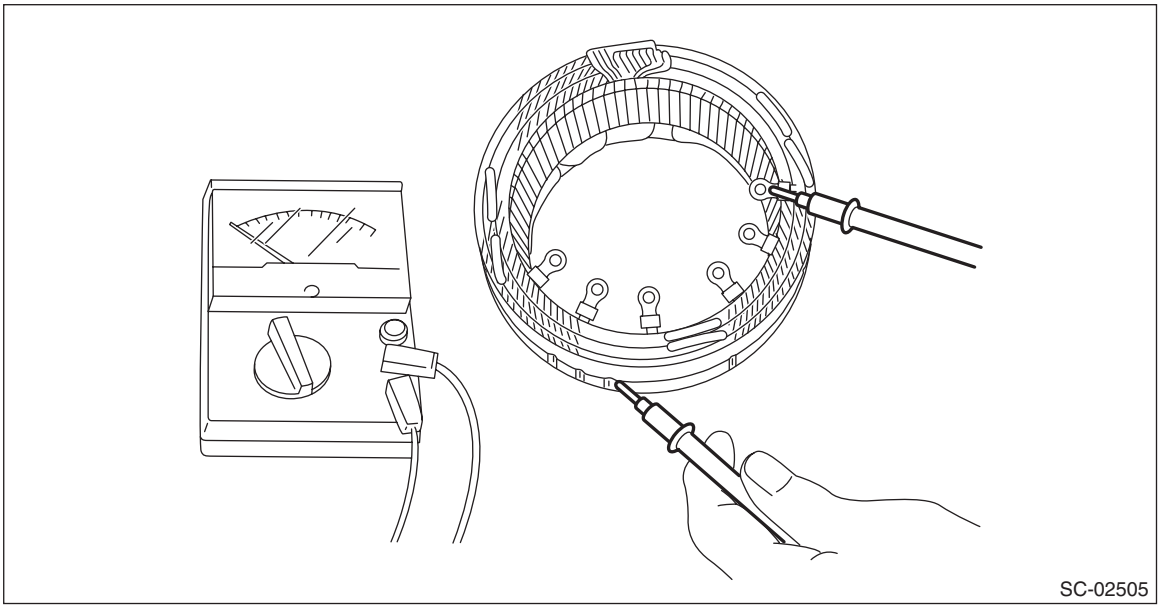
Inspect the continuity between the stator coil terminals. If continuity is not as shown in the table, replace the stator coil.



(A) Terminals



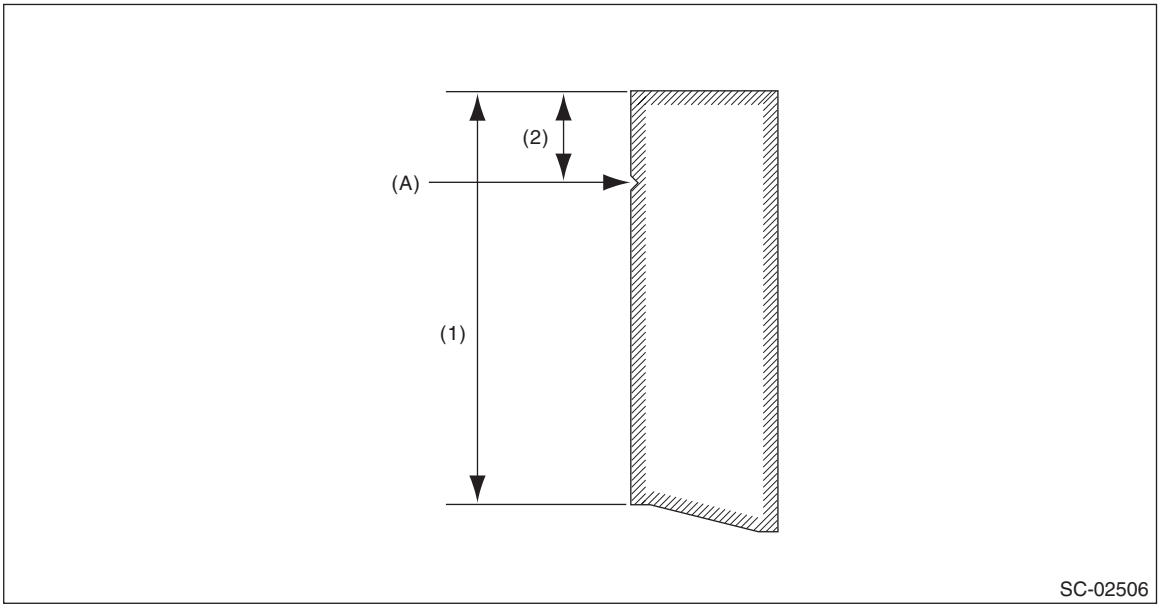
2) Insulation test
Inspect the continuity between the stator coil stator core and lead wire terminals. If there is continuity, replace the stator coil because the stator coil is grounded.


SC-02505

4. BRUSH

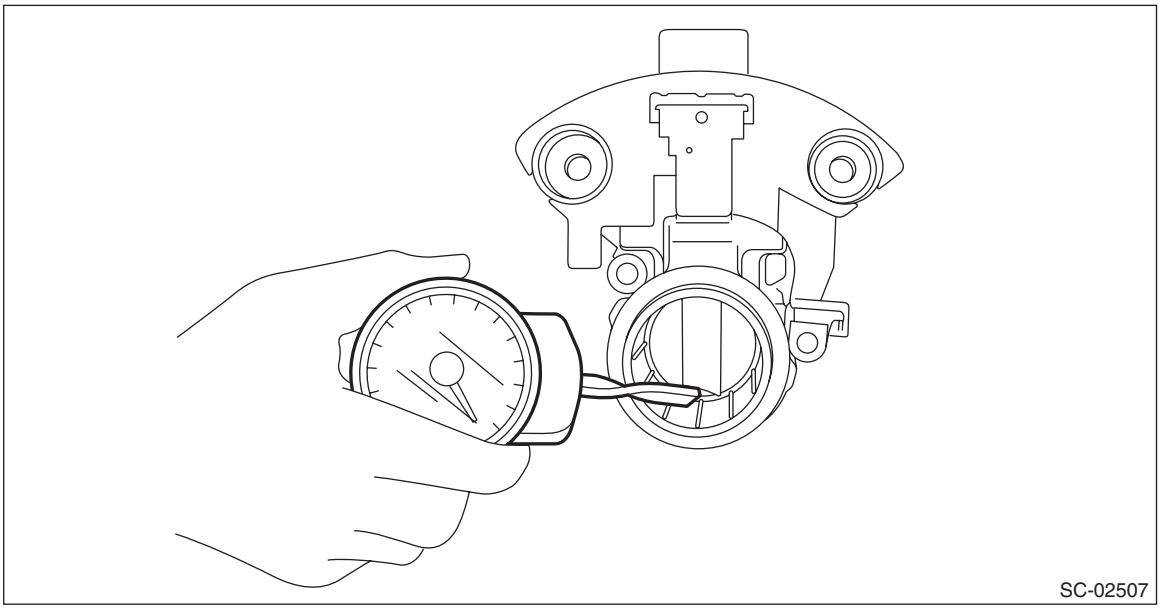
1) Measure the length of each brush. Replace the brush if wear exceeds service limits. There is a service limit mark (A) on each brush.

Brush length:
Standard (1)
22.5 mm (0.886 in)
Limit (2)
5.0 mm (0.197 in)



SC-02506

2) Check that there is appropriate pressure on the brush spring. Using a spring pressure indicator, push the brush into the brush holder until its tip protrudes 2 mm (0.0787 in). Then measure the pressure of brush spring. If the pressure is 1.7 N (173 gf, 6.11 ozf) or less, replace the brush spring. 4.1 — 5.3 N (418 — 540 gf, 14.75 — 19.06 ozf) pressure is required on the new spring.



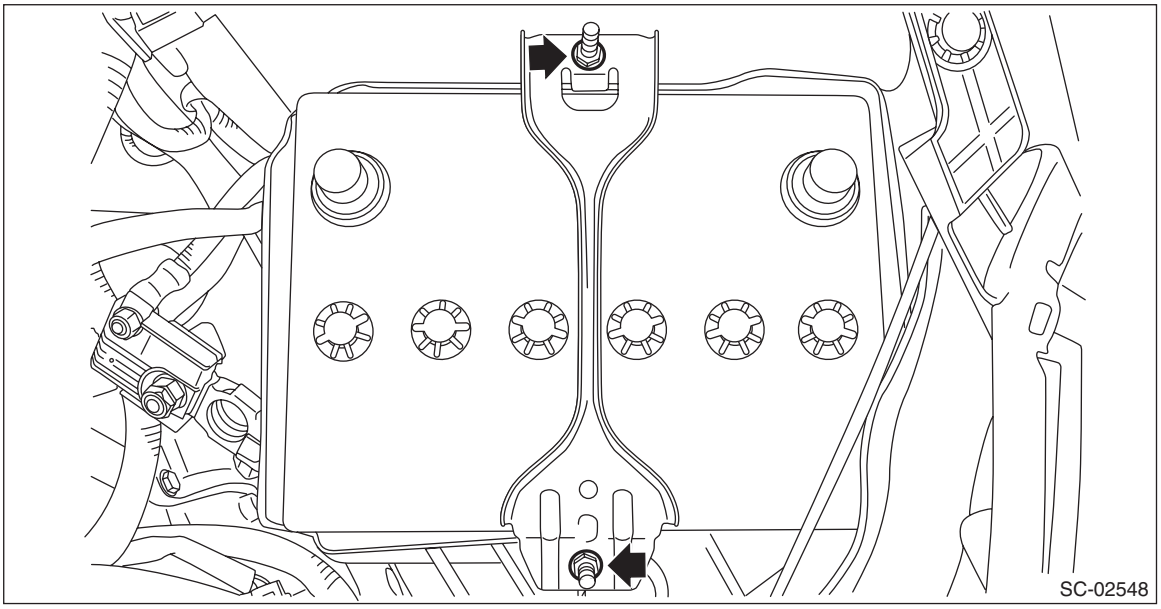
5. BALL BEARING

Check the ball bearings. Replace the ball bearings if there is resistance in the rotation, or if there is any abnormal noise.

4. Battery

A: REMOVAL

1) Disconnect the positive (+) terminal after disconnecting the negative (–) terminal of battery.
2) Remove the battery cable holder from the battery rod.
3) Remove the flange nut from battery rod and remove battery holder.

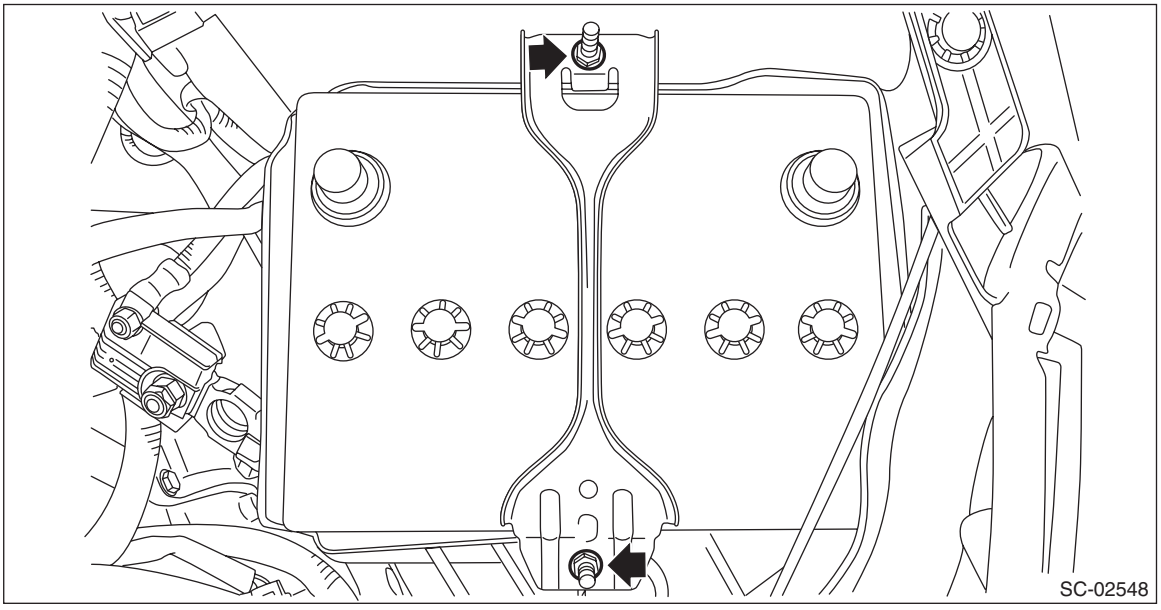


4) Remove the battery.

B: INSTALLATION

CAUTION:
After the battery is installed, initial diagnosis of the electronic throttle control is performed. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.
1) Install the battery.
2) Set the battery holder and install the flange nut to the battery rod.

Tightening torque:
3.5 N·m (0.4 kgf-m, 2.6 ft-lb)



3) Install the battery cable holder to the battery rod.
4) Connect the positive terminal and then connect the negative terminal to the battery.

NOTE:
Clean the battery cable terminals and apply grease to prevent corrosion as necessary.

C: INSPECTION

WARNING:
- **As batteries produce flammable gases, be careful not to bring an open flame close to the batteries.**
- **Ventilate sufficiently when using or charging battery in enclosed space.**
- **Electrolyte is corrosive acid, and has toxicity; be careful of handling the fluid.**
- **For safety, in case an explosion does occur, wear eye protection or shield your eyes when working near any battery. In addition, never lean over the battery.**
- **Be careful that the electrode does not come into contact with skin, eyes or clothing. Especially at contact with eyes, flush with water for 15 minutes and get prompt medical attention.**
- **Be careful not to let the electrode contact with the coated parts.**
- **Before starting work, remove rings, metal watch-bands, and other metal jewelry.**
- **Be careful not to let the metal tools contact the positive battery terminal and anything connected to it. When the operation using a metal tool to the positive terminal or anything connected to it is required, disconnect the battery ground terminal before starting the operation.**

1. APPEARANCE

Check the battery case, top cover and terminal post for contamination or cracks and perform the following procedures as necessary.
- Clean the battery with water and wipe with a dry cloth.
- Apply a light coat of grease to the terminal post to prevent corrosion.

Check

- ***Normal → Go to the check item 2.***
- ***Abnormal → Replace the battery.***

2. ELECTROLYTE LEVEL

Check the electrolyte level in each cell.

CAUTION:
Do not fill beyond MAX level.

NOTE:
If the level is below the middle point between MIN level and MAX level, pour distilled water into the battery cell to bring the level to MAX.

Check

- ***MAX level → Go to the check item 3.***
- ***Below the middle point between MIN level and MAX level → Fill → Go to the check item 3.***

3. SPECIFIC GRAVITY OF ELECTROLYTE

Check the specific gravity of the electrolyte using a hydrometer and a thermometer.

NOTE:

- Specific gravity varies with temperature of electrolyte so that it must be corrected at 20°C (68°F) using the following calculation:

S_{20} = St + 0.0007 × (t – 20)

S_{20}: Specific gravity corrected at electrolyte temperature of 20°C

St: Measured specific gravity

t: Measured temperature (°C)

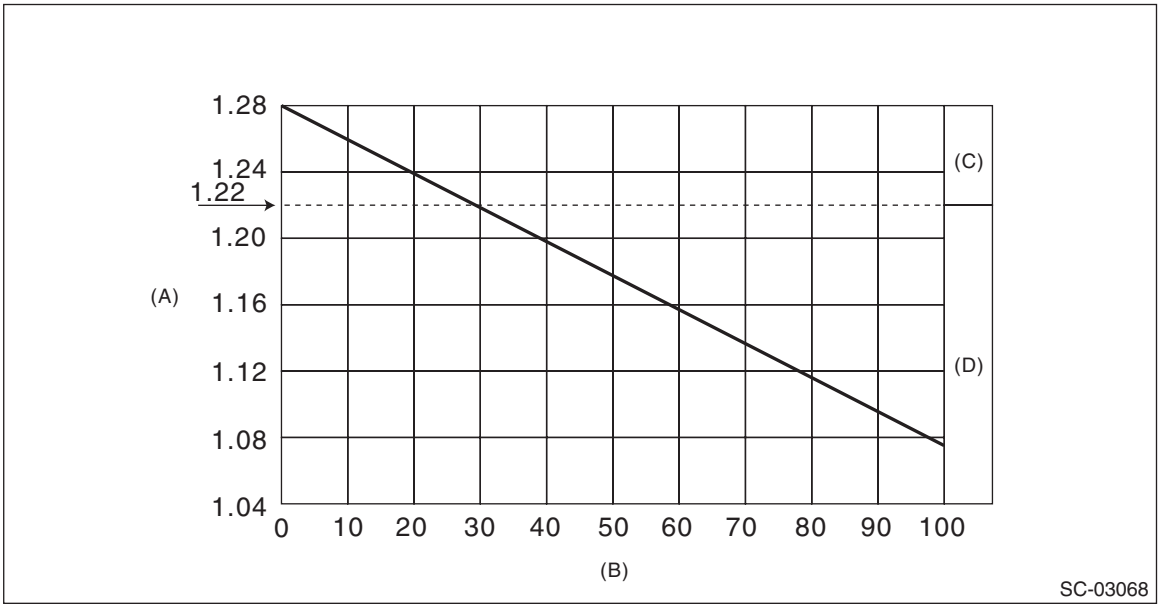
- When measuring in a simplified manner using the battery terminal voltage, calculate the specific gravity by the following formula.

Specific gravity = [0.187 × battery terminal voltage (V)] – 1.1

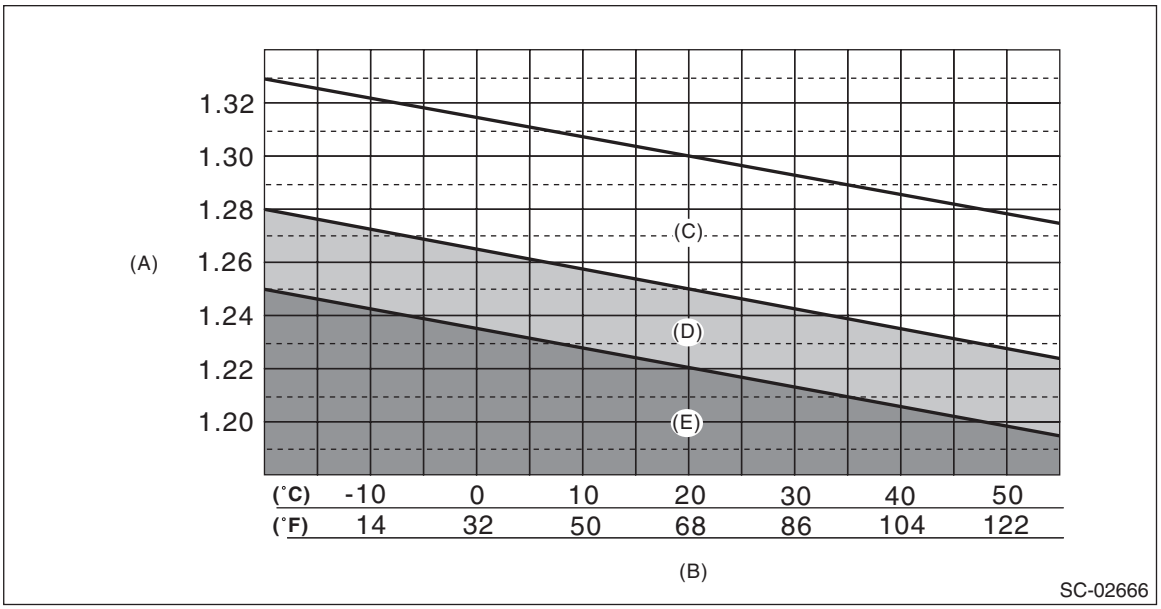
Perform the steps 1) and 2) before measuring the voltage in order to stabilize the voltage.

1) Turn the ignition switch to OFF and illuminate the headlight for 30 seconds.
2) After turning off the headlight, leave the vehicle for one minute.

- Measuring the specific gravity of the electrolyte in the battery will disclose the state of charge of the battery. The relation between specific gravity and state of charge is as shown in the figure.



(A) Specific gravity [20°C (68°F)] (B) Amount of discharge (%) (C) Good
(D) Need to charge or replace



(A) Specific gravity [20°C (68°F)] (B) Electrolyte temperature (C) Good
(D) Caution (E) Need charging

Check

- ***Specific gravity: 1.250 — 1.290, and difference between cells is 0.04 or less → Battery is normal***
- ***Specific gravity: Less than 1.250, or difference between cells is 0.04 or more → Battery needs to be charged or replaced***

4. STANDBY CURRENT

1) Prepare the circuit tester which can measure down to 1 mA.

NOTE:
For model with keyless access function, the standby current changes regularly. Therefore, prepare the analog type circuit tester.

2) Using the circuit tester, check the standby current.
   (1) Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, APPEARANCE, INSPECTION, Battery.> <Ref. to SC(H4DO(w/o HEV))-53, ELECTROLYTE LEVEL, INSPECTION, Battery.> <Ref. to SC(H4DO(w/o HEV))-54, SPECIFIC GRAVITY OF ELECTROLYTE, INSPECTION, Battery.>

NOTE:
The standby current may be displayed lower than the actual value if the battery is weak, so be sure to check the battery. Charge or replace if necessary.

   (2) Check that the fuse is not blown out and is properly inserted.
   (3) When non-genuine electrical parts (including parts sold in authorized workshops) are installed, remove all parts except for genuine electrical parts.
   (4) Check that back-up fuse is inserted. <Ref. to PI-4, FUSE INSTALLATION, PRE-DELIVERY INSPECTION (PDI) PROCEDURE, Pre-delivery Inspection.>
   (5) Start the engine, and set the switch positions for each system as shown in the following table.

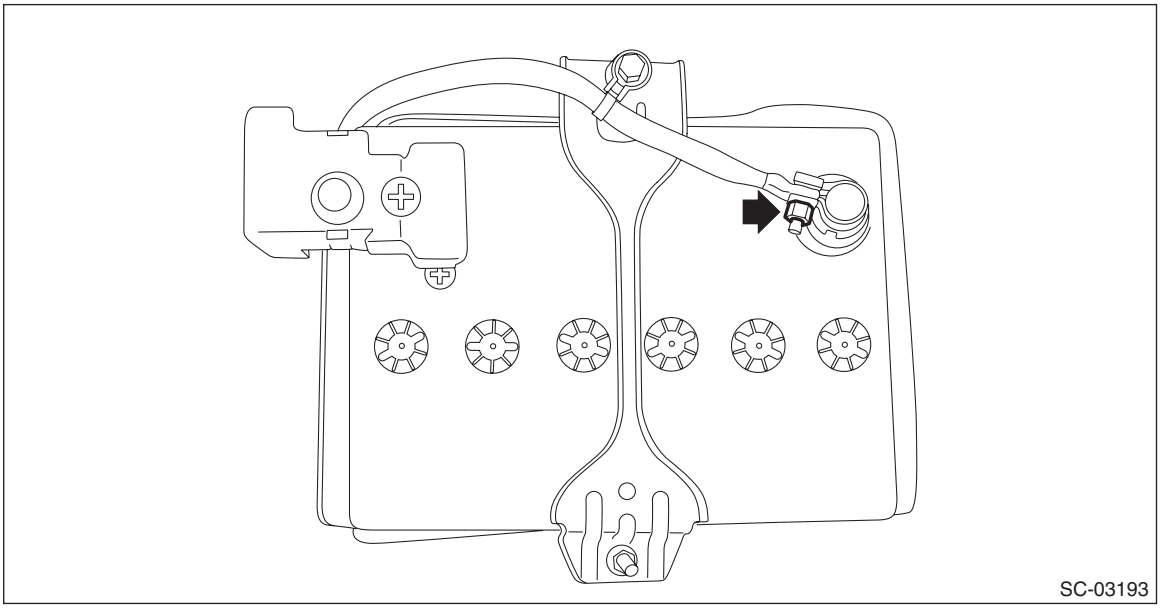
NOTE:
Some of the listed systems are not equipped depending on the vehicle. Set only the systems equipped on the vehicle to the positions as shown.

System	Position
Headlight	ON or Auto
Fog light	ON
Wiper (front and rear)	ON or Low speed
Audio and navigation system	ON
Rear defogger	ON
Room light	DOOR
Luggage light	DOOR
Map light	OFF
Auto A/C	ON (AUTO)
Manual A/C	ON (Speed 1)
Electronic parking brake	ON
Electrical parts other than listed above (electrical parts that users can confirm the operation with the key removed)	OFF

(6) Turn the ignition switch to OFF.
(7) Operate the front hood lock release lever to unlock the front hood.
(8) Close all the doors (including rear gate and trunk lid) and then lock the doors. (Security alarm is in set condition)

NOTE:
For model with keyless access function, take the access key 1.5 m or more away from the vehicle after the door lock. And do not put the access key close to the vehicle while measuring the standby current.
(9) Wait for 5 minutes after door lock until the standby current stabilizes.
(10) Loosen the nut which holds the ground terminal to the battery.

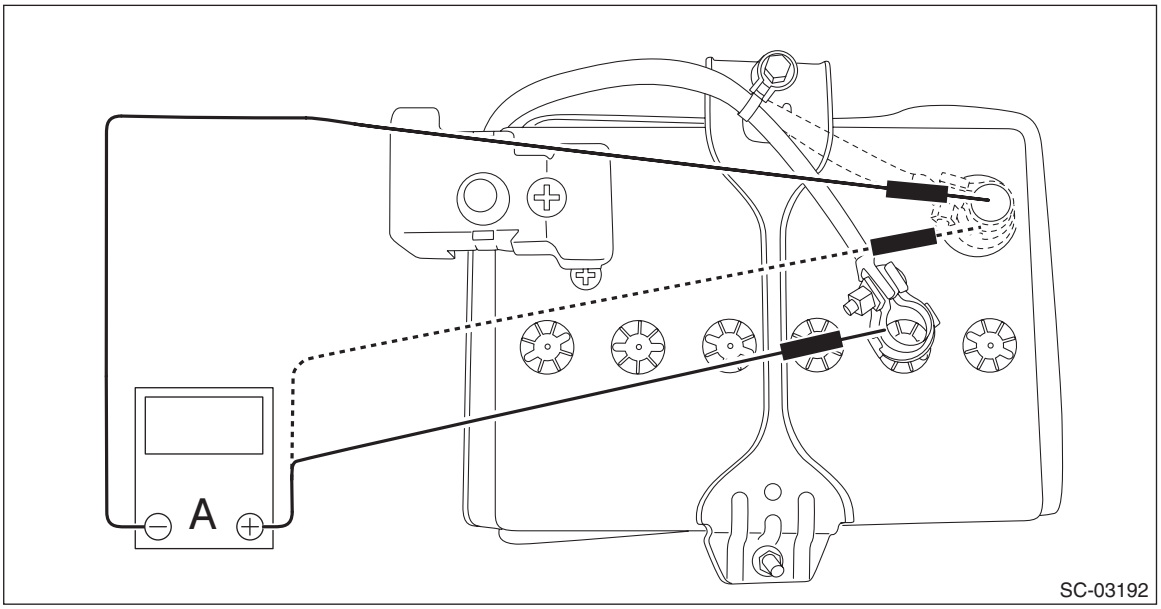
NOTE:
Do not remove the ground terminal.



(11) Connect the circuit tester positive terminal to the ground terminal.

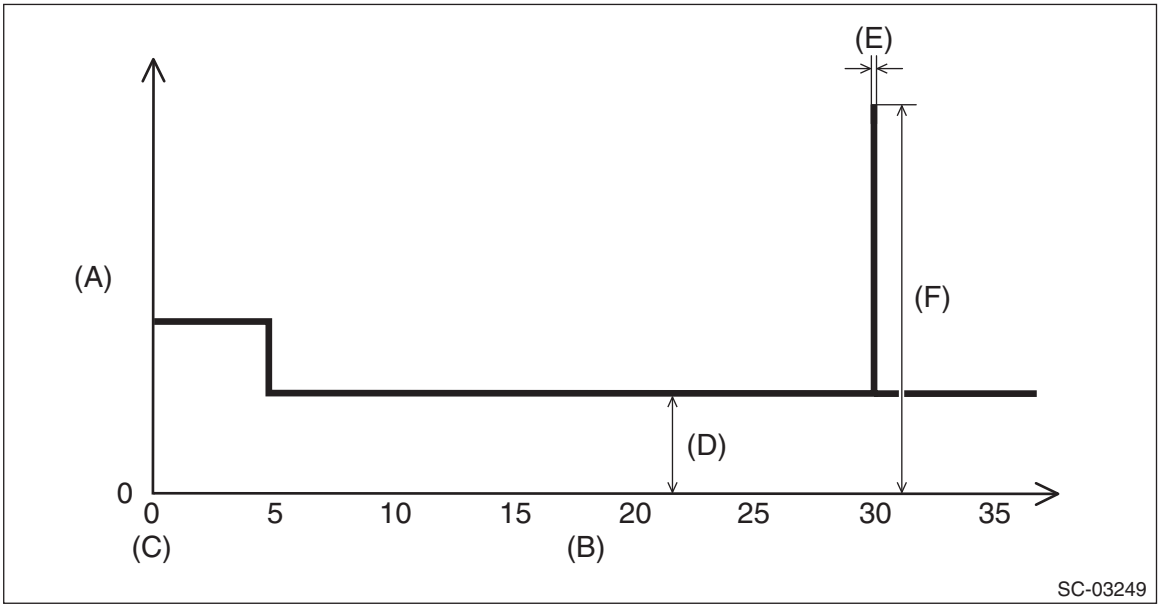
NOTE:
To prevent the damage to the circuit tester, set the circuit tester range to a large value first, then gradually change it to smaller values.
(12) Connect the circuit tester negative terminal to the ground terminal installation part of the battery.

(13) While connecting the circuit tester positive terminal with the ground terminal as shown in the figure below, remove the ground terminal from the battery.



(14) Check the standby current.

NOTE:
• For model with keyless access function, the standby current changes periodically because the keyless access system continuously searches the access key (polling).
• When measuring the standby current, the reading of the circuit tester oscillates. Therefore, read the average value (median value).
• The standby current may become large when the vehicle system is activated 5 times at 30-minute intervals or 5 hours after turning the ignition switch to OFF. Therefore, the measurement should be completed in 20 minutes. If it takes more than 20 minutes, start the engine once, stop the engine, then perform the inspection.



(A) Current/mA
(B) Time/min
(C) Ignition OFF
(D) Less than 70 mA
(E) 5 seconds (system operation)
(F) 300 mA or more

Check

- ***When the maximum measurement value is less than 70 mA → Standby current is normal.***
- ***When the maximum measurement value is 70 mA or more → Go to step (15).***
  (15) Remove all fuses one by one to identify which system changes the standby current value significantly. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
  (16) Check the harness and connector of the system whose standby current has changed significantly.

D: CHARGE

WARNING:
- **Do not bring an open flame close to the battery when working.**

CAUTION:
- **Prior to charging, corroded terminals should be cleaned with a brush and common caustic soda solution.**
- **Be careful while charging the battery because it produces flammable gasses.**
- **Observe instructions when handling the battery charger.**
- **Before charging the battery on the vehicle, disconnect the battery ground terminal to prevent damage of generator diodes or other electrical units.**

1. NORMAL CHARGE (CONSTANT CURRENT CHARGE)

Charge the battery with the current value specified by manufacturer or with approximately 1/10 of battery's rating capacity. (See the table below.)

Battery size	Charging current (A)	CCA (A)
55D23L	4.0 — 5.0	390

CAUTION:
- **The charge control feature and specifications for judgment of charge completion depend on the device. Follow the instruction manual of the charger used.**
- **Keep the electrolyte temperature at 45°C (113°F) or less while charging. Stop charging when the temperature exceeds this value.**

NOTE:
The characteristics of typical charging methods are as follows.
- Constant current charging

This method makes it easy to charge to 100%, since the electrolyte is agitated by the gassing occurred at the end of charging. However, the time for charging is comparatively long because the current value is kept constant.
- Constant voltage charging

This method completes charging in a short period of time due to the large current. However, it is difficult to charge to 100% because no gassing occurred at the end of charging and the electrolyte is not agitated. Therefore, the combined use with the constant current charging is preferable.
- Quasi-constant voltage charging

This method is widely used for commercially available chargers.
Compared to the constant voltage charging whose charging current at the beginning of charging becomes large, it reduces the charging current by lowering the voltage at the initial stage, resulting in battery load reduction. The time for charging is comparatively long. However, this type of chargers can be manufactured comparatively inexpensive due to the simple control circuit (or manual settings). After the initial stage of charging is completed, it gradually raises the charging voltage so that the charging current is within the specification, until the battery is fully charged.
- Constant voltage/current charging

In addition to the constant voltage charging, this method controls the upper limit of the current.
The constant current charging is applied at the beginning of charging, and the constant voltage charging is applied at the end. This makes battery charge comparatively efficient in a short period of time. Charging by generators is similar to this method.
Judgment of charge completion

1) Specific gravity of electrolyte should be held within the specific range of 1.250 — 1.290 for one hour or more.
2) Voltage while charging should be held within the specified range of 15.0 — 16.8 V for one hour or more.
3) Gas is actively generated in all cells.
4) The amount of charge reaches 1.2 — 1.5 times of the amount of discharge.

NOTE:
The amount of discharge/charge can be calculated by the following formula.
Amount of discharge (Ah) = Remaining capacity (%) calculated by specific gravity × 5 hour rate capacity (Ah)
Amount of charge (Ah) = Charging current value (A) × Time for charging

2. QUICK CHARGING

Charge the battery in a short period of time with a relatively large current by using a quick charger.
Charge the battery with the current value at approximately 1/2 of battery's rating capacity. (See the table below.)

CAUTION:
• Quick charging is accompanied by a large amount of heat generation. Charging should be completed in up to 30 minutes regardless of battery size.
• Quick charging is used to recover the battery until it can start the vehicle. For full charging, use the normal charging method.
• Keep the electrolyte temperature at 55°C (131°F) or less while quick charging. Stop charging when the temperature exceeds this value.

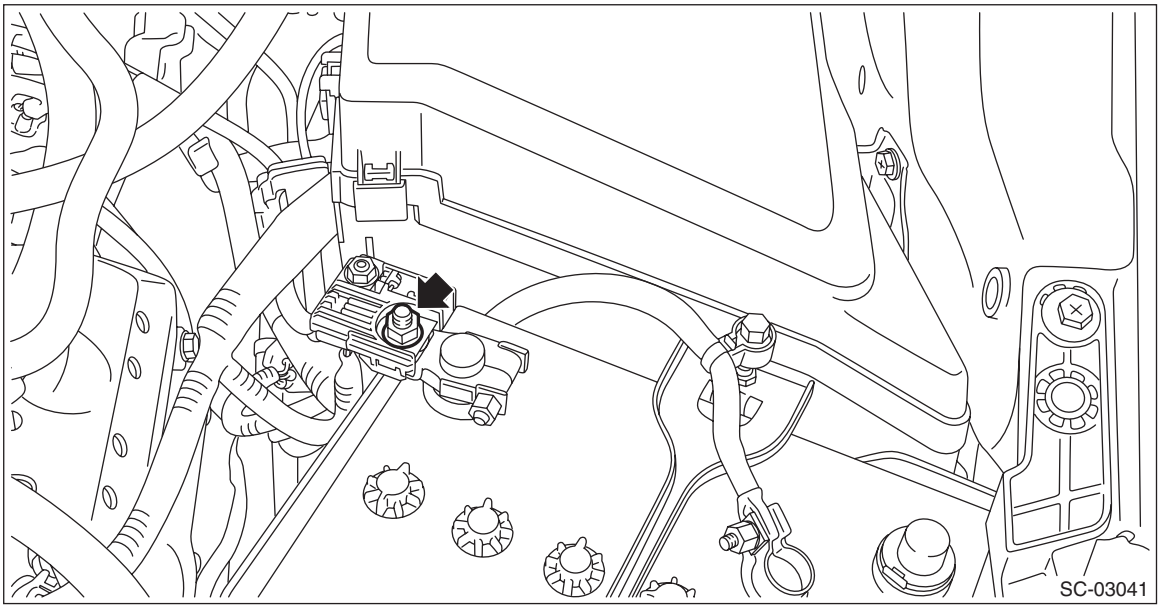
Battery size	Charging current (A)	CCA (A)
55D23L	20.0 — 25.0	390

5. Battery Current & Temperature Sensor

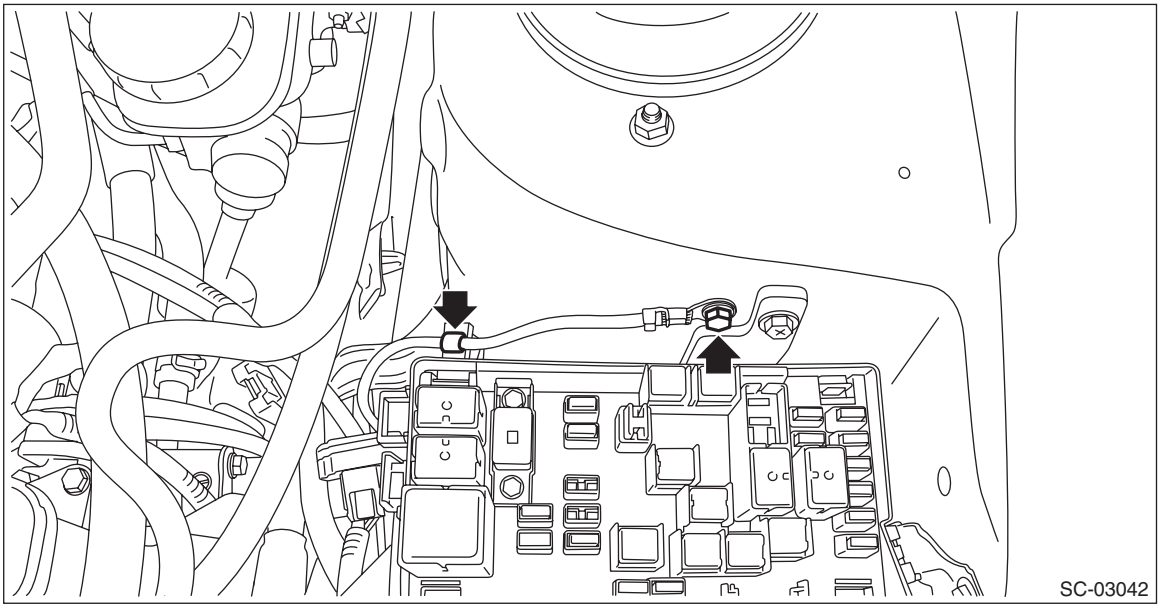
A: REMOVAL

1. BATTERY CURRENT SENSOR

NOTE:
Remove the battery current sensor and battery cable as a unit.
1) Disconnect the battery ground cable and remove the clip from the battery rod.
2) Remove the battery terminal boot.
3) Remove the nuts, and then remove the terminal fuse assembly.

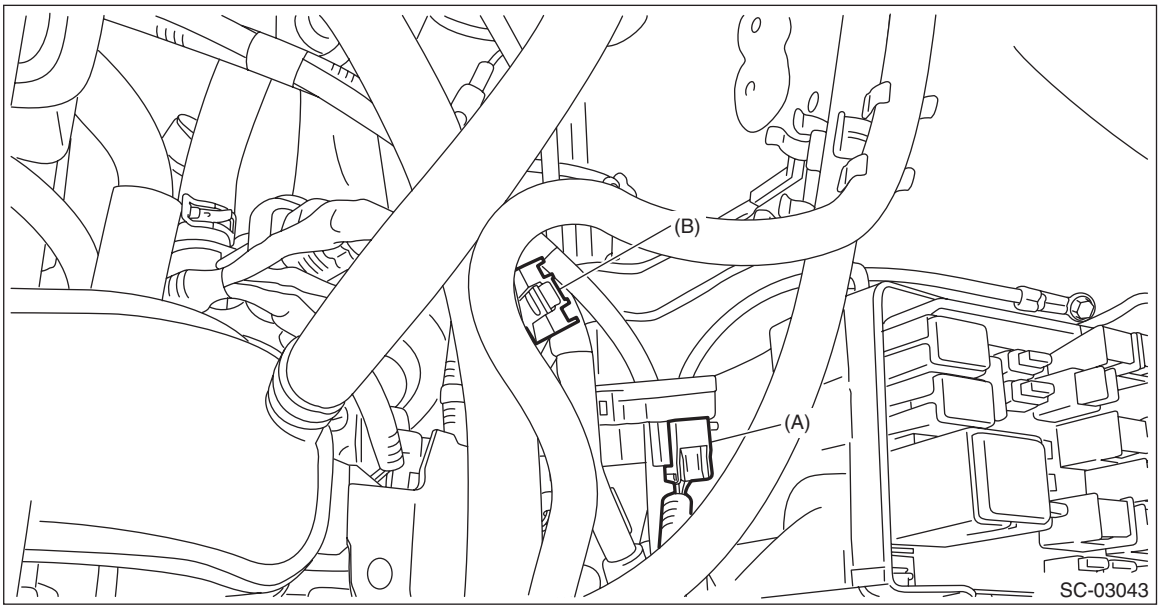


4) Remove the ground terminal from the vehicle and remove the harness clip.

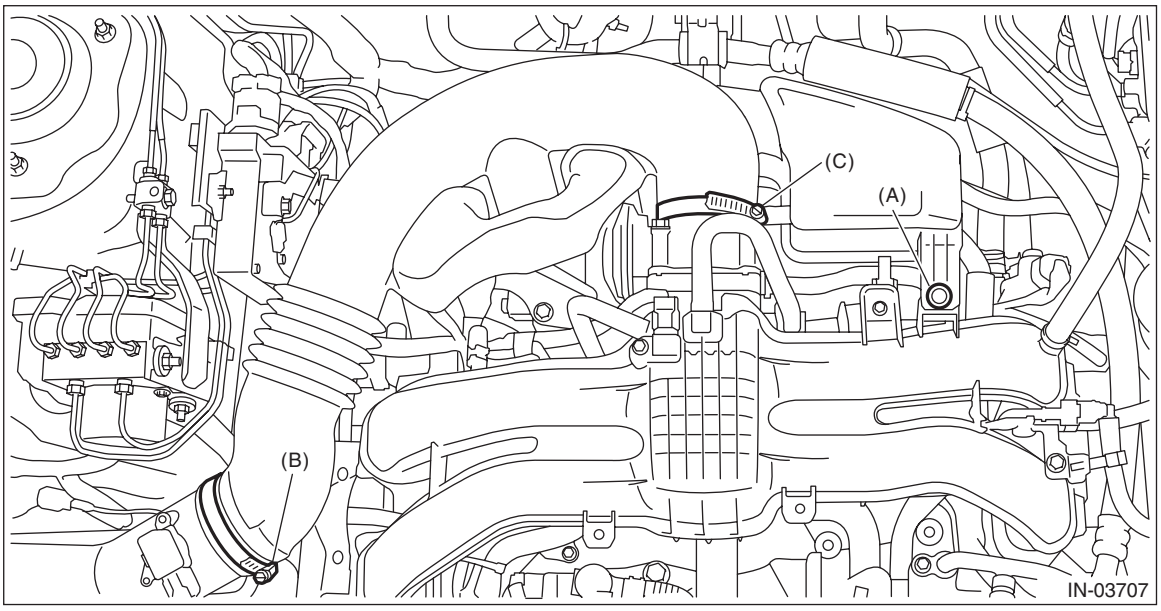


5) Disconnect the harness connector (A) from the battery cable.

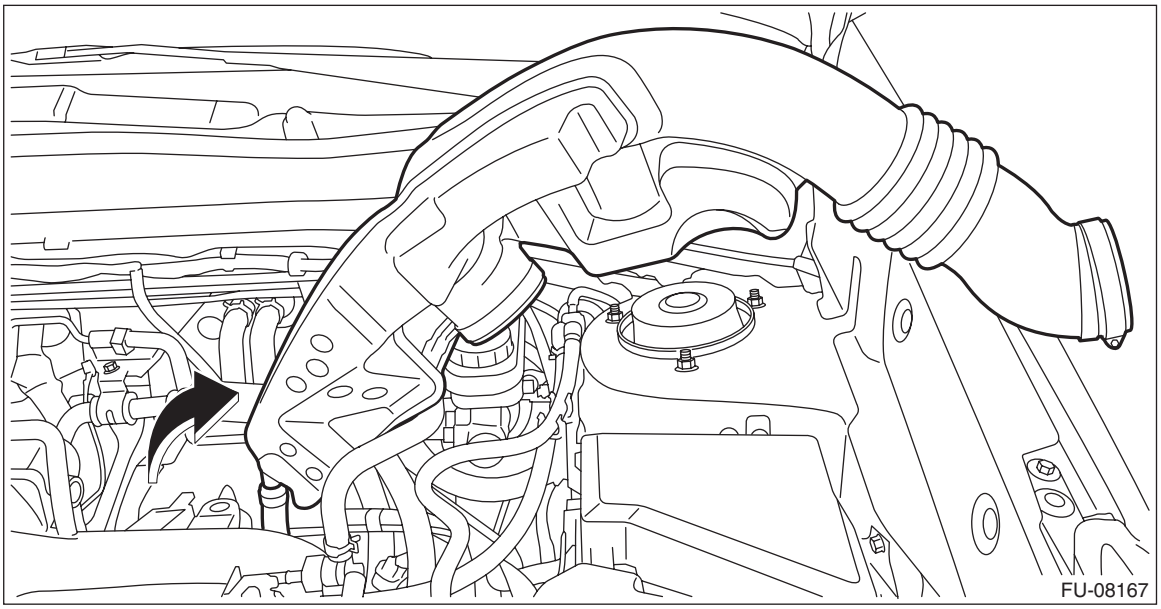
6) Remove the battery cable clip (B) from the battery cable bracket.



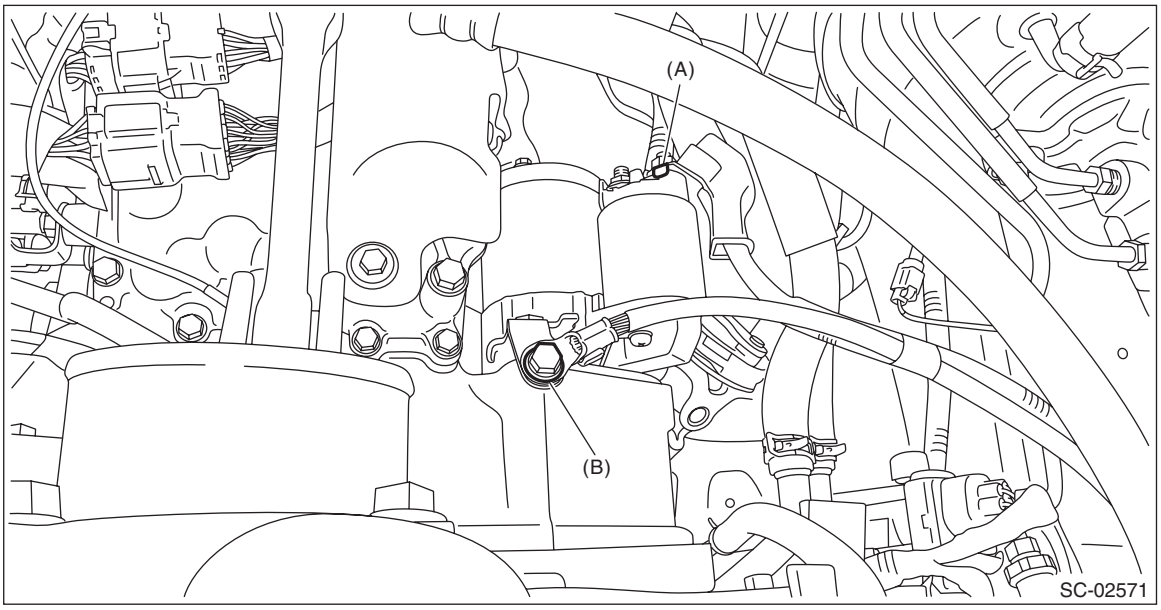
7) Remove the clip (A) from the air intake boot.
8) Loosen the clamp (B) securing the air cleaner case (rear) to the air intake boot.
9) Loosen the clamp (C) which secures the throttle body to the air intake boot.



10) Remove the air intake boot from the throttle body, and move the air intake boot to the left side wheel apron.

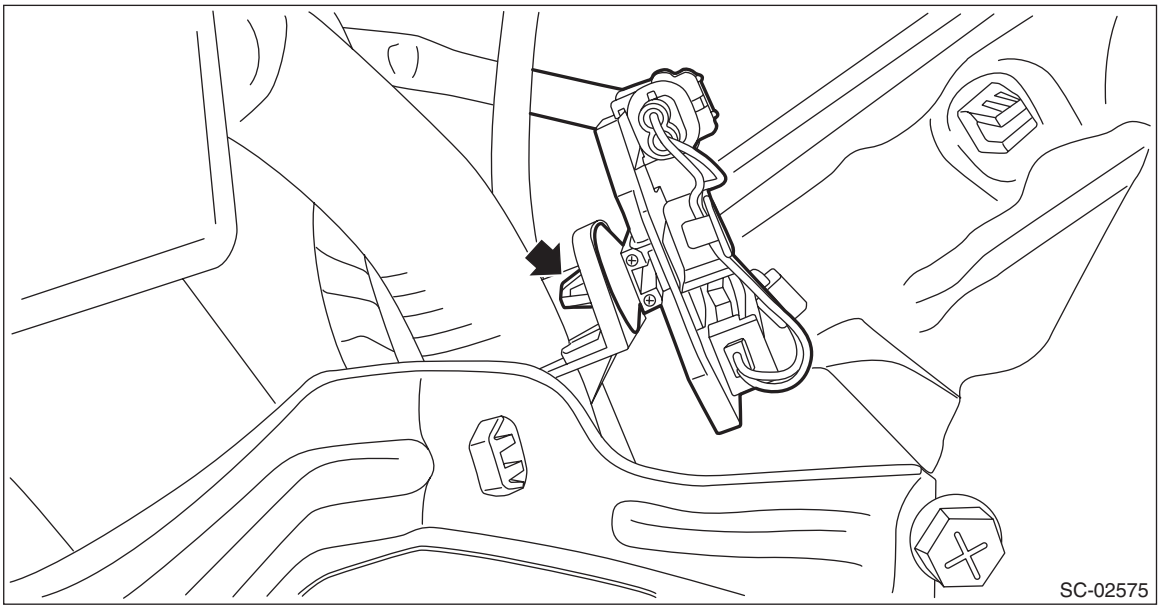


11) Remove the terminal B (A) from the starter.
12) Remove the starter ground cable (B) and remove the battery cable.

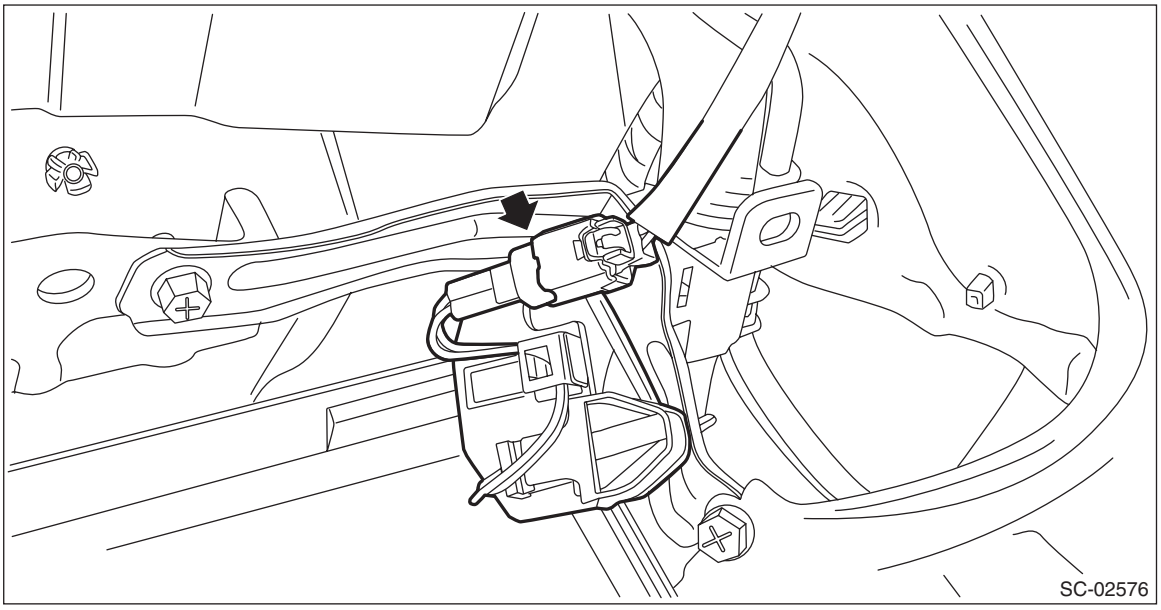


2. BATTERY TEMPERATURE SENSOR

1) Remove the battery. <Ref. to SC(H4DO(w/o HEV))-52, REMOVAL, Battery.>
2) Remove the clip, and remove the battery temperature sensor from the bracket.



3) Disconnect the connector and remove the battery temperature sensor.

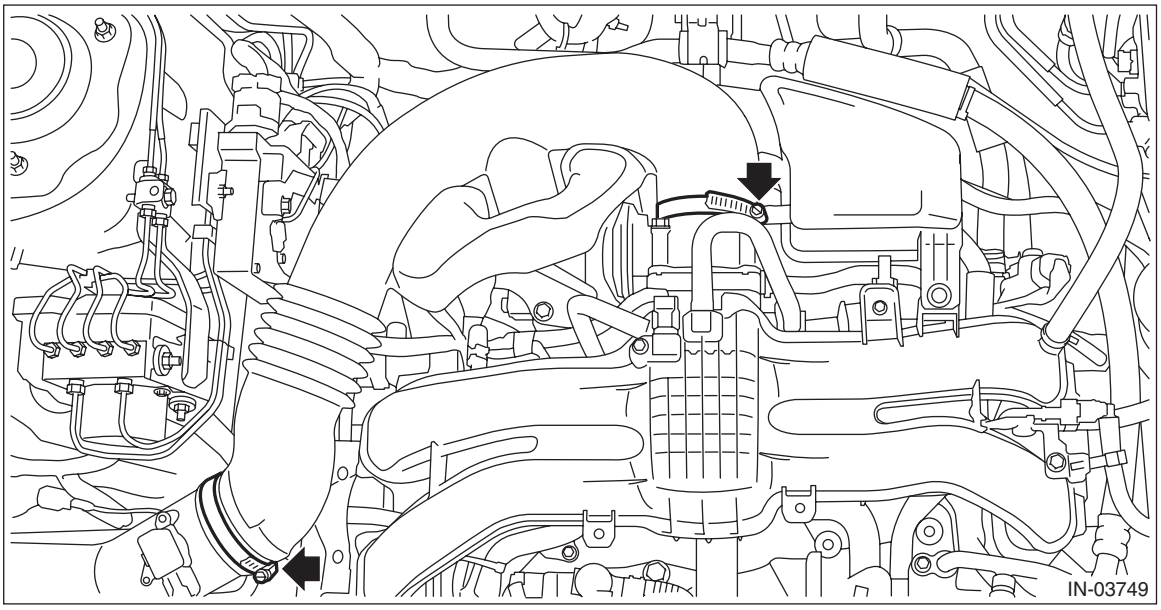


B: INSTALLATION

1. BATTERY CURRENT SENSOR

Install in the reverse order of removal.

Tightening torque:
<Ref. to SC(H4DO(w/o HEV))-6, BATTERY CURRENT & TEMPERATURE SENSOR, COMPONENT, General Description.>
3 N·m (0.3 kgf-m, 2.2 ft-lb)



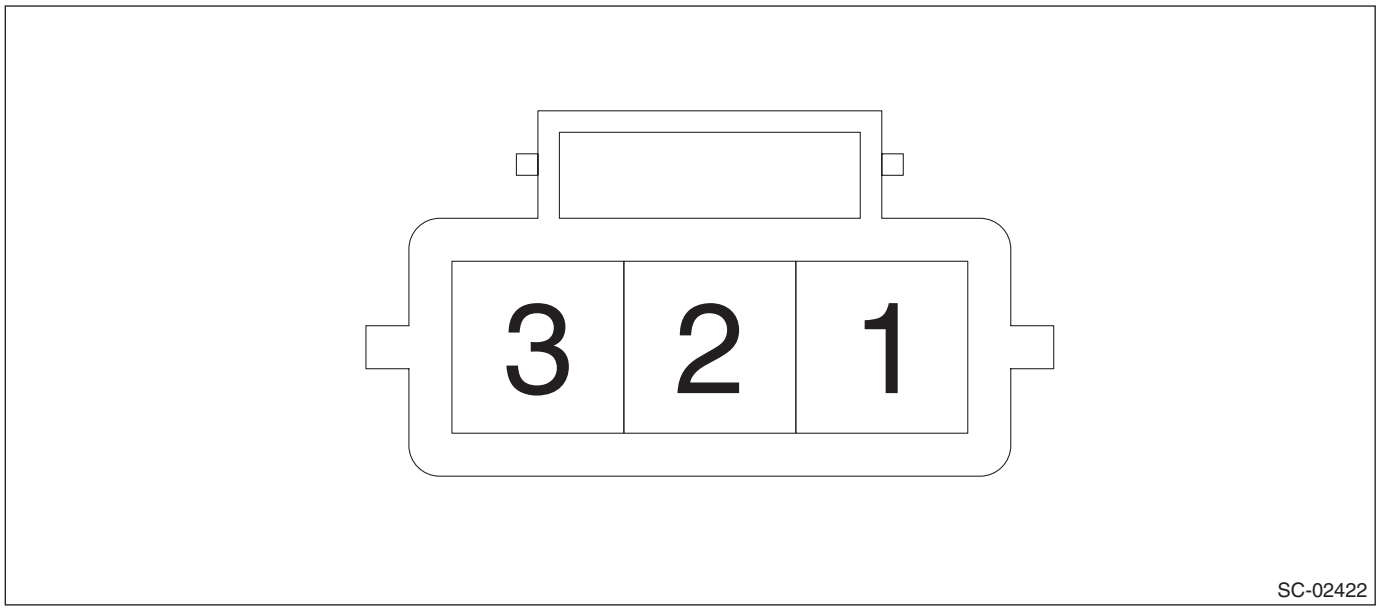
2. BATTERY TEMPERATURE SENSOR

Install in the reverse order of removal.

C: INSPECTION

1. BATTERY CURRENT SENSOR

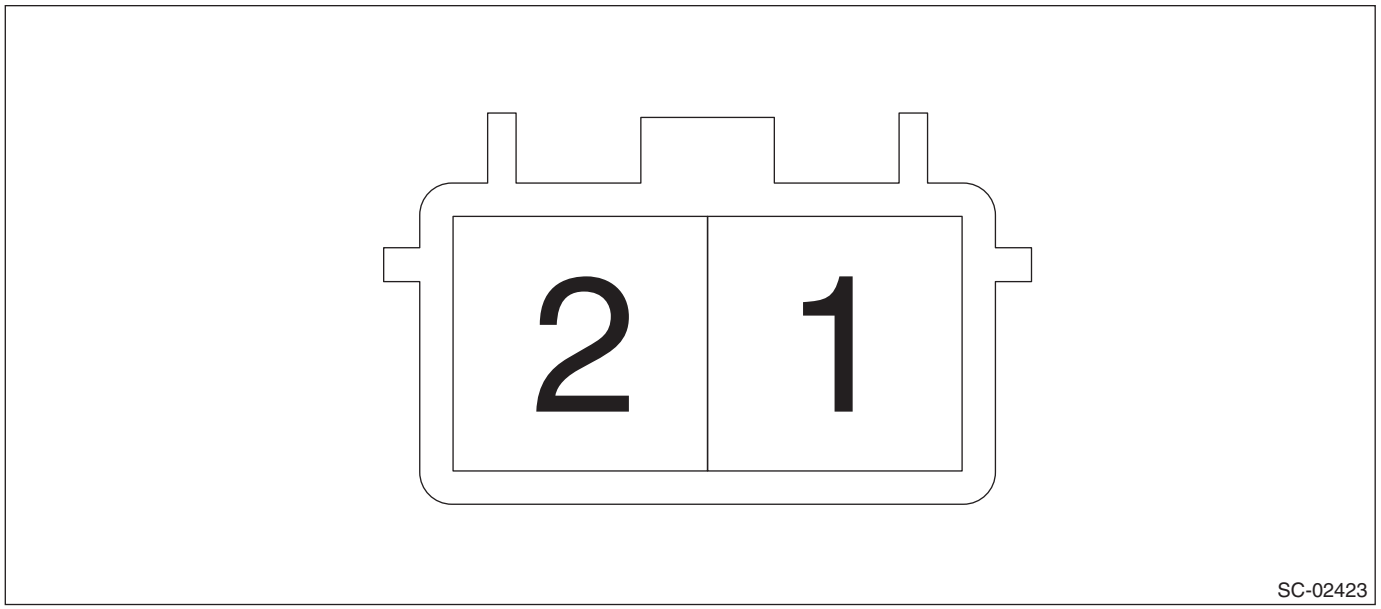
CAUTION:
Pay attention to polarity when checking the resistance in the battery current sensor.
Check the resistance between the battery current sensor terminals.



Terminal No.	Standard
1 (+) and 2 (–)	3 — 10 kΩ
1 (+) and 3 (–)	0.5 kΩ or less
2 (+) and 3 (–)	3 — 10 kΩ

2. BATTERY TEMPERATURE SENSOR

Check the resistance between the battery temperature sensor terminals.



Temperature	Terminal No.	Standard
20 — 30°C (68 — 86°F)	1 and 2	1.5 — 2.8 kΩ

3. OTHER INSPECTIONS

Check that the battery current & temperature sensor has no deformation, cracks or other damages.

ENGINE (DIAGNOSTICS)

EN(H4DO w/o HEV) (diag)

		Page
1.	Basic Diagnostic Procedure	2
2.	Check List for Interview	4
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1. Basic Diagnostic Procedure

A: PROCEDURE

1. ENGINE

	Step	Check	Yes	No
1	**CHECK ENGINE START FAILURE.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to EN(H4DO w/o HEV)(diag)-4, CHECK, Check List for Interview.> 2) Start the engine.	Does the engine start?	Go to step **2**.	Inspection using "Diagnostics for Engine Starting Failure" <Ref. to EN(H4DO w/o HEV)(diag)-75, Diagnostics for Engine Starting Failure.>
2	**CHECK ILLUMINATION OF MALFUNCTION INDICATOR LIGHT.**	Does the malfunction indicator light illuminate?	Go to step **3**.	Inspection using "General Diagnostic Table". <Ref. to EN(H4DO w/o HEV)(diag)-563, INSPECTION, General Diagnostic Table.>
3	**CHECK COMMUNICATION STATUS.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor or general scan tool to the data link connector. 3) Turn the ignition switch to ON, and run the Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to the "Subaru Select Monitor". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Does Subaru Select Monitor or general scan tool communicate with vehicle normally?	Go to step **4**.	Inspection using "Diagnostic Procedure for Subaru Select Monitor Communication". <Ref. to EN(H4DO w/o HEV)(diag)-95, Diagnostic Procedure for Subaru Select Monitor Communication.>
4	**CHECK DTC.** Read DTC using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is DTC displayed on Subaru Select Monitor or general scan tool?	Record DTC and freeze frame data, then repair the trouble cause. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).> After repair, go to the next step. Go to step **5**.	Repair the related parts. NOTE: If DTC is not shown on display although the malfunction indicator light illuminates, perform the diagnosis of malfunction indicator light circuit or combination meter. <Ref. to EN(H4DO w/o HEV)(diag)-69, Malfunction Indicator Light.>

	Step	Check	Yes	No
5	**PERFORM DIAGNOSIS.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Perform the Inspection Mode or Drive Cycle. <Ref. to EN(H4DO w/o HEV)(diag)-50, Inspection Mode.> <Ref. to EN(H4DO w/o HEV)(diag)-55, Drive Cycle.>	Is DTC displayed on Subaru Select Monitor or general scan tool?	Inspect using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-106, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

2. Check List for Interview

A: CHECK

1. CHECK LIST NO. 1

Check the following item when problem has occurred.

NOTE:
Use copies of this page for interviewing customers.

Customer's name		Engine No.	
Date of purchase		Fuel type	
Date of repair		Odometer reading	km
V.I.N.			miles
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Various/Others:		
Ambient air temperature	°C (°F)		
	❑ Hot ❑ Warm ❑ Cool ❑ Cold		
Place	❑ Highway ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Downhill ❑ Rough road ❑ Others:		
Engine temperature	❑ Cold ❑ Warming-up ❑ After warming-up ❑ Any temperature ❑ Others:		
Engine speed	rpm		
Vehicle speed	km/h (MPH)		
Driving conditions	❑ Not affected ❑ At starting ❑ While idling ❑ At racing ❑ While accelerating ❑ While cruising ❑ While decelerating ❑ While turning (RH/LH)		
Headlight	❑ ON/❑ OFF	Rear defogger	❑ ON/❑ OFF
Blower	❑ ON/❑ OFF	Audio	❑ ON/❑ OFF
A/C compressor	❑ ON/❑ OFF	Rear entertainment system	❑ ON/❑ OFF
Radiator fan	❑ ON/❑ OFF	Car phone	❑ ON/❑ OFF
Front wiper	❑ ON/❑ OFF	Wireless device	❑ ON/❑ OFF
Rear wiper	❑ ON/❑ OFF		

2. CHECK LIST NO. 2

Check the following item about the vehicle's state when the malfunction indicator light turns on.

NOTE:
Use copies of this page for interviewing customers.

a) Other warning lights or indicators illuminate: ❑ Yes / ❑ No
❑ Fuel level warning light ❑ Charge warning light ❑ Engine coolant temperature warning light ❑ Oil pressure warning light ❑ ATF temperature warning light or Sport indicator light ❑ Driver's control center differential indicator light ❑ ABS warning light ❑ VDC warning light ❑ Cruise indicator light ❑ SI-CRUISE warning light ❑ Immobilizer indicator light ❑ STEERING warning light ❑ Electronic parking brake warning light ❑ Glow indicator light ❑ Sedimentor warning light ❑ Others:
b) Fuel level
• Lack of fuel: ❑ Yes / ❑ No • Indicator position of fuel gauge: • Experienced running out of fuel: ❑ Yes / ❑ No
c) Intentional connecting or disconnecting of harness connectors or spark plug cords: ❑ Yes / ❑ No
• What:
d) Intentional connecting or disconnecting of hoses: ❑ Yes / ❑ No
• What:
e) Installing of other parts except genuine parts: ❑ Yes / ❑ No
• What: • Where:
f) Occurrence of noise: ❑ Yes / ❑ No
• From where: • What kind:
g) Occurrence of smell: ❑ Yes / ❑ No
• From where: • What kind:
h) Intrusion of water into engine compartment or passenger compartment: ❑ Yes / ❑ No
i) Troubles occurred
❑ Engine does not start. ❑ Engine stalls during idling. ❑ Engine stalls while driving. ❑ Engine speed decreases. ❑ Engine speed does not decrease. ❑ Rough idling ❑ Poor acceleration ❑ Back fire ❑ After fire ❑ Does not shift. ❑ Excessive shift shock

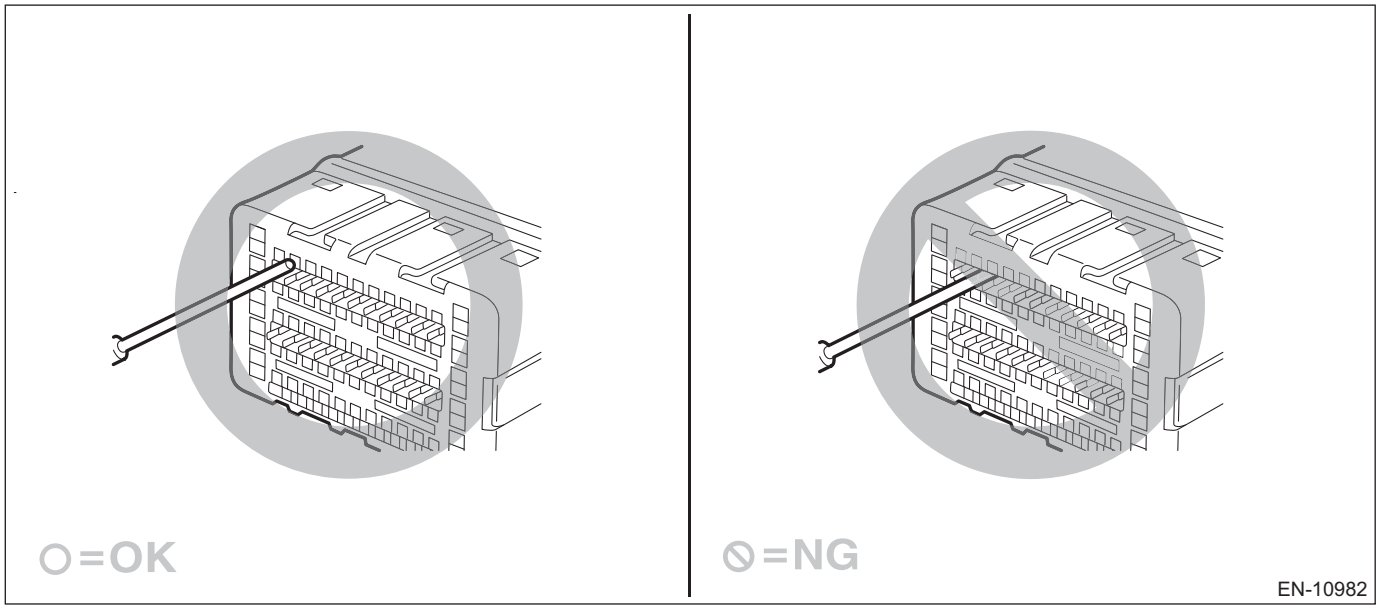
3. General Description

A: CAUTION

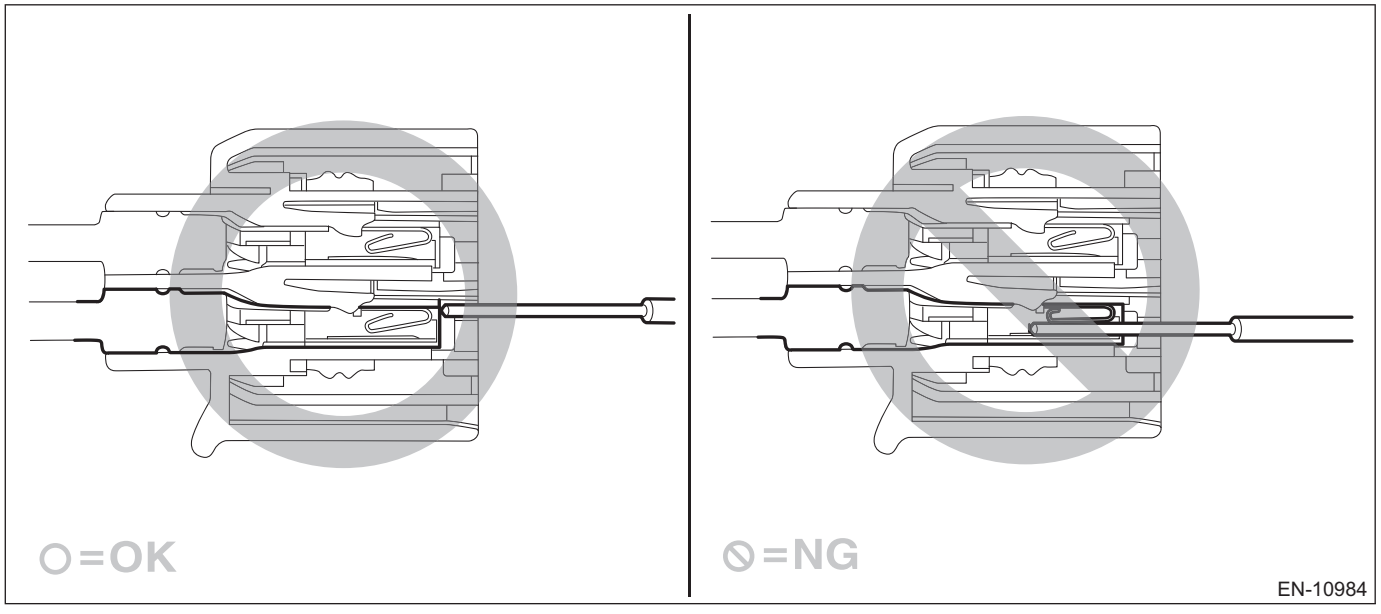
1) Airbag system wiring harness is routed near the ECM, main relay and fuel pump relay.

CAUTION:
- **Do not use electrical test equipment on the airbag system circuits.**
- **Be careful not to damage the airbag system wiring harness when servicing the ECM, TCM, main relay and fuel pump relay.**

2) Never connect the battery in reverse polarity. Doing so will damage the ECM instantly, and other parts will also be damaged.
3) Do not disconnect the battery cables while the engine is running. A large counter electromotive force will be generated in the generator, and this voltage may damage electronic parts such as ECM etc.
4) When disconnecting the connectors of the electrical components, always be sure to turn the ignition switch to OFF. Perform the Clear Memory Mode after connecting the connectors. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>
5) When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal.

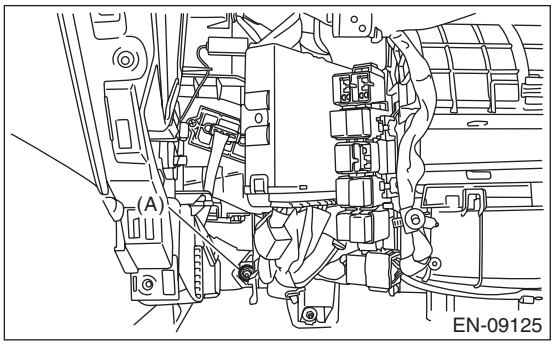


Never insert the tapered pin into the terminal because it deforms inside which may lead to a malfunction.



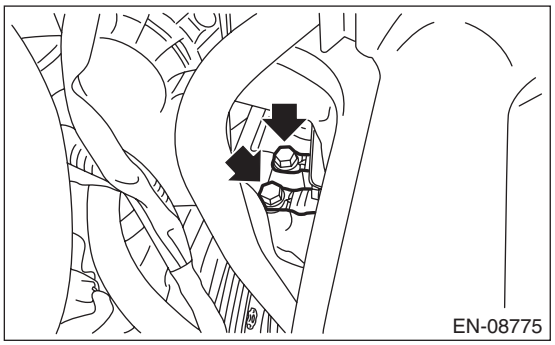
CAUTION:
When replacing the ECM, be careful not to use the ECM of wrong specification to avoid any damage on the fuel injection system.

NOTE:
When replacing the ECM of the models with immobilizer, immobilizer system must be registered. For detailed operation procedure, refer to the “REGISTRATION MANUAL FOR IMMOBILIZER”.
6) Take care not to allow water to get into the connectors when servicing or washing the vehicle in rainy weather. Avoid exposure to water even if the connectors are waterproof.
7) Use ECM mounting stud bolts for the grounding point when measuring voltage and resistance inside the passenger compartment.



(A) Stud bolt

8) Use the engine ground terminal or engine assembly for the grounding point when measuring the voltage and resistance in engine compartment.



9) All parts related to the engine control system are precision parts. Do not drop or otherwise apply impact. Do not reuse the parts that are dropped accidentally.
10) Observe the following cautions when installing a radio in vehicle.

CAUTION:
• The antenna must be kept as far apart as possible from the ECM. <Ref. to EN(H4DO w/o HEV)(diag)-10, CONTROL MODULE, LOCATION, Electrical Component Location.>
• The antenna feeder must be placed as far apart as possible from the ECM and engine control system harness.
• Carefully adjust the antenna for correct matching.
• When mounting a large power type radio, pay special attention to the three items mentioned above.
• Incorrect installation of the radio may affect the operation of ECM.
11) When disconnecting the fuel hose, release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
12) Warning lights may illuminate when performing driving test with jacked-up or lifted-up condition, but this is not a system malfunction. The reason for this is the rotating speed difference between the front and rear wheels. When engine control system diagnosis is finished, perform the VDC memory clearance procedure of self-diagnosis function. <Ref. to VDC(diag)-26, Clear Memory Mode.>

B: INSPECTION

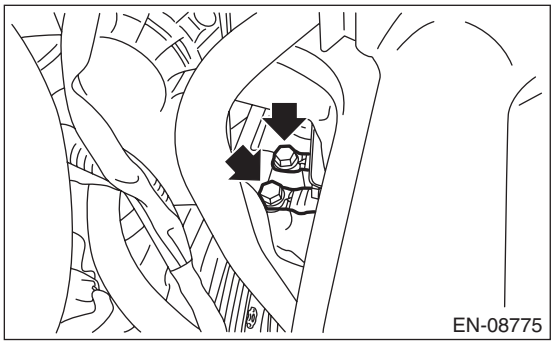
Before performing diagnostics, check the following item which might affect engine problems.

1. BATTERY

1) Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>
2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

2. ENGINE GROUND

Make sure that the engine ground terminal has no contamination, corrosion or looseness and is properly connected to the engine.

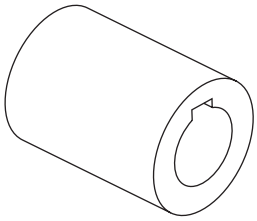


C: NOTE

• The on-board diagnostic (OBD) system detects and indicates a fault in various inputs and outputs of the complex electronic control. Malfunction indicator light in the combination meter indicates occurrence of a fault or trouble.
• Further, against any failure of sensors that would cause the vehicle to stop running, the fail-safe function is provided to ensure the minimal drivability.
• The OBD system incorporated with the vehicles within this type of engine complies with OBD-II regulations. The OBD system monitors the components and the system malfunction listed in “Engine Section” which affects on emissions.
• When the system decides that a malfunction occurs, malfunction indicator light illuminates. At the same time of the malfunction indicator light illumination or blinking, a DTC and a freeze frame engine conditions are stored into on-board computer.
• The OBD system stores freeze frame engine condition data (engine load, engine coolant temperature, fuel trim, engine speed and vehicle speed, etc.) into on-board computer when it detects a malfunction.
• Freeze frame engine condition data are stored until the DTCs are cleared. However when such malfunctions as fuel trim fault and misfire are detected with the freeze frame engine condition data stored, they are rewritten into those related to the fuel trim fault and misfire.
• When the malfunction does not occur again for three consecutive driving cycles*, malfunction indicator light is turned off, but DTC remains at on-board computer.
*: One driving cycle means the period between the ignition switch ON and the ignition switch OFF after driving.
• When performing diagnosis, connect the Subaru Select Monitor or general scan tool to the vehicle.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.
 ST18252AA000	18252AA000	CRANKSHAFT SOCKET	Used for rotating crankshaft.

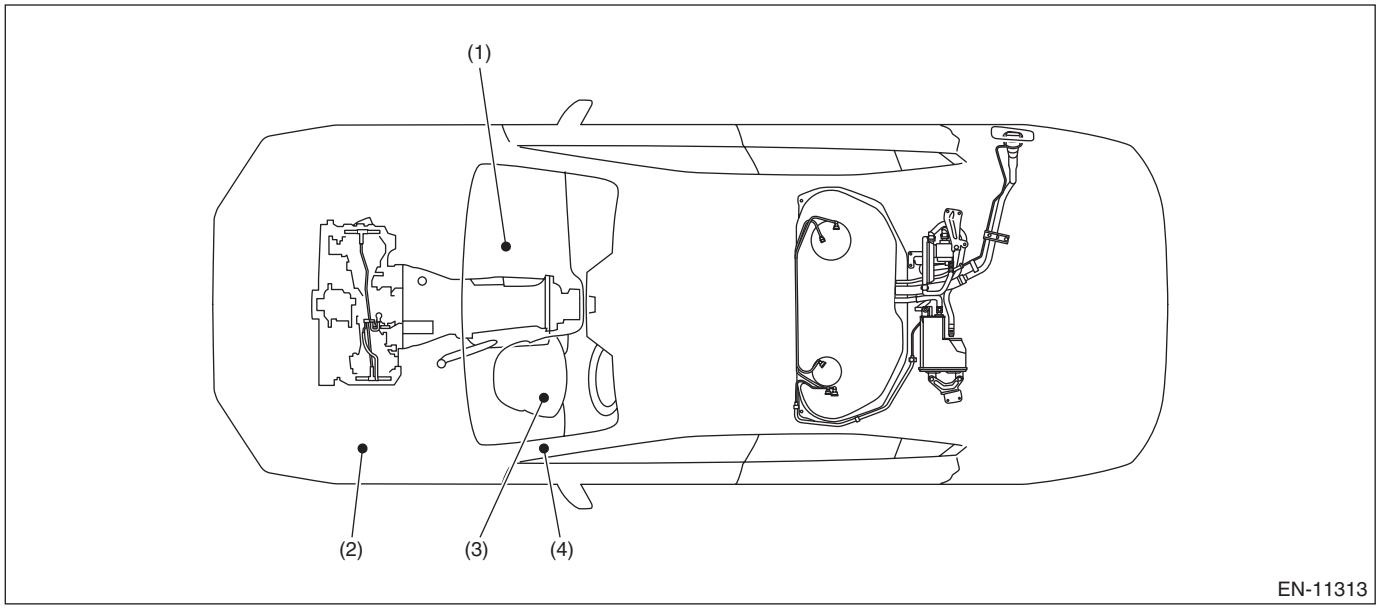
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.
DST-i	Used together with Subaru Select Monitor 4.

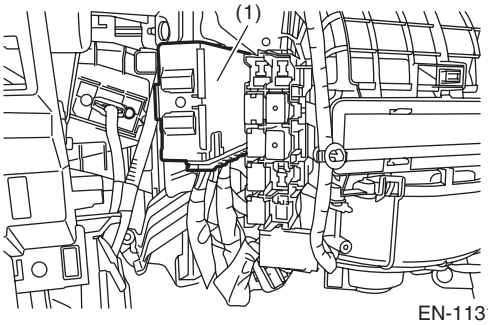
4. Electrical Component Location

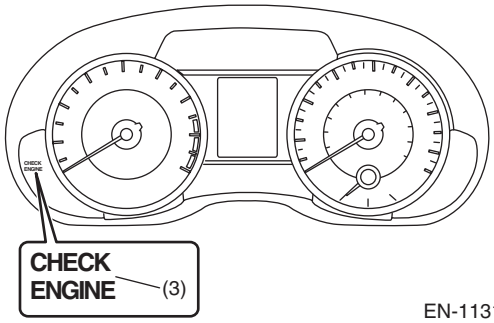
A: LOCATION

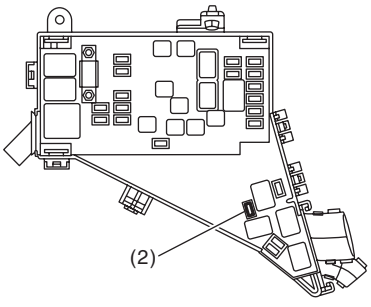
1. CONTROL MODULE

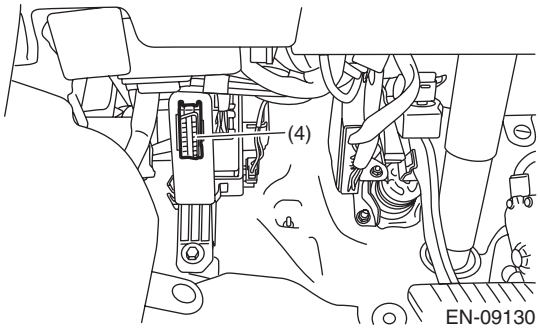


(1) Engine control module (ECM)
(2) Delivery (test) mode fuse
(3) Malfunction indicator light
(4) Data link connector

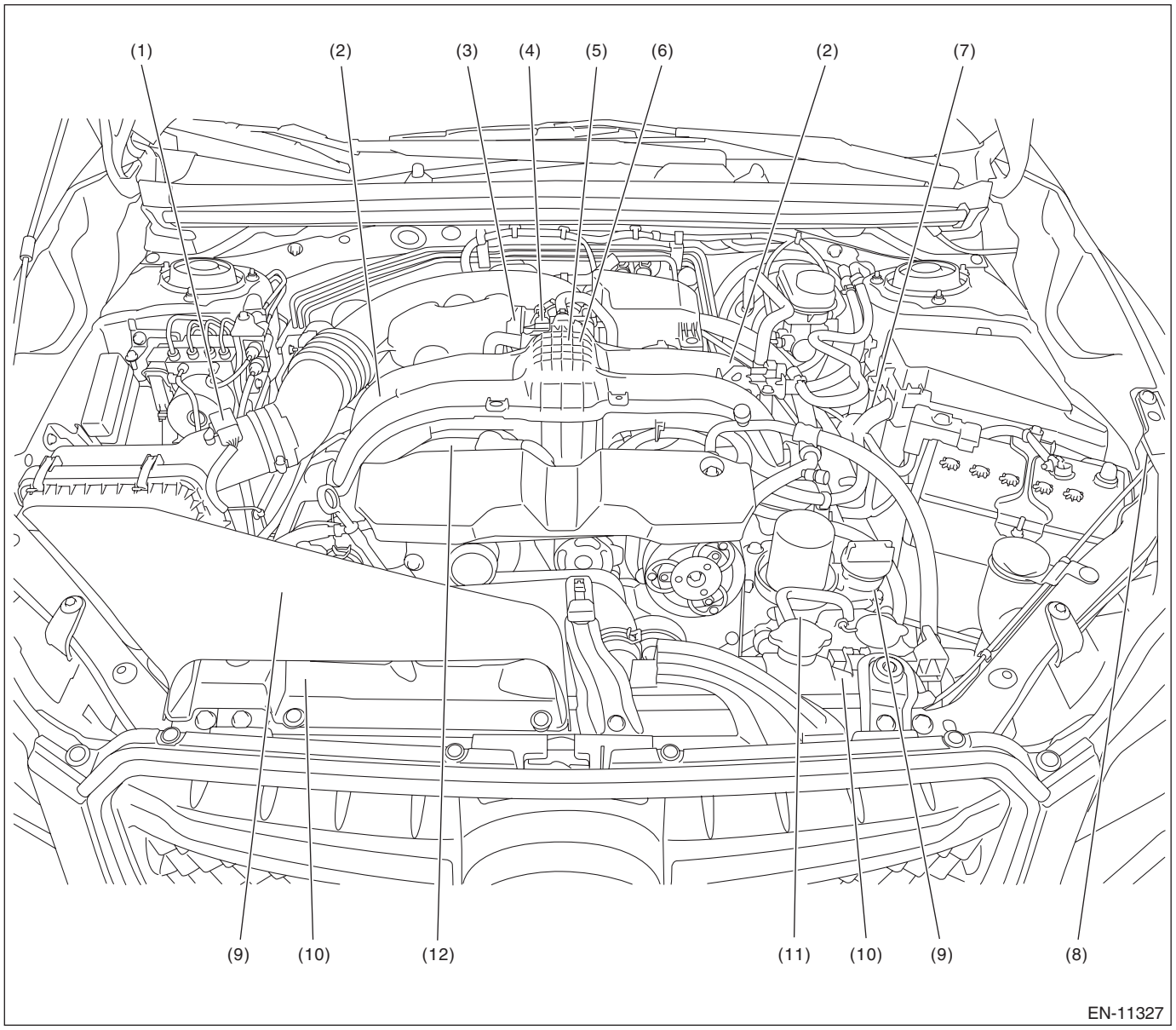




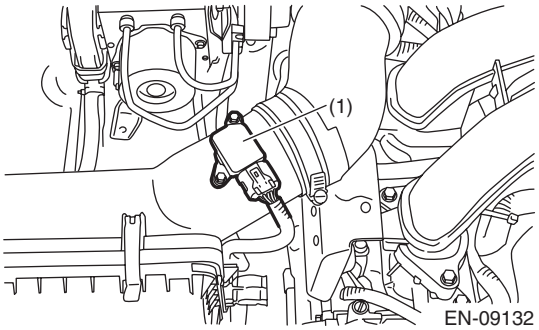


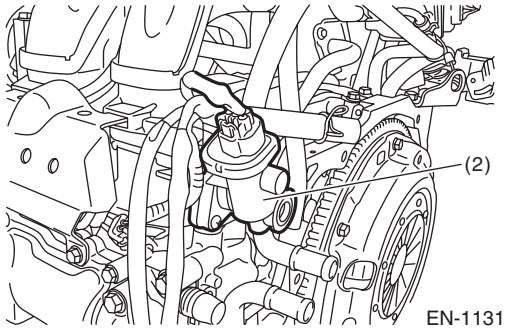


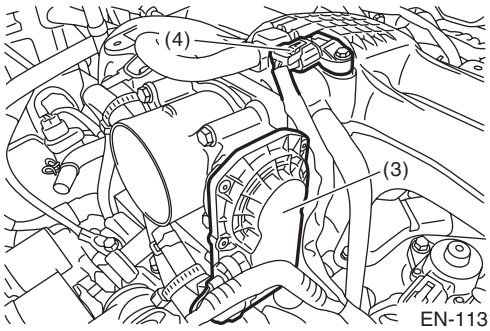
2. SENSOR

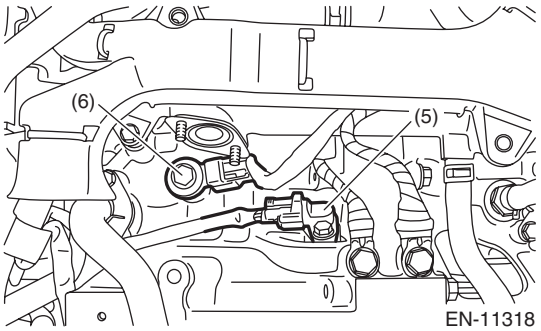


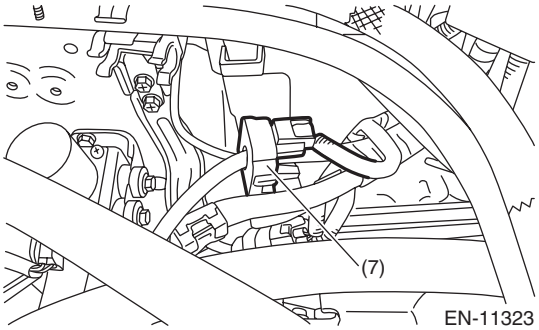
(1)	Mass air flow and intake air temperature sensor	(5)	Crankshaft position sensor	(9)	Intake camshaft position sensor
(2)	Tumble generator valve actuators (with built-in opening angle switch)	(6)	Knock sensor	(10)	Exhaust camshaft position sensor
(3)	Electronic throttle control	(7)	Battery current sensor	(11)	Engine oil temperature sensor
(4)	Manifold absolute pressure sensor	(8)	Battery temperature sensor	(12)	Engine coolant temperature sensor

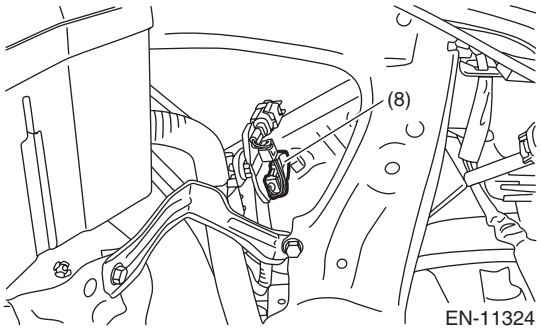

(1)
EN-09132

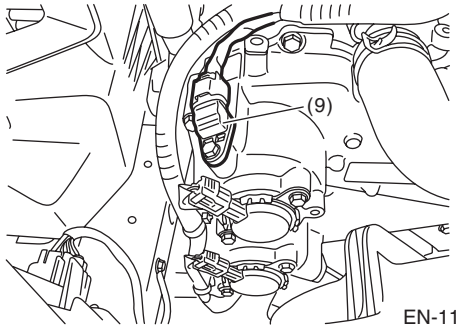

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EN-11319

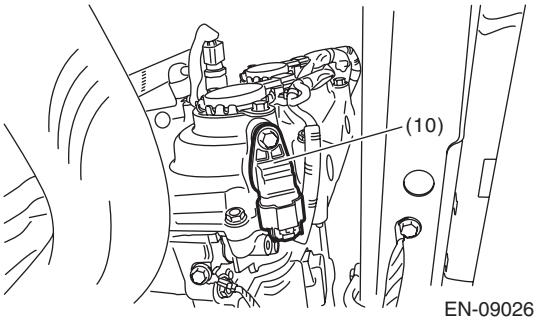

(4)
(3)
EN-11317

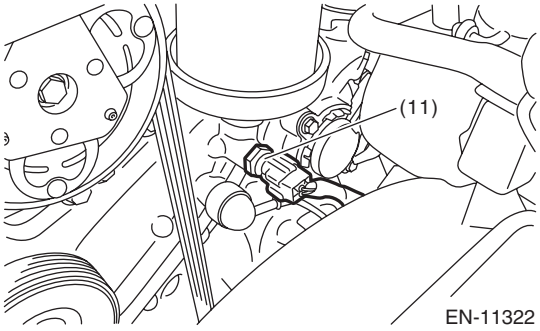

(6)
(5)
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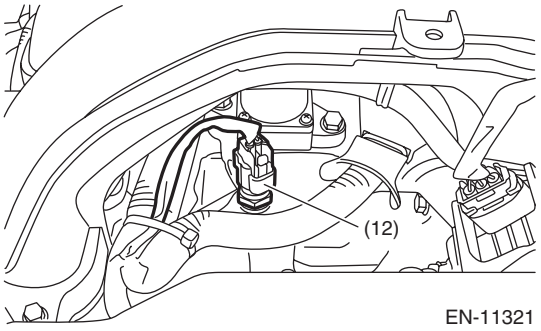

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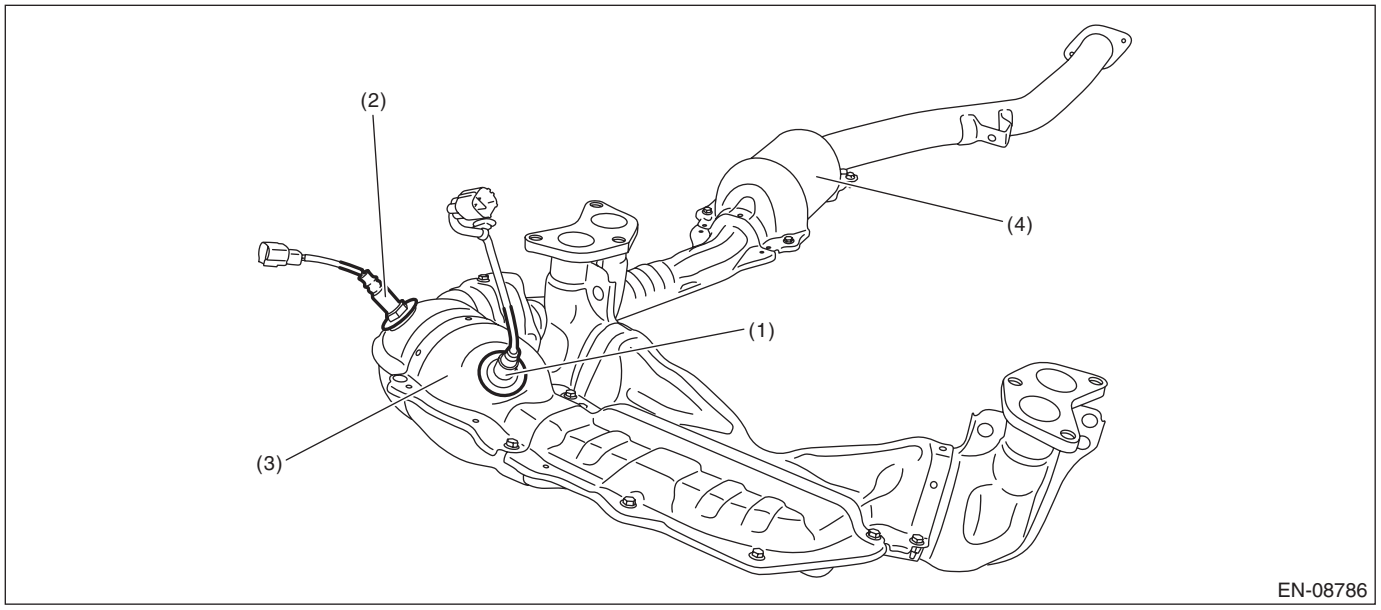

(8)
EN-11324


(9)
EN-11320

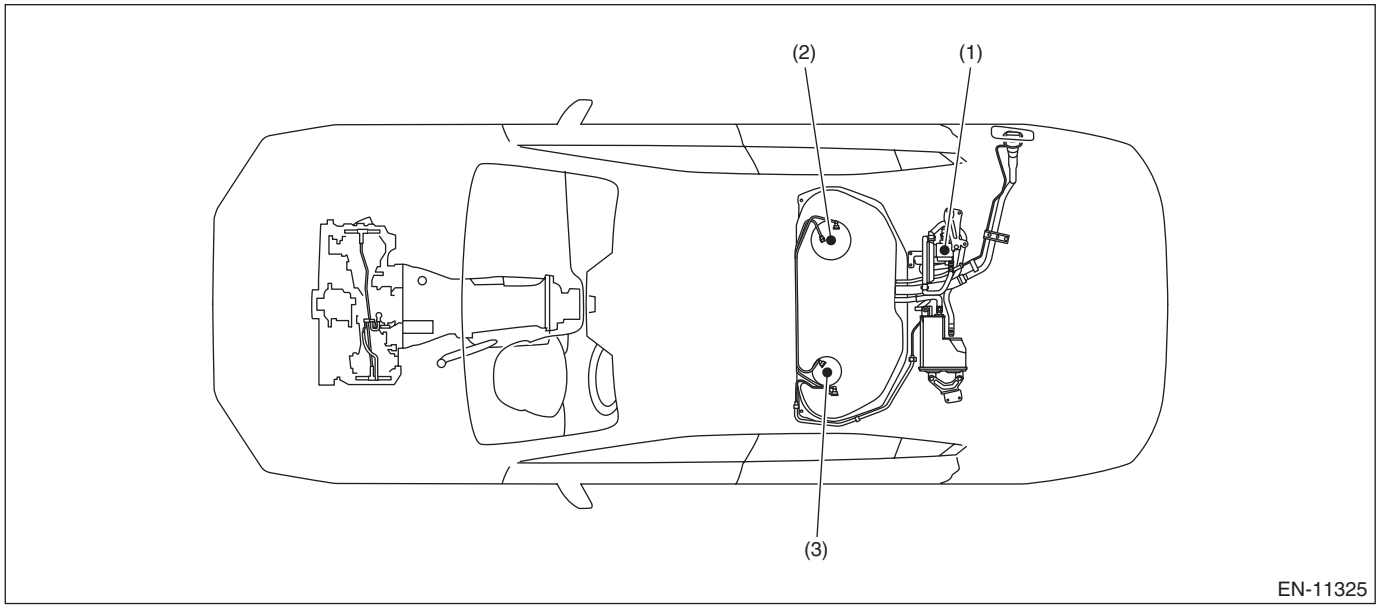

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EN-09026


(11)
EN-11322

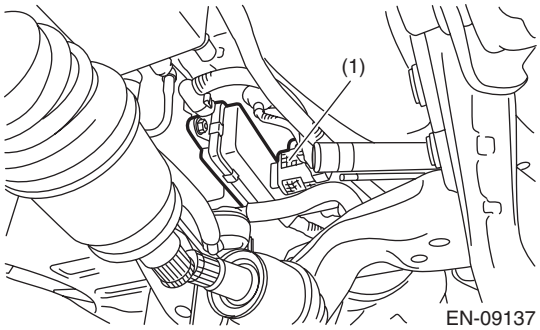

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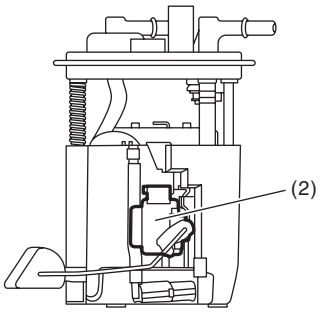
(1) Front oxygen (A/F) sensor
(2) Rear oxygen sensor
(3) Front catalytic converter
(4) Rear catalytic converter



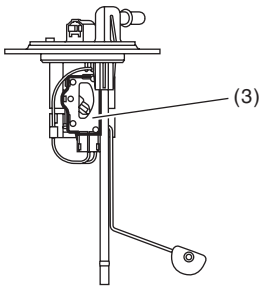
(1) Leak check valve ASSY (with built-in pressure sensor)
(2) Fuel level sensor
(3) Fuel sub level sensor



EN-09137

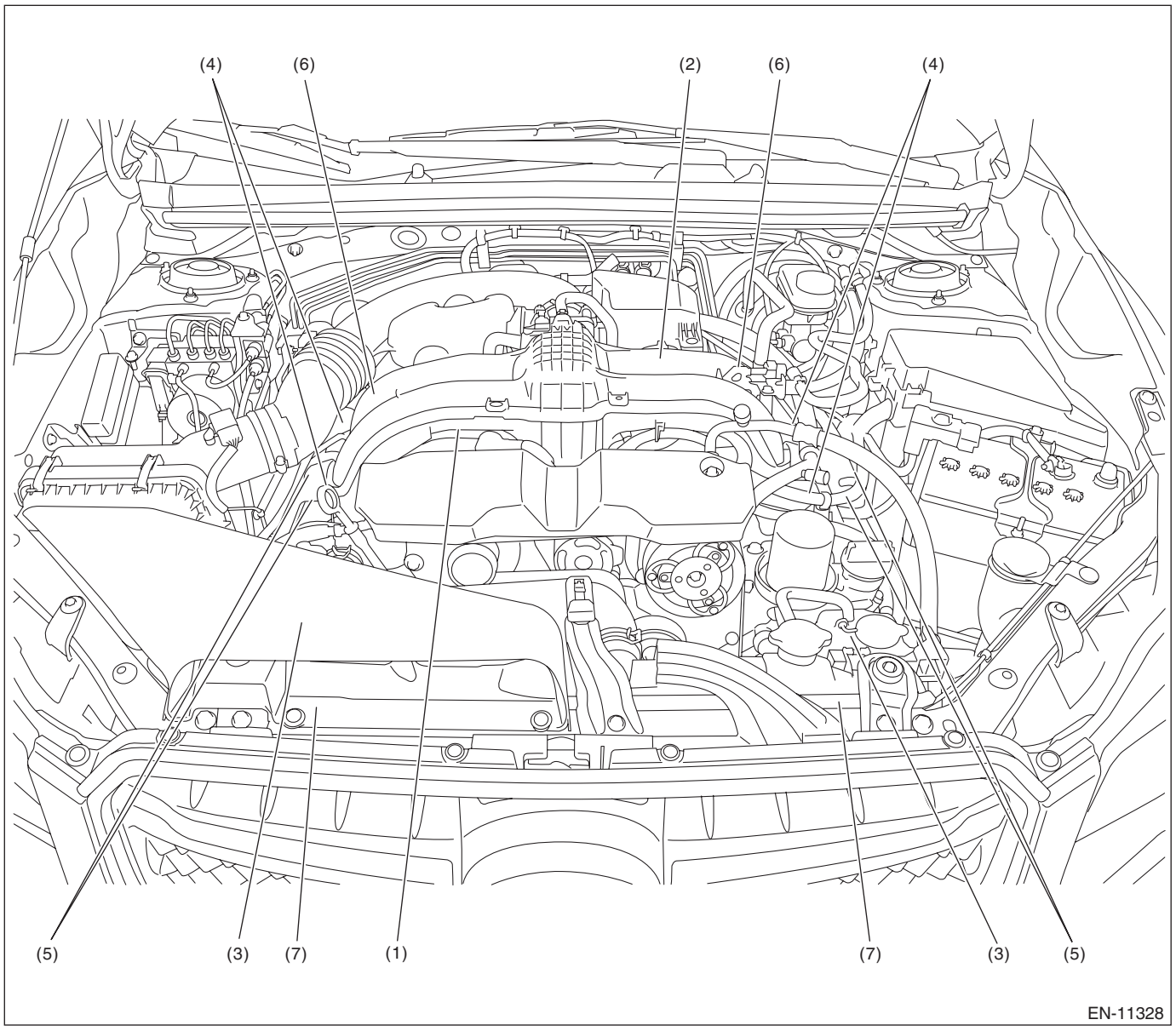


EN-11326

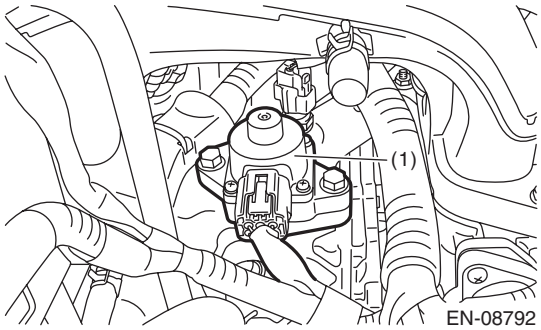


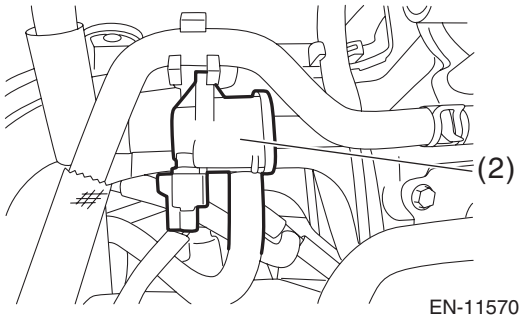
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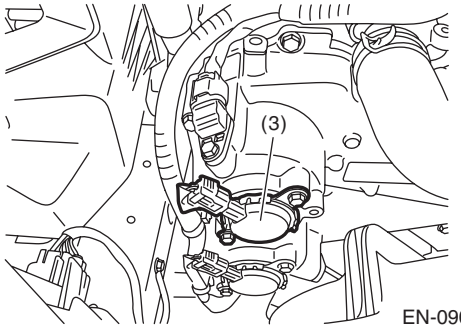
3. SOLENOID VALVE, ACTUATOR, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS

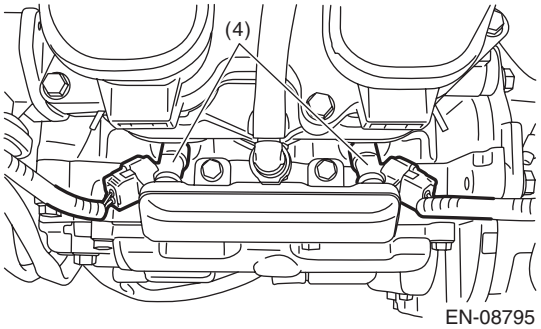


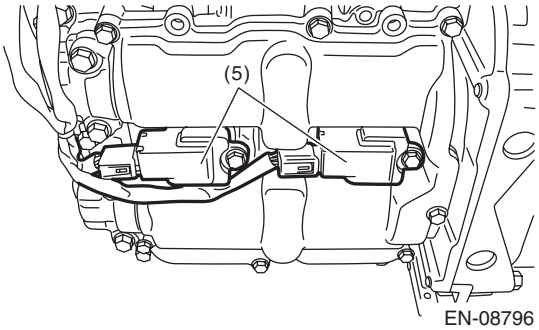
(1) EGR control valve
(2) Purge control solenoid valve
(3) Intake oil control solenoid
(4) Fuel injector
(5) Ignition coil
(6) Tumble generator valve actuator
(7) Exhaust oil control solenoid

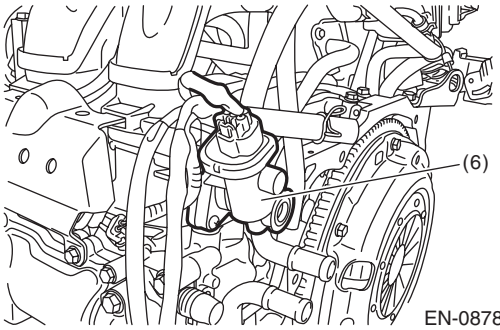

(1)
EN-08792

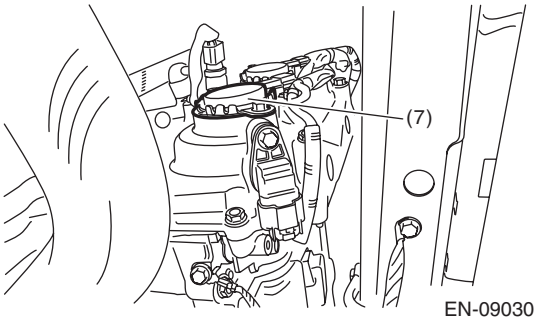

(2)
EN-11570

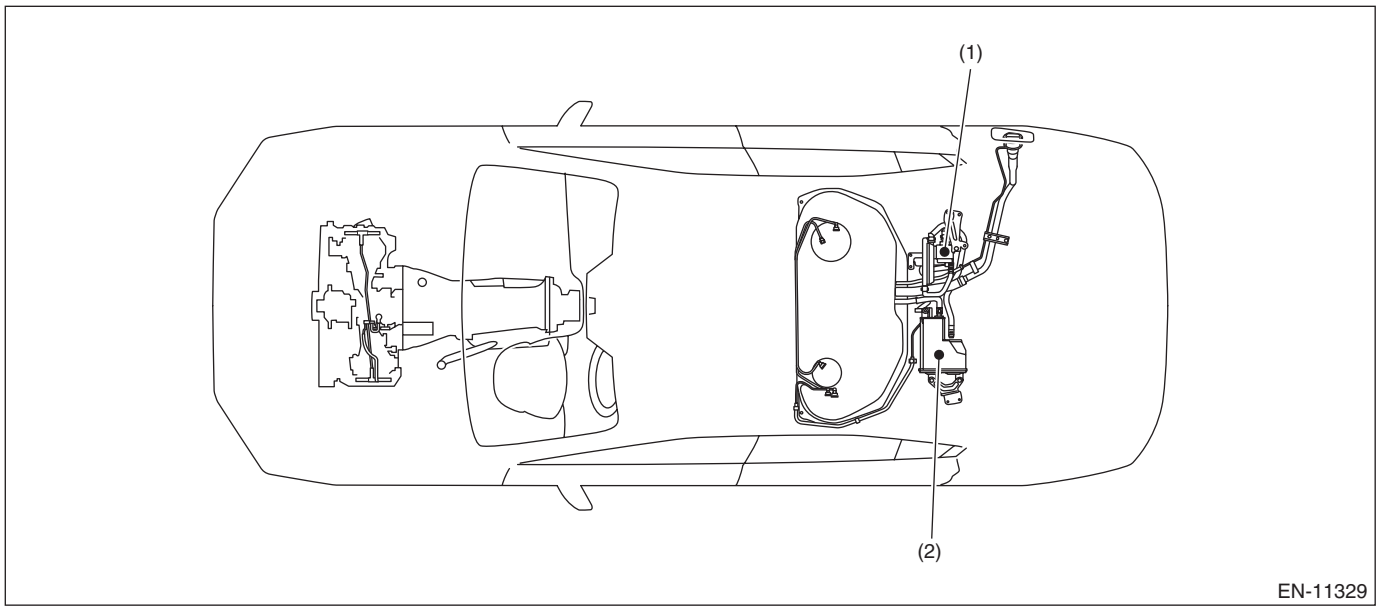

(3)
EN-09029


(4)
EN-08795

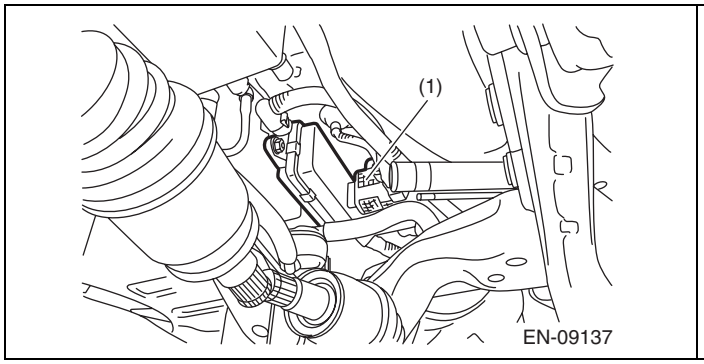

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EN-08796

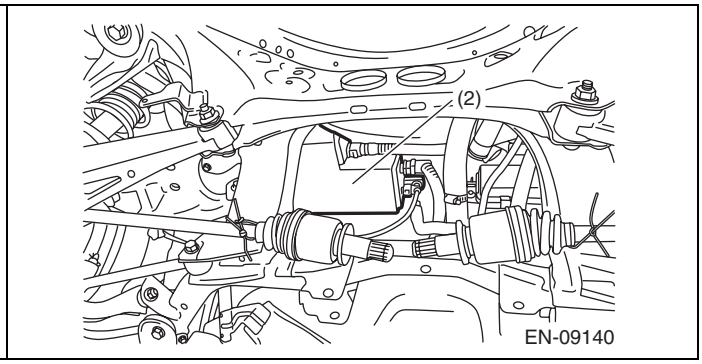

(6)
EN-08782


(7)
EN-09030

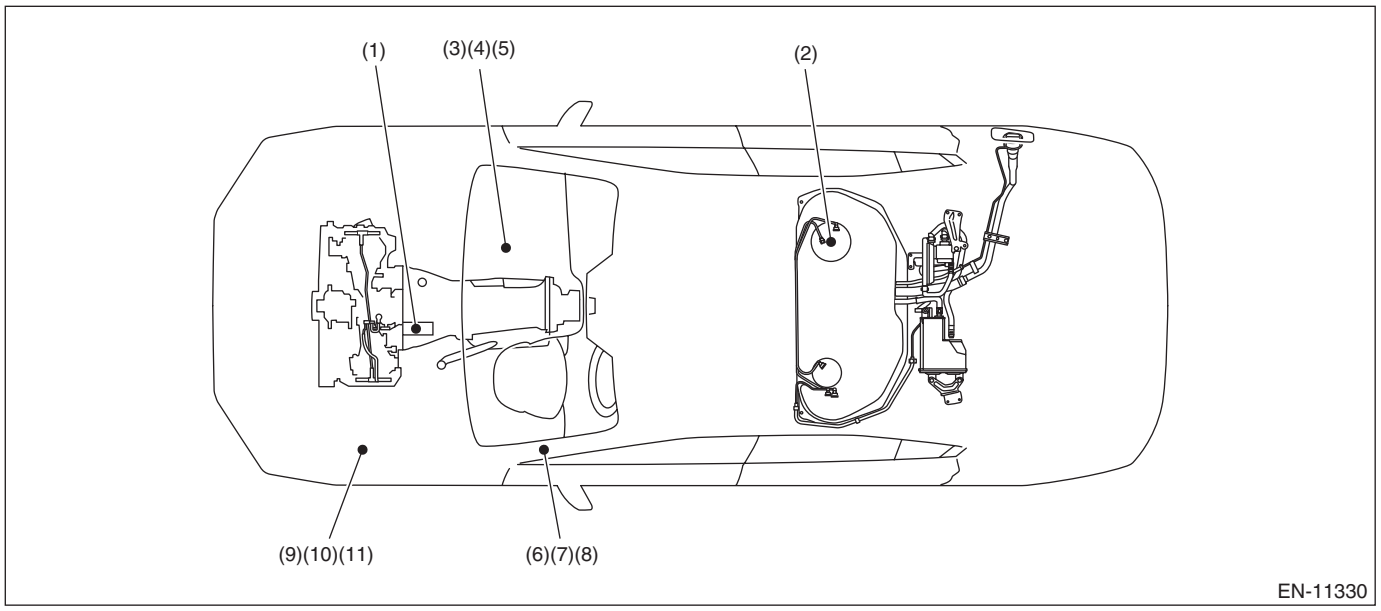


(1) Leak check valve ASSY (2) Canister

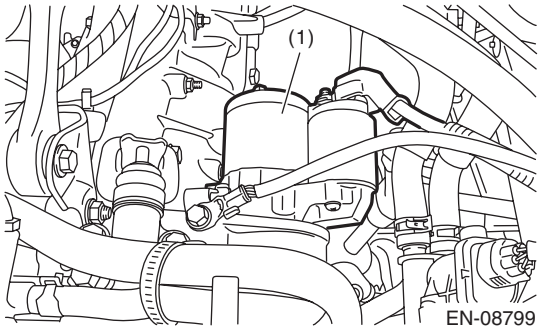


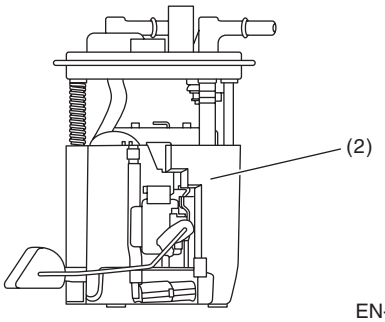


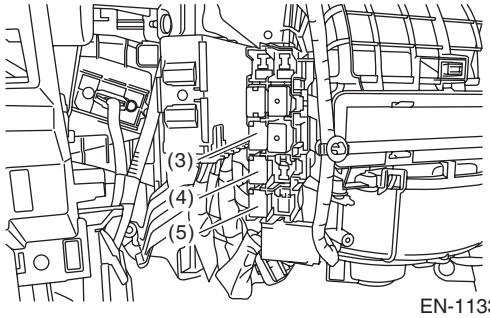
Electrical Component Location

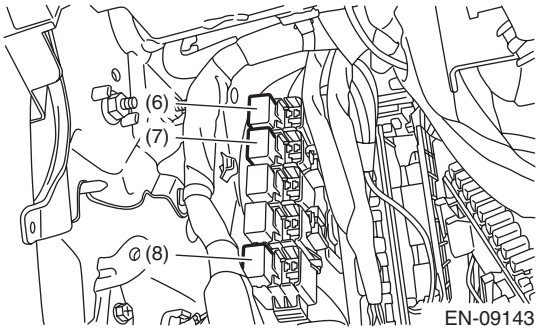


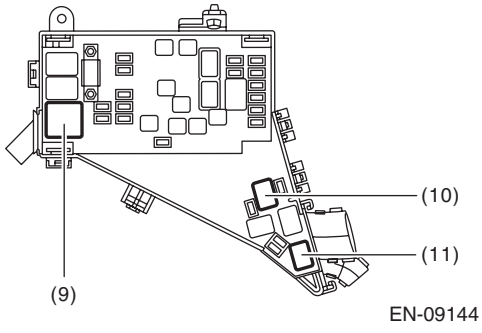
(1) Starter
(2) Fuel pump
(3) Main relay
(4) IG relay
(5) Fuel pump relay
(6) A/F, oxygen sensor relay
(7) Electronic throttle control relay
(8) Starter relay 1
(9) Radiator main fan relay 1
(10) Radiator main fan relay 2
(11) Radiator sub fan relay


(1)
EN-08799


(2)
EN-11331


(3)
(4)
(5)
EN-11332

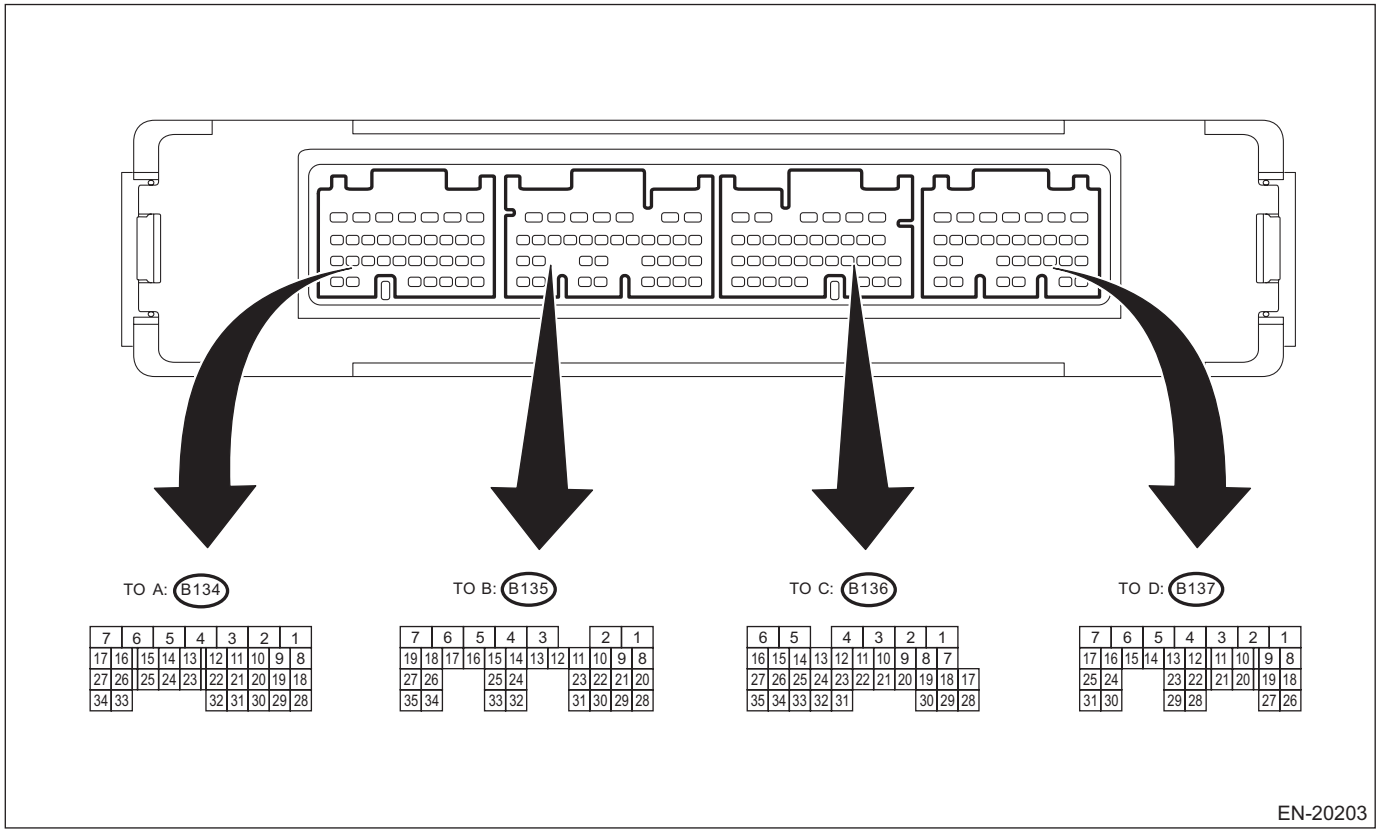

(6)
(7)
(8)
EN-09143


(10)
(11)
(9)
EN-09144

5. Engine Control Module (ECM) I/O Signal

A: ELECTRICAL SPECIFICATION

1. ENGINE CONTROL MODULE (ECM)



Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	B136	16	5	0 or 5	Waveform*
	Signal (–)	B136	27	0	0	—
Front oxygen (A/F) sensor	Signal (+)	B136	19	2.8 — 3.2	2.8 — 3.2	—
	Signal (–)	B136	18	2.4 — 2.7	2.4 — 2.7	—
Rear oxygen sensor	Signal	B136	21	0	0 — 0.9	—
Front oxygen (A/F) sensor heater signal		B136	5	Battery voltage	0 or battery voltage	Waveform
Rear oxygen sensor heater signal		B134	6	Battery voltage	0 or battery voltage	Waveform
Oxygen sensor	Shield	B136	30	0	0	—
Engine coolant temperature sensor	Signal	B134	30	1 — 1.4	1 — 1.6	—
Air flow sensor	Signal	B137	22	—	0.3 — 4.5	—
	Shield	B137	28	0	0	—
	Ground	B137	29	0	0	—
Intake air temperature sensor signal		B137	12	0.3 — 4.6	0.3 — 4.6	—
Engine oil temperature sensor signal		B134	20	1 — 1.4	1 — 1.6	—

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Starter switch		B137	17	Waveform	Waveform	Models without push button start: Waveform Models with push button start: Waveform
Accessory cut request		B135	32	Waveform	Waveform	Models without push button start: Waveform Models with push button start: Waveform
Starter switch 2		B137	14	Waveform	Waveform	Models without push button start: Waveform Models with push button start: Waveform
Starter cut relay		B135	34	Waveform	Waveform	Models without push button start: Waveform Models with push button start: Waveform Waveform
Ignition switch		B137	27	Battery voltage	Battery voltage	—
Neutral position switch		B137	16	ON: 0 OFF: Battery voltage	ON: 0 OFF: Battery voltage	—
Delivery mode switch		B137	13	Battery voltage	Battery voltage	When fuse is installed: 0
Knock sensor	Signal	B136	28	2.5	2.5	—
	Shield	B136	29	0	0	—
Back-up power supply		B137	2	Battery voltage	Battery voltage	—
Control module power supply		B136	6	Battery voltage	Battery voltage	—
		B137	1	Battery voltage	Battery voltage	—
Sensor power supply		B134	19	5	5	—
		B135	22	5	5	—
Ignition control	#1	B134	21	0	0 or 5	Waveform
	#2	B134	10	0	0 or 5	Waveform
	#3	B134	31	0	0 or 5	Waveform
	#4	B134	8	0	0 or 5	Waveform
Fuel injector	#1	B134	12	Battery voltage	0 or battery voltage	Waveform
	#2	B134	22	Battery voltage	0 or battery voltage	Waveform
	#3	B134	32	Battery voltage	0 or battery voltage	Waveform
	#4	B134	13	Battery voltage	0 or battery voltage	Waveform
Fuel pump relay control		B135	19	Battery voltage	ON: 0.5 or less OFF: Battery voltage	—
A/C relay control		B135	35	ON: 0.5 or less OFF: Battery voltage	ON: 0.5 or less OFF: Battery voltage	—
A/C switch		B137	26	ON: Battery voltage OFF: 0	ON: Battery voltage OFF: 0	Manual A/C model
Blower fan switch		B137	20	ON: 0 OFF: Battery voltage	ON: 0 OFF: Battery voltage	Manual A/C model
A/C middle pressure switch		B137	8	ON: 0 OFF: Battery voltage	ON: 0 OFF: Battery voltage	—
Main fan relay control		B135	12	ON: 0.5 or less OFF: Battery voltage	ON: 0.5 or less OFF: Battery voltage	—
Sub fan relay control		B135	11	ON: 0.5 or less OFF: Battery voltage	ON: 0.5 or less OFF: Battery voltage	—
Engine speed output		B135	15	—	0 or battery voltage	Waveform

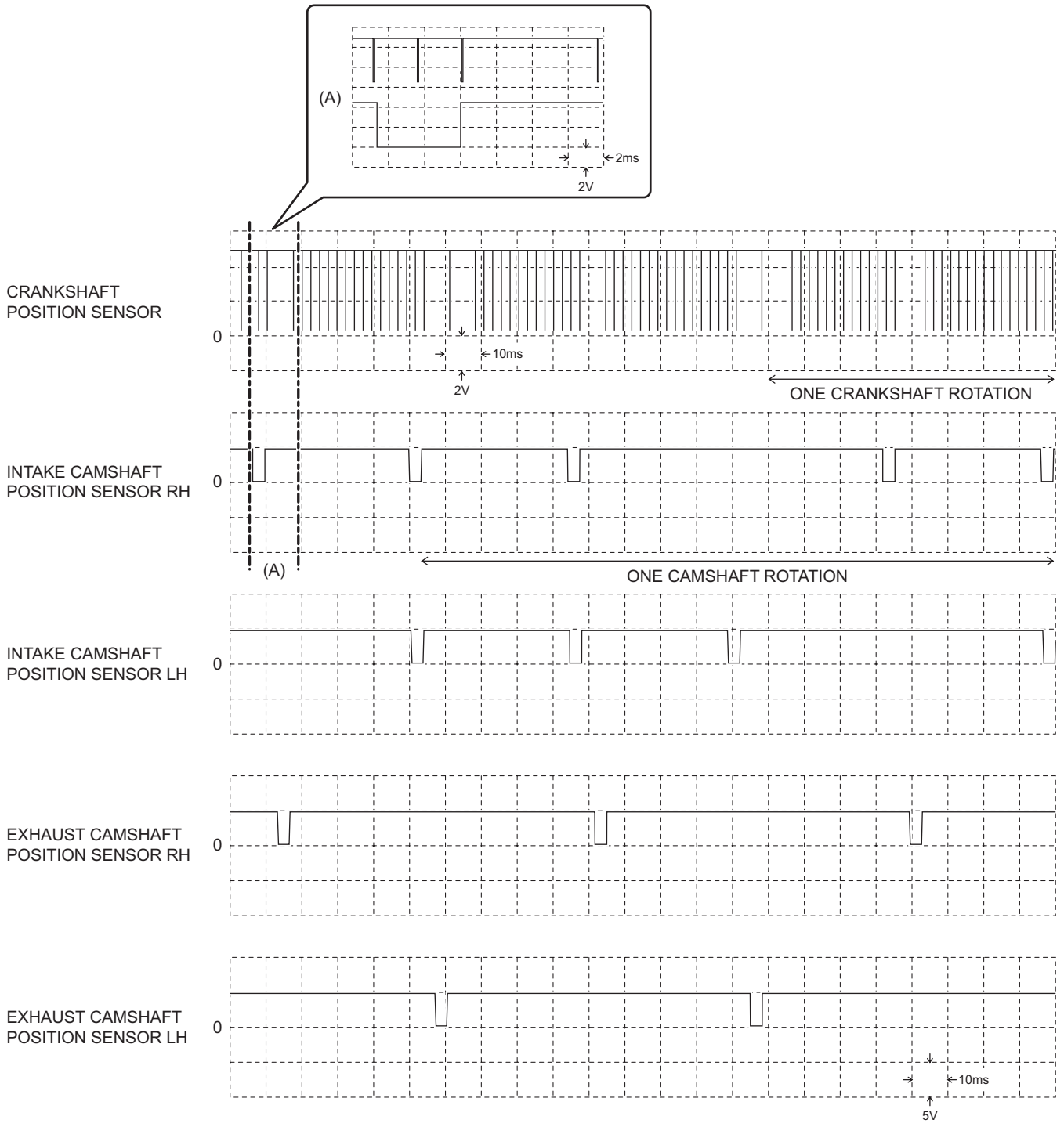
Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Purge control solenoid valve		B134	11	Battery voltage	Battery voltage	When in operation: 0 or battery voltage
EGR control valve	Signal 1	B136	11	Battery voltage	0 or battery voltage	—
	Signal 2	B136	13	Battery voltage	0 or battery voltage	—
	Signal 3	B136	31	Battery voltage	0 or battery voltage	—
	Signal 4	B136	32	Battery voltage	0 or battery voltage	—
Manifold absolute pressure sensor signal		B136	20	3.4 — 3.8	1 — 1.6	—
Electronic throttle control	Main signal	B134	18	Approx. 0.7	Approx. 0.6 — 0.7	Fully closed: Approx. 0.6 Fully open: Approx. 4.0
	Sub signal	B134	28	Approx. 1.6	Approx. 1.5 — 1.6	Fully closed: Approx. 1.5 Fully open: Approx. 4.2
Electronic throttle control motor (+)		B134	2	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor (–)		B134	1	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor power supply		B135	7	Battery voltage	Battery voltage	—
Electronic throttle control motor relay		B135	17	0	0	—
Intake oil control solenoid RH		B134	17	Battery voltage	0 or battery voltage	Waveform
Intake oil control solenoid LH		B134	16	Battery voltage	0 or battery voltage	Waveform
Exhaust oil control solenoid RH		B134	7	Battery voltage	0 or battery voltage	Waveform
Exhaust oil control solenoid LH		B134	5	Battery voltage	0 or battery voltage	Waveform
Intake camshaft position sensor RH		B136	26	0 or 5	0 or 5	Waveform*
Intake camshaft position sensor LH		B136	15	0 or 5	0 or 5	Waveform*
Exhaust camshaft position sensor RH		B136	14	0 or 5	0 or 5	Waveform*
Exhaust camshaft position sensor LH		B136	25	0 or 5	0 or 5	Waveform*
Camshaft position sensor ground		B136	34	0	0	—
Accelerator pedal position sensor	Main sensor signal	B135	23	Fully closed: 0.4 — 1 Fully opened: 2.4 — 3.7	Fully closed: 0.4 — 1 Fully opened: 2.4 — 3.7	—
	Main power supply	B135	21	5	5	—
	Ground (main sensor)	B135	29	0	0	—
	Sub signal sensor	B135	31	Fully closed: 0.3 — 1.1 Fully opened: 2.3 — 3.8	Fully closed: 0.3 — 1.1 Fully opened: 2.3 — 3.8	—
Starter relay		B135	26	Waveform	Waveform	Models without push button start: Waveform Models with push button start: Waveform
Clutch switch		B137	15	ON: 0 OFF: Battery voltage	ON: 0 OFF: Battery voltage	—
Brake switch 1 (Brake switch)		B137	7	When brake pedal is depressed: 0 When brake pedal is released: Battery voltage	When brake pedal is depressed: 0 When brake pedal is released: Battery voltage	—

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Brake switch 2 (Stop light switch)		B137	3	When brake pedal is depressed: Battery voltage When brake pedal is released: 0	When brake pedal is depressed: Battery voltage When brake pedal is released: 0	—
Cruise control command switch		B137	30	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	—
Cruise control main switch		B137	23	ON: 0 OFF: 5	ON: 0 OFF: 5	—
CAN communication (MAIN-CAN)	(Hi)	B137	19	—	—	—
	(Lo)	B137	18	—	—	—
Self-shutoff control		B135	13	0	0	—
Generator control		B135	18	0 or 6.5	0 or 6.5	Waveform
Battery current sensor		B137	11	2.6 — 2.8	2.4 — 2.6	—
Battery temperature sensor		B137	24	1.1 — 2.4	1.1 — 2.4	When battery temperature is 20 — 50°C (68 — 122°F)
Oil level switch		B136	24	0	0	Oil level LOW: Battery voltage
Tumble generator valve opening angle switch signal RH		B136	23	0	Fully closed: 0.5 or less Fully opened: 4.5 or more	When in operation: Waveform
Tumble generator valve actuator RH open		B134	25	0	0	When in operation: Waveform
Tumble generator valve actuator RH closed		B134	14	0	0	When in operation: Waveform
Tumble generator valve opening angle switch signal LH		B136	9	0	Fully closed: 0.5 or less Fully opened: 4.5 or more	When in operation: Waveform
Tumble generator valve actuator LH open		B134	23	0	0	When in operation: Waveform
Tumble generator valve actuator LH closed		B134	24	0	0	When in operation: Waveform
Immobilizer communication		B135	25	—	—	—
ELCM	Switching valve	B135	1	Battery voltage	Battery voltage	Operating: 0
	Pressure sensor	B135	20	1 — 4	1 — 4	—
	Vacuum pump	B135	8	Battery voltage	Battery voltage	Operating: 0

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Ground	Sensor	B134	29	0	0	—
		B135	30	0	0	—
	Engine 1	B134	4	0	0	—
	Engine 2	B134	3	0	0	—
	Engine 3	B136	1	0	0	—
	Engine 4	B136	2	0	0	—
	Engine 5	B136	3	0	0	—
	Body	B137	4	0	0	—

NOTE:
- Perform measurement after warming up the engine.
- Place the select lever in “P” range or “N” range.
- Turn the A/C to OFF.
- Turn all the accessory switches to OFF.
- Waveforms vary depending on a measurement environment and vehicle condition.

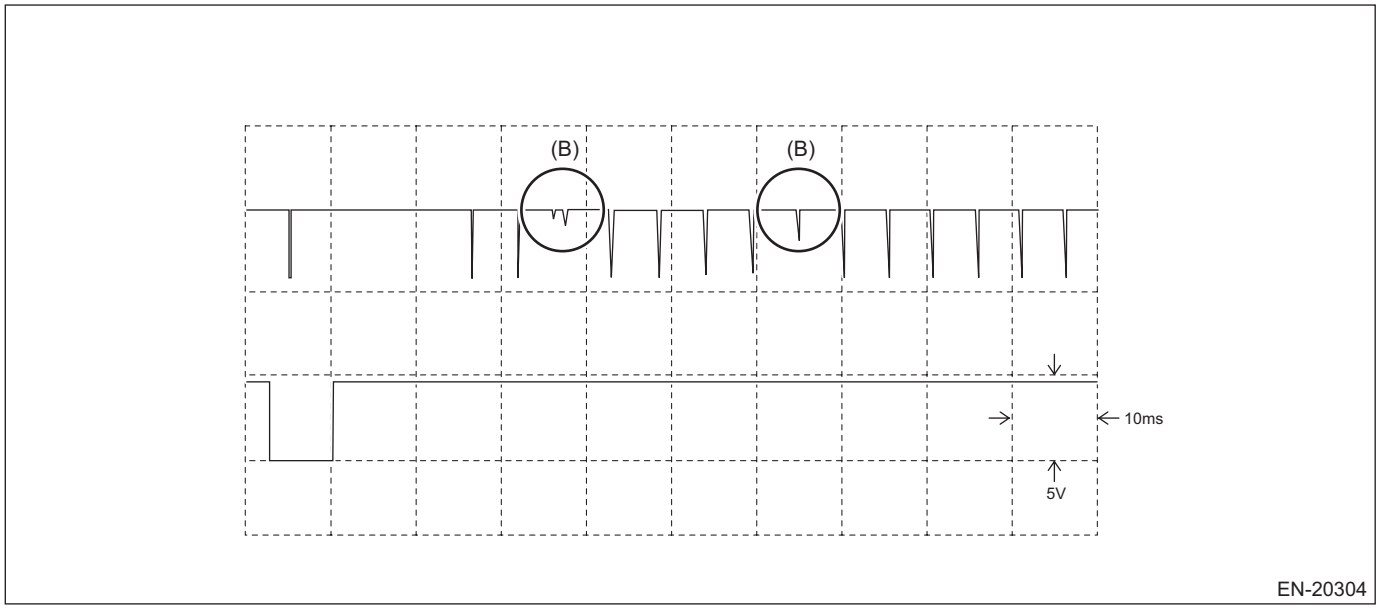
*Waveform



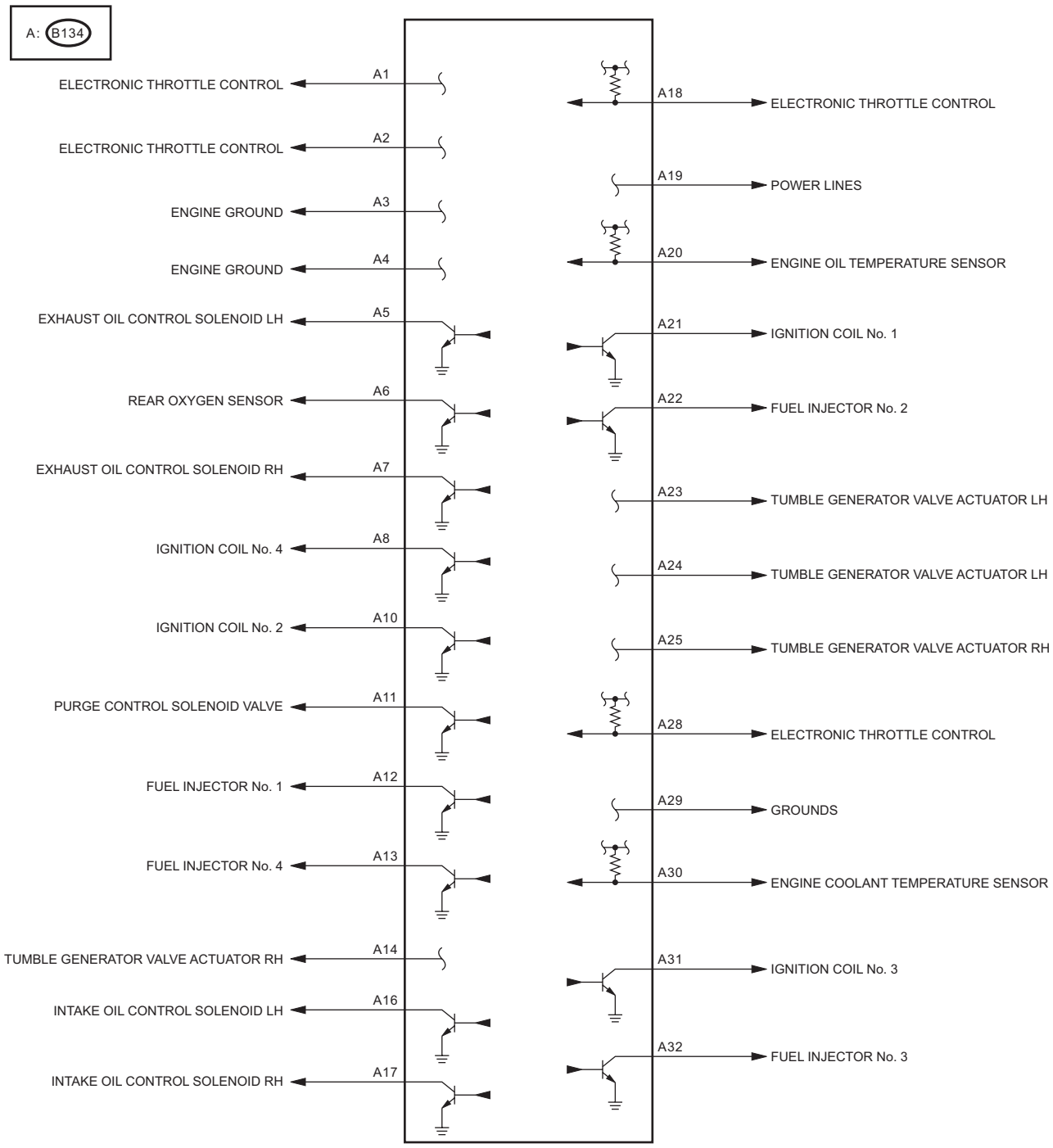
EN-20272

(A) Magnified waveform of crankshaft position sensor and camshaft position sensor

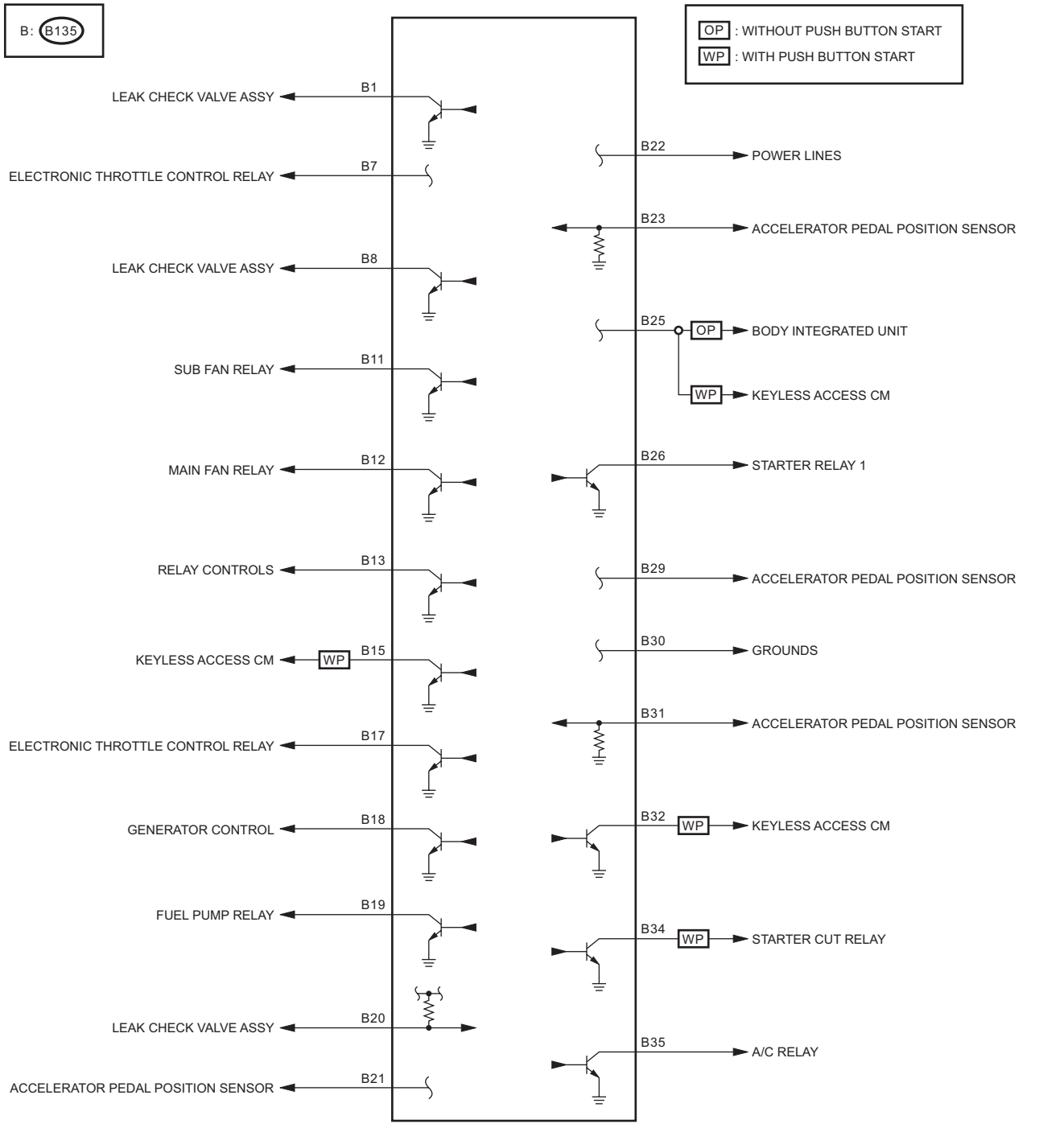
NOTE:
• For measurement of the waveform of the crankshaft position sensor, we recommend using the DST-i oscilloscope function or a general oscilloscope.
• The waveform of the crankshaft position sensor may appear as shown in figure (B) when measured by the Subaru Select Monitor oscilloscope function.
This is because the output unit of the crankshaft position sensor is smaller than the minimal measurement unit of the Subaru Select Monitor, and therefore this phenomenon is not a malfunction of either the Subaru Select monitor or the crankshaft position sensor.



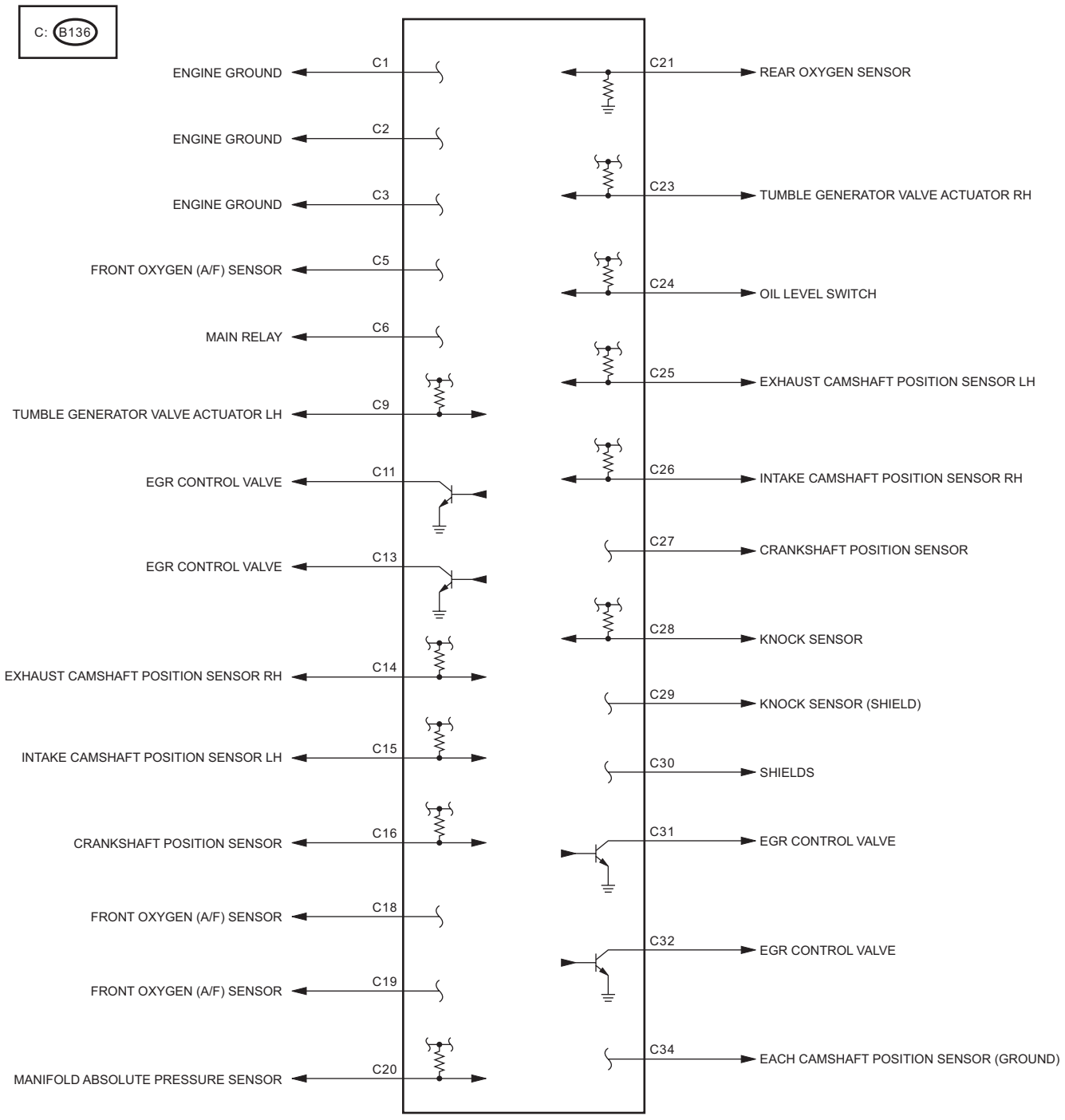
Measured terminal	Crankshaft position sensor (B136) No. 16 — Engine ground 3 (B136) No. 1:
	Intake camshaft position sensor RH (B136) No. 26 — Engine ground 3 (B136) No. 1:
	Intake camshaft position sensor LH (B136) No. 15 — Engine ground 3 (B136) No. 1:
	Exhaust camshaft position sensor RH (B136) No. 14 — Engine ground 3 (B136) No. 1:
	Exhaust camshaft position sensor LH (B136) No. 25 — Engine ground 3 (B136) No. 1:
Measuring condition	While engine idling


A: B134
ELECTRONIC THROTTLE CONTROL
A1
ELECTRONIC THROTTLE CONTROL
A2
ENGINE GROUND
A3
ENGINE GROUND
A4
EXHAUST OIL CONTROL SOLENOID LH
A5
REAR OXYGEN SENSOR
A6
EXHAUST OIL CONTROL SOLENOID RH
A7
IGNITION COIL No. 4
A8
IGNITION COIL No. 2
A10
PURGE CONTROL SOLENOID VALVE
A11
FUEL INJECTOR No. 1
A12
FUEL INJECTOR No. 4
A13
TUMBLE GENERATOR VALVE ACTUATOR RH
A14
INTAKE OIL CONTROL SOLENOID LH
A16
INTAKE OIL CONTROL SOLENOID RH
A17
A18
ELECTRONIC THROTTLE CONTROL
A19
POWER LINES
A20
ENGINE OIL TEMPERATURE SENSOR
A21
IGNITION COIL No. 1
A22
FUEL INJECTOR No. 2
A23
TUMBLE GENERATOR VALVE ACTUATOR LH
A24
TUMBLE GENERATOR VALVE ACTUATOR LH
A25
TUMBLE GENERATOR VALVE ACTUATOR RH
A28
ELECTRONIC THROTTLE CONTROL
A29
GROUNDS
A30
ENGINE COOLANT TEMPERATURE SENSOR
A31
IGNITION COIL No. 3
A32
FUEL INJECTOR No. 3

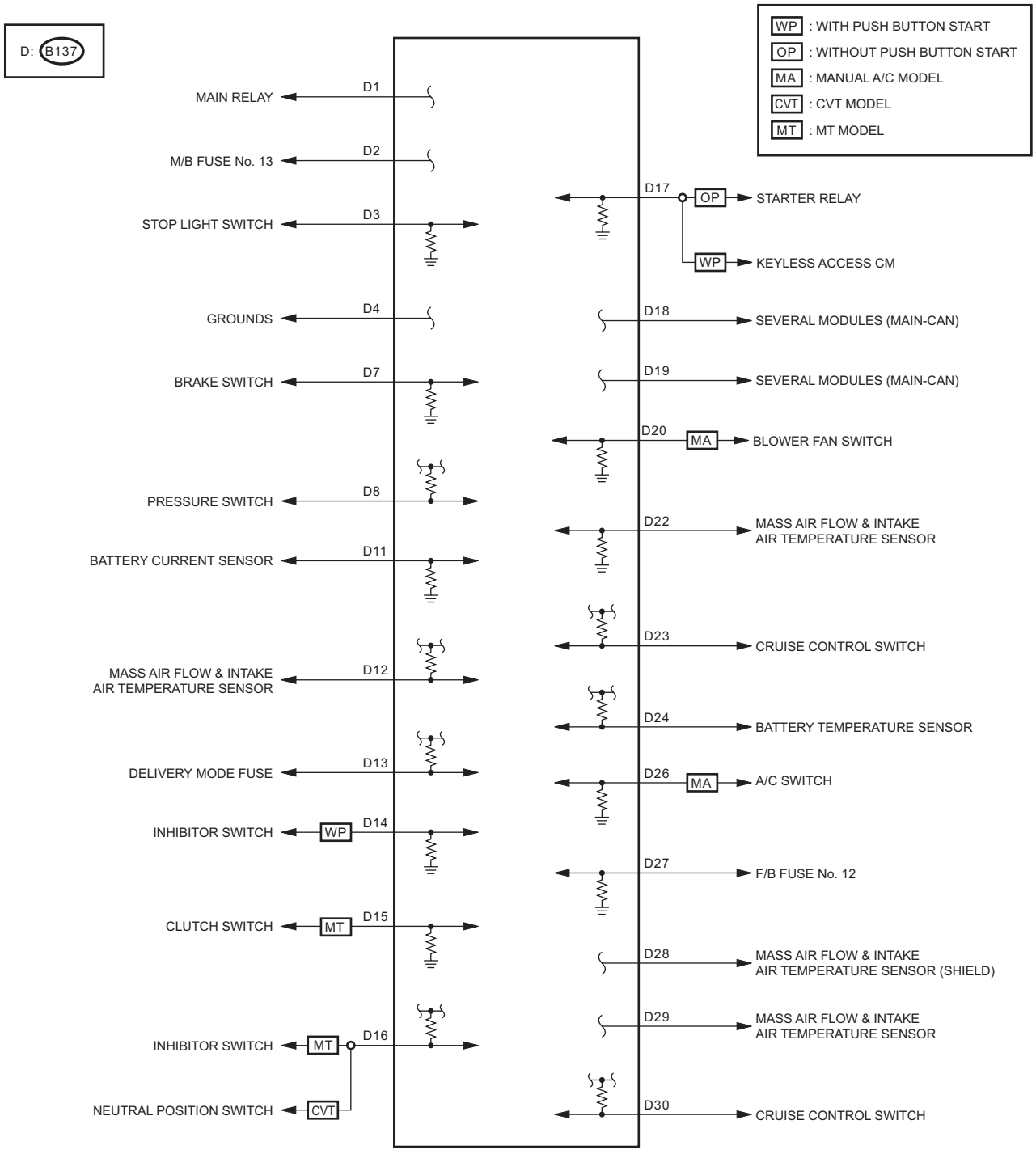
EN-20471


B: B135
OP : WITHOUT PUSH BUTTON START
WP : WITH PUSH BUTTON START
B1
LEAK CHECK VALVE ASSY
B7
ELECTRONIC THROTTLE CONTROL RELAY
B8
LEAK CHECK VALVE ASSY
B11
SUB FAN RELAY
B12
MAIN FAN RELAY
B13
RELAY CONTROLS
B15
KEYLESS ACCESS CM
WP
B17
ELECTRONIC THROTTLE CONTROL RELAY
B18
GENERATOR CONTROL
B19
FUEL PUMP RELAY
B20
LEAK CHECK VALVE ASSY
B21
ACCELERATOR PEDAL POSITION SENSOR
B22
POWER LINES
B23
ACCELERATOR PEDAL POSITION SENSOR
B25
OP
BODY INTEGRATED UNIT
WP
KEYLESS ACCESS CM
B26
STARTER RELAY 1
B29
ACCELERATOR PEDAL POSITION SENSOR
B30
GROUNDS
B31
ACCELERATOR PEDAL POSITION SENSOR
B32
WP
KEYLESS ACCESS CM
B34
WP
STARTER CUT RELAY
B35
A/C RELAY

EN-20472


C: B136
ENGINE GROUND
C1
ENGINE GROUND
C2
ENGINE GROUND
C3
FRONT OXYGEN (A/F) SENSOR
C5
MAIN RELAY
C6
TUMBLE GENERATOR VALVE ACTUATOR LH
C9
EGR CONTROL VALVE
C11
EGR CONTROL VALVE
C13
EXHAUST CAMSHAFT POSITION SENSOR RH
C14
INTAKE CAMSHAFT POSITION SENSOR LH
C15
CRANKSHAFT POSITION SENSOR
C16
FRONT OXYGEN (A/F) SENSOR
C18
FRONT OXYGEN (A/F) SENSOR
C19
MANIFOLD ABSOLUTE PRESSURE SENSOR
C20
C21
REAR OXYGEN SENSOR
C23
TUMBLE GENERATOR VALVE ACTUATOR RH
C24
OIL LEVEL SWITCH
C25
EXHAUST CAMSHAFT POSITION SENSOR LH
C26
INTAKE CAMSHAFT POSITION SENSOR RH
C27
CRANKSHAFT POSITION SENSOR
C28
KNOCK SENSOR
C29
KNOCK SENSOR (SHIELD)
C30
SHIELDS
C31
EGR CONTROL VALVE
C32
EGR CONTROL VALVE
C34
EACH CAMSHAFT POSITION SENSOR (GROUND)

EN-20470


D: B137
WP : WITH PUSH BUTTON START
OP : WITHOUT PUSH BUTTON START
MA : MANUAL A/C MODEL
CVT : CVT MODEL
MT : MT MODEL
D1
MAIN RELAY
D2
M/B FUSE No. 13
D3
STOP LIGHT SWITCH
D4
GROUNDS
D7
BRAKE SWITCH
D8
PRESSURE SWITCH
D11
BATTERY CURRENT SENSOR
D12
MASS AIR FLOW & INTAKE AIR TEMPERATURE SENSOR
D13
DELIVERY MODE FUSE
D14
INHIBITOR SWITCH
WP
D15
CLUTCH SWITCH
MT
D16
INHIBITOR SWITCH
MT
NEUTRAL POSITION SWITCH
CVT
D17
OP
STARTER RELAY
WP
KEYLESS ACCESS CM
D18
SEVERAL MODULES (MAIN-CAN)
D19
SEVERAL MODULES (MAIN-CAN)
D20
MA
BLOWER FAN SWITCH
D22
MASS AIR FLOW & INTAKE AIR TEMPERATURE SENSOR
D23
CRUISE CONTROL SWITCH
D24
BATTERY TEMPERATURE SENSOR
D26
MA
A/C SWITCH
D27
F/B FUSE No. 12
D28
MASS AIR FLOW & INTAKE AIR TEMPERATURE SENSOR (SHIELD)
D29
MASS AIR FLOW & INTAKE AIR TEMPERATURE SENSOR
D30
CRUISE CONTROL SWITCH

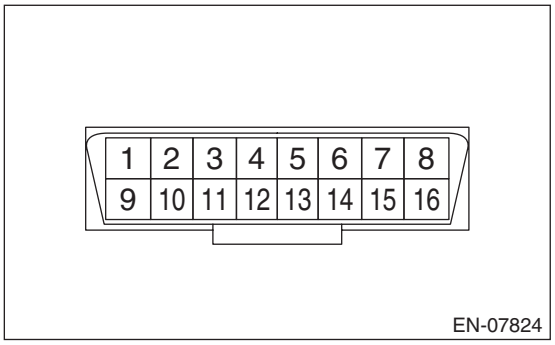
EN-20474

6. Data Link Connector

A: NOTE

This connector is used for Subaru Select Monitor.

CAUTION:
Do not connect any scan tools other than Subaru Select Monitor or general scan tool. Otherwise the circuit may be damaged.



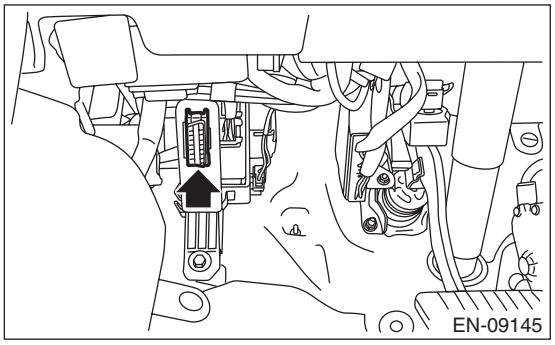
Terminal No.	Contents	Terminal No.	Contents
1	Not used	9	Not used
2	Not used	10	Not used
3	Not used	11	Not used
4	Ground	12	Not used
5	Ground	13	Not used
6	CAN communication (Hi)	14	CAN communication (Lo)
7	Subaru Select Monitor signal	15	Not used
8	Not used	16	Power supply

7. General Scan Tool

A: OPERATION

1. HOW TO USE GENERAL SCAN TOOL

1) Prepare a scan tool (general scan tool) required by SAE J1978.
2) Connect the general scan tool to data link connector located in the lower portion of the instrument panel (on the driver's side).



3) Using the general scan tool, call up each data. General scan tool functions consist of:
   (1) MODE $01: Current powertrain diagnostic data
   (2) MODE $02: Powertrain freeze frame data
   (3) MODE $03: Emission-related powertrain DTC
   (4) MODE $04: Clear/Reset emission-related diagnostic information
   (5) MODE $06: Request on-board monitoring test results for intermittently monitored systems
   (6) MODE $07: Initial emission-related powertrain DTC
   (7) MODE $08: Request control for on-board system, test, and component
   (8) MODE $09: Request vehicle information
4) Read out the data according to repair procedures. (For detailed operation procedures, refer to the general scan tool operation manual.)

NOTE:
For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>

2. MODE $01: (CURRENT POWERTRAIN DIAGNOSTIC DATA)

Refer to data denoting the current operating condition of analog input/output, digital input/output or the powertrain system.
A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
$01	Number of emission-related powertrain DTC, and malfunction indicator light status and diagnosis support information	—
$03	Fuel system control status	—
$04	Calculated engine load value	%
$05	Engine coolant temperature	°C
$06	Short term fuel trim	%
$07	Long term fuel trim	%
$0B	Intake manifold absolute pressure	kPa
$0C	Engine speed	rpm
$0D	Vehicle speed	MPH
$0E	Ignition timing advance	°
$0F	Intake air temperature	°C
$10	Intake air amount	g/s
$11	Throttle valve opening angle	%
$13	Air fuel ratio sensor	—
$15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (bank 1 sensor 2)	V and %
$1C	Supporting OBD system	—
$1F	Elapsed time after starting the engine	sec
$21	Travel distance after the malfunction indicator light illuminates	miles
$24	A/F value and A/F sensor output voltage (bank 1 sensor 1)	— and V
$2C	Target EGR	%
$2D	EGR deviation	%
$2E	Evaporative purge	%
$2F	Fuel level	%
$30	Number of warm ups after DTC clear	time
$31	Travel distance after DTC clear	miles
$33	Barometric pressure	kPa
$34	A/F value and A/F sensor current (bank 1 sensor 1)	— and mA
$3C	Catalyst temperature #1	°C
$41	Diagnostic monitor of each drive cycle	—
$42	ECM power voltage	V
$43	Absolute load	%
$44	A/F target lambda	—
$45	Relative throttle opening angle	%
$46	Ambient temperature	°C
$47	Absolute throttle opening angle 2	%
$49	Absolute accelerator opening angle 1	%
$4A	Absolute accelerator opening angle 2	%
$4C	Target throttle opening angle	%
$4D	Engine operating time while malfunction indicator lit	min
$4E	Elapsed time after DTC clear	min
$51	Fuel used	—
$53	ELCM pressure	—
$56	Learning value of sub feedback compensation level	—
$5A	Relative accelerator opening angle	%
$5C	Engine oil temperature	°C

PID	Data	Unit of measure
$65	Neutral status	—

NOTE:
Refer to general scan tool manufacturer's operation manual to access current powertrain diagnostic data (MODE $01).

3. MODE $02 (POWERTRAIN FREEZE FRAME DATA)

Refer to data denoting the operating condition when trouble is detected by on-board diagnosis system.
A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
$02	DTC that caused freeze frame data to be stored	—
$03	Fuel system control status	—
$04	Calculated engine load value	%
$05	Engine coolant temperature	°C
$06	Short term fuel trim (Bank 1 Sensor 1)	%
$07	Long term fuel trim (Bank 1 Sensor 1)	%
$0B	Intake manifold absolute pressure	kPa
$0C	Engine speed	rpm
$0D	Vehicle speed	MPH
$0E	Ignition timing advance	°
$0F	Intake air temperature	°C
$10	Intake air amount	g/s
$11	Throttle valve opening angle	%
$13	Air fuel ratio sensor	—
$15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (Bank 1 Sensor 2)	V and %
$1C	Supporting OBD system	—
$1F	Elapsed time after starting the engine	sec
$2C	Target EGR	%
$2D	EGR deviation	%
$2E	Evaporative purge	%
$2F	Fuel level	%
$33	Barometric pressure	kPa
$42	ECM power voltage	V
$43	Absolute load	%
$44	A/F target lambda	—
$45	Relative throttle opening angle	%
$46	Ambient temperature	°C
$47	Absolute throttle opening angle 2	%
$49	Absolute accelerator opening angle 1	%
$4A	Absolute accelerator opening angle 2	%
$4C	Target throttle opening angle	%
$51	Fuel used	—
$65	Neutral status	—

NOTE:
Refer to general scan tool manufacturer's instruction manual to access freeze frame data (MODE $02).

4. MODE $03 (EMISSION-RELATED POWERTRAIN DTC)

Refer to "List of Diagnostic Trouble Code (DTC)" for information about data denoting emission-related powertrain DTC. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>

5. MODE $04 (CLEAR/RESET EMISSION-RELATED DIAGNOSTIC INFORMATION)

Refer to the mode used to clear or reset emission-related diagnostic information.

NOTE:
Refer to general scan tool manufacturer's instruction manual to clear the emission-related diagnostic information (MODE $04).

6. MODE $06 (REQUEST ON-BOARD MONITORING TEST RESULTS FOR INTERMITTENTLY MONITORED SYSTEMS)

Refer to diagnostic value of troubleshooting and data of test limit indicated on the support data bit sequence table. A list of the support data is shown in the following table.

NOTE:
Some items are not displayed according to the specifications.

OBDMID	TID	SID	Diagnostic item
$01	$84	$1E	A/F sensor range failure (Bank 1 Sensor 1)
	$85	$1E	
	$86	$20	A/F sensor response failure (Bank 1 Sensor 1)
	$91	$20	
	$92	$10	
	$A3	$20	
	$A4	$10	
	$AC	$10	
	$AD	$10	
	$AE	$10	
	$AF	$10	
	$CD	$20	
	$CF	$20	
	$DF	$10	
$02	$07	$0B	Oxygen sensor drop failure (Bank 1 Sensor 2)
	$08	$0B	
	$A5	$FE	
	$05	$10	Oxygen sensor response failure (Bank 1 Sensor 2)
	$06	$10	
	$BD	$10	
	$D1	$10	Oxygen sensor delay failure (Bank 1 Sensor 2)
	$D2	$01	
$21	$89	$20	Catalyst deterioration diagnosis (Bank 1)
$31	$8A	$FD	EGR system diagnosis
$35	$8B	$9D	VVT monitor (Bank 1)
	$8C	$9D	
	$8D	$9D	
	$8E	$9D	
	$D3	$9D	
	$D5	$9D	
	$D6	$9D	
$36	$8B	$9D	VVT monitor (Bank 2)
	$8C	$9D	
	$8D	$9D	
	$8E	$9D	
	$D3	$9D	
	$D5	$9D	
	$D6	$9D	

OBDMID	TID	SID	Diagnostic item
$3C	$C1	$FE	Evaporative emission control system (0.02 inch leak)
	$C2	$FE	
	$C3	$FE	
	$C4	$FE	
	$C5	$FE	
	$C6	$35	
	$C7	$FE	
	$C8	$FE	
	$C9	$FE	
	$CA	$FE	
$3D	$E2	$FE	ELCM purge flow
$41	$9B	$14	A/F sensor heater characteristics failure (Bank 1 Sensor 1)
$42	$A2	$24	Oxygen sensor heater characteristics failure (Bank 1 Sensor 2)
$A1	$0B	$24	Misfire monitoring (all cylinders)
	$0C	$24	
$A2	$0B	$24	Misfire monitoring (#1 cylinder)
	$0C	$24	
$A3	$0B	$24	Misfire monitoring (#2 cylinder)
	$0C	$24	
$A4	$0B	$24	Misfire monitoring (#3 cylinder)
	$0C	$24	
$A5	$0B	$24	Misfire monitoring (#4 cylinder)
	$0C	$24	

7. MODE $07 (INITIAL EMISSION-RELATED POWERTRAIN DTC)

Refer to the data of DTC (pending code) for troubleshooting result about emission in the first time.

8. MODE $09

Perform “Active Test” of the on-board system.

9. MODE $09 (REQUEST VEHICLE INFORMATION)

Refer to the data of the vehicle specification.

8. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

NOTE:
For detailed operation procedures, refer to “Application help”.

2. DISPLAY ENGINE CURRENT DATA

NOTE:
- For detailed operation procedures, refer to “Application help”.
- A list of the support data is shown in the following table.
- *: For models without cruise control, the brake switch signal does not change.

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then select «Enter».
5) On «Select Function» display, select «Data monitor» and then select «Enter».

Display	Contents	Note (at idling)	Remarks
Engine Speed	Calculated from crankshaft position sensor signal.	700 rpm (agree with the tachometer indication)	rpm
Mass Air Flow	Amount of intake air calculated from air flow sensor output value.	2.5 g/s or 0.33 lb/m	g/s or lb/m
Vehicle Speed	Value calculated from vehicle speed sensor output value.	0 km/h	km/h
Throttle Opening Angle	Throttle valve opening angle (in percentage) calculated from throttle position sensor output value.	13.0%	%
Accel opening angle	Accelerator pedal opening angle (in percentage) calculated from accelerator pedal position sensor output value.	0.0%	%
A/F Sensor #1	Actual lambda value calculated from front A/F sensor output value.	1.0	—
Ignition timing adv. #1	Ignition timing control value for No. 1 cylinder. Calculated from rotation speed, intake manifold pressure, intake air temperature, water temperature, and data from knock sensor etc.	16.0°	°
Engine Coolant Temperature	Value calculated from engine coolant temperature sensor output value.	85°C or 185°F or more (after warm-up)	°C or °F
Fuel Injection #1 Pulse	Control value of fuel injection time by ECM. (RH bank)	2.82 ms	ms
Short Term Fuel Trim-Bank1	Air fuel ratio correction control value for the front.	–0.8%	%
Long Term Fuel Trim-Bank1	Air fuel ratio learning control value for the front.	0.0%	%
Learned Ignition Timing	Ignition timing learning value. Advance or retard angle amount when knocking occurs.	0 deg	deg
Intake Manifold Absolute Pressure	Value calculated from the intake manifold pressure sensor.	200 — 300 mmHg, 26.7 — 40 kPa, 7.8 — 11.8 inHg or 3.8 — 5.8 psig	kPa, mmHg, inHg or psig
Oxygen sensor #12	Rear oxygen sensor output voltage.	0.7 V	V
VVT Adv. Ang. Amount R	AVCS advance angle amount for the RH bank on the intake side.	0 deg	deg
VVT Adv. Ang. Amount L	AVCS advance angle amount for the LH bank on the intake side.	0 deg	deg
Exh. VVT Retard Ang. R	AVCS actual advance angle amount for the RH bank on the exhaust side.	±5 deg	deg
Exh. VVT Retard Ang. L	AVCS actual advance angle amount for the LH bank on the exhaust side.	±5 deg	deg

Display	Contents	Note (at idling)	Remarks
VVT Initial Position Learning Value #1	AVCS initial position learning value for the RH bank on the intake side. Controls the angle against a standard angle. Deviation learning is performed based on this standard value.	29.9°CA	°CA
VVT Initial Position Learning Value #2	AVCS initial position learning value for the LH bank on the intake side. Controls the angle against a standard angle. Deviation learning is performed based on this standard value.	27.7°CA	°CA
VVT Ex Initial Position Learning Value #1	AVCS initial position learning value for the RH bank on the exhaust side. Controls the angle against a standard angle. Deviation learning is performed based on this standard value.	0	°CA
VVT Ex Initial Position Learning Value #2	AVCS initial position learning value for the LH bank on the exhaust side. Controls the angle against a standard angle. Deviation learning is performed based on this standard value.	0	°CA
ECU ACC	ECM input power supply voltage.	13.789 V	V
Target engine speed	ECM target engine speed.	675 rpm	rpm
Target Equivalence Ratio	Target air fuel ratio. (Lambda) It usually becomes 1.0 aiming at a theoretical air fuel ratio.	0.976	—
Engine Oil Temperature	Value calculated from the engine oil temperature sensor output value.	≥ 85°C (after warm-up)	°C or °F
Intake Air Temperature	Intake air temperature calculated from the intake air temperature sensor output value.	36°C	°C or °F
Ambient Temperature	Ambient temperature that ECM estimates by input values from the engine coolant temperature sensor or the intake air temperature sensor etc.	Ambient Temp for A/C	°C or °F
Ambient Temperature Sensor Signal	Data value of the ambient sensor input from the combination meter via CAN. Ambient temperature used for diagnosis.	—	°C or °F
Calculated load value	Current rate of air amount. Value assuming that the air amount at the current engine speed with the throttle fully open is 100%.	17.0	%
Absolute Load Value	Percentage of current intake air amount against the maximum air intake amount of the engine. For non-turbo engine, the value can be close to 95%, but will never be 100%. For turbo engine, this value may exceed 100% due to a boost pressure.	17	%
Atmosphere Pressure	Atmospheric pressure calculated from atmospheric pressure sensor output value.	(Atmospheric pressure)	kPa, mmHg, inHg or psig
Mani. Relative Pressure	Pressure value calculated from manifold pressure sensor output value. (Absolute value) (Air intake absolute pressure – Atmospheric pressure)	(Intake Manifold Absolute Pressure – Atmospheric Pressure)	kPa, mmHg, inHg or psig
Target Throttle Opening Angle	Target throttle opening angle calculated by ECM.	16 deg	deg
Actual Throttle Opening Angle	Actual throttle opening angle. Calculated by ECM based on the throttle sensor input value.	16 deg	deg
Target Throttle Opening Angle	Control value of the target throttle opening angle calculated by ECM. Shows the target value of opening angle in percentage when 0% means fully closed and 100% means fully open.	0.0%	%
Relative Throttle Position	Current throttle opening angle in percentage against the throttle voltage (full range) that has reflected the full close point learning value. The value will be approx. 70% at full open.	2	%
Throttle Motor Voltage	Power supply voltage of the throttle motor. ECM input value.	(Battery voltage)	V

Display	Contents	Note (at idling)	Remarks
Main-Throttle Sensor	Voltage value of the main throttle position sensor. ECM input value.	0.66 V	V
Sub-Throttle Sensor	Voltage value of the sub throttle position sensor. ECM input value.	1.52 V	V
Throttle Motor Duty	Throttle motor control duty ratio. ECM output value.	–15%	%
Main-Accelerator Sensor	Voltage value of the main accelerator pedal position sensor. ECM input value.	0.68 V	V
Sub-Accelerator Sensor	Voltage value of the sub accelerator pedal position sensor. ECM input value.	0.68 V	V
Air Flow Sensor Voltage	Air flow sensor output value. Input value to ECM.	1.26 V	V
Fuel Level	Fuel level sensor output value. ECM input value. Total value of main and sub.	—	%
Fuel level resistance	Fuel level sensor resistance value. ECM input value.	—	Ω
Commanded Evap Purge	Evaporative purge rate displayed by the OBD.	0%	%
CPC Valve Duty Ratio	Purge control solenoid valve control duty ratio. ECM output value.	0 — 3%	%
ALT Duty	Electric power generation voltage is calculated by the ECM. Indicator voltage value from ECM to alternator is under a DUTY control.	0 — 100%	%
Alternator control mode	Control mode of the electric power generation voltage by the alternator. Low: Mode that controls the battery charge Mid: Mode where the battery is not charged and discharged High: Mode that fixes the voltage when the battery is charged or when an electric load is turned on ExHigh: Mode where the battery is charged during deceleration	High/Mid/Low	—
Battery current value	Battery charge/discharge current value input from the battery sensor. When the value is positive: The current flows to a direction that the battery is charged. When the value is negative: The current flows to a direction that the battery is discharged.	–2 — 5 A	A
Battery temperature	Estimated value of battery temperature which is output from the battery temperature sensor and input in the communication with ECM.	20 — 50°C or 68 — 112°F	°C or °F
Knocking Correction	Retard angle amount when knocking occurs. Partially learning value of ignition timing learning value.	0.0 deg	deg
Fuel system for Bank 1	Feedback status of air fuel ratio. Open: Feedback is stopped Closed: Feedback control is being performed	Cl_normal	—
A/F Sensor #1 Current	Front A/F sensor output current value. ECM input value.	–0.2 — 0.2 mA	mA
A/F Sensor #1 Resistance	Front A/F sensor resistance value calculated from the front A/F sensor output value.	32 Ω	Ω
A/F Correction #3	Sub correction value of A/F feedback control.	0.3%	%
No. of EGR steps	Number of EGR valve steps. Number of stepping motor steps. ECM output value.	0 STEP	STEP
Commanded EGR	Target value calculated with the EGR setting value by ECM.	—	%

Display	Contents	Note (at idling)	Remarks
EGR Error	Percentage of the difference in actual EGR steps as compared to the target EGR steps. Both a positive value and a negative value mean that it doesn't fulfill the target. When the value is positive, it opens more than the target value. When the value is negative, it opens smaller than the target value.	—	%
TGV Position SW1	Open/close status of the tumble generator valve opening angle SW for RH bank. Input value from the tumble generator valve opening angle SW for RH bank to the ECM.	Close	—
TGV Position SW2	Open/close status of the tumble generator valve opening angle SW for LH bank. Input value from the tumble generator valve opening angle SW for LH bank to the ECM.	Close	—
TGV Output	Drive signal to tumble generator valve motor. Set to “ON” when the tumble generator valve is activated (when the duty output is other than 0%). ECM output value.	—	OFF
TGV Drive	Tumble generator valve drive status. Set to “Open” when the tumble generator valve is open. ECM control status.	—	Close
OCV Duty R	Oil control solenoid control duty ratio. (RH bank) ECM output value.	40 — 60% (except for Euro 4 (2.0 L model)) 45 — 55% (Euro 4 (2.0 L model))	%
OCV Duty L	Oil control solenoid control duty ratio. (LH bank) ECM output value.	40 — 60% (except for Euro 4 (2.0 L model)) 45 — 55% (Euro 4 (2.0 L model))	%
OCV Current R	Actual current value of the oil control solenoid. (RH bank) ECM input value.	550 — 850 mA (except for Euro 4 (2.0 L model)) 650 — 800 mA (Euro 4 (2.0 L model))	mA
OCV Current L	Actual current value of the oil control solenoid. (LH bank) ECM input value.	550 — 850 mA (except for Euro 4 (2.0 L model)) 650 — 800 mA (Euro 4 (2.0 L model))	mA
Exh. OCV Duty R	Exhaust side oil control solenoid control duty ratio on the RH bank. ECM output value.	45 — 55%	%
Exh. OCV Duty L	Actual current value of the exhaust side oil control solenoid on the LH bank. ECM input value.	45 — 55%	%
Exh. OCV Current R	Actual current value of the exhaust side oil control solenoid on the RH bank. ECM input value.	650 — 800 mA	mA
Exh. OCV Current L	Actual current value of the exhaust side oil control solenoid on the LH bank. ECM input value.	650 — 800 mA	mA
Roughness Monitor #1	#1 cylinder roughness monitor count value.	0	—
Roughness Monitor #2	#2 cylinder roughness monitor count value.	0	—
Roughness Monitor #3	#3 cylinder roughness monitor count value.	0	—
Roughness Monitor #4	#4 cylinder roughness monitor count value.	0	—

Display	Contents	Note (at idling)	Remarks
Ignition SW ON Count	Time stamp information. Number of times the ignition is ON since the vehicle was manufactured. The number of ignition ON is also recorded when a trouble code is recorded, so the comparison with that number will show you how many times the ignition has turned on since the diagnostic code was recorded.	—	times
Count	Time stamp information. Each unit individually counts the elapsed time since the ignition is turned ON. Master integrated unit and ECM synchronize with the master time. When synchronized: “Common” When not synchronized: “Originally”	Common	—
Time Count	Time stamp information. Elapsed time after ignition ON. When a trouble code is recorded, the elapsed time after ignition ON is also recorded.	—	ms
Time Since Engine Start	Elapsed time after starting the engine.	—	sec
Meter since DTC cleared	Travel distance after DTC clear.	—	km
Time while MIL lighted	Engine operating time from when the malfunction indicator light illuminated till when it went off.	—	min
Time since DTC cleared	Elapsed time after DTC clear.	—	min
Number of warm-ups since DTCs cleared	Number of warm ups after DTC clear. 1 cycle is the time from the cold start till warmed up and stop. (Engine start after a warm-up is not counted.)	—	times
Lighted MI lamp history	Travel distance after the warning light illuminated.	—	km
Odometer	ECM calculates the total cumulative travel distance from the vehicle speed, separately from the odometer in the combination meter. Small difference from the odometer will be possible, but if there is a big difference, ECM or the combination meter may need to be replaced.	—	km
Memorized Cruise Speed	Cruise control system target vehicle speed. (Set speed)	0 km/h or 0 MPH	km/h or MPH
Catalyst Temperature #11	Estimated temperature of the front catalytic converter.	—	°C
Type of fuel	Fuel information recorded in the ECM. (It's not the fuel information currently used.)	GAS	—
AT drive status	Neutral condition. Information input from the inhibitor switch. (CVT model)	NEUT	—
MT gear status	Neutral condition. Information input from the neutral switch. (MT model)	NEUT	—
Absolute Evap Sys. Pressure	Evaporative emission control system pressure. Pressure sensor input value.	101.43	kPa
Neutral switch	Neutral switch signal. Signal when in neutral (MT) or in P or N range (AT). Value input to ECM.	Neutral	—
ETC Motor Relay	Drive signal to the electronic throttle motor relay. Set to “ON” when drive signal is output. ECM output value.	ON	—
Clutch switch	Clutch switch signal. Set to “ON” when the clutch switch is ON. Item displayed only for MT model.	OFF	—

Display	Contents	Note (at idling)	Remarks
Stop Light Switch	Stop light switch signal. Set to “ON” when the stop light illuminates. ECM input value.	OFF (when OFF)	—
Brake Switch*	Brake switch signal. Set to “ON” when the brake pedal is depressed. ECM input value.	OFF (when OFF)	—
Idle Switch Signal	Idle signal. Set to “Idle” while idling.	Idle	—
Ignition switch	Ignition switch signal. Set to “ON” when the ignition switch is ON.	ON	—
A/C Mid Pressure Switch	Air conditioner middle pressure switch signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
A/C Compressor Signal	A/C compressor drive signal. Set to “ON” when the drive signal is output. ECM output value.	OFF (when OFF)	—
Radiator Fan Relay #1	Radiator fan relay drive signal. Set to “ON” when the drive signal is output. ECM output value.	OFF (when OFF)	—
Radiator Fan Relay #2	Radiator fan relay drive signal. Set to “ON” when the drive signal is output. ECM output value.	OFF (when OFF)	—
A/C Switch	Air conditioner switch signal. Set to “ON” when the air conditioner switch of the heater control is ON. ECM input value.	OFF (when OFF)	—
Starter Switch	Starter switch signal. Set to “ON” when the starter is ON. ECM input value.	OFF	—
Rear Defogger SW	Rear defogger switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Blower Fan SW	Blower fan switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Light Switch	Light switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Front Fog Light Switch	Front fog light switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Wiper Switch	Wiper switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Delivery Mode Connector	Delivery mode terminal fuse installation status. ECM displays delivery mode status.	OFF	—
Rear O2 Rich Signal	Rear oxygen sensor output value. Set to “Rich” when the air fuel ratio of rear oxygen sensor is rich, and set to “Lean” when lean.	ON/OFF	—
Knocking Signal	Knock sensor output signal. Judges if a knocking occurs or not. ECM input signal.	OFF	—
Crankshaft Position Sig.	Crankshaft position sensor output signal. Set to “ON” when the engine is running. ECM input signal.	ON	—

Display	Contents	Note (at idling)	Remarks
Camshaft Position Sig.	Camshaft position sensor output signal. Set to “ON” when the engine is running. ECM input signal.	ON	—
Ban of Torque Down VDC	Torque down prohibition notification signal to the vehicle dynamics control (VDC) module. Set to “OFF” when the prohibition signal is output. ECM output value.	ON	—
Request Torque Down VDC	Torque down request signal transmitted from the vehicle dynamics control (VDC) module. Set to “ON” when the request signal is sent. Vehicle dynamics control (VDC) ECM input signal.	OFF	—
Torque Permission Signal	Torque down permission notification signal to the transmission control module. (CVT model) Set to “ON” when the permission signal is output. ECM output value.	ON	—
SET/COAST Switch	Cruise control system SET/COAST SW signal. Set to “ON” when the switch is operated. ECM input signal.	OFF (when OFF)	—
RESUME/ACCEL Switch	Cruise control system RESUME/ACCEL SW signal. Set to “ON” when the switch is operated. ECM input signal.	OFF (when OFF)	—
Main switch	Cruise control system main switch signal. Set to “ON” when the switch is operated. ECM input signal.	OFF (when OFF)	—
distance change SW	Distance change switch. (Model with EyeSight)	OFF (when OFF)	—
Cruise Control Cancel Switch Signal	Cruise control cancel switch signal of the cruise control system. Set to “ON” when the switch is operated. ECM input signal.	OFF (when OFF)	—
Fuel Pump Relay	Fuel pump relay drive signal. Set to “ON” when the drive signal is output. ECM output value.	ON	—
All Cylinders Fuel cut	Status under the fuel injection amount control where the fuel injection is cut off in all cylinders.	OFF	—
Shift Pattern Demand for Low Water Temperature	Shift pattern request sent from ECM to the transmission CM. (CVT model) When the water temperature is low, shift pattern change to the low speed side is requested to raise the catalyst temperature faster.	OFF	—
Oil level switch	Oil level switch signal. Set to “LOW level” when the amount of engine oil decreases. ECM input signal.	HIGH level	—
ELCM switching valve	ELCM switching valve drive signal. Set to “Close” when the switching valve is closed. ECM output value.	Open	—
ELCM pump	ELCM pump drive signal. Set to “ON” when ELCM decompression pump is activated. ECM output value.	OFF	—
MIL Status	Malfunction indicator light illumination status. When judged as abnormal, an illumination command signal is sent from ECM to the combination meter.	OFF	—
Number of Diagnostic Code(s):	The number of trouble codes recorded in the ECM.	0	—
(Oxygen sensor #11)	Installation status of the front oxygen sensor.	Support	—
(Oxygen sensor #12)	Installation status of the rear oxygen sensor.	Support	—
Short term fuel trim #12	Air fuel ratio correction control value for the rear.	0.0%	%

Display	Contents	Note (at idling)	Remarks
A/F Sensor #11	Air fuel ratio calculated from the front A/F sensor output value. (Lambda)	1.001	—
A/F Sensor #11	Output voltage of the front A/F sensor.	2.2 V	V
A/F Sensor #11	Air fuel ratio calculated from the front A/F sensor output value. (Lambda)	1.001	—
A/F Sensor #11	Front A/F sensor current value.	0.00	mA
Absolute Throttle Pos.#2	Shows the sub throttle sensor voltage value in % against the full-range 5 V throttle sensor output voltage.	32%	%
Accelerator Pedal Pos.#1	Shows the main accelerator sensor voltage value in % against the full-range 5 V.	13%	%
Accelerator Pedal Pos.#2	Shows the sub accelerator sensor voltage value in % against the full-range 5 V.	13%	%
Relative Accelerator Pos.	Accelerator opening angle with a full close point learning value taken into consideration.	0%	%
Misfire monitoring(Supp)	Support status of the misfire diagnosis.	YES	—
Misfire monitoring(Rdy)	Status of the misfire diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
Fuel system monitoring(Supp)	Support status of the fuel system diagnosis.	YES	—
Fuel system monitoring(Rdy)	Status of the fuel system diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
Component monitoring(Supp)	Support status of the component diagnosis.	YES	—
Component monitoring(Rdy)	Status of the component diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
Catalyst Diagnosis(Supp)	Support status of the catalyst diagnosis.	YES	—
Catalyst Diagnosis(Rdy)	Status of the catalyst diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Heated catalyst(Supp)	Support status of the heated catalyst diagnosis.	NO	—
Heated catalyst(Rdy)	Status of the heated catalyst diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Evaporative purge system(Supp)	Support status of the evaporative purge system diagnosis.	NO	—
Evaporative purge system(Rdy)	Status of the evaporative purge system diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Secondary air system(Supp)	Support status of the secondary air system diagnosis.	NO	—
Secondary air system(Rdy)	Status of the secondary air system diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
A/C system refrigerant(Supp)	Support status of the A/C system refrigerant diagnosis.	NO	—
A/C system refrigerant(Rdy)	Status of the A/C system refrigerant diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Oxygen sensor(Supp)	Support status of the oxygen sensor diagnosis.	YES	—

Display	Contents	Note (at idling)	Remarks
Oxygen sensor(Rdy)	Status of the oxygen sensor diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
O2 Heater Diagnosis(Supp)	Support status of the oxygen sensor heater diagnosis.	YES	—
O2 Heater Diagnosis(Rdy)	Status of the oxygen sensor heater diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
EGR system(Supp)	Support status of the EGR diagnosis.	YES	—
EGR system(Rdy)	Status of the EGR diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Misfire monitoring(Enable)	Shows whether or not the execution condition of misfire diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Misfire monitoring(Comp)	Shows whether or not the continuous misfire diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Fuel system monitoring(Enable)	Shows whether or not the execution condition of fuel system diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Fuel system monitoring(Comp)	Shows whether or not the fuel system diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Component monitoring(Enable)	Shows whether or not the execution condition of component diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Component monitoring(Comp)	Shows whether or not the component diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Catalyst Diagnosis(Enable)	Shows whether or not the execution condition of catalyst diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Catalyst Diagnosis(Comp)	Shows whether or not the catalyst diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Heated catalyst(Enable)	Shows whether or not the execution condition of heated catalyst diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	N/A	—
Heated catalyst(Comp)	Shows whether or not the heated catalyst diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Evaporative purge system(Enable)	Shows whether or not the execution condition of evaporative purge system diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	N/A	—
Evaporative purge system(Comp)	Shows whether or not the evaporative purge system diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—

Display	Contents	Note (at idling)	Remarks
Secondary air system(Enable)	Shows whether or not the execution condition of the secondary air system diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	N/A	—
Secondary air system(Comp)	Shows whether or not the secondary air system diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
A/C system refrigerant(Enable)	Shows whether or not the execution condition of A/C system refrigerant diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	N/A	—
A/C system refrigerant(Comp)	Shows whether or not the A/C system refrigerant diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Oxygen sensor(Enable)	Shows whether or not the execution condition of oxygen sensor diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Oxygen sensor(Comp)	Shows whether or not the oxygen sensor diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
O2 Heater Diagnosis(Enable)	Shows whether or not the execution condition of oxygen heater diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
O2 Heater Diagnosis(Comp)	Shows whether or not the oxygen heater diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
EGR system(Enable)	Shows whether or not the execution condition of EGR diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
EGR system(Comp)	Shows whether or not the EGR diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
OBD System	Shows the OBD regulation to be followed. This is the information recorded in the ECM, and it does not mean that the unit automatically judges the compliance to the OBD regulations.	EOBD	—

3. READ FREEZE FRAME DATA FOR ENGINE (OBD MODE)

NOTE:
- For detailed operation procedures, refer to “Application help”.
- A list of the support data is shown in the following table.

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then select «Enter».
5) On «Select Function» display, select «DTC» and select «Enter».

Display	Contents	Remarks
Engine Speed	Calculated from crankshaft position sensor signal.	rpm
Mass Air Flow	Amount of intake air calculated from air flow sensor output value.	g/s or lb/m
Vehicle Speed	Value calculated from vehicle speed sensor output value.	km/h or MPH
Throttle Opening Angle	Throttle valve opening angle (in percentage) calculated from throttle position sensor output value.	%
Ignition timing adv. #1	Ignition timing control value for No. 1 cylinder. Calculated from rotation speed, intake manifold pressure, intake air temperature, water temperature, and data from knock sensor etc.	°
Engine Coolant Temperature	Value calculated from engine coolant temperature sensor output value.	°C or °F
Short Term Fuel Trim-Bank1	Air fuel ratio correction control value for the front.	%
Long Term Fuel Trim-Bank1	Air fuel ratio learning control value for the front.	%
Intake Manifold Absolute Pressure	Value calculated from the intake manifold pressure sensor.	kPa, mmHg, inHg or psig
Oxygen sensor #12	Rear oxygen sensor output voltage.	V
ECU ACC	ECM input power supply voltage.	V
Target Equivalence Ratio	Target air fuel ratio. (Lambda) It usually becomes 1.0 aiming at a theoretical air fuel ratio.	—
Intake Air Temperature	Intake air temperature calculated from the intake air temperature sensor output value.	°C or °F
Ambient Temperature	Ambient temperature that ECM estimates by input values from the engine coolant temperature sensor or the intake air temperature sensor etc.	°C or °F
Ambient Temperature Sensor Signal	Data value of the ambient sensor input from the combination meter via CAN. Ambient temperature used for diagnosis.	°C or °F
Calculated load value	Current rate of air amount. Value assuming that the air amount at the current engine speed with the throttle fully open is 100%.	%
Absolute Load Value	Percentage of current intake air amount against the maximum air intake amount of the engine. For non-turbo engine, the value can be close to 95%, but will never be 100%. For turbo engine, this value may exceed 100% due to a boost pressure.	%
Atmosphere Pressure	Atmospheric pressure calculated from atmospheric pressure sensor output value.	kPa, mmHg, inHg or psig
Actual Throttle Opening Angle	Actual throttle opening angle. Calculated by ECM based on the throttle sensor input value.	deg
Target Throttle Opening Angle	Control value of the target throttle opening angle calculated by ECM. Shows the target value of opening angle in percentage when 0% means fully closed and 100% means fully open.	%
Relative Throttle Position	Current throttle opening angle in percentage against the throttle voltage (full range) that has reflected the full close point learning value. The value will be approx. 70% at full open.	%
Fuel Level	Fuel level sensor output value. ECM input value. Total value of main and sub.	%
Commanded Evap Purge	Evaporative purge rate displayed by the OBD.	%

Display	Contents	Remarks
Fuel system for Bank 1	Feedback status of air fuel ratio. Open: Feedback is stopped Closed: Feedback control is being performed	—
Commanded EGR	Target value calculated with the EGR setting value by ECM.	%
EGR Error	Percentage of the difference in actual EGR steps as compared to the target EGR steps. Both a positive value and a negative value mean that it doesn't fulfill the target. When the value is positive, it opens more than the target value. When the value is negative, it opens smaller than the target value.	%
Ignition SW ON Count	Time stamp information. Number of times the ignition is ON since the vehicle was manufactured. The number of ignition ON is also recorded when a trouble code is recorded, so the comparison with that number will show you how many times the ignition has turned on since the diagnostic code was recorded.	times
Count	Time stamp information. Each unit individually counts the elapsed time since the ignition is turned ON. Master integrated unit and ECM synchronize with the master time. When synchronized: “Common” When not synchronized: “Originally”	—
Time Count	Time stamp information. Elapsed time after ignition ON. When a trouble code is recorded, the elapsed time after ignition ON is also recorded.	ms
Time Since Engine Start	Elapsed time after starting the engine.	sec
Type of fuel	Fuel information recorded in the ECM. (It's not the fuel information currently used.)	—
AT drive status	Neutral condition. Information input from the inhibitor switch. (CVT model)	—
(Oxygen sensor #11)	Installation status of the front oxygen sensor.	—
(Oxygen sensor #12)	Installation status of the rear oxygen sensor.	—
Short term fuel trim #12	Air fuel ratio correction control value for the rear.	%
Absolute Throttle Pos.#2	Shows the sub throttle sensor voltage value in % against the full-range 5 V throttle sensor output voltage.	%
Accelerator Pedal Pos.#1	Shows the main accelerator sensor voltage value in % against the full-range 5 V.	%
Accelerator Pedal Pos.#2	Shows the sub accelerator sensor voltage value in % against the full-range 5 V.	%
OBD System	Shows the OBD regulation to be followed. This is the information recorded in the ECM, and it does not mean that the unit automatically judges the compliance to the OBD regulations.	—

4. V.I.N REGISTRATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then select «Enter».
5) On «Select Function» display, select «Work Support».
6) On «Work Support» display, select «Entry VIN».
7) Perform the procedures shown on the display screen.

9. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. SUBARU SELECT MONITOR

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then «Enter».
5) On «Select Function» display, select «DTC».

2. GENERAL SCAN TOOL

Refer to data denoting emission-related powertrain DTC. For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>

NOTE:
Refer to general scan tool manufacturer’s instruction manual to access powertrain DTC (MODE $03).

10.Inspection Mode

A: PROCEDURE

Perform the diagnosis shown in the following DTC table.
When performing the diagnosis not listed in “List of Diagnostic Trouble Code (DTC)”, refer to the item on the drive cycle. <Ref. to EN(H4DO w/o HEV)(diag)-55, Drive Cycle.>

DTC	Item	Condition
B1570	ANTENNA	—
B1571	REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM)	—
B1572	IMM CIRCUIT EXCEPT ANTENNA CIRCUIT	—
B1574	KEY COMMUNICATION	—
B1575	INCORRECT IMMOBILIZER KEY	—
B1576	EGI CONTROL MODULE EEPROM	—
B1577	IMM CONTROL MODULE EEPROM	—
B1578	METER	—
P0010	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	—
P0013	"B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	—
P0020	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	—
P0023	"B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	—
P0031	A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 1	—
P0032	A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 1	—
P0037	A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2	—
P0038	A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 2	—
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW	—
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" HIGH	—
P0102	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT LOW	—
P0103	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT HIGH	—
P0107	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT LOW	—
P0108	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH	—
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW BANK 1	—
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH BANK 1	—
P0117	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT LOW	—
P0118	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH	—
P0122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW	—
P0123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH	—
P0131	A/F / O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 1	—
P0132	A/F / O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 1	—
P0197	ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT LOW	—
P0198	ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT HIGH	—
P0201	CYLINDER 1 INJECTOR "A" CIRCUIT	—
P0202	CYLINDER 2 INJECTOR "A" CIRCUIT	—
P0203	CYLINDER 3 INJECTOR "A" CIRCUIT	—
P0204	CYLINDER 4 INJECTOR "A" CIRCUIT	—
P0222	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW	—
P0223	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH	—
P0327	KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT LOW BANK 1 OR SINGLE SENSOR	—
P0328	KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT HIGH BANK 1 OR SINGLE SENSOR	—
P0335	CRANKSHAFT POSITION SENSOR "A" CIRCUIT	—
P0336	CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—
P0340	CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR	—

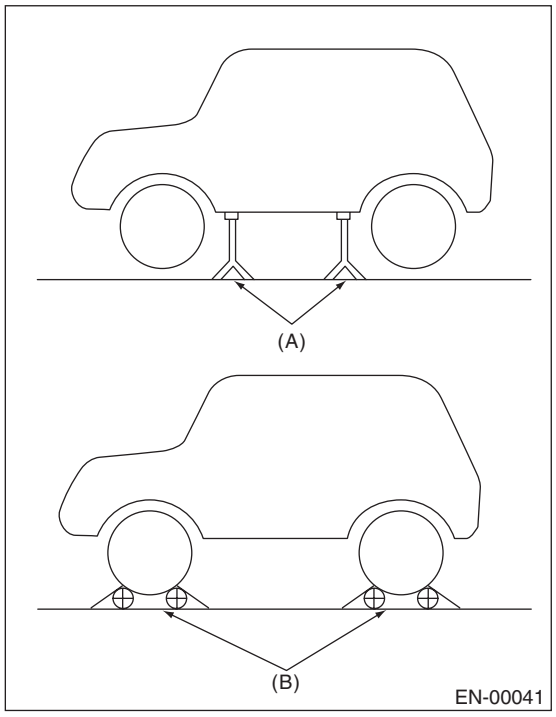
DTC	Item	Condition
P0341	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR	—
P0345	CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2	—
P0346	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 2	—
P0351	IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN	—
P0352	IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN	—
P0353	IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN	—
P0354	IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN	—
P0365	CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1	—
P0366	CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1	—
P0390	CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2	—
P0391	CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 2	—
P0452	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT LOW	—
P0453	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT HIGH	—
P0458	EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT LOW	—
P0462	FUEL LEVEL SENSOR "A" CIRCUIT LOW	—
P0463	FUEL LEVEL SENSOR "A" CIRCUIT HIGH	—
P0512	STARTER (SWITCH) REQUEST CIRCUIT	—
P0516	BATTERY TEMPERATURE SENSOR CIRCUIT LOW	—
P0517	BATTERY TEMPERATURE SENSOR CIRCUIT HIGH	—
P0560	SYSTEM VOLTAGE	—
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	—
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	—
P0606	CONTROL MODULE PROCESSOR	—
P060A	INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE	—
P060B	INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE	—
P0616	STARTER RELAY "A" CIRCUIT LOW	—
P0617	STARTER RELAY "A" CIRCUIT HIGH	—
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	—
P0685	ECM/PCM POWER RELAY CONTROL CIRCUIT/OPEN	—
P081A	STARTER DISABLE CIRCUIT LOW	—
P1160	THROTTLE RETURN SPRING	—
P1530	BATTERY CURRENT SENSOR CIRCUIT LOW	—
P1531	BATTERY CURRENT SENSOR CIRCUIT HIGH	—
P1532	BATTERY CHARGING SYSTEM	—
P2006	TGV CONTROL STUCK CLOSED BANK 1	—
P2007	TGV CONTROL STUCK CLOSED BANK 2	—
P2009	TGV CONTROL CIRCUIT LOW BANK 1	—
P2012	TGV CONTROL CIRCUIT LOW BANK 2	—
P2101	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE	—
P2102	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT LOW	—
P2103	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT HIGH	—
P2109	THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE	—
P2119	THROTTLE ACTUATOR "A" CONTROL THROTTLE BODY RANGE/PERFORMANCE	—
P2122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW	—
P2123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH	—
P2127	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW	—
P2128	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH	—
P2135	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION	—
P2138	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION	—

DTC	Item	Condition
P2401	EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW	—
P2419	EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW	—
P2530	IGNITION SWITCH RUN POSITION CIRCUIT	—
U0073	CONTROL MODULE COMMUNICATION BUS OFF	—
U0101	LOST COMMUNICATION WITH TCM	—
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	—
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	—
U0402	INVALID DATA RECEIVED FROM TCM	—
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	—
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	—

1. PREPARATION FOR THE INSPECTION MODE

1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) Lift up the vehicle using a garage jack and place it on rigid racks, or drive the vehicle onto free rollers.

WARNING:
• Before lifting up the vehicle, ensure parking brake is applied.
• Do not use a pantograph jack in place of a rigid rack.
• Secure a rope or wire to the front or rear towing hooks to prevent the lateral runout of front wheels.
• Before rotating the wheels, make sure that there is no one in front of the vehicle. Besides while the wheels are rotating, make sure that no one approaches the vehicle front side.
• Make sure that there is nothing around the wheels. For AWD model, pay attention to all four wheels.
• While servicing, do not depress or release the clutch pedal or accelerator pedal quickly regardless of the engine speed. Quick operation may cause the vehicle to drop off the free roller.
• To prevent the vehicle from slipping due to vibration, do not place anything between rigid rack and the vehicle.



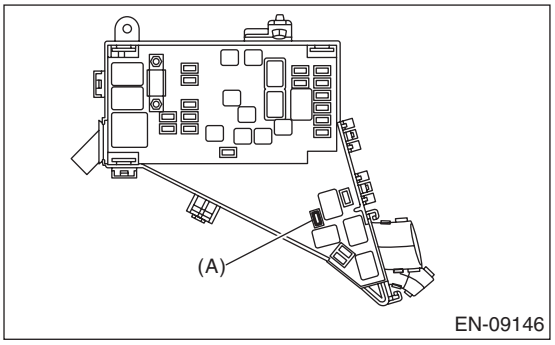
(A) Rigid rack
(B) Free roller

2. SUBARU SELECT MONITOR

1) Check that no DTC remains after clearing memory. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>
2) Warm up the engine.
3) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DO w/o HEV)(diag)-9, PREPARATION TOOL, General Description.>
4) Prepare PC with Subaru Select Monitor installed.
5) Connect the USB cable to the DST-i and the USB port on the personal computer (dedicated port for the Subaru Select Monitor).

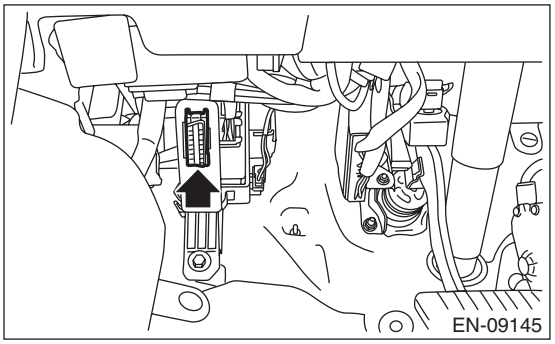
NOTE:
The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.
6) Connect the diagnosis cable to DST-i.
7) Install the delivery (test) mode fuse (A).

CAUTION:
Do not use any fuses that are installed on the vehicle.



8) Connect the DST-i to the data link connector located in the lower portion of the instrument panel (on the driver's side).

CAUTION:
Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



9) Start the PC.
10) Turn the ignition switch to ON (engine OFF) and run the "PC application for Subaru Select Monitor".
11) On «Start» display, select «Diagnosis».

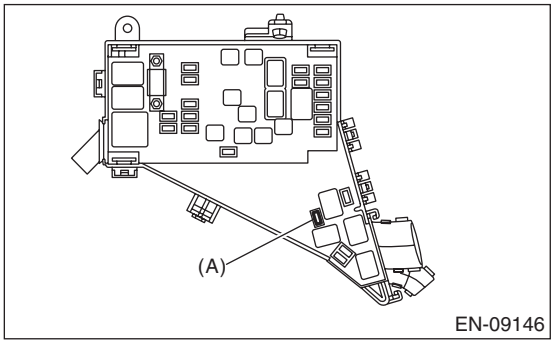
12) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
13) On «Main Menu» display, select «Each System».
14) On «Select System» display, select «Engine Control System» and then select «Enter».
15) On «Select Function» display, select «Dealer Check Mode Procedure» and then select «Enter».
16) When the “Perform Inspection (Dealer Check) Mode ?” is shown on the screen, click the [Next] button.
17) Perform subsequent procedures as instructed on the display screen.
• If trouble still remains in the memory, the corresponding DTC appears on the display screen.

NOTE:
• For detailed operation procedures, refer to “Application help”.
• For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”.
<Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>
• Release the parking brake.
• The rotating speed difference between front and rear wheels may illuminate the warning light, but this does not indicate a malfunction. When engine control system diagnosis is finished, perform the VDC memory clearance procedure of self-diagnosis function. <Ref. to VDC(diag)-26, Clear Memory Mode.>

3. GENERAL SCAN TOOL

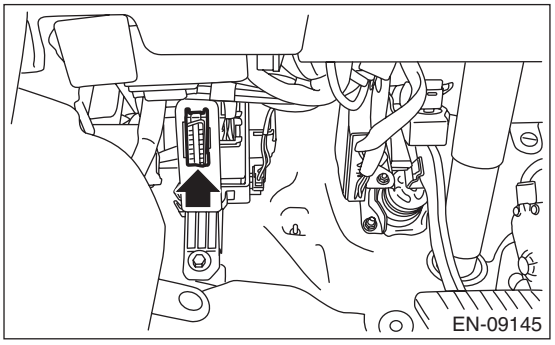
1) Check that no DTC remains after clearing memory. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>
2) Warm up the engine.
3) Install the delivery (test) mode fuse (A).

CAUTION:
Do not use any fuses that are installed on the vehicle.



4) Connect the general scan tool to data link connector located in the lower portion of the instrument panel (on the driver’s side).

CAUTION:
Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



5) Start the engine.

NOTE:
• Ensure the selector lever is placed in the “P” range before starting. (CVT model)
• Depress the clutch pedal when starting engine. (MT model)
6) Turn the neutral position switch to ON using select lever or shift lever.
7) Depress the brake pedal to turn the brake switch ON. (CVT model)
8) Keep the engine speed in 2,500 — 3,000 rpm range for 40 seconds.
9) Place the select lever or shift lever in “D” position (CVT model) or “1st gear” (MT model) and drive the vehicle at 5 to 10 km/h (3 to 6 MPH).

NOTE:
• For AWD model, release the parking brake.
• The rotating speed difference between front and rear wheels may illuminate the ABS warning light, but this does not indicate a malfunction. When engine control system diagnosis is finished, perform the VDC memory clearance procedure of self-diagnosis function. <Ref. to VDC(diag)-26, Clear Memory Mode.>
10) Using the general scan tool, check for DTC and record the result(s).

NOTE:
• For detailed operation procedures, refer to “Application help”.
• For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”.
<Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>

11.Drive Cycle

A: PROCEDURE

It is necessary to perform the drive cycle listed below if DTC is not found in the Inspection Mode. It is possible to complete diagnosis of the DTC by performing the indicated drive cycle. After the repair for the DTC, perform a necessary drive cycle and make sure the function recovers and the DTC is recorded.

1. PREPARATION FOR DRIVE CYCLE

1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) After performing the diagnostics and Clear Memory Mode, check that no DTC remains. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>
3) Check the delivery (test) mode fuse is removed.

NOTE:
• Perform the drive cycle after warming up the engine except when the engine coolant temperature at engine start is specified.
• Perform the drive cycle twice if the DTC in the list is marked with *. After completing the first drive cycle, stop the engine and perform second diagnosis in same condition.

2. DRIVE CYCLE A

DTC	Item	Condition
*P0128	COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)	—
*P0141	O2 SENSOR HEATER CIRCUIT BANK 1 SENSOR 2	—
*P014C	A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1	—
*P014D	A/F / O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 1	—
*P015A	A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1	—
*P015B	A/F / O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 1	—
*P0171	SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle B or C as well.
*P0172	SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle B or C as well.
*P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
*P0301	CYLINDER 1 MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
*P0302	CYLINDER 2 MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
*P0303	CYLINDER 3 MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
*P0304	CYLINDER 4 MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
*P0420	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD BANK 1	—
*P0459	EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT HIGH	—
*P2096	POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle B or C as well.
*P2097	POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle B or C as well.
P2195	A/F /O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 1	—
P2196	A/F /O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 1	—

Diagnostic procedure:
1) Drive for 20 minutes or more at a constant speed of 80 km/h (50 MPH) or more.
2) Stop the vehicle and idle for one minute.

3. DRIVE CYCLE B

DTC	Item	Condition
*P0125	INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL	«Coolant Temp.» at engine start: Less than –15°C (5°F)
P0137	O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2	—
P0138	O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2	—
*P0171	SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle A or C as well.
*P0172	SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle A or C as well.
*P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
*P0301	CYLINDER 1 MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
*P0302	CYLINDER 2 MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
*P0303	CYLINDER 3 MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
*P0304	CYLINDER 4 MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
P0500	VEHICLE SPEED SENSOR "A" CIRCUIT	—
*P0506	IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED	—
*P0507	IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED	—
P0700	TRANSMISSION CONTROL SYSTEM (MIL REQUEST)	—
*P2096	POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle A or C as well.
*P2097	POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle A or C as well.

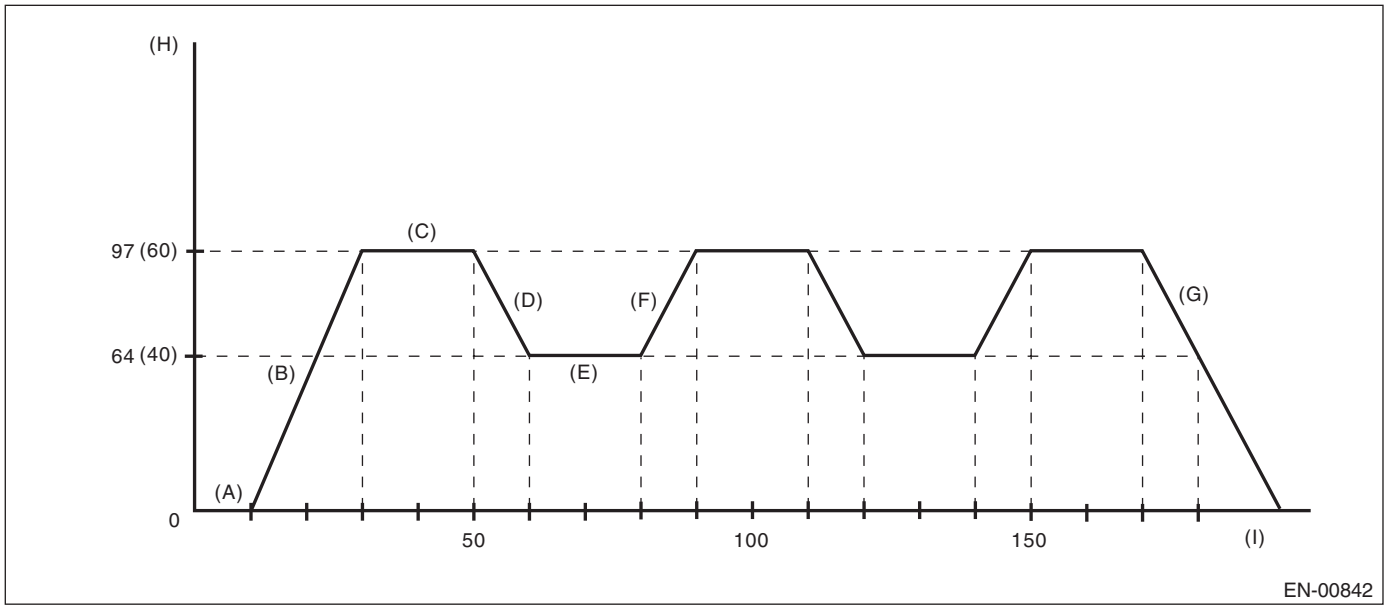
Diagnostic procedure:
1) Drive at 10 km/h (6 MPH) or more.
2) Stop the vehicle and idle for ten minutes.

4. DRIVE CYCLE C

DTC	Item	Condition
*P000A	"A" CAMSHAFT POSITION SLOW RESPONSE BANK 1	—
*P000B	"B" CAMSHAFT POSITION SLOW RESPONSE BANK 1	—
*P000C	"A" CAMSHAFT POSITION SLOW RESPONSE BANK 2	—
*P000D	"B" CAMSHAFT POSITION SLOW RESPONSE BANK 2	—
P0011	"A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1	—
P0014	"B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1	—
P0021	"A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2	—
P0024	"B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2	—
*P0030	A/F / O2 HEATER CONTROL CIRCUIT BANK 1 SENSOR 1	—
*P0068	MAP/MAF - THROTTLE POSITION CORRELATION	—
*P0101	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—
P0134	A/F / O2 SENSOR CIRCUIT NO ACTIVITY DETECTED BANK 1 SENSOR 1	—
*P013A	O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2	—
*P013B	O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 2	—

DTC	Item	Condition
*P013E	O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 2	—
*P013F	O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2	—
*P0171	SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle A or B as well.
*P0172	SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle A or B as well.
*P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
*P0301	CYLINDER 1 MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
*P0302	CYLINDER 2 MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
*P0303	CYLINDER 3 MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
*P0304	CYLINDER 4 MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
*P0400	EGR "A" FLOW	—
P0851	PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW	—
P0852	PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH	—
*P1449	EVAP SYSTEM CLOG DETECTED (AIR FILTER)	—
P1492	COIL 1 EGR "A" CONTROL CIRCUIT LOW	—
P1493	COIL 1 EGR "A" CONTROL CIRCUIT HIGH	—
P1494	COIL 2 EGR "A" CONTROL CIRCUIT LOW	—
P1495	COIL 2 EGR "A" CONTROL CIRCUIT HIGH	—
P1496	COIL 3 EGR "A" CONTROL CIRCUIT LOW	—
P1497	COIL 3 EGR "A" CONTROL CIRCUIT HIGH	—
P1498	COIL 4 EGR "A" CONTROL CIRCUIT LOW	—
P1499	COIL 4 EGR "A" CONTROL CIRCUIT HIGH	—
P2004	TGV CONTROL STUCK OPEN BANK 1	—
P2005	TGV CONTROL STUCK OPEN BANK 2	—
*P2096	POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle A or B as well.
*P2097	POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle A or B as well.
P2270	O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 2	—
P2271	O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 2	—

Diagnostic procedure:
Drive according to the drive pattern described below.



(A)	Shift the select lever to “P” range or the shift lever to the neutral position, and let the engine idle for 10 seconds or more.	(D)	Decelerate with fully closed throttle to 64 km/h (40 MPH) or less.	(G)	Stop vehicle with the throttle fully closed.
(B)	Accelerate to 97 km/h (60 MPH) or more within 20 seconds.	(E)	Drive for 20 seconds or more at 64 km/h (40 MPH) or less.	(H)	Vehicle speed km/h (MPH)
(C)	Drive for 20 seconds or more at 97 km/h (60 MPH) or more.	(F)	Accelerate to 97 km/h (60 MPH) or more within 10 seconds.	(I)	Sec.

5. DRIVE CYCLE E

DTC	Item	Condition
*P0461	FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—

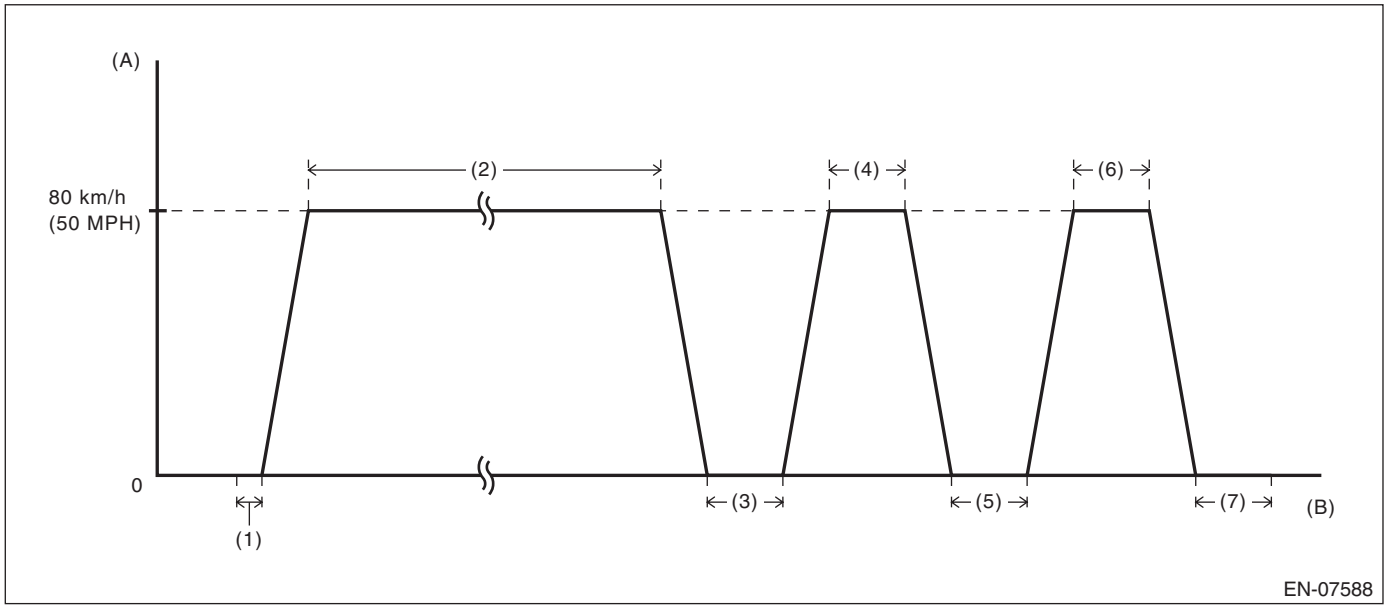
Diagnostic procedure:
1) Make sure that the battery voltage is 10.9 V or more.
2) Perform the Clear Memory Mode. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>
3) Drive for approximately 30 L (7.9 US gal, 6.6 Imp gal) of fuel.

NOTE:
• It is acceptable to drive the vehicle intermittently.
• Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

6. DRIVE CYCLE F

DTC	Item	Condition
*P0111	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE BANK 1	• 6 hours have elapsed since ignition switch is OFF under a completely warmed up condition. • For models with block heater, at least 6 hours must have elapsed without operating the block heater.
*P0196	ENGINE OIL TEMPERATURE SENSOR "A" RANGE/ PERFORMANCE	• 6 hours have elapsed since ignition switch is OFF under a completely warmed up condition. • For models with block heater, at least 6 hours must have elapsed without operating the block heater.

Diagnostic procedure:
1) Make sure that the engine coolant temperature is less than 30°C (86°F).
2) Drive according to the drive pattern described below.



(A) Vehicle speed
(B) Elapsed time
(1) Idle the engine for 10 seconds or more after engine start.
(2) Drive for 8 minutes or more at a constant speed of 80 km/h (50 MPH) or more.
(3) Stop the vehicle and idle for 30 seconds or more.
(4) Drive for 30 seconds or more at a constant speed of 80 km/h (50 MPH) or more.
(5) Stop the vehicle and idle for 30 seconds or more.
(6) Drive for 30 seconds or more at a constant speed of 80 km/h (50 MPH) or more.
(7) Stop the vehicle and idle for 30 seconds.

NOTE:
• There is no given transition time between idling and cruising.
• Driving at constant speed only on a downhill causes smaller engine load and may result in failure to obtain a right diagnostic result.
• When the engine stops while performing drive cycle F, perform it again from the state of procedure 1).

7. DRIVE CYCLE H

DTC	Item	Condition
P0071	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" RANGE/PERFORMANCE	• 6 hours have elapsed since ignition switch is OFF under a completely warmed up condition. • For models with block heater, at least 6 hours must have elapsed without operating the block heater.
P0116	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE	• 6 hours have elapsed since ignition switch is OFF under a completely warmed up condition. • For models with block heater, at least 6 hours must have elapsed without operating the block heater.
P0451	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT RANGE/PERFORMANCE	60 seconds have elapsed since ignition switch is OFF.
*P050A	COLD START IDLE CONTROL SYSTEM PERFORMANCE	—
*P050B	COLD START IGNITION TIMING PERFORMANCE	—

1) Perform the Clear Memory Mode. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>
2) With the ignition switch ON, read the value in «Coolant Temp.» and «Intake Air Temp.». <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>
3) If the values from step 2) satisfy the following conditions, idle the engine for one minute.

Condition:
|Engine coolant temperature — Intake air temperature| ≤ 5°C (9°F)

NOTE:
• If the conditions are not satisfied, turn the ignition switch to OFF and wait until the parameters are satisfied.
• For CVT models, hold the select lever to “P” range or “N” range at idling, and for MT models, the shift lever in the neutral position at idling.

8. DRIVE CYCLE I

DTC	Item	Condition
*P0455	EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK)	«Coolant Temp.»: 5 — 45°C (41 — 113°F) «Intake Air Temp.»: 5 — 50°C (41 — 122°F)
*P0456	EVAP SYSTEM (CPC) LEAK DETECTED (VERY SMALL LEAK)	
*P1451	EVAP SYSTEM CLOG DETECTED (PIPE)	
*P2402	EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH	
*P2404	EVAP SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/ PERFORMANCE	
*P2420	EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH	

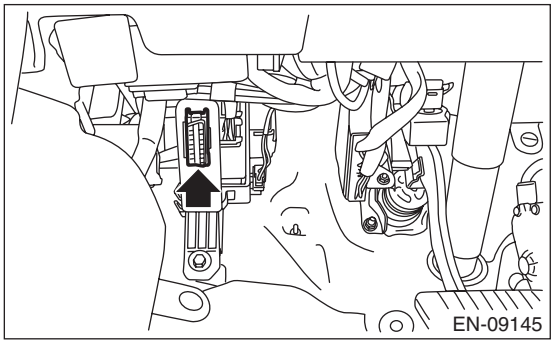
CAUTION:
Be careful of the state of the battery when performing the drive cycle I consecutively. Performing the drive cycle I consecutively without the engine running may cause a low battery voltage and battery discharge.

NOTE:
- If it is necessary to perform drive cycle I consecutively, drive the vehicle under the following conditions to release accumulated evaporating gas. Performing the drive cycle I consecutively without starting the engine causes a large amount of evaporating gas to accumulate in the canister, which hinders an accurate diagnosis.
  - After engine is warmed up.
  - Drive for 10 minutes or more at a speed of 48 km/h (30 MPH) or more (duration of drive can be an accumulation)
- To obtain an accurate diagnostic result, perform the procedures according to the following points.
  - Do not refuel gas immediately before performing drive cycle I. There will be a large amount of evaporating gas immediately after refuel, which may cause a less accurate diagnostic performance.
  - Do not shake the vehicle while performing drive cycle I. Shaking the vehicle causes evaporating gas to increase inside the fuel tank, which may cause a less accurate diagnostic performance.
  - Do not perform any service operation including installation or removal of parts or connectors while performing drive cycle I. Performing service operation could affect on the functions of related parts, which may cause a less accurate diagnostic performance.

1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DO w/o HEV)(diag)-9, PREPARATION TOOL, General Description.>
2) Prepare PC with Subaru Select Monitor installed.
3) Connect the USB cable to the DST-i and the USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:
The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.
4) Connect the diagnosis cable to DST-i.
5) Connect the DST-i to the data link connector located in the lower portion of the instrument panel (on the driver's side).

CAUTION:
Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



6) Start the PC.
7) Turn the ignition switch to ON (engine OFF) and run the “PC application for Subaru Select Monitor”.
8) On «Start» display, select «OBD System».
9) On «Select System» display, select «Evaporative System Leak Test».
10) On «Evaporative System Leak Test» display, select «Evaporative System Leak Test».
11) On «Evaporative System Leak Test is running. Press Cancel to exit this function.» display, click the [OK] button to perform evaporative system leak test.
12) When «Conditions have been enabled to control this function. Turn the ignition switch off to terminate the test.» display appears, wait for 30 minutes without clicking the [OK] button.

CAUTION:
Do not leave the vehicle for an extended period of time after the test is complete. This may cause early deterioration of the battery or discharged battery.

NOTE:
• Clicking the [OK] button bring the «Evaporative System Leak Test» display back, although the test is continuing.
• The Subaru Select Monitor screen does not change after the evaporative system leak test is complete or when the test is aborted by turning off the ignition switch.
• If «Test conditions are not correct» display appears, use Subaru Select Monitor to check that the values in «Coolant Temp.» and «Intake Air Temp.» are within the specified range. If the conditions are satisfied, make the necessary preparation for the drive cycle again. <Ref. to EN(H4DO w/o HEV)(diag)-55, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
13) After 30 minutes passed from the start of step 14), click the [OK] button to return to the «Evaporative System Leak Test» display.
14) Return to the «Select System» display, then select «Result of on-board monitor test».
15) In the «Result of on-board monitor test», check TID $C1 — $CA of MID $3C.

Result of on-board monitor test

Display	Details	Remarks
$0000 is stored in all Val.	During the evaporative system leak test, the test conditions were not met and the test was canceled.	Once the test conditions are met, perform the test again.
All Val. are stored with values and OK is set to all the results.	Evaporative system leak test is completed correctly.	While the ignition switch is ON, read temporary codes using the Subaru Select Monitor.
Some results were no good.	The evaporative system leak test completed successfully but the results were faulty.	While the ignition switch is ON, read temporary codes using the Subaru Select Monitor.

16) When the evaporative system leak test is completed correctly, read the temporary codes with the ignition switch turned to ON position. If the DTC is recorded, check the appropriate DTC. <Ref. to EN(H4DO w/o HEV)(diag)-49, OPERATION, Read Diagnostic Trouble Code (DTC).>

NOTE:
The temporary code will be cleared by turning ignition switch to OFF.

9. DRIVE CYCLE J

DTC	Item	Condition
P2610	ECM/PCM ENGINE OFF TIMER PERFORMANCE	—

1) Idle the engine for 15 minutes or more.
2) Turn the ignition switch to OFF.
3) After 10 hours passed from the start of step 2), read the temporary code using the Subaru Select Monitor. <Ref. to EN(H4DO w/o HEV)(diag)-49, OPERATION, Read Diagnostic Trouble Code (DTC).>

10.DRIVE CYCLE N

DTC	Item	Condition
P0016	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A	«Coolant Temp.»: 80°C (176°F) or more
P0017	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B	
P0018	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR A	
P0019	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR B	

WARNING:
When performing drive cycle N on a public road, pay sufficient attention to the traffic condition and give the highest priority to safe driving.
1) Check the data in condition column of table by using the Subaru Select Monitor or general scan tool.

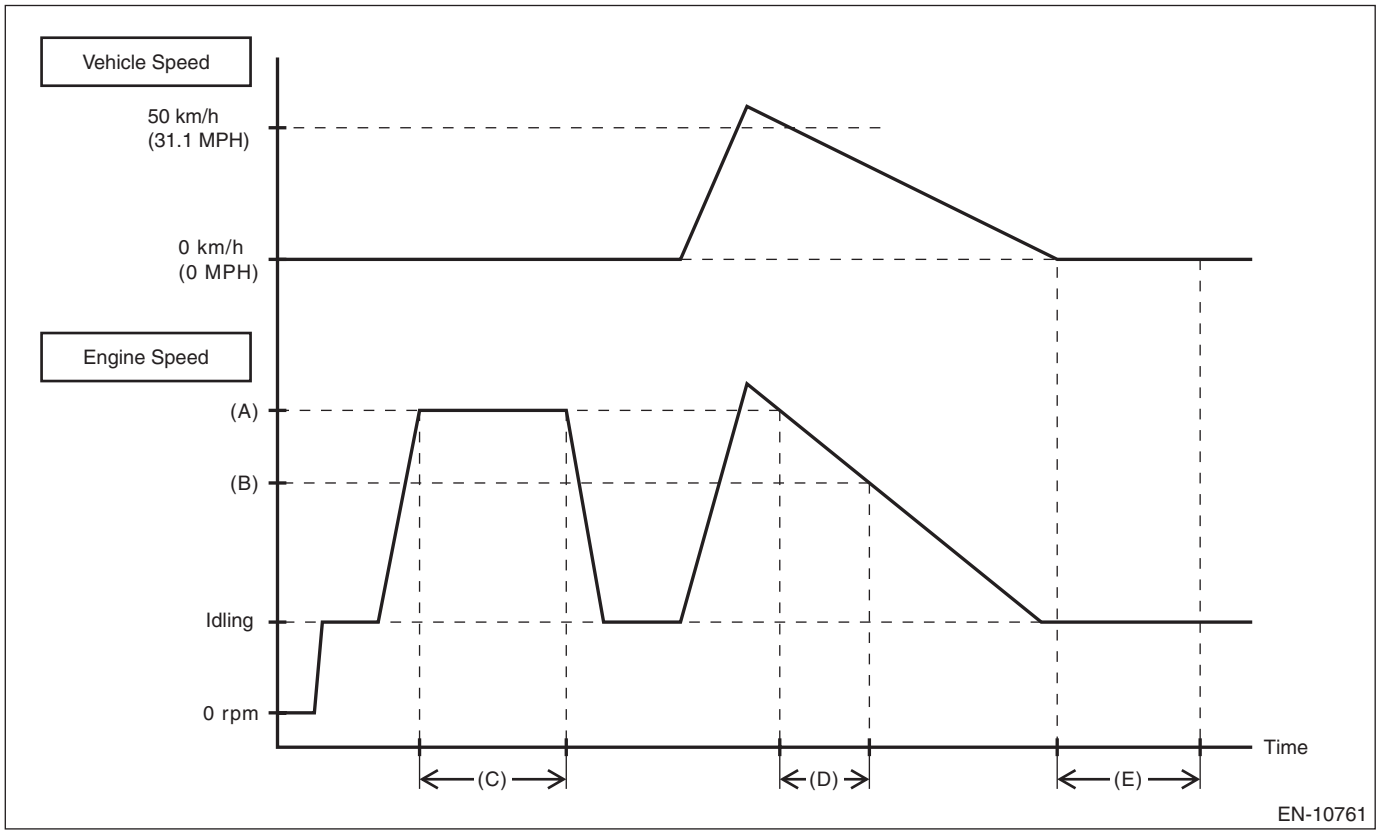
NOTE:
• Subaru Select Monitor
For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.>
• General scan tool
For detailed operation procedures, refer to the general scan tool operation manual.
2) While the conditions in the list are satisfied, race the engine at the speed of approx. 2,500 rpm for 40 seconds or more.
3) Start the vehicle, then accelerate the vehicle to 50 km/h (31.1 MPH) or more.
4) When the speed reaches 50 km/h (31.1 MPH) or more, release the accelerator pedal, the brake pedal and the clutch pedal (MT model) to decelerate the vehicle without shifting the gear. At this time, select an appropriate gear beforehand so that the engine speed can decrease from 2,500 rpm to 1,900 rpm for 5 seconds or more.

NOTE:
• The vehicle speed does not matter so long as the engine speed can maintain from 2,500 rpm to 1,900 rpm for 5 seconds or more.
Example: On a downhill grade, it can be performed with a low speed gear and at a low vehicle speed.
• When it is performed with the electrical load such as the air conditioner, etc. turned OFF or the vehicle driven on a downhill grade, the engine speed decreases slowly. Therefore, the continuous time can be maintained easily.
5) Bring the vehicle to a stop in a safe place, and idle it for 5 minutes or more.

NOTE:
Driving method while vehicle is driven to a stop at safe place is not restricted.
6) With the vehicle idling, read the temporary diagnostic code of DTC using Subaru Select Monitor or general scan tool.

NOTE:
• For detailed operation procedures, refer to “Read Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).>

• In the step 6), if the DTC is not displayed on the Subaru Select Monitor or general scan tool display screen, the trouble is resolved.



(A) 2500 rpm
(B) 1900 rpm
(C) 40 seconds or more
(D) 5 seconds or more
(E) 5 minutes or more

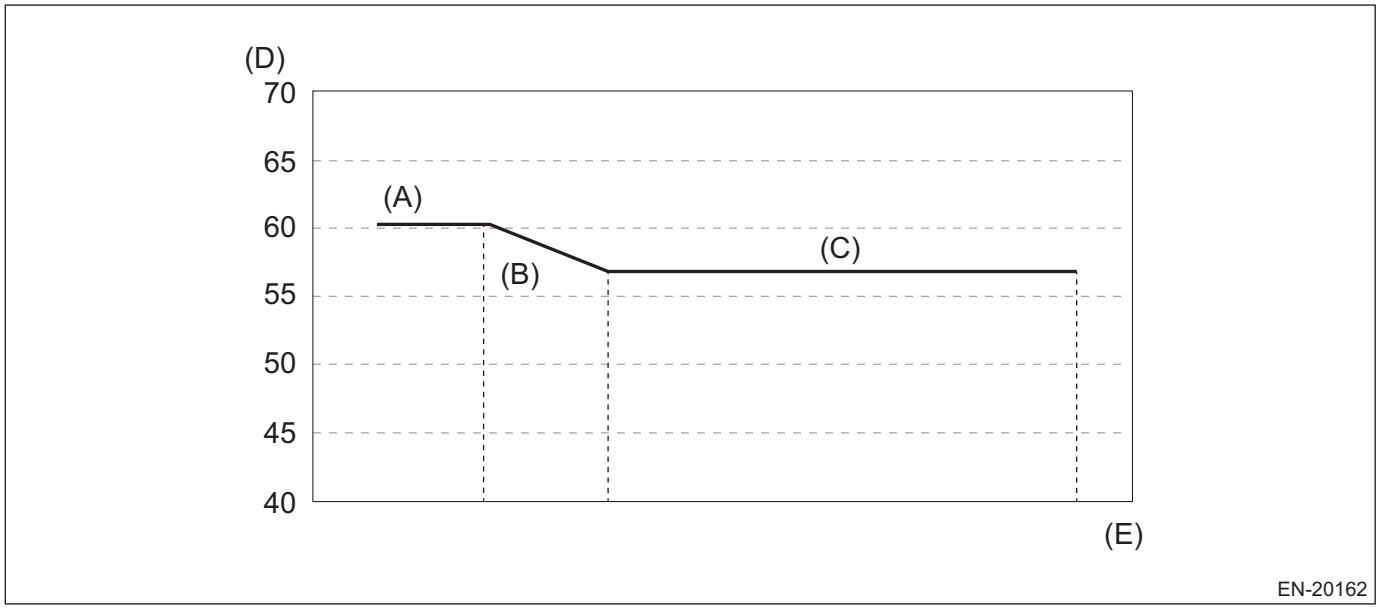
11.DRIVE CYCLE O

DTC	Item	Condition
P0441	EVAP SYSTEM (CPC) INCORRECT PURGE FLOW	—

Diagnostic procedure:

WARNING:
When performing drive cycle O on a public road, pay sufficient attention to the traffic condition and give the highest priority to safe driving.

1) Drive according to the drive pattern described below.



(A) Drive the vehicle at 60 km/h (37 MPH) or faster for at least 5 minutes in fully warm-up condition.
(B) Decelerate with the throttle fully closed for at least 3 seconds.
(C) Drive the vehicle at a constant vehicle speed by depressing the accelerator pedal for at least 30 seconds.
(D) Vehicle speed km/h (MPH)
(E) Sec.

2) Park the vehicle on a safe place.

NOTE:
Driving method while vehicle is driven to a stop at safe place is not restricted.

3) With the vehicle idling, read the temporary diagnostic code of DTC using Subaru Select Monitor or general scan tool.

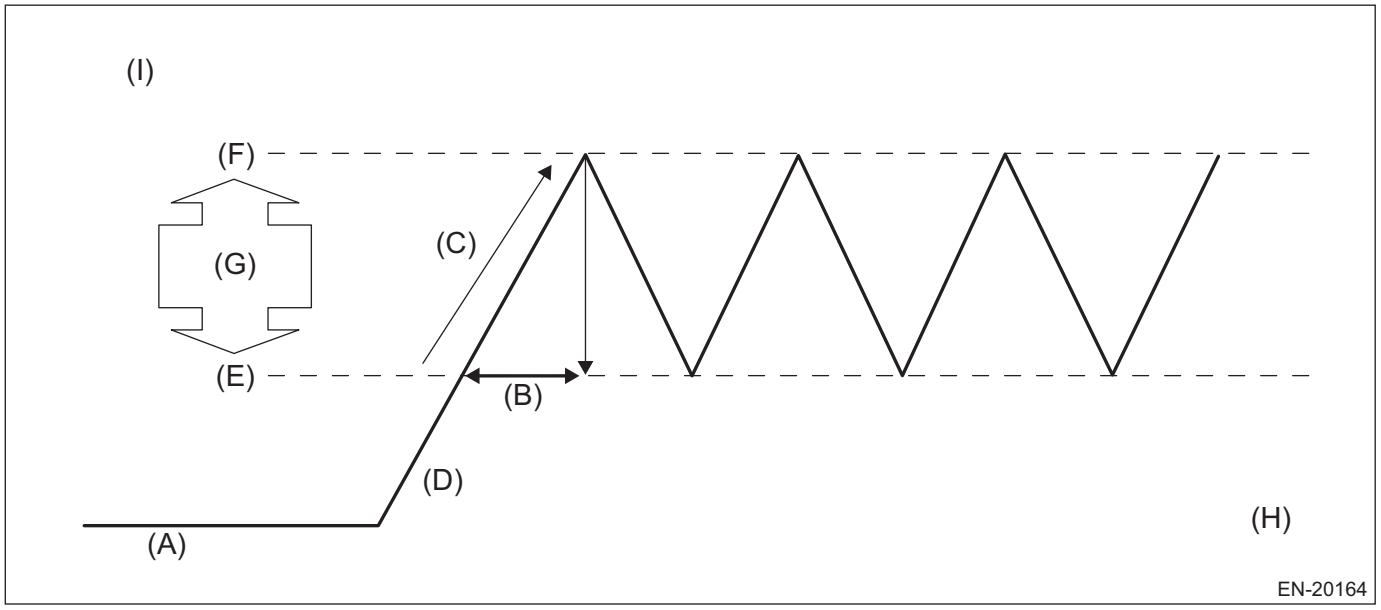
NOTE:
• For detailed operation procedures, refer to “Read Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).>
• In the step 3), if the DTC is not displayed on the Subaru Select Monitor or general scan tool display screen, the trouble is resolved.

12.DRIVE CYCLE R

DTC	Item	Condition
P219A	BANK 1 AIR-FUEL RATIO IMBALANCE	—

WARNING:
When performing the drive cycle R on the public road, be very careful of the traffic condition and the safe driving must be the high priority.
1) Check the data in condition column of table by using the Subaru Select Monitor or general scan tool.

NOTE:
• Subaru Select Monitor
For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.>
• General scan tool
For detailed operation procedures, refer to the general scan tool operation manual.
2) Keep the engine at idle for at least 30 seconds in a fully warm-up condition.
3) Start the driving.
4) With the gear position in the 4th, take 10 seconds to accelerate from 1200 rpm to 2600 rpm.
5) Decelerate to 1200 rpm in the 4th gear position. (There is no restrictions to the deceleration duration and how to use the brake.)
6) Repeat steps 4) and 5) 10 times (end when the temporary code is acquired).



(A)	Idle the engine for at least 30 seconds in a fully warm-up condition.	(D)	Engine speed	(G)	Accelerate and decelerate in the 4th gear position.
(B)	10 seconds	(E)	1200 rpm	(H)	Time
(C)	Accelerating	(F)	2600 rpm	(I)	Accelerating and decelerating

12.Clear Memory Mode

A: OPERATION

1. SUBARU SELECT MONITOR

NOTE:
• Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.
• For detailed operation procedures, refer to “Application help”.
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

2. GENERAL SCAN TOOL

For clear memory procedures using the general scan tool, refer to “General Scan Tool Instruction Manual”.

NOTE:
Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.

13.Active Test

A: OPERATION

CAUTION:
After executing the system operation check mode, execute the Clear Memory Mode. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>

NOTE:
- *: After replacing ECM, be sure to perform this procedure.
- For detailed operation procedures, refer to “Application help”.

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System».
5) On «Select Function» display, select «Active Test».

SSM display item	Execution condition	Remarks		
Fuel Pump Relay	Ignition switch is ON (engine OFF)	Activating the actuator ON/OFF	Activating the fuel pump ON/OFF	ON ←→ OFF
CPC Solenoid Valve			Activating the purge control solenoid valve ON/OFF	ON ←→ OFF
Radiator Fan Relay			Activating the radiator fan relay ON/OFF	ON ←→ OFF
A/C Compressor Relay			Activating the A/C relay ON/OFF	ON ←→ OFF
ELCM switching valve			Activating the ELCM switching valve ON/OFF	ON ←→ OFF
ELCM pump			Activating the ELCM vacuum pump ON/OFF	ON ←→ OFF
OFF Drive	At idling	Fuel pump control	Fuel pump OFF operation	OFF
Fixed Idle Ignition Timing	At idling	Fixing the timing of idle ignition		16.0°*
Idle Speed Control	At idling	Idle speed control		500 — 2000 rpm
Injection Stop Mode (Injector 1) Injection Stop Mode (Injector 2) Injection Stop Mode (Injector 3) Injection Stop Mode (Injector 4)	At idling	Injector control	Stopping fuel injection (Cylinder selection)	Injection Stop Mode (Injector 1) Injection Stop Mode (Injector 2) Injection Stop Mode (Injector 3) Injection Stop Mode (Injector 4)
Injection Quantity Control	At idling		Fuel injection amount control (All cylinders)	0 — 20%
EGR Valve Control	At idling	EGR control valve control		0 — 255 STEP
Alternator control	At idling	Alternator control (model with Auto Start Stop)		Low mode Middle mode High mode

*: Value may change depending on the idle speed.

14.Malfunction Indicator Light

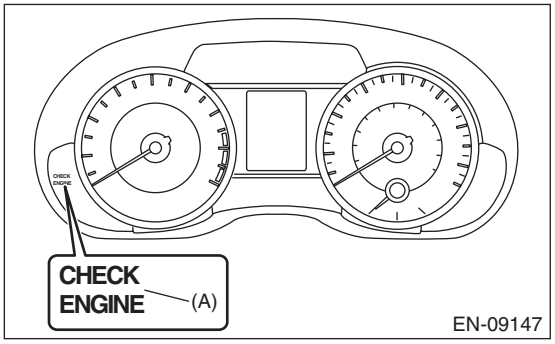
A: PROCEDURE

1. Activation of malfunction indicator light <Ref. to EN(H4DO w/o HEV)(diag)-69, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>
↓
2. Malfunction indicator light does not come on <Ref. to EN(H4DO w/o HEV)(diag)-71, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>
↓
3. Malfunction indicator light does not go off <Ref. to EN(H4DO w/o HEV)(diag)-71, MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF, Malfunction Indicator Light.>
↓
4. Malfunction indicator light does not blink <Ref. to EN(H4DO w/o HEV)(diag)-72, MALFUNCTION INDICATOR LIGHT DOES NOT BLINK, Malfunction Indicator Light.>
↓
5. Malfunction indicator light remains blinking <Ref. to EN(H4DO w/o HEV)(diag)-74, MALFUNCTION INDICATOR LIGHT REMAINS BLINKING, Malfunction Indicator Light.>

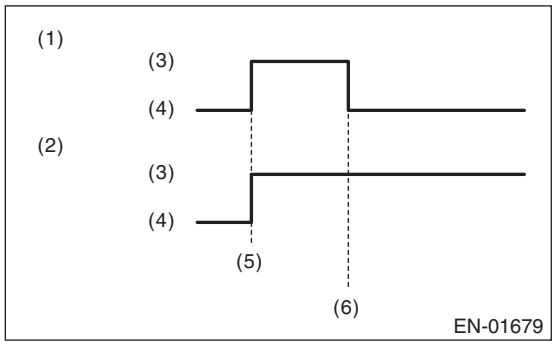
B: ACTIVATION OF MALFUNCTION INDICATOR LIGHT

1) When the ignition switch is turned to ON (engine OFF), the malfunction indicator light (A) in the combination meter illuminates.

NOTE:
If the malfunction indicator light does not illuminate, perform diagnostics of the malfunction indicator light circuit or the combination meter circuit. <Ref. to EN(H4DO w/o HEV)(diag)-71, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>

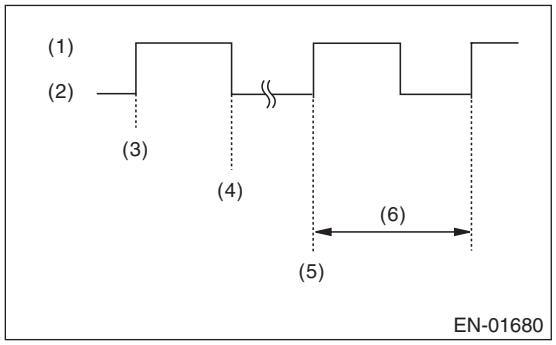


2) After starting the engine, the malfunction indicator light goes out. If it does not go off, any of the engine and emission control system has malfunction.



(1) No faulty
(2) Trouble occurs
(3) ON
(4) OFF
(5) Ignition switch ON
(6) Engine start

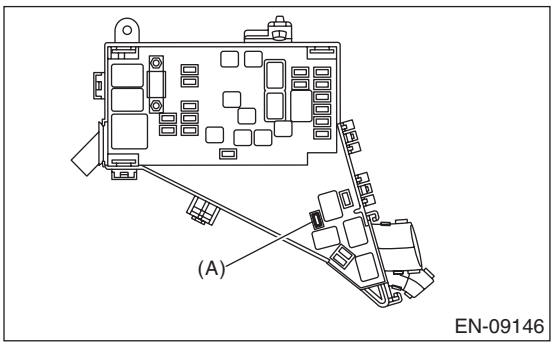
3) If the diagnostic system detects a misfire which could damage the catalyst, the malfunction indicator light will blink at a cycle of 1 Hz.



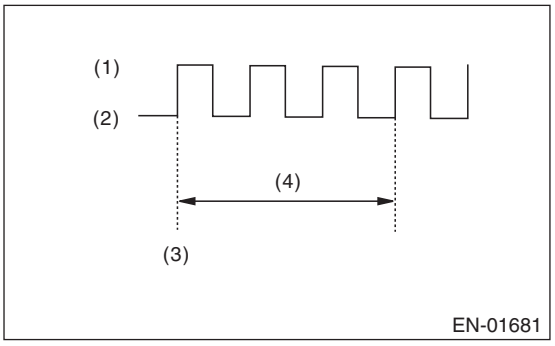
(1) ON
(2) OFF
(3) Ignition switch ON
(4) Engine start
(5) Misfire start
(6) 1 second

4) Install the delivery (test) mode fuse (A) with ignition switch to OFF.

CAUTION:
Do not use any fuses that are installed on the vehicle.



(1) When the ignition switch is turned to ON (engine OFF), the malfunction indicator light illuminates.
(2) After the engine starts, malfunction indicator light blinks in a cycle of 0.5 Hz. (During diagnosis)
(3) Malfunction indicator light blinks at a cycle of 3 Hz after diagnosis if there is no trouble. Malfunction indicator light illuminates if faulty.



(1) ON
(2) OFF
(3) Ignition switch ON
(4) 1 second

C: MALFUNCTION INDICATOR LIGHT DOES NOT COME ON

TROUBLE SYMPTOM:
When the ignition switch is turned to ON (engine OFF), malfunction indicator light does not illuminate.

NOTE:
Refer to IDI section for diagnostic procedure. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

D: MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF

TROUBLE SYMPTOM:
Although malfunction indicator light comes on when the engine runs, DTC is not shown on the Subaru Select Monitor or general scan tool display.

Step	Check	Yes	No
1 **CHECK DTC.**	Is DTC of engine or LAN system displayed? <Ref. to EN(H4DO w/o HEV)(diag)-49, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Check the combination meter system. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

E: MALFUNCTION INDICATOR LIGHT DOES NOT BLINK

DIAGNOSIS:

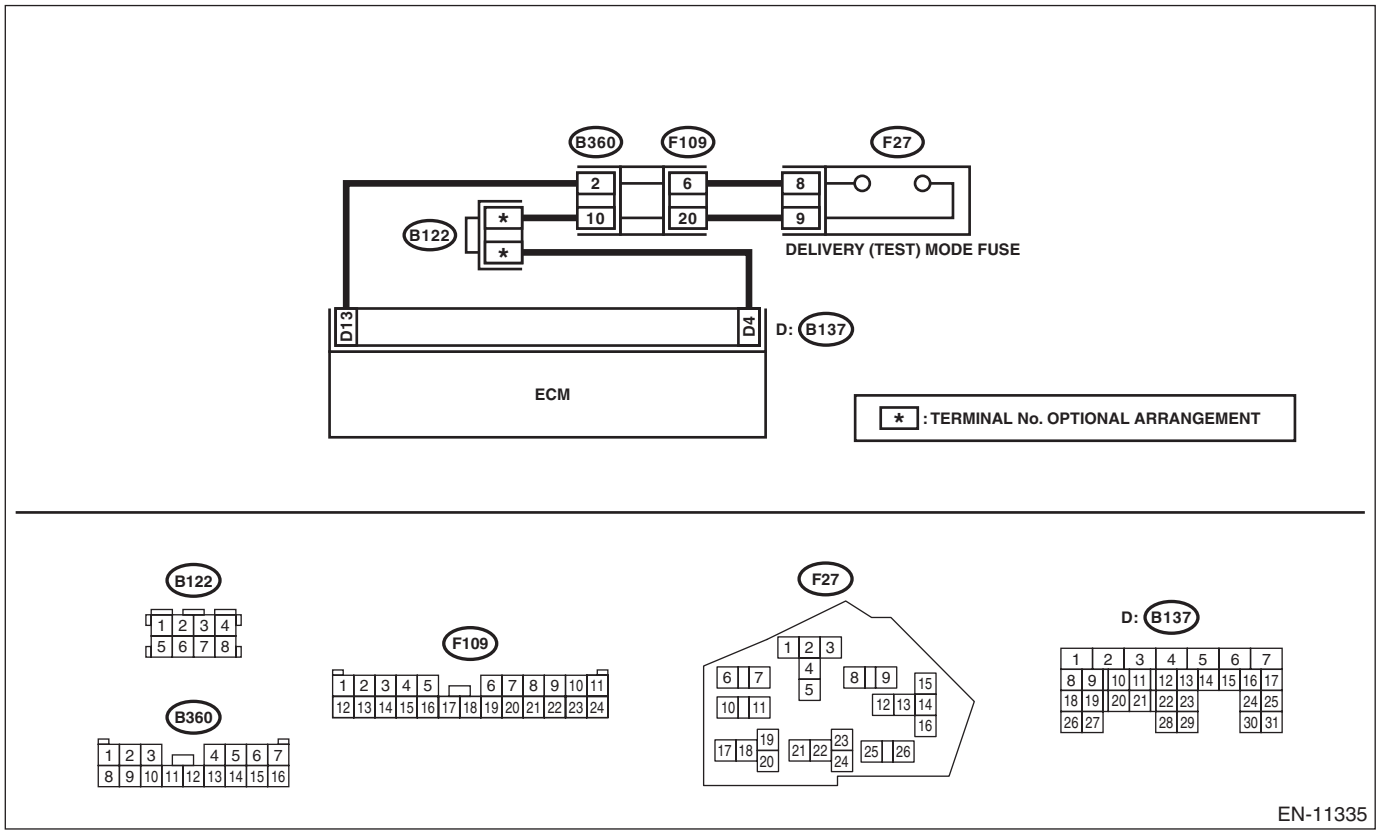
- The malfunction indicator light circuit is open or shorted.
- The delivery (test) mode fuse circuit is open.

TROUBLE SYMPTOM:

Malfunction indicator light does not blink during Inspection Mode.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

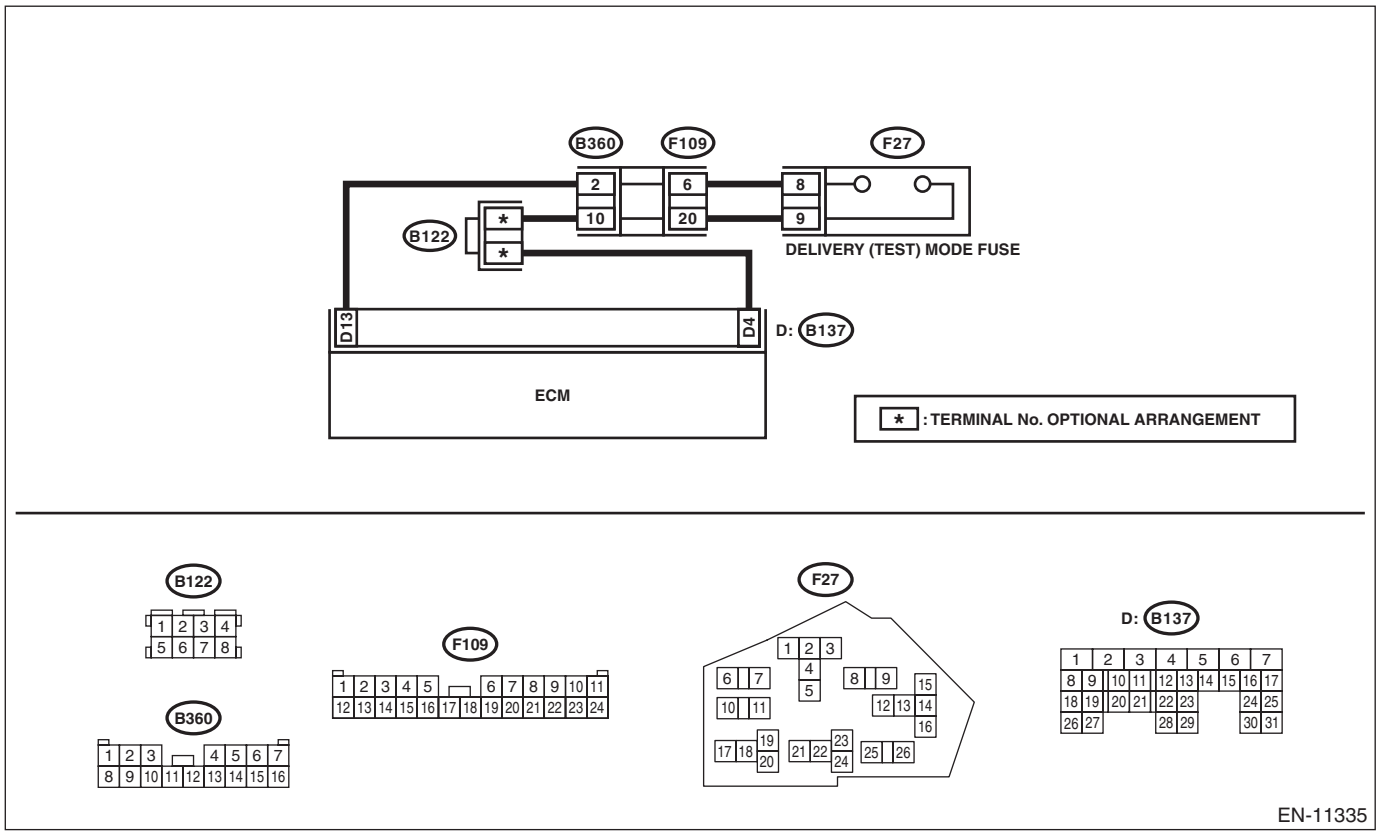


Step		Check	Yes	No
1	**CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.** 1) Turn the ignition switch to OFF. 2) Check the delivery (test) mode fuse is removed. 3) Turn the ignition switch to ON. (engine OFF)	Does the malfunction indicator light illuminate?	Go to step **2**.	Repair the malfunction indicator light circuit. <Ref. to EN(H4DO w/o HEV)(diag)-71, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND DELIVERY (TEST) MODE FUSE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Install the delivery (test) mode fuse. **CAUTION:** **Do not use any fuses that are installed on the vehicle.** 4) Measure the resistance of harness between ECM connectors. ***Connector & terminal*** ***(B137) No. 13 — (B137) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector • Poor contact of each connector between ECM connector
3	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>

F: MALFUNCTION INDICATOR LIGHT REMAINS BLINKING

DIAGNOSIS:
The delivery (test) mode fuse circuit is short-circuited to ground.
TROUBLE SYMPTOM:
Malfunction indicator light blinks when delivery (test) mode fuse is not connected.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



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	Step	Check	Yes	No
1	**CHECK DELIVERY (TEST) MODE CONNECTOR.** 1) Check the delivery (test) mode fuse is removed. 2) Turn the ignition switch to ON.	Does the malfunction indicator light blink?	Go to step **2**.	System is normal. NOTE: Malfunction indicator light blinks at a cycle of 3 Hz when delivery (test) mode fuse is attached.
2	**CHECK HARNESS BETWEEN ECM AND DELIVERY (TEST) MODE FUSE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 34 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Repair the short circuit to ground in the harness between the ECM connector and delivery (test) mode fuse.

15.Diagnostics for Engine Starting Failure

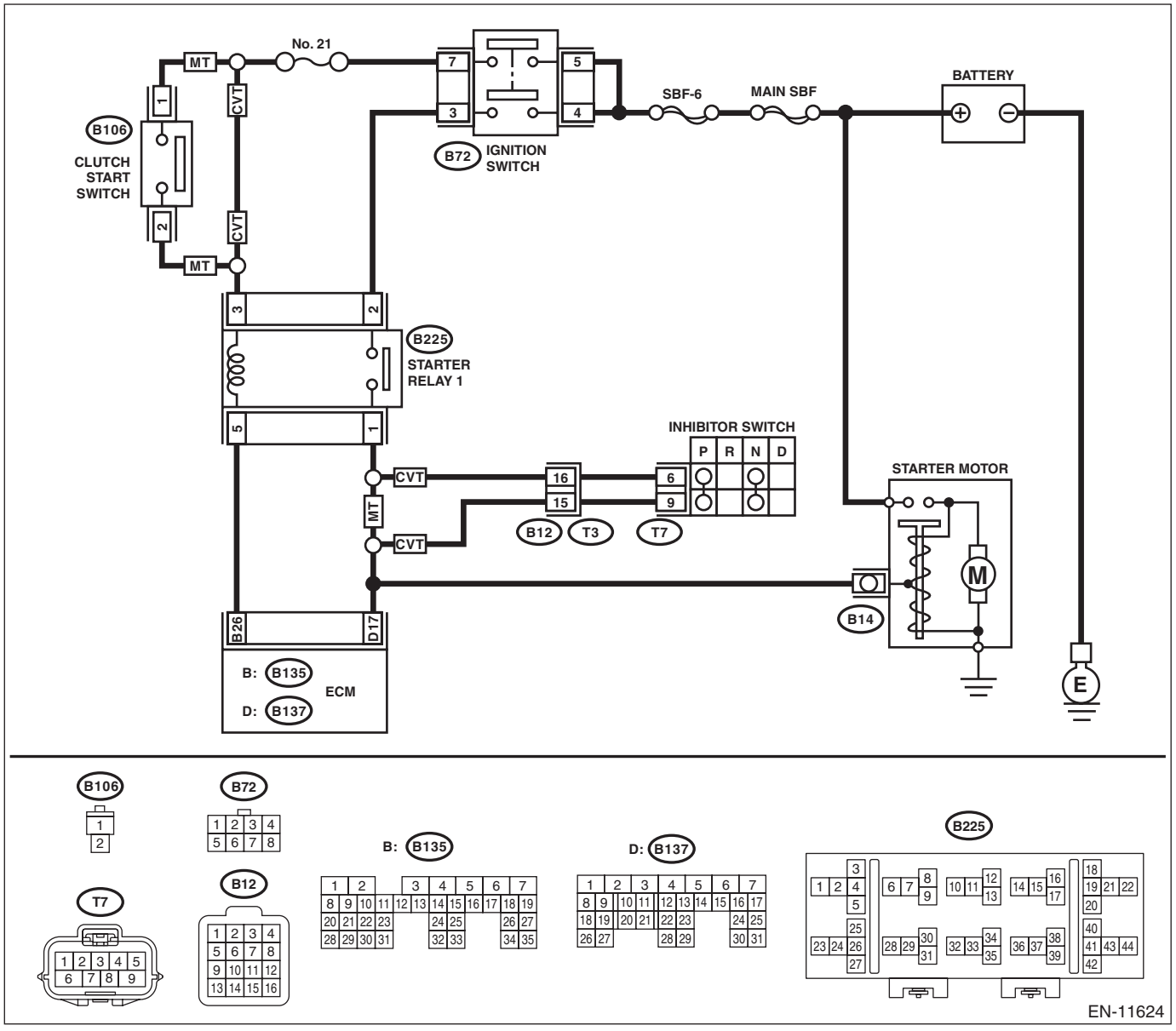
A: PROCEDURE

1. Check of the fuel amount
↓
2. Inspection of starter motor circuit <Ref. to EN(H4DO w/o HEV)(diag)-76, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ECM power supply and ground line <Ref. to EN(H4DO w/o HEV)(diag)-87, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>
↓
4. Inspection of ignition control system <Ref. to EN(H4DO w/o HEV)(diag)-89, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel pump circuit <Ref. to EN(H4DO w/o HEV)(diag)-91, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
6. Inspection of fuel injector circuit <Ref. to EN(H4DO w/o HEV)(diag)-93, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

B: STARTER MOTOR CIRCUIT

1. MODEL WITHOUT PUSH BUTTON START

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK BATTERY.** Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>	Is the battery OK?	Go to step **2**.	Charge or replace the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>
2	**CHECK OPERATION OF STARTER MOTOR.**	Does the starter motor operate?	Go to step **3**.	Go to step **4**.

	Step	Check	Yes	No
3	**CHECK DTC.**	Is DTC displayed? <Ref. to EN(H4DO w/o HEV)(diag)-49, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Check ignition control system. <Ref. to EN(H4DO w/o HEV)(diag)-89, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
4	**CHECK INPUT SIGNAL FOR STARTER MOTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter motor. 3) Turn the ignition switch to START. 4) Measure the voltage between the starter motor connector and the engine ground. ***Connector & terminal*** ***(B14) No. 1 (+) — Engine ground (–):*** NOTE: • For CVT model, place the select lever in "P" range or "N" range. • For MT model, depress the clutch pedal.	Is the voltage 10 V or more?	Check the starter motor. <Ref. to SC(H4DO(w/o HEV))-8, Starter.>	Go to step **5**.
5	**CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition switch. 3) Measure the power supply voltage between ignition switch connector and chassis ground. ***Connector & terminal*** ***(B72) No. 4 (+) — Chassis ground (–):*** ***(B72) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Repair the power supply circuit.
6	**CHECK IGNITION SWITCH.** Measure the resistance between ignition switch terminals after turning the ignition switch to START position. ***Terminals*** ***No. 3 — No. 4:*** ***No. 5 — No. 7:***	Is the resistance less than 1 Ω?	Go to step **7**.	Replace the ignition switch. <Ref. to SL-65, REPLACEMENT, Ignition Key Lock.>
7	**CHECK INPUT VOLTAGE OF STARTER RELAY 1.** 1) Turn the ignition switch to OFF. 2) Remove the starter relay 1. 3) Connect the connector to ignition switch. 4) Measure the voltage between starter relay 1 connector and chassis ground after turning the ignition switch to START position. ***Connector & terminal*** ***(B225) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **8**.	Repair the open circuit of harness between starter relay 1 and ignition switch connector.
8	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and starter relay 1 connector. ***Connector & terminal*** ***(B135) No. 26 — (B225) No. 5:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the open circuit of harness between ECM connector and starter relay 1 connector.

	Step	Check	Yes	No
9	**CHECK STARTER RELAY 1.** 1) Connect the battery to starter relay 1 terminals No. 3 and No. 5. 2) Measure the resistance between starter relay 1 terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **10**.	Replace the starter relay 1. <Ref. to EN(H4DO w/o HEV)(diag)-10, Electrical Component Location.>
10	**CHECK TRANSMISSION TYPE.**	Is the transmission type CVT?	Go to step **11**.	Go to step **15**.
11	**CHECK INPUT VOLTAGE OF STARTER RELAY 1.** Measure the voltage between starter relay 1 connector and chassis ground after turning the ignition switch to START position. ***Connector & terminal*** ***(B225) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **12**.	Check the following item and repair if necessary. • Blown out of fuse • Open or short circuit to ground in harness between starter relay 1 and ignition switch connector
12	**CHECK HARNESS BETWEEN STARTER RELAY 1 AND INHIBITOR SWITCH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from inhibitor switch. 3) Measure the resistance of harness between starter relay 1 connector and inhibitor switch connector. ***Connector & terminal*** ***(B225) No. 1 — (T7) No. 6:***	Is the resistance less than 1 Ω?	Go to step **13**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between starter relay 1 connector and inhibitor switch connector • Poor contact of coupling connector
13	**CHECK HARNESS BETWEEN INHIBITOR SWITCH AND STARTER MOTOR.** Measure the resistance of harness between the inhibitor switch connector and starter motor. ***Connector & terminal*** ***(T7) No. 9 — (B14) No. 1:***	Is the resistance less than 1 Ω?	Go to step **14**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between inhibitor switch connector and starter motor • Poor contact of coupling connector
14	**CHECK INHIBITOR SWITCH.** 1) Place the select lever in “P” range and “N” range. 2) Measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 6 — No. 9:***	Is the resistance less than 1 Ω?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DO w/o HEV)(diag)-87, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Replace the inhibitor switch. <Ref. to CVT(TR580)-100, Inhibitor Switch.>

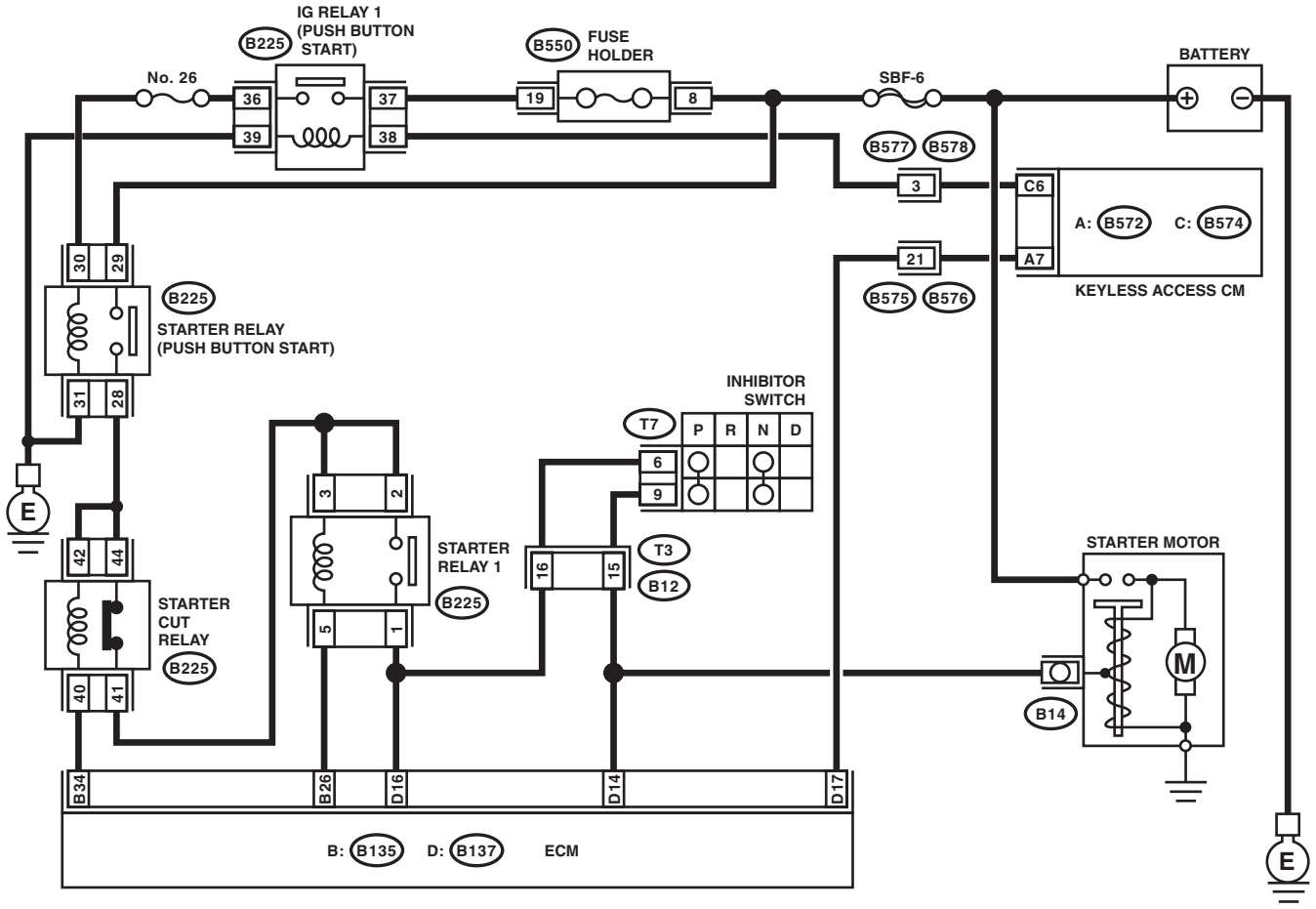
	Step	Check	Yes	No
15	**CHECK INPUT VOLTAGE OF CLUTCH START SWITCH.** 1) Disconnect the connector from clutch start switch. 2) Turn the ignition switch to START. 3) Measure the voltage between the clutch start switch connector and chassis ground. ***Connector & terminal*** ***(B106) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **16**.	Check the following item and repair if necessary. • Blown out of fuse • Open or short circuit to ground in harness between ignition switch connector and clutch start switch connector
16	**CHECK CLUTCH START SWITCH.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between clutch start switch terminals while keeping the clutch pedal depressed. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **17**.	Replace the clutch start switch. <Ref. to CL-30, Clutch Switch.>
17	**CHECK HARNESS BETWEEN STARTER RELAY 1 AND CLUTCH START SWITCH.** Measure the resistance of harness between starter relay 1 and clutch start switch connector. ***Connector & terminal*** ***(B225) No. 3 — (B106) No. 2:***	Is the resistance less than 1 Ω?	Go to step **18**.	Repair the open circuit in harness between starter relay 1 and clutch start switch connector.
18	**CHECK HARNESS BETWEEN STARTER RELAY 1 AND STARTER MOTOR.** Measure the resistance of harness between starter relay 1 connector and starter motor. ***Connector & terminal*** ***(B225) No. 1 — (B14) No. 1:***	Is the resistance less than 1 Ω?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DO w/o HEV)(diag)-87, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair the open circuit of the harness between starter relay 1 connector and starter motor.

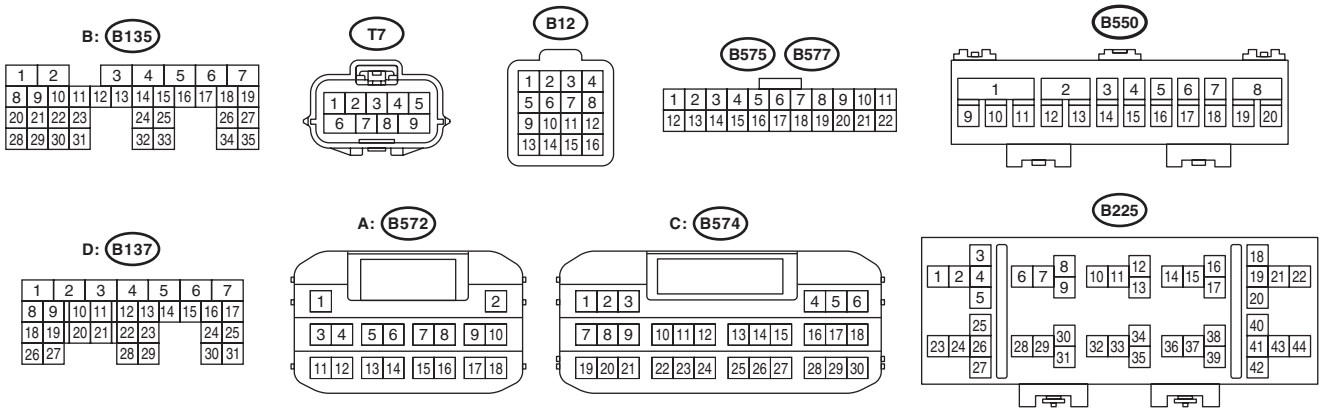
2. MODEL WITH PUSH BUTTON START

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, WITHOUT PUSH BUTTON START, WIRING DIAGRAM, Engine Electrical System.>





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	Step	Check	Yes	No
1	**CHECK DTC.**	Is DTC displayed? <Ref. to EN(H4DO w/o HEV)(diag)-49, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK NEUTRAL POSITION SWITCH SIGNAL.** 1) Read the value of «Neutral Position Switch» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> 2) Turn the ignition to ON. 3) Place the select lever in “P” range or “N” range.	Is «Neutral» displayed?	Go to step **3**.	Go to step **8**.
3	**CHECK BATTERY.** Check the battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the battery OK?	Go to step **4**.	Charge or replace the battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
4	**CHECK OPERATION OF STARTER MOTOR.**	Does the starter motor operate?	Check ignition control system. <Ref. to EN(H4DO w/o HEV)(diag)-89, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to step **5**.
5	**CHECK PUSH BUTTON IGNITION SWITCH.** Press the push button ignition switch twice with the ignition OFF (ACC OFF). NOTE: Release the brake pedal.	Does the ignition turn to ON?	Go to step **6**.	Check the push button start system. <Ref. to KPS(diag)-108, POWER SUPPLY SWITCHING SYSTEM, INSPECTION, General Diagnostic Table.>
6	**CHECK PUSH BUTTON IGNITION SWITCH.** 1) Depress the brake pedal. NOTE: Shift the select lever to “P” range. 2) Check the push button ignition switch indicator.	Does the indicator turn to green?	Go to step **7**.	Check the push button start system. <Ref. to KPS(diag)-141, ENGINE DOES NOT START, INSPECTION, Diagnostics with Phenomenon.>

	Step	Check	Yes	No
7	**CHECK START SWITCH SIGNAL.** 1) Read the waveform of «Starter SW» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> 2) Press the push button ignition switch once with the brake pedal depressed.	Does waveform of the «Starter SW» occur?	Go to step **11**.	Go to step **8**.
8	**CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM.** 1) Turn the ignition to OFF. 2) Disconnect the connectors from ECM and keyless access CM. 3) Measure the resistance of harness between ECM connector and keyless access CM. ***Connector & terminal*** ***(B137) No. 17 — (B572) No. 7:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and keyless access CM connector • Poor contact of coupling connector
9	**CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **10**.	Repair the short circuit to ground in harness between ECM connector and keyless access CM connector.
10	**CHECK START SWITCH SIGNAL.** 1) Connect the connector to ECM and keyless access CM. 2) Read the waveform of start switch signal using an oscilloscope. 3) Press the push button ignition switch once with the brake pedal depressed. ***Connector & terminal*** ***(B137) No. 17 (+) — Chassis ground (–):***	Does waveform of the start switch signal occur?	Repair the poor contact of ECM connector.	Repair the poor contact of keyless access CM connector.
11	**CHECK INPUT SIGNAL FOR STARTER MOTOR.** 1) Turn the ignition to OFF. 2) Disconnect the connector from starter motor. 3) Place the select lever in "P" range or "N" range. 4) Press the push button ignition switch once with the brake pedal depressed. 5) Measure the voltage between the starter motor connector and the engine ground. ***Connector & terminal*** ***(B14) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Check the starter motor. <Ref. to SC(H4DO(HEV))-10, Starter.>	Go to step **12**.
12	**CHECK HARNESS BETWEEN BATTERY AND STARTER MOTOR.** 1) Turn the ignition to OFF. 2) Measure the voltage between starter motor terminal B and engine ground. ***Terminals*** ***Terminal B (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **13**.	Repair the power supply circuit.

	Step	Check	Yes	No
13	**CHECK IG RELAY 1 (PUSH BUTTON START) POWER SUPPLY.** 1) Remove the IG relay 1 (push button start). 2) Turn the ignition to ON. 3) Measure the voltage between the IG relay 1 (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 37 (+) — Chassis ground (–):*** ***(B225) No. 38 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **14**.	Check the following item and repair or replace if necessary. • Blown out of fuse • Open circuit or short circuit to ground in harness between IG relay 1 (push button start) connector and keyless access CM connector • Open circuit or short circuit to ground in harness between IG relay 1 (push button start) connector and 12 volt auxiliary battery • Poor contact of coupling connector
14	**CHECK HARNESS BETWEEN IG RELAY 1 (PUSH BUTTON START) CONNECTOR AND CHASSIS GROUND.** 1) Turn the ignition to OFF. 2) Measure the resistance of harness between the IG relay 1 (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 39 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **15**.	Repair the open circuit in harness between the IG relay 1 (push button start) connector and chassis ground.
15	**CHECK IG RELAY 1 (PUSH BUTTON START).** 1) Connect the battery to IG relay 1 (push button start) terminals No. 38 and No. 39. 2) Measure the resistance between IG relay 1 (push button start) terminals. ***Terminals*** ***No. 36 — No. 37:***	Is the resistance less than 1 Ω?	Go to step **16**.	Replace the IG relay 1 (push button start). <Ref. to SL-111, IG Relay1 (Push Button Start).>

	Step	Check	Yes	No
16	**CHECK STARTER RELAY (PUSH BUTTON START) POWER SUPPLY.** 1) Install the IG relay 1 (push button start). 2) Remove the starter relay (push button start). 3) Turn the ignition to ON. 4) Measure the voltage between starter relay (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 29 (+) — Chassis ground (–):*** ***(B225) No. 30 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **17**.	Check the following item and repair or replace if necessary. • Blown out of fuse (F/B No. 26) • Open circuit or short circuit to ground in harness between starter relay (push button start) connector and IG relay 1 (push button start) connector • Open circuit or short circuit to ground in harness between starter relay (push button start) connector and 12 volt auxiliary battery
17	**CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND CHASSIS GROUND.** 1) Turn the ignition to OFF. 2) Measure the resistance of harness between starter relay (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 31 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **18**.	Repair the open circuit in harness between starter relay (push button start) connector and chassis ground.
18	**CHECK STARTER RELAY (PUSH BUTTON START).** 1) Connect the battery to starter relay (push button start) terminals No. 30 and No. 31. 2) Measure the resistance between starter relay (push button start) terminals. ***Terminals*** ***No. 28 — No. 29:***	Is the resistance less than 1 Ω?	Go to step **19**.	Replace the starter relay (push button start). <Ref. to SL-109, Starter Relay (Push Button Start).>
19	**CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND STARTER CUT RELAY CONNECTOR.** 1) Remove the starter cut relay. 2) Measure the resistance of harness between starter relay (push button start) connector and starter cut relay connector. ***Connector & terminal*** ***(B225) No. 28 — (B225) No. 42:*** ***(B225) No. 28 — (B225) No. 44:***	Is the resistance less than 1 Ω?	Go to step **20**.	Repair the open circuit in harness between starter relay (push button start) connector and starter cut relay connector.
20	**CHECK HARNESS BETWEEN ECM AND STARTER CUT RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between starter cut relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **21**.	Repair the short circuit to ground in harness between ECM connector and starter cut relay connector.

	Step	Check	Yes	No
21	**CHECK STARTER CUT RELAY.** Measure the resistance between starter cut relay terminals. ***Terminals*** ***No. 41 — No. 44:***	Is the resistance less than 1 Ω?	Go to step **22**.	Replace the starter cut relay. <Ref. to SL-117, Starter Cut Relay.>
22	**CHECK HARNESS BETWEEN STARTER CUT RELAY CONNECTOR AND STARTER RELAY 1 CONNECTOR.** 1) Remove the starter relay 1. 2) Measure the resistance of harness between starter cut relay connector and starter relay 1 connector. ***Connector & terminal*** ***(B225) No. 41 — (B225) No. 2:*** ***(B225) No. 41 — (B225) No. 3:***	Is the resistance less than 1 Ω?	Go to step **23**.	Repair the open circuit of harness between starter cut relay connector and starter relay 1 connector.
23	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** Measure the resistance of harness between ECM connector and starter relay 1 connector. ***Connector & terminal*** ***(B135) No. 26 — (B225) No. 5:***	Is the resistance less than 1 Ω?	Go to step **24**.	Repair the open circuit of harness between ECM connector and starter relay 1 connector.
24	**CHECK STARTER RELAY 1.** 1) Connect the battery to starter relay 1 terminals No. 3 and No. 5. 2) Measure the resistance between starter relay 1 terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **25**.	Replace the starter relay 1. <Ref. to EN(H4DO w/o HEV)(diag)-10, LOCATION, Electrical Component Location.>
25	**CHECK HARNESS BETWEEN STARTER RELAY 1 CONNECTOR AND INHIBITOR SWITCH CONNECTOR.** 1) Disconnect the connector from inhibitor switch. 2) Measure the resistance of harness between starter relay 1 connector and inhibitor switch connector. ***Connector & terminal*** ***(B225) No. 1 — (T7) No. 6:***	Is the resistance less than 1 Ω?	Go to step **26**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between starter relay 1 connector and inhibitor switch connector • Poor contact of coupling connector
26	**CHECK INHIBITOR SWITCH.** 1) Place the select lever in “P” range and “N” range. 2) Measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 6 — No. 9:***	Is the resistance less than 1 Ω?	Go to step **27**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
27	**CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and inhibitor switch connector. ***Connector & terminal*** ***(B137) No. 16 — (T7) No. 6:***	Is the resistance less than 1 Ω?	Go to step **28**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and inhibitor switch connector • Poor contact of coupling connector

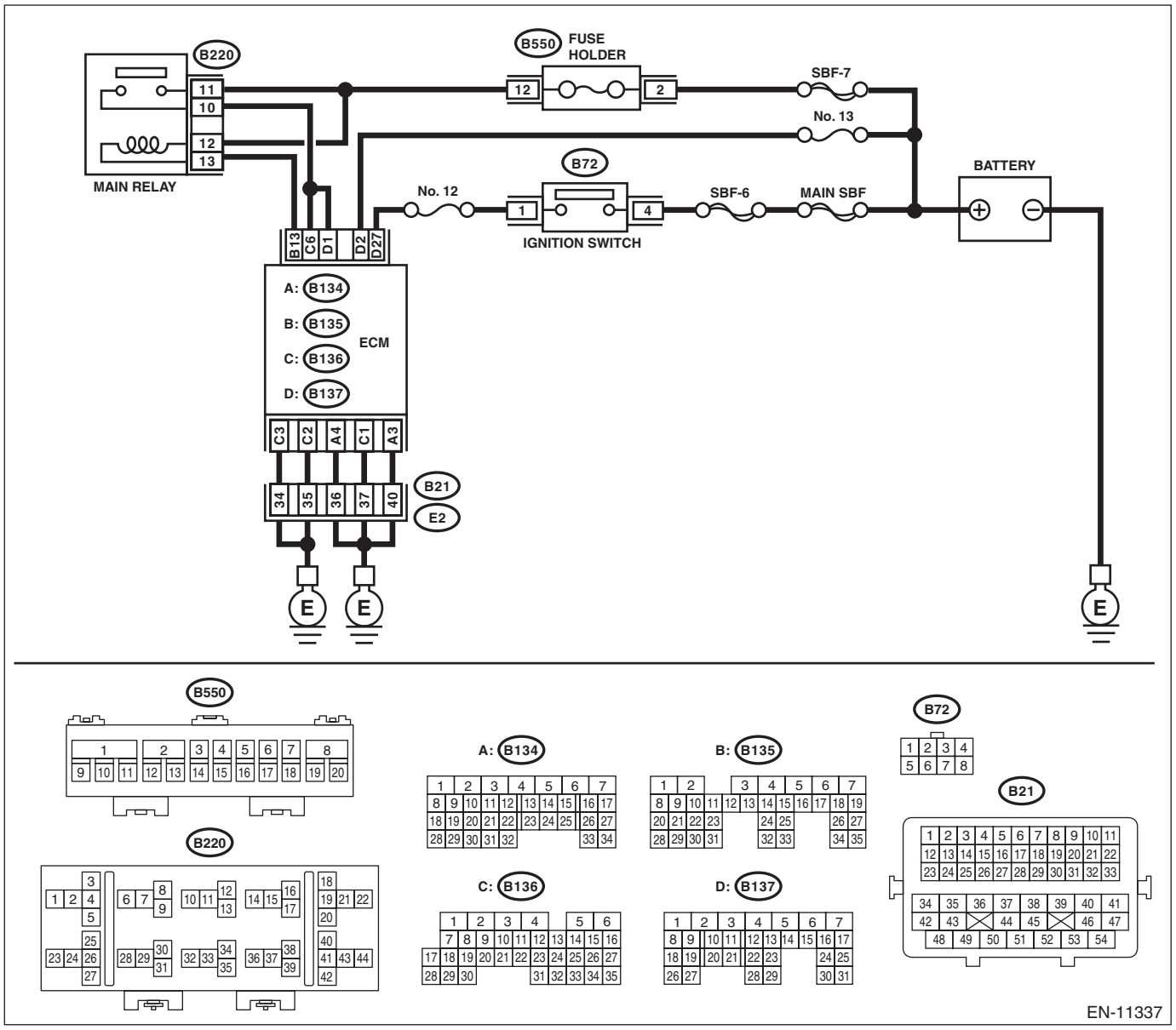
	Step	Check	Yes	No
28	**CHECK HARNESS BETWEEN INHIBITOR SWITCH AND STARTER MOTOR.** Measure the resistance of harness between the inhibitor switch connector and starter motor. ***Connector & terminal*** ***(T7) No. 9 — (B14) No. 1:***	Is the resistance less than 1 Ω?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DO w/o HEV)(diag)-87, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between inhibitor switch connector and starter motor connector • Poor contact of coupling connector

C: CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM)

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



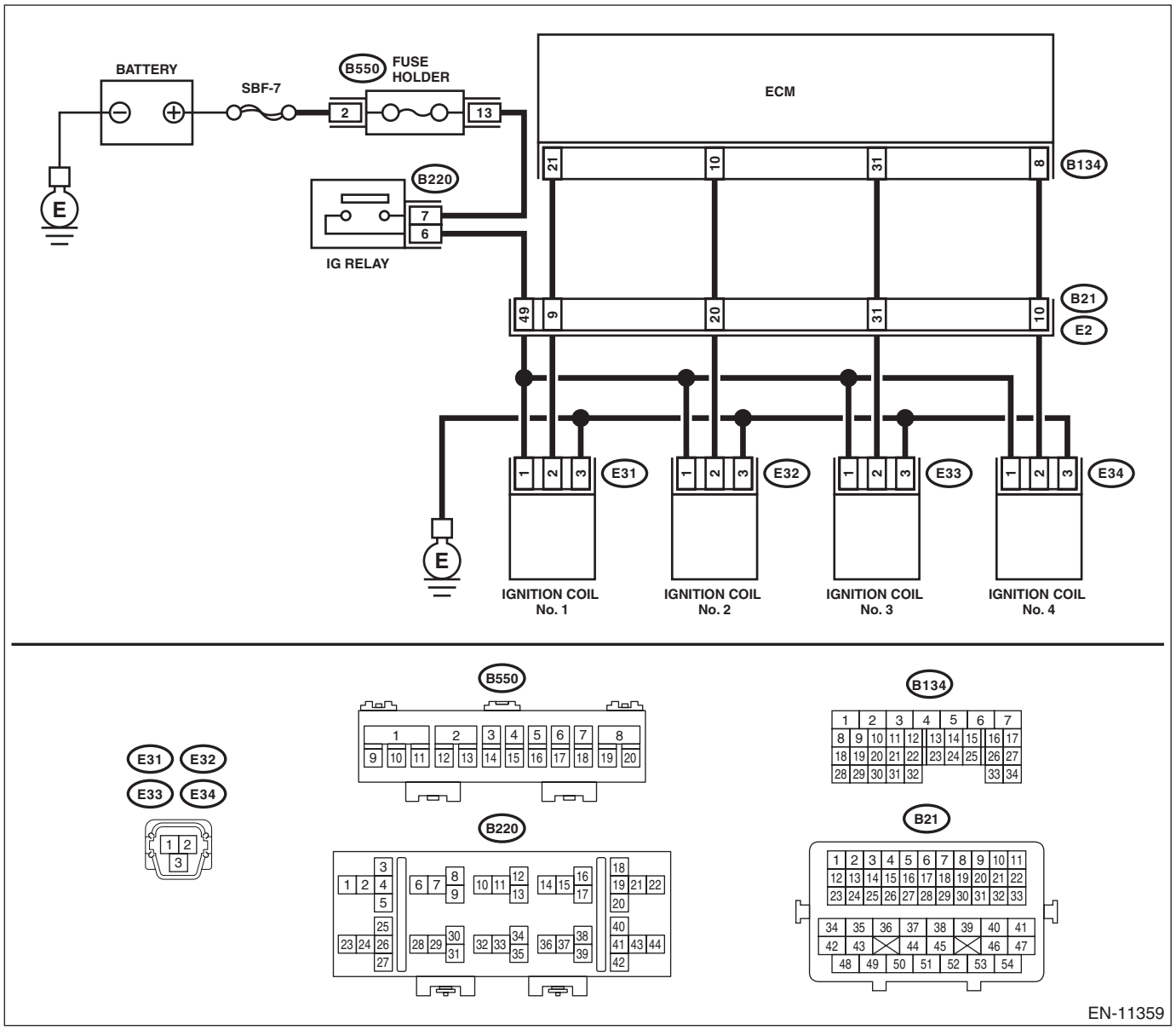
Step		Check	Yes	No
1	**CHECK MAIN RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the main relay. 3) Connect the battery to main relay terminals No. 12 and No. 13. 4) Measure the resistance between main relay terminals. ***Terminals*** ***No. 10 — No. 11:***	Is the resistance less than 1 Ω?	Go to step **2**.	Replace the main relay. <Ref. to FU(H4DO(w/o HEV))-102, Main Relay.>

	Step	Check	Yes	No
2	**CHECK GROUND CIRCUIT FOR ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground terminal • Poor contact of coupling connector
3	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 2 (+) — Chassis ground (–):*** ***(B137) No. 27 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the open or ground short circuit of harness of power supply circuit.
4	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Measure the voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 11 (+) — Chassis ground (–):*** ***(B220) No. 12 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or ground short circuit of harness of power supply circuit.
5	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to OFF. 2) Install the main relay. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Repair the open circuit of harness between ECM connector and main relay connector.
6	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to OFF. 2) Connect the connector to ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 6 (+) — Chassis ground (–):*** ***(B137) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Check ignition control system. <Ref. to EN(H4DO w/o HEV)(diag)-89, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and main relay connector • Poor contact of main relay connector • Poor contact of ECM connector

D: IGNITION CONTROL SYSTEM

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK SPARK PLUG CONDITION.** 1) Remove the spark plug. <Ref. to IG(H4DO(w/o HEV))-4, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H4DO(w/o HEV))-7, INSPECTION, Spark Plug.>	Is the spark plug condition normal?	Go to step **2**.	Replace the spark plug. <Ref. to IG(H4DO(w/o HEV))-4, Spark Plug.>

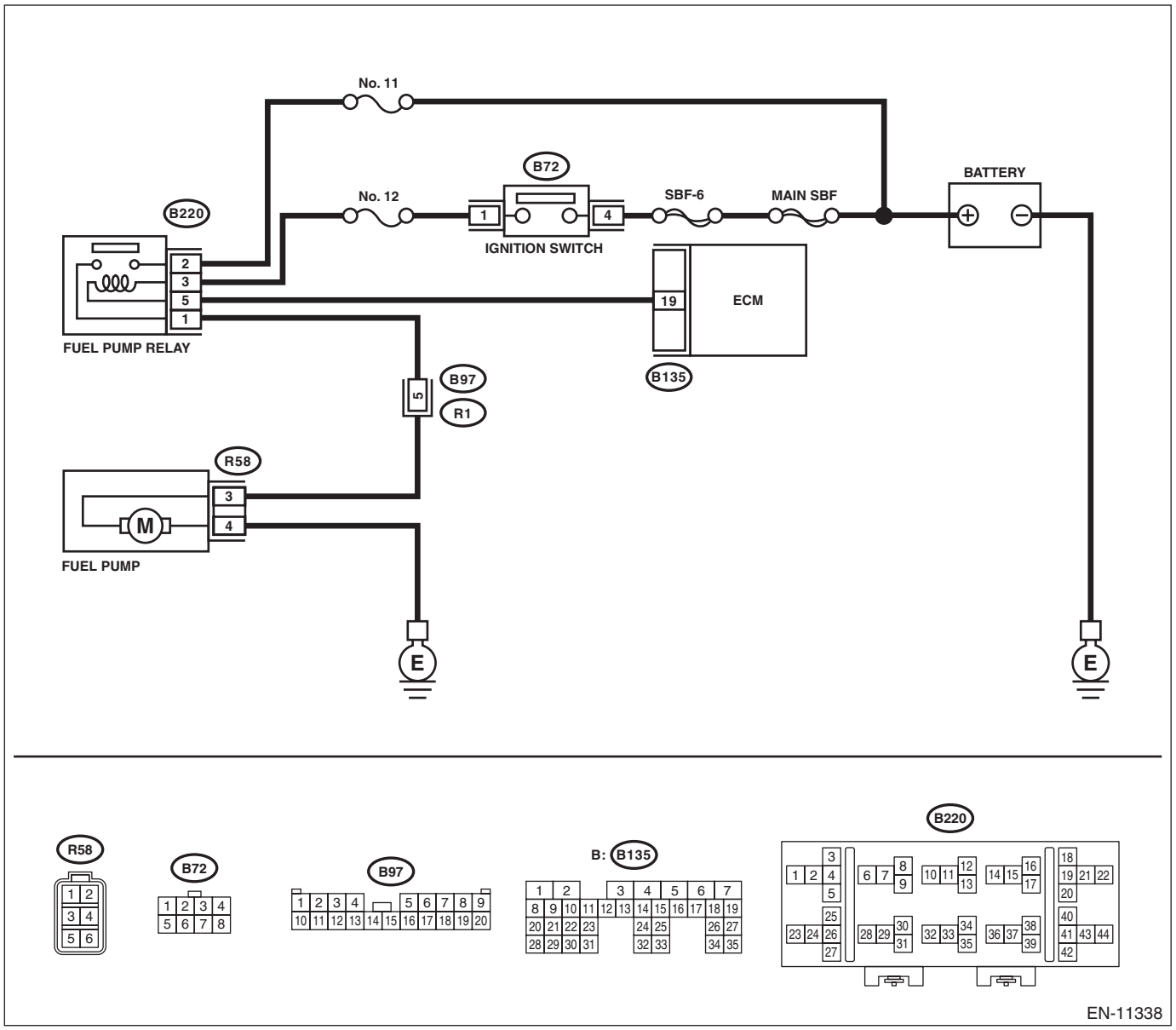
	Step	Check	Yes	No
2	**CHECK IGNITION SYSTEM FOR SPARKS.** 1) Connect the spark plug to ignition coil. 2) Release the fuel pressure. <Ref. to FU(H4DO(w/o HEV))-109, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.> 3) Contact the spark plug thread portion to engine. 4) While opening the throttle valve fully, crank the engine to check that spark occurs at each cylinder.	Does spark occur at each cylinder?	Check fuel pump system. <Ref. to EN(H4DO w/o HEV)(diag)-91, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **3**.
3	**CHECK IGNITION COIL POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil. 3) Turn the ignition switch to ON. 4) Measure the voltage between ignition coil connector and engine ground. ***Connector & terminal*** ***(E31) No. 1 (+) — Engine ground (–):*** ***(E32) No. 1 (+) — Engine ground (–):*** ***(E33) No. 1 (+) — Engine ground (–):*** ***(E34) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness of power supply circuit • Poor contact of coupling connector • Blown out of fuse
4	**CHECK HARNESS OF IGNITION COIL GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between ignition coil connector and engine ground. ***Connector & terminal*** ***(E31) No. 3 — Engine ground:*** ***(E32) No. 3 — Engine ground:*** ***(E33) No. 3 — Engine ground:*** ***(E34) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair the open circuit in harness between ignition coil connector and engine grounding terminal.
5	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and ignition coil connector. ***Connector & terminal*** ***(B134) No. 21 — (E31) No. 2:*** ***(B134) No. 10 — (E32) No. 2:*** ***(B134) No. 31 — (E33) No. 2:*** ***(B134) No. 8 — (E34) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and the ignition coil connector • Poor contact of coupling connector
6	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.** Measure the resistance of harness between ECM connector and engine ground. ***Connector & terminal:*** ***(B134) No. 21 — Engine ground:*** ***(B134) No. 10 — Engine ground:*** ***(B134) No. 31 — Engine ground:*** ***(B134) No. 8 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair the ground short circuit of harness between ECM connector and ignition coil connector.
7	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Replace the ignition coil. <Ref. to IG(H4DO(w/o HEV))-12, Ignition Coil.>

E: FUEL PUMP CIRCUIT

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



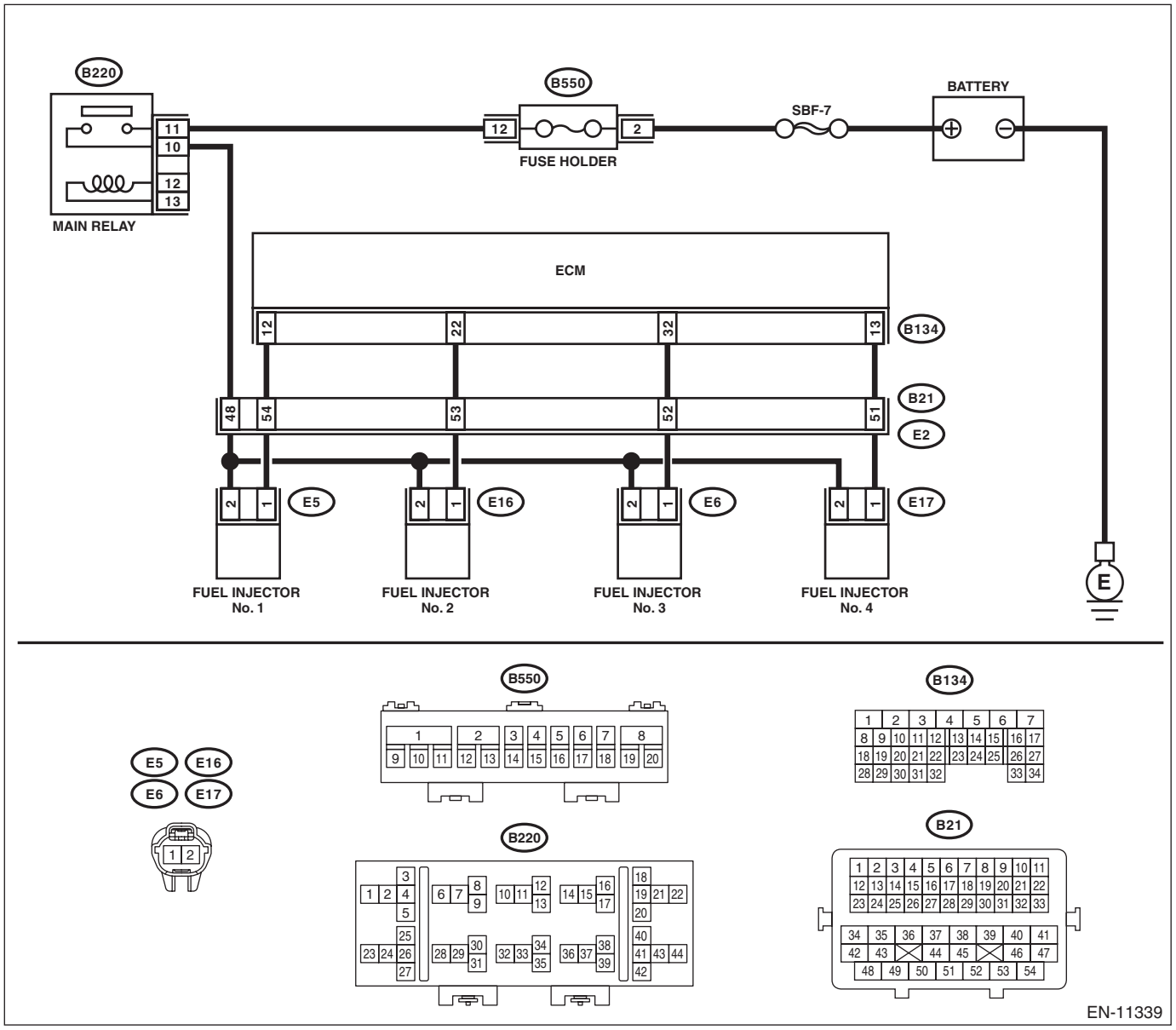
Step		Check	Yes	No
1	**CHECK OPERATING SOUND OF FUEL PUMP.** Check if the fuel pump operates for two seconds when turning the ignition switch to ON. NOTE: Fuel pump operation can be executed using the Subaru Select Monitor. Refer to “Active Test” for the procedures. <Ref. to EN(H4DO w/o HEV)(diag)-68, Active Test.>	Does the fuel pump emit operating sound?	Check the fuel injector circuit. <Ref. to EN(H4DO w/o HEV)(diag)-93, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK GROUND CIRCUIT OF FUEL PUMP.** 1) Turn the ignition switch to OFF. 2) Remove the fuel pump access hole lid. 3) Disconnect the connector from fuel pump. 4) Measure the resistance of harness between fuel pump and chassis ground. ***Connector & terminal*** ***(R58) No. 4 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the open circuit in harness between fuel pump connector and chassis ground terminal.
3	**CHECK POWER SUPPLY TO FUEL PUMP.** 1) Turn the ignition switch to ON. 2) Measure the voltage of power supply circuit between fuel pump connector and chassis ground. ***Connector & terminal*** ***(R58) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the fuel pump. <Ref. to FU(H4DO(w/o HEV))-137, Fuel Pump.>	Go to step **4**.
4	**CHECK HARNESS BETWEEN FUEL PUMP CONNECTOR AND FUEL PUMP RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Remove the fuel pump relay. 3) Measure the resistance of harness between fuel pump connector and fuel pump relay connector. ***Connector & terminal*** ***(R58) No. 3 — (B220) No. 1:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between fuel pump connector and fuel pump relay connector • Poor contact of coupling connector
5	**CHECK HARNESS BETWEEN FUEL PUMP CONNECTOR AND FUEL PUMP RELAY CONNECTOR.** Measure the resistance between fuel pump connector and chassis ground. ***Connector & terminal*** ***(R58) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit to ground in harness between fuel pump connector and fuel pump relay connector.
6	**CHECK FUEL PUMP RELAY.** 1) Connect the battery to fuel pump relay terminals No. 3 and No. 5. 2) Measure the resistance between fuel pump relay terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **7**.	Replace the fuel pump relay. <Ref. to FU(H4DO(w/o HEV))-104, Fuel Pump Relay.>
7	**CHECK HARNESS BETWEEN ECM AND FUEL PUMP RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and fuel pump relay connector. ***Connector & terminal*** ***(B135) No. 19 — (B220) No. 5:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair the open circuit of harness between ECM connector and fuel pump relay connector.
8	**CHECK POWER SUPPLY OF FUEL PUMP RELAY.** 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel pump relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 2 (+) — Chassis ground (–):*** ***(B220) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Repair the open or ground short in the harness of power supply circuit.

F: FUEL INJECTOR CIRCUIT

CAUTION:
- **Check or repair only faulty parts.**
- **After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.**

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



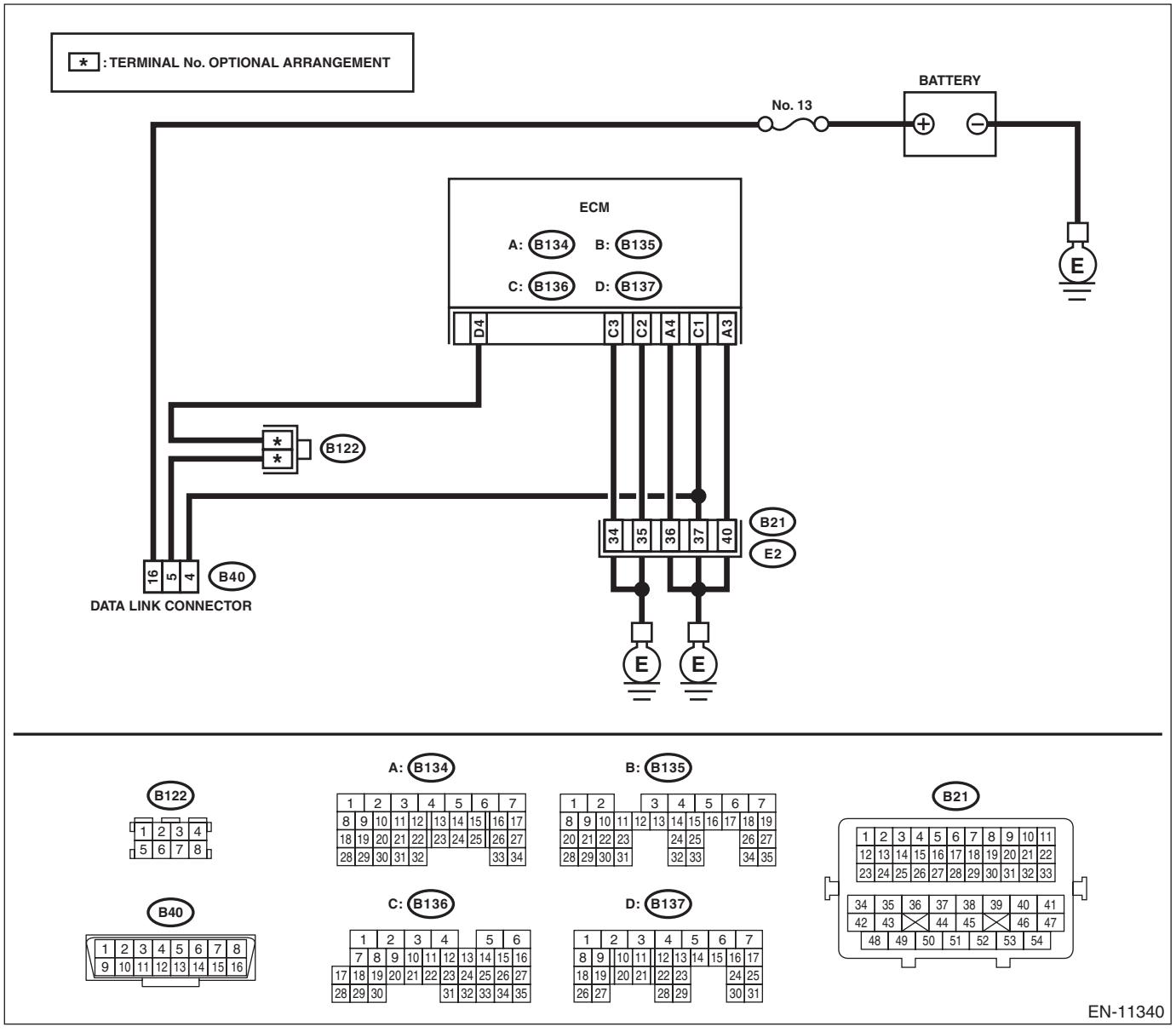
Step		Check	Yes	No
1	**CHECK OPERATION OF EACH FUEL INJECTOR.** While cranking the engine, check each fuel injector emits operating sound. Use a sound scope or attach a screwdriver to the injector to listen to sounds for this check.	Does the fuel injector emit operating sound?	Check the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO EACH FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between fuel injector terminal and engine ground. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay connector and fuel injector connector • Poor contact of main relay connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and fuel injector connector. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***#1 (B134) No. 12 — Chassis ground:*** ***#2 (B134) No. 22 — Chassis ground:*** ***#3 (B134) No. 32 — Chassis ground:*** ***#4 (B134) No. 13 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
5	**CHECK EACH FUEL INJECTOR.** Measure the resistance between each fuel injector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **6**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
6	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Inspection using “General Diagnostic Table” <Ref. to EN(H4DO w/o HEV)(diag)-563, INSPECTION, General Diagnostic Table.>

16.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Open or short circuit in data link connector
TROUBLE SYMPTOM:
Subaru Select Monitor communication failure
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK POWER SUPPLY CIRCUIT.** Connect DST-i or general scan tool to data link connector.	Does DST-i or the general scan tool turn ON?	Go to step **4**.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK POWER SUPPLY CIRCUIT.** Measure the voltage between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the power supply circuit. NOTE: In this case, repair the following item: • Open or ground short circuit of harness between battery and data link connector • Blown out of fuse (M/B No. 13)
3	**CHECK HARNESS BETWEEN DATA LINK CONNECTOR AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 4 — Chassis ground:*** ***(B40) No. 5 — Chassis ground:***	Is the resistance less than 5 Ω?	Repair the poor contact of data link connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and data link connector • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND DATA LINK CONNECTOR.** Measure the resistance between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Repair the poor contact of the ECM or data link connector.	Repair the short circuit to ground in harness between ECM connector and data link connector.

17.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Note
B1570	ANTENNA	<Ref. to IM(diag)-16, DTC B1570 ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1571	REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM)	<Ref. to IM(diag)-18, DTC B1571 REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1572	IMM CIRCUIT EXCEPT ANTENNA CIRCUIT	<Ref. to IM(diag)-19, DTC B1572 IMM CIRCUIT EXCEPT ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1574	KEY COMMUNICATION	<Ref. to IM(diag)-22, DTC B1574 KEY COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1575	INCORRECT IMMOBILIZER KEY	<Ref. to IM(diag)-23, DTC B1575 INCORRECT IMMOBILIZER KEY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1576	EGI CONTROL MODULE EEPROM	<Ref. to IM(diag)-23, DTC B1576 EGI CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1577	IMM CONTROL MODULE EEPROM	<Ref. to IM(diag)-24, DTC B1577 IMM CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1578	METER	<Ref. to IM(diag)-24, DTC B1578 METER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000A	"A" CAMSHAFT POSITION SLOW RESPONSE BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-106, DTC P000A "A" CAMSHAFT POSITION SLOW RESPONSE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000B	"B" CAMSHAFT POSITION SLOW RESPONSE BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-107, DTC P000B "B" CAMSHAFT POSITION SLOW RESPONSE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000C	"A" CAMSHAFT POSITION SLOW RESPONSE BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-108, DTC P000C "A" CAMSHAFT POSITION SLOW RESPONSE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000D	"B" CAMSHAFT POSITION SLOW RESPONSE BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-108, DTC P000D "B" CAMSHAFT POSITION SLOW RESPONSE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0010	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-109, DTC P0010 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0011	"A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-112, DTC P0011 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0013	"B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-114, DTC P0013 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0014	"B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-117, DTC P0014 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0016	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A	<Ref. to EN(H4DO w/o HEV)(diag)-119, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0017	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B	<Ref. to EN(H4DO w/o HEV)(diag)-122, DTC P0017 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0018	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR A	<Ref. to EN(H4DO w/o HEV)(diag)-125, DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR A, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0019	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR B	<Ref. to EN(H4DO w/o HEV)(diag)-127, DTC P0019 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR B, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Note
P0020	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-129, DTC P0020 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0021	"A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-132, DTC P0021 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0023	"B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-134, DTC P0023 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0024	"B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-137, DTC P0024 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0030	A/F / O2 HEATER CONTROL CIRCUIT BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-139, DTC P0030 A/F / O2 HEATER CONTROL CIRCUIT BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0031	A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-142, DTC P0031 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0032	A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-145, DTC P0032 A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0037	A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-148, DTC P0037 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0038	A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-151, DTC P0038 A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0068	MAP/MAF - THROTTLE POSITION CORRELATION	<Ref. to EN(H4DO w/o HEV)(diag)-154, DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0071	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-157, DTC P0071 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW	<Ref. to EN(H4DO w/o HEV)(diag)-160, DTC P0072 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-162, DTC P0073 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0101	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-163, DTC P0101 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0102	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-166, DTC P0102 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0103	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-169, DTC P0103 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0107	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-172, DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0108	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-175, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0111	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-178, DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-182, DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-185, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0116	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-188, DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0117	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-190, DTC P0117 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0118	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-193, DTC P0118 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-196, DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-199, DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0125	INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL	<Ref. to EN(H4DO w/o HEV)(diag)-202, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0128	COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)	<Ref. to EN(H4DO w/o HEV)(diag)-204, DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0131	A/F / O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-209, DTC P0131 A/F / O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0132	A/F / O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-212, DTC P0132 A/F / O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0134	A/F / O2 SENSOR CIRCUIT NO ACTIVITY DETECTED BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-215, DTC P0134 A/F / O2 SENSOR CIRCUIT NO ACTIVITY DETECTED BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0137	O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-218, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0138	O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-222, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013A	O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-225, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013B	O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-229, DTC P013B O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013E	O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-231, DTC P013E O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013F	O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-233, DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Note
P0141	O2 SENSOR HEATER CIRCUIT BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-235, DTC P0141 O2 SENSOR HEATER CIRCUIT BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P014C	A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-236, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P014D	A/F / O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-239, DTC P014D A/F / O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P015A	A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-240, DTC P015A A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P015B	A/F / O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-246, DTC P015B A/F / O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0171	SYSTEM TOO LEAN BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-246, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0172	SYSTEM TOO RICH BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-247, DTC P0172 SYSTEM TOO RICH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0196	ENGINE OIL TEMPERATURE SENSOR "A" RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-250, DTC P0196 ENGINE OIL TEMPERATURE SENSOR "A" RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0197	ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-253, DTC P0197 ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0198	ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-256, DTC P0198 ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0201	CYLINDER 1 INJECTOR "A" CIRCUIT	<Ref. to EN(H4DO w/o HEV)(diag)-259, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0202	CYLINDER 2 INJECTOR "A" CIRCUIT	<Ref. to EN(H4DO w/o HEV)(diag)-262, DTC P0202 CYLINDER 2 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0203	CYLINDER 3 INJECTOR "A" CIRCUIT	<Ref. to EN(H4DO w/o HEV)(diag)-262, DTC P0203 CYLINDER 3 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0204	CYLINDER 4 INJECTOR "A" CIRCUIT	<Ref. to EN(H4DO w/o HEV)(diag)-262, DTC P0204 CYLINDER 4 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0222	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-263, DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0223	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-266, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED	<Ref. to EN(H4DO w/o HEV)(diag)-269, DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0301	CYLINDER 1 MISFIRE DETECTED	<Ref. to EN(H4DO w/o HEV)(diag)-273, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0302	CYLINDER 2 MISFIRE DETECTED	<Ref. to EN(H4DO w/o HEV)(diag)-280, DTC P0302 CYLINDER 2 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0303	CYLINDER 3 MISFIRE DETECTED	<Ref. to EN(H4DO w/o HEV)(diag)-280, DTC P0303 CYLINDER 3 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0304	CYLINDER 4 MISFIRE DETECTED	<Ref. to EN(H4DO w/o HEV)(diag)-281, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0327	KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT LOW BANK 1 OR SINGLE SENSOR	<Ref. to EN(H4DO w/o HEV)(diag)-285, DTC P0327 KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT LOW BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0328	KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT HIGH BANK 1 OR SINGLE SENSOR	<Ref. to EN(H4DO w/o HEV)(diag)-288, DTC P0328 KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT HIGH BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0335	CRANKSHAFT POSITION SENSOR "A" CIRCUIT	<Ref. to EN(H4DO w/o HEV)(diag)-291, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0336	CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-295, DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0340	CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR	<Ref. to EN(H4DO w/o HEV)(diag)-298, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0341	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR	<Ref. to EN(H4DO w/o HEV)(diag)-302, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0345	CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-303, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0346	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-305, DTC P0346 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0351	IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO w/o HEV)(diag)-306, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0352	IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO w/o HEV)(diag)-309, DTC P0352 IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0353	IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO w/o HEV)(diag)-309, DTC P0353 IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0354	IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO w/o HEV)(diag)-309, DTC P0354 IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0365	CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-310, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0366	CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-313, DTC P0366 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0390	CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-314, DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0391	CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-316, DTC P0391 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0400	EGR "A" FLOW	<Ref. to EN(H4DO w/o HEV)(diag)-317, DTC P0400 EGR "A" FLOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0420	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-320, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0441	EVAP SYSTEM (CPC) INCORRECT PURGE FLOW	<Ref. to EN(H4DO w/o HEV)(diag)-328, DTC P0441 EVAP SYSTEM (CPC) INCORRECT PURGE FLOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0451	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-332, DTC P0451 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0452	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-334, DTC P0452 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0453	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-337, DTC P0453 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0455	EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK)	<Ref. to EN(H4DO w/o HEV)(diag)-340, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0456	EVAP SYSTEM (CPC) LEAK DETECTED (VERY SMALL LEAK)	<Ref. to EN(H4DO w/o HEV)(diag)-348, DTC P0456 EVAP SYSTEM (CPC) LEAK DETECTED (VERY SMALL LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0458	EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-349, DTC P0458 EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0459	EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-352, DTC P0459 EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0461	FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-355, DTC P0461 FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0462	FUEL LEVEL SENSOR "A" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-357, DTC P0462 FUEL LEVEL SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0463	FUEL LEVEL SENSOR "A" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-358, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0500	VEHICLE SPEED SENSOR "A" CIRCUIT	<Ref. to EN(H4DO w/o HEV)(diag)-360, DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0506	IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED	<Ref. to EN(H4DO w/o HEV)(diag)-361, DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0507	IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED	<Ref. to EN(H4DO w/o HEV)(diag)-363, DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P050A	COLD START IDLE CONTROL SYSTEM PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-365, DTC P050A COLD START IDLE CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P050B	COLD START IGNITION TIMING PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-376, DTC P050B COLD START IGNITION TIMING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0512	STARTER (SWITCH) REQUEST CIRCUIT	<Ref. to EN(H4DO w/o HEV)(diag)-377, DTC P0512 STARTER (SWITCH) REQUEST CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0516	BATTERY TEMPERATURE SENSOR CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-380, DTC P0516 BATTERY TEMPERATURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0517	BATTERY TEMPERATURE SENSOR CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-383, DTC P0517 BATTERY TEMPERATURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0560	SYSTEM VOLTAGE	<Ref. to EN(H4DO w/o HEV)(diag)-386, DTC P0560 SYSTEM VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	<Ref. to EN(H4DO w/o HEV)(diag)-388, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	<Ref. to EN(H4DO w/o HEV)(diag)-389, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0606	CONTROL MODULE PROCESSOR	<Ref. to EN(H4DO w/o HEV)(diag)-390, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P060A	INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-394, DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P060B	INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-396, DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0616	STARTER RELAY "A" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-398, DTC P0616 STARTER RELAY "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0617	STARTER RELAY "A" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-400, DTC P0617 STARTER RELAY "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	<Ref. to EN(H4DO w/o HEV)(diag)-402, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0685	ECM/PCM POWER RELAY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO w/o HEV)(diag)-404, DTC P0685 ECM/PCM POWER RELAY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0700	TRANSMISSION CONTROL SYSTEM (MIL REQUEST)	<Ref. to EN(H4DO w/o HEV)(diag)-406, DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P081A	STARTER DISABLE CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-407, DTC P081A STARTER DISABLE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-410, DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0852	PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-414, DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1160	THROTTLE RETURN SPRING	<Ref. to EN(H4DO w/o HEV)(diag)-419, DTC P1160 THROTTLE RETURN SPRING, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1449	EVAP SYSTEM CLOG DETECTED (AIR FILTER)	<Ref. to EN(H4DO w/o HEV)(diag)-420, DTC P1449 EVAP SYSTEM CLOG DETECTED (AIR FILTER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1451	EVAP SYSTEM CLOG DETECTED (PIPE)	<Ref. to EN(H4DO w/o HEV)(diag)-423, DTC P1451 EVAP SYSTEM CLOG DETECTED (PIPE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1492	COIL 1 EGR "A" CONTROL CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-424, DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1493	COIL 1 EGR "A" CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-425, DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1494	COIL 2 EGR "A" CONTROL CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-426, DTC P1494 COIL 2 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1495	COIL 2 EGR "A" CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-426, DTC P1495 COIL 2 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1496	COIL 3 EGR "A" CONTROL CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-426, DTC P1496 COIL 3 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1497	COIL 3 EGR "A" CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-426, DTC P1497 COIL 3 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1498	COIL 4 EGR "A" CONTROL CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-427, DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1499	COIL 4 EGR "A" CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-429, DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1530	BATTERY CURRENT SENSOR CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-431, DTC P1530 BATTERY CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Note
P1531	BATTERY CURRENT SENSOR CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-434, DTC P1531 BATTERY CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1532	BATTERY CHARGING SYSTEM	<Ref. to EN(H4DO w/o HEV)(diag)-437, DTC P1532 BATTERY CHARGING SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2004	TGV CONTROL STUCK OPEN BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-442, DTC P2004 TGV CONTROL STUCK OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2005	TGV CONTROL STUCK OPEN BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-443, DTC P2005 TGV CONTROL STUCK OPEN BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2006	TGV CONTROL STUCK CLOSED BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-444, DTC P2006 TGV CONTROL STUCK CLOSED BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2007	TGV CONTROL STUCK CLOSED BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-445, DTC P2007 TGV CONTROL STUCK CLOSED BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2009	TGV CONTROL CIRCUIT LOW BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-446, DTC P2009 TGV CONTROL CIRCUIT LOW BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2012	TGV CONTROL CIRCUIT LOW BANK 2	<Ref. to EN(H4DO w/o HEV)(diag)-449, DTC P2012 TGV CONTROL CIRCUIT LOW BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2096	POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-452, DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2097	POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1	<Ref. to EN(H4DO w/o HEV)(diag)-459, DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2101	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-466, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2102	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-472, DTC P2102 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2103	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-475, DTC P2103 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2109	THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-478, DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2119	THROTTLE ACTUATOR "A" CONTROL THROTTLE BODY RANGE/PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-479, DTC P2119 THROTTLE ACTUATOR "A" CONTROL THROTTLE BODY RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-482, DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-485, DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2127	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-488, DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2128	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-491, DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2135	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION	<Ref. to EN(H4DO w/o HEV)(diag)-494, DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2138	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION	<Ref. to EN(H4DO w/o HEV)(diag)-498, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P2195	A/F /O2 SENSOR SIGNAL BIASED/ STUCK LEAN BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-502, DTC P2195 A/F /O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2196	A/F /O2 SENSOR SIGNAL BIASED/ STUCK RICH BANK 1 SENSOR 1	<Ref. to EN(H4DO w/o HEV)(diag)-505, DTC P2196 A/F /O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P219A	BANK 1 AIR-FUEL RATIO IMBALANCE	<Ref. to EN(H4DO w/o HEV)(diag)-508, DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2270	O2 SENSOR SIGNAL BIASED/ STUCK LEAN BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-524, DTC P2270 O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2271	O2 SENSOR SIGNAL BIASED/ STUCK RICH BANK 1 SENSOR 2	<Ref. to EN(H4DO w/o HEV)(diag)-528, DTC P2271 O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2401	EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-531, DTC P2401 EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2402	EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-534, DTC P2402 EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2404	EVAP SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/ PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-537, DTC P2404 EVAP SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2419	EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW	<Ref. to EN(H4DO w/o HEV)(diag)-541, DTC P2419 EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2420	EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO w/o HEV)(diag)-544, DTC P2420 EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2530	IGNITION SWITCH RUN POSITION CIRCUIT	<Ref. to EN(H4DO w/o HEV)(diag)-547, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2610	ECM/PCM ENGINE OFF TIMER PERFORMANCE	<Ref. to EN(H4DO w/o HEV)(diag)-549, DTC P2610 ECM/PCM ENGINE OFF TIMER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	<Ref. to EN(H4DO w/o HEV)(diag)-556, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	<Ref. to EN(H4DO w/o HEV)(diag)-557, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	<Ref. to EN(H4DO w/o HEV)(diag)-558, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	<Ref. to EN(H4DO w/o HEV)(diag)-559, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	<Ref. to EN(H4DO w/o HEV)(diag)-560, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	<Ref. to EN(H4DO w/o HEV)(diag)-561, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	<Ref. to EN(H4DO w/o HEV)(diag)-562, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

18.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P000A "A" CAMSHAFT POSITION SLOW RESPONSE BANK 1

NOTE:
For the diagnostic procedure, refer to DTC P0011. <Ref. to EN(H4DO w/o HEV)(diag)-112, DTC P0011 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the AVCS system malfunction.
Judge NG when the amount of AVCS actual timing advance does not approach to the amount of AVCS target timing advance.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
AVCS control	In operation
Absolute value	
Target timing advance change amount (per 64 ms)	< 3.2 °CA

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the engine speed increases and AVCS operates.

4. DIAGNOSTIC METHOD

When the differences of target timing advance amount and actual timing advance amount is calculated during AVCS control, and the difference per predetermined time is the specified value or larger.
Judge as NG when the following conditions are established within the predetermined time.

Malfunction Criteria	Threshold Value
Absolute value Σ(Target position – Actual position)	 > 4000 °CA (Bank 1) > 4000 °CA (Bank 2)

Time Needed for Diagnosis: 25000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

B: DTC P000B "B" CAMSHAFT POSITION SLOW RESPONSE BANK 1

NOTE:
For the diagnostic procedure, refer to DTC P0014. <Ref. to EN(H4DO w/o HEV)(diag)-117, DTC P0014 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the exhaust AVCS system malfunction.
Judge NG when the amount of exhaust AVCS actual timing advance does not approach the amount of exhaust AVCS target timing advance.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Exhaust AVCS control	Operation
Absolute value	
Target timing advance change amount (per 64 ms)	< 3.2 °CA

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the engine speed increases and exhaust AVCS operates.

4. DIAGNOSTIC METHOD

When the differences of target timing advance amount and actual timing advance amount is calculated during exhaust AVCS control, and the difference per predetermined time is the specified value or larger.
Judge as NG when the following conditions are established within the predetermined time.

Malfunction Criteria	Threshold Value
Absolute value Σ(Target position – Actual position)	 > 4000 °CA (Bank 1) > 4000 °CA (Bank 2)

Time Needed for Diagnosis: 25000 ms

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

C: DTC P000C "A" CAMSHAFT POSITION SLOW RESPONSE BANK 2

NOTE:
For the diagnostic procedure, refer to DTC P0021. <Ref. to EN(H4DO w/o HEV)(diag)-132, DTC P0021 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to P000A. <Ref. to EN(H4DO w/o HEV)(diag)-106, DTC P000A "A" CAMSHAFT POSITION SLOW RESPONSE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

D: DTC P000D "B" CAMSHAFT POSITION SLOW RESPONSE BANK 2

NOTE:
For the diagnostic procedure, refer to DTC P0024. <Ref. to EN(H4DO w/o HEV)(diag)-137, DTC P0024 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

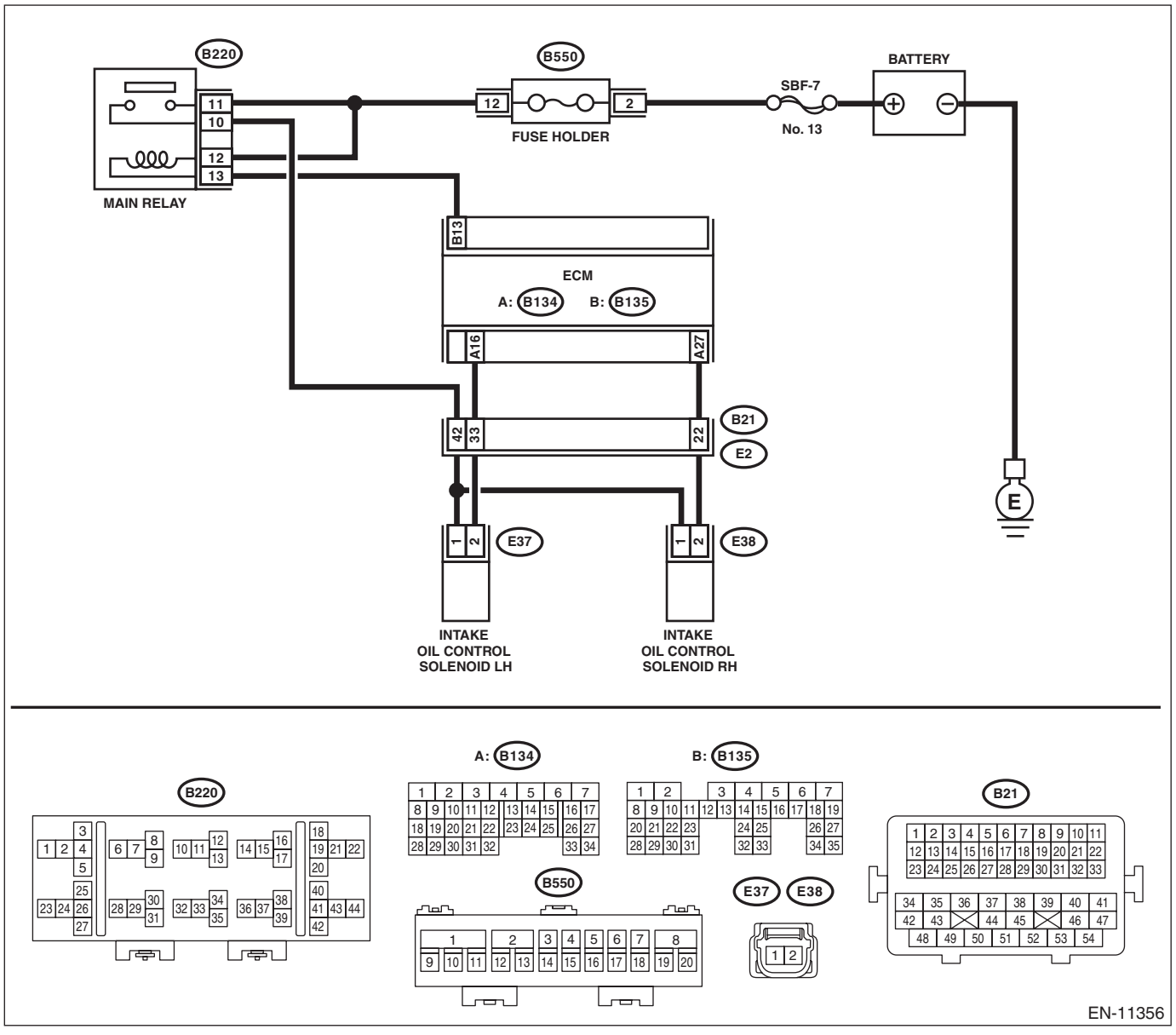
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to P000B. <Ref. to EN(H4DO w/o HEV)(diag)-107, DTC P000B "B" CAMSHAFT POSITION SLOW RESPONSE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

E: DTC P0010 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/ OPEN BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO THE INTAKE OIL CONTROL SOLENOID RH.** Measure the voltage between intake oil control solenoid RH connector and engine ground. ***Connector & terminal*** ***(E38) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID RH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and intake oil control solenoid RH. 3) Measure the resistance between intake oil control solenoid RH connector and engine ground. ***Connector & terminal*** ***(E38) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and intake oil control solenoid RH connector.
5	**CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID RH CONNECTOR.** Measure the resistance of harness between ECM connector and intake oil control solenoid RH. ***Connector & terminal*** ***(B134) No. 17 — (E38) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and intake oil control solenoid RH connector • Poor contact of coupling connector
6	**CHECK INTAKE OIL CONTROL SOLENOID RH.** Measure the resistance between intake oil control solenoid RH terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 6 — 12 Ω?	Repair the poor contact of intake oil control solenoid RH connector.	Replace the intake oil control solenoid RH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the oil control solenoid.
Judge as NG when the current is small even though the duty signal is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Oil control solenoid control duty	≥ 99.61 %

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Oil control solenoid control present current	< 0.306 A

Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

F: DTC P0011 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**IDENTIFYING FAULTY PART.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Replace the defective oil control solenoid by the other (RH or LH, intake side or exhaust side) oil control solenoid. 3) Perform appropriate drive cycle test. <Ref. to EN(H4DO w/o HEV)(diag)-55, Drive Cycle.> 4) Make sure that the fault occurrence (DTC and incorrect advancing) has shifted to the other location.	Did the detected DTC shift to the location where the oil control solenoid was replaced?	Replace the faulty oil control solenoid.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Start the engine and let it idle. 2) Read the value of «VVT Adv. Ang. Amount R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «VVT Adv. Ang. Amount R» approx. 0 deg?	Go to step **3**.	Check the following item and repair or replace if necessary. • Intake cam sprocket (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)
3	**CHECK CURRENT DATA.** 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «OCV Duty R» and «VVT Adv. Ang. Amount R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	When the value of «OCV Duty R» increases more than 10%, is the value of «VVT Adv. Ang. Amount R» approx. 0 deg?	Check the following item and repair or replace if necessary. • Intake cam sprocket (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

1. OUTLINE OF DIAGNOSIS

Detect the AVCS system malfunction.
Judge as NG when the conditions during which the differences of AVCS target timing advance amount and AVCS actual timing advance amount is large continues.

2. EXECUTION CONDITION

- Normal

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
AVCS control	In operation

- Intermediate lock

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Engine speed	≥ 500 rpm
Elapsed time after starting the engine	> 500 ms > and ≤ Value from Map

Map

Engine coolant temperature at engine starting °C (°F)	–40 (–40)	–30 (–22)	–20 (–4)	–10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Time elapsed after engine start ms	10000	10000	10000	8000	5000	3500	2800	2800

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Accumulated duty ratio of the rear oxygen sensor heater operation since engine started %	2800	2800	2800	2800	2800	2800	2800	2800

3. GENERAL DRIVING CYCLE

- Normal

Perform the diagnosis continuously when the engine speed increases and AVCS operates.

- Intermediate lock

Perform the diagnosis when the AVCS is carrying out the intermediate lock control at the engine start.

4. DIAGNOSTIC METHOD

When the conditions during which the differences of AVCS target timing advance amount and AVCS actual timing advance amount is large continues for certain amount of time.
Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
• Normal Absolute value (Target position – Actual position)	> 10 °CA
• Intermediate lock Absolute value (Target position – Actual position)	> 10 °CA

Time Needed for Diagnosis:

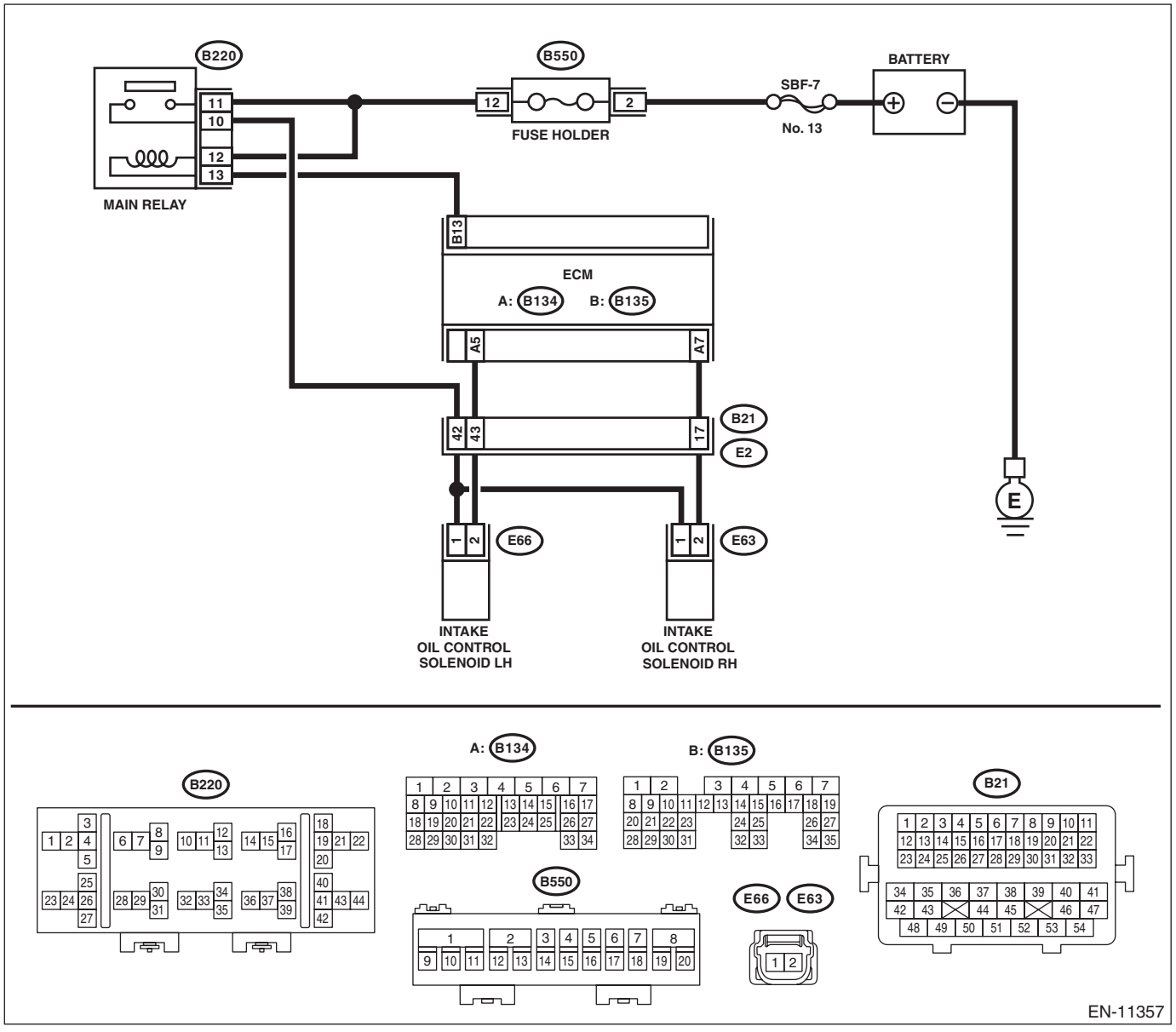
- Normal: 10000 ms
- Intermediate lock: 2000 ms

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

G: DTC P0013 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/ OPEN BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 7 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO THE EXHAUST OIL CONTROL SOLENOID RH.** Measure the voltage between exhaust oil control solenoid RH connector and engine ground. ***Connector & terminal*** ***(E63) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND EXHAUST OIL CONTROL SOLENOID RH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and exhaust oil control solenoid RH. 3) Measure the resistance between exhaust oil control solenoid RH connector and engine ground. ***Connector & terminal*** ***(E63) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and exhaust oil control solenoid RH connector.
5	**CHECK HARNESS BETWEEN ECM AND EXHAUST OIL CONTROL SOLENOID RH CONNECTOR.** Measure the resistance of harness between ECM connector and exhaust oil control solenoid RH. ***Connector & terminal*** ***(B134) No. 7 — (E63) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and exhaust oil control solenoid RH connector • Poor contact of coupling connector
6	**CHECK EXHAUST OIL CONTROL SOLENOID RH.** Measure the resistance between exhaust oil control solenoid RH terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 6 — 12 Ω?	Repair the poor contact of exhaust oil control solenoid RH connector.	Replace the exhaust oil control solenoid RH. <Ref. to FU(H4DO(w/o HEV))-64, Oil Control Solenoid.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the oil control solenoid.
Judge as NG when the current is small even though the duty signal is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Oil control solenoid control duty	≥ 99.61 %

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Oil control solenoid control present current	< 0.306 A

Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

H: DTC P0014 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**IDENTIFYING FAULTY PART.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Replace the defective oil control solenoid by the other (RH or LH, intake side or exhaust side) oil control solenoid. 3) Perform appropriate drive cycle test. <Ref. to EN(H4DO w/o HEV)(diag)-55, Drive Cycle.> 4) Make sure that the fault occurrence (DTC and incorrect advancing) has shifted to the other location.	Did the detected DTC shift to the location where the oil control solenoid was replaced?	Replace the faulty oil control solenoid.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Start the engine and let it idle. 2) Read the value of «Exh. VVT Retard Ang. R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Exh. VVT Retard Ang. R» approx. 0 deg?	Go to step **3**.	Check the following item and repair or replace if necessary. • Exhaust cam sprocket (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)
3	**CHECK CURRENT DATA.** 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «Exh. OCV Duty R» and «Exh. VVT Retard Ang. R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	When the value of «Exh. OCV Duty R» increases more than 10%, is the value of «Exh. VVT Retard Ang. R» approx. 0 deg?	Check the following item and repair or replace if necessary. • Exhaust cam sprocket (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

1. OUTLINE OF DIAGNOSIS

Detect the exhaust AVCS system malfunction.
Judge as NG when the conditions during which the differences of exhaust AVCS target timing advance amount and exhaust AVCS actual timing advance amount is large continues.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Exhaust AVCS control	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the engine speed increases and exhaust AVCS operates.

4. DIAGNOSTIC METHOD

When the conditions during which the differences of exhaust AVCS target timing advance amount and exhaust AVCS actual timing advance amount is large continues for certain amount of time.
Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Target position – Actual position)	> 10 °CA

Time Needed for Diagnosis: 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

I: DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is DTC other than P0016, P0017, P0018 or P0019 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK INTAKE OIL CONTROL SOLENOID RH.** Check the intake oil control solenoid RH. <Ref. to FU(H4DO(w/o HEV))-67, INSPECTION, Oil Control Solenoid.>	Is the intake oil control solenoid RH normal?	Go to step **3**.	Replace the intake oil control solenoid RH. <Ref. to FU(H4DO(w/o HEV))-64, Oil Control Solenoid.>
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step **4**.	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>
4	**CHECK CAM CARRIER FILTER.** Check the filter installed to the cam carrier. <Ref. to ME(H4DO(w/o HEV))-261, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the intake cam sprocket RH. <Ref. to ME(H4DO(w/o HEV))-193, Cam Sprocket.> After the operation is complete, go to the next step. Go to step **5**.	Replace the cam carrier filter. <Ref. to ME(H4DO(w/o HEV))-223, Cam Carrier.>

	Step	Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Initial Position Learning Value #1» and «VVT Adv. Ang. Amount R» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. |«VVT Initial Position Learning Value #1» – (60 + «VVT Adv. Ang. Amount R»)|	Is the calculation result less than 10?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
6	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO w/o HEV)(diag)-63, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	End.

1. OUTLINE OF DIAGNOSIS

Detect the AVCS system malfunction.
Judge as NG when standard timing advance amount is far from learning angle.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after external load (power steering, neutral position switch) change	≥ 3000 ms
AVCS position learning	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting engine and while AVCS is not operating.

4. DIAGNOSTIC METHOD

Judge as NG when the absolute value of the difference between cam signal input position and learning value is out of specification.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Shift by one tooth Absolute value	
Crankshaft position when camshaft position sensor signal is input – Learning value	> 10 °CA
Shift by two teeth	
Actual camshaft angle	< 29.05 °CA or > 87.73 °CA
(This monitoring will be executed at each bank. Base angle of camshaft = 89.5° CA 20° CA at each tooth)	

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

NOTE:
Initial standard learning value is the value of crank angle initially input at the production plant. And then it will be updated every time normal judgment has been completed. Learning value will not be updated if NG judgment occurs because timing belt or chain derails suddenly in process or because wrong assembly occurs during servicing.

J: DTC P0017 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is DTC other than P0016, P0017, P0018 or P0019 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK EXHAUST OIL CONTROL SOLENOID RH.** Check the exhaust oil control solenoid RH. <Ref. to FU(H4DO(w/o HEV))-67, INSPECTION, Oil Control Solenoid.>	Is the exhaust oil control solenoid RH normal?	Go to step **3**.	Replace the exhaust oil control solenoid RH. <Ref. to FU(H4DO(w/o HEV))-64, Oil Control Solenoid.>
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step **4**.	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>
4	**CHECK CAM CARRIER FILTER.** Check the filter installed to the cam carrier. <Ref. to ME(H4DO(w/o HEV))-261, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the exhaust cam sprocket RH. <Ref. to ME(H4DO(w/o HEV))-193, Cam Sprocket.> After the operation is complete, go to the next step. Go to step **5**.	Replace the cam carrier filter. <Ref. to ME(H4DO(w/o HEV))-223, Cam Carrier.>

	Step	Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Ex Initial Position Learning Value #1» and «Exh. VVT Retard Ang. R» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. |«VVT Ex Initial Position Learning Value #1» – (90 – «Exh. VVT Retard Ang. R»)|	Is the calculation result less than 10?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
6	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO w/o HEV)(diag)-63, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	End.

1. OUTLINE OF DIAGNOSIS

Detect the exhaust AVCS system malfunction.
Judge as NG when standard timing advance amount is far from learning angle.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Shift by one tooth Shift by two teeth	
Battery voltage	≥ 10.9 V
Elapsed time after external load (power steering, neutral position switch) change	≥ 3000 ms
Exhaust AVCS position learning	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously while the exhaust AVCS is not operating after warming up.

4. DIAGNOSTIC METHOD

Judge as NG when the absolute value of the difference between cam signal input position and learning value is out of specification.

Judgment Value

Malfunction Criteria	Threshold Value
Shift by one tooth Absolute value	
Crankshaft position when camshaft position sensor signal is input – Learning value	> 10 °CA
Shift by two teeth	
Actual camshaft angle (This monitoring will be executed at each bank. Base angle of camshaft = 89.5° CA 20° CA at each tooth)	< 63.9 °CA or > 121.64 °CA

K: DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR A

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is DTC other than P0016, P0017, P0018 or P0019 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK INTAKE OIL CONTROL SOLENOID LH.** Check the intake oil control solenoid LH. <Ref. to FU(H4DO(w/o HEV))-67, INSPECTION, Oil Control Solenoid.>	Is the intake oil control solenoid LH normal?	Go to step **3**.	Replace the intake oil control solenoid LH. <Ref. to FU(H4DO(w/o HEV))-64, Oil Control Solenoid.>
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step **4**.	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>
4	**CHECK CAM CARRIER FILTER.** Check the filter installed to the cam carrier. <Ref. to ME(H4DO(w/o HEV))-261, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the intake cam sprocket LH. <Ref. to ME(H4DO(w/o HEV))-193, Cam Sprocket.> After the operation is complete, go to the next step. Go to step **5**.	Replace the cam carrier filter. <Ref. to ME(H4DO(w/o HEV))-223, Cam Carrier.>

	Step	Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Initial Position Learning Value #2» and «VVT Adv. Ang. Amount L» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. |«VVT Initial Position Learning Value #2» – (60 + «VVT Adv. Ang. Amount L»)|	Is the calculation result less than 10?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
6	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO w/o HEV)(diag)-63, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	End.

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0016. <Ref. to EN(H4DO w/o HEV)(diag)-119, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

L: DTC P0019 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR B

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is DTC other than P0016, P0017, P0018 or P0019 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK EXHAUST OIL CONTROL SOLENOID LH.** Check the exhaust oil control solenoid LH. <Ref. to FU(H4DO(w/o HEV))-67, INSPECTION, Oil Control Solenoid.>	Is the exhaust oil control solenoid LH normal?	Go to step **3**.	Replace the exhaust oil control solenoid LH. <Ref. to FU(H4DO(w/o HEV))-64, Oil Control Solenoid.>
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step **4**.	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>
4	**CHECK CAM CARRIER FILTER.** Check the filter installed to the cam carrier. <Ref. to ME(H4DO(w/o HEV))-261, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the exhaust cam sprocket LH. <Ref. to ME(H4DO(w/o HEV))-193, Cam Sprocket.> After the operation is complete, go to the next step. Go to step **5**.	Replace the cam carrier filter. <Ref. to ME(H4DO(w/o HEV))-223, Cam Carrier.>

	Step	Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Ex Initial Position Learning Value #2» and «Exh. VVT Retard Ang. L» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. |«VVT Ex Initial Position Learning Value #2» – (90 – «Exh. VVT Retard Ang. L»)|	Is the calculation result less than 10?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
6	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO w/o HEV)(diag)-63, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	End.

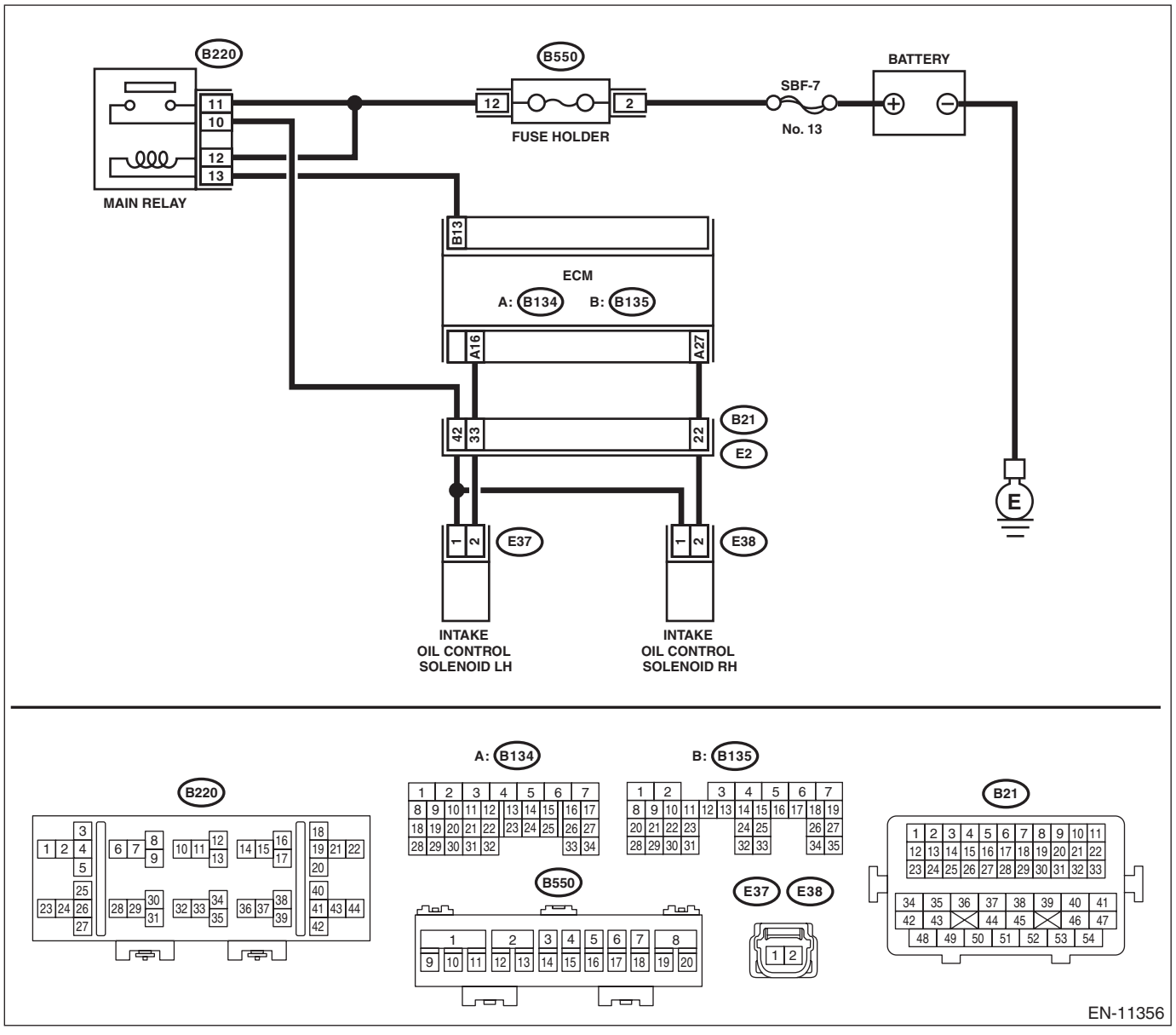
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0017. <Ref. to EN(H4DO w/o HEV)(diag)-122, DTC P0017 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

M: DTC P0020 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/ OPEN BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO THE INTAKE OIL CONTROL SOLENOID LH.** Measure the voltage between intake oil control solenoid LH connector and engine ground. ***Connector & terminal*** ***(E37) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID LH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and intake oil control solenoid LH. 3) Measure the resistance between intake oil control solenoid LH connector and engine ground. ***Connector & terminal*** ***(E37) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and intake oil control solenoid LH connector.
5	**CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID LH CONNECTOR.** Measure the resistance of harness between ECM connector and intake oil control solenoid LH. ***Connector & terminal*** ***(B134) No. 16 — (E37) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and intake oil control solenoid LH connector • Poor contact of coupling connector
6	**CHECK INTAKE OIL CONTROL SOLENOID LH.** Measure the resistance between intake oil control solenoid LH terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 6 — 12 Ω?	Repair the poor contact of intake oil control solenoid LH connector.	Replace the intake oil control solenoid LH. <Ref. to FU(H4DO(w/o HEV))-64, Oil Control Solenoid.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0010. <Ref. to EN(H4DO w/o HEV)(diag)-109, DTC P0010 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

N: DTC P0021 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**IDENTIFYING FAULTY PART.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Replace the defective oil control solenoid by the other (RH or LH, intake side or exhaust side) oil control solenoid. 3) Perform appropriate drive cycle test. <Ref. to EN(H4DO w/o HEV)(diag)-55, Drive Cycle.> 4) Make sure that the fault occurrence (DTC and incorrect advancing) has shifted to the other location.	Did the detected DTC shift to the location where the oil control solenoid was replaced?	Replace the faulty oil control solenoid.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Start the engine and let it idle. 2) Read the value of «VVT Adv. Ang. Amount L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «VVT Adv. Ang. Amount L» approx. 0 deg?	Go to step **3**.	Check the following item and repair or replace if necessary. • Intake cam sprocket (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)
3	**CHECK CURRENT DATA.** 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «OCV Duty L» and «VVT Adv. Ang. Amount L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	When the value of «OCV Duty L» increases more than 10%, is the value of «VVT Adv. Ang. Amount L» approx. 0 deg?	Check the following item and repair or replace if necessary. • Intake cam sprocket (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

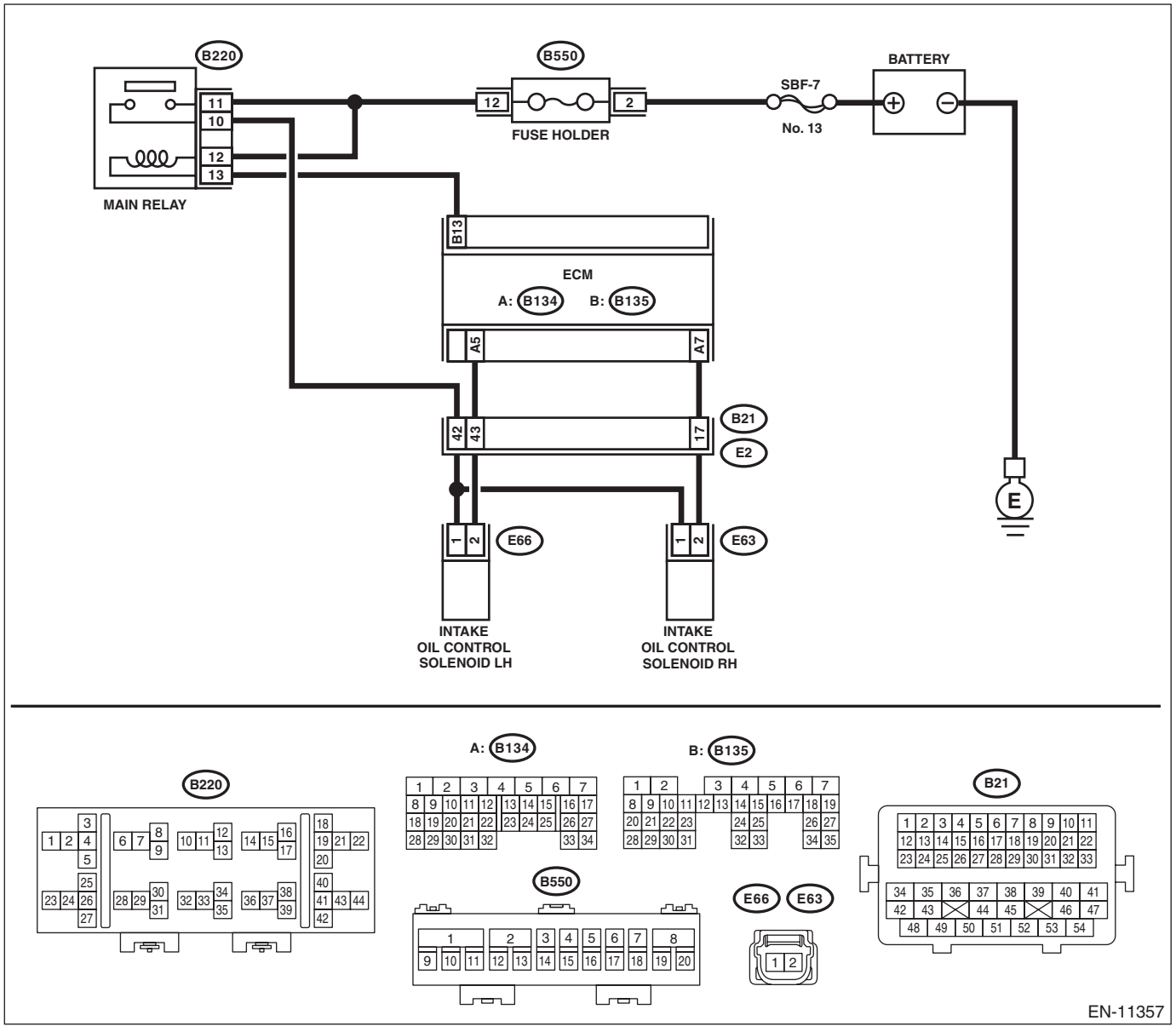
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0011. <Ref. to EN(H4DO w/o HEV)(diag)-112, DTC P0011 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

O: DTC P0023 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/ OPEN BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO THE EXHAUST OIL CONTROL SOLENOID LH.** Measure the voltage between exhaust oil control solenoid LH connector and engine ground. ***Connector & terminal*** ***(E66) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND EXHAUST OIL CONTROL SOLENOID LH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and exhaust oil control solenoid LH. 3) Measure the resistance between exhaust oil control solenoid LH connector and engine ground. ***Connector & terminal*** ***(E66) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and exhaust oil control solenoid LH connector.
5	**CHECK HARNESS BETWEEN ECM AND EXHAUST OIL CONTROL SOLENOID LH CONNECTOR.** Measure the resistance of harness between ECM connector and exhaust oil control solenoid LH. ***Connector & terminal*** ***(B134) No. 5 — (E66) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and exhaust oil control solenoid LH connector • Poor contact of coupling connector
6	**CHECK EXHAUST OIL CONTROL SOLENOID LH.** Measure the resistance between exhaust oil control solenoid LH terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 6 — 12 Ω?	Repair the poor contact of exhaust oil control solenoid LH connector.	Replace the exhaust oil control solenoid LH. <Ref. to FU(H4DO(w/o HEV))-64, Oil Control Solenoid.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0013. <Ref. to EN(H4DO w/o HEV)(diag)-114, DTC P0013 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

P: DTC P0024 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**IDENTIFYING FAULTY PART.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Replace the defective oil control solenoid by the other (RH or LH, intake side or exhaust side) oil control solenoid. 3) Perform appropriate drive cycle test. <Ref. to EN(H4DO w/o HEV)(diag)-55, Drive Cycle.> 4) Make sure that the fault occurrence (DTC and incorrect advancing) has shifted to the other location.	Did the detected DTC shift to the location where the oil control solenoid was replaced?	Replace the faulty oil control solenoid.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Start the engine and let it idle. 2) Read the value of «Exh. VVT Retard Ang. L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Exh. VVT Retard Ang. L» approx. 0 deg?	Go to step **3**.	Check the following item and repair or replace if necessary. • Exhaust cam sprocket (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)
3	**CHECK CURRENT DATA.** 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «Exh. OCV Duty L» and «Exh. VVT Retard Ang. L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	When the value of «Exh. OCV Duty L» increases more than 10%, is the value of «Exh. VVT Retard Ang. L» approx. 0 deg?	Check the following item and repair or replace if necessary. • Exhaust cam sprocket (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0014. <Ref. to EN(H4DO w/o HEV)(diag)-117, DTC P0014 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Q: DTC P0030 A/F / O2 HEATER CONTROL CIRCUIT BANK 1 SENSOR 1

DTC DETECTING CONDITION:

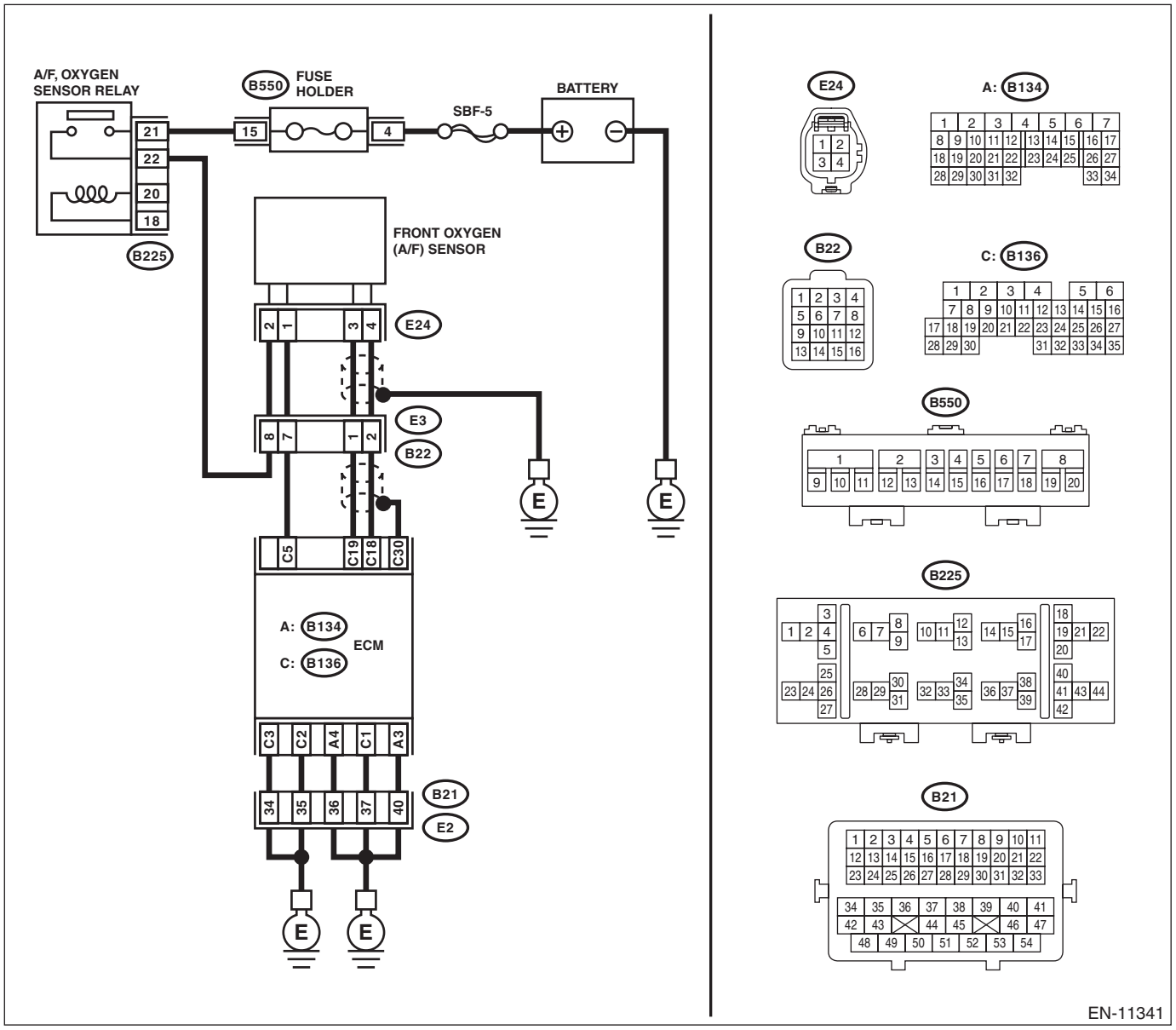
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

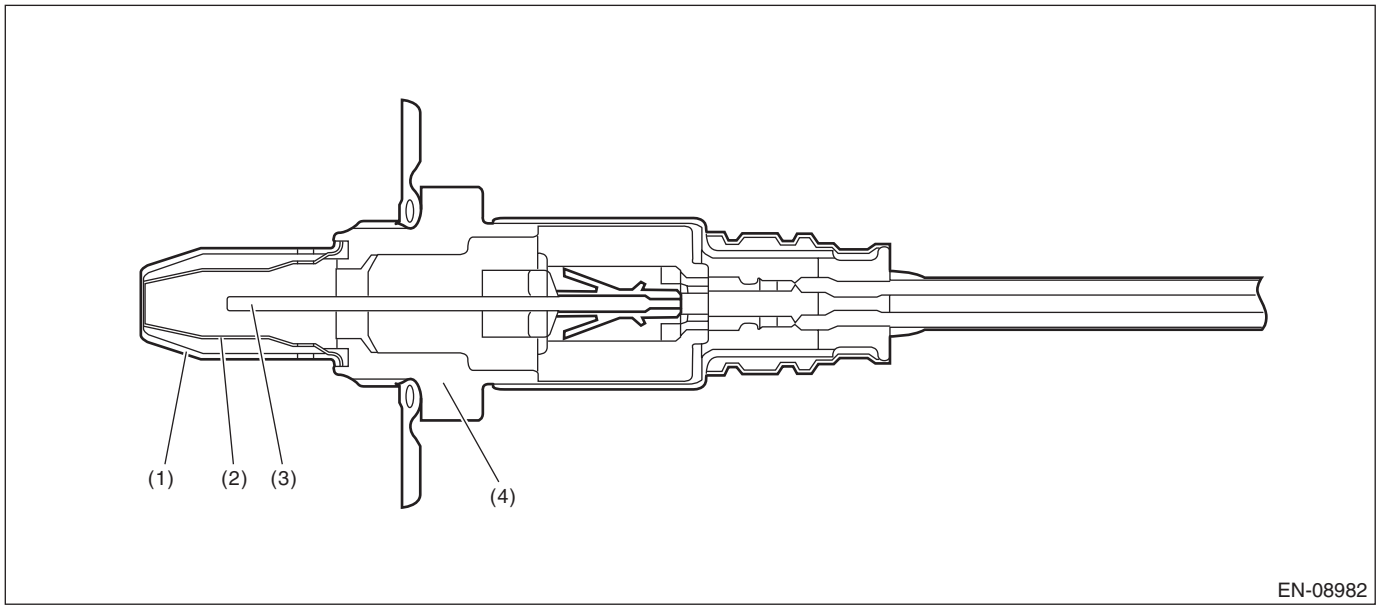


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Start and warm up the engine. 2) Turn the ignition switch to OFF. 3) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 4) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 5 — (E24) No. 1:*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
2	**CHECK FRONT OXYGEN (A/F) SENSOR.** Measure the resistance between front oxygen (A/F) sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 2 — 3 Ω?	Go to step **3**.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>
3	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and front oxygen (A/F) sensor connector.	Is there poor contact of ECM or front oxygen (A/F) sensor connector?	Repair the poor contact of ECM or front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect functional errors of the front oxygen (A/F) sensor heater.
Judge as NG when it is determined that the front oxygen (A/F) sensor impedance is large when looking at engine status such as deceleration fuel cut.

2. COMPONENT DESCRIPTION



(1) Element cover (outer)
(2) Element cover (inner)
(3) Sensor element
(4) Sensor housing

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Condition established time	≥ 42000 ms
Battery voltage	≥ 10.9 V
Heater current	Permitted
A/F sensor heater final control	Main energization status
After fuel cut	≥ 20000 ms

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after 42000 ms seconds or more have passed since the engine started.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Front oxygen (A/F) sensor impedance	> 82 Ω

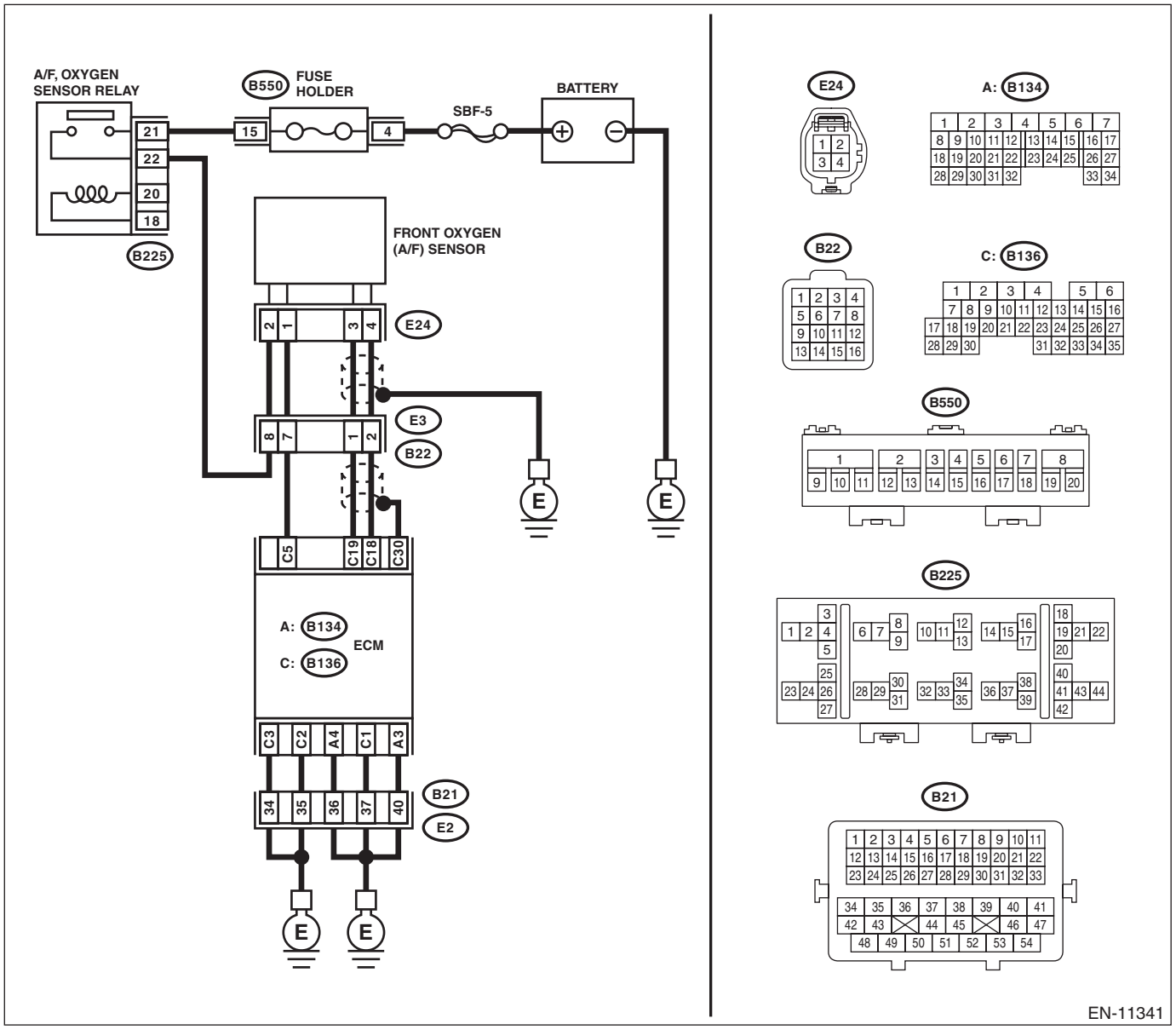
Time Needed for Diagnosis: 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

R: DTC P0031 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

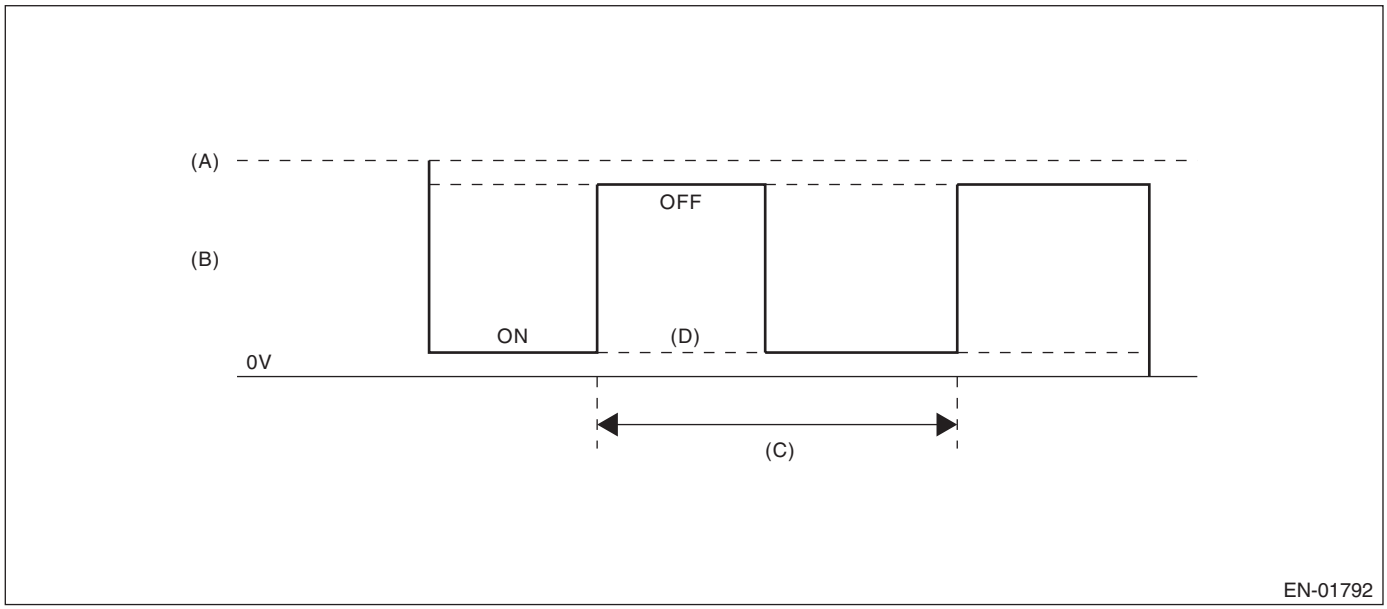


	Step	Check	Yes	No
1	**CHECK POWER SUPPLY TO FRONT OXYGEN (A/F) SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from front oxygen (A/F) sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between front oxygen (A/F) sensor connector and engine ground. ***Connector & terminal*** ***(E24) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the power supply line. NOTE: In this case, repair the following item: • Open circuit in harness between A/F, oxygen sensor relay connector and front oxygen (A/F) sensor connector • Poor contact of A/F, oxygen sensor relay connector • Poor contact of coupling connector • Malfunction of A/F, oxygen sensor relay
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 5 — (E24) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
3	**CHECK GROUND CIRCUIT FOR ECM.** Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
4	**CHECK FRONT OXYGEN (A/F) SENSOR.** Measure the resistance between front oxygen (A/F) sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 2 — 3 Ω?	Repair the poor contact of ECM connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect front oxygen (A/F) sensor heater open or short circuit.
The front oxygen (A/F) sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.
Judge as NG when the terminal voltage remains Low.

2. COMPONENT DESCRIPTION



(A) Battery voltage
(B) Front oxygen (A/F) sensor heater output voltage
(C) 128 ms
(D) Low error

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Primary oxygen sensor heater control duty	< 87.5 %

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured primary oxygen sensor heater control voltage	< 1.9 V

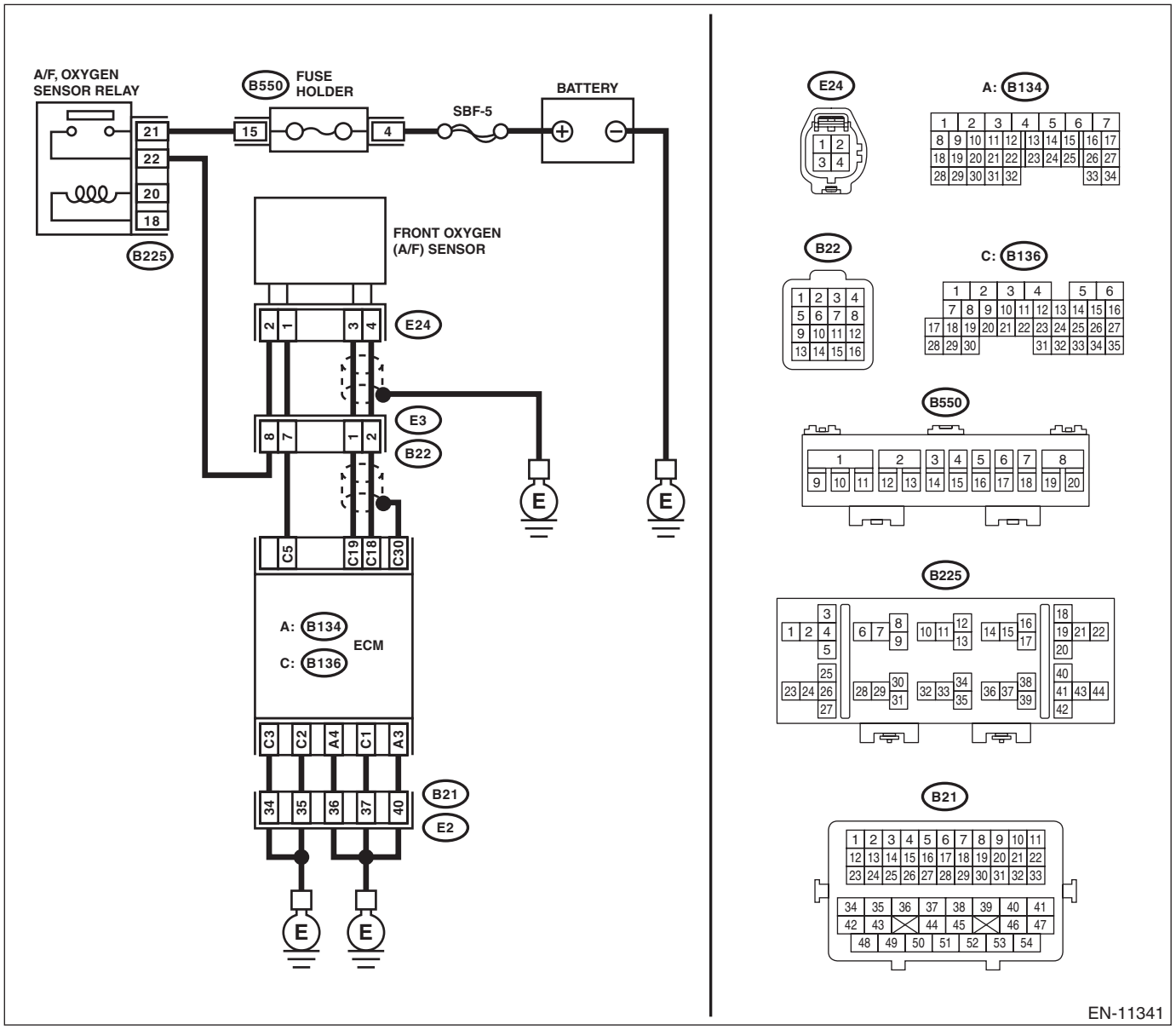
Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

S: DTC P0032 A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



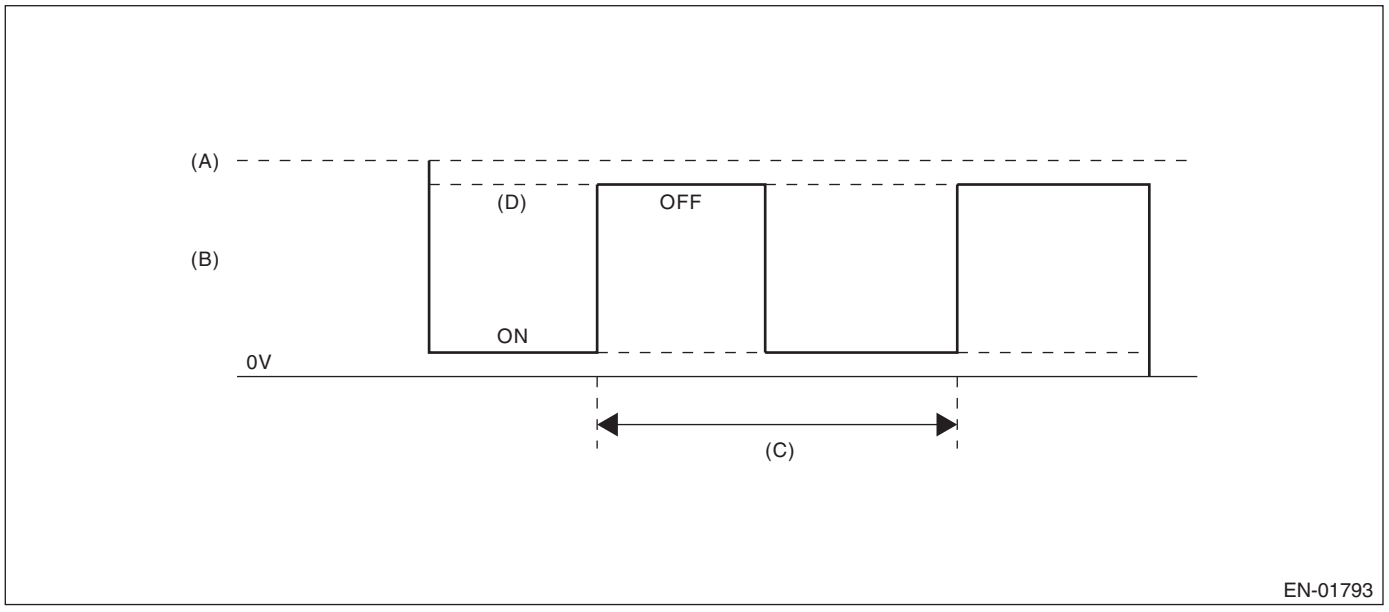
Step		Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector.	Go to step **2**.

Step		Check	Yes	No
2	**CHECK GROUND CIRCUIT FOR ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect front oxygen (A/F) sensor heater open or short circuit.
The front oxygen (A/F) sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.
Judge as NG when the terminal voltage remains High.

2. COMPONENT DESCRIPTION



(A) Battery voltage
(B) Front oxygen (A/F) sensor heater output voltage
(C) 128 ms
(D) High error

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Primary oxygen sensor heater control duty	> 12.5 %

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured primary oxygen sensor heater control voltage	≥ 1.9 V

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

T: DTC P0037 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2

DTC DETECTING CONDITION:

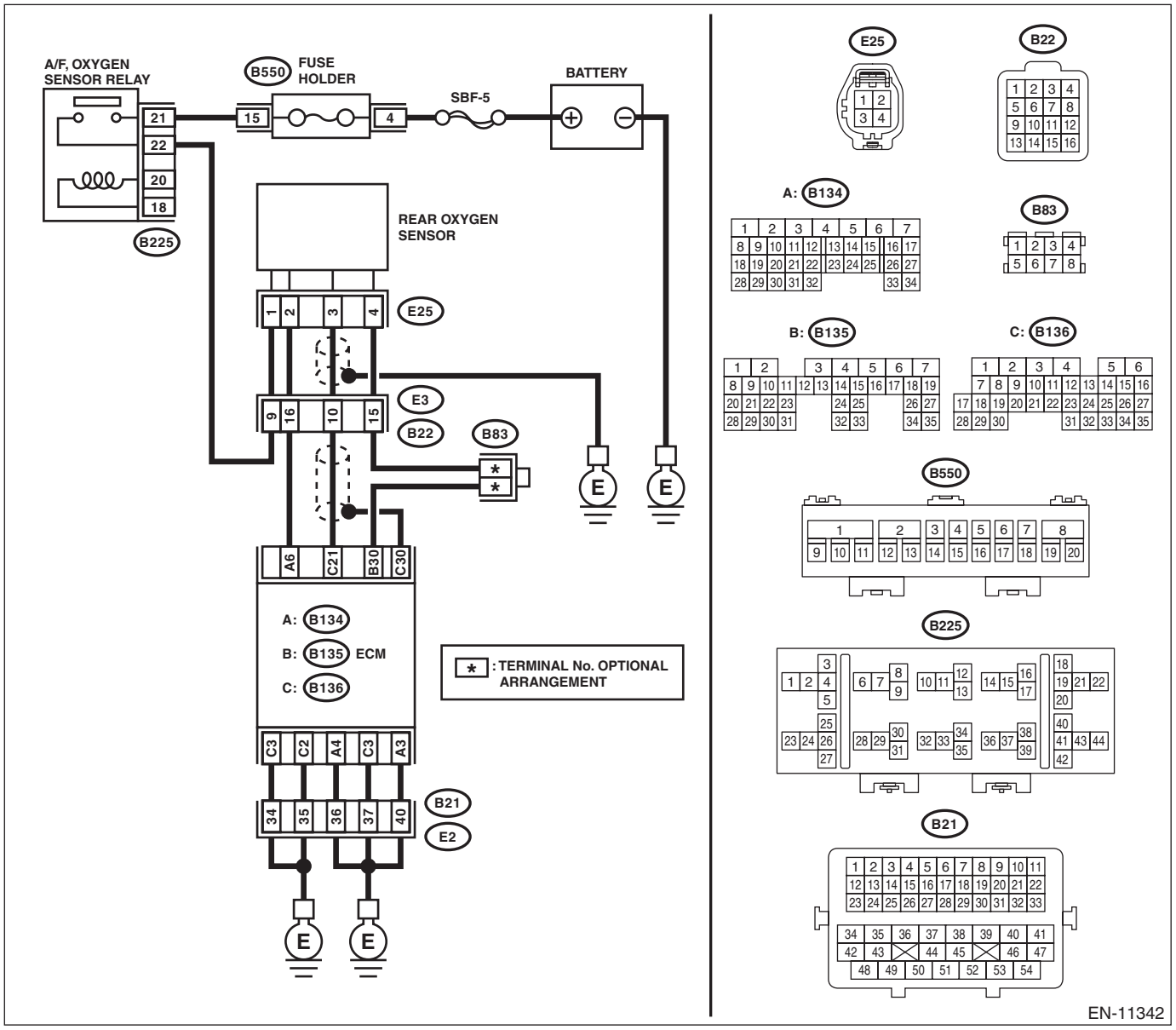
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

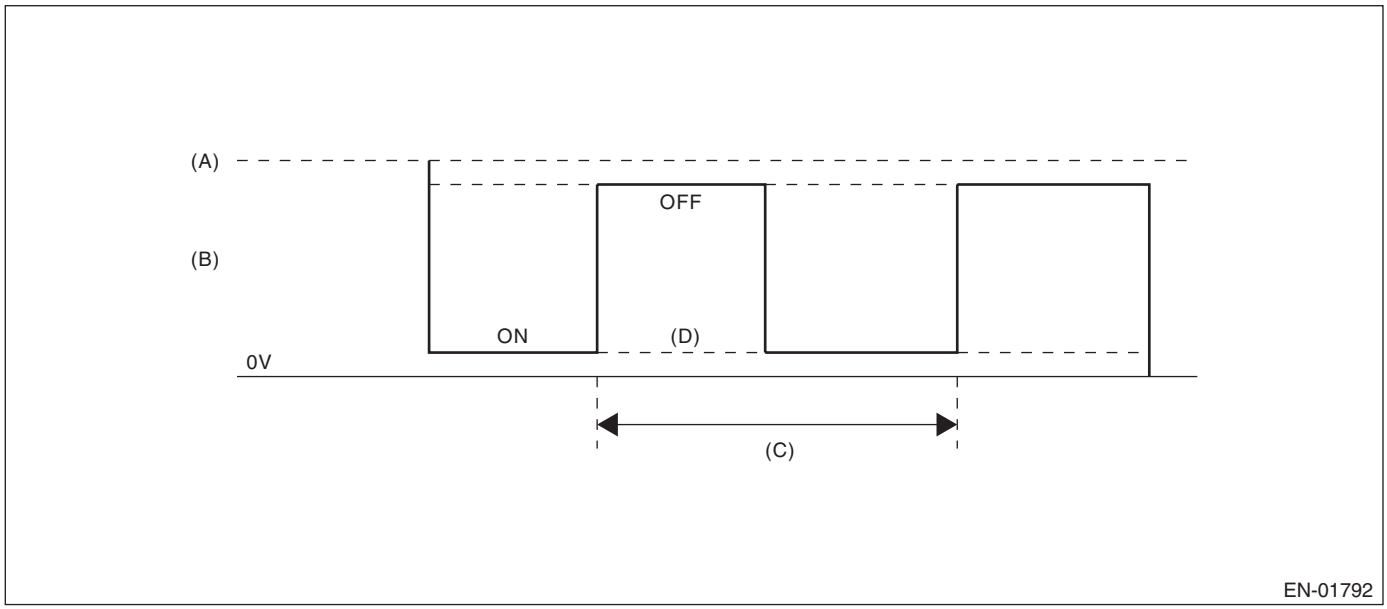


	Step	Check	Yes	No
1	**CHECK POWER SUPPLY TO REAR OXYGEN SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from rear oxygen sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between rear oxygen sensor connector and engine ground. ***Connector & terminal*** ***(E25) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the power supply line. Or replace the main relay. NOTE: In this case, repair the following item: • Open circuit in harness between A/F, oxygen sensor relay connector and rear oxygen sensor connector • Poor contact of A/F, oxygen sensor relay connector • Poor contact of coupling connector • Malfunction of A/F, oxygen sensor relay
2	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and oxygen sensor connector. ***Connector & terminal*** ***(B134) No. 6 — (E25) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
3	**CHECK GROUND CIRCUIT FOR ECM.** Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
4	**CHECK REAR OXYGEN SENSOR.** Measure the resistance between rear oxygen sensor terminals. ***Terminals*** ***No. 2 — No. 1:***	Is the resistance 5 — 6.4 Ω?	Repair the poor contact of ECM connector.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the rear oxygen sensor heater open or short circuit.
The rear oxygen sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.
Judge as NG when the terminal voltage remains Low.

2. COMPONENT DESCRIPTION



(A) Battery voltage
(B) Output voltage of the rear oxygen sensor heater
(C) 256 ms (cycles)
(D) Low error

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Secondary oxygen sensor heater control duty	< 75 %

4. GENERAL DRIVING CYCLE

After starting the engine, perform the diagnosis continuously when engine is low speed.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured secondary oxygen sensor heater control voltage	< 12 V battery system voltage × 0.20 V

Time Needed for Diagnosis: 8 ms × 1250 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

U: DTC P0038 A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 2

DTC DETECTING CONDITION:

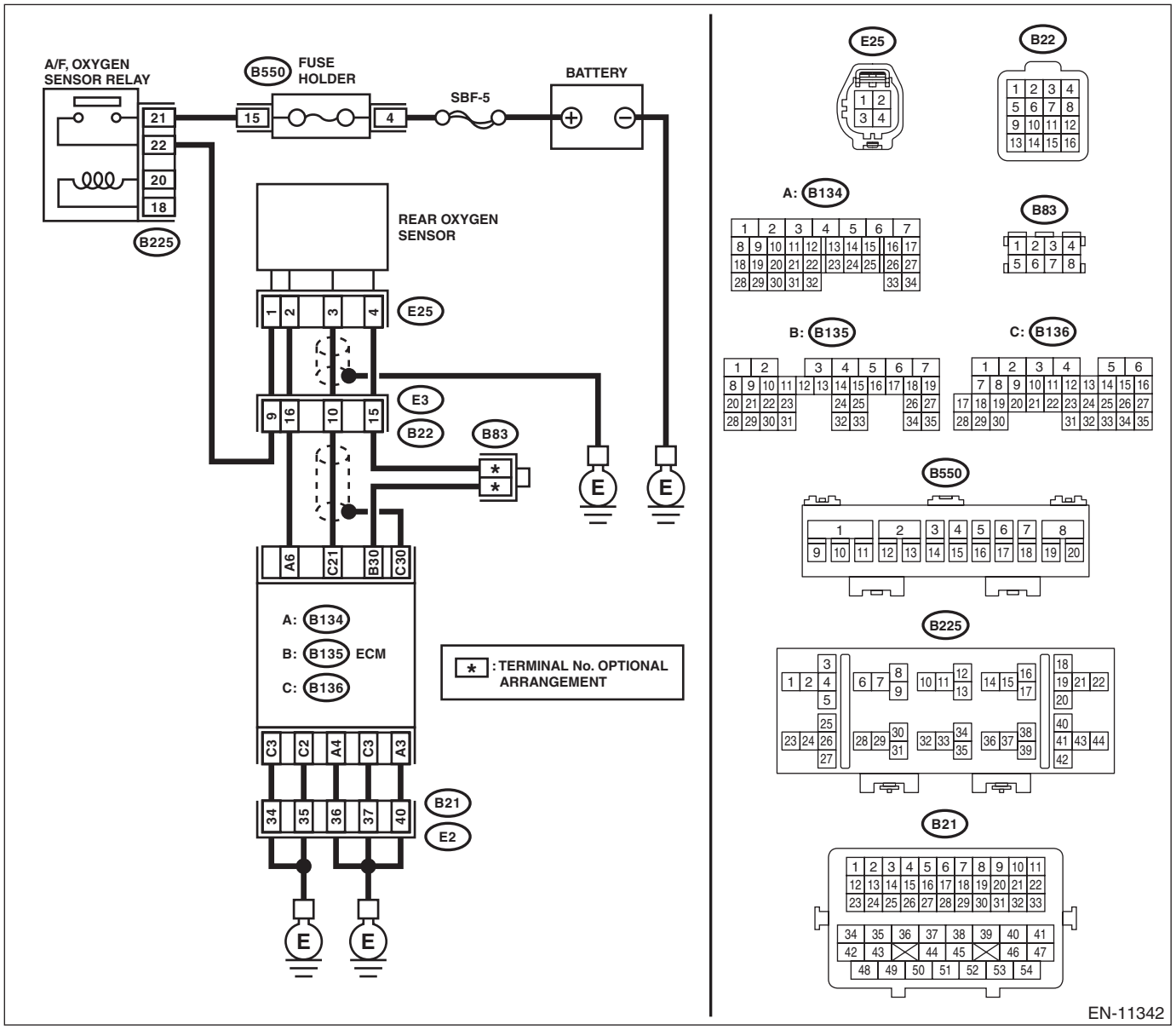
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



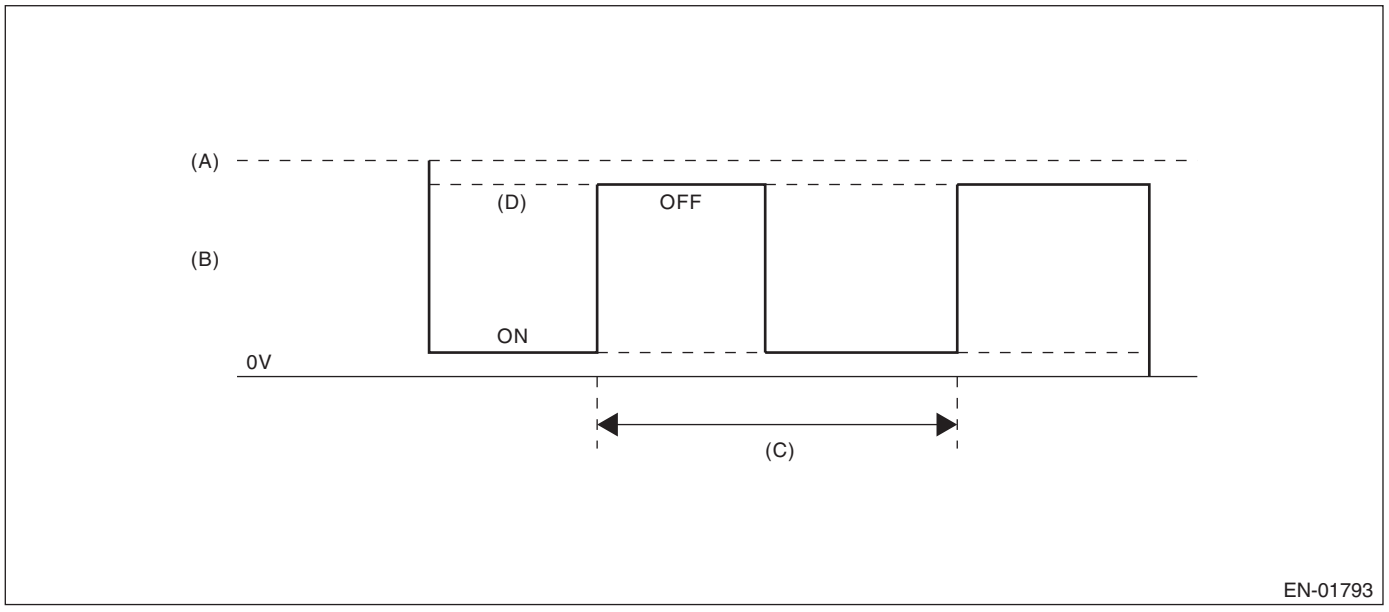
Step		Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and rear oxygen sensor connector.	Go to step **2**.

Step		Check	Yes	No
2	**CHECK GROUND CIRCUIT FOR ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the rear oxygen sensor heater open or short circuit.
The rear oxygen sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.
Judge as NG when the terminal voltage remains High.

2. COMPONENT DESCRIPTION



(A) Battery voltage
(B) Output voltage of the rear oxygen sensor heater
(C) 256 ms (cycles)
(D) High error

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Secondary oxygen sensor heater control duty	≥ 20 %

4. GENERAL DRIVING CYCLE

After starting the engine, perform the diagnosis continuously when engine is low speed.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured secondary oxygen sensor heater control voltage	12 V battery system voltage × 0.30 V

Time Needed for Diagnosis: 2.56 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

V: DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

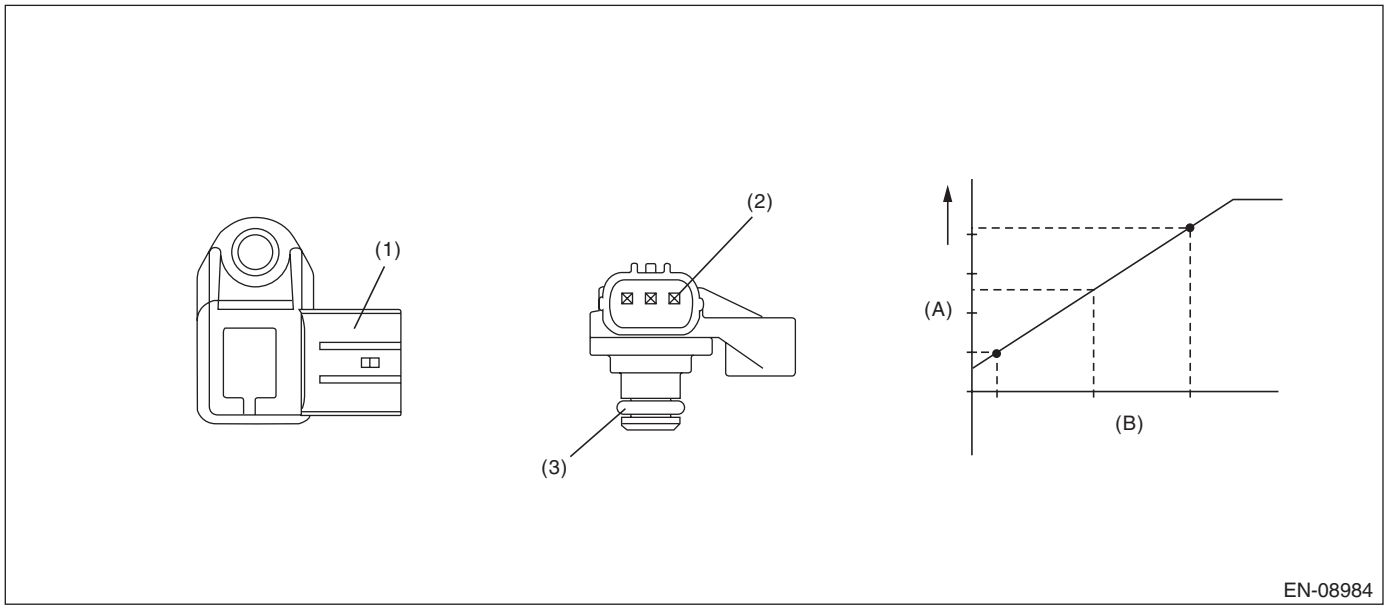
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **2**.
2	**CHECK MANIFOLD ABSOLUTE PRESSURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Mani. Absolute Pressure» 73.3 — 106.6 kPa (550 — 800 mmHg, 21.65 — 31.50 inHg) when the ignition is turned ON, and 20.0 — 46.7 kPa (150 — 350 mmHg, 5.91 — 13.78 inHg) during idling?	Go to step **3**.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(w/o HEV))-76, Manifold Absolute Pressure Sensor.>
3	**CHECK THROTTLE OPENING ANGLE.** Using the Subaru Select Monitor or a general scan tool, read the value in «Throttle Opening Angle». NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Throttle Opening Angle» with the throttle fully closed less than 5%?	Go to step **4**.	Replace the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>
4	**CHECK THROTTLE OPENING ANGLE.**	Is the value in «Throttle Opening Angle» with the throttle fully open 85% or more?	Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(w/o HEV))-76, Manifold Absolute Pressure Sensor.>	Replace the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>

1. OUTLINE OF DIAGNOSIS

Detect problems in the intake manifold pressure sensor output properties.
Judge as NG when the intake air pressure AD value is Low whereas it seemed to be High from the viewpoint of engine condition, or when it is High whereas it seemed to be Low from the engine condition.

2. COMPONENT DESCRIPTION



(A) Output voltage
(B) Absolute pressure
(1) Connector
(2) Terminals
(3) O-ring

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Low	
Engine coolant temperature	≥ 60 °C (140 °F)
Engine speed	< 3200 rpm
Throttle position	≥ 12 ° (CVT model) ≥ 9 ° (MT model)
Engine load	> 0.45 g/rev (0.02 oz/rev) (CVT model) > 0.36 g/rev (0.01 oz/rev) (MT model)
High	
Engine coolant temperature	≥ 60 °C (140 °F)
Engine speed	500 rpm — 950 rpm (CVT model) 500 rpm — 950 rpm (MT model)
Throttle position	≤ 4.1 °
Engine load	< 0.36 g/rev (0.01 oz/rev)

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after idling.

5. DIAGNOSTIC METHOD

Judge as NG when Low side or High side becomes NG.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Low	
Output voltage	< 1.4 V (CVT model) < 1.2 V (MT model)
High	
Output voltage	≥ 2.9 V

Time Needed for Diagnosis:
Low side: 5000 ms
High side: 5000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

W: DTC P0071 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" RANGE/ PERFORMANCE

DTC DETECTING CONDITION:

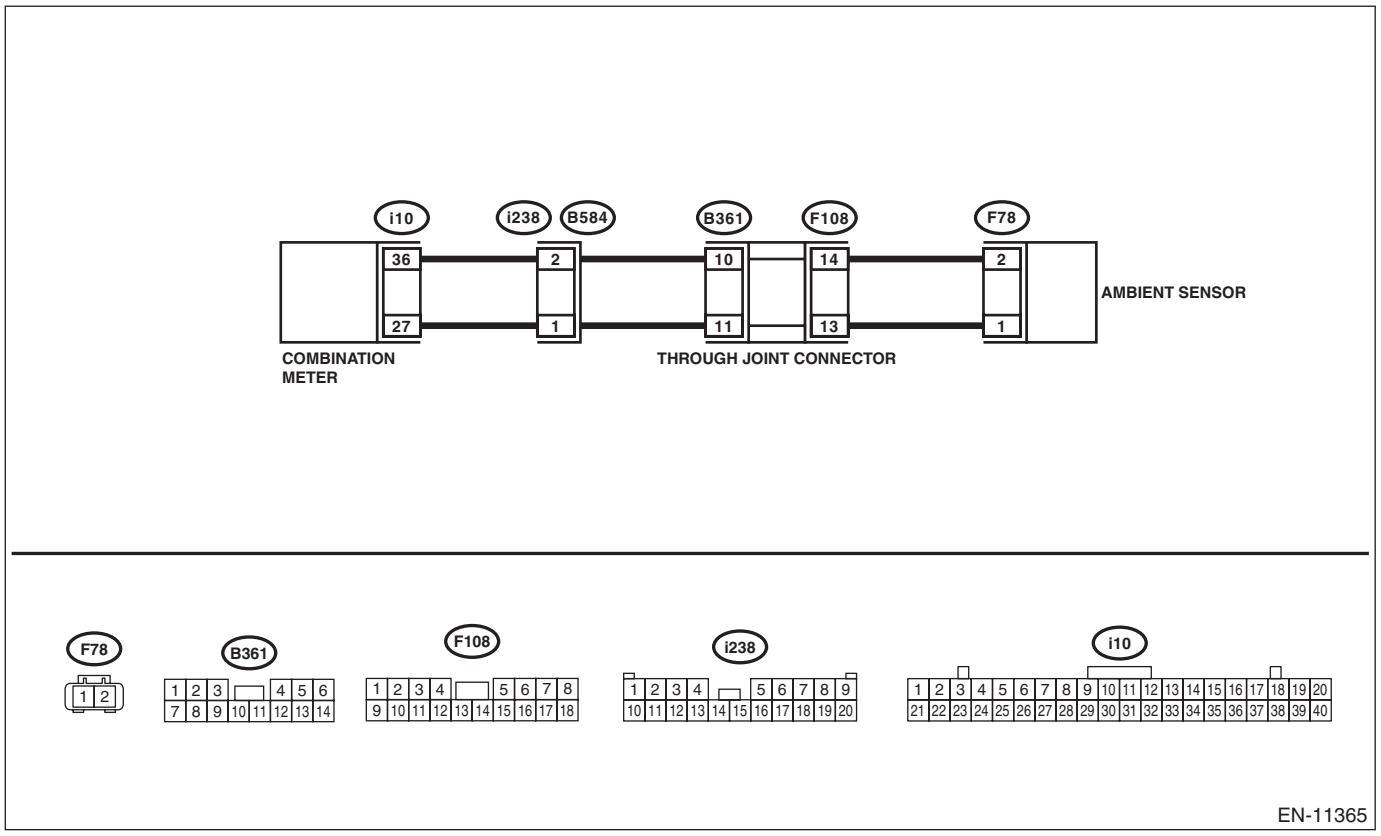
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.

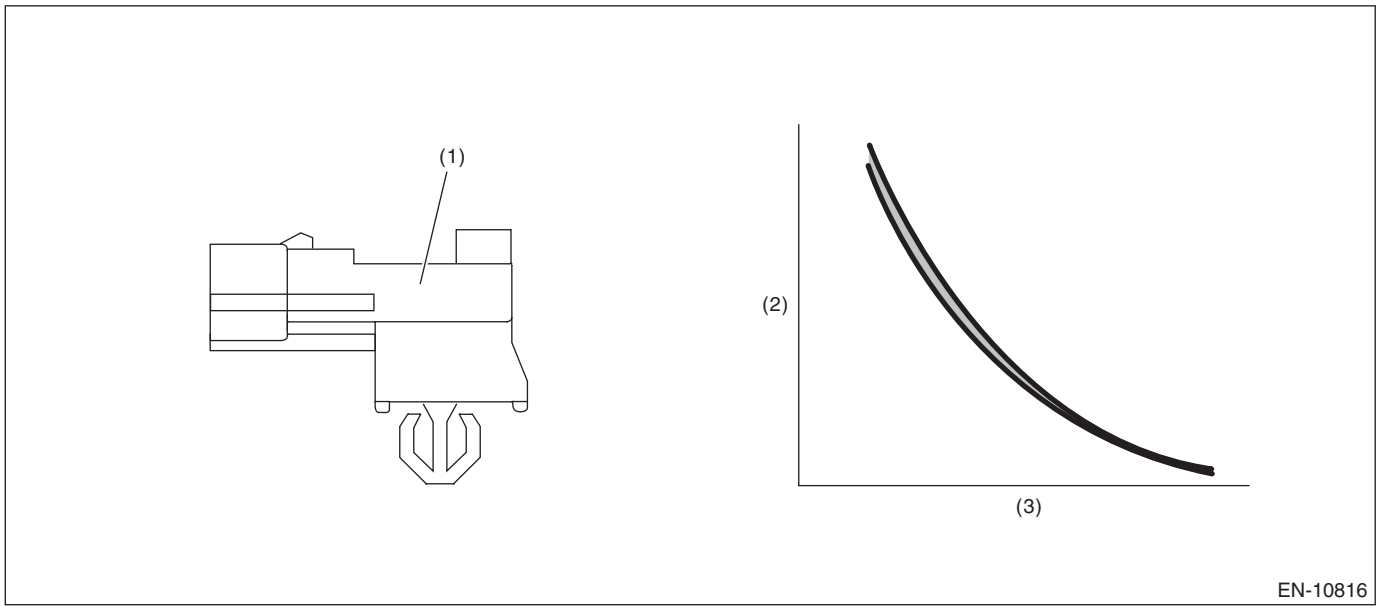
Step		Check	Yes	No
2	**CHECK AMBIENT SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ambient sensor. 3) Measure the resistance between ambient sensor terminals while heating and cooling the ambient sensor using a hair drier. **CAUTION:** **Do not heat the part to the temperature where you cannot touch it with your bare hand in order to prevent burning yourself and protect the part.** ***Terminals*** ***No. 1 — No. 2:***	Is the resistance of ambient sensor different between during heating and during cooling?	Repair the poor contact of ECM connector.	Replace the ambient sensor. <Ref. to AC-72, Ambient Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ambient temperature sensor characteristics.
After the engine starts after the specified period of soaking time has elapsed, judge by correlation between ambient temperature sensor value, intake air temperature sensor value and engine coolant temperature sensor value. Judge as NG when the differences are both above the specified value by comparing between ambient air temperature and intake air temperature, ambient air temperature and engine coolant temperature.

2. COMPONENT DESCRIPTION

Ambient temperature sensor is connected to combination meter. ECM receives the data of ambient temperature sensor via CAN communication with combination meter.



(1) Ambient sensor (2) Resistance value (kΩ) (3) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Soaking time	≥ 21600 s
Block heater judgment	Completed
Block heater operation	Not in operation

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the engine starts after a certain period of soaking time.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value Ambient air temperature 30 sec. after engine start – Intake air temperature 30 sec. after engine start	> Value from Map
Absolute value Ambient air temperature at engine start – Engine coolant temperature at engine start	> 25 °C (45°F)

Map

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Ambient air temperature 30 sec. after engine start – Intake air temperature 30 sec. after engine start| °C (°F)	20 (36°F)	20 (36°F)	32 (57.6°F)	32 (57.6°F)

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

X: DTC P0072 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

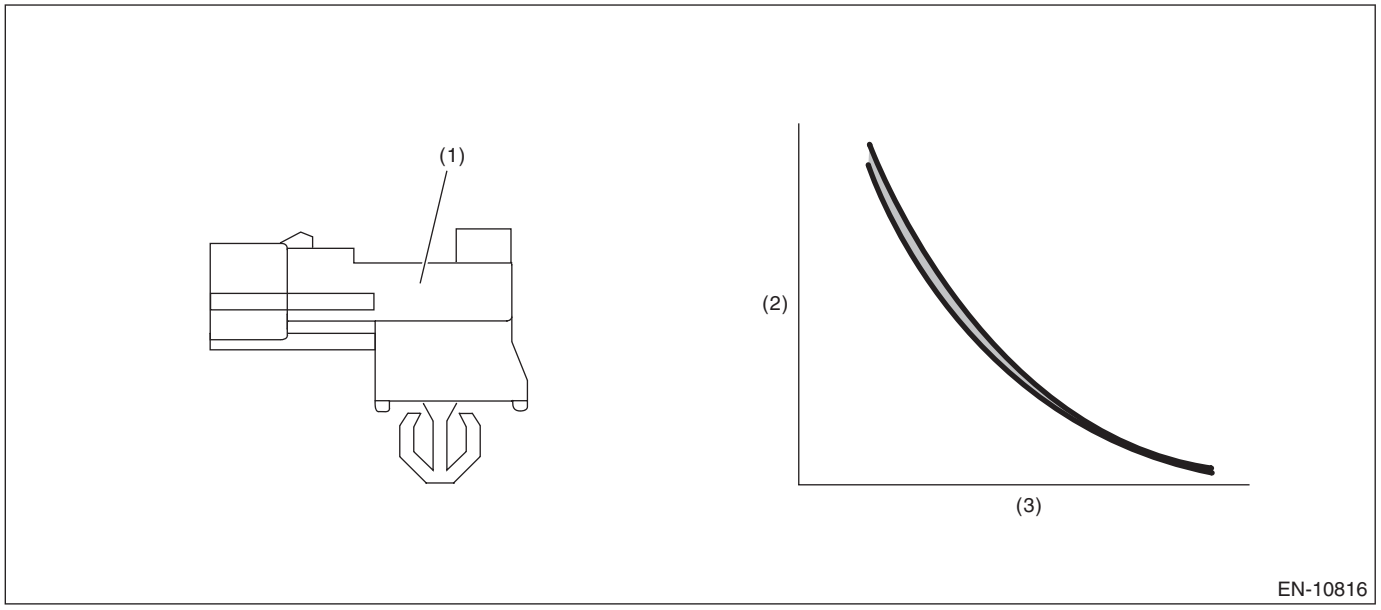
	Step	Check	Yes	No
1	**CHECK DTC.** Check for DTC. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).>	Is P0072 or P0073 displayed in Present fault?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK COMBINATION METER.** Check the combination meter system. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>	Is the combination meter system normal?	Replace the ambient sensor. <Ref. to AC-72, Ambient Sensor.>	Repair the combination meter system. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of ambient temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION

Ambient temperature sensor is connected to combination meter. ECM receives the data of ambient temperature sensor via CAN communication with combination meter.



(1) Ambient sensor (2) Resistance value (kΩ) (3) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.42 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Y: DTC P0073 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" HIGH

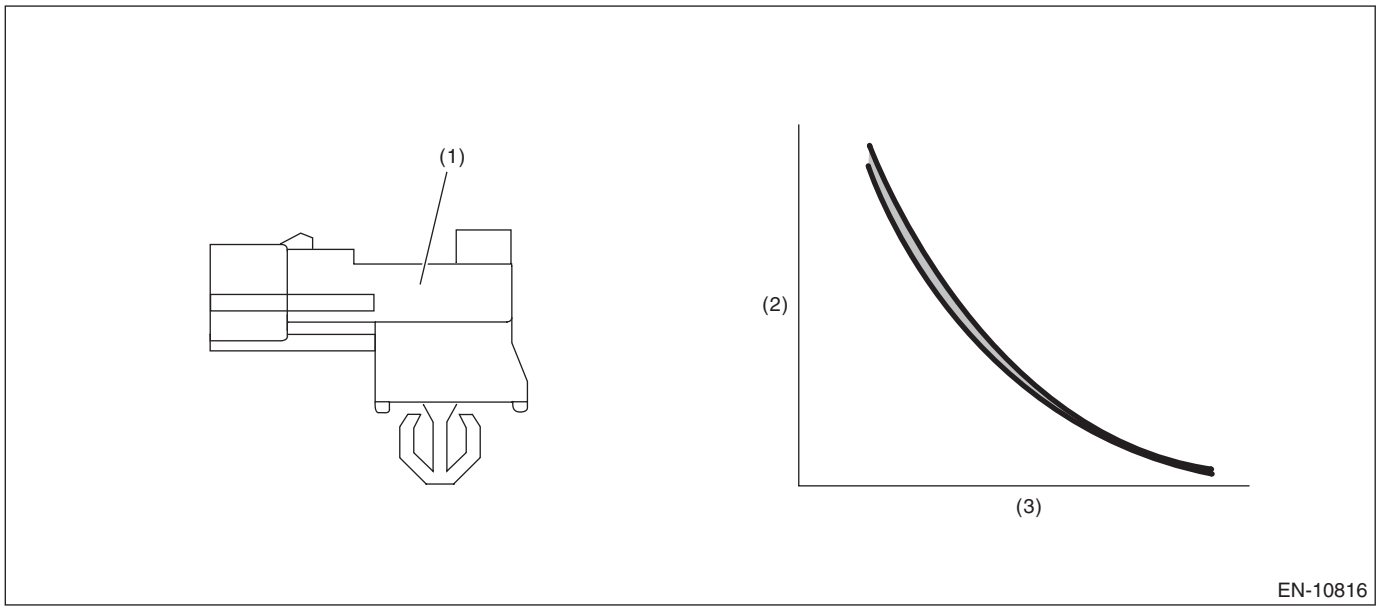
NOTE:
For the diagnostic procedure, refer to DTC P0072. <Ref. to EN(H4DO w/o HEV)(diag)-160, DTC P0072 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of ambient temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION

Ambient temperature sensor is connected to combination meter. ECM receives the data of ambient temperature sensor via CAN communication with combination meter.



(1) Ambient sensor (2) Resistance value (kΩ) (3) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	> 4.88 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Z: DTC P0101 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT RANGE/ PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Improper idling
- Engine stall
- Poor driving performance

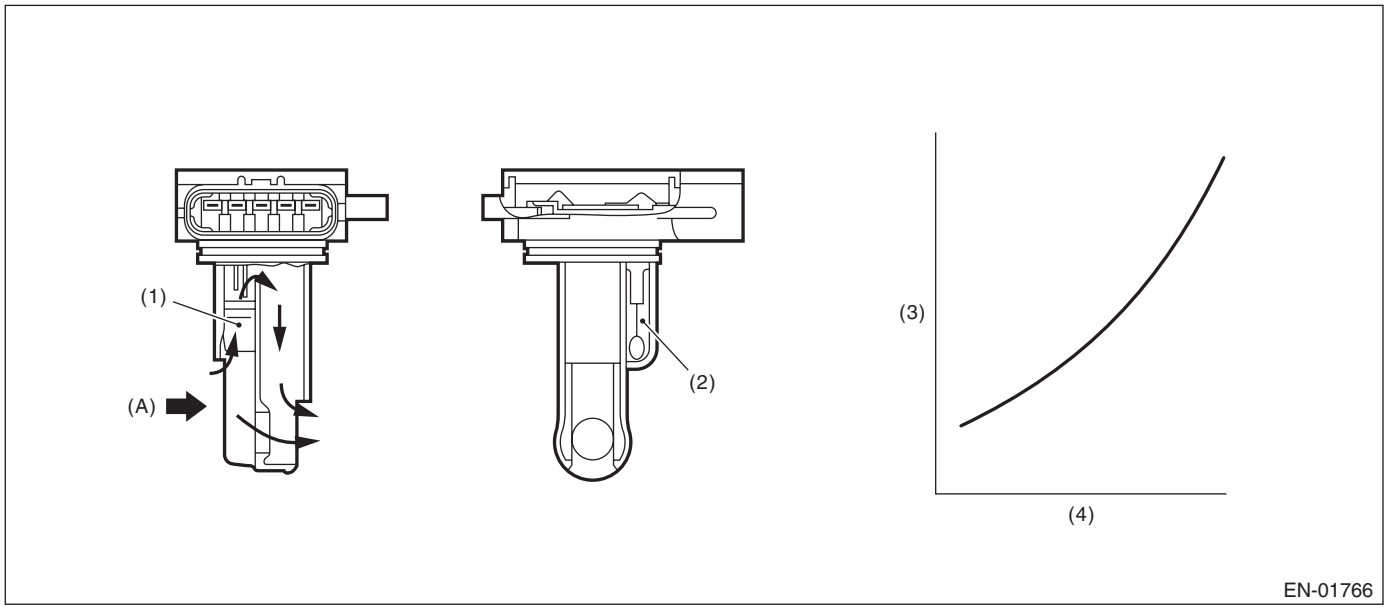
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of air flow sensor output properties.
Judge as a low side NG when the air flow voltage indicates a small value regardless of running in a state where the air flow voltage increases. Judge as a high side NG when the air flow voltage indicates a large value regardless of running in a state where the air flow voltage decreases. Judge air flow sensor property NG when the Low side or High side becomes NG.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor
(2) Intake air temperature sensor
(3) Voltage (V)
(4) Amount of intake air (kg (lb)/s)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Low	
Engine coolant temperature	≥ 60 °C (140 °F)
Engine speed	≥ 1400 rpm
Throttle valve opening angle	≥ 12 ° (CVT model) ≥ 9 ° (MT model)
Intake manifold pressure	≥ 66.7 kPa (500 mmHg, 19.7 inHg) (CVT model) ≥ 66.7 kPa (500 mmHg, 19.7 inHg) (MT model)
High	
Engine coolant temperature	≥ 60 °C (140 °F)
Engine speed	500 rpm — 950 rpm (CVT model) 500 rpm — 950 rpm (MT model)
Throttle valve opening angle	< 4.1 °
Intake manifold pressure	< 47.3 kPa (355 mmHg, 14 inHg)

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after idling.

5. DIAGNOSTIC METHOD

Judge as NG when Low side or High side becomes NG.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Low	
Output voltage	< 1.4 V (CVT model) < 1.3 V (MT model)
High	
Output voltage	≥ 1.8 V

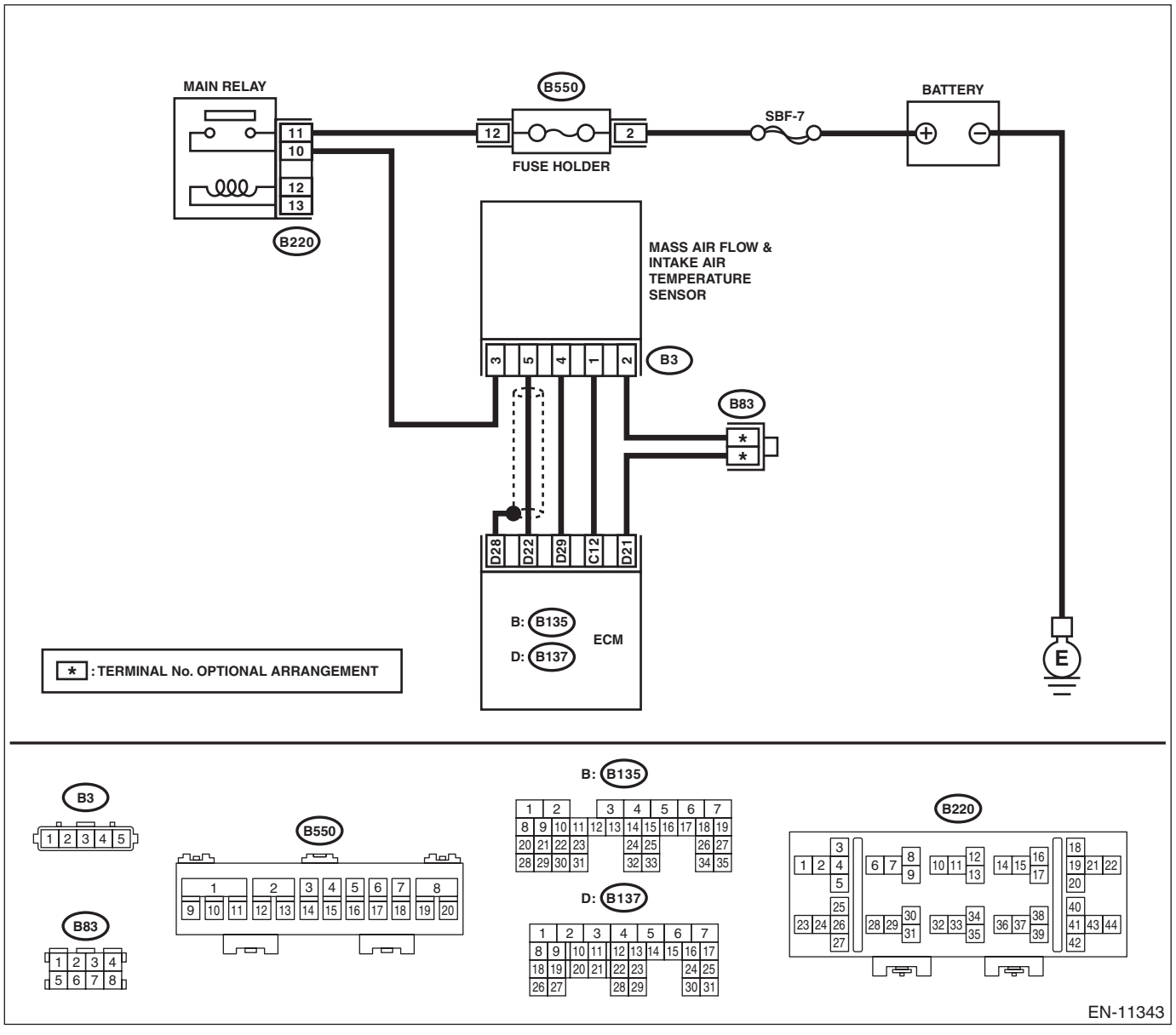
Time Needed for Diagnosis:
Low: 5000 ms
High: 5000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AA:DTC P0102 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Engine stall
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

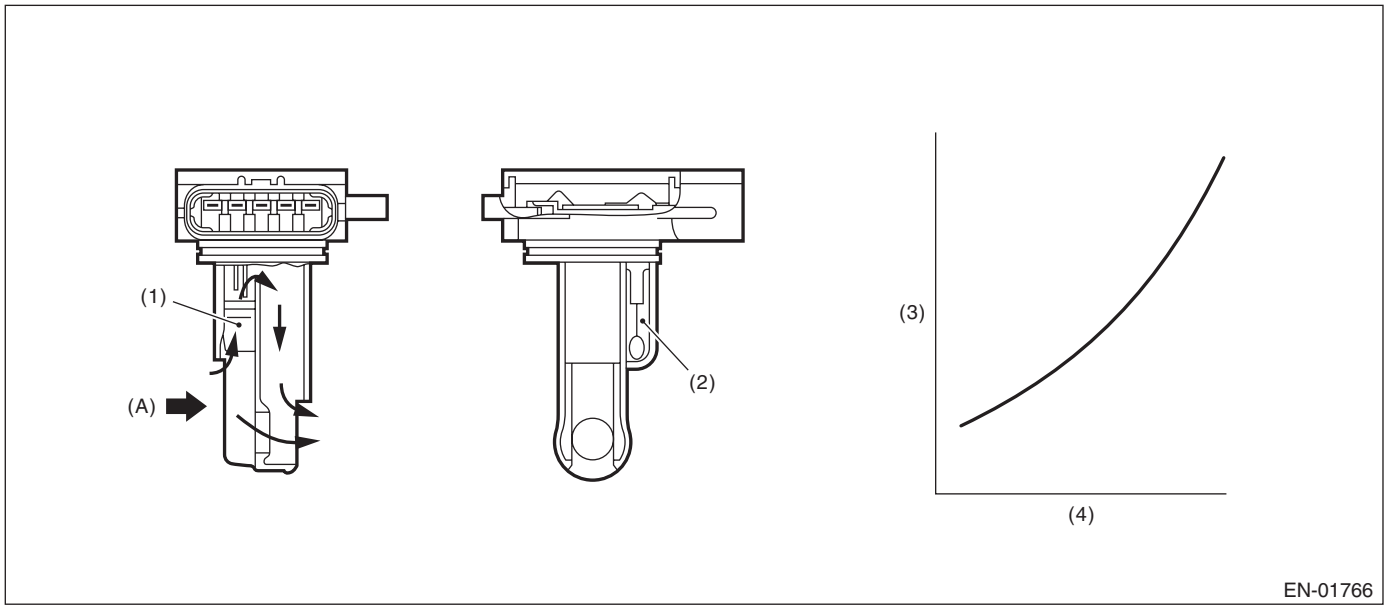


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» less than 0.2 V?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK POWER SUPPLY OF MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the mass air flow and intake air temperature sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between mass air flow and intake air temperature sensor connector and engine ground. ***Connector & terminal*** ***(B3) No. 3 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and mass air flow and intake air temperature sensor connector • Poor contact of main relay connector
3	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the mass air flow and intake air temperature sensor connector. ***Connector & terminal*** ***(B137) No. 22 — (B3) No. 5:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the ground short circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.
5	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and mass air flow and intake air temperature sensor connector.	Is there poor contact of ECM or mass air flow and intake air temperature sensor connector?	Repair the poor contact of ECM or mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuits of the air flow sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor
(2) Intake air temperature sensor
(3) Voltage (V)
(4) Amount of intake air (kg (lb)/s)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≤ 0.127 V

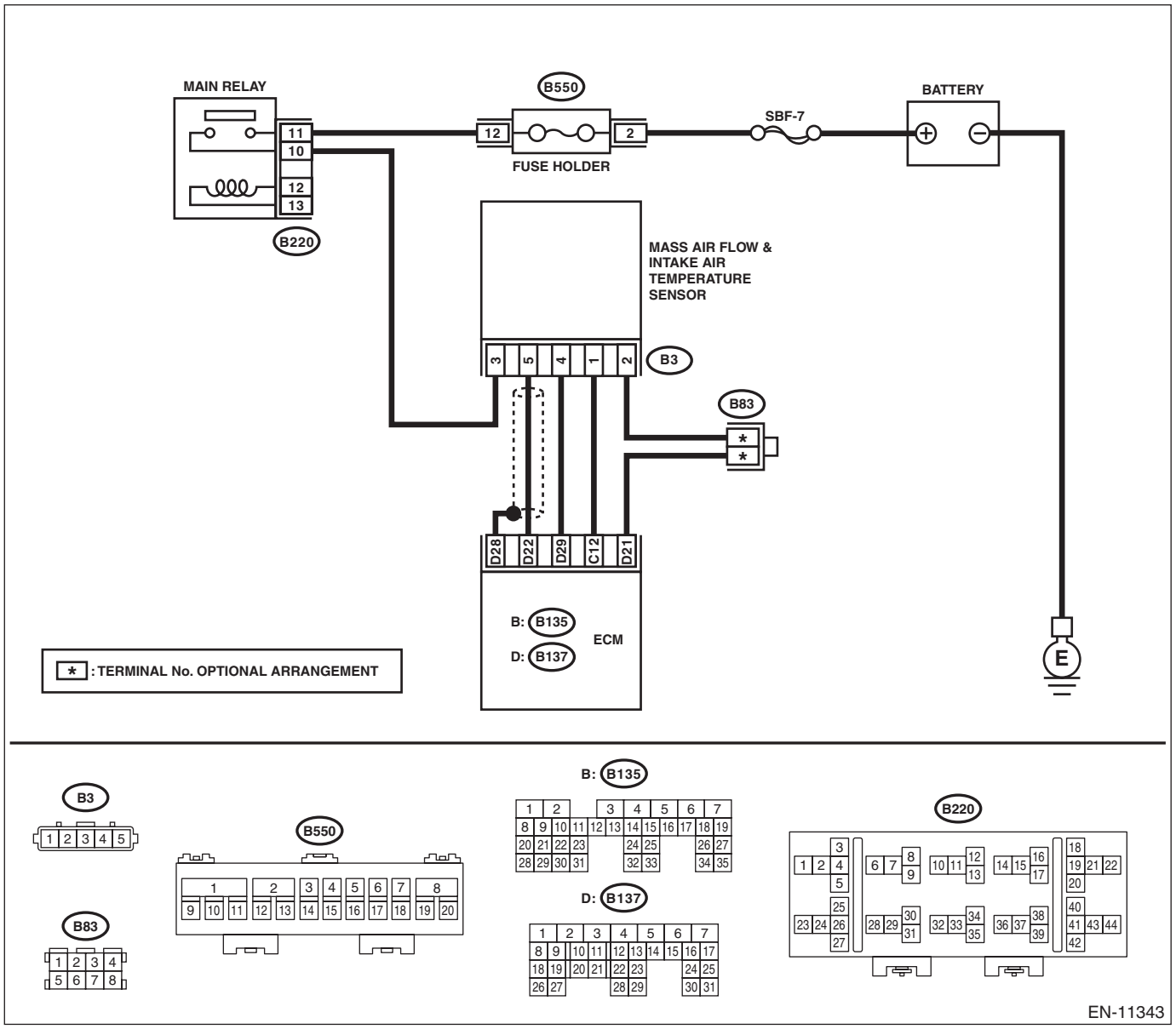
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AB:DTC P0103 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Engine stall
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

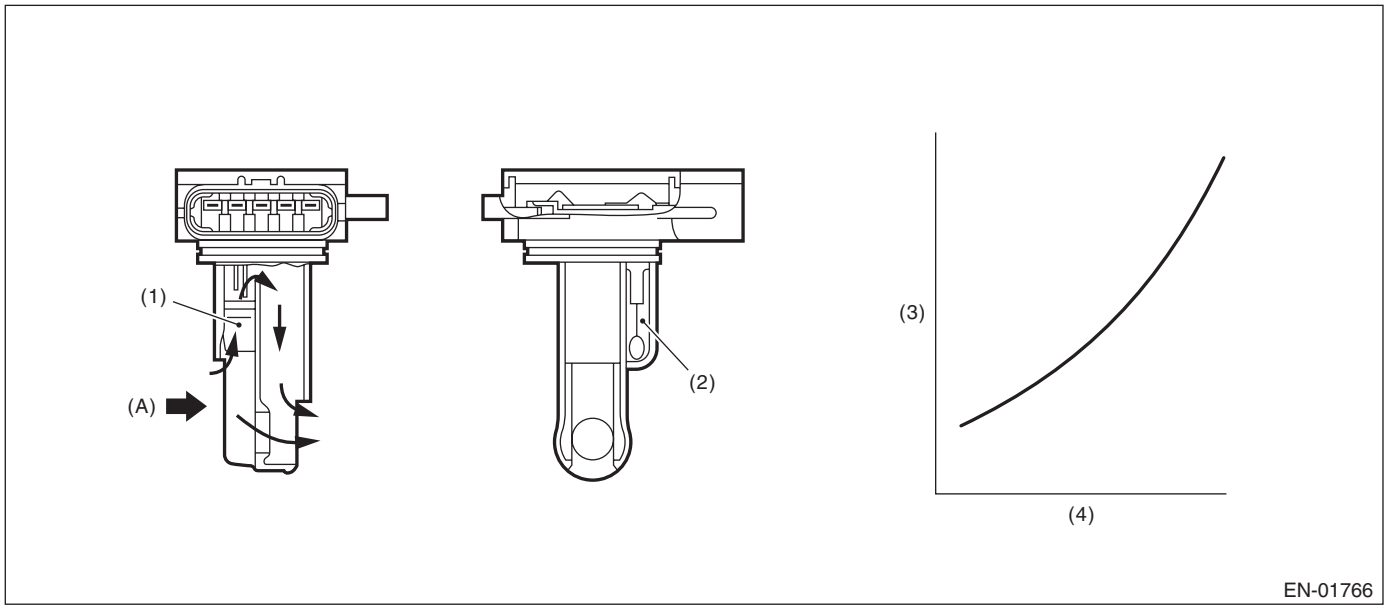


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» 5 V or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the mass air flow and intake air temperature sensor. 3) Start the engine. 4) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and the mass air flow and intake air temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between mass air flow and intake air temperature sensor connector and engine ground. ***Connector & terminal*** ***(B3) No. 4 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the mass air flow and intake air temperature sensor connector • Poor contact of ECM connector
4	**CHECK FOR POOR CONTACT.** Check for poor contact of mass air flow and intake air temperature sensor connector.	Is there poor contact of mass air flow and intake air temperature sensor connector?	Repair the poor contact of mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuits of the air flow sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor
(2) Intake air temperature sensor
(3) Voltage (V)
(4) Amount of intake air (kg (lb)/s)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.43 V

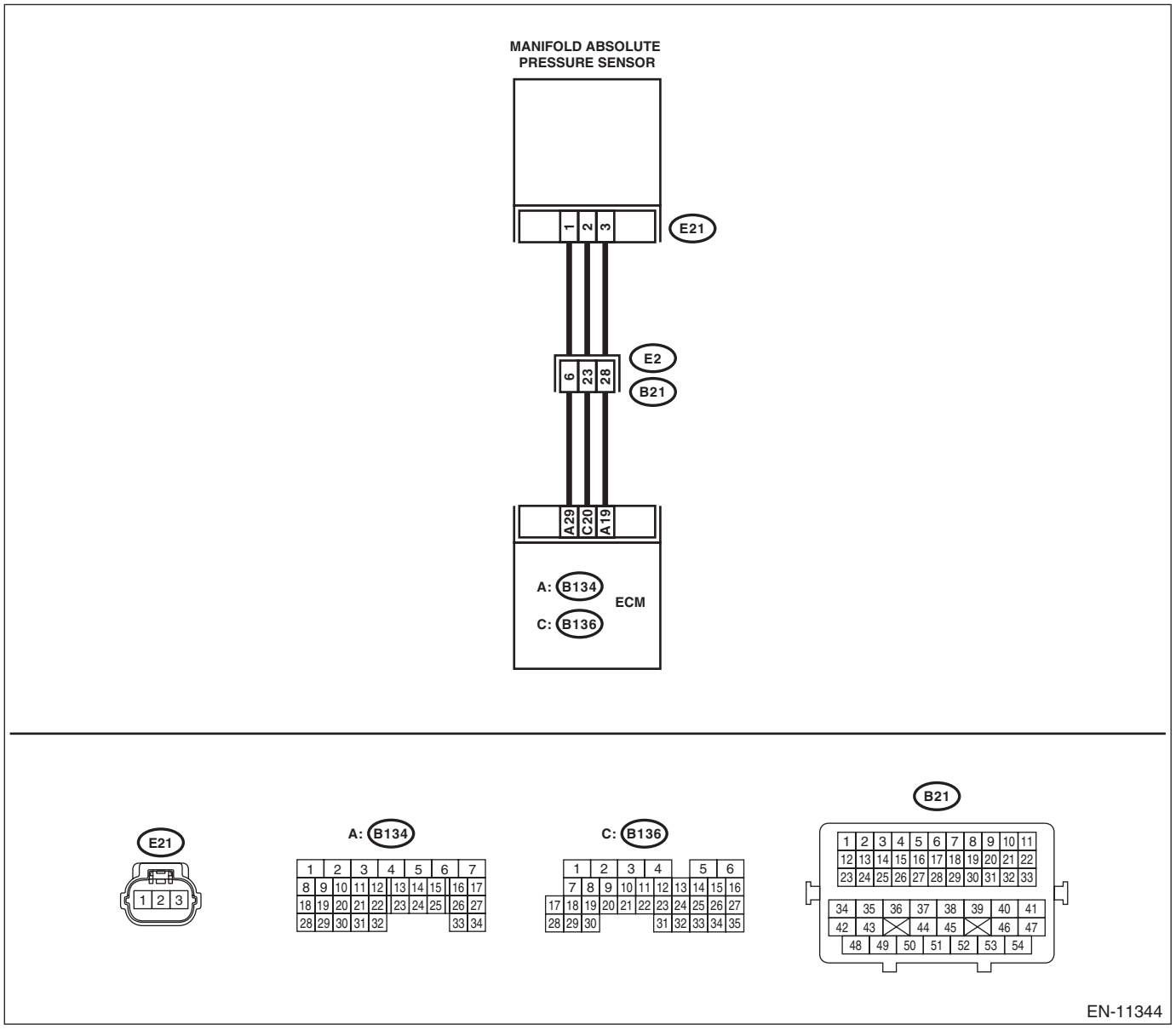
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AC:DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

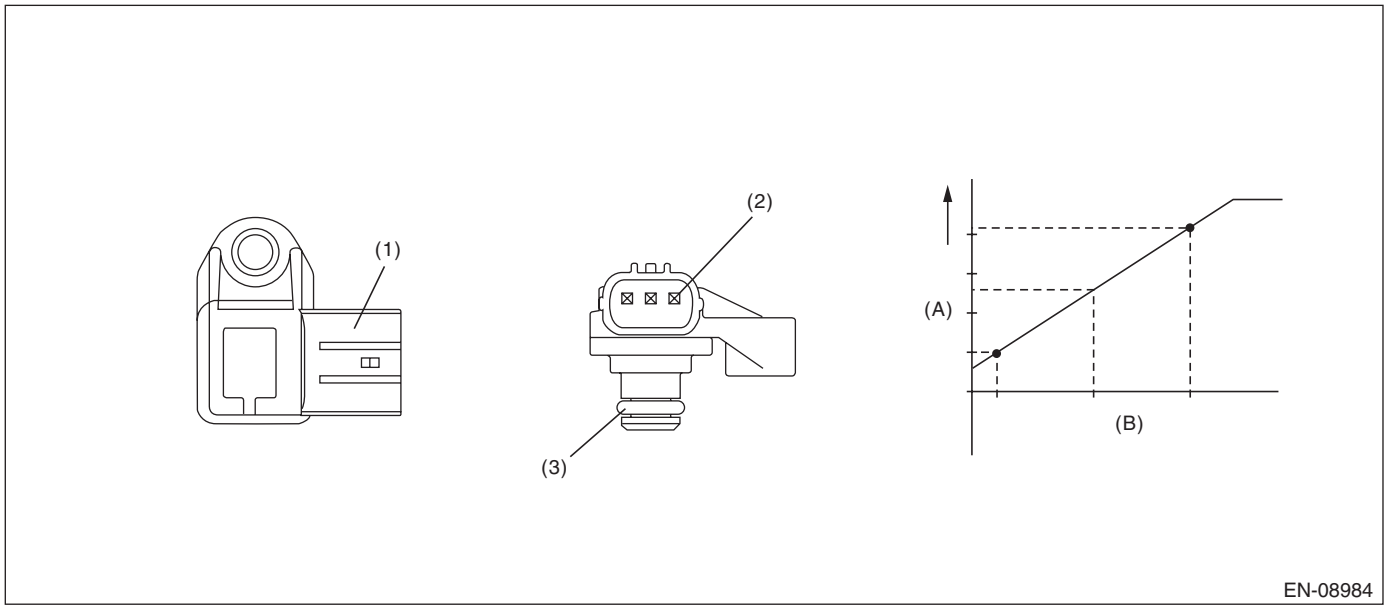


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» less than 13.3 kPa (100 mmHg, 3.94 inHg)?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK POWER SUPPLY OF MANIFOLD ABSOLUTE PRESSURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manifold absolute pressure sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between manifold absolute pressure sensor connector and engine ground. ***Connector & terminal*** ***(E21) No. 3 (+) — Engine ground (–):***	Is the voltage 4.5 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and manifold absolute pressure sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and manifold absolute pressure sensor connector. ***Connector & terminal*** ***(B136) No. 20 — (E21) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and manifold absolute pressure sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair short circuit to ground in harness between ECM connector and manifold absolute pressure sensor connector.
5	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and manifold absolute pressure sensor connector.	Is there poor contact of ECM or manifold absolute pressure sensor connector?	Repair the poor contact of ECM or manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(w/o HEV))-76, Manifold Absolute Pressure Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of intake manifold pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Output voltage
(B) Absolute pressure
(1) Connector
(2) Terminals
(3) O-ring

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≤ 0.608 V

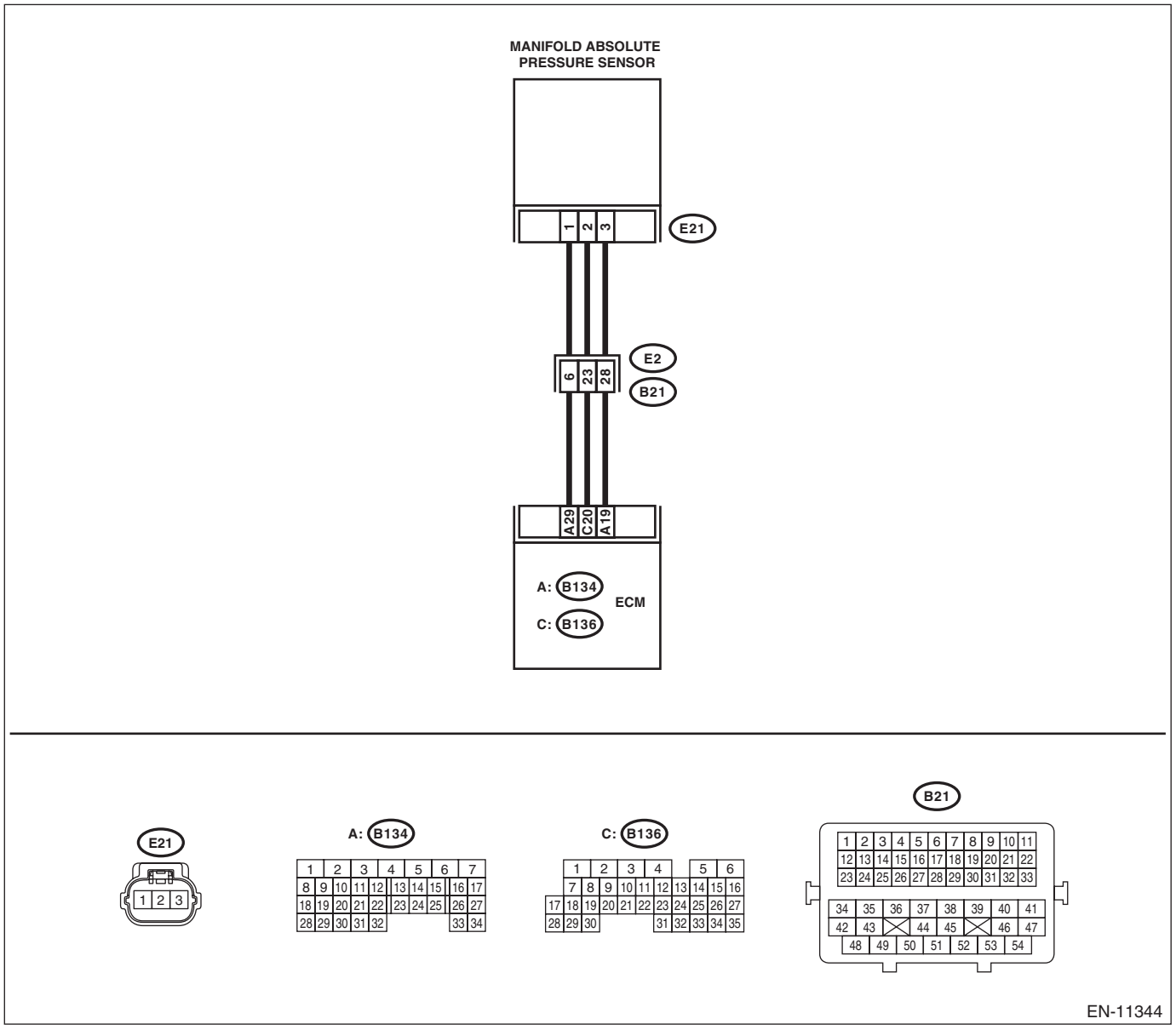
Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AD:DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

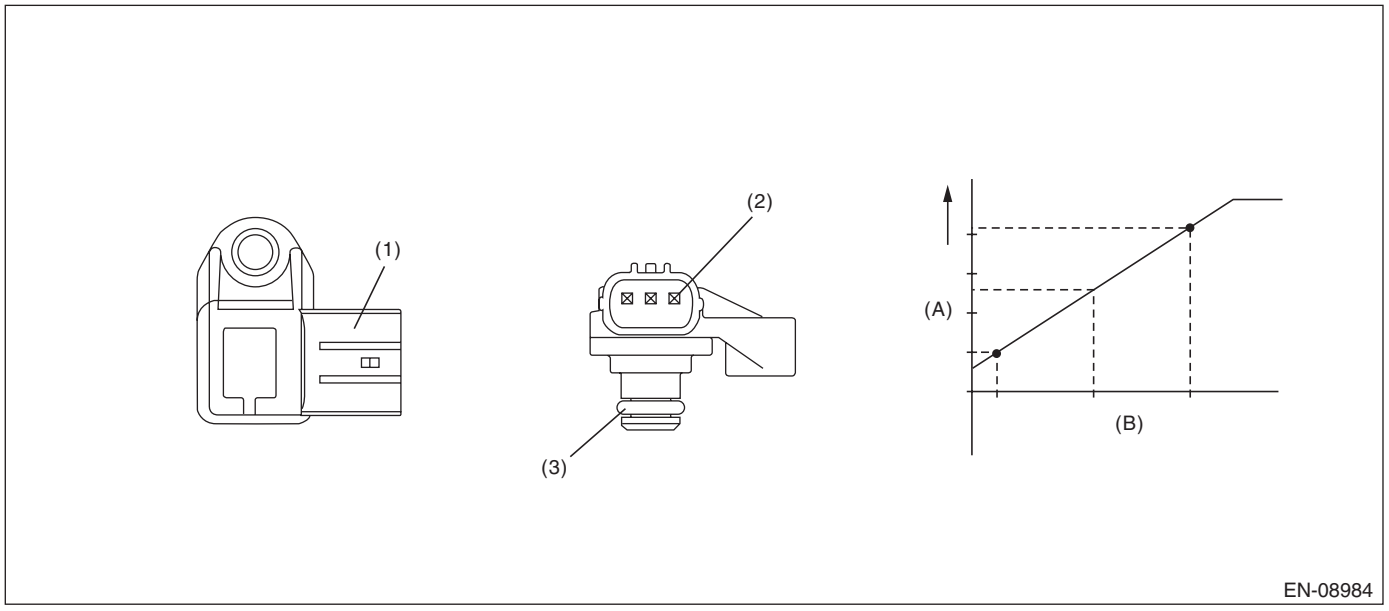


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» 119.5 kPa (896.5 mmHg, 35.29 inHg) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manifold absolute pressure sensor. 3) Start the engine. 4) Read the value data of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» 119.5 kPa (896.5 mmHg, 35.29 inHg) or more?	Repair the short circuit to power in harness between ECM connector and manifold absolute pressure sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between manifold absolute pressure sensor connector and engine ground. ***Connector & terminal*** ***(E21) No. 1 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and manifold absolute pressure sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
4	**CHECK FOR POOR CONTACT.** Check for poor contact of manifold absolute pressure sensor connector.	Is there poor contact of manifold absolute pressure sensor connector?	Repair the poor contact of manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(w/o HEV))-76, Manifold Absolute Pressure Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of intake manifold pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Output voltage
(B) Absolute pressure
(1) Connector
(2) Terminals
(3) O-ring

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 3.906 V

Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AE:DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE BANK 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

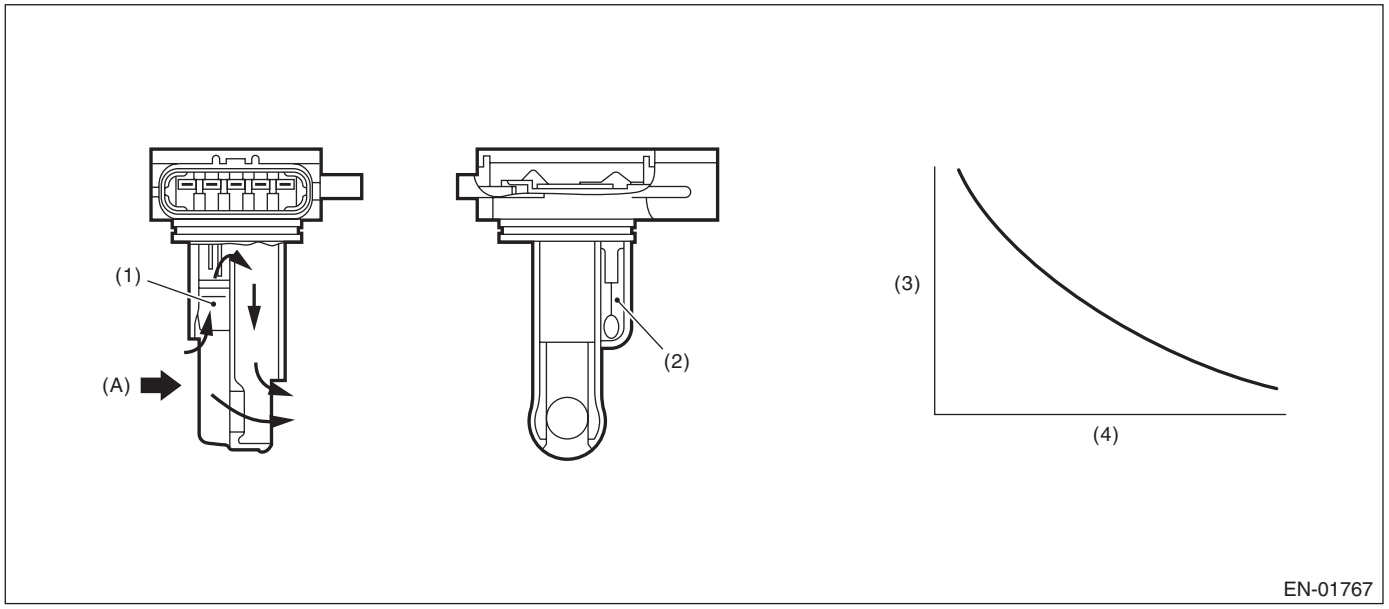
	Step	Check	Yes	No
1	**CHECK ENGINE COOLANT TEMPERATURE.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>	Check for DTC P0125. <Ref. to EN(H4DO w/o HEV)(diag)-202, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the intake air temperature sensor output properties. Using the following two diagnoses, judge as NG when either is NG.

- **Diagnosis 1 (correlation diagnosis):** After the engine starts after the specified period of soaking time has elapsed, diagnose by correlation between intake air temperature sensor value, engine coolant temperature sensor value and ambient temperature sensor value. Judge as NG when the differences are both above the specified value by comparing between intake air temperature and engine coolant temperature, intake air temperature and ambient air temperature.
- **Diagnosis 2 (stuck diagnosis):** Judge as NG when intake air temperature does not change under the driving condition where it should change, considering engine condition.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor
(2) Intake air temperature sensor
(3) Resistance value (Ω)
(4) Intake air temperature °C (°F)

3. EXECUTION CONDITION

Diagnosis 1

Secondary Parameters	Execution condition
Soaking time	≥ 21600 s
Block heater judgment	Completed
Block heater operation	Not in operation

Diagnosis 2

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Engine coolant temperature	≥ 60 °C (140 °F)
Intake air amount sum value	≥ Value of Map 1
Number of experiences under conditions below	≥ 3 time(s)
• Continuous time when vehicle speed is less than 4 km/h (2.5 MPH)	≥ Value from Map 2
• Continuous time when vehicle speed is 40 km/h (24.9 MPH) or more, and intake air amount is 10 g/s (0.35 oz/s) or more	≥ 15 s

Map 1

Engine coolant temperature °C (°F)	-30 (-22)	-10 (14)	0 (32)	10 (50)	20 (68)
Intake air amount sum value (g (oz))	60000 (2116.2)	8500 (299.8)	7500 (264.53)	7000 (246.89)	6500 (229.26)

Map 2

Engine coolant temperature °C (°F)	-30 (-22)	-10 (14)	0 (32)	10 (50)
Continuous time (s) when vehicle speed is less than 4 km/h (2.5 MPH)	180	100	70	45

4. GENERAL DRIVING CYCLE

- **Diagnosis 1:** Perform the diagnosis only once after the engine starts after a certain period of soaking time.
- **Diagnosis 2:** Perform the diagnosis when the vehicle speed condition is met after warming up from a cold condition.

5. DIAGNOSTIC METHOD

Judge as NG when Diagnosis 1 or Diagnosis 2 becomes NG.

Diagnosis 1

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value Intake air temperature 30 sec. after engine start – Engine coolant temperature at engine start	> Value of Map 3
Absolute value Intake air temperature 30 sec. after engine start – Ambient air temperature 30 sec. after engine start	> Value of Map 4

Map 3

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Intake air temperature 30 sec. after engine start – Engine coolant temperature at engine start| °C (°F)	12 (21.6°F)	12 (21.6°F)	22 (39.6°F)	22 (39.6°F)

Map 4

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Intake air temperature 30 sec. after engine start – Ambient air temperature 30 sec. after engine start| °C (°F)	20 (36°F)	20 (36°F)	32 (57.6°F)	32 (57.6°F)

Time Needed for Diagnosis: Less than 1 second

Diagnosis 2

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage difference between Max. and Min.	< 0.02 V (Equivalent to approximately 0.5°C (0.9°F) when the ambient air temperature is near 25°C (77°F)) (Equivalent to approximately 0.9°C (1.6°F) when the ambient air temperature is near –7°C (19.4°F))

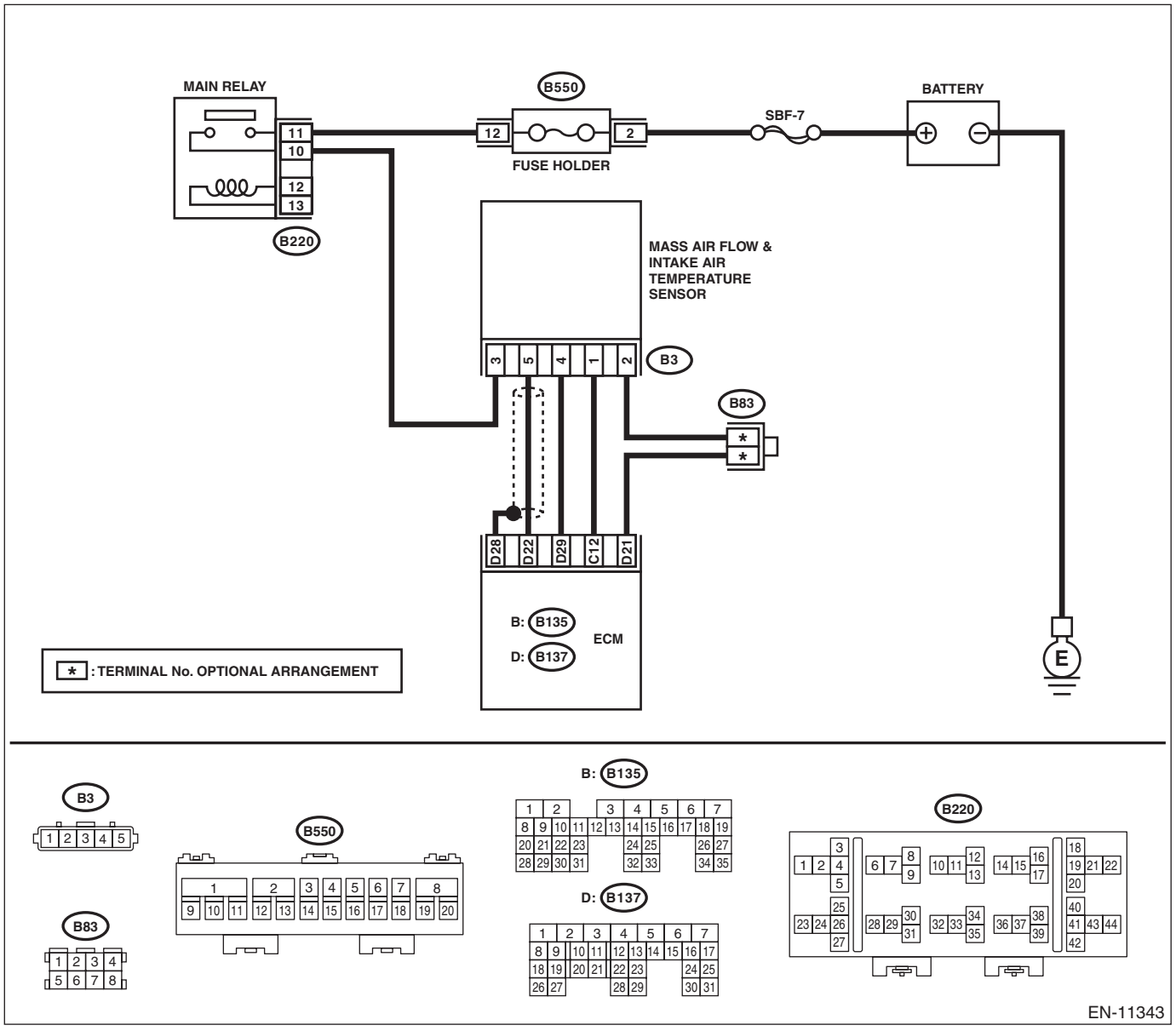
Time Needed for Diagnosis: Less than 1 second

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AF:DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

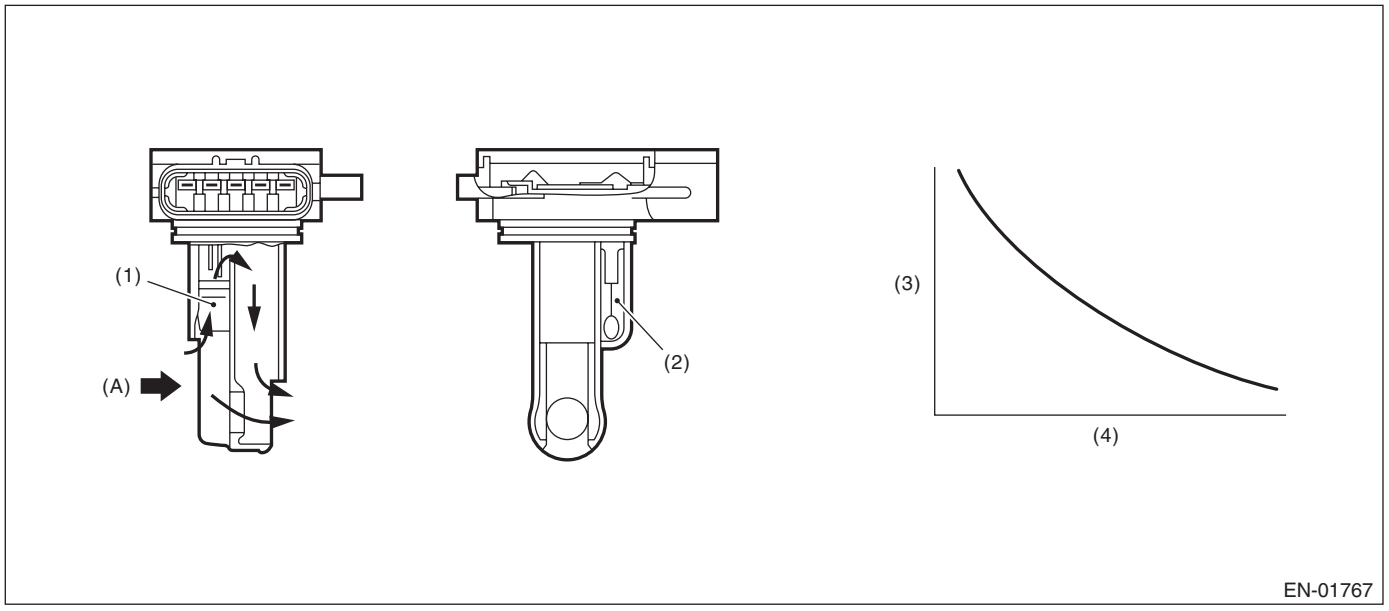


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Intake Air Temp.» 120°C (248°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the mass air flow and intake air temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>	Repair the ground short circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the intake air temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor
(2) Intake air temperature sensor
(3) Resistance value (Ω)
(4) Intake air temperature °C (°F)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

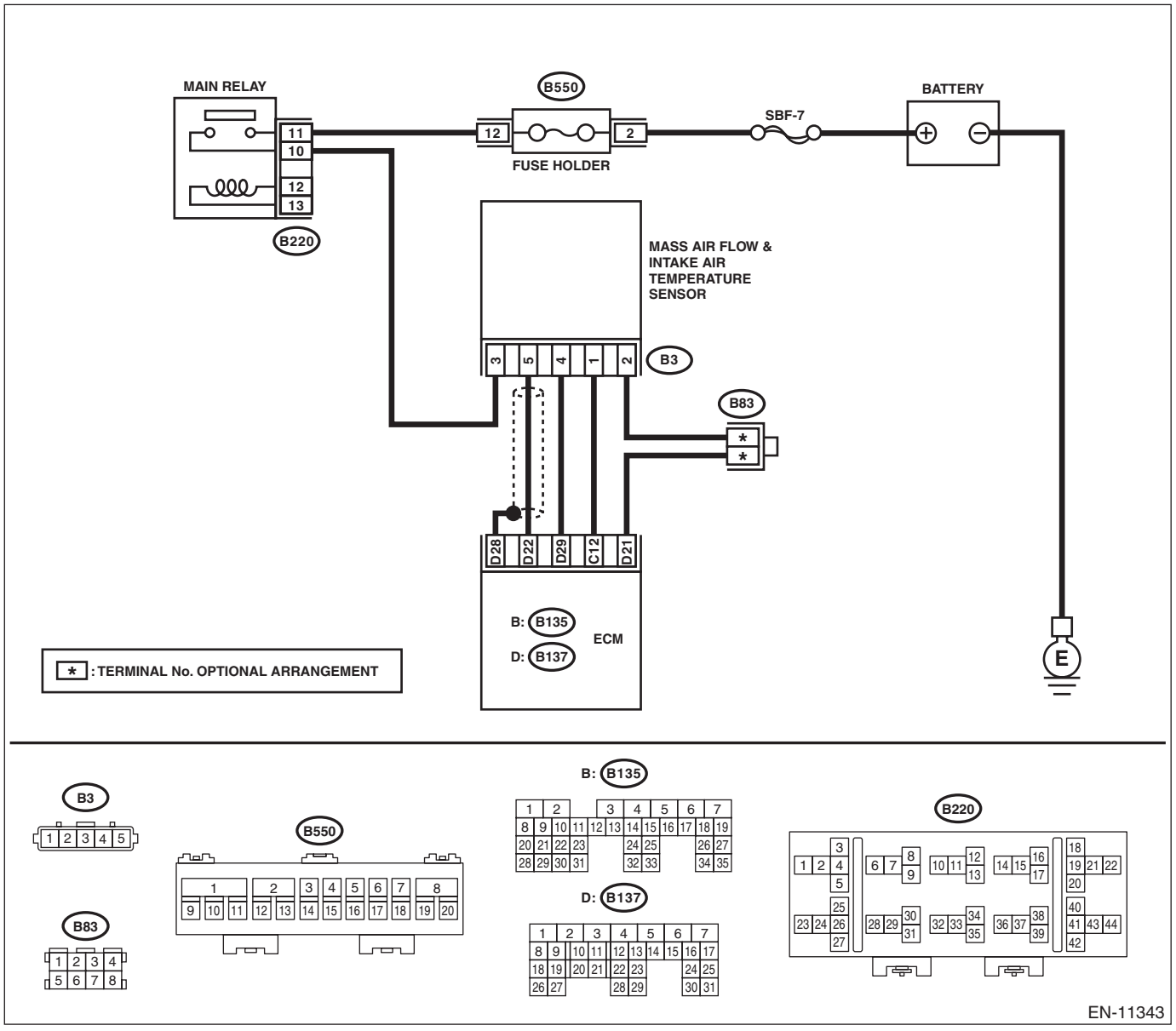
Malfunction Criteria	Threshold Value
Output voltage	< 0.4 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AG:DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

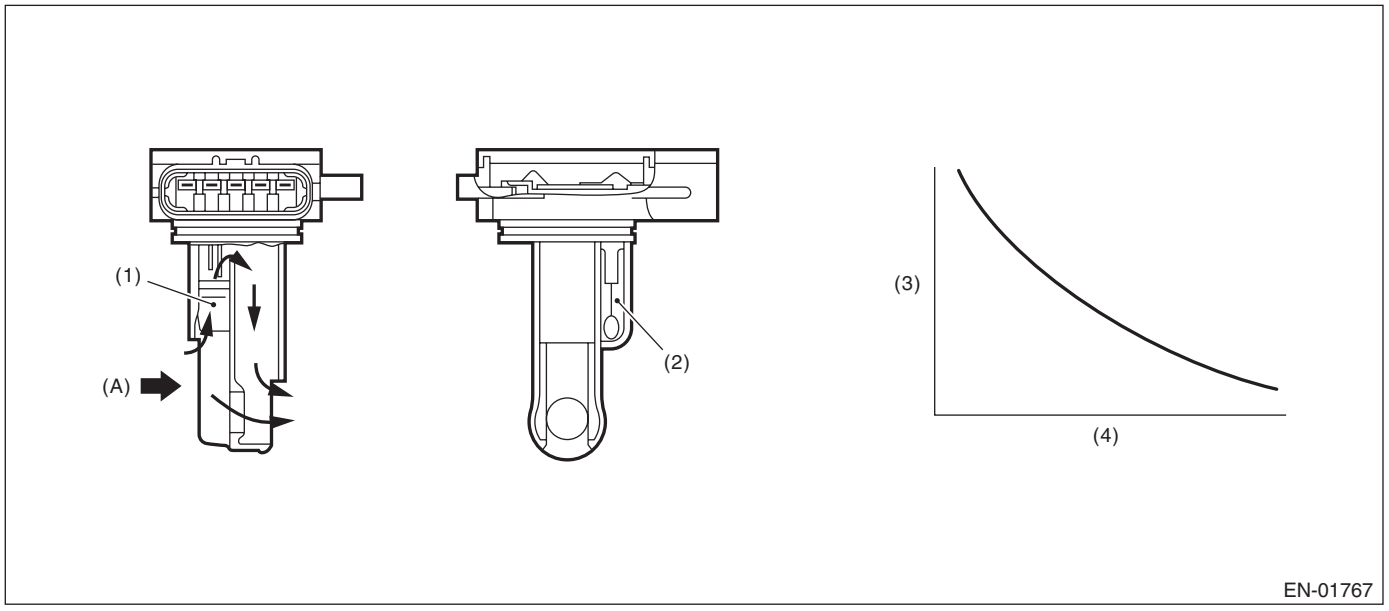


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Intake Air Temp.» –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and mass air flow and intake air temperature sensor connector.	Is there poor contact of ECM or mass air flow and intake air temperature sensor connector?	Repair the poor contact of ECM or mass air flow and intake air temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the mass air flow and intake air temperature sensor. 3) Measure the resistance of harness between ECM connector and the mass air flow and intake air temperature sensor connector. ***Connector & terminal*** ***(B137) No. 12 — (B3) No. 1:*** ***(B137) No. 11 — (B3) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the mass air flow and intake air temperature sensor connector • Poor contact of joint connector
4	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 12 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and the mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the intake air temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor
(2) Intake air temperature sensor
(3) Resistance value (Ω)
(4) Intake air temperature °C (°F)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.707 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AH:DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Hard to start
- Improper idling
- Poor driving performance

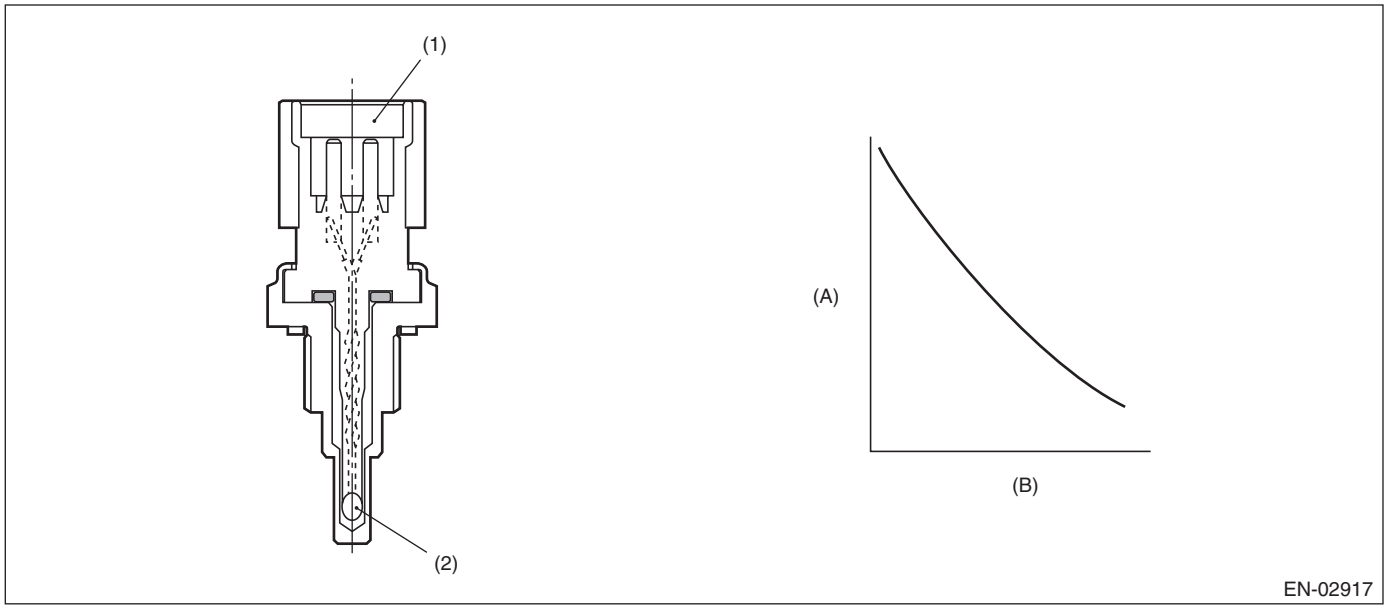
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Disconnect the connectors from the engine coolant temperature sensor. 2) Measure the resistance between engine coolant temperature sensor terminals when the engine coolant is cold and after warmed up. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance of engine coolant temperature sensor different between when engine coolant is cold and after warmed up?	Repair the poor contact of ECM connector.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the engine coolant temperature sensor characteristics.
After the engine starts after the specified period of soaking time has elapsed, diagnose by correlation between engine coolant temperature sensor value, intake air temperature sensor value and ambient temperature sensor value. Judge as NG when the differences are both above the specified value by comparing between engine coolant temperature and ambient air temperature, engine coolant temperature and intake air temperature.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Soaking time	≥ 21600 s
Block heater judgment	Completed
Block heater operation	Not in operation

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the engine starts after a certain period of soaking time.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
|Engine coolant temperature at engine start – Intake air temperature 30 sec. after engine start|	> Value from Map
|Engine coolant temperature at engine start – Ambient air temperature at engine start|	> 25 °C (45°F)

Map

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Engine coolant temperature at engine start – Intake air temperature 30 sec. after engine start| °C (°F)	12 (21.6°F)	12 (21.6°F)	22 (39.6°F)	22 (39.6°F)

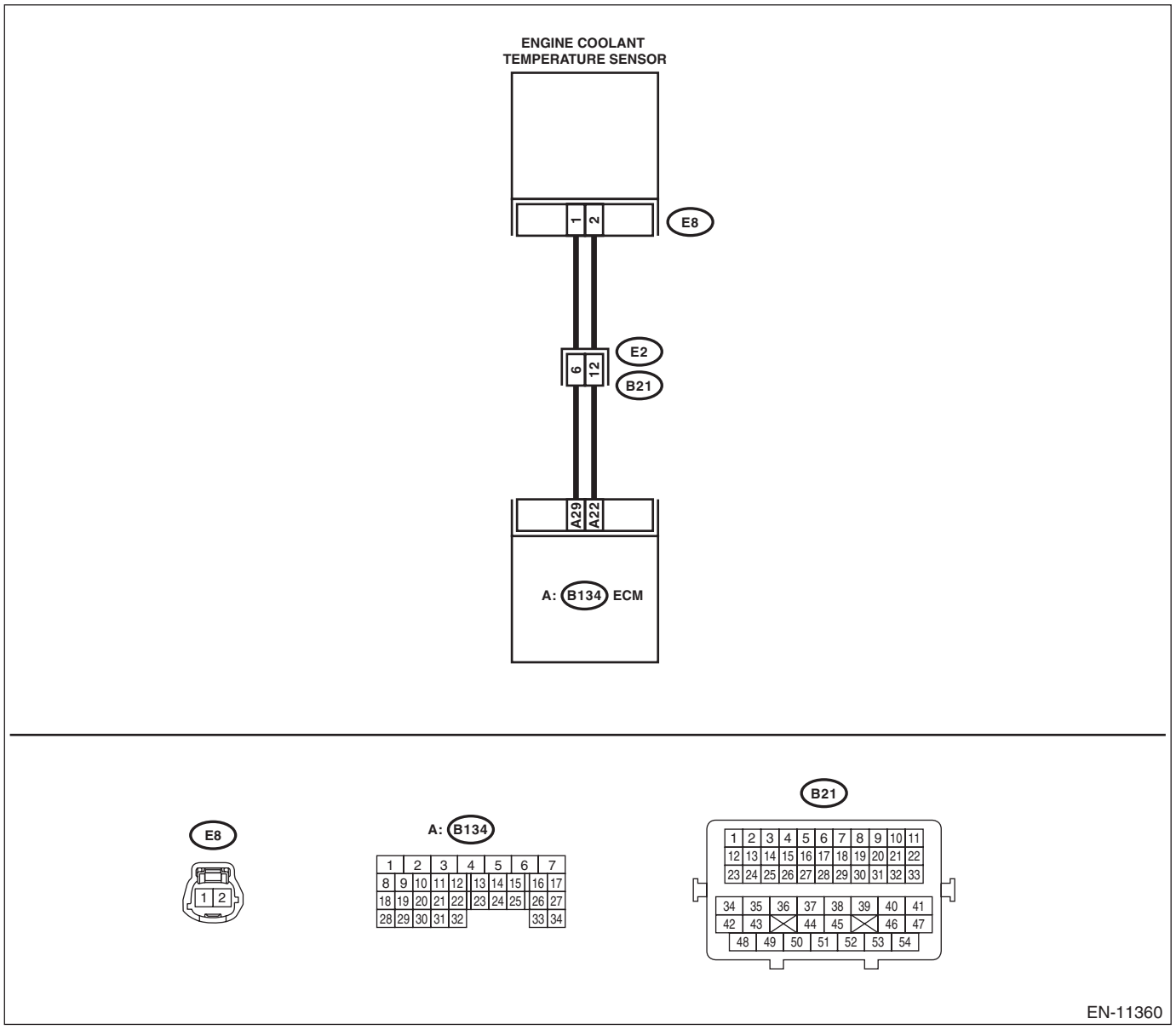
Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AI: DTC P0117 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

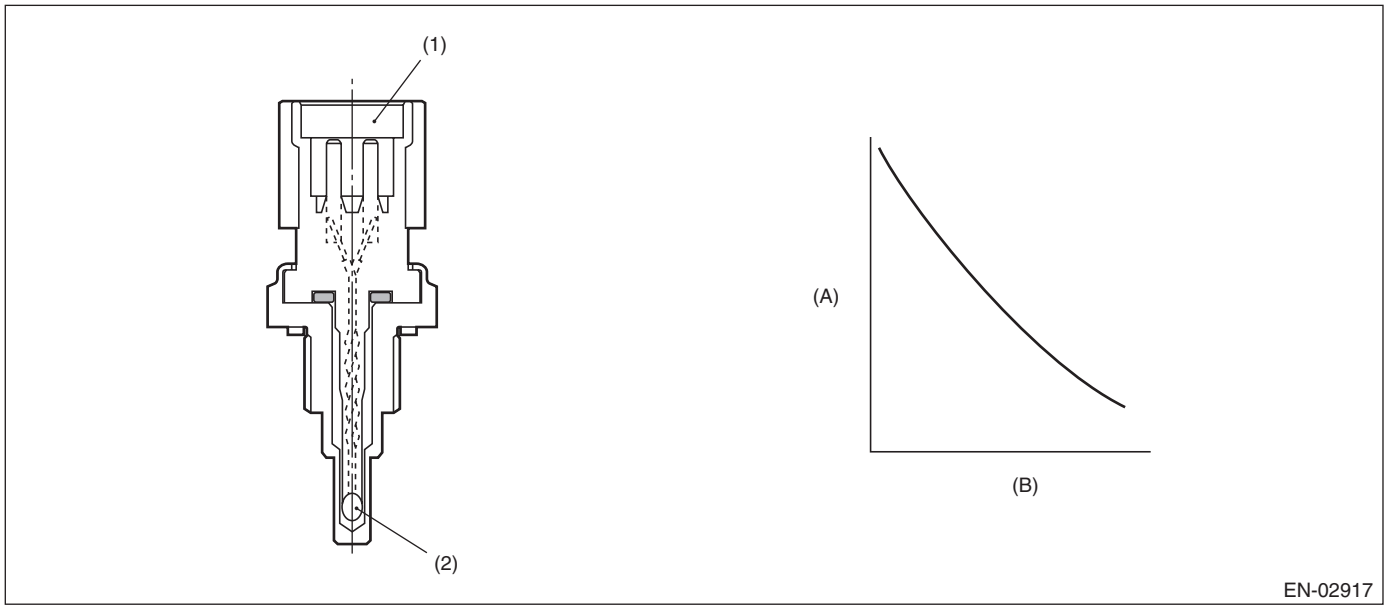


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 120°C (248°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and engine coolant temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 30 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>	Repair the short circuit to ground in harness between ECM connector and engine coolant temperature sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the engine coolant temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.349 V

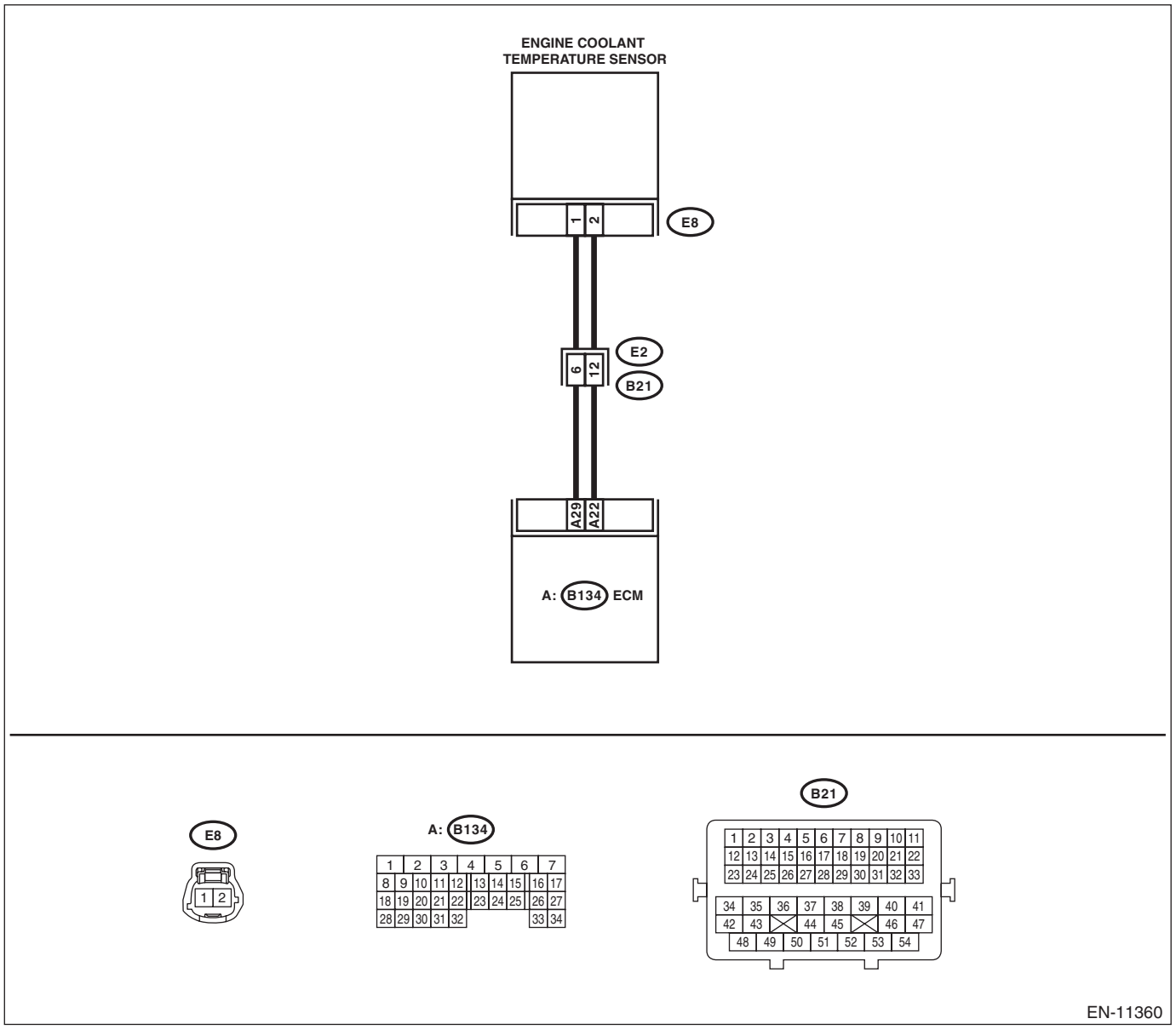
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AJ:DTC P0118 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

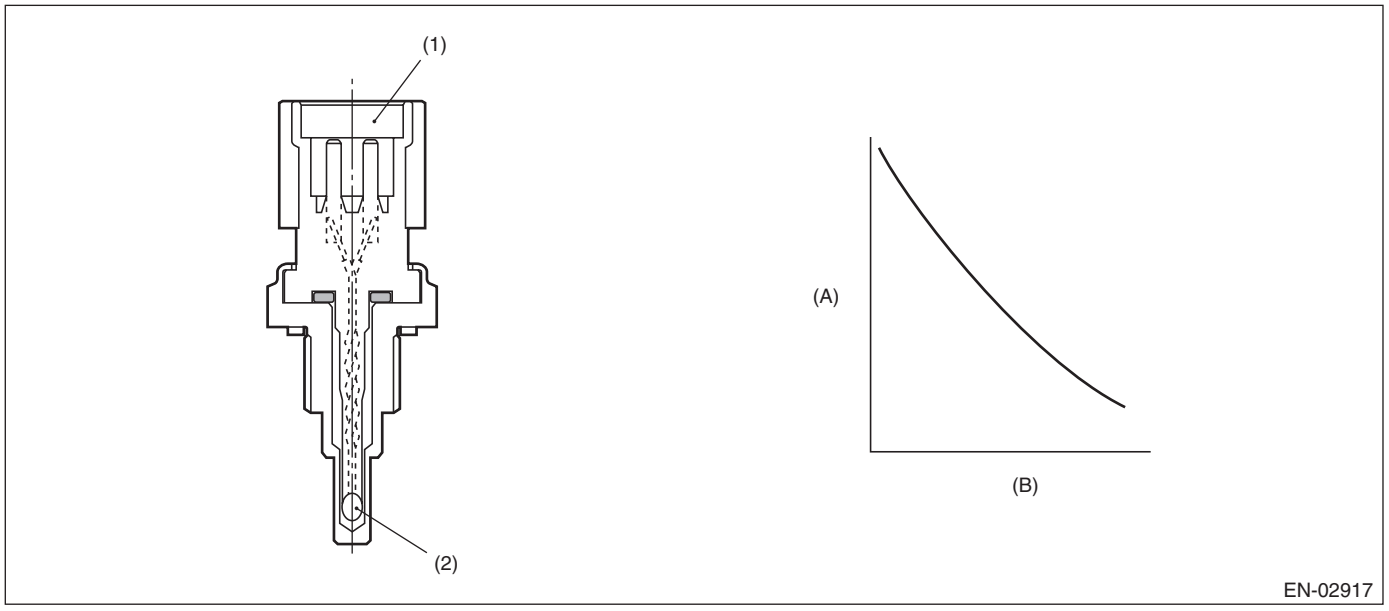


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and engine coolant temperature sensor connector.	Is there poor contact of ECM or engine coolant temperature sensor connector?	Repair the poor contact of ECM or engine coolant temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and engine coolant temperature sensor. 3) Measure the resistance of harness between ECM connector and engine coolant temperature sensor connector. ***Connector & terminal*** ***(B134) No. 30 — (E8) No. 2:*** ***(B134) No. 29 — (E8) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and engine coolant temperature sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 22 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and engine coolant temperature sensor connector.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the engine coolant temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

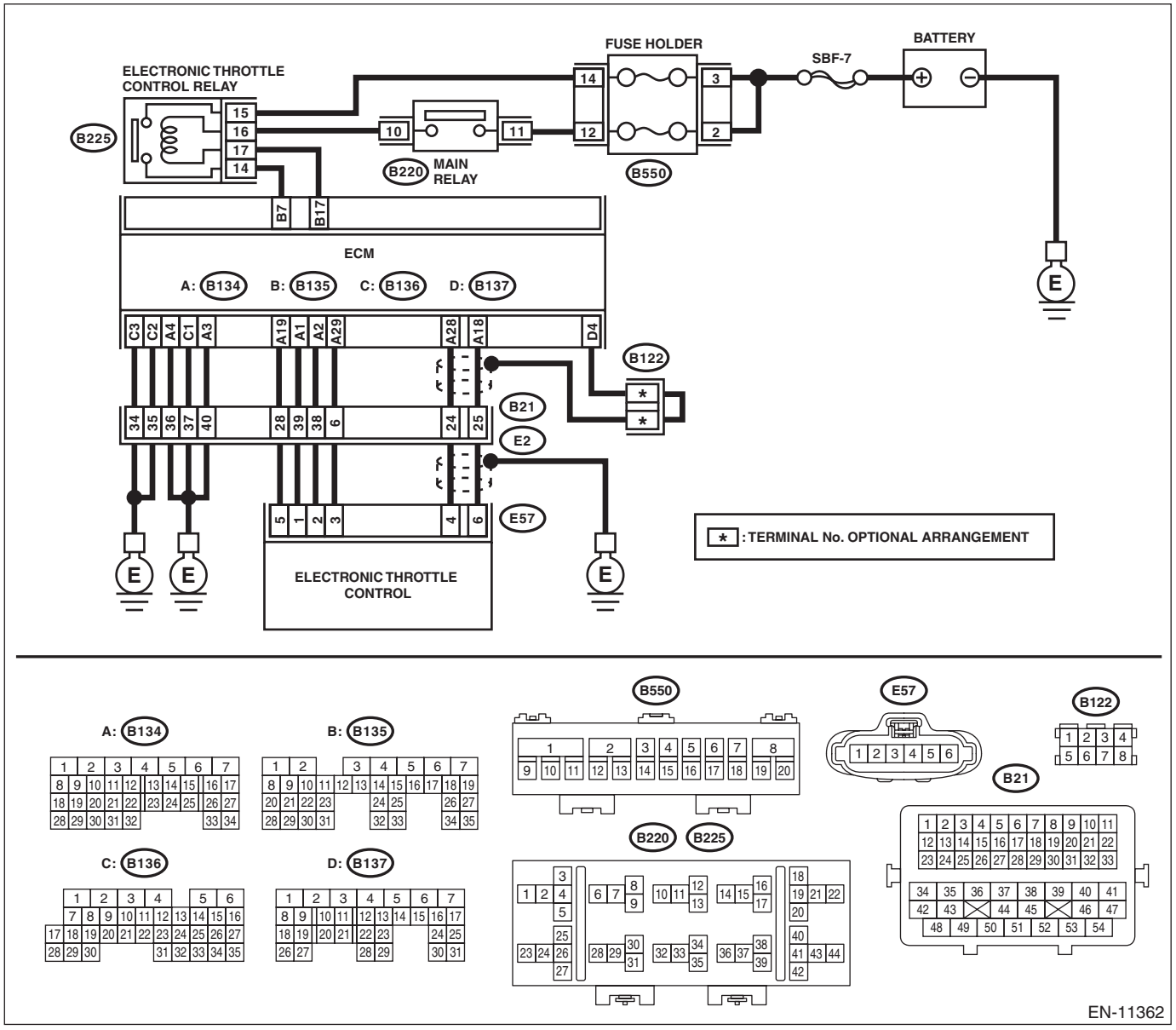
Malfunction Criteria	Threshold Value
Output voltage	≥ 4.698 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AK:DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Engine stall
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

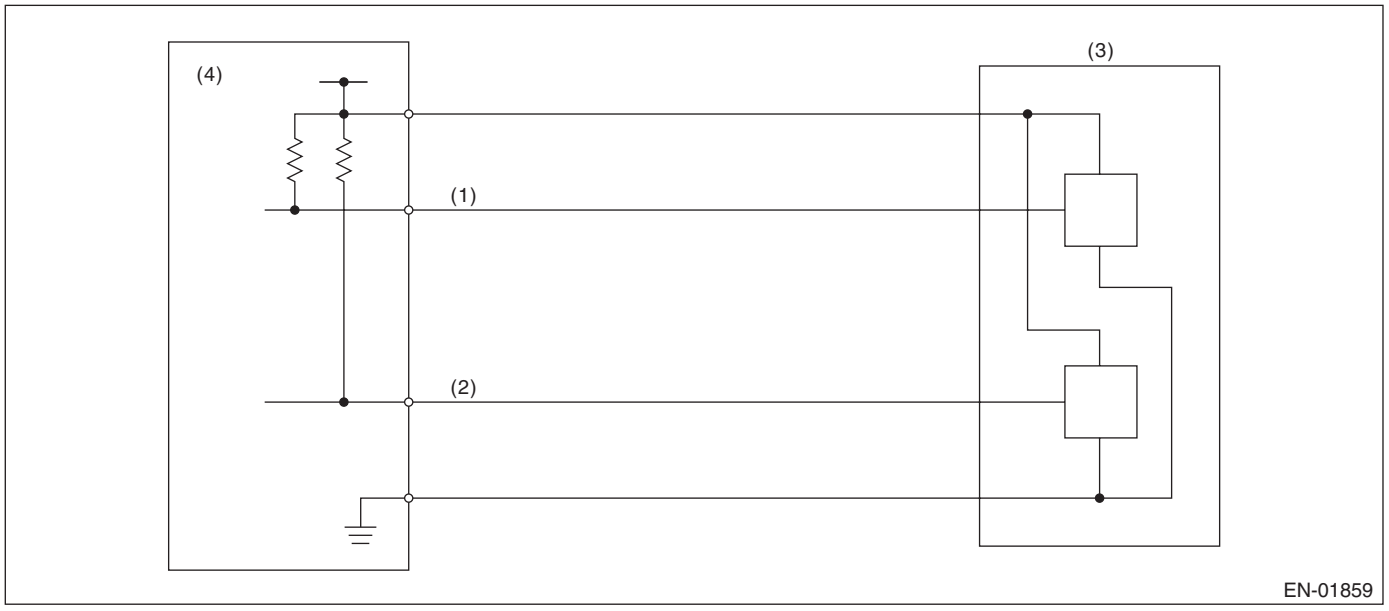


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 18 — Chassis ground:*** ***(B134) No. 18 — (B136) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 — Engine ground:***	Is the resistance 1 MΩ or more?	Replace the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 1.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

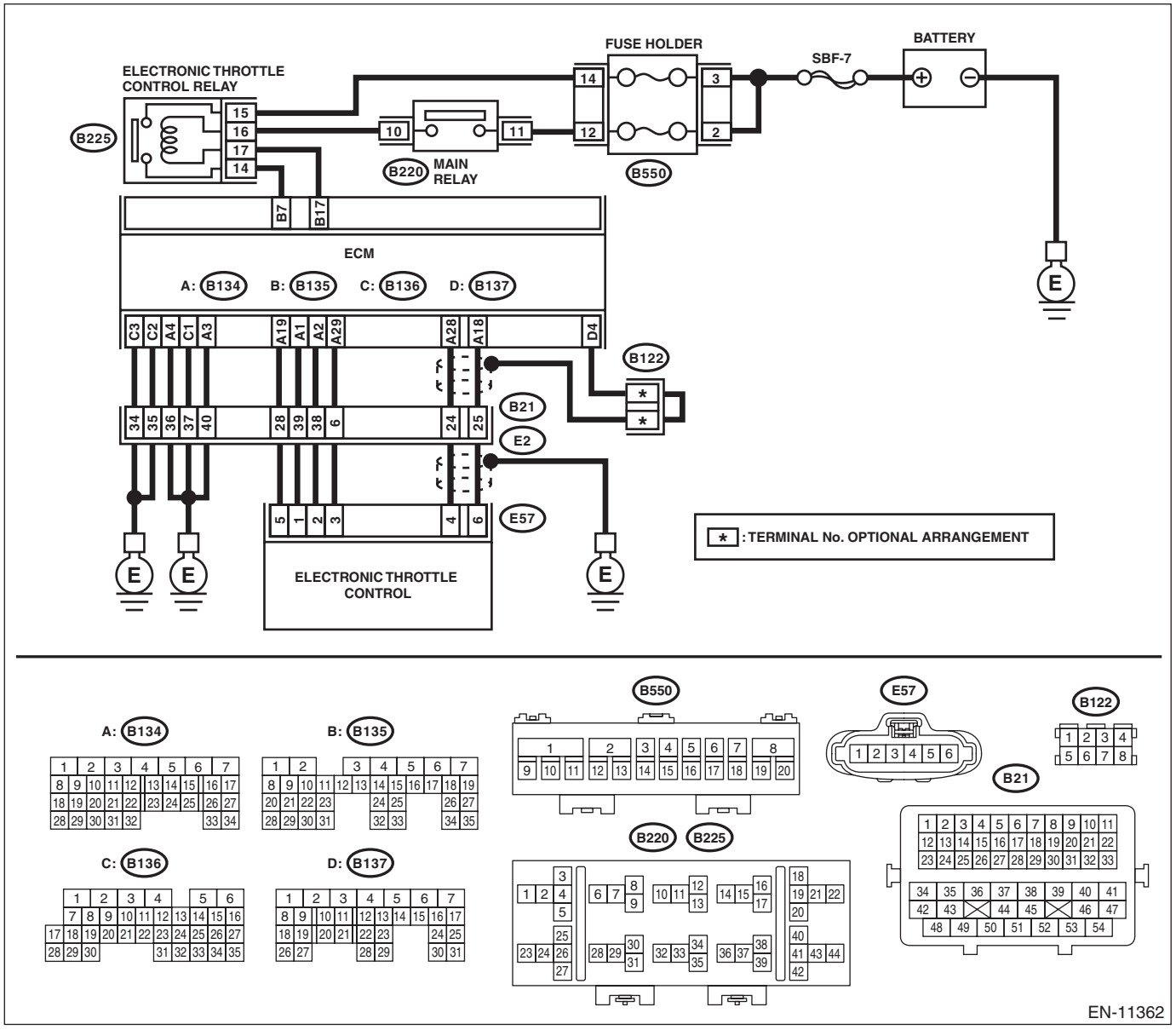
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≤ 0.267 V

Time Needed for Diagnosis: 24 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AL:DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Engine stall
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

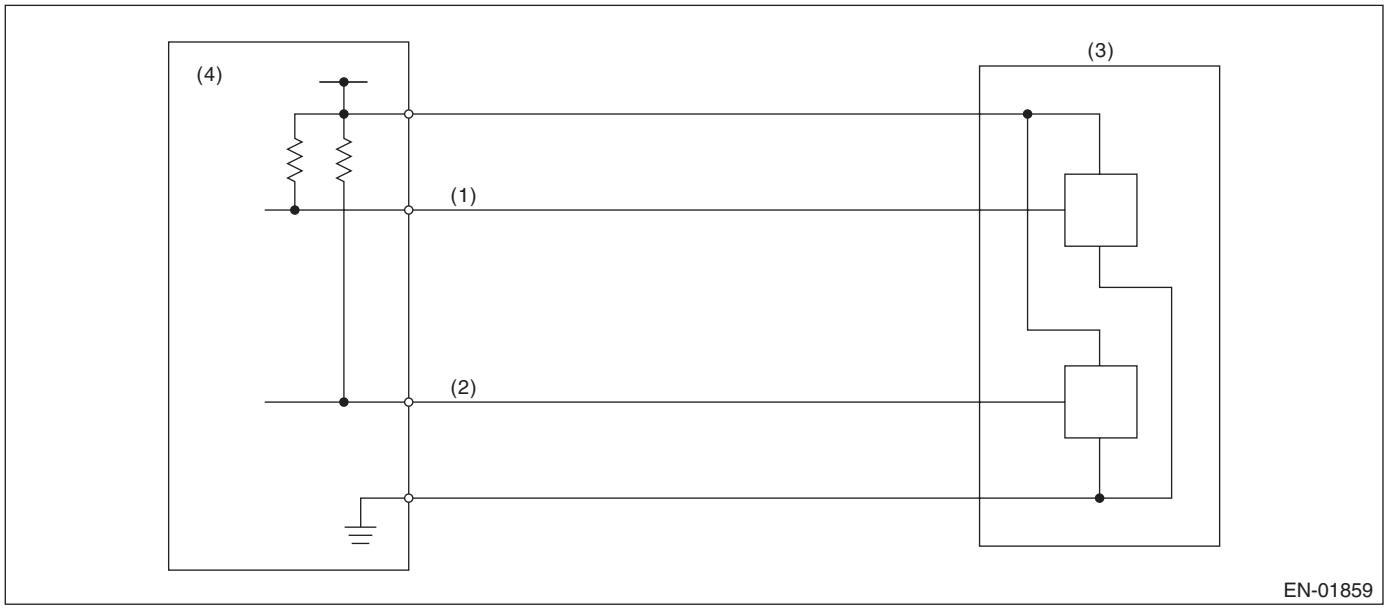


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 18 — (E57) No. 6:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 18:***	Is the resistance 1 MΩ or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 1.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≥ 4.727 V

Time Needed for Diagnosis: 24 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AM:DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Engine does not return to idle.

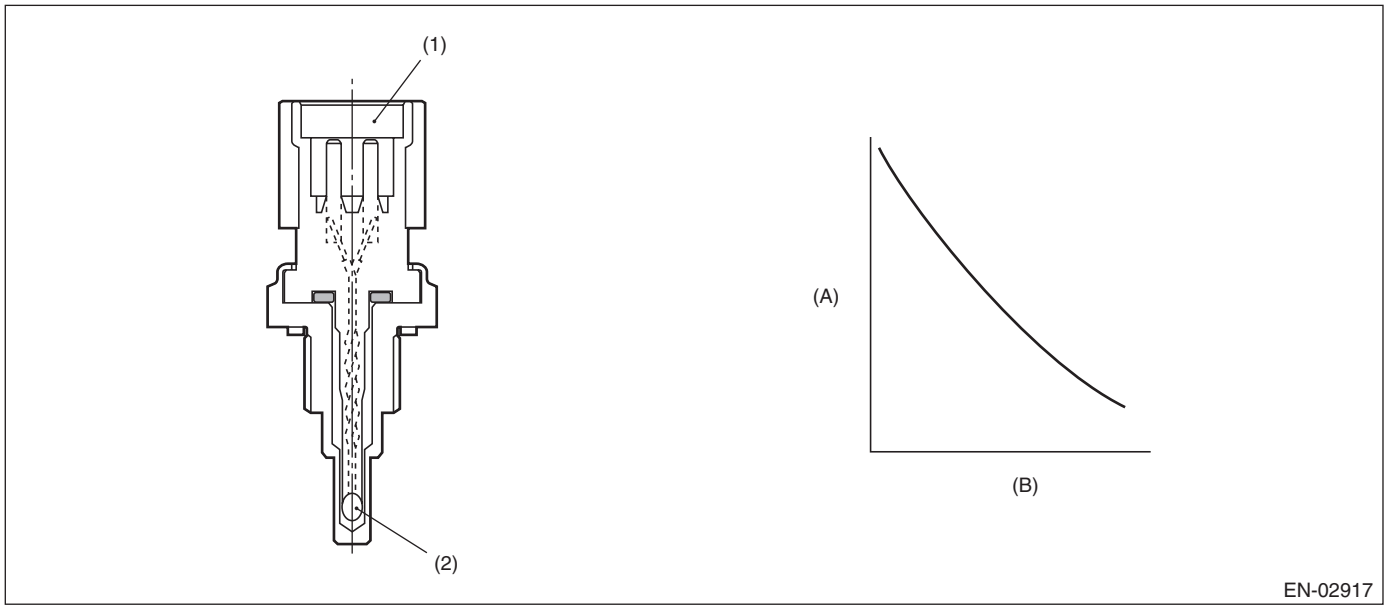
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK ENGINE COOLANT.** Check the following items: • Amount of engine coolant • Engine coolant freeze • Contamination of engine coolant	Is the engine coolant normal?	Go to step **2**.	Fill or replace the engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
2	**CHECK THERMOSTAT.**	Does the thermostat remain opened?	Replace the thermostat. <Ref. to CO(H4DO(w/o HEV))-63, Thermostat.>	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of engine coolant temperature output property.
Judge as NG when engine coolant temperature does not rise to the specified value after predetermined time has elapsed since engine start.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Engine coolant temperature at engine start	< –15 °C (5 °F)
Engine speed	> 500 rpm

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after starting the engine from cold condition.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Engine coolant temperature	< –15 °C (5 °F)
Elapsed time after starting the engine (At the time of (The smaller value of either Engine coolant temperature or Intake air temperature at engine start) ≥ –23.3°C (–9.9°F)) or (At the time of (The smaller value of either Engine coolant temperature or Intake air temperature at engine start) < –23.3°C (–9.9°F))	≥ 120 s ≥ 300 s

Time Needed for Diagnosis: 120 or 300 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AN:DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Thermostat remains open.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

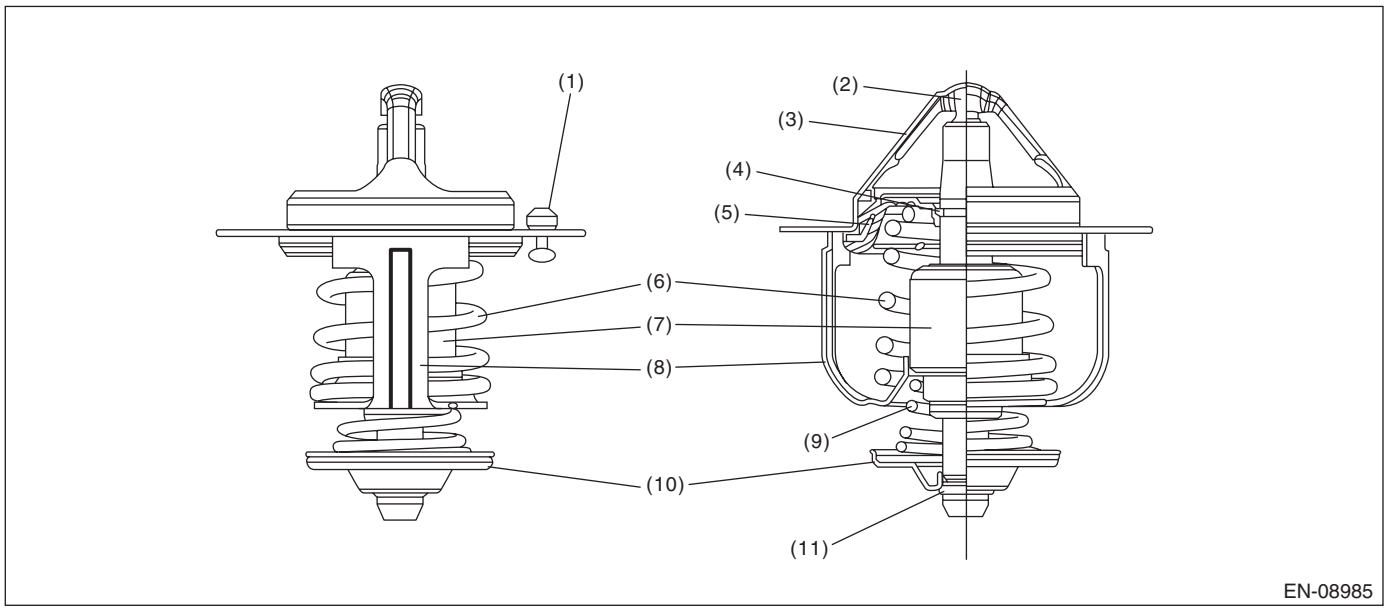
	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ENGINE COOLANT.**	Is the engine coolant amount normal?	Go to step **3**.	Refill the engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
3	**CHECK RADIATOR FAN.** 1) Start the engine. 2) Check the radiator fan operation.	Does the radiator fan continuously rotate for 3 minutes or more during idling?	Repair radiator fan circuit. <Ref. to CO(H4DO(w/o HEV))-88, Radiator Main Fan and Fan Motor.> and <Ref. to CO(H4DO(w/o HEV))-92, Radiator Sub Fan and Fan Motor.>	Replace the thermostat. <Ref. to CO(H4DO(w/o HEV))-63, Thermostat.>

1. OUTLINE OF DIAGNOSIS

Detect malfunctions of the thermostat function.
Judge as NG when any one of the following conditions is established.

- When the actual engine coolant temperature does not reach the maximum temperature necessary to perform other OBDII diagnosis and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 1)
- When the actual engine coolant temperature does not reach the range within –11°C (–19.8°F) from the regulated temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 2)
- When the difference between the estimated coolant temperature and the actual engine coolant temperature exceeds the predetermined value, and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 3)

2. COMPONENT DESCRIPTION



(1) Jiggle valve
(2) Piston
(3) Flange
(4) Stop ring
(5) Dust seal
(6) Main spring
(7) Wax element
(8) Frame
(9) Bypass spring
(10) Bypass valve
(11) Stop ring

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
<Judgment 1>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ –7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	> Value of Map 1
Engine coolant temperature at engine starting	< 62 °C (143.6 °F)
<Judgment 2>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ –7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	> Value of Map 2
Engine coolant temperature at engine starting	< 62 °C (143.6 °F)
<Judgment 3>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ –7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	≥ Value from Map 3
Engine coolant temperature at engine starting	< 62 °C (143.6 °F)

Map 1

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Estimated coolant temperature °C (°F)	60 (140)	60 (140)	60 (140)	60 (140)

Map 2

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Estimated coolant temperature °C (°F)	70.5 (158.9)	79.5 (175.1)	79.5 (175.1)	79.5 (175.1)

Map 3

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	10 (50)	25 (77)	28.5 (83.3)
Estimated coolant temperature °C (°F)	44 (111.2)	61 (141.8)	76 (168.8)	79.5 (175.1)

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after starting the engine.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
When any one of the followings is established:	
<Judgment 1>	
Actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	< Value of Map 4 > Value of Map 5
<Judgment 2>	
Actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	< Regulated temperature – Value of Map 6 > Value of Map 7
<Judgment 3>	
Estimated engine coolant temperature – actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	> Value of Map 8 > Value of Map 9

Map 4

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	60 (140)	60 (140)	60 (140)	60 (140)

Map 5

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	0 (32)	8 (46.4)	10 (50)	30 (86)	40 (104)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1200 (2160)

Map 6

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	20.1 (30.1)	11.1 (20)	11.1 (20)	11.1 (20)

Map 7

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	0 (32)	8 (46.4)	10 (50)	30 (86)	35 (95)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1500 (2700)

Map 8

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	11.1 (20)	11.1 (20)	11.1 (20)	11.1 (20)

Map 9

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)

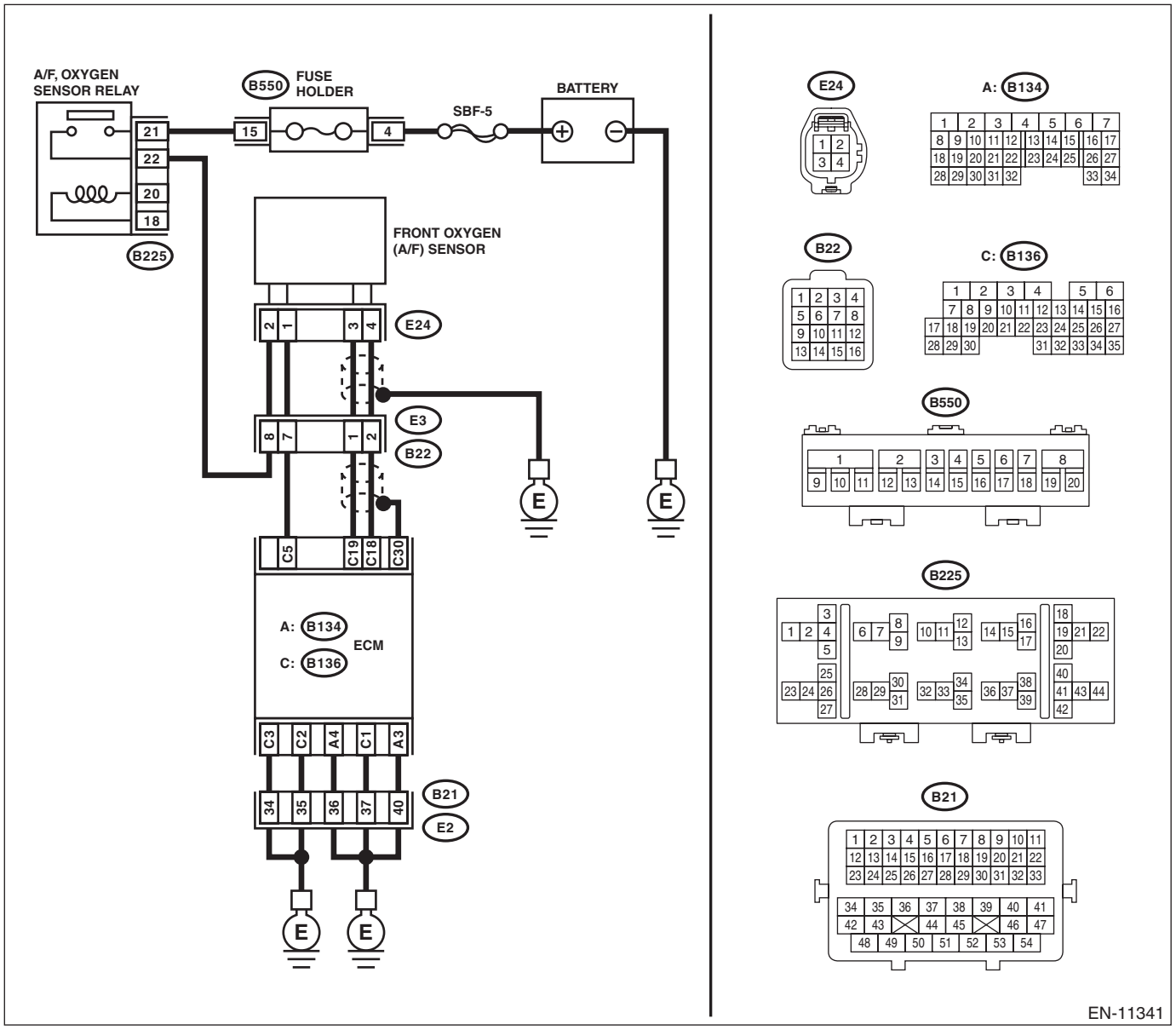
Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AO:DTC P0131 A/F / O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



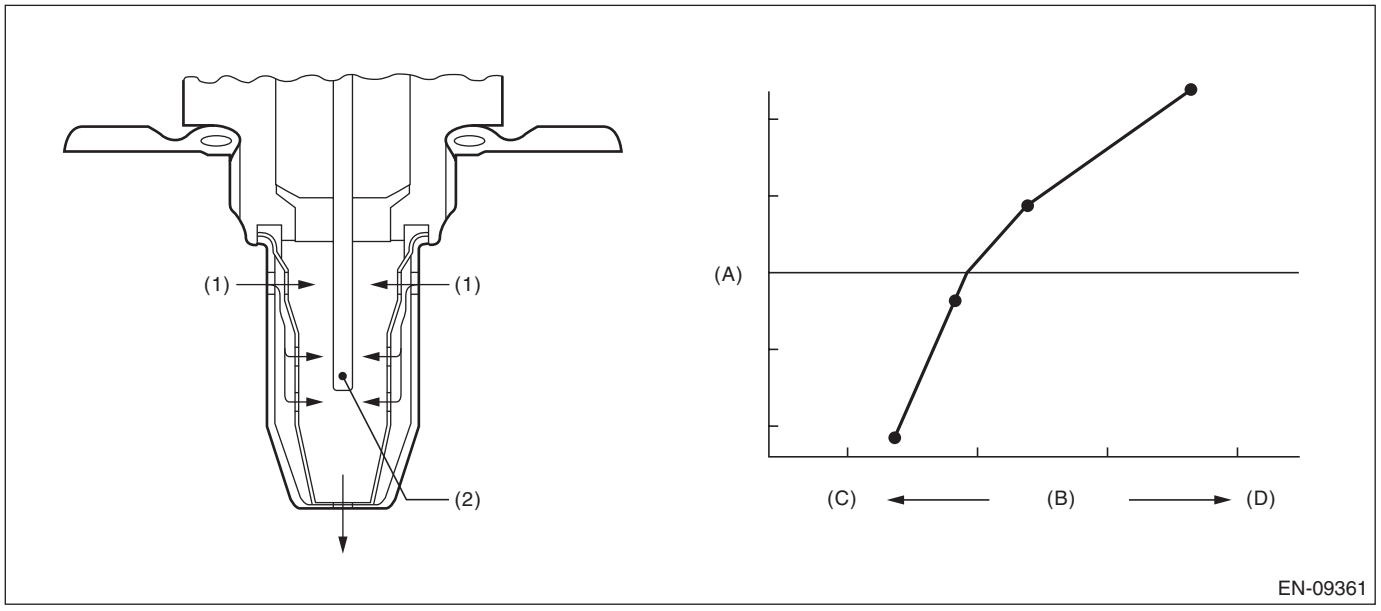
Step		Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 18 — Chassis ground:*** ***(B136) No. 19 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
3	**CHECK FOR POOR CONTACT.** Check for poor contact of the front oxygen (A/F) sensor connector.	Is there poor contact of front oxygen (A/F) sensor connector?	Repair the poor contact of front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of sensor.
Judge as NG, when the element voltage is out of the specified range.

2. COMPONENT DESCRIPTION



(A) Electromotive force (B) Air fuel ratio (C) Rich
(D) Lean

(1) Exhaust gas (2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Input voltage (+) or Input voltage (–) or |Input voltage (+) – Input voltage (–)|	< 0.4 V < 0.4 V < 0.1 V
ECM input voltage (–)	> 3.8 V and < 4.7 V

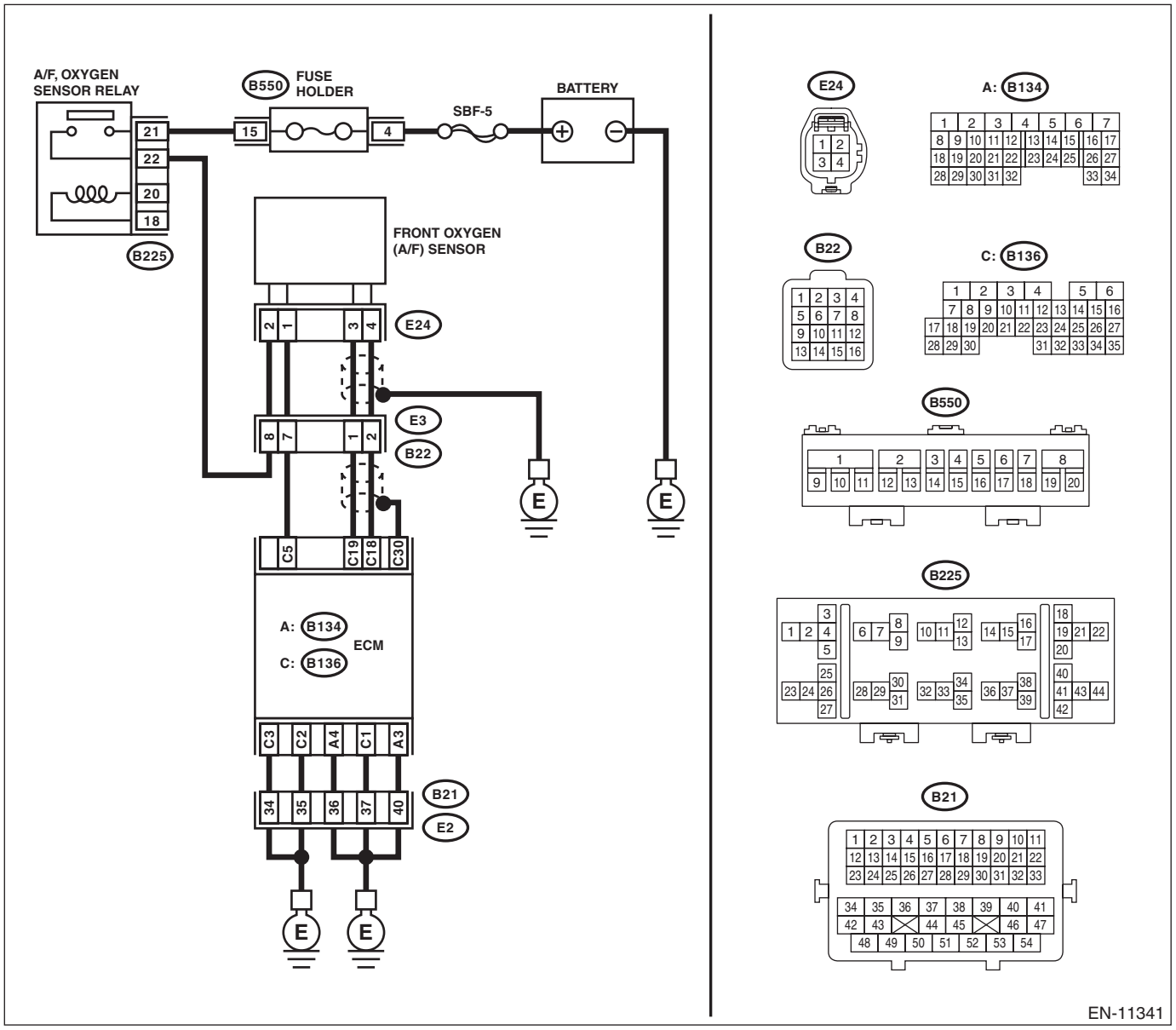
Time Needed for Diagnosis:
Input voltage (+): 1000 ms
Input voltage (–): 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AP:DTC P0132 A/F / O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



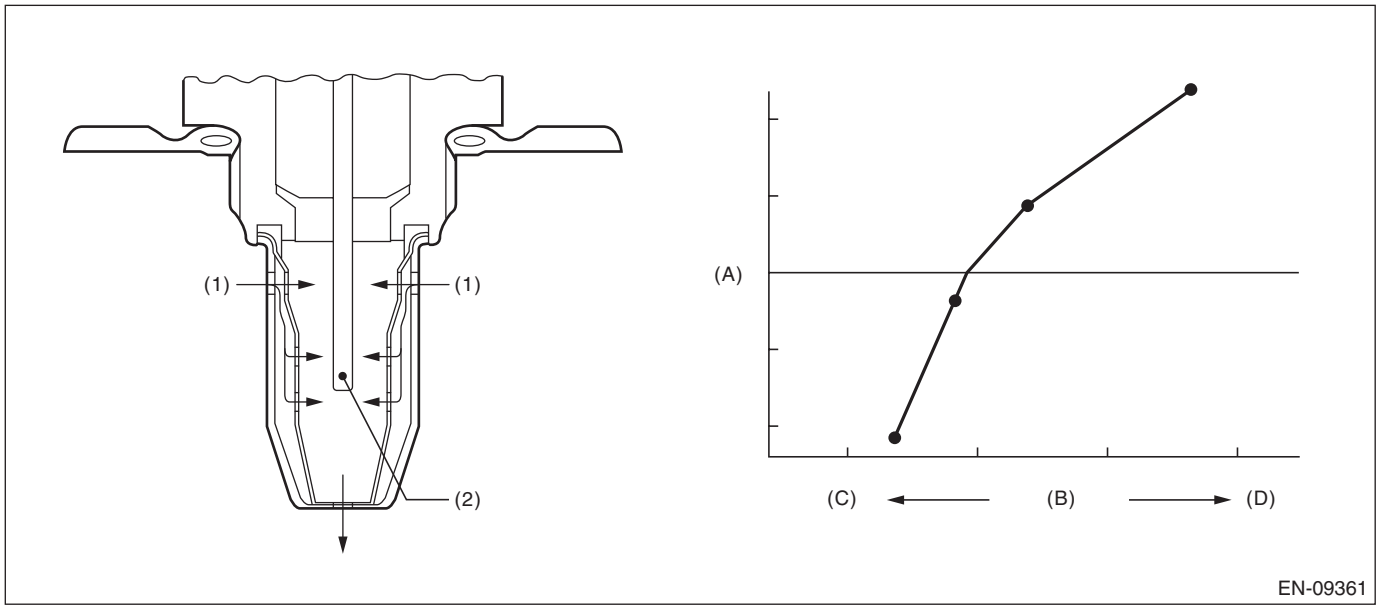
Step		Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from front oxygen (A/F) sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 18 (+) — Chassis ground (–):*** ***(B136) No. 19 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of sensor.
Judge as NG, when the element voltage is out of the specified range.

2. COMPONENT DESCRIPTION



(A) Electromotive force (B) Air fuel ratio (C) Rich
(D) Lean

(1) Exhaust gas (2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Input voltage (+) or Input voltage (–)	> 4.7 V > 4.7 V

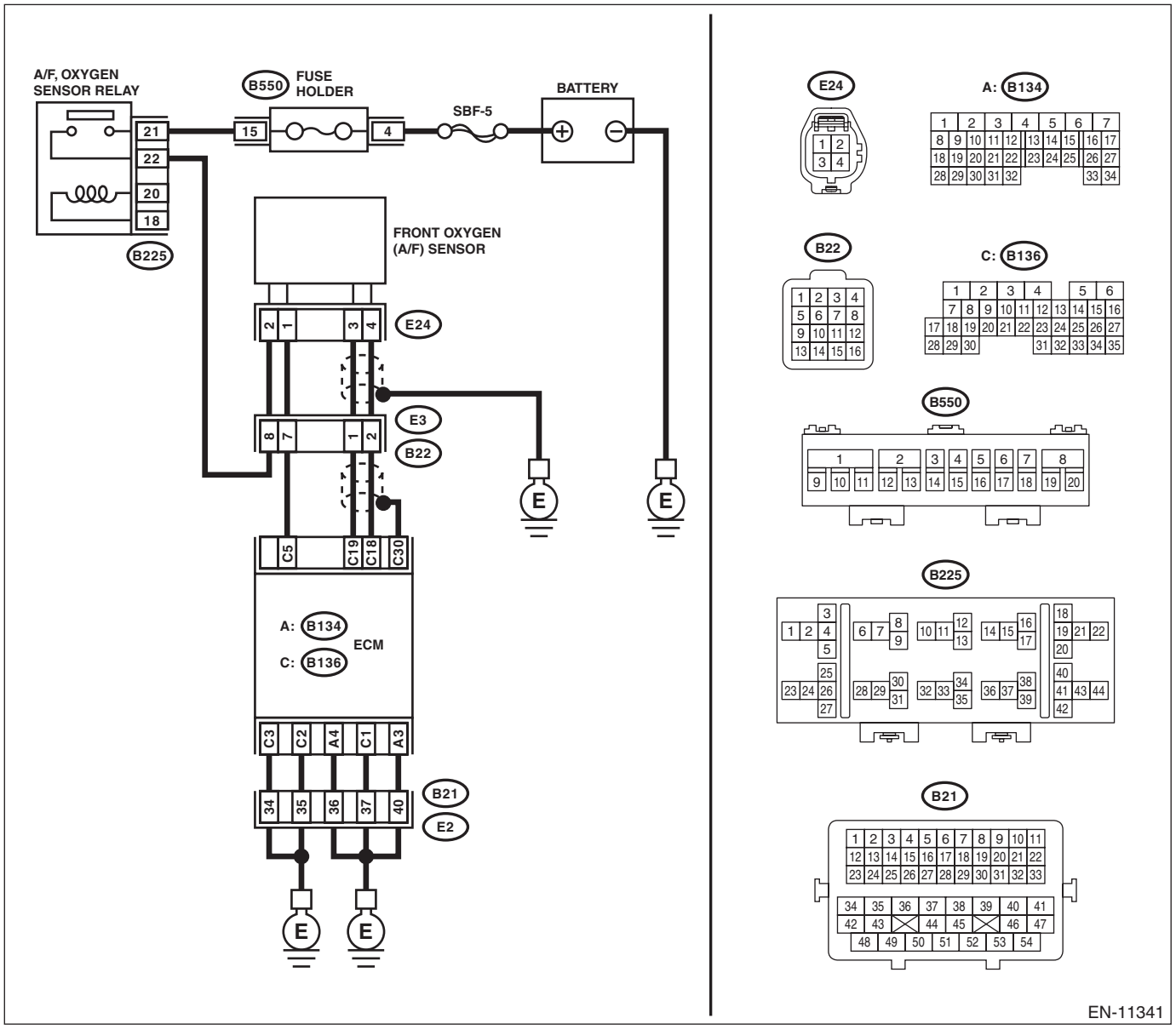
Time Needed for Diagnosis:
Input voltage (+): 1000 ms
Input voltage (–): 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AQ:DTC P0134 A/F / O2 SENSOR CIRCUIT NO ACTIVITY DETECTED BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

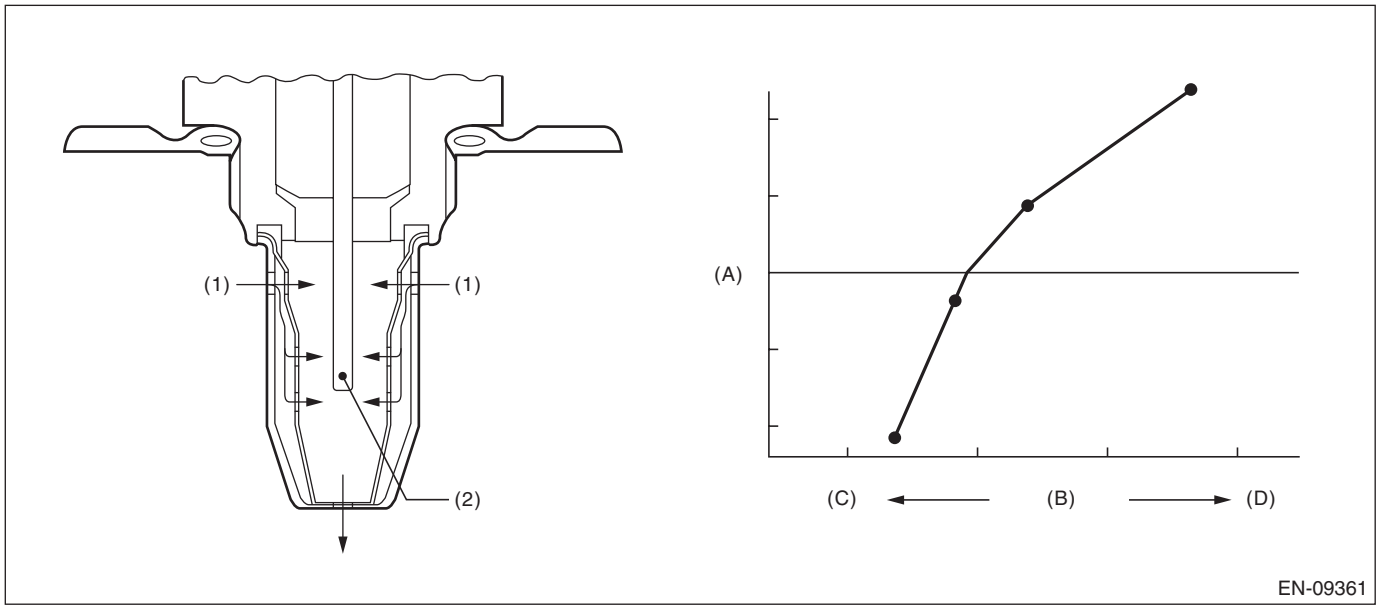


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and front oxygen (A/F) sensor connector.	Is there poor contact of ECM or front oxygen (A/F) sensor connector?	Repair the poor contact of ECM or front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect open circuits of the sensor.
Judge as NG when the impedance of the element is large.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Rich
(D) Lean

(1) Exhaust gas
(2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Time of heater control duty at 70 % or more	≥ 36000 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Front oxygen (A/F) sensor impedance	> 450 Ω

Time Needed for Diagnosis: 5000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AR:DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2

DTC DETECTING CONDITION:

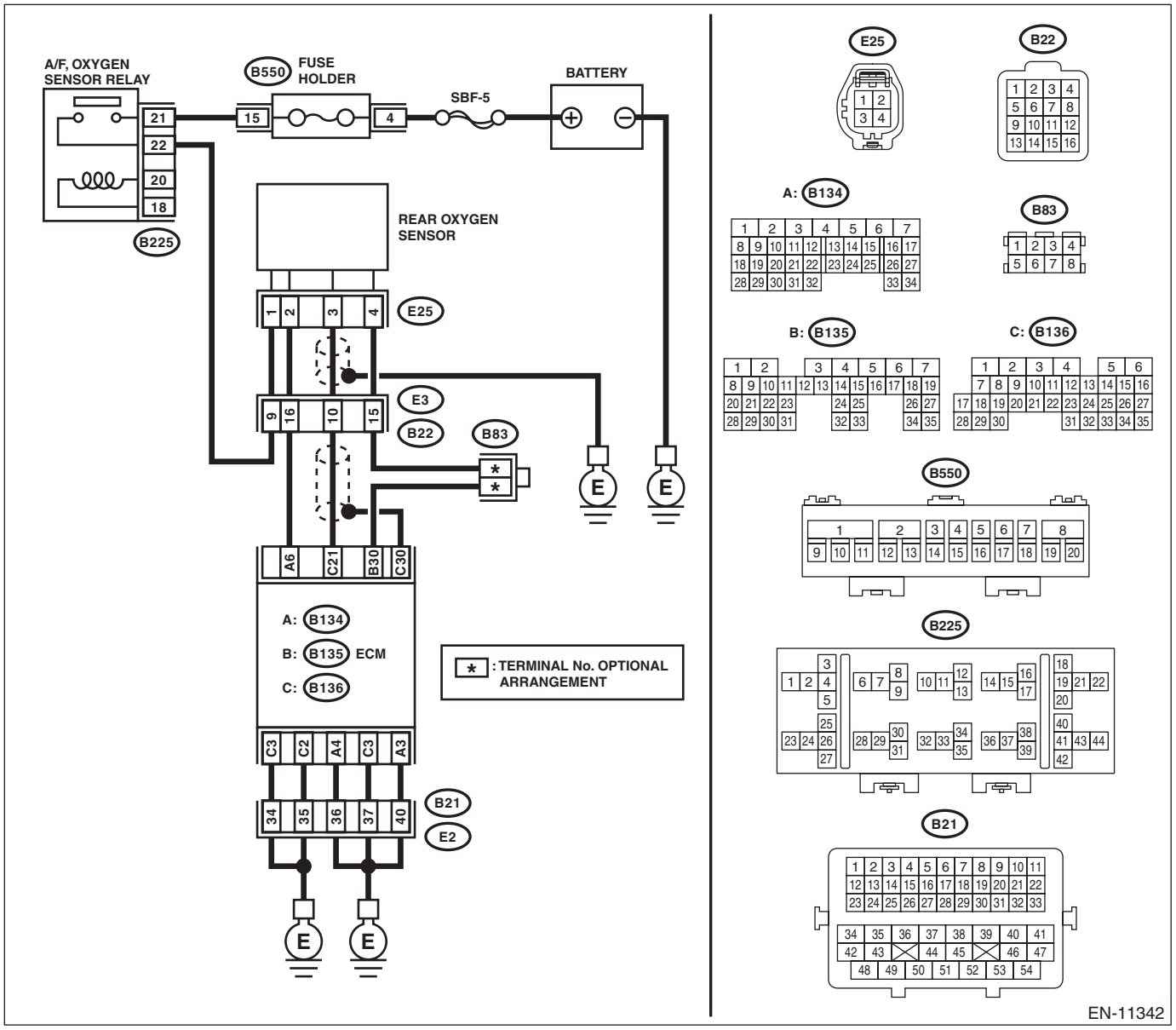
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

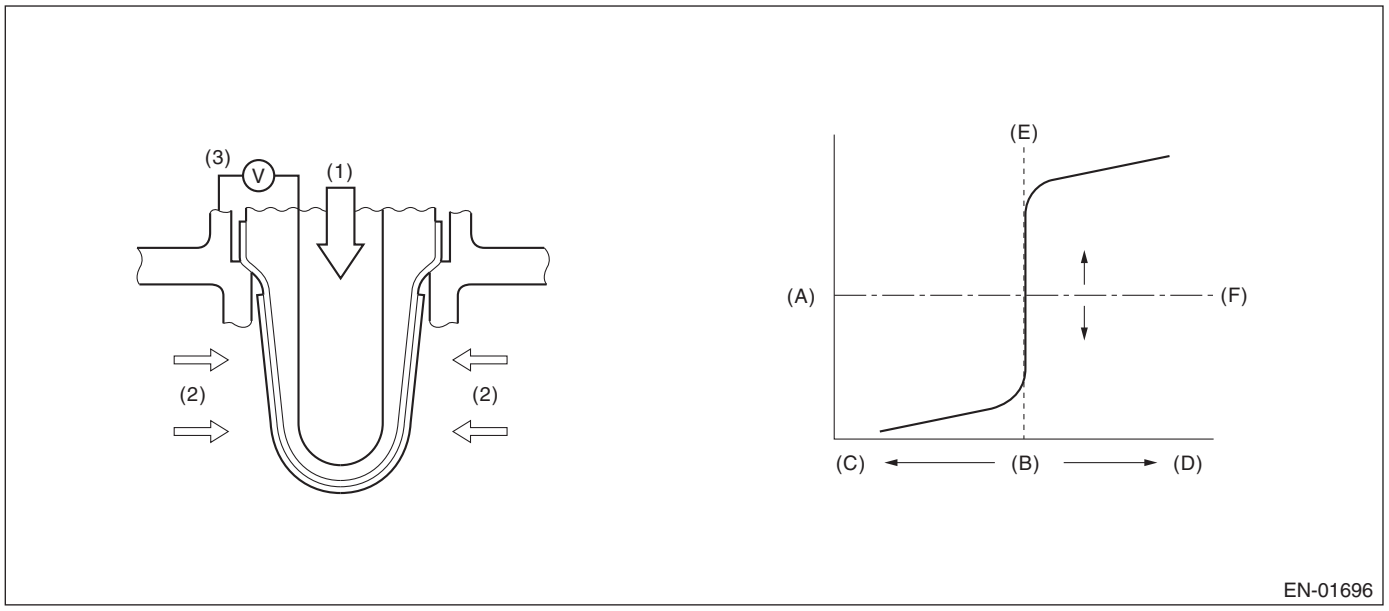


	Step	Check	Yes	No
1	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step **5**.	Go to step **2**.
2	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector • Poor contact of ECM connector
5	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Loose part and improper installation between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect continuity NG of the oxygen sensor. If the oxygen sensor voltage reading is not within the probable range considering the operating conditions, judge as NG.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Lean
(D) Rich
(E) Theoretical air fuel ratio
(F) Comparative voltage

(1) Atmosphere
(2) Exhaust gas
(3) Electromotive force

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
High	
Battery voltage	≥ 10.9 V
Low (1)	
Sub feedback	In operation
Battery voltage	≥ 10.9 V
Amount of intake air	≥ 10 g/s (0.35 oz/s)
Low (2)	
Sub feedback	In operation
Battery voltage	≥ 10.9 V
Amount of intake air	< 10 g/s (0.35 oz/s)

4. GENERAL DRIVING CYCLE

After starting the engine, continuously perform the diagnosis with the same engine condition.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
High O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2	≥ 1.2 V	P0138
Low O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2	< 0.03 V	P0137

Time Needed for Diagnosis:

High: 2500 ms
Low (1): 20000 ms
Low (2): 40000 ms

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AS:DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2

DTC DETECTING CONDITION:

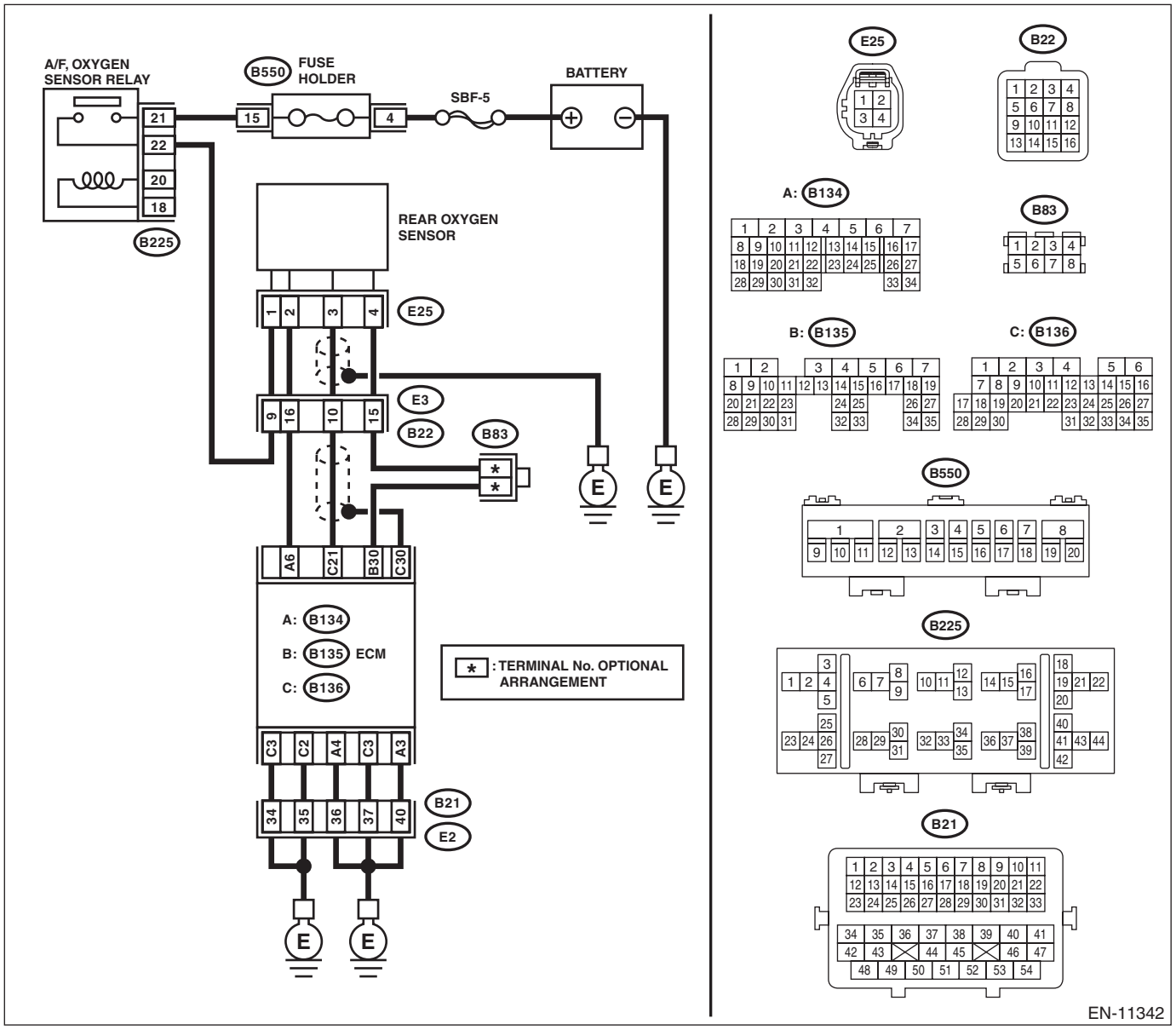
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step **5**.	Go to step **2**.
2	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector • Poor contact of ECM connector
5	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Loose part and improper installation between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0137. <Ref. to EN(H4DO w/o HEV)(diag)-218, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AT:DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2

DTC DETECTING CONDITION:

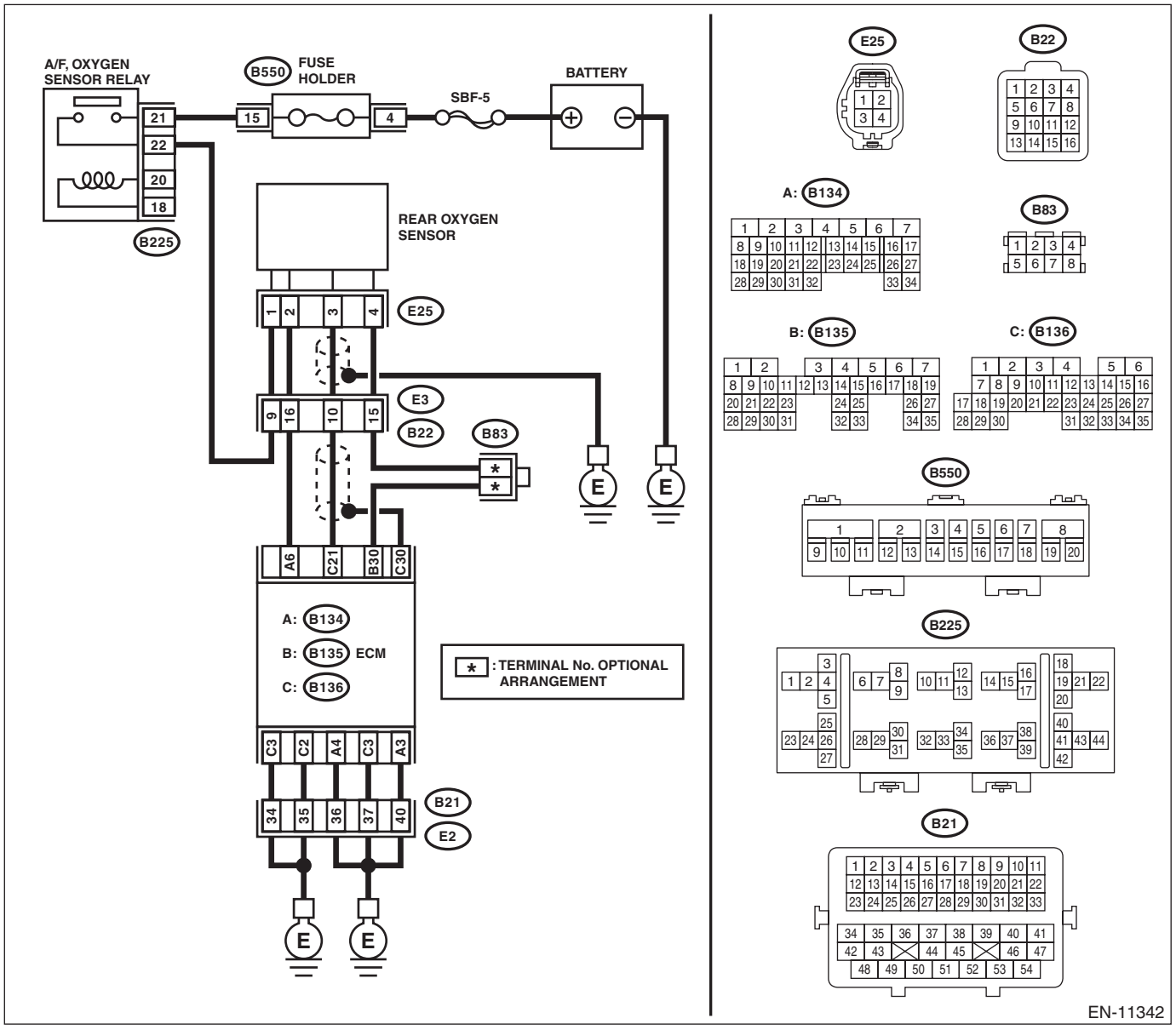
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

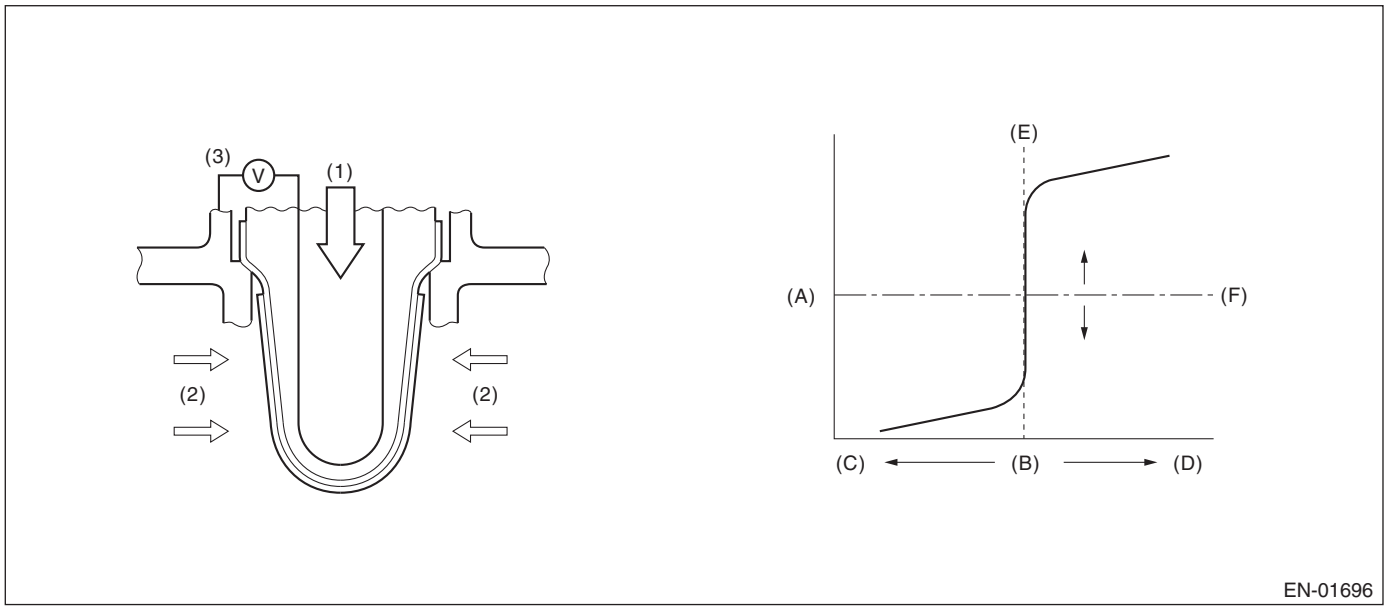


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** Measure the resistance between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and rear oxygen sensor connector.
3	**CHECK REAR OXYGEN SENSOR.** Measure the resistance between rear oxygen sensor terminals. ***Terminals*** ***No. 3 — No. 4***	Is the resistance less than 1 Ω?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the slow response of rich → lean for rear oxygen sensor output.
When the deceleration fuel cut has occurred, detect the trouble by calculating the time when the rear oxygen sensor output passes through the predetermined range of voltages.
Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Lean
(D) Rich
(E) Theoretical air fuel ratio
(F) Comparative voltage

(1) Atmosphere
(2) Exhaust gas
(3) Electromotive force

3. EXECUTION CONDITION

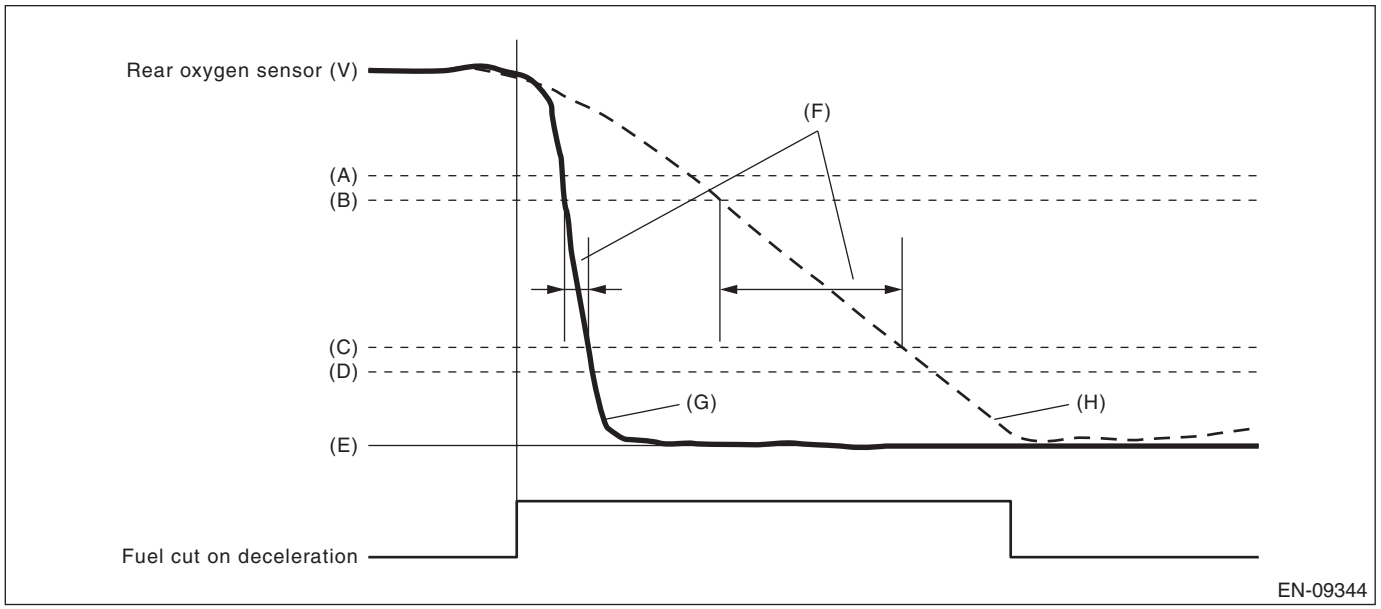
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Current calculation time of the rear oxygen sensor heater after starting	≥ 180000 ms
Rear oxygen sensor voltage when fuel cut starts	≥ 0.55 V
Fuel shut-off function	In operation
Estimated temperature of rear oxygen sensor element when fuel cut starts	≥ 500 °C (932 °F)

4. GENERAL DRIVING CYCLE

Perform diagnosis once during deceleration fuel cut from a constant and high speed driving, when rear oxygen sensor is warmed up sufficiently.

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the response time of the rear oxygen sensor during fuel cut.



(A) 0.55 V
(B) 0.50 V
(C) 0.20 V
(D) 0.15 V
(E) 0 V
(F) Diagnostic parameter
(G) Normal
(H) Malfunction

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time needed for rear oxygen sensor voltage to change from 0.5 V to 0.2 V	> 491 ms

Time Needed for Diagnosis: 5000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

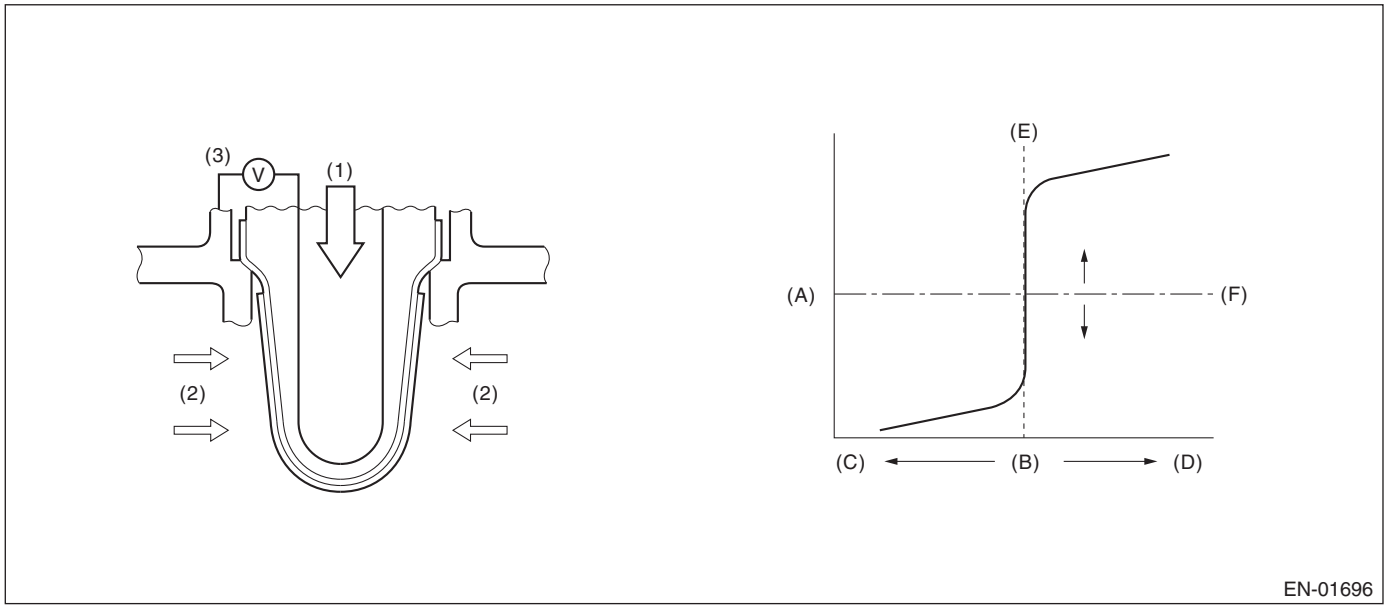
AU:DTC P013B O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 2

NOTE:
For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DO w/o HEV)(diag)-225, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the slow response of lean → rich for rear oxygen sensor output.
After the deceleration fuel cut has occurred, detect the trouble by calculating the time when the rear oxygen sensor output passes through the predetermined range of voltages.
Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

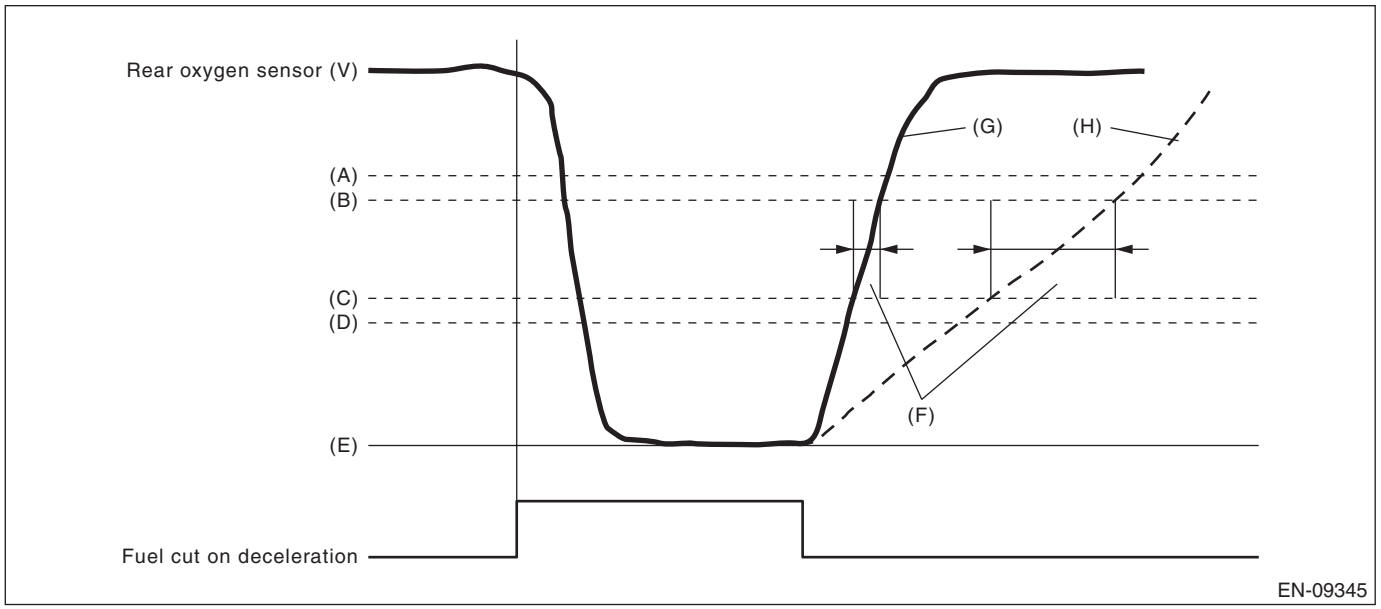
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
A/F main feedback	In operation
((Fuel system status	= Fuel cut
for time)	≥ 5000 ms
followed by	
Fuel system status)	≠ Fuel cut

4. GENERAL DRIVING CYCLE

Perform diagnosis only once after recovering from a deceleration fuel cut continued for more than predetermined time.

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the response time of the rear oxygen sensor after fuel cut.



(A) 0.55 V
(B) 0.50 V
(C) 0.30 V
(D) 0.25 V
(E) 0 V
(F) Diagnostic parameter
(G) Normal
(H) Malfunction

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time needed for rear oxygen sensor voltage to change from 0.3 V to 0.5 V	> 4000 ms

Time Needed for Diagnosis: 4000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

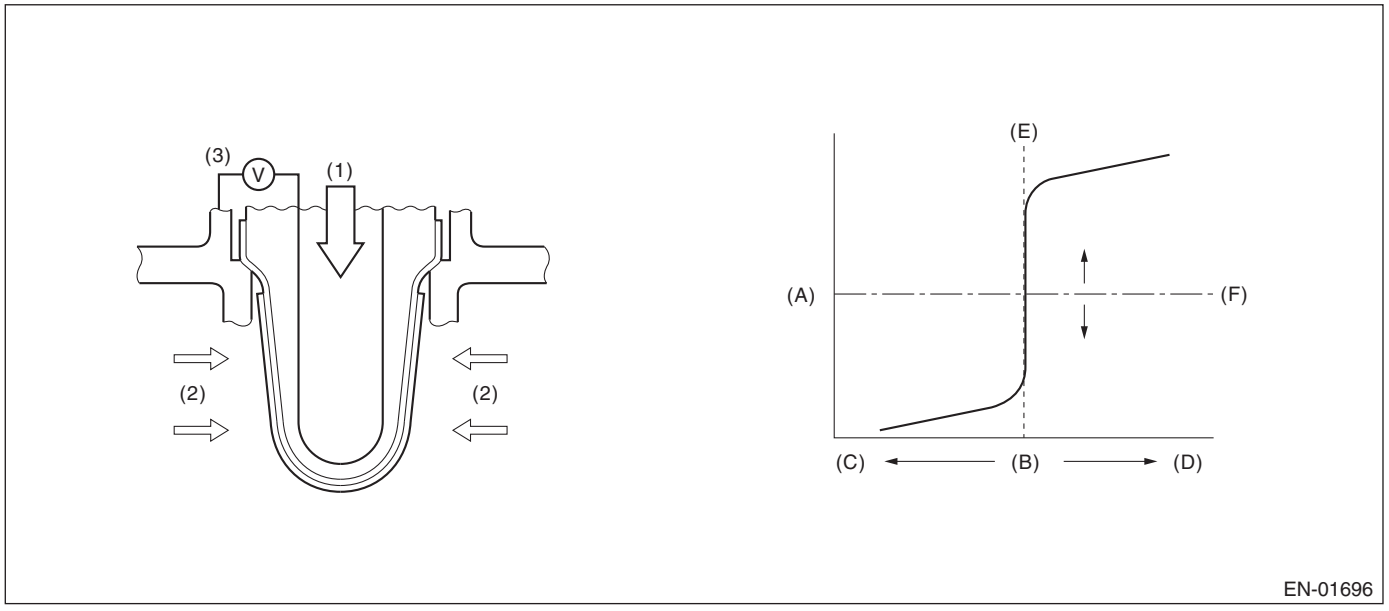
AV:DTC P013E O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 2

NOTE:
For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DO w/o HEV)(diag)-225, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the delayed response of rear oxygen sensor output for rich → lean.
After the deceleration fuel cut has started, detect the trouble by calculating the time when the rear oxygen sensor output decreases to the predetermined voltages.
Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

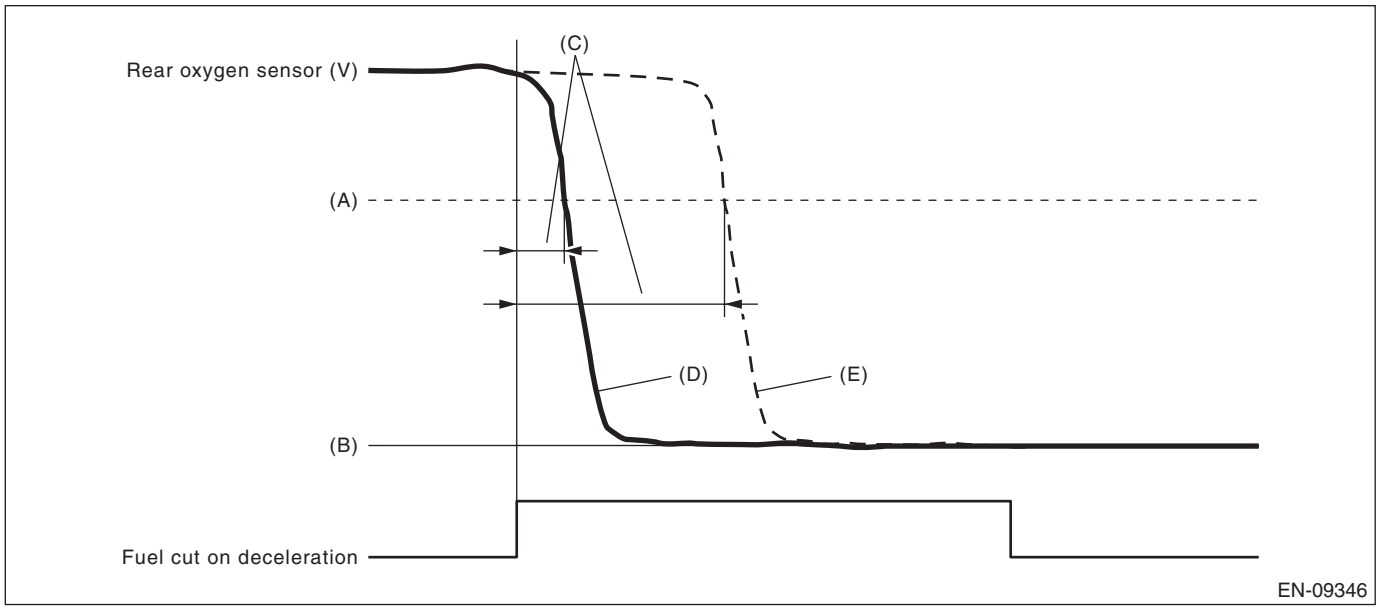
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Fuel shut-off function	In operation
Rear oxygen sensor voltage when fuel cut starts	≥ 0.55 V
Estimated temperature of rear oxygen sensor element when fuel cut starts	≥ 500 °C (932 °F)

4. GENERAL DRIVING CYCLE

Perform diagnosis once during deceleration fuel cut from a constant and high speed driving, when rear oxygen sensor is warmed up sufficiently.

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the time from the beginning of the fuel cut to the beginning of the rear oxygen sensor voltage starting to drop.



(A) 0.5 V
(B) 0 V
(C) Diagnostic parameter
(D) Normal
(E) Malfunction

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed to 0.5 V after the fuel cut started	> 4000 ms

Time Needed for Diagnosis: 5000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

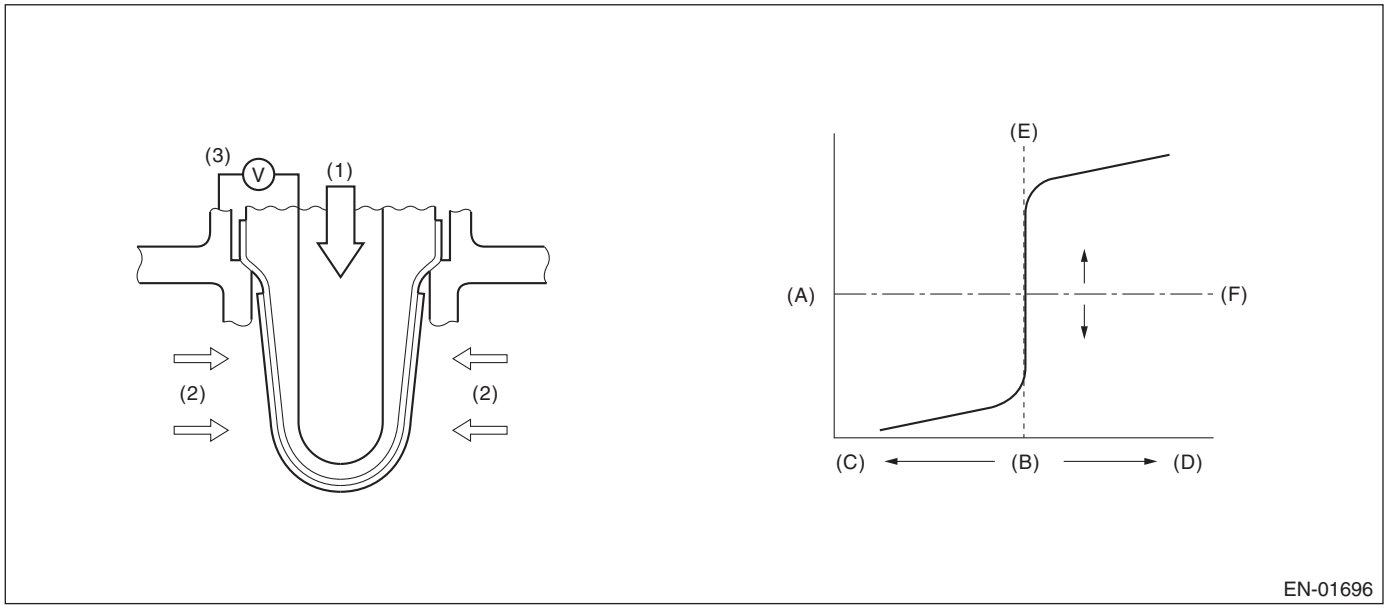
AW:DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2

NOTE:
For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DO w/o HEV)(diag)-225, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the delayed response of rear oxygen sensor output for lean → rich.
After the deceleration fuel cut has completed, detect the trouble by calculating the time when the rear oxygen sensor output increases to the predetermined voltages.
Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

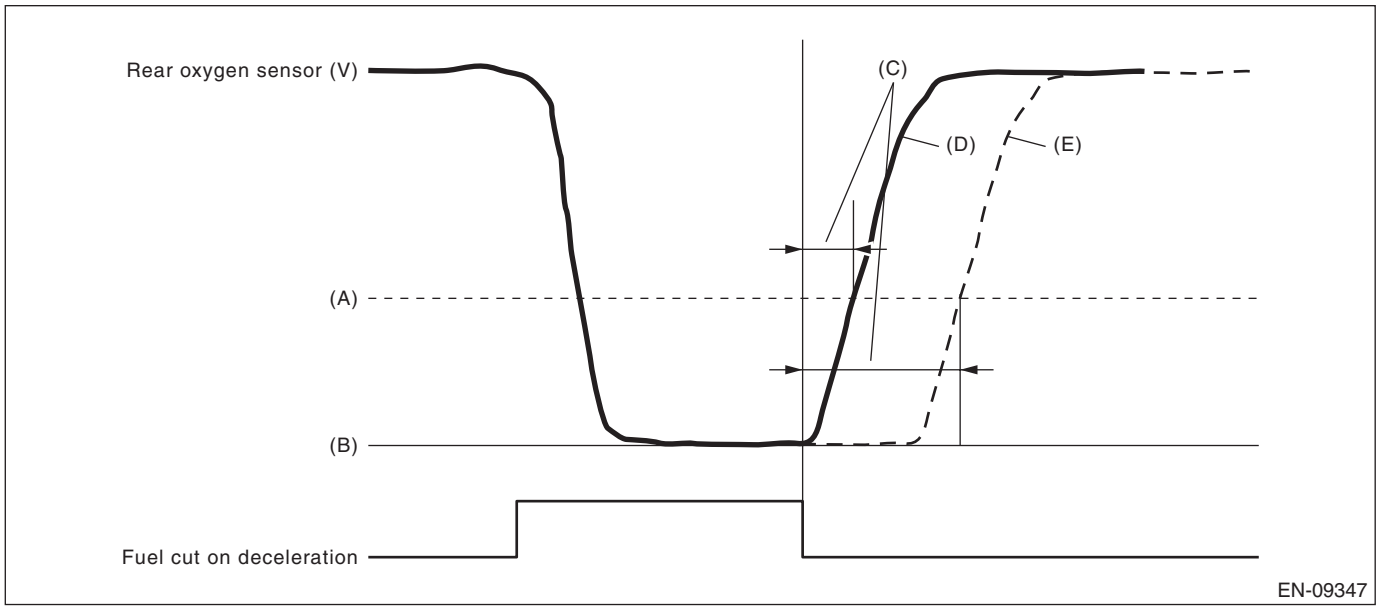
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
A/F main feedback	In operation
Rear oxygen sensor voltage when fuel cut has completed	≤ 0.15 V
((Fuel system status	= Fuel cut
for time)	≥ 5000 ms
followed by	
Fuel system status)	≠ Fuel cut
Estimated element temperature of rear oxygen sensor when fuel cut has completed	≥ 500 °C (932 °F)

4. GENERAL DRIVING CYCLE

Perform diagnosis only once when recovering from the deceleration fuel cut continued for more than predetermined time with the rear oxygen sensor warmed up sufficiently.

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the time from the completion of the fuel cut to the beginning of the rear oxygen sensor voltage starting to rise.



(A) 0.3 V
(B) 0 V
(C) Diagnostic parameter
(D) Normal
(E) Malfunction

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
The number of times that the rear oxygen sensor voltage changed to 0.3 V after the fuel cut has completed (time counter) 32 ms × 3750 time(s)	> 120 s

Time Needed for Diagnosis: 120 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

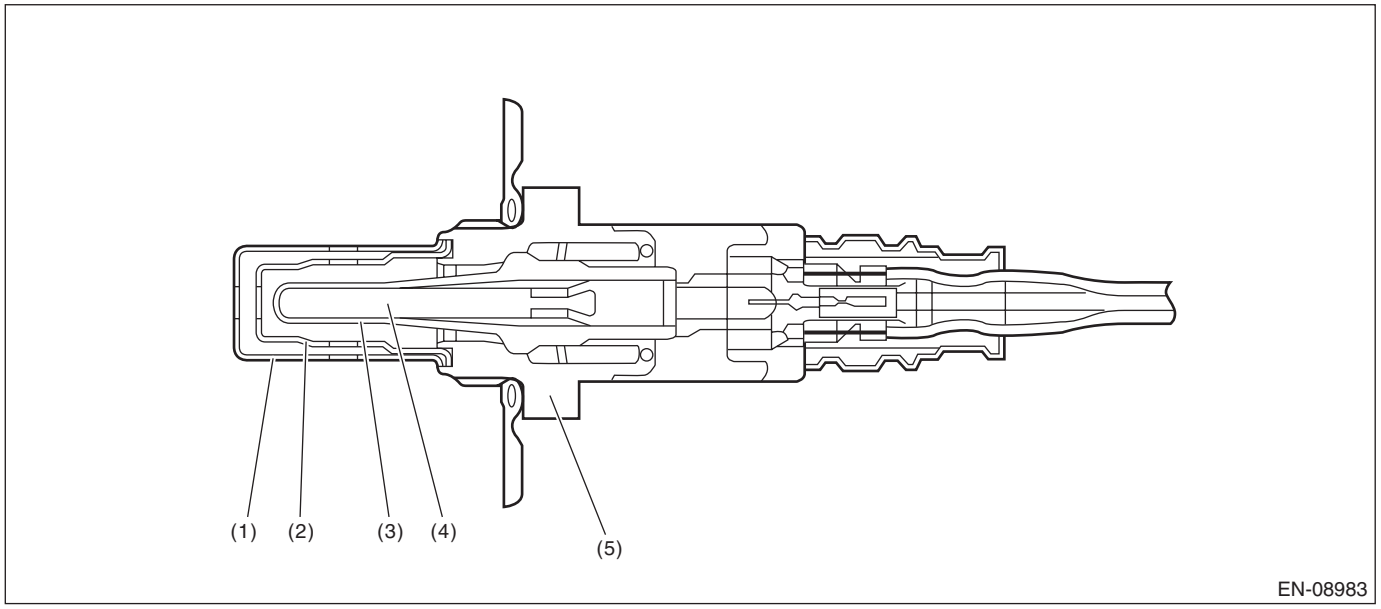
AX:DTC P0141 O2 SENSOR HEATER CIRCUIT BANK 1 SENSOR 2

Refer to DTC P0037 for diagnostic procedure. <Ref. to EN(H4DO w/o HEV)(diag)-148, DTC P0037 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of the rear oxygen sensor heater.
Judge as NG if it is determined that the rear oxygen sensor impedance is large by observing the engine conditions.

2. COMPONENT DESCRIPTION



(1) Element cover (outer)
(2) Element cover (inner)
(3) Sensor element
(4) Ceramic heater
(5) Sensor housing

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1000 ms
A/F sensor element impedance	≤ 82 Ω
A/F sensor heater control duty	≤ 75 %
Rear oxygen sensor heater control duty	< 70 %

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after 1000 ms or more have passed since the engine started.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured secondary oxygen sensor heater control voltage	12 V battery system voltage × 0.88 V

Time Needed for Diagnosis: 4 ms × 2500 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AY:DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

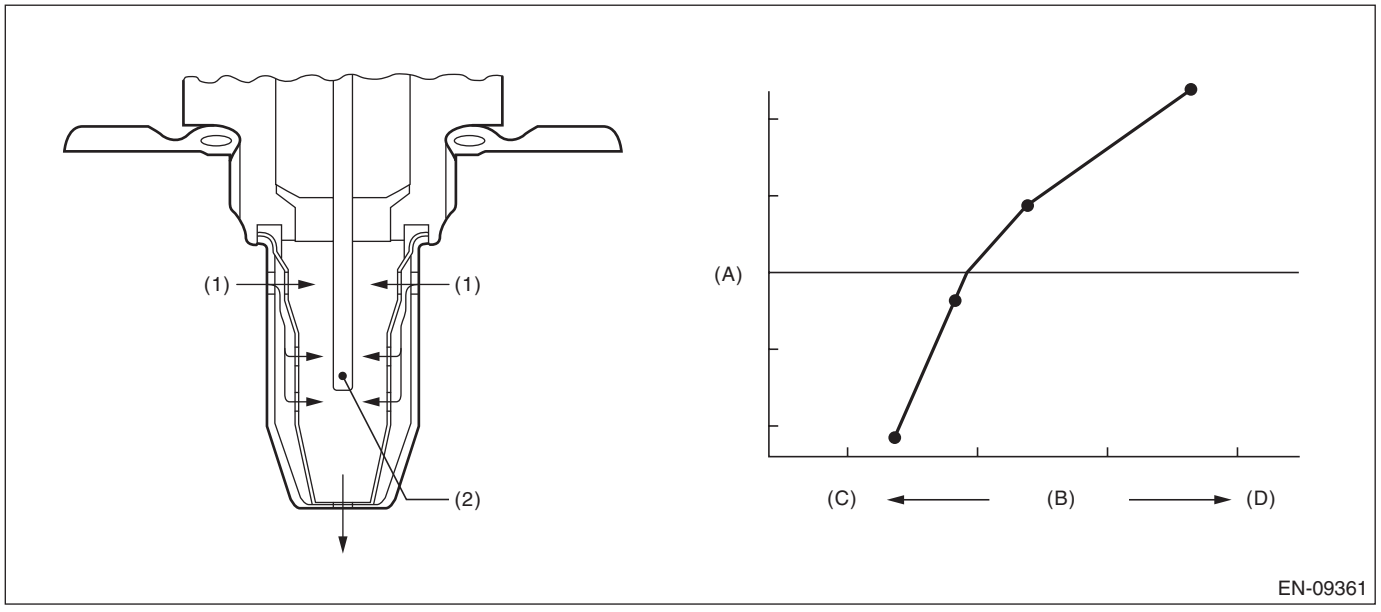
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.** NOTE: Check the following items. • Loose installation of front portion of exhaust pipe onto cylinder heads • Loose connection between front exhaust pipe and front catalytic converter • Damage of exhaust pipe resulting in a hole	Is there any fault in exhaust system?	Repair the exhaust system.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the slow response of front oxygen (A/F) sensor.
For diagnosis, detect the trouble by processing the λ waveform in normal driving without forcibly changing the target air fuel ratio.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Rich
(D) Lean

(1) Exhaust gas
(2) ZrO_2

3. EXECUTION CONDITION

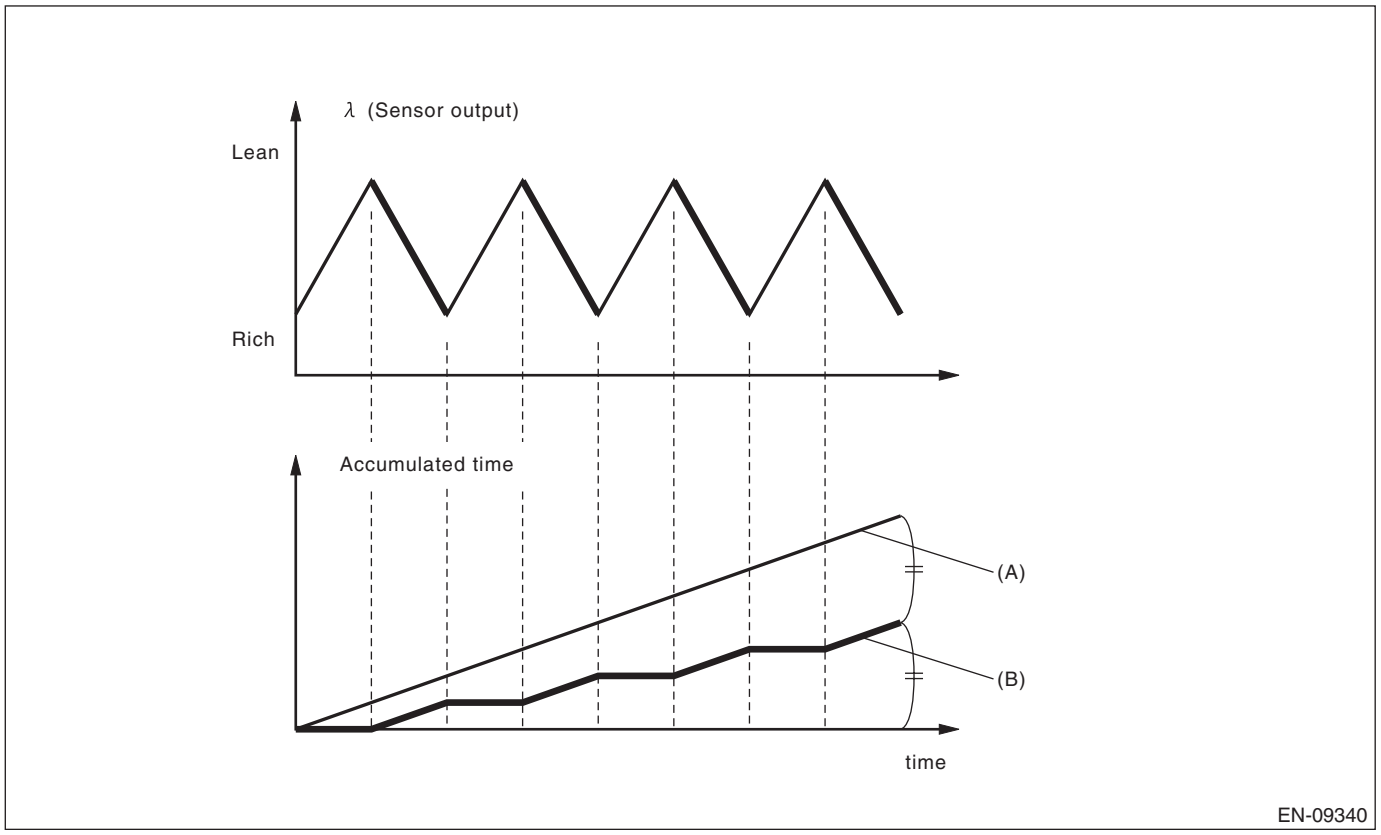
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Engine speed	≥ 1000 rpm
Intake air amount	≥ 10 g/s (0.35 oz/s) (CVT model) ≥ 10 g/s (0.35 oz/s) (MT model)
Operating time of A/F main feedback function	≥ 3000 ms

4. GENERAL DRIVING CYCLE

Perform diagnosis only once in a city driving including normal acceleration and deceleration.

5. DIAGNOSTIC METHOD 1

Detect the malfunction by checking “Cumulative value of time when λ changes from lean → rich” in comparison to “Time during which diagnosis is in progress”.



(A) Time during which diagnosis is in progress

(B) Cumulative value of time when λ changes from lean → rich

Judge as NG when the following conditions are established.

Diagnosis (CVT model)

Judgment Value

Malfunction Criteria	Threshold Value	DTC
(Cumulative value of time when λ changes from lean → rich) / (Time during which diagnosis is in progress) and Average value of time necessary for λ to inverse the air fuel ratio to Lean → Rich → Lean	< 0.39 < 30 ms	P014C
(Cumulative value of time when λ changes from rich → lean) / (Time during which diagnosis is in progress) and Average value of time necessary for λ to inverse the air fuel ratio to Rich → Lean → Rich	> 0.63 > 20 ms	P014D

Diagnosis (MT model)

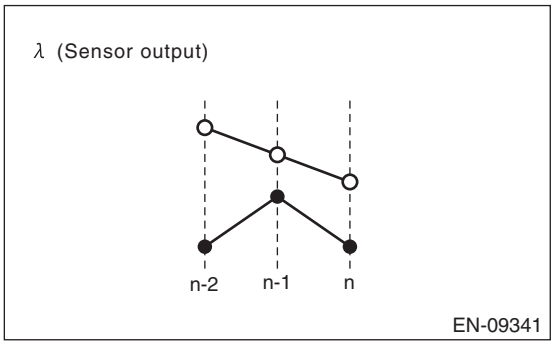
Judgment Value

Malfunction Criteria	Threshold Value	DTC
(Cumulative value of time when λ changes from lean → rich) / (Time during which diagnosis is in progress) and Average value of time necessary for λ to inverse the air fuel ratio to Lean → Rich → Lean	< 0.4 < 25 ms	P014C
(Cumulative value of time when λ changes from rich → lean) / (Time during which diagnosis is in progress) and Average value of time necessary for λ to inverse the air fuel ratio to Rich → Lean → Rich	> 0.6 > 5 ms	P014D

Diagnosis (CVT model)
Time Needed for Diagnosis: 90 seconds
Diagnosis (MT model)
Time Needed for Diagnosis: 60 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DIAGNOSTIC METHOD 2

Detect the malfunction by the cumulative value obtained from the amount of variation in λ change.



Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Cumulative value obtained from the amount of variation in λ change Σ |(lambda(n) – lambda(n-1)) – (lambda(n-1) – lambda(n-2))|	< Value from Map	P014C and P014D

Map (CVT model)

Cumulative value obtained from the amount of variation in λ Σ |(lambda(n) – lambda(n-1)) – (lambda(n-1) – lambda(n-2))|	0.00	3.50
Cumulative value obtained from the amount of variation in λ change	0.00	3.50

Map (MT model)

Cumulative value obtained from the amount of variation in λ Σ |(lambda(n) – lambda(n-1)) – (lambda(n-1) – lambda(n-2))|	0.00	3.50
Cumulative value obtained from the amount of variation in λ change	0.00	3.50

Diagnosis (CVT model)
Time Needed for Diagnosis: 90 seconds
Diagnosis (MT model)
Time Needed for Diagnosis: 60 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AZ:DTC P014D A/F / O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 1

NOTE:
For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DO w/o HEV)(diag)-236, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P014C. <Ref. to EN(H4DO w/o HEV)(diag)-236, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

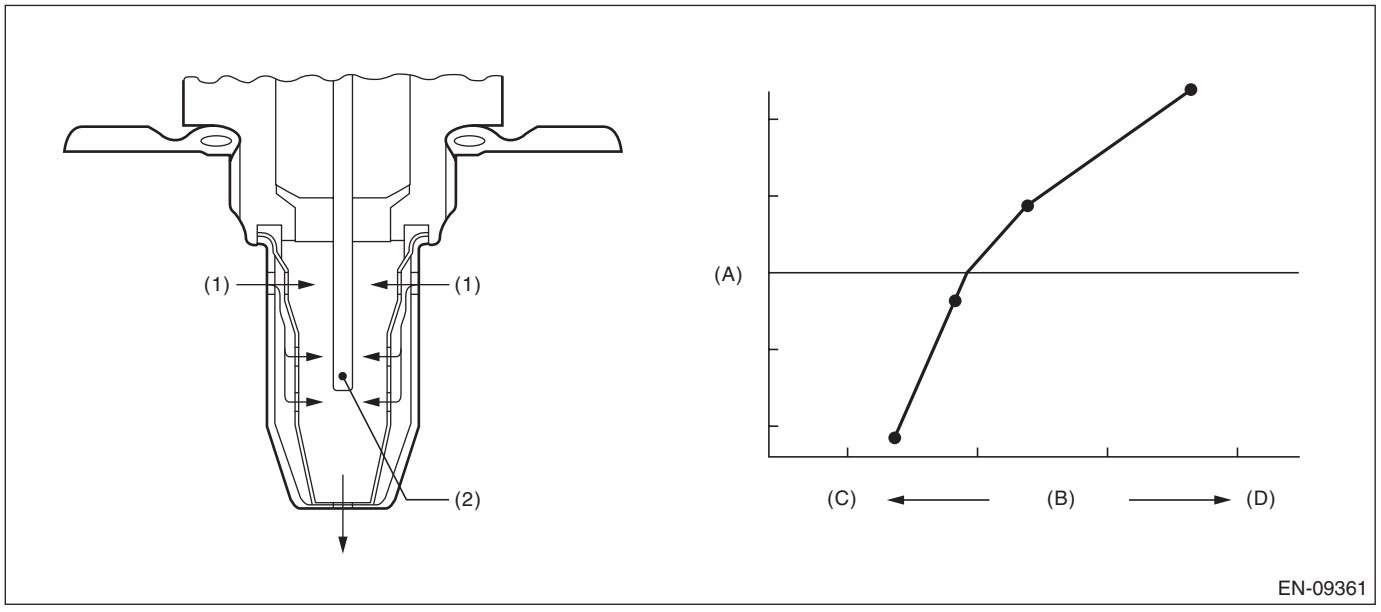
BA:DTC P015A A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1

NOTE:
For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DO w/o HEV)(diag)-236, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the slow response of front oxygen (A/F) sensor.
For diagnosis, detect the trouble by processing the λ waveform in normal driving without forcibly changing the target air fuel ratio.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Rich
(D) Lean
(1) Exhaust gas
(2) ZrO_2

3. EXECUTION CONDITION

Diagnostic method 1

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Operating time of A/F main feedback function	≥ 3000 ms
Engine speed	≥ 1000 rpm
Intake air amount	≥ 10 g/s (0.35 oz/s) (CVT model) ≥ 10 g/s (0.35 oz/s) (MT model)

DIAGNOSIS METHOD 2 (MT MODEL ONLY)

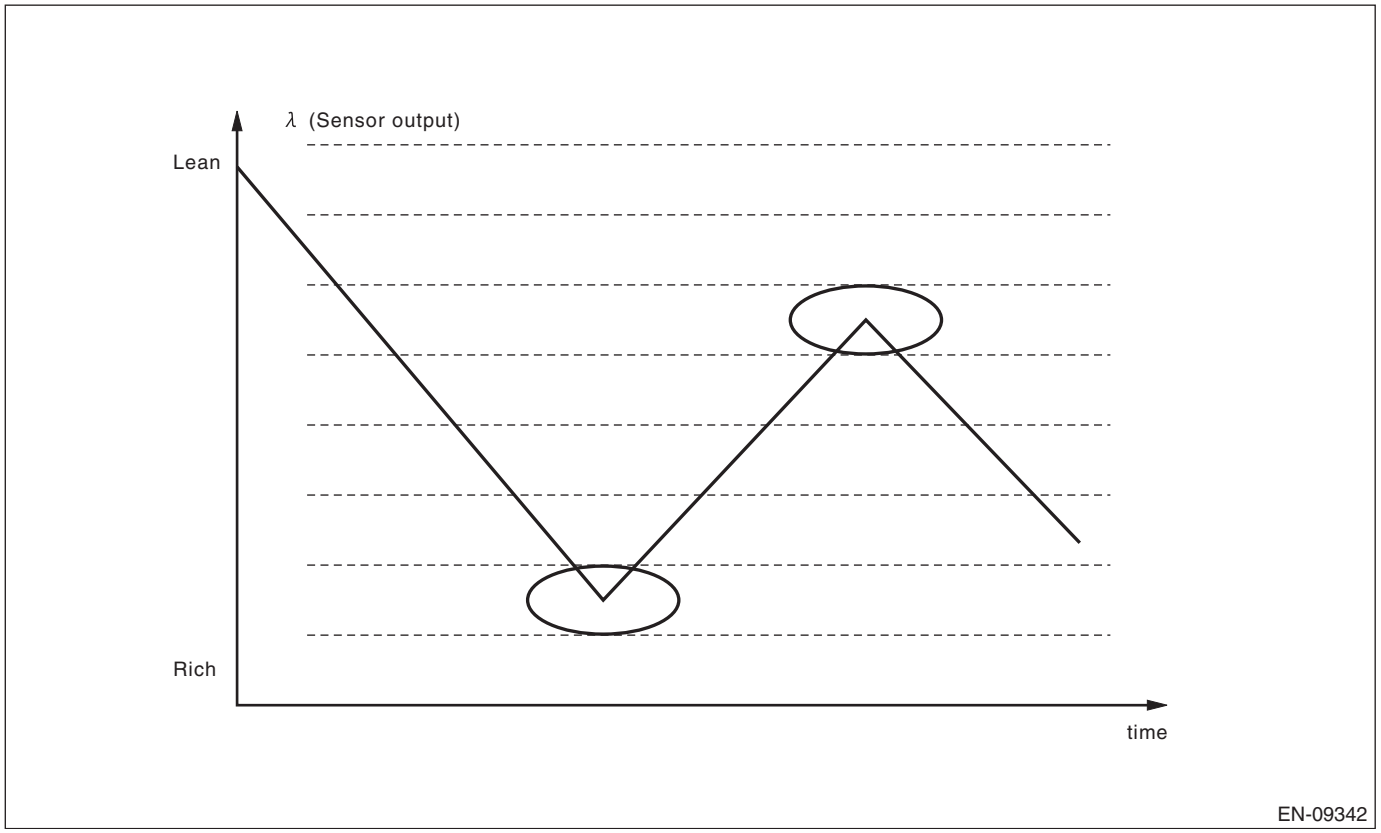
Secondary Parameters	Execution condition
Battery voltage	> 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Closed loop control with main feedback	Operation
Vehicle speed	> 40 km/h (24.9 MPH)
Engine speed	≥ 1000 rpm and < 4000 rpm
Intake air amount	≥ 7.5 g/s (0.26 oz/s) and < 40 g/s (1.41 oz/s)
Catalyst depletion diagnosis	Not under diagnosis

4. GENERAL DRIVING CYCLE

Perform diagnosis only once in a city driving including normal acceleration and deceleration.

5. DIAGNOSTIC METHOD 1

Detect the malfunction depending on the average value of time necessary for λ to inverse the air fuel ratio from “Lean → Rich → Lean” to “Rich → Lean → Rich”.



Judge as NG when the following conditions are established.

Diagnosis (CVT model)

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value of time necessary for λ to inverse the air fuel ratio to Lean → Rich → Lean and Average value of time needed to change to Lean	> 100 ms > 130 ms	P015A
Average value of time necessary for λ to inverse the air fuel ratio to Rich → Lean → Rich and Average value of time needed to change to Rich	> 200 ms > 300 ms	P015B

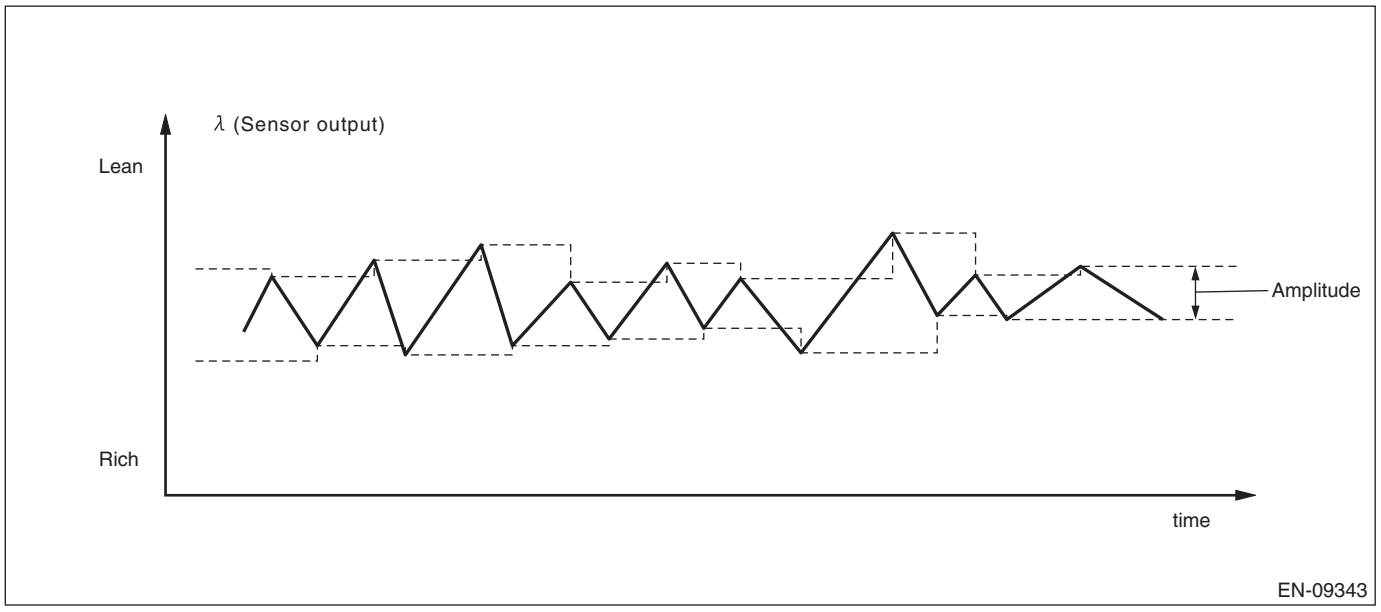
Diagnosis (MT model)
Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value of time necessary for λ to inverse the air fuel ratio to Lean → Rich → Lean and Average value of time needed to change to Lean	> 120 ms > 150 ms	P015A
Average value of time necessary for λ to inverse the air fuel ratio to Rich → Lean → Rich and Average value of time needed to change to Rich	> 200 ms > 250 ms	P015B

Diagnosis (CVT model)
Time Needed for Diagnosis: 90 seconds
Diagnosis (MT model)
Time Needed for Diagnosis: 60 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DIAGNOSTIC METHOD 2

Detect the malfunction by calculating the average amplitude of λ.



Judge as NG when the following conditions are established.

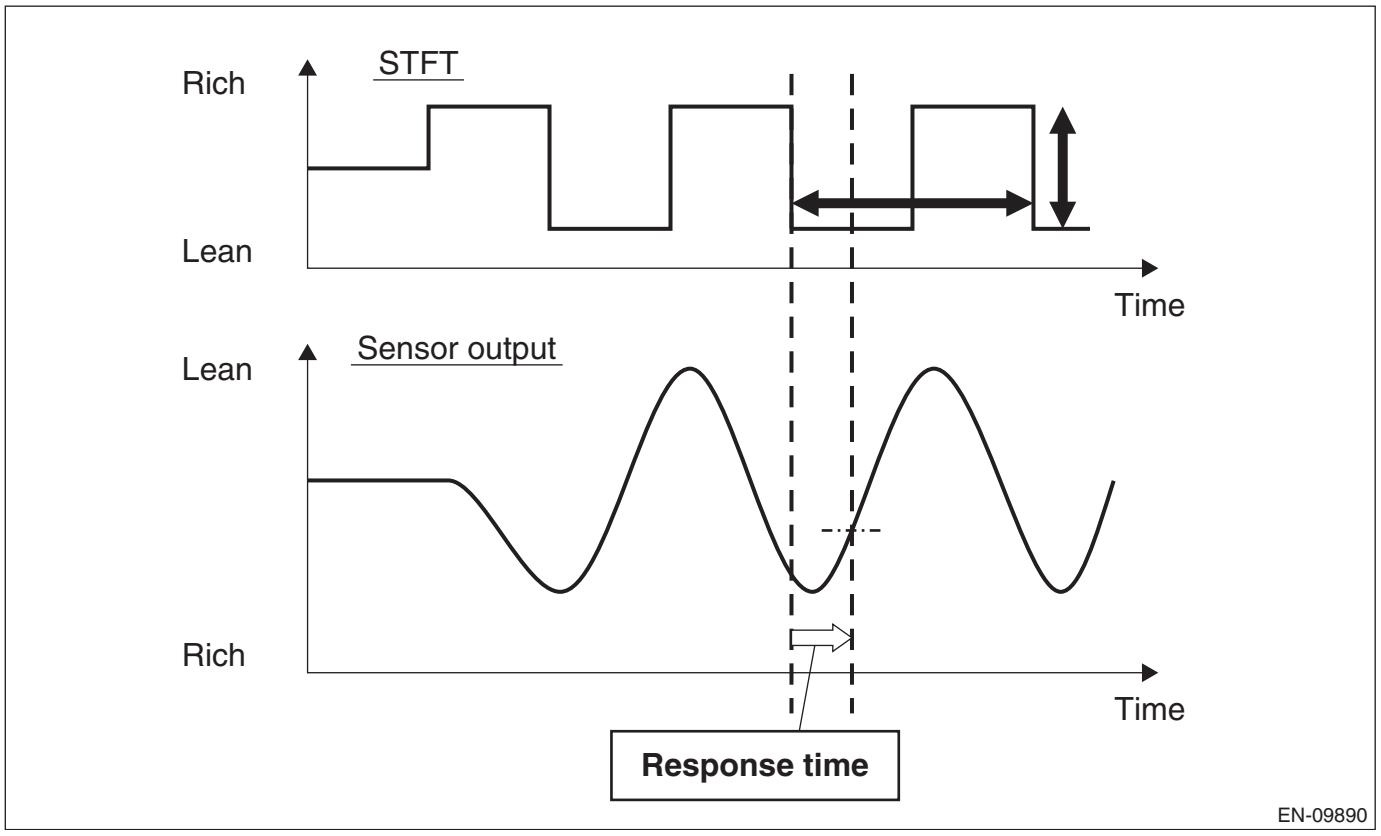
Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value for λ amplitude	> 0.07	P015A and P015B

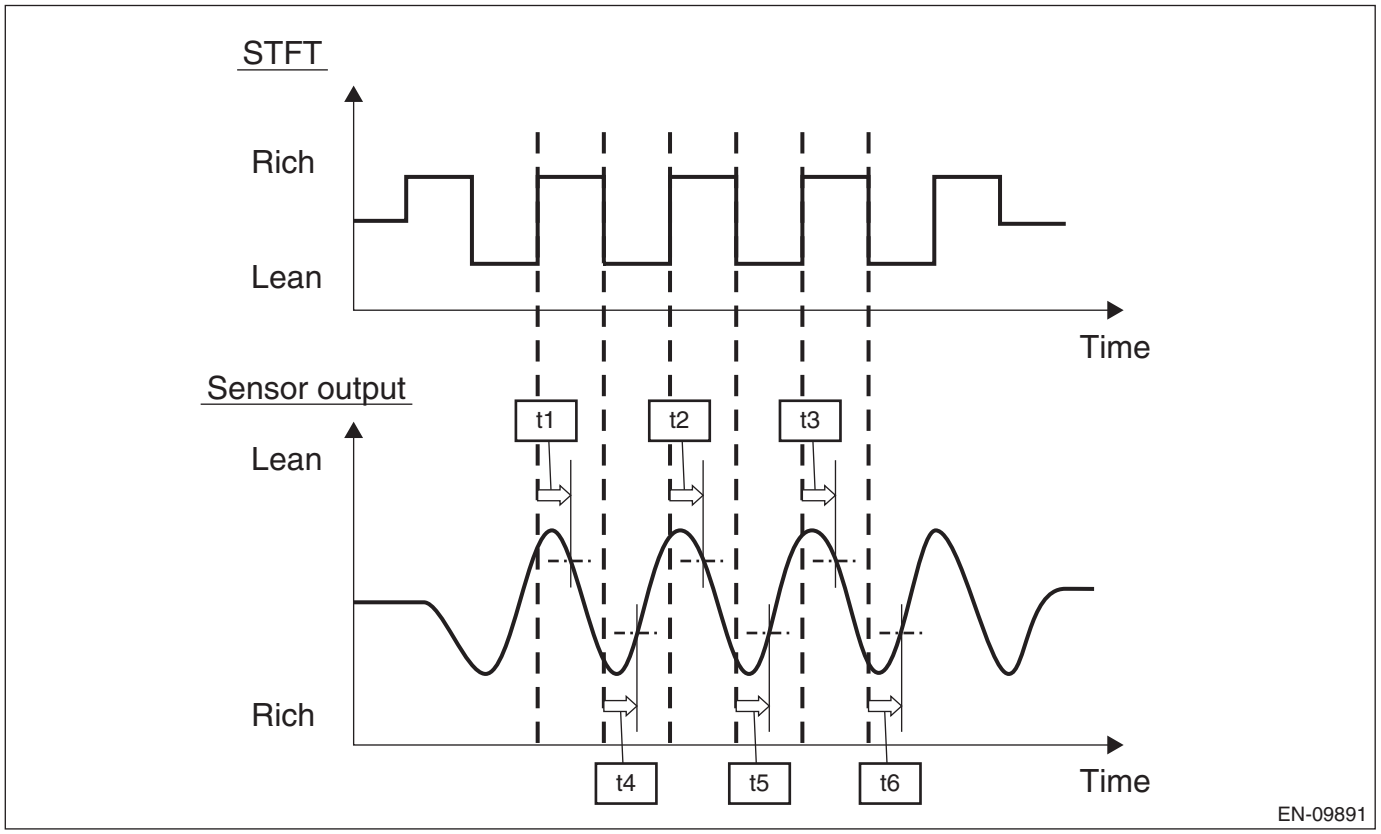
Time Needed for Diagnosis: 1000 ms × 4.5 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

7. DIAGNOSIS METHOD 3 (MT MODEL ONLY)

Change STFT (A/F compensation value) by interruption, and measure the reaction time of λ value. When A/F sensor malfunctions, the reaction time takes longer than at normal condition. In this case, judge as abnormal.



Measure reaction time (t1, t2, t3) and reaction time (t4, t5, t6). Use the average value of the reaction time to obtain the diagnostic value.



Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Condition either A or B should be satisfied.		
A:		P015A and P015B
Average value for λ amplitude	> 0.1	
or		
B:		
(t1 + t2 + t3)/3	> 590 ms	
and		
(t4 + t5 + t6)/3	> 590 ms	

Time Needed for Diagnosis: 1000 ms × 4.5 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BB:DTC P015B A/F / O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 1

NOTE:
For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DO w/o HEV)(diag)-236, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P015A. <Ref. to EN(H4DO w/o HEV)(diag)-240, DTC P015A A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BC:DTC P0171 SYSTEM TOO LEAN BANK 1

Refer to DTC P0172 for diagnostic procedure. <Ref. to EN(H4DO w/o HEV)(diag)-247, DTC P0172 SYSTEM TOO RICH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect fuel system malfunction by the amount of main feedback control.

Diagnostic method

Fuel system is diagnosed by comparing the target air fuel ratio calculated by ECM with the actual air fuel ratio measured by sensor.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
A/F main feedback function	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling or at a constant speed after warming up the engine.

4. DIAGNOSTIC METHOD

Compare the diagnostic value (fsobd) with the threshold value, and if a condition meeting the malfunction criteria listed below continues for 10 s × 3 time(s) or more, judge that there is a fault in the fuel system.

Judgment Value

Malfunction Criteria	Threshold Value
fsobd = (sglmd – tglmda) + faf + flaf In this case: sglmd = measured lambda tglmda = target lambda faf = main feedback compensation coefficient (every 64 milliseconds) flaf = main feedback learning compensation coefficient	≥ Value from Map

Map

Amount of air (g (oz)/s)	0 (0)	3.2 (0.11)	6.4 (0.23)	9.6 (0.34)	12.8 (0.45)	16 (0.56)	19.2 (0.68)
fsobdL1 (%)	1.33	1.33	1.33	1.33	1.33	1.33	1.33

Time Needed for Diagnosis: 10 s × 3 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BD:DTC P0172 SYSTEM TOO RICH BANK 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Improper idling
- Engine stall
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **2**.
2	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **3**.
3	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **4**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(w/o HEV))-144, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(w/o HEV))-176, INSPECTION, Fuel Delivery and Evaporation Lines.>
4	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **5**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>

	Step	Check	Yes	No
5	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **6**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>
6	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Repair the poor contact of ECM connector.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect fuel system malfunction by the amount of main feedback control.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
A/F main feedback function	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously during the closed loop.

4. DIAGNOSTIC METHOD

Compare the diagnostic value (fsobd) with the threshold value, and if a condition meeting the malfunction criteria listed below continues for 10 s × 3 time(s) or more, judge that there is a fault in the fuel system.

Judgment Value

Malfunction Criteria	Threshold Value
fsobd = (sglmd – tglmda) + faf + flaf In this case: sglmd = measured lambda tglmda = target lambda faf = main feedback compensation coefficient (every 64 milliseconds) flaf = main feedback learning compensation coefficient	< Value from Map

Map

Warm-up increase compensation coefficient	0	0.1	0.2	0.3
Threshold Value	0.67	0.572	0.494	0.432

Warm-up increase compensation coefficient	0.35	0.6
Threshold Value	0.401	0.401

Time Needed for Diagnosis: 10 s × 3 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BE:DTC P0196 ENGINE OIL TEMPERATURE SENSOR "A" RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

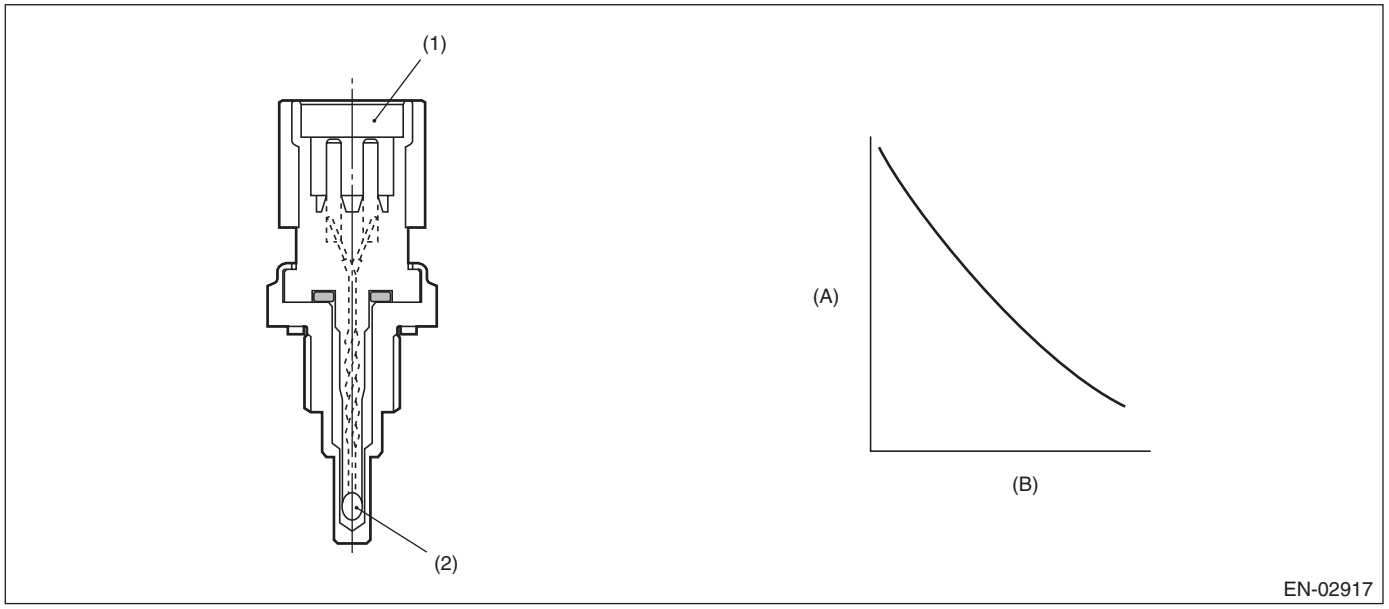
Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Replace the engine oil temperature sensor. <Ref. to FU(H4DO(w/o HEV))-53, Engine Oil Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the engine oil temperature sensor output properties. Using the following two diagnoses, judge as NG when either is NG.

- **Diagnosis 1 (correlation diagnosis):** After the engine starts after the specified period of soaking time has elapsed, diagnose by correlation between engine oil temperature sensor value, engine coolant temperature sensor value and intake air temperature sensor value. Judge as NG when the differences are both above the specified value by comparing between engine oil temperature and engine coolant temperature, engine oil temperature and intake air temperature.
- **Diagnosis 2 (function diagnosis):** Judge as NG when engine oil temperature does not rise to the specified value regardless of an engine running condition that clears certain conditions.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Diagnosis 1

Secondary Parameters	Execution condition
Soaking time	≥ 21600 s
Block heater judgment	Completed
Block heater operation	Not in operation

Diagnosis 2

Secondary Parameters	Execution condition
Engine oil temperature at engine starting	< 50 °C (122 °F)
Engine speed	> 500 rpm
Percentage of idling	≤ 0.5 × 100

4. GENERAL DRIVING CYCLE

- **Diagnosis 1:** Perform the diagnosis only once after the engine starts after a certain period of soaking time.
- **Diagnosis 2:** Perform the diagnosis only once after starting the engine from cold condition.

5. DIAGNOSTIC METHOD

Judge as NG when Diagnosis 1 or Diagnosis 2 becomes NG.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Diagnosis 1

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value Engine oil temperature at engine start – Engine coolant temperature at engine start	> 10 °C (18°F)
Absolute value Engine oil temperature at engine start – Intake air temperature 30 sec. after engine start	> Value of Map 1

Map 1

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Engine oil temperature at engine start – Intake air temperature 30 sec. after engine start| °C (°F)	10 (18°F)	10 (18°F)	22 (39.6°F)	22 (39.6°F)

Time Needed for Diagnosis: Less than 1 second

Diagnosis 2

Judgment Value

Malfunction Criteria	Threshold Value
Engine oil temperature	< 50 °C (122 °F)
Elapsed time after starting the engine	≥ Value from Map 2

Map 2

		Intake air temperature at engine start °C (°F)							
		–40 (–40)	–30 (–22)	–20 (–4)	–10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Percentage of time when engine is at stop against time elapsed since engine start	0.0	3300000	2730000	2200000	1740000	1400000	1120000	800000	500000
	0.3	3300000	2730000	2200000	1740000	1400000	1120000	800000	500000
	0.6	3300000	2730000	2200000	1740000	1400000	1120000	800000	500000
	1.0	3300000	2730000	2200000	1740000	1400000	1120000	800000	500000
ms									

Time Needed for Diagnosis: Value of Map 2

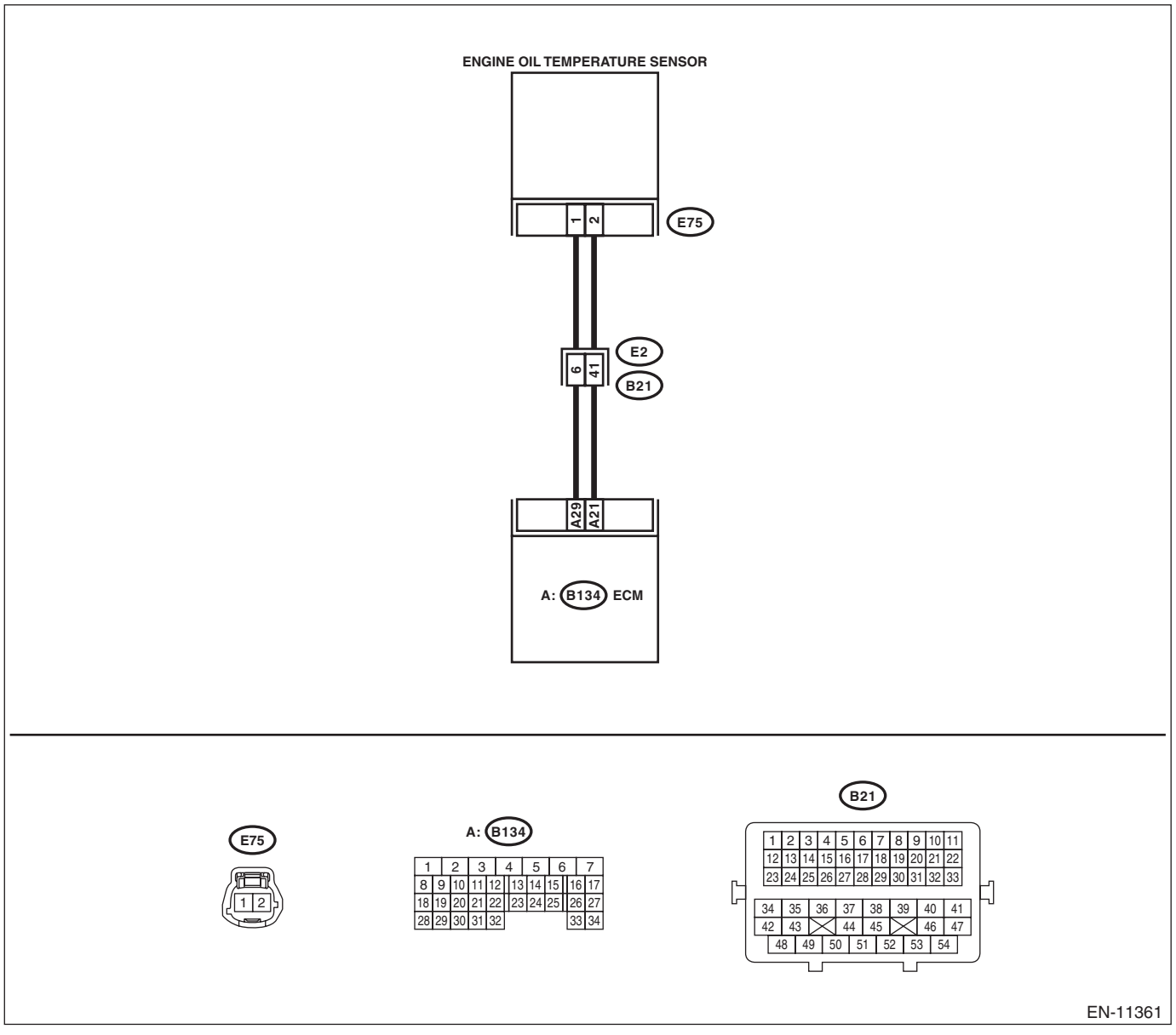
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BF:DTC P0197 ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

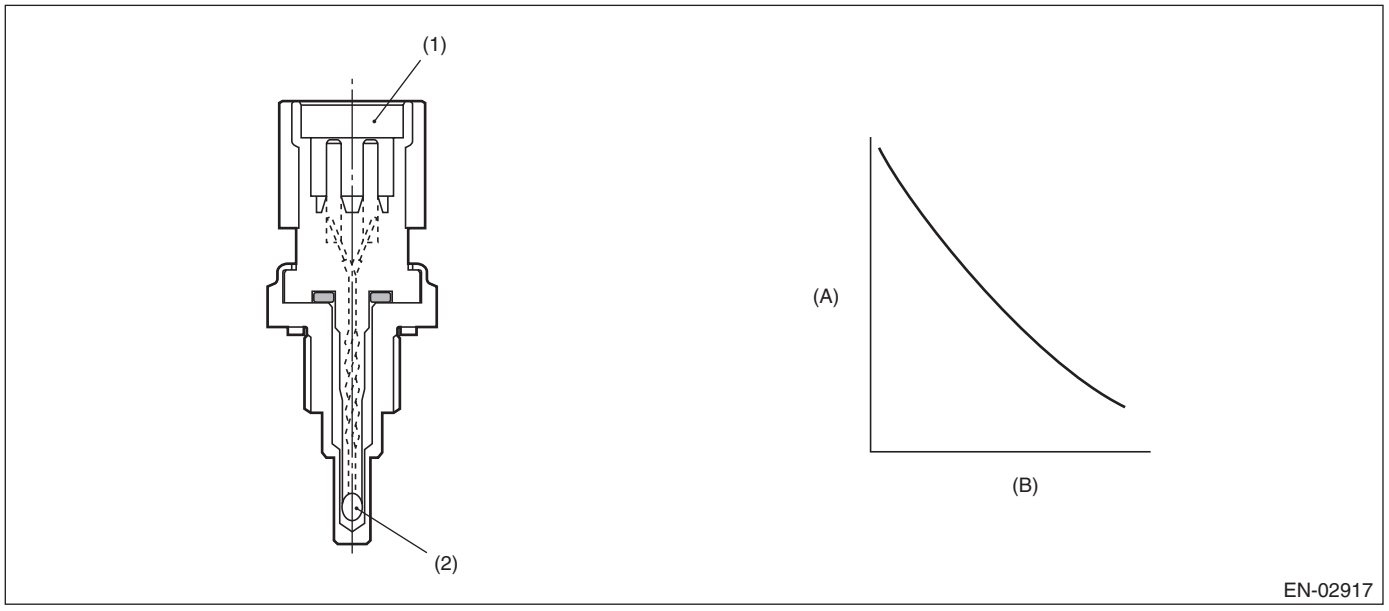


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Oil Temperature» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Oil Temperature» 150°C (302°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and engine oil temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the engine oil temperature sensor. <Ref. to FU(H4DO(w/o HEV))-53, Engine Oil Temperature Sensor.>	Repair the short circuit to ground in the harness between the ECM connector and engine oil temperature sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the oil temperature sensor.
Judge as NG when outside of the judgment value.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.203 V

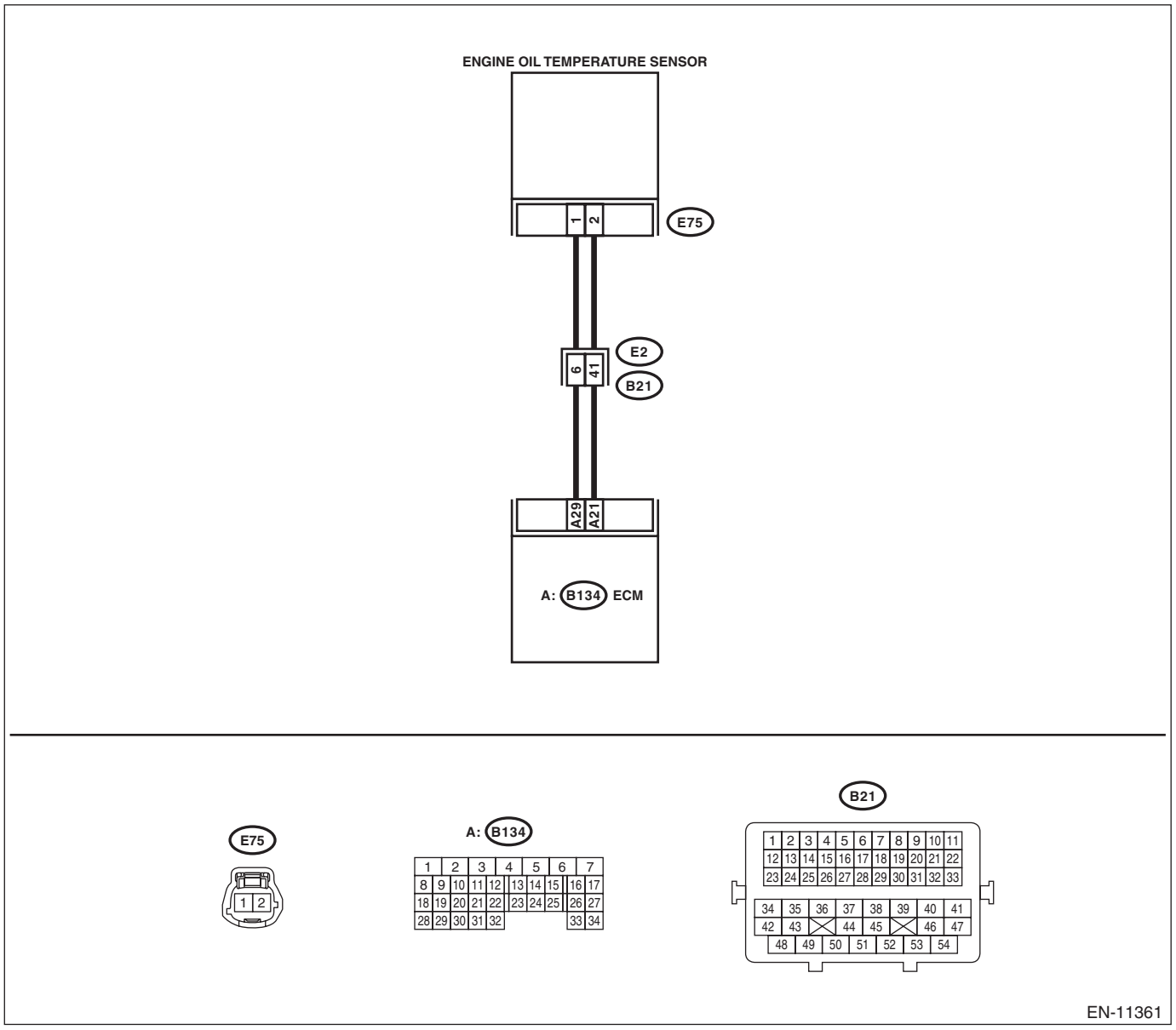
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BG:DTC P0198 ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

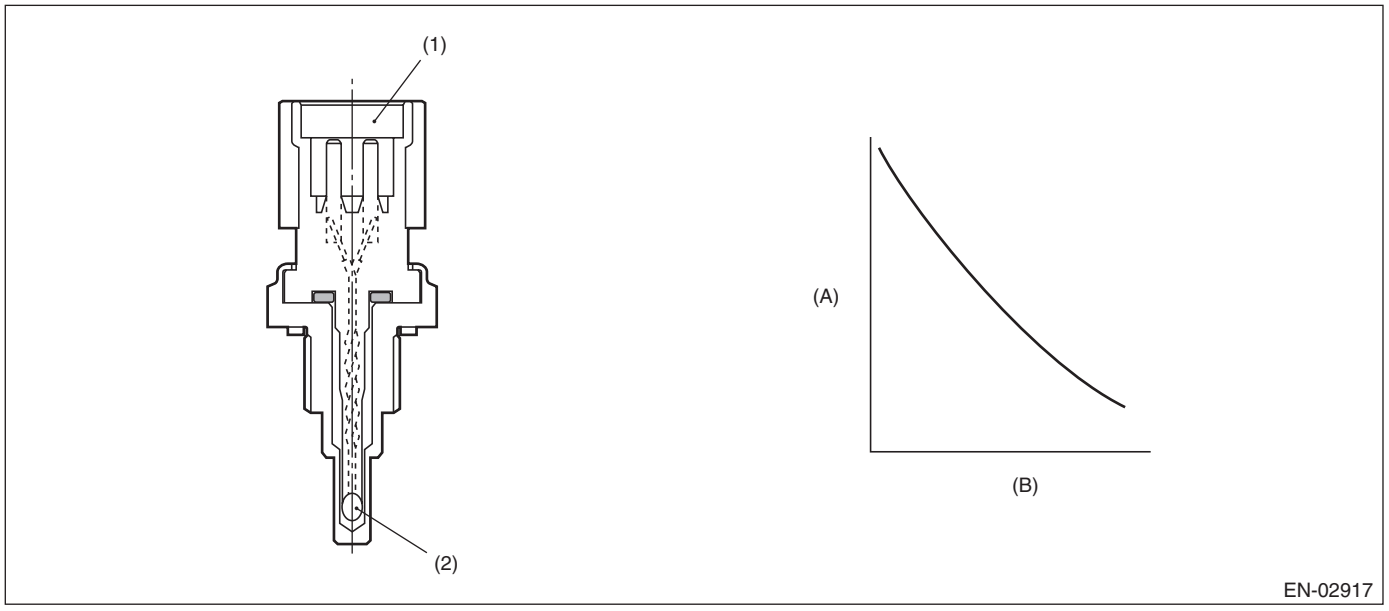


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Oil Temperature» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Oil Temperature» –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK FOR POOR CONTACT.** Check for poor contact between the ECM and engine oil temperature sensor connectors.	Is there poor contact of the ECM or engine oil temperature sensor connectors?	Repair the poor contact of ECM or engine oil temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and engine oil temperature sensor. 3) Measure the resistance of the harness between the ECM connector and engine oil temperature sensor connector. ***Connector & terminal*** ***(B134) No. 29 — (E75) No. 1:*** ***(B134) No. 20 — (E75) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and engine oil temperature sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 20 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and engine oil temperature sensor connector.	Replace the engine oil temperature sensor. <Ref. to FU(H4DO(w/o HEV))-53, Engine Oil Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the oil temperature sensor.
Judge as NG when outside of the judgment value.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

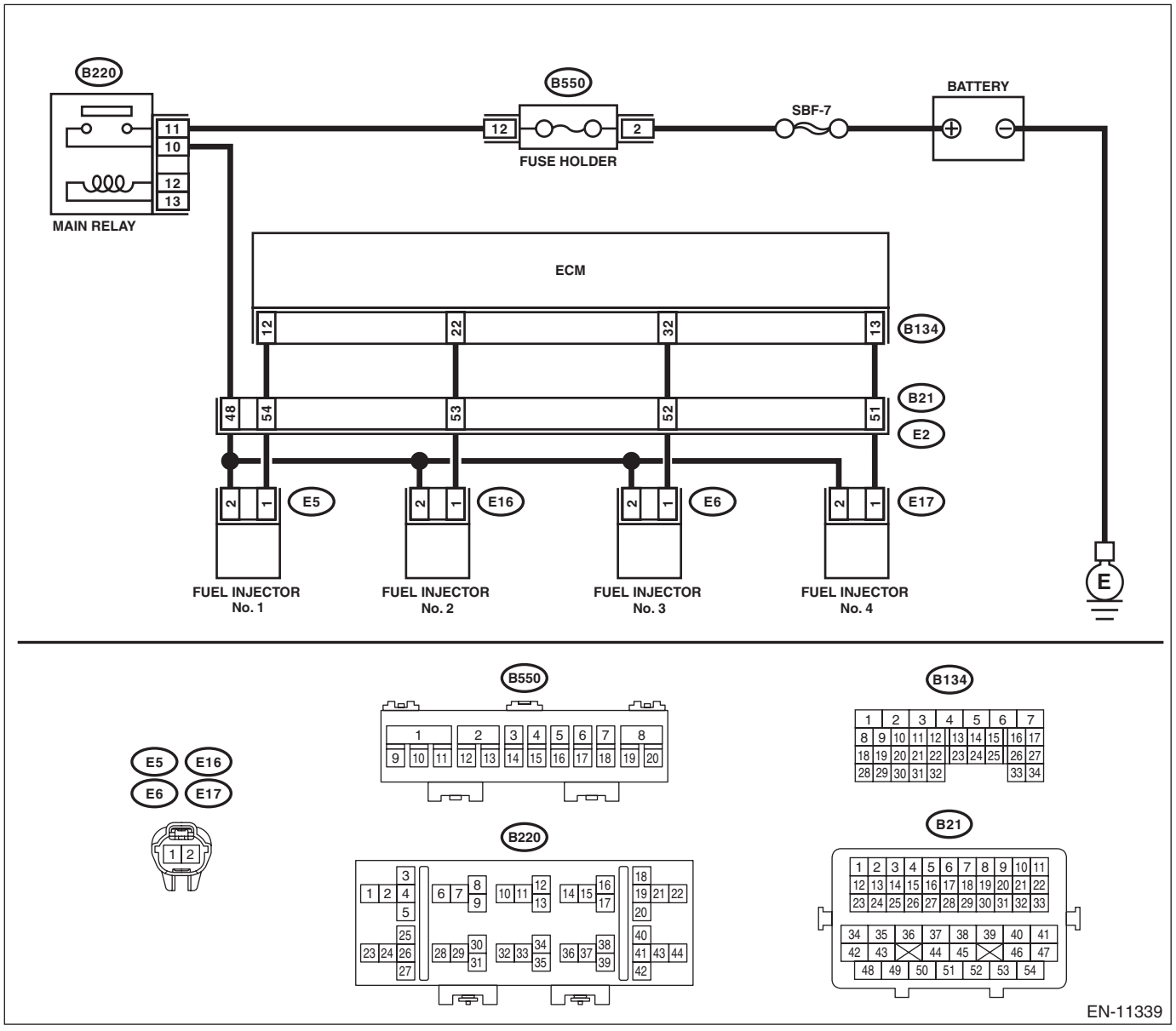
Malfunction Criteria	Threshold Value
Output voltage	≥ 4.698 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BH:DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK POWER SUPPLY TO FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector. 3) Turn the ignition switch to ON. 4) Measure the voltage between fuel injector connector and the engine ground. ***Connector & terminal*** ***DTC P0201; (E5) No. 2 (+) — Engine ground (–):*** ***DTC P0202; (E16) No. 2 (+) — Engine ground (–):*** ***DTC P0203; (E6) No. 2 (+) — Engine ground (–):*** ***DTC P0204; (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and fuel injector connector • Poor contact of main relay connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between fuel injector connector and engine ground. ***Connector & terminal*** ***DTC P0201; (E5) No. 1 — Engine ground:*** ***DTC P0202; (E16) No. 1 — Engine ground:*** ***DTC P0203; (E6) No. 1 — Engine ground:*** ***DTC P0204; (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM connector and fuel injector connector. ***Connector & terminal*** ***DTC P0201; (B134) No. 12 — (E5) No. 1:*** ***DTC P0202; (B134) No. 22 — (E16) No. 1:*** ***DTC P0203; (B134) No. 32 — (E6) No. 1:*** ***DTC P0204; (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4	**CHECK FUEL INJECTOR.** Measure the resistance between fuel injector terminals on the corresponding cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **5**.	Replace the fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
5	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Go to step **6**.

Step		Check	Yes	No
6	**CHECK FUEL INJECTOR OPERATION.** 1) Connect all connectors. 2) Start the engine. 3) Check if the corresponding fuel injector emits operating sound. NOTE: Use a sound scope to check the operating sound.	Does the fuel injector emit operating sound?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the poor contact of fuel injector connector.

1. OUTLINE OF DIAGNOSIS

Based on the self-diagnostic result of the injector driving IC, judge the injector driving circuit as normal or abnormal.
Injector driving IC detects the status of “fuel remains injected” or “fuel is not injected” as a malfunction.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 1 s
Engine speed	> 500 rpm
Injection status	Not during fuel cut

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Injector driving IC information	Trouble

Time Needed for Diagnosis: 2560 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BI: DTC P0202 CYLINDER 2 INJECTOR "A" CIRCUIT

NOTE:
For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO w/o HEV)(diag)-259, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0201. <Ref. to EN(H4DO w/o HEV)(diag)-259, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BJ:DTC P0203 CYLINDER 3 INJECTOR "A" CIRCUIT

NOTE:
For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO w/o HEV)(diag)-259, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0201. <Ref. to EN(H4DO w/o HEV)(diag)-259, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BK:DTC P0204 CYLINDER 4 INJECTOR "A" CIRCUIT

NOTE:
For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO w/o HEV)(diag)-259, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

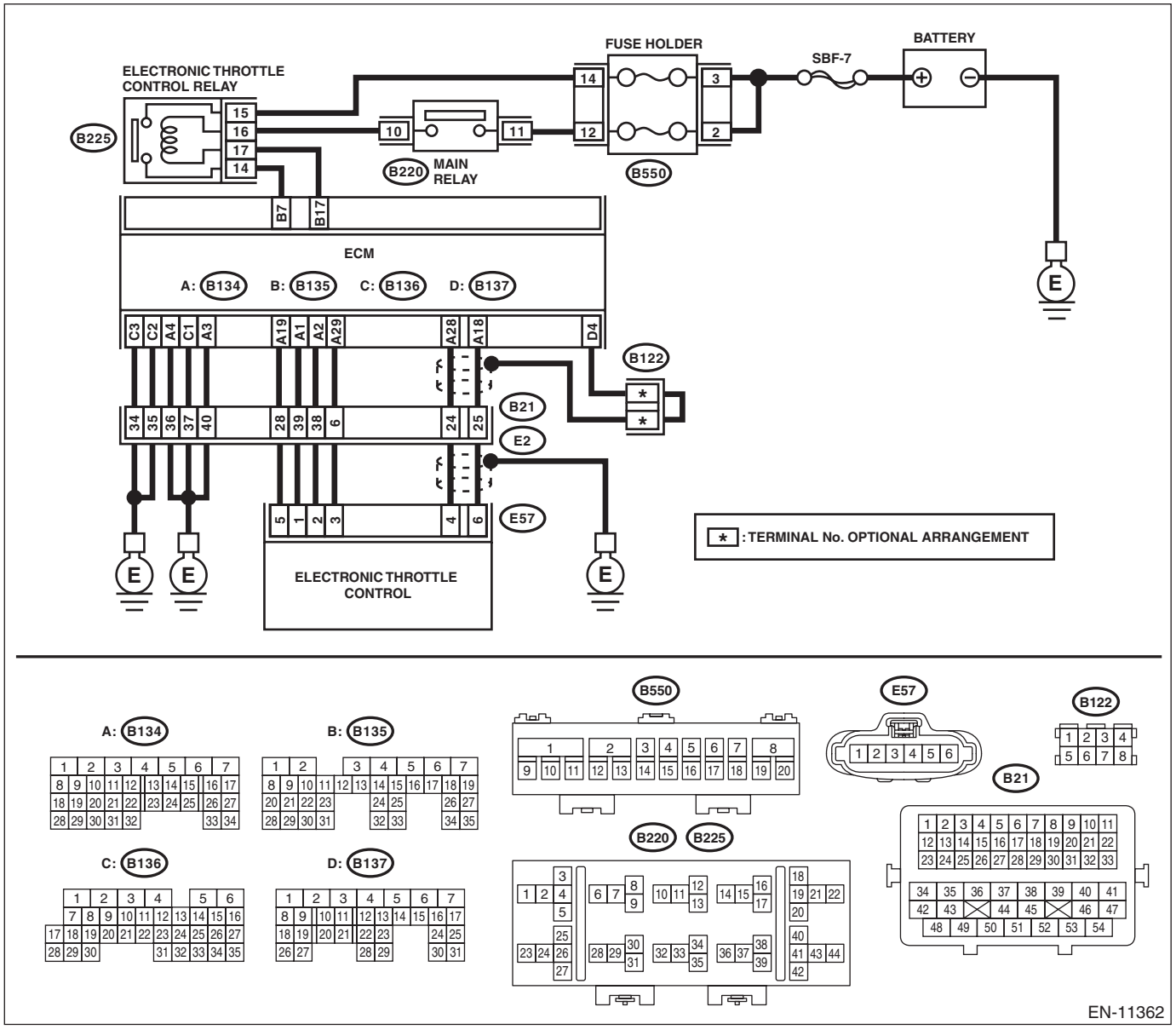
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0201. <Ref. to EN(H4DO w/o HEV)(diag)-259, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BL:DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance
- Engine stall

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



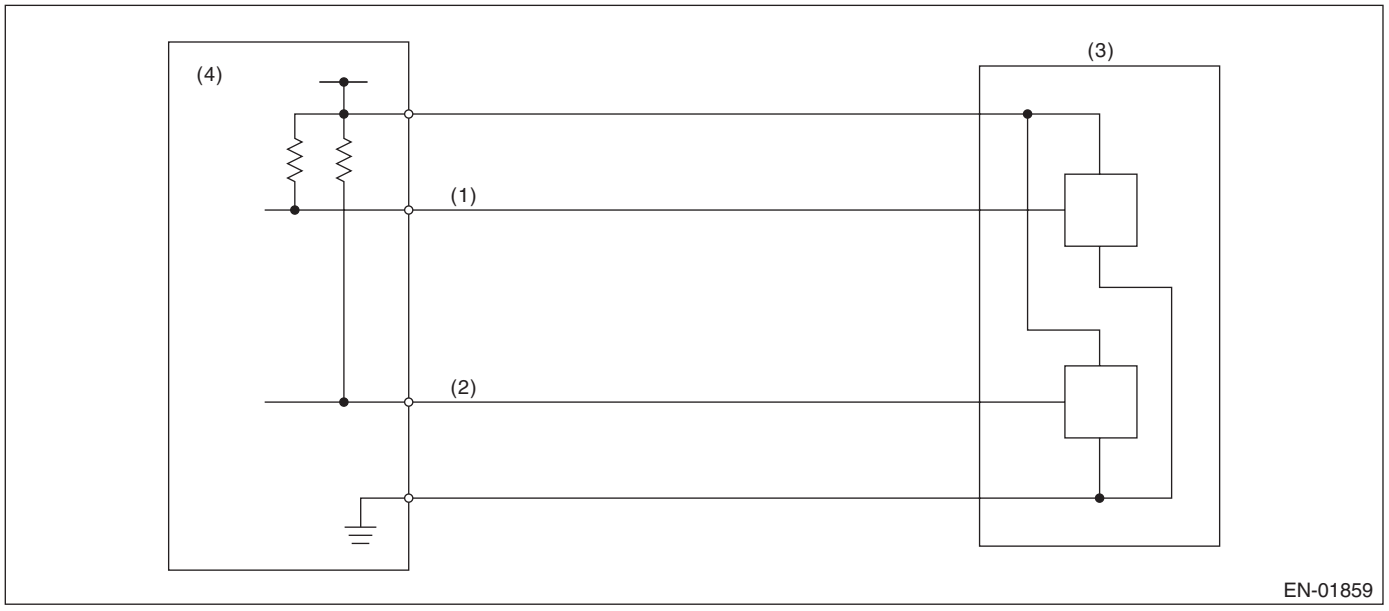
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	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 28 — Chassis ground:*** ***(B134) No. 28 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 4 — Engine ground:***	Is the resistance 1 MΩ or more?	Replace the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 2.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

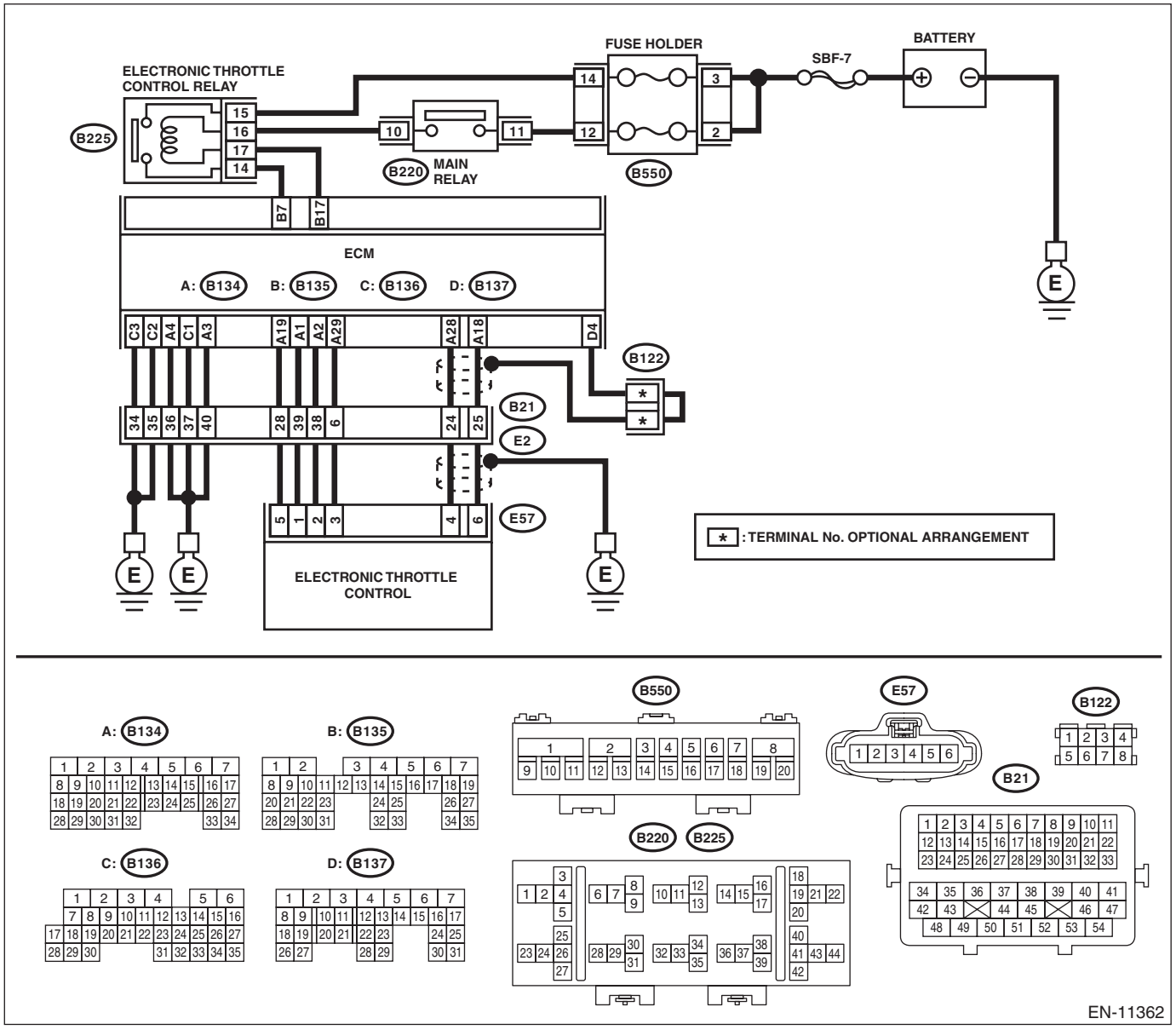
Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≤ 1.133 V

Time Needed for Diagnosis: 24 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BM:DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance
- Engine stall

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

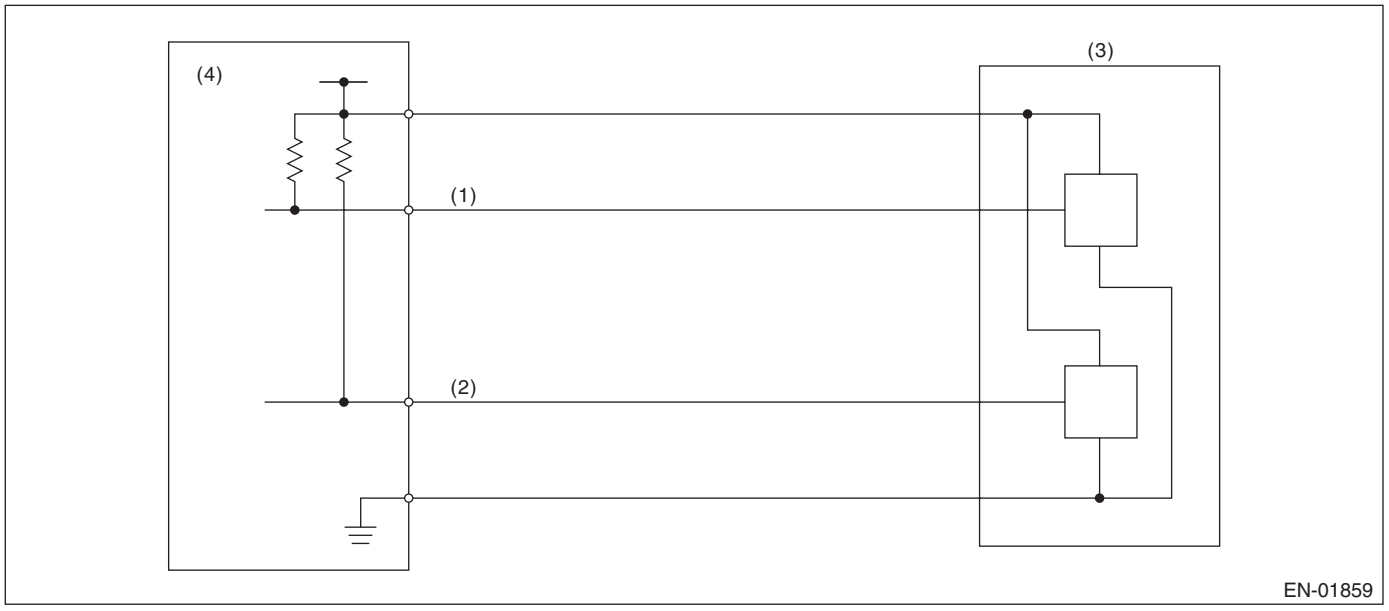


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 28 — (E57) No. 4:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 4 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 28:***	Is the resistance 1 MΩ or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 2.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 4.772 V

Time Needed for Diagnosis: 24 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BN:DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)

TROUBLE SYMPTOM:

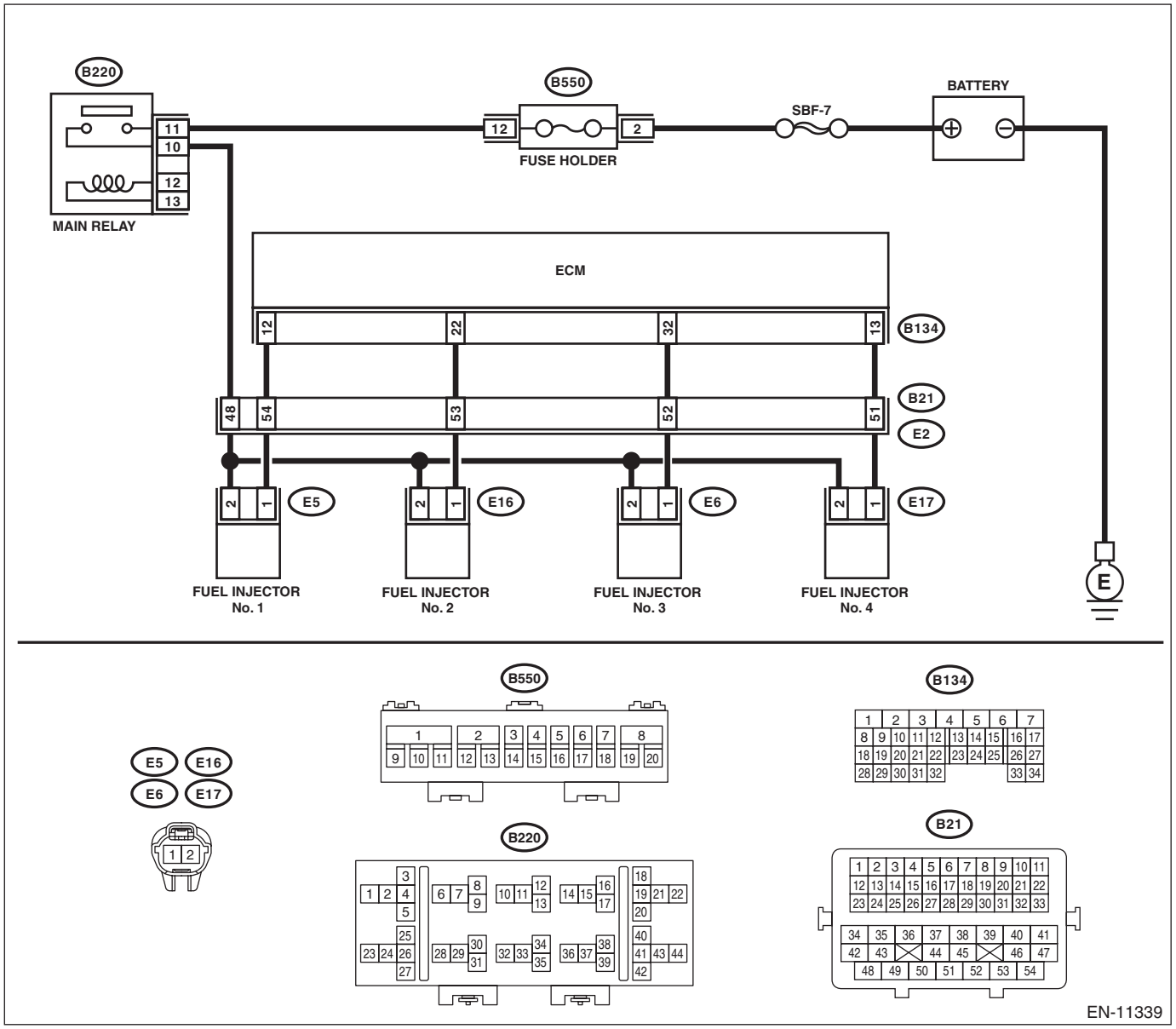
- Engine stall
- Improper idling
- Rough driving

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on all cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from all fuel injectors. 3) Measure the resistance between all fuel injector connectors and engine ground. ***Connector & terminal*** ***#1 (E5) No. 1 — Engine ground:*** ***#2 (E16) No. 1 — Engine ground:*** ***#3 (E6) No. 1 — Engine ground:*** ***#4 (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector on all cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4	**CHECK FUEL INJECTOR.** Measure the resistance between all fuel injector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **5**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
5	**CHECK POWER SUPPLY LINE.** 1) Turn the ignition switch to ON. 2) Measure the voltage between all fuel injectors and the engine ground. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay connector and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector

	Step	Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from all fuel injectors. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on all cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step **7**.
7	**CHECK FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between all fuel injector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **8**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
8	**CHECK INSTALLATION CONDITION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-61, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(w/o HEV))-56, INSTALLATION, Crankshaft Position Sensor.>	Go to step **9**.
9	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **10**.
10	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Go to step **11**.
11	**CHECK FUEL LEVEL.**	Is the fuel meter indication higher than the “Lower” level?	Go to step **12**.	Refill the fuel so that the fuel meter indication is higher than the “Lower” level, and proceed to the next step. Go to step **12**.

	Step	Check	Yes	No
12	**CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step **14**.	Go to step **13**.
13	**CHECK CAUSE OF MISFIRE.**	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
14	**CHECK AIR INTAKE SYSTEM.**	Is there any fault in air intake system?	Repair the air intake system. NOTE: Check the following items. • Are there air leaks or air suction caused by loose or dislocated nuts and bolts? • Are there cracks or any disconnection of hoses?	Go to step **15**.
15	**CHECK ALL CYLINDERS.**	Is there a fault in any cylinder?	Repair or replace the faulty part of the faulty cylinder. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression • Skipping timing chain teeth	Go to DTC P0171. <Ref. to EN(H4DO w/o HEV)(diag)-246, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0301. <Ref. to EN(H4DO w/o HEV)(diag)-273, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BO:DTC P0301 CYLINDER 1 MISFIRE DETECTED

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO w/o HEV)(diag)-281, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the presence of misfire occurrence. (Revolution fluctuation method)
Monitoring Misfire which influences exhaust deterioration (1.5 times of FTP) and catalyst damage is made obligatory by the law. Misfire affecting these two has two patterns below:
• Intermittent misfire (The same cylinder misfires in random, or different cylinders misfire in random.): FTP 1.5 times misfire
• Every time misfire (The same cylinder misfires every time.): FTP 1.5 times misfire, Catalyst damage misfire
The following detecting methods are adopted for these detection.
1) Intermittent misfire: FTP 1.5 times misfire
• 180° Interval Difference Method (MT: 1,800 rpm or less; CVT: None)
• 360° Interval Difference Method (whole range)
• 720° Interval Difference Method (3,000 rpm or more)
2) Misfire every time: FTP 1.5 times misfire, Catalyst damage misfire
• 360° Interval Difference Method

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Throttle position change during 16 milliseconds	< 24.84 °
Fuel shut-off function	Not in operation
Fuel level	≥ 8.25 L (2.18 US gal, 1.82 Imp gal)
Engine speed	450 rpm — 6450 rpm (CVT model) 500 rpm — 6700 rpm (MT model)
Intake air pressure	≥ Value of Map 1
Battery voltage	≥ 8 V
Fuel volatility	Not extremely low volatility
“Fuel volatility” is the only condition that can be applied within 200 ignitions from the engine start.	
Time elapsed after engine start	≥ 2 crankshaft revolutions
Engine coolant temperature at engine start or	> –7°C (19°F)
Engine coolant temperature at engine start and	≤ –7°C (19°F)
Engine coolant temperature after engine start	≥ 21°C (70°F)

Map 1 (CVT model)

- Normal ignition

		Barometric pressure (kPa (mmHg, inHg))				
		65.3 (490 , 19.3)	73.3 (550 , 21.7)	85.3 (640 , 25.2)	92.1 (691 , 27.2)	101.1 (758 , 29.8)
Engine speed (rpm)	650	19.8 (148.5 , 5.8)	23.8 (178.7 , 7)	23.8 (178.7 , 7)	25 (187.2 , 7.4)	26.2 (196.374512, 7.7)
	1000	19.5 (146.0 , 5.7)	21 (157.6 , 6.2)	21.7 (162.8 , 6.4)	22.4 (167.8 , 6.6)	23.7 (177.45, 7)
	1200	18.8 (140.7 , 5.5)	20.5 (154.0 , 6.1)	20.6 (154.6 , 6.1)	21.5 (161.3 , 6.3)	23.6 (176.69, 7)
	1600	18.9 (142.1 , 5.6)	19.6 (146.8 , 5.8)	20.8 (156.2 , 6.2)	21.5 (161.4 , 6.4)	23.3 (174.40, 6.9)
	2000	18.6 (139.6 , 5.5)	20.7 (155.0 , 6.1)	22.2 (166.5 , 6.6)	23.2 (173.8 , 6.8)	24.9 (187.07, 7.4)
	2400	18.9 (141.6 , 5.6)	20.9 (157.0 , 6.2)	23 (172.4 , 6.8)	23.7 (178.1 , 7)	25.7 (193.02, 7.6)
	2800	19.8 (148.3 , 5.8)	22.4 (167.8 , 6.6)	24.4 (183.0 , 7.2)	24.5 (183.4 , 7.2)	25.7 (192.71, 7.6)
	3000	20.4 (153.3 , 6)	22.8 (171.2 , 6.7)	24.2 (181.9 , 7.2)	25.5 (191.3 , 7.5)	26 (194.85, 7.7)
	3200	21.9 (164.6 , 6.5)	24.3 (182.5 , 7.2)	25.9 (194.4 , 7.7)	27.1 (203.5 , 8)	28.6 (214.53, 8.4)
	3600	23.4 (175.3 , 6.9)	26 (194.8 , 7.7)	27.4 (205.5 , 8.1)	28.2 (211.6 , 8.3)	29.4 (220.48, 8.7)
	4000	25.3 (189.5 , 7.5)	27.3 (204.9 , 8.1)	28.2 (211.6 , 8.3)	29.4 (220.5 , 8.7)	30.5 (228.56, 9)
	4400	26.8 (201.1 , 7.9)	28.9 (216.5 , 8.5)	29.8 (223.2 , 8.8)	30.9 (232.1 , 9.1)	32 (240.16, 9.5)
	4800	28.4 (212.7 , 8.4)	30.4 (228.1 , 9)	31.3 (234.8 , 9.2)	32.5 (243.7 , 9.6)	33.6 (251.75, 9.9)
	5200	29.9 (224.3 , 8.8)	32 (239.7 , 9.4)	32.9 (246.4 , 9.7)	34 (255.3 , 10)	35.1 (263.35, 10.4)
	5600	31.4 (235.9 , 9.3)	33.5 (251.3 , 9.9)	34.4 (258.0 , 10.2)	35.6 (266.9 , 10.5)	36.7 (274.94, 10.8)
	6000	33 (247.5 , 9.7)	35 (262.9 , 10.3)	35.9 (269.6 , 10.6)	37.1 (278.4 , 11)	38.2 (286.54, 11.3)
kPa (mmHg, inHg)						

- Idling ignition

		Barometric pressure (kPa (mmHg, inHg))				
		65.3 (490 , 19.3)	73.3 (550 , 21.7)	85.3 (640 , 25.2)	92.1 (691 , 27.2)	101.1 (758 , 29.8)
Engine speed (rpm)	650	19.8 (148.3 , 5.8)	23.7 (177.9 , 7)	23.8 (178.7 , 7)	25 (187.2 , 7.4)	26.2 (196.374512, 7.7)
	1000	19.3 (144.5 , 5.7)	21 (157.3 , 6.2)	21.7 (162.8 , 6.4)	22.7 (170.4 , 6.7)	23.9 (179.59, 7.1)
	1200	18.8 (141.0 , 5.6)	20.6 (154.9 , 6.1)	21.2 (159.3 , 6.3)	22.6 (169.2 , 6.7)	26.8 (201.10, 7.9)
	1600	18.6 (139.5 , 5.5)	20.1 (150.8 , 5.9)	21.6 (161.9 , 6.4)	22.1 (166.0 , 6.5)	23.6 (176.69, 7)
	2000	18.8 (140.7 , 5.5)	20.7 (155.2 , 6.1)	23.1 (173.5 , 6.8)	23.7 (177.9 , 7)	25.2 (188.90, 7.4)
	2400	18.8 (140.8 , 5.5)	20.6 (154.7 , 6.1)	23.4 (175.2 , 6.9)	24.4 (183.0 , 7.2)	26 (194.70, 7.7)
	2800	20 (150.1 , 5.9)	22 (165.2 , 6.5)	24.4 (183.3 , 7.2)	24.5 (183.7 , 7.2)	25.7 (192.71, 7.6)
	3000	22.6 (169.5 , 6.7)	24 (180.0 , 7.1)	25.5 (191.3 , 7.5)	26 (195.2 , 7.7)	26 (195.15, 7.7)
	3200	23.7 (178.1 , 7)	25.3 (189.7 , 7.5)	27.4 (205.5 , 8.1)	28.2 (211.8 , 8.3)	29.3 (219.57, 8.6)
	3600	24.7 (185.5 , 7.3)	26.3 (197.3 , 7.8)	28.3 (212.2 , 8.4)	29 (217.6 , 8.6)	30.2 (226.43, 8.9)
	4000	25.6 (192.1 , 7.6)	27.3 (205.1 , 8.1)	29.2 (219.1 , 8.6)	29.9 (224.1 , 8.8)	31.1 (232.99, 9.2)
	4400	27.2 (203.7 , 8)	28.9 (216.7 , 8.5)	30.8 (230.7 , 9.1)	31.4 (235.7 , 9.3)	32.6 (244.58, 9.6)
	4800	28.7 (215.3 , 8.5)	30.4 (228.3 , 9)	32.3 (242.3 , 9.5)	33 (247.3 , 9.7)	34.2 (256.18, 10.1)
	5200	30.2 (226.9 , 8.9)	32 (239.8 , 9.4)	33.8 (253.9 , 10)	34.5 (258.9 , 10.2)	35.7 (267.77, 10.5)
	5600	31.8 (238.5 , 9.4)	33.5 (251.4 , 9.9)	35.4 (265.5 , 10.5)	36.1 (270.5 , 10.7)	37.2 (279.37, 11)
	6000	33.3 (250.1 , 9.8)	35.1 (263.0 , 10.4)	36.9 (277.1 , 10.9)	37.6 (282.1 , 11.1)	38.8 (290.96, 11.5)
kPa (mmHg, inHg)						

Map 2 (MT model)

- Normal ignition

		Barometric pressure (kPa (mmHg, inHg))						
		65.3 (490 , 19.3)	73.3 (550 , 21.7)	77.2 (579 , 22.8)	81.1 (608 , 23.9)	84.9 (637 , 25.1)	91.7 (688 , 27.1)	100.5 (754, 29.7)
Engine speed (rpm)	650	19.4 (145.7 , 5.7)	20.3 (152.6 , 6)	21.2 (159.3 , 6.3)	22.1 (166.0 , 6.5)	23 (172.7 , 6.8)	23.4 (175.7 , 6.9)	23.9 (179.05 , 7)
	1000	17.2 (128.9 , 5.1)	17.8 (133.4 , 5.3)	18.6 (139.2 , 5.5)	19.3 (145.1 , 5.7)	20.1 (150.9 , 5.9)	21.1 (158.2 , 6.2)	21.4 (160.52 , 6.3)
	1200	16.1 (120.8 , 4.8)	17 (127.4 , 5)	17.8 (133.5 , 5.3)	18.6 (139.6 , 5.5)	19.4 (145.7 , 5.7)	20.6 (154.6 , 6.1)	20.7 (155.18 , 6.1)
	1600	15.9 (119.6 , 4.7)	17.3 (129.7 , 5.1)	17.9 (134.6 , 5.3)	18.6 (139.6 , 5.5)	19.3 (144.5 , 5.7)	20.6 (154.3 , 6.1)	21 (157.31 , 6.2)
	2000	16.4 (123.0 , 4.8)	17.8 (133.7 , 5.3)	18.4 (138.0 , 5.4)	19 (142.3 , 5.6)	19.5 (146.6 , 5.8)	20.9 (156.4 , 6.2)	21.5 (161.43 , 6.4)
	2400	16.5 (123.7 , 4.9)	17.9 (134.0 , 5.3)	18.5 (138.8 , 5.5)	19.1 (143.6 , 5.7)	19.8 (148.5 , 5.8)	20.9 (156.5 , 6.2)	22 (165.09 , 6.5)
	2800	16.3 (122.5 , 4.8)	18 (134.9 , 5.3)	18.7 (140.4 , 5.5)	19.5 (146.0 , 5.7)	20.2 (151.5 , 6)	20.2 (151.5 , 6)	21.5 (161.43 , 6.4)
	3000	17.6 (131.8 , 5.2)	19.5 (146.5 , 5.8)	20 (149.9 , 5.9)	20.5 (153.4 , 6)	20.9 (156.9 , 6.2)	21.5 (161.4 , 6.4)	23 (172.57 , 6.8)
	3200	18.5 (138.6 , 5.5)	20.6 (154.2 , 6.1)	21 (157.8 , 6.2)	21.5 (161.5 , 6.4)	22 (165.2 , 6.5)	22.8 (171.0 , 6.7)	24.4 (182.71 , 7.2)
	3600	19.8 (148.7 , 5.9)	21.6 (162.1 , 6.4)	22.1 (165.8 , 6.5)	22.6 (169.6 , 6.7)	23.1 (173.4 , 6.8)	23.9 (179.6 , 7.1)	25.4 (190.62 , 7.5)
	4000	20 (149.9 , 5.9)	21.6 (161.9 , 6.4)	22.3 (167.2 , 6.6)	23 (172.5 , 6.8)	23.7 (177.8 , 7)	25.7 (192.7 , 7.6)	26.6 (199.45 , 7.9)
	4400	21.1 (158.5 , 6.2)	21.9 (164.5 , 6.5)	22.6 (169.6 , 6.7)	23.3 (174.7 , 6.9)	24 (179.7 , 7.1)	25.5 (191.2 , 7.5)	26.7 (200.19 , 7.9)
	4800	23 (172.8 , 6.8)	24.3 (182.2 , 7.2)	25.1 (188.3 , 7.4)	25.9 (194.5 , 7.7)	26.7 (200.6 , 7.9)	28 (209.8 , 8.3)	29 (217.86 , 8.6)
	5200	26.1 (195.7 , 7.7)	27.5 (206.2 , 8.1)	28.2 (211.3 , 8.3)	28.9 (216.4 , 8.5)	29.5 (221.5 , 8.7)	30.6 (229.3 , 9)	31.5 (236.15 , 9.3)
	5600	27.7 (207.4 , 8.2)	29.2 (219.3 , 8.6)	29.9 (224.4 , 8.8)	30.6 (229.4 , 9)	31.3 (234.4 , 9.2)	32.4 (242.7 , 9.6)	33.3 (249.71 , 9.8)
	6000	31.9 (239.3 , 9.4)	33.7 (252.4 , 9.9)	34.5 (258.4 , 10.2)	35.3 (264.4 , 10.4)	36.1 (270.4 , 10.6)	37.1 (278.5 , 11)	38 (285.08 , 11.2)
kPa (mmHg, inHg)								

- Idling ignition

		Barometric pressure (kPa (mmHg, inHg))						
		65.3 (490 , 19.3)	73.3 (550 , 21.7)	77.2 (579 , 22.8)	81.1 (608 , 23.9)	84.9 (637 , 25.1)	91.7 (688 , 27.1)	100.5 (754, 29.7)
Engine speed (rpm)	650	19.4 (145.7 , 5.7)	20.3 (152.6 , 6)	21.2 (159.3 , 6.3)	22.1 (166.0 , 6.5)	23 (172.7 , 6.8)	23.4 (175.7 , 6.9)	23.9 (179.05 , 7)
	1000	17.7 (133.1 , 5.2)	19.2 (144.2 , 5.7)	20.3 (152.4 , 6)	21.4 (160.6 , 6.3)	22.5 (168.8 , 6.6)	22.5 (169.0 , 6.7)	23.4 (175.85 , 6.9)
	1200	17.5 (131.2 , 5.2)	19 (142.8 , 5.6)	20.9 (156.9 , 6.2)	22.8 (170.9 , 6.7)	24.7 (184.9 , 7.3)	25.8 (193.9 , 7.6)	27 (202.40 , 8)
	1600	18.2 (136.7 , 5.4)	18.8 (141.1 , 5.6)	19.9 (149.1 , 5.9)	20.9 (157.0 , 6.2)	22 (164.9 , 6.5)	25.3 (189.9 , 7.5)	26.5 (198.43 , 7.8)
	2000	17.6 (132.1 , 5.2)	19 (142.2 , 5.6)	19.9 (149.5 , 5.9)	20.9 (156.8 , 6.2)	21.9 (164.0 , 6.5)	23.7 (177.7 , 7)	24.7 (185.15 , 7.3)
	2400	17.1 (128.5 , 5.1)	19 (142.8 , 5.6)	20.3 (151.9 , 6)	21.5 (161.0 , 6.3)	22.7 (170.1 , 6.7)	25 (187.8 , 7.4)	26 (194.85 , 7.7)
	2800	18.6 (139.6 , 5.5)	18.6 (139.6 , 5.5)	20.2 (151.3 , 6)	21.7 (163.0 , 6.4)	23.3 (174.7 , 6.9)	24.9 (186.5 , 7.3)	25.8 (193.63 , 7.6)
	3000	24.8 (185.8 , 7.3)	26.2 (196.8 , 7.7)	27.4 (205.5 , 8.1)	28.6 (214.2 , 8.4)	29.7 (222.9 , 8.8)	31.7 (237.7 , 9.4)	32.9 (246.42 , 9.7)
	3200	27 (202.2 , 8)	28.4 (212.8 , 8.4)	29.7 (223.1 , 8.8)	31.1 (233.4 , 9.2)	32.5 (243.7 , 9.6)	34 (255.3 , 10.1)	35.5 (266.32 , 10.5)
	3600	28.4 (212.7 , 8.4)	29.9 (224.2 , 8.8)	31.2 (234.3 , 9.2)	32.6 (244.4 , 9.6)	33.9 (254.6 , 10)	35.7 (267.7 , 10.5)	36.8 (276.07 , 10.9)
	4000	27.3 (205.1 , 8.1)	29.7 (222.5 , 8.8)	31.2 (233.9 , 9.2)	32.7 (245.3 , 9.7)	34.2 (256.7 , 10.1)	35.8 (268.3 , 10.6)	36.1 (270.40 , 10.6)
	4400	25.7 (192.4 , 7.6)	26.5 (199.0 , 7.8)	27.6 (206.9 , 8.1)	28.7 (214.9 , 8.5)	29.7 (222.9 , 8.8)	31 (232.2 , 9.1)	31.1 (233.14 , 9.2)
	4800	26.1 (195.9 , 7.7)	27.1 (203.1 , 8)	28.1 (210.9 , 8.3)	29.2 (218.7 , 8.6)	30.2 (226.6 , 8.9)	31.2 (234.2 , 9.2)	31.9 (239.53 , 9.4)
	5200	27.2 (203.6 , 8)	28.6 (214.6 , 8.5)	29.4 (220.7 , 8.7)	30.2 (226.8 , 8.9)	31.1 (232.9 , 9.2)	32.1 (240.7 , 9.5)	32.8 (245.92 , 9.7)
	5600	28.4 (213.1 , 8.4)	30.1 (225.6 , 8.9)	31.1 (233.3 , 9.2)	32.1 (241.0 , 9.5)	33.1 (248.6 , 9.8)	33.7 (252.6 , 9.9)	34.3 (257.49 , 10.1)
	6000	32.6 (244.2 , 9.6)	34 (255.3 , 10.1)	35 (262.5 , 10.3)	35.9 (269.6 , 10.6)	36.9 (276.7 , 10.9)	37.7 (282.9 , 11.1)	38.5 (288.59 , 11.4)
kPa (mmHg, inHg)								

3. GENERAL DRIVING CYCLE

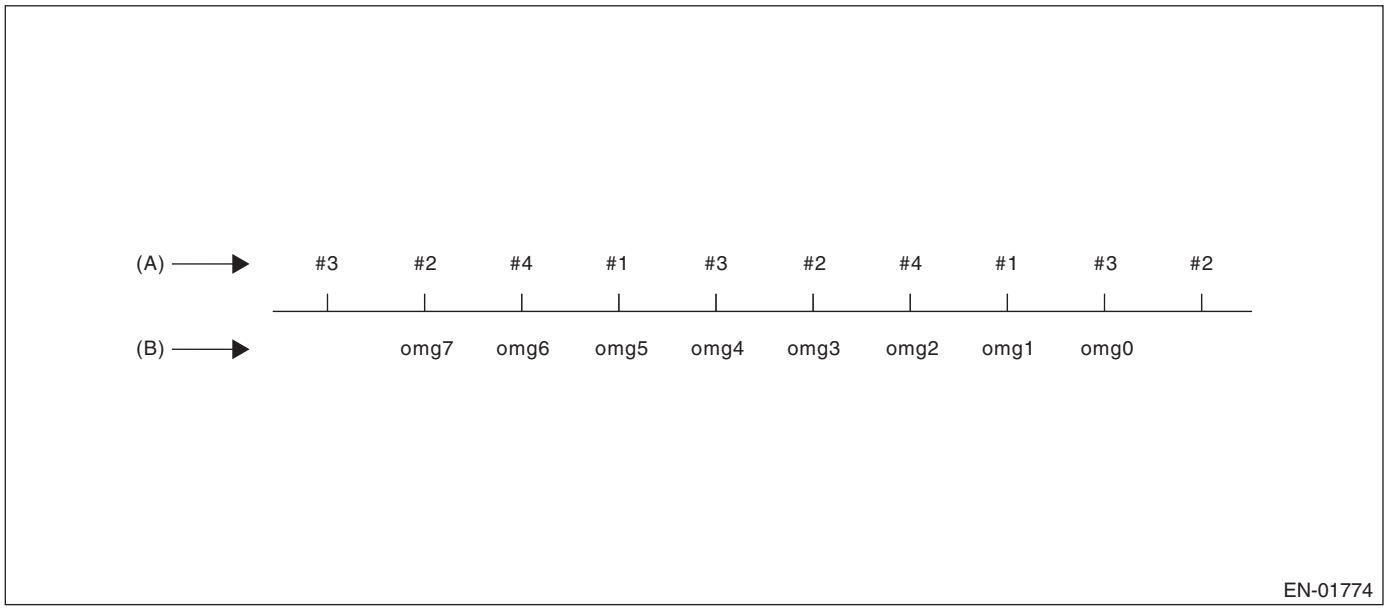
- If conditions are met, it is possible to detect the misfires from idling to high engine speed. However, in case any engine load or breakage occurs, perform with the engine at idle.
- Perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

When a misfire occurs, the engine speed will decrease and the crankshaft position speed will change. Calculate the interval difference value (diagnostic value) from crankshaft position speed by the following formula, and judge whether a misfire is occurring or not comparing the calculated result with judgment value. Count the number of misfires, if the misfire ratio is higher during 1000 revs. or 200 revs., judge corresponding cylinders as NG.

Diagnostic value calculation (Calculate from angle speed) →	Misfire detection every single ignition (Compare diagnostic value with judgment value) →	NG judgment (Misfire occurrence judgment required by the law) (Compare number of misfire with judgment value)
	• 180° Interval Difference Method • 360° Interval Difference Method • 720° Interval Difference Method	• FTP 1.5 times misfire NG judgment • NG judgment for catalyst-damaging misfire

As shown in the following figure, pick a cylinder as the standard and name it omg 0. And the former crankshaft position speed is named omg 1, the second former crankshaft position speed is named omg 2, the third is named omg 3, etc.

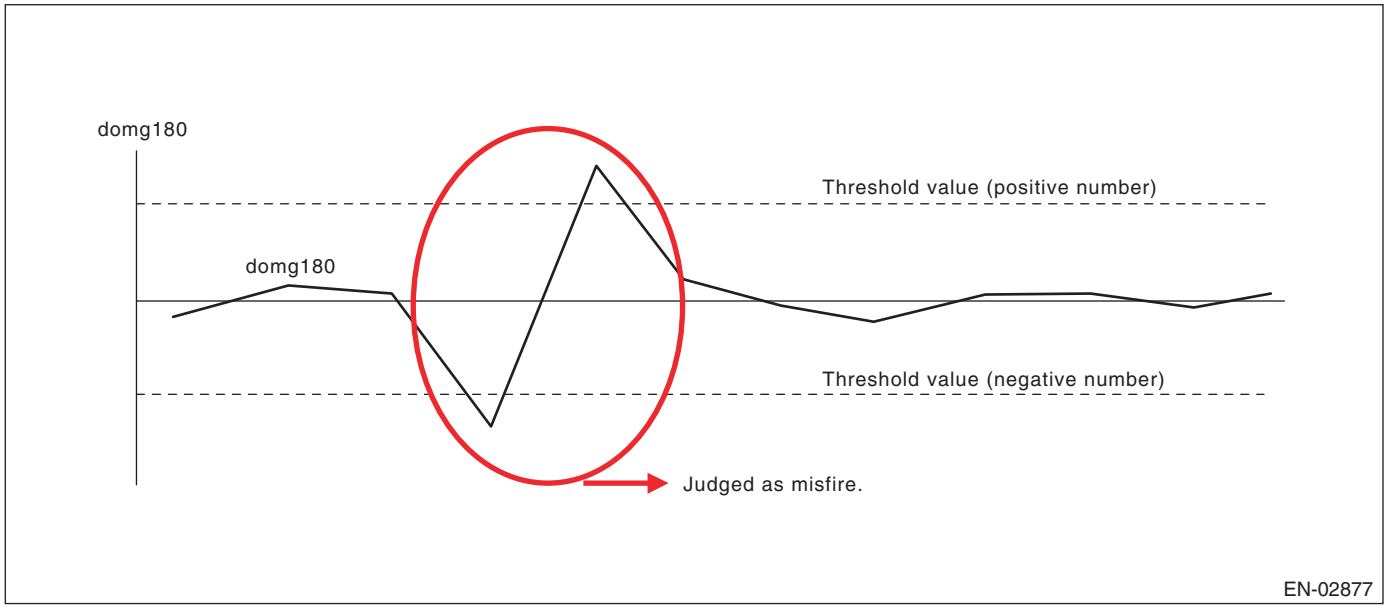


(A) Ignition order

(B) Crankshaft position speed

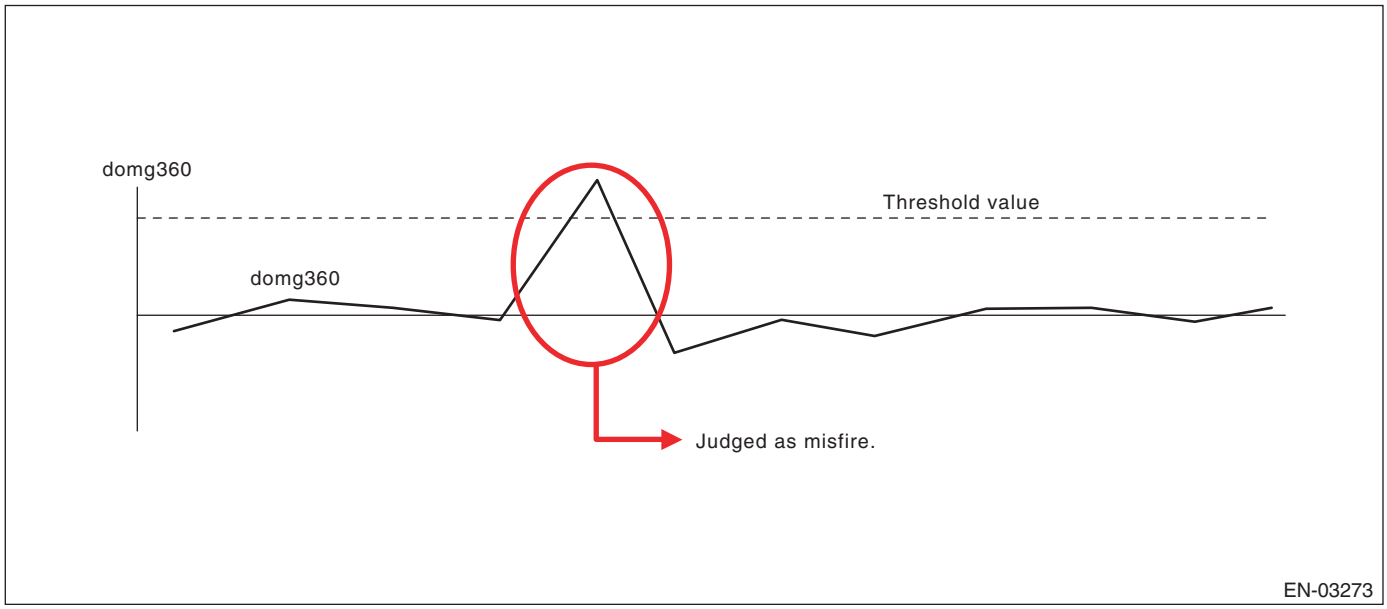
180° Interval Difference Method

Diagnostic value	domg 180 = (omg 1 – omg 0) – (omg 5 – omg 1)/4
Judge as a misfire in the following cases. • domg 180 > judgment value of positive side • domg 180 ≤ judgment value of negative side (Diagnostic value before 180° CA)	



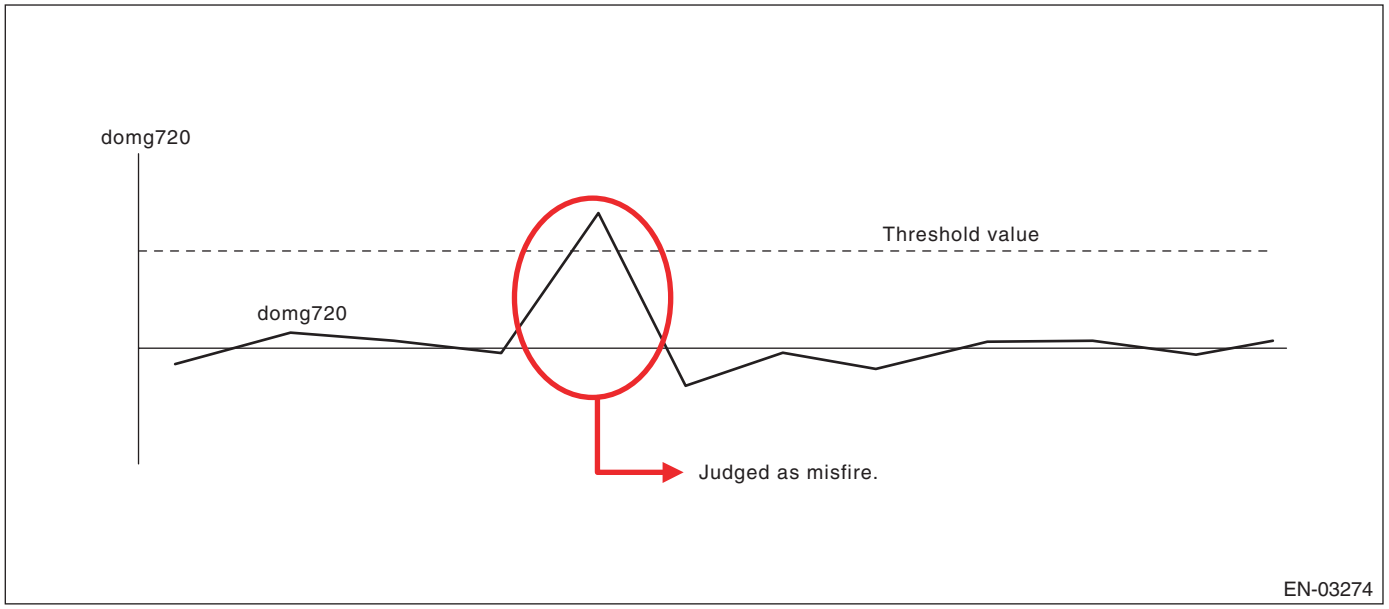
360° Interval Difference Method

Diagnostic value	domg 360 = (omg 1 – omg 0) – (omg 3 – omg 2)
Misfire judgment	domg 360 > Judgment value → Judge as misfire



720° Interval Difference Method

Diagnostic value	domg 720 = (omg 1 – omg 0) – (omg 5 – omg 4)
Misfire judgment	domg 720 > Judgment value → Judge as misfire



- **FTP 1.5 times misfire (Misfire occurrence level which influences exhaust gas)**

Judgment Value (Judge that malfunction occurs when the misfire ratio is high in 1000 engine revs.)

Malfunction Criteria	Threshold Value
FTP emission diagnostic value	≥ 24 × 100/2000% in 1000 revs. (CVT model) ≥ 17 × 100/2000% in 1000 revs. (MT model)

Time Needed for Diagnosis: 1000 engine revs.
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

- **Catalyst-damaging misfire (misfire occurrence level that will damage catalyst)**

Judgment Value

Malfunction Criteria	Threshold Value
Catalyst-damaging misfire diagnostic value	≥ Value from Map 2

Map 2

		Intake air (g(oz)/rev)									
		0.2 (0.01)	0.3 (0.01)	0.4 (0.01)	0.5 (0.02)	0.6 (0.02)	0.7 (0.02)	0.8 (0.03)	0.9 (0.03)	1 (0.04)	1.1 (0.04)
Engine speed (rpm)	700	90	90	90	90	80	80	80	80	80	80
	1000	90	90	90	90	80	80	57	44	80	80
	1200	90	90	90	90	90	80	67	57	57	57
	1600	90	90	80	80	80	57	44	36	44	44
	2000	90	80	80	80	80	57	44	27	44	44
	2400	90	80	80	80	80	57	31	36	36	36
	2800	80	80	80	80	57	44	44	36	36	36
	3200	80	80	57	57	44	36	36	36	36	36
	3600	57	57	57	44	44	44	44	44	44	44
	4000	57	57	57	36	36	36	44	44	44	44
	4400	44	44	44	44	44	44	44	44	44	44
	4800	44	44	44	36	36	36	36	36	36	36
	5200	36	36	36	36	36	36	36	44	44	44
	5600	27	27	27	31	36	36	36	44	44	44
	6000	44	44	44	44	44	44	44	44	36	36
	6400	24	24	24	21	21	21	25	31	31	31

Time Needed for Diagnosis: 200 engine revs.
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BP:DTC P0302 CYLINDER 2 MISFIRE DETECTED

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO w/o HEV)(diag)-281, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0301. <Ref. to EN(H4DO w/o HEV)(diag)-273, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BQ:DTC P0303 CYLINDER 3 MISFIRE DETECTED

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO w/o HEV)(diag)-281, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0301. <Ref. to EN(H4DO w/o HEV)(diag)-273, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BR:DTC P0304 CYLINDER 4 MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)

TROUBLE SYMPTOM:

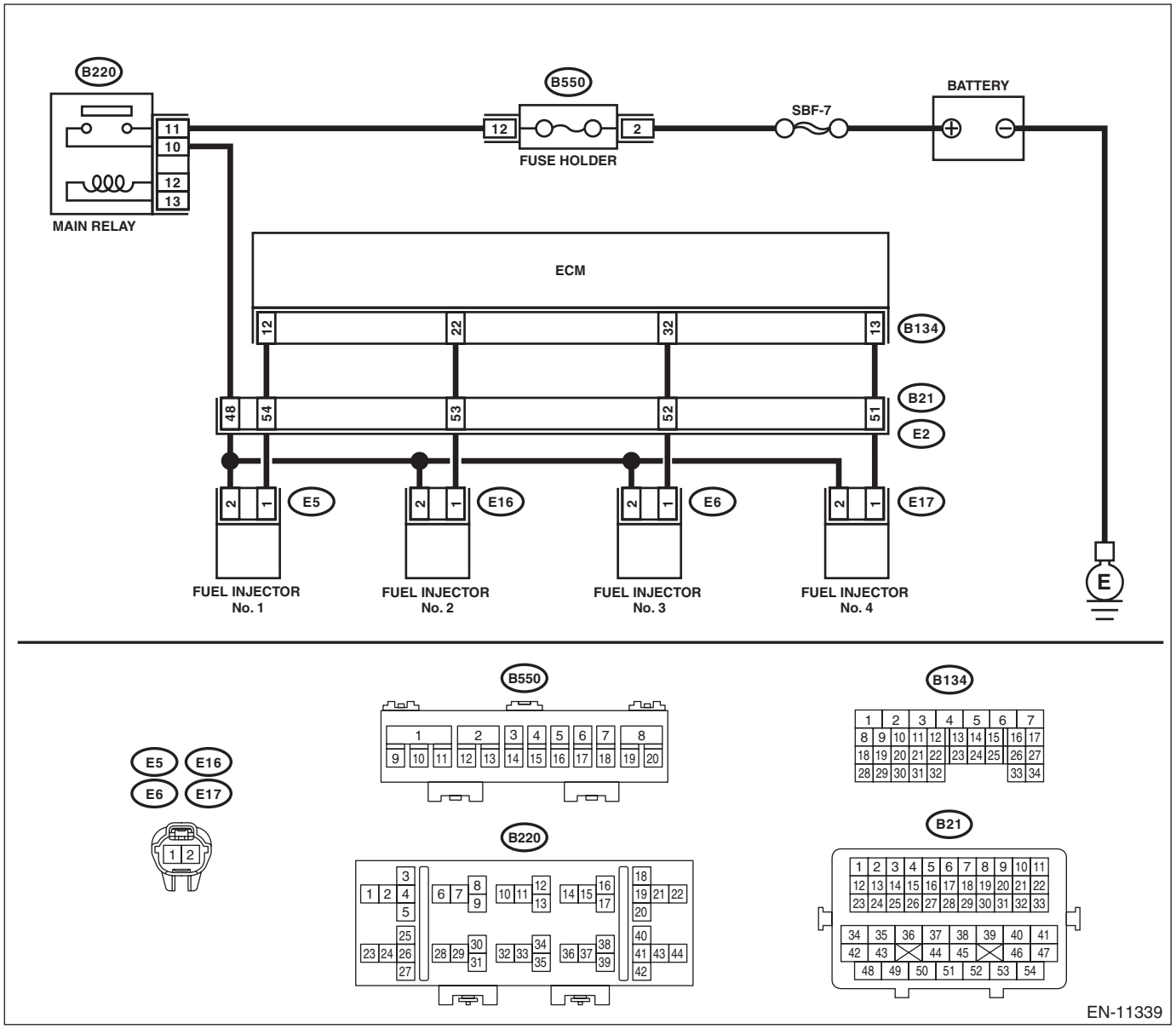
- Engine stall
- Improper idling
- Rough driving

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 1 — Engine ground:*** ***#2 (E16) No. 1 — Engine ground:*** ***#3 (E6) No. 1 — Engine ground:*** ***#4 (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4	**CHECK FUEL INJECTOR.** Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **5**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
5	**CHECK POWER SUPPLY LINE.** 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay connector and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector

	Step	Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step **7**.
7	**CHECK FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **8**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
8	**CHECK INSTALLATION CONDITION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-61, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(w/o HEV))-56, INSTALLATION, Crankshaft Position Sensor.>	Go to step **9**.
9	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **10**.
10	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Go to step **11**.
11	**CHECK FUEL LEVEL.**	Is the fuel meter indication higher than the “Lower” level?	Go to step **12**.	Refill the fuel so that the fuel meter indication is higher than the “Lower” level, and proceed to the next step. Go to step **12**.

	Step	Check	Yes	No
12	**CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step **14**.	Go to step **13**.
13	**CHECK CAUSE OF MISFIRE.**	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
14	**CHECK AIR INTAKE SYSTEM.**	Is there any fault in air intake system?	Repair the air intake system. NOTE: Check the following items. • Are there air leaks or air suction caused by loose or dislocated nuts and bolts? • Are there cracks or any disconnection of hoses?	Go to step **15**.
15	**CHECK CYLINDER.**	Is there any fault in the cylinder?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression • Skipping timing chain teeth	Go to DTC P0171. <Ref. to EN(H4DO w/o HEV)(diag)-246, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

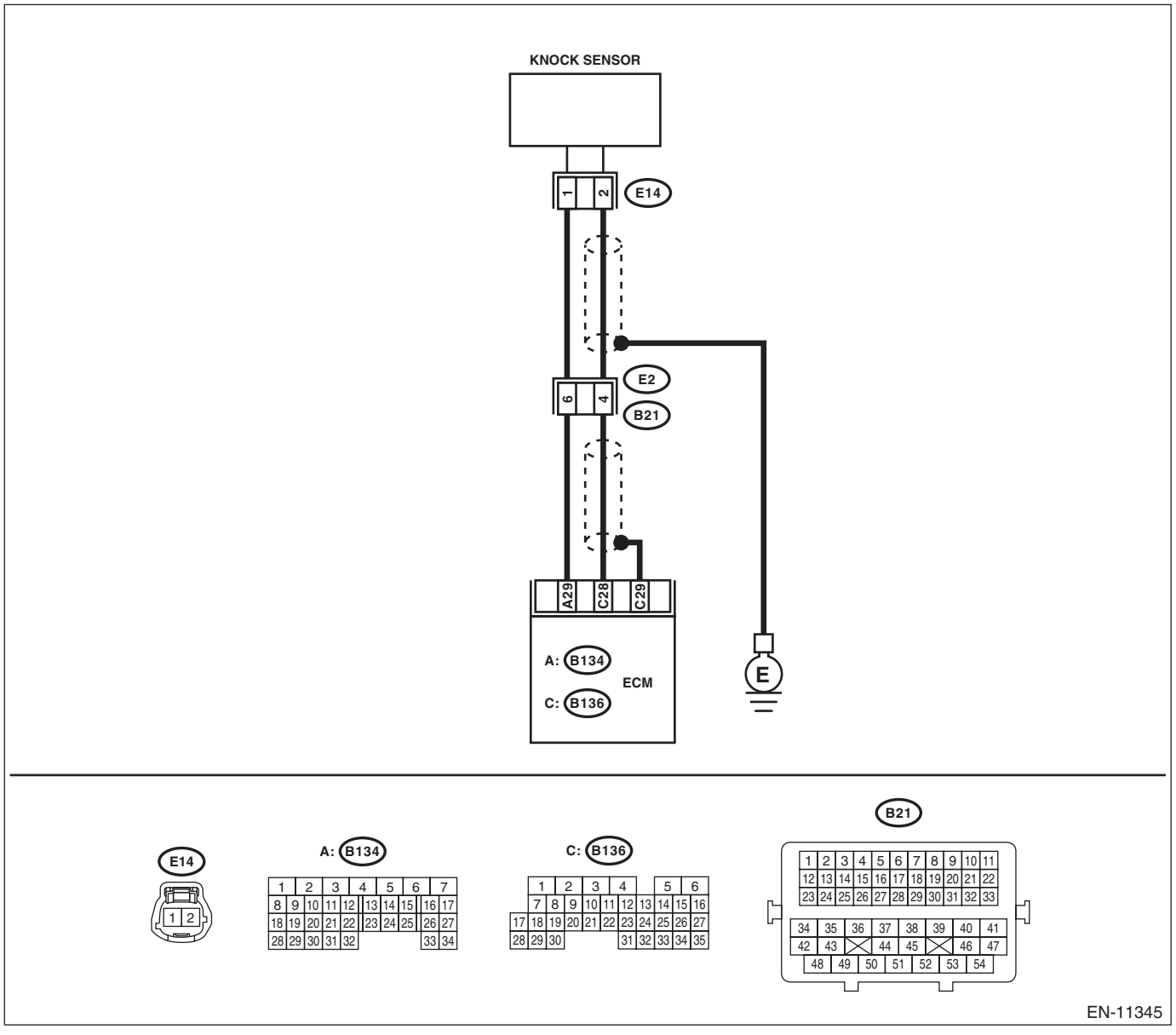
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0301. <Ref. to EN(H4DO w/o HEV)(diag)-273, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BS:DTC P0327 KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT LOW BANK 1 OR SINGLE SENSOR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Poor driving performance
- Knocking occurs

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

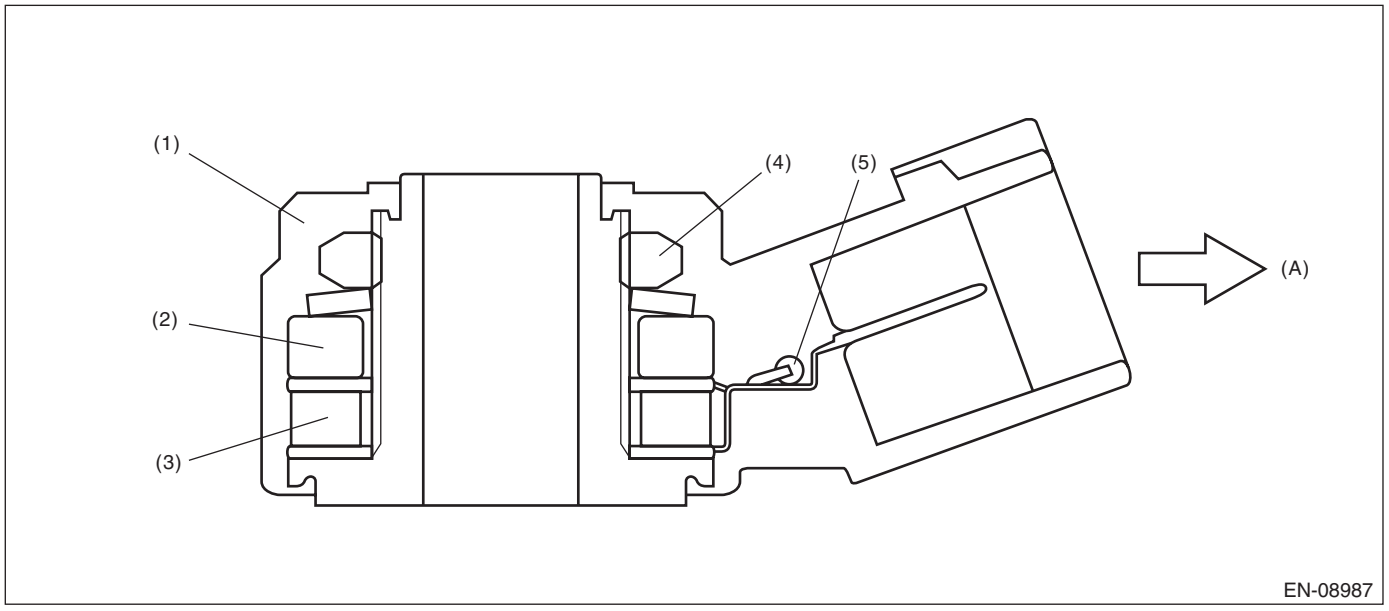


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND KNOCK SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B136) No. 28 — (B134) No. 29:***	Is the resistance less than 500 kΩ?	Go to step **2**.	Go to step **3**.
2	**CHECK KNOCK SENSOR.** 1) Disconnect the connector from the knock sensor. 2) Measure the resistance between knock sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 500 kΩ?	Replace the knock sensor. <Ref. to FU(H4DO(w/o HEV))-68, Knock Sensor.>	Repair the short circuit to ground in harness between ECM connector and knock sensor connector. NOTE: The harness between both connectors are shielded. Remove the shield and repair the short circuit of harness.
3	**CHECK INPUT SIGNAL OF ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 28 (+) — Chassis ground (–):***	Is the voltage 2 V or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the short circuit to ground in harness between ECM connector and knock sensor connector. NOTE: The harness between both connectors are shielded. Remove the shield and repair the short circuit of harness.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of knock sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) To knock sensor harness

(1) Case
(2) Weight
(3) Piezoelectric element
(4) Nut
(5) Resistance

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

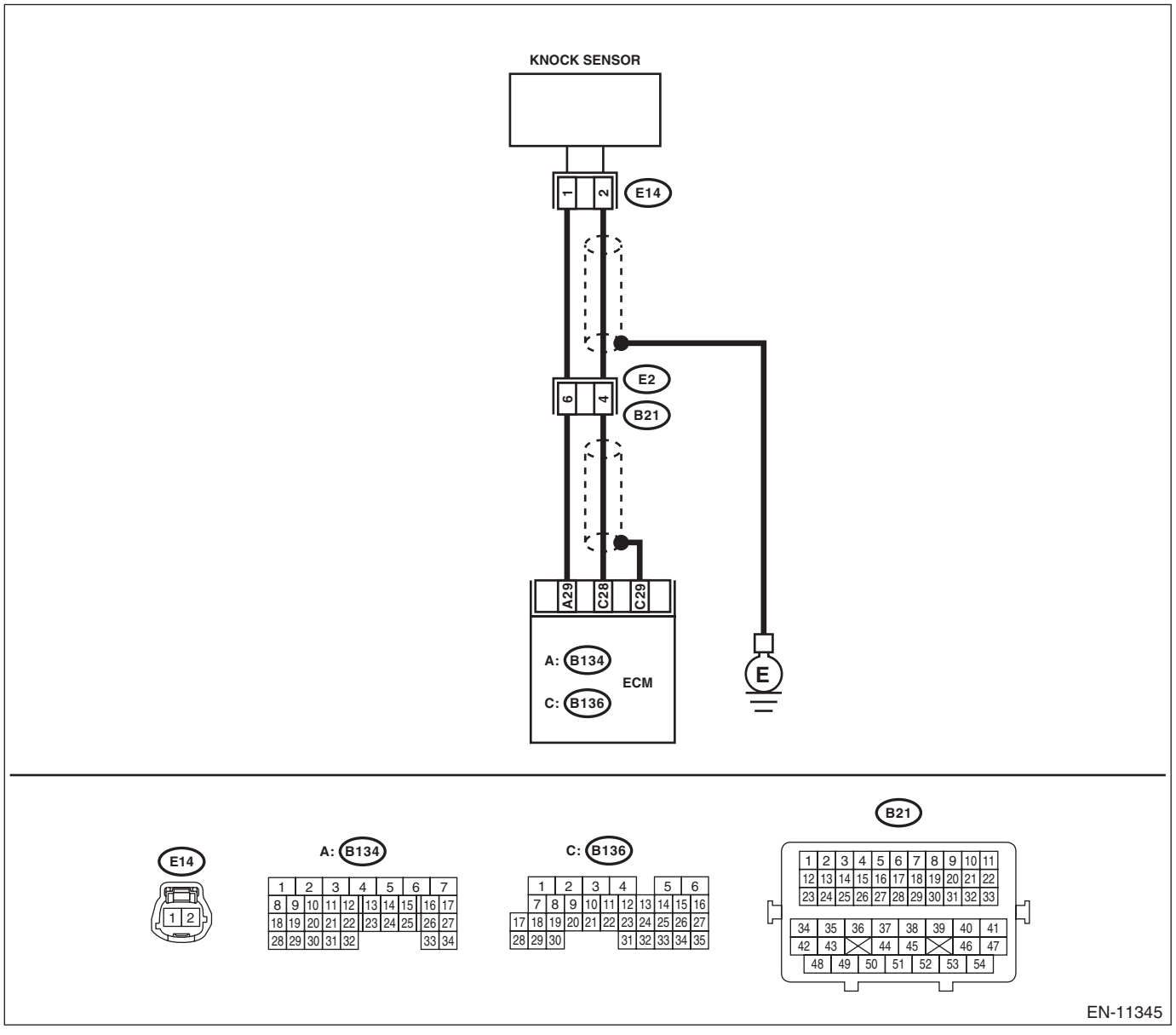
Malfunction Criteria	Threshold Value
Output voltage	< 0.154 V

Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BT:DTC P0328 KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT HIGH BANK 1 OR SINGLE SENSOR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Poor driving performance
- Knocking occurs

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

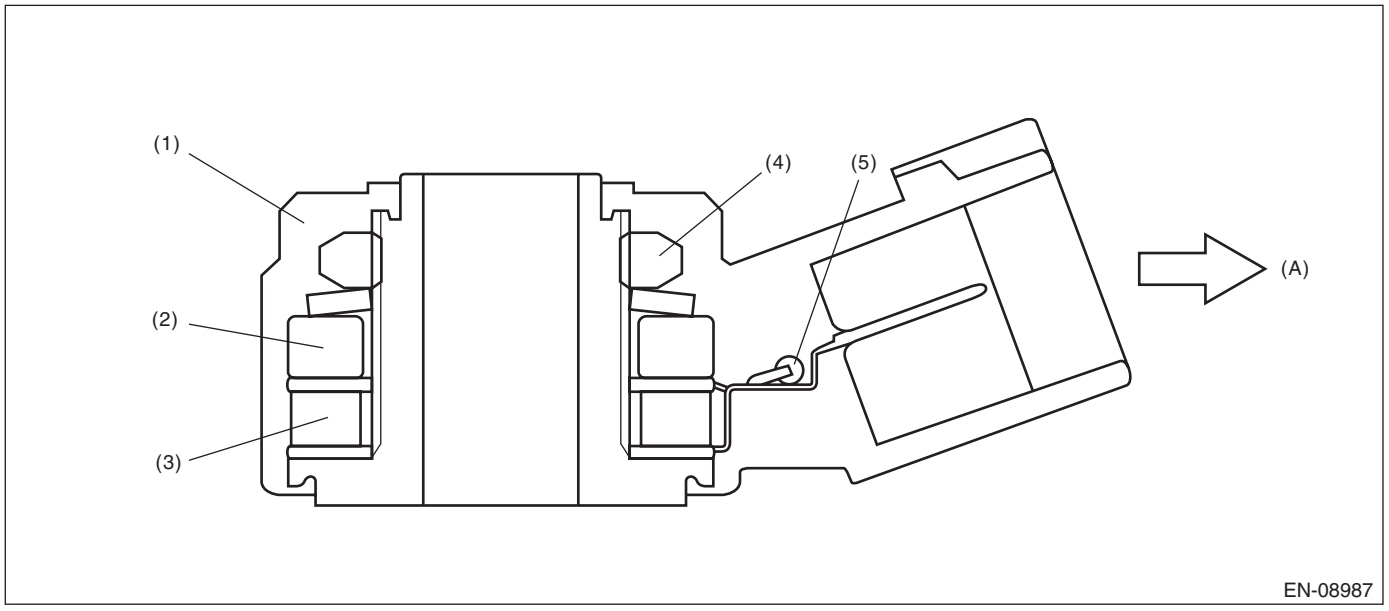


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND KNOCK SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B136) No. 28 — (B134) No. 29:***	Is the resistance 600 kΩ or more?	Go to step **2**.	Repair the poor contact of ECM connector.
2	**CHECK KNOCK SENSOR.** 1) Disconnect the connector from the knock sensor. 2) Measure the resistance between knock sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 600 kΩ or more?	Replace the knock sensor. <Ref. to FU(H4DO(w/o HEV))-68, Knock Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and knock sensor connector • Poor contact of knock sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of knock sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) To knock sensor harness

(1) Case
(2) Weight
(3) Piezoelectric element
(4) Nut
(5) Resistance

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.838 V

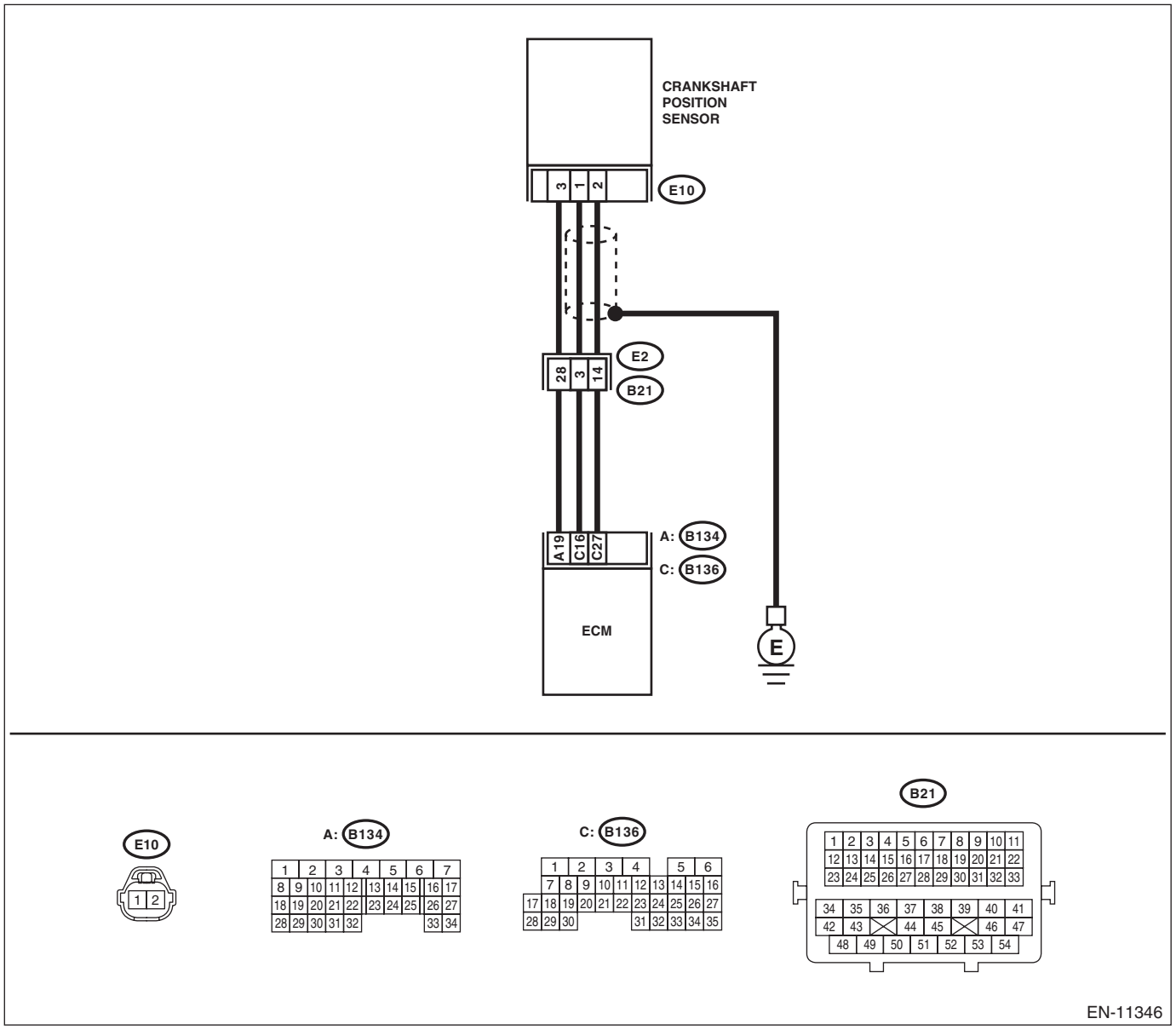
Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BU:DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Engine stall
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



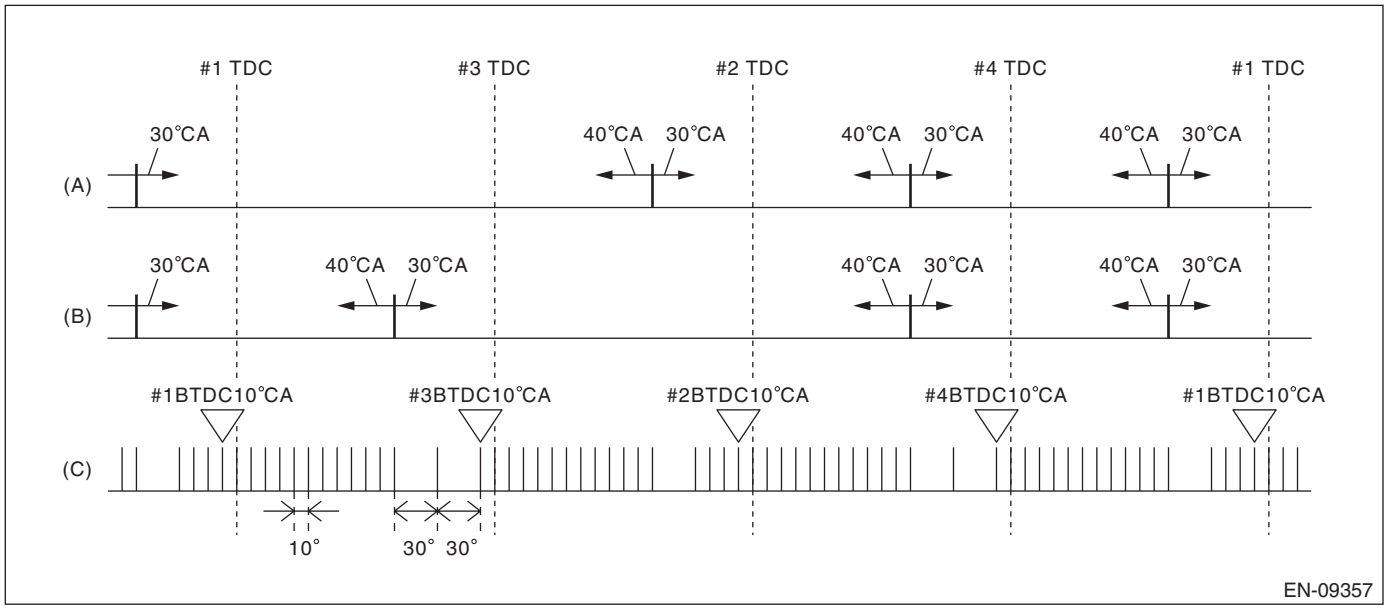
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	Step	Check	Yes	No
1	**CHECK INSTALLATION CONDITION OF CRANKSHAFT POSITION SENSOR.**	Is the crankshaft position sensor installation bolt tightened securely?	Go to step **2**.	Tighten the crankshaft position sensor installation bolt securely. <Ref. to FU(H4DO(w/o HEV))-56, INSTALLATION, Crankshaft Position Sensor.>
2	**CHECK CRANKSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Remove the crankshaft position sensor. 3) Measure the resistance between terminals of crankshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Go to step **3**.	Replace the crankshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-55, Crankshaft Position Sensor.>
3	**CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and crankshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 16 — (E10) No. 1:*** ***(B136) No. 27 — (E10) No. 2:***	Is the resistance less than 1 Ω?	Repair the poor contact of ECM and crankshaft position sensor connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and crankshaft position sensor connector • Poor contact of coupling connector

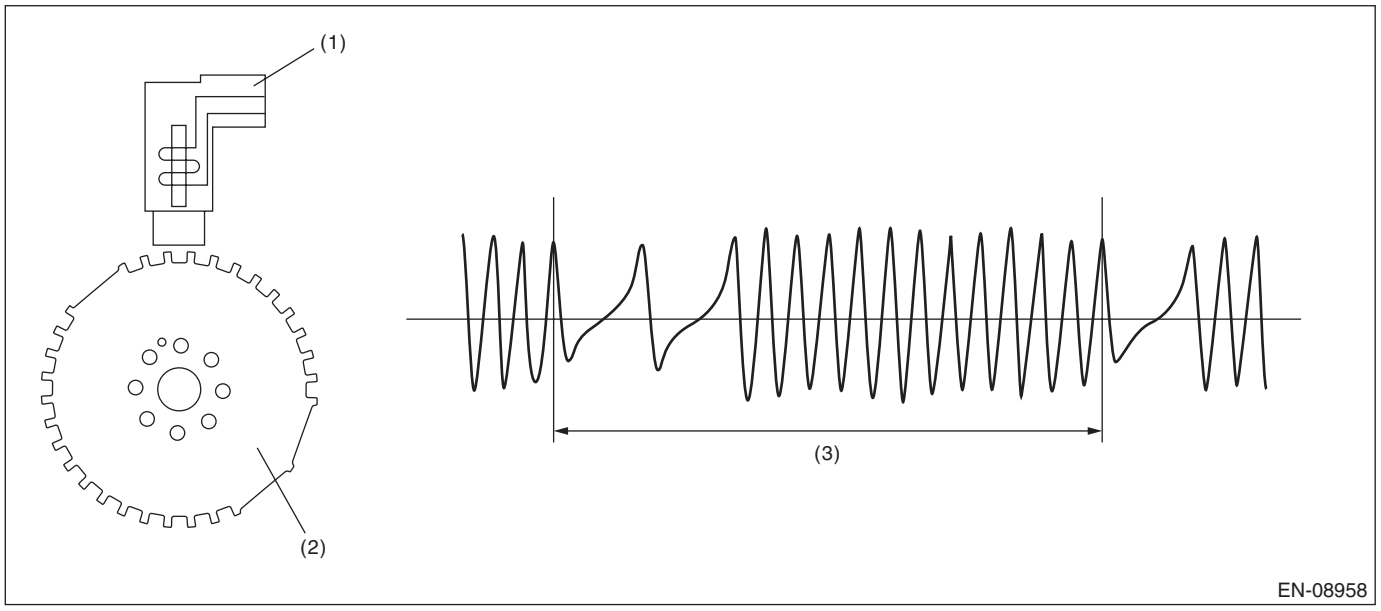
1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the crankshaft position sensor.
Judge as NG when the crank signal is not input even though the starter was rotated.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH) (B) Camshaft signal (LH) (C) Crankshaft signal



(1) Crankshaft position sensor (2) Crankshaft position sensor plate (3) Crankshaft half-turn

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Crankshaft position sensor signal	Not detected

Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BV:DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stall
- Failure of engine to start

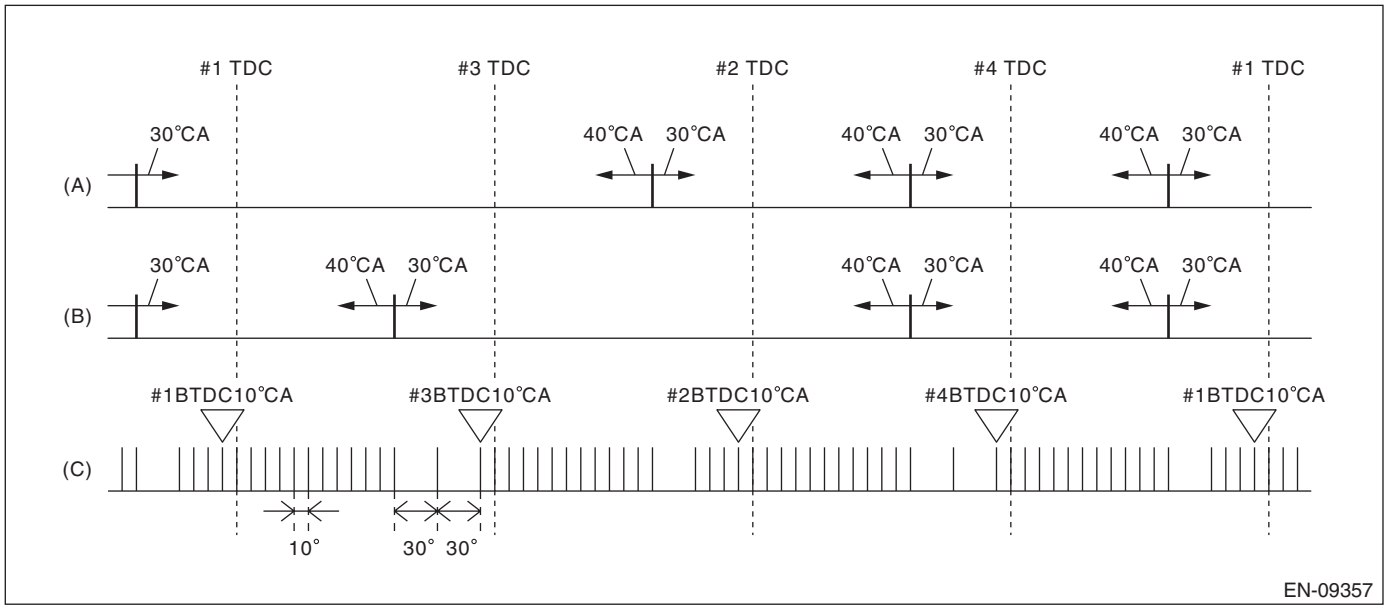
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.** Turn the ignition switch to OFF.	Is the crankshaft position sensor installation bolt tightened securely?	Go to step **2**.	Tighten the crankshaft position sensor installation bolt securely. <Ref. to FU(H4DO(w/o HEV))-56, INSTALLATION, Crankshaft Position Sensor.>
2	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is there crack or damage in the crankshaft position sensor plate teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **3**.
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Replace the crankshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-55, Crankshaft Position Sensor.>

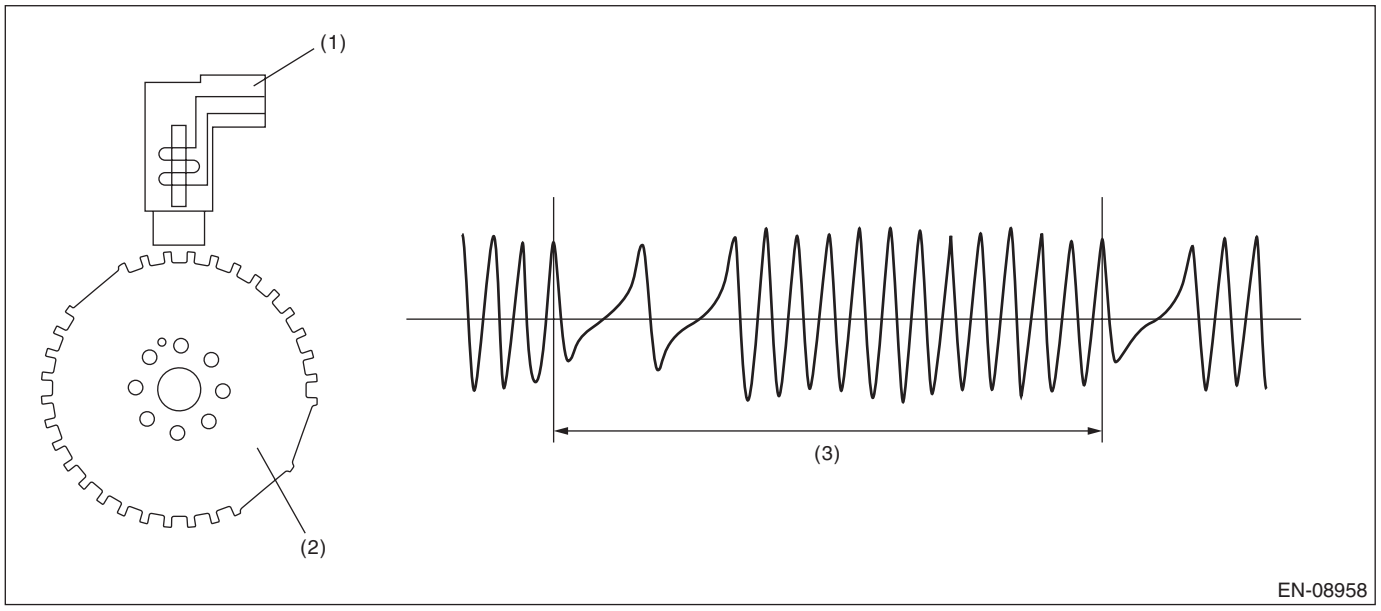
1. OUTLINE OF DIAGNOSIS

Detect for faults in crankshaft position sensor output properties.
Judge as NG when there is a problem in the number of crankshaft signals for every revolution of crankshaft.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH) (B) Camshaft signal (LH) (C) Crankshaft signal



(1) Crankshaft position sensor (2) Crankshaft position sensor plate (3) Crankshaft half-turn

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

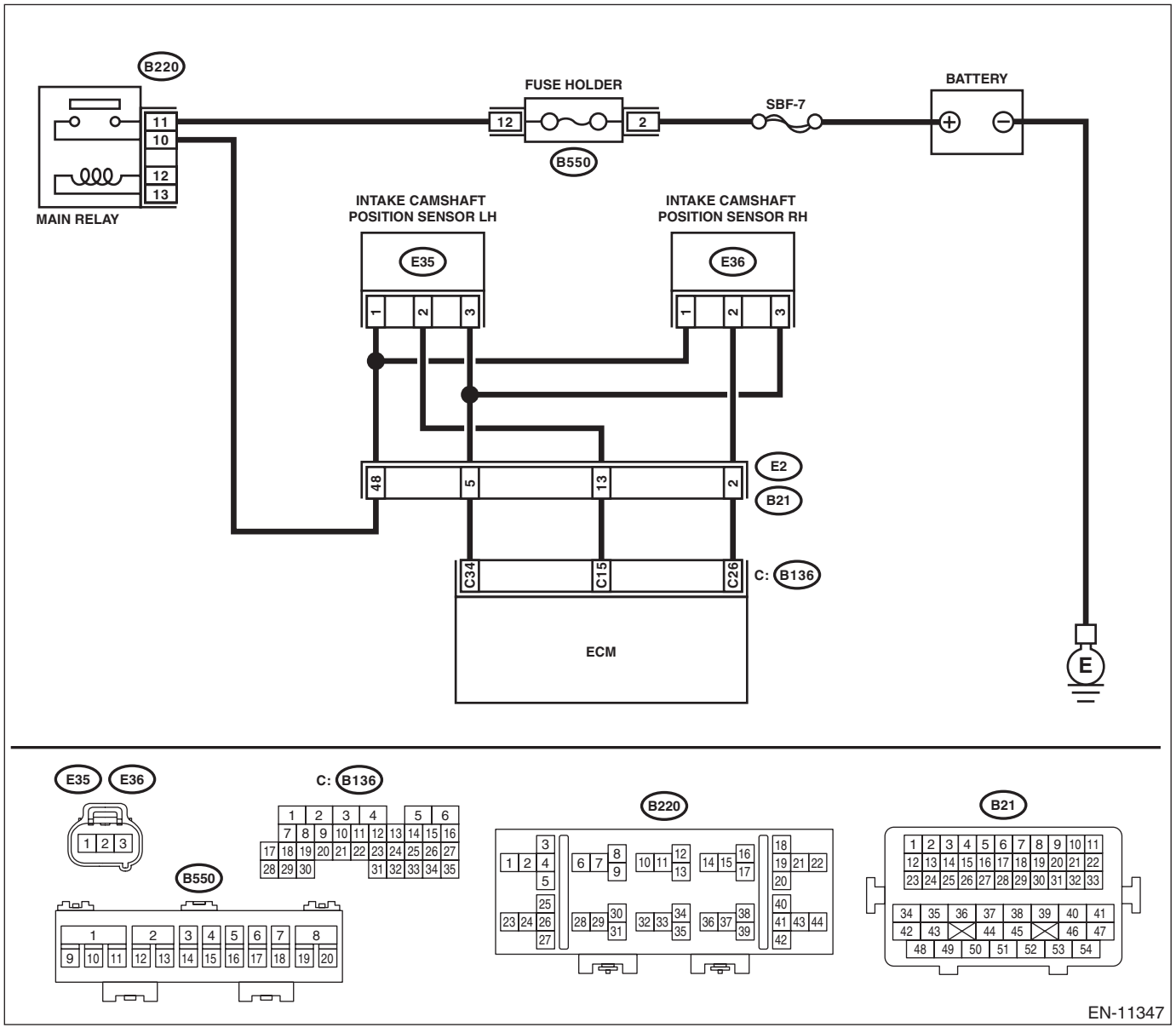
Malfunction Criteria	Threshold Value
Amount of crank sensor signal during 1 rev of crankshaft	Not = 30

Time Needed for Diagnosis: 10 engine revs. engine revs.
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BW:DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine stall
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

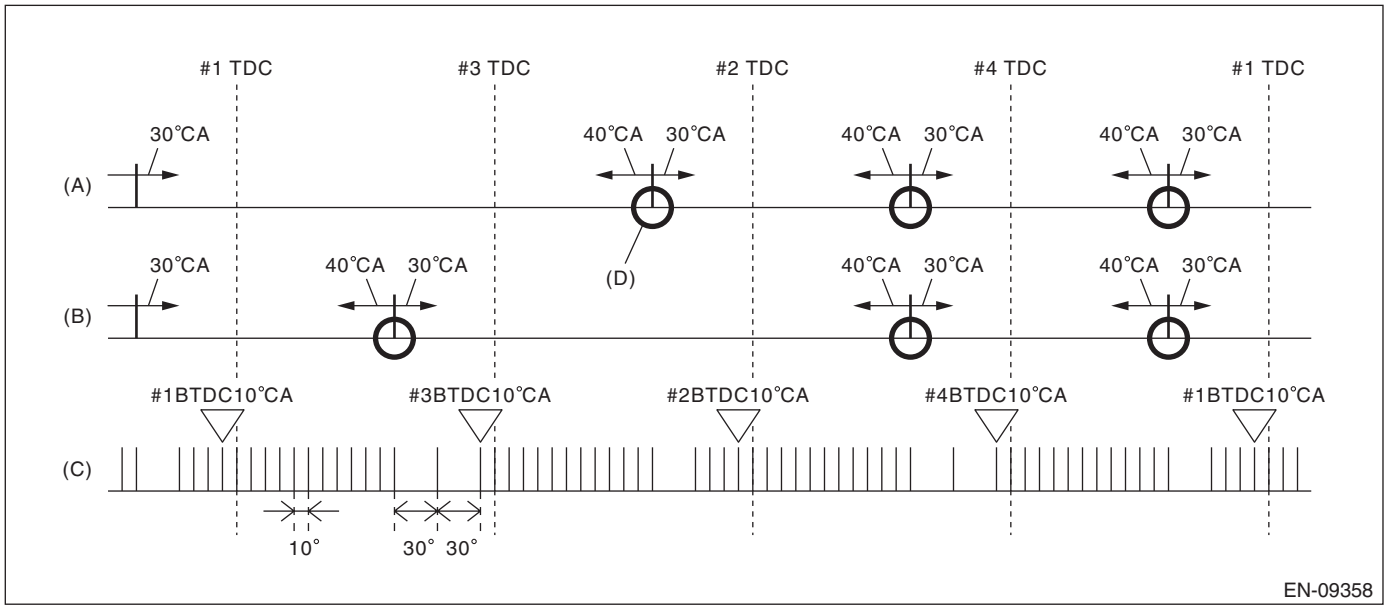


	Step	Check	Yes	No
1	**CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E36) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 26 — (E36) No. 2:*** ***(B136) No. 34 — (E36) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and camshaft position sensor connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E36) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E36) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step **5**.
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten the camshaft position sensor installation bolt securely.
6	**CHECK CAMSHAFT POSITION SENSOR.** Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO w/o HEV)(diag)-20, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-59, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the camshaft position sensor.
When there is no camshaft position signal input continuously, judge as NG.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)
(B) Camshaft signal (LH)
(C) Crankshaft signal
(D) Camshaft position signal: When normal, there will be 3 camshaft position signals for every 2 crankshaft revolutions.

3. EXECUTION CONDITION

Diagnosis 1

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V

Diagnosis 2

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Elapsed time after starting the engine	≥ 200 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Diagnosis 1

Judge as NG when no input of camshaft position sensor signal in TDC remains for 10 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
Number of intake camshaft position sensor pulses during cranking	= 0

Time Needed for Diagnosis: TDC × 10 time(s)

Diagnosis 2

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Number of intake camshaft position sensor pulses during 0.5 crankshaft rev.	= 0

Time Needed for Diagnosis: 3000 ms

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

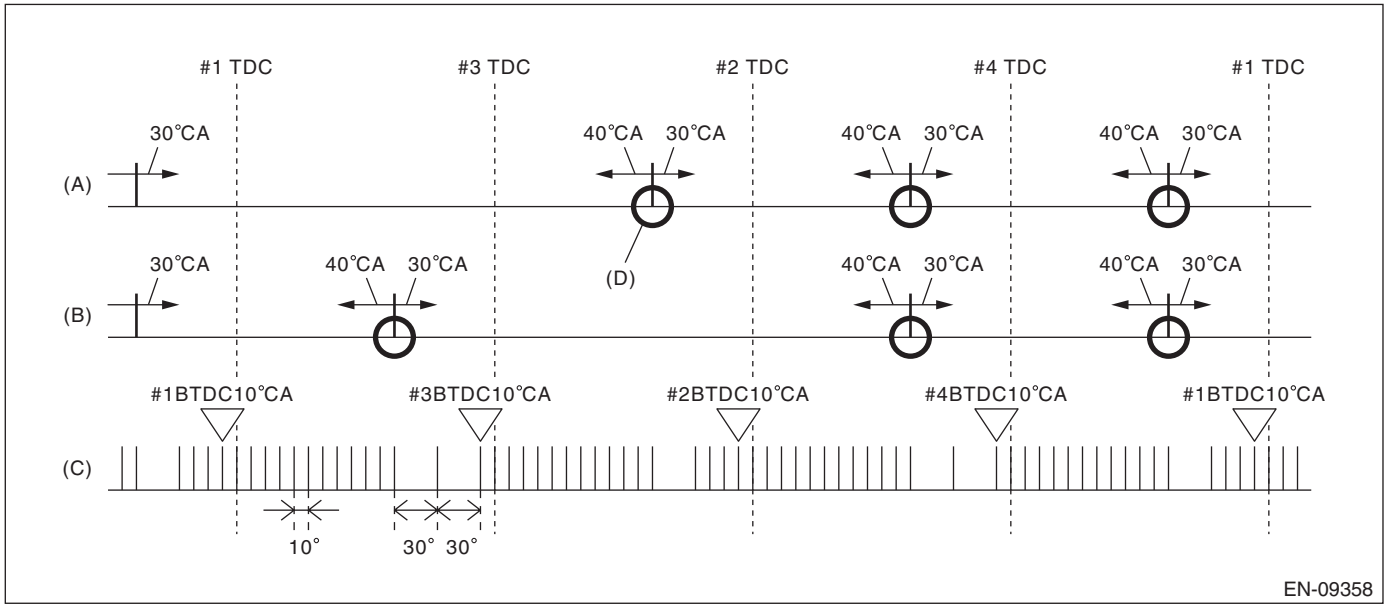
BX:DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR

NOTE:
For the diagnostic procedure, refer to DTC P0340. <Ref. to EN(H4DO w/o HEV)(diag)-298, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of camshaft position sensor property.
Judge as NG when the number of camshaft signals remains abnormal.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)
(B) Camshaft signal (LH)
(C) Crankshaft signal
(D) Camshaft position signal: When normal, there will be 3 camshaft position signals for every 2 crankshaft revolutions.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Elapsed time after starting the engine	≥ 200 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the status where the number of camshaft position sensor signal in two crankshaft revolutions is other than 3 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
Amount of camshaft sensor signal during 2 revs of crankshaft	≠ 3 time(s)

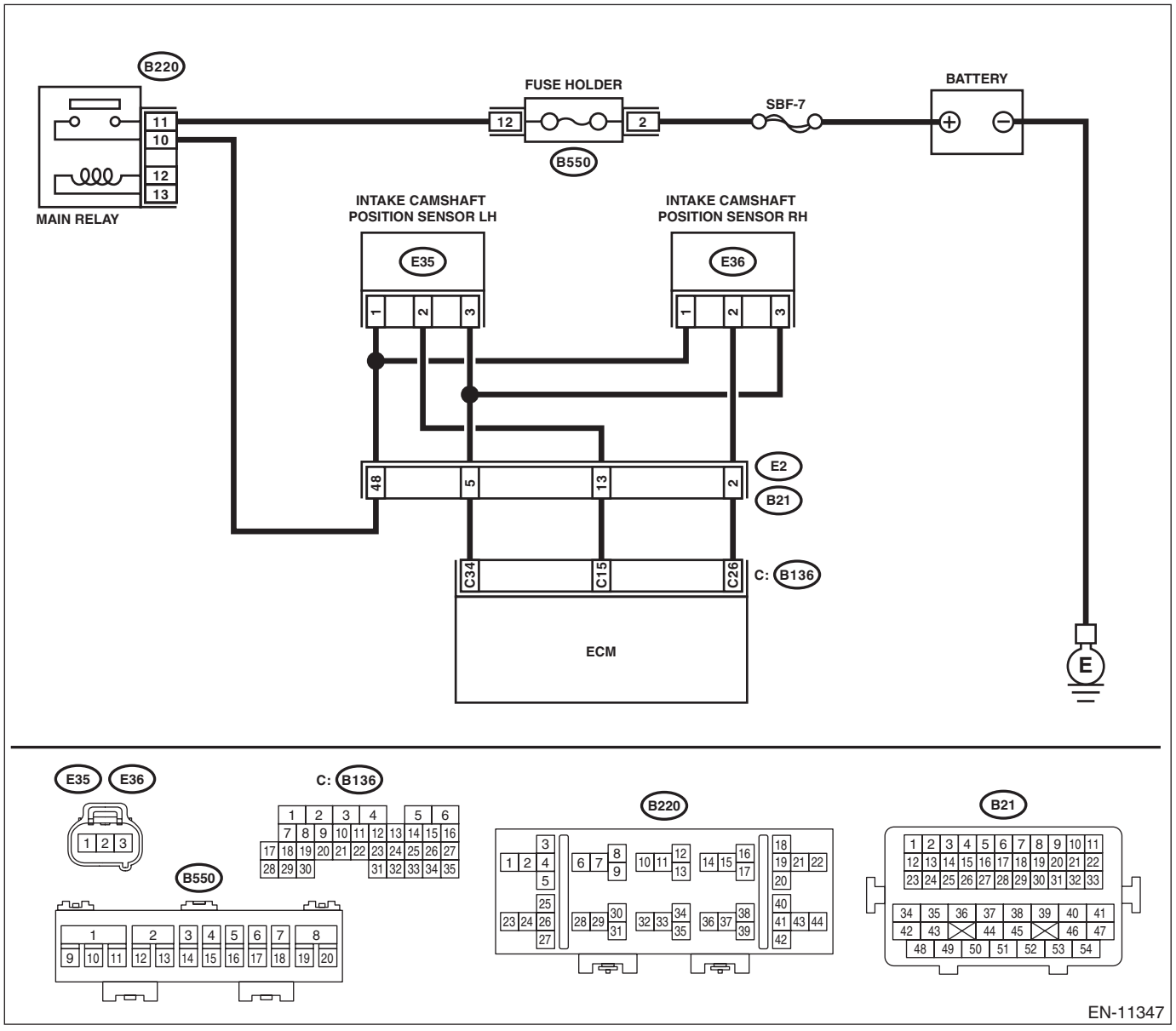
Time Needed for Diagnosis: Two engine revs. × 4 time(s)
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BY:DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Engine stall
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E35) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 15 — (E35) No. 2:*** ***(B136) No. 34 — (E35) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and camshaft position sensor connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E35) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E35) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step **5**.
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten the camshaft position sensor installation bolt securely.
6	**CHECK CAMSHAFT POSITION SENSOR.** Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO w/o HEV)(diag)-20, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-59, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0340. <Ref. to EN(H4DO w/o HEV)(diag)-298, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BZ:DTC P0346 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 2

NOTE:
For the diagnostic procedure, refer to DTC P0345. <Ref. to EN(H4DO w/o HEV)(diag)-303, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0341. <Ref. to EN(H4DO w/o HEV)(diag)-302, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

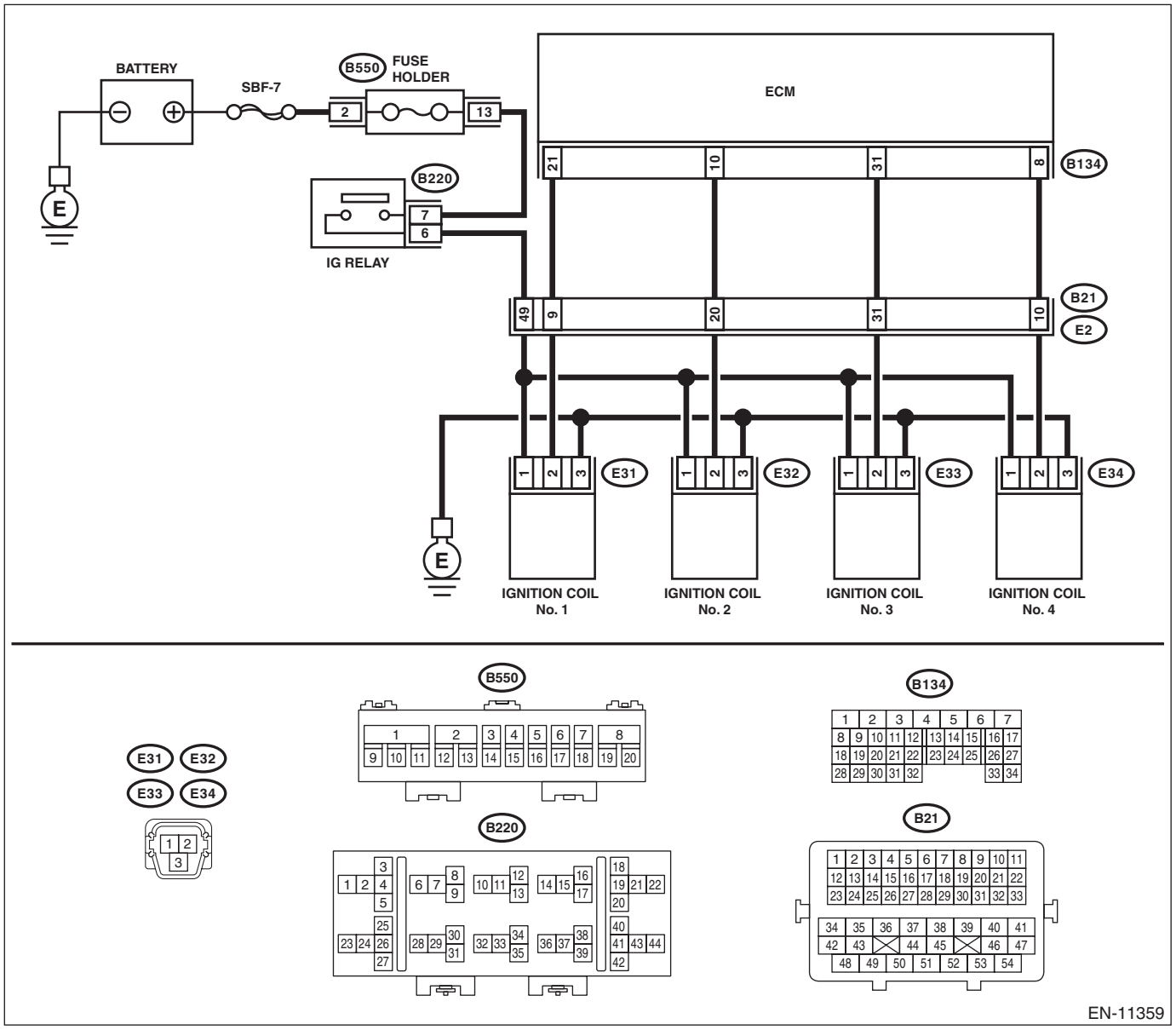
CA:DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN

DTC DETECTING CONDITION:
Immediately at fault recognition

TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK IGNITION COIL POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil. 3) Turn the ignition switch to ON. 4) Measure the voltage between ignition coil connector and engine ground. ***Connector & terminal*** ***DTC P0351; (E31) No. 1 (+) — Engine ground (–):*** ***DTC P0352; (E32) No. 1 (+) — Engine ground (–):*** ***DTC P0353; (E33) No. 1 (+) — Engine ground (–):*** ***DTC P0354; (E34) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open or short to ground in harness of power supply circuit • Blown out of fuse • Poor contact of IG relay connector • Poor contact of coupling connector • Faulty IG relay
2	**CHECK HARNESS OF IGNITION COIL GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between ignition coil connector and engine ground. ***Connector & terminal*** ***DTC P0351; (E31) No. 3 — Engine ground:*** ***DTC P0352; (E32) No. 3 — Engine ground:*** ***DTC P0353; (E33) No. 3 — Engine ground:*** ***DTC P0354; (E34) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the open circuit in harness between ignition coil connector and engine grounding terminal.
3	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ignition coil connector and engine ground. ***Connector & terminal*** ***DTC P0351; (E31) No. 2 — Engine ground:*** ***DTC P0352; (E32) No. 2 — Engine ground:*** ***DTC P0353; (E33) No. 2 — Engine ground:*** ***DTC P0354; (E34) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the ground short circuit of harness between ECM connector and ignition coil connector.
4	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.** Measure the resistance of harness between ECM connector and ignition coil connector. ***Connector & terminal*** ***DTC P0351; (B134) No. 21 — (E31) No. 2:*** ***DTC P0352; (B134) No. 10 — (E32) No. 2:*** ***DTC P0353; (B134) No. 31 — (E33) No. 2:*** ***DTC P0354; (B134) No. 8 — (E34) No. 2:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and the ignition coil connector • Poor contact of coupling connector
5	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Go to step **6**.
6	**CHECK SPARK PLUG CONDITION.** 1) Remove the spark plug of the corresponding cylinder. <Ref. to IG(H4DO(w/o HEV))-4, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H4DO(w/o HEV))-7, INSPECTION, Spark Plug.>	Is the spark plug condition normal?	Replace the ignition coil. <Ref. to IG(H4DO(w/o HEV))-12, Ignition Coil.>	Replace the spark plug. <Ref. to IG(H4DO(w/o HEV))-4, Spark Plug.>

1. OUTLINE OF DIAGNOSIS

Based on the self-diagnostic result of the ignition coil driving IC, judge the ignition coil driving circuit as normal or abnormal.
The ignition coil driving IC detects “no ignition” status as a malfunction.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 1 s
Engine speed	> 500 rpm

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition driving IC information	Trouble

Time Needed for Diagnosis: 2560 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CB:DTC P0352 IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN

NOTE:
For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO w/o HEV)(diag)-306, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0351. <Ref. to EN(H4DO w/o HEV)(diag)-306, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CC:DTC P0353 IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN

NOTE:
For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO w/o HEV)(diag)-306, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0351. <Ref. to EN(H4DO w/o HEV)(diag)-306, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CD:DTC P0354 IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN

NOTE:
For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO w/o HEV)(diag)-306, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

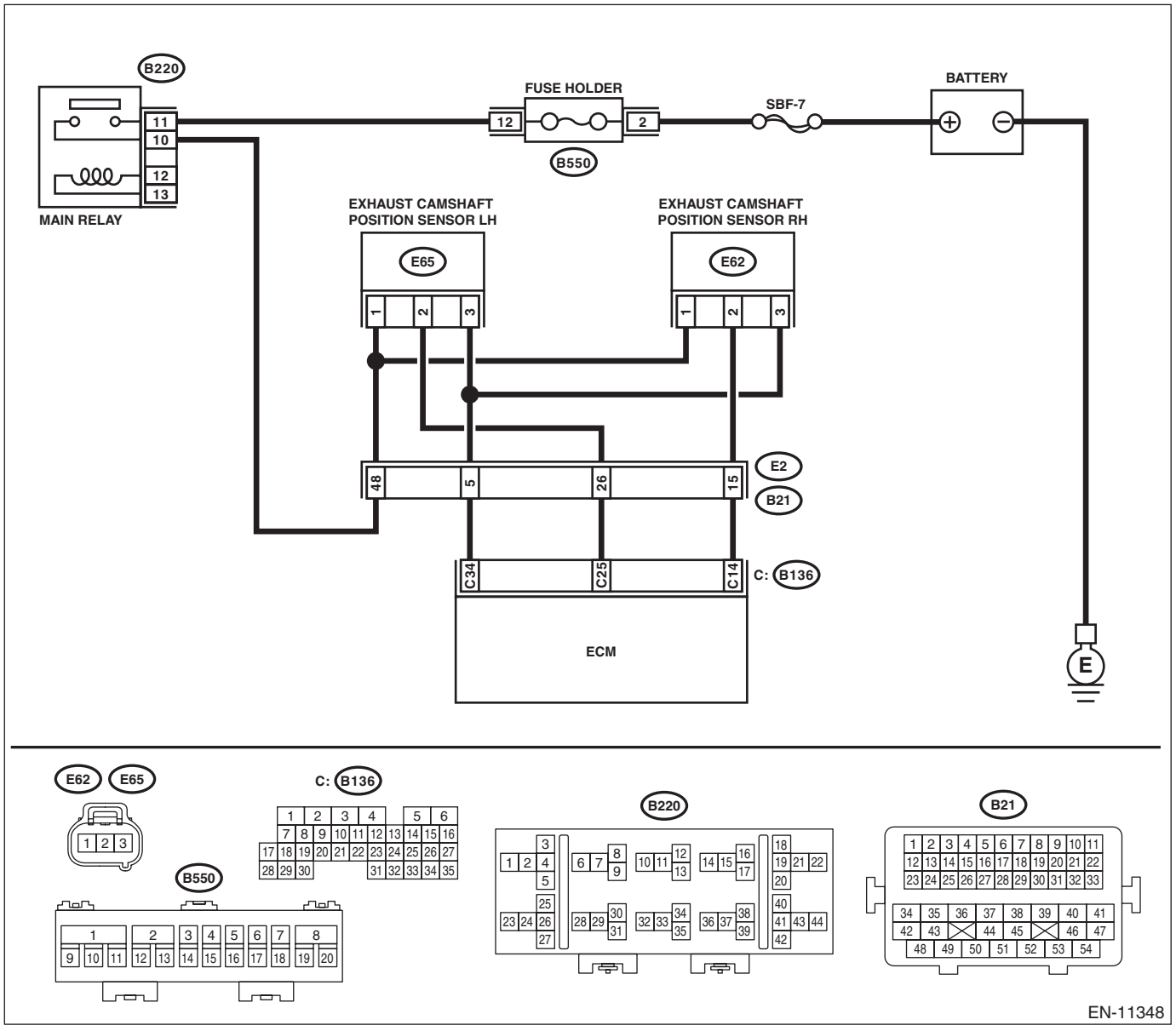
NOTE:
For the detection standard, refer to DTC P0351. <Ref. to EN(H4DO w/o HEV)(diag)-306, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CE:DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Engine stall
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

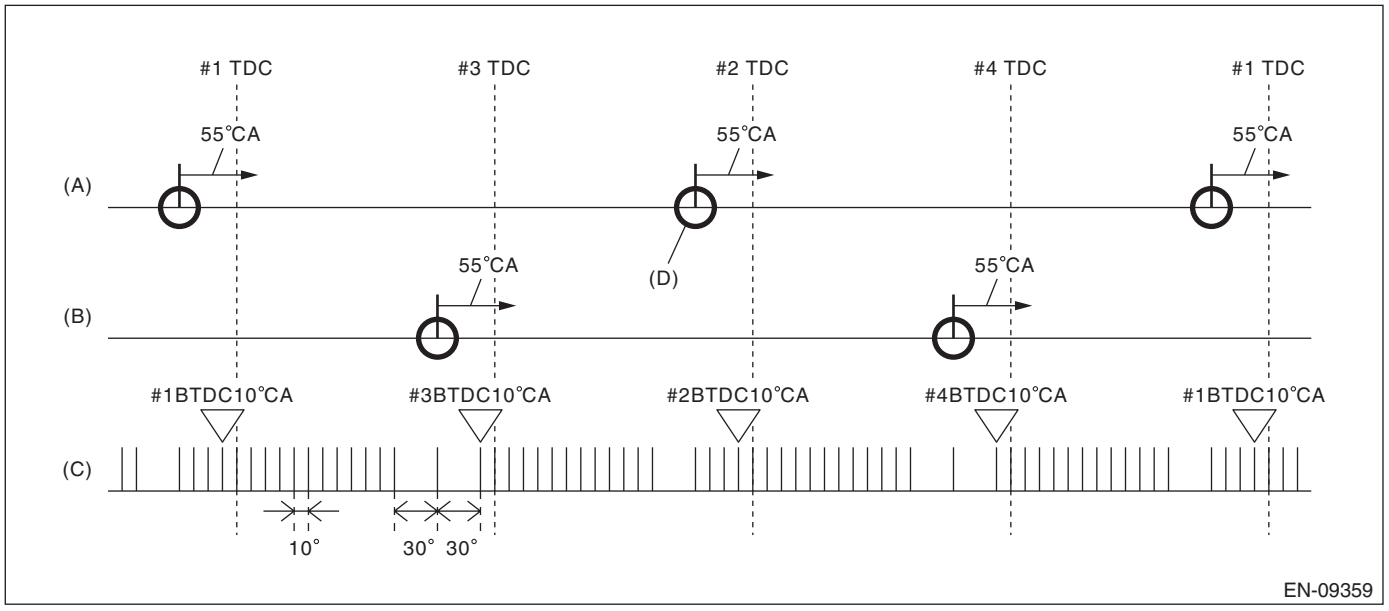


	Step	Check	Yes	No
1	**CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E62) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 14 — (E62) No. 2:*** ***(B136) No. 34 — (E62) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and camshaft position sensor connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E62) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E62) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step **5**.
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten the camshaft position sensor installation bolt securely.
6	**CHECK CAMSHAFT POSITION SENSOR.** Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO w/o HEV)(diag)-20, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-59, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the camshaft position sensor.
When there is no camshaft position signal input continuously, judge as NG.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)
(B) Camshaft signal (LH)
(C) Crankshaft signal
(D) Camshaft position signal: When normal, there will be 2 camshaft position signals for every 2 crankshaft revolutions.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 200 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when no input of camshaft position sensor signal in TDC remains for 10 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
Number of exhaust camshaft position sensor pulse during 0.5 crankshaft rev.	= 0

Time Needed for Diagnosis: TDC × 10 time(s)
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

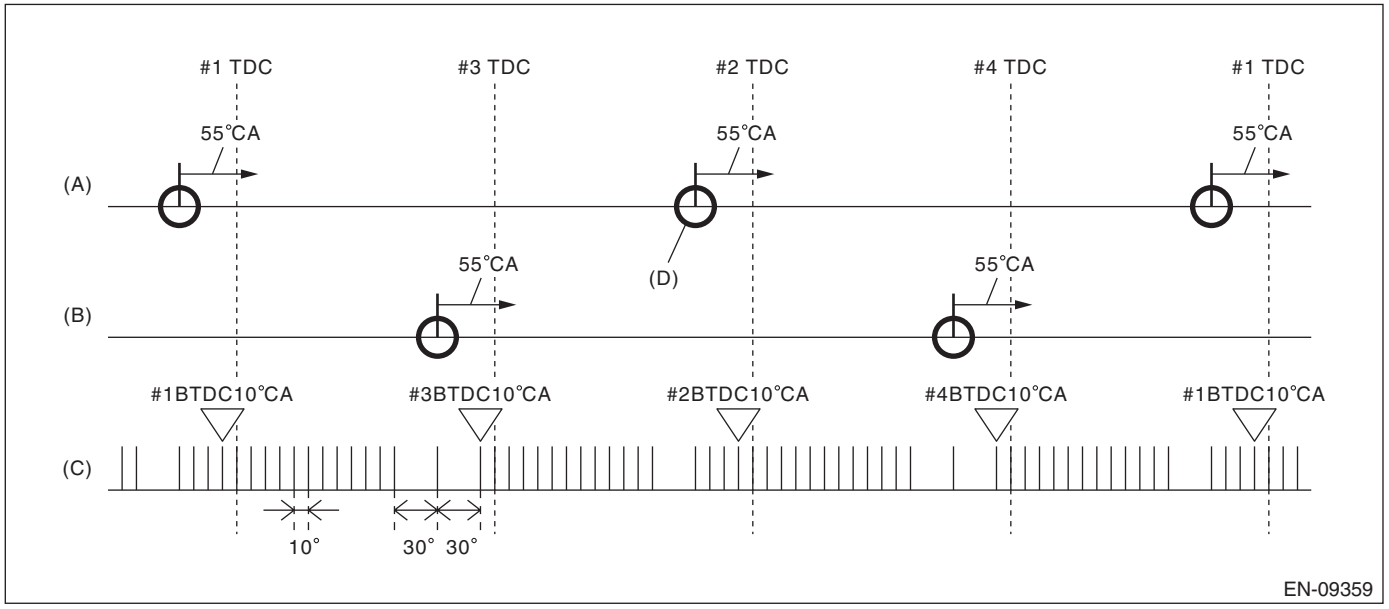
CF:DTC P0366 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1

NOTE:
For the diagnostic procedure, refer to DTC P0365. <Ref. to EN(H4DO w/o HEV)(diag)-310, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of camshaft position sensor property.
Judge as NG when the number of camshaft signals remains abnormal.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)
(B) Camshaft signal (LH)
(C) Crankshaft signal
(D) Camshaft position signal: When normal, there will be 2 camshaft position signals for every 2 crankshaft revolutions.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 200 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the status where the number of camshaft position sensor signal in two crankshaft revolutions is other than 2 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
Amount of camshaft sensor signal during 2 revs of crankshaft	≠ 2 time(s)

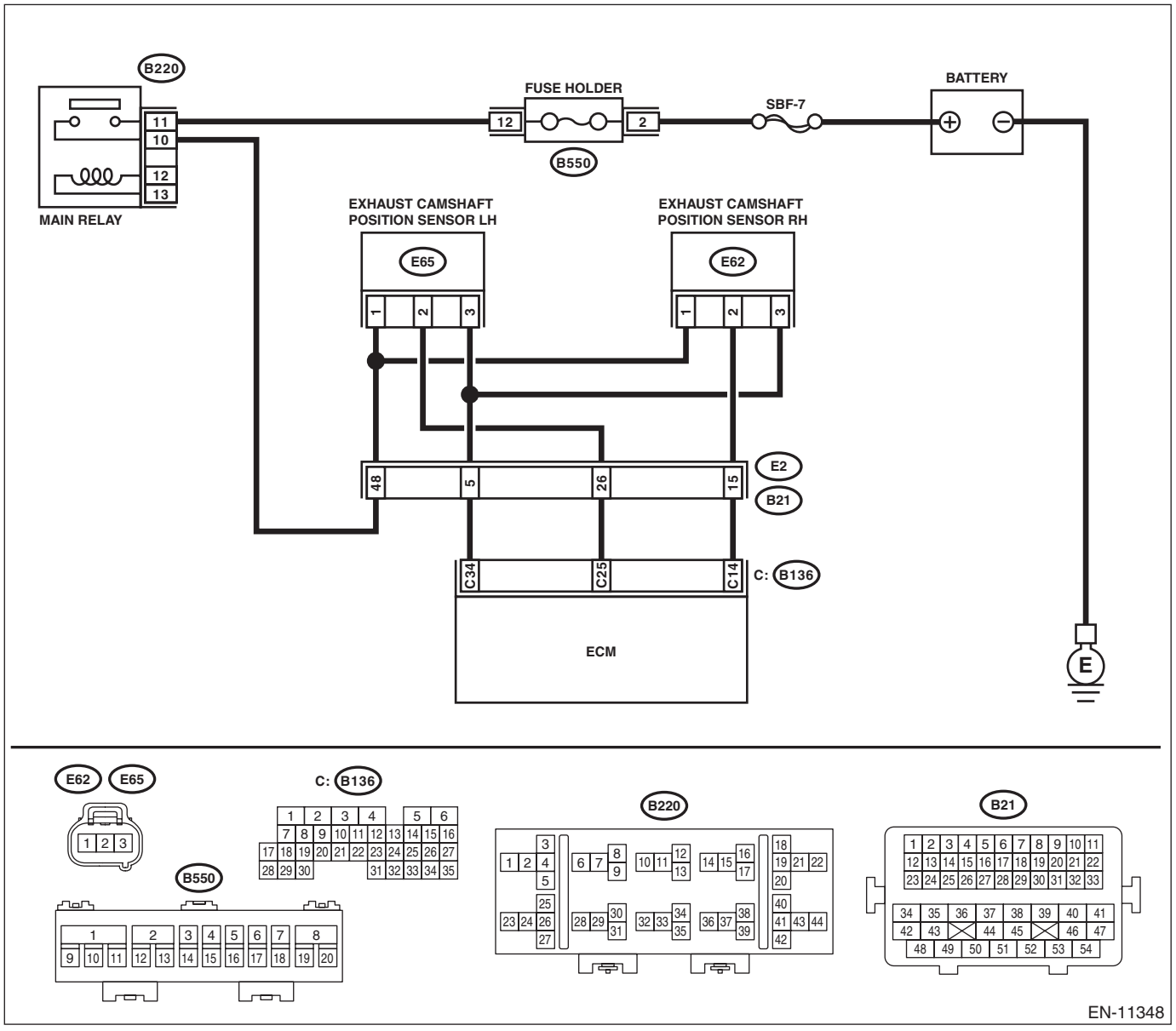
Time Needed for Diagnosis: Two engine revs. × 4 time(s)
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CG:DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Engine stall
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E65) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 25 — (E65) No. 2:*** ***(B136) No. 34 — (E65) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and camshaft position sensor connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E65) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E65) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step **5**.
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten the camshaft position sensor installation bolt securely.
6	**CHECK CAMSHAFT POSITION SENSOR.** Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO w/o HEV)(diag)-20, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-59, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0365. <Ref. to EN(H4DO w/o HEV)(diag)-310, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CH:DTC P0391 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 2

NOTE:
For the diagnostic procedure, refer to DTC P0390. <Ref. to EN(H4DO w/o HEV)(diag)-314, DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0366. <Ref. to EN(H4DO w/o HEV)(diag)-313, DTC P0366 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CI: DTC P0400 EGR "A" FLOW

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Movement performance problem when engine is low speed
- Improper idling
- Movement performance problem

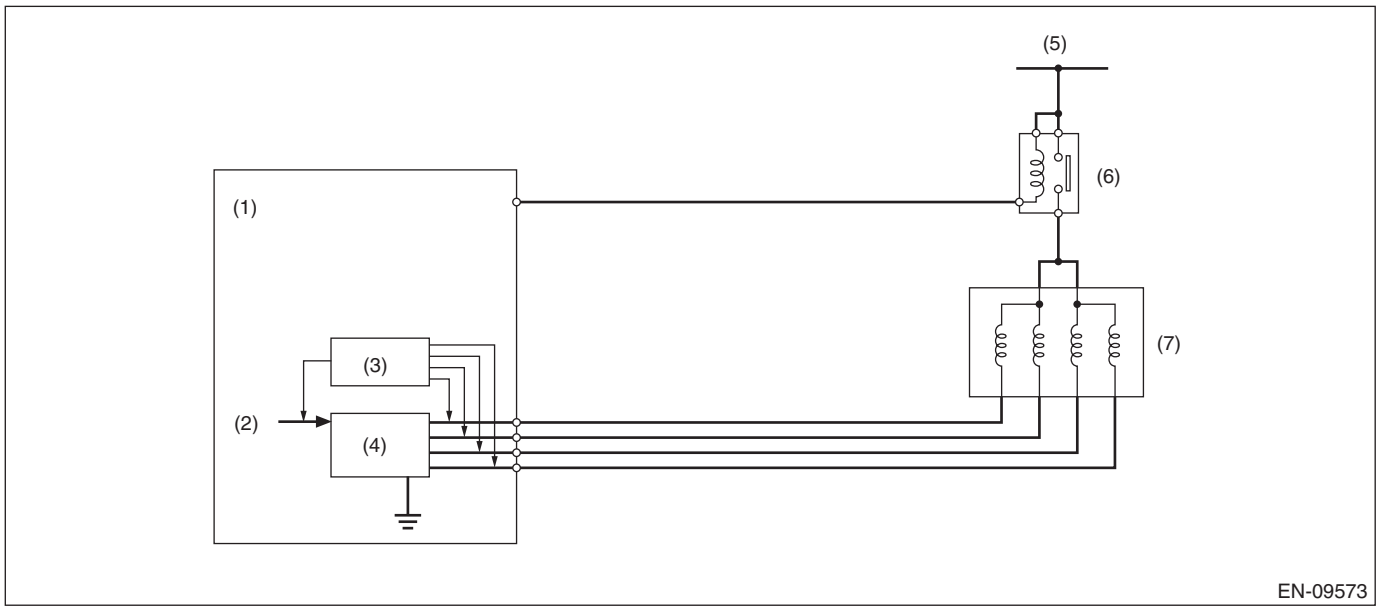
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» 53.3 kPa (400 mmHg, 15.75 inHg) or more?	Make sure that the EGR control valve, manifold absolute pressure sensor and throttle body are installed securely.	Go to step **2**.
2	**CHECK EGR CONTROL VALVE.** Remove the EGR control valve.	Are there any holes, clogged lines or foreign matters in the EGR system?	Repair the EGR system.	Replace EGR control valve. <Ref. to EC(H4DO(w/o HEV))-23, EGR Control Valve.>

1. OUTLINE OF DIAGNOSIS

Detect EGR system malfunction.
Intake manifold pressure (negative pressure) is constant because the throttle valve is fully closed during deceleration fuel cut. At this time, when the EGR control valve is opened/closed, the intake manifold pressure will change. EGR System OK/NG is judged by the range of this change.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Computer unit (CPU)
(3) Detecting circuit
(4) Switching circuit
(5) Battery voltage
(6) Main relay
(7) EGR control valve

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Engine speed	1300 rpm — 5000 rpm
Intake air temperature	≥ 0 °C(32 °F)
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Vehicle speed	≥40 km/h (24.9 MPH)
Time while the fuel shut-off function is in operation	≥ 3000 ms
Neutral switch	= OFF

4. GENERAL DRIVING CYCLE

During deceleration fuel cut from 40 km/h (approx. 24.9 MPH) or more, perform diagnosis once.
Be careful of vehicle speed and engine speed. (Diagnosis will not be completed if the vehicle speed and engine speed conditions become out of specification due to deceleration.)

5. DIAGNOSTIC METHOD

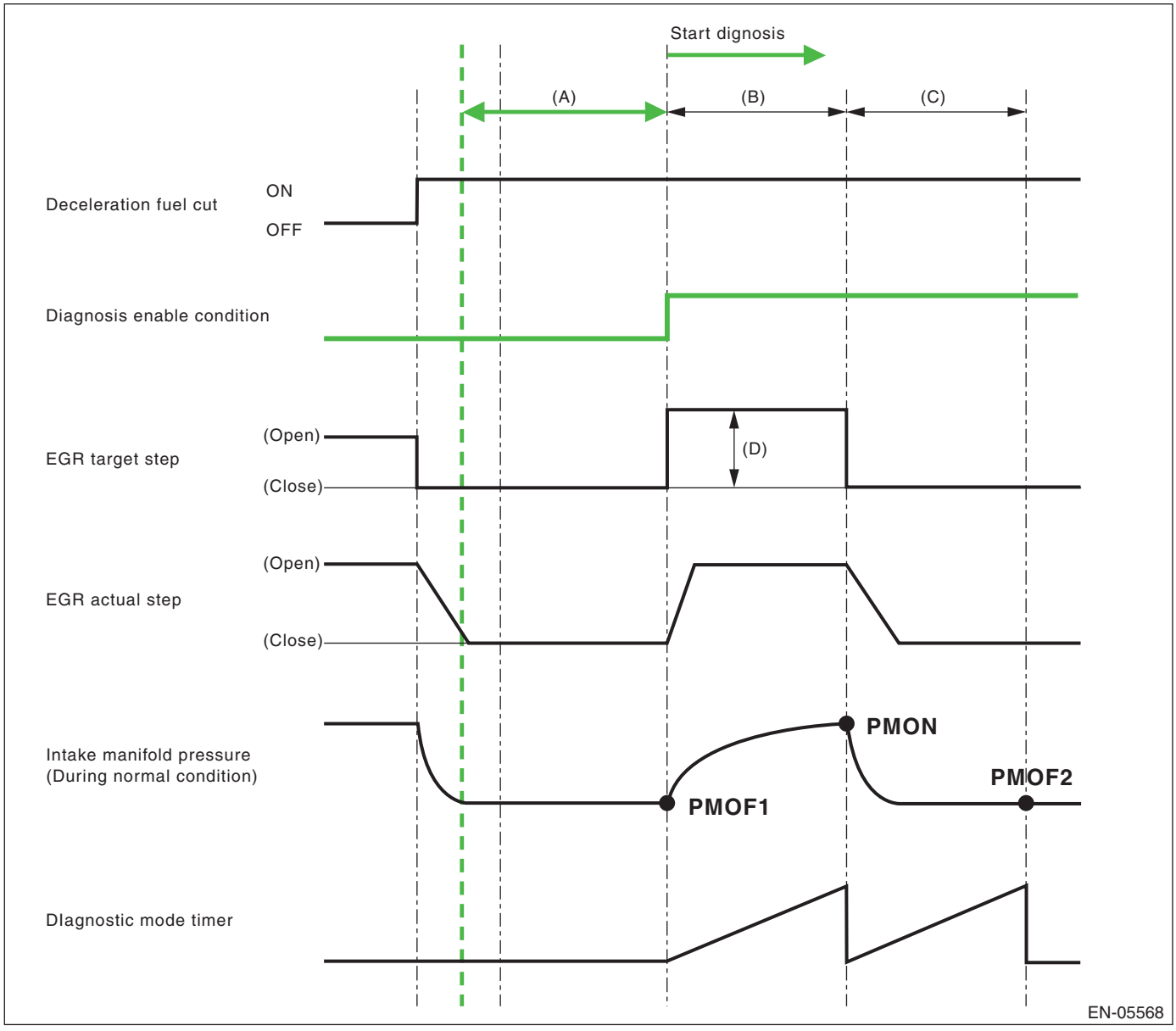
Measure the pressure values when the enable conditions are established, and perform diagnosis by calculating those results.
1. Label the intake manifold pressure value as PMOF1, which is observed when enable conditions are established, and set the EGR target step to 45 step(s) (nearly full open).
2. Label the intake manifold pressure value as PMON, which is observed after 1000 ms has passed since EGR target step was set to 45 step(s) (when the enable conditions were established), and set the EGR target step to 0.

3. Label the intake manifold pressure as PMOF2, which is observed after 1000 ms has passed since EGR target step was set to 0 (after (1000 ms + 1000 ms) have passed since the enable conditions were established).
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
PMON – (PMOF1 + PMOF2)/2	< 2.5 kPa (18.63 mmHg, 0.7 inHg)

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.



(A) 3000 ms (B) 1000 ms (C) 1000 ms
(D) 45 step(s)

CJ:DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD BANK 1

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

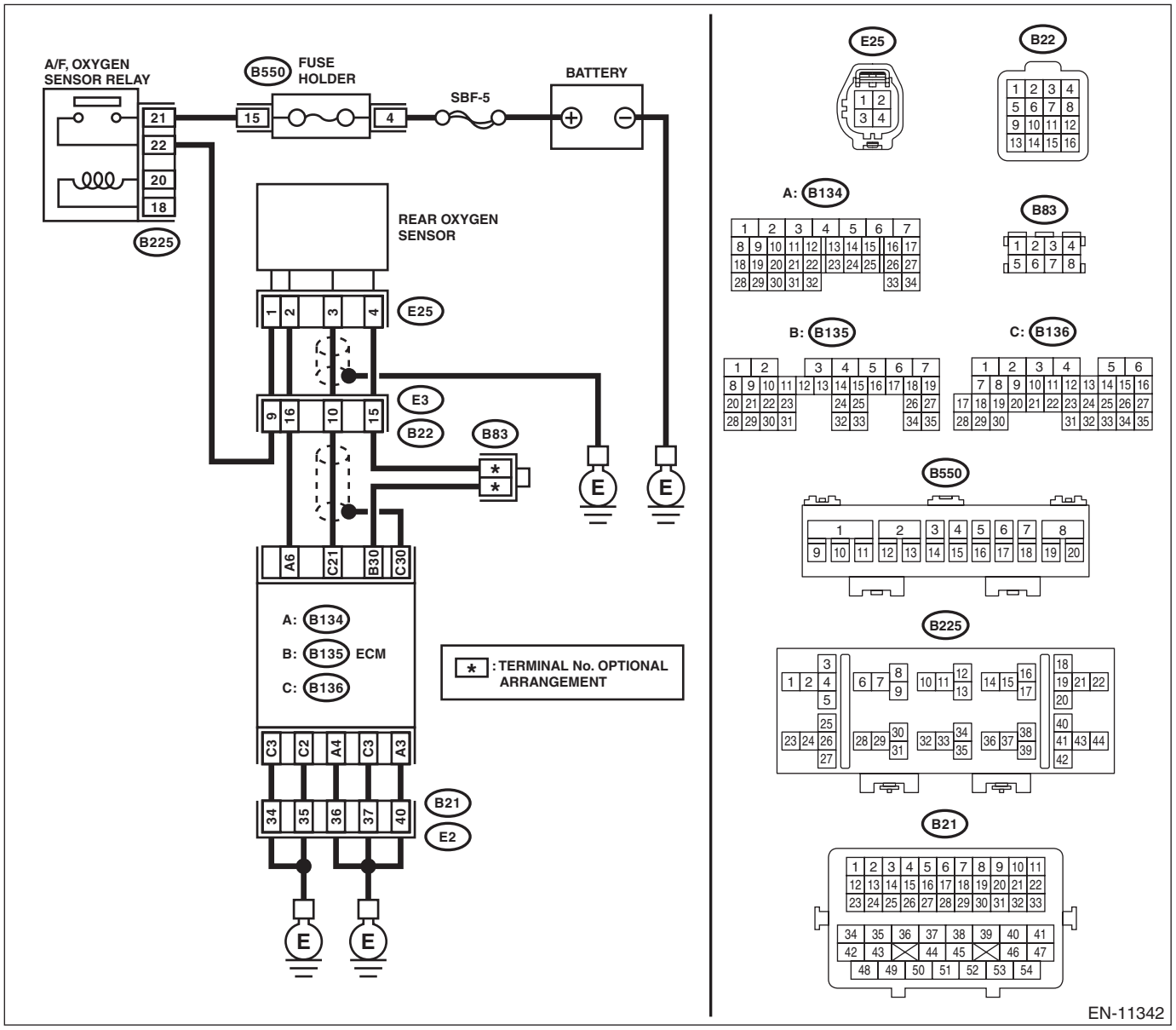
- Engine stall
- Idle mixture is out of specifications.

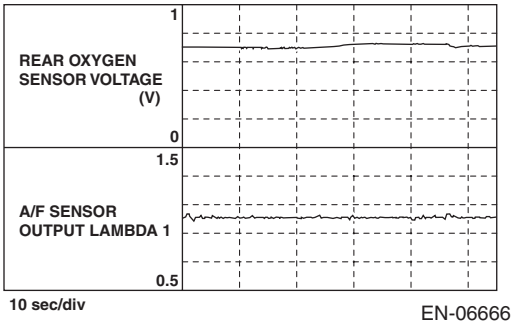
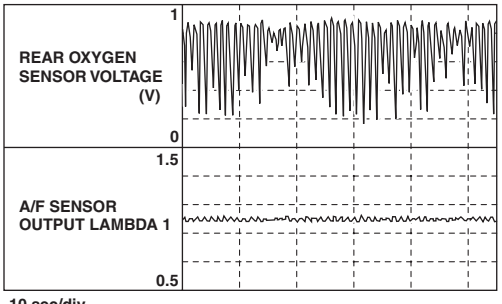
CAUTION:

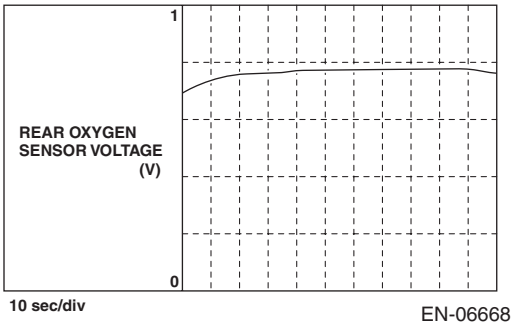
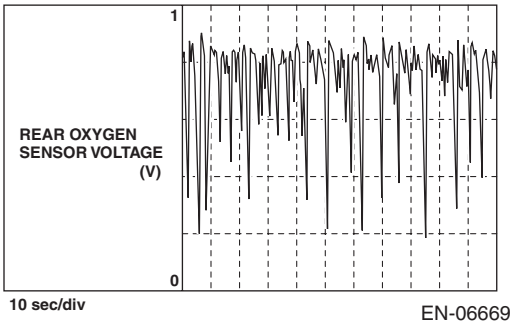
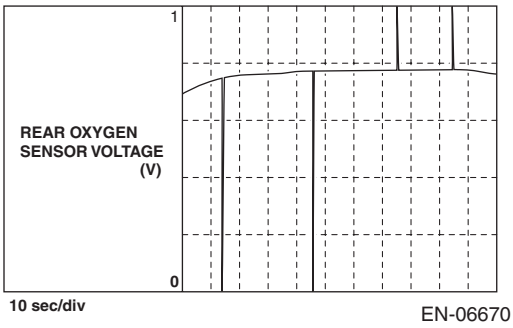
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.** Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes. NOTE: Check the following positions. • Between cylinder head and front exhaust pipe • Between front exhaust pipe and front catalytic converter • Between front catalytic converter and rear catalytic converter • Loose or improperly attached front oxygen (A/F) sensor or rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace the exhaust system. <Ref. to EX(H4DO(w/o HEV))-2, General Description.>	Go to step **2**.
2	**CHECK WAVEFORM DATA ON THE SUBARU SELECT MONITOR (WHILE DRIVING).** 1) Drive at a constant speed between 80 — 112 km/h (50 — 70 MPH). 2) After 5 minutes have elapsed in the condition of step 1), use the Subaru Select Monitor while still driving to read the waveform data. • At normal condition  EN-06666 • At abnormal condition (numerous inversion)  EN-06667	Is a normal waveform displayed?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK WAVEFORM DATA ON THE SUBARU SELECT MONITOR (WHILE IDLING).** 1) Run the engine at idle. 2) In the condition of step 1), use the Subaru Select Monitor to read the waveform data. • At normal condition  EN-06668 • At abnormal condition 1 (numerous inversion)  EN-06669 • At abnormal condition 2 (noise input)  EN-06670	Is a normal waveform displayed?	Go to step **4**.	• The waveform is displayed at abnormal condition 1: Go to step **4**. • The waveform is displayed at abnormal condition 2: Go to step **5**.
4	**CHECK CATALYTIC CONVERTER.**	Is the catalytic converter damaged?	Replace the catalytic converter. <Ref. to EC(H4DO(w/o HEV))-8, Front Catalytic Converter.> <Ref. to EC(H4DO(w/o HEV))-9, Rear Catalytic Converter.>	Go to step **5**.
5	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **6**.

	Step	Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair the harness and connector. NOTE: Repair the following locations. • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
7	**CHECK REAR OXYGEN SENSOR SHIELD.** 1) Turn the ignition switch to OFF. 2) Expose the rear oxygen sensor connector body side harness sensor shield. 3) Measure the resistance between sensor shield and chassis ground.	Is the resistance less than 1 Ω?	Go to step **8**.	Repair the open circuit of rear oxygen sensor harness.
8	**CHECK ENGINE OIL AMOUNT AND EXHAUST GAS.** 1) Check the engine oil amount. <Ref. to LU(H4DO(w/o HEV))-12, INSPECTION, Engine Oil.> 2) Check exhaust gas during idling.	Does the engine oil amount drop or white smoke emit from the muffler?	Check the engine, and repair the defective part. <Ref. to ME(H4DO(w/o HEV))-425, INSPECTION, Engine Trouble in General.> After repairing the engine, replace the catalytic converter. <Ref. to EC(H4DO(w/o HEV))-8, Front Catalytic Converter.> <Ref. to EC(H4DO(w/o HEV))-9, Rear Catalytic Converter.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step **9**.

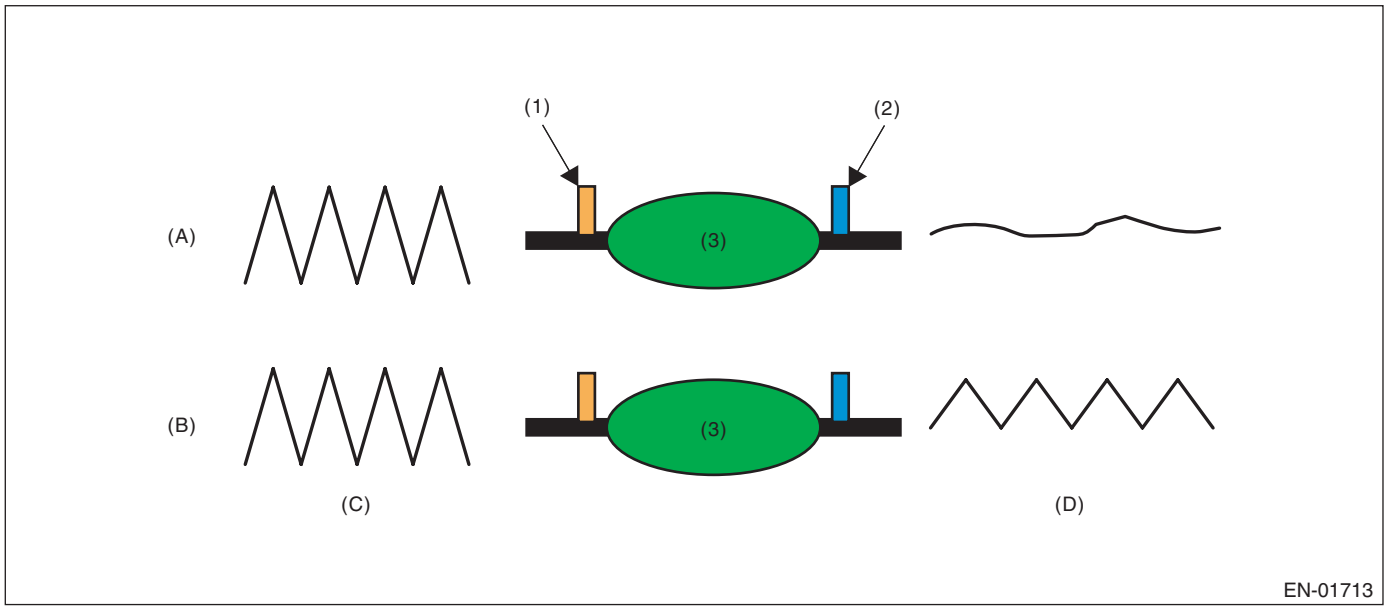
	Step	Check	Yes	No
9	**CHECK IGNITION SYSTEM.** 1) Check the spark plug. <Ref. to IG(H4DO(w/o HEV))-7, INSPECTION, Spark Plug.> 2) Check the status of the ignition coil connector and the spark plug terminal.	Is there any fault in the ignition system?	After repairing the ignition system, replace the catalytic converter. <Ref. to EC(H4DO(w/o HEV))-8, Front Catalytic Converter.> <Ref. to EC(H4DO(w/o HEV))-9, Rear Catalytic Converter.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step **10**.
10	**CHECK FUEL SYSTEM.** 1) Refer to and check the items in “Insufficient fuel supply to fuel injector” (except for “a. Fuel pump does not operate.”) and “Leakage or blow out of fuel”. <Ref. to FU(H4DO(w/o HEV))-177, INSPECTION, Fuel System Trouble in General.> 2) Check throttle body. <Ref. to FU(H4DO(w/o HEV))-18, INSPECTION, Throttle Body.> 3) Check intake manifold. <Ref. to FU(H4DO(w/o HEV))-42, INSPECTION, Intake Manifold.>	Is there any fault in the fuel system?	After repairing the fuel system, replace the catalytic converter. <Ref. to EC(H4DO(w/o HEV))-8, Front Catalytic Converter.> <Ref. to EC(H4DO(w/o HEV))-9, Rear Catalytic Converter.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step **11**.

Step	Check	Yes	No
11 CHECK DTC.	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).> After checking the DTC, replace the catalytic converter. <Ref. to EC(H4DO(w/o HEV))-8, Front Catalytic Converter.> <Ref. to EC(H4DO(w/o HEV))-9, Rear Catalytic Converter.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the deterioration of the catalyst function.
Though the front oxygen sensor output would change slowly with a new catalyst, the sensor output with a deteriorated catalyst becomes high and the inversion time is shortened.
For this reason, the catalyst diagnosis is carried out by monitoring the front oxygen sensor output and comparing it with the front oxygen (A/F) sensor output.

2. COMPONENT DESCRIPTION



(A) Normal
(B) Deterioration
(C) Output waveform from the front oxygen (A/F) sensor
(D) Output waveform from the front oxygen sensor
(1) Front oxygen (A/F) sensor
(2) Front oxygen sensor
(3) Catalytic converter

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Estimated catalyst temperature	≥ 490 °C (914 °F) (CVT model) ≥ 490 °C (914 °F) (MT model)
Sub feedback	In operation
ELCM switching valve	open
Vehicle speed	≥ 40 km/h (24.9 MPH)
Amount of intake air	≥ 5 g/s (0.18 oz/s) and < 40 g/s (1.41 oz/s)
Estimated temperature of rear oxygen element	≥ 500 °C (932 °F)
The following conditions are experienced.	
Rear oxygen sensor output voltage after fuel cut	≥ 0.55 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once at a constant 40 km/h (24.9 MPH) or higher.

5. DIAGNOSTIC METHOD

After the enable conditions have been established, calculate the front oxygen (A/F) sensor lambda value deviation sum value (Σ |(sglmd$_n$ – sglmd$_{n-1}$)|), and rear oxygen sensor output voltage deviation sum value (Σ |(ro2sad$_n$ – ro2sad$_{n-1}$)|) in every 32 ms × 4 times. If the front oxygen (A/F) sensor lambda value deviation sum value (Σ |(sglmd$_n$ – sglmd$_{n-1}$)|) is the predetermined value or more, calculate the diagnostic value.

- **Abnormality Judgment**

If the duration of time while the following conditions are met is within the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Σ |(ro2sad$_n$ – ro2sad$_{n-1}$)| / Σ |(sglmd$_n$ – sglmd$_{n-1}$)|	> 8

Time Needed for Diagnosis: 30 — 55 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CK:DTC P0441 EVAP SYSTEM (CPC) INCORRECT PURGE FLOW

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

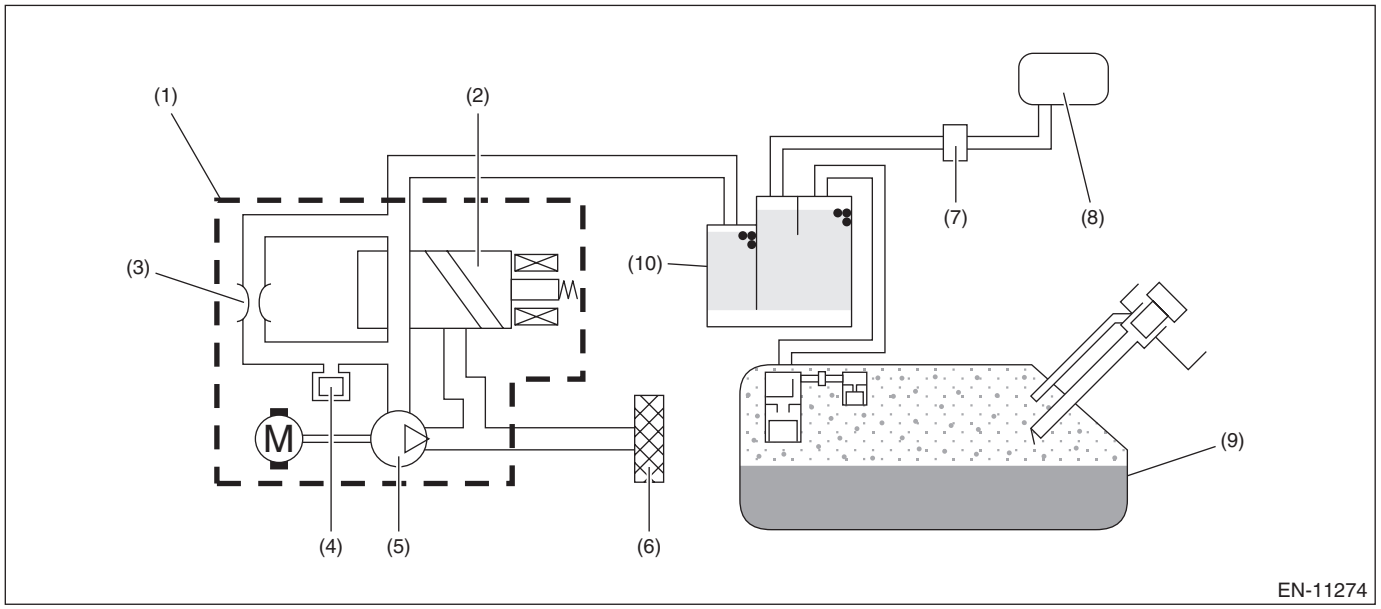
	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK PURGE CONTROL SOLENOID VALVE.** Operate the purge control solenoid valve using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the "Active Test". <Ref. to EN(H4DO w/o HEV)(diag)-68, Active Test.>	Does the purge control solenoid valve operate?	Go to step **3**.	Replace the purge control solenoid valve. <Ref. to EC(H4DO(w/o HEV))-18, Purge Control Solenoid Valve.>
3	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.** 1) Turn the ignition switch to OFF. 2) Check the delivery (test) mode fuse is removed.	Are there holes, cracks, clogging, or disconnection, misconnection of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

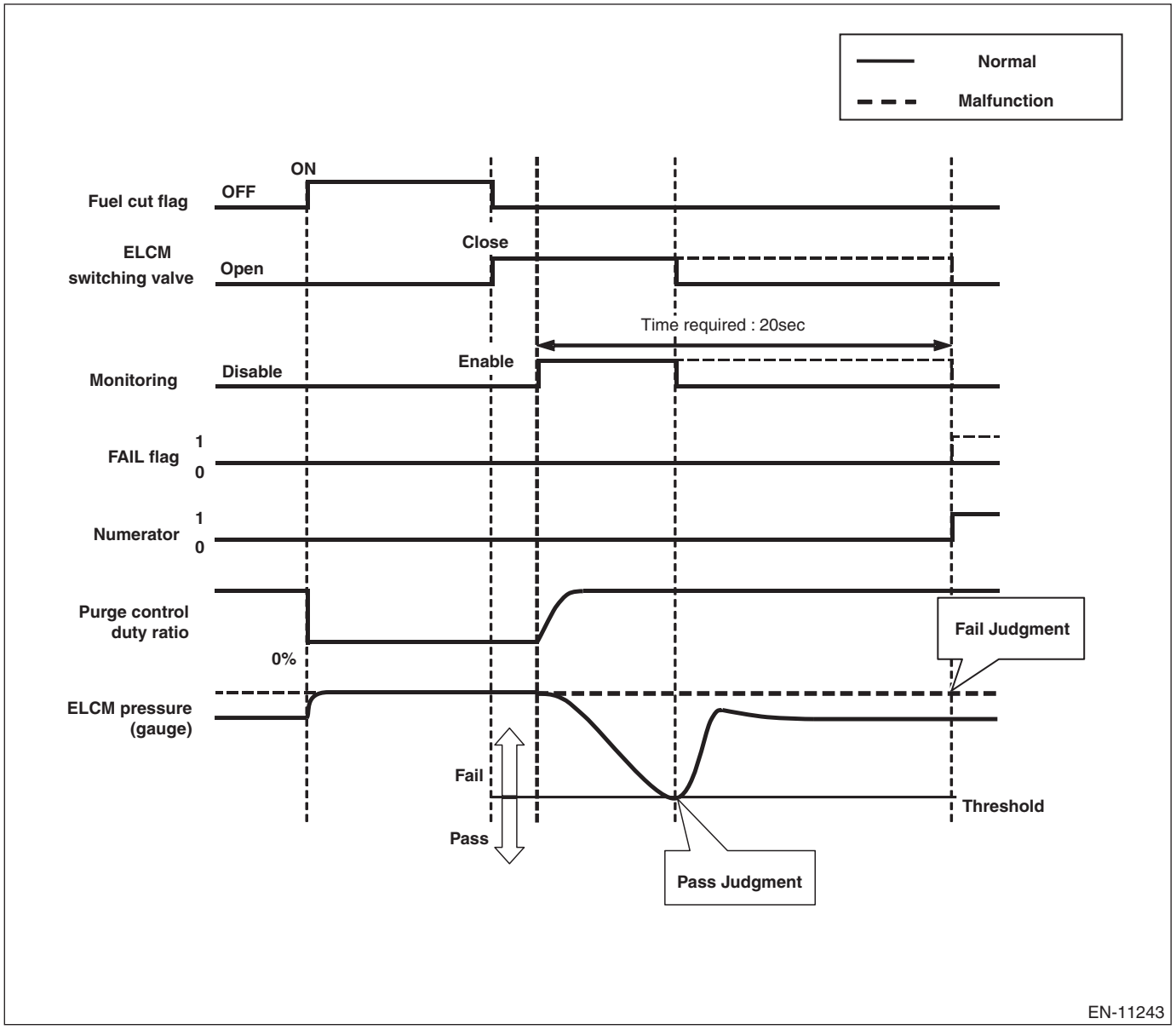
This monitor intrusively performs a functional check to detect incorrect purge flow. The monitor seals the EVAP system (i.e. isolate from atmosphere) by closing the ELCM switching valve intrusively after recovering from a fuel cut event. In the case of normal condition, and the commanded purge control duty ratio is more than 0%, ELCM pressure (gauge) will decrease due to engine vacuum and reach to the threshold value. However, in the case of malfunction condition (e.g. fuel cap open, purge valve stuck closed, purge line disconnected or blocked), if the ELCM pressure (gauge) does not reach the threshold within a predetermined time, the monitor determines a malfunction and stores a fault code.

Malfunction Criteria

ELCM pressure (gauge) > Threshold



(1)	ELCM	(5)	Vacuum pump	(9)	Fuel tank
(2)	Switching valve (closed)	(6)	Drain filter	(10)	Canister
(3)	Reference orifice (0.02 inch orifice)	(7)	Purge control solenoid valve		
(4)	Pressure sensor	(8)	Intake manifold		


Normal
Malfunction
Fuel cut flag
ON
OFF
ELCM switching valve
Close
Open
Time required : 20sec
Monitoring
Disable
Enable
FAIL flag
1
0
Numerator
1
0
Purge control duty ratio
0%
Fail Judgment
ELCM pressure (gauge)
Fail
Pass
Threshold
Pass Judgment
EN-11243

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Time when ELCM switching valve is closed	< 120000 ms
Purge control solenoid valve control duty	> 0%
Precondition Conditions to close the switching valve of ELCM intrusively.	
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Integrated value of calculated purge airflow since engine start	≥ Value from Map*
Atmospheric pressure – Intake manifold absolute pressure	≥ 8.7 kPa (65 mmHg, 2.6 inHg)
((Fuel system status	= Fuel cut
for time) followed by	≥ 1000 ms
Fuel system status)	≠ Fuel cut
Ambient temperature	≥ –25 °C (–13 °F)

*It takes approximately 2 min at 40 MPH

Map

Ambient temperature °C (°F)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)	50 (122)
Integrated value of calculated purge airflow since engine start g (oz)	72 (2.54)	72 (2.54)	72 (2.54)	72 (2.54)	72 (2.54)	72 (2.54)

3. GENERAL DRIVING CYCLE

Perform the diagnosis only once during ordinary driving.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ELCM pressure	> 666.6 Pa × –1 (5 mmHg × –1, 0.2 inHg × –1)

Time Needed for Diagnosis: 30000 ms – 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CL:DTC P0451 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

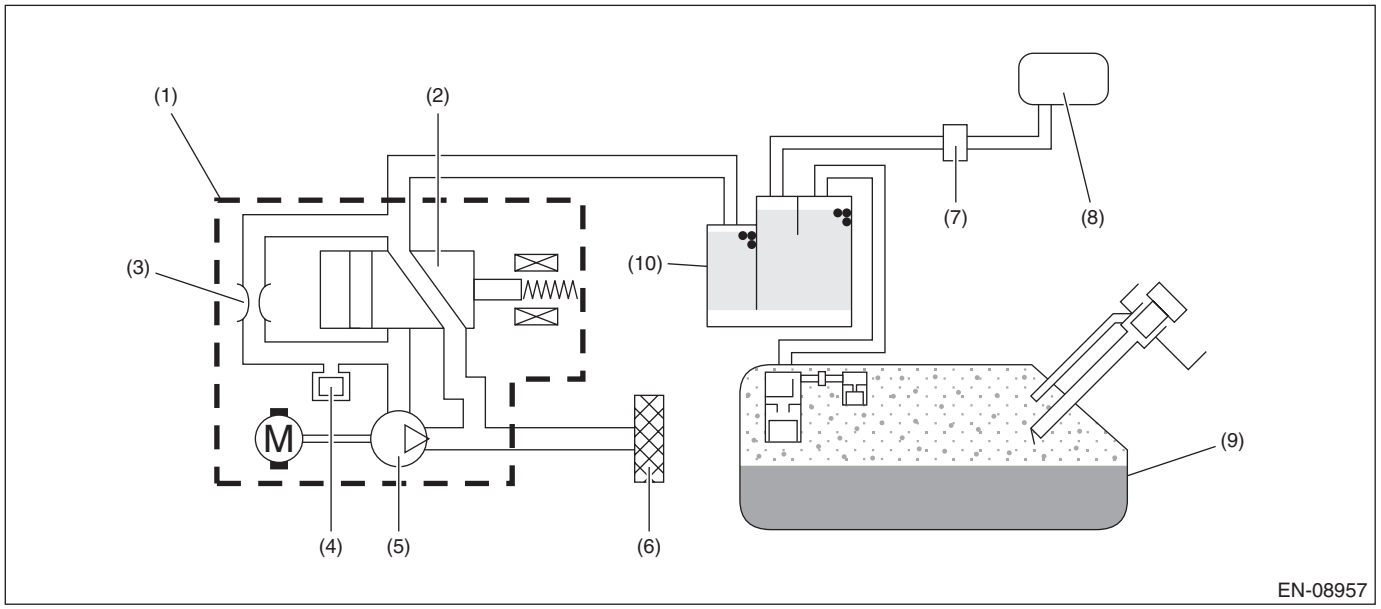
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON (engine OFF). 2) Using the Subaru Select Monitor or general scan tool, read the value in «Absolute Evap Sys. Pressure» and «Mani. Absolute Pressure», and compare them with the actual atmospheric pressure. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual. • To read the actual atmospheric pressure, connect the Subaru Select Monitor or general scan tool to the other known good vehicle.	Is the difference with the actual atmospheric pressure 2.4 kPa (18 mmHg, 0.7 inHg) or more?	Replace the part that showed larger deviation from the actual atmospheric pressure than the other. • If deviations in value for «Absolute Evap Sys. Pressure» is larger: Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.> • If deviations in value for «Mani. Absolute Pressure» is larger: Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(w/o HEV))-76, Manifold Absolute Pressure Sensor.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ELCM pressure sensor output properties.
Judge as NG when the ELCM pressure sensor output value is largely different from the intake manifold pressure when the ignition switch is ON.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Elapsed time after ignition switch is turned to ON	≥ 500 ms and < 60000 ms
Soaking time	≥ 60 s
ELCM vacuum pump	Not in operation
ELCM switching valve	Open
Purge control	Not in operation

4. GENERAL DRIVING CYCLE

Perform the diagnosis once at ignition ON.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (ELCM pressure sensor output value - Intake air pressure at ignition switch ON)	> 4.7 kPa (35.5 mmHg, 1.4 inHg)

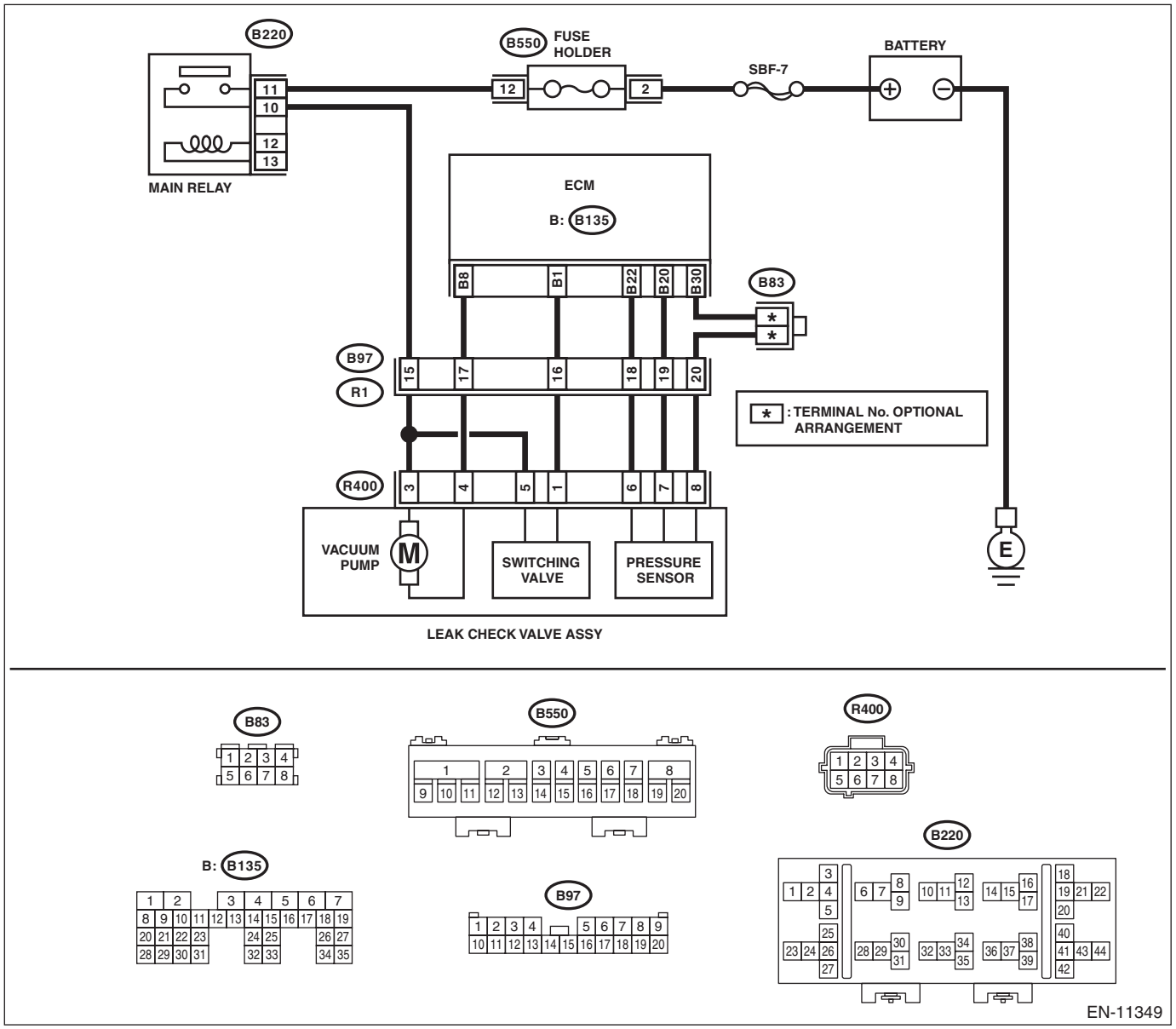
Time Needed for Diagnosis: 328 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CM:DTC P0452 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

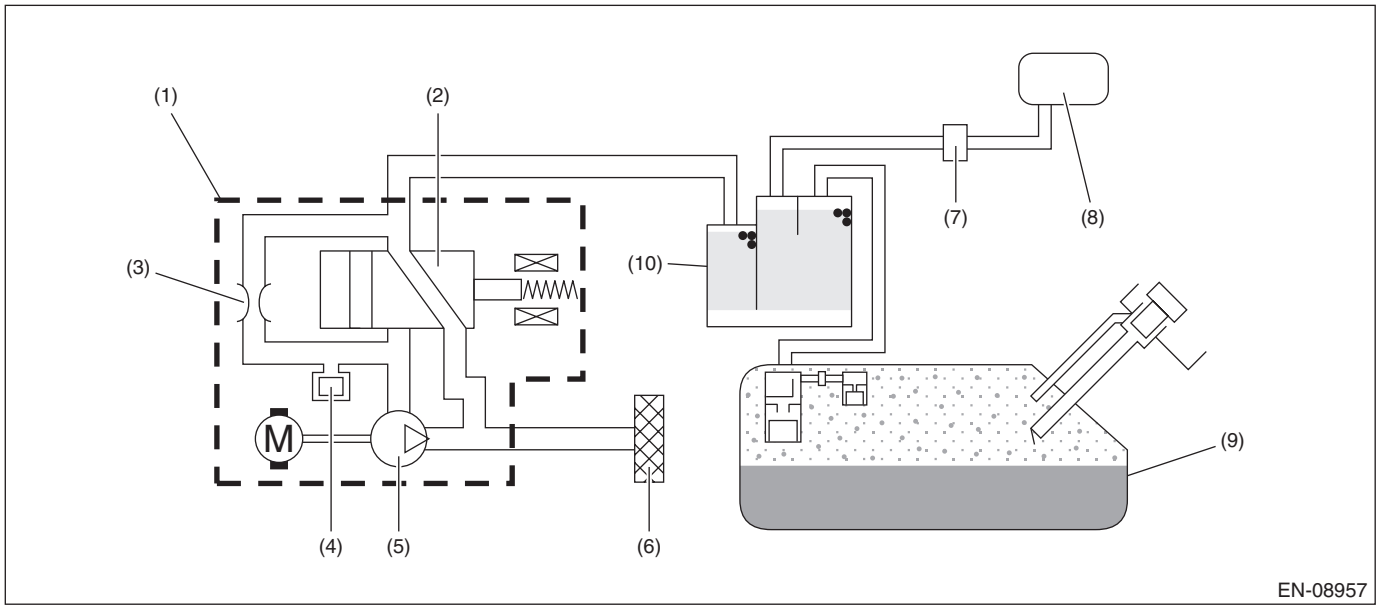


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Read the value of «Atmosphere Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Atmosphere Pressure» 34 kPa (255 mmHg, 10 inHg) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. ***Connector & terminal*** ***(R400) No. 6 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
4	**CHECK FOR POOR CONTACT.** Check for poor contact of leak check valve assembly connector.	Is there poor contact in the leak check valve assembly connector?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.973 V

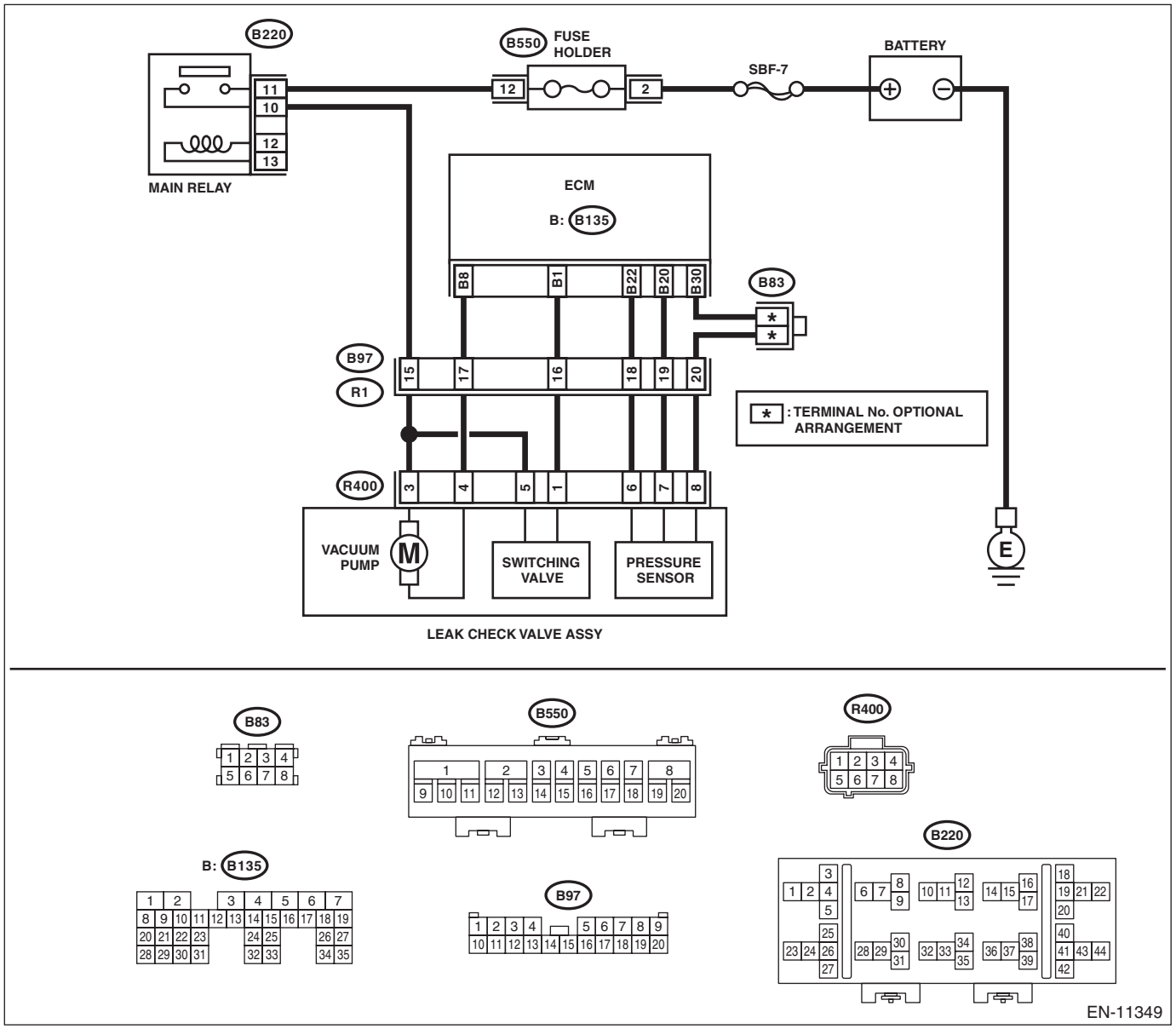
Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CN:DTC P0453 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

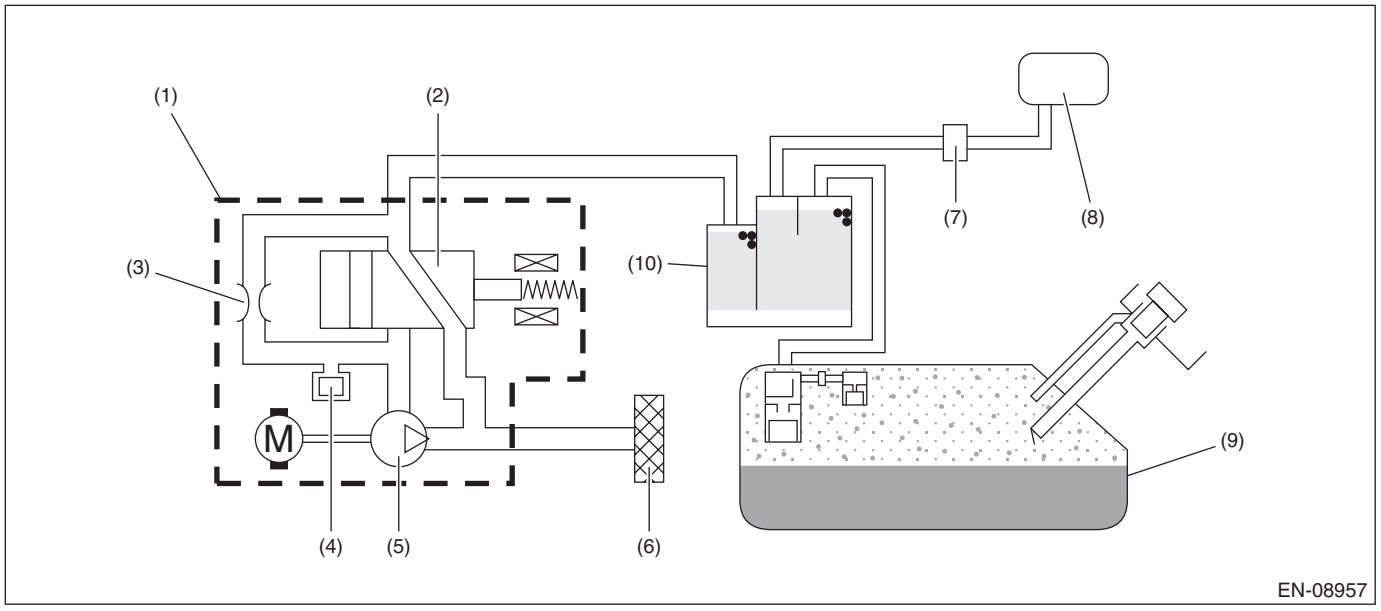


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Read the value of «Atmosphere Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Atmosphere Pressure» 125 kPa (938 mmHg, 36.9 inHg) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 20 — (R400) No. 7:*** ***(B135) No. 30 — (R400) No. 8:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector • Poor contact of joint connector
3	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and the leak check valve assembly connector.	Is there poor contact in ECM and the leak check valve assembly connector?	Repair the poor contact of ECM and the leak check valve assembly connector.	Go to step **4**.
4	**CHECK LEAK CHECK VALVE ASSEMBLY.** Check the pressure sensor of the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-61, CHECK PRESSURE SENSOR, INSPECTION, Leak Check Valve Assembly.>	Is the pressure sensor of the leak check valve assembly OK?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.095 V

Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CO:DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK)

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Fuel odor
- There is a hole of more than 1.0 mm (0.04 in) dia. in evaporation system or fuel tank.
- Fuel filler cap loose or lost

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FUEL FILLER CAP.** 1) Turn the ignition switch to OFF. 2) Check the fuel filler cap. NOTE: The DTC is stored in memory if fuel filler cap is or was loose or if the cap chain has caught while tightening.	Is the fuel filler cap tightened securely?	Go to step **2**.	Tighten fuel filler cap securely.
2	**CHECK FUEL FILLER CAP.**	Is the fuel filler cap genuine?	Go to step **3**.	Replace with a genuine fuel filler cap.
3	**CHECK FUEL FILLER PIPE GASKET.**	Is there any damage to the seal between fuel filler cap and fuel filler pipe?	Repair or replace the fuel filler cap and fuel filler pipe. <Ref. to FU(H4DO(w/o HEV))-132, Fuel Filler Pipe.>	Go to step **4**.
4	**CHECK PURGE CONTROL SOLENOID VALVE.** Check air-tightness of the purge control solenoid valve. <Ref. to EC(H4DO(w/o HEV))-21, INSPECTION, Purge Control Solenoid Valve.>	Is the purge control solenoid valve OK?	Go to step **5**.	Replace the purge control solenoid valve. <Ref. to EC(H4DO(w/o HEV))-18, Purge Control Solenoid Valve.>
5	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.**	Are there holes on the evaporation line?	Repair or replace the evaporation line. <Ref. to FU(H4DO(w/o HEV))-170, Fuel Delivery and Evaporation Lines.>	Go to step **6**.
6	**CHECK CANISTER.**	Are there holes on the canister?	Replace the canister. <Ref. to EC(H4DO(w/o HEV))-10, Canister.>	Go to step **7**.
7	**CHECK LEAK CHECK VALVE ASSEMBLY.**	Are there damage or holes on the leak check valve assembly?	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>	Go to step **8**.

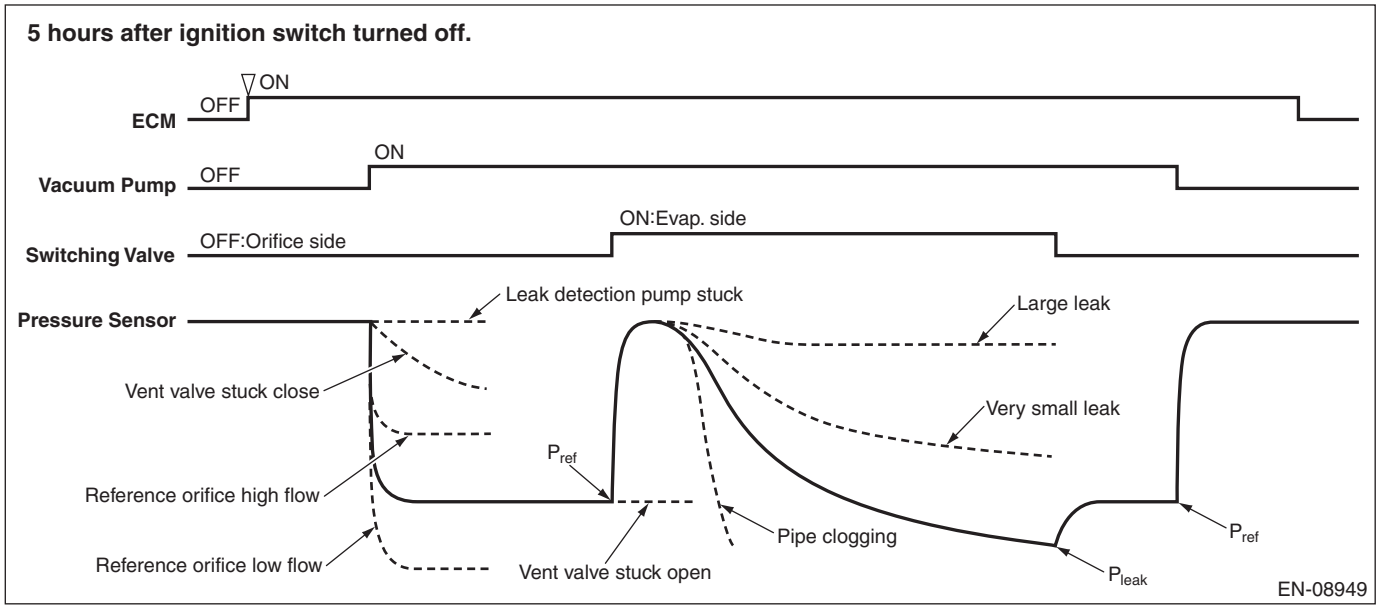
Step		Check	Yes	No
8	**CHECK FUEL TANK.** Remove the fuel tank. <Ref. to FU(H4DO(w/o HEV))-116, Fuel Tank.>	Are there damage or holes on the fuel tank?	Repair or replace the fuel tank. <Ref. to FU(H4DO(w/o HEV))-116, Fuel Tank.>	Go to step **9**.
9	**CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.**	Are there holes, cracks, clogging, or disconnection, misconnection of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

This diagnosis judges whether the ELCM operation is normal or not, and whether the evaporative emission system has leak and clogging or not.
To purge the canister, after driving, perform the five hours soaking after ignition switch OFF in order to stabilize the evaporative gas status. * After 5 or 7 or 9.5 hours passed, ECM is activated by soaking timer, and the leak check is started.
Judges whether the ELCM operation is normal or not, by measuring the reference pressure status via reference orifice (0.02 inch orifice). Judge as malfunction if the reference pressure is out of specified range. Then, judge whether there is a leak or not, by comparing the pressure (leak pressure) when the reference pressure and the evaporative emission system are in negative pressure condition. Judge as system leak in the evaporative emission system if the leak pressure is higher than reference pressure. Judge as clogging of pipe if the leak pressure becomes lower than the reference pressure within the specified amount of time.
0.02 inch leak and 0.04 inch leak can be distinguished by measuring the leak pressure.
The diagnosis results are stored inside ECM until the engine is started again.
*: When the test conditions are not met in 5 hours, perform diagnosis at elapsed time of 7 hours. When the test conditions are not met in 7 hours, perform diagnosis at elapsed time of 9.5 hours.

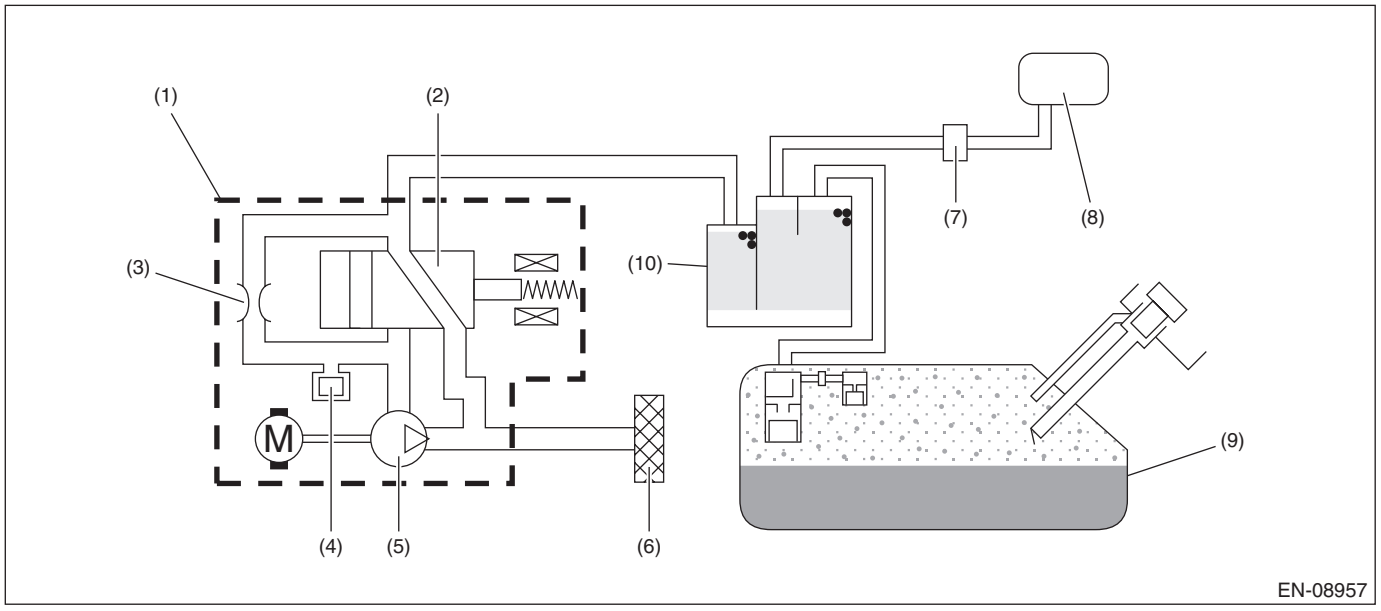
Diagnostic item	
ELCM system (ELCM body)	Vacuum pump stuck Switching valve stuck to open Switching valve stuck to close Reference orifice flow large Reference orifice flow small
Leak check	Large leak • 0.04 inch leak • Fuel cap loose • Fuel cap off • System malfunction
	Very small leak • 0.02 inch leak
Clogging of pipe	—

OUTLINE OF DIAGNOSIS



2. COMPONENT DESCRIPTION

ELCM consists of the pressure sensor, the reference orifice (diameter of 0.02 inch), the vacuum pump which introduces the negative pressure into evaporative emission system, and the switching valve which switches the passage to introduce the negative pressure.



(1)	ELCM	(5)	Vacuum pump	(9)	Fuel tank
(2)	Switching valve	(6)	Drain filter	(10)	Canister
(3)	Reference orifice (0.02 inch orifice)	(7)	Purge control solenoid valve		
(4)	Pressure sensor	(8)	Intake manifold		

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Activation of soaking timer	Completed
Battery voltage	≥ 10.9 V
Engine coolant temperature	≥ 4.4 °C (39.9 °F) and < 45 °C (113 °F)
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Accumulated purge amount during previous driving cycle	≥ Value of Map 1*

*It takes approximately 2 min at 40 MPH

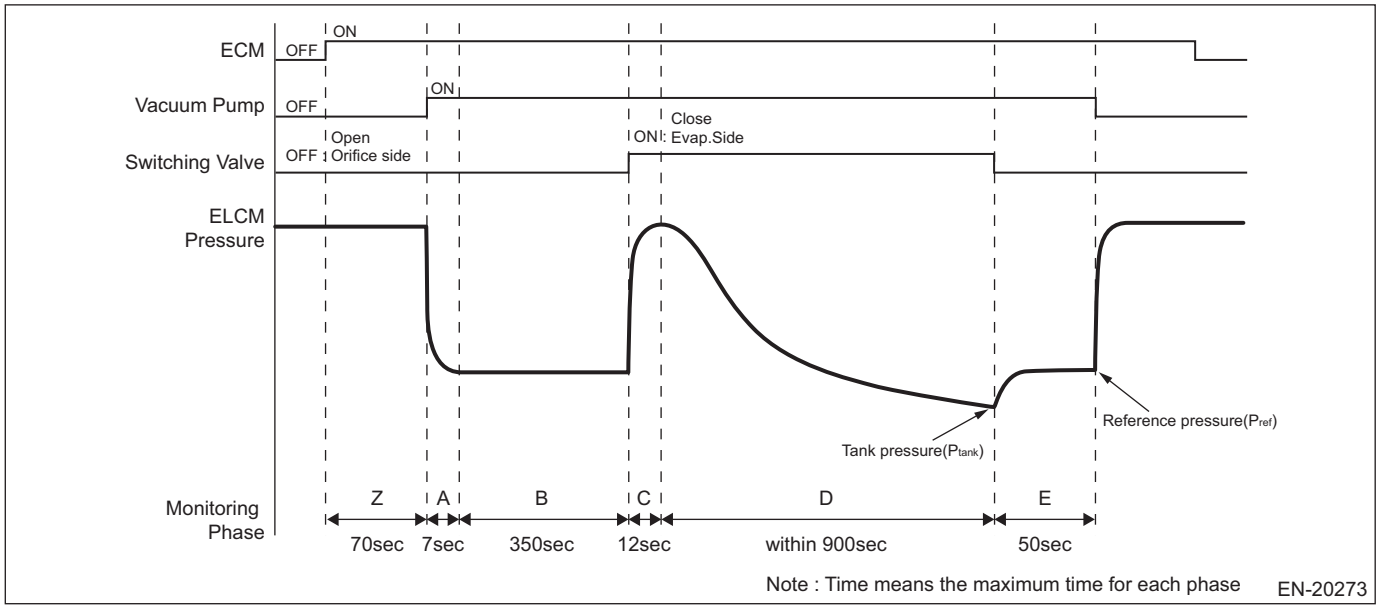
Map 1

Engine coolant temperature °C (°F)	0 (32)	30 (86)	35 (95)	40 (104)	45 (113)
Accumulated purge amount during previous driving cycle g (oz)	128 (4.51)	128 (4.51)	480 (16.93)	800 (28.22)	1120 (39.5)

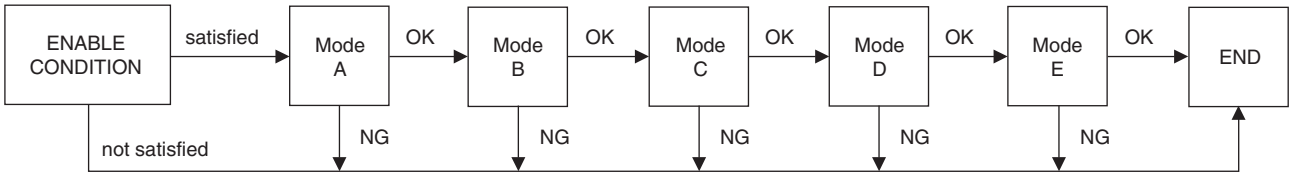
4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when 5 or 7 or 9.5 hours has passed after ignition switch is OFF. For more detail, refer to “OUTLINE OF DIAGNOSIS”. <Ref. to EN(H4DO w/o HEV)(diag)-341, OUTLINE OF DIAGNOSIS, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

5. DIAGNOSTIC METHOD



Mode	Explanation of Mode	Diagnosis Period
A	Vacuum pump operation confirmation and characteristics stability	7 s or less & 300 s
B	Measurement of reference pressure for setting the target negative pressure	40 s or less
C	Switching valve operation confirmation	12 s or less
D	Clogging of pipe diagnosis and leak pressure measurement	900 s or less
E	Reference pressure measurement for judgment	40 s or less



EN-08956

Phase	Explanation	DTC
Z	Measurement the atmospheric pressure	-
A	Diagnostic 1. ELCM Component Performance	P2404
B	Diagnostic 1. ELCM Component Performance	P2404
C	Diagnostic 1. ELCM Component Performance	P2404
D	Diagnostic 2. Pipe clogging in ELCM Measure the tank pressure(P_{tank})	P1451
E	Diagnostic 3: Measure the reference pressure for judgment(P_{ref}) Detect 0.020 inch leak or 0.040 inch leak malfunctions. Diagnostic 1: ELCM Component Performance	P0456,P0455 P2404

EN-20274

Mode A (Vacuum pump operation confirmation and characteristics stability)

Purpose: Detect the vacuum pump operation trouble.
Judge as NG when the following conditions are established.
Judge as OK if the following conditions are not established, and warm up for five minutes to stabilize the vacuum pump characteristics.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure sensor output value	> –0.2 kPa (–1.68 mmHg, –0.1 inHg)	P2404

Mode B (Measurement of reference pressure for setting the target negative pressure)

1. Purpose: Judge the reference pressure stability.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
|Pressure sensor maximum output value – Pressure sensor minimum output value|	> 0.3 kPa (2.355 mmHg, 0.1 inHg)	P2404

2. Purpose: Judge whether the reference pressure is within the normal range, and detect the vacuum pump and orifice malfunctions.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Reference pressure for setting the target negative pressure	< Value of Map 2 or > Value of Map 3	P2404

Map 2

Barometric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for setting the target negative pressure kPa (mmHg, inHg)	-4 (-29.790, -1.2)	-4.1 (-30.593, -1.2)	-4.2 (-31.395, -1.2)	-4.3 (-32.190, -1.3)

Map 3

Barometric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for setting the target negative pressure kPa (mmHg, inHg)	-0.9 (-7.065, -0.3)	-1 (-7.860, -0.3)	-1.2 (-8.663, -0.3)	-1.3 (-9.465, -0.4)

Mode C (Switching valve operation confirmation)

Purpose: Measure the pressure increase when switching valve is changed from open to close, and detect the stuck to open/close malfunctions of the switching valve.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure sensor output value – Reference pressure for setting the target negative pressure	< 0.2 kPa (1.68 mmHg, 0.1 inHg)	P2404

Mode D (Clogging of pipe diagnosis and leak pressure measurement)

1. **Clogging of pipe**
   Purpose: Measure the time required for the evaporative emission system to reach the target negative pressure by the vacuum pump, and detect the clogging of pipe trouble.
   Judge as clogging of pipe malfunction if the evaporative emission system reaches to the target negative pressure within the specified time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Time required to reach to the target negative pressure For target vacuum, use one of the followings. • Reference pressure for target vacuum setting – value of Map 4 • –5 kPa (–37.298 mmHg, –1.5 inHg)	≤ 34000 ms	P1451

Map 4

Time of negative pressure introduction ms	0	100000	200000	300000	400000	500000	600000	700000	800000	900000	1000000	1100000	1200000
Reference pressure for setting the target negative pressure – Pressure sensor output value kPa (mmHg, inHg)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)

2. **Leak pressure measurement**
   Purpose: Measure the pressure (leak pressure) when the evaporative emission system becomes the negative pressure by the vacuum pump.
   Store the pressure as a leak pressure while the following conditions are met.

Judgment Value

Conditions for storing the leak pressure	Threshold Value
When any one of the followings is established:	
• Reference pressure for setting the target negative pressure – Pressure sensor output value	≥ Value of Map 4
• Pressure sensor output value	< –5 kPa (–37.298 mmHg, –1.5 inHg)
• Time of negative pressure introduction	≥ 900000 ms

Mode E (Measurement of reference pressure for judgment)

1. Purpose: Judge the reference pressure stability.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
|Pressure sensor maximum output value – Pressure sensor minimum output value|	> 0.3 kPa (2.355 mmHg, 0.1 inHg)	P2404

2. Purpose: Judge whether the reference pressure is within the normal range, and detect the vacuum pump and orifice malfunctions. Judge the vacuum pump performance stability.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Reference pressure for judgment	< Value of Map 5 or > Value of Map 6	P2404

Map 5

Barometric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for judgment kPa (mmHg, inHg)	-4.5 (-34.020, -1.3)	-4.6 (-34.815, -1.4)	-4.7 (-35.618, -1.4)	-4.9 (-36.420, -1.4)

Map 6

Barometric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for judgment kPa (mmHg, inHg)	-0.8 (-6.180, -0.2)	-0.9 (-6.983, -0.3)	-1 (-7.785, -0.3)	-1.1 (-8.580, -0.3)

3. Purpose: Judge the presence of evaporative emission system leak.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
<Large leak (0.04 inch)> Leak pressure lleakjdg = (Reference pressure for judgment) × 0.377 – (–45.5 Pa)	≥ lleakjdg (Pa)	P0455
<Very small leak (0.02 inch)> Leak pressure	> Reference pressure (Pa) of 0.018 inch and < lleakjdg (Pa)	P0456

Time Needed for Diagnosis: Approx. 23 min
At next engine start, confirm whether the enable conditions are satisfied even though refueling has been done during soaking, and determine the malfunction.
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CP:DTC P0456 EVAP SYSTEM (CPC) LEAK DETECTED (VERY SMALL LEAK)

NOTE:
For the diagnostic procedure, refer to DTC P0455. <Ref. to EN(H4DO w/o HEV)(diag)-340, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

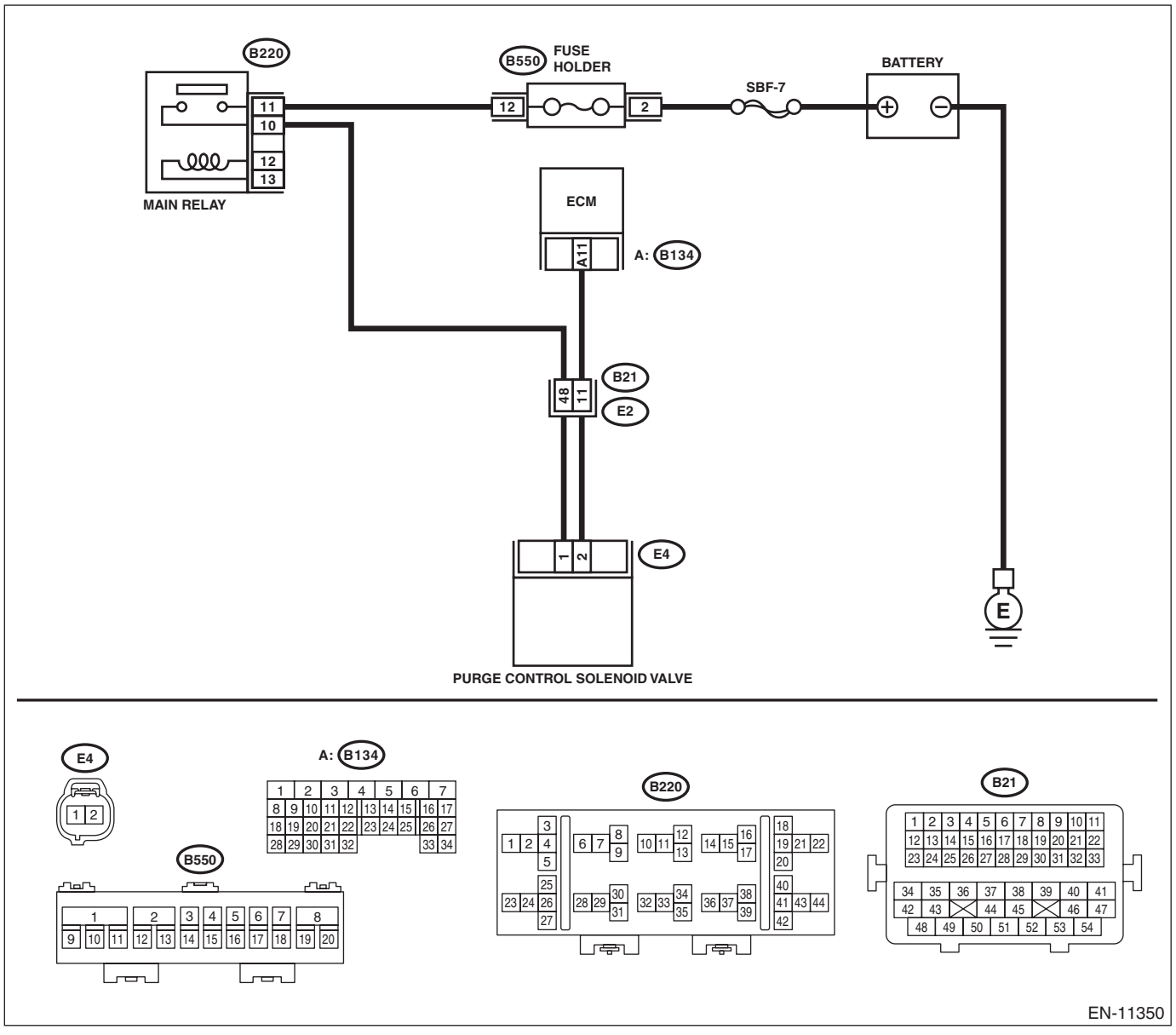
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0455. <Ref. to EN(H4DO w/o HEV)(diag)-340, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CQ:DTC P0458 EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



EN-11350

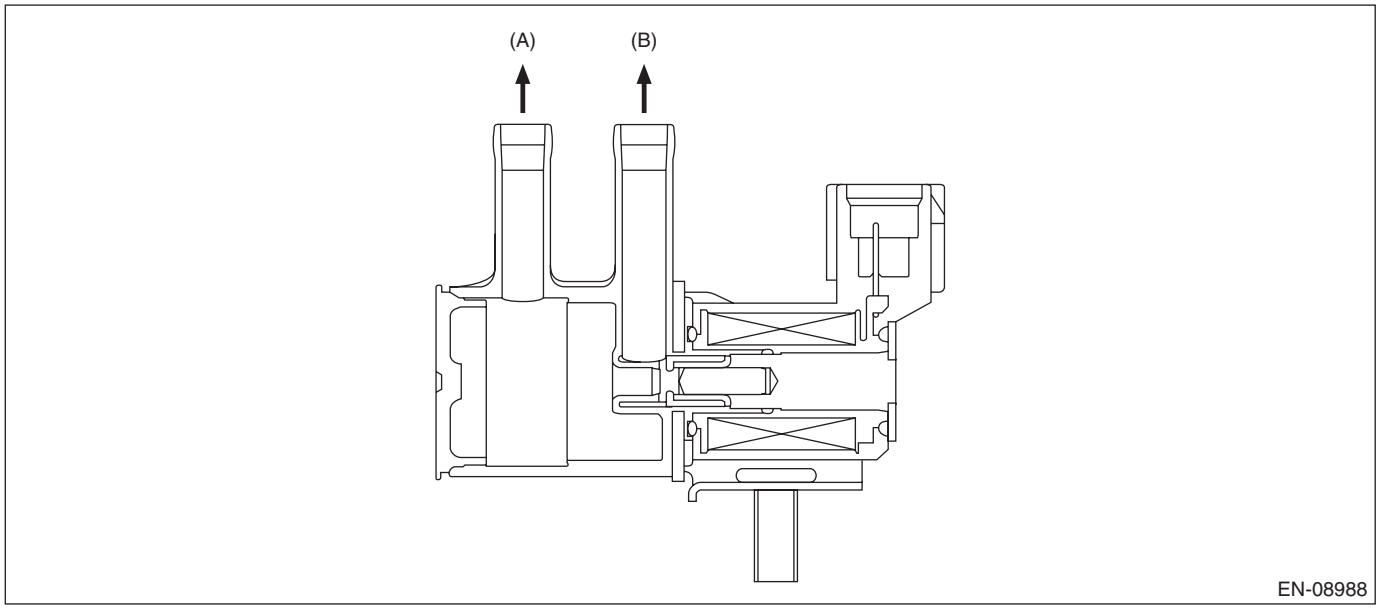
	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3	**CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE.** Measure the voltage between purge control solenoid valve connector and engine ground. ***Connector & terminal*** ***(E4) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and purge control solenoid valve. 3) Measure the resistance between the purge control solenoid valve connector and engine ground. ***Connector & terminal*** ***(E4) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and purge control solenoid valve connector.
5	**CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR.** Measure the resistance of harness between ECM connector and purge control solenoid valve. ***Connector & terminal*** ***(B134) No. 11 — (E4) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and purge control solenoid valve connector • Poor contact of coupling connector

Step		Check	Yes	No
6	**CHECK PURGE CONTROL SOLENOID VALVE.** 1) Remove the purge control solenoid valve. 2) Measure the resistance between purge control solenoid valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 10 — 100 Ω?	Repair the poor contact of purge control solenoid valve connector.	Replace the purge control solenoid valve. <Ref. to EC(H4DO(w/o HEV))-18, Purge Control Solenoid Valve.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the purge control solenoid valve.
Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(A) To canister (B) To intake manifold

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V
Purge control duty ratio	< 75%

4. GENERAL DRIVING CYCLE

Always perform the diagnosis after starting the engine.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

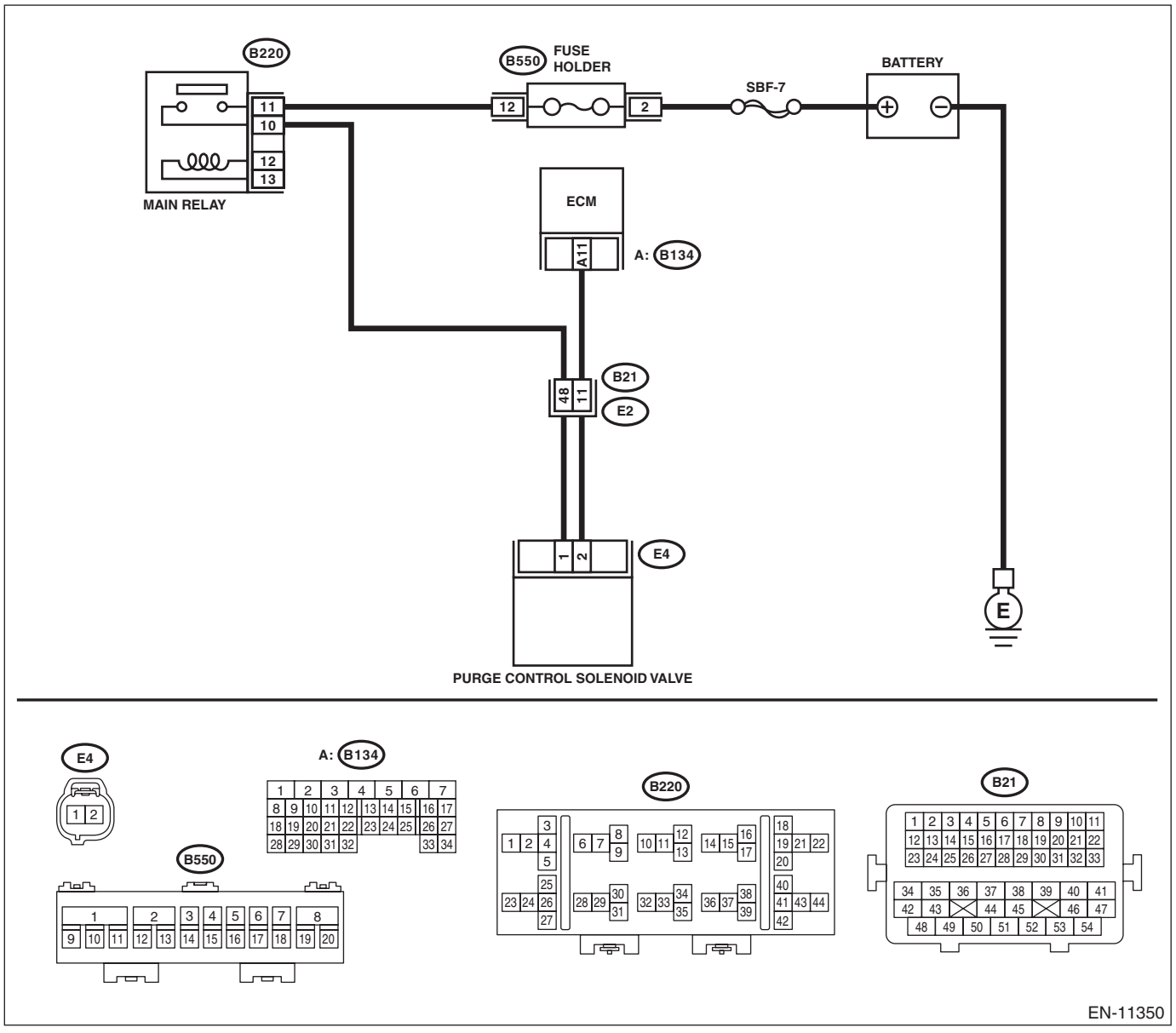
Malfunction Criteria	Threshold Value
Measured solenoid valve for purge control voltage	≤ 12 V battery system voltage × 0.34 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CR:DTC P0459 EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

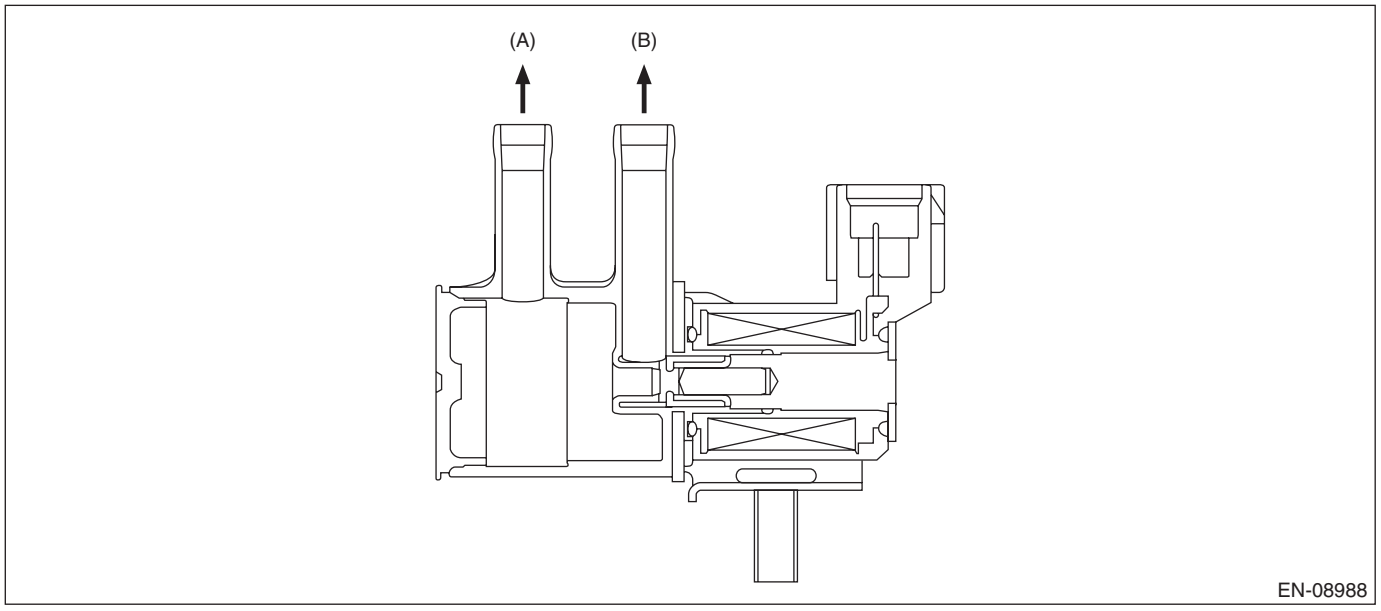


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and purge control solenoid valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 11 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and purge control solenoid valve connector.	Go to step **2**.
2	**CHECK PURGE CONTROL SOLENOID VALVE.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between purge control solenoid valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Replace the purge control solenoid valve. <Ref. to EC(H4DO(w/o HEV))-18, Purge Control Solenoid Valve.>	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the purge control solenoid valve.
Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(A) To canister (B) To intake manifold

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V
Purge control duty ratio	≥ 25%

4. GENERAL DRIVING CYCLE

Always perform the diagnosis after starting the engine.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured solenoid valve for purge control current	≥ 12 A

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CS:DTC P0461 FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

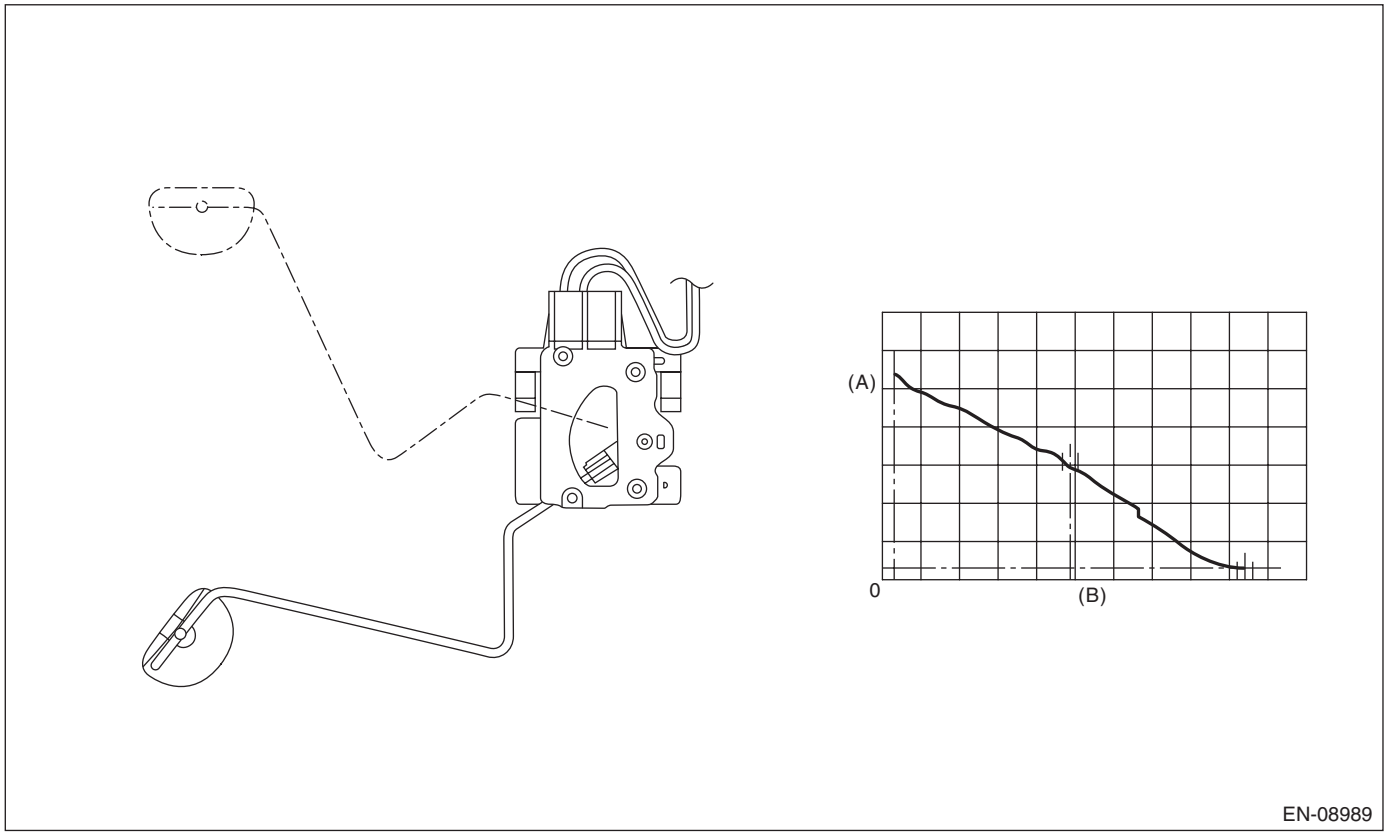
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 **CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Replace the fuel level sensor and fuel sub level sensor. <Ref. to FU(H4DO(w/o HEV))-145, Fuel Level Sensor.> <Ref. to FU(H4DO(w/o HEV))-148, Fuel Sub Level Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect malfunctions of the fuel level sensor output property.
If the fuel level does not vary in a particular driving condition / engine condition where it should, judge as NG.

2. COMPONENT DESCRIPTION



(A) Fuel level (B) Resistance

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 5000 ms
Cumulative amount of intake air without fuel cut	≥ 165375 g

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Max. – min. values of fuel level output	< 2.6 L (0.69 US gal, 0.57 Imp gal)

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

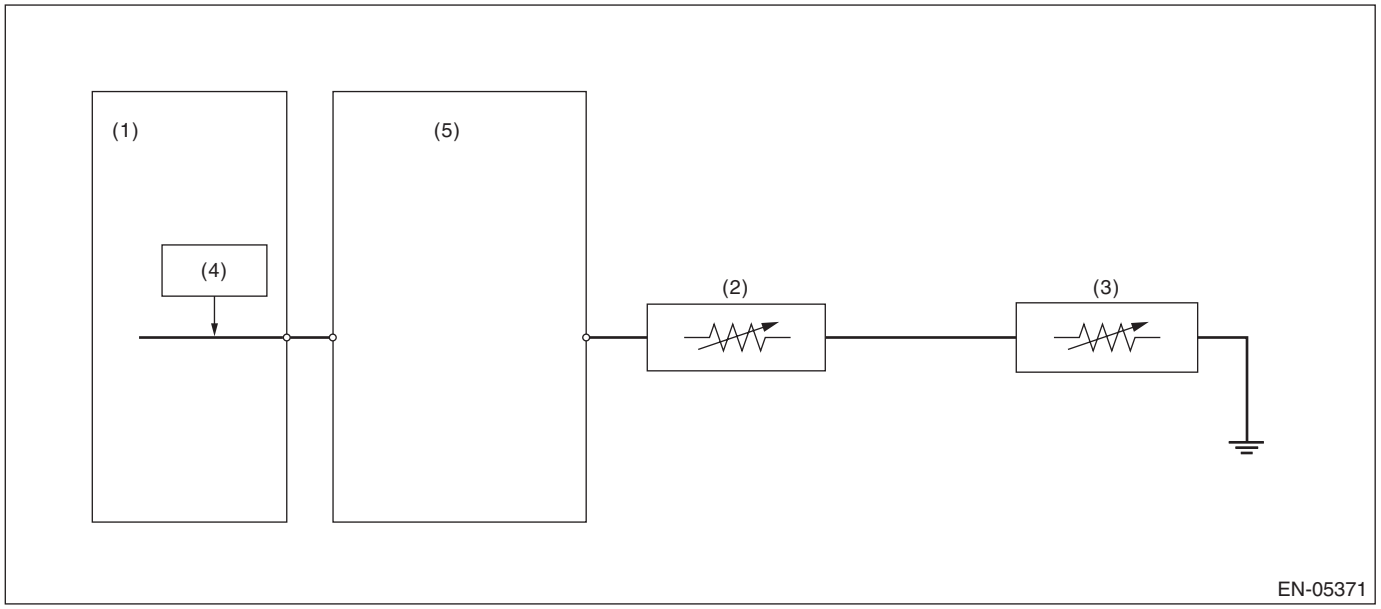
CT:DTC P0462 FUEL LEVEL SENSOR "A" CIRCUIT LOW

NOTE:
For the diagnostic procedure, refer to DTC P0463. <Ref. to EN(H4DO w/o HEV)(diag)-358, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of fuel level sensor. Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Fuel level sensor
(3) Fuel sub level sensor
(4) Detecting circuit
(5) Body integrated unit

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after ignition is turned to ON	≥ 3000 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously after the enable conditions have been established.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.383 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CU:DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

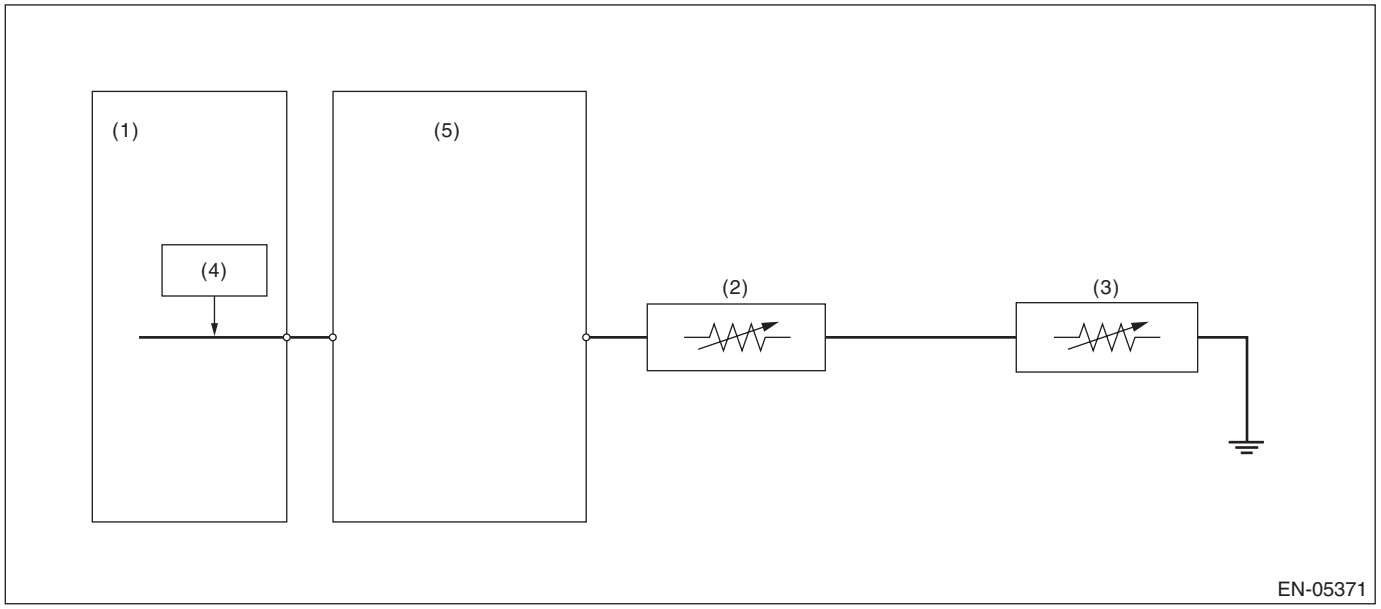
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR ANY OTHER DTC ON DISPLAY.	Is DTC P0462 or P0463 displayed on the Subaru Select Monitor?	Check the combination meter. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of fuel level sensor. Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Fuel level sensor
(3) Fuel sub level sensor
(4) Detecting circuit
(5) Body integrated unit

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 6.632 V

Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CV:DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	**CHECK DTC OF VDC.** Check DTC of VDC.	Is DTC of VDC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Judge as NG when outside of the judgment value.
Judge NG when the received data from VDCCM&H/U is abnormal vehicle speed, and the vehicle speed data is impossible.

2. COMPONENT DESCRIPTION

Vehicle speed signals are taken in to the VDC control module and hydraulic control unit, and normal/erroneous data of the ABS wheel speed sensor is received by CAN communication from the VDC control module and hydraulic control unit.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Speed of RH wheel received from VDC control module & hydraulic control unit	≥ 300 km/h (186.4 MPH)

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CW:DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

- Hard to start the engine.
- Engine does not start
- Improper idling
- Engine stall

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK AIR CLEANER ELEMENT.** 1) Turn the ignition switch to OFF. 2) Check the air cleaner element.	Is there excessive clogging on air cleaner element?	Replace the air cleaner element. <Ref. to IN(H4DO(w/o HEV))-4, Air Cleaner Element.>	Go to step **3**.
3	**CHECK ELECTRONIC THROTTLE CONTROL.** 1) Remove the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.> 2) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101. <Ref. to EN(H4DO w/o HEV)(diag)-466, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction that actual engine speed is not close to target engine speed during idling. Judge as NG when actual engine speed is not close to target engine speed during idling.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Engine coolant temperature	≥ 60 °C (140 °F)
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Elapsed time after starting the engine	≥ 10 s
Accelerator pedal position	= 0%
Lambda value (left and right)	≥ 0.85 and < 1.151
Elapsed time after switching neutral position switch to ON/OFF	> 5 s
Vehicle speed	0 km/h (0 MPH)
CSERS monitor status	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling after warming up engine.

4. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Targeted engine speed	< –100 rpm

Time Needed for Diagnosis: 15 s × 1
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CX:DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Engine keeps running at higher speed than specified idle speed.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK AIR INTAKE SYSTEM.** 1) Start and idle the engine. 2) Check the following items. • Loose installation of intake manifold and throttle body • Cracks of intake manifold gasket and throttle body gasket • Disconnection of vacuum hoses	Is there any fault in air intake system?	Repair air suction and leaks.	Go to step **3**.
3	**CHECK ELECTRONIC THROTTLE CONTROL.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.> 3) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101. <Ref. to EN(H4DO w/o HEV)(diag)-466, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction that actual engine speed is not close to target engine speed during idling. Judge as NG when actual engine speed is not close to target engine speed during idling.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Engine coolant temperature	≥ 60 °C (140 °F)
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Elapsed time after starting the engine	≥ 10 s
Accelerator pedal position	= 0%
Lambda value (left and right)	≥ 0.85 and < 1.151
Elapsed time after switching neutral position switch to ON/OFF	> 5 s
Vehicle speed	= 0 km/h (0 MPH)
CSERS monitor status	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling after warming up engine.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Targeted engine speed	> 200 rpm

Time Needed for Diagnosis: 15 s × 1

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CY:DTC P050A COLD START IDLE CONTROL SYSTEM PERFORMANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

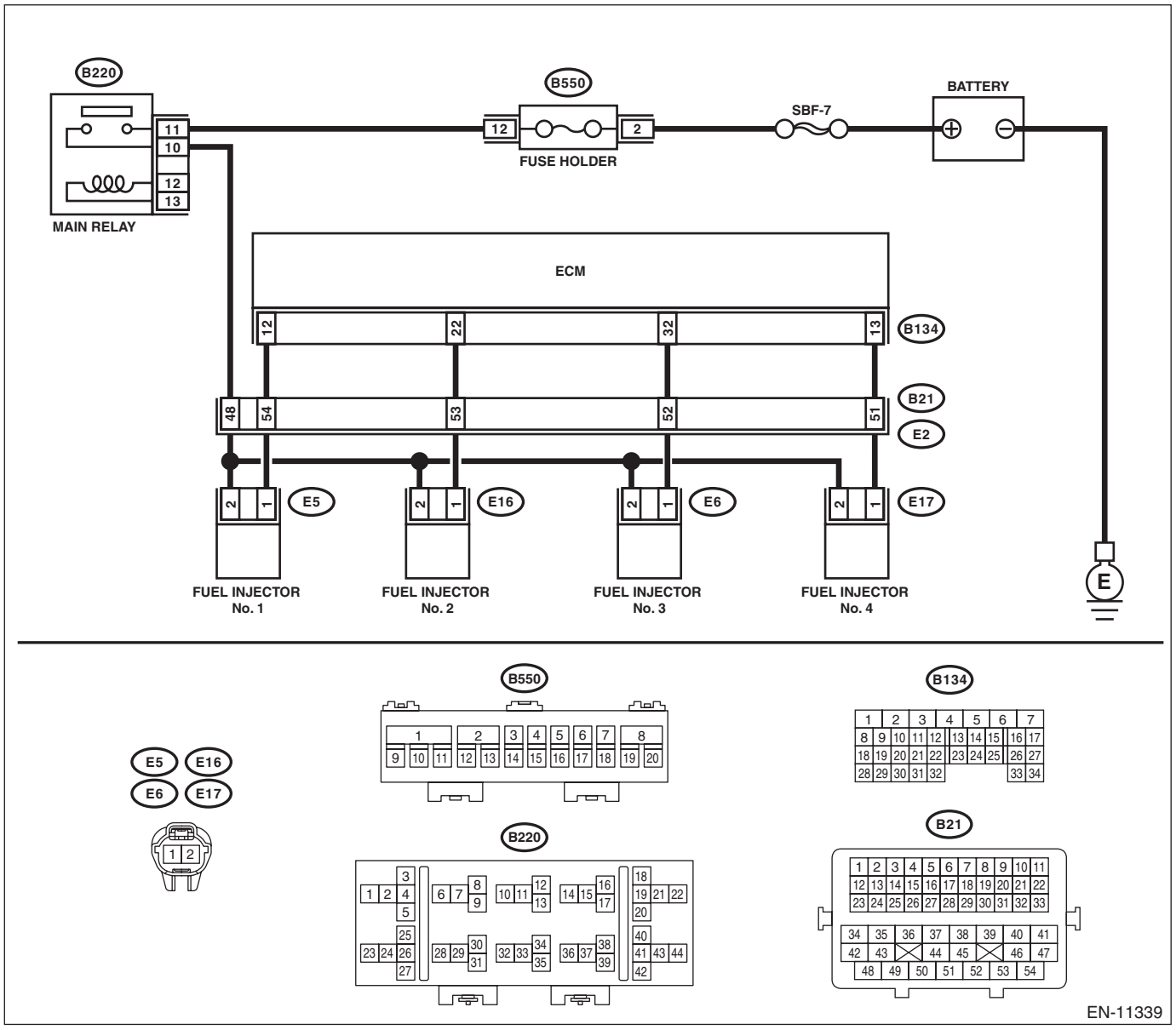
- Engine keeps running at higher speed than specified idle speed.
- Engine keeps running at a lower speed than the specified idle speed.
- Engine stall

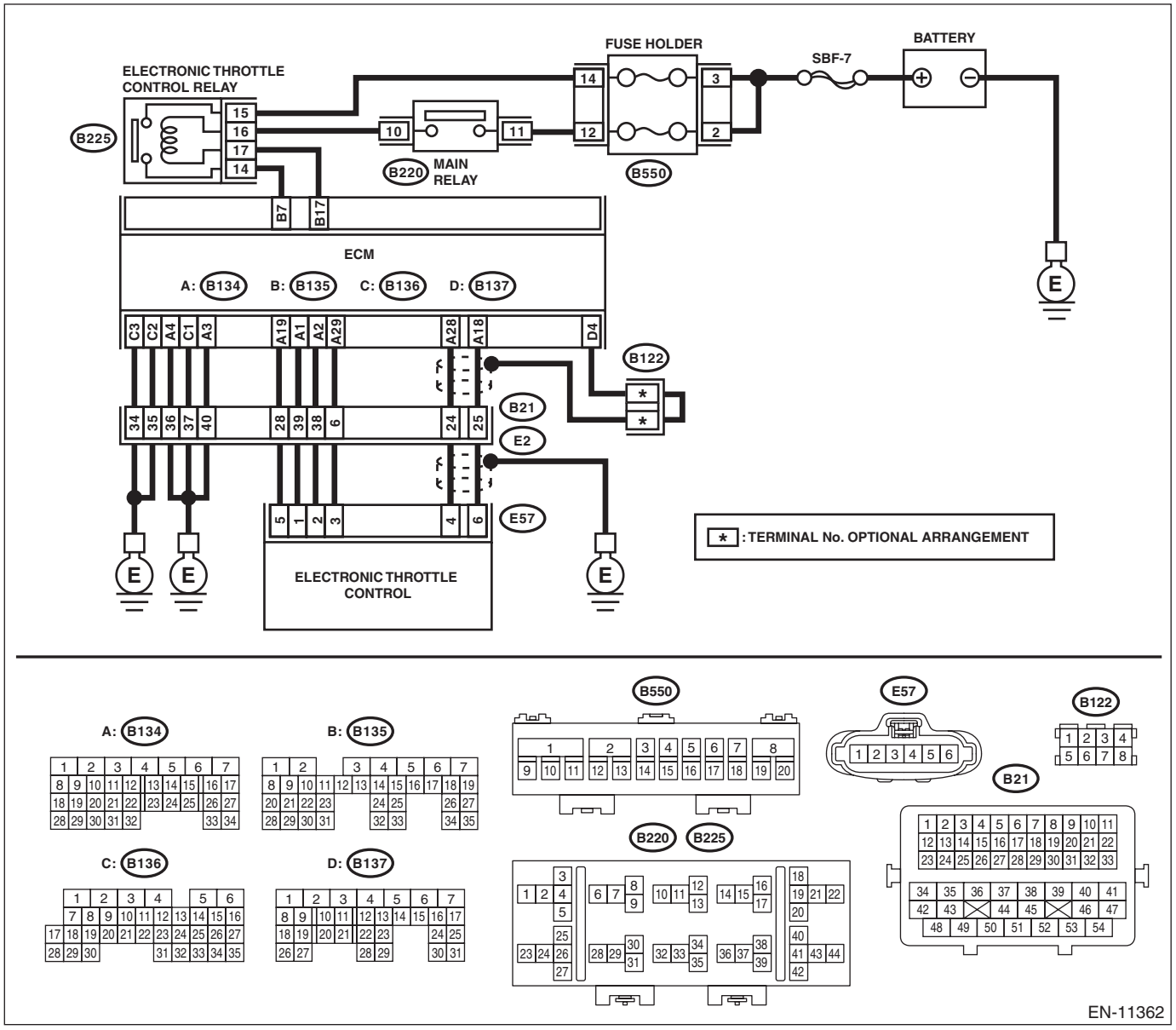
CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>





Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ENGINE OIL.**	Is there a proper amount of engine oil?	Go to step **3**.	Replace engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
3	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **5**.
5	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **6**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(w/o HEV))-144, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(w/o HEV))-176, INSPECTION, Fuel Delivery and Evaporation Lines.>
6	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **7**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>
7	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **8**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

	Step	Check	Yes	No
8	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Go to step **9**.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>
9	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **14**.	Go to step **10**.
10	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 1 — Engine ground:*** ***#2 (E16) No. 1 — Engine ground:*** ***#3 (E6) No. 1 — Engine ground:*** ***#4 (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
11	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **12**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector

	Step	Check	Yes	No
12	**CHECK FUEL INJECTOR.** Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **13**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
13	**CHECK POWER SUPPLY LINE.** 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay connector and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector
14	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector.	Go to step **15**.
15	**CHECK FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **16**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
16	**CHECK INSTALLATION CONDITION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-61, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(w/o HEV))-56, INSTALLATION, Crankshaft Position Sensor.>	Go to step **17**.

	Step	Check	Yes	No
17	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **18**.
18	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Go to step **19**.
19	**CHECK ELECTRONIC THROTTLE CONTROL RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance less than 1 Ω?	Go to step **20**.	Replace the electronic throttle control relay. <Ref. to FU(H4DO(w/o HEV))-106, Electronic Throttle Control Relay.>
20	**CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY.** Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 15 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **21**.	Repair the open or short to ground in the power supply circuit.
21	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step **22**.
22	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 — Chassis ground:*** ***(B225) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **23**.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
23	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** Measure the resistance of harness between ECM connector and electronic throttle control relay connector. ***Connector & terminal*** ***(B135) No. 17 — (B225) No. 17:*** ***(B135) No. 7 — (B225) No. 14:***	Is the resistance less than 1 Ω?	Go to step **24**.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.

	Step	Check	Yes	No
24	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 18 — Chassis ground:*** ***(B134) No. 18 — (B137) No. 4:*** ***(B134) No. 28 — Chassis ground:*** ***(B134) No. 28 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **25**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
25	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 — Engine ground:*** ***(E57) No. 4 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **26**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
26	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 18 — (E57) No. 6:*** ***(B134) No. 28 — (E57) No. 4:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **27**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
27	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **28**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector

	Step	Check	Yes	No
28	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 (+) — Engine ground (–):*** ***(E57) No. 4 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **29**.
29	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 18:*** ***(B134) No. 19 — (B134) No. 28:***	Is the resistance 1 MΩ or more?	Go to step **30**.	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.
30	**CHECK SENSOR OUTPUT.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the value of «Main-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Main-Throttle Sensor» 0.81 — 0.87 V?	Go to step **31**.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>
31	**CHECK SENSOR OUTPUT.** Read the value of «Sub-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Sub-Throttle Sensor» 1.64 — 1.70 V?	Go to step **32**.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>
32	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 2 — (E57) No. 2:*** ***(B134) No. 1 — (E57) No. 1:***	Is the resistance less than 1 Ω?	Go to step **33**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector

	Step	Check	Yes	No
33	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 2 (+) — Engine ground (–):*** ***(E57) No. 1 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **34**.
34	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 2 — Engine ground:*** ***(E57) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **35**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
35	**CHECK HARNESS BETWEEN ELECTRONIC THROTTLE CONTROL CONNECTOR.** Measure the resistance between electronic throttle control connectors. ***Connector & terminal*** ***(E57) No. 2 — (E57) No. 1:***	Is the resistance 1 MΩ or more?	Go to step **36**.	Repair the short circuit in harness between ECM connector and electronic throttle control connector.
36	**CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **37**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
37	**CHECK ELECTRONIC THROTTLE CONTROL.** Measure the resistance between electronic throttle control terminals. ***Terminals*** ***No. 2 — No. 1:***	Is the resistance 50 Ω or less?	Go to step **38**.	Replace the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>
38	**CHECK ELECTRONIC THROTTLE CONTROL.** Move the throttle valve to the fully opened and fully closed positions with fingers. Check that the valve returns to the specified position when releasing fingers.	Does the valve return to the specified position? Standard value: 3 mm (0.12 in) from fully closed position	Repair the poor contact of ECM connector.	Replace the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>

1. OUTLINE OF DIAGNOSIS

• When cold, the abnormality in the control of target engine speed increase is detected. (P050A)

Judge as NG if the exhaust gas temperature diagnosis or idle speed diagnosis is NG.
• Exhaust gas temperature diagnosis
Judge as NG when the estimated exhausted gas temperature in 14 seconds after the cold start is below the specified value.
• Idle speed diagnosis
Judge as NG when actual engine speed is not close to target engine speed at cold start.

• Detect malfunctions of the catalyst advanced idling retard angle control. (P050B)

Judge as NG when ECM is not controlling the angle properly during catalyst advanced idling retard angle control.
• Final ignition timing diagnosis
Judge as NG when actual retard amount is under the specified value at cold start.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
<Idle speed diagnosis>	
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Battery voltage	≥ 10.9 V
Vehicle speed	≤ 2 km/h (1.2 MPH)
Engine coolant temperature	≤ 70 °C (158 °F)
Intake air amount sum value	< Value of Map 1
Elapsed time after gear position change (P ←→ D or N ←→ D)	≥ 3000 ms
Throttle valve opening angle	< 0.37 °
Fuel volatility	Not extremely low volatility
Elapsed time after starting the engine	≥ 2000 ms
<Final ignition timing diagnosis>	
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Battery voltage	≥ 10.9 V
Vehicle speed	≤ 2 km/h (1.2 MPH)
Engine coolant temperature	≤ 70 °C (158 °F)
Intake air amount sum value	< Value of Map 2
Elapsed time after gear position change (P ←→ D or N ←→ D)	≥ 3000 ms
Throttle valve opening angle	< 0.37 °
Fuel volatility	Not extremely low volatility
Target retard amount	≥ 5°CA

Map 1

Engine coolant temperature at engine starting °C (°F)	–40 (–40)	–30 (–22)	–20 (–4)	–10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Intake air amount sum value g (oz)	2391 (84.33)	1872 (66.01)	1419 (50.05)	1033 (36.45)	715 (25.21)	450 (15.87)	390 (13.76)	390 (13.76)

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Intake air amount sum value g (oz)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)

Map 2

Engine coolant temperature at engine starting °C (°F)	–40 (–40)	–30 (–22)	–20 (–4)	–10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Intake air amount sum value g (oz)	2391 (84.33)	1872 (66.01)	1419 (50.05)	1033 (36.45)	715 (25.21)	450 (15.87)	390 (13.76)	390 (13.76)

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Intake air amount sum value g (oz)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)	390 (13.76)

3. GENERAL DRIVING CYCLE

Perform the diagnosis at cold start.

4. DIAGNOSTIC METHOD

• Idle speed diagnosis

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Target engine speed	< – 300 rpm

Time Needed for Diagnosis: 7000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

• Final ignition timing diagnosis

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Final ignition timing – ignition timing during CSERS* *: Ignition timing during CSERS (Cold Start Emission Reduction Strategy) = Base ignition timing – retard amount	> Value of Map 4

Map 4

Engine coolant temperature	-40 °C (-40 °F)	-30 °C (-22 °F)	-20 °C (-4 °F)	-10 °C (14 °F)	0 °C (32 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	50 °C (122 °F)	60 °C (140 °F)
Threshold value (CVT model)	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s
Threshold value (MT model)	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s	6 g/s

Time Needed for Diagnosis: 7000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CZ:DTC P050B COLD START IGNITION TIMING PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P050A. <Ref. to EN(H4DO w/o HEV)(diag)-365, DTC P050A COLD START IDLE CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P050A. <Ref. to EN(H4DO w/o HEV)(diag)-365, DTC P050A COLD START IDLE CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

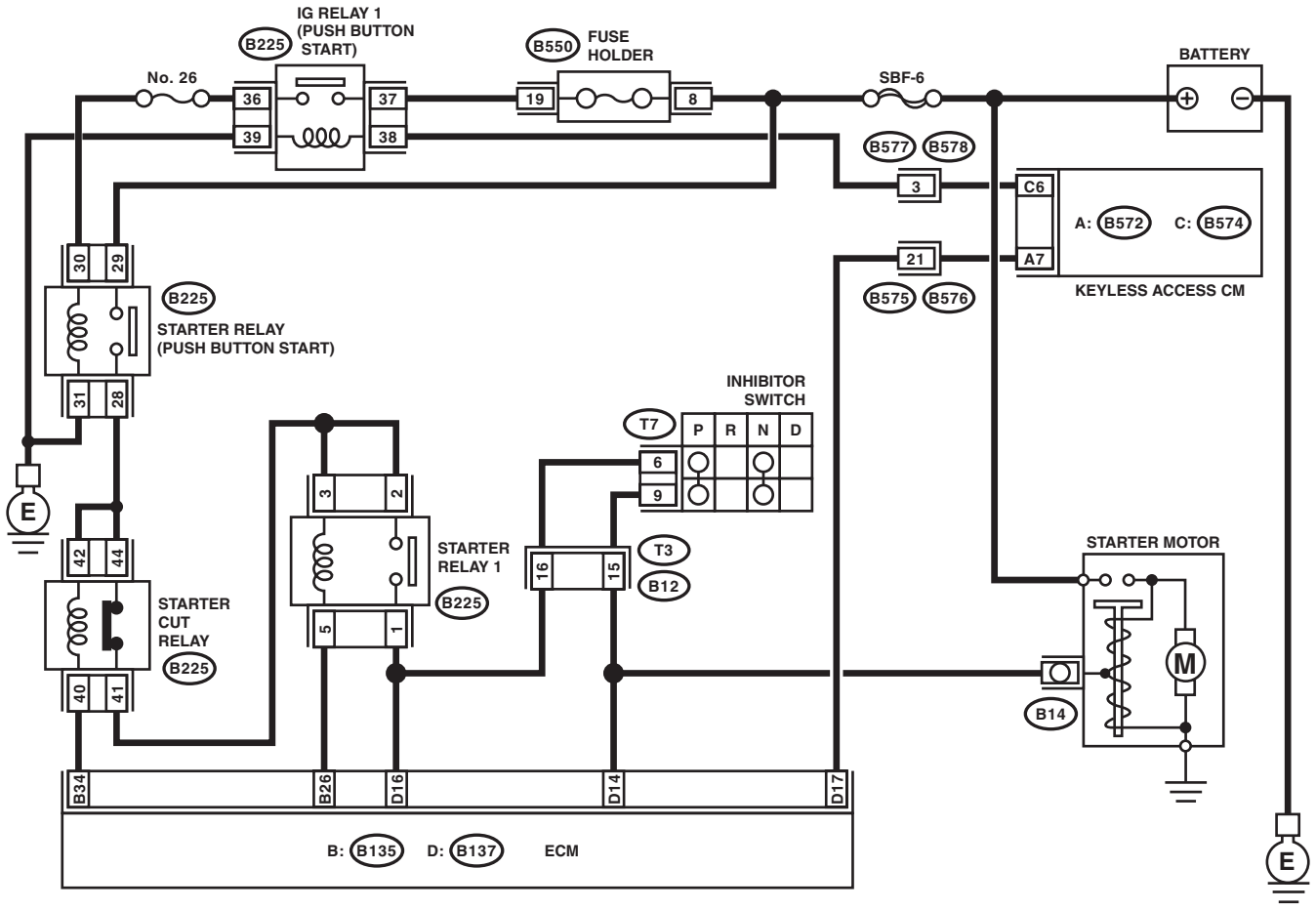
DA:DTC P0512 STARTER (SWITCH) REQUEST CIRCUIT

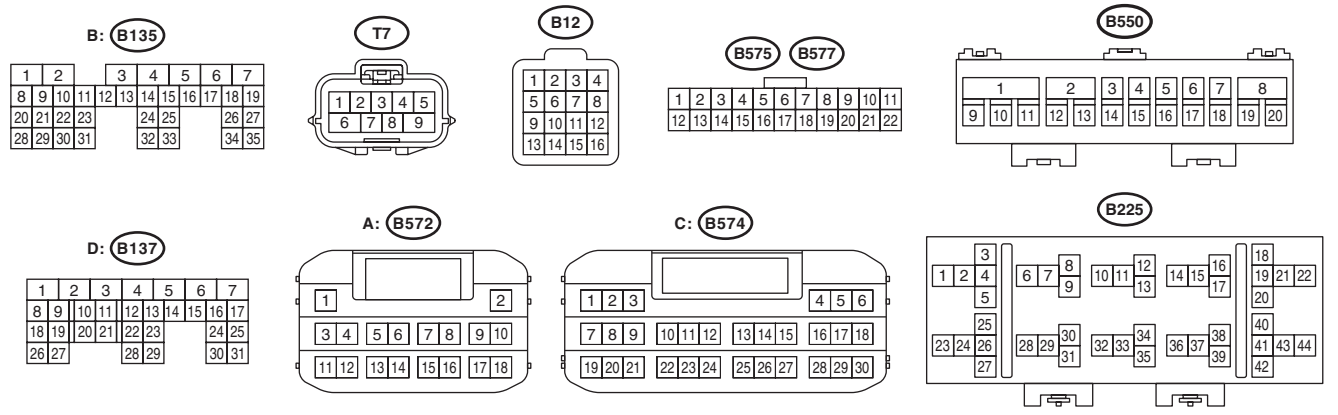
DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-116, WITH PUSH BUTTON START, WIRING DIAGRAM, Engine Electrical System.>





EN-11364

	Step	Check	Yes	No
1	**CHECK PUSH BUTTON IGNITION SWITCH.** Operate the push button ignition switch.	Does it operate smoothly without catch?	Go to step **2**.	Replace the push button ignition switch. <Ref. to SL-107, Push Button Ignition Switch.>
2	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Start and idle the engine for three minutes or more.	Is the same DTC as current diagnosis output?	Go to step **3**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM.** 1) Turn the ignition to OFF. 2) Disconnect the connector from ECM. 3) Turn the ignition to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power supply in harness between ECM connector and keyless access CM connector.	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Detect abnormal continuity in the starter SW1.
Judge as ON NG when the starter SW 1 signal remains ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Engine speed	> 500 rpm

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Starter SW1 voltage	≥ Battery voltage × 0.85

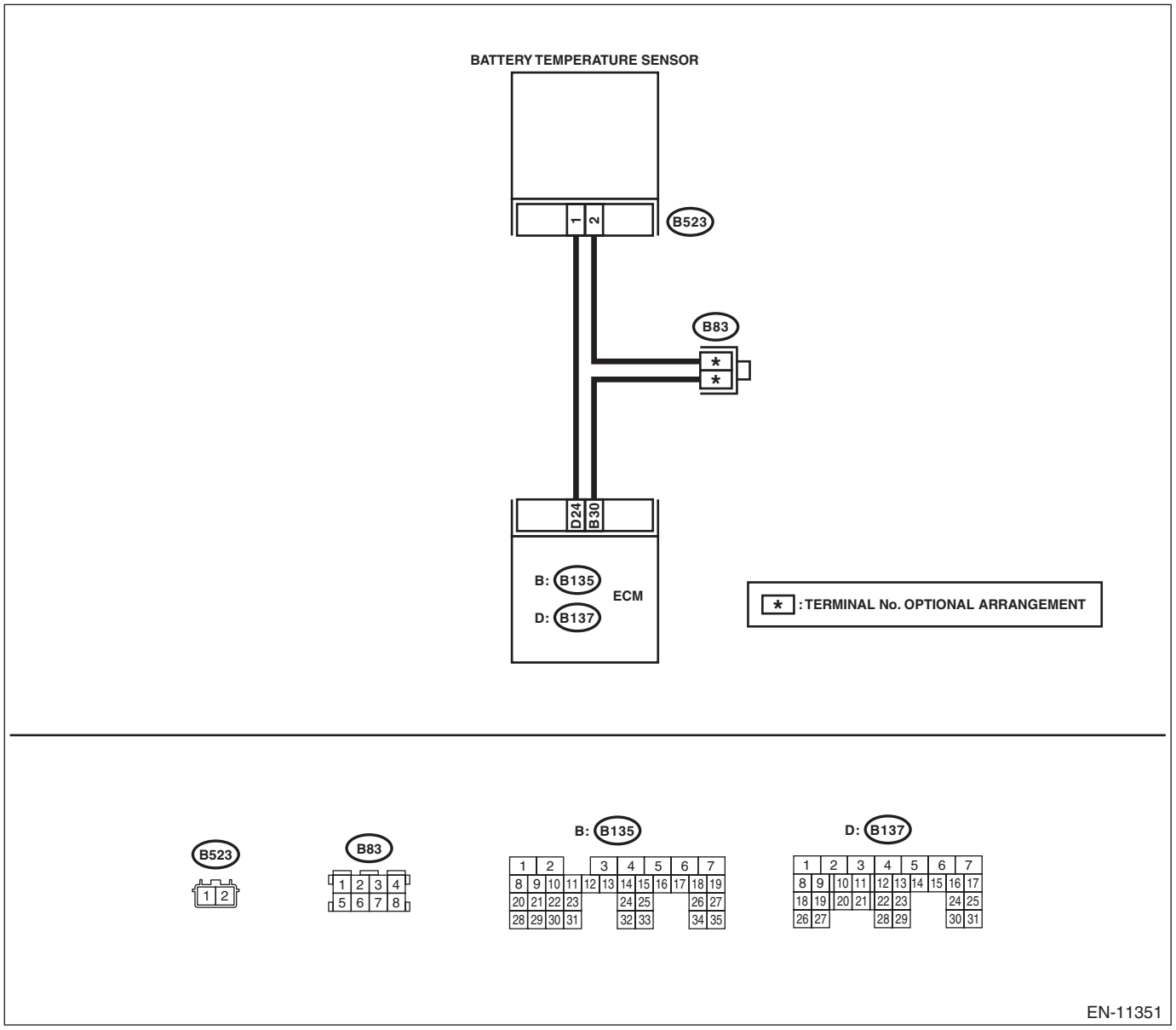
Time Needed for Diagnosis: 30000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DB:DTC P0516 BATTERY TEMPERATURE SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

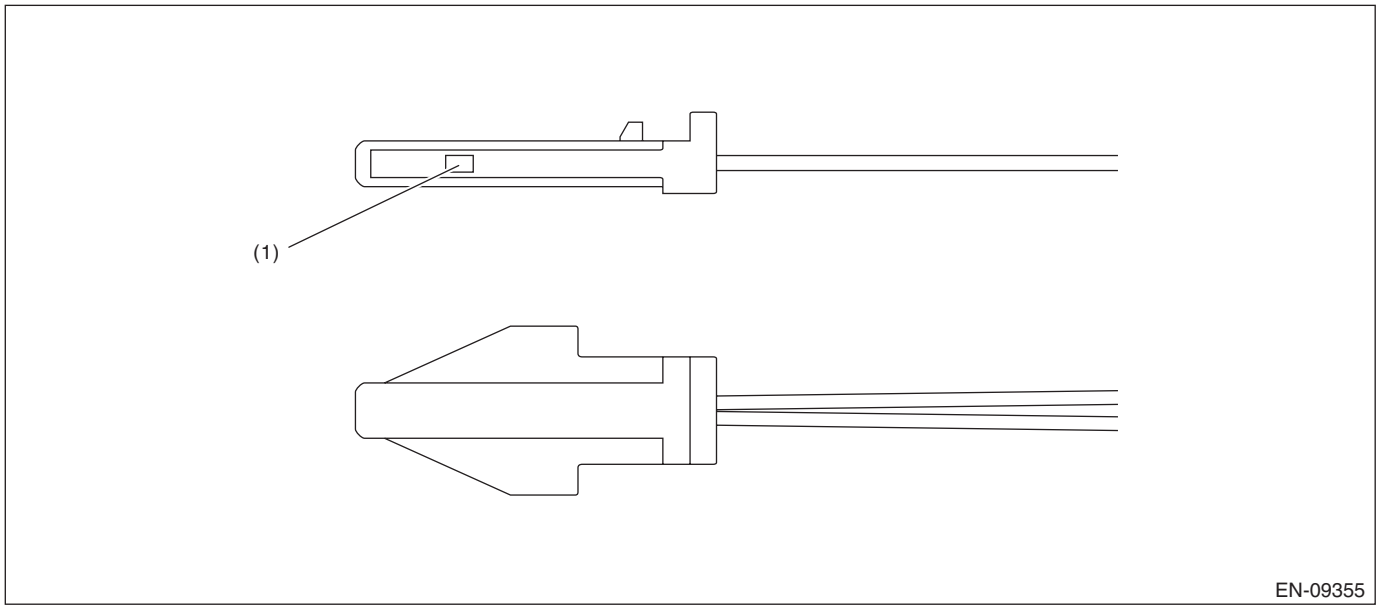


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Battery temperature» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Battery temperature» 100°C (212°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND BATTERY TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and battery temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 24 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the battery temperature sensor. <Ref. to SC(H4DO(w/o HEV))-60, Battery Current & Temperature Sensor.>	Repair the short circuit to ground in the harness between the ECM connector and battery temperature sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of battery temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Sensor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 1000 ms
Engine speed	> 500 rpm
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.1294 V

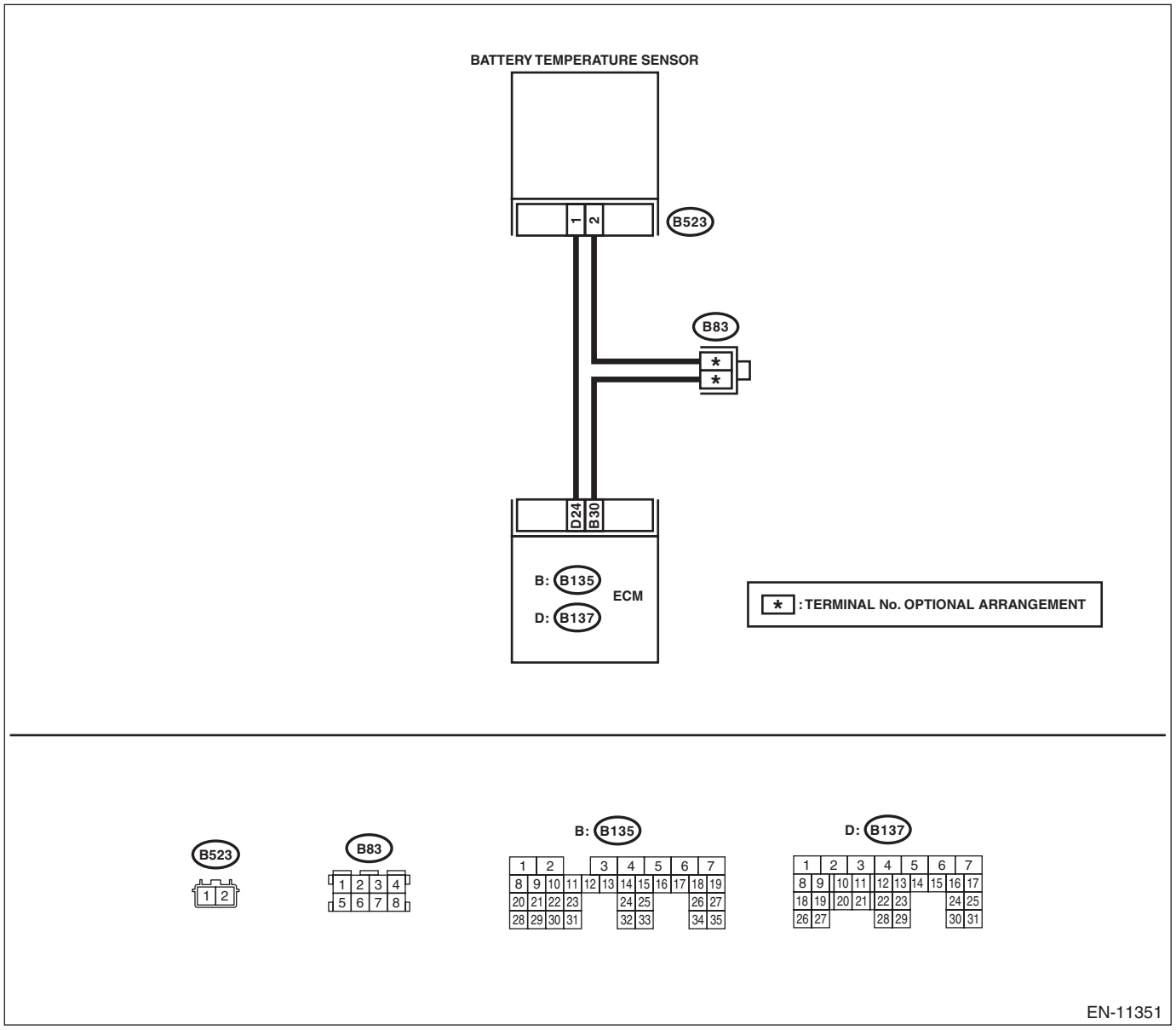
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Does not illuminate even when malfunction occurs.

DC:DTC P0517 BATTERY TEMPERATURE SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

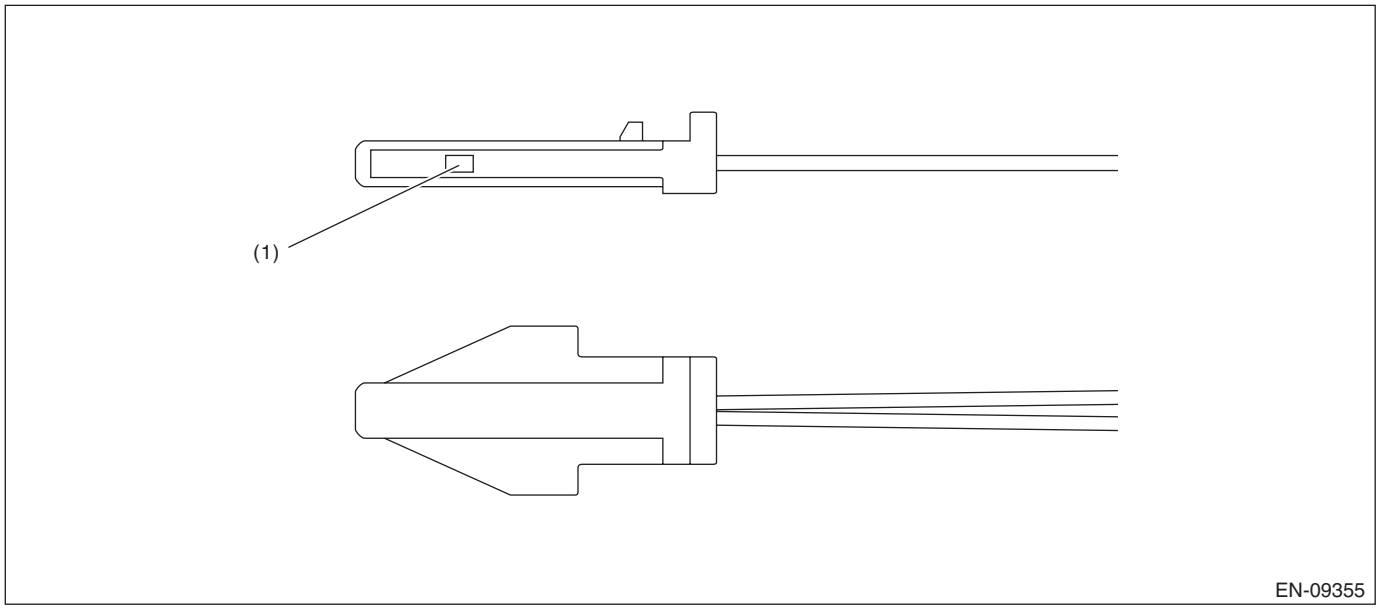


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Battery temperature» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Battery temperature» –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK FOR POOR CONTACT.** Check for poor contact between the ECM and battery temperature sensor connectors.	Is there poor contact of the ECM or battery temperature sensor connectors?	Repair any poor contact between the ECM and battery temperature sensor connectors.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND BATTERY TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and battery temperature sensor. 3) Measure the resistance of harness between ECM connector and battery temperature sensor connector. ***Connector & terminal*** ***(B137) No. 24 — (B523) No. 1:*** ***(B135) No. 30 — (B523) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and battery temperature sensor connector • Poor contact of joint connector
4	**CHECK HARNESS BETWEEN ECM AND BATTERY TEMPERATURE SENSOR CONNECTOR.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 24 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and battery temperature sensor connector.	Replace the battery temperature sensor. <Ref. to SC(H4DO(w/o HEV))-60, Battery Current & Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of battery temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Sensor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 1000 ms
Engine speed	> 500 rpm
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.668 V

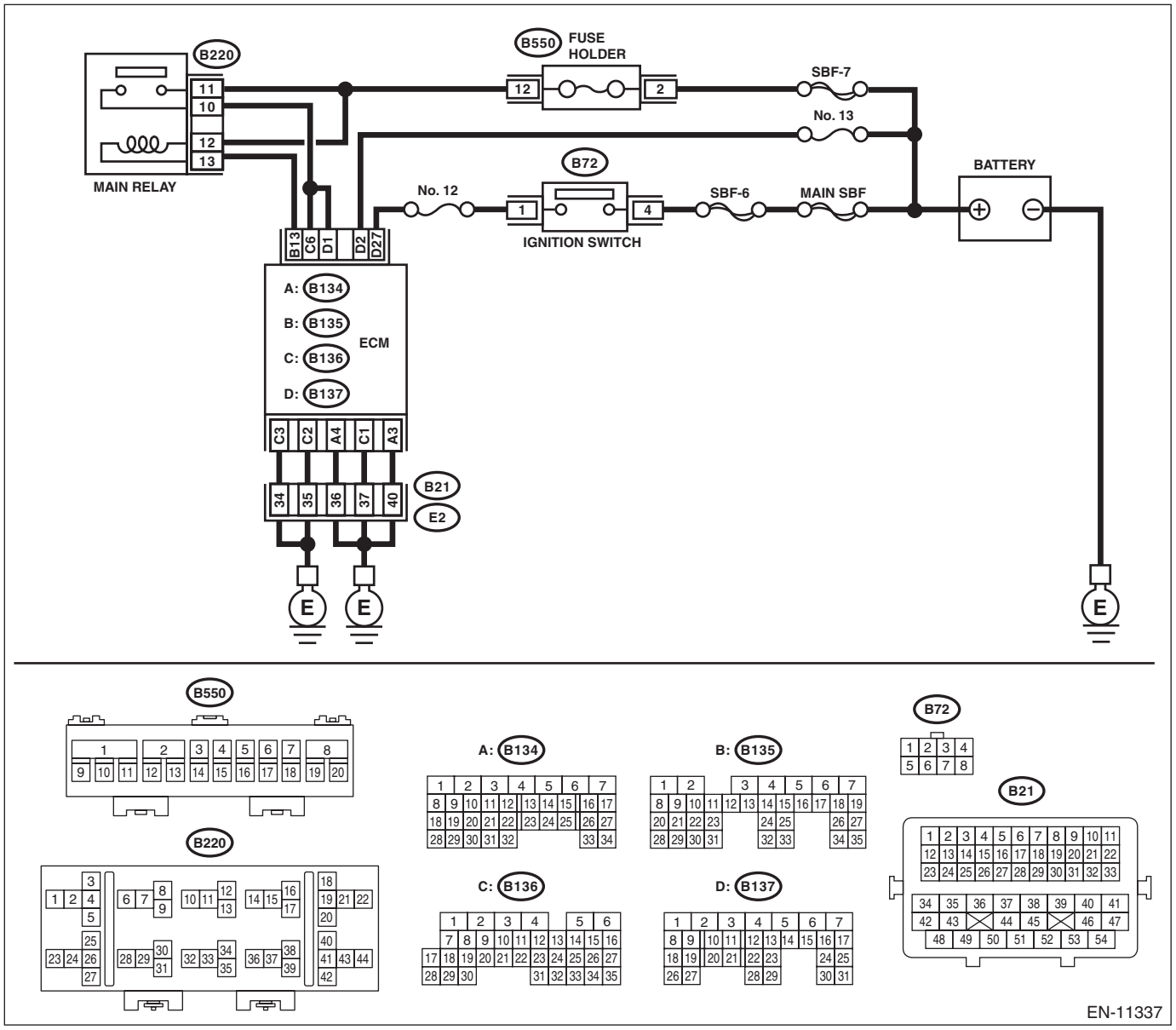
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Does not illuminate even when malfunction occurs.

DD:DTC P0560 SYSTEM VOLTAGE

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL OF ECM.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND MAIN FUSE BOX CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and battery terminal.
3	**CHECK FUSE NO. 13 (MAIN FUSE BOX).**	Is the fuse blown out?	Replace the fuse.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and battery • Poor contact of ECM connector • Poor contact of battery terminal

1. OUTLINE OF DIAGNOSIS

Detect the open/short circuit of back-up power supply circuit.
Judge as NG when the backup power voltage is low.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of back-up power supply	≤ 3.5 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DE:DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine does not start
- Engine stall

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer (RAM).
If it is possible to write data to the whole area of RAM in the initial routine, and is possible to read the same data, it is judged as OK, and if not, NG.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

Diagnosis with the initial routine.

3. GENERAL DRIVING CYCLE

Perform the diagnosis as soon as the ignition switch is turned to ON.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Write the specified value into the RAM.	The written value cannot be read.

Time Needed for Diagnosis: Less than 0.512 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DF:DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR

NOTE:
For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO w/o HEV)(diag)-390, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when SUM value of ROM is outside the standard value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
ECM initialization	Run

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG if the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
SUM value of ROM	Malfunction

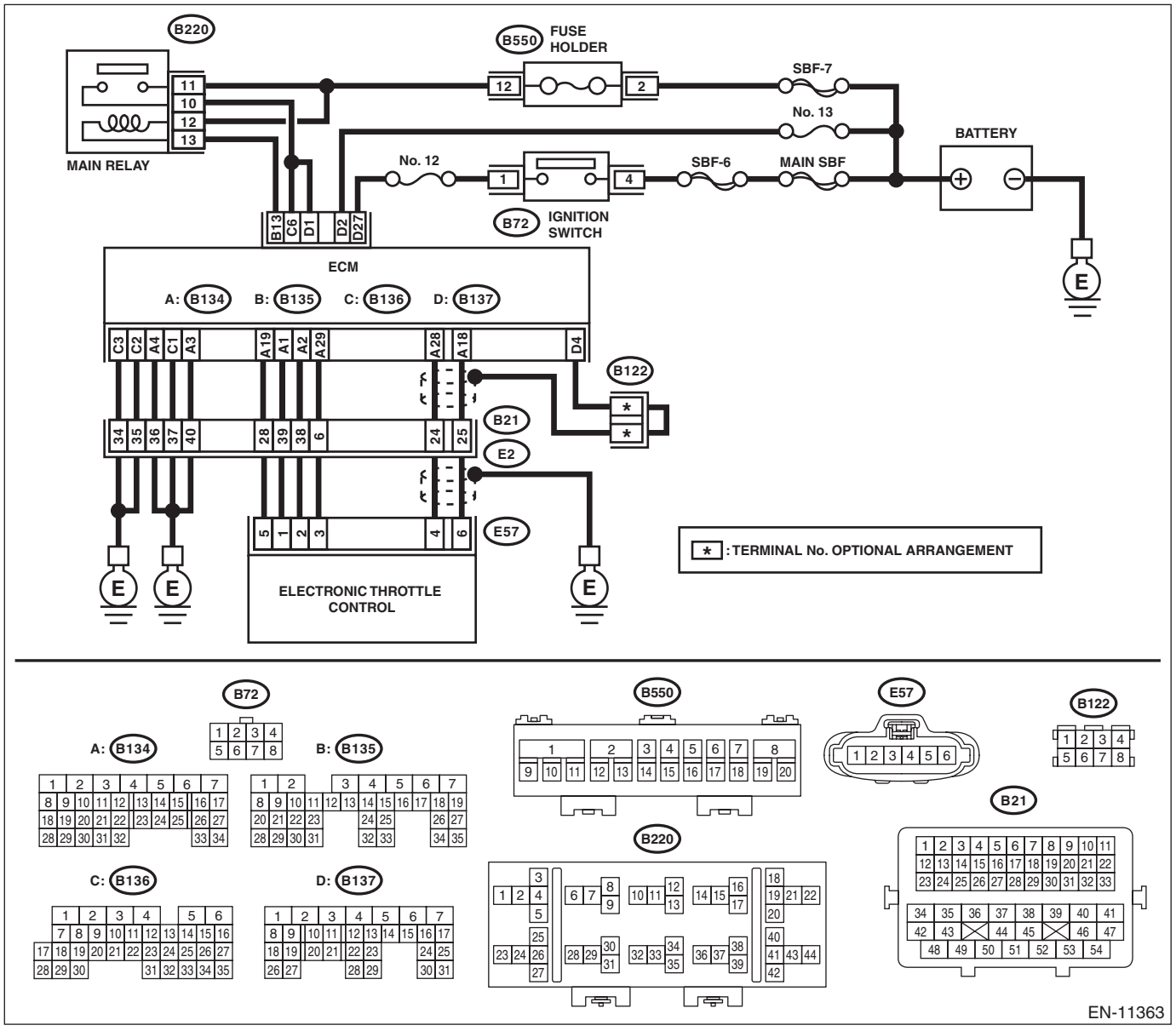
Time Needed for Diagnosis: 0.512 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DG:DTC P0606 CONTROL MODULE PROCESSOR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

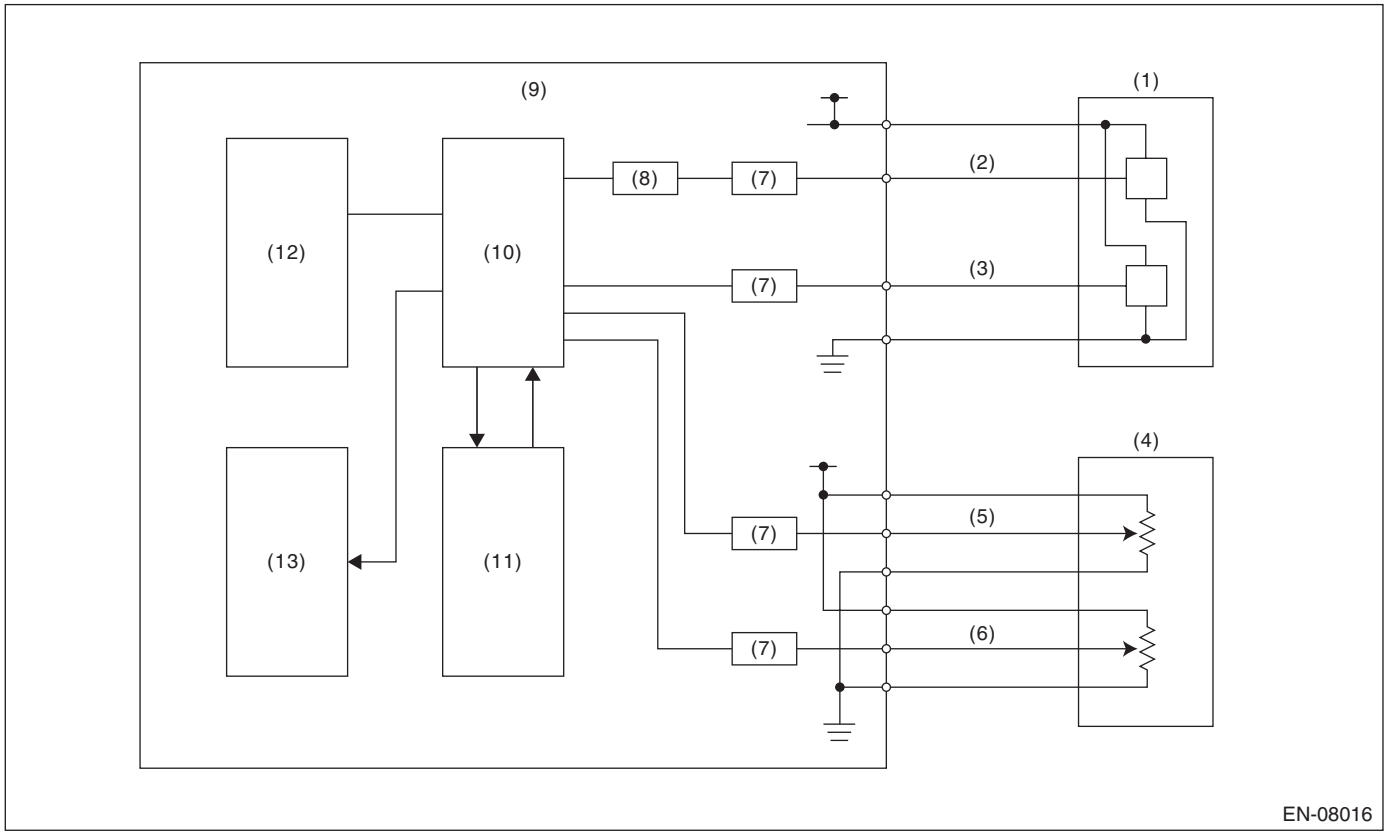


	Step	Check	Yes	No
1	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 6 (+) — Chassis ground (–):*** ***(B137) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **2**.	Repair the open or short to ground in the power supply circuit.
2	**CHECK INPUT VOLTAGE OF ECM.** 1) Start the engine. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 6 (+) — Chassis ground (–):*** ***(B137) No. 1 (+) — Chassis ground (–):***	Is the voltage 13 — 15 V?	Go to step **3**.	Repair the open or short to ground in the power supply circuit.
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 19 — (E57) No. 5:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
4	**CHECK ECM GROUND HARNESS.** 1) Connect all connectors. 2) Turn the ignition to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 (+) — Chassis ground (–):*** ***(B134) No. 4 (+) — Chassis ground (–):*** ***(B136) No. 1 (+) — Chassis ground (–):*** ***(B136) No. 2 (+) — Chassis ground (–):*** ***(B136) No. 3 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Check the connector for poor contact and check the harness. Replace the ECM if no fault is found. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in ground circuit • Further tightening of the engine ground terminal • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Judge as NG when any one of the followings is established.
(1) If the CPU operation is abnormal (instruction/flow check).
(2) If the output IC operation is abnormal (output driver malfunction).

2. COMPONENT DESCRIPTION



(1)	Throttle position sensor	(6)	Accelerator pedal position sensor 2	(10)	CPU
(2)	Throttle position sensor 1	(7)	I/F circuit	(11)	Monitoring IC
(3)	Throttle position sensor 2	(8)	Amplifier circuit	(12)	EEPROM
(4)	Accelerator pedal position sensor	(9)	Engine control module (ECM)	(13)	Output IC
(5)	Accelerator pedal position sensor 1				

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
(1) Ignition switch	ON
(1) ETC control	Permission
(2) Ignition switch	ON
(2) Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG if any of the followings is established.

Judgment Value

Malfunction Criteria	Threshold Value
(1) Main CPU calculation result	The result and expected value match
(2) Communication between output ICs	Possible to communicate
(3) Step of calculation	Expected step of calculation
(4)-1 Motor relay cut-off signal from observation IC	ON
(4)-2 As defined by	
Instruction error	Detect
or	
Instruction error	Detect
(5) Driver IC bus signal	Did not change
(6) Written data in the CAN register	≠ Read data

Time Needed for Diagnosis:
(1): 2 time(s)
(2): 512 ms
(3): 504 ms
(4): 48 ms
(5): 2500 ms
(6): Less than 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

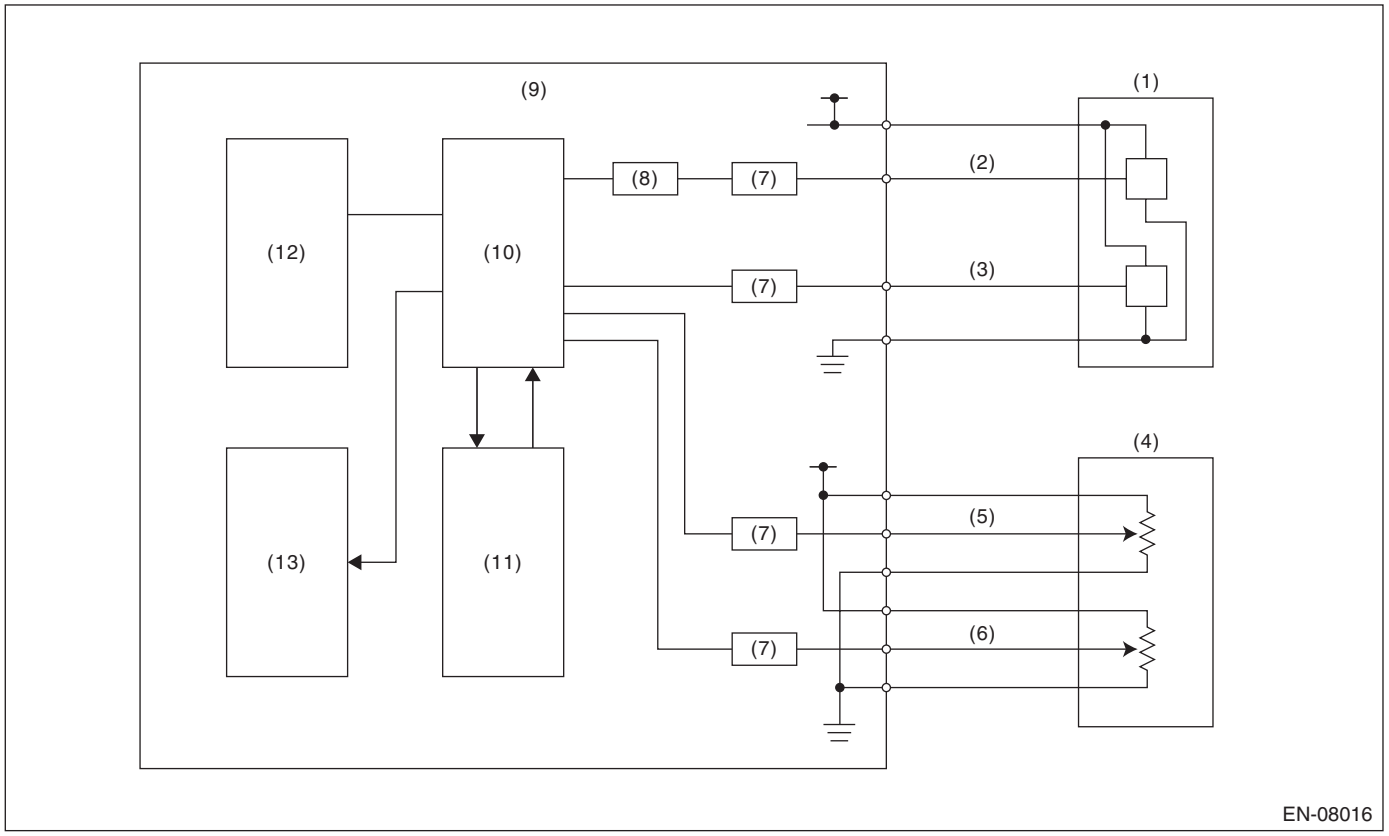
DH:DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO w/o HEV)(diag)-390, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the monitoring IC operation is abnormal. (Monitoring IC malfunction)

2. COMPONENT DESCRIPTION



(1) Throttle position sensor
(2) Throttle position sensor 1
(3) Throttle position sensor 2
(4) Accelerator pedal position sensor
(5) Accelerator pedal position sensor 1
(6) Accelerator pedal position sensor 2
(7) I/F circuit
(8) Amplifier circuit
(9) Engine control module (ECM)
(10) CPU
(11) Monitoring IC
(12) EEPROM
(13) Output IC

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
(1) Battery voltage	≥ 6 V
(1) CPU intentionally sends a motor cut-off command to the observation IC	ON
(2) Battery voltage	≥ 6 V
(2) CPU intentionally sends an incorrect data	ON
(3) Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
(1) Throttle position Memory throttle position when monitoring	≥ 2 °
(2) Motor cut-off signal from observation IC	= Not Detected
(3) Written data in the observation IC register	≠ Not Detected

Time Needed for Diagnosis:
(1): 24 ms
(2): 24 ms
(3): 200 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

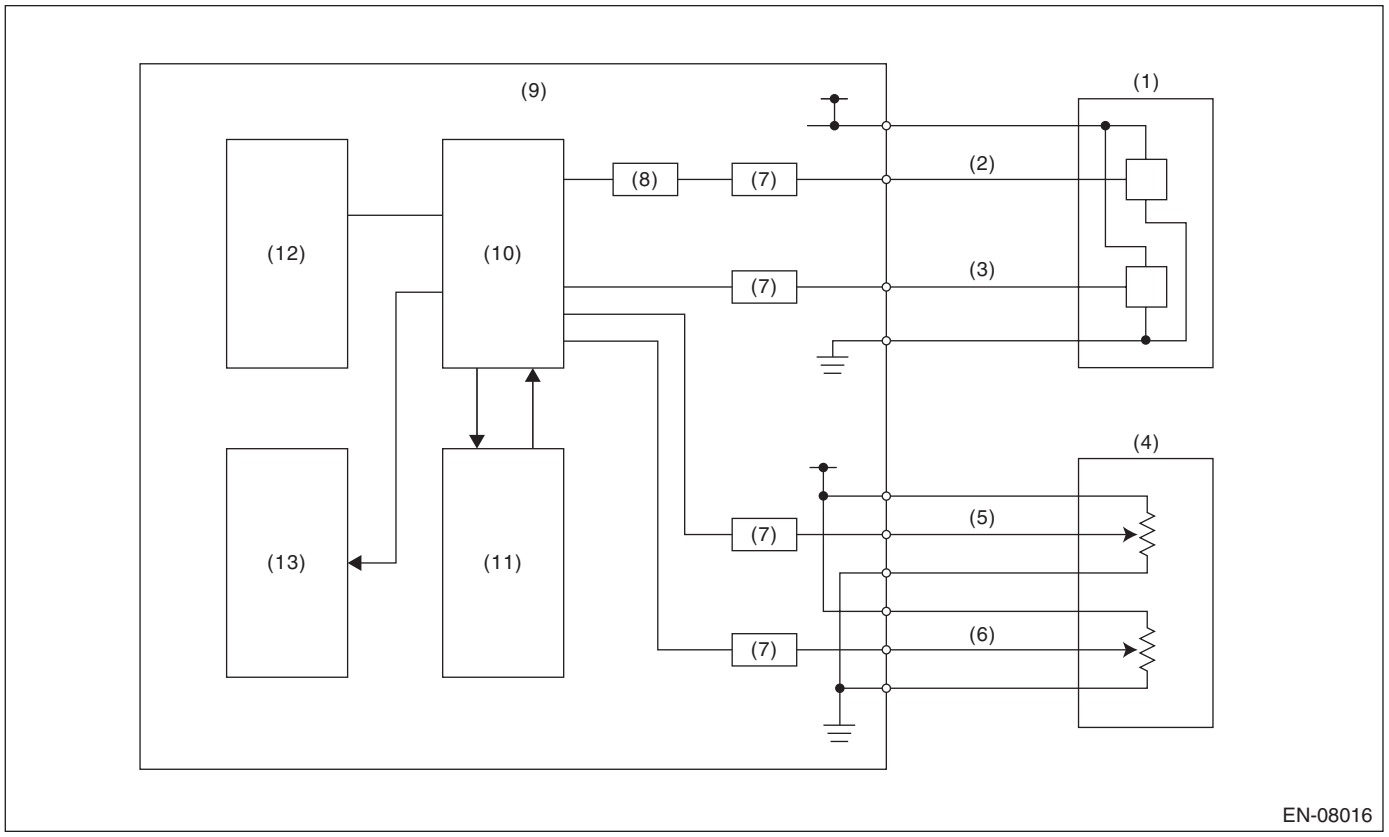
DI: DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO w/o HEV)(diag)-390, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when any one of the followings is established.
(1) If the input amplifier circuit of throttle position sensor 1 is abnormal (quadruple amplification problem).
(2) If the A/D converter operation is abnormal (ADC malfunction).

2. COMPONENT DESCRIPTION



(1) Throttle position sensor
(2) Throttle position sensor 1
(3) Throttle position sensor 2
(4) Accelerator pedal position sensor
(5) Accelerator pedal position sensor 1
(6) Accelerator pedal position sensor 2
(7) I/F circuit
(8) Amplifier circuit
(9) Engine control module (ECM)
(10) CPU
(11) Monitoring IC
(12) EEPROM
(13) Output IC

3. EXECUTION CONDITION

Diagnosis 1

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V
Target voltage	= 0 V

Diagnosis 2

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V
Target voltage	= 5 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Diagnosis 1

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Actual voltage	> 0.01953125 V

Time Needed for Diagnosis: 200 ms

Diagnosis 2

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Actual voltage	> 4.979248047 V

Time Needed for Diagnosis: 200 ms

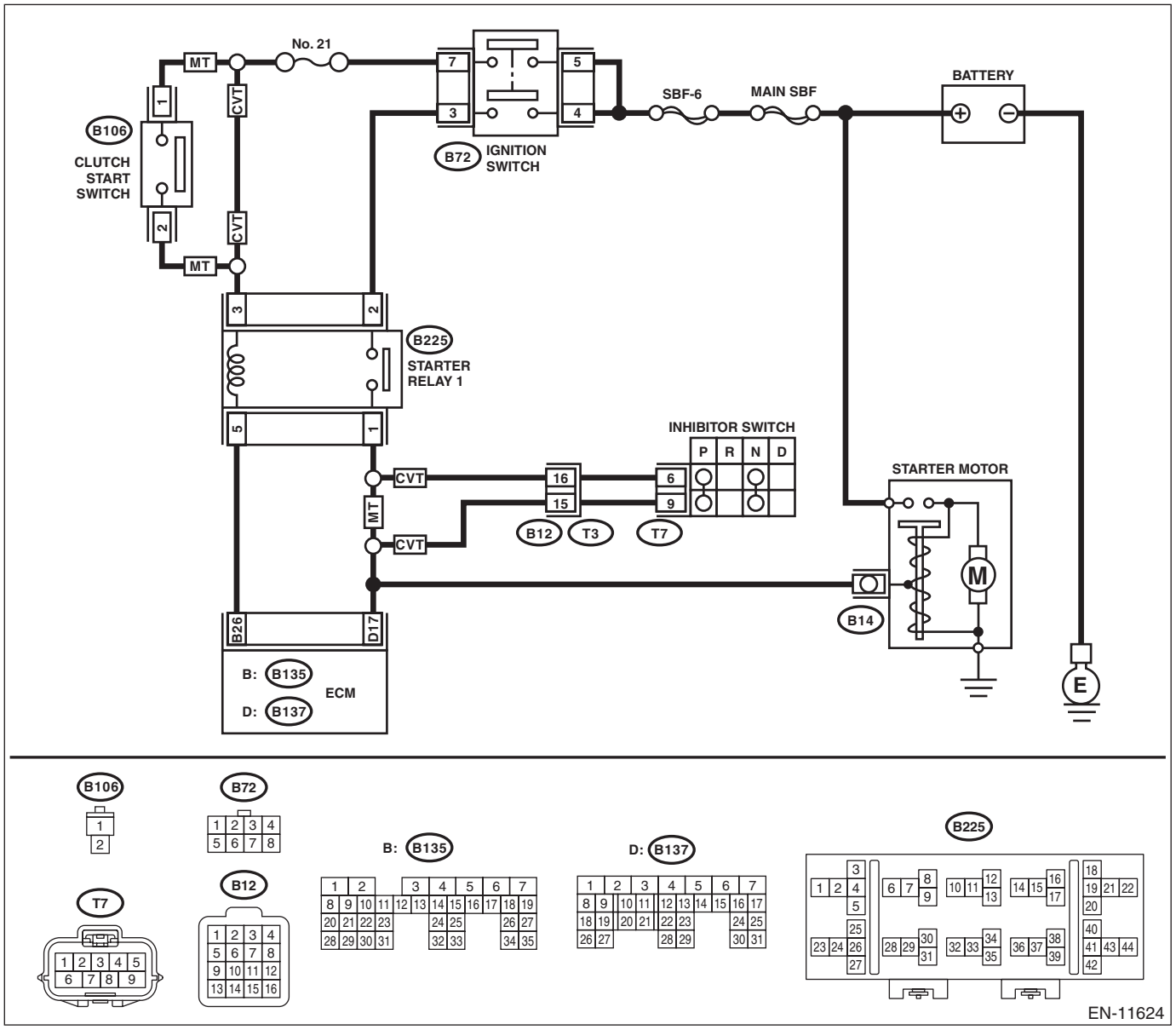
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DJ:DTC P0616 STARTER RELAY "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Remove the starter relay 1. 3) Disconnect the connectors from ECM and starter motor. 4) Measure the resistance of harness between ECM connector and starter relay 1 connector. ***Connector & terminal*** ***(B136) No. 16 — (B225) No. 1:*** NOTE: For CVT model, place the select lever in "P" range or "N" range.	Is the resistance less than 1 Ω?	Go to step **3**.	NOTE: Check the following item and repair or replace if necessary. • Open circuit of harness between ECM connector and starter relay 1 connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and starter relay 1 connector.

1. OUTLINE OF DIAGNOSIS

Detect abnormal continuity in the starter SW.
Judge as OFF NG when the starter SW signal remains OFF.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Engine speed increases from 0 to more than 500 rpm	
Vehicle speed	< 1 km/h
Starter relay command	ON

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as OFF NG when the following conditions are established.

Judgment Value

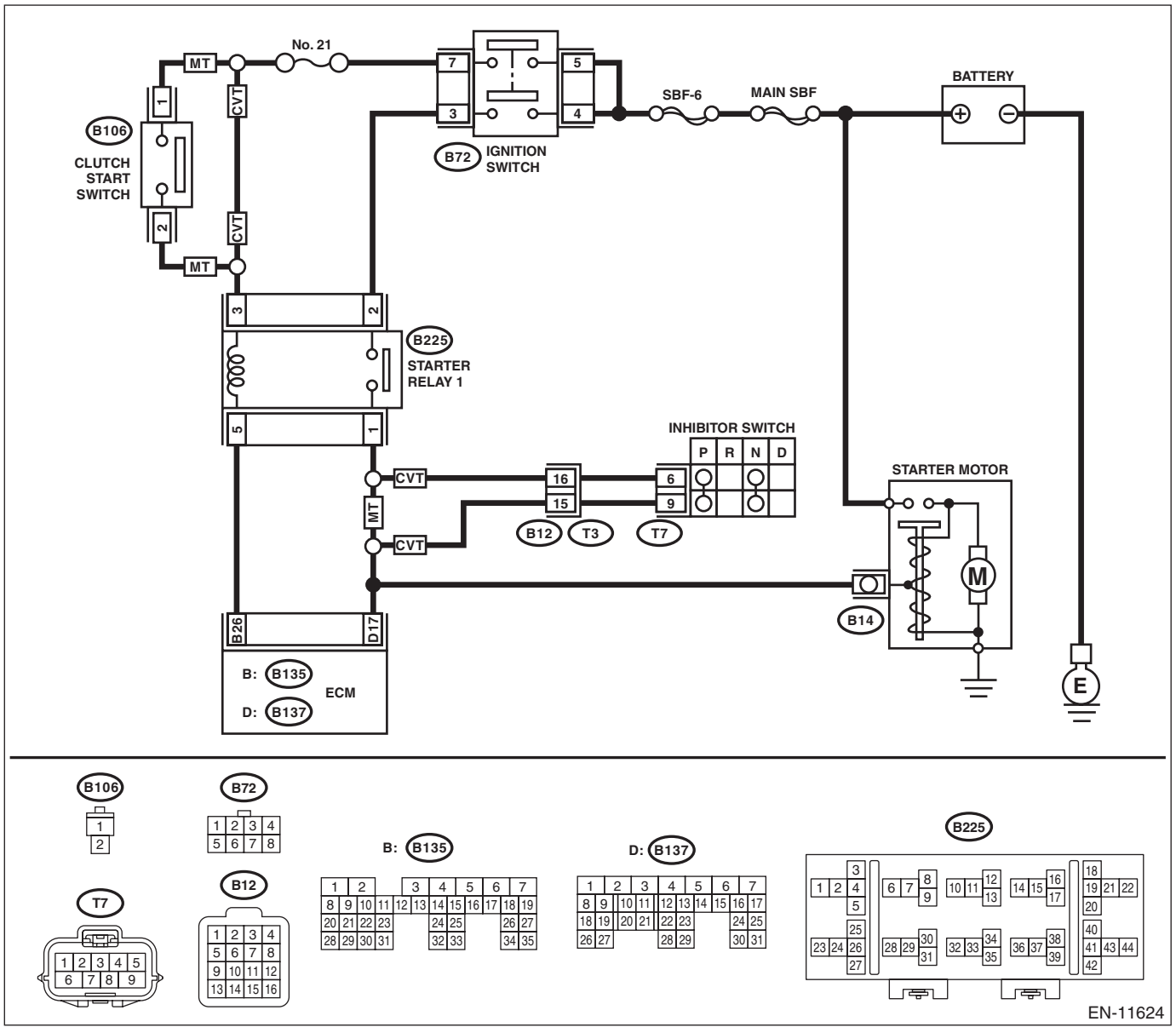
Malfunction Criteria	Threshold Value
The ECM did not detect the following. Measured ECM input voltage which is supplied from 12 V battery system through the starter relay	≥ 12 V battery system voltage × 0.85 V

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DK:DTC P0617 STARTER RELAY "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 16 (+) — Chassis ground (–):*** NOTE: For CVT model, place the select lever in "P" range or "N" range.	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and starter relay 1 connector.	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Detect abnormal continuity in the starter SW.
Judge as ON NG when the starter SW signal remains ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Engine speed	> 500 rpm
Starter relay command	OFF

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured ECM input voltage which is supplied from 12 V battery system through the starter relay	≥ 12 V battery system voltage × 0.85 V

Time Needed for Diagnosis: 30000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

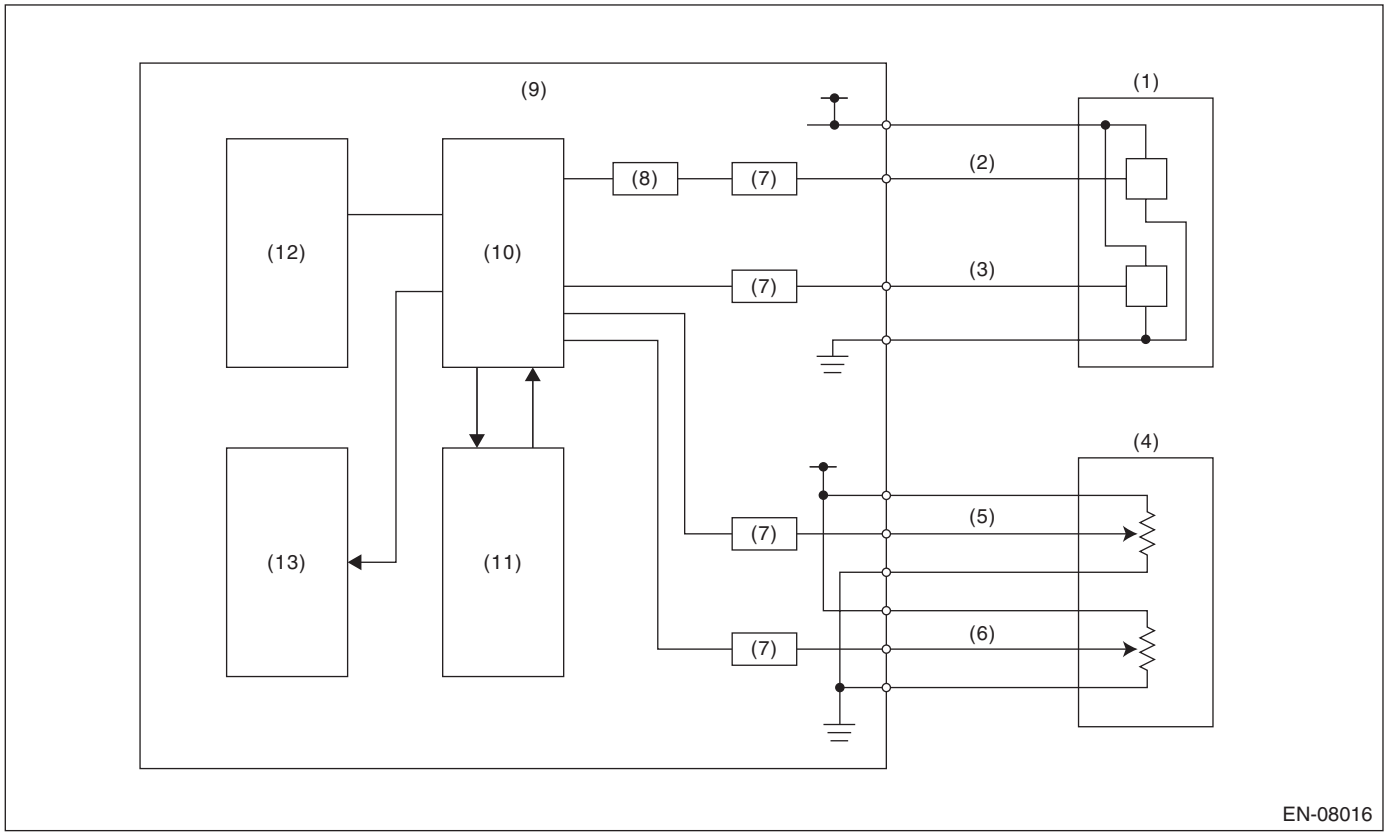
DL:DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

NOTE:
For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO w/o HEV)(diag)-390, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the EEPROM operation is abnormal. (EEPROM malfunction)

2. COMPONENT DESCRIPTION



(1) Throttle position sensor
(2) Throttle position sensor 1
(3) Throttle position sensor 2
(4) Accelerator pedal position sensor
(5) Accelerator pedal position sensor 1
(6) Accelerator pedal position sensor 2
(7) I/F circuit
(8) Amplifier circuit
(9) Engine control module (ECM)
(10) CPU
(11) Monitoring IC
(12) EEPROM
(13) Output IC

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (EEPROM)	Error

Time Needed for Diagnosis: 2 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DM:DTC P0685 ECM/PCM POWER RELAY CONTROL CIRCUIT/OPEN

DTC DETECTING CONDITION:

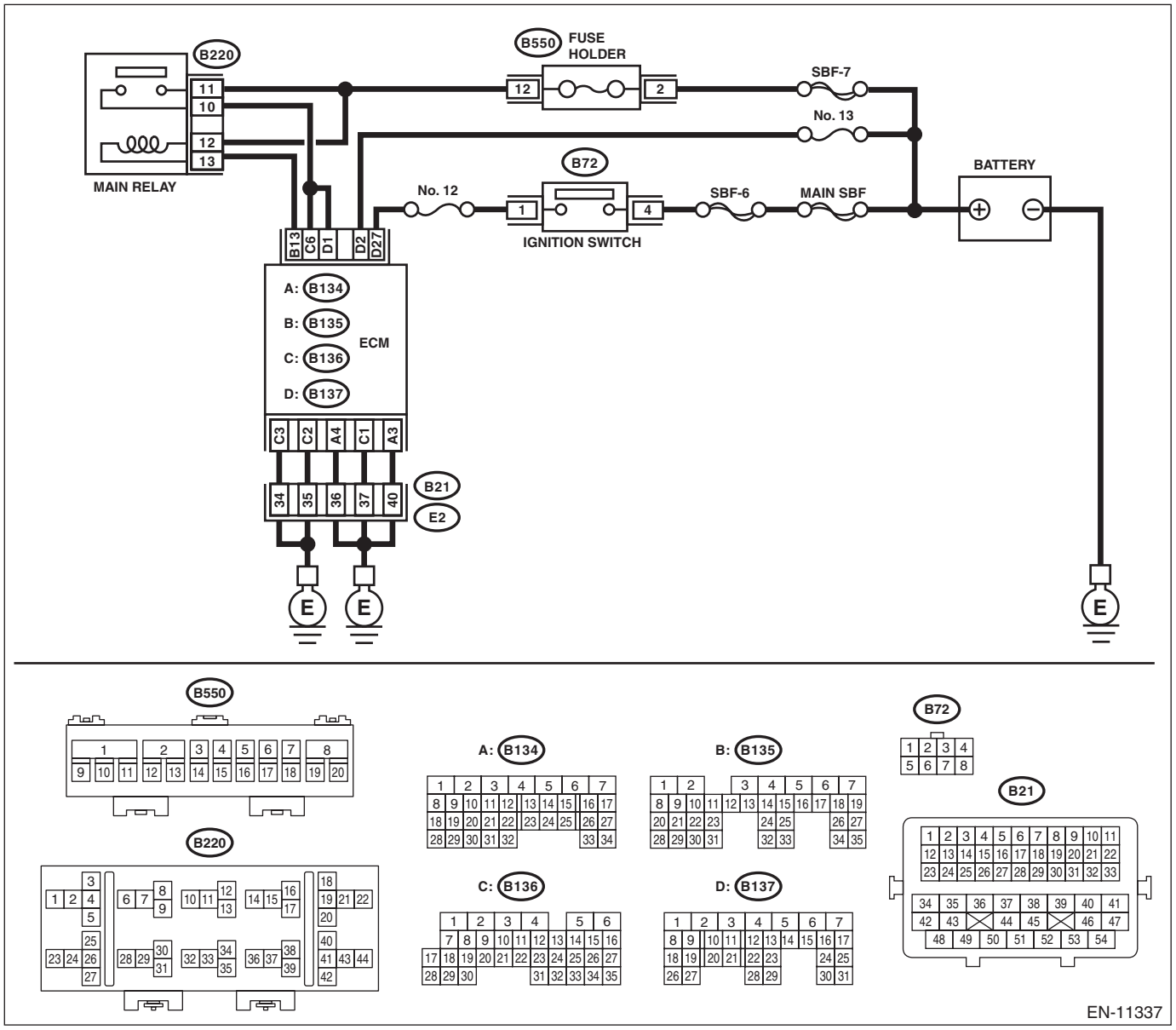
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK ECM CONNECTOR.** Check the connecting condition of ECM connector.	Is the ECM connector correctly connected?	Go to step **2**.	Connect the ECM connector correctly.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and engine ground. ***Connector & terminal*** ***(B136) No. 6 (+) — Engine ground (–):*** ***(B137) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the harness and connector. NOTE: In this case, repair the following item: • Short circuit to power supply in harness between ECM connector and main relay connector • Defective main relay	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Remove the main relay. 3) Disconnect the connector from ECM. 4) Measure the resistance between the ECM connector and engine ground. ***Connector & terminal*** ***(B135) No. 13 — Engine ground:***	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and main relay connector.

1. OUTLINE OF DIAGNOSIS

Detect the main relay stuck to ON.
Judge as NG when ECM keeps operating for more than predetermined time although the main relay does not turn to OFF after ignition switch is turned to OFF.

2. COMPONENT DESCRIPTION

The main relay controls current of coils by receiving instructions from the ignition switch and ELCM to switch ECM to ON/OFF.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Main relay	OFF instruction

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when the enable conditions are established with the ignition switch OFF → ON.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ECM status	In operation

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

DN:DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST)

NOTE:
For the diagnostic procedure, refer to CVT section. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Judge as NG when there is CAN communication with the TCM and there is a MIL lighting request.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
MIL lighting request from TCM	Yes

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V

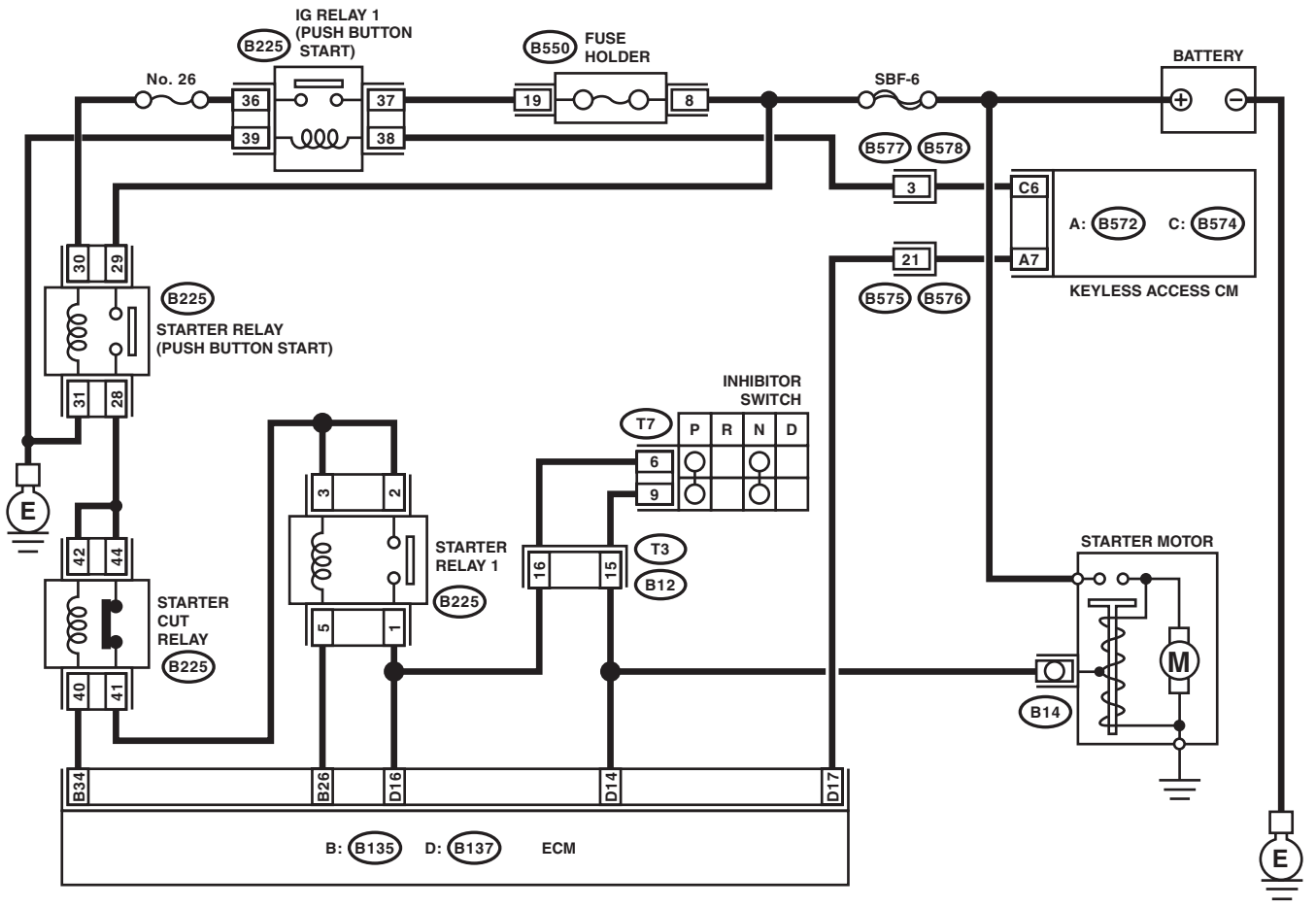
Time Needed for Diagnosis: 128 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

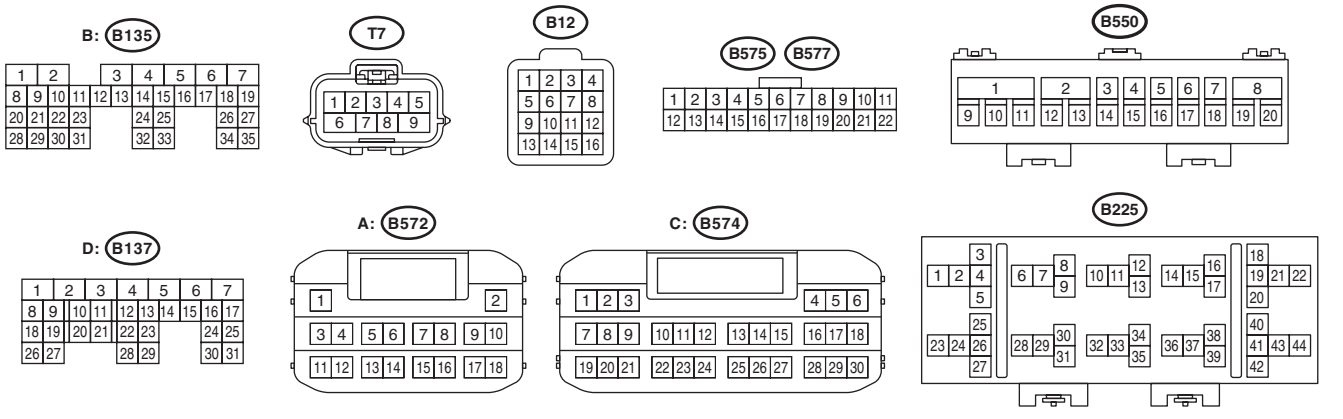
DO:DTC P081A STARTER DISABLE CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>





EN-11364

	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND STARTER CUT RELAY CONNECTOR.** 1) Turn the ignition to OFF. 2) Remove the starter relay (push button start) and starter cut relay. 3) Measure the resistance of harness between starter relay (push button start) connector and starter cut relay connector. ***Connector & terminal*** ***(B225) No. 28 — (B225) No. 42:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit in harness between starter relay (push button start) connector and starter cut relay connector.
2	**CHECK HARNESS BETWEEN ECM AND STARTER CUT RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and starter cut relay connector. ***Connector & terminal*** ***(B135) No. 34 — (B225) No. 40:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness between ECM connector and starter cut relay connector.
3	**CHECK STARTER CUT RELAY.** 1) Connect the battery to starter cut relay terminals No. 40 and No. 42. 2) Measure the resistance between starter cut relay terminals. ***Terminals*** ***No. 41 — No. 44:***	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Replace the starter cut relay. <Ref. to SL-117, Starter Cut Relay.>

1. OUTLINE OF DIAGNOSIS

Detect abnormal continuity in the starter cut relay.
Judge as NG when the starter cut relay output line is open.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Engine speed	Increase from 0 rpm to 500 rpm or more
Vehicle speed	< 1 km/h (0.6 MPH)
Starter cut relay command	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the enable conditions have been established.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Starter cut relay control voltage that exceeds battery voltage × 0.34	Not detected

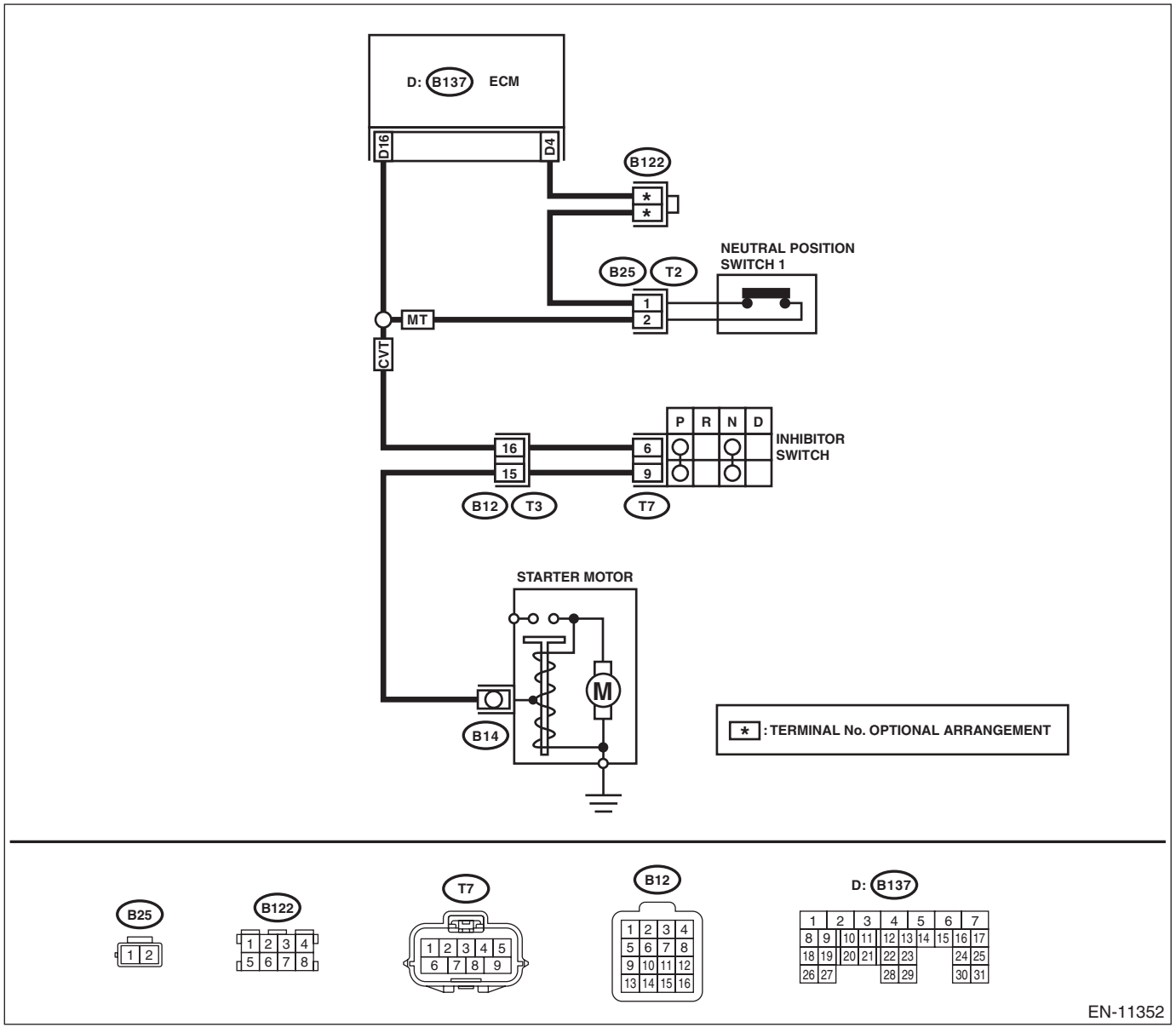
Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DP:DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW

1. AT MODEL

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	CHECK SELECT CABLE.	Is there any fault in select cable?	Repair or adjust the select cable. <Ref. to CS-51, Select Cable.>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK INPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Place the select lever in other than "P" range and "N" range. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND TRANSMISSION HARNESS CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and transmission harness connector (T3). 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in harness between ECM connector and transmission harness connector.
4	**CHECK TRANSMISSION HARNESS CONNECTOR.** 1) Disconnect the connector from inhibitor switch. 2) Measure the resistance between transmission harness connector and engine ground. ***Connector & terminal*** ***(T3) No. 16 — Engine ground:***	Is the resistance 1 MΩ or more?	Replace the inhibitor switch. <Ref. to CVT(TR580)-100, Inhibitor Switch.>	Repair short circuit to ground in harness between transmission harness connector and inhibitor switch connector.

2. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of neutral SW.
Judge as NG when the ECM neutral terminal input differs from the reception data from TCM.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Starter relay feedback voltage	< Battery voltage × 0.35
Data received from TCM	≠ "P" range/"N" range

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

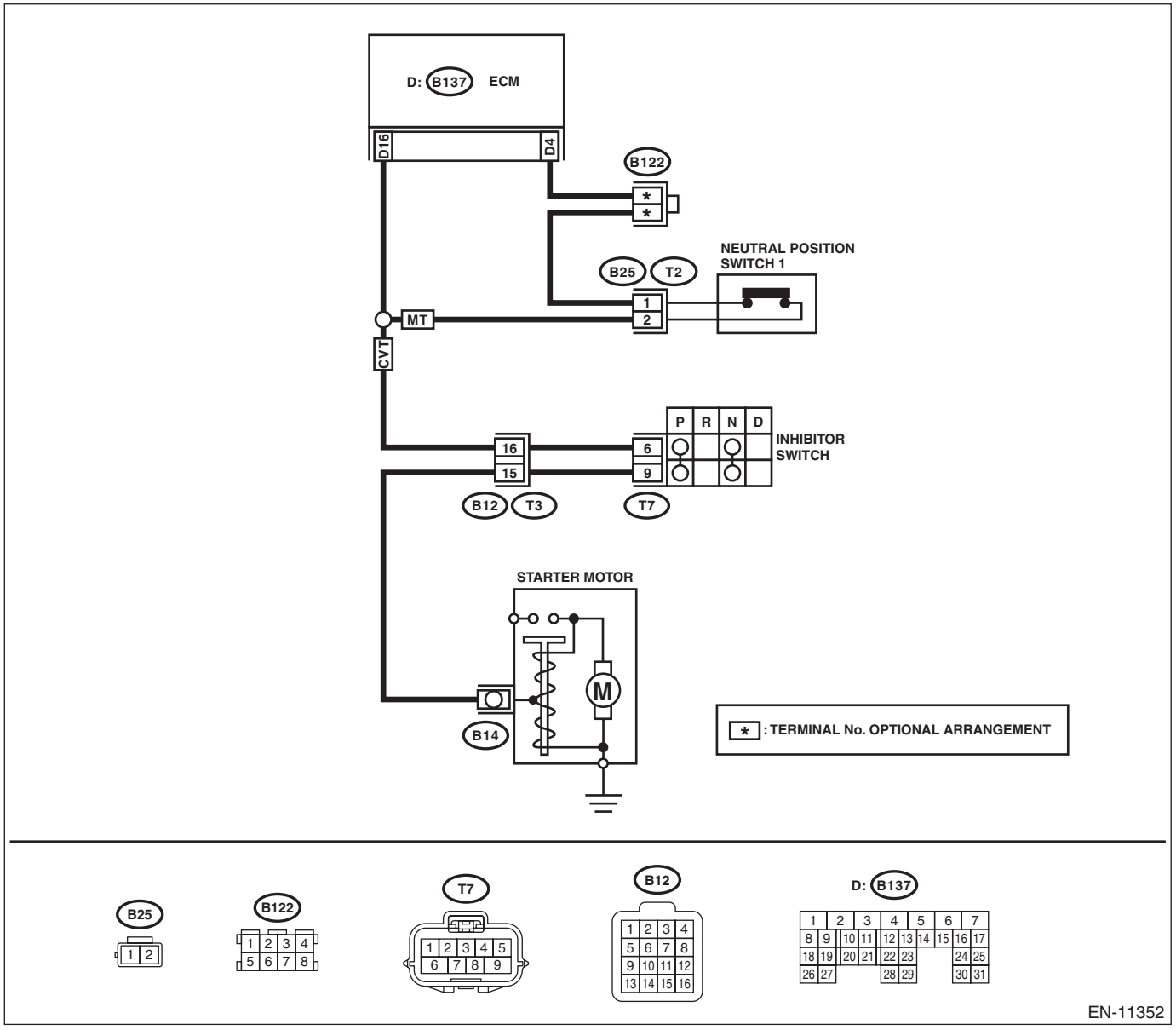
Malfunction Criteria	Threshold Value
Neutral position switch voltage	≤ Battery voltage × 0.19

Time Needed for Diagnosis: 64 ms × 100 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. MT MODEL

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Place the shift lever in a position other than neutral. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH 1 CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and neutral position switch 1. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the neutral position switch 1. <Ref. to 5MT-36, Switches and Harness.>	Repair the short circuit to ground in harness between ECM connector and neutral position switch 1 connector.

7. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of neutral SW.
Judge as NG when there is no change in the neutral SW even if the driving shift was applied. (There is neutral SW ON/OFF inversion from the vehicle speed and engine speed.)

8. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
The number of driving condition change from a) to b)	= 3 time(s)
a) Vehicle speed	≤ 0 km/h (0 MPH)
&	
Engine speed	≥ 550 rpm and ≤ 850 rpm
b) Vehicle speed	≥ 64 km/h (39.8 MPH)
&	
Engine speed	≥ 1550 rpm and ≤ 2100 rpm

9. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

10.DIAGNOSTIC METHOD

Judge NG when the malfunction criteria below are completed determined times or more after the neutral SW change.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral switch output voltage	≤ Battery voltage × 0.19 V

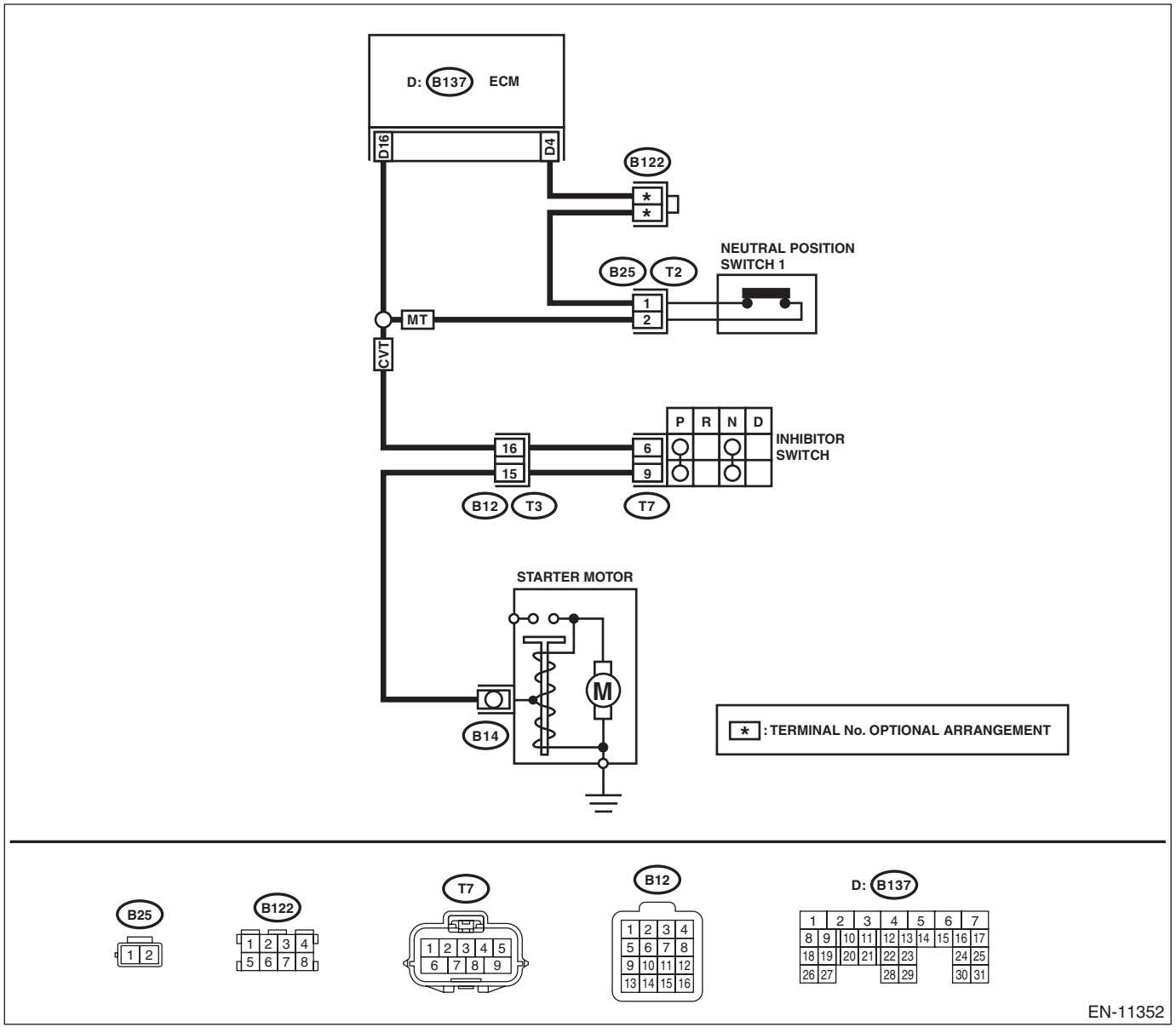
Time Needed for Diagnosis: 3 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.
Time Needed for Diagnosis: Less than 1 second

DQ:DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH

1. AT MODEL

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	CHECK SELECT CABLE.	Is there any fault in select cable?	Repair or adjust the select cable. <Ref. to CS-51, Select Cable.>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK INPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground with select lever at "P" range and "N" range. ***Connector & terminal*** ***(B137) No. 16 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Repair the poor contact of ECM connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and inhibitor switch. 3) Measure the resistance of harness between ECM connector and inhibitor switch connector. ***Connector & terminal*** ***(B137) No. 16 — (T7) No. 6:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and inhibitor switch connector • Poor contact of coupling connector
4	**CHECK INHIBITOR SWITCH GROUND LINE.** Measure the resistance of harness between inhibitor switch connector and engine ground. ***Connector & terminal*** ***(T7) No. 9 — Engine ground:***	Is the resistance less than 5 Ω?	Replace the inhibitor switch. <Ref. to CVT(TR580)-100, Inhibitor Switch.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between inhibitor switch connector and starter motor ground line • Poor contact of coupling connector • Poor contact of starter motor connector • Poor contact of starter motor ground • Starter motor

2. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of neutral SW.
Judge as NG when the ECM neutral terminal input differs from the reception data from TCM.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Starter relay feedback voltage	< Battery voltage × 0.35
Data received from TCM	≠ "P" range/"N" range

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral position switch voltage	≤ Battery voltage × 0.6

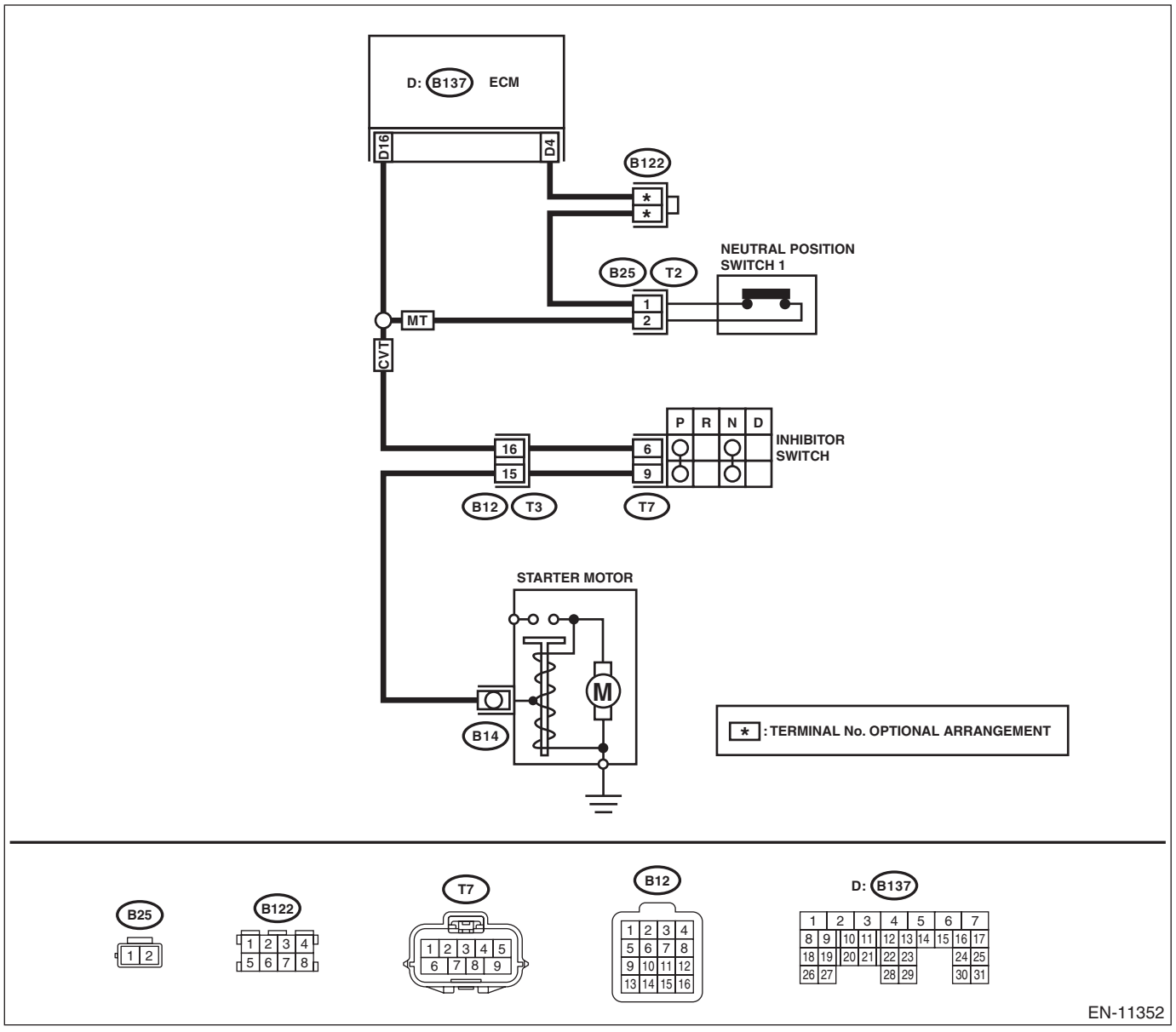
Time Needed for Diagnosis: 64 ms × 100 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. MT MODEL

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Place the shift lever in neutral. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 35 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Repair the poor contact of ECM connector.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH 1 CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and neutral position switch 1. 3) Measure the resistance of harness between ECM connector and neutral position switch 1 connector. ***Connector & terminal*** ***(B137) No. 16 — (B25) No. 2:*** ***(B137) No. 4 — (B25) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and neutral position switch 1 connector • Poor contact of coupling connector
3	**CHECK NEUTRAL POSITION SWITCH 1.** 1) Place the shift lever in neutral. 2) Measure the resistance between neutral position switch 1 terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Repair the poor contact of neutral position switch 1 connector.	Replace the neutral position switch 1. <Ref. to 5MT-36, Switches and Harness.>

7. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of neutral SW.
Judge as NG when there is no change in the neutral SW even if the driving shift was applied. (There is neutral SW ON/OFF inversion from the vehicle speed and engine speed.)

8. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
The number of driving condition change from a) to b)	= 3 time(s)
a) Vehicle speed & Engine speed	≤ 0 km/h (0 MPH) ≥ 550 rpm and ≤ 850 rpm
b) Vehicle speed & Engine speed	≥ 64 km/h (39.8 MPH) ≥ 1550 rpm and ≤ 2100 rpm

9. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

10.DIAGNOSTIC METHOD

Judge NG when the malfunction criteria below are completed determined times or more after the neutral SW change.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral switch output voltage	≥ Battery voltage × 0.6 V

Time Needed for Diagnosis: 3 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

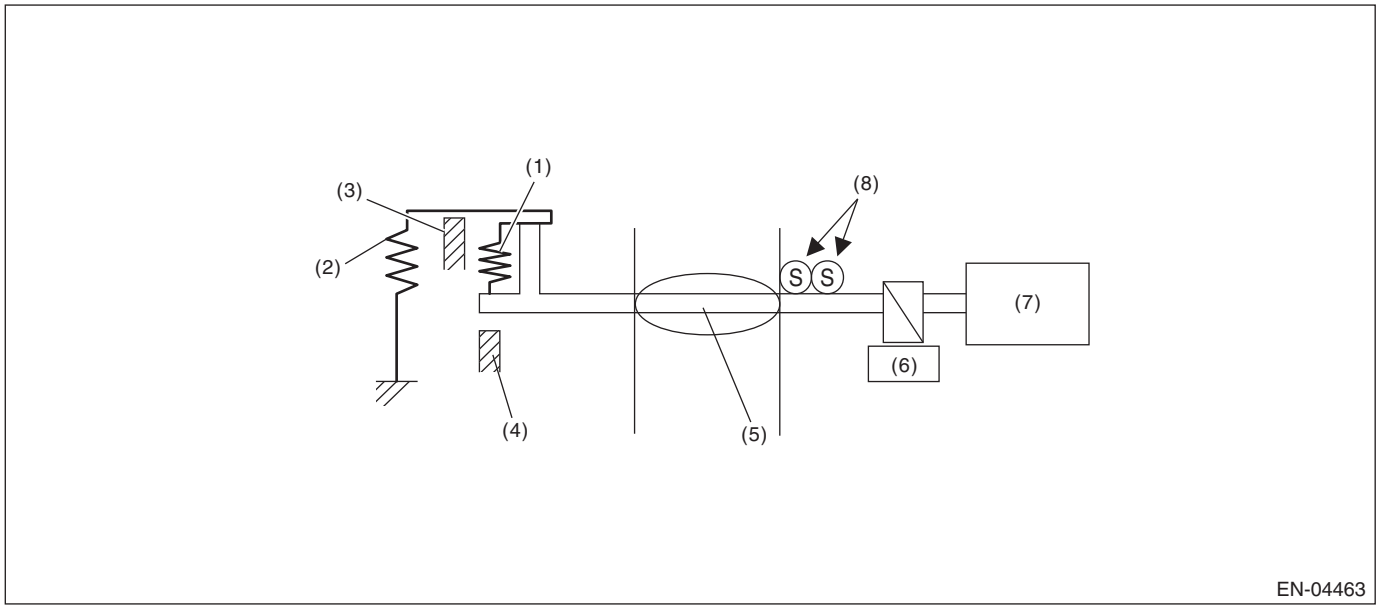
DR:DTC P1160 THROTTLE RETURN SPRING

NOTE:
For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO w/o HEV)(diag)-466, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the valve is opened more than the default opening angle, but does not move to the close direction with the motor power stopped.

2. COMPONENT DESCRIPTION



(1) Opener spring
(2) Return spring
(3) Intermediate stopper
(4) Full closed stopper
(5) Throttle valve
(6) Gear
(7) DC motor
(8) Main and sub throttle position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V
Elapsed time after throttle control power supply off	= 1.6 s

4. GENERAL DRIVING CYCLE

- Ignition switch ON → OFF
- Ignition switch OFF → ON (Only after clearing memory)

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Throttle position (Main Sensor) at power supply off' – Throttle position (Main Sensor)	< 2 °

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DS:DTC P1449 EVAP SYSTEM CLOG DETECTED (AIR FILTER)

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

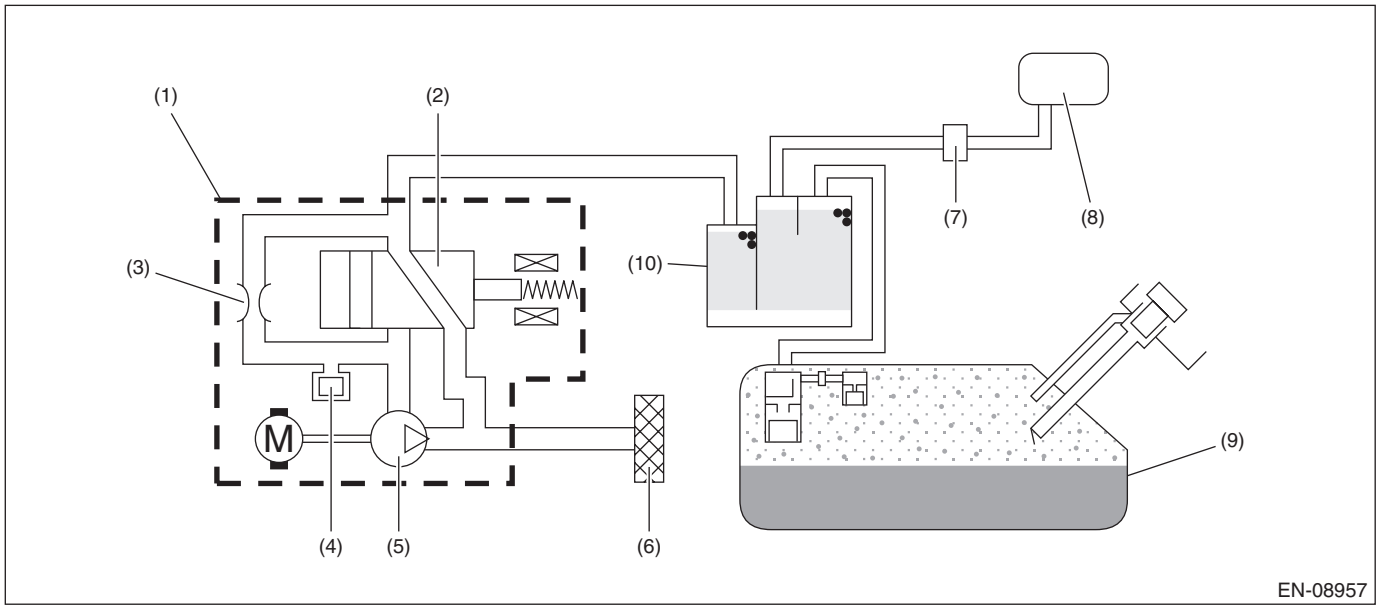
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK DRAIN TUBE B OF LEAK CHECK VALVE ASSEMBLY.**	Is the drain tube B of leak check valve assembly clogged?	Replace the drain tube B of leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>	Go to step **3**.
3	**CHECK DRAIN HOSE AND DRAIN TUBE C BETWEEN LEAK CHECK VALVE ASSEMBLY AND DRAIN SEPARATOR.**	Is the drain hose or the drain tube C between leak check valve assembly and drain separator clogged?	Replace the drain hose or the drain tube C between leak check valve assembly and drain separator. <Ref. to EC(H4DO(w/o HEV))-63, Drain Separator.>	Go to step **4**.
4	**CHECK DRAIN SEPARATOR.**	Is the drain separator clogged?	Replace the drain separator. <Ref. to EC(H4DO(w/o HEV))-63, Drain Separator.>	Go to step **5**.
5	**CHECK INTAKE HOSE AND CONNECTOR BETWEEN DRAIN SEPARATOR AND VEHICLE BODY.**	Is the intake hose or the connector between drain separator and vehicle body clogged?	Replace the intake hose or the connector between drain separator and vehicle body. <Ref. to EC(H4DO(w/o HEV))-63, Drain Separator.>	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the drain filter clogging by the pressure change during purge introduction.
Judge as drain filter clogging malfunction if the pressure in the evaporative emission system piping suddenly decreases by the purging.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

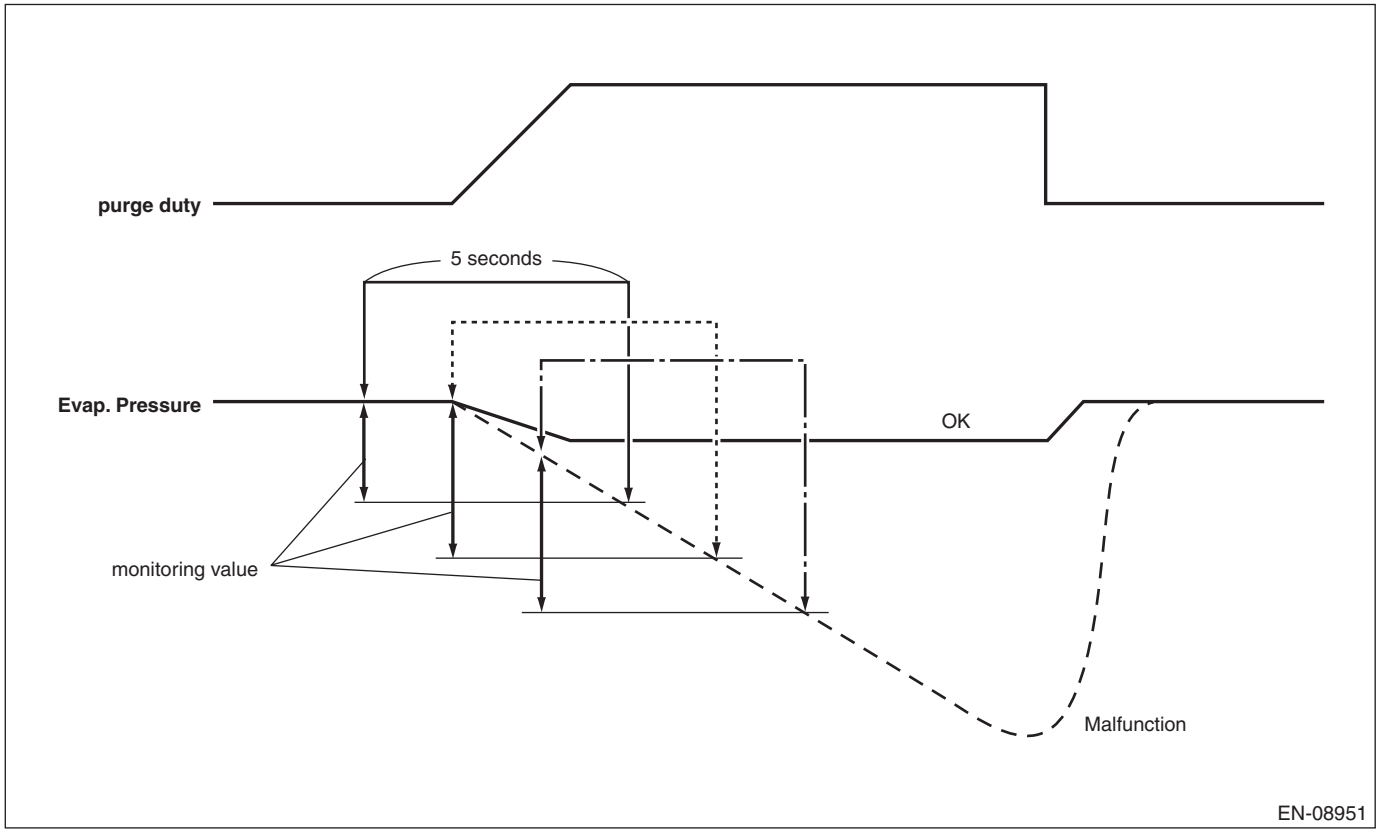
3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after the ignition switch ON	≥ 20000 ms
• ELCM vacuum pump	Not in operation
• ELCM switching valve	Open

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when purging is performed after 20000 ms have passed since the engine started.

5. DIAGNOSTIC METHOD



Calculate the difference between the ELCM pressure sensor output value as of 5 seconds ago and the current one, and if the value is greater than judgment value, detect and judge as filter clogging trouble.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
|Pressure sensor output value as of 5 seconds ago – Current pressure sensor output value|	> Value from Map
Number of above conditions established	> 2 time(s)

Map

Vehicle speed km/h (MPH)	0 (0)	20 (12.4)	40 (24.9)	60 (37.3)	80 (49.7)	100 (62.1)	120 (74.6)	300 (186.4)
|Pressure sensor output value as of 5 seconds ago – Current pressure sensor output value| kPa (mmHg, inHg)	1.4 (10.352 , 0.4)	1.4 (10.352 , 0.4)	1.4 (10.352 , 0.4)	1.4 (10.352 , 0.4)	1.4 (10.352 , 0.4)	1.4 (10.352 , 0.4)	1.4 (10.352 , 0.4)	2.4 (18.287 , 0.7)

Time Needed for Diagnosis: Approx. 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

DT:DTC P1451 EVAP SYSTEM CLOG DETECTED (PIPE)

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK DRAIN TUBE BETWEEN CANISTER AND LEAK CHECK VALVE ASSEMBLY.**	Is the drain tube between canister and leak check valve assembly clogged?	Replace the drain tube between the canister and leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-10, Canister.>	Go to step **2**.
2	**CHECK HOSES BETWEEN CANISTER AND FUEL TANK.**	Are the hoses between the canister and fuel tank clogged?	Replace the hoses between the canister and fuel tank. <Ref. to EC(H4DO(w/o HEV))-10, Canister.> <Ref. to FU(H4DO(w/o HEV))-116, Fuel Tank.>	Replace the canister. <Ref. to EC(H4DO(w/o HEV))-10, Canister.> After the operation is complete, go to the next step. Go to step **3**.
3	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM.** Perform drive cycle I. <Ref. to EN(H4DO w/o HEV)(diag)-61, DRIVE CYCLE I, PROCEDURE, Drive Cycle.>	Is DTC P1451 displayed on the display?	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>	End.

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0455. <Ref. to EN(H4DO w/o HEV)(diag)-340, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

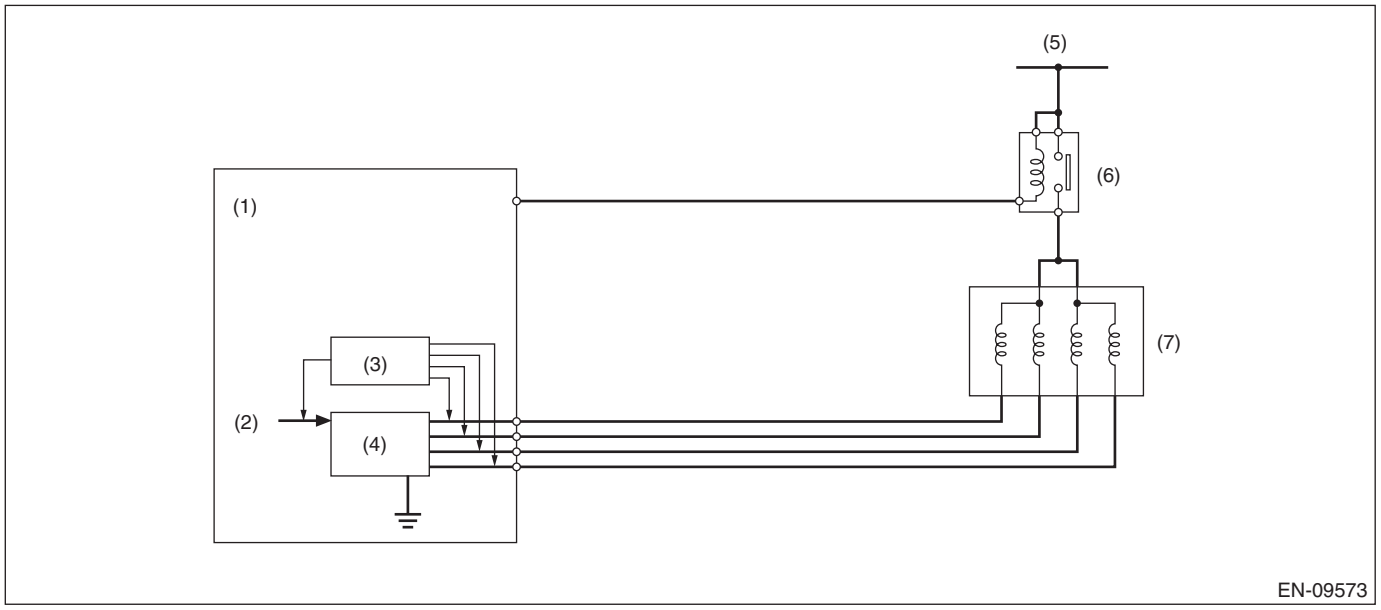
DU:DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW

NOTE:
For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO w/o HEV)(diag)-427, DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detects open or short circuit of EGR.
- Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Computer unit (CPU)
(3) Detecting circuit
(4) Switch circuit
(5) Battery voltage
(6) Main relay
(7) EGR control valve

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
EGR control signal	OFF

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously during EGR operation.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
EGR control voltage	≤ Battery voltage × 0.34 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

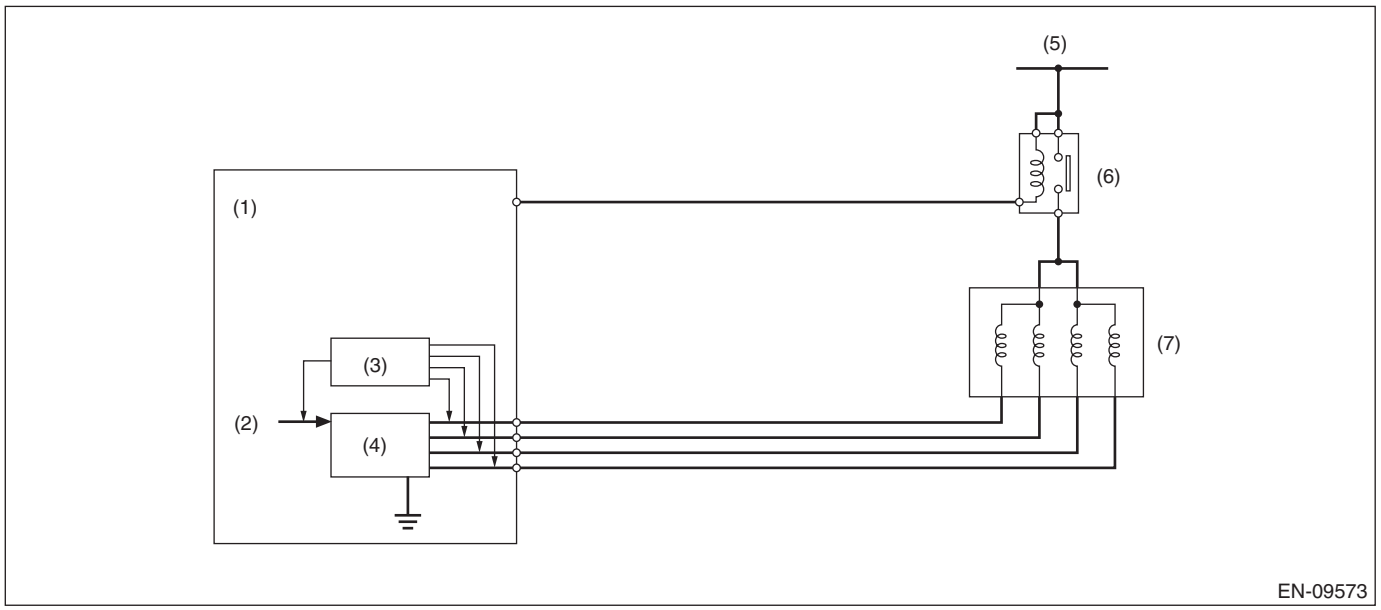
DV:DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH

NOTE:
For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO w/o HEV)(diag)-429, DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detects open or short circuit of EGR.
- Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Computer unit (CPU)
(3) Detecting circuit
(4) Switch circuit
(5) Battery voltage
(6) Main relay
(7) EGR control valve

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
EGR control signal	OFF

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
EGR control current	≥ 6 A

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DW:DTC P1494 COIL 2 EGR "A" CONTROL CIRCUIT LOW

NOTE:
For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO w/o HEV)(diag)-427, DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P1492. <Ref. to EN(H4DO w/o HEV)(diag)-424, DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DX:DTC P1495 COIL 2 EGR "A" CONTROL CIRCUIT HIGH

NOTE:
For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO w/o HEV)(diag)-429, DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P1493. <Ref. to EN(H4DO w/o HEV)(diag)-425, DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DY:DTC P1496 COIL 3 EGR "A" CONTROL CIRCUIT LOW

NOTE:
For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO w/o HEV)(diag)-427, DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P1492. <Ref. to EN(H4DO w/o HEV)(diag)-424, DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DZ:DTC P1497 COIL 3 EGR "A" CONTROL CIRCUIT HIGH

NOTE:
For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO w/o HEV)(diag)-429, DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

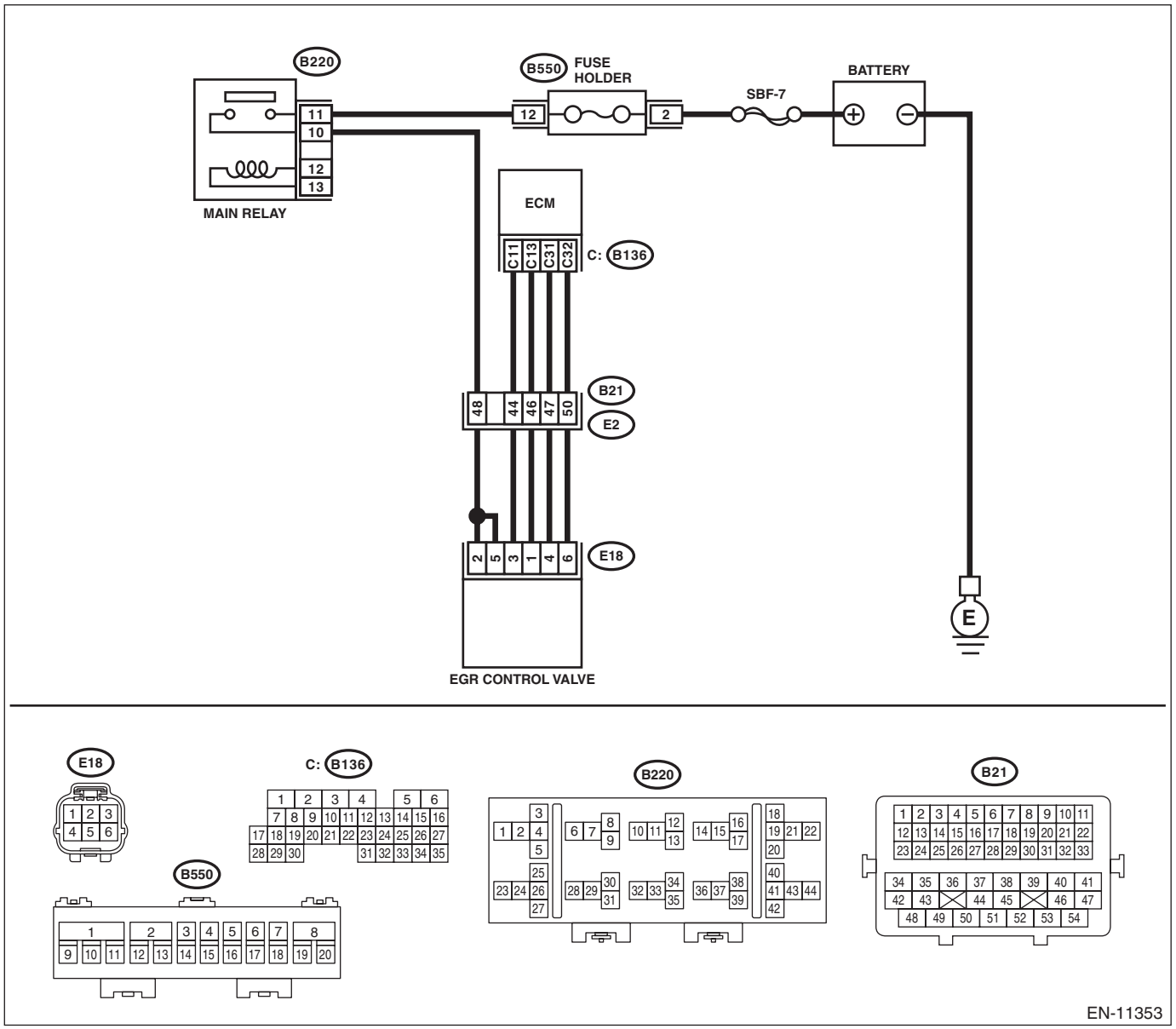
NOTE:
For the detection standard, refer to DTC P1493. <Ref. to EN(H4DO w/o HEV)(diag)-425, DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EA:DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine breathing

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK POWER SUPPLY TO EGR CONTROL VALVE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the EGR control valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between EGR control valve connector and engine ground. ***Connector & terminal*** ***(E18) No. 2 (+) — Engine ground (–):*** ***(E18) No. 5 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between EGR control valve and main relay connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and EGR control valve connector. ***Connector & terminal*** ***DTC P1492; (B136) No. 11 — (E18) No. 3:*** ***DTC P1494; (B136) No. 13 — (E18) No. 1:*** ***DTC P1496; (B136) No. 31 — (E18) No. 4:*** ***DTC P1498; (B136) No. 32 — (E18) No. 6:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and EGR control valve connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***DTC P1492; (B136) No. 11 — Chassis ground:*** ***DTC P1494; (B136) No. 13 — Chassis ground:*** ***DTC P1496; (B136) No. 31 — Chassis ground:*** ***DTC P1498; (B136) No. 32 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair ground short circuit of harness between ECM connector and EGR control valve connector.
4	**CHECK FOR POOR CONTACT.** Check for poor contact between ECM connector and EGR control valve connector.	Is there poor contact in ECM or EGR control valve connector?	Repair the poor contact of ECM or EGR control valve connector.	Replace EGR control valve. <Ref. to EC(H4DO(w/o HEV))-23, EGR Control Valve.>

1. OUTLINE OF DIAGNOSIS

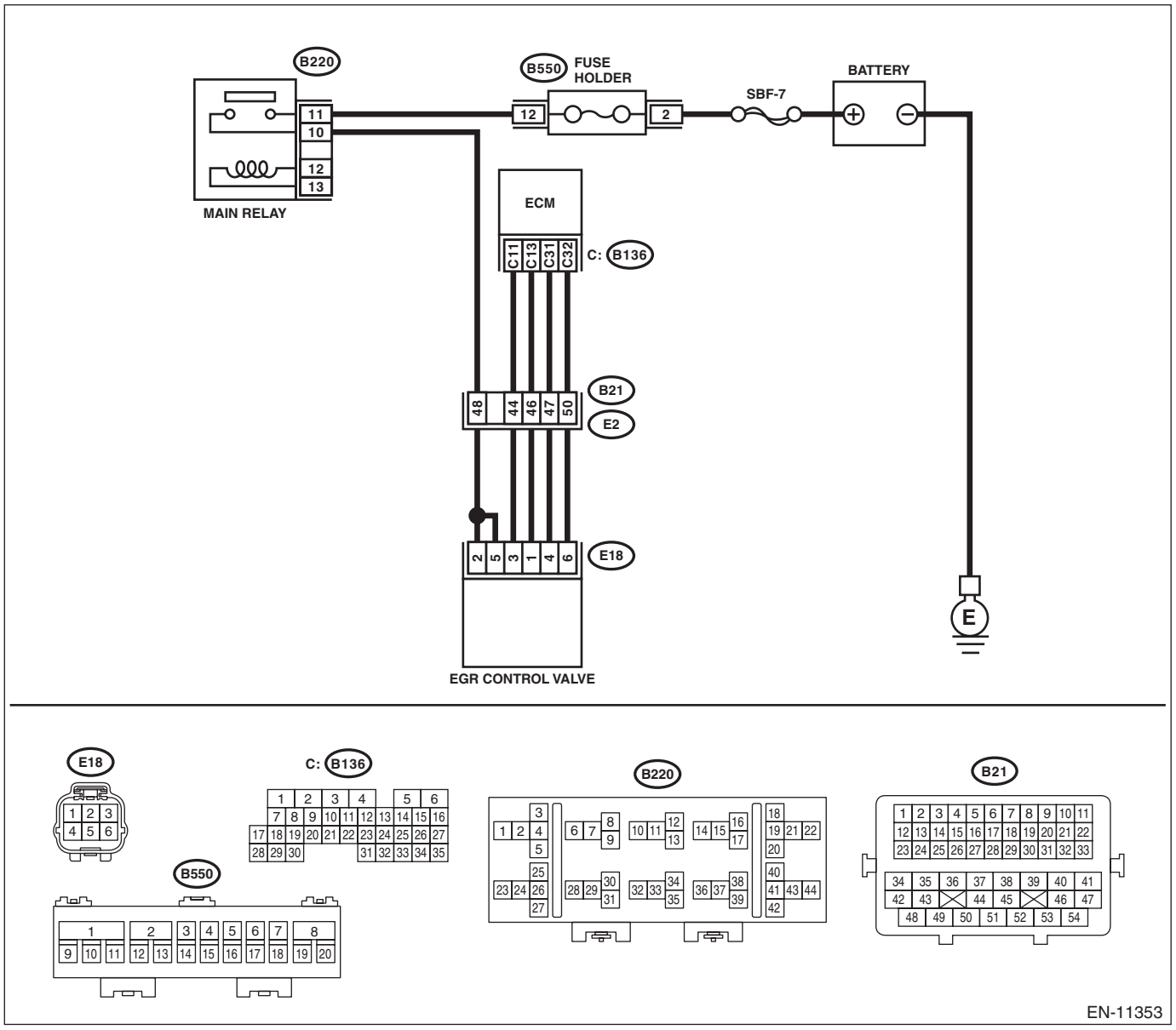
NOTE:
For the detection standard, refer to DTC P1492. <Ref. to EN(H4DO w/o HEV)(diag)-424, DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EB:DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine breathing

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and EGR control valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***DTC P1493; (B136) No. 11 (+) — Chassis ground (–):*** ***DTC P1495; (B136) No. 13 (+) — Chassis ground (–):*** ***DTC P1497; (B136) No. 31 (+) — Chassis ground (–):*** ***DTC P1499; (B136) No. 32 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power supply in the harness between the ECM connector and EGR control valve connector.	Go to step **2**.
2	**CHECK EGR CONTROL VALVE.** Measure the resistance between EGR control valve terminals. ***Terminals*** ***DTC P1493; No. 2 — No. 3:*** ***DTC P1495; No. 2 — No. 1:*** ***DTC P1497; No. 5 — No. 4:*** ***DTC P1499; No. 5 — No. 6:***	Is the resistance 20 Ω or more?	Repair the poor contact of ECM connector.	Replace EGR control valve. <Ref. to EC(H4DO(w/o HEV))-23, EGR Control Valve.>

1. OUTLINE OF DIAGNOSIS

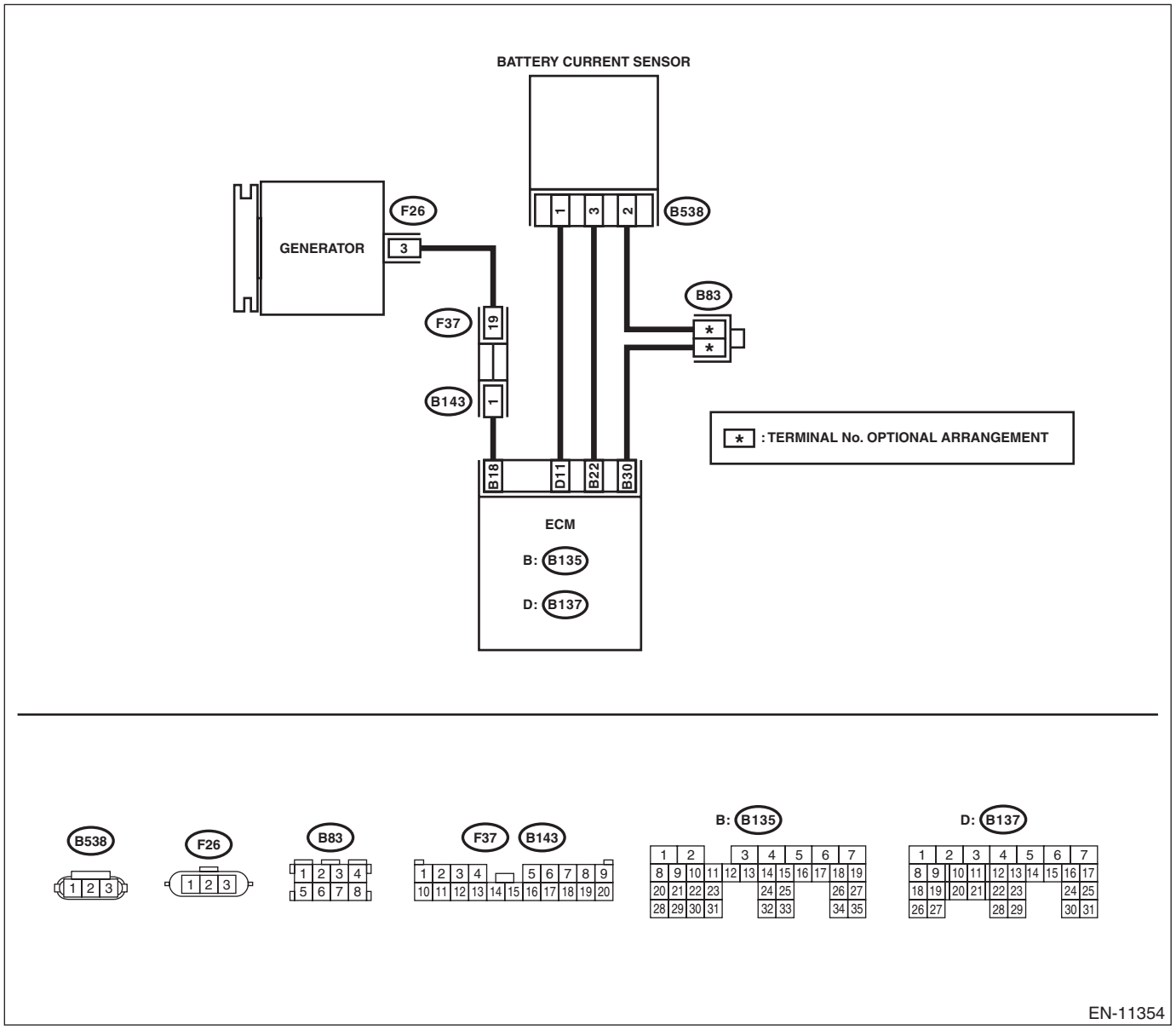
NOTE:
For the detection standard, refer to DTC P1493. <Ref. to EN(H4DO w/o HEV)(diag)-425, DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EC:DTC P1530 BATTERY CURRENT SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



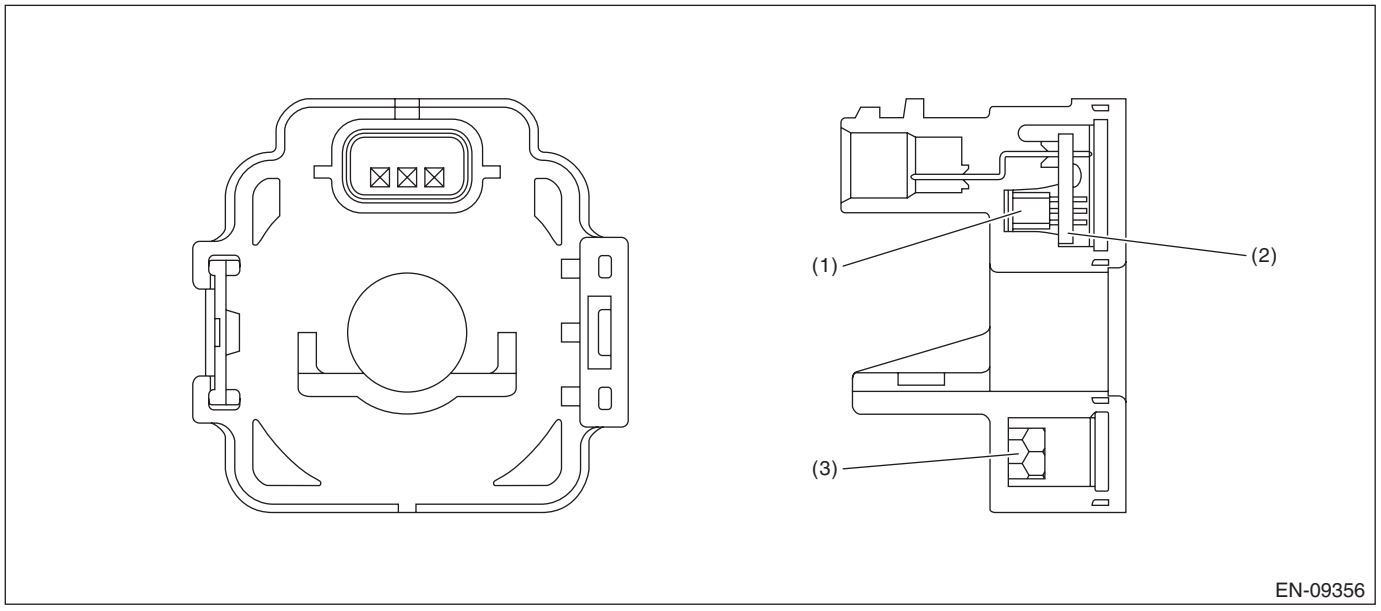
EN-11354

	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Battery current value» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Battery current value» –100 A or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and battery current sensor. 3) Measure the resistance of the harness between ECM connector and battery current sensor connector. ***Connector & terminal*** ***(B135) No. 22 — (B538) No. 3:*** ***(B137) No. 11 — (B538) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit in the harness between ECM connector and battery current sensor connector.
3	**CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 22 — Chassis ground:*** ***(B137) No. 11 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in the harness between ECM connector and battery current sensor connector.
4	**CHECK FOR POOR CONTACT.** Check for poor contact between the ECM and battery current sensor connectors.	Is there poor contact of the ECM or battery current sensor connectors?	Repair any poor contact between the ECM and battery current sensor connectors.	Replace the battery current sensor. <Ref. to SC(H4DO(w/o HEV))-60, Battery Current & Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of battery current sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Hall IC (2) Chip condenser (3) Core

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 1000 ms
Engine speed	> 500 rpm
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.2148 V

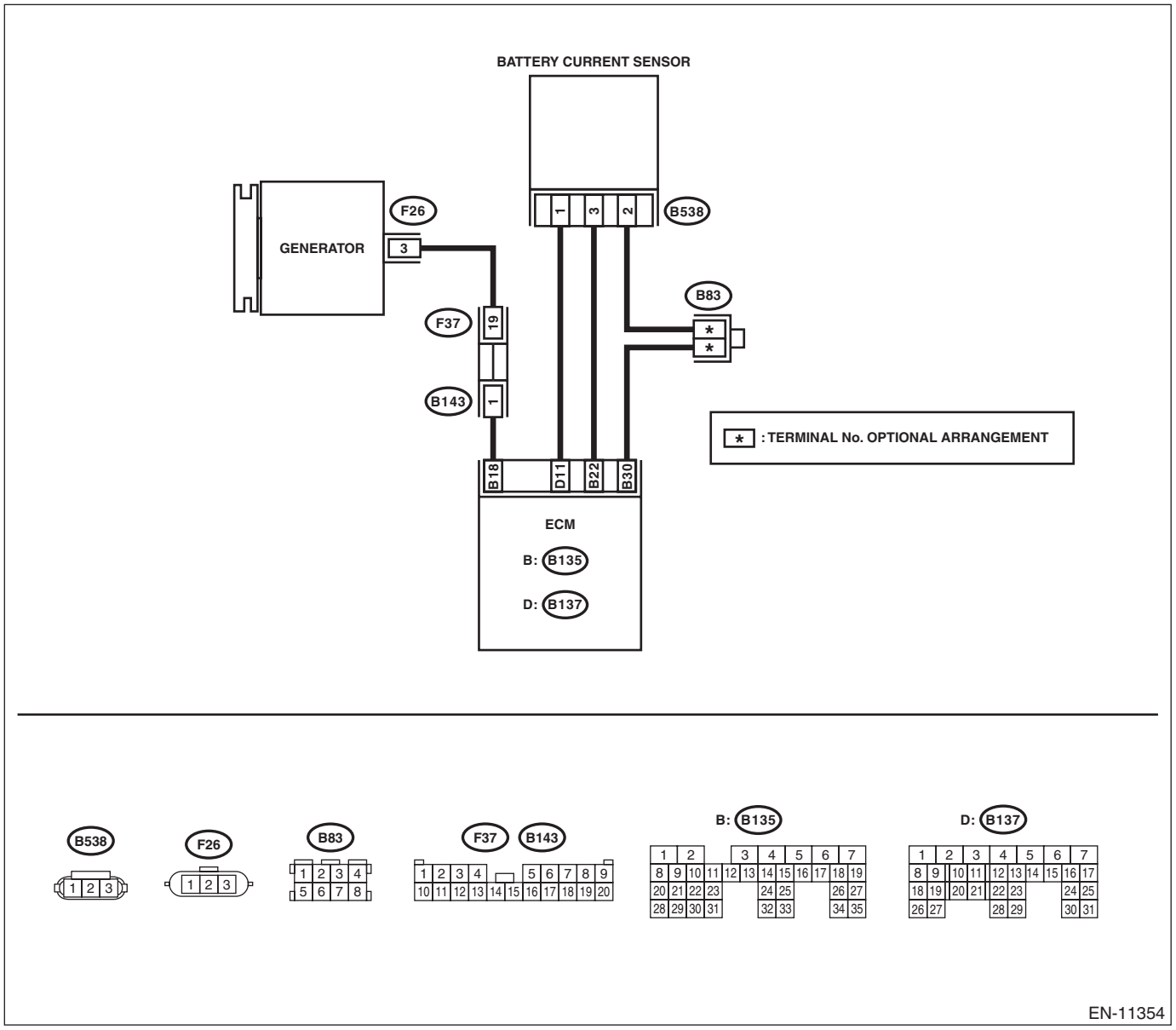
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Does not illuminate even when malfunction occurs.

ED:DTC P1531 BATTERY CURRENT SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



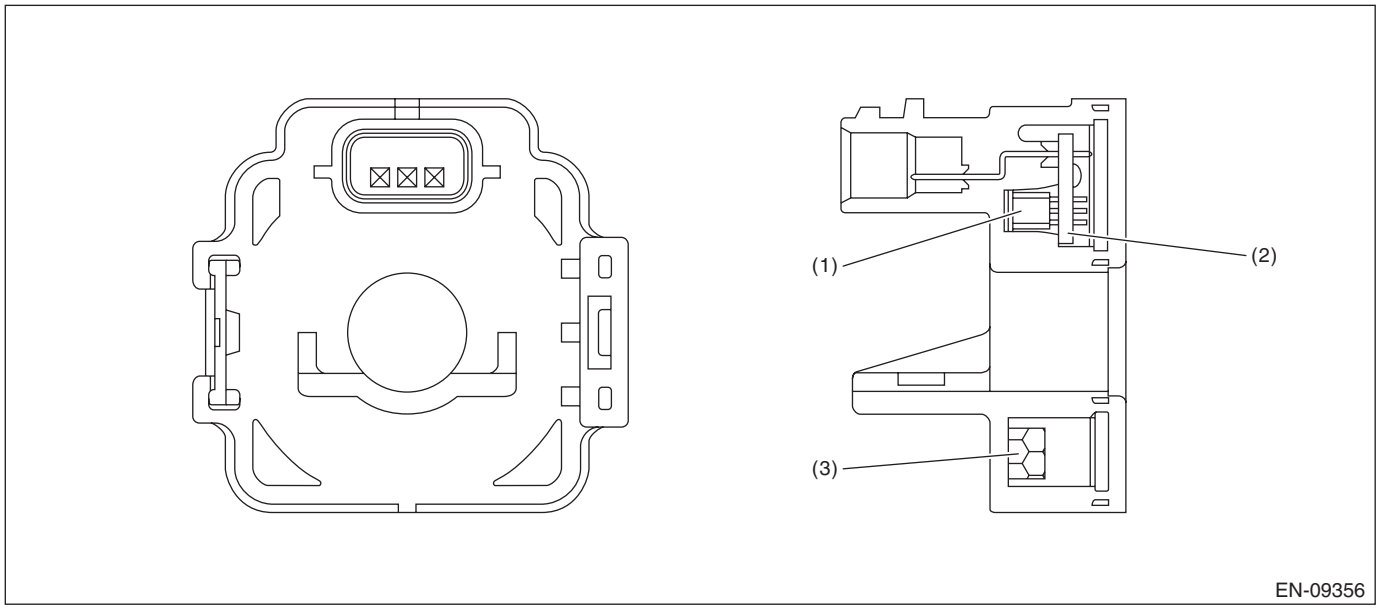
EN-11354

	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Battery current value» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Battery current value» 100 A or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the battery current sensor. 3) Start the engine. 4) Read the value of «Battery current value» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Battery current value» 100 A or more?	Repair the short circuit to power in the harness between ECM connector and battery current sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of the harness between the battery current sensor connector and engine ground. ***Connector & terminal*** ***(B538) No. 2 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and battery current sensor connector • Poor contact of joint connector
4	**CHECK FOR POOR CONTACT.** Check for poor contact of the battery current sensor connector.	Is there poor contact of the battery current sensor connector?	Repair the poor contact of the battery current sensor connector.	Replace the battery current sensor. <Ref. to SC(H4DO(w/o HEV))-60, Battery Current & Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of battery current sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Hall IC (2) Chip condenser (3) Core

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 1000 ms
Engine speed	> 500 rpm
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.717 V

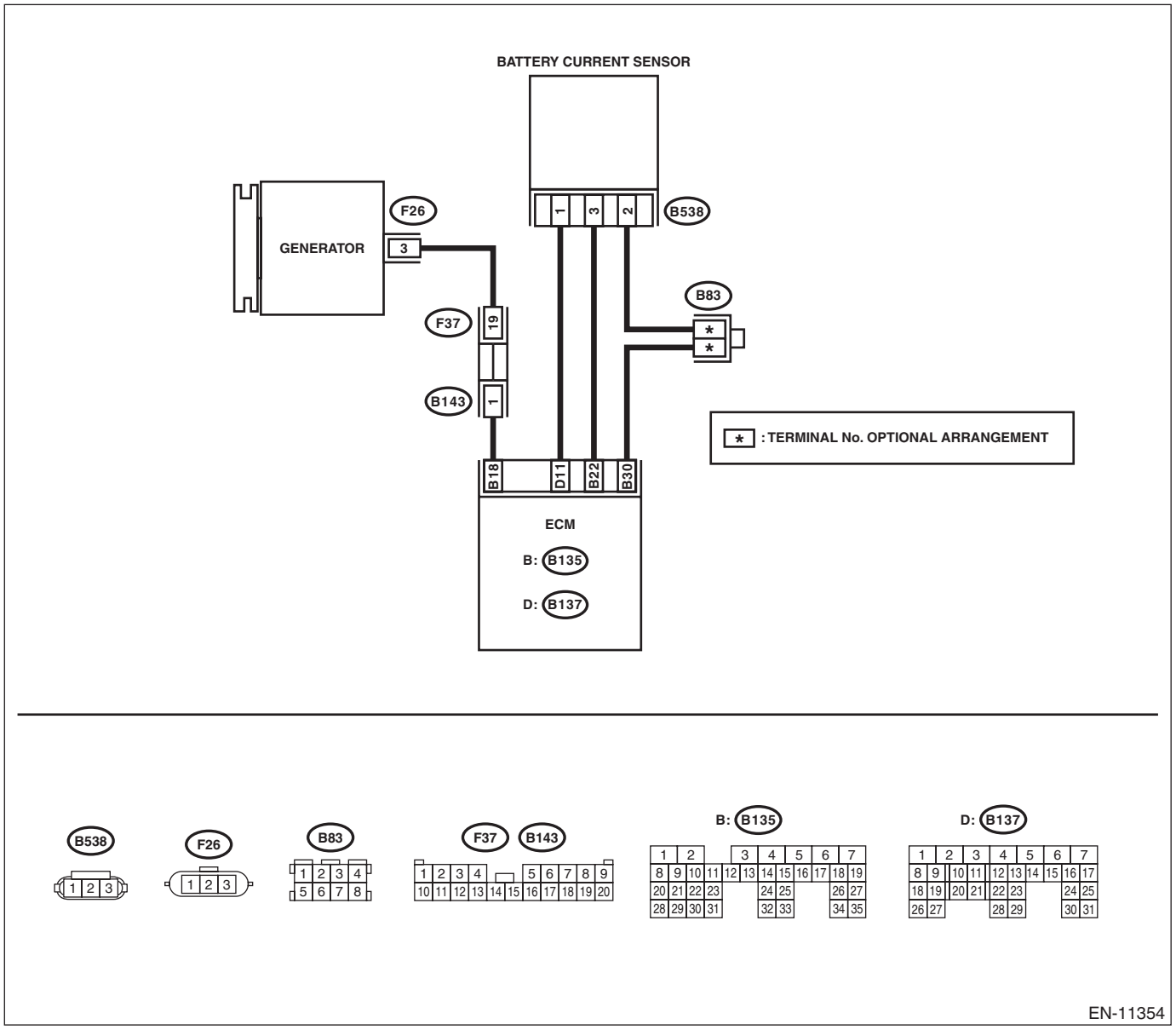
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Does not illuminate even when malfunction occurs.

EE:DTC P1532 BATTERY CHARGING SYSTEM

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK INSTALLATION CONDITION OF BATTERY.** Turn the ignition switch to OFF.	Are the positive and negative terminals of battery securely tightened?	Go to step **2**.	Tighten the positive and negative terminals of battery securely.

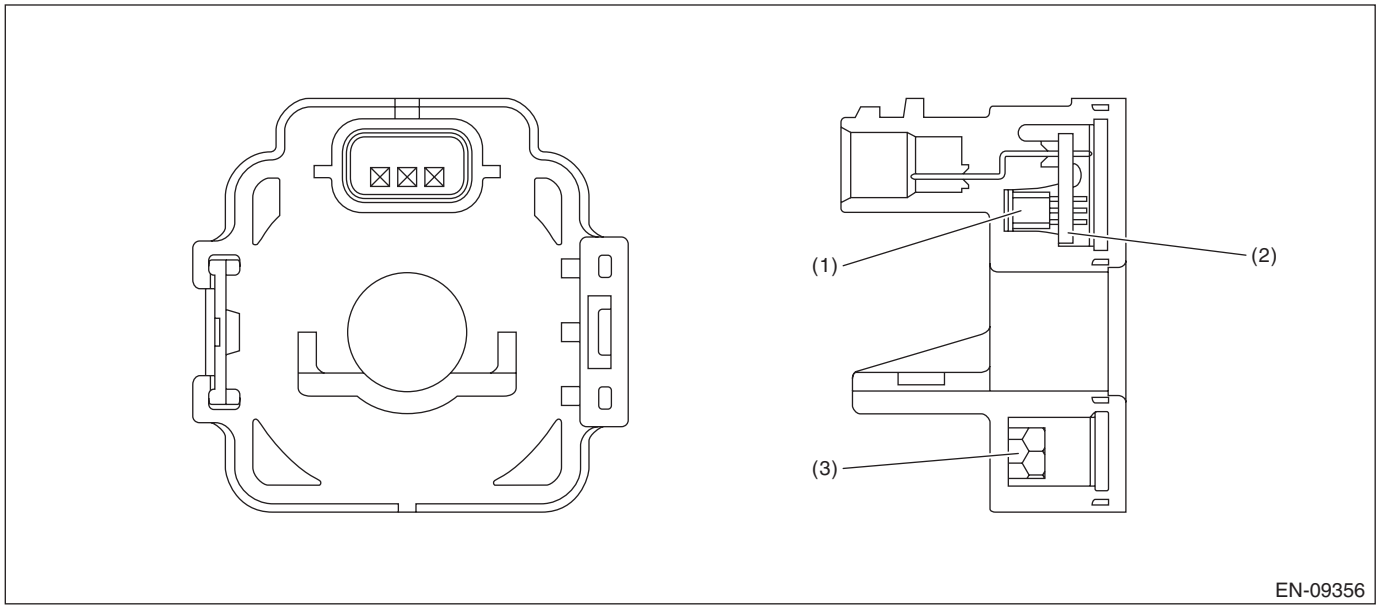
	Step	Check	Yes	No
2	**CHECK BATTERY TERMINAL.**	Is there any connection of electrical parts to the positive and negative terminals of battery?	Remove the wiring of electrical parts connected to the positive and negative terminals of battery. NOTE: Directly connecting electrical parts to the battery may cause erroneous operation of the battery current sensor.	Go to step **3**.
3	**CHECK INSTALLATION CONDITION OF V-BELT.** Check the installation condition of V-belt. <Ref. to ME(H4DO(w/o HEV))-139, INSPECTION, V-belt.>	Is the V-belt installed properly?	Go to step **4**.	Install the V-belt properly. <Ref. to ME(H4DO(w/o HEV))-124, V-belt.>
4	**CHECK BATTERY VOLTAGE.** 1) Start the engine. 2) Select "High mode" from "Alternator control" in "Active Test", and measure the battery voltage after 10 seconds or more have passed. NOTE: For detailed operation procedures, refer to the "Active Test". <Ref. to EN(H4DO w/o HEV)(diag)-68, Active Test.> 3) Select "Low mode" from "Alternator control" in "Active Test", and measure the battery voltage. **CAUTION:** **Do not continue the "Low mode" operation for one minute or more.** NOTE: For detailed operation procedures, refer to the "Active Test". <Ref. to EN(H4DO w/o HEV)(diag)-68, Active Test.>	Does battery voltage lower from 13.9 — 14.8 V to 12.2 — 13.1 V between step 2) and step 3)?	Go to step **7**.	Go to step **5**.
5	**CHECK HARNESS BETWEEN ECM AND GENERATOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and generator. 3) Measure the resistance of harness between ECM connector and generator connector. ***Connector & terminal*** ***(B135) No. 18 — (F26) No. 3:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the open circuit of harness between ECM connector and generator connector.
6	**CHECK HARNESS BETWEEN ECM AND GENERATOR CONNECTOR.** Measure the resistance between generator connector and engine ground. ***Connector & terminal*** ***(F26) No. 3 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair the ground short circuit of harness between ECM connector and generator connector.
7	**CHECK BATTERY CURRENT SENSOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR.** 1) Disconnect the connectors from the ECM and battery current sensor. 2) Measure the resistance of the harness between ECM connector and battery current sensor connector. ***Connector & terminal*** ***(B135) No. 22 — (B538) No. 3:*** ***(B137) No. 11 — (B538) No. 1:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the open circuit in the harness between ECM connector and battery current sensor connector.
9	**CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 22 — Chassis ground:*** ***(B137) No. 11 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **10**.	Repair the short circuit to ground in the harness between ECM connector and battery current sensor connector.
10	**CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR.** Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B135) No. 22 — (B136) No. 32:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Repair the short circuit to power in the harness between ECM connector and battery current sensor connector.
11	**CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance of the harness between the battery current sensor connector and engine ground. ***Connector & terminal*** ***(B538) No. 2 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **12**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and battery current sensor connector • Poor contact of joint connector
12	**CHECK FOR POOR CONTACT.** Check for poor contact of the battery current sensor connector.	Is there poor contact of the battery current sensor connector?	Repair the poor contact of the battery current sensor connector.	Replace the battery current sensor. <Ref. to SC(H4DO(w/o HEV))-60, Battery Current & Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the output property and malfunction of battery current sensor.
Judge as NG when there is no variation (stuck) under a condition where the battery current sensor output should have changed or when difference between output and battery current value is larger than expected (characteristics malfunction).

2. COMPONENT DESCRIPTION



(1) Hall IC (2) Chip condenser (3) Core

3. EXECUTION CONDITION

- Stuck

Secondary Parameters	Execution condition
Ignition switch	ON
During switchover of regulating voltage	High condition judgment*1 ←→ Low condition judgment*2 However, the generator target duty has not experienced the following during switchover. 40 % ≤ Generator target duty < 60 %
*1 High condition judgment	
Continuous time during which all the conditions listed below are met	≥ 5000 ms
• Battery voltage	≥ 13.7 V
• Generator final output duty	≥ 60 %
• Engine speed	≥ 600 rpm
*2 Low condition judgment	
Continuous time during which all the conditions listed below are met	≥ 5000 ms
• Battery voltage	< 13.2 V
• Generator final output duty	< 40 %
or	
• Engine speed	< 600 rpm

- Characteristics malfunction

Secondary Parameters	Execution condition
Ignition switch	ON
During switchover of regulating voltage	High condition judgment is established. Target duty ≥ 60 % → target duty < 40 % or Low condition judgment is established. Target duty < 40 % → target duty ≥ 60 %

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

• Stuck

Judge as NG when the following conditions are repeated 10 time(s) or more.

Judgment Value

Malfunction Criteria	Threshold Value
Difference between maximum value and minimum value in output voltage	< 0.07 V

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Does not illuminate even when malfunction occurs.

• Characteristics malfunction (Charge side)

Within 30000 ms from “enable condition not met” to “enable condition met”, judge as NG when the time required for meeting the following conditions exceeds the predetermined time.
(When NG judgment is performed, NG status is retained during that driving cycle.)

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	2.6 V ≤ Output voltage < 5 V
and	
Battery voltage	< 13.2 V

Time Needed for Diagnosis: 26000 ms
Malfunction Indicator Light Illumination: Does not illuminate even when malfunction occurs.

• Characteristics malfunction (Discharge side)

Within 30000 ms from “enable condition not met” to “enable condition met”, judge as NG when the time required for meeting the following conditions exceeds the predetermined time.
(Within 30000 ms from “enable condition not met” to “enable condition met”, the target duty ≥ 60 % has not been experienced.)

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	0 V ≤ Output voltage < 2.4 V
and	
Battery voltage	≥ 13.7 V

Time Needed for Diagnosis: 26000 ms
Malfunction Indicator Light Illumination: Does not illuminate even when malfunction occurs.

EF:DTC P2004 TGV CONTROL STUCK OPEN BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE RH.** 1) Remove the tumble generator valve assembly RH. 2) Check the tumble generator valve.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve RH. <Ref. to FU(H4DO(w/o HEV))-85, Tumble Generator Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.
Judge open fixing malfunction when the opening degree is large even after finishing the tumble generator valve closing driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Tumble generator valve "close" signal output time	≥ 1600 ms

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
TGV position As defined by: TGV angle position sensor voltage > = 2.5 V	= Open

Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EG:DTC P2005 TGV CONTROL STUCK OPEN BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE LH.** 1) Remove the tumble generator valve assembly LH. 2) Check the tumble generator valve.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve LH. <Ref. to FU(H4DO(w/o HEV))-85, Tumble Generator Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.
Judge open fixing malfunction when the opening degree is large even after finishing the tumble generator valve closing driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time of TGV commanded* to "closed"	1600 ms

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
TGV position As defined by: TGV angle position sensor voltage > = 2.5 V	= Open ≥ 1600 ms

Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EH:DTC P2006 TGV CONTROL STUCK CLOSED BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE RH.** 1) Remove the tumble generator valve assembly RH. 2) Check the tumble generator valve.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve RH. <Ref. to FU(H4DO(w/o HEV))-85, Tumble Generator Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.
Judge close fixing malfunction when the opening degree is small even after finishing the tumble generator valve open driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time of TGV commanded* to "open"	≥ 1600 ms

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
TGV position As defined by: TGV angle position sensor voltage < 2.5 V	= Closed

Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EI: DTC P2007 TGV CONTROL STUCK CLOSED BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE LH.** 1) Remove the tumble generator valve assembly LH. 2) Check the tumble generator valve.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve LH. <Ref. to FU(H4DO(w/o HEV))-85, Tumble Generator Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.
Judge close fixing malfunction when the opening degree is small even after finishing the tumble generator valve open driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time of TGV commanded* to "open"	≥ 1600 ms

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
TGV position As defined by: TGV angle position sensor voltage < 2.5 V	= Closed

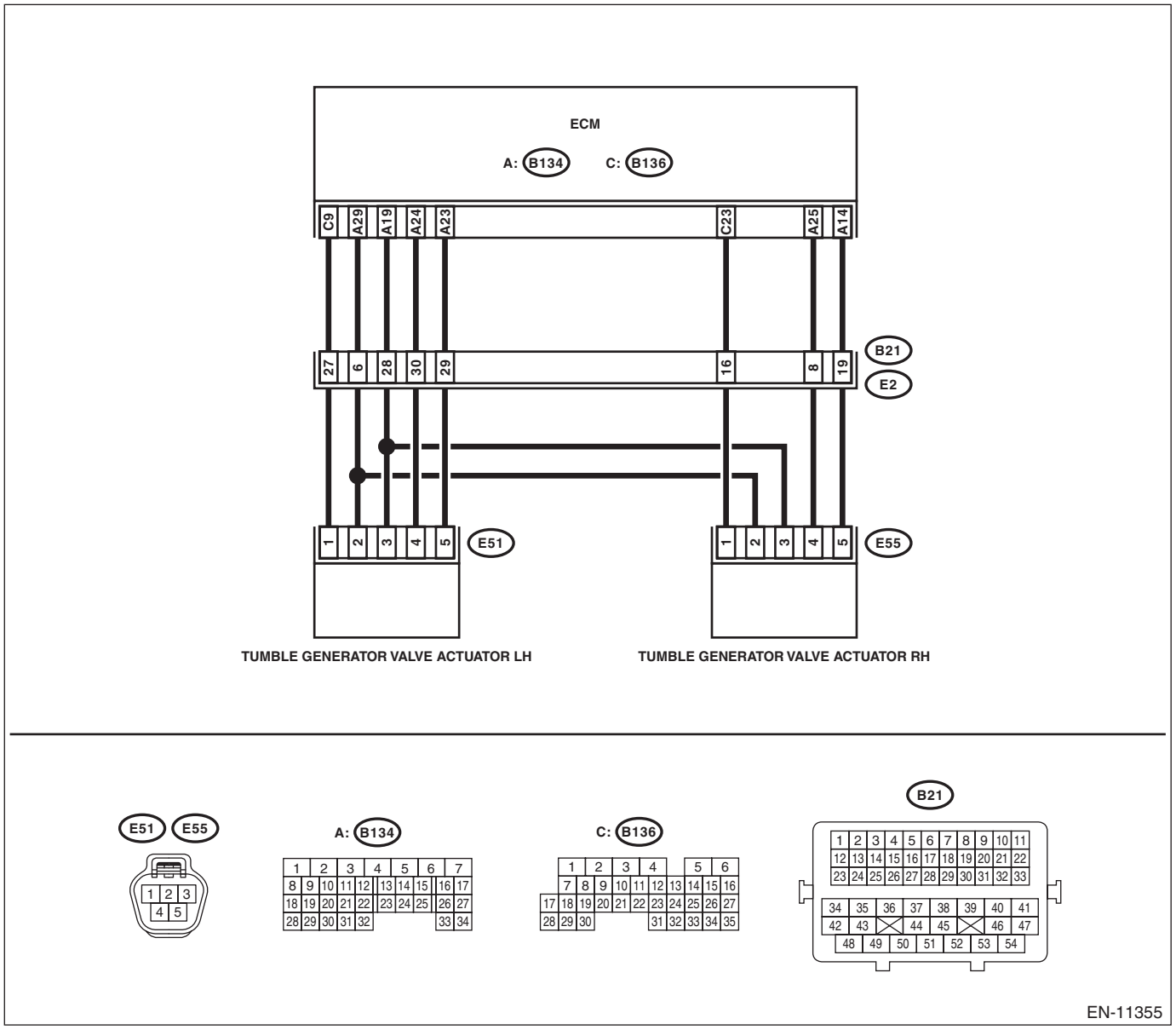
Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EJ: DTC P2009 TGV CONTROL CIRCUIT LOW BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

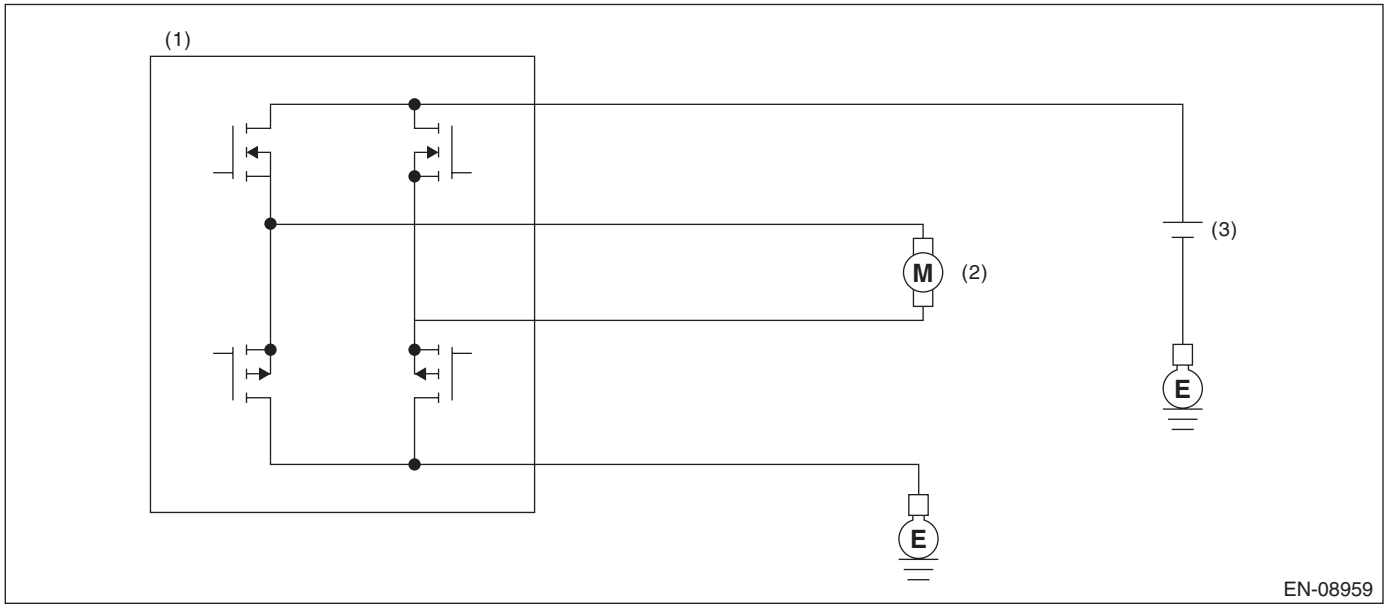


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR RH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 25 (+) — Chassis ground (–):*** ***(B134) No. 14 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and tumble generator valve actuator RH connector.	Replace the tumble generator valve actuator RH. <Ref. to FU(H4DO(w/o HEV))-90, Tumble Generator Valve Actuator.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of tumble generator valve motor.
Judge as NG when the overcurrent signal is sent from IC after tumble generator valve driving IC diagnosis.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM) (2) Tumble generator valve (3) Battery

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
TGV command	= Open or = closed

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Overcurrent signal from driver IC Short circuit to GND is detected when IC current > 16 A or Short circuit to B+ is detected when IC current > 14 A	= ON

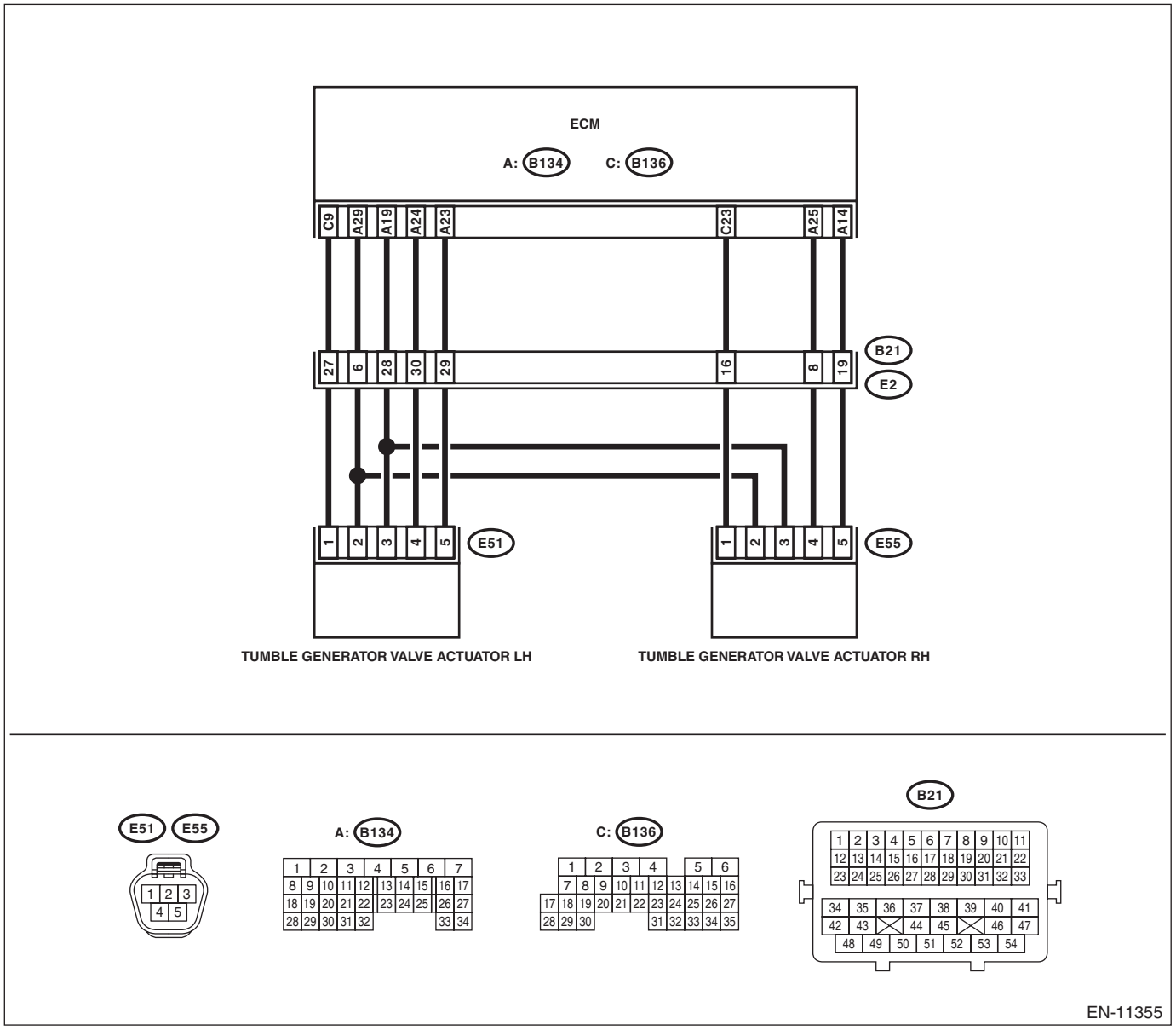
Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EK:DTC P2012 TGV CONTROL CIRCUIT LOW BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

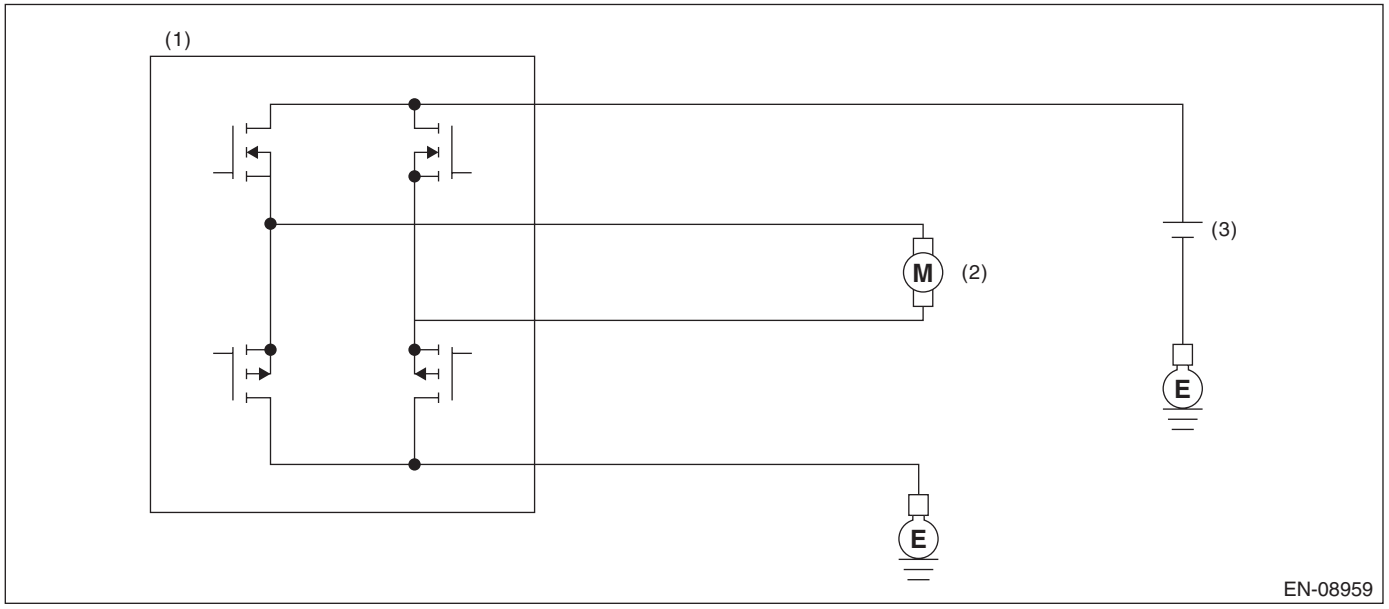


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR LH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 23 (+) — Chassis ground (–):*** ***(B134) No. 24 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and tumble generator valve actuator LH connector.	Replace the tumble generator valve actuator LH. <Ref. to FU(H4DO(w/o HEV))-90, Tumble Generator Valve Actuator.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of tumble generator valve motor.
Judge as NG when the overcurrent signal is sent from IC after tumble generator valve driving IC diagnosis.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM) (2) Tumble generator valve (3) Battery

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
TGV command	= Open or = closed

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Overcurrent signal from driver IC Short circuit to GND is detected when IC current > 16 A or Short circuit to B+ is detected when IC current > 14 A	= ON

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EL:DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1

DTC DETECTING CONDITION:

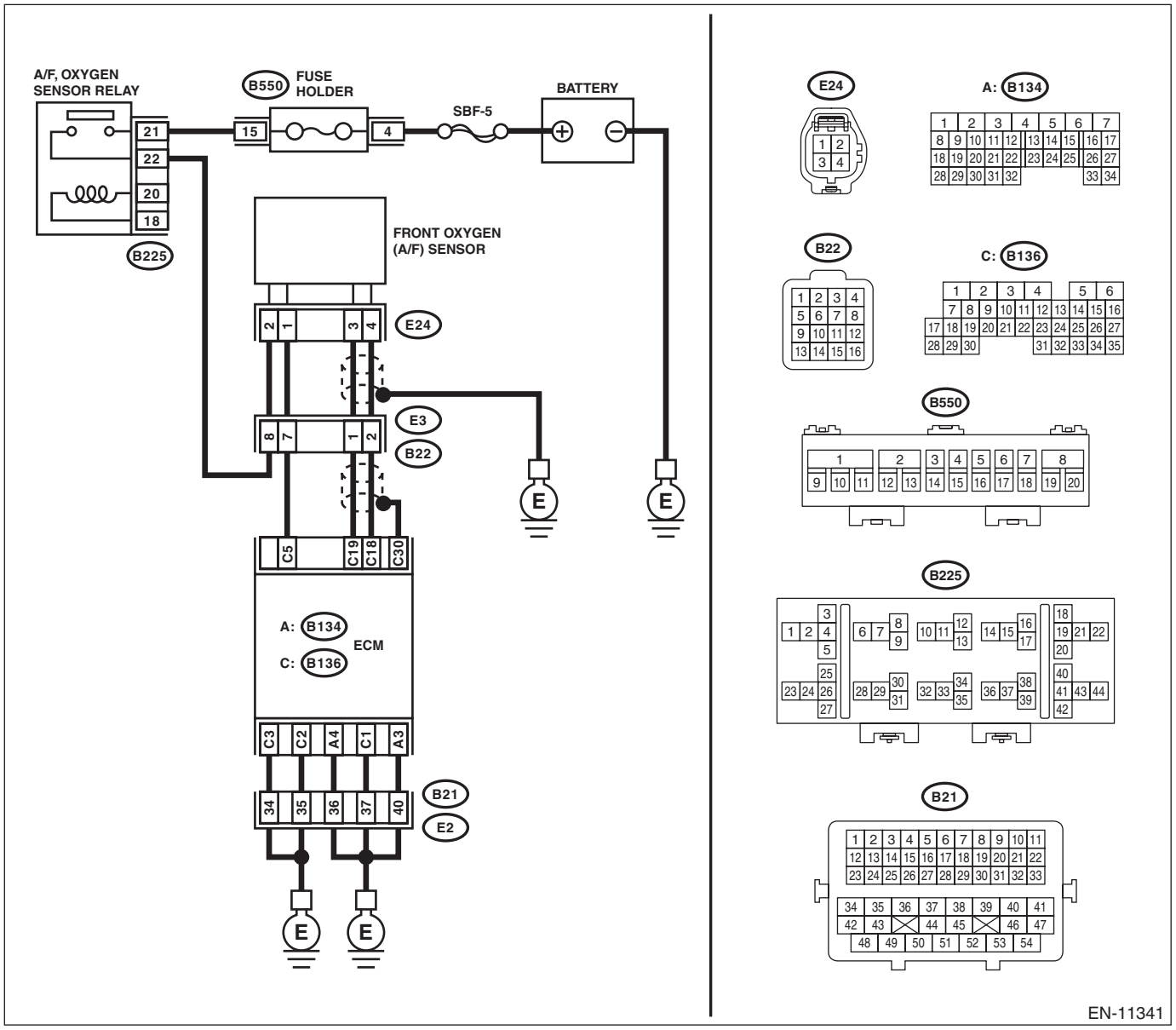
Detected when two consecutive driving cycles with fault occur.

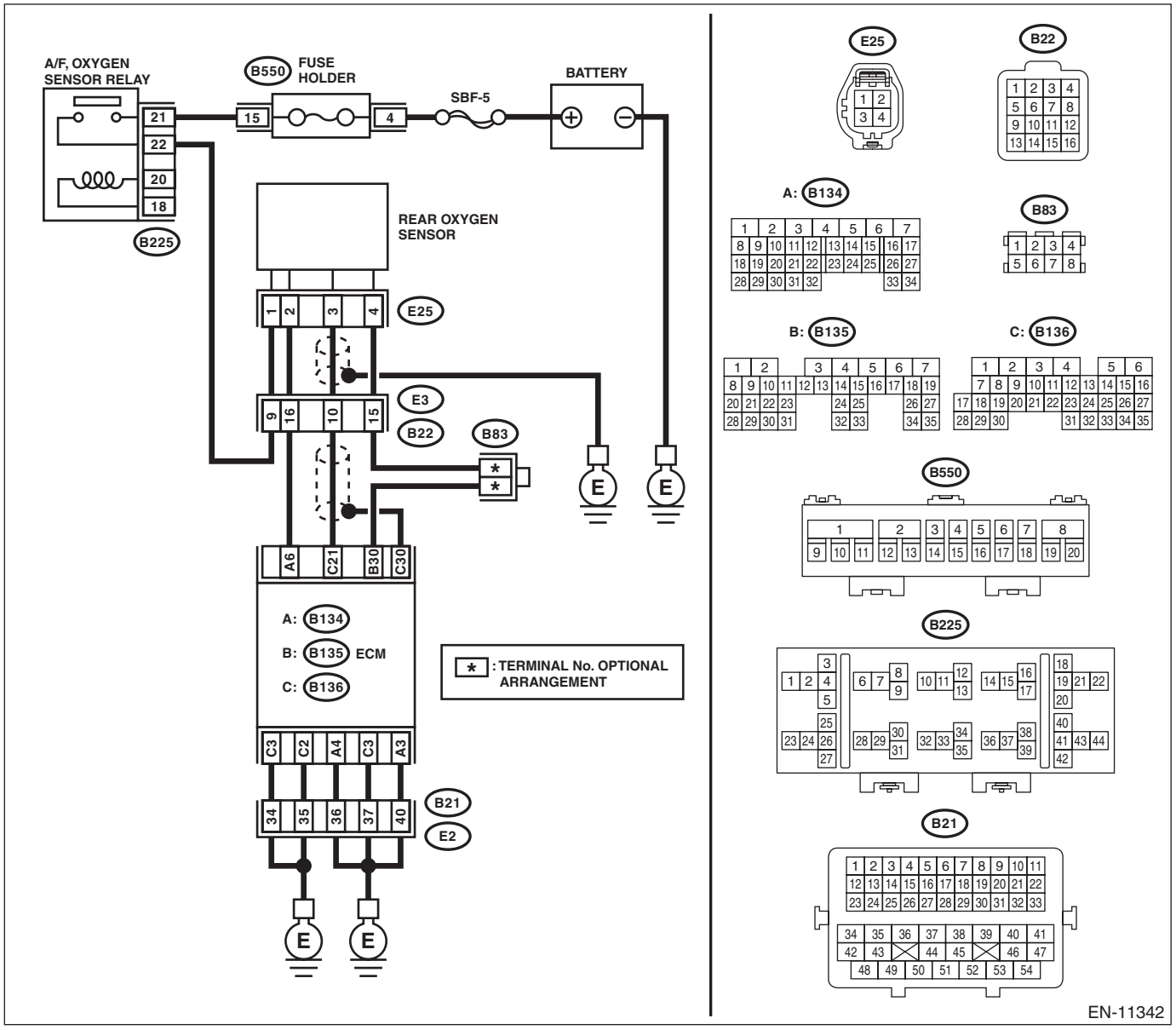
CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>





Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
5	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **7**.	Go to step **6**.
6	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 4.95 V or more?	Go to step **7**.	Go to step **8**.
7	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
8	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **9**.
9	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **11**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(w/o HEV))-144, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(w/o HEV))-176, INSPECTION, Fuel Delivery and Evaporation Lines.>
11	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **12**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>
12	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **13**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

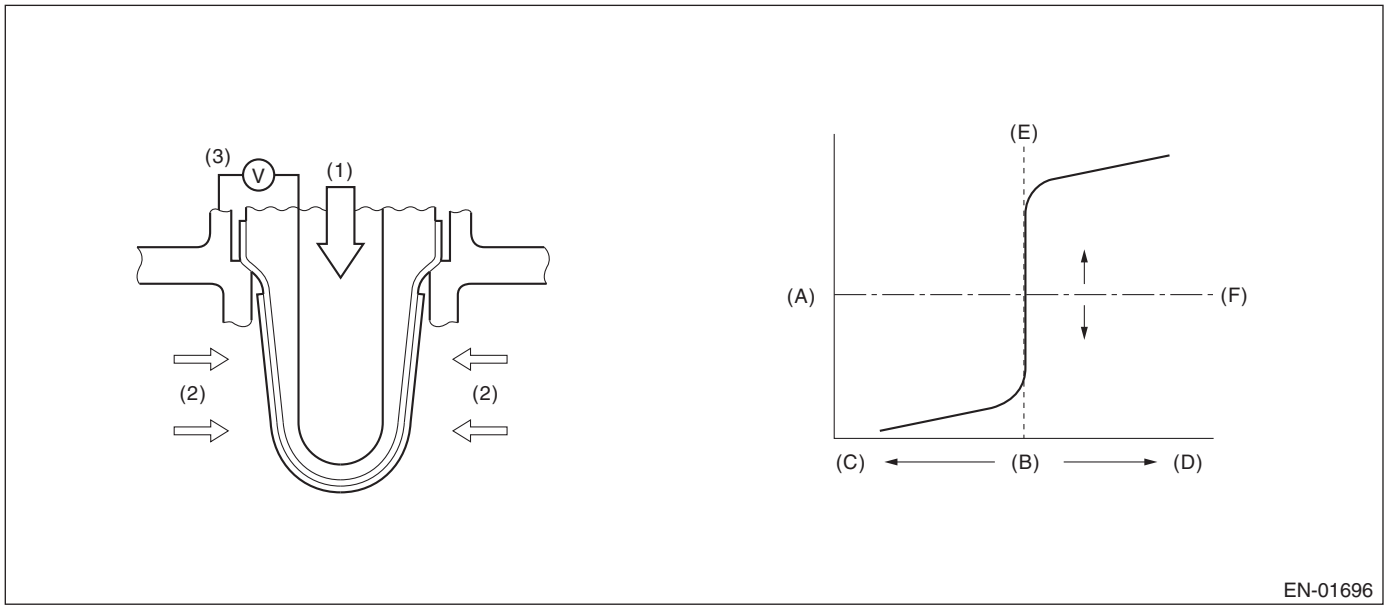
	Step	Check	Yes	No
13	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Go to step **14**.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>
14	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Depress the clutch pedal. (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step **15**.	Go to step **16**.
15	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Depress the clutch pedal. (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step **17**.	Go to step **16**.

	Step	Check	Yes	No
16	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **18**.
17	**CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Rear O2 Sensor» kept at 0.250 V or less for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>	Go to step **18**.
18	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **19**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
19	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of fuel system from the size of the sub feedback learning value.
Control the sub feedback learning and judge as NG when the learning value is in the lean zone.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Conditions for carrying out the sub feedback learning	Completed
Continuous time when all conditions are established.	≥ 1 s

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the vehicle is idling or running at a constant speed of 80 km/h (50 MPH) or more.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sub feedback learning value	< –0.031 (CVT model) < –0.03 (MT model)

Time Needed for Diagnosis: 1 s × 1 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

EM:DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1

DTC DETECTING CONDITION:

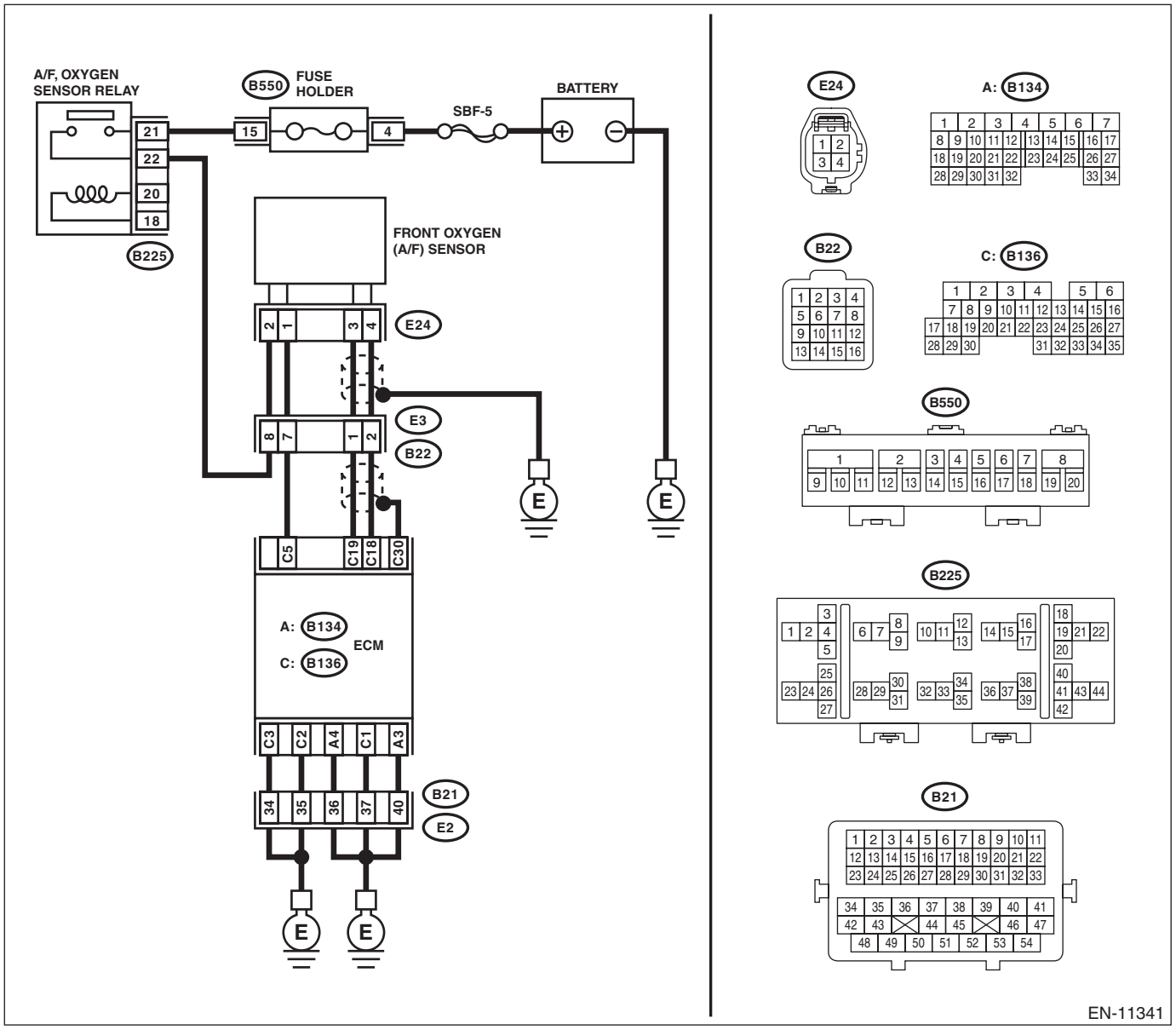
Detected when two consecutive driving cycles with fault occur.

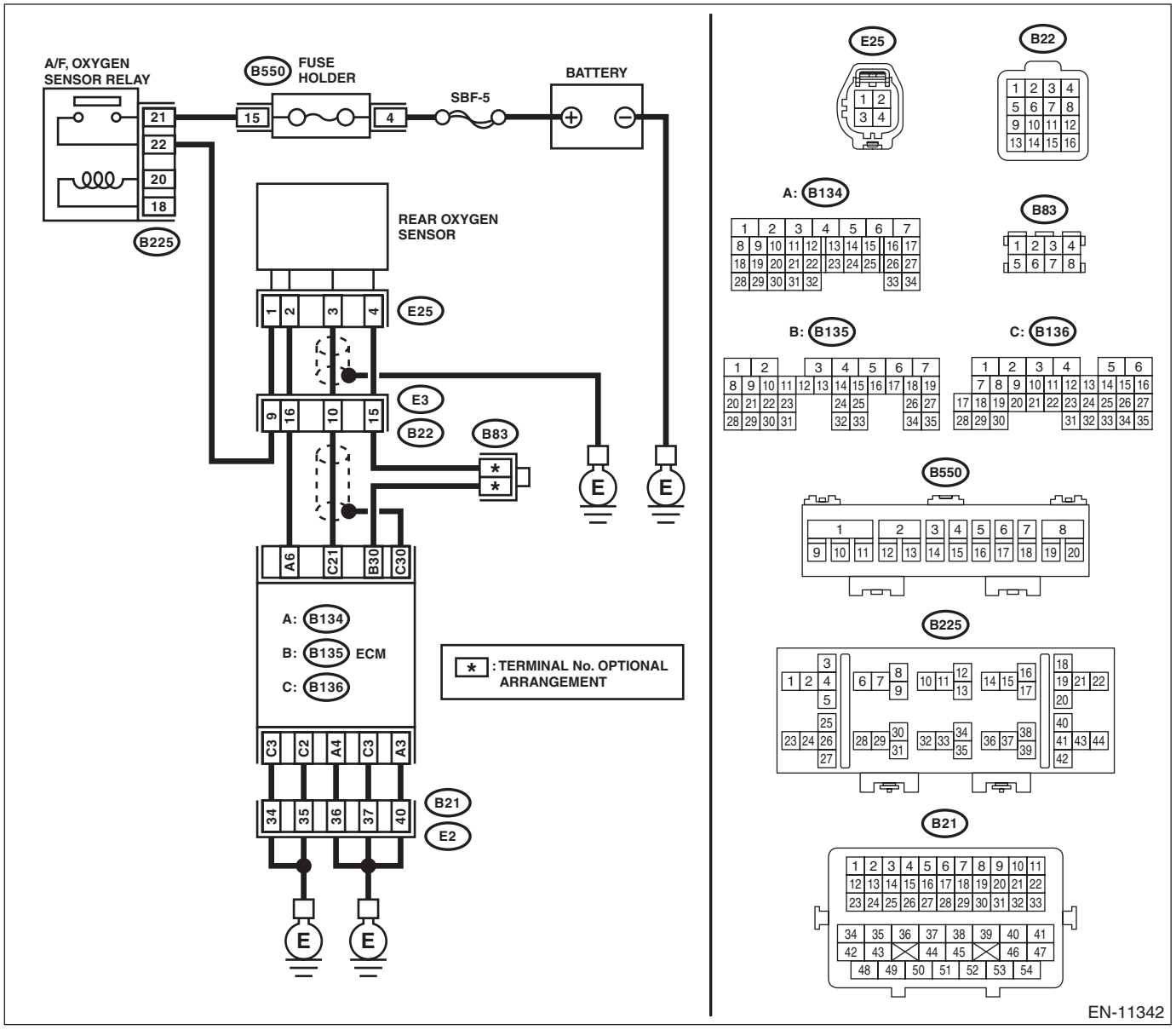
CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>





Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
5	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **7**.	Go to step **6**.
6	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 4.95 V or more?	Go to step **7**.	Go to step **8**.
7	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
8	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **9**.
9	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **11**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(w/o HEV))-144, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(w/o HEV))-176, INSPECTION, Fuel Delivery and Evaporation Lines.>
11	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **12**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>
12	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **13**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

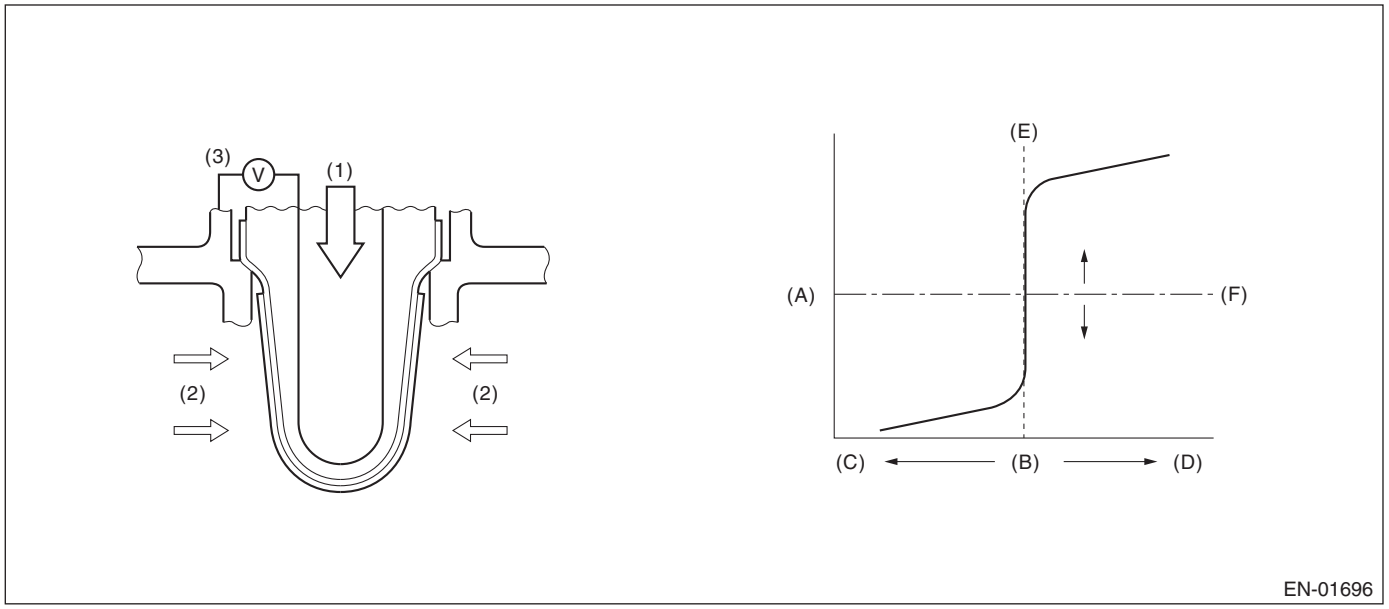
	Step	Check	Yes	No
13	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Go to step **14**.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>
14	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Depress the clutch pedal. (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step **15**.	Go to step **16**.
15	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Depress the clutch pedal. (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step **17**.	Go to step **16**.

	Step	Check	Yes	No
16	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **18**.
17	**CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Rear O2 Sensor» kept at 0.8 V or more for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>	Go to step **18**.
18	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **19**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
19	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of fuel system from the size of the sub feedback learning value.
Sub feedback learning is being performed. When the learning value goes to the rich side, judge as NG.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Conditions for carrying out the sub feedback learning	Completed
Continuous time when all conditions are established.	≥ 1 s

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the vehicle is idling or running at a constant speed of 80 km/h (50 MPH) or more.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

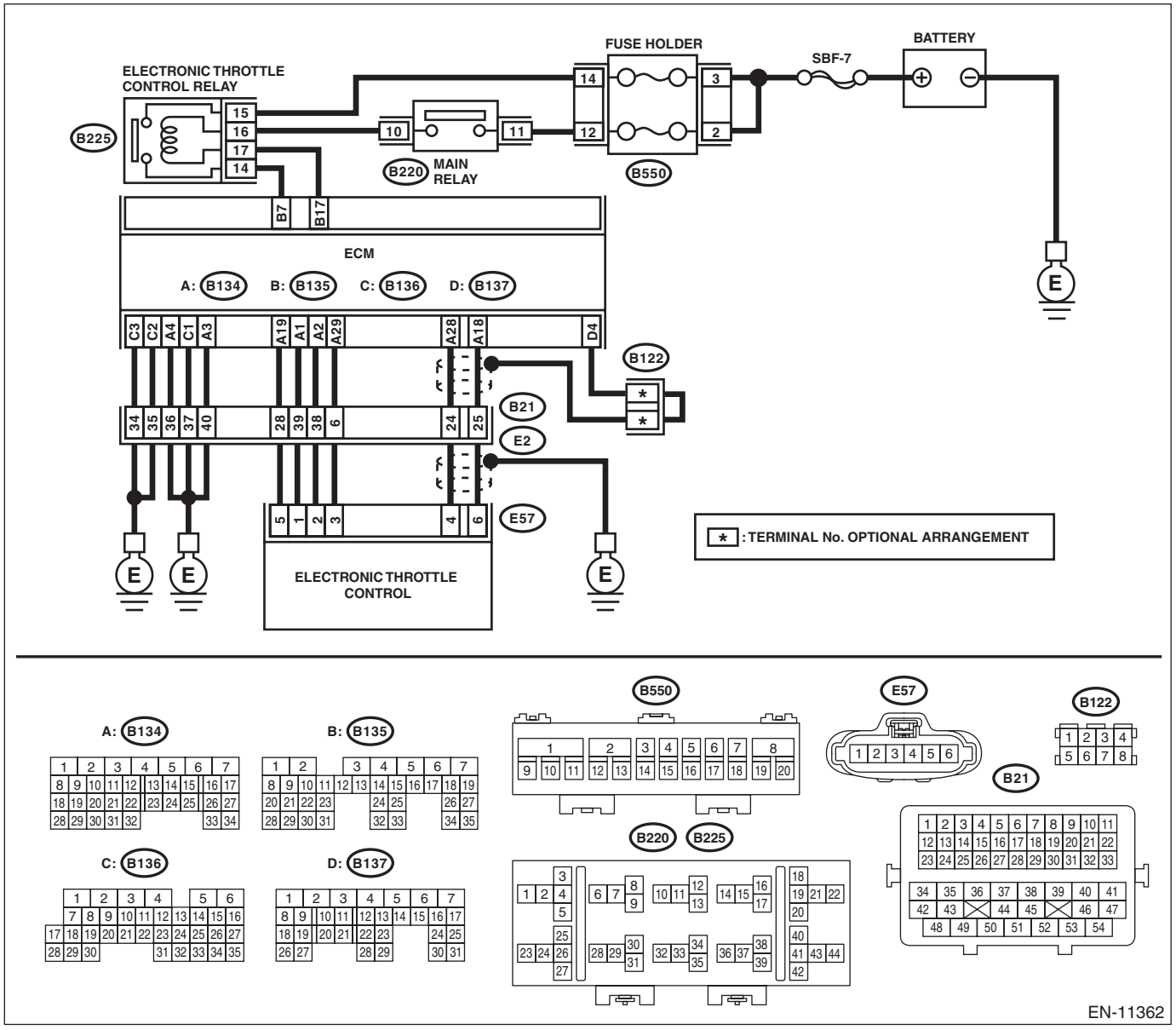
Malfunction Criteria	Threshold Value
Sub feedback learning value	≥ 0.018 (CVT model) ≥ 0.018 (MT model)

Time Needed for Diagnosis: 1 s × 1 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

EN:DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance
- Engine stall

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



EN-11362

	Step	Check	Yes	No
1	**CHECK ELECTRONIC THROTTLE CONTROL RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance less than 1 Ω?	Go to step **2**.	Replace the electronic throttle control relay. <Ref. to FU(H4DO(w/o HEV))-106, Electronic Throttle Control Relay.>
2	**CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY.** Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 15 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the open or short to ground in the power supply circuit.
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 — Chassis ground:*** ***(B225) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
5	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** Measure the resistance between ECM connector and electronic throttle control relay connector. ***Connector & terminal*** ***(B135) No. 17 — (B225) No. 17:*** ***(B135) No. 7 — (B225) No. 14:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.
6	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 18 — Chassis ground:*** ***(B134) No. 18 — (B136) No. 4:*** ***(B134) No. 28 — Chassis ground:*** ***(B134) No. 28 — (B136) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.

	Step	Check	Yes	No
7	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 — Engine ground:*** ***(E57) No. 4 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **8**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
8	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 18 — (E57) No. 6:*** ***(B134) No. 28 — (E57) No. 4:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
9	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **10**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
10	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 (+) — Engine ground (–):*** ***(E57) No. 4 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **11**.
11	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 18:*** ***(B134) No. 19 — (B134) No. 28:***	Is the resistance 1 MΩ or more?	Go to step **12**.	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

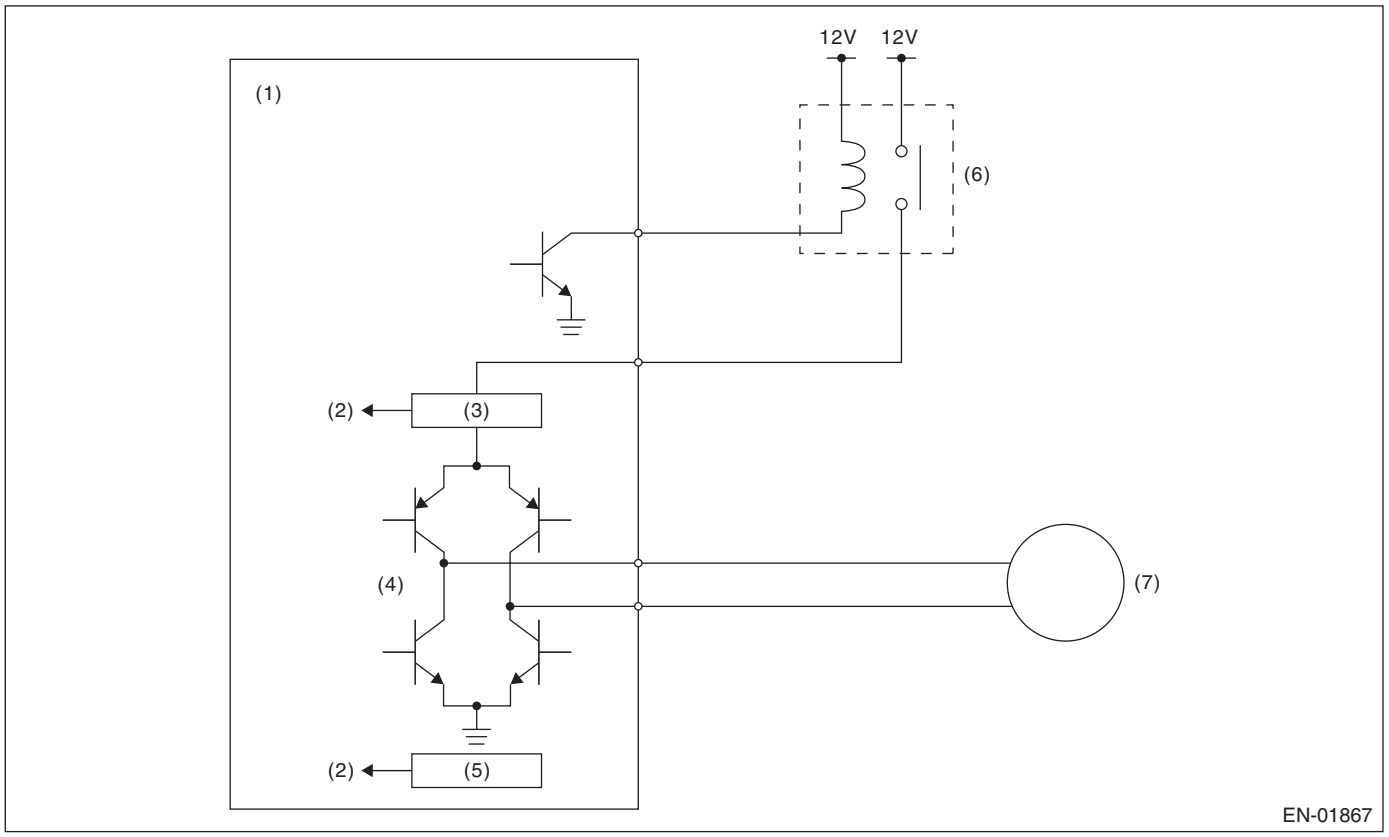
	Step	Check	Yes	No
12	**CHECK SENSOR OUTPUT.** 1) Connect all connectors. 2) Start the engine and warm up completely. 3) Stop the engine, and then turn the ignition switch to ON (engine OFF). 4) Read the value of «Main-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Main-Throttle Sensor» 0.81 — 0.87 V?	Go to step **13**.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>
13	**CHECK SENSOR OUTPUT.** Read the value of «Sub-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Sub-Throttle Sensor» 1.64 — 1.70 V?	Go to step **14**.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>
14	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 2 — (E57) No. 2:*** ***(B134) No. 1 — (E57) No. 1:***	Is the resistance less than 1 Ω?	Go to step **15**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
15	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 2 (+) — Engine ground (–):*** ***(E57) No. 1 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **16**.
16	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 2 — Engine ground:*** ***(E57) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **17**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.

	Step	Check	Yes	No
17	**CHECK ELECTRONIC THROTTLE CONTROL CONNECTOR HARNESS.** Measure the resistance between electronic throttle control connectors. ***Connector & terminal*** ***(E57) No. 2 — (E57) No. 1:***	Is the resistance 1 MΩ or more?	Go to step **18**.	Repair the short circuit in harness between ECM connector and electronic throttle control connector.
18	**CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **19**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
19	**CHECK ELECTRONIC THROTTLE CONTROL.** Measure the resistance between electronic throttle control terminals. ***Terminals*** ***No. 2 — No. 1:***	Is the resistance 50 Ω or less?	Go to step **20**.	Replace the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>
20	**CHECK ELECTRONIC THROTTLE CONTROL.** Move the throttle valve to the fully opened and fully closed positions with fingers. Check that the valve returns to the specified position when releasing fingers.	Does the valve return to the specified position? Standard value: 3 mm (0.12 in) from fully closed position	Repair the poor contact of ECM connector.	Replace the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the motor current becomes large or drive circuit is heated.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Detecting circuit
(3) Overcurrent detection circuit
(4) Drive circuit
(5) Temperature detection circuit
(6) Electronic throttle control relay
(7) Motor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6.2 V
Electronic throttle control relay output	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Overcurrent signal from the electronic throttle control drive IC	ON

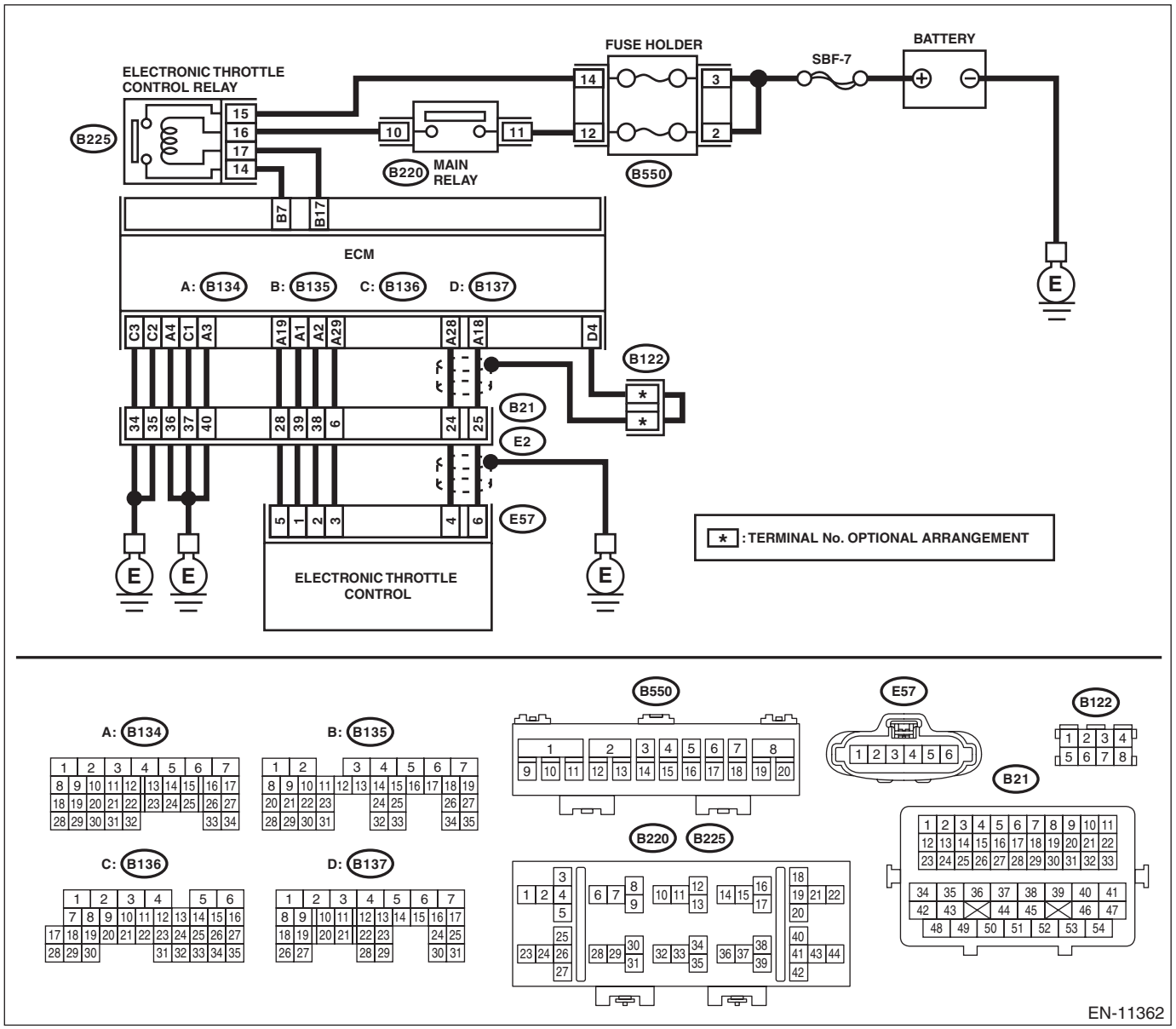
Time Needed for Diagnosis: 512 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EO:DTC P2102 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine stall

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

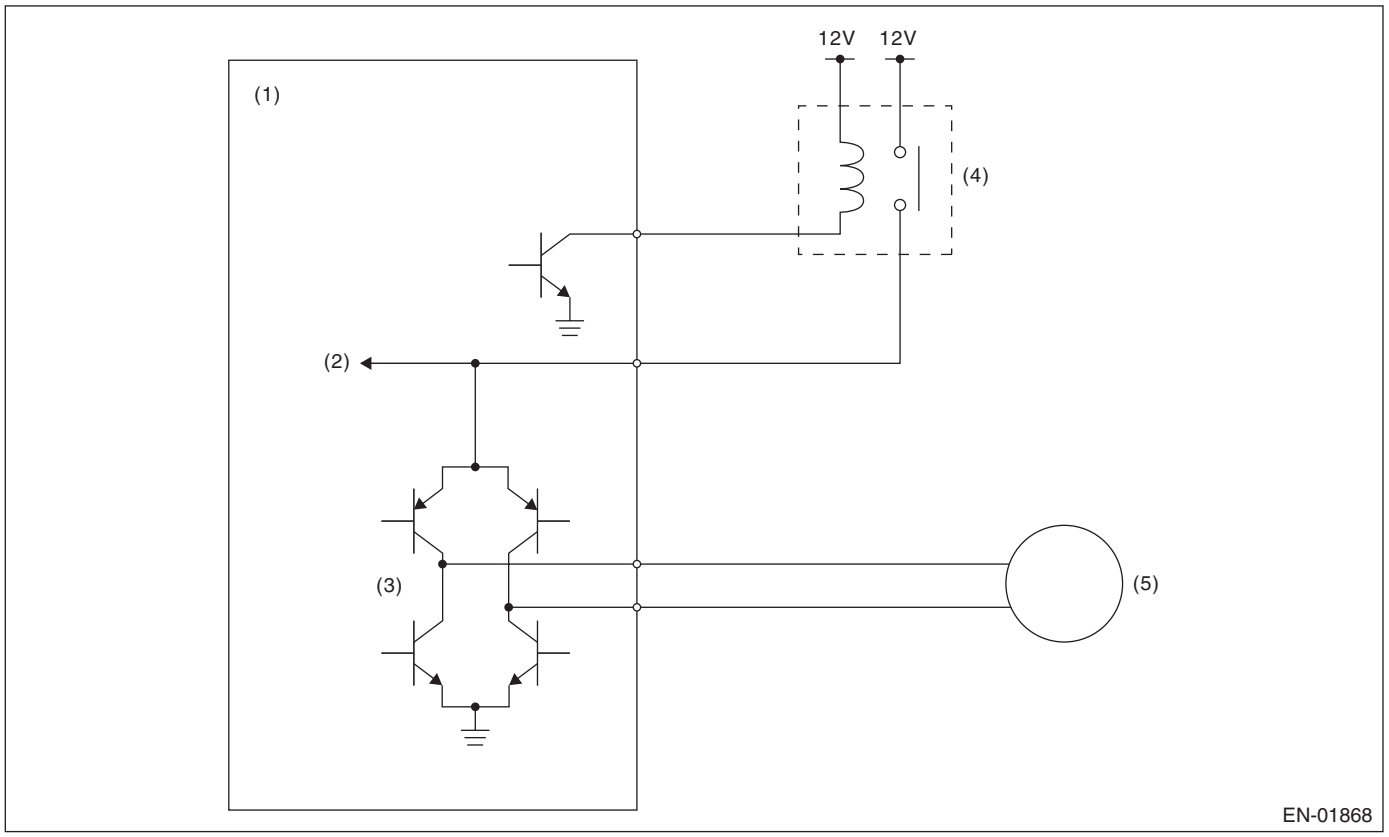


	Step	Check	Yes	No
1	**CHECK ELECTRONIC THROTTLE CONTROL RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance less than 1 Ω?	Go to step **2**.	Replace the electronic throttle control relay. <Ref. to FU(H4DO(w/o HEV))-106, Electronic Throttle Control Relay.>
2	**CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY.** Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 15 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the open or short to ground in the power supply circuit.
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 — Chassis ground:*** ***(B225) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
5	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** Measure the resistance between ECM connector and electronic throttle control relay connector. ***Connector & terminal*** ***(B135) No. 17 — (B225) No. 17:*** ***(B135) No. 7 — (B225) No. 14:***	Is the resistance less than 1 Ω?	Repair the poor contact of ECM connector.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.

1. OUTLINE OF DIAGNOSIS

Judge as NG when the electronic throttle control power is not supplied even when ECM sets the electric control throttle relay to ON.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Voltage detection circuit
(3) Drive circuit
(4) Electronic throttle control relay
(5) Motor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 11 V
Electronic throttle control relay output	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	≤ 5 V

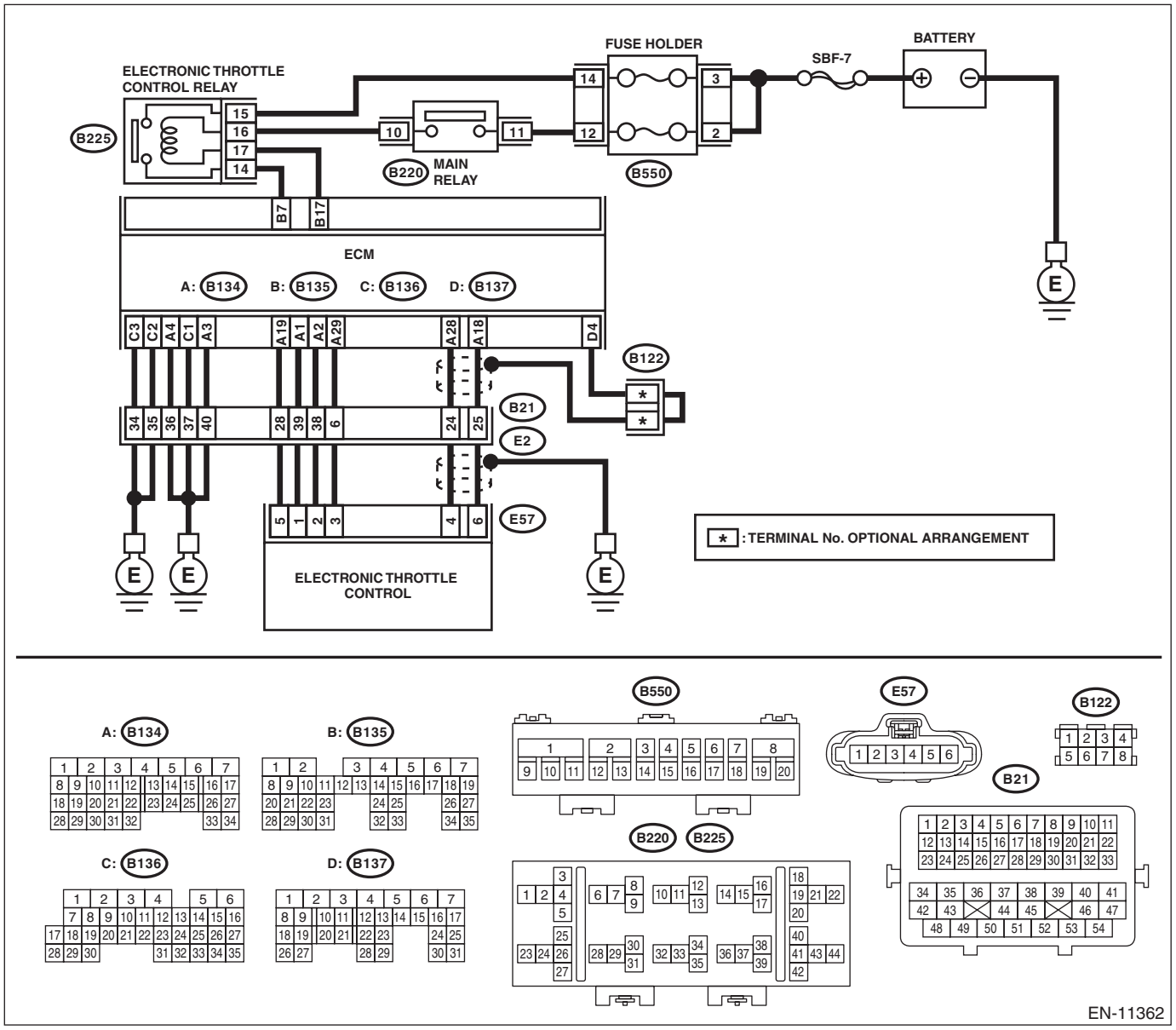
Time Needed for Diagnosis: 352 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EP:DTC P2103 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



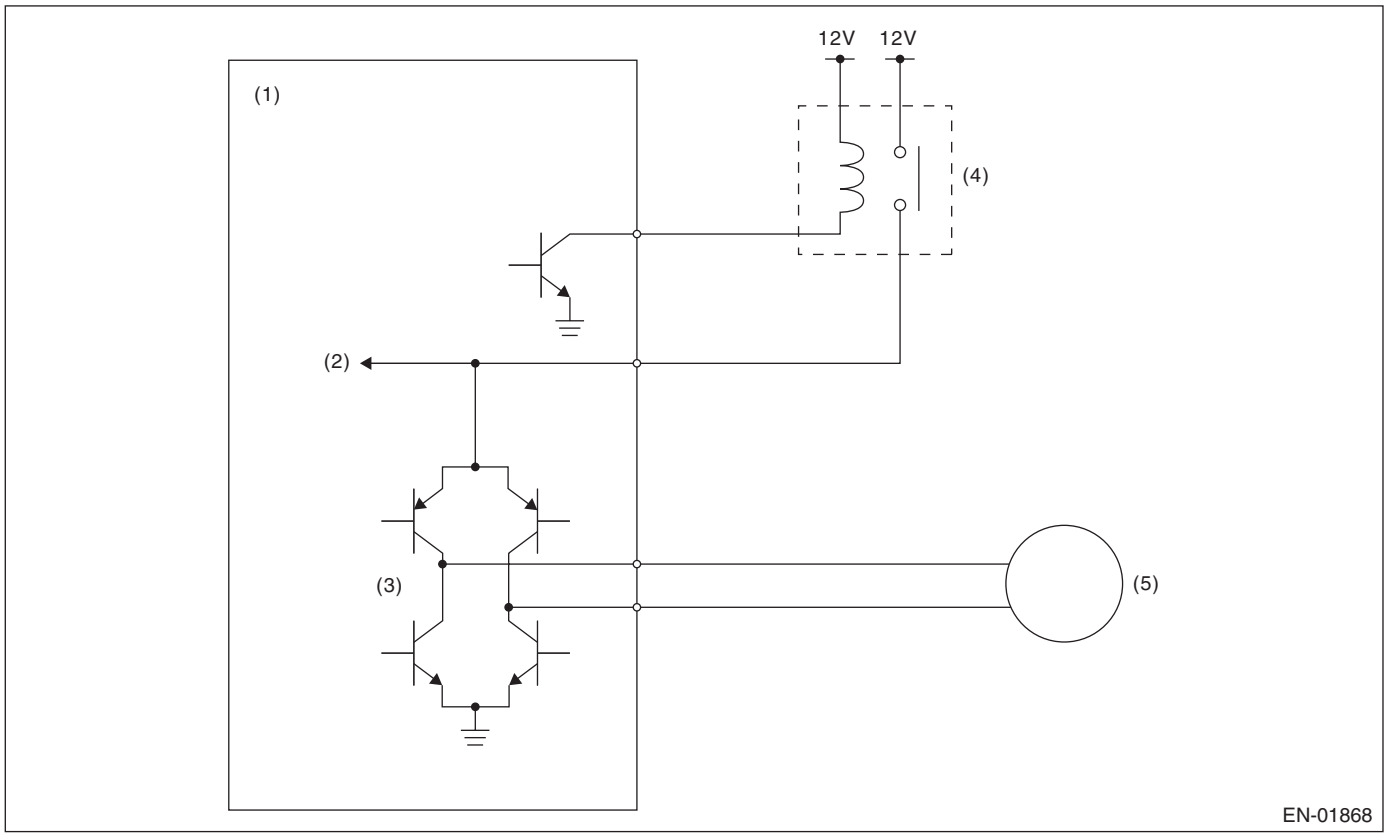
Step		Check	Yes	No
1	**CHECK ELECTRONIC THROTTLE CONTROL RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Measure the resistance between electronic throttle control relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Replace the electronic throttle control relay. <Ref. to FU(H4DO(w/o HEV))-106, Electronic Throttle Control Relay.>

	Step	Check	Yes	No
2	**CHECK SHORT CIRCUIT OF ELECTRONIC THROTTLE CONTROL RELAY POWER SUPPLY.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.

1. OUTLINE OF DIAGNOSIS

Judge as NG when the electronic throttle control power is supplied even when ECM sets the electronic throttle control relay to OFF.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Voltage detection circuit
(3) Drive circuit
(4) Electronic throttle control relay
(5) Motor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V
Electronic throttle control relay output	OFF

4. GENERAL DRIVING CYCLE

- When ignition switch ON → OFF
- Ignition switch OFF → ON (Only after clearing memory)

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	≥ 5 V

Time Needed for Diagnosis: 600 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

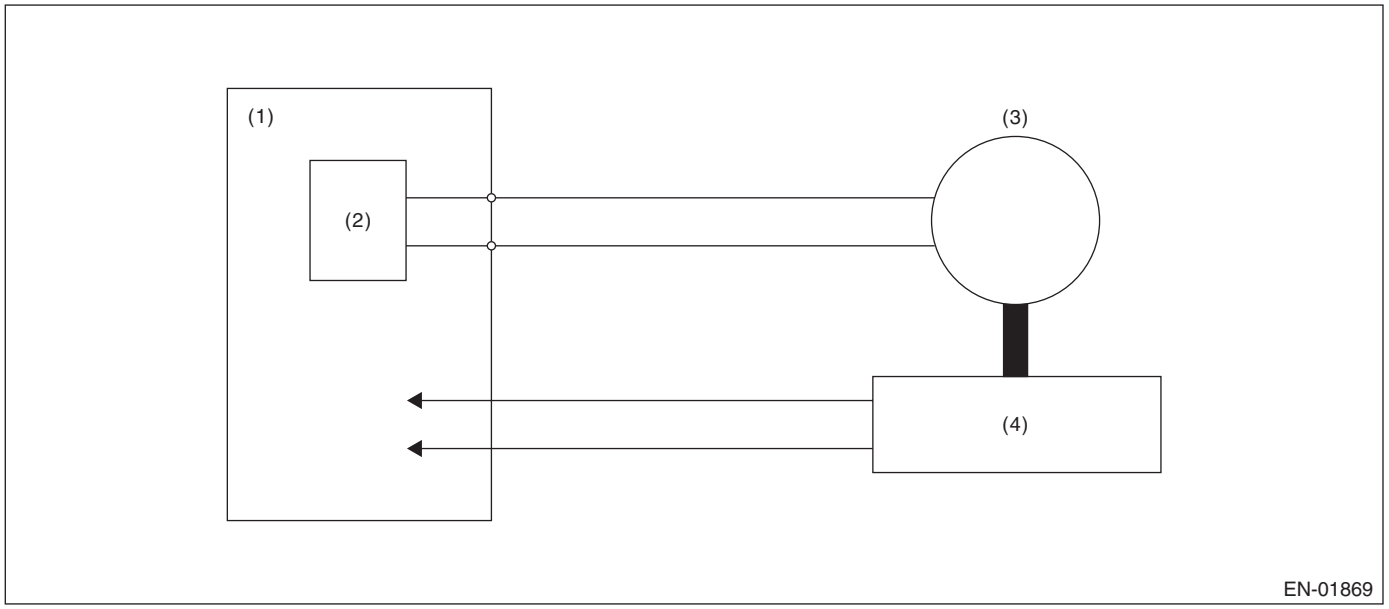
EQ:DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO w/o HEV)(diag)-466, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when full close point learning cannot conducted or abnormal value is detected.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Drive circuit
(3) Motor
(4) Throttle position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Minimum stop position	< -4.020% or > -4.020%
| Throttle default position – Throttle minimum stop position |	< 1.162 °

4. GENERAL DRIVING CYCLE

Perform the diagnosis at full closed point learning.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
12 V battery system voltage	< 6 V

Time Needed for Diagnosis: 8 ms — 80 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

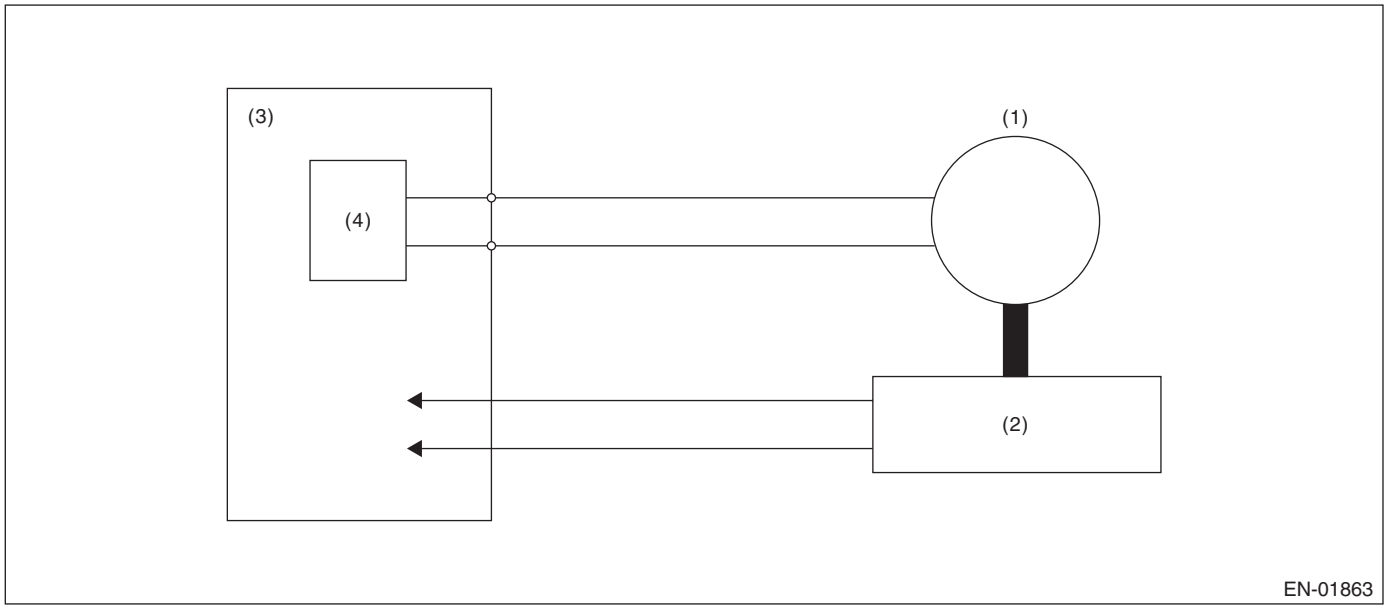
ER:DTC P2119 THROTTLE ACTUATOR "A" CONTROL THROTTLE BODY RANGE/PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO w/o HEV)(diag)-466, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the target opening angle and actual opening angle is mismatched or the current to motor is the specified duty or more for specified time continuously.

2. COMPONENT DESCRIPTION



(1) Motor
(2) Throttle position sensor
(3) Engine control module (ECM)
(4) Drive circuit

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	6.2 V
Throttle motor relay command	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously when the electronic throttle control is operating.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Diagnosis 1

Judgment Value

Malfunction Criteria	Threshold Value
Output duty to drive circuit	≥ 95 %

Time Needed for Diagnosis:

- Engine speed ≥ 500 rpm: 2000 ms
- Engine speed < 500 rpm: 5000 ms

Diagnosis 2

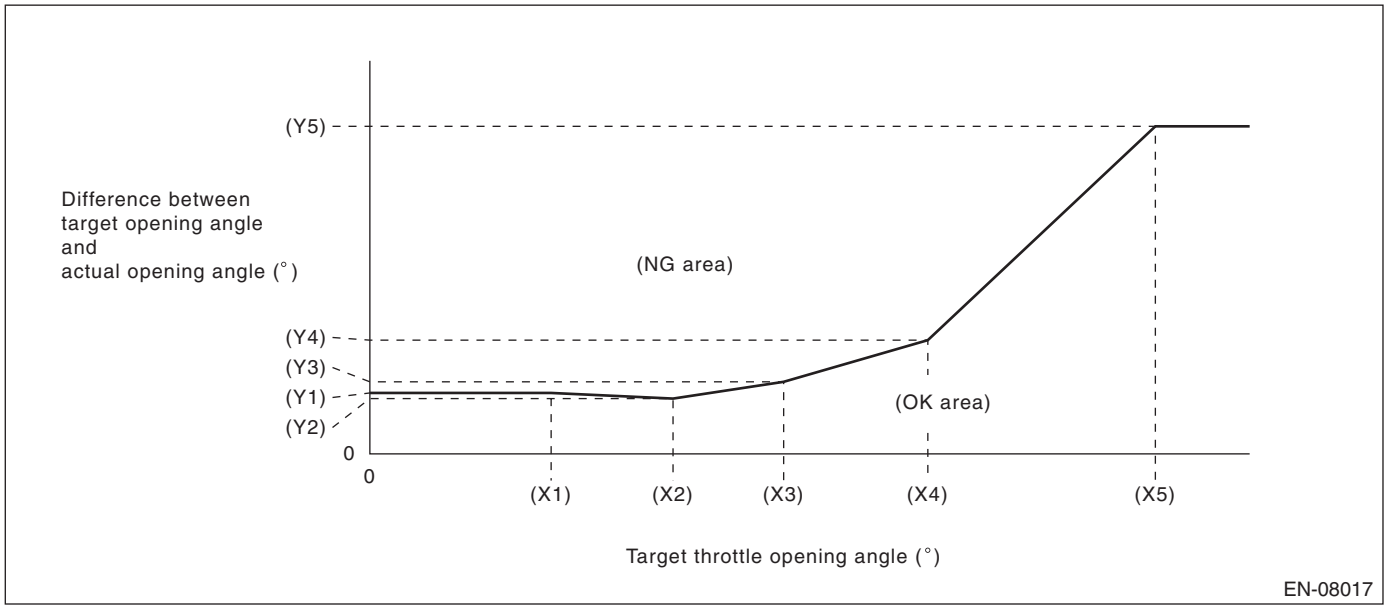
Judgment Value

Malfunction Criteria	Threshold Value
Difference between target opening angle and actual opening angle	Within NG range of **Details of Judgment value**

Time Needed for Diagnosis:

- Engine speed ≥ 500 rpm: Refer to **Details of Judgment time**.
- Engine speed < 500 rpm: 5000 ms

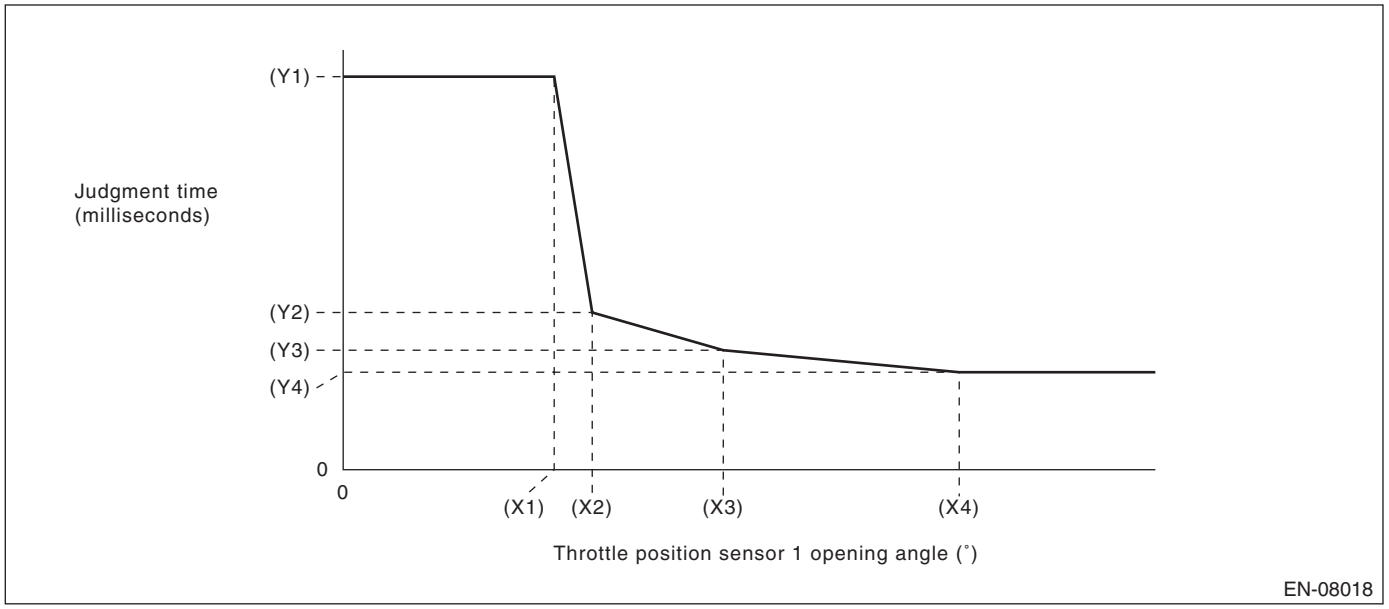
Details of Judgment Value



(X1) 6.915 °
(X2) 11.565 °
(X3) 15.785 °
(X4) 21.285 °
(X5) 29.965 °

(Y1) 4.65 °
(Y2) 4.22 °
(Y3) 5.5 °
(Y4) 8.68 °
(Y5) 25 °

Details of Judgment time



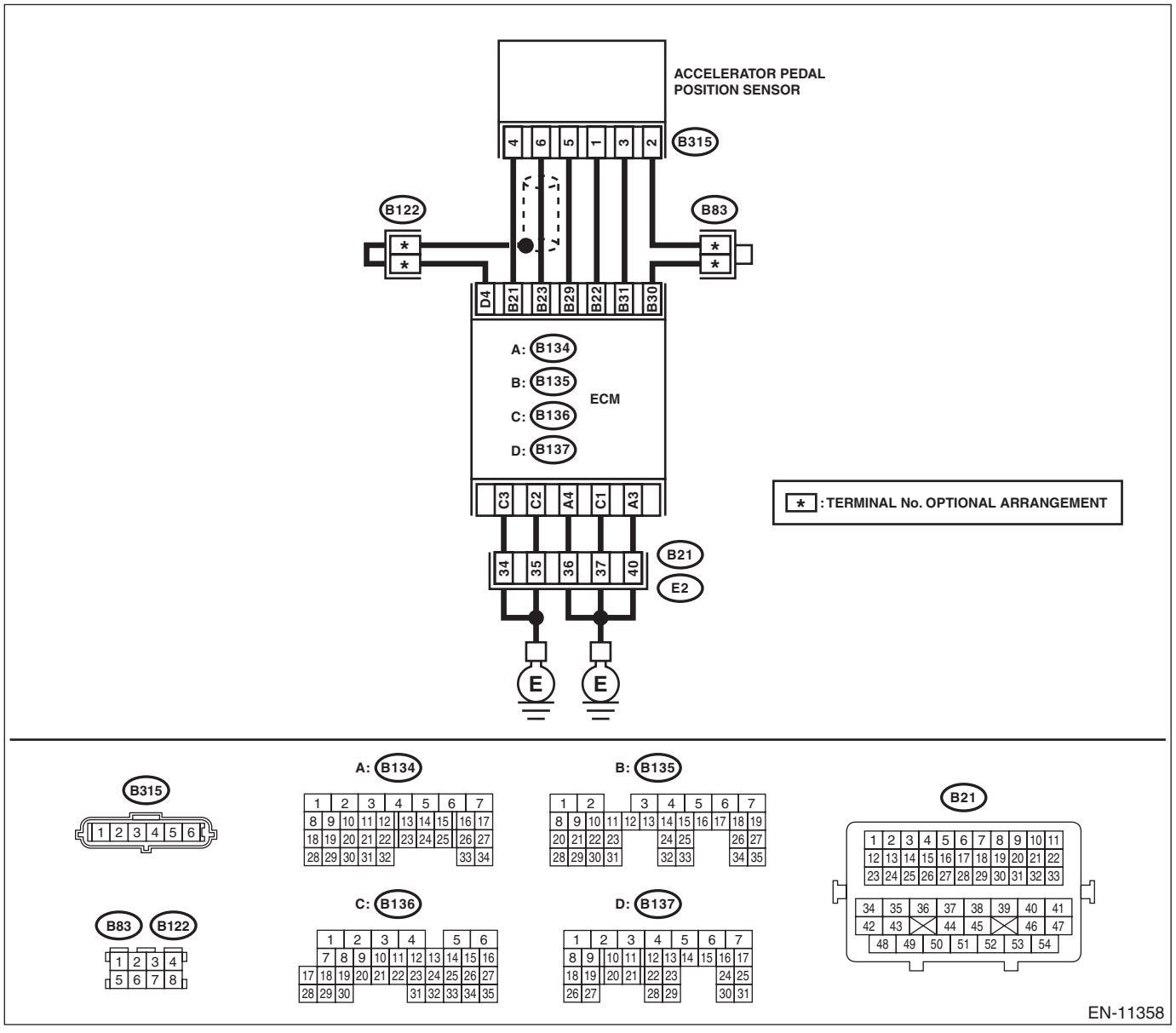
(X1)	8.049999237 °	(X2)	9.5 °	(X3)	14.5 °
(X4)	23.5 °				
(Y1)	1000 ms	(Y2)	400 ms	(Y3)	304 ms
(Y4)	248 ms				

NOTE:
Judgment time when actual opening angle ≤ target opening angle is always 1000 milliseconds.
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

ES:DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

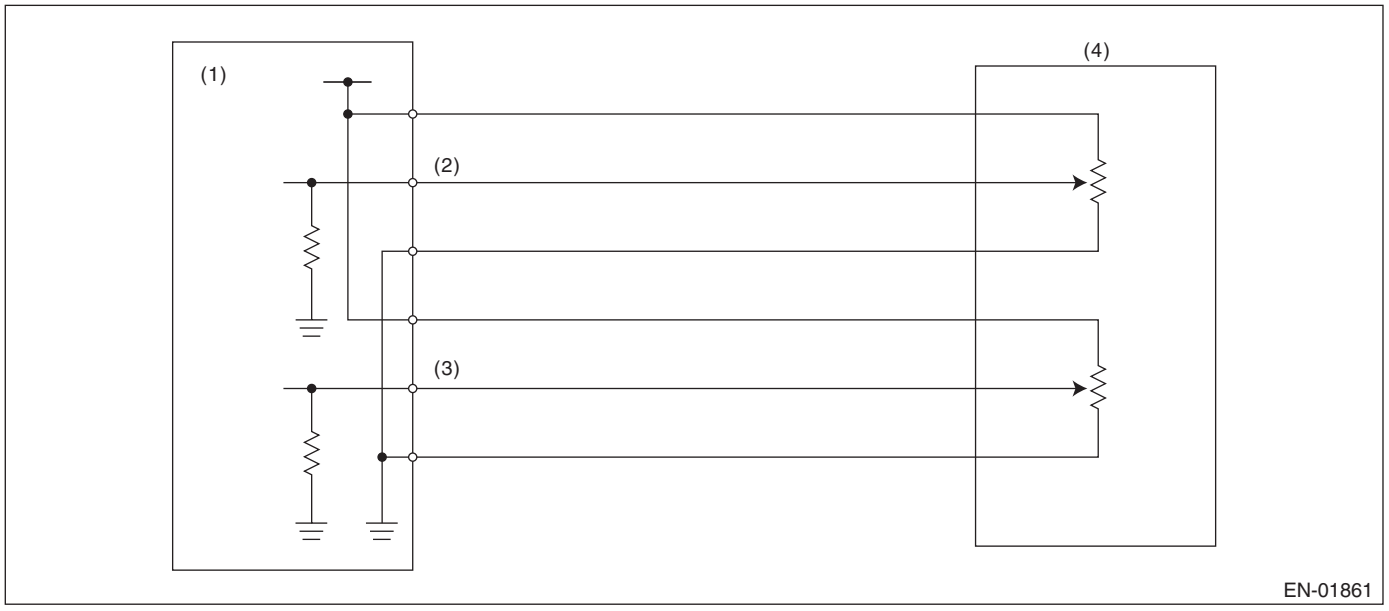


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 21 — Chassis ground:*** ***(B135) No. 23 — Chassis ground:*** ***(B135) No. 23 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the accelerator pedal. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector. Replace the ECM if defective. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of accelerator pedal position sensor 1.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

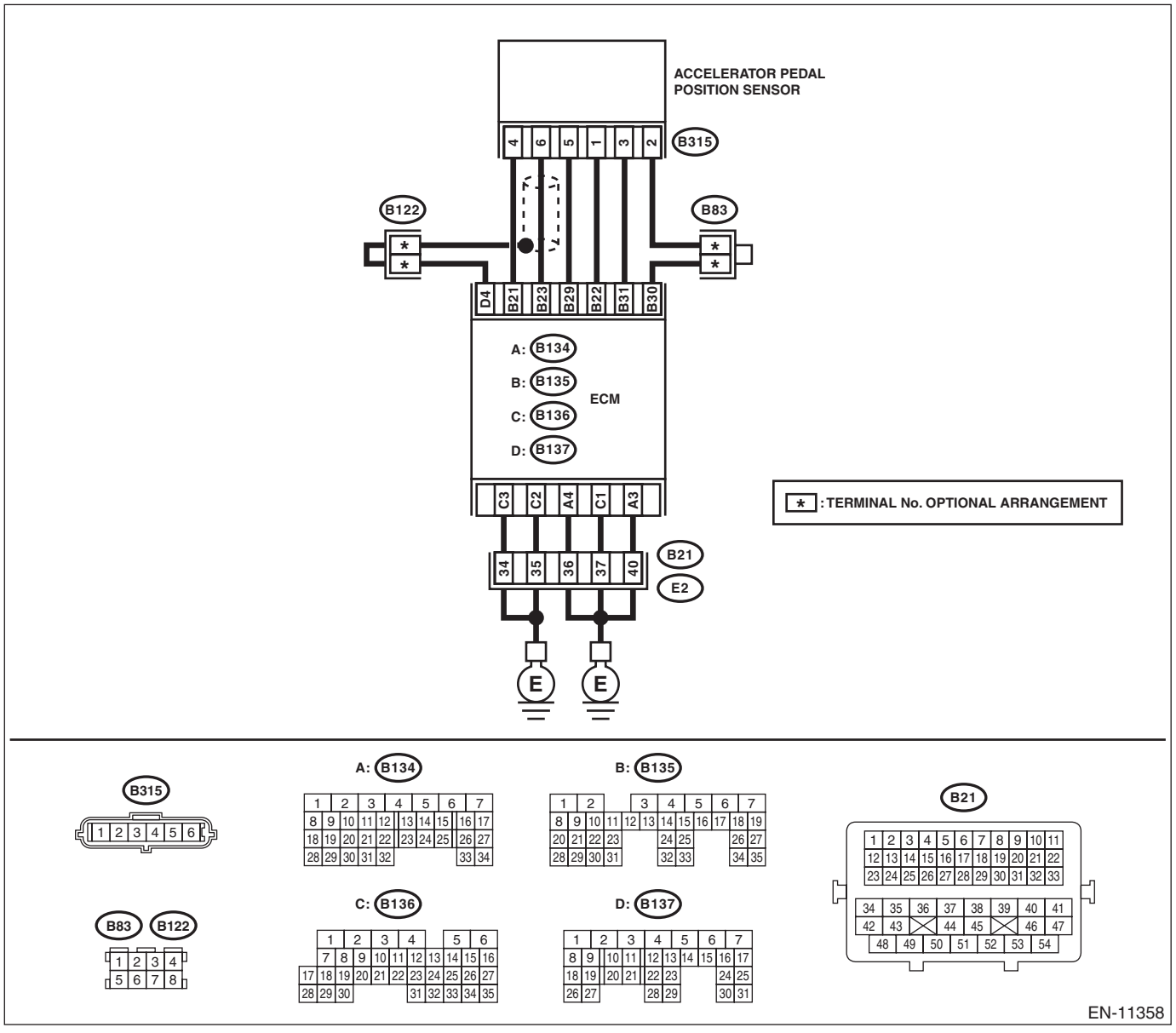
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	< 0.298 V

Time Needed for Diagnosis: 100 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

ET:DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

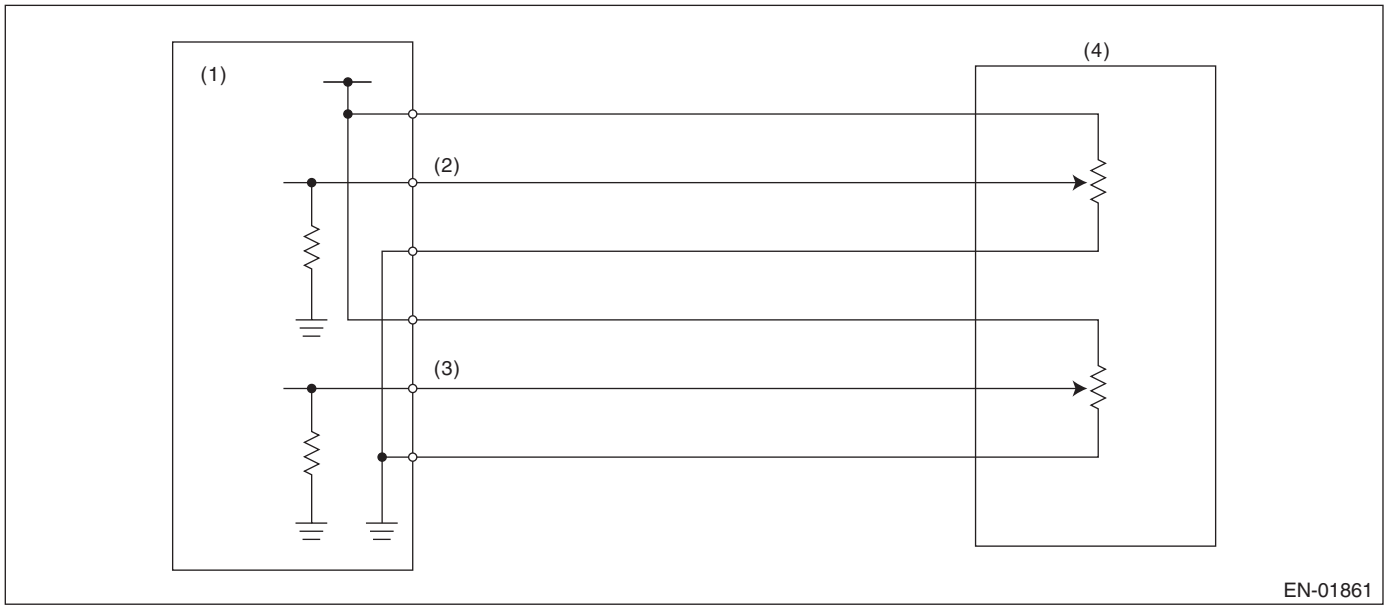


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance of harness between ECM connector and accelerator pedal position sensor connector. ***Connector & terminal*** ***(B135) No. 23 — (B315) No. 6:*** ***(B135) No. 29 — (B315) No. 5:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness between ECM connector and accelerator pedal position sensor connector.
2	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 5 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 6 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B135) No. 21 — (B135) No. 23:***	Is the resistance 1 MΩ or more?	Repair the poor contact of accelerator pedal position sensor connector. Replace the accelerator pedal if defective. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of accelerator pedal position sensor 1.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

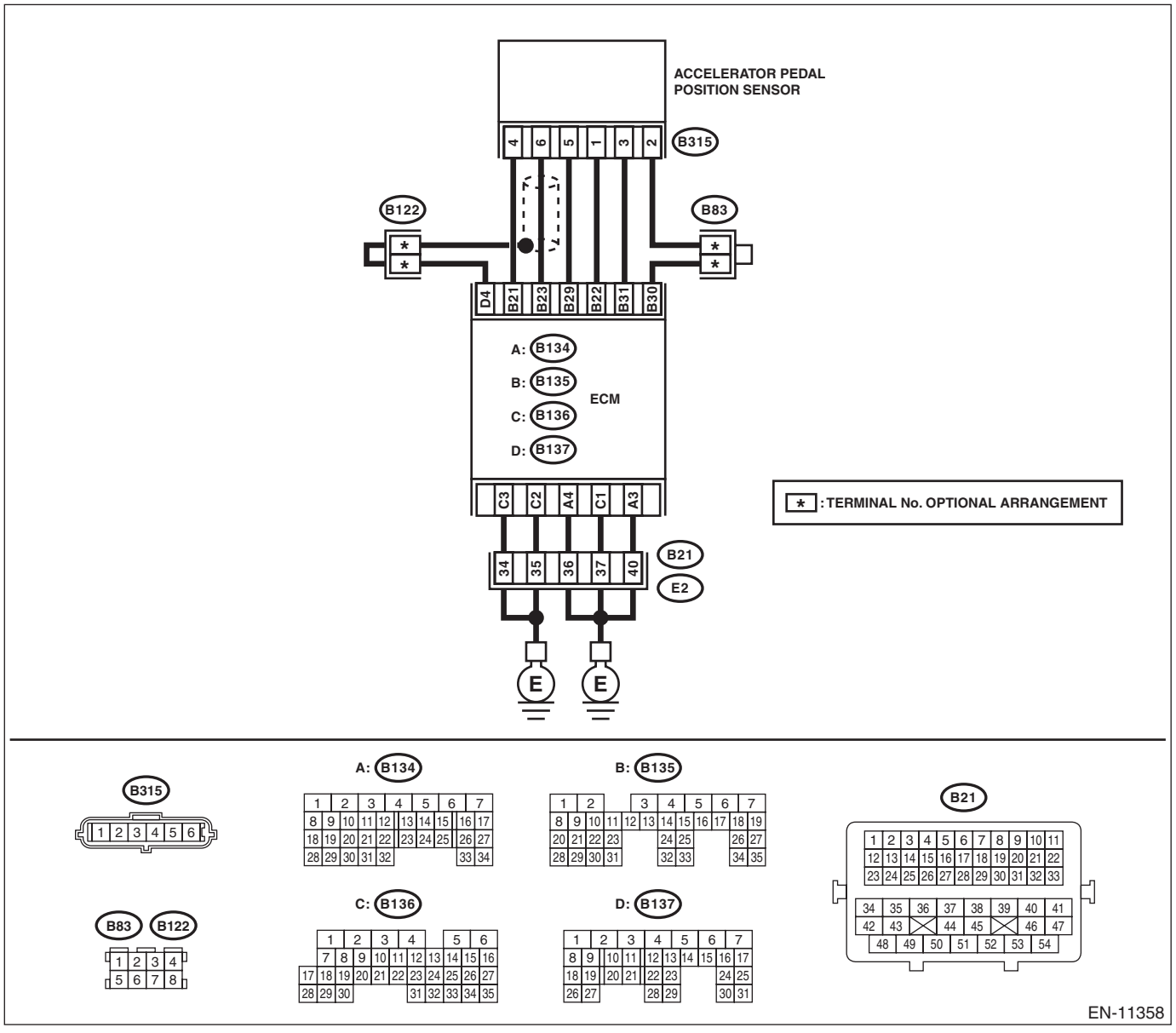
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≥ 4.737 V

Time Needed for Diagnosis: 32 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EU:DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

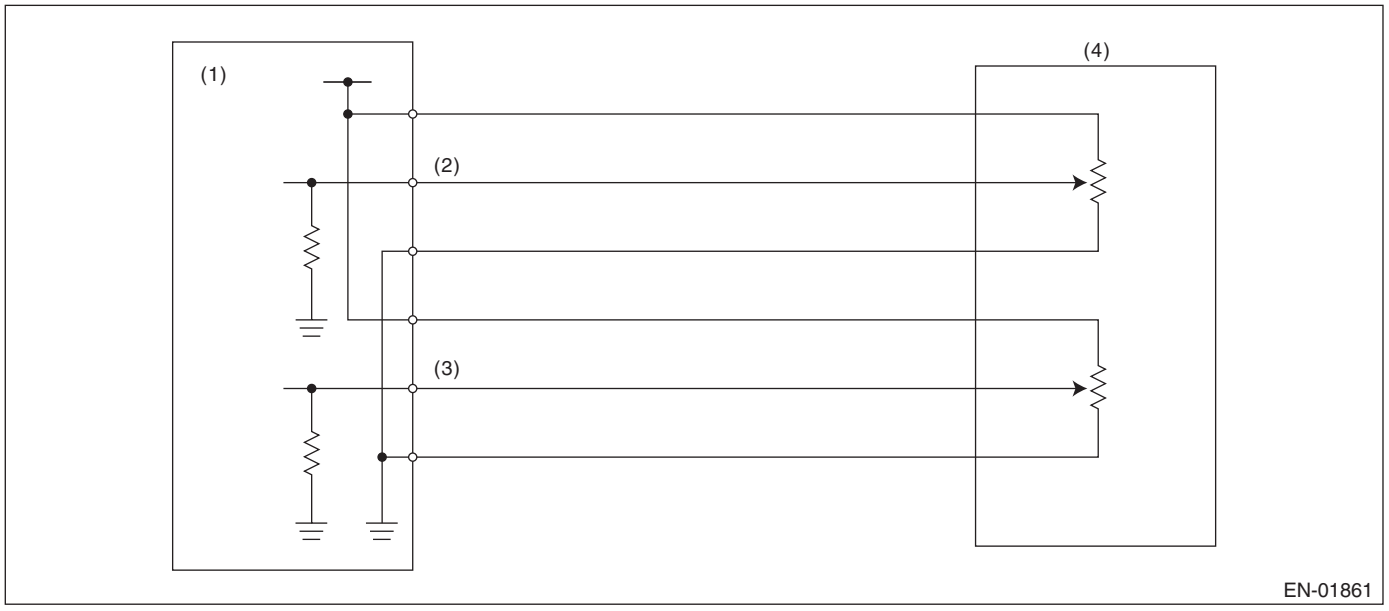


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 22 — Chassis ground:*** ***(B135) No. 31 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the accelerator pedal. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector. Replace the ECM if defective. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of accelerator pedal position sensor 2.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

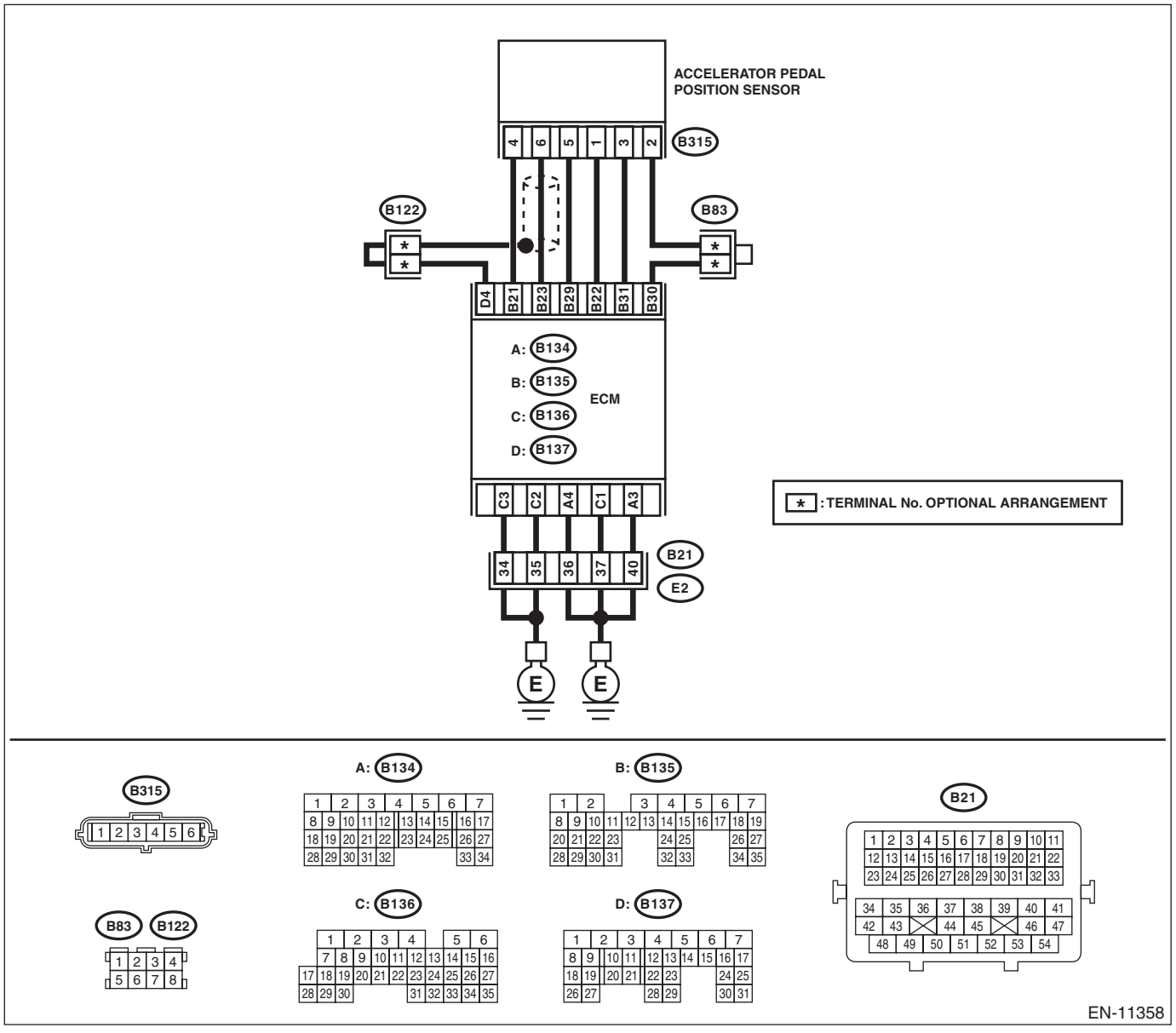
Malfunction Criteria	Threshold Value
Sensor 2 input voltage	< 0.298 V

Time Needed for Diagnosis: 100 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EV:DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

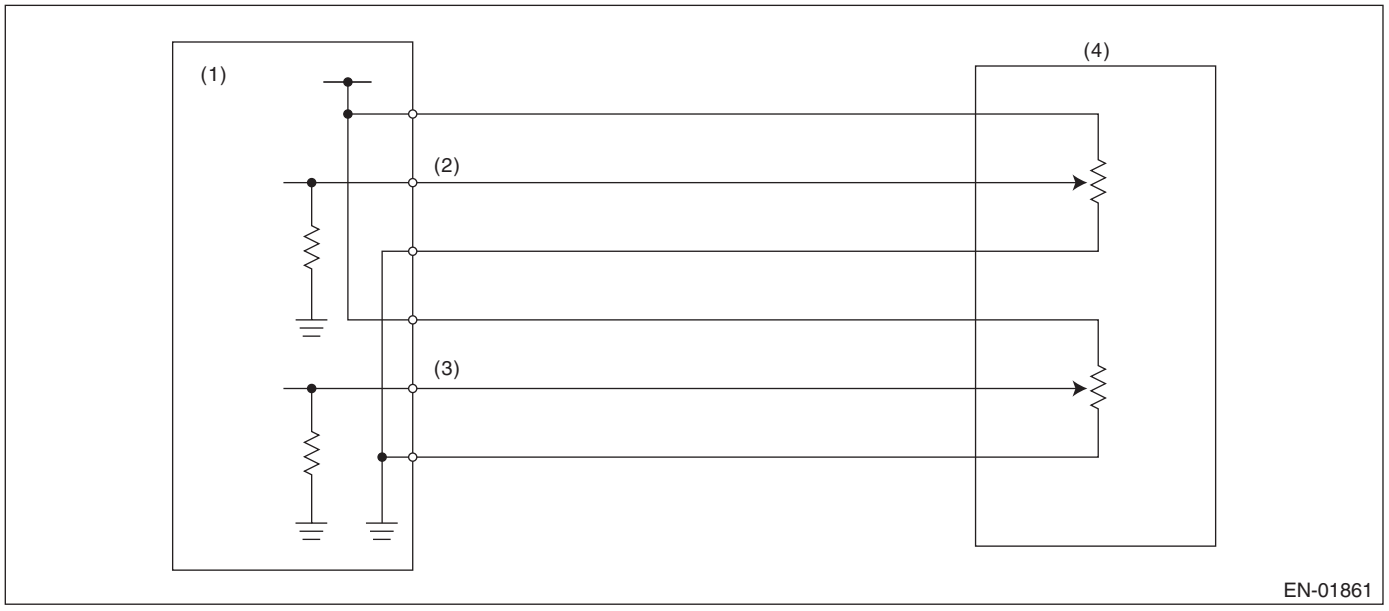


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance of harness between ECM connector and accelerator pedal position sensor connector. ***Connector & terminal*** ***(B135) No. 31 — (B315) No. 3:*** ***(B135) No. 30 — (B315) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and accelerator pedal position sensor connector • Poor contact of joint connector
2	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 2 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 3 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B135) No. 22 — (B135) No. 31:***	Is the resistance 1 MΩ or more?	Repair the poor contact of accelerator pedal position sensor connector. Replace the accelerator pedal if defective. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of accelerator pedal position sensor 2.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

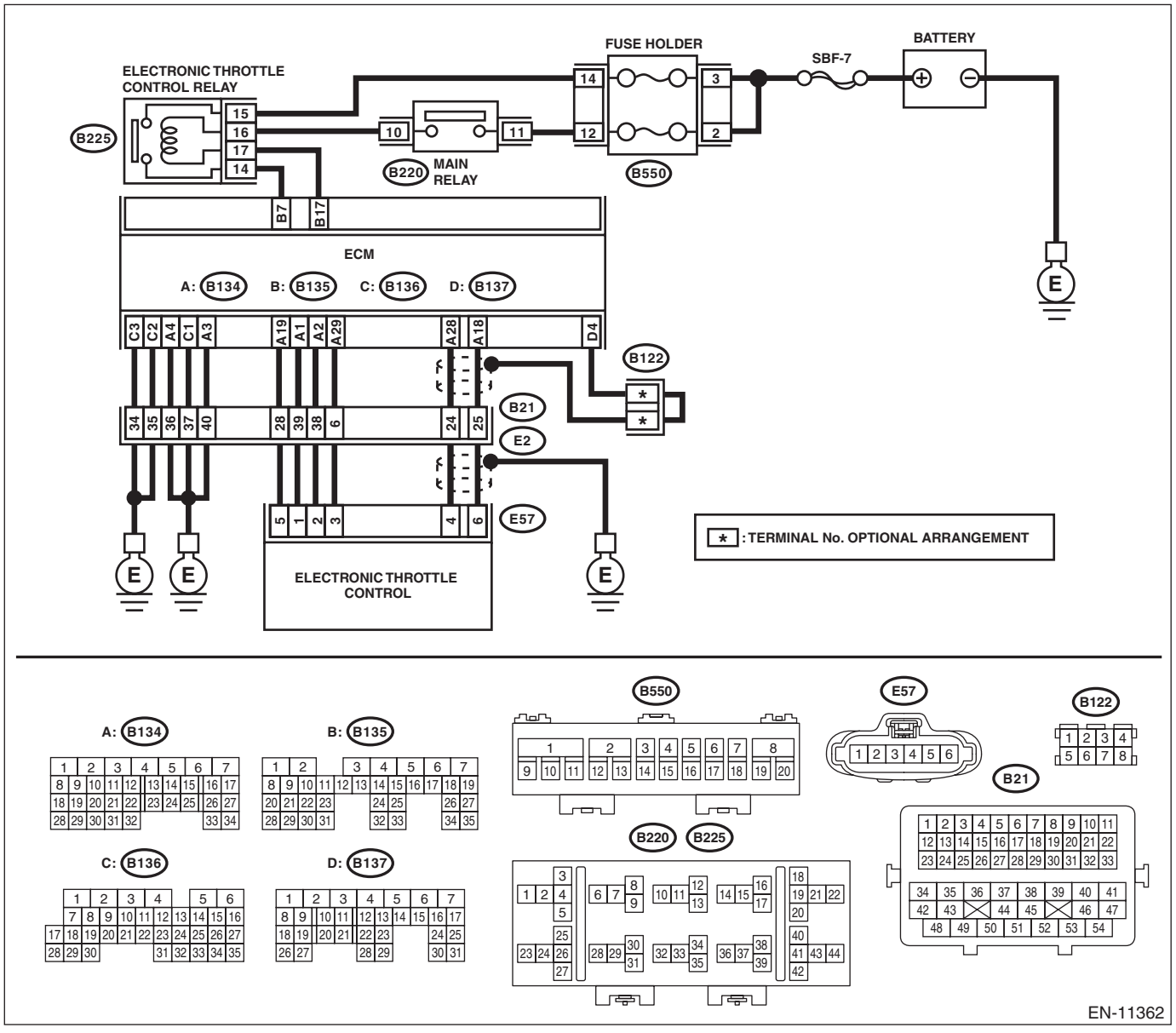
Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 4.737 V

Time Needed for Diagnosis: 100 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EW:DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



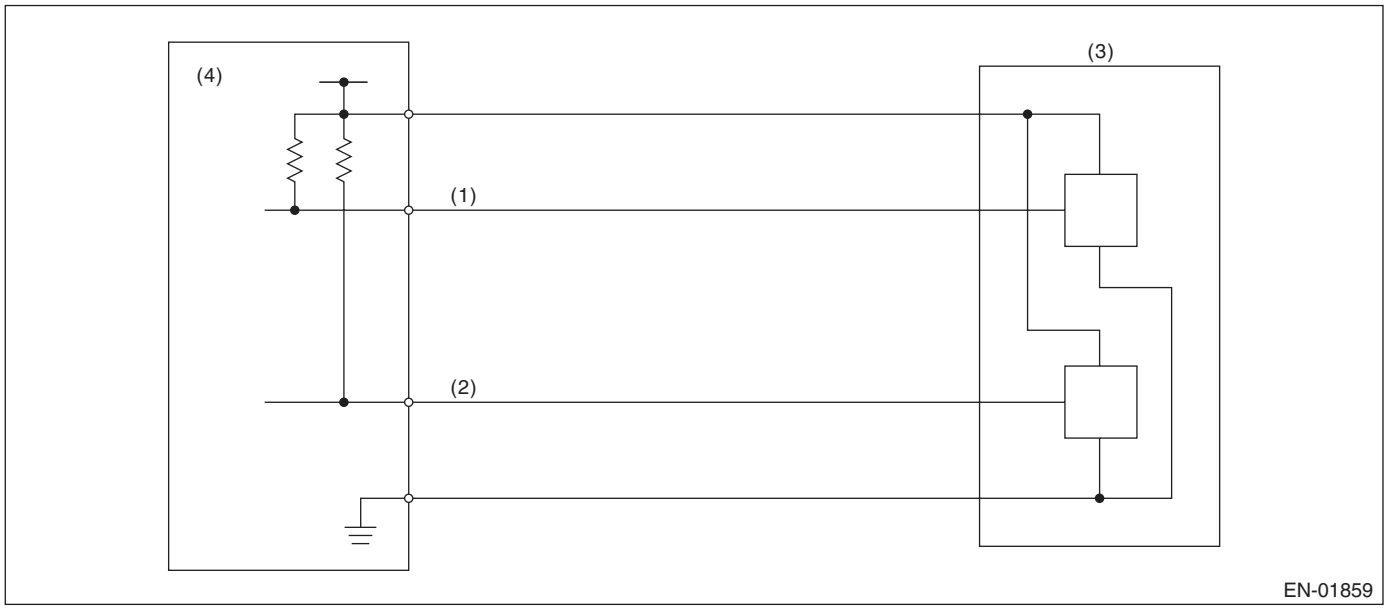
	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 18 — Chassis ground:*** ***(B134) No. 18 — (B136) No. 4:*** ***(B134) No. 28 — Chassis ground:*** ***(B134) No. 28 — (B136) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 — Engine ground:*** ***(E57) No. 4 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 18 — (E57) No. 6:*** ***(B134) No. 28 — (E57) No. 4:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector

	Step	Check	Yes	No
5	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 (+) — Engine ground (–):*** ***(E57) No. 4 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **6**.
6	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 18:*** ***(B134) No. 19 — (B134) No. 28:***	Is the resistance 1 MΩ or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(w/o HEV))-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

1. OUTLINE OF DIAGNOSIS

Judge as NG when the signal level of throttle position sensor 1 is different from the throttle position sensor 2.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition switch	ON
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

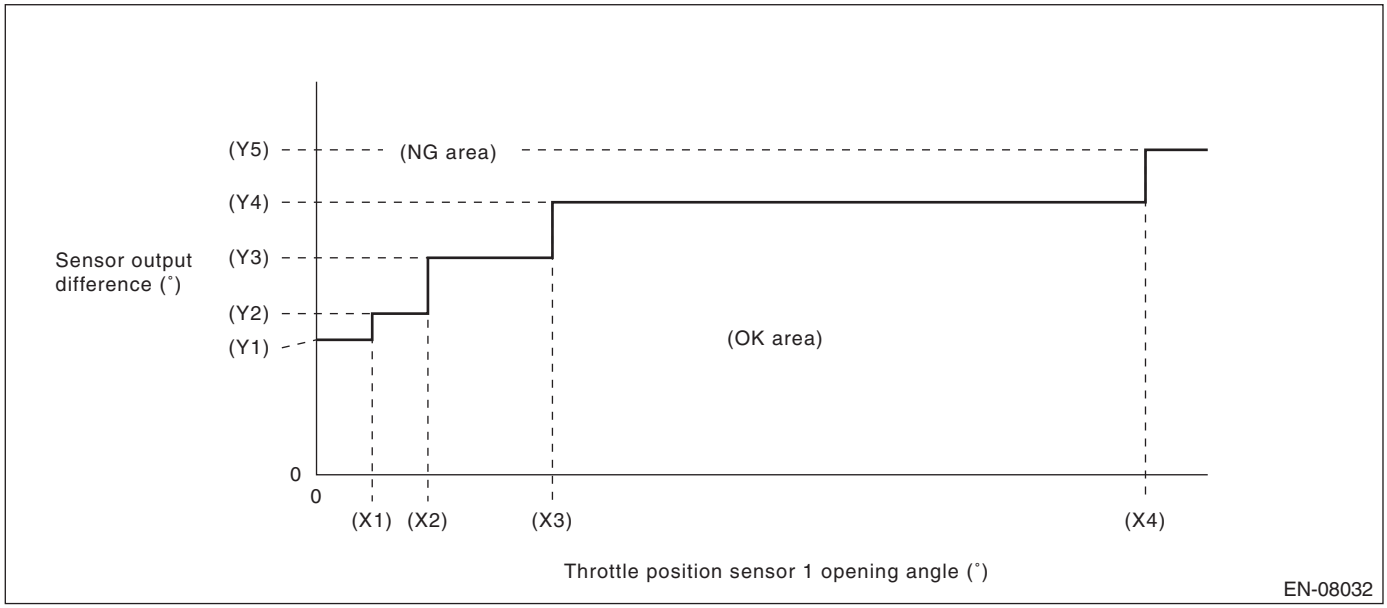
5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	Within NG range of **Details of Judgment value**

Details of Judgment Value



(X1) 2.125 °
(X2) 4.25 °
(X3) 9 °
(X4) 31.625 °

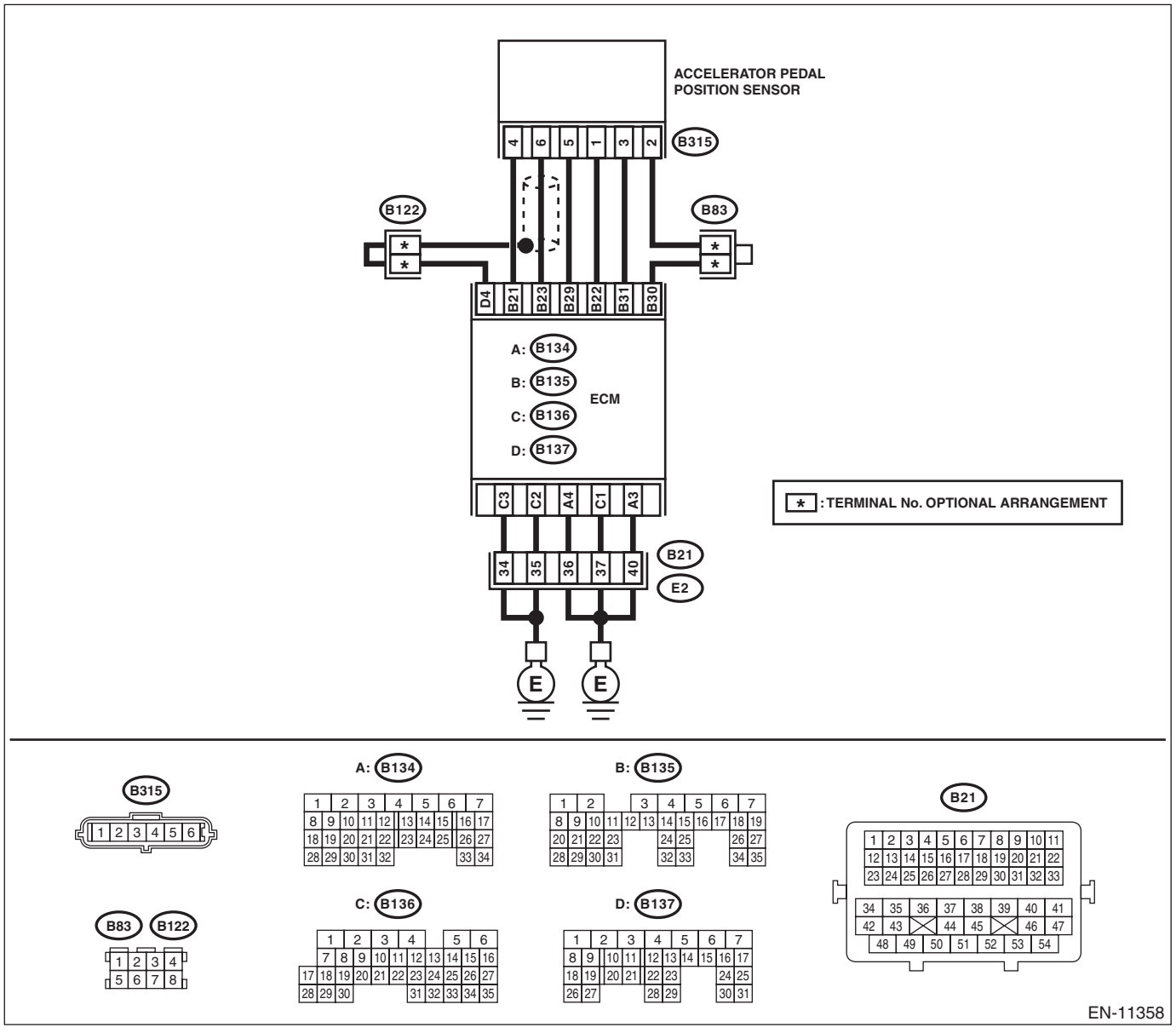
(Y1) 4.736 °
(Y2) 5.736 °
(Y3) 7.861 °
(Y4) 9.986 °
(Y5) 11.986 °

Time Needed for Diagnosis: 212 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EX:DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

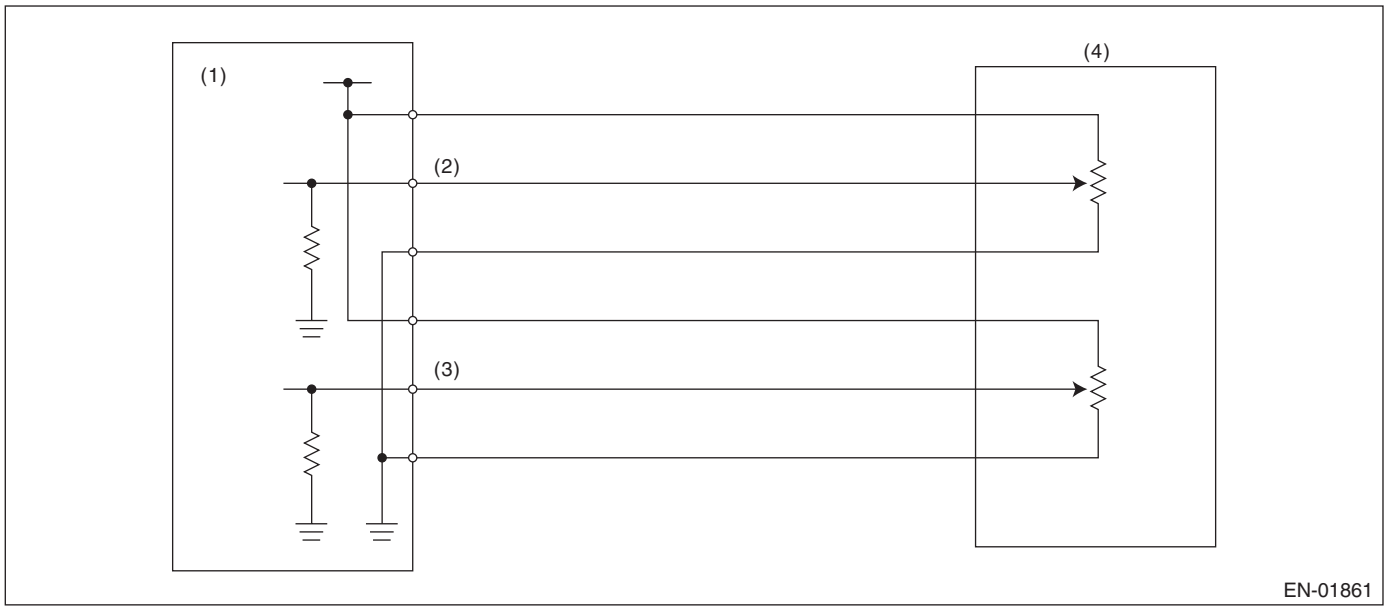


	Step	Check	Yes	No
1	**CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***Main accelerator pedal position sensor signal*** ***(B135) No. 23 (+) — Chassis ground (–):*** ***Sub accelerator pedal position sensor signal*** ***(B135) No. 31 (+) — Chassis ground (–):***	Is the difference in measured values for the main accelerator pedal position sensor signal and the sub accelerator pedal position sensor signal 0 V?	Go to step **3**.	Go to step **2**.
2	**CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT.** 1) Measure the voltage between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 6 (+) — Chassis ground (–):*** ***(B315) No. 3 (+) — Chassis ground (–):***	Is the difference in measured values for the main accelerator pedal position sensor signal and the sub accelerator pedal position sensor signal 0 V?	Replace the accelerator pedal. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and accelerator pedal position sensor connector • Short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector
3	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** Measure the resistance of harness between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 5 — Chassis ground:*** ***(B315) No. 2 — Chassis ground:***	Is the resistance less than 5 Ω?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and accelerator pedal position sensor connector • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of joint connector

1. OUTLINE OF DIAGNOSIS

Judge as NG when the signal level of accelerator pedal position sensor 1 is different from the accelerator pedal position sensor 2.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

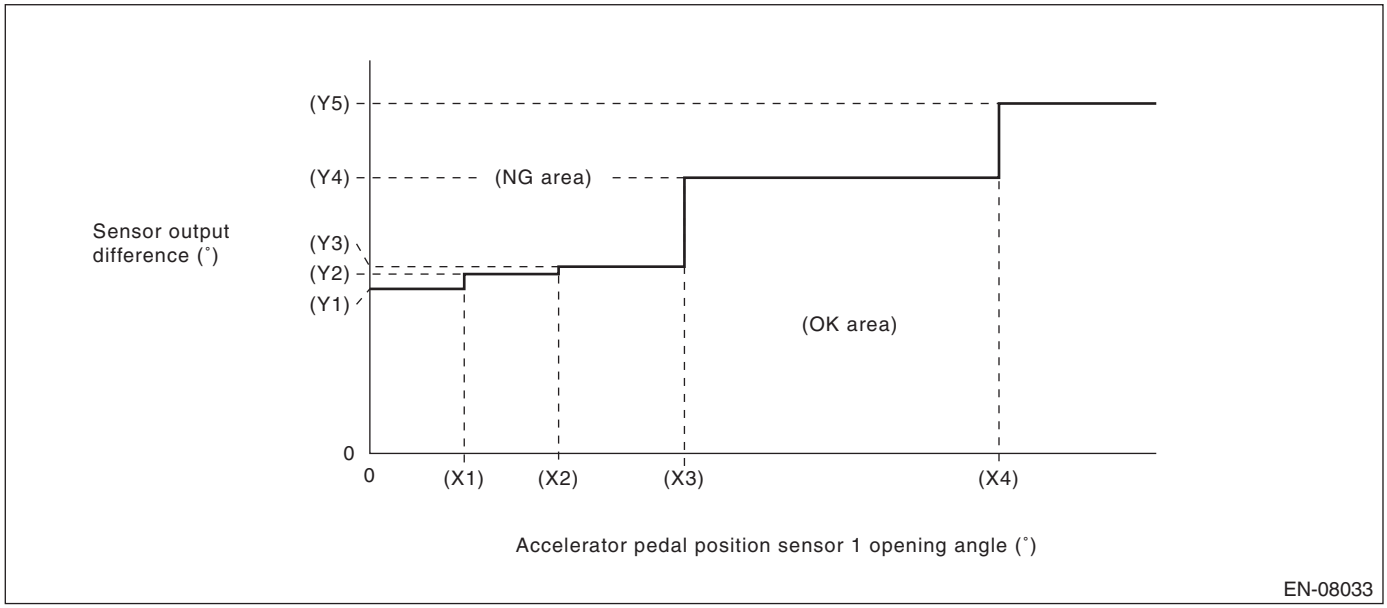
5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	Within NG range of **Details of Judgment value**

Details of Judgment Value



(X1) 0.6 °
(X2) 1.2 °
(X3) 2 °
(X4) 4 °

(Y1) 1.465 °
(Y2) 1.597 °
(Y3) 1.663 °
(Y4) 2.455 °
(Y5) 3.116 °

Time Needed for Diagnosis: 116 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EY:DTC P2195 A/F /O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 1

DTC DETECTING CONDITION:

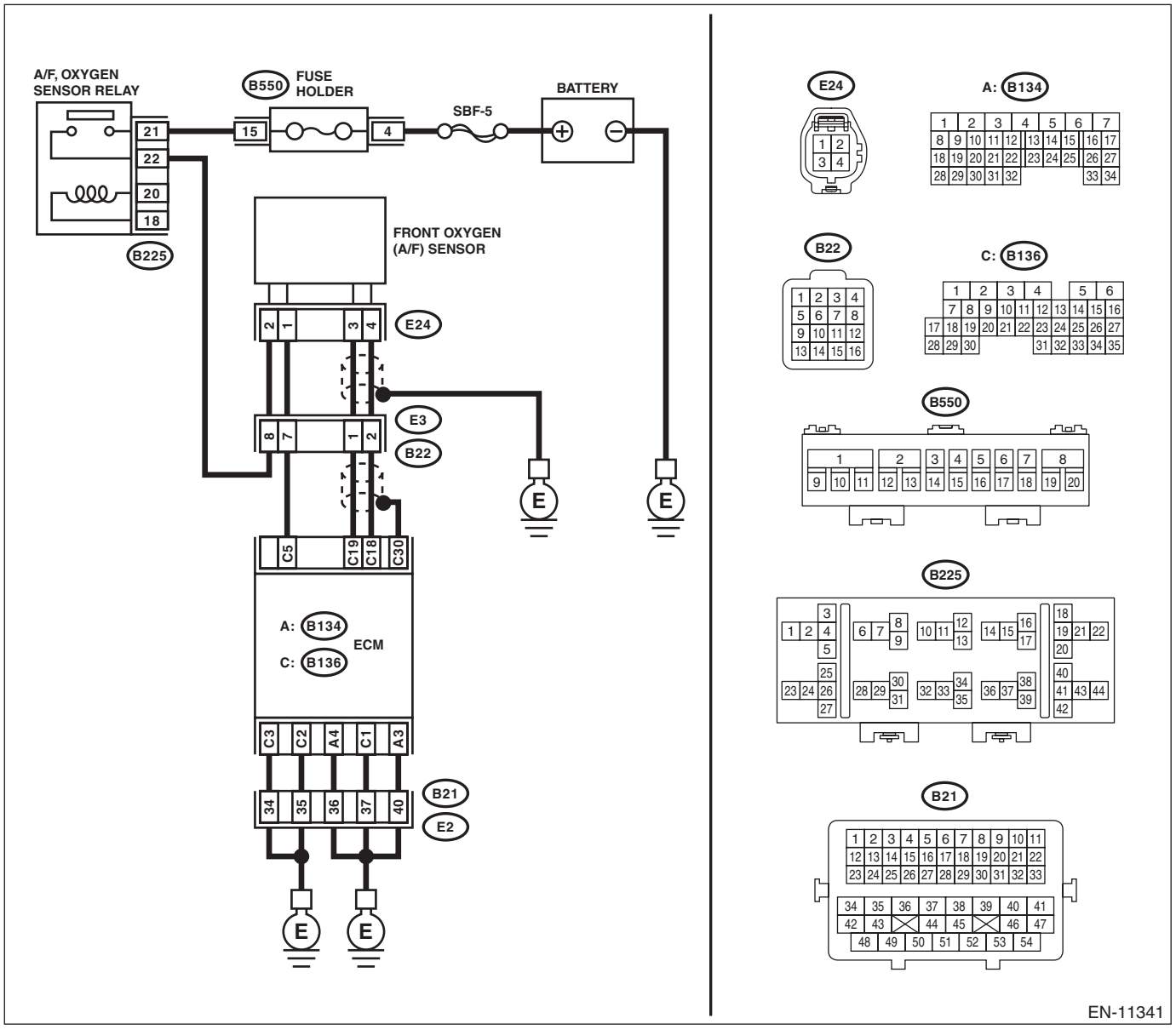
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

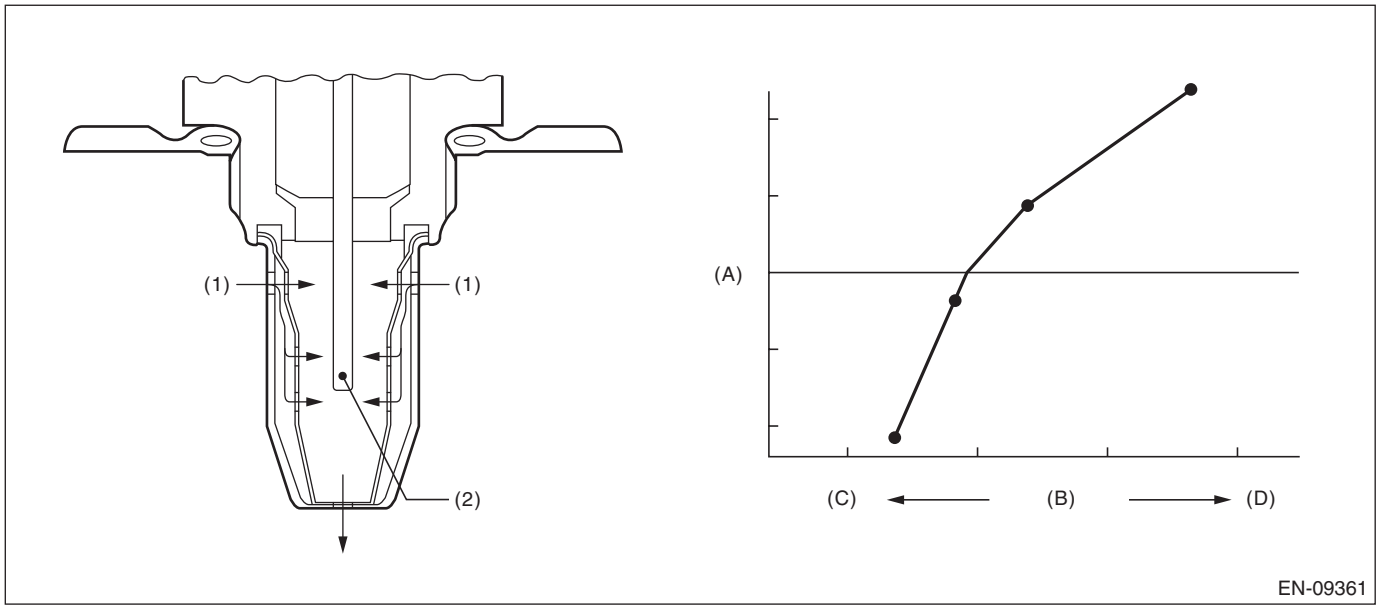
	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
3	**CHECK FOR POOR CONTACT.** Check for poor contact of the front oxygen (A/F) sensor connector.	Is there poor contact of front oxygen (A/F) sensor connector?	Repair the poor contact of front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect that λ value remains low.
Judge as NG when lambda value is abnormal in accordance with λ value of front oxygen (A/F) sensor and running conditions such as vehicle speed, amount of intake air, engine coolant temperature, sub feedback control, etc.

λ value = Actual air fuel ratio/Theoretical air fuel ratio
λ > 1: Lean
λ < 1: Rich

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Rich
(D) Lean

(1) Exhaust gas
(2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Rear oxygen sensor sub feedback	Execution
Rear oxygen sensor output voltage – Feedback target voltage or	≥ – 0.2 V to < 0.1 V
Rear oxygen sensor sub feedback compensation coefficient or	On Min.
Rear oxygen sensor sub feedback compensation coefficient	On Max.
Intake air amount	≥ 6 g/s (0.21 oz/s)

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously at a constant speed of 0 km/h (0 MPH) or more after 0 ms have passed since the engine started.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
λ value	≤ 0.85

Time Needed for Diagnosis: 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

EZ:DTC P2196 A/F /O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 1

DTC DETECTING CONDITION:

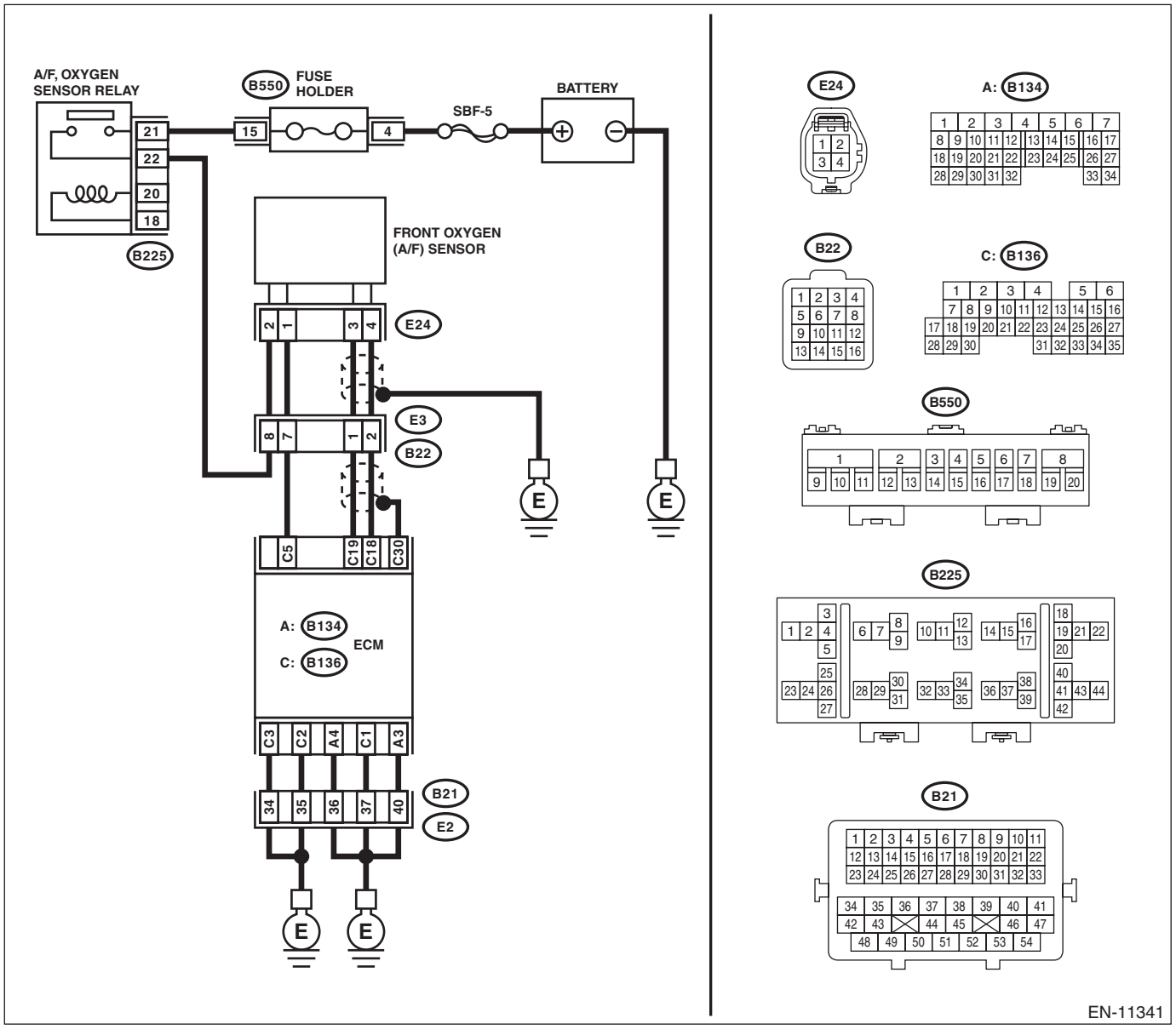
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

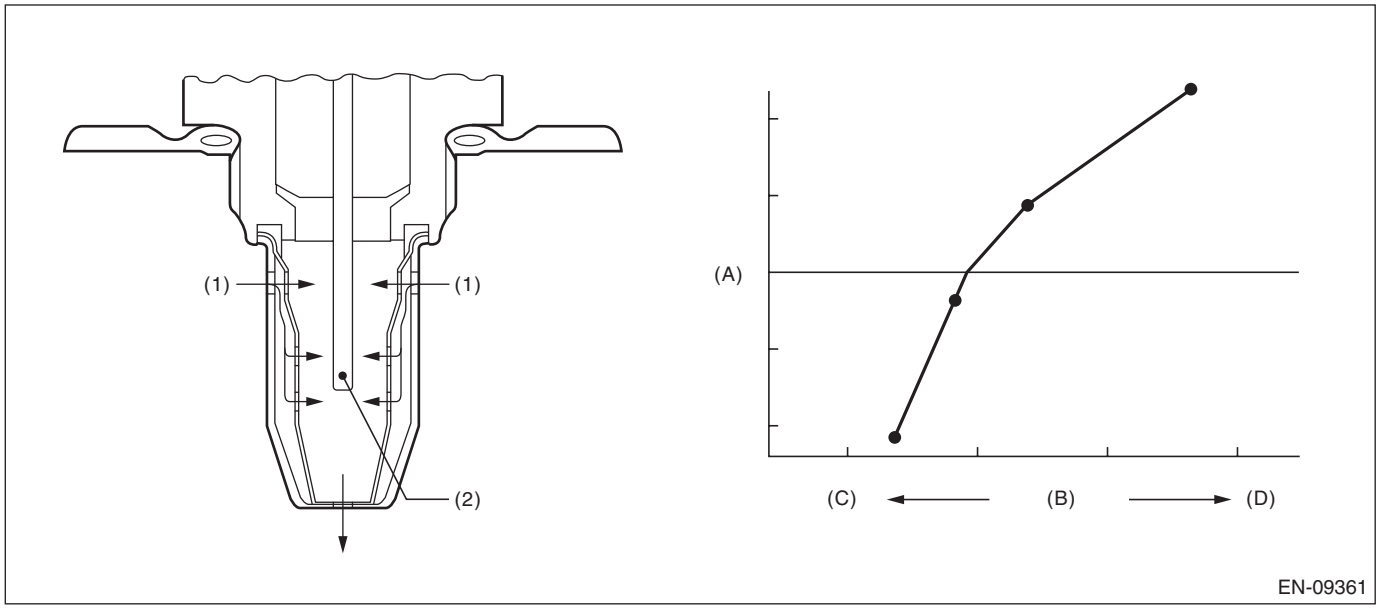
	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
3	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **5**.	Go to step **4**.
4	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 18 (+) — Chassis ground (–):***	Is the voltage 4.95 V or more?	Go to step **5**.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>
5	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 (+) — Chassis ground (–):*** ***(B136) No. 18 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Detect that λ value remains high.
Judge as NG when lambda value is abnormal in accordance with λ value of front oxygen (A/F) sensor and running conditions such as vehicle speed, amount of intake air, engine coolant temperature, sub feedback control, etc.

λ value = Actual air fuel ratio/Theoretical air fuel ratio
λ > 1: Lean
λ < 1: Rich

2. COMPONENT DESCRIPTION



(A) Electromotive force (B) Air fuel ratio (C) Rich
(D) Lean

(1) Exhaust gas (2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Rear oxygen sensor sub feedback	Execution
Rear oxygen sensor output voltage – Feedback target voltage	≥ – 0.2 V to < 0.1 V
or	
Rear oxygen sensor sub feedback compensation coefficient	On Min.
or rear oxygen sensor sub feedback compensation coefficient	On Max.
Intake air amount	≥ 6 g/s (0.21 oz/s)

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously at a constant speed of 0 km/h (0 MPH) or more after 0 ms have passed since the engine started.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
λ value	≥ 1.15

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FA:DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

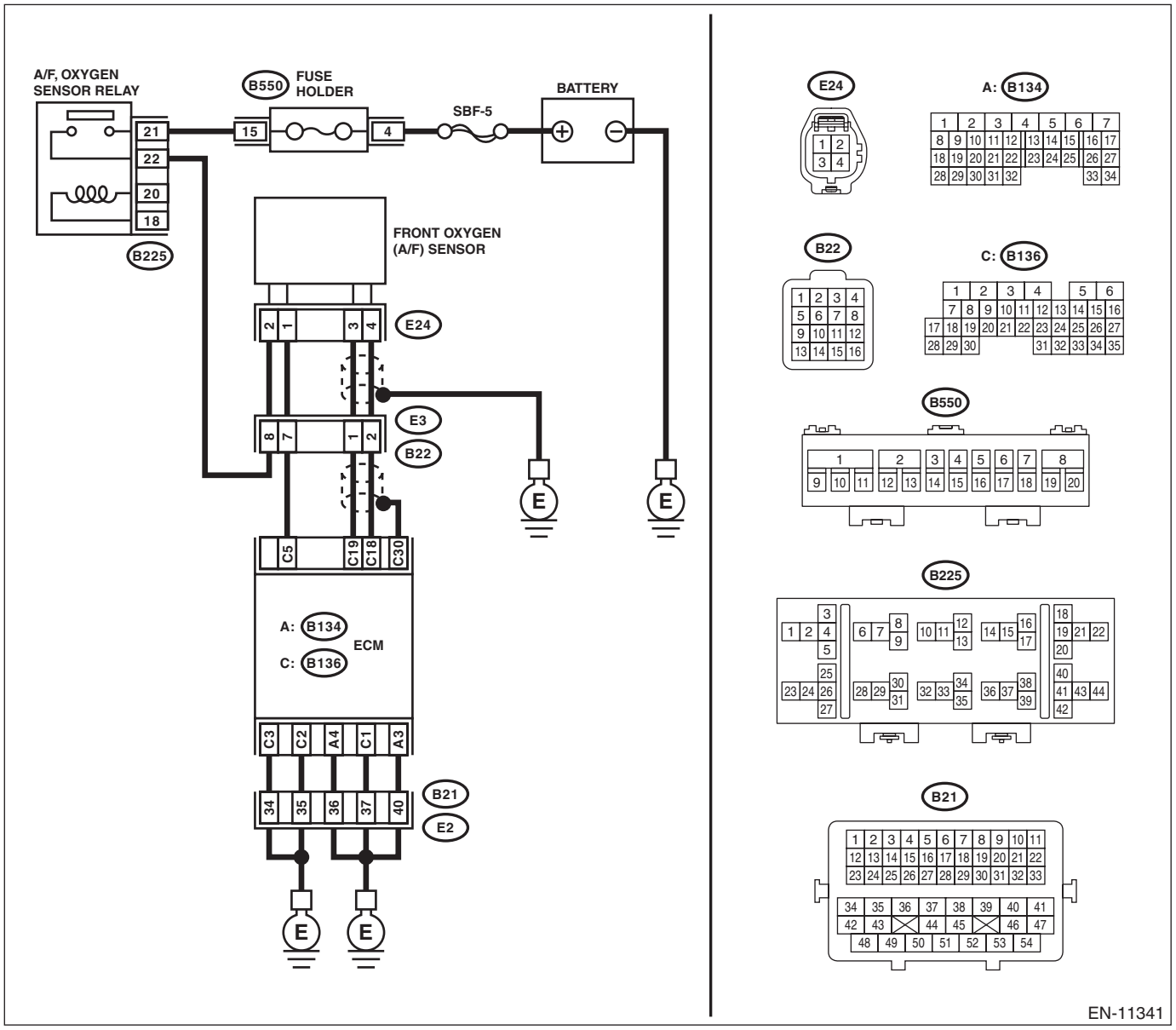
- Engine stall
- Improper idling

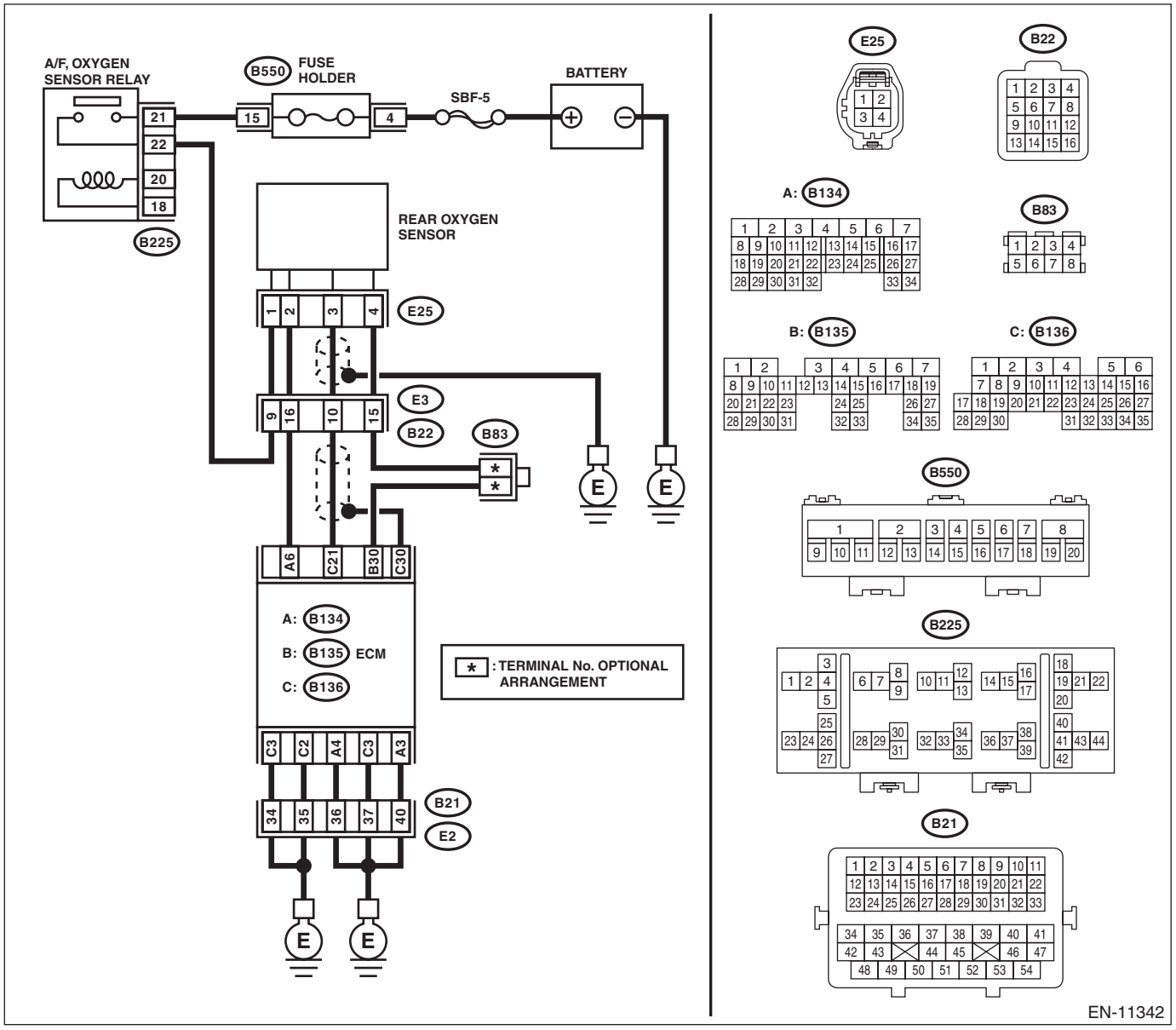
CAUTION:

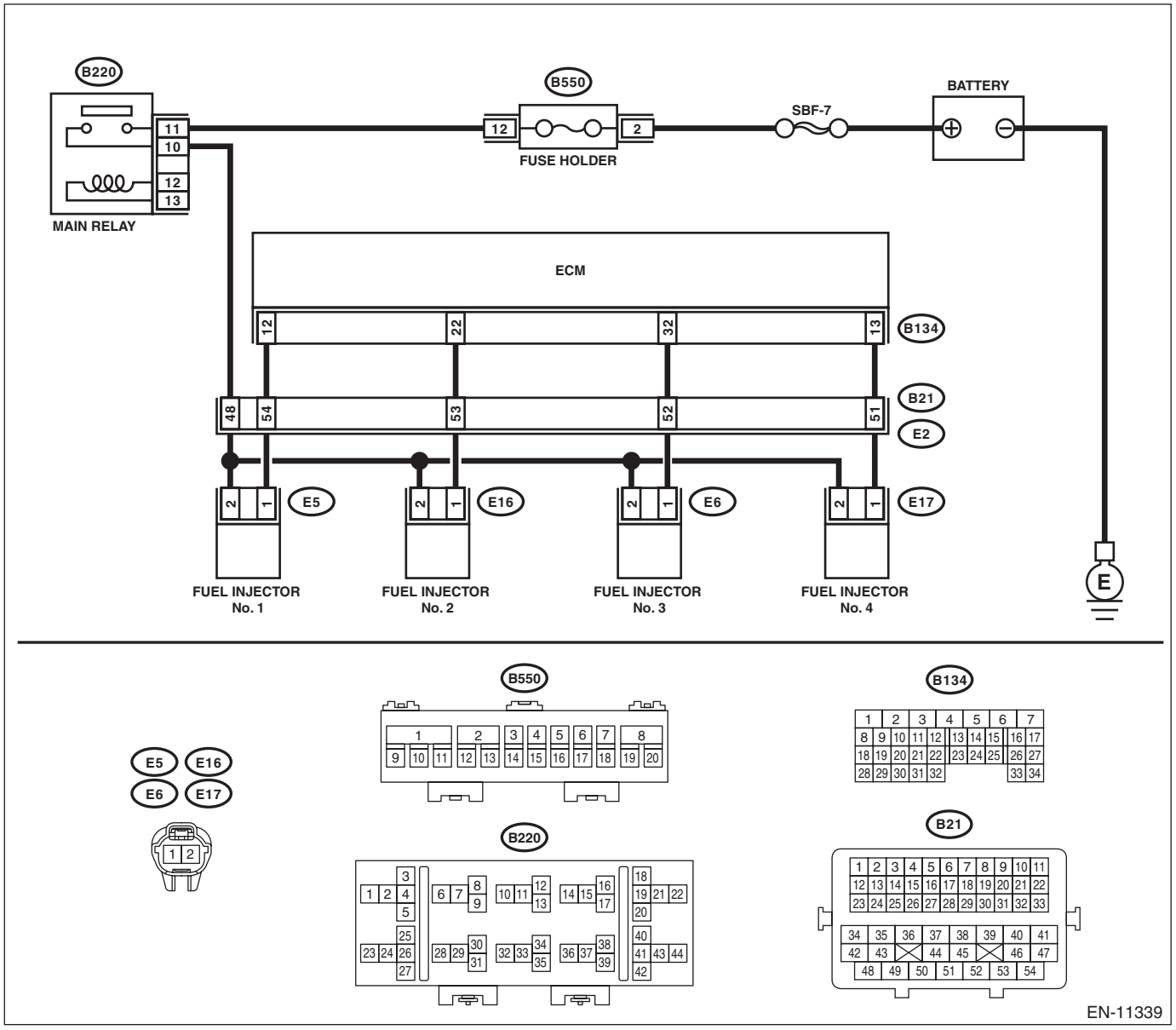
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>




A/F, OXYGEN SENSOR RELAY
B550 FUSE HOLDER
BATTERY
SBF-5
21
22
20
18
15
4
B225
REAR OXYGEN SENSOR
1 2 3 4
E25
9 16 10 15
E3
B22
B83
A6 C21 B30 C30
A: B134
B: B135 ECM
C: B136
C3 C2 A4 C3 A3
34 35 36 37 40
B21
E2
E
E
E
E
* : TERMINAL No. OPTIONAL ARRANGEMENT
E25
B22
A: B134
B83
B: B135
C: B136
B550
B225
B21
EN-11342



Step		Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector

	Step	Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
4	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **6**.	Go to step **5**.
5	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 4.95 V or more?	Go to step **6**.	Go to step **7**.
6	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
7	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **8**.
8	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **9**.
9	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **10**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(w/o HEV))-144, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(w/o HEV))-176, INSPECTION, Fuel Delivery and Evaporation Lines.>

	Step	Check	Yes	No
10	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **11**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(w/o HEV))-51, Engine Coolant Temperature Sensor.>
11	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For AT models, set the select lever to “P” range or “N” range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Read Current Data For Engine”. <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **12**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>

	Step	Check	Yes	No
12	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For AT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Go to step **13**.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(w/o HEV))-73, Mass Air Flow and Intake Air Temperature Sensor.>
13	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Depress the clutch pedal (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step **14**.	Go to step **15**.
14	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Depress the clutch pedal (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step **16**.	Go to step **15**.

	Step	Check	Yes	No
15	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **17**.
16	**CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Rear O2 Sensor» kept at 0.250 V or less for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>	Go to step **17**.
17	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **18**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
18	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-92, Front Oxygen (A/F) Sensor.>	Go to step **19**.
19	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **24**.	Go to step **20**.

	Step	Check	Yes	No
20	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 1 — Engine ground:*** ***#2 (E16) No. 1 — Engine ground:*** ***#3 (E6) No. 1 — Engine ground:*** ***#4 (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **21**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
21	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **22**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
22	**CHECK FUEL INJECTOR.** Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **23**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
23	**CHECK POWER SUPPLY LINE.** 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector connector of faulty cylinders and engine ground. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector
24	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step **25**.

	Step	Check	Yes	No
25	**CHECK FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **26**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(w/o HEV))-79, Fuel Injector.>
26	**CHECK INSTALLATION CONDITION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor. <Ref. to FU(H4DO(w/o HEV))-61, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(w/o HEV))-56, INSTALLATION, Crankshaft Position Sensor.>	Go to step **27**.
27	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **28**.
28	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Go to step **29**.
29	**CHECK FUEL LEVEL.**	Is the fuel meter indication higher than the “Lower” level?	Go to step **30**.	Refill the fuel so that the fuel meter indication is higher than the “Lower” level, and proceed to the next step. Go to step **30**.
30	**CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step **32**.	Go to step **31**.

	Step	Check	Yes	No
31	**CHECK CAUSE OF MISFIRE.**	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
32	**CHECK AIR INTAKE SYSTEM.**	Is there any fault in air intake system?	Repair the air intake system. NOTE: Check the following items. • Are there air leaks or air suction caused by loose or dislocated nuts and bolts? • Are there cracks or any disconnection of hoses?	Go to step **33**.
33	**CHECK MISFIRE SYMPTOM.** 1) Turn the ignition switch to ON. 2) Check for DTC. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).>	Does the Subaru Select Monitor or general scan tool indicate only one DTC?	Go to step **36**.	Go to step **34**.
34	**CHECK DTC.**	Is DTC P0301 and P0303 displayed on the Subaru Select Monitor or general scan tool?	Go to step **37**.	Go to step **35**.
35	**CHECK DTC.**	Is DTC P0302 and P0304 displayed on the Subaru Select Monitor or general scan tool?	Go to step **38**.	Go to step **39**.
36	**ONLY ONE CYLINDER.**	Is there any fault in the cylinder?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression	Go to DTC P0171. <Ref. to EN(H4DO w/o HEV)(diag)-246, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Step		Check	Yes	No
37	GROUP OF #1 AND #3 CYLINDERS.	Are there any faults in #1 and #3 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4DO w/o HEV)(diag)-246, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
38	GROUP OF #2 AND #4 CYLINDERS.	Are there any faults in #2 and #4 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4DO w/o HEV)(diag)-246, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
39	CYLINDER AT RANDOM.	Is the engine idle rough?	Go to DTC P0171. <Ref. to EN(H4DO w/o HEV)(diag)-246, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression

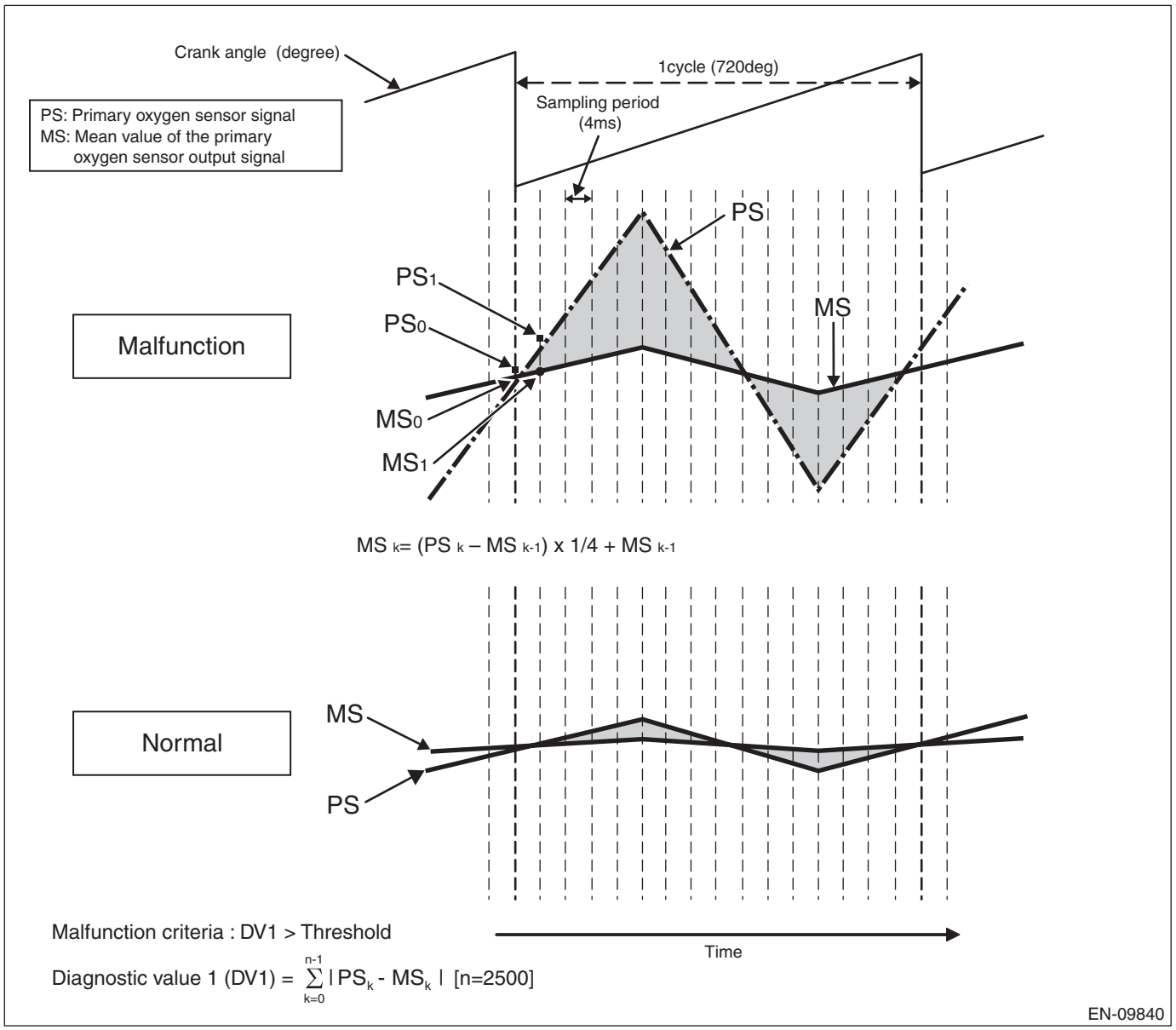
1. OUTLINE OF DIAGNOSIS

This diagnostic monitor performs a functional check of the fuel system to determine an air-fuel ratio cylinder imbalance.
This diagnosis is composed of two monitors.
The outline of “monitor A1” is as follows. When an air-fuel ratio cylinder imbalance occurs, the primary oxygen sensor output signal will oscillate with increased amplitude. This monitor utilizes this behavior to make a diagnosis. The monitor integrates the difference between the amplification value and the mean value of the first oxygen sensor output signal and compares it to a threshold to make a judgment.
The outline of “monitor B1” is as follows. Similarly, when an imbalance occurs, the engine speed also fluctuates with increased amplitude. This monitor utilizes this behavior to make a diagnosis. For reference, it should be noted that this imbalance monitor method is actually similar to the current misfire diagnostic monitor, and the parameter “domg360” (units: degrees CA) is shared between the imbalance and misfire monitors. The imbalance monitor is performed during idle condition when the engine is warm. The monitor integrates the count of “domg360” which exceeds a threshold in 1000 revolution.
When both the “monitor A1” value and the “monitor B1” value exceed a predetermined threshold, this monitor determines a malfunction and stores a fault code.

Monitor A1

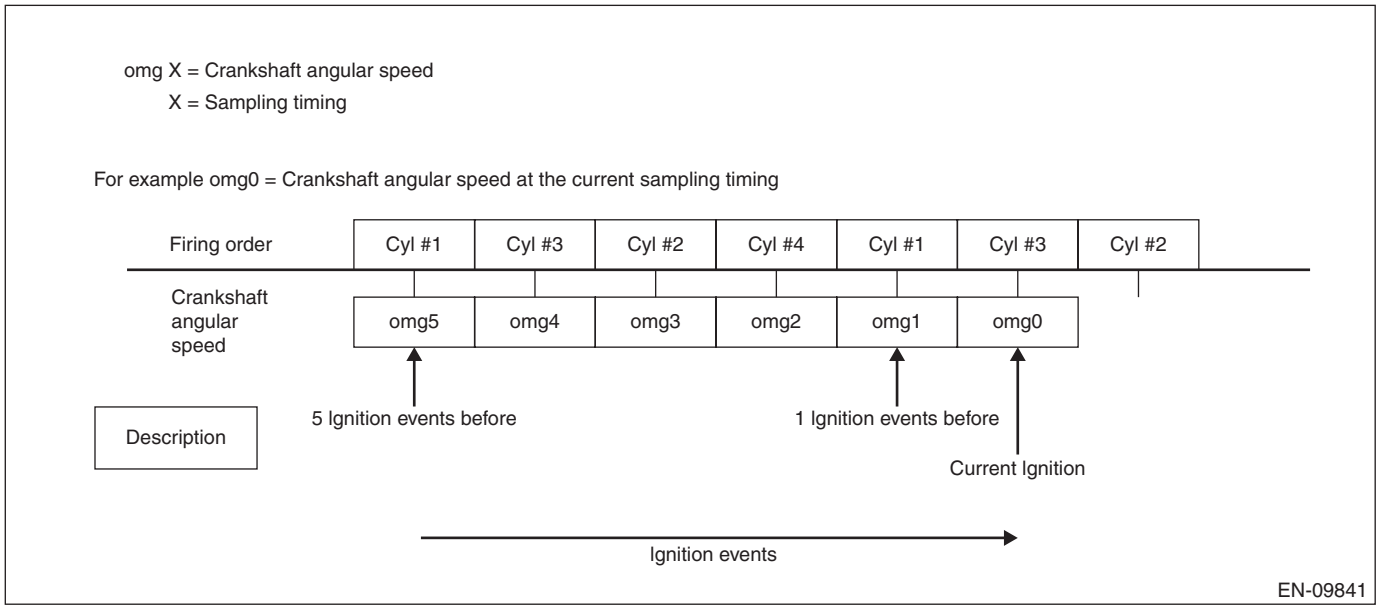
When there is an air-fuel ratio cylinder imbalance malfunction, the primary oxygen sensor output fluctuates widely compared with a normal sensor, as shown by the chain line in Figure 1 below. This monitor makes a diagnosis based on this phenomenon. Each primary oxygen sensor signal (PS) and mean value of the primary oxygen sensor signal (MS) is calculated from the primary oxygen sensor signal. The absolute values of (PS – MS) are sampled every 4 ms as shown in the figure. Diagnostic value 1 (DV1) is obtained by integrating the absolute value of (PS – MS) for 2500 times. A malfunction is determined when DV1 exceeds the threshold. The judgment values are determined experimentally.

Figure 1. Compare malfunctioned primary oxygen sensor output with a normal sensor

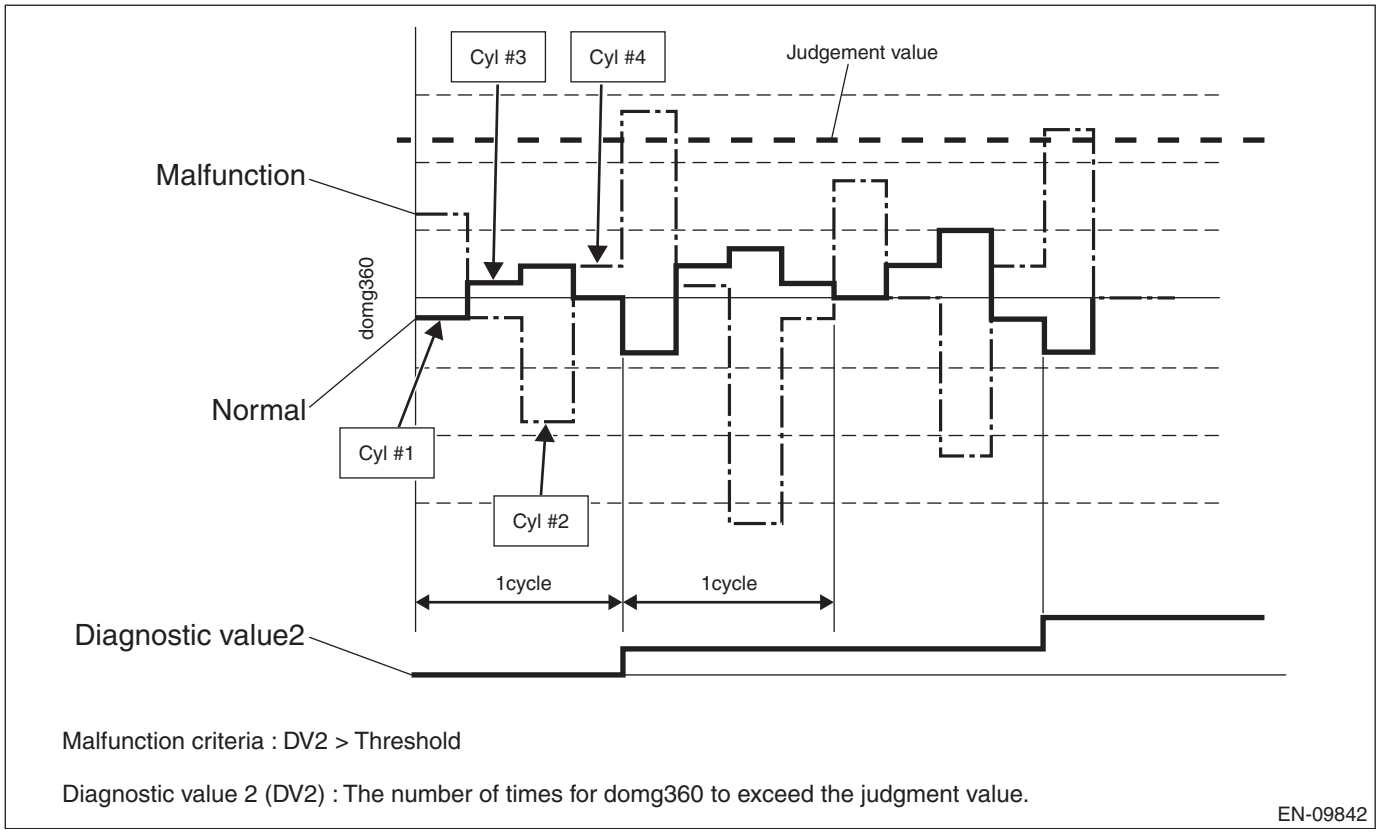


Monitor B1

Method used: Difference method of 360 degrees CA
Monitor value: domg360 = (omg 1 – omg 0) – (omg 3 – omg 2) = angular speed
Each crankshaft angular speed is defined as Figure 2 below.
Figure 2. Description of domg360 output



This method uses the fact that the domg360 of lean conditioned cylinder caused by imbalance malfunction indicates big value, as shown by the chain line in Figure 3 below.
The number of times for domg360 to exceed the judgment value in 1000 revolutions (500 cycles) is calculated as diagnostic value 2 (DV2). A malfunction is determined when DV2 exceeds the threshold.
Figure 3. Compare malfunctioned domg360 output with a normal output



2. EXECUTION CONDITION

Monitor A1: Primary oxygen sensor fluctuation

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
A/F main feedback function	In operation
Engine speed	> 1400 rpm and < 3000 rpm
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Intake air amount per revolution of crankshaft	> 0.7 g/rev (0.02 oz/rev) (CVT model) > 0.7 g/rev (0.02 oz/rev) (MT model)

Monitor B1: Crankshaft speed fluctuation

Secondary Parameters	Execution condition
Misfiring diagnosis monitor	ON
A/F main feedback function	In operation
Accelerator pedal position	≠ 0%
Vehicle speed	≤ 482.78 km/h (300 MPH)
Engine speed	> 1400 rpm and < 3000 rpm (CVT model) > 1400 rpm and < 3000 rpm (MT model)
Intake air amount per revolution of crankshaft	> 0.7 g/rev (0.02 oz/rev) (CVT model) > 0.7 g/rev (0.02 oz/rev) (MT model) and < 100 g/rev (3.53 oz/rev) (CVT model) < 100 g/rev (3.53 oz/rev) (MT model)

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when Monitor A1 and Monitor B1 are both NG, and when either is OK, judge as OK.

Monitor A1

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value 1 (DV1)	> Threshold value 1 (TV1)

Threshold value 1 (TV1):

$$\sum_{k=0}^{n-1} Map_k \qquad [n=2500]$$

EN-09888

Map (CVT model)

		Engine load (g/rev (oz/rev))					
		0.7 (0.02)	0.8 (0.03)	0.9 (0.03)	1 (0.04)	1.1 (0.04)	1.2 (0.04)
Engine speed (rpm)	1400	0.0092	0.0141	0.0172	0.0172	0.0172	0.0172
	1600	0.0160	0.0208	0.0210	0.0210	0.0210	0.0210
	1800	0.0119	0.0148	0.0212	0.0212	0.0212	0.0212
	2000	0.0119	0.0175	0.0265	0.0318	0.0318	0.0318
	2200	0.0111	0.0166	0.0269	0.0341	0.0341	0.0341
	2400	0.0138	0.0185	0.0268	0.0327	0.0327	0.0327
	2600	0.0168	0.0226	0.0313	0.0353	0.0353	0.0353
	2800	0.0170	0.0213	0.0317	0.0324	0.0324	0.0324
	3000	0.0133	0.0166	0.0300	0.0363	0.0363	0.0363

Map (MT model)

		Engine load (g/rev (oz/rev))					
		0.7 (0.02)	0.8 (0.03)	0.9 (0.03)	1 (0.04)	1.1 (0.04)	1.2 (0.04)
Engine speed (rpm)	1400	0.0092	0.0141	0.0172	0.0172	0.0172	0.0172
	1600	0.0160	0.0208	0.0210	0.0210	0.0210	0.0210
	1800	0.0119	0.0148	0.0212	0.0212	0.0212	0.0212
	2000	0.0119	0.0175	0.0265	0.0318	0.0318	0.0318
	2200	0.0111	0.0166	0.0269	0.0341	0.0341	0.0341
	2400	0.0138	0.0185	0.0268	0.0327	0.0327	0.0327
	2600	0.0168	0.0226	0.0313	0.0353	0.0353	0.0353
	2800	0.0170	0.0213	0.0317	0.0324	0.0324	0.0324
	3000	0.0133	0.0166	0.0300	0.0363	0.0363	0.0363

Time Needed for Diagnosis:
- 4 ms × 2500 time(s) (CVT model)
- 4 ms × 2500 time(s) (MT model)

Monitor B1
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value2 (DV2)	> 17 time(s) (CVT model) > 17 time(s) (MT model)

Time Needed for Diagnosis: 1000 engine revs.
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FB:DTC P2270 O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 2

DTC DETECTING CONDITION:

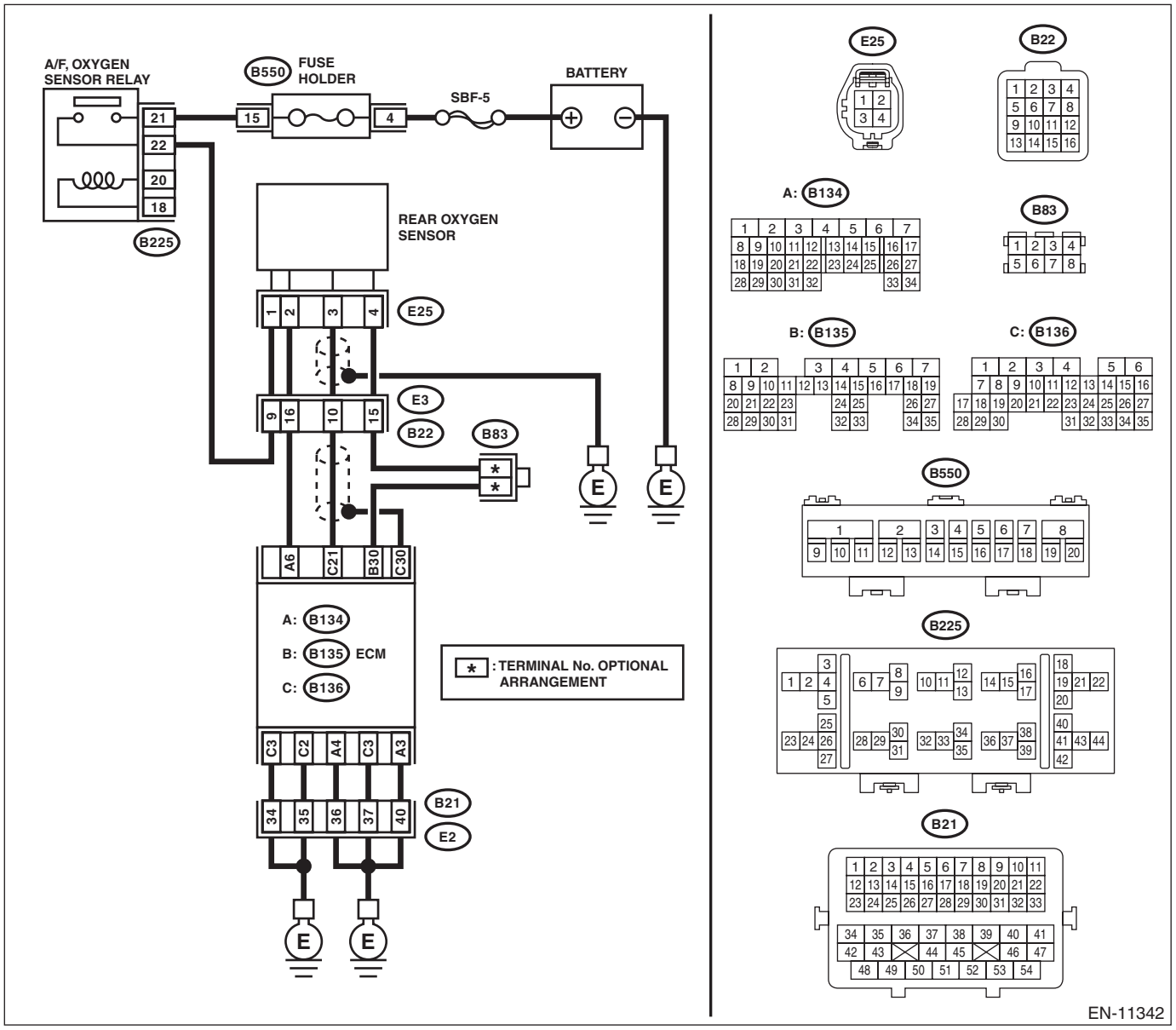
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



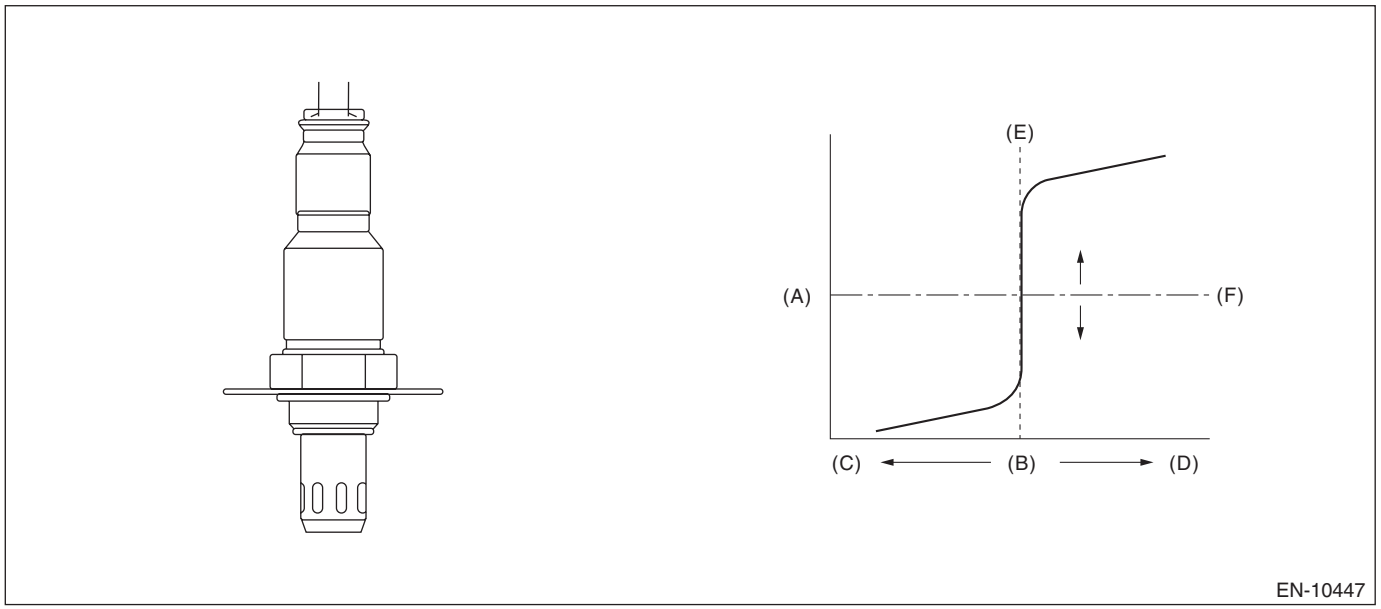
Step		Check	Yes	No
1	**CHECK REAR OXYGEN SENSOR CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(E135) No. 30 — (E25) No. 4:*** ***(E136) No. 21 — (E25) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness between ECM connector and rear oxygen sensor connector.
3	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and engine ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Engine ground (–):***	Is the voltage 0.15 V or more?	Repair the short circuit to power in the harness between ECM connector and rear oxygen sensor connector.	Go to step **4**.
4	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Damage (crack, hole etc.) between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the stuck of rear oxygen sensor voltage in lean state.
When rear oxygen sensor voltage remains below the threshold value for predetermined time, diagnosis interrupts target air fuel ratio for control and raises output voltage.
Judge as NG detecting the stuck in lean state when rear oxygen sensor voltage remains below the threshold value even after the interrupt control.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Lean
(D) Rich
(E) Theoretical air fuel ratio
(F) Comparative voltage

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Sub feedback	In operation
Amount of intake air	≥ 8 g/s (0.28 oz/s) (CVT model) ≥ 8 g/s (0.28 oz/s) (MT model)
Estimated temperature of the rear oxygen sensor element	≥ 500 °C (932 °F) (CVT model) ≥ 500 °C (932 °F) (MT model)
Enable conditions at interrupt control are as follows	
Air fuel ratio reduced from target air fuel ratio	= Value of Map
Continuous time when rear oxygen sensor output voltage is less than 0.55 V	≥ 5000 ms (CVT model) ≥ 15000 ms (MT model)

Map (CVT model)

Output voltage of rear oxygen sensor V	0.000	0.150	0.200	0.400	0.600
Air fuel ratio reduced from target air fuel ratio %	15	15	4	4	4

Map (MT model)

Output voltage of rear oxygen sensor V	0.000	0.150	0.200	0.400	0.600
Air fuel ratio reduced from target air fuel ratio %	15	15	4	4	4

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the enable conditions have been established.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage of rear oxygen sensor	< 0.55 V

Time Needed for Diagnosis:

- 15000 ms (CVT model)
- 25000 ms (MT model)

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FC:DTC P2271 O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 2

DTC DETECTING CONDITION:

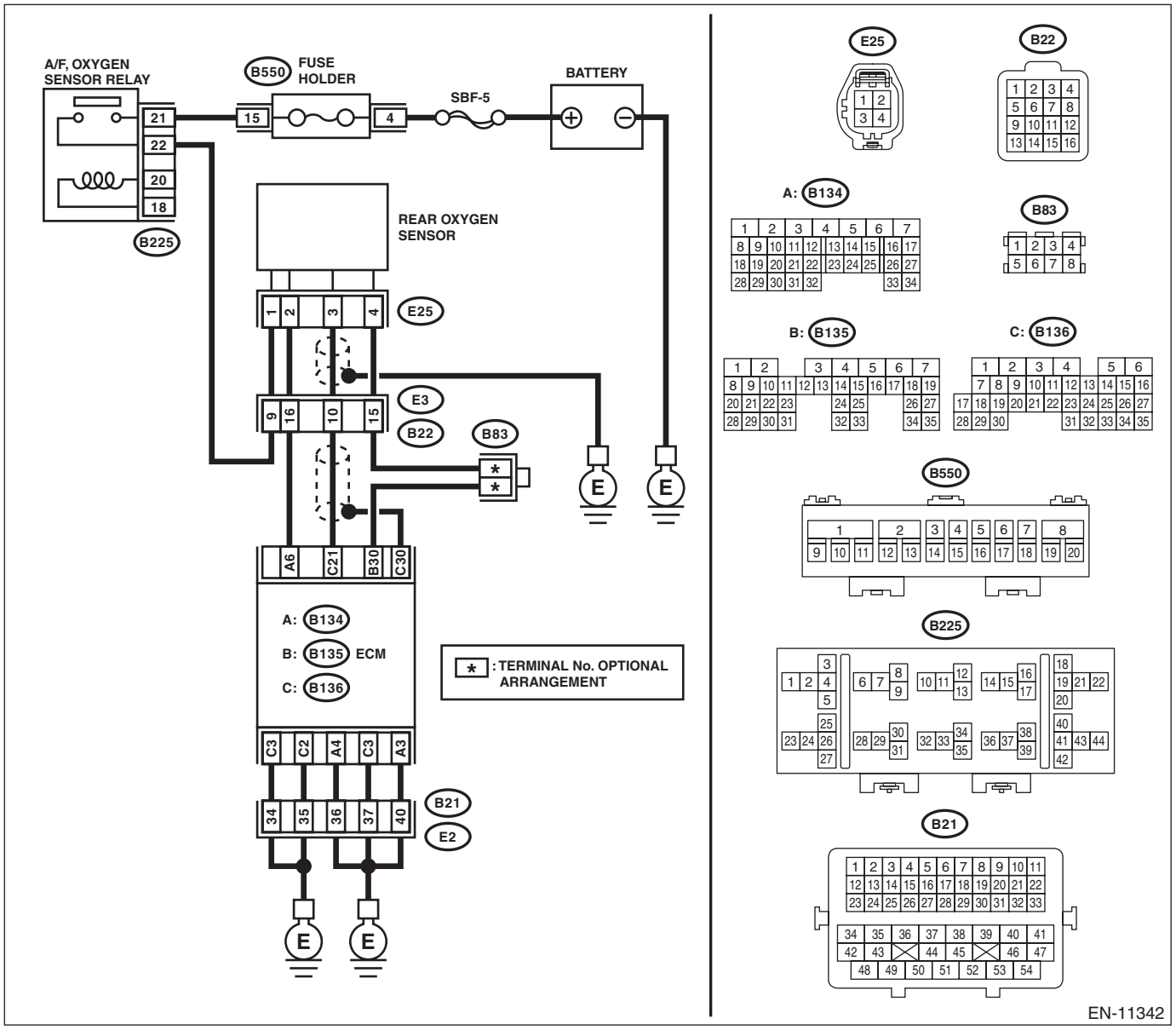
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



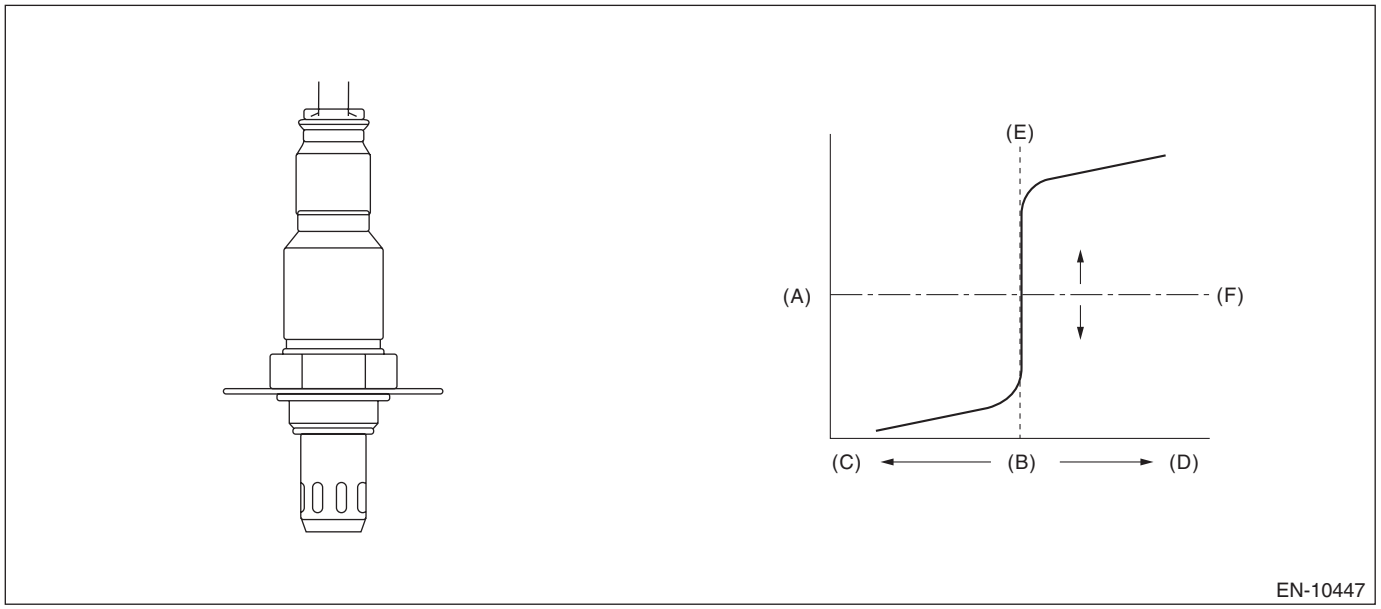
Step		Check	Yes	No
1	**CHECK REAR OXYGEN SENSOR CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(E135) No. 30 — (E25) No. 4:*** ***(E136) No. 21 — (E25) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness between ECM connector and rear oxygen sensor connector.
3	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** Measure the resistance between the ECM connector and engine ground. ***Connector & terminal*** ***(E135) No. 30 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in harness between ECM connector and rear oxygen sensor connector.
4	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Damage (crack, hole etc.) between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(w/o HEV))-96, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the stuck of rear oxygen sensor voltage in rich state.
Detect the stuck in rich state and judge as NG if rear oxygen sensor voltage remains above the threshold value for predetermined time.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Lean
(D) Rich
(E) Theoretical air fuel ratio
(F) Comparative voltage

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Fuel cut time	≥ 5000 ms
Estimated temperature of the rear oxygen sensor element	≥ 500 °C (932 °F) (CVT model) ≥ 500 °C (932 °F) (MT model)

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the enable conditions have been established.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage of rear oxygen sensor	> 0.15 V

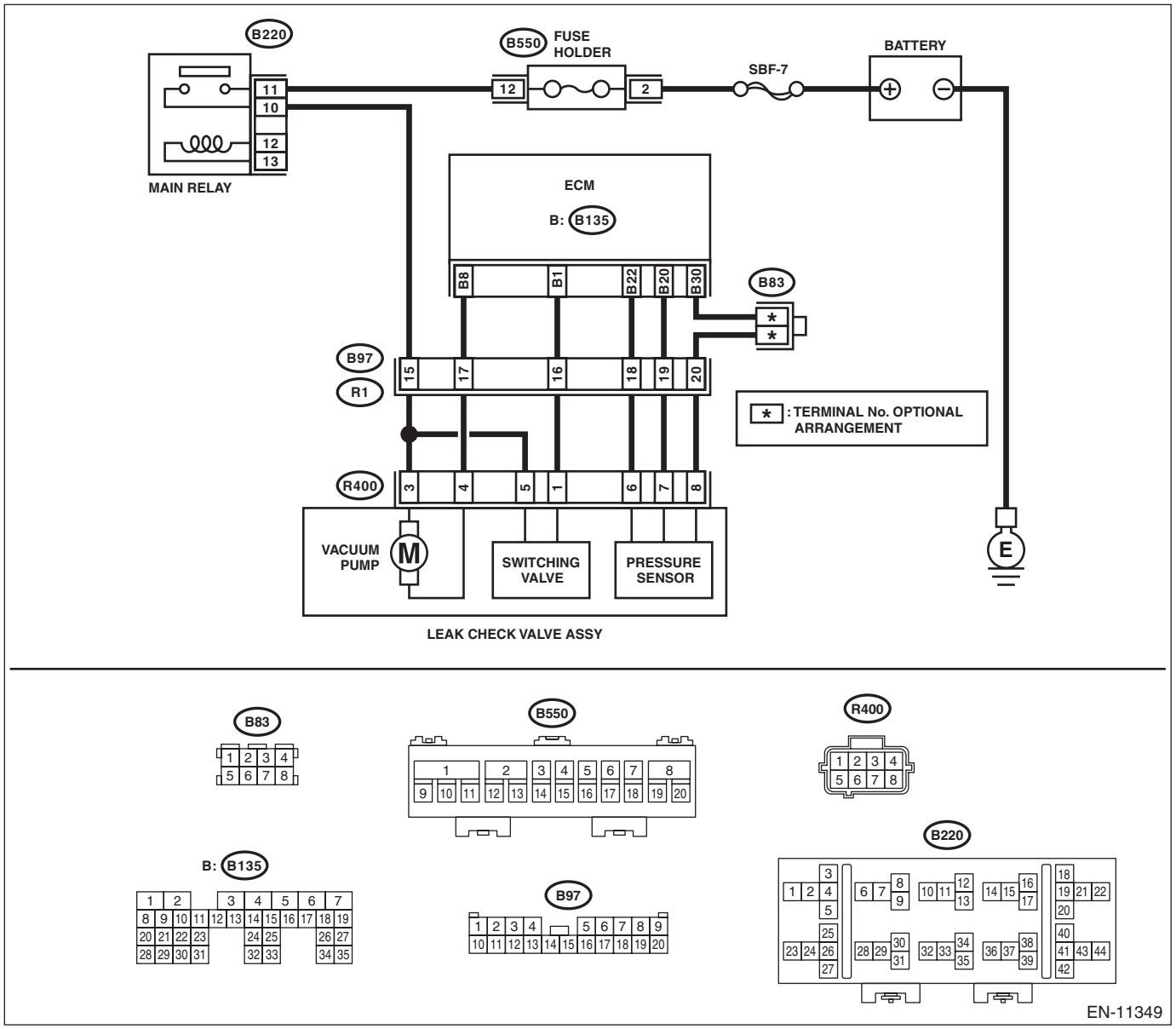
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FD:DTC P2401 EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



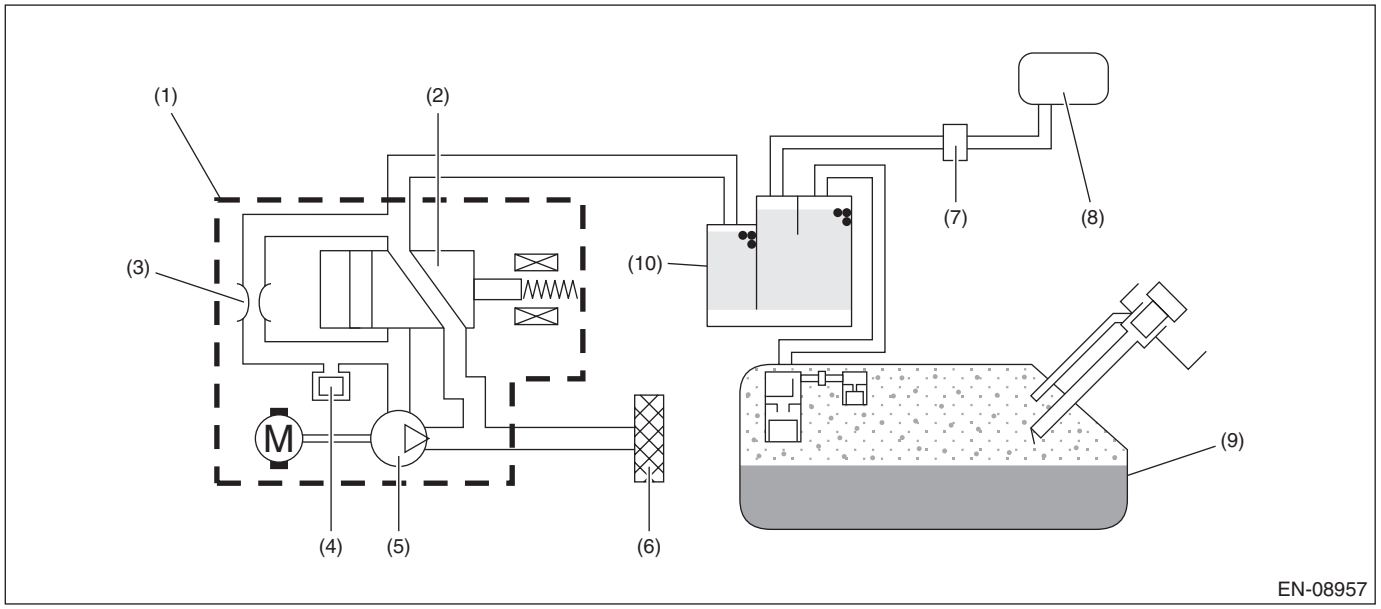
	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 18 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3	**CHECK POWER SUPPLY TO LEAK CHECK VALVE ASSEMBLY.** Measure the voltage between the leak check valve assembly connector and engine ground. ***Connector & terminal*** ***(R400) No. 3 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance between leak check valve assembly and chassis ground. ***Connector & terminal*** ***(R400) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
5	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 18 — (R400) No. 4:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector

Step		Check	Yes	No
6	**CHECK LEAK CHECK VALVE ASSEMBLY.** Check the vacuum pump of the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-60, CHECK VACUUM PUMP, INSPECTION, Leak Check Valve Assembly.>	Is the vacuum pump of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM vacuum pump.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9
Evaporative emission system leak detection pump command	= OFF

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured EVAP system leak detection pump voltage	≤ 12 V battery system voltage × 0.34 V

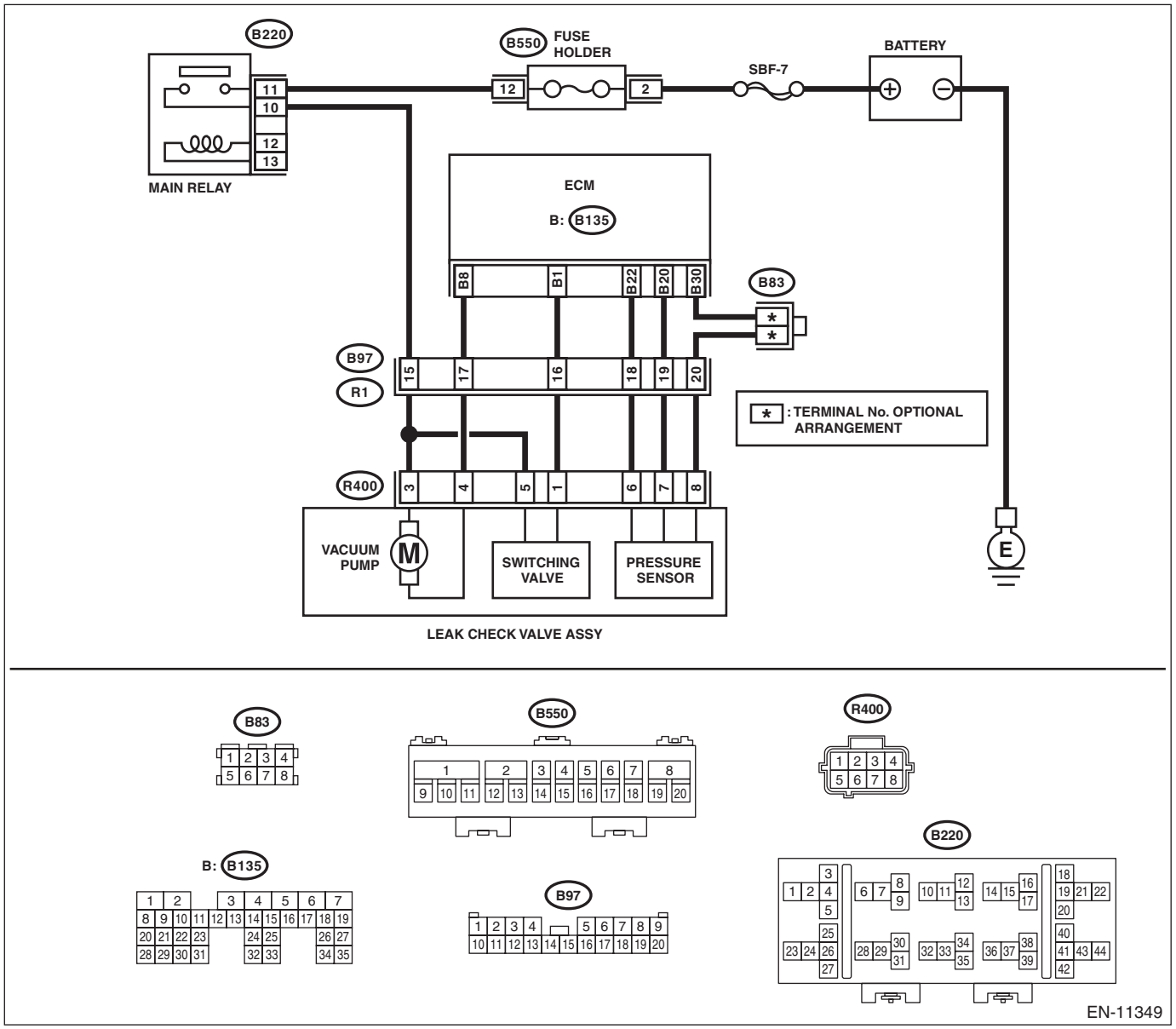
Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FE:DTC P2402 EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

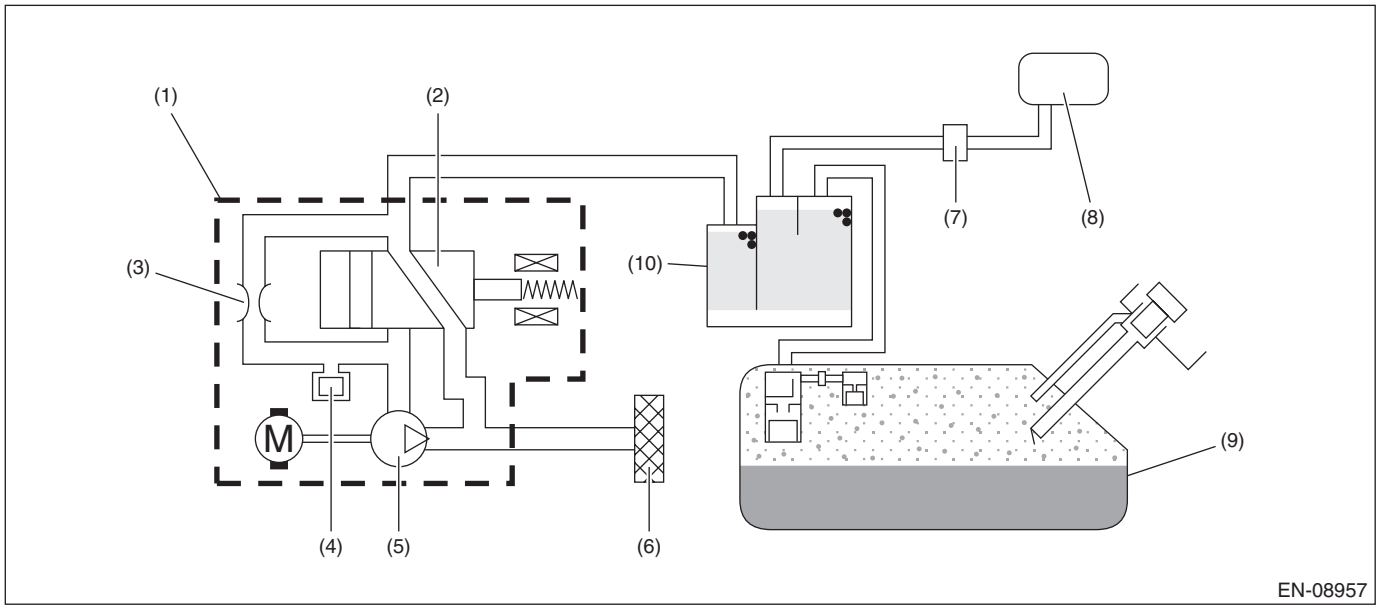


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between leak check valve assembly and chassis ground. ***Connector & terminal*** ***(R400) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Go to step **2**.
2	**CHECK LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Check the vacuum pump of the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-60, CHECK VACUUM PUMP, INSPECTION, Leak Check Valve Assembly.>	Is the vacuum pump of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM vacuum pump.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Measured EVAP system leak detection pump current	≥ 12 A

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs ON signal	High

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FF: DTC P2404 EVAP SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

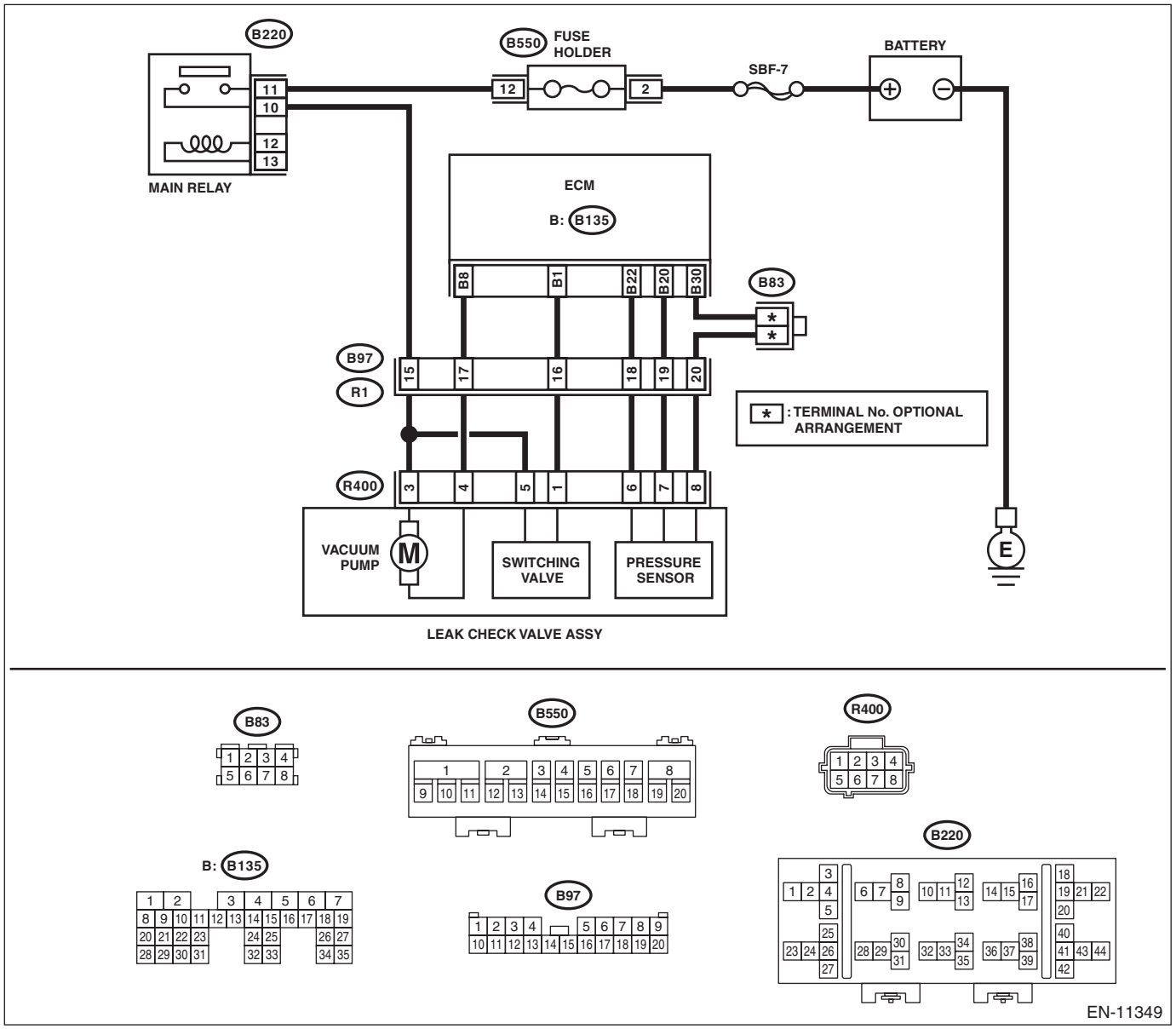
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ELCM PUMP.** Operate the ELCM pump using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the "Active Test". <Ref. to EN(H4DO w/o HEV)(diag)-68, Active Test.>	Does the ELCM pump operate?	Go to step **6**.	Go to step **3**.
3	**CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. ***Connector & terminal*** ***(R400) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay and the leak check valve assembly connector • Poor contact of main relay connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 18 — (R400) No. 4:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector
5	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.

	Step	Check	Yes	No
6	**CHECK ELCM SWITCHING VALVE.** Operate the ELCM switching valve using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the "Active Test". <Ref. to EN(H4DO w/o HEV)(diag)-68, Active Test.>	Does the ELCM switching valve operate?	Go to step **10**.	Go to step **7**.
7	**CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. ***Connector & terminal*** ***(R400) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **8**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay and the leak check valve assembly connector • Poor contact of main relay connector • Poor contact of coupling connector
8	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 1 — (R400) No. 1:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector
9	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
10	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM.** Perform drive cycle I. <Ref. to EN(H4DO w/o HEV)(diag)-61, DRIVE CYCLE I, PROCEDURE, Drive Cycle.>	Is DTC P2404 displayed on the display?	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

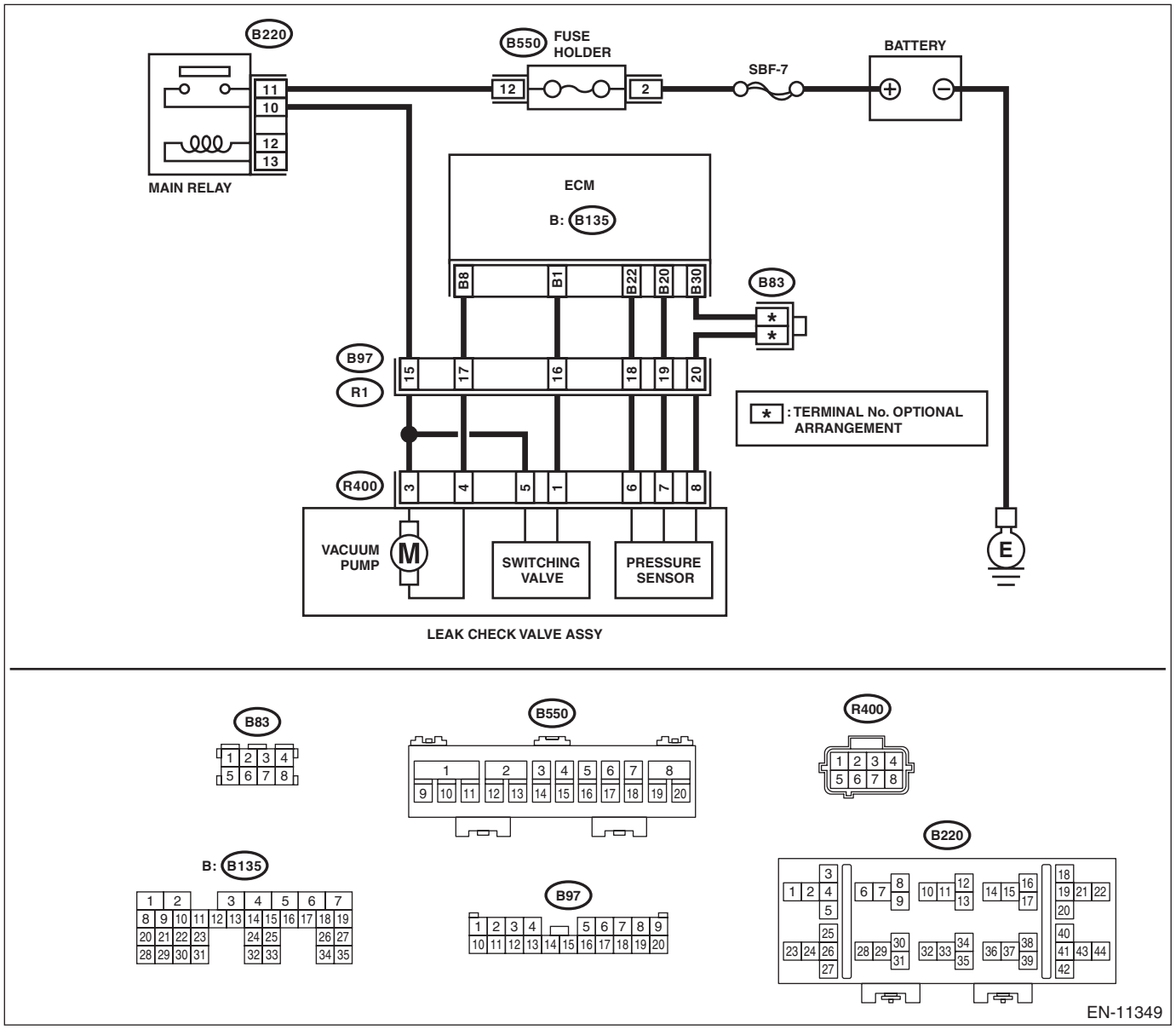
NOTE:
For the detection standard, refer to DTC P0455. <Ref. to EN(H4DO w/o HEV)(diag)-340, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

FG:DTC P2419 EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



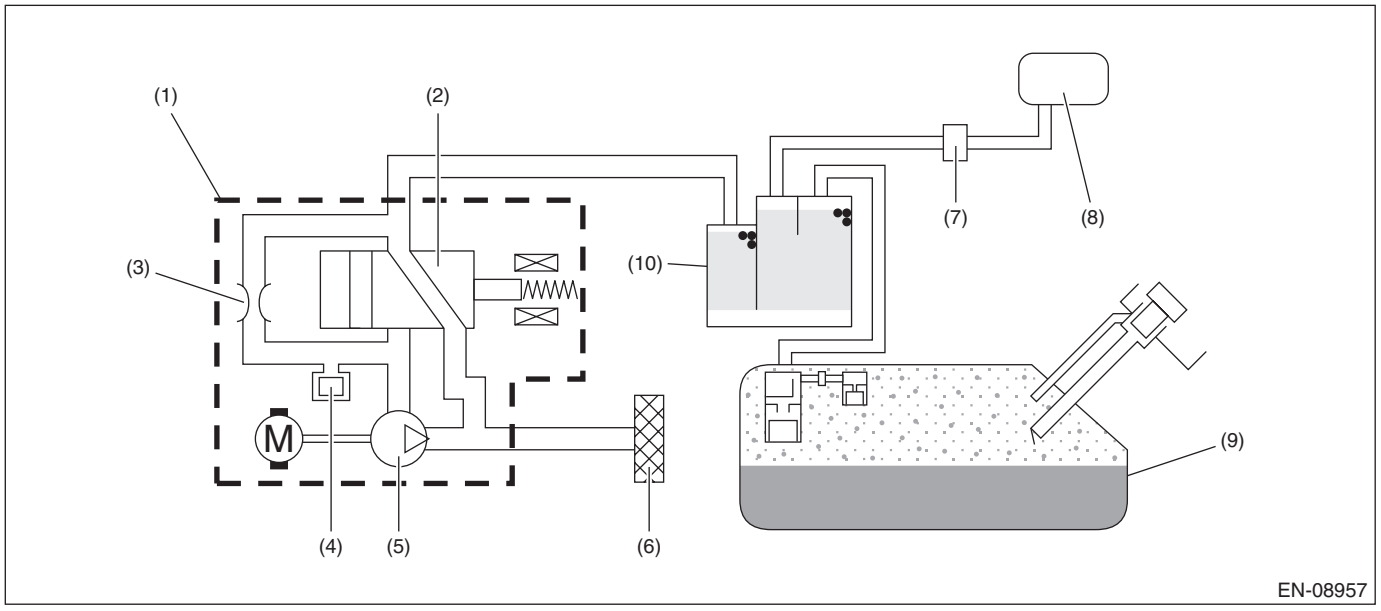
Step		Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.

	Step	Check	Yes	No
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3	**CHECK POWER SUPPLY TO LEAK CHECK VALVE ASSEMBLY.** Measure the voltage between the leak check valve assembly connector and engine ground. ***Connector & terminal*** ***(R400) No. 5 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance between leak check valve assembly and chassis ground. ***Connector & terminal*** ***(R400) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
5	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 1 — (R400) No. 1:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector
6	**CHECK LEAK CHECK VALVE ASSEMBLY.** Check the switching valve of the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-59, CHECK SWITCHING VALVE, INSPECTION, Leak Check Valve Assembly.>	Is the switching valve of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM switching valve.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Evaporative emission system switching valve command	Low

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured EVAP system switching valve voltage	12 V battery system voltage × 0.34 V

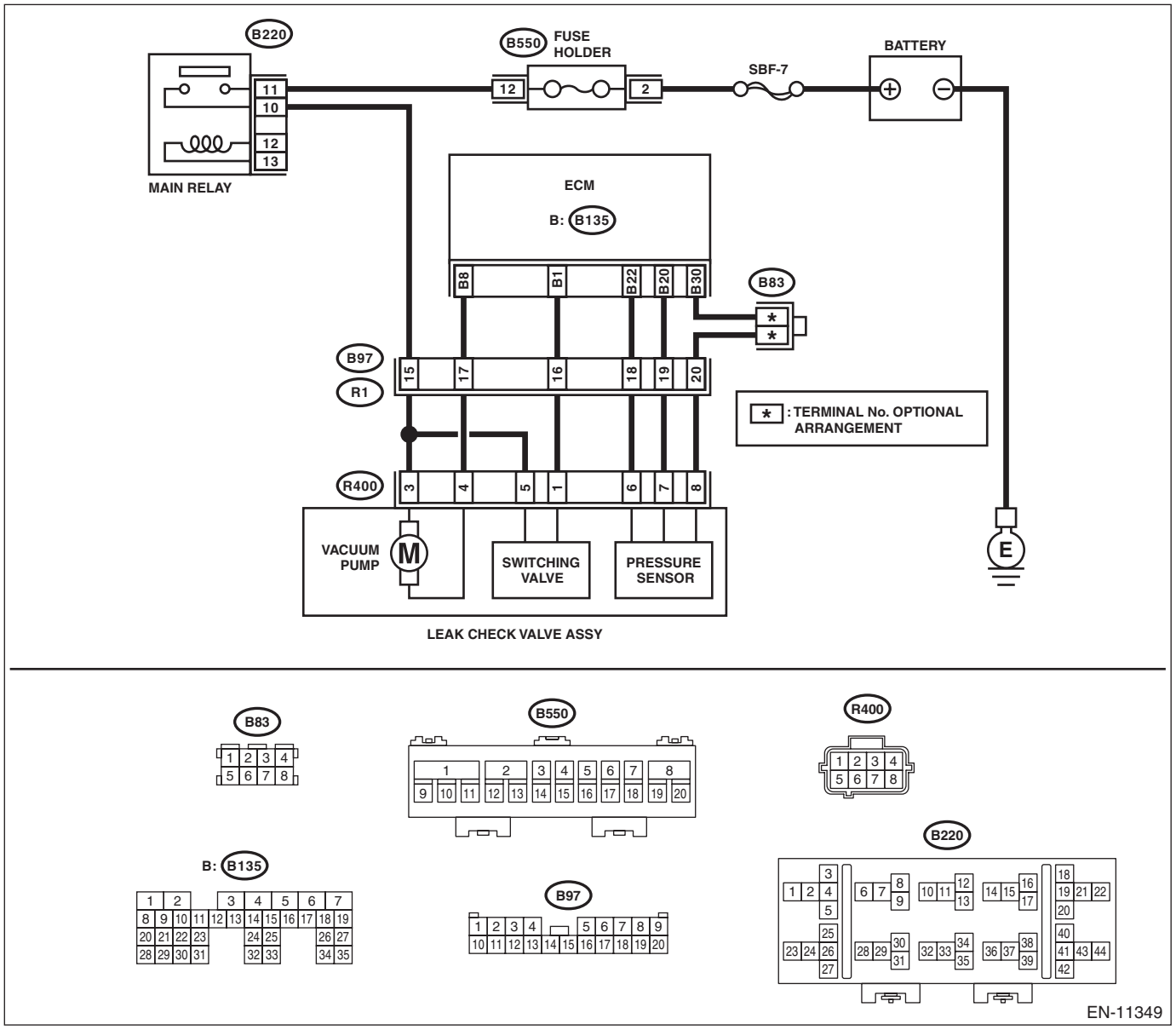
Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FH:DTC P2420 EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>

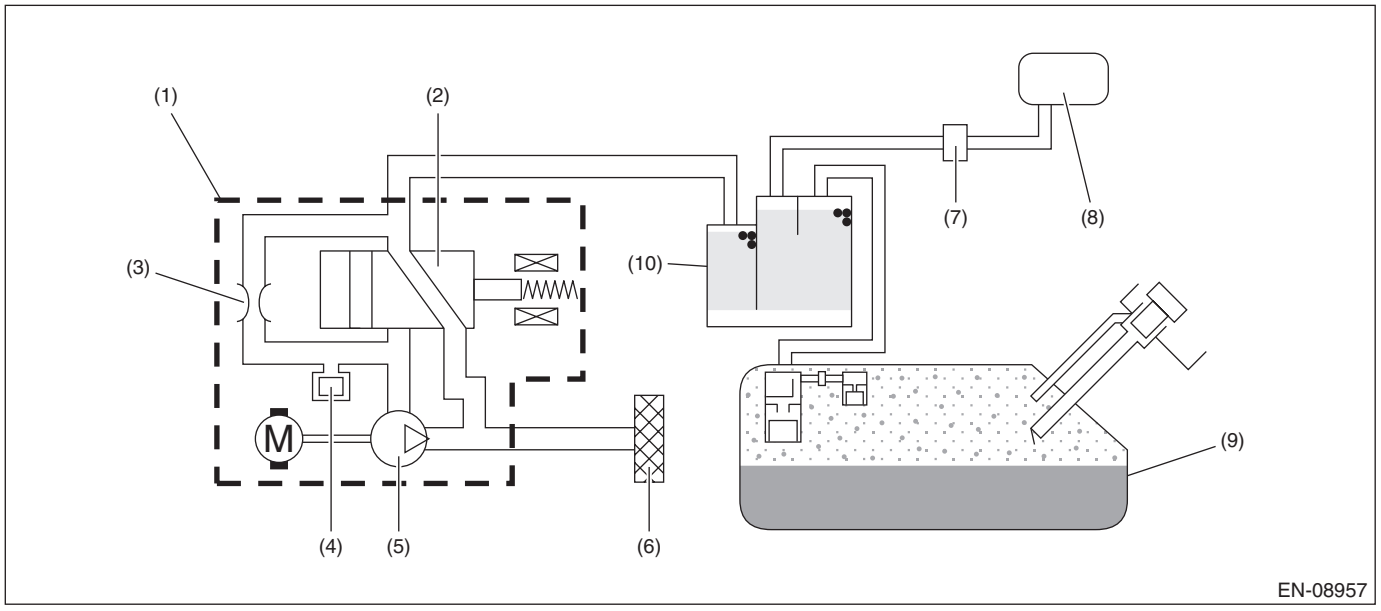


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between leak check valve assembly and chassis ground. ***Connector & terminal*** ***(R400) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Go to step **2**.
2	**CHECK LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Check the switching valve of the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-59, CHECK SWITCHING VALVE, INSPECTION, Leak Check Valve Assembly.>	Is the switching valve of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(w/o HEV))-43, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM switching valve.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1)	ELCM	(5)	Vacuum pump	(9)	Fuel tank
(2)	Switching valve	(6)	Drain filter	(10)	Canister
(3)	Reference orifice (0.02 inch orifice)	(7)	Purge control solenoid valve		
(4)	Pressure sensor	(8)	Intake manifold		

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Evaporative emission system switching valve command	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

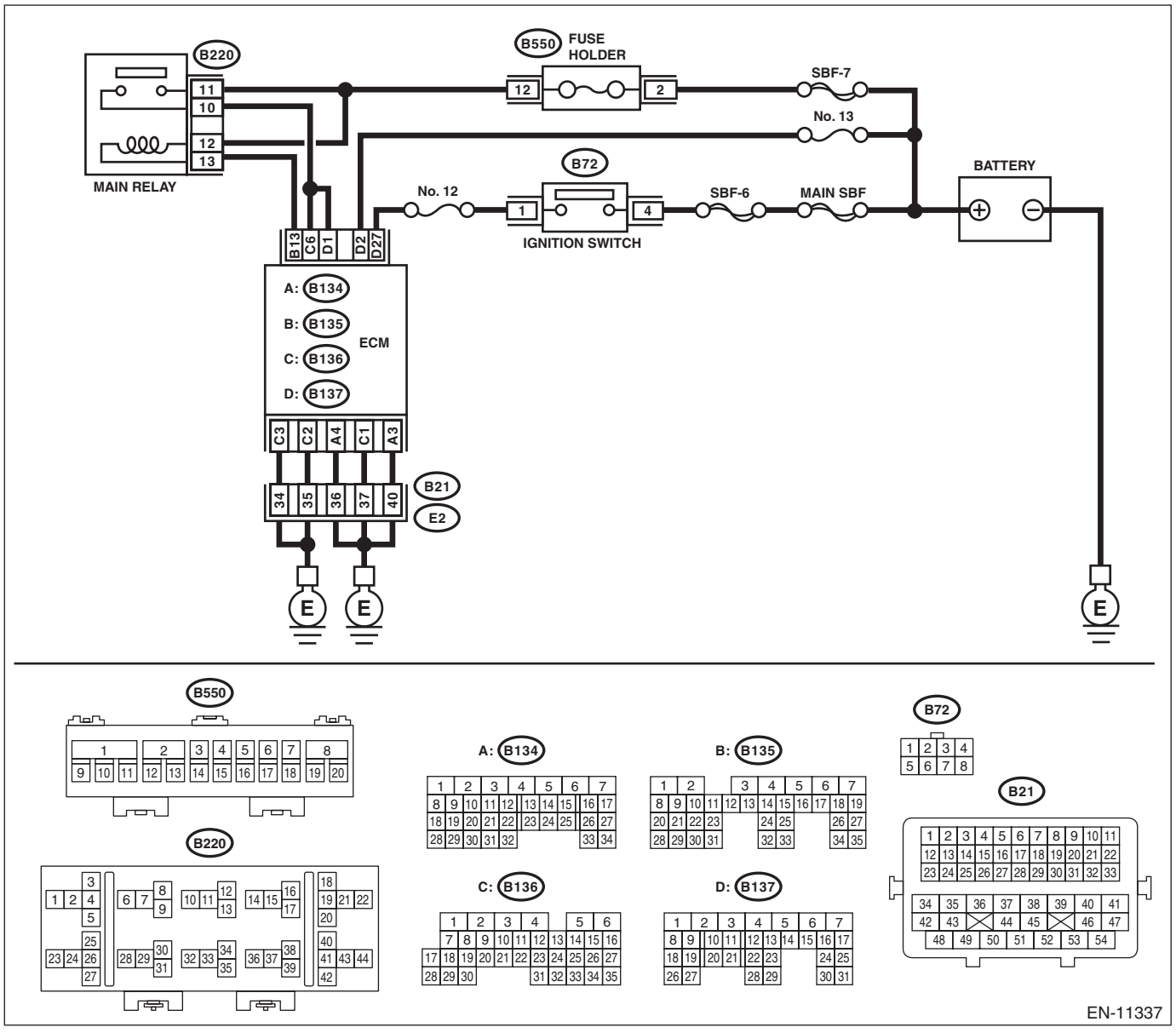
Malfunction Criteria	Threshold Value
Measured EVAP system switching valve current	≥ 12 A

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FI: DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK ECM CONNECTOR.** Check the connecting condition of ECM connector.	Is the ECM connector correctly connected?	Go to step **2**.	Connect the ECM connector correctly.

Step		Check	Yes	No
2	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to ON. 2) Connect the check board. ST 18460AA050 CHECK BOARD 3) Measure the voltage between ECM connector and engine ground while wiggling the harness between ECM connector and F/B connector. ***Connector & terminal*** ***(B137) No. 2 (+) — Engine ground (–):***	Is the voltage 8 V or more all the time?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, the following items may be the cause of fault. • Open circuit or short circuit to ground in harness between ECM connector and F/B connector • Poor contact of fuse (F/B No. 5) • Poor contact of IG2 relay connector • Poor contact of IG2 relay	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between ECM connector and F/B connector • Poor contact of fuse (F/B No. 5) • Poor contact of IG2 relay connector • Poor contact of IG2 relay

1. OUTLINE OF DIAGNOSIS

Detect instantaneous open in ignition switch input circuit to ECM.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION

ECM monitors the voltage of the ignition switch input circuit. Judge as ignition switch ON when the voltage is the specified value or more.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Engine speed	≥ 500 rpm

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after the enable conditions have been established.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Number of instantaneous opens in ignition switch input circuit	≥ 5 time(s)

Time Needed for Diagnosis: 5000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FJ: DTC P2610 ECM/PCM ENGINE OFF TIMER PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

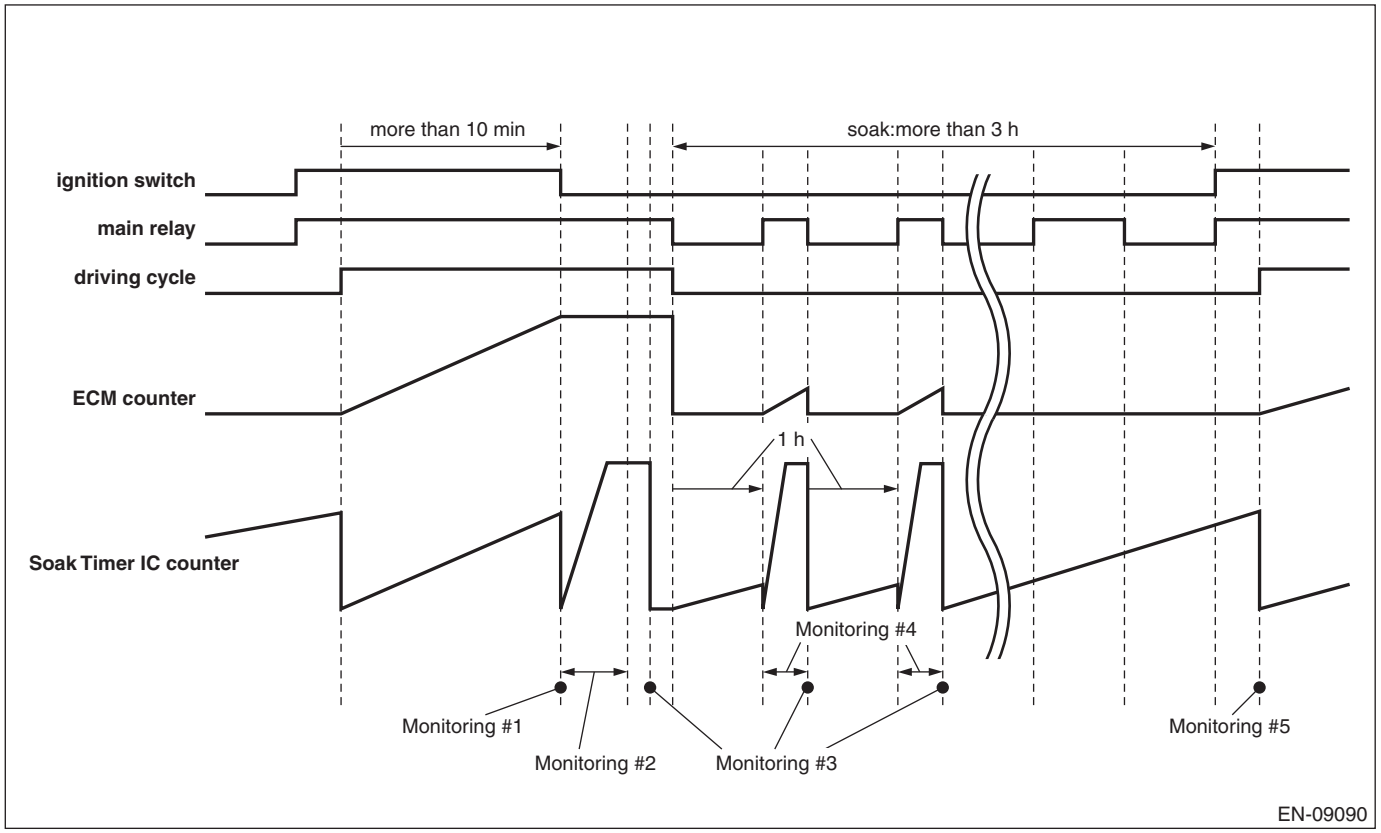
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO w/o HEV)(diag)-50, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).> NOTE: The soaking timer IC is built into the ECM.

1. OUTLINE OF DIAGNOSIS

Detect malfunction of soaking timer IC by the five diagnoses below.

Monitor Number	Explanation	Time required for diagnosis
Monitor #1 <Timer diagnosis>	Perform diagnosis of the soaking timer IC accuracy	196 ms
Monitor #2 <Full count diagnosis>	Perform diagnosis of the soaking timer IC counter function	4000 ms
Monitor #3 <Soaking timer IC setting diagnosis>	Perform diagnosis of communication between ECM and soaking timer IC	196 ms
Monitor #4 <Timer diagnosis (during soaking)>	Perform diagnosis of the soaking timer IC accuracy during soaking	3000 ms
Monitor #5 <Wake-up diagnosis>	Perform diagnosis of wake-up function	64 ms



2. COMPONENT DESCRIPTION

The soaking timer IC is built into the ECM.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
<Timer diagnosis>	
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 600 s and < 61380 s
<Full count diagnosis>	
Battery voltage	≥ 10.9 V
ECM counter	≥ 4 s
<Soaking timer IC setting diagnosis>	
Battery voltage	≥ 10.9 V
<Timer diagnosis (during soaking)>	
Battery voltage	≥ 10.9 V
<Wake-up diagnosis>	
Soak time	> 3600 s

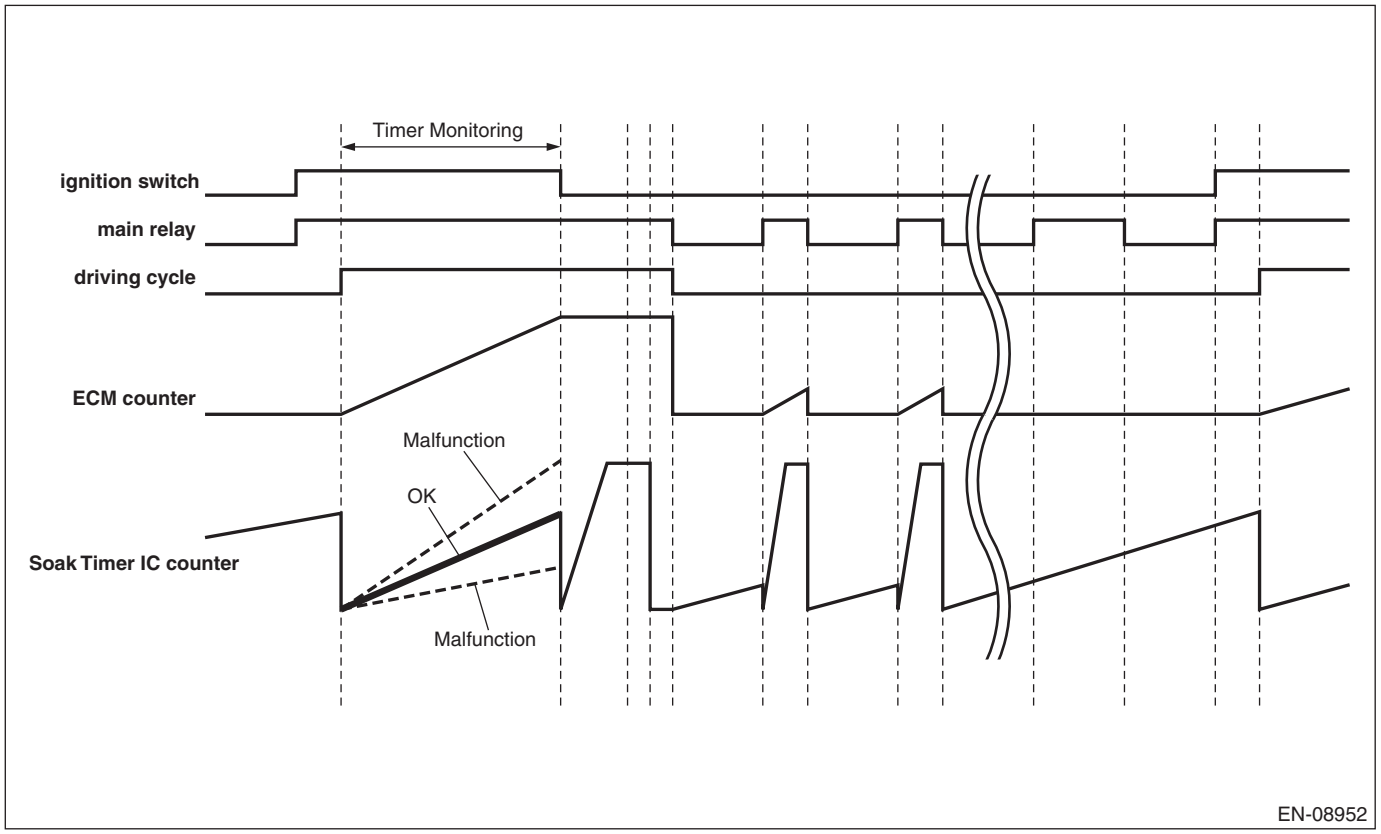
4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when the ignition switch is OFF and when the ignition switch is ON after the soaking of one hour or more.

5. DIAGNOSTIC METHOD

<Timer diagnosis>

Start the count up operation of counters in ECM and in soaking timer IC when the engine is started.
Judge as timer malfunction if the difference between the counter in ECM and counter in soaking timer IC exceeds the allowable limit when the ignition switch is OFF.



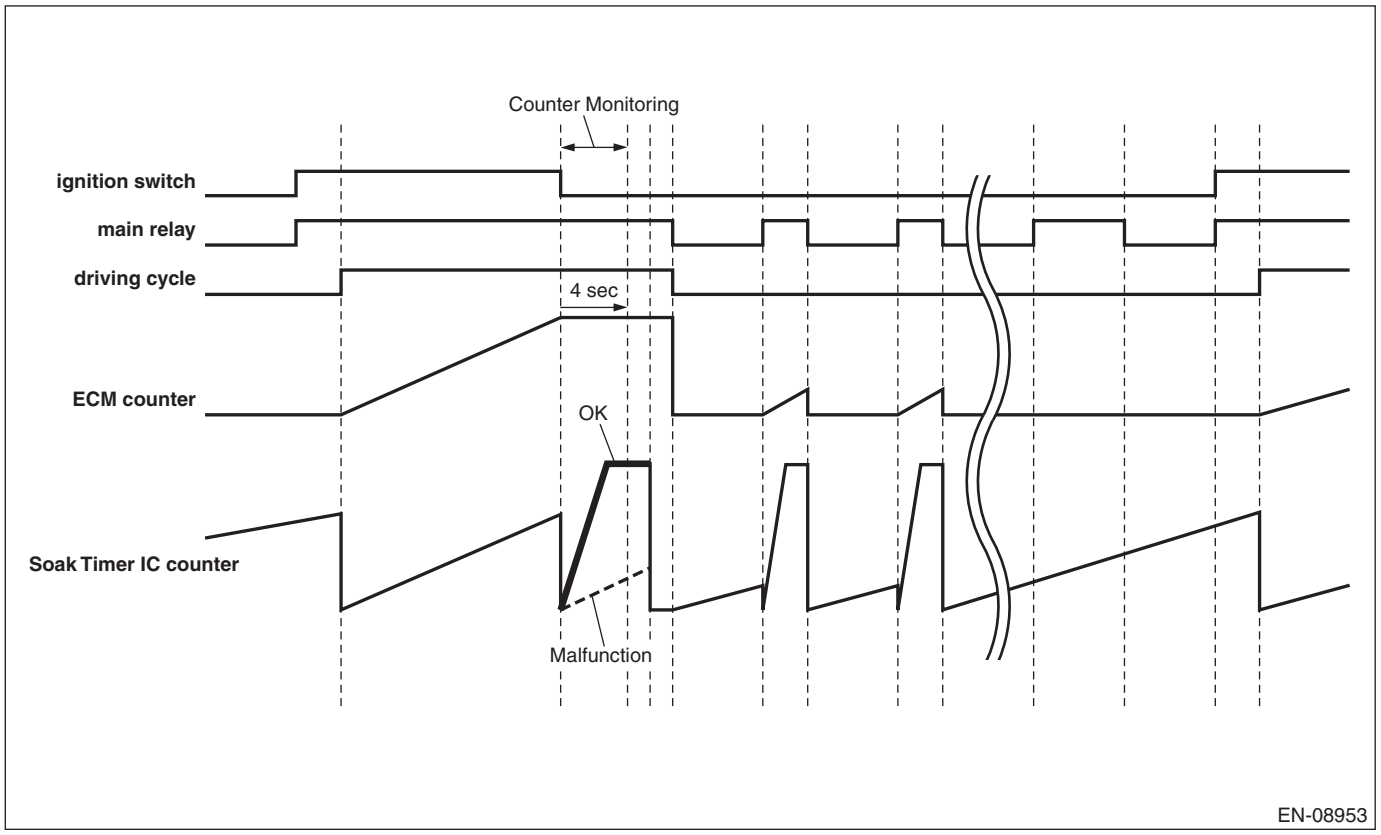
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
| (ECM counter) – (Soak timer IC counter) | / ECM counter	> 0.24

<Full count diagnosis>

Reset the counter in soaking timer IC and start the count up operation.
Judge as full count diagnosis malfunction if counter in soaking timer IC is not $3FF (1023 count) after 4 seconds.



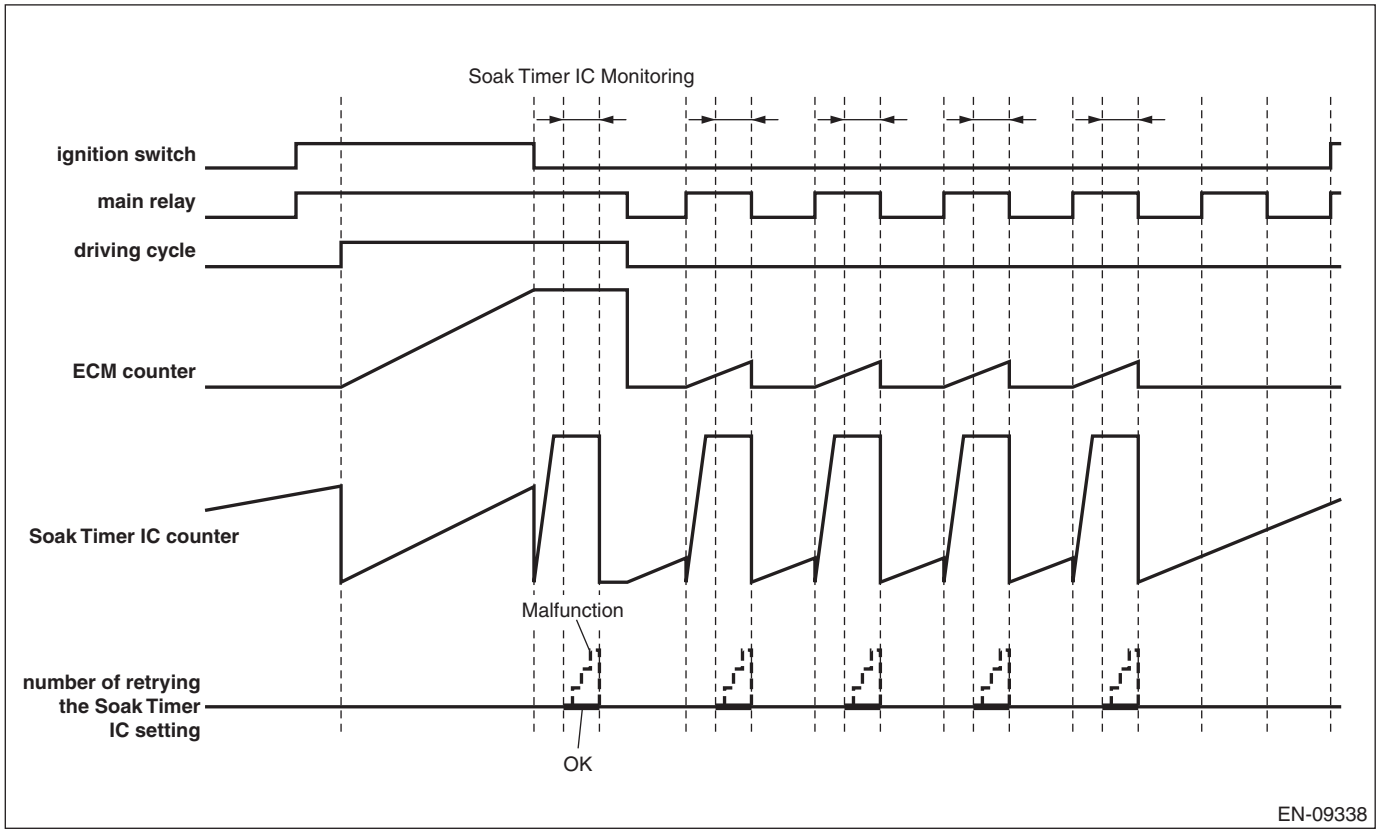
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Soak timer IC counter	≠ $3FF (1023 count)

<Soaking timer IC setting diagnosis>

When setting the activation setting time to soaking timer IC, compare the writing value to soaking timer IC with read out value. Judge as malfunction if the values do not match 3 times in a row.



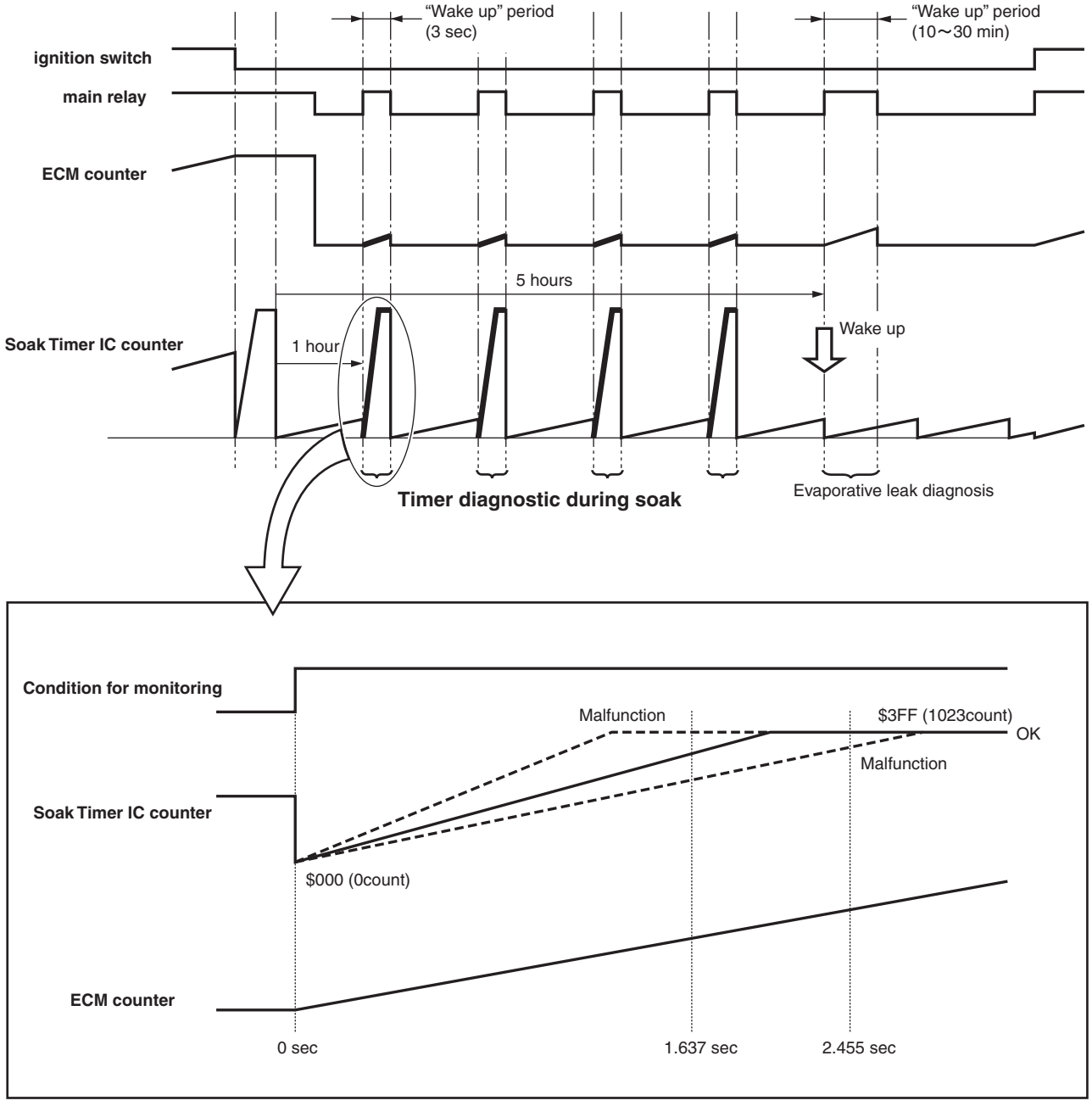
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Value commanded by the ECM	≠ Value received by the soak timer IC

<Timer diagnosis (during soaking)>

Wake-up at the predetermined interval until 5 or 7 or 9.5 hours have passed after the ignition switch is OFF, and compare the counter in soaking timer IC with the counter in ECM.
Judge as malfunction if the counter in soaking timer IC is counted up to maximum value (1023 counts) when the counter in ECM is 1637 ms, or if the counter in soaking timer IC is not counted up to maximum value (1023 counts) when the counter in ECM is 2455 ms.



EN-08981

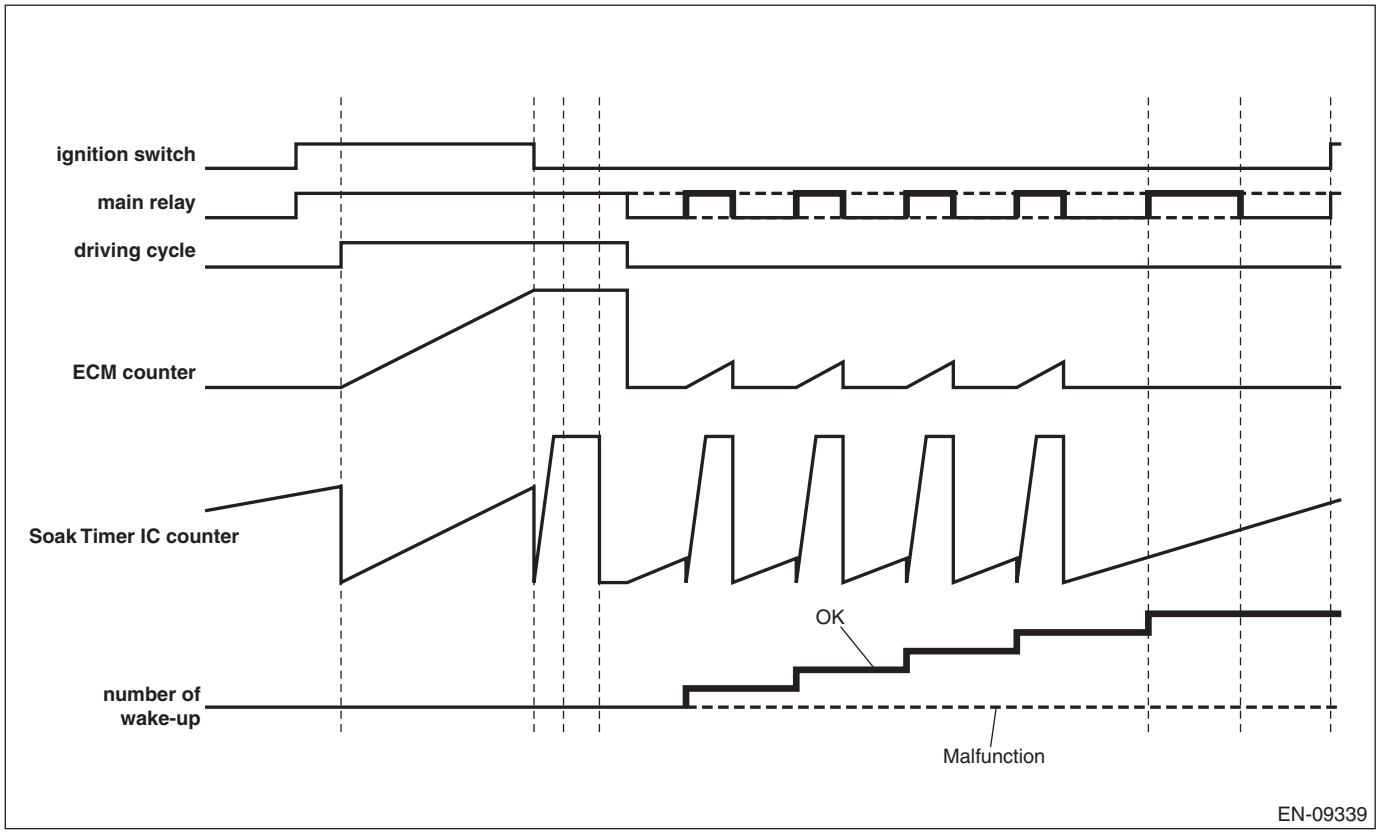
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Soak timer IC counter when ECM counter ≤ 1.636 sec	= 1023 count
Soak timer IC counter when ECM counter ≥ 2.456 sec	≠ 1023 count

<Wake-up diagnosis>

Store the number of wake-up activation when the ECM wakes up by the soaking timer IC.
Next time when the ignition switch is ON, if the number of wake-up activation does not reach the predetermined value even though the counter in soaking timer IC operates 1 hour or more, judge as wake-up malfunction.



Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Number of wake-up function commanded from ECM to Soak-timer IC	≠ Number of actual wake-up ECM

Time Needed for Diagnosis: Approx. 5 — 9.5 hours
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FK:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 436 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FL: DTC U0101 LOST COMMUNICATION WITH TCM

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure between TCM, VDC CM and combination meter has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	= Lost

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FM:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure between TCM, VDC CM and combination meter has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from vehicle dynamics control module	= Lost

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FN:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure between TCM, VDC CM and combination meter has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from instrument panel cluster control module	= Lost

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FO:DTC U0402 INVALID DATA RECEIVED FROM TCM

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when data received from TCM, VDC CM and combination meter is not normal.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	Did not change
CAN data from TCM	Parity error

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FP:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when data received from TCM, VDC CM and combination meter is not normal.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from vehicle dynamics control module	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FQ:DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when data received from TCM, VDC CM and combination meter is not normal.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from instrument panel cluster control module	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

19.General Diagnostic Table

A: INSPECTION

1. ENGINE

NOTE:
Malfunction of parts other than those listed is also possible. <Ref. to ME(H4DO(w/o HEV))-425, Engine Trouble in General.>

Symptoms	Faulty parts
1. Engine stalls during idling.	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Ignition parts (*1) 4) Engine coolant temperature sensor (*2) 5) Crankshaft position sensor (*3) 6) Camshaft position sensor (*3) 7) Fuel injection parts (*4) 8) Electronic throttle control
2. Rough idling	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Engine coolant temperature sensor (*2) 4) Ignition parts (*1) 5) Air intake system (*5) 6) Fuel injection parts (*4) 7) Electronic throttle control 8) Crankshaft position sensor (*3) 9) Camshaft position sensor (*3) 10) Oxygen sensor 11) Fuel pump and fuel pump relay 12) EGR control valve
3. Engine does not return to idle.	1) Engine coolant temperature sensor 2) Electronic throttle control 3) Manifold absolute pressure sensor 4) Mass air flow and intake air temperature sensor 5) EGR control valve 6) Accelerator pedal position sensor 7) Engine oil temperature sensor
4. Poor acceleration	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Electronic throttle control 4) Fuel injection parts (*4) 5) Fuel pump and fuel pump relay 6) Engine coolant temperature sensor (*2) 7) Crankshaft position sensor (*3) 8) Camshaft position sensor (*3) 9) Engine torque control signal circuit 10) Ignition parts (*1) 11) EGR control valve 12) Accelerator pedal position sensor 13) Engine oil temperature sensor
5. Engine stalls, hesitates, or sputters at acceleration.	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Engine coolant temperature sensor (*2) 4) Crankshaft position sensor (*3) 5) Camshaft position sensor (*3) 6) Purge control solenoid valve 7) Fuel injection parts (*4) 8) Electronic throttle control 9) Fuel pump and fuel pump relay 10) EGR control valve

Symptoms	Faulty parts
6. Surging	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor (*2) 4) Crankshaft position sensor (*3) 5) Camshaft position sensor (*3) 6) Fuel injection parts (*4) 7) Electronic throttle control 8) Fuel pump and fuel pump relay 9) EGR control valve
7. Spark knock	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor 4) Knock sensor 5) Fuel injection parts (*4) 6) Fuel pump and fuel pump relay 7) EGR control valve
8. After burning in exhaust system	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor (*2) 4) Fuel injection parts (*4) 5) Fuel pump and fuel pump relay

*1: Check ignition coil and spark plug.
*2: Indicate the symptom occurring only in cold temperatures.
*3: Ensure the secure installation.
*4: Check fuel injector and fuel filter.
*5: Inspect air leak in air intake system.

ENGINE 2 SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUEL INJECTION (FUEL SYSTEMS)	FU(H4DO (HEV))
EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)	EC(H4DO (HEV))
INTAKE (INDUCTION)	IN(H4DO (HEV))
MECHANICAL	ME(H4DO (HEV))
EXHAUST	EX(H4DO (HEV))
COOLING	CO(H4DO (HEV))
LUBRICATION	LU(H4DO (HEV))
SPEED CONTROL SYSTEMS	SP(H4DO (HEV))
IGNITION	IG(H4DO (HEV))
STARTING/CHARGING SYSTEMS	SC(H4DO (HEV))
ENGINE (DIAGNOSTICS)	EN(H4DO HEV)(diag)

FUJI HEAVY INDUSTRIES LTD.

FUEL INJECTION (FUEL SYSTEMS)

FU(H4DO(HEV))

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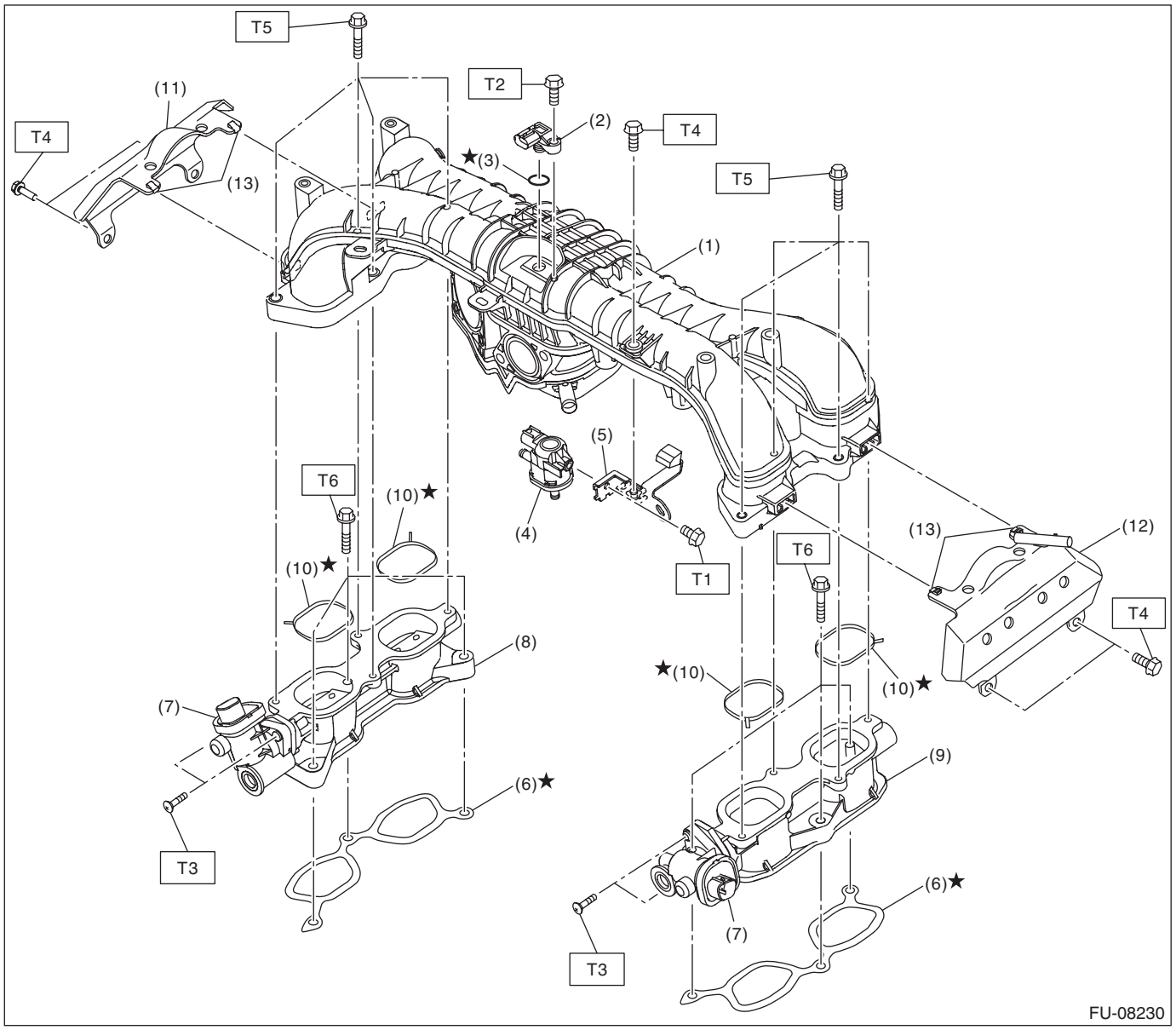
1. General Description

A: SPECIFICATION

Fuel tank	Capacity	52 L (13.7 US gal, 11.4 Imp gal)
	Location	Under rear seat
Fuel pump	Type	Impeller
	Shutoff discharge pressure	750 kPa (7.7 kg/cm^2, 108.8 psi) or less
	Discharge rate	82 L (21.7 US gal, 18 Imp gal)/h or more [12.5 V at 343 kPa (3.5 kg/cm^2, 49.7 psi)]
Fuel filter		In-tank type

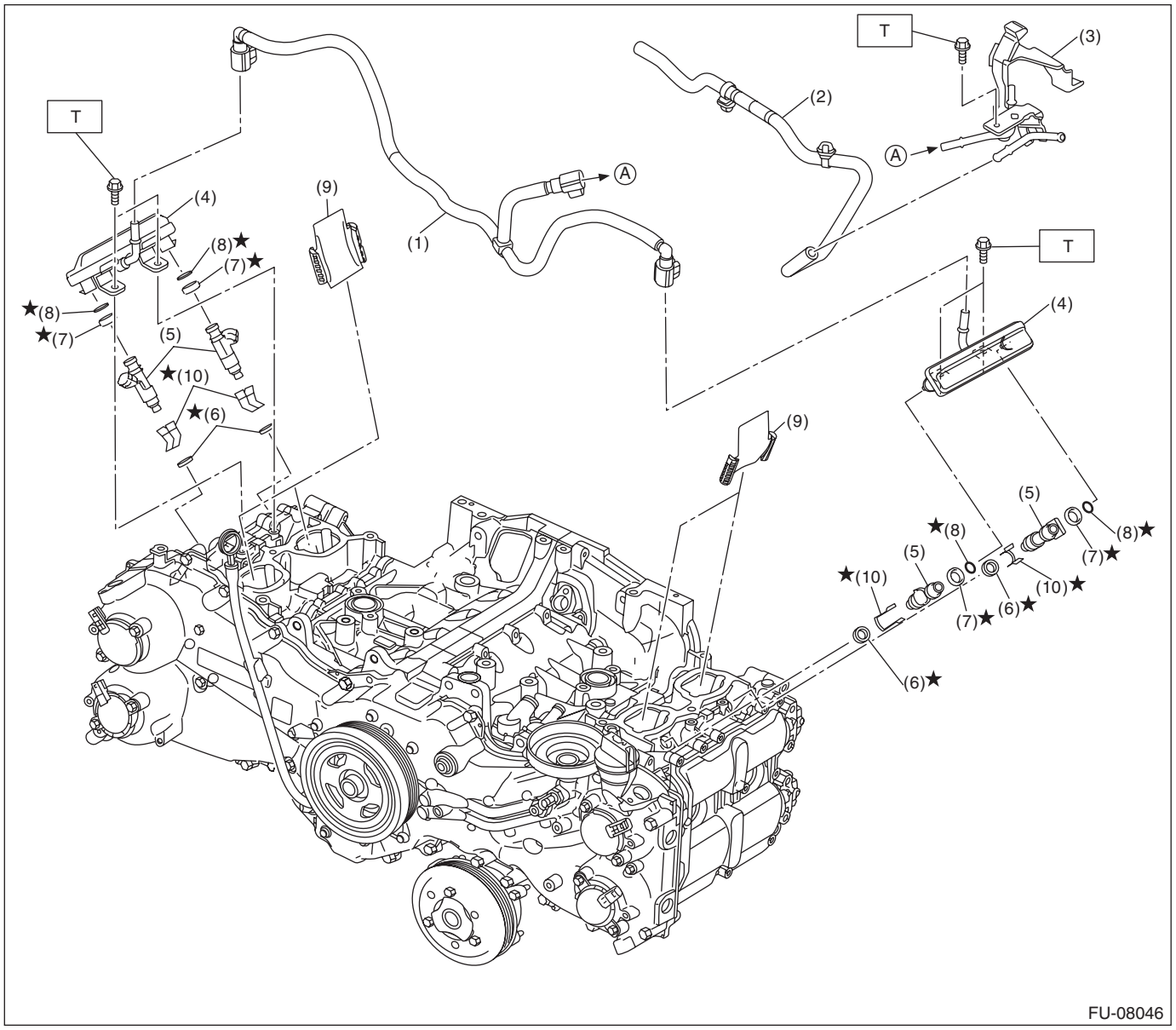
B: COMPONENT

1. INTAKE MANIFOLD 1



(1)	Intake manifold	(8)	Tumble generator valve LH	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Manifold absolute pressure sensor	(9)	Tumble generator valve RH	***T1: 3.4 (0.3, 2.5)***
(3)	O-ring	(10)	Gasket	***T2: 4 (0.4, 3.0)***
(4)	Purge control solenoid valve	(11)	Intake manifold protector LH	***T3: 6 (0.6, 4.4)***
(5)	Purge control solenoid valve bracket	(12)	Intake manifold protector RH	***T4: 6.4 (0.7, 4.7)***
(6)	Gasket	(13)	Cushion	***T5: 8.3 (0.8, 6.1)***
(7)	Tumble generator valve actuator			***T6: 25 (2.5, 18.4)***

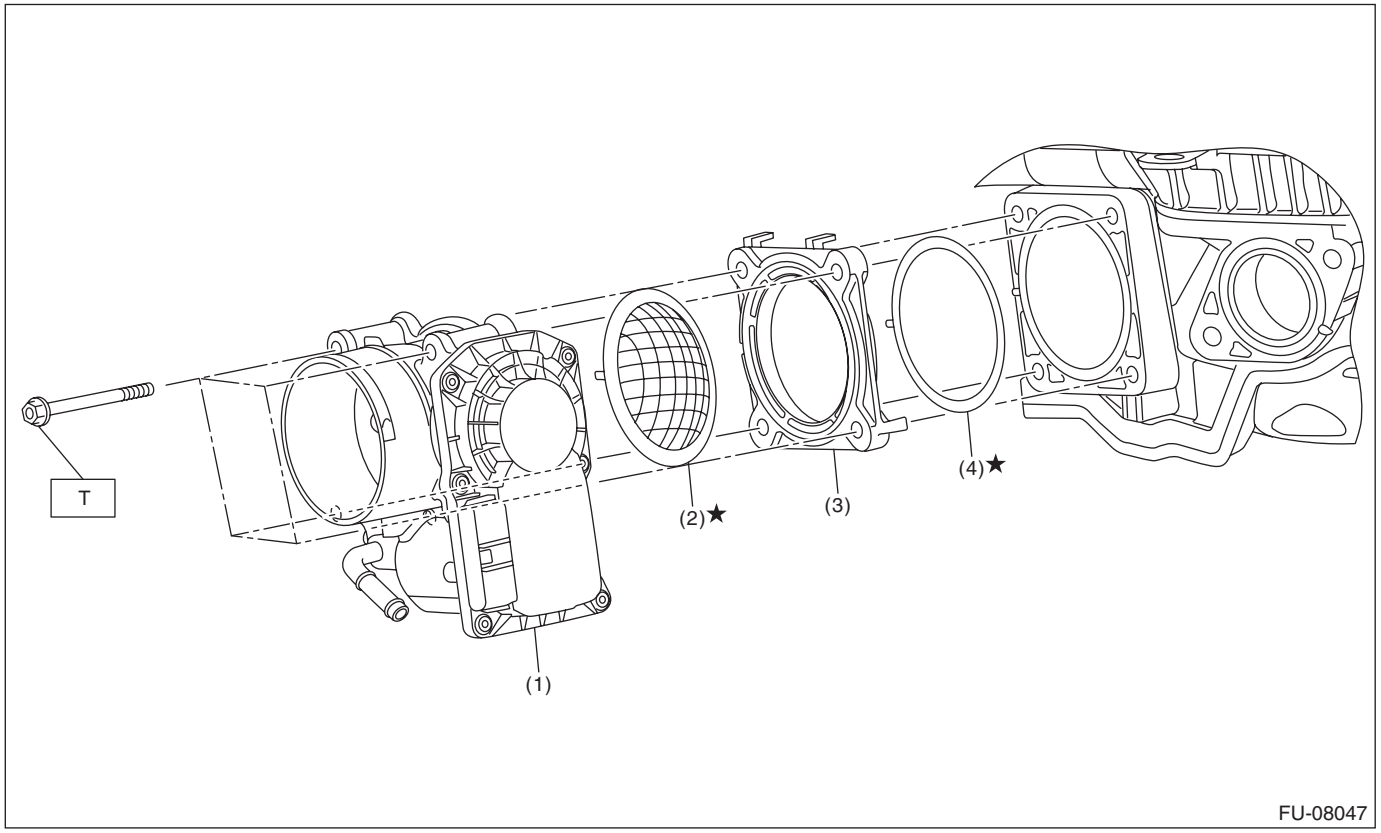
2. INTAKE MANIFOLD 2



(1) Fuel delivery pipe
(2) Vacuum hose
(3) Fuel pipe ASSY
(4) Fuel pipe
(5) Fuel injector
(6) Seal ring
(7) Rubber
(8) O-ring
(9) Cylinder head plate
(10) Fuel injector holder

Tightening torque: N·m (kgf-m, ft-lb)
T: 6.4 (0.7, 4.7)

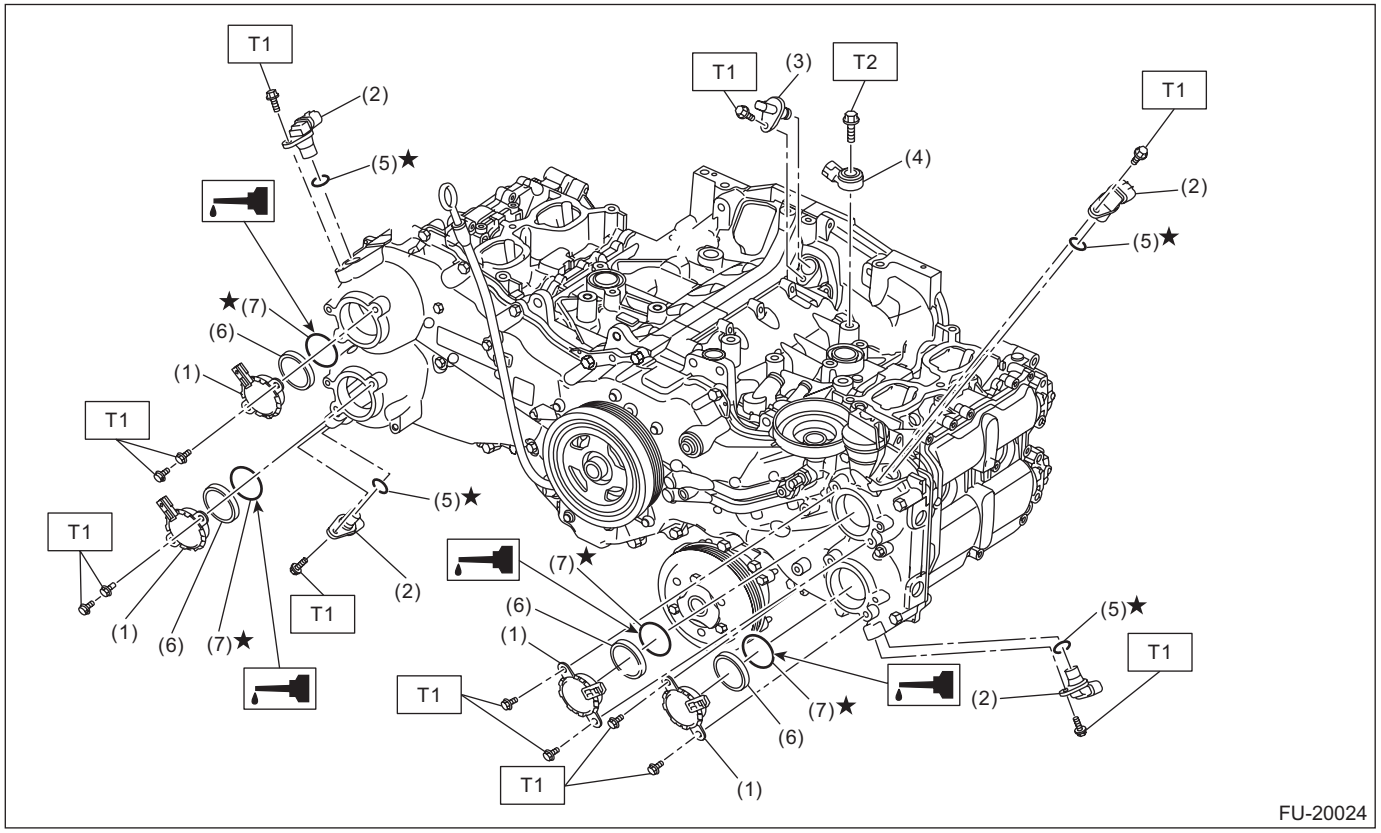
3. THROTTLE BODY



(1) Throttle body
(2) Gasket A
(3) Throttle chamber duct
(4) Gasket B

Tightening torque: N·m (kgf-m, ft-lb)
T: <Ref. to FU(H4DO(HEV))-16, INSTALLATION, Throttle Body.>

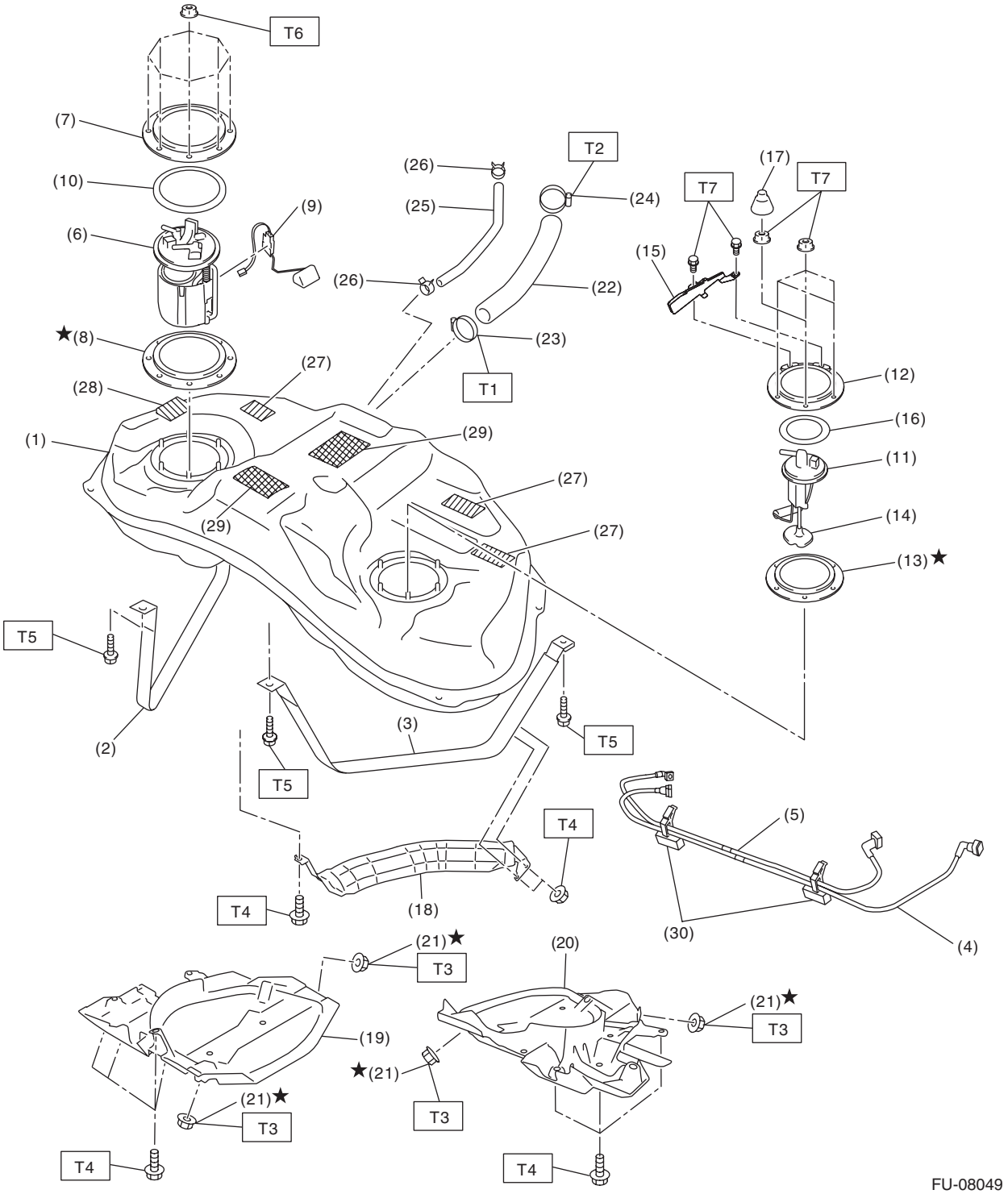
4. CRANKSHAFT POSITION, CAMSHAFT POSITION AND KNOCK SENSORS



(1) Oil control solenoid
(2) Camshaft position sensor
(3) Crankshaft position sensor
(4) Knock sensor
(5) O-ring
(6) Back-up ring
(7) O-ring

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.7, 4.7)
T2: 24 (2.4, 17.7)

5. FUEL TANK

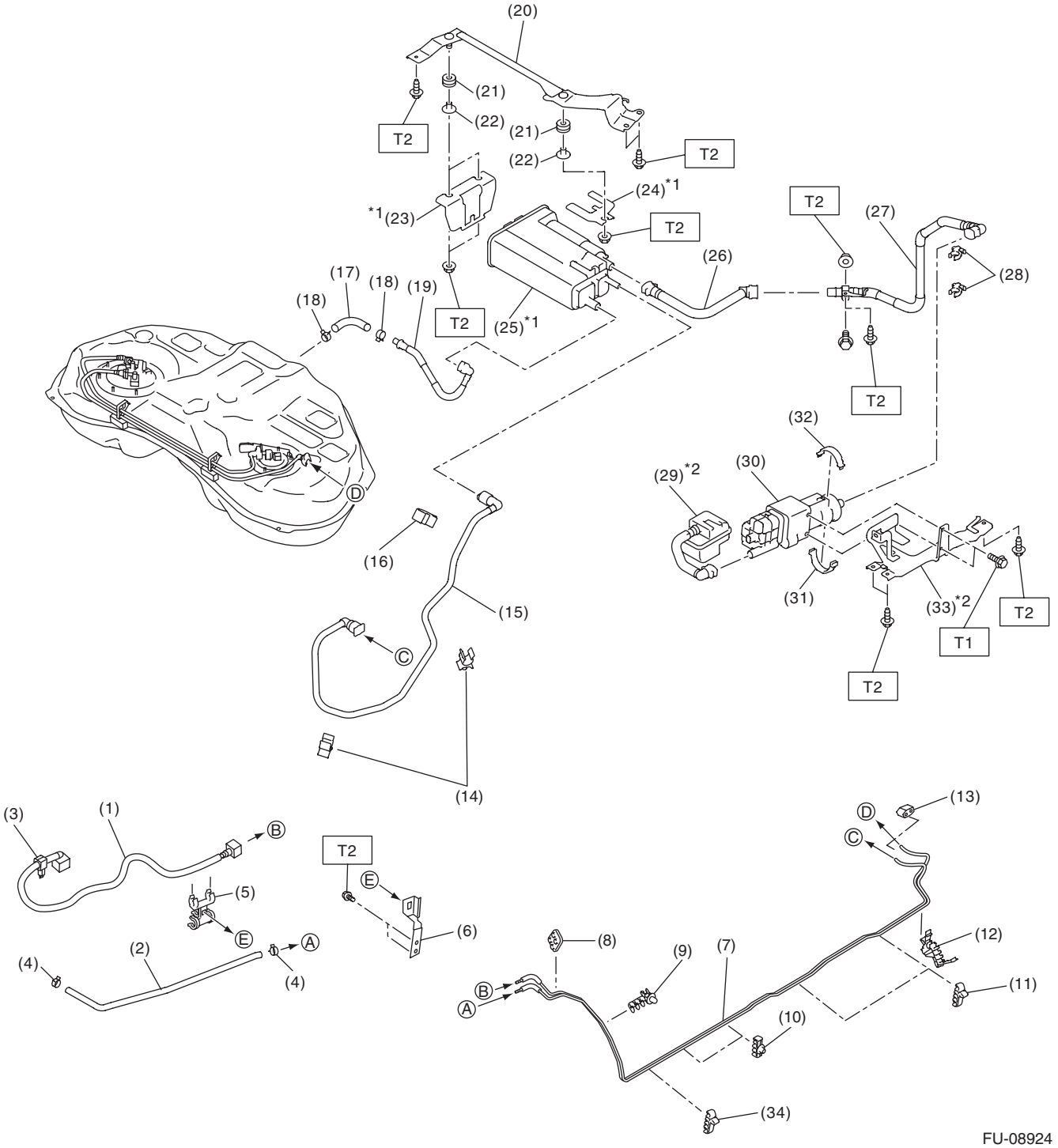

T6
(7)
(10)
(9)
(6)
(26)
(25)
T2
(24)
(17)
T7
T7
(15)
(26)
(22)
★(8)
(23)
T1
(27)
(28)
(12)
(16)
(1)
(29)
(11)
(27)
(29)
(14)
(27)
(13)★
T5
(2)
(3)
T5
T5
T4
(5)
T4
(18)
(30)
(4)
(21)★
T3
(20)
(21)★
T3
(19)
★(21)
T3
(21)★
T3
T4
T4
FU-08049

(1) Fuel tank
(2) Fuel tank band RH
(3) Fuel tank band LH
(4) Delivery tube
(5) Jet pump tube
(6) Fuel pump ASSY
(7) Fuel pump upper plate
(8) Fuel pump gasket
(9) Fuel level sensor
(10) Fuel pump upper plate cushion
(11) Fuel sub level sensor
(12) Fuel sub level sensor upper plate
(13) Fuel sub level sensor gasket
(14) Fuel sub level sensor filter
(15) Fuel sub level sensor protector
(16) Fuel sub level sensor upper plate cushion
(17) Rubber cap
(18) Heat shield cover
(19) Fuel tank protector RH
(20) Fuel tank protector LH
(21) Self-locking nut
(22) Fuel filler hose
(23) Clamp
(24) Clamp
(25) Evaporation hose
(26) Clip
(27) Cushion
(28) Cushion
(29) Cushion
(30) Tube clamp

Tightening torque: N·m (kgf-m, ft-lb)

T1: 2 (0.2, 1.5)
T2: 2.5 (0.3, 1.8)
T3: 9 (0.9, 6.6)
T4: 18 (1.8, 13.3)
T5: 33 (3.4, 24.3)
T6: <Ref. to FU(H4DO(HEV))-125, INSTALLATION, Fuel Pump.>
T7: <Ref. to FU(H4DO(HEV))-136, INSTALLATION, Fuel Sub Level Sensor.>

6. FUEL LINE

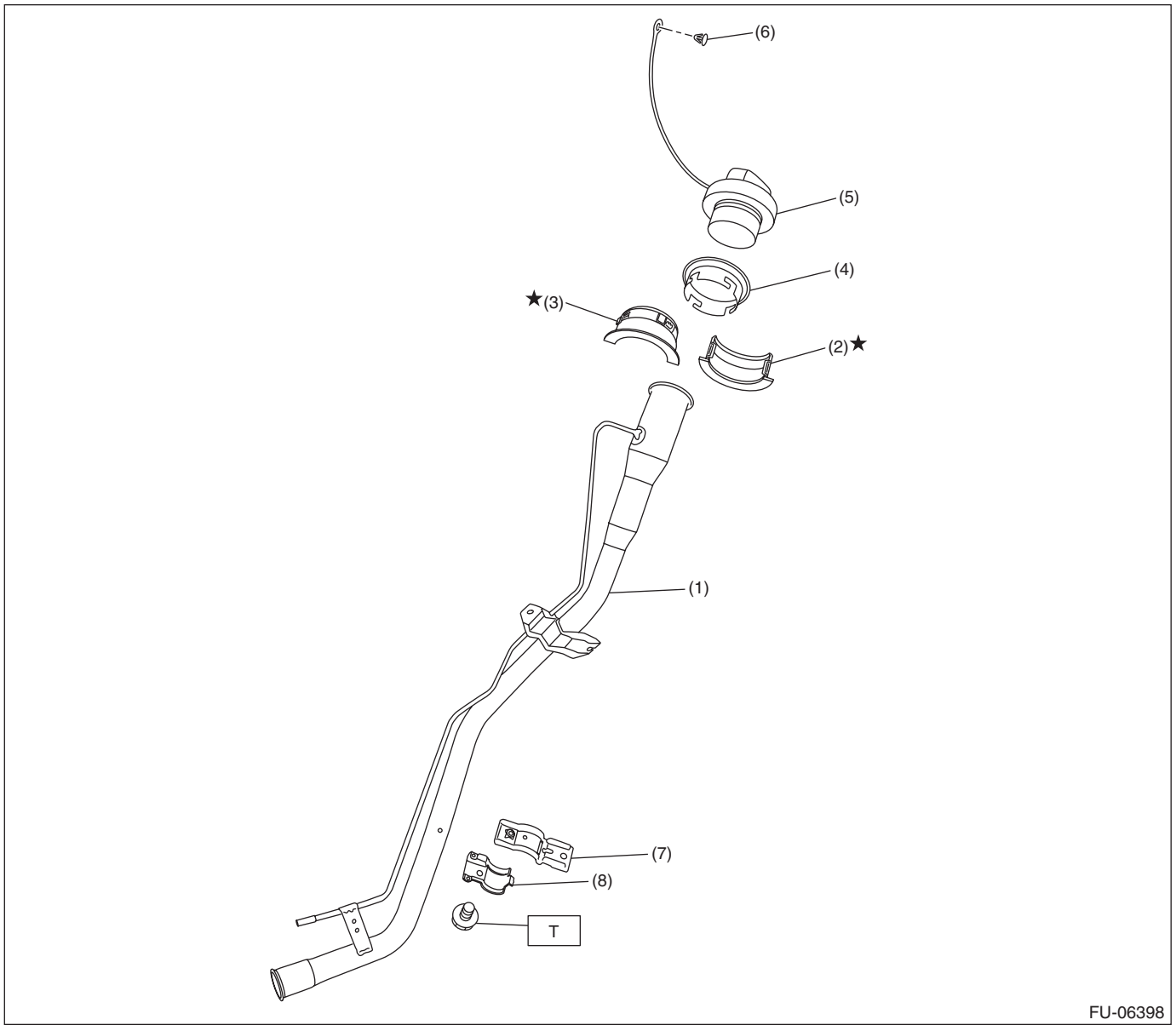

(20)
(21)
(22)
T2
(24)*1
*1(23)
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(2)
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(9)
(7)
(10)
(11)
(12)
(13)
(34)
FU-08924

(1) Fuel delivery tube
(2) Evaporation hose
(3) Tube clamp
(4) Clip
(5) Hose clamp
(6) Hose clamp bracket
(7) Fuel pipe ASSY
(8) Fuel pipe front grommet
(9) Pipe clamp
(10) Pipe clamp
(11) Pipe clamp
(12) Pipe clamp
(13) Fuel pipe rear grommet
(14) Tube clamp
(15) Purge tube
(16) Clip
(17) Vent hose
(18) Clip
(19) Vent tube
(20) Canister bracket A
(21) Cushion
(22) Collar
(23) Canister bracket B
(24) Canister bracket C
(25) Canister
(26) Drain tube A
(27) Drain tube B
(28) Tube clamp
(29) Drain filter
(30) Leak check valve ASSY
(31) Clamp A
(32) Clamp B
(33) Drain bracket
(34) Pipe clamp

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5.4 (0.6, 4.0)
T2: 7.5 (0.8, 5.5)

*1 When removing the canister bracket from the canister, use the new canister and canister bracket to install.
*2 When removing the drain bracket from the drain filter, use the new drain filter and drain bracket to install.

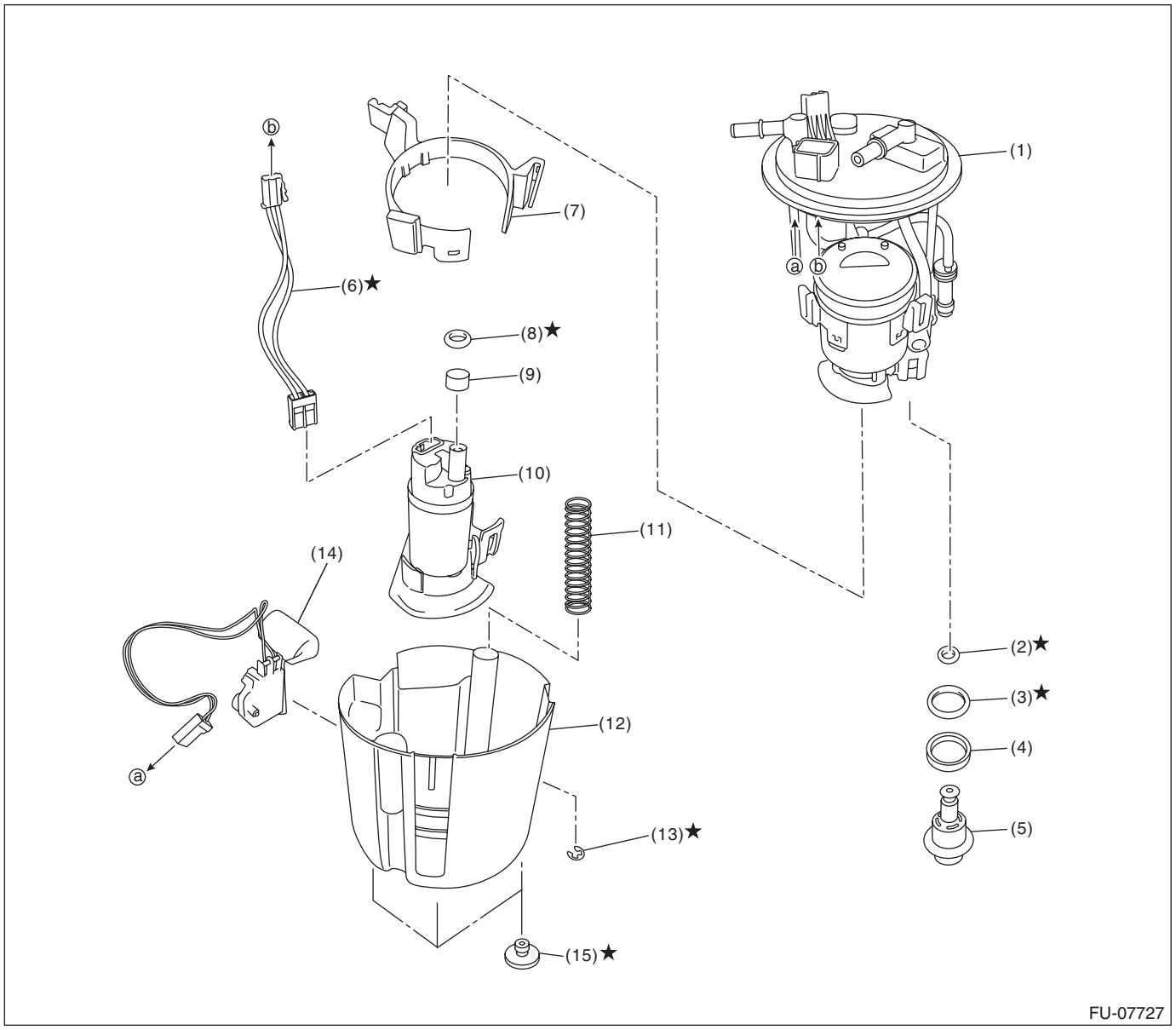
7. FUEL FILLER PIPE



(1) Fuel filler pipe ASSY
(2) Neck holder A
(3) Neck holder B
(4) Fuel filler pipe protector
(5) Fuel filler cap
(6) Clip
(7) Upper bracket
(8) Lower bracket

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.8, 5.5)

8. FUEL PUMP



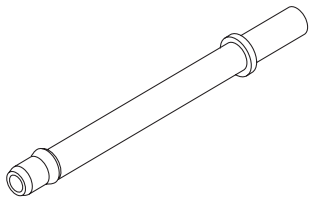
(1) Fuel filter ASSY
(2) O-ring
(3) O-ring
(4) Back-up ring
(5) Pressure regulator
(6) Connector cable
(7) Fuel pump holder
(8) O-ring
(9) Spacer
(10) Fuel pump
(11) Spring
(12) Fuel chamber ASSY
(13) Clip
(14) Fuel level sensor
(15) Cushion

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Place “NO OPEN FLAMES” signs near the working area.
- Prepare a container and cloth to prevent scattering of fuels when performing work where fuels can be spilled. If the oil spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Follow all government and local regulations concerning disposal of refuse when disposing fuel.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18471AA000	18471AA000	FUEL PIPE ADAPTER	Used for draining fuel.
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for inspecting the waveform of each sensor.
Mighty Vac	Used for inspecting the manifold absolute pressure sensor.
DST-i	Used together with Subaru Select Monitor 4.

2. Throttle Body

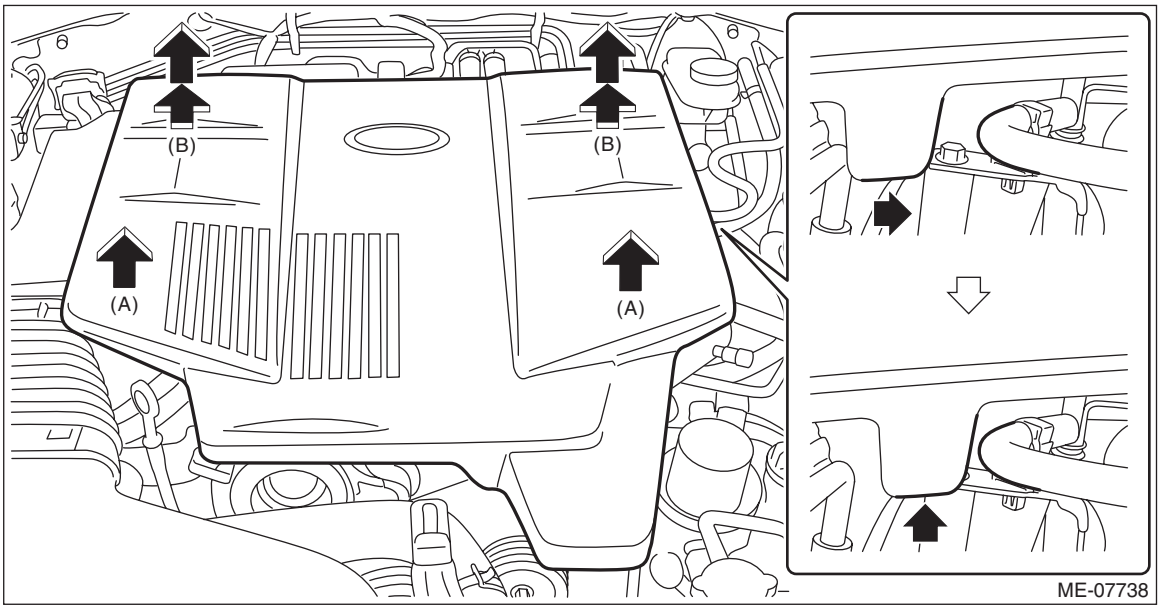
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

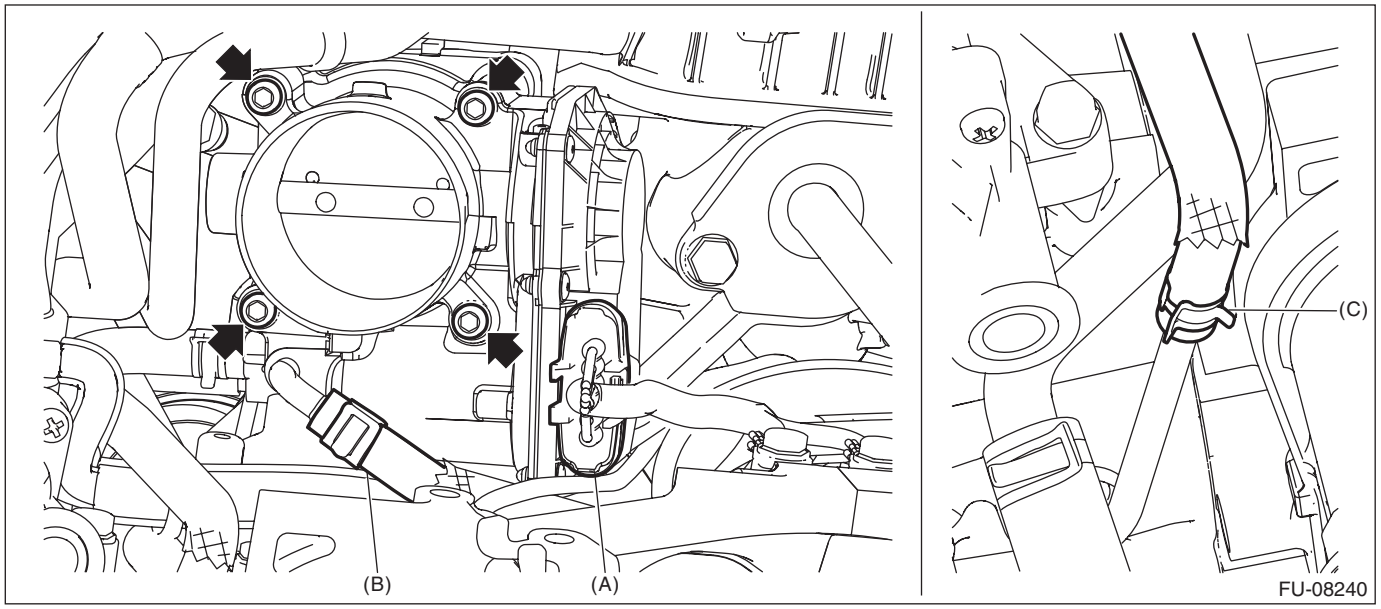
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Lift up the vehicle.
4) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
5) Drain approximately 3.0 L (3.2 US qt, 2.6 Imp qt) of coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
6) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
7) Remove the air intake boot No. 2. <Ref. to IN(H4DO(HEV))-11, AIR INTAKE BOOT NO. 2, REMOVAL, Air Intake Boot.>
8) Disconnect the connectors (A) from the throttle position sensor.
9) Disconnect the preheater hose (B) from the throttle body.
10) Disconnect the preheater hose (C) from the water pipe assembly LH.

11) Remove the throttle body from the intake manifold.

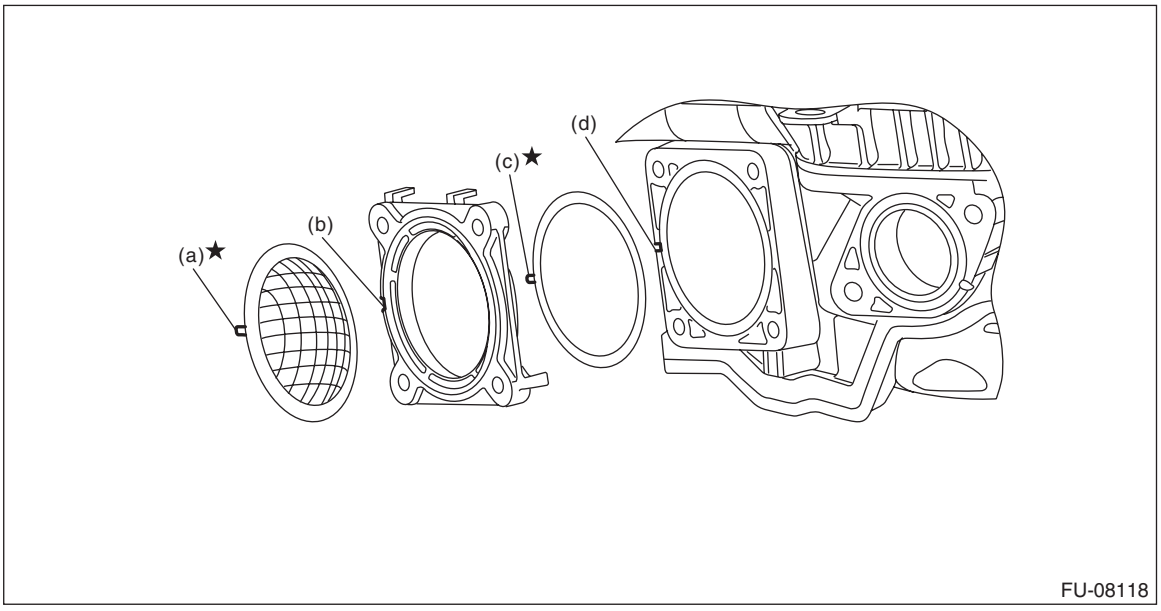


12) Disconnect the preheater hose from throttle body.

B: INSTALLATION

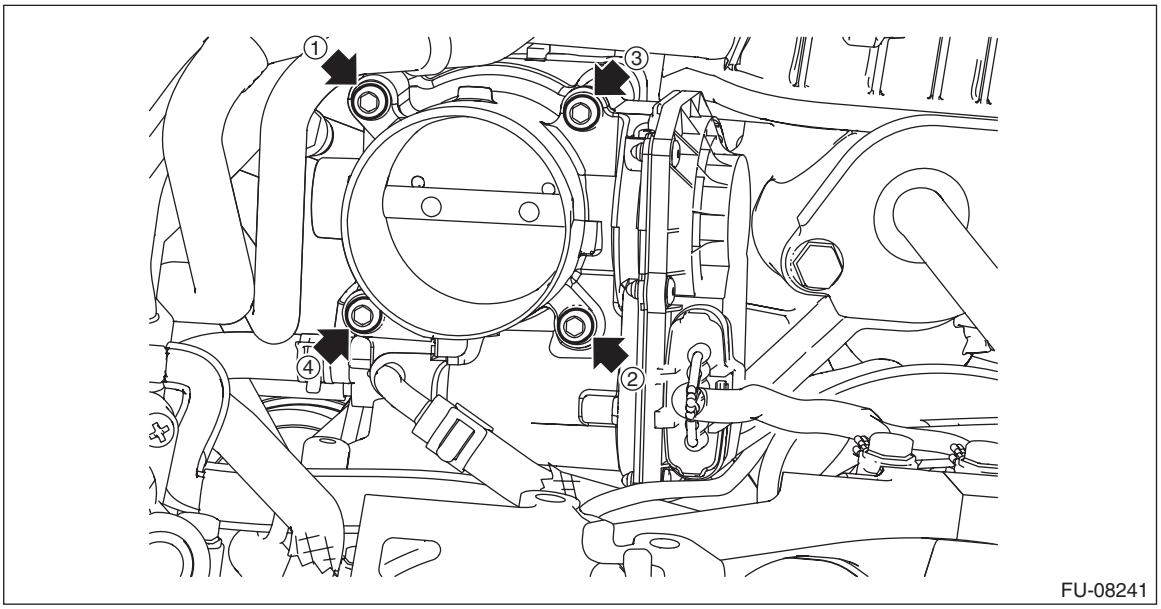
Install in the reverse order of removal.

NOTE:
- Use a new gasket.
- Install it by aligning the protrusion of the gasket with the groove of the throttle chamber duct or the intake manifold.



(a) Gasket A protrusion
(b) Throttle chamber duct groove
(c) Gasket B protrusion
(d) Intake manifold groove

• Tighten with the specified torque in the numerical sequence as shown in the figure, and further tighten with the specified torque in the numerical sequence as shown in the figure.



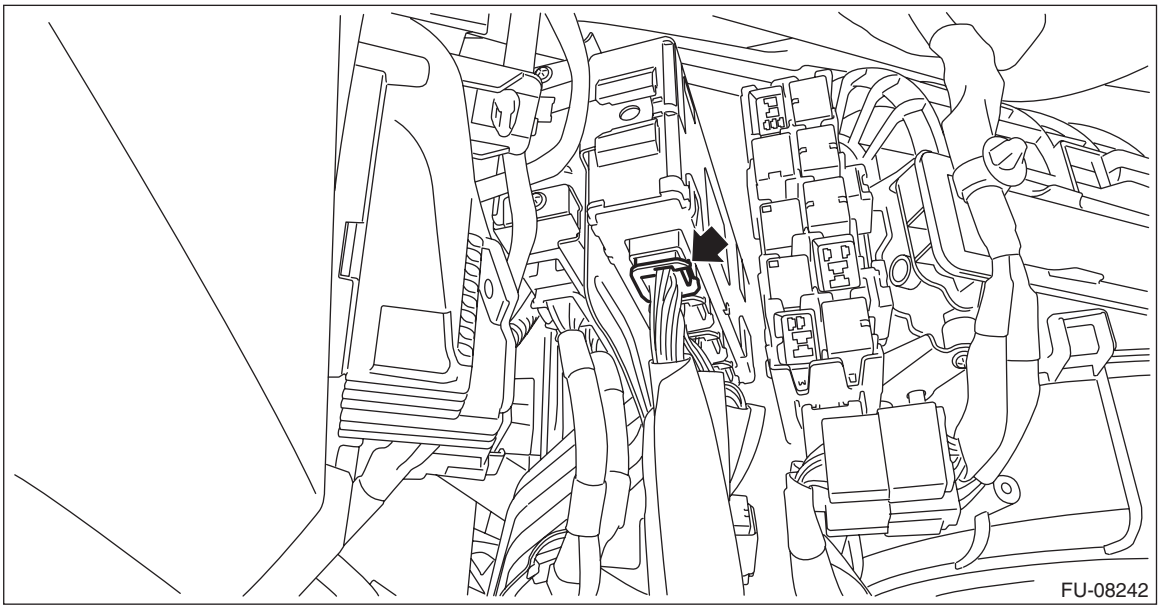
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

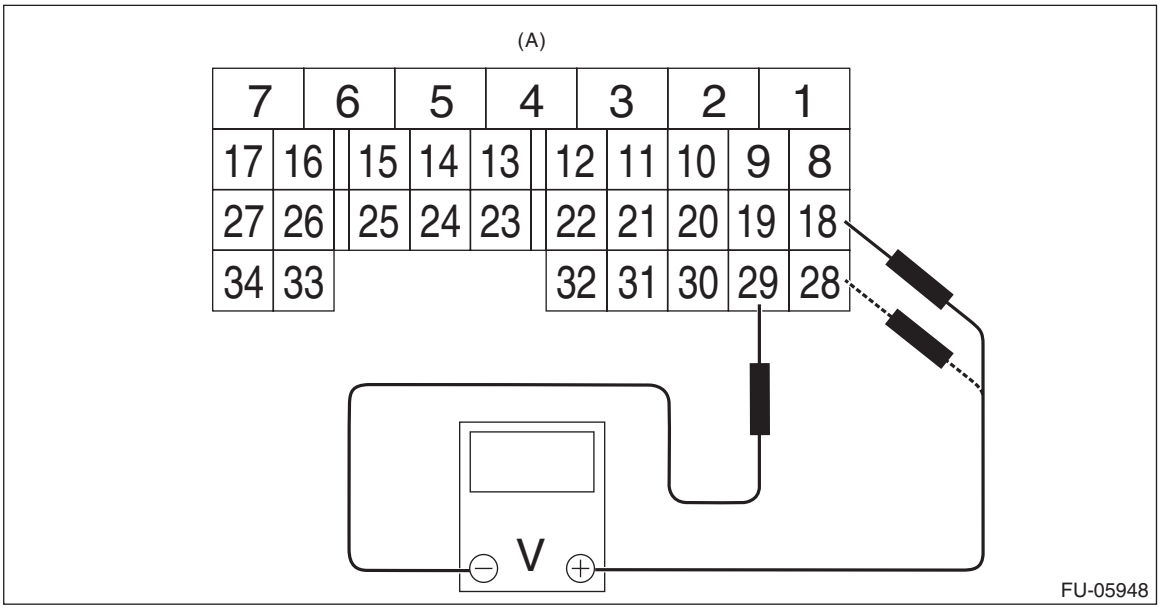
C: INSPECTION

1. THROTTLE SENSOR (METHOD WITH CIRCUIT TESTER)

1) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
2) After warming-up the engine, turn the ignition switch to OFF.
3) Turn the ignition switch to ON. (engine OFF)

4) Measure the voltage between ECM connector terminals.





(A) To ECM connector

Throttle sensor	Accelerator pedal	Terminal No.	Standard
Main	Not depressed (full closed)	18 (+) and 29 (–)	Approx. 0.6 V
	Depressed (full opened)		Approx. 4.0 V
Sub	Not depressed (full closed)	28 (+) and 29 (–)	Approx. 1.5 V
	Depressed (full opened)		Approx. 4.2 V

5) After inspection, install the related parts in the reverse order of removal.

2. THROTTLE SENSOR (METHOD WITH SUBARU SELECT MONITOR)

1) After warming-up the engine, turn the ignition switch to OFF.
2) Turn the ignition switch to ON. (engine OFF)
3) Read the throttle opening angle signal and voltage of throttle sensor using Subaru Select Monitor. <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>

Throttle sensor	Throttle opening angle signal	Standard
Main	0.0%	Approx. 0.6 V
	100.0%	Approx. 4.0 V
Sub	0.0%	Approx. 1.5 V
	100.0%	Approx. 4.2 V

3. OTHER INSPECTIONS

1) Check that the throttle body has no deformation, cracks or other damages.
2) Check that the preheater hose has no cracks, damage or loose part.

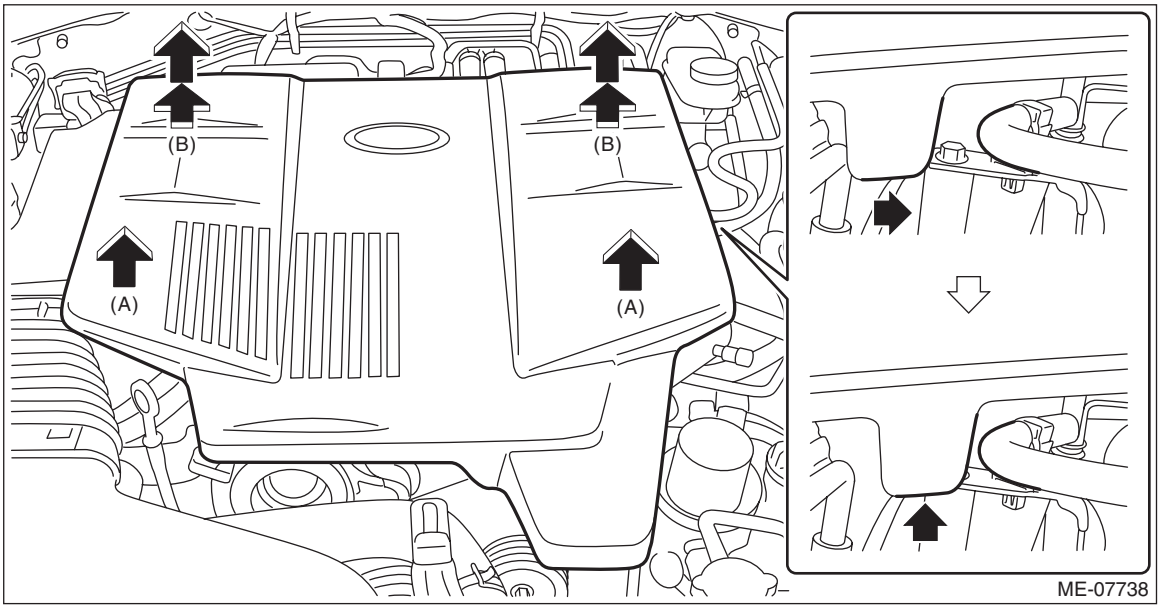
3. Intake Manifold

A: REMOVAL

1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

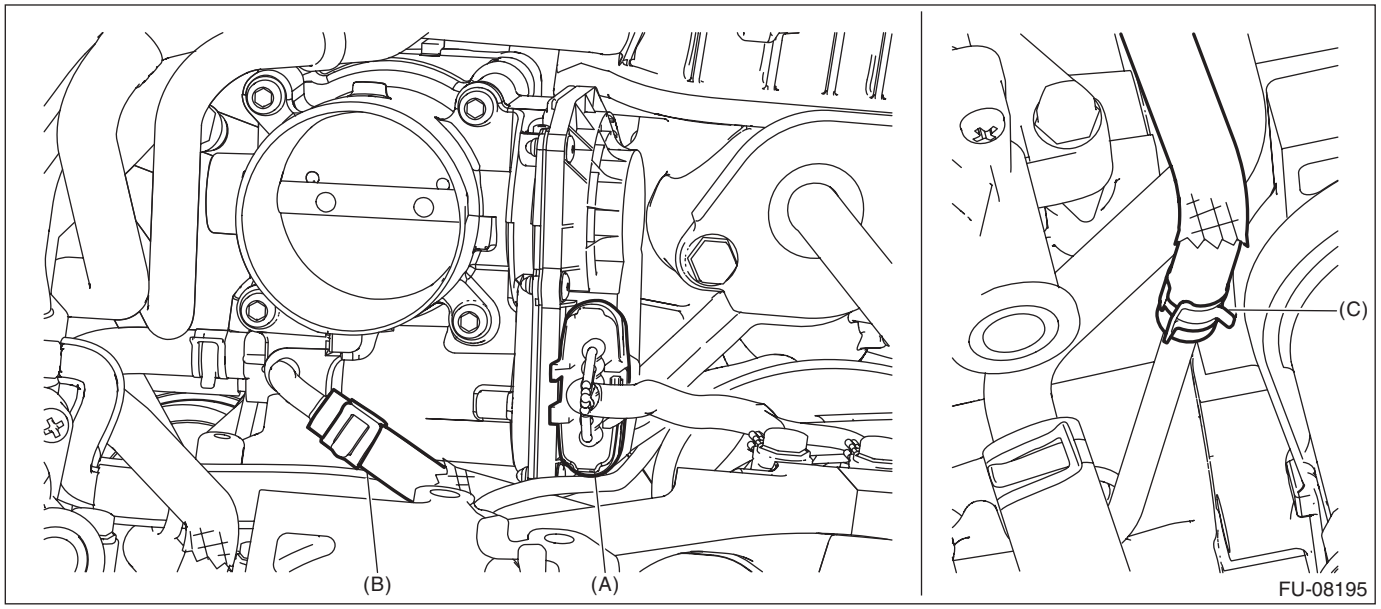
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



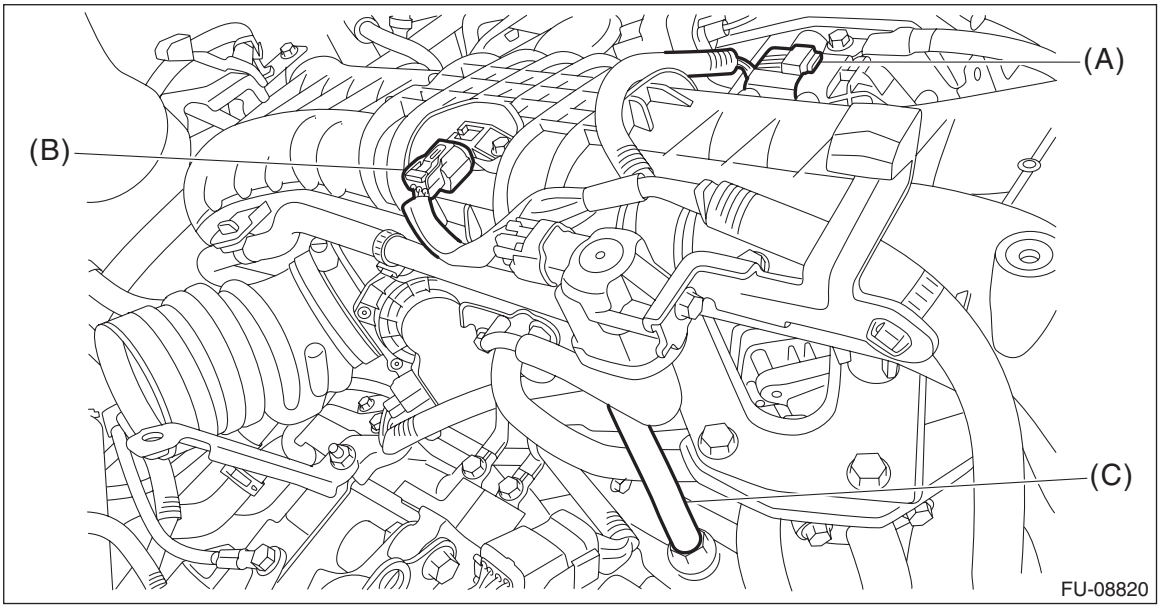
4) Open the fuel filler lid and remove the fuel filler cap.

NOTE:
This operation is required to release the inner pressure of the fuel tank.
5) Lift up the vehicle.
6) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
7) Drain approximately 3.0 L (3.2 US qt, 2.6 Imp qt) of coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
8) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
9) Remove the air intake boot No. 2. <Ref. to IN(H4DO(HEV))-11, AIR INTAKE BOOT NO. 2, REMOVAL, Air Intake Boot.>
10) Disconnect the connectors (A) from the throttle position sensor.
11) Disconnect the preheater hose (B) from the throttle body.

12) Disconnect the preheater hose (C) from the water pipe assembly LH.

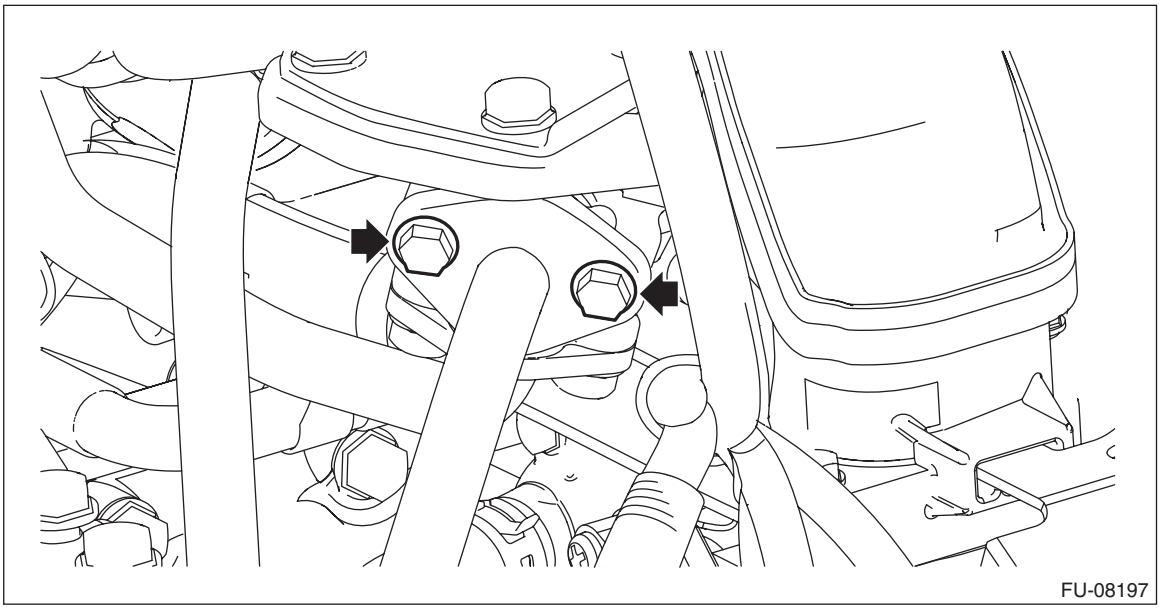


13) Disconnect the connector (A) from ISG.
14) Disconnect the connector (B) from manifold absolute pressure sensor.
15) Disconnect the PCV hose (C) from the PCV valve.

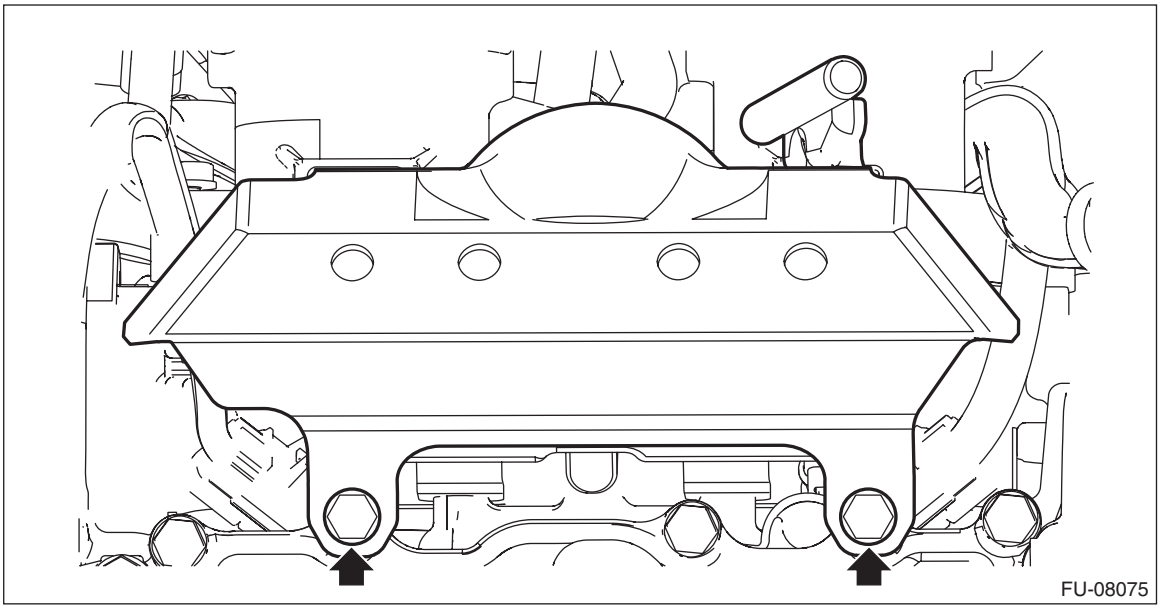


16) Remove the purge control solenoid valve. <Ref. to EC(H4DO(HEV))-22, REMOVAL, Purge Control Solenoid Valve.>

17) Remove the bolts securing the EGR cooler to the EGR control valve.



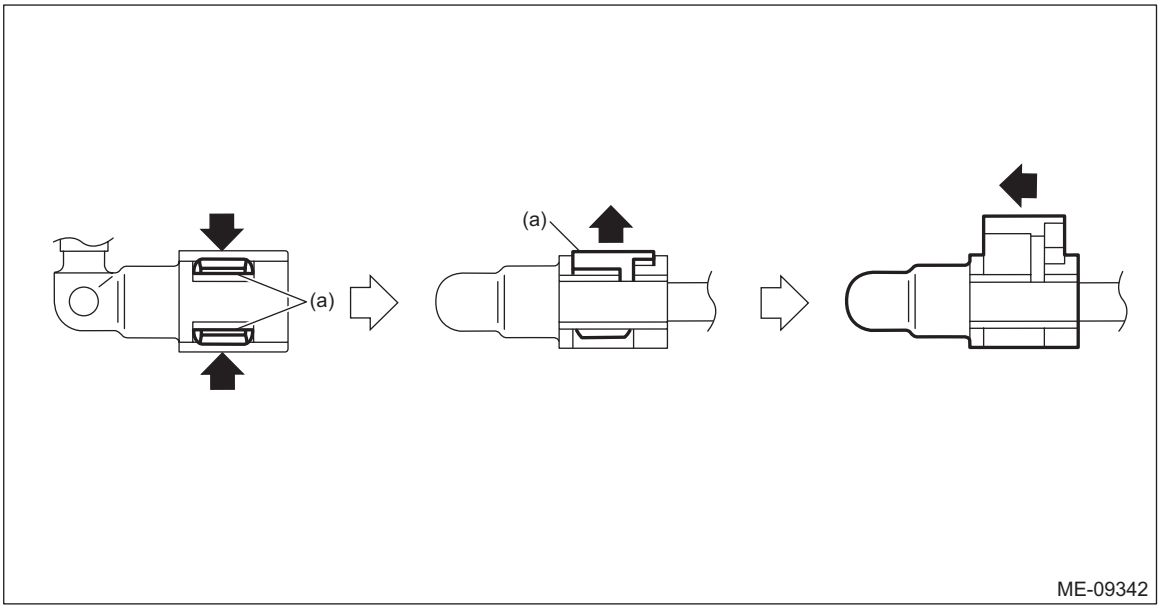
18) Remove the intake manifold protector RH.



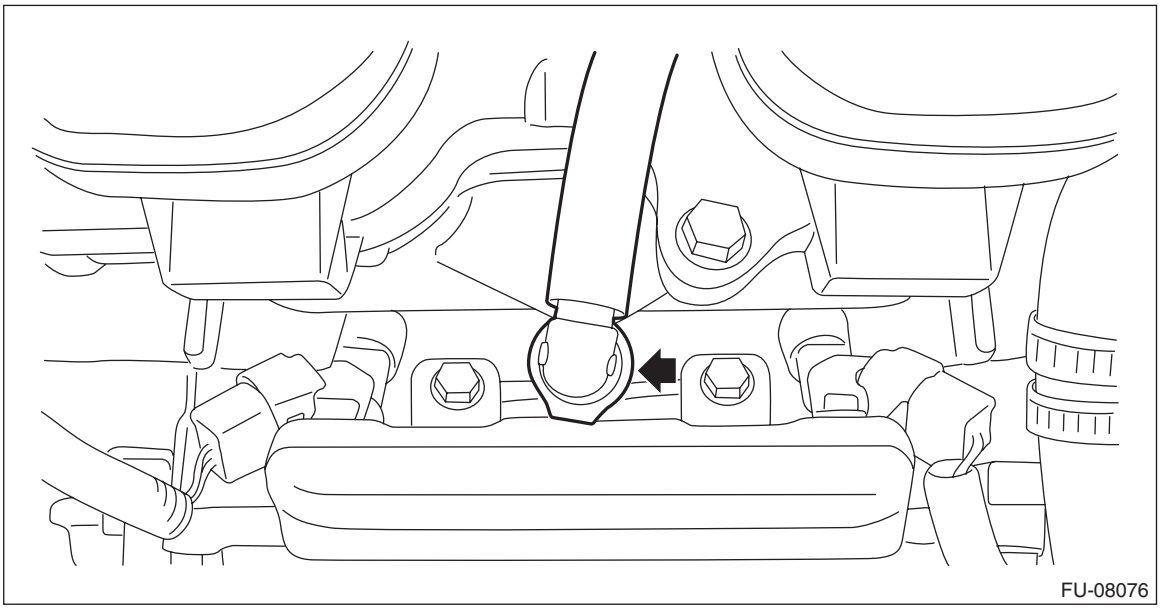
19) Disconnect the fuel delivery pipe from the fuel pipe RH.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the pipes using a container or cloth.**

NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



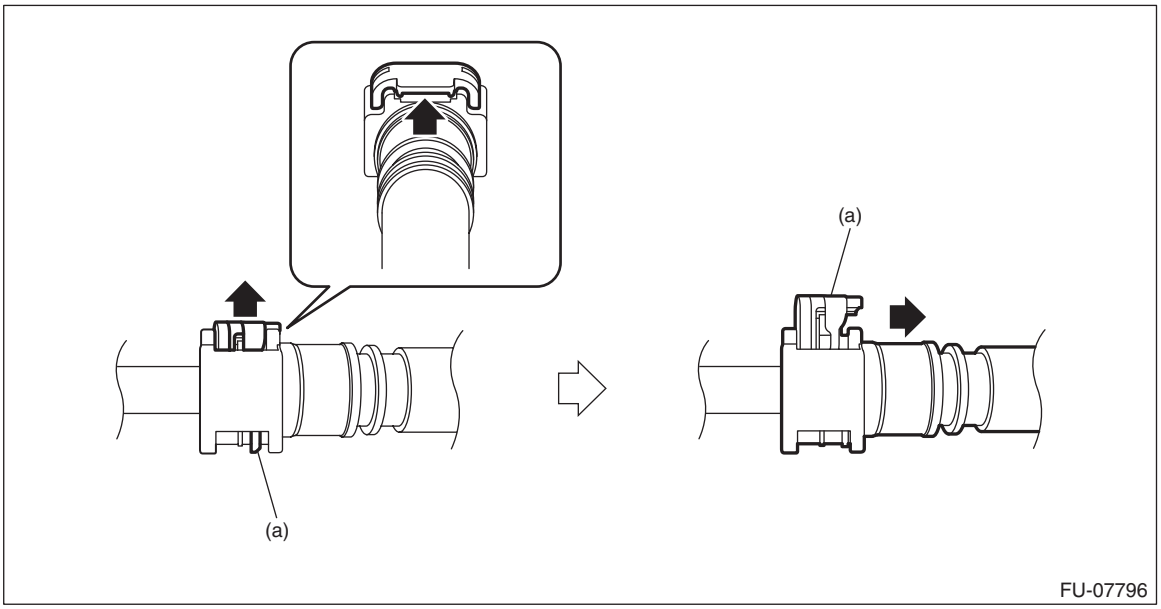
20) Remove the intake manifold protector LH in the same manner, and disconnect the fuel delivery pipe from the fuel pipe LH.

21) Disconnect the fuel delivery tube and evaporation hose.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

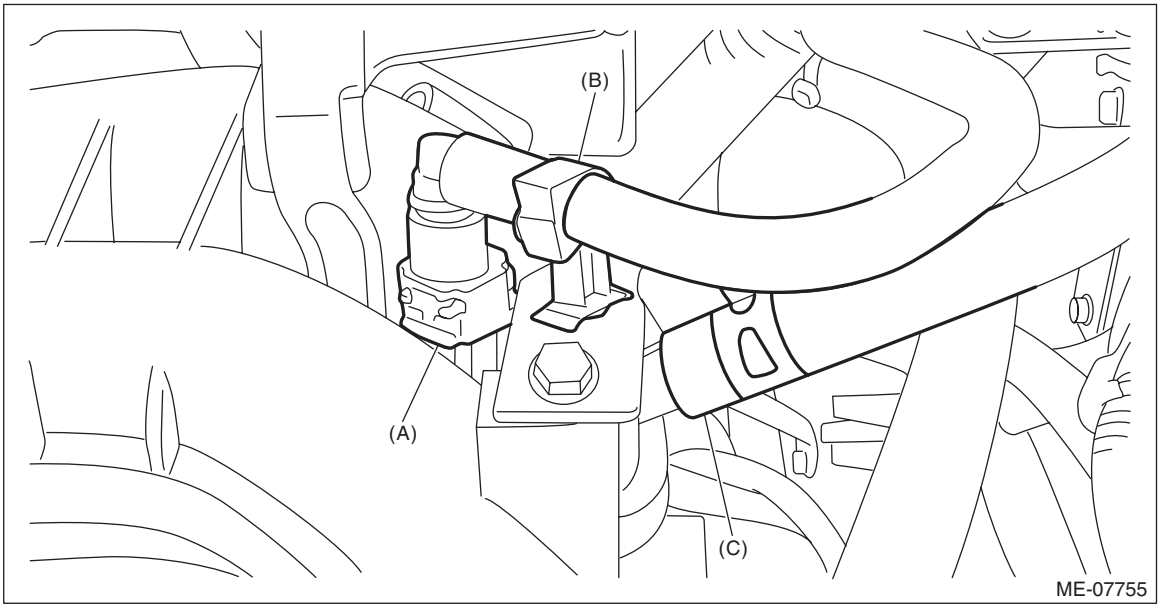
(1) Disconnect the quick connector (A) of the fuel delivery tube from the fuel pipe assembly, and remove the clip (B) securing the fuel delivery tube.

NOTE:
Disconnect the quick connector as shown in the figure.

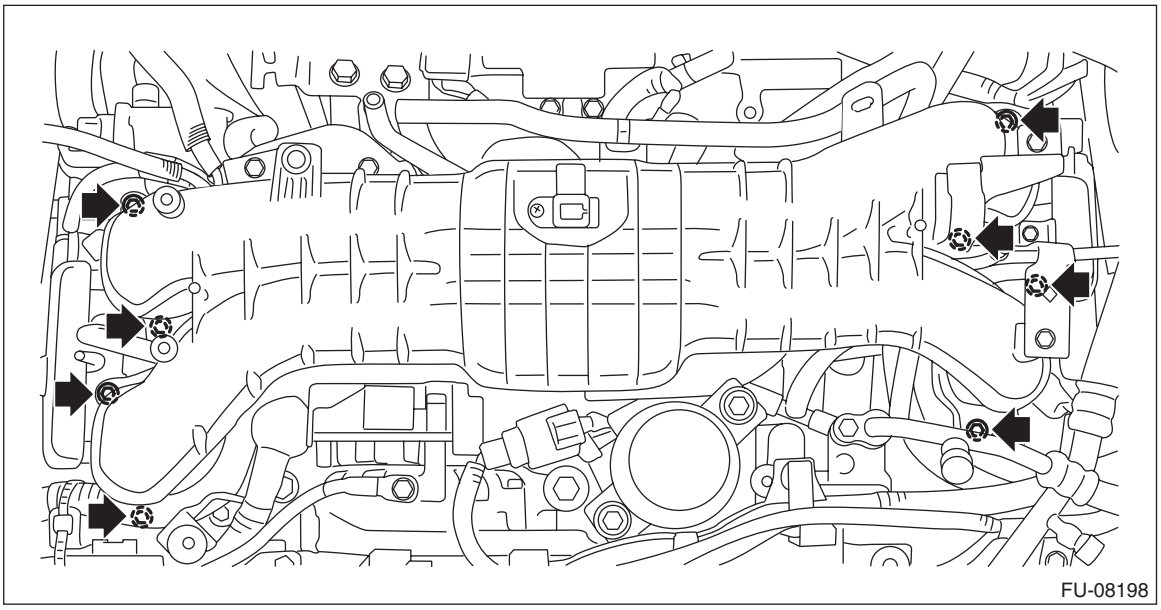


(a) Slider

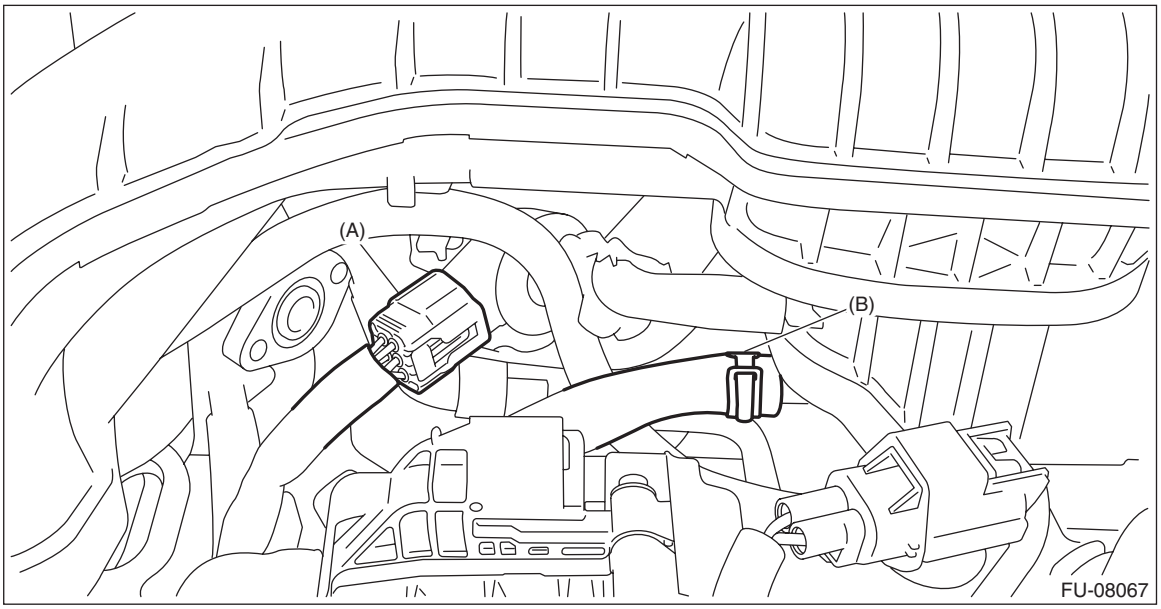
(2) Disconnect the evaporation hose (C) from the fuel pipe assembly.



22) Remove the bolts which hold the intake manifold to the tumble generator valve assembly.

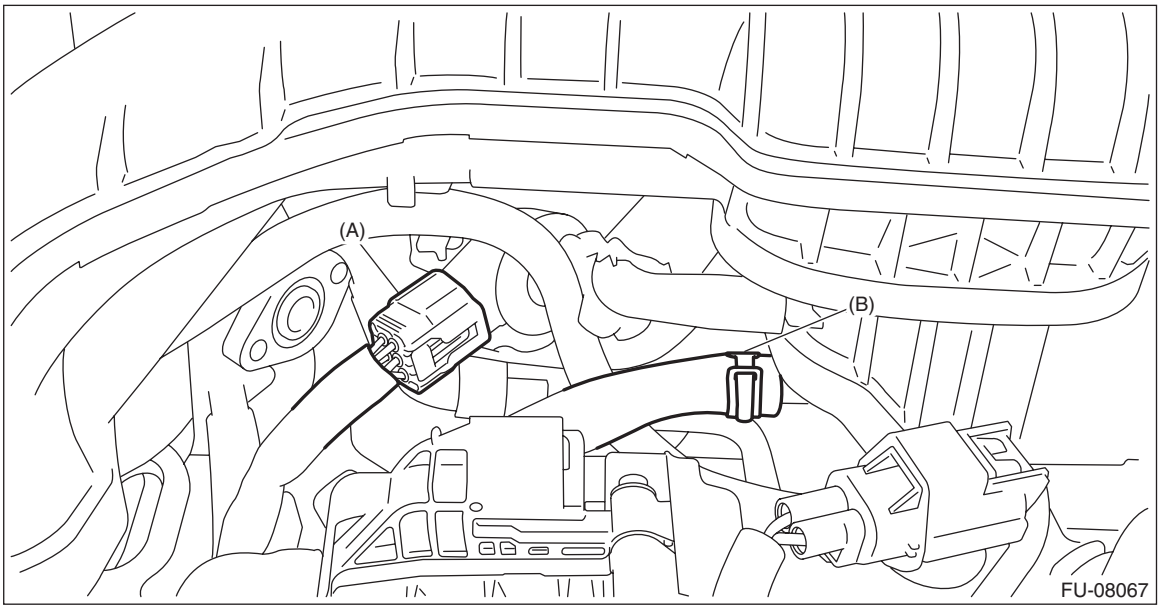


23) Lift the intake manifold, and disconnect the connector (A) from the EGR control valve.
24) Disconnect the brake vacuum hose (B) from the intake manifold, and remove the intake manifold.



B: INSTALLATION

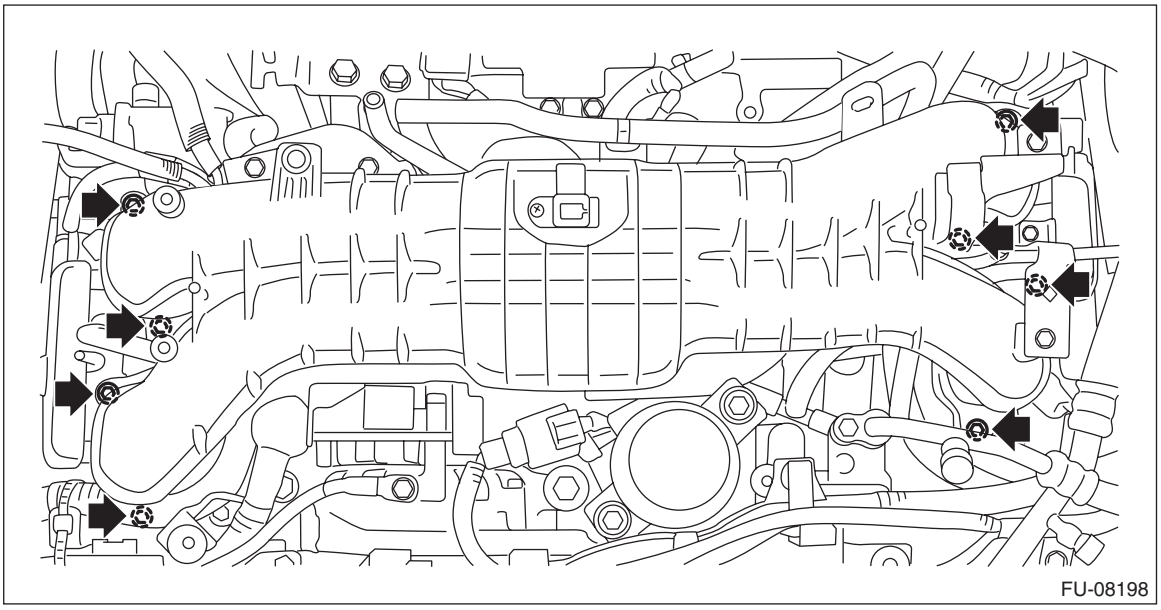
1) Connect the connector (A) to the EGR control valve, and connect the brake vacuum hose (B) to the intake manifold.



2) Install the intake manifold to the tumble generator valve assembly.

NOTE:
Use a new gasket.

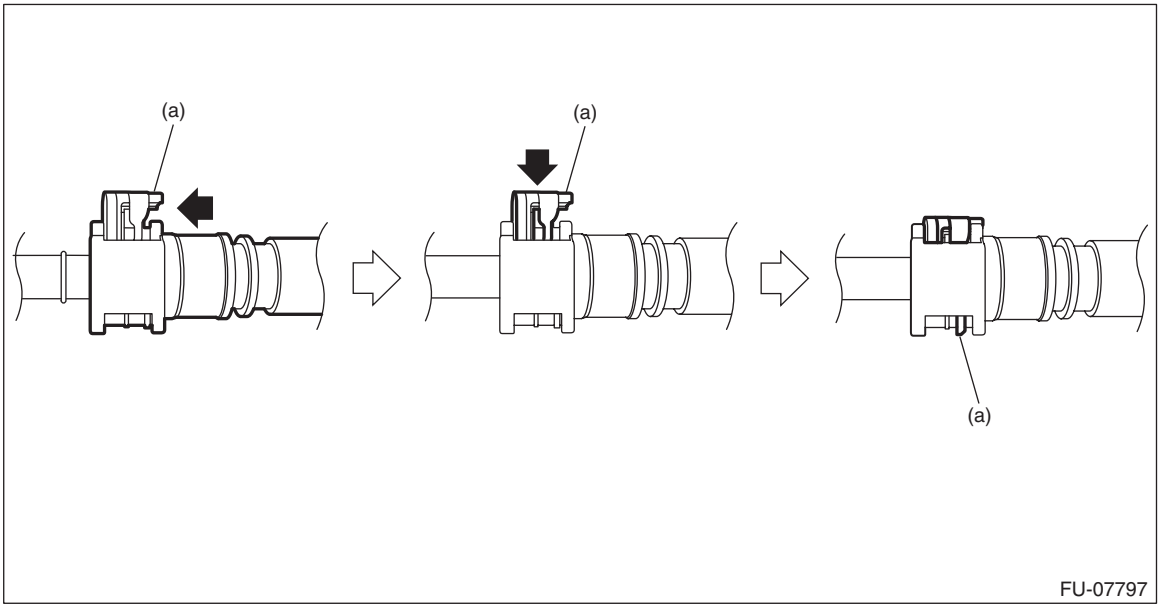
Tightening torque:
8.3 N·m (0.8 kgf-m, 6.1 ft-lb)



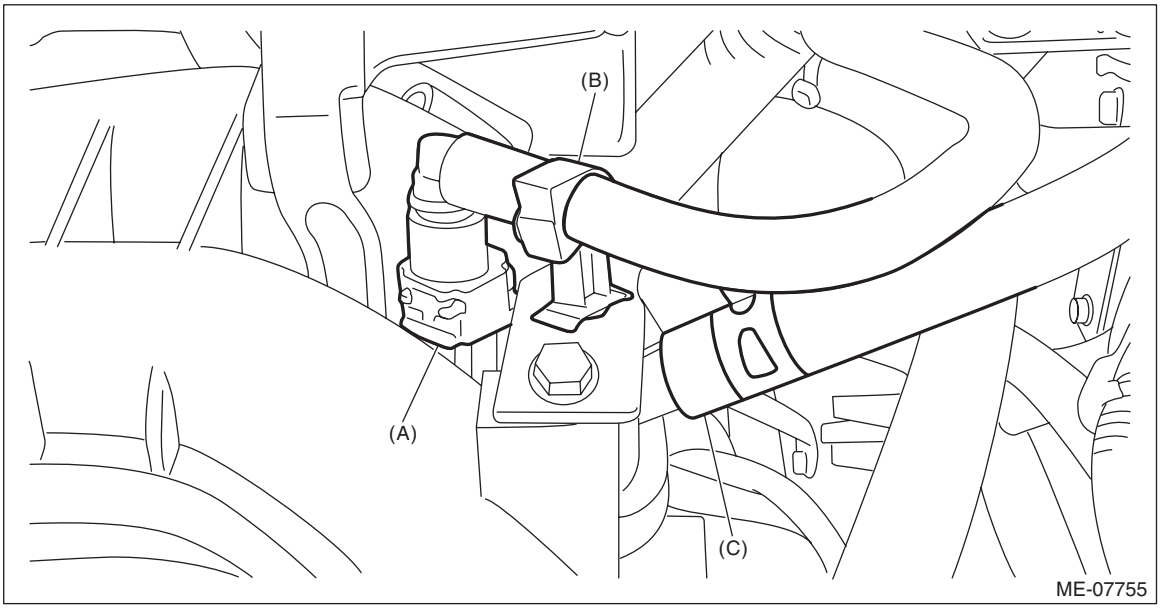
3) Connect the fuel delivery tube and evaporation hose.
   (1) Connect the evaporation hose (C) to the fuel pipe assembly.
   (2) Connect the quick connector (A) of the fuel delivery tube to the fuel pipe assembly, and secure the fuel delivery tube using clip (B).

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.



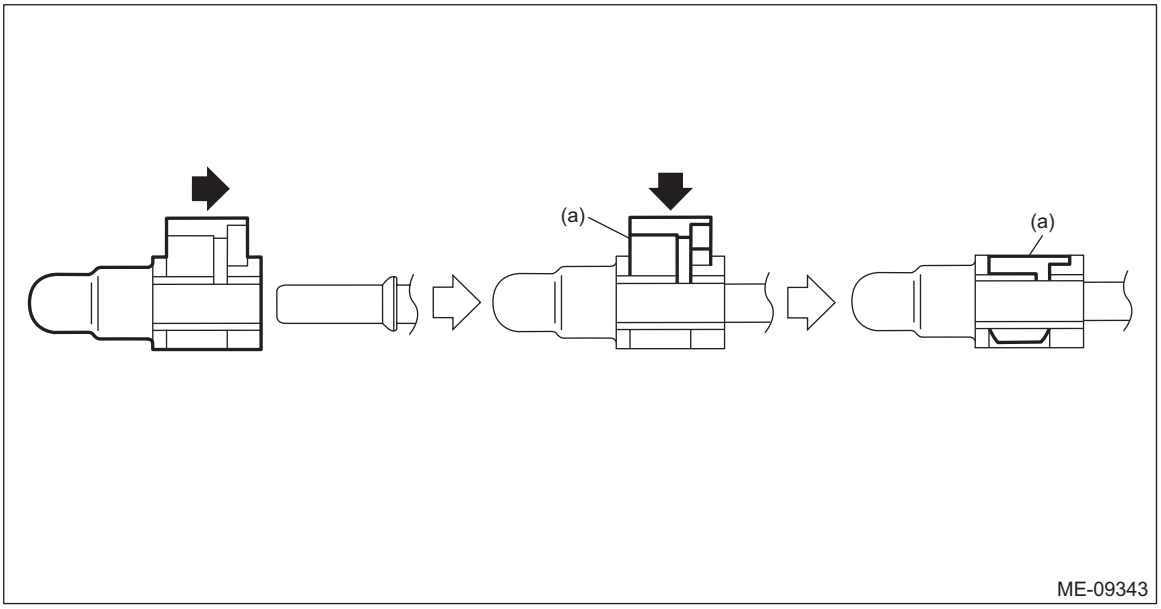
(a) Slider



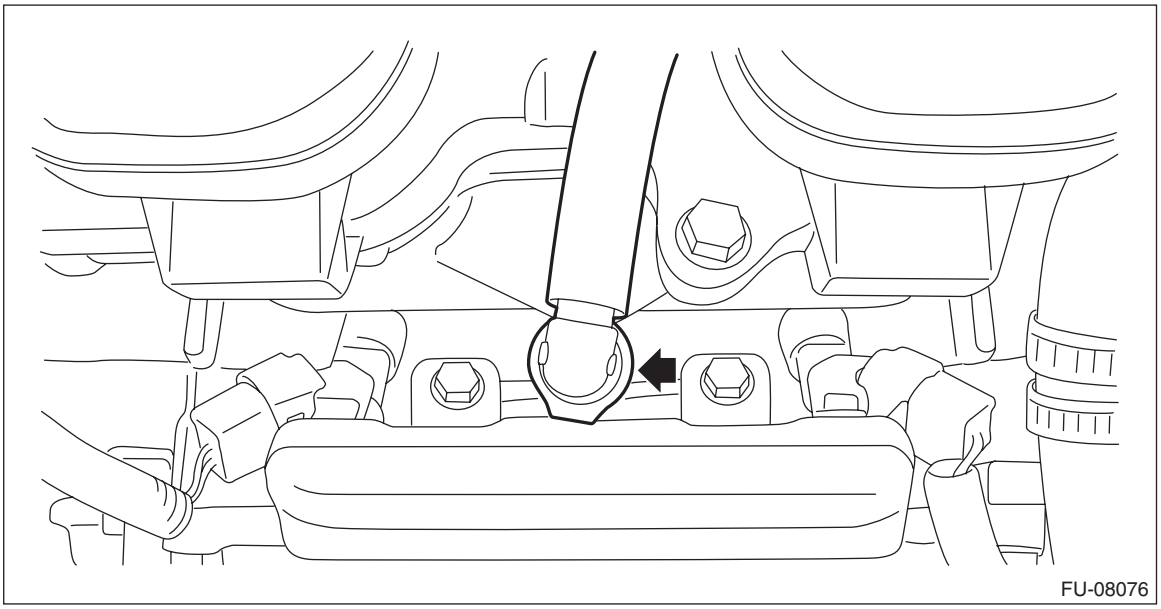
4) Connect the fuel delivery pipe to the fuel pipe RH.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.

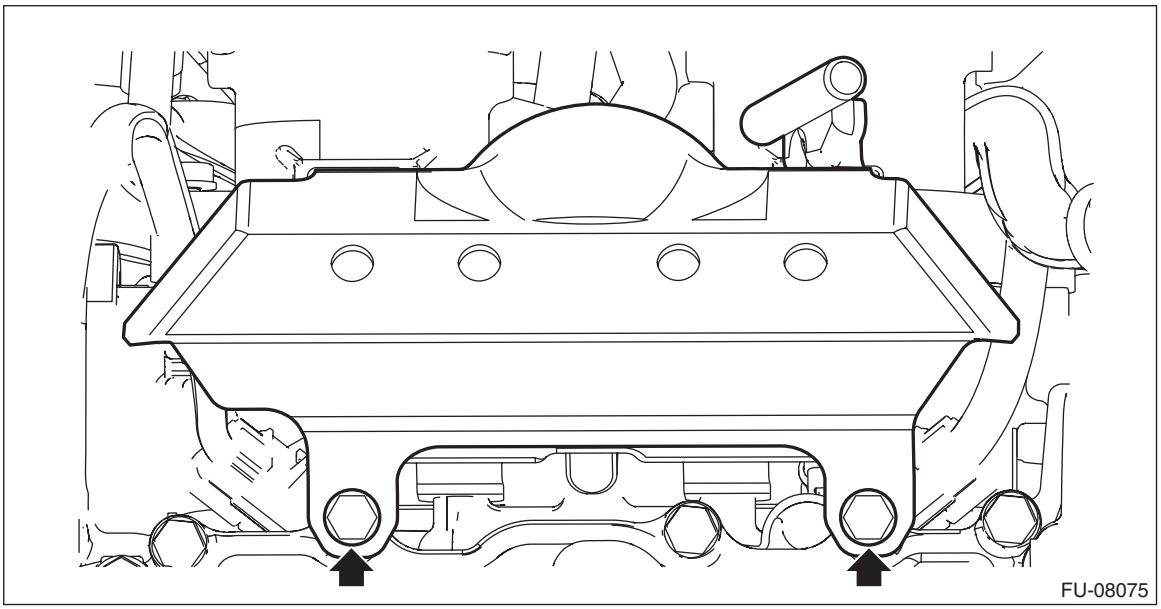


(a) Slider



5) Install the intake manifold protector RH.

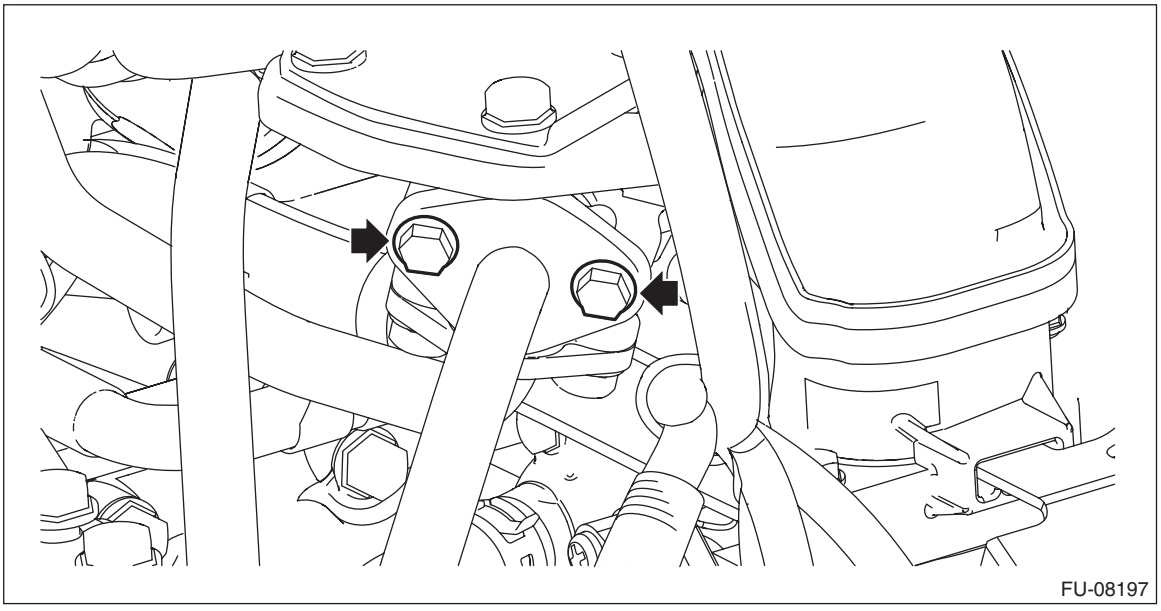
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



6) Connect the fuel delivery pipe to the fuel pipe LH in the same manner, and install the intake manifold protector LH.
7) Tighten the bolt securing the EGR cooler to the EGR control valve.

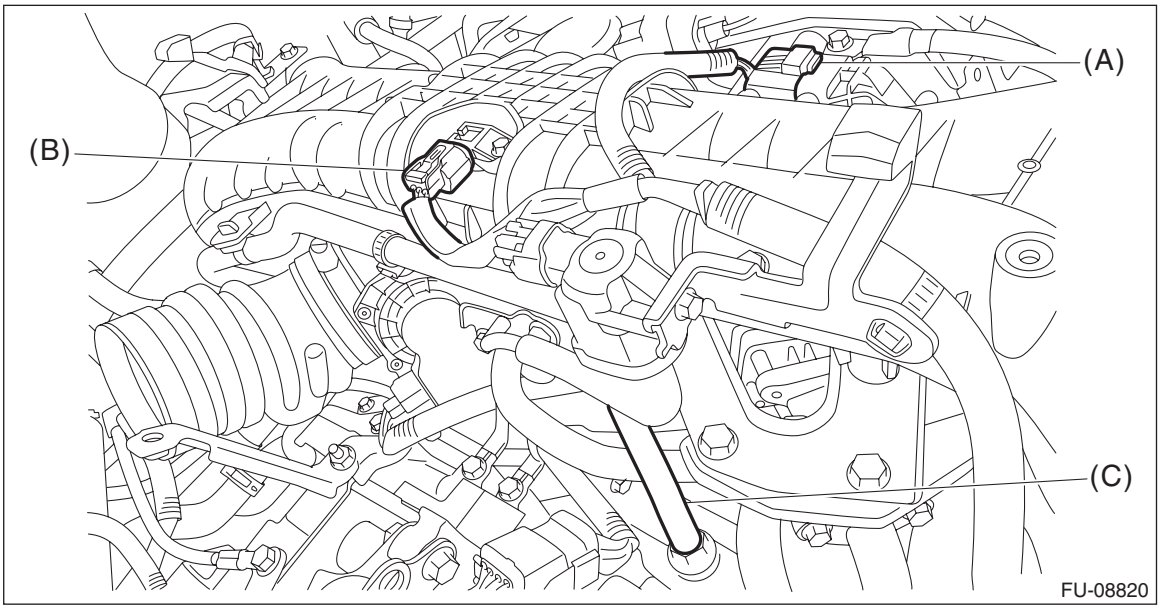
NOTE:
Use a new gasket.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

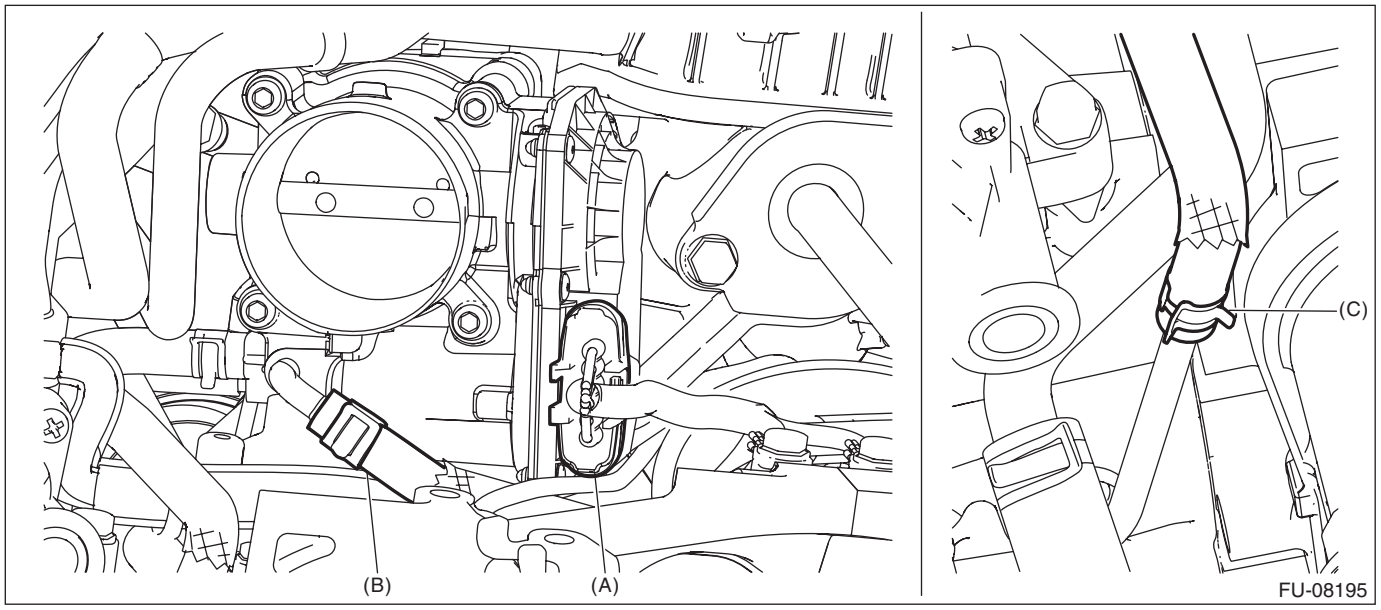


8) Install the purge control solenoid valve. <Ref. to EC(H4DO(HEV))-23, INSTALLATION, Purge Control Solenoid Valve.>
9) Connect the connector (A) to ISG.
10) Connect the connector (B) to the manifold absolute pressure sensor.

11) Install the PCV hose (C) to the PCV valve.



12) Connect the connector (A) to the throttle position sensor.
13) Connect the preheater hoses (B) to the throttle body.
14) Connect the preheater hose (C) to the water pipe assembly LH.

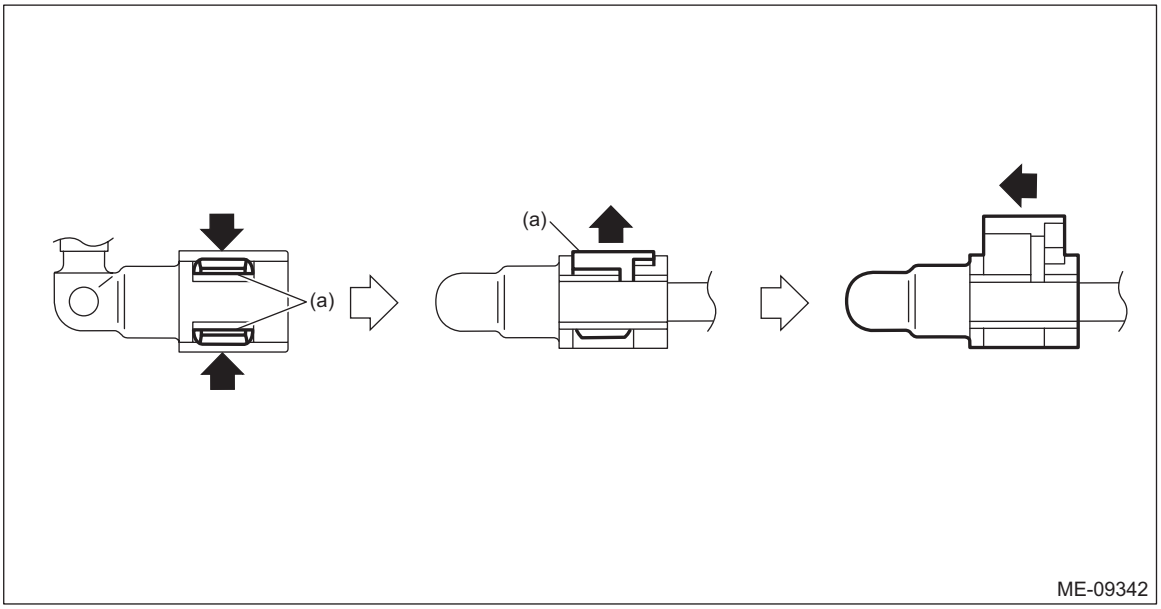


15) Install the air intake boot No. 2. <Ref. to IN(H4DO(HEV))-14, AIR INTAKE BOOT NO. 2, INSTALLATION, Air Intake Boot.>
16) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
17) Lift up the vehicle.
18) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
19) Lower the vehicle.
20) Install the collector cover.
21) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
22) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

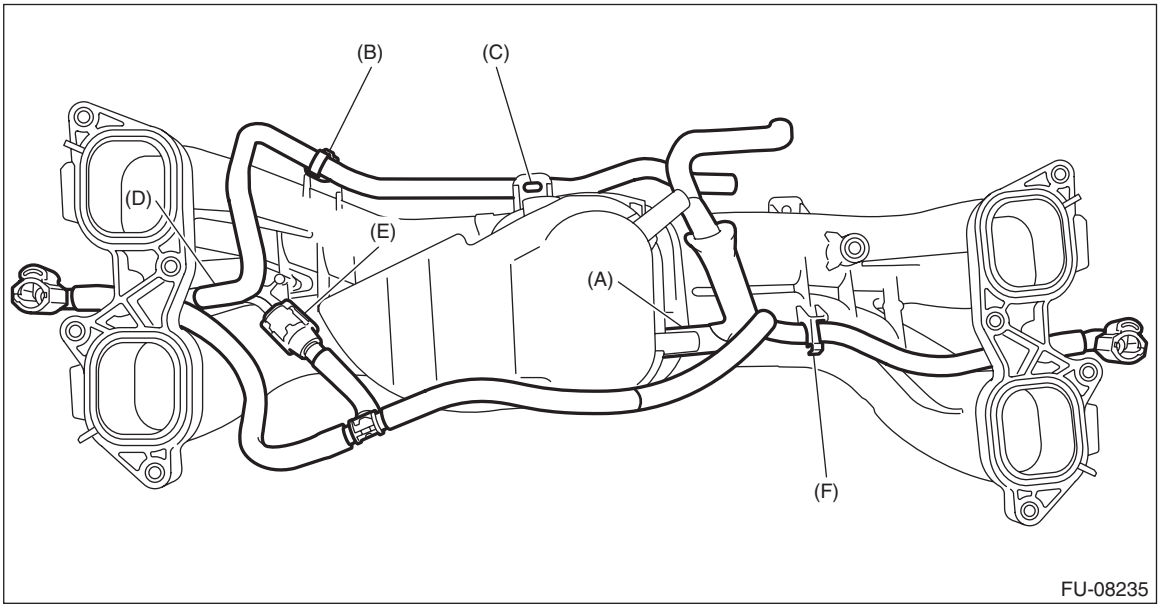
C: DISASSEMBLY

1) Remove the throttle body. <Ref. to FU(H4DO(HEV))-15, REMOVAL, Throttle Body.>
2) Remove the manifold absolute pressure sensor. <Ref. to FU(H4DO(HEV))-67, REMOVAL, Manifold Absolute Pressure Sensor.>
3) Remove the EGR pipe and the EGR control valve. <Ref. to EC(H4DO(HEV))-29, REMOVAL, EGR Pipe.> <Ref. to EC(H4DO(HEV))-27, REMOVAL, EGR Control Valve.>
4) Remove the PCV hose A. <Ref. to EC(H4DO(HEV))-51, REMOVAL, PCV Hose.>
5) Remove the vacuum hose (A) from the intake manifold.
6) Remove the clip (B) and the clip (C) securing the vacuum hose to the intake manifold, and remove the vacuum hose (D).
7) Disconnect the quick connector of the fuel delivery pipe (E) from the fuel pipe assembly, and remove the fuel delivery pipe (E) from the clip (F).

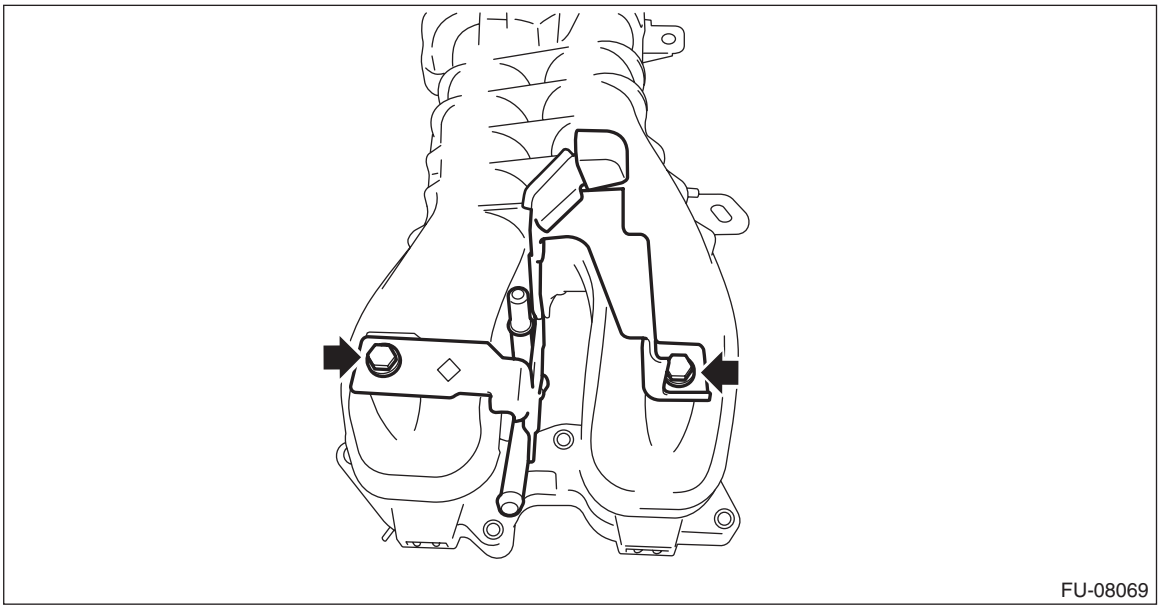
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



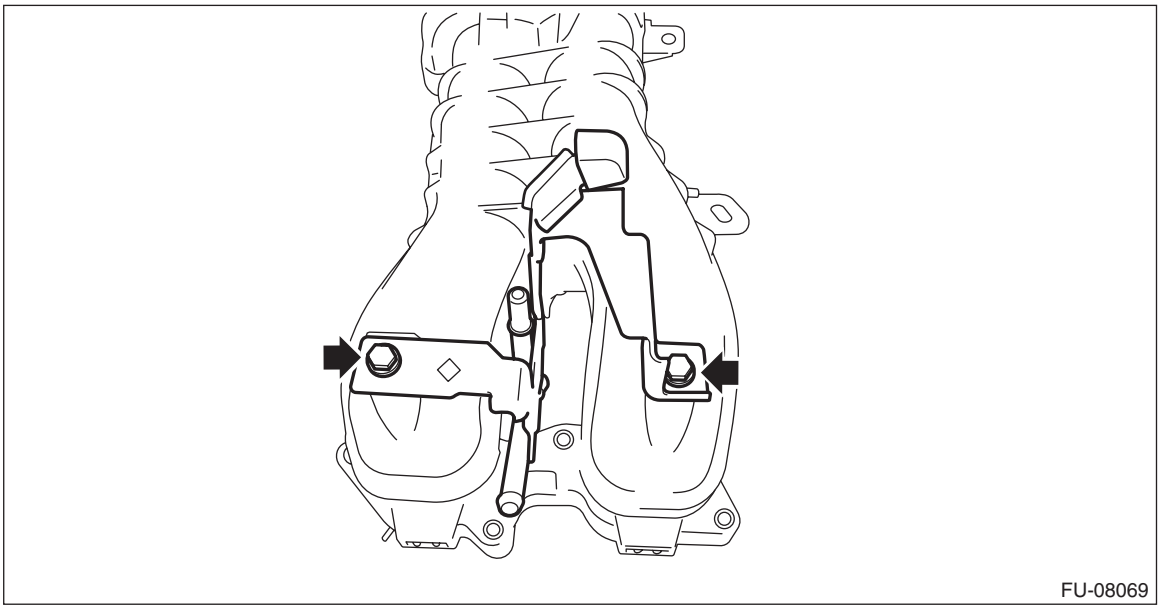
8) Remove the fuel pipe assembly from the intake manifold.



D: ASSEMBLY

1) Install the fuel pipe assembly to the intake manifold.

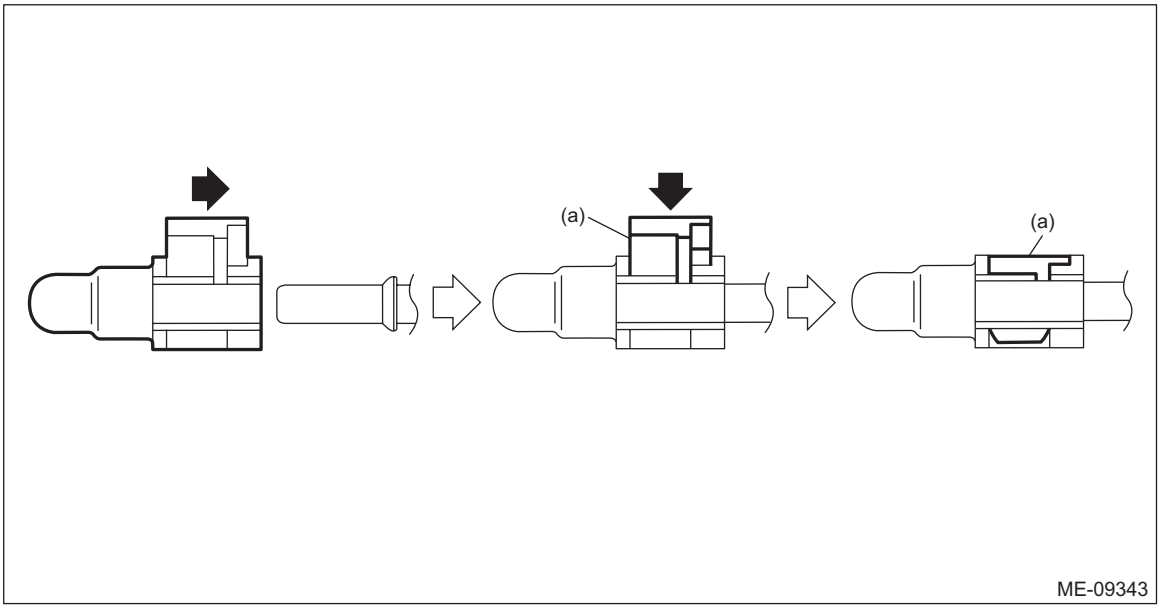
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



2) Install the fuel delivery pipe (E) to the clip (F), and connect the quick connector of the fuel delivery pipe (E) to the fuel pipe assembly.

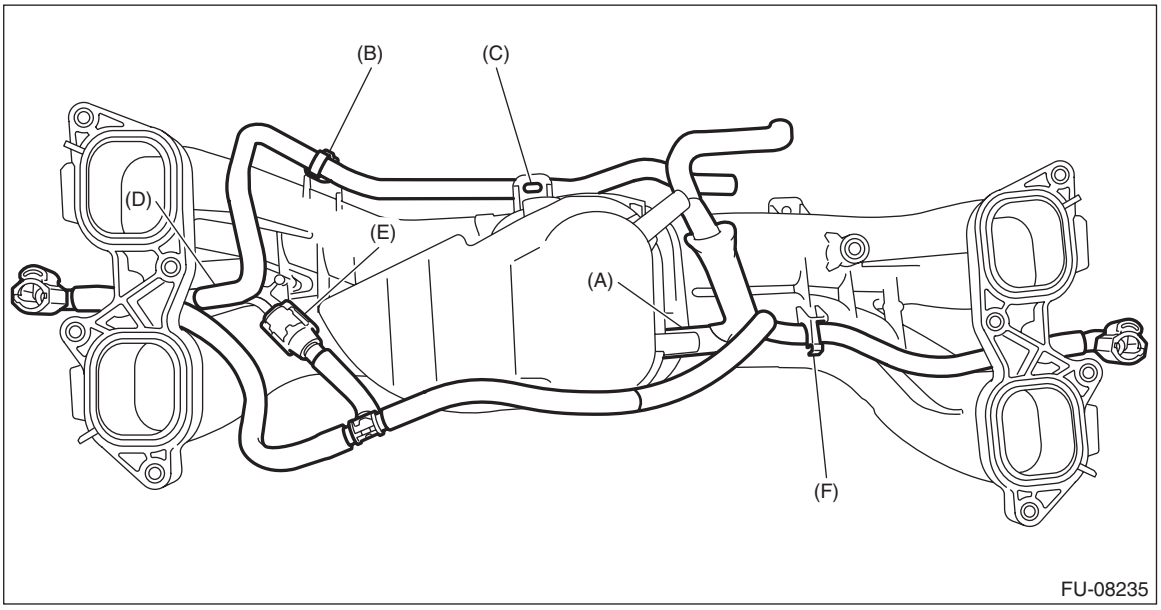
CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.



(a) Slider

3) Install the clip (B) and the clip (C) securing the vacuum hose to the intake manifold, and connect the vacuum hose (D).
4) Connect the vacuum hose (A) to the intake manifold.



5) Install the PCV hose A. <Ref. to EC(H4DO(HEV))-52, INSTALLATION, PCV Hose.>
6) Install the EGR pipe and the EGR control valve. <Ref. to EC(H4DO(HEV))-30, INSTALLATION, EGR Pipe.> <Ref. to EC(H4DO(HEV))-28, INSTALLATION, EGR Control Valve.>
7) Install the manifold absolute pressure sensor. <Ref. to FU(H4DO(HEV))-68, INSTALLATION, Manifold Absolute Pressure Sensor.>
8) Install the throttle body. <Ref. to FU(H4DO(HEV))-16, INSTALLATION, Throttle Body.>

E: INSPECTION

1) Check that the intake manifold, fuel pipe assembly and fuel delivery pipe have no deformation, cracks and other damages.
2) Check that the hose has no cracks, damage or loose part.

4. Engine Wiring Harness

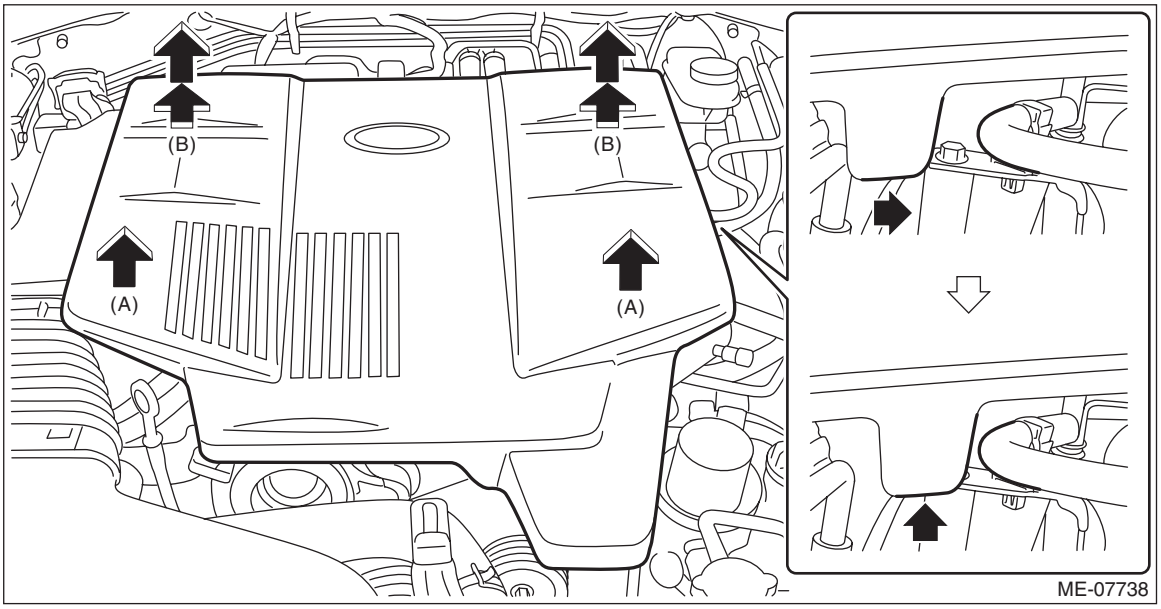
A: REMOVAL

1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

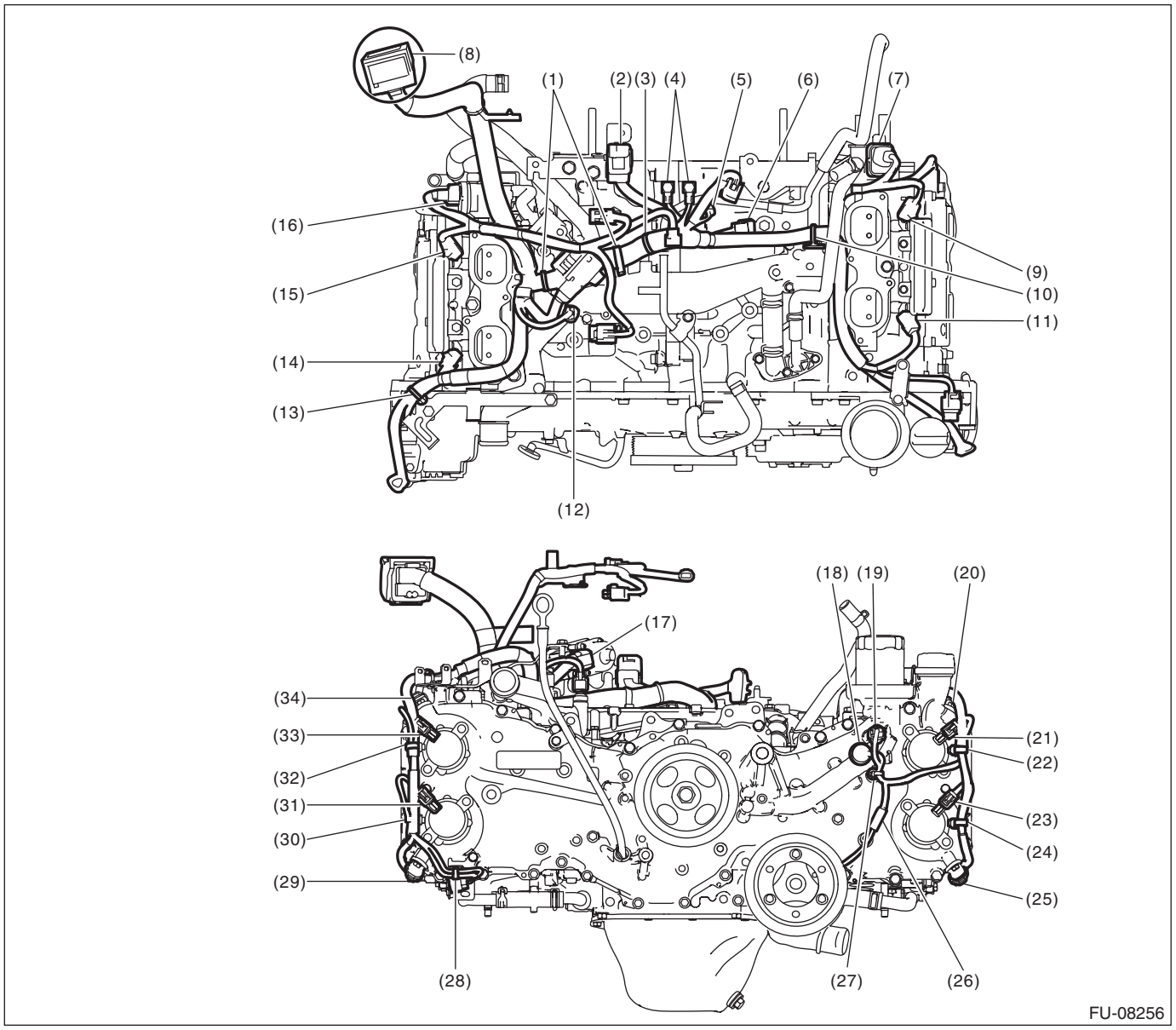
3) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



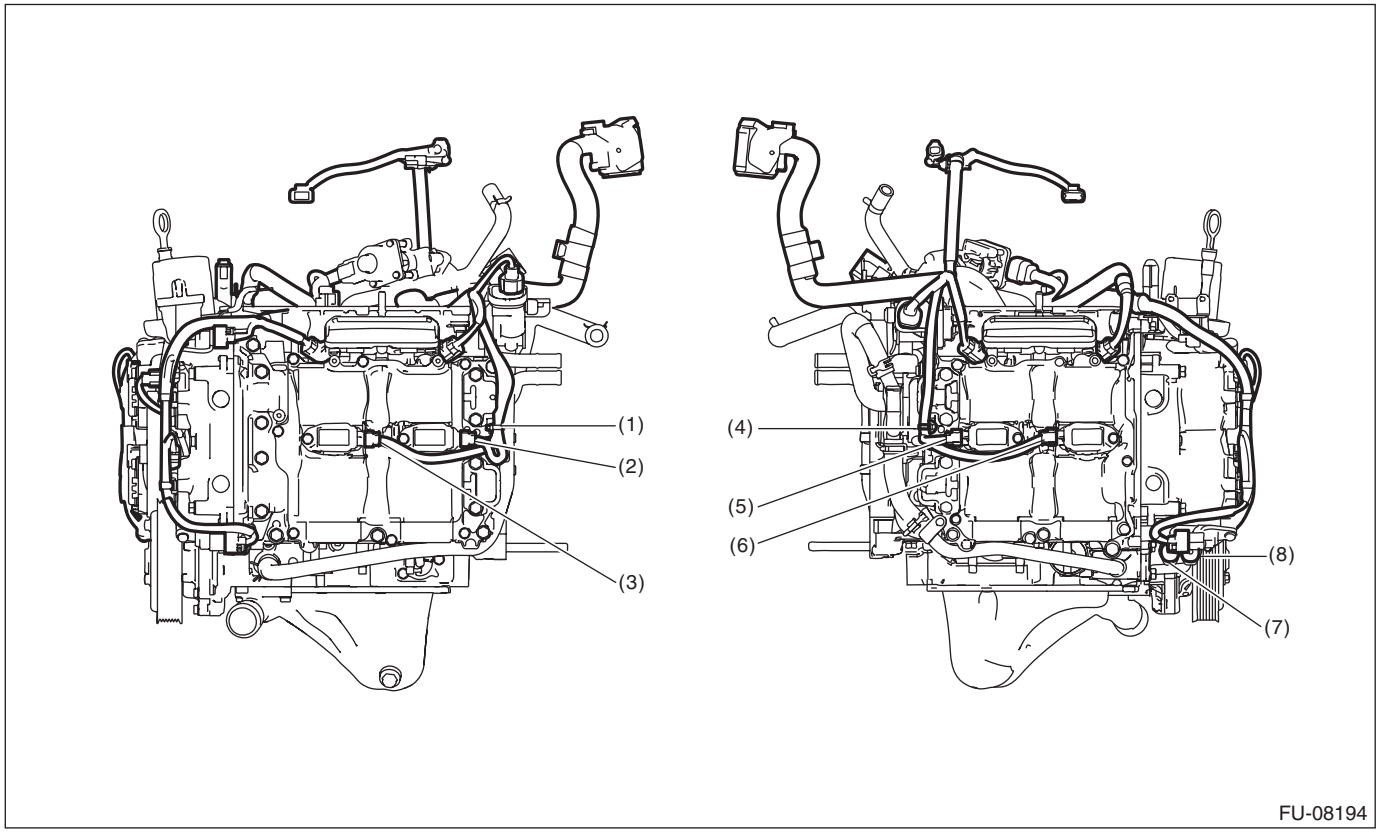
4) Remove the intake manifold. <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
5) Disconnect the connector from the engine, and then remove the engine wiring harness.

- Structural diagram 1



(1) Remove the clip from the screw hole.
(2) Engine harness connector (16P)
(3) Remove the clip from the brake pipe bracket.
(4) Engine ground (2 locations)
(5) Crankshaft position sensor
(6) Knock sensor
(7) Tumble generator valve actuator LH
(8) Engine harness connector (54P)
(9) Fuel injector (#4)
(10) Remove the clip from the hole of the water pipe assembly.
(11) Fuel injector (#2)
(12) Engine coolant temperature sensor
(13) Remove the clip from the bracket.
(14) Fuel injector (#1)
(15) Fuel injector (#3)
(16) Tumble generator valve actuator RH
(17) EGR control valve
(18) Oil pressure switch
(19) Engine oil temperature sensor
(20) Intake camshaft position sensor LH
(21) Intake oil control solenoid LH
(22) Remove the clip from the screw hole.
(23) Exhaust oil control solenoid LH
(24) Remove the clip from the screw hole.
(25) Exhaust camshaft position sensor LH
(26) Oil level switch connector
(27) Remove the clip from the screw hole.
(28) Remove the clip from the oval hole.
(29) Exhaust camshaft position sensor RH
(30) Remove the clip from the screw hole.
(31) Exhaust oil control solenoid RH
(32) Remove the clip from the screw hole.
(33) Intake oil control solenoid RH
(34) Intake camshaft position sensor RH

- Structural diagram 2

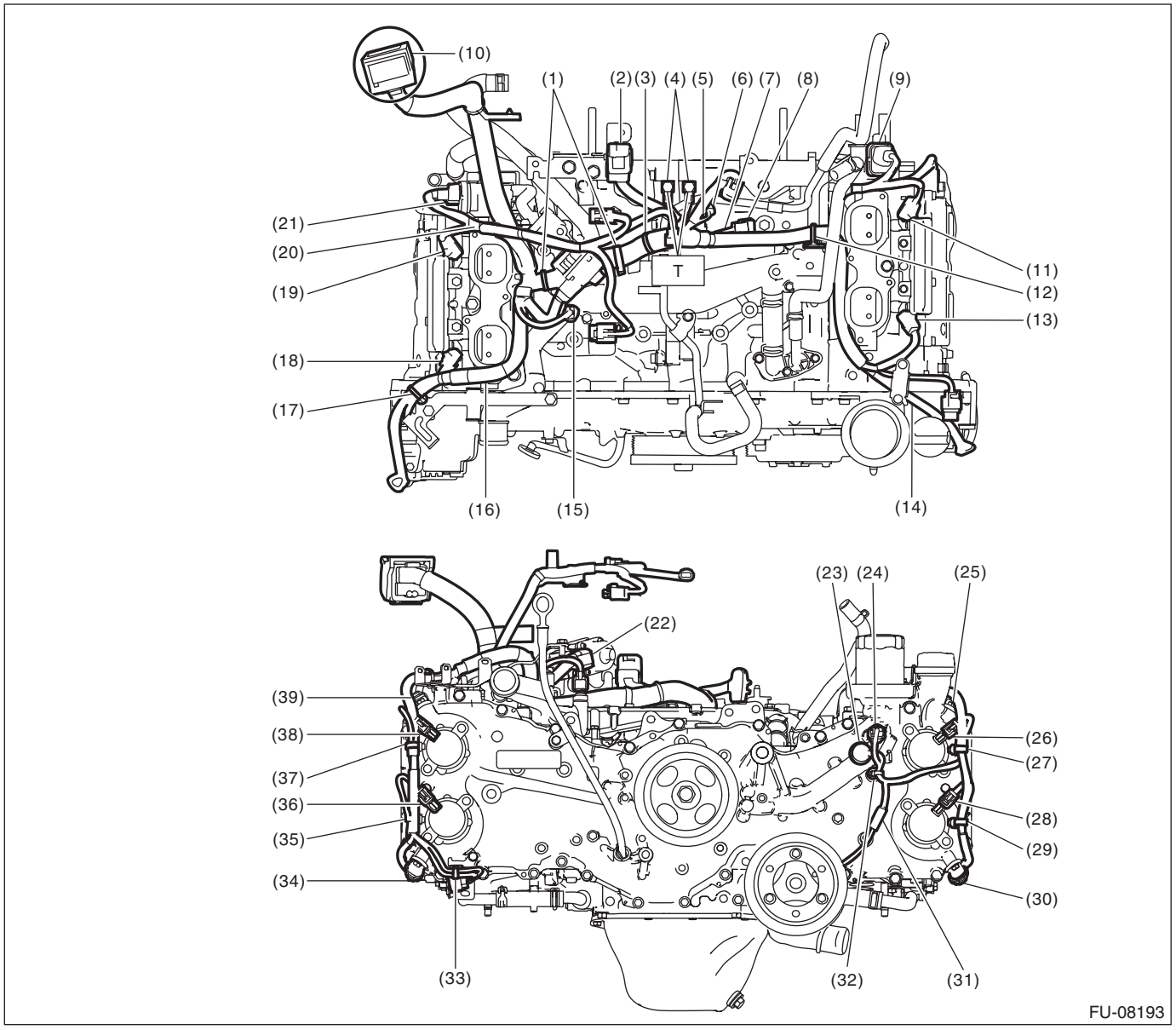


(1) Remove the clip from the screw hole.
(2) Ignition coil No. 4
(3) Ignition coil No. 2
(4) Remove the clip from the screw hole.
(5) Ignition coil No. 3
(6) Ignition coil No. 1
(7) Front oxygen (A/F) sensor
(8) Rear oxygen sensor

B: INSTALLATION

1) Route the engine wiring harness around the engine and connect connectors.

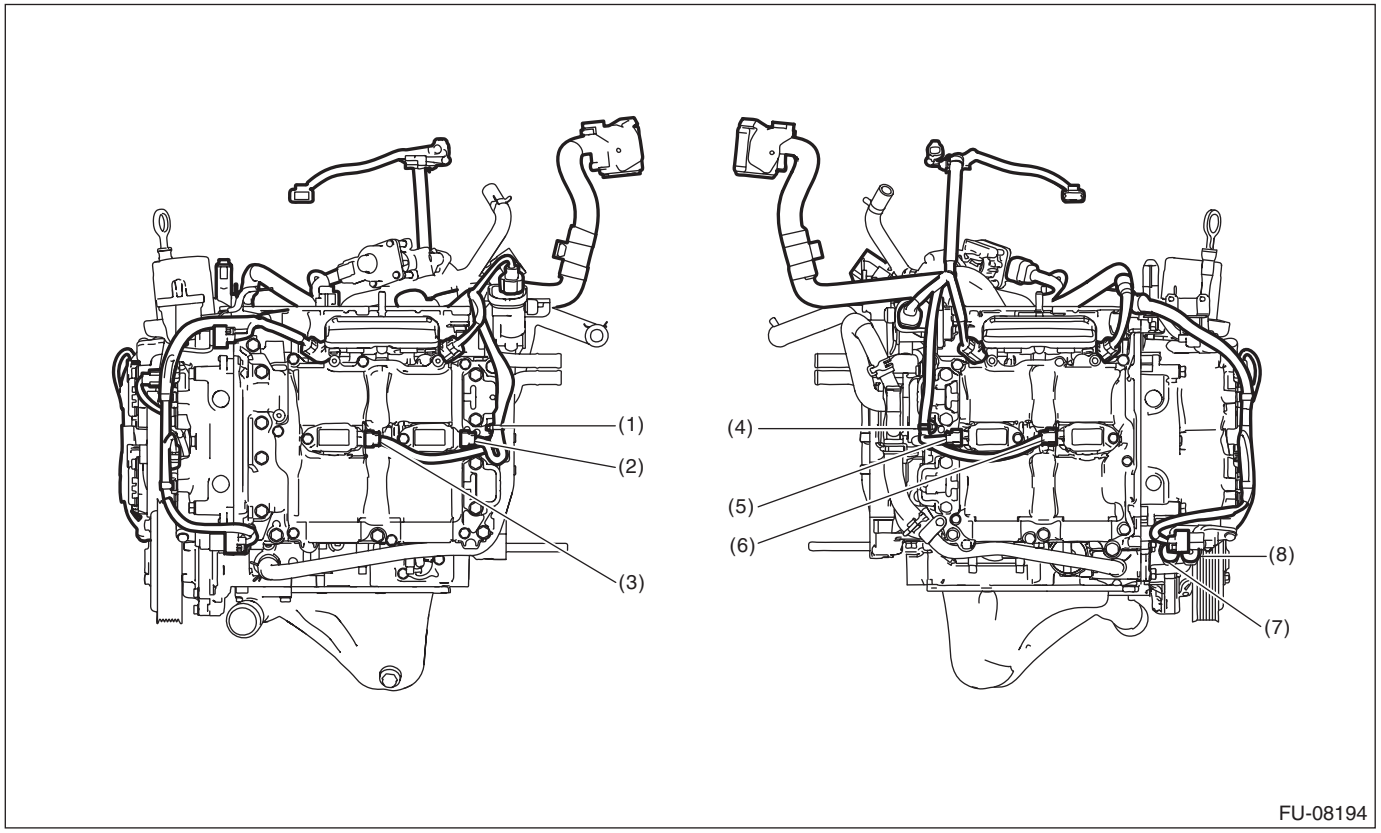
- Structural diagram 1



(1) Secure the clip to the screw hole.
(2) Engine harness connector (16P)
(3) Secure the clip to the brake pipe bracket.
(4) Engine ground (2 locations)
(5) Pass the crankshaft position sensor harness on the upper side of the preheater hose.
(6) Crankshaft position sensor
(7) Pass the knock sensor harness on the front side of the preheater hose.
(8) Knock sensor
(9) Tumble generator valve actuator LH
(10) Engine harness connector (54P)
(11) Fuel injector (#4)
(12) Secure the clip to the hole of the water pipe assembly.
(13) Fuel injector (#2)
(14) Pass the engine wiring harness under the bracket.
(15) Engine coolant temperature sensor
(16) Be careful of pinching when installing the intake manifold.
(17) Secure the clip to the bracket.
(18) Fuel injector (#1)
(19) Fuel injector (#3)
(20) Be careful of pinching when installing the intake manifold.
(21) Tumble generator valve actuator RH
(22) EGR control valve
(23) Oil pressure switch
(24) Engine oil temperature sensor
(25) Intake camshaft position sensor LH
(26) Intake oil control solenoid LH
(27) Secure the clip to the screw hole.
(28) Exhaust oil control solenoid LH
(29) Secure the clip to the screw hole.
(30) Exhaust camshaft position sensor LH
(31) Oil level switch connector
(32) Secure the clip to the screw hole.
(33) Secure the clip to the oval hole.
(34) Exhaust camshaft position sensor RH
(35) Secure the clip to the screw hole.
(36) Exhaust oil control solenoid RH
(37) Secure the clip to the screw hole.
(38) Intake oil control solenoid RH
(39) Intake camshaft position sensor RH

Tightening torque: N·m (kgf-m, ft-lb)
T: 19 (1.9, 14.0)

- Structural diagram 2



(1) Secure the clip to the screw hole.
(2) Ignition coil No. 4
(3) Ignition coil No. 2
(4) Secure the clip to the screw hole.
(5) Ignition coil No. 3
(6) Ignition coil No. 1
(7) Front oxygen (A/F) sensor
(8) Rear oxygen sensor

2) Install the intake manifold. <Ref. to FU(H4DO(HEV))-26, INSTALLATION, Intake Manifold.>
3) Install the collector cover.
4) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

Check that the engine wiring harness does not have deformation, cracks and any other damage.

5. Engine Coolant Temperature Sensor

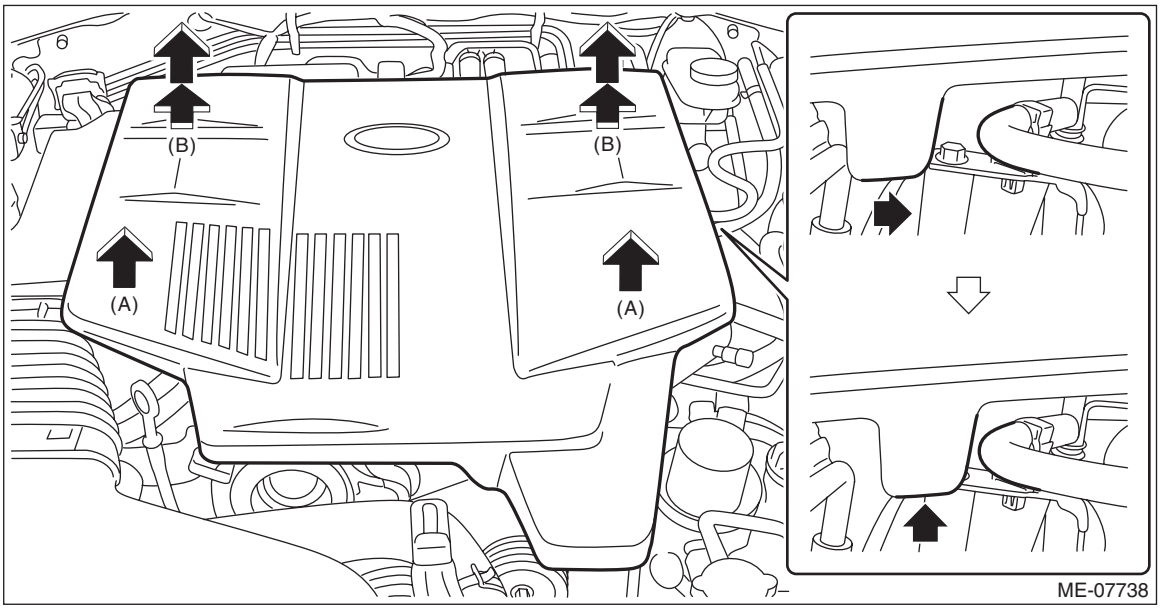
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

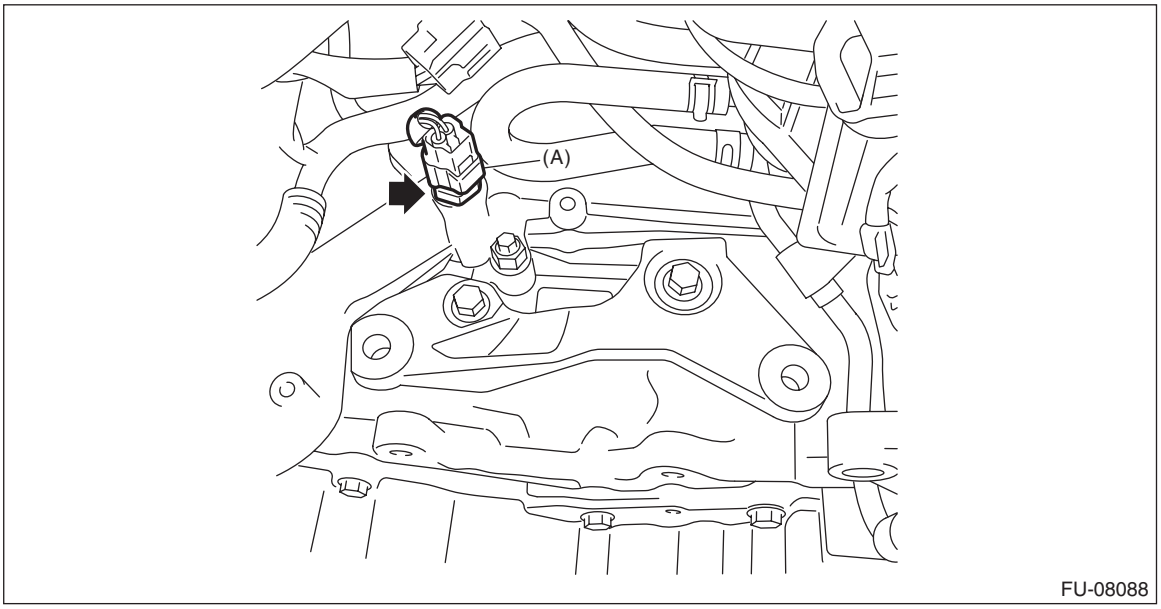
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
4) Remove the ISG. <Ref. to SC(H4DO(HEV))-33, REMOVAL, Integrated Starter Generator (ISG).>
5) Disconnect the connector (A) from the engine coolant temperature sensor, and remove the engine coolant temperature sensor.



B: INSTALLATION

Install in the reverse order of removal.

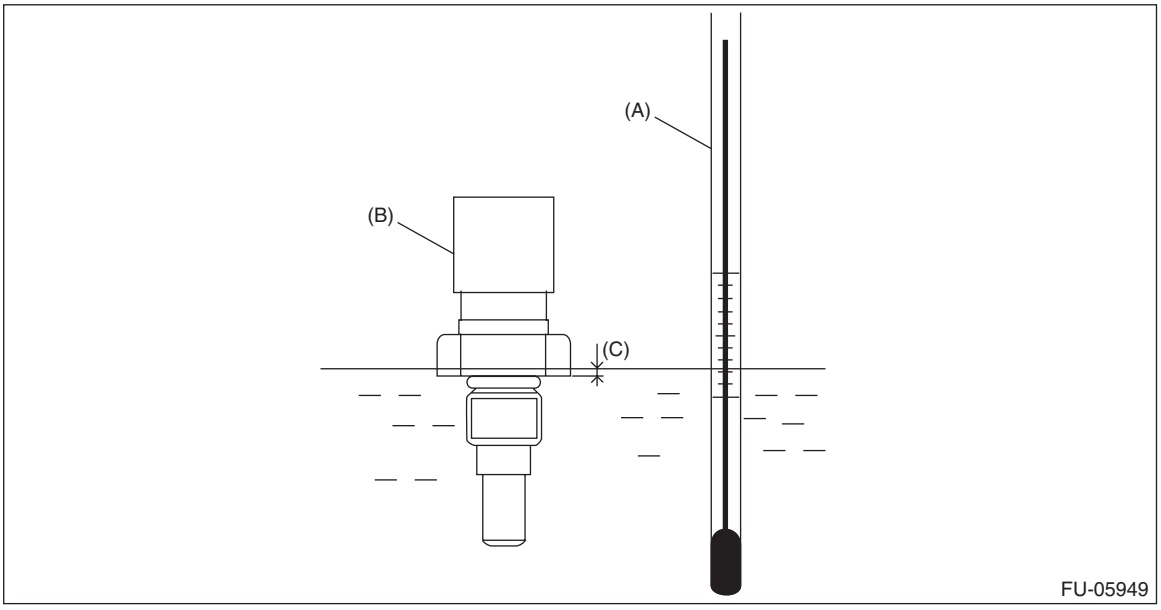
NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

C: INSPECTION

1) Check that the engine coolant temperature sensor has no deformation, cracks or other damages.
2) Immerse the engine coolant temperature sensor and a thermometer in water.

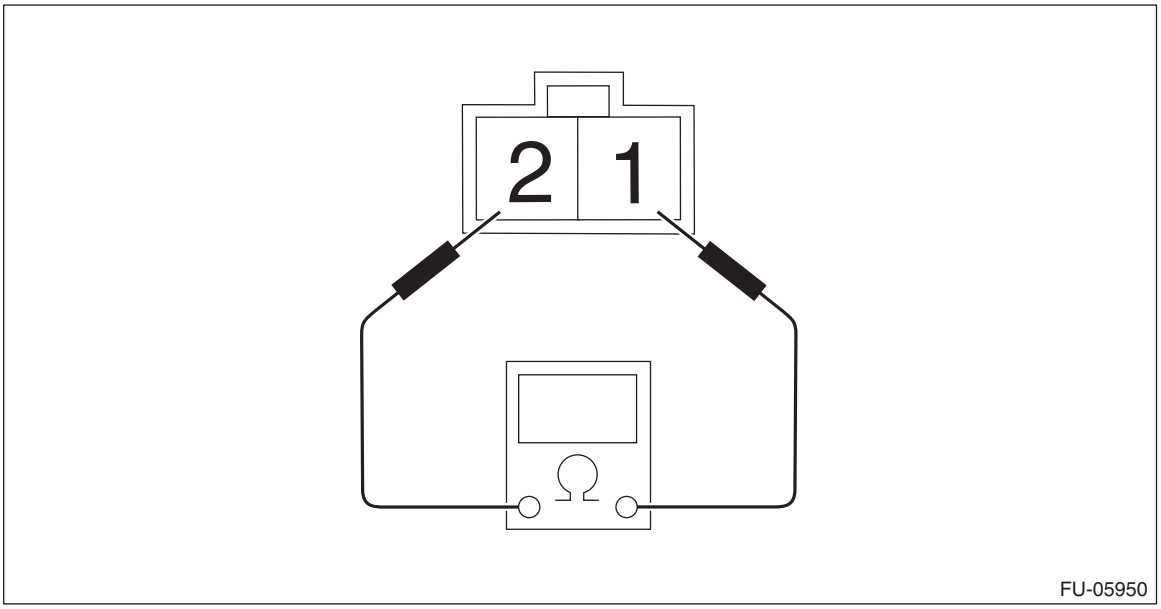
CAUTION:
Take care not to allow water to get into the engine coolant temperature sensor connector. Completely remove any water inside.



(A) Thermometer
(B) Engine coolant temperature sensor
(C) Hexagonal part height: To approx. $^{1}/_{3}$

3) Raise water temperature gradually, measure the resistance between the engine coolant temperature sensor terminals when the temperature is 20°C (68°F) and 80°C (176°F).

NOTE:
Agitate the water for even temperature distribution.



Water temperature	Terminal No.	Standard
20°C (68°F)	1 and 2	Approx. 2.45±0.2 kΩ
80°C (176°F)		Approx. 0.318±0.013 kΩ

6. Engine Oil Temperature Sensor

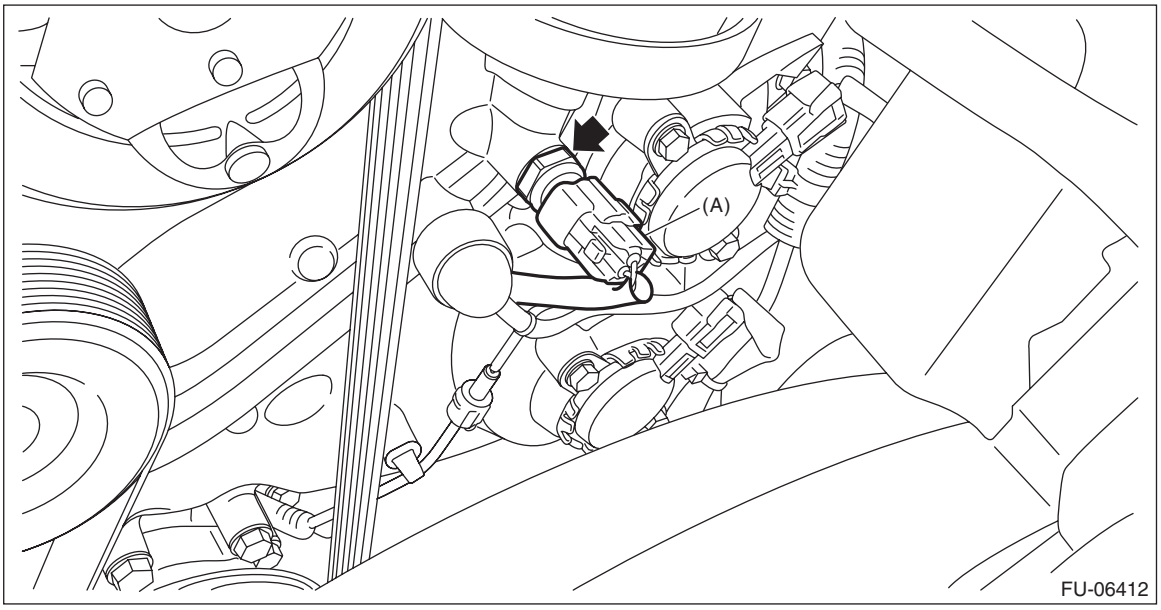
A: REMOVAL

CAUTION:
If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emission of smoke or causing a fire.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Disconnect the connector (A) from the engine oil temperature sensor, and remove the engine oil temperature sensor from the chain cover.



B: INSTALLATION

Install in the reverse order of removal.

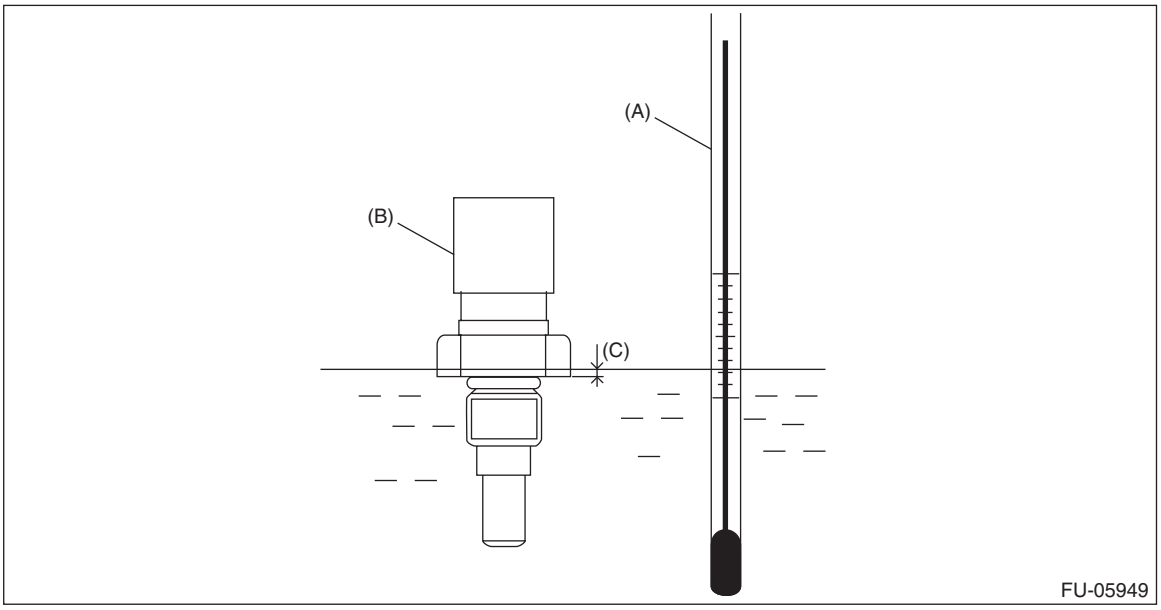
NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

C: INSPECTION

1) Check that the engine oil temperature sensor has no deformation, cracks or other damages.
2) Immerse the engine oil temperature sensor and a thermometer in water.

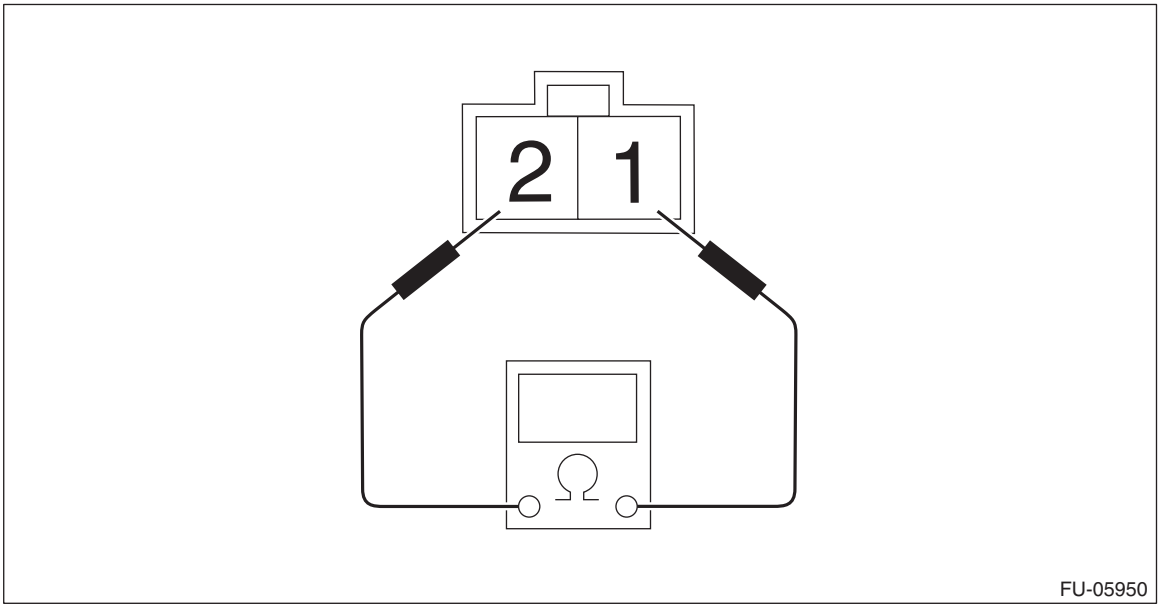
CAUTION:
Take care not to allow water to get into the engine oil temperature sensor connector. Completely remove any water inside.



(A) Thermometer
(B) Engine oil temperature sensor
(C) Hexagonal part height: To approx. $^{1}/_{3}$

3) Raise water temperature gradually, measure the resistance between the engine oil temperature sensor terminals when the temperature is 20°C (68°F) and 80°C (176°F).

NOTE:
Agitate the water for even temperature distribution.



Water temperature	Terminal No.	Standard
20°C (68°F)	1 and 2	Approx. 2.45±0.2 kΩ
80°C (176°F)		Approx. 0.318±0.013 kΩ

7. Crankshaft Position Sensor

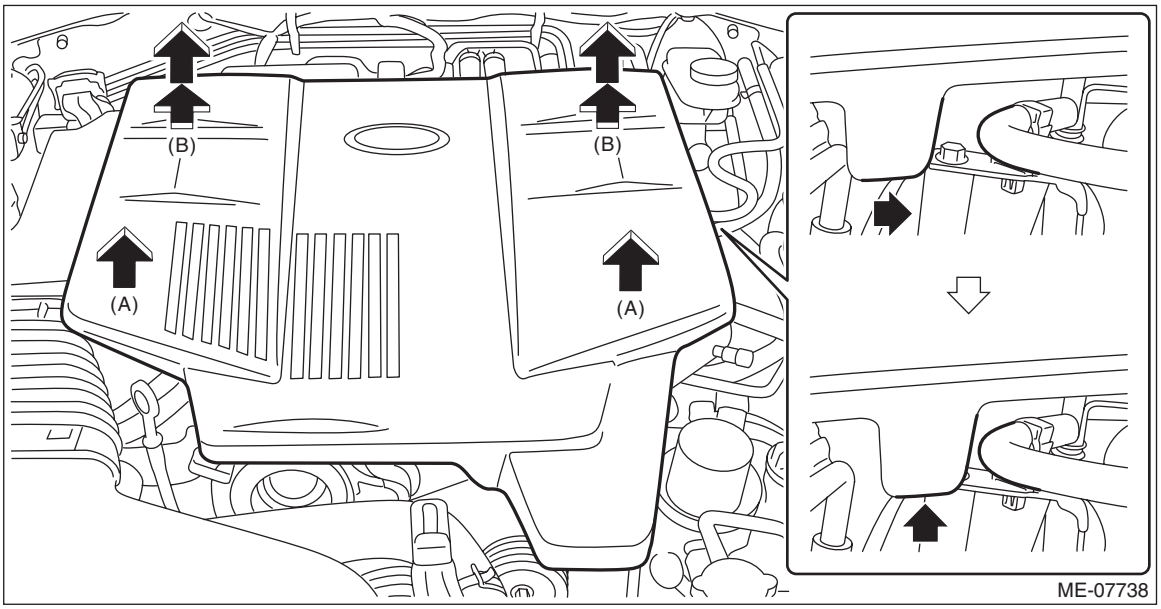
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

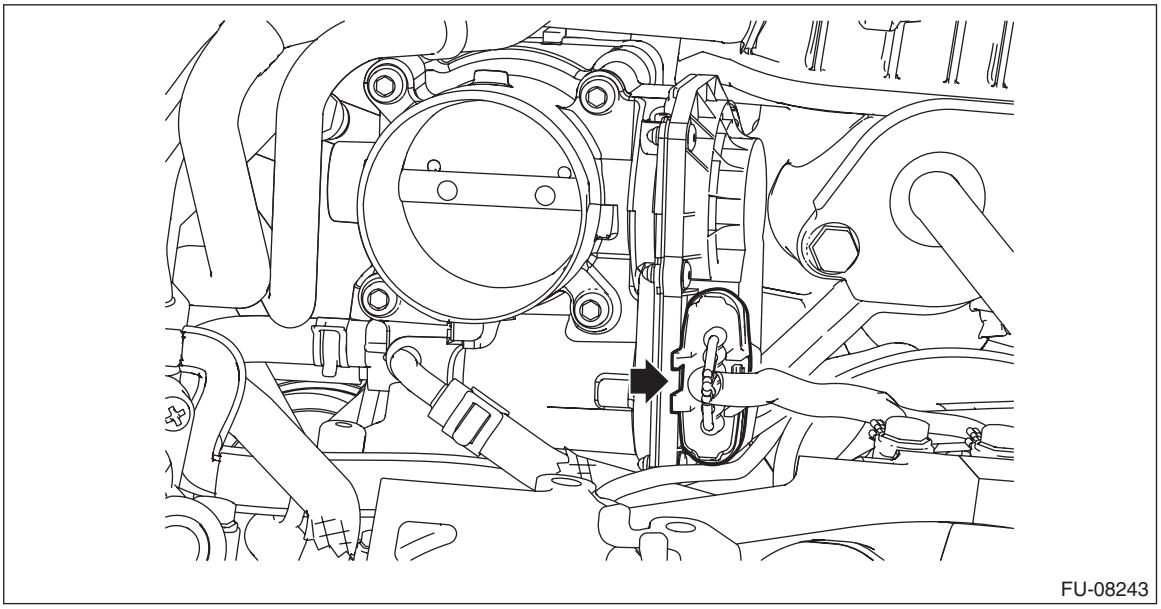
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

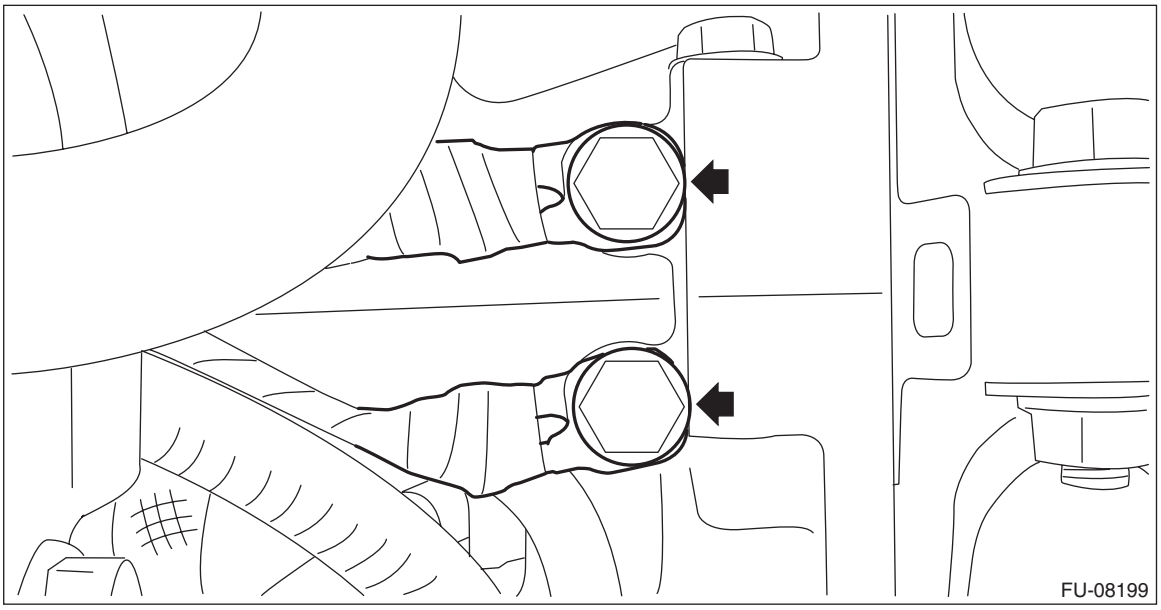
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



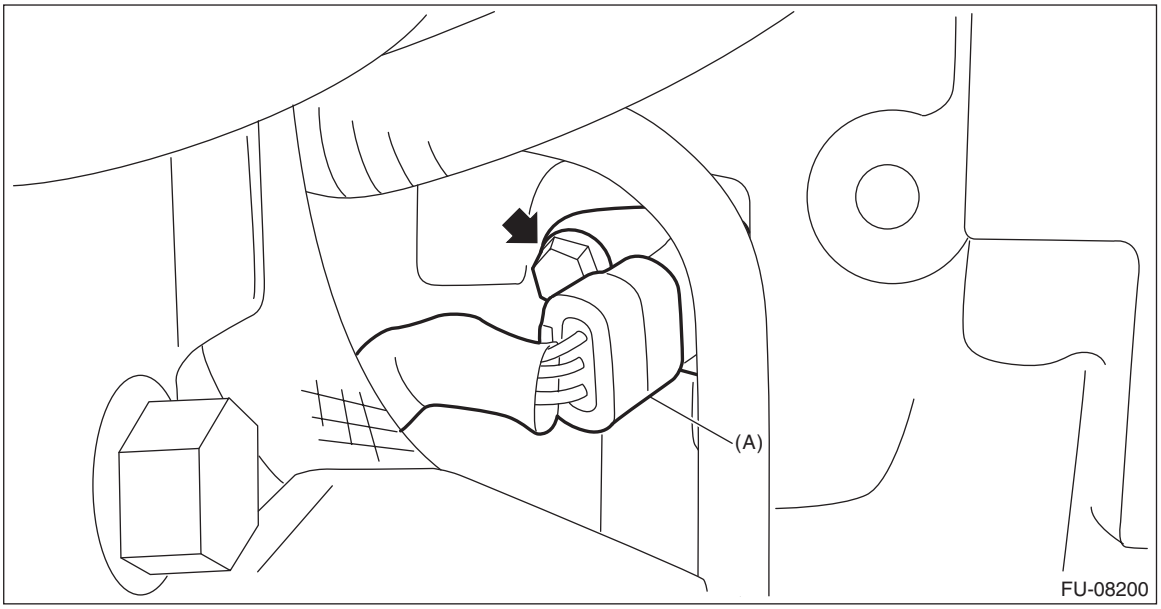
3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Remove the air intake boot No. 2. <Ref. to IN(H4DO(HEV))-11, AIR INTAKE BOOT NO. 2, REMOVAL, Air Intake Boot.>
5) Disconnect the connector from the throttle body.



6) Disconnect the engine ground from the engine assembly.



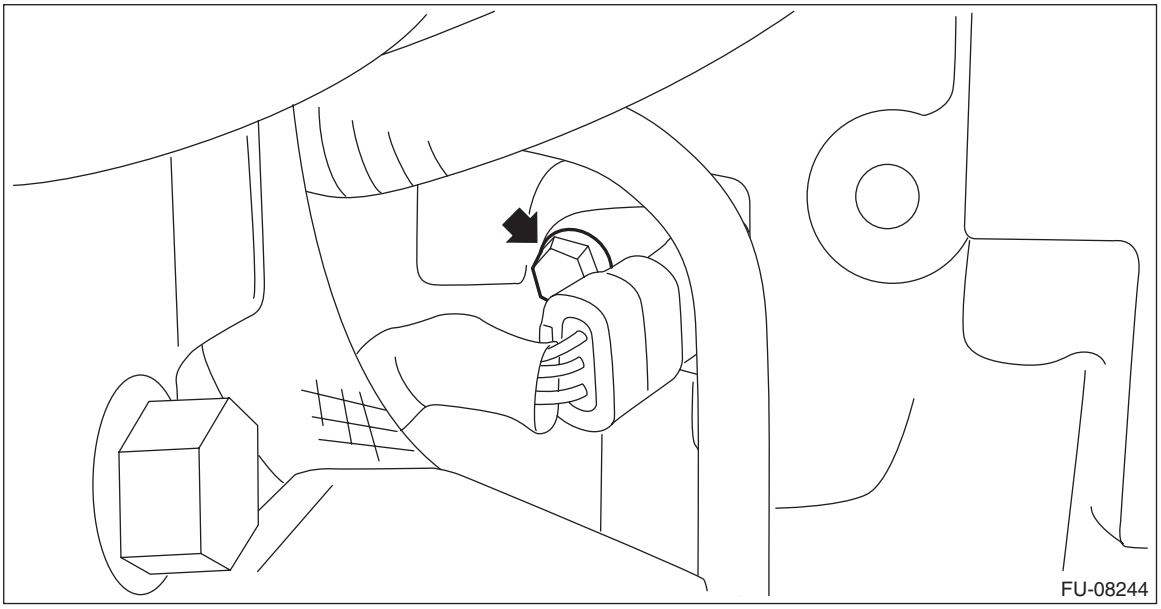
7) Disconnect the connector (A) from the crankshaft position sensor, and remove the crankshaft position sensor from the cylinder block.



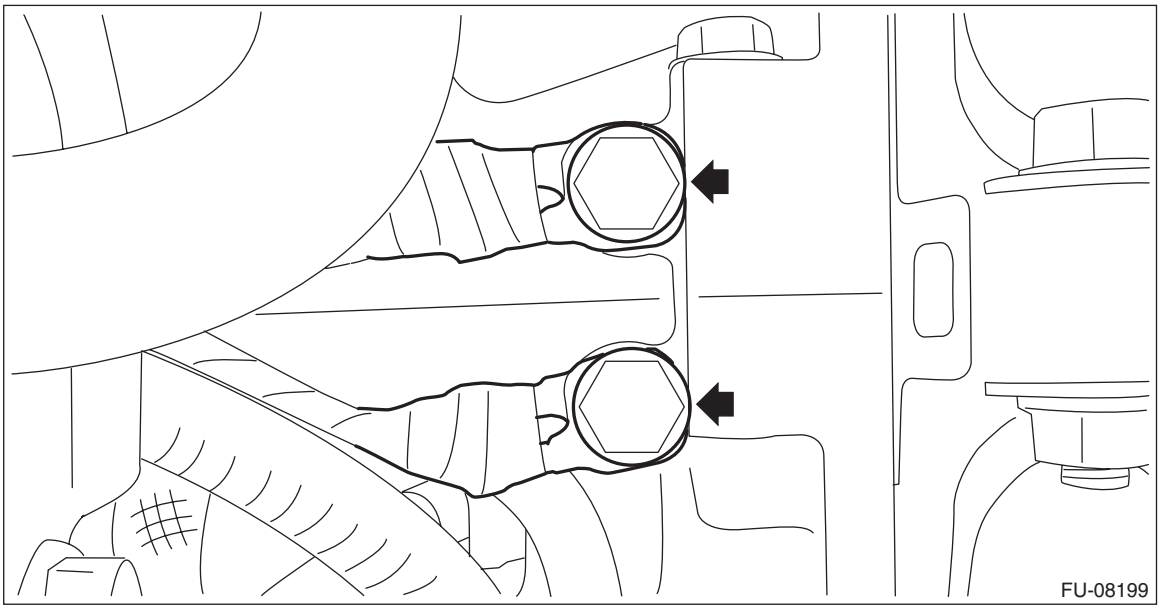
B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



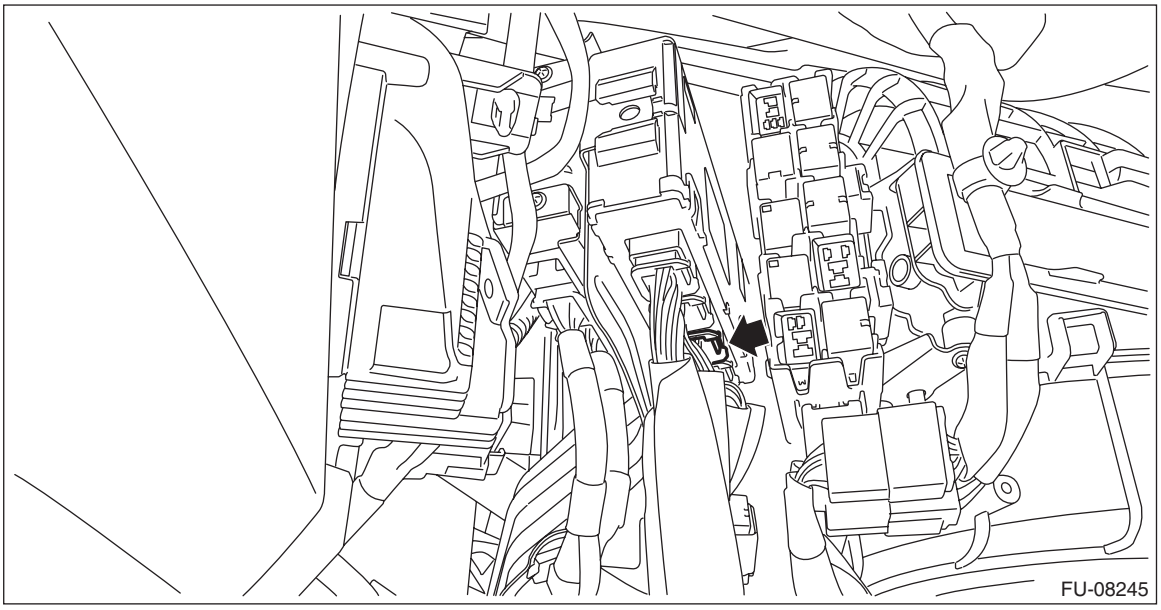
Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)

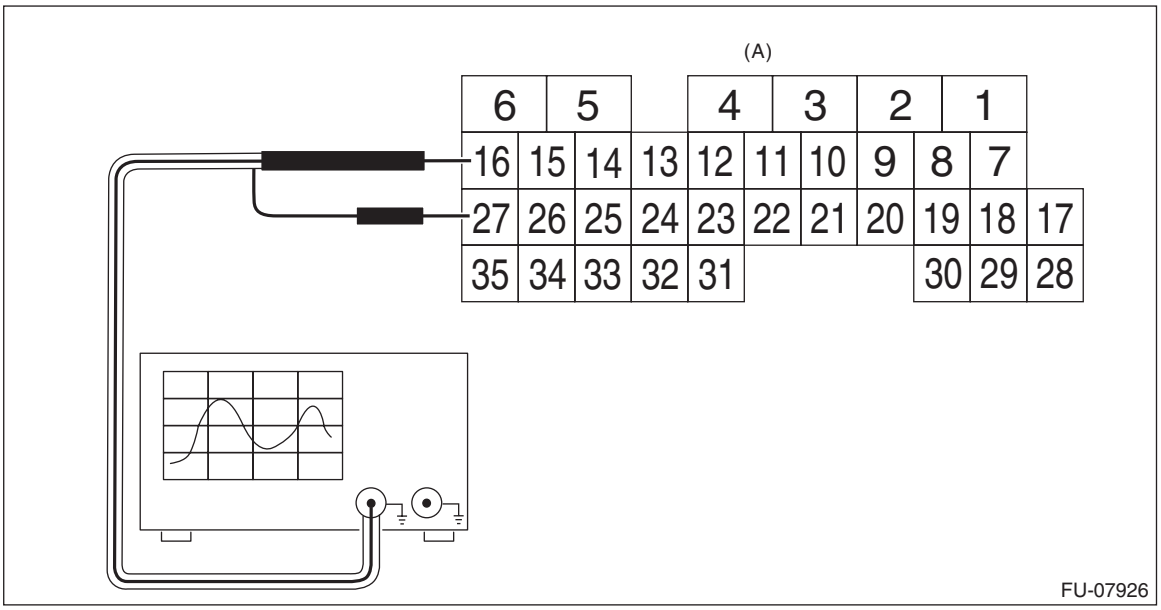


C: INSPECTION

1. CRANKSHAFT POSITION SENSOR (METHOD WITH OSCILLOSCOPE)

1) Prepare an oscilloscope.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Connect the probe to ECM connector.





(A) To ECM connector

Terminal No.	Probe
16	+
27	–

4) Start the engine and let it idle.
5) Check the waveforms and voltage.

NOTE:
For waveform and voltage, refer to “Engine Control Module I/O Signal”. <Ref. to EN(H4DO HEV)(diag)-21, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>
6) After inspection, install the related parts in the reverse order of removal.

2. OTHER INSPECTIONS

Check that the crankshaft position sensor has no deformation, cracks or other damages.

8. Crankshaft Position Sensor Plate

A: REMOVAL

The crankshaft position sensor plate is tightened together with the drive plate; therefore, refer to “Drive Plate” for removal procedure. <Ref. to CVT(TH58A)-175, REMOVAL, Drive Plate.>

B: INSTALLATION

The crankshaft position sensor plate is tightened together with the drive plate; therefore, refer to “Drive Plate” for installation procedure. <Ref. to CVT(TH58A)-176, INSTALLATION, Drive Plate.>

C: INSPECTION

Check that the crankshaft position sensor plate has no deformation, cracks or other damages.

9. Camshaft Position Sensor

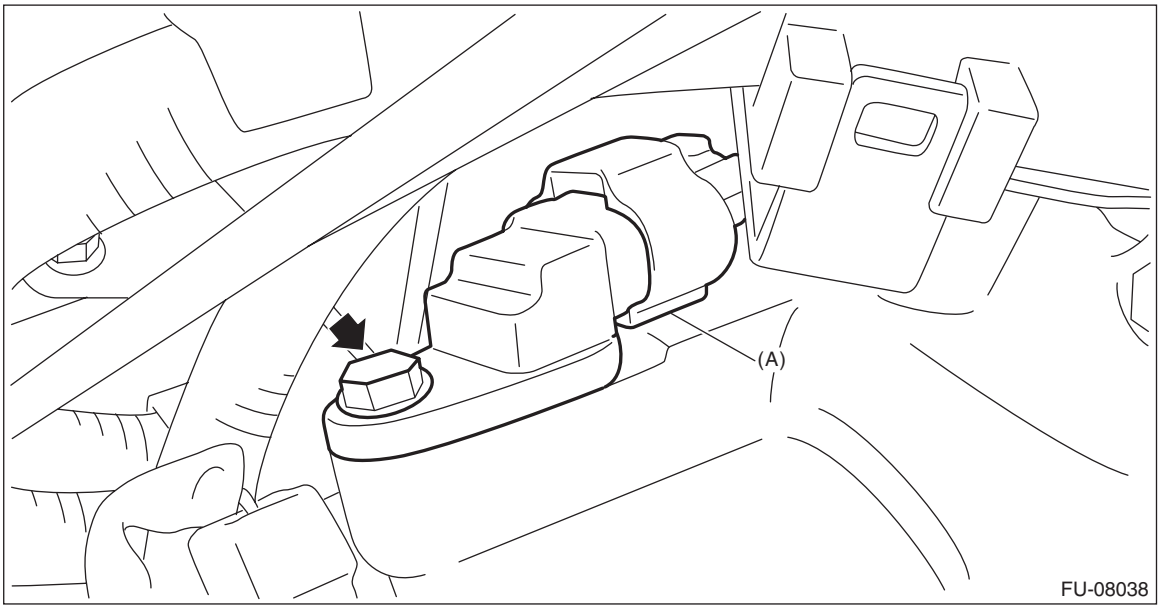
A: REMOVAL

1. INTAKE SIDE

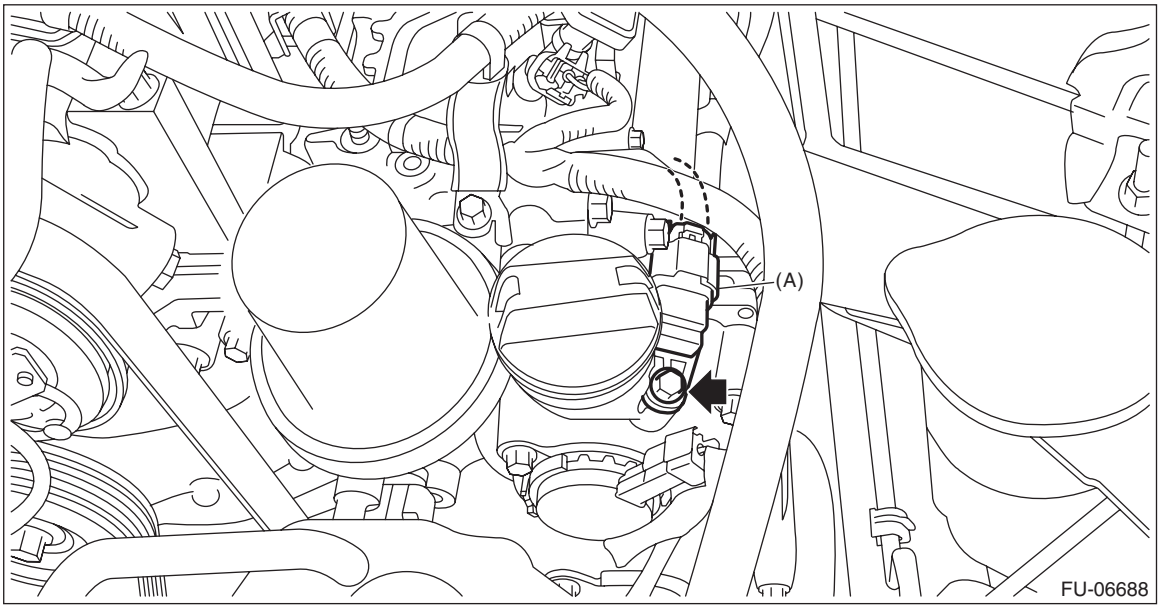
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the air intake duct. (RH side only) <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
3) Remove the air intake boot No. 1. (RH side only) <Ref. to IN(H4DO(HEV))-10, AIR INTAKE BOOT NO. 1, REMOVAL, Air Intake Boot.>
4) Disconnect the connector (A) from the camshaft position sensor, and remove the camshaft position sensor from the chain cover.

- RH side



- LH side

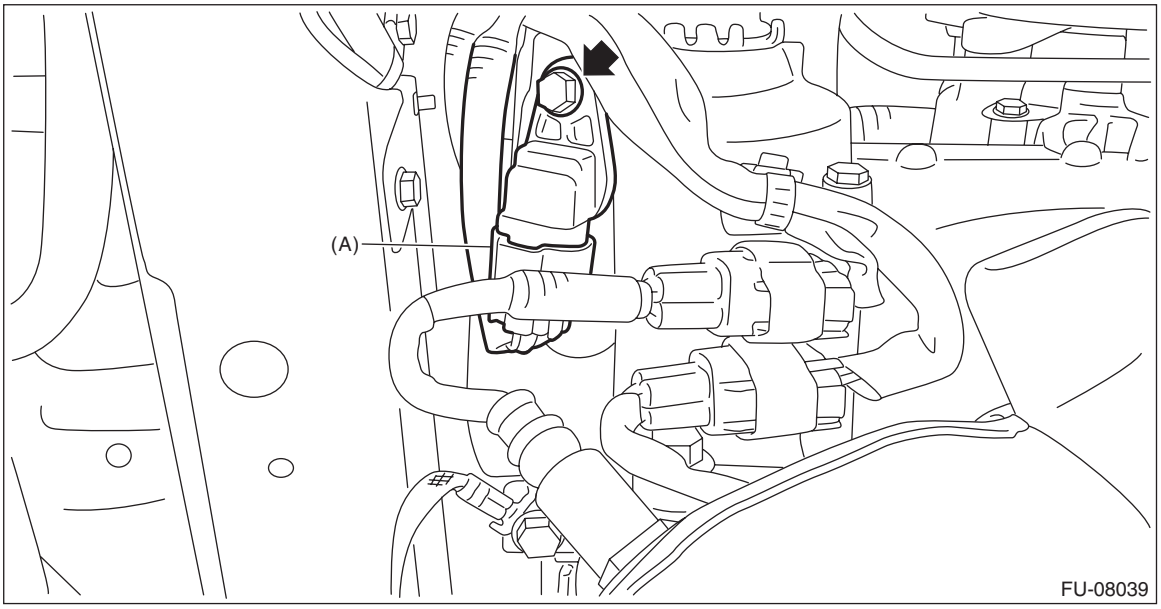


2. EXHAUST SIDE

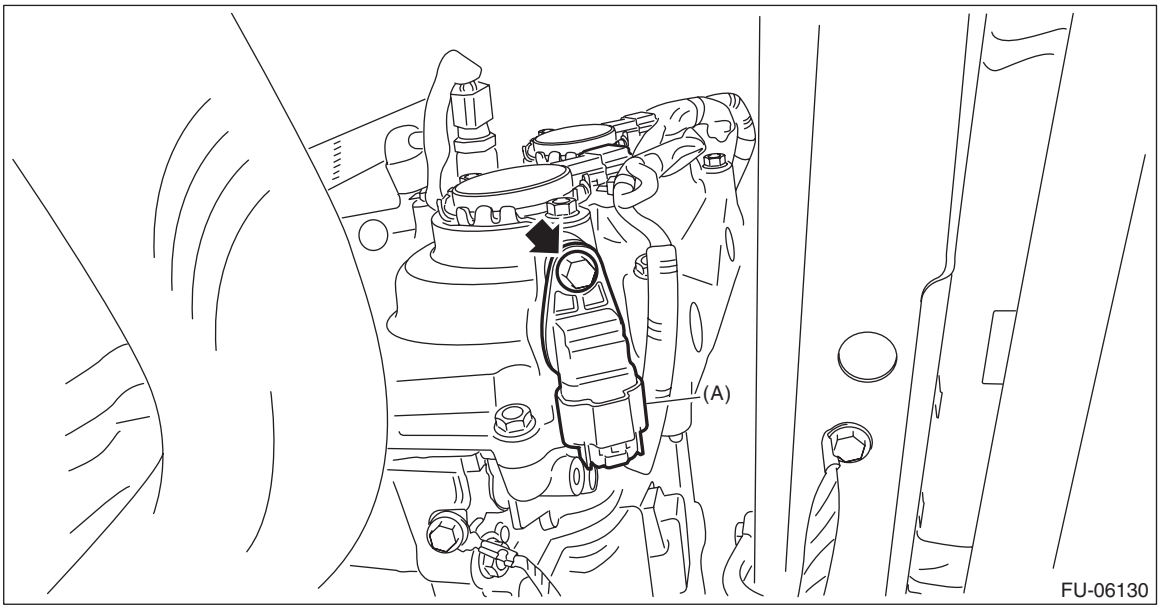
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
3) Disconnect the connector (A) from the camshaft position sensor, and remove the camshaft position sensor from the chain cover.

- RH side



- LH side



B: INSTALLATION

Install in the reverse order of removal.

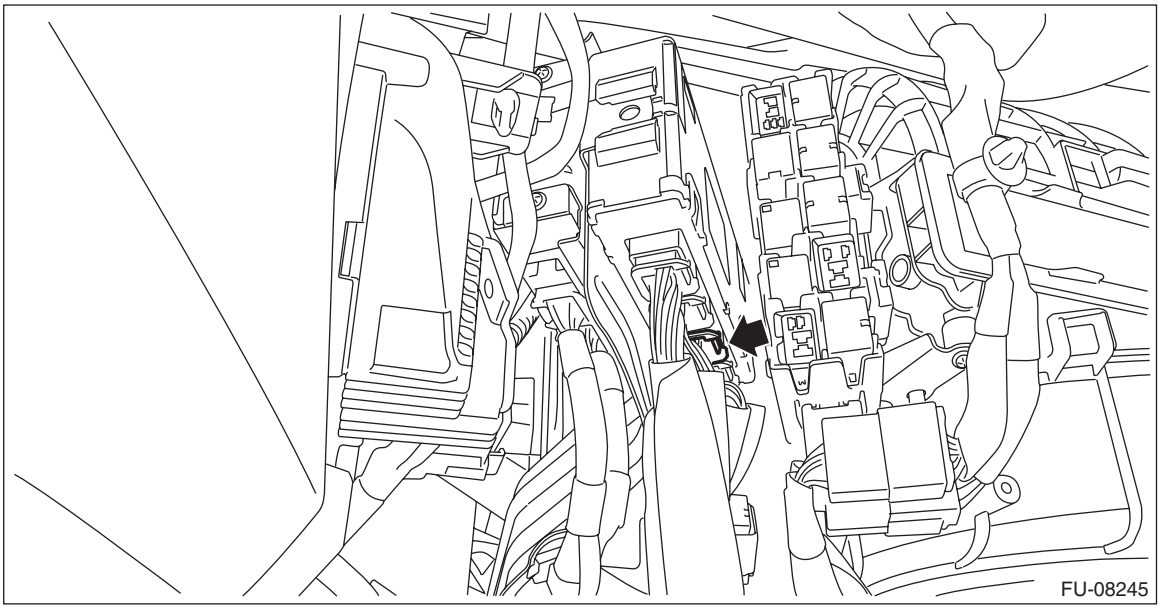
NOTE:
- Use new O-rings.
- Apply engine oil to O-ring.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

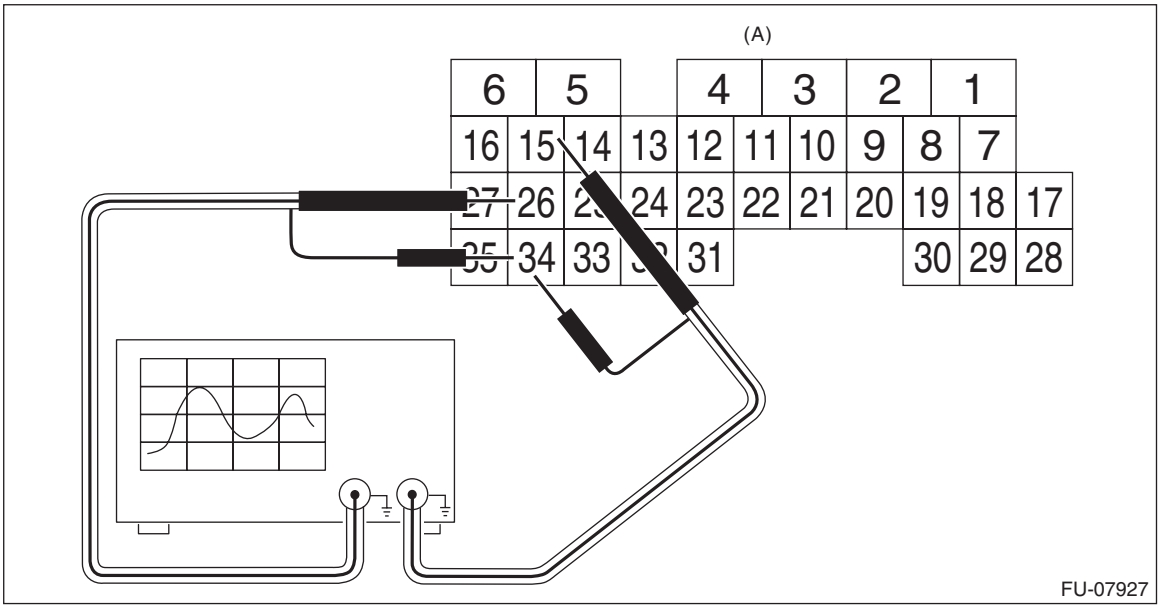
C: INSPECTION

1. CAMSHAFT POSITION SENSOR (METHOD WITH OSCILLOSCOPE)

1) Prepare an oscilloscope.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Connect the probe to ECM connector.

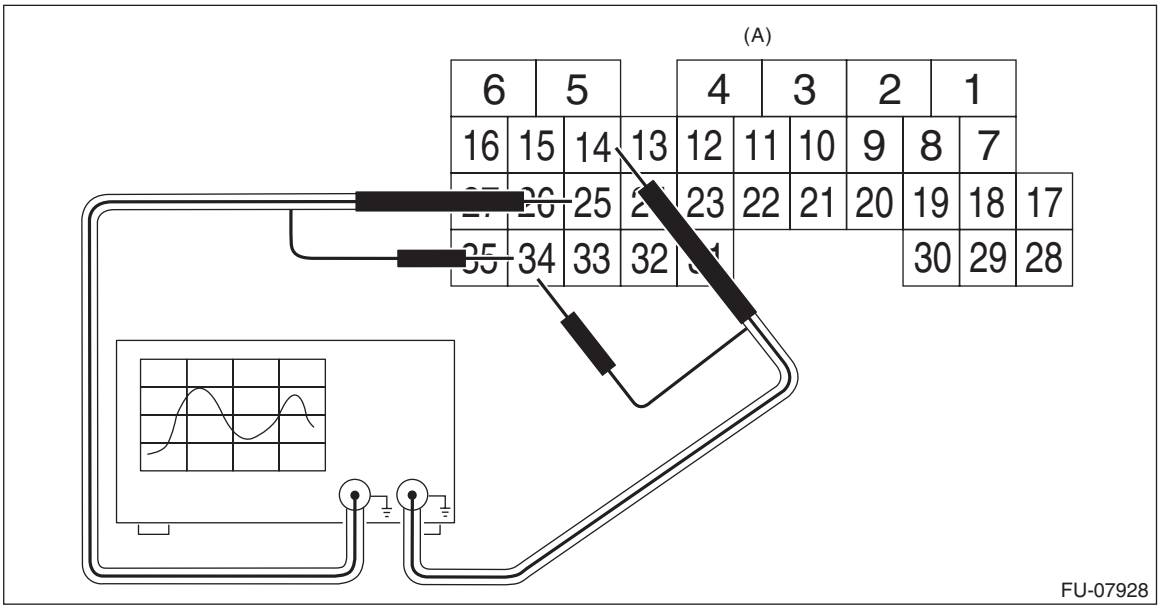


- Intake camshaft position sensor



(A) To ECM connector

- Exhaust camshaft position sensor



(A) To ECM connector

Camshaft position sensor		Terminal No.	Probe
Intake	RH	26	+
	LH	15	+
Exhaust	RH	14	+
	LH	25	+
RH and LH		34	–

4) Start the engine and let it idle.
5) Check the waveforms and voltage.

NOTE:
For waveform and voltage, refer to “Engine Control Module I/O Signal”. <Ref. to EN(H4DO HEV)(diag)-21, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>
6) After inspection, install the related parts in the reverse order of removal.

2. OTHER INSPECTIONS

Check that the camshaft position sensor has no deformation, cracks or other damages.

10.Oil Control Solenoid

A: REMOVAL

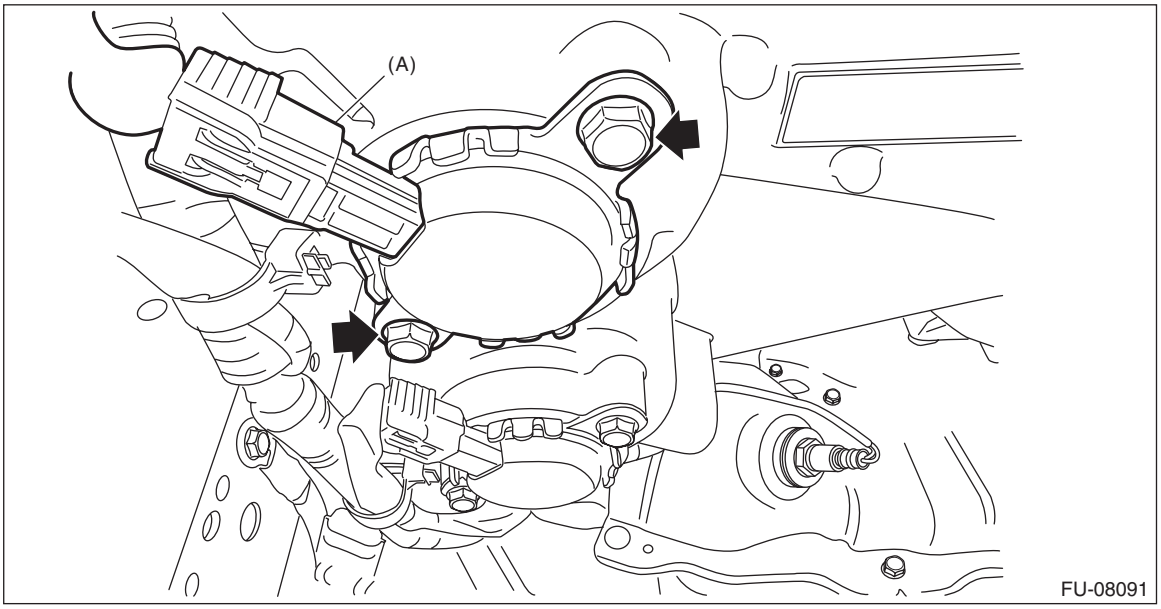
CAUTION:
If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emission of smoke or causing a fire.

1. INTAKE SIDE

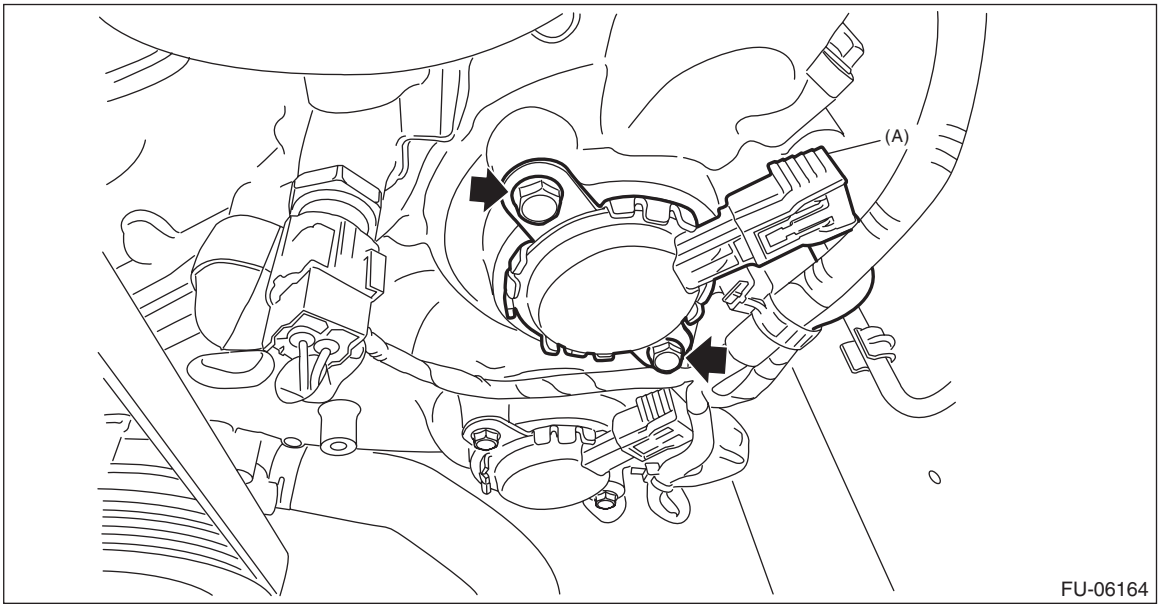
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the air intake duct. (RH side only) <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
3) Remove the reservoir tank. (LH side only) <Ref. to CO(H4DO(w/o HEV))-96, REMOVAL, Reservoir Tank.>
4) Disconnect the connector (A) from the oil control solenoid, and remove the oil control solenoid from the chain cover.

- RH side



- LH side

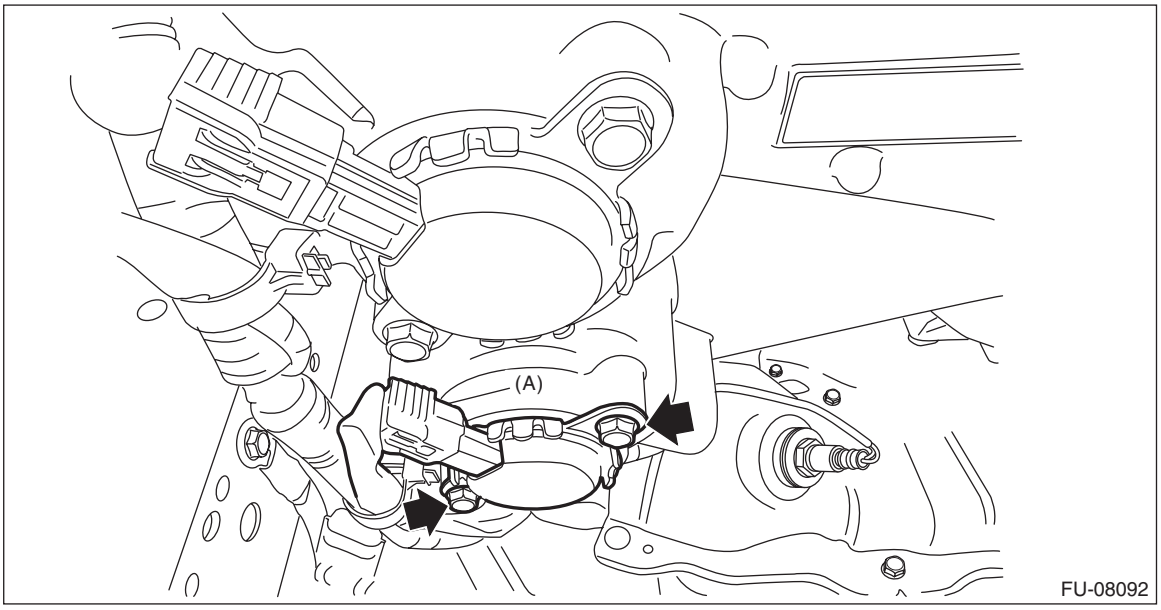


2. EXHAUST SIDE

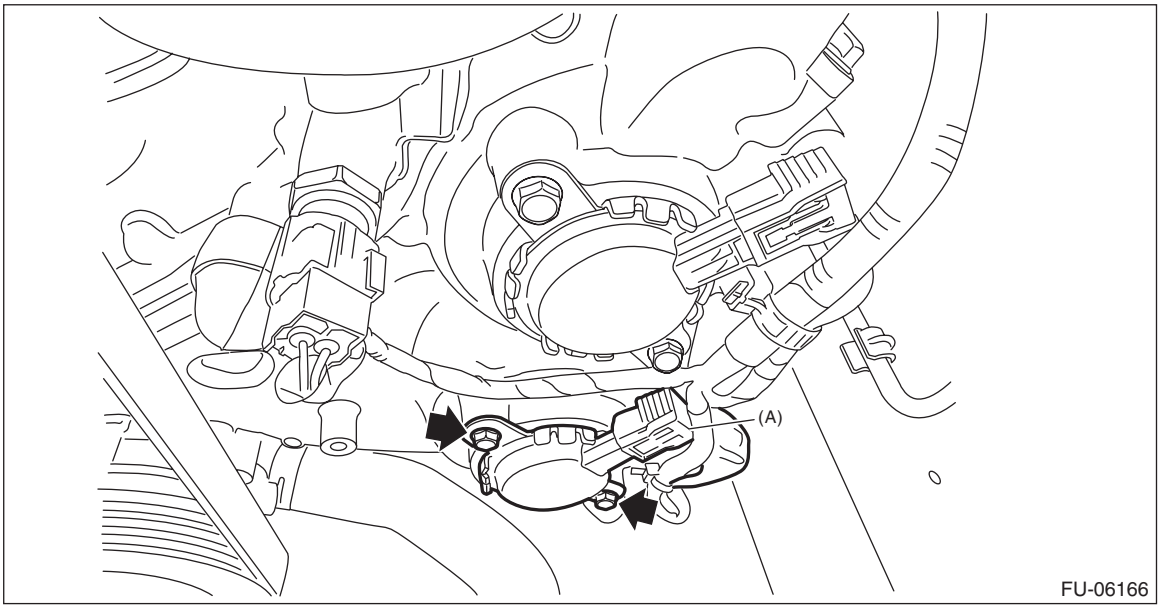
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the air intake duct. (RH side only) <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
3) Remove the reservoir tank. (LH side only) <Ref. to CO(H4DO(w/o HEV))-96, REMOVAL, Reservoir Tank.>
4) Disconnect the connector (A) from the oil control solenoid, and remove the oil control solenoid from the chain cover.

- RH side



- LH side



B: INSTALLATION

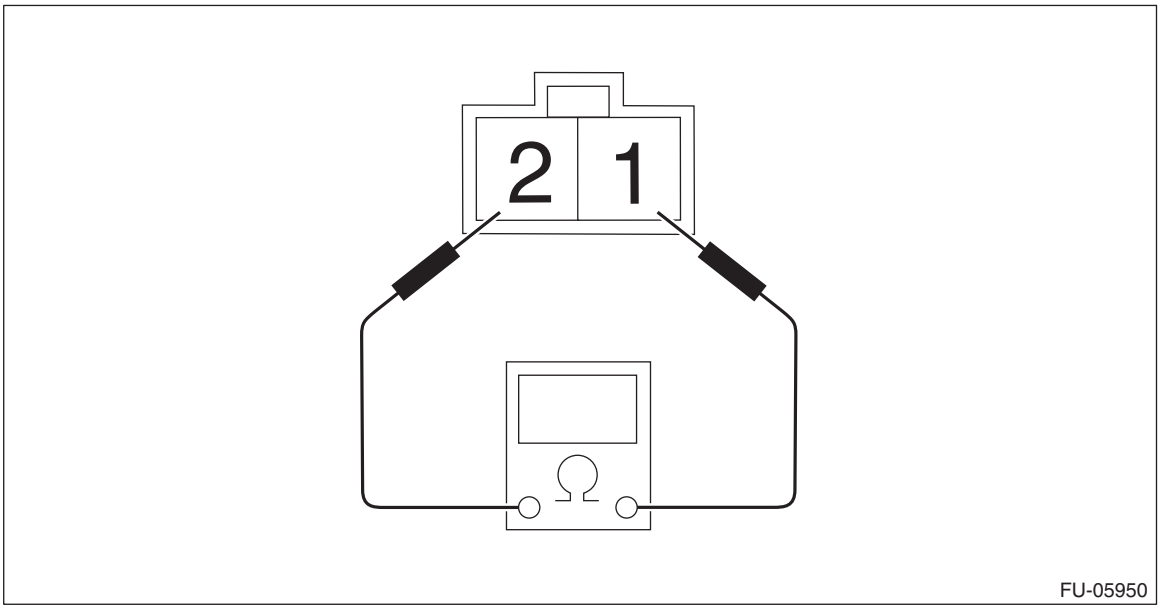
Install in the reverse order of removal.

NOTE:
- Use new O-rings.
- Apply engine oil to O-ring.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

C: INSPECTION

1) Check that the oil control solenoid has no deformation, cracks or other damages.
2) Measure the resistance between the oil control solenoid terminals.



Terminal No.	Standard
1 and 2	7.25±0.4 Ω (when 20°C (68°F))

11.Knock Sensor

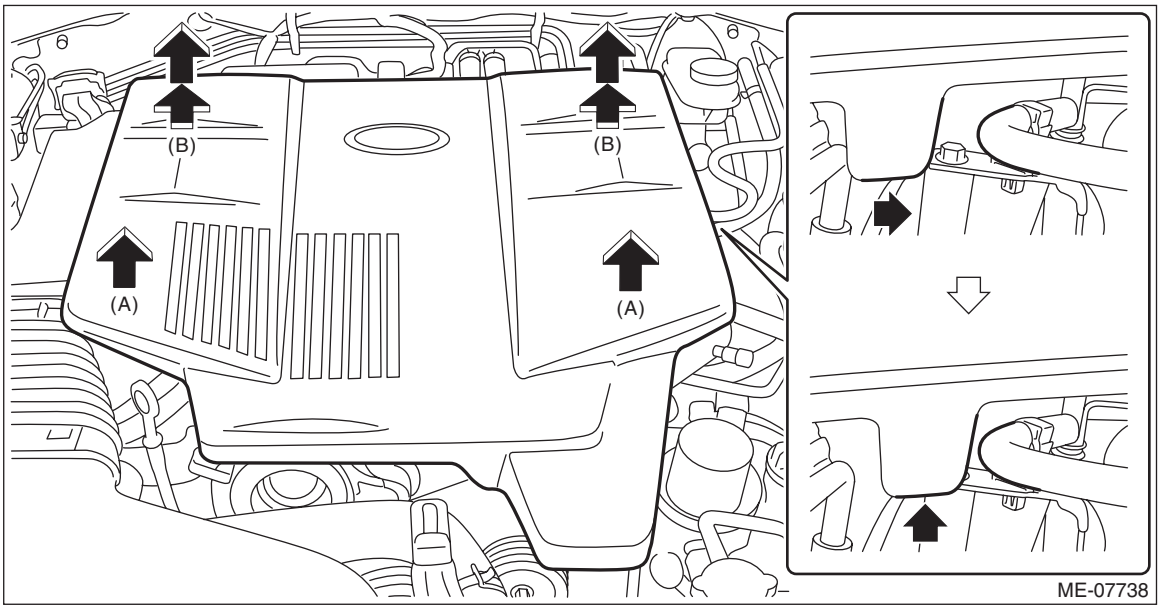
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

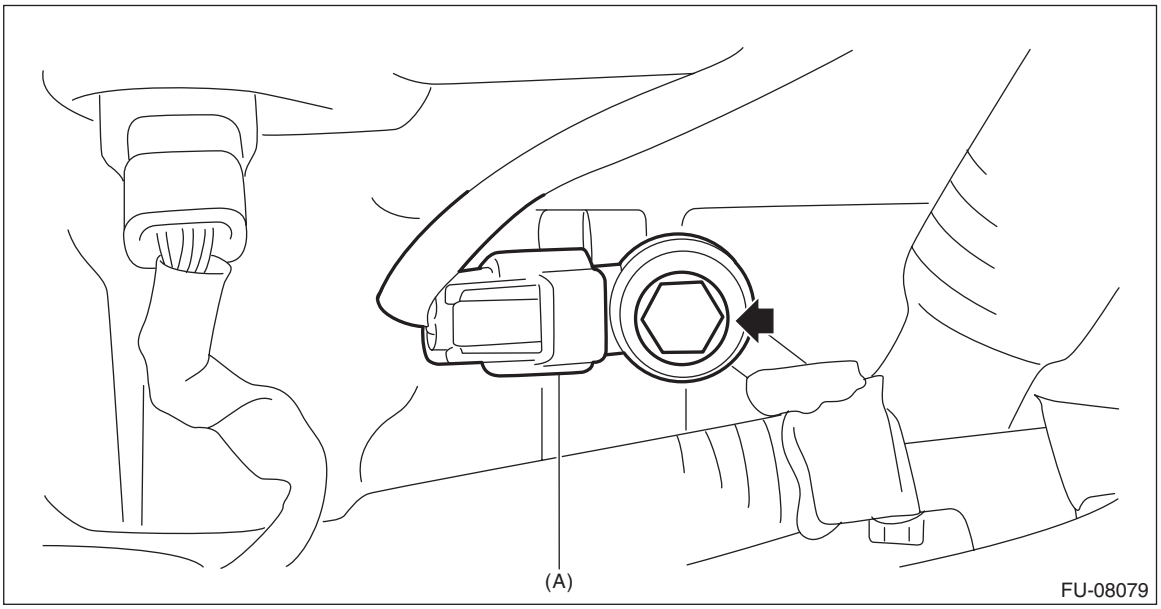
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the throttle body. <Ref. to FU(H4DO(HEV))-15, REMOVAL, Throttle Body.>
4) Disconnect the connector (A) from the knock sensor, and remove the knock sensor from the cylinder block.

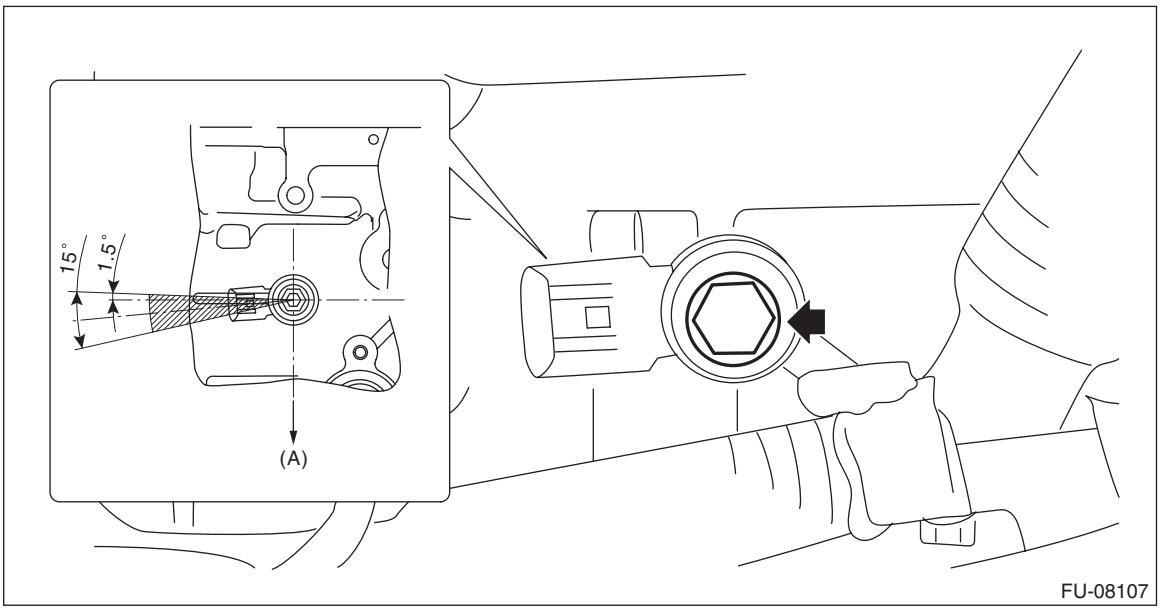


B: INSTALLATION

1) Install the knock sensor to the cylinder block.

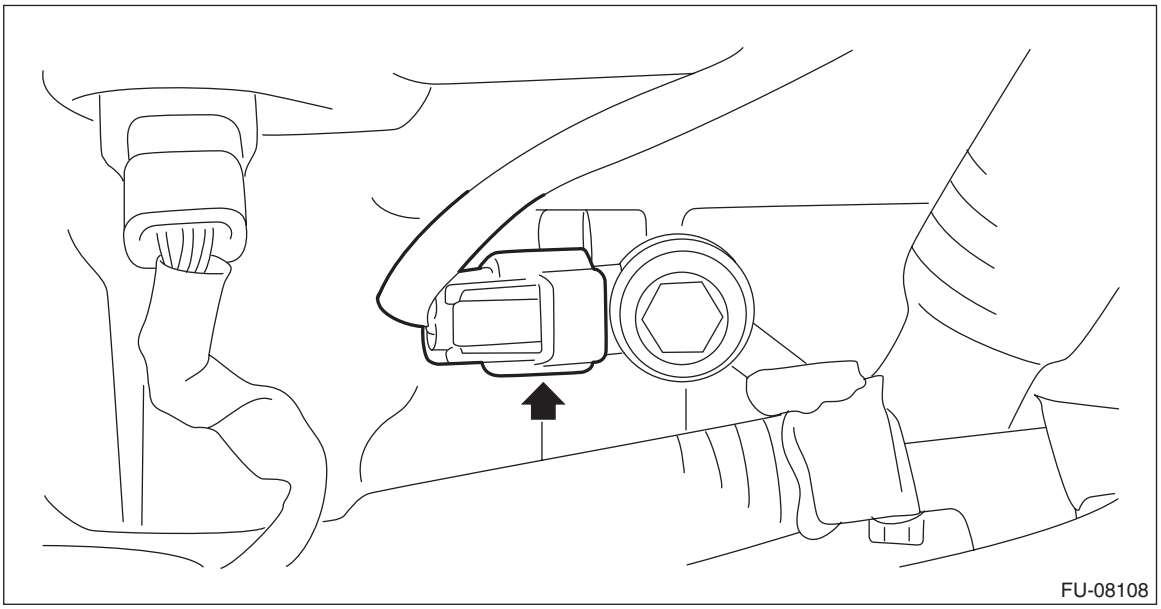
NOTE:
The knock sensor should be installed so that the center of the connector is positioned at a 76.5 — 91.5° angle relative to the front of engine.

Tightening torque:
24 N·m (2.4 kgf-m, 17.7 ft-lb)



(A) Front of engine

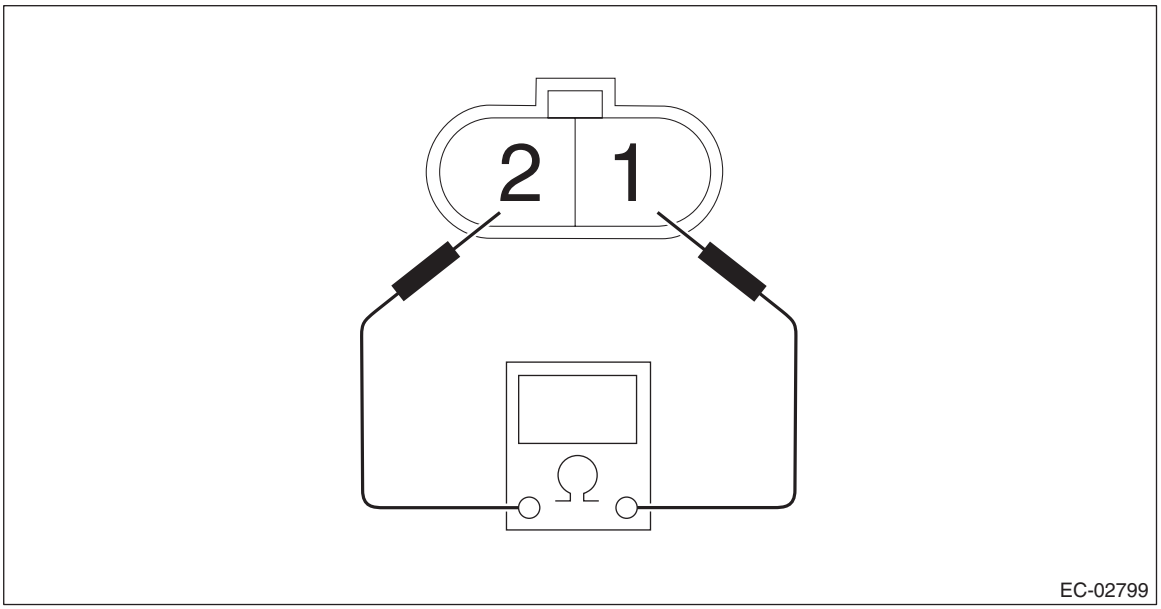
2) Connect the connector to the knock sensor.



3) Install the throttle body. <Ref. to FU(H4DO(HEV))-16, INSTALLATION, Throttle Body.>
4) Install the collector cover.
5) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Check that the knock sensor has no deformation, cracks or other damages.
2) Measure the resistance between knock sensor terminals.



Terminal No.	Standard
1 and 2	560±28 kΩ

12.Throttle Position Sensor

A: SPECIFICATION

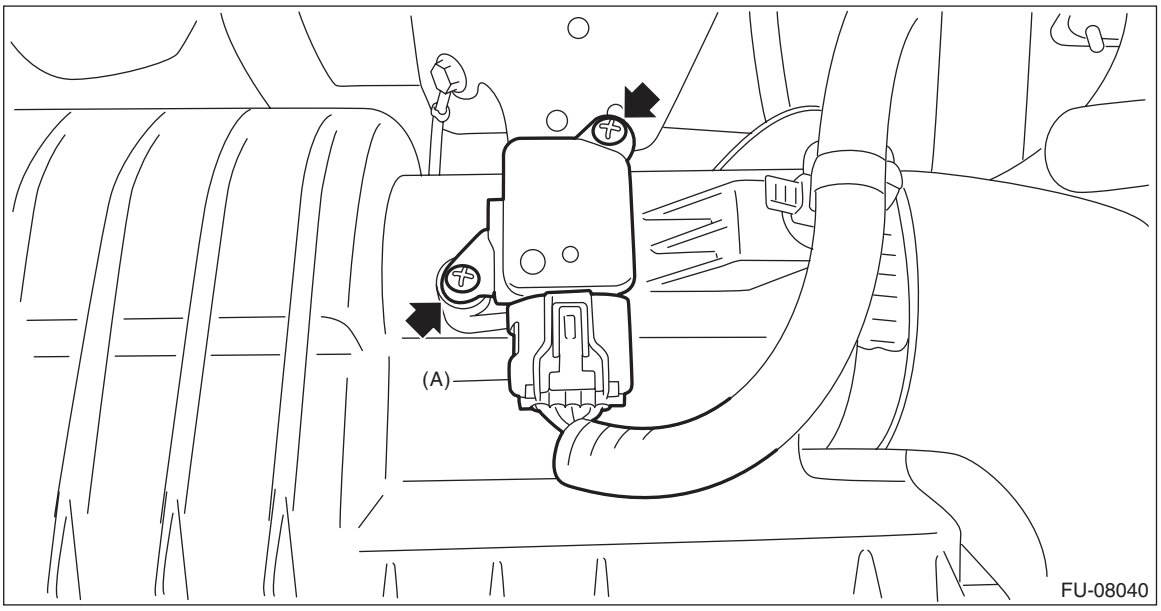
Throttle body is a non-disassembled part, so do not remove the throttle position sensor from throttle body. Refer to “Throttle Body” for removal and installation procedure. <Ref. to FU(H4DO(HEV))-15, REMOVAL, Throttle Body.> <Ref. to FU(H4DO(HEV))-16, INSTALLATION, Throttle Body.>

13.Mass Air Flow and Intake Air Temperature Sensor

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Disconnect the connector (A) from the mass air flow and intake air temperature sensor, and remove the mass air flow and intake air temperature sensor.



B: INSTALLATION

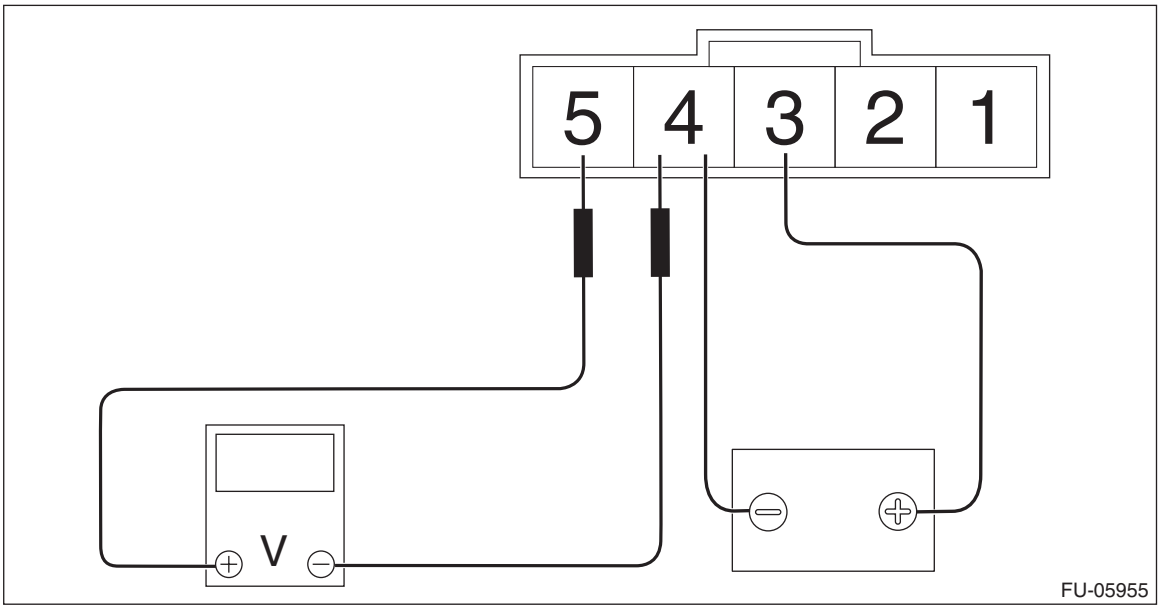
Install in the reverse order of removal.

Tightening torque:
1 N·m (0.1 kgf-m, 0.7 ft-lb)

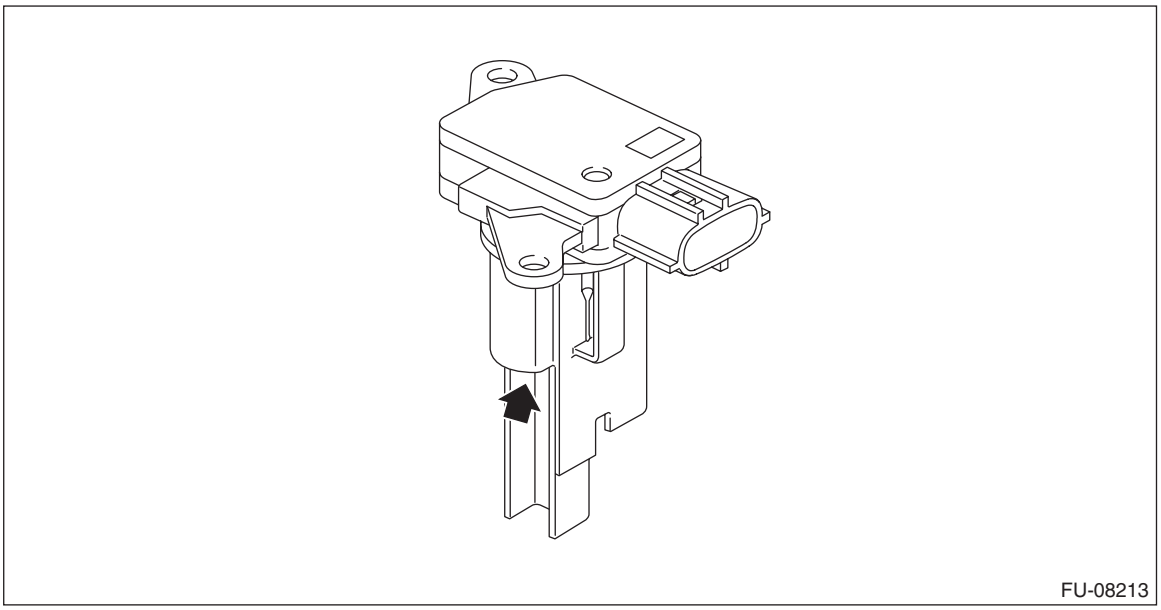
C: INSPECTION

1. CHECK THE MASS AIR FLOW SENSOR UNIT

1) Connect the battery positive terminal to terminal No. 3 and the battery ground terminal to terminal No. 4, the circuit tester positive terminal to terminal No. 5 and the circuit tester ground terminal to terminal No. 4.

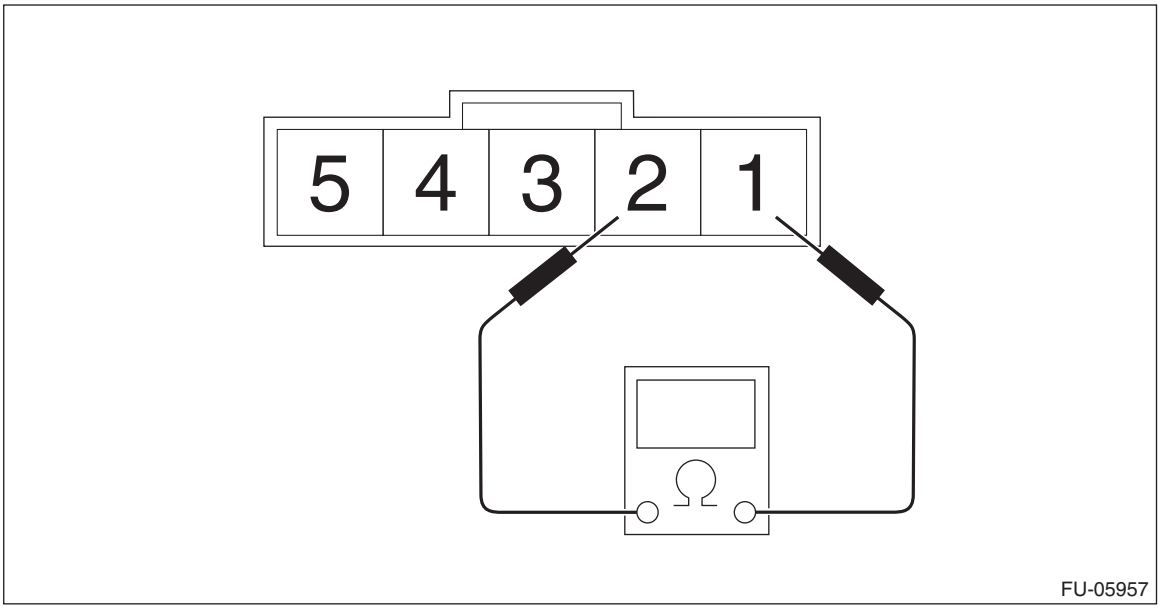


2) Check the voltage changes when air is blown from the arrow pointing area to the mass air flow sensor unit.



2. CHECK THE INTAKE AIR TEMPERATURE SENSOR UNIT

Measure the resistance between intake air temperature sensor terminals.



Temperature	Terminal No.	Standard
–20°C (–4°F)	1 and 2	16.0±2.4 kΩ
20°C (68°F)		2.45±0.24 kΩ
60°C (140°F)		0.58±0.087 kΩ

3. OTHER INSPECTIONS

1) Check that the mass air flow and intake air temperature sensor has no deformation, cracks or other damages.
2) Check that the mass air flow and intake air temperature sensor has no dirt.

14.Manifold Absolute Pressure Sensor

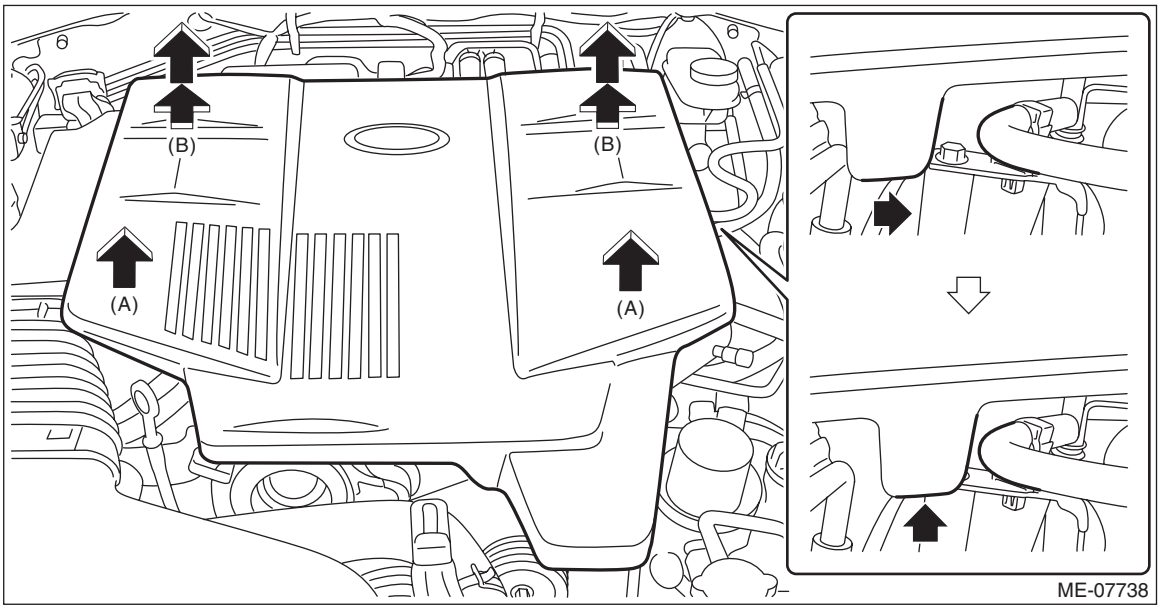
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

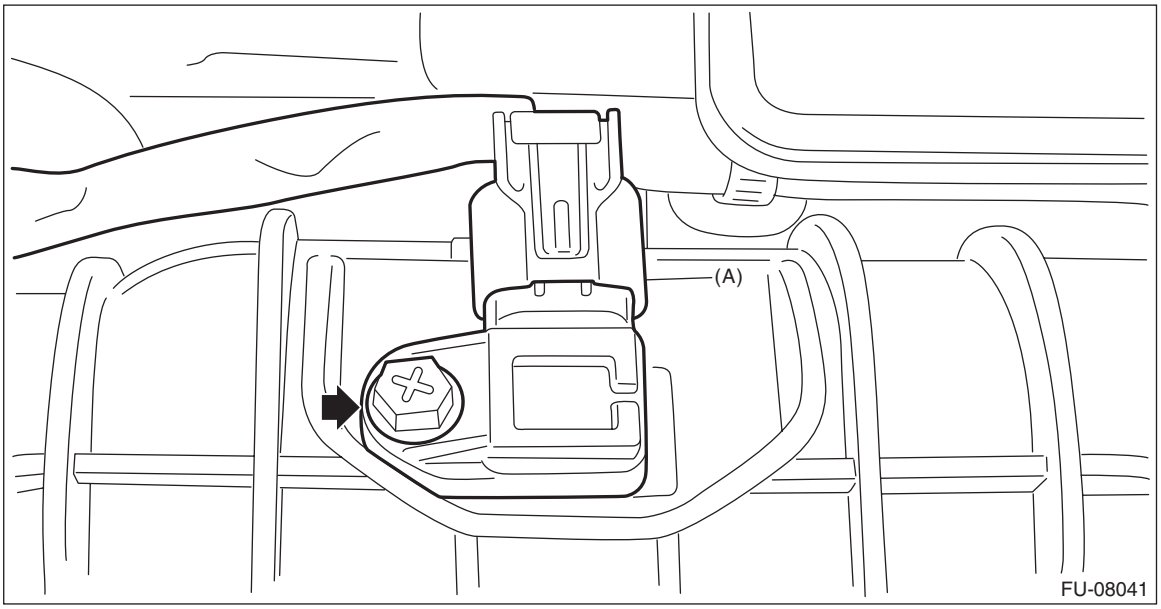
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Disconnect the connector (A) from the manifold absolute pressure sensor, and remove the manifold absolute pressure sensor from intake manifold.



B: INSTALLATION

Install in the reverse order of removal.

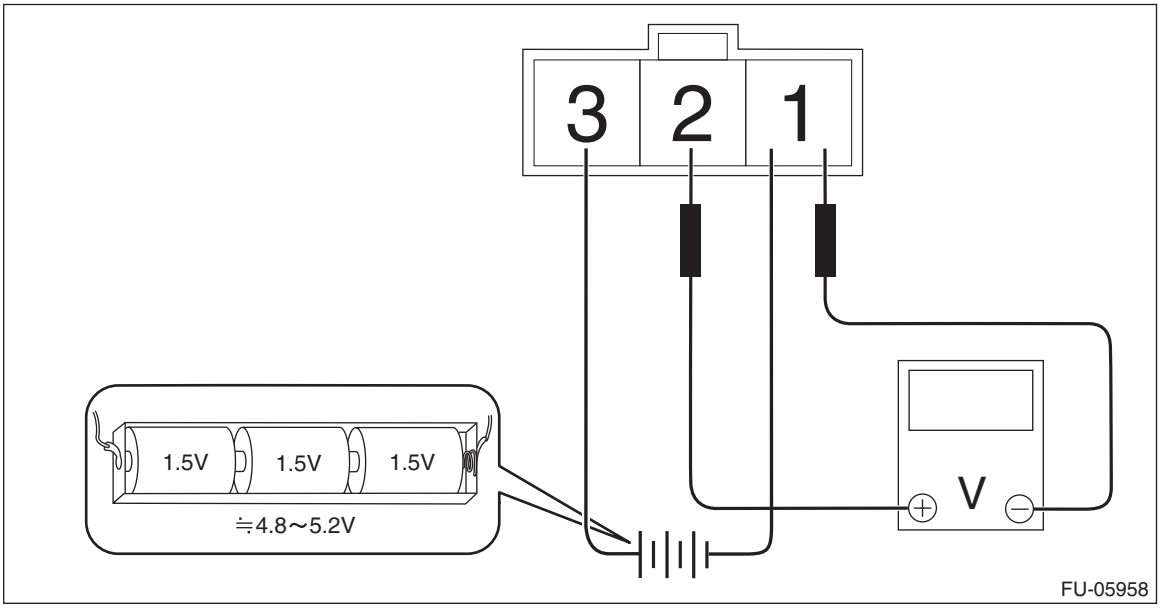
NOTE:
Use new O-rings.

Tightening torque:
4 N·m (0.4 kgf-m, 3.0 ft-lb)

C: INSPECTION

1) Check that the manifold absolute pressure sensor has no deformation, cracks or other damages.
2) Connect dry-cell battery positive terminal to terminal No. 3 and dry-cell battery ground terminal to terminal No. 1, circuit tester positive terminal to terminal No. 2 and the circuit tester ground terminal to terminal No. 1.

NOTE:
- Use new dry-cell batteries.
- Using a circuit tester, check that the initial voltage of each dry-cell battery is 1.6 V or more. And also check that the voltage of three batteries in series is between 4.8 V and 5.2 V.
- For power supply, 5 V DC constant voltage power source can also be used.

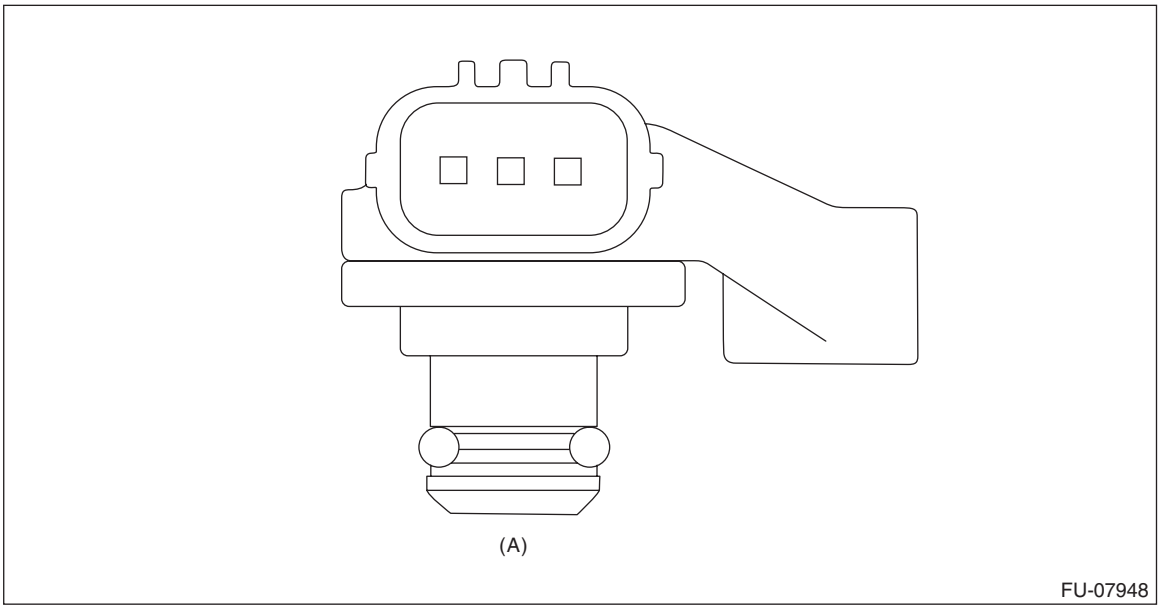


3) Check the voltage at a normal atmospheric pressure.

NOTE:
The atmospheric pressure at higher altitude is lower than normal. Therefore, the voltage is lower than the standard value.

Terminal No.	Standard
2 (+) and 1 (–)	Approx. 4.2 V (when 25°C (77°F))

4) Connect the Mighty Vac to the pressure port (A) of manifold absolute pressure sensor.



5) Check the voltage when generating vacuum using Mighty Vac.

CAUTION:
Do not apply vacuum of less than –88 kPa (–0.9 kg/cm^2, –12.8 psi). Doing so may damage the manifold absolute pressure sensor.

NOTE:
When vacuum occurs at the pressure port of manifold absolute pressure sensor, the voltage will drop from the value as in step 3).

Pressure	Terminal No.	Standard
–88 kPa (–0.9 kg/cm^2, –12.8 psi)	2 (+) and 1 (–)	Approx. 1 V (when 25°C (77°F))

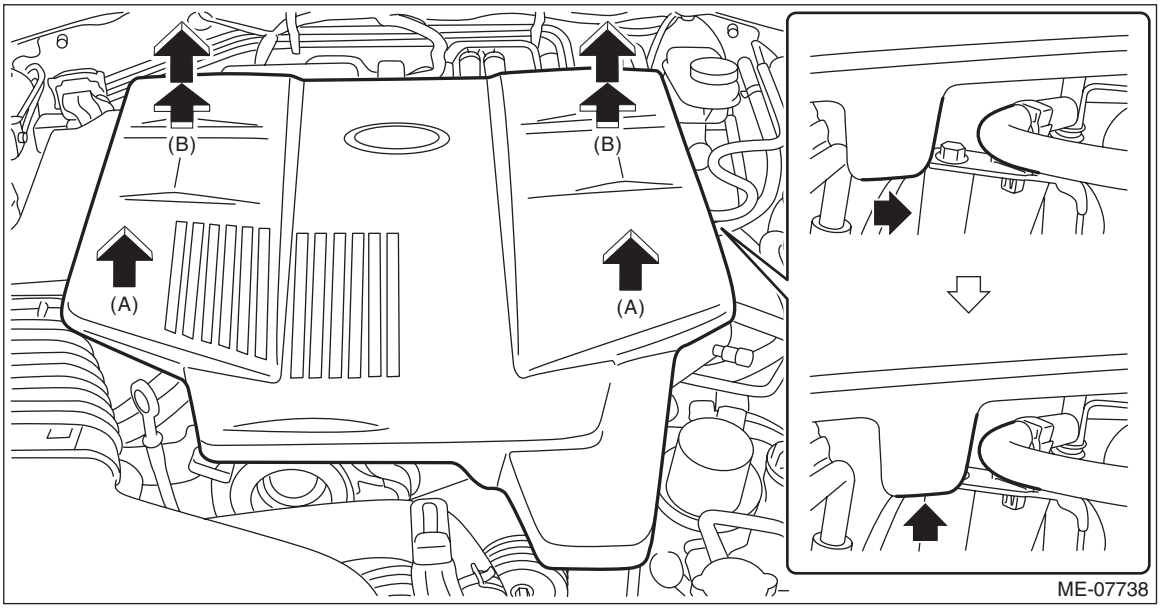
15.Fuel Injector

A: REMOVAL

1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

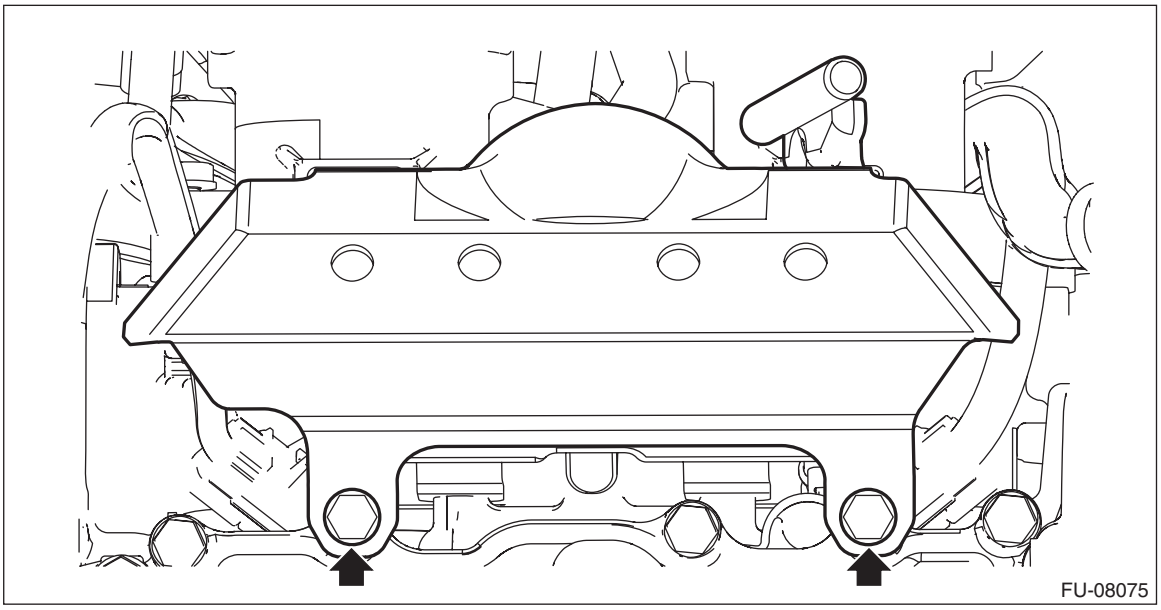
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



4) Open the fuel filler lid and remove the fuel filler cap.

NOTE:
This operation is required to release the inner pressure of the fuel tank.
5) Remove the intake duct. (RH side only) <Ref. to IN(H4DO(HEV))-16, REMOVAL, Intake Duct.>

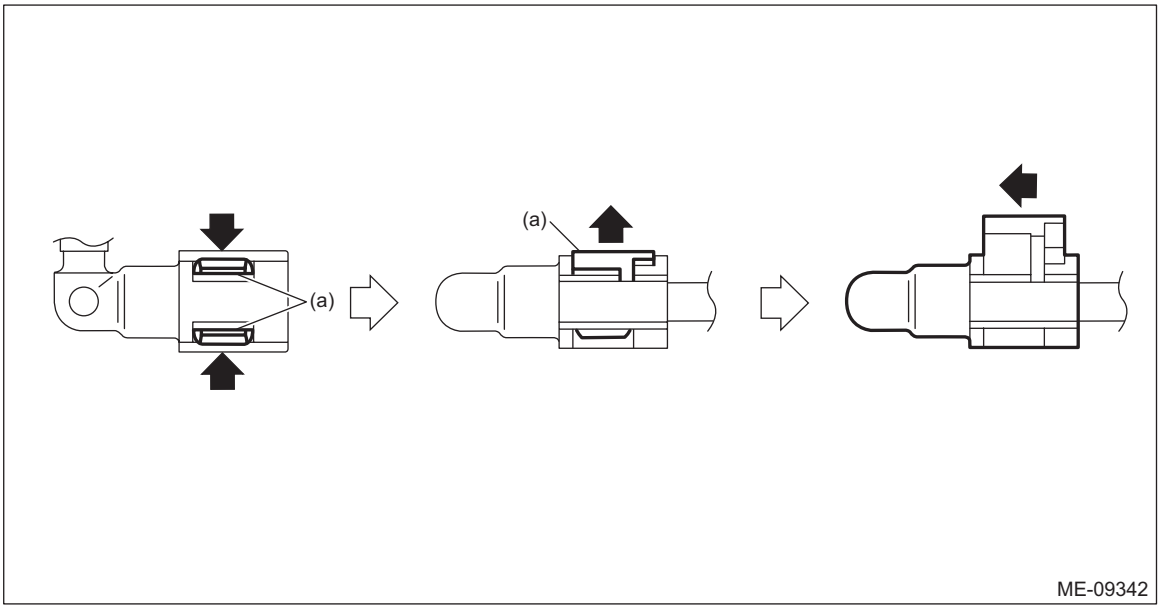
6) Remove the intake manifold protector RH.



7) Disconnect the connectors (A) from fuel injector.
8) Disconnect the quick connector (B) of the fuel delivery pipe from the fuel pipe.

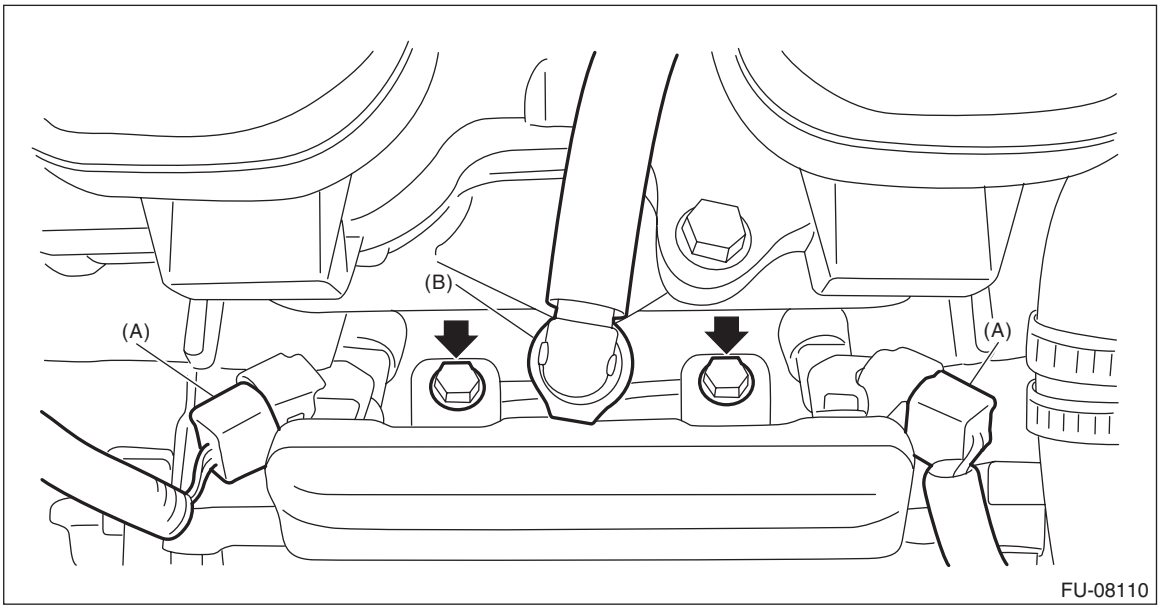
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the pipes using a container or cloth.**

NOTE:
Disconnect the quick connector as shown in the figure.

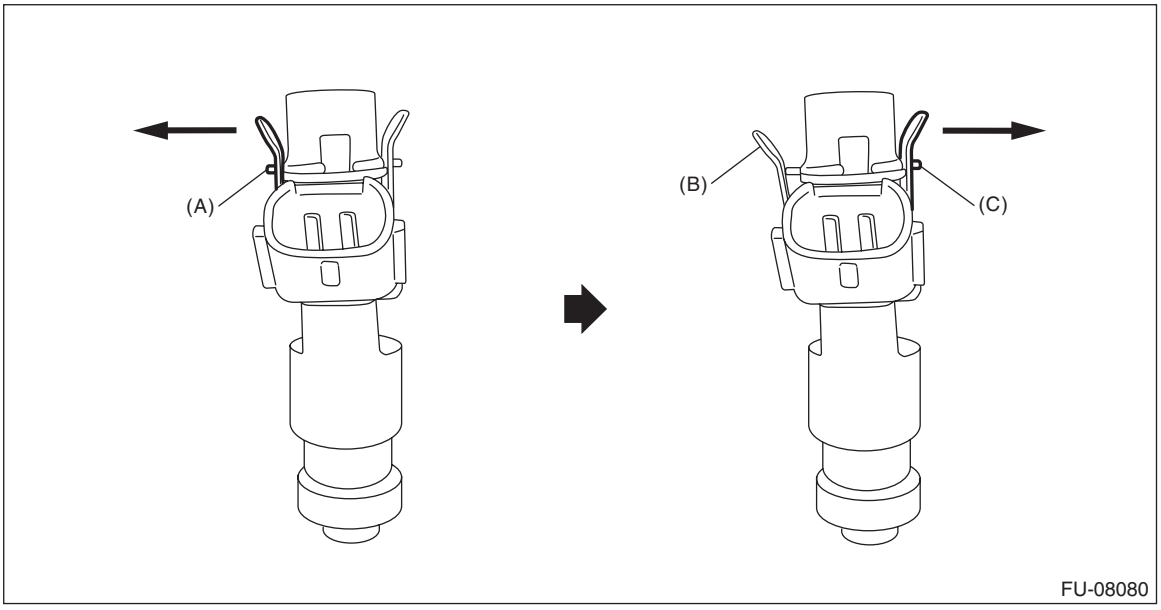


(a) Slider

9) Remove the bolts which hold fuel pipe onto the cam carrier, and remove the fuel pipe together with the fuel injector.



10) Remove the fuel injector from the fuel pipe.
(1) Remove the fuel injector holder from one side of flange section (A) of the fuel pipe.
(2) While holding one side of fuel injector holder (B) you removed in step (1) by finger, remove the other side of fuel injector holder from the flange section (C) of the fuel pipe.

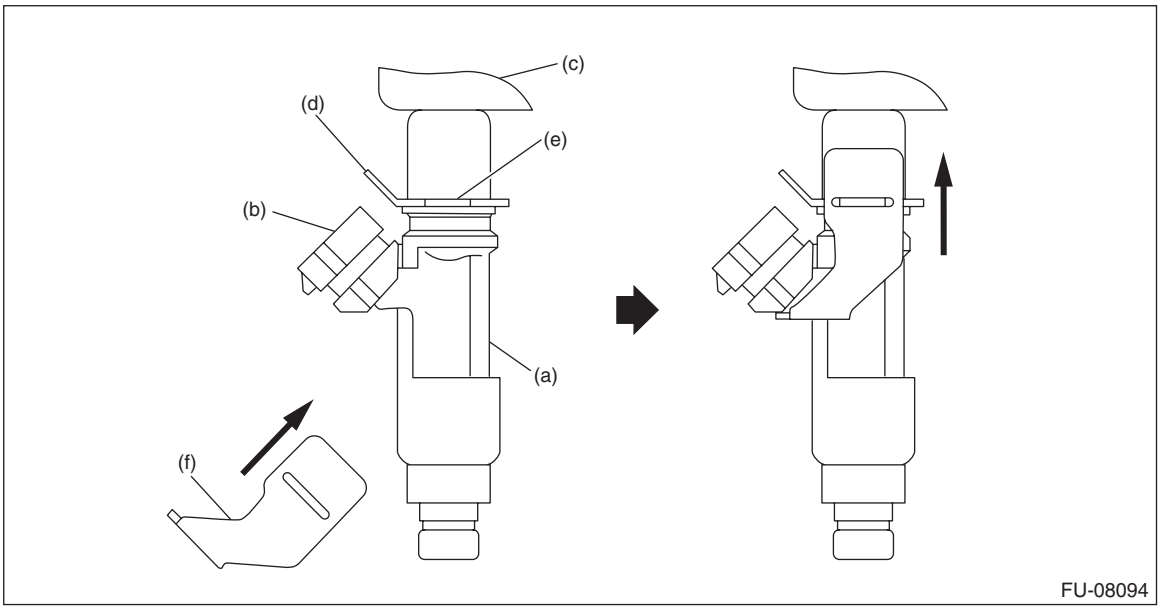


(3) Remove the fuel injector holder from the fuel pipe and fuel injector, and remove the fuel injector from the fuel pipe.
(4) Remove the fuel injector on the LH side in the same manner.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:
- Use new fuel injector holder, O-rings, rubbers and seal rings.
- Install the fuel injector so that the connector joint faces the connector rotation stopper side of the fuel pipe.
- Securely put the flange section of fuel pipe into the groove of fuel injector holder.

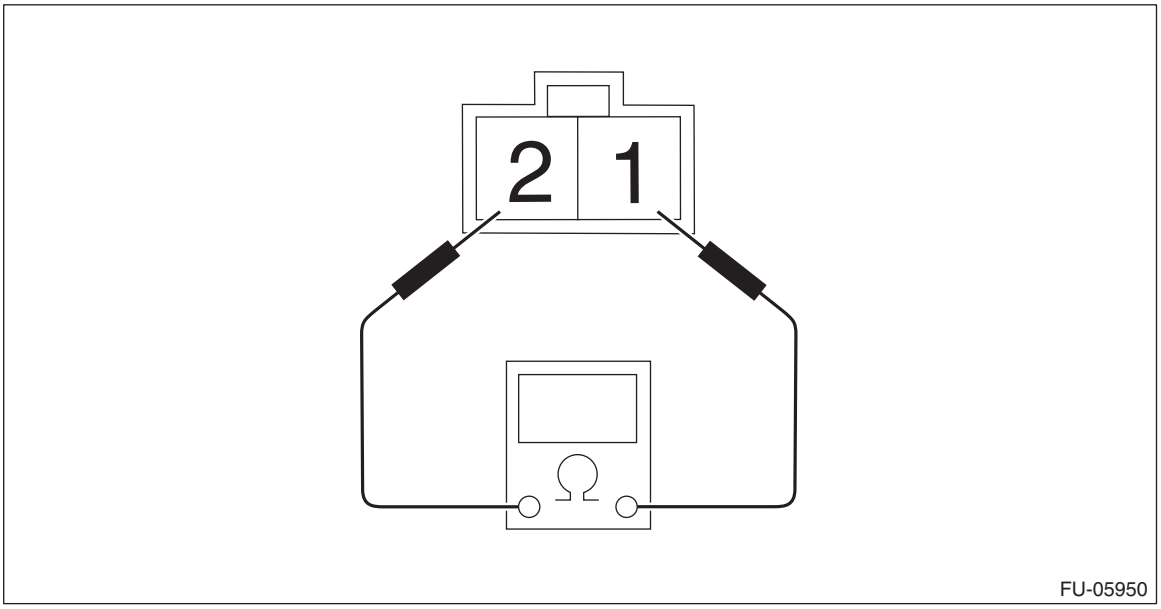


(a)	Fuel injector	(b)	Connector joint	(c)	Fuel pipe
(d)	Connector rotation stopper	(e)	Flange section	(f)	Fuel injector holder

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

C: INSPECTION

1) Check that the fuel injector has no deformation, cracks or other damages.
2) Measure the resistance between fuel injector terminals.



Terminal No.	Standard
1 and 2	Approx. 12.0 Ω (when 20°C (68°F))

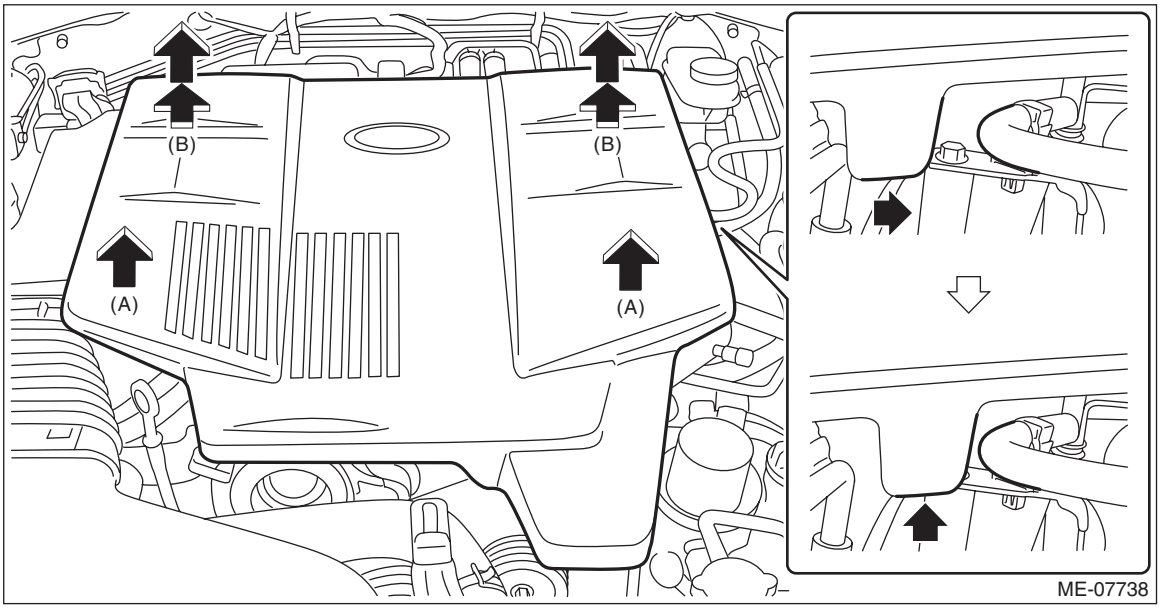
16.Tumble Generator Valve Assembly

A: REMOVAL

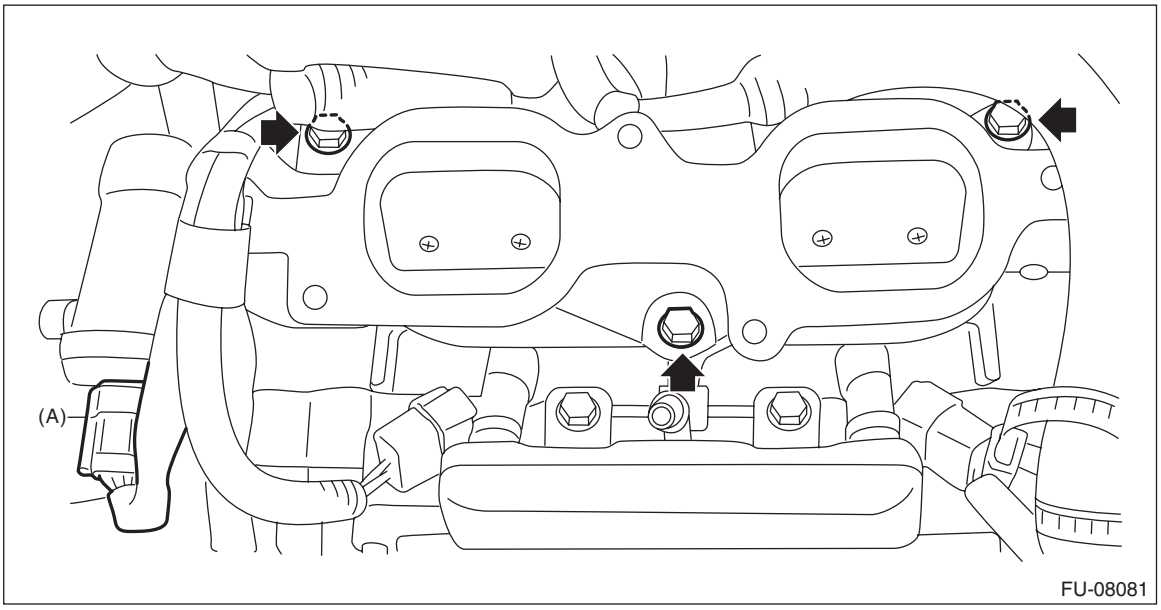
1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

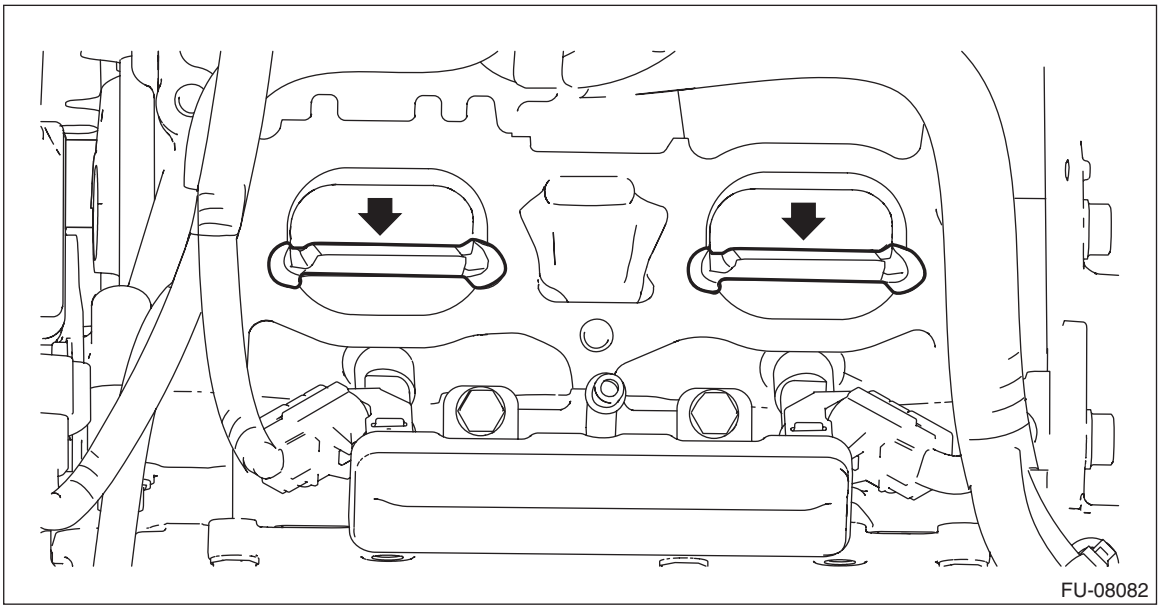
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



4) Remove the intake manifold. <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
5) Disconnect the connector (A) from the tumble generator valve assembly RH.
6) Remove the tumble generator valve assembly RH from the cylinder head.



7) Remove the cylinder head plate from cylinder head RH.



8) Remove the tumble generator valve assembly LH and cylinder head plate in the same manner.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Use a new gasket.

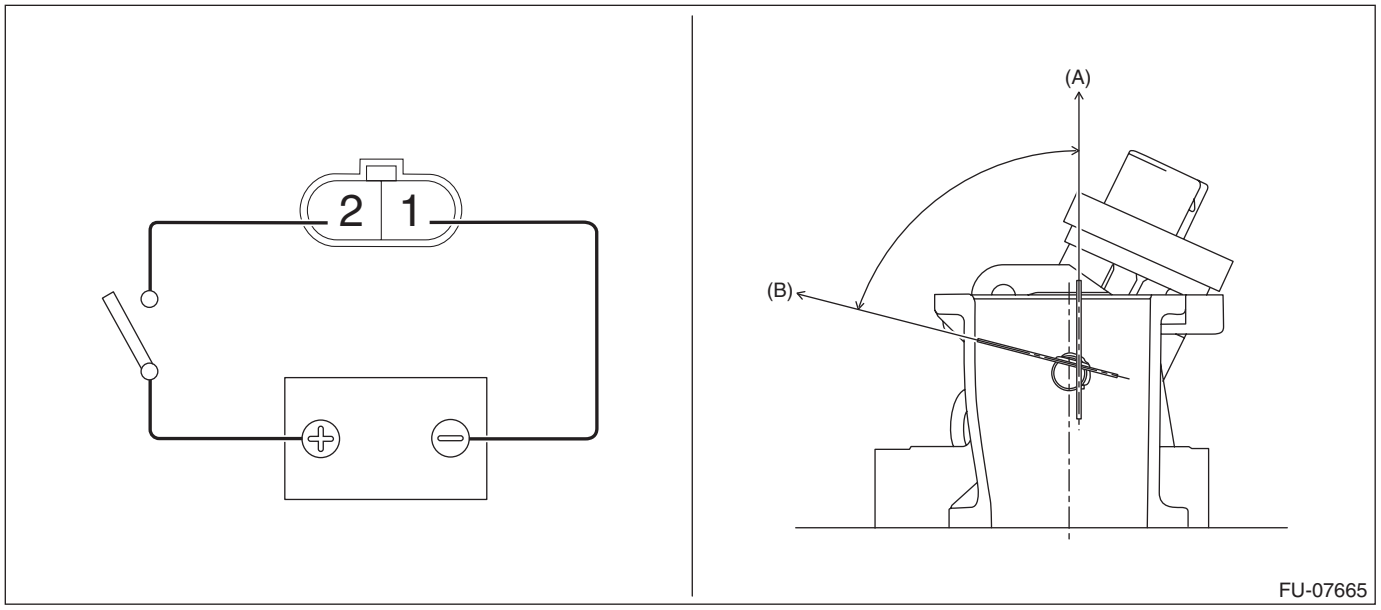
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

C: INSPECTION

1. CHECK MOTOR

1) Connect the battery positive terminal to terminal No. 2 and the battery ground terminal to terminal No. 1, and check that the valve is fully opened on LH side and the valve is fully closed on RH side.

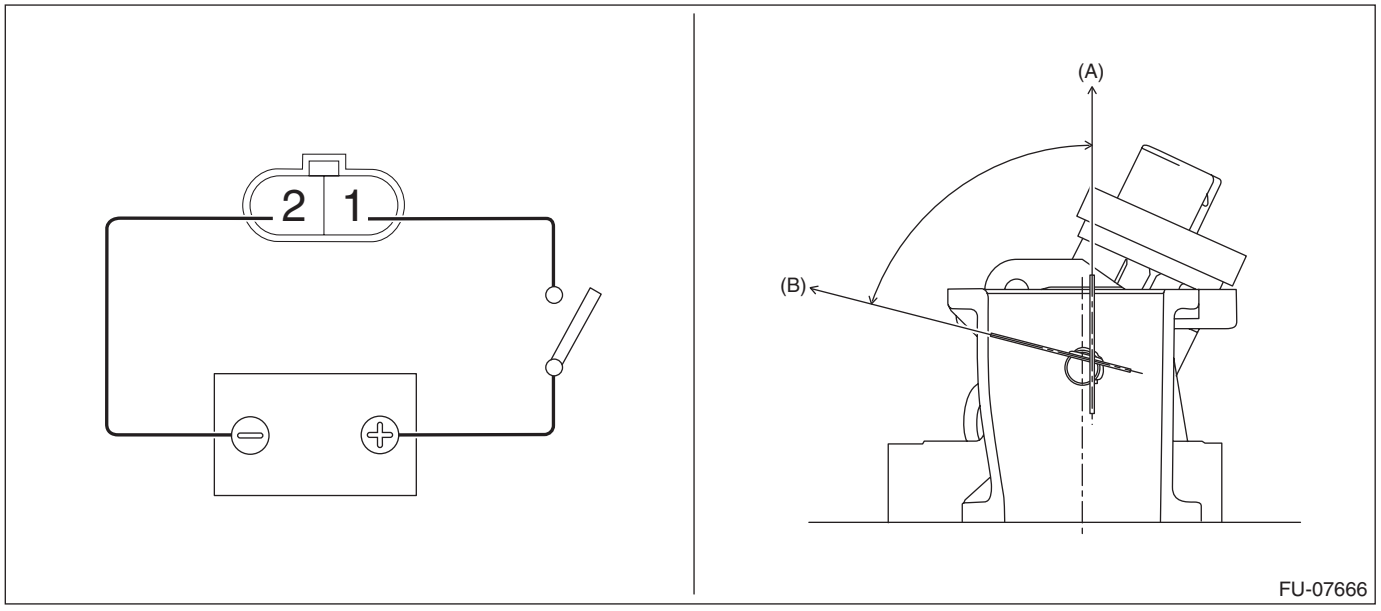
CAUTION:
Do not power the motor for more than 10 seconds.



(A) Full open (B) Full closed

2) Connect the battery positive terminal to terminal No. 1 and the battery ground terminal to terminal No. 2, and check that the valve is fully closed on LH side and the valve is fully opened on RH side.

CAUTION:
Do not power the motor for more than 10 seconds.



(A) Full open (B) Full closed

2. OTHER INSPECTIONS

1) Check that the tumble generator valve assembly has no deformation, cracks or other damages.
2) Check tumble generator valve assembly for contamination or clogging.

17.Tumble Generator Valve Actuator

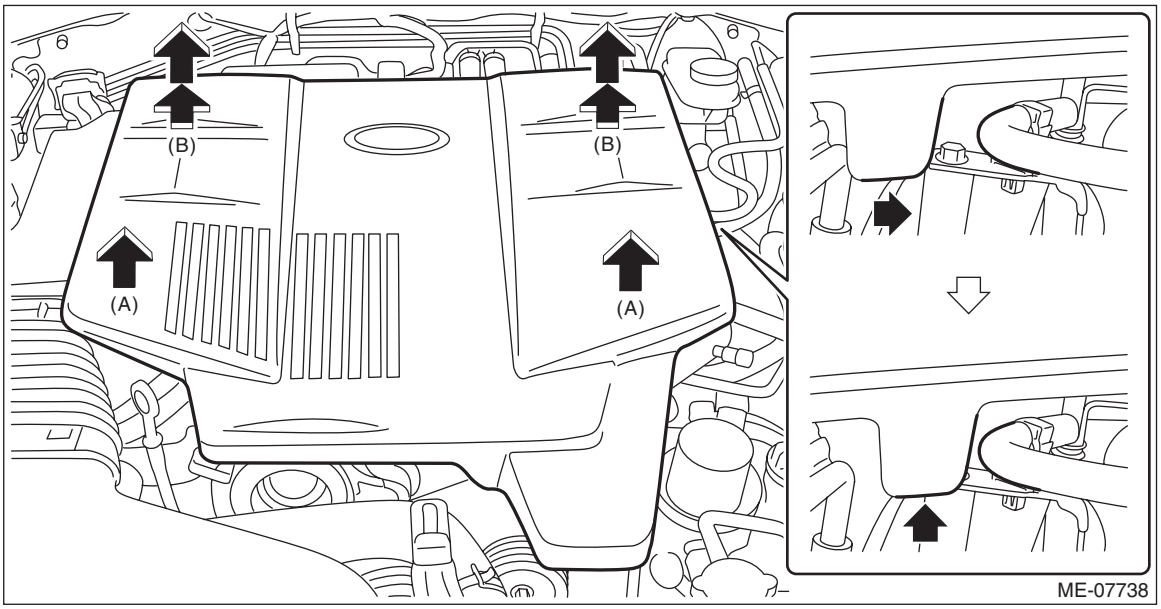
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

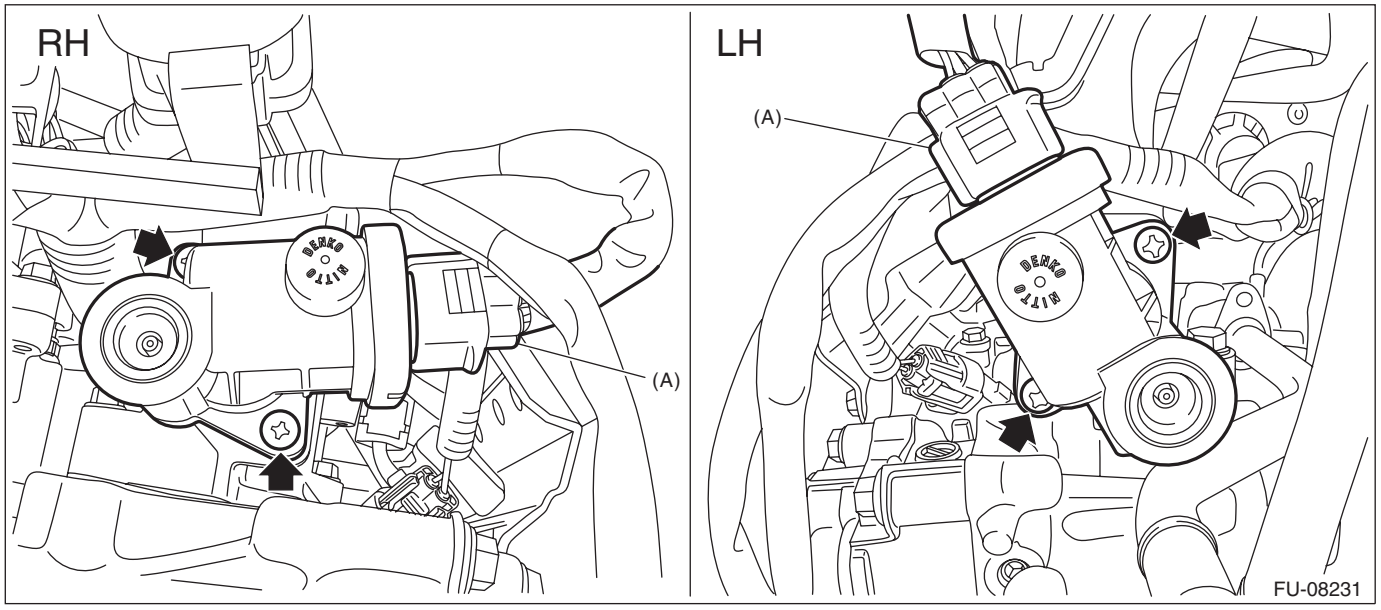
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Disconnect the connector (A) from tumble generator valve assembly, and remove the tumble generator valve actuator.

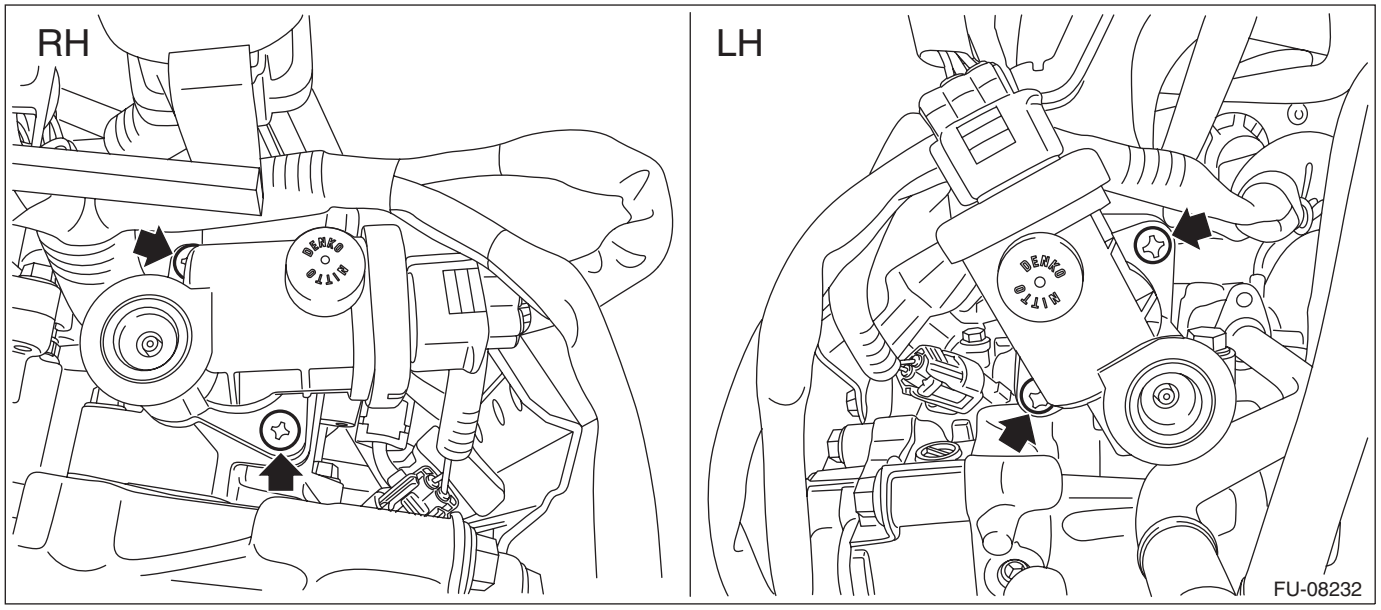


B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Use a new gasket.

Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



C: INSPECTION

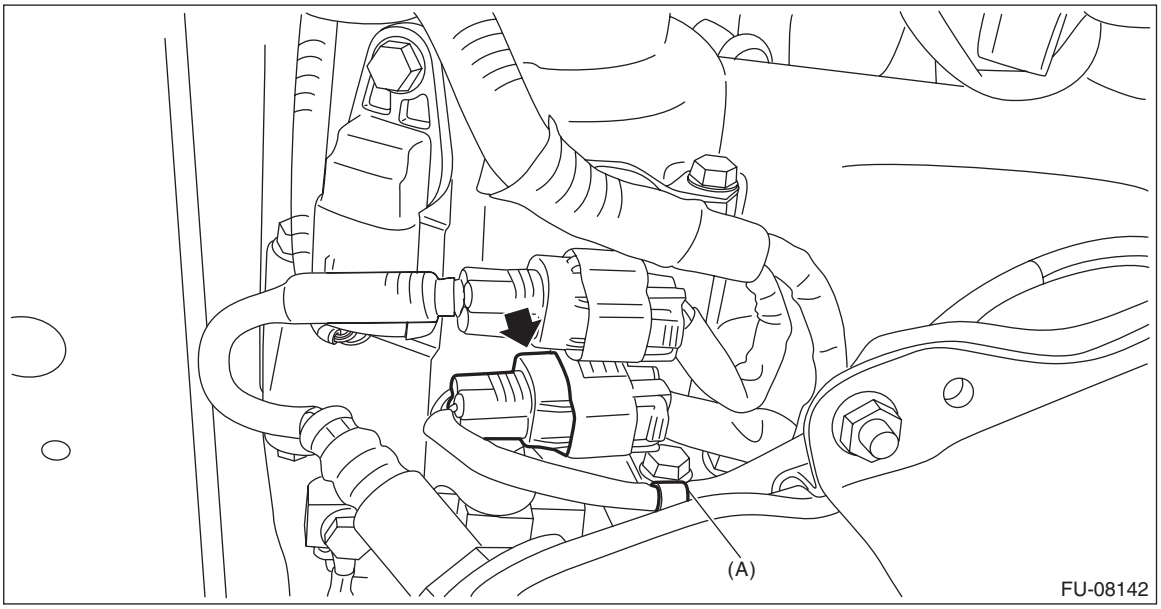
1) Check that the tumble generator valve actuator has no deformation, cracks or other damages.
2) Check tumble generator valve actuator for contamination or clogging.

18.Front Oxygen (A/F) Sensor

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

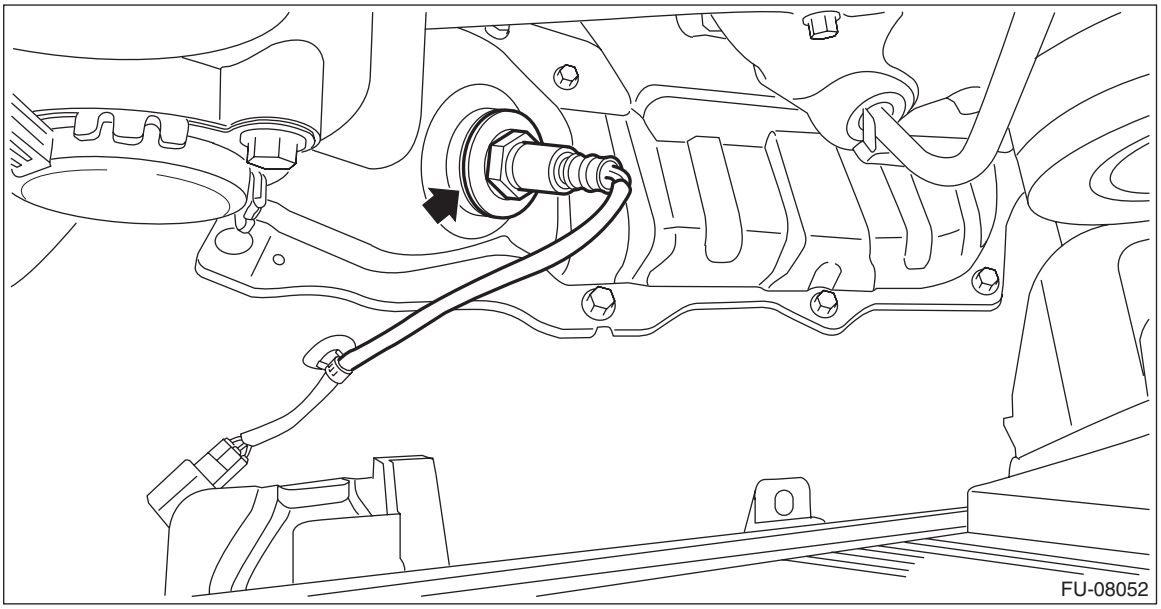
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the radiator sub fan and fan motor assembly. <Ref. to CO(H4DO(w/o HEV))-92, REMOVAL, Radiator Sub Fan and Fan Motor.>
3) Lift up the vehicle.
4) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
5) Disconnect the front oxygen (A/F) sensor connector, and remove the clip (A) holding the front oxygen (A/F) sensor harness.



6) Lower the vehicle.
7) Apply spray-type lubricant to the threaded portion of front oxygen (A/F) sensor, and leave it for one minute or more.

8) Remove the front oxygen (A/F) sensor.

CAUTION:
When removing the front oxygen (A/F) sensor, wait until exhaust pipe cools, otherwise it will damage the exhaust pipe.



B: INSTALLATION

CAUTION:
If lubricant is spilt over the exhaust pipe, wipe it off with cloth to avoid emission of smoke or causing a fire.

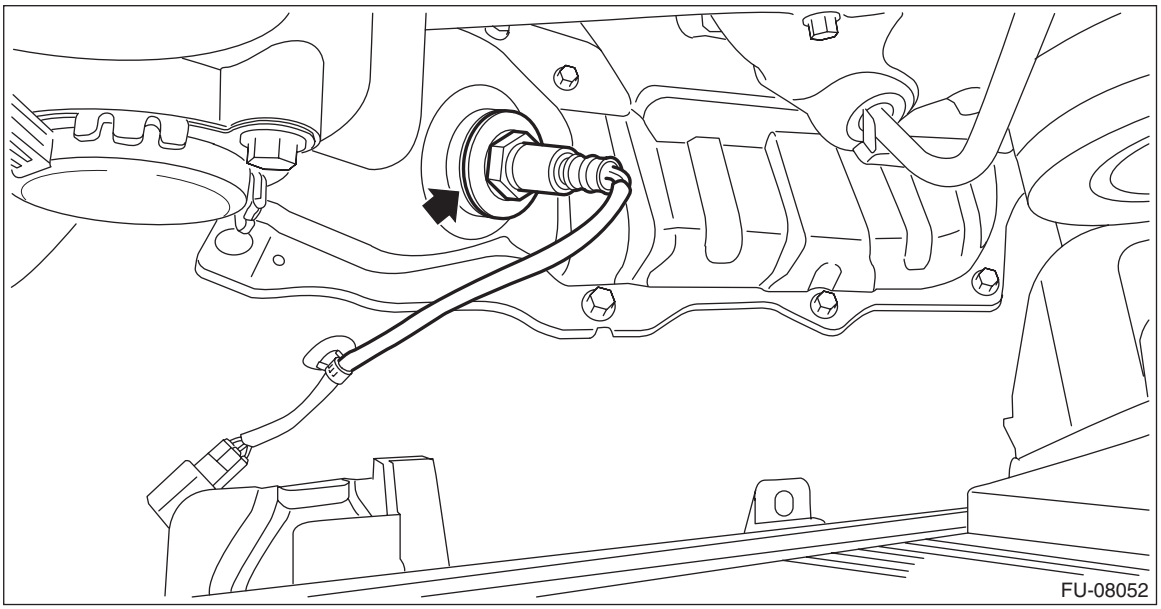
1) Before installing front oxygen (A/F) sensor, apply anti-seize compound only to the threaded portion of front oxygen (A/F) sensor to make the next removal easier.

CAUTION:
Never apply anti-seize compound to the protector of front oxygen (A/F) sensor.

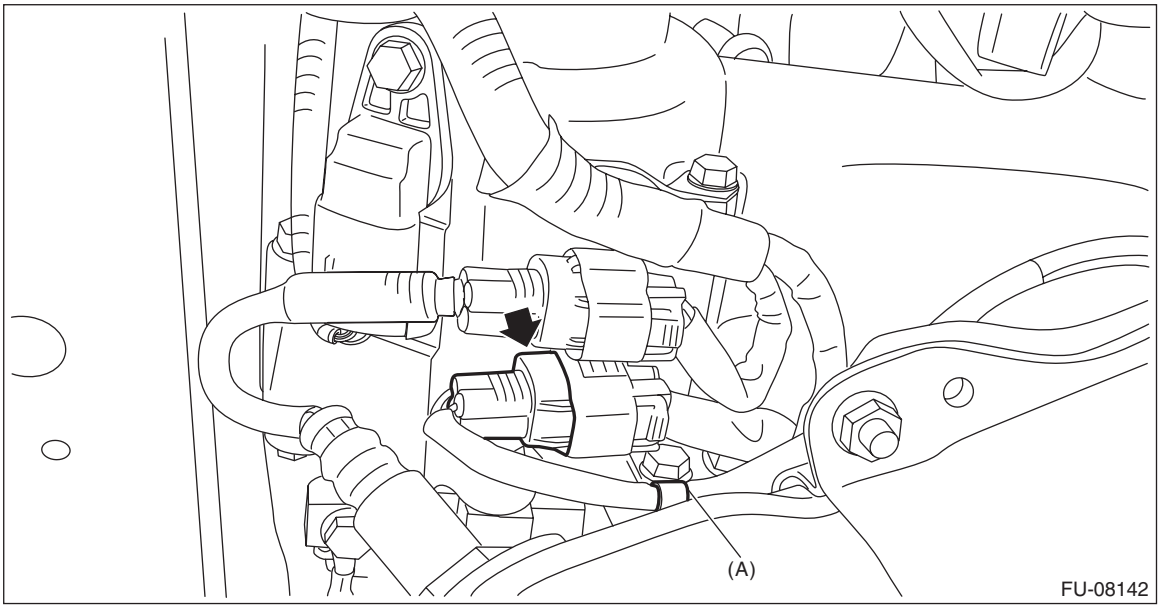
Anti-seize compound:
NEVER-SEEZ NSN, JET LUBE SS-30 or equivalent

2) Install the front oxygen (A/F) sensor.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



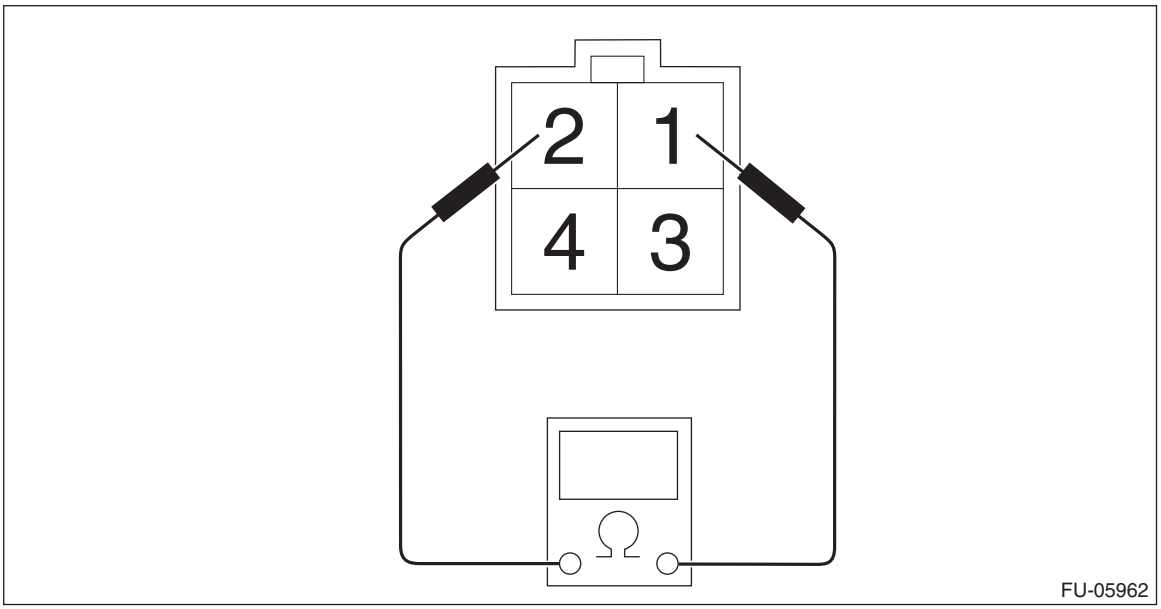
3) Lift up the vehicle.
4) Connect the front oxygen (A/F) sensor connector, and secure the front oxygen (A/F) sensor harness by using the clip (A).



5) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
6) Lower the vehicle.
7) Install the radiator sub fan and fan motor assembly. <Ref. to CO(H4DO(w/o HEV))-93, INSTALLATION, Radiator Sub Fan and Fan Motor.>
8) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Check that the front oxygen (A/F) sensor has no deformation, cracks or other damages.
2) Measure the resistance between front oxygen (A/F) sensor terminals.



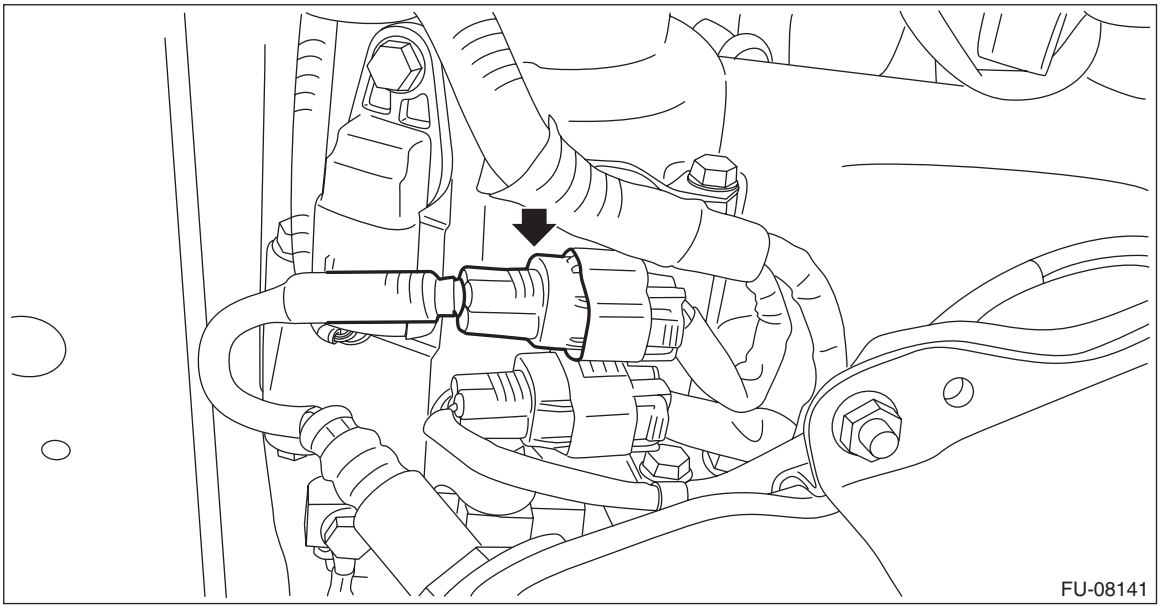
Terminal No.	Standard
1 and 2	$2.0^{+0.42}_{-0.2}$ Ω (when 20°C (68°F))

19.Rear Oxygen Sensor

A: REMOVAL

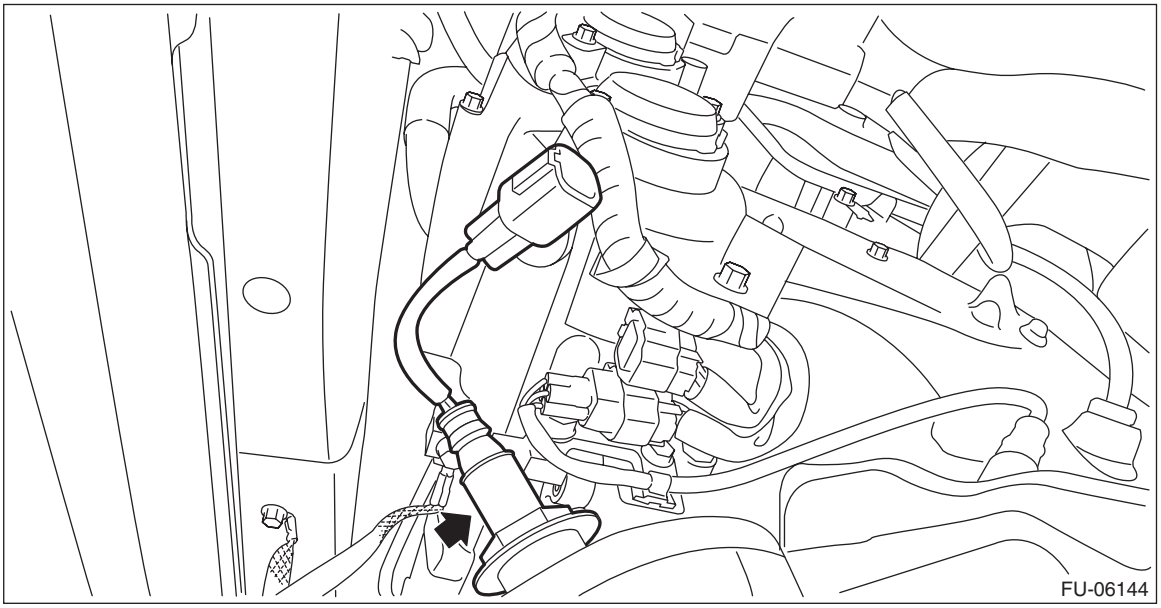
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Disconnect the rear oxygen sensor connector.



5) Apply spray-type lubricant to the threaded portion of rear oxygen sensor, and leave it for one minute or more.
6) Remove the rear oxygen sensor.

CAUTION:
When removing the rear oxygen sensor, wait until exhaust pipe cools, otherwise it will damage the exhaust pipe.



B: INSTALLATION

CAUTION:
If lubricant is spilt over the exhaust pipe, wipe it off with cloth to avoid emission of smoke or causing a fire.

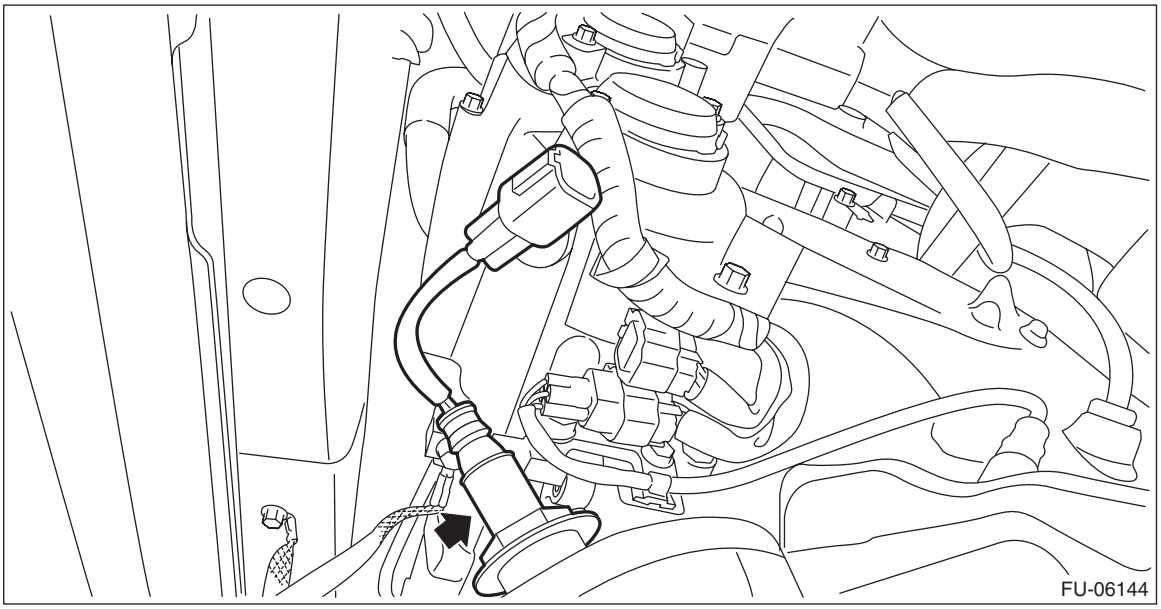
1) Before installing rear oxygen sensor, apply the anti-seize compound only to the threaded portion of rear oxygen sensor to make the next removal easier.

CAUTION:
Never apply anti-seize compound to the protector of rear oxygen sensor.

Anti-seize compound:
NEVER-SEEZ NSN, JET LUBE SS-30 or equivalent

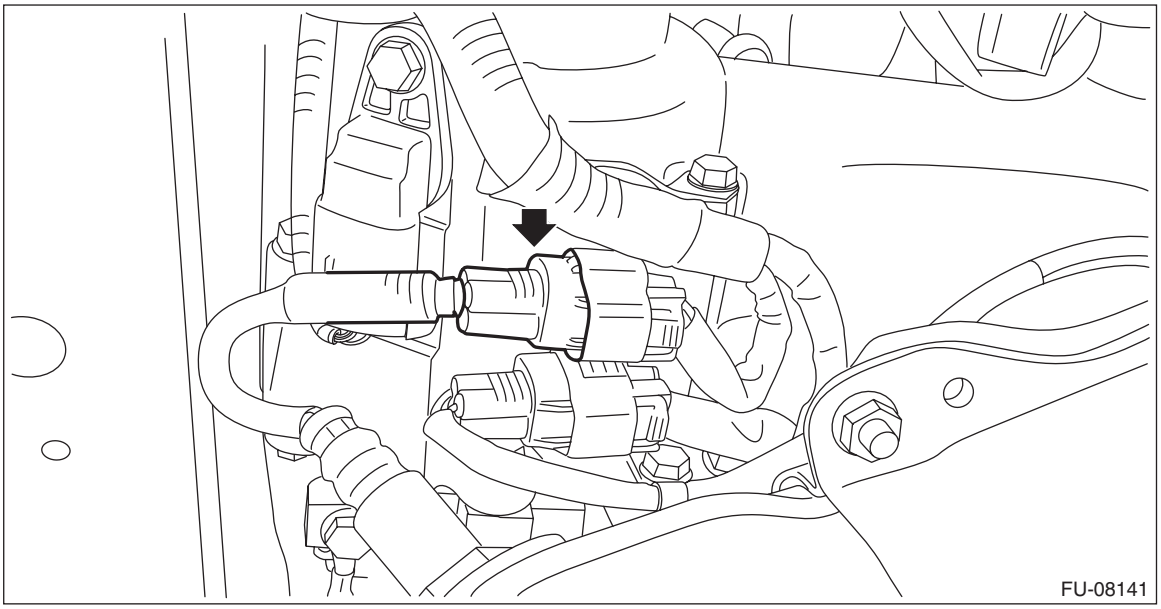
2) Install the rear oxygen sensor.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



3) Connect the rear oxygen sensor connector.

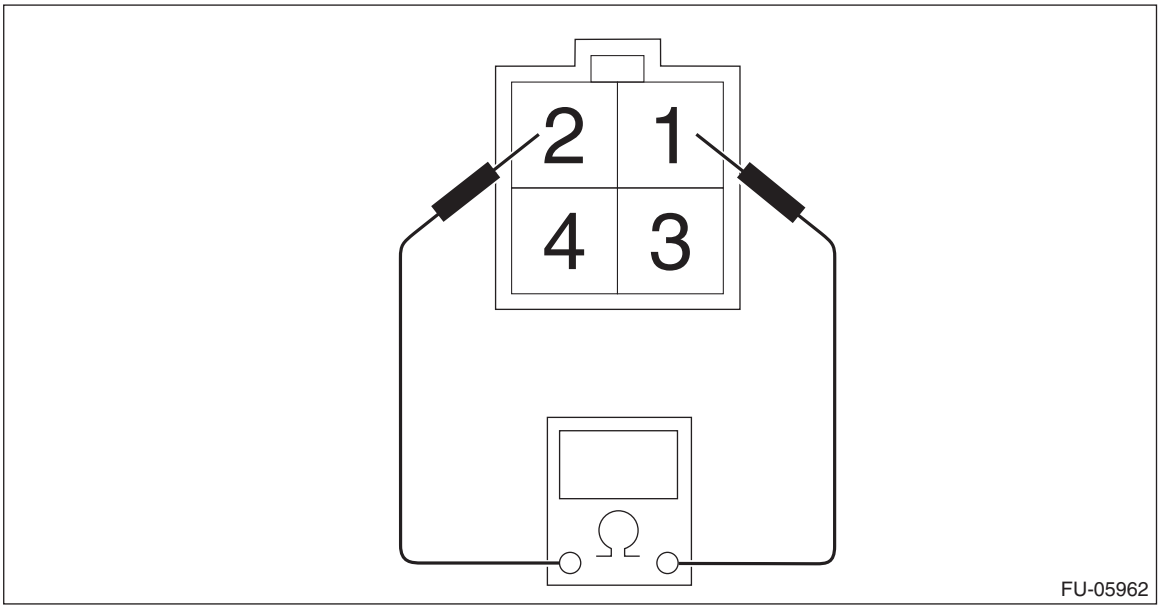
NOTE:
Be careful not to allow the rear oxygen sensor harness to interfere with the sensor unit and the front oxygen (A/F) sensor harness.



4) Install the under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
5) Lower the vehicle.
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Check that the rear oxygen sensor has no deformation, cracks or other damages.
2) Measure the resistance between rear oxygen sensor terminals.



Terminal No.	Standard
1 and 2	$5.6^{+1.7}_{-0.6}$ Ω (when 20°C (68°F))

20.Engine Control Module (ECM)

A: REMOVAL

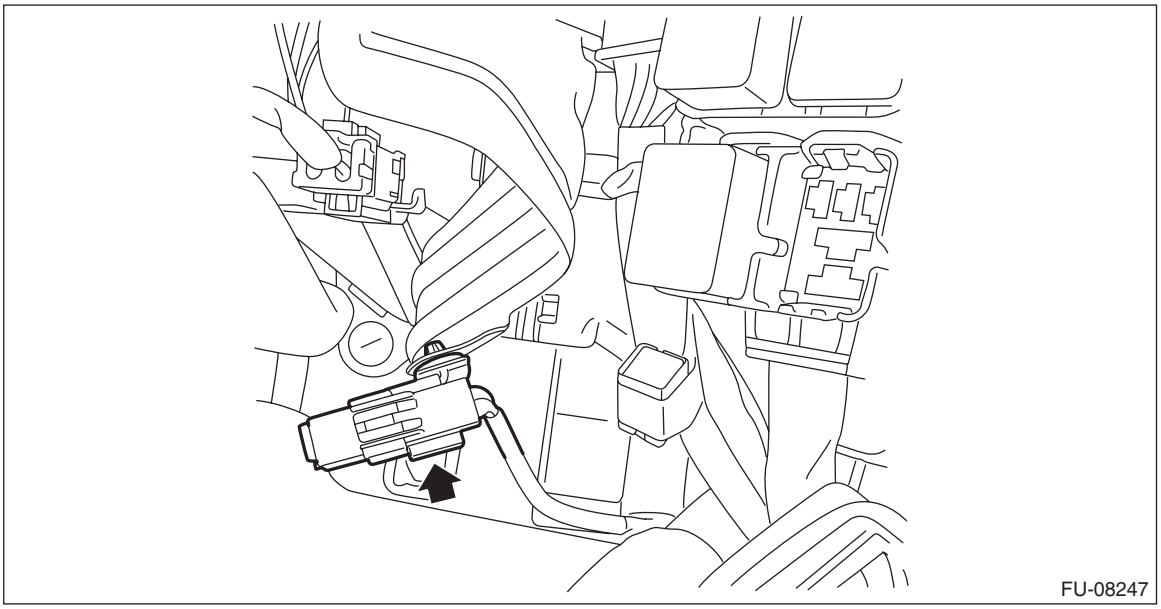
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

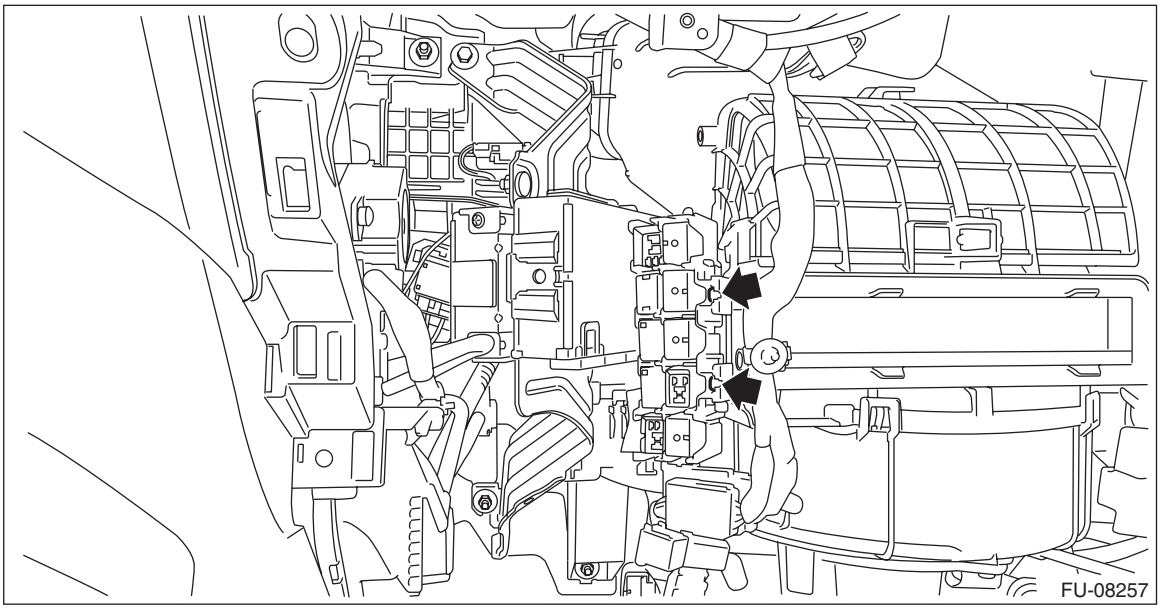
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Disconnect the connectors from ECM and the hybrid powertrain control module.



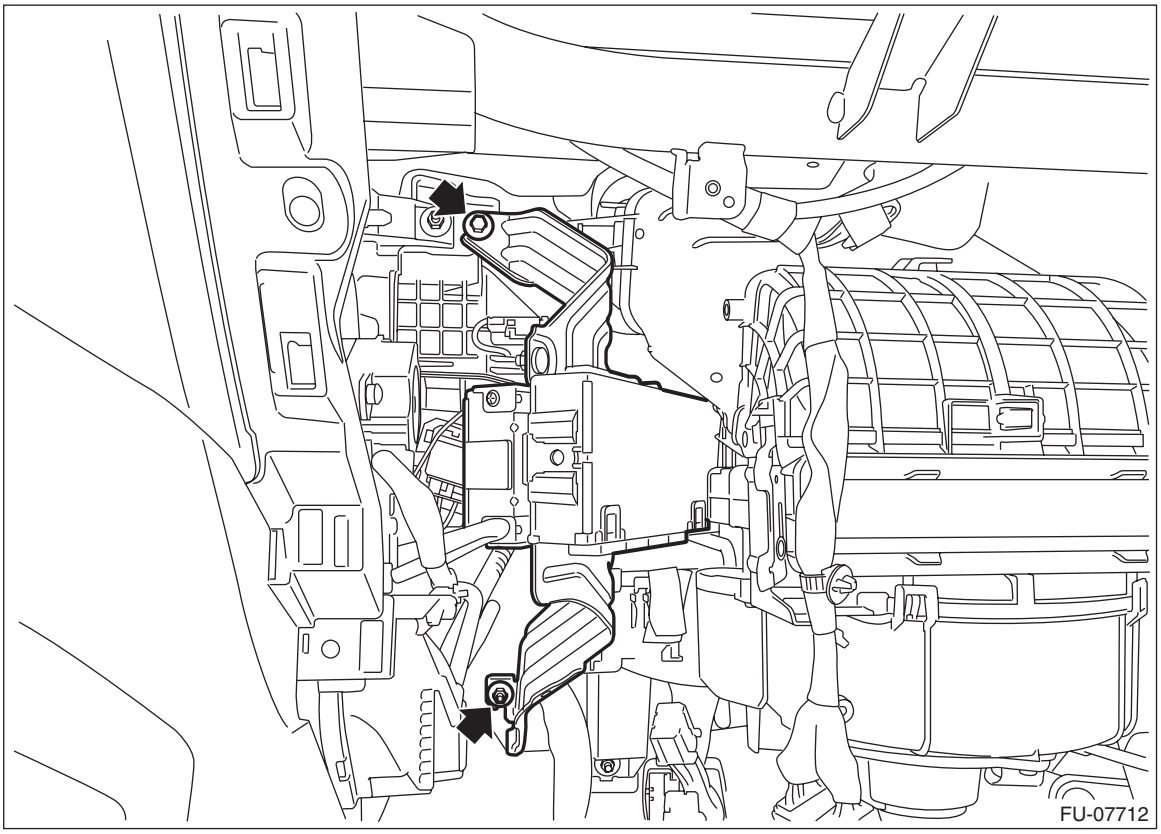
4) Remove the clip securing the linear solenoid relay from the bracket.



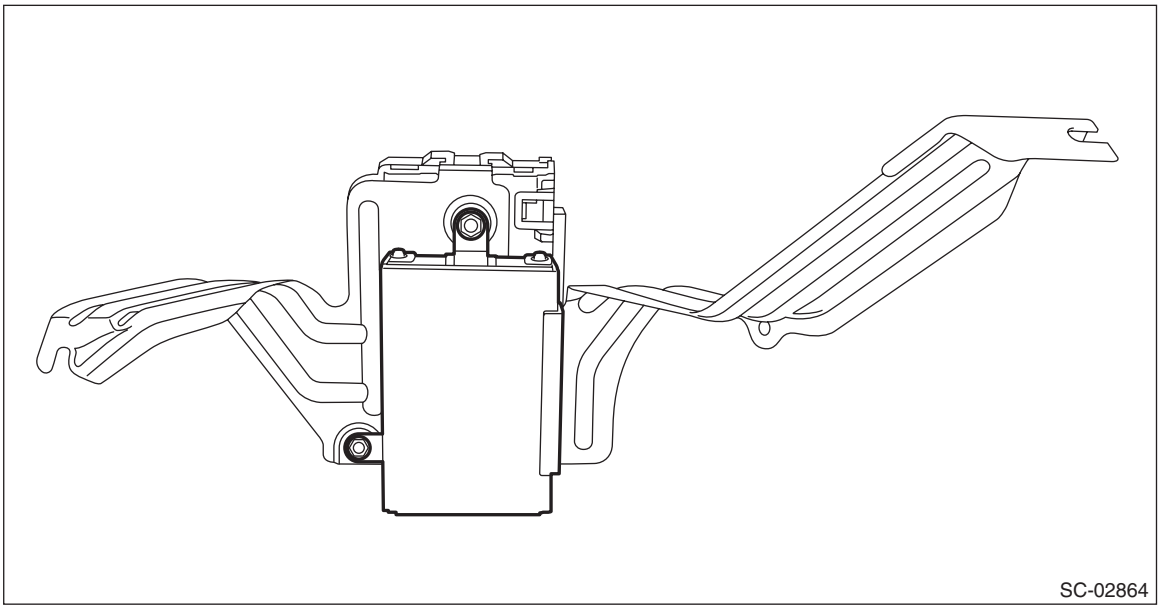
5) Push down the claws, and remove the relay block.



6) Remove the bolts and nuts, and remove the ECM.



7) Remove the hybrid powertrain control module.



B: INSTALLATION

Install in the reverse order of removal.

CAUTION:
• When the ECM of model with immobilizer has been replaced, be sure to perform the registration of immobilizer system. (Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER".)
• When the ECM has been replaced, make sure to perform the calibration (the active test for ACTGS control). <Ref. to EN(H4DO HEV)(diag)-69, OPERATION, Active Test.>
• If replacing ECM or the bracket, replace both parts with new parts at a time.
• After installing the bracket to ECM, do not separate the bracket.
• If the bracket has been installed to ECM in the wrong direction, replace both parts to new parts.

NOTE:
When replacing the ECM, be careful not to use the ECM of wrong specification to avoid any damage on the fuel injection system.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

C: INSPECTION

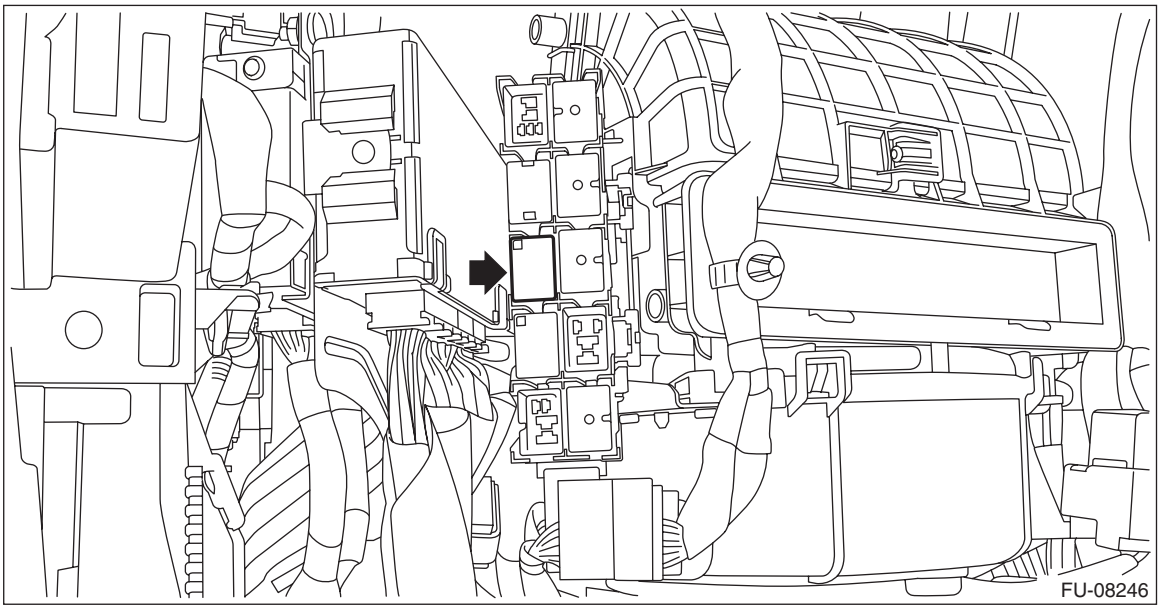
Check that the ECM has no deformation, cracks or other damages.

21.Main Relay

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the main relay from relay block.

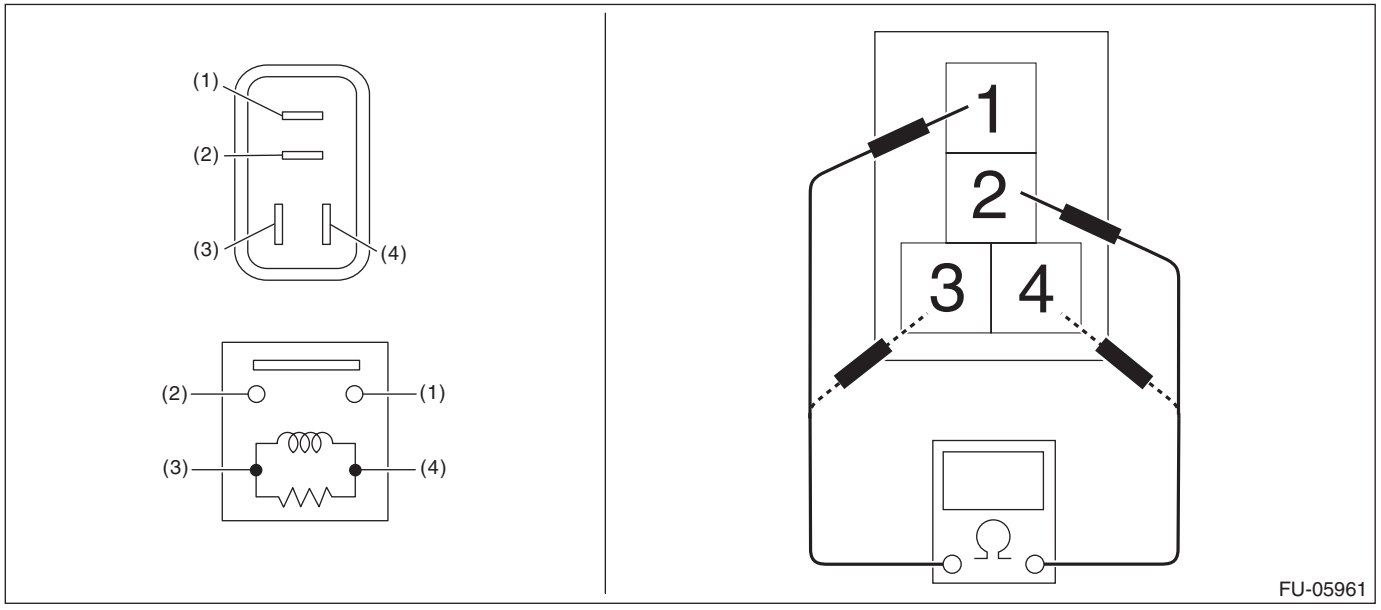


B: INSTALLATION

Install in the reverse order of removal.

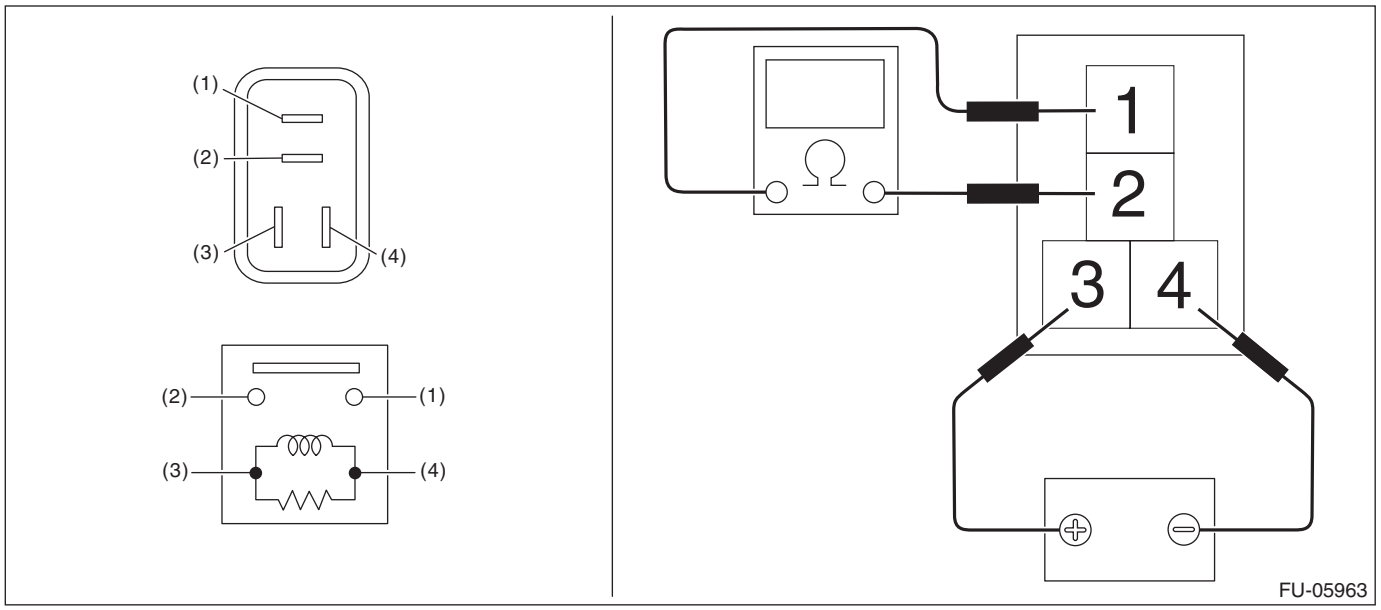
C: INSPECTION

1) Check that the main relay has no deformation, cracks or other damages.
2) Measure the resistance between main relay terminals.



Terminal No.	Standard
1 and 2	1 MΩ or more
3 and 4	130.4 — 230.8 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 3 and battery ground terminal to terminal No. 4, and measure the resistance between the main relay terminals.



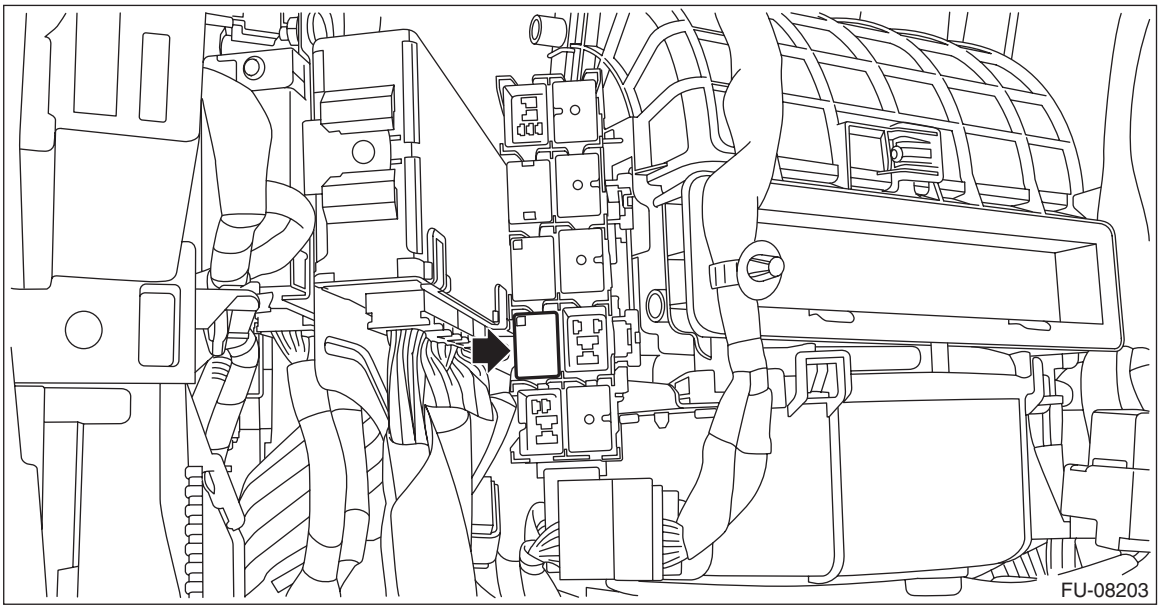
Terminal No.	Standard
1 and 2	Less than 1 Ω

22.IG Relay

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the IG relay from the relay block.

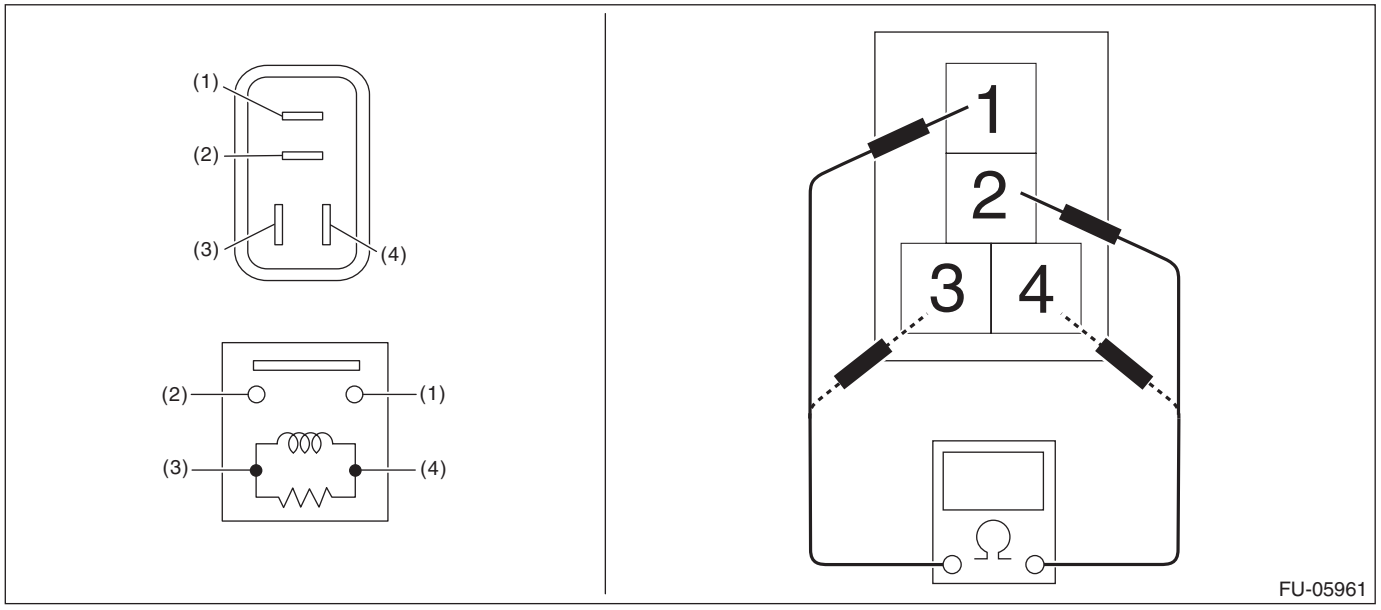


B: INSTALLATION

Install in the reverse order of removal.

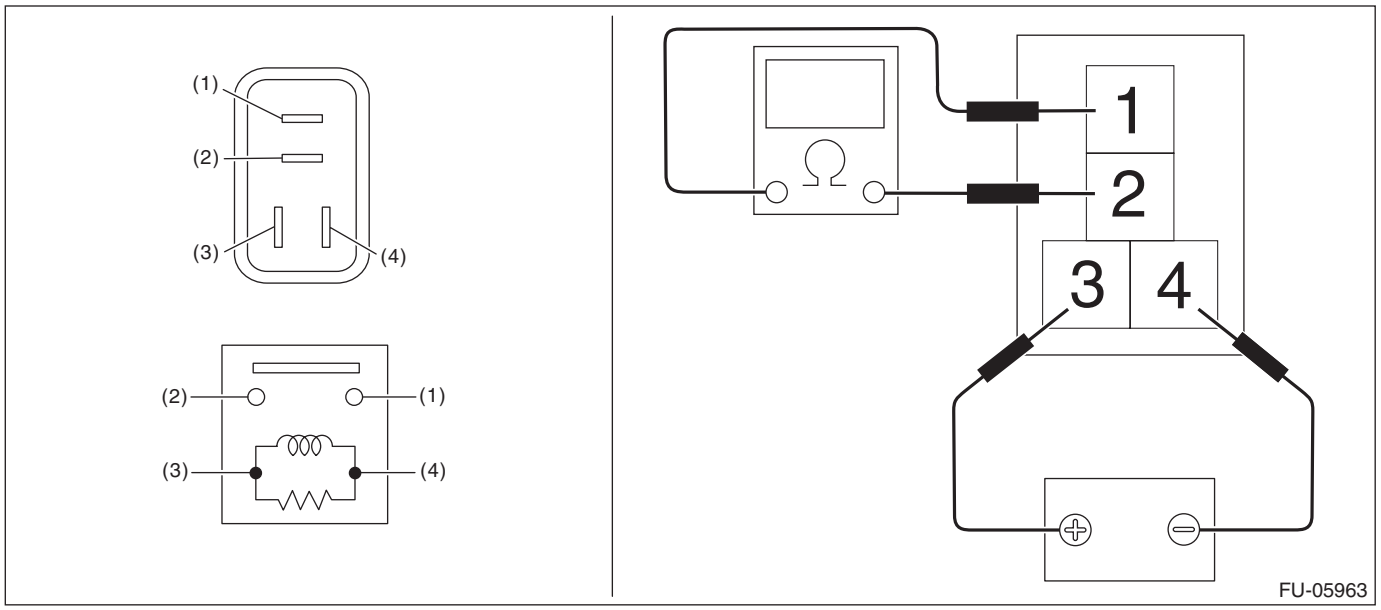
C: INSPECTION

1) Check that the IG relay has no deformation, cracks or other damages.
2) Measure the resistance between the IG relay terminals.



Terminal No.	Standard
1 and 2	1 MΩ or more
3 and 4	130.4 — 230.8 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 3 and battery ground terminal to terminal No. 4, and measure the resistance between IG relay terminals.



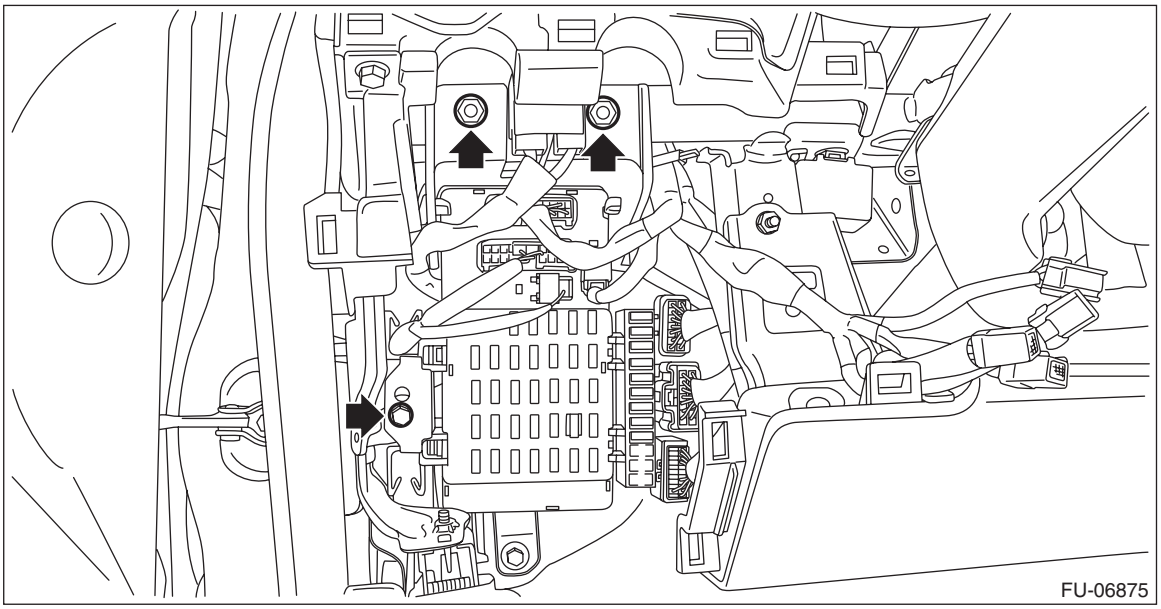
Terminal No.	Standard
1 and 2	Less than 1 Ω

23.Oxygen Sensor Relay

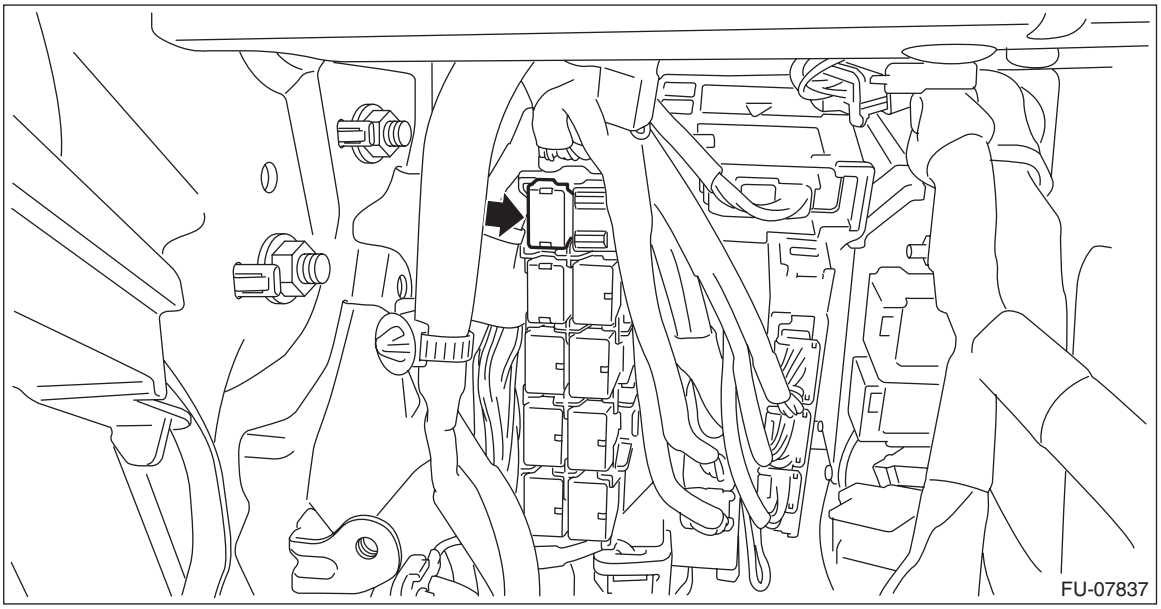
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the instrument panel lower cover. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the bolts and nuts securing the fuse block and move down the fuse block.



4) Remove the oxygen sensor relay from the relay block.



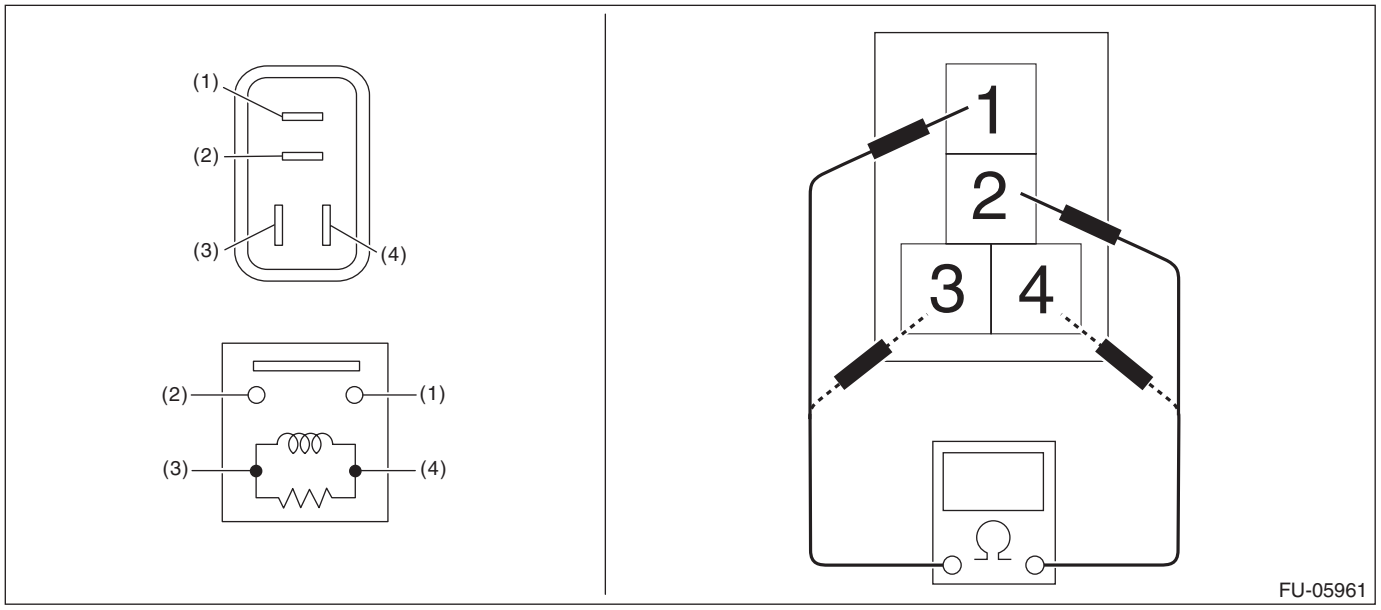
B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

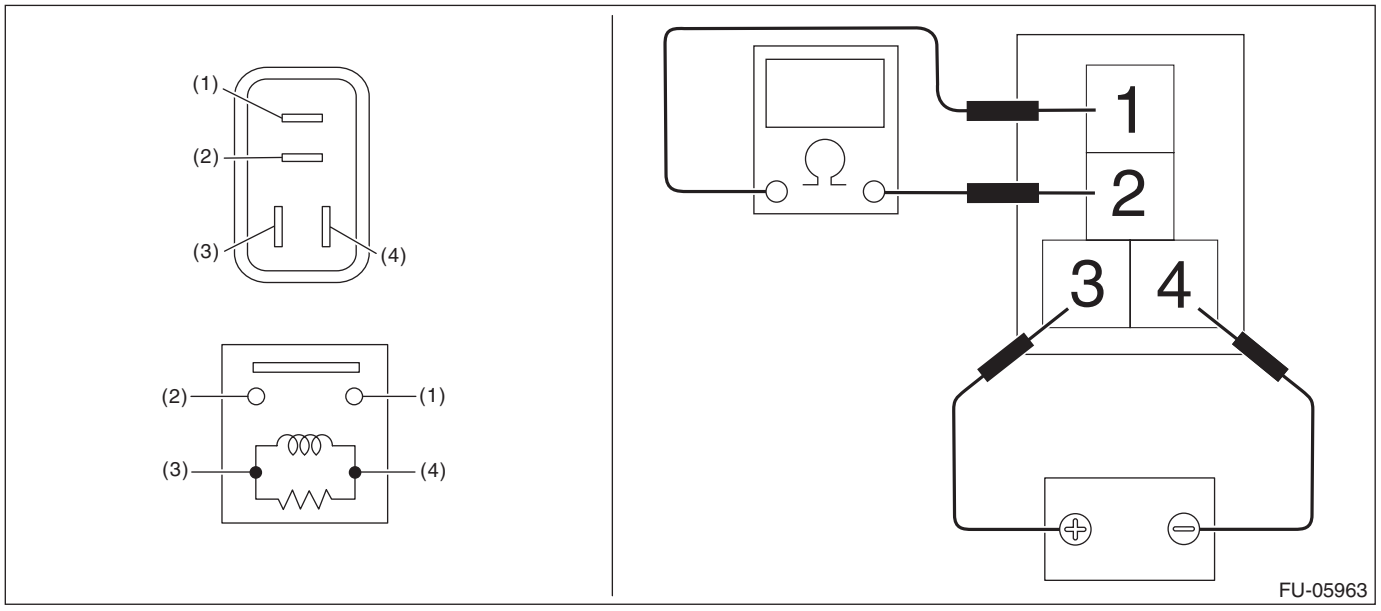
C: INSPECTION

1) Check that the oxygen sensor relay has no deformation, cracks or other damages.
2) Measure the resistance between oxygen sensor relay terminals.



Terminal No.	Standard
1 and 2	1 MΩ or more
3 and 4	93.8 — 136.4 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 3 and battery ground terminal to terminal No. 4, and measure the resistance between oxygen sensor relay terminals.



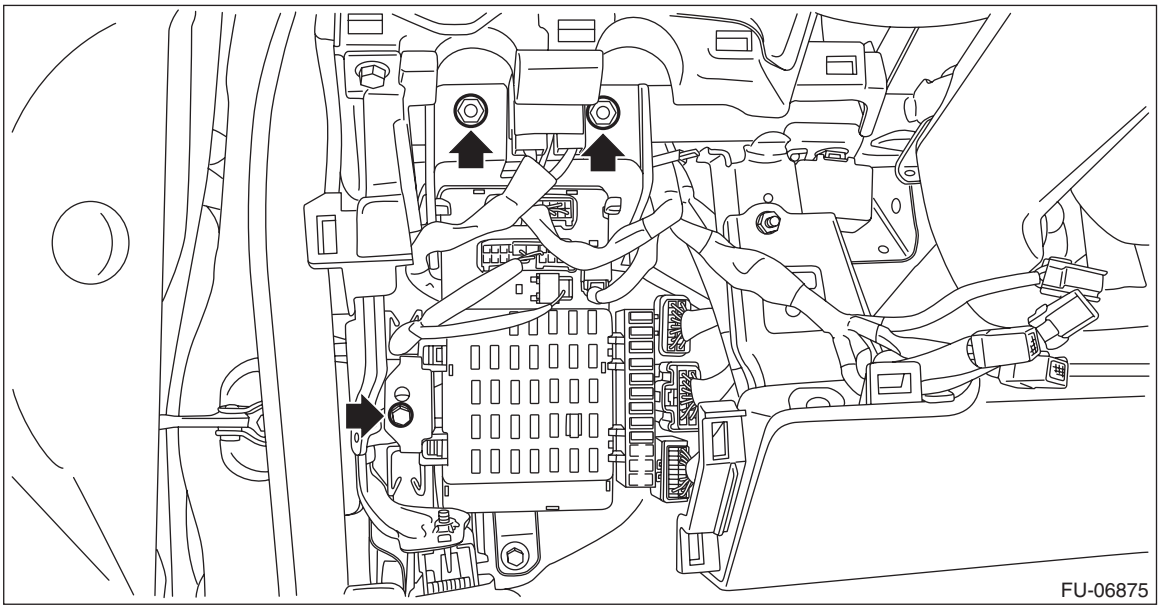
Terminal No.	Standard
1 and 2	Less than 1 Ω

24.Electronic Throttle Control Relay

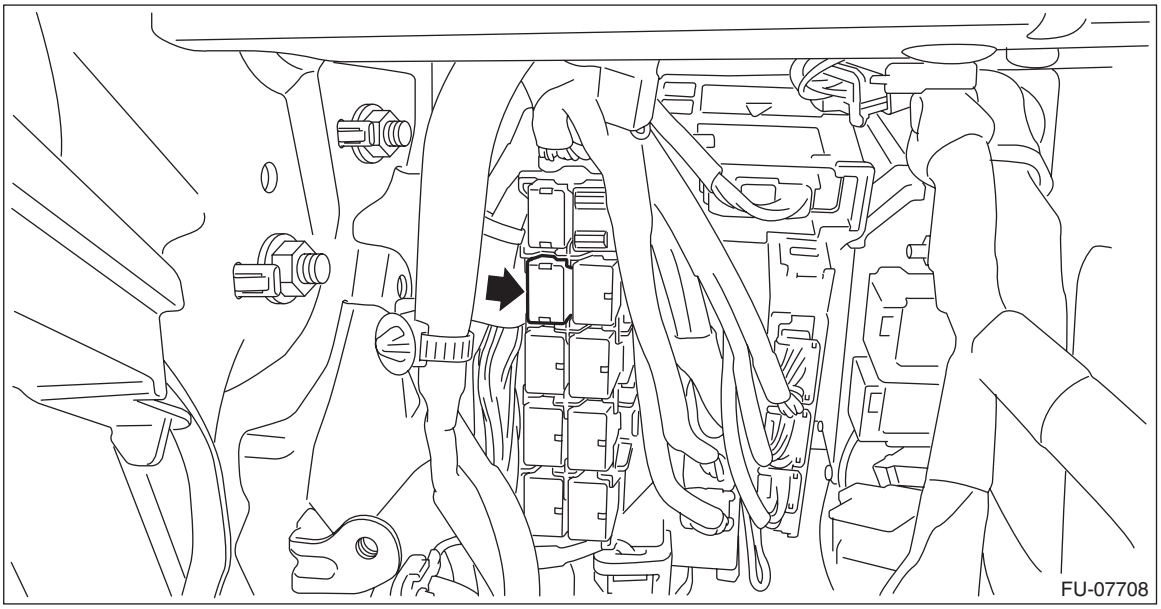
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the instrument panel lower cover. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the bolts and nuts securing the fuse block and move down the fuse block.



4) Remove the electronic throttle control relay from the relay block.



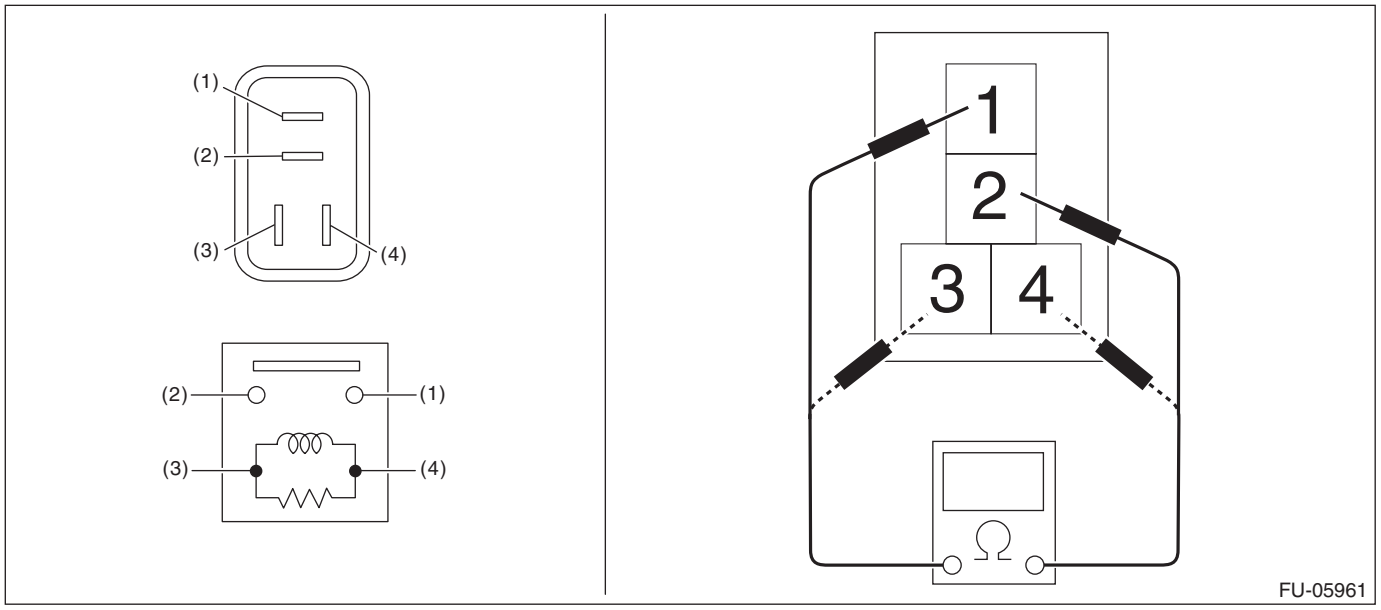
B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

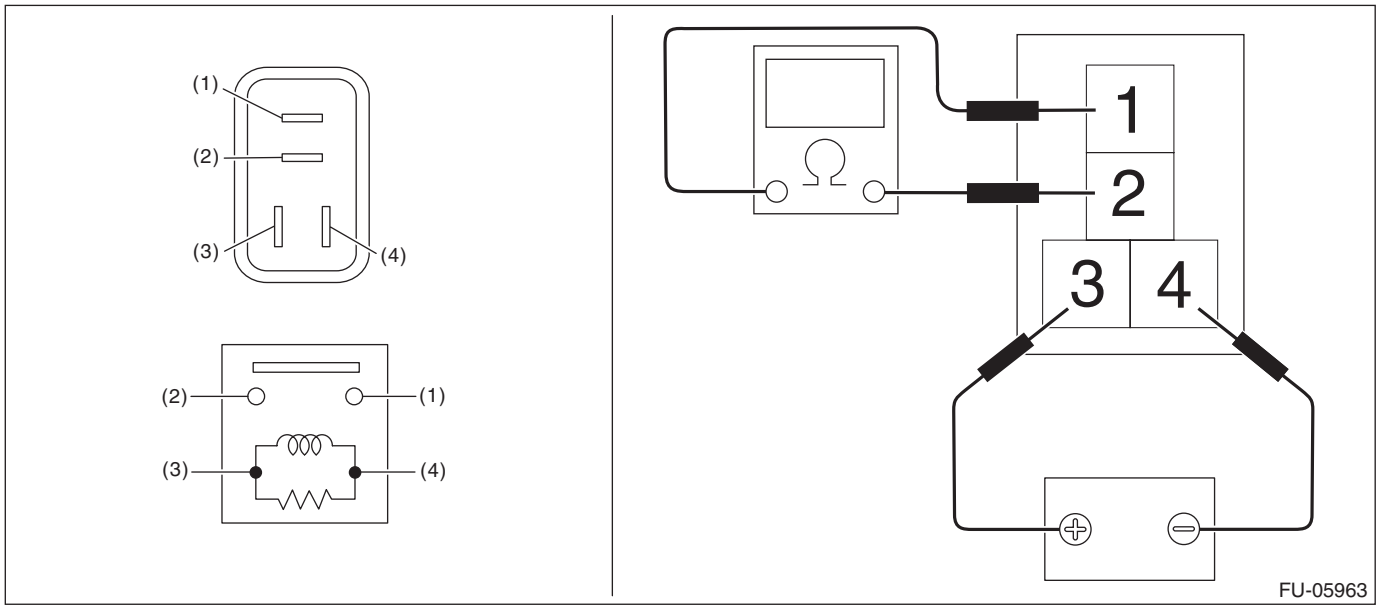
C: INSPECTION

1) Check that the electronic throttle control relay has no deformation, cracks or other damages.
2) Measure the resistance between electronic throttle control relay terminals.



Terminal No.	Standard
1 and 2	1 MΩ or more
3 and 4	93.8 — 136.4 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 3 and battery ground terminal to terminal No. 4, and measure the resistance between the electronic throttle control relay terminals.



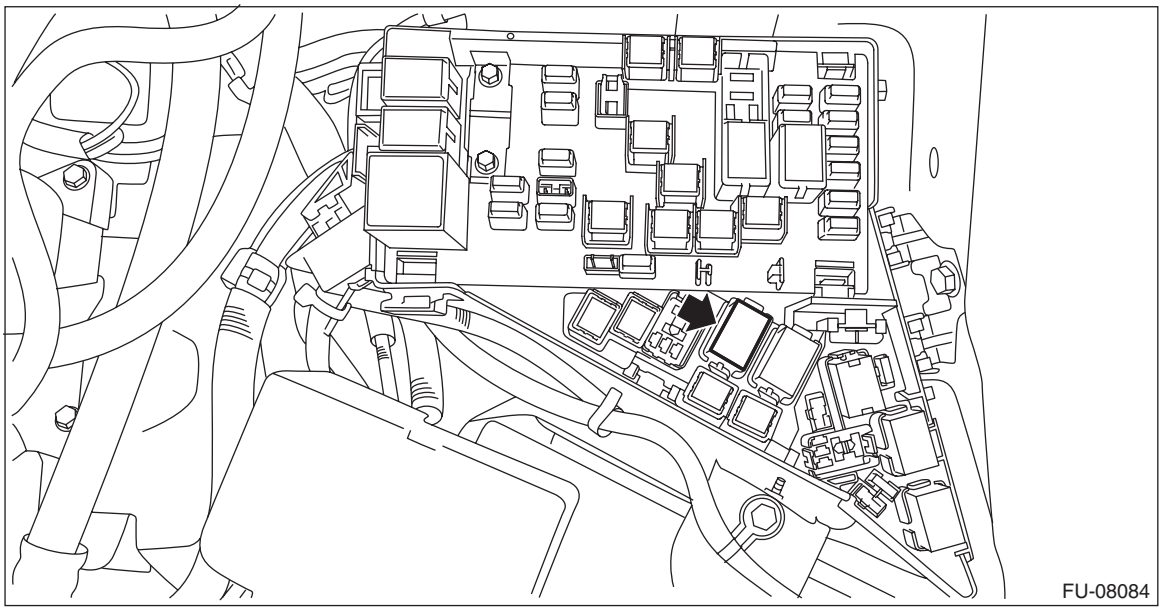
Terminal No.	Standard
1 and 2	Less than 1 Ω

25.Fuel Pump Relay

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the fuel pump relay from the main fuse box.

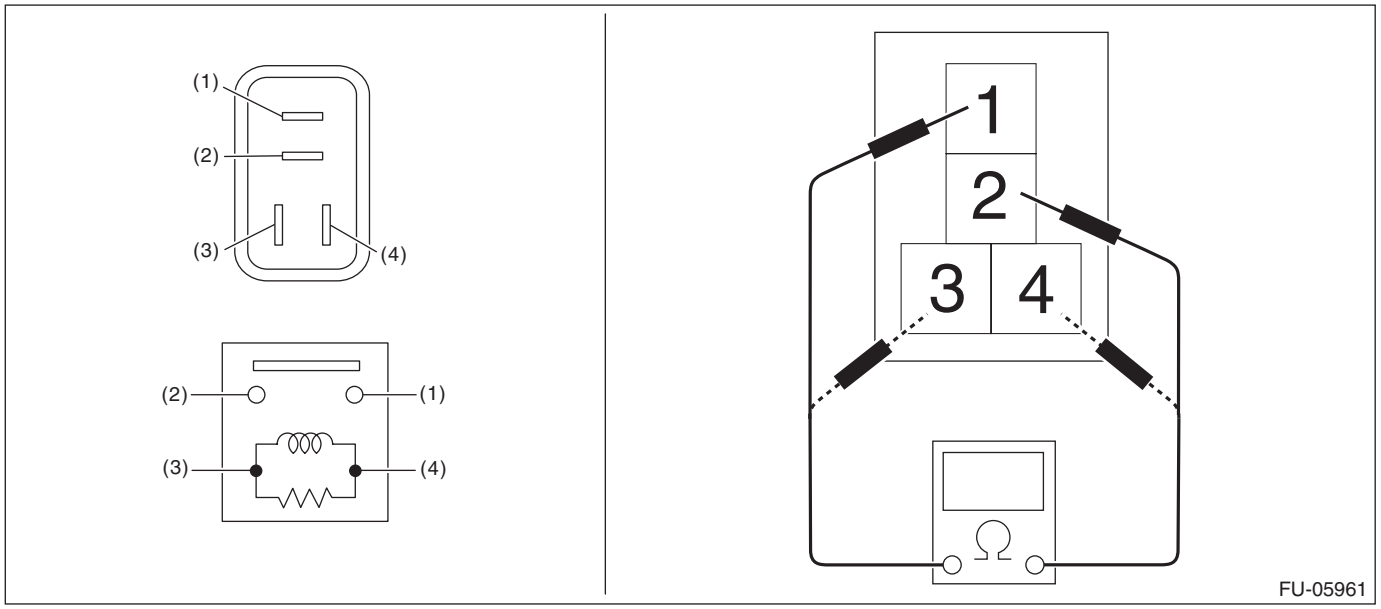


B: INSTALLATION

Install in the reverse order of removal.

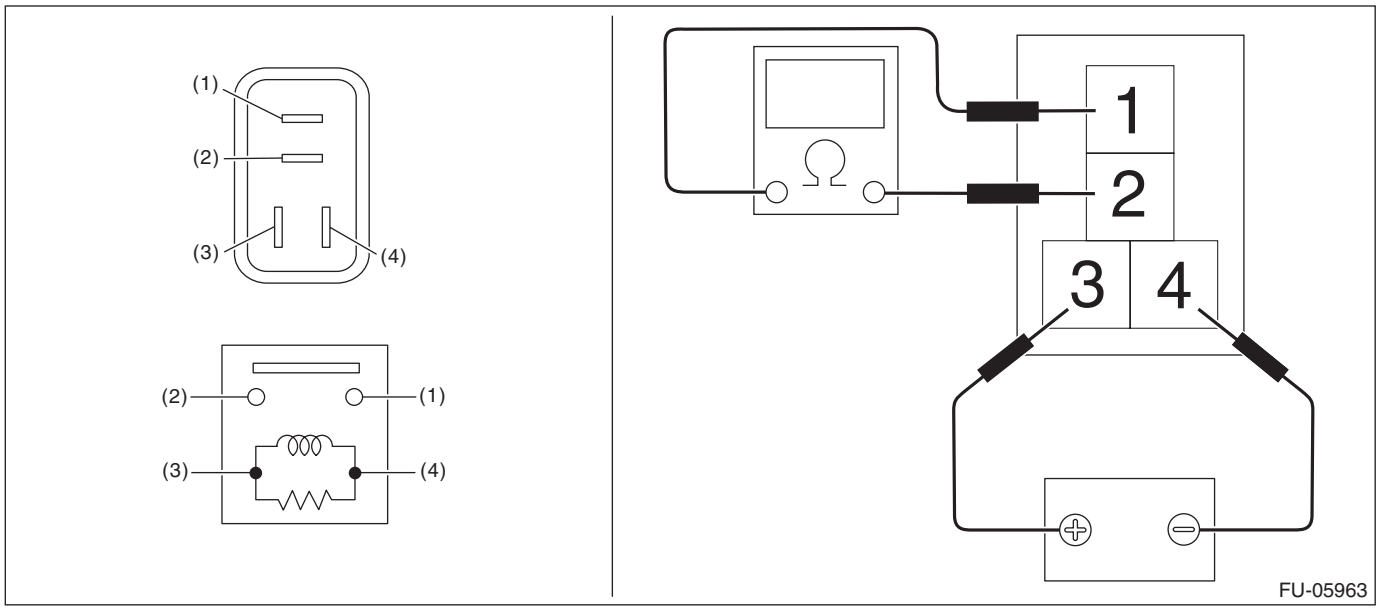
C: INSPECTION

1) Check that the fuel pump relay has no deformation, cracks or other damages.
2) Measure the resistance between fuel pump relay terminals.



Terminal No.	Standard
1 and 2	1 MΩ or more
3 and 4	93.8 — 136.4 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 3 and battery ground terminal to terminal No. 4, and measure the resistance between the fuel pump relay terminals.



Terminal No.	Standard
1 and 2	Less than 1 Ω

26.Fuel

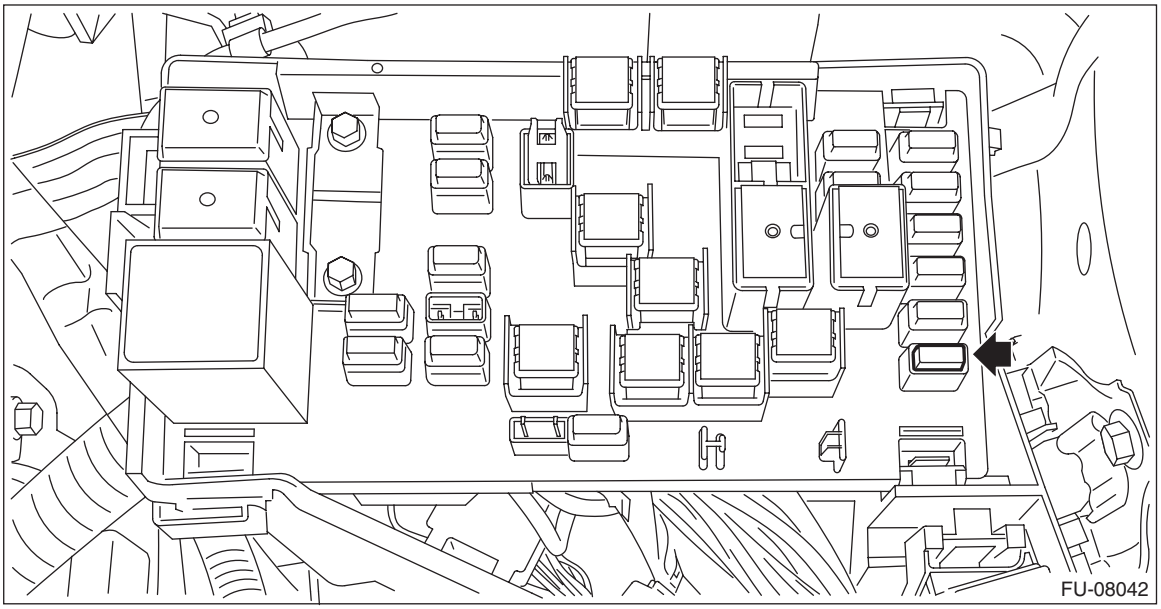
A: PROCEDURE

1. RELEASING OF FUEL PRESSURE

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
Be careful not to spill fuel.

1) Turn the ignition switch to OFF.
2) Remove the fuse of fuel pump from main fuse box.



3) Start the engine and run it until it stalls.
4) After the engine stalls, crank it for five more seconds.
5) Turn the ignition switch to OFF.
6) Install the fuse of fuel pump to the main fuse box.

2. DRAINING FUEL (WITH SUBARU SELECT MONITOR)

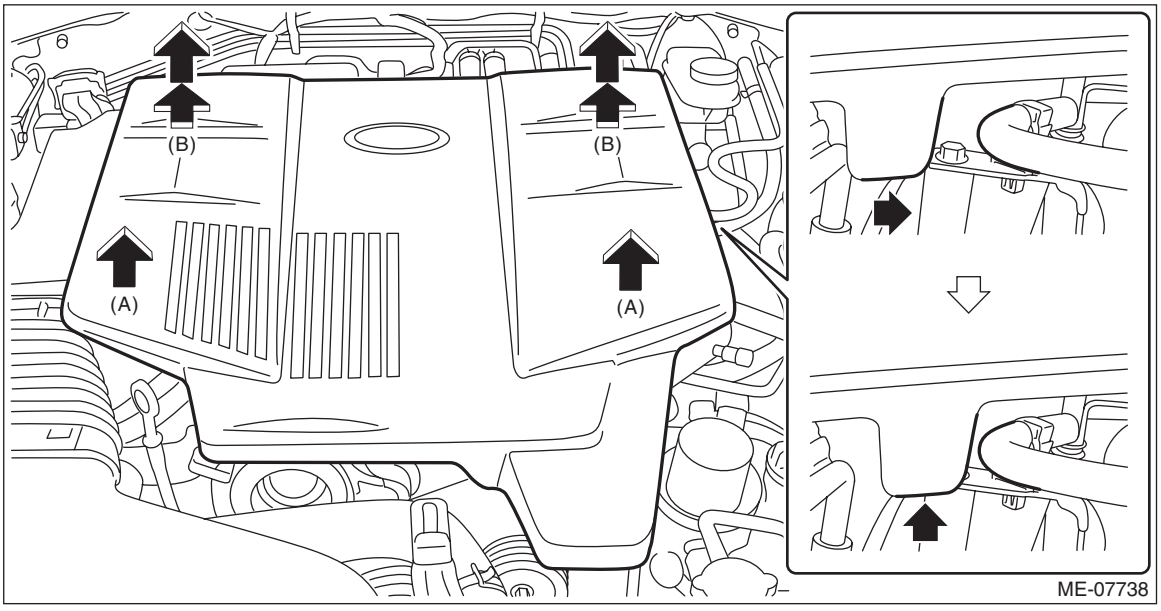
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
Be careful not to spill fuel.

NOTE:
• If the fuel pump cannot be driven, refer to the procedures for draining from the fuel filler hose. <Ref. to FU(H4DO(HEV))-103, DRAINING FUEL (THROUGH THE FUEL FILLER HOSE), PROCEDURE, Fuel.>
• Be careful not to let the battery run-out.
• Be aware that the fuel may remain in the fuel tank after draining the fuel.

1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

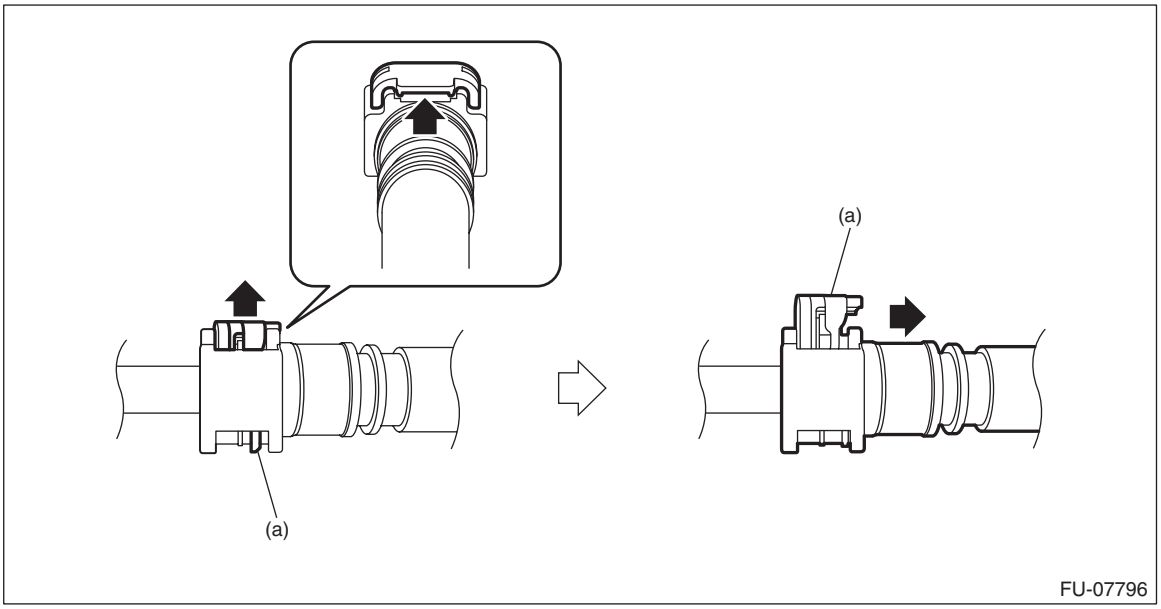
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



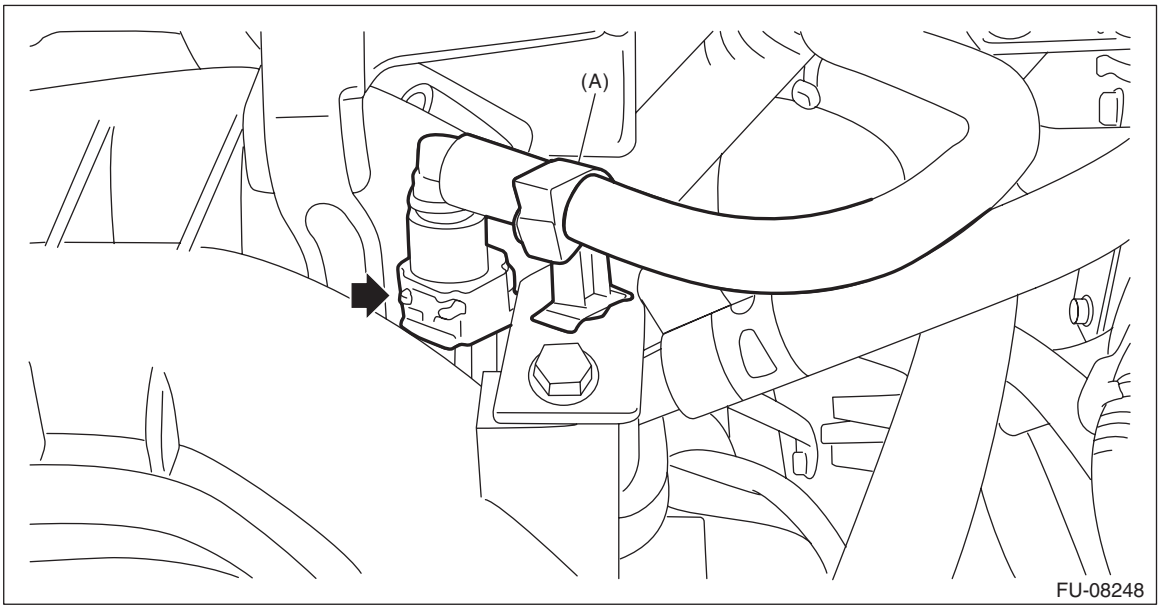
3) Disconnect the quick connector on the fuel delivery tube from the fuel pipe assembly, and remove the clip (A) securing the fuel delivery tube to the fuel pipe assembly.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



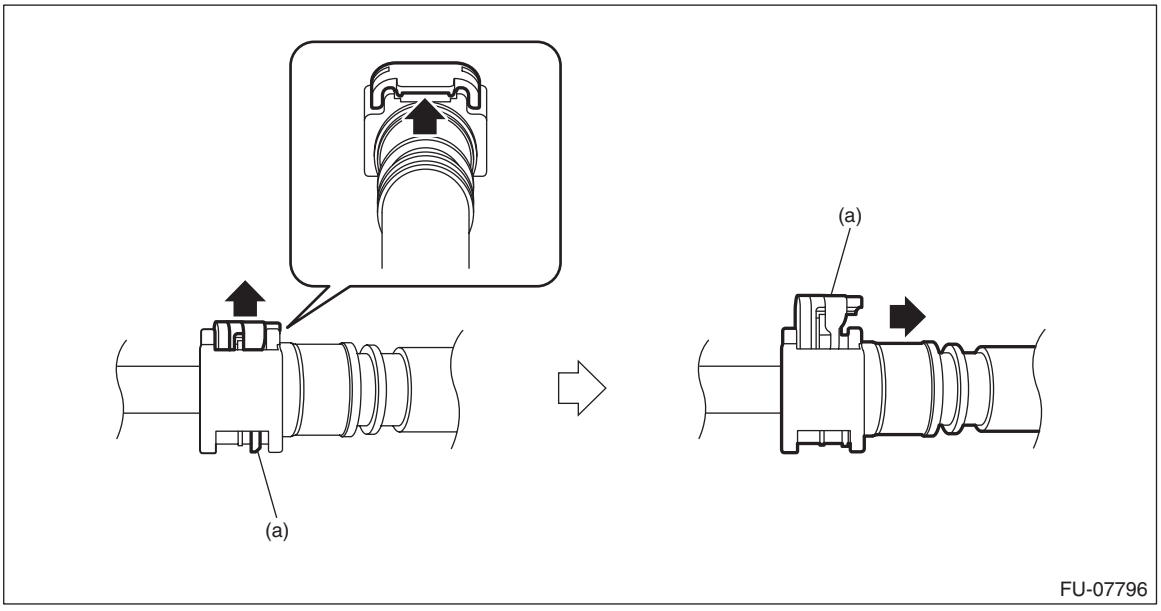
4) Connect ST to the fuel delivery tube.
ST 18471AA000 FUEL PIPE ADAPTER
5) Connect the gasoline proof hose to ST and put the end of the hose in the container.
6) Drive the fuel pump and drain the fuel using Subaru Select Monitor.

CAUTION:
Be careful not to spill fuel.

NOTE:
For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
7) Install the related parts in the reverse order after draining the fuel.

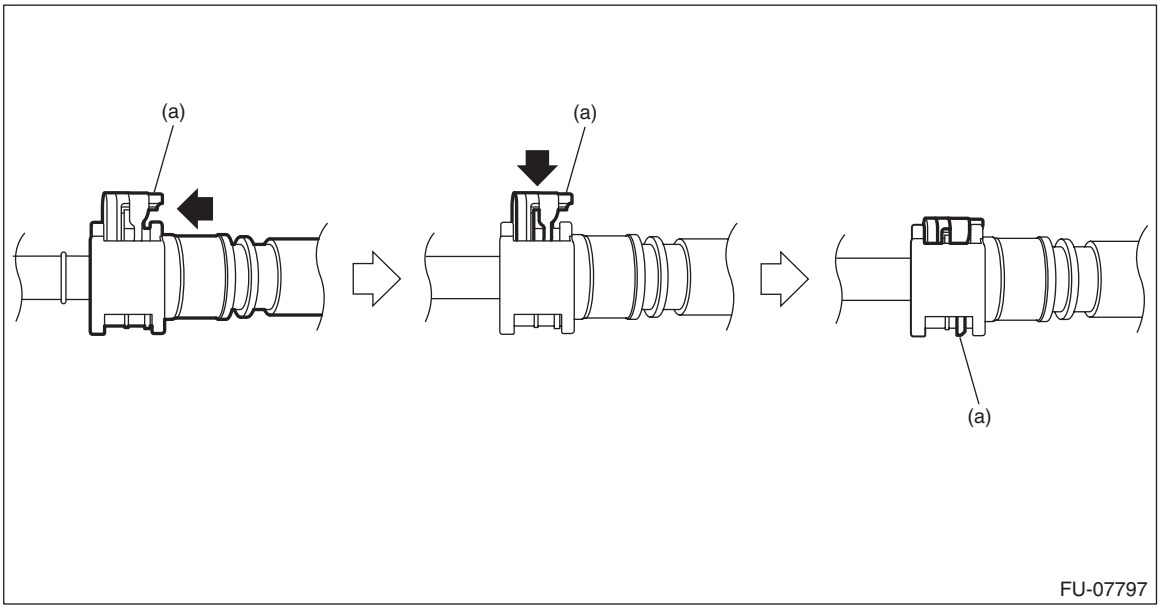
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check again that the quick connector is securely connected.**

NOTE:
- Disconnect the quick connector on the fuel delivery tube as shown in the figure.



(a) Slider

- Connect the quick connector on the fuel delivery tube as shown in the figure.



(a) Slider

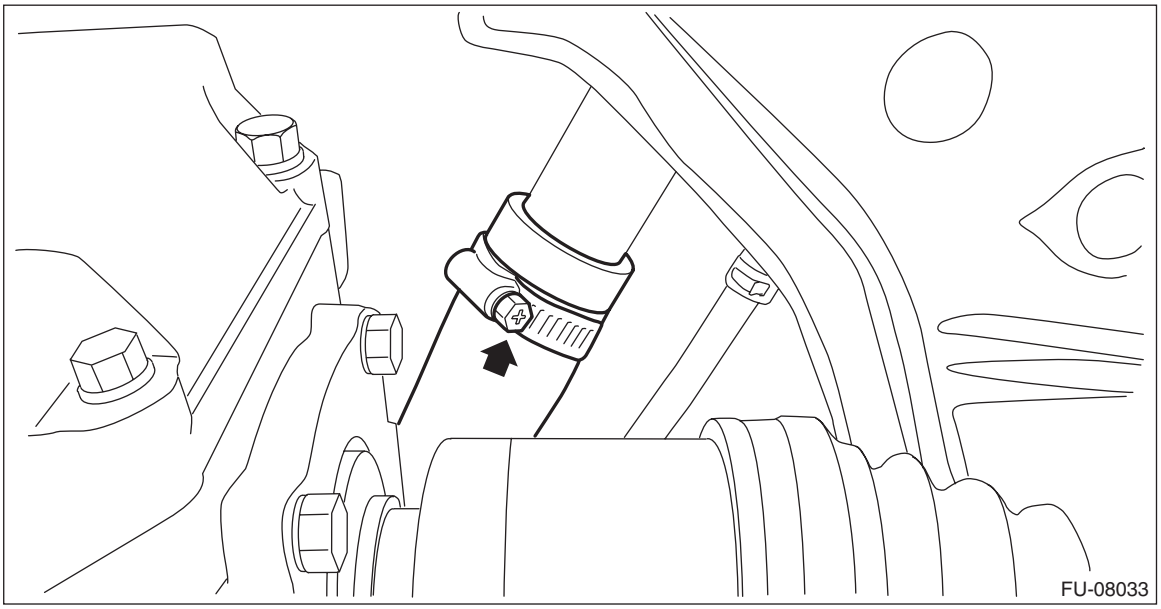
3. DRAINING FUEL (THROUGH THE FUEL FILLER HOSE)

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
- **Be careful not to spill fuel.**
- **Fuel may remain in the fuel filler pipe. Drain the fuel from the fuel filler pipe through the fill opening using the gasoline proof pump and the gasoline proof hose (ø10 or less) before the operation.**

NOTE:
Be aware that the fuel may remain in the fuel tank after draining the fuel.
1) Lift up the vehicle.
2) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DO(w/o HEV))-22, REMOVAL, Muffler.>
3) Open the fuel filler lid and remove the fuel filler cap.
4) Drain the fuel from the fuel filler pipe through the filler opening using the gasoline proof pump and the gasoline proof hose (ø10 or less).
5) Disconnect the fuel filler hose from the fuel filler pipe assembly.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from hoses using a container or cloth.**



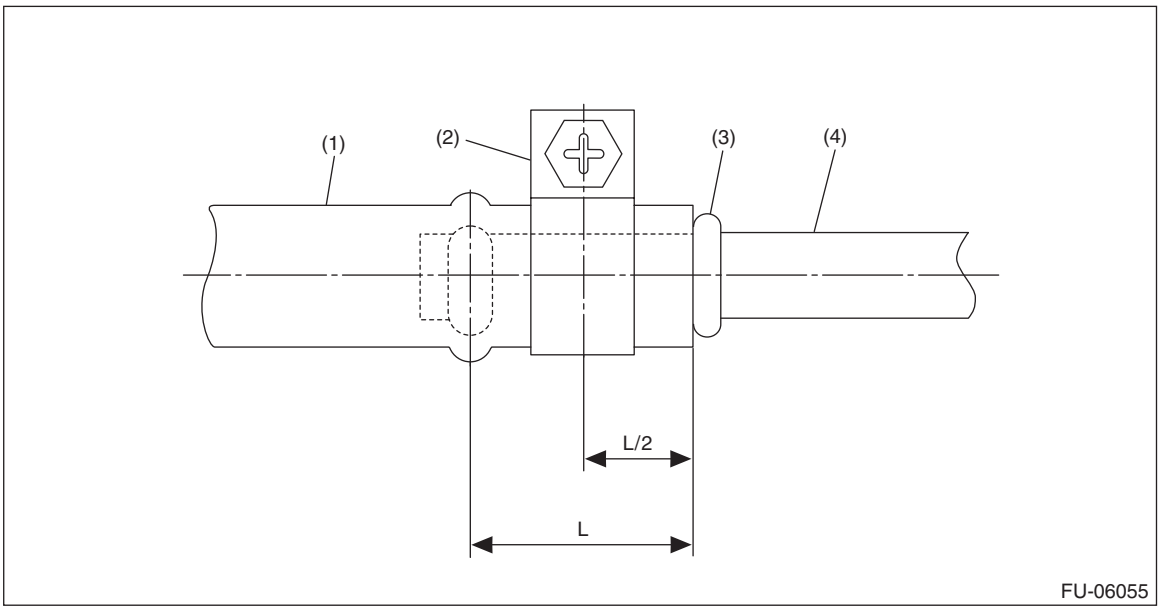
6) Set the container under the vehicle and insert the gasoline proof hose (ø10 or less) into the fuel filler hose to drain the fuel.

CAUTION:
Be careful not to spill fuel.

7) Install the related parts in the reverse order after draining the fuel.

NOTE:
Correctly insert the fuel filler hose to the spool, and then install the clamp as shown.

Tightening torque:
2.5 N·m (0.3 kgf-m, 1.8 ft-lb)

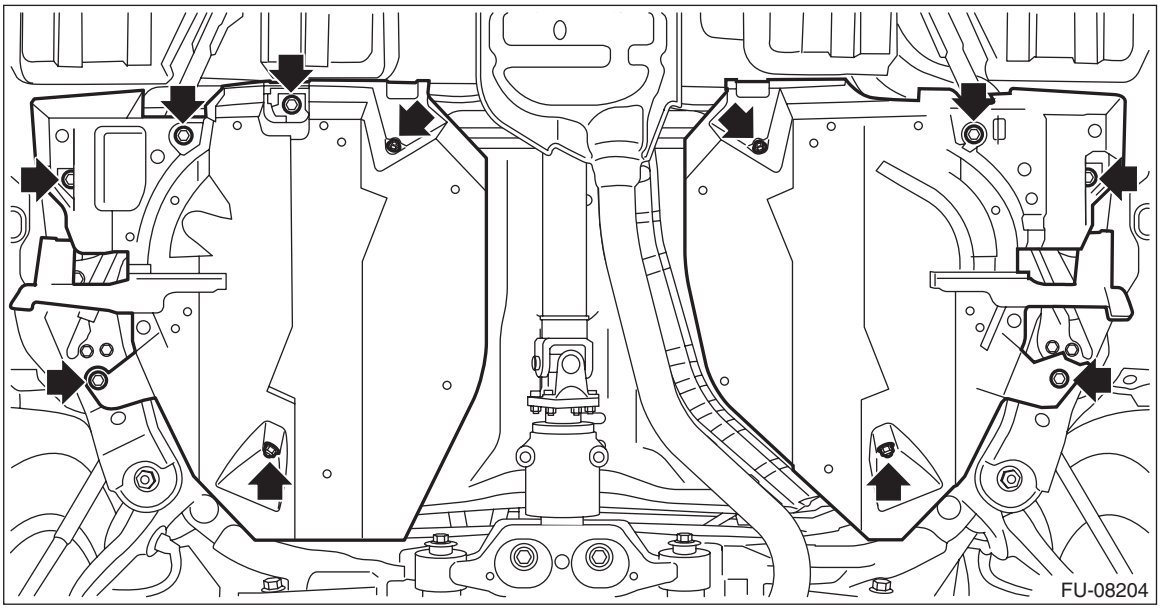


(1) Fuel filler hose
(2) Clamp
(3) Spool
(4) Fuel filler pipe

27.Fuel Tank Protector

A: REMOVAL

1) Lift up the vehicle.
2) Remove the bolt and nuts and remove the fuel tank protector.

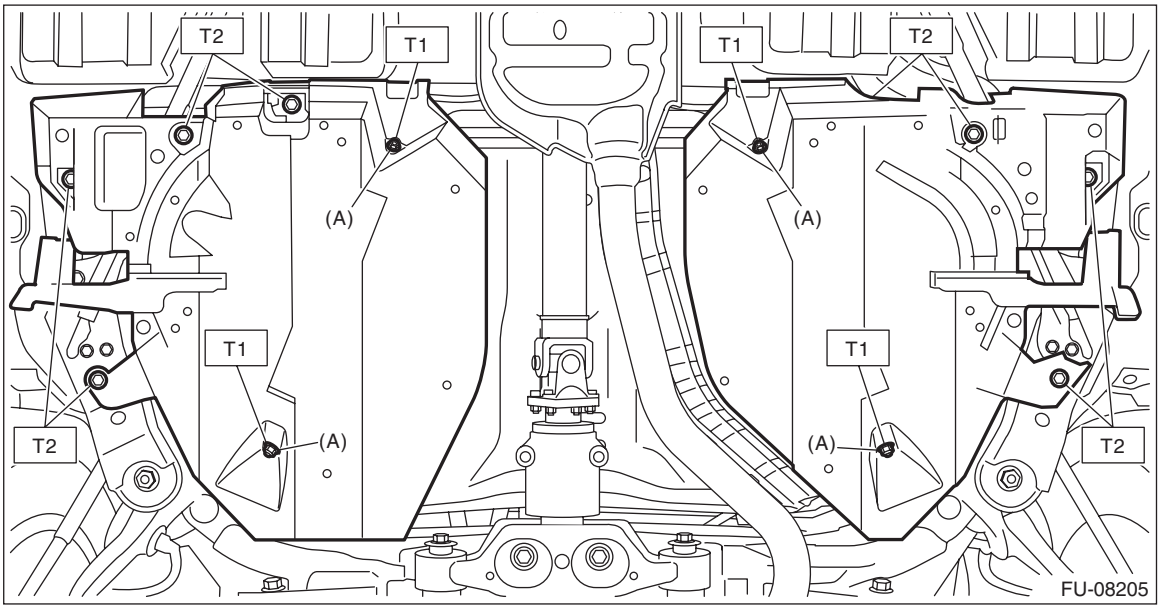


B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Use a new self-locking nut.

Tightening torque:
T1: 9 N·m (0.9 kgf-m, 6.6 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)



(A) Self-locking nut

28.Fuel Tank

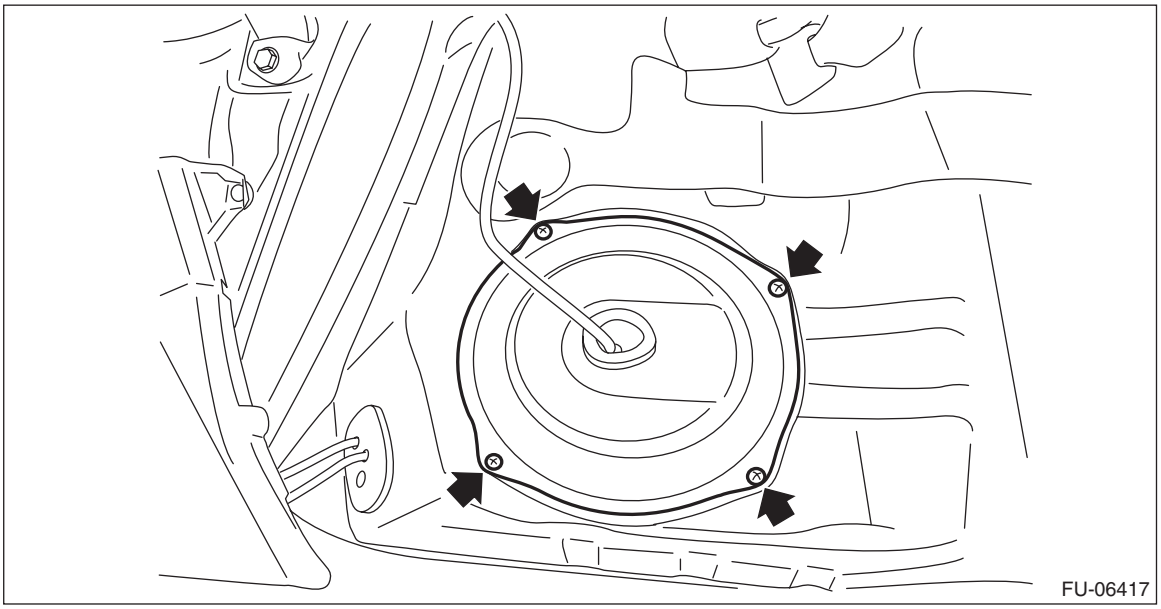
A: REMOVAL

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

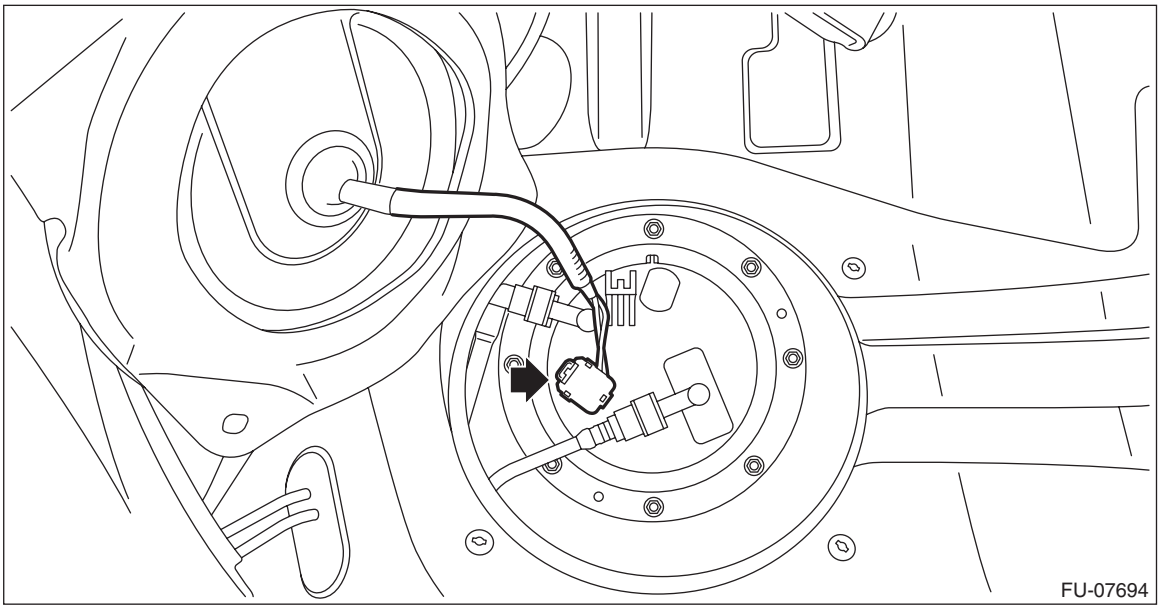
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Drain fuel. <Ref. to FU(H4DO(HEV))-100, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
3) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

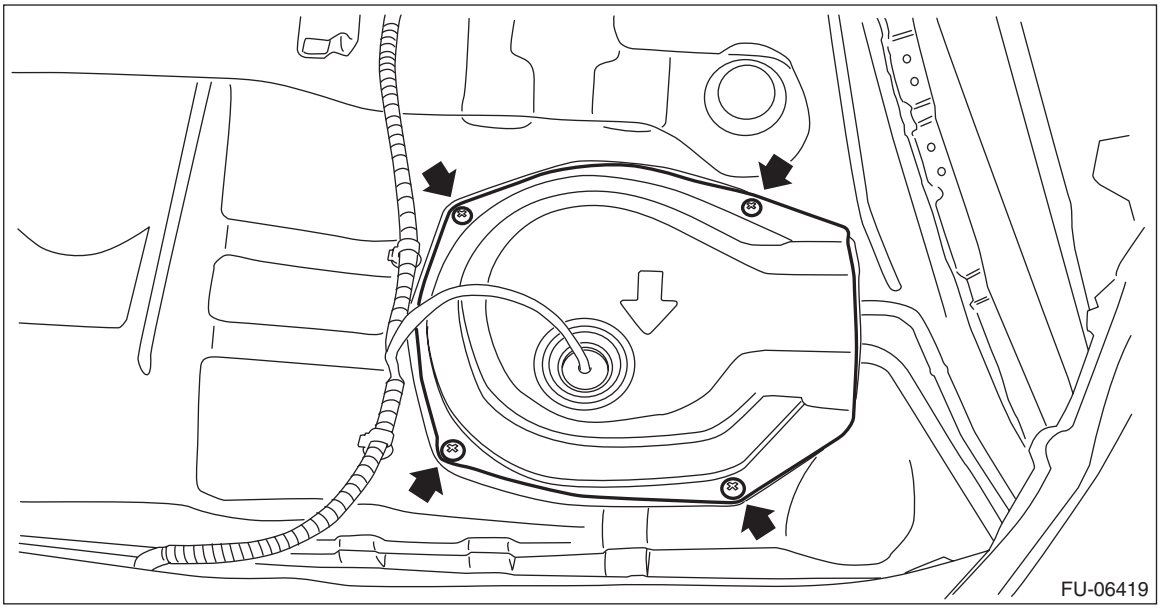
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
4) Remove the rear seat cushion. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the service hole cover of fuel pump.



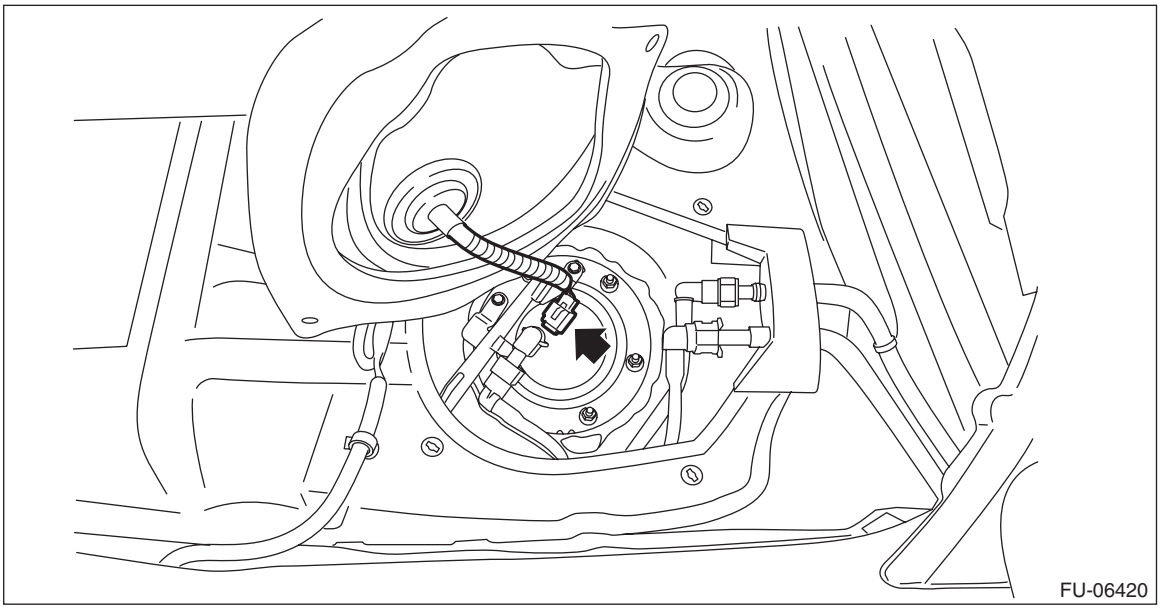
6) Disconnect connectors from the fuel pump, and move aside the service hole cover.



7) Remove the service hole cover of fuel sub level sensor.

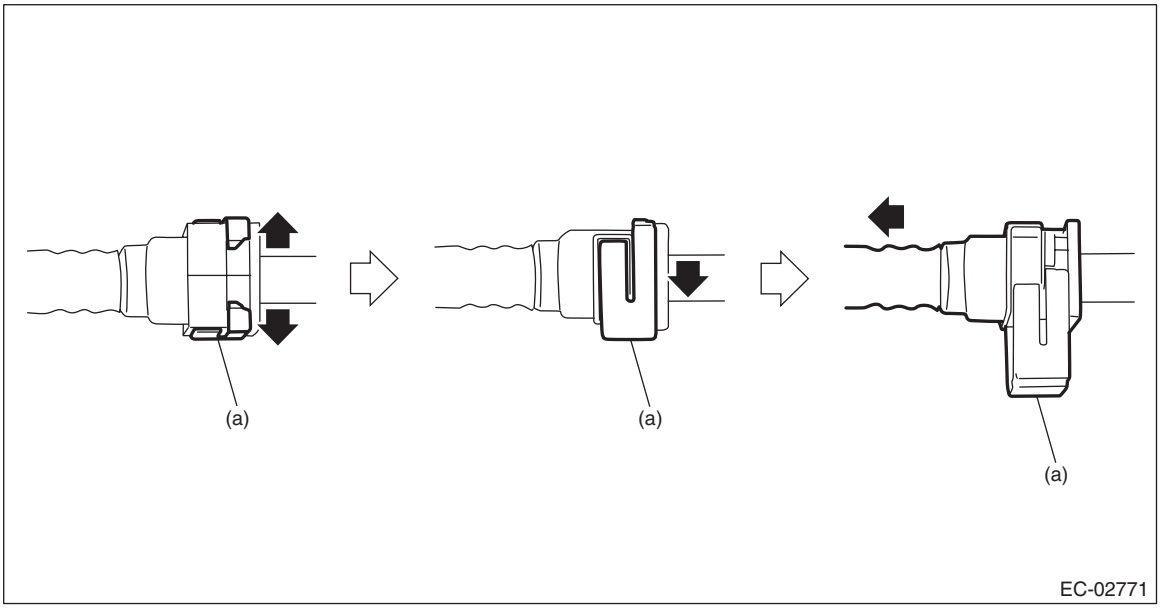


8) Disconnect the connector from the fuel sub level sensor, and move aside the service hole cover.

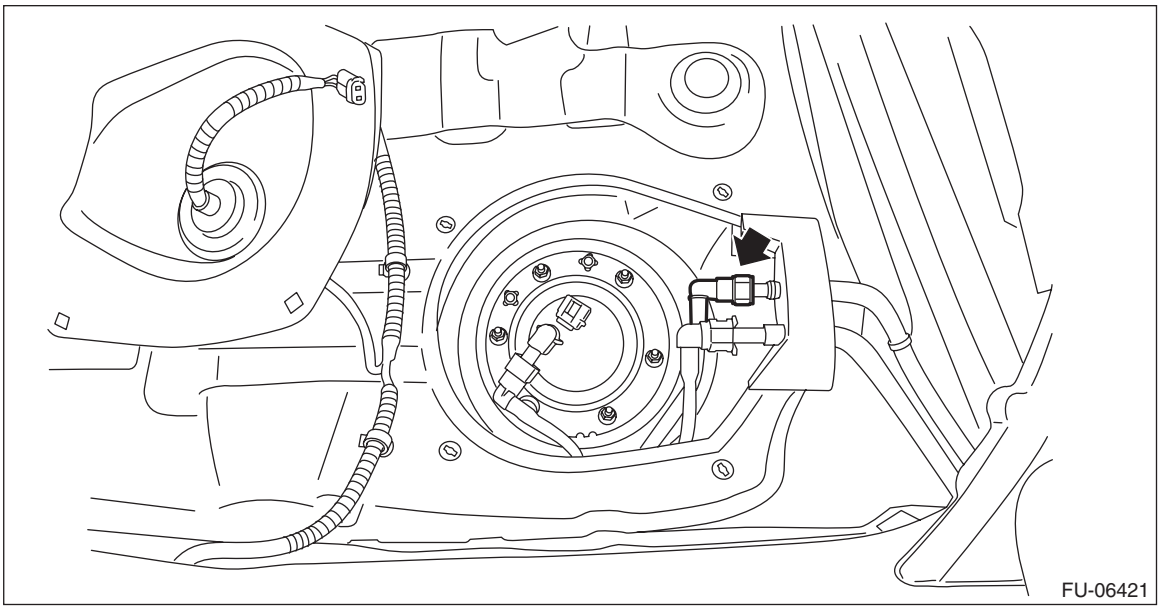


9) Disconnect the quick connector on the fuel delivery tube.

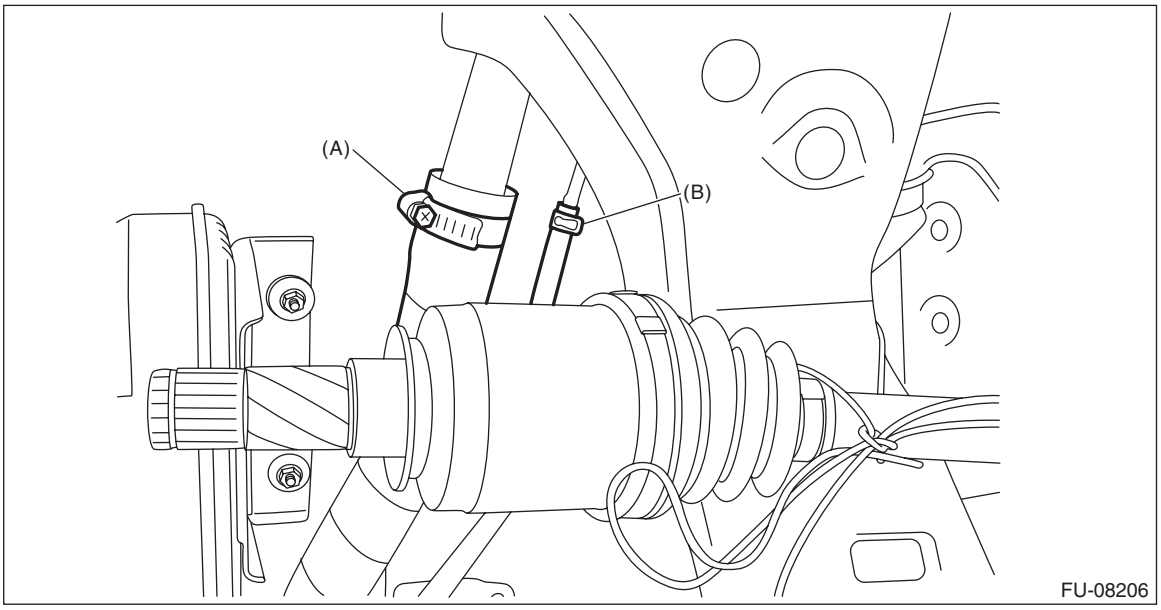
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider

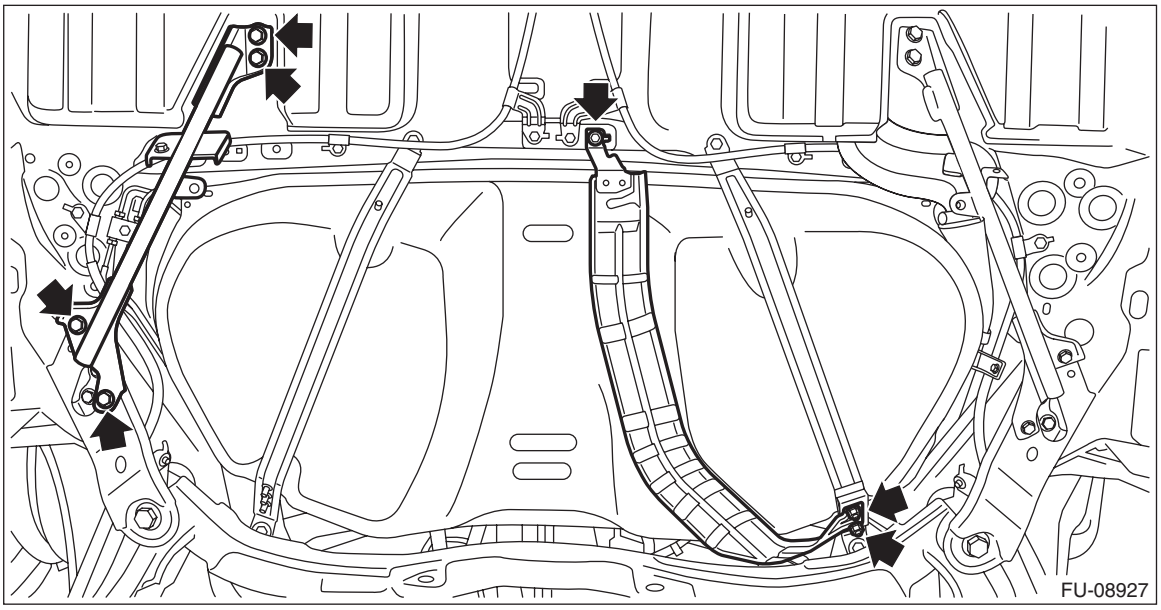


10) Lift up the vehicle.
11) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DO(w/o HEV))-22, REMOVAL, Muffler.>
12) Remove the rear differential. <Ref. to DI-43, REMOVAL, Rear Differential (VA-type).>
13) Disconnect the fuel filler hose (A) and evaporation hose (B) from the fuel filler pipe assembly.

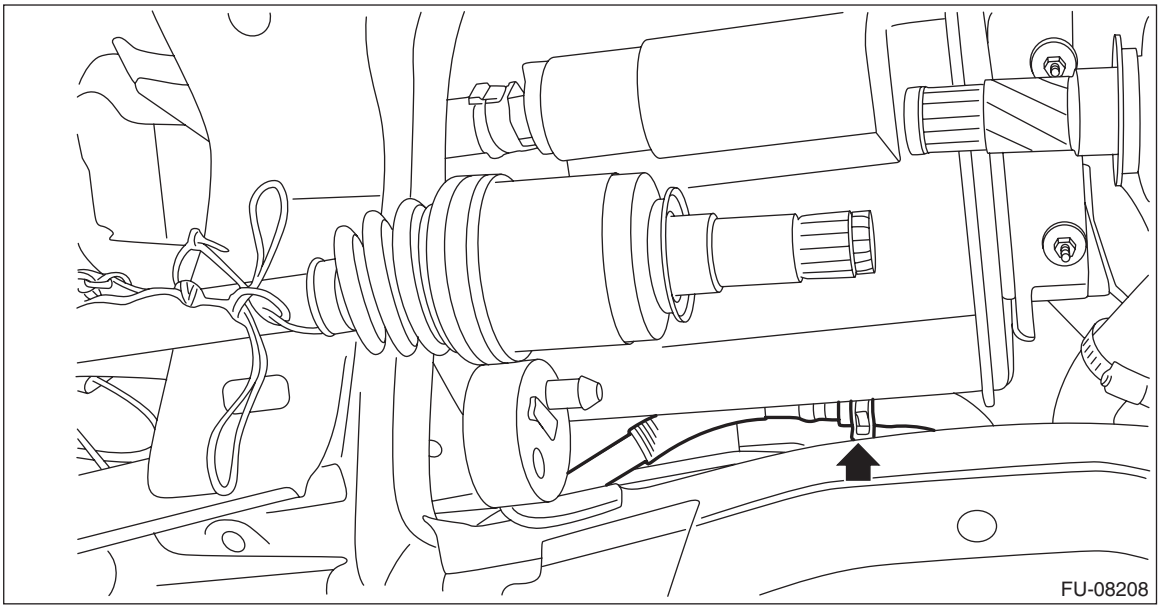


14) Remove the fuel tank protector. <Ref. to FU(H4DO(HEV))-105, REMOVAL, Fuel Tank Protector.>

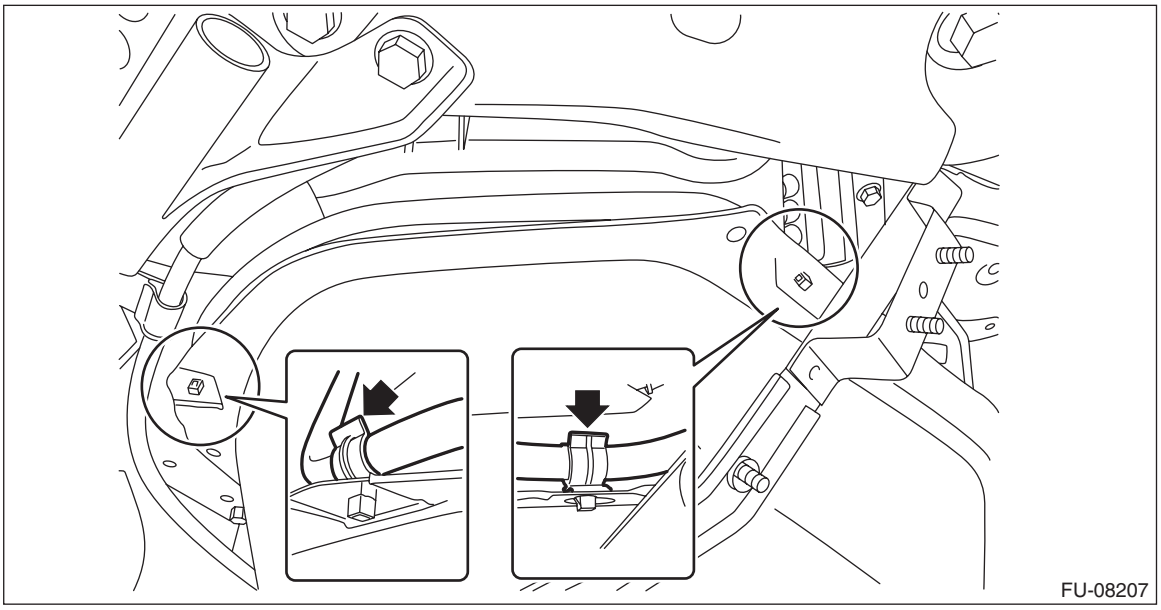
15) Remove the heat shield cover and the stay - rear frame COMPL RH.



16) Disconnect the vent tube from the vent hose.

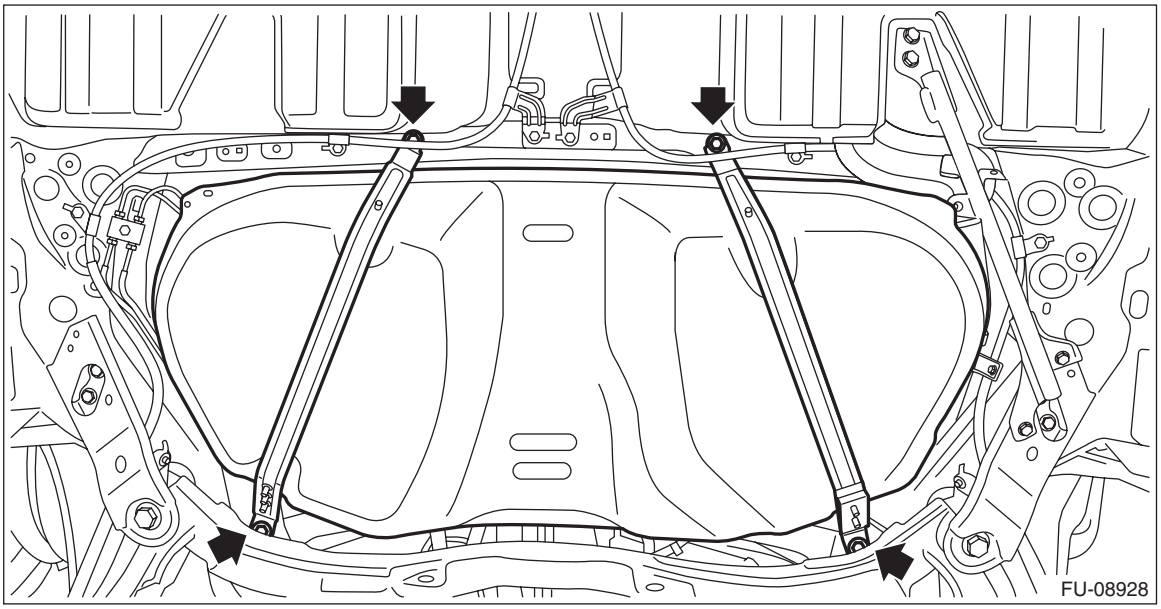


17) Remove the purge tube from the tube clamp.



18) Support the fuel tank with a transmission jack, remove the bolts from the fuel tank band, and remove the fuel tank from the vehicle.

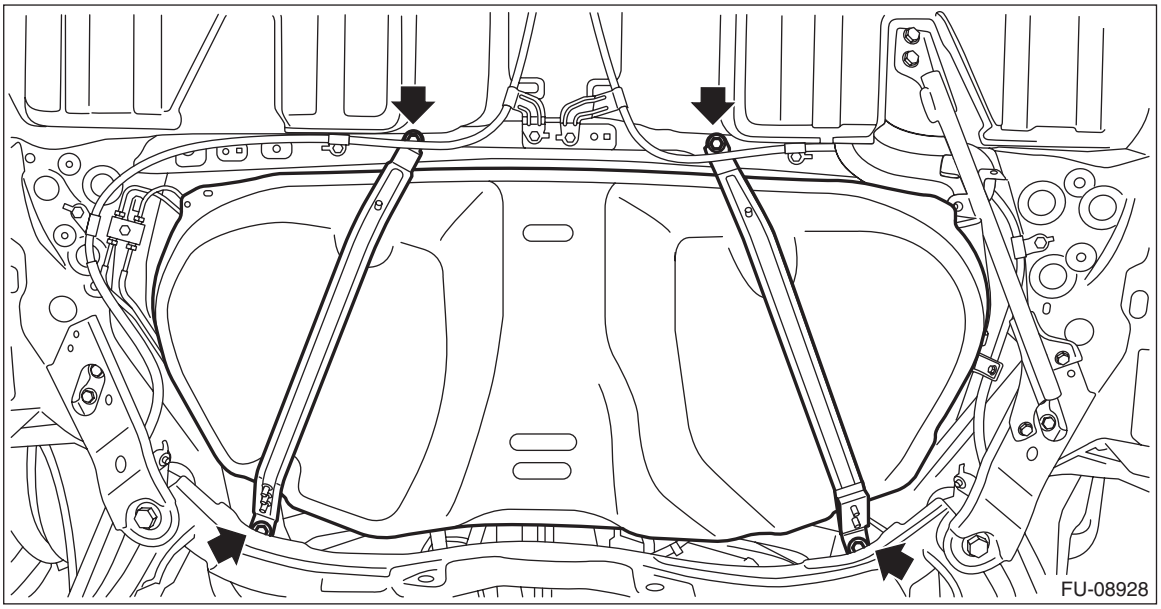
WARNING:
- **A helper is required to perform this work.**
- **Fuel may remain in the fuel tank. This will cause the left and right sides to be unbalanced. Be careful not to drop the fuel tank.**



B: INSTALLATION

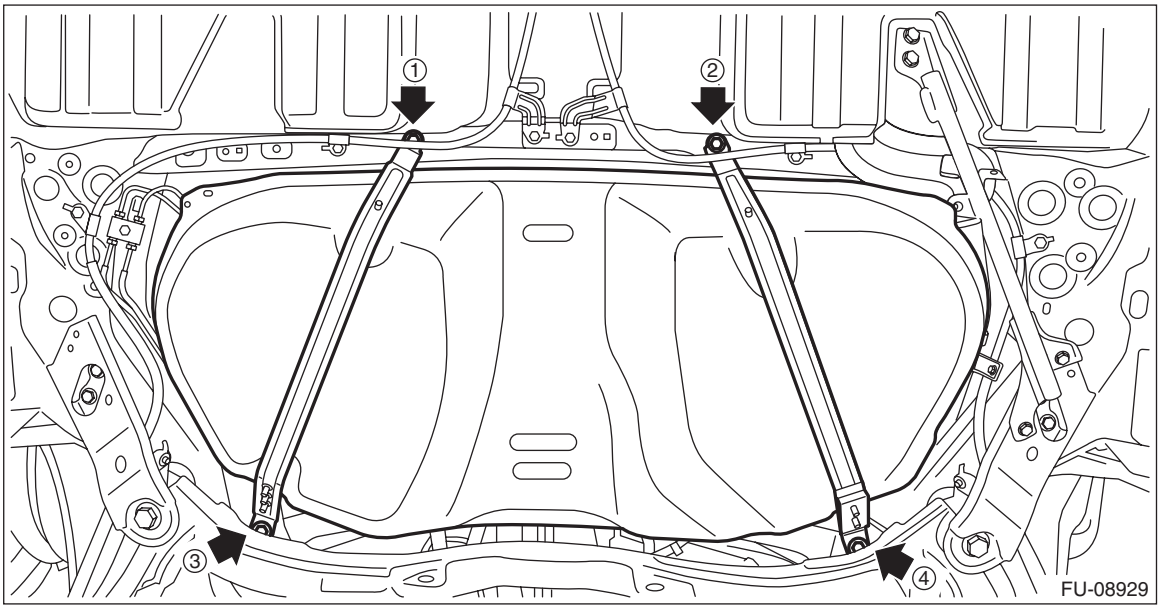
1) Support the fuel tank with a transmission jack, set the fuel tank in place, and temporarily tighten the bolts of the fuel tank band.

WARNING:
A helper is required to perform this work.

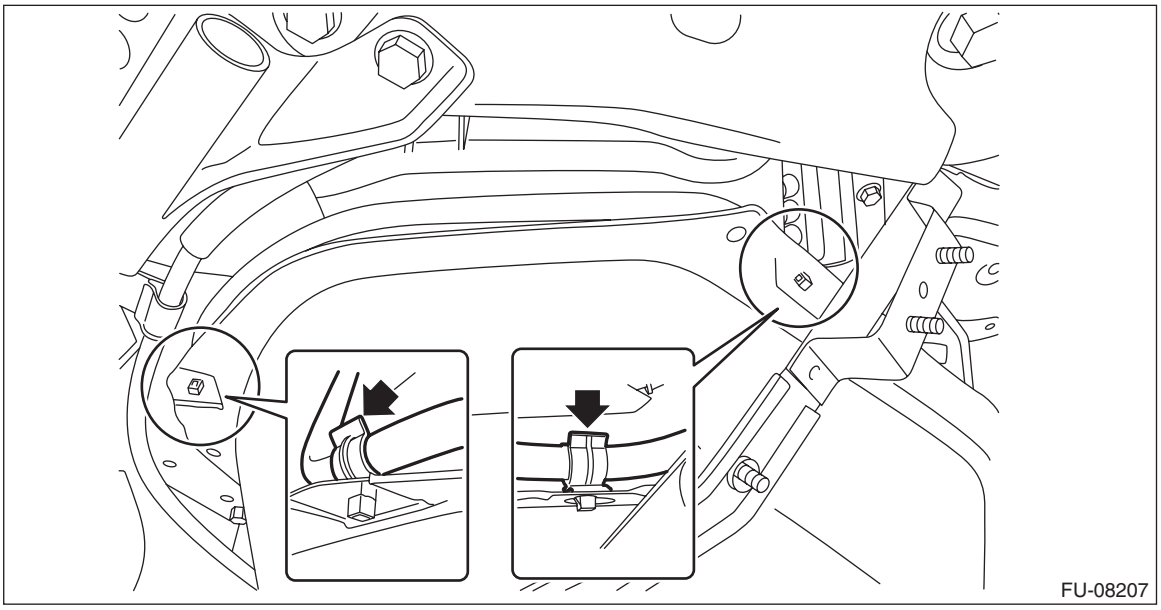


2) Tighten the bolts of the fuel tank band in the order shown in the figure.

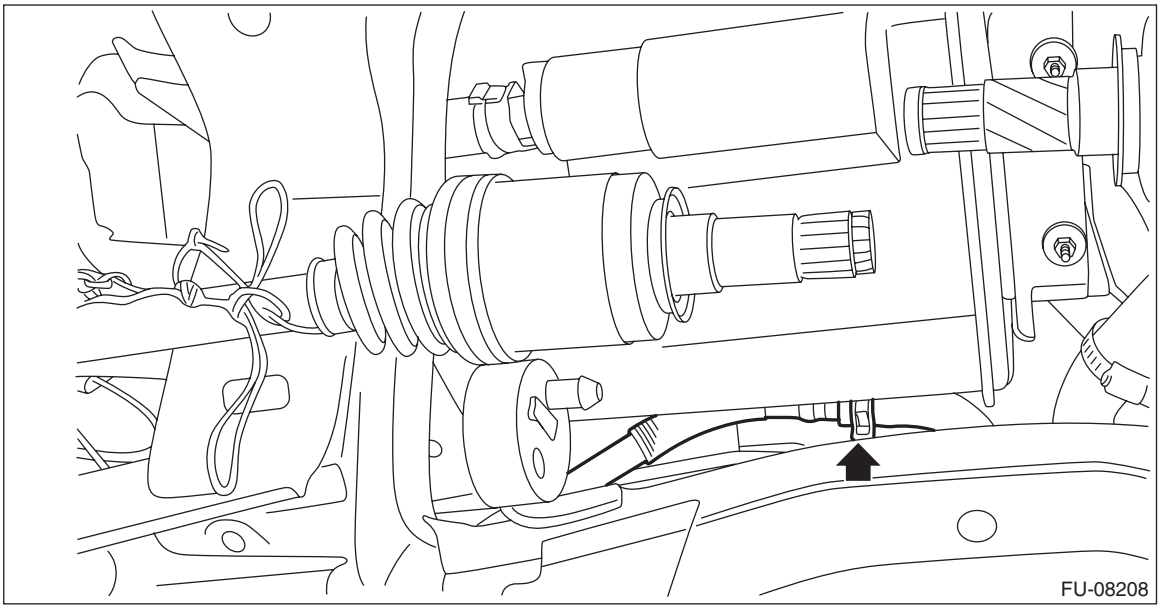
Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



3) Install the purge tube to the tube clamp.

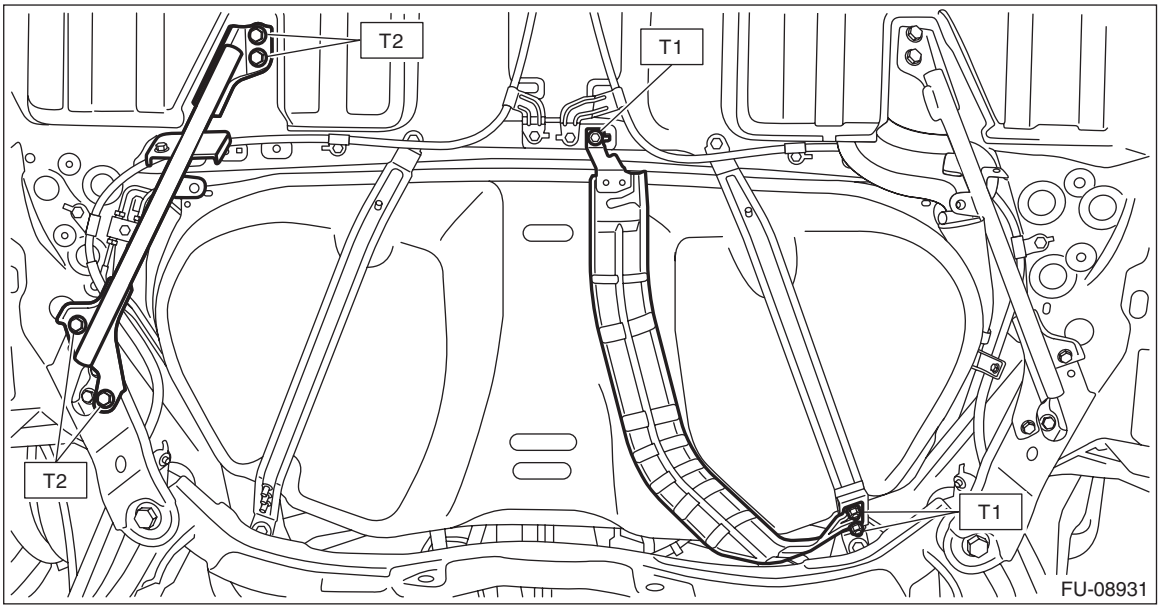


4) Connect the vent tube to the vent hose.



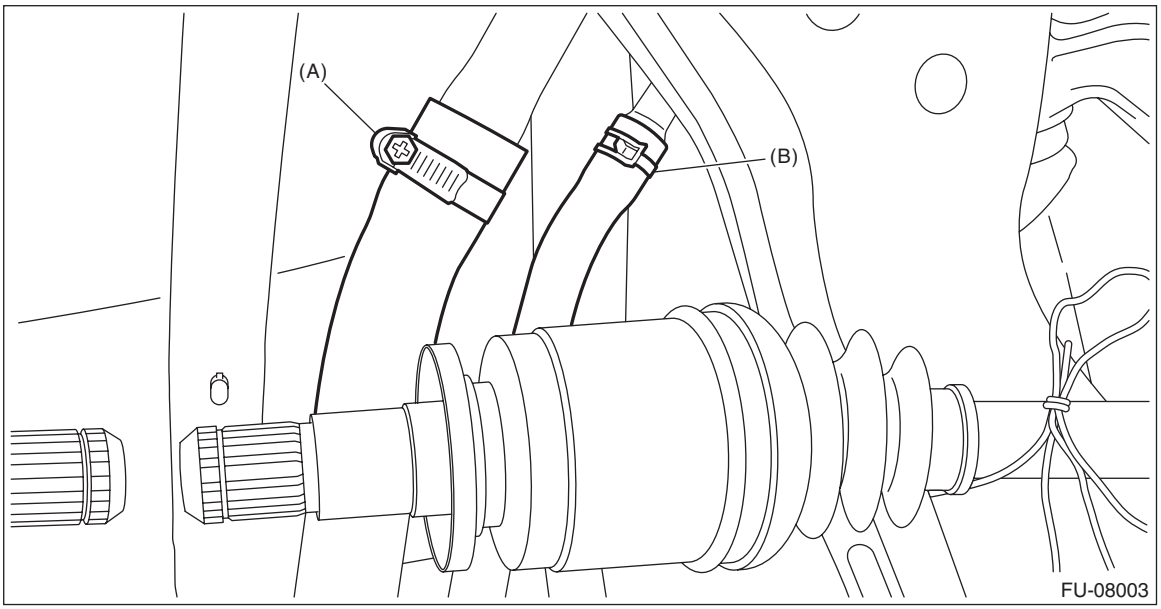
5) Install the heat shield cover and the stay - rear frame COMPL RH.

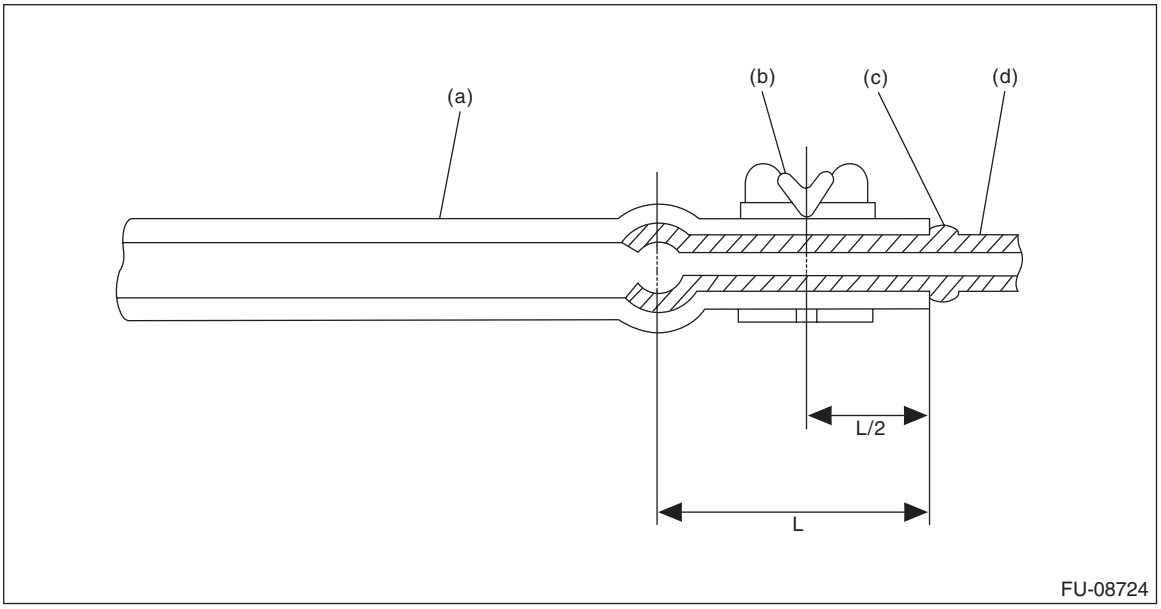
Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T2: 33 N·m (3.4 kgf-m, 24.3 ft-lb)



6) Securely insert the fuel filler hose (A) and evaporation hose (B) until the hose end contacts the spool, then attach the clamp or clip as shown in the figure.

Tightening torque:
2.5 N·m (0.3 kgf-m, 1.8 ft-lb)





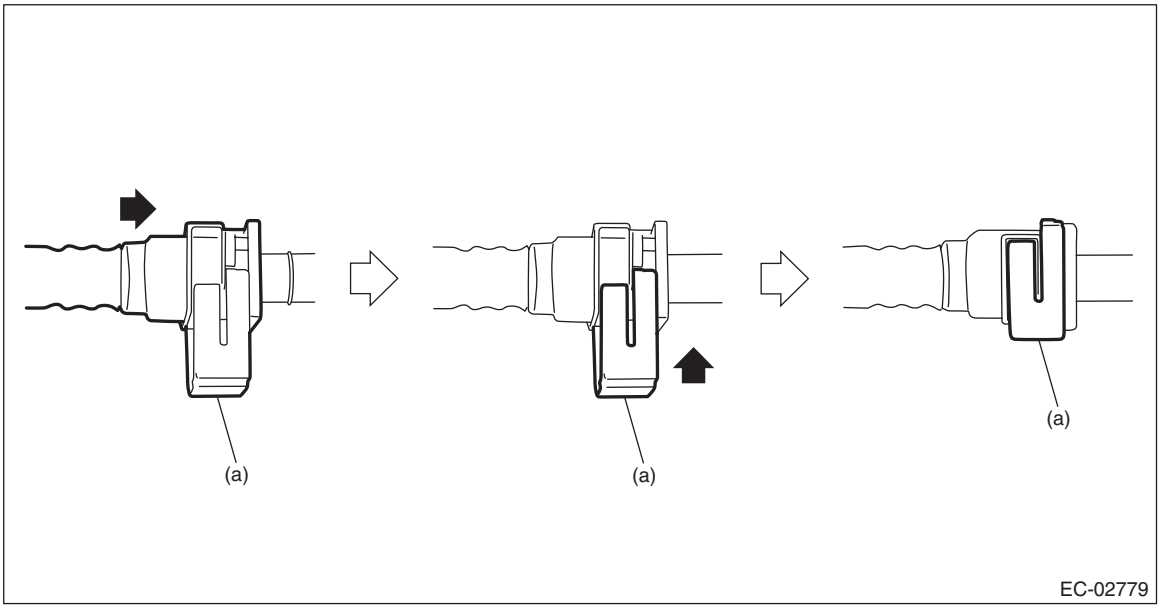
(a) Hose
(b) Clamp or clip
(c) Spool or bump
(d) Pipe

7) Install the fuel tank protector. <Ref. to FU(H4DO(HEV))-105, INSTALLATION, Fuel Tank Protector.>
8) Install the rear differential. <Ref. to DI-43, INSTALLATION, Rear Differential (VA-type).>
9) Install the rear exhaust pipe and muffler. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DO(w/o HEV))-25, INSTALLATION, Muffler.>

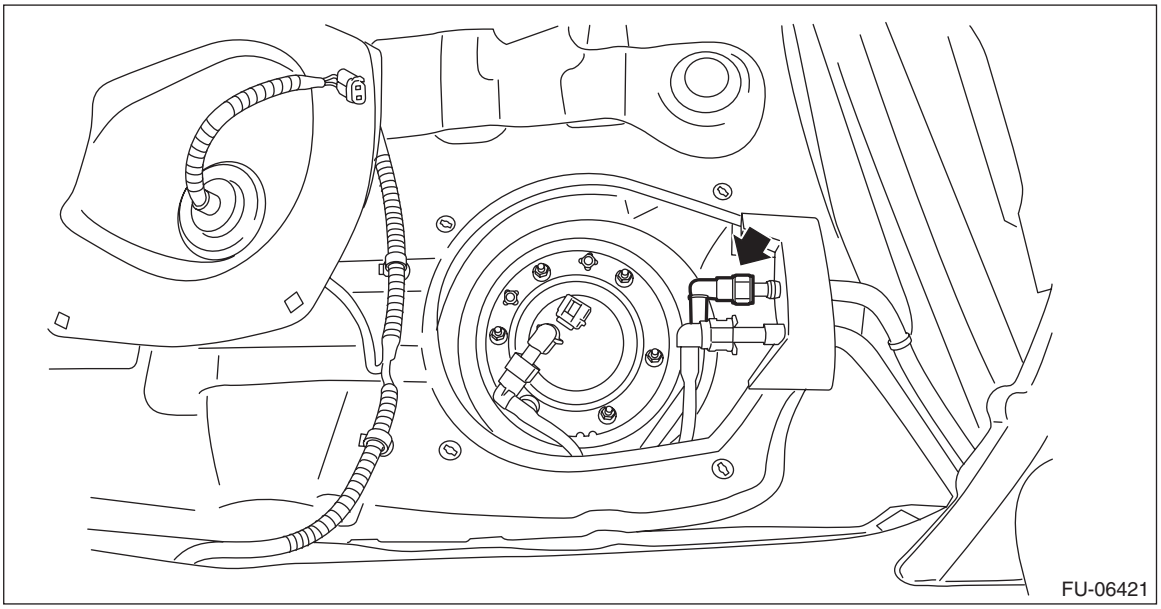
10) Connect the quick connector of the fuel delivery tube.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• When connecting the quick connector, make sure to insert it all the way in before locking the slider.
• When it is difficult to lock the slider, check that the connector is fully inserted.
• After locking the slider, check again that the quick connector is securely connected.

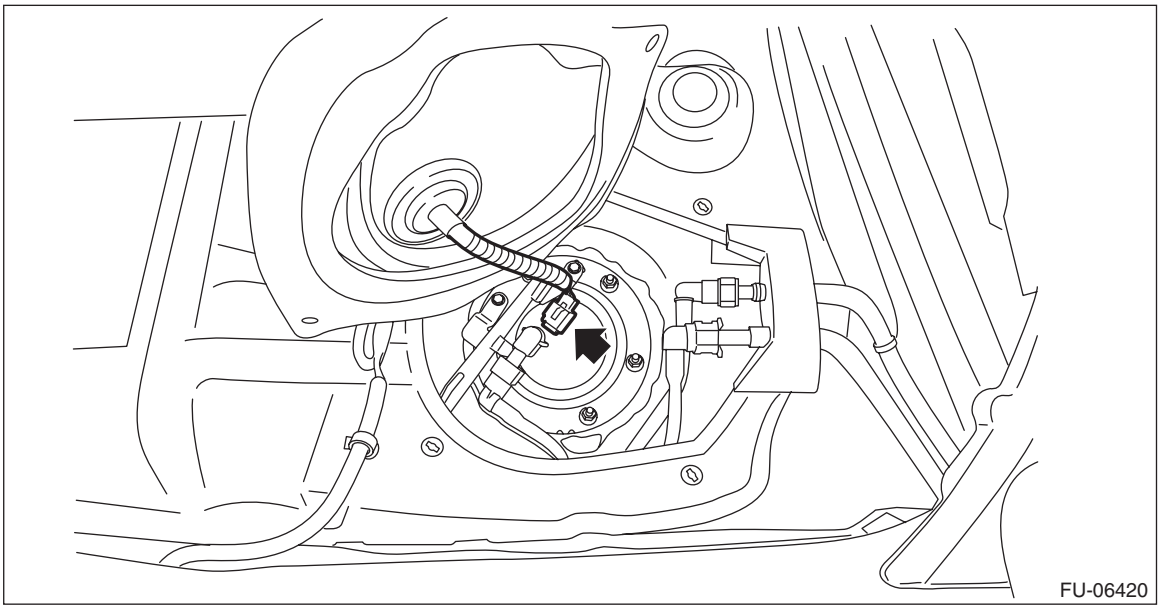
NOTE:
Connect the quick connector as shown in the figure.



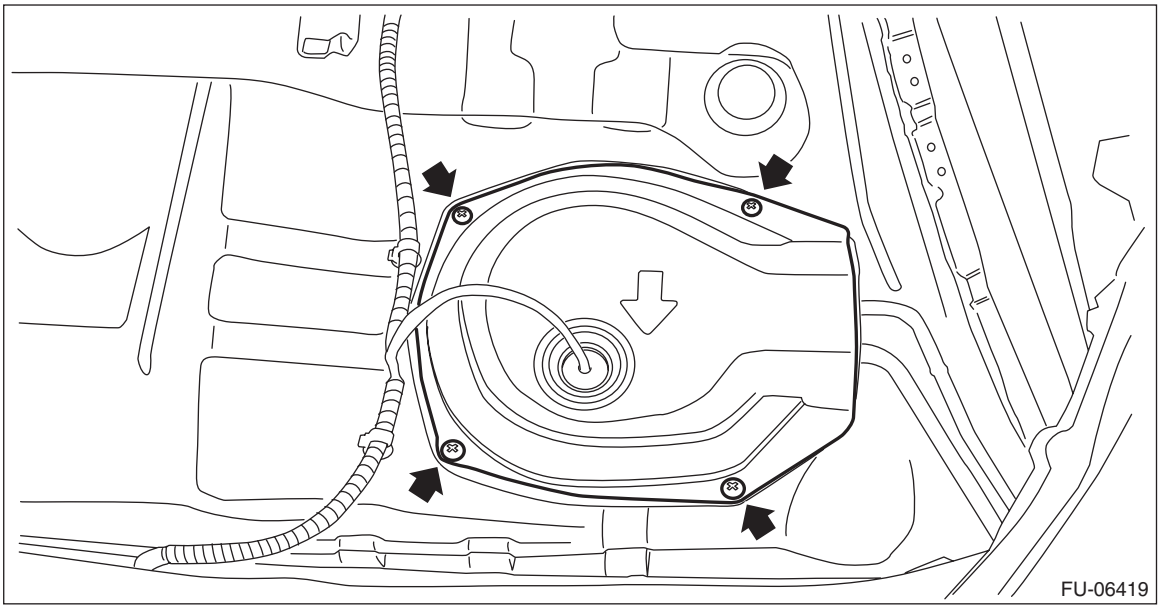
(a) Slider



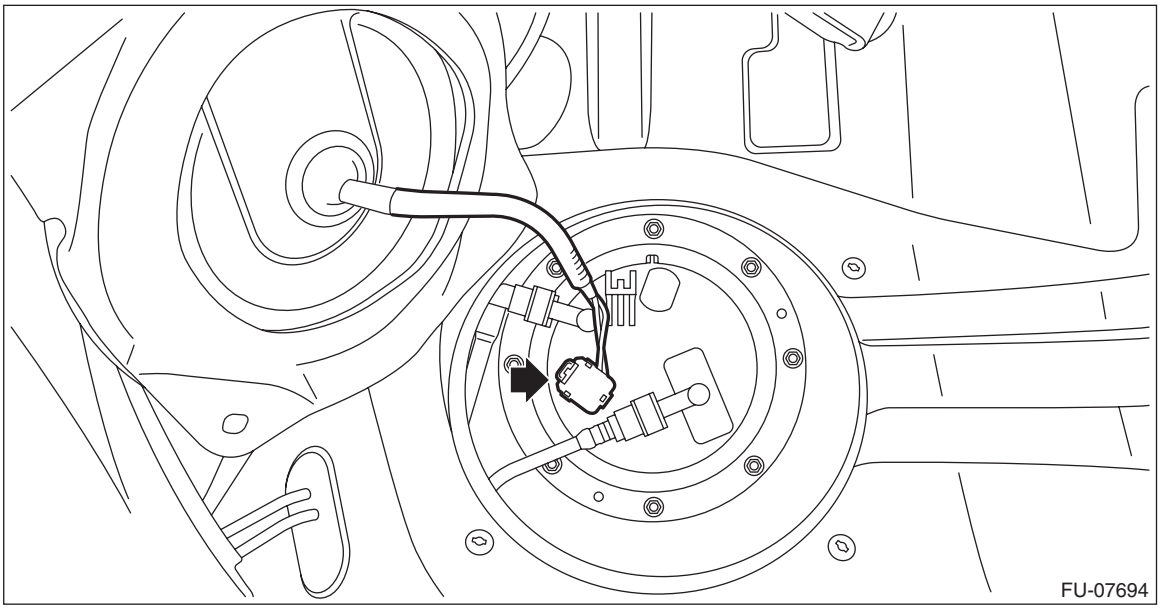
11) Connect the connector to the fuel sub level sensor.



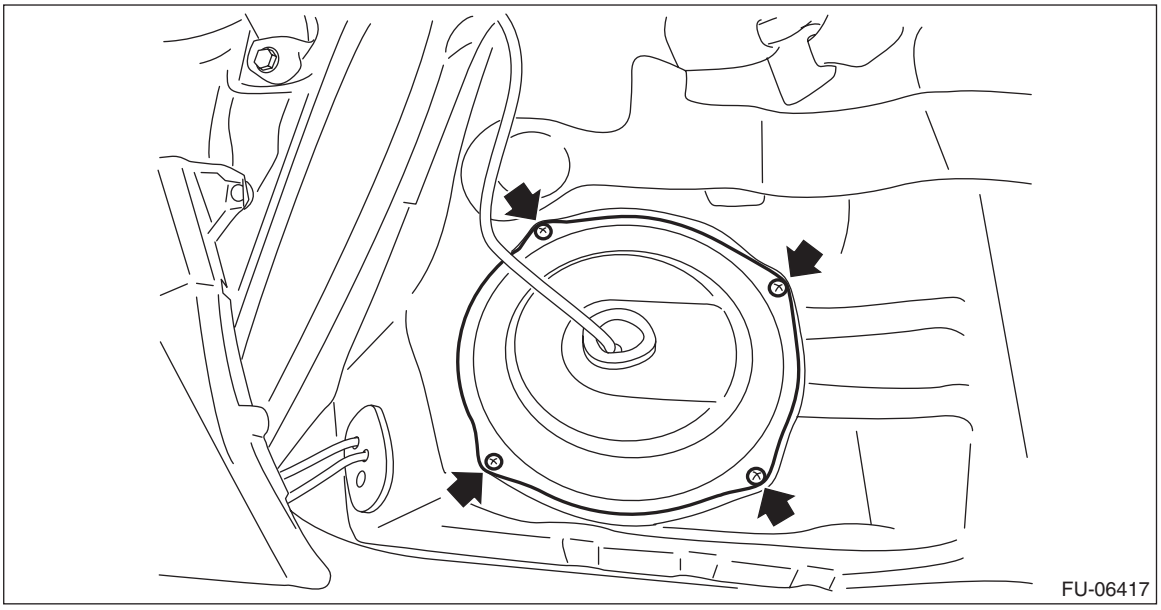
12) Install the service hole cover of fuel sub level sensor.



13) Connect the connector to the fuel pump.



14) Install the service hole cover of fuel pump.



15) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
16) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Check that the fuel tank and fuel pipe have no deformation, cracks and other damages.
2) Check that the fuel hose and tube have no cracks, damage or loose part.

29.Fuel Filler Pipe

A: REMOVAL

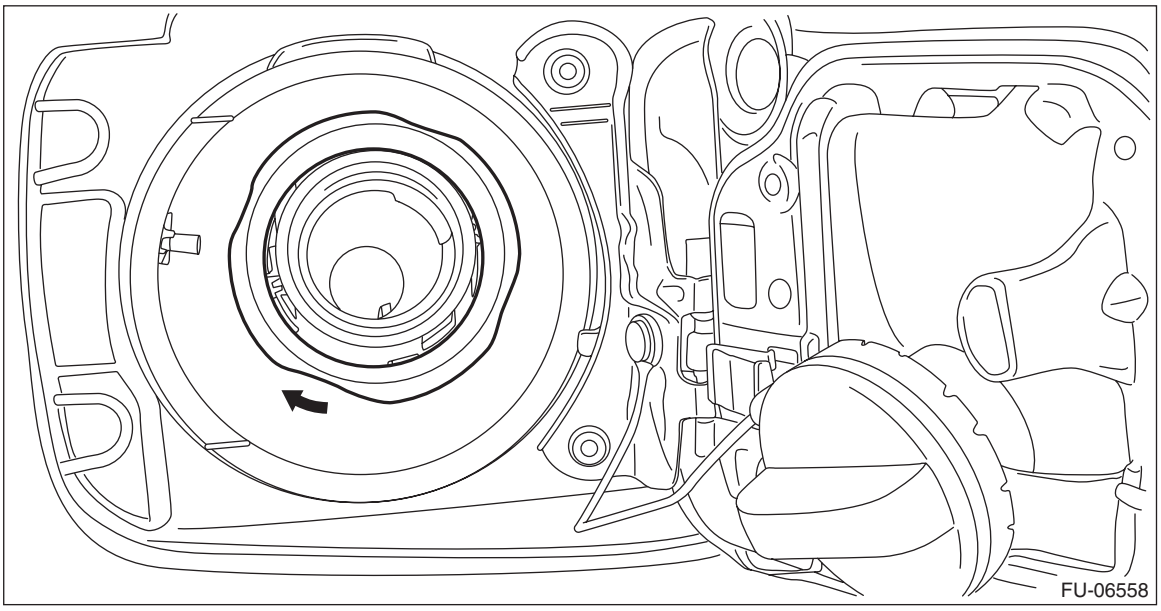
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
Be careful not to spill fuel.

1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Drain fuel. <Ref. to FU(H4DO(HEV))-100, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
3) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

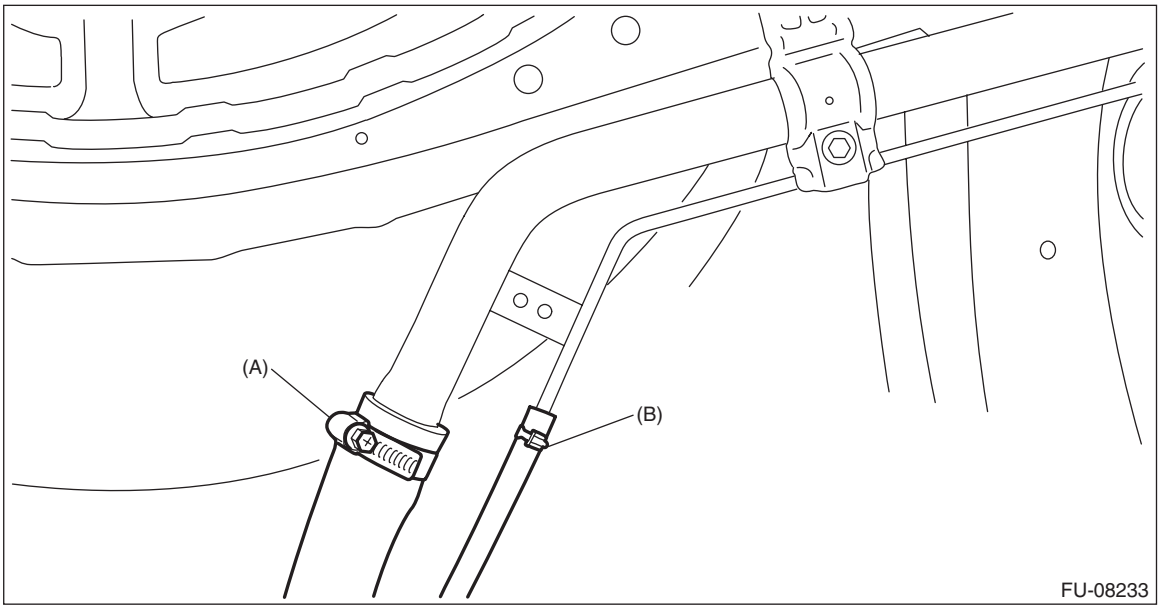
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

4) Open the fuel filler lid and remove the fuel filler cap.
5) Turn the fuel filler pipe protector in the direction of the arrow to unlock and remove it.

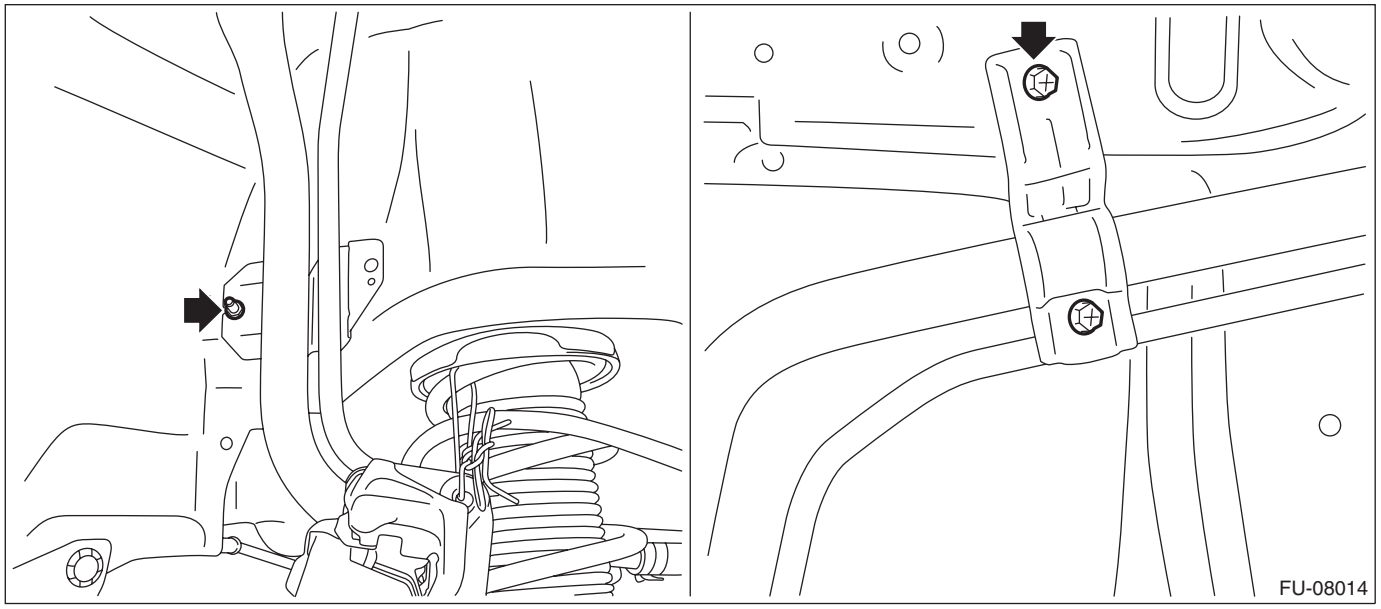


6) Remove the rear sub frame assembly. <Ref. to RS-10, REMOVAL, Rear Sub Frame.>
7) Remove the rear mud guard RH. <Ref. to EI-32, REMOVAL, Mud Guard.>

8) Disconnect the fuel filler hose (A) and evaporation hose (B) from the fuel filler pipe assembly.



9) Remove the bolts and nuts which secure the fuel filler pipe assembly to the vehicle.

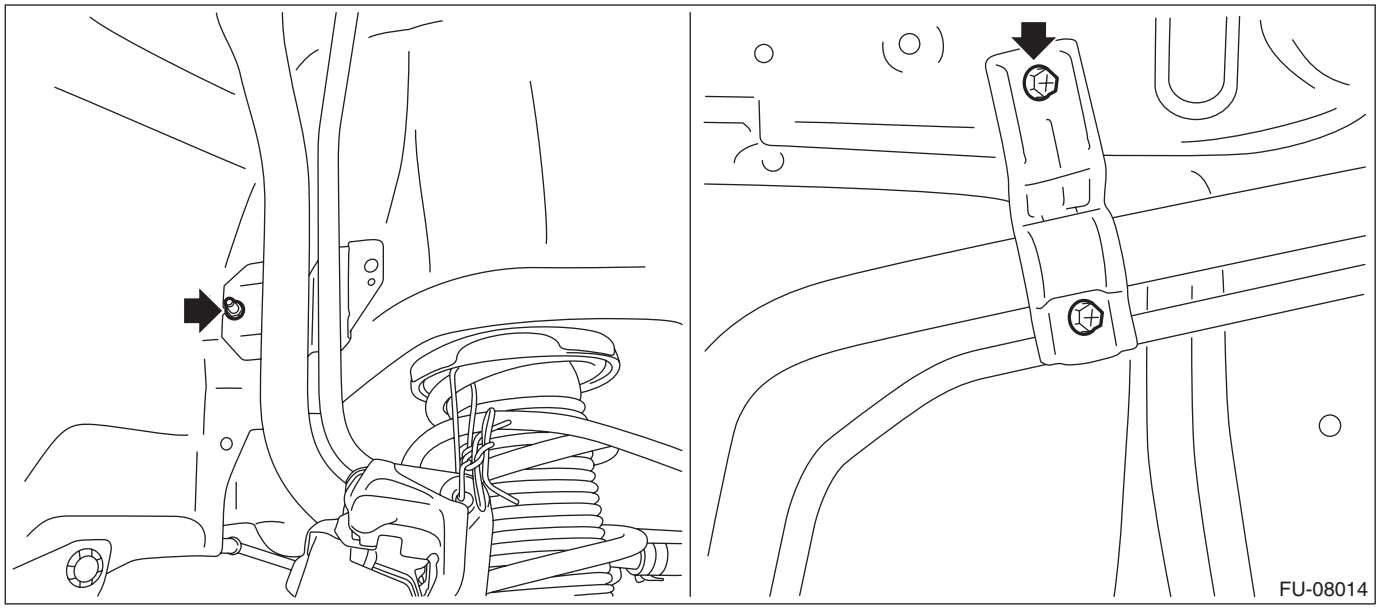


10) Remove the fuel filler pipe assembly from the underside of the vehicle.

B: INSTALLATION

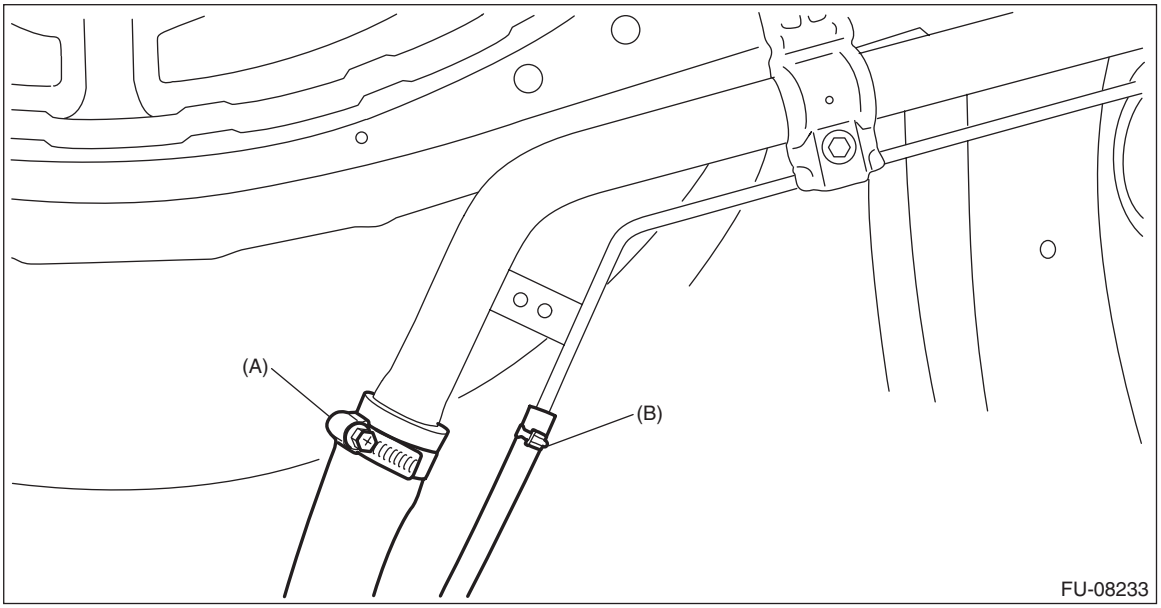
1) Open the fuel filler lid.
2) Insert the fuel filler pipe assembly into the rubber saucer from inside of the rear fender.
3) Install the fuel filler pipe assembly to the vehicle.

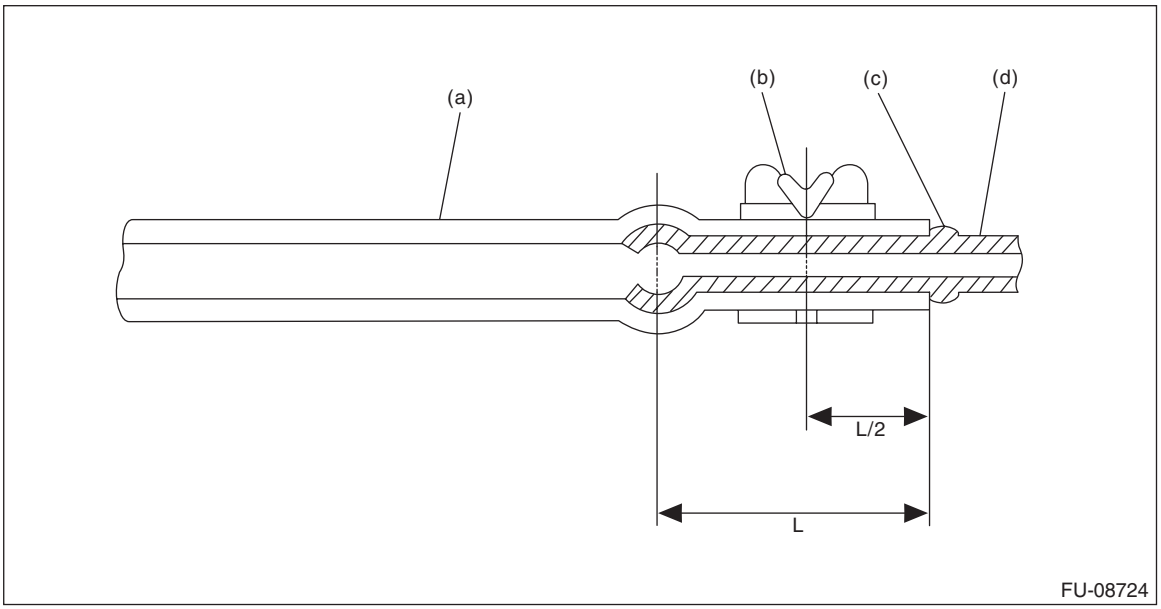
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



4) Securely insert the fuel filler hose (A) and evaporation hose (B) until the hose end contacts the spool, then attach the clamp or clip as shown in the figure.

Tightening torque:
2.5 N·m (0.3 kgf-m, 1.8 ft-lb)





(a) Hose
(b) Clamp or clip
(c) Spool or bump
(d) Pipe

5) Install the rear mud guard RH. <Ref. to EI-32, INSTALLATION, Mud Guard.>
6) Install the rear sub frame assembly. <Ref. to RS-16, INSTALLATION, Rear Sub Frame.>
7) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
8) Inspect the wheel alignment and adjust if necessary. <Ref. to FS-7, Wheel Alignment.>
9) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>
10) Adjust the steering angle sensor. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

C: INSPECTION

1) Check that the fuel filler pipe assembly has no deformation, cracks or other damages.
2) Check that the fuel hose has no cracks, damage or loose part.

30.Fuel Pump

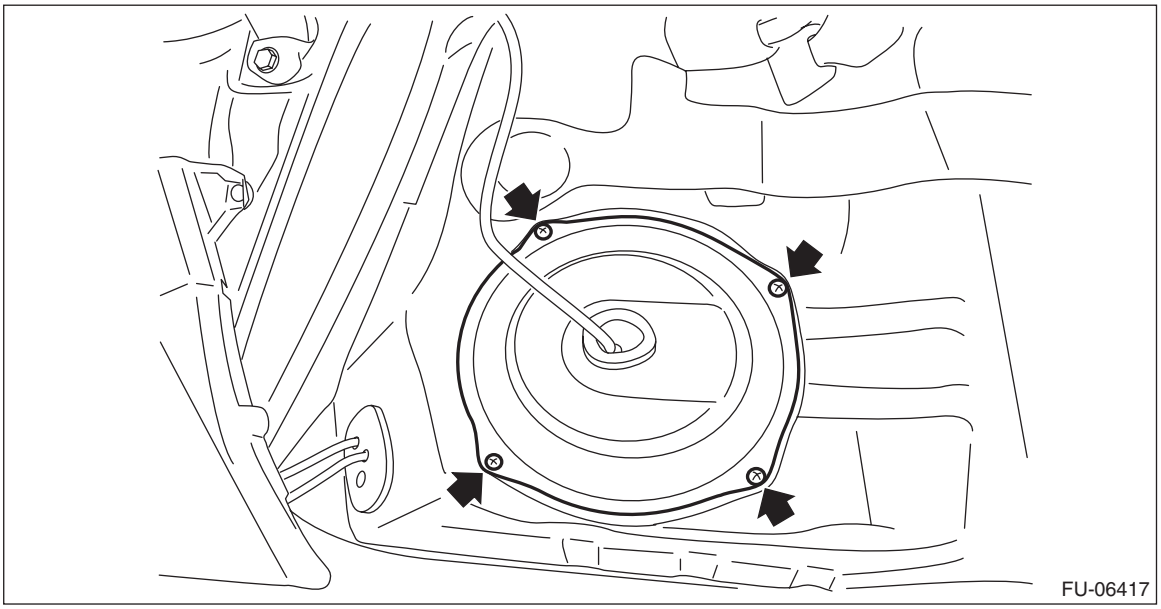
A: REMOVAL

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

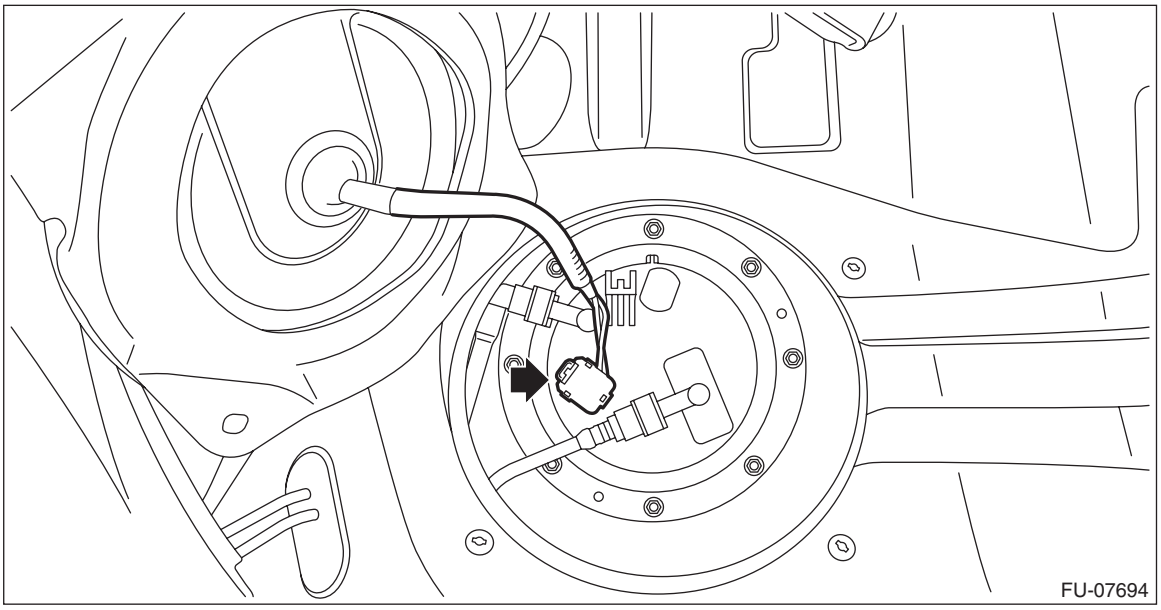
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
- **If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.**

NOTE:
Fuel pump assembly consists of fuel pump, fuel filter and fuel level sensor.
1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Drain fuel. <Ref. to FU(H4DO(HEV))-100, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
3) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
4) Remove the rear seat cushion. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the service hole cover of fuel pump.

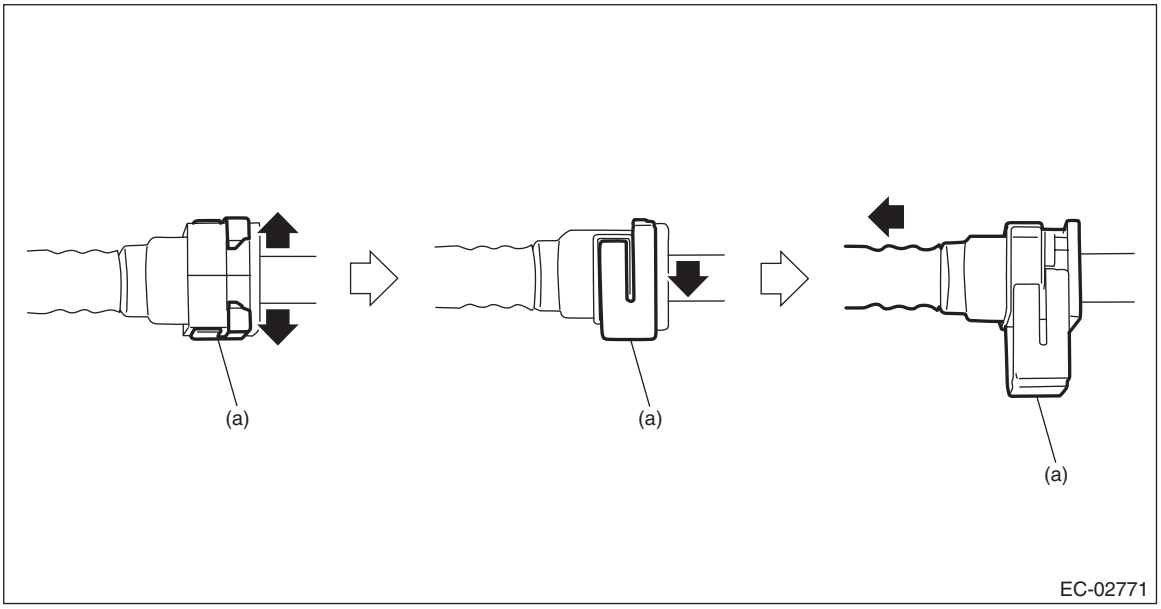


6) Disconnect connectors from the fuel pump, and move aside the service hole cover.

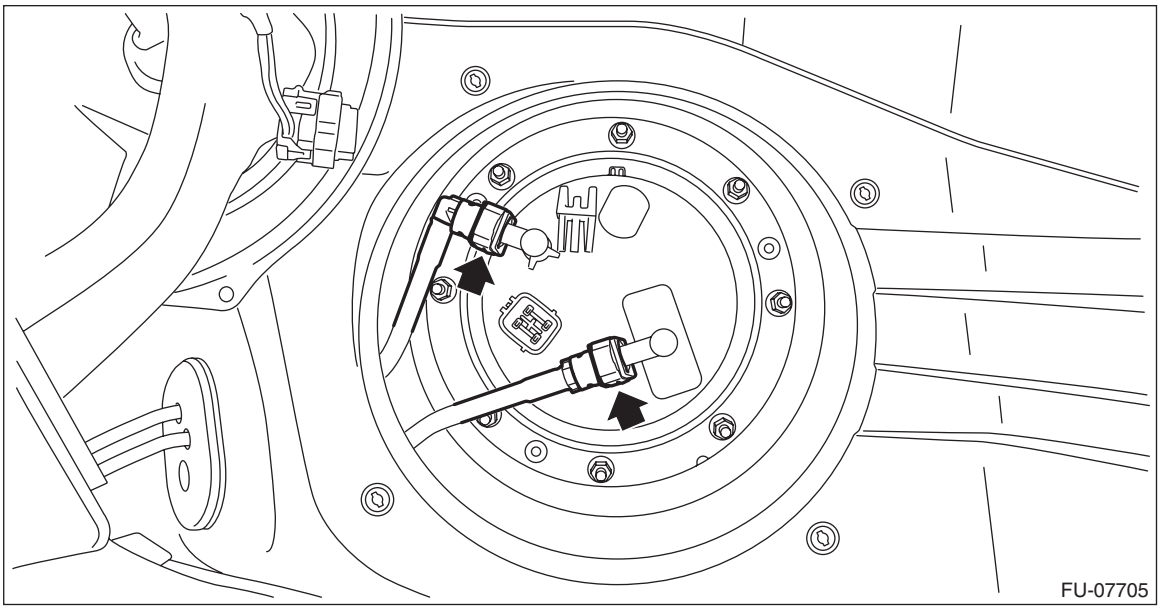


7) Disconnect the quick connector of fuel delivery tube and jet pump tube.

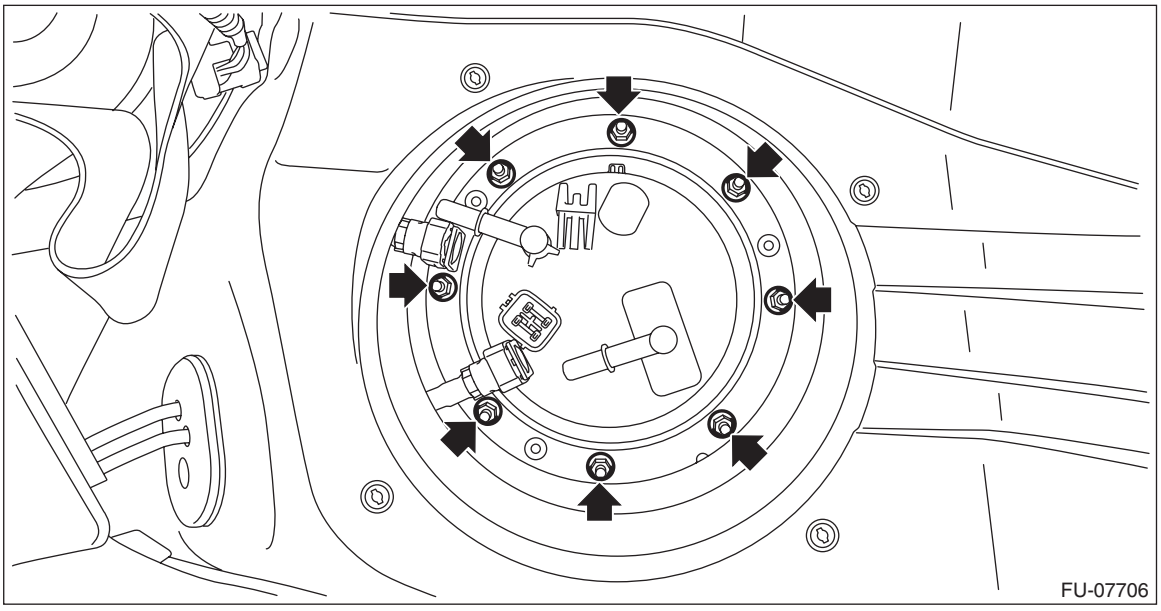
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider



8) Remove the nuts which hold the fuel pump upper plate to the fuel tank.



9) Remove the fuel pump assembly from the fuel tank.

CAUTION:
Be careful not to let the arm and float of fuel level sensor contact the fuel tank.

B: INSTALLATION

1) Install the fuel pump assembly to the fuel tank.
   (1) Make sure the sealing portion is free from fuel or foreign matter before installation.
   (2) Align the protrusion (A) of the gasket to the position shown in the figure, and install the gasket from the lower side of the fuel pump assembly.

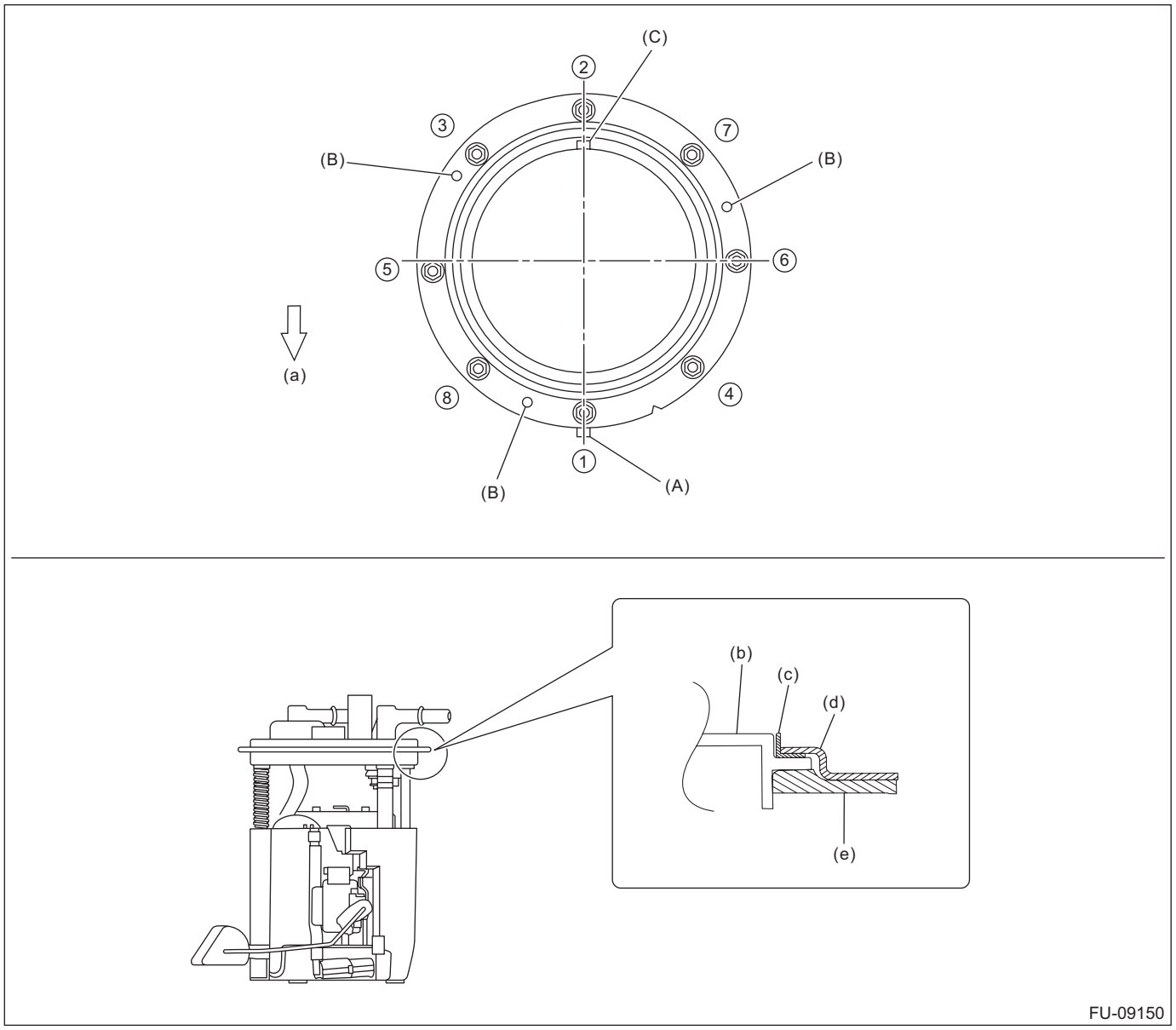
NOTE:
Use a new gasket.

   (3) Align the protrusion (C) of fuel pump upper plate cushion with the protrusion (C) of the fuel pump assembly as shown in the figure, and install the fuel pump upper plate cushion from the upper side of the fuel pump assembly.
   (4) Align the cutout of the fuel pump upper plate with the protrusion (C), and install the fuel pump upper plate from the upper side of the fuel pump assembly so that the protrusions (B) (3 places) of the gasket fit the holes of the fuel pump upper plate.

(5) Install the fuel pump assembly to the fuel tank in the direction shown in the figure, and tighten the nuts to the specified torque in the order as shown in the figure.

CAUTION:
Set the arm and float of the fuel level sensor while paying attention to prevent them from contacting the fuel tank. If the arm of the fuel level sensor is bent, the fuel gauge may not read correctly.

Tightening torque:
4.4 N·m (0.4 kgf-m, 3.2 ft-lb)

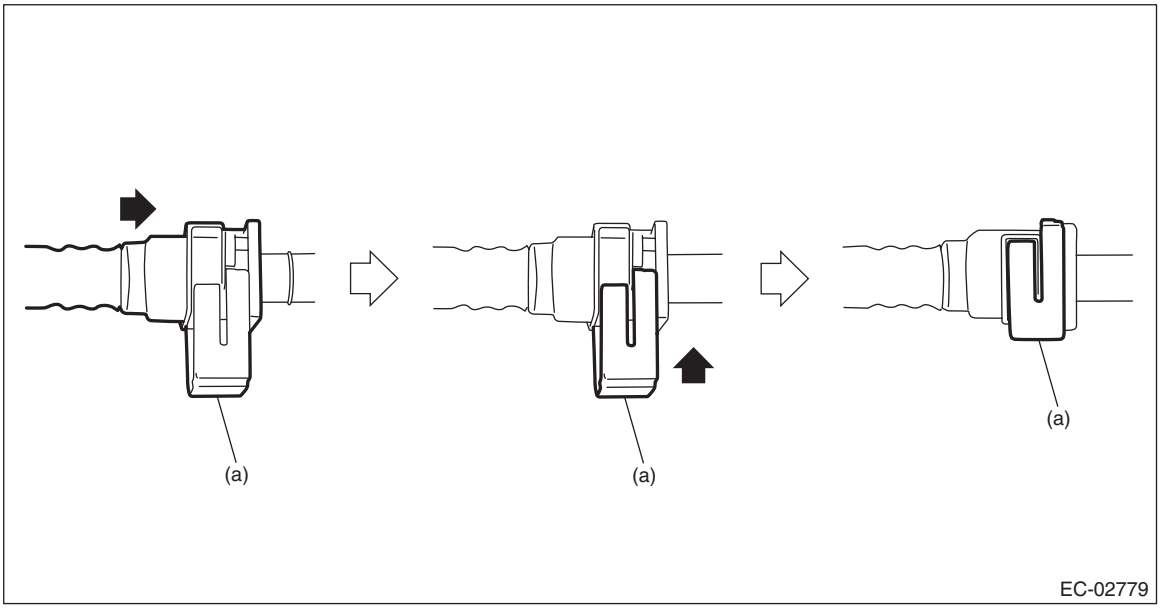


(a) Front side of vehicle
(b) Fuel pump ASSY
(c) Fuel pump upper plate cushion
(d) Fuel pump upper plate
(e) Gasket

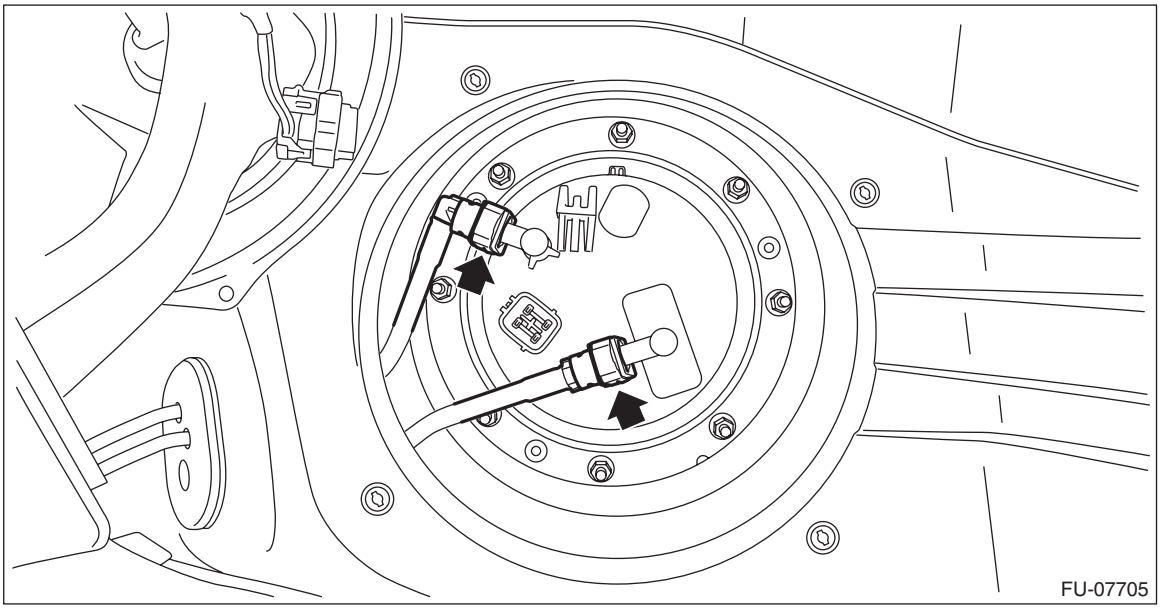
2) Connect the quick connector of the fuel delivery tube and the jet pump tube.

CAUTION:
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check again that the quick connector is securely connected.**

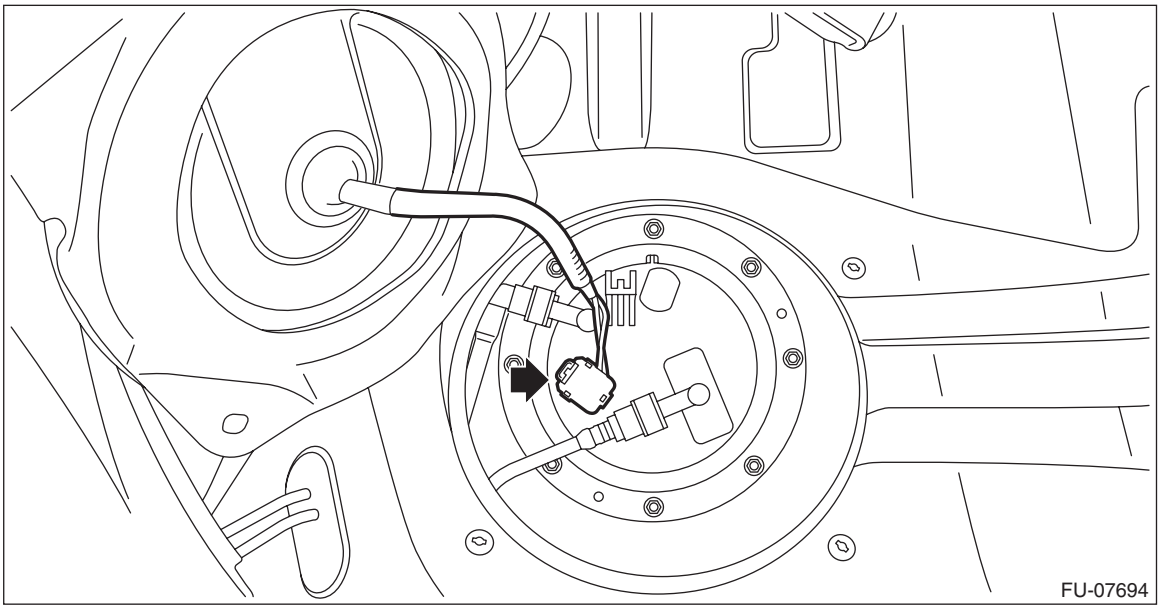
NOTE:
Connect the quick connector as shown in the figure.



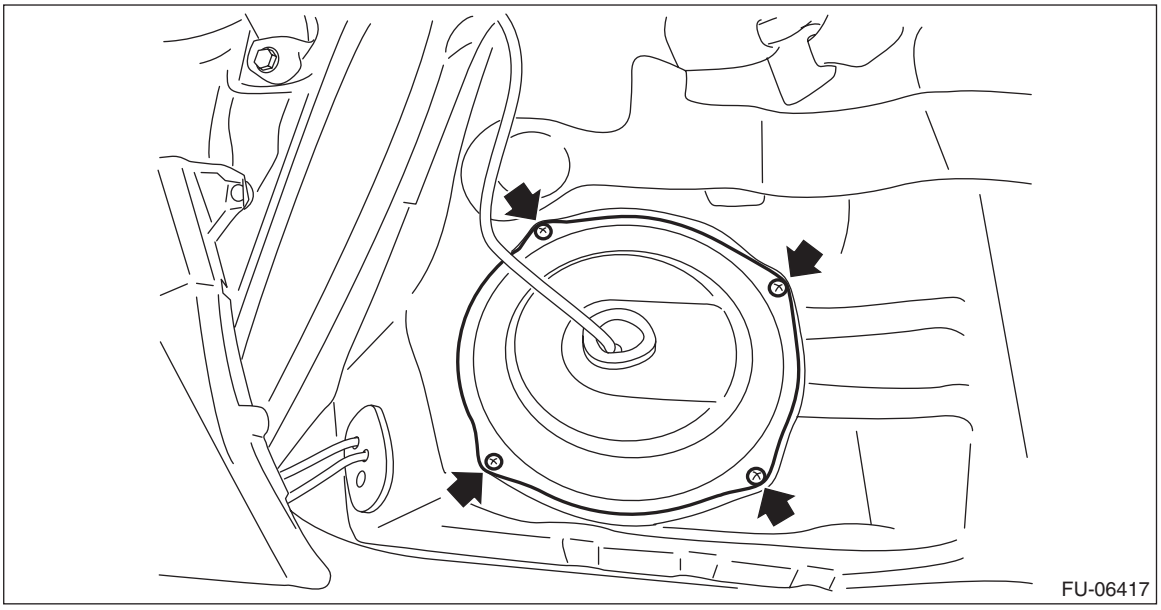
(a) Slider



3) Connect the connector to the fuel pump.



4) Install the service hole cover of fuel pump.

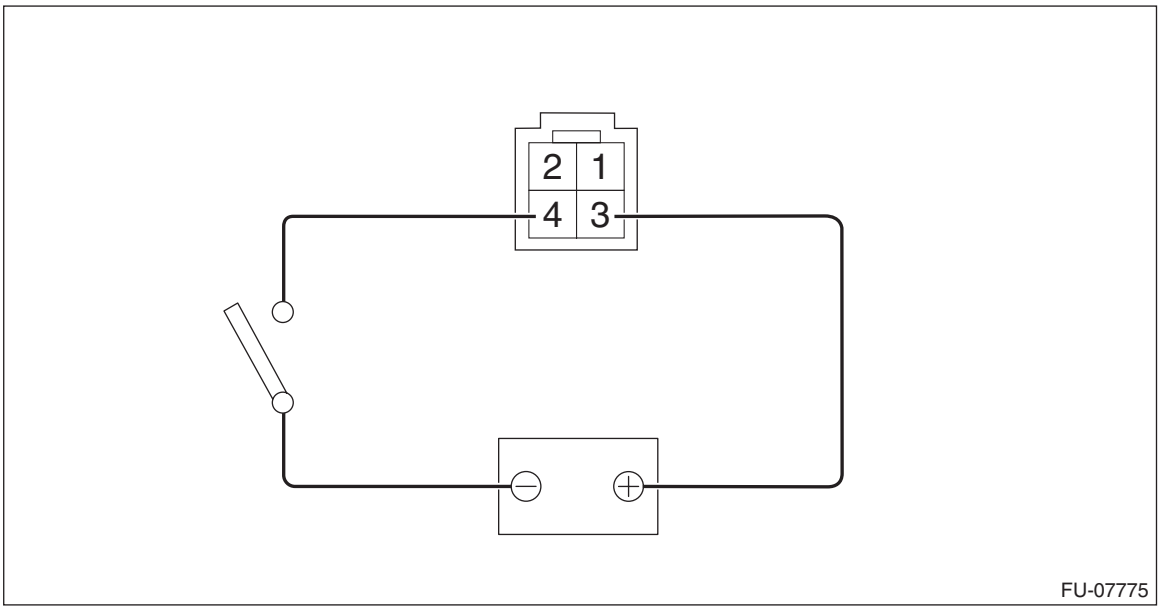


5) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Check that the fuel pump has no deformation, cracks or other damages.
2) Connect the battery positive terminal to terminal No. 3 and the battery ground terminal to terminal No. 4, and inspect the fuel pump operation.

WARNING:
- **Wipe off fuel completely.**
- **Keep the battery as far apart from fuel pump as possible.**
- **Do not run the fuel pump for a long time under non-load condition.**



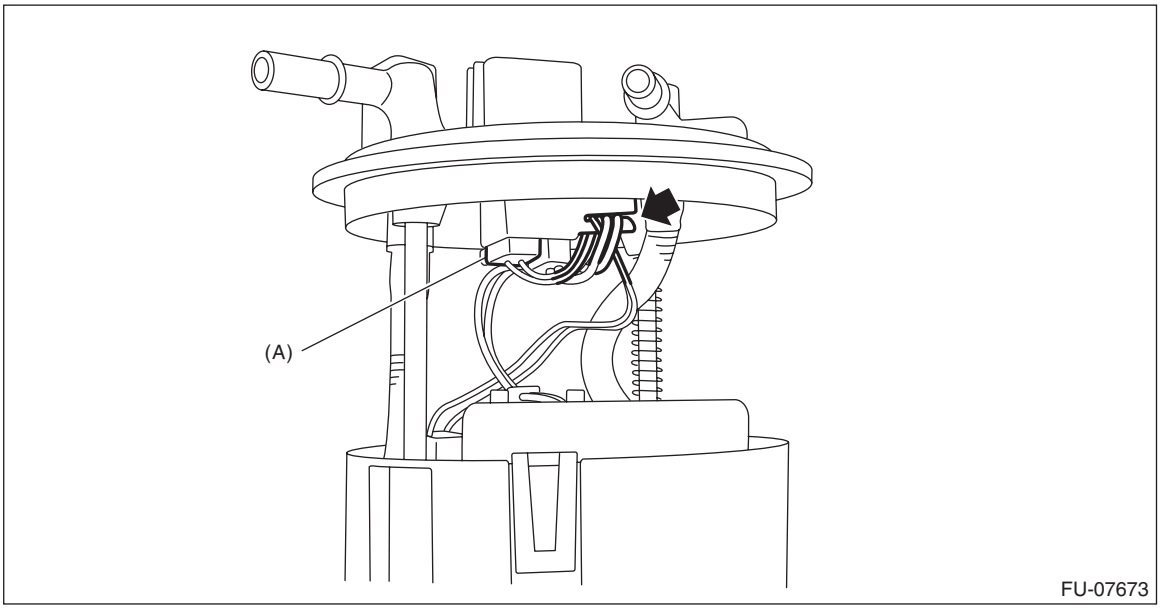
31.Fuel Level Sensor

A: REMOVAL

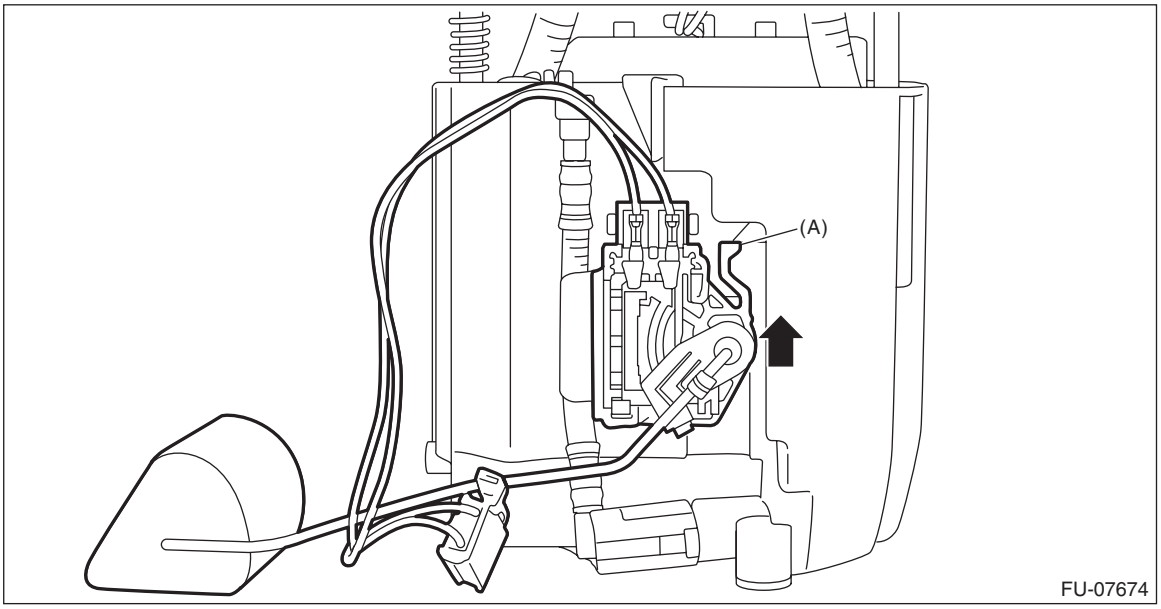
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
- **Be careful not to spill fuel.**
- **If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.**

NOTE:
The fuel level sensor is built in fuel pump assembly.
1) Remove the fuel pump assembly. <Ref. to FU(H4DO(HEV))-123, REMOVAL, Fuel Pump.>
2) Disconnect the fuel level sensor connector (A), and pull out the connector cable and fuel level sensor harness from the clip.



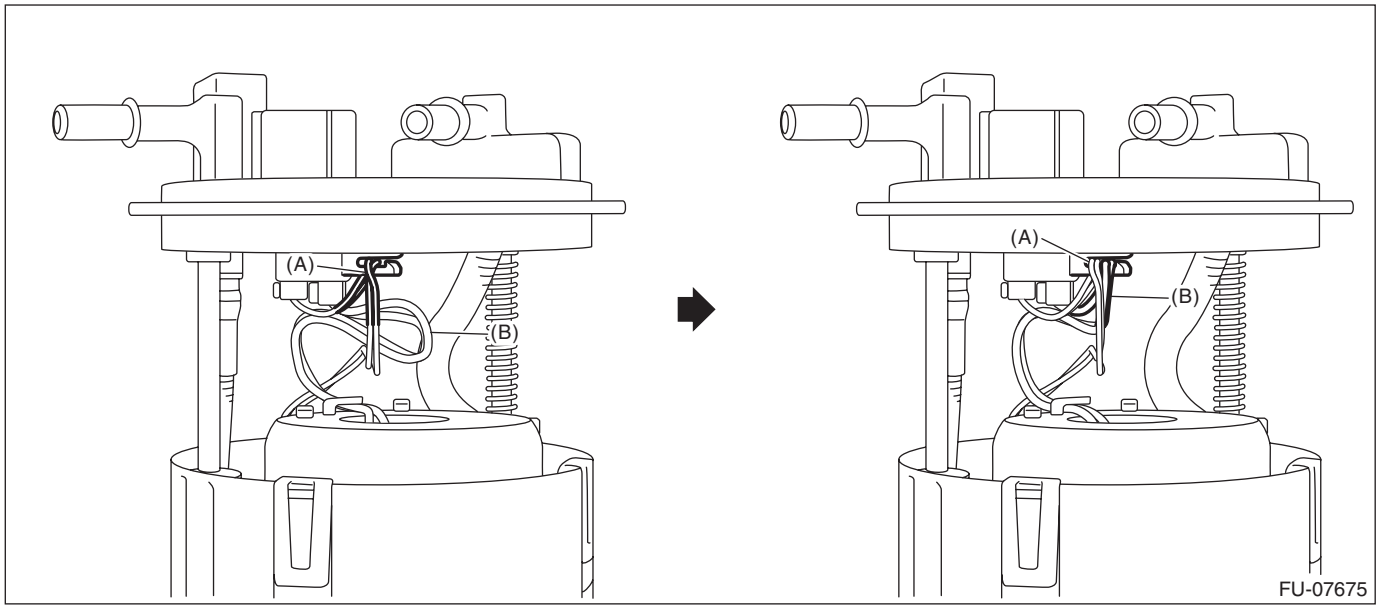
3) While pressing the claw (A) of the fuel level sensor, slide the fuel level sensor in the direction of the arrow, and remove the fuel level sensor.



B: INSTALLATION

Install in the reverse order of removal.

CAUTION:
Be sure to install the fuel level sensor harness to the clip first, then install the connector cable. Otherwise, malfunction may occur.

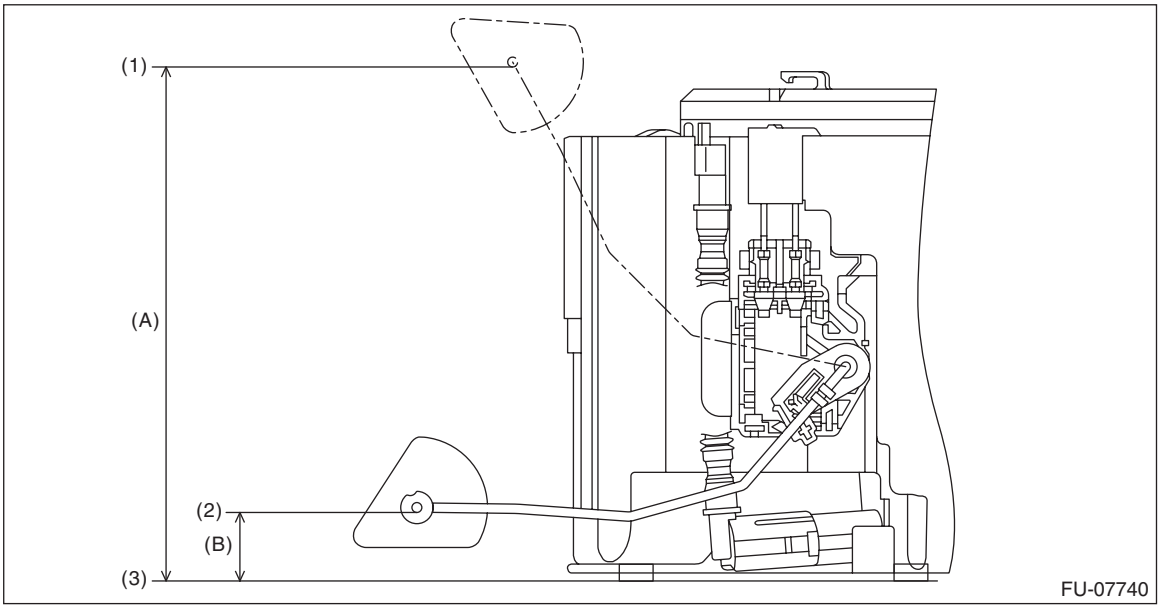


(A) Fuel level sensor harness (B) Connector cable

C: INSPECTION

1) Check that the fuel level sensor has no damage.
2) Measure the fuel level sensor float position.

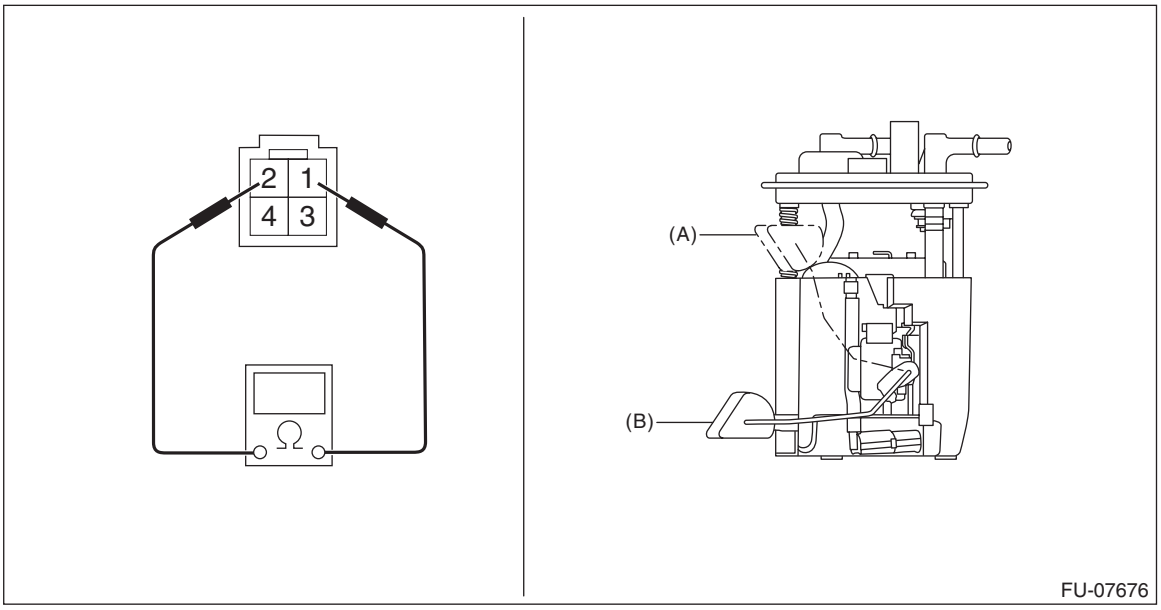
NOTE:
When inspecting the fuel level sensor, perform the work with the sensor installed to the fuel pump.



(1) FULL (2) EMPTY (3) Fuel tank seating surface

Float position	Standard
FULL to Fuel tank seating surface (A)	133.0±4 mm (5.236±0.157 in)
EMPTY to Fuel tank seating surface (B)	21.6±4 mm (0.850±0.157 in)

3) Check the resistance between fuel level sensor terminals by the connector on top of the fuel pump.



Float position	Terminal No.	Standard
FULL (A)	1 and 2	8.7±1.0 Ω
EMPTY (B)		139.1±2.0 Ω

32.Fuel Sub Level Sensor

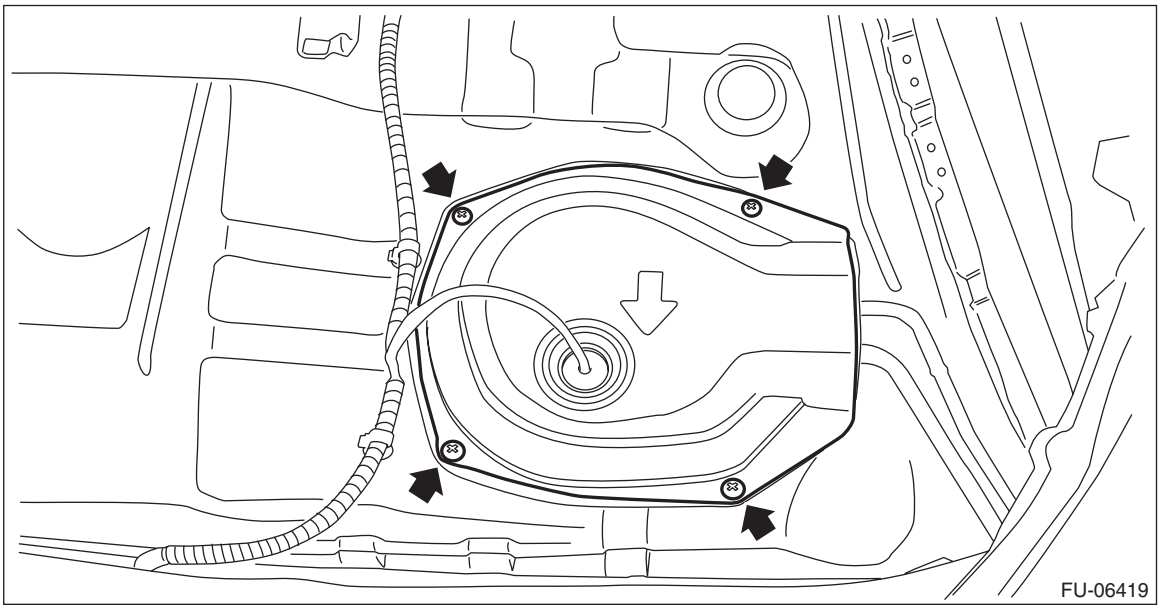
A: REMOVAL

WARNING:
Place “NO OPEN FLAMES” signs near the working area.

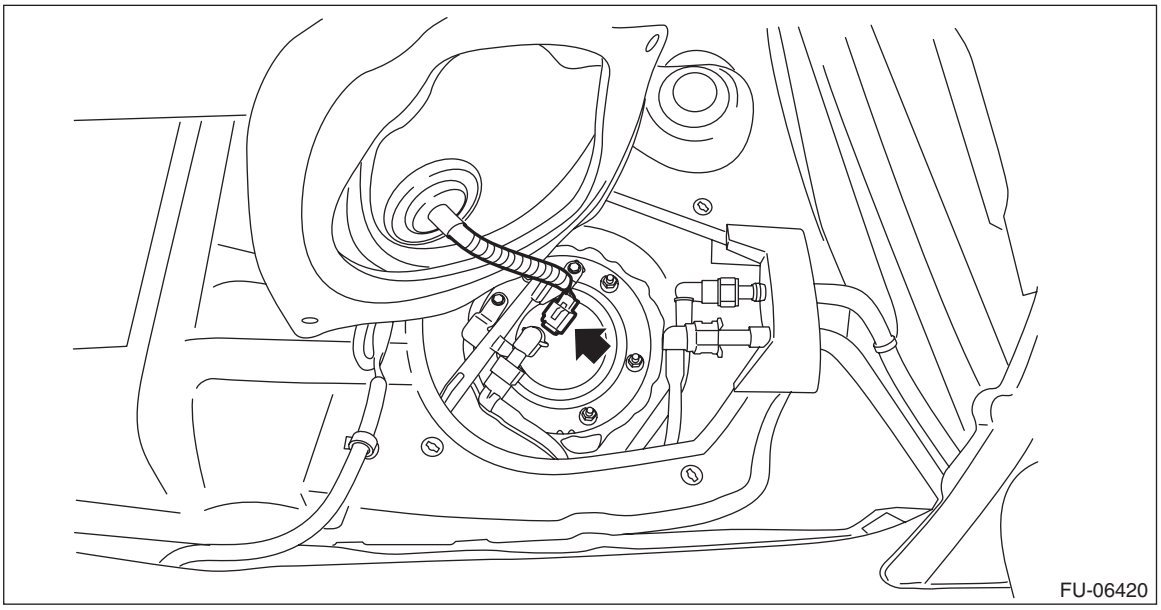
CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**
- **If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.**

1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Drain fuel. <Ref. to FU(H4DO(HEV))-100, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
3) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
4) Remove the rear seat cushion. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the service hole cover of fuel sub level sensor.

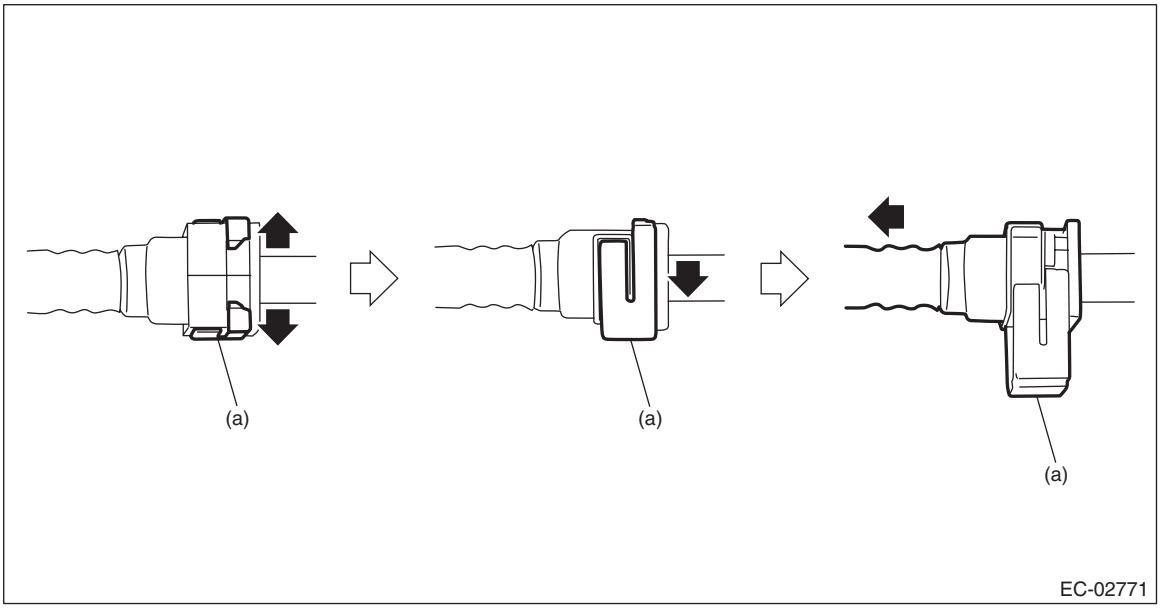


6) Disconnect the connector from the fuel sub level sensor, and move aside the service hole cover.

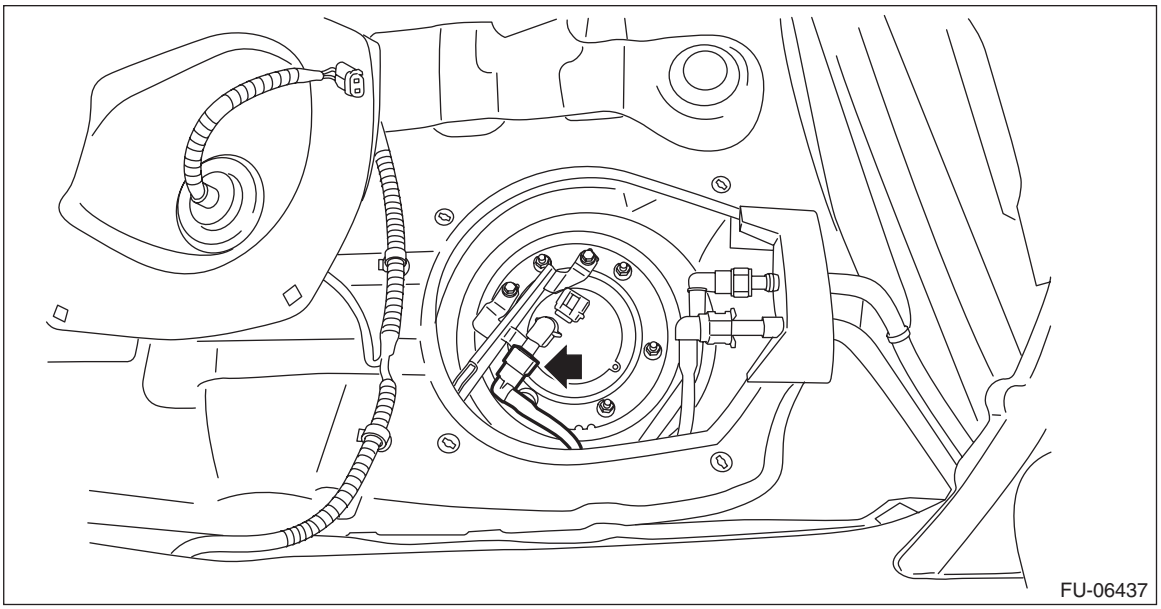


7) Disconnect the quick connector of the jet pump tube.

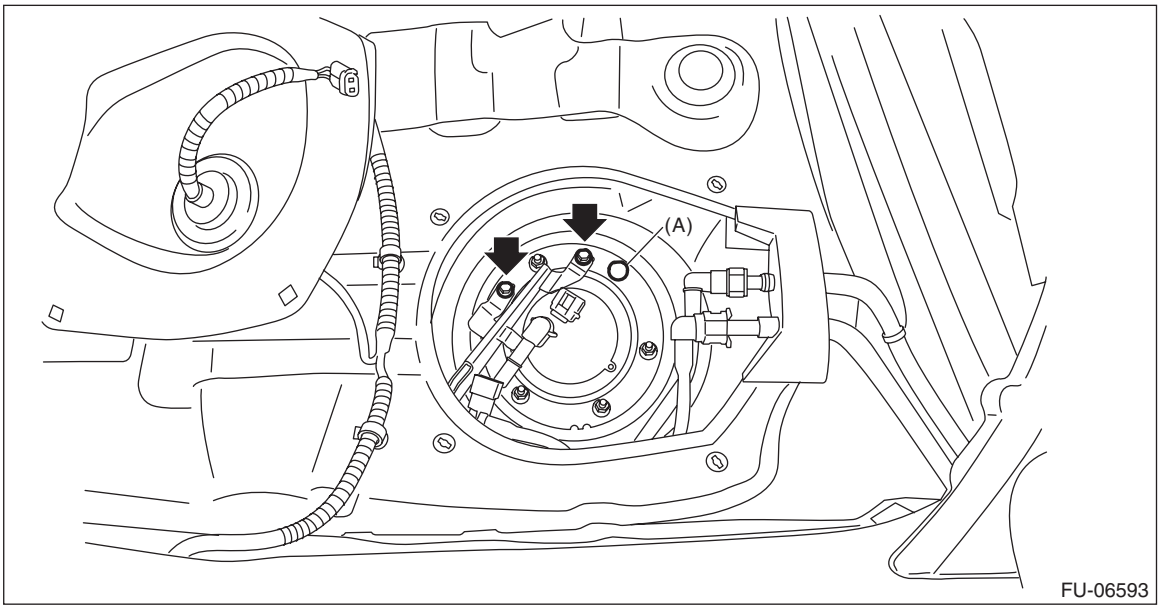
NOTE:
Disconnect the quick connector as shown in the figure.



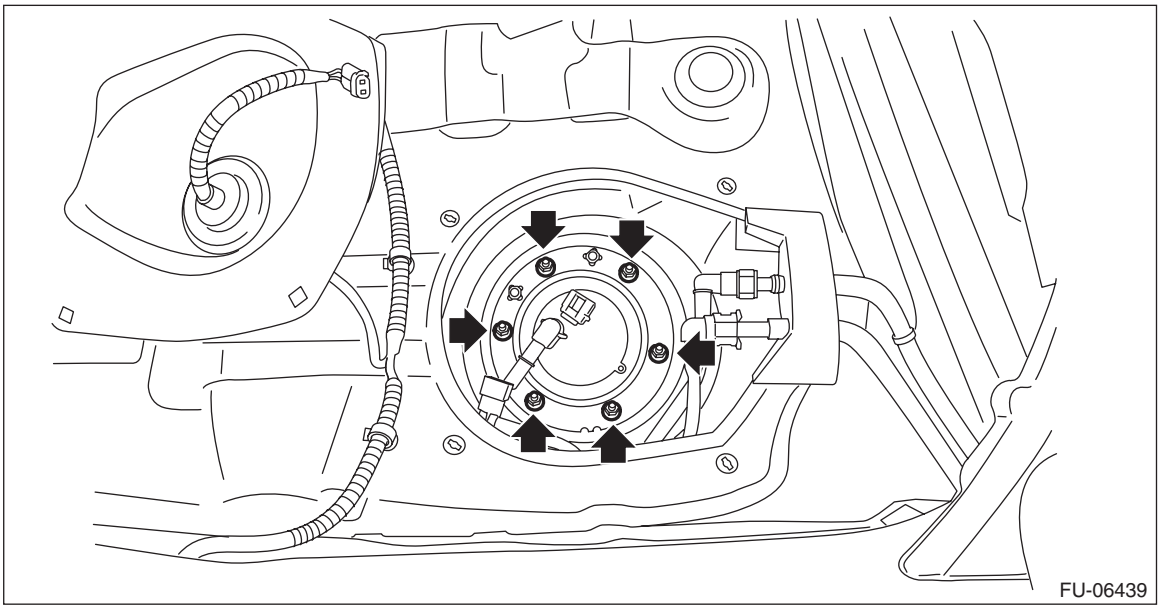
(a) Slider



8) Remove the fuel sub level sensor protector, and remove the rubber cap (A) from nut.



9) Remove the bolts and nuts which hold fuel sub level sensor protector and fuel sub level sensor upper plate to the fuel tank.



10) Remove the fuel sub level sensor from the fuel tank.

CAUTION:
Be careful not to let the arm and float of the fuel sub level sensor contact the fuel tank.

B: INSTALLATION

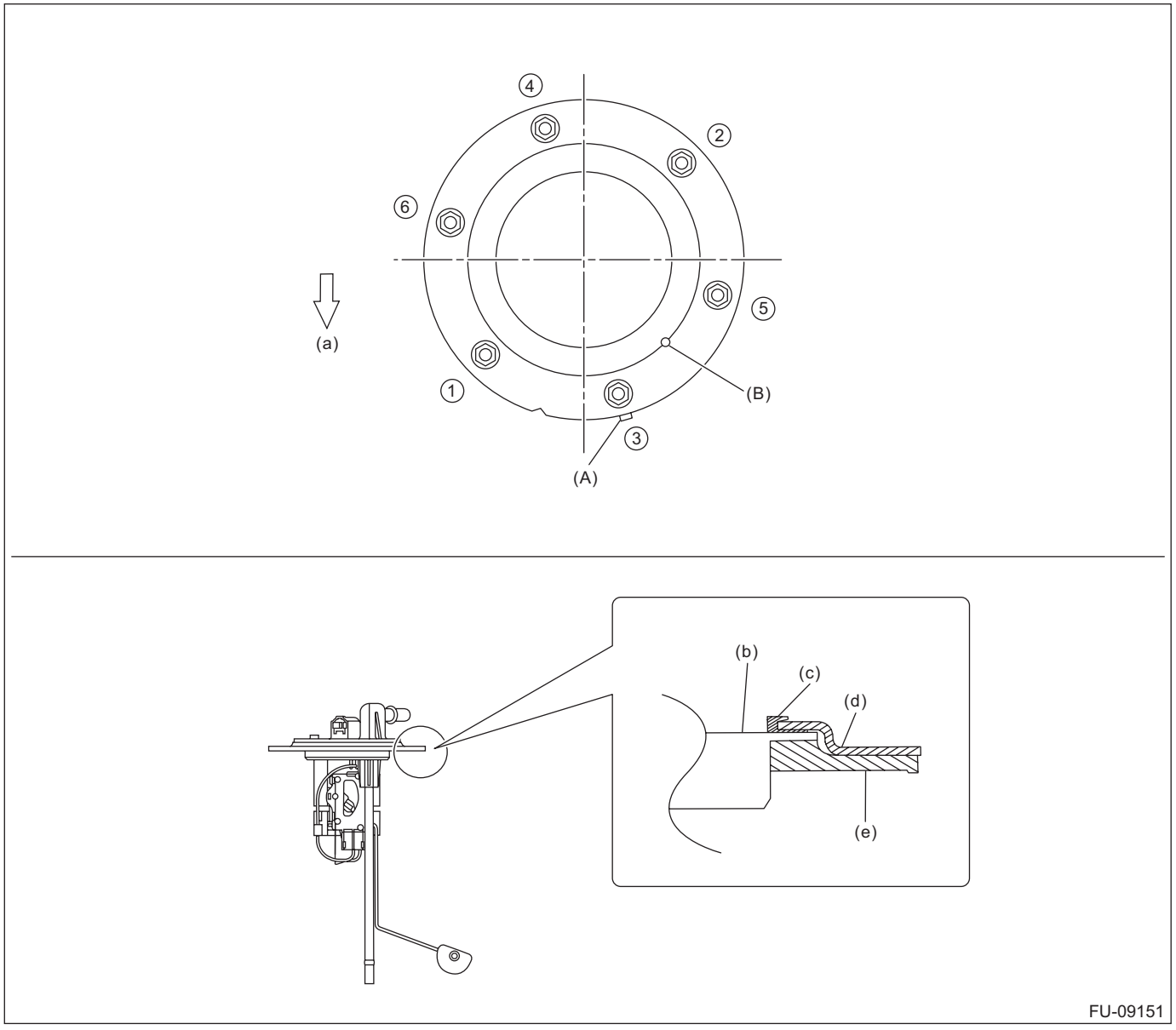
1) Install the fuel sub level sensor to the fuel tank.
   (1) Make sure the sealing portion is free from fuel or foreign matter before installation.
   (2) Align the cutout (B) as shown in the figure, and install the fuel sub level sensor upper plate cushion to the fuel sub level sensor upper plate.
   (3) Align the cutout of the fuel sub level sensor upper plate with the protrusion (B) of the fuel sub level sensor as shown in the figure, and install the fuel sub level sensor upper plate from the upper side of the fuel sub level sensor.
   (4) Install the gasket from the lower side of the fuel sub level sensor so that the protrusion (B) of the fuel sub level sensor and the protrusion (A) of the gasket are positioned as shown in the figure.

NOTE:
Use a new gasket.

(5) Install the fuel sub level sensor to the fuel tank in the direction shown in the figure, and tighten the nuts to the specified torque in the order as shown in the figure.

CAUTION:
Set the arm and float of the fuel sub level sensor while paying attention to prevent them from contacting the fuel tank. If the arm of the fuel sub level sensor is bent, the fuel gauge may not read correctly.

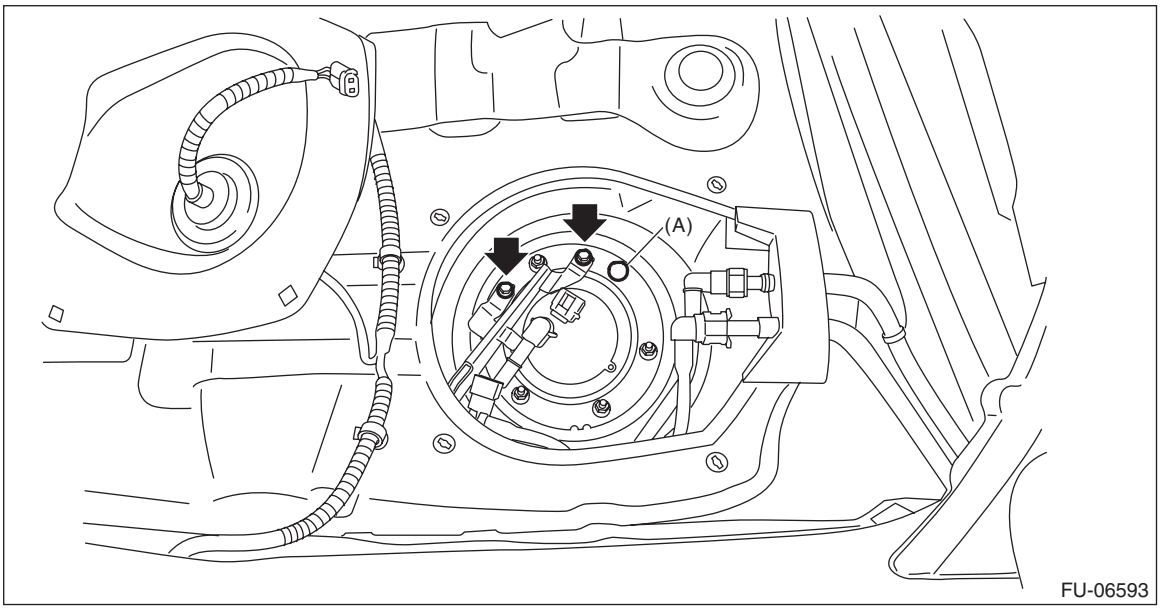
Tightening torque:
4.4 N·m (0.4 kgf-m, 3.2 ft-lb)



(a) Front side of vehicle
(b) Fuel sub level sensor
(c) Fuel sub level sensor upper plate cushion
(d) Fuel sub level sensor upper plate
(e) Gasket

2) Install the fuel sub level sensor protector, and install the rubber cap (A).

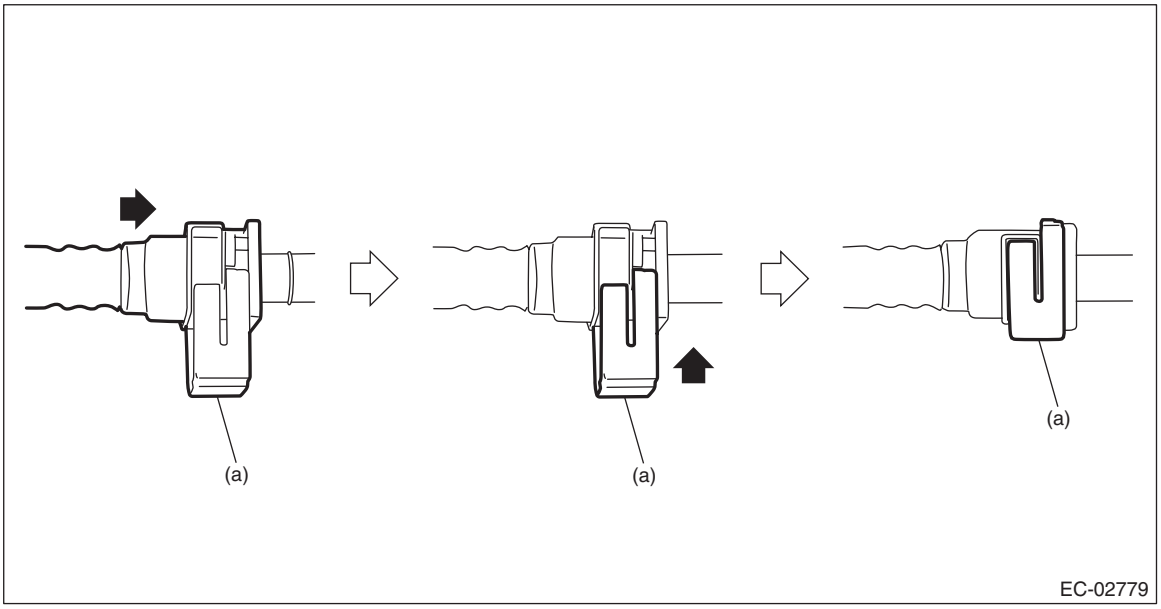
Tightening torque:
4.4 N·m (0.4 kgf-m, 3.2 ft-lb)



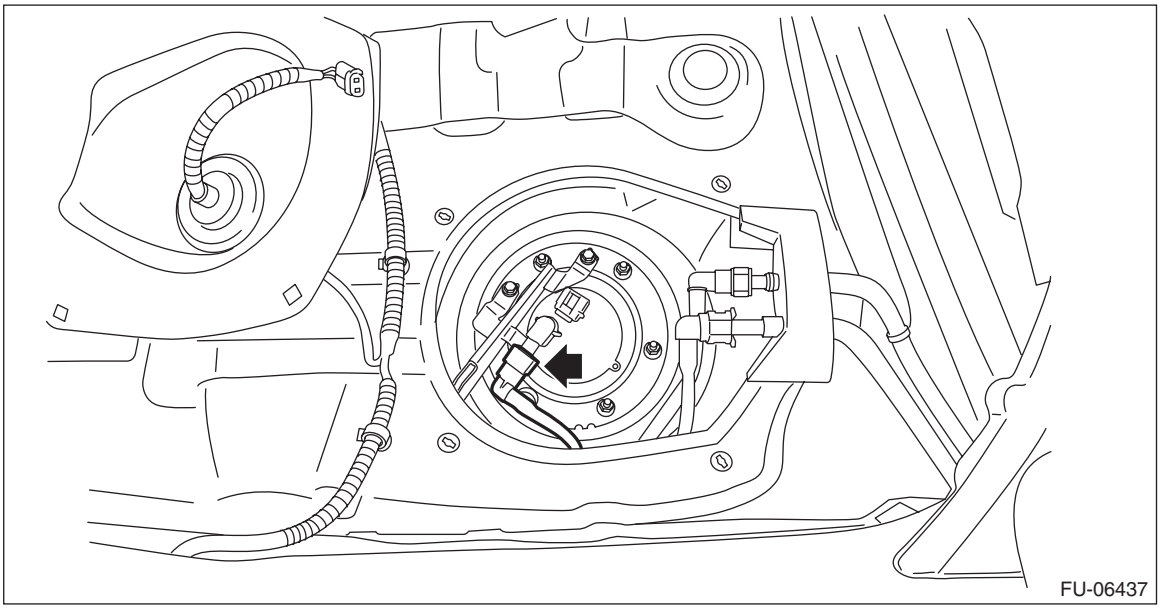
3) Connect the quick connector of the jet pump tube.

CAUTION:
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check again that the quick connector is securely connected.**

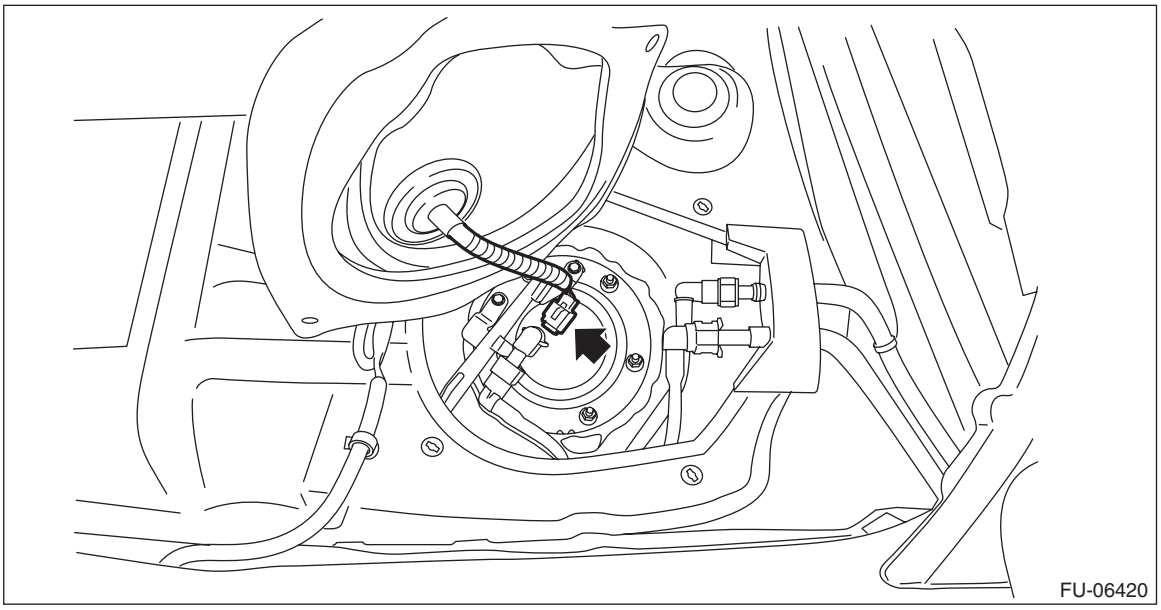
NOTE:
Connect the quick connector as shown in the figure.



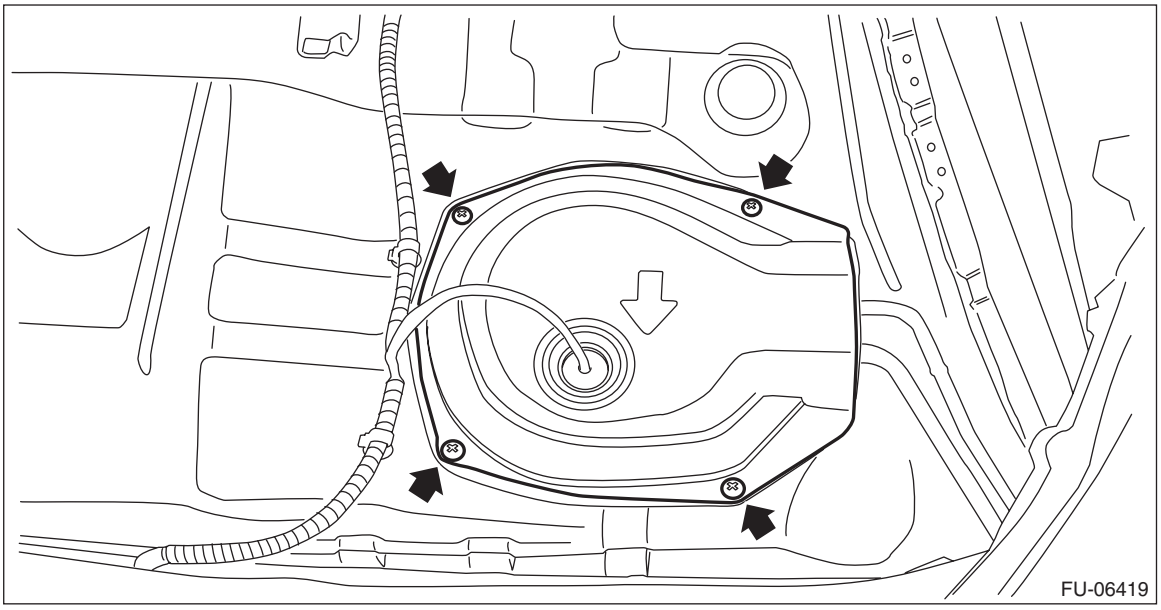
(a) Slider



4) Connect the connector to the fuel sub level sensor.



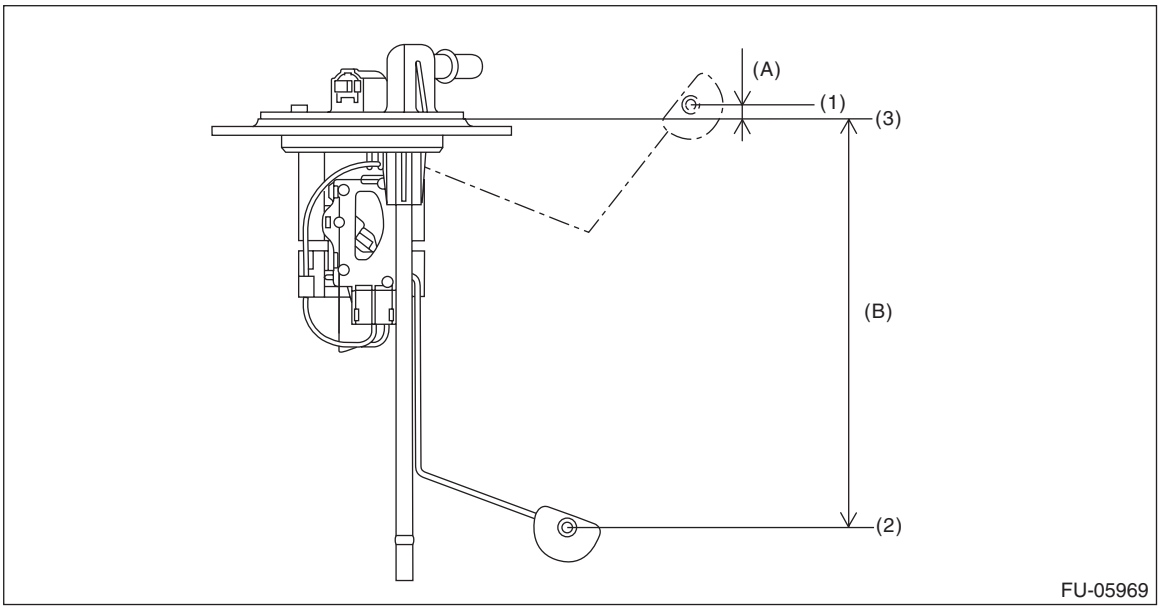
5) Install the service hole cover of fuel sub level sensor.



6) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
7) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

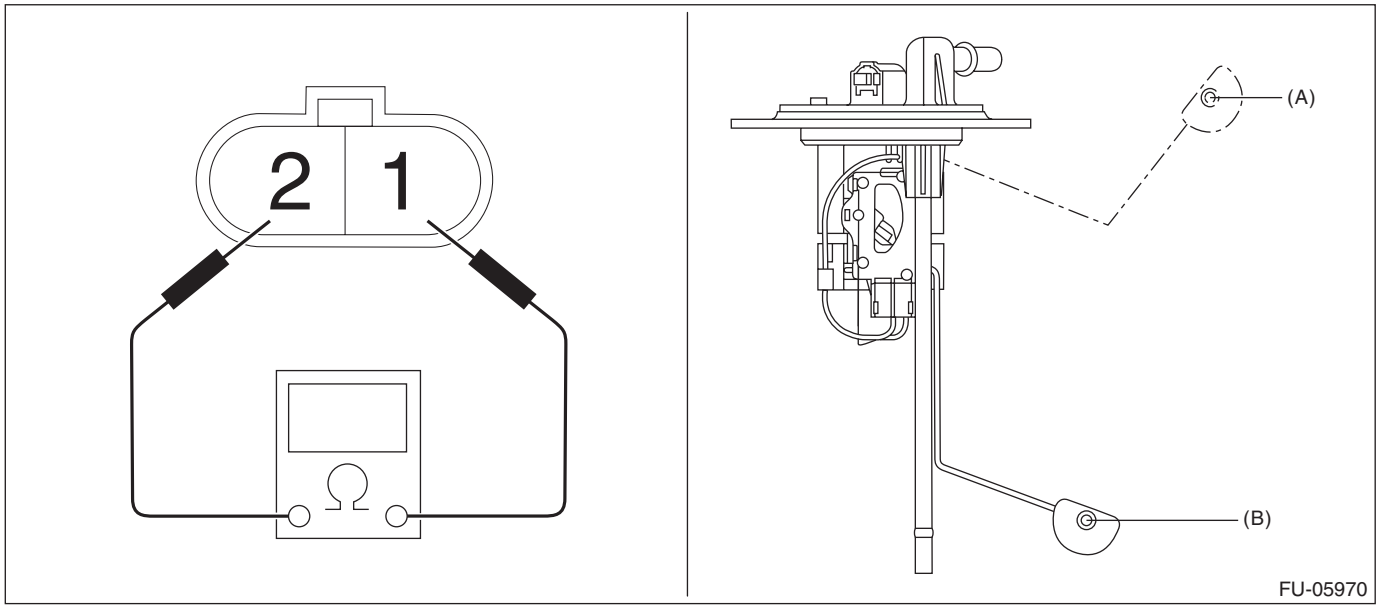
1) Check that the fuel sub level sensor has no damage.
2) Measure the fuel sub level sensor float position.



(1) FULL (2) EMPTY (3) Datum points

Float position	Standard
FULL to Datum point (A)	5.31±3.5 mm (0.209±0.138 in)
EMPTY to Datum point (B)	160.6±3.5 mm (6.32±0.138 in)

3) Measure the resistance between fuel sub level sensor terminals.



Float position	Terminal No.	Standard
FULL (A)	1 and 2	8.7±1.0 Ω
EMPTY (B)		270.9±4.0 Ω

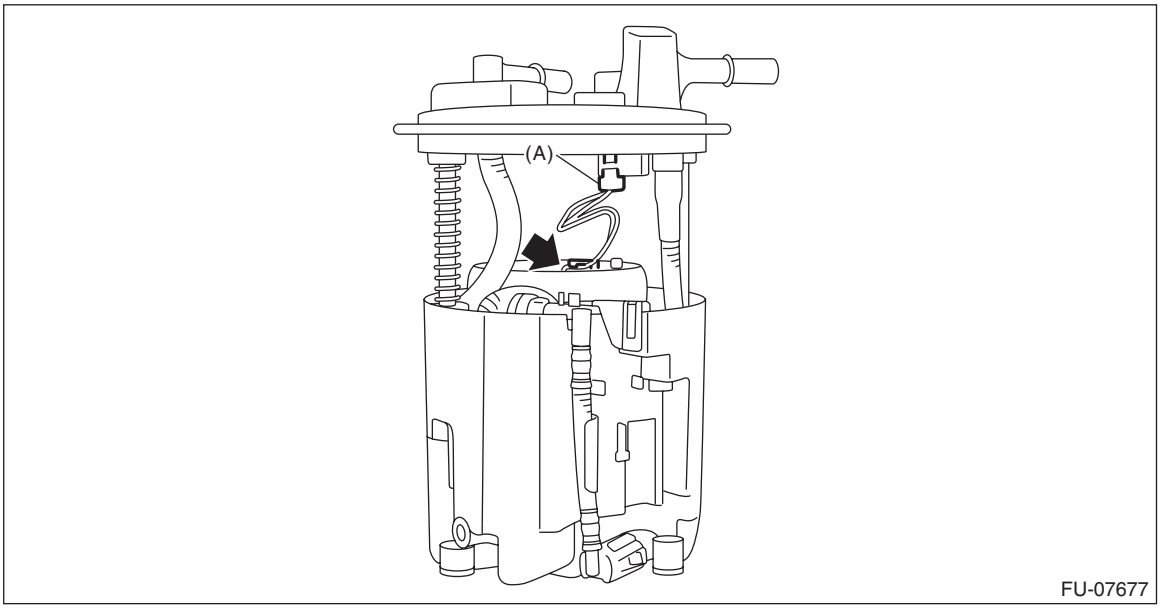
33.Fuel Filter

A: REMOVAL

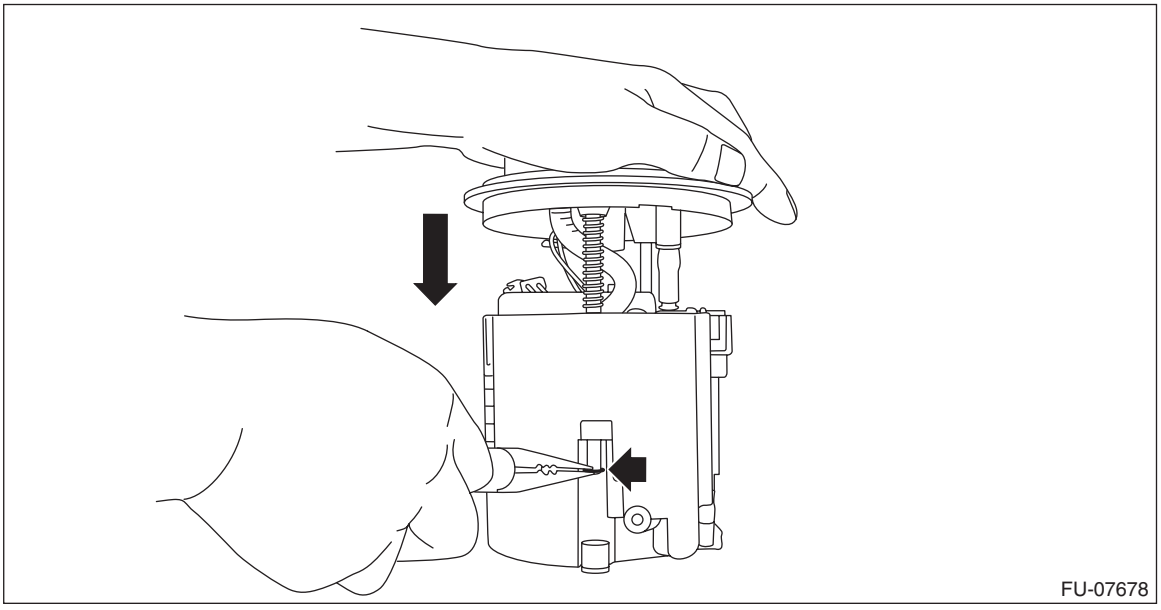
WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
- **Be careful not to spill fuel.**
- **If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.**
- **Be careful not to drop or apply any impact to the fuel pump during work. This may deteriorate its performance.**

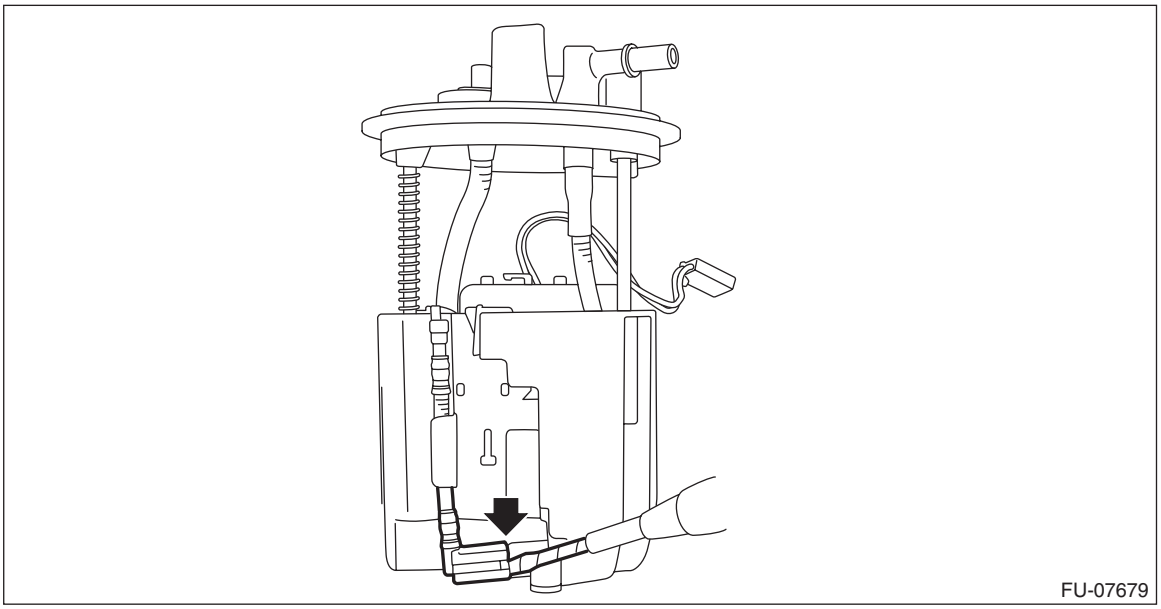
NOTE:
The fuel filter is built in fuel pump assembly.
1) Remove the fuel pump assembly. <Ref. to FU(H4DO(HEV))-123, REMOVAL, Fuel Pump.>
2) Remove the fuel level sensor. <Ref. to FU(H4DO(HEV))-130, REMOVAL, Fuel Level Sensor.>
3) Remove the connector cable from the clip, and disconnect the connector (A) of the connector cable.



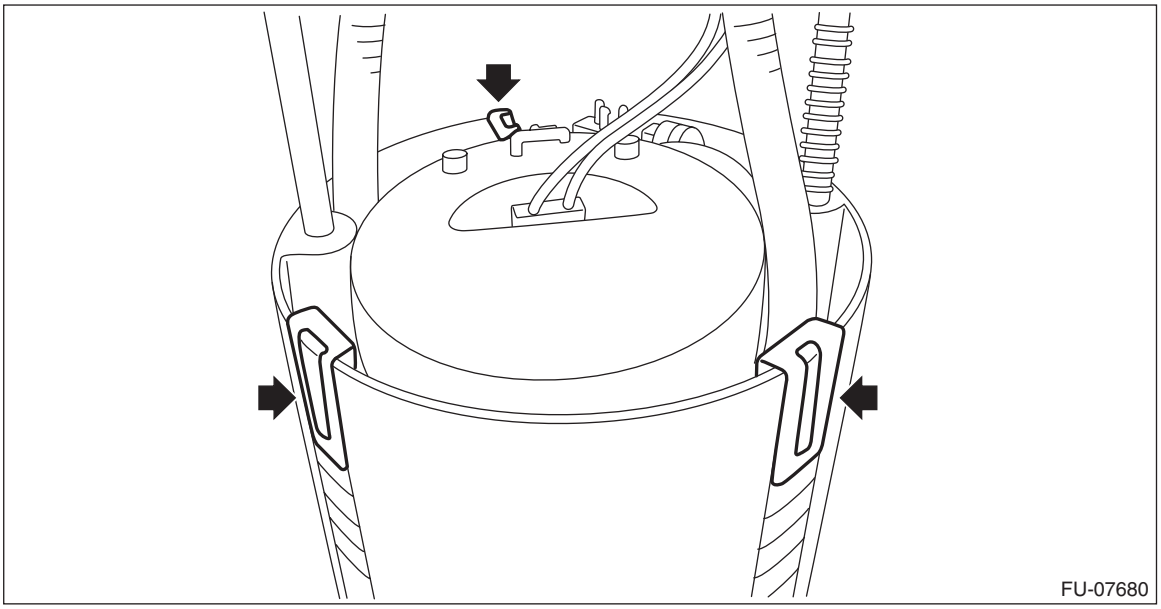
4) Push the fuel filter assembly in the direction of the arrow to compress, and detach the connecting clip.



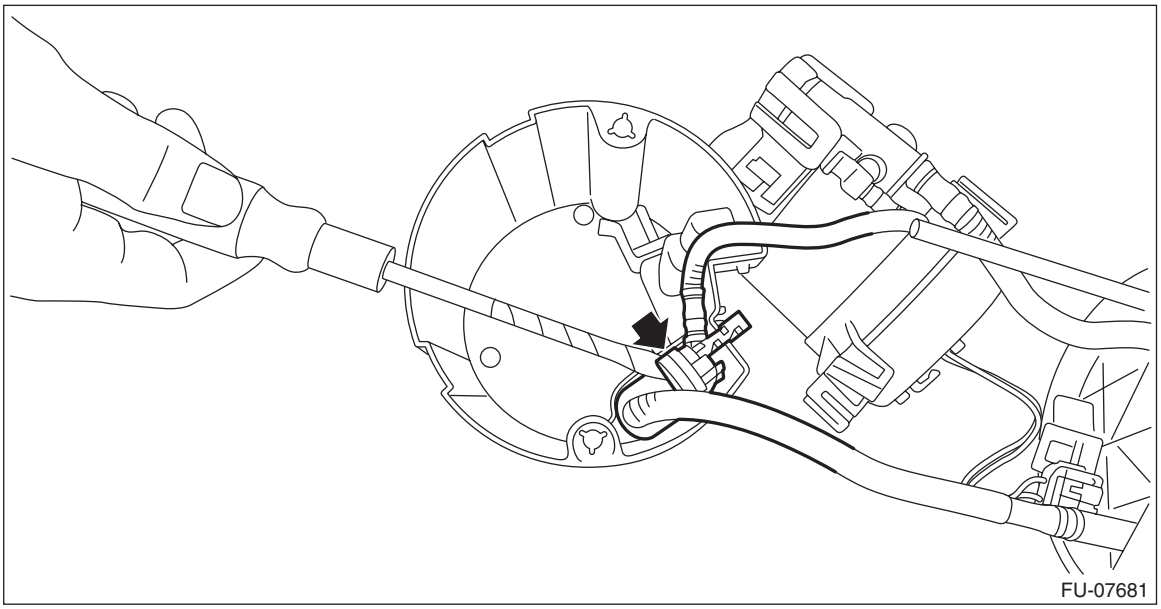
5) Release the claw using a flat tip screwdriver or similar tool wrapped with a protection tape, and remove the tube assembly from the fuel chamber assembly.



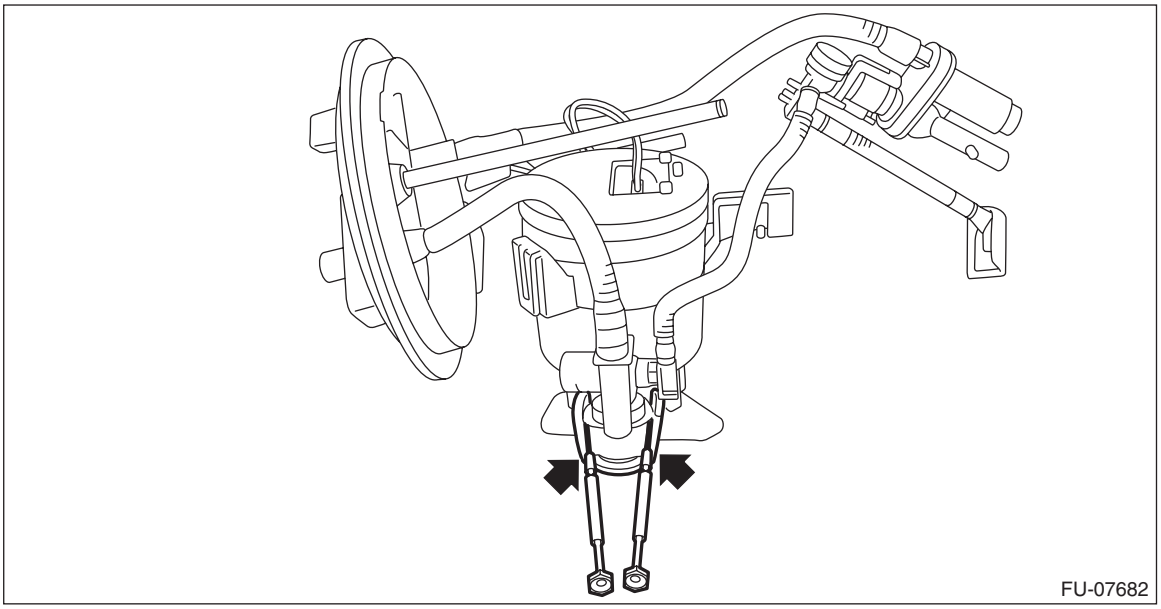
6) Release three claws on the fuel pump holder from the fuel chamber assembly, and raise the fuel filter assembly.



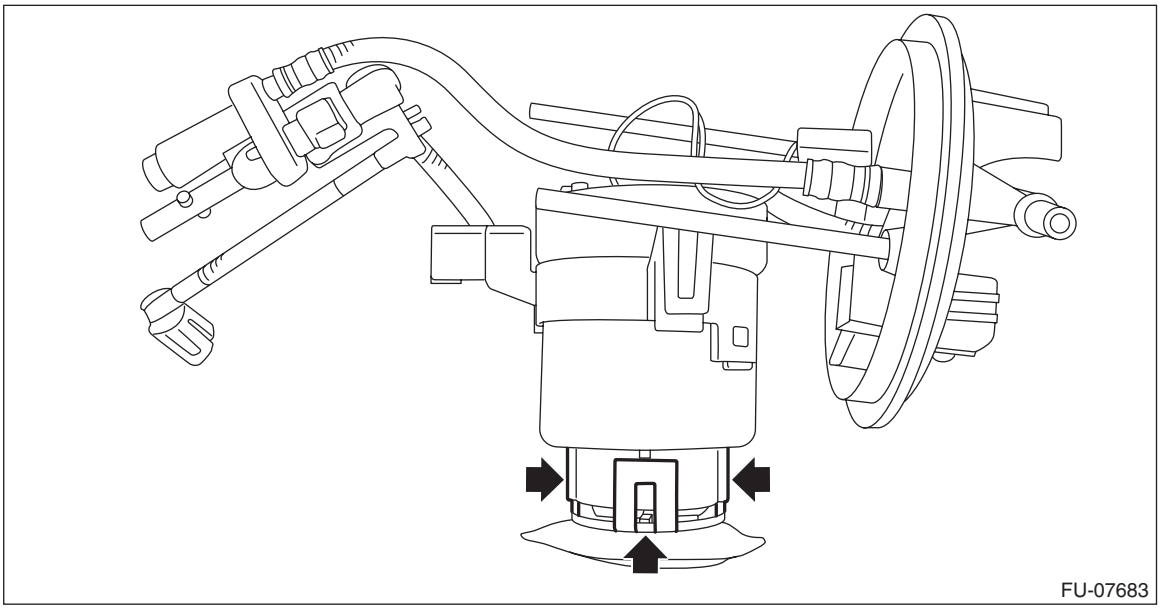
7) Using a flat tip screwdriver or similar tool wrapped with a protection tape, remove the tube assembly from the fuel chamber assembly, and separate the fuel filter assembly and fuel chamber assembly.



8) Using a precision driver or similar tool wrapped with a protection tape, expand the claws on the fuel pump.

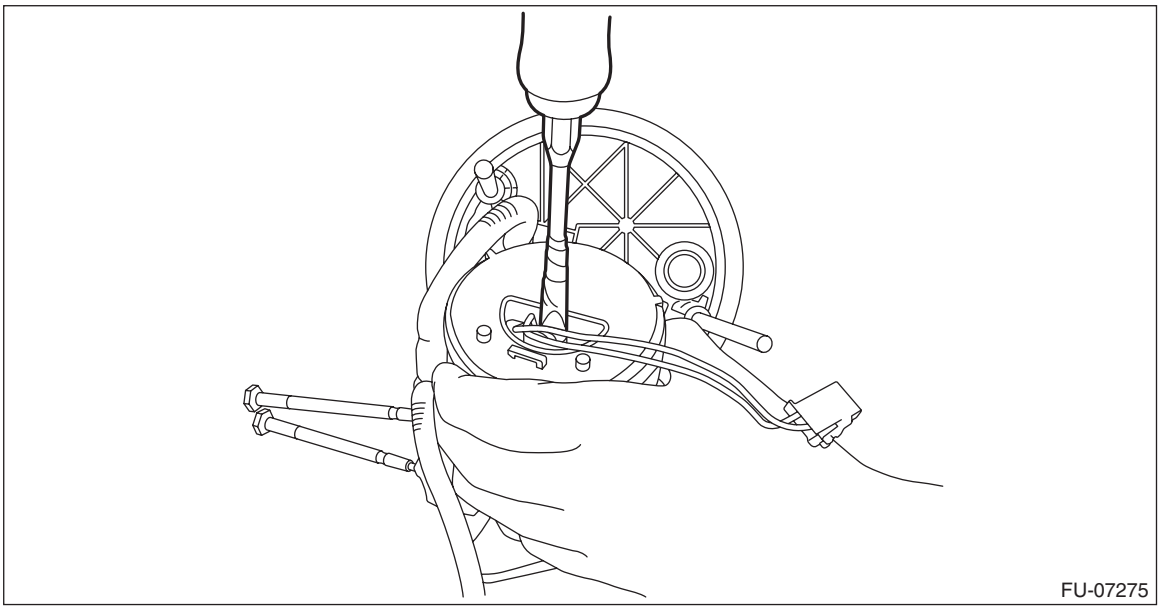


9) Release the claws on the fuel pump.

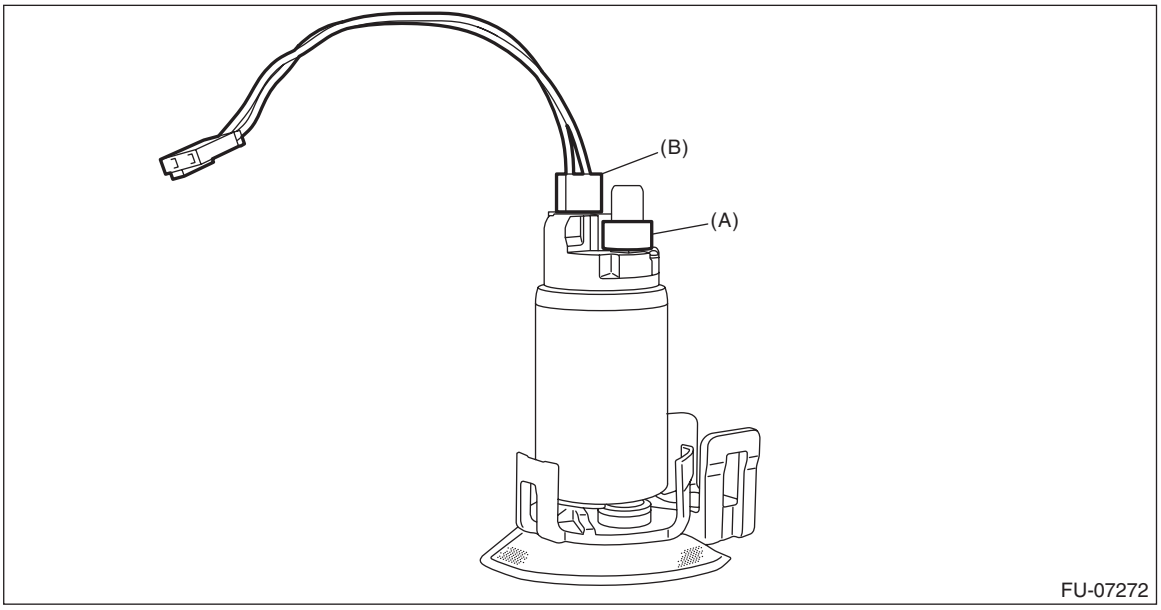


10) Using a flat tip screwdriver or similar tool wrapped with a protection tape, press on the fuel pump and remove the fuel pump together with the fuel pump holder from the fuel filter assembly.

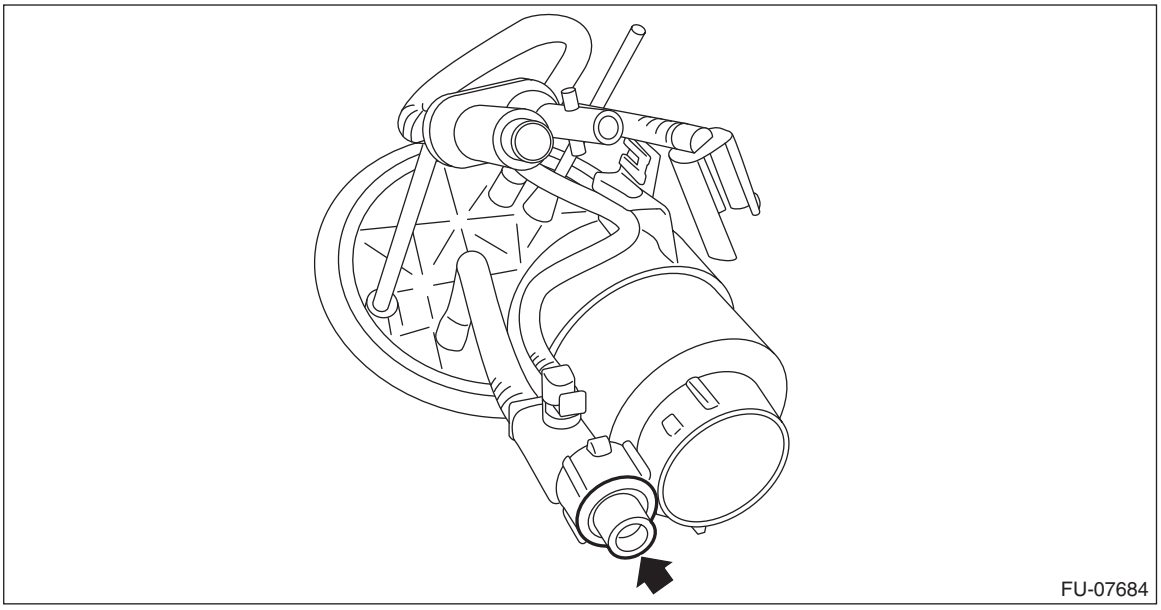
CAUTION:
If O-rings remain on the fuel filter assembly side, carefully remove them with a precision screwdriver or similar tool wrapped with a protection tape.



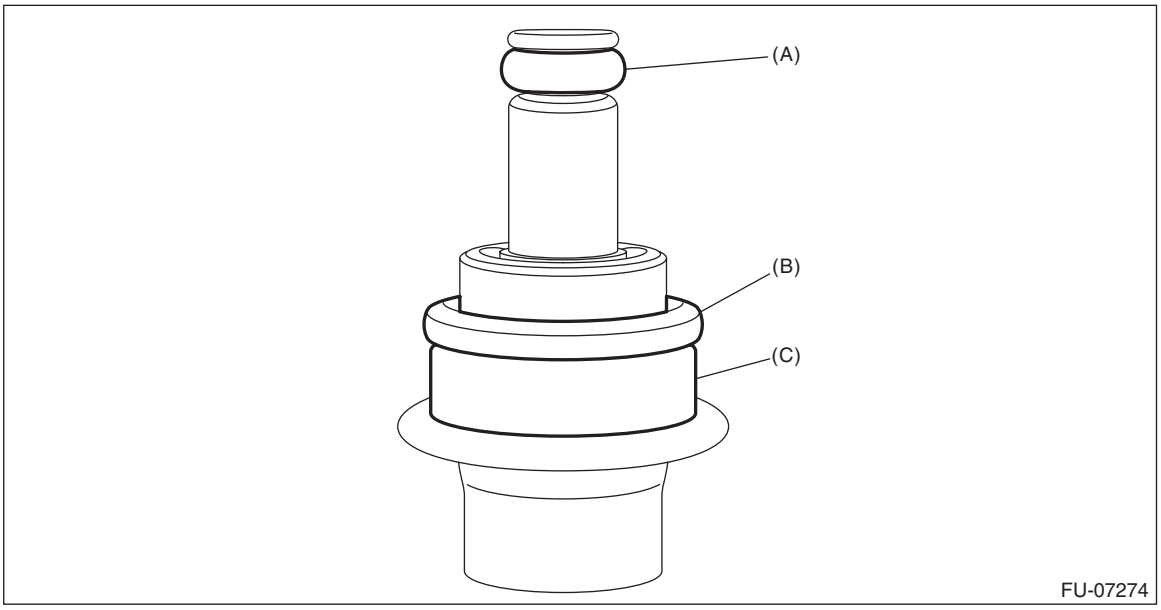
11) Remove the spacer (A) and connector cable (B) from the fuel pump.



12) Remove the pressure regulator from the fuel filter assembly.



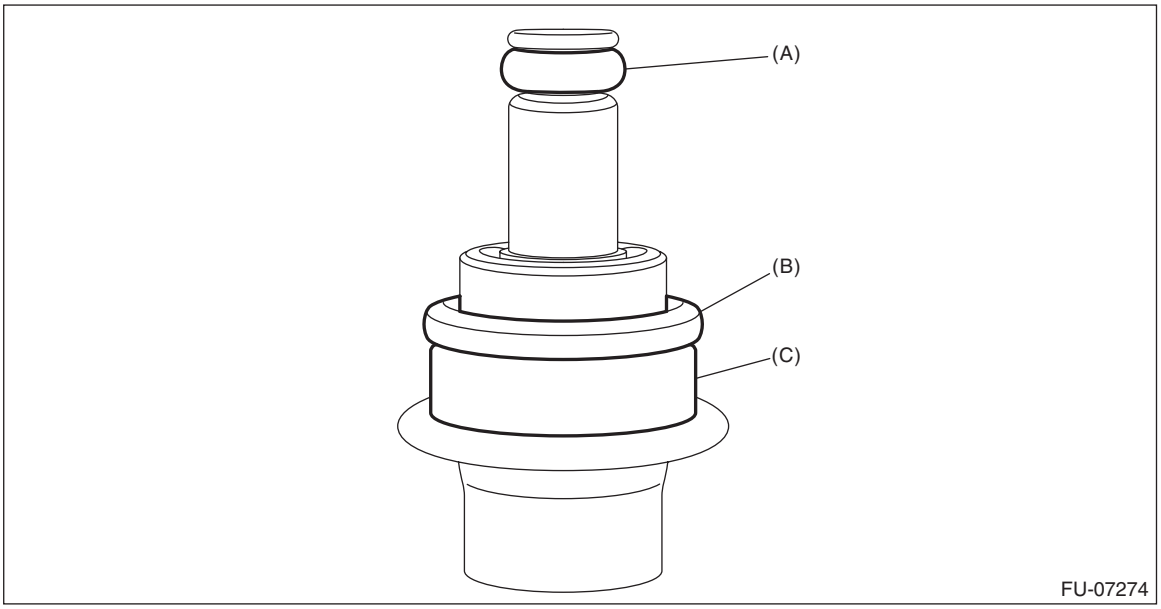
13) Remove O-ring (A), O-ring (B), and backup ring (C) from the pressure regulator.



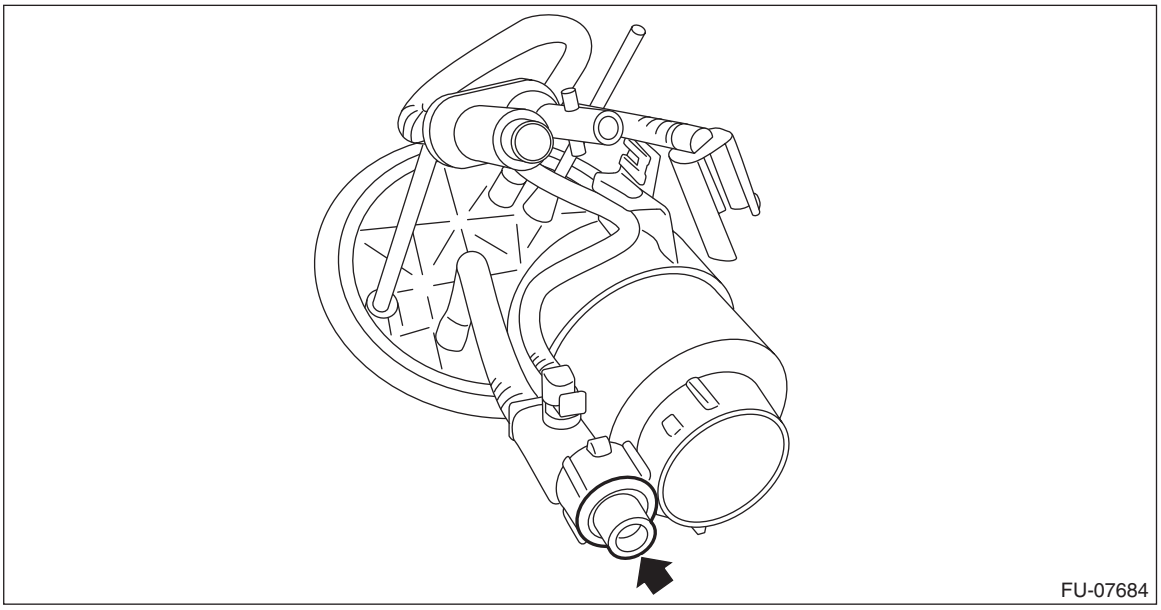
B: INSTALLATION

1) Install O-ring (A), O-ring (B), and backup ring (C) to the pressure regulator.

NOTE:
- Use new O-rings.
- Apply gasoline to the O-ring and backup ring.

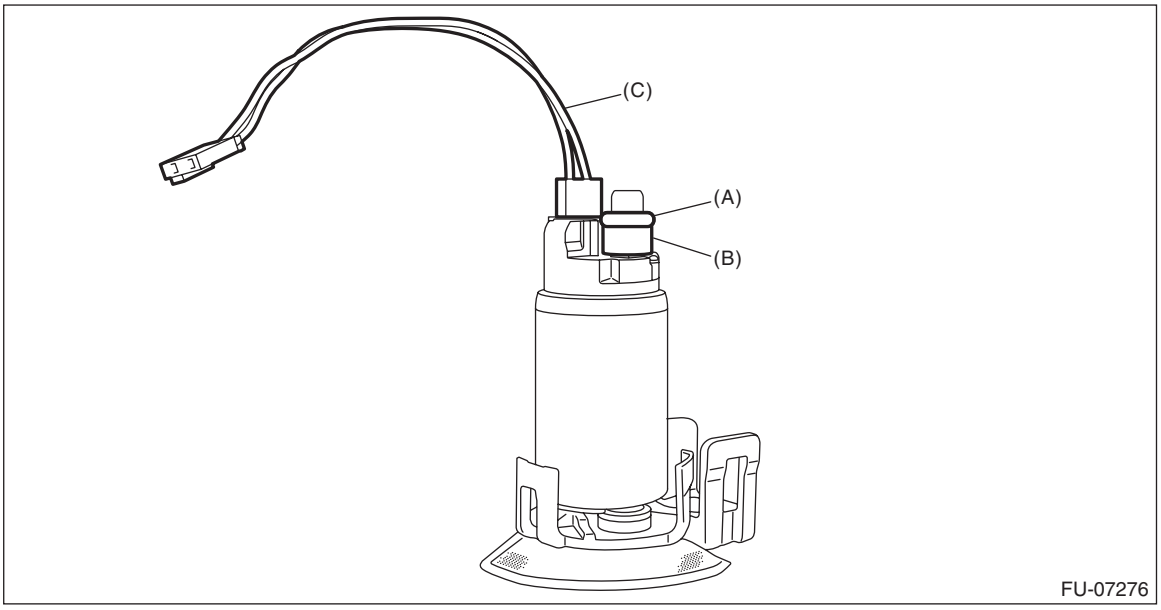


2) Install the pressure regulator to the fuel filter assembly.



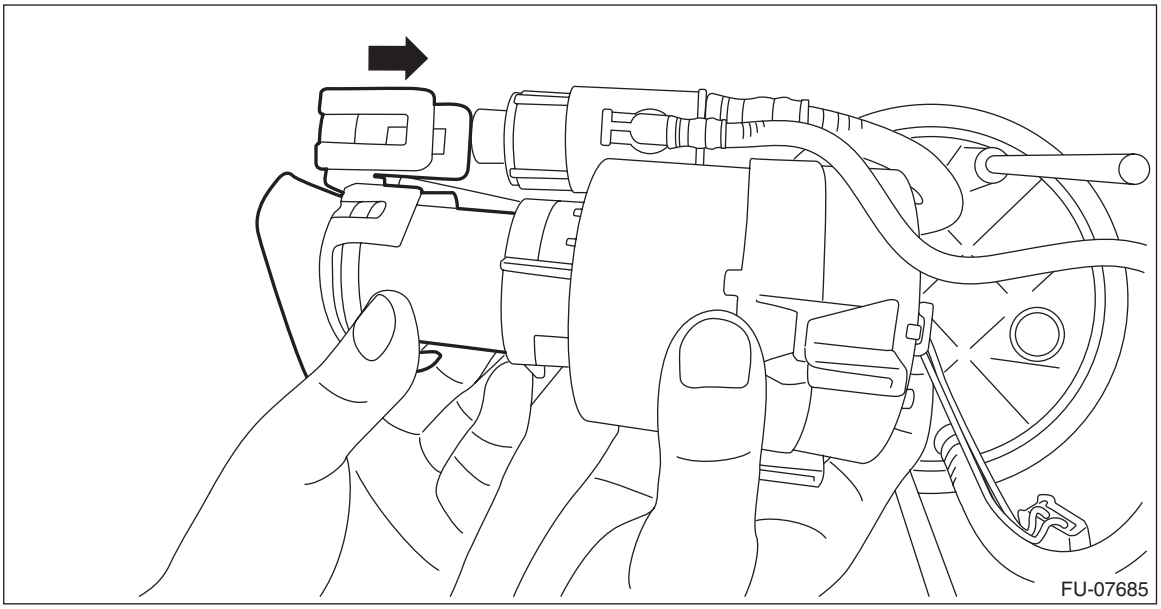
3) Install O-ring (A), spacer (B), and connector cable (C) to the fuel pump.

NOTE:
- Use new O-rings and the connector cable.
- Apply gasoline to the O-rings and the spacer.

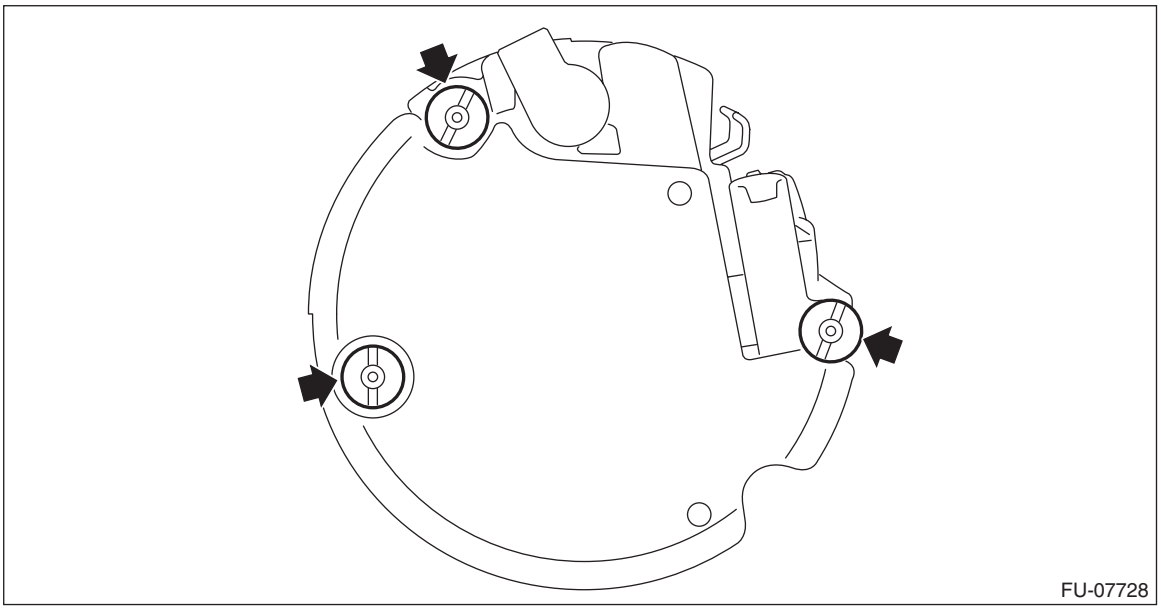


4) Install the fuel pump to the fuel filter assembly.

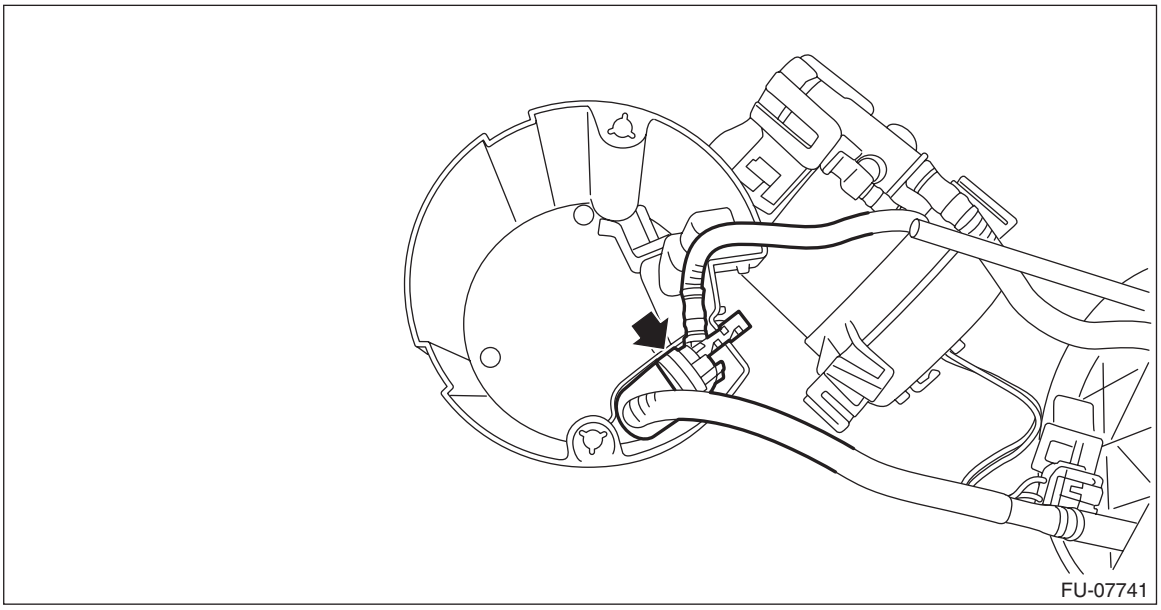
NOTE:
After installation, make sure five claws are correctly engaged in each position.



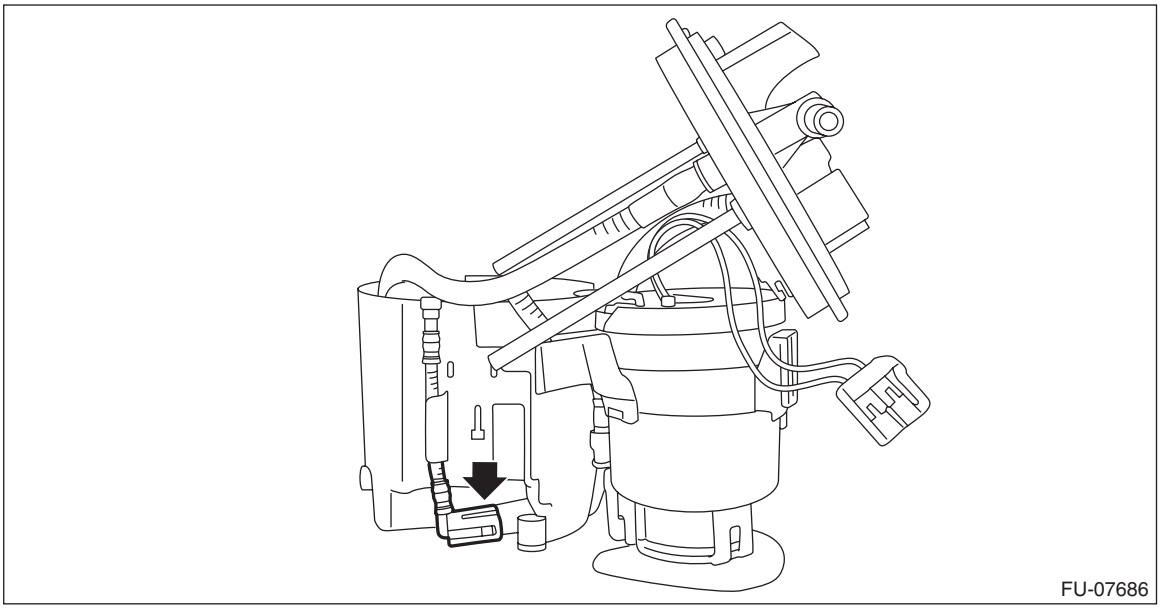
5) Check that the cushions of the fuel chamber assembly for dislocation. If any of them is dislocated, install a new cushion.



6) Slowly press in and install the tube assembly to the fuel chamber assembly until a clicking sound is heard.



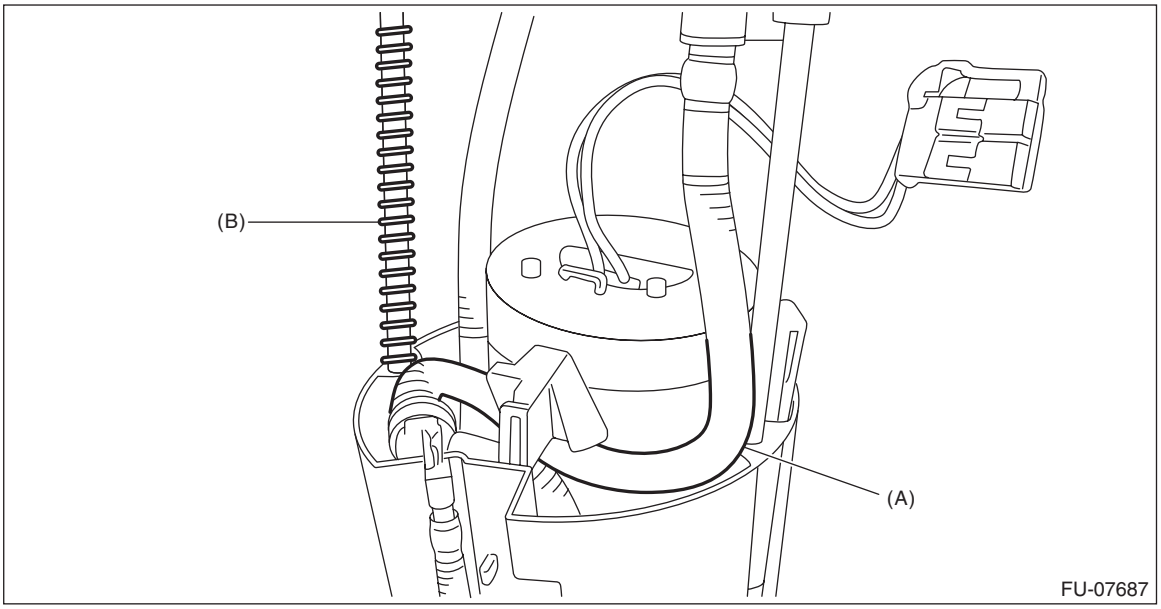
7) Connect the tube assembly to the fuel chamber assembly.



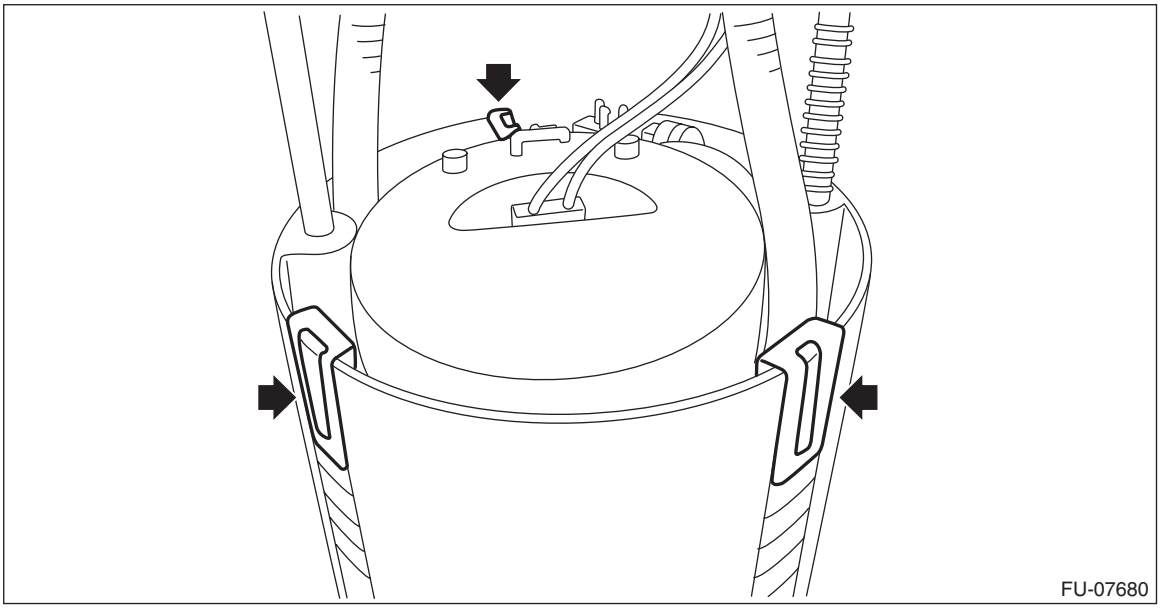
8) Install the fuel filter assembly to the fuel chamber assembly.

NOTE:

- Set the tube (A) and spring (B) for the fuel filter assembly as shown in the figure.

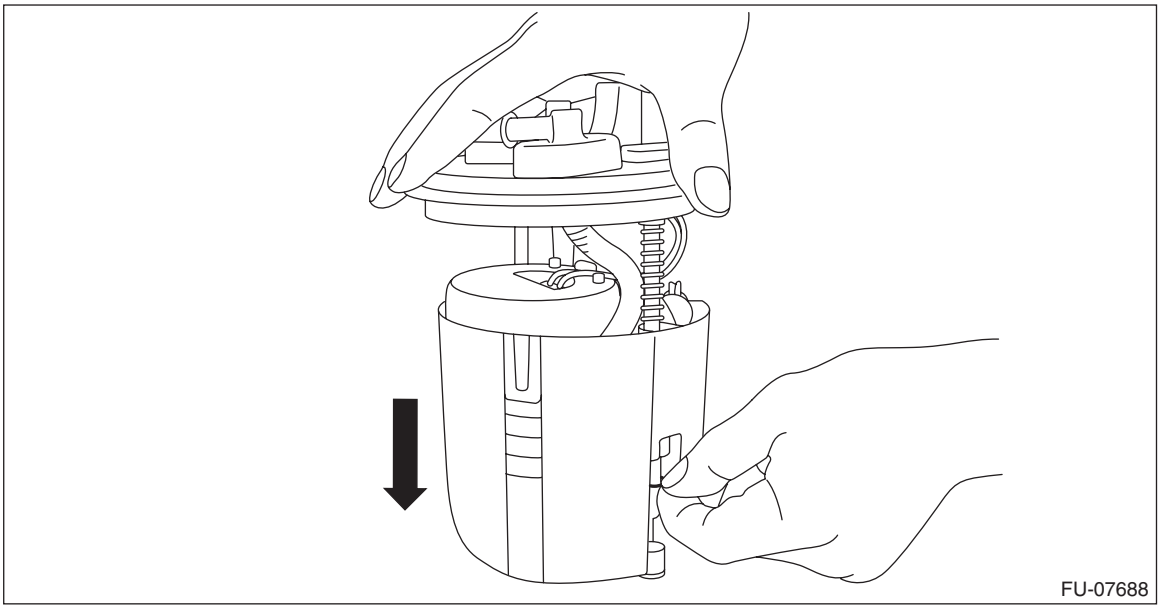


- Check that the claw connecting the fuel camber assembly and the fuel filter assembly is securely fastened.

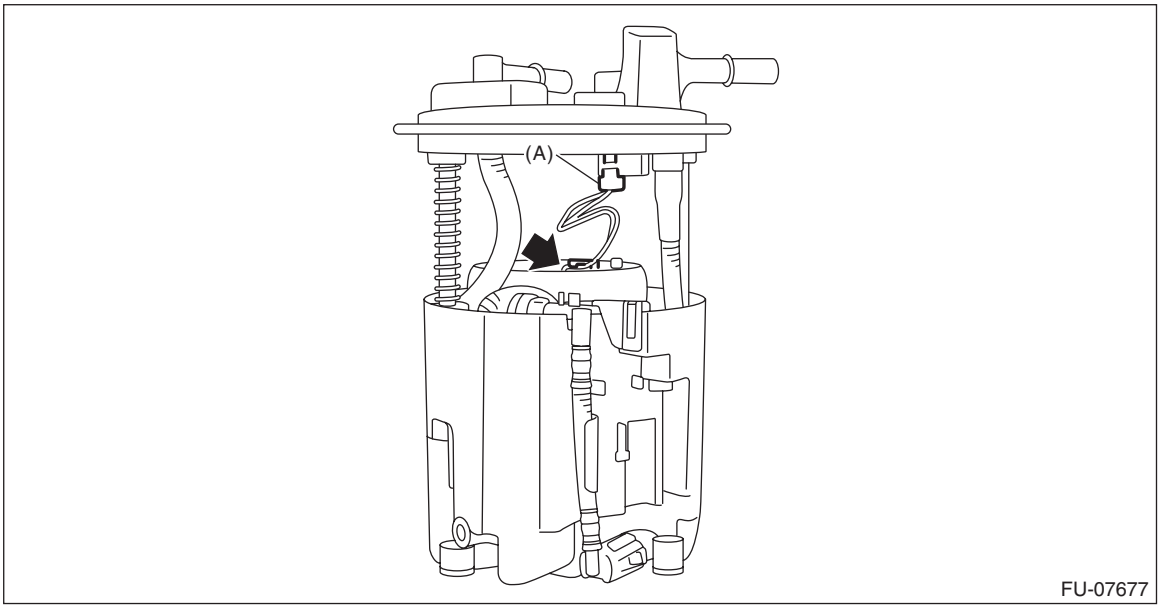


9) Push the fuel filter assembly in the direction of the arrow to compress, and attach the clip.

NOTE:
Use a new clip.



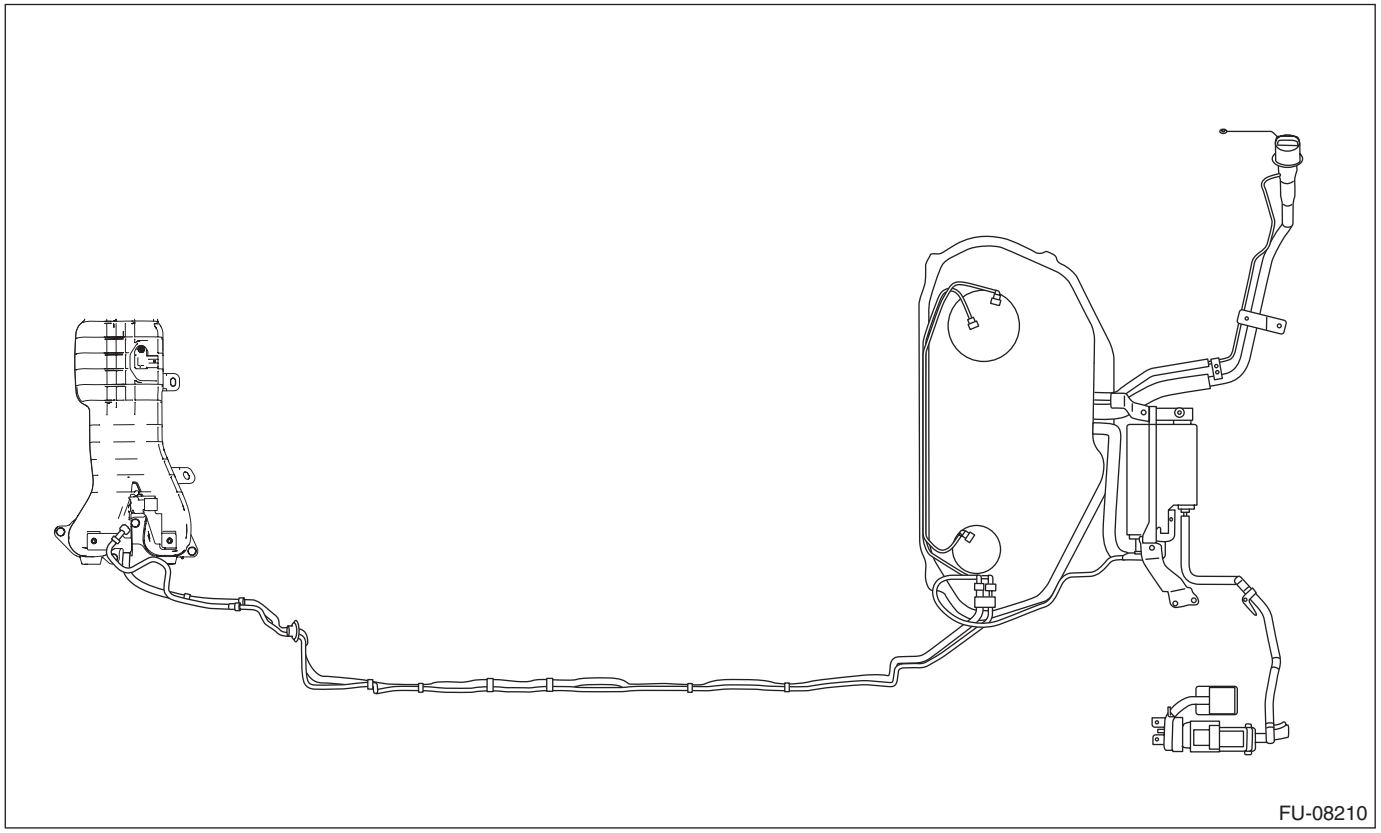
10) Secure the connector cable with the clip, and connect the connector (A) of the connector cable.



11) Install the fuel level sensor. <Ref. to FU(H4DO(HEV))-131, INSTALLATION, Fuel Level Sensor.>
12) Inspect the fuel level sensor. <Ref. to FU(H4DO(HEV))-131, INSPECTION, Fuel Level Sensor.>
13) Install the fuel pump assembly. <Ref. to FU(H4DO(HEV))-125, INSTALLATION, Fuel Pump.>

34.Fuel Delivery and Evaporation Lines

A: REMOVAL



WARNING:
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:
Be careful not to spill fuel.

1) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
2) Open the fuel filler lid and remove the fuel filler cap.

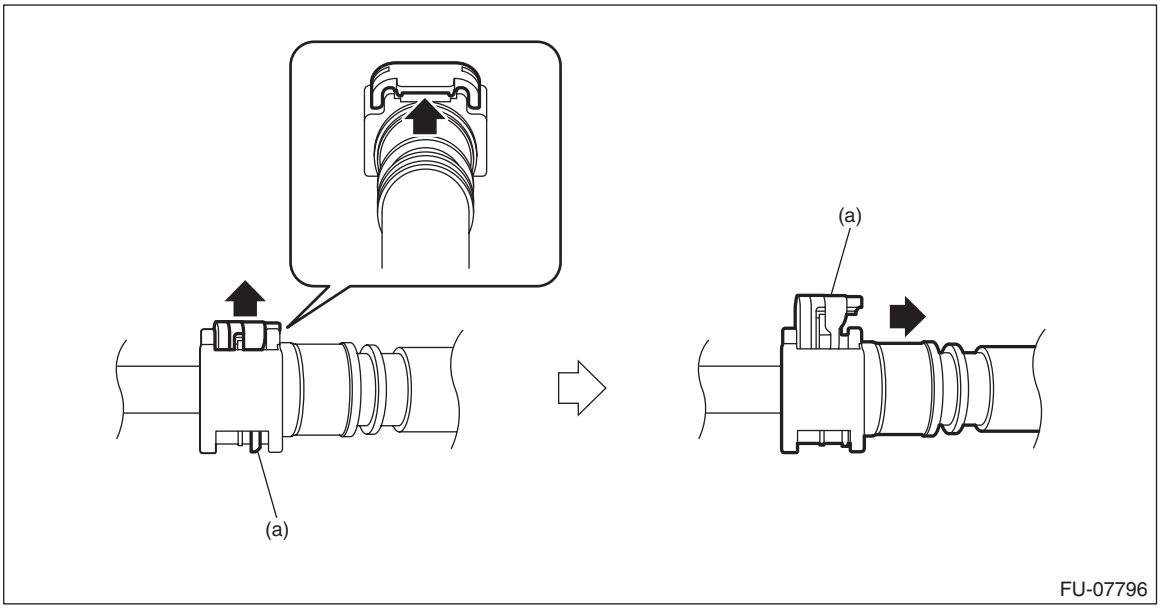
NOTE:
This operation is required to release the inner pressure of the fuel tank.

3) Remove the floor mat. <Ref. to EI-124, REMOVAL, Floor Mat.>

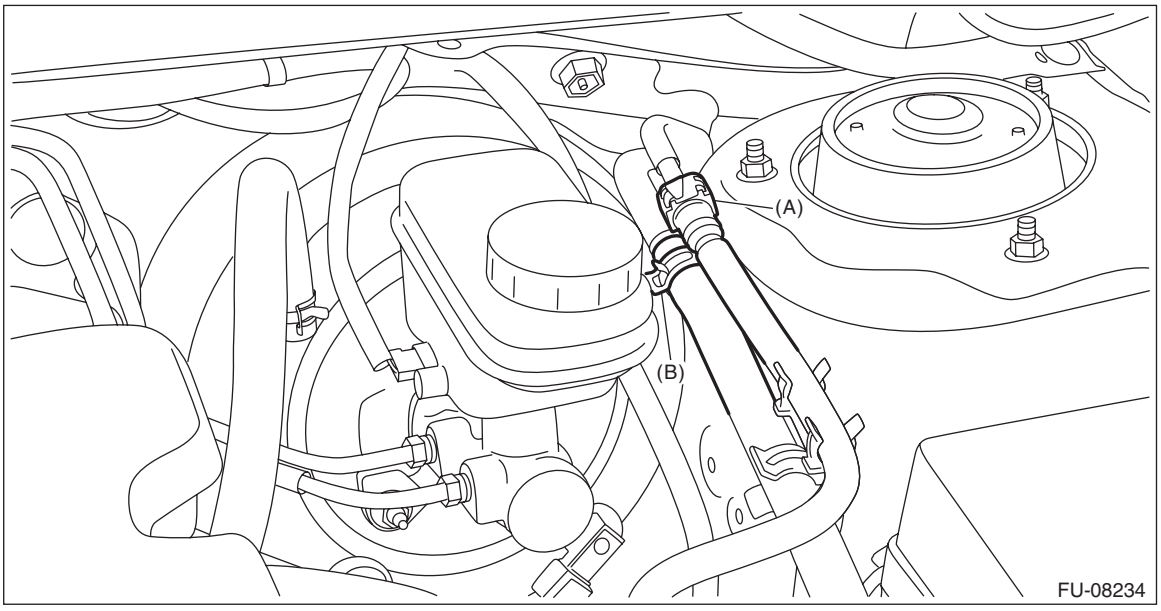
4) In the engine compartment, disconnect the fuel delivery tube (A) and evaporation hose (B).

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from the tubes using a container or cloth.**

NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider

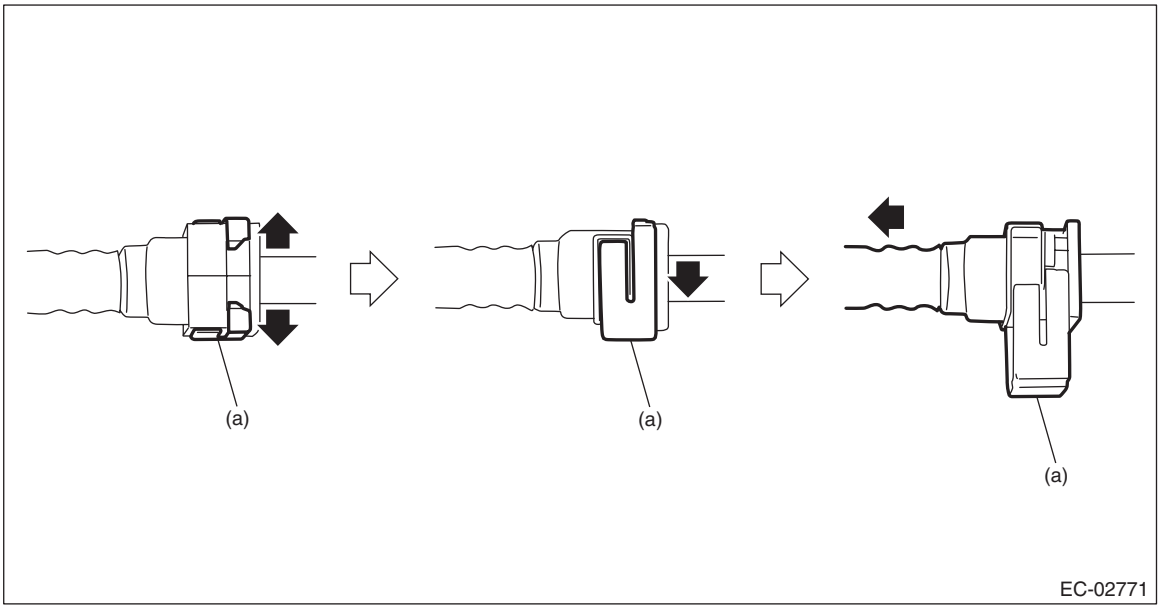


5) Remove the fuel tank. <Ref. to FU(H4DO(HEV))-106, REMOVAL, Fuel Tank.>

6) Disconnect the quick connector, and remove the fuel delivery tube and jet pump tube from the fuel tank.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from hoses using a container or cloth.**

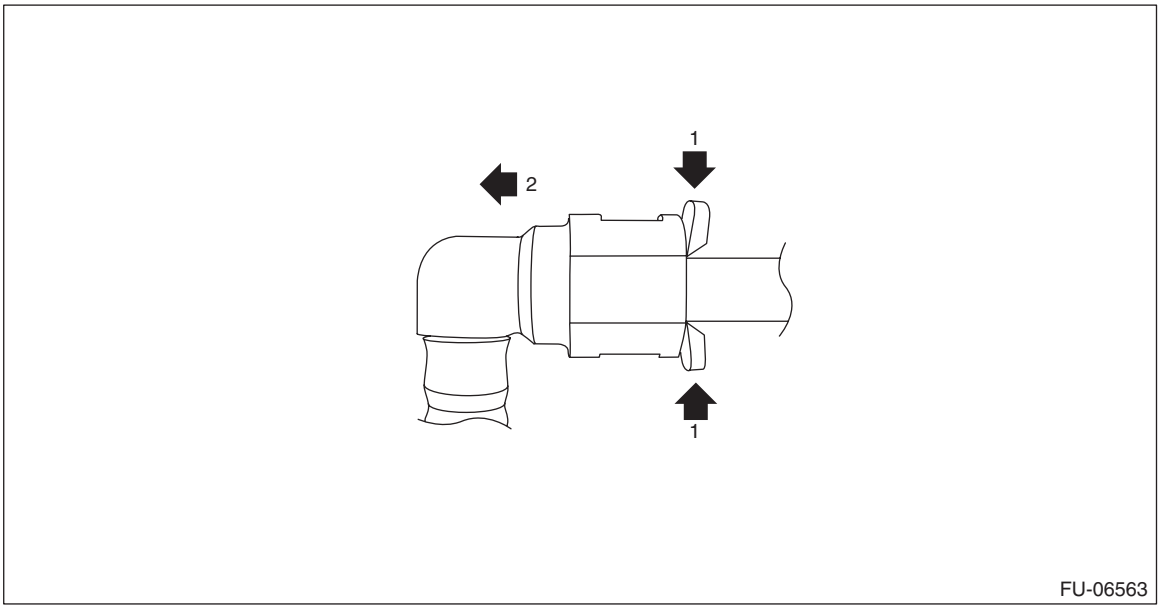
NOTE:
Disconnect the quick connector as shown in the figure.



(a) Slider

7) Remove the clip (A) from the purge tube.
8) Disconnect the quick connector and remove the purge tube from the fuel pipe assembly.

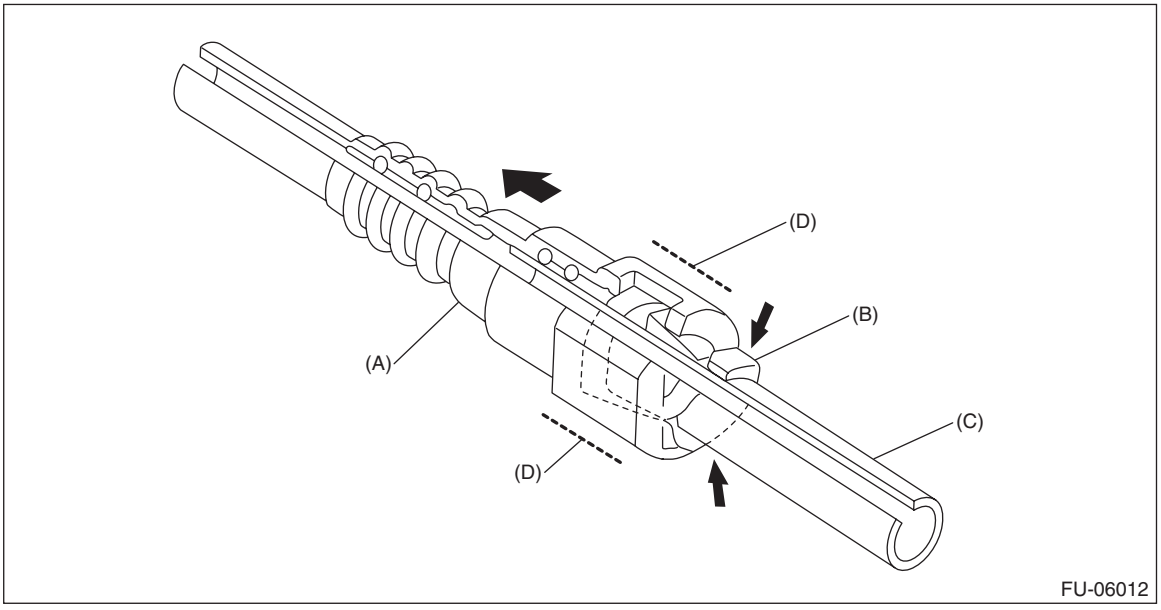
NOTE:
Disconnect the quick connector as shown in the figure.



9) Disconnect the quick connector and remove the purge tube from the canister.
1. Push the retainer in the direction of the arrow, disconnect the quick connector from pipe.

CAUTION:
- **Be careful not to spill fuel.**
- **Catch the fuel from hoses using a container or cloth.**
- **To disconnect the connector, hold (D) shown in the figure and pull in axial direction.**
- **If the connector and pipe are sticking to each other, push and pull the connector with the retainer pushed in the direction of the arrow, and then pull the connector after it starts moving freely.**
- **When disconnecting the connector, do not bend or twist the tube forcibly. If the tube is bent, replace with a new part.**

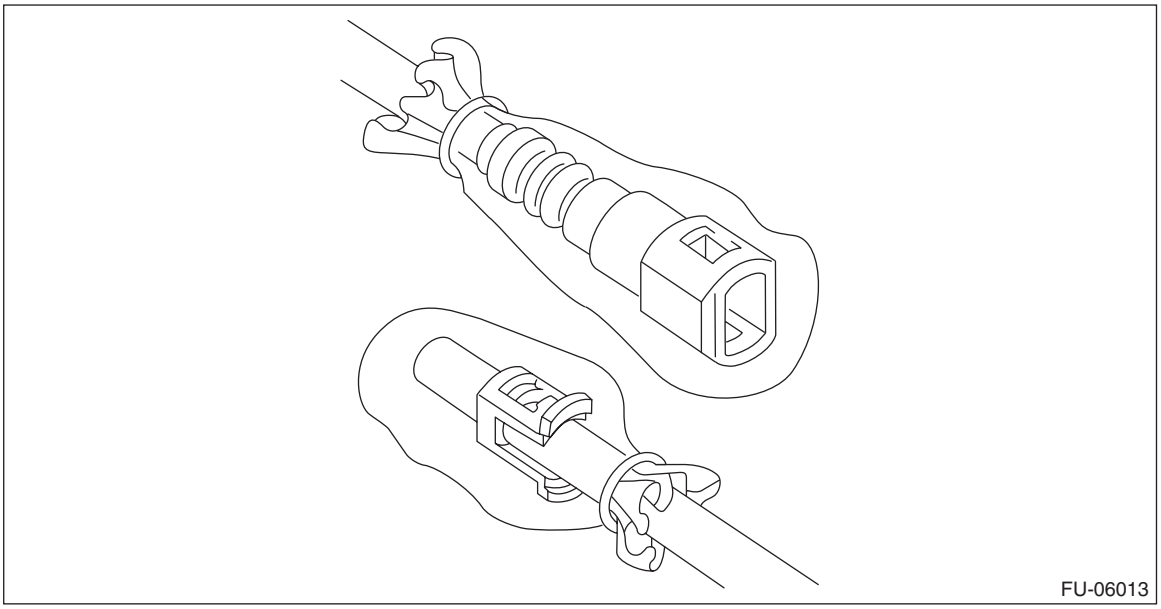
NOTE:
Clean the pipe and quick connector, if they are covered with dust.

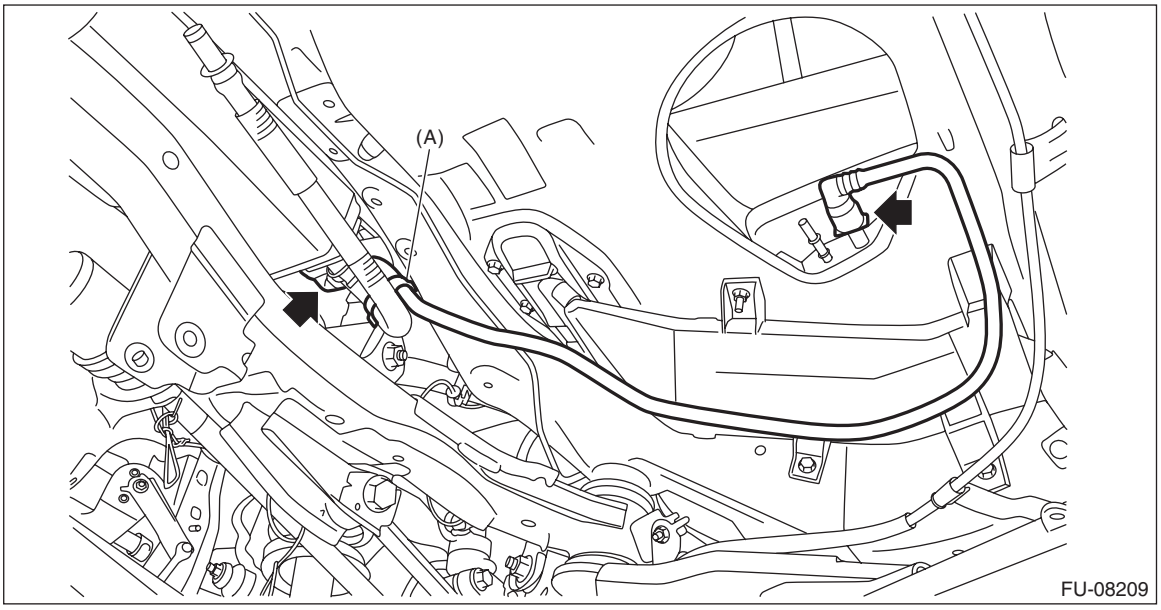


(A) Quick connector
(B) Retainer
(C) Pipe
(D) Connector holding position

2. To prevent from damaging or entering foreign matter, wrap the pipes and quick connectors with plastic bag etc.

CAUTION:
When reusing the retainer, do not disconnect the retainer from the pipe.


FU-06013



FU-08209

10) Remove the fuel pipe assembly from vehicle.

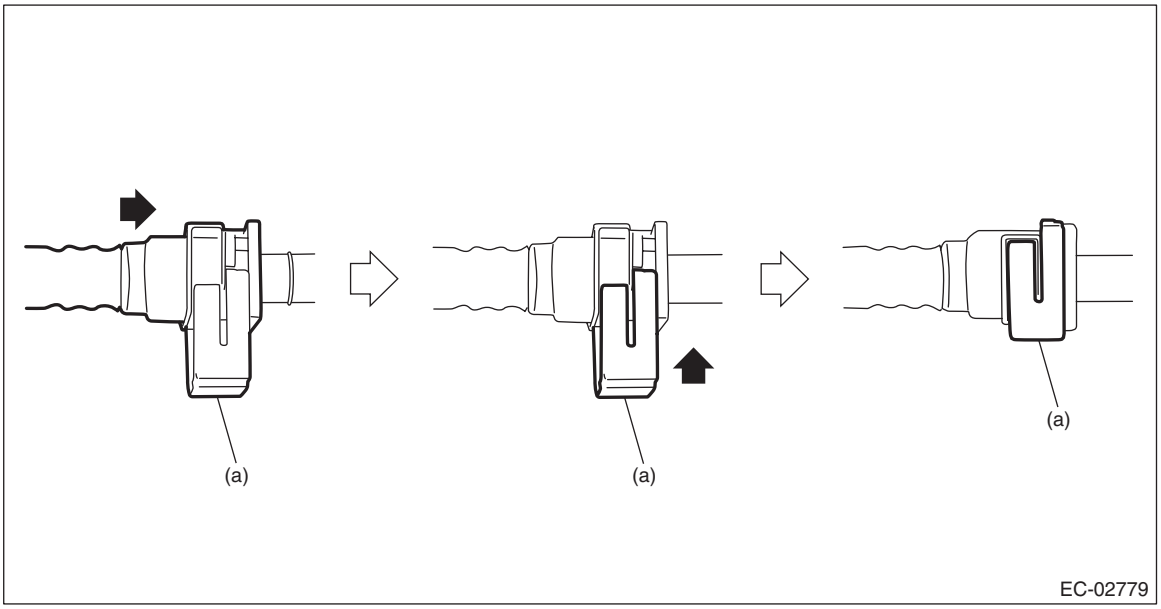
B: INSTALLATION

Install in the reverse order of removal while being careful of the following.

1. CONNECTING THE FUEL LINE QUICK CONNECTOR

Connect the quick connector as shown in the figure.

CAUTION:
- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **When connecting the quick connector, make sure to insert it all the way in before locking the slider.**
- **When it is difficult to lock the slider, check that the connector is fully inserted.**
- **After locking the slider, check again that the quick connector is securely connected.**

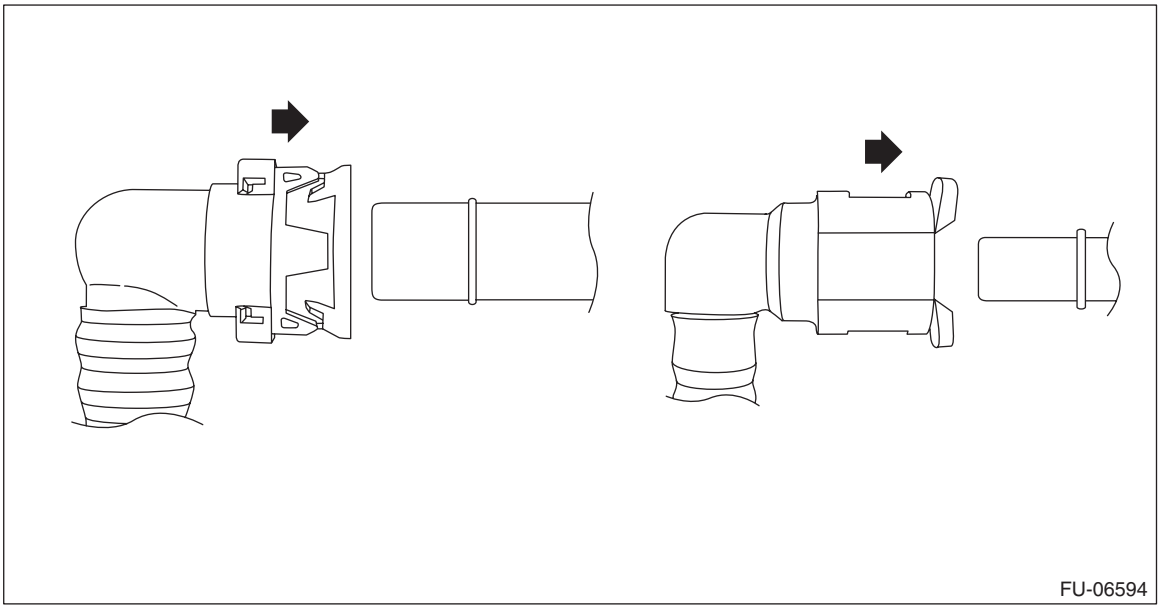


(a) Slider

2. CONNECTING THE EVAPORATION LINE QUICK CONNECTOR

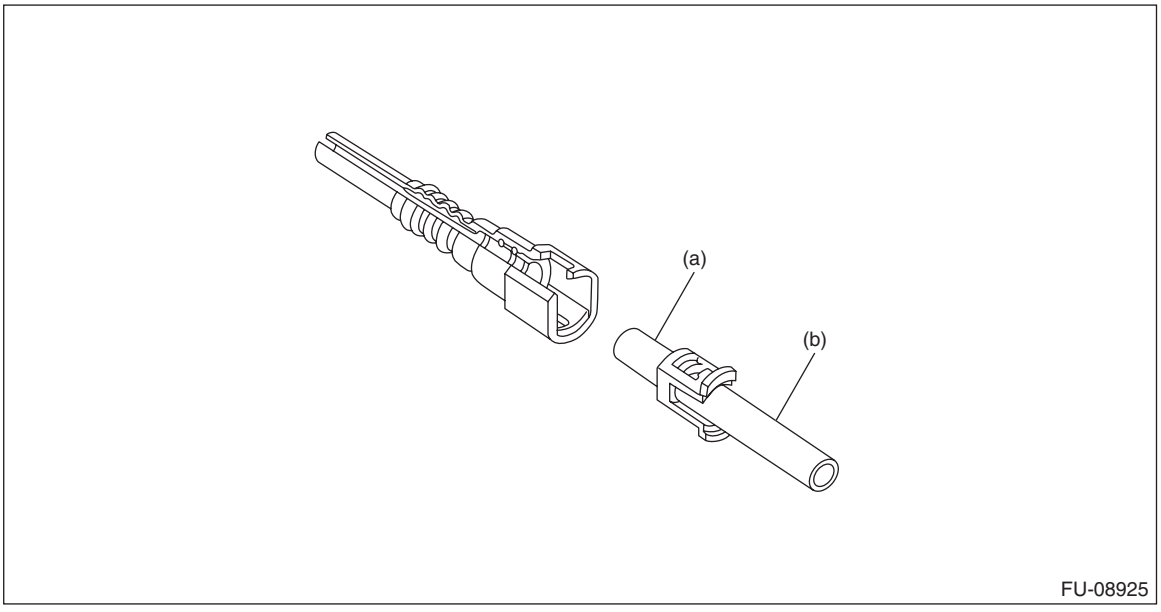
Connect the quick connector as shown in the figure.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• Make sure that the quick connector is securely connected.



3. CONNECTION OF QUICK CONNECTOR OF PURGE TUBE (CANISTER SIDE)

CAUTION:
• Make sure there are no damage or dust on connections. If necessary, clean seal surface of pipe.



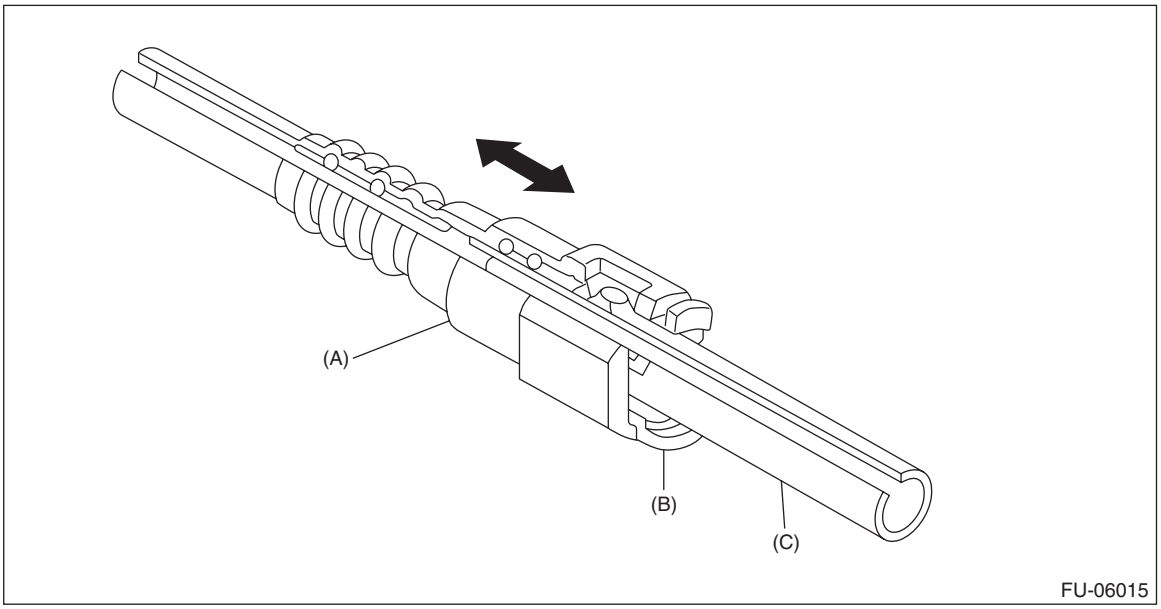
(a) Seal surface (b) Pipe

• When reusing the retainer, make sure that neither scratches nor deformation exist on the retainer. If it is faulty, use a new part.

1) Connect the quick connector to pipe.

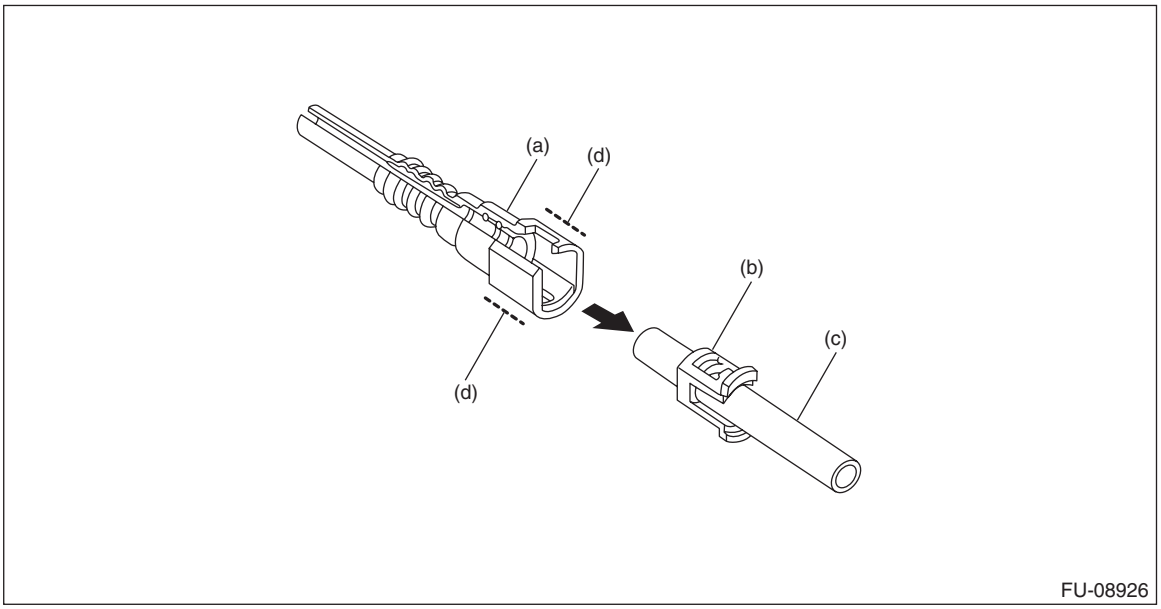
CAUTION:

• Make sure that the quick connector is securely connected.



(A) Quick connector (B) Retainer (C) Pipe

• Make sure the two retainer pawls are engaged in their mating positions in the quick connector.
• Be sure to inspect tubes and their connections for any leakage of fuel.
• To connect the connector, hold (d) shown in the figure and push in axial direction.
• When connecting the connector, do not bend or twist the tube forcibly. If the tube is bent, replace with a new part.

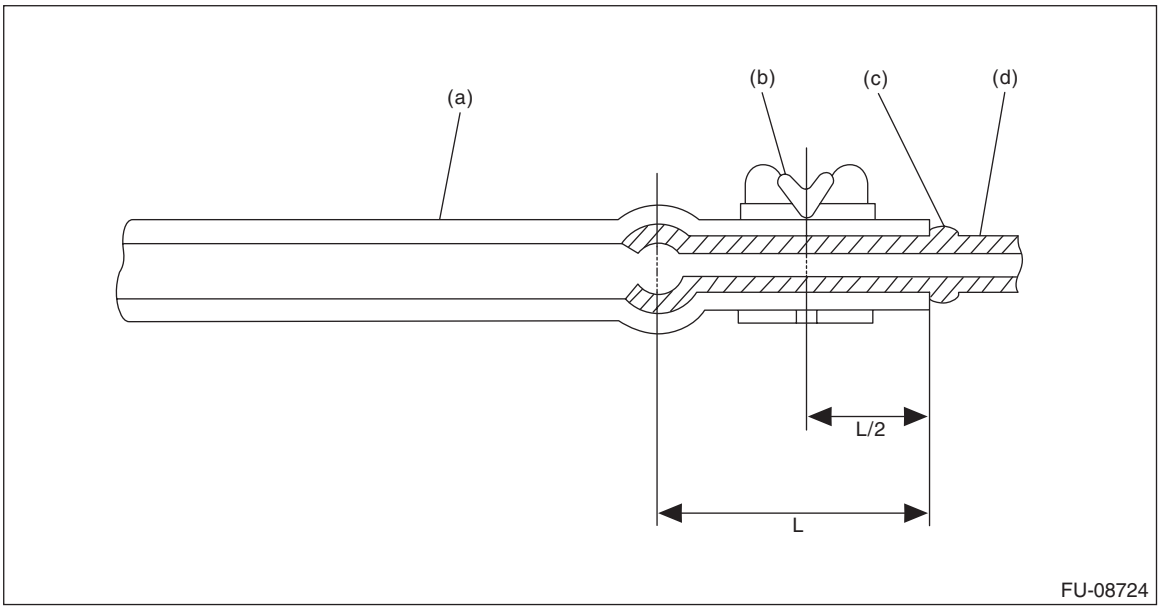


(a) Quick connector (c) Pipe
(b) Retainer (d) Connector holding position

4. EVAPORATION HOSE CONNECTION

Connect the evaporation hose by inserting it to the pipe until the hose reaches the spool or bump.

NOTE:
If there is no spool nor bump, connect the evaporation hose by inserting it at 15 to 20 mm (0.6 to 0.8 in) to the pipe.



(a) Hose
(b) Clip
(c) Spool or bump
(d) Pipe

C: INSPECTION

1) Check that the fuel pipe has no deformation, cracks or other damages.
2) Check that the hose and tube have no cracks, damage or loose part.

35.Fuel System Trouble in General

A: INSPECTION

Trouble	Possible cause	Corrective action
Insufficient fuel supply to fuel injector	a. Fuel pump does not operate.	
	❍ Defective terminal contact	Inspect contact, especially ground, and tighten it securely.
	❍ Trouble in electromagnetic or electronic circuit parts	Replace the faulty parts.
	b. Decline of fuel pump function	Replace the fuel pump.
	c. Clogged fuel filter	Replace the fuel filter. Clean or replace the fuel tank if necessary.
	d. Clogged or bent fuel line pipe, hose or tube	Clean, correct or replace the fuel line pipe, hose or tube.
	e. Air is mixed in fuel system.	Check the fuel line connections, correct or replace the defective part.
	f. Damaged diaphragm of pressure regulator	Replace the fuel filter assembly.
Leakage or blow out of fuel	a. Loose connections of fuel line pipe, hose or tube	Check the fuel line connections, correct or replace the defective part.
	b. Cracked fuel line pipe, hose or tube	Replace the fuel line pipe, hose or tube.
	c. Cracked fuel tank or defective welding part	Replace the fuel tank.
	d. Clogged or bent fuel line pipe, hose or tube	Clean, correct or replace the fuel line pipe, hose or tube.
Gasoline smell inside of compartment	a. Loose connections of fuel line pipe, hose or tube	Check the fuel line connections, correct or replace the defective part.
	b. Defective gasket of fuel saucer or fuel filler pipe assembly	Correct or replace the gasket.
	c. Defective canister	Replace the canister.
Defective fuel gauge	a. Defective operation of fuel level sensor	Replace the fuel level sensor.
	b. Defective operation of combination meter <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>	Replace the combination meter.
Noise	a. Large operation noise or vibration of fuel pump	Replace the fuel pump.

NOTE:
• When the vehicle is left unattended for an extended period of time, water may accumulate in the fuel tank. Fill fuel fully to prevent the problem.
• In snow-covered areas, mountainous areas, skiing areas, etc. where ambient temperatures drop to 0°C (32°F) or less throughout the winter season, use a water removing agent in the fuel system to prevent freezing fuel system and accumulating water.
• When water is accumulated in fuel filter, fill the water removing agent in the fuel tank.
• Before using water removing agent, follow the cautions noted on the bottle.

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)

EC(H4DO(HEV))

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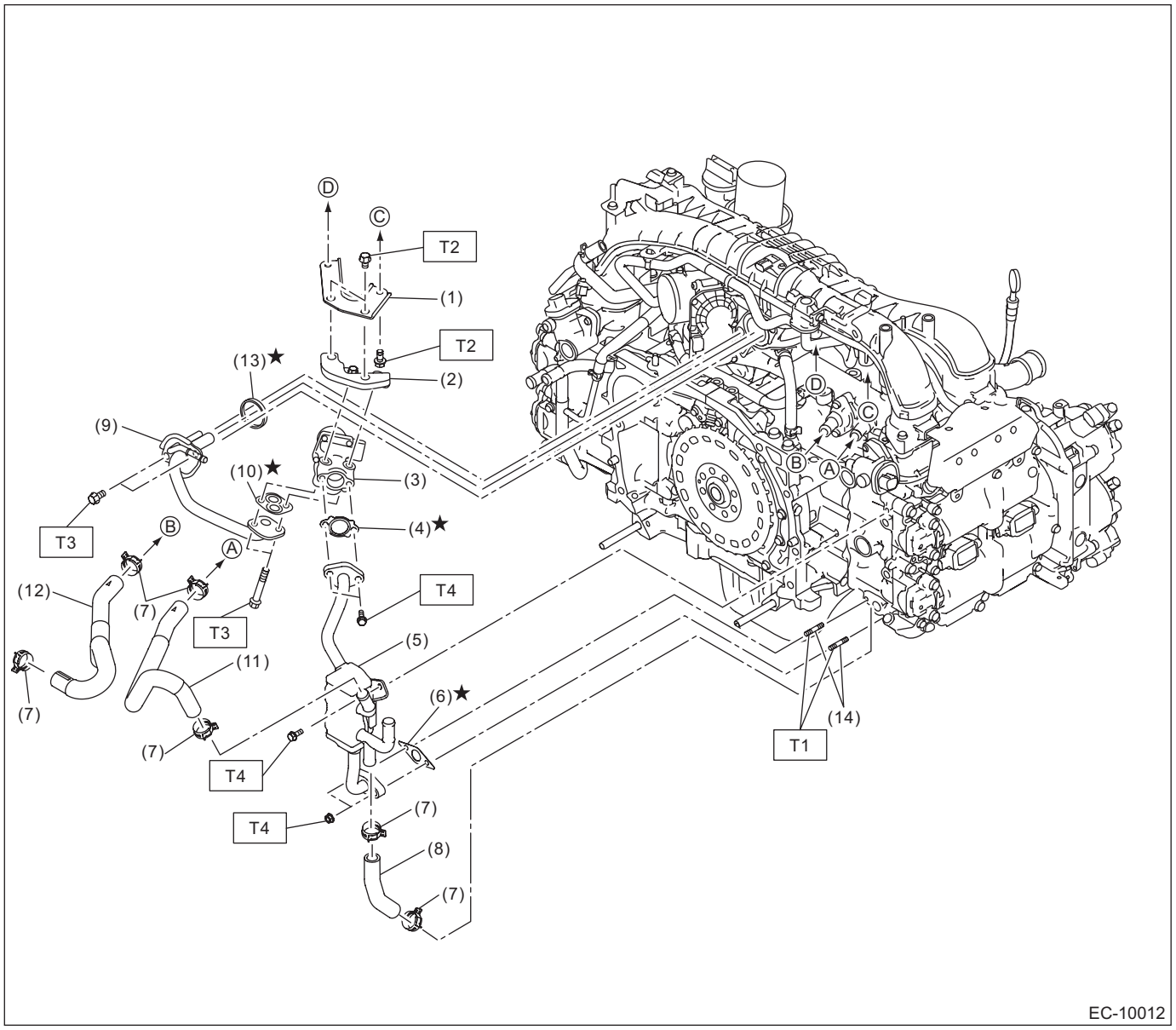
1. General Description

A: COMPONENT

1. CANISTER, PURGE CONTROL SOLENOID VALVE, DRAIN FILTER AND LEAK CHECK VALVE ASSEMBLY

For components of canister, purge control solenoid valve, drain filter, and leak check valve assembly, refer to “FU (H4DO (HEV))”. <Ref. to FU(H4DO(HEV))-3, COMPONENT, General Description.>

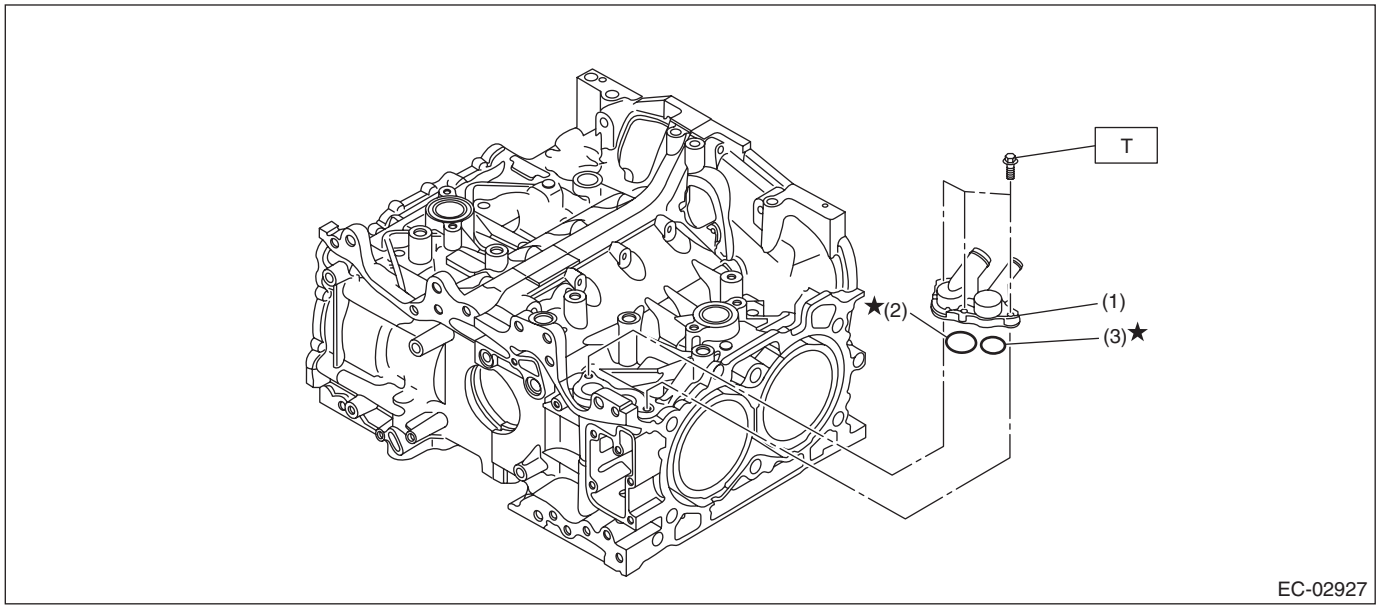
2. EXHAUST GAS RECIRCULATION CONTROL CIRCUIT RANGE/PERFORMANCE



(1) EGR control valve bracket A
(2) EGR control valve bracket B
(3) EGR control valve
(4) Gasket
(5) EGR cooler
(6) Gasket
(7) Clip
(8) Engine coolant inlet hose
(9) EGR pipe
(10) Gasket
(11) Engine coolant outlet hose A
(12) Engine coolant outlet hose B
(13) Gasket
(14) Stud bolt

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.7, 4.7)
T2: 19 (1.9, 14.0)
T3: <Ref. to EC(H4DO(HEV))-30, INSTALLATION, EGR Pipe.>
T4: <Ref. to EC(H4DO(HEV))-33, INSTALLATION, EGR Cooler.>

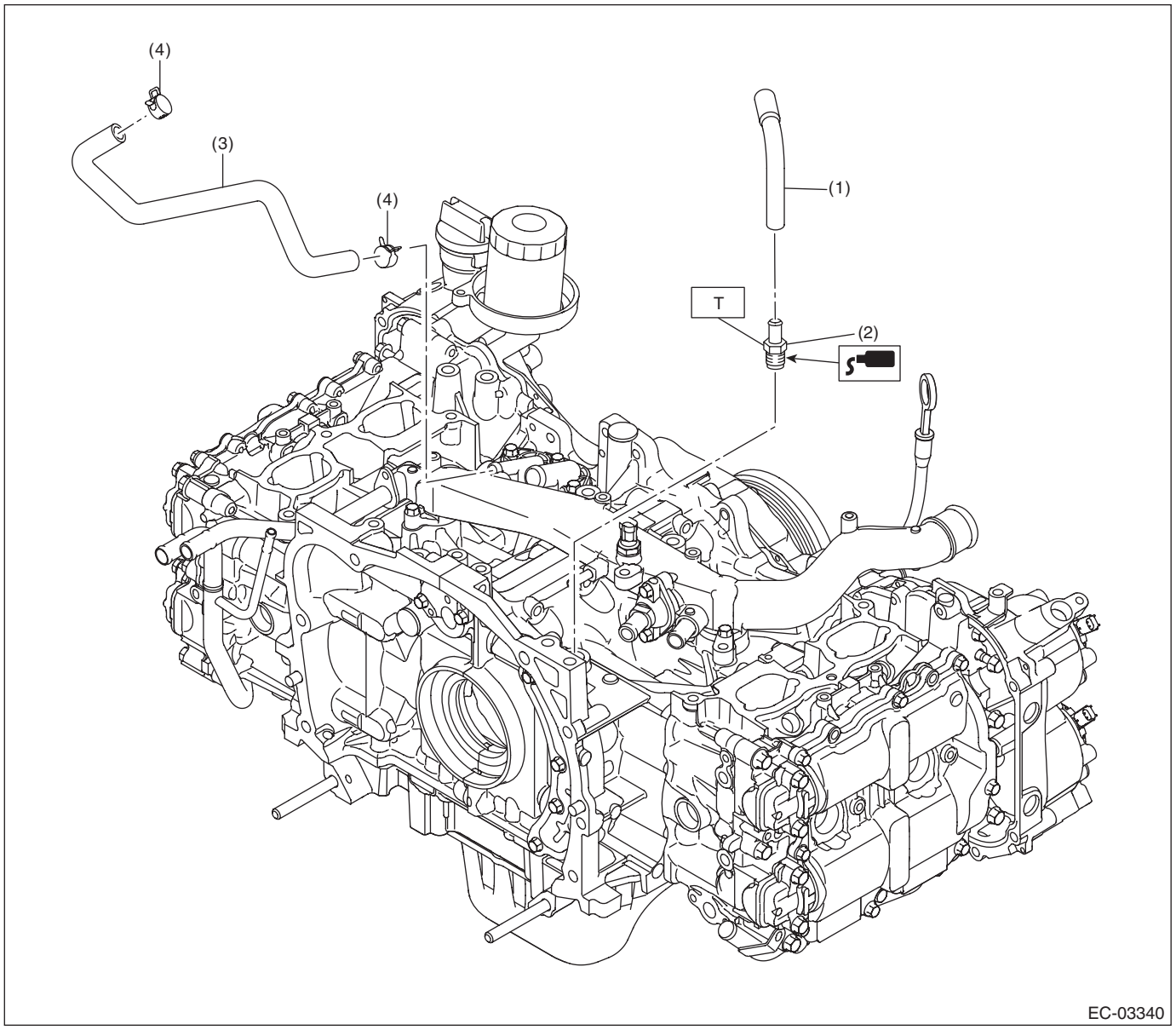
3. PCV SYSTEM 1



(1) PCV connector
(2) O-ring
(3) O-ring

Tightening torque: N·m (kgf-m, ft-lb)
T: 6.4 (0.7, 4.7)

4. PCV SYSTEM 2



(1) PCV hose A
(2) PCV valve
(3) PCV hose B
(4) Clip

Tightening torque: N·m (kgf-m, ft-lb)
T: 23 (2.3, 17.0)

B: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

C: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.

2. Front Catalytic Converter

A: REMOVAL

The front catalytic converter is integrated into the front exhaust pipe; therefore, refer to “Front Exhaust Pipe” for the removal procedure. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>

B: INSTALLATION

The front catalytic converter is integrated into the front exhaust pipe; therefore, refer to “Front Exhaust Pipe” for the installation procedure. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>

C: INSPECTION

1) Check the connections and welded parts for exhaust leaks.
2) Make sure there are no holes or rusting.

3. Rear Catalytic Converter

A: REMOVAL

The rear catalytic converter is integrated into the center exhaust pipe; therefore, refer to “Center Exhaust Pipe” for the removal procedure. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>

B: INSTALLATION

The rear catalytic converter is integrated into the center exhaust pipe; therefore, refer to “Center Exhaust Pipe” for the installation procedure. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>

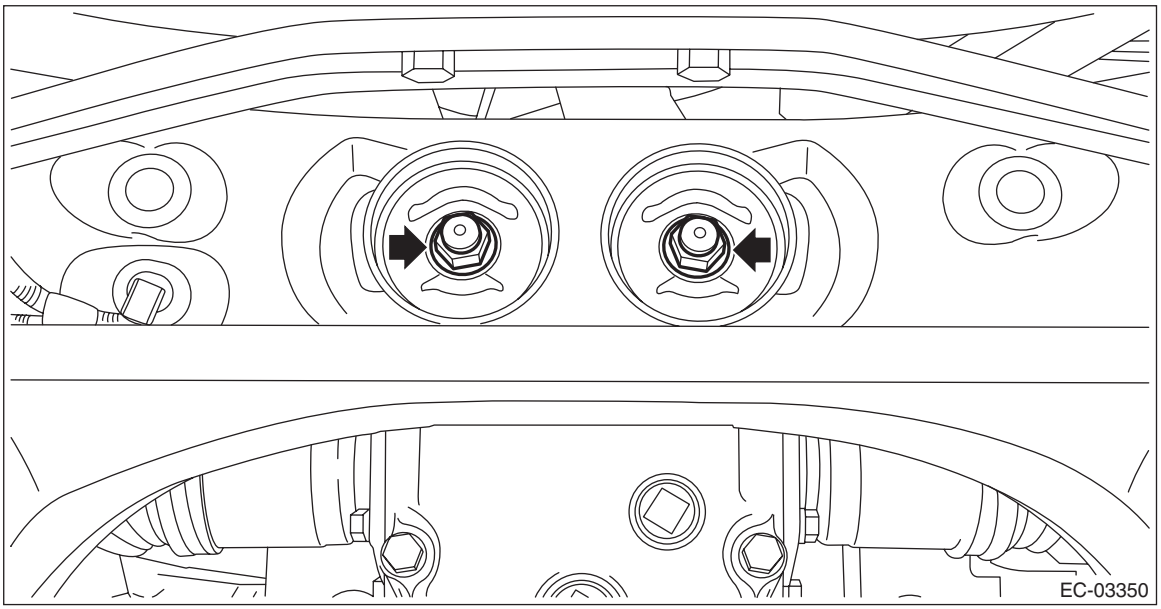
C: INSPECTION

1) Check the connections and welded parts for exhaust leaks.
2) Make sure there are no holes or rusting.

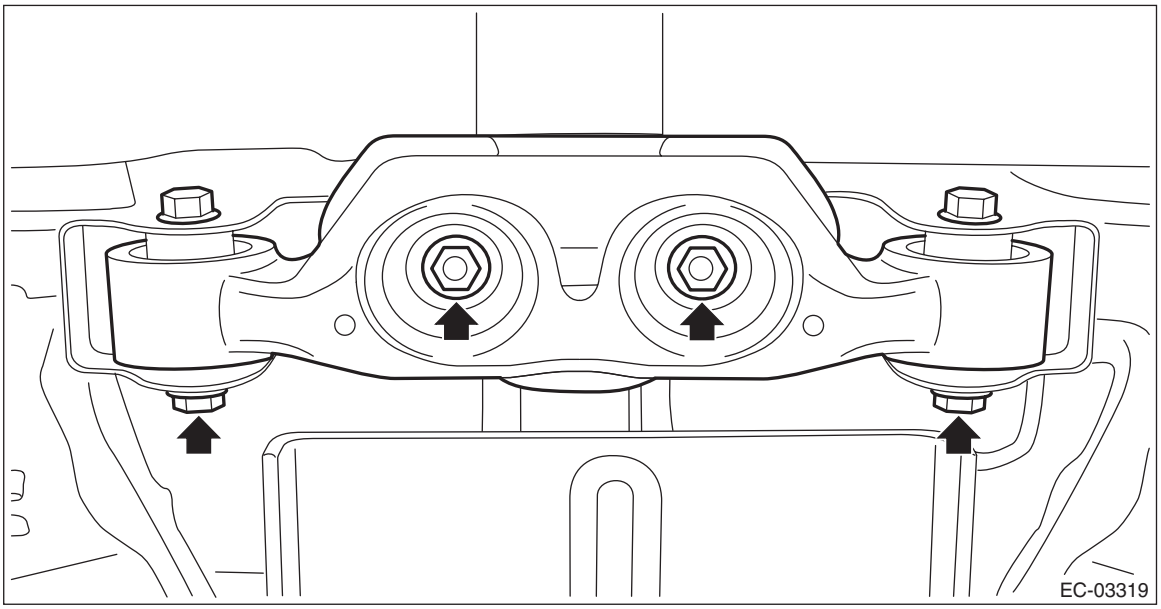
4. Canister

A: REMOVAL

1) Remove the rear wheel LH.
2) Lift up the vehicle.
3) Remove the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
4) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
5) Support the rear differential with the transmission jack.
6) Remove the self-locking nuts which hold the rear differential to the rear sub frame assembly.



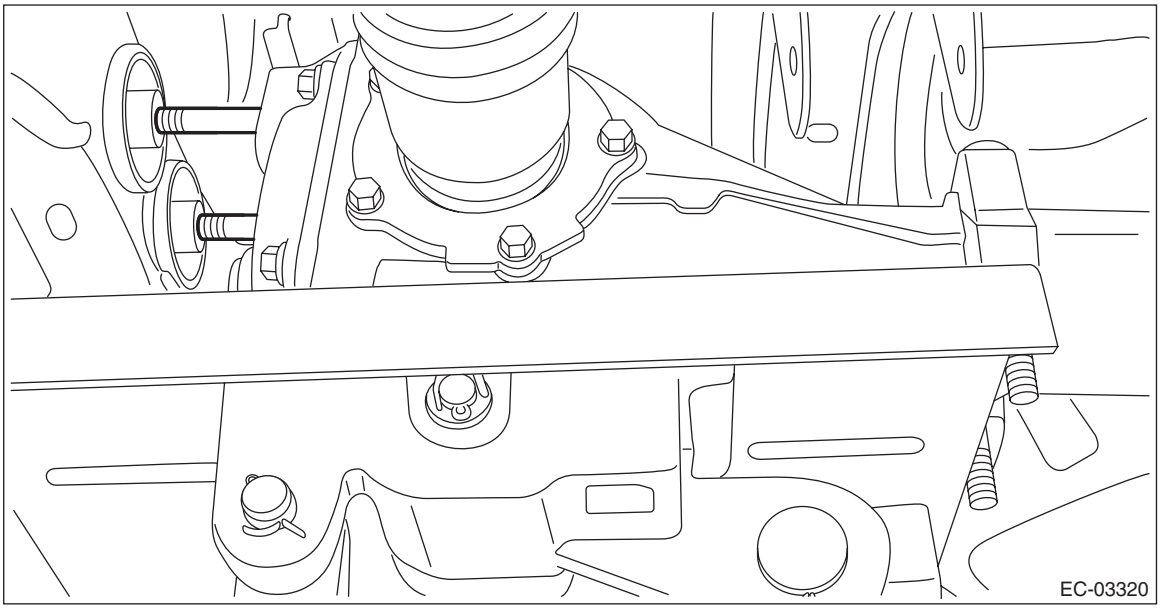
7) Remove the rear differential member from the rear sub frame assembly and the rear differential.



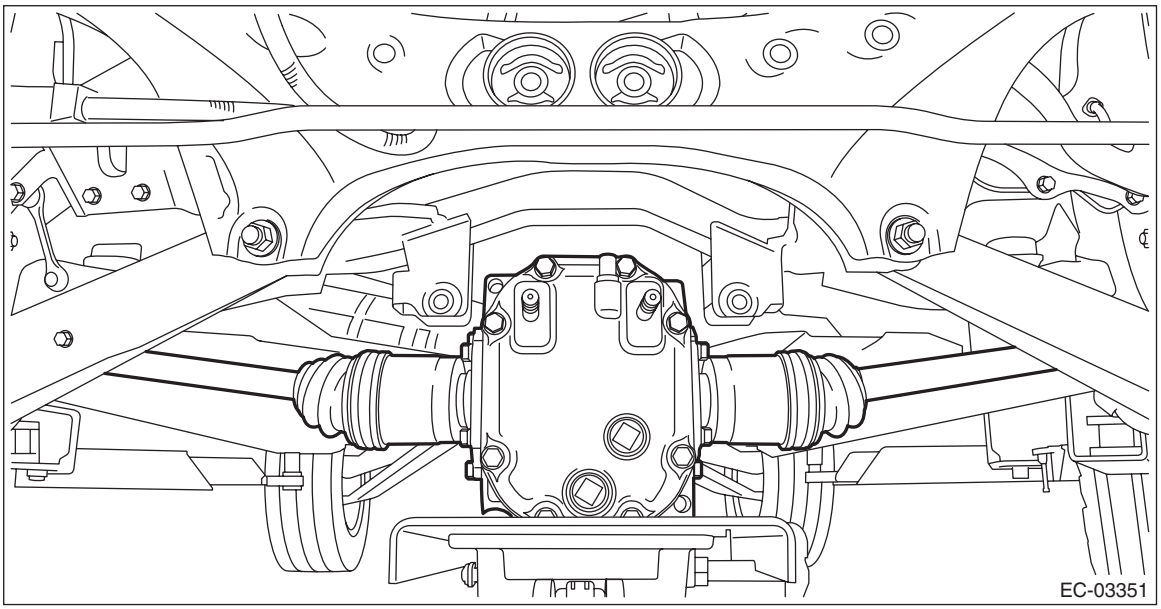
8) Lower the transmission jack gradually until the rear differential is at the position shown in the figure.

NOTE:

• When pulling out the stud bolt from the bushing portion of the rear sub frame assembly, adjust the angle and location of transmission jack and jack stand.

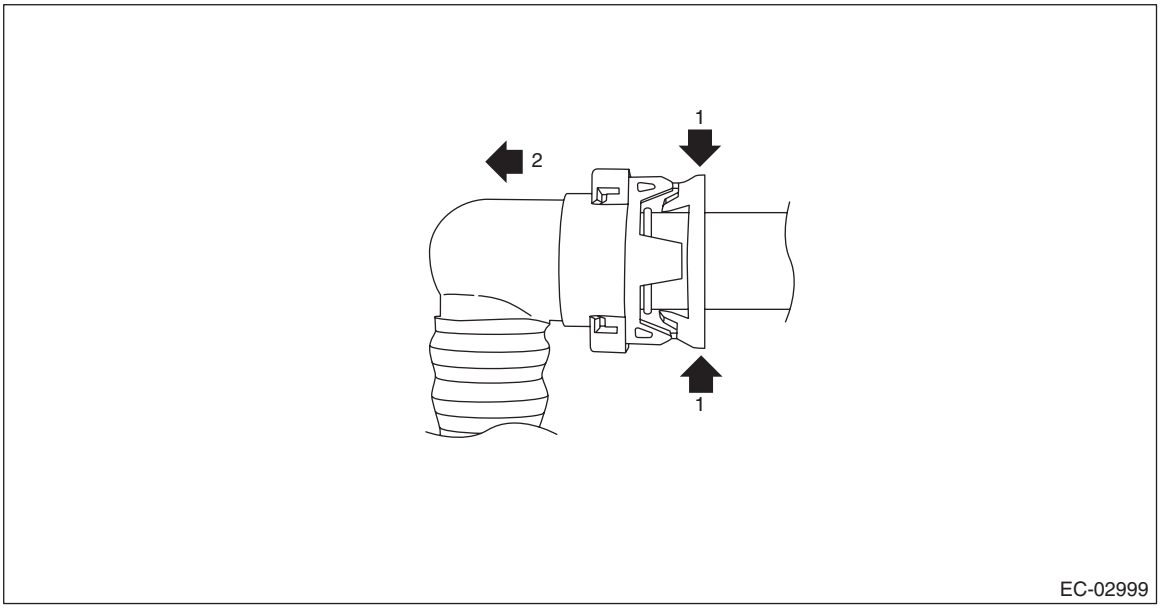


• Do not lower the rear differential excessively. Doing so may add extra load to the drive shaft or cause the falling-off of the drive shaft.



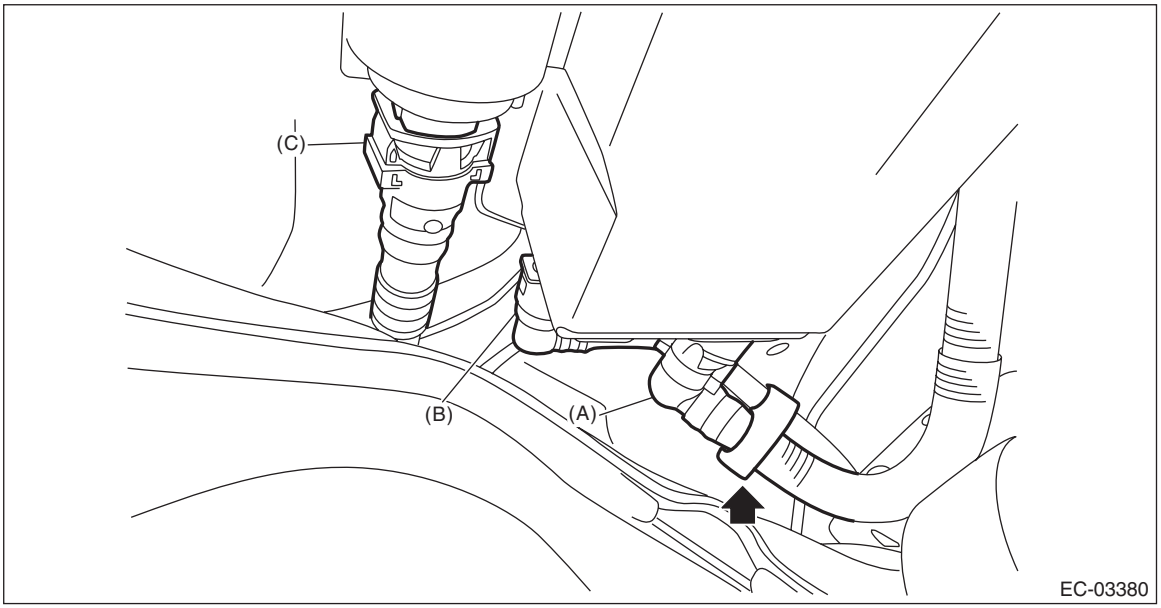
9) Remove the clips from vent tube (A) and purge tube (B).
10) Disconnect the vent tube (A), purge tube (B) and drain tube A (C) from the canister.

NOTE:
Disconnect the quick connector as shown in the figure.
- Drain tube and vent tube

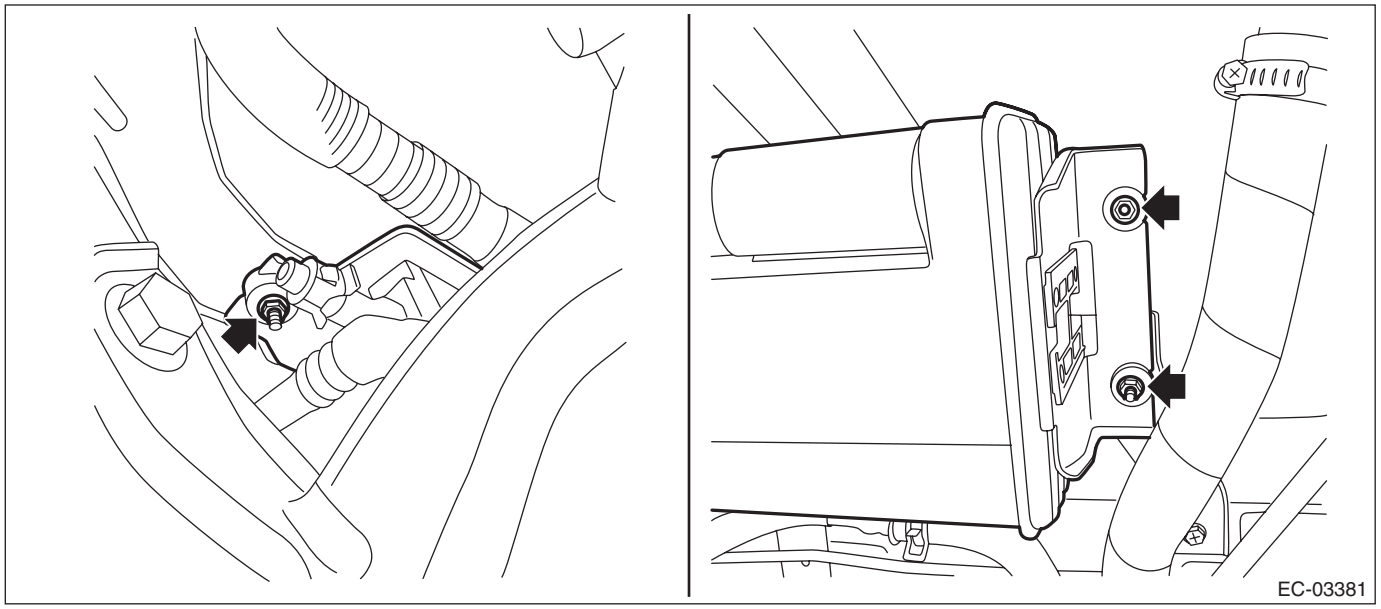


- Purge tube

For information about disconnecting the purge tube, refer to “Fuel Delivery and Evaporation Lines”. <Ref. to FU(H4DO(HEV))-153, REMOVAL, Fuel Delivery and Evaporation Lines.>

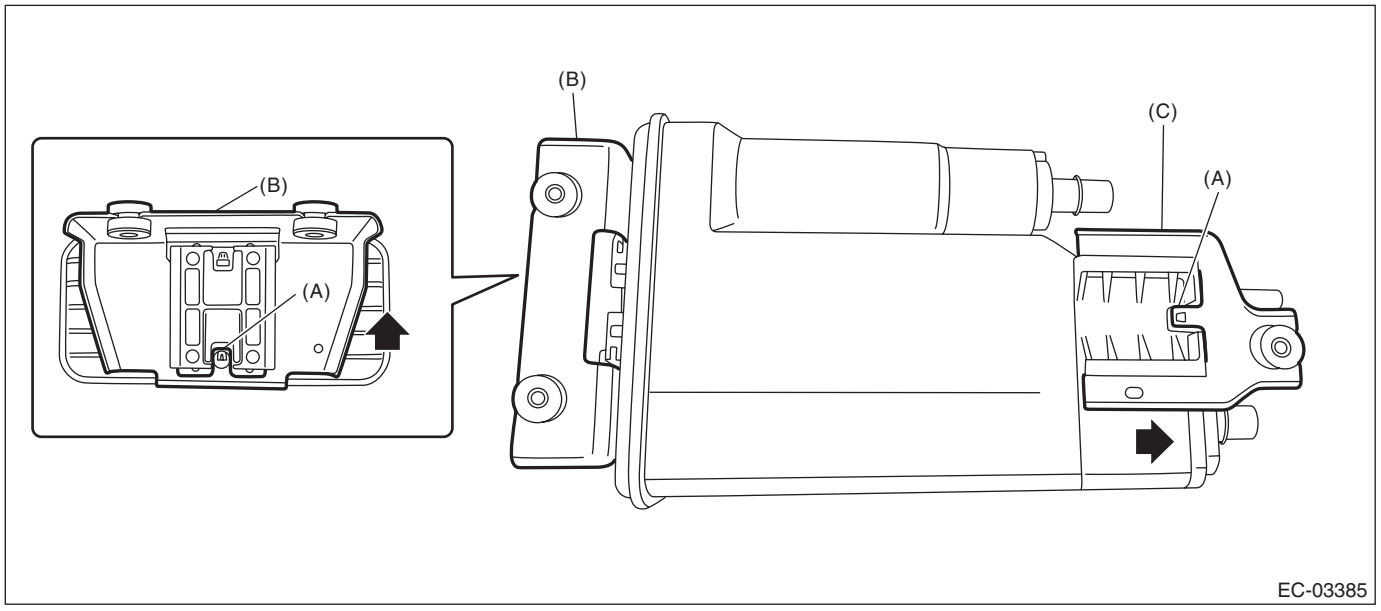


11) Remove the canister assembly from the vehicle and the canister bracket A.

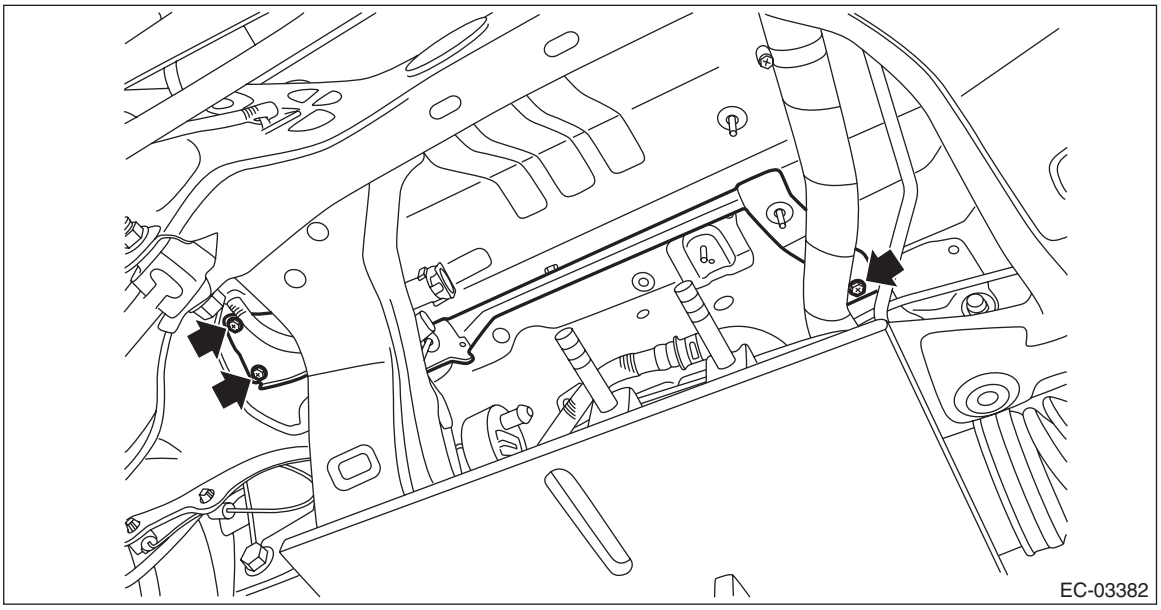


12) Release the claw (A) from the canister, slide it in the direction of the arrow, and remove the canister bracket B (B) and the canister bracket C (C).

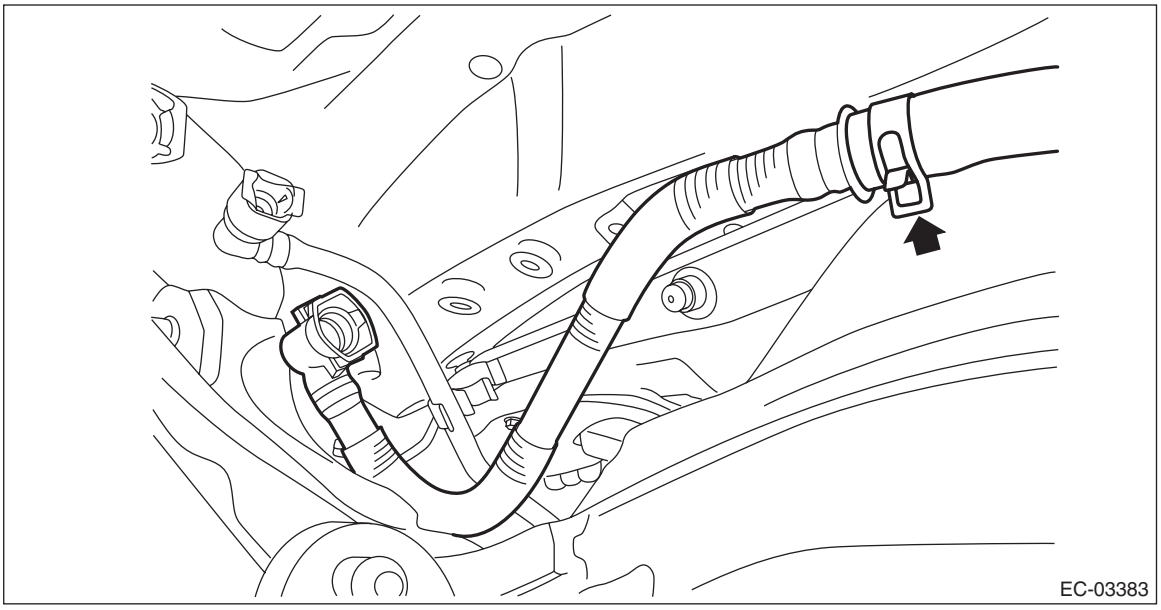
NOTE:
When removing the canister bracket from the canister, use the new canister and canister bracket to install.



13) Remove the canister bracket A from the vehicle.

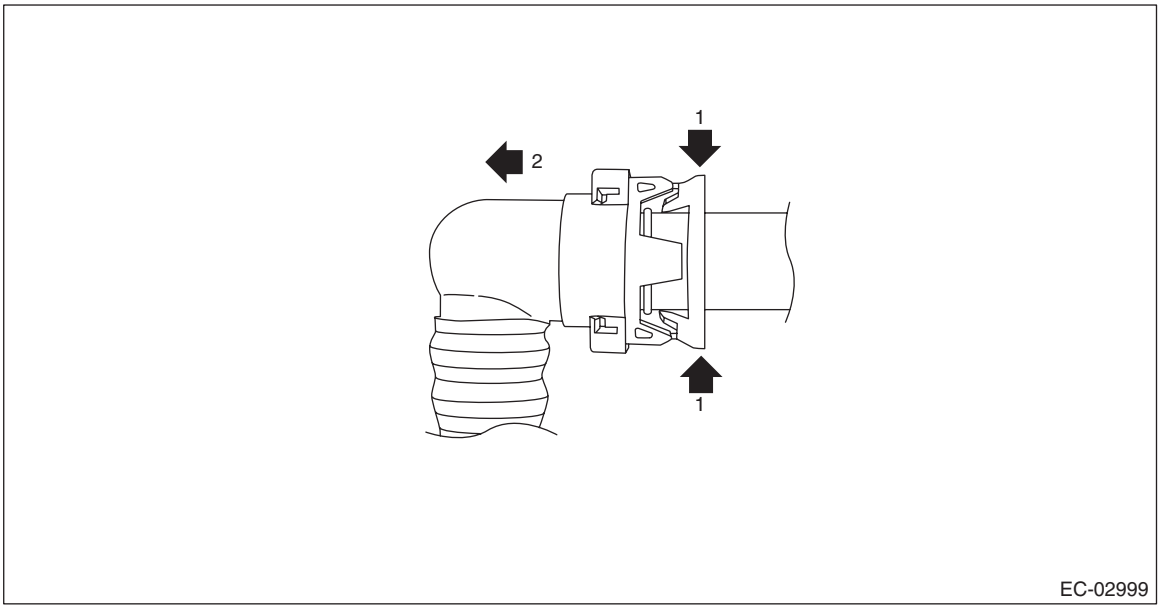


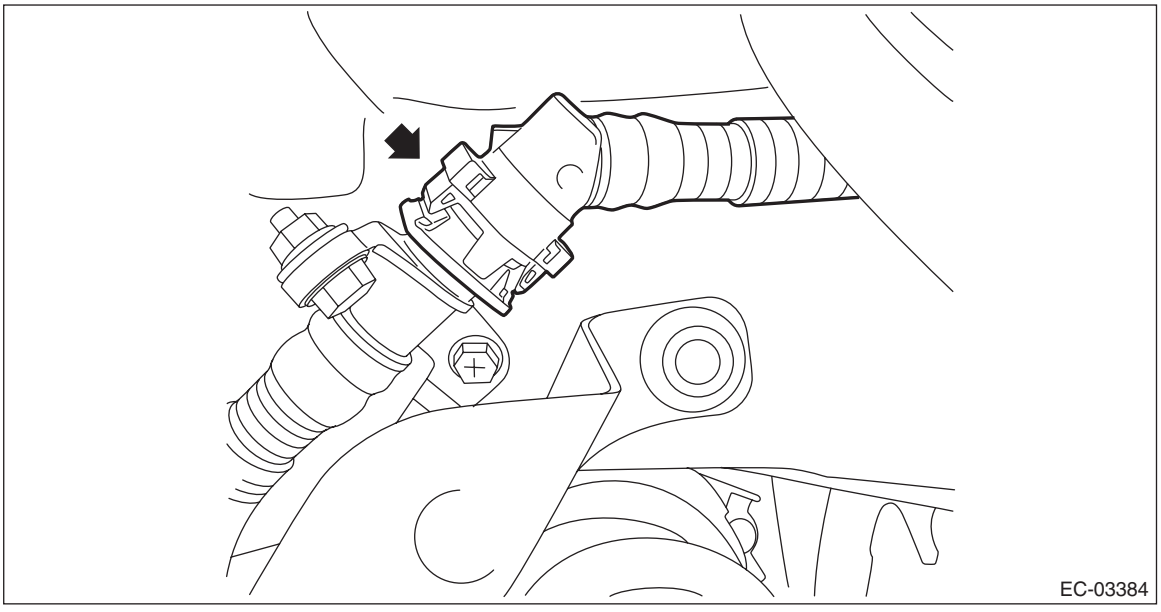
14) Disconnect the vent tube from the vent hose.



15) Disconnect the drain tube A from the drain tube B.

NOTE:
Disconnect the quick connector as shown in the figure.

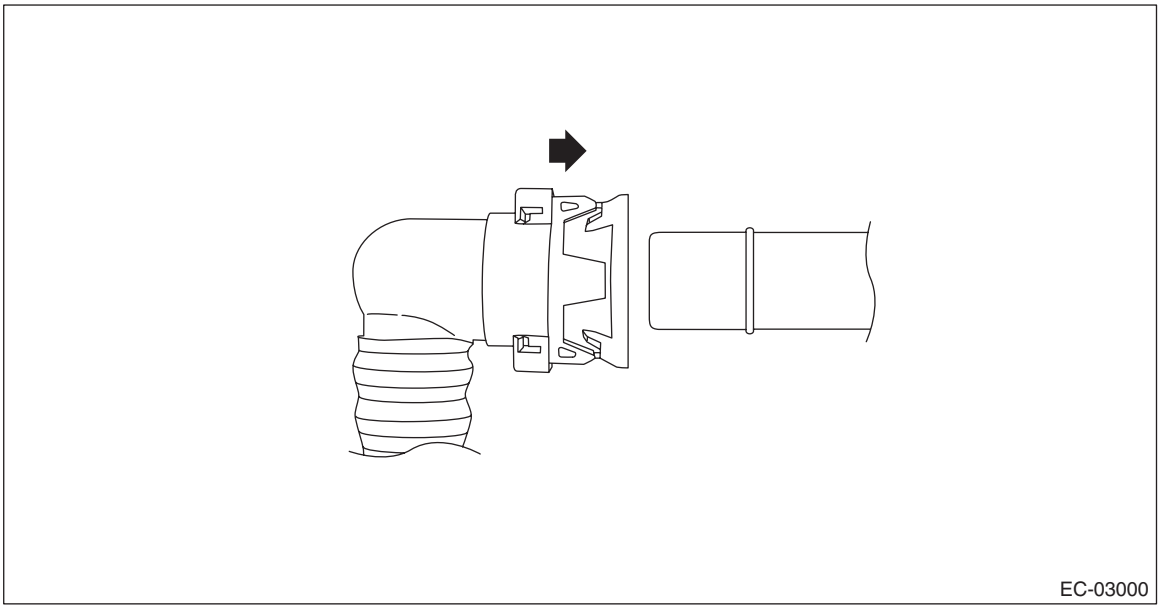


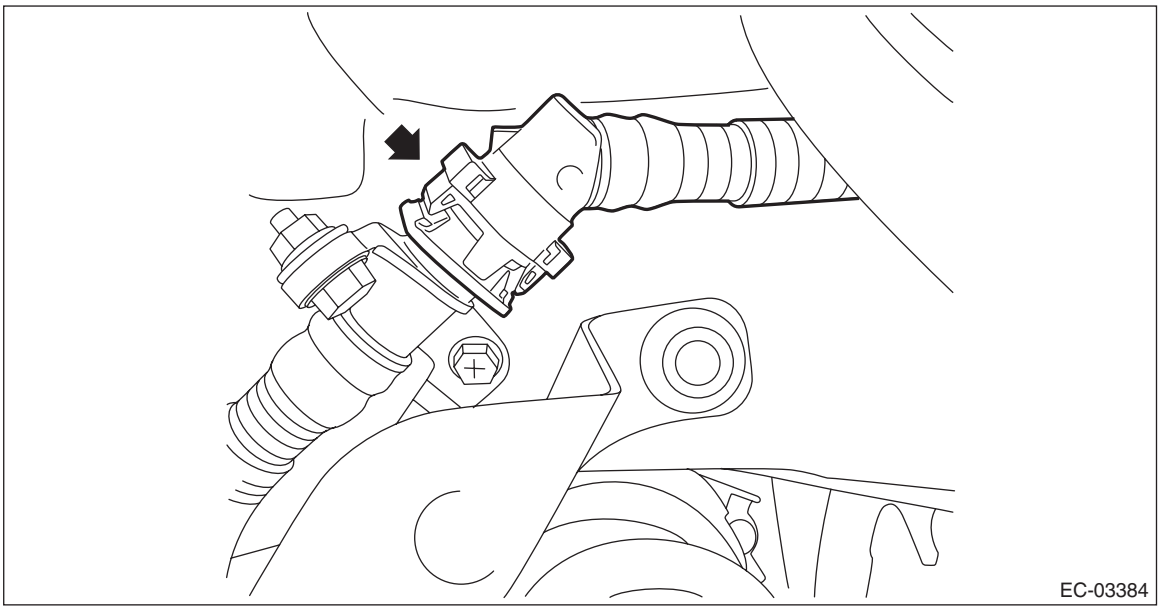


B: INSTALLATION

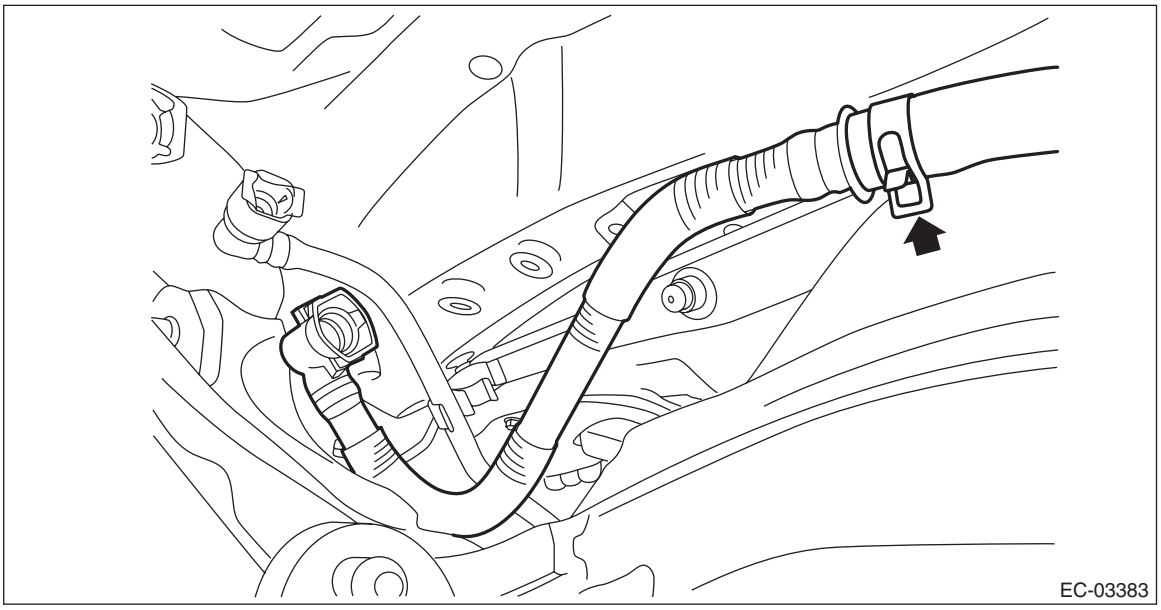
1) Connect the drain tube A to the drain tube B.

NOTE:
Connect the quick connector as shown in the figure.



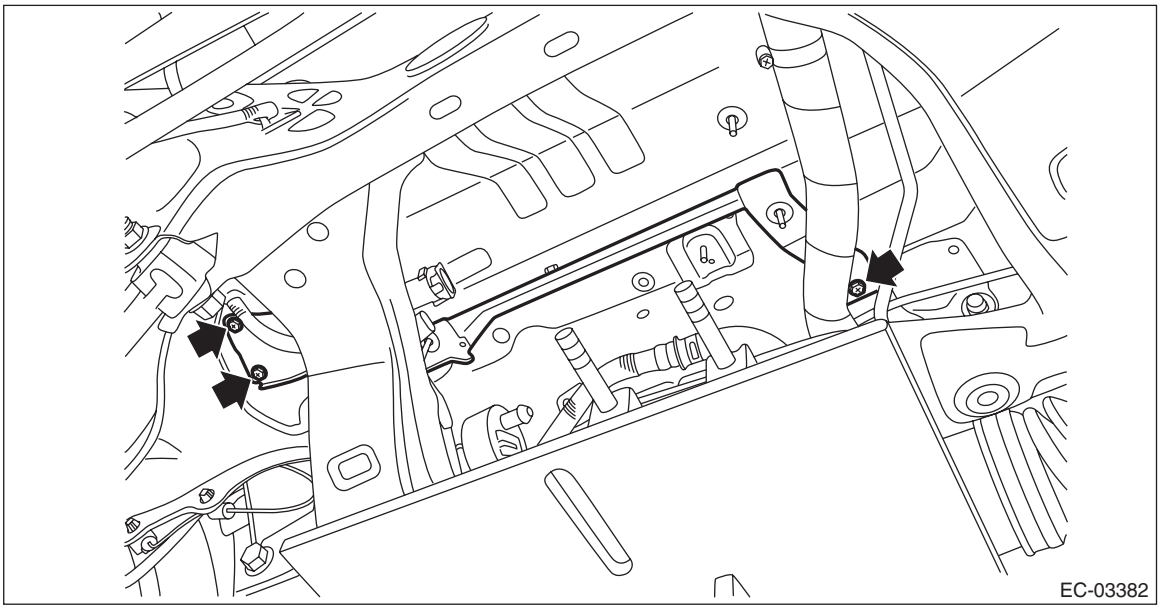


2) Connect the vent tube to the vent hose.



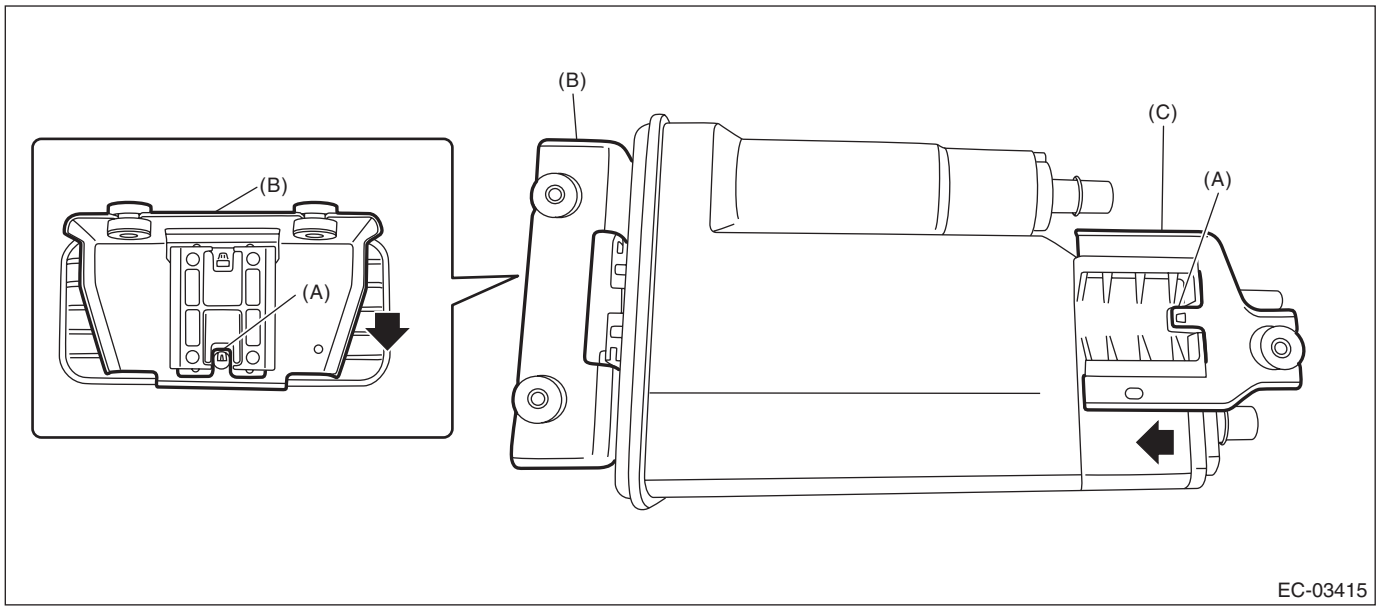
3) Install the canister bracket A to the vehicle.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



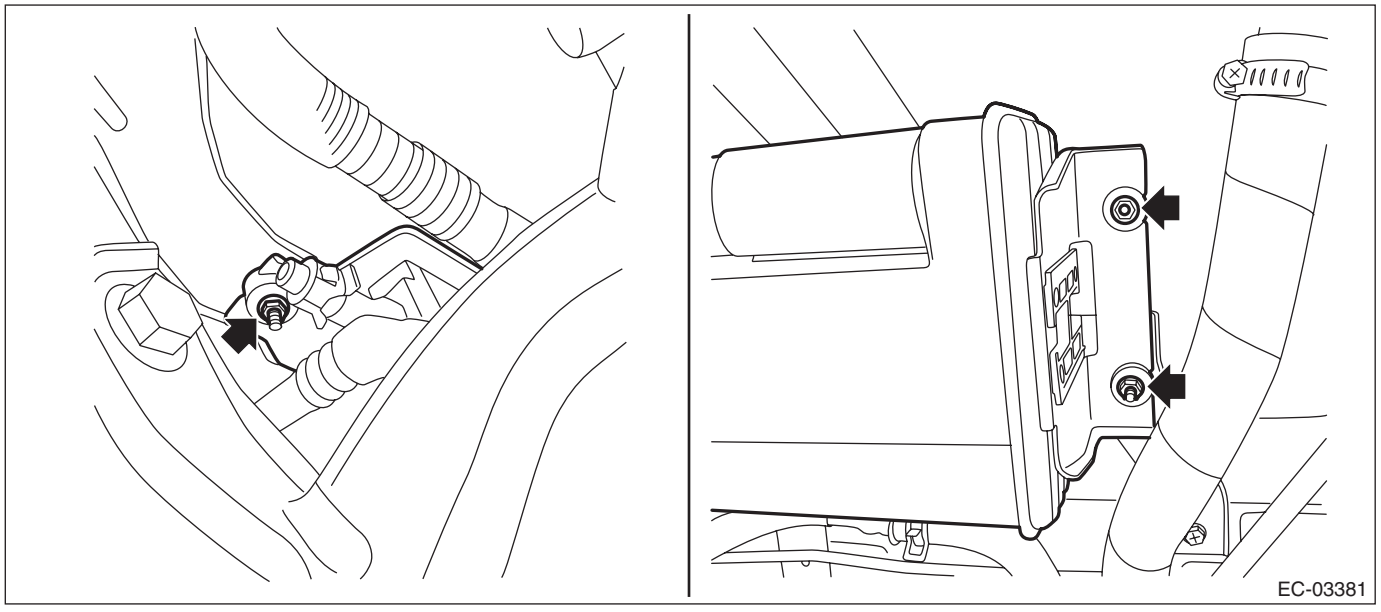
4) Slide in the direction of the arrow, and install the canister bracket B (B) and the canister bracket C (C) to the canister.

NOTE:
- Use a new canister and canister bracket.
- Check that the claw (A) is firmly secured.



5) Install the canister assembly to the vehicle and the canister bracket A.

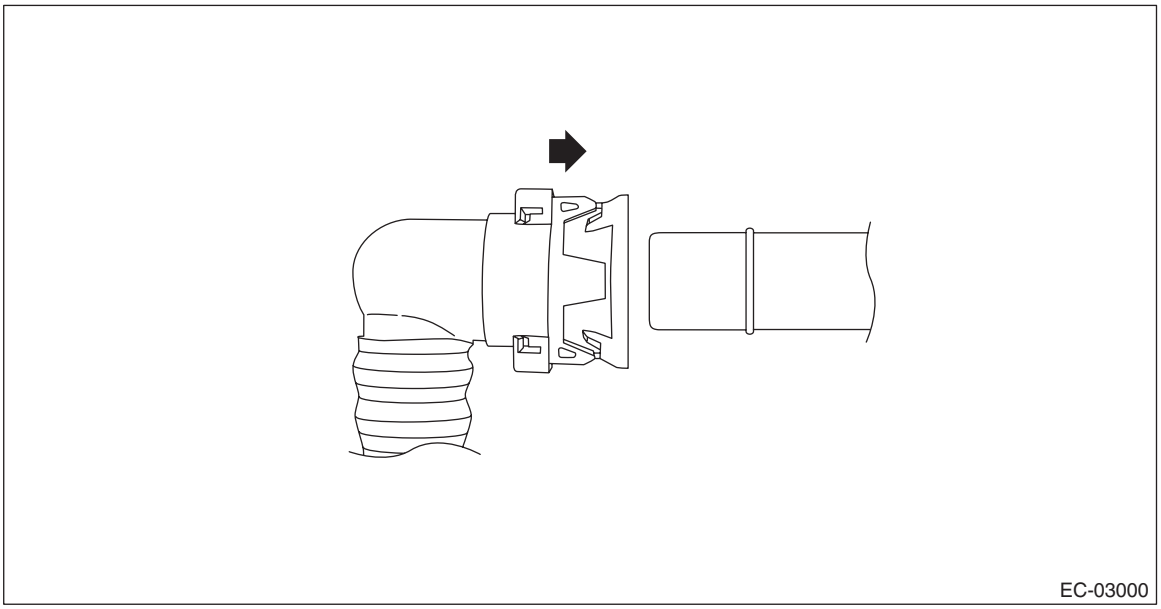
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



6) Connect the vent tube (A), purge tube (B), and drain tube (C) to the canister.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• Make sure that the quick connector is securely connected.

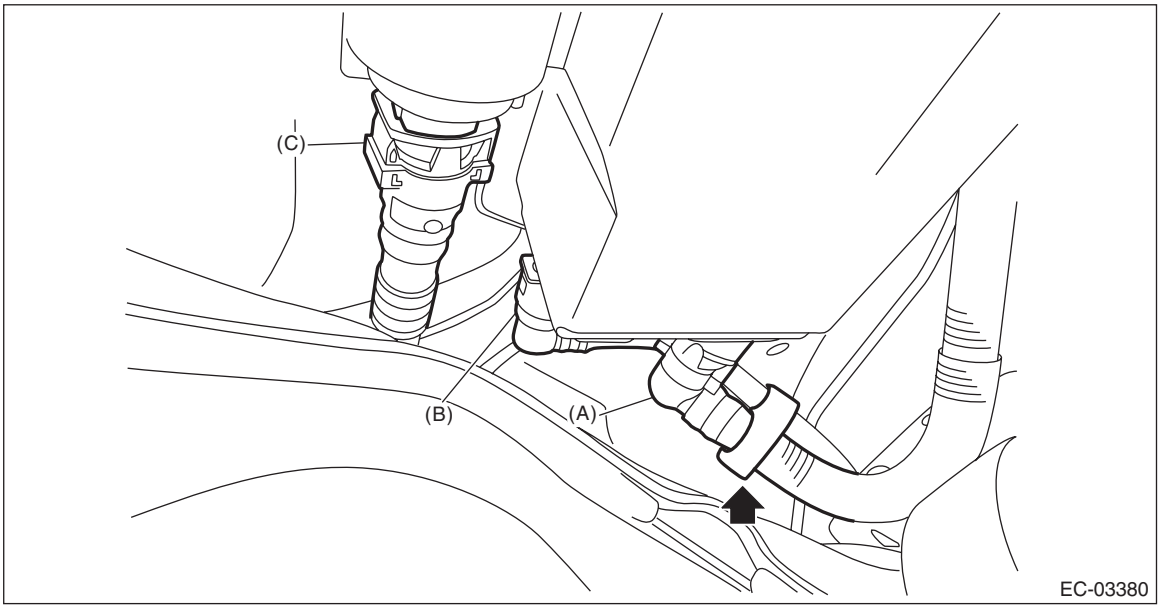
NOTE:
Install the quick connector as shown in the figure.
• Drain tube and vent tube



• Purge tube

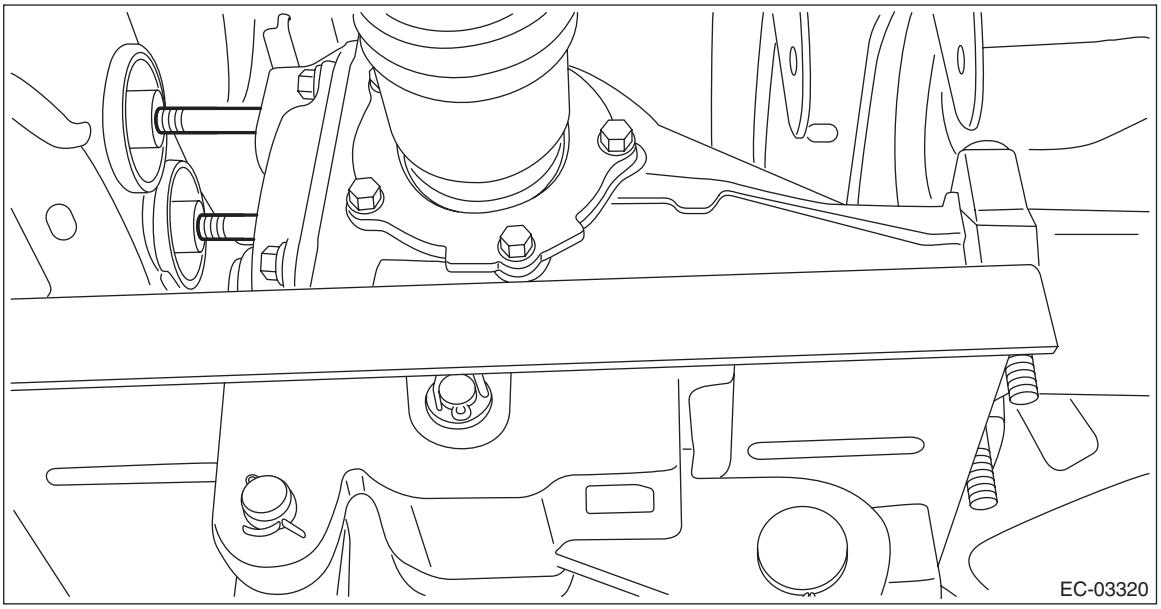
For information about connecting the purge tube, refer to “Fuel Delivery and Evaporation Lines”. <Ref. to FU(H4DO(HEV))-159, CONNECTION OF QUICK CONNECTOR OF PURGE TUBE (CANISTER SIDE), INSTALLATION, Fuel Delivery and Evaporation Lines.>

7) Install the clips to the vent tube (A) and purge tube (B).



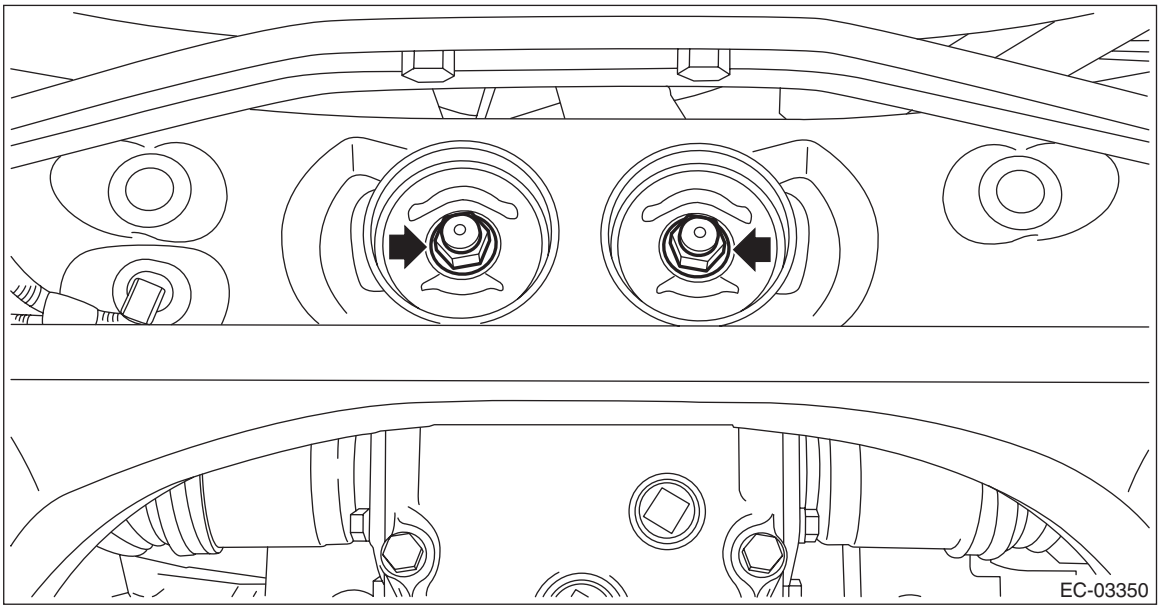
8) Lift up the transmission jack gradually, and set the rear differential to the rear sub frame assembly.

NOTE:
When inserting the stud bolt into the bushing portion of the rear sub frame assembly, adjust the angle and location of transmission jack and jack stand.



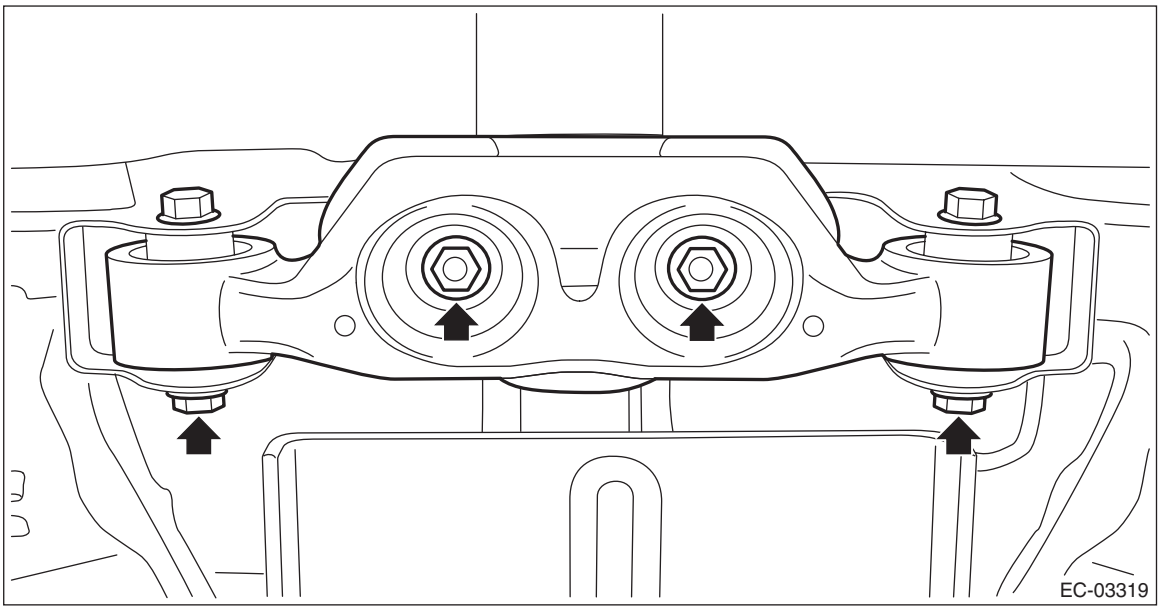
9) Temporarily tighten the self-locking nuts which hold the rear differential to the rear sub frame assembly.

NOTE:
Use a new self-locking nut.



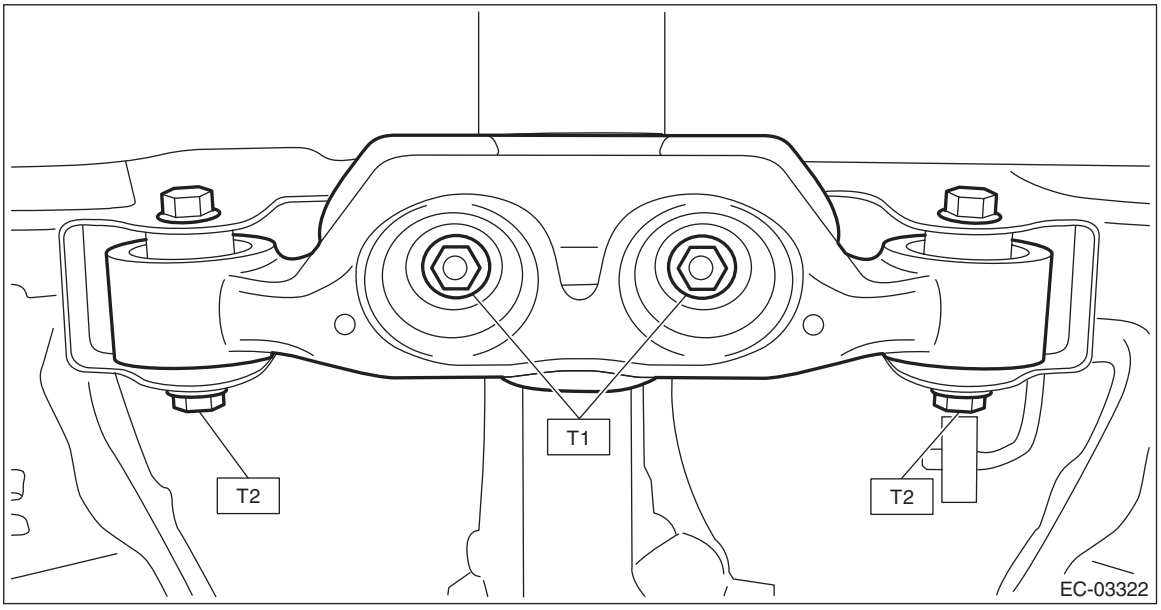
10) Set the rear differential member to the rear sub frame assembly and rear differential, and temporarily tighten the self-lock nuts which secure the rear differential member to the rear sub frame assembly and rear differential.

NOTE:
Use a new self-locking nut.



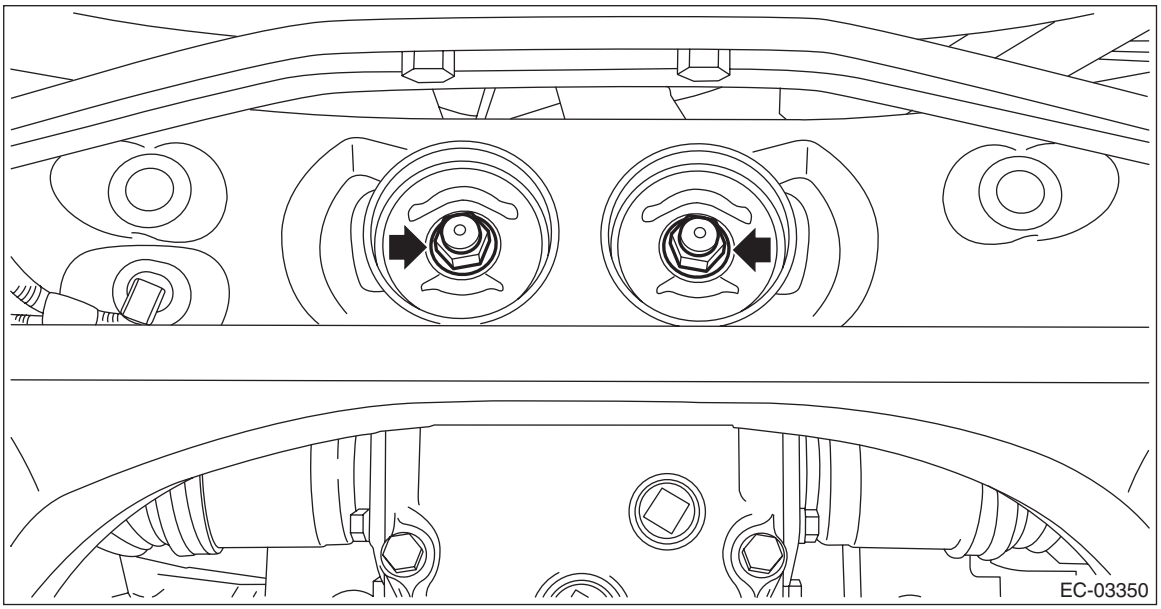
11) Remove the transmission jack from the rear differential.
12) Tighten the self-locking nuts which secure the rear differential member to the rear sub frame assembly and rear differential.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 110 N·m (11.2 kgf-m, 81.1 ft-lb)



13) Tighten the self-locking nuts which secure the rear differential to the rear sub frame assembly.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



14) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
15) Install the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.>
16) Lower the vehicle.

C: INSPECTION

1) Check that the canister has no deformation, cracks or other damages.
2) Check that the tube has no cracks, damage or loose part.

5. Purge Control Solenoid Valve

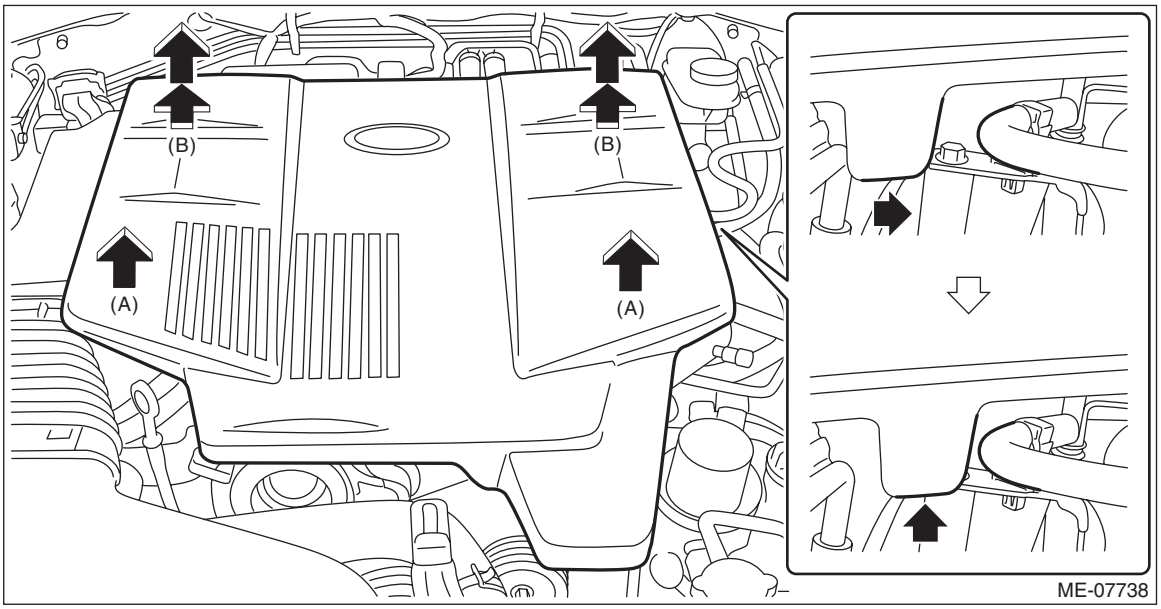
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

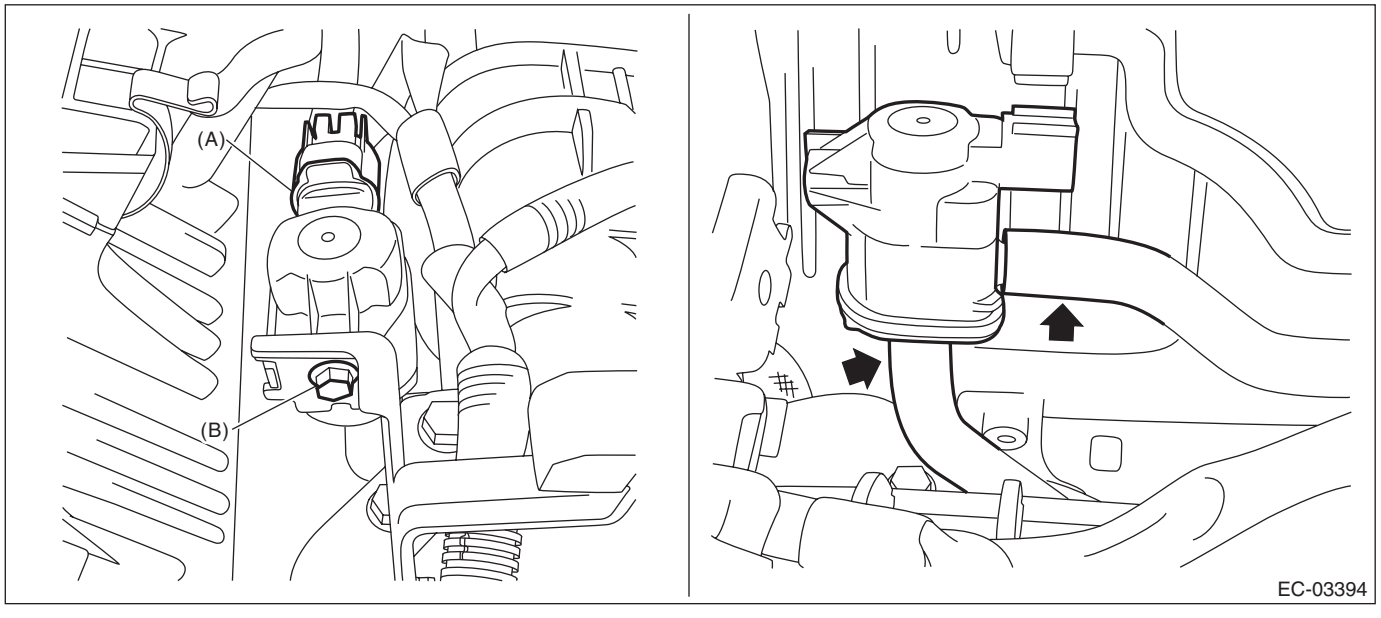
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



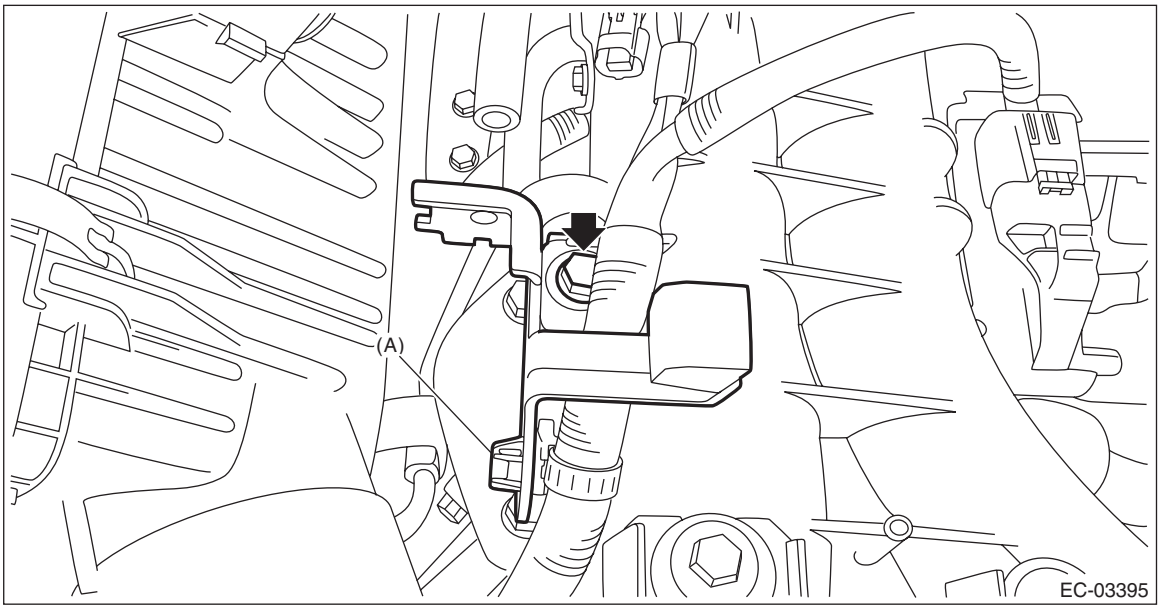
3) Disconnect the connector (A) from the purge control solenoid valve, and remove the bolt (B) which secures the purge control solenoid valve to the purge control solenoid valve bracket.

NOTE:
Hold the purge control solenoid valve unit by hand to prevent it from rotating together.

4) Disconnect the vacuum hose from the purge control solenoid valve, and then remove the purge control solenoid valve.



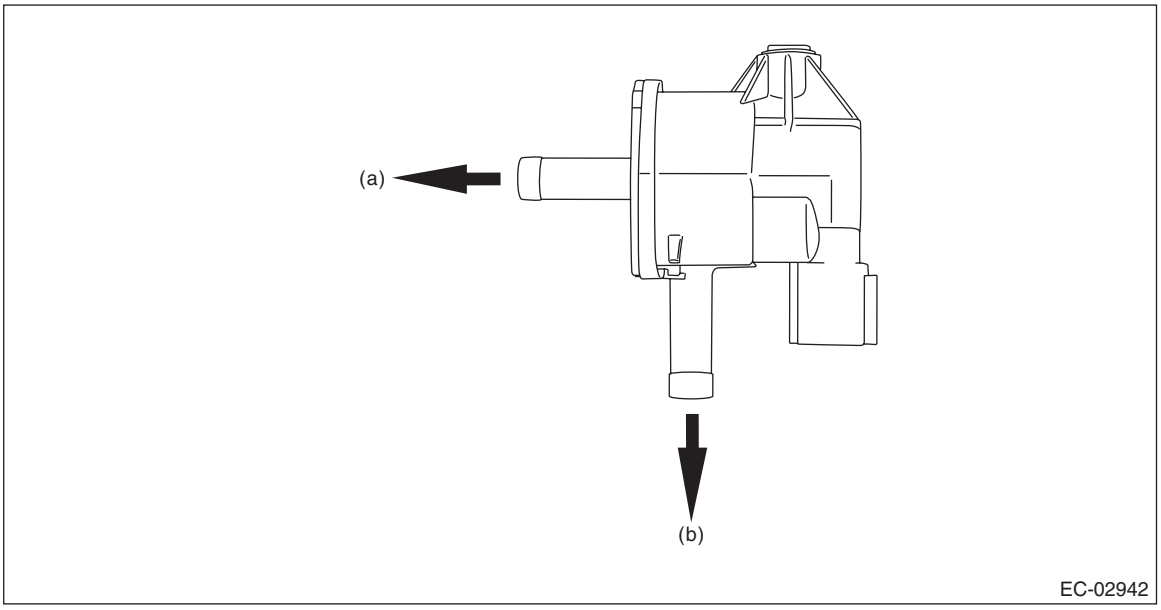
5) Remove the clip (A) securing the engine wiring harness, and remove the purge control solenoid valve bracket from the intake manifold.



B: INSTALLATION

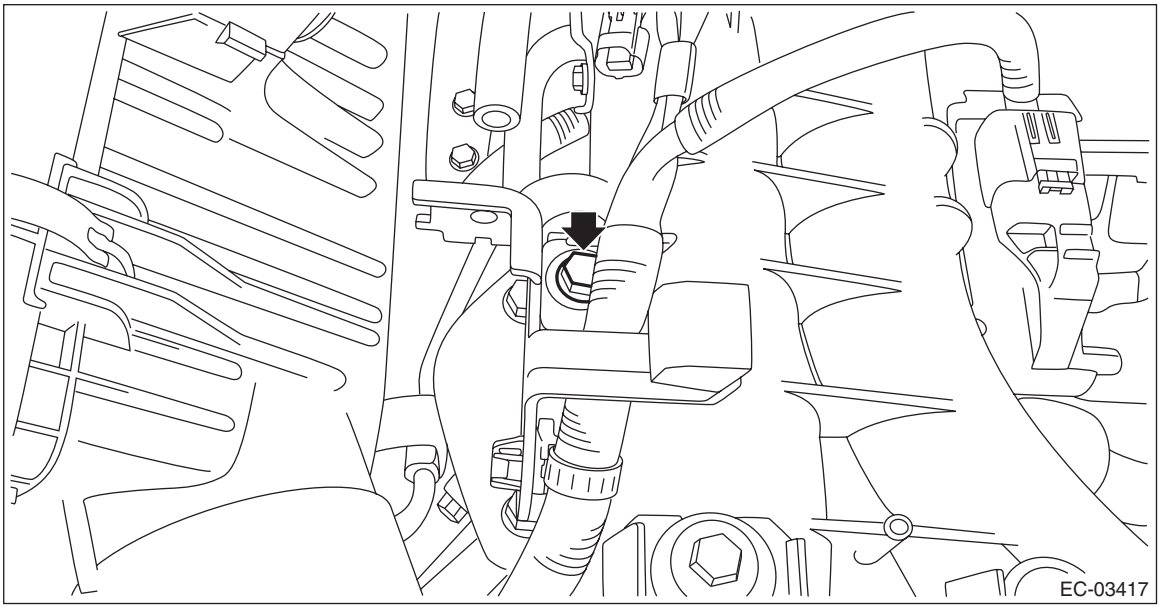
Install in the reverse order of removal.

NOTE:
- Hold the purge control solenoid valve unit by hand to prevent it from rotating together.
- Connect the vacuum hose as shown in the figure.

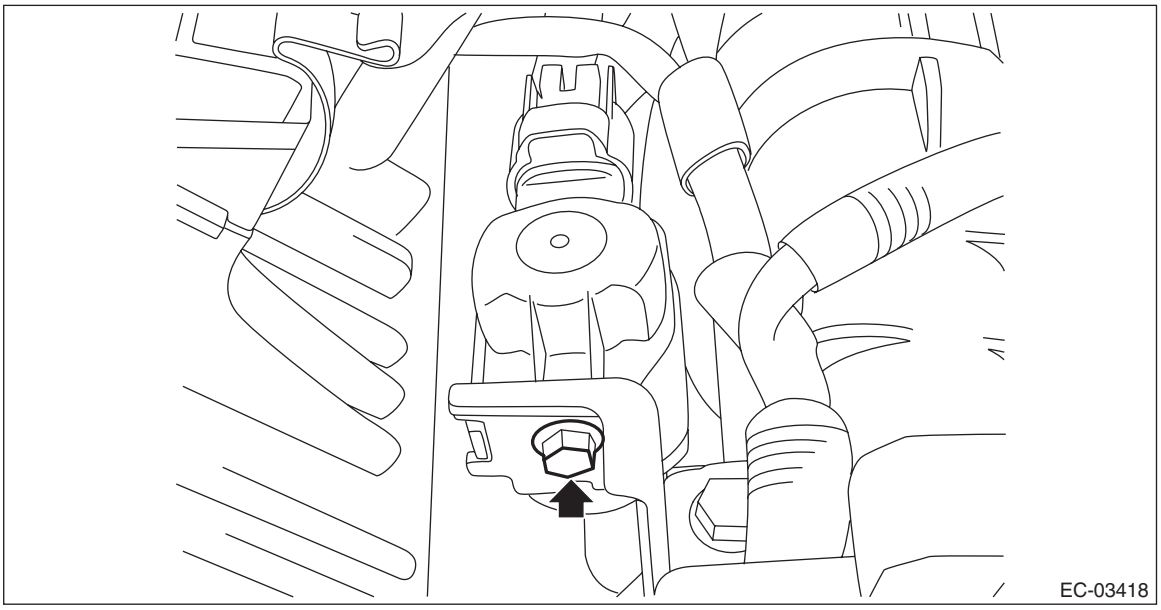


(a) To EGR pipe (b) To fuel pipe

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



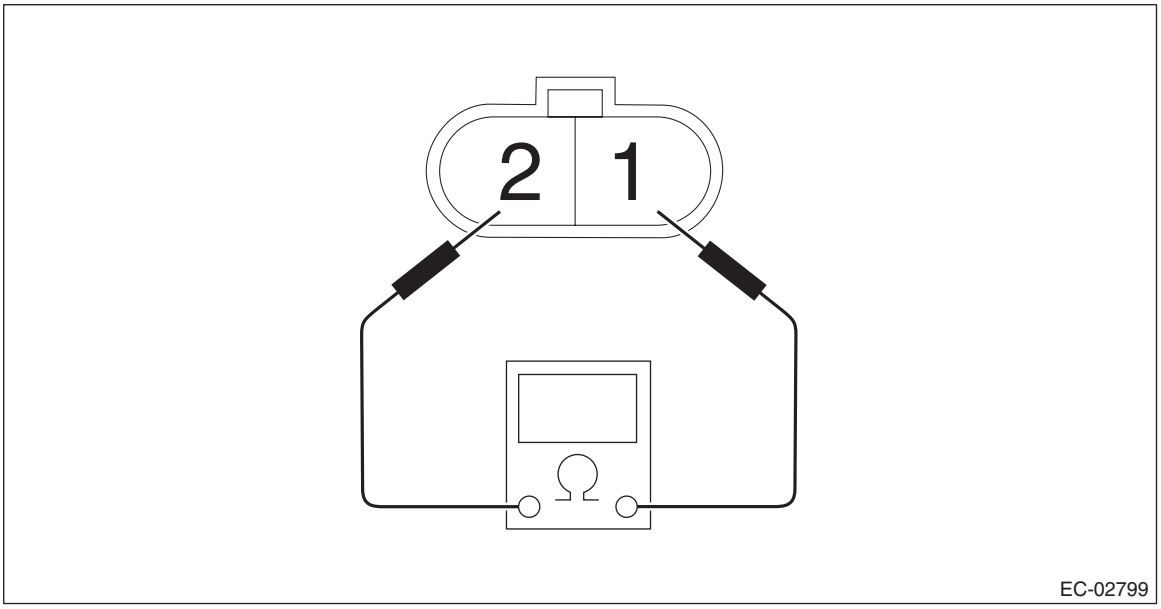
Tightening torque:
3.4 N·m (0.3 kgf-m, 2.5 ft-lb)



C: INSPECTION

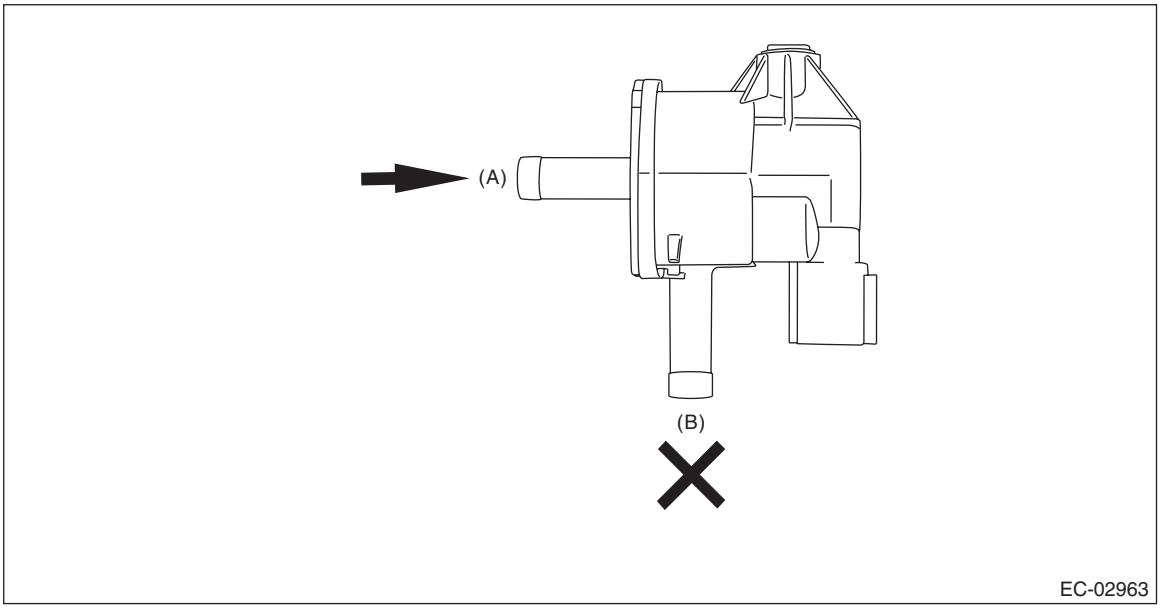
1. PURGE CONTROL SOLENOID VALVE

1) Check that the purge control solenoid valve has no deformation, cracks or other damages.
2) Measure the resistance between the purge control solenoid valve terminals.

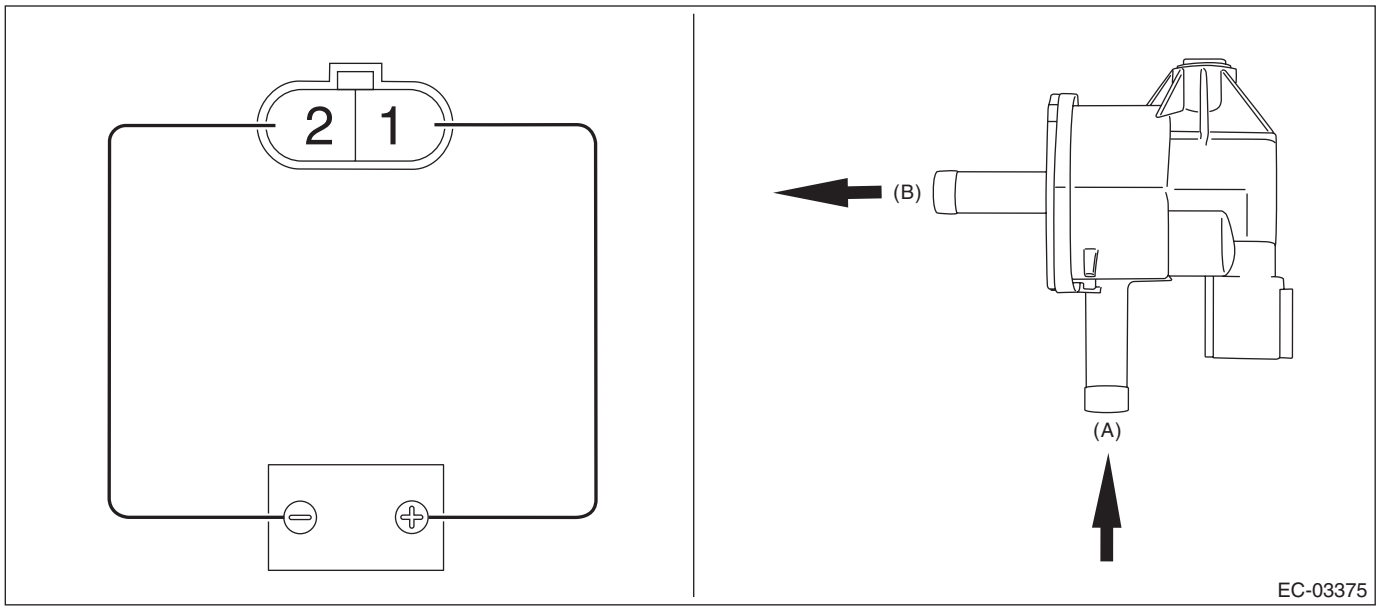


Terminal No.	Standard
1 and 2	24.5±1.5 Ω (when 20°C (68°F))

3) Check that air does not come out from (B) when air is blown into (A).



4) Connect the battery positive terminal to the terminal No. 1 and the battery negative terminal to the terminal No. 2. Check that air is discharged from (B), when supplying air to (A).



2. OTHER INSPECTIONS

Check the vacuum hose for cracks, damage or looseness.

6. EGR Control Valve

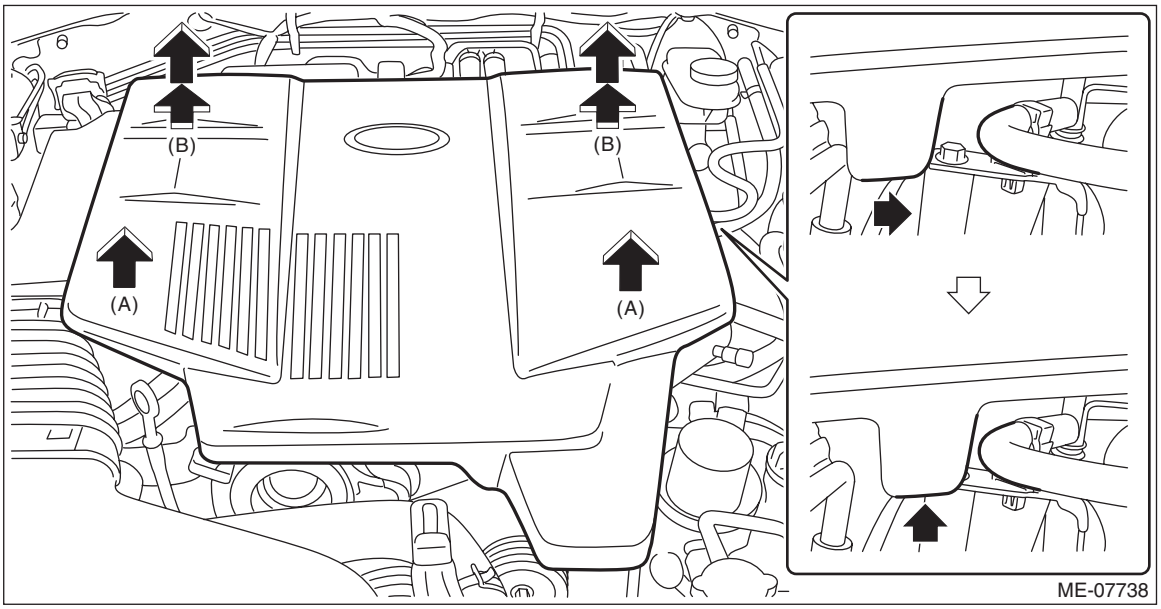
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

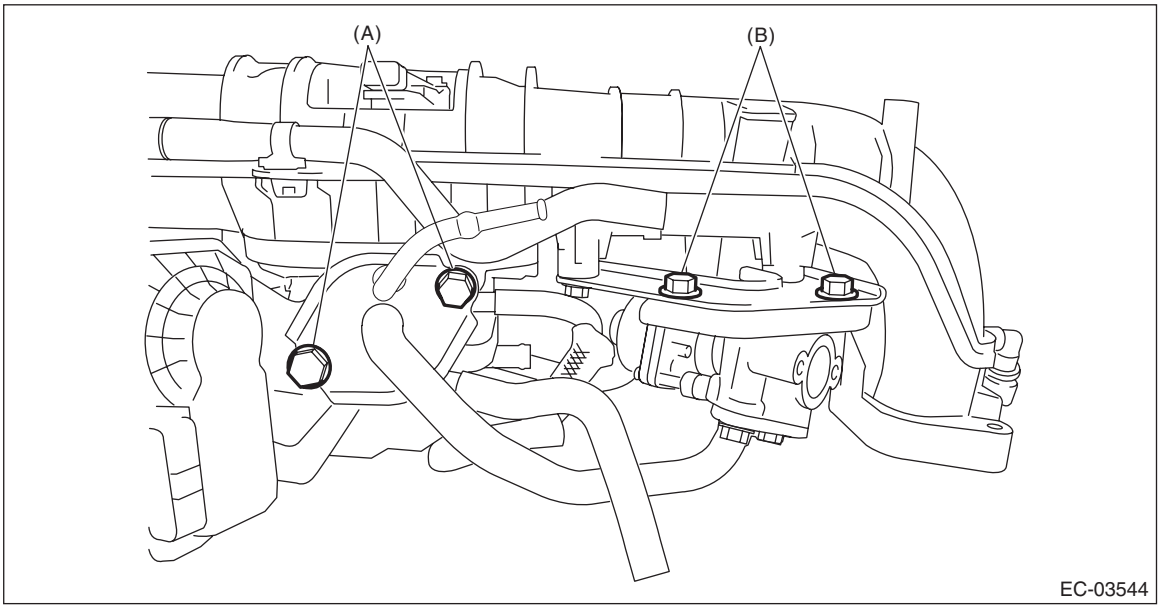
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

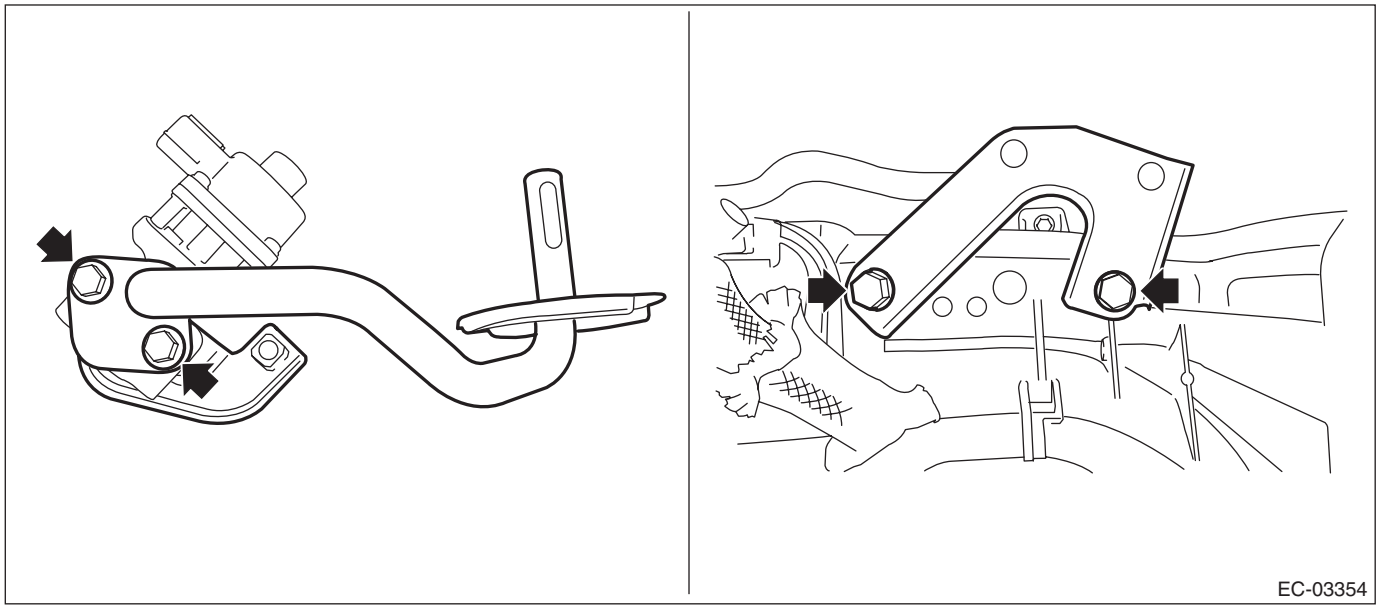


3) Remove the intake manifold. <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
4) Remove the bolt (A) which holds the EGR pipe to the intake manifold.
5) Remove the bolt (B) which secures the EGR control valve bracket B to the EGR control valve bracket A, and remove the EGR control valve together with the EGR pipe from the intake manifold.



6) Remove the bolts securing the EGR pipe and the EGR control valve bracket B from the EGR control valve.

7) Remove the EGR control valve bracket A from the intake manifold.



B: INSTALLATION

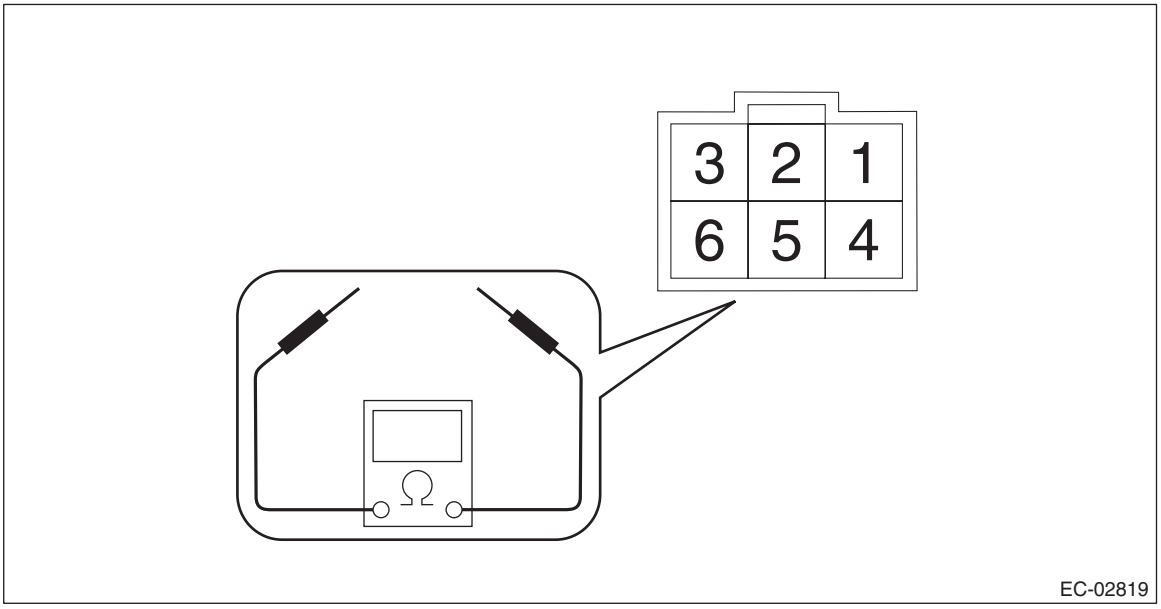
Install in the reverse order of removal.

NOTE:
Use a new gasket.

Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)

C: INSPECTION

1) Check that the EGR control valve and EGR control valve bracket have no deformation, cracks or other damages.
2) Measure the resistance between EGR control valve terminals.



Terminal No.	Standard
2 and 1	22±2 Ω
2 and 3	22±2 Ω
5 and 4	22±2 Ω
5 and 6	22±2 Ω

7. EGR Pipe

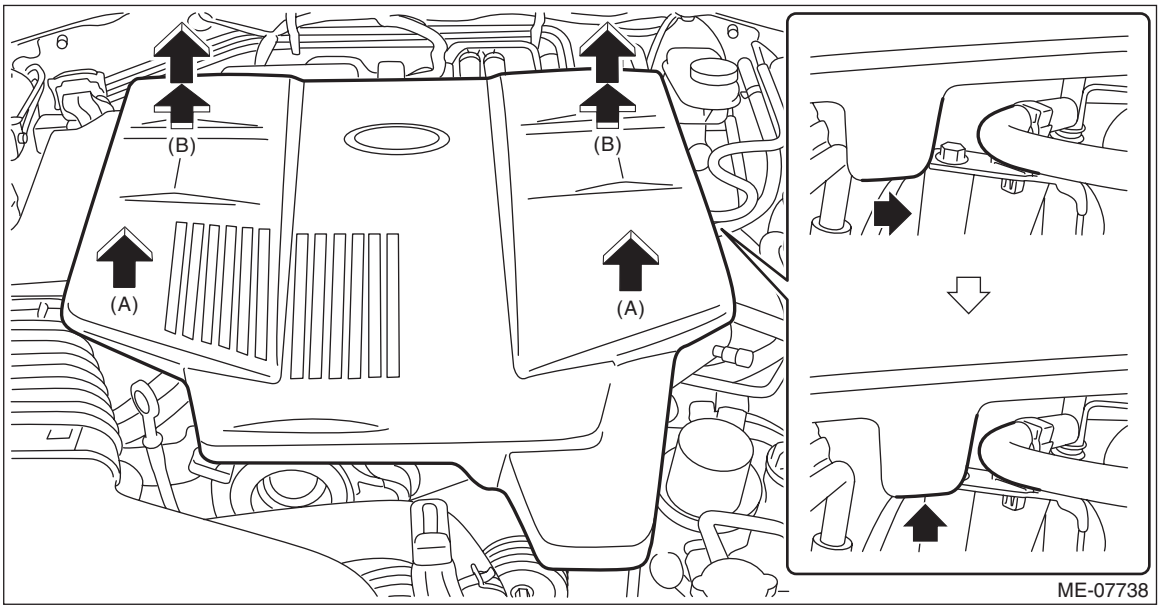
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

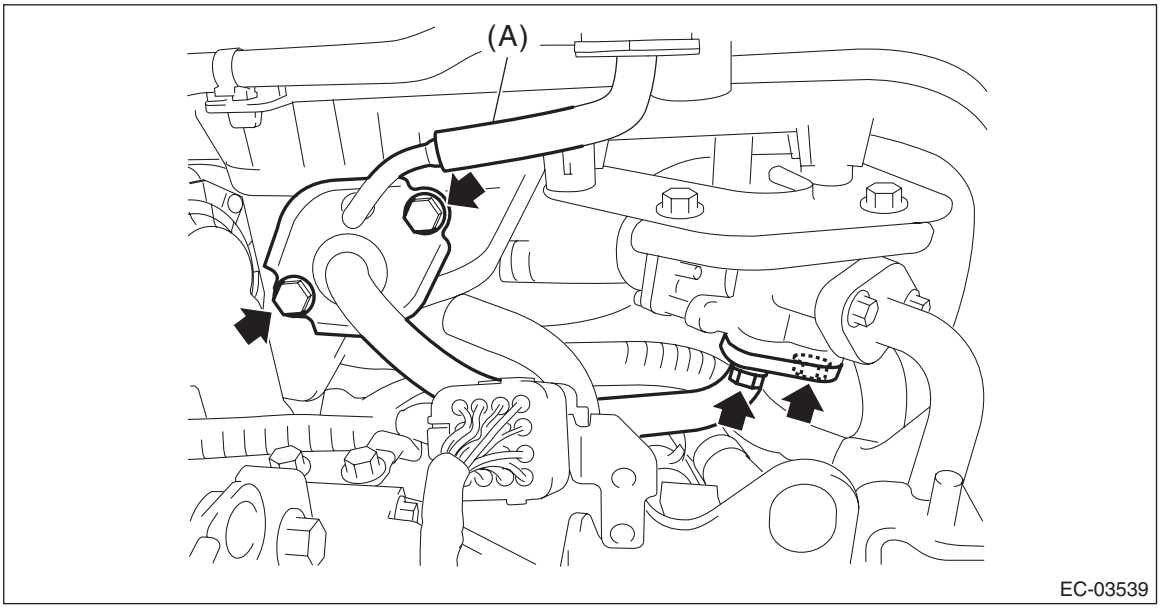
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Disconnect the vacuum hose (A) from EGR pipe.
5) Remove the bolts which secure the EGR pipe to the intake manifold and EGR control valve, and remove the EGR pipe.



B: INSTALLATION

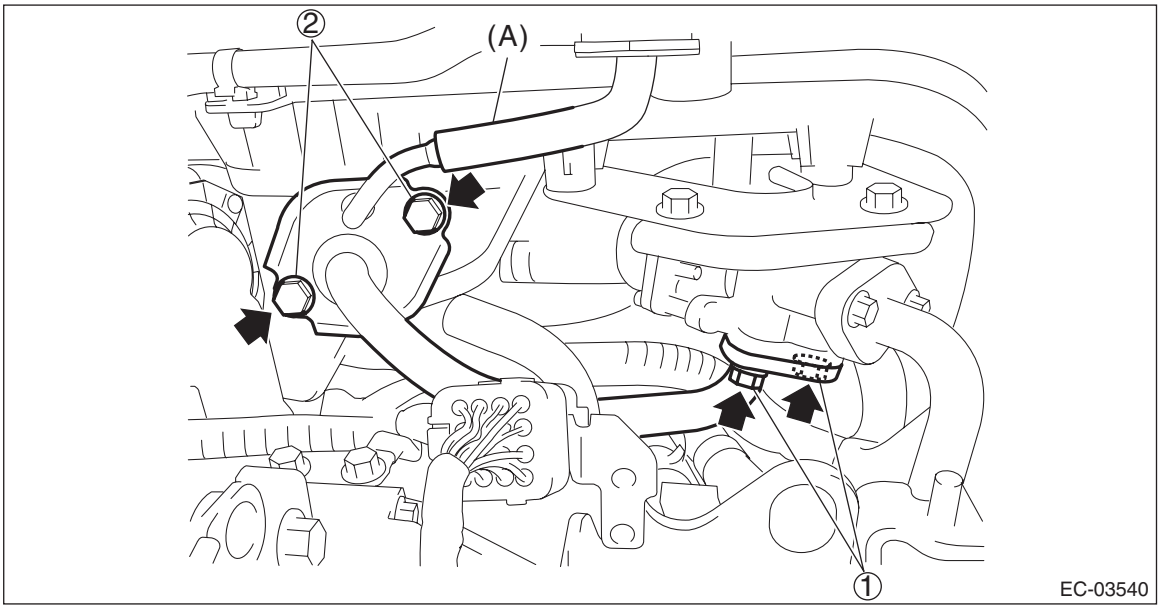
1) Set the EGR pipe to the intake manifold and EGR control valve, and temporarily tighten the bolts which secure the EGR pipe.

NOTE:
Use a new gasket.

2) Tighten the bolts which secure the EGR pipe to the intake manifold and EGR control valve in numerical order as shown in the figure.

Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)

3) Connect the vacuum hose (A) to EGR pipe.



4) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
5) Install the collector cover.
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

Check that the EGR pipe has no deformation, cracks or other damages.

8. EGR Cooler

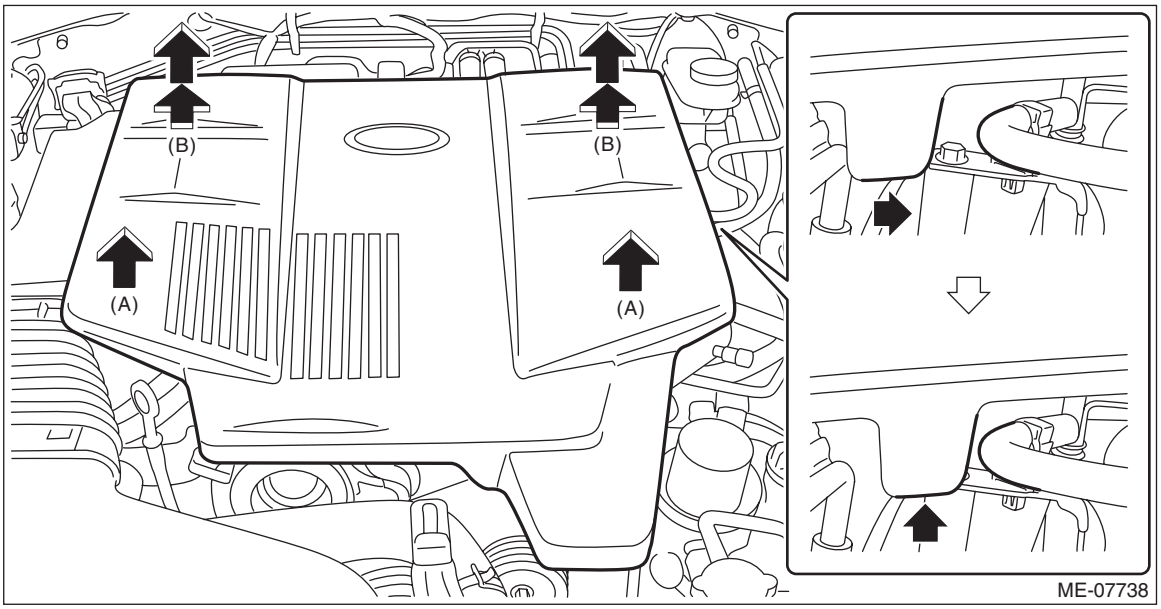
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

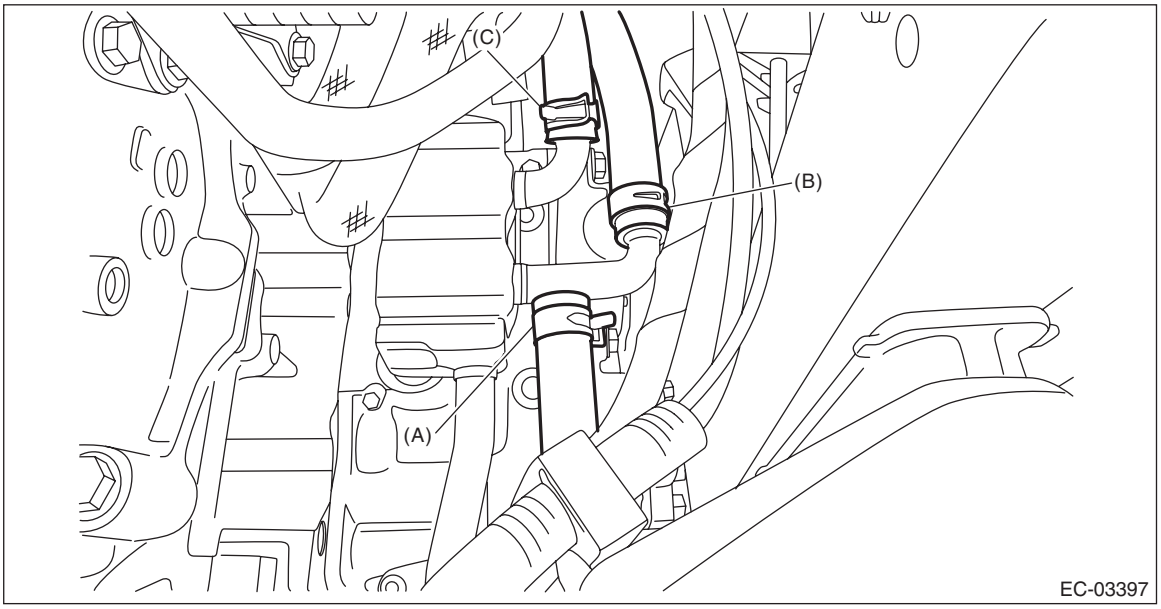
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

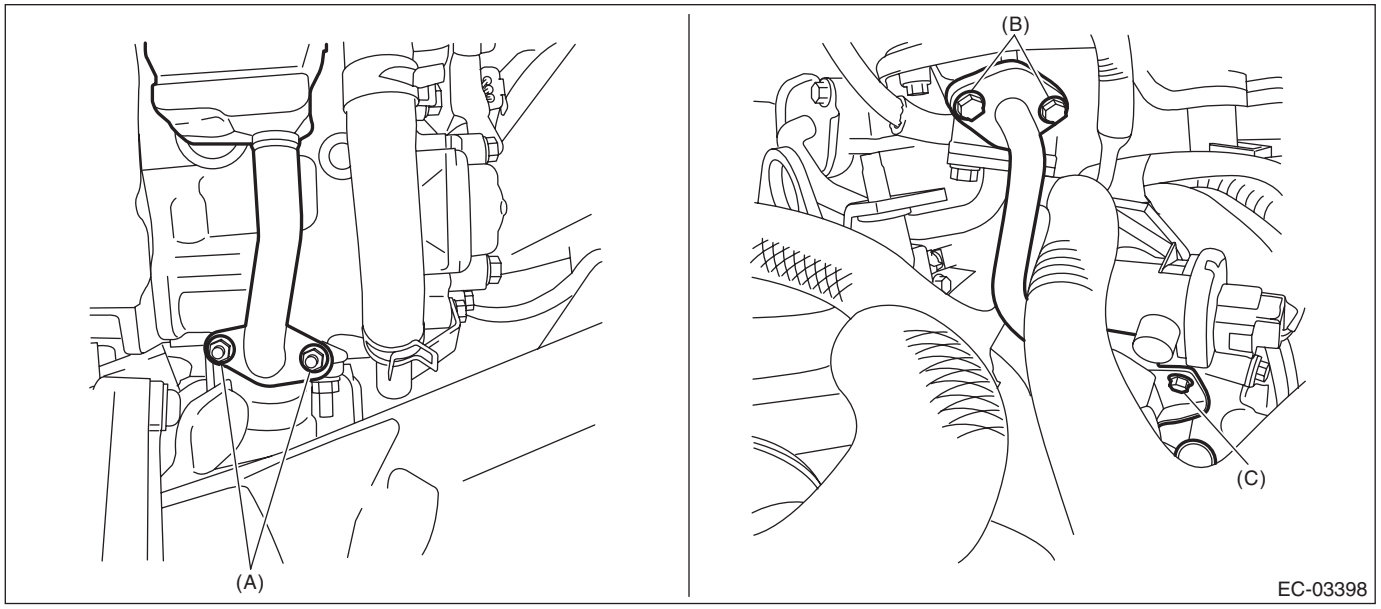
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



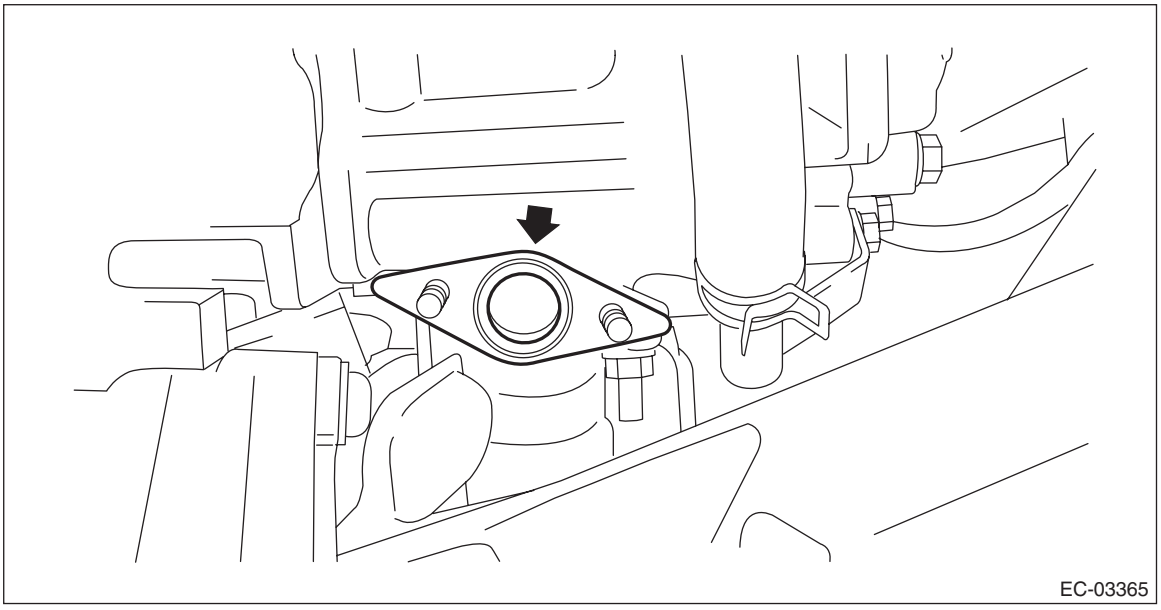
3) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
4) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
5) Disconnect the engine coolant inlet hose A (A), engine coolant inlet hose B (B) and engine coolant outlet hose (C) from the EGR cooler.



6) Remove the nut (A) which secures the EGR cooler to the cylinder head RH.
7) Remove the bolts (B) securing the EGR cooler to the EGR control valve.
8) Remove the bolt (C) which secures the EGR cooler to the cylinder head RH, and remove the EGR cooler.

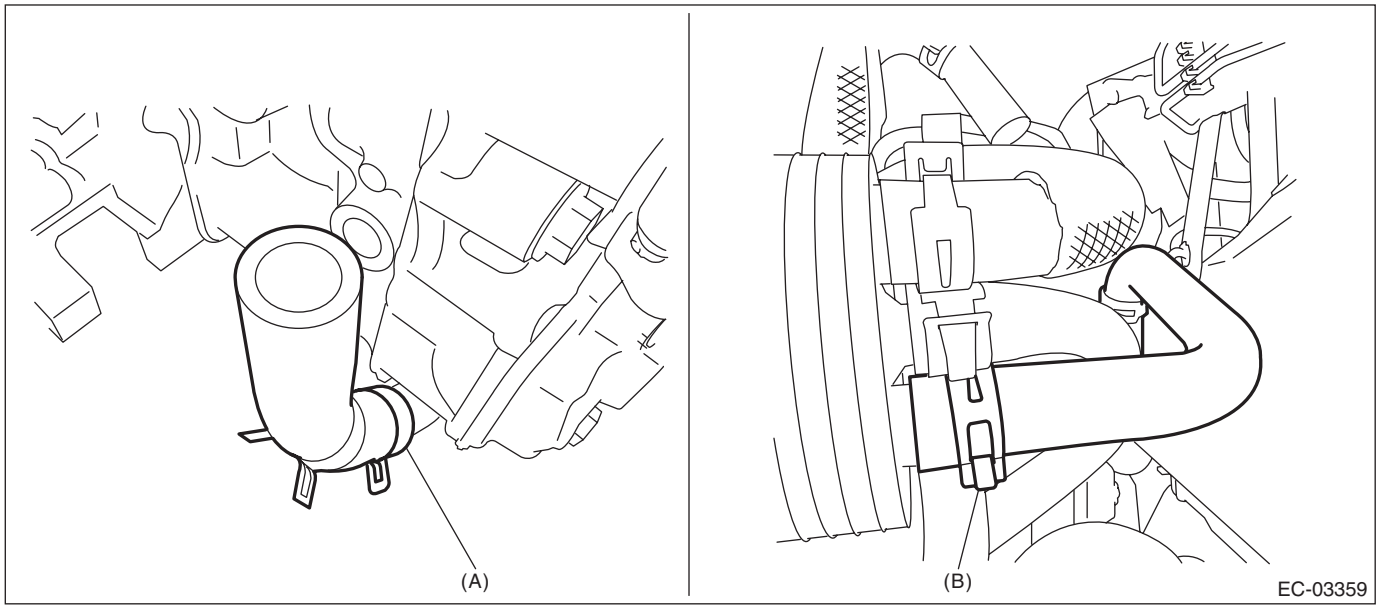


9) Remove the gasket from the stud bolt.



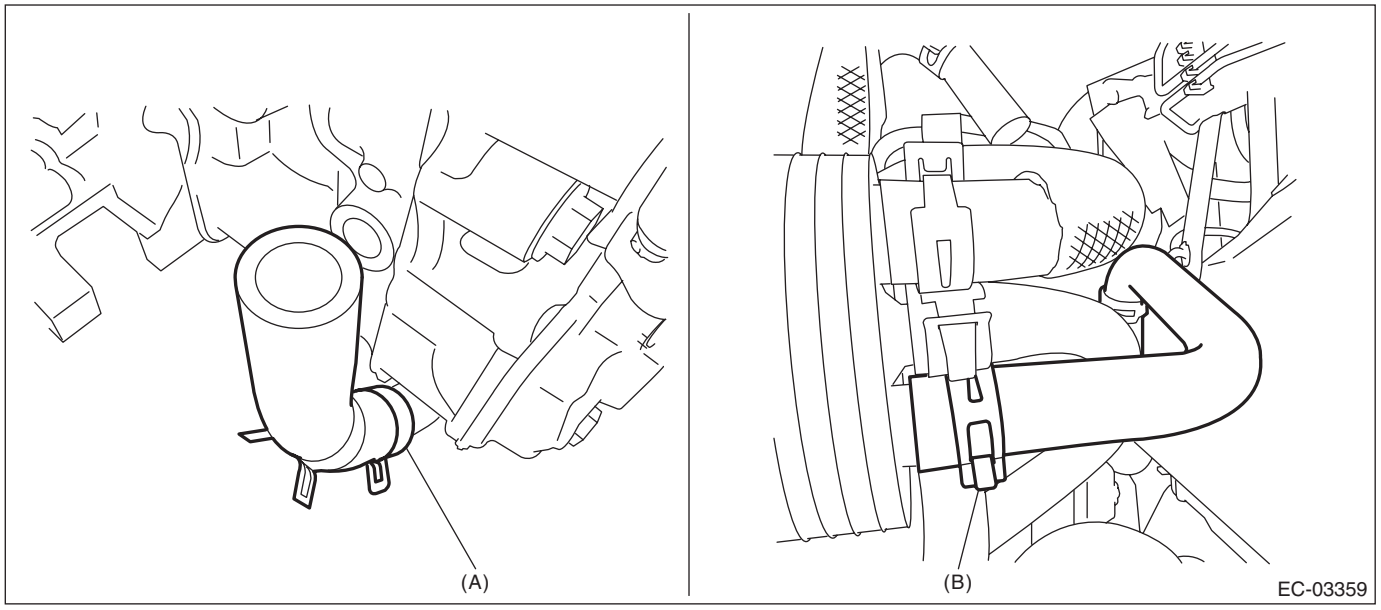
10) Disconnect the engine coolant inlet hose (A) from the water pipe RH.

11) Disconnect the engine coolant inlet hose B (B) from the CVTF cooler (with warmer feature).



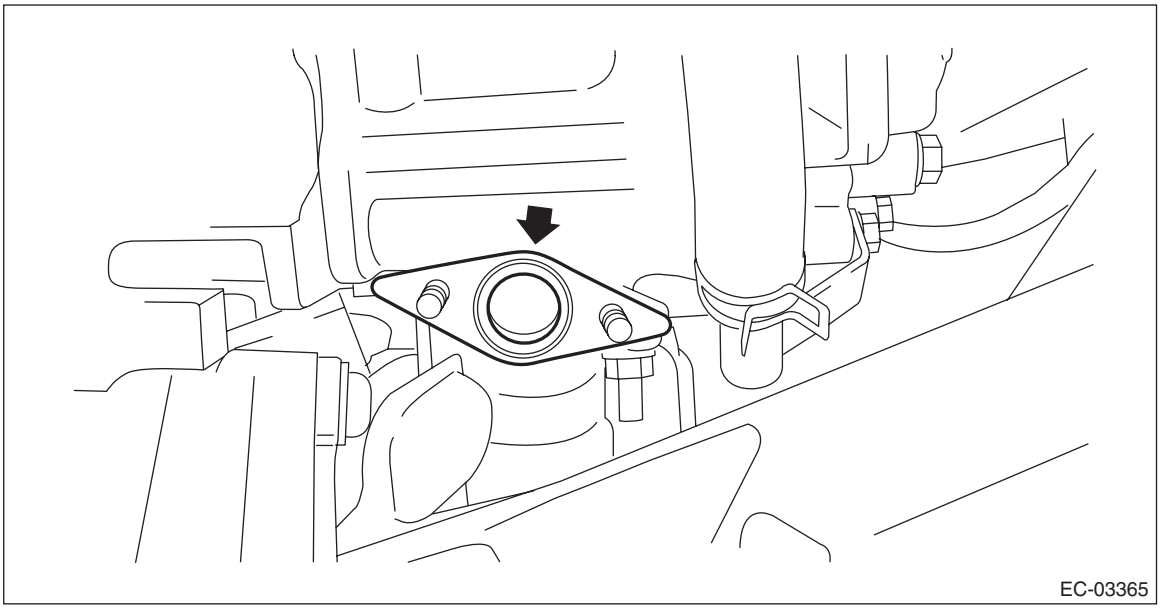
B: INSTALLATION

1) Connect the engine coolant inlet hose (A) to the water pipe RH.
2) Connect the engine coolant inlet hose B (B) to the CVTF cooler (with warmer feature).



3) Set the gasket to the stud bolt.

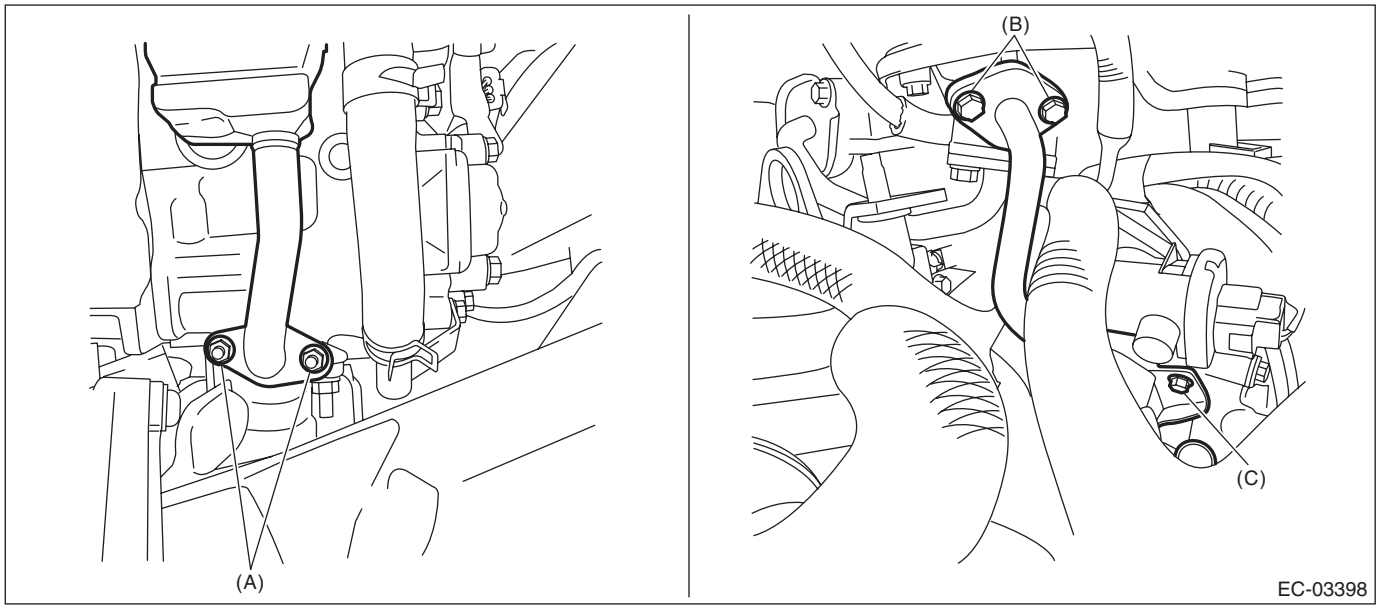
NOTE:
Use a new gasket.



4) Set the EGR cooler on the vehicle.

NOTE:
Use a new gasket.

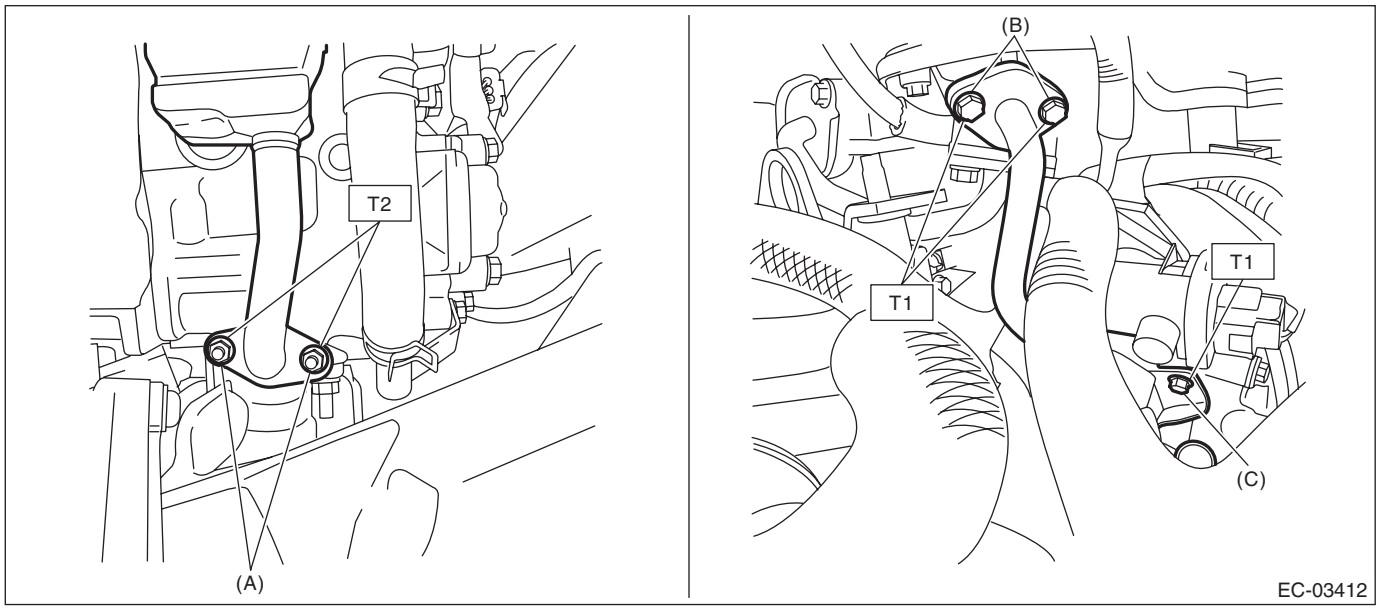
5) Temporarily tighten the bolt (C) which secures the EGR cooler to the cylinder head RH.
6) Temporarily tighten the bolt (B) which secures the EGR cooler to the EGR control valve.
7) Temporarily tighten the nut (A) which secures the EGR cooler to the cylinder head RH.



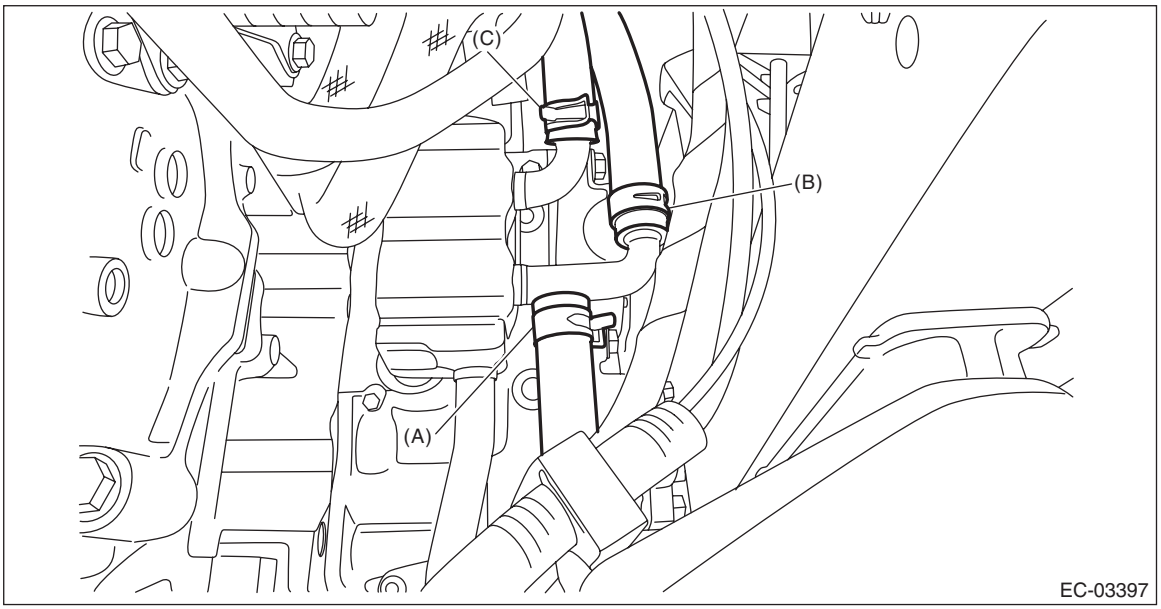
8) Tighten the nut (A) which secures the EGR cooler to the cylinder head RH.
9) Tighten the bolt (C) which secures the EGR cooler to the cylinder head RH.

10) Tighten the bolt (B) which secures the EGR cooler to the EGR control valve.

Tightening torque:
T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T2: 9 N·m (0.9 kgf-m, 6.6 ft-lb)



11) Connect the engine coolant inlet hose A (A), engine coolant inlet hose B (B) and engine coolant outlet hose (C) to the EGR cooler.



12) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
13) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
14) Install the collector cover.
15) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Check that the EGR cooler has no deformation, cracks or other damages.
2) Check that the hose has no cracks, damage or loose part.

9. Fuel Level Sensor

A: REMOVAL

For removal procedures, refer to the “FU (H4DO (HEV))” section. <Ref. to FU(H4DO(HEV))-130, REMOVAL, Fuel Level Sensor.>

B: INSTALLATION

For installation procedures, refer to the “FU (H4DO (HEV))” section. <Ref. to FU(H4DO(HEV))-131, INSTALLATION, Fuel Level Sensor.>

C: INSPECTION

For inspection procedures, refer to the “FU (H4DO (HEV))” section. <Ref. to FU(H4DO(HEV))-131, INSPECTION, Fuel Level Sensor.>

10.Fuel Sub Level Sensor

A: REMOVAL

For removal procedures, refer to the “FU (H4DO (HEV))” section. <Ref. to FU(H4DO(HEV))-133, REMOVAL, Fuel Sub Level Sensor.>

B: INSTALLATION

For installation procedures, refer to the “FU (H4DO (HEV))” section. <Ref. to FU(H4DO(HEV))-136, INSTALLATION, Fuel Sub Level Sensor.>

C: INSPECTION

For inspection procedures, refer to the “FU (H4DO (HEV))” section. <Ref. to FU(H4DO(HEV))-141, INSPECTION, Fuel Sub Level Sensor.>

11.Drain Filter

A: REMOVAL

The drain filter is installed to the leak check valve assembly. Refer to “Leak Check Valve Assembly” for removal procedure. <Ref. to EC(H4DO(HEV))-39, REMOVAL, Leak Check Valve Assembly.>

B: INSTALLATION

The drain filter is installed to the leak check valve assembly. Refer to “Leak Check Valve Assembly” for installation procedure. <Ref. to EC(H4DO(HEV))-42, INSTALLATION, Leak Check Valve Assembly.>

C: INSPECTION

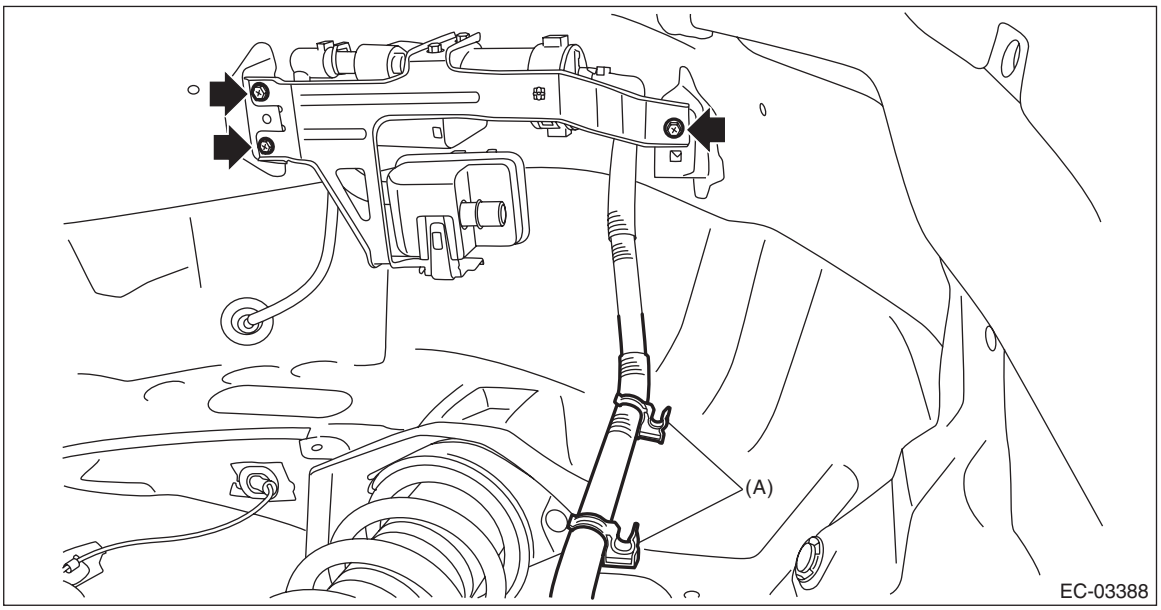
1) Check that the drain filer and drain bracket have no deformation, crack, or other damage.
2) Check that the drain tube has no cracks, damage or loose part.
3) Check that no foreign substances are clogged in the drain filter.

12.Leak Check Valve Assembly

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

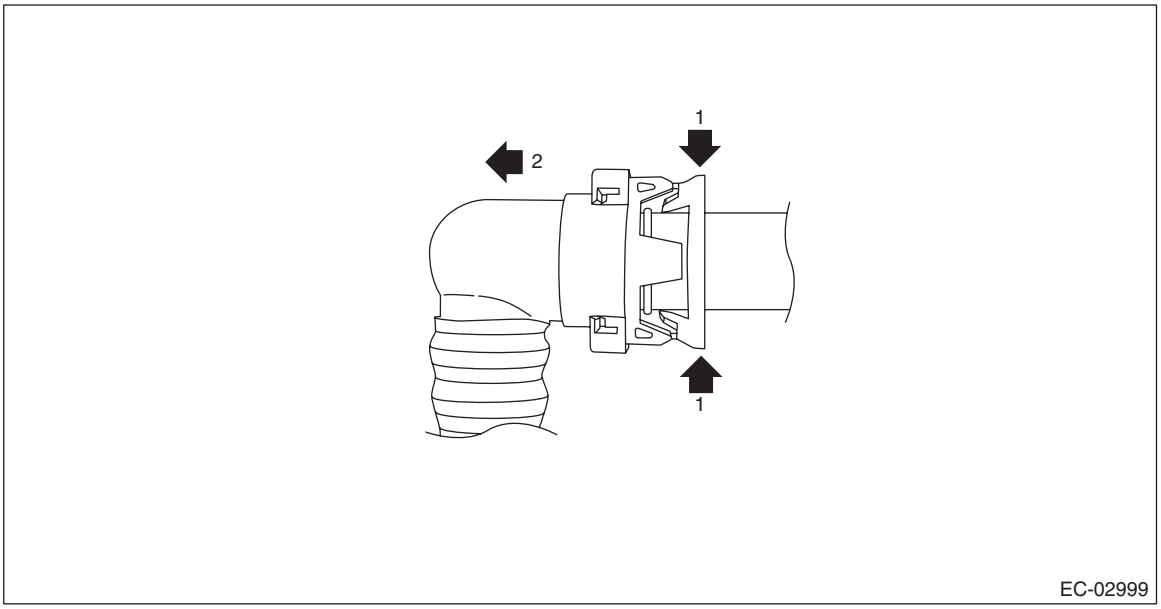
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the rear wheel LH.
3) Lift up the vehicle.
4) Remove the rear mud guard LH. <Ref. to EI-32, REMOVAL, Mud Guard.>
5) Remove the drain tube B from the tube clamp (A).
6) Hold the leak check valve assembly, and remove the bolts securing the leak check valve assembly.

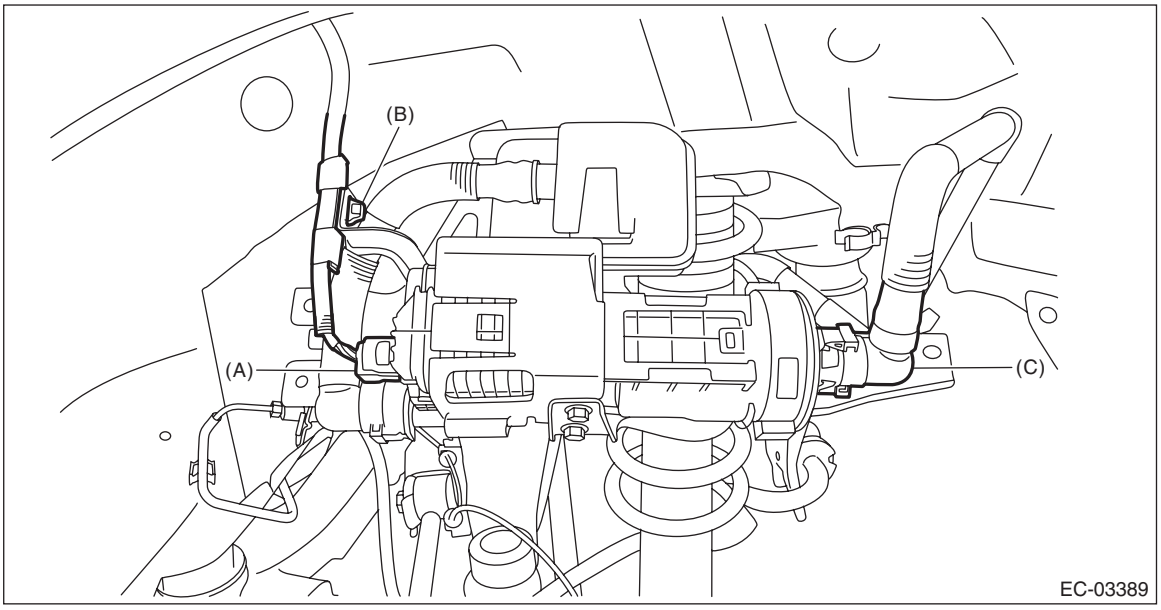


7) Disconnect the connector (A) from the leak check valve assembly, and remove the clip (B) securing the harness.

8) Disconnect the drain tube B (C) from the leak check valve assembly.

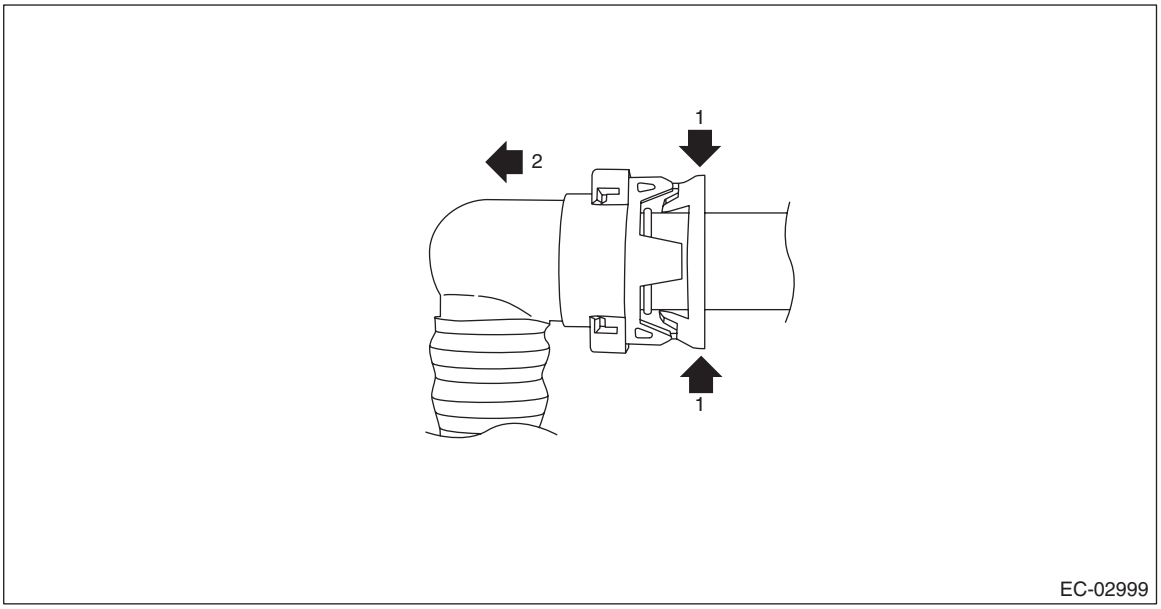
NOTE:
Disconnect the quick connector as shown in the figure.



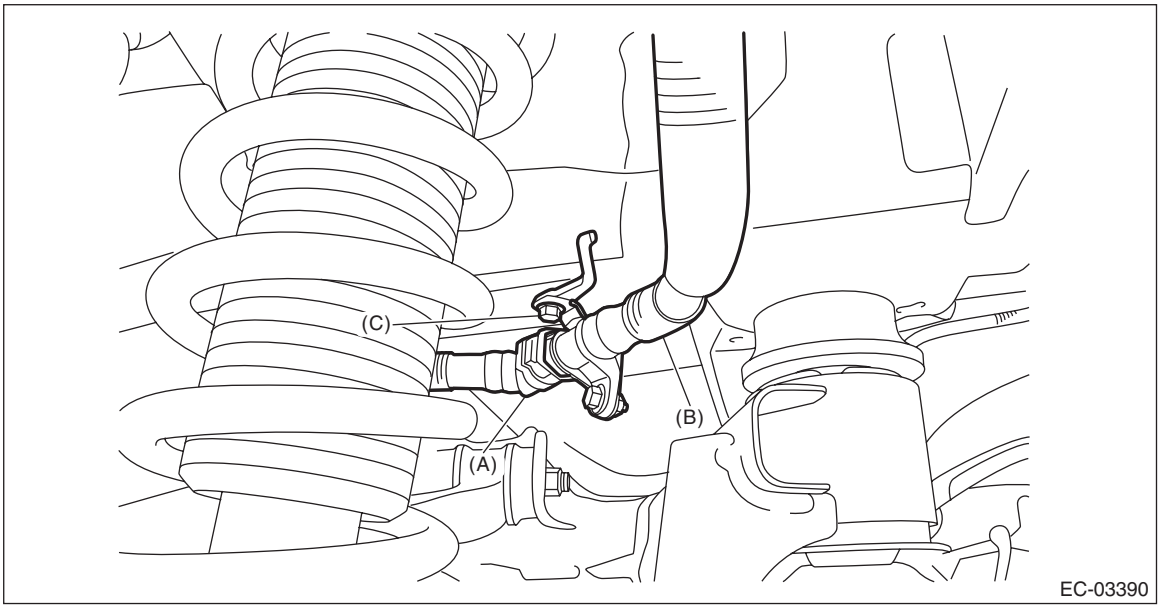


9) Disconnect the drain tube A (A) from the drain tube B (B).

NOTE:
Disconnect the quick connector as shown in the figure.



10) Remove the bolt (C) which secures to the vehicle, and remove the drain tube B (B).



B: INSTALLATION

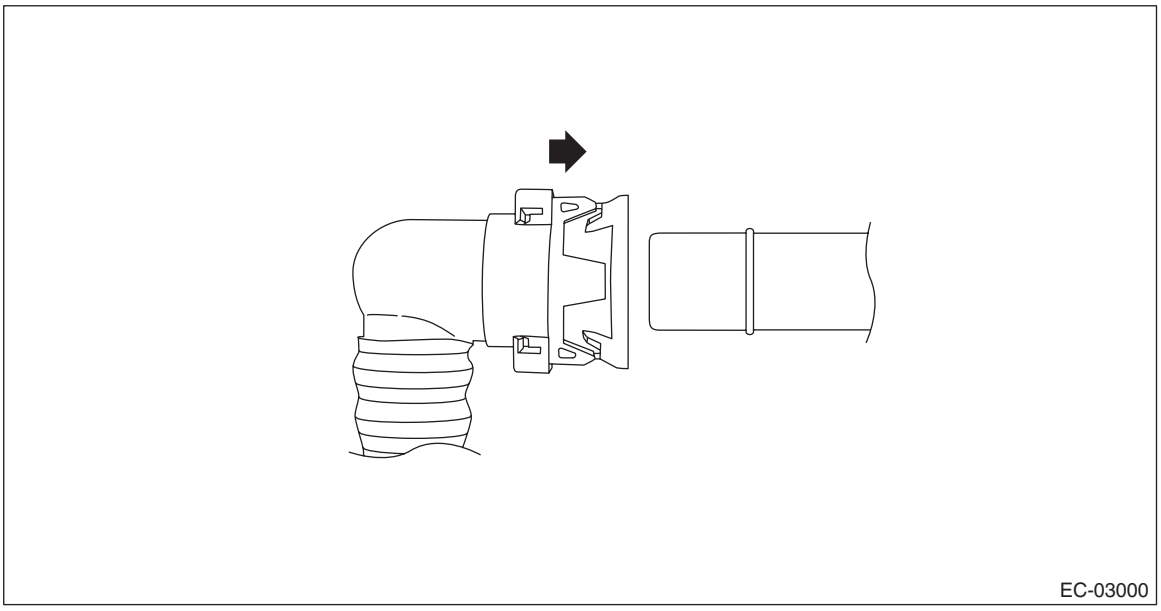
1) Install the drain tube B (B) to the vehicle using the bolt (C).

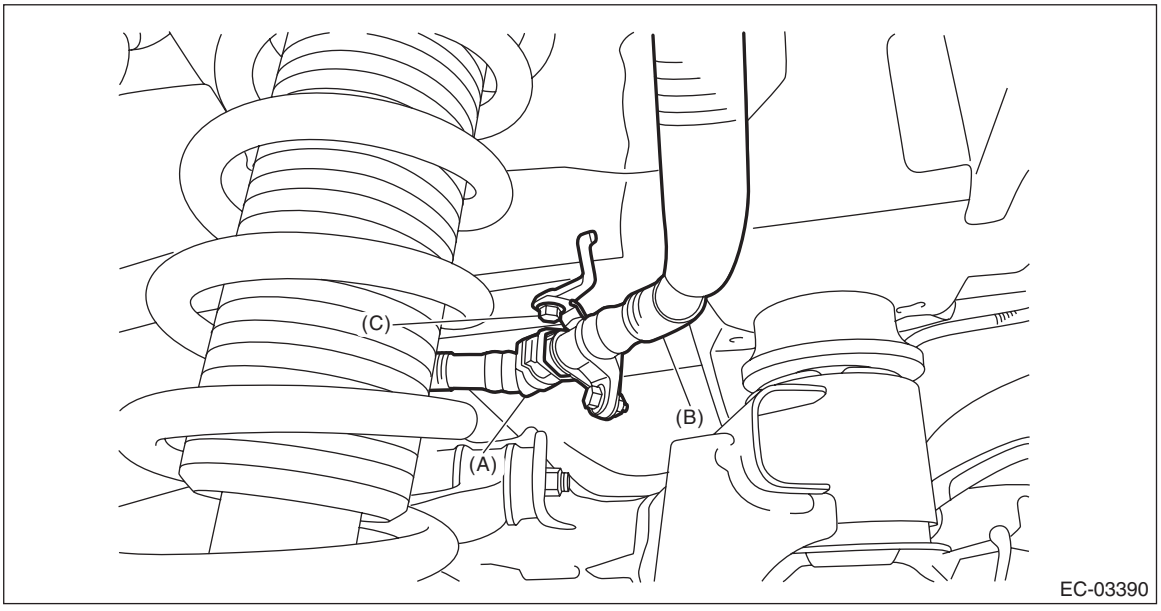
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

2) Connect the drain tube A (A) to the drain tube B (B).

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• Make sure that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.


EC-03000

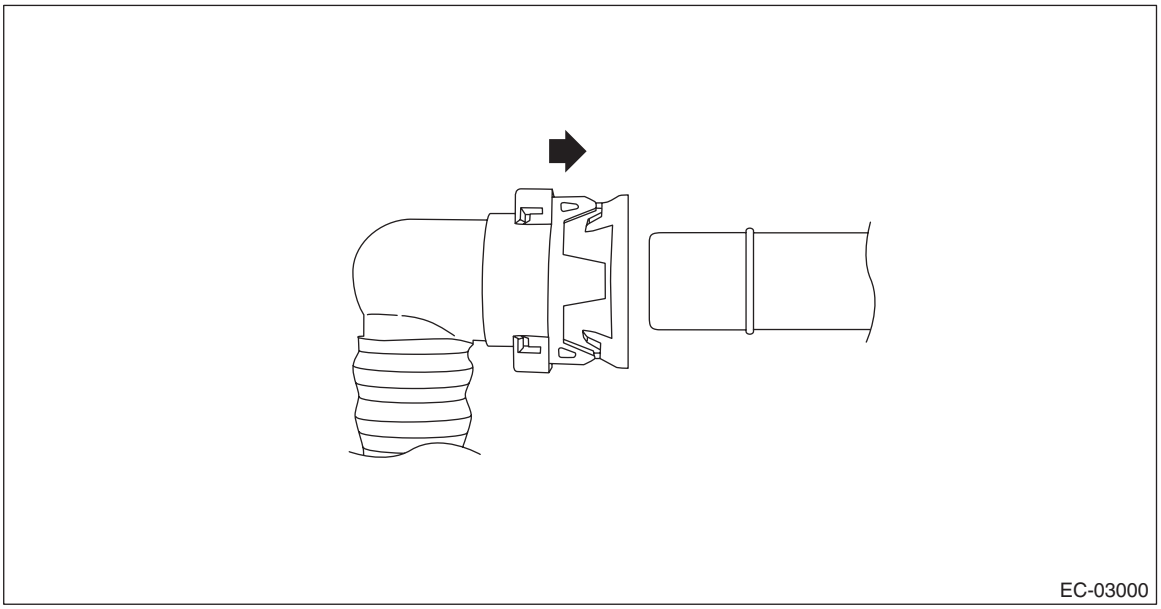


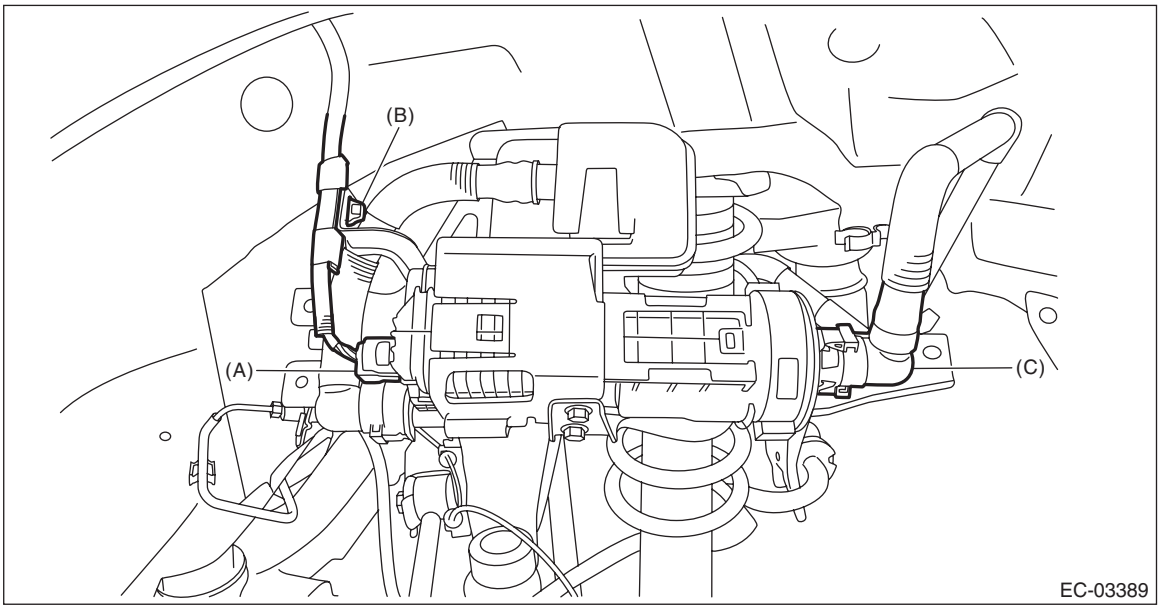
EC-03390

3) Connect the connector (A) to the leak check valve assembly, and install the clip (B) securing the harness.
4) Connect the drain tube B (C) to the leak check valve assembly.

CAUTION:
• Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
• Make sure that the quick connector is securely connected.

NOTE:
Connect the quick connector as shown in the figure.


EC-03000

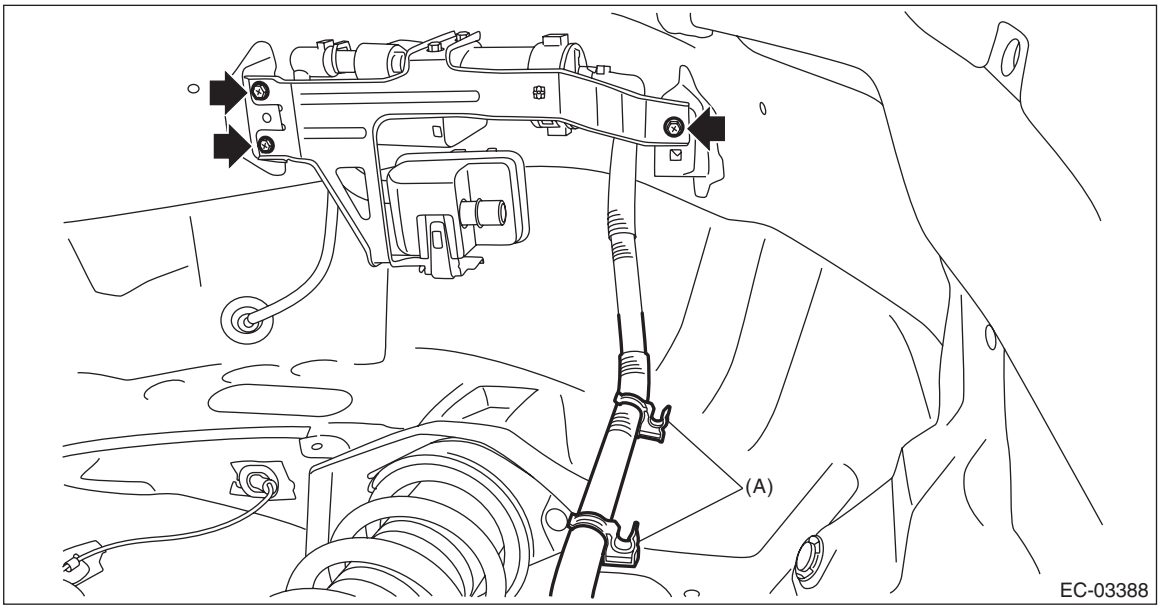


EC-03389

5) Install the leak check valve assembly to the vehicle.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

6) Install the drain tube B to the tube clamp (A).

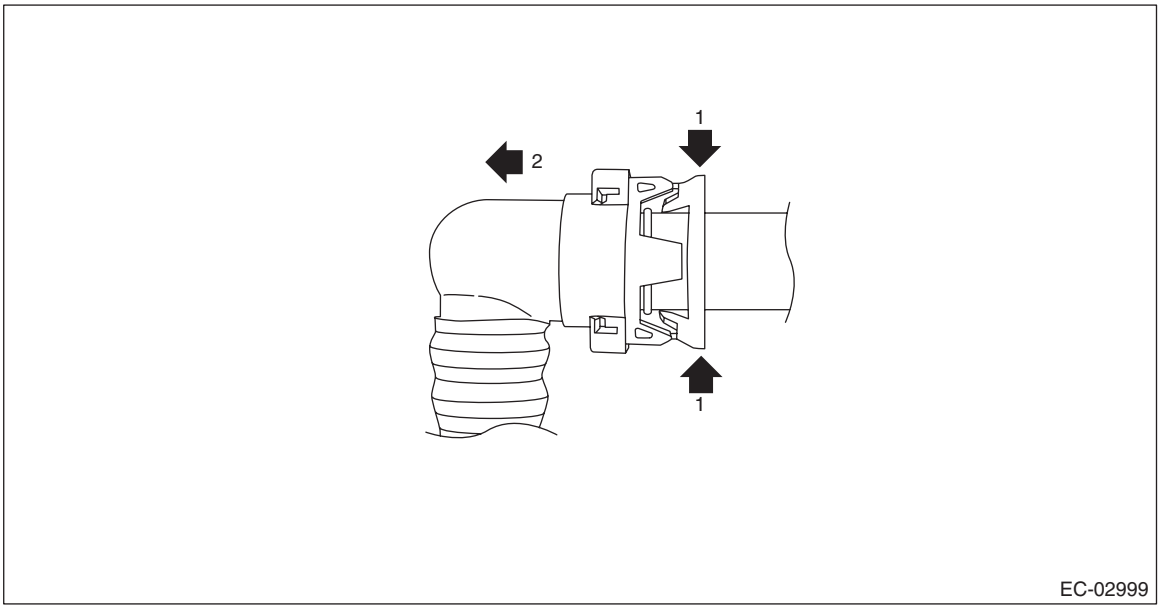


7) Install the rear mud guard LH. <Ref. to EI-32, INSTALLATION, Mud Guard.>
8) Lower the vehicle.
9) Install the rear wheel LH.
10) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

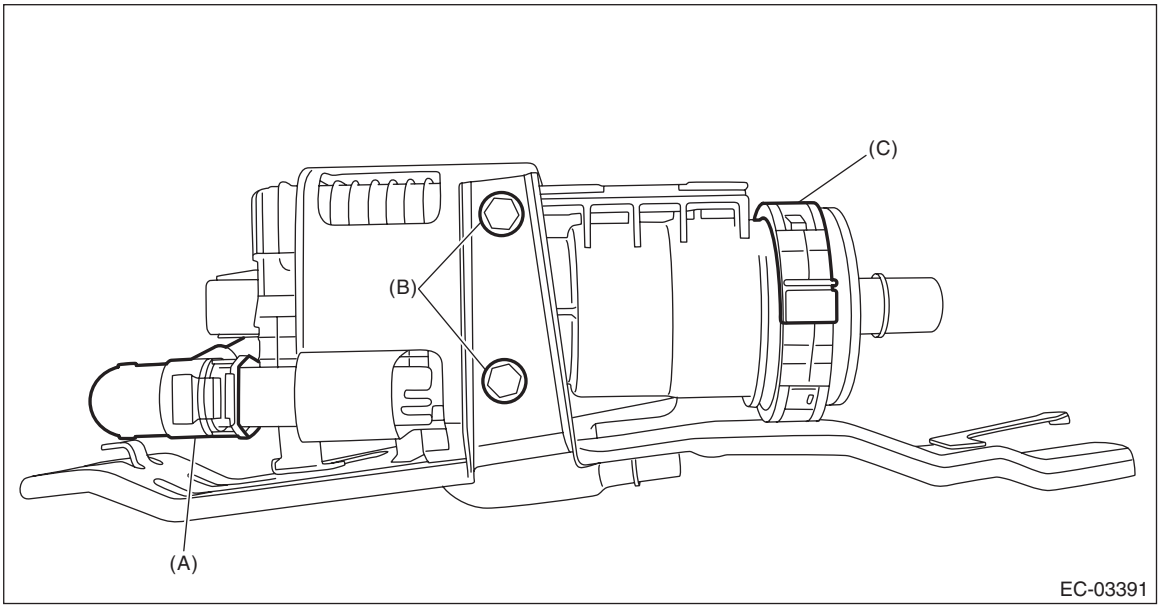
C: DISASSEMBLY

1) Disconnect the drain tube (A) from the leak check valve assembly.

NOTE:
Disconnect the quick connector as shown in the figure.

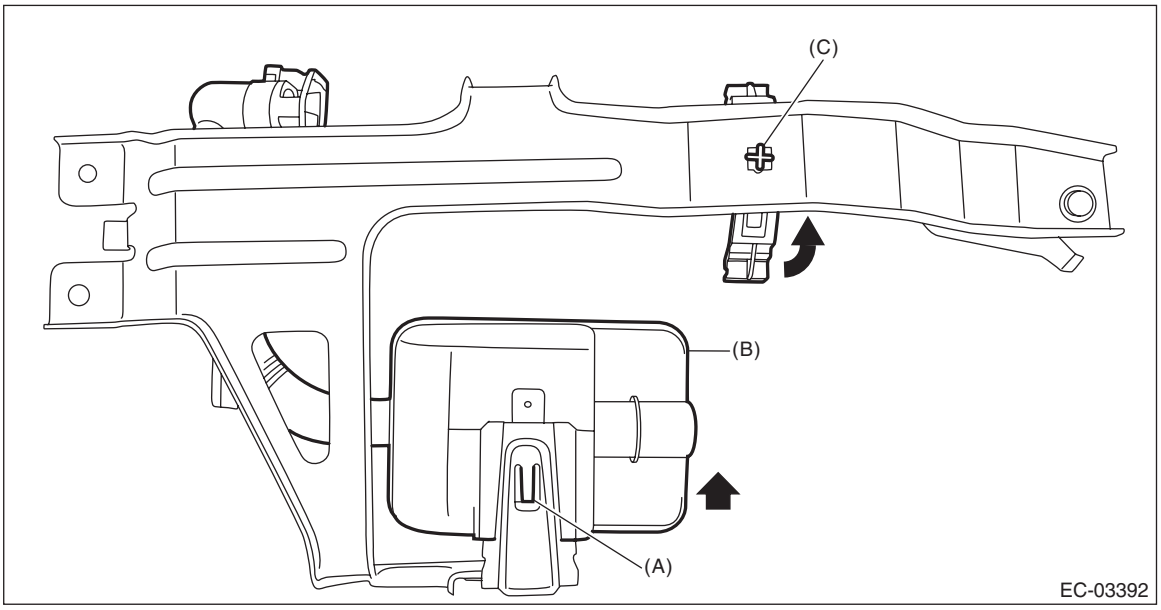


2) Remove the bolt (B) securing the leak check valve assembly to the drain bracket.
3) Remove the clamp B (C) which secures the leak check valve assembly, and remove the leak check valve assembly.



4) Release the claw (A), and slide the drain filter (B) from the drain bracket in the direction of the arrow to remove.

NOTE:
When removing the drain filter from the drain bracket, use the new drain bracket and drain filter to install.
5) Turn the clamp A (C) from the drain bracket in the direction of arrow to remove.



D: ASSEMBLY

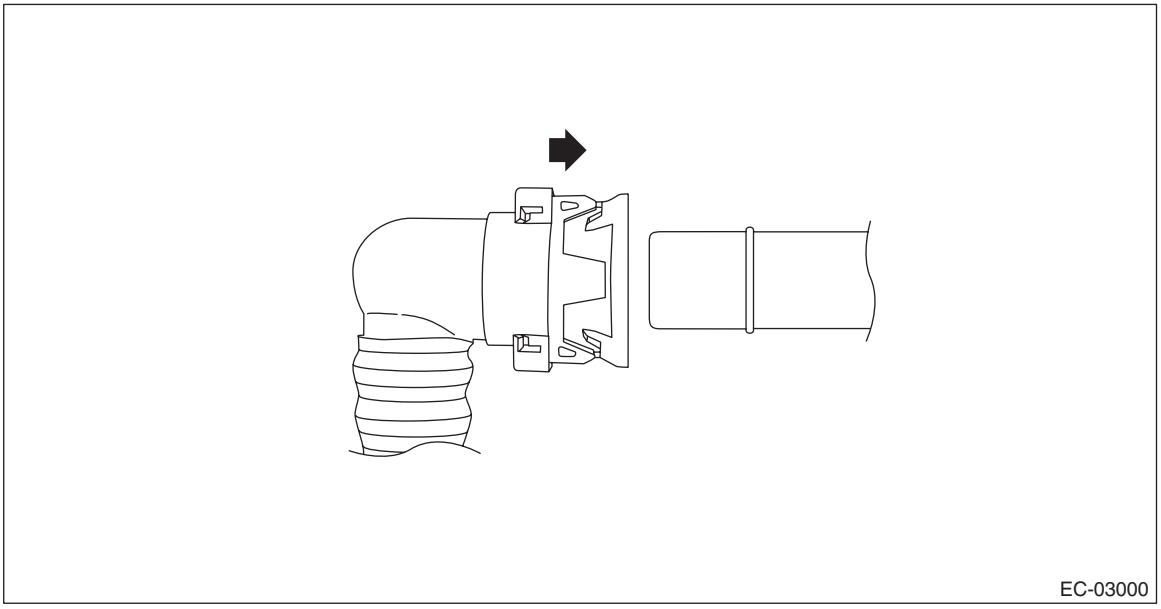
Assemble in the reverse order of disassembly.

CAUTION:

- **Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.**
- **Make sure that the quick connector is securely connected.**

NOTE:

- Use a new drain bracket and drain filter.
- Connect the quick connector as shown in the figure.

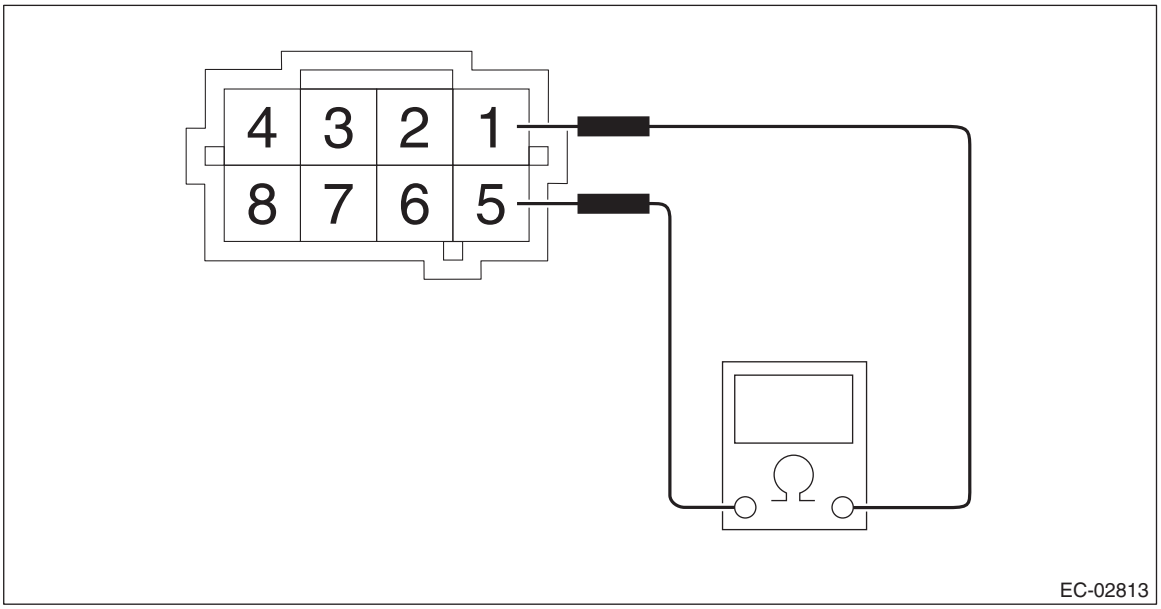


Tightening torque:
5.4 N·m (0.6 kgf-m, 4.0 ft-lb)

E: INSPECTION

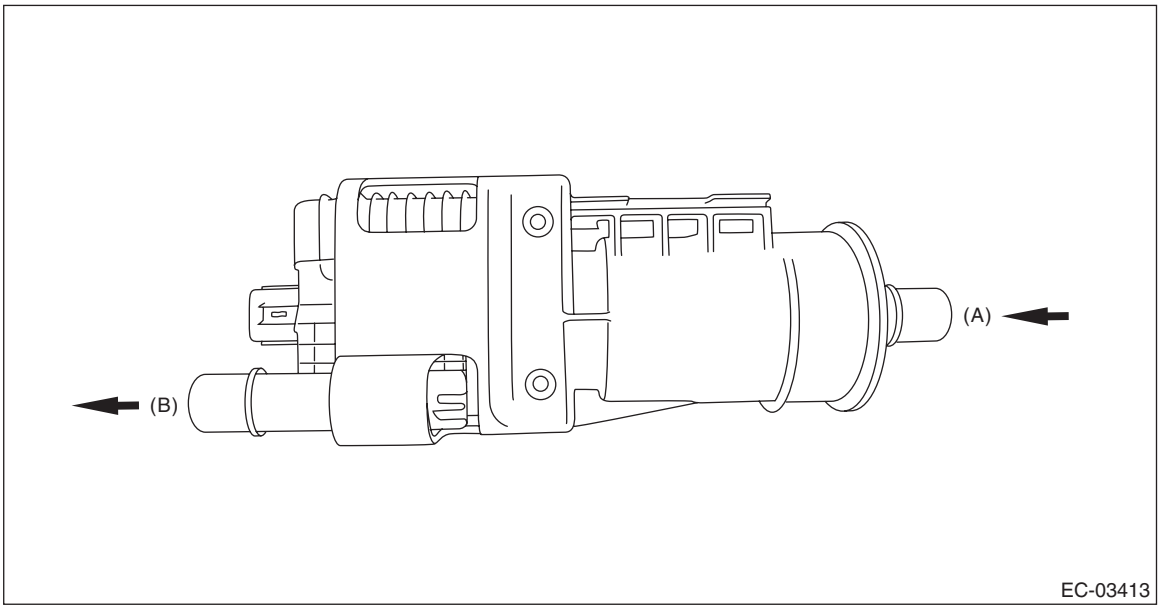
1. CHECK SWITCHING VALVE

1) Check the resistance between switching valve terminals.

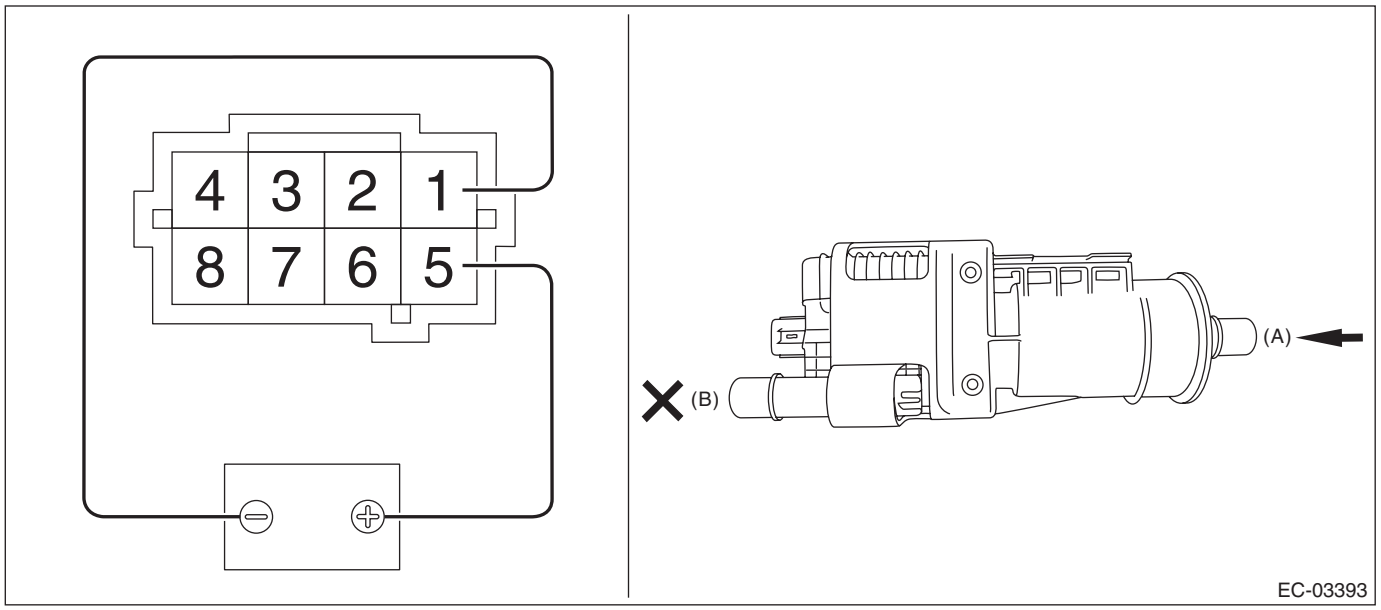


Terminal No.	Standard
1 and 5	27^{+3}_{-2} Ω (when 20°C (68°F))
	31±4 Ω (60°C (140°F))

2) Check that air is discharged from (B) when air is blown into (A).



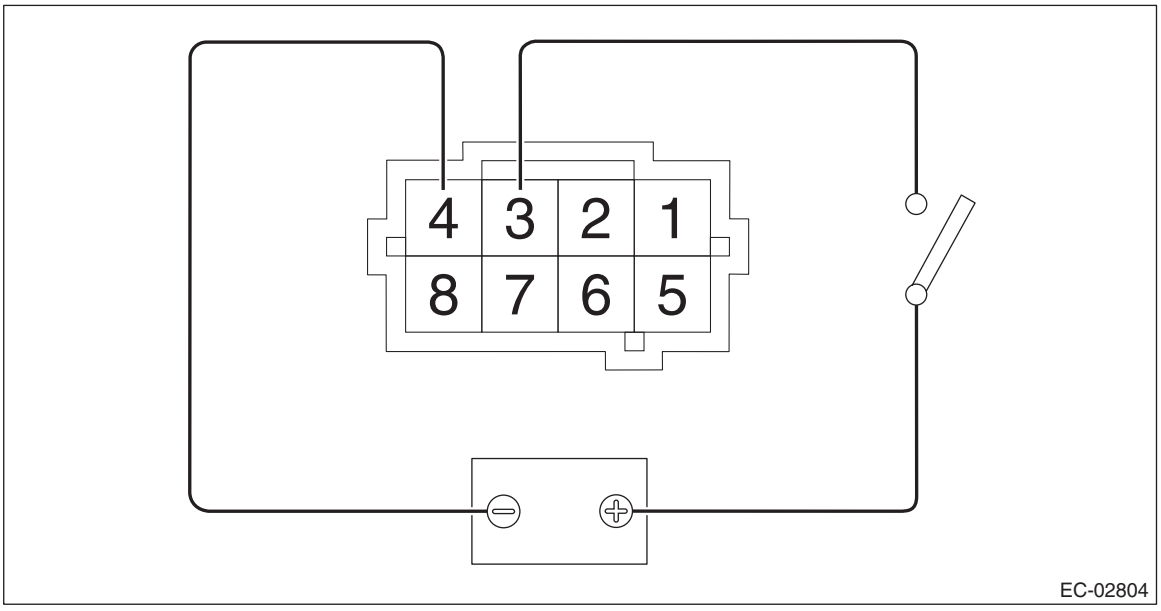
3) Connect the battery positive terminal to the terminal No. 5 and the battery negative terminal to the terminal No. 1. Check that air does not come out from (B) when air is blown into (A).



2. CHECK VACUUM PUMP

1) Connect the battery positive terminal to terminal No. 3 and the battery ground terminal to terminal No. 4, and inspect the vacuum pump operation.

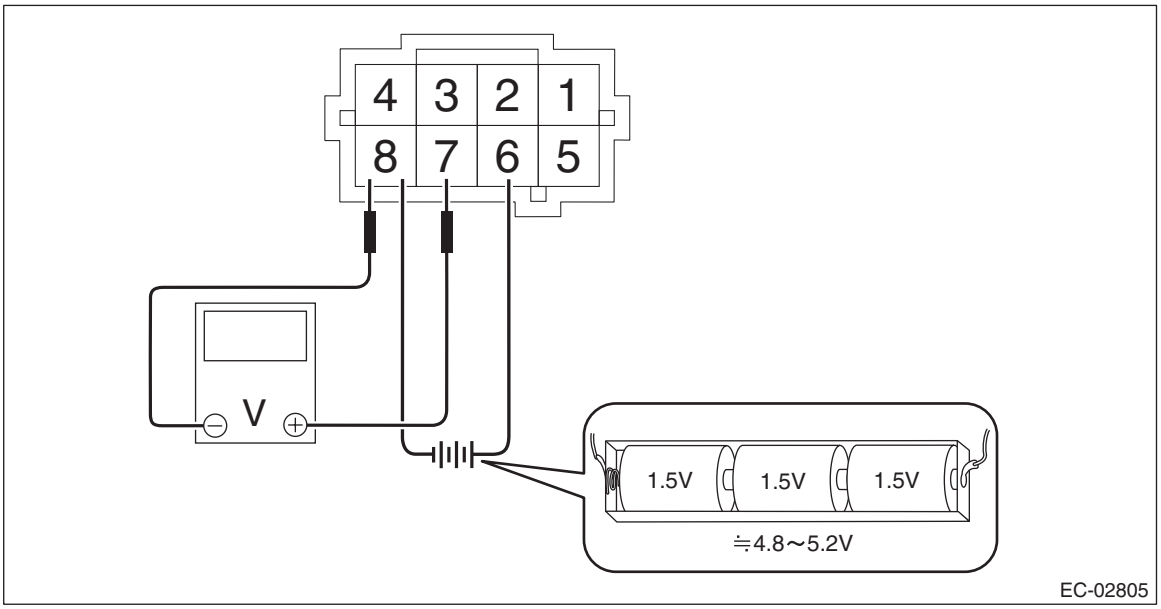
CAUTION:
Do not operate the vacuum pump for 5 minutes or more.



3. CHECK PRESSURE SENSOR

1) Connect dry-cell battery positive terminal to terminal No. 6 and dry-cell battery ground terminal to terminal No. 8, circuit tester positive terminal to terminal No. 7 and the circuit tester negative terminal to terminal No. 8.

NOTE:
- Use new dry-cell batteries.
- Using circuit tester, check the voltage of a single dry-cell battery is 1.6 V or more. And also check the voltage of three batteries in series is between 4.8 V and 5.2 V.
- For power supply, 5 V DC voltage source can also be used.

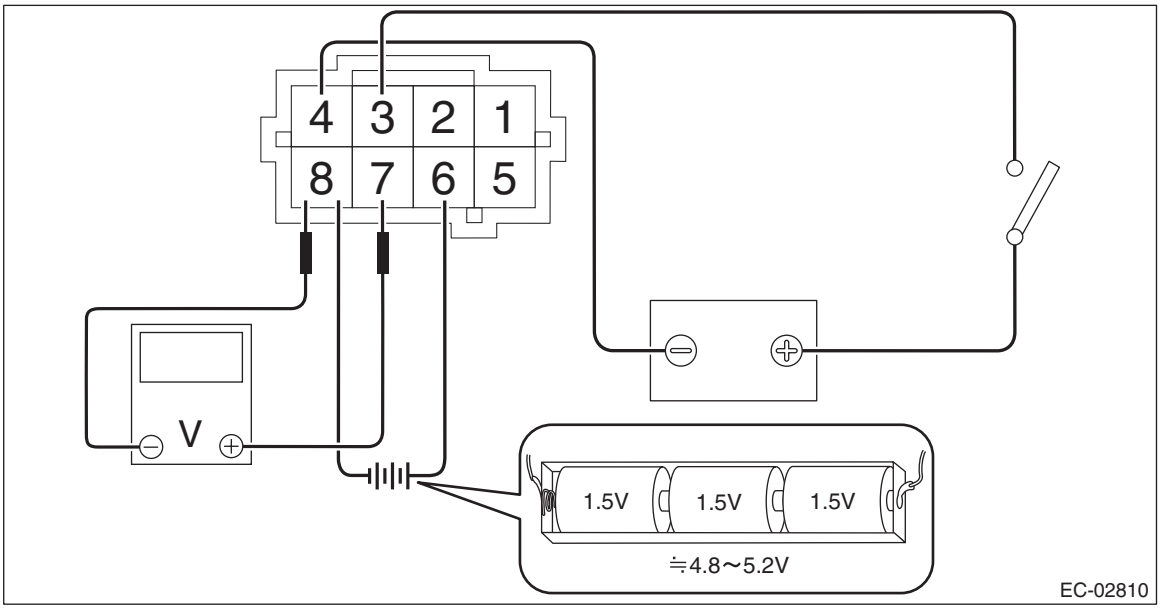


2) Check the voltage at a normal atmospheric pressure.

NOTE:
The atmospheric pressure at higher altitude is lower than normal. Therefore, the voltage is lower than the standard value.

Terminal No.	Standard
7 (+) and 8 (–)	Approx. 3.5 V (when 25°C (77°F))

3) Connect the battery positive terminal to terminal No. 3 and the battery ground terminal to terminal No. 4, and check that there is a voltage drop from the voltage measured in step 2) when the vacuum pump is operated.



4. OTHER INSPECTIONS

1) Check that the leak check valve assembly has no deformation, cracks or other damages.
2) Check that the tube has no cracks, damage or loose part.

13.PCV Hose

A: REMOVAL

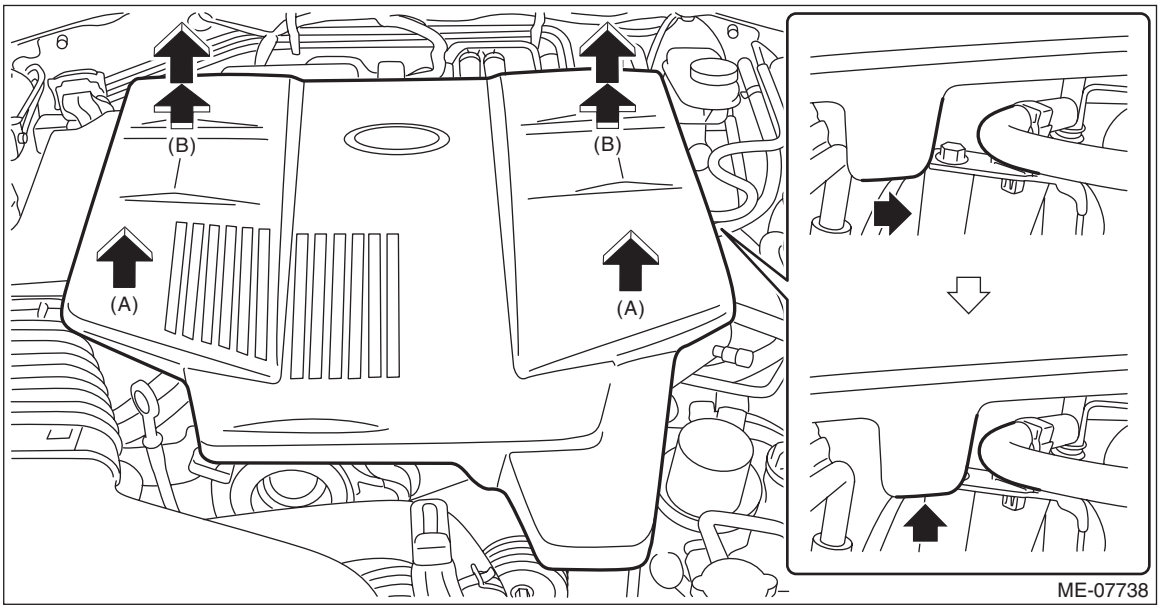
CAUTION:
Do not remove except when the PCV hose is broken.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

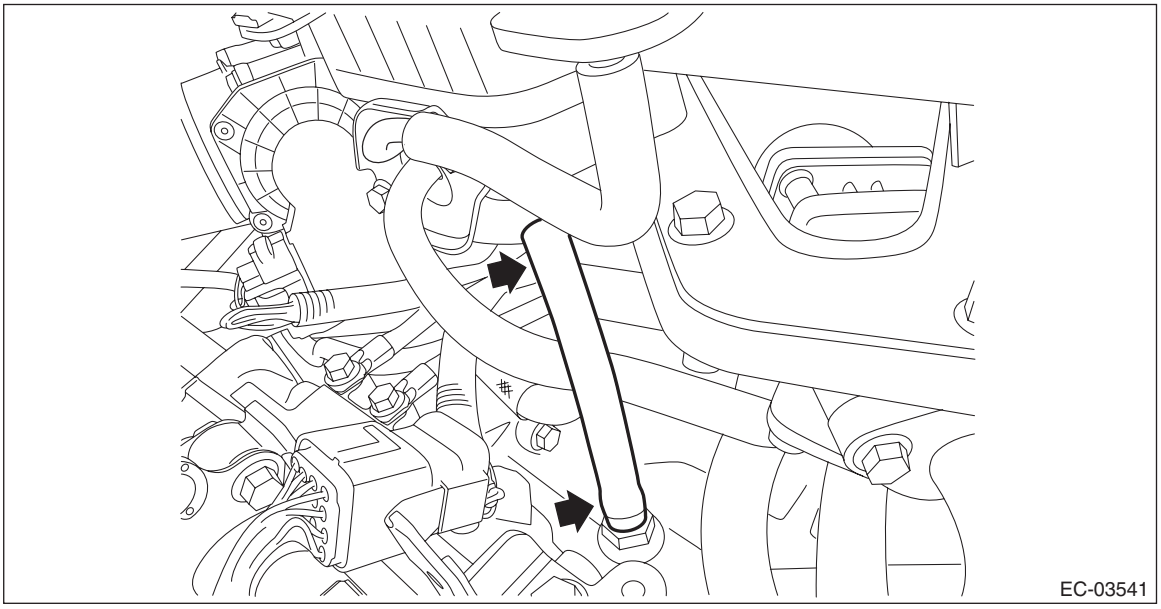
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

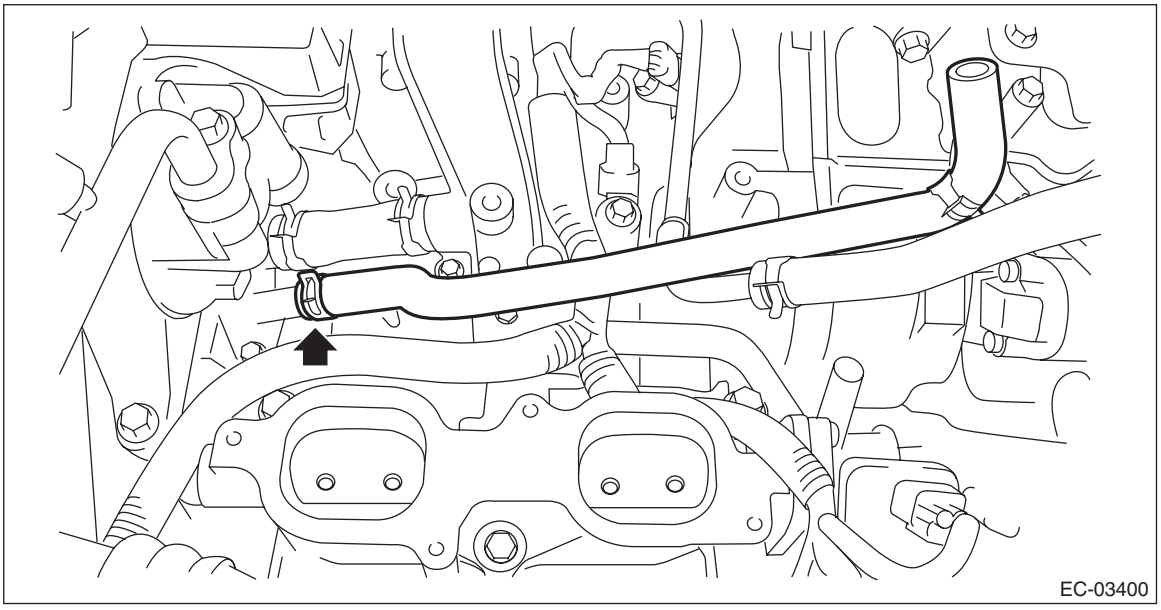
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Disconnect the PCV hose A from the intake manifold and the PCV valve, and then remove the PCV hose A.



5) Remove the intake manifold. <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
6) Remove the PCV hose B from the PCV connector.



B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Check that the PCV hose has no cracks, damage or loose part.

14.PCV Valve

A: REMOVAL

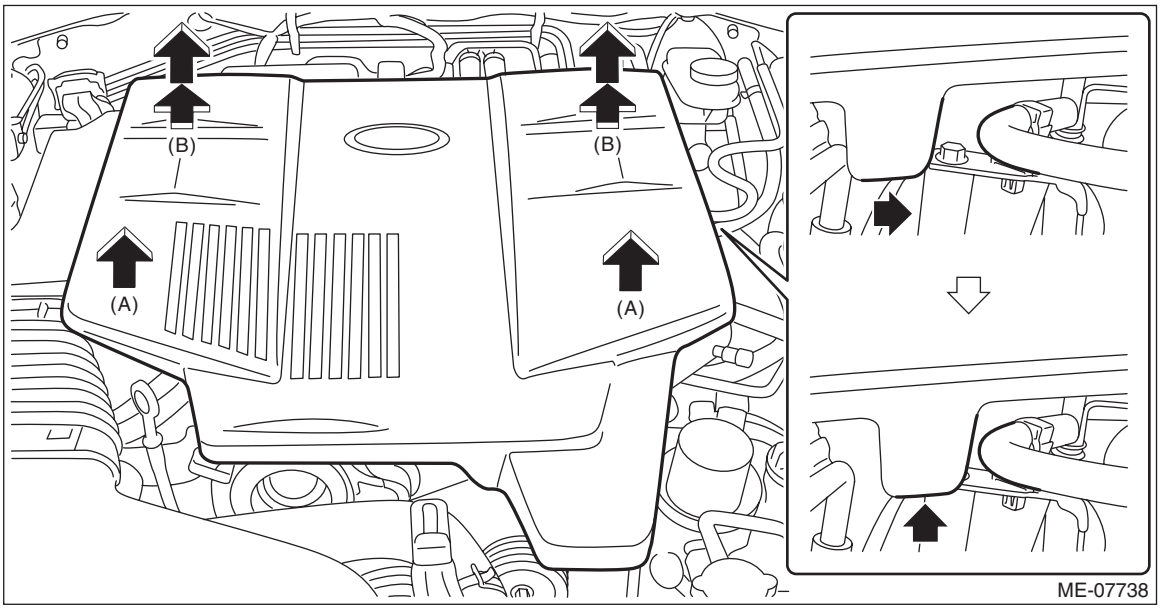
CAUTION:
Do not remove unless the PCV valve is broken.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

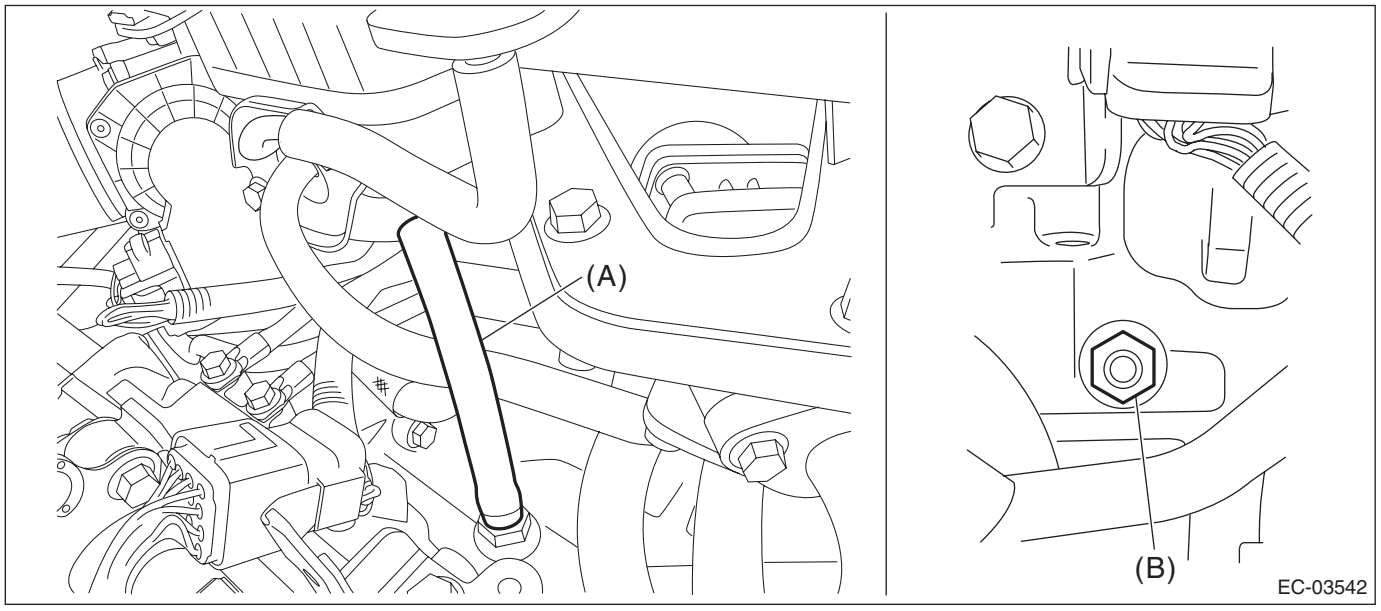
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Disconnect the PCV hose A (A) from the intake manifold and the PCV valve, and then remove the PCV hose A (A).
5) Remove the PCV valve (B) from the cylinder block RH.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Apply liquid gasket to the bolt threads of PCV valve.

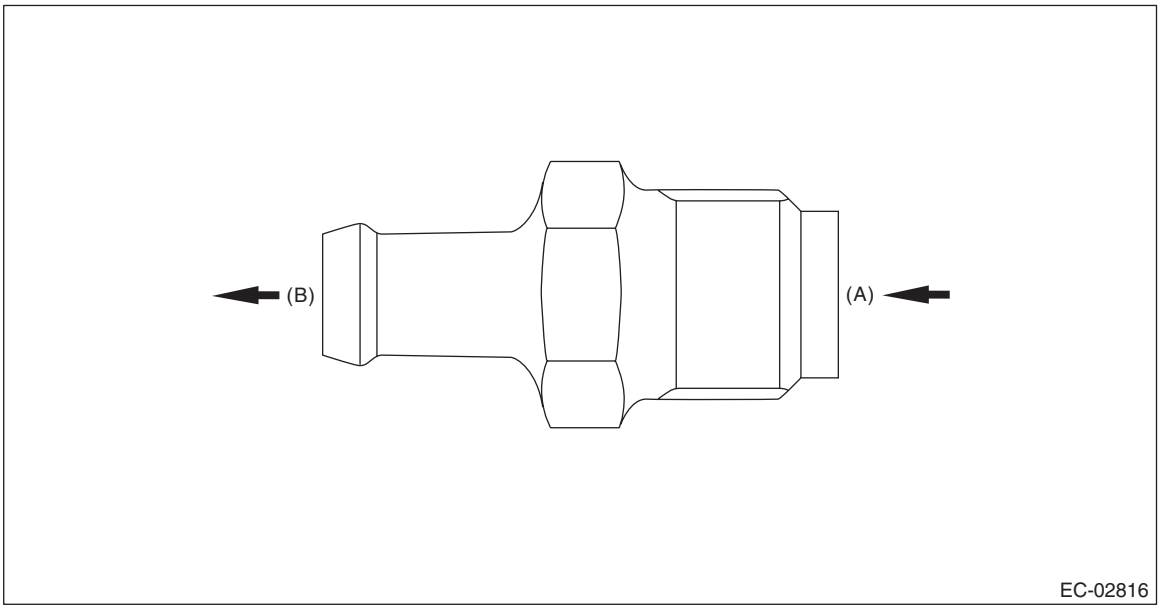
Liquid gasket:
THREE BOND 1324 (Part No. 004403042) or equivalent

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)

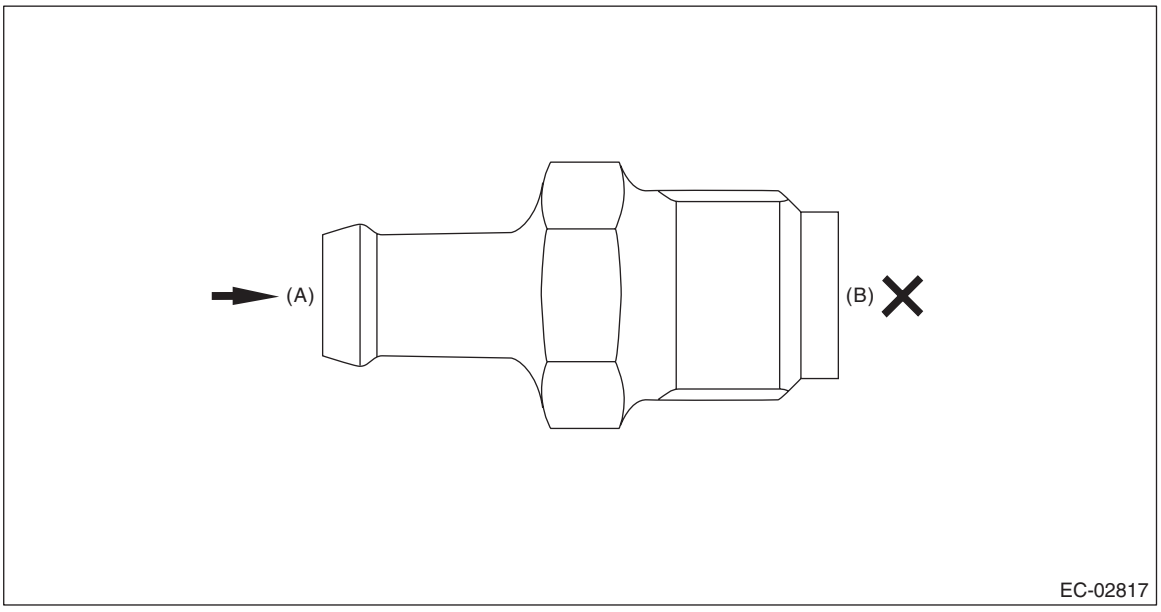
C: INSPECTION

1. PCV VALVE

1) Check that the PCV valve has no deformation, cracks or other damages.
2) Check that air is discharged from (B) when air is blown into (A).



3) Check that air does not come out from (B) when air is blown into (A).



2. OTHER INSPECTIONS

Check that the PCV hose has no cracks, damage or loose part.

INTAKE (INDUCTION)

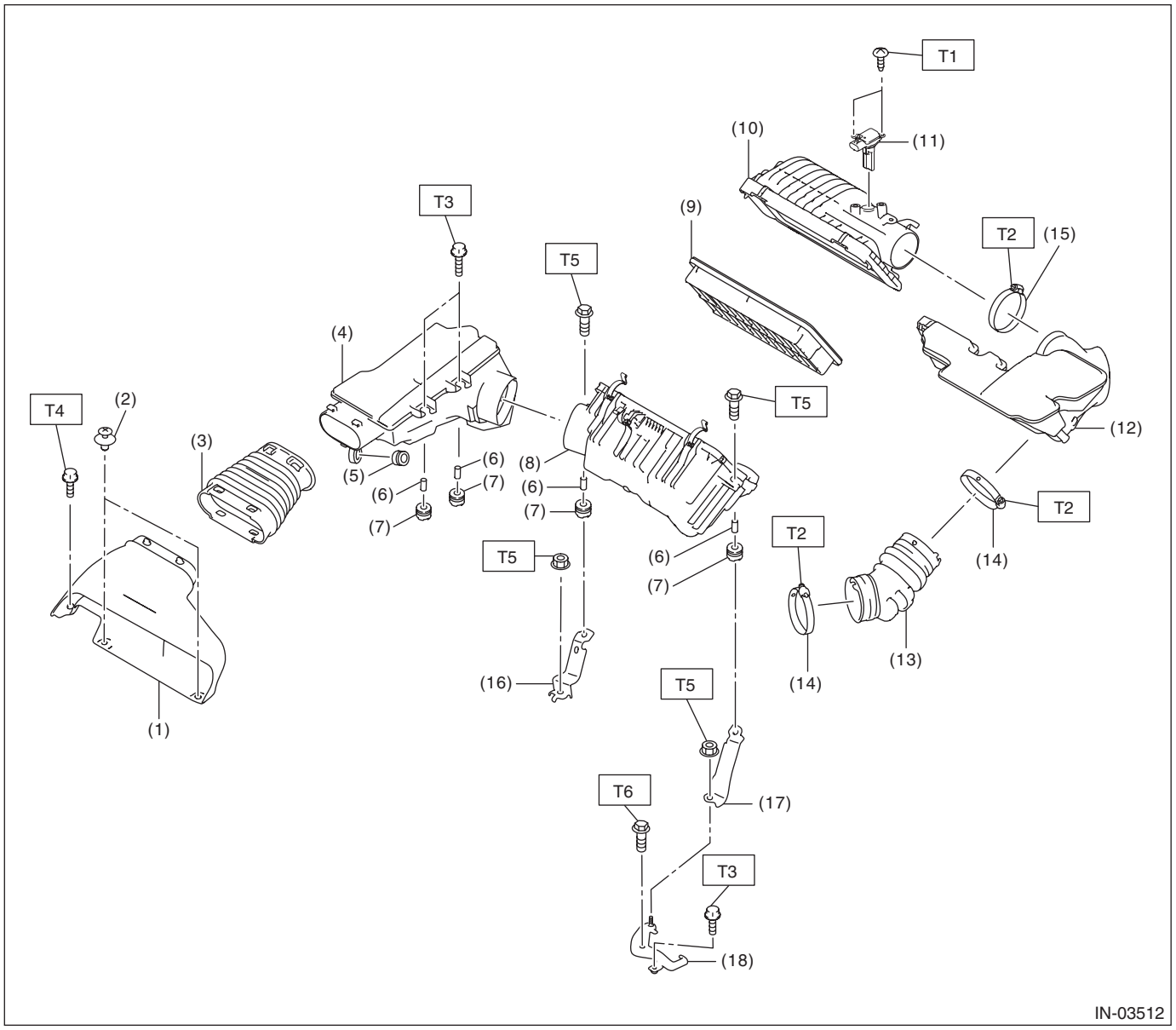
IN(H4DO(HEV))

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1. General Description 2
2. Air Cleaner Element 4
3. Air Cleaner Case 6
4. Air Intake Boot 10
5. Air Intake Duct 15
6. Intake Duct 16
7. Resonator Chamber 18

1. General Description

A: COMPONENT



(1) Air intake duct
(2) Clip
(3) Air intake boot No. 1
(4) Intake duct
(5) Cushion
(6) Spacer
(7) Cushion
(8) Air cleaner case (front)
(9) Air cleaner element
(10) Air cleaner case (rear)
(11) Mass air flow and intake air temperature sensor
(12) Resonator chamber
(13) Air intake boot No. 2
(14) Clamp
(15) Clamp
(16) Air cleaner case bracket No. 1 RH
(17) Air cleaner case bracket No. 1 LH
(18) Air cleaner case bracket No. 2

Tightening torque: N·m (kgf-m, ft-lb)
T1: 1 (0.1, 0.7)
T2: 3 (0.3, 2.2)
T3: 6.4 (0.7, 4.7)
T4: 7.5 (0.8, 5.5)
T5: 16 (1.6, 11.8)
T6: 18 (1.8, 13.3)

B: CAUTION

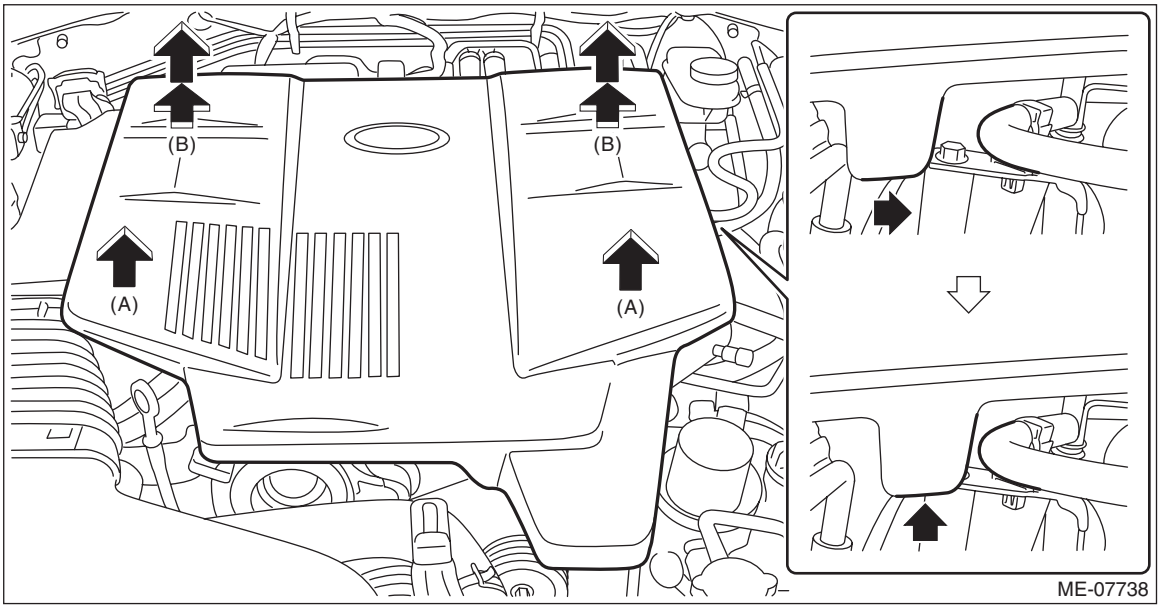
- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

2. Air Cleaner Element

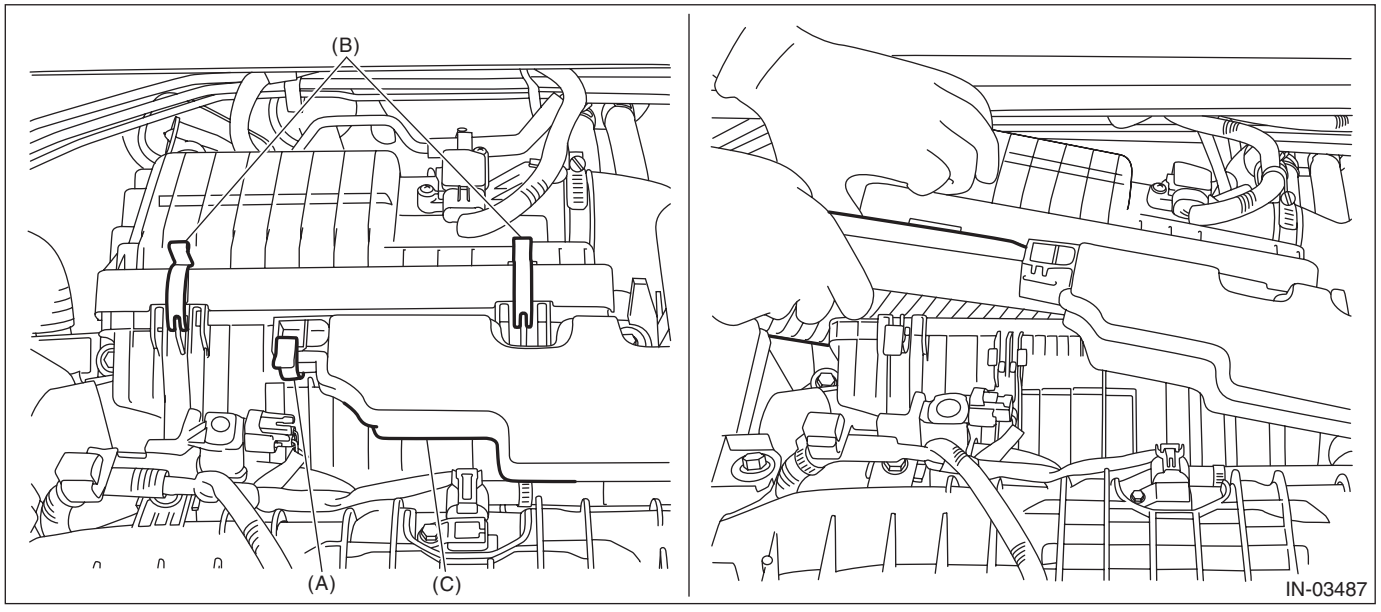
A: REMOVAL

1) Turn the ignition switch to OFF.
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the clip (A) from the resonator chamber, and remove the clip (B) from the air cleaner case (rear).
4) Lift the resonator chamber (C) and open the air cleaner case (rear).
5) Put aside the air cleaner case (rear) as shown in the figure, and remove the air cleaner element.

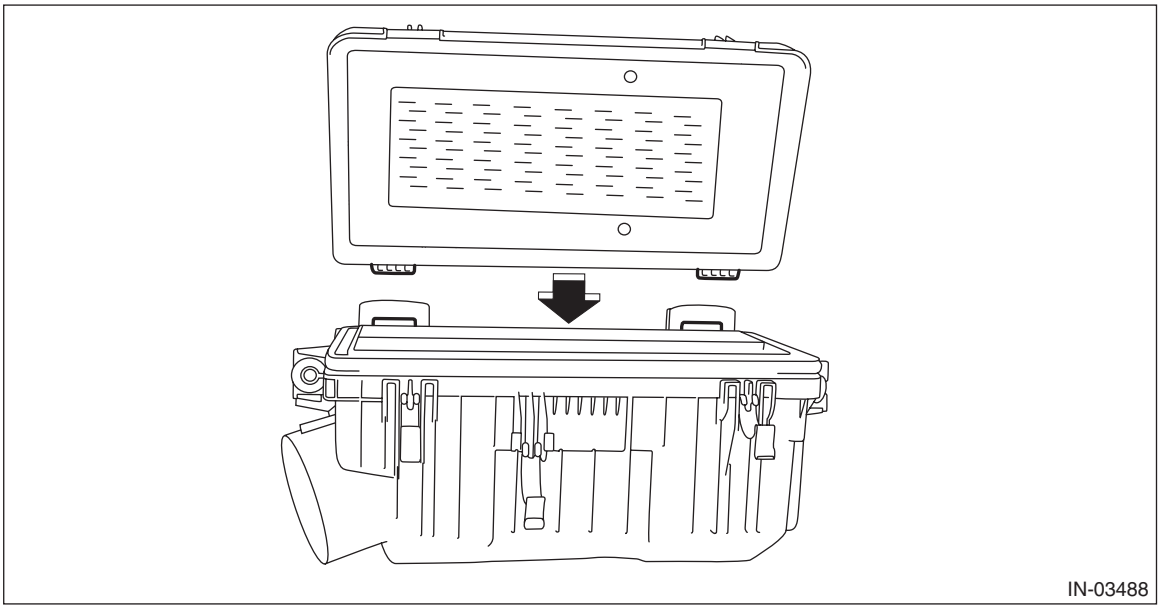


B: INSTALLATION

Install in the reverse order of removal.

CAUTION:
Be sure to use SUBARU genuine air cleaner element depending on the engine type when replacing the air cleaner elements. Using other air cleaner element may affect the engine performance.

NOTE:
- Check that there is no dirt or dust within the air cleaner case. If any dirt or dust is found, clean it.
- When installing the air cleaner case (rear), align the protrusion of the air cleaner case (rear) to the hole on the air cleaner case (front).



C: INSPECTION

1) Check that the air cleaner element has no deformation, cracks or other damages.
2) Check the air cleaner element for excessive dirt.
3) Replace the air cleaner case (rear) if the HC absorption filter is damaged.

3. Air Cleaner Case

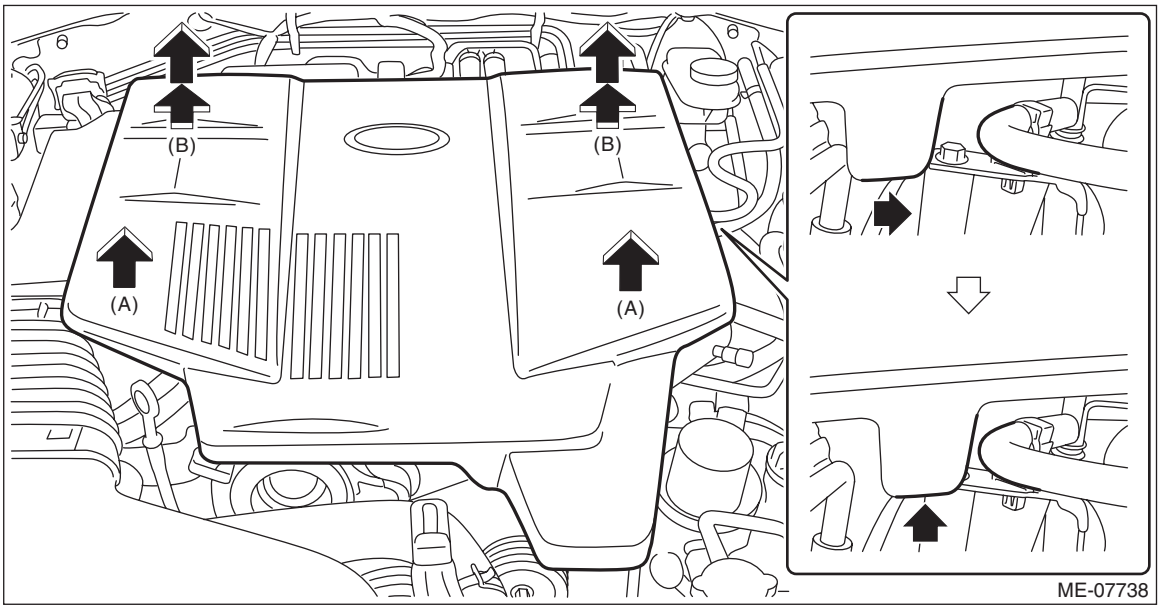
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

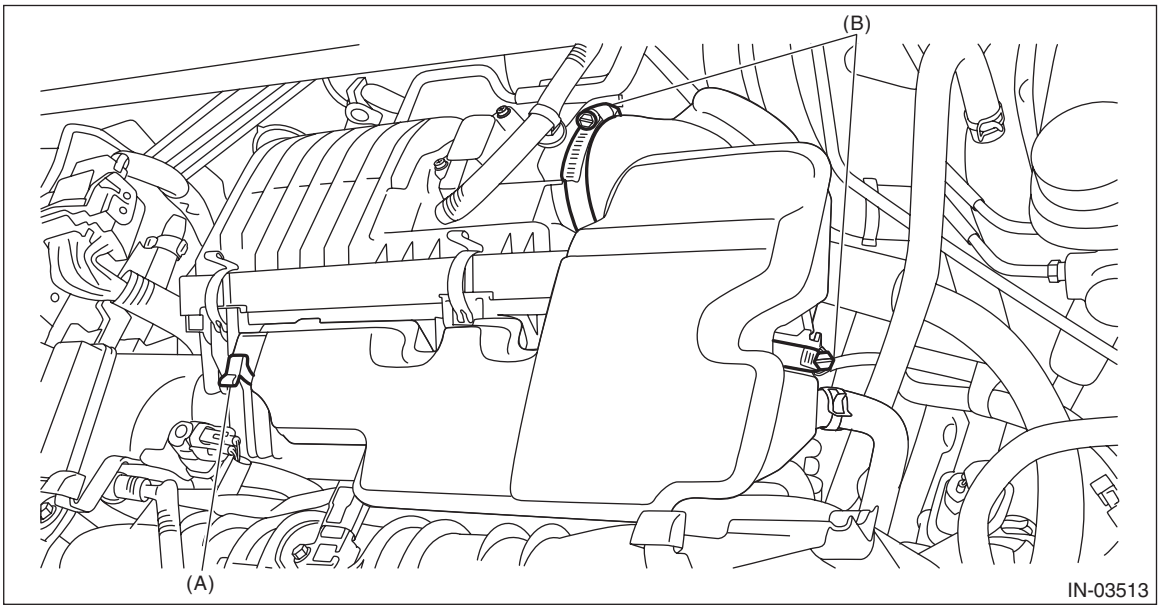
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

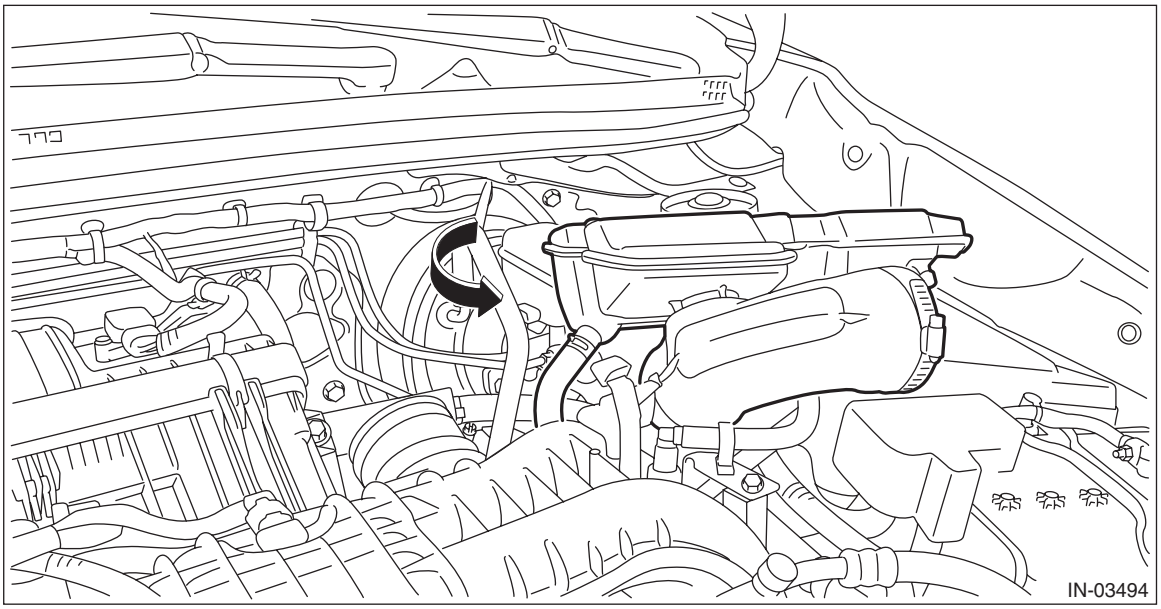


3) Remove the intake duct. <Ref. to IN(H4DO(HEV))-16, REMOVAL, Intake Duct.>

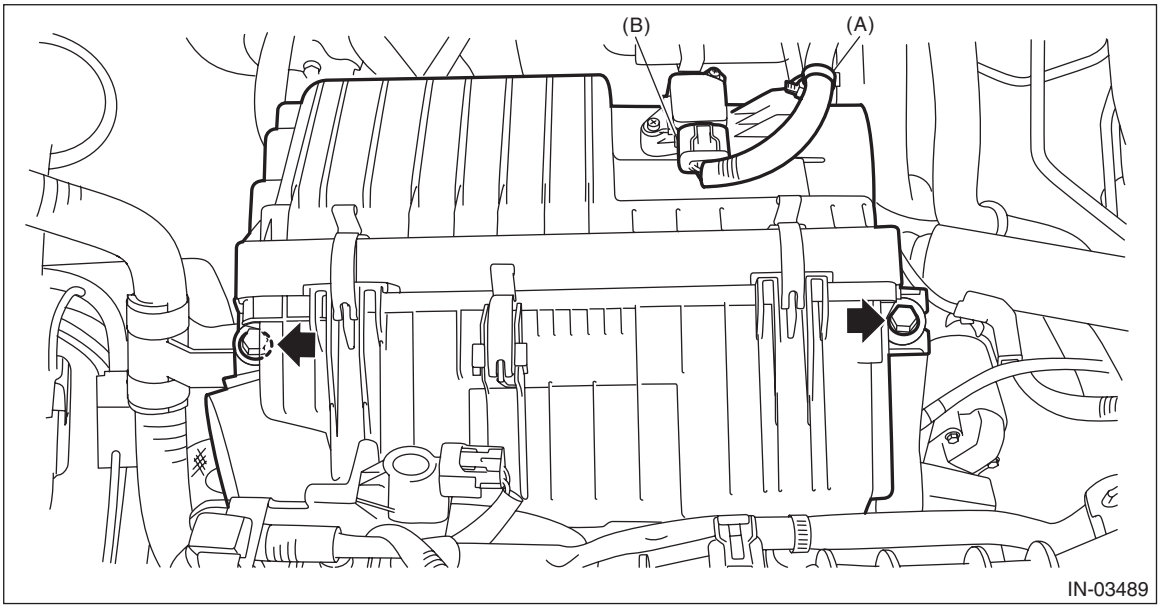
4) Remove the clip (A) which secures the resonator chamber to the air cleaner case (rear), and then loosen the clamp (B) which secures the resonator chamber to the air cleaner case (rear) and the air intake boot No. 2.



5) Remove the resonator chamber from the air cleaner case (rear) and the air intake boot No. 2, and move the resonator chamber to the left side wheel apron.

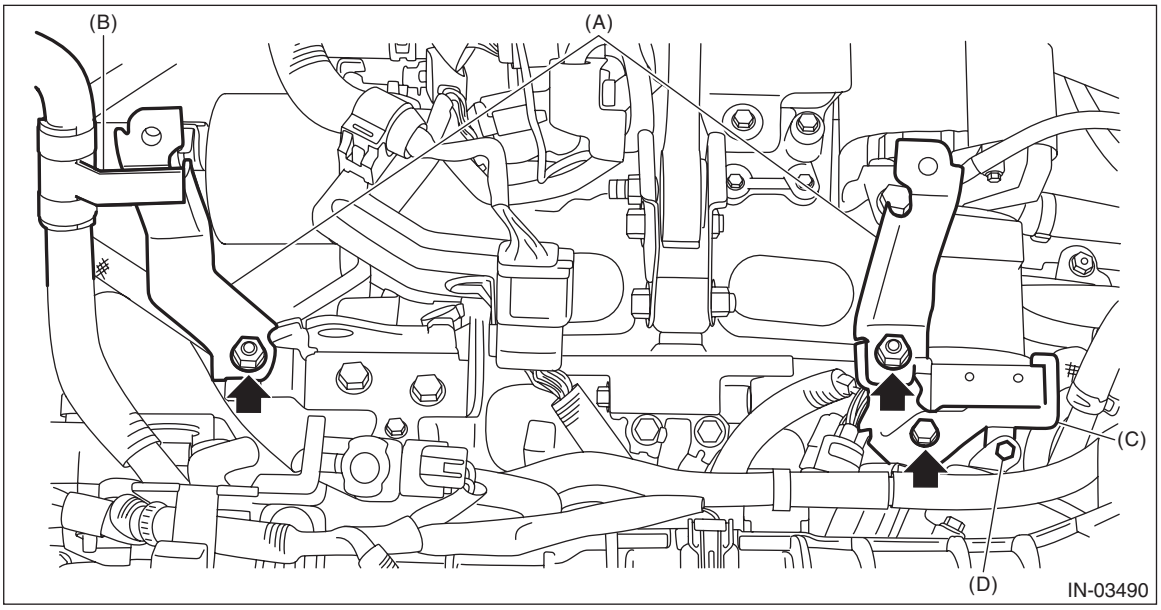


6) Remove the air intake boot No. 2. <Ref. to IN(H4DO(HEV))-11, AIR INTAKE BOOT NO. 2, REMOVAL, Air Intake Boot.>
7) Remove the clip (A) securing the bulk head wiring harness to the air cleaner case (rear), and disconnect the connector (B) from the mass air flow and intake air temperature sensor.
8) Remove the air cleaner case assembly from the air cleaner case bracket No. 1.



9) Remove the engine wiring harness (B) from the air cleaner case bracket No. 1 (A).
10) Remove the air cleaner case bracket No. 1 (A) from the engine rear hanger and the air cleaner case bracket No. 2 (C).
11) Remove the bolt (D) securing the brake vacuum pipe from the air cleaner case bracket No. 2 (C).

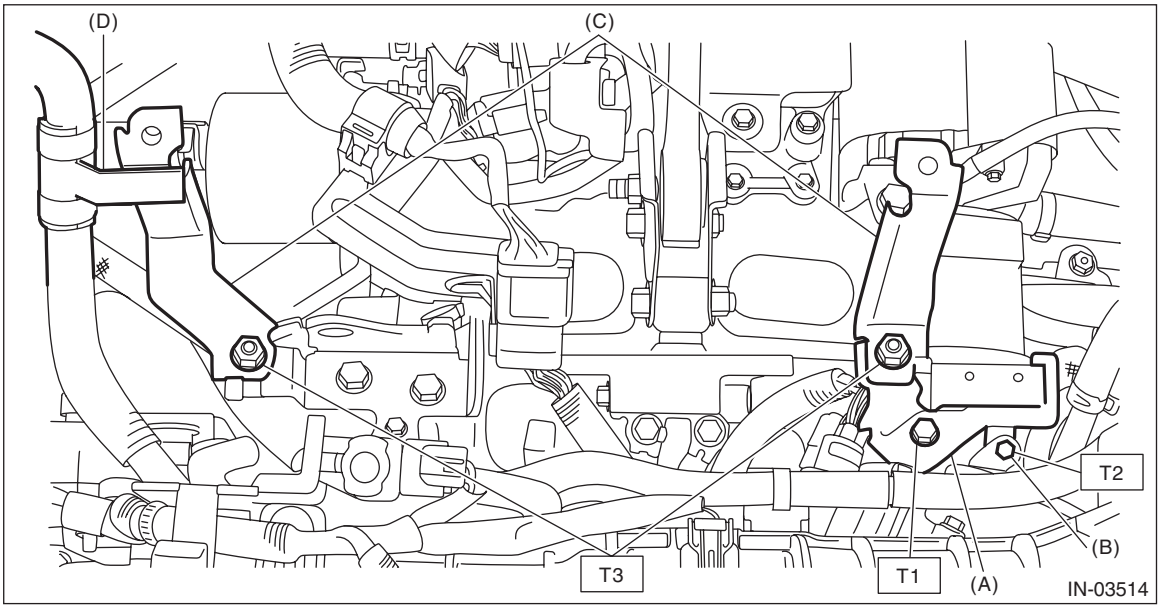
12) Remove the air cleaner case bracket No. 2 (C) from the cylinder block LH.



B: INSTALLATION

1) Install the air cleaner case bracket No. 2 (A) to the cylinder block LH, and install the bolt (B) which secures the brake vacuum pipe to the air cleaner case bracket No. 2 (A).
2) Install the air cleaner case bracket No. 1 (C) to the engine rear hanger and the air cleaner case bracket No. 2 (A).
3) Install the engine wiring harness (D) to the air cleaner case bracket No. 1 (C).

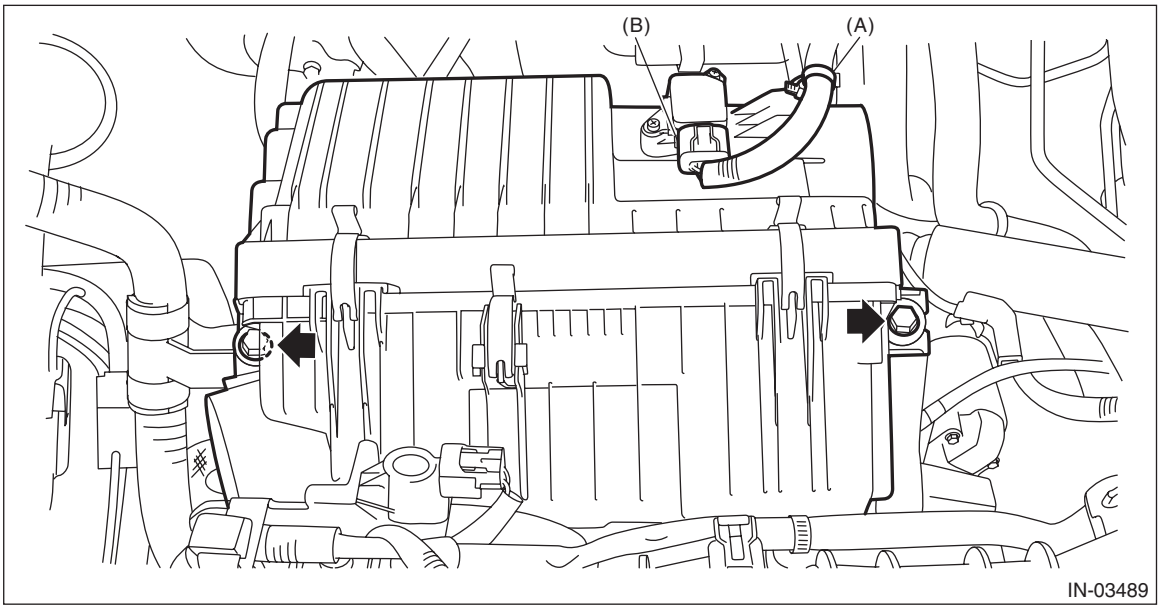
Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T2: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T3: 16 N·m (1.6 kgf-m, 11.8 ft-lb)



4) Install the air cleaner case assembly to the air cleaner case bracket No. 1.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)

5) Connect the connector (B) to the mass air flow and intake air temperature sensor, and secure the bulk head wiring harness to the air cleaner case (rear) with the clip (A).



6) Install the air intake boot No. 2. <Ref. to IN(H4DO(HEV))-14, AIR INTAKE BOOT NO. 2, INSTALLATION, Air Intake Boot.>
7) Install the intake duct. <Ref. to IN(H4DO(HEV))-17, INSTALLATION, Intake Duct.>
8) Install the collector cover.
9) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: DISASSEMBLY

1) Remove the air cleaner element. <Ref. to IN(H4DO(HEV))-4, REMOVAL, Air Cleaner Element.>
2) Remove the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, REMOVAL, Mass Air Flow and Intake Air Temperature Sensor.>

D: ASSEMBLY

1) Install the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, INSTALLATION, Mass Air Flow and Intake Air Temperature Sensor.>
2) Install the air cleaner element. <Ref. to IN(H4DO(HEV))-5, INSTALLATION, Air Cleaner Element.>

E: INSPECTION

Check that the air cleaner case has no deformation, cracks or other damages.

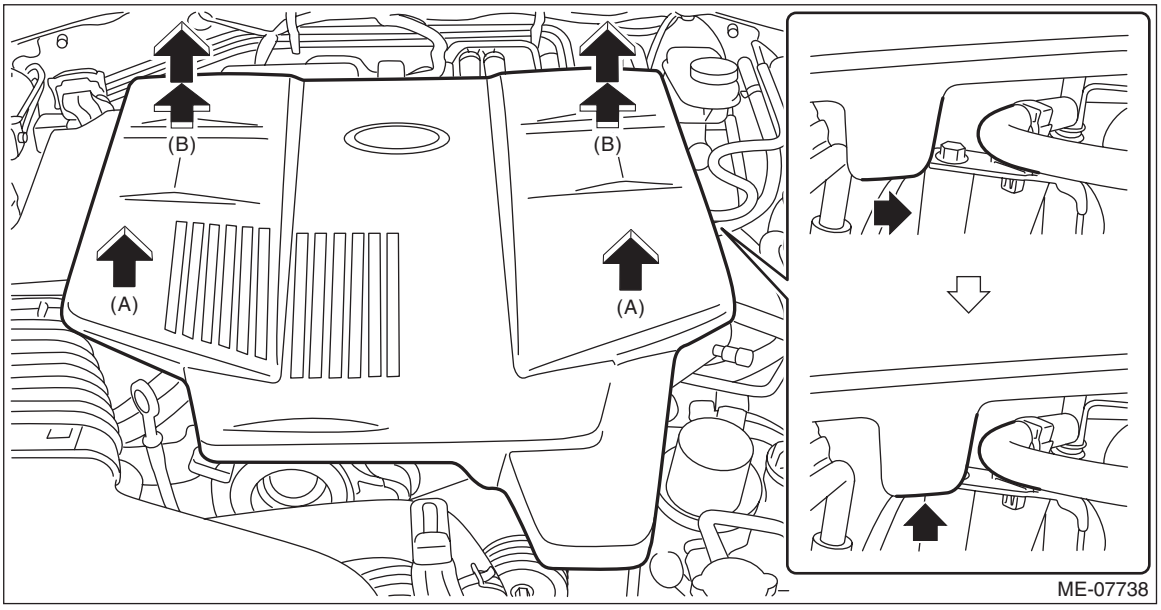
4. Air Intake Boot

A: REMOVAL

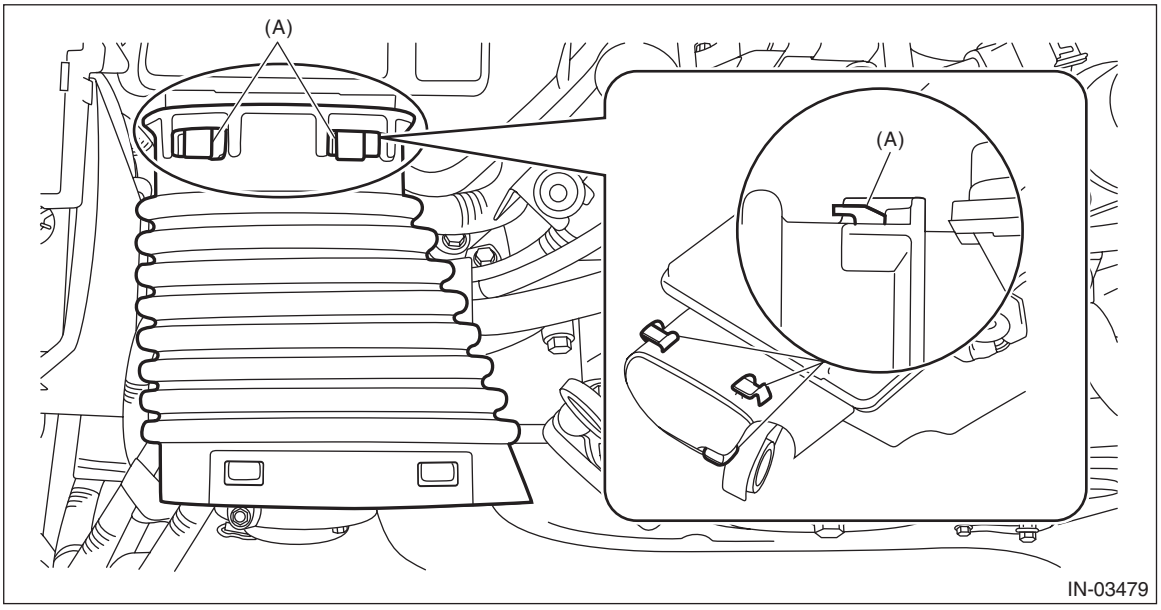
1. AIR INTAKE BOOT NO. 1

1) Turn the ignition switch to OFF.
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



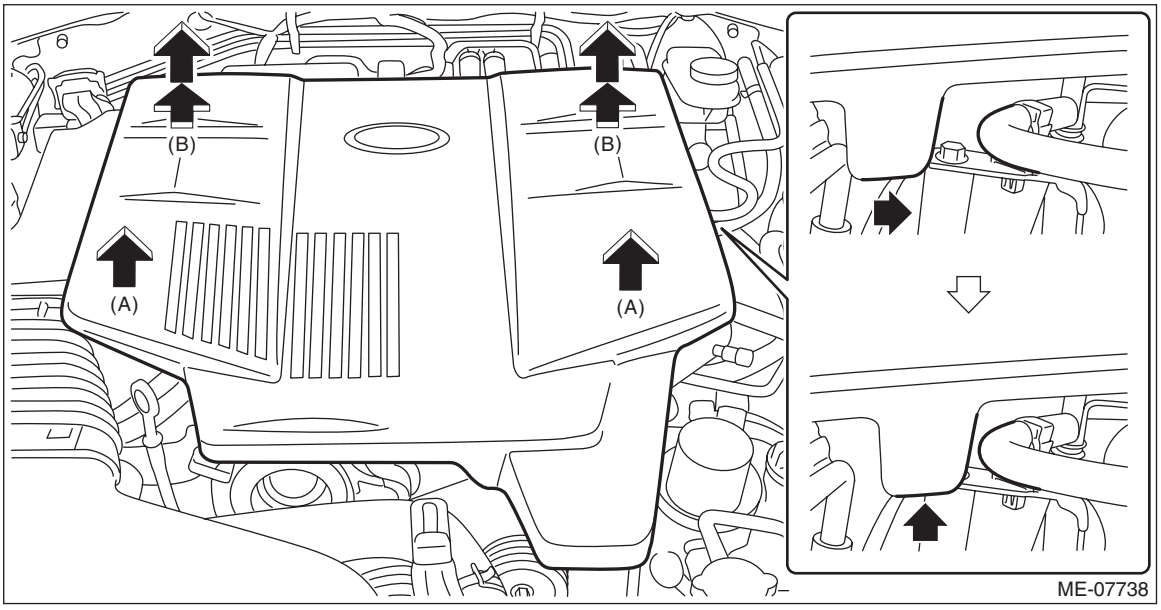
3) Remove the air intake duct. <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
4) Remove the air intake boot No. 1 from the protrusion (A) on the intake duct.



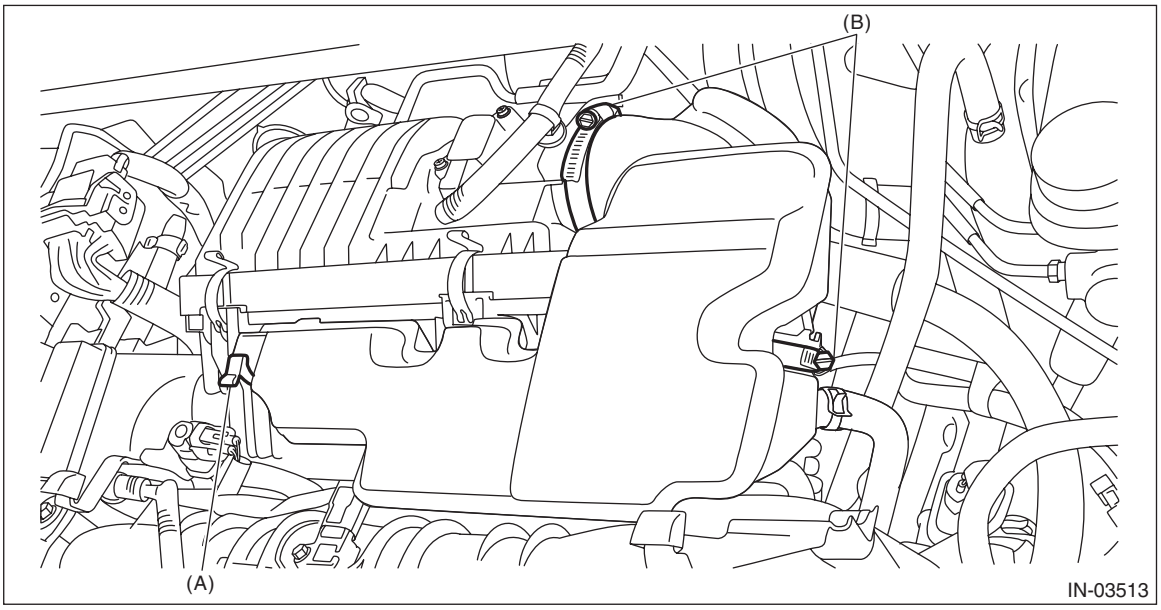
2. AIR INTAKE BOOT NO. 2

1) Turn the ignition switch to OFF.
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

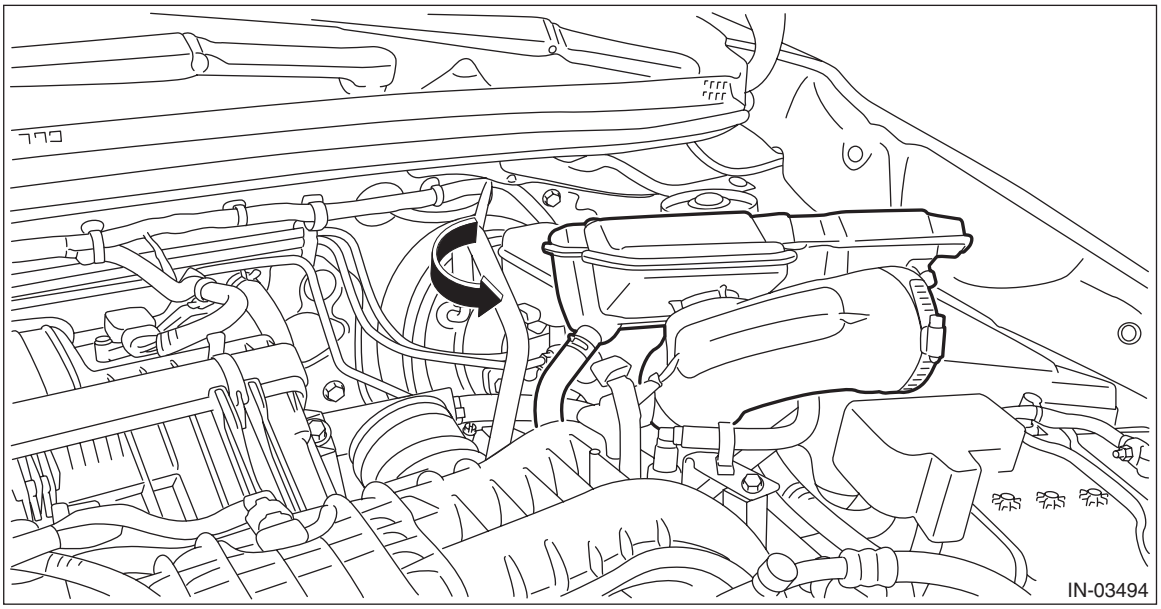
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



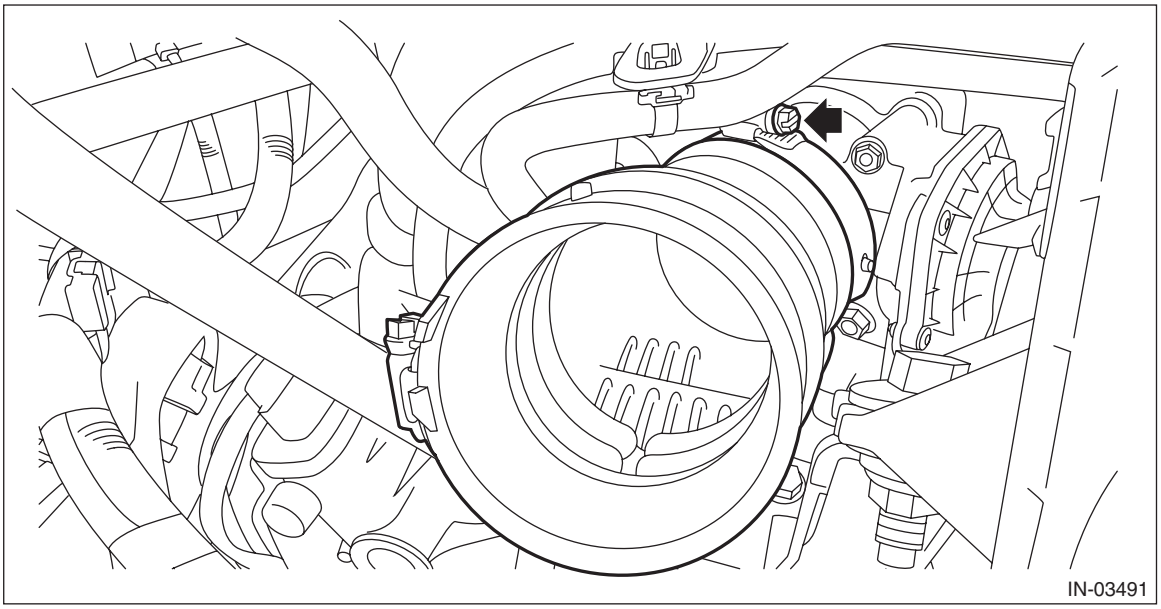
3) Remove the clip (A) which secures the resonator chamber to the air cleaner case (rear), and then loosen the clamp (B) which secures the resonator chamber to the air cleaner case (rear) and the air intake boot No. 2.



4) Remove the resonator chamber from the air cleaner case (rear) and the air intake boot No. 2, and move the resonator chamber to the left side wheel apron.



5) Remove the air intake boot No. 2 from the throttle body.



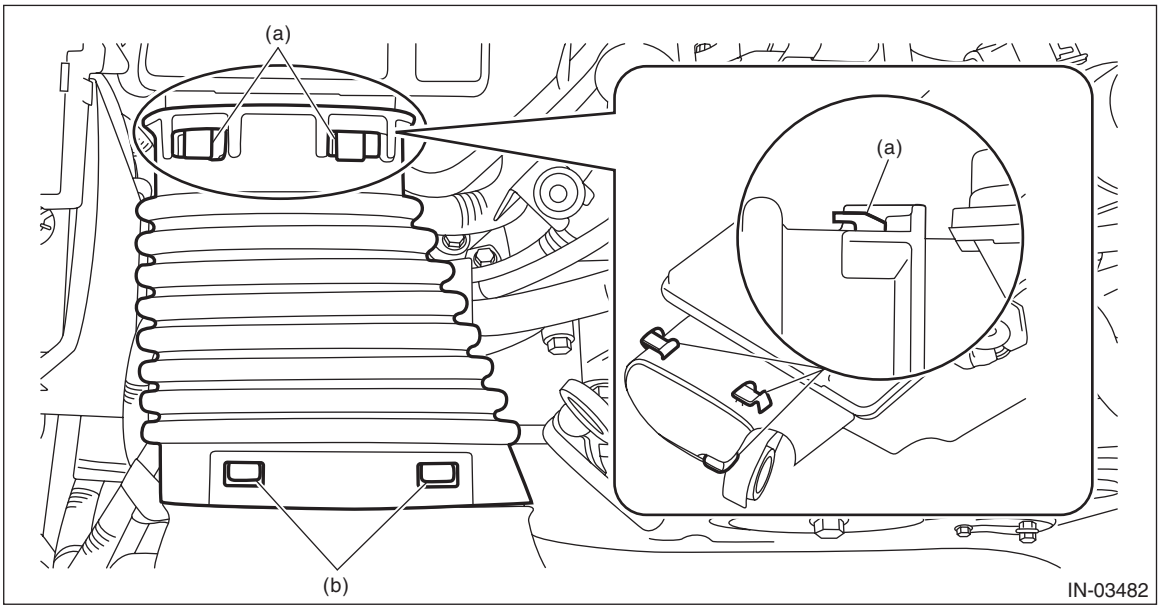
B: INSTALLATION

1. AIR INTAKE BOOT NO. 1

Install in the reverse order of removal.

NOTE:

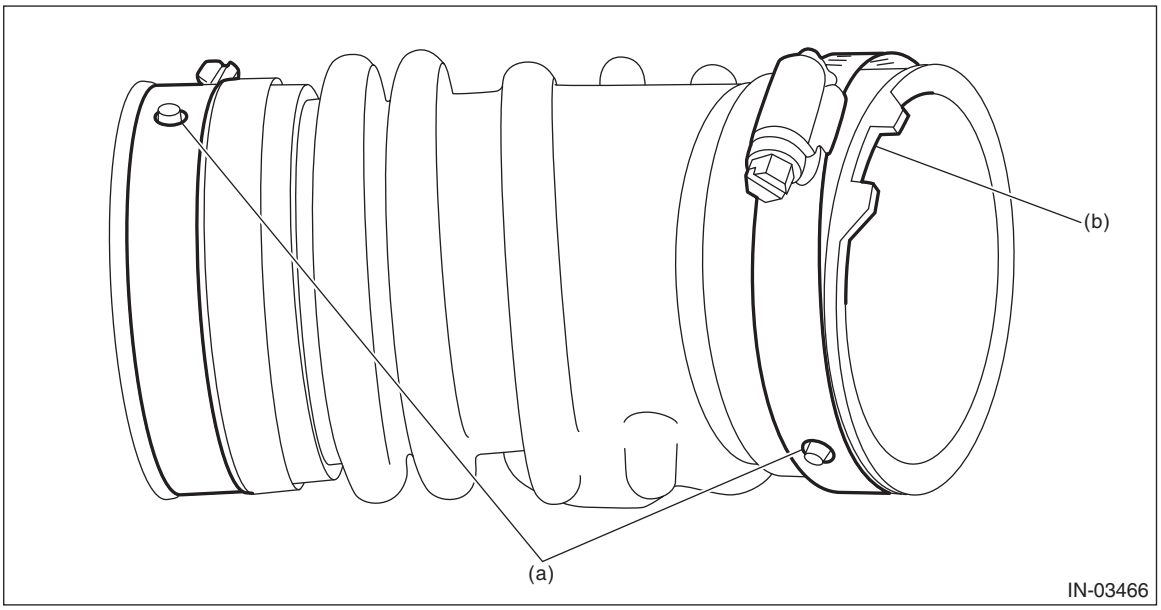
- Make sure that the air intake boot No. 1 is securely installed to the protrusion (a) on the intake duct and the protrusion (b) on the air intake duct.
- Check the air intake boot No. 1 for peel-off.



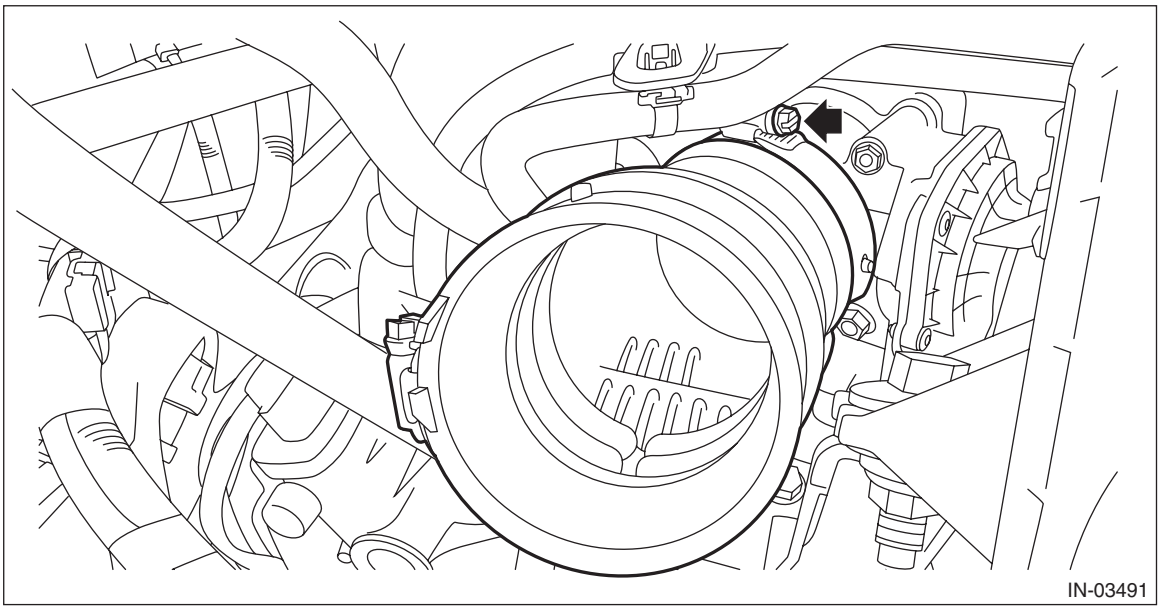
2. AIR INTAKE BOOT NO. 2

1) Install the air intake boot No. 2 to the throttle body.

NOTE:
• Align the clamp hole (a) with the protrusion of the air intake boot No. 2, and install the clamp in the direction as shown in the figure below.
• When installing the air intake boot No. 2 to the throttle body, align the air intake boot No. 2 (b) with the protrusion on the throttle body.



Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)



2) Install the resonator chamber. <Ref. to IN(H4DO(HEV))-19, INSTALLATION, Resonator Chamber.>
3) Install the collector cover.

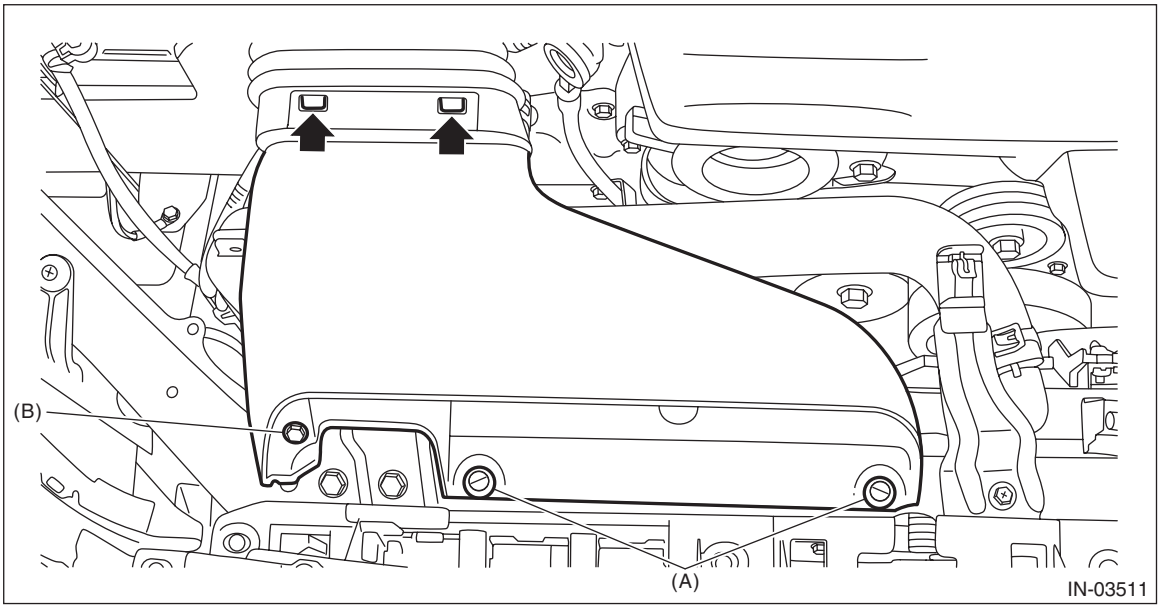
C: INSPECTION

1) Check that the air intake boot has no deformation, cracks or other damages.
2) Inspect that no foreign objects are mixed in the air intake boot.

5. Air Intake Duct

A: REMOVAL

1) Turn the ignition switch to OFF.
2) Remove the clip (A) and the bolt (B) which hold the air intake duct.
3) Remove the protrusion on the air intake duct from the air intake boot No. 1, and remove the air intake duct.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
- Make sure that the air intake boot No. 1 is securely installed to the protrusion on the air intake duct.
- Check the air intake boot No. 1 for peel-off.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

C: INSPECTION

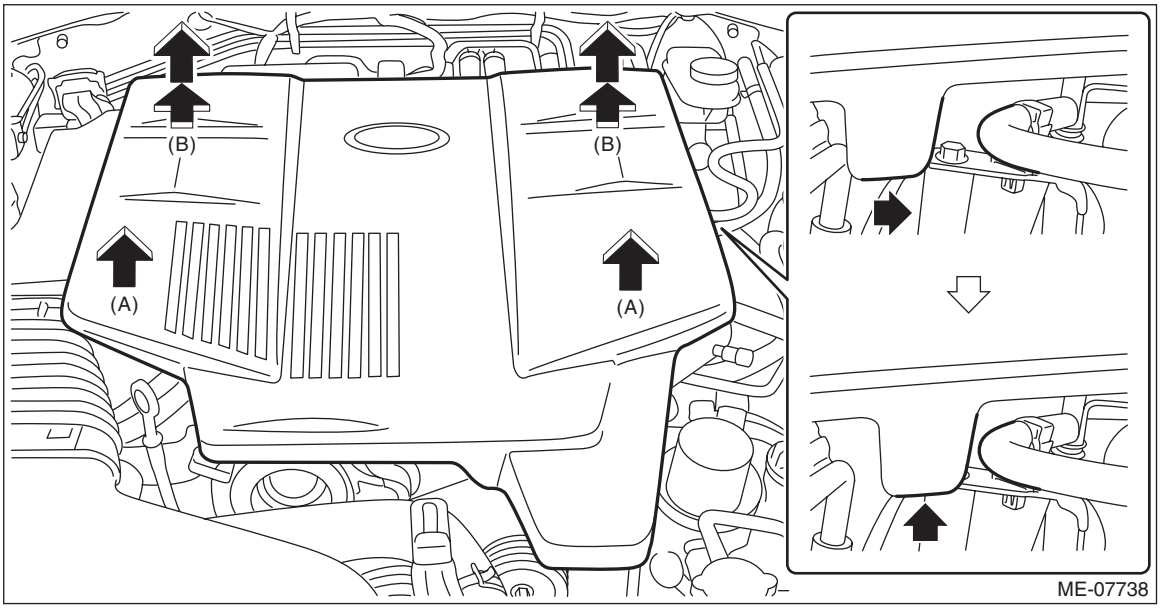
1) Check that the air intake duct has no deformation, cracks or other damages.
2) Inspect that no foreign objects are mixed in the air intake duct.

6. Intake Duct

A: REMOVAL

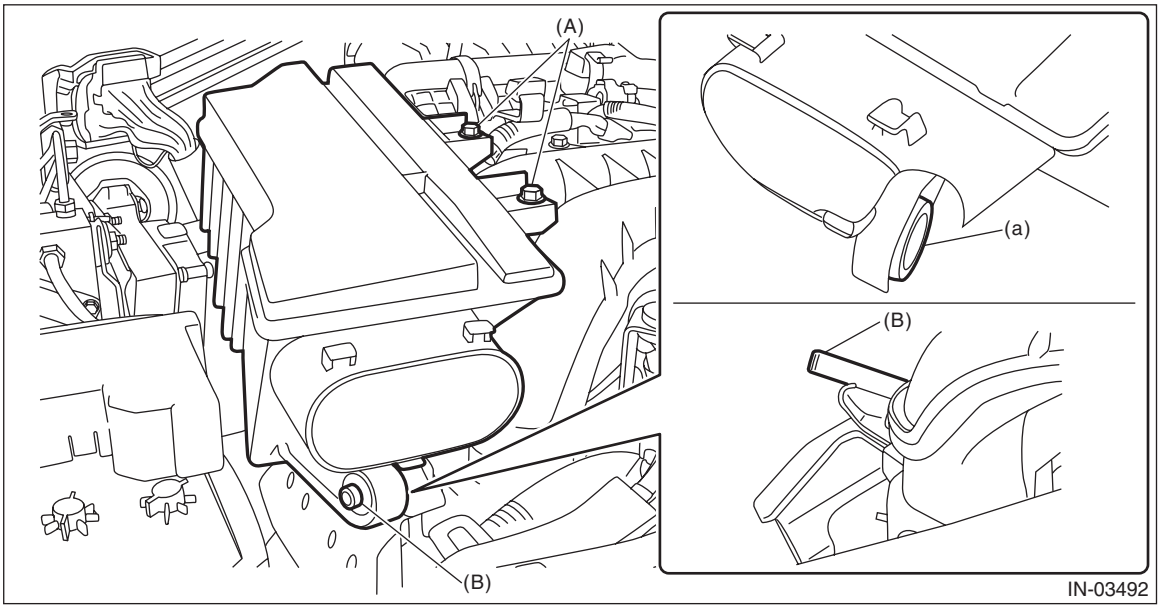
1) Turn the ignition switch to OFF.
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the air intake boot No. 1. <Ref. to IN(H4DO(HEV))-10, AIR INTAKE BOOT NO. 1, REMOVAL, Air Intake Boot.>
4) Remove the bolt (A) which holds the intake duct to the intake manifold.
5) Remove the intake duct from the air cleaner case front and the protrusion (B) on the intake manifold protector RH.

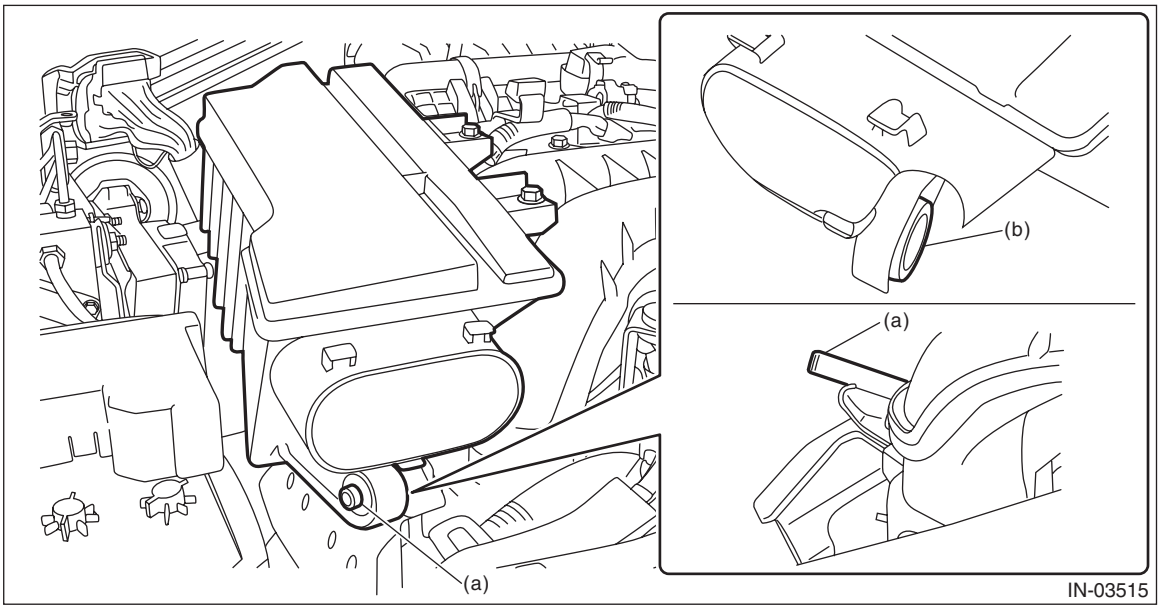
NOTE:
When removing the intake duct, check the cushion (a) of the intake duct for peel-off or misalignment.



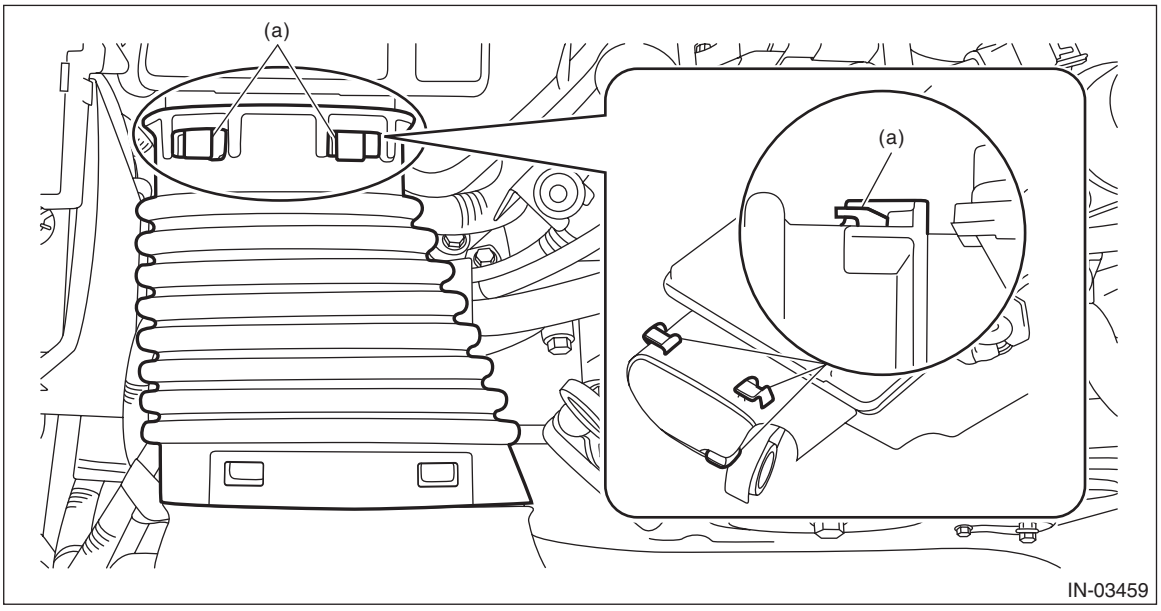
B: INSTALLATION

Install in the reverse order of removal.

NOTE:
- Check that the intake duct is firmly inserted into the protrusion (a) on the intake manifold protector RH.
- Check the cushion (b) for peel-off.



- Make sure that the air intake boot No. 1 is securely installed to the protrusion (a) on the intake duct.
- Check the air intake boot No. 1 for peel-off.



Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

C: INSPECTION

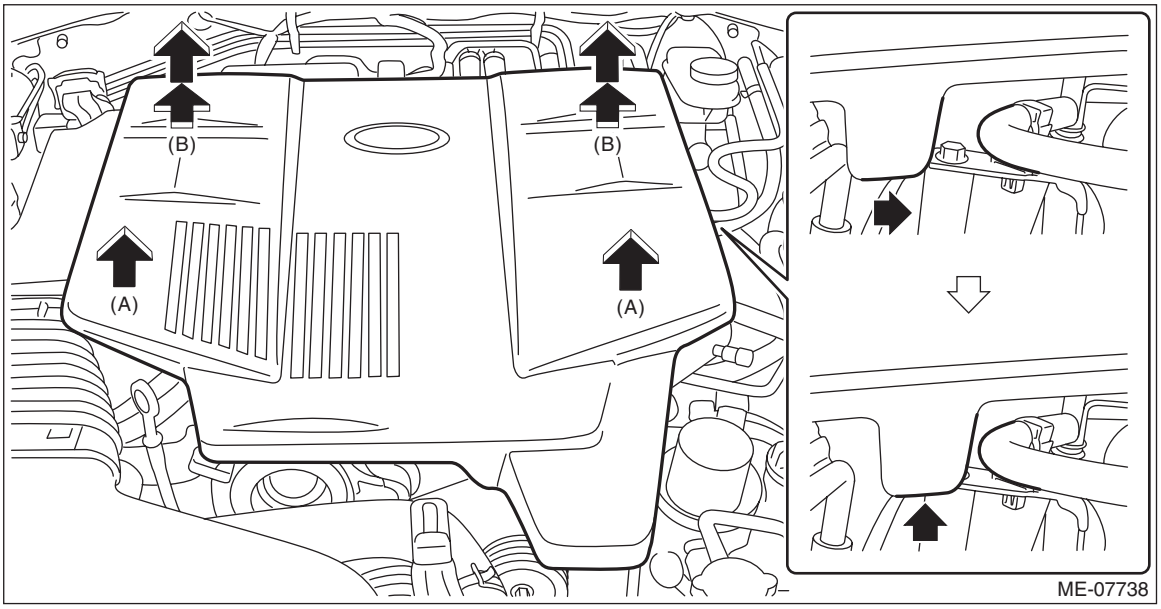
1) Check that the intake duct has no deformation, cracks or other damages.
2) Inspect that no foreign objects are mixed in the intake duct.

7. Resonator Chamber

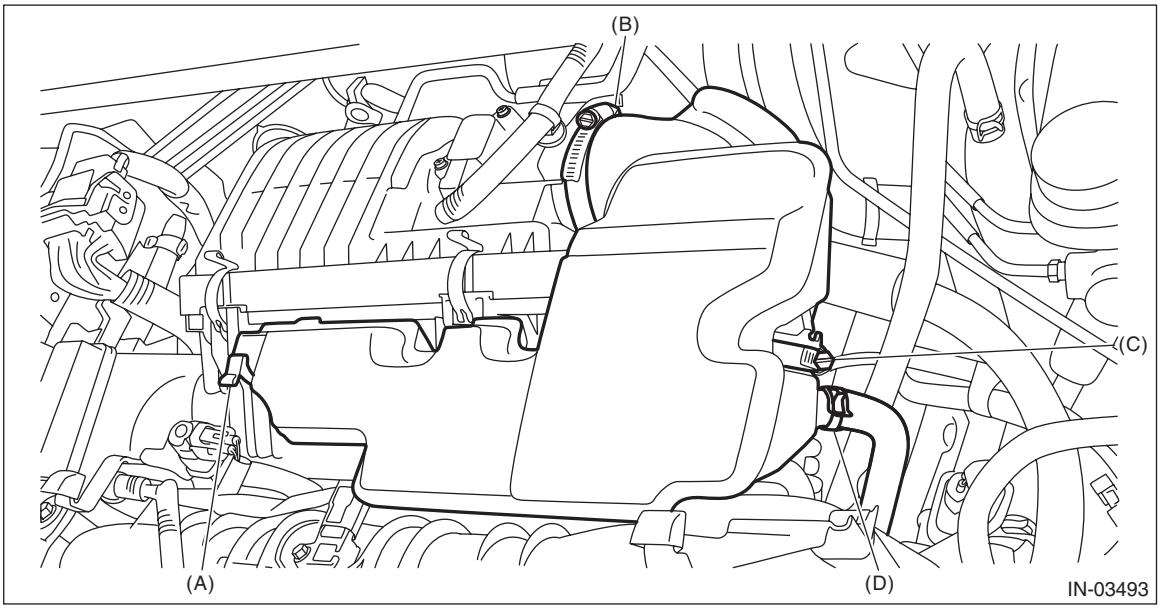
A: REMOVAL

1) Turn the ignition switch to OFF.
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



3) Remove the clip (A) from the resonator chamber, and loosen the clamp (B) securing the resonator chamber to the air cleaner case (rear).
4) Loosen the clamp (C) which secures the resonator chamber to the air intake boot No. 2.
5) Disconnect the PCV hose (D), and remove the resonator chamber from the air cleaner case (rear) and the air intake boot No. 2.

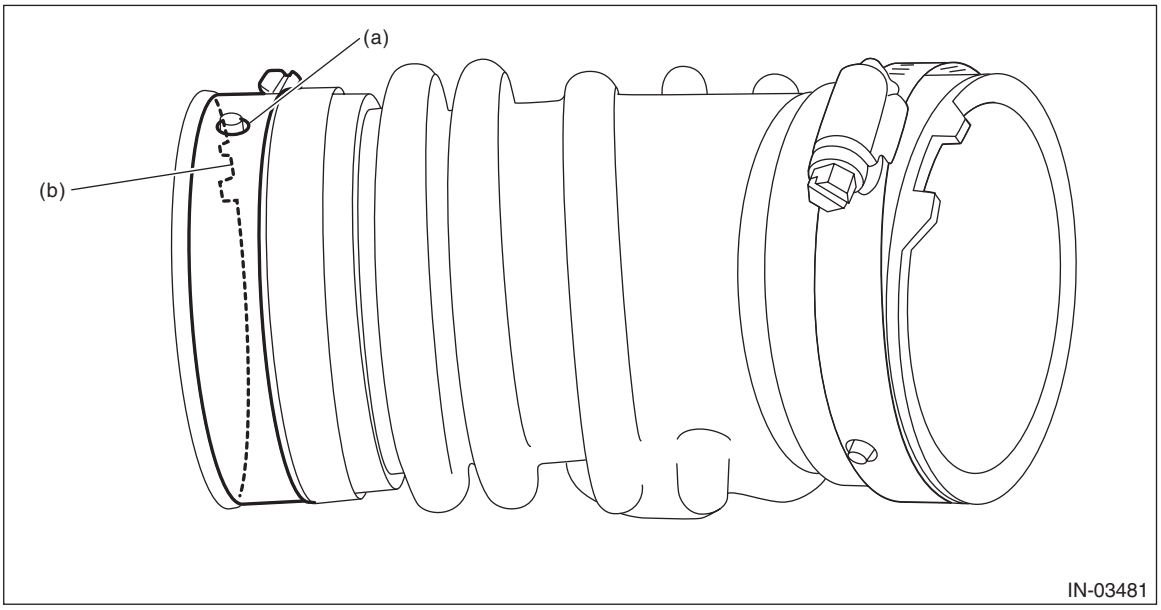


B: INSTALLATION

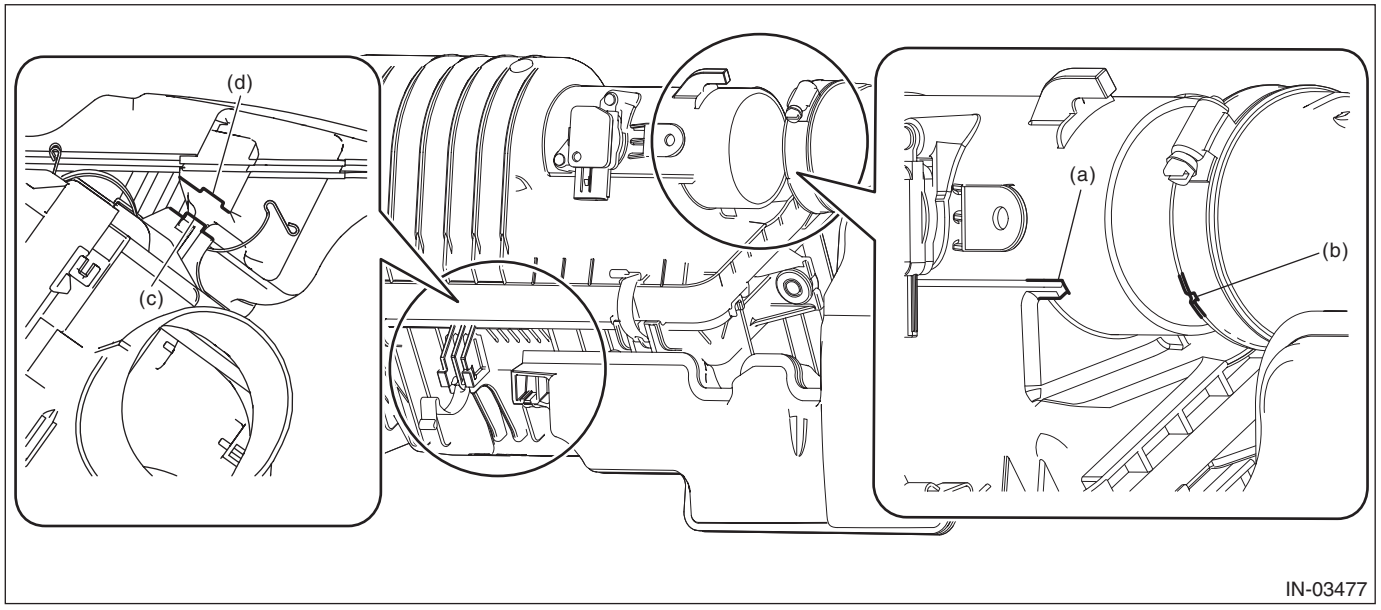
Install in the reverse order of removal.

NOTE:

- Align the clamp hole (a) with the protrusion of the air intake boot No. 2, and install the clamp in the direction as shown in the figure below.
- When installing the resonator chamber to the air intake boot No. 2, align the air intake boot No. 2 (b) with the protrusion on the resonator chamber.



- When installing the resonator chamber to the air cleaner case (rear), align the resonator chamber (b) to the protrusion (a) of the air cleaner case (rear), and align the resonator chamber (d) to the protrusion (c) of the air cleaner case (front).



Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)

C: INSPECTION

1) Check that the resonator chamber has no deformation, cracks or other damages.
2) Inspect that no foreign objects are mixed in the resonator chamber.

MECHANICAL

ME(H4DO(HEV))

Page
1. General Description 2

1. General Description

A: SPECIFICATION

Specifications for the HEV model are included in the ME (H4DO (w/o HEV)) section. <Ref. to ME(H4DO(w/o HEV))-2, General Description.>

EXHAUST

EX(H4DO(HEV))

Page
1. General Description 2

1. General Description

A: SPECIFICATION

Specifications for the HEV model are included in the EX (H4DO (w/o HEV)) section. <Ref. to EX(H4DO(w/o HEV))-2, General Description.>

COOLING

CO(H4DO(HEV))

Page
1. General Description 2

1. General Description

A: SPECIFICATION

Specifications for the HEV model are included in the CO (H4DO (w/o HEV)) section. <Ref. to CO(H4DO(w/o HEV))-2, General Description.>

LUBRICATION

LU(H4DO(HEV))

Page
1. General Description 2

1. General Description

A: SPECIFICATION

Specifications for the HEV model are included in the LU (H4DO (w/o HEV)) section. <Ref. to LU(H4DO(w/o HEV))-2, General Description.>

SPEED CONTROL SYSTEMS

SP(H4DO(HEV))

Page

1. General Description 2

1. General Description

A: SPECIFICATION

Specifications for the HEV model are the same as those for the gasoline engine model. <Ref. to SP(H4DO(w/o HEV))-2, General Description.>

IGNITION

IG(H4DO(HEV))

Page
1. General Description 2

1. General Description

A: SPECIFICATION

Specifications for the HEV model are included in the IG (H4DO (w/o HEV)) section. <Ref. to IG(H4DO(w/o HEV))-2, General Description.>

STARTING/CHARGING SYSTEMS

SC(H4DO(HEV))

		Page
1.	General Description	2
2.	Starter	10
3.	Integrated Starter Generator (ISG)	33
4.	Battery	40
5.	Battery Cable Assembly	51
6.	Battery Sensor	61
7.	Battery Temperature Sensor	63
8.	12V Battery Relay	65
9.	DC/DC Converter	72

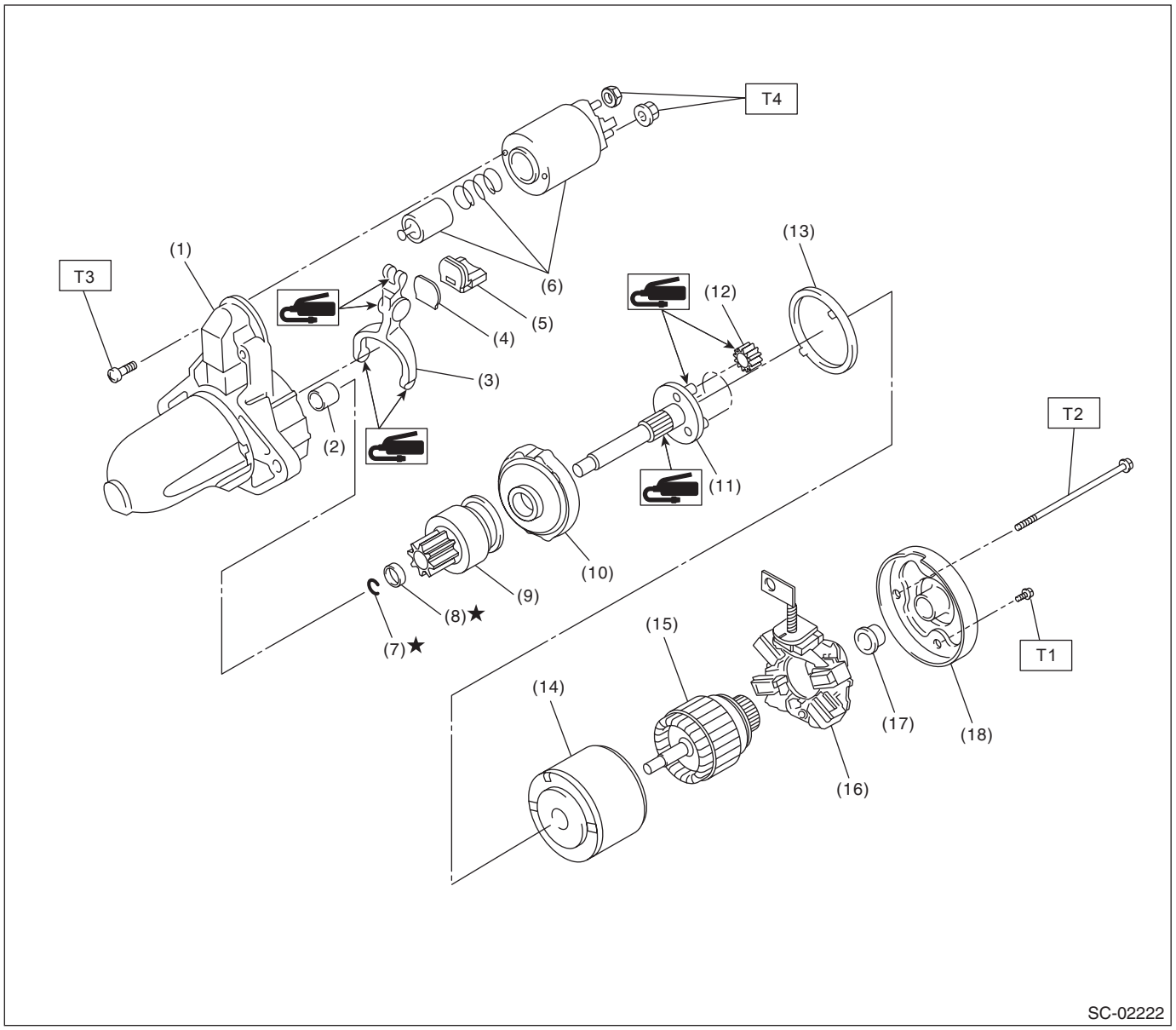
1. General Description

A: SPECIFICATION

Item			Specifications
Vehicle model			CVT
Starter	Type		Reduction type
	Model		M000T38571
	Manufacturer		Mitsubishi Electric
	Voltage and output		12 V — 1.2 kW
	Direction of rotation		Counterclockwise (when observed from pinion)
	Number of pinion teeth		9
	Armature commutator runout	Standard	0.05 mm (0.0020 in)
		Limit	0.10 mm (0.0039 in)
	Armature depth of segment mold	Standard	0.50 mm (0.020 in)
	Brush length	Standard	12.3 mm (0.484 in)
		Limit	7.0 mm (0.276 in)
	Brush spring force	Standard	15.9 — 19.5 N (1.62 — 1.99 kgf, 3.57 — 4.38 lbf)
		Limit	2.5 N (0.25 kgf, 0.56 lbf)
	No-load characteristics	Voltage	11 V
		Current	90 A or less
Integrated starter generator (ISG)	Type		Rotating-field three-phase type, voltage regulator built-in type, with load response control system, with inverter mode and self-diagnosis feature via LIN communication
	Model		iST60C021
	Manufacturer		Valeo
	Voltage and output		12 V — 200 A
	Polarity on ground side		Negative
	Direction of rotation		Clockwise (when observed from pulley side)
	Stator connection		3-phase △ type
	Output current		1,500 r/min — 79.7 A or more 2,500 r/min — 166.6 A or more 5,000 r/min — 196.9 A or more
	Regulated voltage		14.1 — 14.5 V [20°C (68°F)]
Battery	Type and capacity	For 12 volt auxiliary	12 V — 48 AH (55D23L)
		For 12 volt engine restart	12 V — 41 AH (N55-R)
	CCA	For 12 volt auxiliary	390 A
		For 12 volt engine restart	450 A

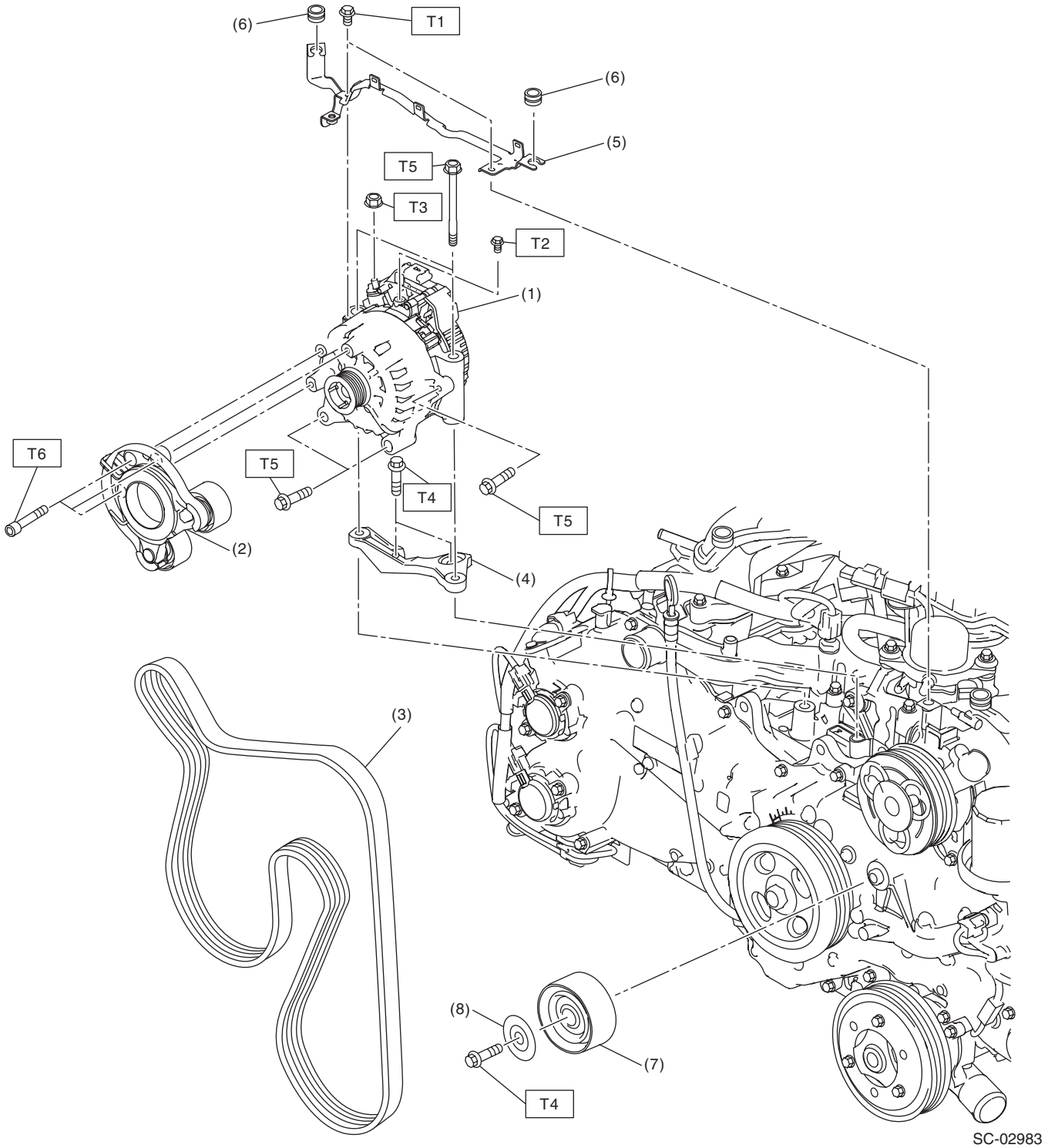
B: COMPONENT

1. STARTER



(1)	Starter housing ASSY	(9)	Overrunning clutch	(17)	Sleeve bearing
(2)	Sleeve bearing	(10)	Internal gear ASSY	(18)	Starter cover ASSY
(3)	Shift lever	(11)	Shaft		
(4)	Plate	(12)	Pinion gear	***Tightening torque: N·m (kgf-m, ft-lb)***	
(5)	Seal rubber	(13)	Seal rubber	***T1:***	***1.4 (0.1, 1.0)***
(6)	Magnet switch ASSY	(14)	Yoke ASSY	***T2:***	***6 (0.6, 4.4)***
(7)	Snap ring	(15)	Armature ASSY	***T3:***	***7.5 (0.8, 5.5)***
(8)	Stopper	(16)	Brush holder ASSY	***T4:***	***10 (1.0, 7.4)***

2. INTEGRATED STARTER GENERATOR (ISG) & ISG BRACKET

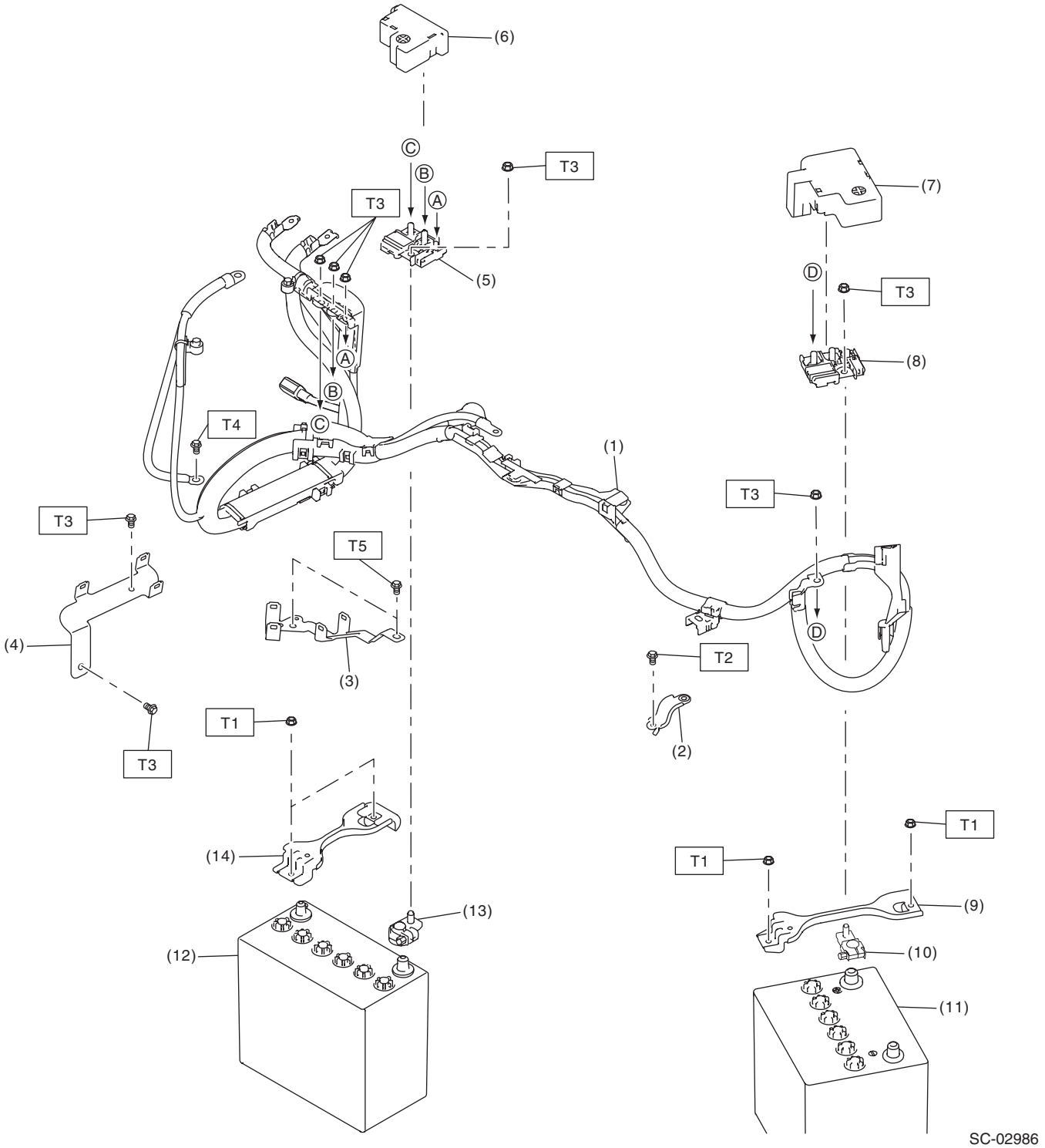


(1) Integrated starter generator (ISG)
(2) V-belt tensioner ASSY
(3) V-belt
(4) ISG bracket
(5) Collector cover bracket
(6) Cushion
(7) Idler pulley
(8) Idler pulley cover

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)
T2: 7.5 (0.8, 5.5)
T3: 15.5 (1.6, 11.4)
T4: 36 (3.7, 26.6)
T5: <Ref. to SC(H4DO(HEV))-36, INSTALLATION, Integrated Starter Generator (ISG).>
T6: <Ref. to ME(H4DO(w/o HEV))-136, HEV MODEL, INSTALLATION, V-belt.>

3. BATTERY CABLE ASSY



(1)	Battery cable ASSY	(8)	Slow blow fuse (12 volt auxiliary battery)
(2)	Battery cable stay	(9)	Battery holder (12 volt auxiliary battery)
(3)	Battery cable bracket No. 1	(10)	Terminal base (12 volt auxiliary battery)
(4)	Battery cable bracket No. 2	(11)	12 volt auxiliary battery
(5)	Slow blow fuse (12 volt engine restart battery)	(12)	12 volt engine restart battery
(6)	Terminal boot (12 volt engine restart battery)	(13)	Terminal base (12 volt engine restart battery)
(7)	Terminal boot (12 volt auxiliary battery)	(14)	Battery holder (12 volt engine restart battery)

Tightening torque: N·m (kgf-m, ft-lb)

T1: 3.5 (0.4, 2.6)

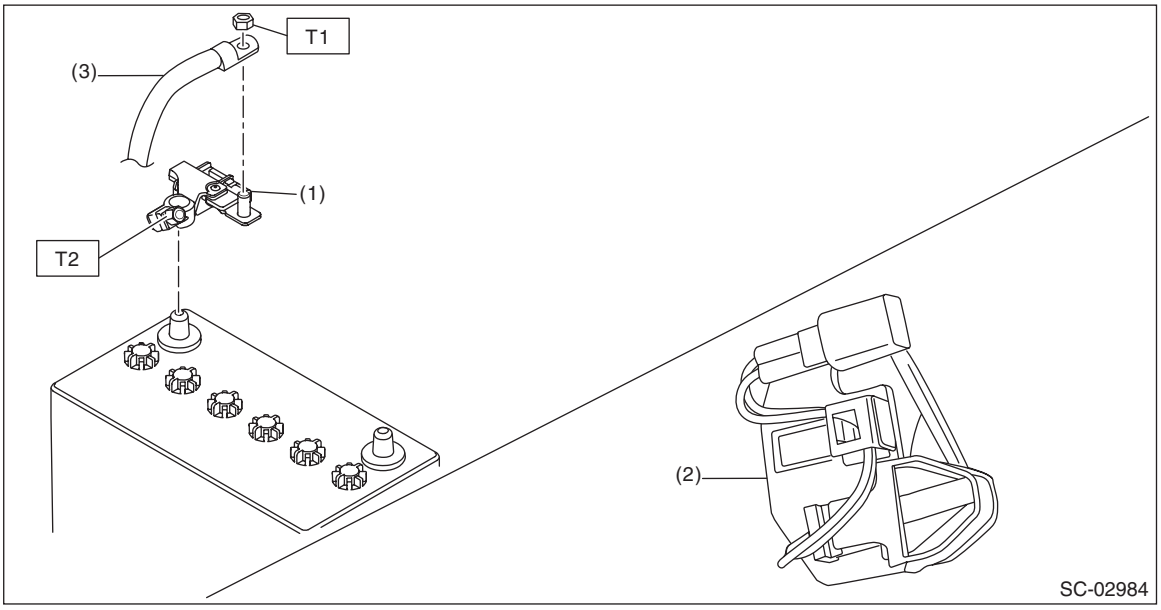
T2: 6.4 (0.7, 4.7)

T3: 7.5 (0.8, 5.5)

T4: 13 (1.3, 9.6)

T5: 19 (1.9, 14.0)

4. 12V ENGINE RESTART BATTERY SENSOR & BATTERY TEMPERATURE SENSOR



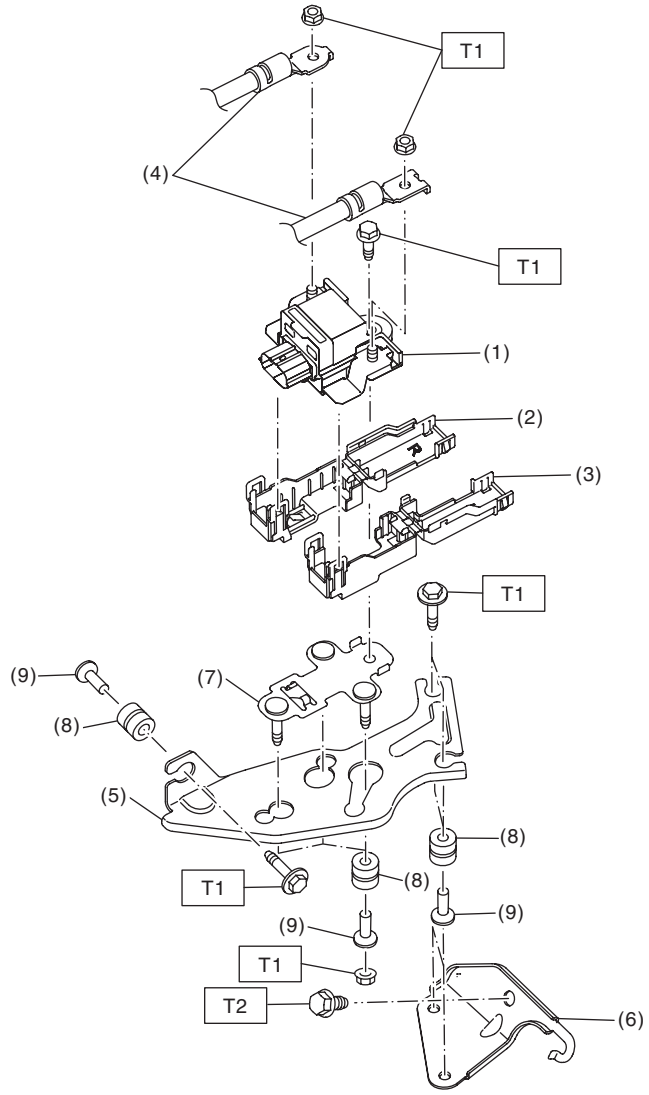
(1)	12V engine restart battery sensor	(3)	Ground terminal
(2)	Battery temperature sensor		

Tightening torque: N·m (kgf-m, ft-lb)

T1: 7.5 (0.8, 5.5)

T2: <Ref. to SC(H4DO(HEV))-61, INSTALLATION, Battery Sensor.>

5. 12V BATTERY RELAY



SC-02985

(1) 12V battery relay
(2) 12V battery relay cover RH
(3) 12V battery relay cover LH
(4) Battery cable ASSY
(5) 12V battery relay bracket No. 1
(6) 12V battery relay bracket No. 2
(7) 12V battery relay bracket No. 3
(8) Cushion
(9) Collar

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.8, 5.5)
T2: 33 (3.4, 24.3)

C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

D: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current. NOTE: • For measuring standby current, prepare a circuit tester that can measure by 1 mA unit. • For measuring standby current in the models with keyless access, prepare an analog type circuit tester.

2. Starter

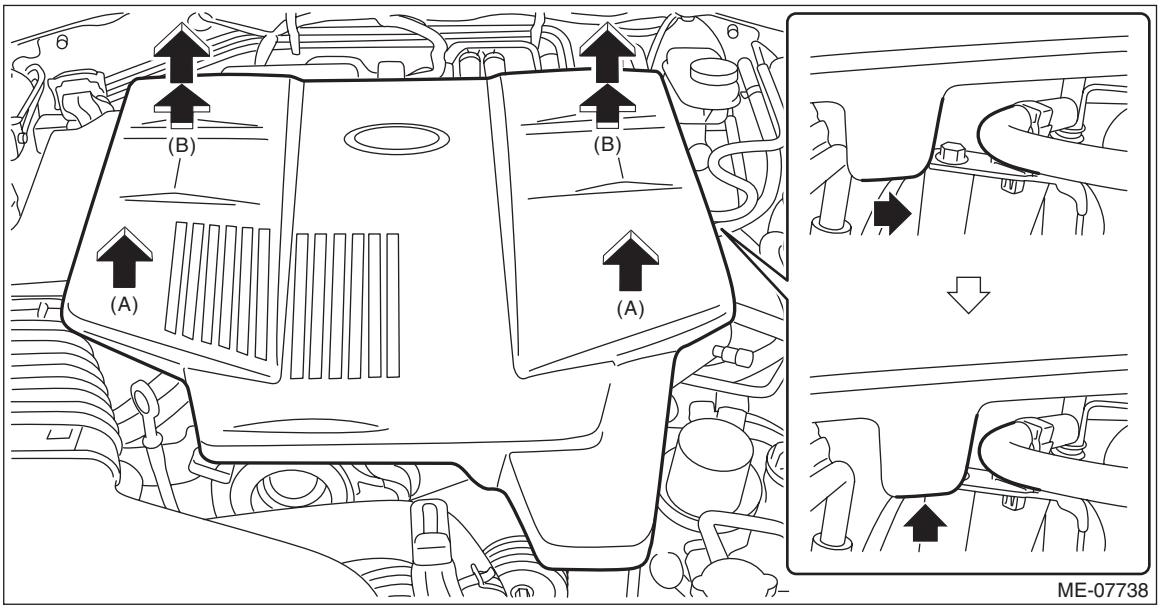
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

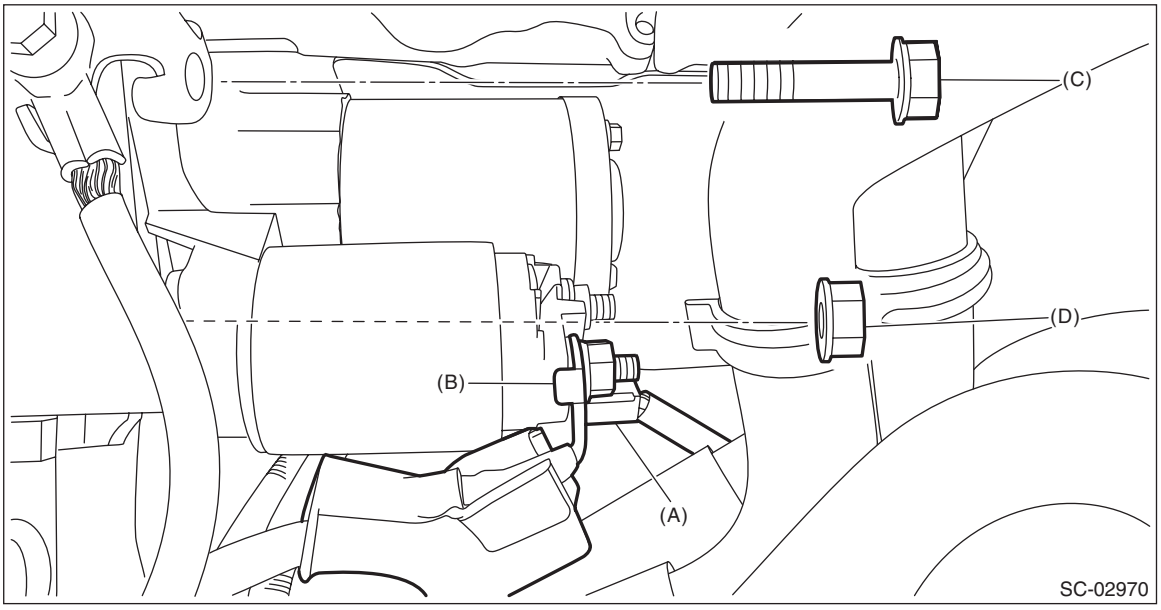
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



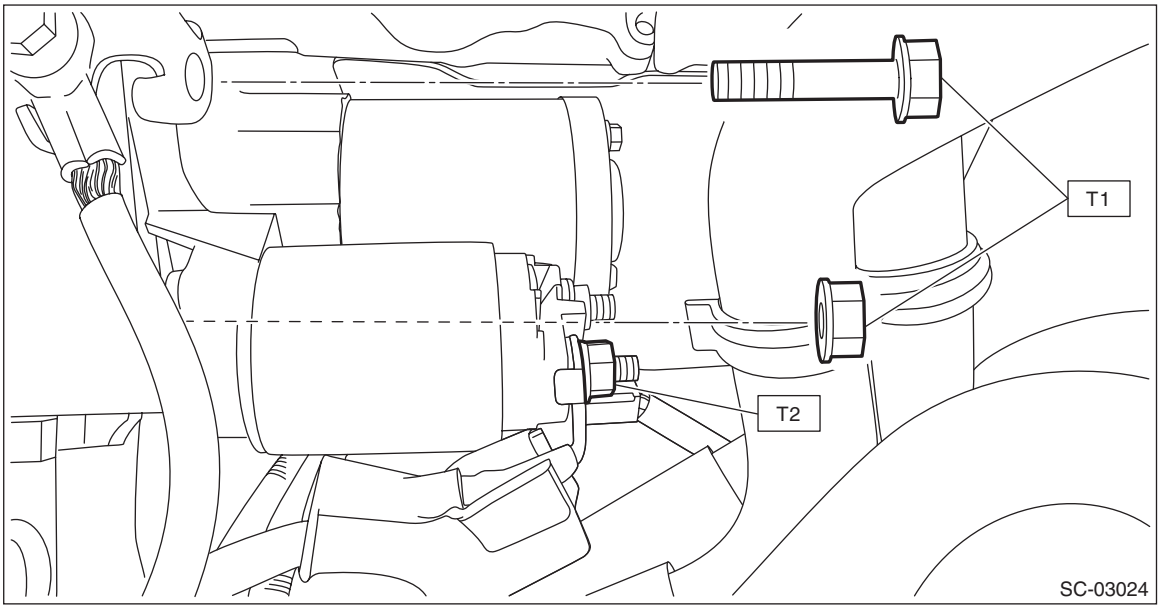
3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Disconnect the connector (A) and terminal (B) from starter.
5) Remove the bolt (C) and the nut (D) securing the starter, and remove the starter from the transmission.



B: INSTALLATION

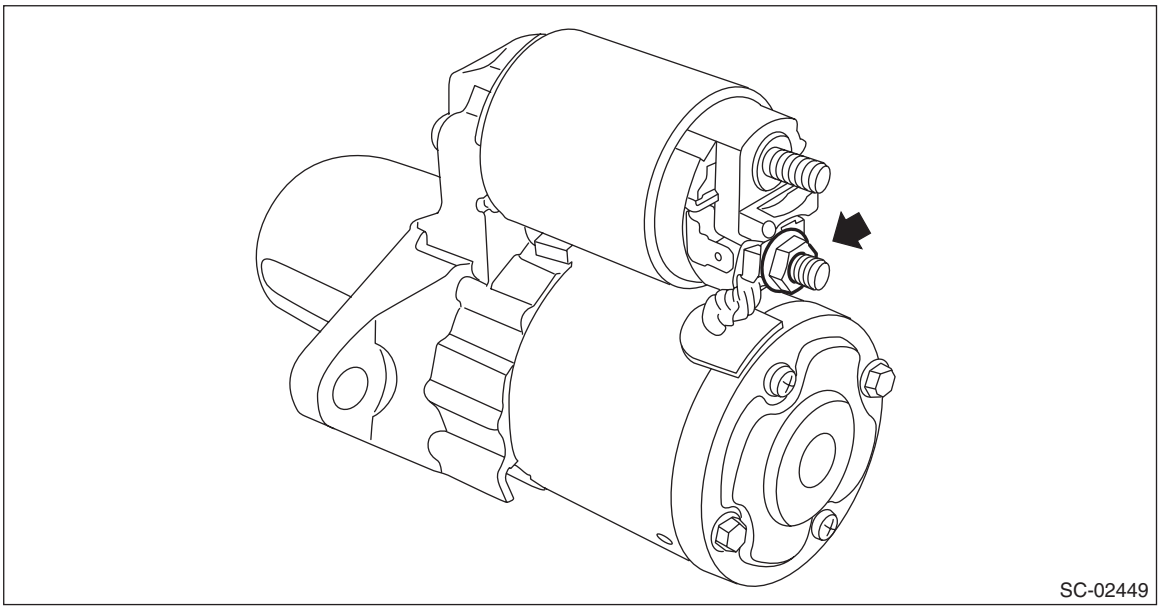
Install in the reverse order of removal.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 11 N·m (1.1 kgf-m, 8.1 ft-lb)

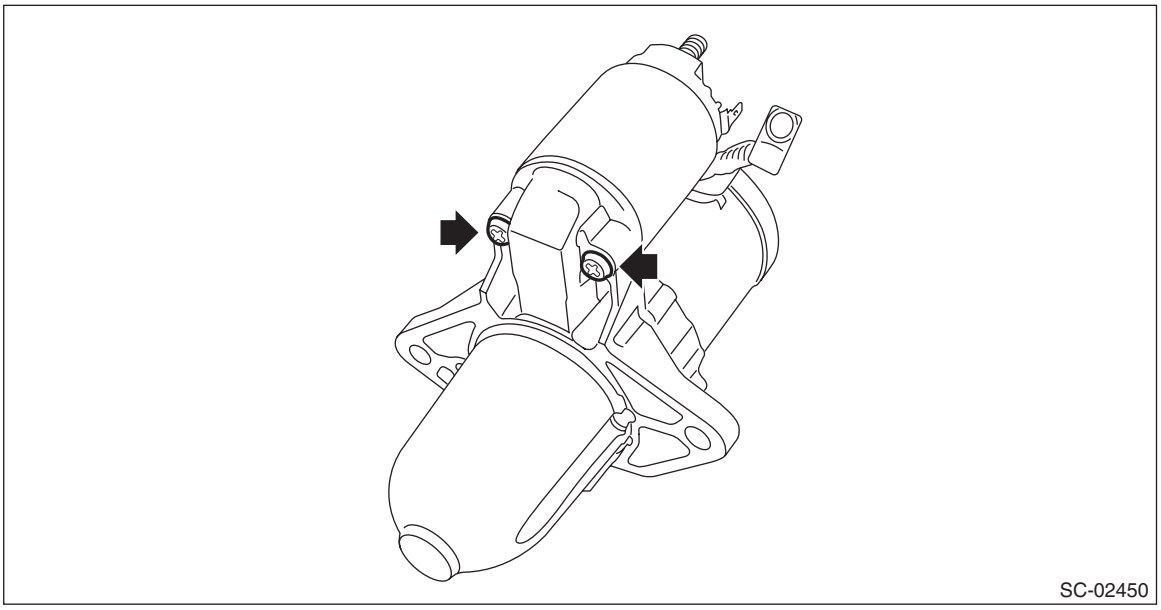


C: DISASSEMBLY

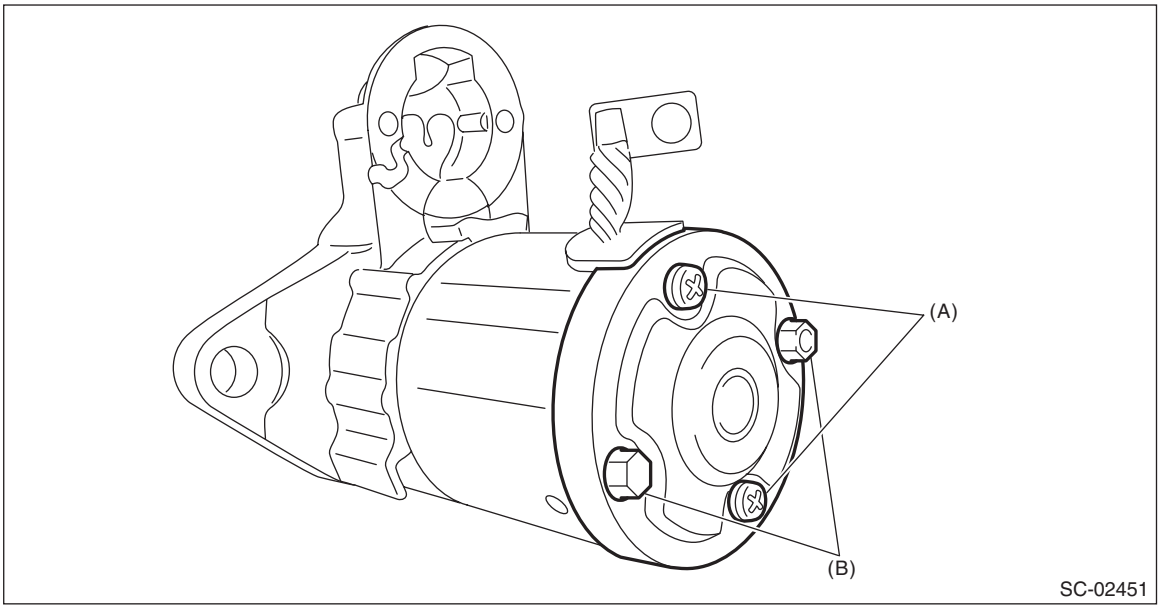
1) Disconnect the terminal M from the magnet switch assembly.



2) Remove the magnet switch assembly from the starter housing assembly.

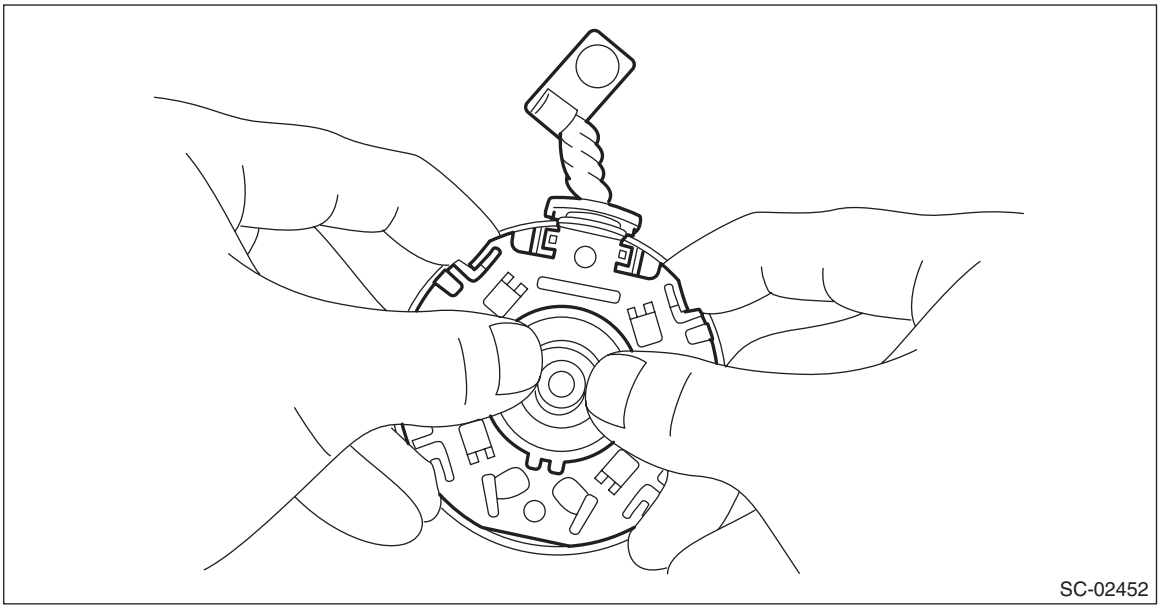


3) Remove screws (A) of the brush holder assembly, and through bolts (B) on both sides, and remove the starter cover assembly.

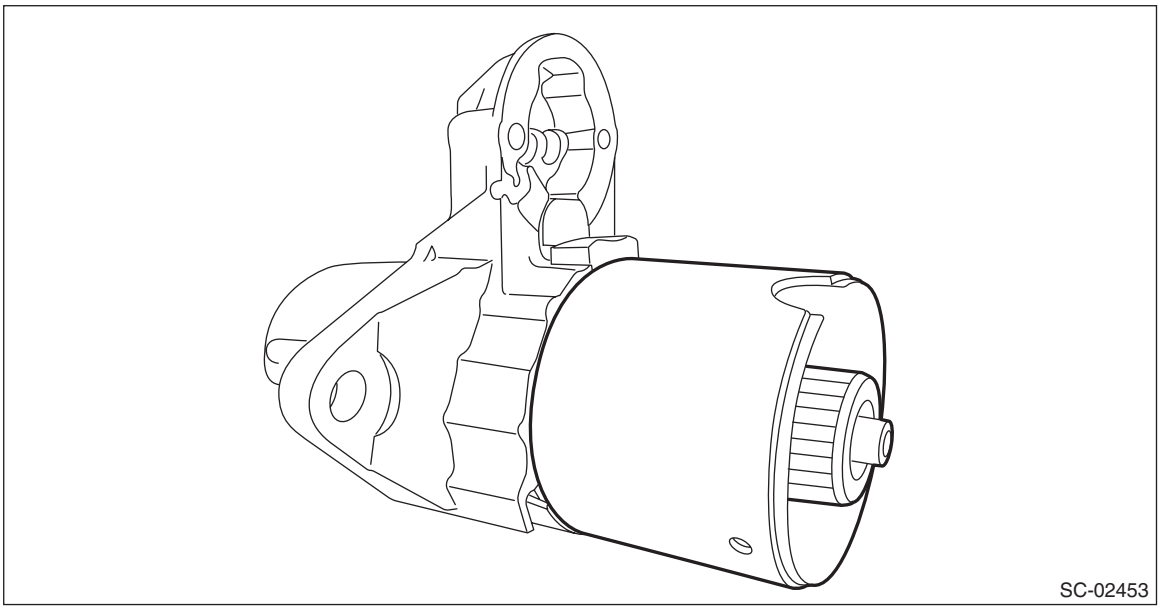


4) Remove the brush holder assembly from the armature assembly.

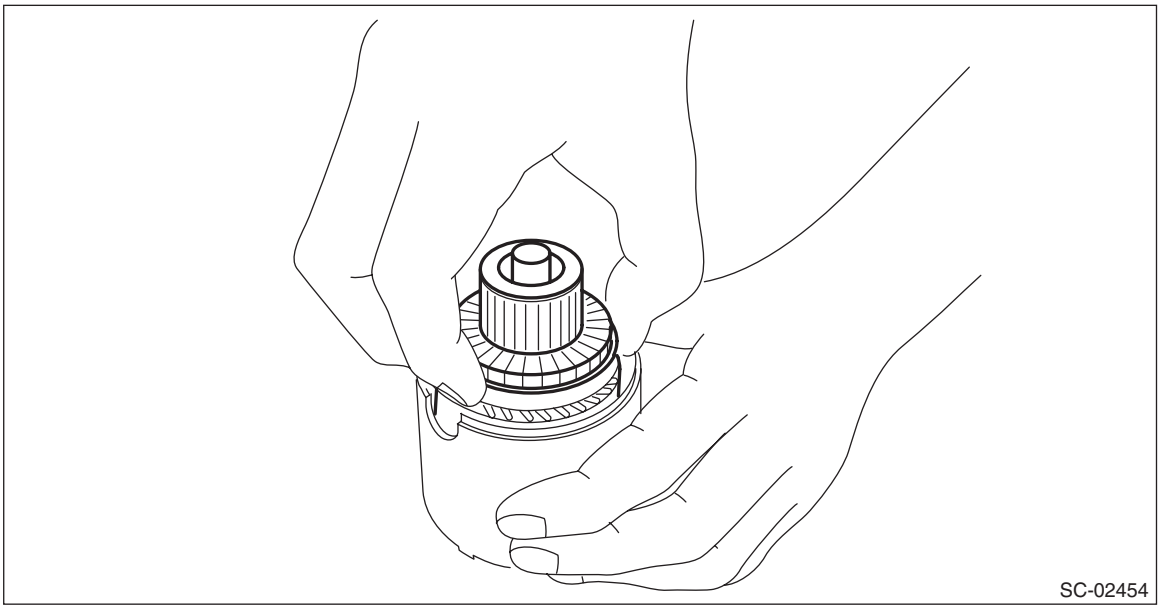
NOTE:
Hold the brush with your fingers so that the brush spring does not come flying out.


SC-02452

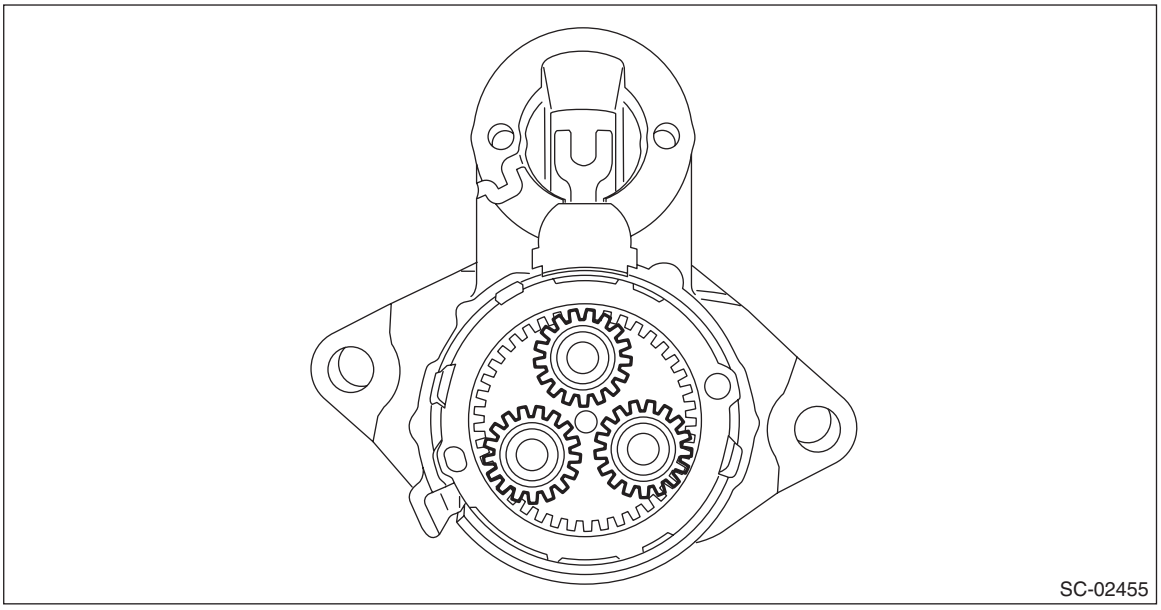
5) Remove the armature assembly and yoke assembly from the starter housing assembly together as a single unit.


SC-02453

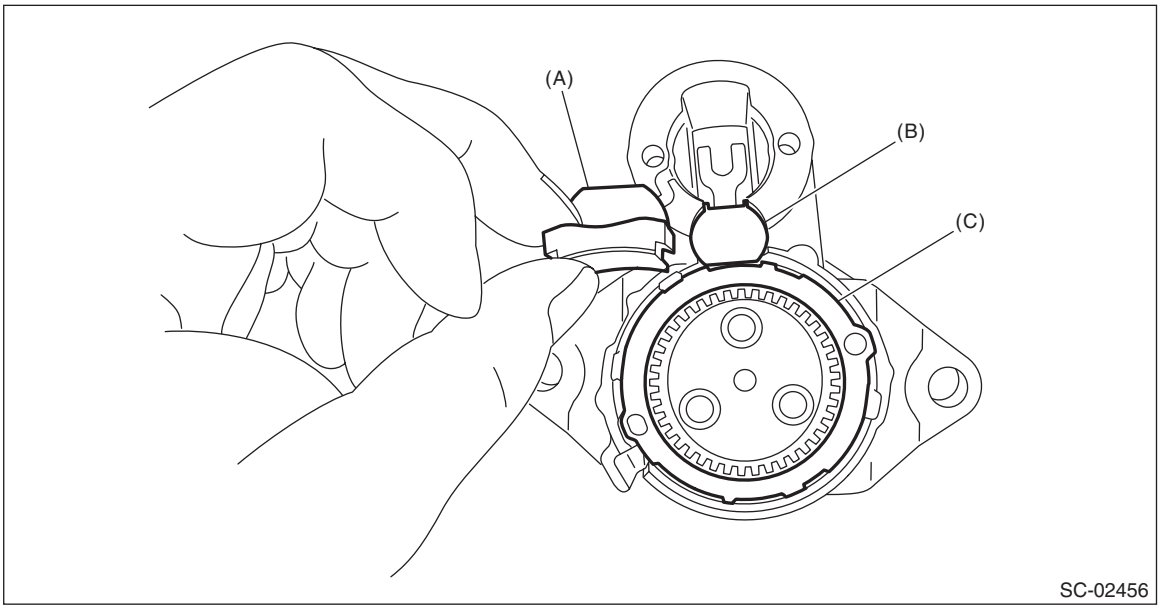
6) Separate the armature assembly and yoke assembly.


SC-02454

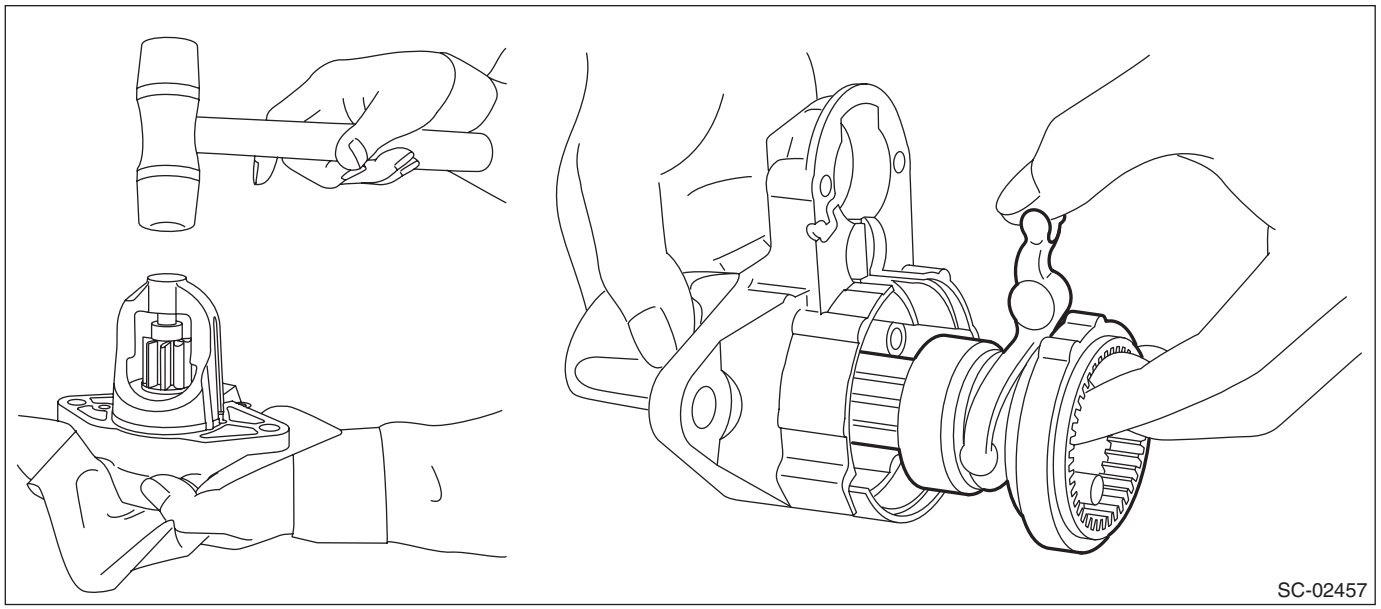
7) Remove the pinion gear from the internal gear assembly.


SC-02455

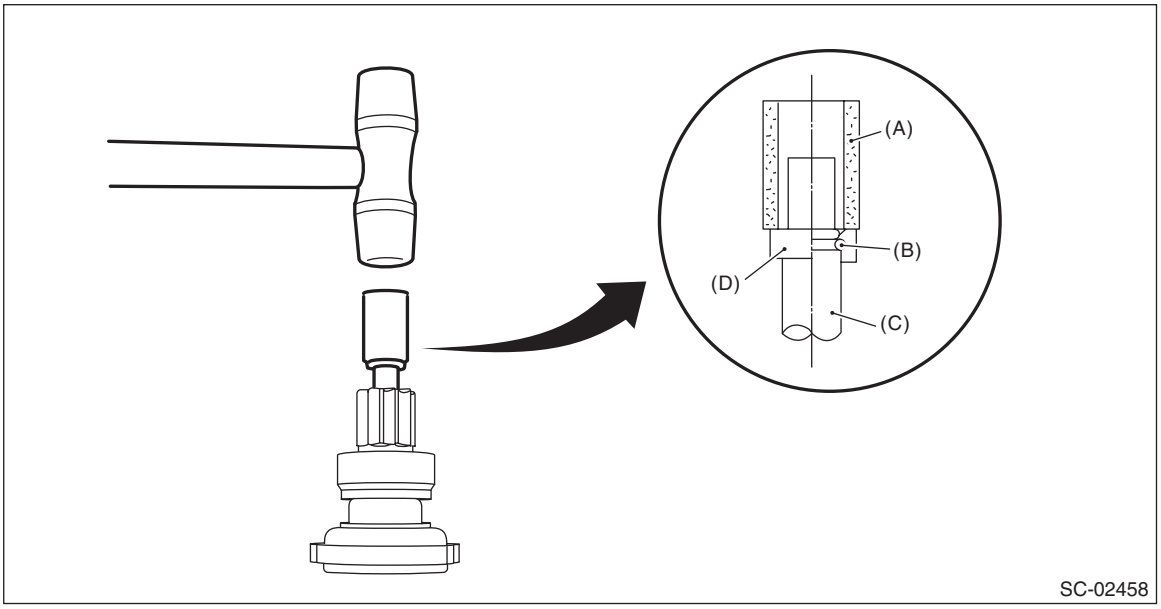
8) Remove seal rubber (A), plate (B), and seal rubber (C).



9) Lightly tap the starter housing assembly with a plastic hammer as shown in the figure, and remove the overrunning clutch, internal gear assembly, shaft and shift lever together as one unit.

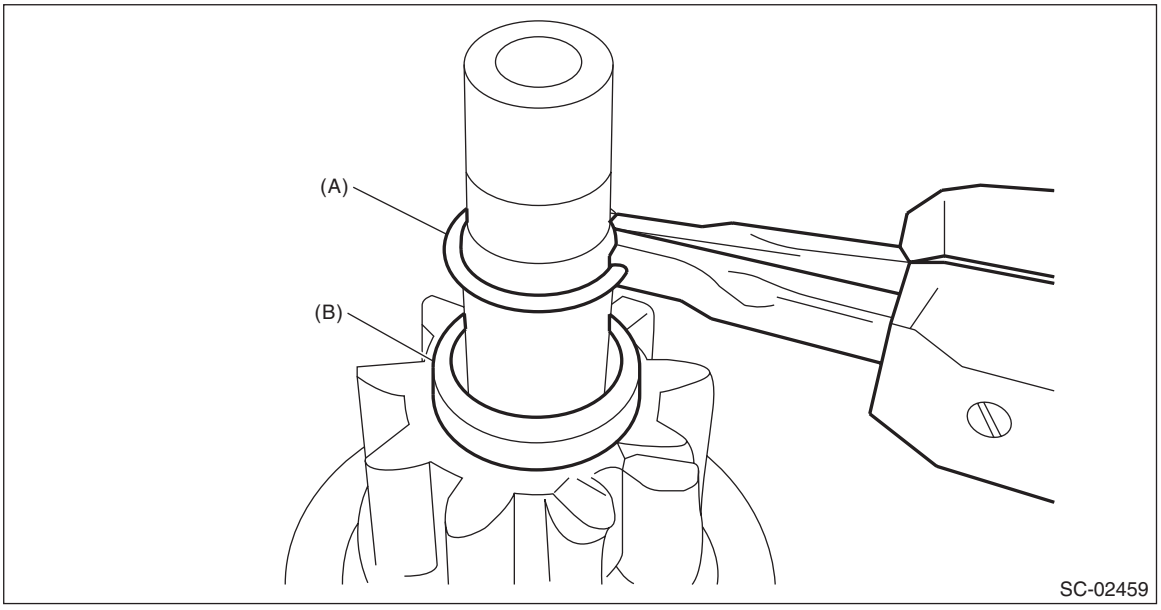


10) Use the following procedures to remove the overrunning clutch from the shaft.
(1) Use an appropriate tool (such as a fit socket wrench), and remove the stopper from snap ring by lightly tapping the stopper with a plastic hammer.

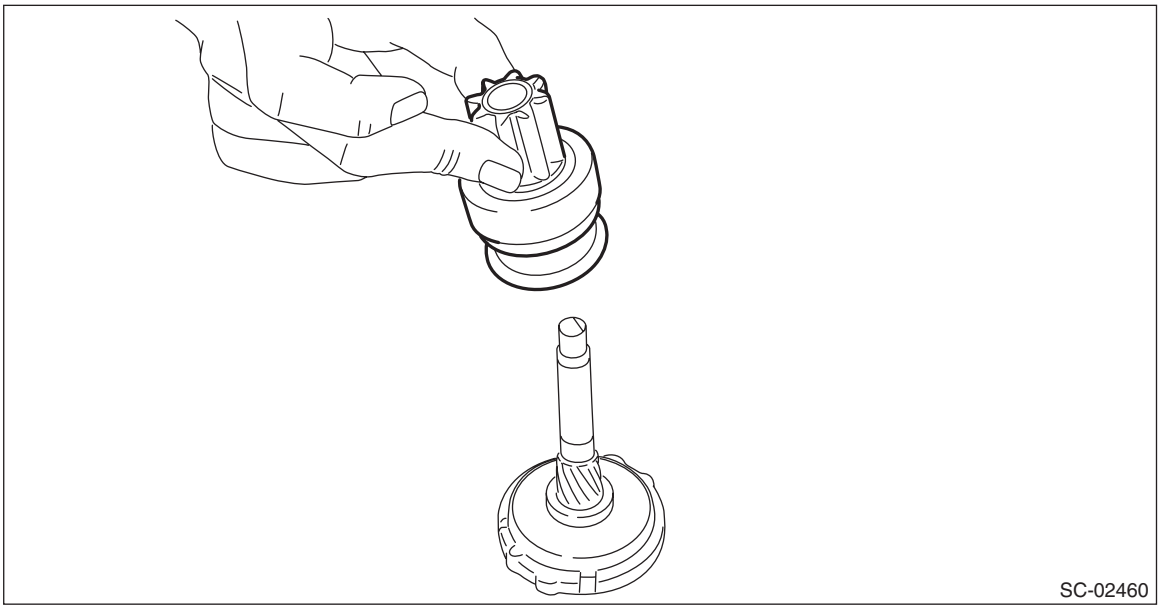


(A) Appropriate tool (B) Snap ring (C) Shaft
(D) Stopper

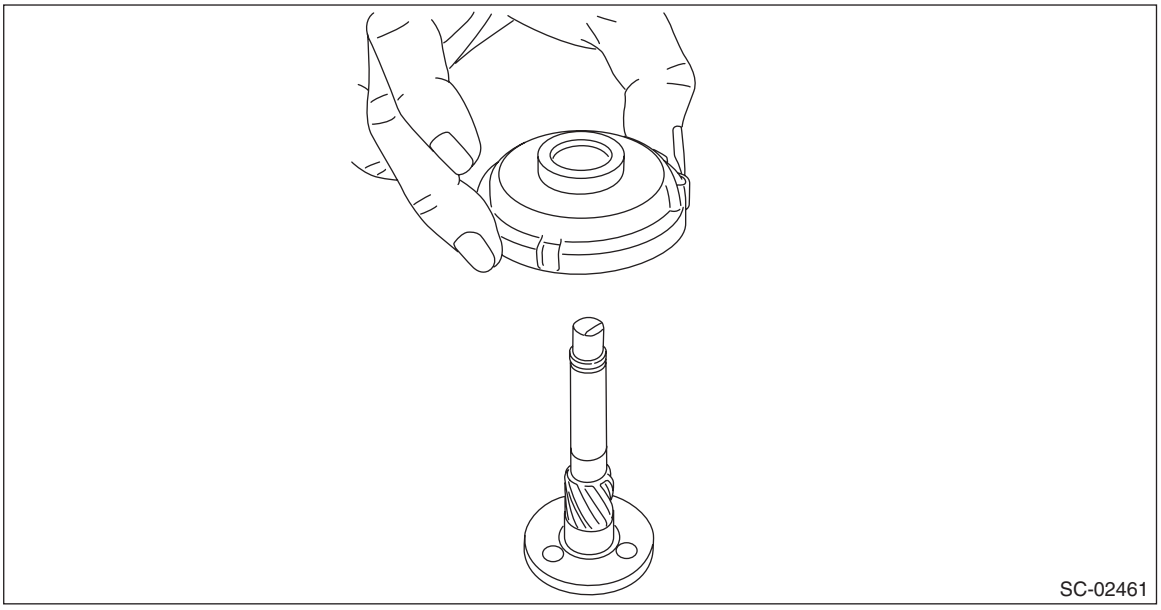
(2) Remove snap ring (A) from the shaft, and remove stopper (B).



(3) Remove the overrunning clutch from the shaft.


SC-02460

11) Separate the internal gear assembly and shaft.

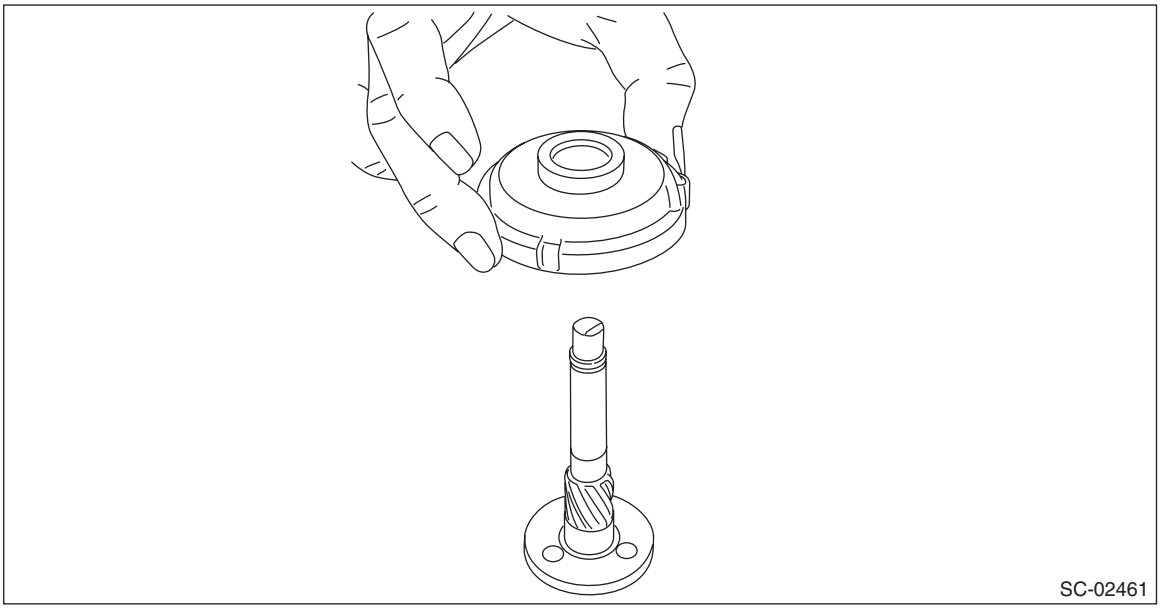

SC-02461

D: ASSEMBLY

1) Apply grease to the shaft sliding surfaces of the internal gear assembly.

Grease:
Multemp #6129 or equivalent

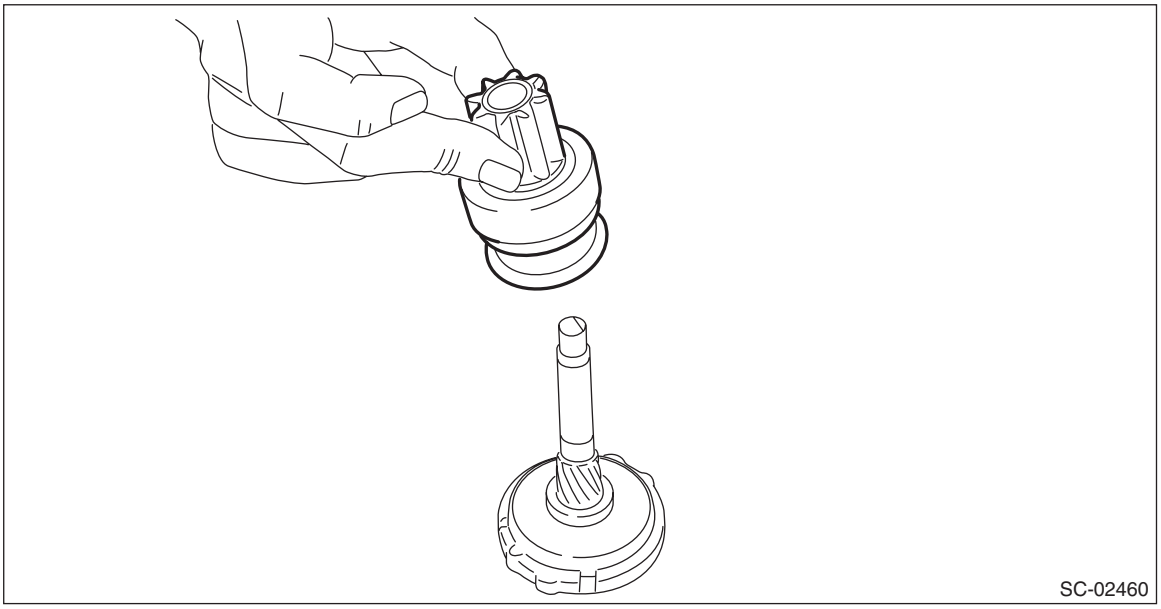
2) Assemble the shaft to the internal gear assembly.



3) Assemble the overrunning clutch as follows:
(1) Apply grease to the spline portion of the shaft.

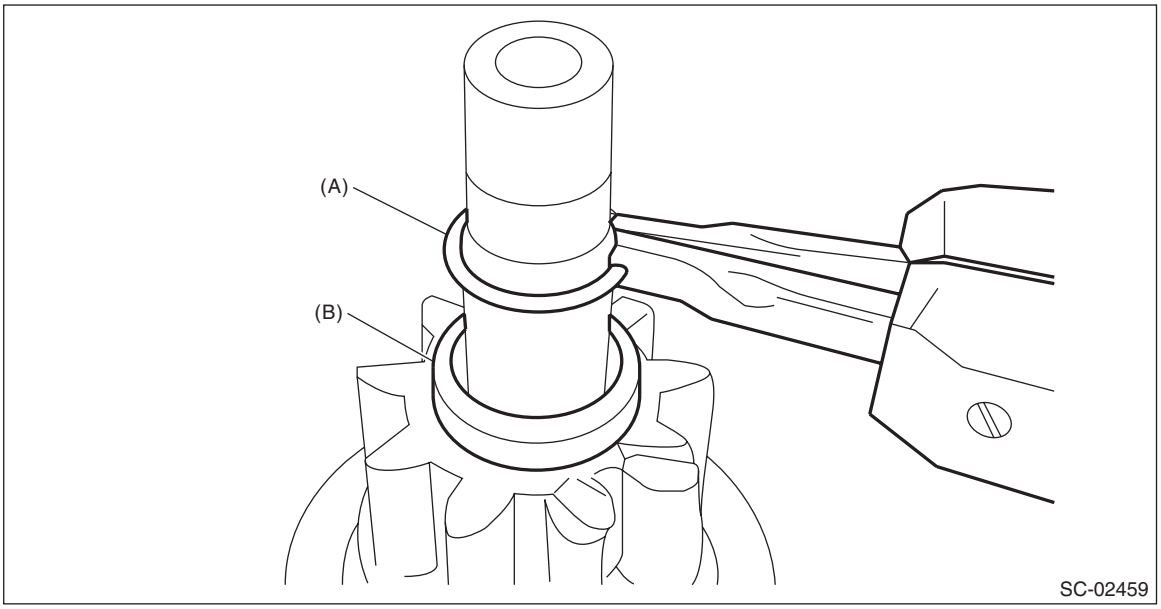
Grease:
Multemp #6129 or equivalent

(2) Install the overrunning clutch to shaft.

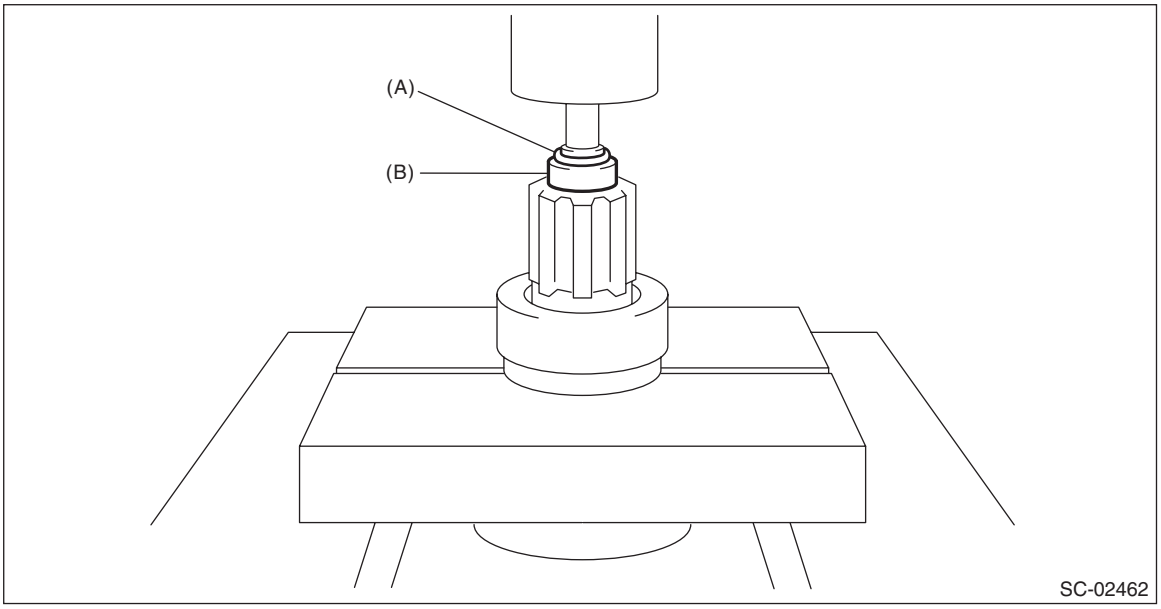


(3) Pass stopper (B) through the shaft assembly, and attach snap ring (A).

NOTE:
Use new stoppers and snap rings.



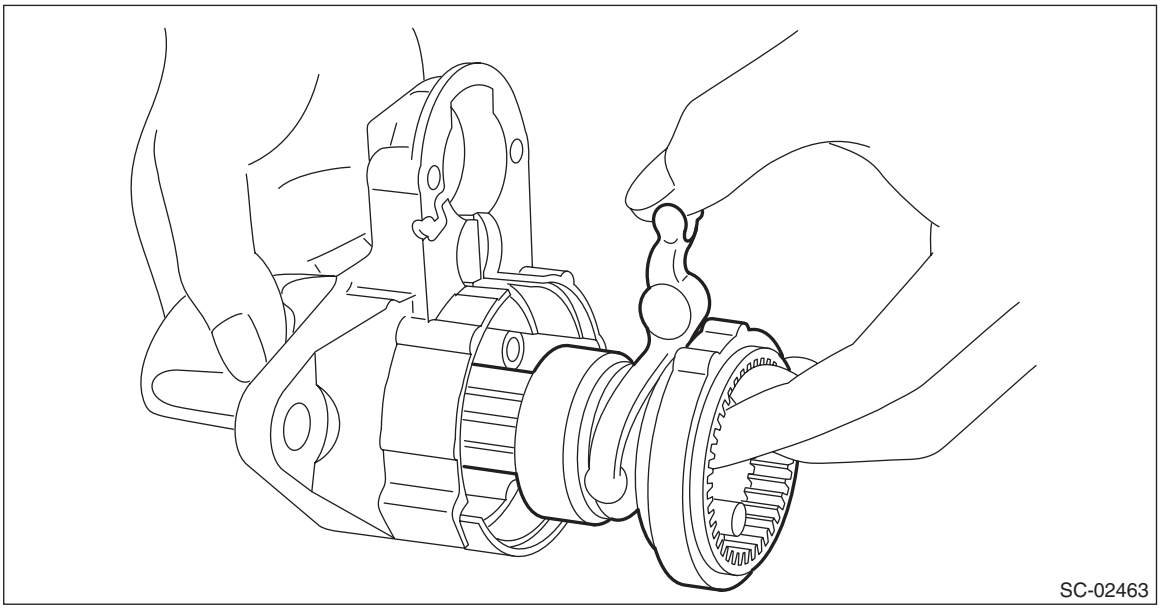
(4) Using a press, pressure fit stopper (B) into snap ring (A).



4) Assemble the overrunning clutch, internal gear assembly, shaft and shift lever as a single unit into the starter housing assembly.

NOTE:
Apply grease to the moving parts of the shift lever.

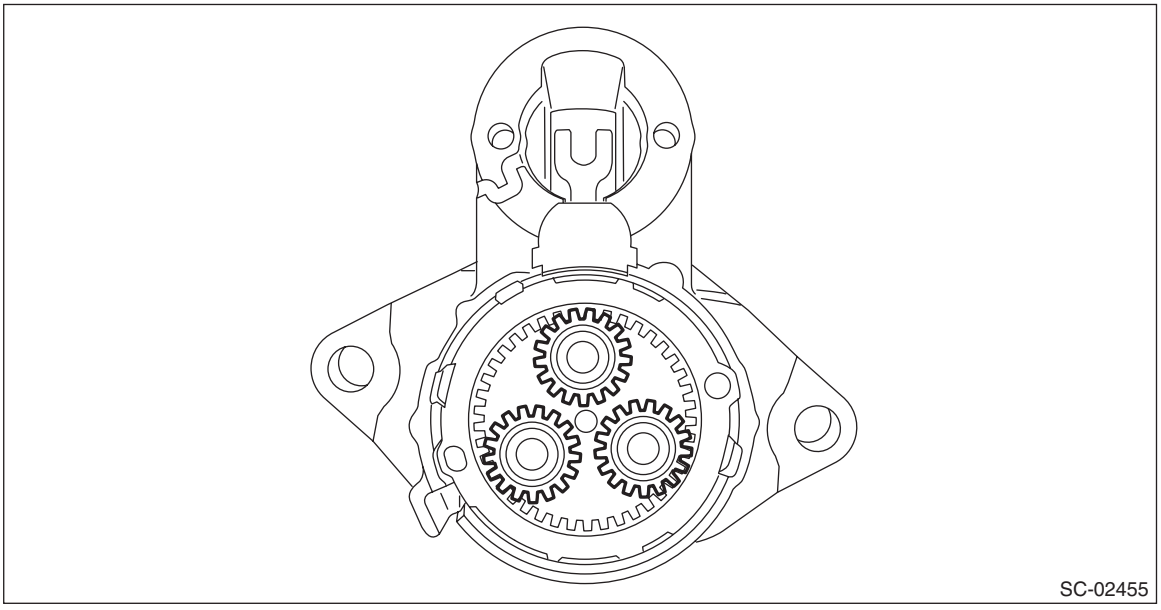
Grease:
Multemp #6129 or equivalent



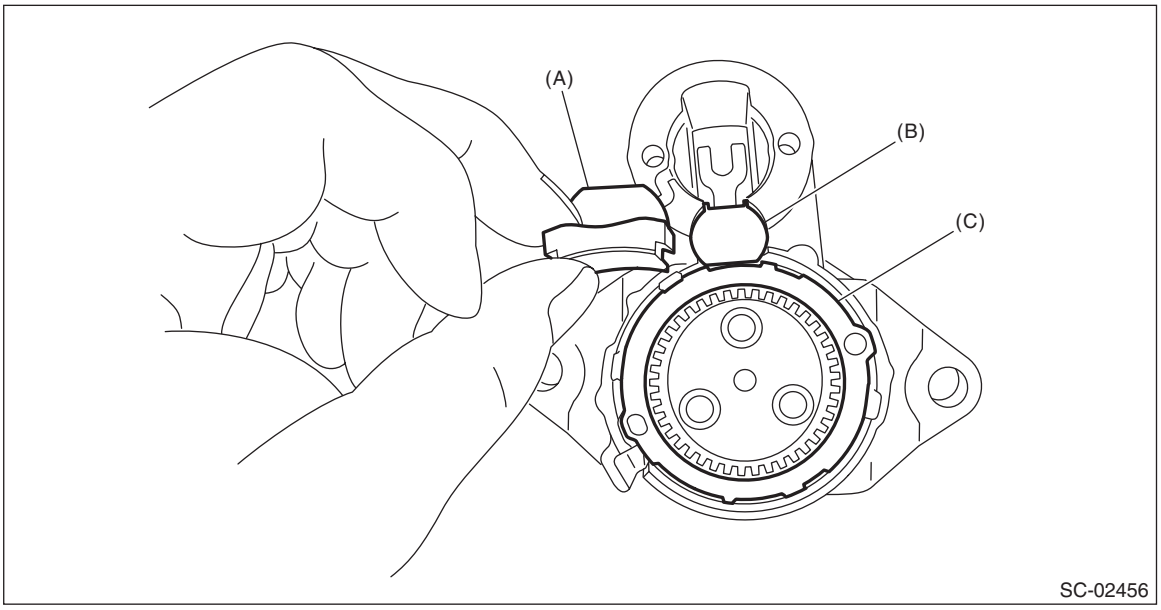
5) Apply grease to the inside of the internal gear assembly and pinion gear, and attach the pinion gear to the internal gear assembly.

NOTE:
- Apply grease evenly to the contact surfaces of each gear.
- Be careful that no debris becomes attached.

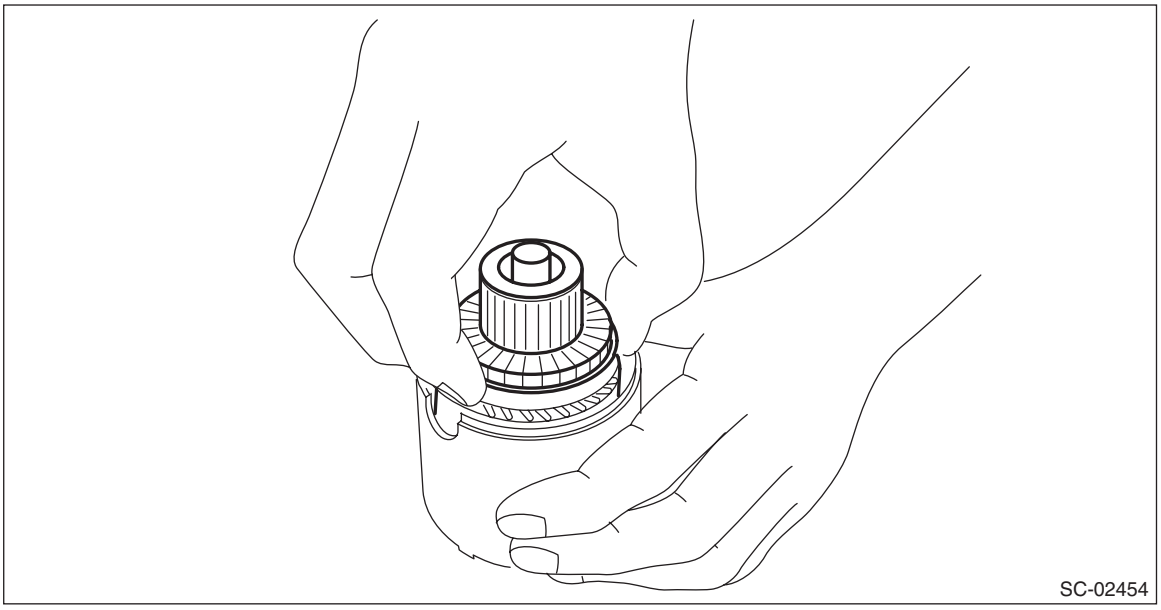
Grease:
Molykote® AG650 or equivalent



6) Install seal rubber (A), plate (B), and seal rubber (C).

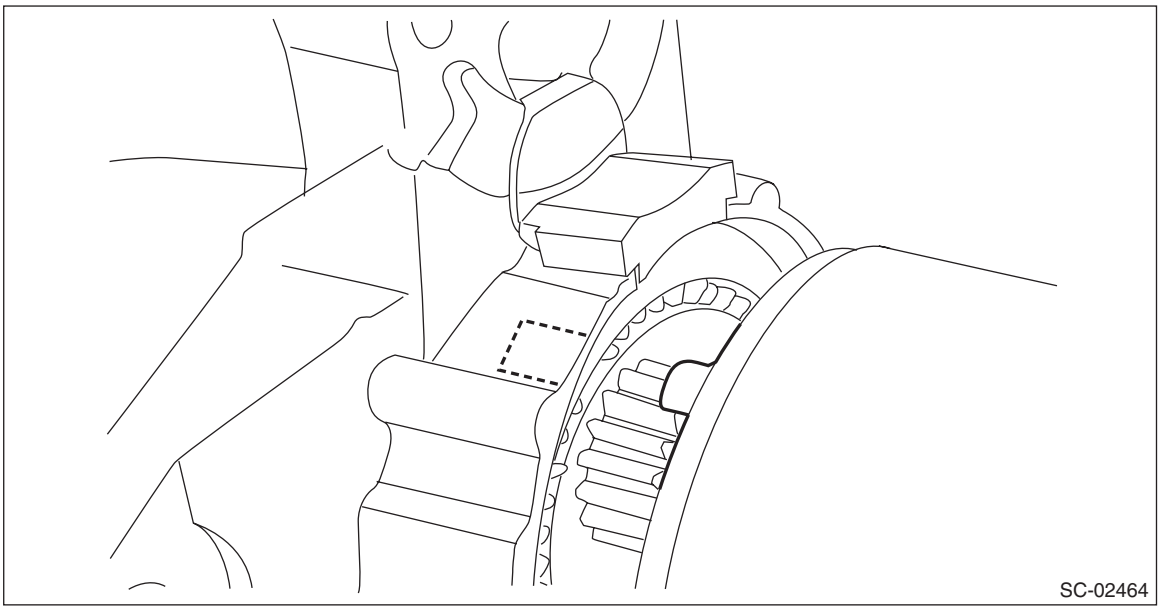


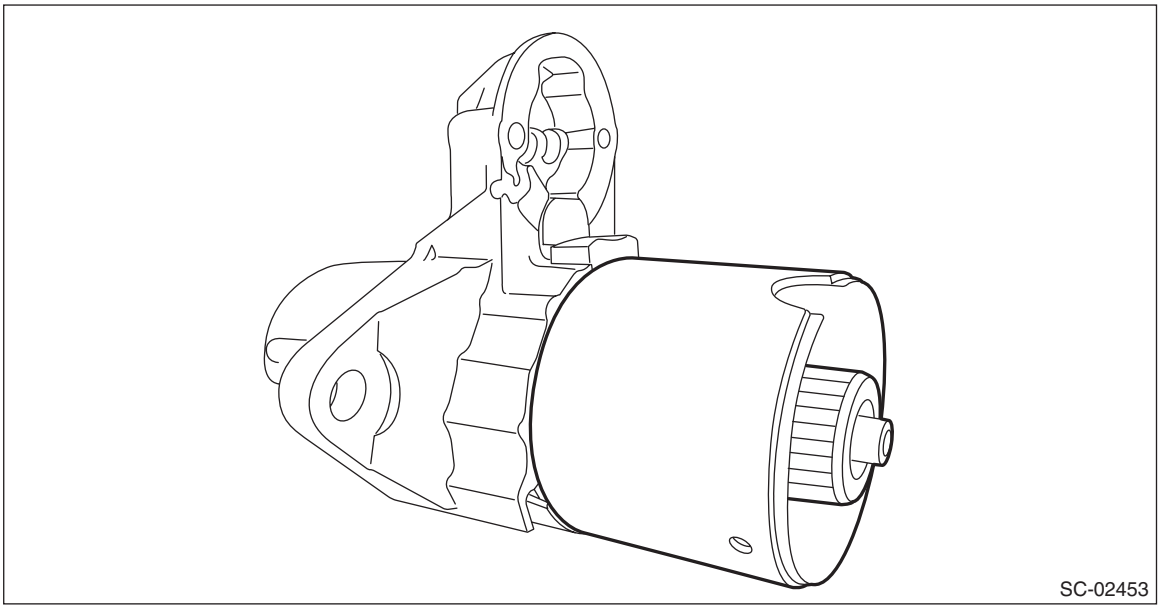
7) Assemble the armature assembly to the yoke assembly.



8) Attach the armature assembly and yoke assembly to the starter housing assembly together as a single unit.

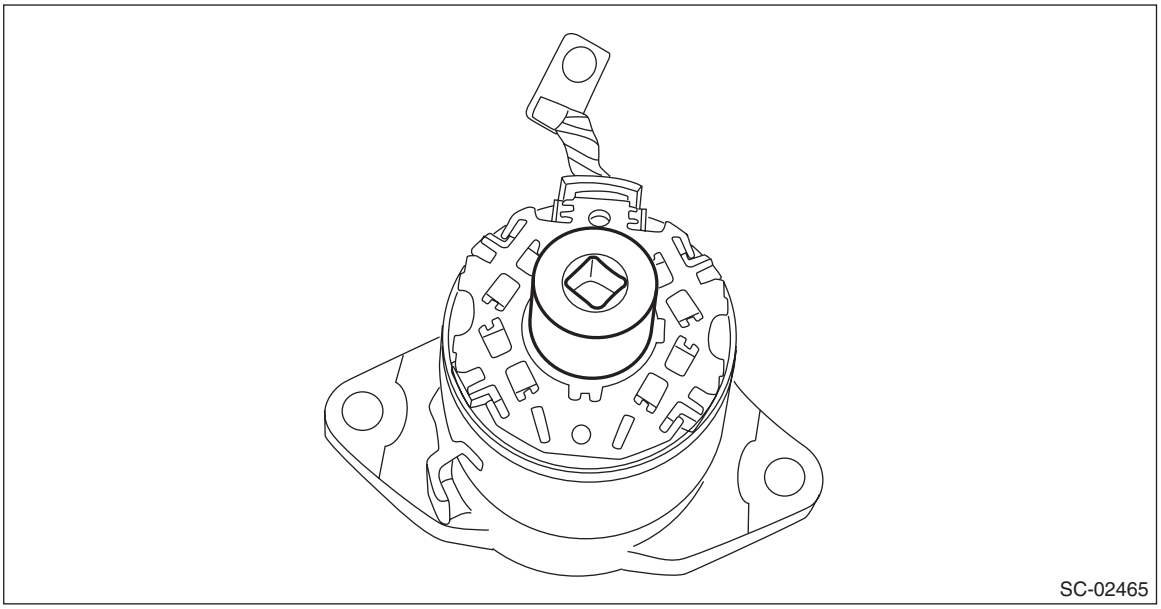
NOTE:
As shown in the figure, match the protrusion of the yoke assembly to the cut out of the starter housing assembly.


SC-02464


SC-02453

9) Use an appropriate tool (such as correctly sized socket wrenches) and attach the brush holder assembly to the armature assembly.

NOTE:
Be careful not to damage the brushes.

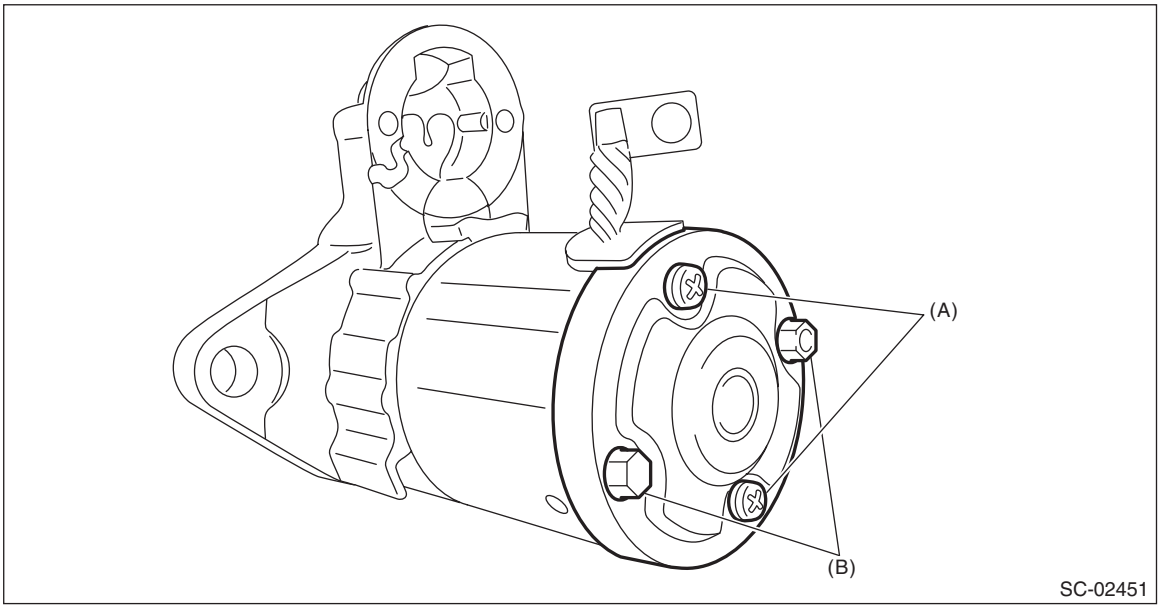


10) Secure starter cover assembly to the brush holder assembly with screws (A).

Tightening torque:
1.4 N·m (0.1 kgf-m, 1.0 ft-lb)

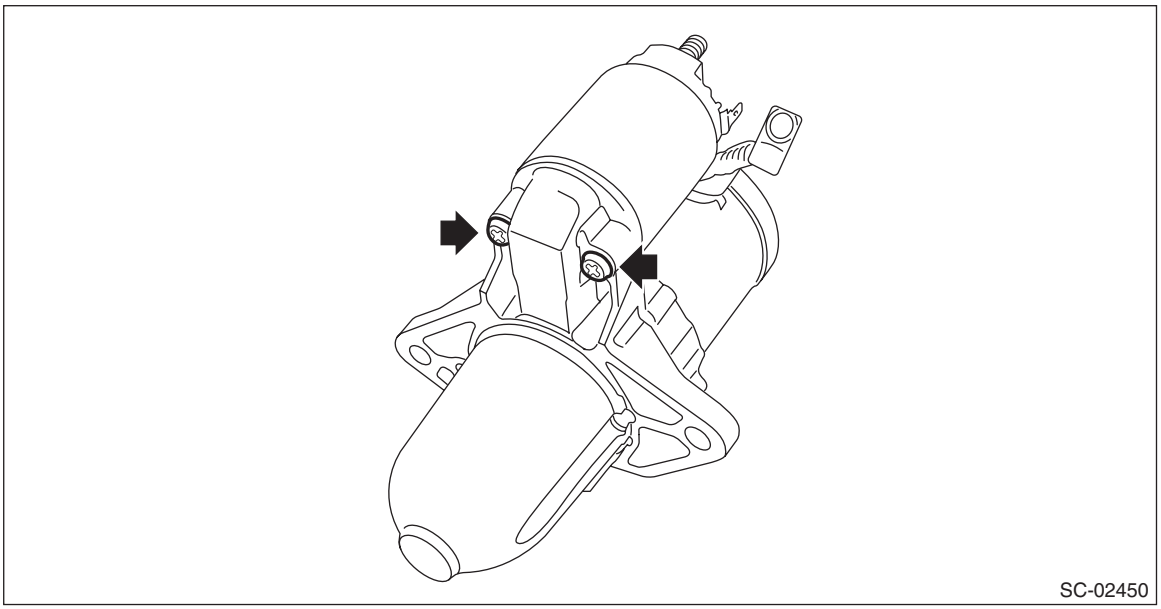
11) Tighten through bolts (B) on both sides.

Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



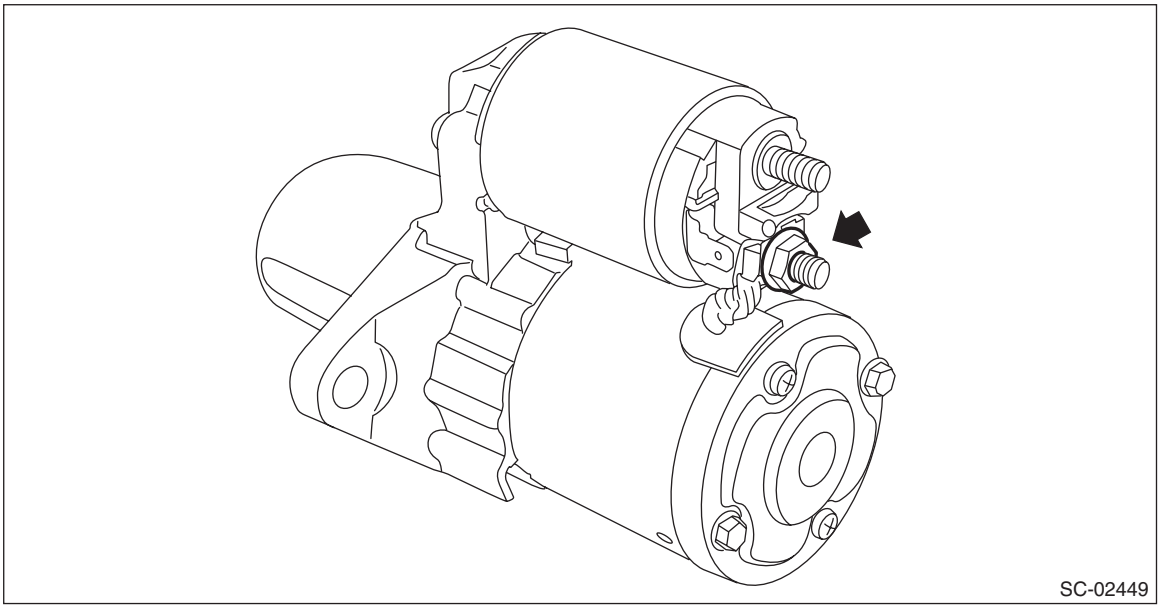
12) Attach the magnet switch assembly to the starter housing assembly.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



13) Attach the cable to the terminal M of the magnet switch assembly, and secure with nuts.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

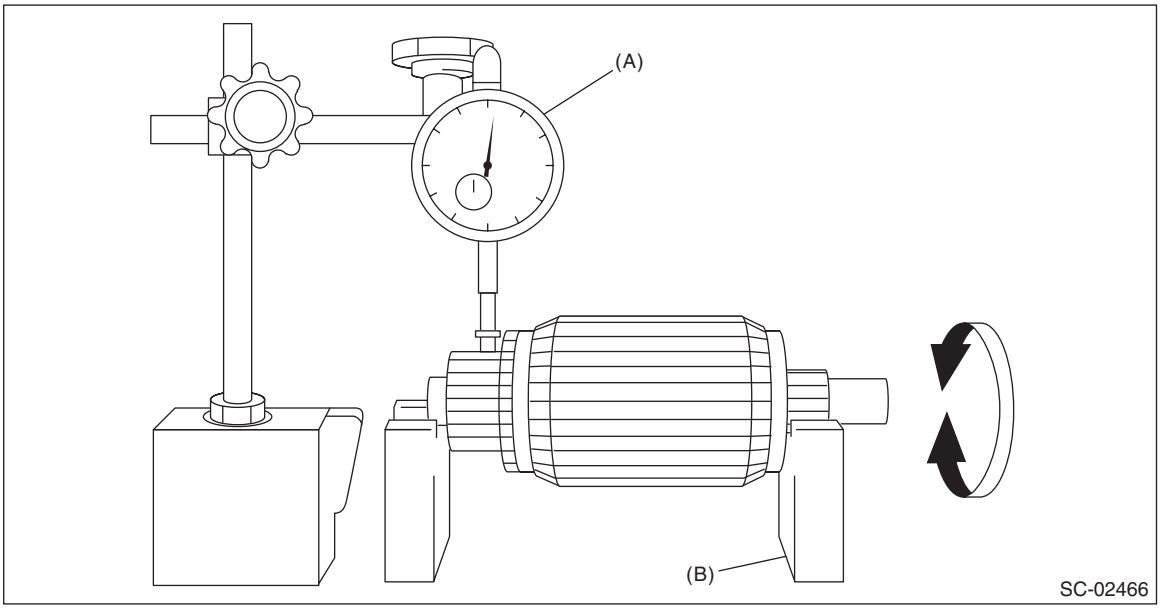


E: INSPECTION

1. ARMATURE

1) Check the commutator for signs of seizure or stepped wear caused by roughness of the surface. If there is light wear, use sandpaper to repair.
2) Check for runout on the commutator. If excessive, replace the armature.

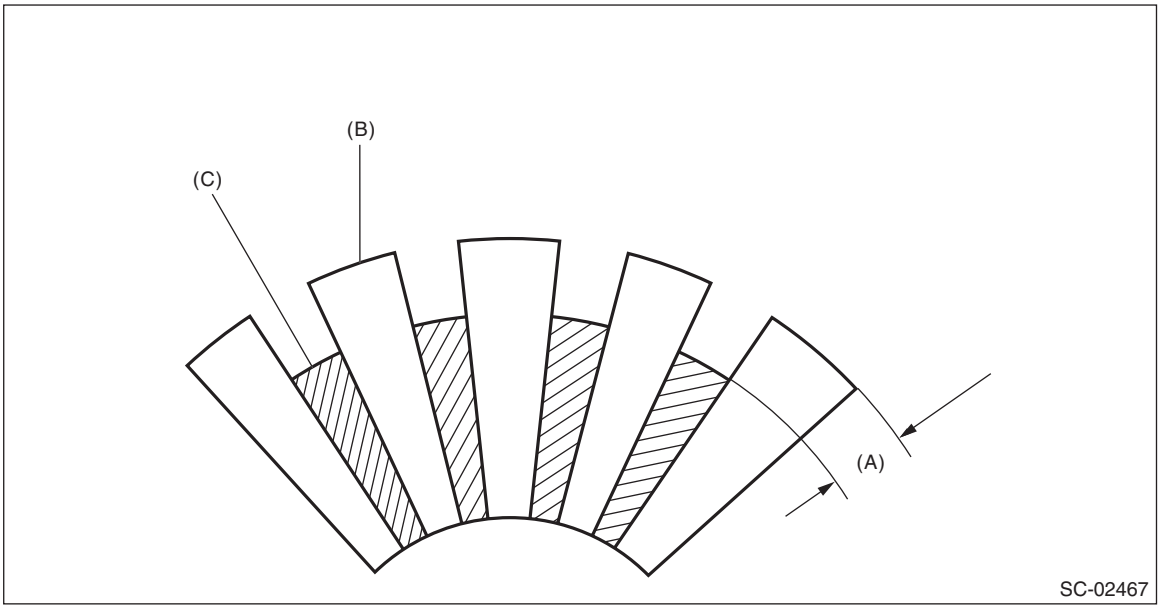
Commutator runout:
Standard
0.05 mm (0.0020 in)
Limit
0.10 mm (0.0039 in)



(A) Dial gauge
(B) V-block

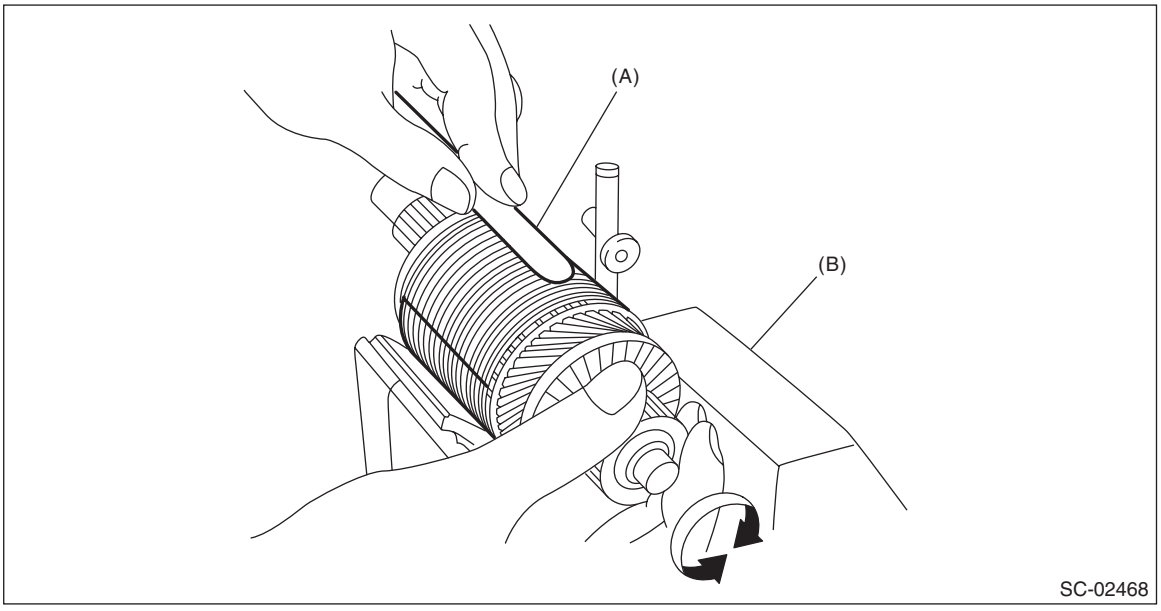
3) Check the depth of the segment mold. If it is not within the standard, replace the armature.

Depth of segment mold:
Standard
0.50 mm (0.020 in)



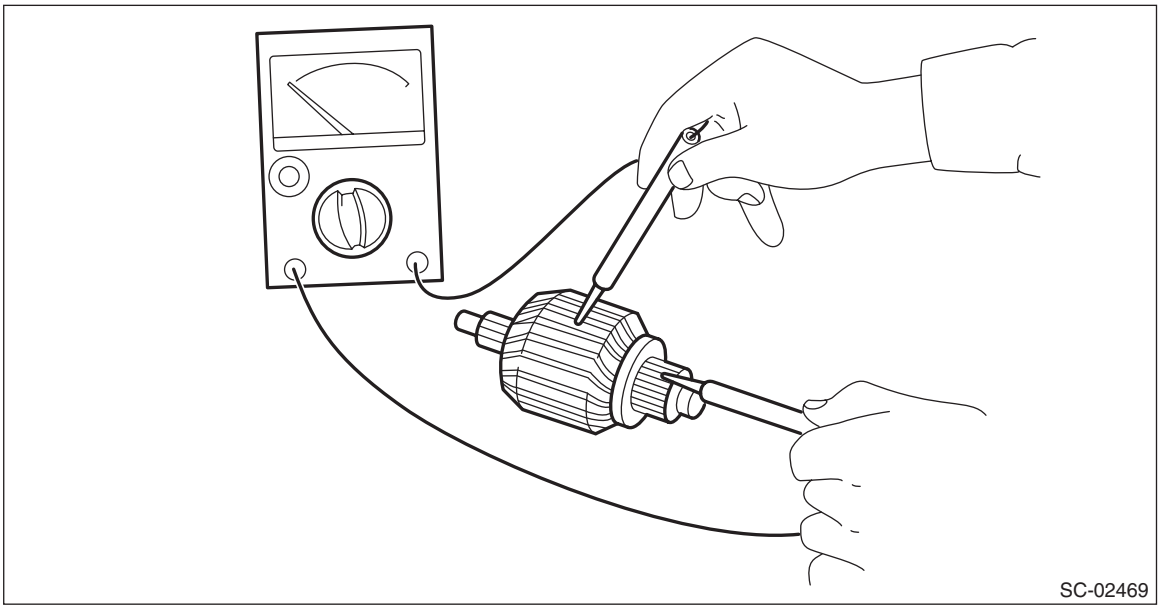
(A) Depth of mold (B) Segment (C) Mold

4) Place the armature on the growler tester to check for short circuits. While slowly turning the armature, support the steel sheet for the armature core. If the circuit of the armature is shorted, the steel sheet will vibrate, causing it to move towards the core. When the steel sheet has moved or vibrated, replace the armature.



(A) Steel sheet (B) Growler tester

5) Use a circuit tester to touch the probe of one side to the commutator segment, and the other probe to the shaft. If there is continuity, replace the armature.



2. YOKE

Make sure that the pole is set at the predetermined position.

3. OVERRUNNING CLUTCH

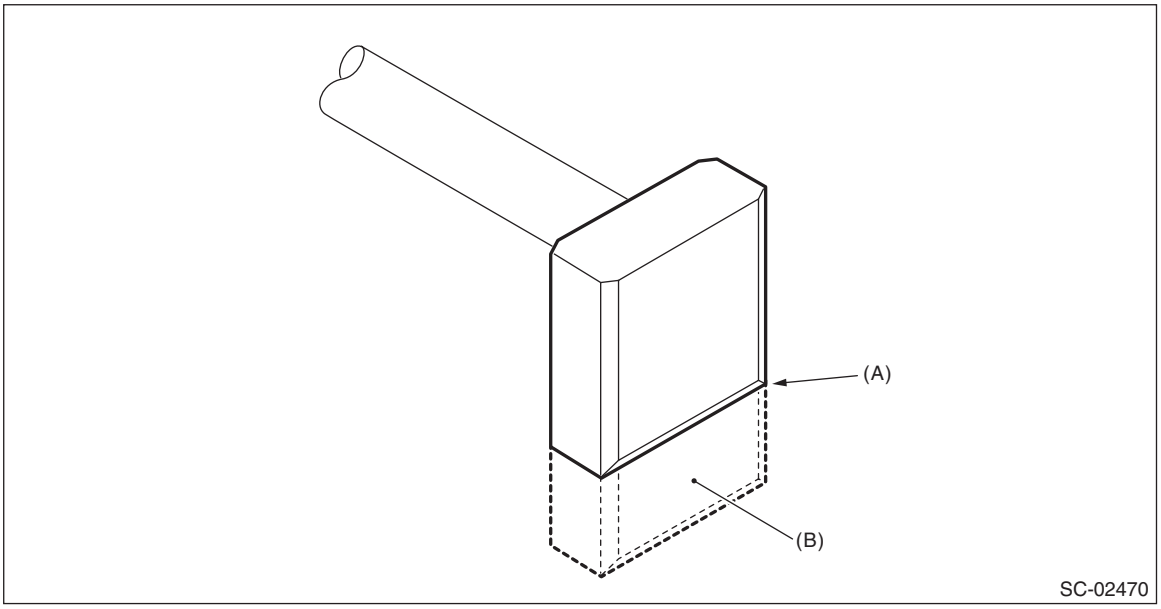
Inspect the pinion, and if there is any wear or damage, replace the overrunning clutch. Also, check that the pinion rotates counterclockwise smoothly and does not rotate clockwise. If there is any fault, replace the overrunning clutch.

CAUTION:
To prevent spilling of grease, do not clean the overrunning clutch with oil.

4. BRUSH AND BRUSH HOLDER

1) Visually check the brush. If there is any abnormal wear or cracks, replace the brush.
2) Measure the length of the brush. If it exceeds service limits, replace the brush.

Brush length:
Standard
12.3 mm (0.484 in)
Limit
7.0 mm (0.276 in)



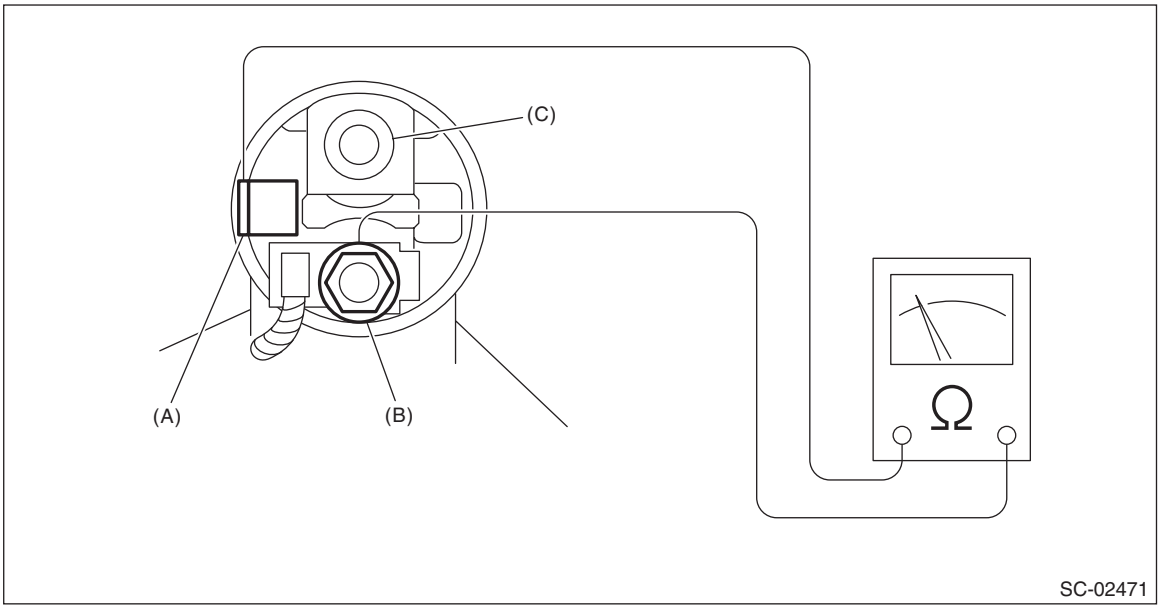
(A) Service limit line (B) Brush

3) Check that the brush moves smoothly in the brush holder.
4) Measure the brush spring force with a spring scale. Replace the brush holder if below the service limit.

Brush spring force:
Standard
15.9 — 19.5 N (1.62 — 1.99 kgf, 3.57 — 4.38 lbf) (when new)
Limit
2.5 N (0.25 kgf, 0.56 lbf)

5. SWITCH ASSEMBLY

Using a circuit tester, check there is continuity between S terminal and M terminal, and between S terminal and ground. Also, check that there is no continuity between M terminal and B terminal.



(A) Terminal S (B) Terminal M (C) Terminal B

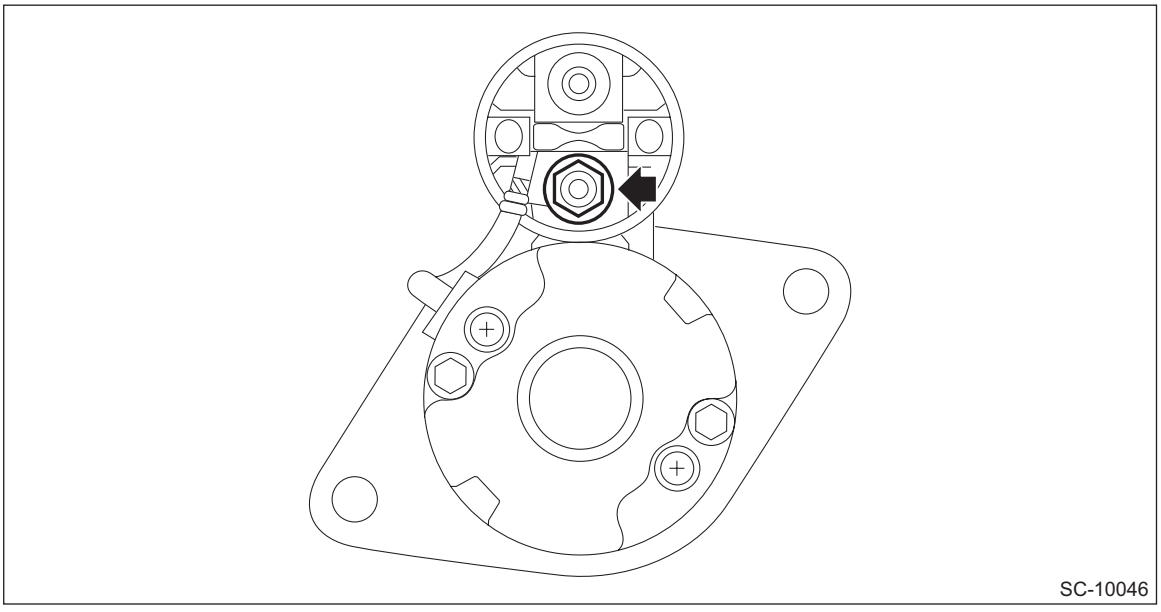
Terminals	Standard
Terminal S — terminal M	1 Ω or less
Terminal S — Ground	1 Ω or less
Terminal M — terminal B	1 MΩ or more

6. SWITCH ASSEMBLY OPERATION

CAUTION:
Perform the inspection in a short period of time. (Within 3 to 5 seconds)

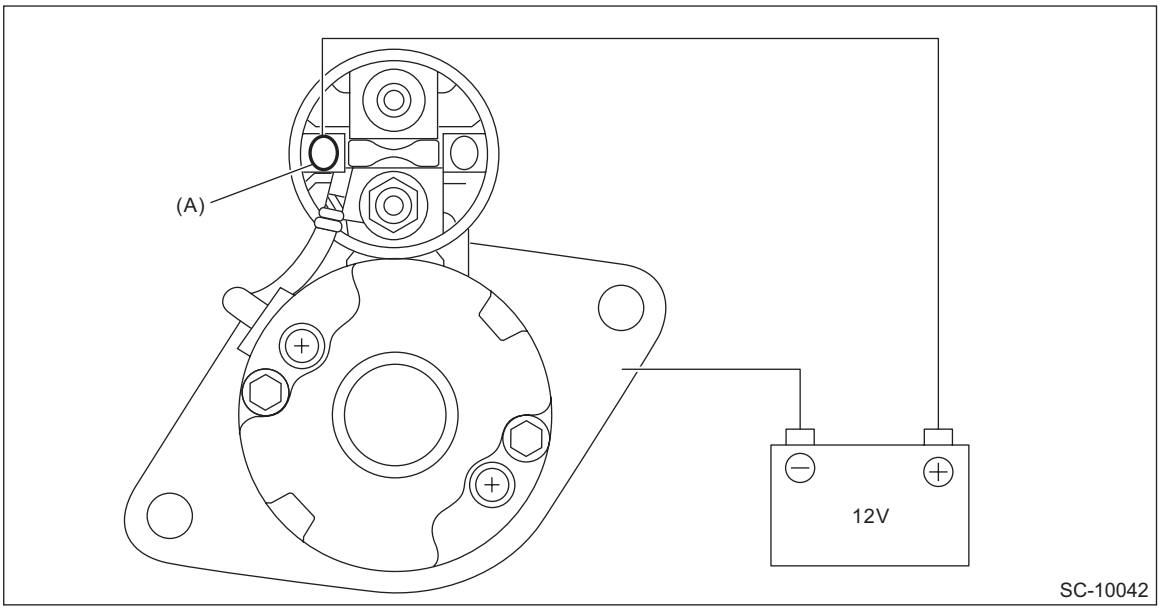
1) Loosen the nut which holds the M terminal to the starter body.

NOTE:
This procedure is required to facilitate the harness removal from the M terminal.



2) Connect the battery positive terminal to the switch assembly S terminal, and connect the battery negative terminal to the starter body. Then, if the pinion protrudes, it is normal.

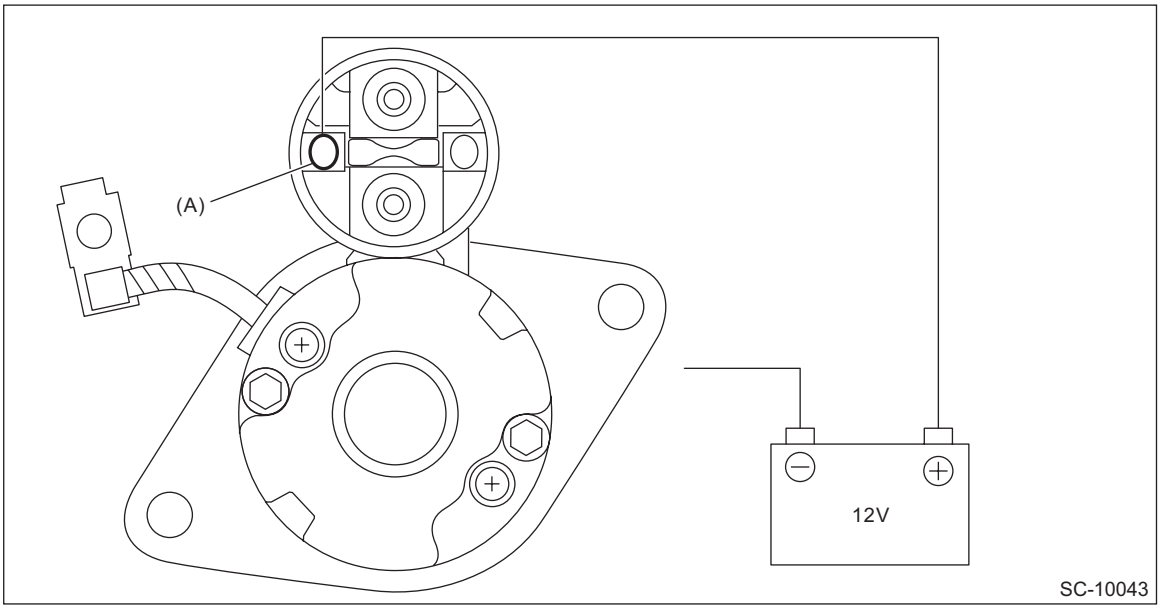
NOTE:
The starter motor may rotate while the pinion protrudes. This occurs due to current that flows to the motor via pull-in coil. This is not a problem.



(A) Terminal S

3) Disconnect the harness from the M terminal. Check that the pinion is being protruded at this time.

CAUTION:
Hold the disconnected harness so that it does not contact the terminal or wiring.
4) Disconnect the battery negative terminal from the starter body. Then, if the pinion returns to its original position, it is normal.



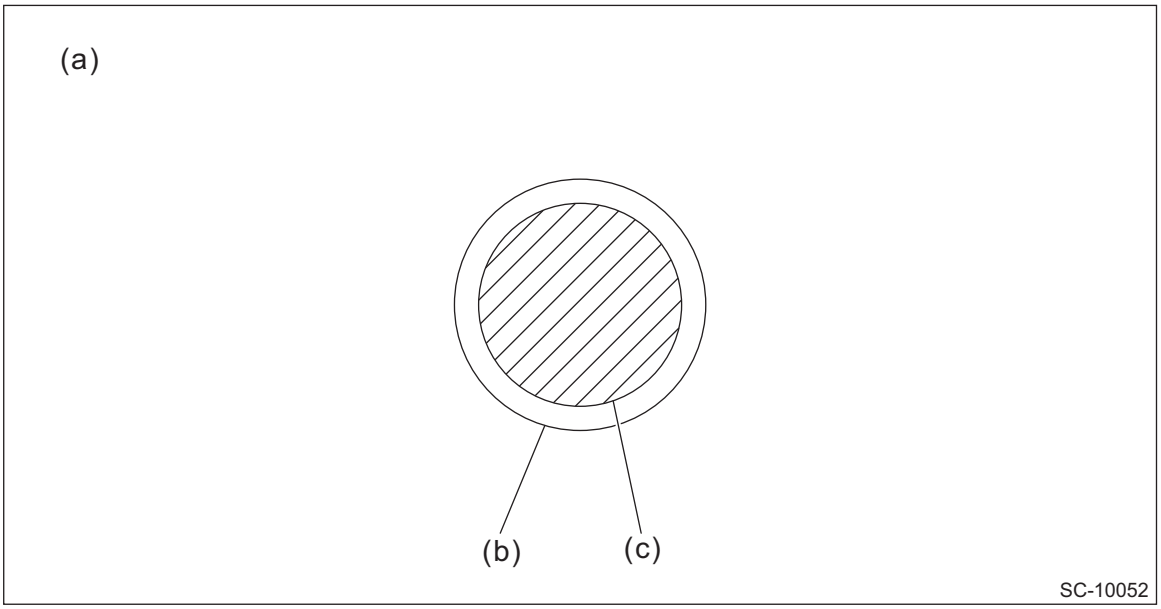
(A) Terminal S

7. NO-LOAD TEST

The starter should be placed through a no-load test whenever it has been overhauled.
For no-load test, use the circuit shown in figure.

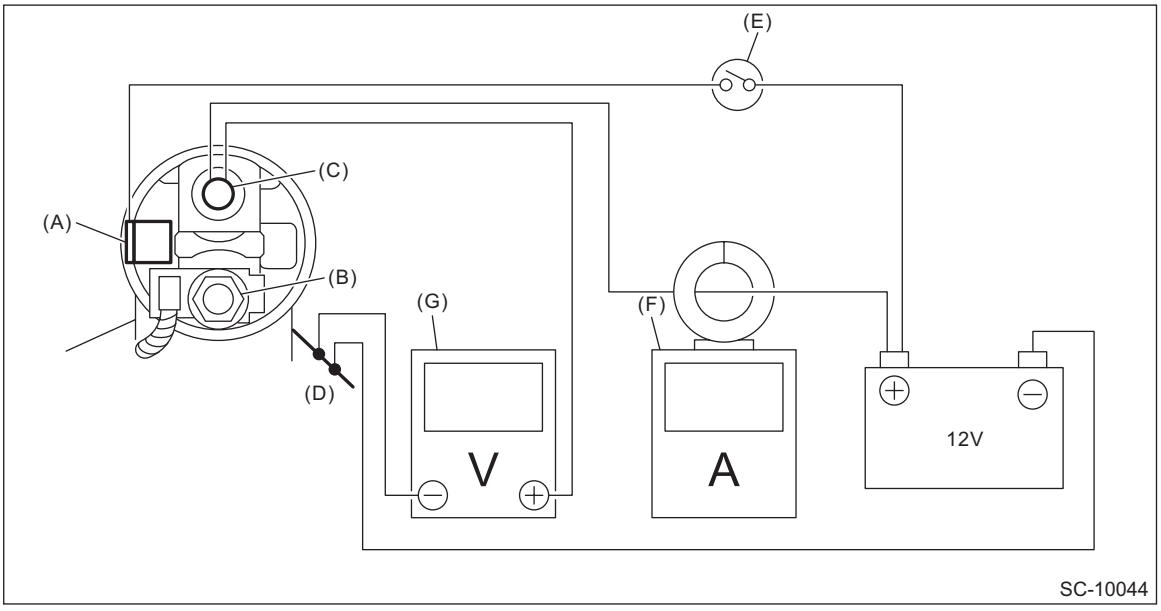
CAUTION:

- **Use a thick cable due to large current flowing through the cable.**
  - **For B terminal and ground, it is recommended that the cross-section area of continuity part (shaded part) should be 20 mm ^{2} (0.00310 sq in) or more. For S terminal, 1.25 mm ^{2} (0.00194 sq in) or more.**



(a) Cable cross-section (b) Cable shield part (c) Cable continuity part

  - **It is possible to use a booster cable instead of wiring.**
- **Be careful not to burn yourself and cause a fire due to heat.**
- **Perform the no-load test in a short period of time. (Within 3 to 5 seconds)**



(A) Terminal S (B) Terminal M (C) Terminal B
(D) Magnet switch (E) Switch (F) Circuit tester with clamp-type ammeter
(G) Circuit tester

1) Using a vise, secure the starter.

CAUTION:
Be careful not to deform or damage the starter.
2) Turn the switch ON, and check that the pinion protrudes rapidly into the specified position and rotates powerfully without noise.
3) Check the current and voltage after its rotation speed stabilizes.

Current/Voltage
90 A or less (approx. 11 V)

8. OTHER INSPECTIONS

Check that the starter does not have deformation, cracks and any other damage.

3. Integrated Starter Generator (ISG)

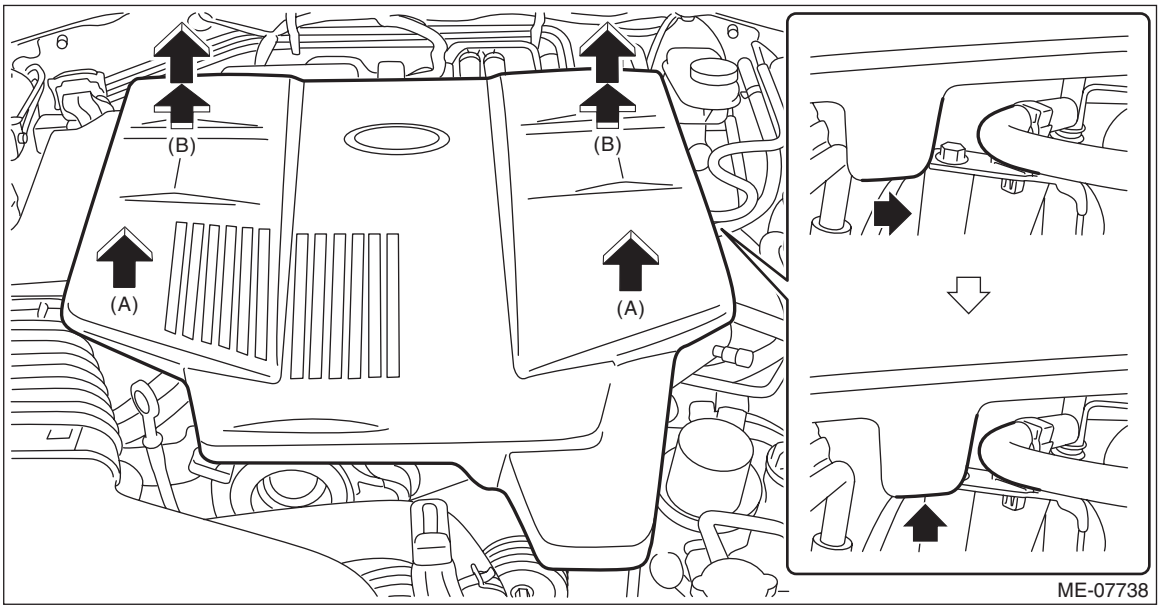
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

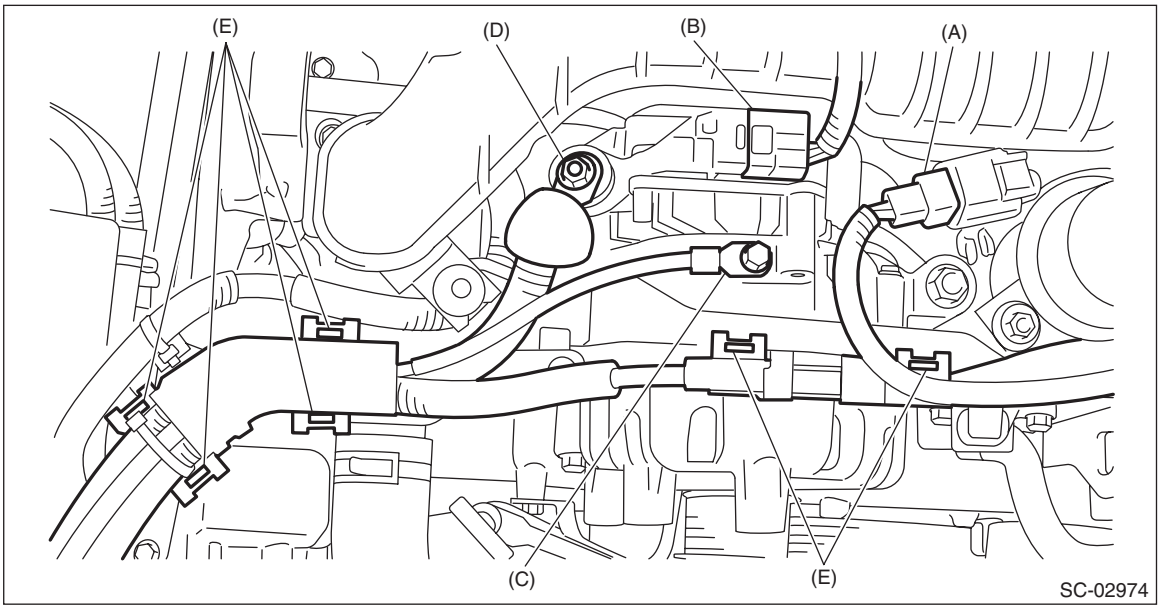
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

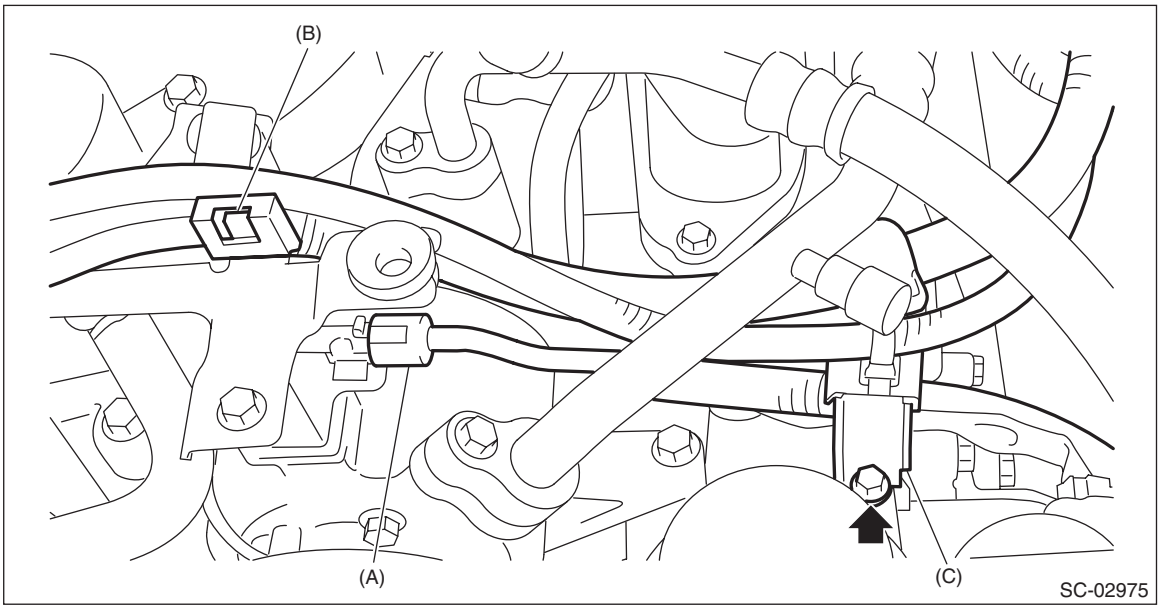


3) Remove the air intake duct. <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
4) Remove the intake duct. <Ref. to IN(H4DO(HEV))-16, REMOVAL, Intake Duct.>
5) Remove the V-belts. <Ref. to ME(H4DO(w/o HEV))-126, HEV MODEL, REMOVAL, V-belt.>
6) Disconnect the connector (A) from the brake vacuum pump, and disconnect the connector (B) from ISG.
7) Disconnect the terminal (C) and the terminal (D) from ISG.

8) Remove the clip (E) securing the battery cable assembly, and remove the battery cable assembly from the battery cable bracket No. 1 and the collector cover bracket.

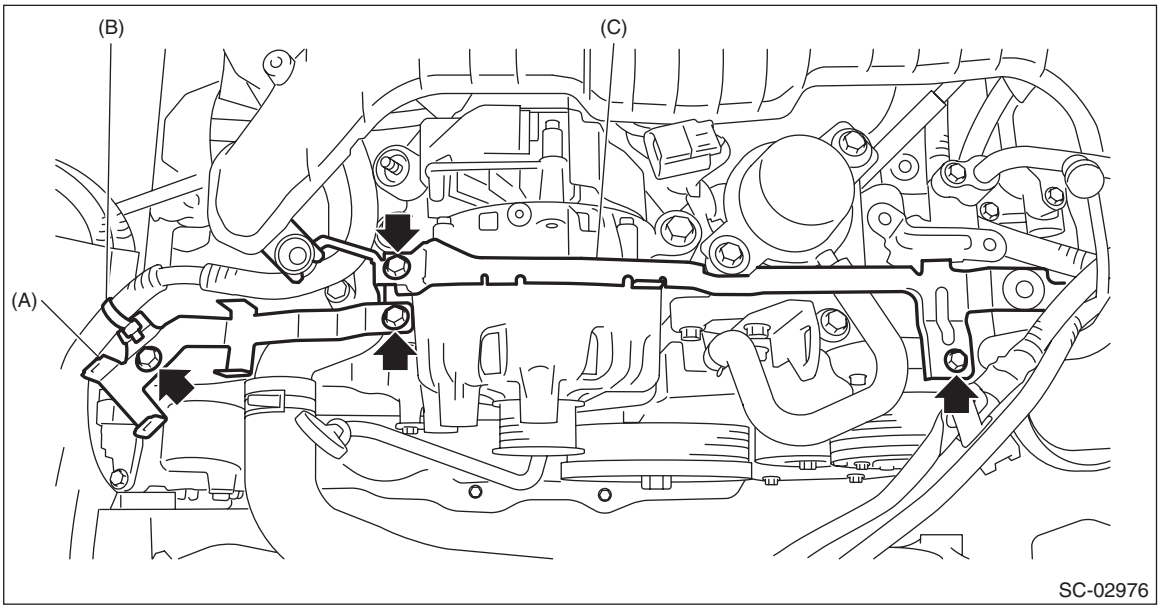


9) Disconnect the connector (A) from the A/C compressor, and remove the clip (B) securing the battery cable assembly to the collector cover bracket.
10) Remove the bolts which secure the battery cable stay (C) to the chain cover, and move the battery cable assembly to the front of the vehicle.

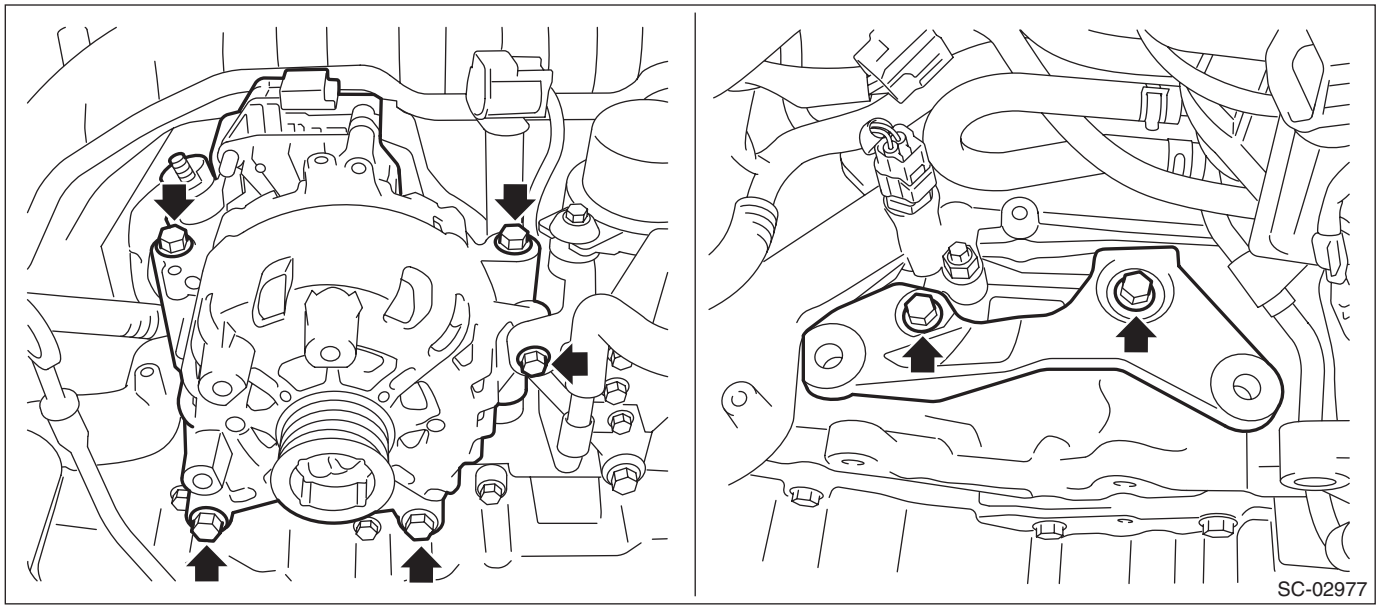


11) Remove the clip (B) which holds the engine harness to the battery cable bracket No. 1 (A).

12) Remove the battery cable bracket No. 1 (A) and collector cover bracket (C).



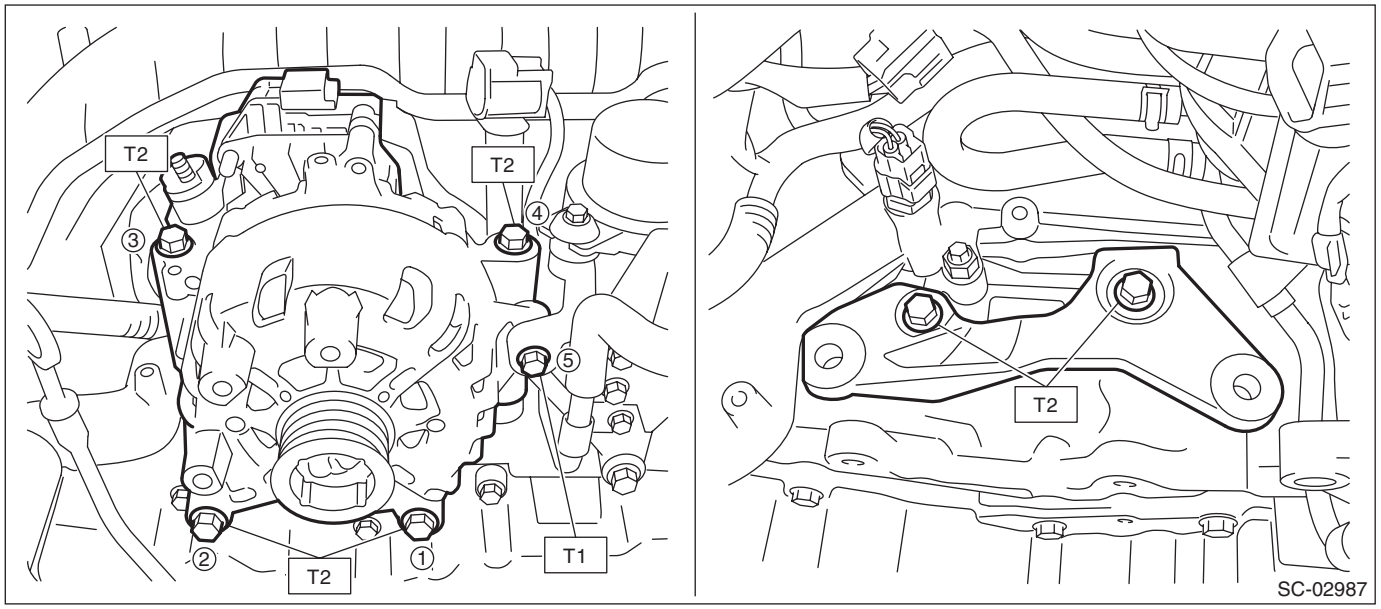
13) Remove ISG from the engine assembly, ISG bracket and brake vacuum pump bracket.
14) Remove the ISG bracket from the engine assembly.



B: INSTALLATION

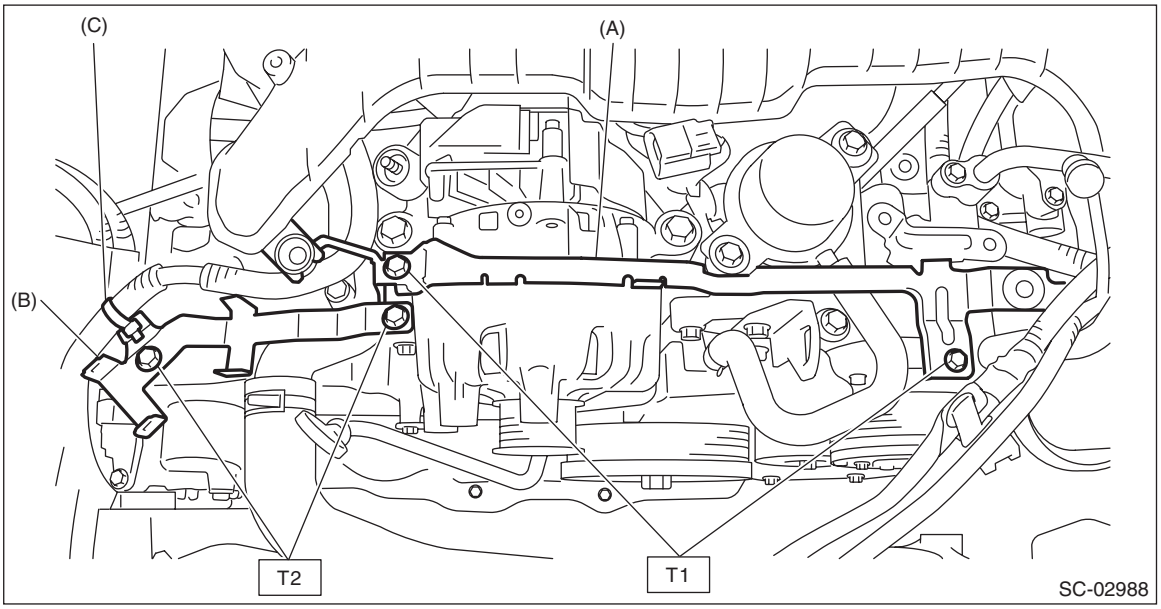
1) Install the ISG bracket to the engine assembly.
2) Set ISG to the engine, ISG bracket and brake vacuum pump bracket, and tighten the bolts in numerical order as shown in the figure.

Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T2: 36 N·m (3.7 kgf-m, 26.6 ft-lb)



3) Install the collector cover bracket (A).
4) Install the battery cable bracket No. 1 (B), and secure the engine harness to the battery cable bracket No. 1 (B) with the clip (C).

Tightening torque:
T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T2: 19 N·m (1.9 kgf-m, 14.0 ft-lb)

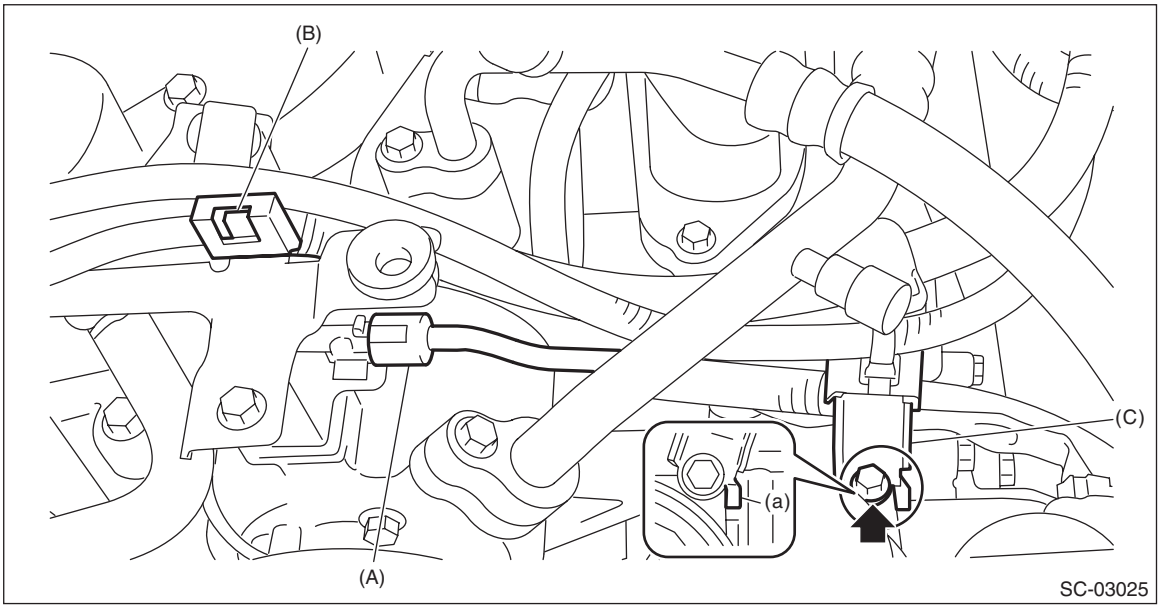


5) Set the battery cable assembly, and install the battery cable stay (C) to the chain cover.

NOTE:
When installing the battery cable stay, install it by fitting the folded end (a) of the battery cable stay to the chain cover boss.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

6) Connect the connector (A) to the A/C compressor, and secure the battery cable assembly to the collector cover bracket with the clip (B).

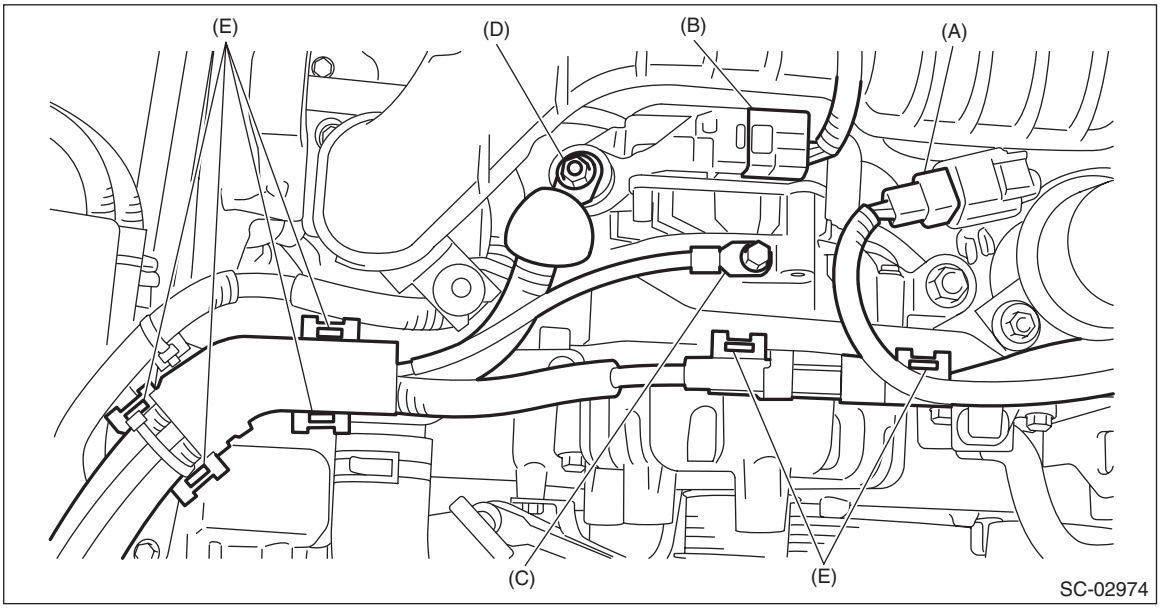


7) Secure the battery cable assembly to the battery cable bracket No. 1 and the collector cover bracket with the clip (E).
8) Connect the connector (B) to ISG, and install the terminal (D) to ISG.

Tightening torque:
15.5 N·m (1.6 kgf-m, 11.4 ft-lb)

9) Install the terminal (C) to ISG, and connect the connector (A) to the brake vacuum pump.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

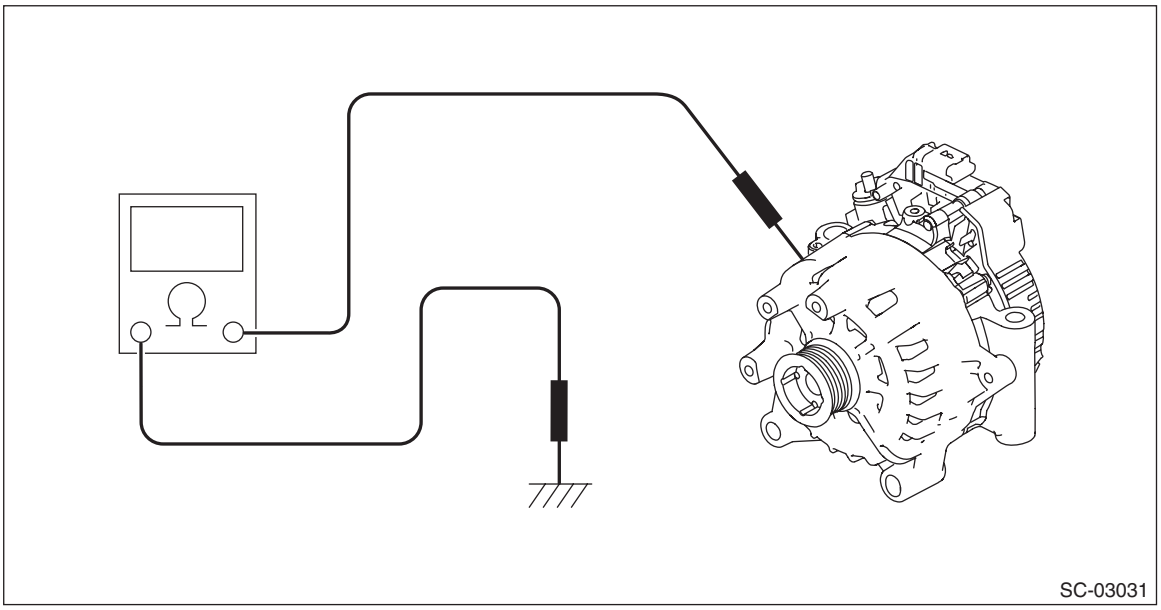


10) Install the V-belts. <Ref. to ME(H4DO(w/o HEV))-136, HEV MODEL, INSTALLATION, V-belt.>
11) Install the intake duct. <Ref. to IN(H4DO(HEV))-17, INSTALLATION, Intake Duct.>
12) Install the air intake duct. <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
13) Install the collector cover.
14) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1. CHECK ISG SENSOR

1) Check ISG for deformation, cracks or damage.
2) Check the ISG ground circuit.
   (1) Check the continuity between the ISG unit and chassis ground.



   (2) If no continuity exists, inspect the ISG installation condition, chassis ground and engine ground conditions, then repair as necessary.

2. CHECK CHARGE WARNING LIGHT

Inspect as follows, if the charge warning light illuminates.

Step		Check	Yes	No
1	**CHECK DTC.**	Is DTC of HEV and IDI displayed? <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).> <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> <Ref. to IDI(diag)-25, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ISG SENSOR.** 1) Turn the ignition switch to OFF and wait for 20 minutes. 2) Start the engine. 3) Check the warning light in the combination meter.	Does the warning light illuminate?	Go to step **3**.	Temporary overheat occurs in ISG. Currently returned to normal.
3	**CHECK COMBINATION METER.** 1) Check the combination meter. <Ref. to IDI(diag)-20, OPERATION, System Operation Check Mode.>	Is combination meter OK?	Replace ISG. <Ref. to SC(H4DO(HEV))-33, REMOVAL, Integrated Starter Generator (ISG).>	Repair or replace the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>

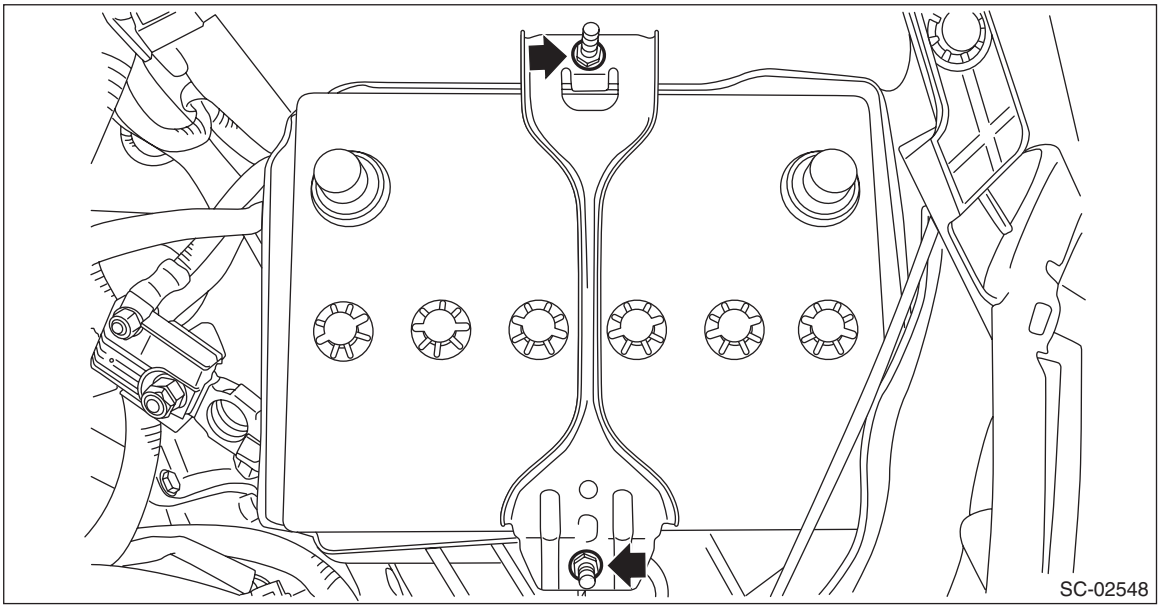
4. Battery

A: REMOVAL

1. 12 VOLT AUXILIARY BATTERY

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Disconnect the terminal boot from the battery positive terminal, and disconnect the positive terminal.
3) Remove the battery cable holder from the battery rod.
4) Remove the flange nut from battery rod and remove battery holder.



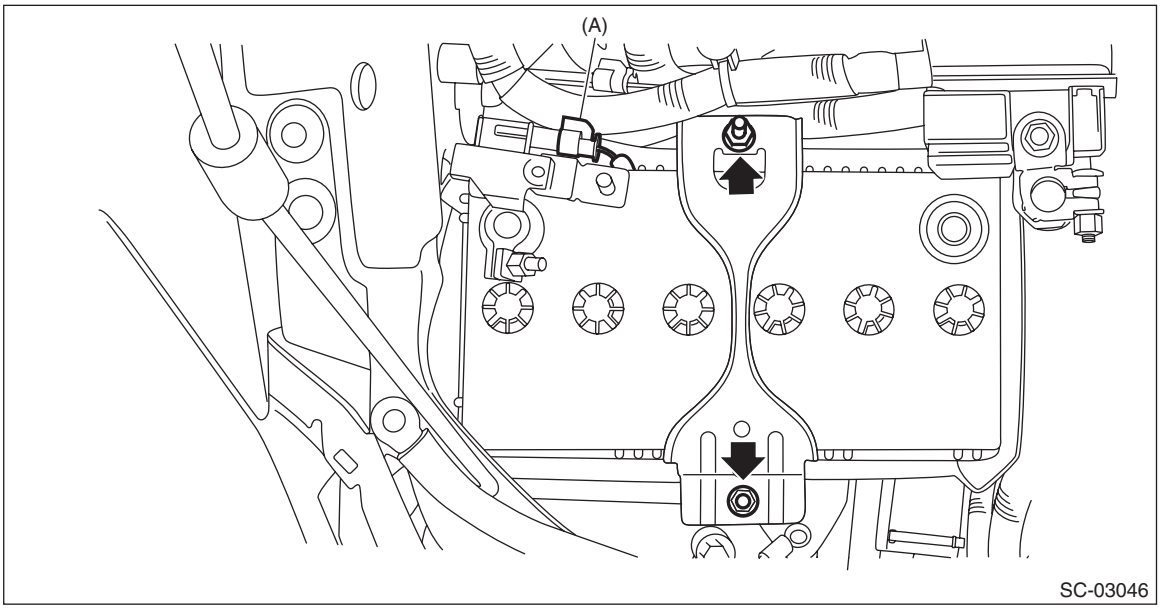
5) Remove the battery.

2. 12 VOLT ENGINE RESTART BATTERY

CAUTION:
Do not detach the 12V engine restart battery sensor from the 12 volt engine restart battery except when replacing the 12 volt engine restart battery.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Disconnect the positive (+) terminal after disconnecting the negative (–) terminal of battery.
3) Remove the battery cable holder from the battery rod.
4) Disconnect the connector (A) from the 12V engine restart battery sensor.

5) Remove the flange nut from battery rod and remove battery holder.



6) Remove the battery.

B: INSTALLATION

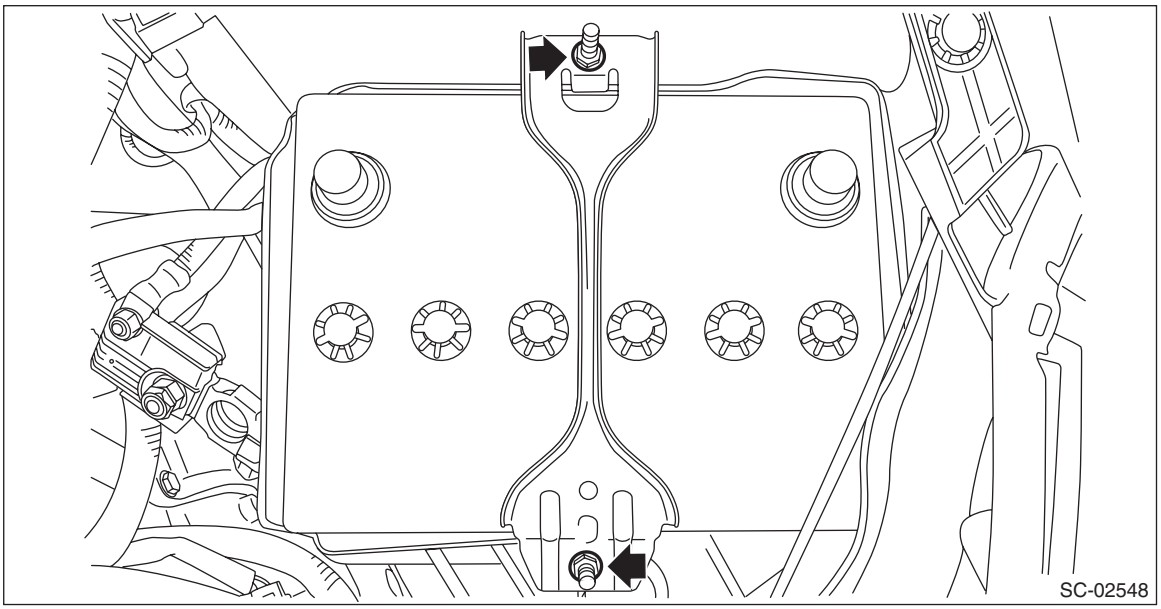
1. 12 VOLT AUXILIARY BATTERY

CAUTION:
• When installing the 12 volt auxiliary battery, wait at least one minute after removing the 12 volt auxiliary battery.
• Be careful not to contact the cable with the battery terminal during work because the power supply switches ON/OFF in a short time. Besides, in case trouble occurs in the vehicle during work, remove the 12 volt auxiliary battery again, and wait for one minute or more to install the 12 volt auxiliary battery. After that make sure there is no trouble anymore.
• After connecting the ground terminal to the battery, the following operations are automatically performed in the vehicle. Therefore, before starting the engine, place the select lever in the "P" position and wait for 10 seconds or more after turning the ignition switch to ON with the brake pedal released.
– Initial diagnosis of electronic throttle control
– Learning control of brake pedal stroke sensor

1) Install the battery.

2) Set the battery holder and install the flange nut to the battery rod.

Tightening torque:
3.5 N·m (0.4 kgf-m, 2.6 ft-lb)



3) Install the battery cable holder to the battery rod.
4) Connect the positive terminal to the battery and install the terminal boot.

NOTE:
Clean the battery cable terminals and apply grease to prevent corrosion as necessary.
5) Connect the ground cable to battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For 12 volt engine restart battery, connect the ground terminal to the 12V engine restart battery sensor.

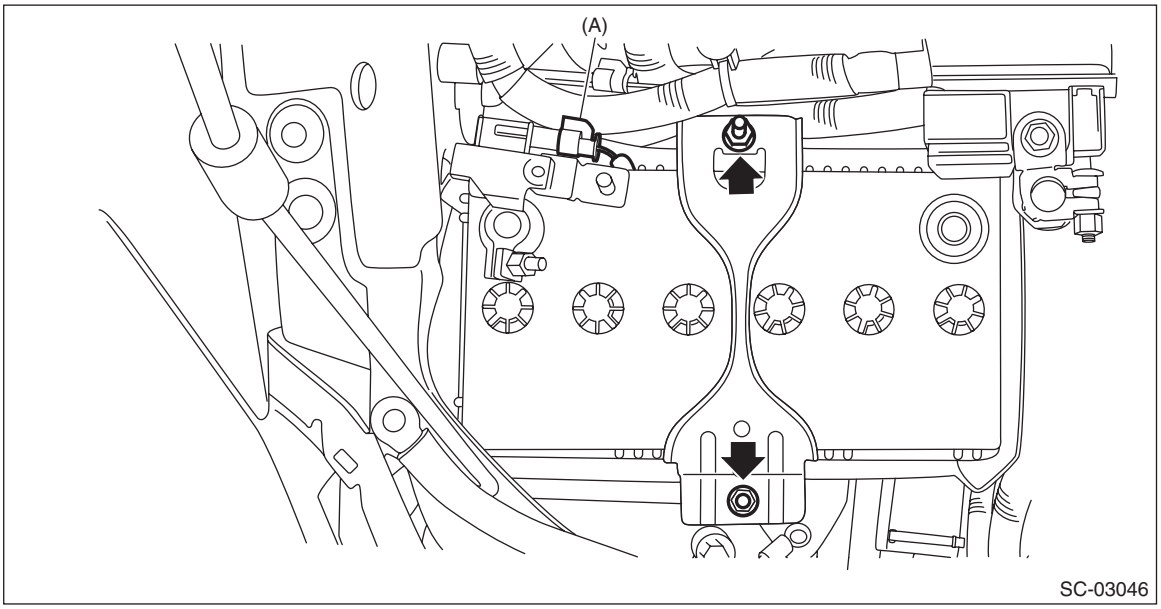
2. 12 VOLT ENGINE RESTART BATTERY

CAUTION:
• Do not detach the 12V engine restart battery sensor from the 12 volt engine restart battery except when replacing the 12 volt engine restart battery.
• After connecting the ground terminal to the battery, the following operations are automatically performed in the vehicle. Therefore, before starting the engine, place the select lever in the "P" position and wait for 10 seconds or more after turning the ignition switch to ON with the brake pedal released.
– Initial diagnosis of electronic throttle control
– Learning control of brake pedal stroke sensor

1) Install the battery.
2) Set the battery holder and install the flange nut to the battery rod.

Tightening torque:
3.5 N·m (0.4 kgf-m, 2.6 ft-lb)

3) Connect the connector (A) to 12V engine restart battery sensor.



4) Install the battery cable holder to the battery rod.
5) Connect the positive terminal and then connect the negative terminal to the battery.

NOTE:
Clean the battery cable terminals and apply grease to prevent corrosion as necessary.

6) Connect the ground cable to battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For 12 volt engine restart battery, connect the ground terminal to the 12V engine restart battery sensor.

C: DISASSEMBLY

Remove the 12V engine restart battery sensor. <Ref. to SC(H4DO(HEV))-61, REMOVAL, Battery Sensor.>

D: ASSEMBLY

Install the 12V engine restart battery sensor. <Ref. to SC(H4DO(HEV))-61, INSTALLATION, Battery Sensor.>

E: INSPECTION

WARNING:
- **As batteries produce flammable gases, be careful not to bring an open flame close to the batteries.**
- **Ventilate sufficiently when using or charging battery in enclosed space.**
- **Electrolyte is corrosive acid, and has toxicity; be careful of handling the fluid.**
- **For safety, in case an explosion does occur, wear eye protection or shield your eyes when working near any battery. In addition, never lean over the battery.**
- **Be careful that the electrode does not come into contact with skin, eyes or clothing. Especially at contact with eyes, flush with water for 15 minutes and get prompt medical attention.**
- **Be careful not to let the electrode contact with the coated parts.**
- **Before starting work, remove rings, metal watch-bands, and other metal jewelry.**
- **Be careful not to let the metal tools contact the positive battery terminal and anything connected to it. When the operation using a metal tool to the positive terminal or anything connected to it is required, disconnect the battery ground terminal before starting the operation.**

1. APPEARANCE

Check the battery case, top cover and terminal post for contamination or cracks and perform the following procedures as necessary.
- Clean the battery with water and wipe with a dry cloth.
- Apply a light coat of grease to the terminal post to prevent corrosion.

Check

- ***Normal → Go to the check item 2.***
- ***Abnormal → Replace the battery.***

2. ELECTROLYTE LEVEL

Check the electrolyte level in each cell.

CAUTION:
Do not fill beyond MAX level.

NOTE:
If the level is below the middle point between MIN level and MAX level, pour distilled water into the battery cell to bring the level to MAX.

Check

- ***MAX level → Go to the check item 3.***
- ***Below the middle point between MIN level and MAX level → Fill → Go to the check item 3.***

3. SPECIFIC GRAVITY OF ELECTROLYTE

Check the specific gravity of the electrolyte using a hydrometer and a thermometer.

NOTE:
- Specific gravity varies with temperature of electrolyte so that it must be corrected at 20°C (68°F) using the following calculation:

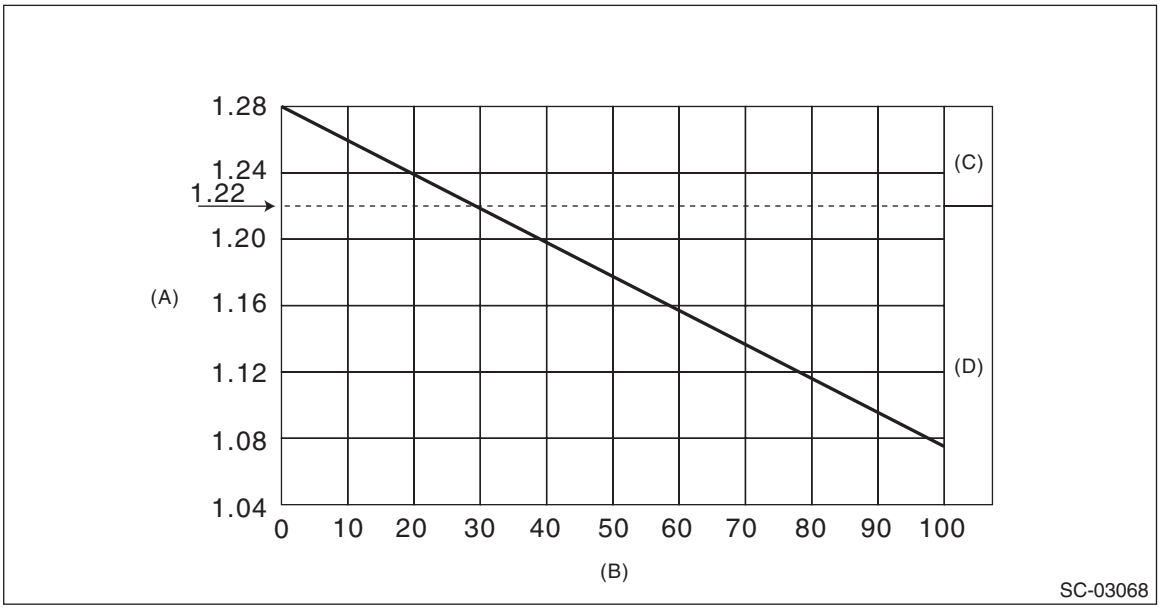
S_{20} = St + 0.0007 × (t – 20)
S_{20}: Specific gravity corrected at electrolyte temperature of 20°C
St: Measured specific gravity
t: Measured temperature (°C)

- When measuring in a simplified manner using the battery terminal voltage, calculate the specific gravity by the following formula.

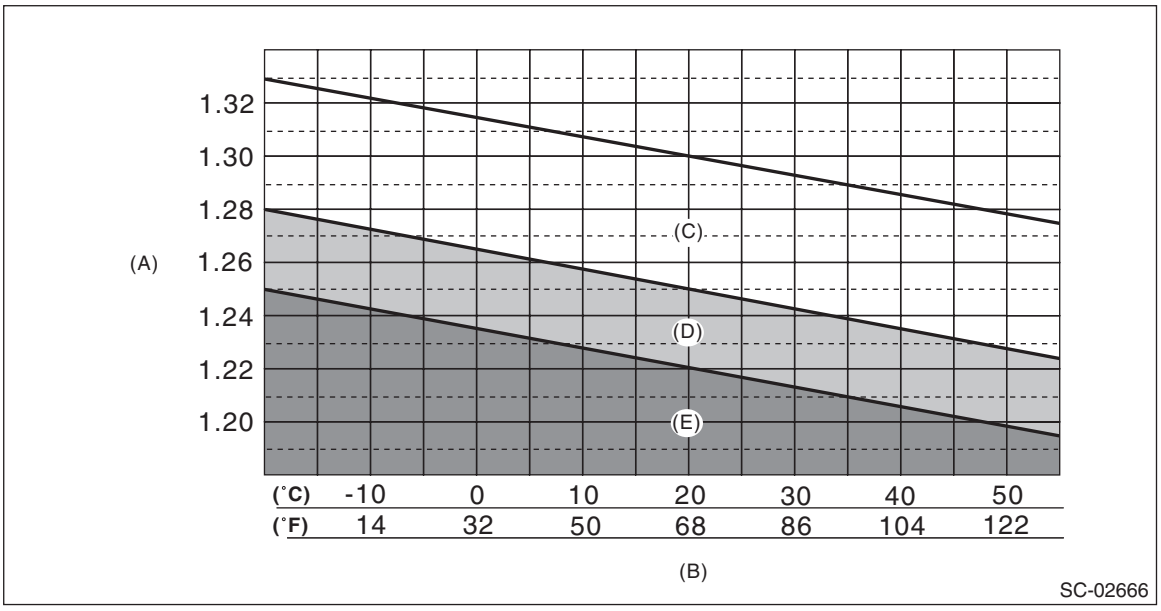
Specific gravity = [0.187 × battery terminal voltage (V)] – 1.1

Perform the steps 1) and 2) before measuring the voltage in order to stabilize the voltage.
1) Turn the ignition switch to OFF and illuminate the headlight for 30 seconds.
2) After turning off the headlight, leave the vehicle for one minute.

• Measuring the specific gravity of the electrolyte in the battery will disclose the state of charge of the battery. The relation between specific gravity and state of charge is as shown in the figure.



(A) Specific gravity [20°C (68°F)] (B) Amount of discharge (%) (C) Good
(D) Need to charge or replace



(A) Specific gravity [20°C (68°F)] (B) Electrolyte temperature (C) Good
(D) Caution (E) Need charging

Check

- ***Specific gravity: 1.250 — 1.290, and difference between cells is 0.04 or less → Battery is normal***
- ***Specific gravity: Less than 1.250, or difference between cells is 0.04 or more → Battery needs to be charged or replaced***

4. STANDBY CURRENT

1) Prepare the circuit tester which can measure down to 1 mA.

NOTE:
For models with keyless access function, the standby current changes regularly. Therefore, prepare an analog type circuit tester.

2) Using the circuit tester, check the standby current.

(1) Check the battery. <Ref. to SC(H4DO(HEV))-44, APPEARANCE, INSPECTION, Battery.> <Ref. to SC(H4DO(HEV))-44, ELECTROLYTE LEVEL, INSPECTION, Battery.> <Ref. to SC(H4DO(HEV))-44, SPECIFIC GRAVITY OF ELECTROLYTE, INSPECTION, Battery.>

NOTE:
The standby current may be displayed lower than the actual value if the battery is weak, so be sure to check the battery. Charge or replace if necessary.

(2) Check that the fuse is not blown out and is properly inserted.

(3) When non-genuine electrical parts (including parts sold in authorized workshops) are installed, remove all parts except for genuine electrical parts.

(4) Check that back-up fuse is inserted. <Ref. to PI-4, FUSE INSTALLATION, PRE-DELIVERY INSPECTION (PDI) PROCEDURE, Pre-delivery Inspection.>

(5) Start the engine, and set the switch positions for each system as shown in the following table.

NOTE:
Some of the listed systems are not equipped depending on the vehicle. Set only the systems equipped on the vehicle to the positions as shown.

System	Position
Headlight	ON or Auto
Fog light	ON
Wiper (front and rear)	ON or Low speed
Audio and navigation system	ON
Rear defogger	ON
Room light	DOOR
Luggage light	DOOR
Map light	OFF
Auto A/C	ON (AUTO)
Manual A/C	ON (Speed 1)
Electronic parking brake	ON
Electrical parts other than listed above (electrical parts that users can confirm the operation with the key removed)	OFF

(6) Turn the ignition switch to OFF.

(7) Operate the front hood lock release lever to unlock the front hood.

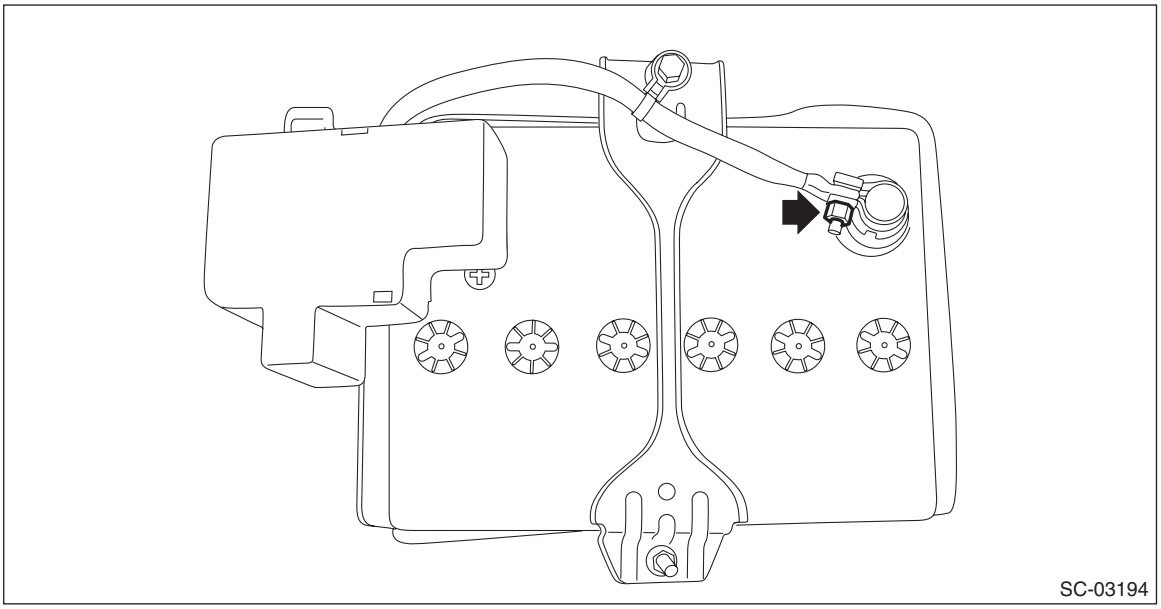
(8) Close all the doors (including rear gate and trunk lid) and then lock the doors. (Security alarm is in set condition)

NOTE:
For models with keyless access function, take the access key 1.5 m or more away from the vehicle after the door lock. And do not put the access key close to the vehicle while measuring the standby current.

(9) Wait for 5 minutes after door lock until the standby current stabilizes.

(10) Loosen the nut which holds the ground terminal to the battery.

NOTE:
Do not remove the ground terminal.

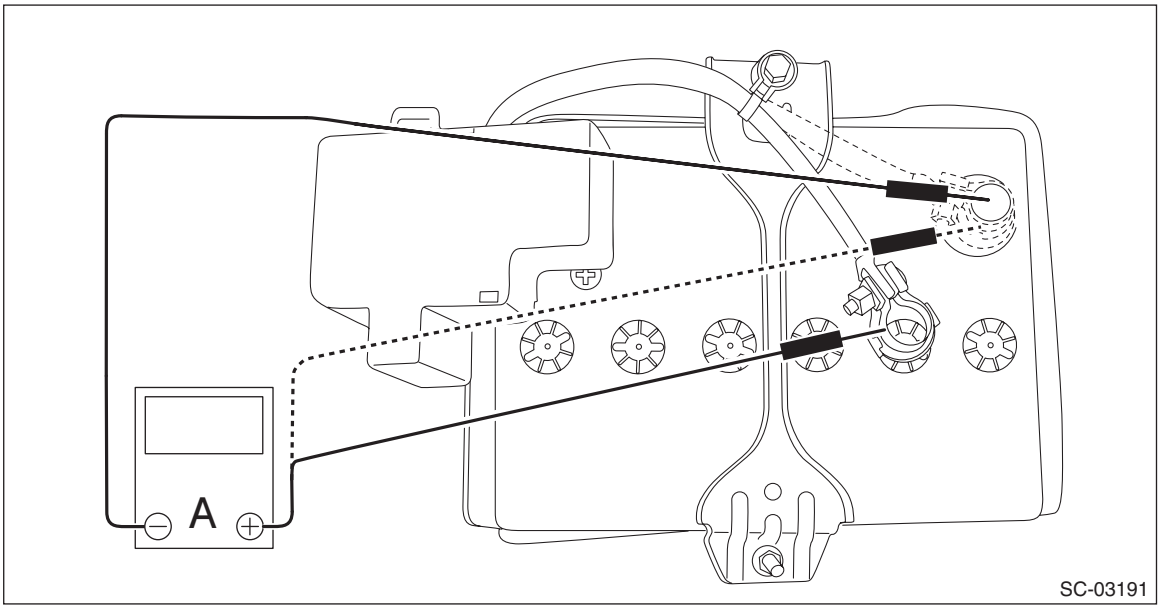


(11) Connect the circuit tester positive terminal to the ground terminal.

NOTE:
To prevent the damage to the circuit tester, set the circuit tester range to a large value first, then gradually change it to smaller values.

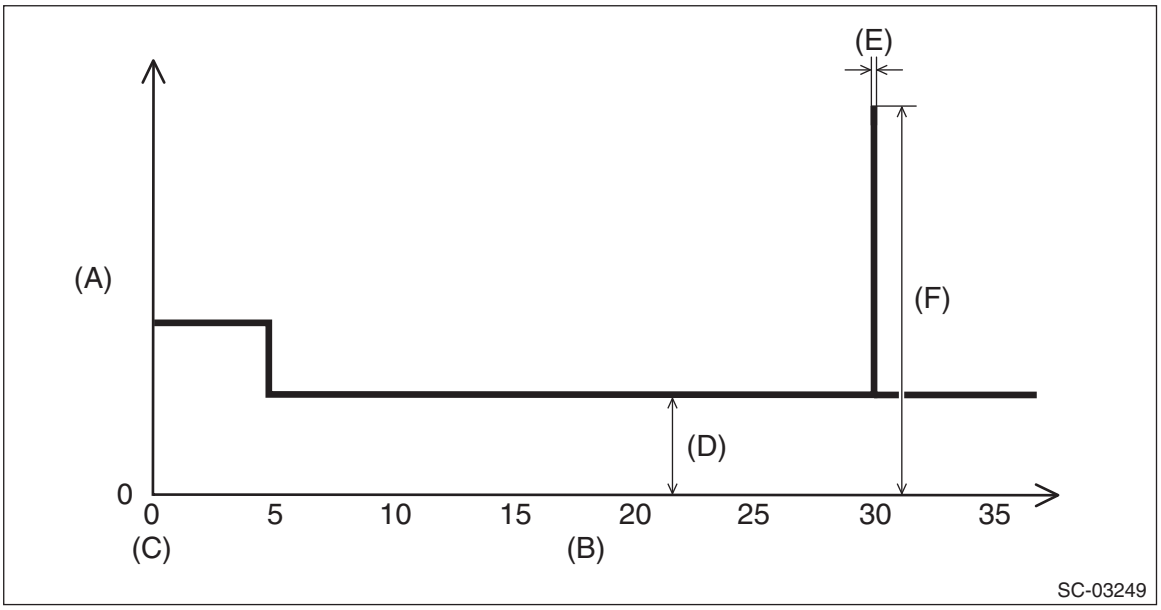
(12) Connect the circuit tester negative terminal to the ground terminal installation part of the battery.

(13) While connecting the circuit tester positive terminal with the ground terminal as shown in the figure below, remove the ground terminal from the battery.



(14) Check the standby current.

NOTE:
• For models with keyless access function, the standby current changes periodically because the keyless access system continuously searches the access key (polling).
• When measuring the standby current, the reading of the circuit tester oscillates. Therefore, read the average value (median value).
• As shown in the figure below, the standby current may become large when the vehicle system is activated 5 times at 30-minute intervals or 5 hours after turning the ignition switch to OFF. Therefore, the measurement should be completed in 20 minutes. If it takes more than 20 minutes, start the engine once, stop the engine, then perform the inspection.



(A)	Current/mA	(B)	Time/minute	(C)	Ignition OFF
(D)	Less than 70 mA	(E)	5 seconds (system operation)	(F)	300 mA or more

Check

- ***When the maximum measurement value is less than 70 mA → Standby current is normal.***
- ***When the maximum measurement value is 70 mA or more → Go to step (15).***

(15) Remove all fuses one by one to identify which system changes the standby current value significantly. <Ref. to WI(HEV)-21, WIRING DIAGRAM, Power Supply Circuit.>
(16) Check the harness and connector of the system whose standby current has changed significantly.

F: CHARGE

WARNING:
• Do not bring an open flame close to the battery when working.

CAUTION:
• Prior to charging, corroded terminals should be cleaned with a brush and common caustic soda solution.
• Be careful while charging the battery because it produces flammable gasses.
• Observe instructions when handling the battery charger.
• Before charging the battery on the vehicle, disconnect the battery ground terminal to prevent damage of generator diodes or other electrical units.

1. NORMAL CHARGE (CONSTANT CURRENT CHARGE)

Charge the battery with the current value specified by manufacturer or with approximately 1/10 of battery's rating capacity. (See the table below.)

Battery size	Charging current (A)	CCA (A)
55D23L	4.0 — 5.0	390
N55-R	4.0 — 5.0	450

CAUTION:
• The charge control feature and specifications for judgment of charge completion depend on the device. Follow the instruction manual of the charger used.
• Keep the electrolyte temperature at 45°C (113°F) or less while charging. Stop charging when the temperature exceeds this value.

NOTE:
The characteristics of typical charging methods are as follows.
• Constant current charging
This method makes it easy to charge to 100%, since the electrolyte is agitated by the gassing occurred at the end of charging. However, the time for charging is comparatively long because the current value is kept constant.
• Constant voltage charging
This method completes charging in a short period of time due to the large current. However, it is difficult to charge to 100% because no gassing occurred at the end of charging and the electrolyte is not agitated. Therefore, the combined use with the constant current charging is preferable.
• Quasi-constant voltage charging
This method is widely used for commercially available chargers.
Compared to the constant voltage charging whose charging current at the beginning of charging becomes large, it reduces the charging current by lowering the voltage at the initial stage, resulting in battery load reduction. The time for charging is comparatively long. However, this type of chargers can be manufactured comparatively inexpensive due to the simple control circuit (or manual settings). After the initial stage of charging is completed, it gradually raises the charging voltage so that the charging current is within the specification, until the battery is fully charged.
• Constant voltage/current charging
In addition to the constant voltage charging, this method controls the upper limit of the current.
The constant current charging is applied at the beginning of charging, and the constant voltage charging is applied at the end. This makes battery charge comparatively efficient in a short period of time. Charging by generators is similar to this method.
Judgment of charge completion
1) Specific gravity of electrolyte should be held within the specific range of 1.250 — 1.290 for one hour or more.
2) Voltage while charging should be held within the specified range of 15.0 — 16.8 V for one hour or more.
3) Gas is actively generated in all cells.
4) The amount of charge reaches 1.2 — 1.5 times of the amount of discharge.

NOTE:
The amount of discharge/charge can be calculated by the following formula.
Amount of discharge (Ah) = Remaining capacity (%) calculated by specific gravity × 5 hour rate capacity (Ah)
Amount of charge (Ah) = Charging current value (A) × Time for charging

2. QUICK CHARGING

Charge the battery in a short period of time with a relatively large current by using a quick charger.
Charge the battery with the current value at approximately 1/2 of battery's rating capacity. (See the table below.)

CAUTION:
• Quick charging is accompanied by a large amount of heat generation. Charging should be completed in up to 30 minutes regardless of battery size.
• Quick charging is used to recover the battery until it can start the vehicle. For full charging, use the normal charging method.
• Keep the electrolyte temperature at 55°C (131°F) or less while quick charging. Stop charging when the temperature exceeds this value.

Battery size	Charging current (A)	CCA (A)
55D23L	20.0 — 25.0	390
N55-R	20.0 — 25.0	450

5. Battery Cable Assembly

A: REMOVAL

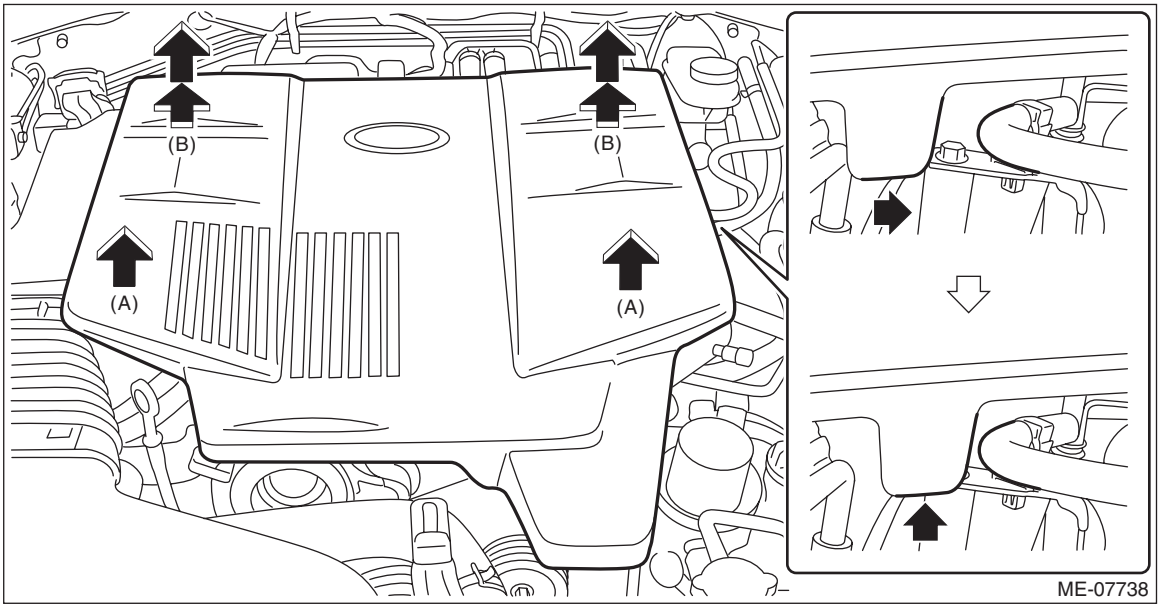
1. BATTERY CABLE ASSY

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

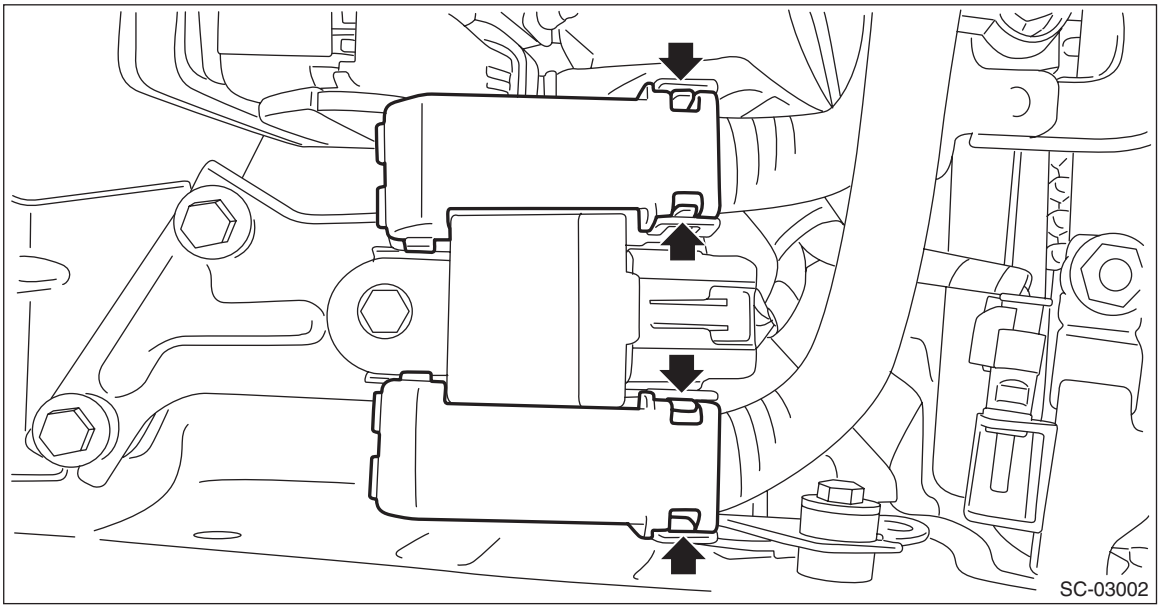
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

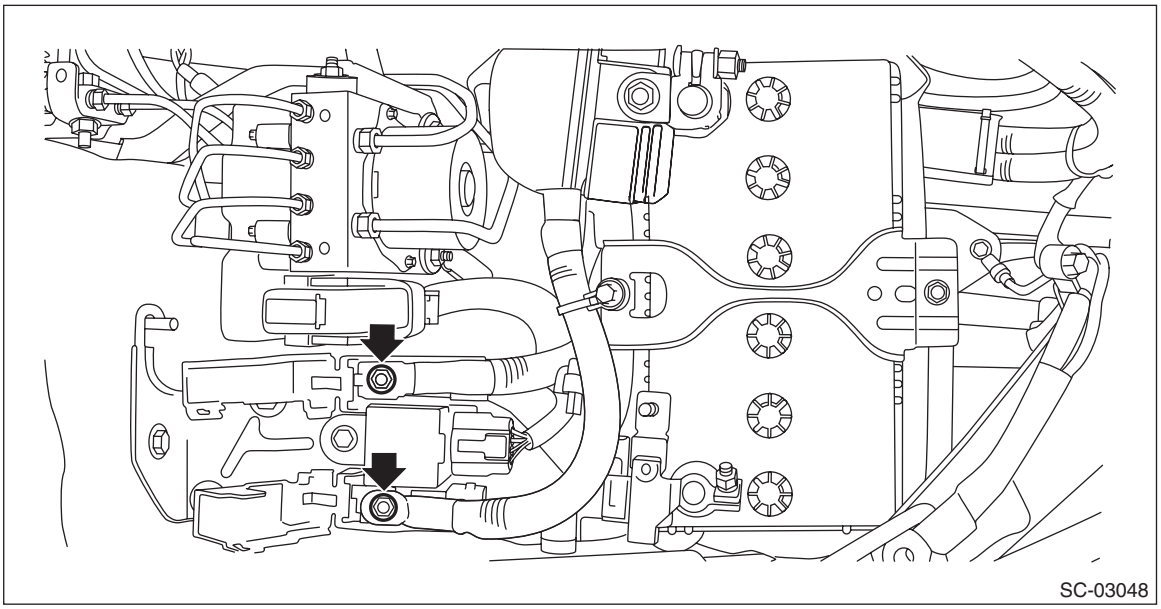
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



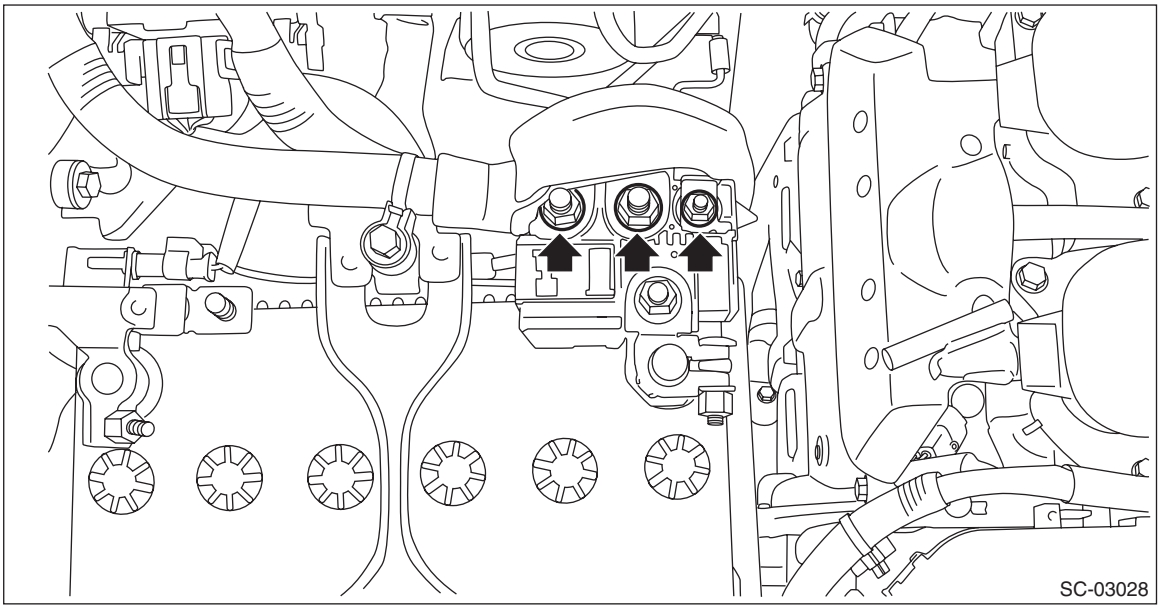
3) Remove the air intake duct. <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
4) Remove the intake duct. <Ref. to IN(H4DO(HEV))-16, REMOVAL, Intake Duct.>
5) Open the 12V battery relay cover RH and the 12V battery relay cover LH.



6) Remove the nuts fastening the battery cable assembly from the 12V battery relay terminal, and remove the battery cable assembly.

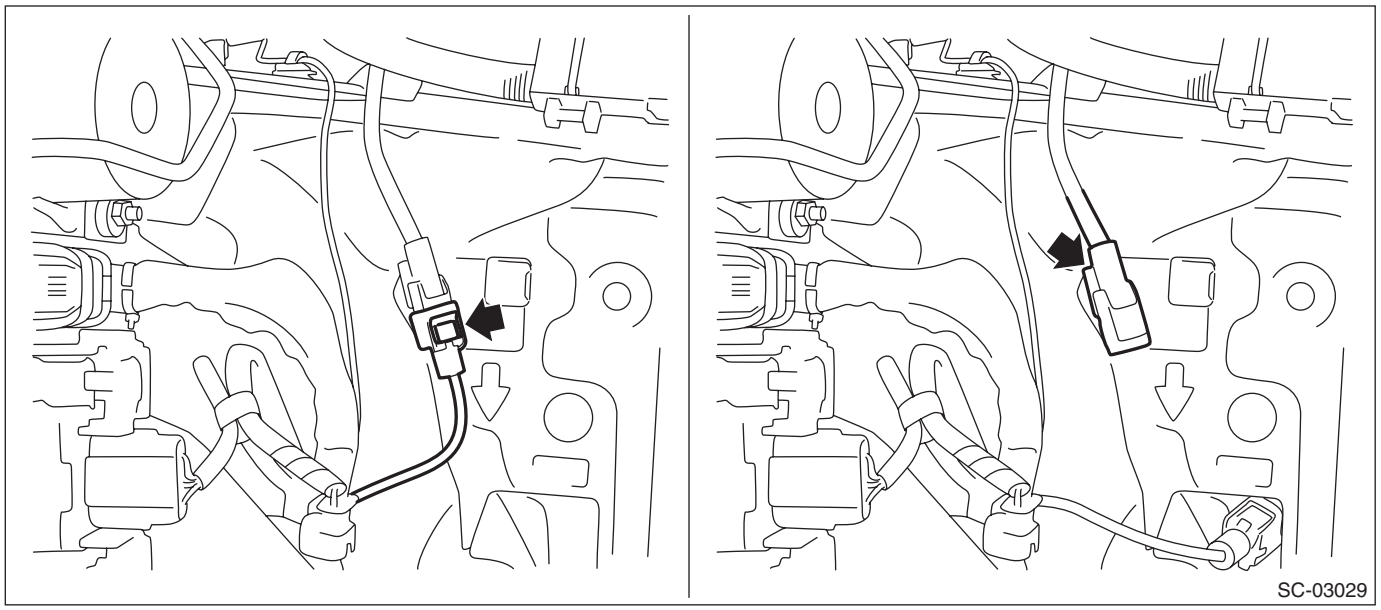


7) Remove the nuts fastening the battery cable assembly to the slow blow fuse (12 volt engine restart battery), and remove the battery cable assembly.

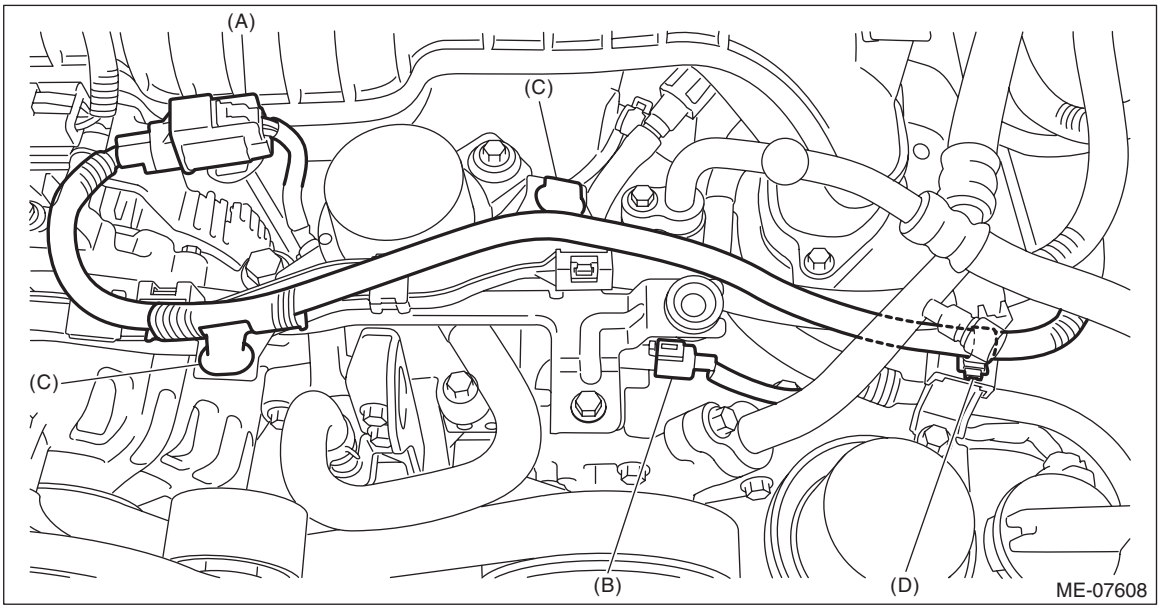


8) Remove the 12 volt engine restart battery. <Ref. to SC(H4DO(HEV))-40, 12 VOLT ENGINE RESTART BATTERY, REMOVAL, Battery.>

9) Disconnect the battery cable assembly connector from the bulk head wiring harness, and remove the battery cable assembly from the clip.

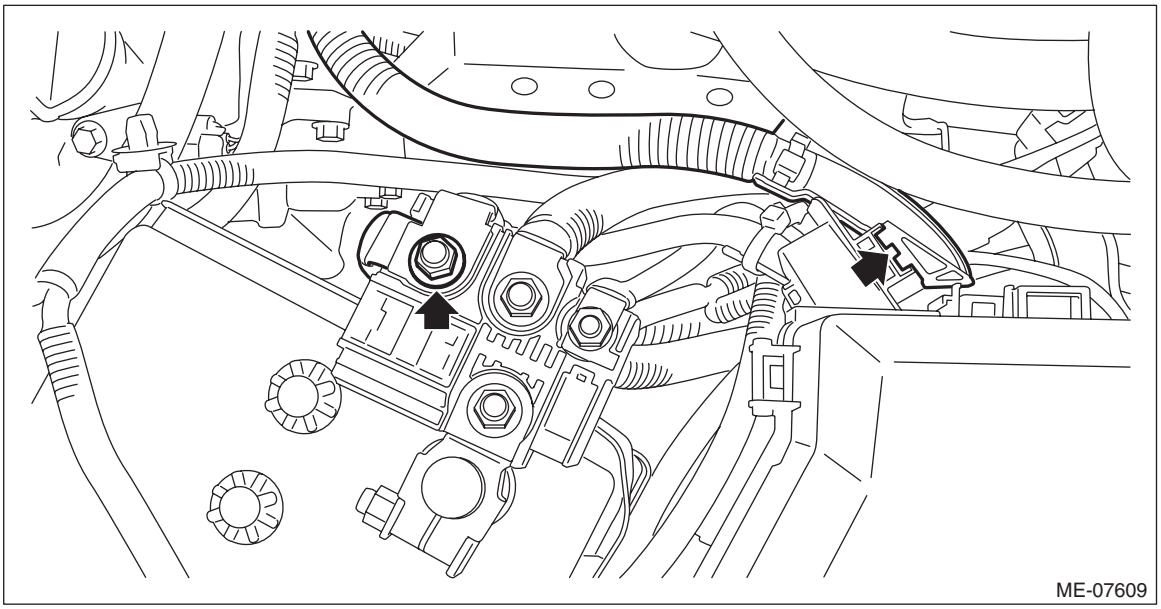


10) Disconnect the connector (A) from the brake vacuum pump, and disconnect the connector (B) from the A/C compressor.
11) Remove the clip (C) and the clip (D) securing the harness to the battery cable assembly, and move the harness to the left side wheel apron.

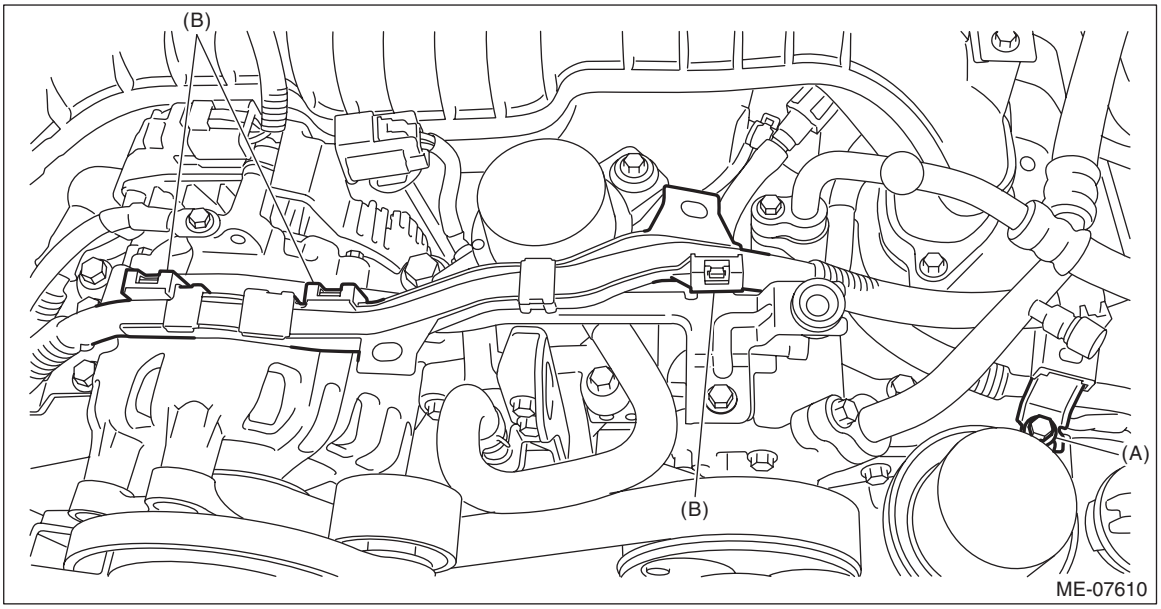


12) Remove the terminal boot from the positive terminal of the 12 volt auxiliary battery.

13) Remove the nuts fastening the battery cable assembly to the slow blow fuse (12 volt auxiliary battery), and remove the battery cable assembly from the main fuse box.

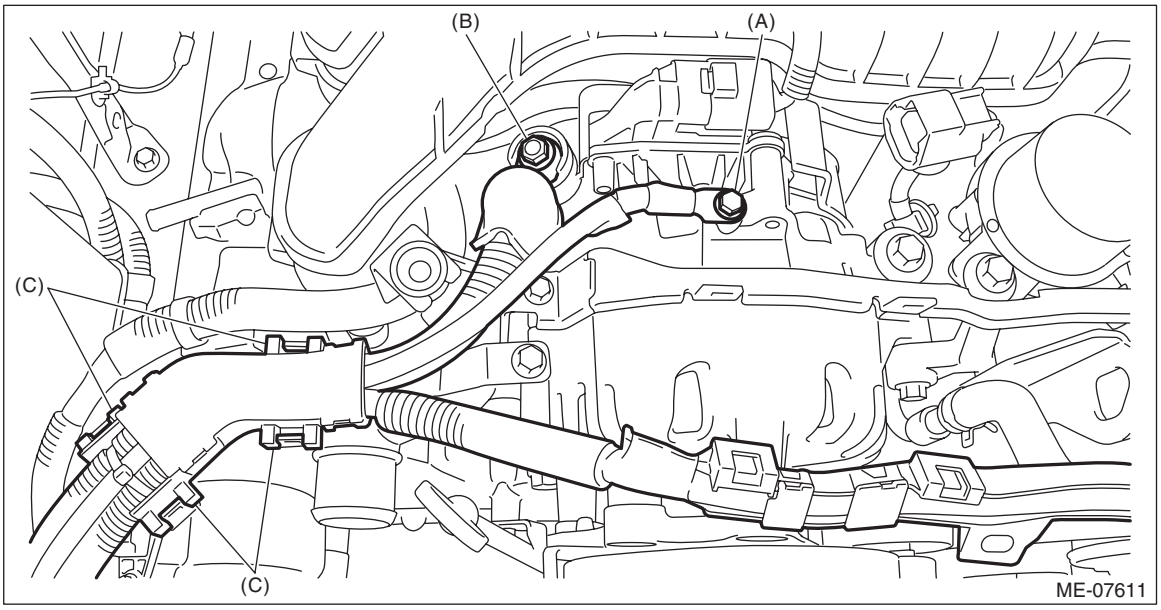


14) Remove the bolt (A) securing the battery cable stay to the chain cover, and remove the clip (B) securing the battery cable assembly to the collector cover bracket.

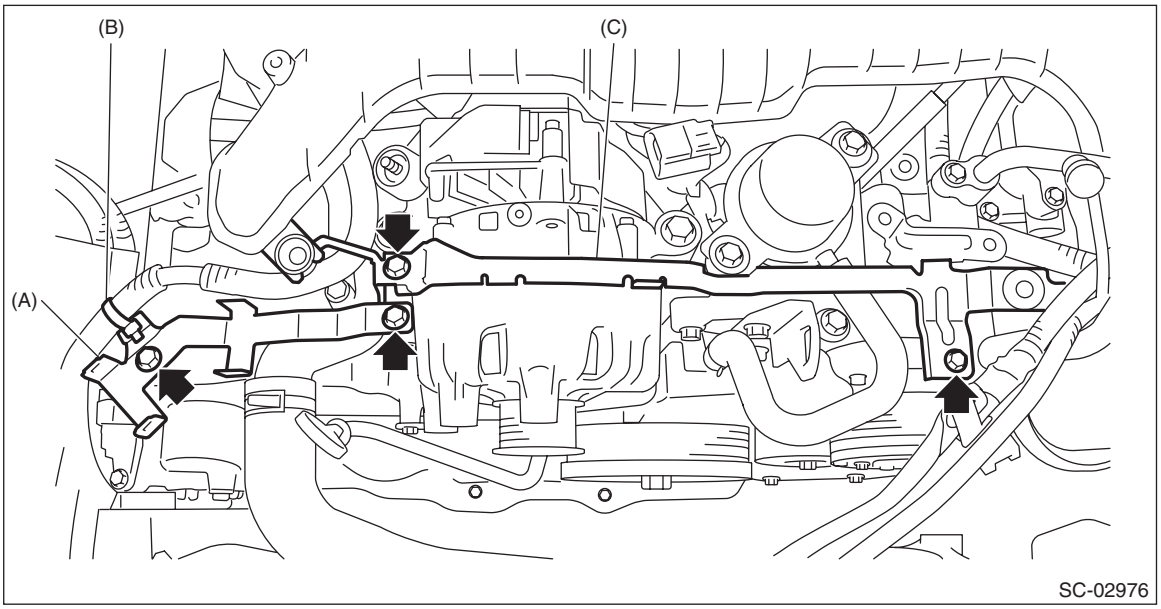


15) Disconnect the terminal (A) and the terminal (B) from ISG.

16) Remove the clip (C) which holds the battery cable assembly to the battery cable bracket No. 1.

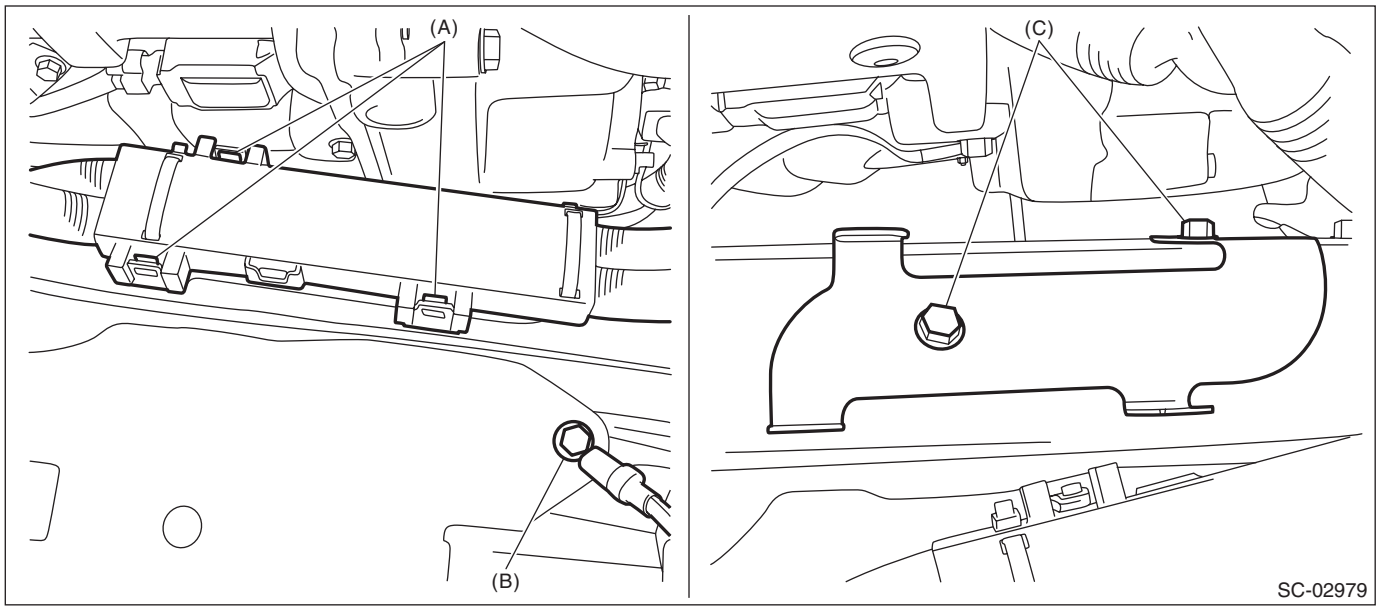


17) Remove the clip (B) which holds the engine harness from the battery cable bracket No. 1 (A).
18) Remove the battery cable bracket No. 1 (A) and collector cover bracket (C).



19) Remove the clip (A) securing the battery cable assembly, and remove the battery cable assembly from the battery cable bracket No. 2.
20) Remove the bolt (B) which holds the chassis ground terminal of the battery cable assembly from the vehicle.

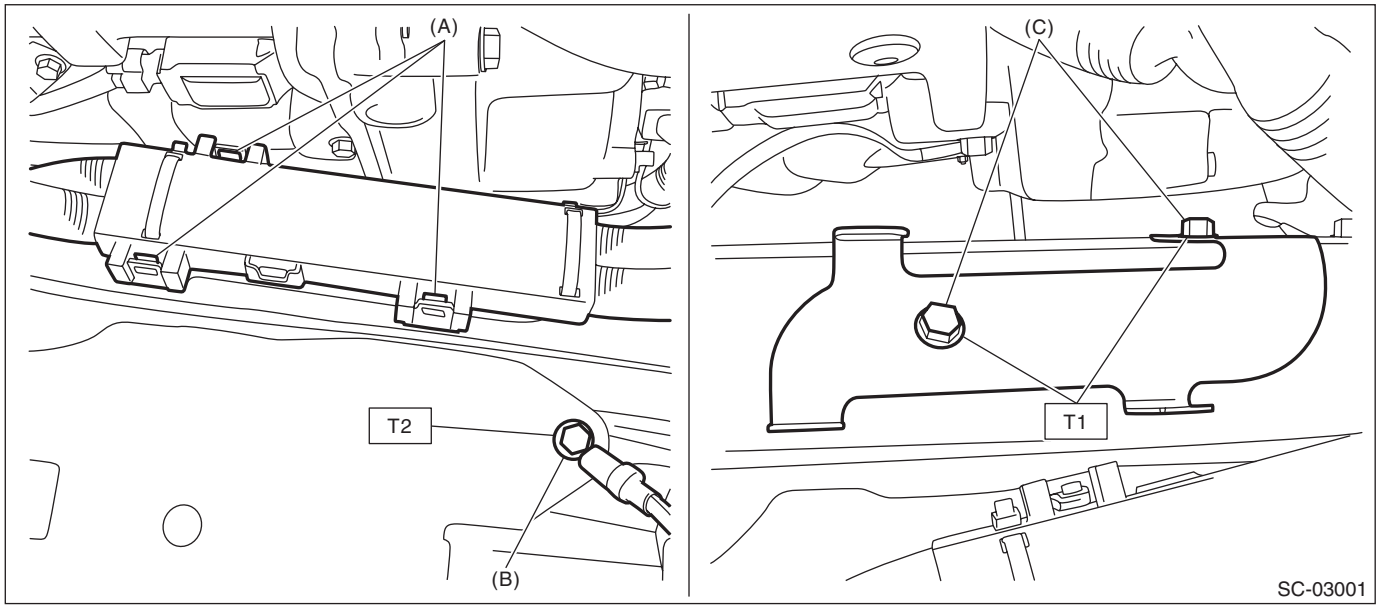
21) Remove the bolt (C) securing the battery cable bracket No. 2 from the vehicle, and remove the battery cable bracket No. 2.



B: INSTALLATION

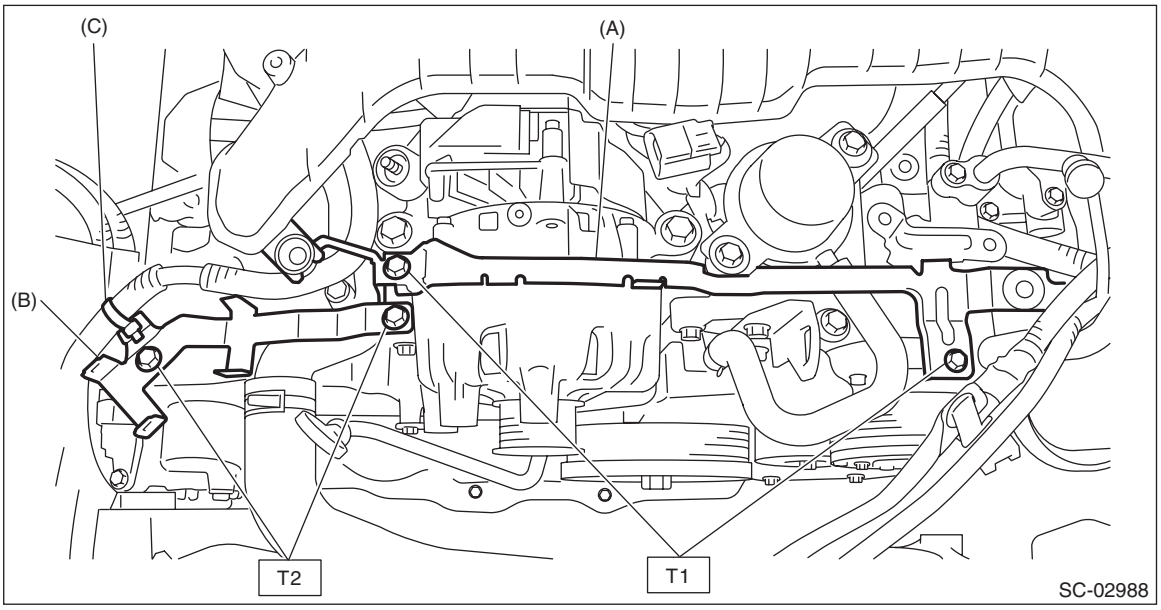
1) Install the bolt (C) which secures the battery cable bracket No. 2 to the vehicle, and secure the battery cable assembly to the battery cable bracket No. 2 with the clip (A).
2) Install the chassis ground terminal (B) of the battery cable assembly to the vehicle.

Tightening torque:
T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
T2: 13 N·m (1.3 kgf-m, 9.6 ft-lb)



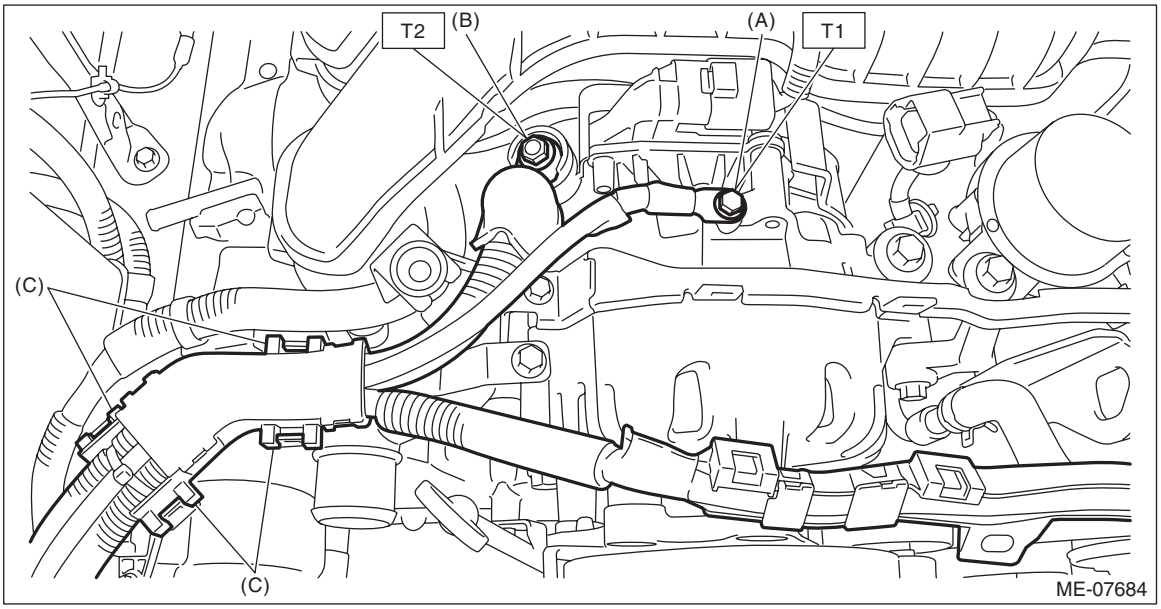
3) Install the collector cover bracket (A).
4) Install the battery cable bracket No. 1 (B), and secure the engine harness with the clip (C).

Tightening torque:
T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
T2: 19 N·m (1.9 kgf-m, 14.0 ft-lb)



5) Set the battery cable assembly, and secure the battery cable assembly to the battery cable bracket No. 1 with the clip (C).
6) Connect the terminal (A) and the terminal (B) to ISG.

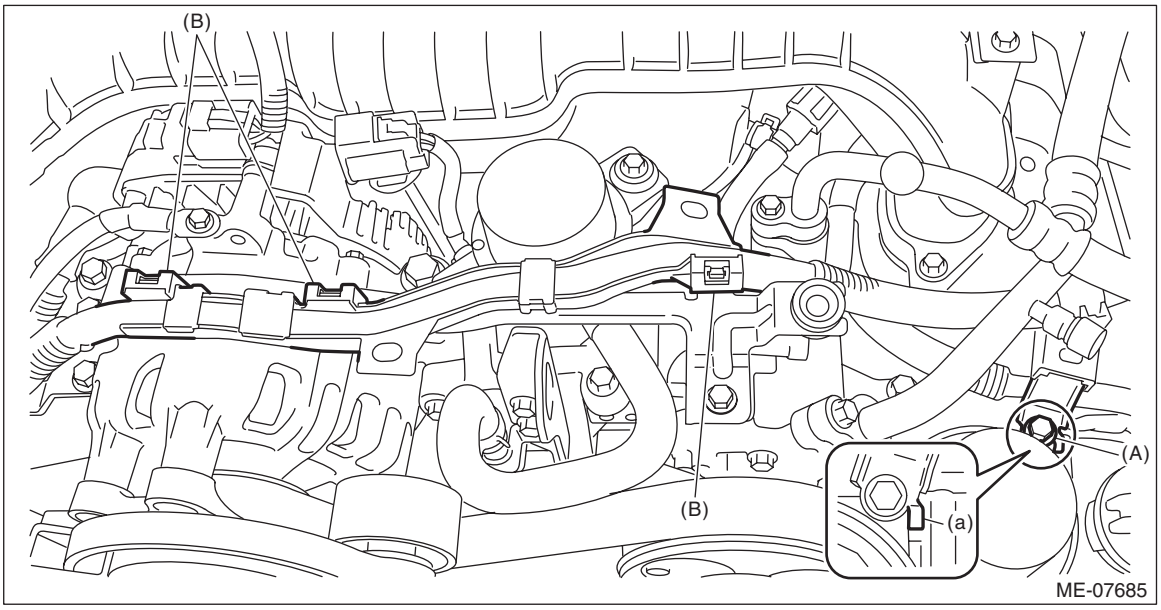
Tightening torque:
T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
T2: 15.5 N·m (1.6 kgf-m, 11.4 ft-lb)



7) Secure the battery cable assembly to the collector cover bracket with the clip (B), and install the bolt (A) which secures the battery cable stay to the chain cover.

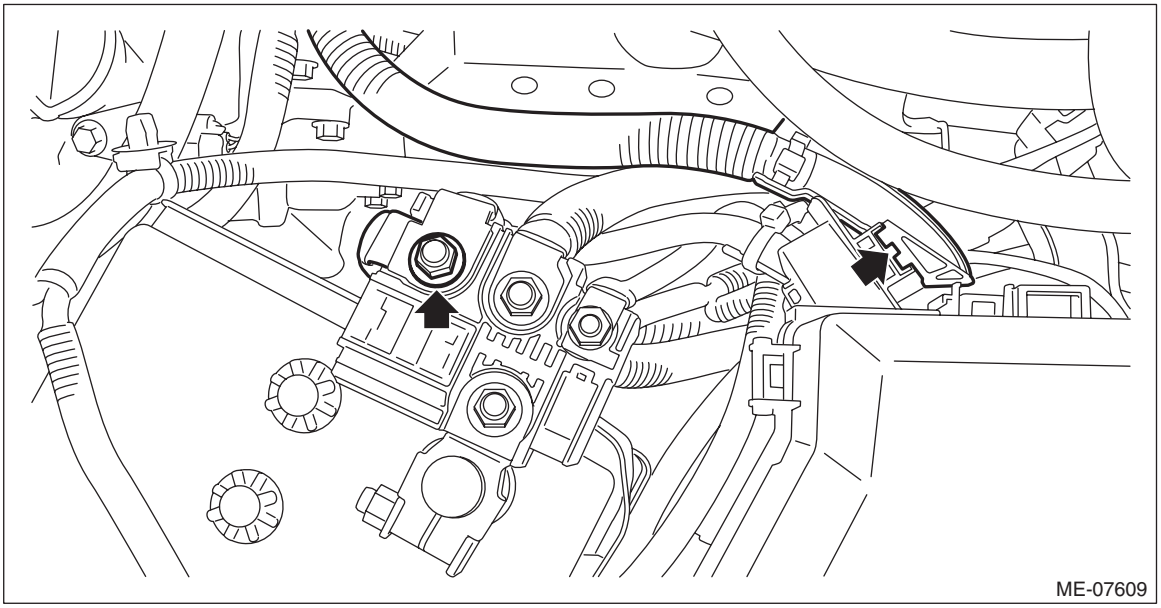
NOTE:
When installing the battery cable stay, install it by fitting the folded end (a) of the battery cable stay to the chain cover boss.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



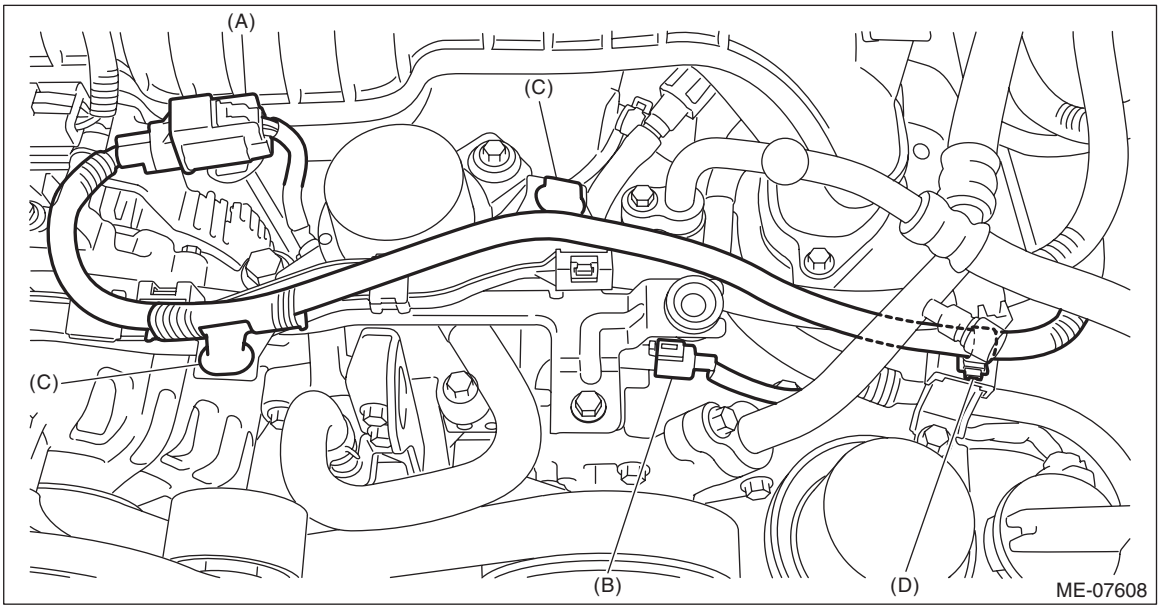
8) Install the battery cable assembly to the main fuse box, and install the nut which secures the battery cable assembly to the slow blow fuse (12 volt auxiliary battery).

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



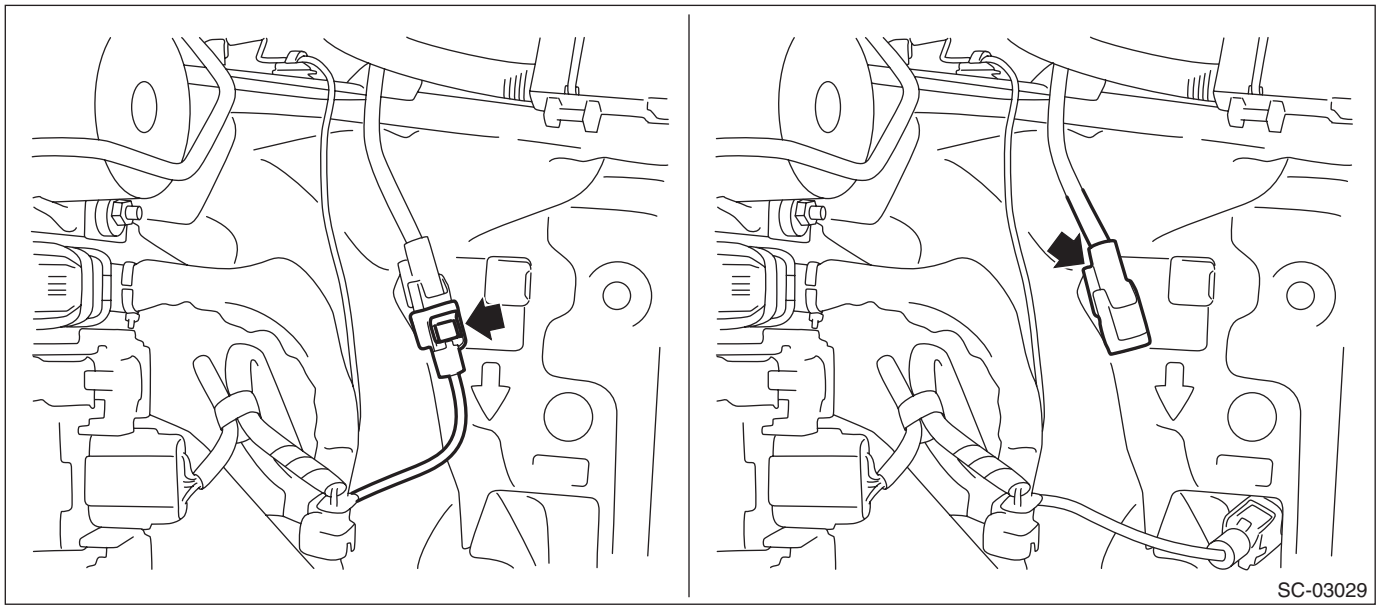
9) Install the terminal boot to the positive terminal of the 12 volt auxiliary battery.
10) Set the harness, and secure the harness to the battery cable assembly with the clip (C) and the clip (D).

11) Connect the connector (A) to the brake vacuum pump, and connect the connector (B) to the A/C compressor.



12) Install the battery cable assembly connector to the clip, and connect the battery cable assembly connector to the bulk head wiring harness.

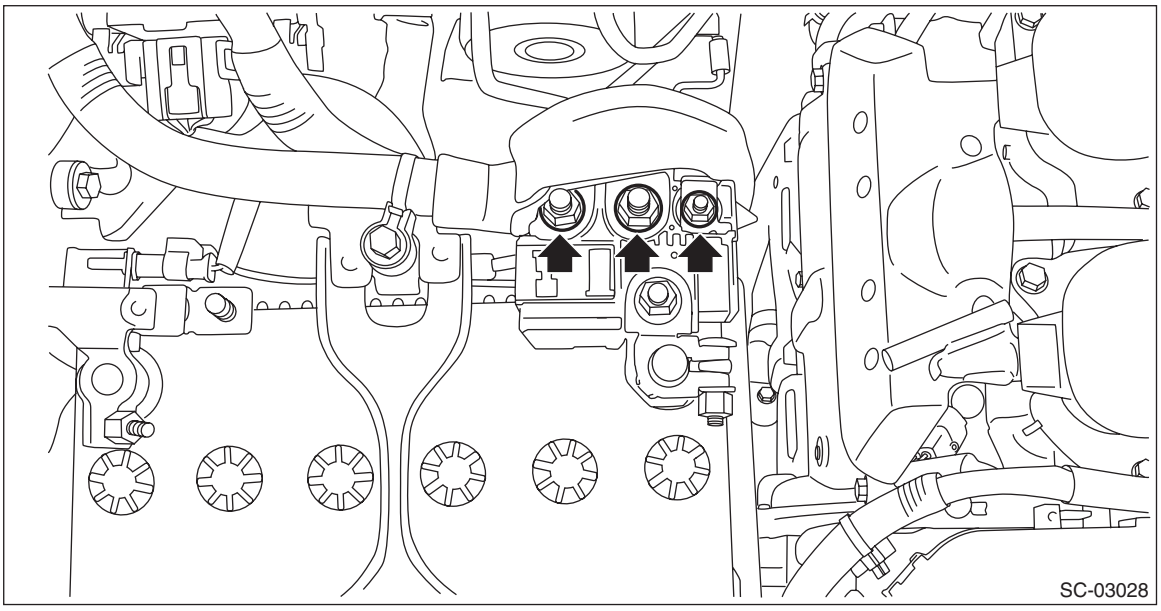
NOTE:
If the clip is damaged, replace it with a new part.



13) Install the 12 volt engine restart battery. <Ref. to SC(H4DO(HEV))-43, 12 VOLT ENGINE RESTART BATTERY, INSTALLATION, Battery.>

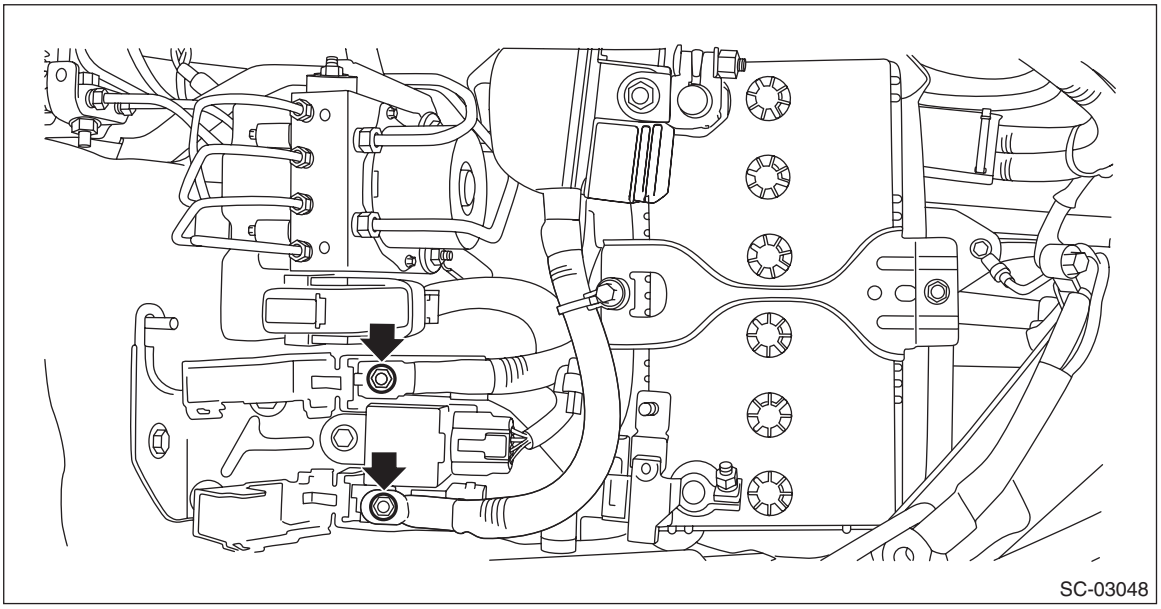
14) Install the battery cable assembly to the slow blow fuse (12 volt engine restart battery), and install the nut which secures the battery cable assembly.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



15) Install the battery cable assembly to the 12V battery relay, and close the install the 12V battery relay cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



16) Install the intake duct. <Ref. to IN(H4DO(HEV))-17, INSTALLATION, Intake Duct.>
17) Install the air intake duct. <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
18) Install the collector cover.
19) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

Check that the battery cable assembly has no deformation, cracks or other damages.

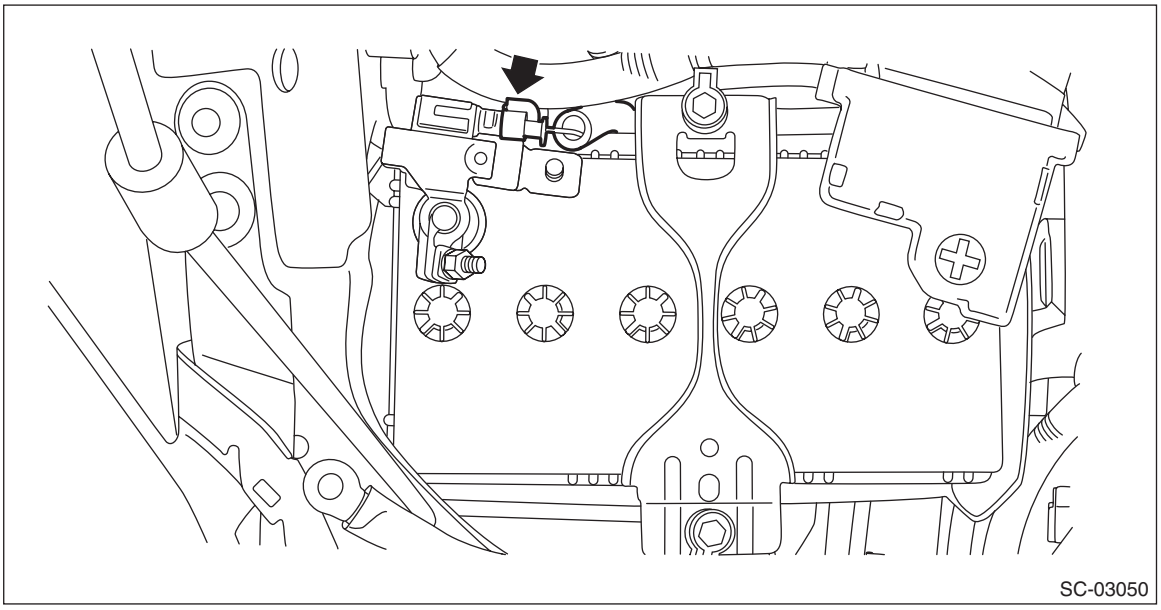
6. Battery Sensor

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Disconnect the connector from the 12V engine restart battery sensor.
3) Remove the 12V engine restart battery sensor from the 12 volt engine restart battery.

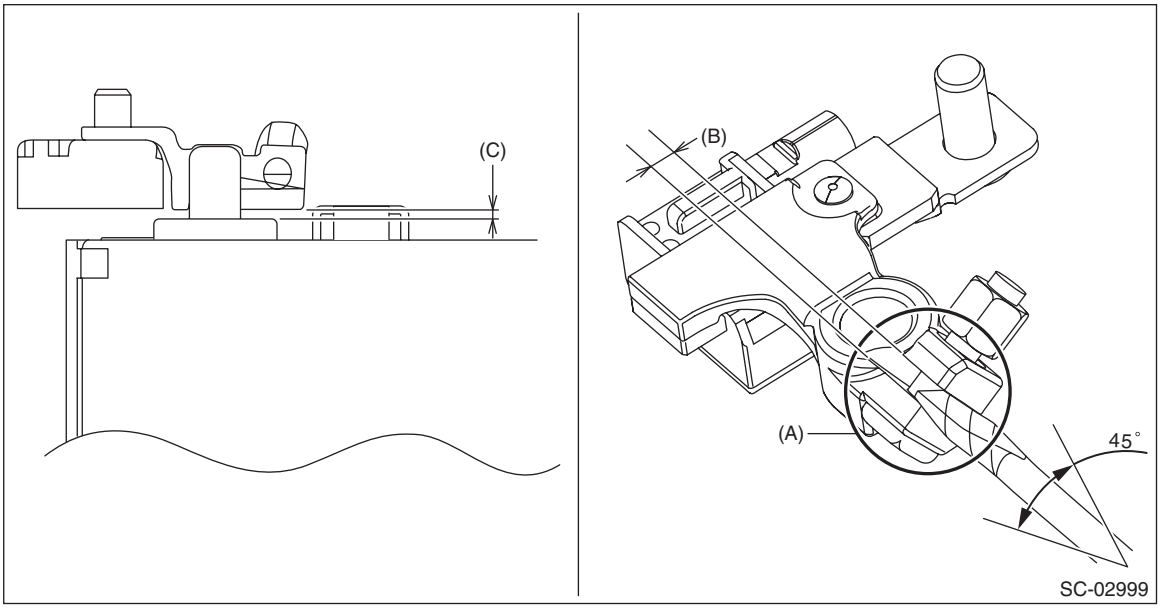
NOTE:
When removing the 12V engine restart battery sensor, pry the terminal tightening point of the 12V engine restart battery sensor using a flat tip screwdriver or similar tool wrapped with a protection tape.



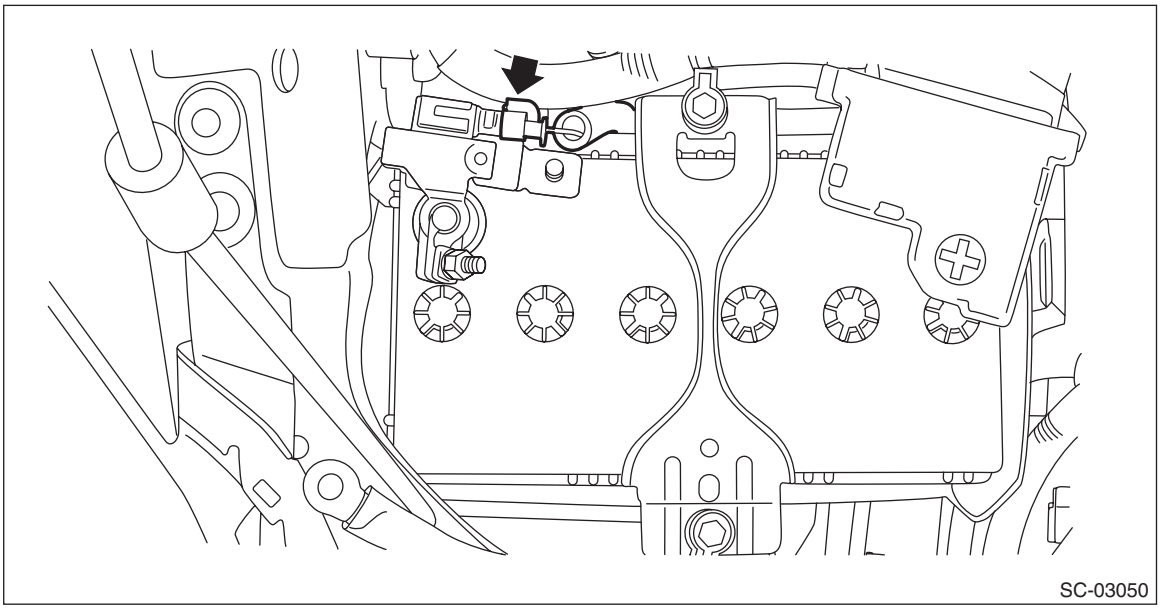
B: INSTALLATION

1) Pry the terminal tightening point (A) of the 12V engine restart battery sensor by approx. 45° using a flat tip screwdriver or similar tool wrapped with a protection tape, and adjust the clearance (B) to be approx. 2.5 mm (0.0984 in).
2) Adjust the clearance (C) to be 1.5 mm (0.0591 in) or less for the 12 volt engine restart battery and the 12V engine restart battery sensor, and install the 12V engine restart battery sensor to the 12 volt engine restart battery.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)



3) Connect the connector to 12V engine restart battery sensor.



4) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

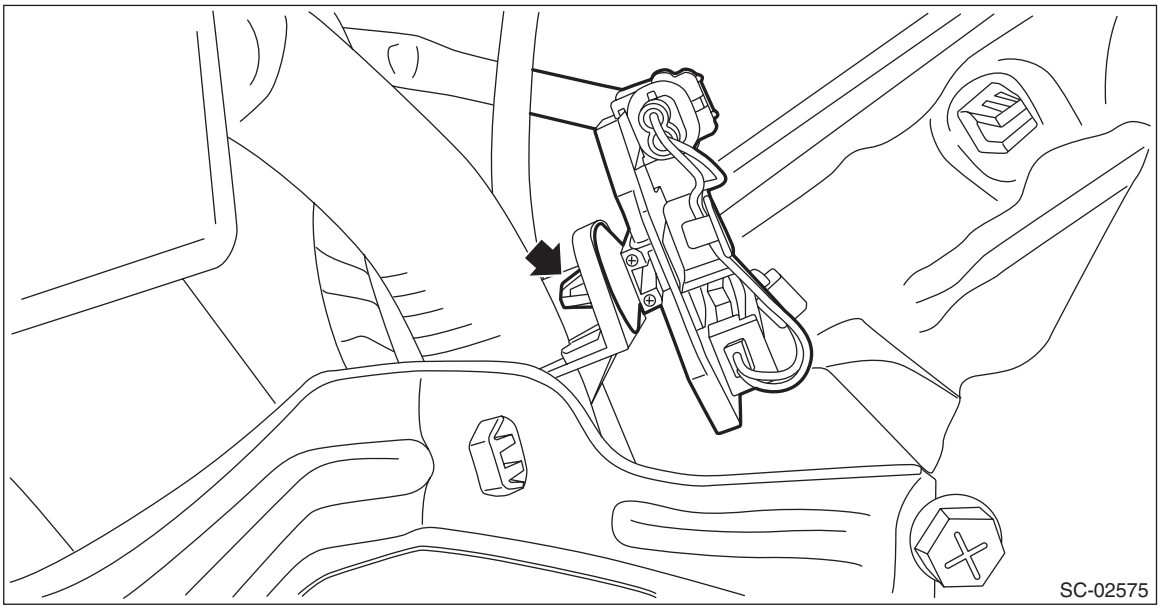
Check that the 12V engine restart battery sensor has no deformation, cracks or other damages.

7. Battery Temperature Sensor

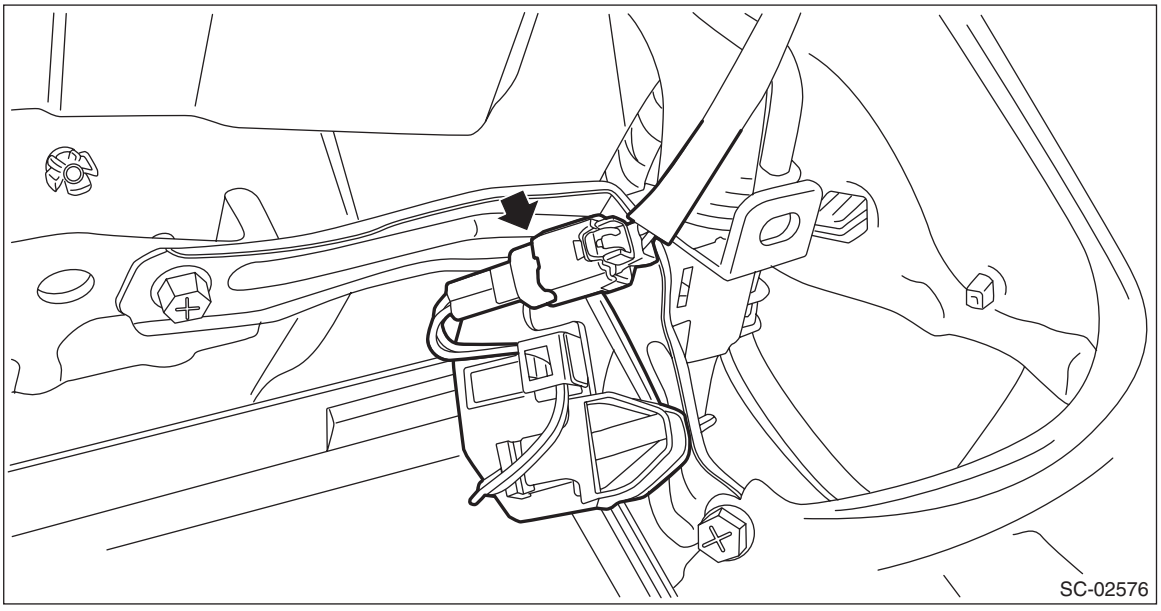
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, 12 VOLT AUXILIARY BATTERY, REMOVAL, Battery.>
3) Remove the battery temperature sensor from the bracket.



4) Disconnect the connector and remove the battery temperature sensor.

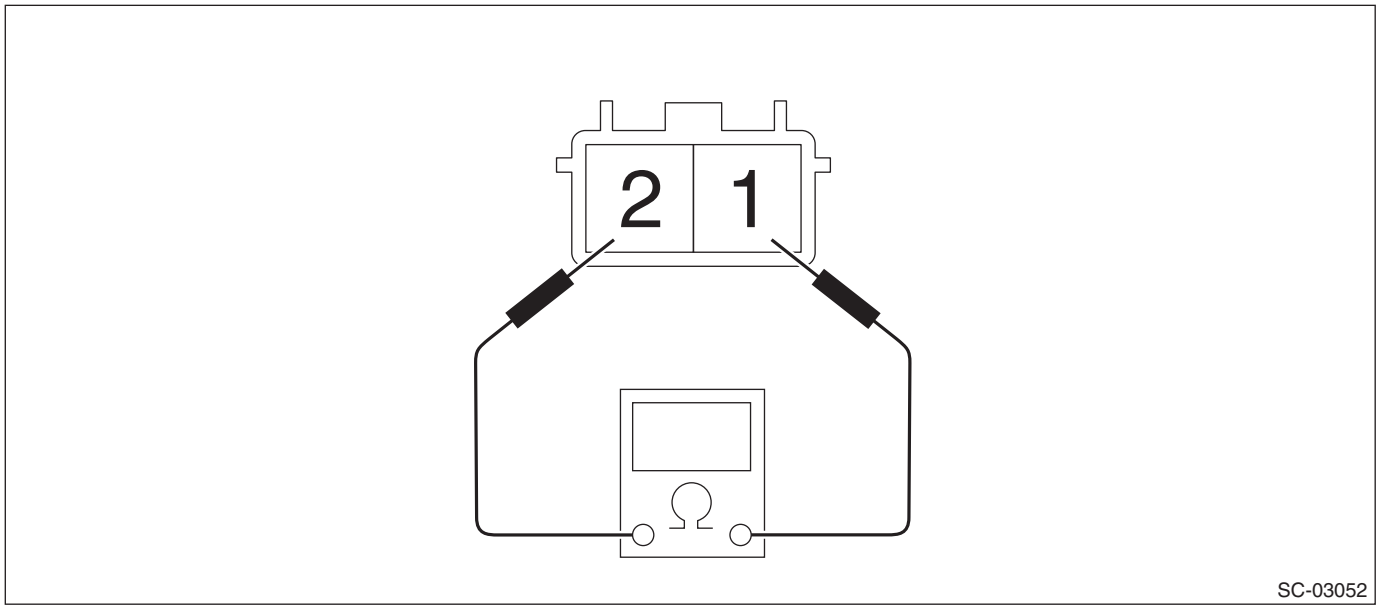


B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

1) Check that the battery current & temperature sensor has no deformation, cracks or other damages.
2) Check the resistance between the battery temperature sensor terminals.



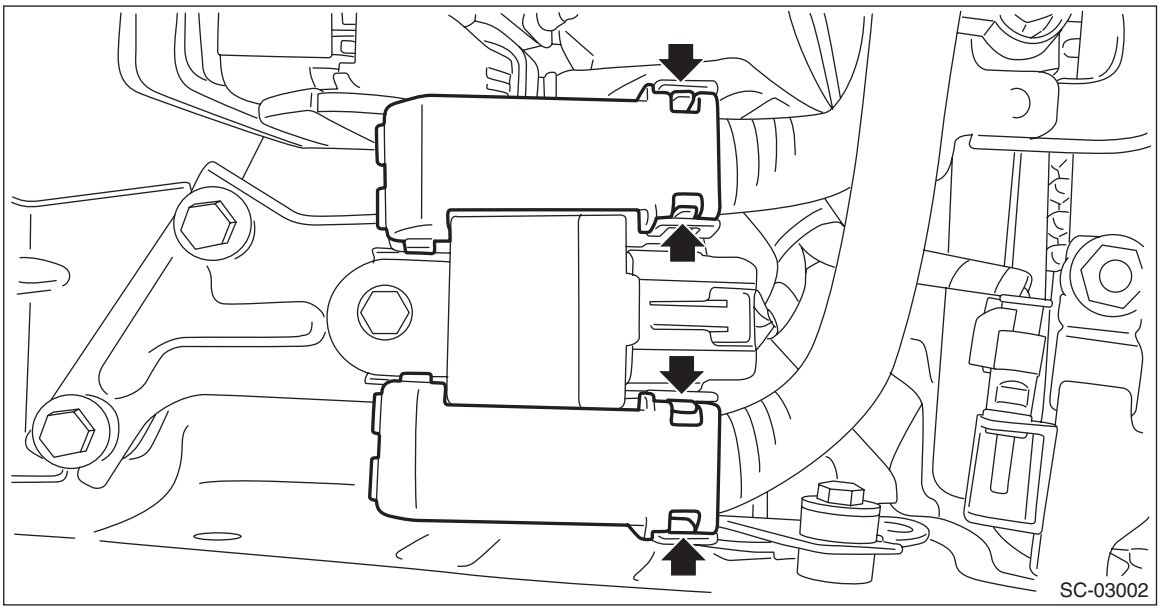
Temperature	Terminal No.	Standard
20 — 30°C (68 — 86°F)	1 and 2	1.5 — 2.8 kΩ

8. 12V Battery Relay

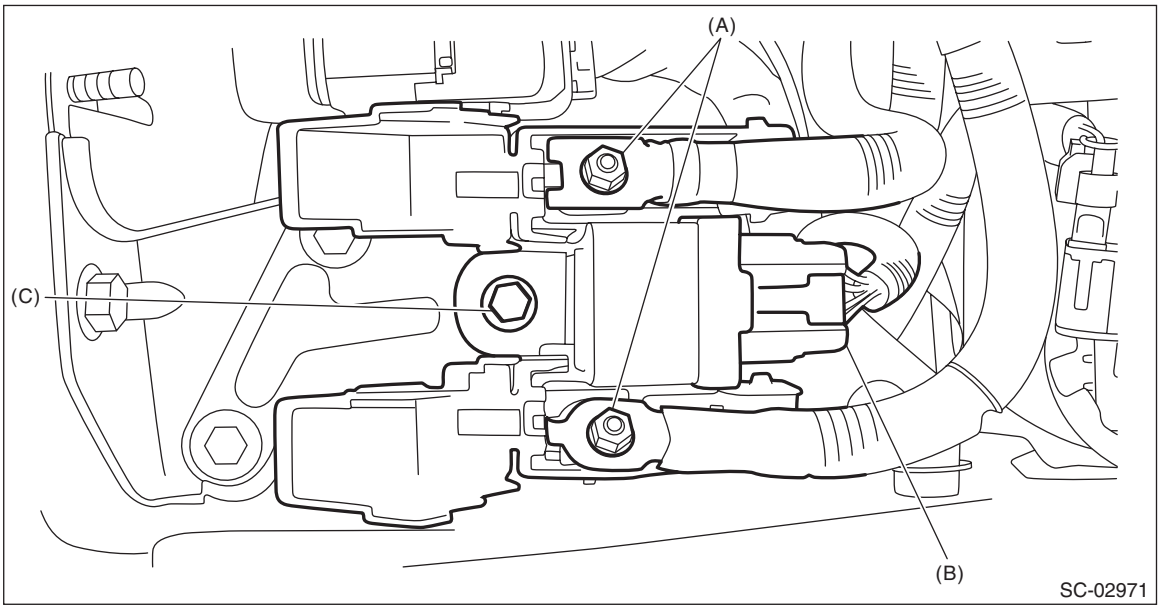
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Open the 12V battery relay cover RH and the 12V battery relay cover LH.

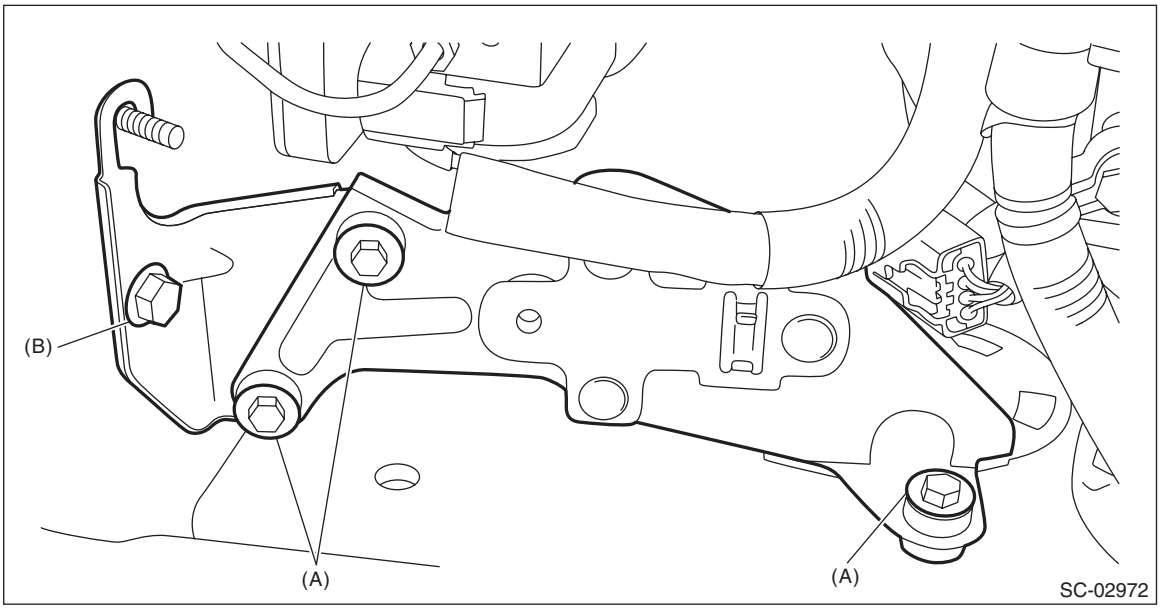


3) Disconnect the battery cable assembly terminal (A) from the 12V battery relay.
4) Disconnect the connector (B) from the 12V battery relay, and remove the bolt (C) holding the 12V battery relay.
5) Remove the 12V battery relay from the 12V battery relay bracket assembly.



6) Remove the bolt (A) securing the 12V battery relay bracket assembly, and remove the 12V battery relay bracket assembly.

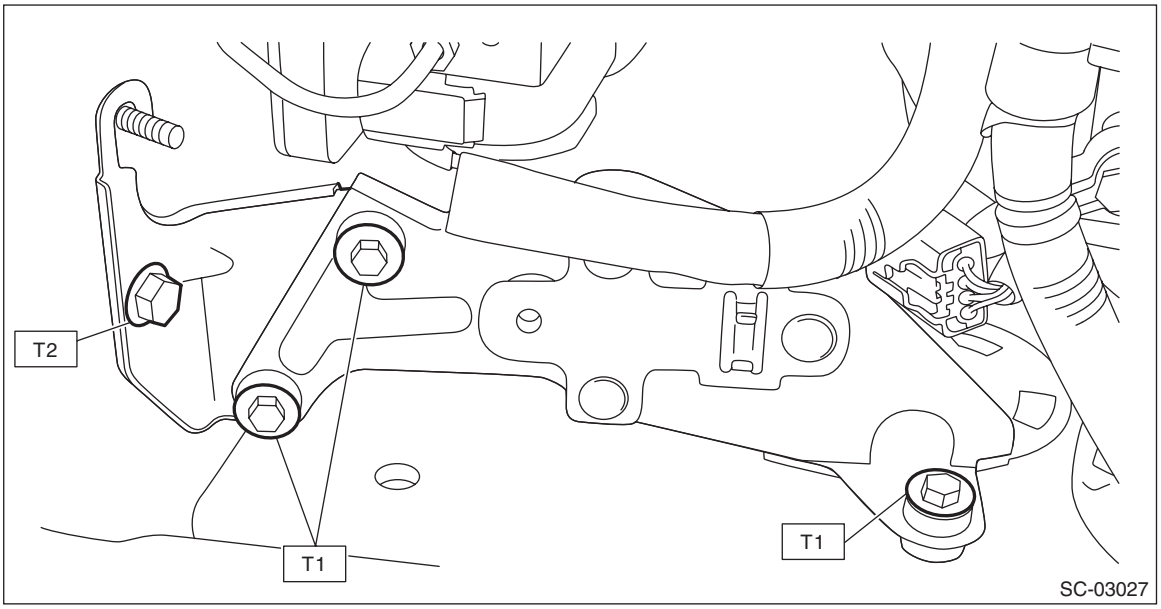
7) Remove the bolt (B) securing the 12V battery relay bracket No. 2 to the vehicle, and remove the 12V battery relay bracket No. 2.

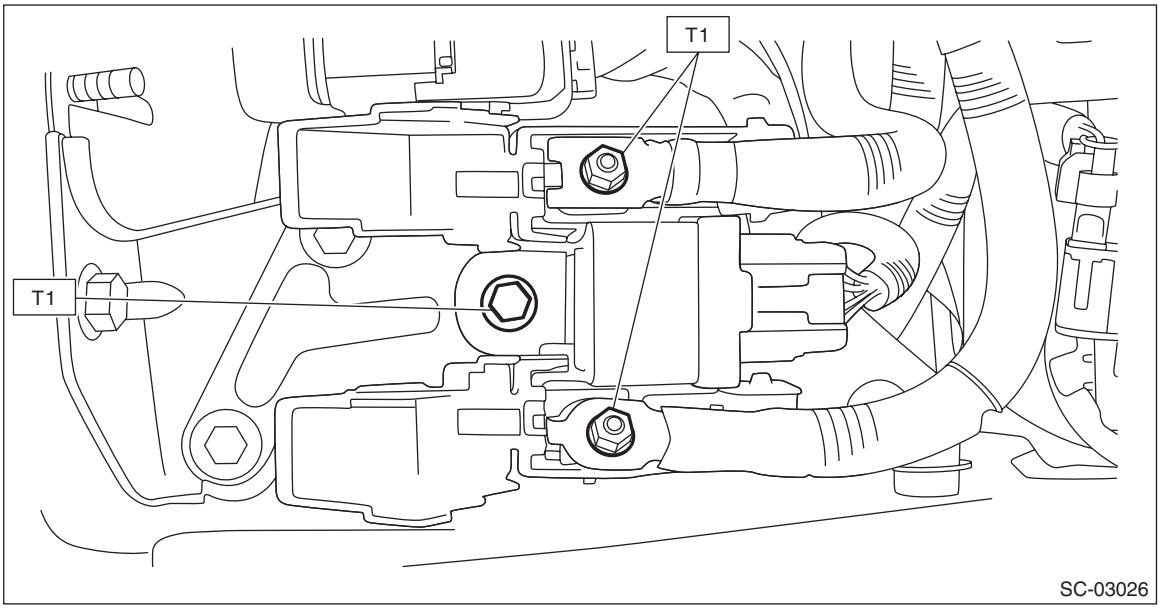


B: INSTALLATION

Install in the reverse order of removal.

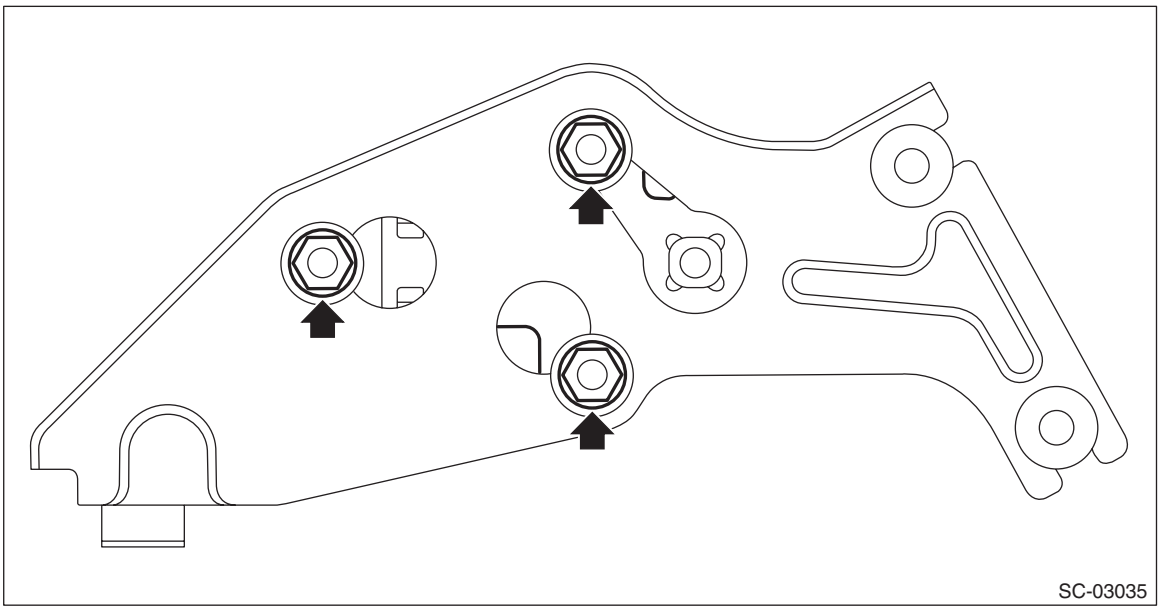
Tightening torque:
T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
T2: 33 N·m (3.4 kgf-m, 24.3 ft-lb)





C: DISASSEMBLY

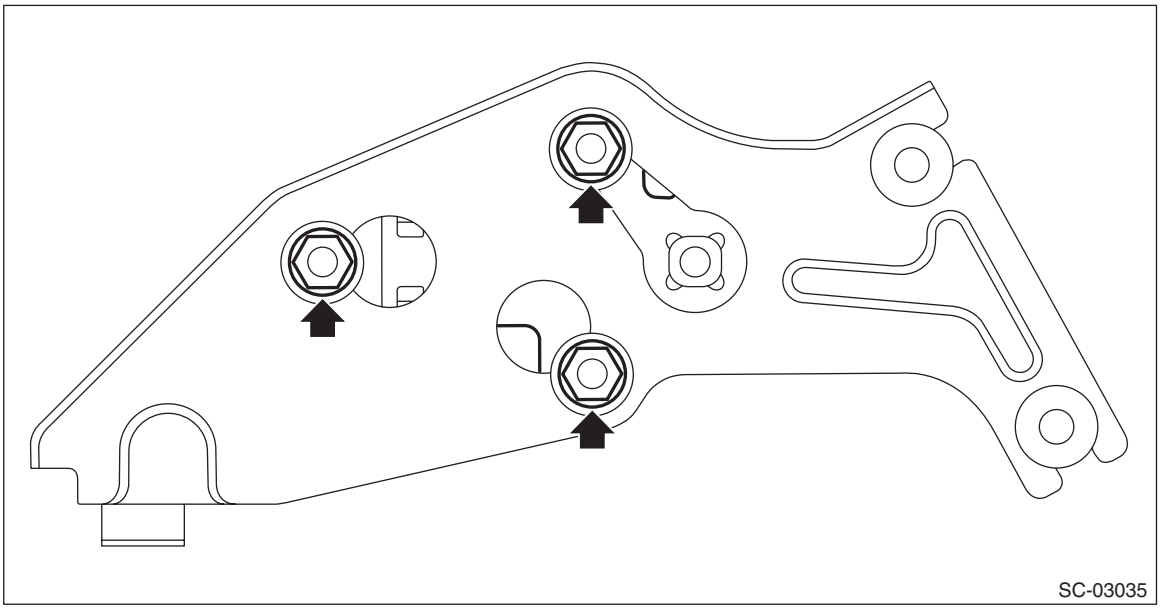
Remove the 12V battery relay bracket No. 3 from the 12V battery relay bracket No. 1.



D: ASSEMBLY

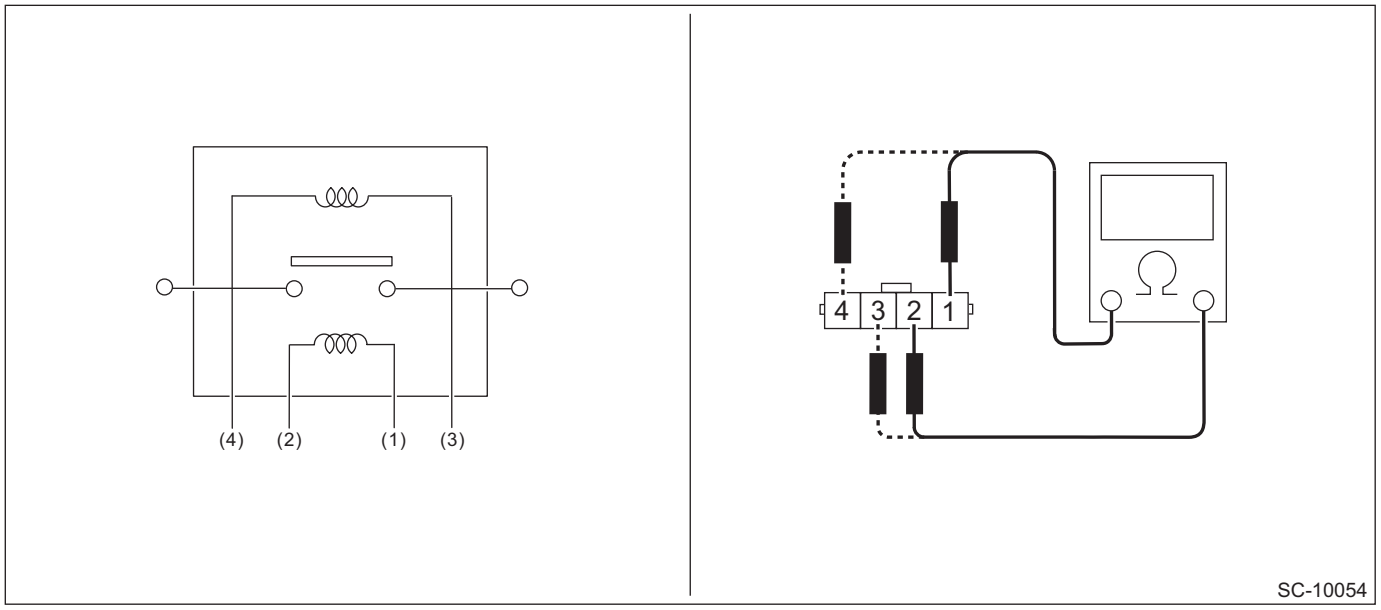
Install the 12V battery relay bracket No. 3 to the 12V battery relay bracket No. 1.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



E: INSPECTION

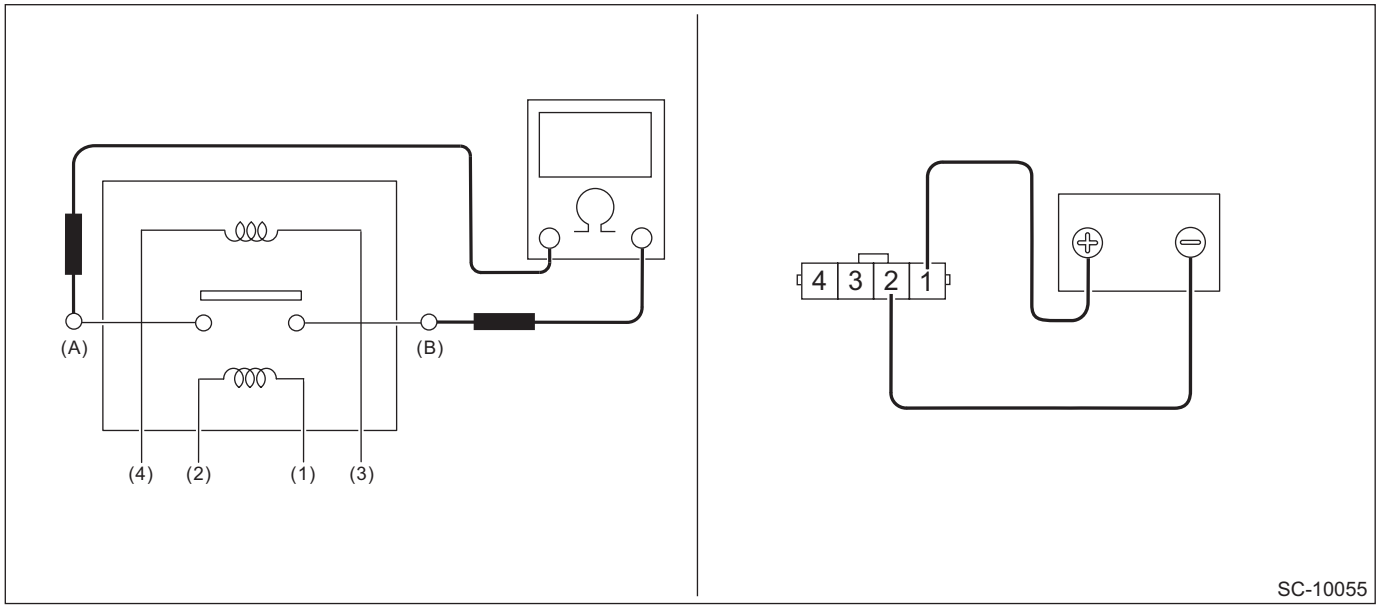
1) Check that the 12V battery relay has no deformation, cracks or other damages.
2) Measure the resistance between the 12V battery relay terminals.



Terminal No.	Standard
1 and 2	Approx. 4.3 Ω (when 20°C (68°F))
3 and 4	Approx. 4.3 Ω (when 20°C (68°F))

3) Connect battery positive terminal to terminal No. 1 and battery ground terminal to terminal No. 2, and measure the resistance between the 12 volt engine restart battery connection terminal (A) and the 12 volt auxiliary battery connection terminal (B).

CAUTION:
To avoid burning a magnetizing coil, continuity time should be within 1 second.

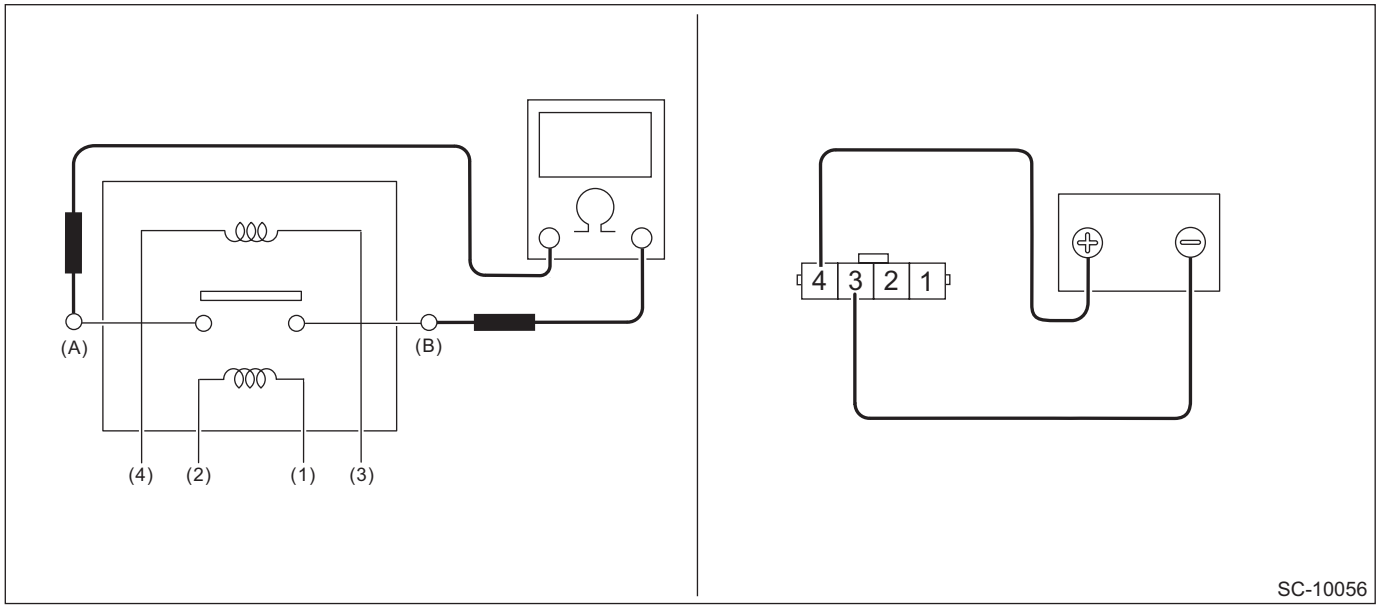


(A) 12 volt engine restart battery connection terminal
(B) 12 volt auxiliary battery connection terminal

Terminal No.	Standard
(A) and (B)	Less than 1 Ω

4) Connect battery positive terminal to terminal No. 4 and battery ground terminal to terminal No. 3, and measure the resistance between the 12 volt engine restart battery connection terminal (A) and the 12 volt auxiliary battery connection terminal (B).

CAUTION:
To avoid burning a magnetizing coil, continuity time should be within 1 second.



(A) 12 volt engine restart battery connection terminal
(B) 12 volt auxiliary battery connection terminal

Terminal No.	Standard
(A) and (B)	1 MΩ or more

9. DC/DC Converter

A: SPECIFICATION

Refer to “HYBRID ELECTRIC VEHICLE” for specification. <Ref. to HEV-2, SPECIFICATION, General Description.>

B: REMOVAL

Refer to “HYBRID ELECTRIC VEHICLE” for removal procedure. <Ref. to HEV-38, REMOVAL, DC/DC Converter.>

C: INSTALLATION

Refer to “HYBRID ELECTRIC VEHICLE” for the installation procedure. <Ref. to HEV-41, INSTALLATION, DC/DC Converter.>

ENGINE (DIAGNOSTICS)

EN(H4DO HEV) (diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

1. ENGINE

	Step	Check	Yes	No
1	**CHECK ENGINE START FAILURE.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to EN(H4DO HEV)(diag)-4, CHECK, Check List for Interview.> 2) Start the engine.	Does the engine start?	Go to step **2**.	Inspection using “Diagnostics for Engine Starting Failure” <Ref. to EN(H4DO HEV)(diag)-72, Diagnostics for Engine Starting Failure.>
2	**CHECK ILLUMINATION OF MALFUNCTION INDICATOR LIGHT.**	Does the malfunction indicator light illuminate?	Go to step **3**.	Inspection using “General Diagnostic Table”. <Ref. to EN(H4DO HEV)(diag)-562, INSPECTION, General Diagnostic Table.>
3	**CHECK COMMUNICATION STATUS.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor or general scan tool to the data link connector. 3) Turn the ignition switch to ON, and run the Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to the “Subaru Select Monitor”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Does Subaru Select Monitor or general scan tool communicate with vehicle normally?	Go to step **4**.	Inspection using “Basic Diagnostic Procedure” of LAN system <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

	Step	Check	Yes	No
4	**CHECK DTC.** Read DTC using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Read Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is DTC displayed on Subaru Select Monitor or general scan tool?	Record DTC, time stamp, and freeze frame data, then repair the trouble cause. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).> After repair, go to the next step. Go to step **5**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Repair the related parts. NOTE: If DTC is not shown on display although the malfunction indicator light illuminates, perform the diagnosis of malfunction indicator light circuit or combination meter. <Ref. to EN(H4DO HEV)(diag)-70, Malfunction Indicator Light.>
5	**PERFORM DIAGNOSIS.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Perform the Inspection Mode or Drive Cycle. <Ref. to EN(H4DO HEV)(diag)-52, Inspection Mode.> <Ref. to EN(H4DO HEV)(diag)-55, Drive Cycle.>	Is DTC displayed on Subaru Select Monitor or general scan tool?	Inspect using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-102, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

2. Check List for Interview

A: CHECK

1. CHECK LIST NO. 1

Check the following item when problem has occurred.

NOTE:
Use copies of this page for interviewing customers.

Customer's name		Engine No.	
Date of purchase		Fuel type	
Date of repair		Odometer reading	km
V.I.N.			miles
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Various/Others:		
Ambient air temperature	°C (°F)		
	❑ Hot ❑ Warm ❑ Cool ❑ Cold		
Place	❑ Highway ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Downhill ❑ Rough road ❑ Others:		
Engine temperature	❑ Cold ❑ During warming-up ❑ After warming-up ❑ Any temperature ❑ Others:		
Engine speed	rpm		
Vehicle speed	km/h (MPH)		
Driving conditions	❑ Not affected ❑ At starting ❑ While idling ❑ At racing ❑ While accelerating ❑ While cruising ❑ While decelerating ❑ While turning (RH/LH)		
Headlight	❑ ON/❑ OFF	Rear defogger	❑ ON/❑ OFF
Blower	❑ ON/❑ OFF	Audio	❑ ON/❑ OFF
A/C compressor	❑ ON/❑ OFF	Rear entertainment system	❑ ON/❑ OFF
Radiator fan	❑ ON/❑ OFF	Car phone	❑ ON/❑ OFF
Front wiper	❑ ON/❑ OFF	Wireless device	❑ ON/❑ OFF
Rear wiper	❑ ON/❑ OFF		

2. CHECK LIST NO. 2

Check the following item about the vehicle's state when the malfunction indicator light turns on.

NOTE:
Use copies of this page for interviewing customers.

a) Other warning lights or indicators illuminate.: ❑ Yes / ❑ No
❑ Fuel level warning light ❑ Charge warning light ❑ Engine coolant temperature warning light ❑ Oil pressure warning light ❑ ATF temperature warning light or Sport indicator light ❑ Driver's control center differential indicator light ❑ ABS warning light ❑ VDC warning light ❑ Cruise indicator light ❑ SI-CRUISE warning light ❑ EyeSight warning light ❑ Immobilizer indicator light ❑ STEERING warning light ❑ Electronic parking brake warning light ❑ Glow indicator light ❑ Sedimenter warning light ❑ Auto Start Stop indicator light ❑ Auto Start Stop OFF indicator light ❑ Hybrid fail lamp ❑ Others:
b) Fuel level
• Lack of fuel: ❑ Yes / ❑ No • Indicator position of fuel gauge: • Experienced running out of fuel: ❑ Yes / ❑ No
c) Intentional connecting or disconnecting of harness connectors or spark plug cords: ❑ Yes / ❑ No
• What:
d) Intentional connecting or disconnecting of hoses: ❑ Yes / ❑ No
• What:
e) Installing parts other than genuine parts: ❑ Yes / ❑ No
• What: • Where:
f) Occurrence of noise: ❑ Yes / ❑ No
• From where: • What kind:
g) Occurrence of smell: ❑ Yes / ❑ No
• From where: • What kind:
h) Intrusion of water into engine compartment or passenger compartment: ❑ Yes / ❑ No
i) Troubles occurred
❑ Engine does not start. ❑ Engine stalls during idling. ❑ Engine stalls while driving. ❑ Engine speed decreases. ❑ Engine speed does not decrease. ❑ Rough idling ❑ Poor acceleration ❑ Back fire ❑ After fire ❑ Does not shift. ❑ Excessive shift shock

3. General Description

A: CAUTION

1) Airbag system wiring harness is routed near the ECM, main relay and fuel pump relay.

CAUTION:
- **Do not use electrical test equipment on the airbag system circuits.**
- **Be careful not to damage the airbag system wiring harness when servicing the ECM, TCM, main relay and fuel pump relay.**

2) Never connect the battery in reverse polarity. Doing so will damage the ECM instantly, and other parts will also be damaged.

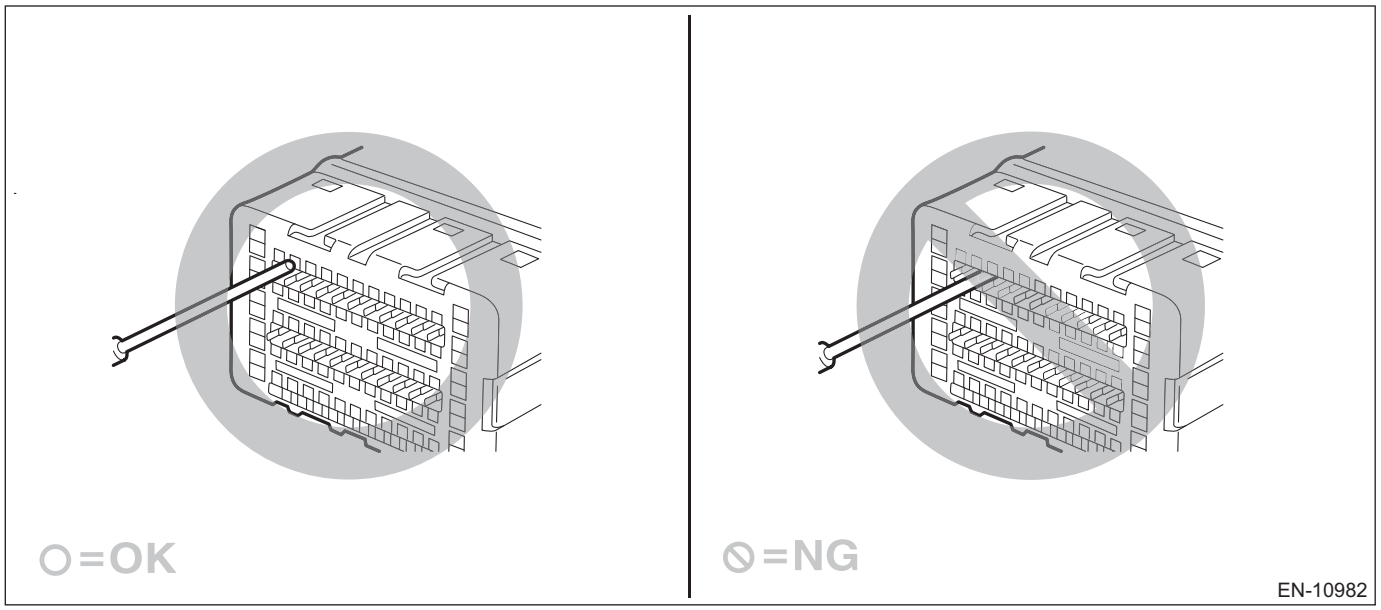
NOTE:
- When connecting 12 volt auxiliary battery, wait for one minute or more after disconnecting connectors.
- When disconnecting or connecting 12 volt auxiliary battery, make sure to avoid battery terminal from multiple contacts with cable within one minute.
- When trouble occurs in vehicle by connection of 12 volt auxiliary battery terminal, disconnect 12 volt auxiliary battery terminal and reconnect after one minute or more. Then confirm the trouble has been solved.

3) Before connecting 12 volt auxiliary battery, make sure that no obstacles exist within the operation range of active grille shutter. Active grille shutter may be activated when 12 volt auxiliary battery is connected.

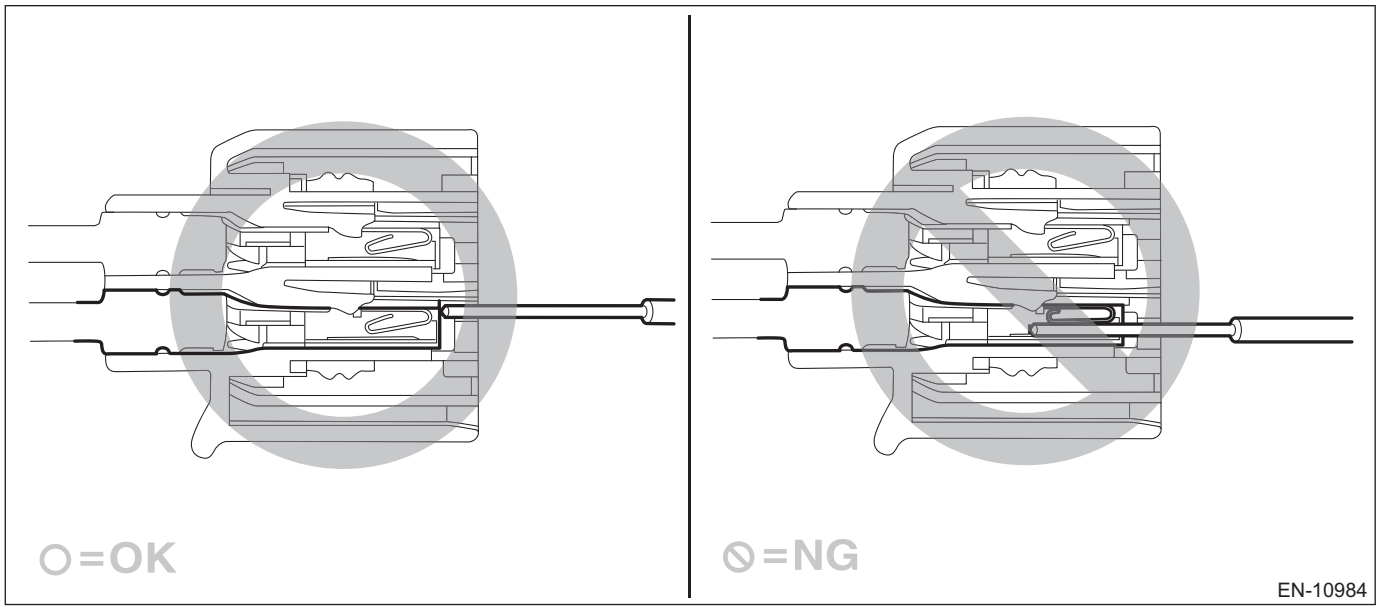
4) Do not disconnect the battery cables while the engine is running. A large counter electromotive force will be generated in the generator, and this voltage may damage electronic parts such as ECM etc.

5) When disconnecting the connectors of the electrical components, always be sure to turn the ignition switch to OFF. Perform the Clear Memory Mode after connecting the connectors. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>

6) When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal.



Never insert the tapered pin into the terminal because it deforms inside which may lead to a malfunction.

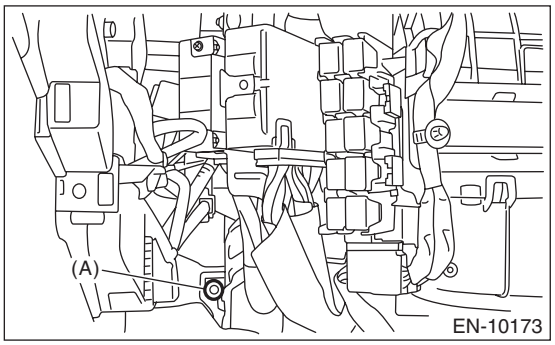


CAUTION:
When replacing the ECM, be careful not to use the ECM of wrong specification to avoid any damage on the fuel injection system.

NOTE:
When replacing the ECM of the models with immobilizer, immobilizer system must be registered. For detailed operation procedure, refer to the “REGISTRATION MANUAL FOR IMMOBILIZER”.

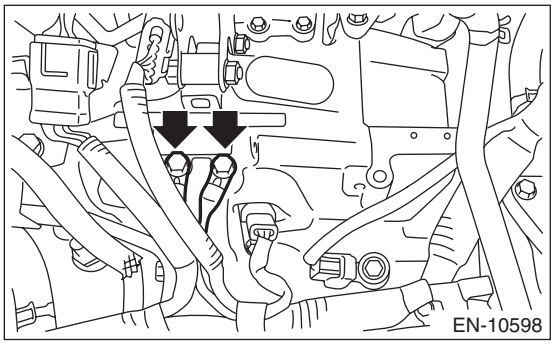
7) Take care not to allow water to get into the connectors when servicing or washing the vehicle in rainy weather. Avoid exposure to water even if the connectors are waterproof.

8) Use ECM mounting stud bolts for the grounding point when measuring voltage and resistance inside the passenger compartment.



(A) Stud bolt

9) Use the engine ground terminal or engine assembly for the grounding point when measuring the voltage and resistance in engine compartment.



10) All parts related to the engine control system are precision parts. Do not drop or otherwise apply impact. Do not reuse the parts that are dropped accidentally.
11) Do not connect the wiring of electrical parts directly to the battery terminals. It may cause erroneous operation of the charge control, leading to early deterioration of the battery or discharged battery.
12) Observe the following cautions when installing a radio in vehicle.

CAUTION:
• The antenna must be kept as far apart as possible from the ECM. <Ref. to EN(H4DO HEV)(diag)-11, CONTROL MODULE, LOCATION, Electrical Component Location.>
• The antenna feeder must be placed as far apart as possible from the ECM and engine control system harness.
• Carefully adjust the antenna for correct matching.
• When mounting a large power type radio, pay special attention to the three items mentioned above.
• Incorrect installation of the radio may affect the operation of ECM.
13) When disconnecting the fuel hose, be sure to release the fuel pressure beforehand. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
14) Warning lights may illuminate when performing driving test with jacked-up or lifted-up condition, but this is not a system malfunction. The reason for this is the rotating speed difference between the front and rear wheels. After diagnosis of engine control system, perform the VDC memory clear procedure of self-diagnosis function. <Ref. to VDC(diag)-26, Clear Memory Mode.>

B: INSPECTION

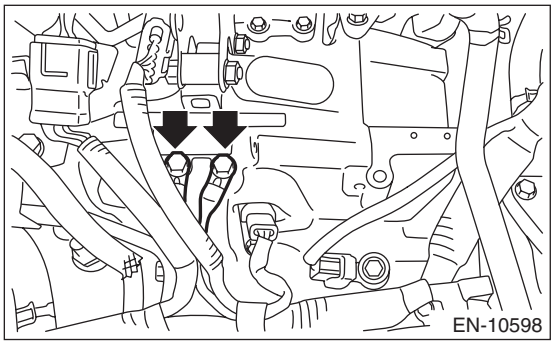
Before performing diagnostics, check the following item which might affect engine problems.

1. 12 VOLT AUXILIARY BATTERY

1) Check the battery. <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>
2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

2. ENGINE GROUND

Make sure that the engine ground terminal has no contamination, corrosion or looseness and is properly connected to the engine.

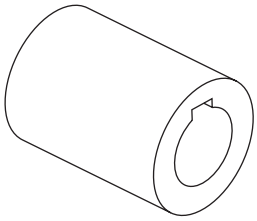


C: NOTE

• The on-board diagnostic (OBD) system detects and indicates a fault in various inputs and outputs of the complex electronic control. Malfunction indicator light in the combination meter indicates occurrence of a fault or trouble.
• Further, against any failure of sensors that would cause the vehicle to stop running, the fail-safe function is provided to ensure the minimal drivability.
• The OBD system incorporated with the vehicles within this type of engine complies with OBD-II regulations. The OBD system monitors the components and the system malfunction listed in “Engine Section” which affects on emissions.
• When the system decides that a malfunction occurs, malfunction indicator light illuminates. At the same time of the malfunction indicator light illumination or blinking, a DTC and a freeze frame engine conditions are stored into on-board computer.
• The OBD system stores freeze frame engine condition data (engine load, engine coolant temperature, fuel trim, engine speed and vehicle speed, etc.) into on-board computer when it detects a malfunction.
• Freeze frame engine condition data are stored until the DTCs are cleared. However when such malfunctions as fuel trim fault and misfire are detected with the freeze frame engine condition data stored, they are rewritten into those related to the fuel trim fault and misfire.
• When the malfunction does not occur again for three consecutive driving cycles*, malfunction indicator light is turned off, but DTC remains at on-board computer.
*: One driving cycle means the period between the ignition switch ON and the ignition switch OFF after driving.
• When performing diagnosis, connect the Subaru Select Monitor to the vehicle.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.
 ST18252AA000	18252AA000	CRANKSHAFT SOCKET	Used for rotating crankshaft.

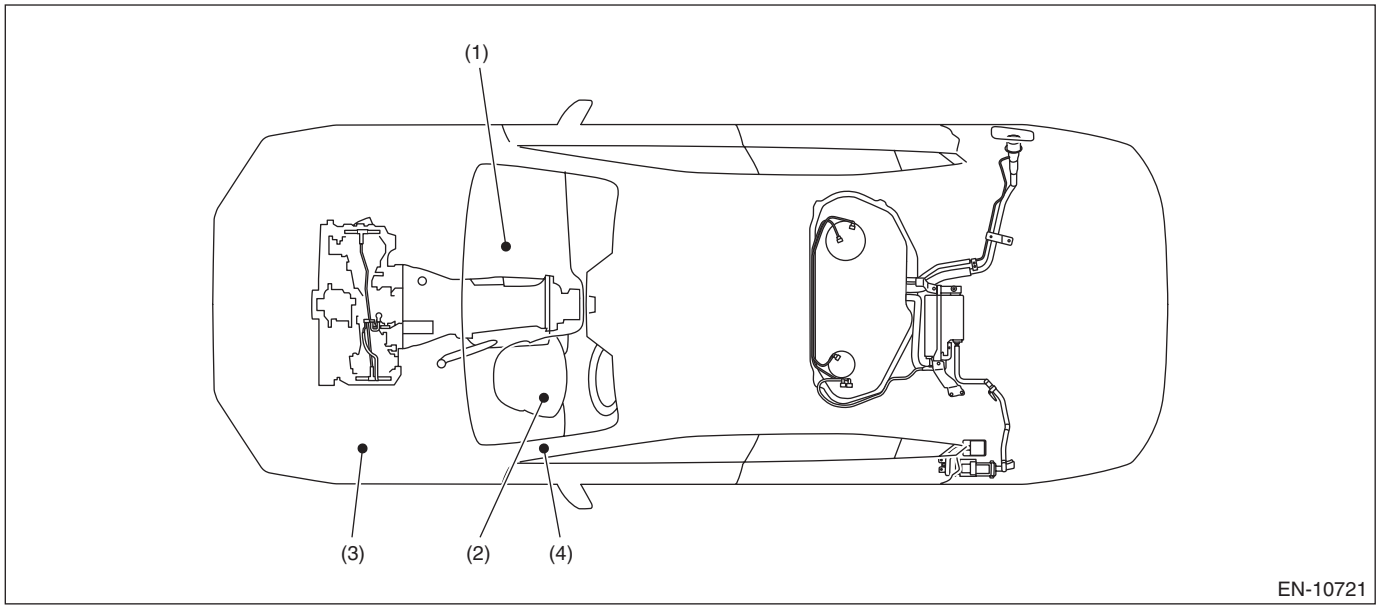
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.
DST-i	Used together with Subaru Select Monitor 4.

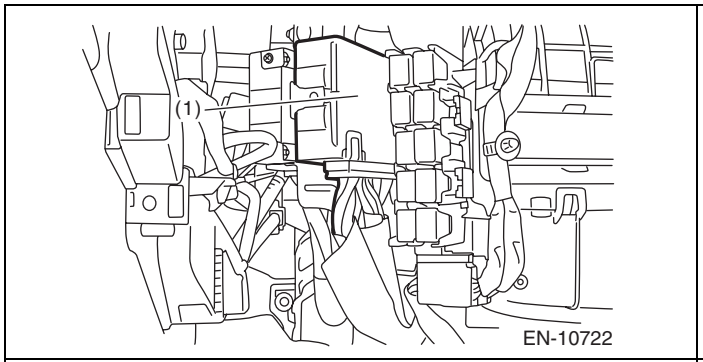
4. Electrical Component Location

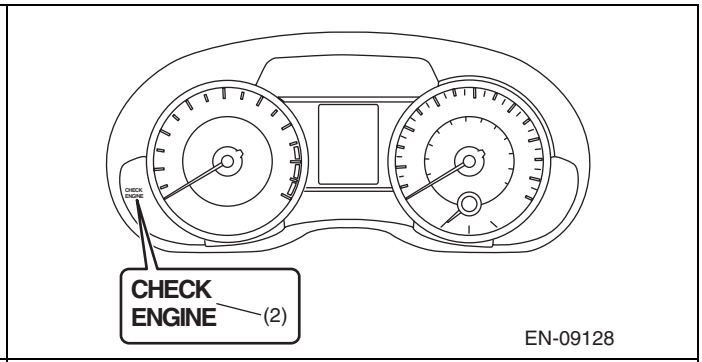
A: LOCATION

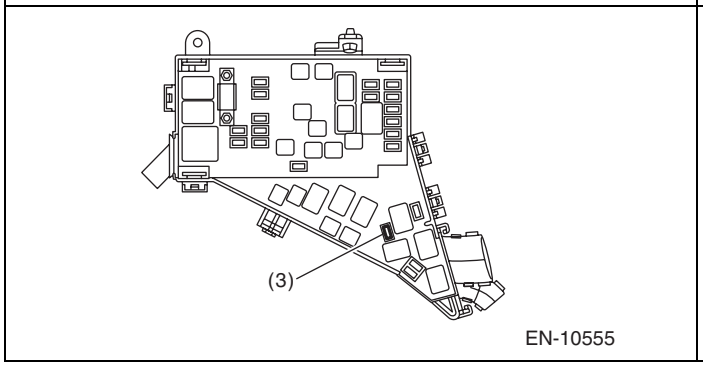
1. CONTROL MODULE

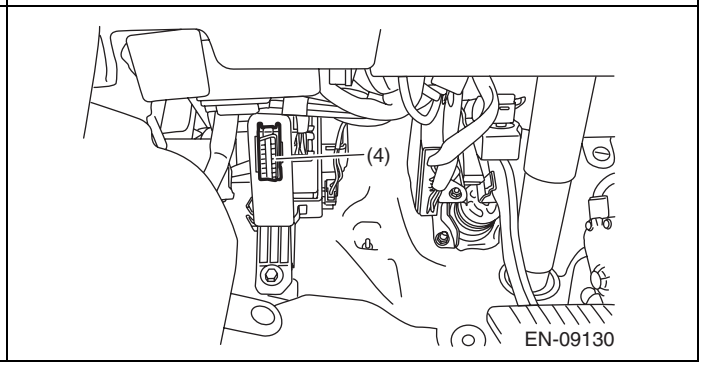


(1) Engine control module (ECM)
(2) Malfunction indicator light
(3) Delivery (test) mode fuse
(4) Data link connector

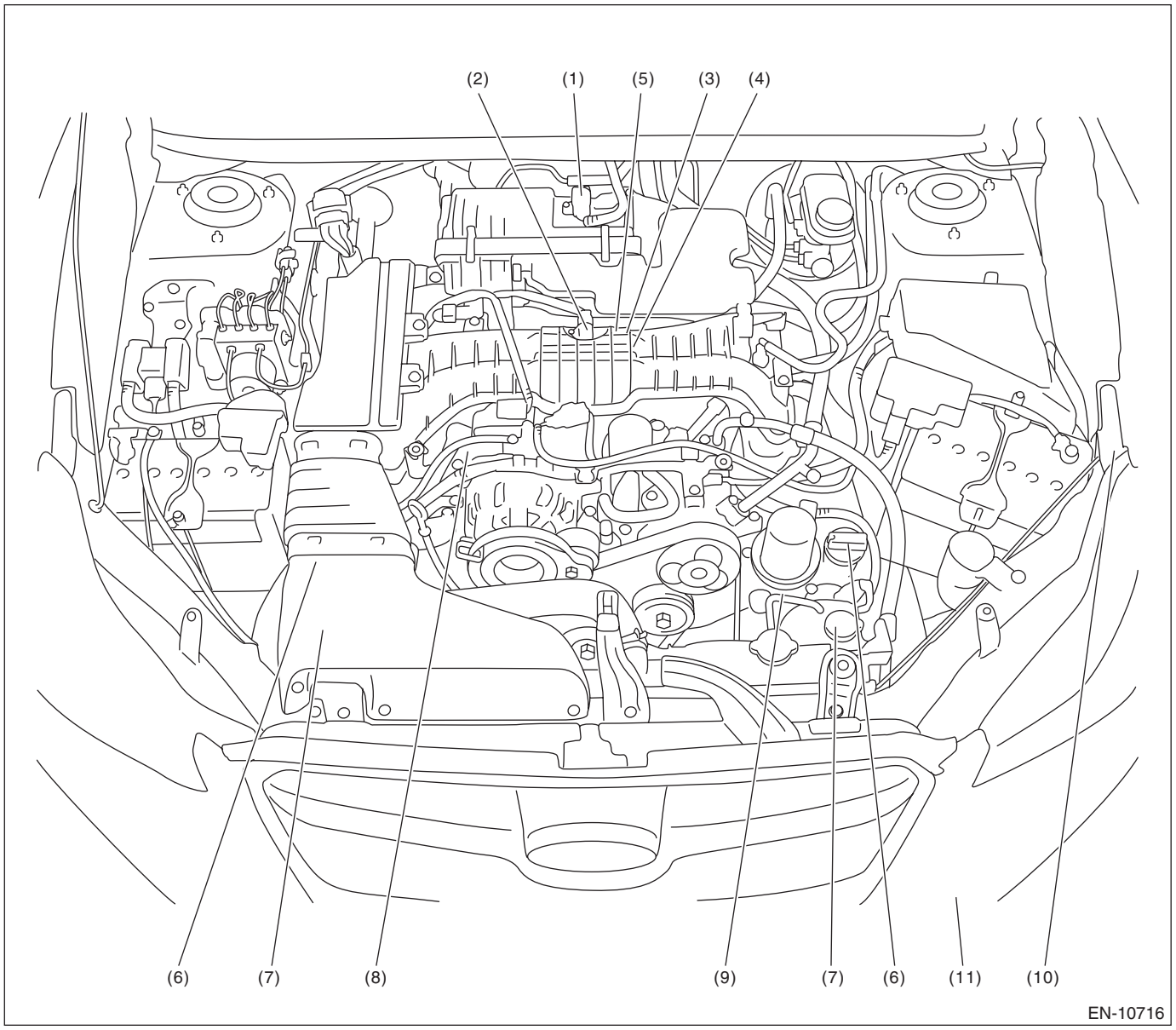




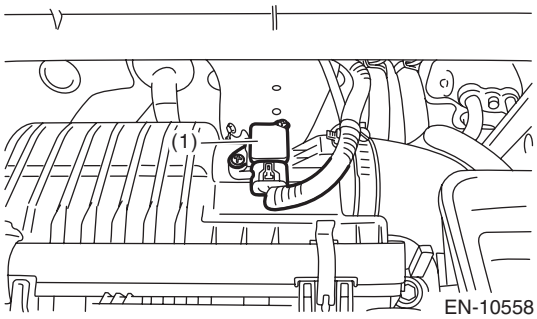


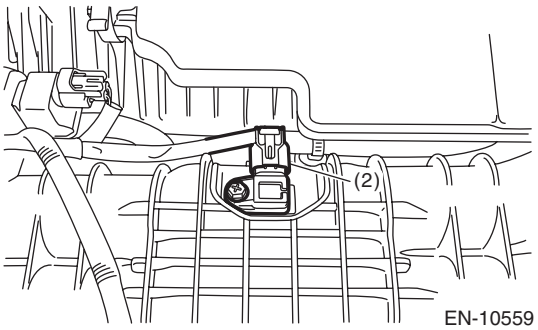


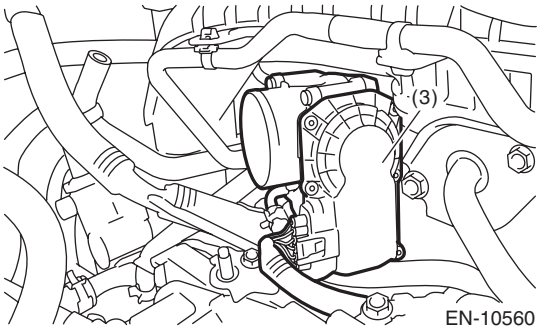
2. SENSOR

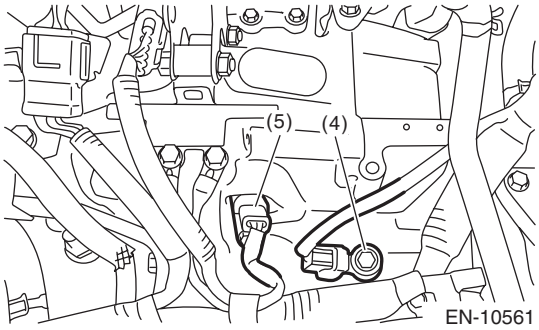


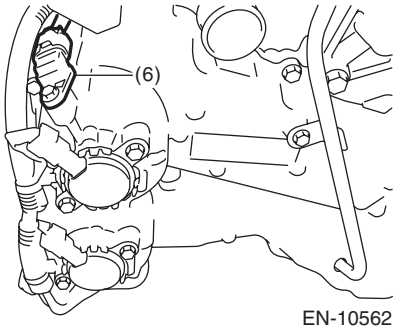
(1) Mass air flow and intake air temperature sensor
(2) Manifold absolute pressure sensor
(3) Electronic throttle control
(4) Knock sensor
(5) Crankshaft position sensor
(6) Intake camshaft position sensor
(7) Exhaust camshaft position sensor
(8) Engine coolant temperature sensor
(9) Engine oil temperature sensor
(10) Battery temperature sensor
(11) Ambient sensor

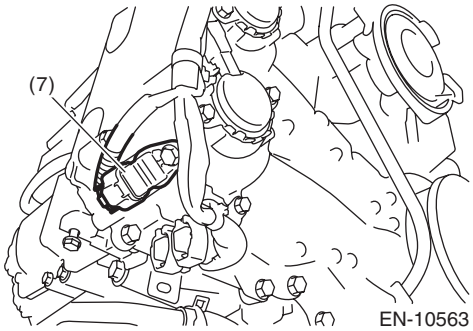

(1)
EN-10558

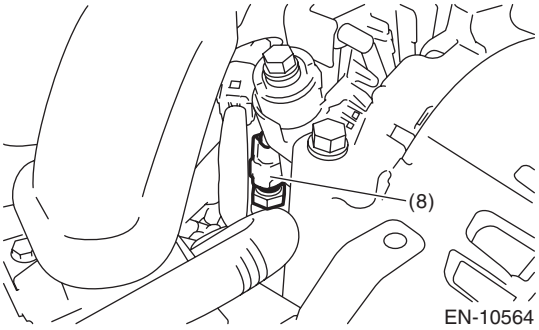

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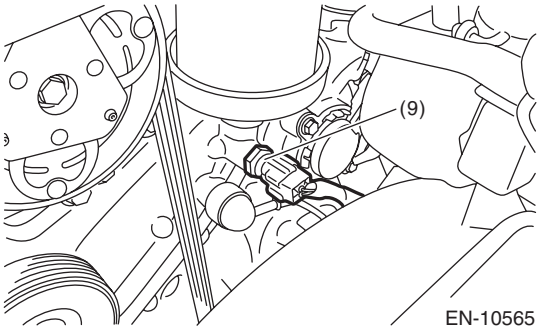

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EN-10560

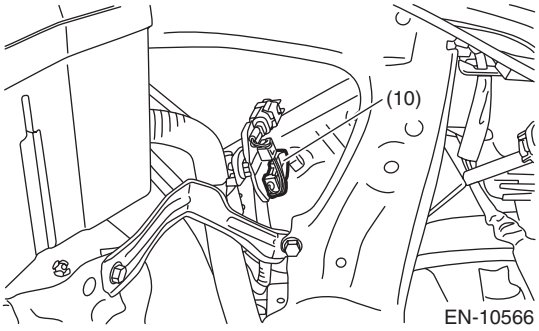

(5)
(4)
EN-10561

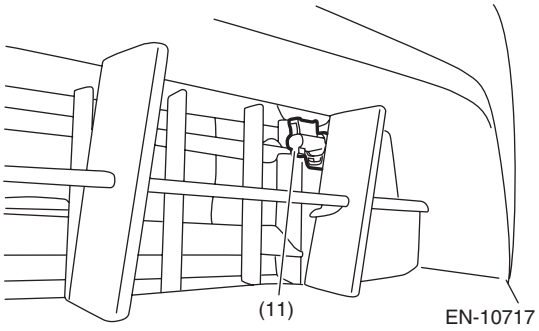

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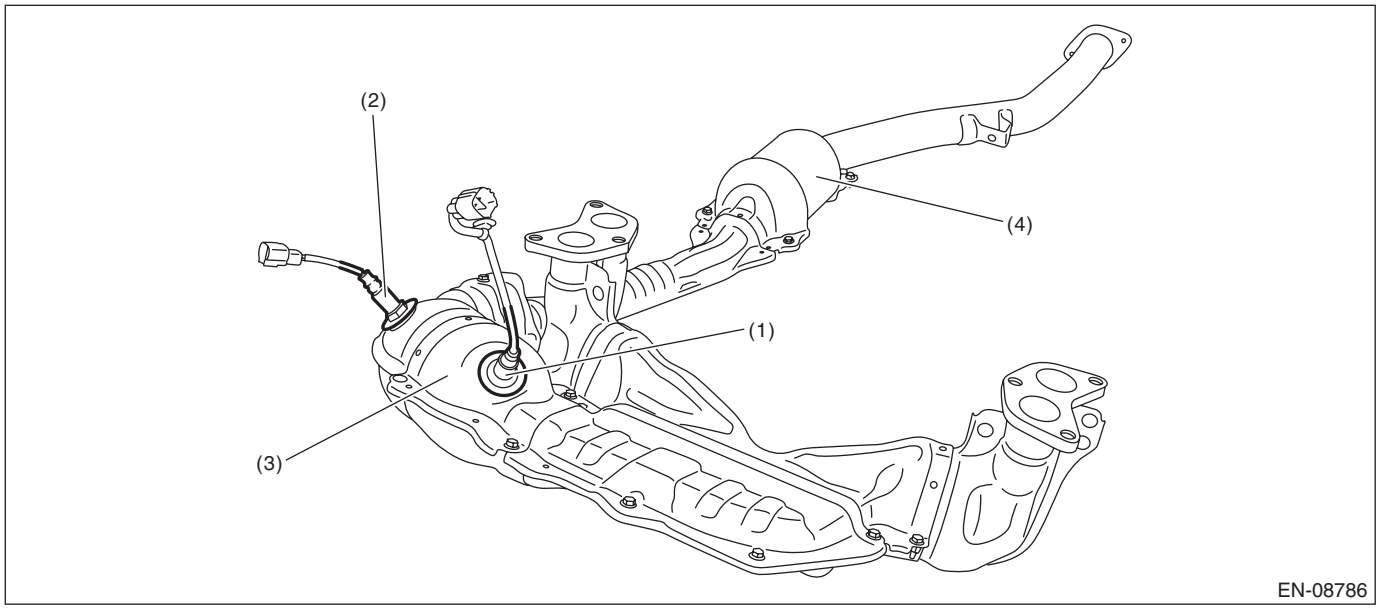

(7)
EN-10563


(8)
EN-10564

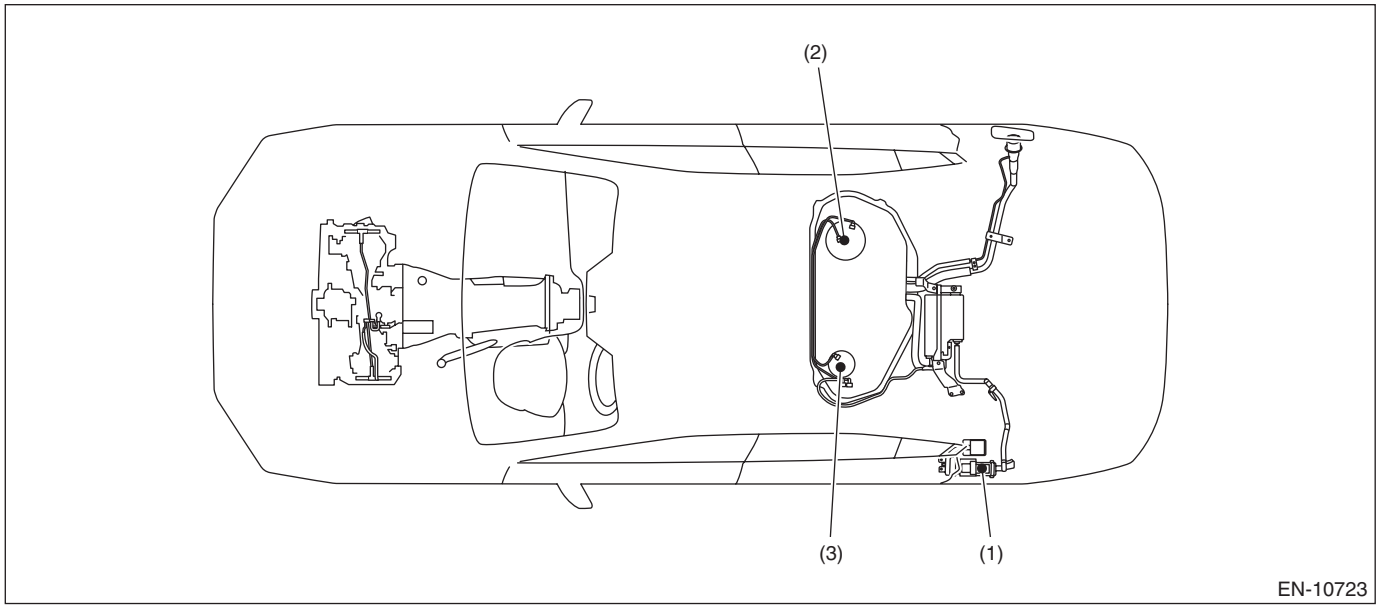

(9)
EN-10565


(10)
EN-10566

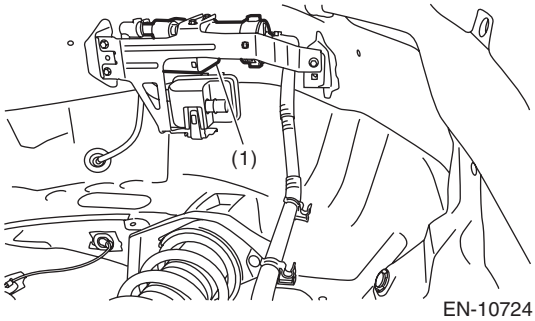

(11)
EN-10717



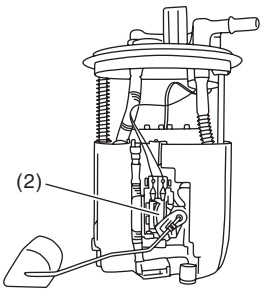
(1) Front oxygen (A/F) sensor
(2) Rear oxygen sensor
(3) Front catalytic converter
(4) Rear catalytic converter



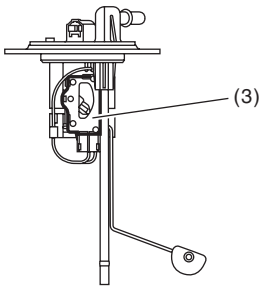
(1) Leak check valve ASSY (with built-in pressure sensor)
(2) Fuel level sensor
(3) Fuel sub level sensor



EN-10724

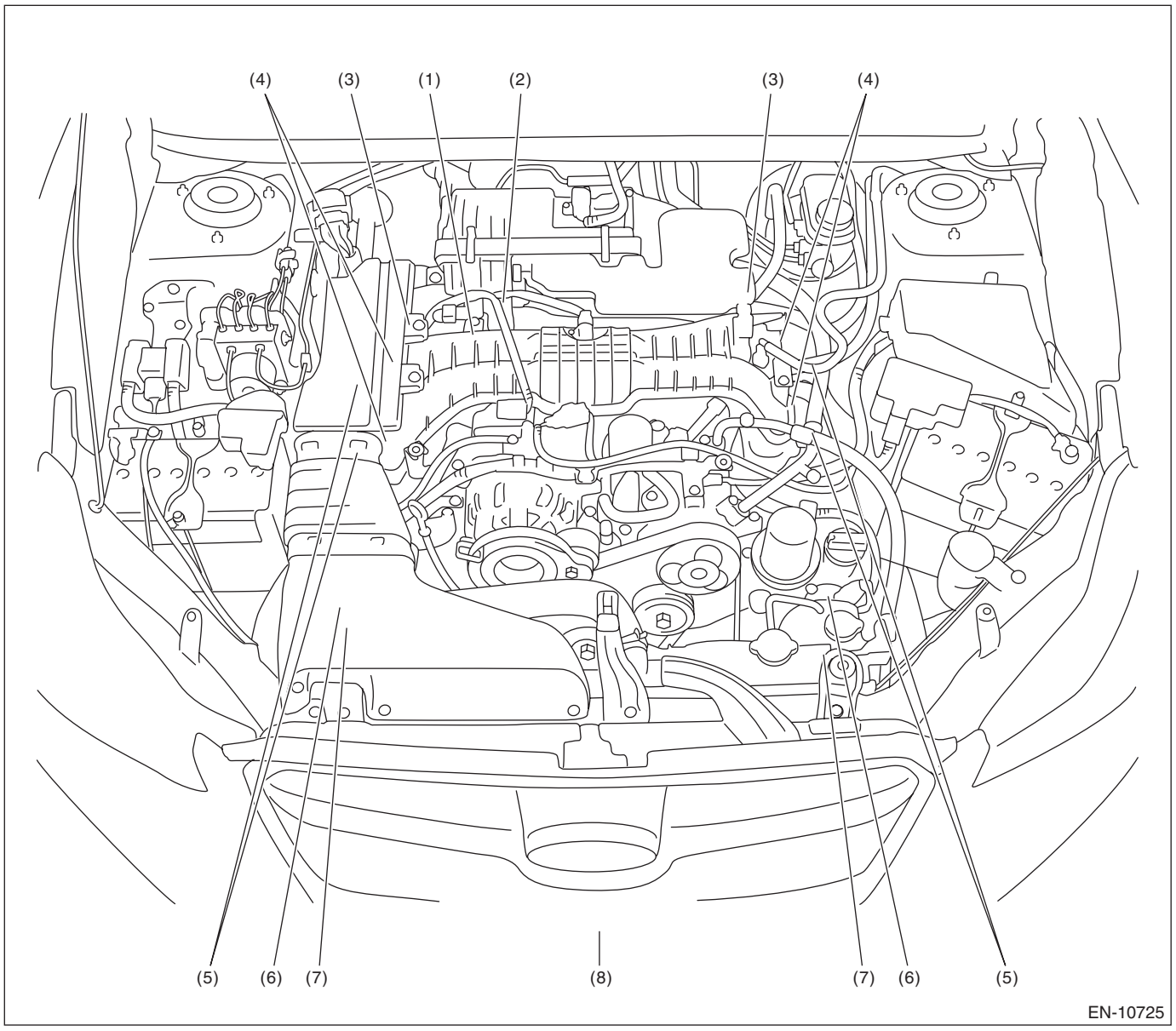


EN-10473

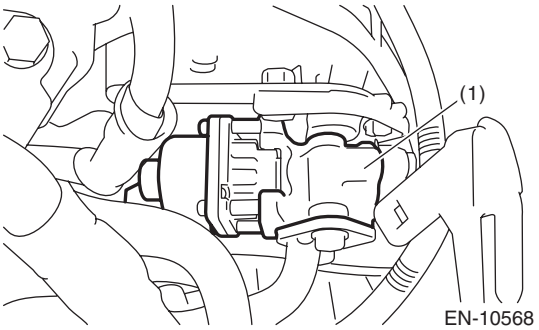


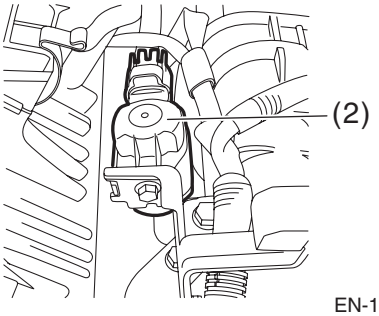
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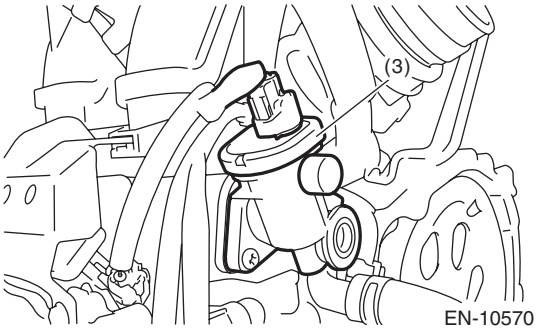
3. SOLENOID VALVE, ACTUATOR, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS

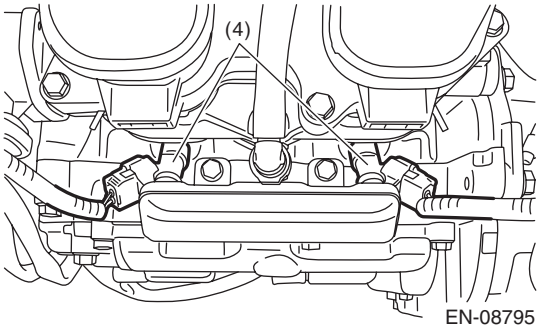


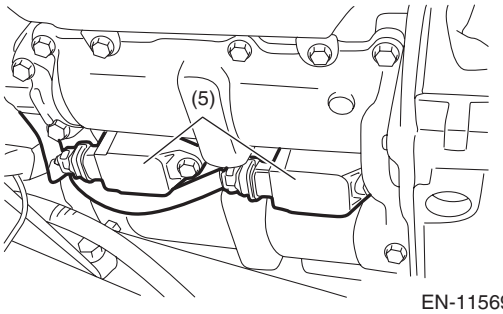
(1) EGR control valve
(2) Purge control solenoid valve
(3) Tumble generator valve actuator
(4) Fuel injector
(5) Ignition coil
(6) Intake oil control solenoid
(7) Exhaust oil control solenoid
(8) Active grille shutter

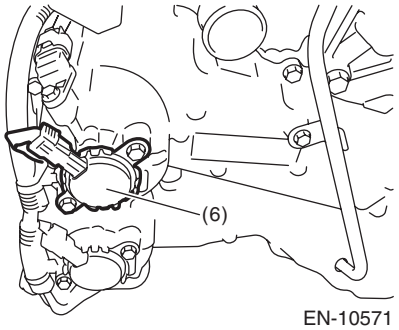

(1)
EN-10568

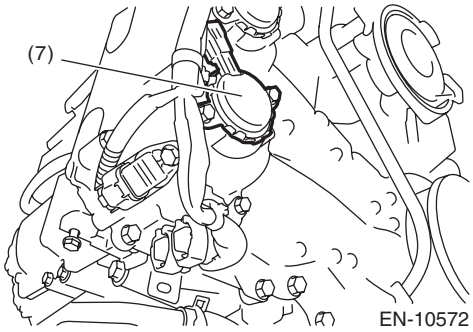

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EN-11571

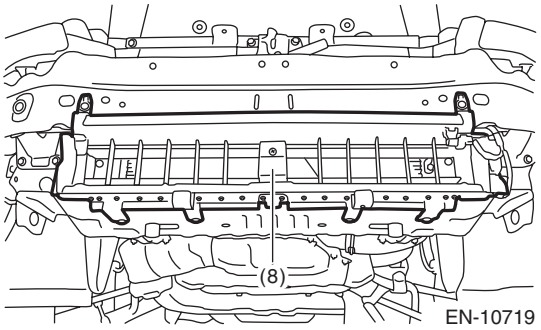

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EN-10570

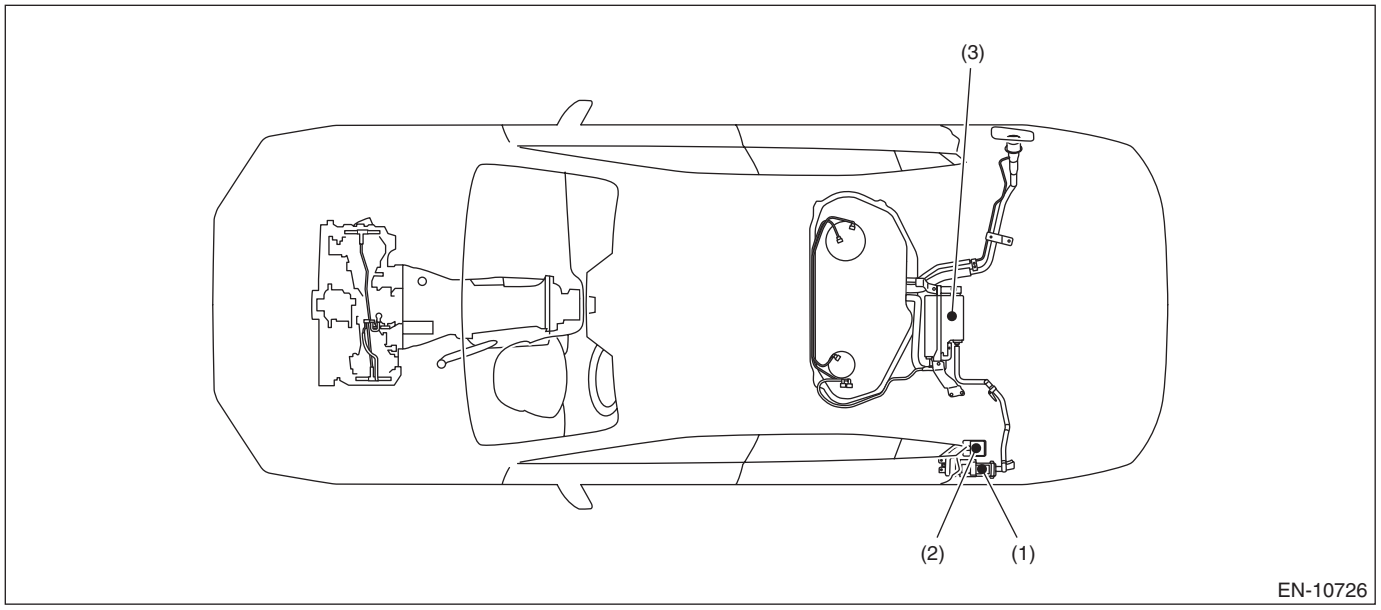

(4)
EN-08795


(5)
EN-11569

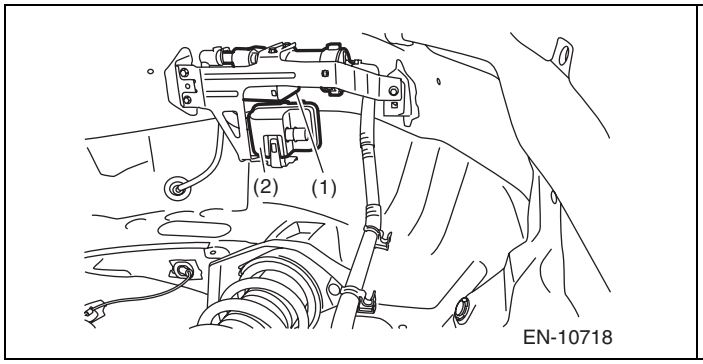

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EN-10571

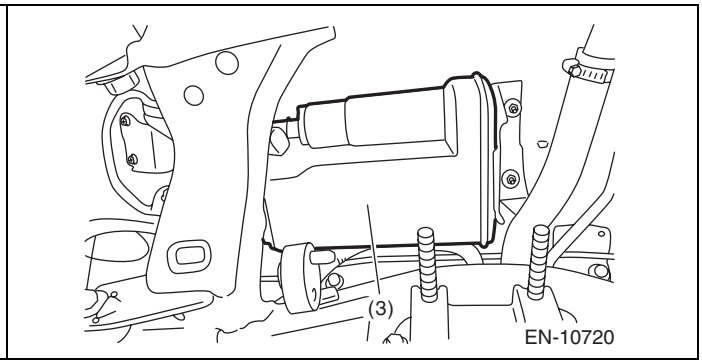

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EN-10572

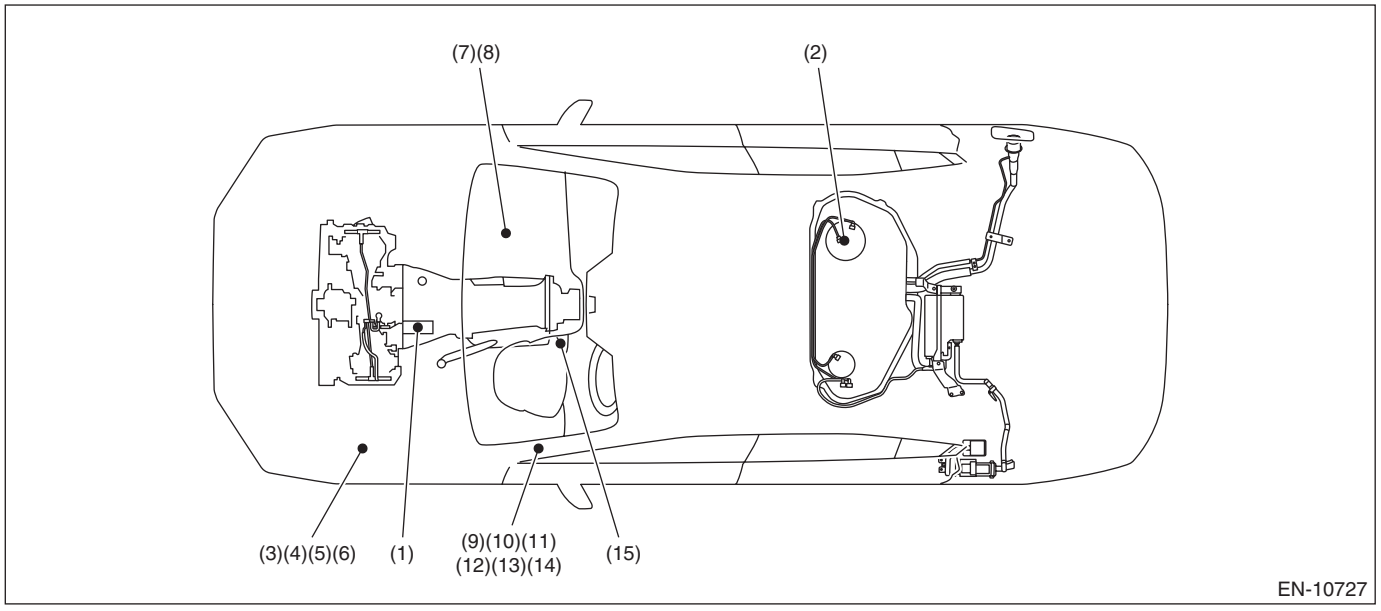

(8)
EN-10719



(1) Leak check valve ASSY (2) Drain filter (3) Canister

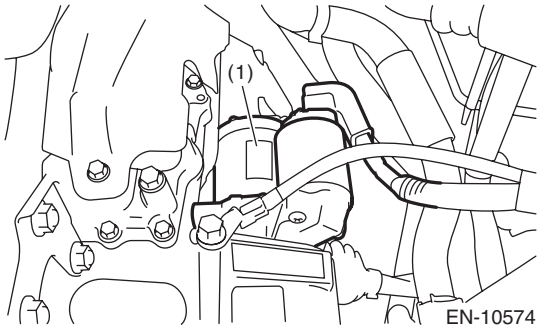




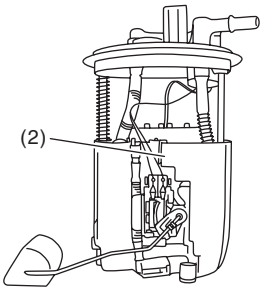


Electrical Component Location

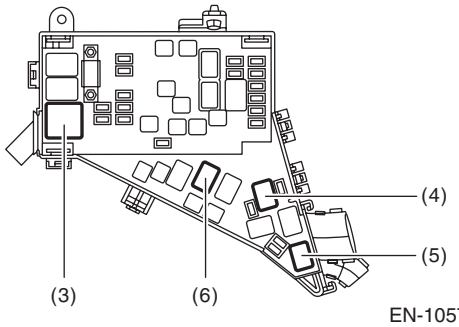
(1) Starter
(2) Fuel pump
(3) Radiator main fan relay 1
(4) Radiator main fan relay 2
(5) Radiator sub fan relay
(6) Fuel pump relay
(7) Main relay
(8) IG relay
(9) A/F, oxygen sensor relay
(10) Electronic throttle control relay
(11) Starter relay 1
(12) Starter cut relay (model with push button start)
(13) IG relay 1 (push button start) (model with push button start)
(14) Starter relay (push button start) (model with push button start)
(15) Push button ignition switch (model with push button start)



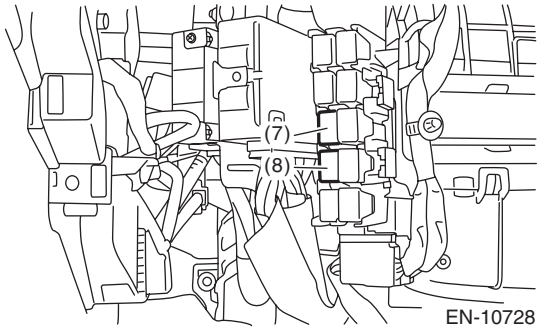
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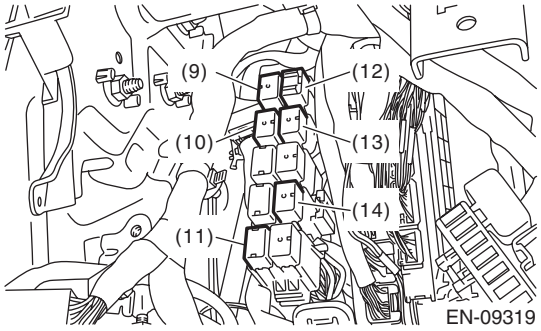
EN-10186



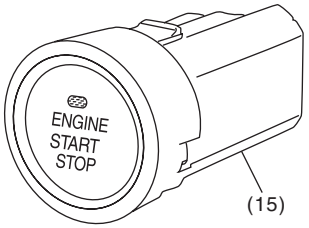
EN-10575



EN-10728

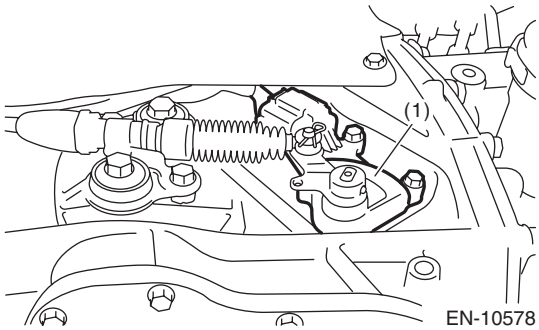


EN-09319



EN-09321

4. TRANSMISSION

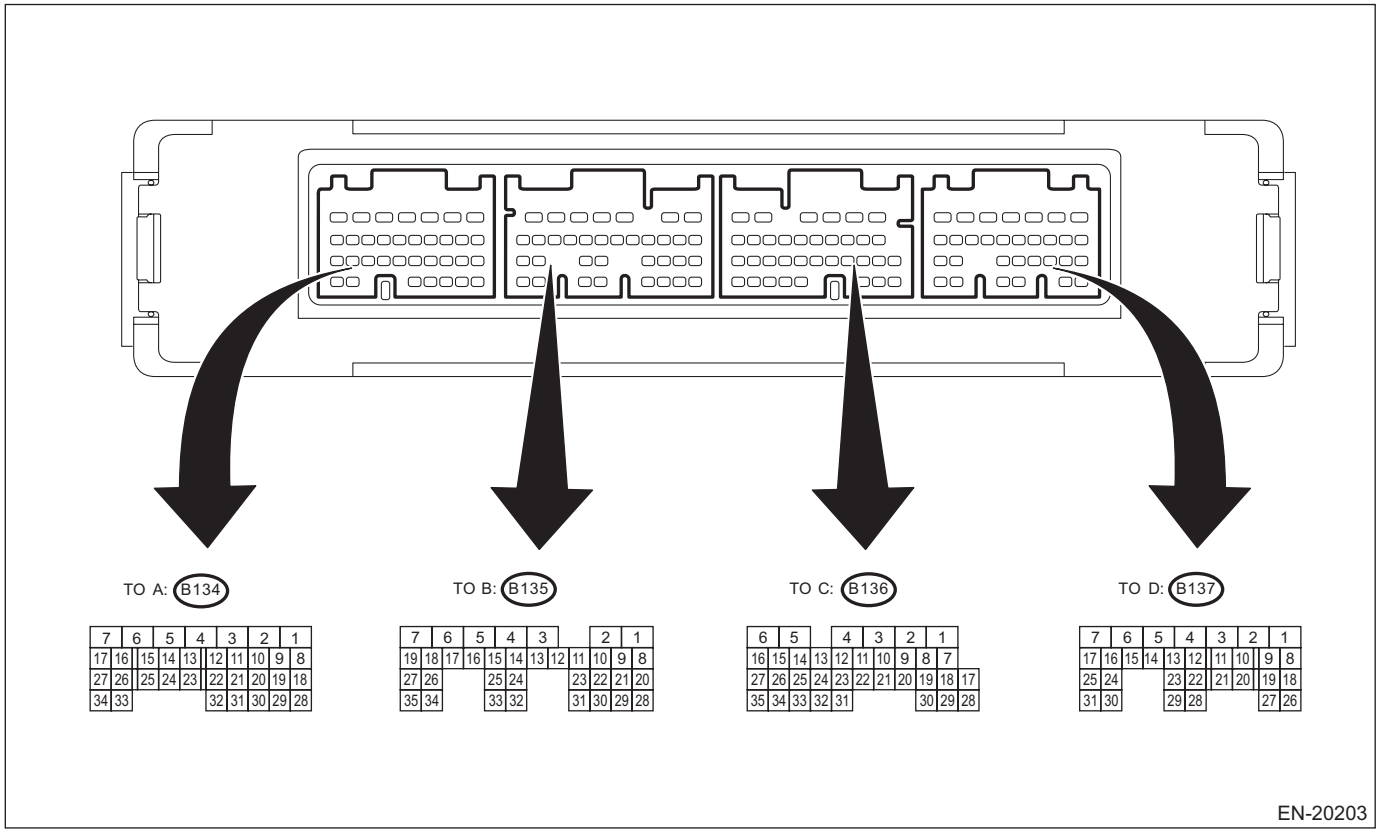


(1) Inhibitor switch

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

1. ENGINE CONTROL MODULE (ECM)



Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	B136	16	5	0 or 5	Waveform*
	Signal (–)	B136	27	5	0	—
Front oxygen (A/F) sensor	Signal (+)	B136	19	2.8 — 3.2	2.8 — 3.2	—
	Signal (–)	B136	18	2.4 — 2.7	2.4 — 2.7	—
Rear oxygen sensor	Signal	B136	21	0	0 — 0.9	—
Front oxygen (A/F) sensor heater signal		B136	5	Battery voltage	0 or battery voltage	Waveform
Rear oxygen sensor heater signal		B134	6	Battery voltage	0 or battery voltage	Waveform
Oxygen sensor	Shield	B136	30	0	0	—
Engine coolant temperature sensor	Signal	B134	30	1 — 1.4	1 — 1.6	—
Air flow sensor	Signal	B137	22	—	0.3 — 4.5	—
	Shield	B137	28	0	0	—
	Ground	B137	29	0	0	—
Intake air temperature sensor signal		B137	12	0.3 — 4.6	0.3 — 4.6	—
Engine oil temperature sensor signal		B134	20	1 — 1.4	1 — 1.6	—

Control Module I/O Signal

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Starter switch		B137	17	Waveform	Waveform	Waveform
Accessory cut request		B135	32	Waveform	Waveform	Cranking: Waveform
Starter switch 2		B137	14	Waveform	Waveform	Cranking: Waveform
Starter cut relay		B135	34	Waveform	Waveform	Cranking: Waveform
Ignition switch		B137	27	Battery voltage	Battery voltage	—
Neutral position switch		B137	16	ON: 0 OFF: Battery voltage	ON: 0 OFF: Battery voltage	—
Delivery mode switch		B137	13	Battery voltage	Battery voltage	When fuse is installed: 0
Knock sensor	Signal	B136	28	2.5	2.5	—
	Shield	B136	29	0	0	—
Back-up power supply		B137	2	Battery voltage	Battery voltage	—
Control module power supply		B136	6	Battery voltage	Battery voltage	—
		B137	1	Battery voltage	Battery voltage	—
Sensor power supply		B134	19	5	5	—
		B135	22	5	5	—
Ignition control	#1	B134	21	0	0 or 5	Waveform
	#2	B134	10	0	0 or 5	Waveform
	#3	B134	31	0	0 or 5	Waveform
	#4	B134	8	0	0 or 5	Waveform
Fuel injector	#1	B134	12	Battery voltage	0 or battery voltage	Waveform
	#2	B134	22	Battery voltage	0 or battery voltage	Waveform
	#3	B134	32	Battery voltage	0 or battery voltage	Waveform
	#4	B134	13	Battery voltage	0 or battery voltage	Waveform
Fuel pump relay control		B135	19	Battery voltage	ON: 0.5 or less OFF: Battery voltage	—
A/C relay control		B135	35	ON: 0.5 or less OFF: Battery voltage	ON: 0.5 or less OFF: Battery voltage	—
Pressure switch		B137	8	ON: 0 OFF: Battery voltage	ON: 0 OFF: Battery voltage	—
Main fan relay control		B135	12	ON: 0.5 or less OFF: Battery voltage	ON: 0.5 or less OFF: Battery voltage	—
Sub fan relay control		B135	11	ON: 0.5 or less OFF: Battery voltage	ON: 0.5 or less OFF: Battery voltage	—
Engine speed output		B135	15	—	0 or battery voltage	Waveform
Purge control solenoid valve		B134	11	Battery voltage	Battery voltage	In operation: Waveform
EGR control valve	Signal 1	B136	11	Battery voltage	0 or battery voltage	—
	Signal 2	B136	13	Battery voltage	0 or battery voltage	—
	Signal 3	B136	31	Battery voltage	0 or battery voltage	—
	Signal 4	B136	32	Battery voltage	0 or battery voltage	—
Manifold absolute pressure sensor signal		B136	20	3.4 — 3.8	1 — 1.6	—
Electronic throttle control	Main	B134	18	Approx. 0.7	Approx. 0.6 — 0.7	Fully closed: Approx. 0.6 Fully open: Approx. 4.0
	Sub	B134	28	Approx. 1.6	Approx. 1.5 — 1.6	Fully closed: Approx. 1.5 Fully open: Approx. 4.2
Electronic throttle control motor (+)		B134	2	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor (–)		B134	1	Duty waveform	Duty waveform	Drive frequency: 500 Hz

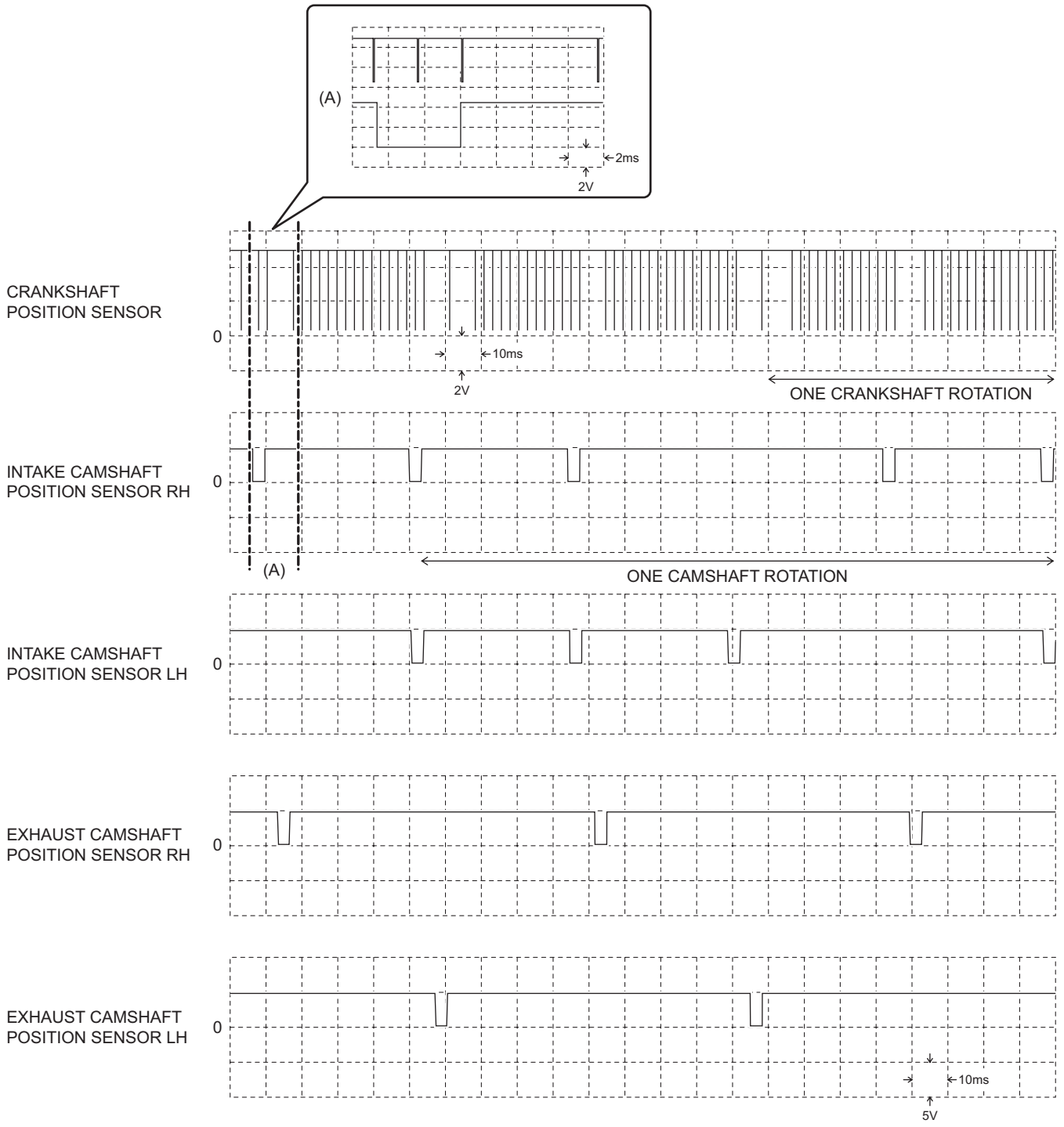
Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Electronic throttle control motor power supply		B135	7	Battery voltage	Battery voltage	—
Electronic throttle control motor relay		B135	17	0	0	—
Intake oil control solenoid RH		B134	17	Battery voltage	0 or battery voltage	Waveform
Intake oil control solenoid LH		B134	16	Battery voltage	0 or battery voltage	Waveform
Exhaust oil control solenoid RH		B134	7	Battery voltage	0 or battery voltage	Waveform
Exhaust oil control solenoid LH		B134	5	Battery voltage	0 or battery voltage	Waveform
Intake camshaft position sensor RH		B136	26	5	0 or 5	Waveform*
Intake camshaft position sensor LH		B136	15	5	0 or 5	Waveform*
Exhaust camshaft position sensor RH		B136	14	5	0 or 5	Waveform*
Exhaust camshaft position sensor LH		B136	25	5	0 or 5	Waveform*
Camshaft position sensor ground		B136	34	0	0	—
Accelerator pedal position sensor	Main sensor signal	B135	23	Fully closed: 0.4 — 1 Fully opened: 2.4 — 3.7	Fully closed: 0.4 — 1 Fully opened: 2.4 — 3.7	—
	Main power supply	B135	21	5	5	—
	Ground (main sensor)	B135	29	0	0	—
	Sub signal sensor	B135	31	Fully closed: 0.3 — 1.1 Fully opened: 2.3 — 3.8	Fully closed: 0.3 — 1.1 Fully opened: 2.3 — 3.8	—
Starter relay		B135	26	Waveform	Waveform	Waveform
Brake switch 1 (Brake switch)		B137	7	When brake pedal is depressed: 0 When brake pedal is released: Battery voltage	When brake pedal is depressed: 0 When brake pedal is released: Battery voltage	—
Brake switch 2 (Stop light switch)		B137	3	When brake pedal is depressed: Battery voltage When brake pedal is released: 0	When brake pedal is depressed: Battery voltage When brake pedal is released: 0	—
Cruise control command switch		B137	30	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	—
Cruise control main switch		B137	23	ON: 0 OFF: 5	ON: 0 OFF: 5	—
CAN communication (MAIN-CAN)	(Hi)	B137	19	—	—	—
	(Lo)	B137	18	—	—	—

Control Module I/O Signal

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
CAN communication (PU-CAN)	(Hi)	B137	10	—	—	—
	(Lo)	B137	21	—	—	—
Self-shutoff control		B135	13	0	0	—
Battery temperature sensor		B137	24	1.1 — 2.4	1.1 — 2.4	When battery temperature is 20 — 50°C (68 — 122°F)
Oil level switch		B136	24	0	0	Oil level LOW: Battery voltage
Tumble generator valve opening angle switch signal RH		B136	23	0	Fully closed: 0.5 or less Fully opened: 4.5 or more	When in operation: Waveform
Tumble generator valve actuator RH open		B134	25	0	0	When in operation: Waveform
Tumble generator valve actuator RH closed		B134	14	0	0	When in operation: Waveform
Tumble generator valve opening angle switch signal LH		B136	9	0	Fully closed: 0.5 or less Fully opened: 4.5 or more	When in operation: Waveform
Tumble generator valve actuator LH open		B134	23	0	0	When in operation: Waveform
Tumble generator valve actuator LH closed		B134	24	0	0	When in operation: Waveform
Immobilizer communication		B135	25	—	—	—
ELCM	Switching valve	B135	1	Battery voltage	Battery voltage	Operating: 0
	Pressure sensor	B135	20	1 — 4	1 — 4	—
	Vacuum pump	B135	8	Battery voltage	Battery voltage	Operating: 0
Ground	Sensor	B134	29	0	0	—
		B135	30	0	0	—
	Engine 1	B134	4	0	0	—
	Engine 2	B134	3	0	0	—
	Engine 3	B136	1	0	0	—
	Engine 4	B136	2	0	0	—
	Engine 5	B136	3	0	0	—
	Body	B137	4	0	0	—

NOTE:
- Perform measurement after warming up the engine.
- Place the select lever in “P” range or “N” range.
- Turn the A/C to OFF.
- Turn all the accessory switches to OFF.
- Waveforms vary depending on a measurement environment and vehicle condition.

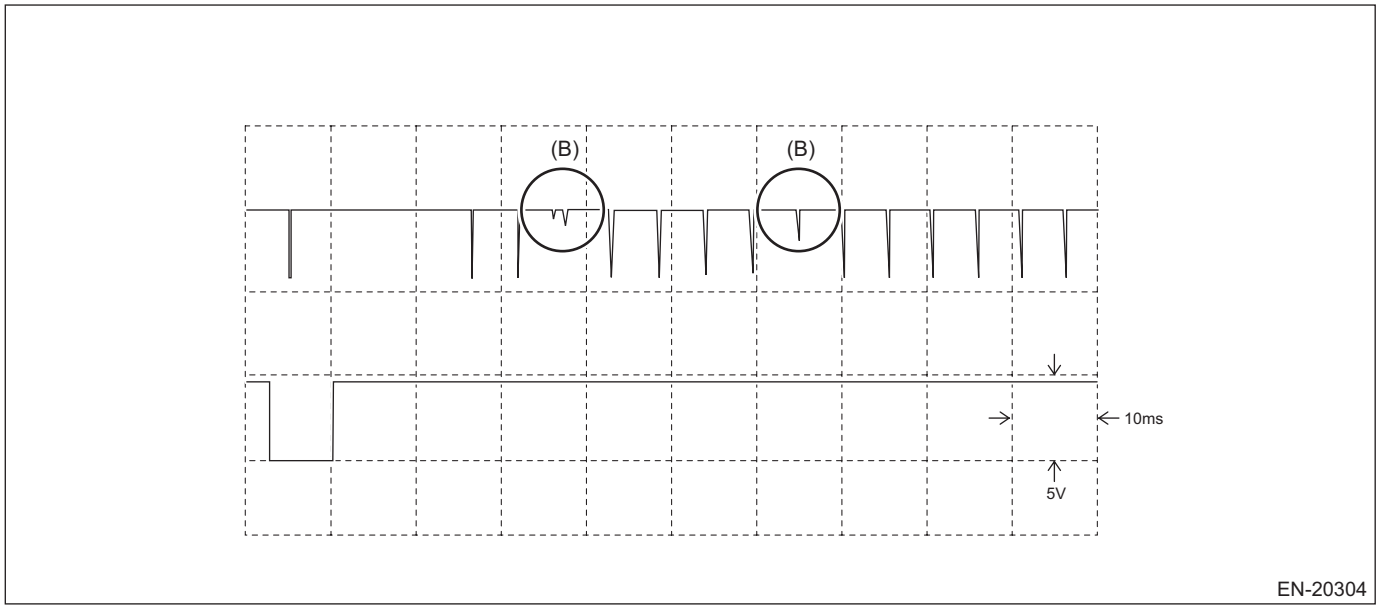
*Waveform



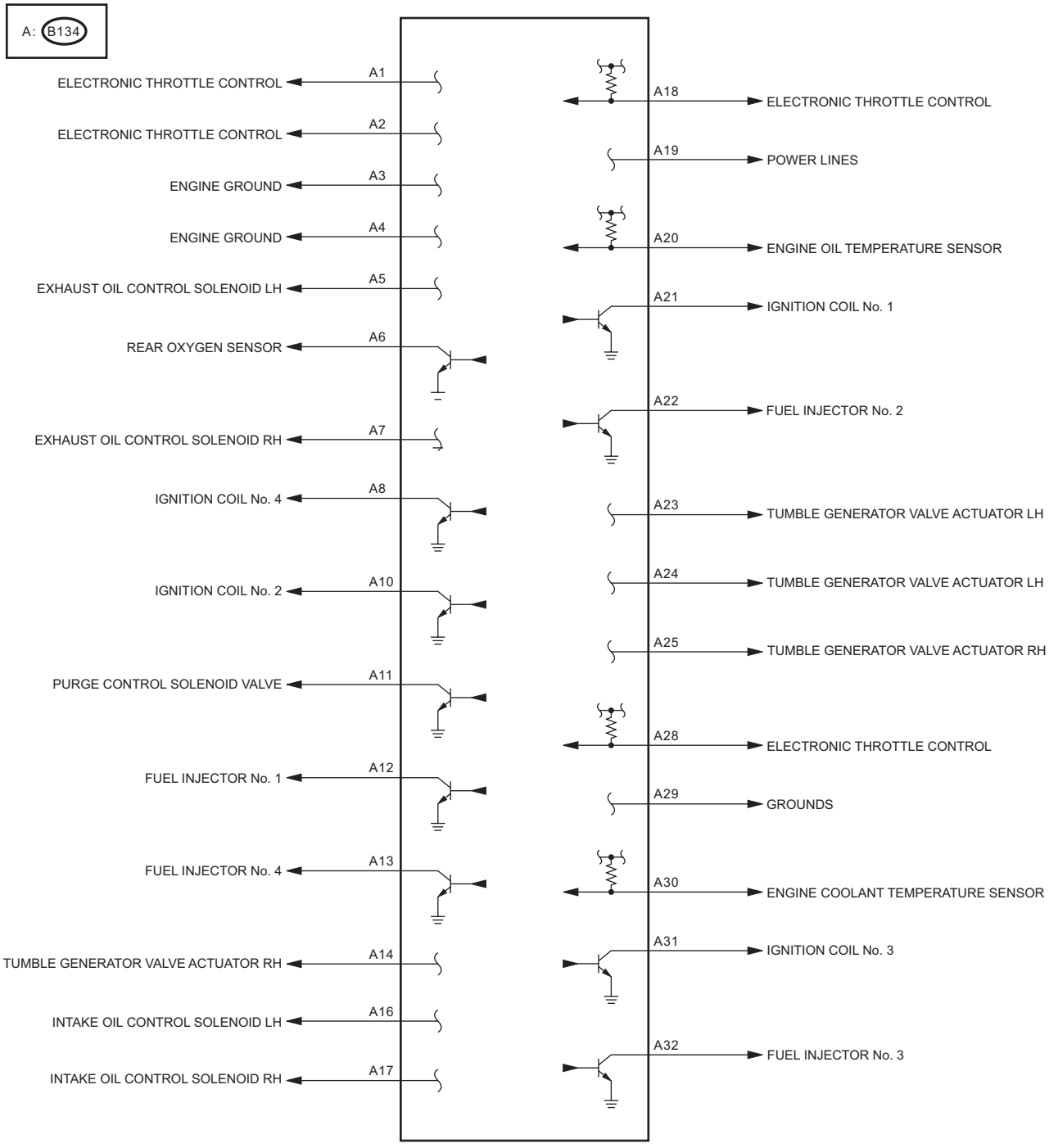
EN-20272

(A) Magnified waveform of crankshaft position sensor and camshaft position sensor

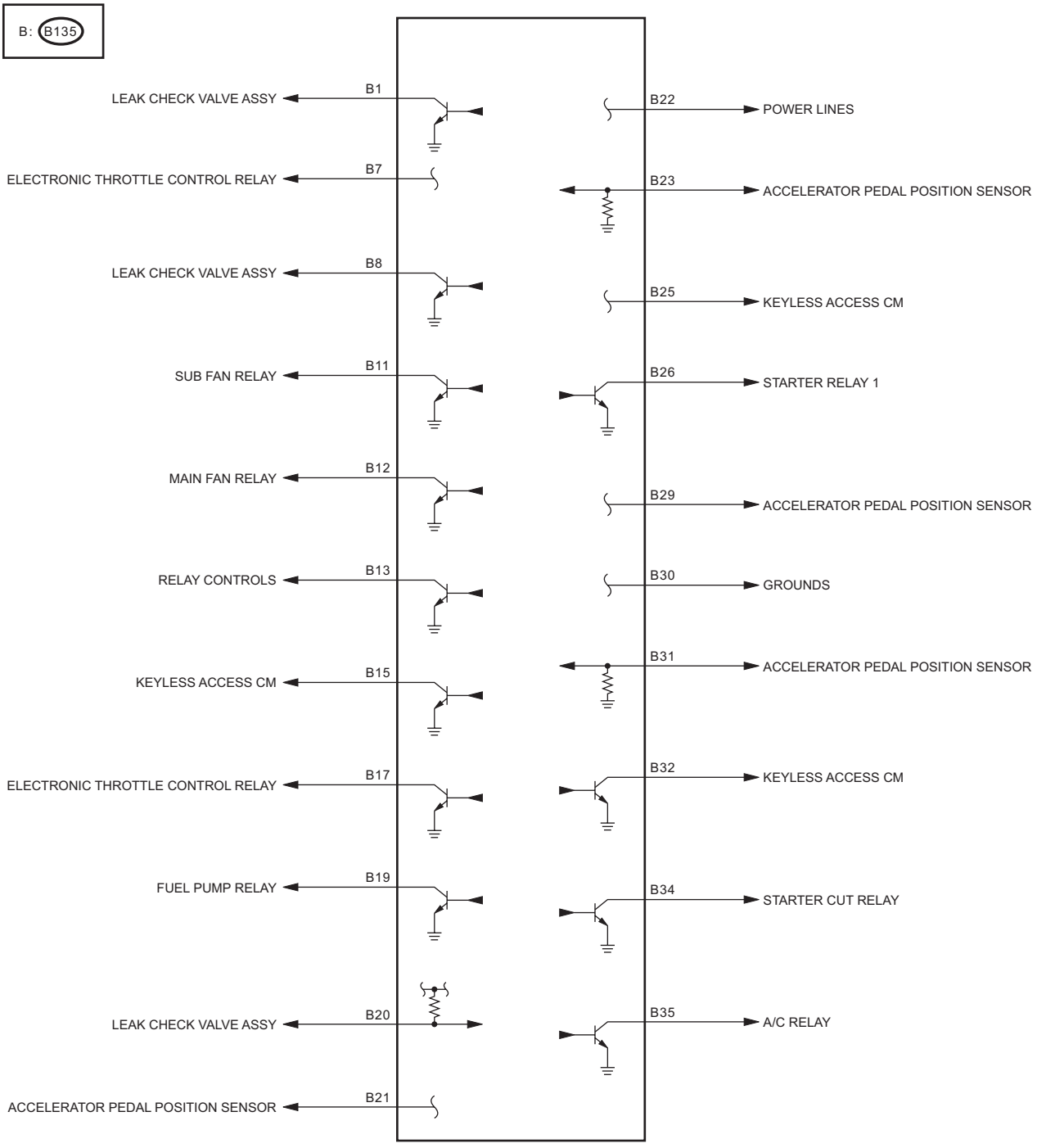
NOTE:
• For measurement of the waveform of the crankshaft position sensor, we recommend using the DST-i oscilloscope function or a general oscilloscope.
• The waveform of the crankshaft position sensor may appear as shown in figure (B) when measured by the Subaru Select Monitor oscilloscope function.
This is because the output unit of the crankshaft position sensor is smaller than the minimal measurement unit of the Subaru Select Monitor, and therefore this phenomenon is not a malfunction of either the Subaru Select monitor or the crankshaft position sensor.



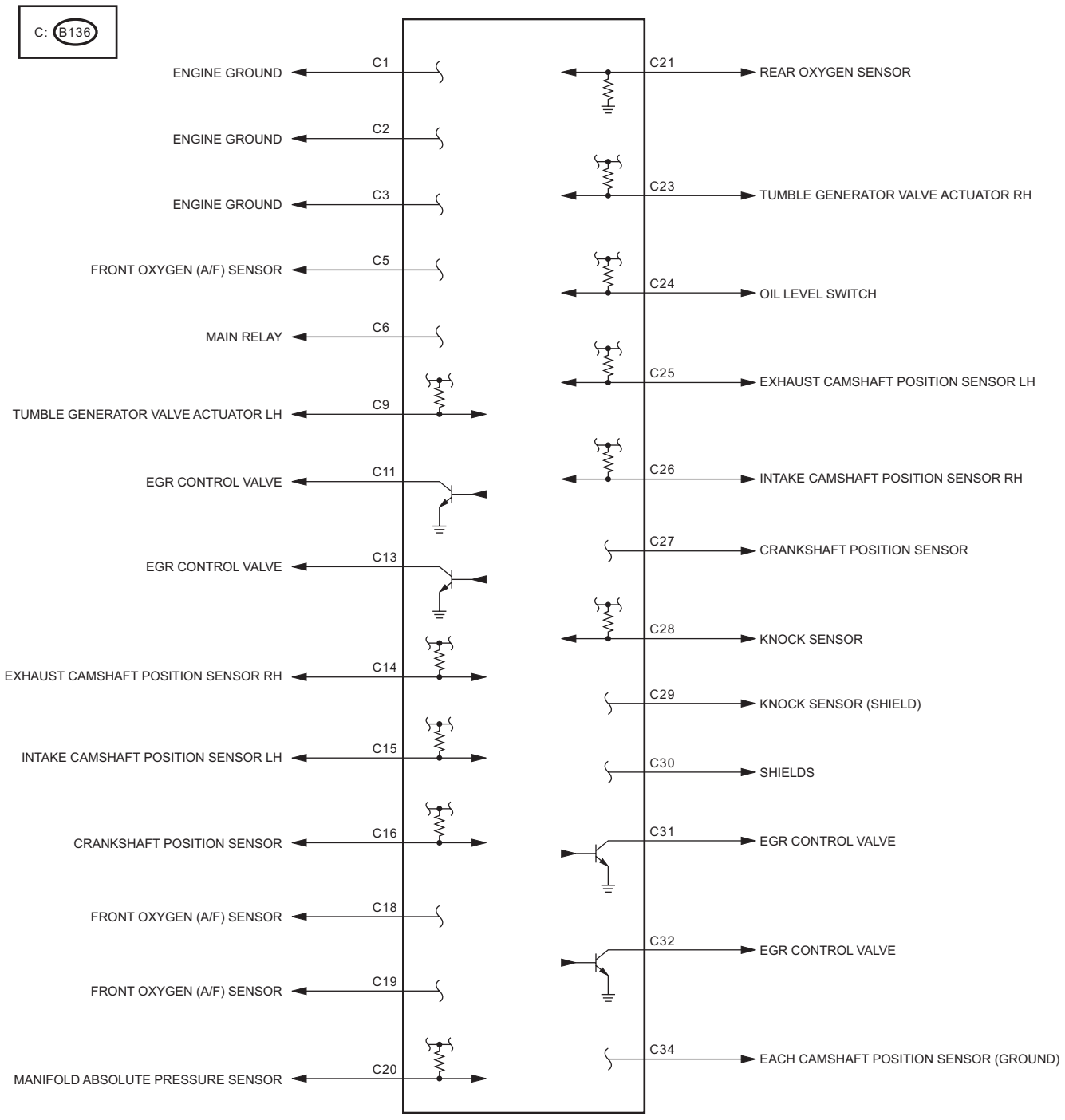
Measured terminal	Crankshaft position sensor (B136) No. 16 — Engine ground 3 (B136) No. 1:
	Intake camshaft position sensor RH (B136) No. 26 — Engine ground 3 (B136) No. 1:
	Intake camshaft position sensor LH (B136) No. 15 — Engine ground 3 (B136) No. 1:
	Exhaust camshaft position sensor RH (B136) No. 14 — Engine ground 3 (B136) No. 1:
	Exhaust camshaft position sensor LH (B136) No. 25 — Engine ground 3 (B136) No. 1:
Measuring condition	While engine idling


A: B134
ELECTRONIC THROTTLE CONTROL
A1
ELECTRONIC THROTTLE CONTROL
A2
ENGINE GROUND
A3
ENGINE GROUND
A4
EXHAUST OIL CONTROL SOLENOID LH
A5
REAR OXYGEN SENSOR
A6
EXHAUST OIL CONTROL SOLENOID RH
A7
IGNITION COIL No. 4
A8
IGNITION COIL No. 2
A10
PURGE CONTROL SOLENOID VALVE
A11
FUEL INJECTOR No. 1
A12
FUEL INJECTOR No. 4
A13
TUMBLE GENERATOR VALVE ACTUATOR RH
A14
INTAKE OIL CONTROL SOLENOID LH
A16
INTAKE OIL CONTROL SOLENOID RH
A17
A18
ELECTRONIC THROTTLE CONTROL
A19
POWER LINES
A20
ENGINE OIL TEMPERATURE SENSOR
A21
IGNITION COIL No. 1
A22
FUEL INJECTOR No. 2
A23
TUMBLE GENERATOR VALVE ACTUATOR LH
A24
TUMBLE GENERATOR VALVE ACTUATOR LH
A25
TUMBLE GENERATOR VALVE ACTUATOR RH
A28
ELECTRONIC THROTTLE CONTROL
A29
GROUNDS
A30
ENGINE COOLANT TEMPERATURE SENSOR
A31
IGNITION COIL No. 3
A32
FUEL INJECTOR No. 3

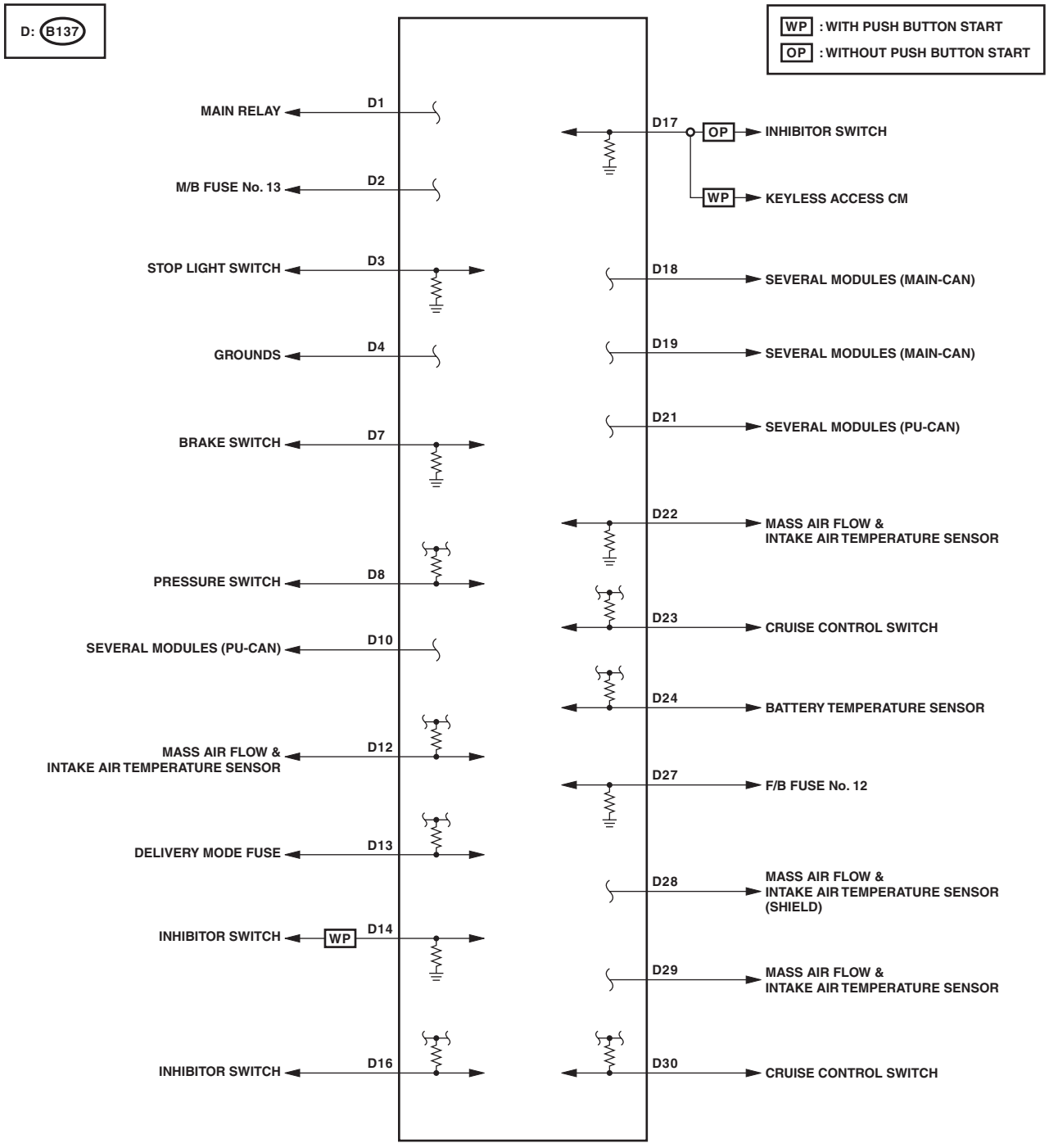
EN-20580


B: B135
LEAK CHECK VALVE ASSY
B1
ELECTRONIC THROTTLE CONTROL RELAY
B7
LEAK CHECK VALVE ASSY
B8
SUB FAN RELAY
B11
MAIN FAN RELAY
B12
RELAY CONTROLS
B13
KEYLESS ACCESS CM
B15
ELECTRONIC THROTTLE CONTROL RELAY
B17
FUEL PUMP RELAY
B19
LEAK CHECK VALVE ASSY
B20
ACCELERATOR PEDAL POSITION SENSOR
B21
B22
POWER LINES
B23
ACCELERATOR PEDAL POSITION SENSOR
B25
KEYLESS ACCESS CM
B26
STARTER RELAY 1
B29
ACCELERATOR PEDAL POSITION SENSOR
B30
GROUNDS
B31
ACCELERATOR PEDAL POSITION SENSOR
B32
KEYLESS ACCESS CM
B34
STARTER CUT RELAY
B35
A/C RELAY

EN-20469


C: B136
ENGINE GROUND
C1
ENGINE GROUND
C2
ENGINE GROUND
C3
FRONT OXYGEN (A/F) SENSOR
C5
MAIN RELAY
C6
TUMBLE GENERATOR VALVE ACTUATOR LH
C9
EGR CONTROL VALVE
C11
EGR CONTROL VALVE
C13
EXHAUST CAMSHAFT POSITION SENSOR RH
C14
INTAKE CAMSHAFT POSITION SENSOR LH
C15
CRANKSHAFT POSITION SENSOR
C16
FRONT OXYGEN (A/F) SENSOR
C18
FRONT OXYGEN (A/F) SENSOR
C19
MANIFOLD ABSOLUTE PRESSURE SENSOR
C20
C21
REAR OXYGEN SENSOR
C23
TUMBLE GENERATOR VALVE ACTUATOR RH
C24
OIL LEVEL SWITCH
C25
EXHAUST CAMSHAFT POSITION SENSOR LH
C26
INTAKE CAMSHAFT POSITION SENSOR RH
C27
CRANKSHAFT POSITION SENSOR
C28
KNOCK SENSOR
C29
KNOCK SENSOR (SHIELD)
C30
SHIELDS
C31
EGR CONTROL VALVE
C32
EGR CONTROL VALVE
C34
EACH CAMSHAFT POSITION SENSOR (GROUND)

EN-20470


D: B137
WP : WITH PUSH BUTTON START
OP : WITHOUT PUSH BUTTON START
MAIN RELAY
D1
M/B FUSE No. 13
D2
STOP LIGHT SWITCH
D3
GROUNDS
D4
BRAKE SWITCH
D7
PRESSURE SWITCH
D8
SEVERAL MODULES (PU-CAN)
D10
MASS AIR FLOW &
INTAKE AIR TEMPERATURE SENSOR
D12
DELIVERY MODE FUSE
D13
INHIBITOR SWITCH
WP
D14
INHIBITOR SWITCH
D16
D17
OP
INHIBITOR SWITCH
WP
KEYLESS ACCESS CM
D18
SEVERAL MODULES (MAIN-CAN)
D19
SEVERAL MODULES (MAIN-CAN)
D21
SEVERAL MODULES (PU-CAN)
D22
MASS AIR FLOW &
INTAKE AIR TEMPERATURE SENSOR
D23
CRUISE CONTROL SWITCH
D24
BATTERY TEMPERATURE SENSOR
D27
F/B FUSE No. 12
D28
MASS AIR FLOW &
INTAKE AIR TEMPERATURE SENSOR
(SHIELD)
D29
MASS AIR FLOW &
INTAKE AIR TEMPERATURE SENSOR
D30
CRUISE CONTROL SWITCH

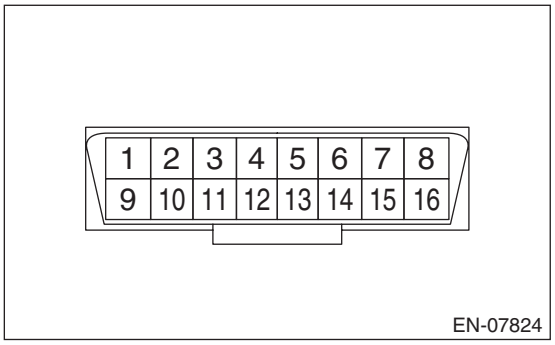
EN-10601

6. Data Link Connector

A: NOTE

This connector is used for Subaru Select Monitor.

CAUTION:
Do not connect any scan tools other than Subaru Select Monitor or general scan tool. Otherwise the circuit may be damaged.



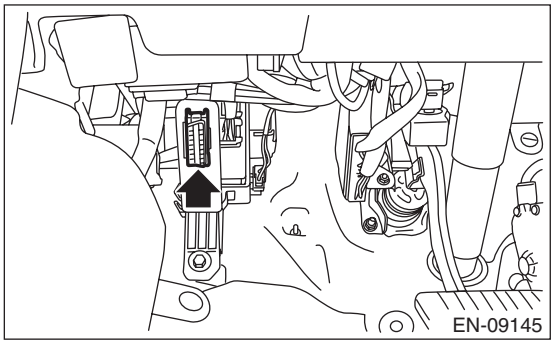
Terminal No.	Contents	Terminal No.	Contents
1	Not used	9	Not used
2	Not used	10	Not used
3	Not used	11	Not used
4	Ground	12	Not used
5	Ground	13	Not used
6	CAN communication (Hi)	14	CAN communication (Lo)
7	Not used	15	Not used
8	Not used	16	Power supply

7. General Scan Tool

A: OPERATION

1. HOW TO USE GENERAL SCAN TOOL

1) Prepare a scan tool (general scan tool) required by SAE J1978.
2) Connect the general scan tool to data link connector located in the lower portion of the instrument panel (on the driver's side).



3) Using the general scan tool, call up each data. General scan tool functions consist of:
   (1) MODE $01: Current powertrain diagnostic data
   (2) MODE $02: Powertrain freeze frame data
   (3) MODE $03: Emission-related powertrain DTC
   (4) MODE $04: Clear/Reset emission-related diagnostic information
   (5) MODE $06: Request on-board monitoring test results for intermittently monitored systems
   (6) MODE $07: Initial emission-related powertrain DTC
   (7) MODE $08: Request control for on-board system, test, and component
   (8) MODE $09: Request vehicle information
4) Read out the data according to repair procedures. (For detailed operation procedures, refer to the general scan tool operation manual.)

NOTE:
For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>

2. MODE $01: (CURRENT POWERTRAIN DIAGNOSTIC DATA)

Refer to data denoting the current operating condition of analog input/output, digital input/output or the powertrain system.
A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
$01	Number of emission-related powertrain DTC, and malfunction indicator light status and diagnosis support information	—
$03	Fuel system control status	—
$04	Calculated engine load value	%
$05	Engine coolant temperature	°C
$06	Short term fuel trim	%
$07	Long term fuel trim	%
$0B	Intake manifold absolute pressure	kPa
$0C	Engine speed	rpm
$0D	Vehicle speed	MPH
$0E	Ignition timing advance	°
$0F	Intake air temperature	°C
$10	Intake air amount	g/s
$11	Throttle valve opening angle	%
$13	Air fuel ratio sensor	—

PID	Data	Unit of measure
$15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (bank 1 sensor 2)	V and %
$1C	Supporting OBD system	—
$1F	Elapsed time after starting the engine	sec
$21	Travel distance after the malfunction indicator light illuminates	miles
$24	A/F value and A/F sensor output voltage (bank 1 sensor 1)	— and V
$2C	Target EGR	%
$2D	EGR deviation	%
$2E	Evaporative purge	%
$2F	Fuel level	%
$30	Number of warm ups after DTC clear	time
$31	Travel distance after DTC clear	miles
$33	Barometric pressure	kPa
$34	A/F value and A/F sensor current (bank 1 sensor 1)	— and mA
$3C	Catalyst temperature #1	°C
$41	Diagnostic monitor of each drive cycle	—
$42	ECM power voltage	V
$43	Absolute load	%
$44	A/F target lambda	—
$45	Relative throttle opening angle	%
$46	Ambient temperature	°C
$47	Absolute throttle opening angle 2	%
$49	Absolute accelerator opening angle 1	%
$4A	Absolute accelerator opening angle 2	%
$4C	Target throttle opening angle	%
$4D	Engine operating time while malfunction indicator lit	min
$4E	Elapsed time after DTC clear	min
$53	ELCM pressure	—
$56	Learning value of sub feedback compensation level	—
$5A	Relative accelerator opening angle	%
$5C	Engine oil temperature	°C
$65	Neutral status	—

NOTE:
Refer to general scan tool manufacturer's operation manual to access current powertrain diagnostic data (MODE $01).

3. MODE $02 (POWERTRAIN FREEZE FRAME DATA)

Refer to data denoting the operating condition when trouble is detected by on-board diagnosis system. A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
$02	DTC that caused freeze frame data to be stored	—
$03	Fuel system control status	—
$04	Calculated engine load value	%
$05	Engine coolant temperature	°C
$06	Short term fuel trim (Bank 1 Sensor 1)	%
$07	Long term fuel trim (Bank 1 Sensor 1)	%
$0B	Intake manifold absolute pressure	kPa
$0C	Engine speed	rpm
$0D	Vehicle speed	MPH
$0E	Ignition timing advance	°
$0F	Intake air temperature	°C
$10	Intake air amount	g/s
$11	Throttle valve opening angle	%
$13	Air fuel ratio sensor	—
$15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (Bank 1 Sensor 2)	V and %
$1C	Supporting OBD system	—
$1F	Elapsed time after starting the engine	sec
$2C	Target EGR	%
$2D	EGR deviation	%
$2E	Evaporative purge	%
$2F	Fuel level	%
$33	Barometric pressure	kPa
$42	ECM power voltage	V
$43	Absolute load	%
$44	A/F target lambda	—
$45	Relative throttle opening angle	%
$46	Ambient temperature	°C
$47	Absolute throttle opening angle 2	%
$49	Absolute accelerator opening angle 1	%
$4A	Absolute accelerator opening angle 2	%
$4C	Target throttle opening angle	%
$65	Neutral status	—

NOTE:
Refer to general scan tool manufacturer's instruction manual to access freeze frame data (MODE $02).

4. MODE $03 (EMISSION-RELATED POWERTRAIN DTC)

Refer to "List of Diagnostic Trouble Code (DTC)" for information about data denoting emission-related powertrain DTC. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>

5. MODE $04 (CLEAR/RESET EMISSION-RELATED DIAGNOSTIC INFORMATION)

Refer to the mode used to clear or reset emission-related diagnostic information.

NOTE:
Refer to general scan tool manufacturer's instruction manual to clear the emission-related diagnostic information (MODE $04).

6. MODE $06 (REQUEST ON-BOARD MONITORING TEST RESULTS FOR INTERMITTENTLY MONITORED SYSTEMS)

Refer to diagnostic value of troubleshooting and data of test limit indicated on the support data bit sequence table. A list of the support data is shown in the following table.

NOTE:
Some items are not displayed according to the specifications.

OBDMID	TID	SID	Diagnostic item
$01	$84	$1E	A/F sensor range failure (Bank 1 Sensor 1)
	$85	$1E	
	$86	$20	A/F sensor response failure (Bank 1 Sensor 1)
	$91	$20	
	$92	$10	
	$A3	$20	
	$A4	$10	
	$AC	$10	
	$AD	$10	
	$AE	$10	
	$AF	$10	
	$CD	$20	
	$CF	$20	
	$DF	$10	
$02	$07	$0B	Oxygen sensor drop failure (Bank 1 Sensor 2)
	$08	$0B	
	$A5	$0B	
	$05	$10	Oxygen sensor response failure (Bank 1 Sensor 2)
	$06	$10	
	$BD	$10	
	$D1	$10	Oxygen sensor delay failure (Bank 1 Sensor 2)
	$D2	$01	
$21	$89	$20	Catalyst deterioration diagnosis (Bank 1)
$31	$8A	$FD	EGR system diagnosis
$35	$8B	$9D	VVT monitor (Bank 1)
	$8C	$9D	
	$8D	$9D	
	$8E	$9D	
	$D3	$9D	
	$D5	$9D	
	$D6	$9D	
$36	$8B	$9D	VVT monitor (Bank 2)
	$8C	$9D	
	$8D	$9D	
	$8E	$9D	
	$D3	$9D	
	$D5	$9D	
	$D6	$9D	

OBDMID	TID	SID	Diagnostic item
$3C	$C1	$FE	Evaporative emission control system (0.02 inch leak)
	$C2	$FE	
	$C3	$FE	
	$C4	$FE	
	$C5	$FE	
	$C6	$35	
	$C7	$FE	
	$C8	$FE	
	$C9	$FE	
	$CA	$FE	
$3D	$E2	$FE	ELCM purge flow
$41	$9B	$14	A/F sensor heater characteristics failure (Bank 1 Sensor 1)
$42	$A2	$24	Oxygen sensor heater characteristics failure (Bank 1 Sensor 2)
$A1	$0B	$24	Misfire monitoring (all cylinders)
	$0C	$24	
$A2	$0B	$24	Misfire monitoring (#1 cylinder)
	$0C	$24	
$A3	$0B	$24	Misfire monitoring (#2 cylinder)
	$0C	$24	
$A4	$0B	$24	Misfire monitoring (#3 cylinder)
	$0C	$24	
$A5	$0B	$24	Misfire monitoring (#4 cylinder)
	$0C	$24	

7. MODE $07 (INITIAL EMISSION-RELATED POWERTRAIN DTC)

Refer to the data of DTC (pending code) for troubleshooting result about emission in the first time.

8. MODE $08 (REQUEST CONTROL FOR ON-BOARD SYSTEM, TEST, AND COMPONENT)

Perform “Active Test” of the on-board system.

9. MODE $09 (REQUEST VEHICLE INFORMATION)

Refer to the data of the vehicle specification.

8. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

NOTE:
For detailed operation procedures, refer to “Application help”.

2. DISPLAY CURRENT ENGINE DATA

NOTE:
- For detailed operation procedures, refer to “Application help”.
- A list of the support data is shown in the following table.
- *: For models without cruise control, the brake switch signal does not change.

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then select «Enter».
5) On «Select Function» display, select «Data monitor» and then select «Enter».

Display	Contents	Note (at idling)	Remarks
Engine Speed	Calculated from crankshaft position sensor signal.	650 rpm	rpm
Mass Air Flow	Amount of intake air calculated from air flow sensor output value.	2.0 g/s	g/s or lb/m
Vehicle Speed	Value calculated from vehicle speed sensor output value.	0 km/h	km/h or MPH
Throttle Opening Angle	Throttle valve opening angle (in percentage) calculated from throttle position sensor output value.	13%	%
Accel opening angle	Accelerator pedal opening angle (in percentage) calculated from accelerator pedal position sensor output value.	0.0%	%
A/F Sensor #1	Actual lambda value calculated from front A/F sensor output value.	1.00	—
Ignition timing adv. #1	Ignition timing control value for No. 1 cylinder. Calculated from rotation speed, intake manifold pressure, intake air temperature, water temperature, and data from knock sensor etc.	7°	°
Engine Coolant Temperature	Value calculated from engine coolant temperature sensor output value.	96°C	°C or °F
Fuel Injection #1 Pulse	Control value of fuel injection time by engine control module. (RH bank)	2.56 ms	ms
Short Term Fuel Trim-Bank1	Air fuel ratio correction control value for the front.	0.0%	%
Long Term Fuel Trim-Bank1	Air fuel ratio learning control value for the front.	0.0%	%
Learned Ignition Timing	Ignition timing learning value. Advance or retard angle amount when knocking occurs.	0.0 deg	deg
Intake Manifold Absolute Pressure	Value calculated from the intake manifold pressure sensor.	29 kPa	kPa, mmHg, inHg or psig
Oxygen sensor #12	Rear oxygen sensor output voltage.	—	V
VVT Adv. Ang. Amount R	Intake AVCS advance angle amount. (RH bank)	0 deg	deg
VVT Adv. Ang. Amount L	Intake AVCS advance angle amount. (LH bank)	0 deg	deg
Exh. VVT Retard Ang. R	AVCS actual retard angle amount for the RH bank on the exhaust side.	0 deg	deg
Exh. VVT Retard Ang. L	AVCS actual retard angle amount for the RH bank on the exhaust side.	0 deg	deg
VVT Initial Position Learning Value #1	AVCS initial position learning value for the RH bank on the intake side. Controls the angle against a standard angle. Deviation learning is performed based on this standard value.	60°CA	°CA

Display	Contents	Note (at idling)	Remarks
VVT Initial Position Learning Value #2	AVCS initial position learning value for the LH bank on the intake side. Controls the angle against a standard angle. Deviation learning is performed based on this standard value.	60°CA	°CA
VVT Ex Initial Position Learning Value #1	AVCS initial position learning value for the RH bank on the intake side. Controls the angle against a standard angle. Deviation learning is performed based on this standard value.	90°CA	°CA
VVT Ex Initial Position Learning Value #2	AVCS initial position learning value for the LH bank on the intake side. Controls the angle against a standard angle. Deviation learning is performed based on this standard value.	90°CA	°CA
ECU ACC	ECM input power supply voltage.	13.3 V	V
Target engine speed	ECM target engine speed.	650 rpm	rpm
Target Equivalence Ratio	Target air fuel ratio. (Lambda) It usually becomes 1.0 aiming at a theoretical air fuel ratio.	0.996	—
Engine Oil Temperature	Value calculated from the engine oil temperature sensor output value.	96°C	°C or °F
Intake Air Temperature	Intake air temperature calculated from the intake air temperature sensor output value.	50°C	°C or °F
Ambient Temperature	Ambient temperature that ECM estimates by input values from the engine coolant temperature sensor or the intake air temperature sensor etc.	—	°C or °F
Ambient Temperature Sensor Signal	Data value of the ambient sensor input from the combination meter via CAN. Ambient temperature used for diagnosis.	—	°C or °F
Ambient Temperature for Control	Data value of the ambient sensor input from the combination meter via CAN. Ambient temperature used for control.	—	°C or °F
Calculated load value	Current rate of air amount. Value assuming that the air amount at the current engine speed with the throttle fully open is 100%.	19%	%
Absolute Load Value	Percentage of current intake air amount against the maximum air intake amount of the engine. For non-turbo engine, the value can be close to 95%, but will never be 100%. For turbo engine, this value may exceed 100% due to a boost pressure.	14%	%
Atmosphere Pressure	Atmospheric pressure calculated from atmospheric pressure sensor output value.	—	kPa, mmHg, inHg or psig
Mani. Relative Pressure	Pressure value calculated from manifold pressure sensor output value. (Absolute value) (Air intake absolute pressure – Atmospheric pressure)	—	kPa, mmHg, inHg or psig
Target Throttle Opening Angle	Target throttle opening angle calculated by ECM.	16 deg	deg
Actual Throttle Opening Angle	Actual throttle opening angle. Calculated by ECM based on the throttle sensor input value.	16 deg	deg
Target Throttle Opening Angle	Control value of the target throttle opening angle calculated by ECM. Shows the target value of opening angle in percentage when 0% means fully closed and 100% means fully open.	0.0%	%
Relative Throttle Position	Current throttle opening angle in percentage against the throttle voltage (full range) that has reflected the full close point learning value. The value will be approx. 70% at full open.	1.2%	%
Throttle Motor Voltage	Power supply voltage of the throttle motor. ECM input value.	13.4 V	V

Display	Contents	Note (at idling)	Remarks
Main-Throttle Sensor	Voltage value of the main throttle position sensor. ECM input value.	0.63 V	V
Sub-Throttle Sensor	Voltage value of the sub throttle position sensor. ECM input value.	1.52 V	V
Throttle Motor Duty	Throttle motor control duty ratio. ECM output value.	–12.5%	%
Main-Accelerator Sensor	Voltage value of the main accelerator pedal position sensor. ECM input value.	0.68 V	V
Sub-Accelerator Sensor	Voltage value of the sub accelerator pedal position sensor. ECM input value.	0.68 V	V
Air Flow Sensor Voltage	Air flow sensor output value. Input value to ECM.	1.2 V	V
Fuel Level	Fuel level sensor output value. ECM input value. Total value of main and sub.	—	%
Fuel level resistance	Fuel level sensor resistance value. ECM input value.	—	Ω
Commanded Evap Purge	Evaporative purge rate displayed by the OBD.	0%	%
CPC Valve Duty Ratio	Purge control solenoid valve control duty ratio. ECM output value.	0%	%
Knocking Correction	Retard angle amount when knocking occurs. Partially learning value of ignition timing learning value.	0.0 deg	deg
Fuel system for Bank 1	Feedback status of air fuel ratio. Open: Feedback is stopped Closed: Feedback control is being performed	Cl_normal	—
A/F Sensor #1 Current	Front A/F sensor output current value. ECM input value.	0.00 mA	mA
A/F Sensor #1 Resistance	Front A/F sensor resistance value calculated from the front A/F sensor output value.	50 Ω	Ω
A/F Correction #3	Sub correction value of A/F feedback control.	0.00%	%
No. of EGR steps	Number of EGR valve steps. Number of stepping motor steps. ECM output value.	0 STEP	STEP
Commanded EGR	EGR setting value is calculated by ECM and the target value is displayed.	0%	%
EGR Error	Percentage of the difference in actual EGR steps as compared to the target EGR steps. Both a positive value and a negative value mean that it doesn't fulfill the target. When the value is positive, it opens more than the target value. When the value is negative, it opens smaller than the target value.	0%	%
TGV Position SW1	Shows an open/close status of the tumble generator valve opening angle SW for RH bank. Input value from the tumble generator valve opening angle SW for RH bank to the ECM.	Close	—
TGV Position SW2	Shows an open/close status of the tumble generator valve opening angle SW for RH bank. Input value from the tumble generator valve opening angle SW for LH bank to the ECM.	Close	—
TGV Output	Drive signal to tumble generator valve motor. Set to “ON” when the tumble generator valve is activated (when the duty output is other than 0%). ECM output value.	OFF	—
TGV Drive	Display of tumble generator valve drive status. Set to “Open” when the tumble generator valve is open. ECM control status.	Close	—

Display	Contents	Note (at idling)	Remarks
OCV Duty R	Oil control solenoid control duty ratio. (RH bank) ECM output value.	60%	%
OCV Duty L	Oil control solenoid control duty ratio. (LH bank) ECM output value.	63%	%
OCV Current R	Actual current value of the oil control solenoid. (RH bank) ECM input value.	703 mA	mA
OCV Current L	Actual current value of the oil control solenoid. (LH bank) ECM input value.	735 mA	mA
Exh. OCV Duty R	Exhaust side oil control solenoid control duty ratio on the RH bank. ECM output value.	49%	%
Exh. OCV Duty L	Exhaust side oil control solenoid control duty ratio on the LH bank. ECM output value.	49%	%
Exh. OCV Current R	Actual current value of the exhaust side oil control solenoid on the RH bank, and engine input value.	570 mA	mA
Exh. OCV Current L	Actual current value of the exhaust side oil control solenoid on the LH bank, and engine input value.	570 mA	mA
Roughness Monitor #1	#1 cylinder roughness monitor count value.	0	—
Roughness Monitor #2	#2 cylinder roughness monitor count value.	0	—
Roughness Monitor #3	#3 cylinder roughness monitor count value.	0	—
Roughness Monitor #4	#4 cylinder roughness monitor count value.	0	—
Active Grille Shutter Position	Displays the active grille shutter position. Counts the pulse and displays as 100% at full open and 0% at fully closed.	—	—
Active Grille Shutter Mechanical Break Status	Displays mechanical error status of the active grille shutter. During the calibration procedure, if a linkage of the active grille shutter is off, calibration is not performed. Judgment is done by the active grille shutter and the status is sent to ECM.	Normal	—
Active Grille Shutter Sensor Error Status	Judges a malfunction of the active grille shutter opening angle sensor. Judges the sensor malfunction on the pulse counter. Judgment is done by the active grille shutter and the status is sent to ECM.	Normal	—
Active Grille Shutter Voltage Error Status	Judges a malfunction of the power source voltage supplied to the active grille shutter. Judgment is done by the active grille shutter and the status is sent to ECM.	Normal	—
Active Grille Shutter Control Circuit Error Status	Judges a malfunction of the active grille shutter internal circuit (drive motor). Judgment is done by the active grille shutter and the status is sent to ECM.	Normal	—
Active Grille Shutter Stuck Error Status	Judges an abnormal stuck of the active grille shutter. Active grille shutter detects the status where the operation failed because of any foreign matter or ice clogging.	Normal	—
Active Grille Shutter Temperature Error Status	Detects internal temperature of the active grille shutter. Shows the status where the judgment is performed to check if the temperature is excessively high. Judgment is done by the active grille shutter and the status is sent to ECM.	Normal	—
Active Grille Shutter Communication Error Status	Communication is performed between the active grille shutter and ECM, and judges the abnormality of the communication status.	Normal	—
Active Grille Shutter Position Commanded Status	Shutter open/close command is sent from ECM to the active grille shutter, and the status of that command is displayed.	—	—
Active Grille Shutter Calibration in progress	Displays the calibration status of the active grille shutter. Active grille shutter performs the calibration when the ignition is ON. Set to ON when the calibration was performed.	OFF	—

Display	Contents	Note (at idling)	Remarks
Active Grille Shutter Calibration Commanded Status	Displays commands from ECM to the active grille shutter.	OFF	—
Active Grille Shutter Calibration Status	Shows the status where the calibration of the active grille shutter has completed or not completed. Always completed when there is no abnormality in the active grille shutter.	Complete	—
Active Grille Shutter Warning Status	Warning signal of the active grille shutter. When the active grille shutter has a malfunction, signal is sent to the combination meter to illuminate the warning light.	OFF	—
Active Grille Shutter Control Status 1	Shows the status such as operating factors (air conditioner, radiator fan etc.) or frozen judgment of the active grille shutter controlled by the ECM.	—	—
Ignition SW ON Count	Time stamp information. Number of times the ignition is ON since the vehicle was manufactured. The number of ignition ON is also recorded when a trouble code is recorded, so the comparison with that number will show you how many times the ignition has turned on since the diagnostic code was recorded.	—	times
Count	Time stamp information. Each unit individually counts the elapsed time since the ignition is turned ON. Master integrated unit and ECM synchronize with the master time. When synchronized: “Common” When not synchronized: “Originally”	Common	—
Time Count	Time stamp information. Elapsed time after ignition ON. When a trouble code is recorded, the elapsed time after ignition ON is also recorded.	—	ms
Time Since Engine Start	Elapsed time after starting the engine.	—	sec
Elapsed Time After Engine Run	Elapsed time after starting the engine. This value is used for control.	—	sec
Accumulation Time After Engine Run	Cumulative time after starting the engine. For models with Auto Start Stop, cumulative time after the first engine start. Time is not accumulated while the engine stops due to the Auto Start Stop system.	—	sec
Meter since DTC cleared	Travel distance after DTC clear.	—	km or mile
Time while MIL lighted	Engine operating time from when the malfunction indicator light illuminated till when it went off.	—	min
Time since DTC cleared	Elapsed time after DTC clear.	—	min
Number of warm-ups since DTCs cleared	Number of warm ups after DTC clear. 1 cycle is the time from the cold start till warmed up and stop. (Engine start after a warm-up is not counted.)	—	times
Lighted MI lamp history	Travel distance after the warning light illuminated.	—	km or mile
Odometer	ECM calculates the total cumulative travel distance from the vehicle speed, separately from the odometer in the combination meter. Small difference from the odometer will be possible, but if there is a big difference, ECM or the combination meter may need to be replaced.	—	km
Catalyst Temperature #11	Estimated temperature of the front catalytic converter.	—	°C or °F
AT drive status	Neutral condition. Information input from the inhibitor switch. (CVT model)	NEUT	—
Absolute Evap Sys. Pressure	Measured value of the evaporative emission system pressure. Pressure sensor input value.	101 kPa	kPa

Display	Contents	Note (at idling)	Remarks
Neutral switch	Neutral switch signal. Signal when in neutral (MT) or in P or N range (AT). Value input to ECM.	Neutral	—
ETC Motor Relay	Drive signal to the electronic throttle motor relay. Set to ON when drive signal is output. ECM output value.	ON	—
Stop Light Switch	Stop light switch signal. Set to “ON” when the stop light illuminates. ECM input value.	OFF (when OFF)	—
Brake Switch*	Brake switch signal. Set to “ON” when the brake pedal is depressed. ECM input value.	OFF (when OFF)	—
Idle Switch Signal	Idle signal. Set to “Idle” while idling.	Idle	—
Ignition switch	Ignition switch signal. Set to “ON” when the ignition switch is ON.	ON	—
A/C Mid Pressure Switch	Air conditioner middle pressure switch signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
A/C Compressor Signal	A/C compressor drive signal. Set to “ON” when the drive signal is output. ECM output value.	OFF (when OFF)	—
Radiator Fan Relay #1	Radiator fan relay drive signal. Set to “ON” when the drive signal is output. ECM output value.	OFF (when OFF)	—
Radiator Fan Relay #2	Radiator fan relay drive signal. Set to “ON” when the drive signal is output. ECM output value.	OFF (when OFF)	—
A/C Switch	Air conditioner switch signal. Set to “ON” when the air conditioner switch of the heater control is ON. ECM input value.	OFF (when OFF)	—
Starter Switch	Starter switch signal. Set to “ON” when the starter is ON. ECM input value.	OFF	—
Rear Defogger SW	Rear defogger switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Blower Fan SW	Blower fan switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Light Switch	Light switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Wiper Switch	Wiper switch input signal. Set to “ON” when the switch is ON. ECM input value.	OFF (when OFF)	—
Delivery Mode Connector	Delivery mode terminal fuse installation status.	OFF	—
Rear O2 Rich Signal	Rear oxygen sensor output value. Displays “Rich” when the air fuel ratio of rear oxygen sensor is rich, and displays “Lean” when lean.	—	—
Knocking Signal	Knock sensor output signal. Judges if a knocking occurs or not. ECM input signal.	OFF	—
Crankshaft Position Sig.	Crankshaft position sensor output signal. Set to “ON” when the engine is running. ECM input signal.	ON	—

Display	Contents	Note (at idling)	Remarks
Camshaft Position Sig.	Camshaft position sensor output signal. Set to “ON” when the engine is running. ECM input signal.	ON	—
Ban of Torque Down VDC	Torque down prohibition notification signal to the vehicle dynamics control (VDC) module. Set to “OFF” when the prohibition signal is output. ECM output value.	ON	—
Request Torque Down VDC	Torque down request signal transmitted from the vehicle dynamics control (VDC) module. Set to “ON” when the request signal is sent. ECM input signal.	OFF	—
Torque Permission Signal	Torque down permission notification signal to the transmission control module. (CVT model) Set to “ON” when the permission signal is output. ECM output value.	ON	—
SET/COAST Switch	Cruise control system SET/COAST SW signal. Set to “ON” when the switch is operated. ECM input signal.	OFF (when OFF)	—
RESUME/ACCEL Switch	Cruise control system RESUME/ACCEL SW signal. Set to “ON” when the switch is operated. ECM input signal.	OFF (when OFF)	—
Main switch	Cruise control system main switch signal. Set to “ON” when the switch is operated. ECM input signal.	OFF (when OFF)	—
Cruise Control Cancel Switch Signal	Cruise control cancel switch signal of the cruise control system. Set to “ON” when the switch is operated. ECM input signal.	OFF (when OFF)	—
Fuel Pump Relay	Fuel pump relay drive signal. Set to “ON” when the drive signal is output. ECM output value.	ON	—
All Cylinders Fuel cut	Status under the fuel injection amount control where the fuel injection is cut off in all cylinders.	OFF	—
Shift Pattern Demand for Low Water Temperature	Shift pattern request sent from ECM to the transmission CM. When the water temperature is low, shift pattern change to the low speed side is requested to raise the catalyst temperature faster.	OFF	—
Emphasized idle stop request	Request signal for prohibiting the Auto Start Stop coordinate control. Output signal from ECM to Auto Start Stop CM. Displayed only on models with Auto Start Stop.	ON	—
Oil level switch	Oil level switch signal. Set to “LOW level” when the amount of engine oil decreases. ECM input signal.	HIGH level	—
ELCM switching valve	ELCM switching valve drive signal. Set to “Close” when closing the switching valve. ECM output value.	Open	—
ELCM pump	ELCM pump drive signal. Set to “ON” when ELCM decompression pump is activated. ECM output value.	OFF	—
HPCM Current Control Mode	Shows current HPCM control mode for hybrid models.	—	—
Engine Control Status	Shows current engine control mode for hybrid models.	—	—
ISG Load Torque	Shows load torque of ISG equipped with hybrid models. Value calculated by ECM.	—	Nm
Primary Rev Speed	CVT primary pulley speed. Information received from HEV-CM.	—	rpm

Display	Contents	Note (at idling)	Remarks
12V Battery Relay Target Mode	Commanded status for the connection relay between the battery for starting engine and the battery for DCDC convert and for other load related to vehicle body. Information received from HEV-CM.	—	—
Start Control Check	Shows control mode when starting engine.	—	—
Input Clutch Open Request	Commanded status of drive request from HEV-CM to input clutch (which connects engine and primary axis).	—	—
ISG cranking Status	Drive command status from HEV-CM to ISG.	OFF	—
Idle Stop Fuel Cut Request	Auto Start Stop fuel cut request status from HEV-CM to ECM.	No Request	—
Starter Relay Drive Permission Status	Starter relay operation permission status from HEV-CM to ECM.	—	—
Engine Torque Check 1	Engine torque information is transmitted from engine ECM to HPCM. And this is the engine torque related information.	—	Nm
Engine Torque Check 2	Engine torque information is transmitted from engine ECM to HPCM. And this is the engine torque related information.	—	Nm
Engine Torque Check 3	Engine torque information is transmitted from engine ECM to HPCM. And this is the engine torque related information.	—	Nm
Engine Torque Check 4	Engine torque information is transmitted from engine ECM to HPCM. And this is the engine torque related information.	—	Nm
Engine Torque Check 5	Engine torque information is transmitted from engine ECM to HPCM. And this is the engine torque related information.	—	Nm
Ignition Control Check 1	Detailed status of the engine ignition control information.	—	—
Ignition Control Check 2	Detailed status of the engine ignition control information.	—	—
MIL Status	Malfunction indicator light illumination status. When judged as abnormal, an illumination command signal is sent from ECM to the combination meter.	OFF	—
Number of Diagnostic Code(s):	The number of trouble codes recorded in the ECM.	0	—
(Oxygen sensor #11)	Installation status of the front oxygen sensor.	Support	—
(Oxygen sensor #12)	Installation status of the rear oxygen sensor.	Support	—
Short term fuel trim #12	Air fuel ratio correction control value for the rear.	0.0%	%
A/F Sensor #11	Air fuel ratio calculated from the front A/F sensor output value. (Lambda)	1.001	—
A/F Sensor #11	Output voltage of the front A/F sensor.	2.193 V	V
A/F Sensor #11	Air fuel ratio calculated from the front A/F sensor output value. (Lambda)	1.001	—
A/F Sensor #11	Front A/F sensor current value.	0.00	mA
Absolute Throttle Pos.#2	Shows the sub throttle sensor voltage value in % against the full-range 5 V throttle sensor output voltage.	30.2%	%
Accelerator Pedal Pos.#1	Shows the main accelerator sensor voltage value in % against the full-range 5 V.	13.3%	%
Accelerator Pedal Pos.#2	Shows the sub accelerator sensor voltage value in % against the full-range 5 V.	13.3%	%
Relative Accelerator Pos.	Shows the accelerator opening angle with a full close point learning value taken into consideration.	0%	%
Misfire monitoring(Supp)	Shows the support status of misfire diagnosis.	YES	—
Misfire monitoring(Rdy)	Status of the misfire diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—

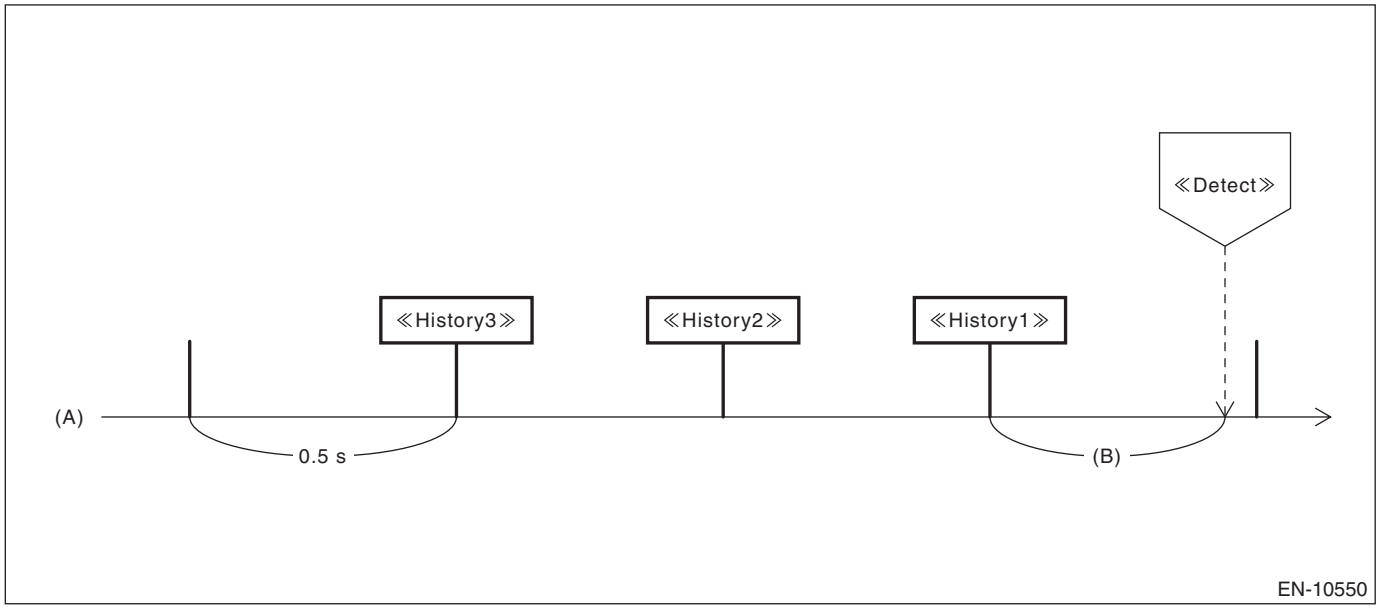
Display	Contents	Note (at idling)	Remarks
Fuel system monitoring(Supp)	Shows the support status of fuel system diagnosis.	YES	—
Fuel system monitoring(Rdy)	Status of the fuel system diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
Component monitoring(Supp)	Shows the support status of component diagnosis.	YES	—
Component monitoring(Rdy)	Status of the component diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
Catalyst Diagnosis(Supp)	Shows the support status of catalyst diagnosis.	YES	—
Catalyst Diagnosis(Rdy)	Status of the catalyst diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Heated catalyst(Supp)	Shows the support status of heated catalyst diagnosis.	NO	—
Heated catalyst(Rdy)	Status of the heated catalyst diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Evaporative purge system(Supp)	Shows the support status of evaporative purge system diagnosis.	NO	—
Evaporative purge system(Rdy)	Status of the evaporative purge system diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Secondary air system(Supp)	Shows the support status of the secondary air system diagnosis.	NO	—
Secondary air system(Rdy)	Status of the secondary air system diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
A/C system refrigerant(Supp)	Shows the support status of A/C system refrigerant diagnosis.	NO	—
A/C system refrigerant(Rdy)	Status of the A/C system refrigerant diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Oxygen sensor(Supp)	Shows the support status of oxygen sensor diagnosis.	YES	—
Oxygen sensor(Rdy)	Status of the oxygen sensor diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
O2 Heater Diagnosis(Supp)	Shows the support status of oxygen sensor heater diagnosis.	YES	—
O2 Heater Diagnosis(Rdy)	Status of the oxygen sensor heater diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
EGR system(Supp)	Shows the support status of EGR diagnosis.	YES	—
EGR system(Rdy)	Status of the EGR diagnosis. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Misfire monitoring(Enable)	Shows whether or not the execution condition of misfire diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Misfire monitoring(Comp)	Shows whether or not the continuous misfire diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
Fuel system monitoring(Enable)	Shows whether or not the execution condition of fuel system diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—

Display	Contents	Note (at idling)	Remarks
Fuel system monitoring(Comp)	Shows whether or not the fuel system diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
Component monitoring(Enable)	Shows whether or not the execution condition of component diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Component monitoring(Comp)	Shows whether or not the component diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Catalyst Diagnosis(Enable)	Shows whether or not the execution condition of catalyst diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Catalyst Diagnosis(Comp)	Shows whether or not the catalyst diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
Heated catalyst(Enable)	Shows whether or not the execution condition of heated catalyst diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	N/A	—
Heated catalyst(Comp)	Shows whether or not the heated catalyst diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Evaporative purge system(Enable)	Shows whether or not the execution condition of evaporative purge system diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	N/A	—
Evaporative purge system(Comp)	Shows whether or not the evaporative purge system diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Secondary air system(Enable)	Shows whether or not the execution condition of the secondary air system diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	N/A	—
Secondary air system(Comp)	Shows whether or not the secondary air system diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
A/C system refrigerant(Enable)	Shows whether or not the execution condition of A/C system refrigerant diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	N/A	—
A/C system refrigerant(Comp)	Shows whether or not the A/C system refrigerant diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	N/A	—
Oxygen sensor(Enable)	Shows whether or not the execution condition of oxygen sensor diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
Oxygen sensor(Comp)	Shows whether or not the oxygen sensor diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—

Display	Contents	Note (at idling)	Remarks
O2 Heater Diagnosis(Enable)	Shows whether or not the execution condition of oxygen heater diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
O2 Heater Diagnosis(Comp)	Shows whether or not the oxygen heater diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	YES	—
EGR system(Enable)	Shows whether or not the execution condition of EGR diagnosis is met. YES: Diagnosis can be executed. NO or N/A: Diagnosis cannot be executed or is not supported.	YES	—
EGR system(Comp)	Shows whether or not the EGR diagnosis is completed. YES or N/A: Diagnosis is completed or not supported. NO: Diagnosis is not completed.	NO	—
OBD System	Shows the OBD regulation to be followed. This is the information recorded in the ECM, and it does not mean that the unit automatically judges the compliance to the OBD regulations.	OBD/OBD2	—

3. DISPLAY OF ENGINE FREEZE FRAME DATA

NOTE:
• ECM updates the freeze frame data every 0.5 seconds, and always keeps the last three records. Time-series freeze frame data includes the last three freeze frame data and the freeze frame data when the DTC is detected.
• In the time-series freeze frame data, the following freeze frame data are displayed: «Detect», «History1», «History2», and «History3».
• Time lag between the freeze frame data of «Detect» and the freeze frame data of «History1» changes within the range of 0 — 0.5 seconds. This is because the freeze frame data of «Detect» is recorded when the DTC is actually detected, while the freeze frame data of «History1» is updated every 0.5 seconds.



(A) 0.5 seconds timer
(B) Changes within the range of 0 — 0.5 seconds, depending on the timing of DTC detection.

• When more than one DTCs are recorded, the time-series freeze frame data is recorded only for the first-detected DTC, and for the next DTC, just the freeze frame data of «Detect» is recorded. And for the subsequent DTCs, no freeze frame data is recorded.
• When performing diagnosis, you can utilize the time-series freeze frame data to guess the vehicle status when the DTC was detected.
• For detailed operation procedures, refer to “Application help”.
• A list of the support data is shown in the following table.
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then select «Enter».
5) On «Select Function» display, select «DTC» and select «Enter».

Display	Contents	Unit of measure
Engine Speed	Calculated from crankshaft position sensor signal.	rpm
Mass Air Flow	Amount of intake air calculated from air flow sensor output value.	g/s or lb/m
Vehicle Speed	Value calculated from vehicle speed sensor output value.	km/h or MPH
Throttle Opening Angle	Throttle valve opening angle (in percentage) calculated from throttle position sensor output value.	%
Ignition timing adv. #1	No. 1 cylinder ignition timing control value calculated from rotation speed, intake manifold pressure, intake air temperature, water temperature, and data from knock sensor etc.	°
Engine Coolant Temperature	Value calculated from engine coolant temperature sensor output value.	°C or °F
Short Term Fuel Trim-Bank1	Main correction value of A/F feedback control.	%
Long Term Fuel Trim-Bank1	Main learning value of A/F feedback control.	%
Intake Manifold Absolute Pressure	Value calculated from the intake manifold pressure sensor.	kPa, mmHg, inHg or psig
Oxygen sensor #12	Rear oxygen sensor voltage value.	V
ECU ACC	ECM input power supply voltage.	V
Target Equivalence Ratio	Target air fuel ratio. (Lambda) It usually becomes 1.0 aiming at a theoretical air fuel ratio.	—
Intake Air Temperature	Intake air temperature calculated from the intake air temperature sensor output value.	°C or °F
Ambient Temperature	Ambient temperature that ECM estimates by input values from the engine coolant temperature sensor or the intake air temperature sensor etc.	°C or °F
Ambient Temperature Sensor Signal	Data value of the ambient sensor input from the combination meter via CAN. Ambient temperature used for diagnosis.	°C or °F
Ambient Temperature for Control	Data value of the ambient sensor input from the combination meter via CAN. Ambient temperature used for control.	°C or °F
Calculated load value	Current rate of air amount. Current rate of air amount assuming that the air amount at the current engine speed with the throttle fully open is 100%	%
Absolute Load Value	Shows a percentage of current intake air amount against the maximum air intake amount of the engine. For non-turbo engine, the value can be close to 95%, but will never be 100%. For turbo engine, this value may exceed 100% due to a boost pressure.	%
Atmosphere Pressure	Atmospheric pressure calculated from atmospheric pressure sensor output value.	kPa, mmHg, inHg or psig
Actual Throttle Opening Angle	Actual throttle opening angle calculated by ECM based on the throttle sensor input value.	deg
Target Throttle Opening Angle	Control value of the target throttle opening angle calculated by ECM. Shows the target value of opening angle in percentage when 0% means fully closed and 100% means fully open.	%
Relative Throttle Position	Shoes the current throttle opening angle in percentage against the throttle voltage (full range) that has reflected the full close point learning value. The value will be approx. 70% at full open.	%

Display	Contents	Unit of measure
Fuel Level	Fuel level sensor output value. ECM input value. Total value of main and sub.	%
Commanded Evap Purge	Evaporative purge rate displayed by the OBD.	%
Fuel system for Bank 1	Displays the feedback status of air fuel ratio. Open: Feedback is stopped Closed: Feedback control is being performed	—
Commanded EGR	EGR setting value is calculated by ECM and the target value is displayed.	%
EGR Error	Percentage of the difference in actual EGR steps as compared to the target EGR steps. Both a positive value and a negative value mean that it doesn't fulfill the target. When the value is positive, it opens more than the target value. When the value is negative, it opens smaller than the target value.	%
Active Grille Shutter Position	Counts the pulse of active grille shutter position, and displays as 100% at full open and 0% at fully closed.	—
Active Grille Shutter Mechanical Break Status	During the calibration procedure, if a linkage of the active grille shutter is off, calibration is not performed. Judgment is done by the active grille shutter and the status is sent to ECM.	—
Active Grille Shutter Sensor Error Status	Counts the pulse of active grille shutter opening angle position. Judges the sensor malfunction on the pulse counter. Judgment is done by the active grille shutter and the status is sent to ECM.	—
Active Grille Shutter Voltage Error Status	Judges whether the power source voltage supplied to the active grille shutter is abnormal. Judgment is done by the active grille shutter and the status is sent to ECM.	—
Active Grille Shutter Control Circuit Error Status	Shows the status where the judgment is performed to check if there is any abnormality in the internal circuit (drive motor) of the active grille shutter. Judgment is done by the active grille shutter and the status is sent to ECM.	—
Active Grille Shutter Stuck Error Status	Active grille shutter detects the status where the operation failed because of any foreign matter or ice clogging.	—
Active Grille Shutter Temperature Error Status	Detects internal temperature of the active grille shutter. Shows the status where the judgment is performed to check if the temperature is excessively high. Judgment is done by the active grille shutter and the status is sent to ECM.	—
Active Grille Shutter Communication Error Status	Communication is performed between the active grille shutter and ECM, and shows whether the communication status is abnormal.	—
Active Grille Shutter Position Commanded Status	Shutter open/close command is sent from ECM to the active grille shutter, and the status of that command is displayed.	—
Active Grille Shutter Calibration in progress	Active grille shutter performs the calibration when the ignition is ON, and displays the calibration status. Set to “ON” when the calibration was performed.	—
Active Grille Shutter Calibration Commanded Status	Status where the shutter open/close command is sent from ECM to the active grille shutter.	—
Active Grille Shutter Calibration Status	Shows the status where the calibration of the active grille shutter has completed or not completed, and is always completed when there is no abnormality in the active grille shutter.	—
Active Grille Shutter Warning Status	Shows warning signals of the active grille shutter. When the active grille shutter has a malfunction, signal is sent to the meter CM to illuminate the warning light.	—
Active Grille Shutter Control Status 1	Shows the status such as factors of the active grille operation (air conditioner, radiator fan etc.) or frozen judgment which is controlled by the ECM.	—
IGN Counter	Time stamp information. Number of times the ignition is ON since the vehicle was manufactured. The number of ignition ON is also recorded when a trouble code is recorded, so the comparison with that number will show you how many times the ignition has turned on since the diagnostic code was recorded.	times

Display	Contents	Unit of measure
Count	Shows the number of times the ignition is turned ON since the vehicle was manufactured. The number of ignition ON is also recorded when a trouble code is recorded, so the comparison with that number will show you how many times the ignition has turned on since the diagnostic code was recorded.	—
past time after IG on	Elapsed time after ignition ON. When a trouble code is recorded, the elapsed time after ignition ON is also recorded.	ms
Time Since Engine Start	Elapsed time after starting the engine.	sec
AT drive status	Neutral condition. (CVT model) Information input from the inhibitor switch. (CVT model)	—
Engine Control Status	On hybrid system, engine torque information is transmitted from engine ECM to HPCM. And this is the engine torque related information.	—
Idle Stop Fuel Cut Request	On hybrid system, engine torque information is transmitted from engine ECM to hybrid powertrain control module. And this is the engine torque related information.	—
Engine Torque Check 1	On hybrid system, engine torque information is transmitted from engine ECM to hybrid powertrain control module. And this is the engine torque related information.	Nm
Engine Torque Check 2	On hybrid system, engine torque information is transmitted from engine ECM to hybrid powertrain control module. And this is the engine torque related information.	Nm
Engine Torque Check 3	On hybrid system, engine torque information is transmitted from engine ECM to hybrid powertrain control module. And this is the engine torque related information.	Nm
(Oxygen sensor #11)	Installation status of the front oxygen sensor.	—
(Oxygen sensor #12)	Installation status of the rear oxygen sensor.	—
Short term fuel trim #12	Air fuel ratio correction control value for the rear.	%
Absolute Throttle Pos.#2	Shows the sub throttle sensor voltage value in % against the full-range 5 V throttle sensor output voltage.	%
Accelerator Pedal Pos.#1	Absolute means to show the main accelerator sensor voltage value in % against the full-range 5 V.	%
Accelerator Pedal Pos.#2	Absolute means to show the sub accelerator sensor voltage value in % against the full-range 5 V.	%
OBD System	Shows the OBD regulation to be followed. This information is recorded in the ECM, and it does not mean that the unit automatically judges the compliance to the OBD regulations.	—

4. V.I.N REGISTRATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then select «Enter».
5) On «Select Function» display, select «Work Support».
6) On «Work Support» display, select «Entry VIN».
7) Perform the procedures shown on the display screen.

9. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. SUBARU SELECT MONITOR

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then «Enter».
5) On «Select Function» display, select «DTC».

2. GENERAL SCAN TOOL

Refer to data denoting emission-related powertrain DTC.
For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>

NOTE:
Refer to general scan tool manufacturer’s instruction manual to access powertrain DTC (MODE $03).

10.Inspection Mode

A: PROCEDURE

Perform the diagnosis shown in the following DTC table.
When performing the diagnosis not listed in “List of Diagnostic Trouble Code (DTC)”, refer to the item on the drive cycle. <Ref. to EN(H4DO HEV)(diag)-55, Drive Cycle.>

DTC	Item	Condition
B1570	ANTENNA	—
B1571	REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM)	—
B1572	IMM CIRCUIT EXCEPT ANTENNA CIRCUIT	—
B1574	KEY COMMUNICATION	—
B1575	INCORRECT IMMOBILIZER KEY	—
B1576	EGI CONTROL MODULE EEPROM	—
B1577	IMM CONTROL MODULE EEPROM	—
B1578	METER	—
P0010	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	—
P0013	"B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	—
P0020	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	—
P0023	"B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	—
P0031	A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 1	—
P0032	A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 1	—
P0037	A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2	—
P0038	A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 2	—
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW	—
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" HIGH	—
P0102	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT LOW	—
P0103	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT HIGH	—
P0107	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT LOW	—
P0108	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH	—
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW BANK 1	—
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH BANK 1	—
P0117	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT LOW	—
P0118	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH	—
P0122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW	—
P0123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH	—
P0131	A/F / O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 1	—
P0132	A/F / O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 1	—
P0197	ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT LOW	—
P0198	ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT HIGH	—
P0201	CYLINDER 1 INJECTOR "A" CIRCUIT	—
P0202	CYLINDER 2 INJECTOR "A" CIRCUIT	—
P0203	CYLINDER 3 INJECTOR "A" CIRCUIT	—
P0204	CYLINDER 4 INJECTOR "A" CIRCUIT	—
P0222	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW	—
P0223	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH	—
P0327	KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT LOW BANK 1 OR SINGLE SENSOR	—
P0328	KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT HIGH BANK 1 OR SINGLE SENSOR	—
P0335	CRANKSHAFT POSITION SENSOR "A" CIRCUIT	—
P0336	CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—

DTC	Item	Condition
P0340	CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR	—
P0341	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR	—
P0345	CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2	—
P0346	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 2	—
P0351	IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN	—
P0352	IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN	—
P0353	IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN	—
P0354	IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN	—
P0365	CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1	—
P0366	CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1	—
P0390	CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2	—
P0391	CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 2	—
P0452	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT LOW	—
P0453	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT HIGH	—
P0458	EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT LOW	—
P0462	FUEL LEVEL SENSOR "A" CIRCUIT LOW	—
P0463	FUEL LEVEL SENSOR "A" CIRCUIT HIGH	—
P0512	STARTER (SWITCH) REQUEST CIRCUIT	—
P0560	SYSTEM VOLTAGE	—
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	—
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	—
P0606	CONTROL MODULE PROCESSOR	—
P060A	INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE	—
P060B	INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE	—
P0616	STARTER RELAY "A" CIRCUIT LOW	—
P0617	STARTER RELAY "A" CIRCUIT HIGH	—
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	—
P0685	ECM/PCM POWER RELAY CONTROL CIRCUIT/OPEN	—
P081A	STARTER DISABLE CIRCUIT LOW	—
P0A7B	BATTERY ENERGY CONTROL MODULE REQUEST MIL ILLUMINATION	—
P0AC4	HYBRID POWERTRAIN CONTROL MODULE REQUEST MIL ILLUMINATION	—
P0CA1	DRIVE MOTOR CONTROL MODULE REQUEST MIL ILLUMINATION	—
P1160	THROTTLE RETURN SPRING	—
P2006	TGV CONTROL STUCK CLOSED BANK 1	—
P2007	TGV CONTROL STUCK CLOSED BANK 2	—
P2009	TGV CONTROL CIRCUIT LOW BANK 1	—
P2012	TGV CONTROL CIRCUIT LOW BANK 2	—
P2101	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE	—
P2102	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT LOW	—
P2103	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT HIGH	—
P2109	THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE	—
P2119	THROTTLE ACTUATOR "A" CONTROL THROTTLE BODY RANGE/PERFORMANCE	—
P2122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW	—
P2123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH	—
P2127	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW	—
P2128	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH	—
P2135	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION	—
P2138	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION	—

DTC	Item	Condition
P2401	EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW	«Coolant Temp.»: 5 — 45°C (41 — 113°F) «Intake Air Temp.»: 5 — 50°C (41 — 122°F)
P2419	EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW	
P2530	IGNITION SWITCH RUN POSITION CIRCUIT	—
U0073	CONTROL MODULE COMMUNICATION BUS OFF	—
U0075	CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF	—
U0101	LOST COMMUNICATION WITH TCM	—
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	—
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	—
U0284	LOST COMMUNICATION WITH ACTIVE GRILLE SHUTTER MODULE "A"	—
U0293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE	—
U0402	INVALID DATA RECEIVED FROM TCM	—
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	—
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	—
U0594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE	—
U1101	LOST COMMUNICATION WITH TCM PU-CAN	—
U1293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN	—
U1402	INVALID DATA RECEIVED FROM TCM PU-CAN	—
U1594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN	—

1) Check that the 12 volt auxiliary battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) Perform the Clear Memory Mode. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>
3) Read the diagnostic trouble code (DTC) and check that no DTC is displayed. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-102, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> After solving the DTC, repeat from step 2).
4) Start the engine, and run the engine at idle for 10 seconds or more.
5) Read the readiness code using Subaru Select Monitor and check that the concerned DTC is not displayed. For detailed operation procedures, refer to “Application help”.

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 4).
6) Read the diagnostic trouble code (DTC) and check the DTC. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-102, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> After solving the DTC, repeat from step 2).

11.Drive Cycle

A: PROCEDURE

It is necessary to perform the drive cycle listed below if DTC is not found in the Inspection Mode. It is possible to complete diagnosis of the DTC by performing the indicated drive cycle. After the repair for the DTC, perform a necessary drive cycle and make sure the function recovers and the DTC is recorded.

1. PREPARATION FOR DRIVE CYCLE

1) Check that the 12 volt auxiliary battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) After performing the diagnostics and Clear Memory Mode, check that no DTC remains. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>

NOTE:
Perform the drive cycle after warming up the engine except when the engine coolant temperature at engine start is specified.

2. DRIVE CYCLE A

DTC	Item	Condition
P0128	COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)	—
P0141	O2 SENSOR HEATER CIRCUIT BANK 1 SENSOR 2	—
P014C	A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1	—
P014D	A/F / O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 1	—
P015A	A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1	—
P015B	A/F / O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 1	—
P0171	SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle B or C as well.
P0172	SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle B or C as well.
P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
P0301	CYLINDER 1 MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
P0302	CYLINDER 2 MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
P0303	CYLINDER 3 MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
P0304	CYLINDER 4 MISFIRE DETECTED	Complete diagnosis with drive cycle B or C as well.
P0420	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD BANK 1	—
P0459	EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT HIGH	—
P2096	POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle B or C as well.
P2097	POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle B or C as well.
P2195	A/F /O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 1	—
P2196	A/F /O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 1	—

Diagnostic procedure:
1) Drive for 20 minutes or more at a constant speed of 80 km/h (50 MPH) or more.
2) Stop the vehicle and idle for one minute.
3) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>

3. DRIVE CYCLE B

DTC	Item	Condition
P0010	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	—
P0020	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	—
P0125	INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL	«Coolant Temp.» at engine start: Less than –15°C (5°F)
P0137	O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2	—
P0138	O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2	—
P0171	SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle A or C as well.
P0172	SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle A or C as well.
P0201	CYLINDER 1 INJECTOR "A" CIRCUIT	—
P0202	CYLINDER 2 INJECTOR "A" CIRCUIT	—
P0203	CYLINDER 3 INJECTOR "A" CIRCUIT	—
P0204	CYLINDER 4 INJECTOR "A" CIRCUIT	—
P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
P0301	CYLINDER 1 MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
P0302	CYLINDER 2 MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
P0303	CYLINDER 3 MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
P0304	CYLINDER 4 MISFIRE DETECTED	Complete diagnosis with drive cycle A or C as well.
P0351	IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN	—
P0352	IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN	—
P0353	IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN	—
P0354	IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN	—
P0500	VEHICLE SPEED SENSOR "A" CIRCUIT	—
P0506	IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED	—
P0507	IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED	—
P059A	ACTIVE GRILLE AIR SHUTTER "A" POSITION SENSOR CIRCUIT	«Ambient Temperature»: 3 — 33°C (37.4 — 91.4°F)
P059F	ACTIVE GRILLE AIR SHUTTER "A" PERFORMANCE/STUCK OFF	
P05A0	ACTIVE GRILLE AIR SHUTTER "A" STUCK ON	
P05A1	ACTIVE GRILLE AIR SHUTTER "A" POSITION SENSOR MINIMUM/MAXIMUM STOP PERFORMANCE	
P05A2	ACTIVE GRILLE AIR SHUTTER "A" CONTROL CIRCUIT/OPEN	
P05A6	ACTIVE GRILLE AIR SHUTTER "A" SUPPLY VOLTAGE CIRCUIT/OPEN	
P05C0	ACTIVE GRILLE AIR SHUTTER MODULE "A" OVER TEMPERATURE	
P0700	TRANSMISSION CONTROL SYSTEM (MIL REQUEST)	—
P2006	TGV CONTROL STUCK CLOSED BANK 1	—
P2007	TGV CONTROL STUCK CLOSED BANK 2	—
P2009	TGV CONTROL CIRCUIT LOW BANK 1	—
P2012	TGV CONTROL CIRCUIT LOW BANK 2	—
P2096	POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle A or C as well.
P2097	POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle A or C as well.
P2135	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION	—
P2138	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION	—

Diagnostic procedure:
1) Drive at 10 km/h (6 MPH) or more.
2) Stop the vehicle and idle for ten minutes.
3) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>

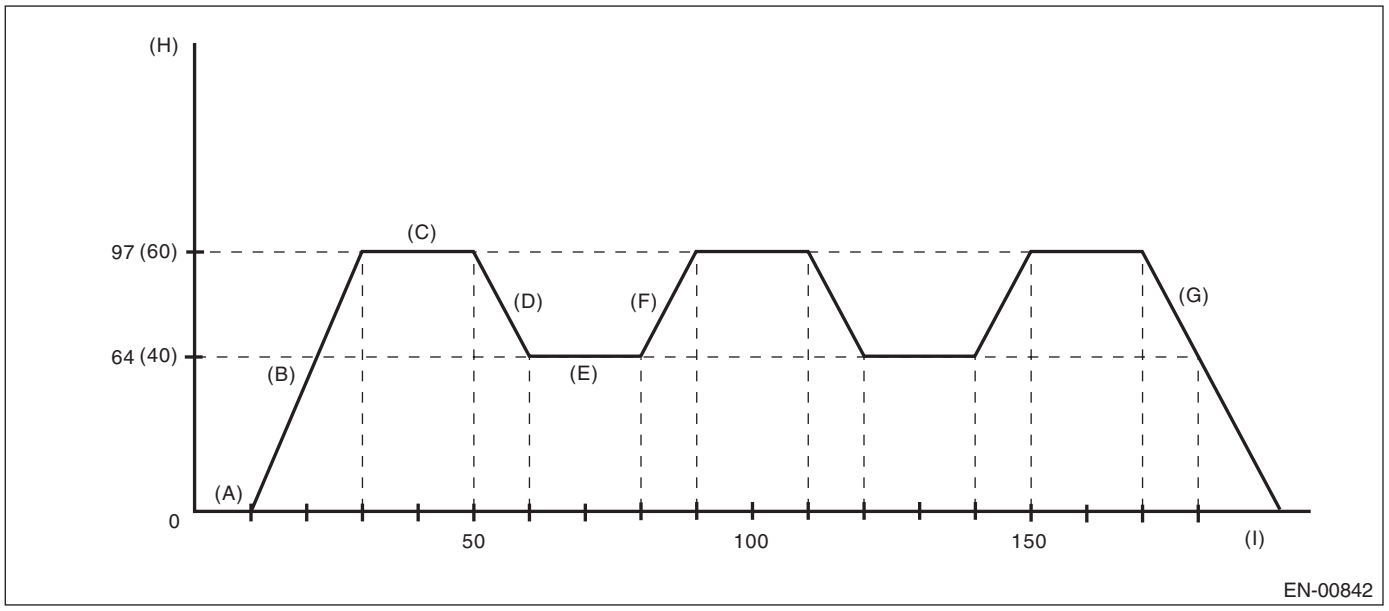
4. DRIVE CYCLE C

DTC	Item	Condition
P000A	"A" CAMSHAFT POSITION SLOW RESPONSE BANK 1	—
P000B	"B" CAMSHAFT POSITION SLOW RESPONSE BANK 1	—
P000C	"A" CAMSHAFT POSITION SLOW RESPONSE BANK 2	—
P000D	"B" CAMSHAFT POSITION SLOW RESPONSE BANK 2	—
P0011	"A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1	—
P0014	"B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1	—
P0021	"A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2	—
P0024	"B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2	—
P0030	A/F / O2 HEATER CONTROL CIRCUIT BANK 1 SENSOR 1	—
P0068	MAP/MAF - THROTTLE POSITION CORRELATION	—
P0101	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—
P0134	A/F / O2 SENSOR CIRCUIT NO ACTIVITY DETECTED BANK 1 SENSOR 1	—
P013A	O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2	—
P013B	O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 2	—
P013E	O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 2	—
P013F	O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2	—
P0171	SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle A or B as well.
P0172	SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle A or B as well.
P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
P0301	CYLINDER 1 MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
P0302	CYLINDER 2 MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
P0303	CYLINDER 3 MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
P0304	CYLINDER 4 MISFIRE DETECTED	Complete diagnosis with drive cycle A or B as well.
P0400	EGR "A" FLOW	—
P0851	PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW	—
P0852	PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH	—
P1449	EVAP SYSTEM CLOG DETECTED (AIR FILTER)	—
P1492	COIL 1 EGR "A" CONTROL CIRCUIT LOW	—
P1493	COIL 1 EGR "A" CONTROL CIRCUIT HIGH	—
P1494	COIL 2 EGR "A" CONTROL CIRCUIT LOW	—
P1495	COIL 2 EGR "A" CONTROL CIRCUIT HIGH	—
P1496	COIL 3 EGR "A" CONTROL CIRCUIT LOW	—
P1497	COIL 3 EGR "A" CONTROL CIRCUIT HIGH	—
P1498	COIL 4 EGR "A" CONTROL CIRCUIT LOW	—

DTC	Item	Condition
P1499	COIL 4 EGR "A" CONTROL CIRCUIT HIGH	—
P2004	TGV CONTROL STUCK OPEN BANK 1	—
P2005	TGV CONTROL STUCK OPEN BANK 2	—
P2096	POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1	Complete diagnosis with drive cycle A or B as well.
P2097	POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1	Complete diagnosis with drive cycle A or B as well.
P2270	O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 2	—
P2271	O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 2	—

Diagnostic procedure:

1) Drive according to the drive pattern described below.



(A)	Shift the select lever to “P” range, and let the engine idle for 10 seconds or more.	(D)	Decelerate with fully closed throttle to 64 km/h (40 MPH) or less.	(G)	Stop vehicle with the throttle fully closed.
(B)	Accelerate to 97 km/h (60 MPH) or more within 20 seconds.	(E)	Drive for 20 seconds or more at 64 km/h (40 MPH) or less.	(H)	Vehicle speed km/h (MPH)
(C)	Drive for 20 seconds or more at 97 km/h (60 MPH) or more.	(F)	Accelerate to 97 km/h (60 MPH) or more within 10 seconds.	(I)	Sec.

2) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>

5. DRIVE CYCLE E

DTC	Item	Condition
P0461	FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—

Diagnostic procedure:
1) Make sure that the battery voltage is 10.9 V or more.
2) Perform the Clear Memory Mode. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>
3) Drive for approximately 30 L (7.9 US gal, 6.6 Imp gal) of fuel.

NOTE:
- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

4) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>

6. DRIVE CYCLE F

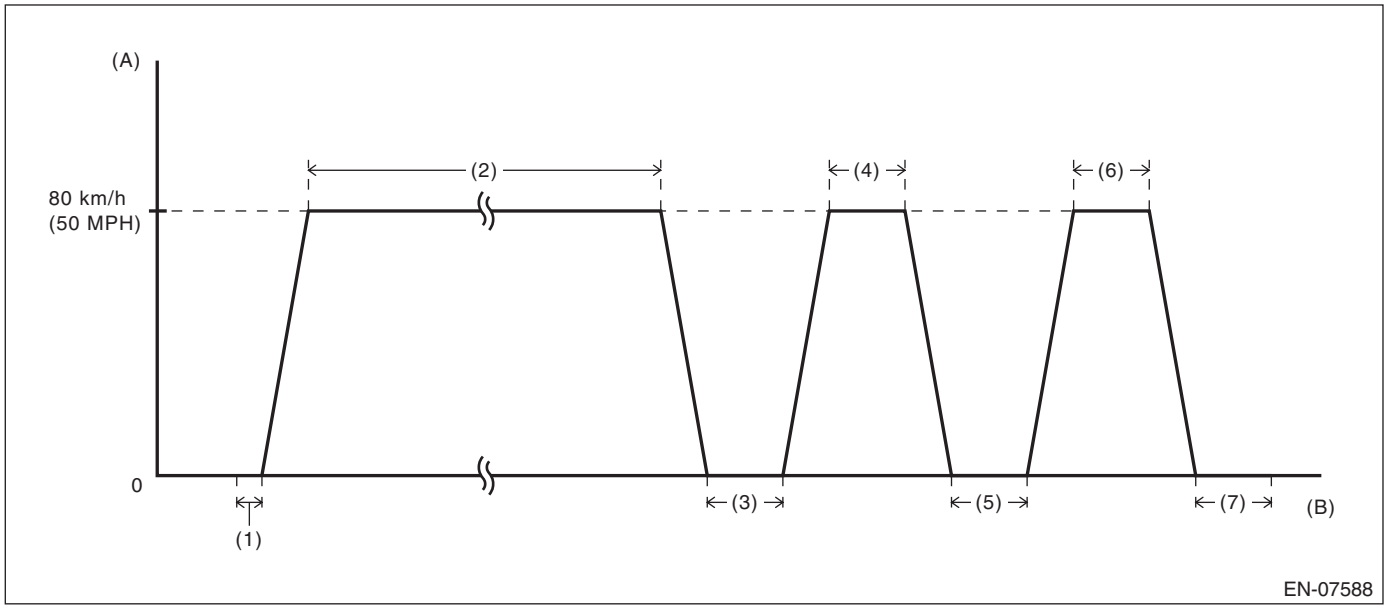
DTC	Item	Condition
P0111	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE BANK 1	• 6 hours have elapsed since ignition switch is OFF under a completely warmed up condition. • For models with block heater, at least 6 hours must have elapsed without operating the block heater.
P0196	ENGINE OIL TEMPERATURE SENSOR "A" RANGE/PERFORMANCE	

Diagnostic procedure:
1) With the ignition switch ON (engine stopped), read the values in «Coolant Temp.» and «Intake Air Temp.». <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>
2) If the values from step 1) satisfy the following conditions, idle the engine for two minutes or more.

Condition:
|Engine coolant temperature — Intake air temperature| ≤ 5°C (9°F)

NOTE:
- If the conditions are not satisfied, turn the ignition switch to OFF and wait until the parameters are satisfied.
- Hold the select lever in “P” range or “N” range at idling.

3) Drive according to the drive pattern described below.



(A)	Vehicle speed	(B)	Elapsed time		
(1)	Idle the engine for 2 minutes or more.	(4)	Drive for 30 seconds or more at a constant speed of 80 km/h (50 MPH) or more.	(6)	Drive for 30 seconds or more at a constant speed of 80 km/h (50 MPH) or more.
(2)	Drive for a total period of 15 minutes or more at a speed of 80 km/h (50 MPH) or more.	(5)	Stop the vehicle and idle for 30 seconds or more.	(7)	Stop the vehicle and idle for 30 seconds.
(3)	Stop the vehicle and idle for 30 seconds or more.				

NOTE:
- In pattern (2), it is acceptable to decelerate to less than 80 km/h (50 MPH) or to stop the vehicle depending on the traffic conditions. Drive the vehicle at 80 km/h (50 MPH) or more until the total driving time reaches or exceeds 15 minutes.
- There is no given transition time between idling and cruising.
- Driving at constant speed only on a downhill causes smaller engine load and may result in failure to obtain a right diagnostic result.
- If the ignition switch is turned to OFF during driving cycle F, perform this driving cycle again after satisfying the conditions listed in the table.

4) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>

7. DRIVE CYCLE H

DTC	Item	Condition
P0071	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" RANGE/PERFORMANCE	• 6 hours have elapsed since ignition switch is OFF under a completely warmed up condition. • For models with block heater, at least 6 hours must have elapsed without operating the block heater.
P0116	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE	• 6 hours have elapsed since ignition switch is OFF under a completely warmed up condition. • For models with block heater, at least 6 hours must have elapsed without operating the block heater.
P0451	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT RANGE/PERFORMANCE	60 seconds have elapsed since ignition switch is OFF.
P050A	COLD START IDLE CONTROL SYSTEM PERFORMANCE	—
P050B	COLD START IGNITION TIMING PERFORMANCE	—

Diagnostic procedure:
1) With the ignition switch ON (engine stopped), read the values in «Coolant Temp.» and «Intake Air Temp.». <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>
2) If the values from step 1) satisfy the following conditions, idle the engine for two minutes or more.

Condition:
|Engine coolant temperature — Intake air temperature| ≤ 5°C (9°F)

NOTE:
- If the conditions are not satisfied, turn the ignition switch to OFF and wait until the parameters are satisfied.
- Hold the select lever in “P” range or “N” range at idling.

3) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>

8. DRIVE CYCLE I

DTC	Item	Condition
P0455	EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK)	«Coolant Temp.»: 5 — 45°C (41 — 113°F) «Intake Air Temp.»: 5 — 50°C (41 — 122°F)
P0456	EVAP SYSTEM (CPC) LEAK DETECTED (VERY SMALL LEAK)	
P1451	EVAP SYSTEM CLOG DETECTED (PIPE)	
P2402	EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH	
P2404	EVAP SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE	
P2420	EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH	

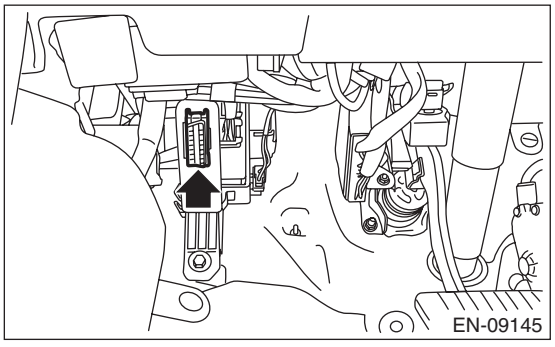
CAUTION:
Be careful of the state of the battery when performing the drive cycle I consecutively. Performing the drive cycle I consecutively without the engine running may cause a low battery voltage and battery discharge.

NOTE:
• If it is necessary to perform drive cycle I consecutively, drive the vehicle under the following conditions to release accumulated evaporating gas. Performing the drive cycle I consecutively without starting the engine causes a large amount of evaporating gas to accumulate in the canister, which hinders an accurate diagnosis.
  • After engine is warmed up.
  • Drive for 10 minutes or more at a speed of 48 km/h (30 MPH) or more (duration of drive can be an accumulation)
• To obtain an accurate diagnostic result, perform the procedures according to the following points.
  • Do not refuel gas immediately before performing drive cycle I. There will be a large amount of evaporating gas immediately after refuel, which may cause a less accurate diagnostic performance.
  • Do not shake the vehicle while performing drive cycle I. Shaking the vehicle causes evaporating gas to increase inside the fuel tank, which may cause a less accurate diagnostic performance.
  • Do not perform any service operation including installation or removal of parts or connectors while performing drive cycle I. Performing service operation could affect on the functions of related parts, which may cause a less accurate diagnostic performance.
• Perform MODE $08 when using a general scan tool.

Diagnostic procedure:
1) Prepare the Subaru Select Monitor. <Ref. to EN(H4DO HEV)(diag)-10, PREPARATION TOOL, General Description.>
2) Prepare PC with Subaru Select Monitor installed.
3) Connect the USB cable to the DST-i and the USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:
The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.
4) Connect the diagnosis cable to DST-i.
5) Connect the DST-i to the data link connector located in the lower portion of the instrument panel (on the driver's side).

CAUTION:
Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



6) Start the PC.
7) Turn the ignition switch to ON (engine OFF) and run the "PC application for Subaru Select Monitor".
8) On «Start» display, select «OBD System».
9) On «Select System» display, select «Evaporative System Leak Test».
10) On «Evaporative System Leak Test» display, select «Evaporative System Leak Test».
11) On «Evaporative System Leak Test is running. Press Cancel to exit this function.» display, click the [OK] button to perform evaporative system leak test.
12) When «Conditions have been enabled to control this function. Turn the ignition switch off to terminate the test.» display appears, wait for 30 minutes without clicking the [OK] button.

CAUTION:
Do not leave the vehicle for an extended period of time after the test is complete. This may cause early deterioration of the battery or discharged battery.

NOTE:
• Clicking the [OK] button bring the «Evaporative System Leak Test» display back, although the test is continuing.
• The Subaru Select Monitor screen does not change after the evaporative system leak test is complete or when the test is aborted by turning off the ignition switch.
• If «Test conditions are not correct» display appears, use Subaru Select Monitor to check that the values in «Coolant Temp.» and «Intake Air Temp.» are within the specified range. If the conditions are satisfied, make the necessary preparation for the drive cycle again. <Ref. to EN(H4DO HEV)(diag)-55, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
13) After 30 minutes passed from the start of step 14), click the [OK] button to return to the «Evaporative System Leak Test» display.
14) Click buttons until the «Select System» display appears, then select {Result of on-board monitor test}.
15) In the {Result of on-board monitor test}, check TID $C1 — $CA of MID $3C.

NOTE:
Perform MODE $06 and check when using a general scan tool.

Result of on-board monitor test

Display	Details	Remarks
$0000 is stored in all Val.	During the evaporative system leak test, the test conditions were not met and the test was canceled.	Once the test conditions are met, perform the test again.
All Val. are stored with values and OK is set to all the results.	Evaporative system leak test is completed correctly.	While the ignition switch is ON, read the pending code using the Subaru Select Monitor.
Some results were no good.	The evaporative system leak test completed successfully but the results were faulty.	While the ignition switch is ON, read the pending code using the Subaru Select Monitor.

16) When the evaporative system leak test is completed correctly, read the pending code with the ignition switch turned to ON position. If the DTC is recorded, check the appropriate DTC. <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>

NOTE:
• Perform MODE $07 when using a general scan tool.
• The pending code will be cleared by turning ignition switch to OFF.

9. DRIVE CYCLE J

DTC	Item	Condition
P2610	ECM/PCM ENGINE OFF TIMER PERFORMANCE	—

Diagnostic procedure:
1) Idle the engine for 15 minutes or more.
2) Turn the ignition switch to OFF.
3) After at least 10 hours passed from the start of step 2), read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>

10.DRIVE CYCLE N

DTC	Item	Condition
P0016	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A	«Coolant Temp.»: 80°C (176°F) or more
P0017	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B	
P0018	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR A	
P0019	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR B	

WARNING:
When performing drive cycle N on a public road, pay sufficient attention to the traffic condition and give the highest priority to safe driving.
1) Check the data in condition column of table by using the Subaru Select Monitor or general scan tool.

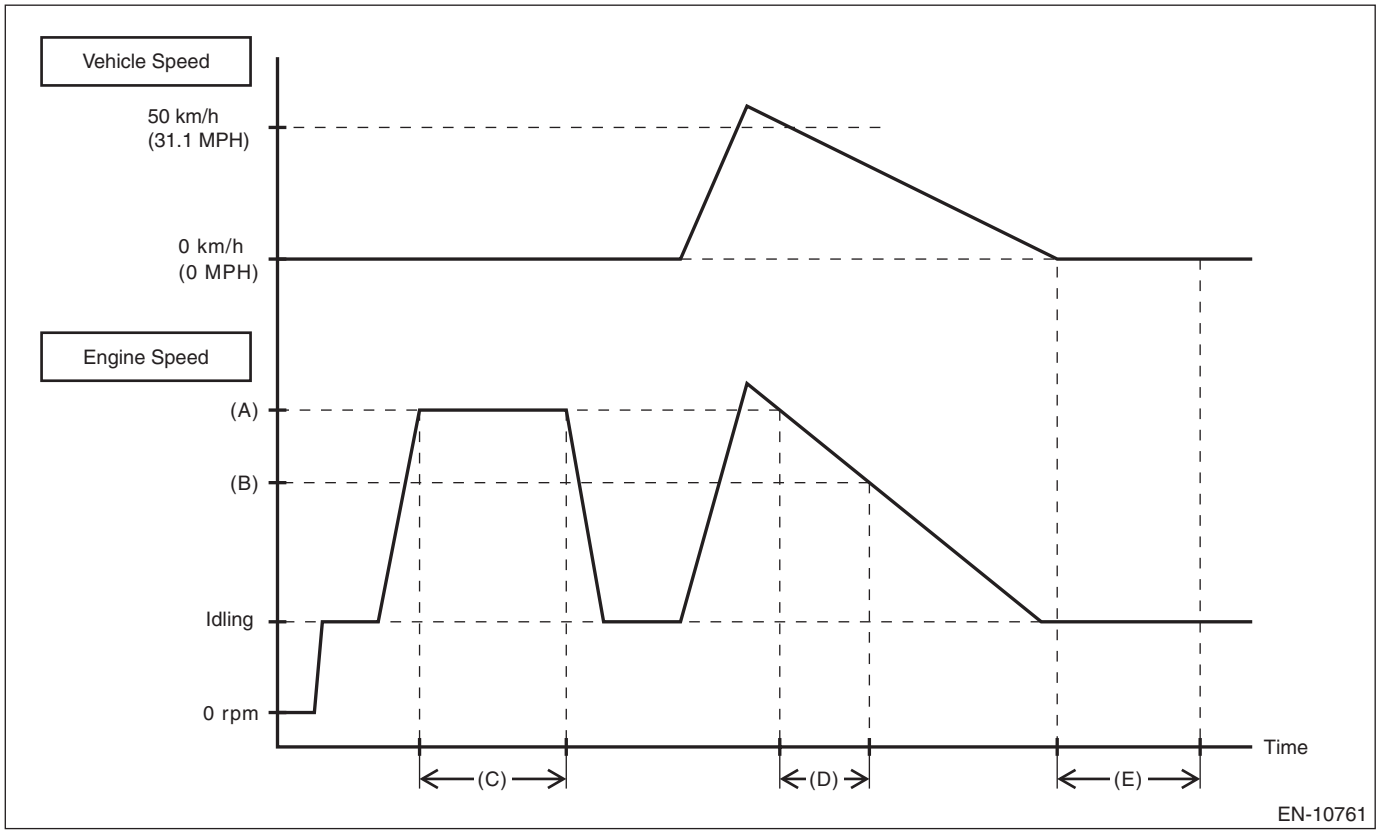
NOTE:
• Subaru Select Monitor
For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>
• General scan tool
For detailed operation procedures, refer to the general scan tool operation manual.
2) While the conditions in the list are satisfied, race the engine at the speed of approx. 2,500 rpm for 40 seconds or more.
3) Start the vehicle, then accelerate the vehicle to 50 km/h (31.1 MPH) or more.
4) When the speed reaches 50 km/h (31.1 MPH) or more, release the accelerator pedal and brake pedal to decelerate the vehicle without shifting the gear. At this time, select an appropriate gear beforehand so that the engine speed can decrease from 2,500 rpm to 1,900 rpm for 5 seconds or more.

NOTE:
• The vehicle speed does not matter so long as the engine speed can maintain from 2,500 rpm to 1,900 rpm for 5 seconds or more.
Example: On a downhill grade, it can be performed with a low speed gear and at a low vehicle speed.
• When it is performed with the electrical load such as the air conditioner, etc. turned OFF or the vehicle driven on a downhill grade, the engine speed decreases slowly. Therefore, the continuous time can be maintained easily.
5) Bring the vehicle to a stop in a safe place, and idle it for 5 minutes or more.

NOTE:
Driving method while vehicle is driven to a stop at safe place is not restricted.
6) With the vehicle idling, read the temporary diagnostic code of DTC using Subaru Select Monitor or general scan tool.

Drive Cycle

NOTE:
• For detailed operation procedures, refer to “Read Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>
• In the step 6), if the DTC is not displayed on the Subaru Select Monitor or general scan tool display screen, the trouble is resolved.



(A) 2500 rpm
(B) 1900 rpm
(C) 40 seconds or more
(D) 5 seconds or more
(E) 5 minutes or more

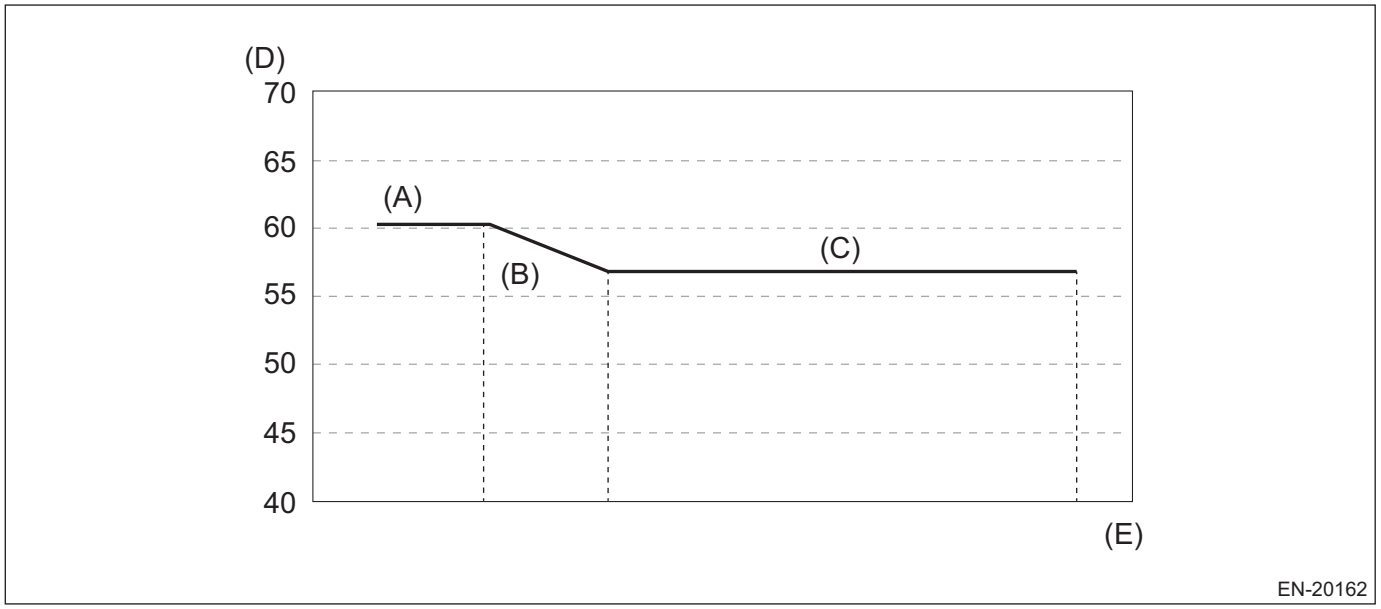
11.DRIVE CYCLE O

DTC	Item	Condition
P0441	EVAP SYSTEM (CPC) INCORRECT PURGE FLOW	—

Diagnostic procedure:

WARNING:
When performing drive cycle O on a public road, pay sufficient attention to the traffic condition and give the highest priority to safe driving.

1) Drive according to the drive pattern described below.



(A) Drive the vehicle at 60 km/h (37 MPH) or faster for at least 5 minutes in fully warm-up condition.
(B) Decelerate with the throttle fully closed for at least 3 seconds.
(C) Drive the vehicle at a constant vehicle speed by depressing the accelerator pedal for at least 30 seconds.
(D) Vehicle speed km/h (MPH)
(E) Sec.

2) Park the vehicle on a safe place.

NOTE:
Driving method while vehicle is driven to a stop at safe place is not restricted.

3) With the vehicle idling, read the temporary diagnostic code of DTC using Subaru Select Monitor or general scan tool.

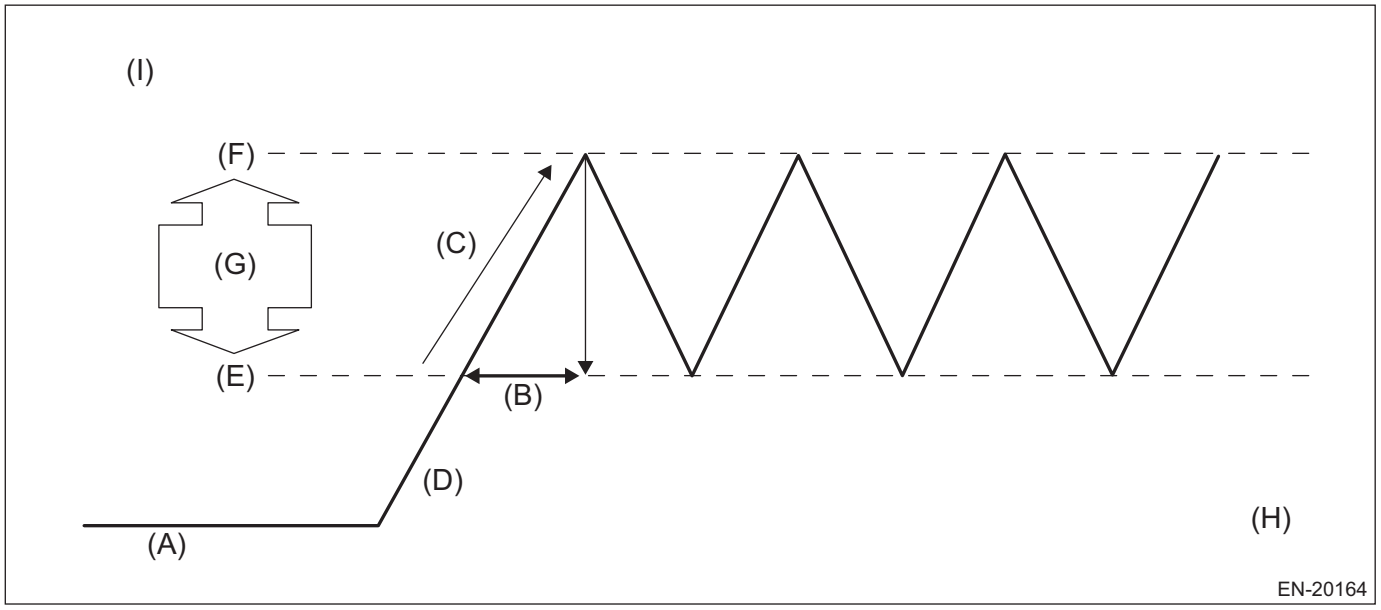
NOTE:
• For detailed operation procedures, refer to “Read Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>
• In the step 3), if the DTC is not displayed on the Subaru Select Monitor or general scan tool display screen, the trouble is resolved.

12.DRIVE CYCLE R

DTC	Item	Condition
P219A	BANK 1 AIR-FUEL RATIO IMBALANCE	—

WARNING:
When performing the drive cycle R on the public road, be very careful of the traffic condition and the safe driving must be the high priority.
1) Check the data in condition column of table by using the Subaru Select Monitor or general scan tool.

NOTE:
• Subaru Select Monitor
For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>
• General scan tool
For detailed operation procedures, refer to the general scan tool operation manual.
2) Keep the engine at idle for at least 30 seconds in a fully warm-up condition.
3) Start the driving.
4) With the gear position in the 4th, take 10 seconds to accelerate from 1400 rpm to 3000 rpm.
5) Decelerate to 1400 rpm in the 4th gear position. (There is no restrictions to the deceleration duration and how to use the brake.)
6) Repeat procedures 4) and 5) 10 times. (Exit when a temporary code is acquired)



(A)	Idle the engine for at least 30 seconds in a fully warm-up condition.	(D)	Engine speed	(G)	Accelerate and decelerate in the 4th gear position.
(B)	10 seconds	(E)	1400 rpm	(H)	Time
(C)	Accelerating	(F)	3000 rpm	(I)	Accelerating and decelerating

12.Clear Memory Mode

A: OPERATION

1. SUBARU SELECT MONITOR

NOTE:
• Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.
• For detailed operation procedures, refer to “Application help”.
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

2. GENERAL SCAN TOOL

For clear memory procedures using the general scan tool, refer to “General Scan Tool Instruction Manual”.

NOTE:
Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.

13.Active Test

A: OPERATION

CAUTION:
After executing the system operation check mode, execute the Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>.

NOTE:
- *: When the ECM, HPCM or the active grille shutter has been replaced, be sure to perform this.
- For detailed operation procedures, refer to “Application help”.

SSM display item	Execution condition	Remarks		
Fuel Pump Relay	Ignition switch is ON (engine OFF)	Activating the actuator ON/OFF	Activating the fuel pump ON/OFF	ON output ←→ OFF output
CPC Solenoid Valve			Activating the purge control solenoid valve ON/OFF	ON output ←→ OFF output
Radiator Fan Relay			Activating the radiator fan relay ON/OFF	ON output ←→ OFF output
A/C Compressor Relay			Activating the A/C relay ON/OFF	ON output ←→ OFF output
ELCM switching valve			Activating the ELCM switching valve ON/OFF	ON output ←→ OFF output
ELCM pump			Activating the ELCM vacuum pump ON/OFF	ON output ←→ OFF output
OFF Drive	At idling	Fuel pump control	Fuel pump OFF operation	OFF output
Fixed Idle Ignition Timing	At idling	Fixing the timing of idle ignition		
Idle Speed Control	At idling	Idle speed control		
Injection Stop Mode (Injector 1) Injection Stop Mode (Injector 2) Injection Stop Mode (Injector 3) Injection Stop Mode (Injector 4)	At idling	Injector control	Stopping fuel injection (Cylinder selection)	
Injection Quantity Control	At idling		Fuel injection amount control (All cylinders)	0 — 20%
EGR Valve Control	At idling	EGR control valve control		
Active Grille Shutter Control	• Ignition switch is ON (engine OFF) • Experienced 20 seconds or more of the elapsed time after starting engine (when replacing ECM)	Active grille shutter control*		

14.Malfunction Indicator Light

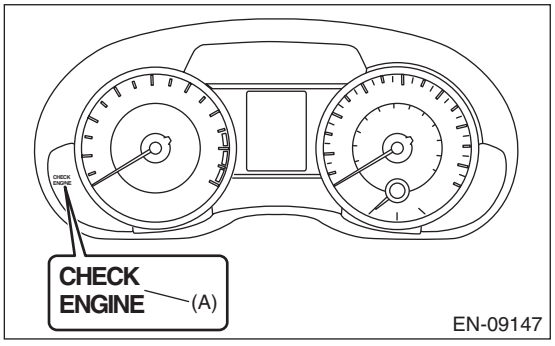
A: PROCEDURE

1. Activation of malfunction indicator light. <Ref. to EN(H4DO HEV)(diag)-70, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>
↓
2. Malfunction indicator light does not come on. <Ref. to EN(H4DO HEV)(diag)-71, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>
↓
3. Malfunction indicator light does not go off <Ref. to EN(H4DO HEV)(diag)-71, MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF, Malfunction Indicator Light.>

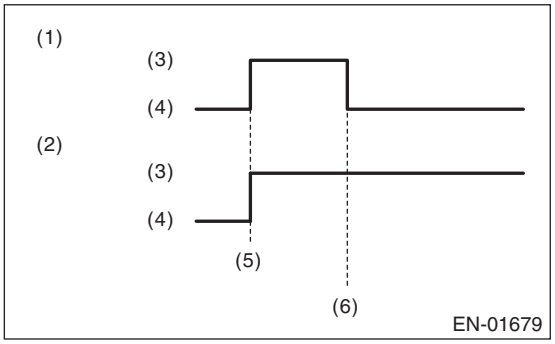
B: ACTIVATION OF MALFUNCTION INDICATOR LIGHT

1) When the ignition switch is turned to ON (engine OFF), the malfunction indicator light (A) in the combination meter illuminates.

NOTE:
If the malfunction indicator light does not illuminate, perform diagnostics of the malfunction indicator light circuit or the combination meter circuit. <Ref. to EN(H4DO HEV)(diag)-71, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>

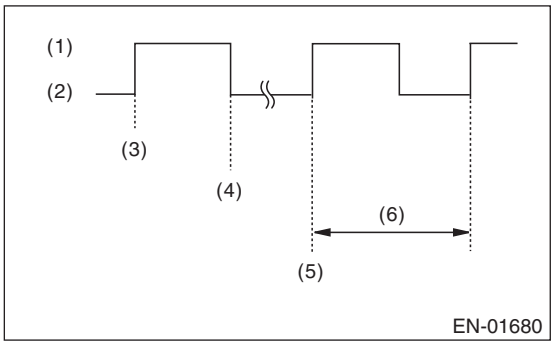


2) After starting the engine, the malfunction indicator light goes out. If it does not go off, any of the engine and emission control system has malfunction.



(1) No faulty
(2) Trouble occurs
(3) ON
(4) OFF
(5) Ignition switch ON
(6) Engine start

3) If the diagnostic system detects a misfire which could damage the catalyst, the malfunction indicator light will blink at a cycle of 1 Hz.



(1) ON
(2) OFF
(3) Ignition switch ON
(4) Engine start
(5) Misfire start
(6) 1 second

C: MALFUNCTION INDICATOR LIGHT DOES NOT COME ON

TROUBLE SYMPTOM:
When the ignition switch is turned to ON (engine OFF), malfunction indicator light does not illuminate.

NOTE:
Refer to IDI section for diagnostic procedure. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

D: MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF

TROUBLE SYMPTOM:
Although malfunction indicator light comes on when the engine runs, DTC is not shown on the Subaru Select Monitor display.

Step	Check	Yes	No
1 **CHECK DTC.**	Is DTC of engine or LAN system displayed? <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Check the combination meter system. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

15.Diagnostics for Engine Starting Failure

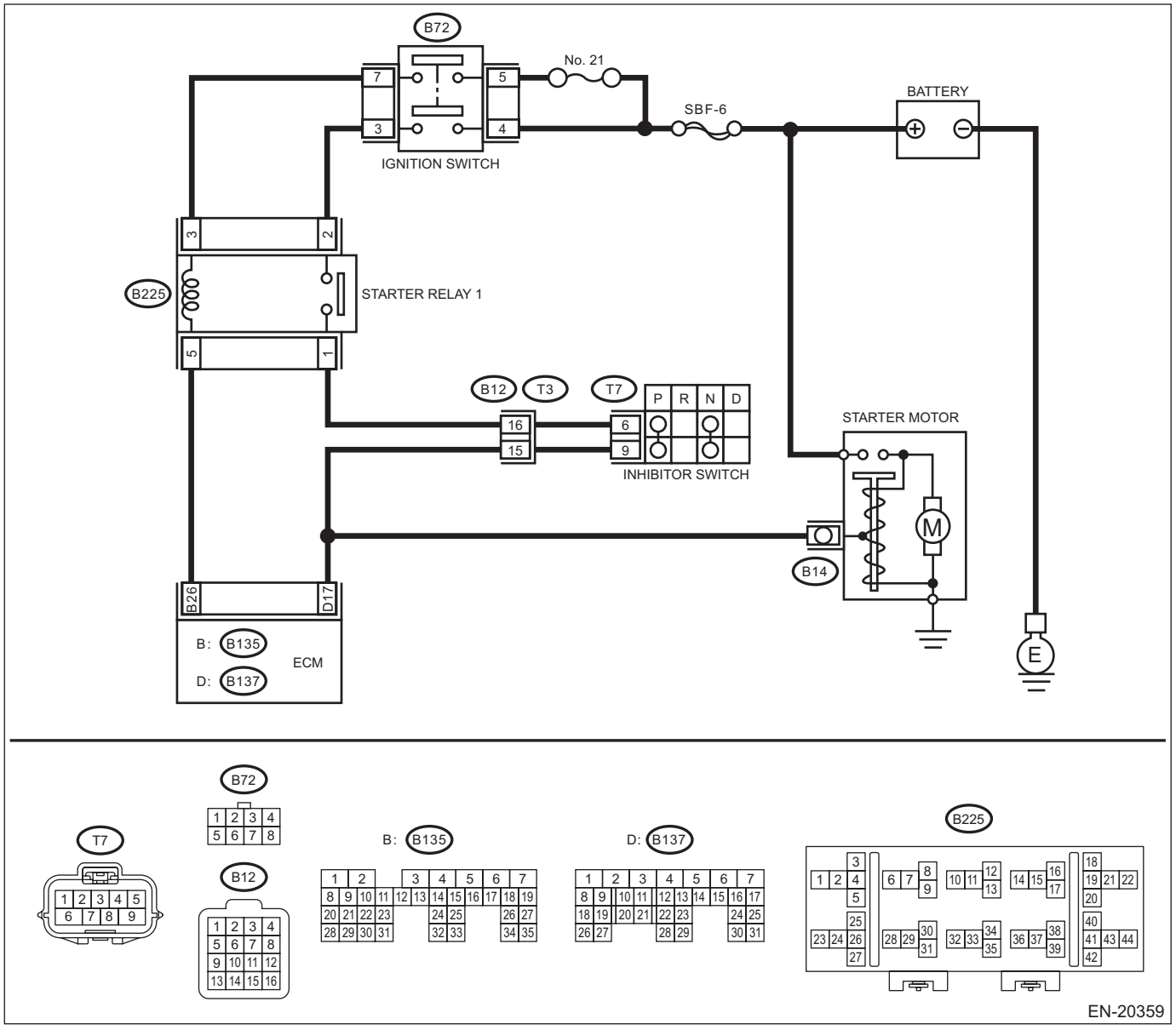
A: PROCEDURE

1. Check of the fuel amount
↓
2. Inspection of starter motor circuit <Ref. to EN(H4DO HEV)(diag)-73, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ECM power supply and ground line <Ref. to EN(H4DO HEV)(diag)-84, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>
↓
4. Inspection of ignition control system <Ref. to EN(H4DO HEV)(diag)-86, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel pump circuit <Ref. to EN(H4DO HEV)(diag)-88, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
6. Inspection of fuel injector circuit <Ref. to EN(H4DO HEV)(diag)-90, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

B: STARTER MOTOR CIRCUIT

1. MODEL WITHOUT PUSH BUTTON START

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



Diagnostics for Engine Starting Failure

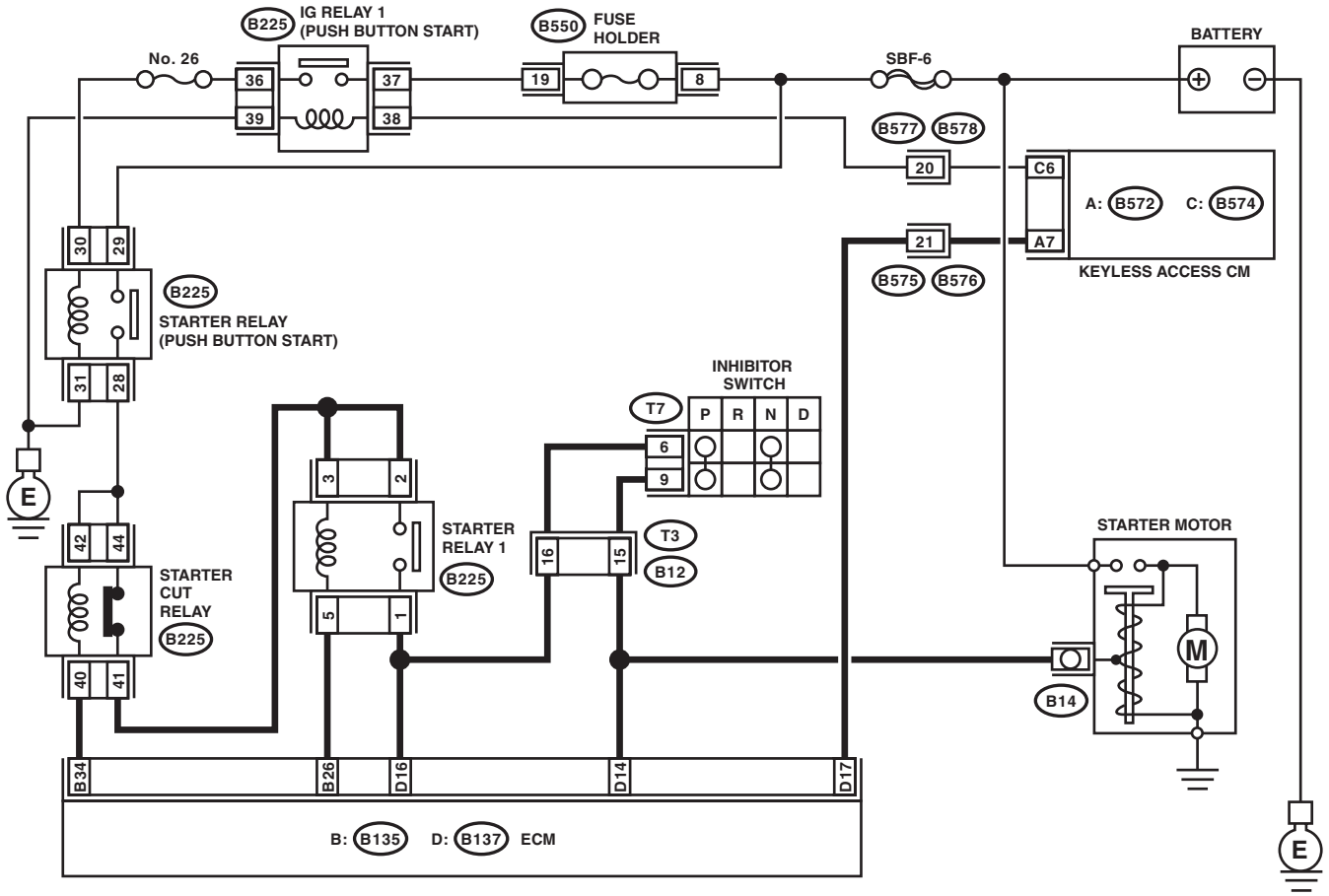
	Step	Check	Yes	No
1	**CHECK FOR MALFUNCTION OCCURRENCE.**	Has the start failure occurred during Auto Start Stop or during EV traveling?	Inspection using “Basic Diagnostic Procedure” of hybrid system. <Ref. to HEV(diag)-2, Basic Diagnostic Procedure.>	Go to step **2**.
2	**CHECK DTC.**	Is DTC displayed? <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Read the value of «Starter Relay Drive Permission Status» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is «OK» displayed?	Go to step **4**.	Inspection using “Basic Diagnostic Procedure” of hybrid system. <Ref. to HEV(diag)-2, Basic Diagnostic Procedure.>
4	**CHECK NEUTRAL POSITION SWITCH SIGNAL.** 1) Read the value of «Neutral Position Switch» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> 2) Turn the ignition to ON. 3) Place the select lever in “P” range or “N” range.	Is «Neutral» displayed?	Go to step **5**.	Go to step **9**.
5	**CHECK 12 VOLT AUXILIARY BATTERY.** Check the battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the battery OK?	Go to step **6**.	Charge or replace the battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
6	**CHECK OPERATION OF STARTER MOTOR.**	Does the starter motor operate?	Check ignition control system. <Ref. to EN(H4DO HEV)(diag)-86, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to step **7**.

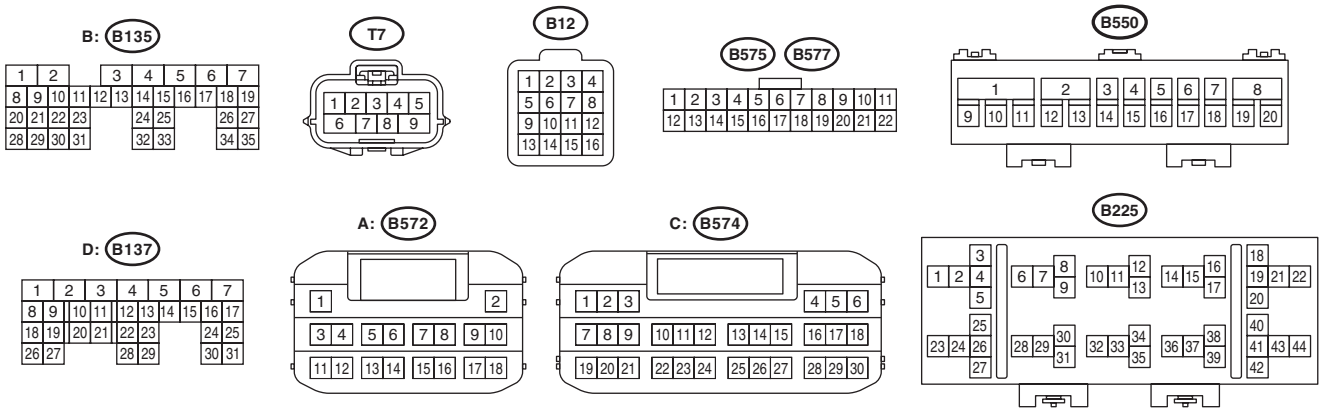
	Step	Check	Yes	No
7	**CHECK INPUT SIGNAL FOR STARTER MOTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter motor. 3) Turn the ignition switch to START. 4) Measure the voltage between the starter motor connector and the engine ground. ***Connector & terminal*** ***(B14) No. 1 (+) — Engine ground (–):*** NOTE: Place the select lever in "P" range or "N" range.	Is the voltage 10 V or more?	Check the starter motor. <Ref. to SC(H4DO(HEV))-10, Starter.>	Go to step **8**.
8	**CHECK HARNESS BETWEEN 12 VOLT AUXILIARY BATTERY AND STARTER MOTOR.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between starter motor terminal B and engine ground. ***Terminals*** ***Terminal B (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **9**.	Repair the power supply circuit.
9	**CHECK HARNESS BETWEEN 12 VOLT AUXILIARY BATTERY AND IGNITION SWITCH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition switch. 3) Measure the power supply voltage between ignition switch connector and chassis ground. ***Connector & terminal*** ***(B72) No. 4 (+) — Chassis ground (–):*** ***(B72) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **10**.	Repair the power supply circuit.
10	**CHECK IGNITION SWITCH.** Measure the resistance between ignition switch terminals after turning the ignition switch to START position. ***Terminals*** ***No. 3 — No. 4:*** ***No. 5 — No. 7:***	Is the resistance less than 1 Ω?	Go to step **11**.	Replace the ignition switch. <Ref. to SL-65, REPLACEMENT, Ignition Key Lock.>
11	**CHECK INPUT VOLTAGE OF STARTER RELAY 1.** 1) Turn the ignition switch to OFF. 2) Remove the starter relay 1. 3) Connect the connector to ignition switch. 4) Measure the voltage between starter relay 1 connector and chassis ground after turning the ignition switch to START position. ***Connector & terminal*** ***(B225) No. 2 (+) — Chassis ground (–):*** ***(B225) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **12**.	Check the following item and repair if necessary. • Blown out of fuse • Open or short circuit to ground in harness between starter relay 1 and ignition switch connector
12	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and starter relay 1 connector. ***Connector & terminal*** ***(B135) No. 26 — (B225) No. 5:***	Is the resistance less than 1 Ω?	Go to step **13**.	Repair the open circuit of harness between ECM connector and starter relay 1 connector.

	Step	Check	Yes	No
13	**CHECK STARTER RELAY 1.** 1) Connect the battery to starter relay 1 terminals No. 3 and No. 5. 2) Measure the resistance between starter relay 1 terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the starter relay 1. <Ref. to EN(H4DO HEV)(diag)-11, Electrical Component Location.>
14	**CHECK HARNESS BETWEEN STARTER RELAY 1 AND INHIBITOR SWITCH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from inhibitor switch. 3) Measure the resistance of harness between starter relay 1 connector and inhibitor switch connector. ***Connector & terminal*** ***(B225) No. 1 — (T7) No. 6:***	Is the resistance less than 1 Ω?	Go to step **15**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between starter relay 1 connector and inhibitor switch connector • Poor contact of coupling connector
15	**CHECK HARNESS BETWEEN INHIBITOR SWITCH AND STARTER MOTOR.** Measure the resistance of harness between the inhibitor switch connector and starter motor. ***Connector & terminal*** ***(T7) No. 9 — (B14) No. 1:***	Is the resistance less than 1 Ω?	Go to step **16**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between inhibitor switch connector and starter motor • Poor contact of coupling connector
16	**CHECK INHIBITOR SWITCH.** 1) Place the select lever in “P” range and “N” range. 2) Measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 6 — No. 9:***	Is the resistance less than 1 Ω?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DO HEV)(diag)-84, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>

2. MODEL WITH PUSH BUTTON START

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





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Diagnostics for Engine Starting Failure

	Step	Check	Yes	No
1	**CHECK FOR MALFUNCTION OCCURRENCE.**	Has the start failure occurred during Auto Start Stop or during EV traveling?	Inspection using “Basic Diagnostic Procedure” of hybrid system. <Ref. to HEV(diag)-2, Basic Diagnostic Procedure.>	Go to step **2**.
2	**CHECK DTC.**	Is DTC displayed? <Ref. to EN(H4DO HEV)(diag)-51, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK CURRENT DATA.** 1) Turn the ignition to ON. 2) Read the value of «Starter Relay Drive Permission Status» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is «OK» displayed?	Go to step **4**.	Inspection using “Basic Diagnostic Procedure” of hybrid system. <Ref. to HEV(diag)-2, Basic Diagnostic Procedure.>
4	**CHECK NEUTRAL POSITION SWITCH SIGNAL.** 1) Read the value of «Neutral Position Switch» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> 2) Turn the ignition to ON. 3) Place the select lever in “P” range or “N” range.	Is «Neutral» displayed?	Go to step **5**.	Go to step **10**.
5	**CHECK 12 VOLT AUXILIARY BATTERY.** Check the battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the battery OK?	Go to step **6**.	Charge or replace the battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
6	**CHECK OPERATION OF STARTER MOTOR.**	Does the starter motor operate?	Check ignition control system. <Ref. to EN(H4DO HEV)(diag)-86, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to step **7**.

	Step	Check	Yes	No
7	**CHECK PUSH BUTTON IGNITION SWITCH.** Press the push button ignition switch twice with the ignition OFF (ACC OFF). NOTE: Release the brake pedal.	Does the ignition turn to ON?	Go to step **8**.	Check the push button start system. <Ref. to KPS(diag)-108, POWER SUPPLY SWITCHING SYSTEM, INSPECTION, General Diagnostic Table.>
8	**CHECK PUSH BUTTON IGNITION SWITCH.** 1) Depress the brake pedal. NOTE: Shift the select lever to “P” range. 2) Check the push button ignition switch indicator.	Does the indicator turn to green?	Go to step **9**.	Check the push button start system. <Ref. to KPS(diag)-141, ENGINE DOES NOT START, INSPECTION, Diagnostics with Phenomenon.>
9	**CHECK START SWITCH SIGNAL.** 1) Read the waveform of «Starter SW» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> 2) Press the push button ignition switch once with the brake pedal depressed.	Does waveform of the «Starter SW» occur?	Go to step **13**.	Go to step **10**.
10	**CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM.** 1) Turn the ignition to OFF. 2) Disconnect the connectors from ECM and keyless access CM. 3) Measure the resistance of harness between ECM connector and keyless access CM. ***Connector & terminal*** ***(B137) No. 17 — (B572) No. 7:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and keyless access CM connector • Poor contact of coupling connector
11	**CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **12**.	Repair the short circuit to ground in harness between ECM connector and keyless access CM connector.
12	**CHECK START SWITCH SIGNAL.** 1) Connect the connector to ECM and keyless access CM. 2) Read the waveform of start switch signal using an oscilloscope. 3) Press the push button ignition switch once with the brake pedal depressed. ***Connector & terminal*** ***(B137) No. 17 (+) — Chassis ground (–):***	Does waveform of the start switch signal occur?	Repair the poor contact of ECM connector.	Repair the poor contact of keyless access CM connector.

	Step	Check	Yes	No
13	**CHECK INPUT SIGNAL FOR STARTER MOTOR.** 1) Turn the ignition to OFF. 2) Disconnect the connector from starter motor. 3) Place the select lever in “P” range or “N” range. 4) Press the push button ignition switch once with the brake pedal depressed. 5) Measure the voltage between the starter motor connector and the engine ground. ***Connector & terminal*** ***(B14) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Check the starter motor. <Ref. to SC(H4DO(HEV))-10, Starter.>	Go to step **14**.
14	**CHECK HARNESS BETWEEN 12 VOLT AUXILIARY BATTERY AND STARTER MOTOR.** 1) Turn the ignition to OFF. 2) Measure the voltage between starter motor terminal B and engine ground. ***Terminals*** ***Terminal B (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **15**.	Repair the power supply circuit.
15	**CHECK IG RELAY 1 (PUSH BUTTON START) POWER SUPPLY.** 1) Remove the IG relay 1 (push button start). 2) Turn the ignition to ON. 3) Measure the voltage between the IG relay 1 (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 37 (+) — Chassis ground (–):*** ***(B225) No. 38 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **16**.	Check the following item and repair or replace if necessary. • Blown out of fuse • Open circuit or short circuit to ground in harness between IG relay 1 (push button start) connector and keyless access CM connector • Open circuit or short circuit to ground in harness between IG relay 1 (push button start) connector and 12 volt auxiliary battery • Poor contact of coupling connector
16	**CHECK HARNESS BETWEEN IG RELAY 1 (PUSH BUTTON START) CONNECTOR AND CHASSIS GROUND.** 1) Turn the ignition to OFF. 2) Measure the resistance of harness between the IG relay 1 (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 39 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **17**.	Repair the open circuit in harness between the IG relay 1 (push button start) connector and chassis ground.
17	**CHECK IG RELAY 1 (PUSH BUTTON START).** 1) Connect the battery to IG relay 1 (push button start) terminals No. 38 and No. 39. 2) Measure the resistance between IG relay 1 (push button start) terminals. ***Terminals*** ***No. 36 — No. 37:***	Is the resistance less than 1 Ω?	Go to step **18**.	Replace the IG relay 1 (push button start). <Ref. to SL-111, IG Relay1 (Push Button Start).>

	Step	Check	Yes	No
18	**CHECK STARTER RELAY (PUSH BUTTON START) POWER SUPPLY.** 1) Install the IG relay 1 (push button start). 2) Remove the starter relay (push button start). 3) Turn the ignition to ON. 4) Measure the voltage between starter relay (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 29 (+) — Chassis ground (–):*** ***(B225) No. 30 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **19**.	Check the following item and repair or replace if necessary. • Blown out of fuse (F/B No. 26) • Open circuit or short circuit to ground in harness between starter relay (push button start) connector and IG relay 1 (push button start) connector • Open circuit or short circuit to ground in harness between starter relay (push button start) connector and 12 volt auxiliary battery
19	**CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND CHASSIS GROUND.** 1) Turn the ignition to OFF. 2) Measure the resistance of harness between starter relay (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 31 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **20**.	Repair the open circuit in harness between starter relay (push button start) connector and chassis ground.
20	**CHECK STARTER RELAY (PUSH BUTTON START).** 1) Connect the battery to starter relay (push button start) terminals No. 30 and No. 31. 2) Measure the resistance between starter relay (push button start) terminals. ***Terminals*** ***No. 28 — No. 29:***	Is the resistance less than 1 Ω?	Go to step **21**.	Replace the starter relay (push button start). <Ref. to SL-109, Starter Relay (Push Button Start).>
21	**CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND STARTER CUT RELAY CONNECTOR.** 1) Remove the starter cut relay. 2) Measure the resistance of harness between starter relay (push button start) connector and starter cut relay connector. ***Connector & terminal*** ***(B225) No. 28 — (B225) No. 42:*** ***(B225) No. 28 — (B225) No. 44:***	Is the resistance less than 1 Ω?	Go to step **22**.	Repair the open circuit in harness between starter relay (push button start) connector and starter cut relay connector.
22	**CHECK HARNESS BETWEEN ECM AND STARTER CUT RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between starter cut relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **23**.	Repair the short circuit to ground in harness between ECM connector and starter cut relay connector.

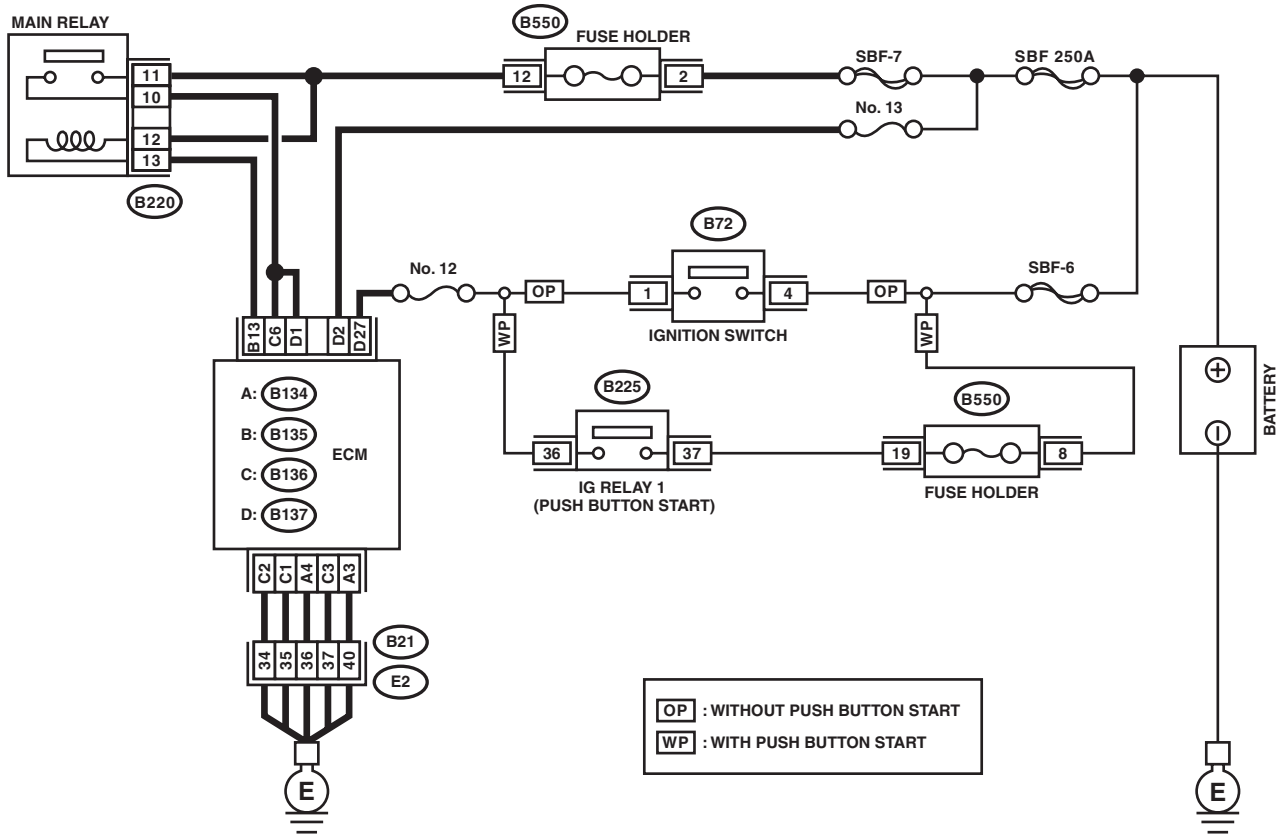
	Step	Check	Yes	No
23	**CHECK STARTER CUT RELAY.** Measure the resistance between starter cut relay terminals. ***Terminals*** ***No. 41 — No. 44:***	Is the resistance less than 1 Ω?	Go to step **24**.	Replace the starter cut relay. <Ref. to SL-117, Starter Cut Relay.>
24	**CHECK HARNESS BETWEEN STARTER CUT RELAY CONNECTOR AND STARTER RELAY 1 CONNECTOR.** 1) Remove the starter relay 1. 2) Measure the resistance of harness between starter cut relay connector and starter relay 1 connector. ***Connector & terminal*** ***(B225) No. 41 — (B225) No. 2:*** ***(B225) No. 41 — (B225) No. 3:***	Is the resistance less than 1 Ω?	Go to step **25**.	Repair the open circuit of harness between starter cut relay connector and starter relay 1 connector.
25	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** Measure the resistance of harness between ECM connector and starter relay 1 connector. ***Connector & terminal*** ***(B135) No. 26 — (B225) No. 5:***	Is the resistance less than 1 Ω?	Go to step **26**.	Repair the open circuit of harness between ECM connector and starter relay 1 connector.
26	**CHECK STARTER RELAY 1.** 1) Connect the battery to starter relay 1 terminals No. 3 and No. 5. 2) Measure the resistance between starter relay 1 terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **27**.	Replace the starter relay 1. <Ref. to EN(H4DO HEV)(diag)-11, LOCATION, Electrical Component Location.>
27	**CHECK HARNESS BETWEEN STARTER RELAY 1 CONNECTOR AND INHIBITOR SWITCH CONNECTOR.** 1) Disconnect the connector from inhibitor switch. 2) Measure the resistance of harness between starter relay 1 connector and inhibitor switch connector. ***Connector & terminal*** ***(B225) No. 1 — (T7) No. 6:***	Is the resistance less than 1 Ω?	Go to step **28**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between starter relay 1 connector and inhibitor switch connector • Poor contact of coupling connector
28	**CHECK INHIBITOR SWITCH.** 1) Place the select lever in “P” range and “N” range. 2) Measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 6 — No. 9:***	Is the resistance less than 1 Ω?	Go to step **29**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
29	**CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and inhibitor switch connector. ***Connector & terminal*** ***(B137) No. 16 — (T7) No. 6:***	Is the resistance less than 1 Ω?	Go to step **30**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and inhibitor switch connector • Poor contact of coupling connector

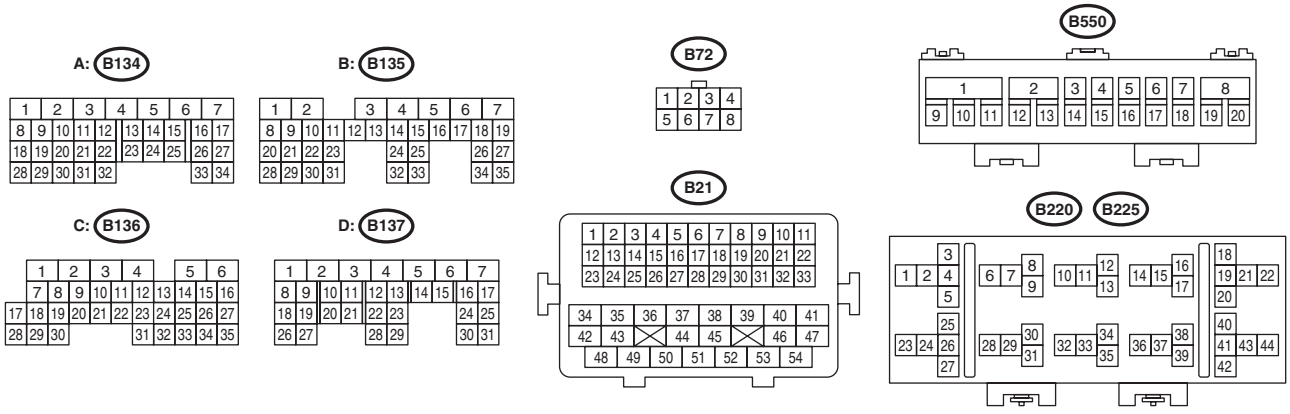
	Step	Check	Yes	No
30	**CHECK HARNESS BETWEEN INHIBITOR SWITCH AND STARTER MOTOR.** Measure the resistance of harness between the inhibitor switch connector and starter motor. ***Connector & terminal*** ***(T7) No. 9 — (B14) No. 1:***	Is the resistance less than 1 Ω?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DO HEV)(diag)-84, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between inhibitor switch connector and starter motor connector • Poor contact of coupling connector

C: CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM)

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



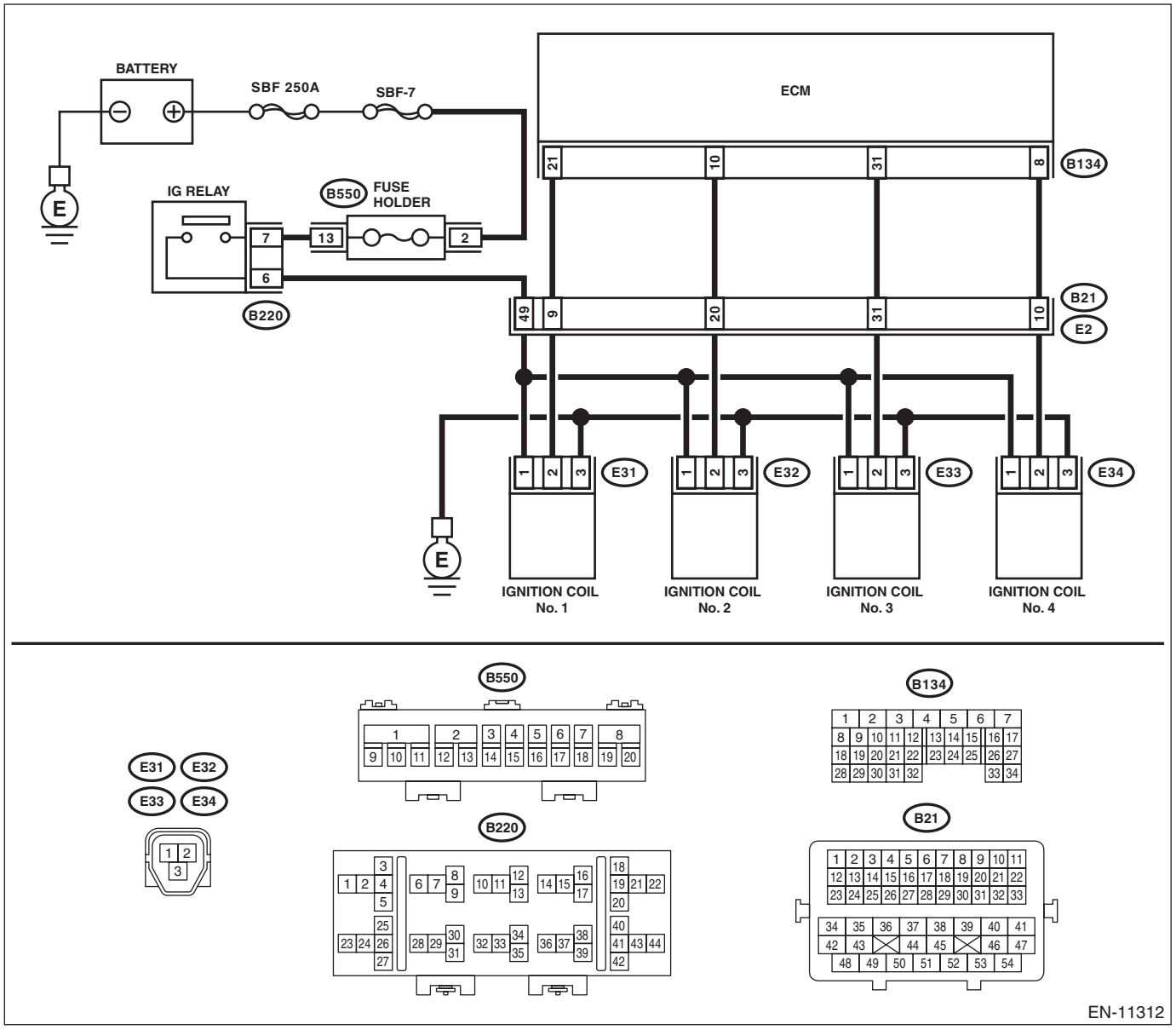


EN-10733

	Step	Check	Yes	No
1	**CHECK MAIN RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the main relay. 3) Connect the battery to main relay terminals No. 12 and No. 13. 4) Measure the resistance between main relay terminals. ***Terminals*** ***No. 10 — No. 11:***	Is the resistance less than 1 Ω?	Go to step **2**.	Replace the main relay. <Ref. to FU(H4DO(HEV))-89, Main Relay.>
2	**CHECK GROUND CIRCUIT FOR ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground terminal • Poor contact of coupling connector
3	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 2 (+) — Chassis ground (–):*** ***(B137) No. 27 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the open or ground short in the harness of power supply circuit.
4	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Measure the voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 11 (+) — Chassis ground (–):*** ***(B220) No. 12 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or ground short in the harness of power supply circuit.
5	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to OFF. 2) Install the main relay. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Repair the open circuit of harness between ECM connector and main relay connector.
6	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to OFF. 2) Connect the connector to ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 6 (+) — Chassis ground (–):*** ***(B137) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Check ignition control system. <Ref. to EN(H4DO HEV)(diag)-86, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and main relay connector • Poor contact of main relay connector • Poor contact of ECM connector

D: IGNITION CONTROL SYSTEM

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



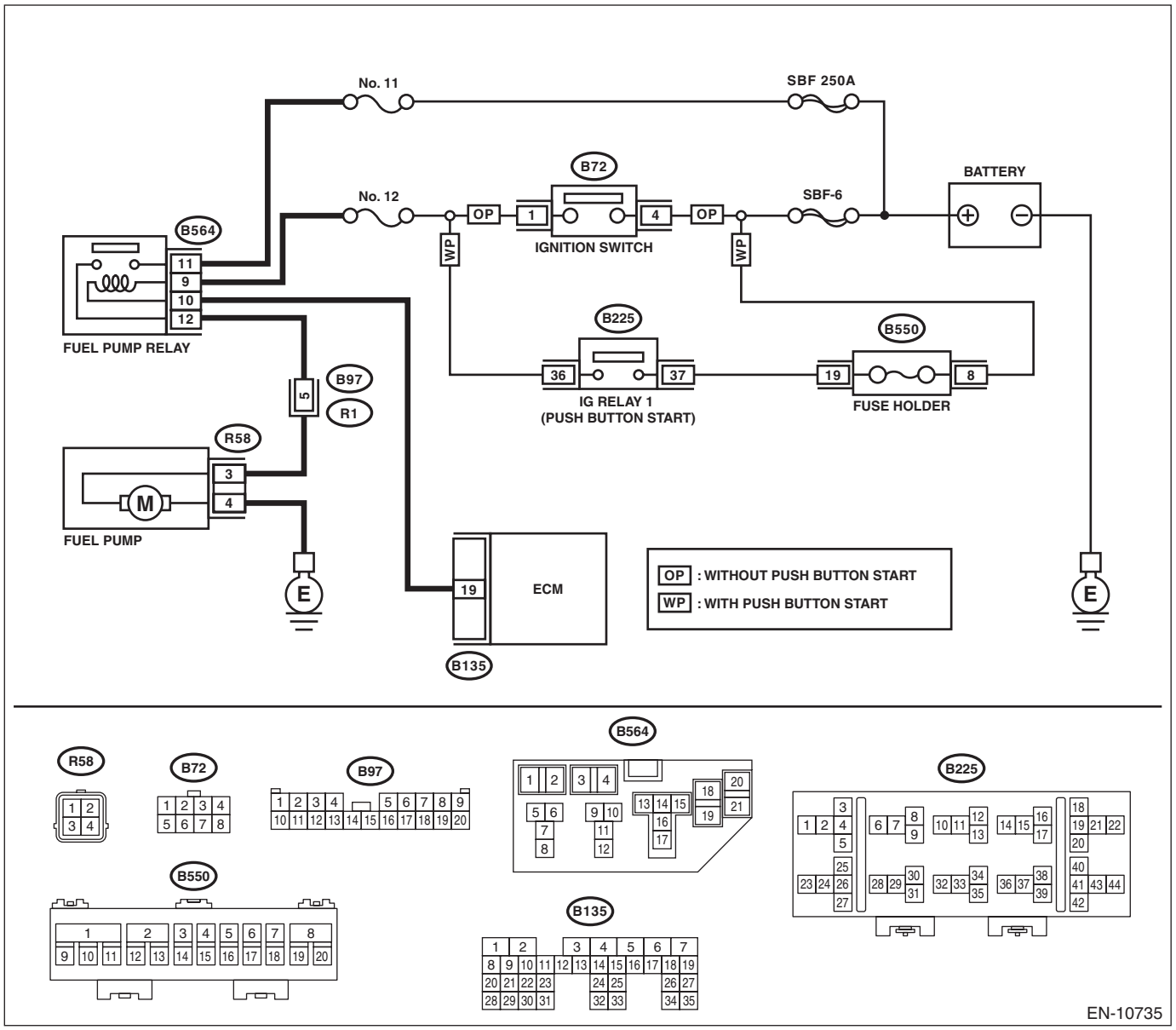
Step		Check	Yes	No
1	**CHECK SPARK PLUG CONDITION.** 1) Remove the spark plug. <Ref. to IG(H4DO(w/o HEV))-4, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H4DO(w/o HEV))-7, INSPECTION, Spark Plug.>	Is the spark plug condition normal?	Go to step **2**.	Replace the spark plug. <Ref. to IG(H4DO(w/o HEV))-4, Spark Plug.>

	Step	Check	Yes	No
2	**CHECK IGNITION SYSTEM FOR SPARKS.** 1) Connect the spark plug to ignition coil. 2) Release the fuel pressure. <Ref. to FU(H4DO(HEV))-99, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.> 3) Contact the spark plug thread portion to engine. 4) While opening the throttle valve fully, crank the engine to check that spark occurs at each cylinder.	Does spark occur at each cylinder?	Check fuel pump system. <Ref. to EN(H4DO HEV)(diag)-88, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **3**.
3	**CHECK IGNITION COIL POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil. 3) Turn the ignition switch to ON. 4) Measure the voltage between ignition coil connector and engine ground. ***Connector & terminal*** ***(E31) No. 1 (+) — Engine ground (–):*** ***(E32) No. 1 (+) — Engine ground (–):*** ***(E33) No. 1 (+) — Engine ground (–):*** ***(E34) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open or short to ground in harness of power supply circuit • Poor contact of coupling connector • Blown out of fuse
4	**CHECK HARNESS OF IGNITION COIL GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between ignition coil connector and engine ground. ***Connector & terminal*** ***(E31) No. 3 — Engine ground:*** ***(E32) No. 3 — Engine ground:*** ***(E33) No. 3 — Engine ground:*** ***(E34) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair the open circuit in harness between ignition coil connector and engine grounding terminal.
5	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and ignition coil connector. ***Connector & terminal*** ***(B134) No. 21 — (E31) No. 2:*** ***(B134) No. 10 — (E32) No. 2:*** ***(B134) No. 31 — (E33) No. 2:*** ***(B134) No. 8 — (E34) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and the ignition coil connector • Poor contact of coupling connector
6	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.** Measure the resistance of harness between ECM connector and engine ground. ***Connector & terminal:*** ***(B134) No. 21 — Engine ground:*** ***(B134) No. 10 — Engine ground:*** ***(B134) No. 31 — Engine ground:*** ***(B134) No. 8 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair the ground short circuit of harness between ECM connector and ignition coil connector.
7	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Replace the ignition coil. <Ref. to IG(H4DO(w/o HEV))-12, Ignition Coil.>

E: FUEL PUMP CIRCUIT

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



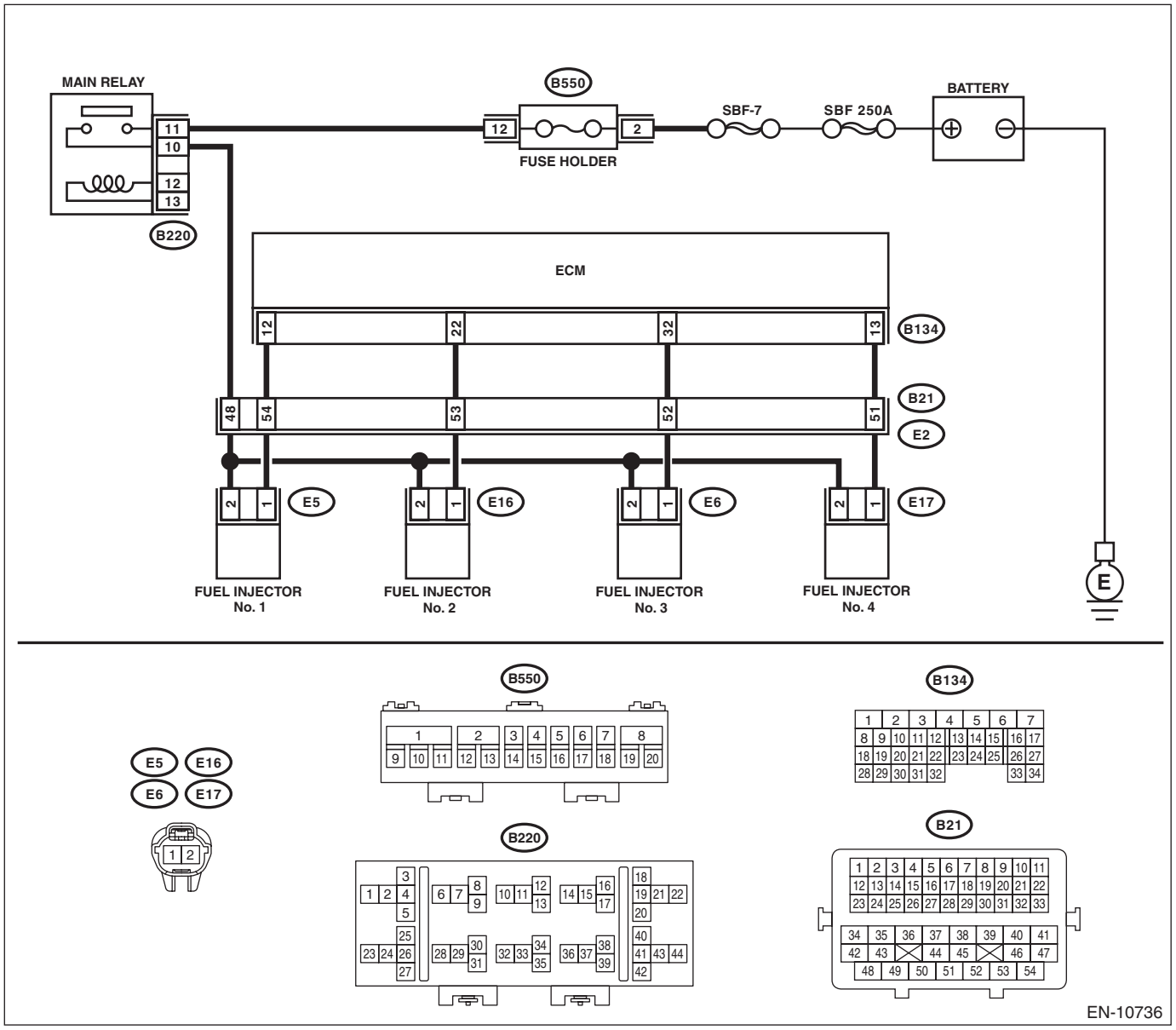
Step		Check	Yes	No
1	**CHECK OPERATING SOUND OF FUEL PUMP.** Check if the fuel pump operates for two seconds when turning the ignition switch to ON. NOTE: Fuel pump operation can be executed using the Subaru Select Monitor. For detailed operation procedures, refer to the "Active Test". <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>	Does the fuel pump emit operating sound?	Check the fuel injector circuit. <Ref. to EN(H4DO HEV)(diag)-90, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK GROUND CIRCUIT OF FUEL PUMP.** 1) Turn the ignition switch to OFF. 2) Remove the fuel pump access hole lid. 3) Disconnect the connector from fuel pump. 4) Measure the resistance of harness between fuel pump connector and chassis ground. ***Connector & terminal*** ***(R58) No. 4 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the open circuit in harness between fuel pump connector and chassis ground terminal.
3	**CHECK POWER SUPPLY TO FUEL PUMP.** 1) Turn the ignition switch to ON. 2) Measure the voltage of power supply circuit between fuel pump connector and chassis ground. ***Connector & terminal*** ***(R58) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the fuel pump. <Ref. to FU(H4DO(HEV))-123, Fuel Pump.>	Go to step **4**.
4	**CHECK HARNESS BETWEEN FUEL PUMP CONNECTOR AND FUEL PUMP RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Remove the fuel pump relay. 3) Measure the resistance of harness between fuel pump connector and fuel pump relay connector. ***Connector & terminal*** ***(R58) No. 3 — (B564) No. 12:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between fuel pump connector and fuel pump relay connector • Poor contact of coupling connector
5	**CHECK HARNESS BETWEEN FUEL PUMP CONNECTOR AND FUEL PUMP RELAY CONNECTOR.** Measure the resistance between fuel pump connector and chassis ground. ***Connector & terminal*** ***(R58) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit to ground in harness between fuel pump connector and fuel pump relay connector.
6	**CHECK FUEL PUMP RELAY.** 1) Connect the battery to fuel pump relay terminals No. 9 and No. 10. 2) Measure the resistance between fuel pump relay terminals. ***Terminals*** ***No. 11 — No. 12:***	Is the resistance less than 1 Ω?	Go to step **7**.	Replace the fuel pump relay. <Ref. to FU(H4DO(HEV))-97, Fuel Pump Relay.>
7	**CHECK HARNESS BETWEEN ECM AND FUEL PUMP RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and fuel pump relay connector. ***Connector & terminal*** ***(B135) No. 19 — (B564) No. 10:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair the open circuit of harness between ECM connector and fuel pump relay connector.
8	**CHECK POWER SUPPLY OF FUEL PUMP RELAY.** 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel pump relay connector and chassis ground. ***Connector & terminal*** ***(B564) No. 9 (+) — Chassis ground (–):*** ***(B564) No. 11 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Repair the open or ground short in the harness of power supply circuit.

F: FUEL INJECTOR CIRCUIT

CAUTION:
- **Check or repair only faulty parts.**
- **After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.**

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK OPERATION OF EACH FUEL INJECTOR.** While cranking the engine, check each fuel injector emits operating sound. Use a sound scope or attach a screwdriver to the injector to listen to sounds for this check.	Does the fuel injector emit operating sound?	Check the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO EACH FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between fuel injector terminal and engine ground. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay connector and fuel injector connector • Poor contact of main relay connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and fuel injector connector. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***#1 (B134) No. 12 — Chassis ground:*** ***#2 (B134) No. 22 — Chassis ground:*** ***#3 (B134) No. 32 — Chassis ground:*** ***#4 (B134) No. 13 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
5	**CHECK EACH FUEL INJECTOR.** Measure the resistance between each fuel injector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **6**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
6	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Inspection using “General Diagnostic Table” <Ref. to EN(H4DO HEV)(diag)-562, INSPECTION, General Diagnostic Table.>

16.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Note
B1570	ANTENNA	<Ref. to IM(diag)-16, DTC B1570 ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1571	REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM)	<Ref. to IM(diag)-18, DTC B1571 REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1572	IMM CIRCUIT EXCEPT ANTENNA CIRCUIT	<Ref. to IM(diag)-19, DTC B1572 IMM CIRCUIT EXCEPT ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1574	KEY COMMUNICATION	<Ref. to IM(diag)-22, DTC B1574 KEY COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1575	INCORRECT IMMOBILIZER KEY	<Ref. to IM(diag)-23, DTC B1575 INCORRECT IMMOBILIZER KEY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1576	EGI CONTROL MODULE EEPROM	<Ref. to IM(diag)-23, DTC B1576 EGI CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1577	IMM CONTROL MODULE EEPROM	<Ref. to IM(diag)-24, DTC B1577 IMM CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1578	METER	<Ref. to IM(diag)-24, DTC B1578 METER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000A	"A" CAMSHAFT POSITION SLOW RESPONSE BANK 1	<Ref. to EN(H4DO HEV)(diag)-102, DTC P000A "A" CAMSHAFT POSITION SLOW RESPONSE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000B	"B" CAMSHAFT POSITION SLOW RESPONSE BANK 1	<Ref. to EN(H4DO HEV)(diag)-103, DTC P000B "B" CAMSHAFT POSITION SLOW RESPONSE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000C	"A" CAMSHAFT POSITION SLOW RESPONSE BANK 2	<Ref. to EN(H4DO HEV)(diag)-104, DTC P000C "A" CAMSHAFT POSITION SLOW RESPONSE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000D	"B" CAMSHAFT POSITION SLOW RESPONSE BANK 2	<Ref. to EN(H4DO HEV)(diag)-104, DTC P000D "B" CAMSHAFT POSITION SLOW RESPONSE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0010	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	<Ref. to EN(H4DO HEV)(diag)-105, DTC P0010 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0011	"A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1	<Ref. to EN(H4DO HEV)(diag)-108, DTC P0011 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0013	"B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1	<Ref. to EN(H4DO HEV)(diag)-110, DTC P0013 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0014	"B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1	<Ref. to EN(H4DO HEV)(diag)-113, DTC P0014 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0016	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A	<Ref. to EN(H4DO HEV)(diag)-115, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0017	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B	<Ref. to EN(H4DO HEV)(diag)-118, DTC P0017 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0018	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR A	<Ref. to EN(H4DO HEV)(diag)-121, DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR A, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0019	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR B	<Ref. to EN(H4DO HEV)(diag)-123, DTC P0019 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR B, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0020	"A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	<Ref. to EN(H4DO HEV)(diag)-125, DTC P0020 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0021	"A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2	<Ref. to EN(H4DO HEV)(diag)-128, DTC P0021 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0023	"B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2	<Ref. to EN(H4DO HEV)(diag)-130, DTC P0023 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0024	"B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2	<Ref. to EN(H4DO HEV)(diag)-133, DTC P0024 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0030	A/F / O2 HEATER CONTROL CIRCUIT BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-135, DTC P0030 A/F / O2 HEATER CONTROL CIRCUIT BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0031	A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-138, DTC P0031 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0032	A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-141, DTC P0032 A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0037	A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-144, DTC P0037 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0038	A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-147, DTC P0038 A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0068	MAP/MAF - THROTTLE POSITION CORRELATION	<Ref. to EN(H4DO HEV)(diag)-150, DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0071	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-153, DTC P0071 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW	<Ref. to EN(H4DO HEV)(diag)-156, DTC P0072 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" HIGH	<Ref. to EN(H4DO HEV)(diag)-158, DTC P0073 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0101	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-159, DTC P0101 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0102	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-161, DTC P0102 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0103	MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-164, DTC P0103 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0107	MANIFOLD ABSOLUTE PRESSURE/ BAROMETRIC PRESSURE SENSOR CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-167, DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0108	MANIFOLD ABSOLUTE PRESSURE/ BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-170, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0111	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE BANK 1	<Ref. to EN(H4DO HEV)(diag)-173, DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Note
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW BANK 1	<Ref. to EN(H4DO HEV)(diag)-178, DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH BANK 1	<Ref. to EN(H4DO HEV)(diag)-181, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0116	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-184, DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0117	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-187, DTC P0117 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0118	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-190, DTC P0118 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-193, DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-196, DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0125	INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL	<Ref. to EN(H4DO HEV)(diag)-199, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0128	COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)	<Ref. to EN(H4DO HEV)(diag)-201, DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0131	A/F / O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-206, DTC P0131 A/F / O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0132	A/F / O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-209, DTC P0132 A/F / O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0134	A/F / O2 SENSOR CIRCUIT NO ACTIVITY DETECTED BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-212, DTC P0134 A/F / O2 SENSOR CIRCUIT NO ACTIVITY DETECTED BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0137	O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-215, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0138	O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-219, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013A	O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-222, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013B	O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-226, DTC P013B O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013E	O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-228, DTC P013E O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013F	O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-230, DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0141	O2 SENSOR HEATER CIRCUIT BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-232, DTC P0141 O2 SENSOR HEATER CIRCUIT BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P014C	A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-233, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P014D	A/F / O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-236, DTC P014D A/F / O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P015A	A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-237, DTC P015A A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P015B	A/F / O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-240, DTC P015B A/F / O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0171	SYSTEM TOO LEAN BANK 1	<Ref. to EN(H4DO HEV)(diag)-241, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0172	SYSTEM TOO RICH BANK 1	<Ref. to EN(H4DO HEV)(diag)-242, DTC P0172 SYSTEM TOO RICH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0196	ENGINE OIL TEMPERATURE SENSOR "A" RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-245, DTC P0196 ENGINE OIL TEMPERATURE SENSOR "A" RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0197	ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-249, DTC P0197 ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0198	ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-252, DTC P0198 ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0201	CYLINDER 1 INJECTOR "A" CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-255, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0202	CYLINDER 2 INJECTOR "A" CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-258, DTC P0202 CYLINDER 2 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0203	CYLINDER 3 INJECTOR "A" CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-258, DTC P0203 CYLINDER 3 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0204	CYLINDER 4 INJECTOR "A" CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-258, DTC P0204 CYLINDER 4 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0222	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-259, DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0223	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-262, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED	<Ref. to EN(H4DO HEV)(diag)-265, DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0301	CYLINDER 1 MISFIRE DETECTED	<Ref. to EN(H4DO HEV)(diag)-269, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0302	CYLINDER 2 MISFIRE DETECTED	<Ref. to EN(H4DO HEV)(diag)-275, DTC P0302 CYLINDER 2 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0303	CYLINDER 3 MISFIRE DETECTED	<Ref. to EN(H4DO HEV)(diag)-275, DTC P0303 CYLINDER 3 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0304	CYLINDER 4 MISFIRE DETECTED	<Ref. to EN(H4DO HEV)(diag)-276, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0327	KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT LOW BANK 1 OR SINGLE SENSOR	<Ref. to EN(H4DO HEV)(diag)-280, DTC P0327 KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT LOW BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0328	KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT HIGH BANK 1 OR SINGLE SENSOR	<Ref. to EN(H4DO HEV)(diag)-283, DTC P0328 KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT HIGH BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0335	CRANKSHAFT POSITION SENSOR "A" CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-286, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0336	CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-290, DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0340	CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR	<Ref. to EN(H4DO HEV)(diag)-293, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0341	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR	<Ref. to EN(H4DO HEV)(diag)-297, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0345	CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2	<Ref. to EN(H4DO HEV)(diag)-298, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0346	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 2	<Ref. to EN(H4DO HEV)(diag)-300, DTC P0346 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0351	IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO HEV)(diag)-301, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0352	IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO HEV)(diag)-304, DTC P0352 IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0353	IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO HEV)(diag)-304, DTC P0353 IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0354	IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO HEV)(diag)-304, DTC P0354 IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0365	CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1	<Ref. to EN(H4DO HEV)(diag)-305, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0366	CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1	<Ref. to EN(H4DO HEV)(diag)-308, DTC P0366 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0390	CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2	<Ref. to EN(H4DO HEV)(diag)-309, DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0391	CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 2	<Ref. to EN(H4DO HEV)(diag)-311, DTC P0391 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0400	EGR "A" FLOW	<Ref. to EN(H4DO HEV)(diag)-312, DTC P0400 EGR "A" FLOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0420	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD BANK 1	<Ref. to EN(H4DO HEV)(diag)-315, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0441	EVAP SYSTEM (CPC) INCORRECT PURGE FLOW	<Ref. to EN(H4DO HEV)(diag)-323, DTC P0441 EVAP SYSTEM (CPC) INCORRECT PURGE FLOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0451	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-327, DTC P0451 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0452	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-329, DTC P0452 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0453	EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-332, DTC P0453 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0455	EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK)	<Ref. to EN(H4DO HEV)(diag)-335, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0456	EVAP SYSTEM (CPC) LEAK DETECTED (VERY SMALL LEAK)	<Ref. to EN(H4DO HEV)(diag)-342, DTC P0456 EVAP SYSTEM (CPC) LEAK DETECTED (VERY SMALL LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0458	EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-343, DTC P0458 EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0459	EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-346, DTC P0459 EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0461	FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-349, DTC P0461 FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0462	FUEL LEVEL SENSOR "A" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-351, DTC P0462 FUEL LEVEL SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0463	FUEL LEVEL SENSOR "A" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-352, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0500	VEHICLE SPEED SENSOR "A" CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-354, DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0506	IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED	<Ref. to EN(H4DO HEV)(diag)-355, DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0507	IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED	<Ref. to EN(H4DO HEV)(diag)-357, DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P050A	COLD START IDLE CONTROL SYSTEM PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-359, DTC P050A COLD START IDLE CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P050B	COLD START IGNITION TIMING PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-370, DTC P050B COLD START IGNITION TIMING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0512	STARTER (SWITCH) REQUEST CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-371, DTC P0512 STARTER (SWITCH) REQUEST CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0560	SYSTEM VOLTAGE	<Ref. to EN(H4DO HEV)(diag)-374, DTC P0560 SYSTEM VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P059A	ACTIVE GRILLE AIR SHUTTER "A" POSITION SENSOR CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-376, DTC P059A ACTIVE GRILLE AIR SHUTTER "A" POSITION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P059F	ACTIVE GRILLE AIR SHUTTER "A" PERFORMANCE/STUCK OFF	<Ref. to EN(H4DO HEV)(diag)-378, DTC P059F ACTIVE GRILLE AIR SHUTTER "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P05A0	ACTIVE GRILLE AIR SHUTTER "A" STUCK ON	<Ref. to EN(H4DO HEV)(diag)-381, DTC P05A0 ACTIVE GRILLE AIR SHUTTER "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P05A1	ACTIVE GRILLE AIR SHUTTER "A" POSITION SENSOR MINIMUM/MAXIMUM STOP PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-383, DTC P05A1 ACTIVE GRILLE AIR SHUTTER "A" POSITION SENSOR MINIMUM/MAXIMUM STOP PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Note
P05A2	ACTIVE GRILLE AIR SHUTTER "A" CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO HEV)(diag)-385, DTC P05A2 ACTIVE GRILLE AIR SHUTTER "A" CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P05A6	ACTIVE GRILLE AIR SHUTTER "A" SUPPLY VOLTAGE CIRCUIT/OPEN	<Ref. to EN(H4DO HEV)(diag)-387, DTC P05A6 ACTIVE GRILLE AIR SHUTTER "A" SUPPLY VOLTAGE CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P05C0	ACTIVE GRILLE AIR SHUTTER MODULE "A" OVER TEMPERATURE	<Ref. to EN(H4DO HEV)(diag)-390, DTC P05C0 ACTIVE GRILLE AIR SHUTTER MODULE "A" OVER TEMPERATURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	<Ref. to EN(H4DO HEV)(diag)-392, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	<Ref. to EN(H4DO HEV)(diag)-393, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0606	CONTROL MODULE PROCESSOR	<Ref. to EN(H4DO HEV)(diag)-394, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P060A	INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-398, DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P060B	INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-400, DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0616	STARTER RELAY "A" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-402, DTC P0616 STARTER RELAY "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0617	STARTER RELAY "A" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-405, DTC P0617 STARTER RELAY "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	<Ref. to EN(H4DO HEV)(diag)-409, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0685	ECM/PCM POWER RELAY CONTROL CIRCUIT/OPEN	<Ref. to EN(H4DO HEV)(diag)-411, DTC P0685 ECM/PCM POWER RELAY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0700	TRANSMISSION CONTROL SYSTEM (MIL REQUEST)	<Ref. to EN(H4DO HEV)(diag)-413, DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P081A	STARTER DISABLE CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-414, DTC P081A STARTER DISABLE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-417, DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0852	PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-419, DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A7B	BATTERY ENERGY CONTROL MODULE REQUEST MIL ILLUMINATION	<Ref. to EN(H4DO HEV)(diag)-421, DTC P0A7B BATTERY ENERGY CONTROL MODULE REQUEST MIL ILLUMINATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AC4	HYBRID POWERTRAIN CONTROL MODULE REQUEST MIL ILLUMINATION	<Ref. to EN(H4DO HEV)(diag)-421, DTC P0AC4 HYBRID POWERTRAIN CONTROL MODULE REQUEST MIL ILLUMINATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0CA1	DRIVE MOTOR CONTROL MODULE REQUEST MIL ILLUMINATION	<Ref. to EN(H4DO HEV)(diag)-422, DTC P0CA1 DRIVE MOTOR CONTROL MODULE REQUEST MIL ILLUMINATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1160	THROTTLE RETURN SPRING	<Ref. to EN(H4DO HEV)(diag)-423, DTC P1160 THROTTLE RETURN SPRING, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P1449	EVAP SYSTEM CLOG DETECTED (AIR FILTER)	<Ref. to EN(H4DO HEV)(diag)-424, DTC P1449 EVAP SYSTEM CLOG DETECTED (AIR FILTER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1451	EVAP SYSTEM CLOG DETECTED (PIPE)	<Ref. to EN(H4DO HEV)(diag)-426, DTC P1451 EVAP SYSTEM CLOG DETECTED (PIPE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1492	COIL 1 EGR "A" CONTROL CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-427, DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1493	COIL 1 EGR "A" CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-428, DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1494	COIL 2 EGR "A" CONTROL CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-429, DTC P1494 COIL 2 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1495	COIL 2 EGR "A" CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-429, DTC P1495 COIL 2 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1496	COIL 3 EGR "A" CONTROL CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-429, DTC P1496 COIL 3 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1497	COIL 3 EGR "A" CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-429, DTC P1497 COIL 3 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1498	COIL 4 EGR "A" CONTROL CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-430, DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1499	COIL 4 EGR "A" CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-432, DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2004	TGV CONTROL STUCK OPEN BANK 1	<Ref. to EN(H4DO HEV)(diag)-434, DTC P2004 TGV CONTROL STUCK OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2005	TGV CONTROL STUCK OPEN BANK 2	<Ref. to EN(H4DO HEV)(diag)-435, DTC P2005 TGV CONTROL STUCK OPEN BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2006	TGV CONTROL STUCK CLOSED BANK 1	<Ref. to EN(H4DO HEV)(diag)-436, DTC P2006 TGV CONTROL STUCK CLOSED BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2007	TGV CONTROL STUCK CLOSED BANK 2	<Ref. to EN(H4DO HEV)(diag)-437, DTC P2007 TGV CONTROL STUCK CLOSED BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2009	TGV CONTROL CIRCUIT LOW BANK 1	<Ref. to EN(H4DO HEV)(diag)-438, DTC P2009 TGV CONTROL CIRCUIT LOW BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2012	TGV CONTROL CIRCUIT LOW BANK 2	<Ref. to EN(H4DO HEV)(diag)-440, DTC P2012 TGV CONTROL CIRCUIT LOW BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2096	POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1	<Ref. to EN(H4DO HEV)(diag)-442, DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2097	POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1	<Ref. to EN(H4DO HEV)(diag)-449, DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2101	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-456, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2102	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-462, DTC P2102 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2103	THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-465, DTC P2103 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2109	THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-468, DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2119	THROTTLE ACTUATOR "A" CONTROL THROTTLE BODY RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-469, DTC P2119 THROTTLE ACTUATOR "A" CONTROL THROTTLE BODY RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Note
P2122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-472, DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-475, DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2127	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-478, DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2128	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-481, DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2135	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION	<Ref. to EN(H4DO HEV)(diag)-484, DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2138	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION	<Ref. to EN(H4DO HEV)(diag)-488, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2195	A/F /O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-492, DTC P2195 A/F /O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2196	A/F /O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 1	<Ref. to EN(H4DO HEV)(diag)-495, DTC P2196 A/F /O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P219A	BANK 1 AIR-FUEL RATIO IMBALANCE	<Ref. to EN(H4DO HEV)(diag)-498, DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2270	O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-513, DTC P2270 O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2271	O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 2	<Ref. to EN(H4DO HEV)(diag)-516, DTC P2271 O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2401	EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-519, DTC P2401 EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2402	EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-522, DTC P2402 EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2404	EVAP SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-525, DTC P2404 EVAP SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2419	EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW	<Ref. to EN(H4DO HEV)(diag)-529, DTC P2419 EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2420	EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH	<Ref. to EN(H4DO HEV)(diag)-532, DTC P2420 EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2530	IGNITION SWITCH RUN POSITION CIRCUIT	<Ref. to EN(H4DO HEV)(diag)-535, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2610	ECM/PCM ENGINE OFF TIMER PERFORMANCE	<Ref. to EN(H4DO HEV)(diag)-538, DTC P2610 ECM/PCM ENGINE OFF TIMER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	<Ref. to EN(H4DO HEV)(diag)-547, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
U0075	CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF	<Ref. to EN(H4DO HEV)(diag)-548, DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	<Ref. to EN(H4DO HEV)(diag)-549, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	<Ref. to EN(H4DO HEV)(diag)-550, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	<Ref. to EN(H4DO HEV)(diag)-550, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0284	LOST COMMUNICATION WITH ACTIVE GRILLE SHUTTER MODULE "A"	<Ref. to EN(H4DO HEV)(diag)-551, DTC U0284 LOST COMMUNICATION WITH ACTIVE GRILLE SHUTTER MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE	<Ref. to EN(H4DO HEV)(diag)-554, DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	<Ref. to EN(H4DO HEV)(diag)-555, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	<Ref. to EN(H4DO HEV)(diag)-556, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	<Ref. to EN(H4DO HEV)(diag)-556, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE	<Ref. to EN(H4DO HEV)(diag)-557, DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1101	LOST COMMUNICATION WITH TCM PU-CAN	<Ref. to EN(H4DO HEV)(diag)-558, DTC U1101 LOST COMMUNICATION WITH TCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN	<Ref. to EN(H4DO HEV)(diag)-559, DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1402	INVALID DATA RECEIVED FROM TCM PU-CAN	<Ref. to EN(H4DO HEV)(diag)-560, DTC U1402 INVALID DATA RECEIVED FROM TCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN	<Ref. to EN(H4DO HEV)(diag)-561, DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

17.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P000A "A" CAMSHAFT POSITION SLOW RESPONSE BANK 1

NOTE:
For the diagnostic procedure, refer to DTC P0011. <Ref. to EN(H4DO HEV)(diag)-108, DTC P0011 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the AVCS system malfunction.
Judge NG when the amount of AVCS actual timing advance does not approach to the amount of AVCS target timing advance.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
AVCS control	In operation
Absolute value	
Target timing advance change amount (per 64 ms)	< 3.2 °CA

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the engine speed increases and AVCS operates.

4. DIAGNOSTIC METHOD

When the differences of target timing advance amount and actual timing advance amount is calculated during AVCS control, and the difference per predetermined time is the specified value or larger.
Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value Σ(Target position – Actual position)	 > 4000 °CA (Bank 1) > 4000 °CA (Bank 2)

Time Needed for Diagnosis: 25000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

B: DTC P000B "B" CAMSHAFT POSITION SLOW RESPONSE BANK 1

NOTE:
For the diagnostic procedure, refer to DTC P0014. <Ref. to EN(H4DO HEV)(diag)-113, DTC P0014 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the exhaust AVCS system malfunction.
Judge NG when the amount of exhaust AVCS actual timing advance does not approach the amount of exhaust AVCS target timing advance.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Exhaust AVCS control	In operation
Absolute value Target timing advance change amount (per 64 ms)	< 3.2 °CA

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the engine speed increases and exhaust AVCS operates.

4. DIAGNOSTIC METHOD

When the differences of target timing advance amount and actual timing advance amount is calculated during exhaust AVCS control, and the difference per predetermined time is the specified value or larger.
Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value Σ(Target position – Actual position)	> 4000 °CA (Bank 1) > 4000 °CA (Bank 2)

Time Needed for Diagnosis: 25000 ms

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

C: DTC P000C "A" CAMSHAFT POSITION SLOW RESPONSE BANK 2

NOTE:
For the diagnostic procedure, refer to DTC P0021. <Ref. to EN(H4DO HEV)(diag)-128, DTC P0021 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to P000A. <Ref. to EN(H4DO HEV)(diag)-102, DTC P000A "A" CAMSHAFT POSITION SLOW RESPONSE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

D: DTC P000D "B" CAMSHAFT POSITION SLOW RESPONSE BANK 2

NOTE:
For the diagnostic procedure, refer to DTC P0024. <Ref. to EN(H4DO HEV)(diag)-133, DTC P0024 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

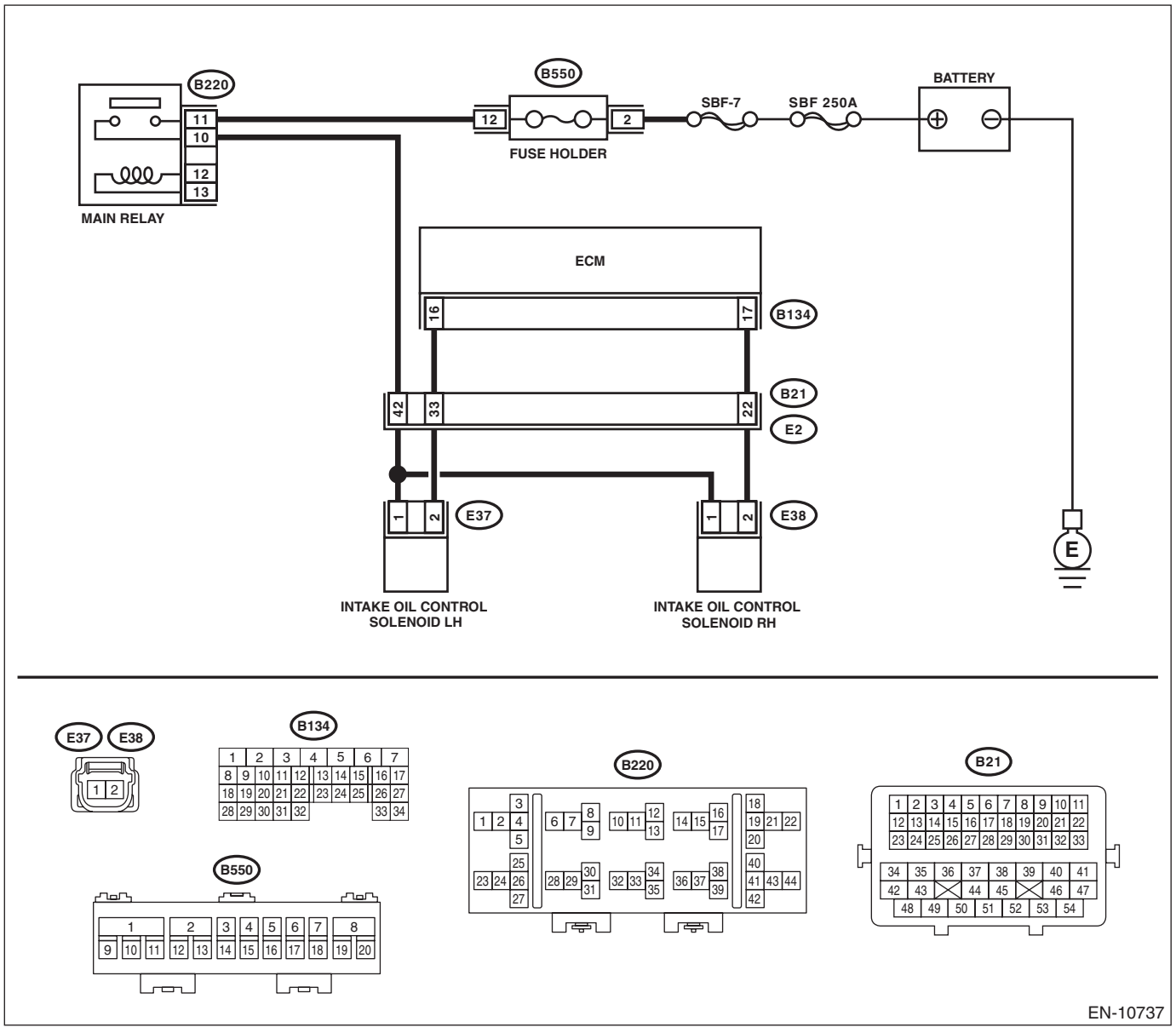
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to P000B. <Ref. to EN(H4DO HEV)(diag)-103, DTC P000B "B" CAMSHAFT POSITION SLOW RESPONSE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

E: DTC P0010 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/ OPEN BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO THE INTAKE OIL CONTROL SOLENOID RH.** Measure the voltage between intake oil control solenoid RH connector and engine ground. ***Connector & terminal*** ***(E38) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID RH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and intake oil control solenoid RH. 3) Measure the resistance between intake oil control solenoid RH connector and engine ground. ***Connector & terminal*** ***(E38) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and intake oil control solenoid RH connector.
5	**CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID RH CONNECTOR.** Measure the resistance of harness between ECM connector and intake oil control solenoid RH. ***Connector & terminal*** ***(B134) No. 17 — (E38) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and intake oil control solenoid RH connector • Poor contact of coupling connector
6	**CHECK INTAKE OIL CONTROL SOLENOID RH.** Measure the resistance between intake oil control solenoid RH terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 6 — 12 Ω?	Repair the poor contact of intake oil control solenoid RH connector.	Replace the intake oil control solenoid RH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the oil control solenoid.
Judge as NG when the current is small even though the duty signal is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Oil control solenoid control duty	≥ 99.61 %

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Oil control solenoid control present current	< 0.306 A

Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

F: DTC P0011 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**IDENTIFYING FAULTY PART.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Replace the defective oil control solenoid by the other (RH or LH, intake side or exhaust side) oil control solenoid. 3) Perform appropriate drive cycle test. <Ref. to EN(H4DO HEV)(diag)-55, Drive Cycle.> 4) Make sure that the fault occurrence (DTC and incorrect advancing) has shifted to the other location.	Did the detected DTC shift to the location where the oil control solenoid was replaced?	Replace the faulty oil control solenoid.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Start the engine and let it idle. 2) Read the value of «VVT Adv. Ang. Amount R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «VVT Adv. Ang. Amount R» approx. 0 deg?	Go to step **3**.	Check the following item and repair or replace if necessary. • Intake cam sprocket (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)
3	**CHECK CURRENT DATA.** 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «OCV Duty R» and «VVT Adv. Ang. Amount R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	When the value of «OCV Duty R» increases more than 10%, is the value of «VVT Adv. Ang. Amount R» approx. 0 deg?	Check the following item and repair or replace if necessary. • Intake cam sprocket (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

1. OUTLINE OF DIAGNOSIS

Detect the AVCS system malfunction.
Judge as NG when the conditions during which the differences of AVCS target timing advance amount and AVCS actual timing advance amount is large continues.

2. EXECUTION CONDITION

- Normal

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
AVCS control	In operation

- Intermediate lock

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Engine speed	≥ 500 rpm
Elapsed time after starting the engine	> 500 ms > and ≤ Value from Map

Map

Engine coolant temperature at engine starting °C (°F)	-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Time elapsed after engine start ms	10000	10000	10000	8000	5000	3500	2800	2800

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Time elapsed after engine start ms	2800	2800	2800	2800	2800	2800	2800	2800

3. GENERAL DRIVING CYCLE

- Normal

Perform the diagnosis continuously when the engine speed increases and AVCS operates.

- Intermediate lock

Perform the diagnosis when the AVCS is carrying out the intermediate lock control at the engine start.

4. DIAGNOSTIC METHOD

When the conditions during which the differences of AVCS target timing advance amount and AVCS actual timing advance amount is large continues for certain amount of time.
Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
• Normal Absolute value (Target position – Actual position)	> 10 °CA
• Intermediate lock Absolute value (Target position – Actual position)	> 10 °CA

Time Needed for Diagnosis:

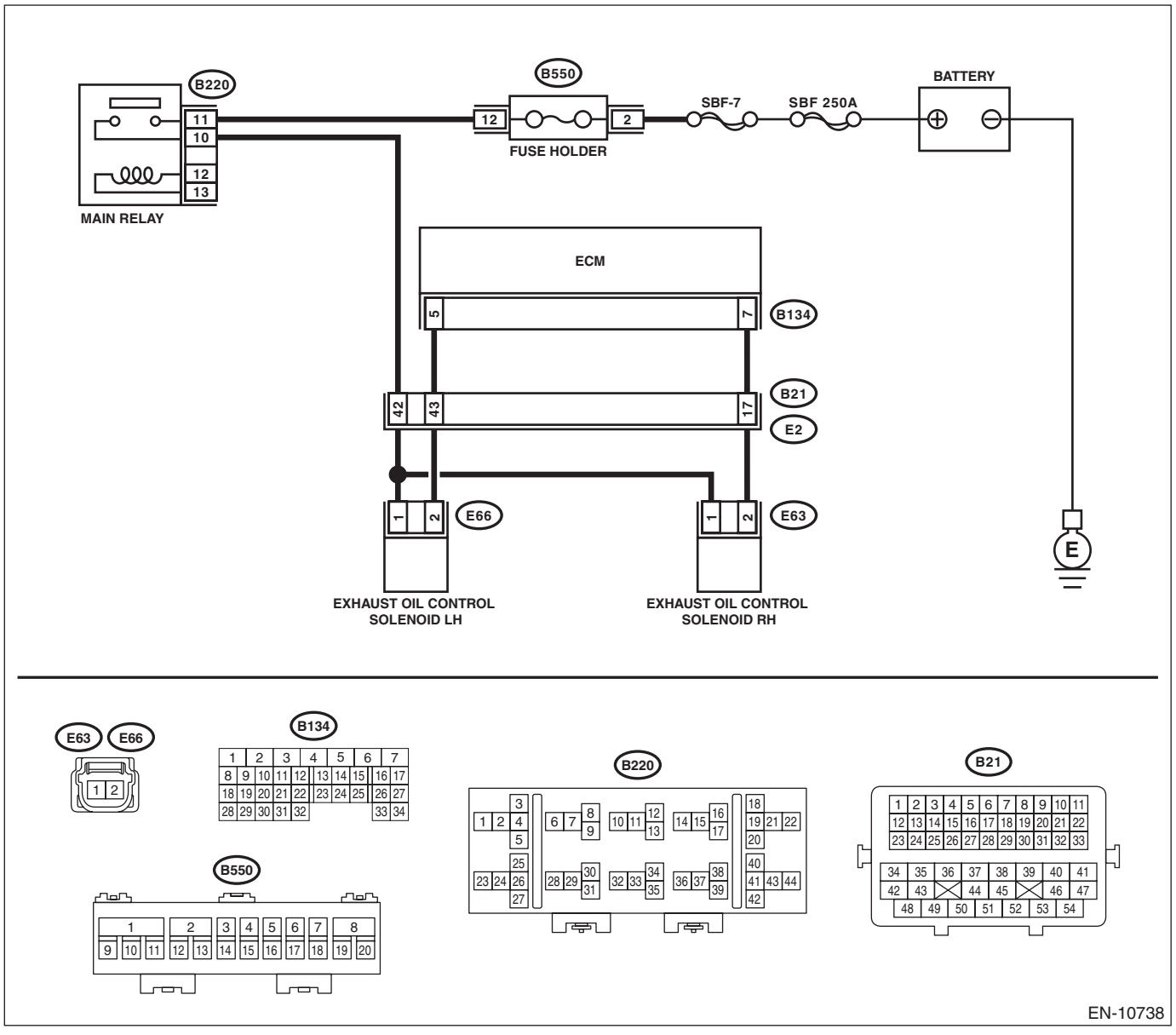
- Normal: 10000 ms
- Intermediate lock: 2000 ms

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

G: DTC P0013 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/ OPEN BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 7 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO THE EXHAUST OIL CONTROL SOLENOID RH.** Measure the voltage between exhaust oil control solenoid RH connector and engine ground. ***Connector & terminal*** ***(E63) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND EXHAUST OIL CONTROL SOLENOID RH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and exhaust oil control solenoid RH. 3) Measure the resistance between exhaust oil control solenoid RH connector and engine ground. ***Connector & terminal*** ***(E63) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and exhaust oil control solenoid RH connector.
5	**CHECK HARNESS BETWEEN ECM AND EXHAUST OIL CONTROL SOLENOID RH CONNECTOR.** Measure the resistance of harness between ECM connector and exhaust oil control solenoid RH. ***Connector & terminal*** ***(B134) No. 7 — (E63) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and exhaust oil control solenoid RH connector • Poor contact of coupling connector

Step		Check	Yes	No
6	**CHECK EXHAUST OIL CONTROL SOLENOID RH.** Measure the resistance between exhaust oil control solenoid RH terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 6 — 12 Ω?	Repair the poor contact of exhaust oil control solenoid RH connector.	Replace the exhaust oil control solenoid RH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the oil control solenoid.
Judge as NG when the current is small even though the duty signal is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Oil control solenoid control duty	≥ 99.61 %

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Oil control solenoid control present current	< 0.306 A

Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

H: DTC P0014 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**IDENTIFYING FAULTY PART.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Replace the defective oil control solenoid by the other (RH or LH, intake side or exhaust side) oil control solenoid. 3) Perform appropriate drive cycle test. <Ref. to EN(H4DO HEV)(diag)-55, Drive Cycle.> 4) Make sure that the fault occurrence (DTC and incorrect advancing) has shifted to the other location.	Did the detected DTC shift to the location where the oil control solenoid was replaced?	Replace the faulty oil control solenoid.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Start the engine and let it idle. 2) Read the value of «Exh. VVT Retard Ang. R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Exh. VVT Retard Ang. R» approx. 0 deg?	Go to step **3**.	Check the following item and repair or replace if necessary. • Exhaust cam sprocket (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)
3	**CHECK CURRENT DATA.** 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «Exh. OCV Duty R» and «Exh. VVT Retard Ang. R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	When the value of «Exh. OCV Duty R» increases more than 10%, is the value of «Exh. VVT Retard Ang. R» approx. 0 deg?	Check the following item and repair or replace if necessary. • Exhaust cam sprocket (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

1. OUTLINE OF DIAGNOSIS

Detect the exhaust AVCS system malfunction.
Judge as NG when the conditions during which the differences of exhaust AVCS target timing advance amount and exhaust AVCS actual timing advance amount is large continues.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Exhaust AVCS control	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the engine speed increases and exhaust AVCS operates.

4. DIAGNOSTIC METHOD

When the conditions during which the differences of exhaust AVCS target timing advance amount and exhaust AVCS actual timing advance amount is large continues for certain amount of time.
Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Target position – Actual position)	> 10 °CA

Time Needed for Diagnosis: 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

I: DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is DTC other than P0016, P0017, P0018 or P0019 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK INTAKE OIL CONTROL SOLENOID RH.** Check the intake oil control solenoid RH. <Ref. to FU(H4DO(HEV))-59, INSPECTION, Oil Control Solenoid.>	Is the intake oil control solenoid RH normal?	Go to step **3**.	Replace the intake oil control solenoid RH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step **4**.	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>
4	**CHECK CAM CARRIER FILTER.** Check the filter installed to the cam carrier. <Ref. to ME(H4DO(w/o HEV))-261, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the intake cam sprocket RH. <Ref. to ME(H4DO(w/o HEV))-193, Cam Sprocket.> After the operation is complete, go to the next step. Go to step **5**.	Replace the cam carrier filter. <Ref. to ME(H4DO(w/o HEV))-223, Cam Carrier.>

Step		Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Initial Position Learning Value #1» and «VVT Adv. Ang. Amount R» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. |«VVT Initial Position Learning Value #1» – (60 + «VVT Adv. Ang. Amount R»)|	Is the calculation result less than 10?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
6	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO HEV)(diag)-64, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	End.

1. OUTLINE OF DIAGNOSIS

Detect the AVCS system malfunction.
Judge as NG when standard timing advance amount is far from learning angle.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after external load (power steering, neutral position switch) change	≥ 3000 ms
AVCS position learning	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting engine and while AVCS is not operating.

4. DIAGNOSTIC METHOD

Judge as NG when the absolute value of the difference between cam signal input position and learning value is out of specification.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
• Shift by one tooth Absolute value Crankshaft position when camshaft position sensor signal is input – Learning value	> 10 °CA
• Shift by two teeth Actual camshaft angle (This monitoring will be executed at each bank. Base angle of camshaft = 60.5° CA 20° CA at each tooth)	< 29.05 °CA or > 87.73 °CA

Time Needed for Diagnosis: 400 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

NOTE:
Initial standard learning value is the value of crank angle initially input at the production plant. And then it will be updated every time normal judgment has been completed. Learning value will not be updated if NG judgment occurs because timing belt or chain derails suddenly in process or because wrong assembly occurs during servicing.

J: DTC P0017 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is DTC other than P0016, P0017, P0018 or P0019 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK EXHAUST OIL CONTROL SOLENOID RH.** Check the exhaust oil control solenoid RH. <Ref. to FU(H4DO(HEV))-59, INSPECTION, Oil Control Solenoid.>	Is the exhaust oil control solenoid RH normal?	Go to step **3**.	Replace the exhaust oil control solenoid RH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step **4**.	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>
4	**CHECK CAM CARRIER FILTER.** Check the filter installed to the cam carrier. <Ref. to ME(H4DO(w/o HEV))-261, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the exhaust cam sprocket RH. <Ref. to ME(H4DO(w/o HEV))-193, Cam Sprocket.> After the operation is complete, go to the next step. Go to step **5**.	Replace the cam carrier filter. <Ref. to ME(H4DO(w/o HEV))-223, Cam Carrier.>

	Step	Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Ex Initial Position Learning Value #1» and «Exh. VVT Retard Ang. R» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. |«VVT Ex Initial Position Learning Value #1» – (90 – «Exh. VVT Retard Ang. R»)|	Is the calculation result less than 10?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
6	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO HEV)(diag)-64, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	End.

1. OUTLINE OF DIAGNOSIS

Detect the exhaust AVCS system malfunction.
Judge as NG when standard timing advance amount is far from learning angle.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after external load (power steering, neutral position switch) change	≥ 3000 ms
Exhaust AVCS position learning	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously while the exhaust AVCS is not operating after warming up.

4. DIAGNOSTIC METHOD

Judge as NG when the absolute value of the difference between cam signal input position and learning value is out of specification.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
• Shift by one tooth Absolute value	
Crankshaft position when camshaft position sensor signal is input – Learning value	> 10 °CA
• Shift by two teeth	
Actual camshaft angle	< 63.9 °CA or > 121.64 °CA
(This monitoring will be executed at each bank. Base angle of camshaft = 89.5° CA 20° CA at each tooth)	

Time Needed for Diagnosis: 400 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

NOTE:
Initial standard learning value is the value of crank angle initially input at the production plant. And then it will be updated every time normal judgment has been completed. Learning value will not be updated if NG judgment occurs because timing belt or chain derails suddenly in process or because wrong assembly occurs during servicing.

K: DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR A

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is DTC other than P0016, P0017, P0018 or P0019 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK INTAKE OIL CONTROL SOLENOID LH.** Check the intake oil control solenoid LH. <Ref. to FU(H4DO(HEV))-59, INSPECTION, Oil Control Solenoid.>	Is the intake oil control solenoid LH normal?	Go to step **3**.	Replace the intake oil control solenoid LH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step **4**.	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>
4	**CHECK CAM CARRIER FILTER.** Check the filter installed to the cam carrier. <Ref. to ME(H4DO(w/o HEV))-261, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the intake cam sprocket LH. <Ref. to ME(H4DO(w/o HEV))-193, Cam Sprocket.> After the operation is complete, go to the next step. Go to step **5**.	Replace the cam carrier filter. <Ref. to ME(H4DO(w/o HEV))-223, Cam Carrier.>

	Step	Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Initial Position Learning Value #2» and «VVT Adv. Ang. Amount L» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. |«VVT Initial Position Learning Value #2» – (60 + «VVT Adv. Ang. Amount L»)|	Is the calculation result less than 10?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
6	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO HEV)(diag)-64, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	End.

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0016. <Ref. to EN(H4DO HEV)(diag)-115, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR A, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

L: DTC P0019 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR B

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is DTC other than P0016, P0017, P0018 or P0019 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK EXHAUST OIL CONTROL SOLENOID LH.** Check the exhaust oil control solenoid LH. <Ref. to FU(H4DO(HEV))-59, INSPECTION, Oil Control Solenoid.>	Is the exhaust oil control solenoid LH normal?	Go to step **3**.	Replace the exhaust oil control solenoid LH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step **4**.	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>
4	**CHECK CAM CARRIER FILTER.** Check the filter installed to the cam carrier. <Ref. to ME(H4DO(w/o HEV))-261, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the exhaust cam sprocket LH. <Ref. to ME(H4DO(w/o HEV))-193, Cam Sprocket.> After the operation is complete, go to the next step. Go to step **5**.	Replace the cam carrier filter. <Ref. to ME(H4DO(w/o HEV))-223, Cam Carrier.>

	Step	Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Ex Initial Position Learning Value #2» and «Exh. VVT Retard Ang. L» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. |«VVT Ex Initial Position Learning Value #2» – (90 – «Exh. VVT Retard Ang. L»)|	Is the calculation result less than 10?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
6	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO HEV)(diag)-64, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	End.

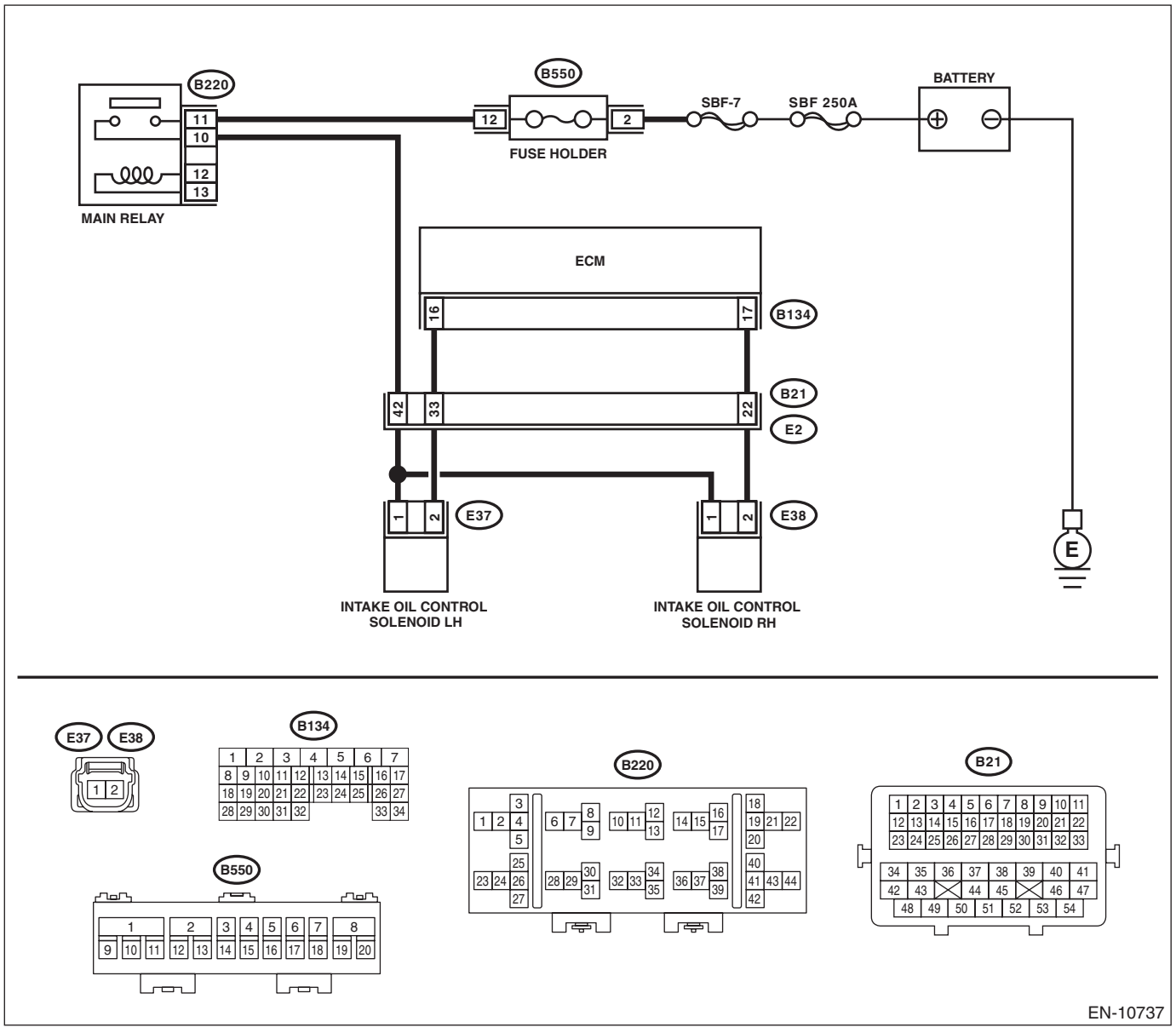
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0017. <Ref. to EN(H4DO HEV)(diag)-118, DTC P0017 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 1 SENSOR B, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

M: DTC P0020 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/ OPEN BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO THE INTAKE OIL CONTROL SOLENOID LH.** Measure the voltage between intake oil control solenoid LH connector and engine ground. ***Connector & terminal*** ***(E37) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID LH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and intake oil control solenoid LH. 3) Measure the resistance between intake oil control solenoid LH connector and engine ground. ***Connector & terminal*** ***(E37) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and intake oil control solenoid LH connector.
5	**CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID LH CONNECTOR.** Measure the resistance of harness between ECM connector and intake oil control solenoid LH. ***Connector & terminal*** ***(B134) No. 16 — (E37) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and intake oil control solenoid LH connector • Poor contact of coupling connector
6	**CHECK INTAKE OIL CONTROL SOLENOID LH.** Measure the resistance between intake oil control solenoid LH terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 6 — 12 Ω?	Repair the poor contact of intake oil control solenoid LH connector.	Replace the intake oil control solenoid LH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0010. <Ref. to EN(H4DO HEV)(diag)-105, DTC P0010 "A" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

N: DTC P0021 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**IDENTIFYING FAULTY PART.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Replace the defective oil control solenoid by the other (RH or LH, intake side or exhaust side) oil control solenoid. 3) Perform appropriate drive cycle test. <Ref. to EN(H4DO HEV)(diag)-55, Drive Cycle.> 4) Make sure that the fault occurrence (DTC and incorrect advancing) has shifted to the other location.	Did the detected DTC shift to the location where the oil control solenoid was replaced?	Replace the faulty oil control solenoid.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Start the engine and let it idle. 2) Read the value of «VVT Adv. Ang. Amount L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «VVT Adv. Ang. Amount L» approx. 0 deg?	Go to step **3**.	Check the following item and repair or replace if necessary. • Intake cam sprocket (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)
3	**CHECK CURRENT DATA.** 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «OCV Duty L» and «VVT Adv. Ang. Amount L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	When the value of «OCV Duty L» increases more than 10%, is the value of «VVT Adv. Ang. Amount L» approx. 0 deg?	Check the following item and repair or replace if necessary. • Intake cam sprocket (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

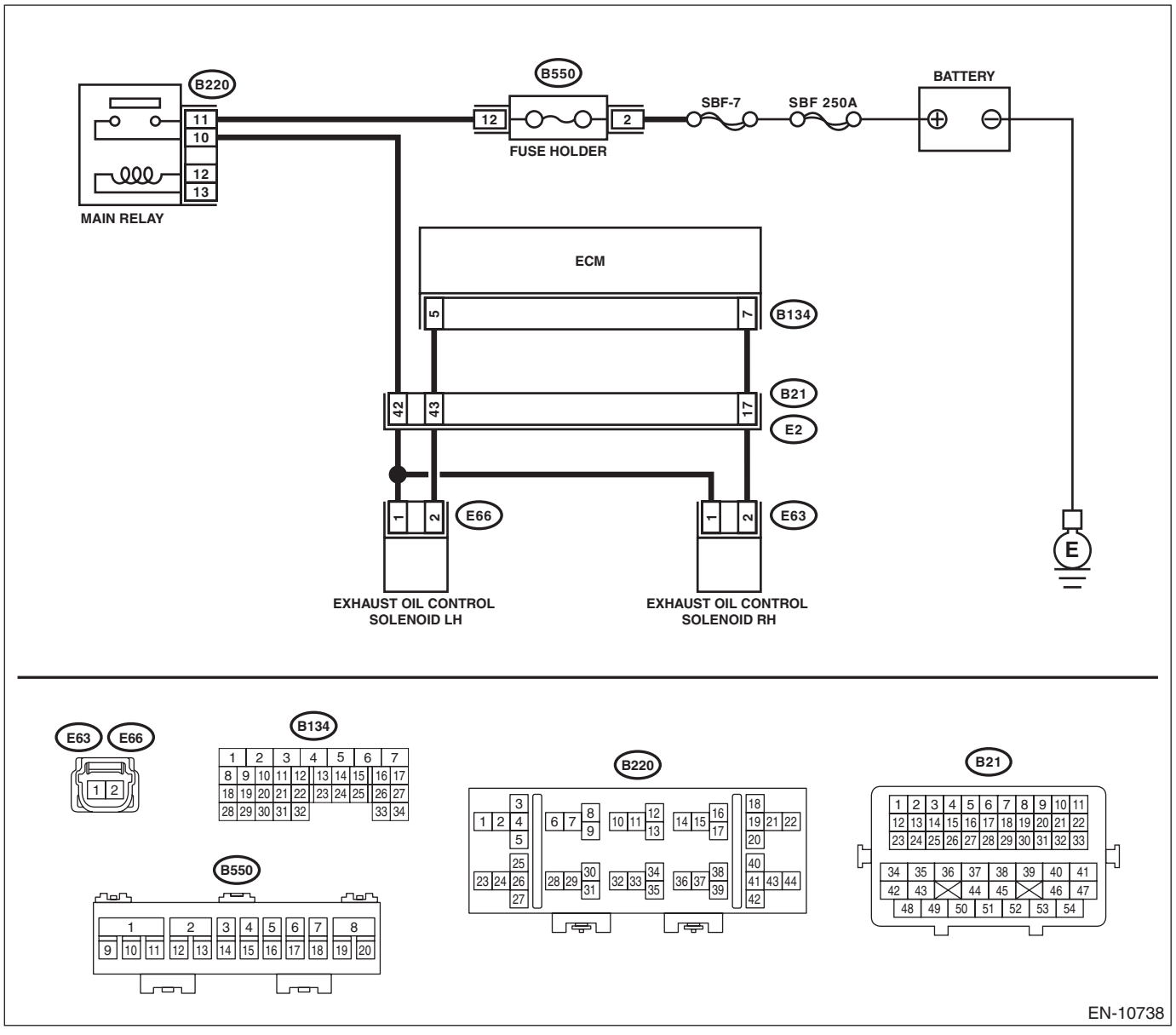
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0011. <Ref. to EN(H4DO HEV)(diag)-108, DTC P0011 "A" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

O: DTC P0023 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/ OPEN BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



EN-10738

	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO THE EXHAUST OIL CONTROL SOLENOID LH.** Measure the voltage between exhaust oil control solenoid LH connector and engine ground. ***Connector & terminal*** ***(E66) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND EXHAUST OIL CONTROL SOLENOID LH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and exhaust oil control solenoid LH. 3) Measure the resistance between exhaust oil control solenoid LH connector and engine ground. ***Connector & terminal*** ***(E66) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and exhaust oil control solenoid LH connector.
5	**CHECK HARNESS BETWEEN ECM AND EXHAUST OIL CONTROL SOLENOID LH CONNECTOR.** Measure the resistance of harness between ECM connector and exhaust oil control solenoid LH. ***Connector & terminal*** ***(B134) No. 5 — (E66) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and exhaust oil control solenoid LH connector • Poor contact of coupling connector

Step		Check	Yes	No
6	**CHECK EXHAUST OIL CONTROL SOLENOID LH.** Measure the resistance between exhaust oil control solenoid LH terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 6 — 12 Ω?	Repair the poor contact of exhaust oil control solenoid LH connector.	Replace the exhaust oil control solenoid LH. <Ref. to FU(H4DO(HEV))-57, Oil Control Solenoid.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0013. <Ref. to EN(H4DO HEV)(diag)-110, DTC P0013 "B" CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT/OPEN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

P: DTC P0024 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 2

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**IDENTIFYING FAULTY PART.** 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Replace the defective oil control solenoid by the other (RH or LH, intake side or exhaust side) oil control solenoid. 3) Perform appropriate drive cycle test. <Ref. to EN(H4DO HEV)(diag)-55, Drive Cycle.> 4) Make sure that the fault occurrence (DTC and incorrect advancing) has shifted to the other location.	Did the detected DTC shift to the location where the oil control solenoid was replaced?	Replace the faulty oil control solenoid.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Start the engine and let it idle. 2) Read the value of «Exh. VVT Retard Ang. L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Exh. VVT Retard Ang. L» approx. 0 deg?	Go to step **3**.	Check the following item and repair or replace if necessary. • Exhaust cam sprocket (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)
3	**CHECK CURRENT DATA.** 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «Exh. OCV Duty L» and «Exh. VVT Retard Ang. L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	When the value of «Exh. OCV Duty L» increases more than 10%, is the value of «Exh. VVT Retard Ang. L» approx. 0 deg?	Check the following item and repair or replace if necessary. • Exhaust cam sprocket (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO(w/o HEV))-29, Engine Oil Filter.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0014. <Ref. to EN(H4DO HEV)(diag)-113, DTC P0014 "B" CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Q: DTC P0030 A/F / O2 HEATER CONTROL CIRCUIT BANK 1 SENSOR 1

DTC DETECTING CONDITION:

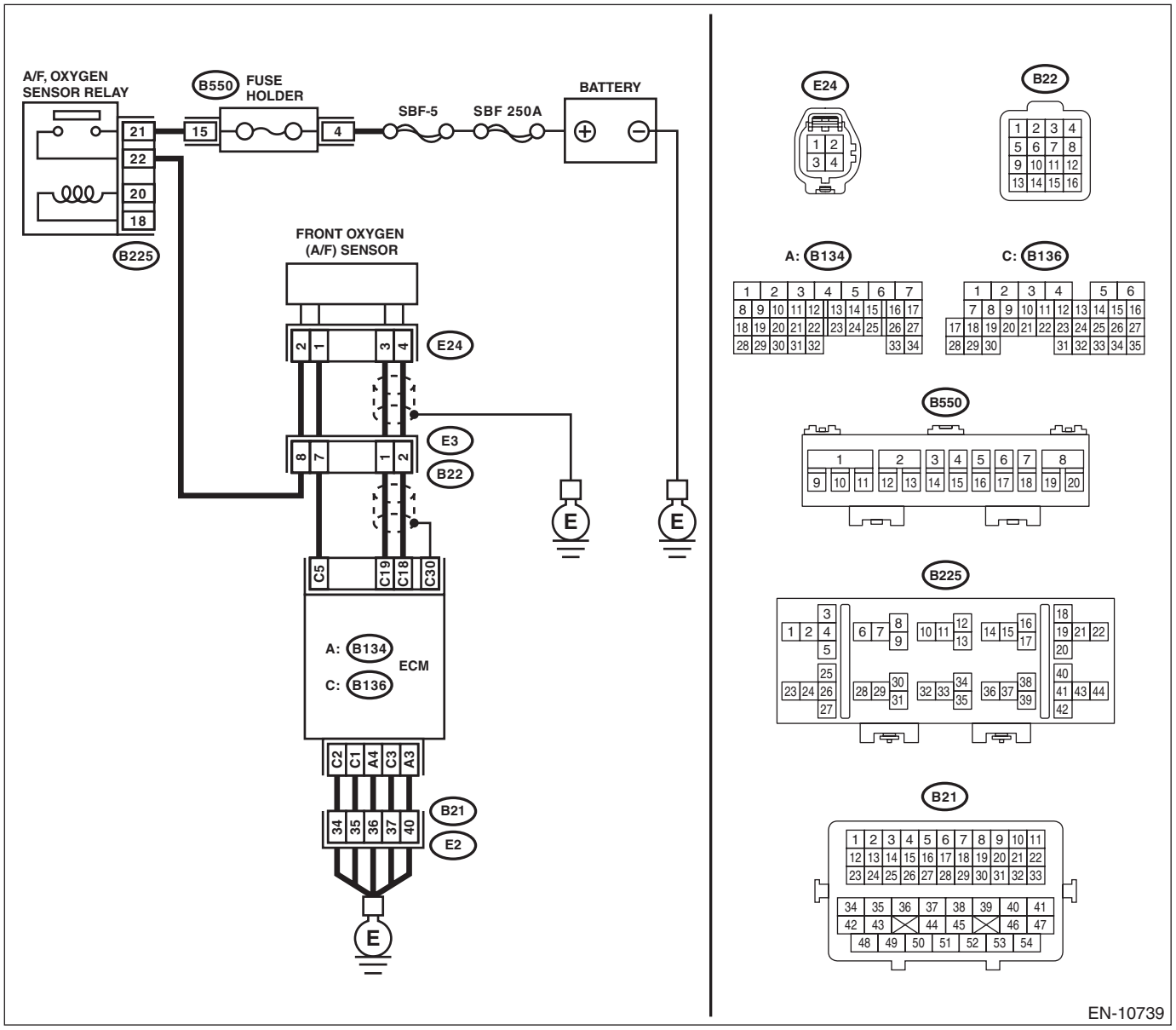
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

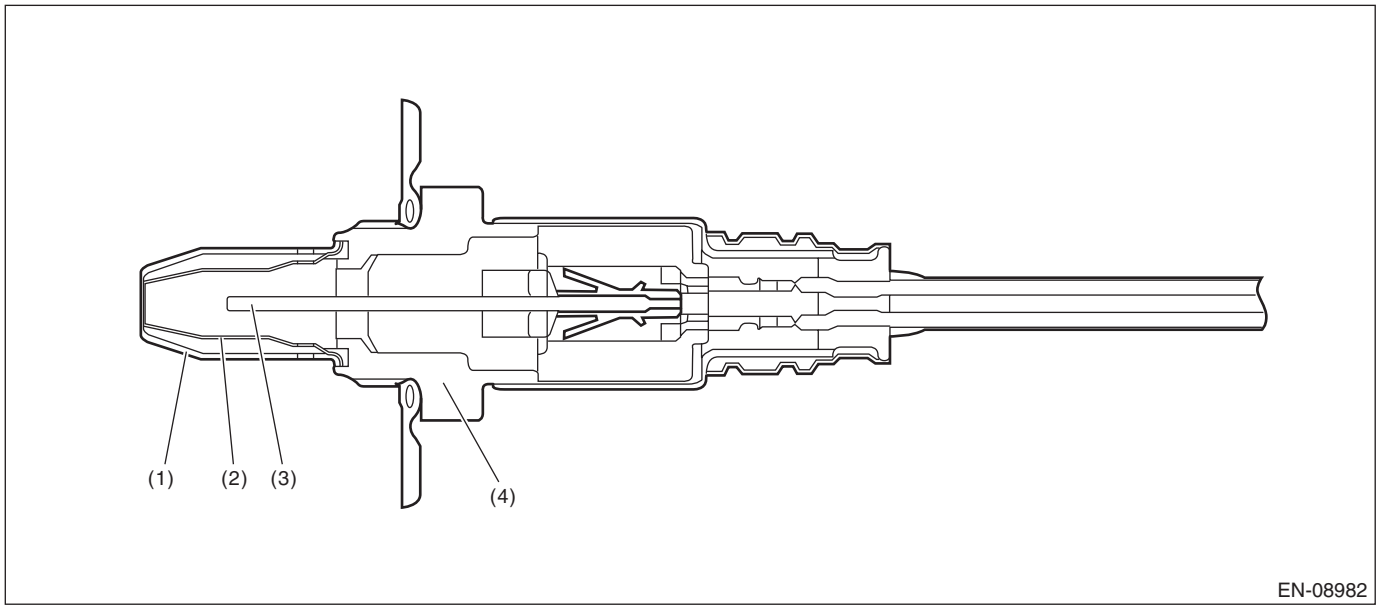


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Start and warm up the engine. 2) Turn the ignition switch to OFF. 3) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 4) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 5 — (E24) No. 1:*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
2	**CHECK FRONT OXYGEN (A/F) SENSOR.** Measure the resistance between front oxygen (A/F) sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 1.8 — 2.2 Ω?	Go to step **3**.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>
3	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and front oxygen (A/F) sensor connector.	Is there poor contact of ECM or front oxygen (A/F) sensor connector?	Repair the poor contact of ECM or front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect functional errors of the front oxygen (A/F) sensor heater.
Judge as NG when it is determined that the front oxygen (A/F) sensor impedance is large when looking at engine status such as deceleration fuel cut.

2. COMPONENT DESCRIPTION



(1) Element cover (outer)
(2) Element cover (inner)
(3) Sensor element
(4) Sensor housing

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
A/F sensor heater final control	> 17 %
Elapsed time after fuel cut	≥ 20000 ms

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after 42000 ms or more have passed since the engine started.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Front oxygen (A/F) sensor impedance	> 82 Ω

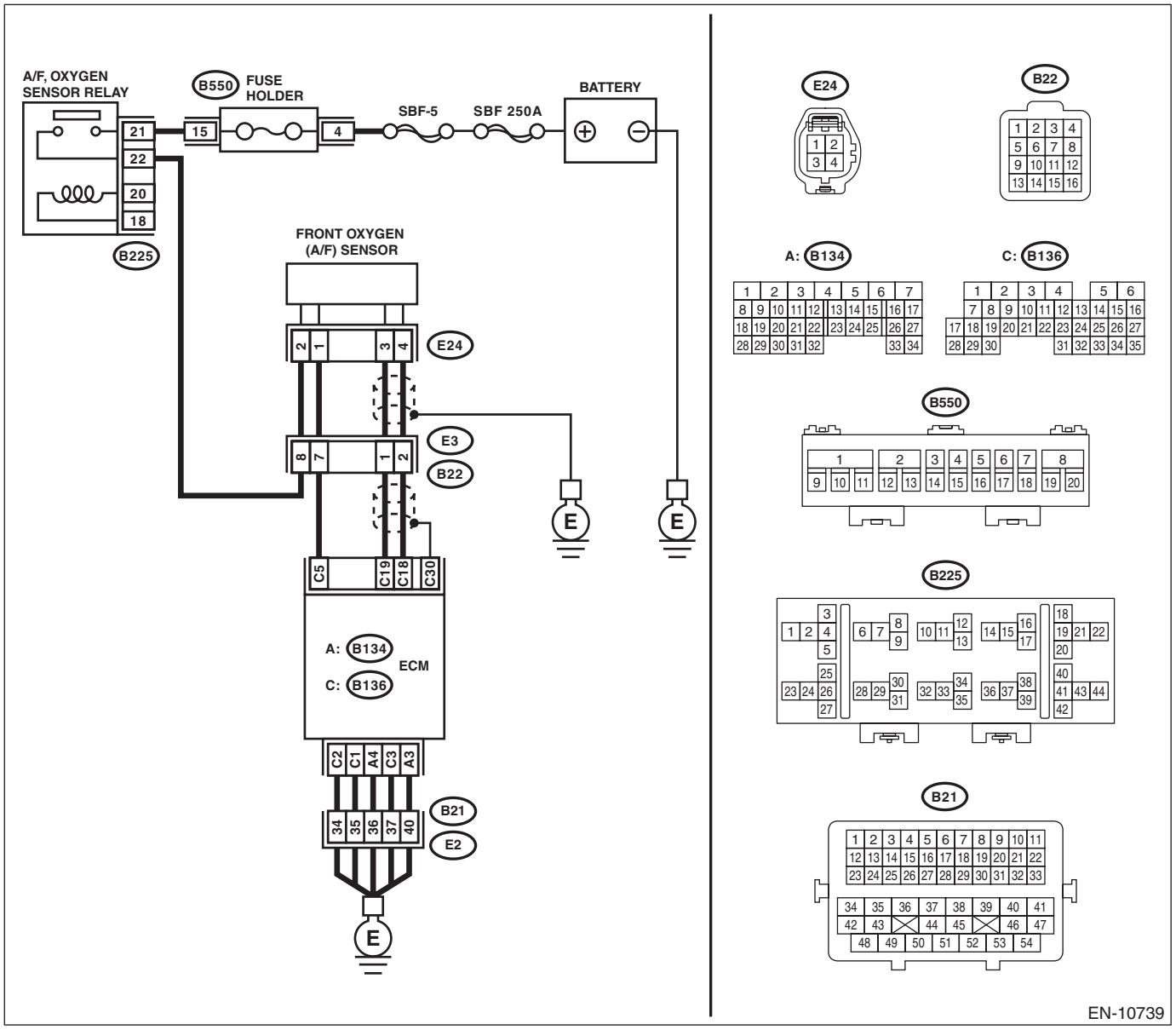
Time Needed for Diagnosis: 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

R: DTC P0031 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

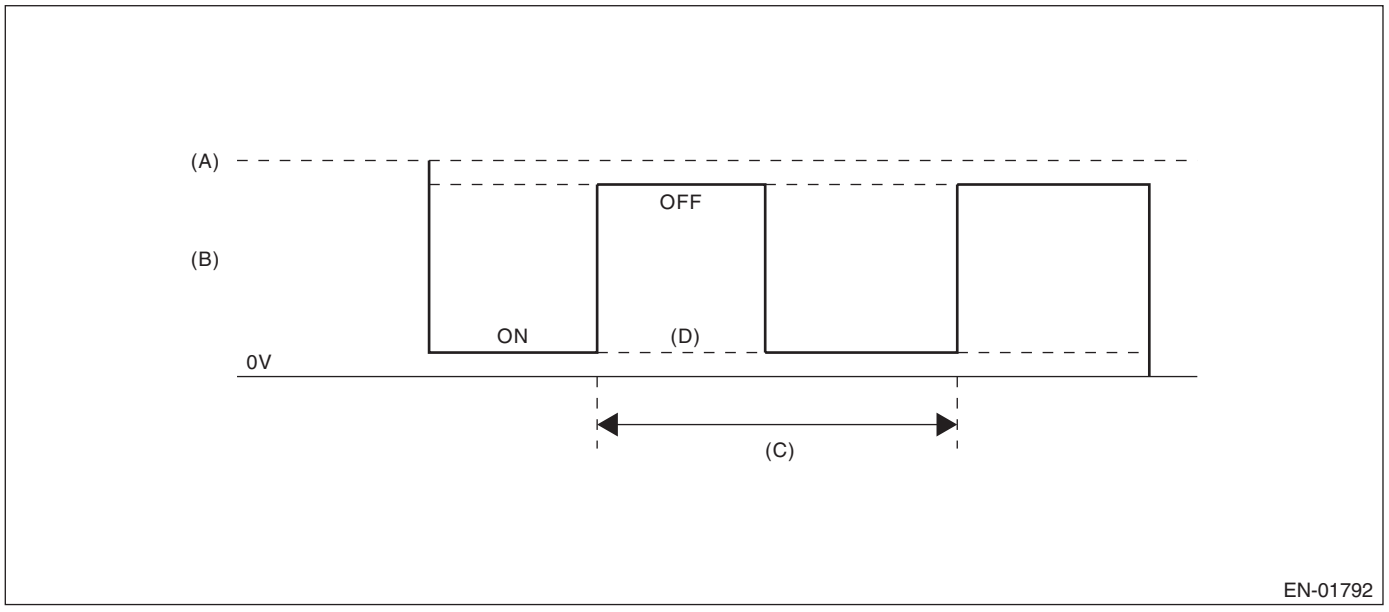


	Step	Check	Yes	No
1	**CHECK POWER SUPPLY TO FRONT OXYGEN (A/F) SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from front oxygen (A/F) sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between front oxygen (A/F) sensor connector and engine ground. ***Connector & terminal*** ***(E24) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the power supply line. NOTE: In this case, repair the following item: • Open circuit in harness between A/F, oxygen sensor relay connector and front oxygen (A/F) sensor connector • Poor contact of A/F, oxygen sensor relay connector • Poor contact of coupling connector • Malfunction of A/F, oxygen sensor relay
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 5 — (E24) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
3	**CHECK GROUND CIRCUIT FOR ECM.** Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
4	**CHECK FRONT OXYGEN (A/F) SENSOR.** Measure the resistance between front oxygen (A/F) sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 1.8 — 2.2 Ω?	Repair the poor contact of ECM connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect front oxygen (A/F) sensor heater open or short circuit.
The front oxygen (A/F) sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.
Judge as NG when the terminal voltage remains Low.

2. COMPONENT DESCRIPTION



(A) Battery voltage
(B) Front oxygen (A/F) sensor heater output voltage
(C) 128 ms
(D) Low error

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Front oxygen (A/F) sensor heater control duty	< 87.5 %

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 1.9 V

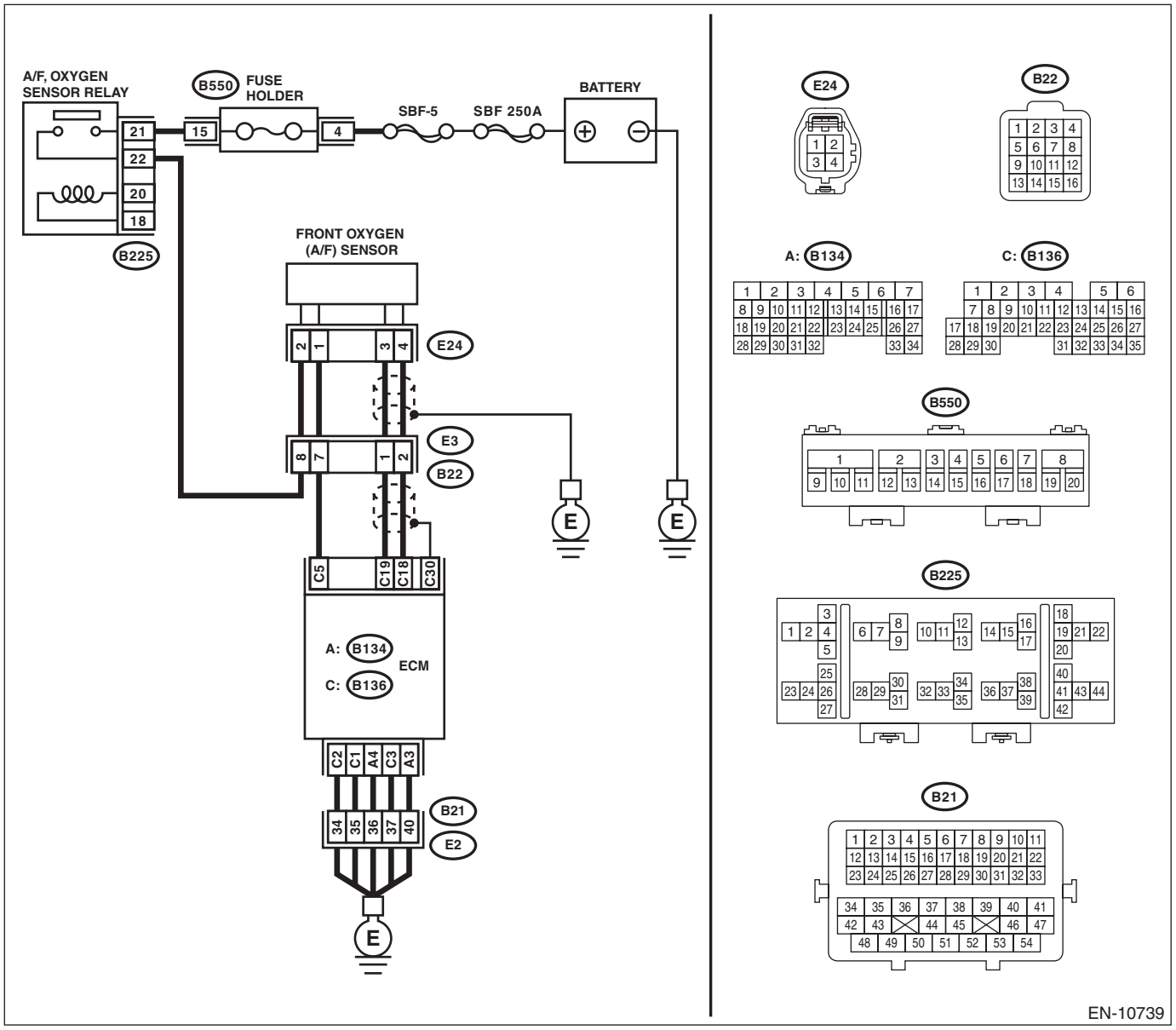
Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

S: DTC P0032 A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



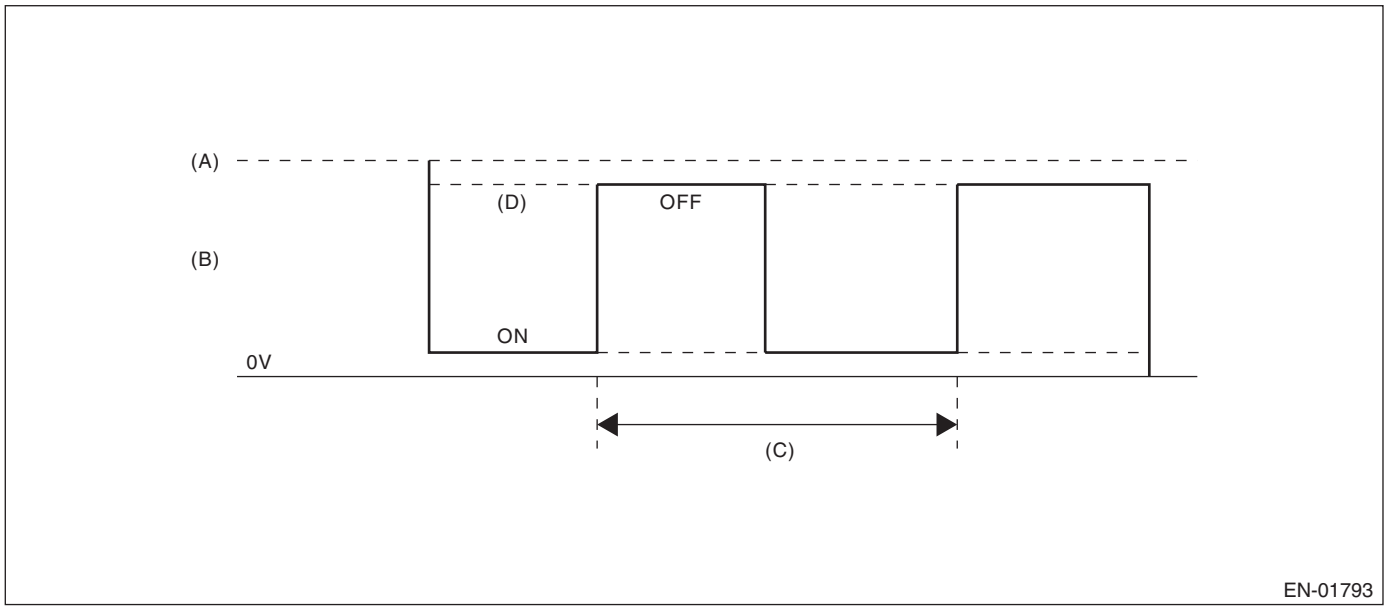
Step		Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector.	Go to step **2**.

Step		Check	Yes	No
2	**CHECK GROUND CIRCUIT FOR ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect front oxygen (A/F) sensor heater open or short circuit.
The front oxygen (A/F) sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.
Judge as NG when the terminal voltage remains High.

2. COMPONENT DESCRIPTION



(A) Battery voltage
(B) Front oxygen (A/F) sensor heater output voltage
(C) 128 ms
(D) High error

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Front oxygen (A/F) sensor heater control duty	> 12.5 %

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 1.9 V

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

T: DTC P0037 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2

DTC DETECTING CONDITION:

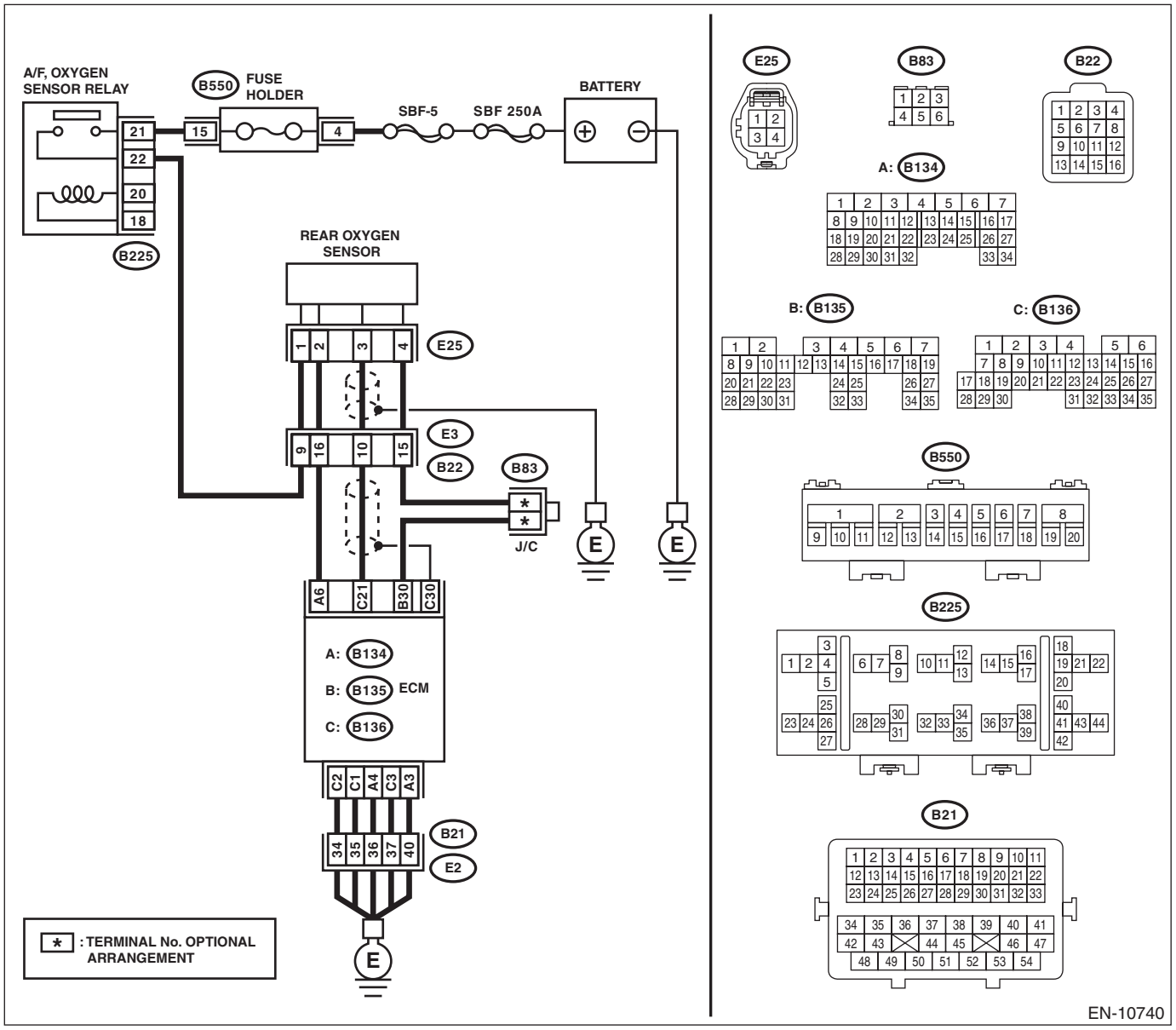
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

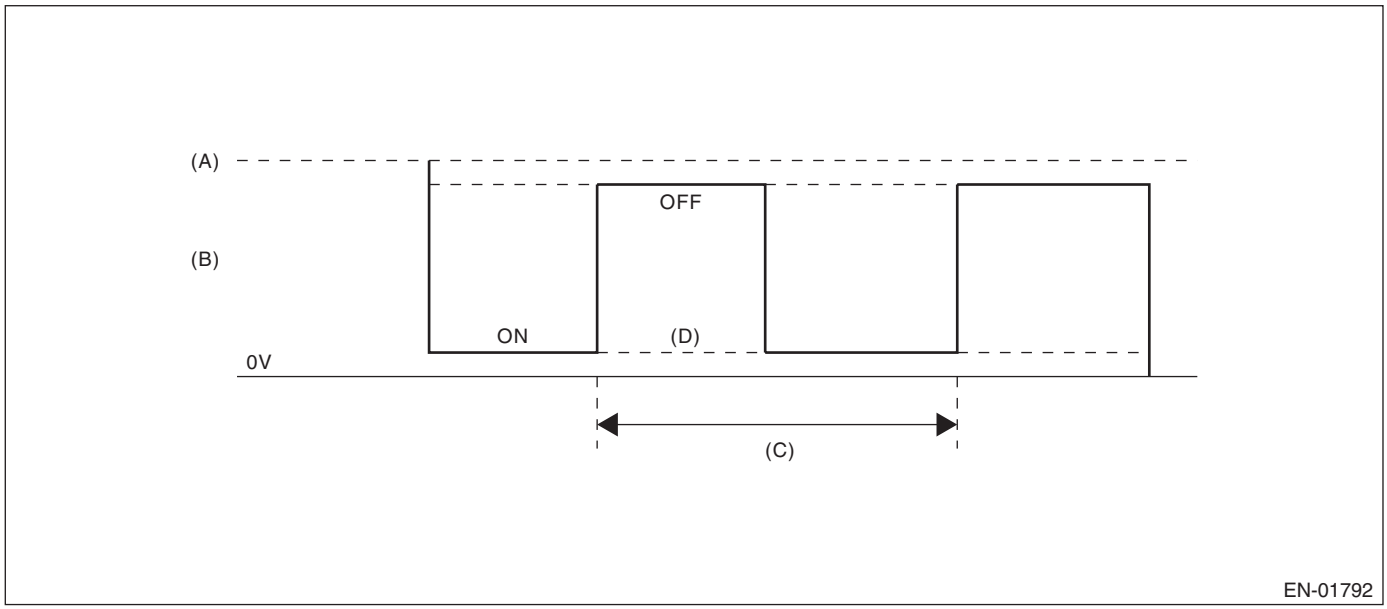


	Step	Check	Yes	No
1	**CHECK POWER SUPPLY TO REAR OXYGEN SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from rear oxygen sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between rear oxygen sensor connector and engine ground. ***Connector & terminal*** ***(E25) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the power supply line. Or replace the main relay. NOTE: In this case, repair the following item: • Open circuit in harness between A/F, oxygen sensor relay connector and rear oxygen sensor connector • Poor contact of A/F, oxygen sensor relay connector • Poor contact of coupling connector • Malfunction of A/F, oxygen sensor relay
2	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and oxygen sensor connector. ***Connector & terminal*** ***(B134) No. 6 — (E25) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
3	**CHECK GROUND CIRCUIT FOR ECM.** Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
4	**CHECK REAR OXYGEN SENSOR.** Measure the resistance between rear oxygen sensor terminals. ***Terminals*** ***No. 2 — No. 1:***	Is the resistance 5 — 6.4 Ω?	Repair the poor contact of ECM connector.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the rear oxygen sensor heater open or short circuit.
The rear oxygen sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.
Judge as NG when the terminal voltage remains Low.

2. COMPONENT DESCRIPTION



(A) Battery voltage
(B) Output voltage of the rear oxygen sensor heater
(C) 256 ms (cycles)
(D) Low error

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Rear oxygen sensor heater control duty	< 75 %

4. GENERAL DRIVING CYCLE

After starting the engine, perform the diagnosis continuously when engine is low speed.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< Battery voltage × 0.2

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

U: DTC P0038 A/F / O2 HEATER CONTROL CIRCUIT HIGH BANK 1 SENSOR 2

DTC DETECTING CONDITION:

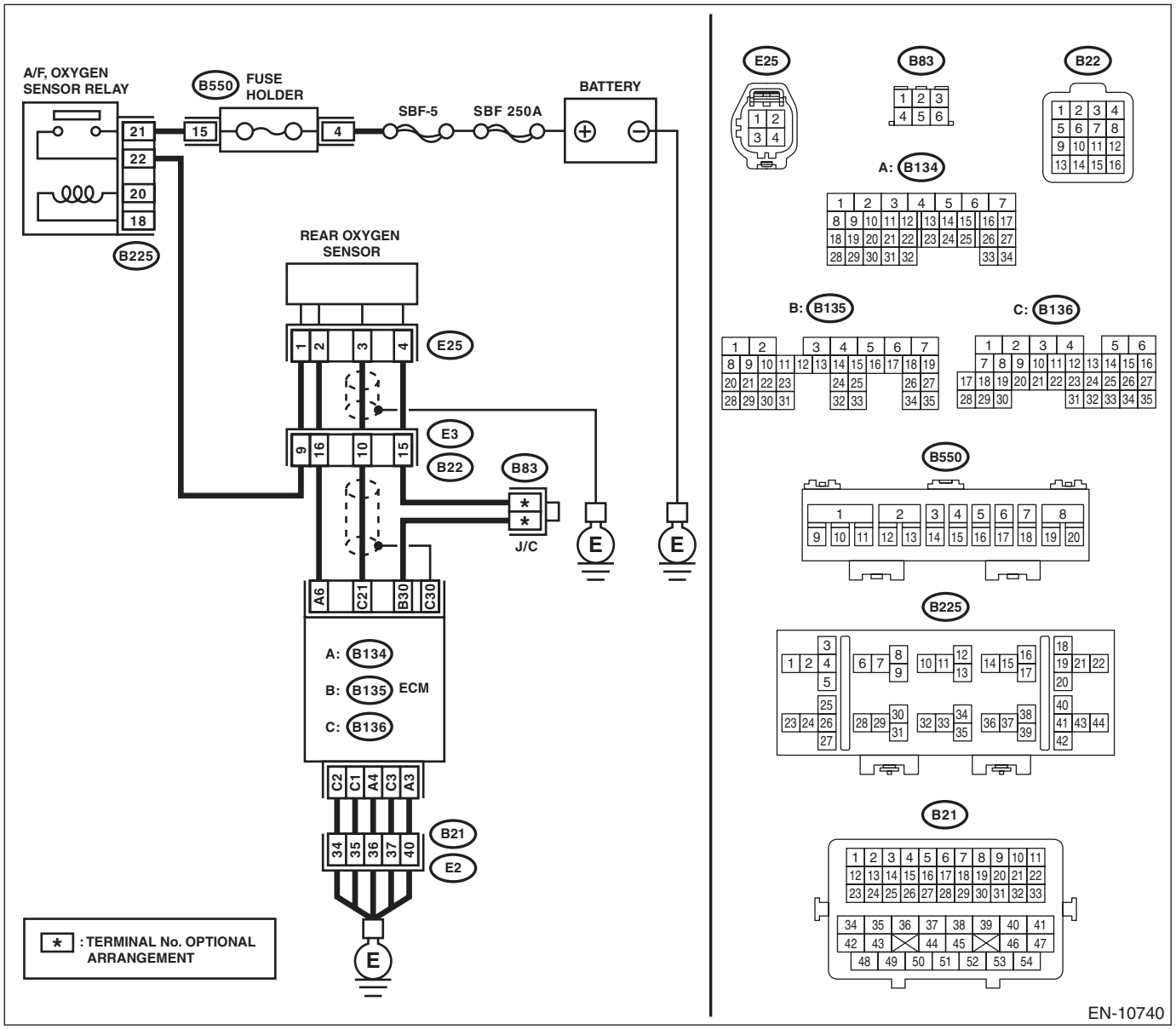
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



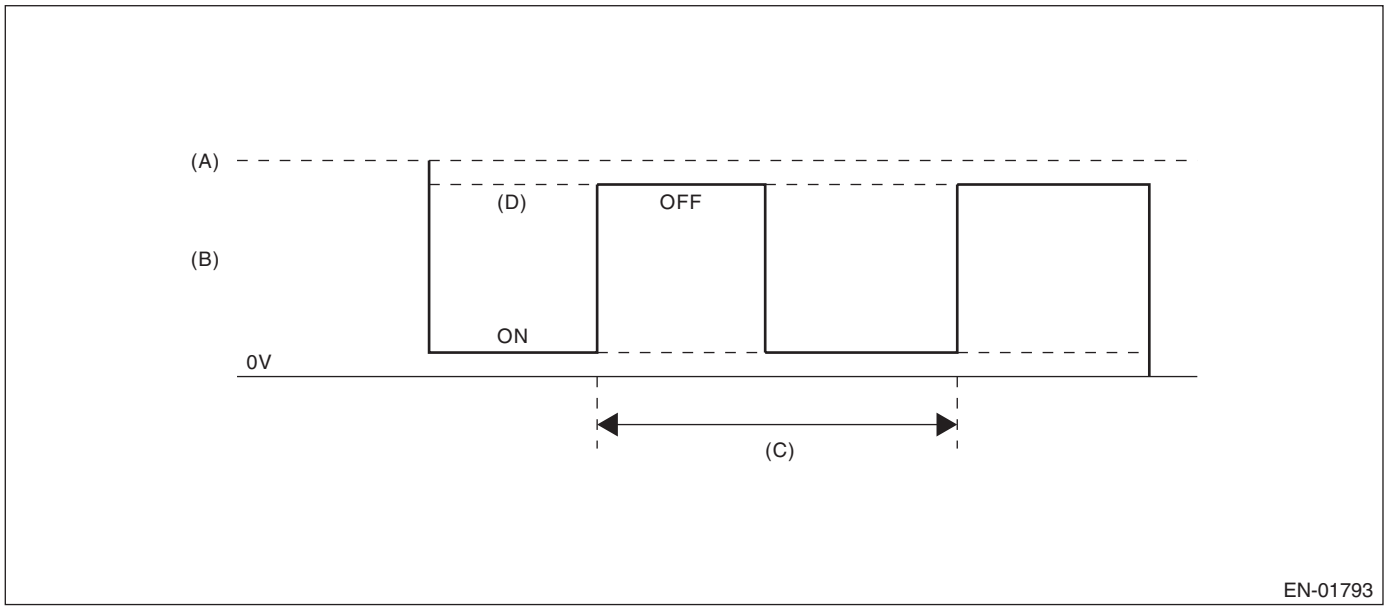
Step		Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and rear oxygen sensor connector.	Go to step **2**.

Step		Check	Yes	No
2	**CHECK GROUND CIRCUIT FOR ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the rear oxygen sensor heater open or short circuit.
The rear oxygen sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.
Judge as NG when the terminal voltage remains High.

2. COMPONENT DESCRIPTION



(A) Battery voltage
(B) Output voltage of the rear oxygen sensor heater
(C) 256 ms (cycles)
(D) High error

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Rear oxygen sensor heater control duty	≥ 20 %

4. GENERAL DRIVING CYCLE

After starting the engine, perform the diagnosis continuously when engine is low speed.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	> Battery voltage × 0.3

Time Needed for Diagnosis: 2.56 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

V: DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

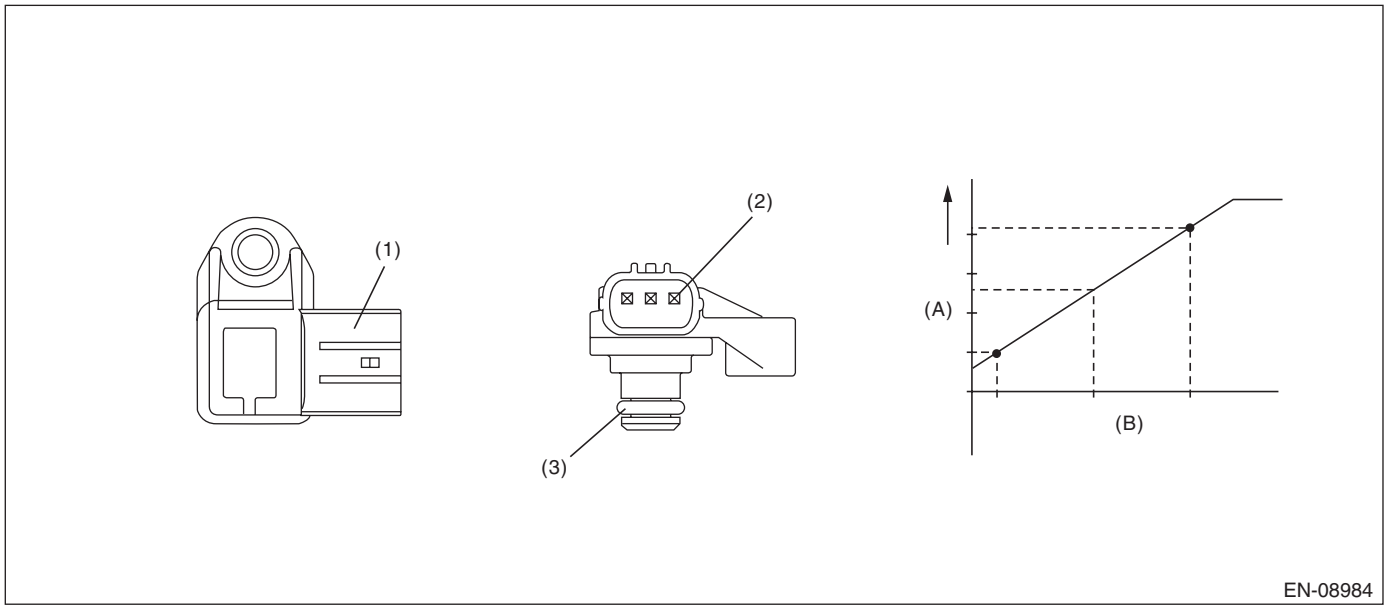
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **2**.
2	**CHECK MANIFOLD ABSOLUTE PRESSURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in “P” range or “N” range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Mani. Absolute Pressure» 73.3 — 106.6 kPa (550 — 800 mmHg, 21.65 — 31.50 inHg) when the ignition is turned ON, and 20.0 — 46.7 kPa (150 — 350 mmHg, 5.91 — 13.78 inHg) during idling?	Go to step **3**.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(HEV))-67, Manifold Absolute Pressure Sensor.>
3	**CHECK THROTTLE OPENING ANGLE.** Using the Subaru Select Monitor or a general scan tool, read the value in «Throttle Opening Angle». NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Throttle Opening Angle» with the throttle fully closed less than 5%?	Go to step **4**.	Replace the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>
4	**CHECK THROTTLE OPENING ANGLE.**	Is the value in «Throttle Opening Angle» with the throttle fully open 85% or more?	Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(HEV))-67, Manifold Absolute Pressure Sensor.>	Replace the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>

1. OUTLINE OF DIAGNOSIS

Detect problems in the intake manifold pressure sensor output properties.
Judge as NG when the intake air pressure AD value is Low whereas it seemed to be High from the viewpoint of engine condition, or when it is High whereas it seemed to be Low from the engine condition.

2. COMPONENT DESCRIPTION



(A) Output voltage
(B) Absolute pressure
(1) Connector
(2) Terminals
(3) O-ring

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Low	
Engine coolant temperature	≥ 60 °C (140 °F)
Engine speed	< 2900 rpm
Throttle position	≤ 3.4 °
Intake air mass per crankshaft revolution	> 0.36 g/rev (0.01 oz/rev)
High	
Engine coolant temperature	≥ 60 °C (140 °F)
Engine speed	≥ 500 rpm to < 2000 rpm
Throttle position	≤ 9.6 °
Intake air mass per crankshaft revolution	< 0.34 g/rev (0.01 oz/rev)

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after idling.

5. DIAGNOSTIC METHOD

Judge as NG when Low side or High side becomes NG.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Low	
Output voltage	< 0.95 V
High	
Output voltage	≥ 3.61 V

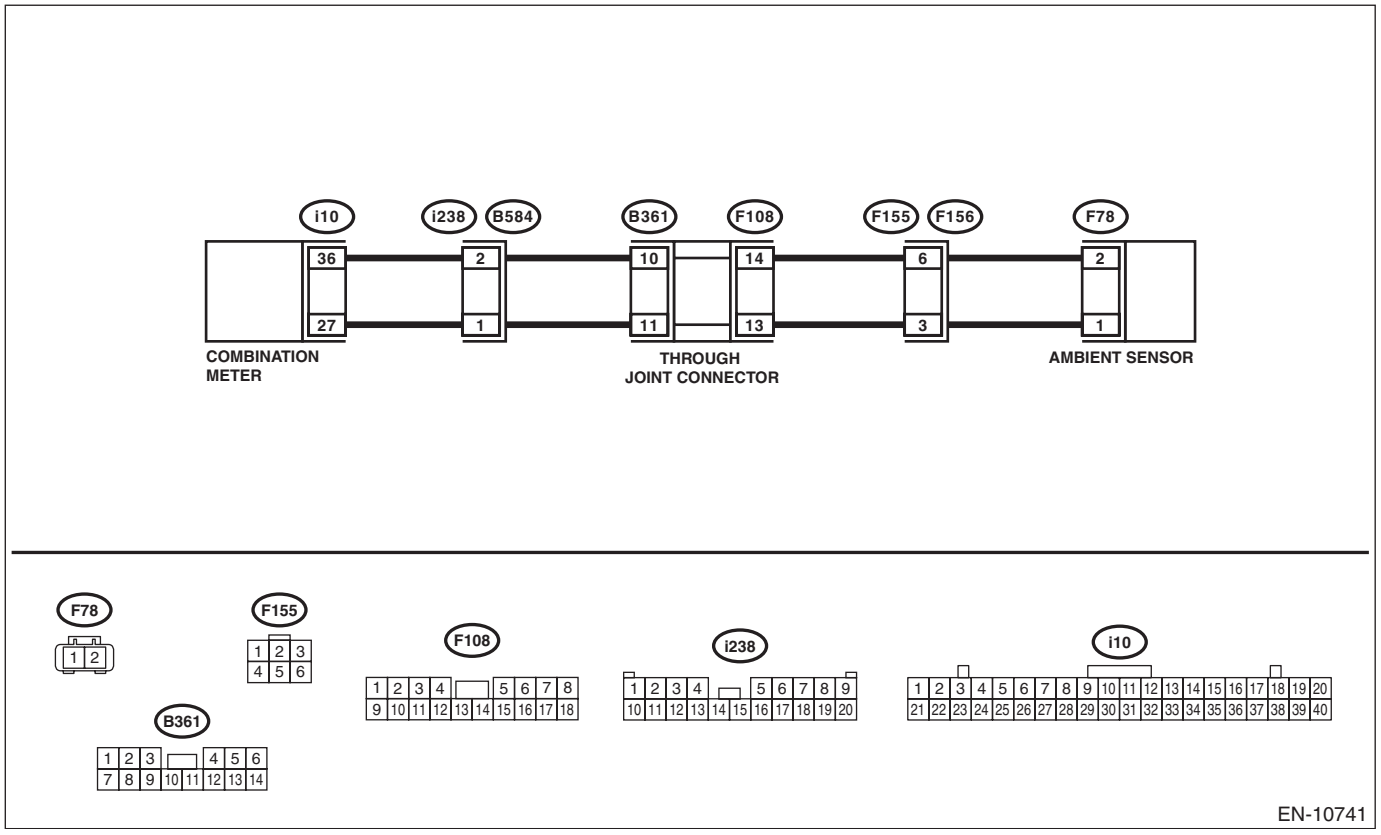
Time Needed for Diagnosis:
Low side: 5000 ms
High side: 5000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

W: DTC P0071 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" RANGE/ PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



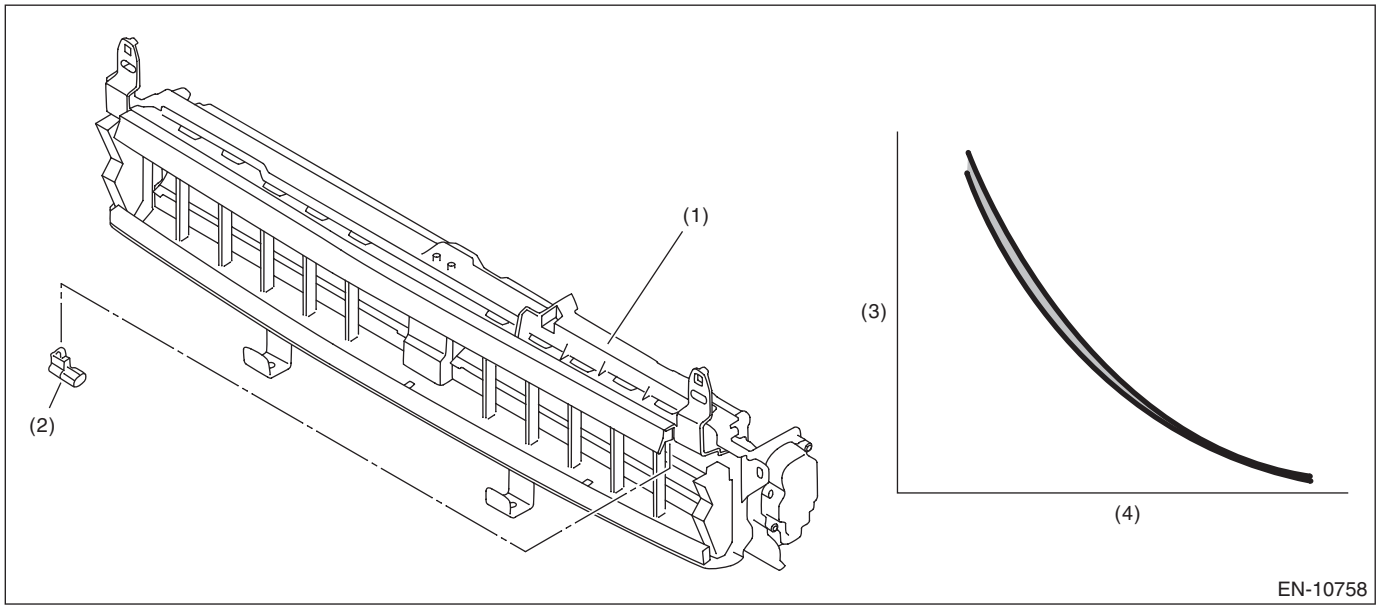
Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.

Step		Check	Yes	No
2	**CHECK AMBIENT SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ambient sensor. 3) Measure the resistance between ambient sensor terminals while heating and cooling the ambient sensor using a hair drier. **CAUTION:** **Do not heat the part to the temperature where you cannot touch it with your bare hand in order to prevent burning yourself and protect the part.** ***Terminals*** ***No. 1 — No. 2:***	Is the resistance of ambient sensor different between during heating and during cooling?	Repair the poor contact of ECM connector.	Replace the ambient sensor. <Ref. to AC-72, Ambient Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ambient temperature sensor characteristics.
After the engine starts after the specified period of soaking time has elapsed, judge by correlation between ambient temperature sensor value, intake air temperature sensor value and engine coolant temperature sensor value. Judge as NG when the differences are both above the specified value by comparing between ambient air temperature and intake air temperature, ambient air temperature and engine coolant temperature.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Soaking time	≥ 21600 s
Block heater judgment	Completed
Block heater operation	Not in operation

Block heater judgment

Parameter	Execution condition
Engine speed	> 500 rpm

Judge as “Block heater is not activate” when the following conditions are established.

Judgment Value

Specifications	Threshold Value
Σ (Engine coolant temperature – Engine coolant temperature at engine start)	≥ –10 °C (–18°F)

Time Needed for Judgment: 1 s × 20 times

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the engine starts after a certain period of soaking time.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value Ambient air temperature 30 sec. after engine start – Intake air temperature 30 sec. after engine start	> Value from Map
Absolute value Ambient air temperature at engine start – Engine coolant temperature at engine start	> 25 °C (45°F)

Map

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
Absolute value Ambient air temperature 30 sec. after engine start – Intake air temperature 30 sec. after engine start °C (°F)	20 (36°F)	20 (36°F)	32 (57.6°F)	32 (57.6°F)

Time Needed for Diagnosis: 64 ms

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

X: DTC P0072 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

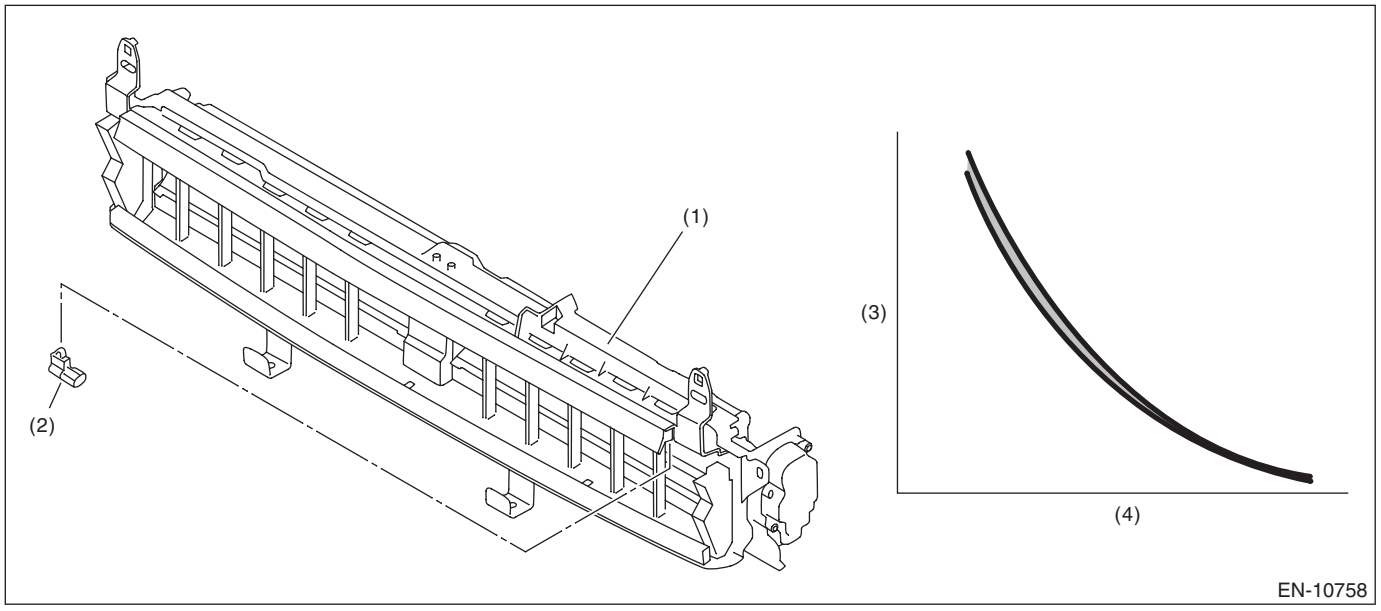
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK DTC.** Check for DTC. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is P0072 or P0073 displayed in Present fault?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK COMBINATION METER.** Check the combination meter system. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>	Is the combination meter system normal?	Replace the ambient sensor. <Ref. to AC-72, Ambient Sensor.>	Repair the combination meter system. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of ambient air temperature sensor installed in active grille shutter.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.42 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

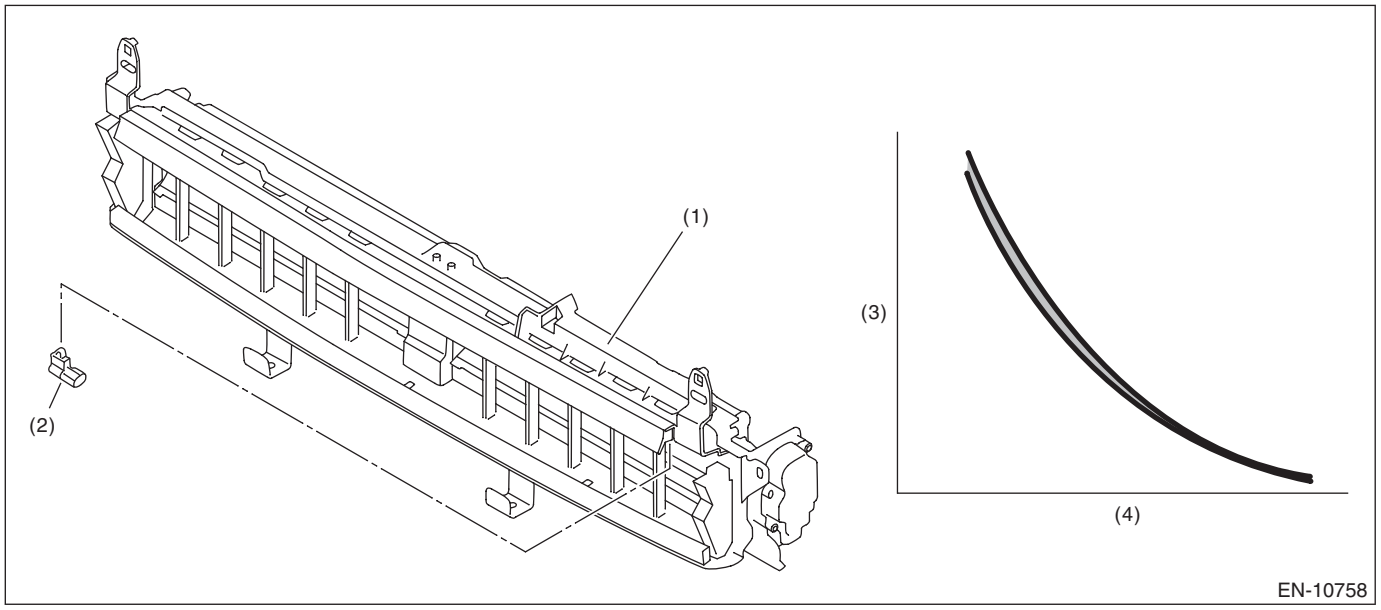
Y: DTC P0073 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" HIGH

NOTE:
For the diagnostic procedure, refer to DTC P0072. <Ref. to EN(H4DO HEV)(diag)-156, DTC P0072 AMBIENT AIR TEMPERATURE SENSOR CIRCUIT "A" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of ambient air temperature sensor installed in active grille shutter.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	> 4.88 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Z: DTC P0101 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT RANGE/ PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Improper idling
- Engine stalls.
- Poor driving performance

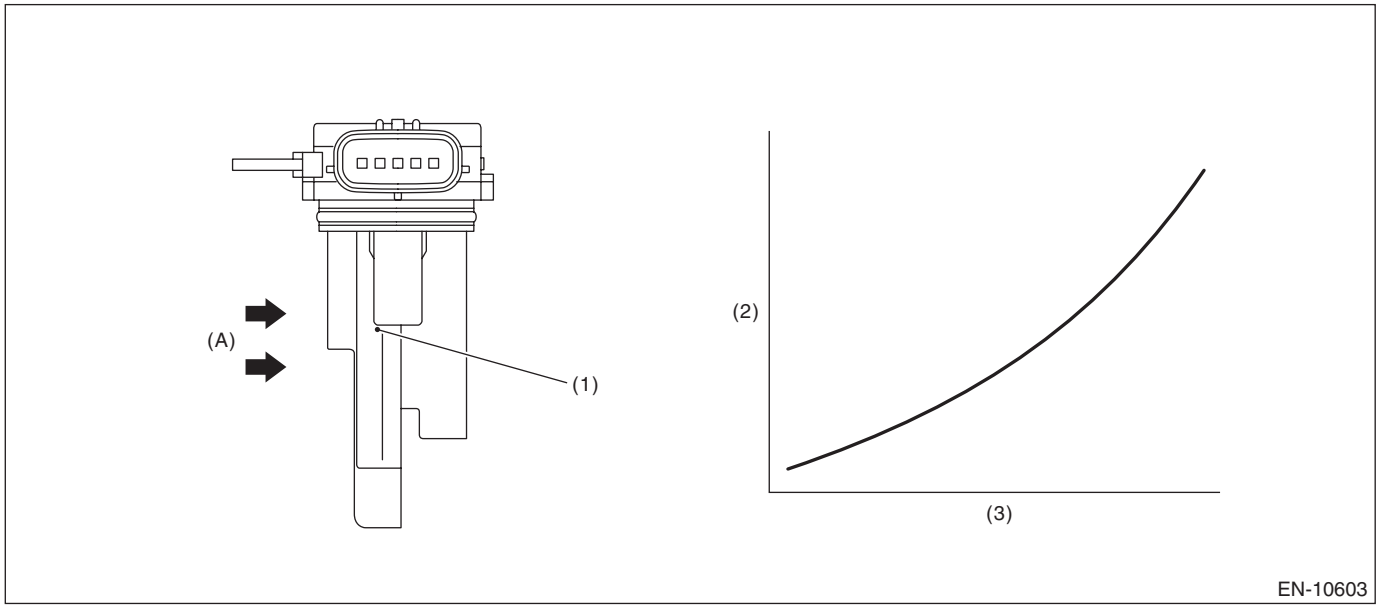
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of air flow sensor output properties.
Judge as a low side NG when the air flow voltage indicates a small value regardless of running in a state where the air flow voltage increases. Judge as a high side NG when the air flow voltage indicates a large value regardless of running in a state where the air flow voltage decreases. Judge air flow sensor property NG when the Low side or High side becomes NG.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor (2) Voltage (V) (3) Amount of intake air (kg (lb)/s)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Low	
Engine coolant temperature	≥ 60 °C (140 °F)
Engine speed	≥ 1600 rpm
Throttle valve opening angle	≥ 5.6 °
Intake manifold pressure	≥ 66.7 kPa (500 mmHg, 19.7 inHg)
High	
Engine coolant temperature	≥ 60 °C (140 °F)
Engine speed	≥ 500 rpm to < 2000 rpm
Throttle valve opening angle	< 9.3 °
Intake manifold pressure	< 44.8 kPa (336.3 mmHg, 13.2 inHg)

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after idling.

5. DIAGNOSTIC METHOD

Judge as NG when Low side or High side becomes NG.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Low	
Output voltage	< 1.27 V
High	
Output voltage	≥ 2.44 V

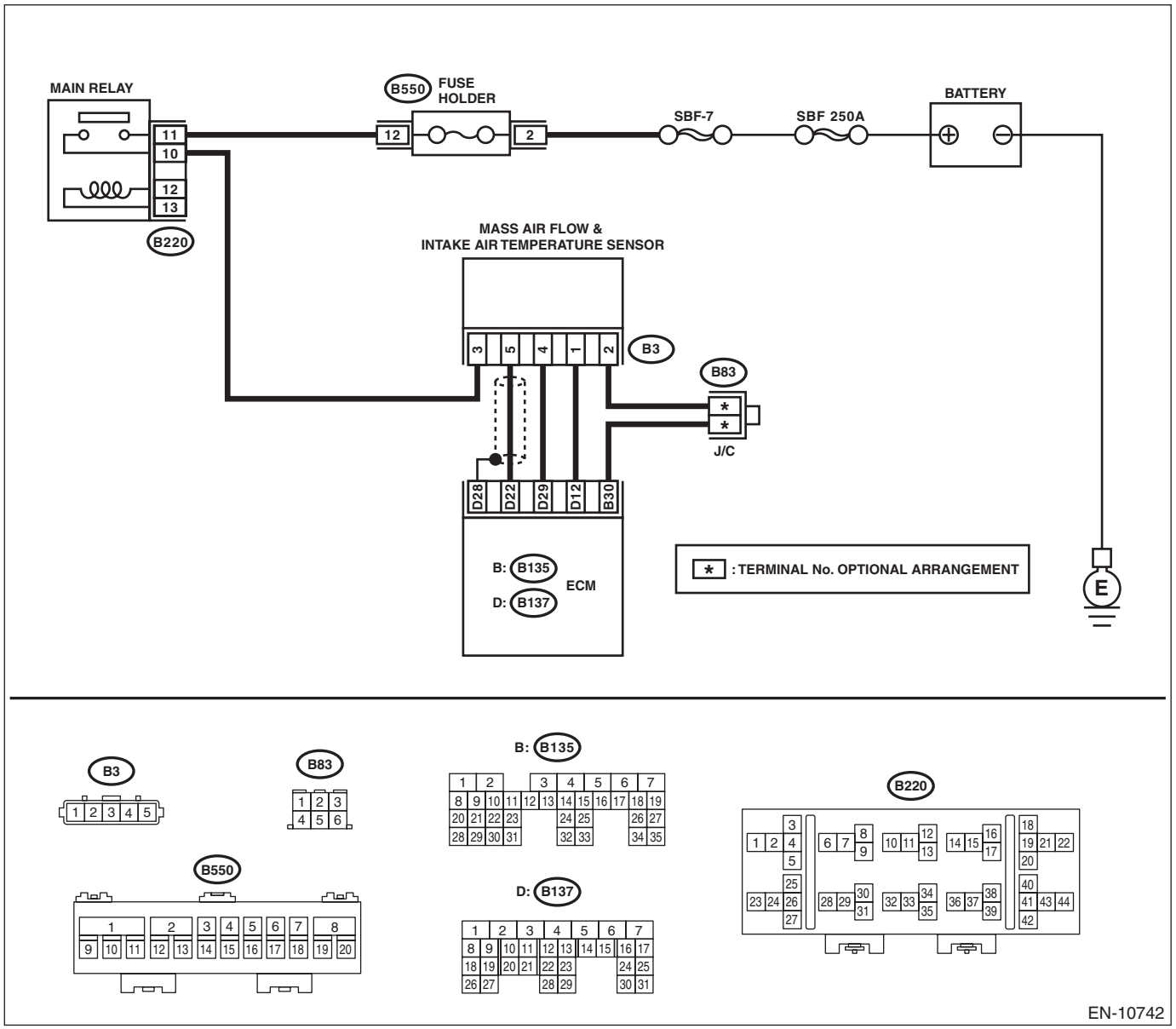
Time Needed for Diagnosis:
Low: 5000 ms
High: 5000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AA:DTC P0102 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

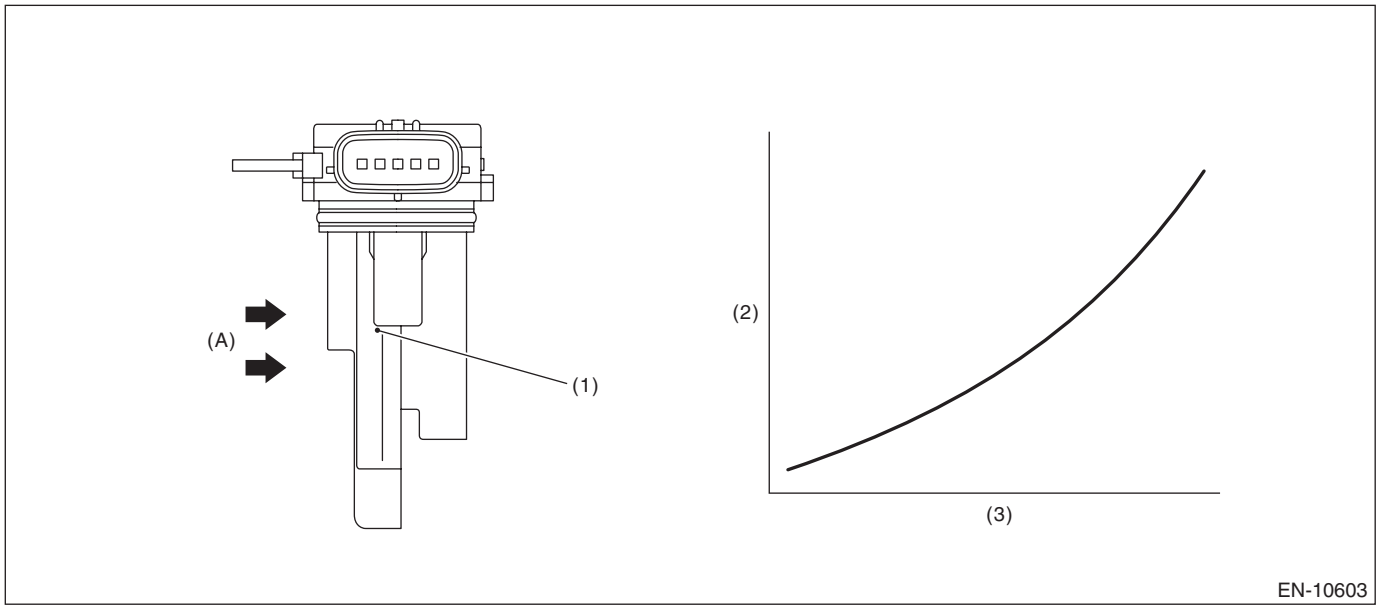


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» less than 0.2 V?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK POWER SUPPLY OF MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the mass air flow and intake air temperature sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between mass air flow and intake air temperature sensor connector and engine ground. ***Connector & terminal*** ***(B3) No. 3 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and mass air flow and intake air temperature sensor connector • Poor contact of main relay connector
3	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the mass air flow and intake air temperature sensor connector. ***Connector & terminal*** ***(B137) No. 22 — (B3) No. 5:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the ground short circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.
5	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and mass air flow and intake air temperature sensor connector.	Is there poor contact of ECM or mass air flow and intake air temperature sensor connector?	Repair the poor contact of ECM or mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuits of the air flow sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor (2) Voltage (V) (3) Amount of intake air (kg (lb)/s)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.127 V

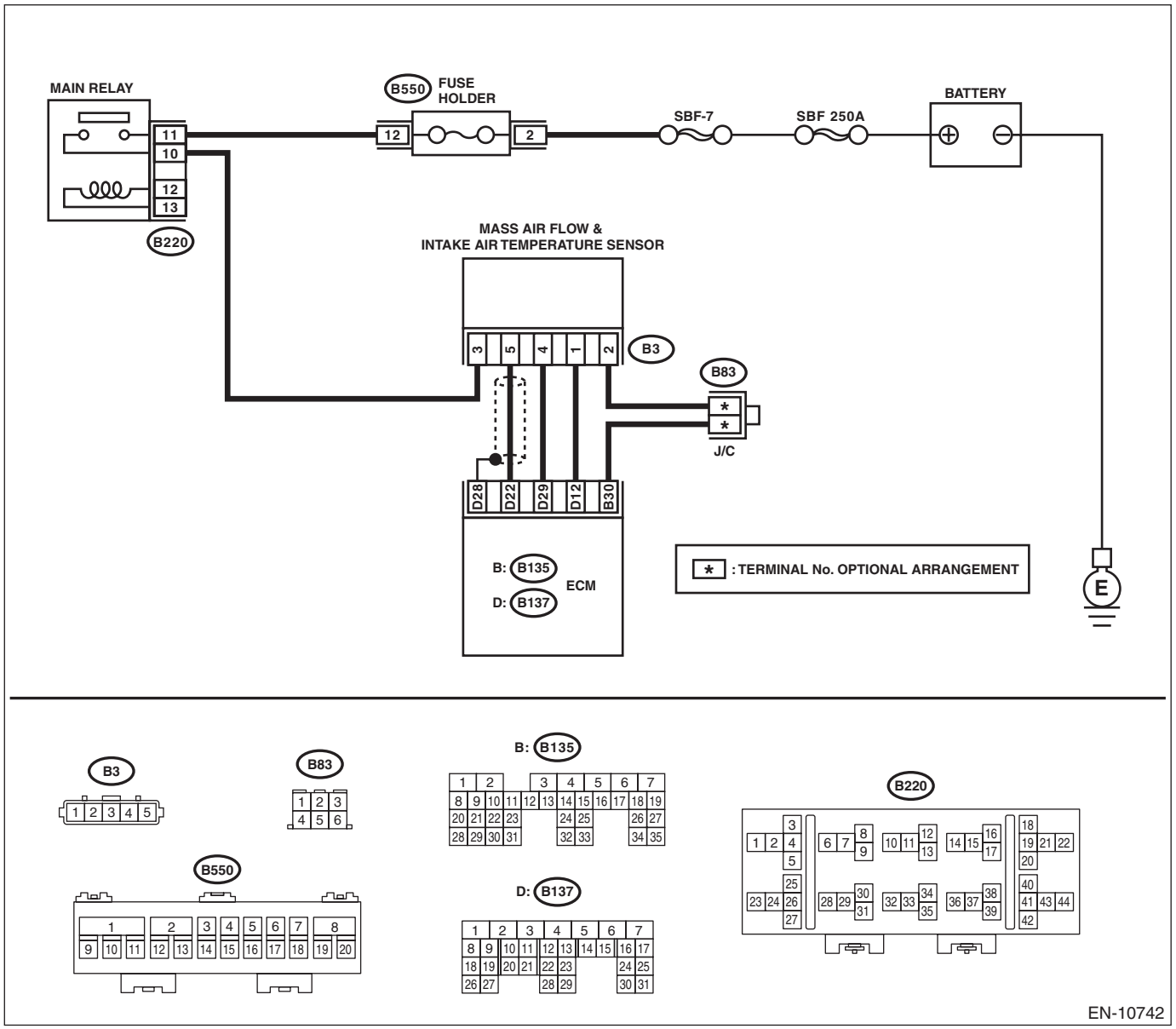
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AB:DTC P0103 MASS OR VOLUME AIR FLOW SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

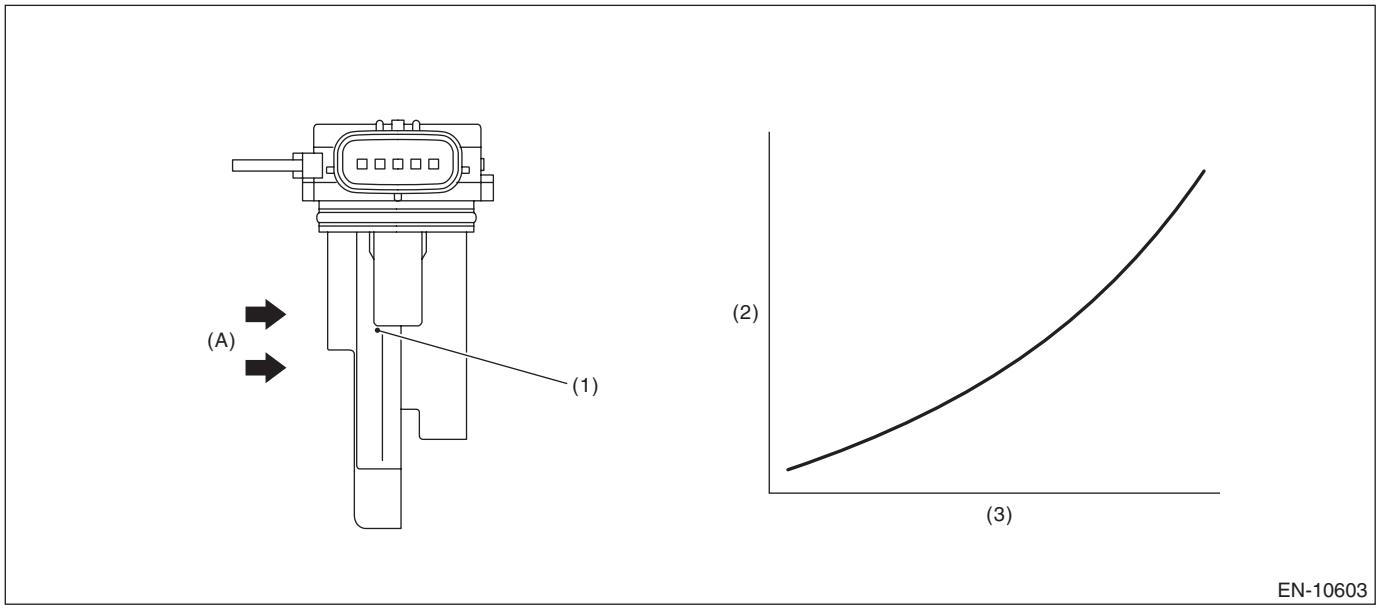


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» 5 V or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the mass air flow and intake air temperature sensor. 3) Start the engine. 4) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and the mass air flow and intake air temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between mass air flow and intake air temperature sensor connector and engine ground. ***Connector & terminal*** ***(B3) No. 4 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the mass air flow and intake air temperature sensor connector • Poor contact of ECM connector
4	**CHECK FOR POOR CONTACT.** Check for poor contact of mass air flow and intake air temperature sensor connector.	Is there poor contact of mass air flow and intake air temperature sensor connector?	Repair the poor contact of mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuits of the air flow sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor (2) Voltage (V) (3) Amount of intake air (kg (lb)/s)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.43 V

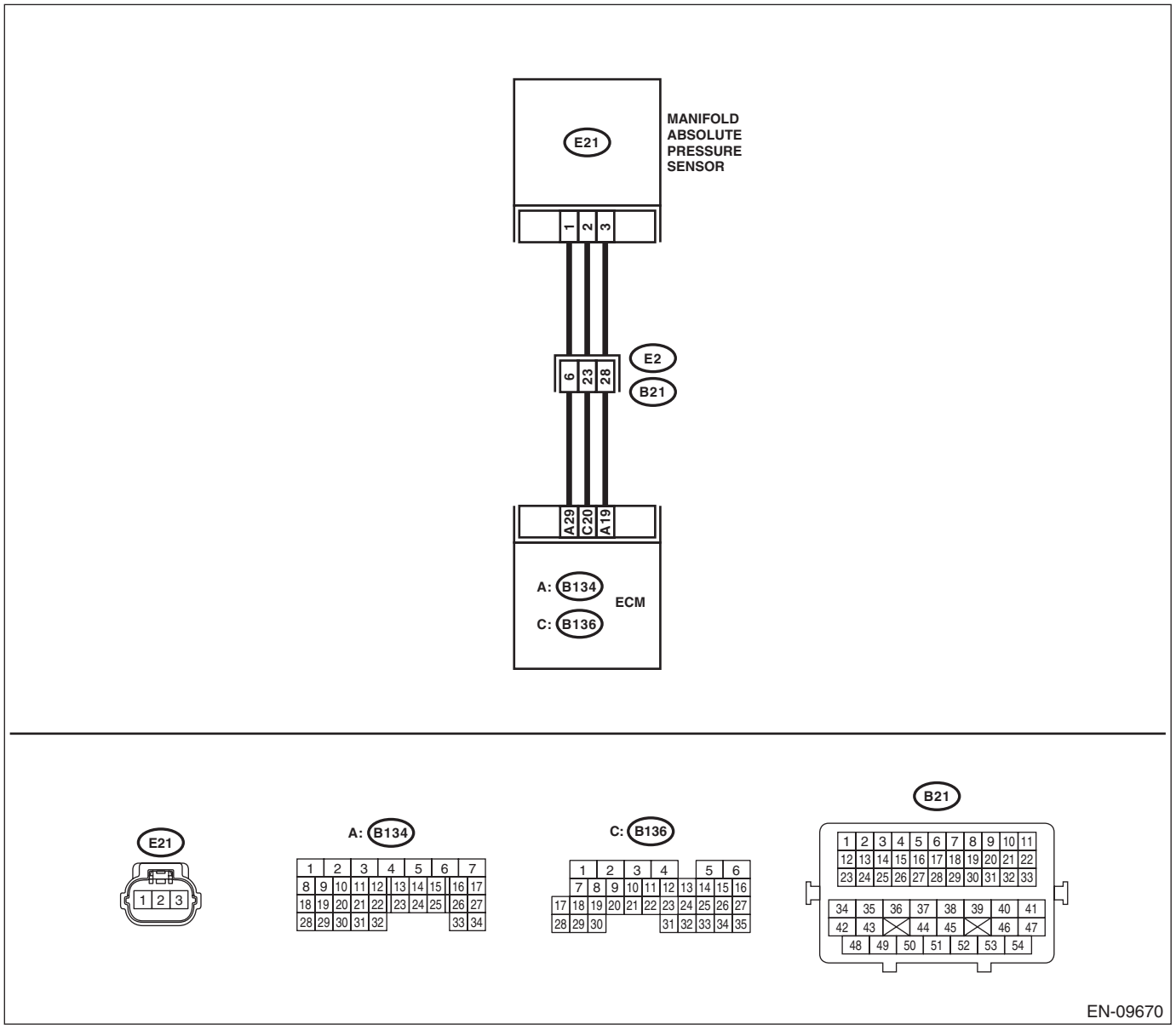
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AC:DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



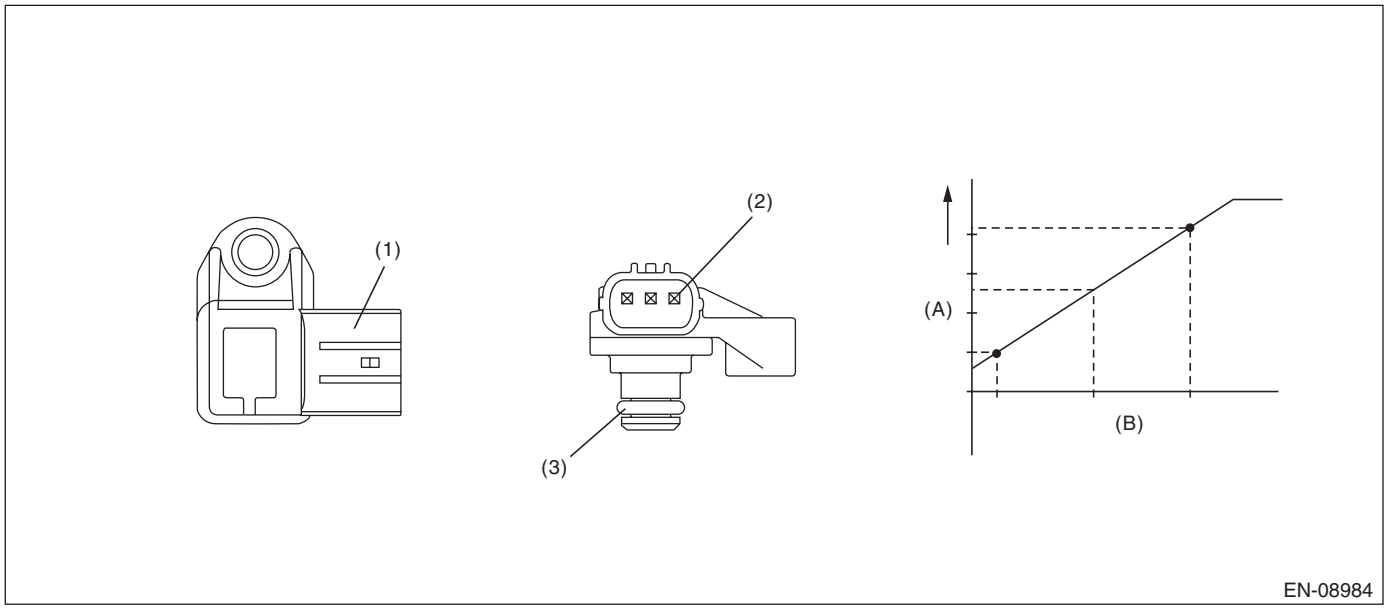
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	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» less than 13.3 kPa (100 mmHg, 3.94 inHg)?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK POWER SUPPLY OF MANIFOLD ABSOLUTE PRESSURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manifold absolute pressure sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between manifold absolute pressure sensor connector and engine ground. ***Connector & terminal*** ***(E21) No. 3 (+) — Engine ground (–):***	Is the voltage 4.5 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and manifold absolute pressure sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and manifold absolute pressure sensor connector. ***Connector & terminal*** ***(B136) No. 20 — (E21) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and manifold absolute pressure sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair short circuit to ground in harness between ECM connector and manifold absolute pressure sensor connector.
5	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and manifold absolute pressure sensor connector.	Is there poor contact of ECM or manifold absolute pressure sensor connector?	Repair the poor contact of ECM or manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(HEV))-67, Manifold Absolute Pressure Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of intake manifold pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Output voltage
(B) Absolute pressure
(1) Connector
(2) Terminals
(3) O-ring

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.608 V

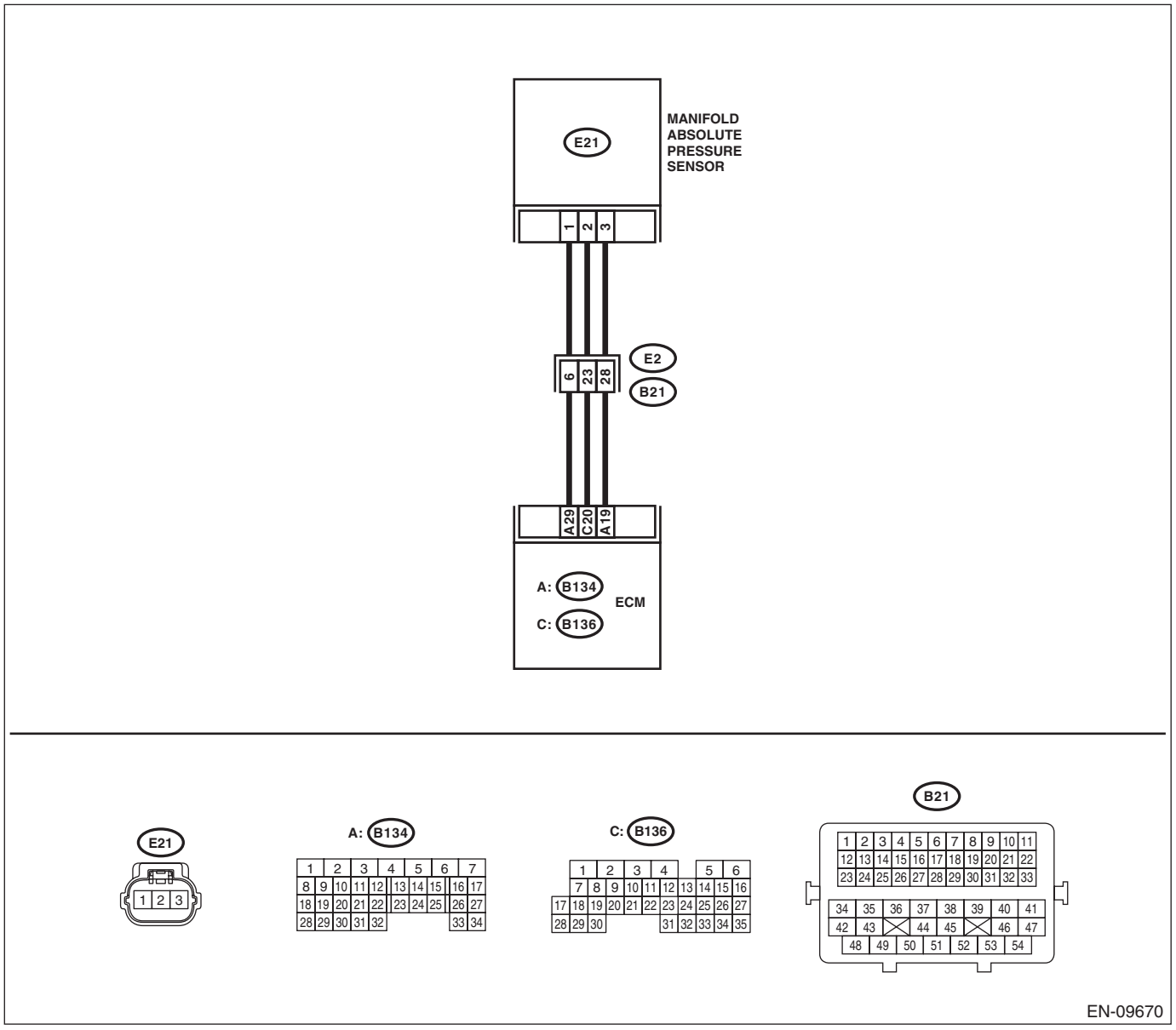
Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AD:DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

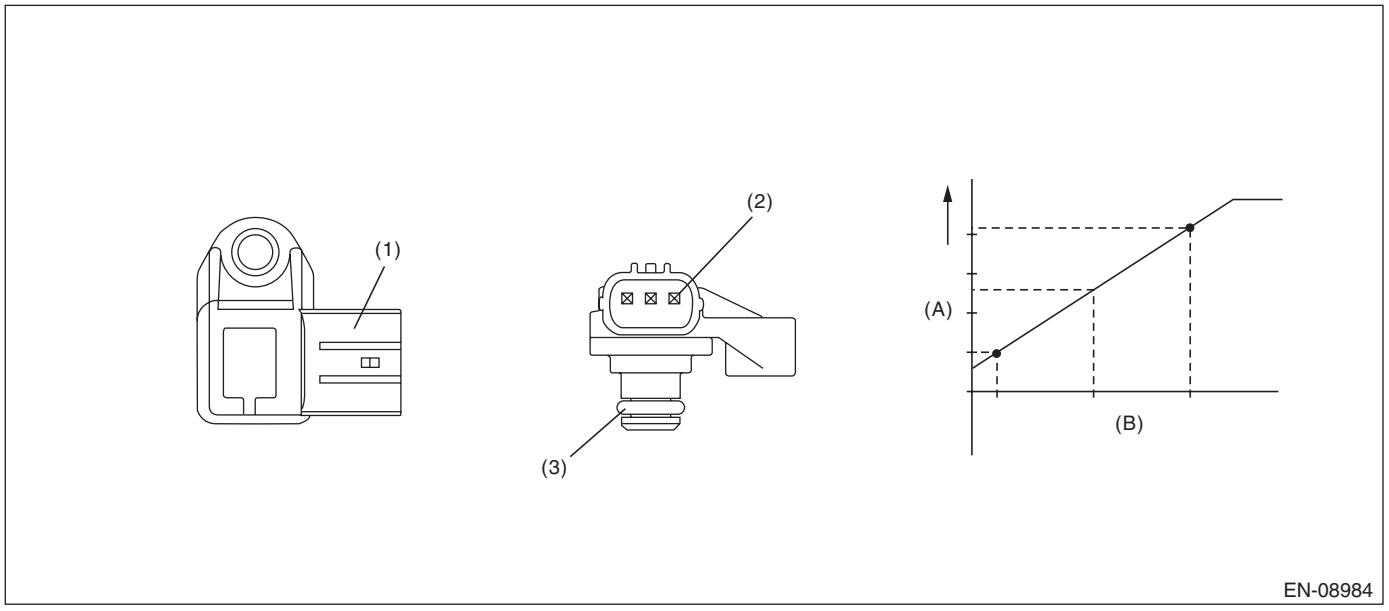


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» 119.5 kPa (896.5 mmHg, 35.29 inHg) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manifold absolute pressure sensor. 3) Start the engine. 4) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» 119.5 kPa (896.5 mmHg, 35.29 inHg) or more?	Repair the short circuit to power in harness between ECM connector and manifold absolute pressure sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between manifold absolute pressure sensor connector and engine ground. ***Connector & terminal*** ***(E21) No. 1 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and manifold absolute pressure sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
4	**CHECK FOR POOR CONTACT.** Check for poor contact of manifold absolute pressure sensor connector.	Is there poor contact of manifold absolute pressure sensor connector?	Repair the poor contact of manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(HEV))-67, Manifold Absolute Pressure Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of intake manifold pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Output voltage
(B) Absolute pressure
(1) Connector
(2) Terminals
(3) O-ring

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 3.906 V

Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AE:DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE BANK 1

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

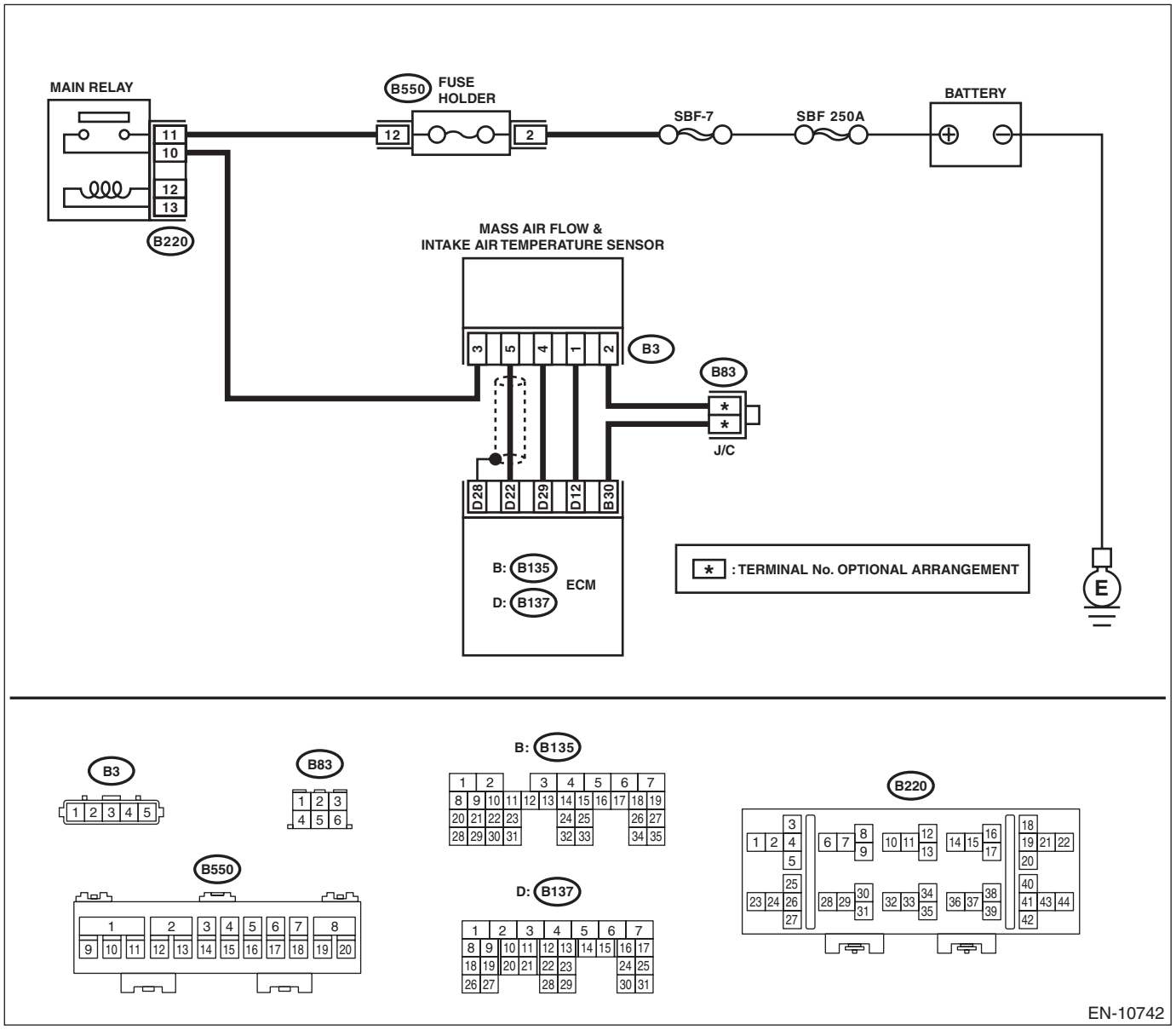
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



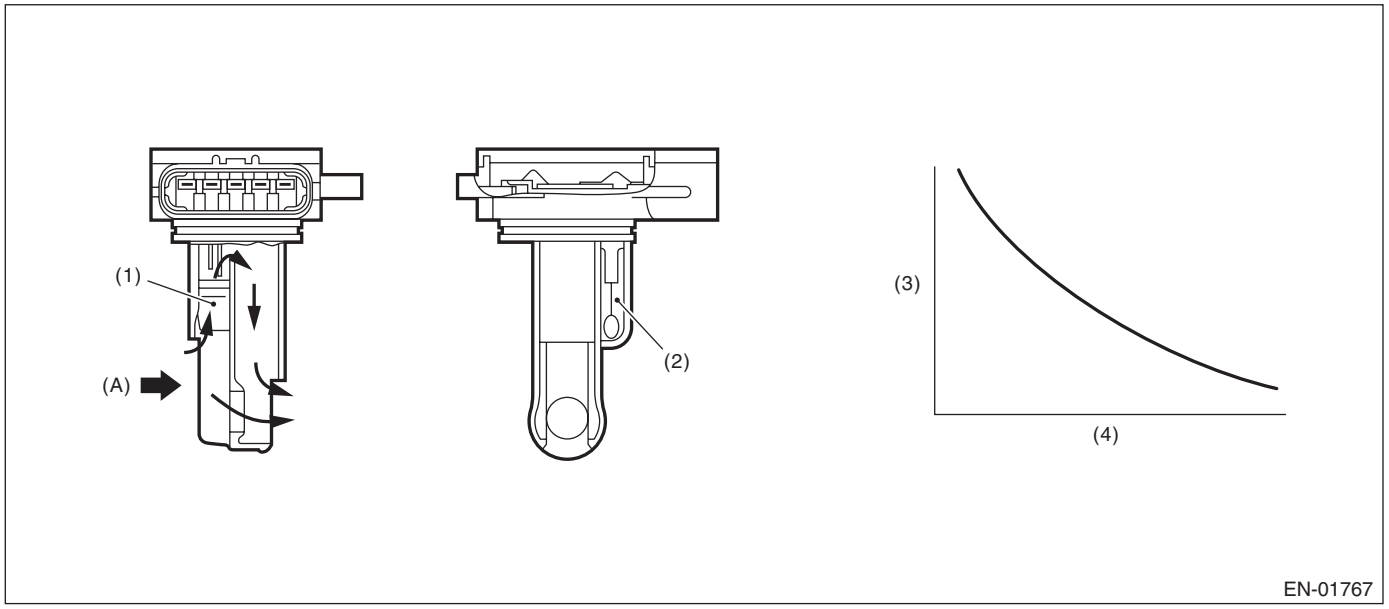
	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Disconnect the connectors from the mass air flow and intake air temperature sensor. 2) Measure the resistance between the mass air flow and intake air temperature sensor terminals when the engine is cold and after warmed up. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance of the mass air flow and intake air temperature sensor different between when engine is cold and after warmed up?	Repair the poor contact of ECM connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the intake air temperature sensor output properties. Using the following two diagnoses, judge as NG when either is NG.

- **Diagnosis 1 (correlation diagnosis):** After the engine starts after the specified period of soaking time has elapsed, diagnose by correlation between intake air temperature sensor value, engine coolant temperature sensor value and ambient temperature sensor value. Judge as NG when the differences are both above the specified value by comparing between intake air temperature and engine coolant temperature, intake air temperature and ambient air temperature.
- **Diagnosis 2 (stuck diagnosis):** Judge as NG when intake air temperature does not change under the driving condition where it should change, considering engine condition.

2. COMPONENT DESCRIPTION



(A) Air

(1) Air flow sensor
(2) Intake air temperature sensor
(3) Resistance value (Ω)
(4) Intake air temperature °C (°F)

3. EXECUTION CONDITION

Diagnosis 1

Secondary Parameters	Execution condition
Soaking time	≥ 21600 s
Block heater judgment	Completed
Block heater operation	Not in operation

Diagnosis 2

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Engine coolant temperature	≥ 60 °C (140 °F)
Intake air amount sum value	≥ Value of Map 1
Number of experiences under conditions below	≥ 3 time(s)
• Continuous time when vehicle speed is less than 4 km/h (2.5 MPH)	≥ Value from Map 2
• Continuous time when vehicle speed is 40 km/h (24.9 MPH) or more and intake air amount is 10 g/s (0.35 oz/s) or more.	≥ 15 s

Map 1

Engine coolant temperature °C (°F)	-30 (-22)	-10 (14)	0 (32)	10 (50)	20 (68)
Intake air amount sum value (g (oz))	60000 (2116.2)	8500 (299.8)	7500 (264.53)	7000 (246.89)	5000 (176.35)

Map 2

Engine coolant temperature °C (°F)	-30 (-22)	-10 (14)	0 (32)	10 (50)
Continuous time (s) when vehicle speed is less than 4 km/h (2.5 MPH)	180	100	70	45

4. GENERAL DRIVING CYCLE

- **Diagnosis 1:** Perform the diagnosis only once after the engine starts after a certain period of soaking time.
- **Diagnosis 2:** Perform the diagnosis when the vehicle speed condition is met after warming up from a cold condition.

5. DIAGNOSTIC METHOD

Judge as NG when Diagnosis 1 or Diagnosis 2 becomes NG.

Diagnosis 1

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value Intake air temperature 30 sec. after engine start – Engine coolant temperature at engine start	> Value of Map 3
Absolute value Intake air temperature 30 sec. after engine start – Ambient air temperature 30 sec. after engine start	> Value of Map 4

Map 3

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Intake air temperature 30 sec. after engine start – Engine coolant temperature at engine start| °C (°F)	12 (21.6°F)	12 (21.6°F)	22 (39.6°F)	22 (39.6°F)

Map 4

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Intake air temperature 30 sec. after engine start – Ambient air temperature 30 sec. after engine start| °C (°F)	20 (36°F)	20 (36°F)	32 (57.6°F)	32 (57.6°F)

Time Needed for Diagnosis: Less than 1 second

Diagnosis 2

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage difference between Max. and Min.	< 0.02 V (Equivalent to approximately 0.5°C (0.9°F) when the ambient air temperature is near 25°C (77°F)) (Equivalent to approximately 0.9°C (1.6°F) when the ambient air temperature is near –7°C (19.4°F))

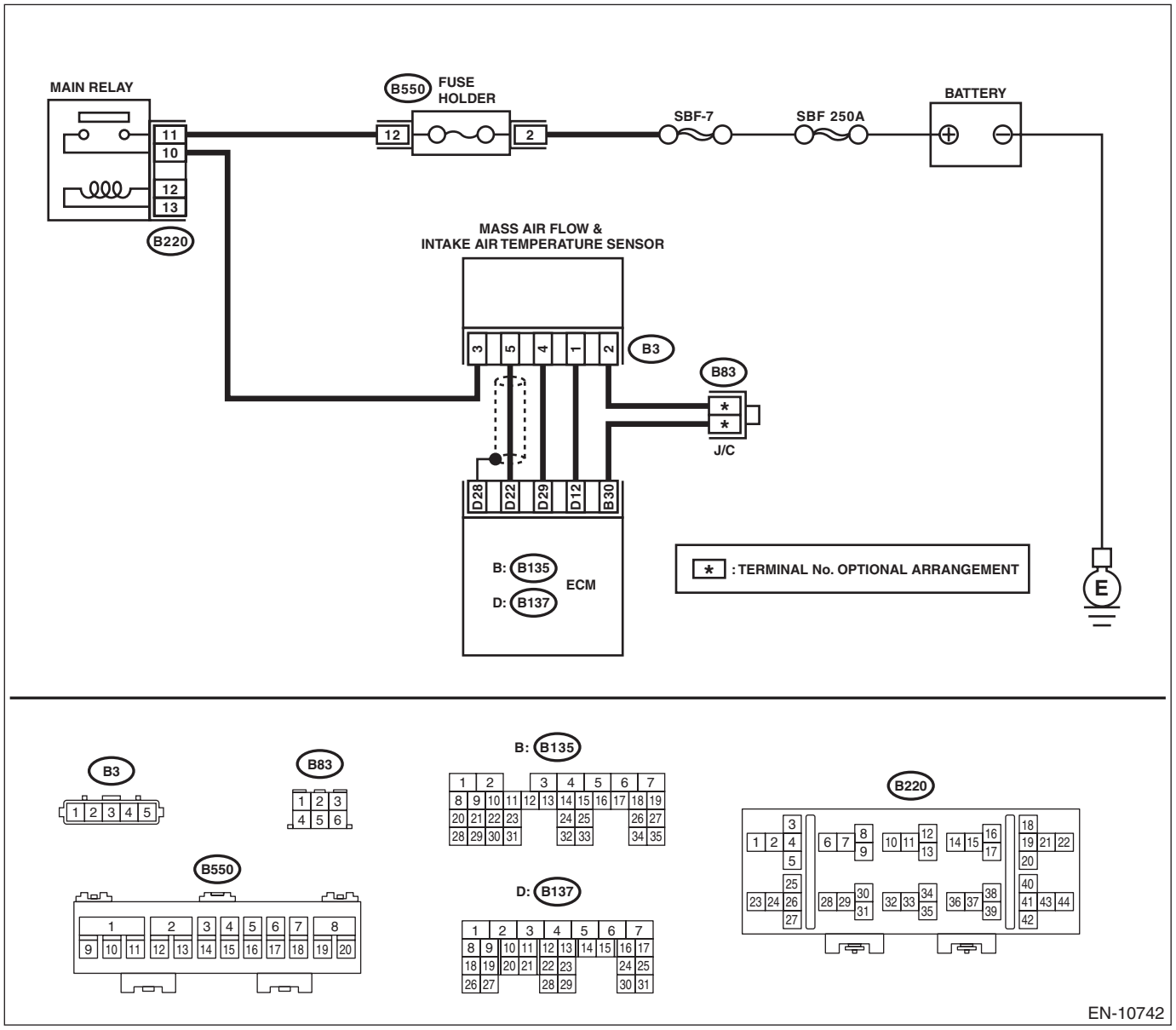
Time Needed for Diagnosis: Less than 1 second

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AF:DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

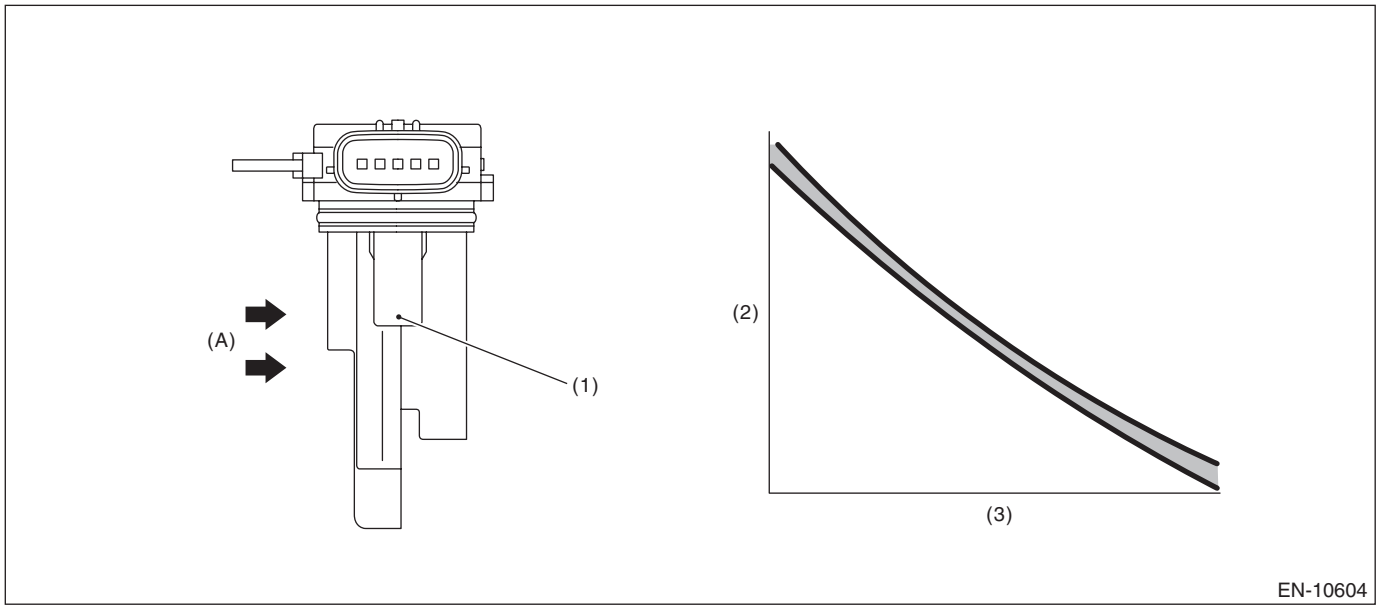


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Intake Air Temp.» 120°C (248°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the mass air flow and intake air temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>	Repair the ground short circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the intake air temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Air

(1) Intake air temperature sensor (2) Resistance value (Ω) (3) Intake air temperature °C (°F)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

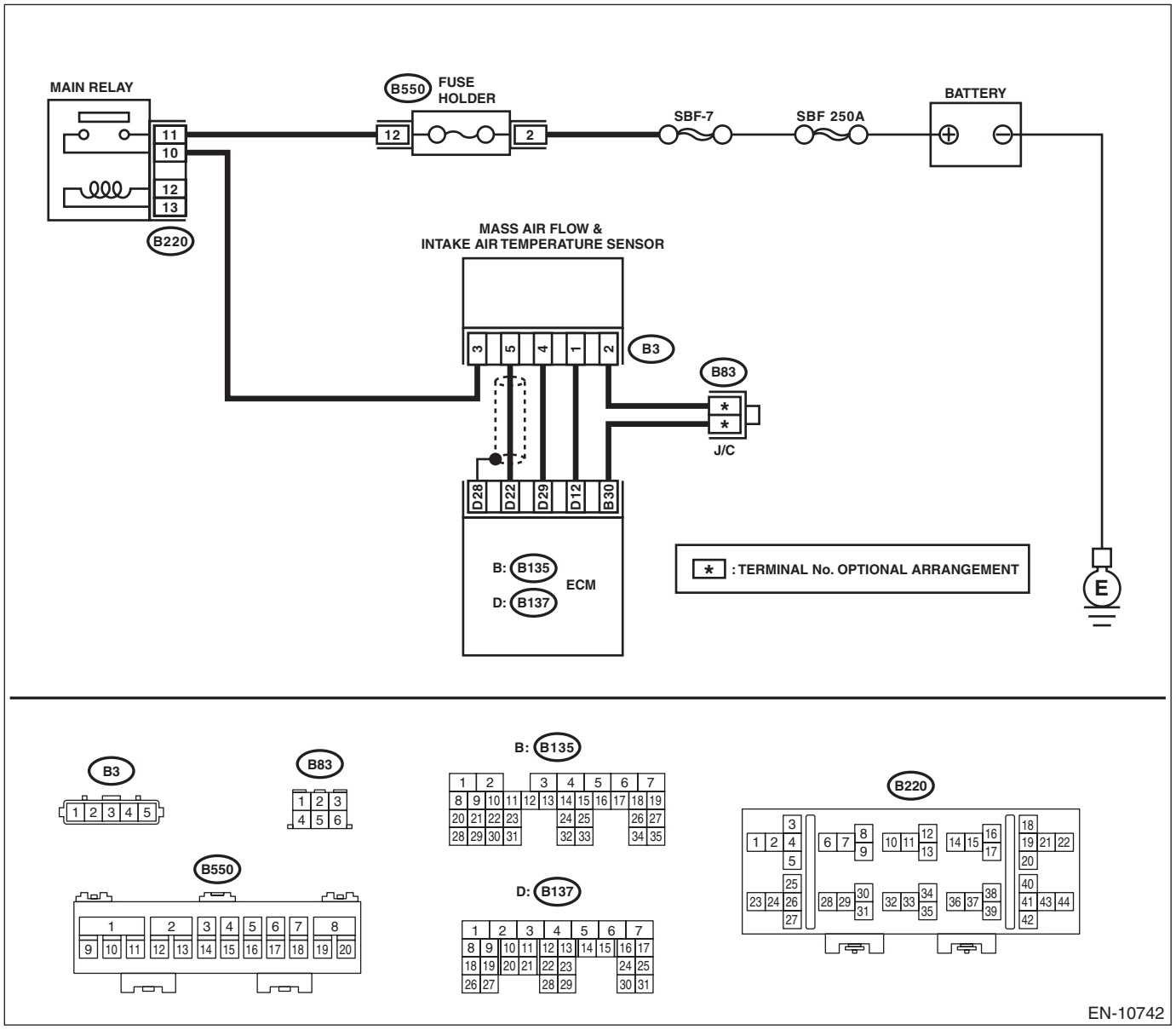
Malfunction Criteria	Threshold Value
Output voltage	< 0.4 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AG:DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

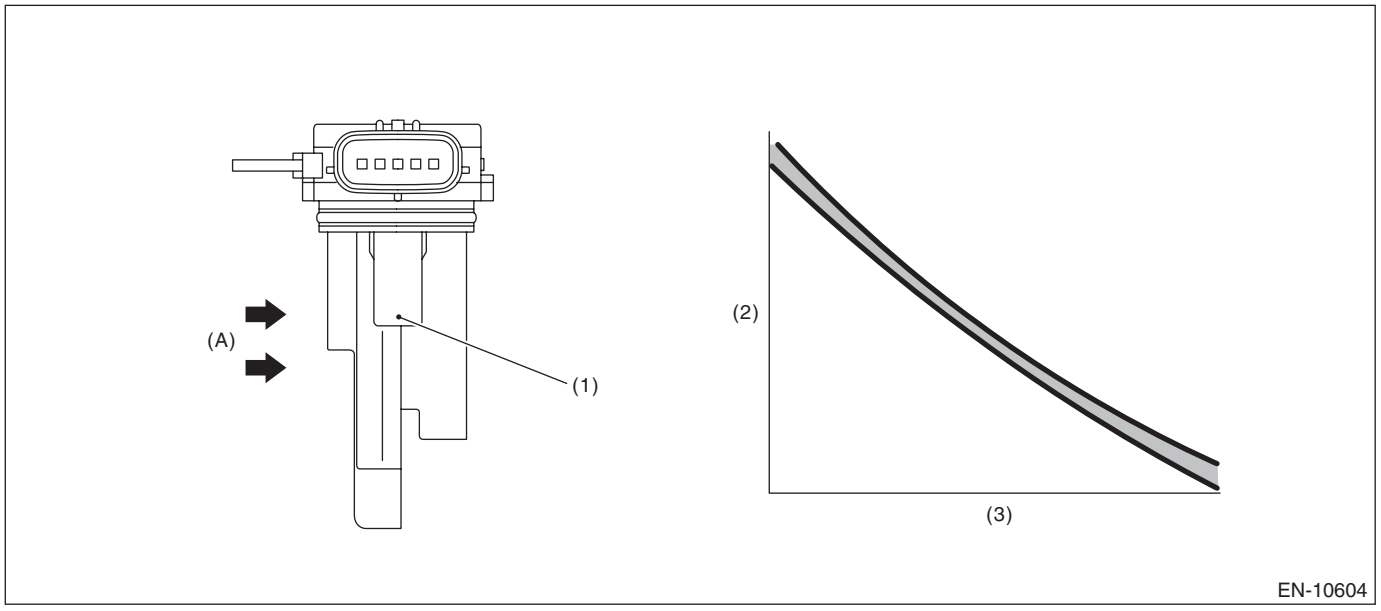


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Intake Air Temp.» –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and mass air flow and intake air temperature sensor connector.	Is there poor contact of ECM or mass air flow and intake air temperature sensor connector?	Repair the poor contact of ECM or mass air flow and intake air temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the mass air flow and intake air temperature sensor. 3) Measure the resistance of harness between ECM connector and the mass air flow and intake air temperature sensor connector. ***Connector & terminal*** ***(B137) No. 12 — (B3) No. 1:*** ***(B135) No. 30 — (B3) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the mass air flow and intake air temperature sensor connector • Poor contact of joint connector
4	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 12 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and the mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the intake air temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Air

(1) Intake air temperature sensor (2) Resistance value (Ω) (3) Intake air temperature °C (°F)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.707 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AH:DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

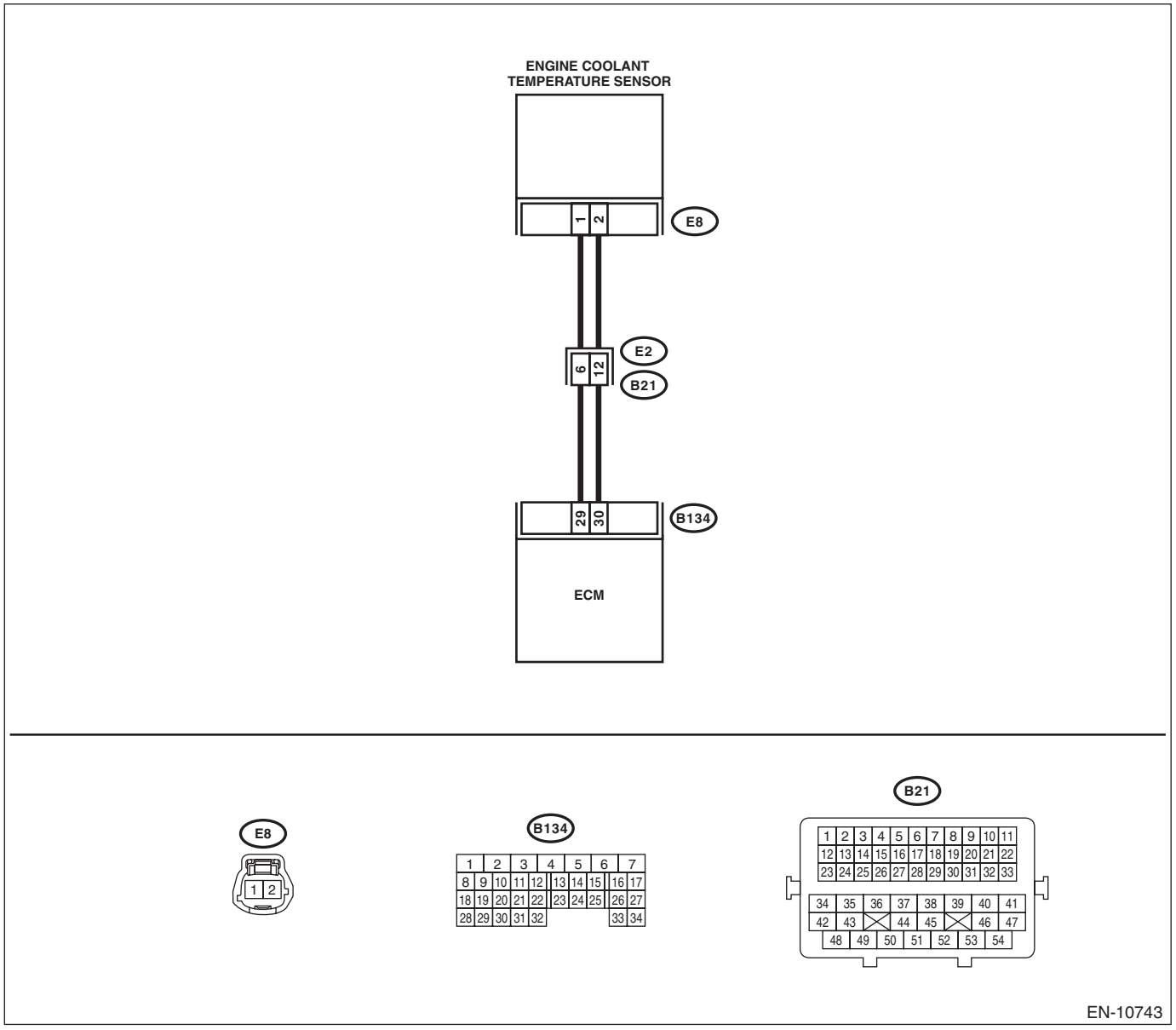
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

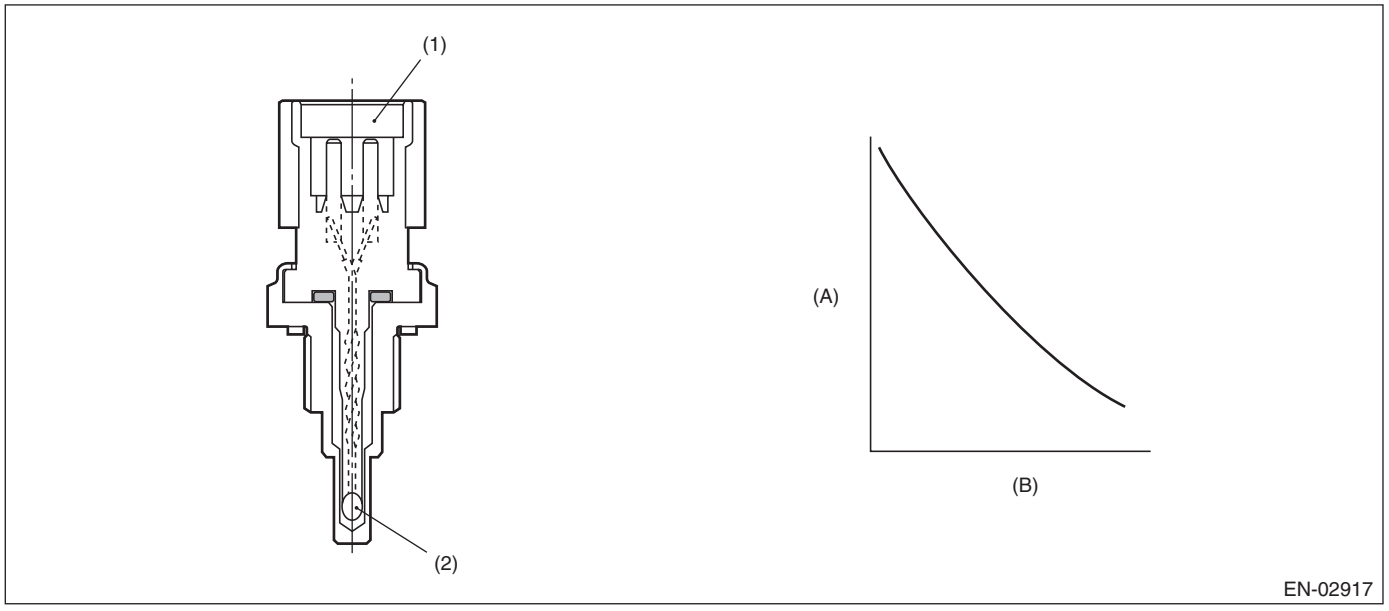


	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Disconnect the connectors from the engine coolant temperature sensor. 2) Measure the resistance between engine coolant temperature sensor terminals when the engine coolant is cold and after warmed up. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance of engine coolant temperature sensor different between when engine coolant is cold and after warmed up?	Repair the poor contact of ECM connector.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the engine coolant temperature sensor characteristics.
After the engine starts after the specified period of soaking time has elapsed, diagnose by correlation between engine coolant temperature sensor value, intake air temperature sensor value and ambient temperature sensor value. Judge as NG when the differences are both above the specified value by comparing between engine coolant temperature and ambient air temperature, engine coolant temperature and intake air temperature.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Soaking time	≥ 21600 s
Block heater judgment	Completed
Block heater operation	Not in operation

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the engine starts after a certain period of soaking time.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
|Engine coolant temperature at engine start – Intake air temperature 30 sec. after engine start|	> Value from Map
|Engine coolant temperature at engine start – Ambient air temperature at engine start|	> 25 °C (45°F)

Map

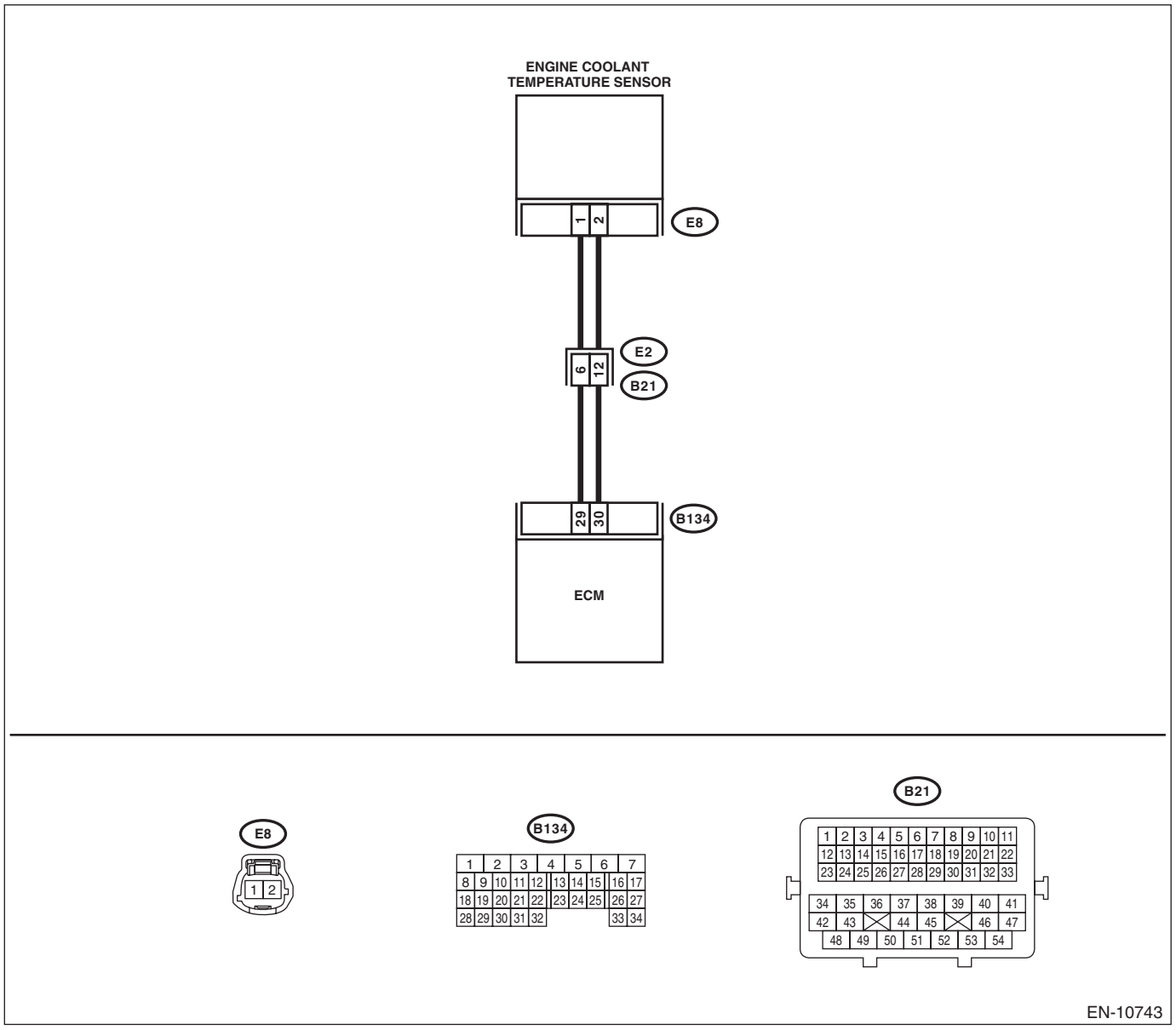
Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Engine coolant temperature at engine start – Intake air temperature 30 sec. after engine start| °C (°F)	12 (21.6°F)	12 (21.6°F)	22 (39.6°F)	22 (39.6°F)

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AI: DTC P0117 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

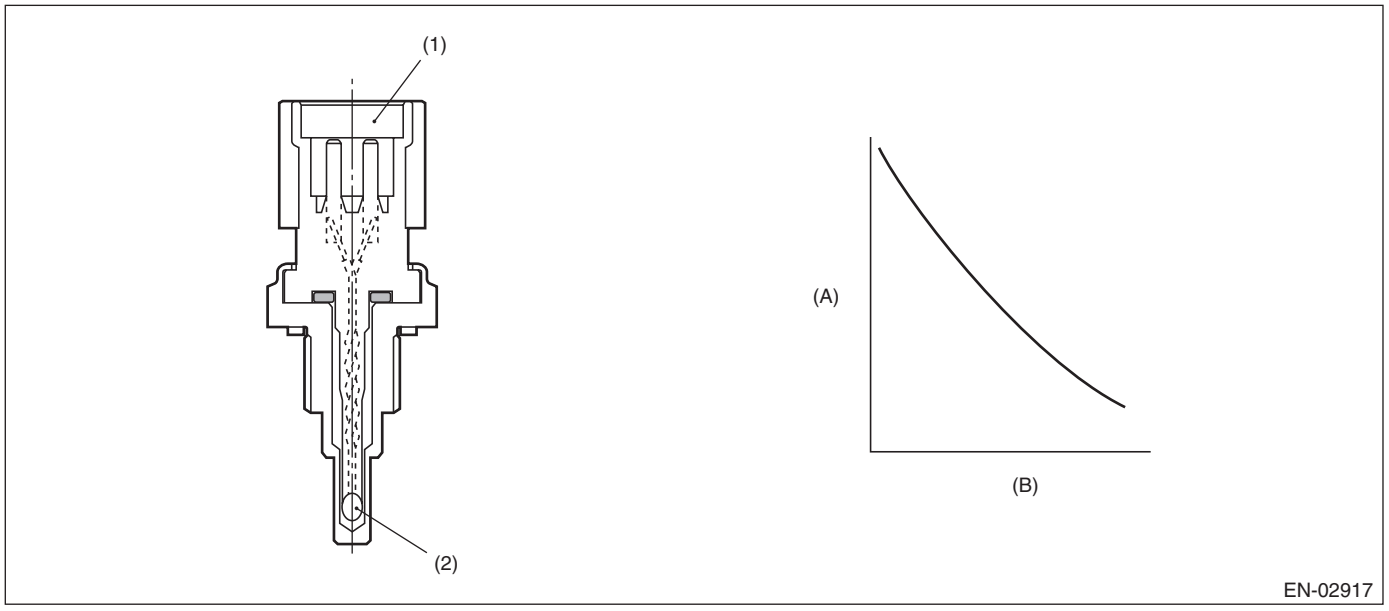


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 120°C (248°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and engine coolant temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 30 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>	Repair the short circuit to ground in harness between ECM connector and engine coolant temperature sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the engine coolant temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

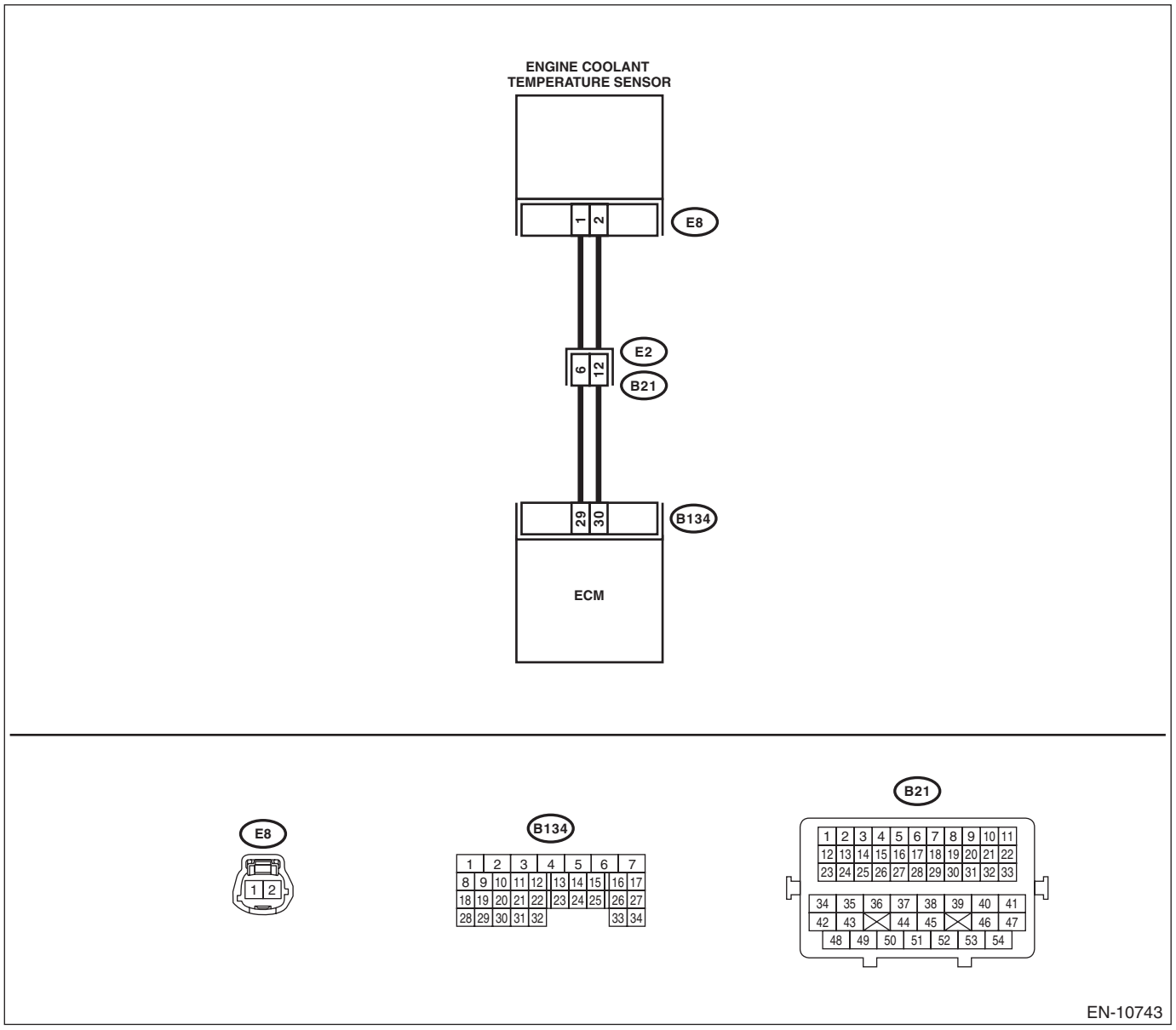
Malfunction Criteria	Threshold Value
Output voltage	< 0.349 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AJ:DTC P0118 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

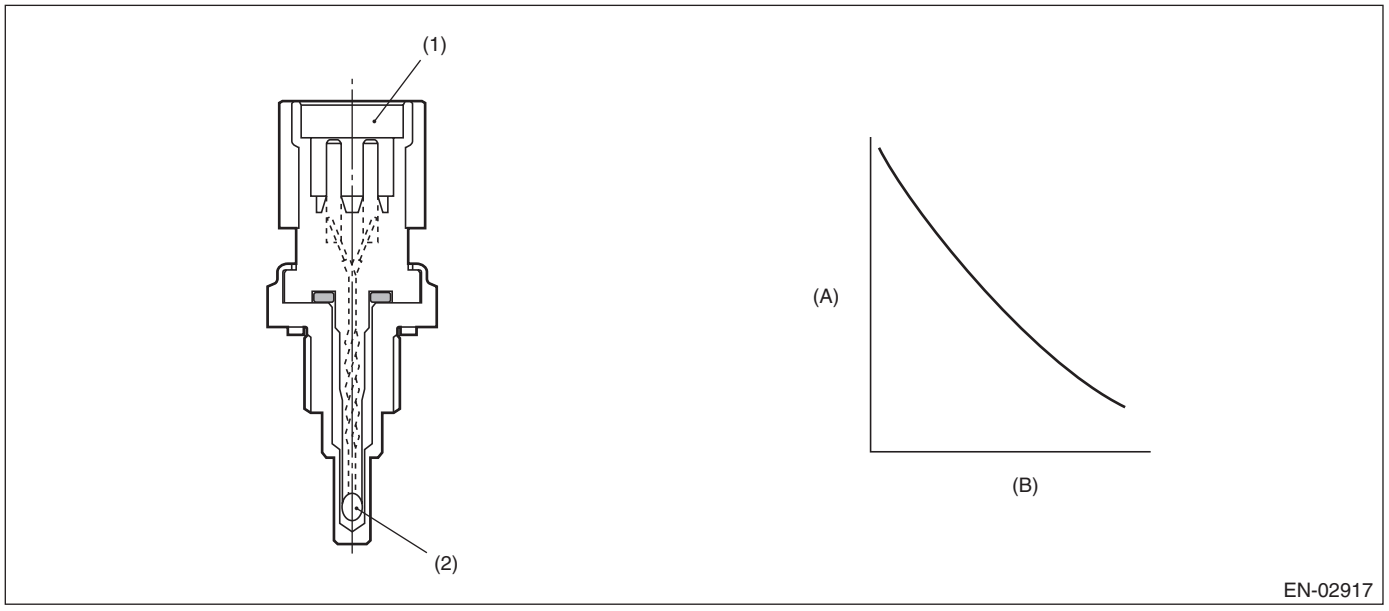


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and engine coolant temperature sensor connector.	Is there poor contact of ECM or engine coolant temperature sensor connector?	Repair the poor contact of ECM or engine coolant temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and engine coolant temperature sensor. 3) Measure the resistance of harness between ECM connector and engine coolant temperature sensor connector. ***Connector & terminal*** ***(B134) No. 29 — (E8) No. 1:*** ***(B134) No. 30 — (E8) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and engine coolant temperature sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 30 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and engine coolant temperature sensor connector.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the engine coolant temperature sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

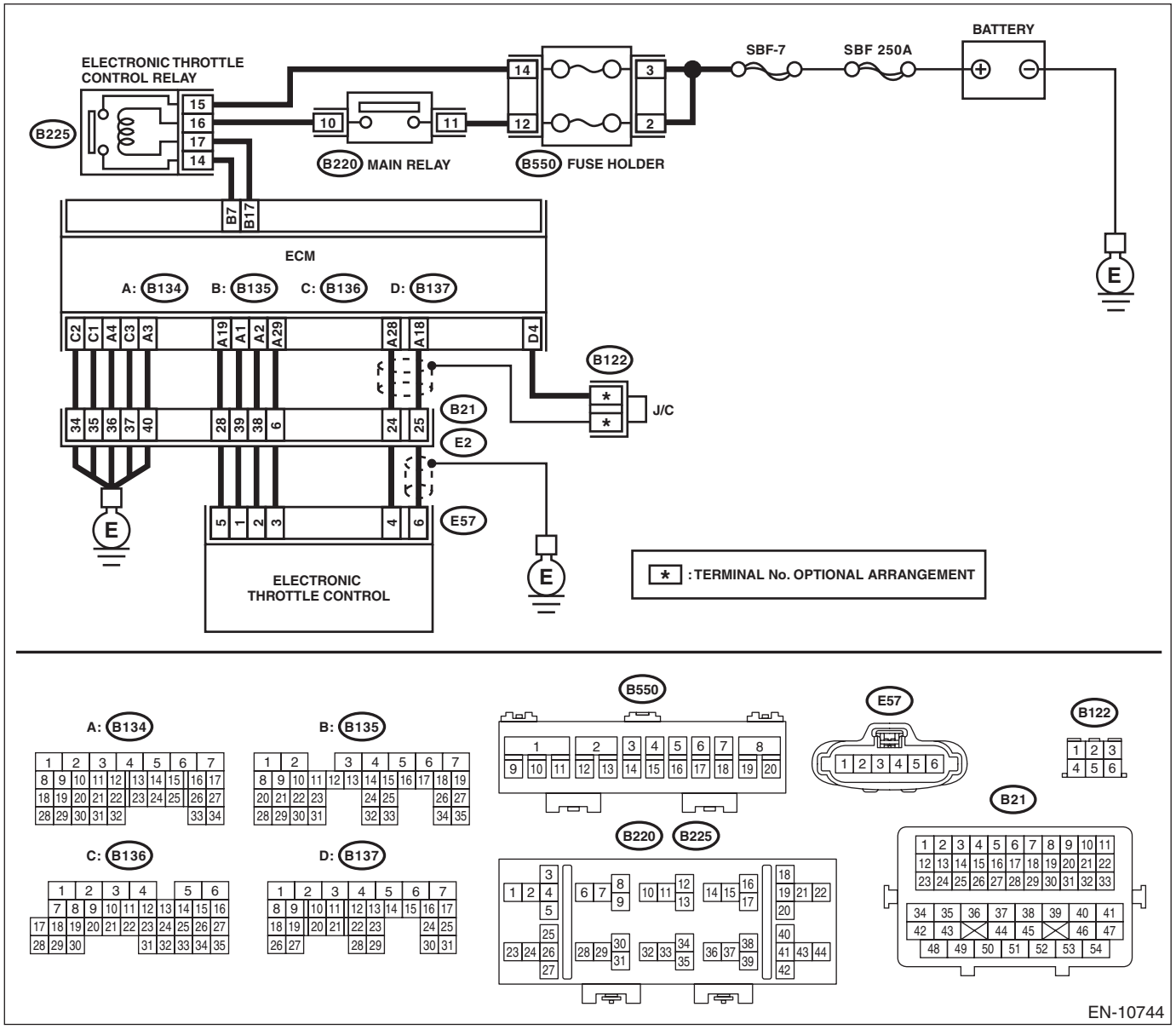
Malfunction Criteria	Threshold Value
Output voltage	≥ 4.698 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AK:DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

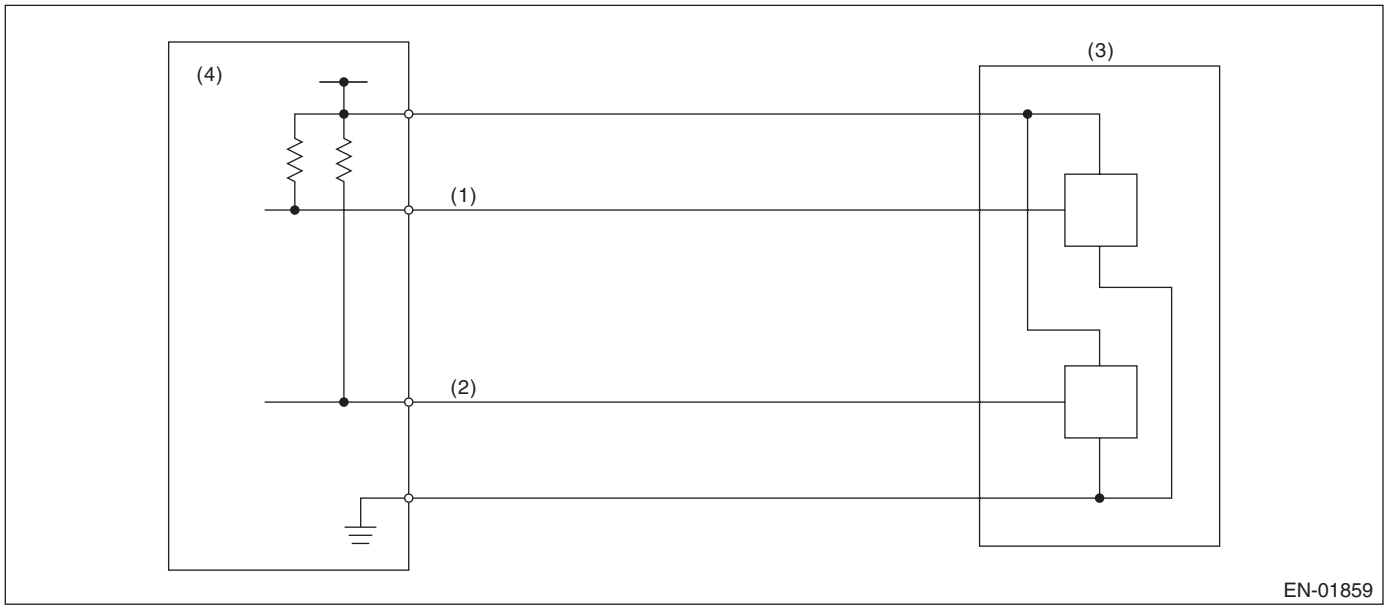


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 18 — Chassis ground:*** ***(B134) No. 18 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 — Engine ground:***	Is the resistance 1 MΩ or more?	Replace the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 1.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

JUDGMENT VALUE

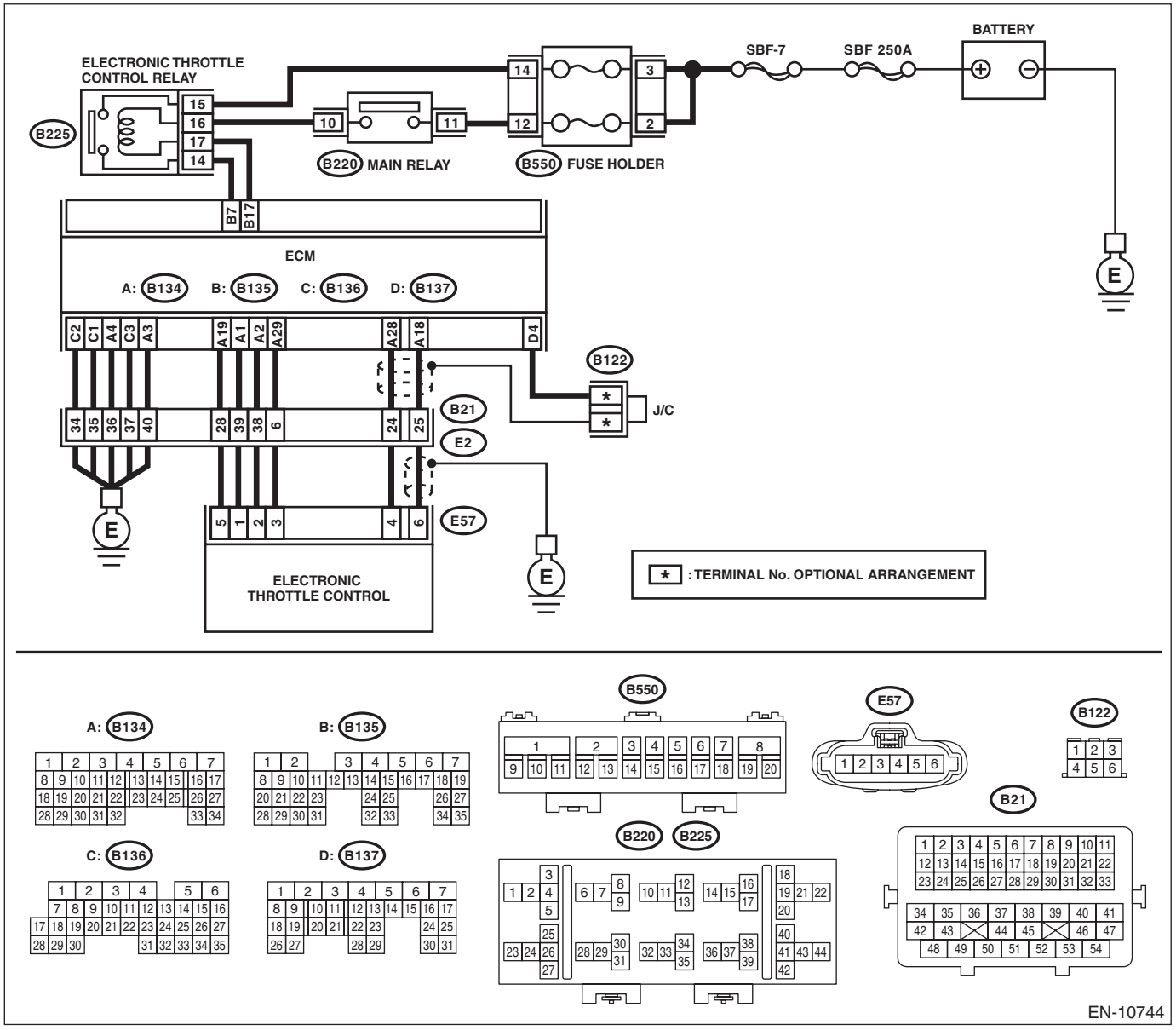
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≤ 0.267 V

Time Needed for Diagnosis: 24 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AL:DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

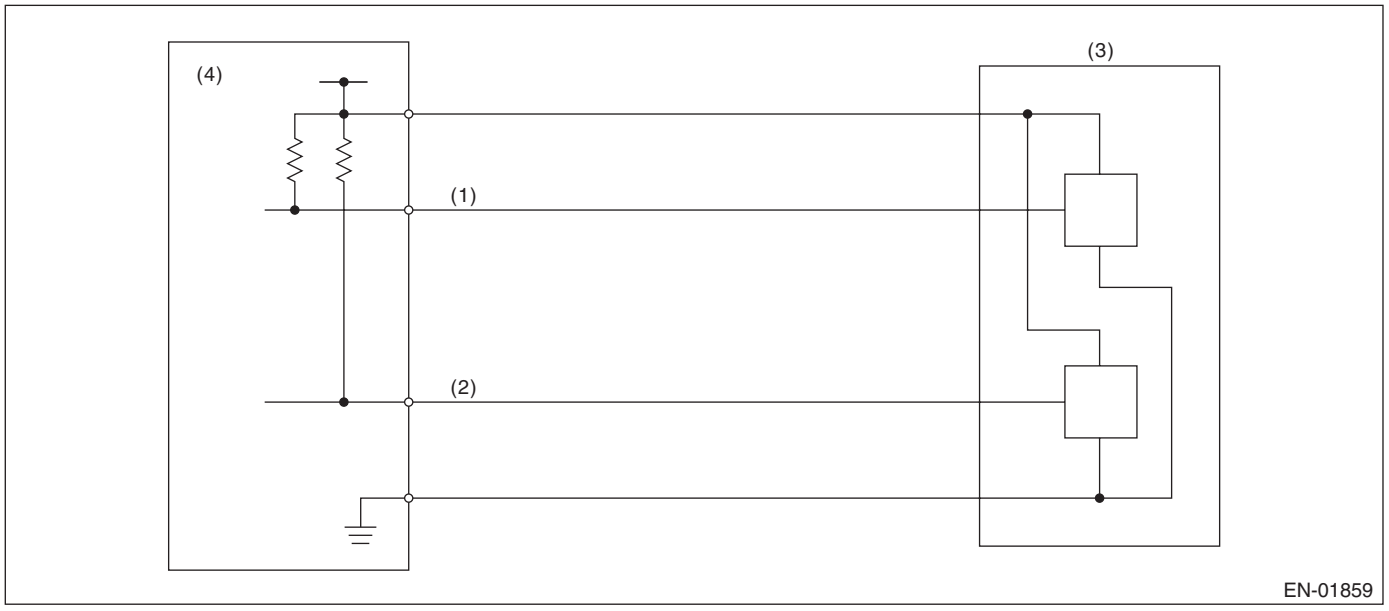


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 18 — (E57) No. 6:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 18:***	Is the resistance 1 MΩ or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 1.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≥ 4.727 V

Time Needed for Diagnosis: 24 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AM:DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Engine does not return to idle.

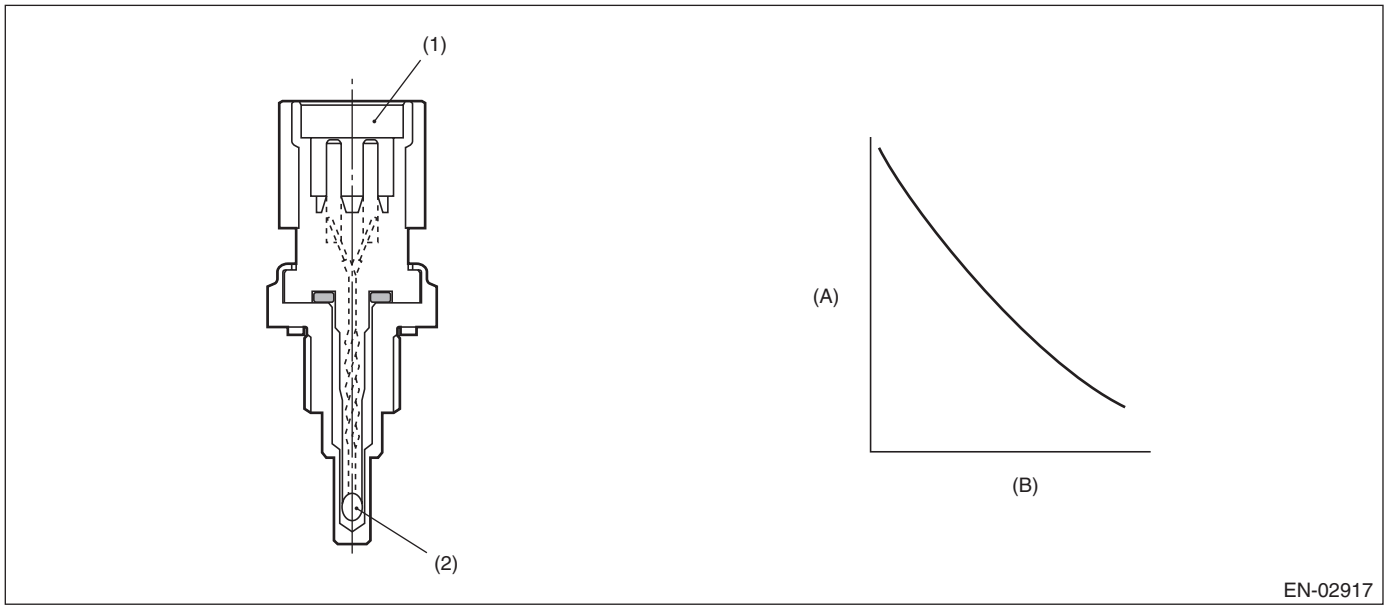
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK ENGINE COOLANT.** Check the following items: • Amount of engine coolant • Engine coolant freeze • Contamination of engine coolant	Is the engine coolant normal?	Go to step **2**.	Fill or replace the engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
2	**CHECK THERMOSTAT.**	Does the thermostat remain opened?	Replace the thermostat. <Ref. to CO(H4DO(w/o HEV))-63, Thermostat.>	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of engine coolant temperature output property.
Judge as NG when engine coolant temperature does not rise to the specified value after predetermined time has elapsed since engine start.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Engine coolant temperature at engine start	< –15 °C (5 °F)
Engine speed	> 500 rpm

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after starting the engine from cold condition.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Engine coolant temperature	< –15 °C (5 °F)
Elapsed time after starting the engine	
(At the time of (The smaller value of either Engine coolant temperature or Intake air temperature at engine start) ≥ –23.3°C (–9.9°F))	≥ 120 s
or	
(At the time of (The smaller value of either Engine coolant temperature or Intake air temperature at engine start) < –23.3°C (–9.9°F))	≥ 300 s

Time Needed for Diagnosis: 120 or 300 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AN:DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Thermostat remains open.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

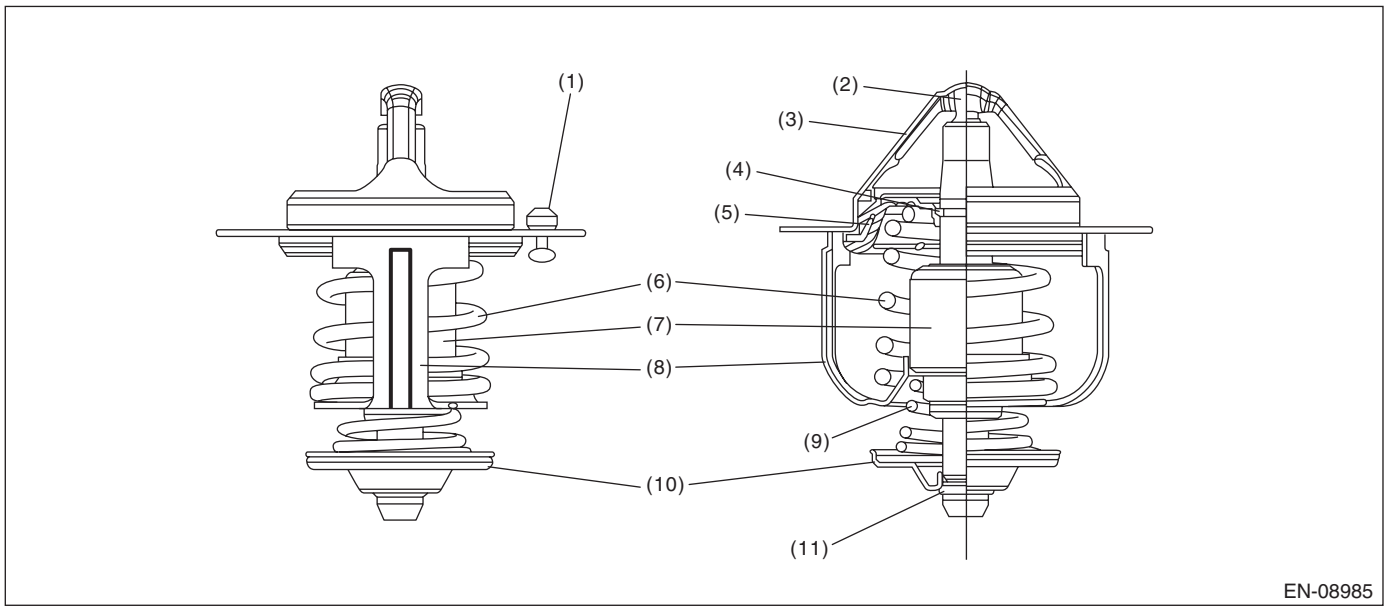
	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ENGINE COOLANT.**	Is the engine coolant amount normal?	Go to step **3**.	Refill the engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
3	**CHECK RADIATOR FAN.** 1) Start the engine. 2) Check the radiator fan operation.	Does the radiator fan continuously rotate for 3 minutes or more during idling?	Repair radiator fan circuit. <Ref. to CO(H4DO(w/o HEV))-88, Radiator Main Fan and Fan Motor.> and <Ref. to CO(H4DO(w/o HEV))-92, Radiator Sub Fan and Fan Motor.>	Replace the thermostat. <Ref. to CO(H4DO(w/o HEV))-63, Thermostat.>

1. OUTLINE OF DIAGNOSIS

Detect malfunctions of the thermostat function.
Judge as NG when any one of the following conditions is established.

- When the actual engine coolant temperature does not reach the maximum temperature necessary to perform other OBDII diagnosis and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 1)
- When the actual engine coolant temperature does not reach the range within –11°C (–19.8°F) from the regulated temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 2)
- When the difference between the estimated coolant temperature and the actual engine coolant temperature exceeds the predetermined value, and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 3)

2. COMPONENT DESCRIPTION



(1) Jiggle valve
(2) Piston
(3) Flange
(4) Stop ring
(5) Dust seal
(6) Main spring
(7) Wax element
(8) Frame
(9) Bypass spring
(10) Bypass valve
(11) Stop ring

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
<Judgment 1>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ –7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	> Value of Map 1
Engine coolant temperature at engine start	< 62 °C (143.6 °F)
<Judgment 2>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ –7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	> Value of Map 2
Engine coolant temperature at engine start	< 62 °C (143.6 °F)
<Judgment 3>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ –7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	> Value of Map 3
Engine coolant temperature at engine start	< 62 °C (143.6 °F)

Map 1

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Estimated coolant temperature °C (°F)	60 (140)	60 (140)	60 (140)	60 (140)

Map 2

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Estimated coolant temperature °C (°F)	70.2 (158.4)	80.2 (176.4)	80.2 (176.4)	80.2 (176.4)

Map 3

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	10 (50)	25 (77)	29 (84.2)
Estimated coolant temperature °C (°F)	59 (138.2)	70 (158)	78 (172.4)	80.2 (176.4)

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
When any one of the followings is established:	
<Judgment 1>	
Actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	< Value of Map 4 > Value of Map 5
<Judgment 2>	
Actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	< Regulated temperature – Value of Map 6 > Value of Map 7
<Judgment 3>	
Estimated engine coolant temperature – actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	> Value of Map 8 > Value of Map 9

Map 4

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	60 (140)	60 (140)	60 (140)	60 (140)

Map 5

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	0 (32)	8 (46.4)	10 (50)	25 (77)	35 (95)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1200 (2160)

Map 6

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	21.1 (30.1)	11.1 (20)	11.1 (20)	11.1 (20)

Map 7

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	0 (32)	8 (46.4)	10 (50)	30 (86)	35 (95)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1500 (2700)

Map 8

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	11.1 (20)	11.1 (20)	11.1 (20)	11.1 (20)

Map 9

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)

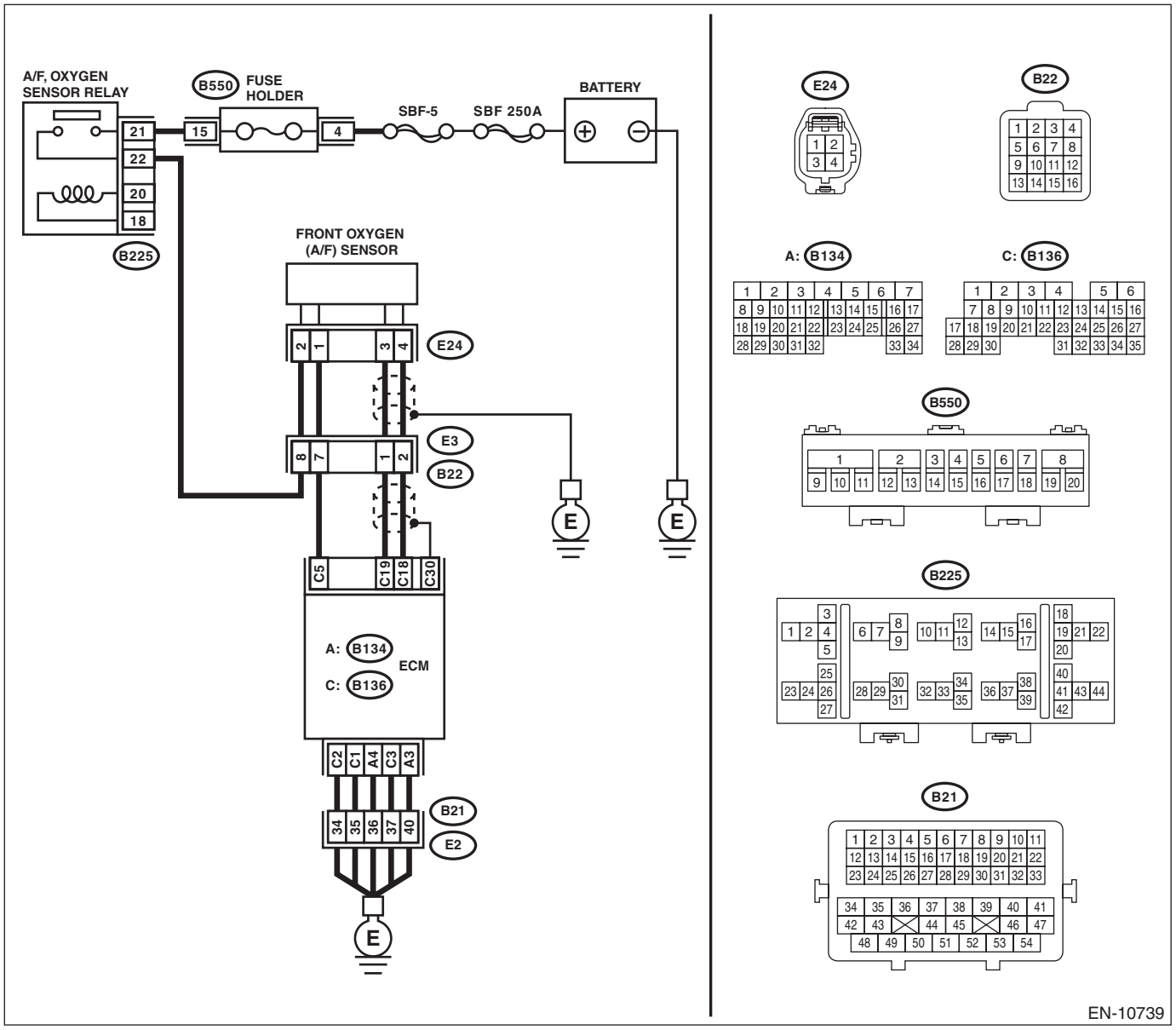
Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AO:DTC P0131 A/F / O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

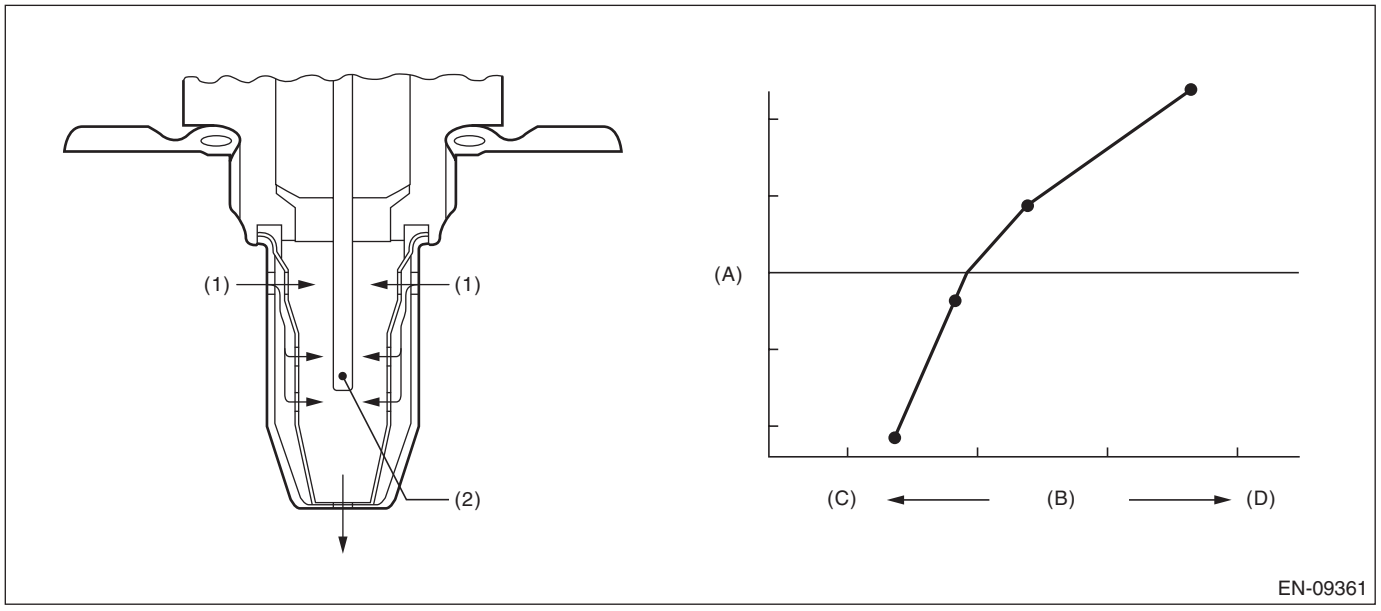


	Step	Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 18 — Chassis ground:*** ***(B136) No. 19 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
3	**CHECK FOR POOR CONTACT.** Check for poor contact of the front oxygen (A/F) sensor connector.	Is there poor contact of front oxygen (A/F) sensor connector?	Repair the poor contact of front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of sensor.
Judge as NG, when the element voltage is out of the specified range.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Rich
(D) Lean

(1) Exhaust gas
(2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
(1) Input voltage (+) or (2) Input voltage (–) or (3) |Input voltage (+) – Input voltage (–)| and 3.8 V < Input voltage (–) < 4.7 V	< 0.4 V < 0.4 V < 0.1 V

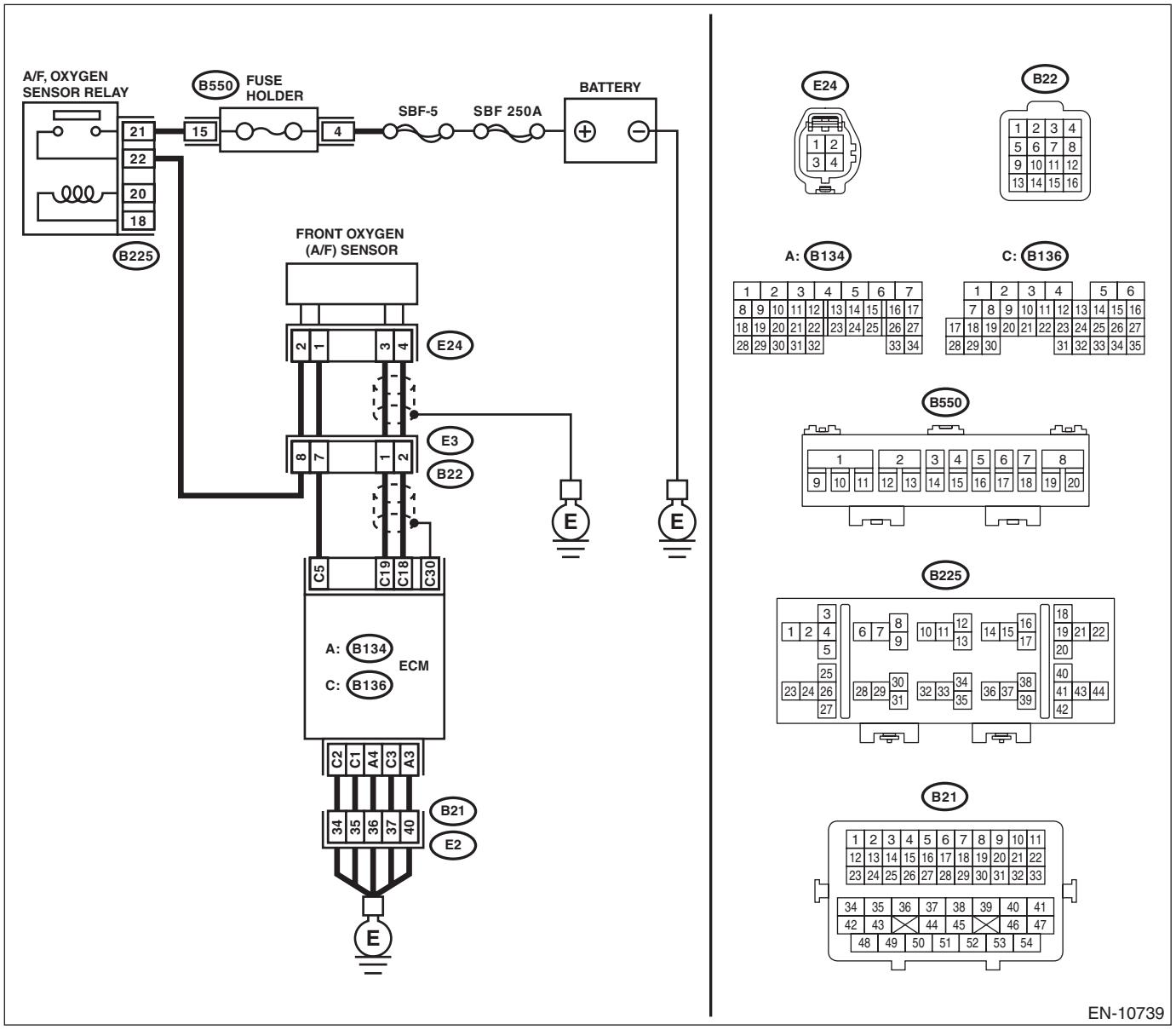
Time Needed for Diagnosis:
(1): 1000 ms
(2): 1000 ms
(3): 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AP:DTC P0132 A/F / O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

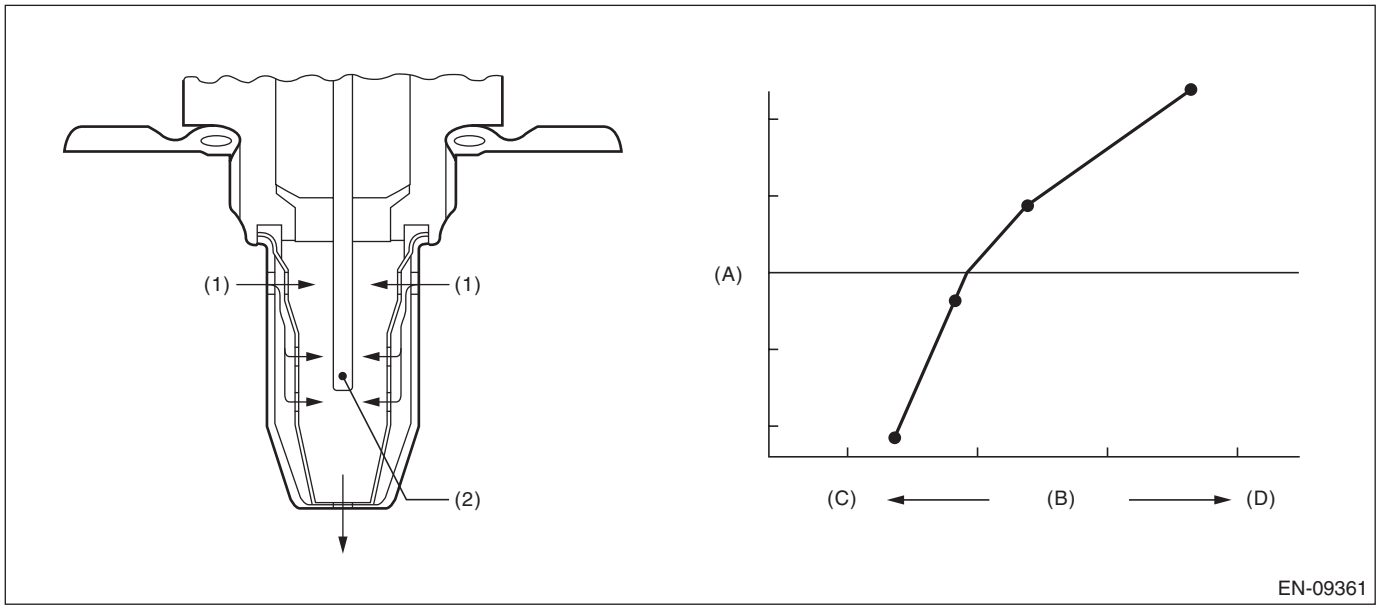


	Step	Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from front oxygen (A/F) sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 18 (+) — Chassis ground (–):*** ***(B136) No. 19 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of sensor.
Judge as NG, when the element voltage is out of the specified range.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Rich
(D) Lean

(1) Exhaust gas
(2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
(1) Input voltage (+) or (2) Input voltage (–)	> 4.7 V > 4.7 V

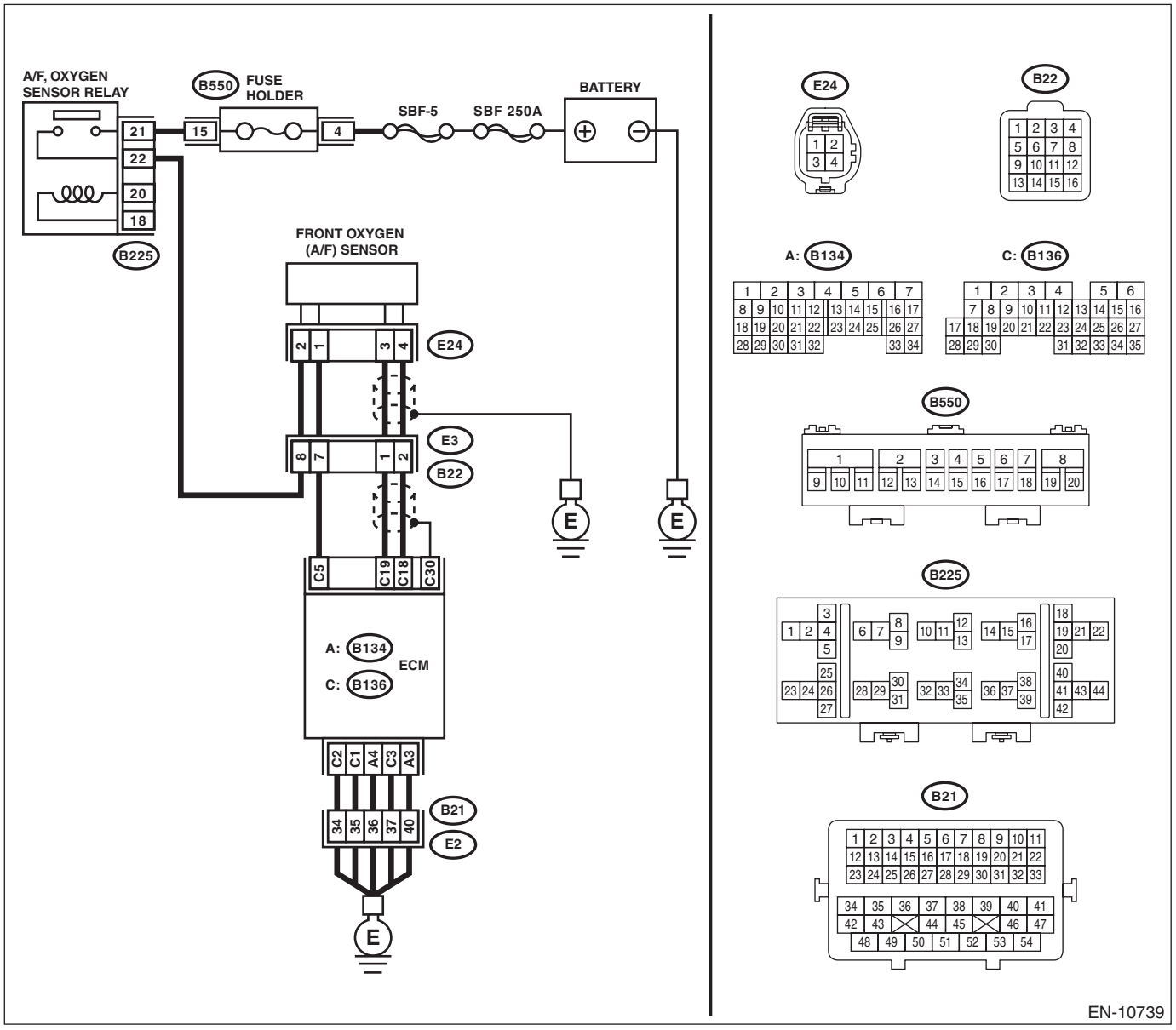
Time Needed for Diagnosis:
(1): 1000 ms
(2): 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AQ:DTC P0134 A/F / O2 SENSOR CIRCUIT NO ACTIVITY DETECTED BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

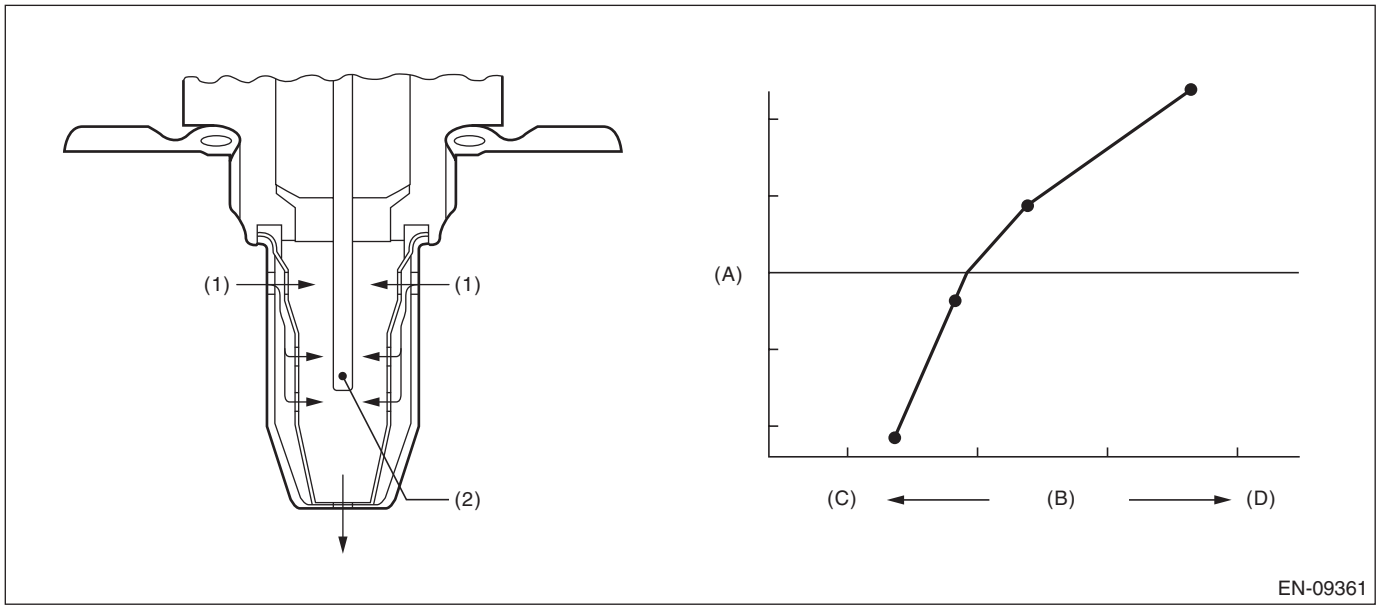


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and front oxygen (A/F) sensor connector.	Is there poor contact of ECM or front oxygen (A/F) sensor connector?	Repair the poor contact of ECM or front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect open circuits of the sensor.
Judge as NG when the impedance of the element is large.

2. COMPONENT DESCRIPTION



(A) Electromotive force (B) Air fuel ratio (C) Rich
(D) Lean

(1) Exhaust gas (2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Time of heater control duty at 70 % or more	≥ 36000 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Front oxygen (A/F) sensor impedance	> 450 Ω

Time Needed for Diagnosis: 5000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AR:DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2

DTC DETECTING CONDITION:

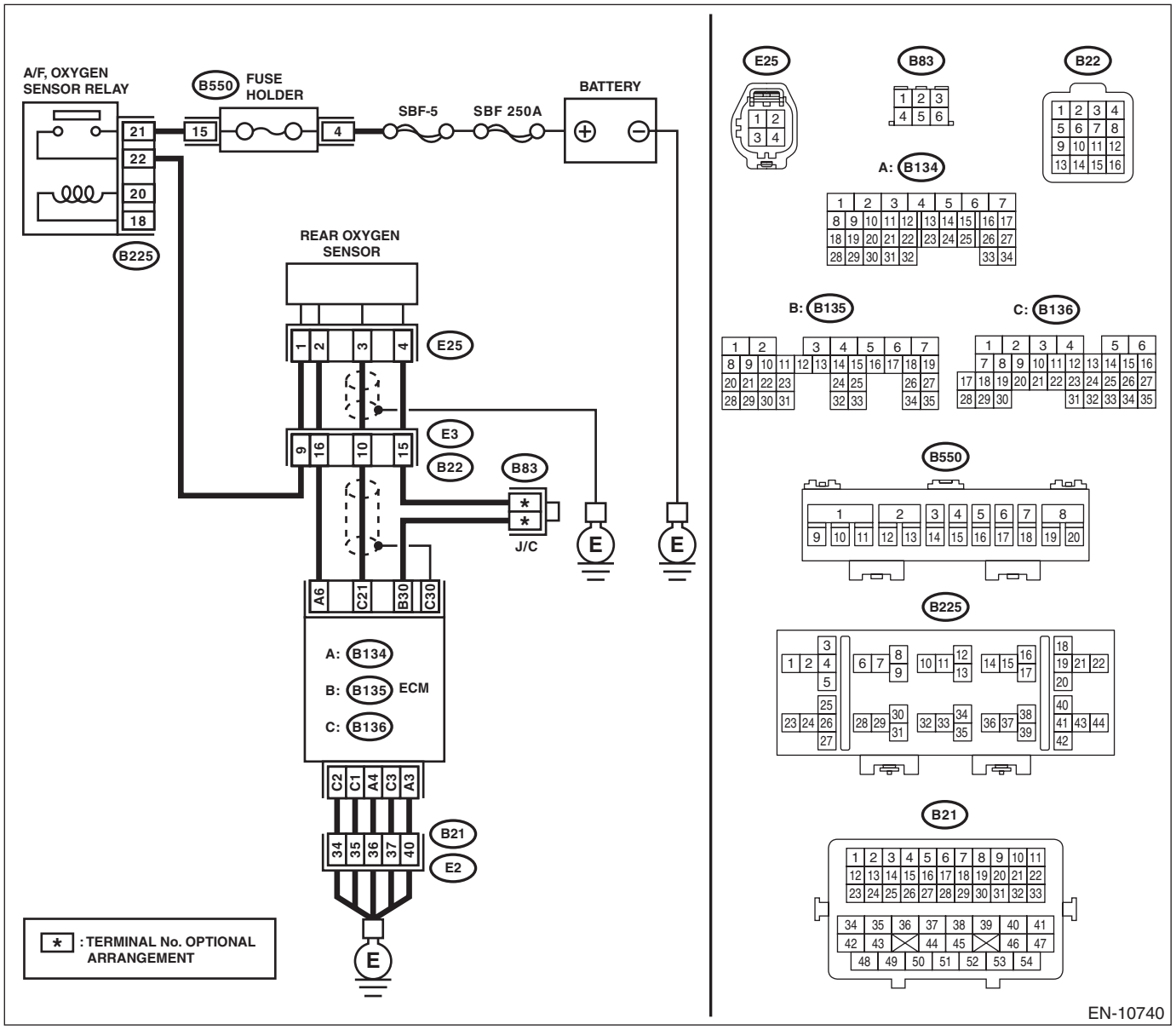
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

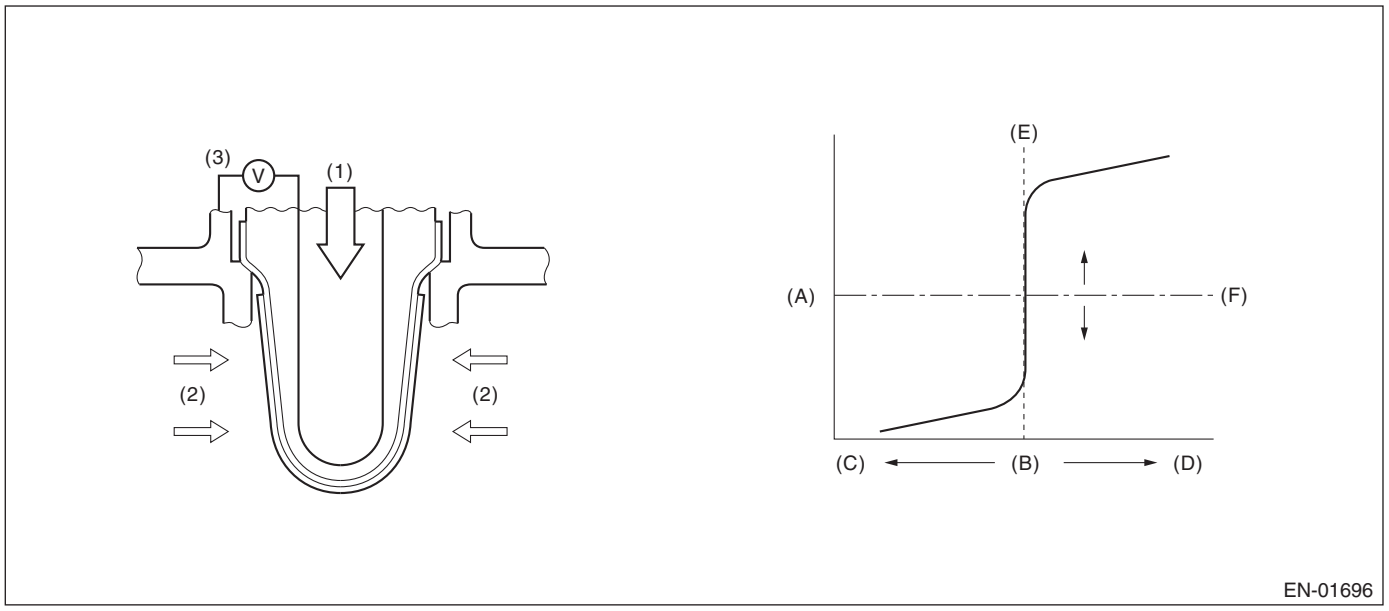


	Step	Check	Yes	No
1	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.490 V or more?	Go to step **5**.	Go to step **2**.
2	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector • Poor contact of ECM connector
5	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Loose part and improper installation between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect continuity NG of the oxygen sensor. If the oxygen sensor voltage reading is not within the probable range considering the operating conditions, judge as NG.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Lean
(D) Rich
(E) Theoretical air fuel ratio
(F) Comparative voltage

(1) Atmosphere
(2) Exhaust gas
(3) Electromotive force

3. EXECUTION CONDITION

Used for judgment

Secondary Parameters	Execution condition
High	
Battery voltage	≥ 10.9 V
Low (1)	
A/F main feedback function	In operation
Battery voltage	≥ 10.9 V
Intake air amount per second	≥ 10 g/s (0.35 oz/s)
Low (2)	
A/F main feedback function	In operation
Battery voltage	≥ 10.9 V
Intake air amount	< 10 g/s (0.35 oz/s)

4. GENERAL DRIVING CYCLE

After starting the engine, continuously perform the diagnosis with the same engine condition.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

JUDGMENT VALUE

Malfunction Criteria	Threshold Value	DTC
High Sensor output voltage	≥ 1.2 V	P0138
Low Sensor output voltage	< 0.03 V	P0137

Time Needed for Diagnosis:
High: 2500 ms
Low (1): 20000 ms
Low (2): 40000 ms

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AS:DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE BANK 1 SENSOR 2

DTC DETECTING CONDITION:

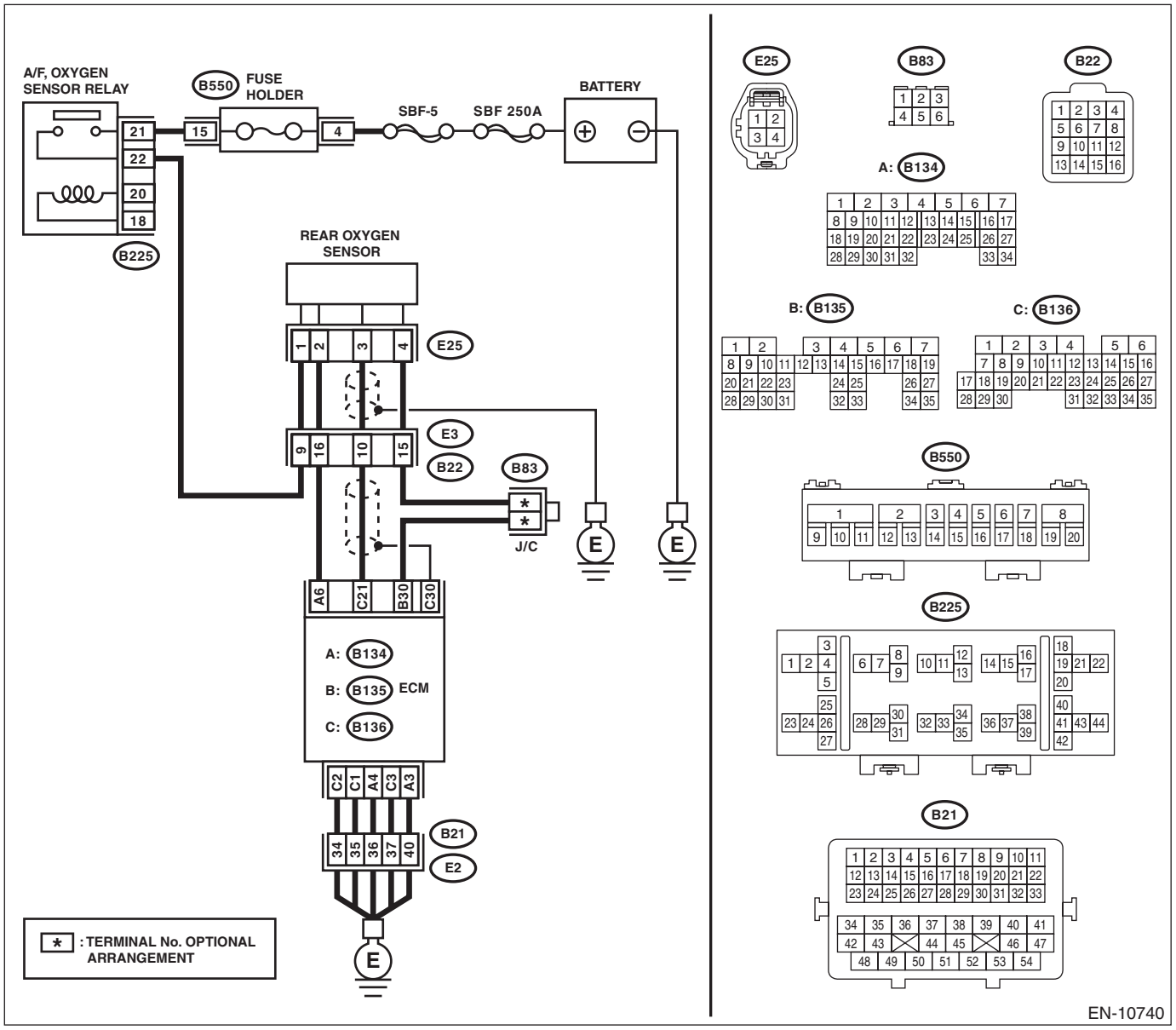
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.250 V or less?	Go to step **5**.	Go to step **2**.
2	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector • Poor contact of ECM connector
5	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Loose part and improper installation between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0137. <Ref. to EN(H4DO HEV)(diag)-215, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AT:DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2

DTC DETECTING CONDITION:

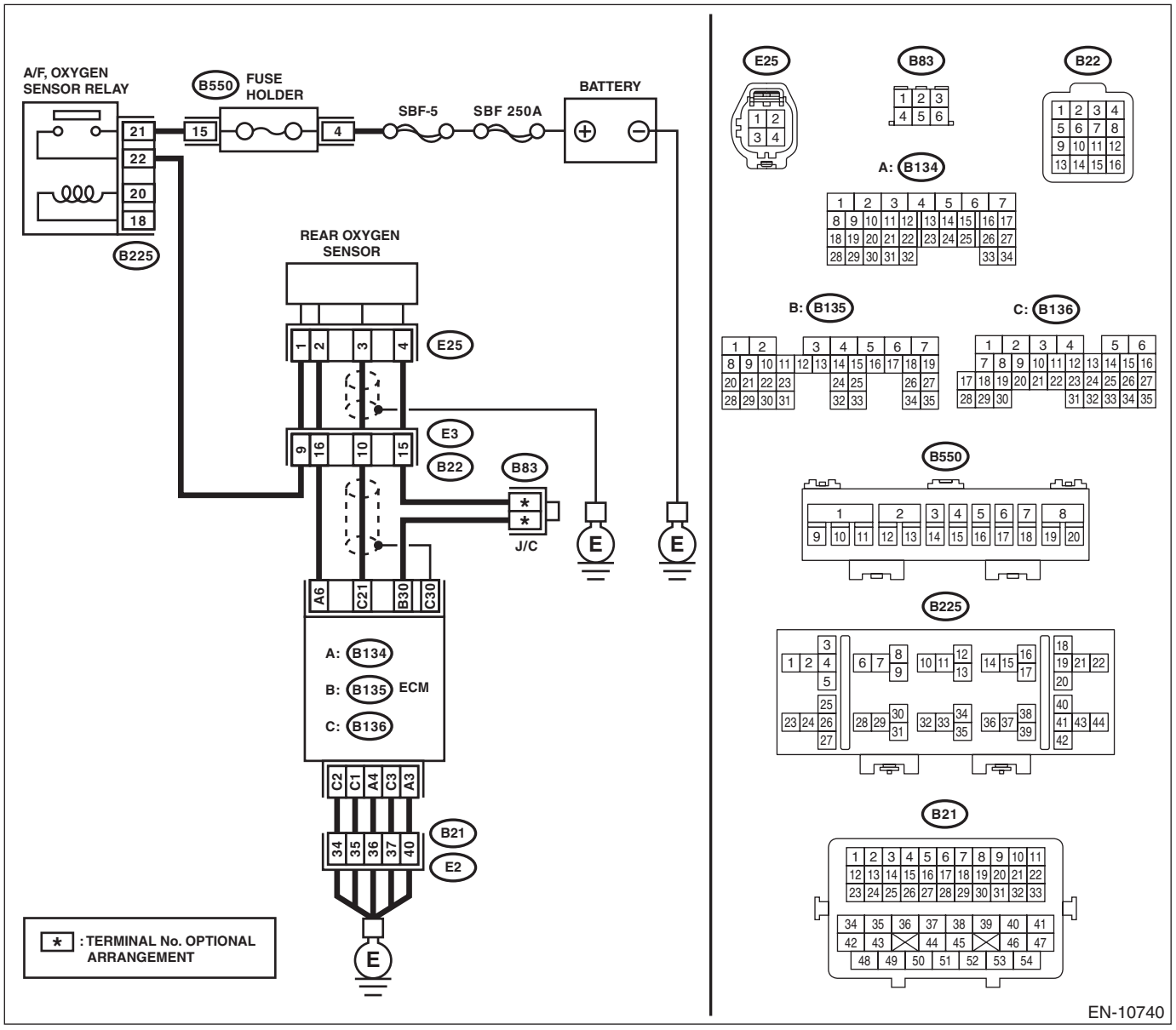
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

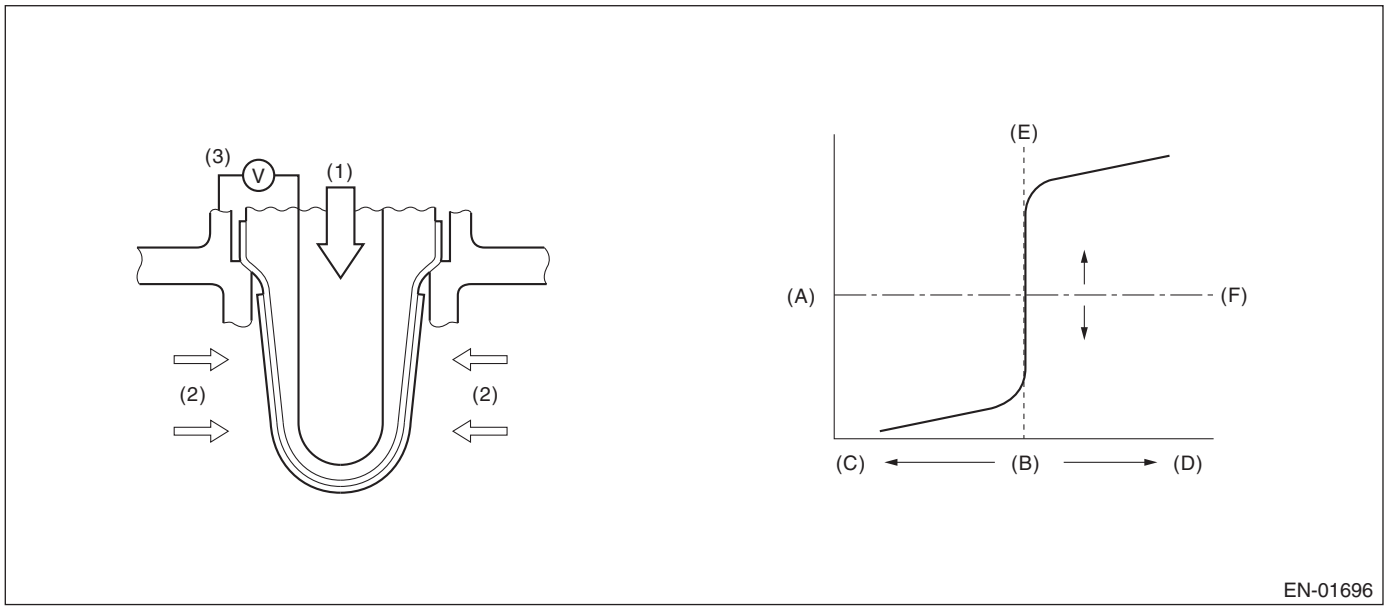


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** Measure the resistance between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and rear oxygen sensor connector.
3	**CHECK REAR OXYGEN SENSOR.** Measure the resistance between rear oxygen sensor terminals. ***Terminals*** ***No. 3 — No. 4***	Is the resistance less than 1 Ω?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the slow response of rich → lean for rear oxygen sensor output.
When the deceleration fuel cut has occurred, detect the trouble by calculating the time when the rear oxygen sensor output passes through the predetermined range of voltages.
Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

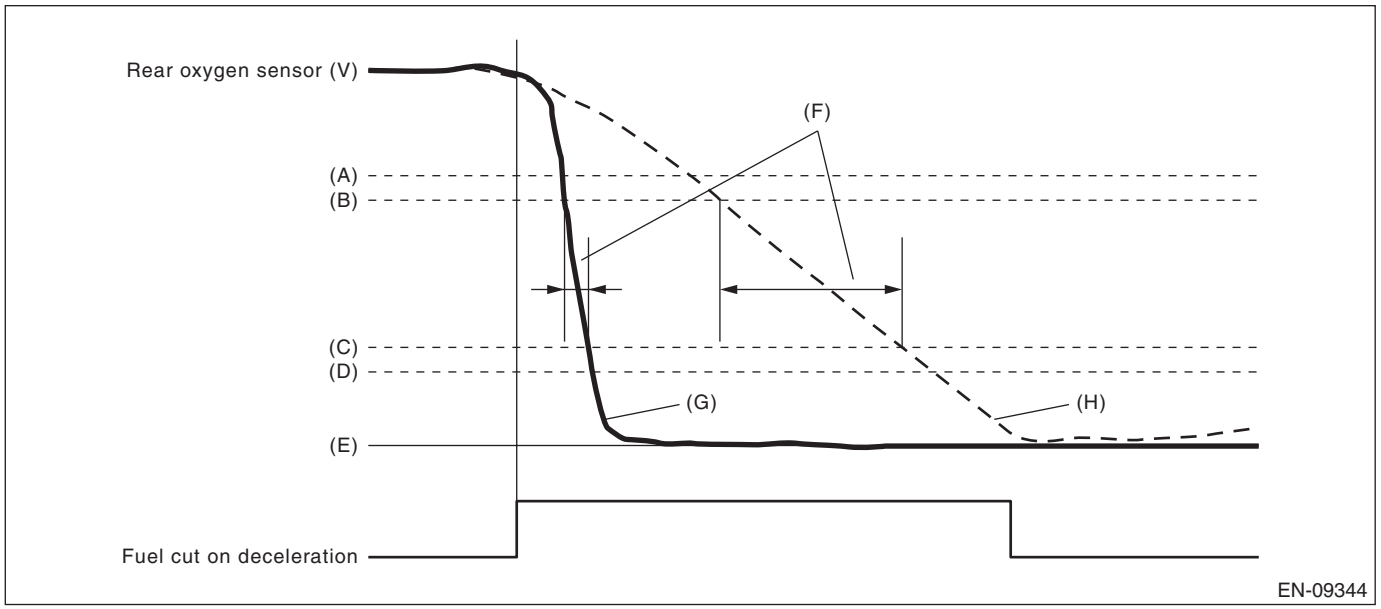
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Current calculation time of the rear oxygen sensor heater after starting	≥ 180000 ms
Rear oxygen sensor voltage when fuel cut starts	≥ 0.55 V
Fuel System Status	Fuel cut
Estimated temperature of rear oxygen sensor element when fuel cut starts	≥ 500 °C (932 °F)

4. GENERAL DRIVING CYCLE

Perform diagnosis once during deceleration fuel cut from a constant and high speed driving, when rear oxygen sensor is warmed up sufficiently.

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the response time of the rear oxygen sensor during fuel cut.



(A) 0.55 V
(B) 0.50 V
(C) 0.20 V
(D) 0.15 V
(E) 0 V
(F) Diagnostic parameter
(G) Normal
(H) Malfunction

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time needed for rear oxygen sensor voltage to change from 0.5 V to 0.2 V	> 491 ms

Time Needed for Diagnosis: 5000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

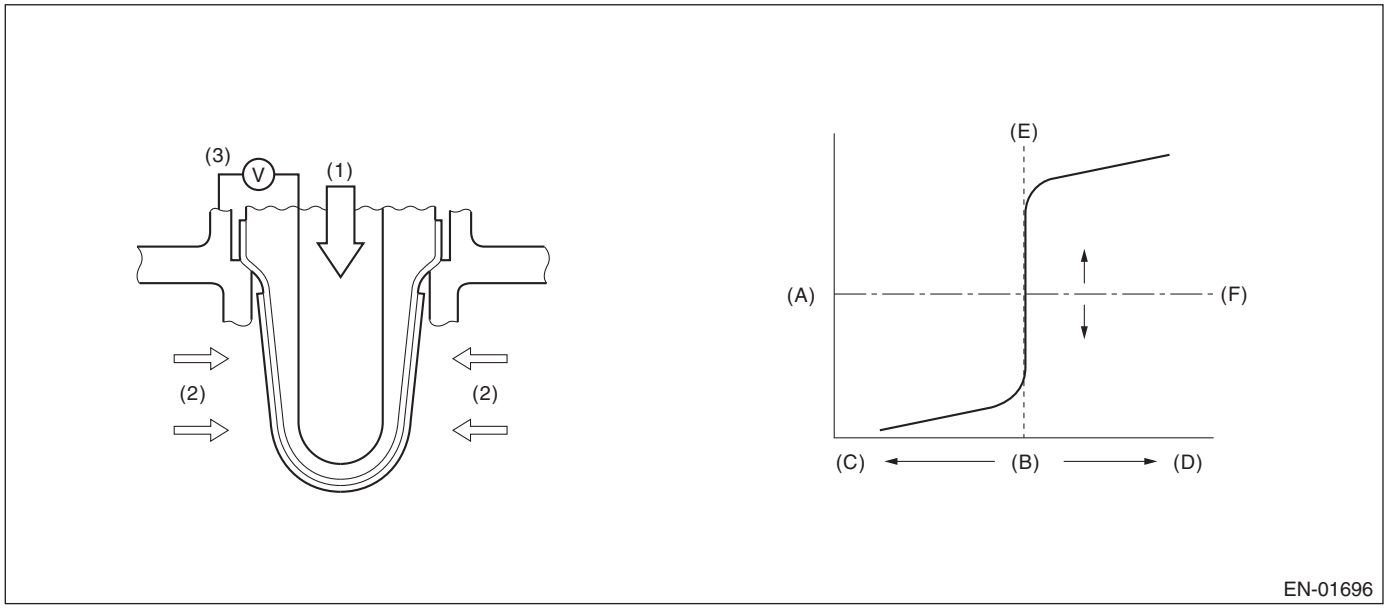
AU:DTC P013B O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 2

NOTE:
For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DO HEV)(diag)-222, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the slow response of lean → rich for rear oxygen sensor output.
After the deceleration fuel cut has occurred, detect the trouble by calculating the time when the rear oxygen sensor output passes through the predetermined range of voltages.
Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

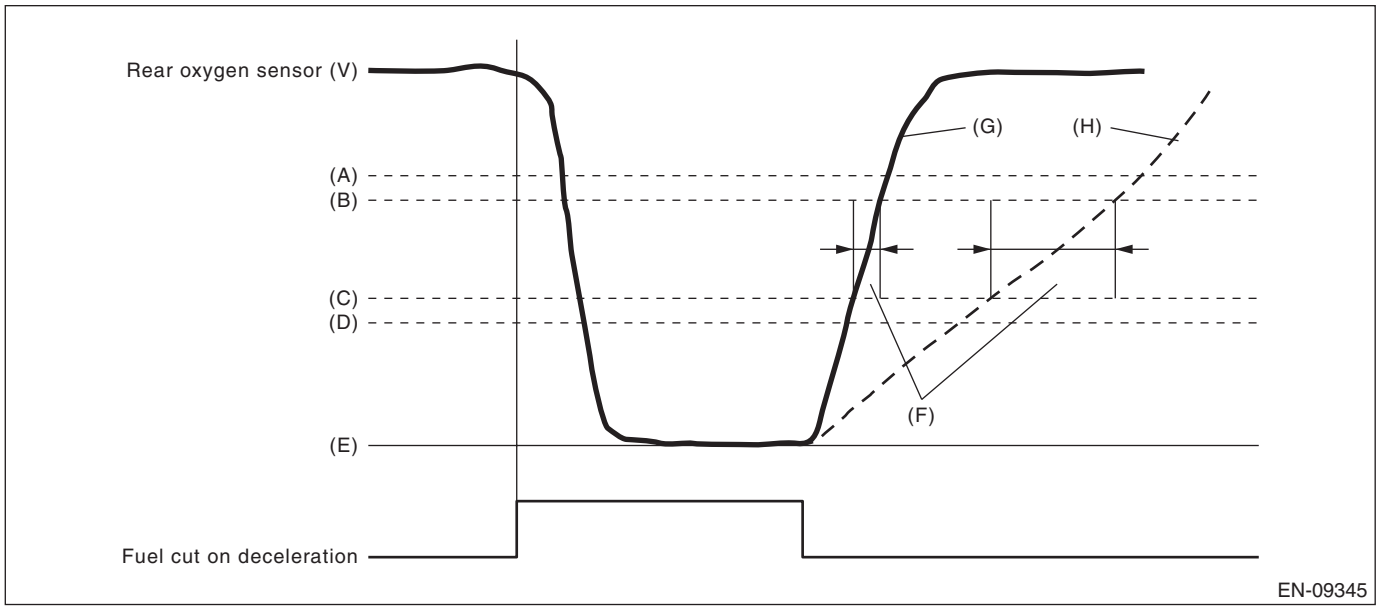
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
A/F main feedback function	In operation
((Fuel system status	= Fuel cut
for time)	≥ 5000 ms
followed by	
Fuel system status)	≠ Fuel cut

4. GENERAL DRIVING CYCLE

Perform diagnosis only once after recovering from a deceleration fuel cut continued for more than predetermined time.

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the response time of the rear oxygen sensor after fuel cut.



(A) 0.55 V
(B) 0.50 V
(C) 0.30 V
(D) 0.25 V
(E) 0 V
(F) Diagnostic parameter
(G) Normal
(H) Malfunction

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time needed for rear oxygen sensor voltage to change from 0.3 V to 0.5 V	> 4000 ms

Time Needed for Diagnosis: 4000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

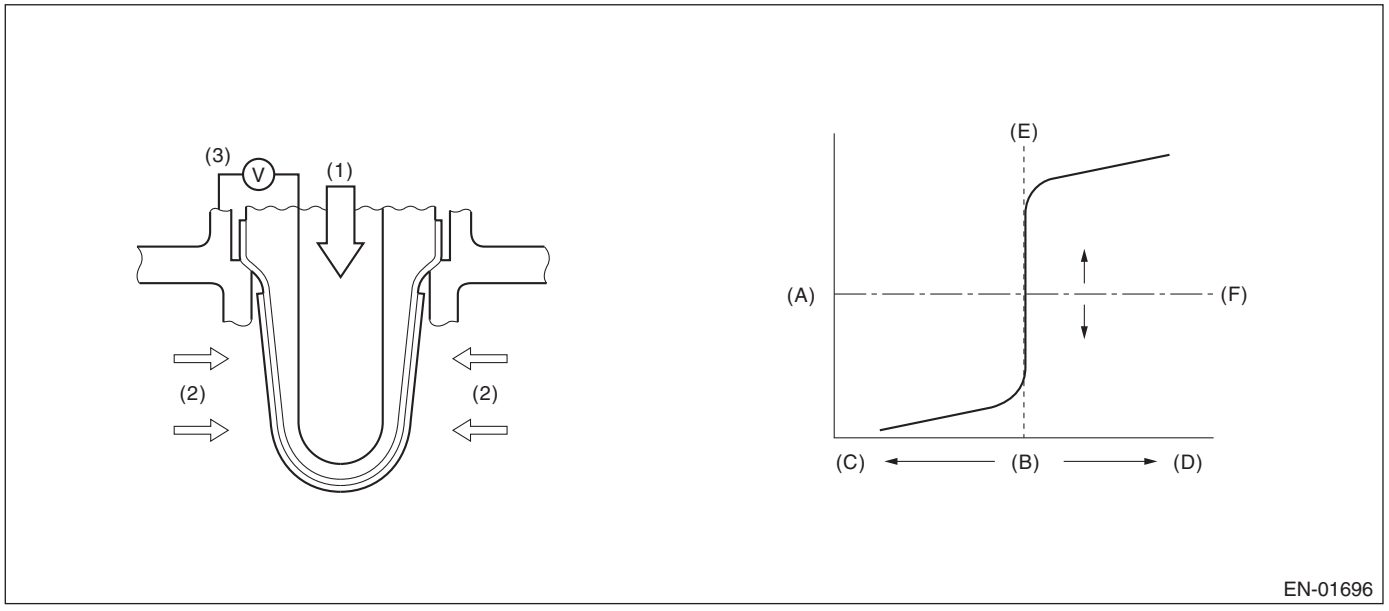
AV:DTC P013E O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 2

NOTE:
For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DO HEV)(diag)-222, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the delayed response of rear oxygen sensor output for rich → lean.
After the deceleration fuel cut has started, detect the trouble by calculating the time when the rear oxygen sensor output decreases to the predetermined voltages.
Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

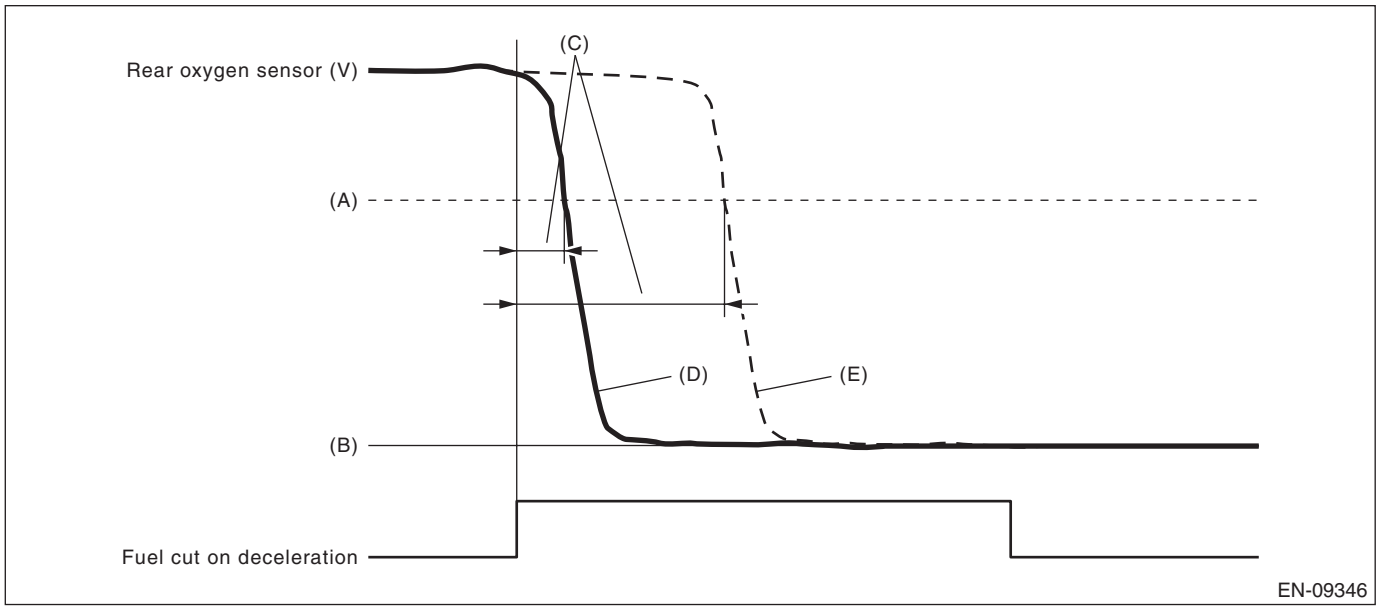
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Rear oxygen sensor voltage when fuel cut starts	≥ 0.55 V
Fuel System Status	Fuel cut
Estimated temperature of rear oxygen sensor element when fuel cut starts	≥ 500 °C (932 °F)

4. GENERAL DRIVING CYCLE

Perform diagnosis once during deceleration fuel cut from a constant and high speed driving, when rear oxygen sensor is warmed up sufficiently.

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the time from the beginning of the fuel cut to the beginning of the rear oxygen sensor voltage starting to drop.



(A) 0.5 V
(B) 0 V
(C) Diagnostic parameter
(D) Normal
(E) Malfunction

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed to 0.5 V after the fuel cut started	> 4000 ms

Time Needed for Diagnosis: 5000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

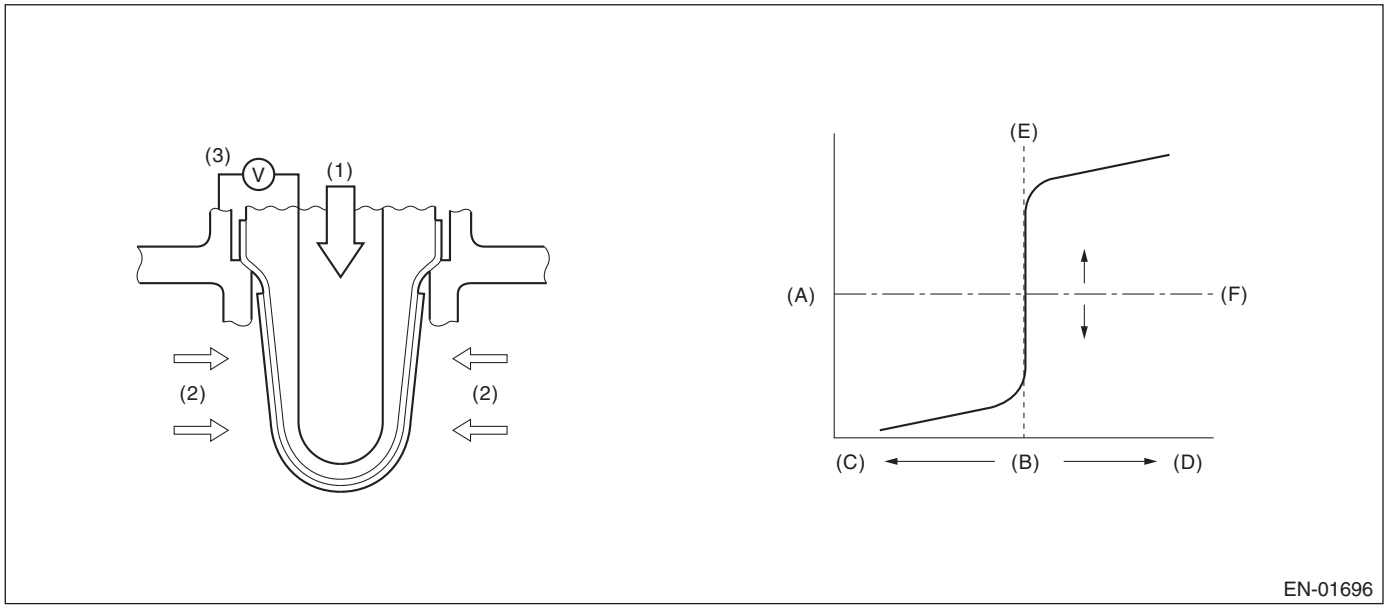
AW:DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2

NOTE:
For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DO HEV)(diag)-222, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the delayed response of rear oxygen sensor output for lean → rich.
After the deceleration fuel cut has completed, detect the trouble by calculating the time when the rear oxygen sensor output increases to the predetermined voltages.
Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

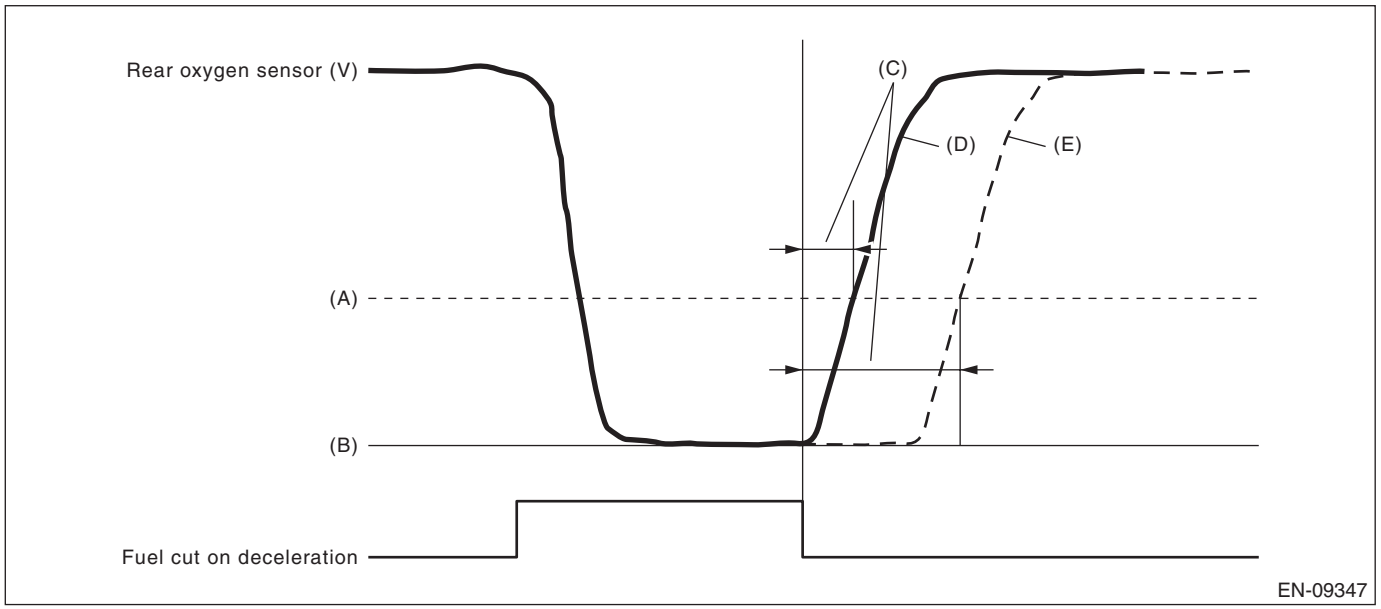
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
A/F main feedback function	In operation
Rear oxygen sensor voltage when fuel cut has completed	≤ 0.15 V
((Fuel system status	= Fuel cut
for time)	≥ 5000 ms
followed by	
Fuel system status)	≠ Fuel cut
Estimated element temperature of rear oxygen sensor when fuel cut has completed	≥ 500 °C (932 °F)

4. GENERAL DRIVING CYCLE

Perform diagnosis only once when recovering from the deceleration fuel cut continued for more than predetermined time with the rear oxygen sensor warmed up sufficiently.

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the time from the completion of the fuel cut to the beginning of the rear oxygen sensor voltage starting to rise.



(A) 0.3 V
(B) 0 V
(C) Diagnostic parameter
(D) Normal
(E) Malfunction

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
The number of times that the rear oxygen sensor voltage changed to 0.3 V after the fuel cut has completed (time counter) (32 ms × 3750 time(s)	> 120 s

Time Needed for Diagnosis: 32 ms × 3750 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

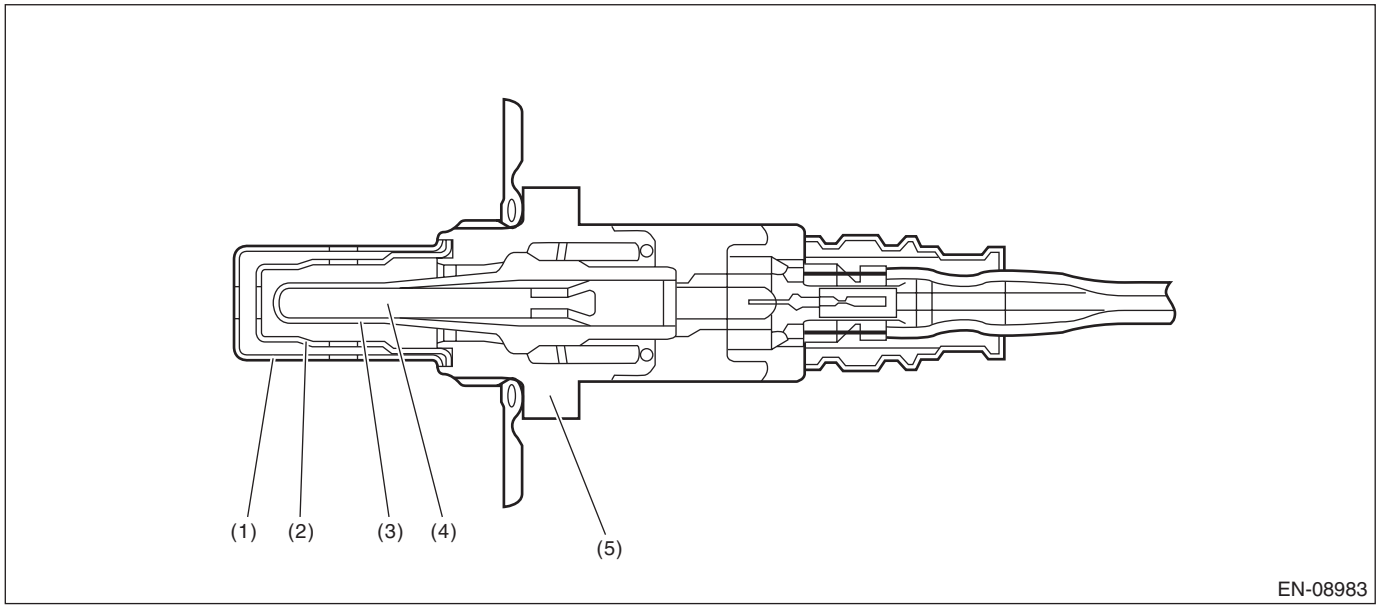
AX:DTC P0141 O2 SENSOR HEATER CIRCUIT BANK 1 SENSOR 2

Refer to DTC P0037 for diagnostic procedure. <Ref. to EN(H4DO HEV)(diag)-144, DTC P0037 A/F / O2 HEATER CONTROL CIRCUIT LOW BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of the rear oxygen sensor heater.
Judge as NG if it is determined that the rear oxygen sensor impedance is large by observing the engine conditions.

2. COMPONENT DESCRIPTION



(1) Element cover (outer)
(2) Element cover (inner)
(3) Sensor element
(4) Ceramic heater
(5) Sensor housing

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1000 ms
A/F sensor element impedance	≤ 82 Ω
A/F sensor heater control duty	≤ 75 %
Rear oxygen sensor heater control duty	< 70 %

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after 1000 ms or more have passed since the engine started.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< Battery voltage × 0.88

Time Needed for Diagnosis: 4 ms × 2500 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AY:DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

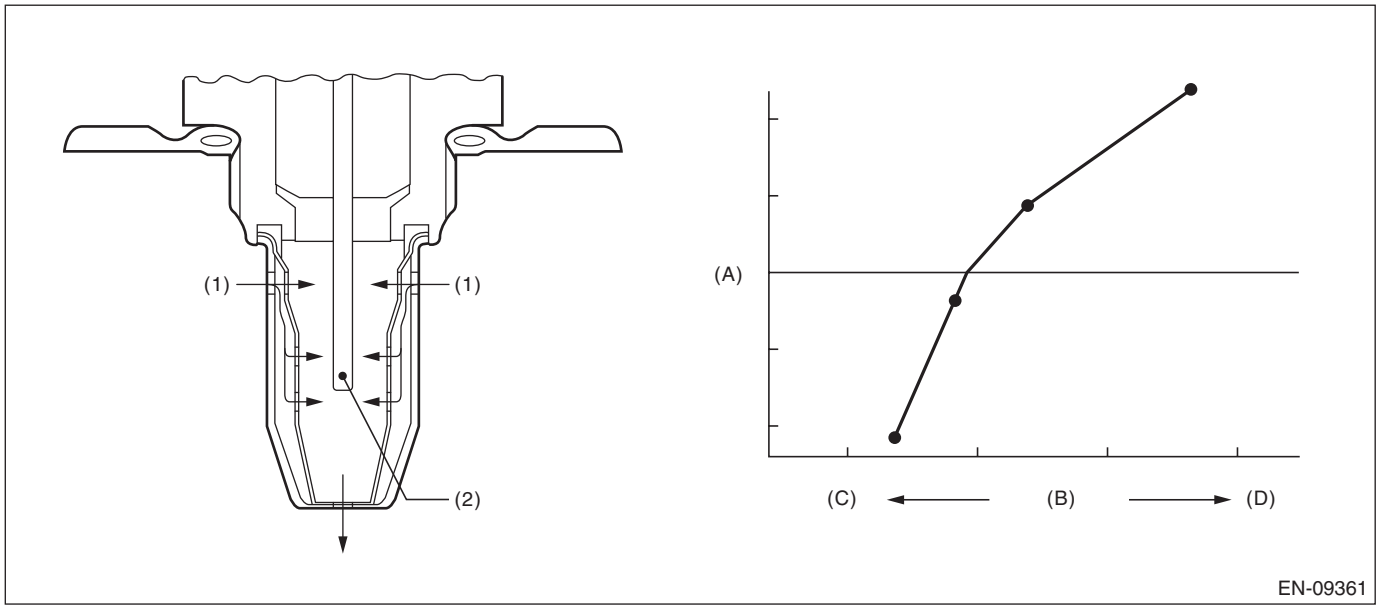
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.** NOTE: Check the following items. • Loose installation of front portion of exhaust pipe onto cylinder heads • Loose connection between front exhaust pipe and front catalytic converter • Damage of exhaust pipe resulting in a hole	Is there any fault in exhaust system?	Repair the exhaust system.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the slow response of front oxygen (A/F) sensor.
For diagnosis, detect the trouble by processing the λ waveform in normal driving without forcibly changing the target air fuel ratio.

2. COMPONENT DESCRIPTION



(A) Electromotive force (B) Air fuel ratio (C) Rich
(D) Lean

(1) Exhaust gas (2) ZrO_2

3. EXECUTION CONDITION

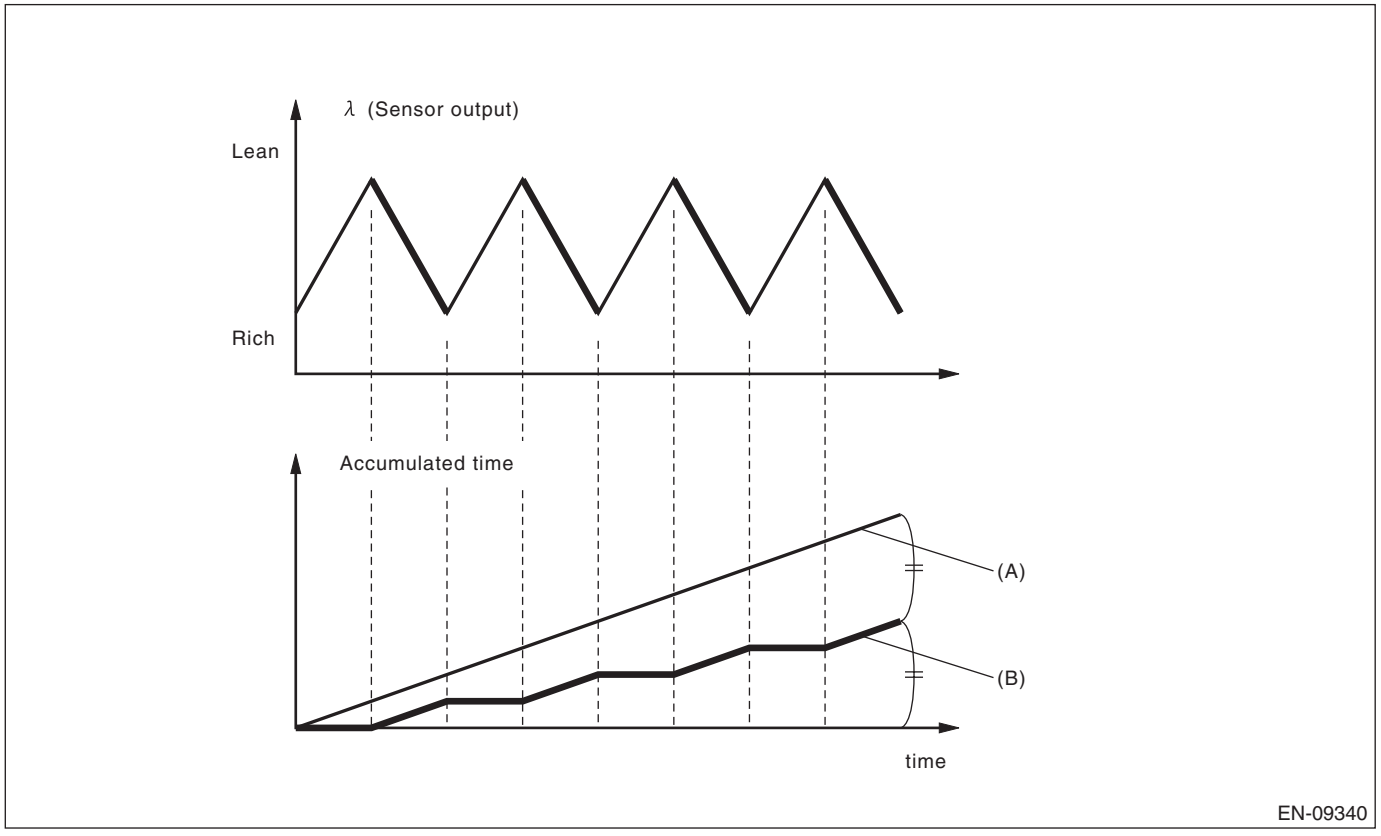
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Operating time of A/F main feedback function	≥ 3000 ms
Engine speed	≥ 1000 rpm
Intake air amount	≥ 10 g/s (0.35 oz/s)

4. GENERAL DRIVING CYCLE

Perform diagnosis only once in a city driving including normal acceleration and deceleration.

5. DIAGNOSTIC METHOD 1

Detect the malfunction by checking “Cumulative value of time when λ changes from lean → rich” in comparison to “Time during which diagnosis is in progress”.



(A) Time during which diagnosis is in progress

(B) Cumulative value of time when λ changes from lean → rich

Judge as NG when the following conditions are established.

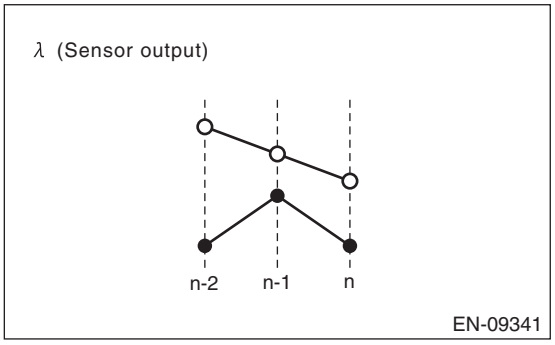
Judgment Value

Malfunction Criteria	Threshold Value	DTC
(Cumulative value of time when λ changes from lean → rich) / (Time during which diagnosis is in progress) and Average value of time necessary for λ to inverse the air fuel ratio to Lean → Rich → Lean	< 0.39 (CVT model) < 0.4 (MT model) < 25 ms (CVT model) < 25 ms (MT model)	P014C
(Cumulative value of time when λ changes from rich → lean) / (Time during which diagnosis is in progress) and Average value of time necessary for λ to inverse the air fuel ratio to Rich → Lean → Rich	> 0.61 (CVT model) > 0.6 (MT model) > 20 ms (CVT model) > 5 ms (MT model)	P014D

Time Needed for Diagnosis: 90 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DIAGNOSTIC METHOD 2

Detect the malfunction by the cumulative value obtained from the amount of variation in λ change.



Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Cumulative value obtained from the amount of variation in λ change Σ |(lambda(n) – lambda(n-1)) – (lambda(n-1) – lambda(n-2))|	< Value from Map	P014C and P014D

Map

Cumulative value obtained from the amount of variation in λ Σ |lambda(n) – lambda(n-1)|	0.00	3.50
Cumulative value obtained from the amount of variation in λ change	0.00	3.50

Time Needed for Diagnosis: 90 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AZ:DTC P014D A/F / O2 SENSOR SLOW RESPONSE - LEAN TO RICH BANK 1 SENSOR 1

NOTE:
For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DO HEV)(diag)-233, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P014C. <Ref. to EN(H4DO HEV)(diag)-233, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

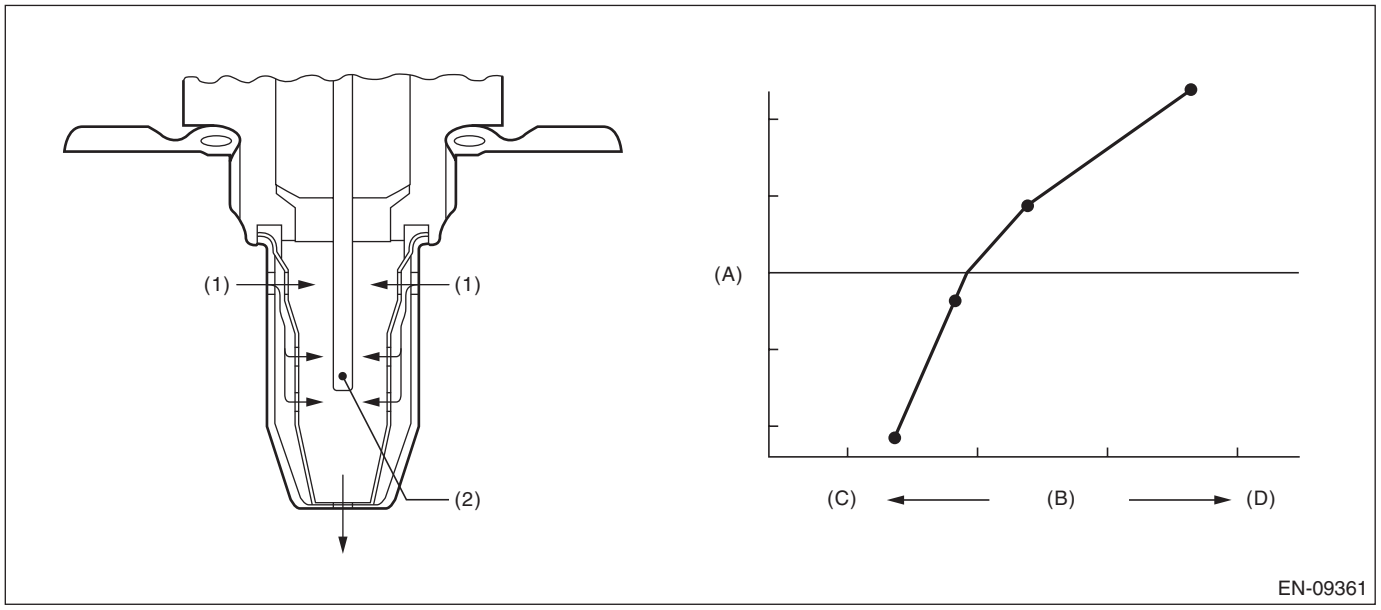
BA:DTC P015A A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1

NOTE:
For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DO HEV)(diag)-233, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the slow response of front oxygen (A/F) sensor.
For diagnosis, detect the trouble by processing the λ waveform in normal driving without forcibly changing the target air fuel ratio.

2. COMPONENT DESCRIPTION



(A) Electromotive force (B) Air fuel ratio (C) Rich
(D) Lean

(1) Exhaust gas (2) ZrO_2

3. EXECUTION CONDITION

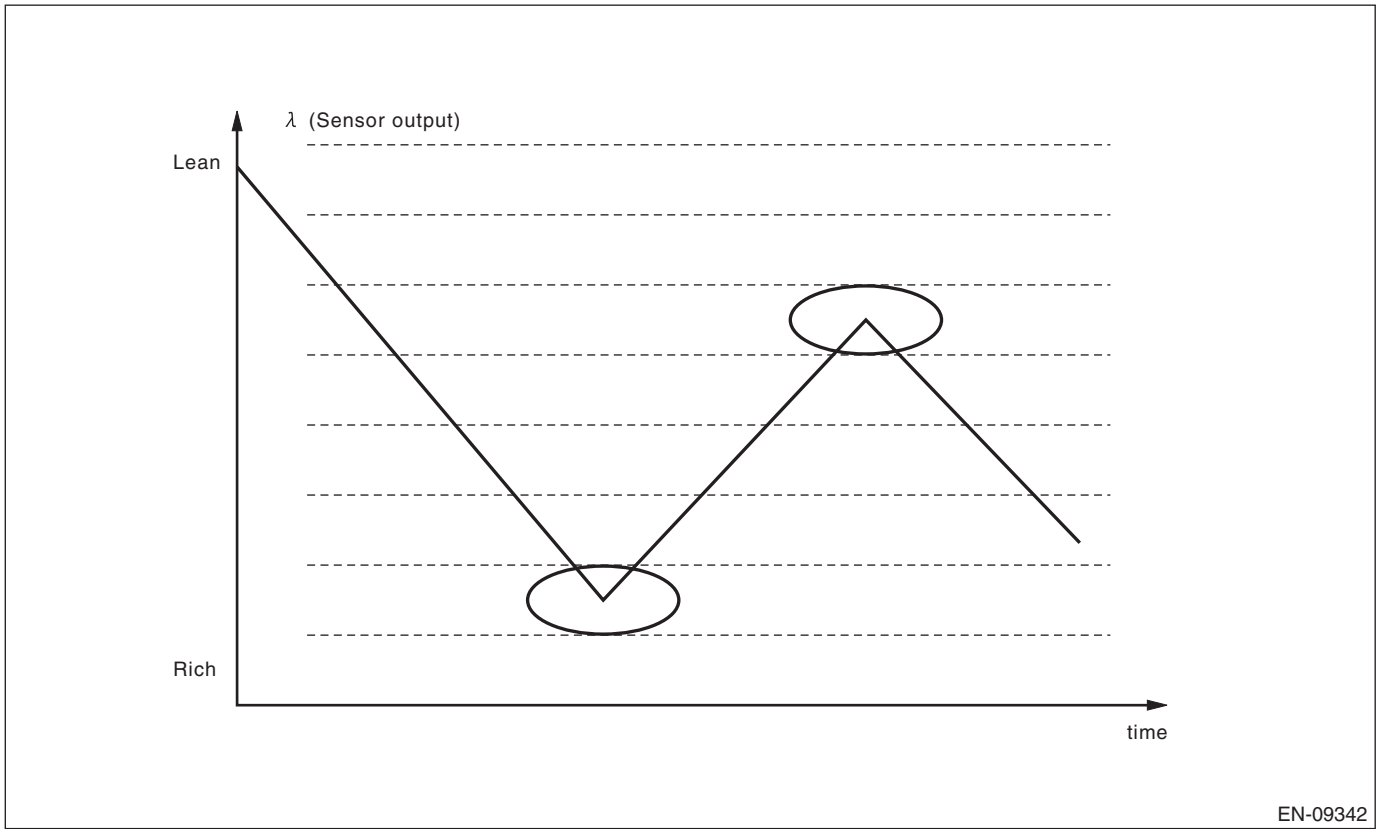
Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Operating time of A/F main feedback function	≥ 3000 ms
Engine speed	≥ 1000 rpm
Intake air amount	≥ 10 g/s (0.35 oz/s)

4. GENERAL DRIVING CYCLE

Perform diagnosis only once in a city driving including normal acceleration and deceleration.

5. DIAGNOSTIC METHOD 1

Detect the malfunction depending on the average value of time necessary for λ to inverse the air fuel ratio from “Lean → Rich → Lean” to “Rich → Lean → Rich”.



Judge as NG when the following conditions are established.

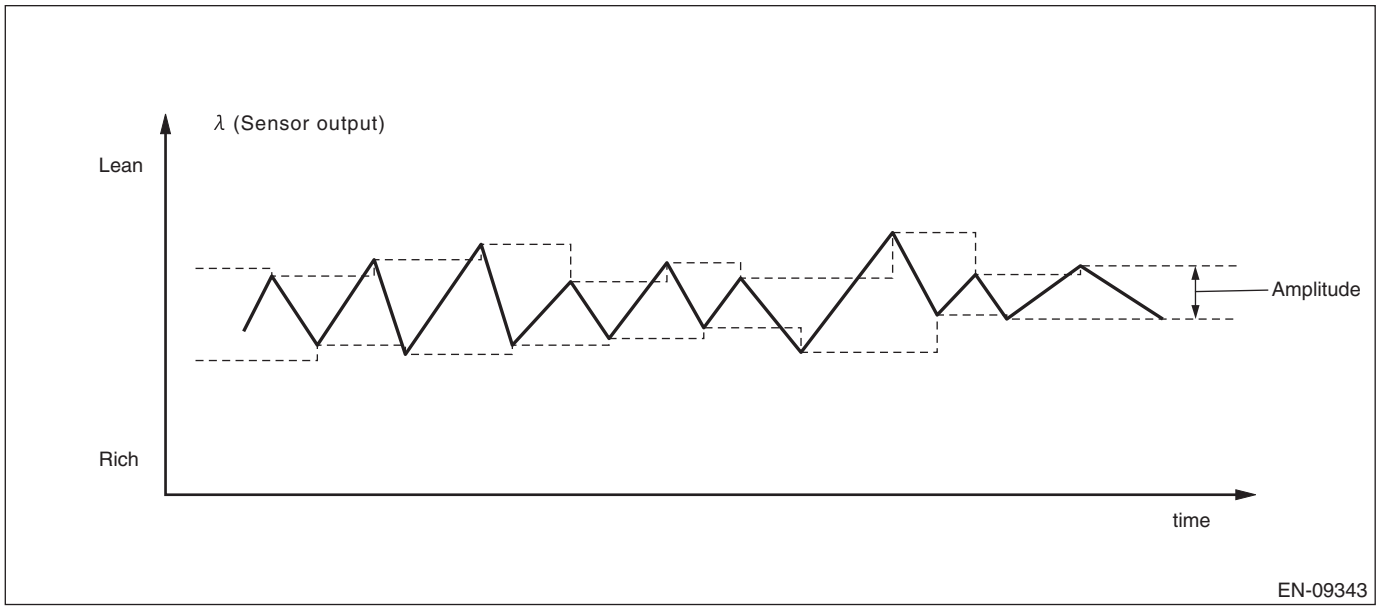
Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value of time necessary for λ to inverse the air fuel ratio to Lean → Rich → Lean and Average value of time needed to change to Lean	> 100 ms > 150 ms	P015A
Average value of time necessary for λ to inverse the air fuel ratio to Rich → Lean → Rich and Average value of time needed to change to Rich	> 250 ms > 300 ms	P015B

Time Needed for Diagnosis: 50 times of inversion
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DIAGNOSTIC METHOD 2

Detect the malfunction by calculating the average amplitude of λ.



Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value for λ amplitude	> 0.06	P015A and P015B

Time Needed for Diagnosis: 11250 time(s) × 8 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BB:DTC P015B A/F / O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 1

NOTE:
For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DO HEV)(diag)-233, DTC P014C A/F / O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P015A. <Ref. to EN(H4DO HEV)(diag)-237, DTC P015A A/F / O2 SENSOR DELAYED RESPONSE - RICH TO LEAN BANK 1 SENSOR 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BC:DTC P0171 SYSTEM TOO LEAN BANK 1

Refer to DTC P0172 for diagnostic procedure. <Ref. to EN(H4DO HEV)(diag)-242, DTC P0172 SYSTEM TOO RICH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect fuel system malfunction by the amount of main feedback control.

Diagnostic method

Fuel system is diagnosed by comparing the target air fuel ratio calculated by ECM with the actual air fuel ratio measured by sensor.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
A/F main feedback function	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling or at a constant speed after warming up the engine.

4. DIAGNOSTIC METHOD

Compare the diagnostic value (fsobd) with the threshold value, and if a condition meeting the malfunction criteria listed below continues for 10 s × 3 time(s) or more, judge that there is a fault in the fuel system.

Judgment Value

Malfunction Criteria	Threshold Value
fsobd = (sglmd – tglmda) + faf + flaf In this case: sglmd = measured lambda tglmda = target lambda faf = main feedback compensation coefficient (every 64 milliseconds) flaf = main feedback learning compensation coefficient	≥ Value from Map

Map

Amount of air (g (oz)/s)	0 (0)	3.2 (0.11)	6.4 (0.23)	9.6 (0.34)	12.8 (0.45)	16 (0.56)	19.2 (0.68)
fsobdL1 (%)	1.33	1.33	1.33	1.33	1.33	1.33	1.33

Time Needed for Diagnosis: 10 s × 3 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BD:DTC P0172 SYSTEM TOO RICH BANK 1

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **2**.
2	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **3**.
3	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **4**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(HEV))-129, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(HEV))-161, INSPECTION, Fuel Delivery and Evaporation Lines.>
4	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **5**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>

	Step	Check	Yes	No
5	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in “P” range or “N” range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 1.0 — 5.0 g/s (0.13 — 0.66 lb/m)?	Go to step **6**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>
6	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in “P” range or “N” range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Repair the poor contact of ECM connector.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect fuel system malfunction by the amount of main feedback control.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
A/F main feedback function	In operation

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously during the closed loop.

4. DIAGNOSTIC METHOD

Compare the diagnostic value (fsobd) with the threshold value, and if a condition meeting the malfunction criteria listed below continues for 10 s × 3 time(s) or more, judge that there is a fault in the fuel system.

Judgment Value

Malfunction Criteria	Threshold Value
fsobd = (sglmd – tglmda) + faf + flaf In this case: sglmd = measured lambda tglmda = target lambda faf = main feedback compensation coefficient (every 64 milliseconds) flaf = main feedback learning compensation coefficient	< Value from Map

Map

Warm-up increase compensation coefficient	0	0.1	0.2	0.3
Threshold Value	0.67	0.576	0.502	0.436

Warm-up increase compensation coefficient	0.4	0.5
Threshold Value	0.382	0.333

Time Needed for Diagnosis: 10 s × 3 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BE:DTC P0196 ENGINE OIL TEMPERATURE SENSOR "A" RANGE/PERFORMANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

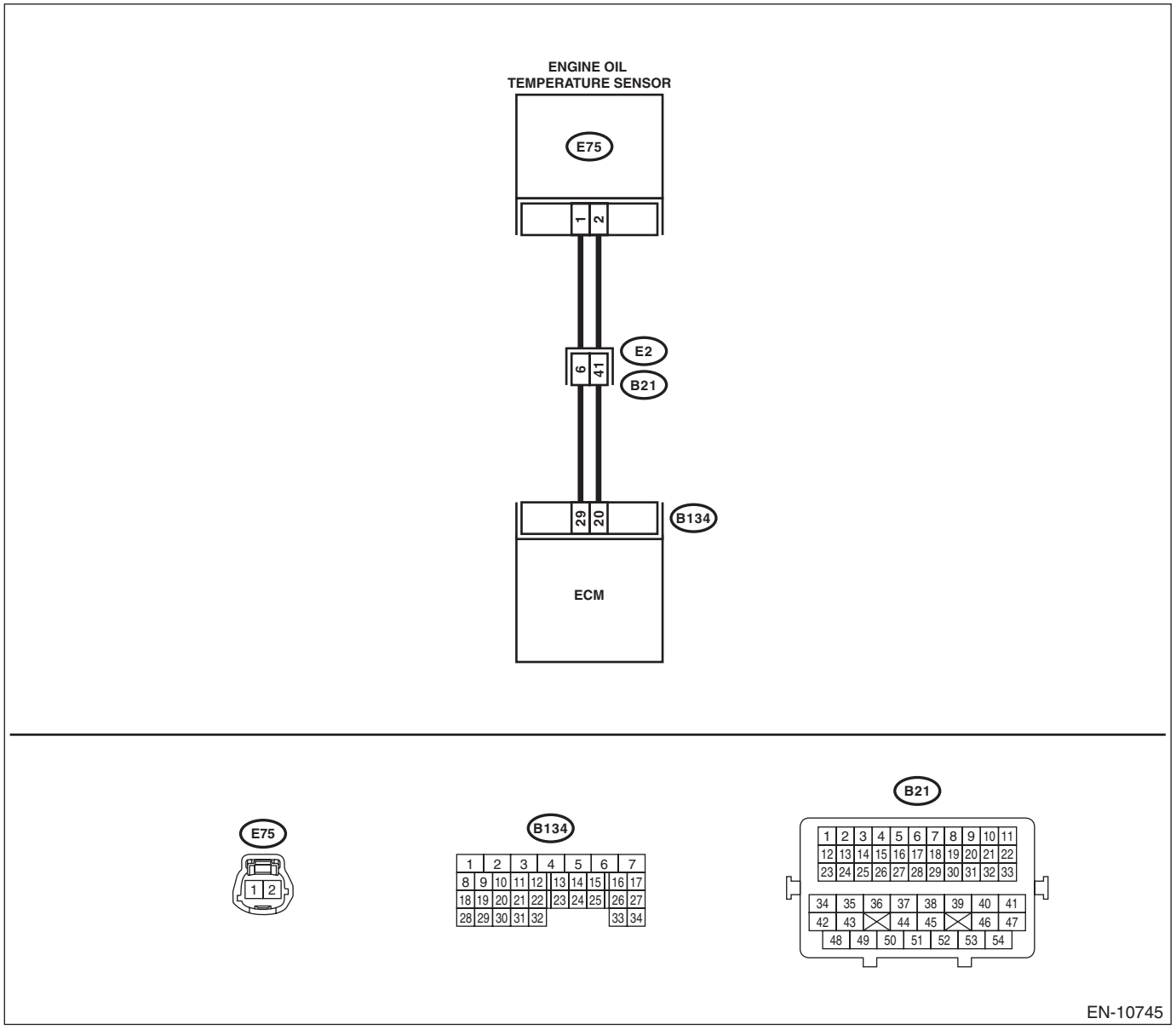
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



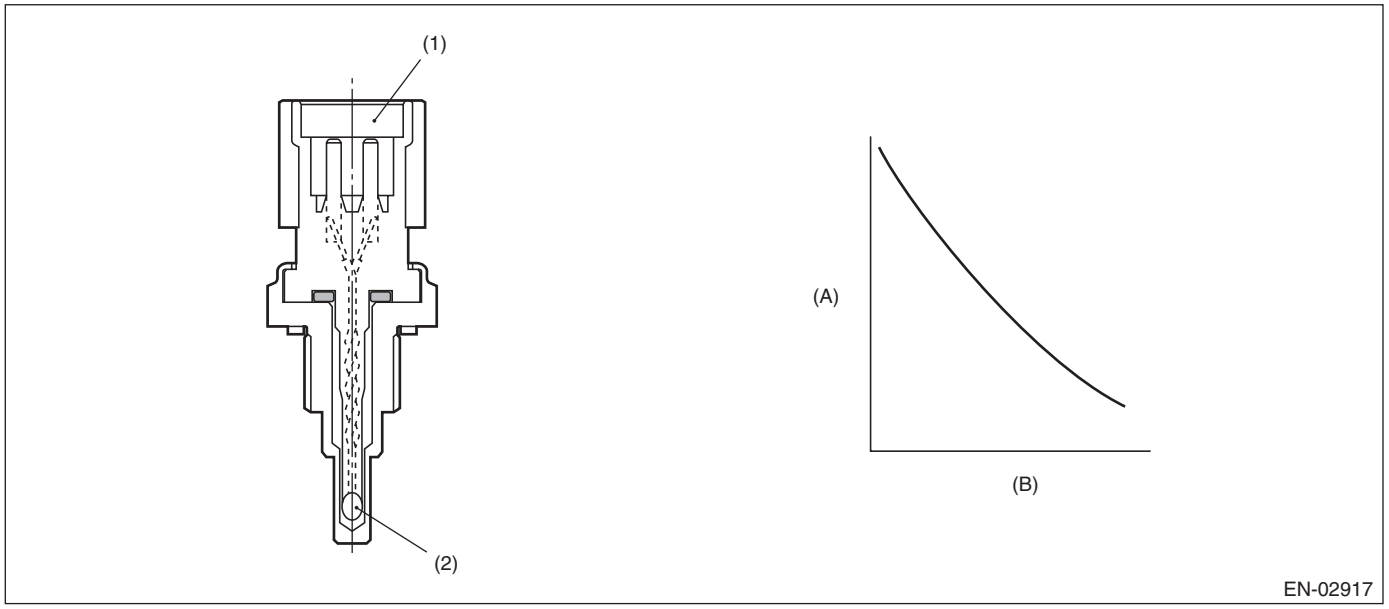
	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ENGINE OIL TEMPERATURE SENSOR.** 1) Disconnect the connectors from the engine oil temperature sensor. 2) Measure the resistance between engine oil temperature sensor terminals when the engine is cold and after warmed up. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance of engine oil temperature sensor different between when engine is cold and after warmed up?	Repair the poor contact of ECM connector.	Replace the engine oil temperature sensor. <Ref. to FU(H4DO(HEV))-45, Engine Oil Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the engine oil temperature sensor output properties. Using the following two diagnoses, judge as NG when either is NG.

- **Diagnosis 1 (correlation diagnosis):** After the engine starts after the specified period of soaking time has elapsed, diagnose by correlation between engine oil temperature sensor value, engine coolant temperature sensor value and intake air temperature sensor value. Judge as NG when the differences are both above the specified value by comparing between engine oil temperature and engine coolant temperature, engine oil temperature and intake air temperature.
- **Diagnosis 2 (function diagnosis):** Judge as NG when engine oil temperature does not rise to the specified value regardless of an engine running condition that clears certain conditions.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Diagnosis 1

Secondary Parameters	Execution condition
Soaking time	≥ 21600 s
Block heater judgment	Completed
Block heater operation	Not in operation

Diagnosis 2

Secondary Parameters	Execution condition
Engine oil temperature at engine starting	< 50 °C (122 °F)
Engine speed	> 500 rpm
Percentage of idling (0.5 × 100)	≤ 50%

4. GENERAL DRIVING CYCLE

- **Diagnosis 1:** Perform the diagnosis only once after the engine starts after a certain period of soaking time.
- **Diagnosis 2:** Perform the diagnosis only once after starting the engine from cold condition.

5. DIAGNOSTIC METHOD

Judge as NG when Diagnosis 1 or Diagnosis 2 becomes NG.
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Diagnosis 1

Judgment Value

Malfunction Criteria	Threshold Value
|Engine oil temperature at engine start – Engine coolant temperature at engine start|	> 10 °C (18°F)
|Engine oil temperature at engine start – Intake air temperature 30 sec. after engine start|	> Value of Map 1

Map 1

Ambient temperature °C (°F)	-30 (-22)	30 (86)	45 (113)	60 (140)
|Engine oil temperature at engine start – Intake air temperature 30 sec. after engine start| °C (°F)	10 (18°F)	10 (18°F)	22 (39.6°F)	22 (39.6°F)

Time Needed for Diagnosis: Less than 1 second

Diagnosis 2

Judgment Value

Malfunction Criteria	Threshold Value
Engine oil temperature	< 50 °C (122 °F)
Elapsed time after starting the engine	≥ Value from Map 2

Map 2

		Intake air temperature at engine start °C (°F)							
		–30 (–22)	–20 (–4)	–10 (14)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Percentage of time when engine is at stop against time elapsed since engine start	0.0	2800000	2100000	1500000	1000000	750000	600000	500000	400000
	0.3	2800000	2100000	1500000	1000000	750000	600000	500000	400000
	0.6	2800000	2100000	1500000	1000000	750000	600000	500000	400000
	1.0	2800000	2100000	1500000	1000000	750000	600000	500000	400000
ms									

Time Needed for Diagnosis: Value of Map 2

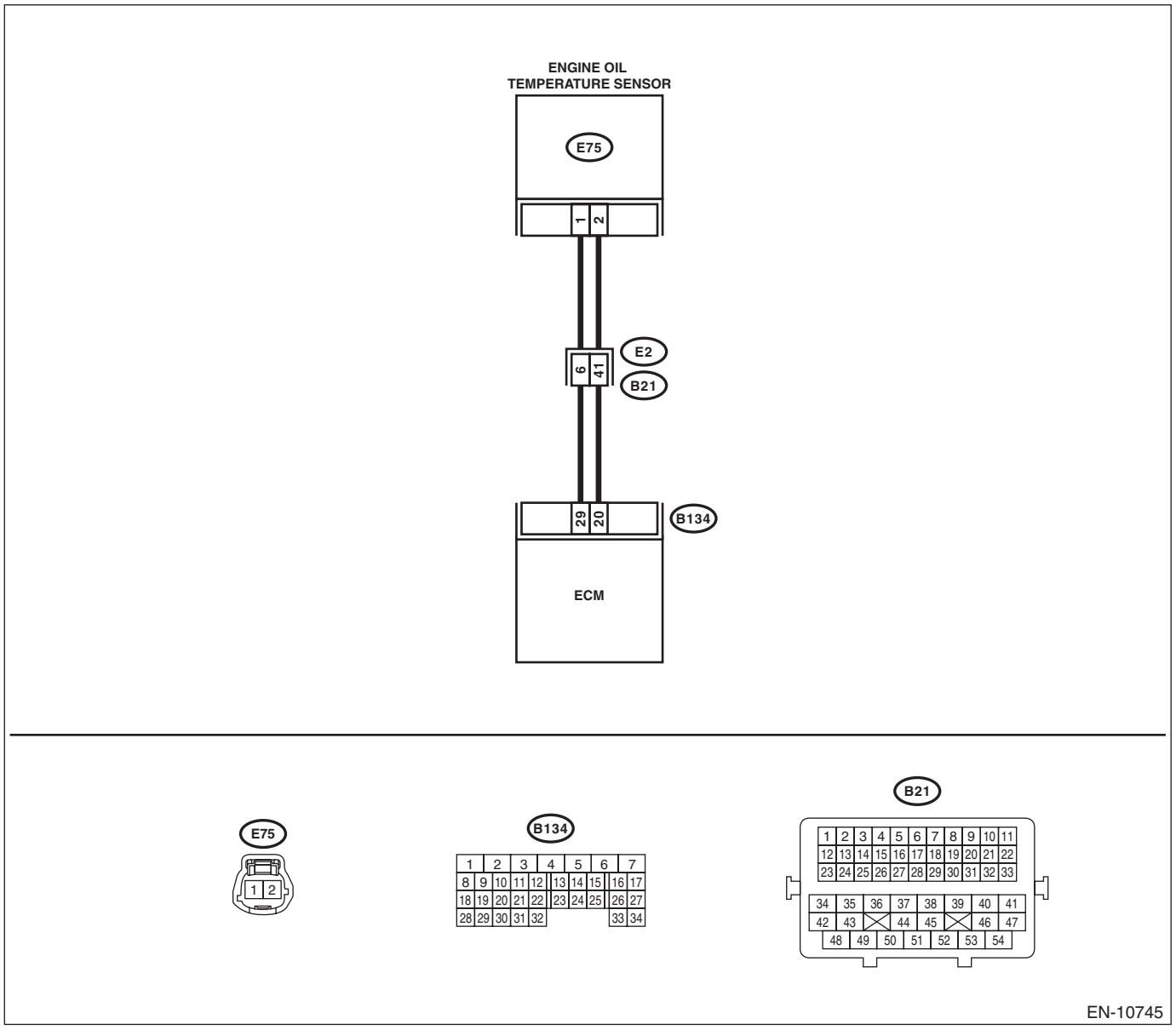
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BF:DTC P0197 ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

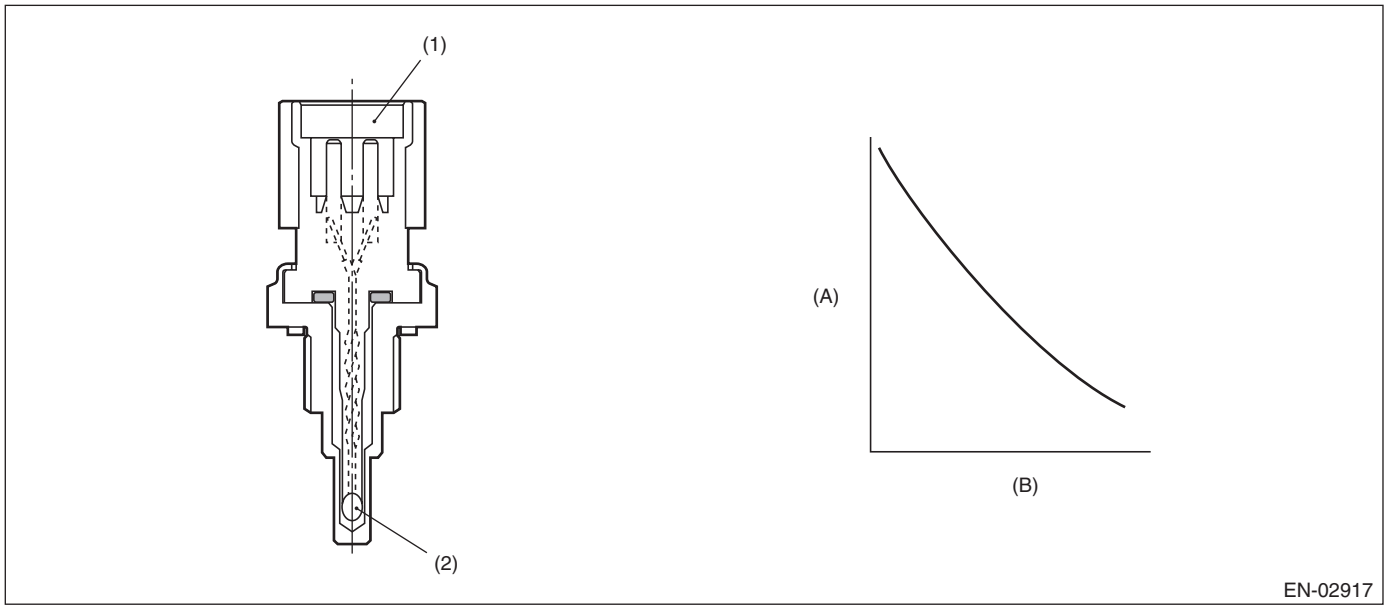


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Oil Temperature» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oil Temperature» 150°C (302°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and engine oil temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the engine oil temperature sensor. <Ref. to FU(H4DO(HEV))-45, Engine Oil Temperature Sensor.>	Repair the short circuit to ground in the harness between the ECM connector and engine oil temperature sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the oil temperature sensor.
Judge as NG when outside of the judgment value.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

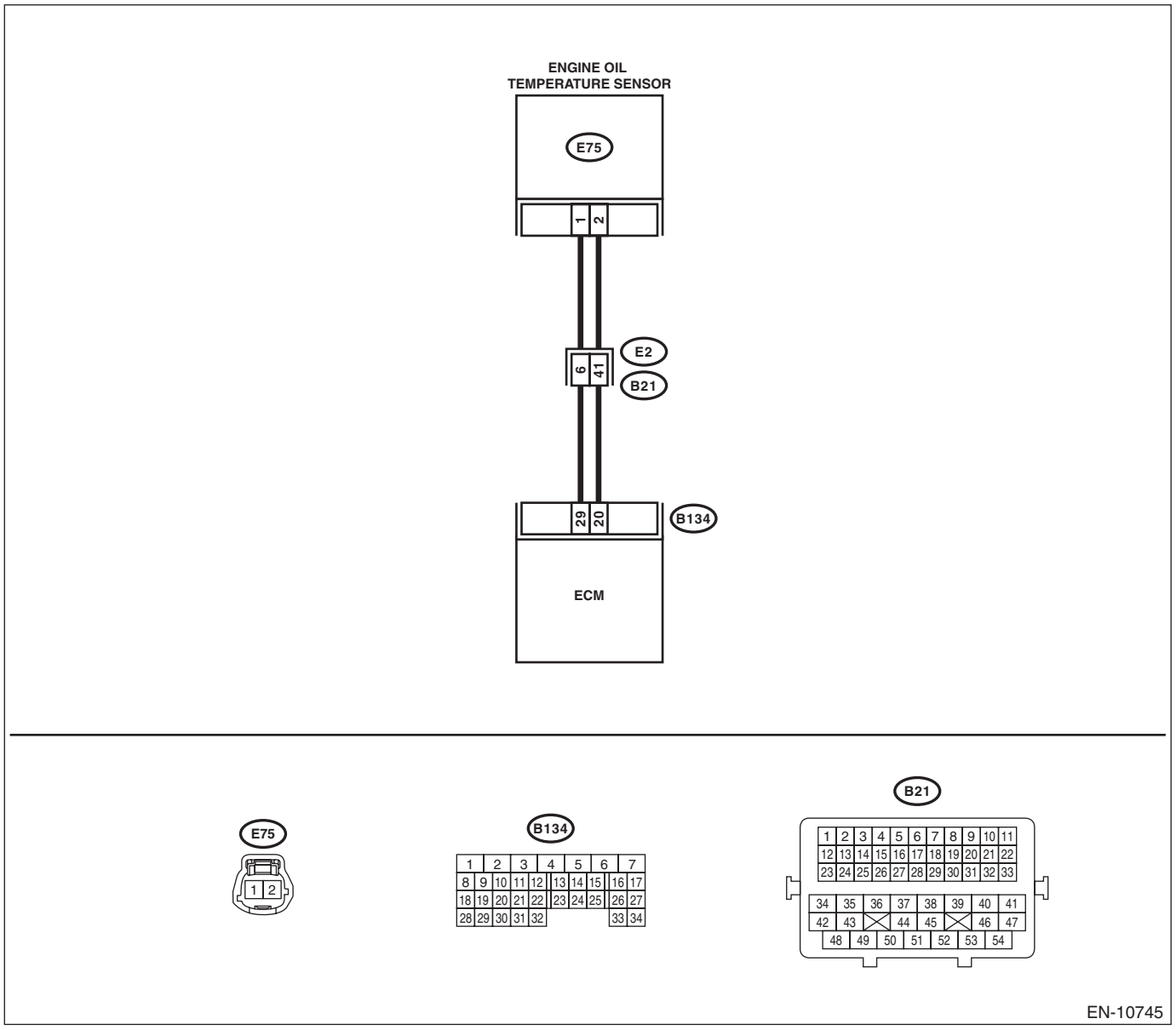
Malfunction Criteria	Threshold Value
Output voltage	< 0.203 V

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BG:DTC P0198 ENGINE OIL TEMPERATURE SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

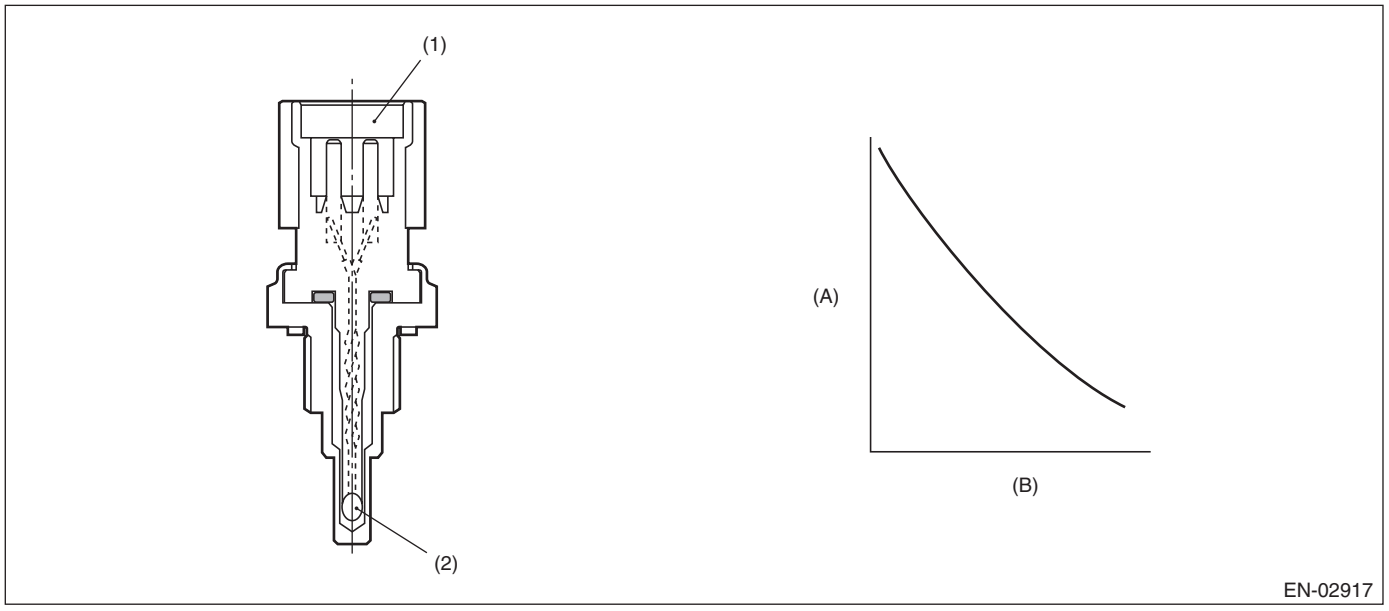


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Oil Temperature» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oil Temperature» –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK FOR POOR CONTACT.** Check for poor contact between the ECM and engine oil temperature sensor connectors.	Is there poor contact of the ECM or engine oil temperature sensor connectors?	Repair the poor contact of ECM or engine oil temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and engine oil temperature sensor. 3) Measure the resistance of the harness between the ECM connector and engine oil temperature sensor connector. ***Connector & terminal*** ***(B134) No. 29 — (E75) No. 1:*** ***(B134) No. 20 — (E75) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and engine oil temperature sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 20 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and engine oil temperature sensor connector.	Replace the engine oil temperature sensor. <Ref. to FU(H4DO(HEV))-45, Engine Oil Temperature Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the oil temperature sensor.
Judge as NG when outside of the judgment value.

2. COMPONENT DESCRIPTION



(A) Resistance value (kΩ)
(B) Temperature °C (°F)
(1) Connector
(2) Thermistor element

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.698 V

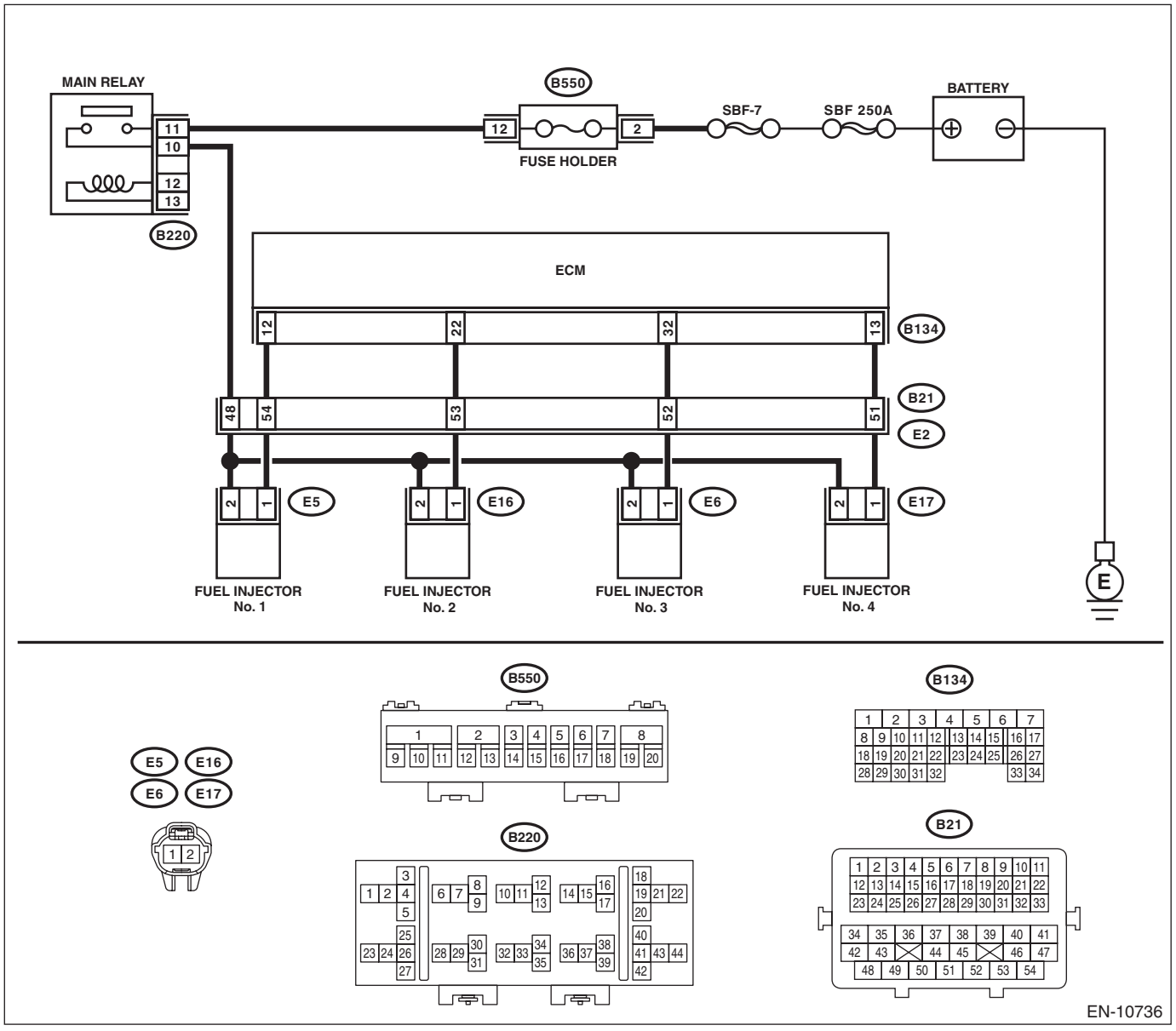
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BH:DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK POWER SUPPLY TO FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector. 3) Turn the ignition switch to ON. 4) Measure the voltage between fuel injector connector and the engine ground. ***Connector & terminal*** ***DTC P0201; (E5) No. 2 (+) — Engine ground (–):*** ***DTC P0202; (E16) No. 2 (+) — Engine ground (–):*** ***DTC P0203; (E6) No. 2 (+) — Engine ground (–):*** ***DTC P0204; (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and fuel injector connector • Poor contact of main relay connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between fuel injector connector and engine ground. ***Connector & terminal*** ***DTC P0201; (E5) No. 1 — Engine ground:*** ***DTC P0202; (E16) No. 1 — Engine ground:*** ***DTC P0203; (E6) No. 1 — Engine ground:*** ***DTC P0204; (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM connector and fuel injector connector. ***Connector & terminal*** ***DTC P0201; (B134) No. 12 — (E5) No. 1:*** ***DTC P0202; (B134) No. 22 — (E16) No. 1:*** ***DTC P0203; (B134) No. 32 — (E6) No. 1:*** ***DTC P0204; (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4	**CHECK FUEL INJECTOR.** Measure the resistance between fuel injector terminals on the corresponding cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **5**.	Replace the fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
5	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Go to step **6**.

Step		Check	Yes	No
6	**CHECK FUEL INJECTOR OPERATION.** 1) Connect all connectors. 2) Start the engine. 3) Check if the corresponding fuel injector emits operating sound. NOTE: Use a sound scope to check the operating sound.	Does the fuel injector emit operating sound?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the poor contact of fuel injector connector.

1. OUTLINE OF DIAGNOSIS

Based on the self-diagnostic result of the injector driving IC, judge the injector driving circuit as normal or abnormal.
Injector driving IC detects the status of “fuel remains injected” or “fuel is not injected” as a malfunction.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 1 s
Engine speed	> 500 rpm
Injection status	Not during fuel cut

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Injector driving IC information	Trouble

Time Needed for Diagnosis: 2560 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BI: DTC P0202 CYLINDER 2 INJECTOR "A" CIRCUIT

NOTE:
For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO HEV)(diag)-255, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0201. <Ref. to EN(H4DO HEV)(diag)-255, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BJ:DTC P0203 CYLINDER 3 INJECTOR "A" CIRCUIT

NOTE:
For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO HEV)(diag)-255, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0201. <Ref. to EN(H4DO HEV)(diag)-255, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BK:DTC P0204 CYLINDER 4 INJECTOR "A" CIRCUIT

NOTE:
For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO HEV)(diag)-255, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

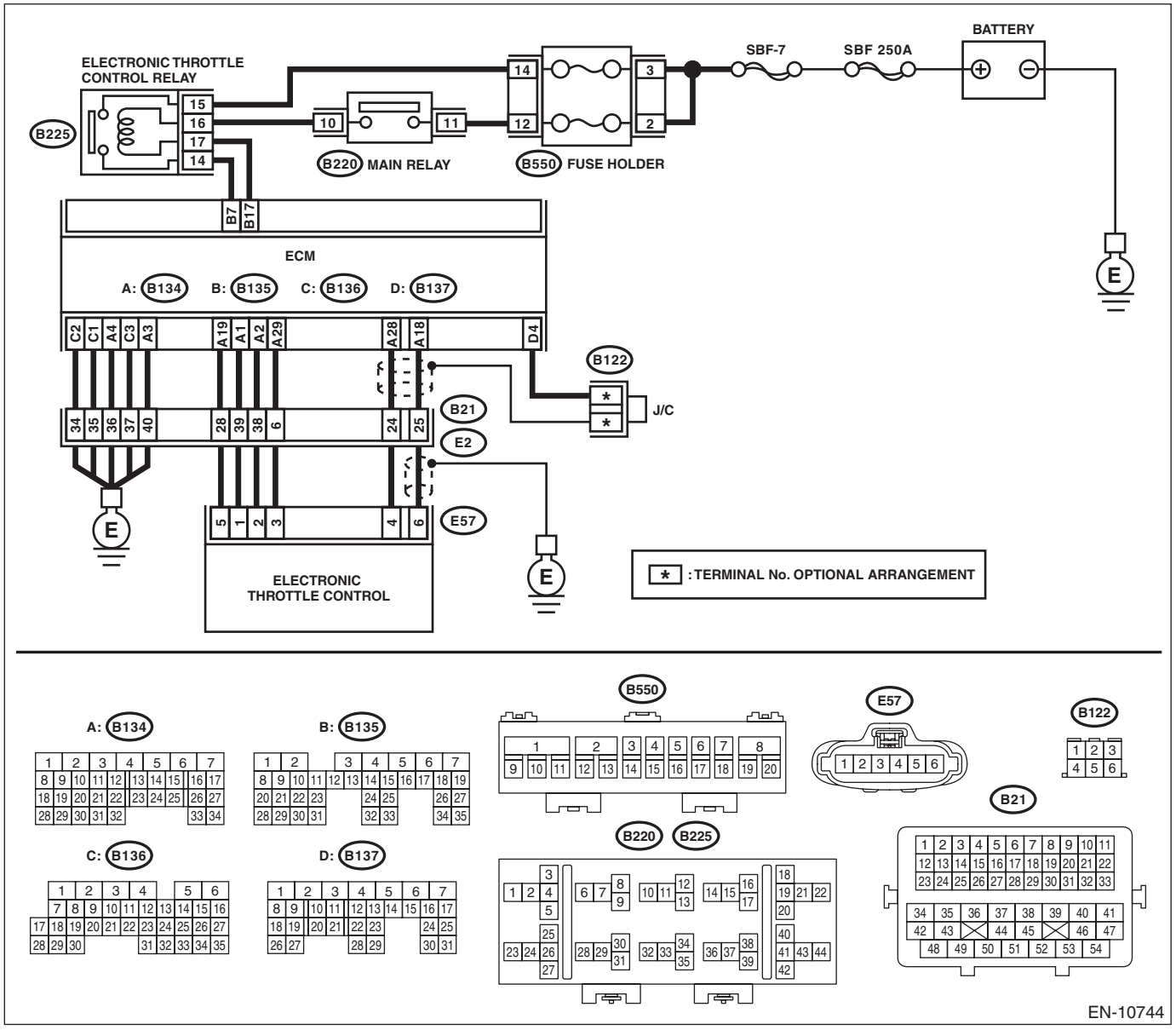
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0201. <Ref. to EN(H4DO HEV)(diag)-255, DTC P0201 CYLINDER 1 INJECTOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BL:DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

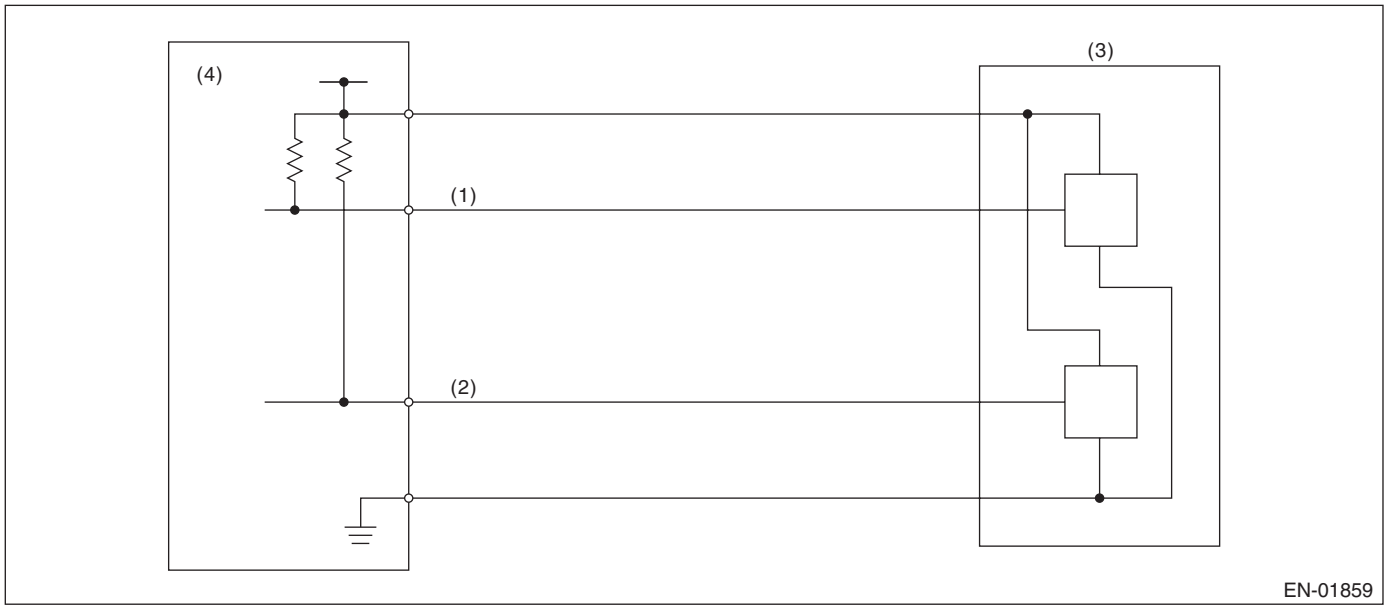


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 28 — Chassis ground:*** ***(B134) No. 28 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 4 — Engine ground:***	Is the resistance 1 MΩ or more?	Replace the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 2.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

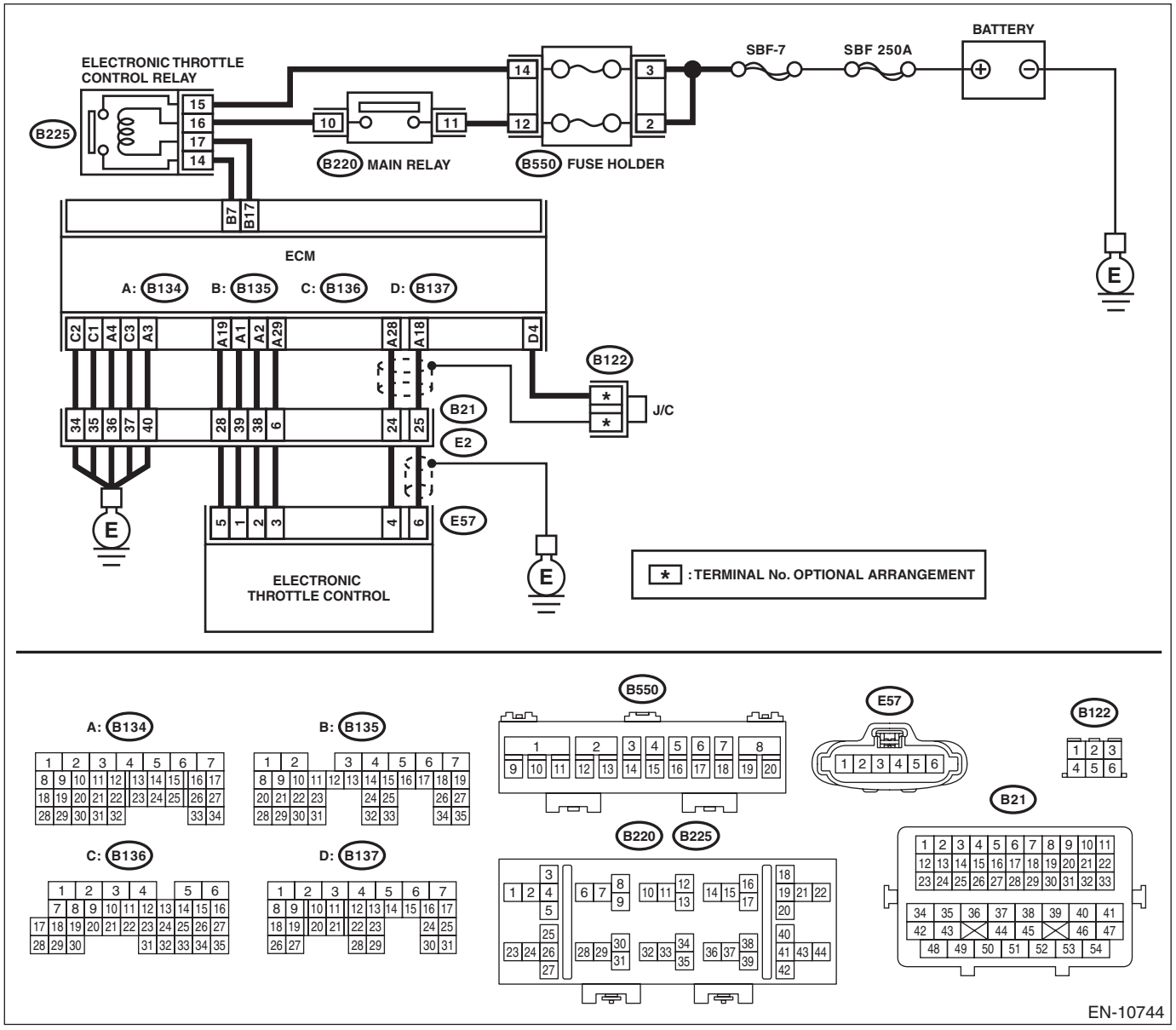
Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≤ 1.133 V

Time Needed for Diagnosis: 24 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BM:DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

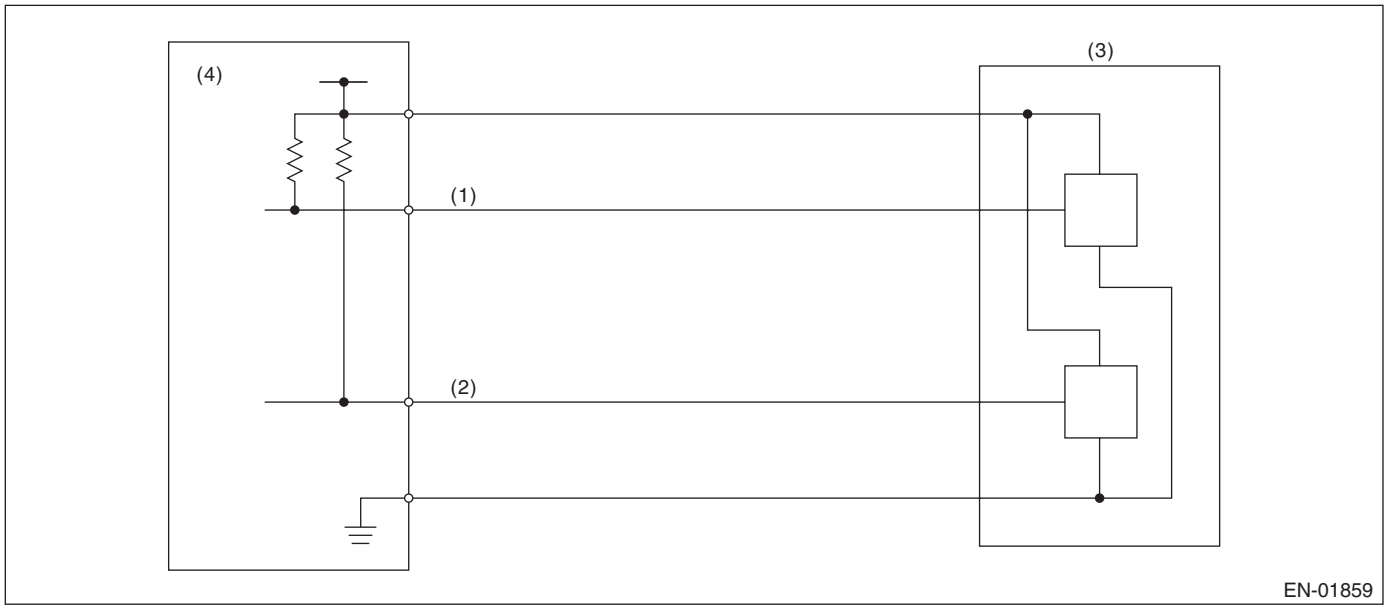


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 28 — (E57) No. 4:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 4 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 28:***	Is the resistance 1 MΩ or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 2.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 4.772 V

Time Needed for Diagnosis: 24 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BN:DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)

TROUBLE SYMPTOM:

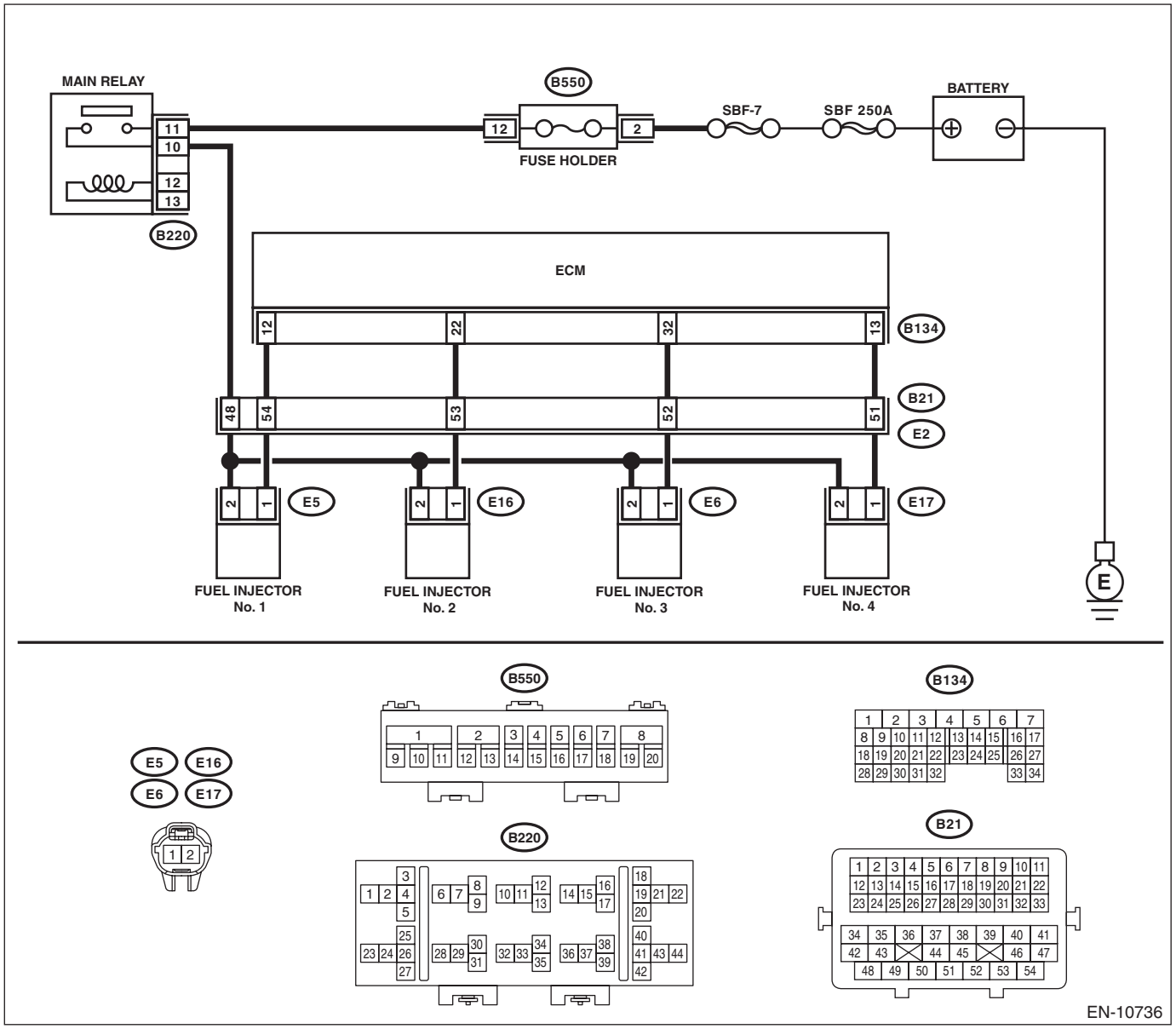
- Engine stalls.
- Improper idling
- Rough driving

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on all cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from all fuel injectors. 3) Measure the resistance between all fuel injector connectors and engine ground. ***Connector & terminal*** ***#1 (E5) No. 1 — Engine ground:*** ***#2 (E16) No. 1 — Engine ground:*** ***#3 (E6) No. 1 — Engine ground:*** ***#4 (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector connector on all cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4	**CHECK FUEL INJECTOR.** Measure the resistance between all fuel injector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **5**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
5	**CHECK POWER SUPPLY LINE.** 1) Turn the ignition switch to ON. 2) Measure the voltage between all fuel injector connectors and the engine ground. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay connector and fuel injector connector • Poor contact of coupling connector • Poor contact of main relay connector

	Step	Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from all fuel injectors. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on all cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step **7**.
7	**CHECK FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between all fuel injector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **8**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
8	**CHECK INSTALLATION CONDITION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor. <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(HEV))-49, INSTALLATION, Crankshaft Position Sensor.>	Go to step **9**.
9	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **10**.
10	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Go to step **11**.
11	**CHECK FUEL LEVEL.**	Is the fuel meter indication higher than the “Lower” level?	Go to step **12**.	Refill the fuel so that the fuel meter indication is higher than the “Lower” level, and proceed to the next step. Go to step **12**.
12	**CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.** 1) Clear the memory using the Subaru Select Monitor. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step **14**.	Go to step **13**.

Step		Check	Yes	No
13	**CHECK CAUSE OF MISFIRE.**	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
14	**CHECK AIR INTAKE SYSTEM.**	Is there any fault in air intake system?	Repair the air intake system. NOTE: Check the following items. • Are there air leaks or air suction caused by loose or dislocated nuts and bolts? • Are there cracks or any disconnection of hoses?	Go to step **15**.
15	**CHECK ALL CYLINDERS.**	Is there a fault in any cylinder?	Repair or replace the faulty part of the faulty cylinder. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression • Skipping timing chain teeth	Go to DTC P0171. <Ref. to EN(H4DO HEV)(diag)-241, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0301. <Ref. to EN(H4DO HEV)(diag)-269, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BO:DTC P0301 CYLINDER 1 MISFIRE DETECTED

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO HEV)(diag)-276, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the presence of misfire occurrence. (Revolution fluctuation method)
Monitoring Misfire which influences exhaust deterioration (1.5 times of FTP) and catalyst damage is made obligatory by the law. Misfire affecting these two has two patterns below:
• Intermittent misfire (The same cylinder misfires in random, or different cylinders misfire in random.): FTP 1.5 times misfire
• Every time misfire (The same cylinder misfires every time.): FTP 1.5 times misfire, Catalyst damage misfire
The following detecting methods are adopted for these detection.
1) Intermittent misfire: FTP 1.5 times misfire
• 180° Interval Difference Method (MT: 1,800 rpm or less; AT: None)
• 360° Interval Difference Method (whole range)
• 720° Interval Difference Method (3,000 rpm or more)
2) Misfire every time: FTP 1.5 times misfire, Catalyst damage misfire
• 360° Interval Difference Method

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Fuel level	≥ 7.8 L (2.06 US gal, 1.72 Imp gal)
Fuel shut-off function	Not in operation
Engine speed	450 rpm — 6400 rpm
Intake air pressure	≥ Value of Map 1
Fuel volatility “Fuel volatility” is the only condition that can be applied within 200 ignitions from the engine start.	Not extremely low volatility
Time elapsed after engine start	≥ 2 crankshaft revolutions
Engine temperature at engine start-up	> –7°C (19°F)
or	
Engine temperature at engine start-up	≤ –7°C (19°F)
and	
Engine temperature at engine start-up	≥ 21°C (70°F)

Map 1

- Normal ignition

		Barometric pressure (kPa (mmHg, inHg))							
		66.4 (498 , 19.6)	72.5 (544 , 21.4)	75.7 (568 , 22.4)	79.5 (596 , 23.5)	82.3 (617 , 24.3)	84.9 (637 , 25.1)	91.6 (687 , 27)	100.5 (754, 29.7)
Engine speed (rpm)	700	17 (127.8 , 5)	17.7 (132.8 , 5.2)	18.1 (135.4 , 5.3)	18.5 (139.1 , 5.5)	19.2 (144.4 , 5.7)	20.3 (152.1 , 6)	21.2 (159.3 , 6.3)	26.3 (197.6 , 7.8)
	1000	17.8 (133.6 , 5.3)	18.5 (138.5 , 5.5)	19.2 (144.2 , 5.7)	19.8 (148.3 , 5.8)	20.3 (152.4 , 6)	20.6 (154.6 , 6.1)	21.7 (162.5 , 6.4)	23 (172.7 , 6.8)
	1200	17.7 (132.8 , 5.2)	18.1 (136.0 , 5.4)	19.2 (144.0 , 5.7)	19.9 (149.4 , 5.9)	20.2 (151.2 , 6)	20.8 (155.8 , 6.1)	21.9 (164.4 , 6.5)	22.7 (170.1 , 6.7)
	1600	17.7 (132.4 , 5.2)	18.2 (136.9 , 5.4)	19.2 (144.4 , 5.7)	19.6 (146.7 , 5.8)	20.3 (152.2 , 6)	20.5 (153.4 , 6)	21.6 (161.7 , 6.4)	22.8 (170.9 , 6.7)
	2000	18.1 (136.0 , 5.4)	19.5 (146.6 , 5.8)	20 (150.2 , 5.9)	20.3 (152.2 , 6)	21 (157.6 , 6.2)	21.5 (161.1 , 6.3)	22.3 (167.6 , 6.6)	23.9 (179.4 , 7.1)
	2400	18.2 (136.4 , 5.4)	20 (150.2 , 5.9)	20.6 (154.3 , 6.1)	21.6 (161.9 , 6.4)	21.8 (163.5 , 6.4)	22.8 (170.7 , 6.7)	23.5 (175.9 , 6.9)	24.8 (186.2 , 7.3)
	2800	18.9 (141.9 , 5.6)	20.5 (153.9 , 6.1)	21 (157.4 , 6.2)	21.6 (161.8 , 6.4)	22.4 (167.8 , 6.6)	22.7 (170.5 , 6.7)	23.7 (178.1 , 7)	25 (187.8 , 7.4)
	3000	19.4 (145.6 , 5.7)	20.1 (150.8 , 5.9)	20.7 (155.1 , 6.1)	21.4 (160.4 , 6.3)	22.4 (167.9 , 6.6)	22.4 (168.0 , 6.6)	23.4 (175.9 , 6.9)	25.2 (188.9 , 7.4)
	3200	21.8 (163.8 , 6.4)	22.7 (170.0 , 6.7)	22.9 (172.0 , 6.8)	23.5 (176.2 , 6.9)	24.4 (183.1 , 7.2)	24.5 (184.1 , 7.2)	25.4 (190.8 , 7.5)	25.1 (188.5 , 7.4)
	3600	23.7 (178.1 , 7)	24.8 (186.3 , 7.3)	25.5 (191.0 , 7.5)	26.2 (196.7 , 7.7)	27.4 (205.2 , 8.1)	27.5 (206.4 , 8.1)	28.1 (210.7 , 8.3)	27.8 (208.2 , 8.2)
	4000	25.4 (190.8 , 7.5)	26.7 (200.2 , 7.9)	27.4 (205.7 , 8.1)	28.7 (215.1 , 8.5)	29.7 (222.9 , 8.8)	29.8 (223.8 , 8.8)	30.1 (225.6 , 8.9)	29.1 (218.0 , 8.6)
	4400	27 (202.5 , 8)	28.3 (211.9 , 8.3)	29 (217.5 , 8.6)	30.2 (226.8 , 8.9)	31.3 (234.7 , 9.2)	31.4 (235.6 , 9.3)	31.6 (237.4 , 9.3)	30.6 (229.8 , 9)
	4800	28.6 (214.3 , 8.4)	29.8 (223.7 , 8.8)	30.6 (229.3 , 9)	31.8 (238.6 , 9.4)	32.9 (246.5 , 9.7)	33 (247.4 , 9.7)	33.2 (249.1 , 9.8)	32.2 (241.5 , 9.5)
	5200	30.1 (226.1 , 8.9)	31.4 (235.5 , 9.3)	32.1 (241.0 , 9.5)	33.4 (250.4 , 9.9)	34.4 (258.2 , 10.2)	34.5 (259.1 , 10.2)	34.8 (260.9 , 10.3)	33.8 (253.3 , 10)
	5600	31.7 (237.8 , 9.4)	33 (247.2 , 9.7)	33.7 (252.8 , 10)	34.9 (262.1 , 10.3)	36 (270.0 , 10.6)	36.1 (270.9 , 10.7)	36.4 (272.7 , 10.7)	35.3 (265.1 , 10.4)
	6000	33.3 (249.6 , 9.8)	34.5 (259.0 , 10.2)	35.3 (264.6 , 10.4)	36.5 (273.9 , 10.8)	37.6 (281.8 , 11.1)	37.7 (282.6 , 11.1)	37.9 (284.4 , 11.2)	36.9 (276.8 , 10.9)
	6400	34.8 (261.4 , 10.3)	36.1 (270.7 , 10.7)	36.8 (276.3 , 10.9)	38.1 (285.6 , 11.2)	39.1 (293.5 , 11.6)	39.3 (294.4 , 11.6)	39.5 (296.2 , 11.7)	38.5 (288.6 , 11.4)
kPa (mmHg, inHg)									

- Idling ignition

		Barometric pressure (kPa (mmHg, inHg))							
		66.4 (498 , 19.6)	72.5 (544 , 21.4)	75.7 (568 , 22.4)	79.5 (596 , 23.5)	82.3 (617 , 24.3)	84.9 (637 , 25.1)	91.6 (687 , 27)	100.5 (754, 29.7)
Engine speed (rpm)	700	17 (127.8 , 5)	17.7 (133.0 , 5.2)	18.1 (135.7 , 5.3)	18.7 (140.4 , 5.5)	19.2 (144.4 , 5.7)	20.3 (152.1 , 6)	21.2 (159.3 , 6.3)	26.3 (197.6 , 7.8)
	1000	18.6 (139.7 , 5.5)	19.5 (146.3 , 5.8)	19.9 (149.1 , 5.9)	20.9 (156.6 , 6.2)	20.9 (157.0 , 6.2)	22.1 (165.9 , 6.5)	23.4 (175.3 , 6.9)	24.4 (183.3 , 7.2)
	1200	18.5 (138.4 , 5.4)	19.3 (144.5 , 5.7)	20.2 (151.8 , 6)	20.7 (154.9 , 6.1)	21.1 (158.0 , 6.2)	23.4 (175.2 , 6.9)	25.8 (193.9 , 7.6)	24.6 (184.2 , 7.3)
	1600	18.3 (137.6 , 5.4)	19.3 (144.6 , 5.7)	19.9 (149.6 , 5.9)	20.4 (153.0 , 6)	20.9 (156.4 , 6.2)	21.9 (164.6 , 6.5)	23.7 (178.0 , 7)	23.8 (178.7 , 7)
	2000	18.4 (137.7 , 5.4)	20 (149.9 , 5.9)	20.4 (153.3 , 6)	20.9 (156.8 , 6.2)	21.4 (160.4 , 6.3)	22.7 (170.5 , 6.7)	24.1 (180.6 , 7.1)	25.4 (190.6 , 7.5)
	2400	18.2 (136.4 , 5.4)	20 (150.2 , 5.9)	20.6 (154.7 , 6.1)	21.6 (161.9 , 6.4)	22 (165.2 , 6.5)	23 (172.8 , 6.8)	24.7 (185.3 , 7.3)	26.2 (196.7 , 7.7)
	2800	18.9 (141.9 , 5.6)	20.5 (153.9 , 6.1)	21 (157.4 , 6.2)	22 (165.0 , 6.5)	22.4 (167.8 , 6.6)	22.7 (170.5 , 6.7)	24.3 (182.0 , 7.2)	25 (187.8 , 7.4)
	3000	19.4 (145.6 , 5.7)	20.1 (150.9 , 5.9)	20.7 (155.1 , 6.1)	21.5 (161.2 , 6.3)	22.4 (167.9 , 6.6)	22.4 (168.0 , 6.6)	23.7 (177.9 , 7)	25.2 (188.9 , 7.4)
	3200	21.8 (163.8 , 6.4)	22.7 (170.0 , 6.7)	22.9 (172.0 , 6.8)	23.5 (176.2 , 6.9)	24.4 (183.1 , 7.2)	24.5 (184.1 , 7.2)	25.7 (192.8 , 7.6)	25.1 (188.5 , 7.4)
	3600	24.4 (183.2 , 7.2)	25.5 (191.5 , 7.5)	25.8 (193.3 , 7.6)	26.9 (201.5 , 7.9)	28.1 (210.5 , 8.3)	28.4 (213.2 , 8.4)	29 (217.5 , 8.6)	28.6 (214.5 , 8.4)
	4000	25.8 (193.5 , 7.6)	27.1 (203.0 , 8)	27.4 (205.8 , 8.1)	28.9 (217.0 , 8.5)	30.1 (225.8 , 8.9)	30.1 (225.8 , 8.9)	30.1 (225.8 , 8.9)	29.4 (220.6 , 8.7)
	4400	27.4 (205.3 , 8.1)	28.6 (214.7 , 8.5)	29 (217.6 , 8.6)	30.5 (228.7 , 9)	31.7 (237.6 , 9.4)	31.7 (237.6 , 9.4)	31.7 (237.6 , 9.4)	31 (232.4 , 9.1)
	4800	28.9 (217.1 , 8.5)	30.2 (226.5 , 8.9)	30.6 (229.4 , 9)	32.1 (240.5 , 9.5)	33.2 (249.4 , 9.8)	33.2 (249.4 , 9.8)	33.2 (249.4 , 9.8)	32.5 (244.1 , 9.6)
	5200	30.5 (228.8 , 9)	31.8 (238.3 , 9.4)	32.1 (241.1 , 9.5)	33.6 (252.3 , 9.9)	34.8 (261.1 , 10.3)	34.8 (261.1 , 10.3)	34.8 (261.1 , 10.3)	34.1 (255.9 , 10.1)
	5600	32.1 (240.6 , 9.5)	33.3 (250.0 , 9.8)	33.7 (252.9 , 10)	35.2 (264.0 , 10.4)	36.4 (272.9 , 10.7)	36.4 (272.9 , 10.7)	36.4 (272.9 , 10.7)	35.7 (267.7 , 10.5)
	6000	33.6 (252.4 , 9.9)	34.9 (261.8 , 10.3)	35.3 (264.6 , 10.4)	36.8 (275.8 , 10.9)	38 (284.7 , 11.2)	38 (284.7 , 11.2)	38 (284.7 , 11.2)	37.3 (279.4 , 11)
	6400	35.2 (264.1 , 10.4)	36.5 (273.6 , 10.8)	36.9 (276.4 , 10.9)	38.3 (287.6 , 11.3)	39.5 (296.4 , 11.7)	39.5 (296.4 , 11.7)	39.5 (296.4 , 11.7)	38.8 (291.2 , 11.5)
kPa (mmHg, inHg)									

3. GENERAL DRIVING CYCLE

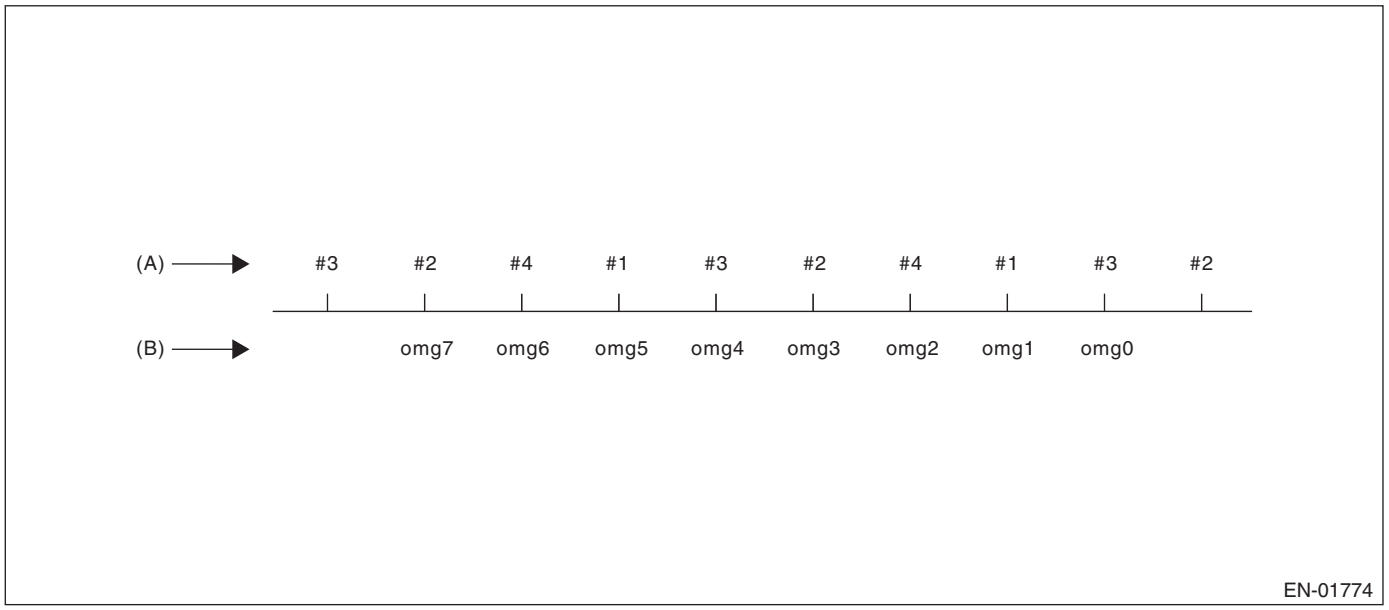
- If conditions are met, it is possible to detect the misfires from idling to high engine speed. However, in case any engine load or breakage occurs, perform with the engine at idle.
- Perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

When a misfire occurs, the engine speed will decrease and the crankshaft position speed will change. Calculate the interval difference value (diagnostic value) from crankshaft position speed by the following formula, and judge whether a misfire is occurring or not comparing the calculated result with judgment value. Count the number of misfires, if the misfire ratio is higher during 1000 revs. or 200 revs., judge corresponding cylinders as NG.

Diagnostic value calculation (Calculate from angle speed) →	Misfire detection every single ignition (Compare diagnostic value with judgment value) →	NG judgment (Misfire occurrence judgment required by the law) (Compare number of misfire with judgment value)
	• 180° Interval Difference Method • 360° Interval Difference Method • 720° Interval Difference Method	• FTP 1.5 times misfire NG judgment • NG judgment for catalyst-damaging misfire

As shown in the following figure, pick a cylinder as the standard and name it omg 0. And the former crankshaft position speed is named omg 1, the second former crankshaft position speed is named omg 2, the third is named omg 3, etc.

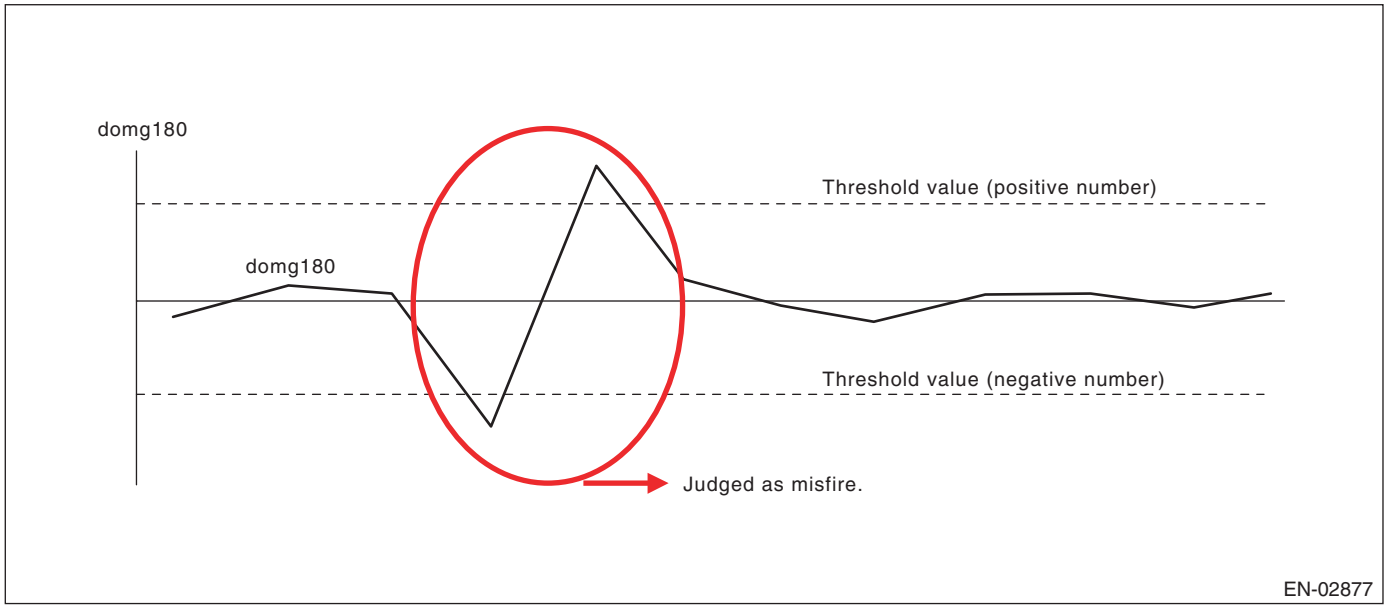


(A) Ignition order

(B) Crankshaft position speed

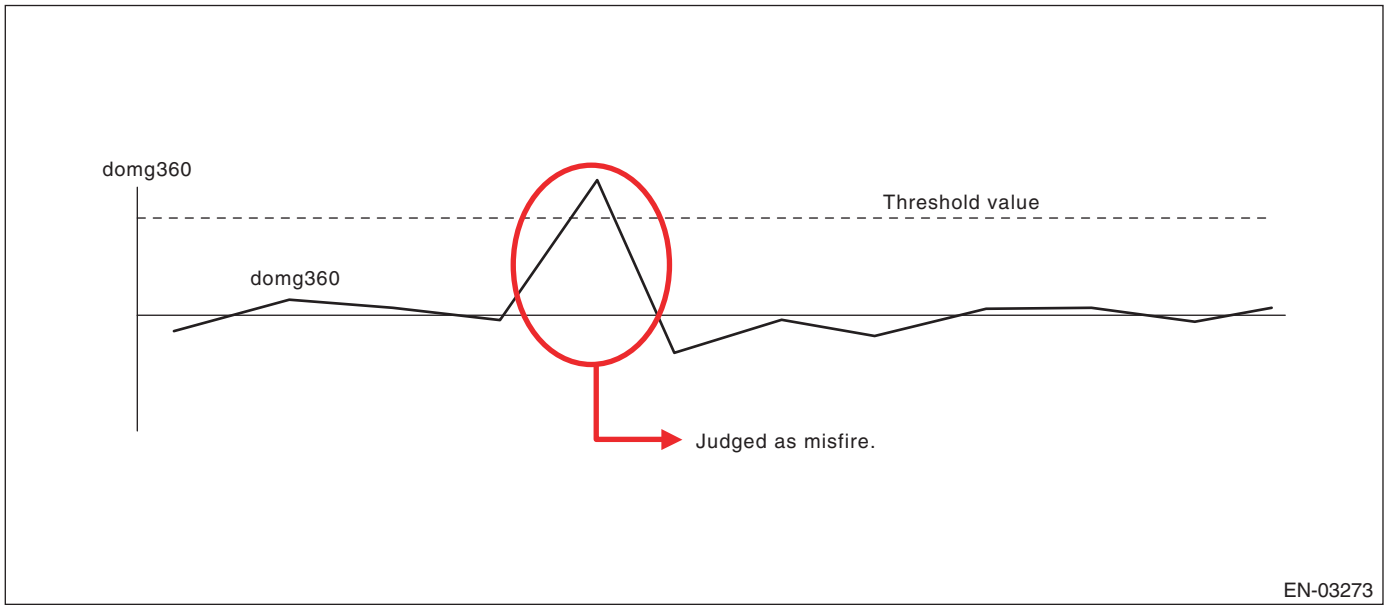
180° Interval Difference Method

Diagnostic value	domg 180 = (omg 1 – omg 0) – (omg 5 – omg 1)/4
Judge as a misfire in the following cases. • domg 180 > judgment value of positive side • domg 180 ≤ judgment value of negative side (Diagnostic value before 180° CA)	



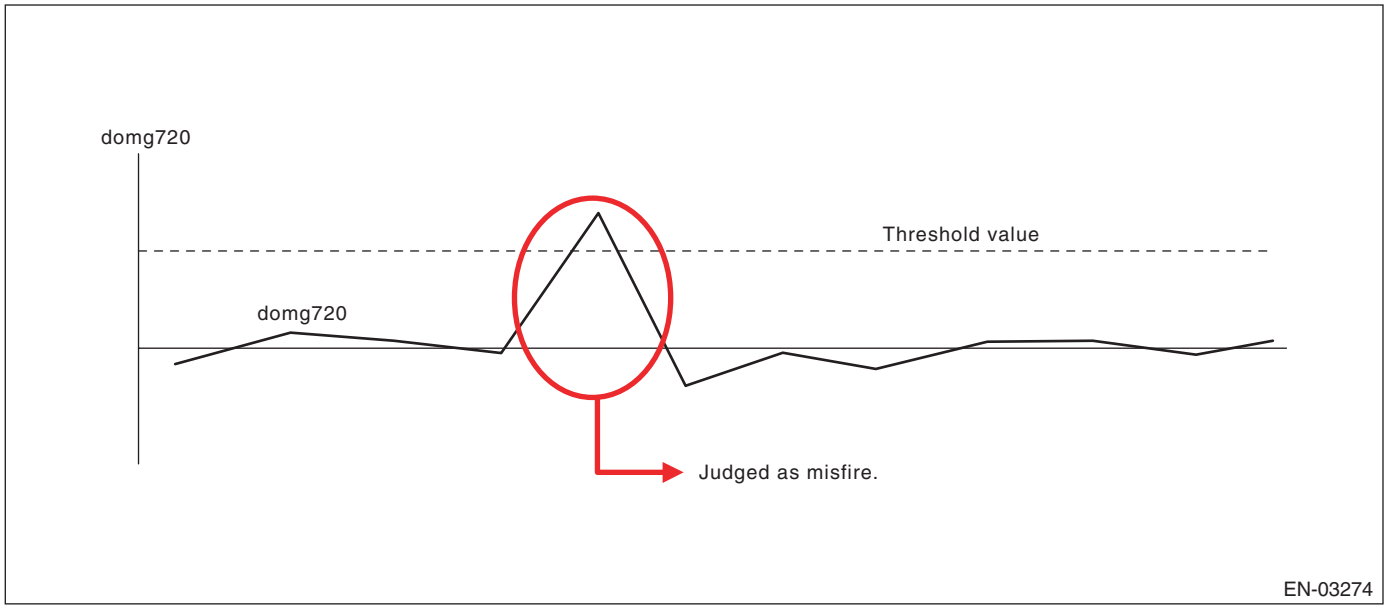
360° Interval Difference Method

Diagnostic value	domg 360 = (omg 1 – omg 0) – (omg 3 – omg 2)
Misfire judgment	domg 360 > Judgment value → Judge as misfire



720° Interval Difference Method

Diagnostic value	domg 720 = (omg 1 – omg 0) – (omg 5 – omg 4)
Misfire judgment	domg 720 > Judgment value → Judge as misfire



- **FTP 1.5 times misfire (Misfire occurrence level which influences exhaust gas)**

Judgment Value (Judge that malfunction occurs when the misfire ratio is high in 1000 engine revs.)

Malfunction Criteria	Threshold Value
FTP emission diagnostic value	≥ 15 × 100/2000% in 1000 revs.

Time Needed for Diagnosis: 1000 engine revs.
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

- **Catalyst-damaging misfire (misfire occurrence level that will damage catalyst)**

Judgment Value

Malfunction Criteria	Threshold Value
Catalyst-damaging misfire diagnostic value	≥ Value from Map 2

Map 2

		Intake air (g(oz)/rev)									
		0.2 (0.01)	0.3 (0.01)	0.4 (0.01)	0.5 (0.02)	0.6 (0.02)	0.7 (0.02)	0.8 (0.03)	0.9 (0.03)	1 (0.04)	1.1 (0.04)
Engine speed (rpm)	700	100	100	100	100	80	80	80	80	80	80
	1000	100	100	100	100	80	80	57	44	80	80
	1200	100	100	100	100	100	80	67	57	57	57
	1600	100	100	80	80	80	57	44	36	44	44
	2000	100	80	80	80	80	57	44	27	44	44
	2400	100	80	80	80	80	57	31	36	36	36
	2800	80	80	80	80	57	44	44	36	36	36
	3200	80	80	57	57	44	36	36	36	36	36
	3600	57	57	57	44	44	44	44	44	44	44
	4000	57	57	57	36	36	36	44	44	44	44
	4400	44	44	44	44	44	44	44	44	44	44
	4800	44	44	44	36	36	36	36	36	36	36
	5200	36	36	36	36	36	36	36	44	44	44
	5600	27	27	27	31	36	36	36	44	44	44
	6000	44	44	44	44	44	44	44	44	36	36
	6400	24	24	24	21	21	21	25	31	31	31

Time Needed for Diagnosis: 200 engine revs.
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BP:DTC P0302 CYLINDER 2 MISFIRE DETECTED

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO HEV)(diag)-276, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0301. <Ref. to EN(H4DO HEV)(diag)-269, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BQ:DTC P0303 CYLINDER 3 MISFIRE DETECTED

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO HEV)(diag)-276, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0301. <Ref. to EN(H4DO HEV)(diag)-269, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BR:DTC P0304 CYLINDER 4 MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)

TROUBLE SYMPTOM:

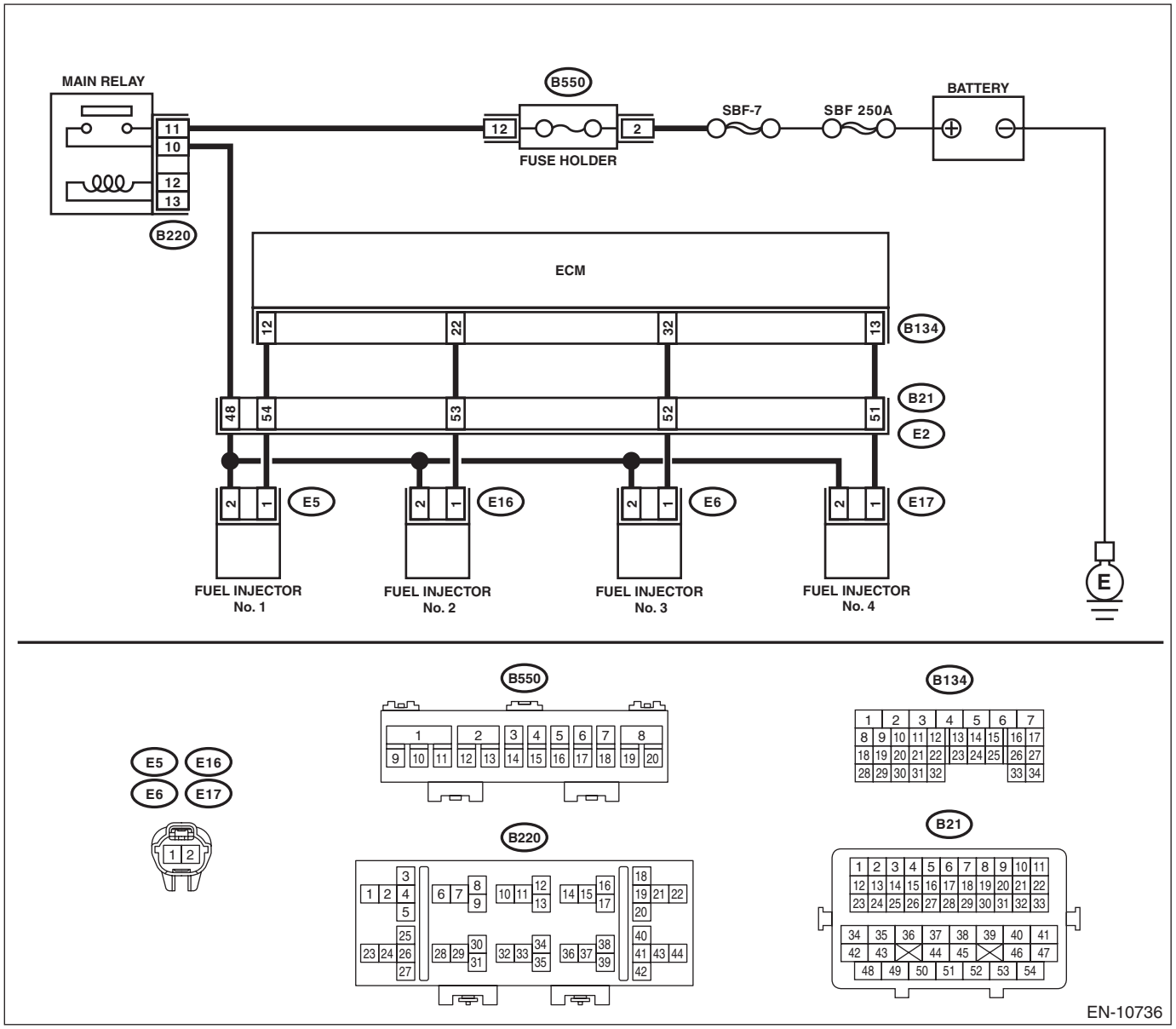
- Engine stalls.
- Improper idling
- Rough driving

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 1 — Engine ground:*** ***#2 (E16) No. 1 — Engine ground:*** ***#3 (E6) No. 1 — Engine ground:*** ***#4 (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4	**CHECK FUEL INJECTOR.** Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **5**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
5	**CHECK POWER SUPPLY LINE.** 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay connector and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector

	Step	Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step **7**.
7	**CHECK FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **8**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
8	**CHECK INSTALLATION CONDITION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor. <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(HEV))-49, INSTALLATION, Crankshaft Position Sensor.>	Go to step **9**.
9	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **10**.
10	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Go to step **11**.
11	**CHECK FUEL LEVEL.**	Is the fuel meter indication higher than the “Lower” level?	Go to step **12**.	Refill the fuel so that the fuel meter indication is higher than the “Lower” level, and proceed to the next step. Go to step **12**.
12	**CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.** 1) Clear the memory using the Subaru Select Monitor. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step **14**.	Go to step **13**.

Step		Check	Yes	No
13	**CHECK CAUSE OF MISFIRE.**	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
14	**CHECK AIR INTAKE SYSTEM.**	Is there any fault in air intake system?	Repair the air intake system. NOTE: Check the following items. • Are there air leaks or air suction caused by loose or dislocated nuts and bolts? • Are there cracks or any disconnection of hoses?	Go to step **15**.
15	**CHECK CYLINDER.**	Is there any fault in the cylinder?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression • Skipping timing chain teeth	Go to DTC P0171. <Ref. to EN(H4DO HEV)(diag)-241, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

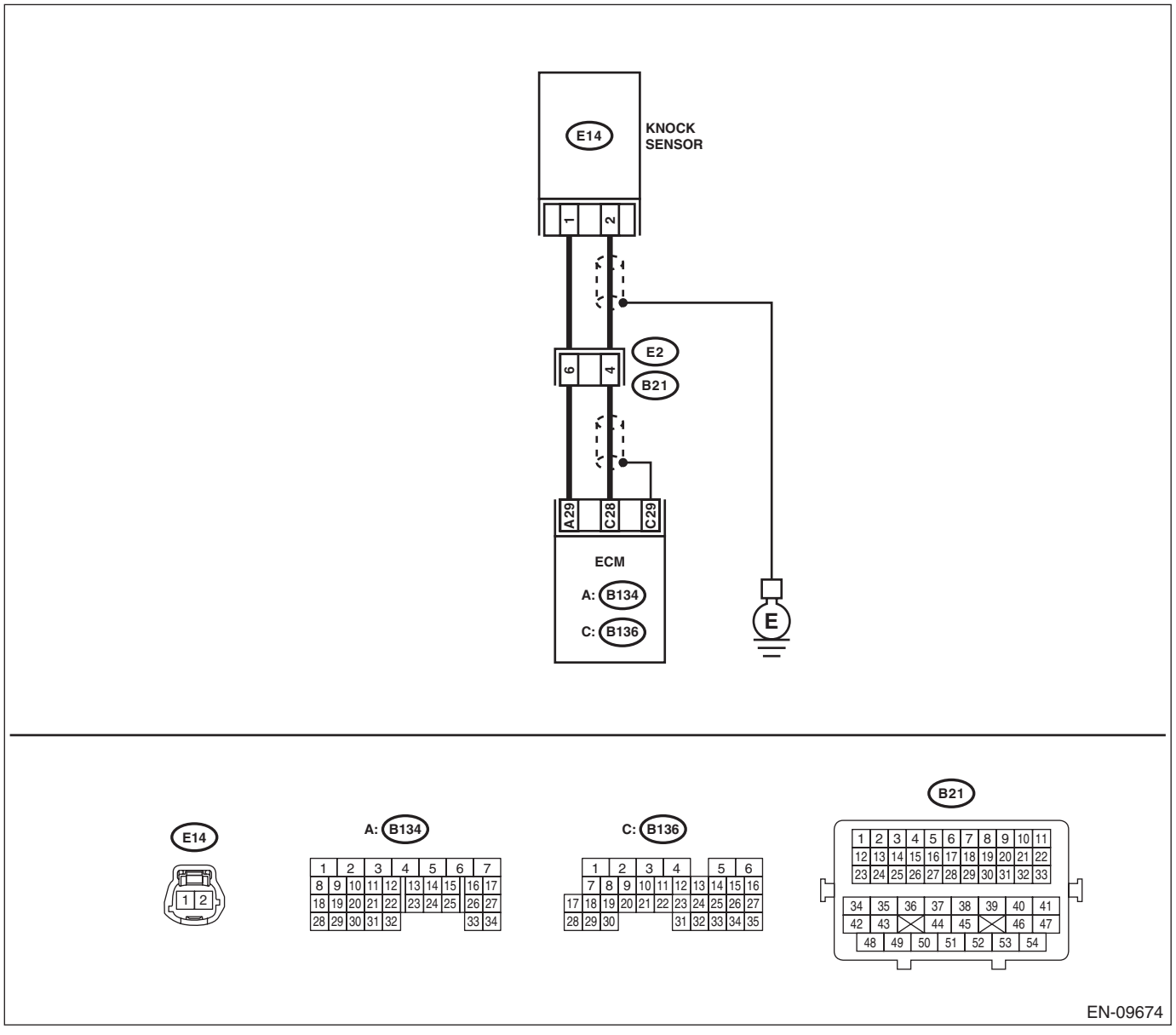
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0301. <Ref. to EN(H4DO HEV)(diag)-269, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BS:DTC P0327 KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT LOW BANK 1 OR SINGLE SENSOR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Poor driving performance
- Knocking occurs

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

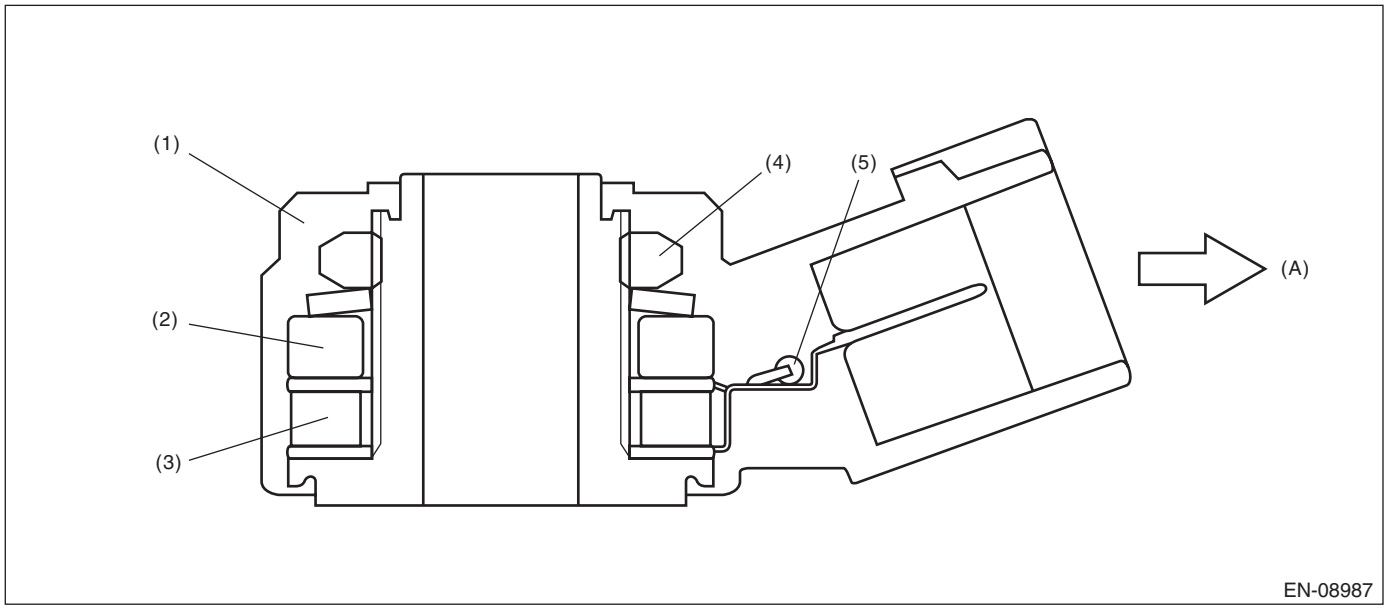


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND KNOCK SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B136) No. 28 — (B134) No. 29:***	Is the resistance less than 500 kΩ?	Go to step **2**.	Go to step **3**.
2	**CHECK KNOCK SENSOR.** 1) Disconnect the connector from the knock sensor. 2) Measure the resistance between knock sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 500 kΩ?	Replace the knock sensor. <Ref. to FU(H4DO(HEV))-60, Knock Sensor.>	Repair the short circuit to ground in harness between ECM connector and knock sensor connector. NOTE: The harness between both connectors are shielded. Remove the shield and repair the short circuit of harness.
3	**CHECK INPUT SIGNAL OF ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 28 (+) — Chassis ground (–):***	Is the voltage 2 V or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the short circuit to ground in harness between ECM connector and knock sensor connector. NOTE: The harness between both connectors are shielded. Remove the shield and repair the short circuit of harness.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of knock sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) To knock sensor harness

(1) Case
(2) Weight
(3) Piezoelectric element
(4) Nut
(5) Resistance

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

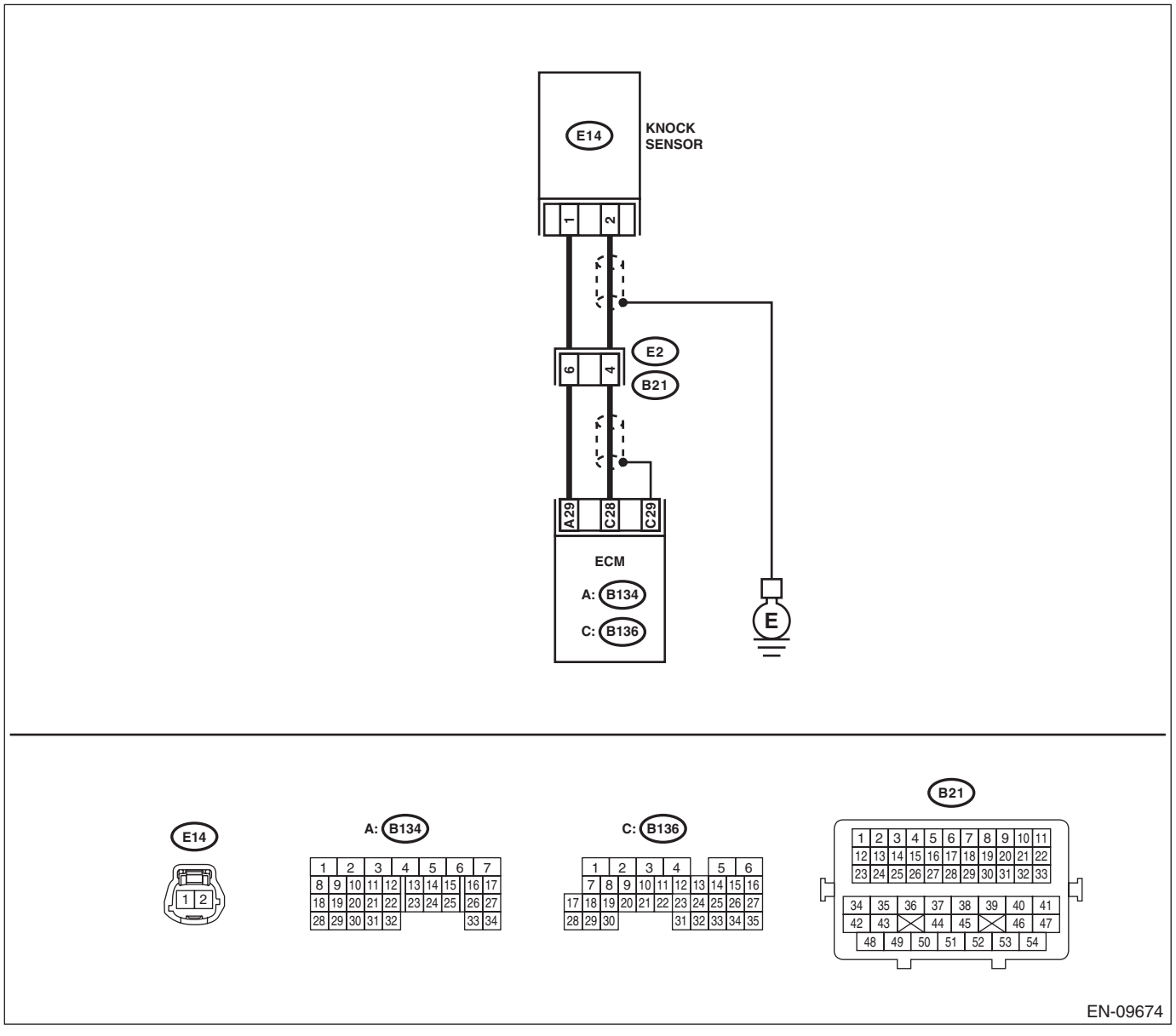
Malfunction Criteria	Threshold Value
Output voltage	< 0.154 V

Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BT:DTC P0328 KNOCK/COMBUSTION VIBRATION SENSOR 1 CIRCUIT HIGH BANK 1 OR SINGLE SENSOR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Poor driving performance
- Knocking occurs

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

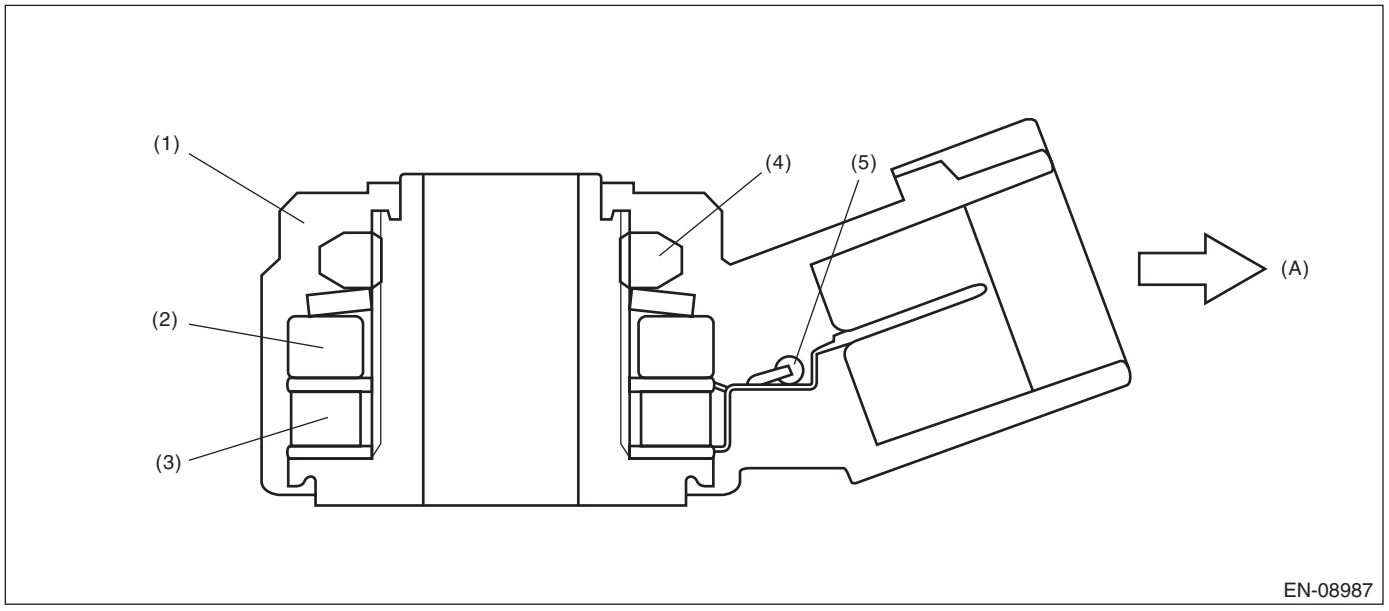


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND KNOCK SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B136) No. 28 — (B134) No. 29:***	Is the resistance 600 kΩ or more?	Go to step **2**.	Repair the poor contact of ECM connector.
2	**CHECK KNOCK SENSOR.** 1) Disconnect the connector from the knock sensor. 2) Measure the resistance between knock sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 600 kΩ or more?	Replace the knock sensor. <Ref. to FU(H4DO(HEV))-60, Knock Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and knock sensor connector • Poor contact of knock sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of knock sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) To knock sensor harness

(1) Case
(2) Weight
(3) Piezoelectric element
(4) Nut
(5) Resistance

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.838 V

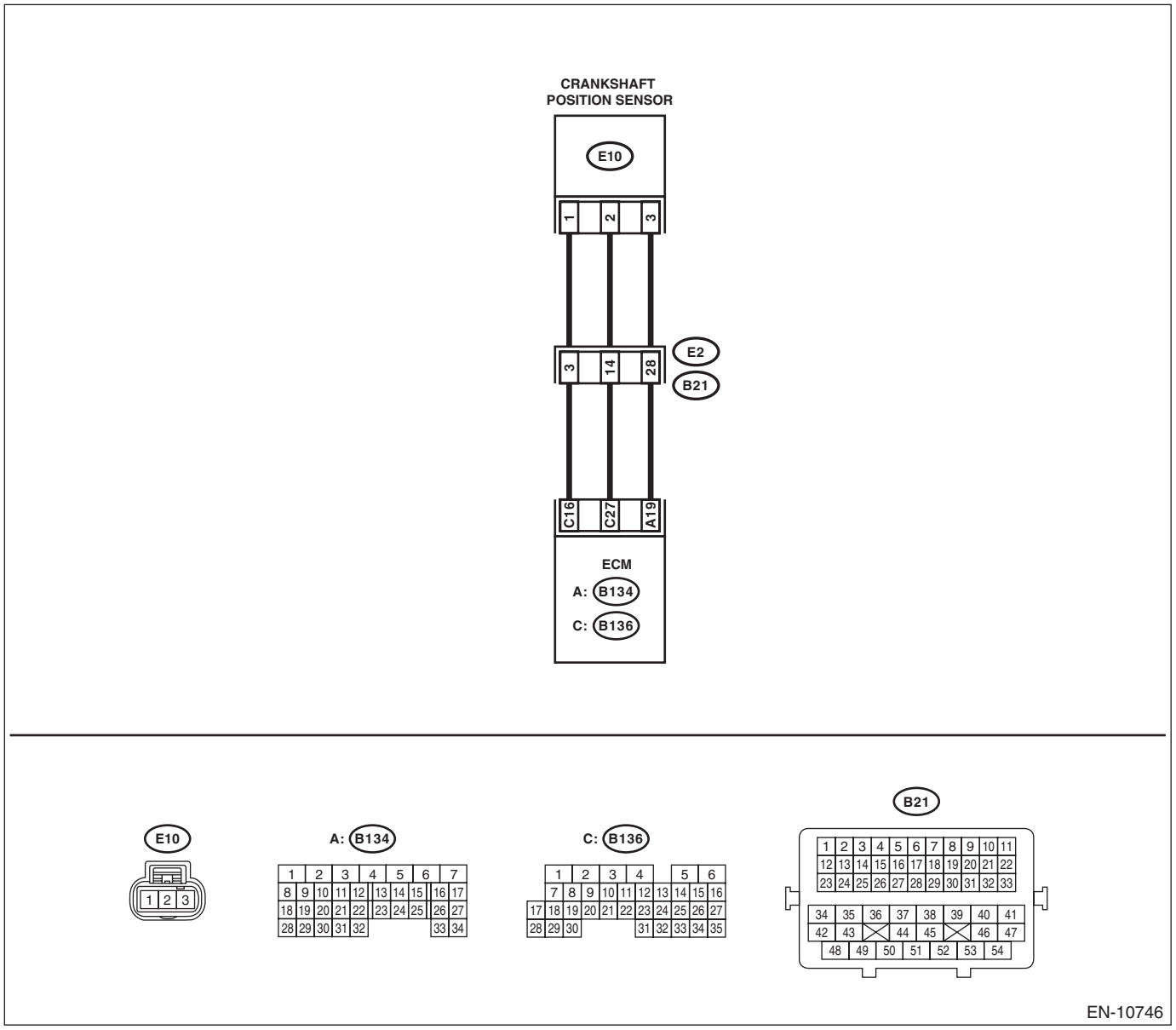
Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BU:DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



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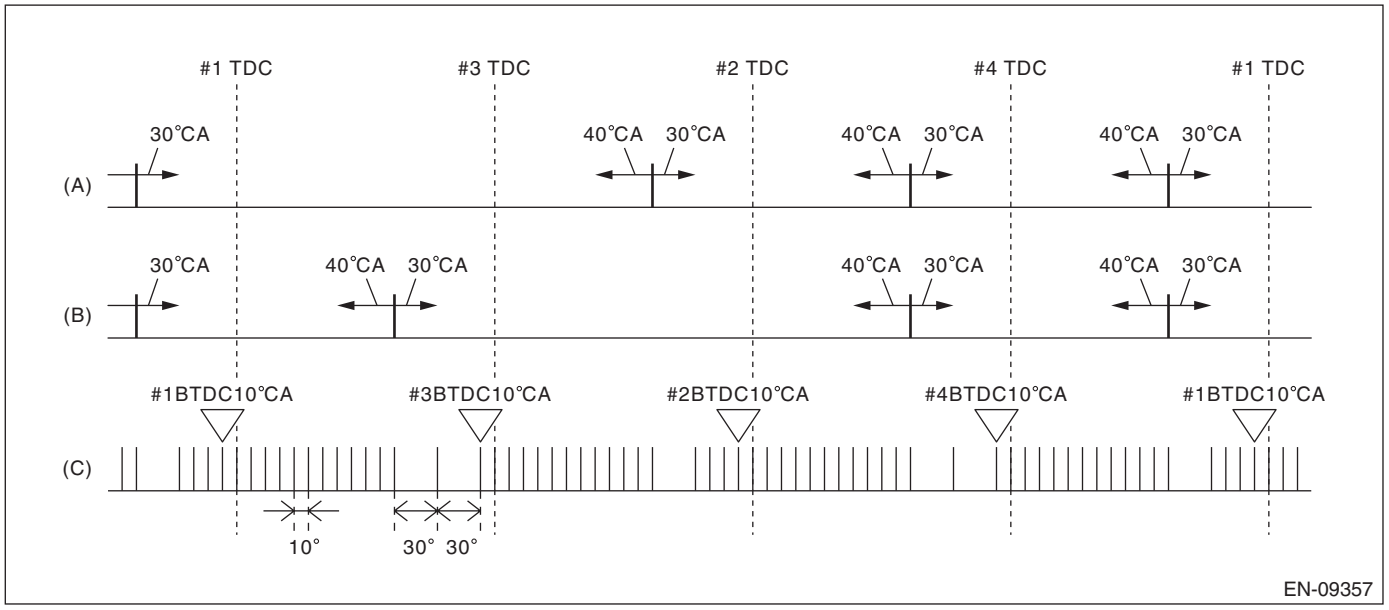
	Step	Check	Yes	No
1	**CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.**	Is the crankshaft position sensor installation bolt tightened securely?	Go to step **2**.	Tighten the crankshaft position sensor installation bolt securely. <Ref. to FU(H4DO(HEV))-49, INSTALLATION, Crankshaft Position Sensor.>
2	**CHECK POWER SUPPLY OF CRANKSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the crankshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between crankshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E10) No. 3 (+) — Engine ground (–):***	Is the voltage 4.5 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and crankshaft position sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and crankshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 16 — (E10) No. 1:*** ***(B136) No. 27 — (E10) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and crankshaft position sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between crankshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E10) No. 1 — Engine ground:*** ***(E10) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair short circuit to ground in harness between ECM connector and crankshaft position sensor connector.
5	**CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between crankshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E10) No. 1 (+) — Engine ground (–):*** ***(E10) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and crankshaft position sensor connector.	Go to step **6**.

Step		Check	Yes	No
6	**CHECK CRANKSHAFT POSITION SENSOR.** Check waveform of crankshaft position sensor. <Ref. to EN(H4DO HEV)(diag)-21, Control Module I/O Signal.>	Is there any abnormality in waveform?	Replace the crankshaft position sensor. <Ref. to FU(H4DO(HEV))-47, Crankshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of crankshaft position sensor connector • Poor contact of coupling connector

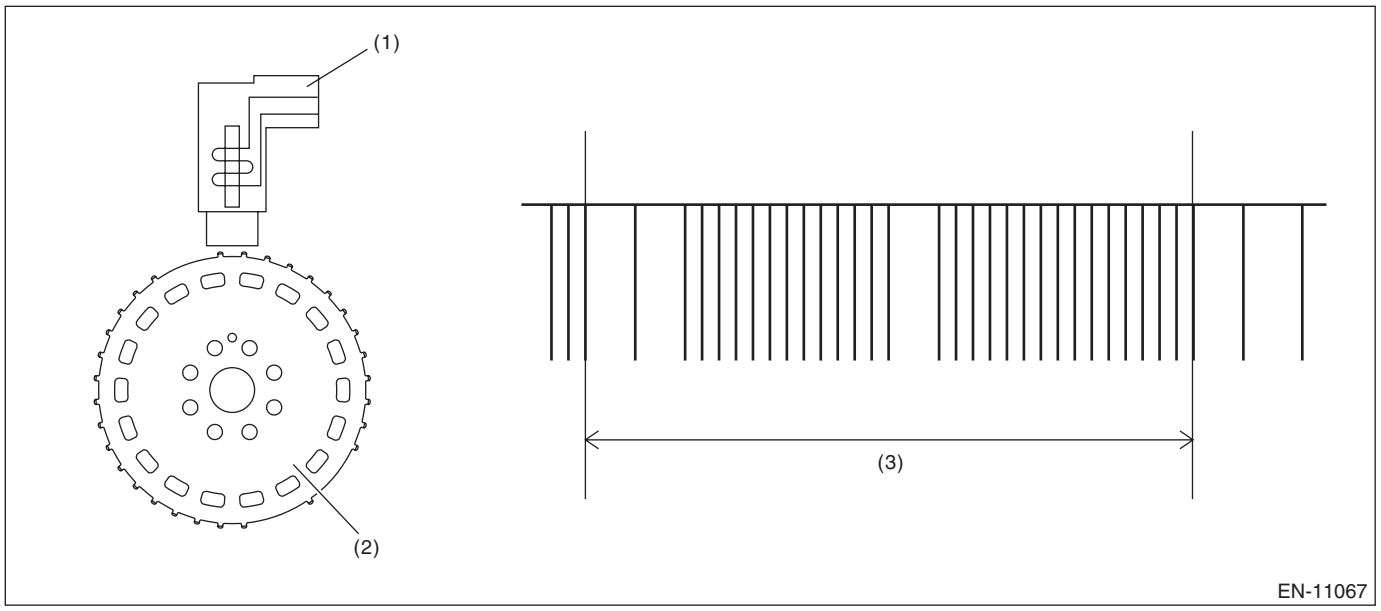
1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the crankshaft position sensor.
Judge as NG when the crank signal is not input even though the starter was rotated.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH) (B) Camshaft signal (LH) (C) Crankshaft signal



(1) Crankshaft position sensor (2) Crankshaft position sensor plate (3) One crankshaft rotation

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Crankshaft position sensor signal	Not detected

Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BV:DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine stalls.
- Failure of engine to start

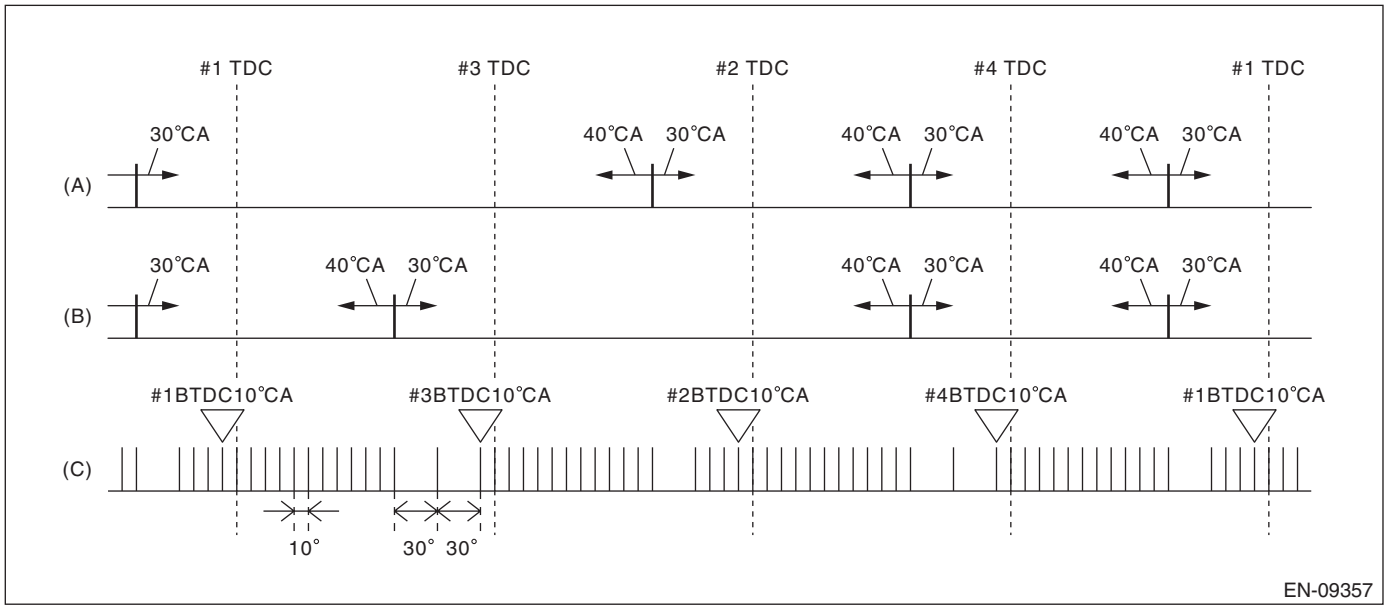
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.** Turn the ignition switch to OFF.	Is the crankshaft position sensor installation bolt tightened securely?	Go to step **2**.	Tighten the crankshaft position sensor installation bolt securely. <Ref. to FU(H4DO(HEV))-49, INSTALLATION, Crankshaft Position Sensor.>
2	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is there crack or damage in the crankshaft position sensor plate teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **3**.
3	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Replace the crankshaft position sensor. <Ref. to FU(H4DO(HEV))-47, Crankshaft Position Sensor.>

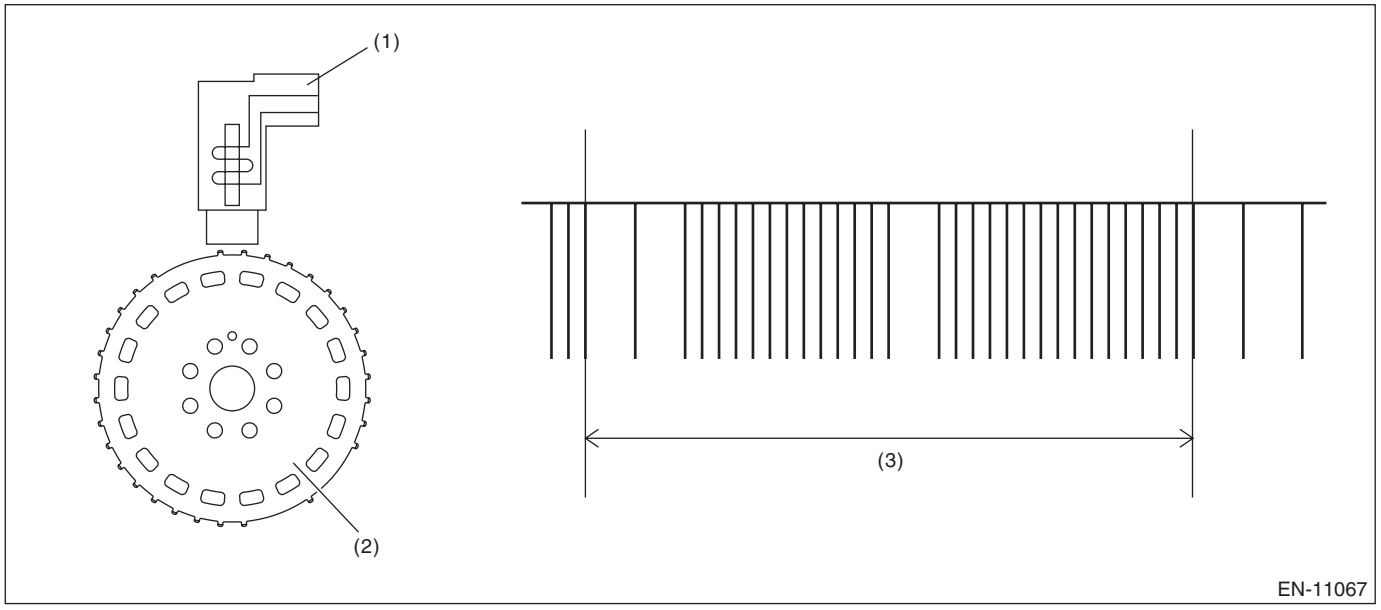
1. OUTLINE OF DIAGNOSIS

Detect for faults in crankshaft position sensor output properties.
Judge as NG when there is a problem in the number of crankshaft signals for every revolution of crankshaft.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH) (B) Camshaft signal (LH) (C) Crankshaft signal



(1) Crankshaft position sensor (2) Crankshaft position sensor plate (3) One crankshaft rotation

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

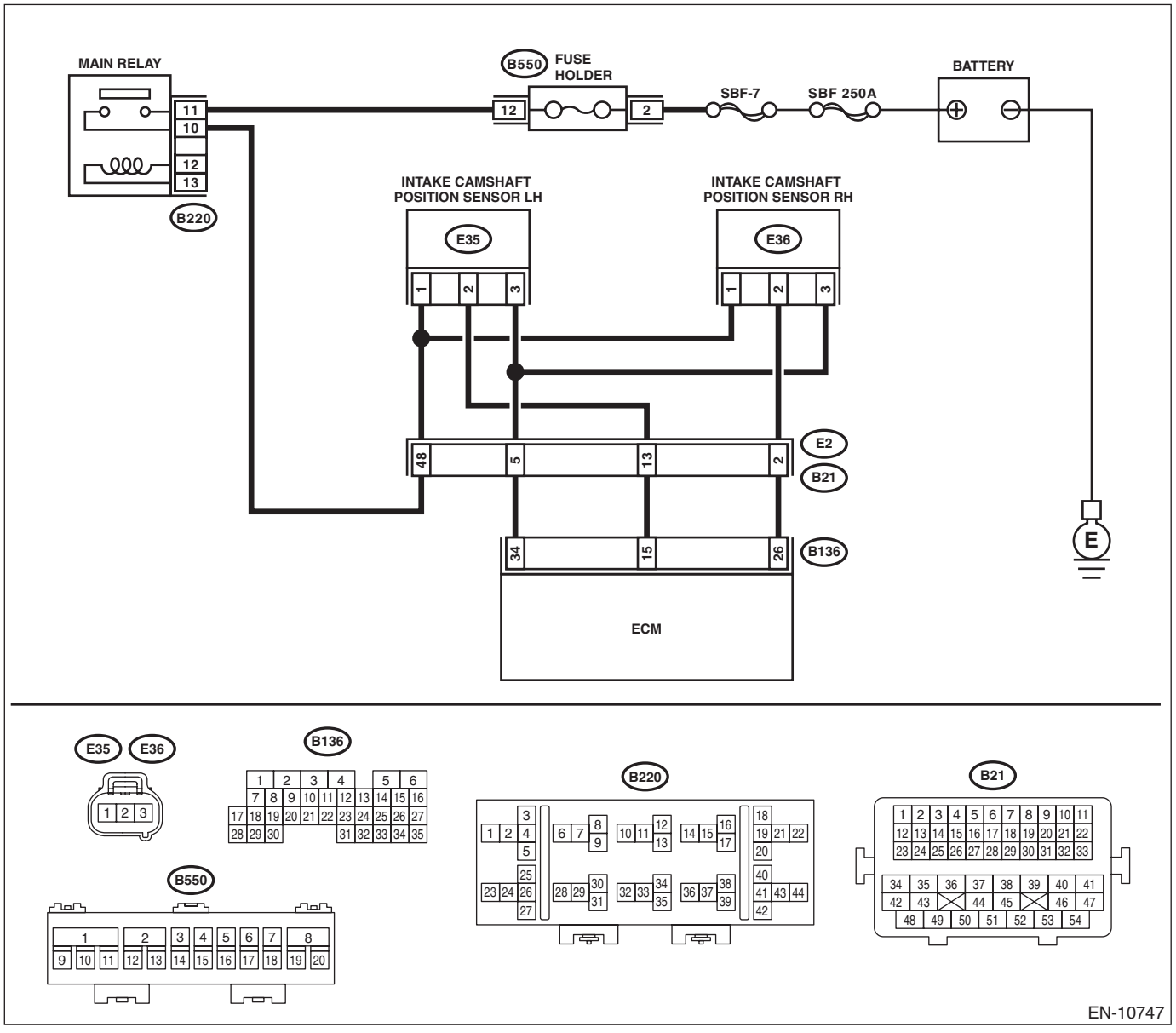
Malfunction Criteria	Threshold Value
Amount of crank sensor signal during 1 rev of crankshaft	Not = 30

Time Needed for Diagnosis: Engine speed 10 engine revs.
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BW:DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine stalls.
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



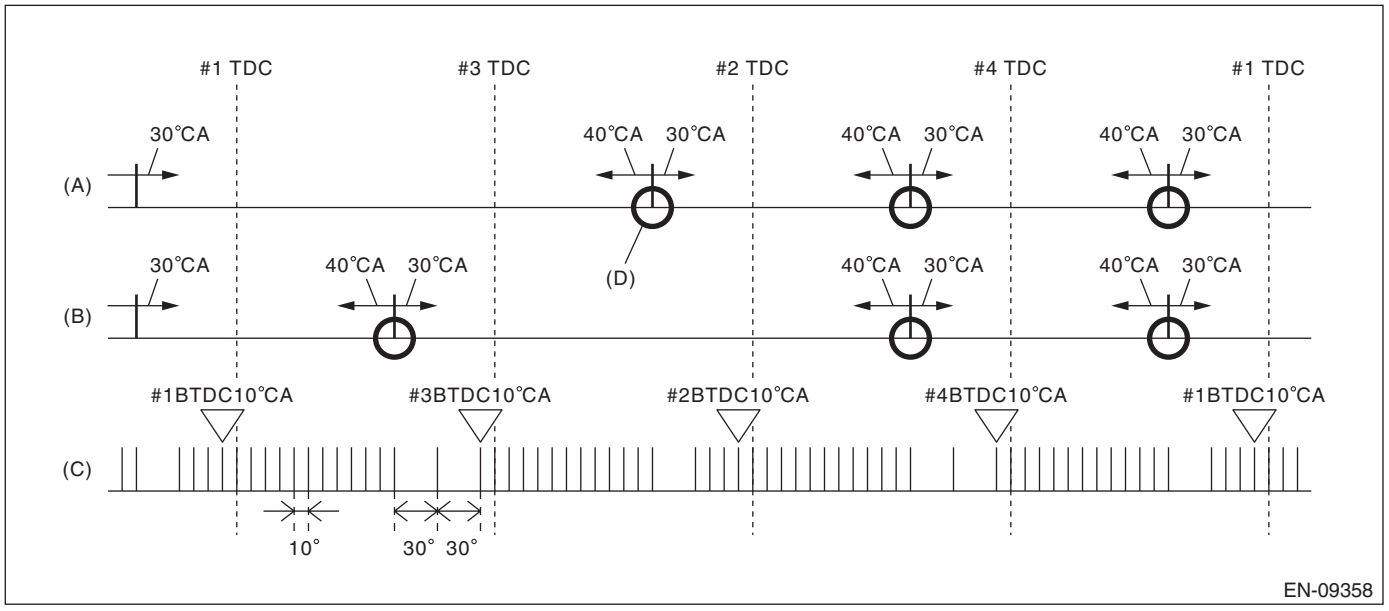
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	Step	Check	Yes	No
1	**CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E36) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 26 — (E36) No. 2:*** ***(B136) No. 34 — (E36) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and camshaft position sensor connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E36) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E36) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step **5**.
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten the camshaft position sensor installation bolt securely. <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.>
6	**CHECK CAMSHAFT POSITION SENSOR.** Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO HEV)(diag)-21, ENGINE CONTROL MODULE (ECM), ELECTRICAL SPECIFICATION, Control Module I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO(HEV))-53, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the camshaft position sensor.
When there is no camshaft position signal input continuously, judge as NG.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)
(B) Camshaft signal (LH)
(C) Crankshaft signal
(D) Camshaft position signal: When normal, there will be 3 camshaft position signals for every 2 crankshaft revolutions.

3. EXECUTION CONDITION

Diagnosis 1

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V

Diagnosis 2

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Elapsed time after starting the engine	≥ 200 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Diagnosis 1

Judge as NG when no input of camshaft position sensor signal in TDC remains for (10 time(s)+2)/2 engine revs.

Judgment Value

Malfunction Criteria	Threshold Value
Number of camshaft position sensor signal input in TDC	= 0

Time Needed for Diagnosis: (10 time(s) +2)/2 engine revs.

Diagnosis 2

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Camshaft position sensor signal	No input

Time Needed for Diagnosis: 3000 ms

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

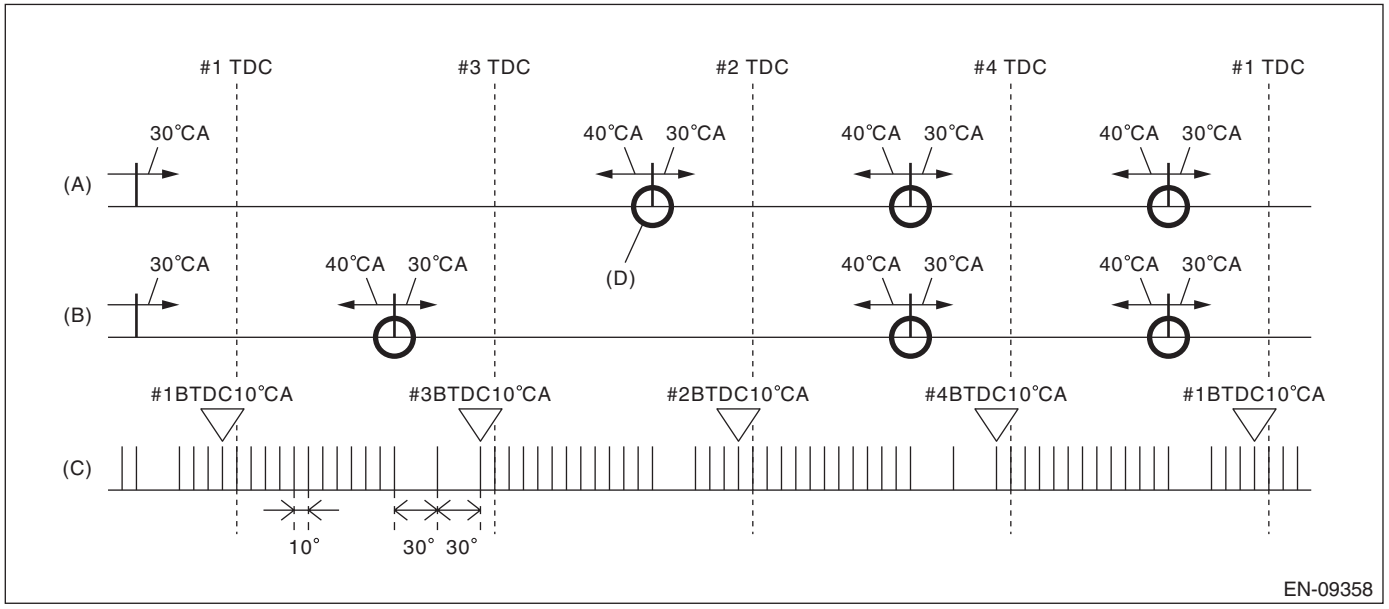
BX:DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR

NOTE:
For the diagnostic procedure, refer to DTC P0340. <Ref. to EN(H4DO HEV)(diag)-293, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of camshaft position sensor property.
Judge as NG when the number of camshaft signals remains abnormal.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)
(B) Camshaft signal (LH)
(C) Crankshaft signal
(D) Camshaft position signal: When normal, there will be 3 camshaft position signals for every 2 crankshaft revolutions.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Elapsed time after starting the engine	≥ 200 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the status where the number of camshaft position sensor signals in two crankshaft revolutions is other than 3 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
Amount of camshaft sensor signal during 2 revs of crankshaft	≠ 3 time(s)

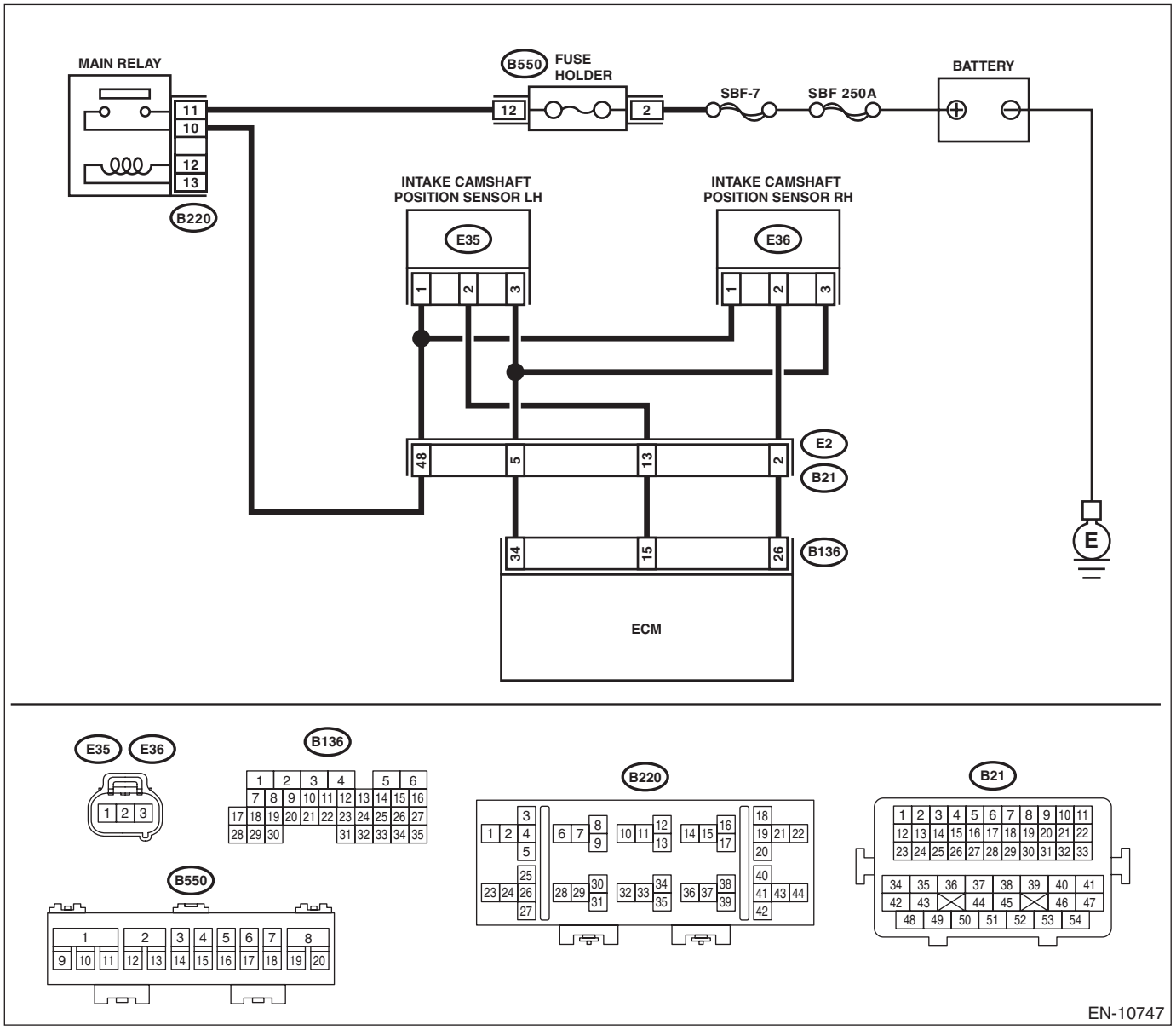
Time Needed for Diagnosis: Two engine revs. × 4 time(s)
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BY:DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E35) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 15 — (E35) No. 2:*** ***(B136) No. 34 — (E35) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and camshaft position sensor connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E35) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E35) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step **5**.
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten the camshaft position sensor installation bolt securely. <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.>
6	**CHECK CAMSHAFT POSITION SENSOR.** Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO HEV)(diag)-21, ENGINE CONTROL MODULE (ECM), ELECTRICAL SPECIFICATION, Control Module I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO(HEV))-53, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0340. <Ref. to EN(H4DO HEV)(diag)-293, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BZ:DTC P0346 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 2

NOTE:
For the diagnostic procedure, refer to DTC P0345. <Ref. to EN(H4DO HEV)(diag)-298, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

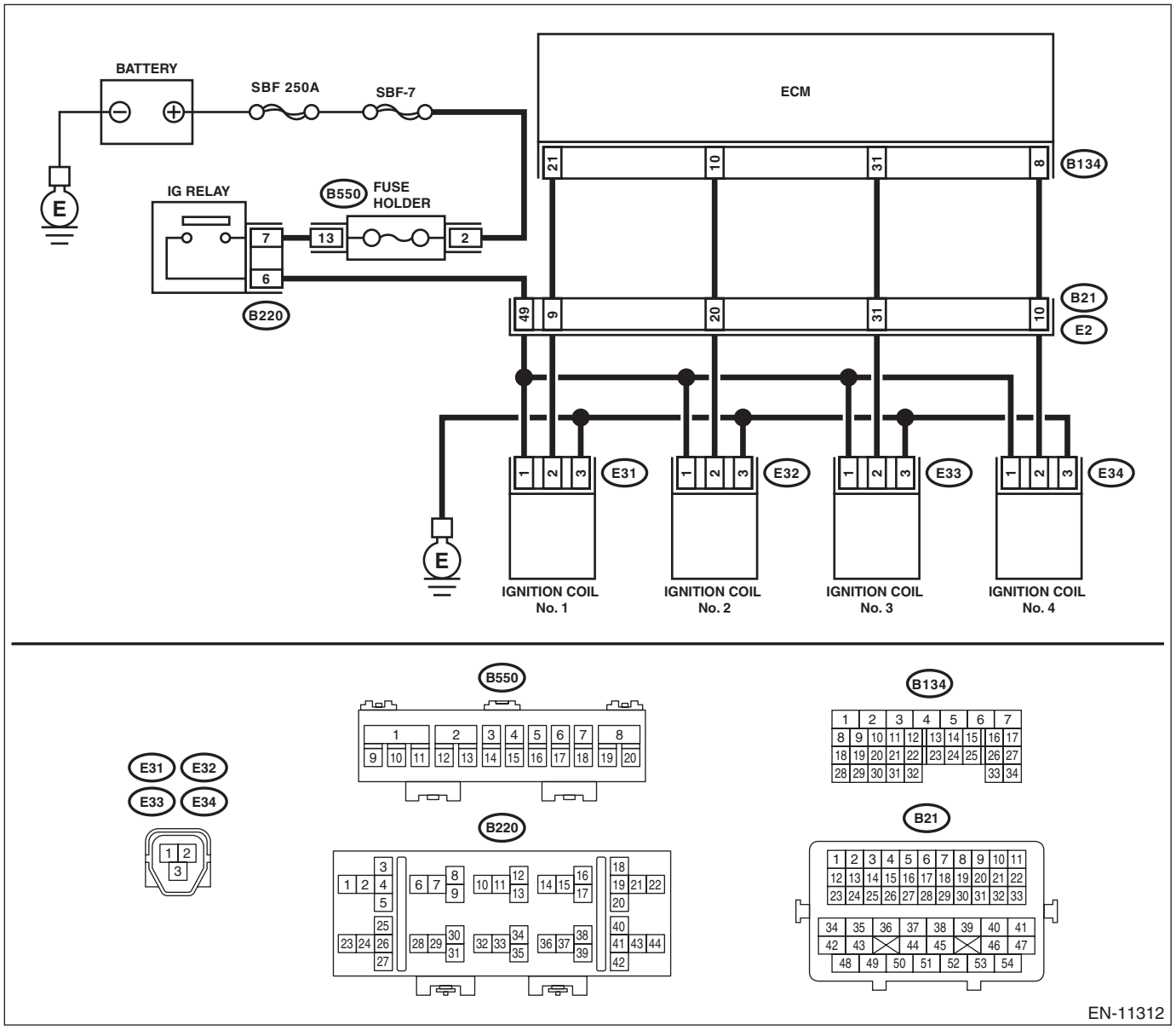
NOTE:
For the detection standard, refer to DTC P0341. <Ref. to EN(H4DO HEV)(diag)-297, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE BANK 1 OR SINGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CA:DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK IGNITION COIL POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil. 3) Turn the ignition switch to ON. 4) Measure the voltage between ignition coil connector and engine ground. ***Connector & terminal*** ***DTC P0351; (E31) No. 1 (+) — Engine ground (–):*** ***DTC P0352; (E32) No. 1 (+) — Engine ground (–):*** ***DTC P0353; (E33) No. 1 (+) — Engine ground (–):*** ***DTC P0354; (E34) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open or short to ground in harness of power supply circuit • Blown out of fuse • Poor contact of IG relay connector • Poor contact of coupling connector • Faulty IG relay
2	**CHECK HARNESS OF IGNITION COIL GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between ignition coil connector and engine ground. ***Connector & terminal*** ***DTC P0351; (E31) No. 3 — Engine ground:*** ***DTC P0352; (E32) No. 3 — Engine ground:*** ***DTC P0353; (E33) No. 3 — Engine ground:*** ***DTC P0354; (E34) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the open circuit in harness between ignition coil connector and engine grounding terminal.
3	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ignition coil connector and engine ground. ***Connector & terminal*** ***DTC P0351; (E31) No. 2 — Engine ground:*** ***DTC P0352; (E32) No. 2 — Engine ground:*** ***DTC P0353; (E33) No. 2 — Engine ground:*** ***DTC P0354; (E34) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the ground short circuit of harness between ECM connector and ignition coil connector.
4	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.** Measure the resistance of harness between ECM connector and ignition coil connector. ***Connector & terminal*** ***DTC P0351; (B134) No. 21 — (E31) No. 2:*** ***DTC P0352; (B134) No. 10 — (E32) No. 2:*** ***DTC P0353; (B134) No. 31 — (E33) No. 2:*** ***DTC P0354; (B134) No. 8 — (E34) No. 2:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and the ignition coil connector • Poor contact of coupling connector
5	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Go to step **6**.
6	**CHECK SPARK PLUG CONDITION.** 1) Remove the spark plug of the corresponding cylinder. <Ref. to IG(H4DO(w/o HEV))-4, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H4DO(w/o HEV))-7, INSPECTION, Spark Plug.>	Is the spark plug condition normal?	Replace the ignition coil. <Ref. to IG(H4DO(w/o HEV))-12, Ignition Coil.>	Replace the spark plug. <Ref. to IG(H4DO(w/o HEV))-4, Spark Plug.>

1. OUTLINE OF DIAGNOSIS

Based on the self-diagnostic result of the ignition coil driving IC, judge the ignition coil driving circuit as normal or abnormal.
The ignition coil driving IC detects “no ignition” status as a malfunction.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	> 1 s
Engine speed	> 500 rpm

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition driving IC information	Trouble

Time Needed for Diagnosis: 2560 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CB:DTC P0352 IGNITION COIL "B" PRIMARY CONTROL CIRCUIT/OPEN

NOTE:
For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO HEV)(diag)-301, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0351. <Ref. to EN(H4DO HEV)(diag)-301, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CC:DTC P0353 IGNITION COIL "C" PRIMARY CONTROL CIRCUIT/OPEN

NOTE:
For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO HEV)(diag)-301, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0351. <Ref. to EN(H4DO HEV)(diag)-301, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CD:DTC P0354 IGNITION COIL "D" PRIMARY CONTROL CIRCUIT/OPEN

NOTE:
For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO HEV)(diag)-301, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

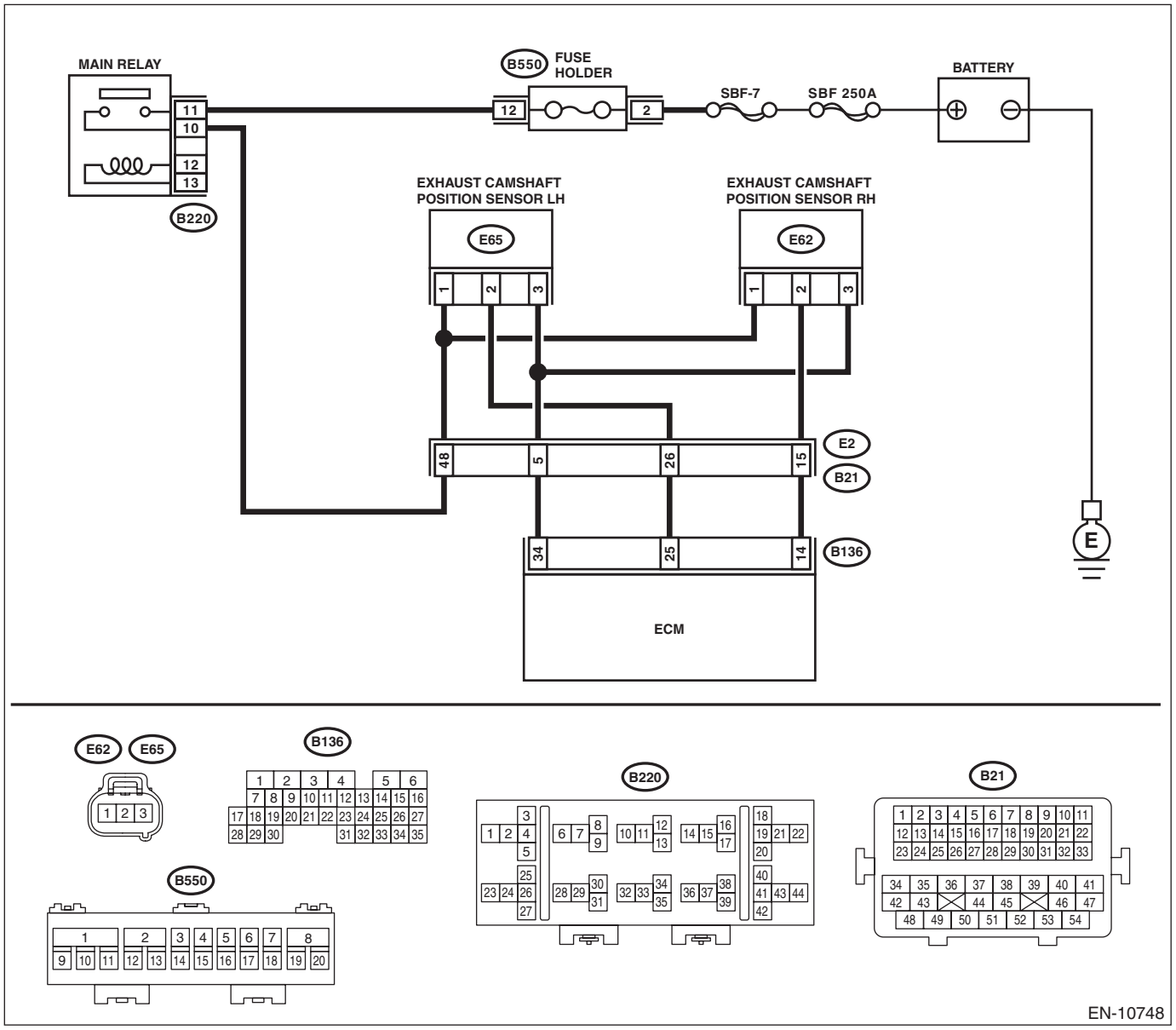
NOTE:
For the detection standard, refer to DTC P0351. <Ref. to EN(H4DO HEV)(diag)-301, DTC P0351 IGNITION COIL "A" PRIMARY CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CE:DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

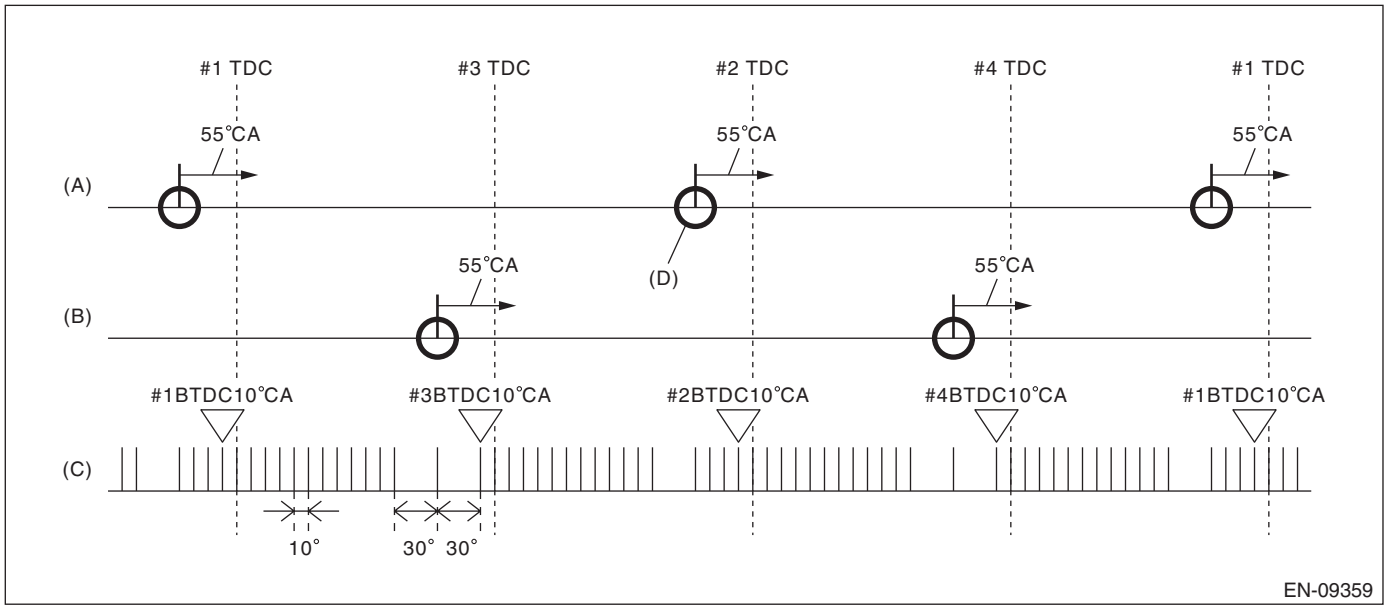


	Step	Check	Yes	No
1	**CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E62) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 14 — (E62) No. 2:*** ***(B136) No. 34 — (E62) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and camshaft position sensor connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E62) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E62) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step **5**.
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten the camshaft position sensor installation bolt securely. <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.>
6	**CHECK CAMSHAFT POSITION SENSOR.** Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO HEV)(diag)-21, ENGINE CONTROL MODULE (ECM), ELECTRICAL SPECIFICATION, Control Module I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO(HEV))-53, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the camshaft position sensor.
When there is no camshaft position signal input continuously, judge as NG.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)
(B) Camshaft signal (LH)
(C) Crankshaft signal
(D) Camshaft position signal: When normal, there will be 2 camshaft position signals for every 2 crankshaft revolutions.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 200 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when no input of camshaft position sensor signal in TDC remains for (10 time(s) +2)/2 engine revs.

Judgment Value

Malfunction Criteria	Threshold Value
Number of camshaft position sensor signal input in TDC	= 0

Time Needed for Diagnosis: (10 time(s) +2)/2 engine revs.
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

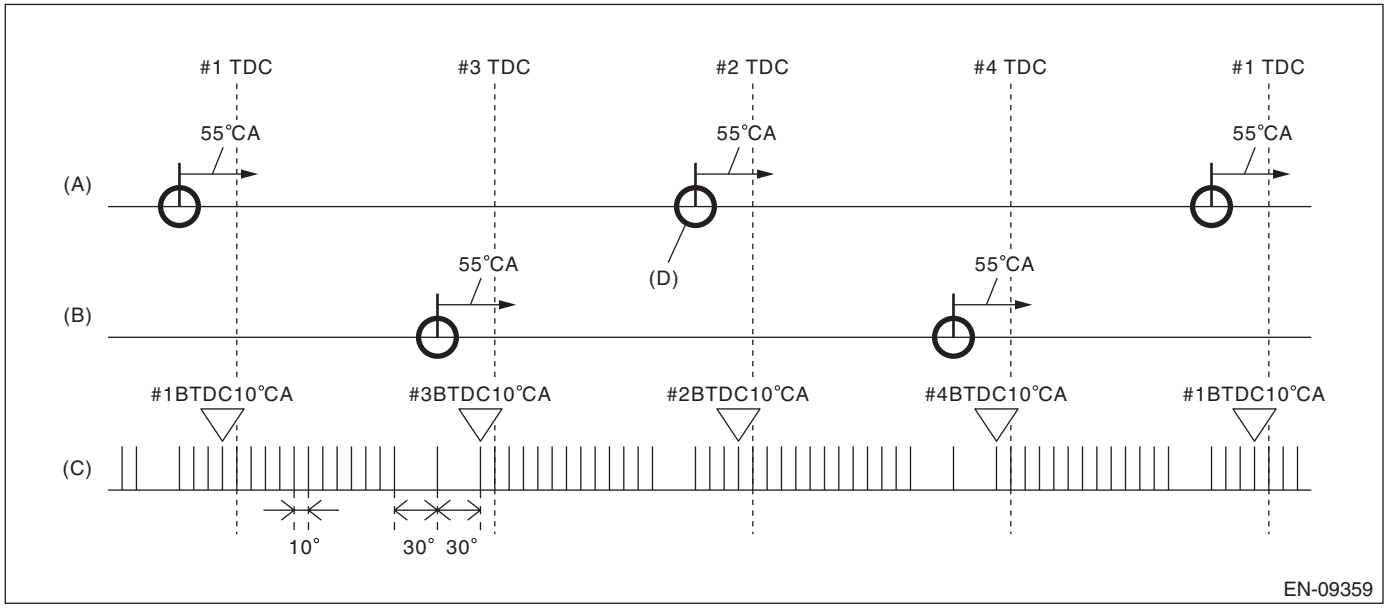
CF:DTC P0366 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1

NOTE:
For the diagnostic procedure, refer to DTC P0365. <Ref. to EN(H4DO HEV)(diag)-305, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of camshaft position sensor property.
Judge as NG when the number of camshaft signals remains abnormal.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)
(B) Camshaft signal (LH)
(C) Crankshaft signal
(D) Camshaft position signal: When normal, there will be 2 camshaft position signals for every 2 crankshaft revolutions.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 200 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the status where the number of camshaft position sensor signals in two crankshaft revolutions is other than 2 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
Amount of camshaft sensor signal during 2 revs of crankshaft	≠ 2 time(s)

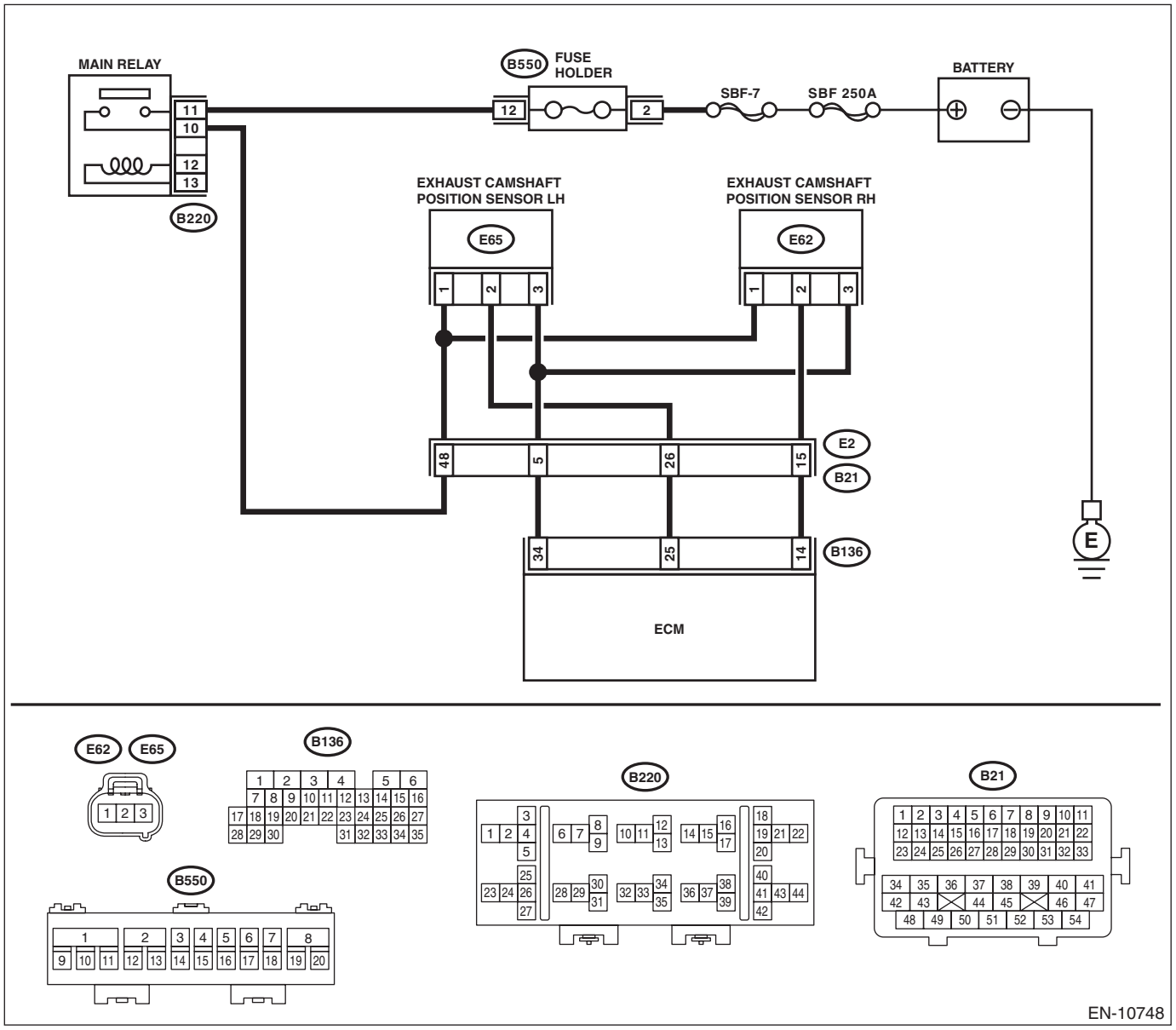
Time Needed for Diagnosis: Two engine revs. × 4 time(s)
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CG:DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E65) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. ***Connector & terminal*** ***(B136) No. 25 — (E65) No. 2:*** ***(B136) No. 34 — (E65) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and camshaft position sensor connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the resistance between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E65) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.** Measure the voltage between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E65) No. 2 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step **5**.
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten the camshaft position sensor installation bolt securely. <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.>
6	**CHECK CAMSHAFT POSITION SENSOR.** Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO HEV)(diag)-21, ENGINE CONTROL MODULE (ECM), ELECTRICAL SPECIFICATION, Control Module I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO(HEV))-53, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0365. <Ref. to EN(H4DO HEV)(diag)-305, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CH:DTC P0391 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 2

NOTE:
For the diagnostic procedure, refer to DTC P0390. <Ref. to EN(H4DO HEV)(diag)-309, DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT BANK 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0366. <Ref. to EN(H4DO HEV)(diag)-308, DTC P0366 CAMSHAFT POSITION SENSOR "B" CIRCUIT RANGE/PERFORMANCE BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CI: DTC P0400 EGR "A" FLOW

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Movement performance problem when engine is low speed
- Improper idling
- Movement performance problem

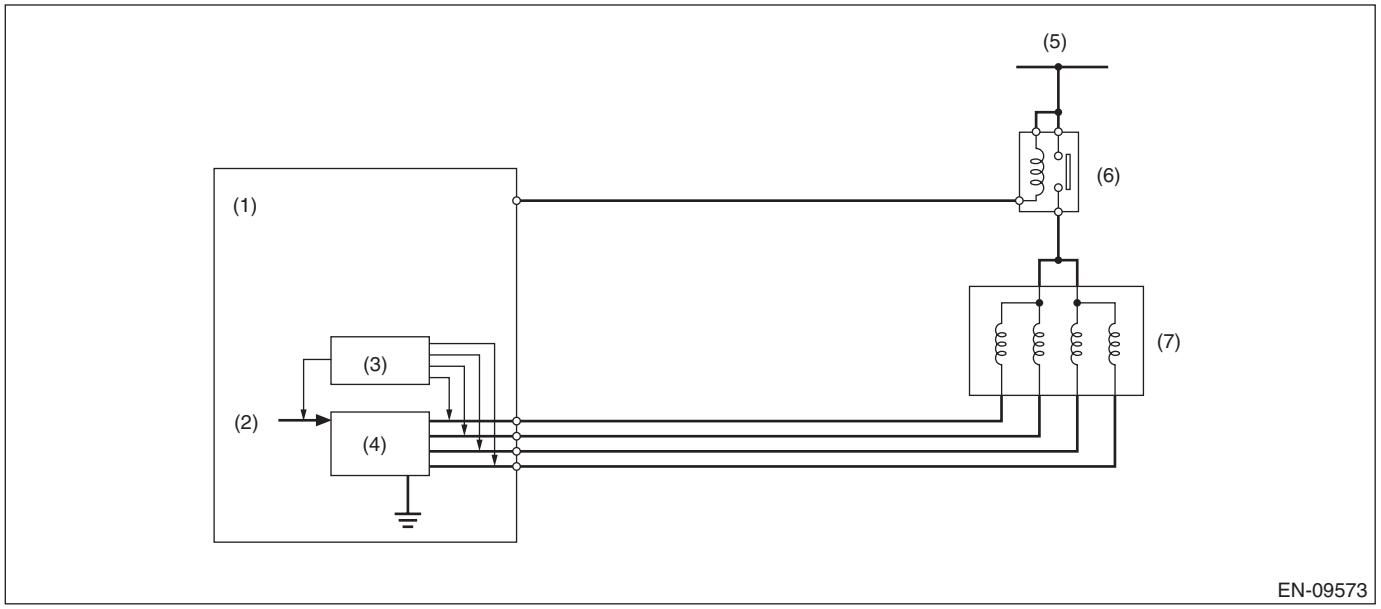
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» 53.3 kPa (400 mmHg, 15.75 inHg) or more?	Make sure that the EGR control valve, manifold absolute pressure sensor and throttle body are installed securely.	Go to step **2**.
2	**CHECK EGR CONTROL VALVE.** Remove the EGR control valve.	Are there any holes, clogged lines or foreign matters in the EGR system?	Repair the EGR system.	Replace EGR control valve. <Ref. to EC(H4DO(HEV))-27, EGR Control Valve.>

1. OUTLINE OF DIAGNOSIS

Detect EGR system malfunction.
Intake manifold pressure (negative pressure) is constant because the throttle valve is fully closed during deceleration fuel cut. At this time, when the EGR control valve is opened/closed, the intake manifold pressure will change. EGR System OK/NG is judged by the range of this change.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Computer unit (CPU)
(3) Detecting circuit
(4) Switching circuit
(5) Battery voltage
(6) Main relay
(7) EGR control valve

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Intake air temperature	≥ 0 °C(32 °F)
Engine speed	1100 rpm — 5000 rpm
Vehicle speed	≥40 km/h (24.9 MPH)
Time while the fuel shut-off function is in operation	≥ 2 s
Neutral switch	= OFF

4. GENERAL DRIVING CYCLE

During deceleration fuel cut from 40 km/h (approx. 24.9 MPH) or more, perform diagnosis once.
Be careful of vehicle speed and engine speed. (Diagnosis will not be completed if the vehicle speed and engine speed conditions become out of specification due to deceleration.)

5. DIAGNOSTIC METHOD

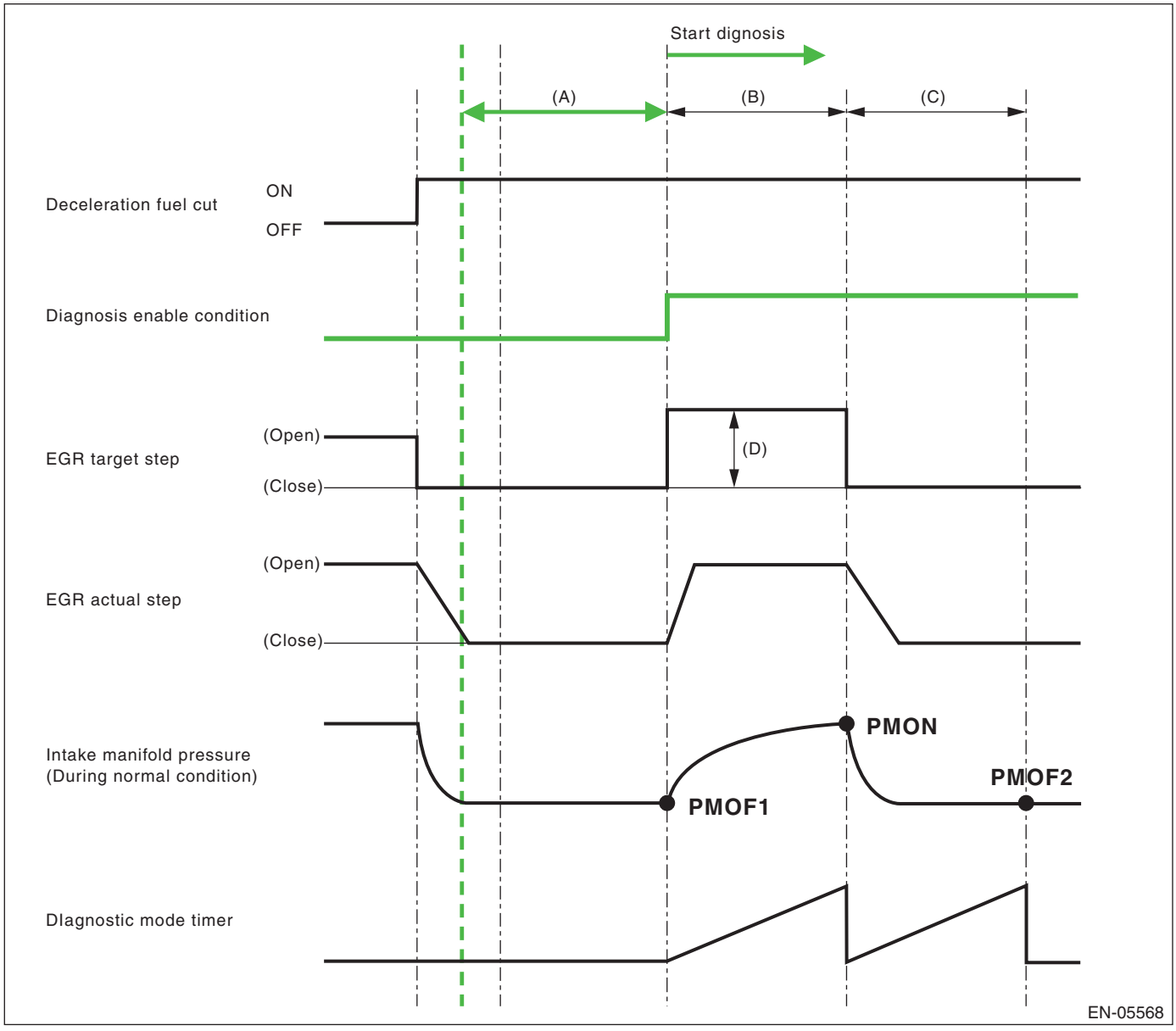
Measure the pressure values when the enable conditions are established, and perform diagnosis by calculating those results.
1. Label the intake manifold pressure value as PMOF1, which is observed when enable conditions are established, and set the EGR target step to 45 step(s) (nearly full open).
2. Label the intake manifold pressure value as PMON, which is observed after 1000 ms has passed since EGR target step was set to 45 step(s) (when the enable conditions were established), and set the EGR target step to 0.

3. Label the intake manifold pressure as PMOF2, which is observed after 1000 ms has passed since EGR target step was set to 0 (after (1000 ms + 1000 ms) have passed since the enable conditions were established).
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
PMON – (PMOF1 + PMOF2)/2	< 2.5 kPa (18.63 mmHg, 0.7 inHg)

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.



(A) 2000 ms (B) 1000 ms (C) 1000 ms
(D) 45 step(s)

CJ:DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD BANK 1

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

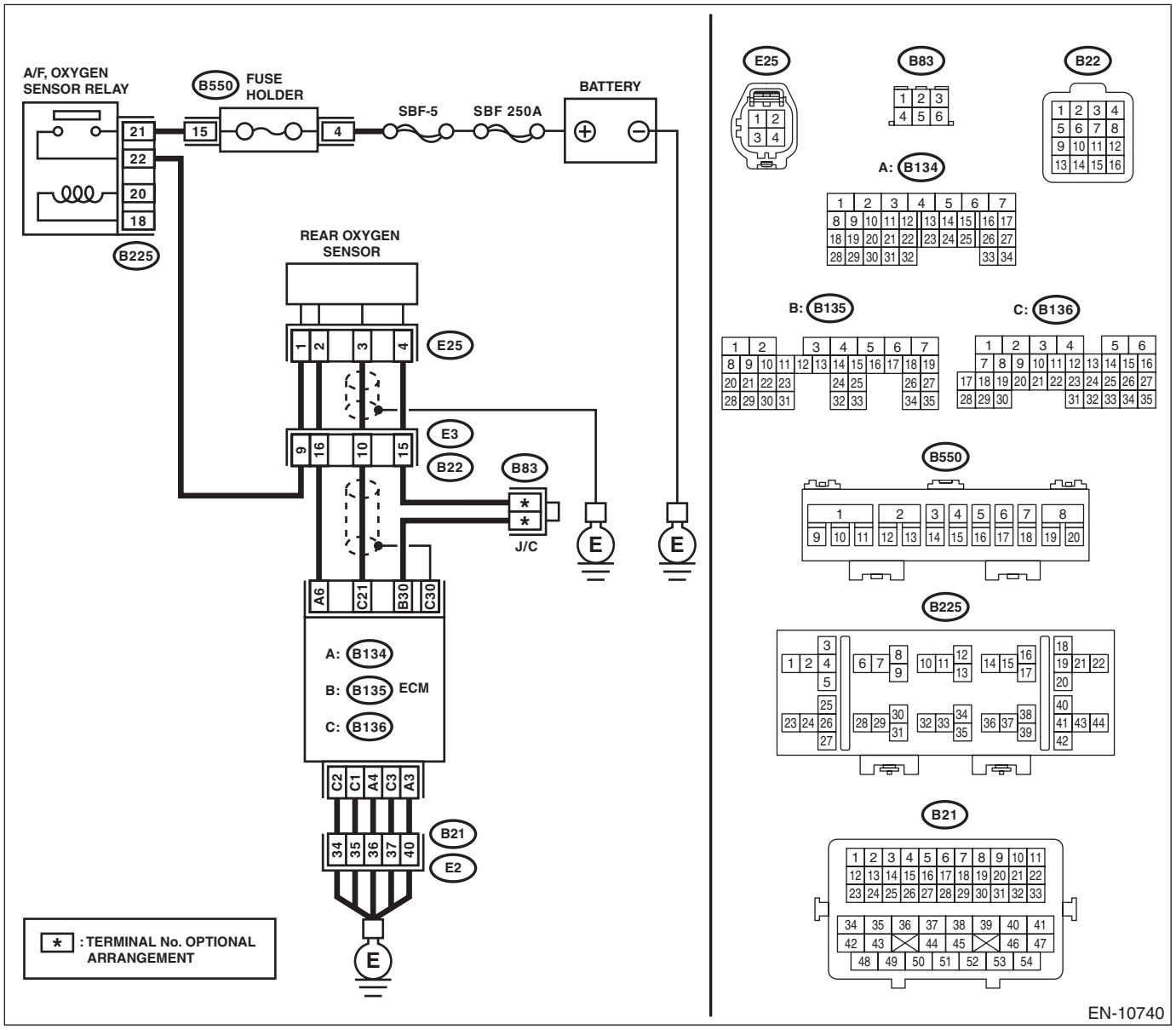
- Engine stalls.
- Idle mixture is out of specifications.

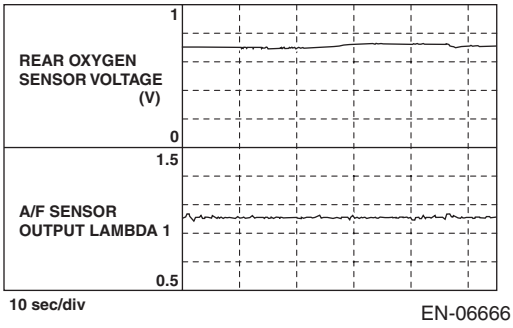
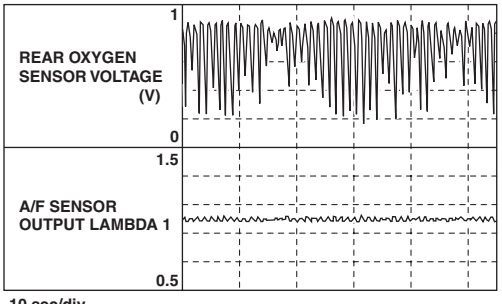
CAUTION:

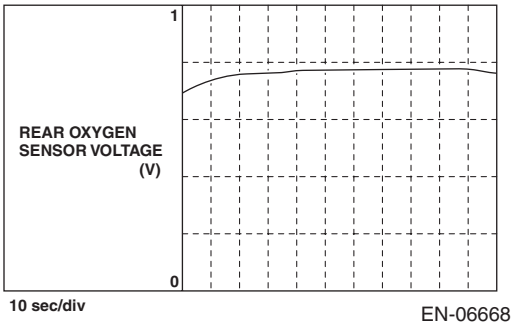
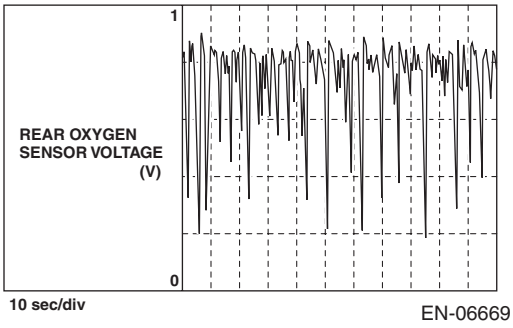
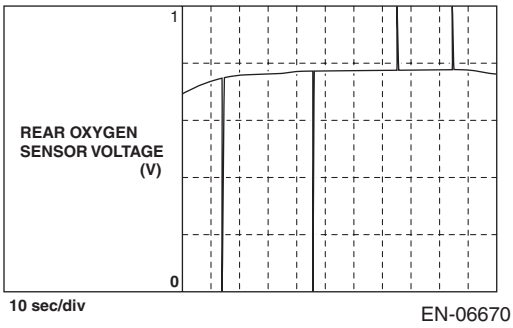
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.** Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes. NOTE: Check the following positions. • Between cylinder head and front exhaust pipe • Between front exhaust pipe and front catalytic converter • Between front catalytic converter and rear catalytic converter • Loose or improperly attached front oxygen (A/F) sensor or rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace the exhaust system. <Ref. to EX(H4DO(w/o HEV))-2, General Description.>	Go to step **2**.
2	**CHECK WAVEFORM DATA ON THE SUBARU SELECT MONITOR (WHILE DRIVING).** 1) Drive at a constant speed between 80 — 112 km/h (50 — 70 MPH). 2) After 5 minutes have elapsed in the condition of step 1), use the Subaru Select Monitor while still driving to read the waveform data. • At normal condition  EN-06666 • At abnormal condition (numerous inversion)  EN-06667	Is a normal waveform displayed?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK WAVEFORM DATA ON THE SUBARU SELECT MONITOR (WHILE IDLING).** 1) Run the engine at idle. 2) In the condition of step 1), use the Subaru Select Monitor to read the waveform data. • At normal condition  EN-06668 • At abnormal condition 1 (numerous inversion)  EN-06669 • At abnormal condition 2 (noise input)  EN-06670	Is a normal waveform displayed?	Go to step **4**.	• The waveform is displayed at abnormal condition 1: Go to step **4**. • The waveform is displayed at abnormal condition 2: Go to step **5**.
4	**CHECK CATALYTIC CONVERTER.**	Is the catalytic converter damaged?	Replace the catalytic converter. <Ref. to EC(H4DO(HEV))-7, Front Catalytic Converter.> <Ref. to EC(H4DO(HEV))-8, Rear Catalytic Converter.>	Go to step **5**.
5	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **6**.

Step		Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair the harness and connector. NOTE: Repair the following locations. • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
7	**CHECK REAR OXYGEN SENSOR SHIELD.** 1) Turn the ignition switch to OFF. 2) Expose the rear oxygen sensor connector body side harness sensor shield. 3) Measure the resistance between sensor shield and chassis ground.	Is the resistance less than 1 Ω?	Go to step **8**.	Repair the open circuit of rear oxygen sensor harness.
8	**CHECK ENGINE OIL AMOUNT AND EXHAUST GAS.** 1) Check the engine oil amount. <Ref. to LU(H4DO(w/o HEV))-12, INSPECTION, Engine Oil.> 2) Check exhaust gas during idling.	Does the engine oil amount drop or white smoke emit from the muffler?	Check the engine, and repair the defective part. <Ref. to ME(H4DO(w/o HEV))-425, INSPECTION, Engine Trouble in General.> After repairing the engine, replace the catalytic converter. <Ref. to EC(H4DO(HEV))-7, Front Catalytic Converter.> <Ref. to EC(H4DO(HEV))-8, Rear Catalytic Converter.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step **9**.

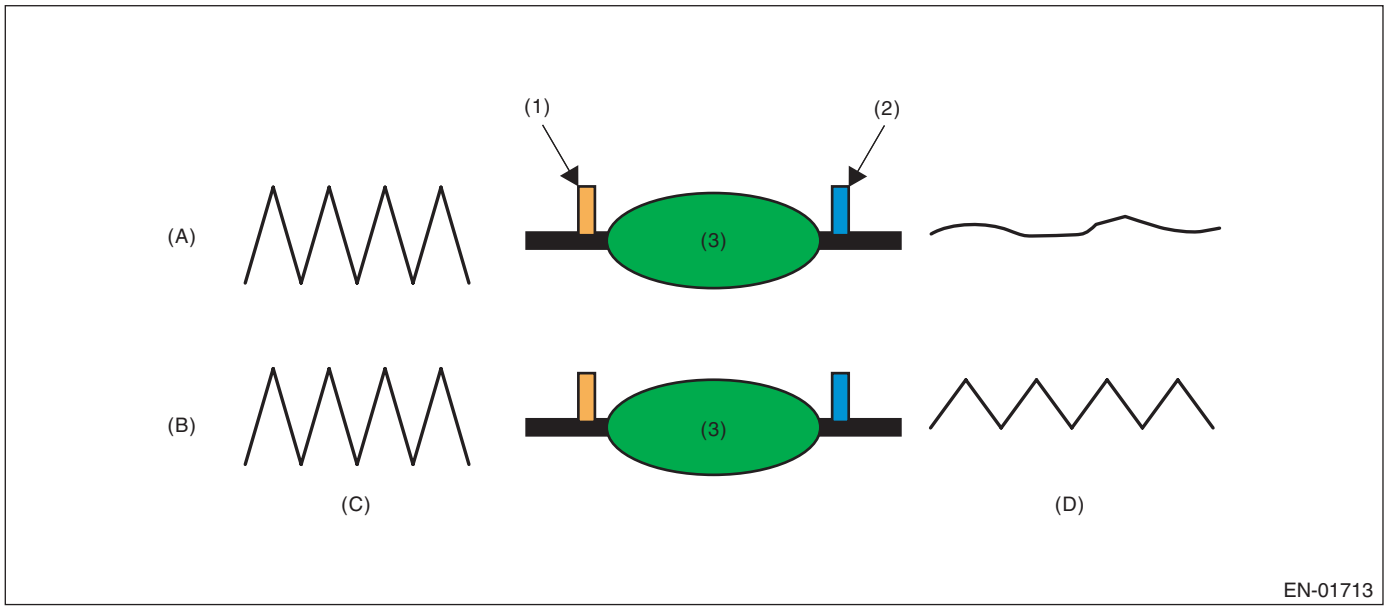
	Step	Check	Yes	No
9	**CHECK IGNITION SYSTEM.** 1) Check the spark plug. <Ref. to IG(H4DO(w/o HEV))-7, INSPECTION, Spark Plug.> 2) Check the status of the ignition coil connector and the spark plug terminal.	Is there any fault in the ignition system?	After repairing the ignition system, replace the catalytic converter. <Ref. to EC(H4DO(HEV))-7, Front Catalytic Converter.> <Ref. to EC(H4DO(HEV))-8, Rear Catalytic Converter.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step **10**.
10	**CHECK FUEL SYSTEM.** 1) Refer to and check the items in “Insufficient fuel supply to fuel injector” (except for “a. Fuel pump does not operate.”) and “Leakage or blow out of fuel”. <Ref. to FU(H4DO(HEV))-162, INSPECTION, Fuel System Trouble in General.> 2) Check throttle body. <Ref. to FU(H4DO(HEV))-17, INSPECTION, Throttle Body.> 3) Check intake manifold. <Ref. to FU(H4DO(HEV))-34, INSPECTION, Intake Manifold.>	Is there any fault in the fuel system?	After repairing the fuel system, replace the catalytic converter. <Ref. to EC(H4DO(HEV))-7, Front Catalytic Converter.> <Ref. to EC(H4DO(HEV))-8, Rear Catalytic Converter.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step **11**.

Step	Check	Yes	No
11 CHECK DTC.	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).> After checking the DTC, replace the catalytic converter. <Ref. to EC(H4DO(HEV))-7, Front Catalytic Converter.> <Ref. to EC(H4DO(HEV))-8, Rear Catalytic Converter.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the deterioration of the catalyst function.
Though the front oxygen sensor output would change slowly with a new catalyst, the sensor output with a deteriorated catalyst becomes high and the inversion time is shortened.
For this reason, the catalyst diagnosis is carried out by monitoring the front oxygen sensor output and comparing it with the front oxygen (A/F) sensor output.

2. COMPONENT DESCRIPTION



(A) Normal
(B) Deterioration
(C) Output waveform from the front oxygen (A/F) sensor
(D) Output waveform from the front oxygen sensor
(1) Front oxygen (A/F) sensor
(2) Front oxygen sensor
(3) Catalytic converter

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Amount of intake air	≥ 5 g/s (0.18 oz/s) and < 40 g/s (1.41 oz/s)
Estimated catalyst temperature	≥ 480 °C (896 °F)
Vehicle speed	≥ 40 km/h (24.9 MPH)
ELCM switching valve	open
Estimated temperature of rear oxygen element	≥ 500 °C (932 °F)
Sub feedback	In operation
The following conditions are experienced.	
Rear oxygen sensor output voltage after fuel cut	≥ 0.55 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once at a constant 40 km/h (24.9 MPH) or higher.

5. DIAGNOSTIC METHOD

After the enable conditions have been established, calculate the front oxygen (A/F) sensor lambda value deviation sum value (Σ |(sglmd$_n$ – sglmd$_{n-1}$)|), and rear oxygen sensor output voltage deviation sum value (Σ |(ro2sad$_n$ – ro2sad$_{n-1}$)|) in every 32 ms × 4 times. If the front oxygen (A/F) sensor lambda value deviation sum value (Σ |(sglmd$_n$ – sglmd$_{n-1}$)|) is the predetermined value or more, calculate the diagnostic value.
If the duration of time while the following conditions are met is within the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Σ |(ro2sad$_n$ – ro2sad$_{n-1}$)| / Σ |(sglmd$_n$ – sglmd$_{n-1}$)|	> 8

Time Needed for Diagnosis: 30 — 55 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CK:DTC P0441 EVAP SYSTEM (CPC) INCORRECT PURGE FLOW

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

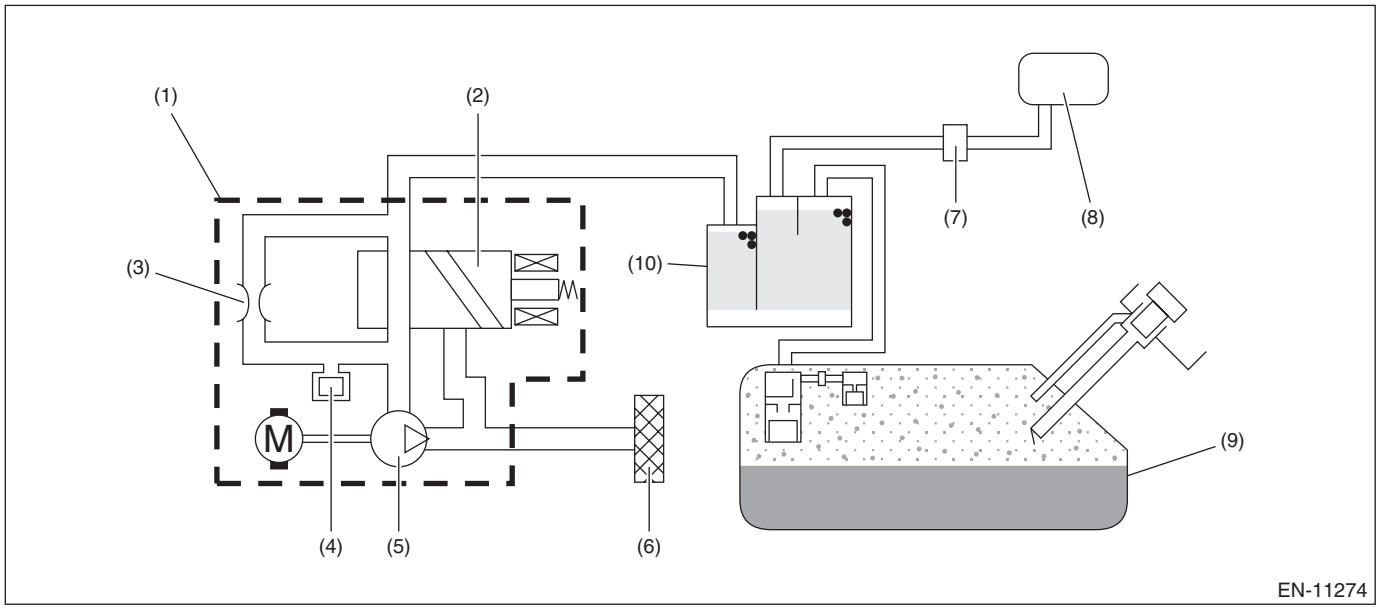
	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK PURGE CONTROL SOLENOID VALVE.** Operate the purge control solenoid valve using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the “Active Test”. <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>	Does the purge control solenoid valve operate?	Go to step **3**.	Replace the purge control solenoid valve. <Ref. to EC(H4DO(HEV))-22, Purge Control Solenoid Valve.>
3	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.** Turn the ignition switch to OFF.	Are there holes, cracks, clogging, or disconnection, misconnection of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

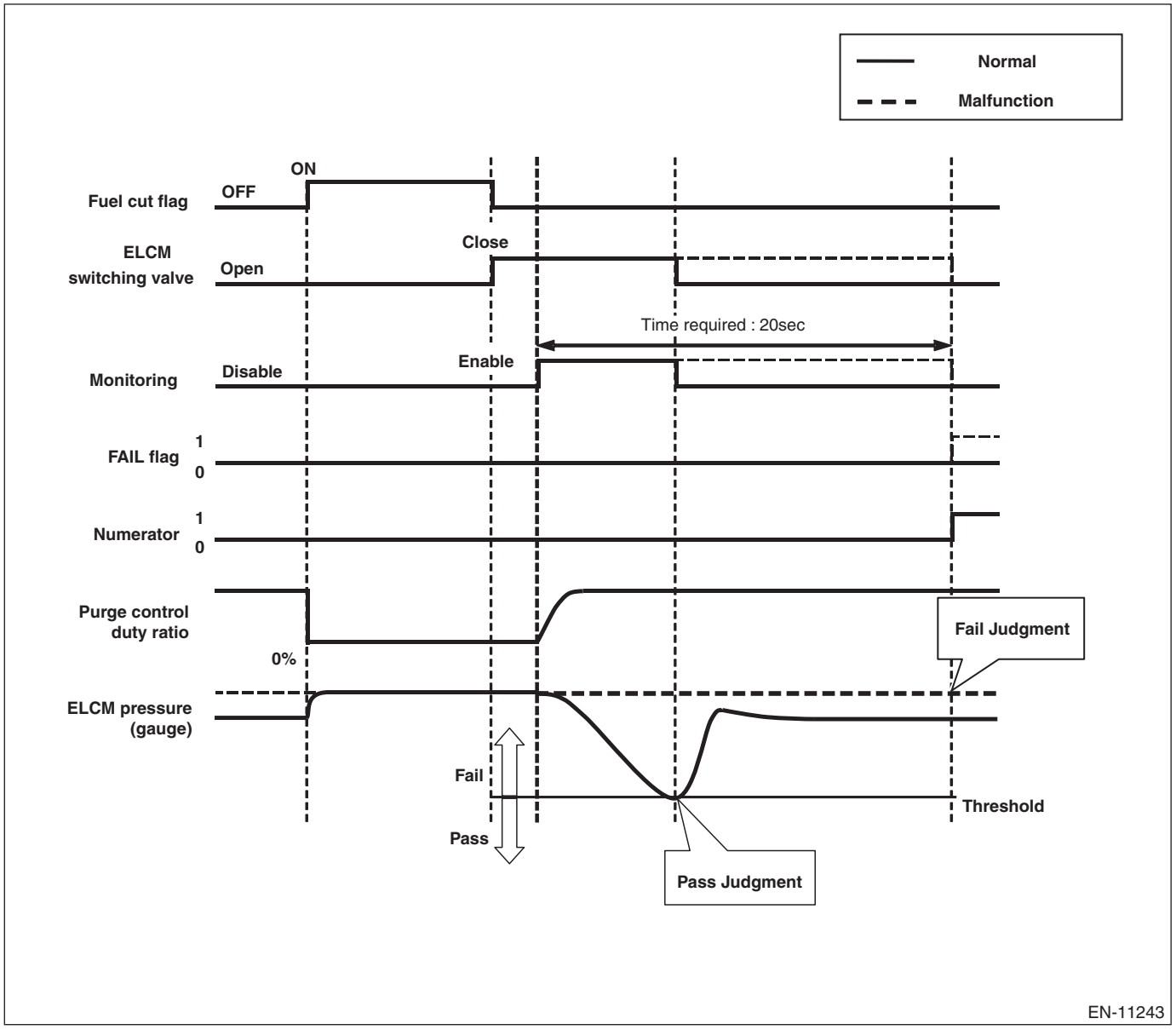
This monitor intrusively performs a functional check to detect incorrect purge flow. The monitor seals the EVAP system (i.e. isolate from atmosphere) by closing the ELCM switching valve intrusively after recovering from a fuel cut event. In the case of normal condition, and the commanded purge control duty ratio is more than 0%, ELCM pressure (gauge) will decrease due to engine vacuum and reach to the threshold value. However, in the case of malfunction condition (e.g. fuel cap open, purge valve stuck closed, purge line disconnected or blocked), if the ELCM pressure (gauge) does not reach the threshold within a predetermined time, the monitor determines a malfunction and stores a fault code.

Malfunction Criteria

ELCM pressure (gauge) > Threshold



(1)	ELCM	(5)	Vacuum pump	(9)	Fuel tank
(2)	Switching valve (closed)	(6)	Drain filter	(10)	Canister
(3)	Reference orifice (0.02 inch orifice)	(7)	Purge control solenoid valve		
(4)	Pressure sensor	(8)	Intake manifold		


Normal
Malfunction
Fuel cut flag
ON
OFF
ELCM switching valve
Close
Open
Time required : 20sec
Monitoring
Disable
Enable
FAIL flag
1
0
Numerator
1
0
Purge control duty ratio
0%
Fail Judgment
ELCM pressure (gauge)
Fail
Pass
Threshold
Pass Judgment
EN-11243

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Time when ELCM switching valve is closed	< 120000 ms
Purge control solenoid valve control duty	> 0%
Precondition Conditions to close the switching valve of ELCM intrusively.	
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Cumulative value of purge air amount from engine start	≥ Value from Map*
Atmospheric pressure – Intake manifold absolute pressure	≥ 10 kPa (75 mmHg, 3 inHg)
((Fuel system status for time) followed by Fuel system status)	= Fuel cut ≥ 1000 ms ≠ Fuel cut
Ambient temperature	≥ –25 °C (–13 °F)

*It takes approximately 2 min at 40 MPH

Map

Ambient temperature °C (°F)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)	50 (122)
Integrated value of calculated purge airflow since engine start g (oz)	72 (2.54)	72 (2.54)	72 (2.54)	72 (2.54)	72 (2.54)	72 (2.54)

3. GENERAL DRIVING CYCLE

Perform the diagnosis only once during ordinary driving.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ELCM pressure	> 666.6 Pa × –1 (5 mmHg × –1, 0.2 inHg × –1)

Time Needed for Diagnosis: 30000 ms – 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CL:DTC P0451 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

CAUTION:

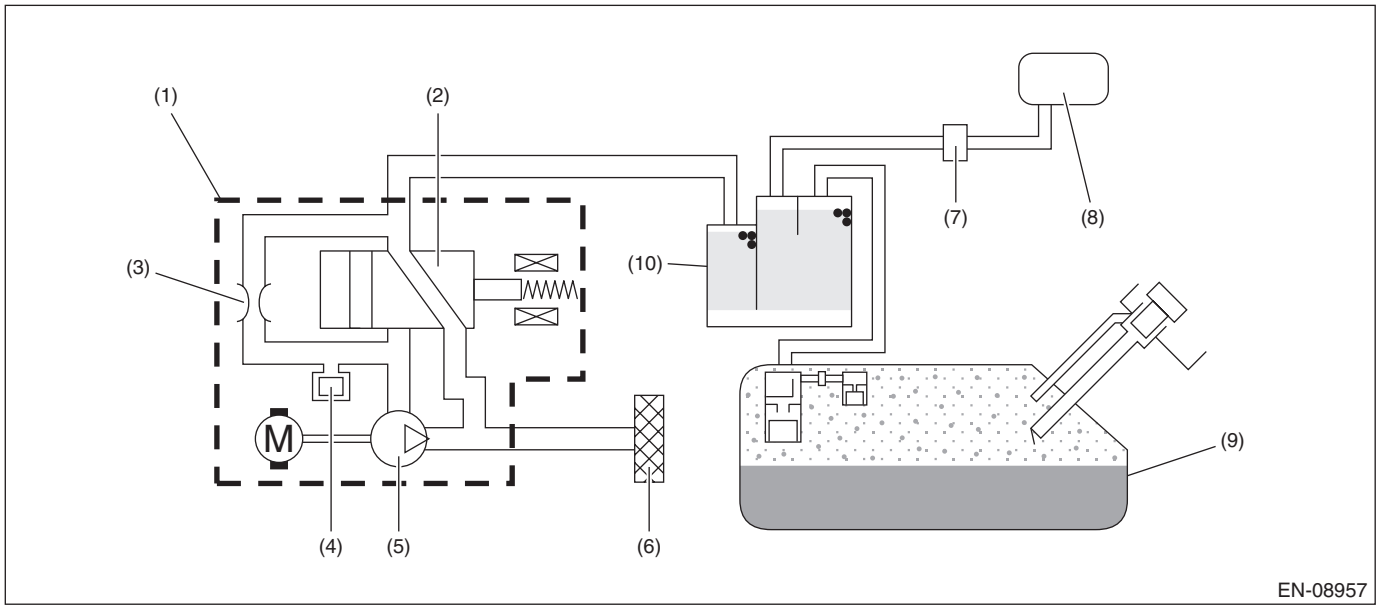
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON (engine OFF). 2) Using the Subaru Select Monitor or general scan tool, read the value in «Absolute Evap Sys. Pressure» and «Mani. Absolute Pressure», and compare them with the actual atmospheric pressure. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual. • To read the actual atmospheric pressure, connect the Subaru Select Monitor or general scan tool to the other known good vehicle.	Is the difference with the actual atmospheric pressure 2.3 kPa (17.2 mmHg, 0.67 inHg) or more?	Replace the part that showed larger deviation from the actual atmospheric pressure than the other. • If deviations in value for «Absolute Evap Sys. Pressure» is larger: Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.> • If deviations in value for «Mani. Absolute Pressure» is larger: Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO(HEV))-67, Manifold Absolute Pressure Sensor.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ELCM pressure sensor output properties.
Judge as NG when the ELCM pressure sensor output value is largely different from the intake manifold pressure when the ignition switch is ON.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Elapsed time after ignition switch is turned to ON	≥ 500 ms and < 60000 ms
Soaking time	≥ 60 s
ELCM vacuum pump	Not in operation
ELCM switching valve	Open
Purge control	Not in operation

4. GENERAL DRIVING CYCLE

Perform the diagnosis once at ignition ON.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value ELCM pressure sensor output value – intake manifold pressure when ignition switch is ON	> 4732.9 Pa (35.5 mmHg, 1.4 inHg)

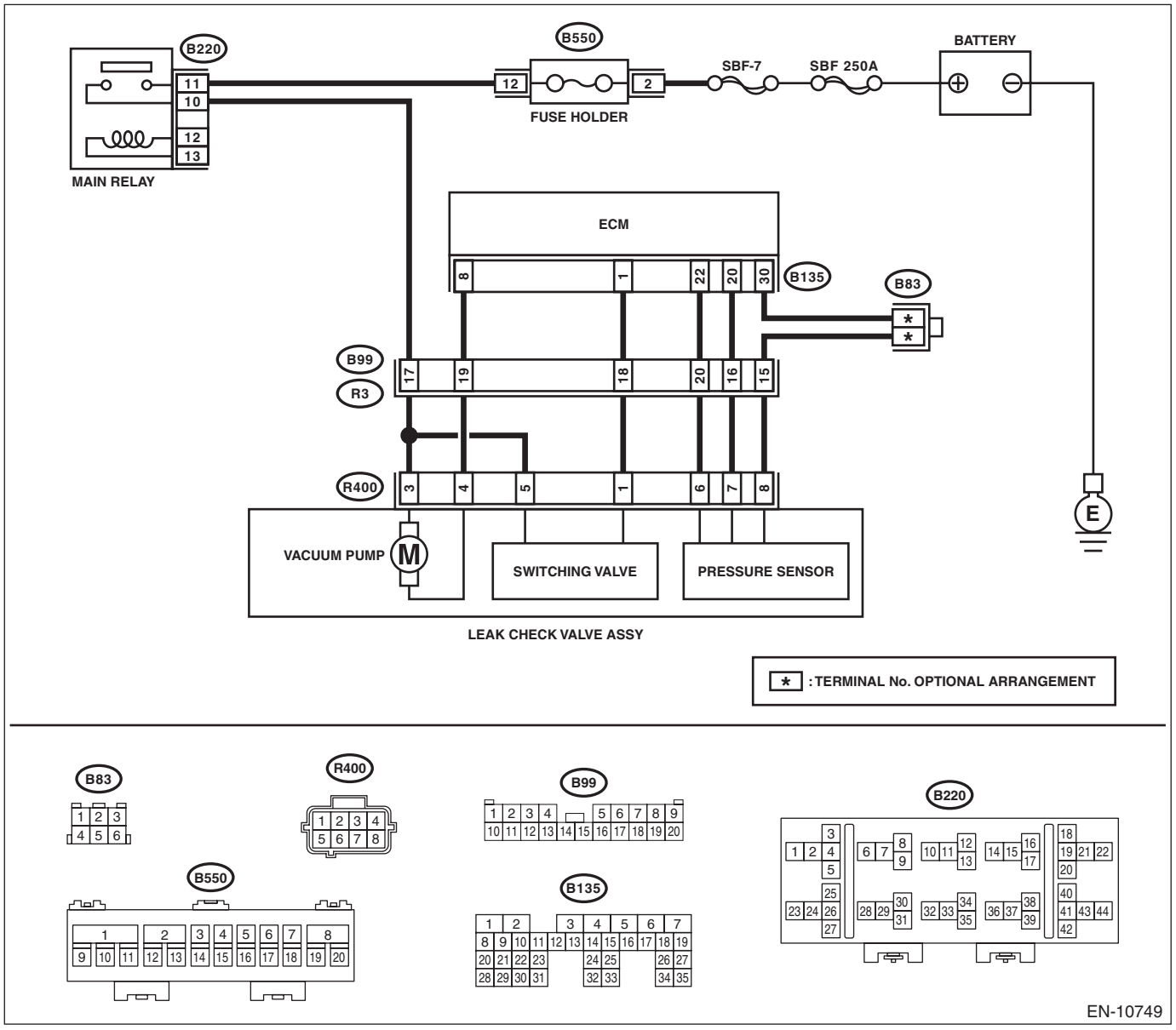
Time Needed for Diagnosis: 328 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CM:DTC P0452 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

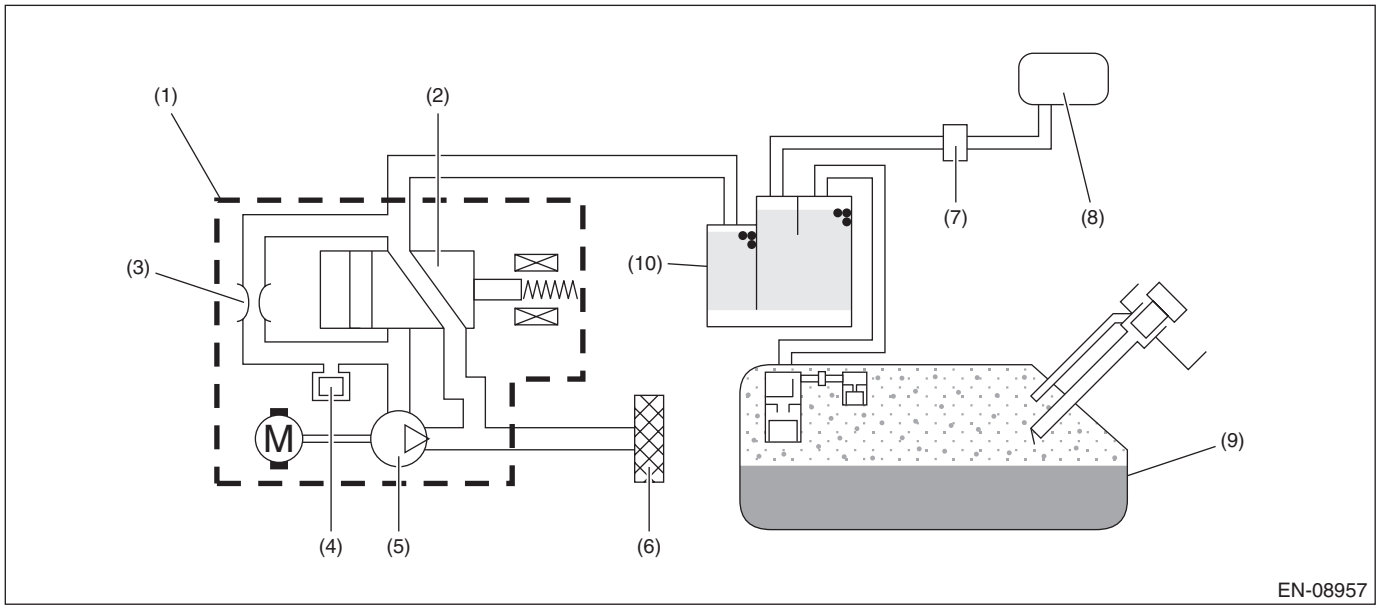


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Read the value of «Atmosphere Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Atmosphere Pressure» 34 kPa (255 mmHg, 10 inHg) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. ***Connector & terminal*** ***(R400) No. 6 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
4	**CHECK FOR POOR CONTACT.** Check for poor contact of leak check valve assembly connector.	Is there poor contact in the leak check valve assembly connector?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.973 V

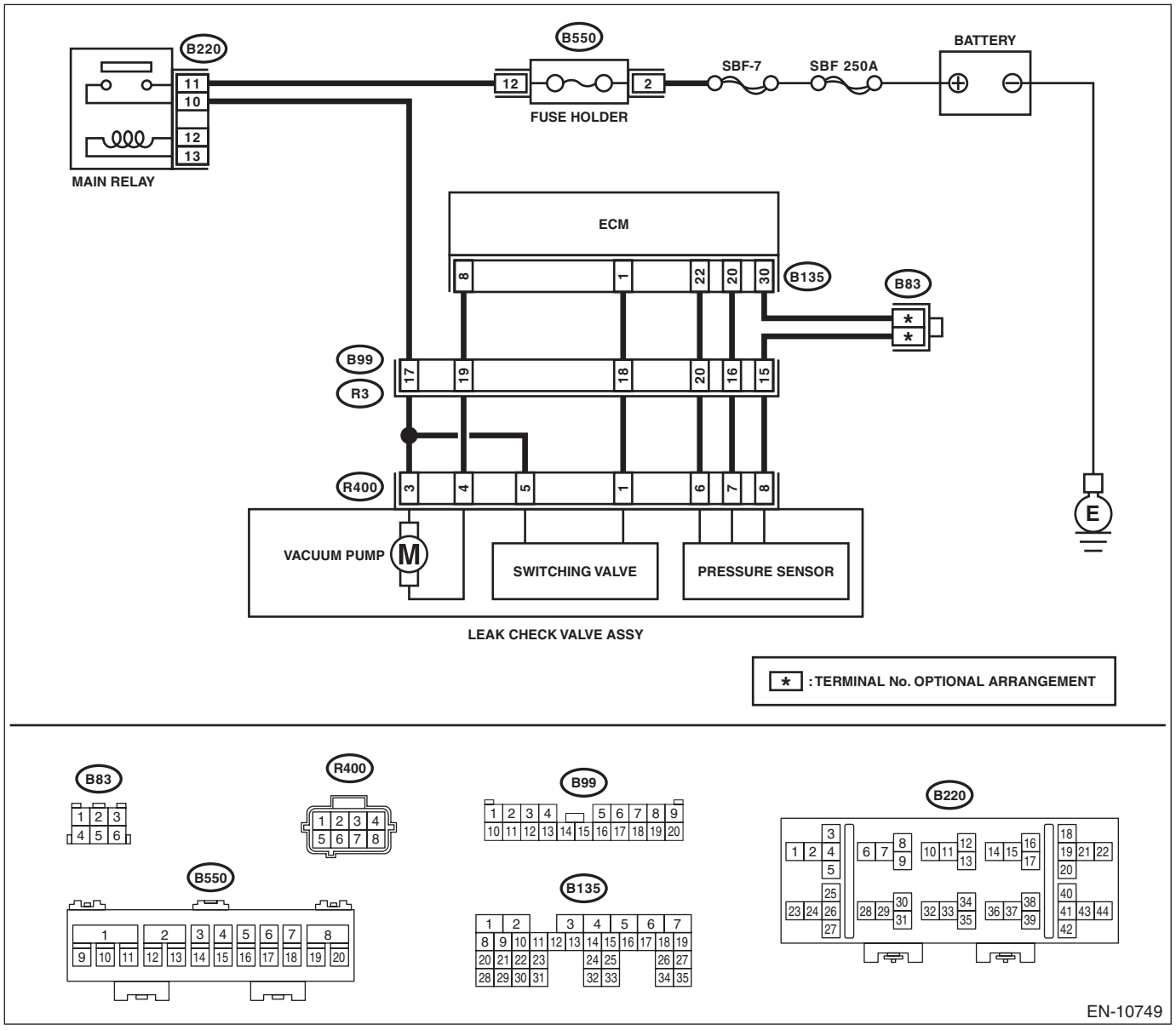
Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CN:DTC P0453 EVAP SYSTEM (CPC) PRESSURE SENSOR/SWITCH CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

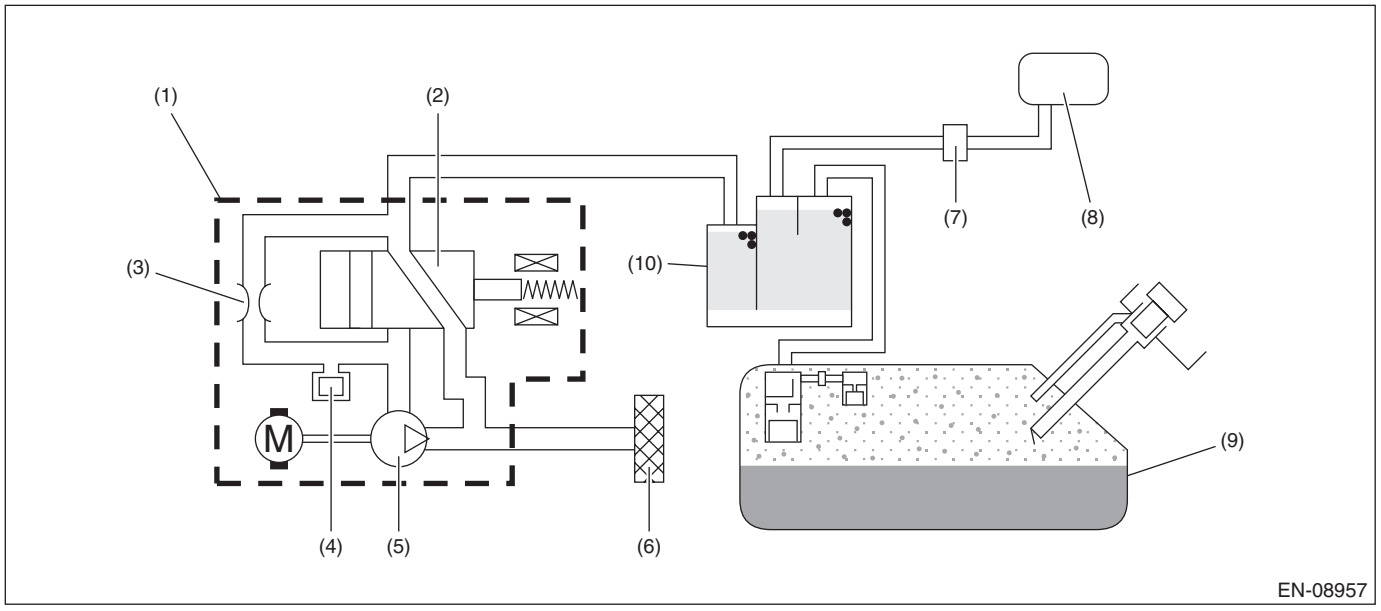


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Read the value of «Atmosphere Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Atmosphere Pressure» 125 kPa (938 mmHg, 36.9 inHg) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 20 — (R400) No. 7:*** ***(B135) No. 30 — (R400) No. 8:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector • Poor contact of joint connector
3	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM and the leak check valve assembly connector.	Is there poor contact in ECM and the leak check valve assembly connector?	Repair the poor contact of ECM and the leak check valve assembly connector.	Go to step **4**.
4	**CHECK LEAK CHECK VALVE ASSEMBLY.** Check the pressure sensor of the leak check valve assembly. <Ref. to EC(H4DO(HEV))-49, CHECK PRESSURE SENSOR, INSPECTION, Leak Check Valve Assembly.>	Is the pressure sensor of the leak check valve assembly OK?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.095 V

Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CO:DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK)

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Fuel odor
- There is a hole of more than 1.0 mm (0.04 in) dia. in evaporation system or fuel tank.
- Fuel filler cap loose or lost

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FUEL FILLER CAP.** 1) Turn the ignition switch to OFF. 2) Check the fuel filler cap. NOTE: The DTC is stored in memory if fuel filler cap is or was loose or if the cap chain has caught while tightening.	Is the fuel filler cap tightened securely?	Go to step **2**.	Tighten fuel filler cap securely.
2	**CHECK FUEL FILLER CAP.**	Is the fuel filler cap genuine?	Go to step **3**.	Replace with a genuine fuel filler cap.
3	**CHECK FUEL FILLER PIPE GASKET.**	Is there any damage to the seal between fuel filler cap and fuel filler pipe?	Repair or replace the fuel filler cap and fuel filler pipe. <Ref. to FU(H4DO(HEV))-119, Fuel Filler Pipe.>	Go to step **4**.
4	**CHECK PURGE CONTROL SOLENOID VALVE.** Check air-tightness of the purge control solenoid valve. <Ref. to EC(H4DO(HEV))-25, INSPECTION, Purge Control Solenoid Valve.>	Is the purge control solenoid valve OK?	Go to step **5**.	Replace the purge control solenoid valve. <Ref. to EC(H4DO(HEV))-22, Purge Control Solenoid Valve.>
5	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.**	Are there holes on the evaporation line?	Repair or replace the evaporation line. <Ref. to FU(H4DO(HEV))-153, Fuel Delivery and Evaporation Lines.>	Go to step **6**.
6	**CHECK CANISTER.**	Are there holes on the canister?	Replace the canister. <Ref. to EC(H4DO(HEV))-9, Canister.>	Go to step **7**.
7	**CHECK LEAK CHECK VALVE ASSEMBLY.**	Are there damage or holes on the leak check valve assembly?	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>	Go to step **8**.
8	**CHECK FUEL TANK.** Remove the fuel tank. <Ref. to FU(H4DO(HEV))-106, Fuel Tank.>	Are there damage or holes on the fuel tank?	Repair or replace the fuel tank. <Ref. to FU(H4DO(HEV))-106, Fuel Tank.>	Go to step **9**.

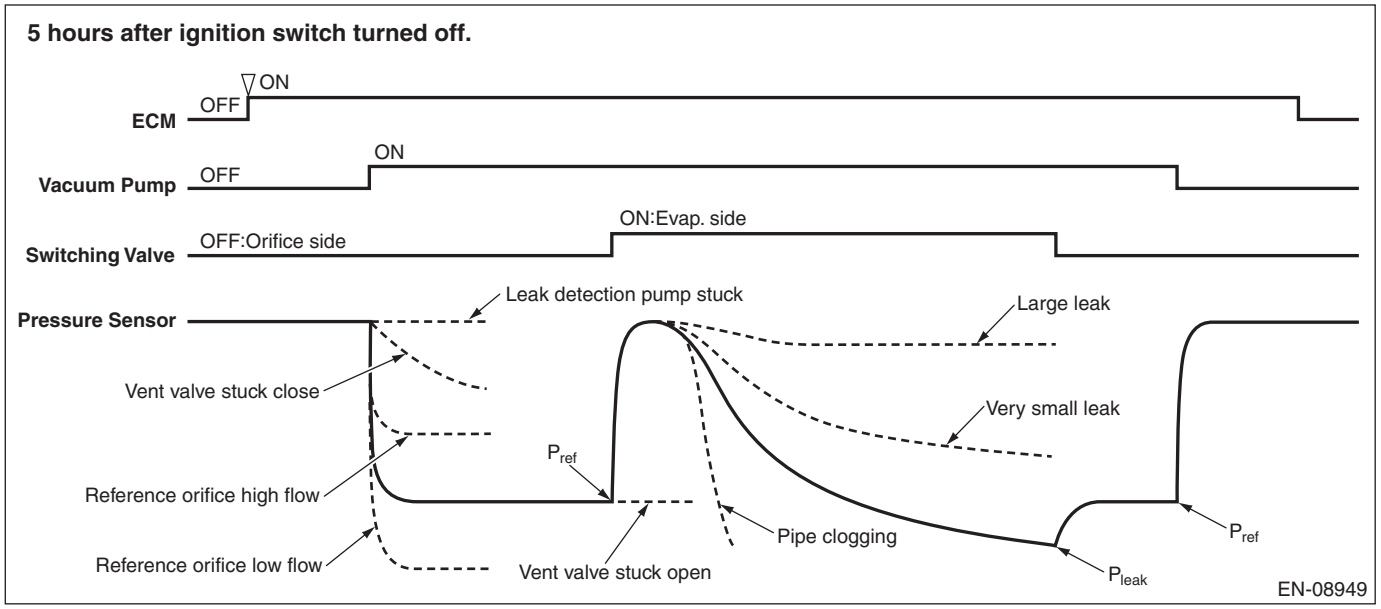
Step		Check	Yes	No
9	**CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.**	Are there holes, cracks, clogging, or disconnection, misconnection of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

This diagnosis judges whether the ELCM operation is normal or not, and whether the evaporative emission system has leak and clogging or not.
To purge the canister, after driving, perform the five hours soaking after ignition switch OFF in order to stabilize the evaporative gas status. * After 5 or 7 or 9.5 hours passed, ECM is activated by soaking timer, and the leak check is started.
Judges whether the ELCM operation is normal or not, by measuring the reference pressure status via reference orifice (0.02 inch orifice). Judge as malfunction if the reference pressure is out of specified range. Then, judge whether there is a leak or not, by comparing the pressure (leak pressure) when the reference pressure and the evaporative emission system are in negative pressure condition. Judge as system leak in the evaporative emission system if the leak pressure is higher than reference pressure. Judge as clogging of pipe if the leak pressure becomes lower than the reference pressure within the specified amount of time.
0.02 inch leak and 0.04 inch leak can be distinguished by measuring the leak pressure.
The diagnosis results are stored inside ECM until the engine is started again.
*: When the test conditions are not met in 5 hours, perform diagnosis at elapsed time of 7 hours. When the test conditions are not met in 7 hours, perform diagnosis at elapsed time of 9.5 hours.

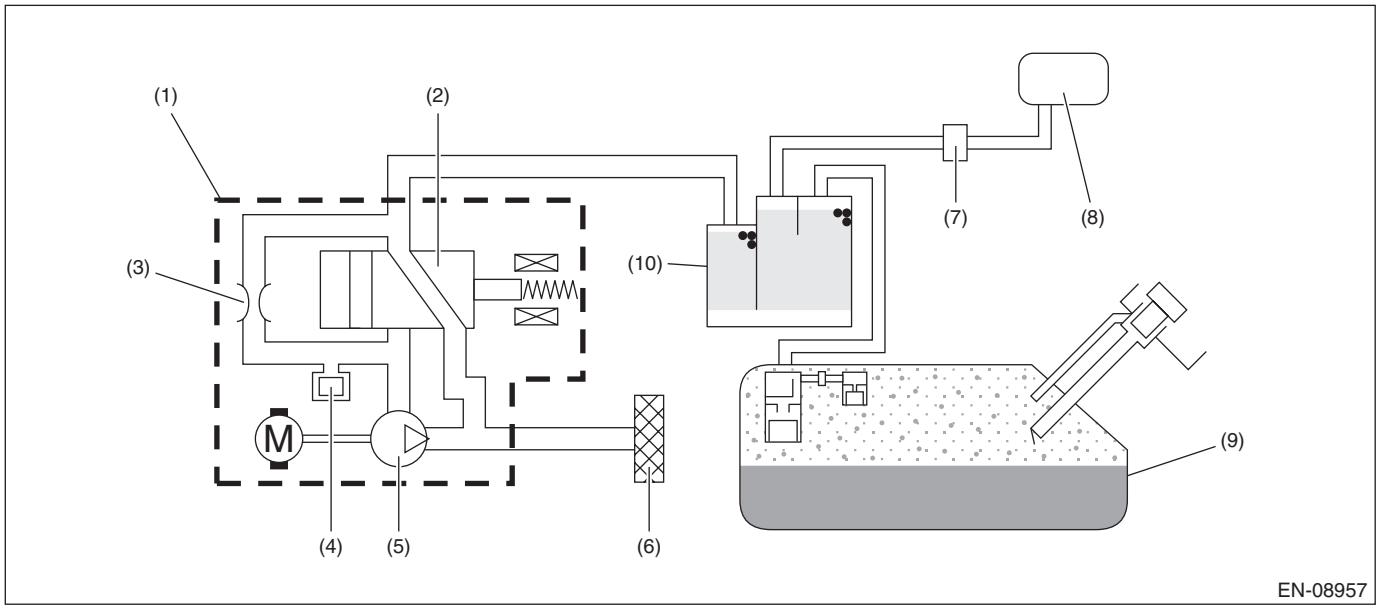
Diagnostic item	
ELCM system (ELCM body)	Vacuum pump stuck Switching valve stuck to open Switching valve stuck to close Reference orifice flow large Reference orifice flow small
Leak check	Large leak • 0.04 inch leak • Fuel cap loose • Fuel cap off • System malfunction
	Very small leak • 0.02 inch leak
Clogging of pipe	—

OUTLINE OF DIAGNOSIS



2. COMPONENT DESCRIPTION

ELCM consists of the pressure sensor, the reference orifice (diameter of 0.02 inch), the vacuum pump which introduces the negative pressure into evaporative emission system, and the switching valve which switches the passage to introduce the negative pressure.



(1)	ELCM	(5)	Vacuum pump	(9)	Fuel tank
(2)	Switching valve	(6)	Drain filter	(10)	Canister
(3)	Reference orifice (0.02 inch orifice)	(7)	Purge control solenoid valve		
(4)	Pressure sensor	(8)	Intake manifold		

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Activation of soaking timer	Completed
Engine coolant temperature	≥ 4.4 °C (39.9 °F) and < 45 °C (113 °F)
Accumulated purge amount during previous driving cycle	≥ Value of Map 1*

*It takes approximately 2 min at 40 MPH

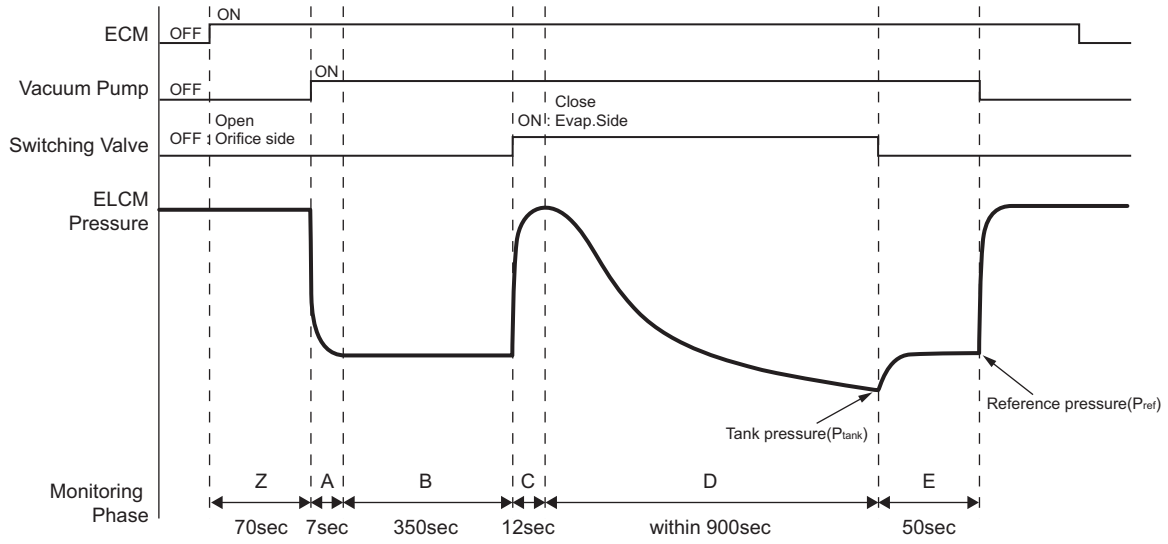
Map 1

Engine coolant temperature °C (°F)	0 (32)	30 (86)	35 (95)	40 (104)	45 (113)
Accumulated purge amount during previous driving cycle g (oz)	48 (1.69)	48 (1.69)	480 (16.93)	800 (28.22)	1120 (39.5)

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when 5 or 7 or 9.5 hours has passed after ignition switch is OFF. For more detail, refer to “OUTLINE OF DIAGNOSIS”. <Ref. to EN(H4DO HEV)(diag)-336, OUTLINE OF DIAGNOSIS, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

5. DIAGNOSTIC METHOD



Mode	Explanation of Mode	Diagnosis Period
A	Vacuum pump operation confirmation and characteristics stability	7 s or less & 300 s
B	Measurement of reference pressure for setting the target negative pressure	40 s or less
C	Switching valve operation confirmation	12 s or less
D	Clogging of pipe diagnosis and leak pressure measurement	900 s or less
E	Reference pressure measurement for judgment	40 s or less

Phase	Explanation	DTC
Z	Measurement the atmospheric pressure	-
A	Diagnostic 1. ELCM Component Performance	P2404
B	Diagnostic 1. ELCM Component Performance	P2404
C	Diagnostic 1. ELCM Component Performance	P2404
D	Diagnostic 2. Pipe clogging in ELCM Measure the tank pressure(P_{tank})	P1451
E	Diagnostic 3: Measure the reference pressure for judgment(P_{ref}) Detect 0.020 inch leak or 0.040 inch leak malfunctions. Diagnostic 1: ELCM Component Performance	P0456,P0455 P2404

EN-20274

Mode A (Vacuum pump operation confirmation and characteristics stability)

Purpose: Detect the vacuum pump operation trouble.
Judge as NG when the following conditions are established.
Judge as OK if the following conditions are not established, and warm up for five minutes to stabilize the vacuum pump characteristics.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure sensor output value	> –0.2 kPa (–1.68 mmHg, –0.1 inHg)	P2404

Mode B (Measurement of reference pressure for setting the target negative pressure)

1. Purpose: Judge the reference pressure stability.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
|Pressure sensor maximum output value – Pressure sensor minimum output value|	> 0.3 kPa (2.355 mmHg, 0.1 inHg)	P2404

2. Purpose: Judge whether the reference pressure is within the normal range, and detect the vacuum pump and orifice malfunctions.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Reference pressure for setting the target negative pressure	< Value of Map 2 or > Value of Map 3	P2404

Map 2

Barometric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for setting the target negative pressure kPa (mmHg, inHg)	-4 (-29.790, -1.2)	-4.1 (-30.593, -1.2)	-4.2 (-31.395, -1.2)	-4.3 (-32.190, -1.3)

Map 3

Barometric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for setting the target negative pressure kPa (mmHg, inHg)	-0.9 (-7.065, -0.3)	-1 (-7.860, -0.3)	-1.2 (-8.663, -0.3)	-1.3 (-9.465, -0.4)

Mode C (Switching valve operation confirmation)

Purpose: Measure the pressure increase when switching valve is changed from open to close, and detect the stuck to open/close malfunctions of the switching valve.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure sensor output value – Reference pressure for setting the target negative pressure	< 0.2 kPa (1.68 mmHg, 0.1 inHg)	P2404

Mode D (Clogging of pipe diagnosis and leak pressure measurement)

1. **Clogging of pipe**
   Purpose: Measure the time required for the evaporative emission system to reach the target negative pressure by the vacuum pump, and detect the clogging of pipe trouble.
   Judge as clogging of pipe malfunction if the evaporative emission system reaches to the target negative pressure within the specified time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Time required to reach to the target negative pressure For target vacuum, use one of the followings. • Reference pressure for target vacuum setting – value of Map 4 • –5 kPa (–37.298 mmHg, –1.5 inHg)	≤ 25000 ms	P1451

Map 4

Time of negative pressure introduction ms	0	100000	200000	300000	400000	500000	600000	700000	800000	900000	1000000	1100000	1200000
Reference pressure for setting the target negative pressure – Pressure sensor output value kPa (mmHg, inHg)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)

2. **Leak pressure measurement**
   Purpose: Measure the pressure (leak pressure) when the evaporative emission system becomes the negative pressure by the vacuum pump.
   Store the pressure as a leak pressure while the following conditions are met.

Judgment Value

Conditions for storing the leak pressure	Threshold Value
When any one of the followings is established:	
• Reference pressure for setting the target negative pressure – Pressure sensor output value	≥ Value of Map 4
• Pressure sensor output value	< –5 kPa (–37.298 mmHg, –1.5 inHg)
• Time of negative pressure introduction	≥ 900000 ms

Mode E (Measurement of reference pressure for judgment)

1. Purpose: Judge the reference pressure stability.

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
|Pressure sensor maximum output value – Pressure sensor minimum output value|	> 0.3 kPa (2.355 mmHg, 0.1 inHg)	P2404

2. Purpose: Judge whether the reference pressure is within the normal range, and detect the vacuum pump and orifice malfunctions. Judge the vacuum pump performance stability.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Reference pressure for judgment	< Value of Map 5 or > Value of Map 6	P2404

Map 5

Barometric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for judgment kPa (mmHg, inHg)	-4.5 (-34.020, -1.3)	-4.6 (-34.815, -1.4)	-4.7 (-35.618, -1.4)	-4.9 (-36.420, -1.4)

Map 6

Barometric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for judgment kPa (mmHg, inHg)	-0.8 (-6.180, -0.2)	-0.9 (-6.983, -0.3)	-1 (-7.785, -0.3)	-1.1 (-8.580, -0.3)

3. Purpose: Judge the presence of evaporative emission system leak.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
<Large leak (0.04 inch)> Leak pressure lleakjdg = (Reference pressure for judgment) × 0.377 – (–45.5 Pa)	≥ lleakjdg (Pa)	P0455
<Very small leak (0.02 inch)> Leak pressure	< Reference pressure (Pa) of 0.018 inch and < lleakjdg (Pa)	P0456

Time Needed for Diagnosis: Approx. 23 min
At next engine start, confirm whether the enable conditions are satisfied even though refueling has been done during soaking, and determine the malfunction.
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CP:DTC P0456 EVAP SYSTEM (CPC) LEAK DETECTED (VERY SMALL LEAK)

NOTE:
For the diagnostic procedure, refer to DTC P0455. <Ref. to EN(H4DO HEV)(diag)-335, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

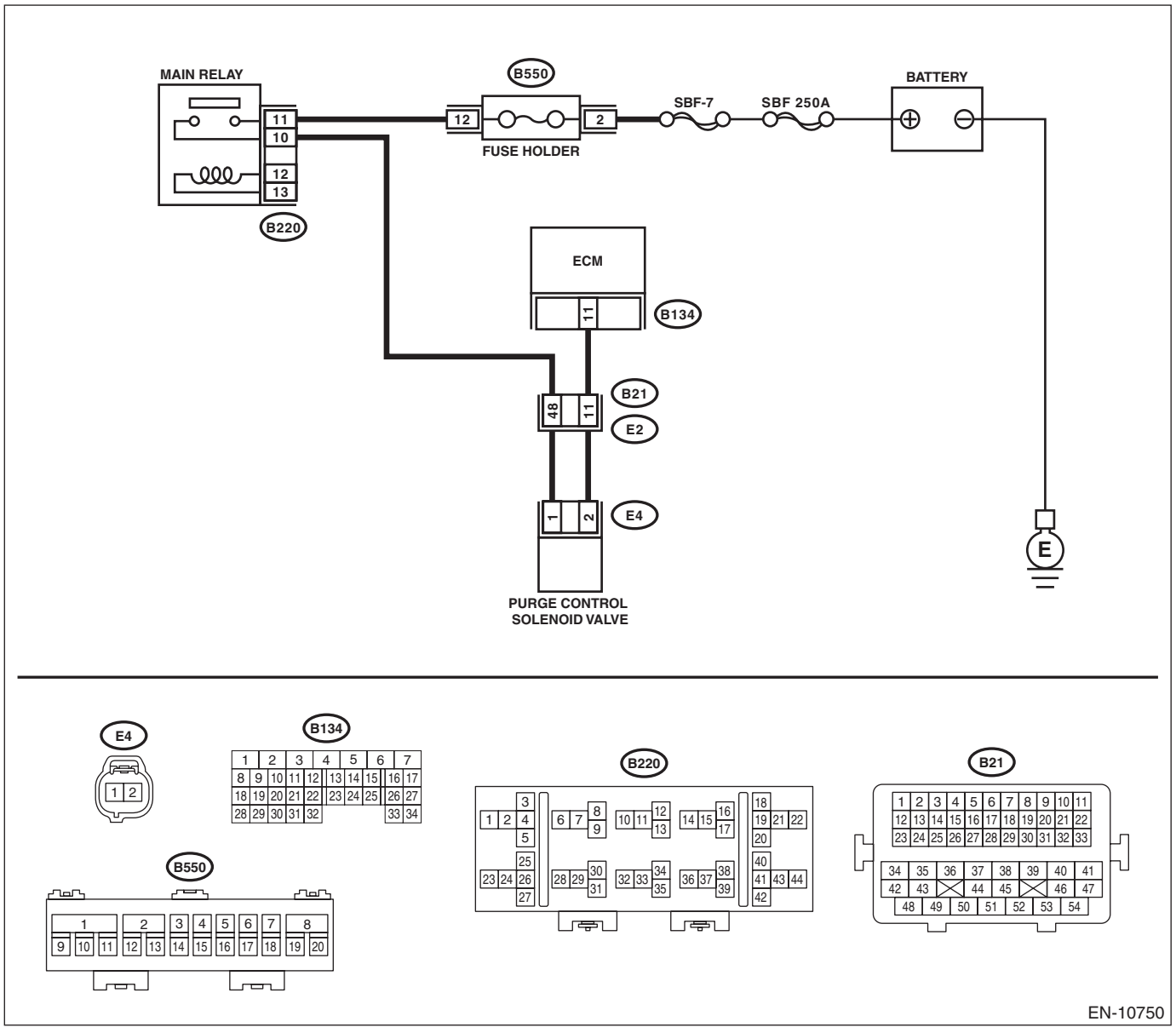
1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0455. <Ref. to EN(H4DO HEV)(diag)-335, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CQ:DTC P0458 EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



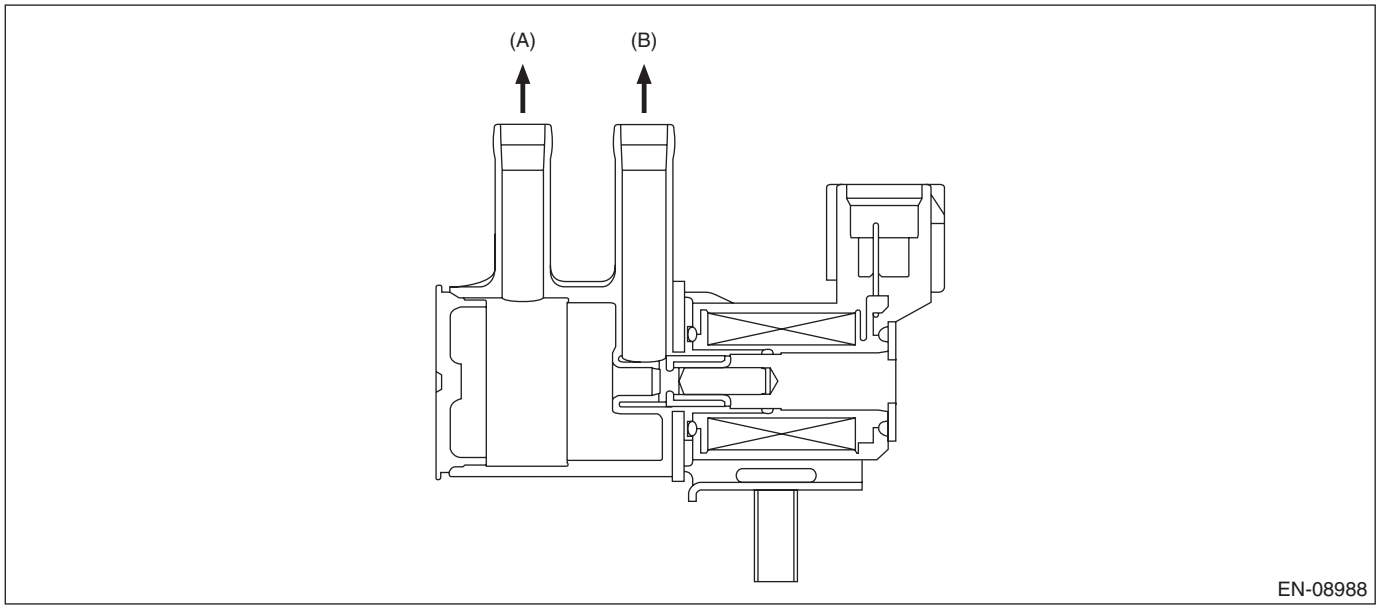
	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 11 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE.** Measure the voltage between purge control solenoid valve connector and engine ground. ***Connector & terminal*** ***(E4) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and purge control solenoid valve. 3) Measure the resistance between the purge control solenoid valve connector and engine ground. ***Connector & terminal*** ***(E4) No. 2 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and purge control solenoid valve connector.
5	**CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR.** Measure the resistance of harness between ECM connector and purge control solenoid valve. ***Connector & terminal*** ***(B134) No. 11 — (E4) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and purge control solenoid valve connector • Poor contact of coupling connector

Step		Check	Yes	No
6	**CHECK PURGE CONTROL SOLENOID VALVE.** 1) Remove the purge control solenoid valve. 2) Measure the resistance between purge control solenoid valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 10 — 100 Ω?	Repair the poor contact of purge control solenoid valve connector.	Replace the purge control solenoid valve. <Ref. to EC(H4DO(HEV))-22, Purge Control Solenoid Valve.>

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the purge control solenoid valve.
Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(A) To canister (B) To intake manifold

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Duty ratio of “ON”	< 0.75

4. GENERAL DRIVING CYCLE

Always perform the diagnosis after starting the engine.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

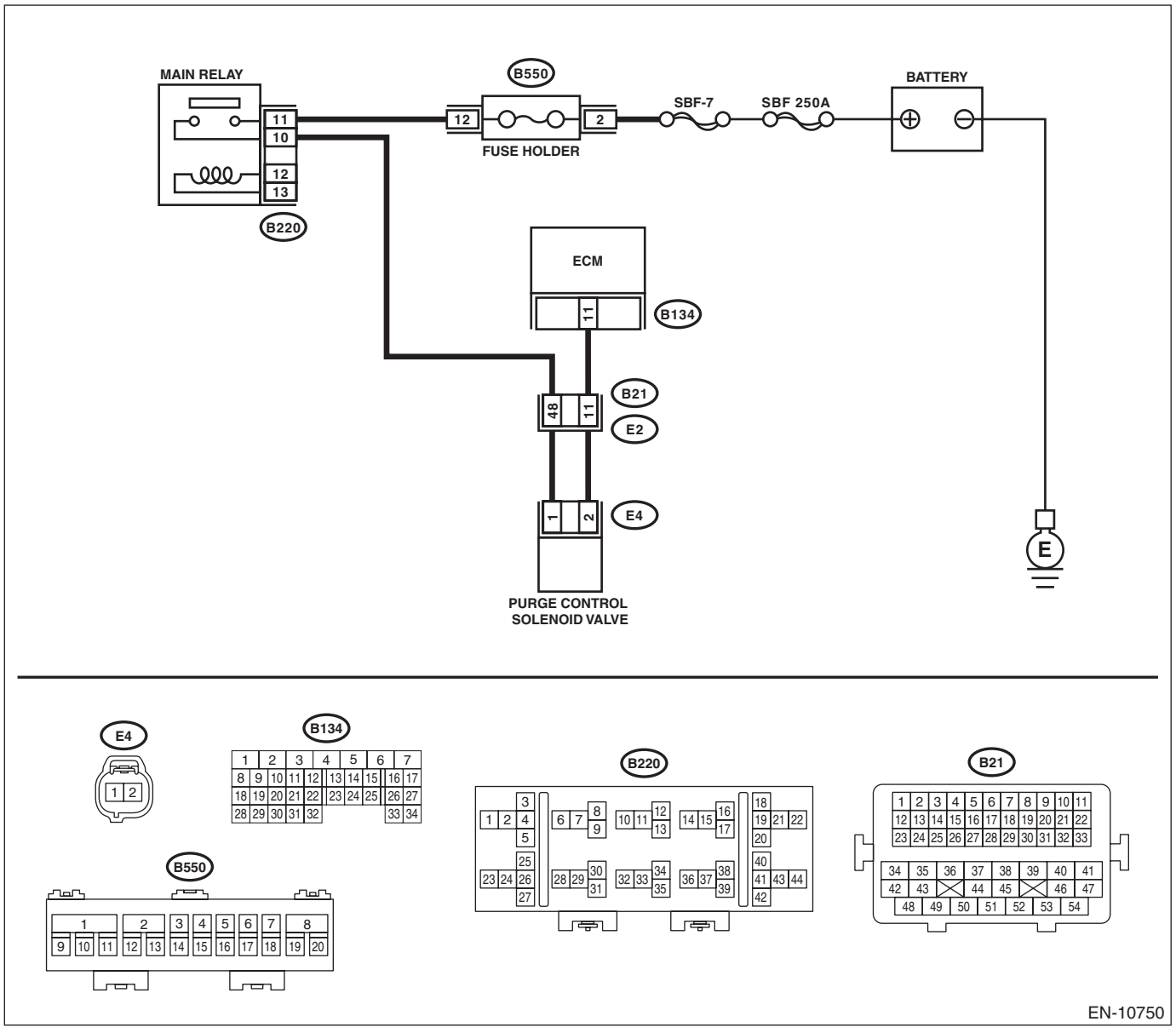
Malfunction Criteria	Threshold Value
Terminal output voltage	≤ Battery voltage × 0.34

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CR:DTC P0459 EVAP SYSTEM (CPC) PURGE CONTROL VALVE "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

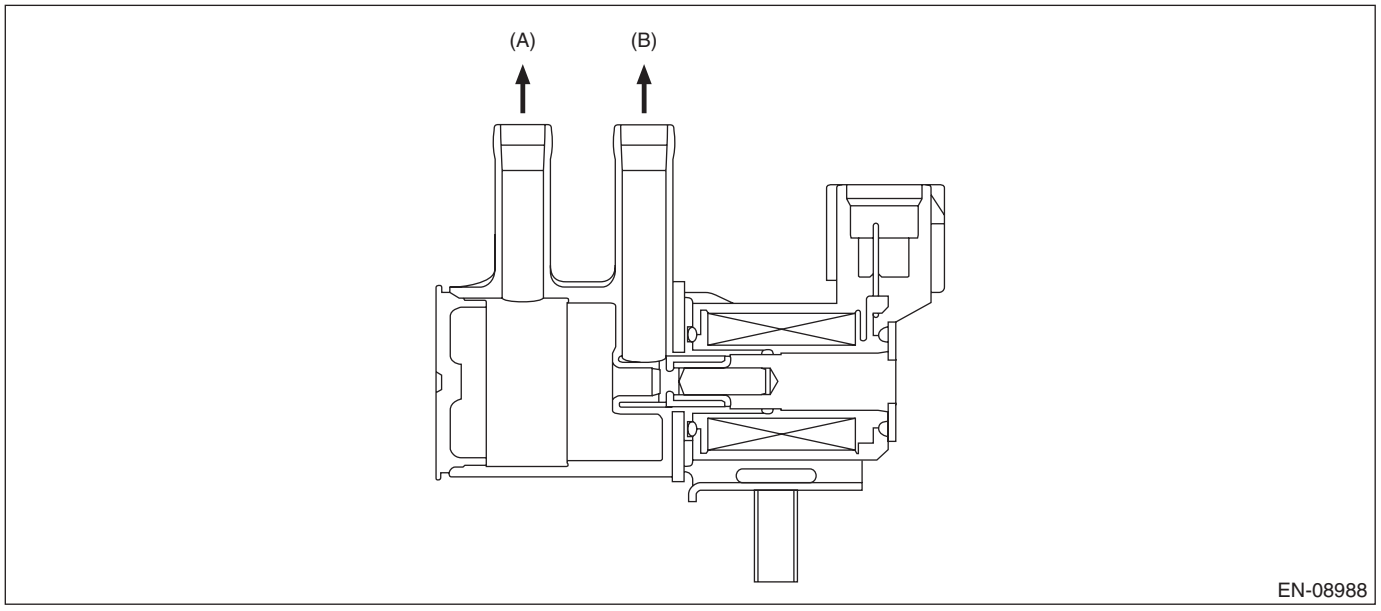


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and purge control solenoid valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 11 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and purge control solenoid valve connector.	Go to step **2**.
2	**CHECK PURGE CONTROL SOLENOID VALVE.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between purge control solenoid valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Replace the purge control solenoid valve. <Ref. to EC(H4DO(HEV))-22, Purge Control Solenoid Valve.>	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the purge control solenoid valve.
Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(A) To canister
(B) To intake manifold

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Duty ratio of “ON”	≥ 0.25

4. GENERAL DRIVING CYCLE

Always perform the diagnosis after starting the engine.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output current	≥ 12 A

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CS:DTC P0461 FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

CAUTION:

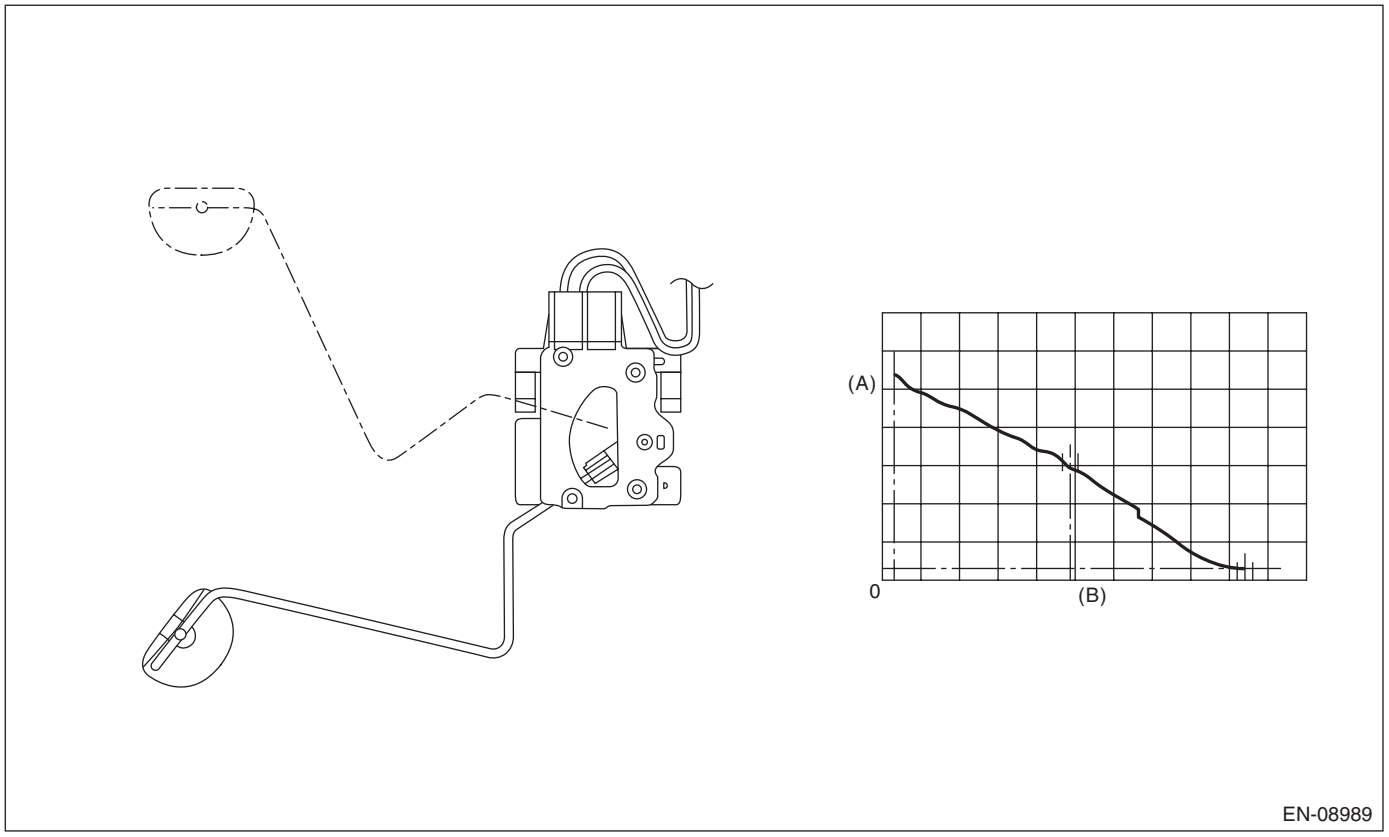
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Replace the fuel level sensor and fuel sub level sensor. <Ref. to FU(H4DO(HEV))-130, Fuel Level Sensor.> <Ref. to FU(H4DO(HEV))-133, Fuel Sub Level Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect malfunctions of the fuel level sensor output property.
If the fuel level does not vary in a particular driving condition / engine condition where it should, judge as NG.

2. COMPONENT DESCRIPTION



(A) Fuel level (B) Resistance

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 5000 ms
Cumulative amount of intake air without fuel cut	≥ 165375 g

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Max. – min. values of fuel level output	< 2.6 L (0.69 US gal, 0.57 Imp gal)

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

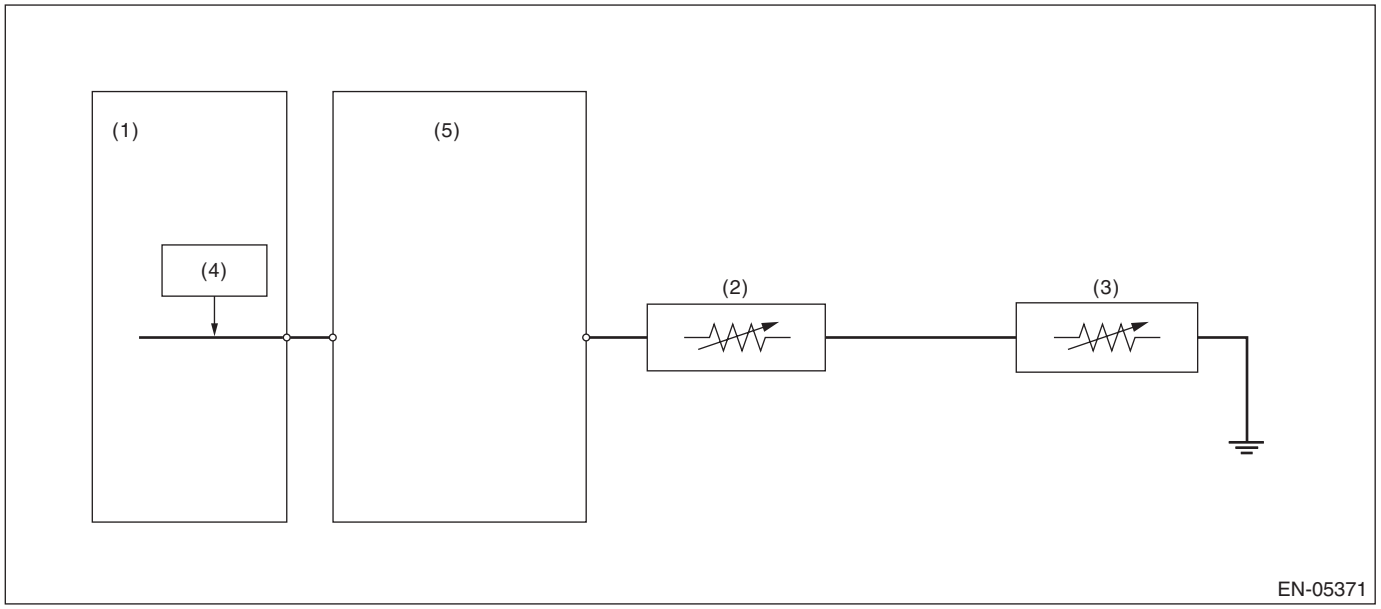
CT:DTC P0462 FUEL LEVEL SENSOR "A" CIRCUIT LOW

NOTE:
For the diagnostic procedure, refer to DTC P0463. <Ref. to EN(H4DO HEV)(diag)-352, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of fuel level sensor. Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Fuel level sensor
(3) Fuel sub level sensor
(4) Detecting circuit
(5) Body integrated unit

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after ignition switch is turned to ON	≥ 3000 ms

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 2.211 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CU:DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

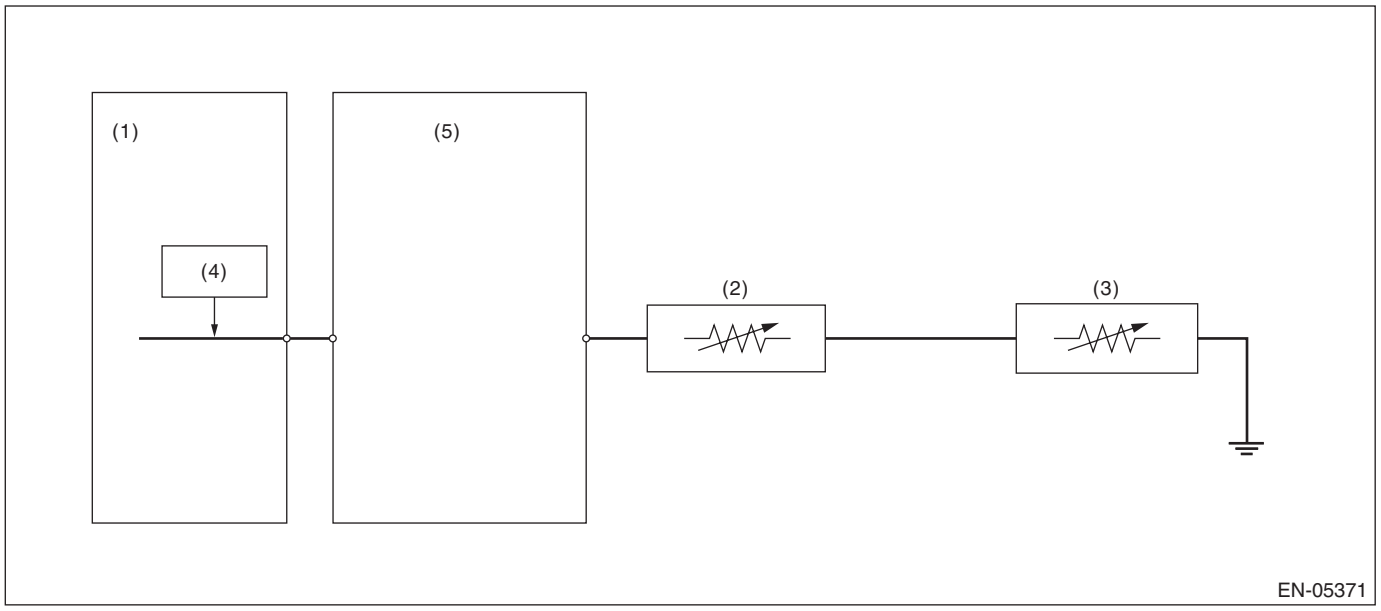
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is DTC P0462 or P0463 displayed on the Subaru Select Monitor?	Check the combination meter. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of fuel level sensor. Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Fuel level sensor
(3) Fuel sub level sensor
(4) Detecting circuit
(5) Body integrated unit

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 12 V

Time Needed for Diagnosis: 1000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CV:DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	**CHECK DTC OF VDC.** Check DTC of VDC.	Is DTC of VDC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Judge as NG when outside of the judgment value.
Judge NG when the received data from VDCCM&H/U is abnormal vehicle speed, and the vehicle speed data is impossible.

2. COMPONENT DESCRIPTION

Vehicle speed signals are taken in to the VDC control module and hydraulic control unit, and normal/erroneous data of the ABS wheel speed sensor is received by CAN communication from the VDC control module and hydraulic control unit.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Front ABS wheel speed sensor status	Malfunction
Either of the following is established	
Front left wheel speed	≥ 300 km/h (186.4 MPH)
Front right wheel speed	≥ 300 km/h (186.4 MPH)

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CW:DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

- Hard to start the engine.
- Engine does not start.
- Improper idling
- Engine stalls.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK AIR CLEANER ELEMENT.** 1) Turn the ignition switch to OFF. 2) Check the air cleaner element.	Is there excessive clogging on air cleaner element?	Replace the air cleaner element. <Ref. to IN(H4DO(HEV))-4, Air Cleaner Element.>	Go to step **3**.
3	**CHECK ELECTRONIC THROTTLE CONTROL.** 1) Remove the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, REMOVAL, Throttle Body.> 2) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101. <Ref. to EN(H4DO HEV)(diag)-456, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction that actual engine speed is not close to target engine speed during idling. Judge as NG when actual engine speed is not close to target engine speed during idling.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Lambda value (left and right)	≥ 0.85 to < 1.151
Vehicle speed	0 km/h (0 MPH)
Engine coolant temperature	≥ 50 °C (122 °F)
Elapsed time after starting the engine	≥ 10 s
Accelerator pedal position	= 0%
CSERS monitor status	OFF
Idle speed control monitor of HPCM status	OFF
Elapsed time after switching neutral position switch to ON/OFF	> 5 s

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling after warming up engine.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Targeted engine speed	< –100 rpm

Time Needed for Diagnosis: 15 s × 1 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CX:DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Engine keeps running at higher speed than specified idle speed.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK AIR INTAKE SYSTEM.** 1) Start and idle the engine. 2) Check the following items. • Loose installation of intake manifold and throttle body • Cracks of intake manifold gasket and throttle body gasket • Disconnection of vacuum hoses	Is there any fault in air intake system?	Repair air suction and leaks.	Go to step **3**.
3	**CHECK ELECTRONIC THROTTLE CONTROL.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, REMOVAL, Throttle Body.> 3) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101. <Ref. to EN(H4DO HEV)(diag)-456, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction that actual engine speed is not close to target engine speed during idling. Judge as NG when actual engine speed is not close to target engine speed during idling.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Lambda value (left and right)	≥ 0.85 to < 1.151
Vehicle speed	0 km/h (0 MPH)
Engine coolant temperature	≥ 50 °C (122 °F)
Elapsed time after starting the engine	≥ 10 s
Accelerator pedal position	= 0%
CSERS monitor status	OFF
Idle speed control monitor of HPCM status	OFF
Elapsed time after switching neutral position switch to ON/OFF	> 5 s

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling after warming up engine.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Targeted engine speed	> 200 rpm

Time Needed for Diagnosis: 15 s × 1 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CY:DTC P050A COLD START IDLE CONTROL SYSTEM PERFORMANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

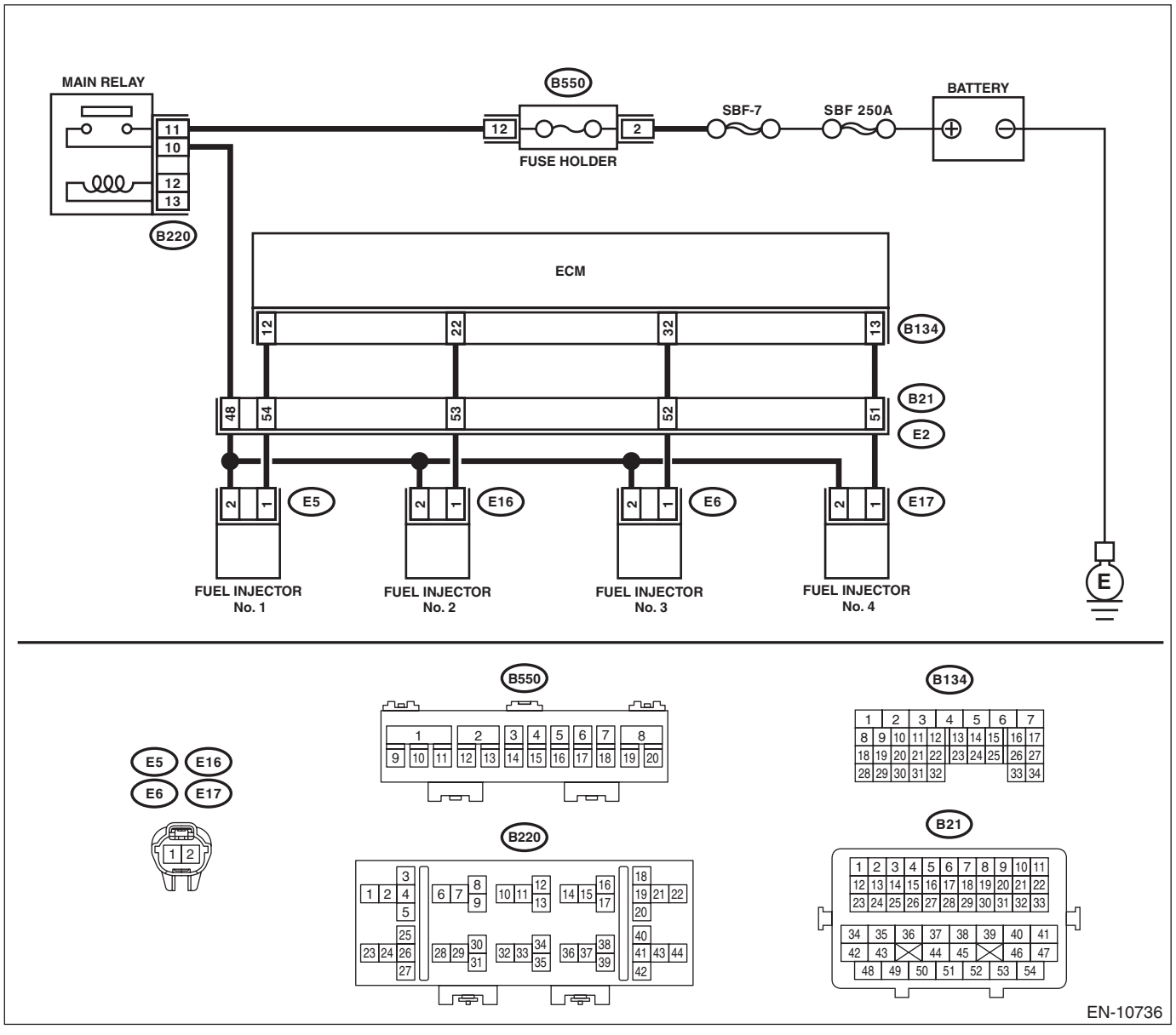
- Engine keeps running at higher speed than specified idle speed.
- Engine keeps running at a lower speed than the specified idle speed.
- Engine stalls.

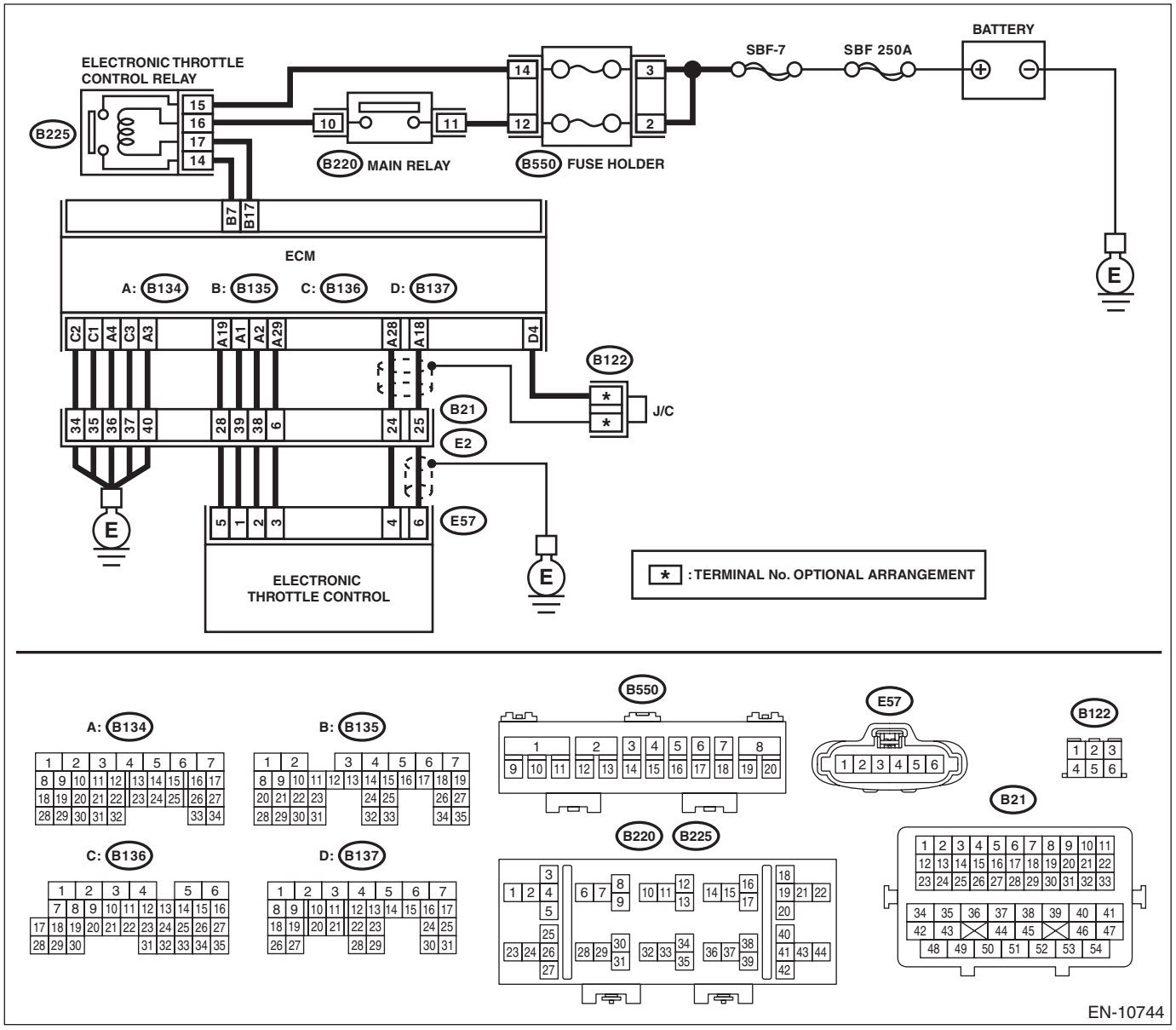
CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ENGINE OIL.**	Is there a proper amount of engine oil?	Go to step **3**.	Replace engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
3	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **5**.
5	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **6**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(HEV))-129, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(HEV))-161, INSPECTION, Fuel Delivery and Evaporation Lines.>
6	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **7**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>
7	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in "P" range or "N" range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **8**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

	Step	Check	Yes	No
8	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in "P" range or "N" range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Go to step **9**.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>
9	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **14**.	Go to step **10**.
10	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 1 — Engine ground:*** ***#2 (E16) No. 1 — Engine ground:*** ***#3 (E6) No. 1 — Engine ground:*** ***#4 (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
11	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **12**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector

	Step	Check	Yes	No
12	**CHECK FUEL INJECTOR.** Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **13**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
13	**CHECK POWER SUPPLY LINE.** 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay connector and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector
14	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector.	Go to step **15**.
15	**CHECK FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **16**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
16	**CHECK INSTALLATION CONDITION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor. <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(HEV))-49, INSTALLATION, Crankshaft Position Sensor.>	Go to step **17**.
17	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **18**.

	Step	Check	Yes	No
18	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Go to step **19**.
19	**CHECK ELECTRONIC THROTTLE CONTROL RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance less than 1 Ω?	Go to step **20**.	Replace the electronic throttle control relay. <Ref. to FU(H4DO(HEV))-95, Electronic Throttle Control Relay.>
20	**CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY.** Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 15 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **21**.	Repair the open or short to ground in the power supply circuit.
21	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step **22**.
22	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 — Chassis ground:*** ***(B225) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **23**.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
23	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** Measure the resistance of harness between ECM connector and electronic throttle control relay connector. ***Connector & terminal*** ***(B135) No. 17 — (B225) No. 17:*** ***(B135) No. 7 — (B225) No. 14:***	Is the resistance less than 1 Ω?	Go to step **24**.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.

	Step	Check	Yes	No
24	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 18 — Chassis ground:*** ***(B134) No. 18 — (B137) No. 4:*** ***(B134) No. 28 — Chassis ground:*** ***(B134) No. 28 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **25**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
25	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 — Engine ground:*** ***(E57) No. 4 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **26**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
26	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 18 — (E57) No. 6:*** ***(B134) No. 28 — (E57) No. 4:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **27**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
27	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **28**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector

	Step	Check	Yes	No
28	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 (+) — Engine ground (–):*** ***(E57) No. 4 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **29**.
29	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 18:*** ***(B134) No. 19 — (B134) No. 28:***	Is the resistance 1 MΩ or more?	Go to step **30**.	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.
30	**CHECK SENSOR OUTPUT.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the value of «Main-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Main-Throttle Sensor» 0.81 — 0.87 V?	Go to step **31**.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>
31	**CHECK SENSOR OUTPUT.** Read the value of «Sub-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Sub-Throttle Sensor» 1.64 — 1.70 V?	Go to step **32**.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>
32	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 2 — (E57) No. 2:*** ***(B134) No. 1 — (E57) No. 1:***	Is the resistance less than 1 Ω?	Go to step **33**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector

	Step	Check	Yes	No
33	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 2 (+) — Engine ground (–):*** ***(E57) No. 1 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **34**.
34	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 2 — Engine ground:*** ***(E57) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **35**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
35	**CHECK HARNESS BETWEEN ELECTRONIC THROTTLE CONTROL CONNECTOR.** Measure the resistance between electronic throttle control connectors. ***Connector & terminal*** ***(E57) No. 2 — (E57) No. 1:***	Is the resistance 1 MΩ or more?	Go to step **36**.	Repair the short circuit in harness between ECM connector and electronic throttle control connector.
36	**CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **37**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
37	**CHECK ELECTRONIC THROTTLE CONTROL.** Measure the resistance between electronic throttle control terminals. ***Terminals*** ***No. 2 — No. 1:***	Is the resistance 50 Ω or less?	Go to step **38**.	Replace the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>
38	**CHECK ELECTRONIC THROTTLE CONTROL.** Move the throttle valve to the fully opened and fully closed positions with fingers. Check that the valve returns to the specified position when releasing fingers.	Does the valve return to the specified position? Standard value: 3 mm (0.12 in) from fully closed position	Repair the poor contact of ECM connector.	Replace the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>

1. OUTLINE OF DIAGNOSIS

• When cold, the abnormality in the control of target engine speed increase is detected. (P050A)

• Idle speed diagnosis

Judge as NG when actual engine speed is not close to target engine speed at cold start.

• Detect malfunctions of the catalyst advanced idling retard angle control. (P050B)

Judge as NG when ECM is not controlling the angle properly during catalyst advanced idling retard angle control.

• Final ignition timing diagnosis

Judge as NG when actual retard amount is under the specified value at cold start.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
<Idle speed diagnosis>	
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Vehicle speed	≤ 2 km/h (1.2 MPH)
Engine coolant temperature	≤ 60 °C (140 °F)
Throttle valve opening angle	< 0.37 °
Intake air amount sum value	< Value of Map 1
Elapsed time after gear position change (P ←→ D or N ←→ D)	≥ 3000 ms
Fuel volatility	Not extremely low volatility
Elapsed time after starting the engine	≥ 2000 ms
<Final ignition timing diagnosis>	
Battery voltage	> 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Vehicle speed	≤ 2 km/h (1.2 MPH)
Engine coolant temperature	≤ 60 °C (140 °F)
Throttle valve opening angle	< 0.37 °
Intake air amount sum value	< Value of Map 2
Elapsed time after gear position change (P ←→ D or N ←→ D)	≥ 3000 ms
Fuel volatility	Not extremely low volatility
Target retard amount	≥ Value from Map 3

Map 1

Engine coolant temperature at engine starting °C (°F)	-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Intake air amount sum value g (oz)	770 (27.16)	690 (24.34)	620 (21.87)	560 (19.75)	510 (17.99)	450 (15.87)	390 (13.76)	320 (11.29)

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Intake air amount sum value g (oz)	260 (9.17)	210 (7.41)	180 (6.35)	180 (6.35)	180 (6.35)	180 (6.35)	180 (6.35)	180 (6.35)

Map 2

Engine coolant temperature at engine starting °C (°F)	-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Intake air amount sum value g (oz)	770 (27.16)	690 (24.34)	620 (21.87)	560 (19.75)	510 (17.99)	450 (15.87)	390 (13.76)	320 (11.29)

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Intake air amount sum value g (oz)	260 (9.17)	210 (7.41)	180 (6.35)	180 (6.35)	180 (6.35)	180 (6.35)	180 (6.35)	180 (6.35)

Map 3

Engine coolant temperature	-40 °C (-40 °F)	-30 °C (-22 °F)	-20 °C (-4 °F)	-10 °C (14 °F)	0 °C (32 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	50 °C (122 °F)	60 °C (140 °F)
Target retard amount	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA

3. GENERAL DRIVING CYCLE

Perform the diagnosis at cold start.

4. DIAGNOSTIC METHOD

• Idle speed diagnosis

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Target engine speed	< Value of Map 4

Map 4

Engine coolant temperature	–40 °C (–40 °F)	–30 °C (–22 °F)	–20 °C (–4 °F)	–10 °C (14 °F)	0.00 °C (32 °F)	10.00 °C (50 °F)	20.00 °C (68 °F)	30.00 °C (86 °F)	40.00 °C (104 °F)	50.00 °C (122 °F)	60.00 °C (140 °F)
Threshold Value	–300 rpm	–300 rpm	–300 rpm	–300 rpm	–300 rpm	–300 rpm	–300 rpm	–300 rpm	–300 rpm	–300 rpm	–300 rpm

Time Needed for Diagnosis: 6000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

• Final ignition timing diagnosis

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Final ignition timing – ignition timing during CSERS* *: Ignition timing during CSERS (Cold Start Emission Reduction Strategy) = Base ignition timing – retard amount	> Value of Map 5

Map 5

Engine coolant temperature	-40 °C (-40 °F)	-30 °C (-22 °F)	-20 °C (-4 °F)	-10 °C (14 °F)	0 °C (32 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	50 °C (122 °F)	60 °C (140 °F)
Threshold Value	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA	5 °CA

Time Needed for Diagnosis: 7000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

CZ:DTC P050B COLD START IGNITION TIMING PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P050A. <Ref. to EN(H4DO HEV)(diag)-359, DTC P050A COLD START IDLE CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

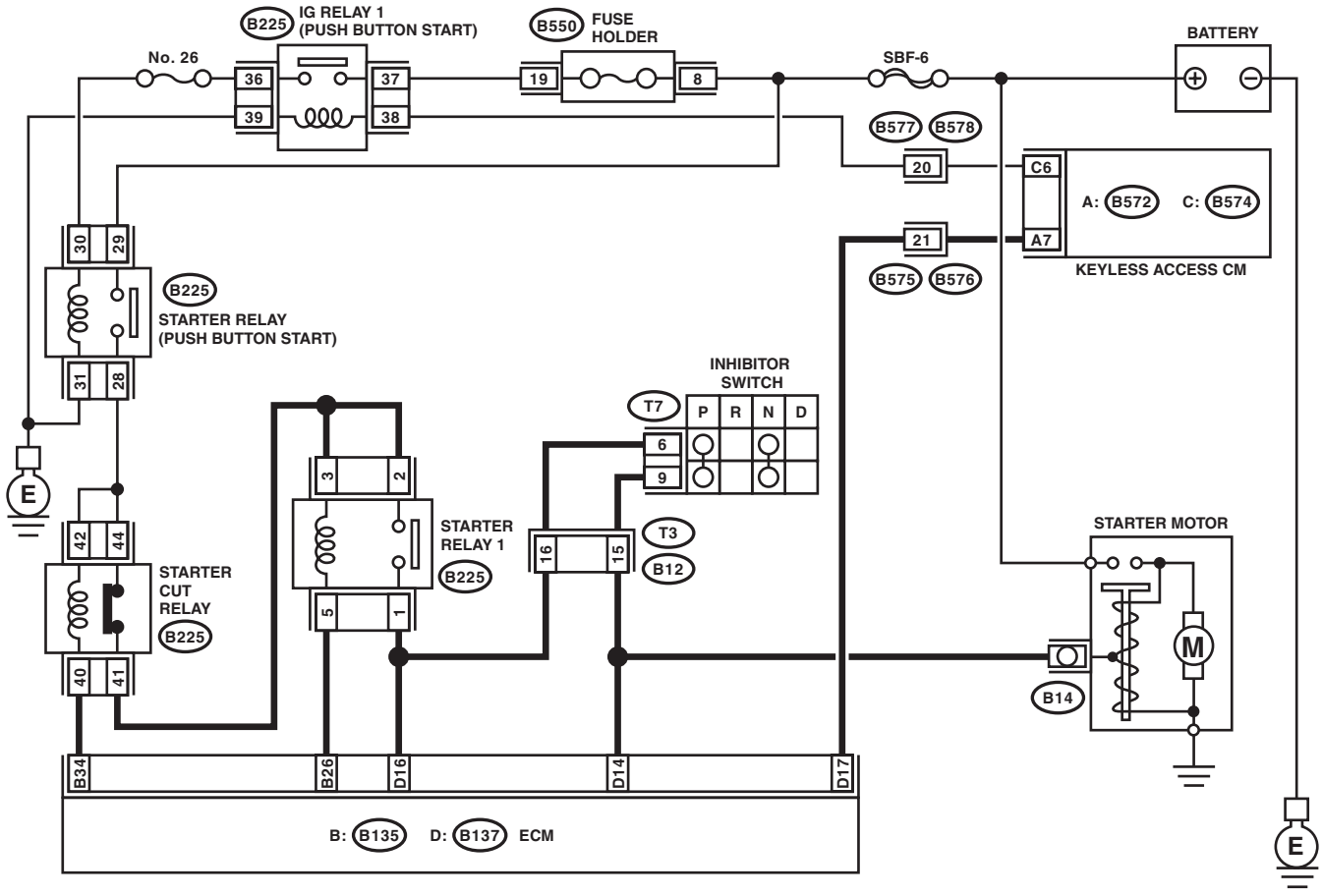
NOTE:
For the detection standard, refer to DTC P050A. <Ref. to EN(H4DO HEV)(diag)-359, DTC P050A COLD START IDLE CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

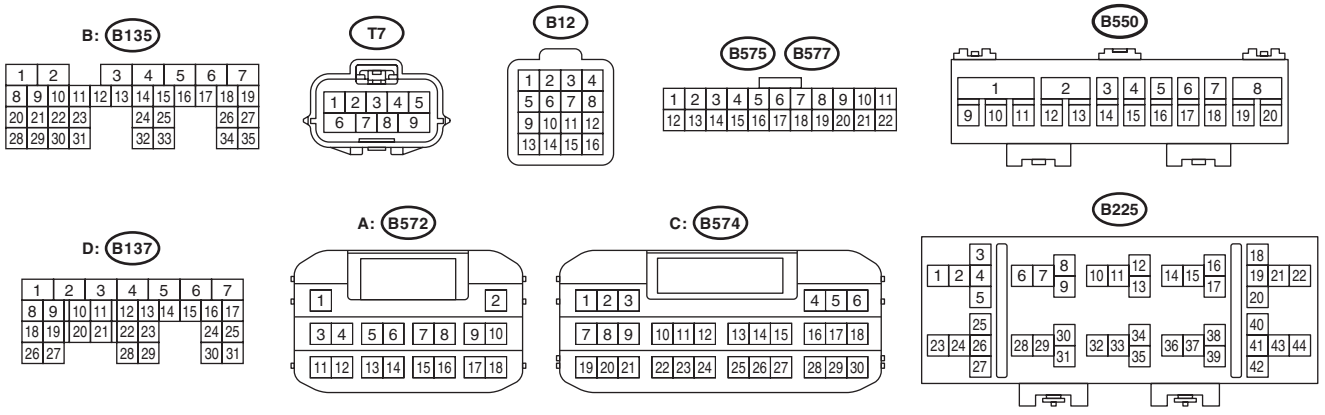
DA:DTC P0512 STARTER (SWITCH) REQUEST CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





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Step		Check	Yes	No
1	**CHECK PUSH BUTTON IGNITION SWITCH.** Operate the push button ignition switch.	Does it operate smoothly without catch?	Go to step **2**.	Replace the push button ignition switch. <Ref. to SL-107, Push Button Ignition Switch.>

	Step	Check	Yes	No
2	**CHECK DTC.** 1) Clear the memory using the Subaru Select Monitor. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Start and idle the engine for three minutes or more.	Is the same DTC as current diagnosis output?	Go to step **3**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM.** 1) Turn the ignition to OFF. 2) Disconnect the connector from ECM. 3) Turn the ignition to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power supply in harness between ECM connector and keyless access CM connector.	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Detect abnormal continuity in the starter SW1.
Judge as ON NG when the starter SW 1 signal remains ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Engine revs (only at abnormality judgment)	> 500 rpm

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Starter SW1 voltage	≥ Battery voltage × 0.85

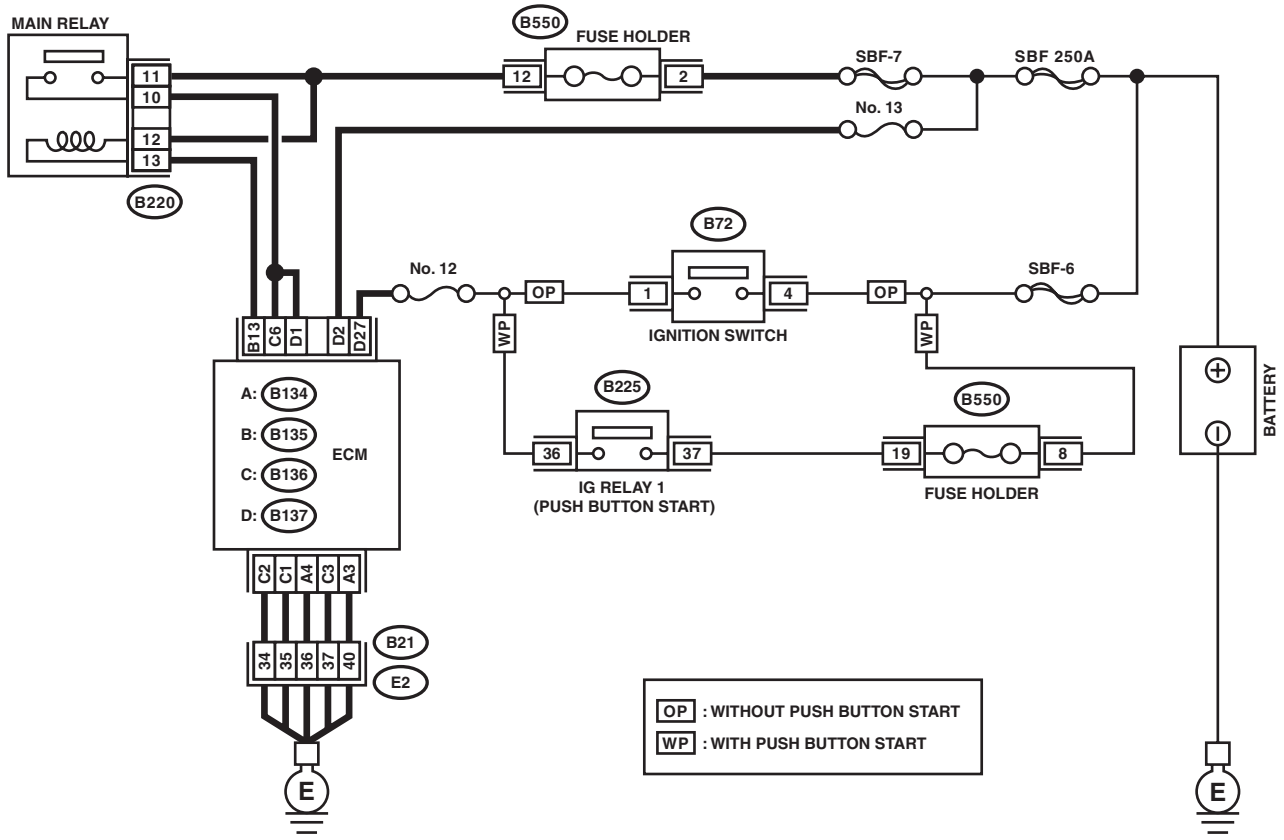
Time Needed for Diagnosis: 30000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

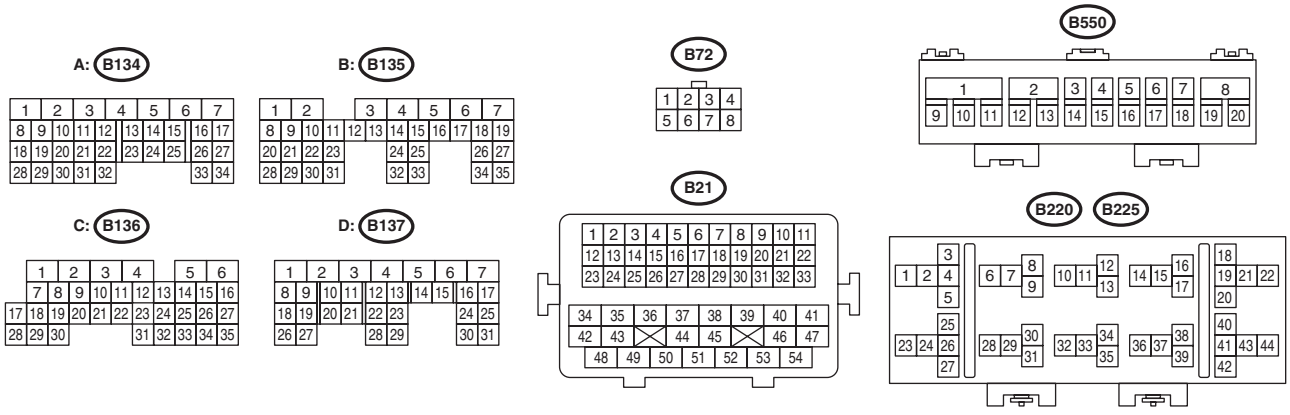
DB:DTC P0560 SYSTEM VOLTAGE

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





EN-10733

	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL OF ECM.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND MAIN FUSE BOX CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and 12 volt auxiliary battery terminal.
3	**CHECK FUSE NO. 13 (MAIN FUSE BOX).**	Is the fuse blown out?	Replace the fuse.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and 12 volt auxiliary battery • Poor contact of ECM connector • Poor contact of 12 volt auxiliary battery terminal

1. OUTLINE OF DIAGNOSIS

Detect the open/short circuit of back-up power supply circuit.
Judge as NG when the backup power voltage is low.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of back-up power supply	≤ 3.5 V

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DC:DTC P059A ACTIVE GRILLE AIR SHUTTER "A" POSITION SENSOR CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition

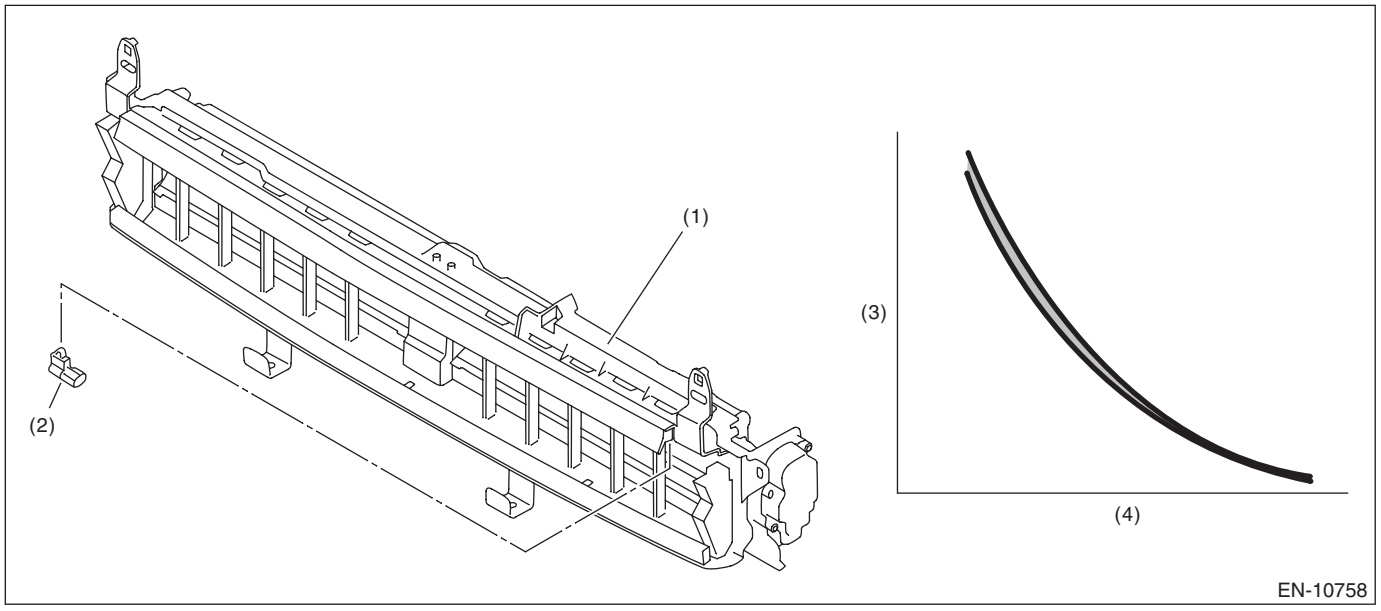
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK ACTIVE GRILLE SHUTTER.** 1) Turn the ignition switch to OFF, and wait for approx. 30 seconds. 2) Turn the ignition switch to ON. 3) Perform operation check for the active grille shutter using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the “Active Test”. <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>	Does the open/close operation finish correctly?	Even if DTC is detected, it has returned to a normal condition at this time. NOTE: In this case, it is assumed that the active grille shutter may have temporarily had a foreign matter adhered/pinched or a frost.	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of active grille shutter position sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Command to active grille shutter	Open or Closed

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Input pulse of the active grille shutter position sensor	= 0

Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DD:DTC P059F ACTIVE GRILLE AIR SHUTTER "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

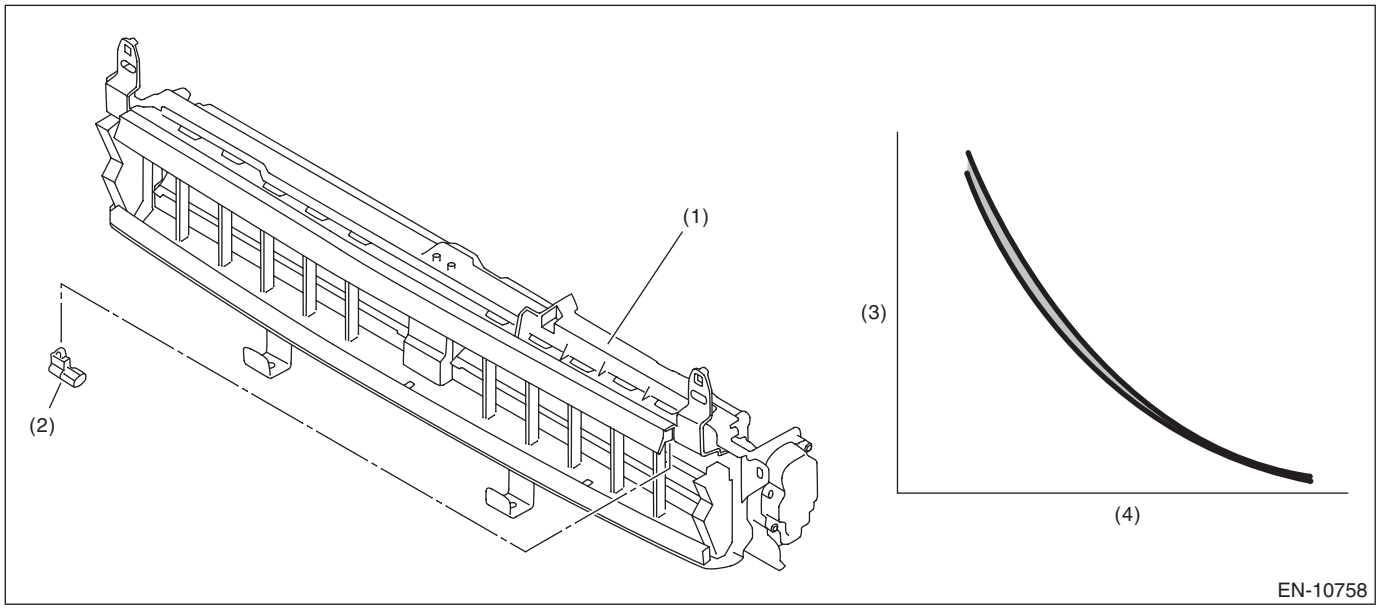
	Step	Check	Yes	No
1	**CHECK DTC.** Check for DTC. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is P059F displayed in Present fault?	Go to step **2**.	Even if DTC is detected, it has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, it is assumed that the active grille shutter may have temporarily had a foreign matter adhered/pinched or a frost.
2	**CHECK ACTIVE GRILLE SHUTTER.** Check the area around the active grille shutter louver, louver link and actuator.	Is there any abnormality such as a foreign matter adhered or pinched and a frost?	Remove the foreign matter from the active grille shutter and go to the next step. Go to step **3**.	Go to step **3**.
3	**CHECK ACTIVE GRILLE SHUTTER.** 1) Turn the ignition switch to ON. (Engine OFF) 2) Using the Subaru Select Monitor, perform the operation check of the active grille shutter to measure time needed for open or close operation. NOTE: For detailed operation procedures, refer to the “Active Test”. <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>	Is the time less than 15 seconds?	Even if DTC is detected, it has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Go to step **4**.
4	**CHECK CURRENT DATA.** Read the value of «Active Grille Shutter Voltage Error Status» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is «Normal» displayed?	Go to step **5**.	Check the power supply circuit. If the power supply circuit is normal. replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>

	Step	Check	Yes	No
5	**CHECK CURRENT DATA.** 1) Turn the ignition switch to OFF, and cool down the engine enough. NOTE: Cool down the engine unit until it can be easily touched by hand. 2) Turn the ignition switch to ON. 3) Read the value of «Active Grille Shutter Temperature Error Status» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is «Normal» displayed?	Even if DTC is detected, it has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the response to open/close request for the active grille shutter.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Active grille shutter drive	Yes

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Operation angle in 15000 ms of active grille shutter	< 88%

Time Needed for Diagnosis: 15000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

DE:DTC P05A0 ACTIVE GRILLE AIR SHUTTER "A" STUCK ON

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

CAUTION:

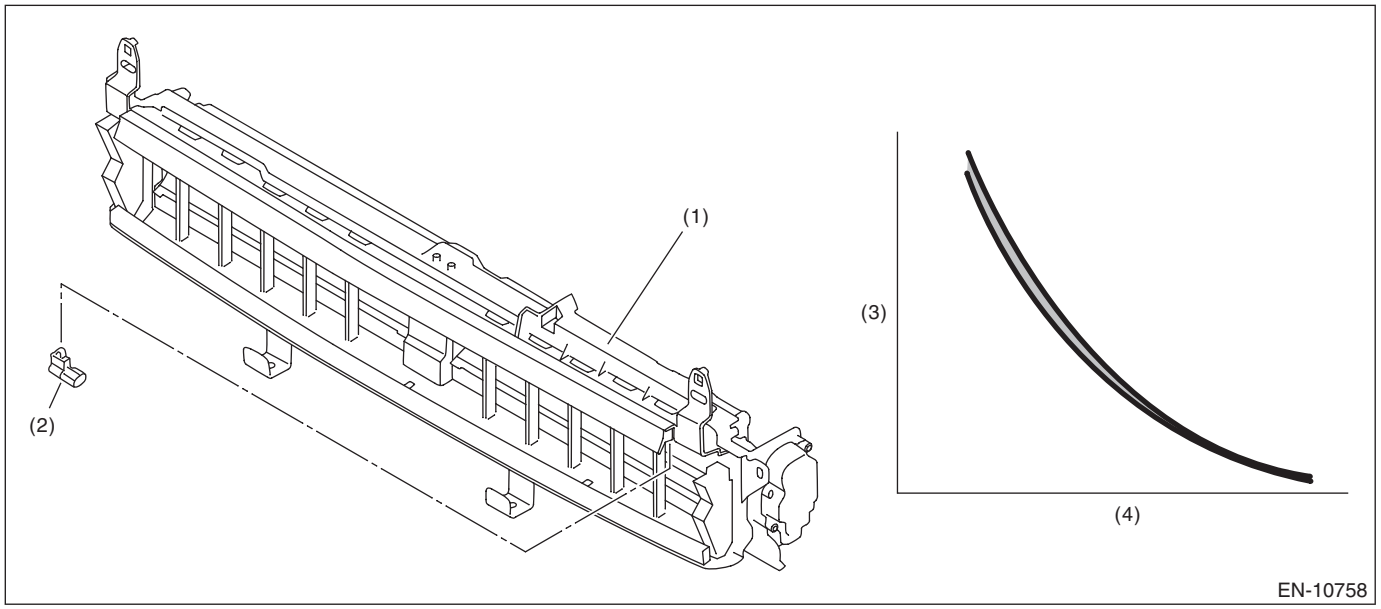
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK ACTIVE GRILLE SHUTTER.** Check the area around the active grille shutter louver, louver link and actuator.	Is there any abnormality such as a foreign matter adhered or pinched and a frost?	Remove the foreign matter from the active grille shutter.	Go to step **2**.
2	**CHECK ACTIVE GRILLE SHUTTER.** Check the area around the active grille shutter louver, louver link and actuator.	Is there any damage in each part of the active grille shutter?	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>	Go to step **3**.
3	**CHECK ACTIVE GRILLE SHUTTER.** 1) Turn the ignition switch to OFF, and wait for approx. 30 seconds. 2) Turn the ignition switch to ON. 3) Perform operation check for the active grille shutter using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the “Active Test”. <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>	Does the open/close operation finish correctly?	Even if DTC is detected, it has returned to a normal condition at this time. NOTE: In this case, it is assumed that the active grille shutter may have temporarily had a foreign matter adhered/pinched or a frost.	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>

1. OUTLINE OF DIAGNOSIS

Detect that open/close operation of the active grille shutter is disabled due to a foreign matter pinched in or other defects.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Command to active grille shutter	Open or Closed

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Max value of the active grille shutter position sensor (when controlled at power supply ON)	< 70 deg
Operating angle of active grille shutter (when controlled at power supply ON)	< 88%

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

DF:DTC P05A1 ACTIVE GRILLE AIR SHUTTER "A" POSITION SENSOR MINIMUM/MAXIMUM STOP PERFORMANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

CAUTION:

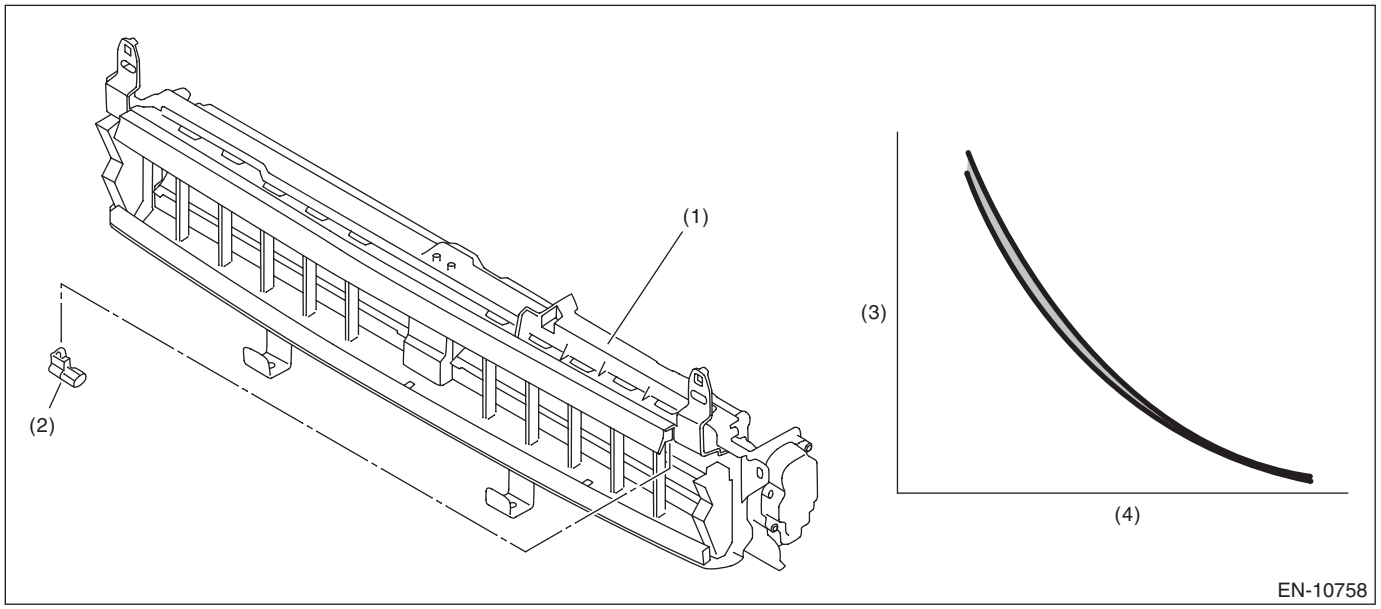
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK ACTIVE GRILLE SHUTTER.** Check the area around the active grille shutter louver, louver link and actuator.	Is there any abnormality such as a foreign matter adhered or pinched and a frost?	Remove the foreign matter from the active grille shutter.	Go to step **2**.
2	**CHECK ACTIVE GRILLE SHUTTER.** Check the area around the active grille shutter louver, louver link and actuator.	Is there any damage in each part of the active grille shutter?	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>	Go to step **3**.
3	**CHECK ACTIVE GRILLE SHUTTER.** 1) Turn the ignition switch to OFF, and wait for approx. 30 seconds. 2) Turn the ignition switch to ON. 3) Perform operation check for the active grille shutter using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the “Active Test”. <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>	Does the open/close operation finish correctly?	Even if DTC is detected, it has returned to a normal condition at this time. NOTE: In this case, it is assumed that the active grille shutter may have temporarily had a foreign matter adhered/pinched or a frost.	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>

1. OUTLINE OF DIAGNOSIS

Detect that the revolution angle goes beyond the defined angle due to the malfunction of the active grille shutter.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Command to active grille shutter	Open or Closed

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Max value of the active grille shutter position sensor (when controlled at power supply ON)	> 155 deg
Operating angle of active grille shutter (when controlled at power supply ON)	> 112%

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

DG:DTC P05A2 ACTIVE GRILLE AIR SHUTTER "A" CONTROL CIRCUIT/OPEN

DTC DETECTING CONDITION:
Immediately at fault recognition

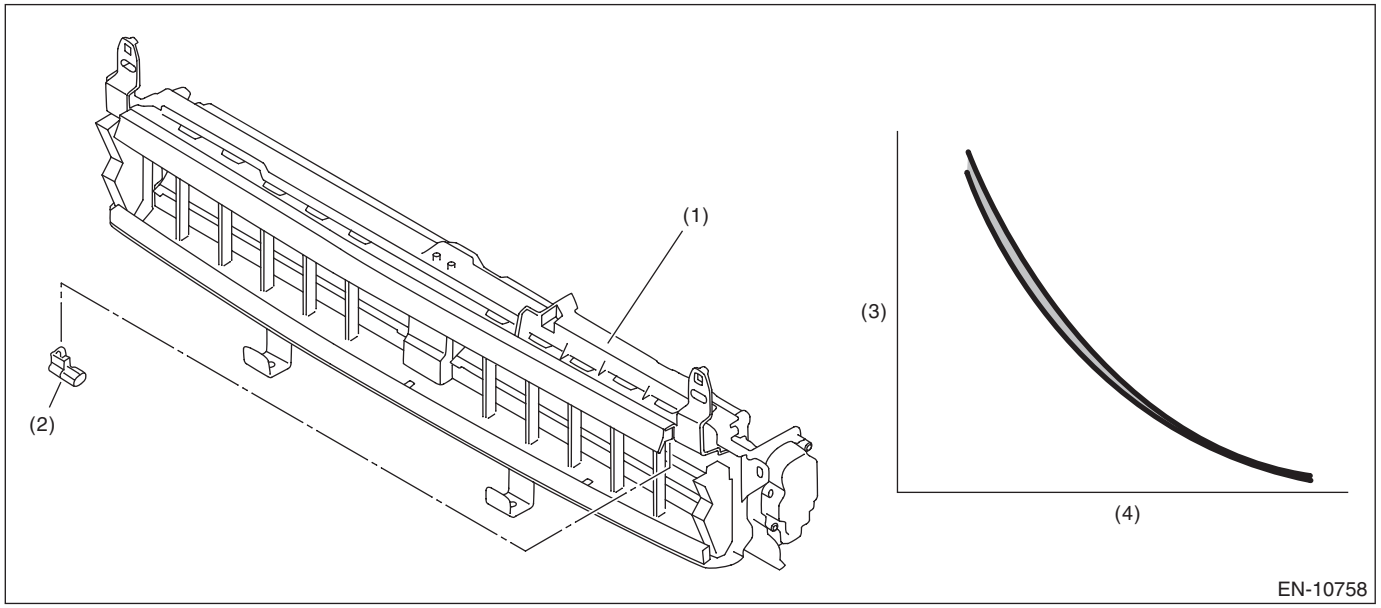
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to OFF, and wait for approx. 30 seconds. 2) Turn the ignition switch to ON. 3) Check for DTC. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is P05A2 displayed in Present fault or in Past fault?	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>	Using the Subaru Select Monitor, perform the operation check for the active grille shutter to make sure that its open and close operation can be completed properly. NOTE: For detailed operation procedures, refer to the “Active Test”. <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>

1. OUTLINE OF DIAGNOSIS

Detect for the malfunction of active grille shutter motor circuit.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Diagnosis 1

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

Diagnosis 2

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Command to active grille shutter	Open or Closed

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Diagnosis 1

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from AGASCM	ON
Current in the motor circuit during open/close command to the active grille shutter	< 10 mA or > 650 mA

Time Needed for Diagnosis: 2500 ms

Diagnosis 2

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from AGASCM	ON
Current in the motor circuit during open/close command to the active grille shutter	< 10 mA or > 10 mA

Time Needed for Diagnosis: 2500 ms

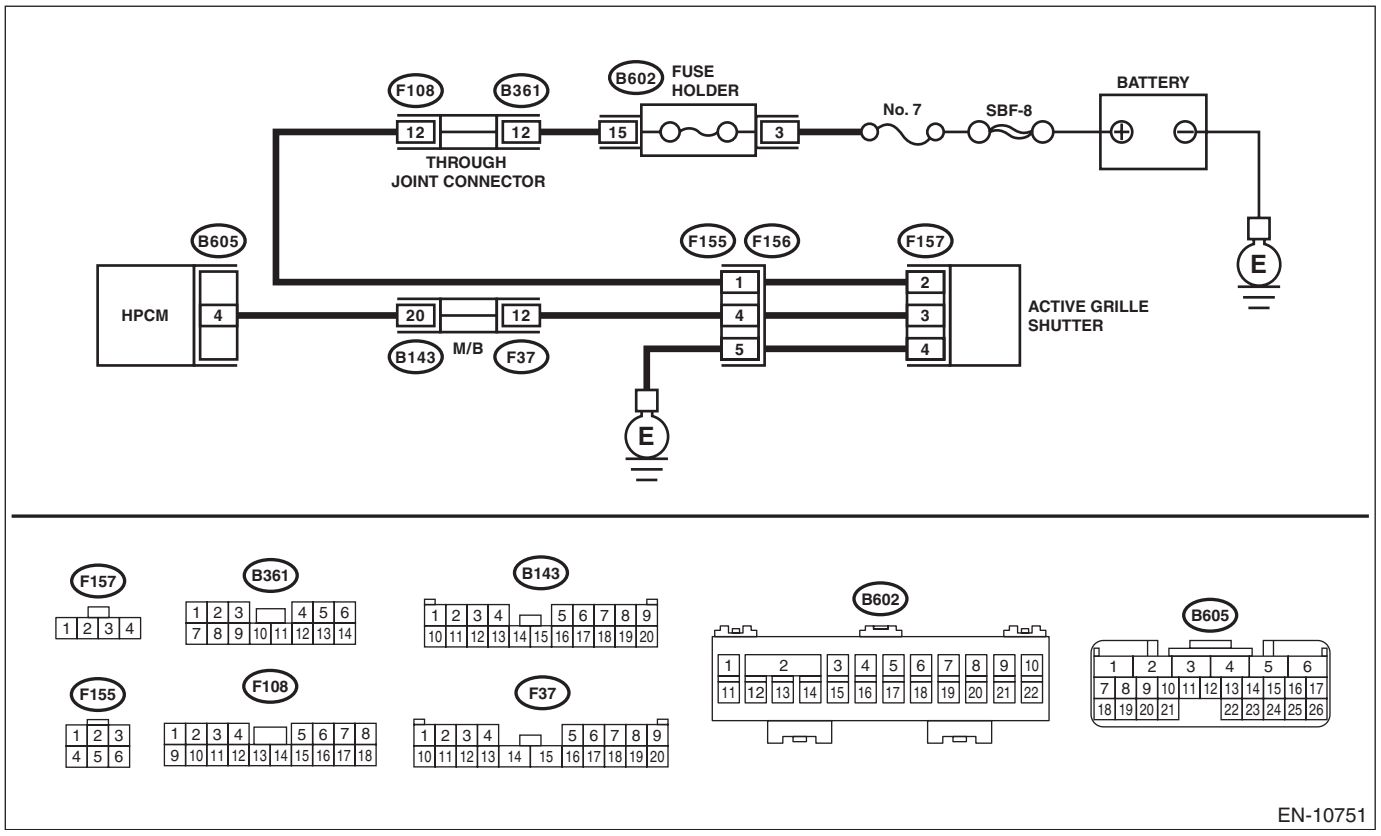
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DH:DTC P05A6 ACTIVE GRILLE AIR SHUTTER "A" SUPPLY VOLTAGE CIRCUIT/OPEN

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Active grille shutter <Ref. to WI(HEV)-41, Active Grille Shutter.>



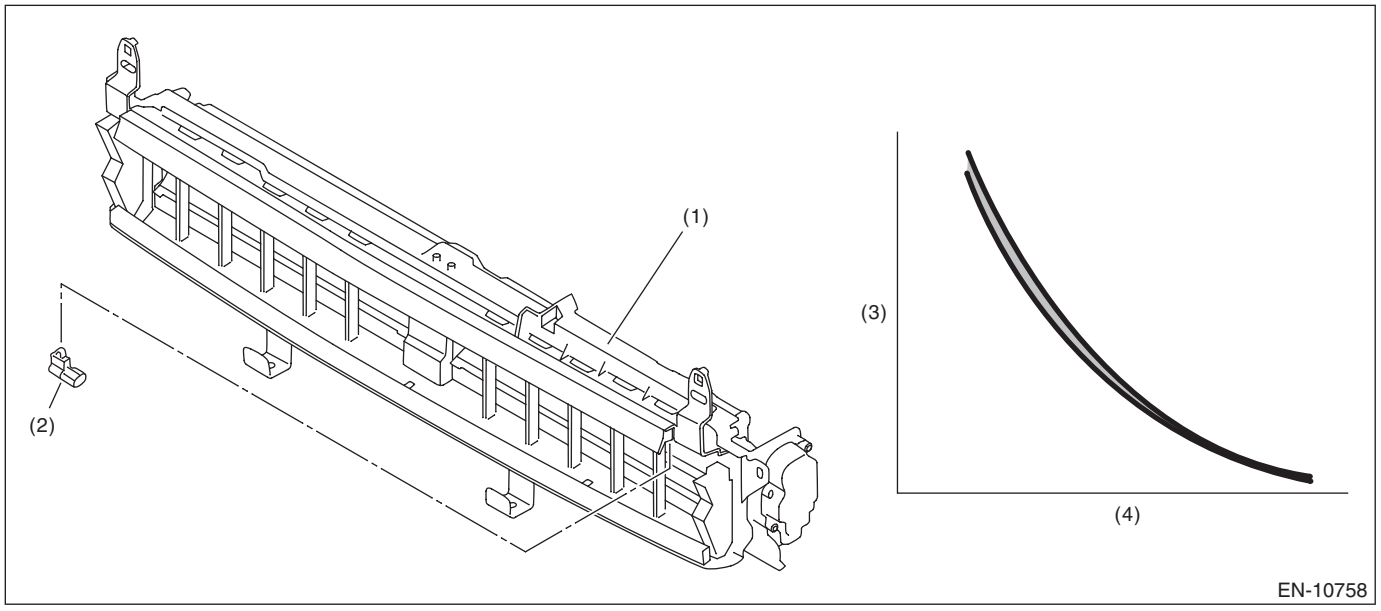
Step		Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to OFF, and wait for approx. 30 seconds. 2) Turn the ignition switch to ON. 3) Check for DTC. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is P05A6 displayed in Present fault?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, a temporary drop of battery voltage, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

Step		Check	Yes	No
2	**CHECK 12 VOLT AUXILIARY BATTERY.** Check the battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the battery OK?	Go to step **3**.	Charge or replace the battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
3	**CHECK ACTIVE GRILLE SHUTTER POWER SUPPLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the 12 volt auxiliary battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Disconnect the connector from the active grille shutter. 4) Measure the voltage between active grille shutter connector and chassis ground. ***Connector & terminal*** ***(F157) No. 2 (+) — Chassis ground (–):***	Is the voltage 9 V or more?	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>	Repair the power supply circuit.

1. OUTLINE OF DIAGNOSIS

Detect the abnormal voltage of active grille shutter power supply.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction judgment flag	1

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Does not illuminate.

DI: DTC P05C0 ACTIVE GRILLE AIR SHUTTER MODULE "A" OVER TEMPERATURE

DTC DETECTING CONDITION:
Immediately at fault recognition

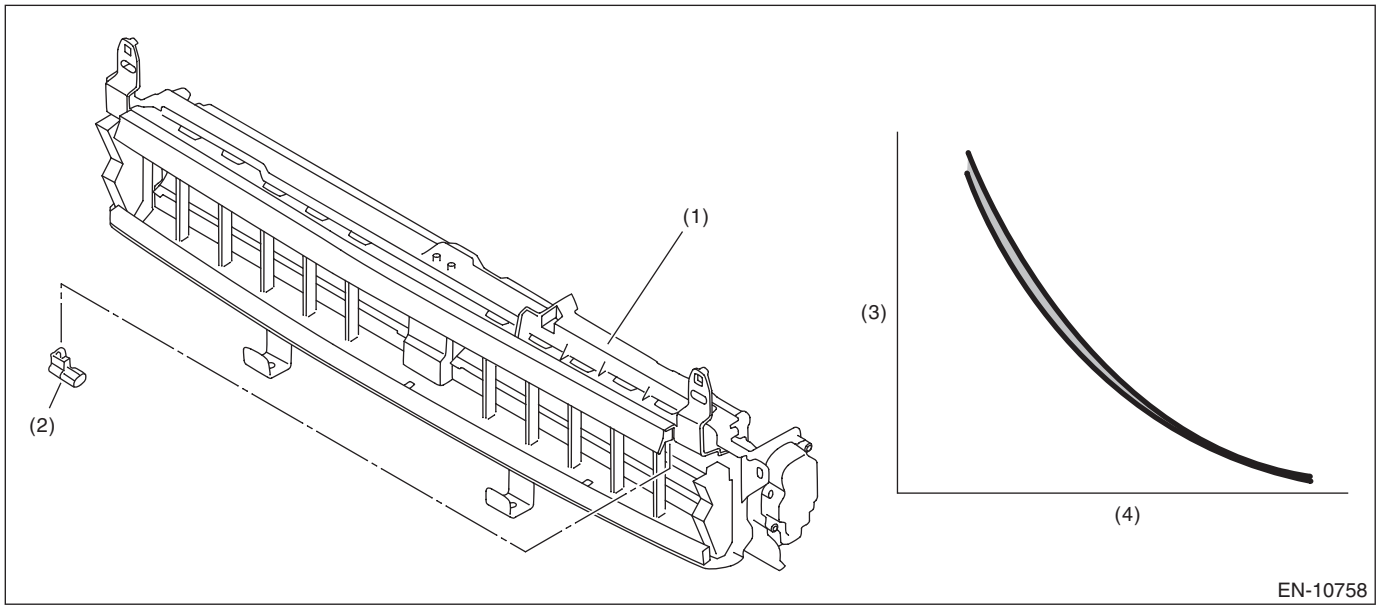
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to OFF, and cool down the engine enough. NOTE: Cool down the engine unit until it can be easily touched by hand. 2) Turn the ignition switch to ON. 3) Check for DTC. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is P05C0 displayed in Present fault?	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>	Even if DTC is detected, it has returned to a normal condition at this time. NOTE: In this case, there may have been a temporary rise of the temperature in the engine compartment.

1. OUTLINE OF DIAGNOSIS

Detect the abnormal temperature inside the active grille shutter.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Active grille shutter
(2) Ambient sensor
(3) Resistance value (kΩ)
(4) Ambient air temperature (°C (°F))

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction judgment flag	1

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Does not illuminate.

DJ:DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine does not start.
- Engine stalls.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer (RAM).
When there is a problem in the CPU normal RAM, judge as NG.
If it is possible to write data to the whole area of RAM in the initial routine, and is possible to read the same data, it is judged as OK, and if not, NG.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

Diagnosis with the initial routine.

3. GENERAL DRIVING CYCLE

Perform the diagnosis as soon as the ignition switch is turned to ON.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Write the specified value into the RAM.	Unmatch to written value

Time Needed for Diagnosis: less than 512 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DK:DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR

NOTE:
For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO HEV)(diag)-394, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when SUM value of ROM is outside the standard value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
None	

Diagnosis with the initial routine.

3. GENERAL DRIVING CYCLE

Perform the diagnosis as soon as the ignition switch is turned to ON.

4. DIAGNOSTIC METHOD

Judge as NG if the criteria below are met.

Judgment Value

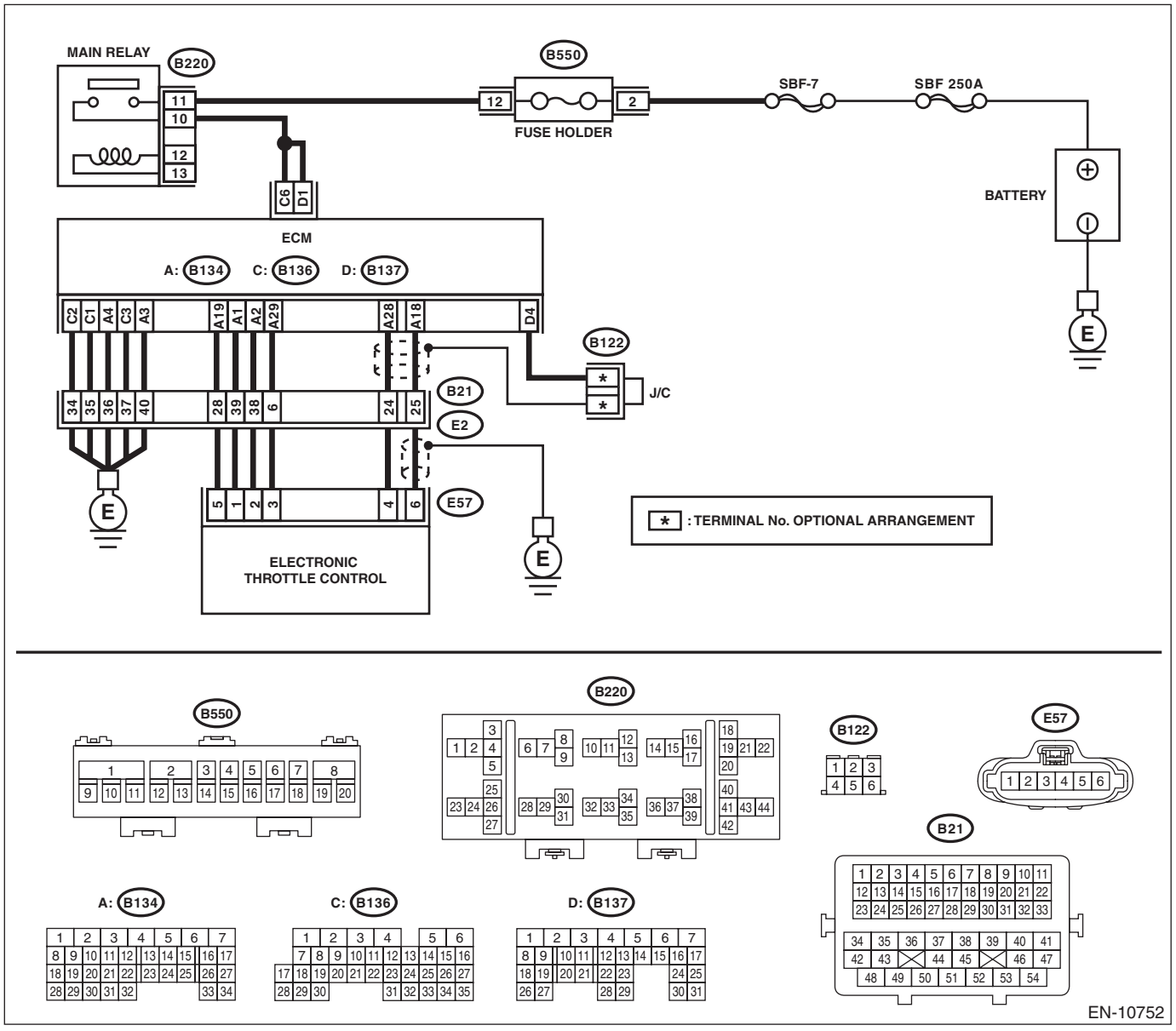
Malfunction Criteria	Threshold Value
SUM value of ROM	Standard

Time Needed for Diagnosis: 512 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DL:DTC P0606 CONTROL MODULE PROCESSOR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

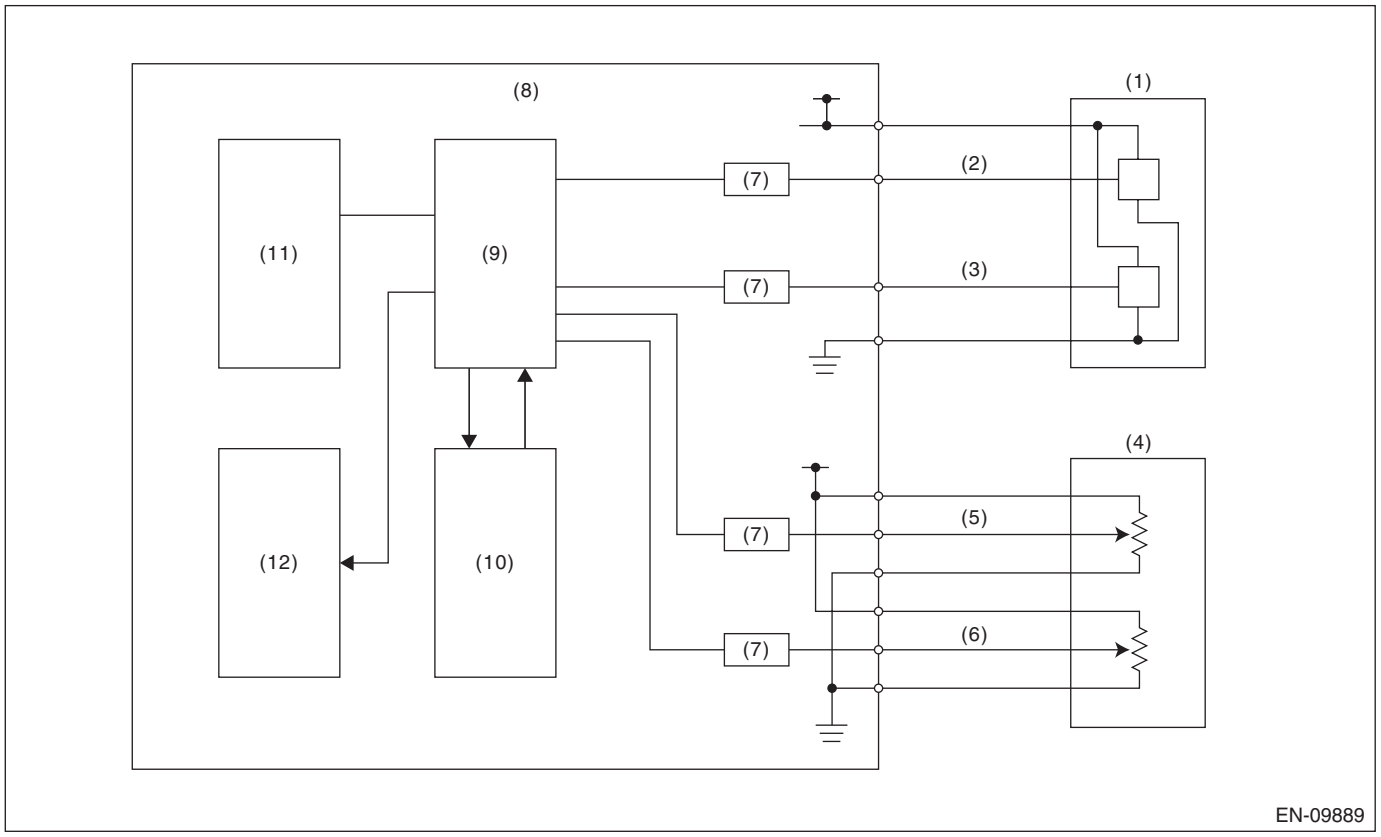


	Step	Check	Yes	No
1	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 6 (+) — Chassis ground (–):*** ***(B137) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **2**.	Repair the open or short to ground in the power supply circuit.
2	**CHECK INPUT VOLTAGE OF ECM.** 1) Start the engine. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 6 (+) — Chassis ground (–):*** ***(B137) No. 1 (+) — Chassis ground (–):***	Is the voltage 13 — 15 V?	Go to step **3**.	Repair the open or short to ground in the power supply circuit.
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 19 — (E57) No. 5:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
4	**CHECK ECM GROUND HARNESS.** 1) Connect all connectors. 2) Turn the ignition to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 (+) — Chassis ground (–):*** ***(B134) No. 4 (+) — Chassis ground (–):*** ***(B136) No. 1 (+) — Chassis ground (–):*** ***(B136) No. 2 (+) — Chassis ground (–):*** ***(B136) No. 3 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Check the connector for poor contact and check the harness. Replace the ECM if no fault is found. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in ground circuit • Loose engine ground terminal • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Judge as NG when the CPU operation is abnormal.
(1) Instruction check
(2) Software flow check
(3) Software monitor check
(4) CAN register check
(5) If the output IC operation is abnormal

2. COMPONENT DESCRIPTION



(1)	Throttle position sensor	(5)	Accelerator pedal position sensor 1	(9)	CPU
(2)	Throttle position sensor 1	(6)	Accelerator pedal position sensor 2	(10)	Monitoring IC
(3)	Throttle position sensor 2	(7)	I/F circuit	(11)	EEPROM
(4)	Accelerator pedal position sensor	(8)	Engine control module (ECM)	(12)	Output IC

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
(1) — 1 Initial routine	
(1) — 2 Ignition switch	ON
(1) — 2 Battery voltage	≥ 6.2 V
(1) — 2 Electronic throttle control relay	ON
(2) Ignition switch	ON
(3) Ignition switch	ON
(3) Battery voltage	≥ 6.2 V
(3) Electronic throttle control relay	ON
(4) Ignition switch	ON
(5) Initial routine	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
(1) — 1 Instruction value	Different from expected value
(1) — 2 Calculated result from CPU and FPU	Different from expected value
(2) Process flow result	The result and expected value do not match.
(3) High integrated IC motor continuity cut demand	Exist
(4) Communication between output driver ICs	Communication failure
(5) Writing value to CAN register	≠ Read out value

Time Needed for Diagnosis:
(1) — 1:2 time(s)
(1) — 2:512 ms
(2): 504 ms
(3): 48 ms
(4): 2500 ms
(5): None
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

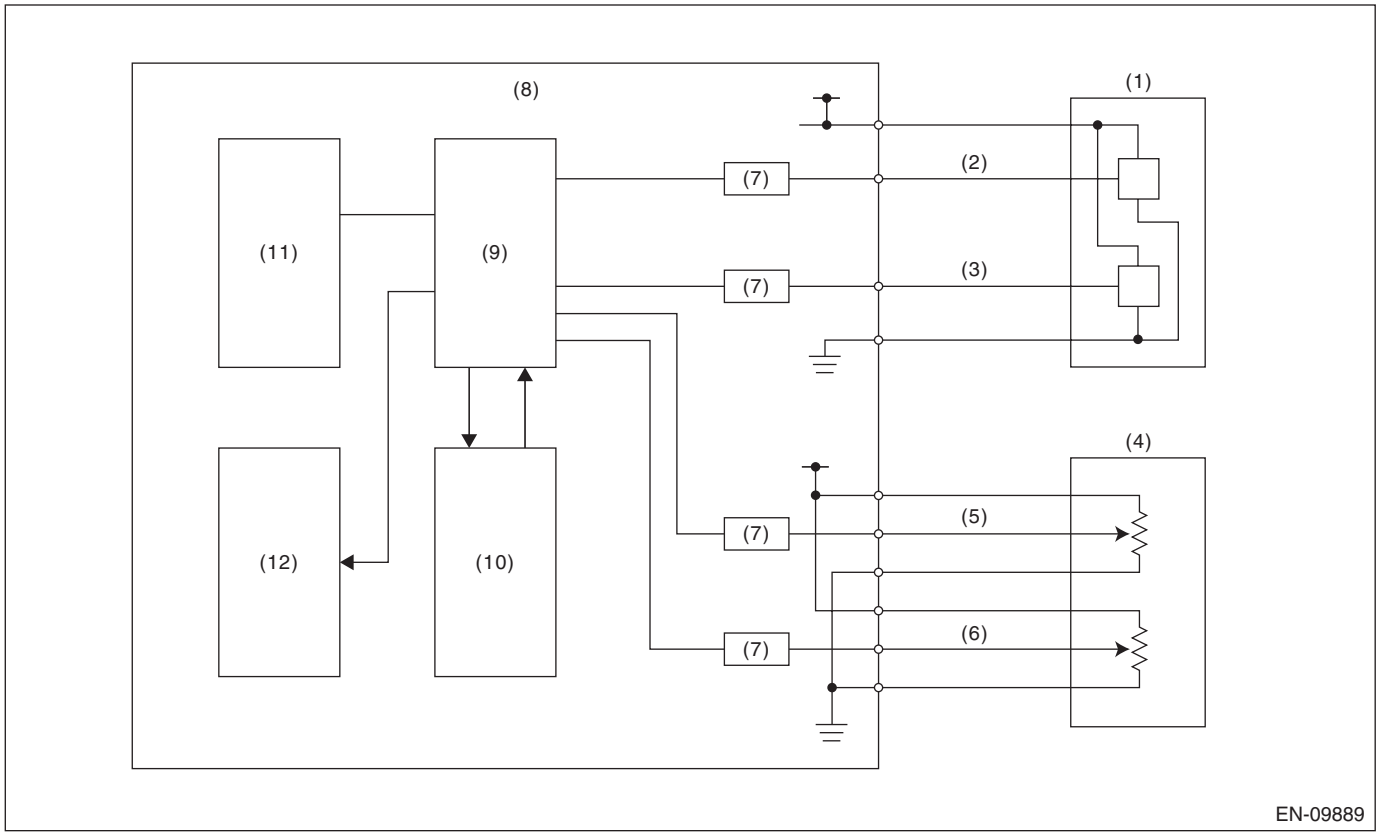
DM:DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO HEV)(diag)-394, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the monitoring IC operation is abnormal.
(1) Monitoring IC Disable (motor continuity cut demand) diagnosis
(2) Monitoring IC function diagnosis
(3) Monitoring IC register diagnosis

2. COMPONENT DESCRIPTION



(1)	Throttle position sensor	(5)	Accelerator pedal position sensor 1	(9)	CPU
(2)	Throttle position sensor 1	(6)	Accelerator pedal position sensor 2	(10)	Monitoring IC
(3)	Throttle position sensor 2	(7)	I/F circuit	(11)	EEPROM
(4)	Accelerator pedal position sensor	(8)	Engine control module (ECM)	(12)	Output IC

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
(1) Battery voltage	≥ 6 V
(1) CPU intentionally sends incorrect data	
(2) Battery voltage	≥ 6 V
(2) CPU intentionally sends incorrect data	
(3) Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when one of the following conditions is established.

Judgment Value

Malfunction Criteria	Threshold Value
(1) Main throttle opening angle – Main throttle opening angle at monitoring start	≥ 2 °
(2) Monitoring IC motor continuity cut demand	None
(3) Monitoring IC register writing value	≠ Reading value

Time Needed for Diagnosis:

(1): 24 ms

(2): 2984 ms = (25 + 6) × 0.008 + (4 × 25 + 4) × 0.008 + (5 × 25 + 9) × 0.008 + (2 × 25) × 0.008 + (25 + 2) × 0.008 × 2

(3): 200 ms

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

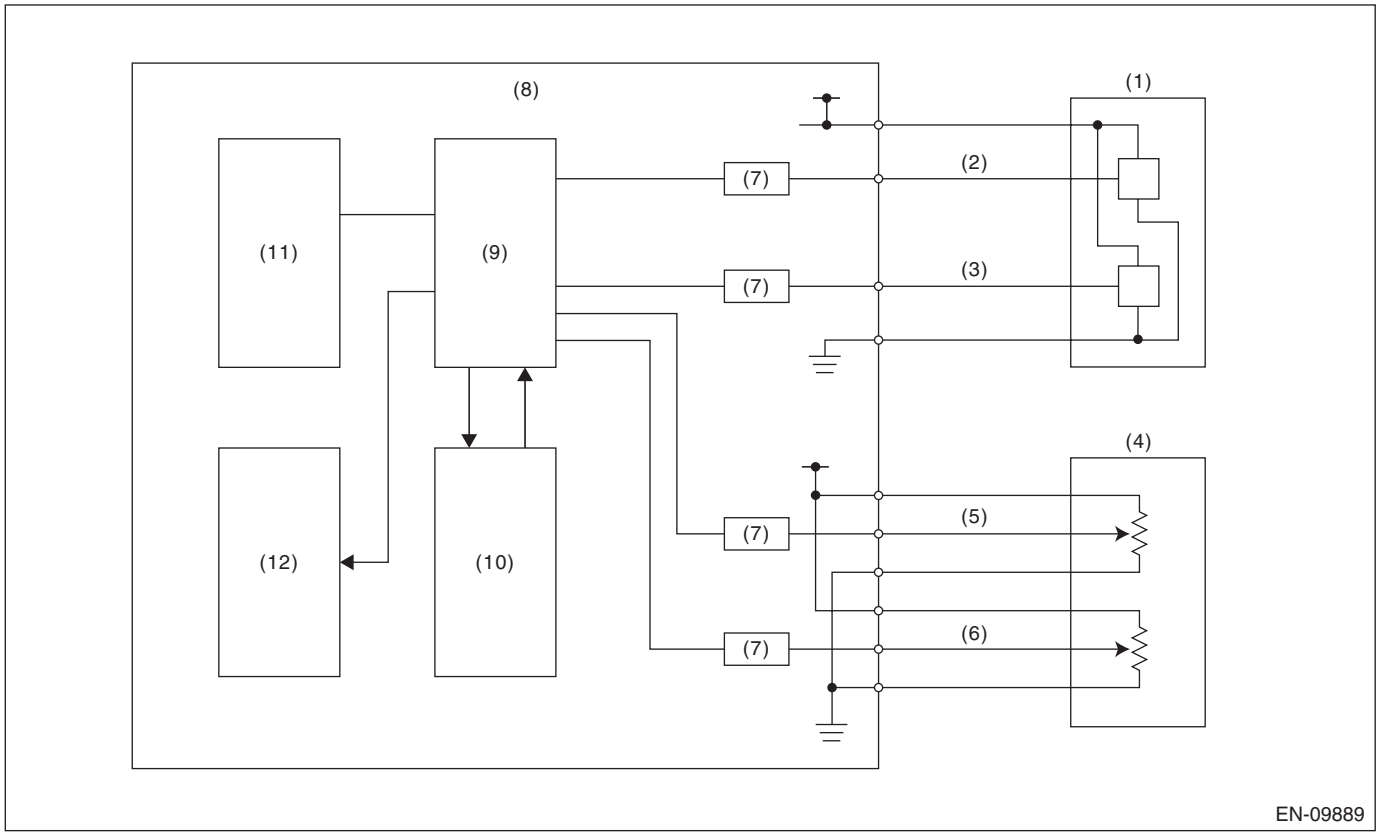
DN:DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO HEV)(diag)-394, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the AD converter operation is abnormal.

2. COMPONENT DESCRIPTION



(1)	Throttle position sensor	(5)	Accelerator pedal position sensor 1	(9)	CPU
(2)	Throttle position sensor 1	(6)	Accelerator pedal position sensor 2	(10)	Monitoring IC
(3)	Throttle position sensor 2	(7)	I/F circuit	(11)	EEPROM
(4)	Accelerator pedal position sensor	(8)	Engine control module (ECM)	(12)	Output IC

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V
Target voltage	= 0 V
Battery voltage	≥ 6 V
Target voltage	= 5 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when one of the following conditions is established.

Judgment Value

Malfunction Criteria	Threshold Value
Actual voltage	> 0.01953125 V
Actual voltage	< 4.979248047 V

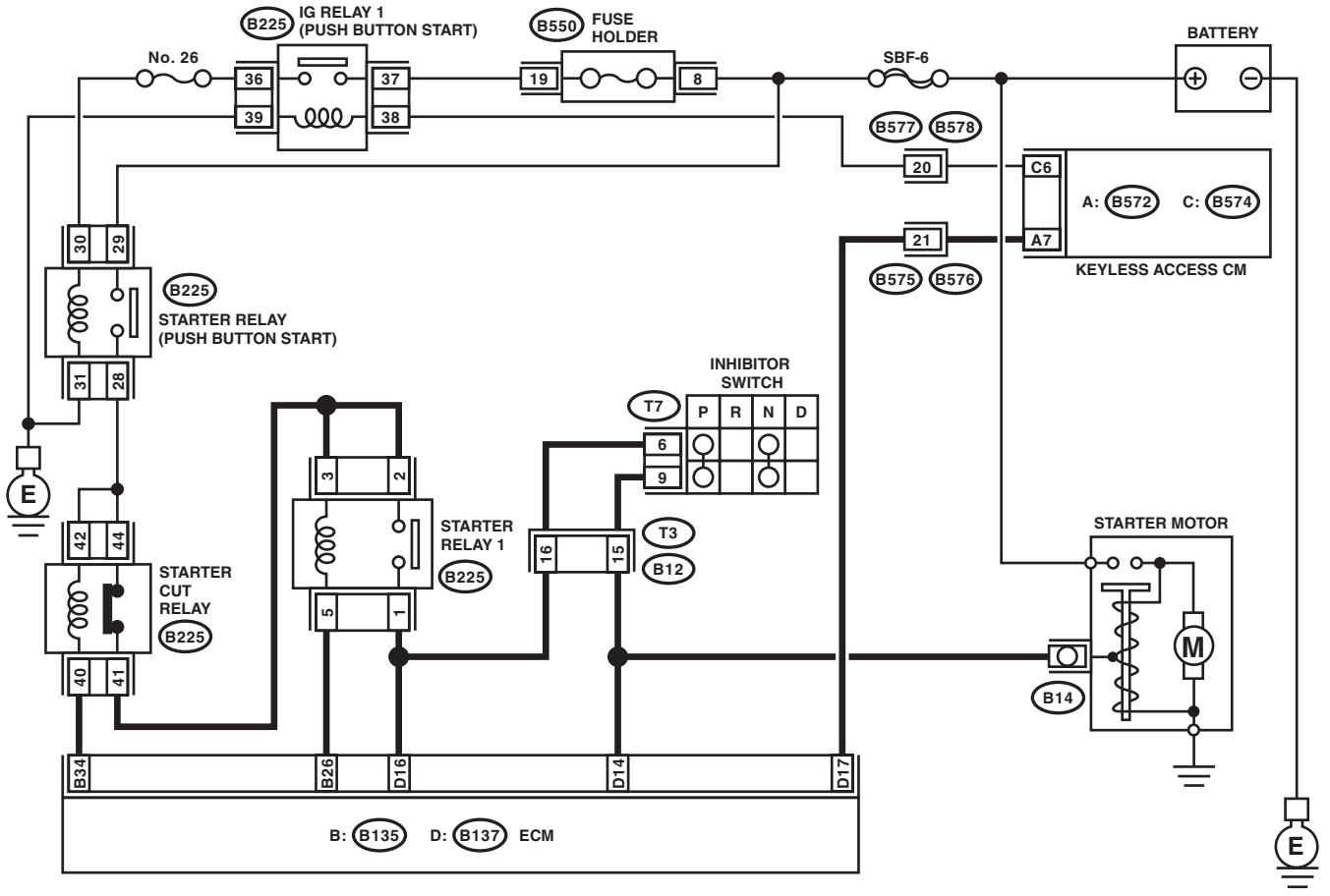
Time Needed for Diagnosis: 200 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

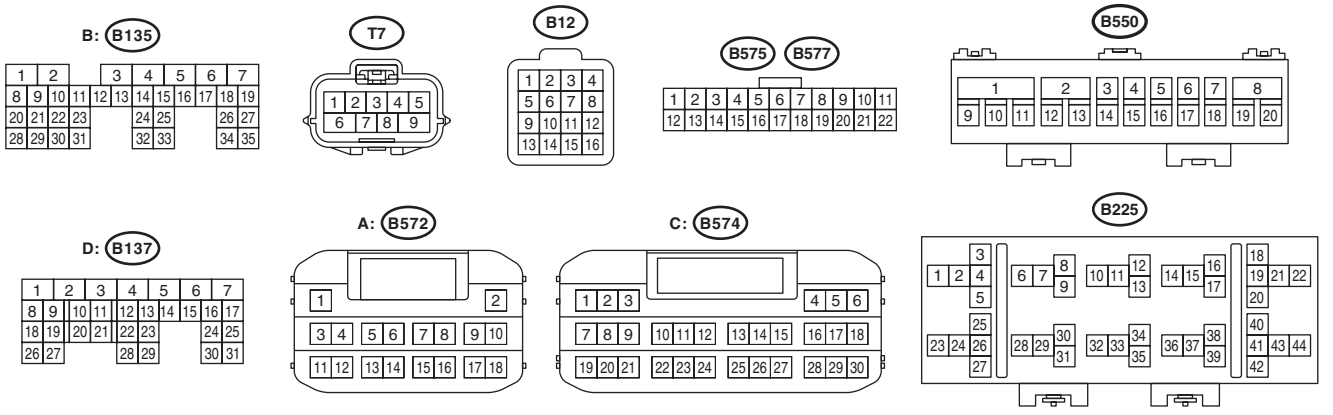
DO:DTC P0616 STARTER RELAY "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





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	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** 1) Turn the ignition to OFF. 2) Disconnect the connector from ECM. 3) Remove the starter relay 1. 4) Measure the resistance of harness between ECM connector and starter relay 1 connector. NOTE: Place the select lever in "P" range or "N" range. ***Connector & terminal*** ***(B137) No. 14 — (B225) No. 1:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and starter relay 1 connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** 1) Disconnect the connector from starter motor. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 14 — Chassis ground:***	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and starter relay 1 connector.

1. OUTLINE OF DIAGNOSIS

• Model without push button start
Detect abnormal continuity in the starter SW1.
Judge as OFF NG when the starter SW 1 signal remains OFF.
• Model with push button start
Detect abnormal continuity in the starter SW 2.
Judge as OFF NG when the starter SW 2 signal remains OFF.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Vehicle speed	< 1 km/h (0.6 MPH)
Starter relay command	ON
Engine speed	Changes from 0 rpm to 500 rpm or more

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as OFF NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Starter SW1 signal with battery voltage × 0.85 or more (models without push button start) Starter SW2 signal with battery voltage × 0.85 or more (models with push button start)	Not detected

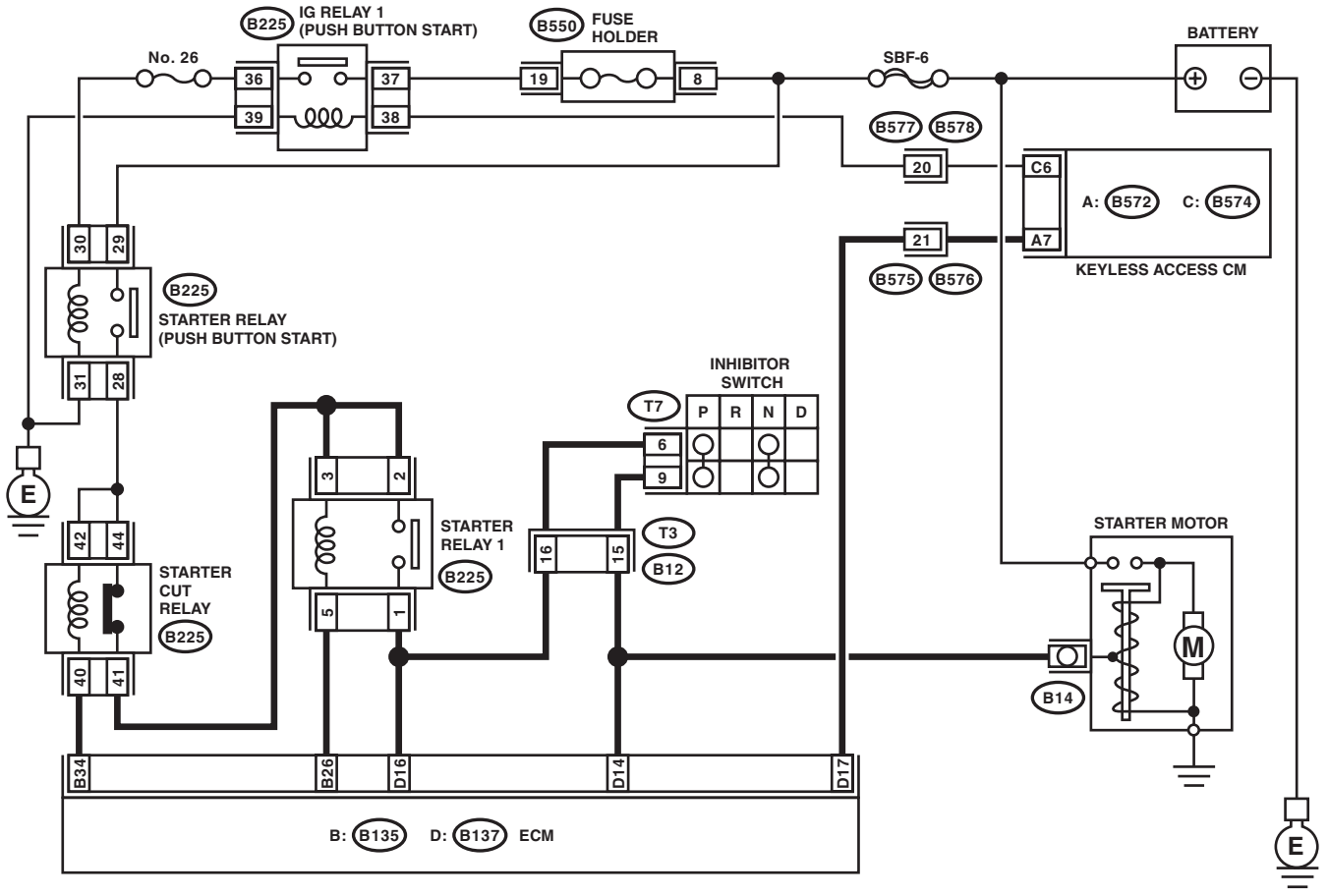
Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

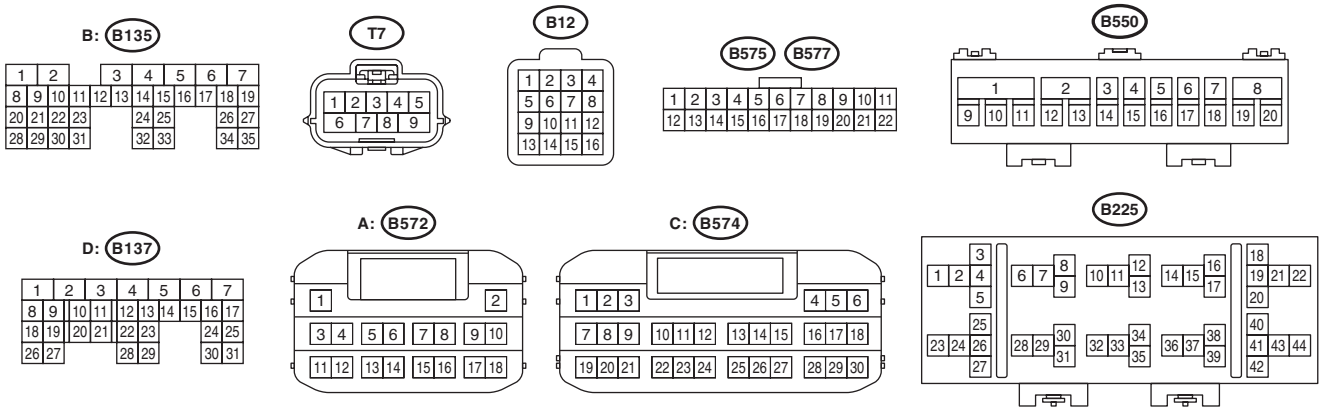
DP:DTC P0617 STARTER RELAY "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





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	Step	Check	Yes	No
1	**CHECK STARTER MOTOR.** 1) Turn the ignition to ON. 2) Check the starter motor condition.	Is the starter motor rotating?	Go to step **2**.	Repair the short circuit to power supply. NOTE: In this case, repair the following harnesses: • Short circuit to power supply in harness between ECM connector and starter relay 1 connector • Short circuit to power supply in harness between ECM connector and starter motor • Short circuit to power supply in harness between starter relay 1 connector and starter motor
2	**CHECK HARNESS BETWEEN STARTER CUT RELAY CONNECTOR AND STARTER RELAY 1 CONNECTOR.** 1) Turn the ignition to OFF. 2) Disconnect the connector from starter motor. 3) Remove the starter cut relay and starter relay 1. 4) Turn the ignition to ON. 5) Measure the voltage between starter relay 1 connector and chassis ground. ***Connector & terminal*** ***(B225) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between starter cut relay connector and starter relay 1 connector.	Go to step **3**.
3	**CHECK STARTER CUT RELAY.** 1) Connect the battery to starter cut relay terminals No. 40 and No. 42. 2) Measure the resistance between starter cut relay terminals. ***Terminals*** ***No. 41 — No. 44:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the starter cut relay. <Ref. to SL-117, Starter Cut Relay.> Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY 1 CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 26 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and starter relay 1 connector.
5	**CHECK STARTER RELAY 1.** Measure the resistance between starter relay 1 terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the starter relay 1. <Ref. to EN(H4DO HEV)(diag)-11, LOCATION, Electrical Component Location.>

Step		Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM, STARTER RELAY 1 CONNECTOR AND STARTER MOTOR.** 1) Disconnect the connector from ECM. 2) Turn the ignition to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 14 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power supply. NOTE: In this case, repair the following harnesses: • Short circuit to power supply in harness between ECM connector and starter relay 1 connector • Short circuit to power supply in harness between ECM connector and starter motor • Short circuit to power supply in harness between starter relay 1 connector and starter motor	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

• Model without push button start
Detect abnormal continuity in the starter SW1.
Judge as ON NG when the starter SW 1 signal remains ON.
• Model with push button start
Detect abnormal continuity in the starter SW 2.
Judge as ON NG when the starter SW 2 signal remains ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Engine speed	> 500 rpm
Starter relay command	OFF

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Starter SW 1 signal (model without push button start) Starter SW 2 signal (model with push button start)	≥ Battery voltage × 0.85

Time Needed for Diagnosis: 30000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

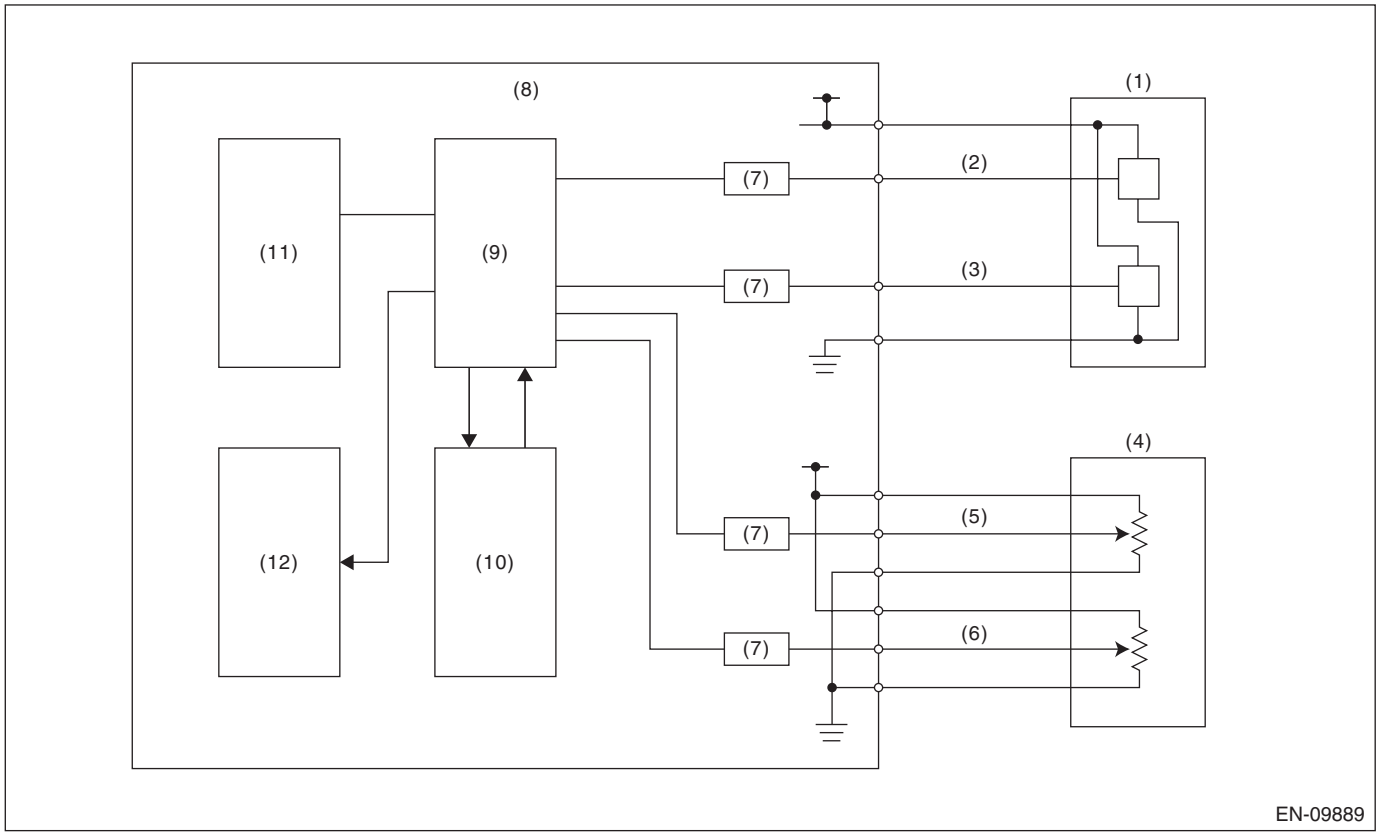
DQ:DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

NOTE:
For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO HEV)(diag)-394, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the EEPROM operation is abnormal.

2. COMPONENT DESCRIPTION



(1)	Throttle position sensor	(5)	Accelerator pedal position sensor 1	(9)	CPU
(2)	Throttle position sensor 1	(6)	Accelerator pedal position sensor 2	(10)	Monitoring IC
(3)	Throttle position sensor 2	(7)	I/F circuit	(11)	EEPROM
(4)	Accelerator pedal position sensor	(8)	Engine control module (ECM)	(12)	Output IC

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Perform the diagnosis during self shut.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Writing result to EEPROM	Malfunction

Time Needed for Diagnosis: 2 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DR:DTC P0685 ECM/PCM POWER RELAY CONTROL CIRCUIT/OPEN

DTC DETECTING CONDITION:

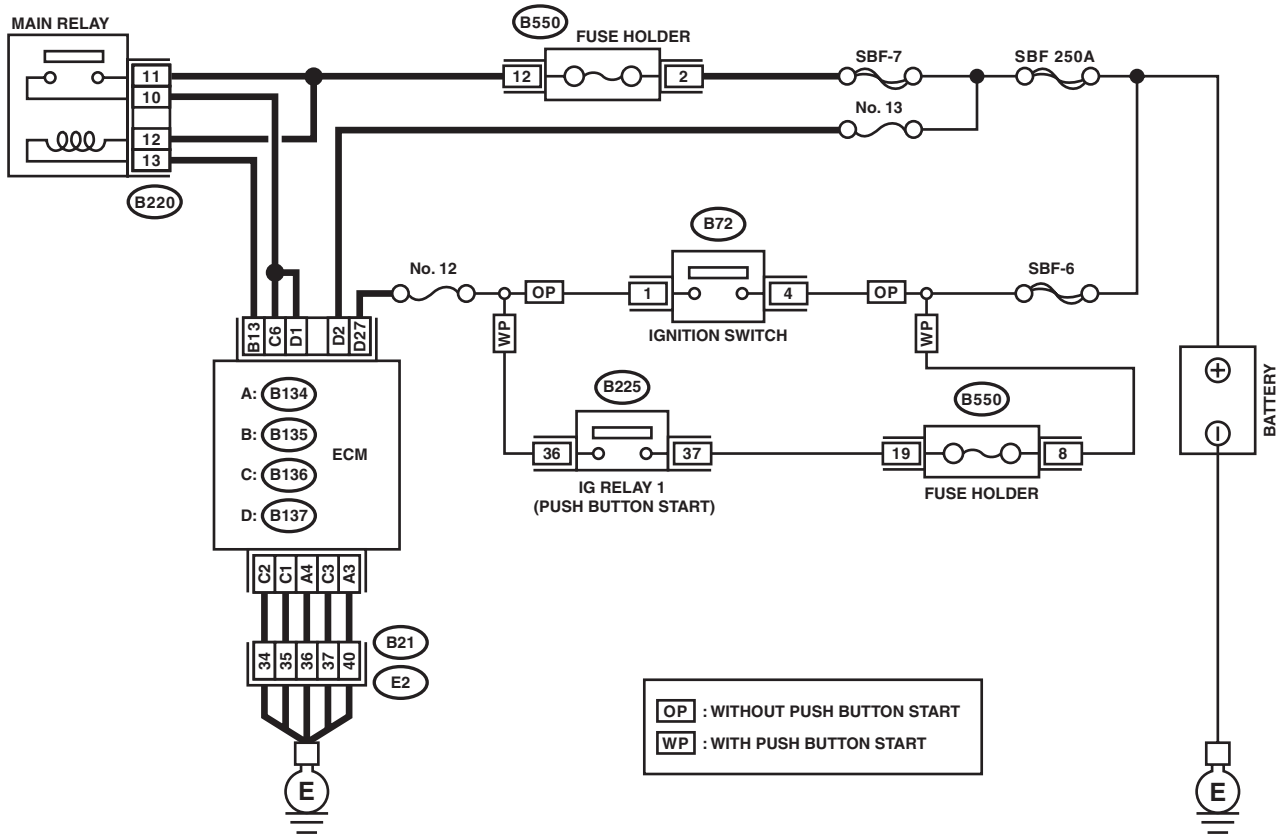
Detected when two consecutive driving cycles with fault occur.

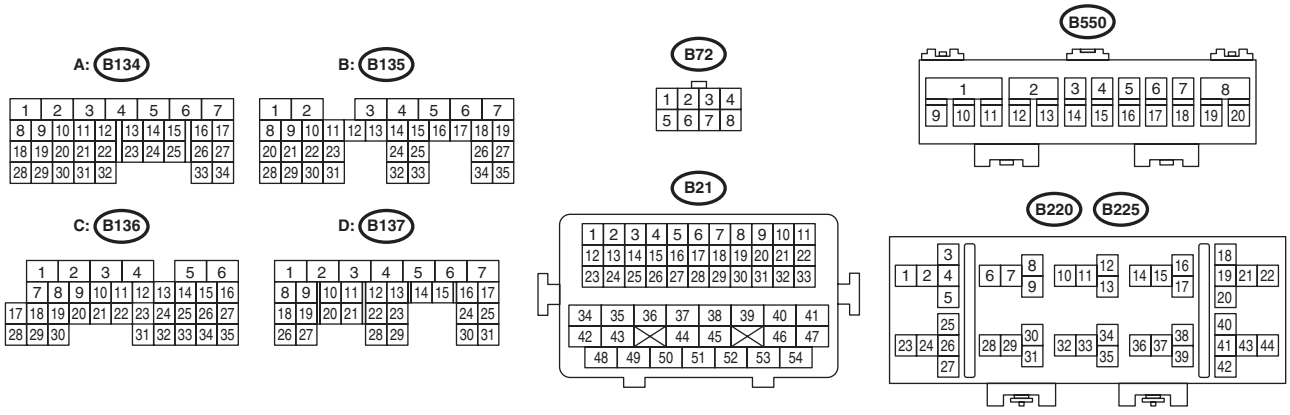
CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





EN-10733

	Step	Check	Yes	No
1	**CHECK ECM CONNECTOR.** Check the connecting condition of ECM connector.	Is the ECM connector correctly connected?	Go to step **2**.	Connect the ECM connector correctly.
2	**CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and engine ground. ***Connector & terminal*** ***(B136) No. 6 (+) — Engine ground (–):*** ***(B137) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the harness and connector. NOTE: In this case, repair the following item: • Short circuit to power supply in harness between ECM connector and main relay connector • Defective main relay	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Remove the main relay. 3) Disconnect the connector from ECM. 4) Measure the resistance between the ECM connector and engine ground. ***Connector & terminal*** ***(B135) No. 13 — Engine ground:***	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and main relay connector.

1. OUTLINE OF DIAGNOSIS

Detect the main relay stuck to ON.
Judge as NG when ECM keeps operating for more than predetermined time although the main relay does not turn to OFF after ignition switch is turned to OFF.

2. COMPONENT DESCRIPTION

The main relay controls current of coils by receiving instructions from the ignition switch and ELCM to switch ECM to ON/OFF.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Main relay	OFF instruction

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when the enable conditions are established with the ignition switch OFF → ON.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ECM status	In operation

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

DS:DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST)

NOTE:
For the diagnostic procedure, refer to CVT section. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Judge as NG when there is CAN communication with the TCM and there is a MIL lighting request.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
MIL lighting request from TCM	Yes

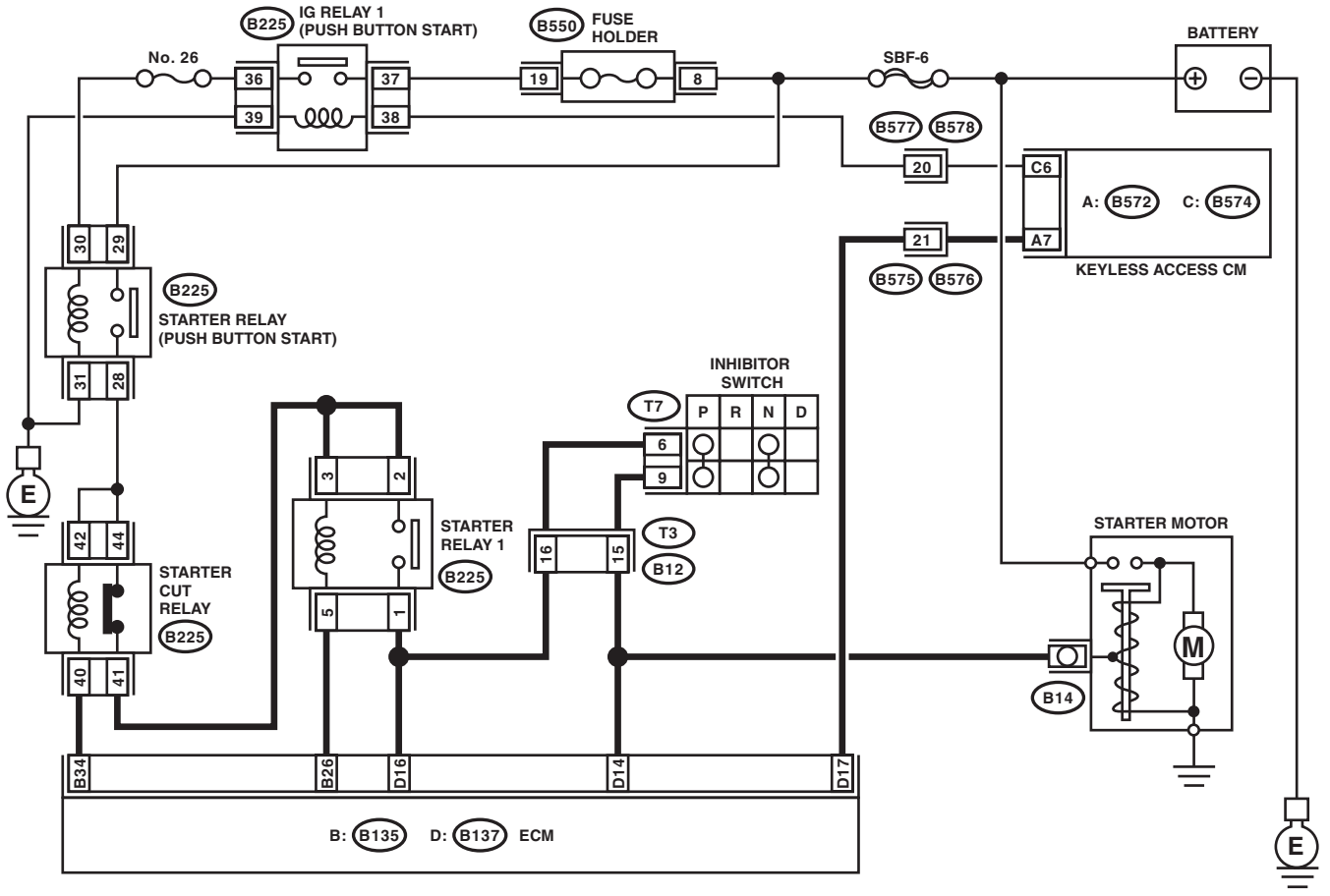
Time Needed for Diagnosis: 128 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

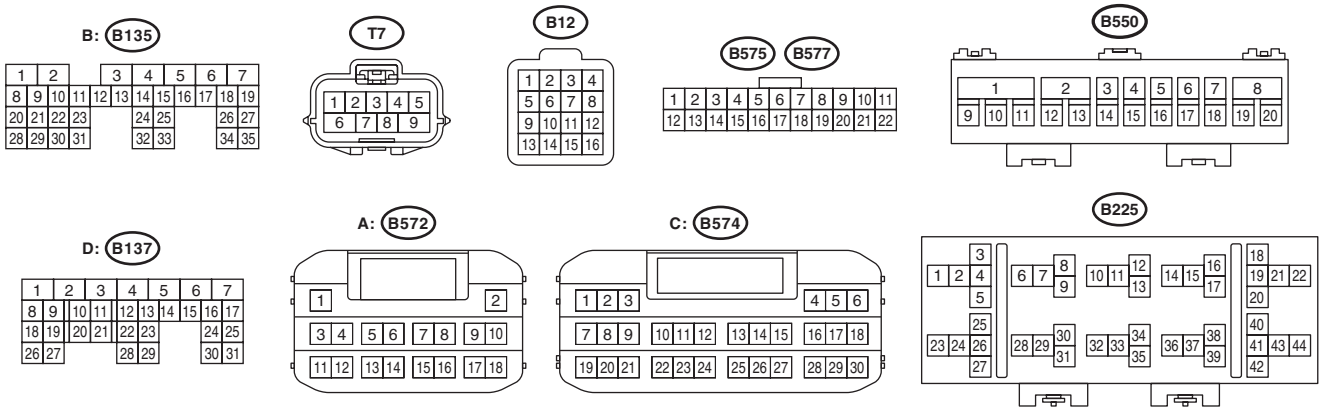
DT:DTC P081A STARTER DISABLE CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Failure of engine to start

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





EN-10732

	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND STARTER CUT RELAY CONNECTOR.** 1) Turn the ignition to OFF. 2) Remove the starter relay (push button start) and starter cut relay. 3) Measure the resistance of harness between starter relay (push button start) connector and starter cut relay connector. ***Connector & terminal*** ***(B225) No. 28 — (B225) No. 42:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit in harness between starter relay (push button start) connector and starter cut relay connector.
2	**CHECK HARNESS BETWEEN ECM AND STARTER CUT RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and starter cut relay connector. ***Connector & terminal*** ***(B135) No. 34 — (B225) No. 40:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness between ECM connector and starter cut relay connector.
3	**CHECK STARTER CUT RELAY.** 1) Connect the battery to starter cut relay terminals No. 40 and No. 42. 2) Measure the resistance between starter cut relay terminals. ***Terminals*** ***No. 41 — No. 44:***	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Replace the starter cut relay. <Ref. to SL-117, Starter Cut Relay.>

1. OUTLINE OF DIAGNOSIS

Detect abnormal continuity in the starter cut relay.
Judge as NG when the starter cut relay output line is open.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 8 V
Engine speed	Changes from 0 rpm to 500 rpm or more
Vehicle speed	< 1 km/h (0.6 MPH)
Starter cut relay command	OFF

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

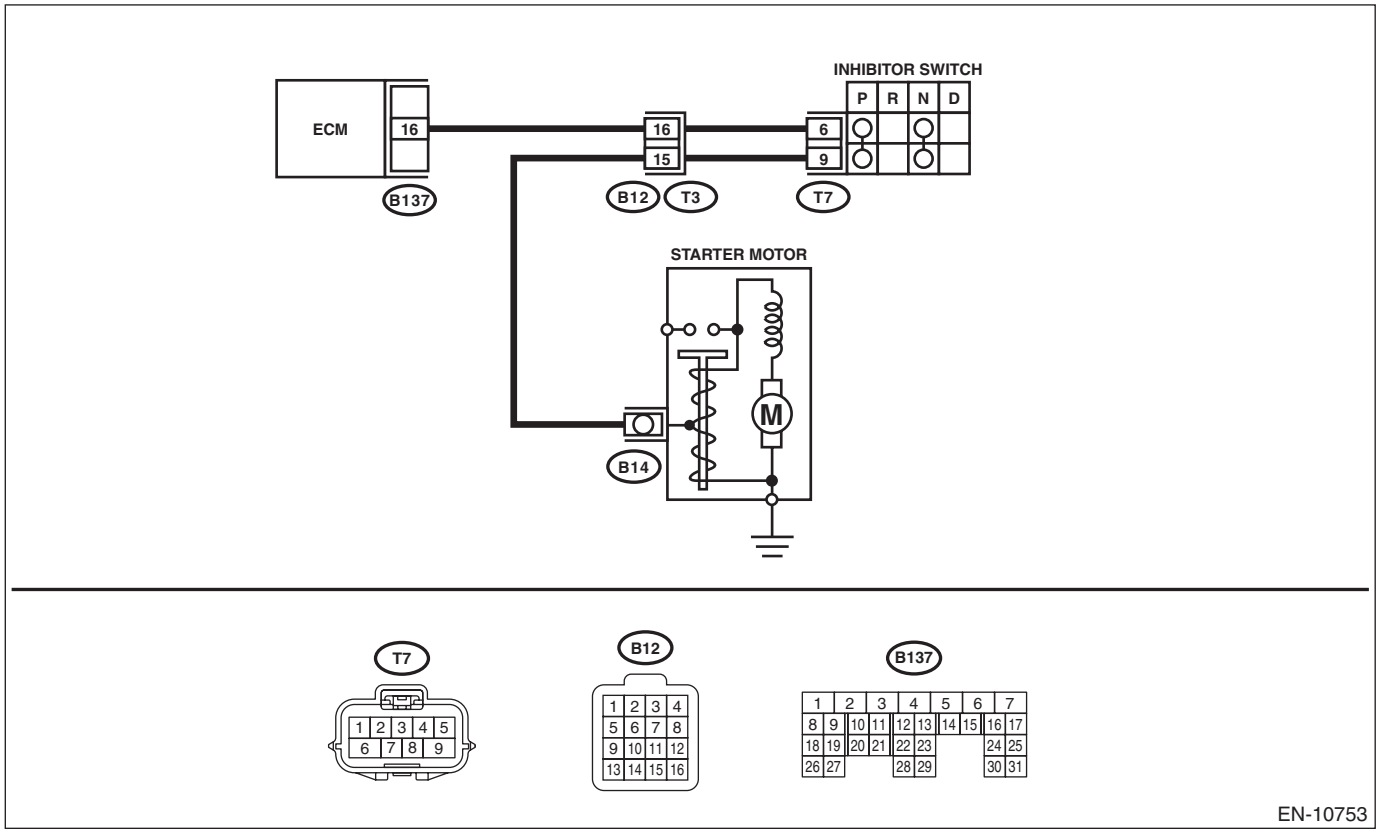
Malfunction Criteria	Threshold Value
Starter cut relay terminal voltage	> Battery voltage × 0.34 is not experienced

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DU:DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK SELECT CABLE.**	Is there any fault in select cable?	Repair or adjust the select cable. <Ref. to CS-51, Select Cable.>	Go to step **2**.
2	**CHECK INPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Place the select lever in other than "P" range and "N" range. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND TRANSMISSION HARNESS CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and transmission harness connector (T3). 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in harness between ECM connector and transmission harness connector.
4	**CHECK TRANSMISSION HARNESS CONNECTOR.** 1) Disconnect the connector from inhibitor switch. 2) Measure the resistance between transmission harness connector and engine ground. ***Connector & terminal*** ***(T3) No. 16 — Engine ground:***	Is the resistance 1 MΩ or more?	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>	Repair short circuit to ground in harness between transmission harness connector and inhibitor switch connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of neutral SW.
Judge as NG when the ECM neutral terminal input differs from the reception data from TCM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Starter relay feedback voltage	< Battery voltage × 0.35
“P” range/“N” range of TCM	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

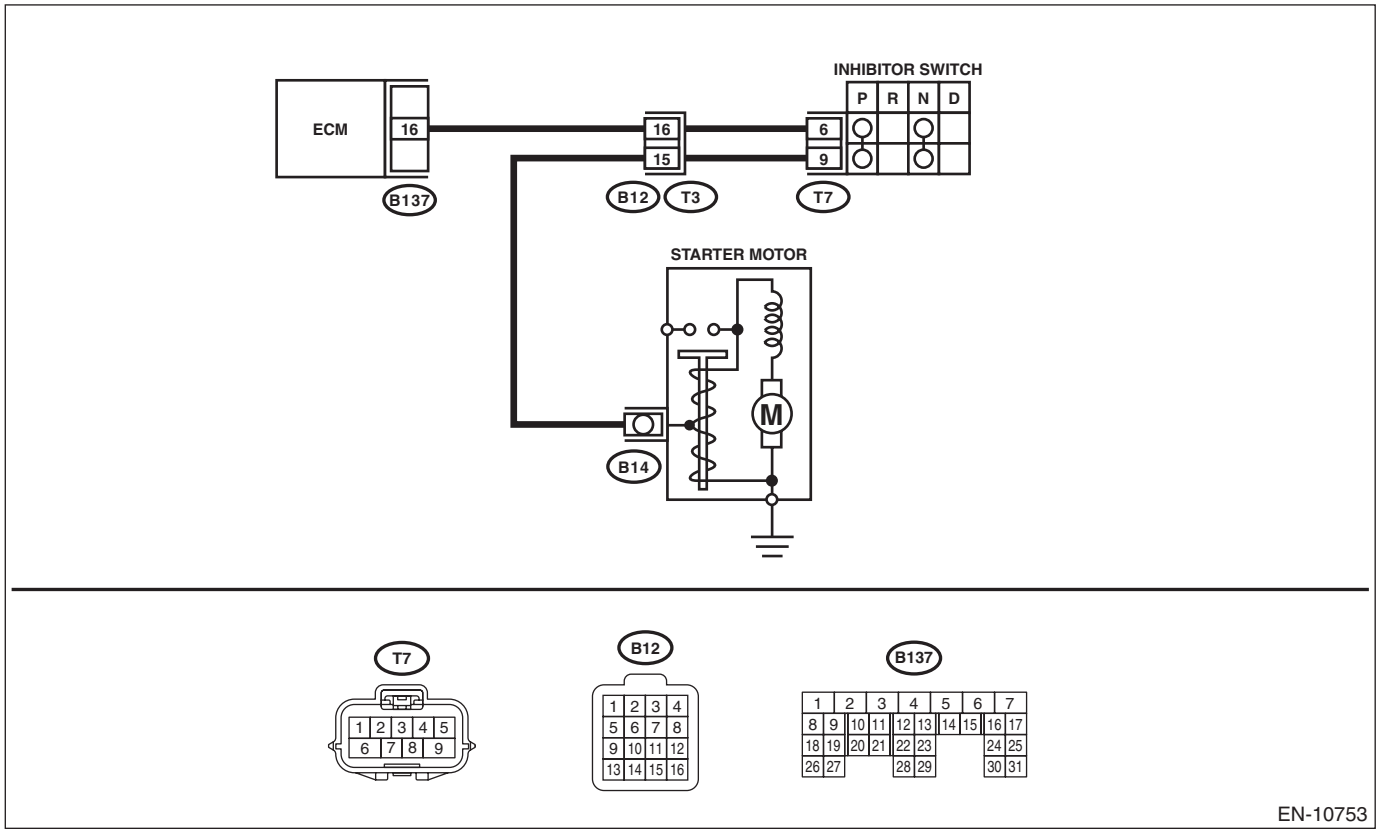
Malfunction Criteria	Threshold Value
Voltage of the neutral position switch signal	≤ Battery voltage × 0.19

Time Needed for Diagnosis: 64 ms × 100 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

DV:DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK SELECT CABLE.**	Is there any fault in select cable?	Repair or adjust the select cable. <Ref. to CS-51, Select Cable.>	Go to step **2**.
2	**CHECK INPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground with select lever at "P" range and "N" range. ***Connector & terminal*** ***(B137) No. 16 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Repair the poor contact of ECM connector.	Go to step **3**.

Step		Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and inhibitor switch. 3) Measure the resistance of harness between ECM connector and inhibitor switch connector. ***Connector & terminal*** ***(B137) No. 16 — (T7) No. 6:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and inhibitor switch connector • Poor contact of coupling connector
4	**CHECK INHIBITOR SWITCH GROUND LINE.** Measure the resistance of harness between inhibitor switch connector and engine ground. ***Connector & terminal*** ***(T7) No. 9 — Engine ground:***	Is the resistance less than 5 Ω?	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between inhibitor switch connector and starter motor ground line • Poor contact of coupling connector • Poor contact of starter motor connector • Poor contact of starter motor ground • Starter motor

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of neutral SW.
Judge as NG when the ECM neutral terminal input differs from the reception data from TCM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Starter relay feedback voltage	< Battery voltage × 0.35
"P" range/"N" range of TCM	ON

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of the neutral position switch signal	≥ Battery voltage × 0.6

Time Needed for Diagnosis: 64 ms × 100 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

DW:DTC P0A7B BATTERY ENERGY CONTROL MODULE REQUEST MIL ILLUMINATION

NOTE:
Refer to HEV section for diagnostic procedure. <Ref. to HEV(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Judge as NG when MIL lighting request comes from BECM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
MIL lighting request from BECM	Yes

Time Needed for Diagnosis: 128 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DX:DTC P0AC4 HYBRID POWERTRAIN CONTROL MODULE REQUEST MIL ILLUMINATION

NOTE:
Refer to HEV section for diagnostic procedure. <Ref. to HEV(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Judge as NG when MIL lighting request comes from HPCM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
MIL lighting request from HPCM	Yes

Time Needed for Diagnosis: 128 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DY:DTC P0CA1 DRIVE MOTOR CONTROL MODULE REQUEST MIL ILLUMINATION

NOTE:
Refer to HEV section for diagnostic procedure. <Ref. to HEV(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Judge as NG when MIL lighting request comes from DMCM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
MIL lighting request from DMCM	Yes

Time Needed for Diagnosis: 128 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

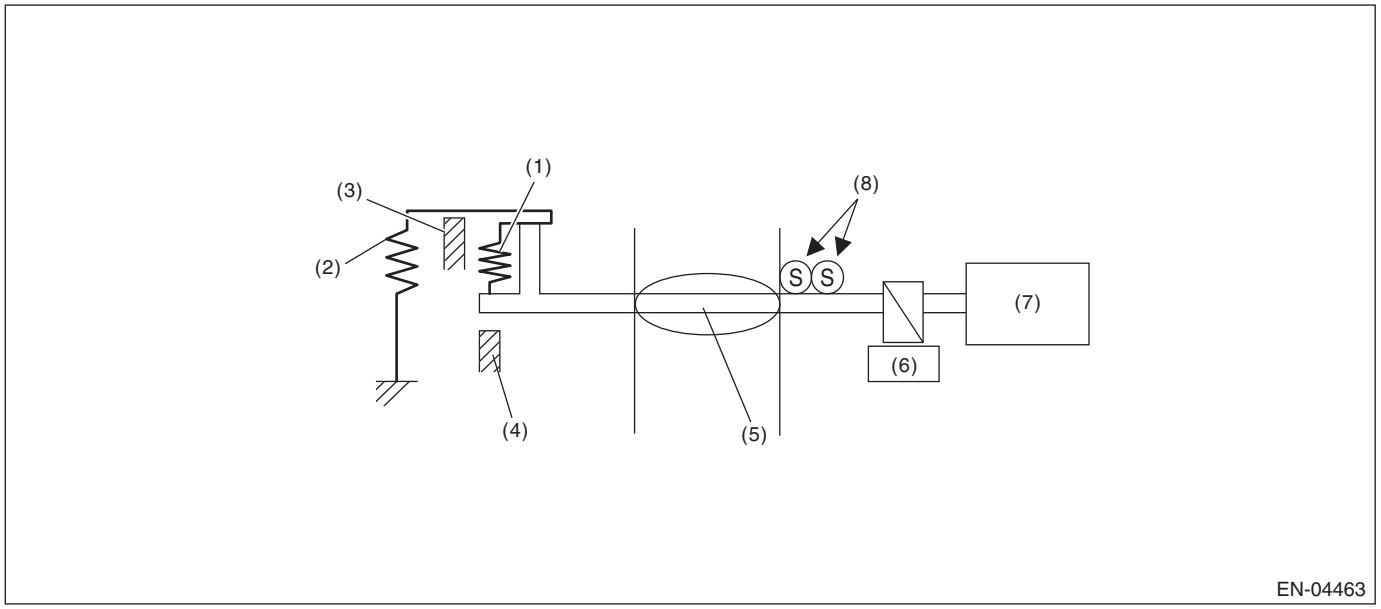
DZ:DTC P1160 THROTTLE RETURN SPRING

NOTE:
For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO HEV)(diag)-456, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the valve is opened more than the default opening angle, but does not move to the close direction with the motor power stopped.

2. COMPONENT DESCRIPTION



(1) Opener spring
(2) Return spring
(3) Intermediate stopper
(4) Full closed stopper
(5) Throttle valve
(6) Gear
(7) DC motor
(8) Main and sub throttle position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V
Ignition switch	OFF
Elapsed time after motor continuity OFF	= 1.6 s

4. GENERAL DRIVING CYCLE

- Ignition switch ON → OFF
- Ignition switch OFF → ON (Only after clearing memory)

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Change of the opening angle after the motor current is cut OFF	< 2 °

Time Needed for Diagnosis: Less than 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EA:DTC P1449 EVAP SYSTEM CLOG DETECTED (AIR FILTER)

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

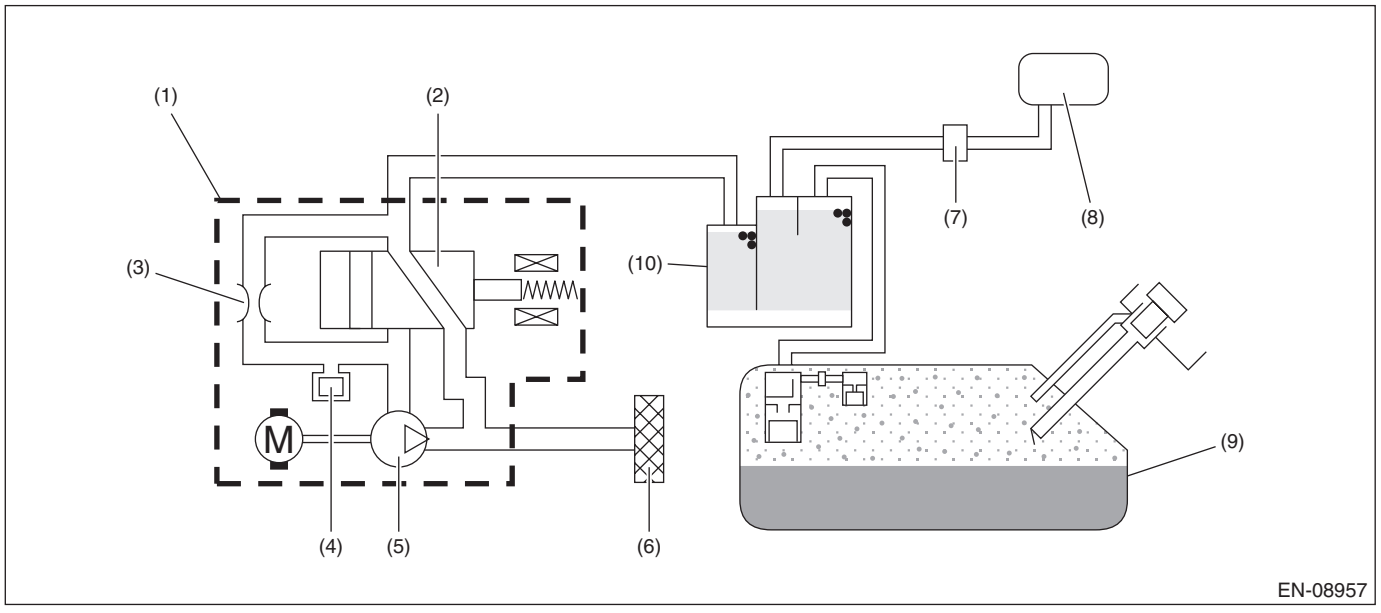
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	CHECK DRAIN FILTER AND DRAIN TUBE.	Is the drain filter or drain tube clogged?	Replace the drain filter. <Ref. to EC(H4DO(HEV))-38, Drain Filter.>	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the drain filter clogging by the pressure change during purge introduction.
Judge as drain filter clogging malfunction if the pressure in the evaporative emission system piping suddenly decreases by the purging.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

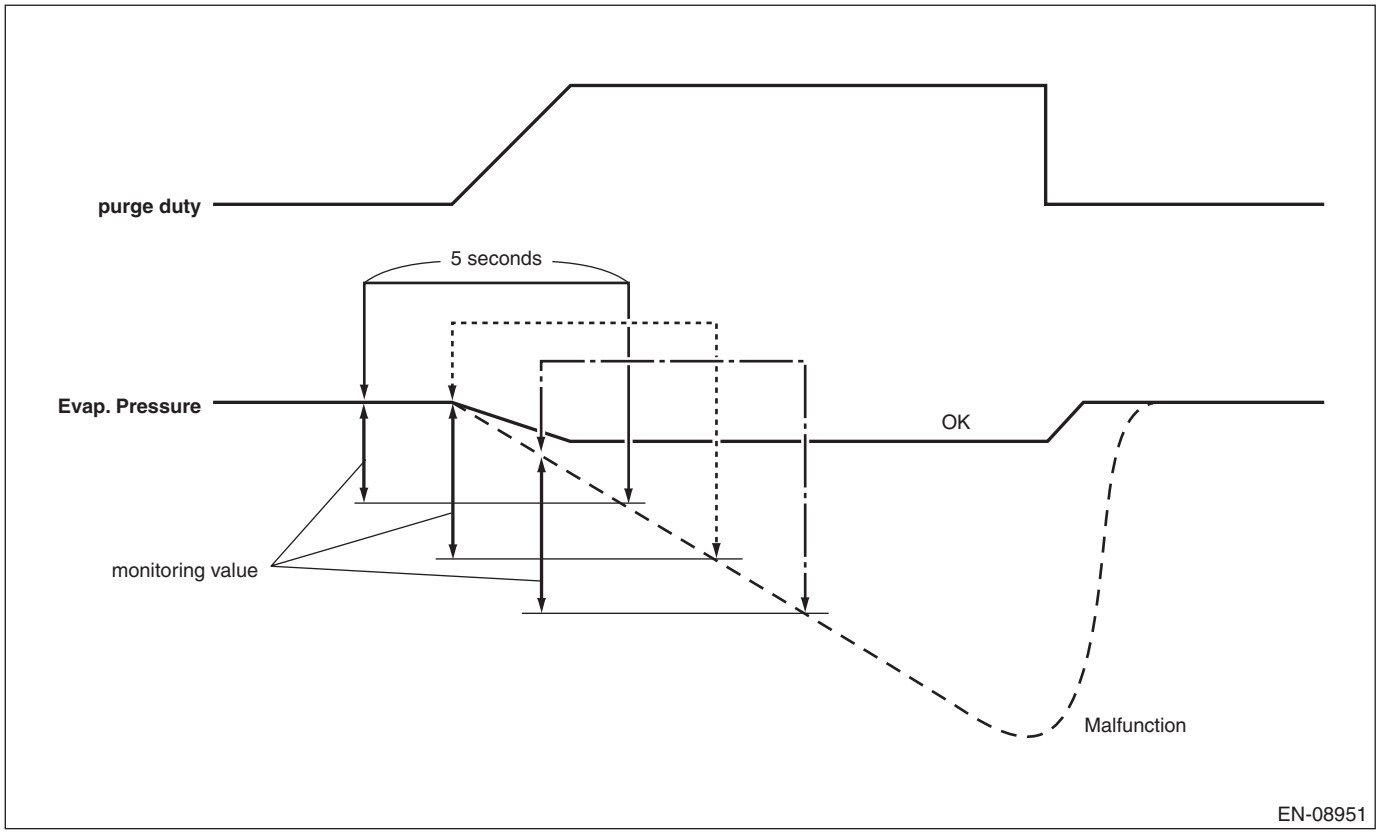
3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Elapsed time after ignition is turned to ON	≥ 20000 ms
ELCM vacuum pump	Not in operation
ELCM switching valve	Open

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when purging is performed after 20000 ms have passed since the engine started.

5. DIAGNOSTIC METHOD



Calculate the difference between the ELCM pressure sensor output value as of 5 seconds ago and the current one, and if the value is greater than judgment value, detect and judge as filter clogging trouble.
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
|Pressure sensor output value as of 5 seconds ago – Current pressure sensor output value|	> Value from Map
Number of above conditions established	≥ 2 time(s)

Map

Vehicle speed km/h (MPH)	0 (0)	20 (12.4)	40 (24.9)	60 (37.3)	80 (49.7)	100 (62.1)	120 (74.6)	300 (186.4)
|Pressure sensor output value as of 5 seconds ago – Current pressure sensor output value| kPa (mmHg, inHg)	1.1 (8.055, 0.3)	1.1 (8.055, 0.3)	1.1 (8.055, 0.3)	1.1 (8.055, 0.3)	1.1 (8.055, 0.3)	1.1 (8.055, 0.3)	1.1 (8.055, 0.3)	2.1 (15.99, 0.6)

Time Needed for Diagnosis: Approx. 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

EB:DTC P1451 EVAP SYSTEM CLOG DETECTED (PIPE)

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK DRAIN TUBE BETWEEN CANISTER AND LEAK CHECK VALVE ASSEMBLY.**	Is the drain tube between canister and leak check valve assembly clogged?	Replace the drain tube between the canister and leak check valve assembly. <Ref. to EC(H4DO(HEV))-9, Canister.> <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>	Go to step **2**.
2	**CHECK HOSES BETWEEN CANISTER AND FUEL TANK.**	Are the hoses between the canister and fuel tank clogged?	Replace the hoses between the canister and fuel tank. <Ref. to EC(H4DO(HEV))-9, Canister.> <Ref. to FU(H4DO(HEV))-106, Fuel Tank.>	Replace the canister. <Ref. to EC(H4DO(HEV))-9, Canister.> After the operation is complete, go to the next step. Go to step **3**.
3	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM.** Perform drive cycle I. <Ref. to EN(H4DO HEV)(diag)-61, DRIVE CYCLE I, PROCEDURE, Drive Cycle.>	Is DTC P1451 displayed on the display?	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>	End.

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P0455. <Ref. to EN(H4DO HEV)(diag)-335, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

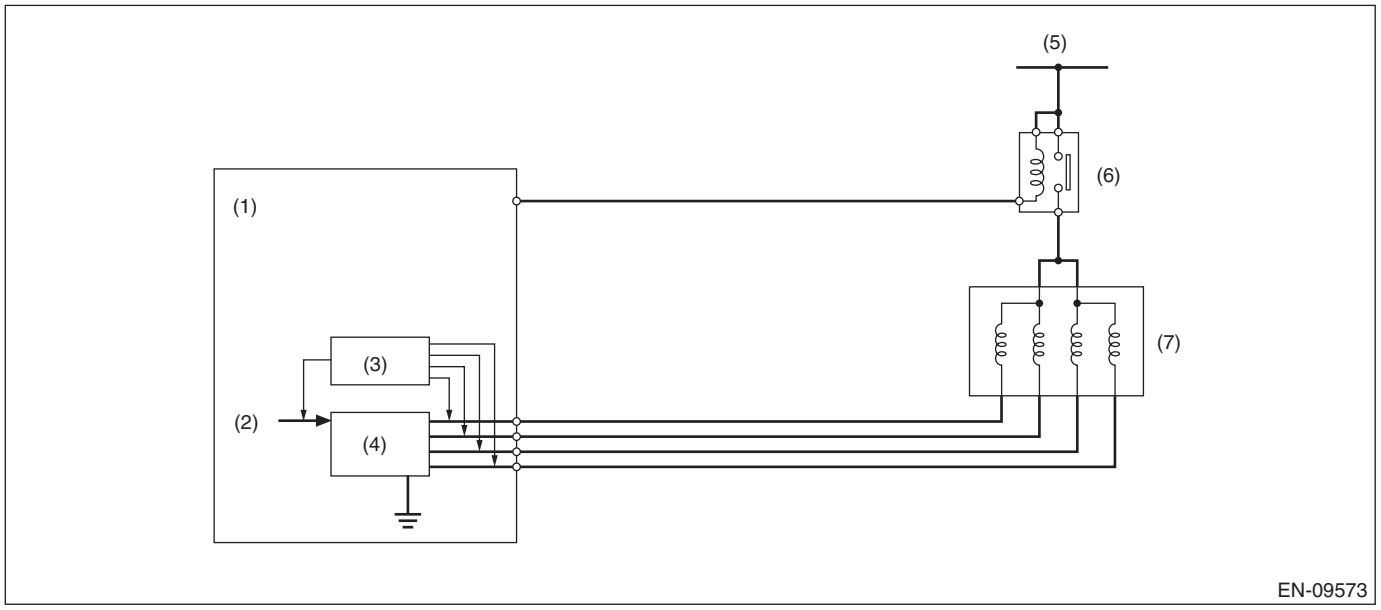
EC:DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW

NOTE:
For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO HEV)(diag)-430, DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detects open or short circuit of EGR.
- Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Computer unit (CPU)
(3) Detecting circuit
(4) Switch circuit
(5) Battery voltage
(6) Main relay
(7) EGR control valve

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
EGR drive signal	OFF

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously during EGR operation.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
EGR terminal voltage	≤ Battery voltage × 0.34

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

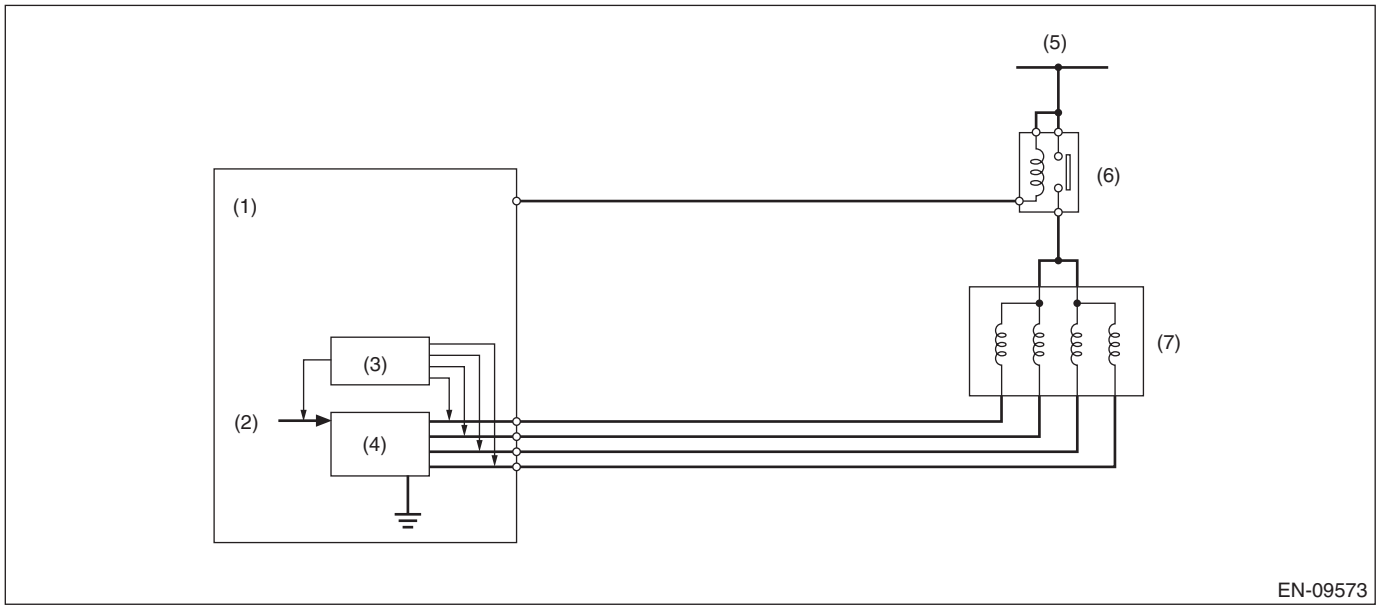
ED:DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH

NOTE:
For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO HEV)(diag)-432, DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detects open or short circuit of EGR.
- Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Computer unit (CPU)
(3) Detecting circuit
(4) Switch circuit
(5) Battery voltage
(6) Main relay
(7) EGR control valve

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
EGR drive signal	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
EGR terminal current	≥ 6 A

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EE:DTC P1494 COIL 2 EGR "A" CONTROL CIRCUIT LOW

NOTE:
For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO HEV)(diag)-430, DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P1492. <Ref. to EN(H4DO HEV)(diag)-427, DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EF:DTC P1495 COIL 2 EGR "A" CONTROL CIRCUIT HIGH

NOTE:
For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO HEV)(diag)-432, DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P1493. <Ref. to EN(H4DO HEV)(diag)-428, DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EG:DTC P1496 COIL 3 EGR "A" CONTROL CIRCUIT LOW

NOTE:
For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO HEV)(diag)-430, DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P1492. <Ref. to EN(H4DO HEV)(diag)-427, DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EH:DTC P1497 COIL 3 EGR "A" CONTROL CIRCUIT HIGH

NOTE:
For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO HEV)(diag)-432, DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

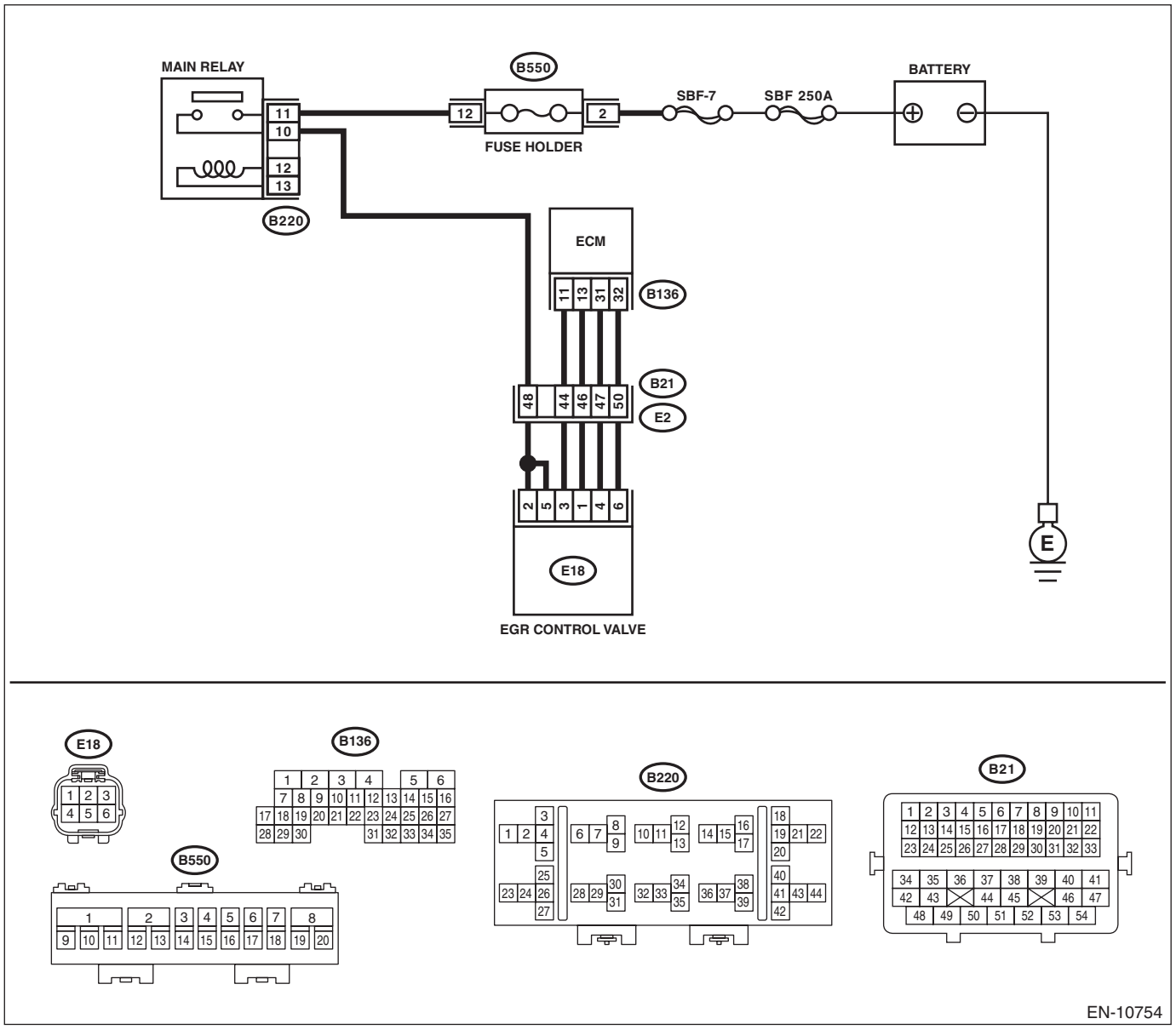
NOTE:
For the detection standard, refer to DTC P1493. <Ref. to EN(H4DO HEV)(diag)-428, DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EI: DTC P1498 COIL 4 EGR "A" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine breathing

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK POWER SUPPLY TO EGR CONTROL VALVE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the EGR control valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between EGR control valve connector and engine ground. ***Connector & terminal*** ***(E18) No. 2 (+) — Engine ground (–):*** ***(E18) No. 5 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between EGR control valve and main relay connector • Poor contact of coupling connector
2	**CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and EGR control valve connector. ***Connector & terminal*** ***DTC P1492; (B136) No. 11 — (E18) No. 3:*** ***DTC P1494; (B136) No. 13 — (E18) No. 1:*** ***DTC P1496; (B136) No. 31 — (E18) No. 4:*** ***DTC P1498; (B136) No. 32 — (E18) No. 6:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and EGR control valve connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***DTC P1492; (B136) No. 11 — Chassis ground:*** ***DTC P1494; (B136) No. 13 — Chassis ground:*** ***DTC P1496; (B136) No. 31 — Chassis ground:*** ***DTC P1498; (B136) No. 32 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair ground short circuit of harness between ECM connector and EGR control valve connector.
4	**CHECK FOR POOR CONTACT.** Check for poor contact between ECM connector and EGR control valve connector.	Is there poor contact in ECM or EGR control valve connector?	Repair the poor contact of ECM or EGR control valve connector.	Replace EGR control valve. <Ref. to EC(H4DO(HEV))-27, EGR Control Valve.>

1. OUTLINE OF DIAGNOSIS

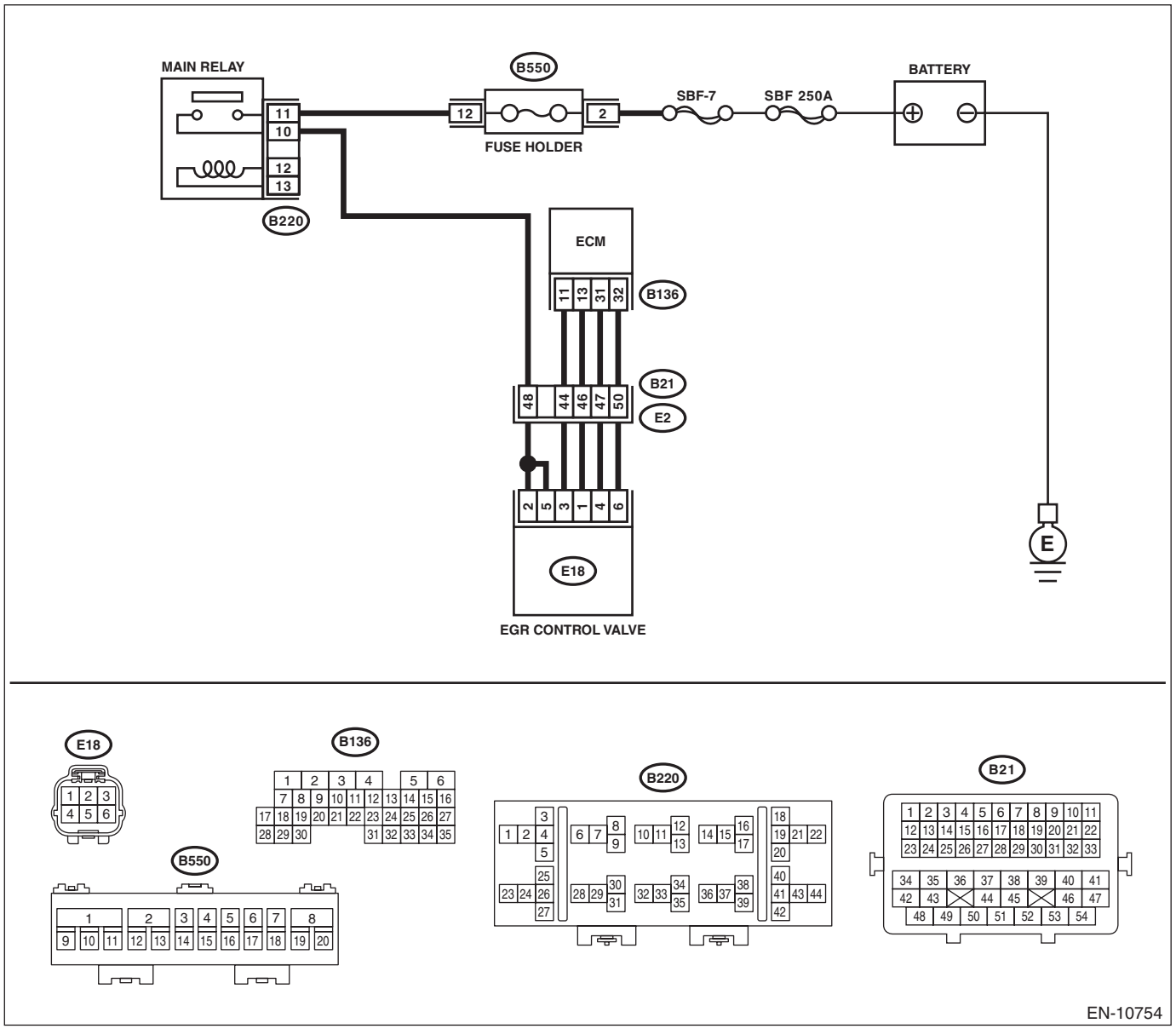
NOTE:
For the detection standard, refer to DTC P1492. <Ref. to EN(H4DO HEV)(diag)-427, DTC P1492 COIL 1 EGR "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EJ: DTC P1499 COIL 4 EGR "A" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine breathing

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and EGR control valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***DTC P1493; (B136) No. 11 (+) — Chassis ground (–):*** ***DTC P1495; (B136) No. 13 (+) — Chassis ground (–):*** ***DTC P1497; (B136) No. 31 (+) — Chassis ground (–):*** ***DTC P1499; (B136) No. 32 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power supply in the harness between the ECM connector and EGR control valve connector.	Go to step **2**.
2	**CHECK EGR CONTROL VALVE.** Measure the resistance between EGR control valve terminals. ***Terminals*** ***DTC P1493; No. 2 — No. 3:*** ***DTC P1495; No. 2 — No. 1:*** ***DTC P1497; No. 5 — No. 4:*** ***DTC P1499; No. 5 — No. 6:***	Is the resistance 20 Ω or more?	Repair the poor contact of ECM connector.	Replace EGR control valve. <Ref. to EC(H4DO(HEV))-27, EGR Control Valve.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P1493. <Ref. to EN(H4DO HEV)(diag)-428, DTC P1493 COIL 1 EGR "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EK:DTC P2004 TGV CONTROL STUCK OPEN BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE RH.** 1) Remove the tumble generator valve assembly RH. 2) Check the tumble generator valve.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve RH. <Ref. to FU(H4DO(HEV))-74, Tumble Generator Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.
Judge open fixing malfunction when the opening degree is large even after finishing the tumble generator valve closing driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Tumble generator valve "close" signal output time	≥ 1600 ms

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve	Open

Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EL:DTC P2005 TGV CONTROL STUCK OPEN BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE LH.** 1) Remove the tumble generator valve assembly LH. 2) Check the tumble generator valve.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve LH. <Ref. to FU(H4DO(HEV))-74, Tumble Generator Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.
Judge open fixing malfunction when the opening degree is large even after finishing the tumble generator valve closing driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Tumble generator valve "close" signal output time	≥ 1600 ms

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve	Open

Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EM:DTC P2006 TGV CONTROL STUCK CLOSED BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE RH.** 1) Remove the tumble generator valve assembly RH. 2) Check the tumble generator valve.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve RH. <Ref. to FU(H4DO(HEV))-74, Tumble Generator Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.
Judge close fixing malfunction when the opening degree is small even after finishing the tumble generator valve open driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Tumble generator valve "open" signal output time	≥ 1600 ms

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve	Close

Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EN:DTC P2007 TGV CONTROL STUCK CLOSED BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE LH.** 1) Remove the tumble generator valve assembly LH. 2) Check the tumble generator valve.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve LH. <Ref. to FU(H4DO(HEV))-74, Tumble Generator Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.
Judge close fixing malfunction when the opening degree is small even after finishing the tumble generator valve open driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Tumble generator valve "open" signal output time	≥ 1600 ms

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve	Close

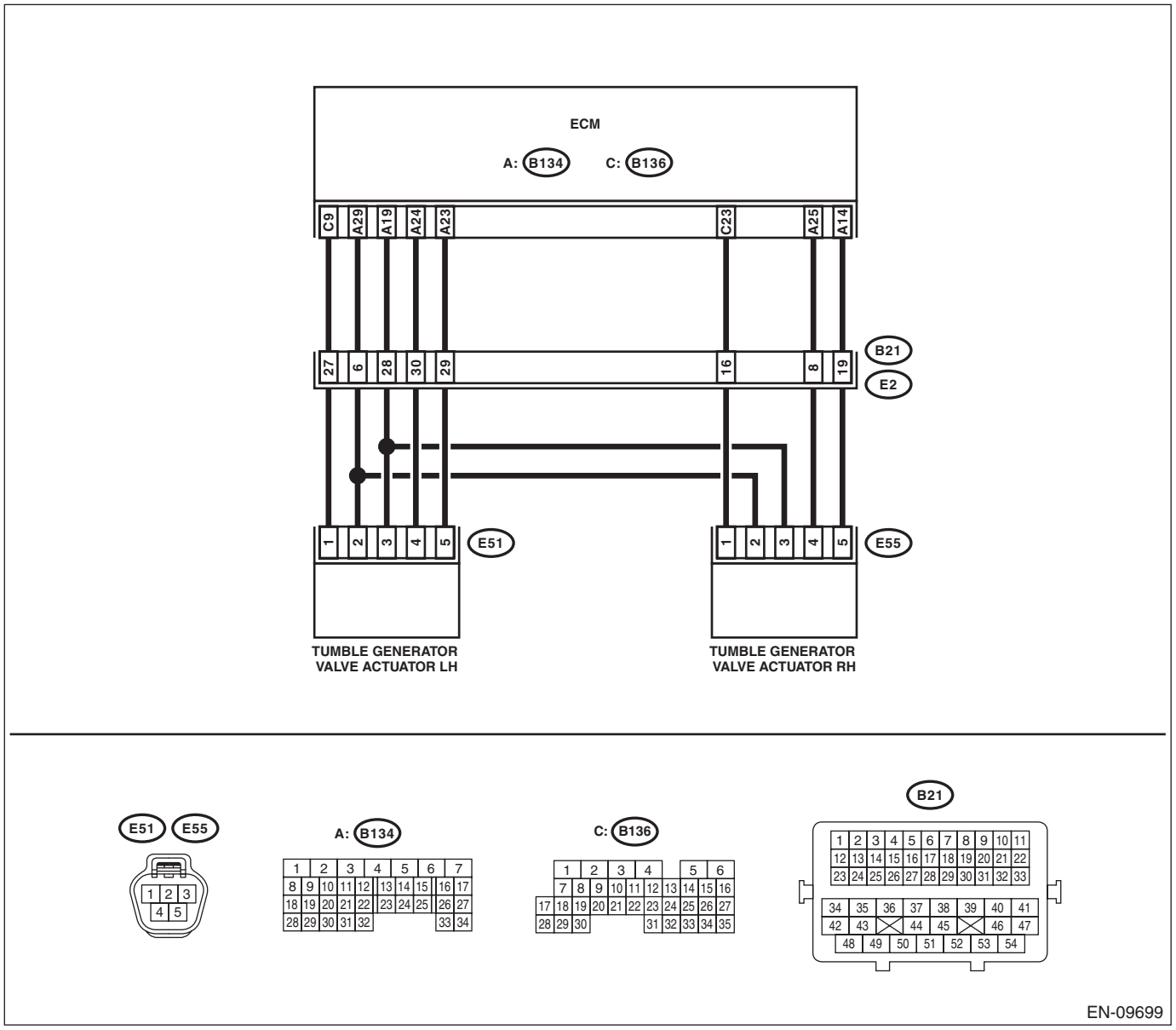
Time Needed for Diagnosis: 3000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EO:DTC P2009 TGV CONTROL CIRCUIT LOW BANK 1

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

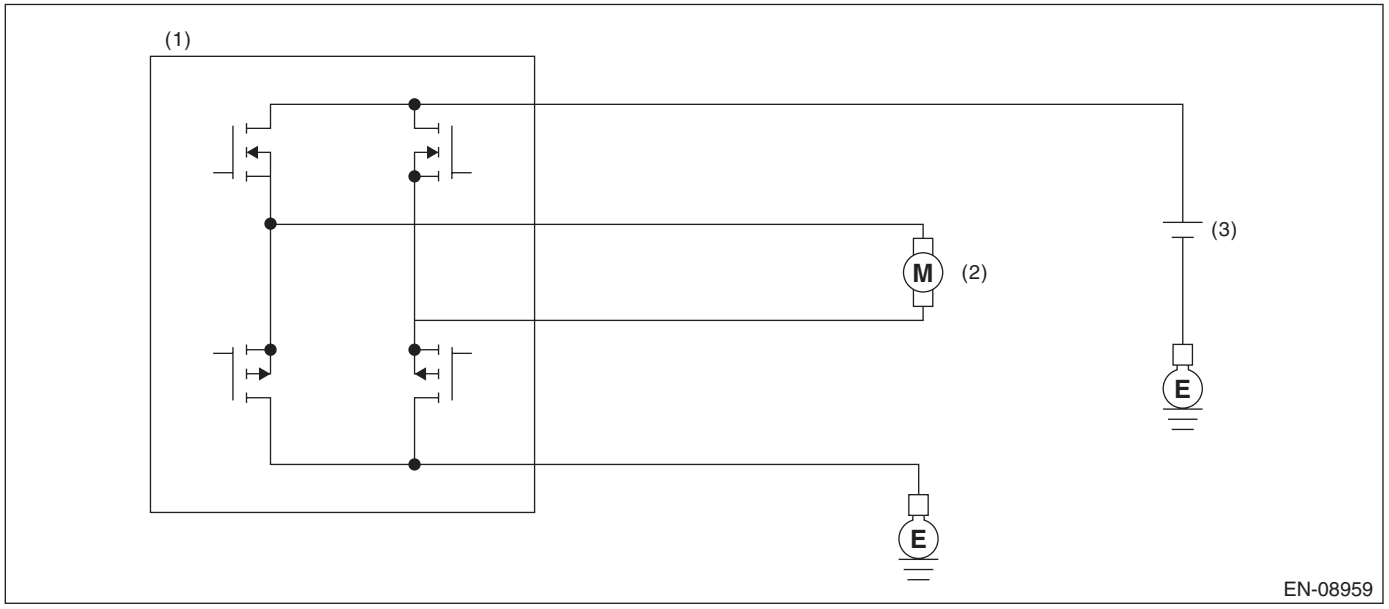


Step		Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR RH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 25 (+) — Chassis ground (–):*** ***(B134) No. 14 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and tumble generator valve actuator RH connector.	Replace the tumble generator valve actuator RH. <Ref. to FU(H4DO(HEV))-77, Tumble Generator Valve Actuator.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of tumble generator valve motor.
Judge as NG when the overcurrent signal is sent from IC after tumble generator valve driving IC diagnosis.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM) (2) Tumble generator valve (3) Battery

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Tumble generator valve instruction	Open or Closed

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Overcurrent signal from tumble generator valve drive IC	ON

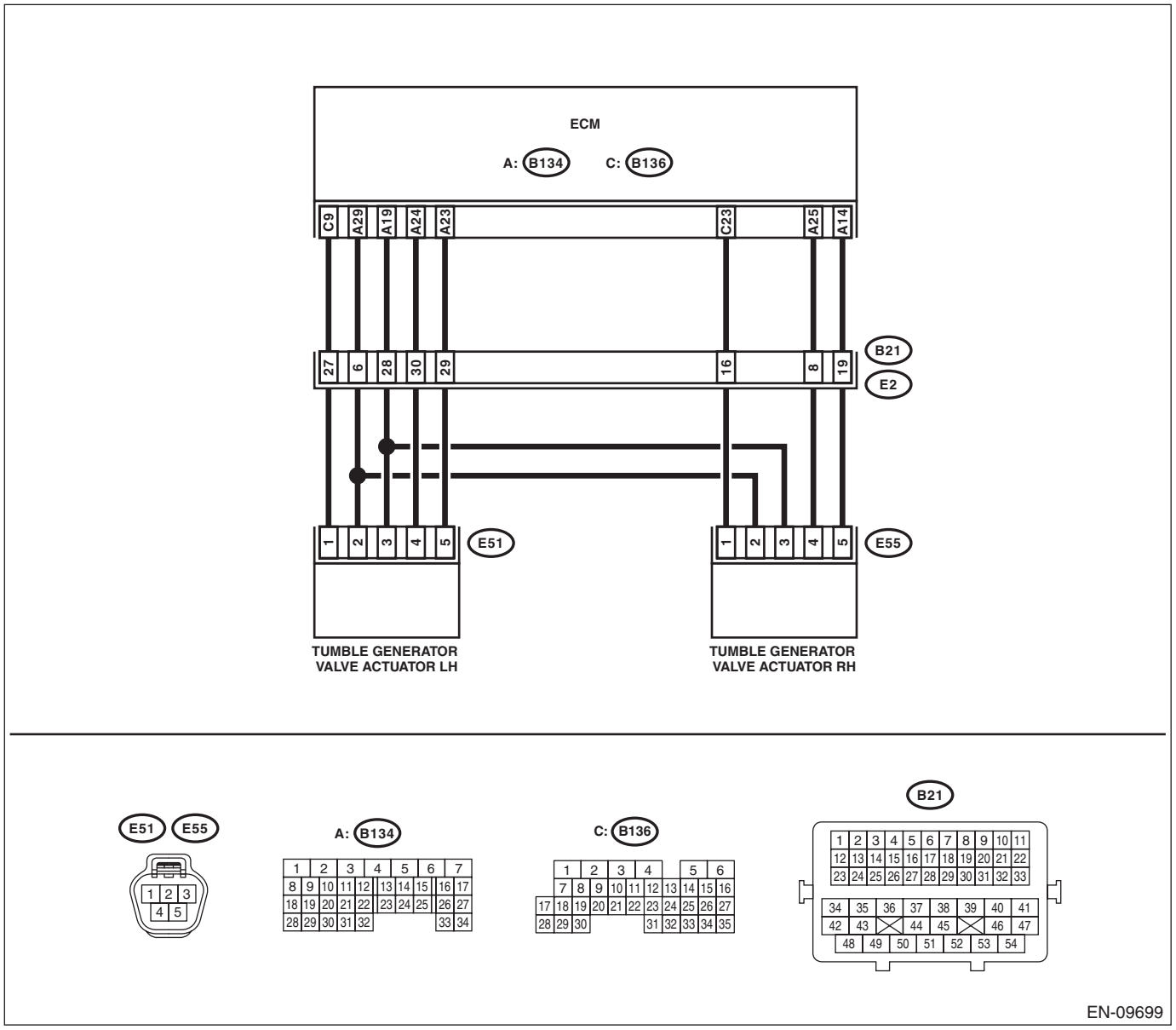
Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EP:DTC P2012 TGV CONTROL CIRCUIT LOW BANK 2

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR LH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 23 (+) — Chassis ground (–):*** ***(B134) No. 24 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and tumble generator valve actuator LH connector.	Replace the tumble generator valve actuator LH. <Ref. to FU(H4DO(HEV))-77, Tumble Generator Valve Actuator.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC P2009. <Ref. to EN(H4DO HEV)(diag)-438, DTC P2009 TGV CONTROL CIRCUIT LOW BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EQ:DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1

DTC DETECTING CONDITION:

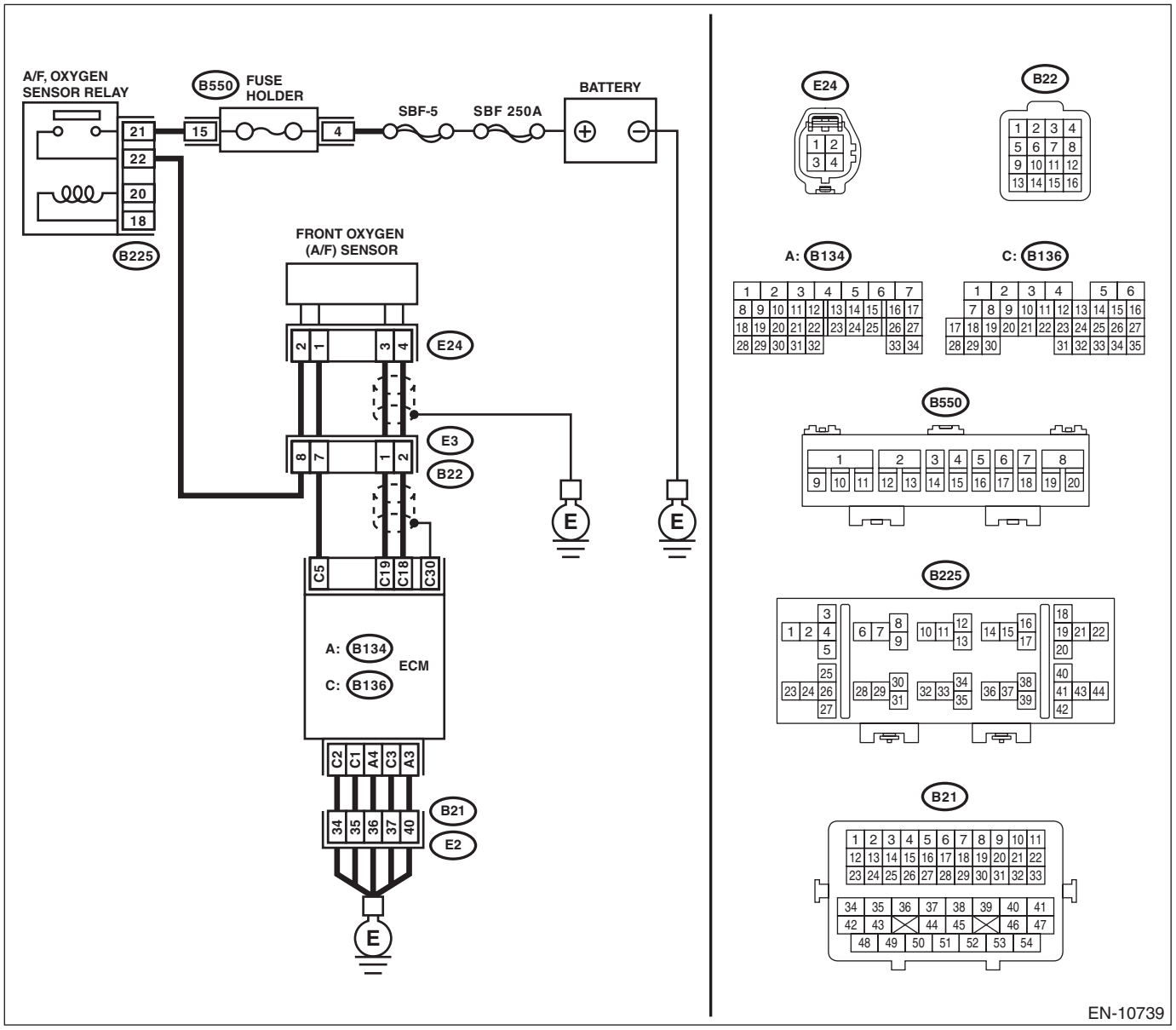
Detected when two consecutive driving cycles with fault occur.

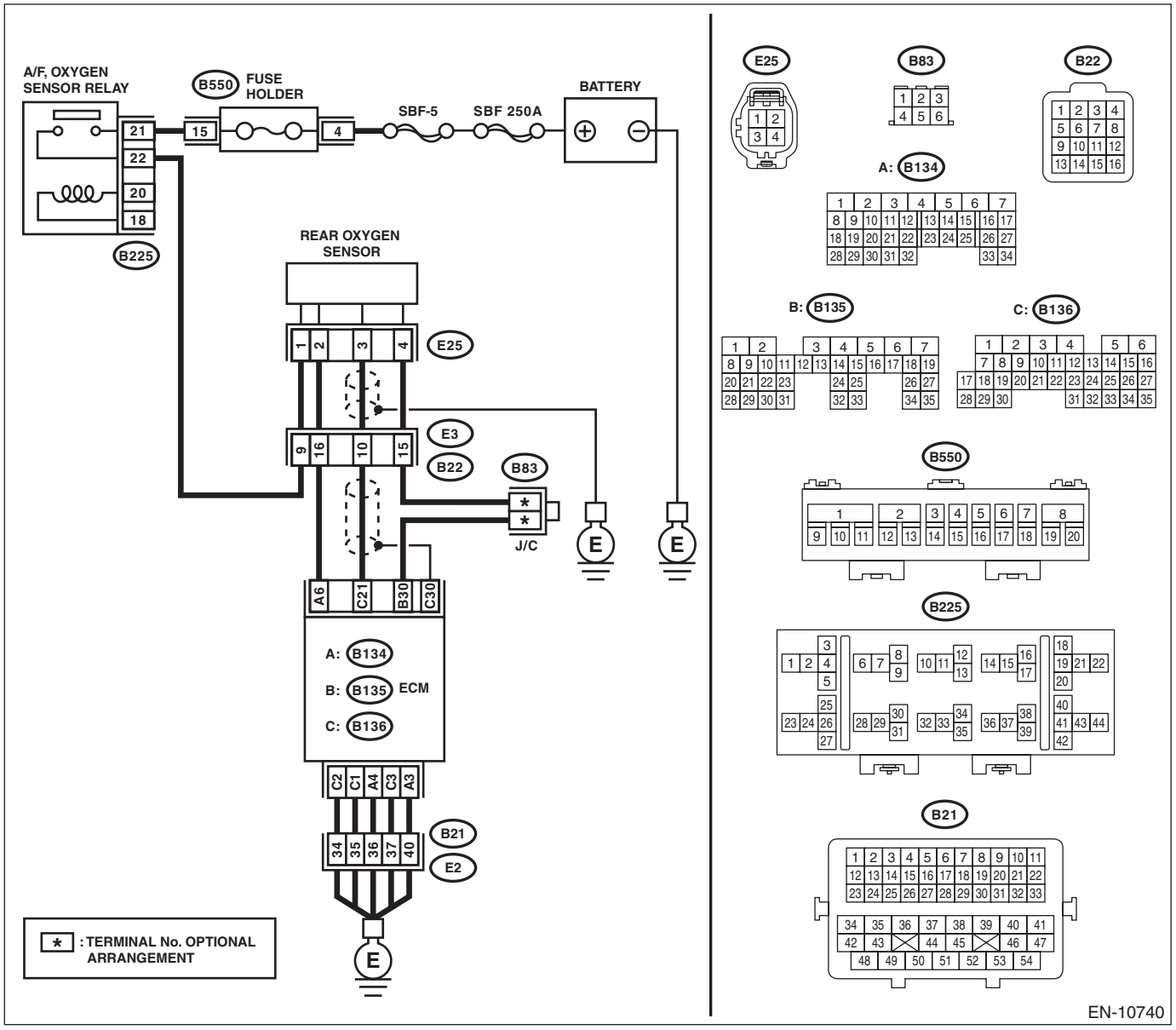
CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
5	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **7**.	Go to step **6**.
6	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 4.95 V or more?	Go to step **7**.	Go to step **8**.
7	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
8	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **9**.
9	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **11**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(HEV))-129, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(HEV))-161, INSPECTION, Fuel Delivery and Evaporation Lines.>
11	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **12**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>
12	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in "P" range or "N" range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **13**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

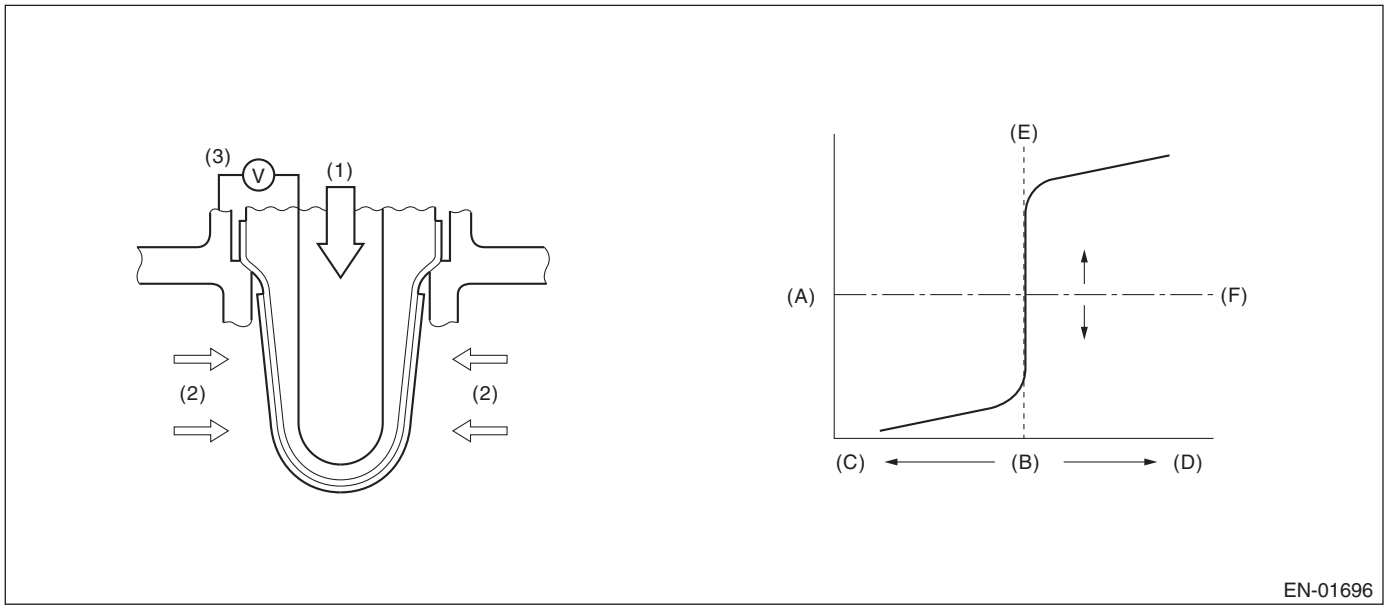
	Step	Check	Yes	No
13	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in “P” range or “N” range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Go to step **14**.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>
14	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.490 V or more?	Go to step **15**.	Go to step **16**.
15	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.250 V or less?	Go to step **17**.	Go to step **16**.
16	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **18**.

	Step	Check	Yes	No
17	**CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.250 V or less for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>	Go to step **18**.
18	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **19**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
19	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of fuel system from the size of the sub feedback learning value.
Control the sub feedback learning and judge as NG when the learning value is in the lean zone.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Conditions for carrying out the sub feedback learning	Completed
Continuous time when all conditions are established.	≥ 1 s

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the vehicle is idling or running at a constant speed of 80 km/h (50 MPH) or more.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sub feedback learning value	< –0.0245

Time Needed for Diagnosis: 1 s × 1 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

ER:DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1

DTC DETECTING CONDITION:

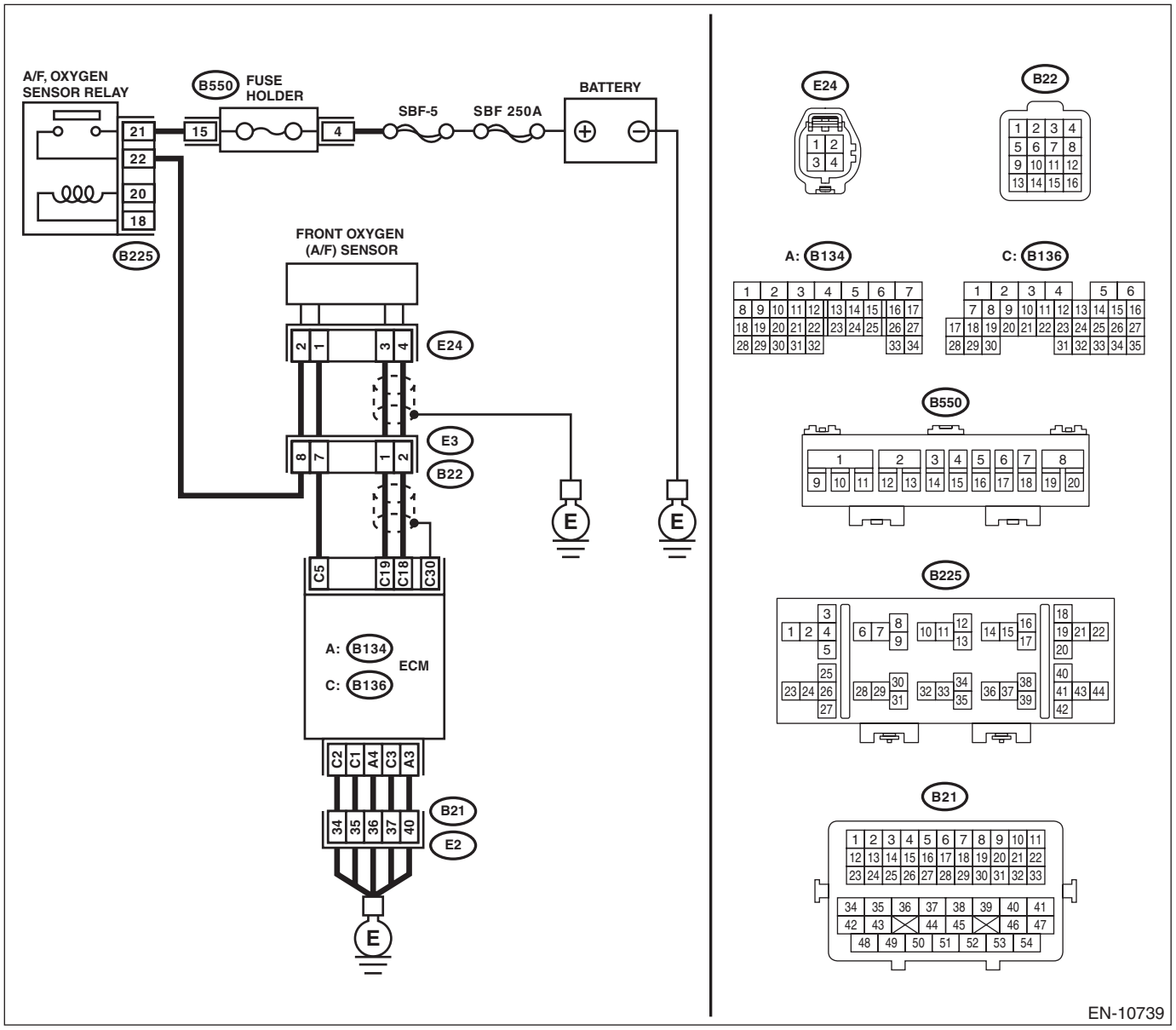
Detected when two consecutive driving cycles with fault occur.

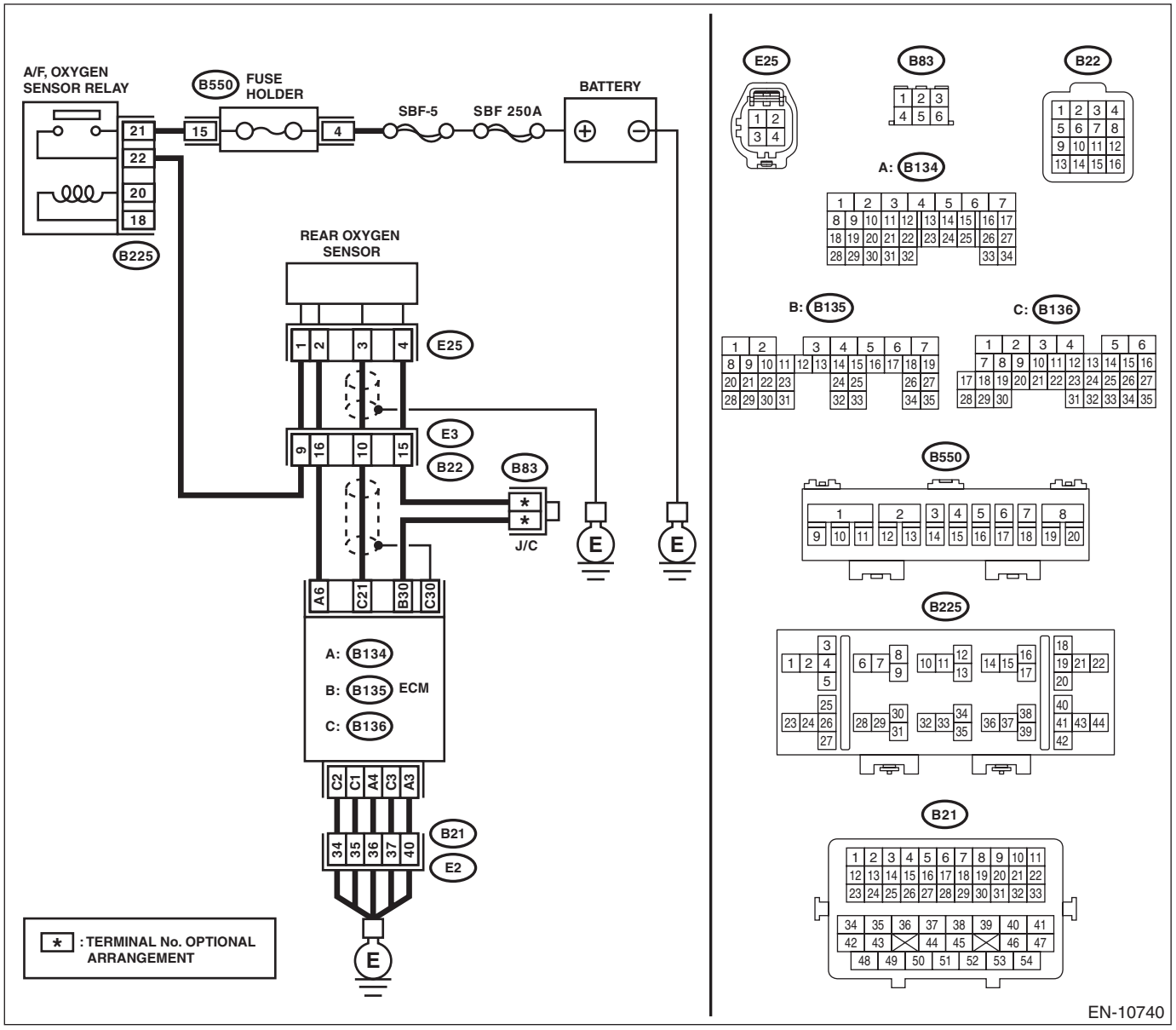
CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





Step		Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
5	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **7**.	Go to step **6**.
6	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 4.95 V or more?	Go to step **7**.	Go to step **8**.
7	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
8	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **9**.
9	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **11**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(HEV))-129, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(HEV))-161, INSPECTION, Fuel Delivery and Evaporation Lines.>
11	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **12**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>
12	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in "P" range or "N" range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **13**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

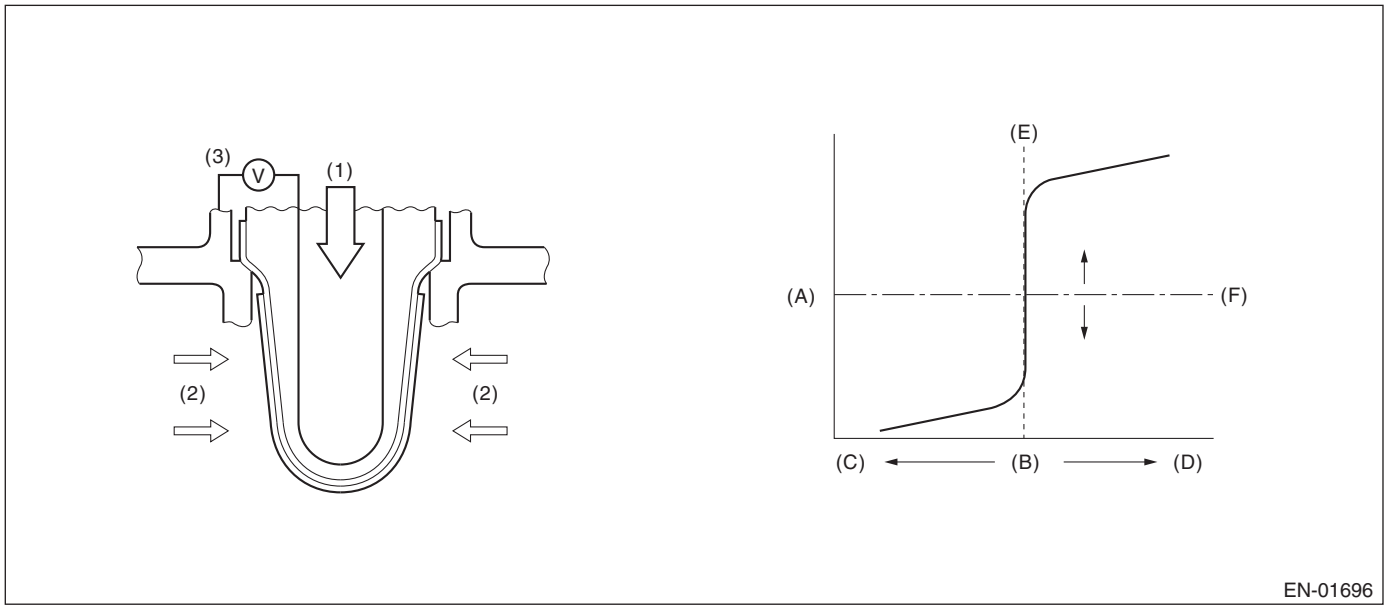
	Step	Check	Yes	No
13	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in "P" range or "N" range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Go to step **14**.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>
14	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.490 V or more?	Go to step **15**.	Go to step **16**.
15	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.250 V or less?	Go to step **17**.	Go to step **16**.
16	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **18**.

	Step	Check	Yes	No
17	**CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.8 V or more for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>	Go to step **18**.
18	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **19**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
19	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of fuel system from the size of the sub feedback learning value.
Sub feedback learning is being performed. When the learning value goes to the rich side, judge as NG.

2. COMPONENT DESCRIPTION



(A)	Electromotive force	(B)	Air fuel ratio	(C)	Lean
(D)	Rich	(E)	Theoretical air fuel ratio	(F)	Comparative voltage
(1)	Atmosphere	(2)	Exhaust gas	(3)	Electromotive force

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Conditions for carrying out the sub feedback learning	Completed
Continuous time when all conditions are established.	≥ 1 s

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the vehicle is idling or running at a constant speed of 80 km/h (50 MPH) or more.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

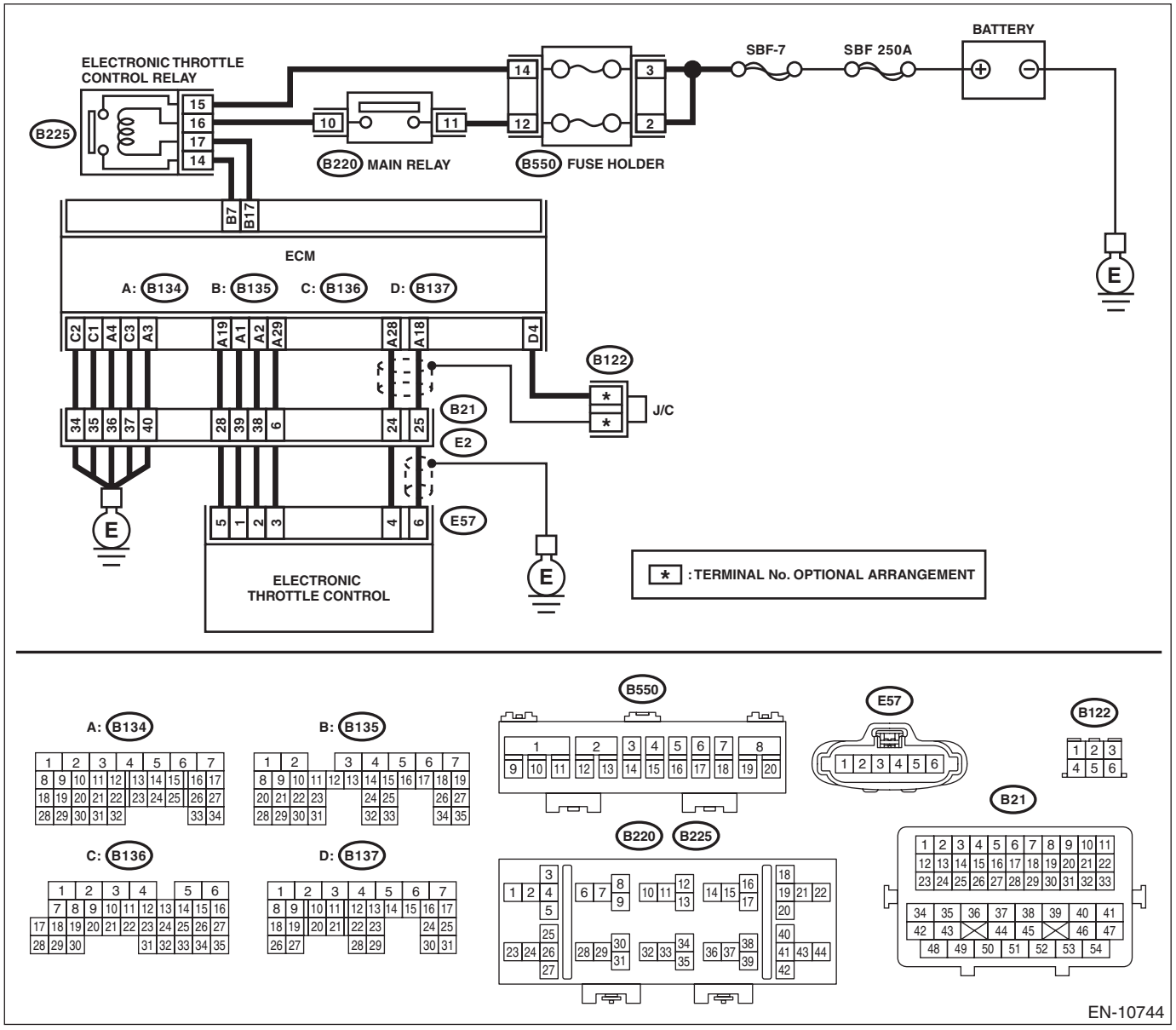
Malfunction Criteria	Threshold Value
Sub feedback learning value	≥ 0.0271

Time Needed for Diagnosis: 1 s × 1 time(s)
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

ES:DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK ELECTRONIC THROTTLE CONTROL RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance less than 1 Ω?	Go to step **2**.	Replace the electronic throttle control relay. <Ref. to FU(H4DO(HEV))-95, Electronic Throttle Control Relay.>
2	**CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY.** Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 15 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the open or short to ground in the power supply circuit.
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 — Chassis ground:*** ***(B225) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
5	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** Measure the resistance between ECM connector and electronic throttle control relay connector. ***Connector & terminal*** ***(B135) No. 7 — (B225) No. 14:*** ***(B135) No. 17 — (B225) No. 17:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.
6	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 18 — Chassis ground:*** ***(B134) No. 18 — (B137) No. 4:*** ***(B134) No. 28 — Chassis ground:*** ***(B134) No. 28 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.

	Step	Check	Yes	No
7	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 — Engine ground:*** ***(E57) No. 4 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **8**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
8	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 18 — (E57) No. 6:*** ***(B134) No. 28 — (E57) No. 4:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
9	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **10**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
10	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 (+) — Engine ground (–):*** ***(E57) No. 4 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **11**.
11	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 18:*** ***(B134) No. 19 — (B134) No. 28:***	Is the resistance 1 MΩ or more?	Go to step **12**.	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

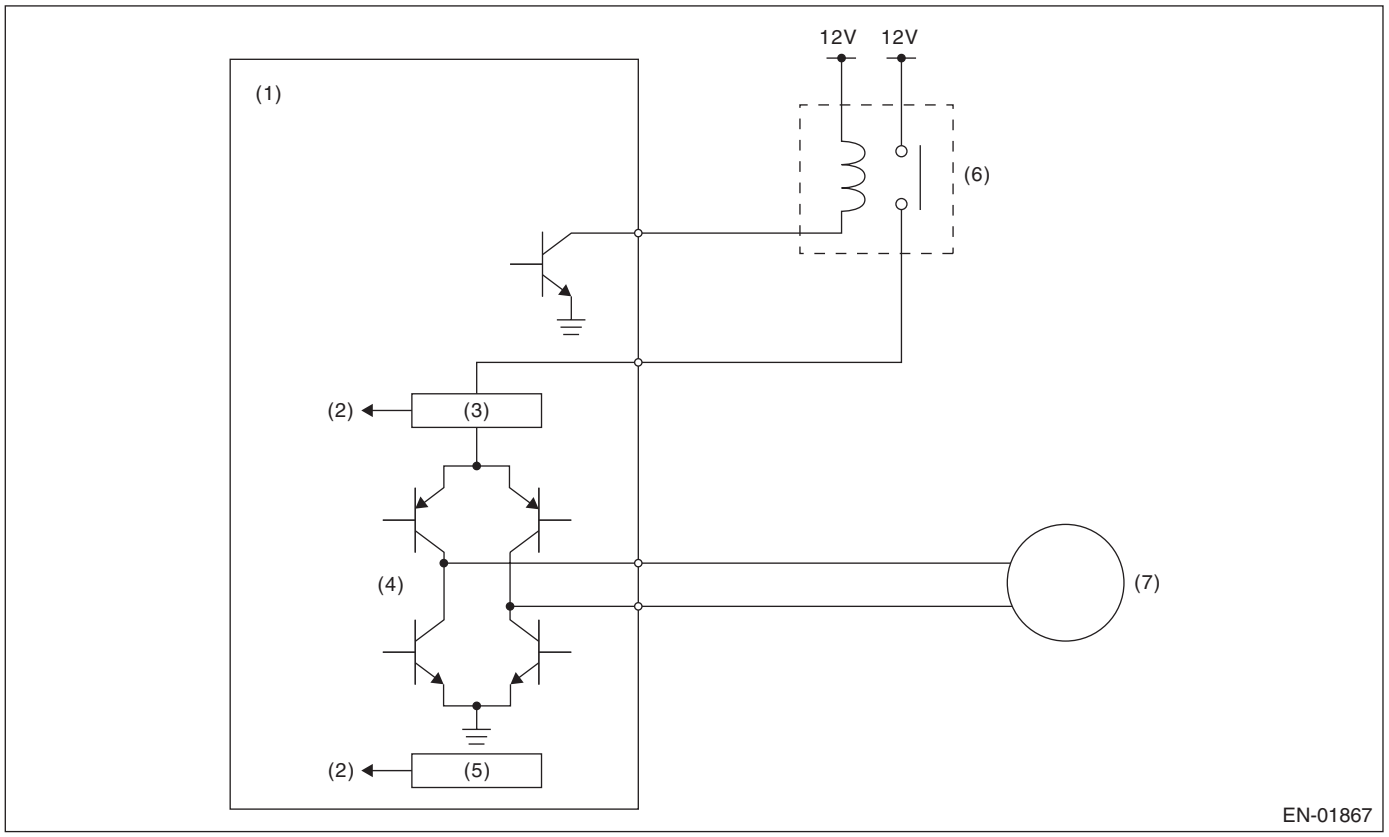
	Step	Check	Yes	No
12	**CHECK SENSOR OUTPUT.** 1) Connect all connectors. 2) Start the engine and warm up completely. 3) Stop the engine, and turn the ignition switch to ON. (Engine OFF) 4) Read the value of «Main-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Main-Throttle Sensor» 0.81 — 0.87 V?	Go to step **13**.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>
13	**CHECK SENSOR OUTPUT.** Read the value of «Sub-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Sub-Throttle Sensor» 1.64 — 1.70 V?	Go to step **14**.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>
14	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 2 — (E57) No. 2:*** ***(B134) No. 1 — (E57) No. 1:***	Is the resistance less than 1 Ω?	Go to step **15**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
15	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 2 (+) — Engine ground (–):*** ***(E57) No. 1 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **16**.
16	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 2 — Engine ground:*** ***(E57) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **17**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.

	Step	Check	Yes	No
17	**CHECK ELECTRONIC THROTTLE CONTROL CONNECTOR HARNESS.** Measure the resistance between electronic throttle control connectors. ***Connector & terminal*** ***(E57) No. 2 — (E57) No. 1:***	Is the resistance 1 MΩ or more?	Go to step **18**.	Repair the short circuit in harness between ECM connector and electronic throttle control connector.
18	**CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 4 — Chassis ground:*** ***(B136) No. 1 — Chassis ground:*** ***(B136) No. 2 — Chassis ground:*** ***(B136) No. 3 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **19**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
19	**CHECK ELECTRONIC THROTTLE CONTROL.** Measure the resistance between electronic throttle control terminals. ***Terminals*** ***No. 2 — No. 1:***	Is the resistance 50 Ω or less?	Go to step **20**.	Replace the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>
20	**CHECK ELECTRONIC THROTTLE CONTROL.** Move the throttle valve to the fully opened and fully closed positions with fingers. Check that the valve returns to the specified position when releasing fingers.	Does the valve return to the specified position? Standard value: 3 mm (0.12 in) from fully closed position	Repair the poor contact of ECM connector.	Replace the electronic throttle control. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the motor current becomes large or drive circuit is heated.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Detecting circuit
(3) Overcurrent detection circuit
(4) Drive circuit
(5) Temperature detection circuit
(6) Electronic throttle control relay
(7) Motor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Under control of electronic throttle control	ON
Battery voltage	≥ 6.2 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Overcurrent signal from driver	ON

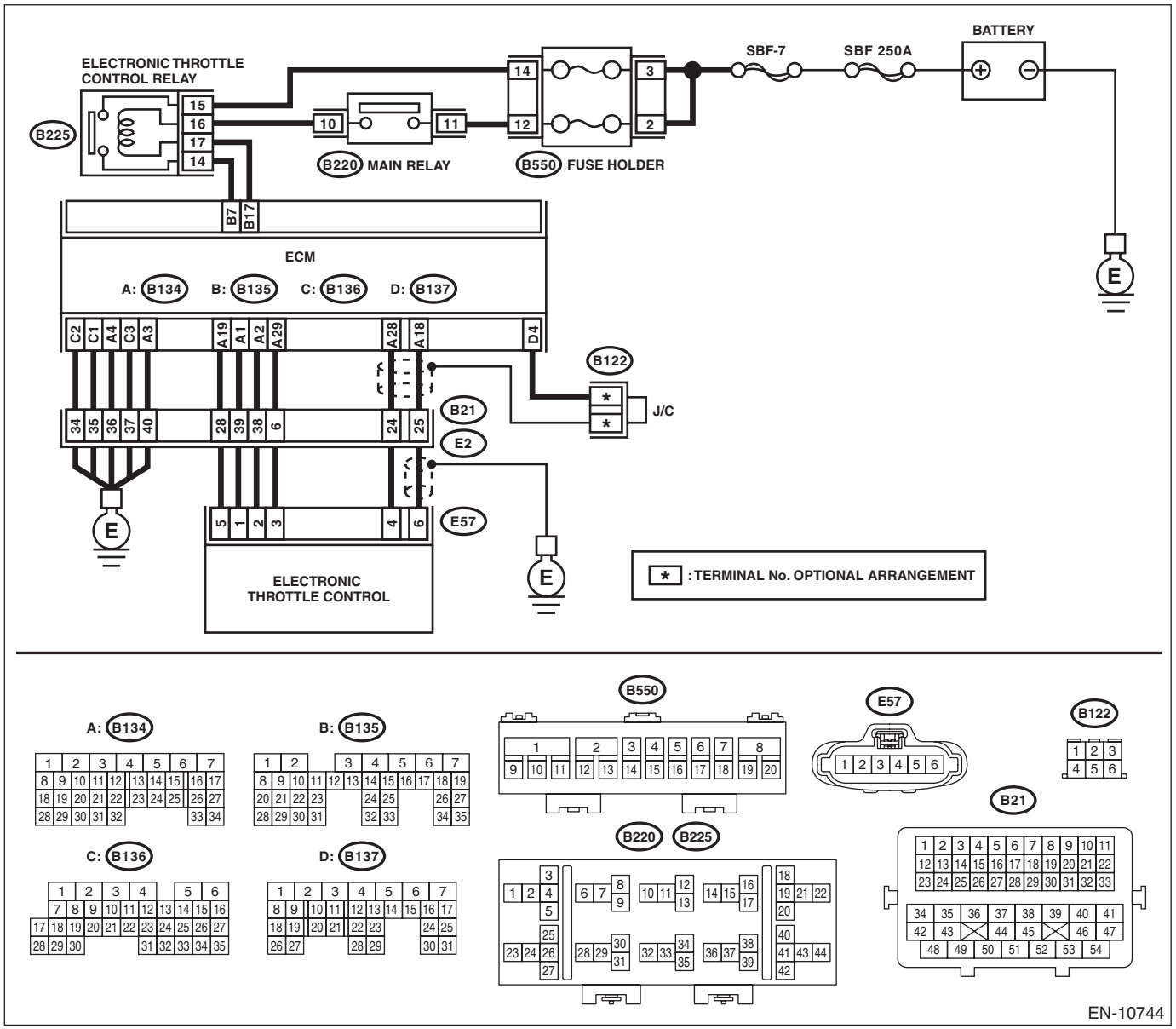
Time Needed for Diagnosis: 512 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

ET:DTC P2102 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

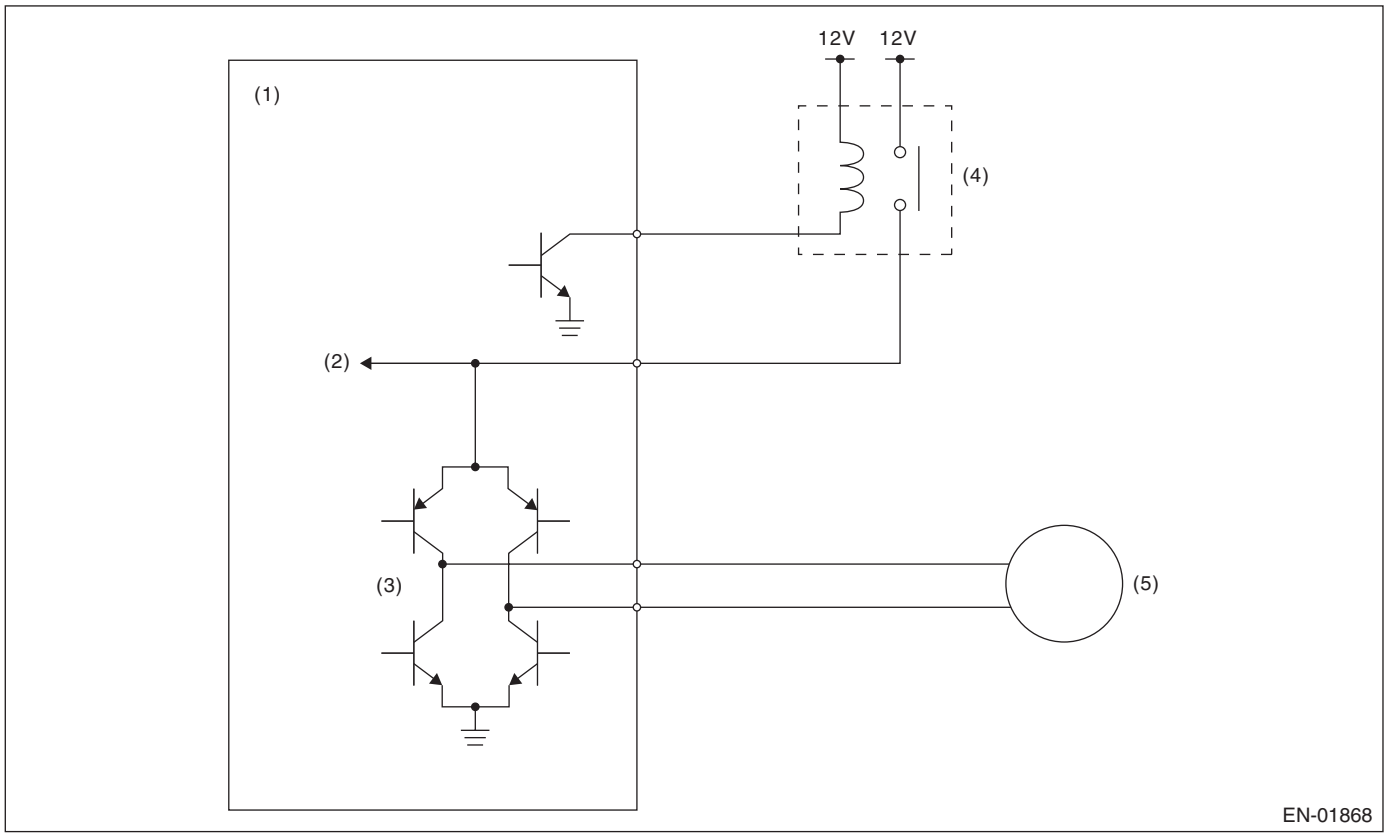


	Step	Check	Yes	No
1	**CHECK ELECTRONIC THROTTLE CONTROL RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance less than 1 Ω?	Go to step **2**.	Replace the electronic throttle control relay. <Ref. to FU(H4DO(HEV))-95, Electronic Throttle Control Relay.>
2	**CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY.** Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 15 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the open or short to ground in the power supply circuit.
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 — Chassis ground:*** ***(B225) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
5	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** Measure the resistance between ECM connector and electronic throttle control relay connector. ***Connector & terminal*** ***(B135) No. 7 — (B225) No. 14:*** ***(B135) No. 17 — (B225) No. 17:***	Is the resistance less than 1 Ω?	Repair the poor contact of ECM connector.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.

1. OUTLINE OF DIAGNOSIS

Judge as NG when the electronic throttle control power is not supplied even when ECM sets the electric control throttle relay to ON.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Voltage detection circuit
(3) Drive circuit
(4) Electronic throttle control relay
(5) Motor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 11 V
Electronic throttle control relay output	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	≤ 5 V

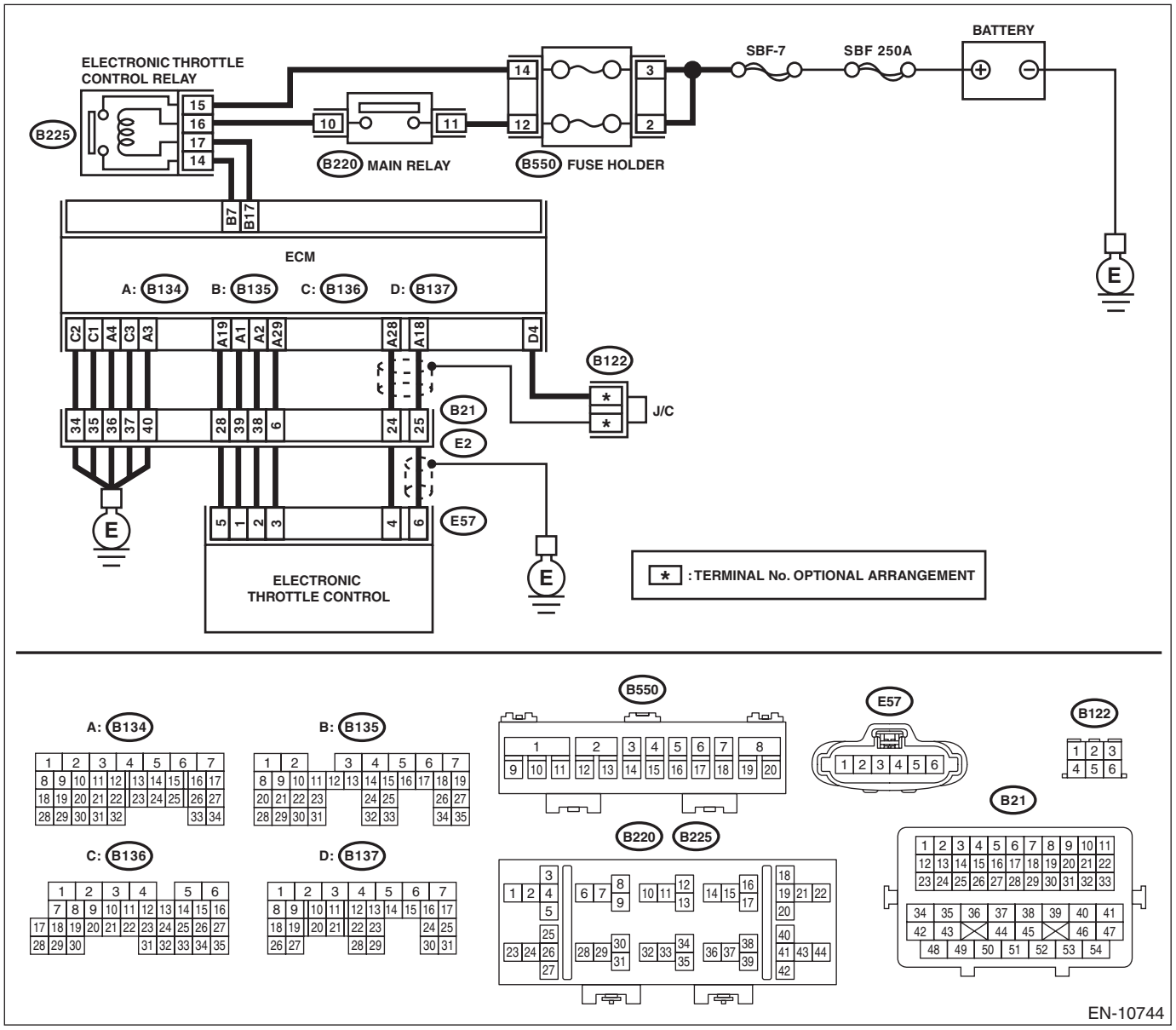
Time Needed for Diagnosis: 352 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EU:DTC P2103 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



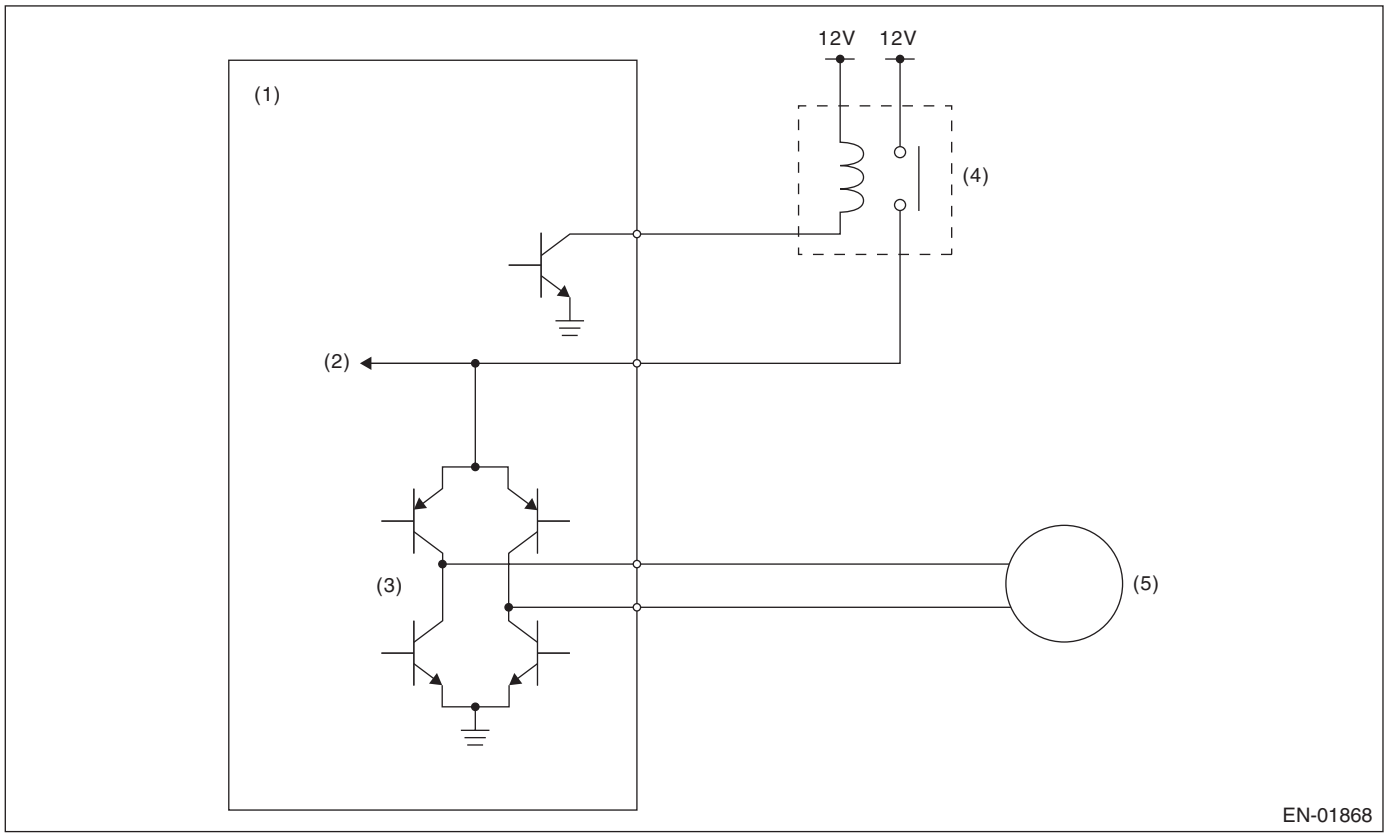
Step		Check	Yes	No
1	**CHECK ELECTRONIC THROTTLE CONTROL RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Measure the resistance between electronic throttle control relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Replace the electronic throttle control relay. <Ref. to FU(H4DO(HEV))-95, Electronic Throttle Control Relay.>

	Step	Check	Yes	No
2	**CHECK SHORT CIRCUIT OF ELECTRONIC THROTTLE CONTROL RELAY POWER SUPPLY.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.

1. OUTLINE OF DIAGNOSIS

Judge as NG when the electronic throttle control power is supplied even when ECM sets the electronic throttle control relay to OFF.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Voltage detection circuit
(3) Drive circuit
(4) Electronic throttle control relay
(5) Motor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V
Electronic throttle control relay output	OFF

4. GENERAL DRIVING CYCLE

- When ignition switch ON → OFF
- Ignition switch OFF → ON (Only after clearing memory)

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	≥ 5 V

Time Needed for Diagnosis: 600 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

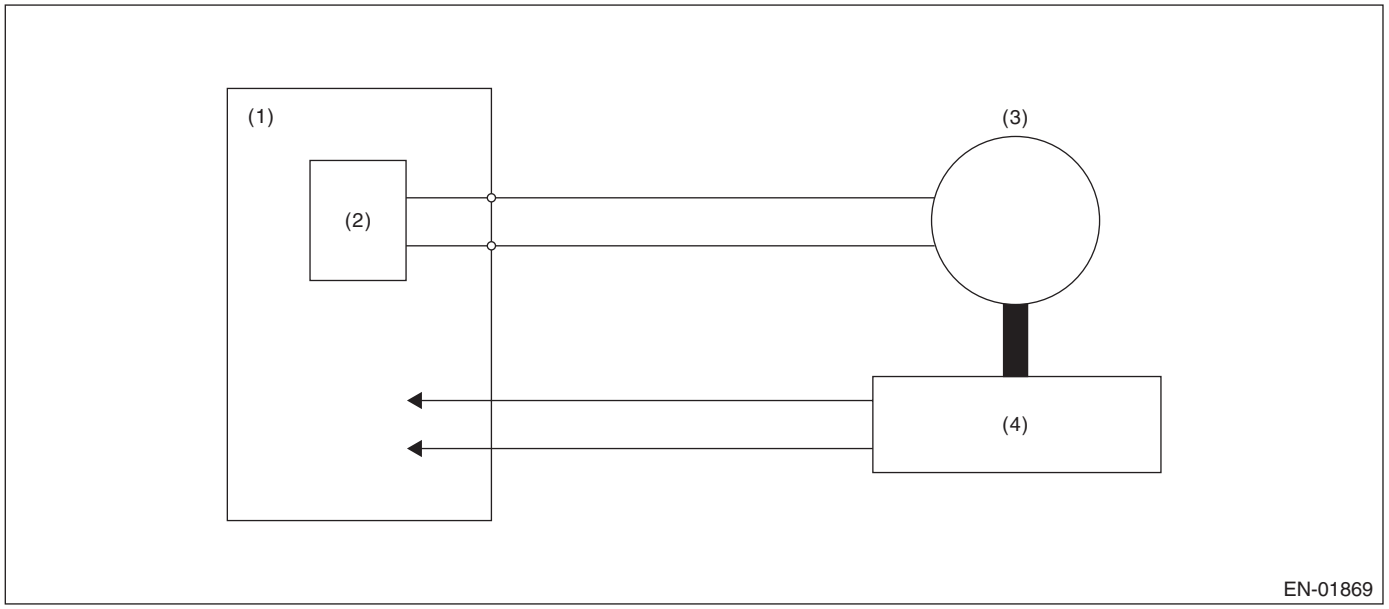
EV:DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO HEV)(diag)-456, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when full close point learning cannot conducted or abnormal value is detected.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Drive circuit
(3) Motor
(4) Throttle position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis at full closed point learning.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Throttle sensor opening angle at full close point learning	< –4.02% (0.4 V) or > 4.02% (0.8 V)
or	
Throttle opening angle when the ignition switch is ON – Throttle minimum stop position	1.162 °

Time Needed for Diagnosis: 8 ms — 80 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

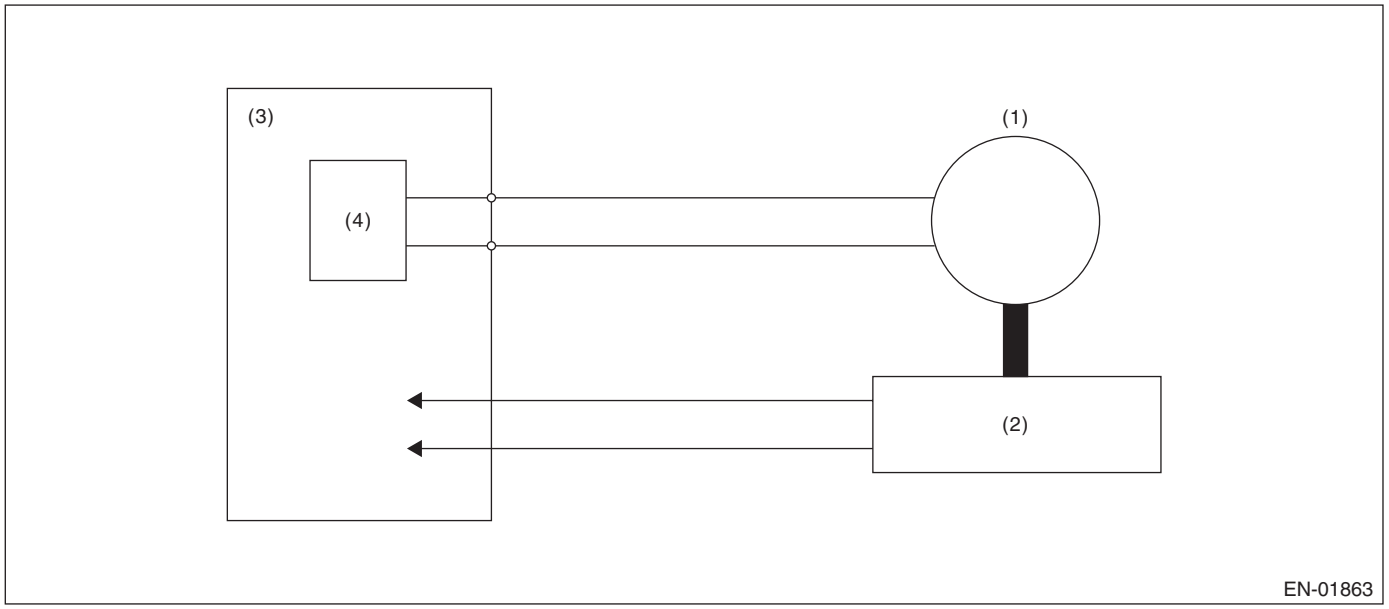
EW:DTC P2119 THROTTLE ACTUATOR "A" CONTROL THROTTLE BODY RANGE/PERFORMANCE

NOTE:
For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO HEV)(diag)-456, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Judge as NG when the target opening angle and actual opening angle is mismatched or the current to motor is the specified duty or more for specified time continuously.

2. COMPONENT DESCRIPTION



(1) Motor
(2) Throttle position sensor
(3) Engine control module (ECM)
(4) Drive circuit

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6.2 V
Normal operation of electronic throttle control	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously when the electronic throttle control is operating.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Diagnosis 1

Judgment Value

Malfunction Criteria	Threshold Value
Output duty to drive circuit	< 95 %

Time Needed for Diagnosis:

- Engine speed ≥ 500 rpm: 2000 ms
- Engine speed < 500 rpm: 5000 ms

Diagnosis 2

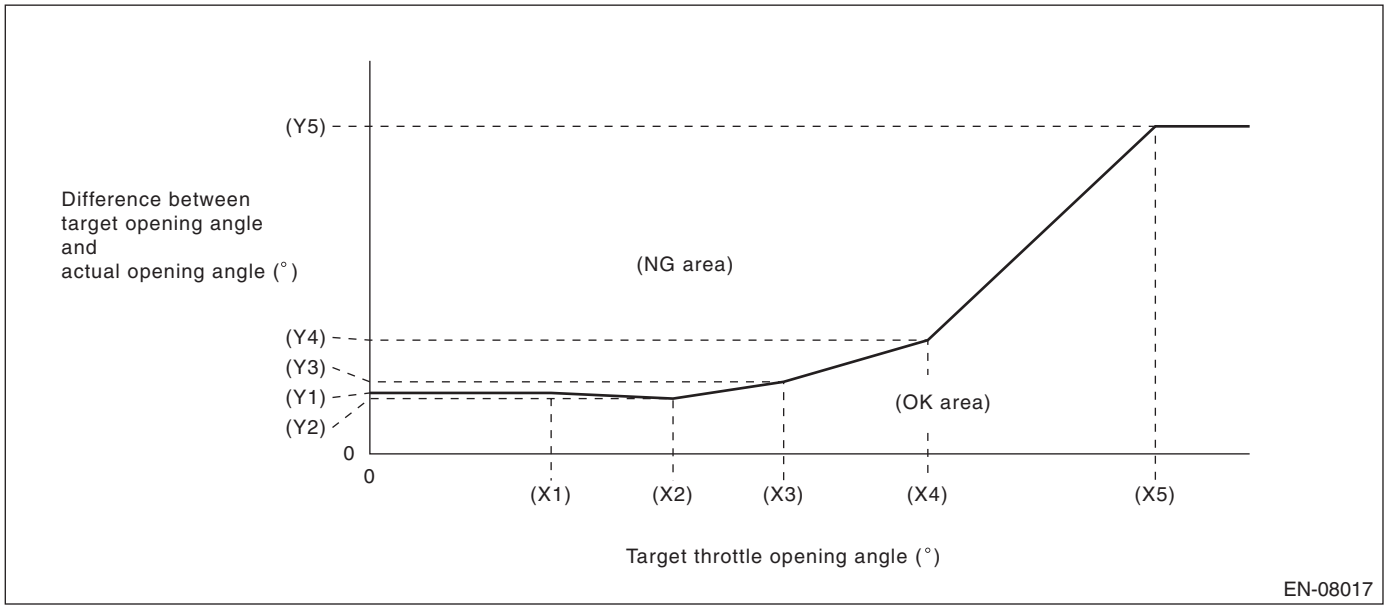
Judgment Value

Malfunction Criteria	Threshold Value
Difference between target opening angle and actual opening angle	Within NG range of **Details of Judgment value**

Time Needed for Diagnosis:

- Engine speed ≥ 500 rpm: Refer to **Details of Judgment time**.
- Engine speed < 500 rpm: 5000 ms

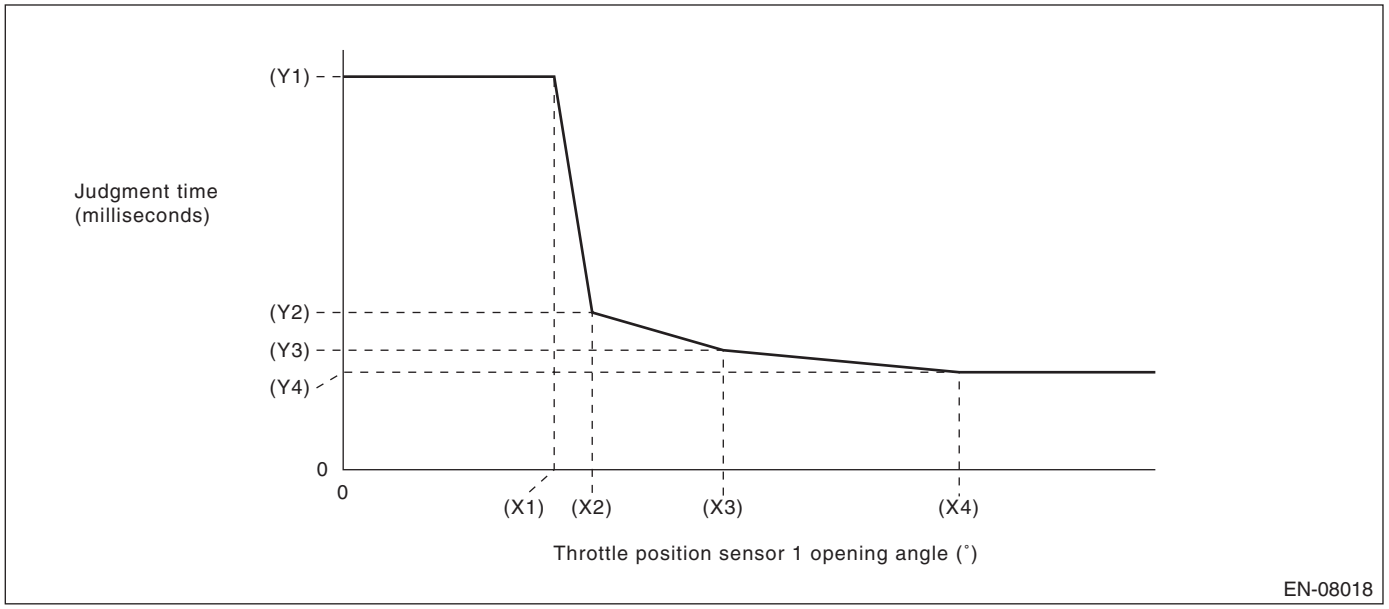
Details of Judgment Value



(X1) 6.915 °
(X2) 11.565 °
(X3) 15.785 °
(X4) 21.285 °
(X5) 29.965 °

(Y1) 4.65 °
(Y2) 4.22 °
(Y3) 5.5 °
(Y4) 8.68 °
(Y5) 25 °

Details of Judgment time



(X1) 8.049999237 °
(X2) 9.5 °
(X3) 14.5 °
(X4) 23.5 °

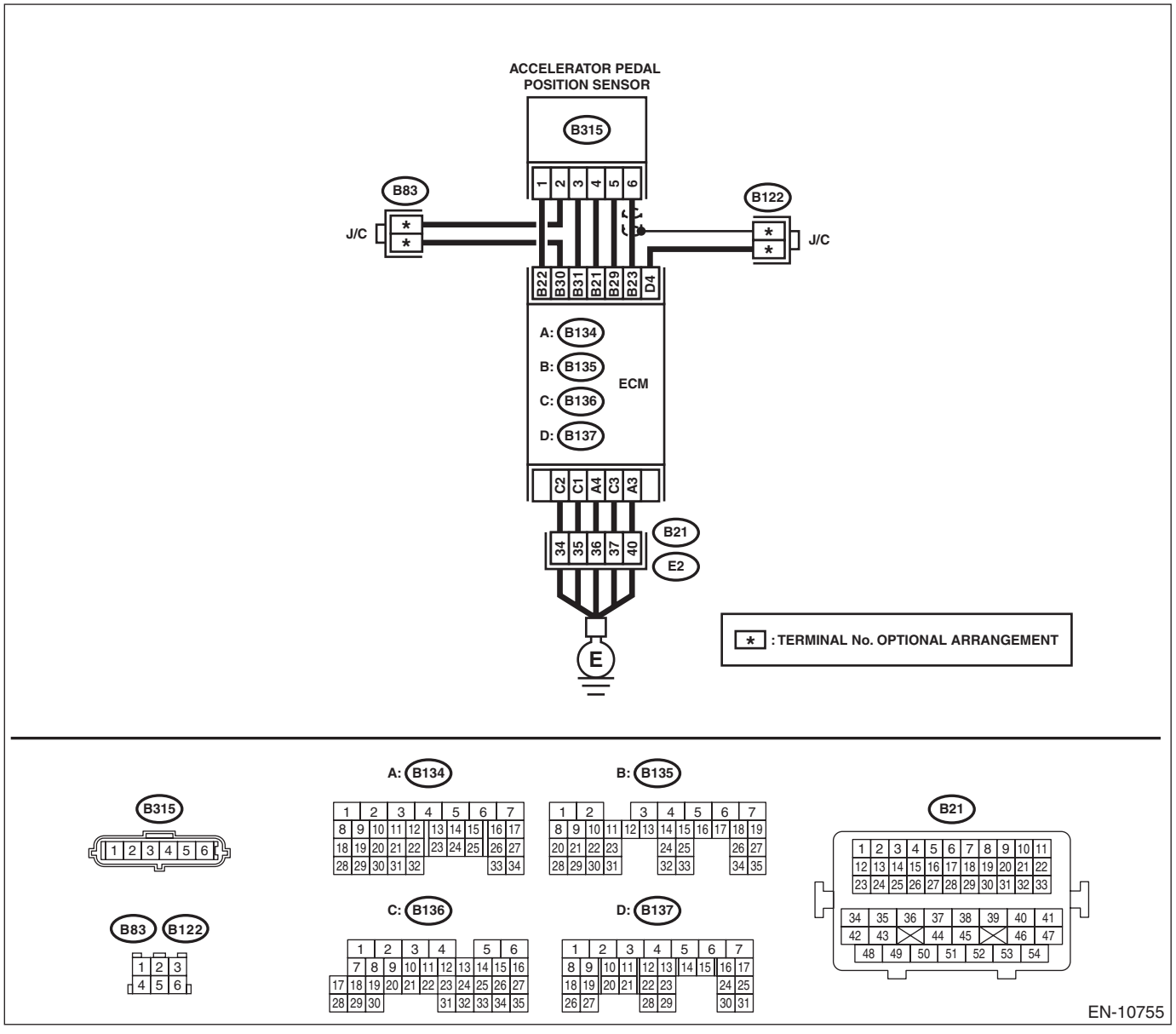
(Y1) 1000 ms
(Y2) 400 ms
(Y3) 304 ms
(Y4) 248 ms

NOTE:
Judgment time when actual opening angle ≤ target opening angle is always 1000 milliseconds.
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EX:DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:

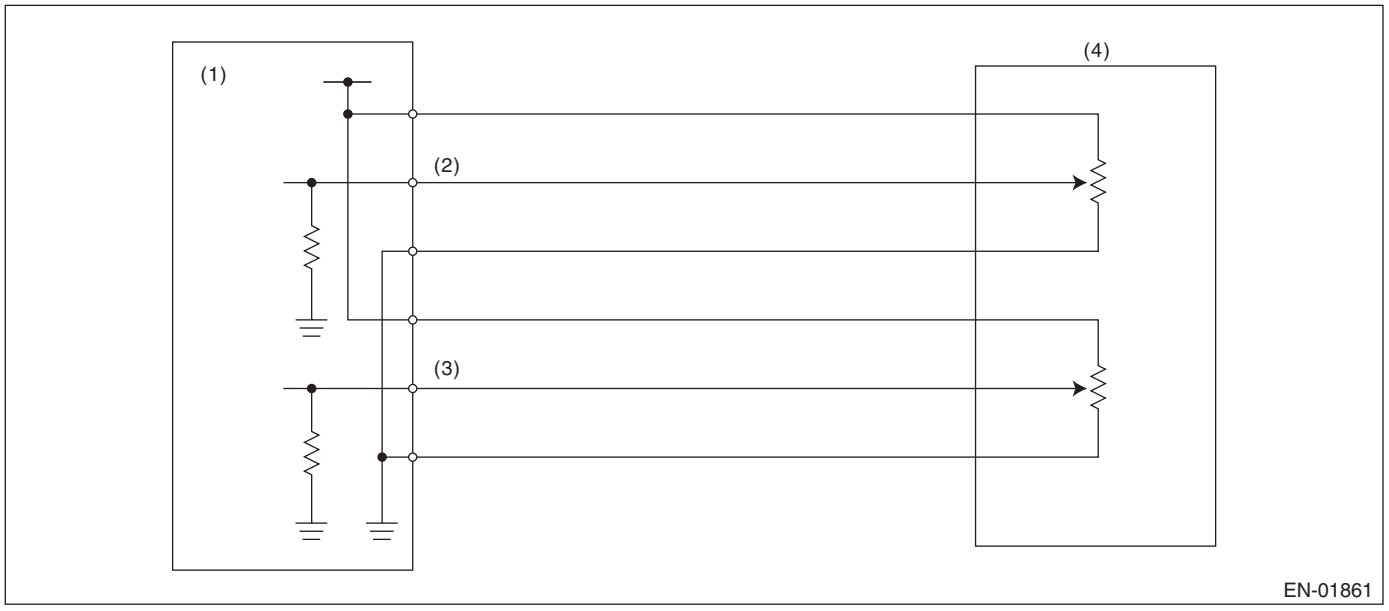


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 21 — Chassis ground:*** ***(B135) No. 23 — Chassis ground:*** ***(B135) No. 23 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the accelerator pedal. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector. Replace the ECM if defective. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of accelerator pedal position sensor 1.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

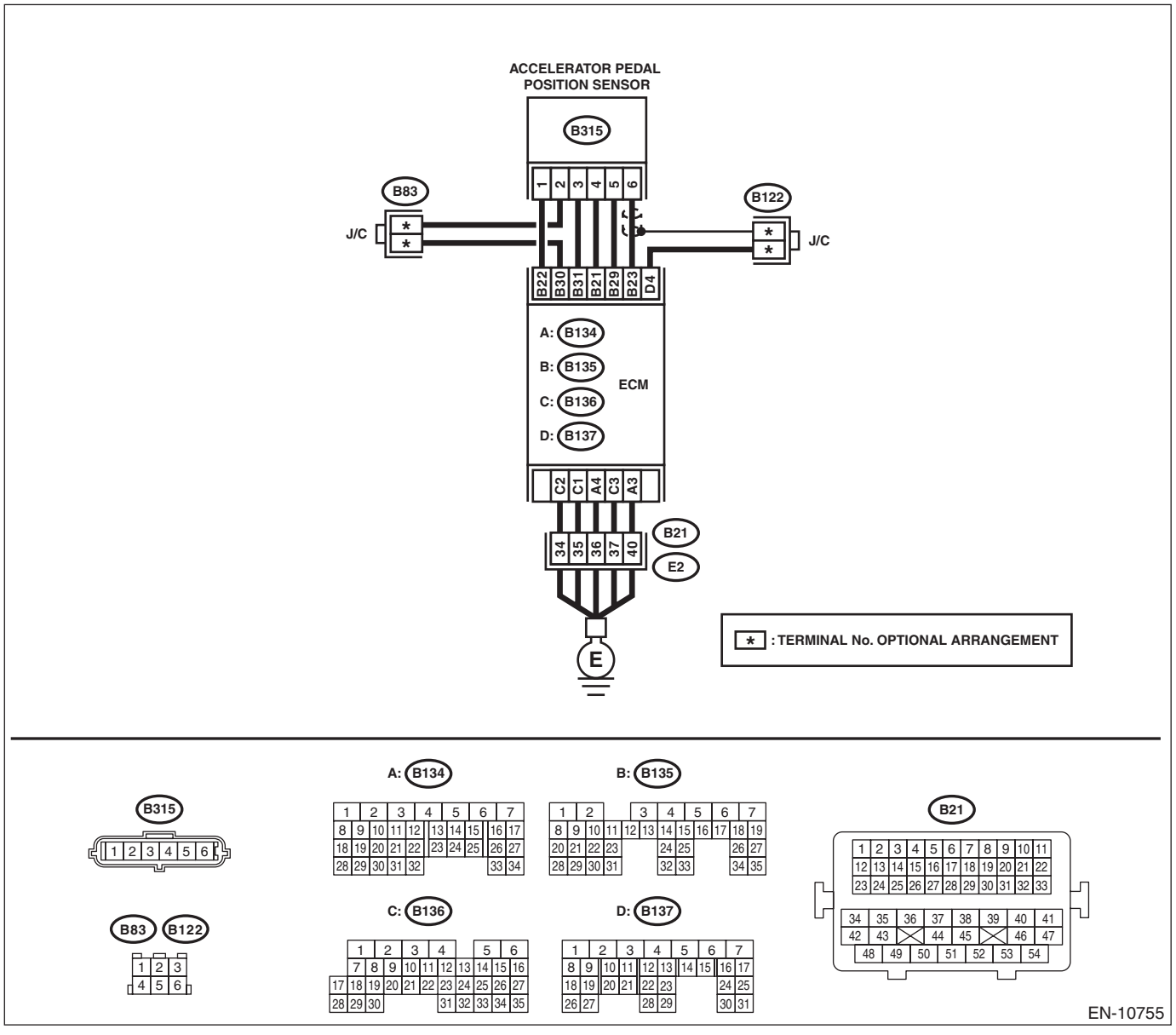
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	< 0.298 V

Time Needed for Diagnosis: 100 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EY:DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

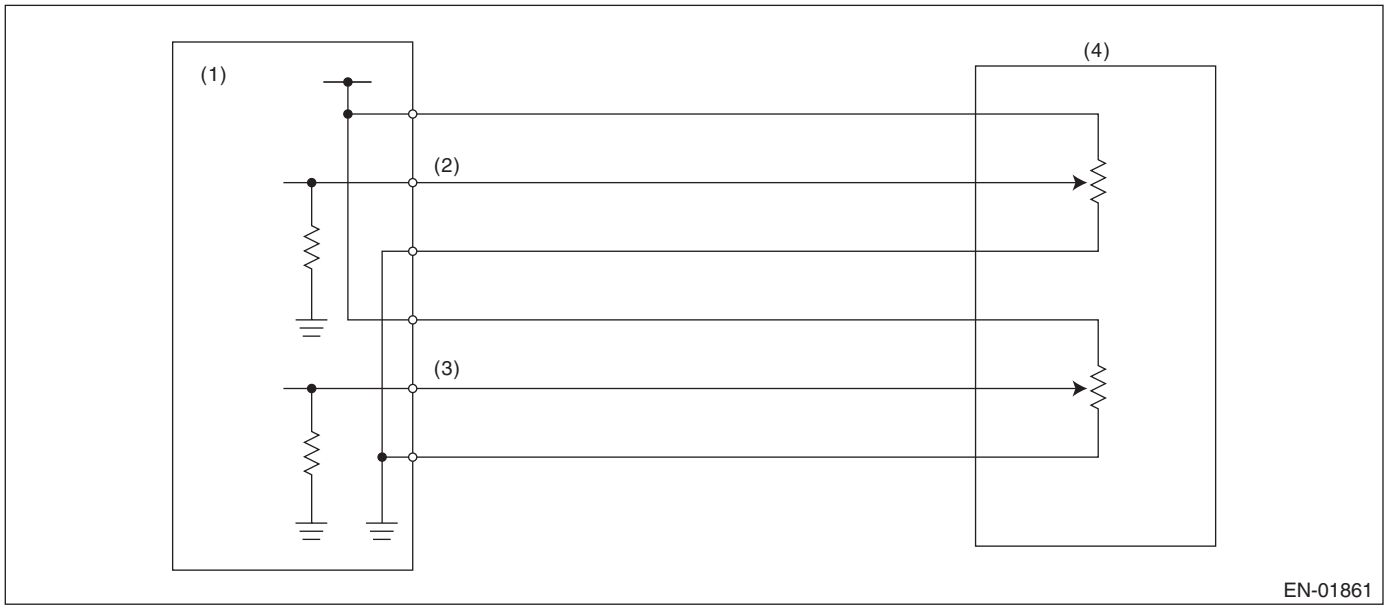


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance of harness between ECM connector and accelerator pedal position sensor connector. ***Connector & terminal*** ***(B135) No. 23 — (B315) No. 6:*** ***(B135) No. 29 — (B315) No. 5:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness between ECM connector and accelerator pedal position sensor connector.
2	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 5 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 6 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B135) No. 21 — (B135) No. 23:***	Is the resistance 1 MΩ or more?	Repair the poor contact of accelerator pedal position sensor connector. Replace the accelerator pedal if defective. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of accelerator pedal position sensor 1.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

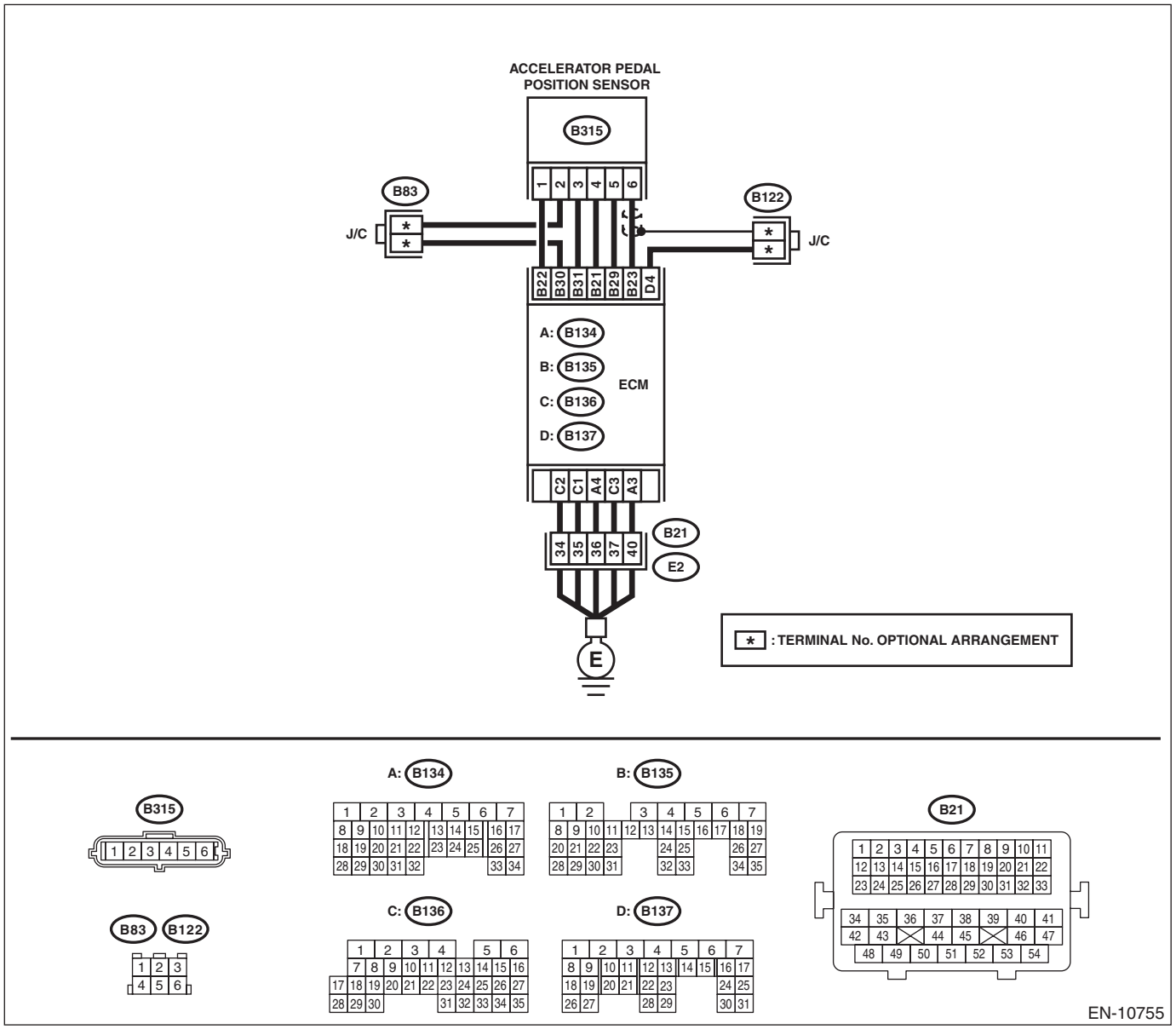
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≥ 4.737 V

Time Needed for Diagnosis: 32 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

EZ:DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

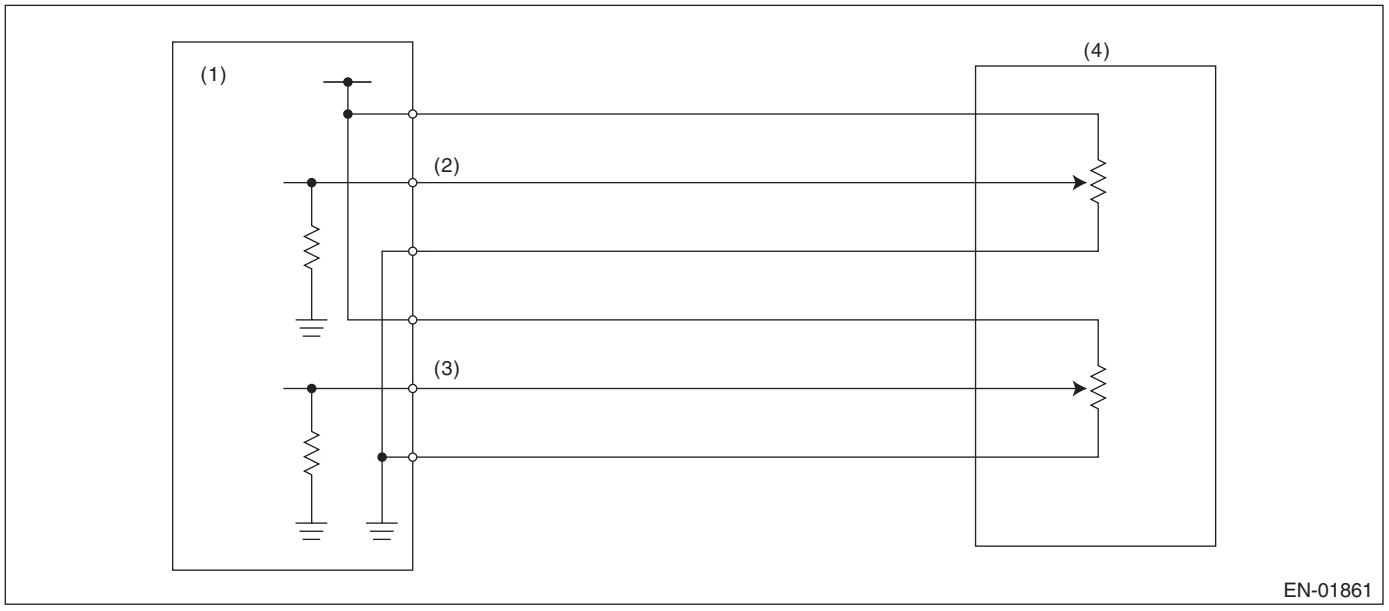


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 22 — Chassis ground:*** ***(B135) No. 31 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the accelerator pedal. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector. Replace the ECM if defective. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of accelerator pedal position sensor 2.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

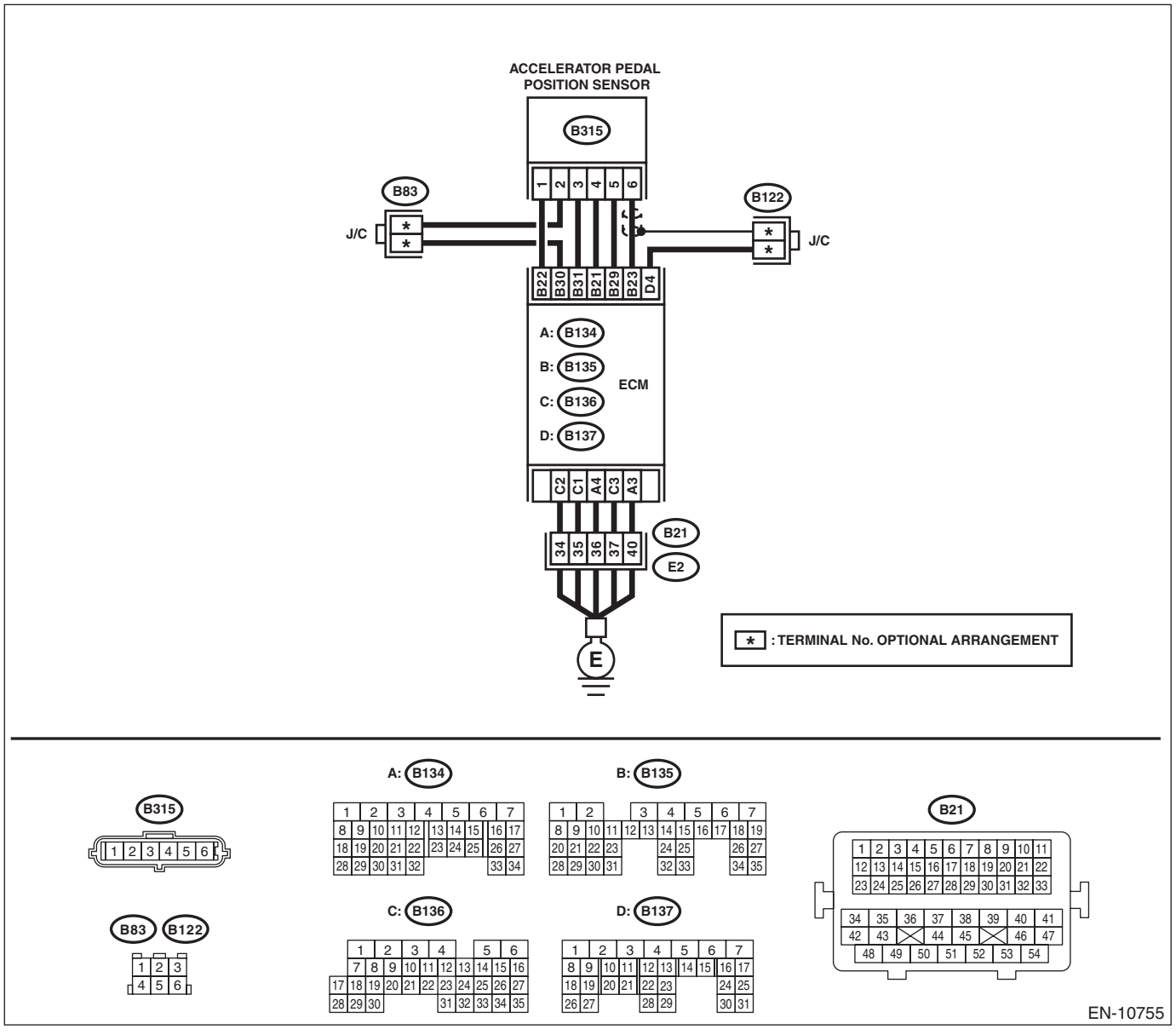
Malfunction Criteria	Threshold Value
Sensor 2 input voltage	< 0.298 V

Time Needed for Diagnosis: 100 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FA:DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

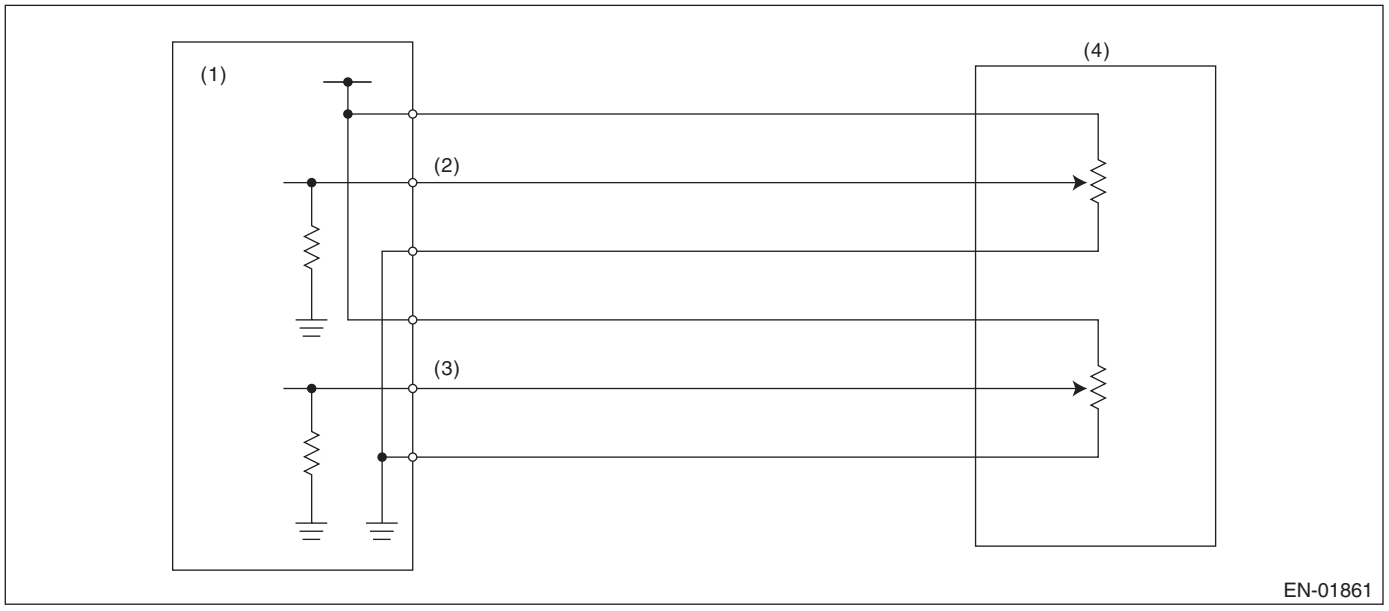


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance of harness between ECM connector and accelerator pedal position sensor connector. ***Connector & terminal*** ***(B135) No. 31 — (B315) No. 3:*** ***(B135) No. 30 — (B315) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and accelerator pedal position sensor connector • Poor contact of joint connector
2	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 2 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 3 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B135) No. 22 — (B135) No. 31:***	Is the resistance 1 MΩ or more?	Repair the poor contact of accelerator pedal position sensor connector. Replace the accelerator pedal if defective. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of accelerator pedal position sensor 2.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

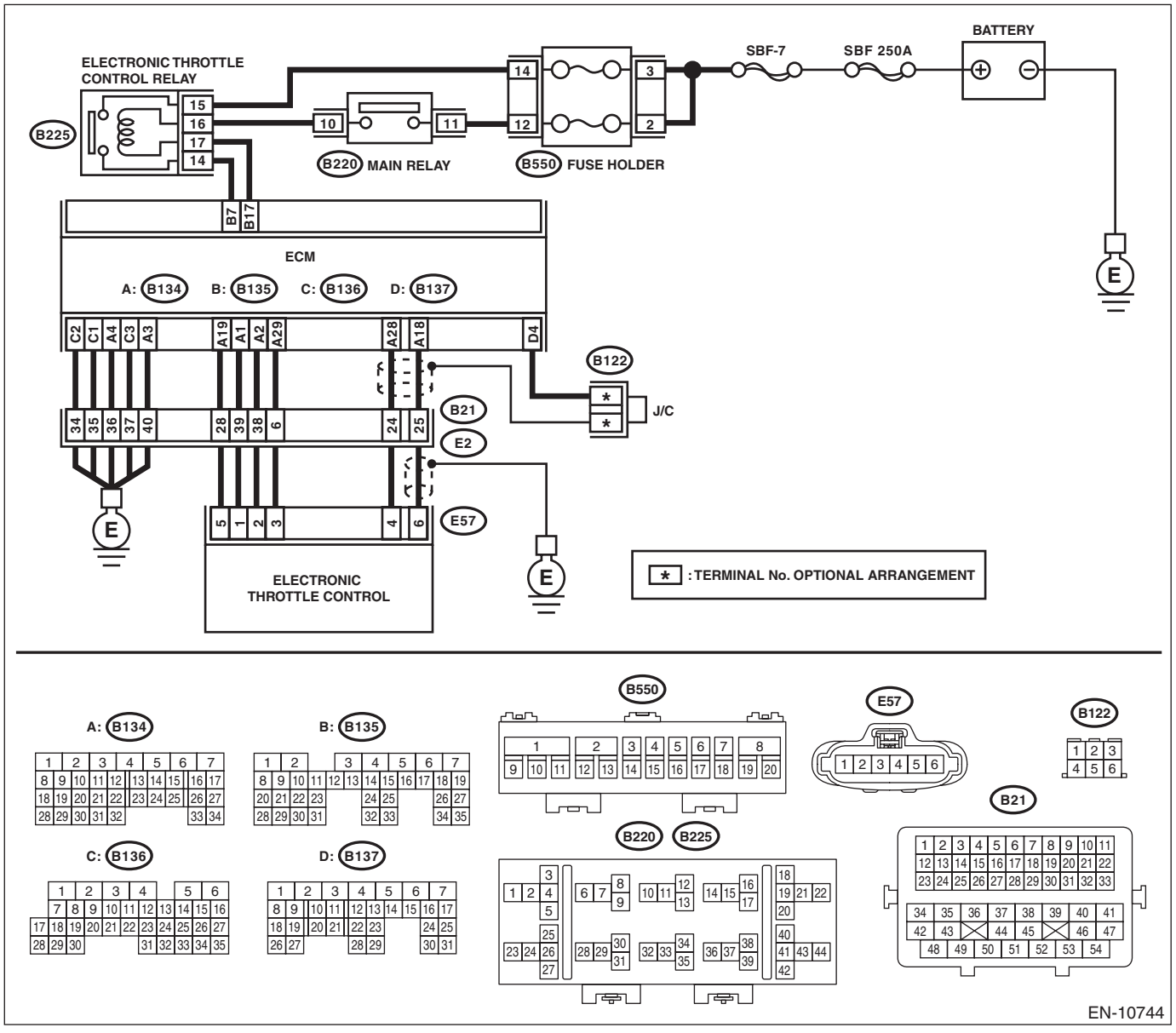
Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 4.737 V

Time Needed for Diagnosis: 100 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FB:DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



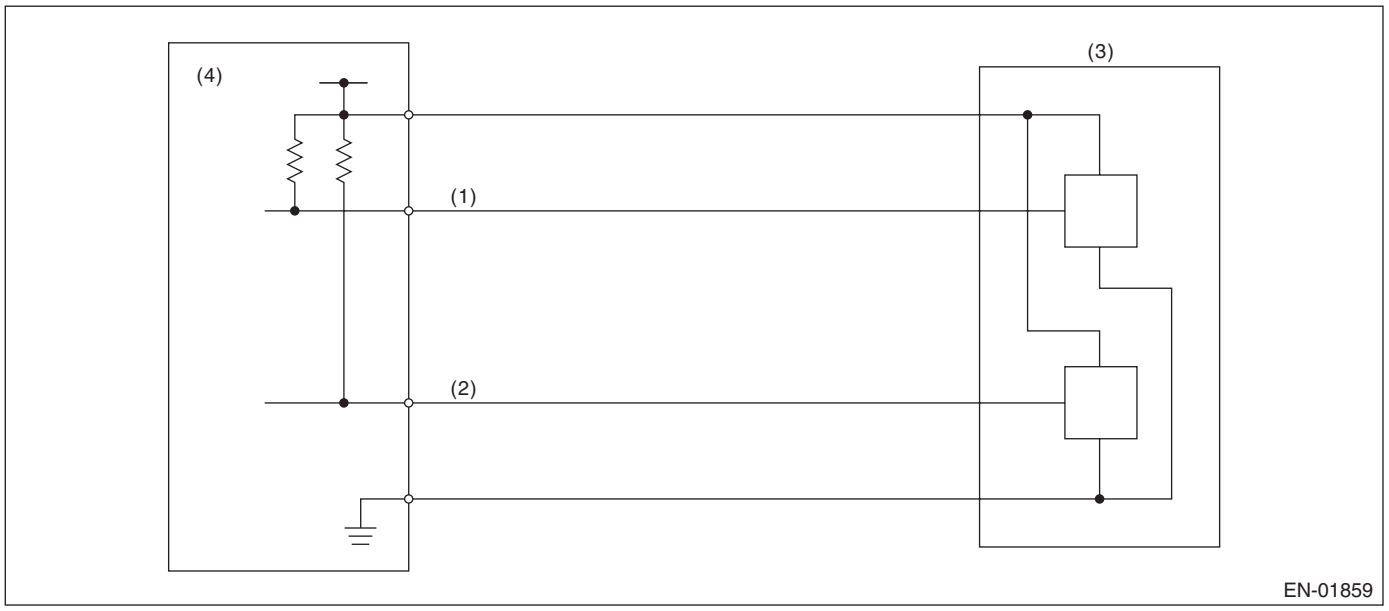
	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 19 — Chassis ground:*** ***(B134) No. 18 — Chassis ground:*** ***(B134) No. 18 — (B137) No. 4:*** ***(B134) No. 28 — Chassis ground:*** ***(B134) No. 28 — (B137) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
2	**CHECK SHORT CIRCUIT INSIDE THE ECM.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 — Engine ground:*** ***(E57) No. 4 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
3	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. ***Connector & terminal*** ***(B134) No. 18 — (E57) No. 6:*** ***(B134) No. 28 — (E57) No. 4:*** ***(B134) No. 29 — (E57) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 3 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector

	Step	Check	Yes	No
5	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. ***Connector & terminal*** ***(E57) No. 6 (+) — Engine ground (–):*** ***(E57) No. 4 (+) — Engine ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step **6**.
6	**CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. ***Connector & terminal*** ***(B134) No. 19 — (B134) No. 18:*** ***(B134) No. 19 — (B134) No. 28:***	Is the resistance 1 MΩ or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO(HEV))-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

1. OUTLINE OF DIAGNOSIS

Judge as NG when the signal level of throttle position sensor 1 is different from the throttle position sensor 2.

2. COMPONENT DESCRIPTION



(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal
(3) Throttle position sensor
(4) Engine control module (ECM)

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

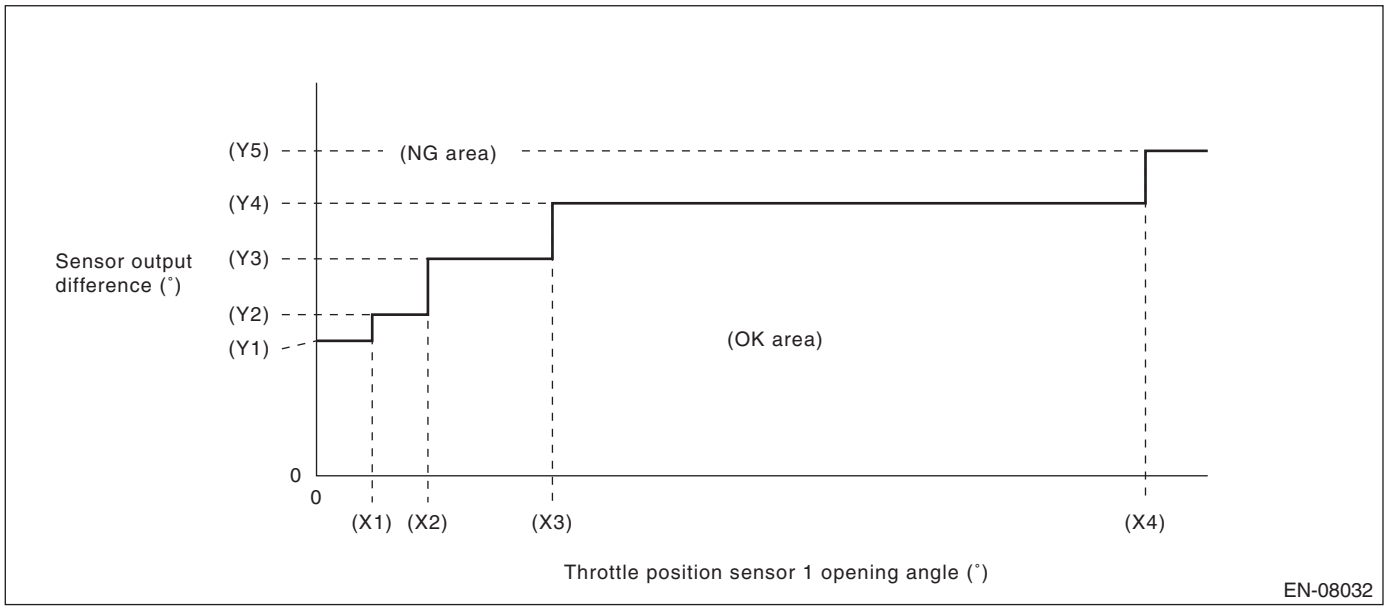
5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	Within NG range of **Details of Judgment value**

Details of Judgment Value



(X1) 2.125 °
(X2) 4.25 °
(X3) 9 °
(X4) 31.625 °

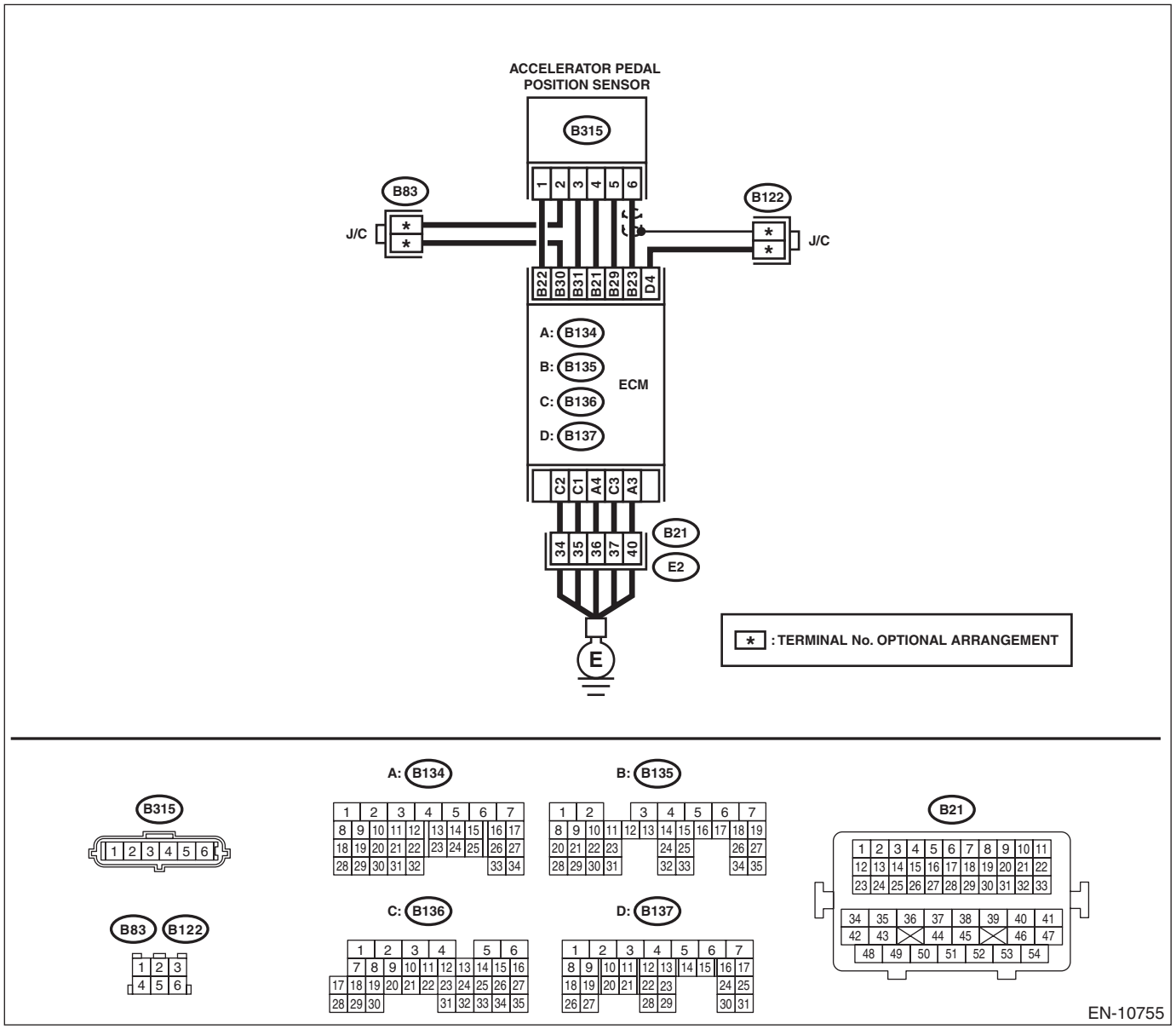
(Y1) 4.736 °
(Y2) 5.736 °
(Y3) 7.861 °
(Y4) 9.986 °
(Y5) 11.986 °

Time Needed for Diagnosis: 212 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FC:DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Improper idling
- Poor driving performance

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

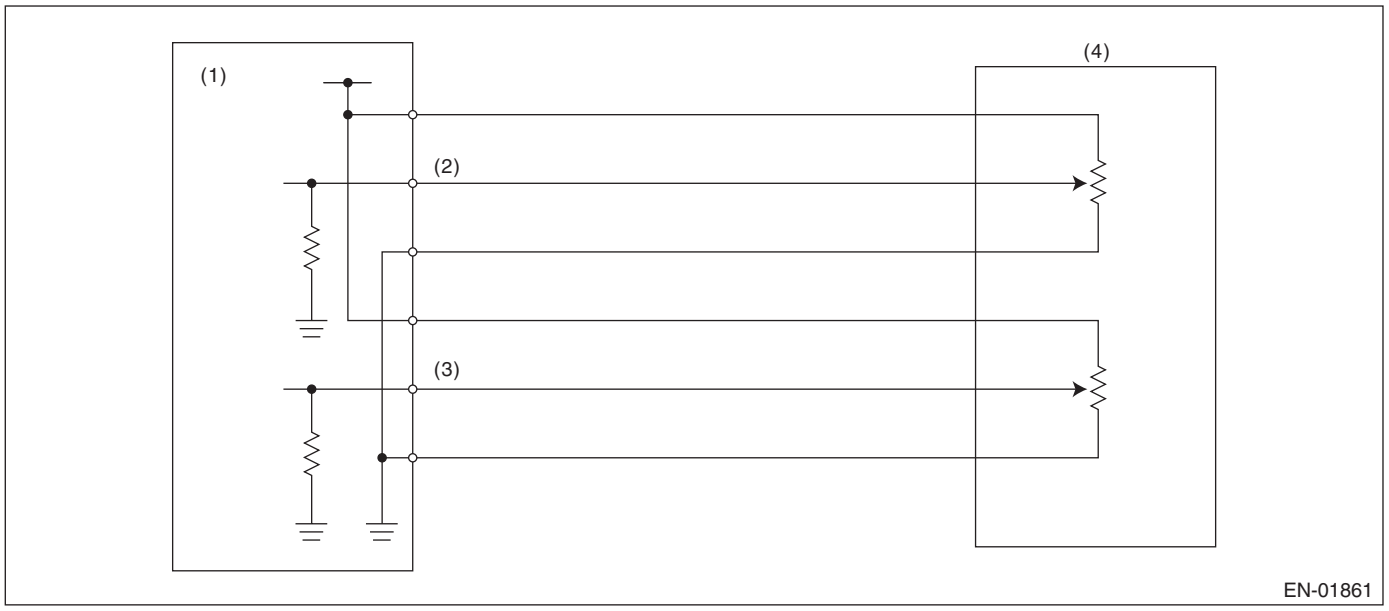


	Step	Check	Yes	No
1	**CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***Main accelerator pedal position sensor signal*** ***(B135) No. 23 (+) — Chassis ground (–):*** ***Sub accelerator pedal position sensor signal*** ***(B135) No. 31 (+) — Chassis ground (–):***	Is the difference in measured values for the main accelerator pedal position sensor signal and the sub accelerator pedal position sensor signal 0 V?	Go to step **3**.	Go to step **2**.
2	**CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT.** 1) Measure the voltage between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 6 (+) — Chassis ground (–):*** ***(B315) No. 3 (+) — Chassis ground (–):***	Is the difference in measured values for the main accelerator pedal position sensor signal and the sub accelerator pedal position sensor signal 0 V?	Replace the accelerator pedal. <Ref. to SP(H4DO(w/o HEV))-5, Accelerator Pedal.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and accelerator pedal position sensor connector • Short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector
3	**CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR.** Measure the resistance of harness between accelerator pedal position sensor connector and chassis ground. ***Connector & terminal*** ***(B315) No. 5 — Chassis ground:*** ***(B315) No. 2 — Chassis ground:***	Is the resistance less than 5 Ω?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and accelerator pedal position sensor connector • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of joint connector

1. OUTLINE OF DIAGNOSIS

Judge as NG when the signal level of accelerator pedal position sensor 1 is different from the accelerator pedal position sensor 2.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)
(2) Accelerator pedal position sensor 1 signal
(3) Accelerator pedal position sensor 2 signal
(4) Accelerator pedal position sensor

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 6 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

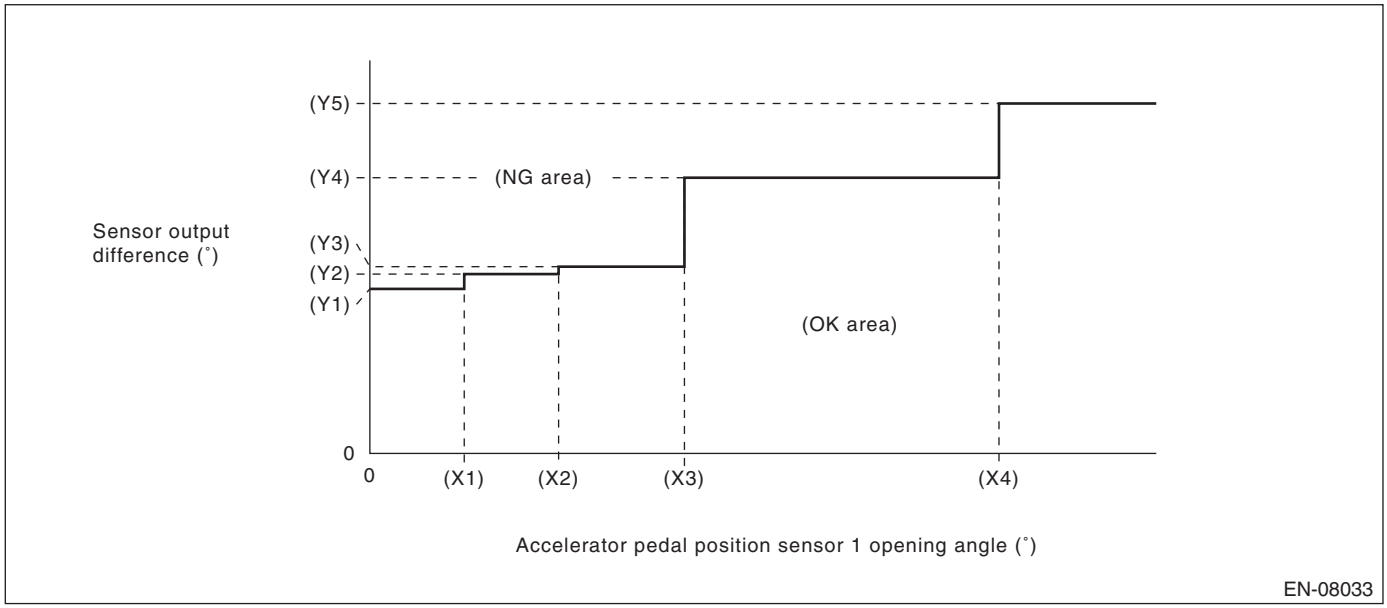
5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	Within NG range of **Details of Judgment value**

Details of Judgment Value



(X1) 0.6 °
(X2) 1.2 °
(X3) 2 °
(X4) 4 °

(Y1) 1.465 °
(Y2) 1.597 °
(Y3) 1.663 °
(Y4) 2.455 °
(Y5) 3.116 °

Time Needed for Diagnosis: 116 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FD:DTC P2195 A/F /O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 1

DTC DETECTING CONDITION:

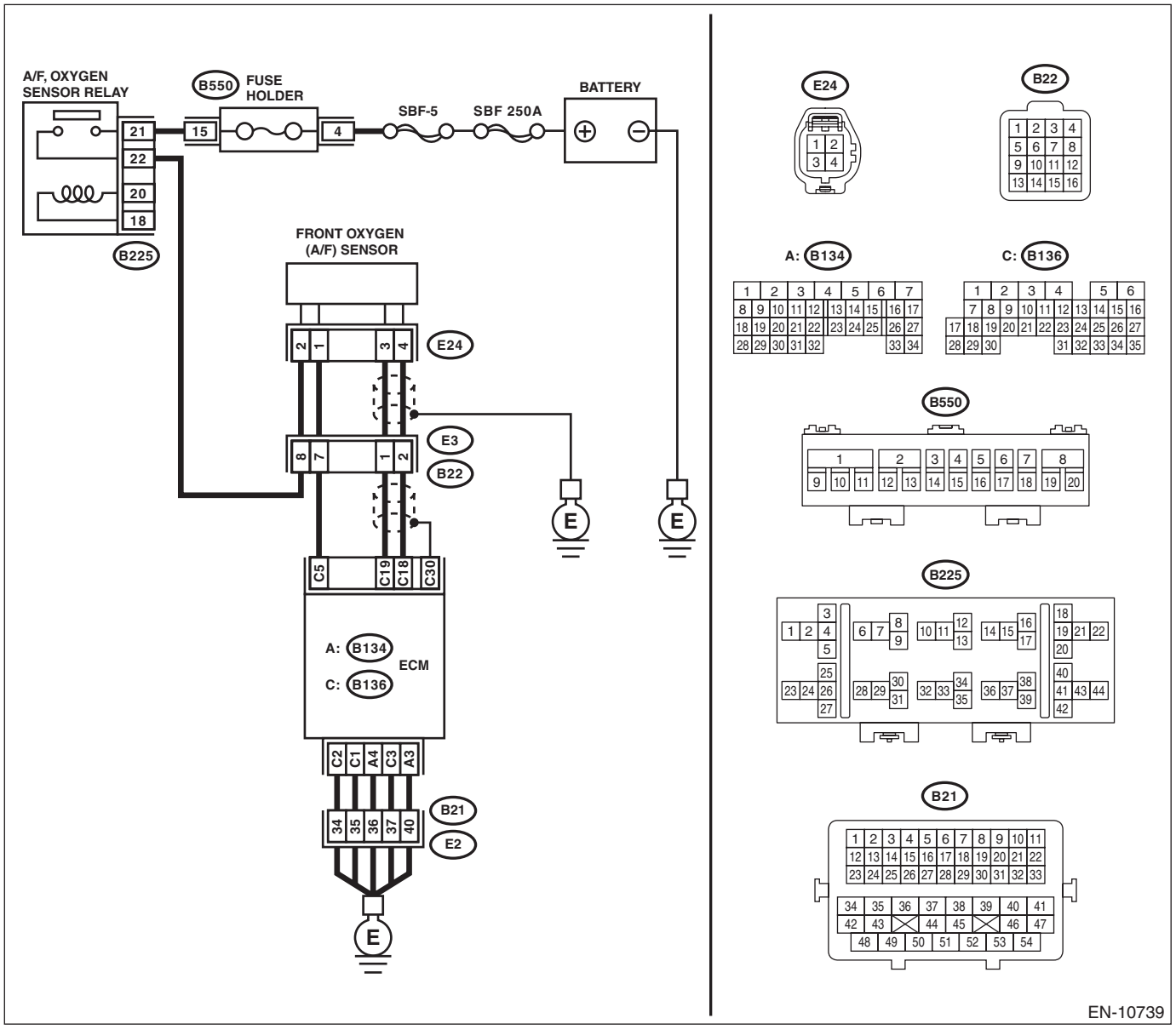
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

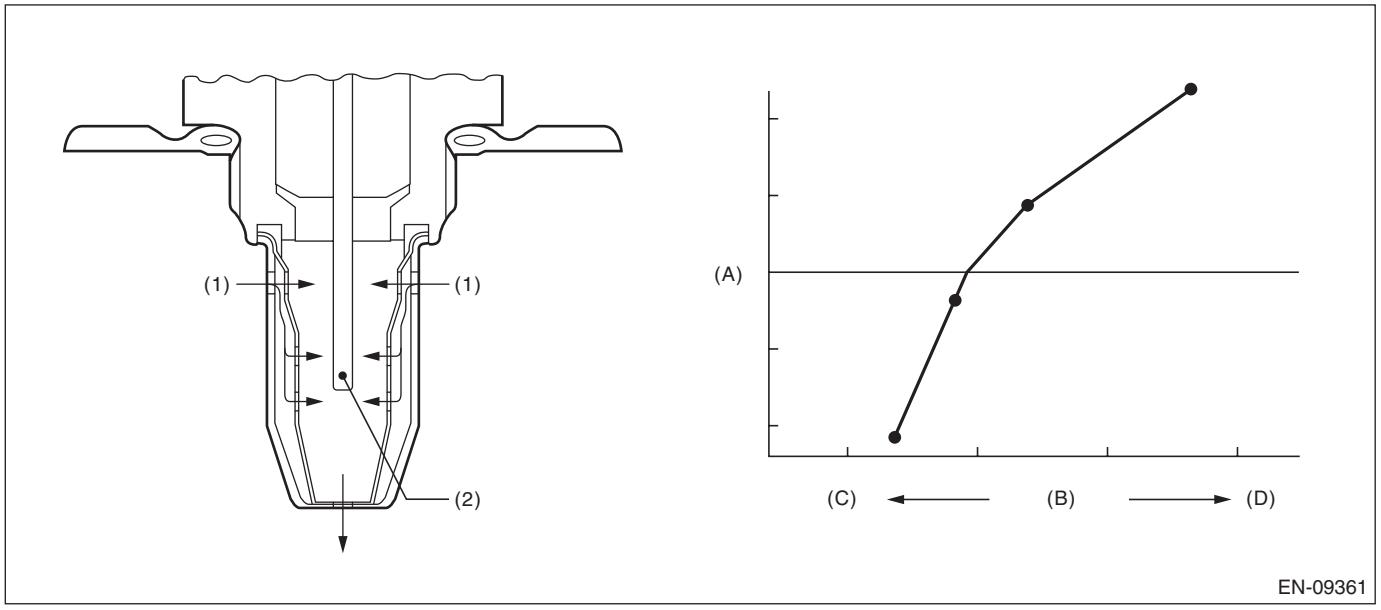
	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector
3	**CHECK FOR POOR CONTACT.** Check for poor contact of the front oxygen (A/F) sensor connector.	Is there poor contact of front oxygen (A/F) sensor connector?	Repair the poor contact of front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect that λ value remains low.
Judge as NG when lambda value is abnormal in accordance with λ value of front oxygen (A/F) sensor and running conditions such as vehicle speed, amount of intake air, engine coolant temperature, sub feedback control, etc.

λ value = Actual air fuel ratio/Theoretical air fuel ratio
λ > 1: Lean
λ < 1: Rich

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Rich
(D) Lean

(1) Exhaust gas
(2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Sub feedback	Execution
Rear oxygen sensor output voltage – Feedback target voltage or	≥ – 0.2 V to < 0.1 V
Rear oxygen sensor sub feedback compensation coefficient or	On Min.
Rear oxygen sensor sub feedback compensation coefficient	On Max.
Intake air amount	≥ 6 g/s (0.21 oz/s)

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously at a constant speed of 0 km/h (0 MPH) or more after 0 ms have passed since the engine started.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
λ value	≤ 0.85

Time Needed for Diagnosis: 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FE:DTC P2196 A/F /O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 1

DTC DETECTING CONDITION:

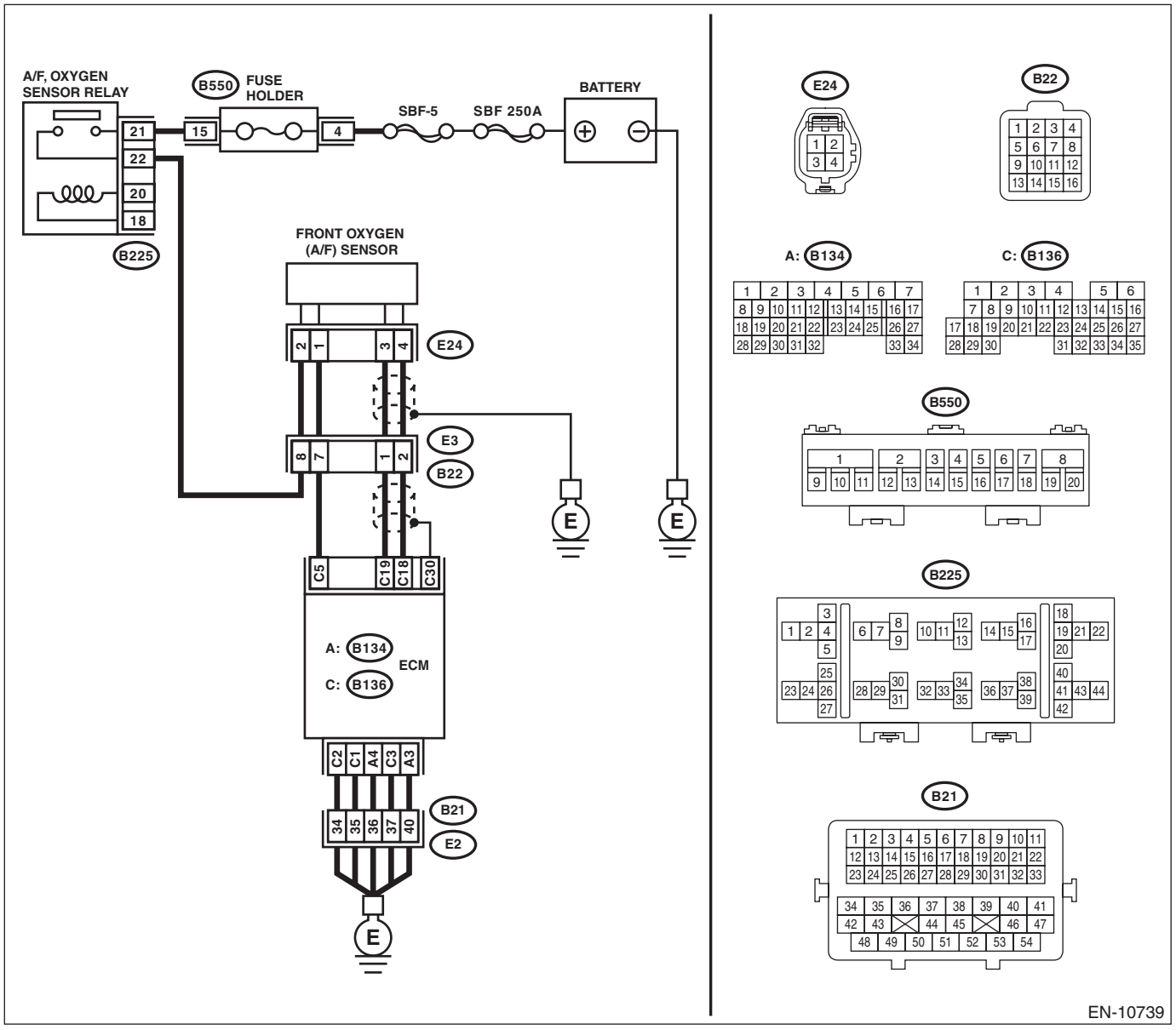
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

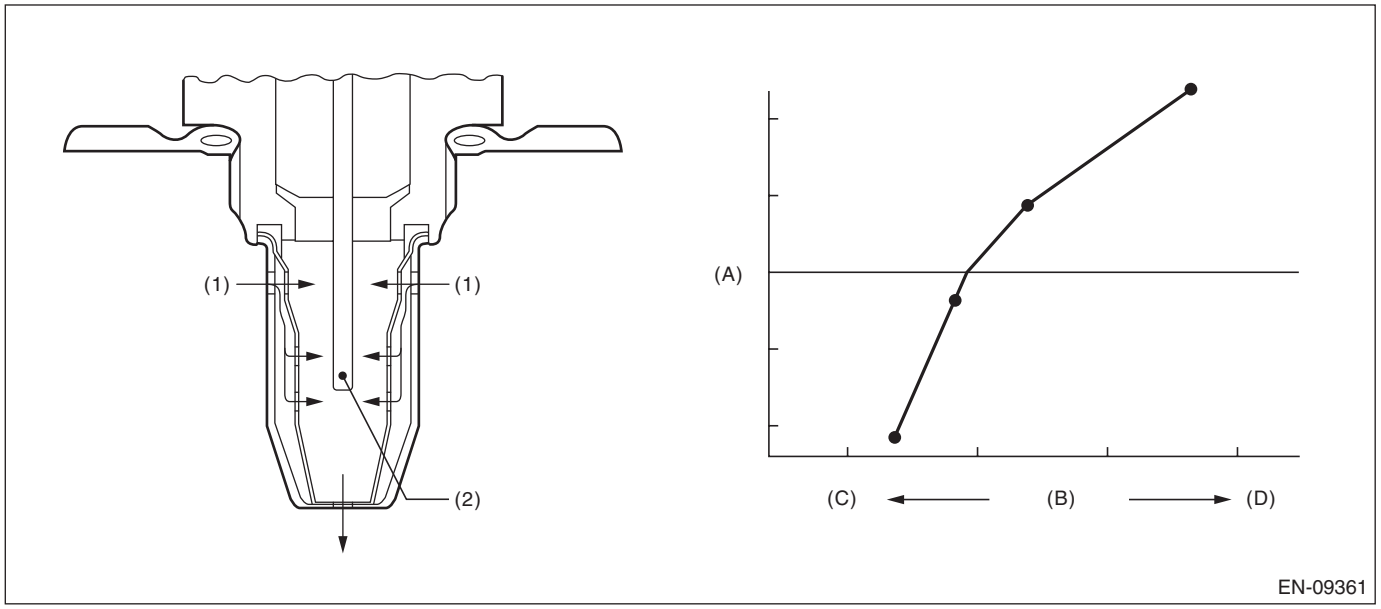
Step		Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
3	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **5**.	Go to step **4**.
4	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 18 (+) — Chassis ground (–):***	Is the voltage 4.95 V or more?	Go to step **5**.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>
5	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 (+) — Chassis ground (–):*** ***(B136) No. 18 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.

1. OUTLINE OF DIAGNOSIS

Detect that λ value remains high.
Judge as NG when lambda value is abnormal in accordance with λ value of front oxygen (A/F) sensor and running conditions such as vehicle speed, amount of intake air, engine coolant temperature, sub feedback control, etc.

λ value = Actual air fuel ratio/Theoretical air fuel ratio
λ > 1: Lean
λ < 1: Rich

2. COMPONENT DESCRIPTION



(A) Electromotive force (B) Air fuel ratio (C) Rich
(D) Lean

(1) Exhaust gas (2) ZrO_2

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Rear oxygen sensor sub feedback	Execution
Rear oxygen sensor output voltage – Feedback target voltage	≥ – 0.2 V to < 0.1 V
or	
Rear oxygen sensor sub feedback compensation coefficient	On Min.
or rear oxygen sensor sub feedback compensation coefficient	On Max.
Intake air amount	≥ 6 g/s (0.21 oz/s)

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously at a constant speed of 0 km/h (0 MPH) or more after 0 ms have passed since the engine started.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
λ value	≥ 1.15

Time Needed for Diagnosis: 10000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FF: DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE

DTC DETECTING CONDITION:

Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:

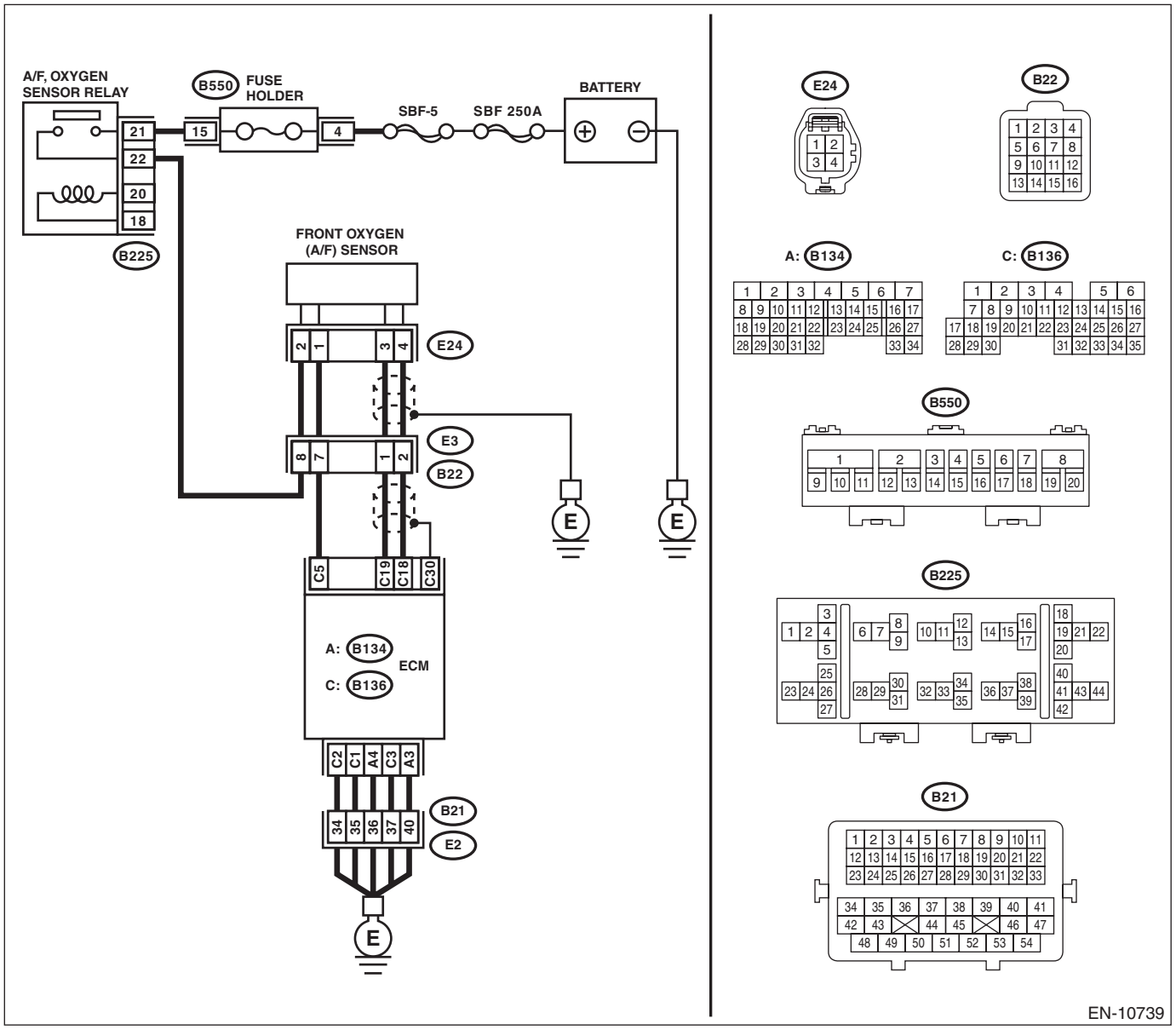
- Engine stalls.
- Improper idling

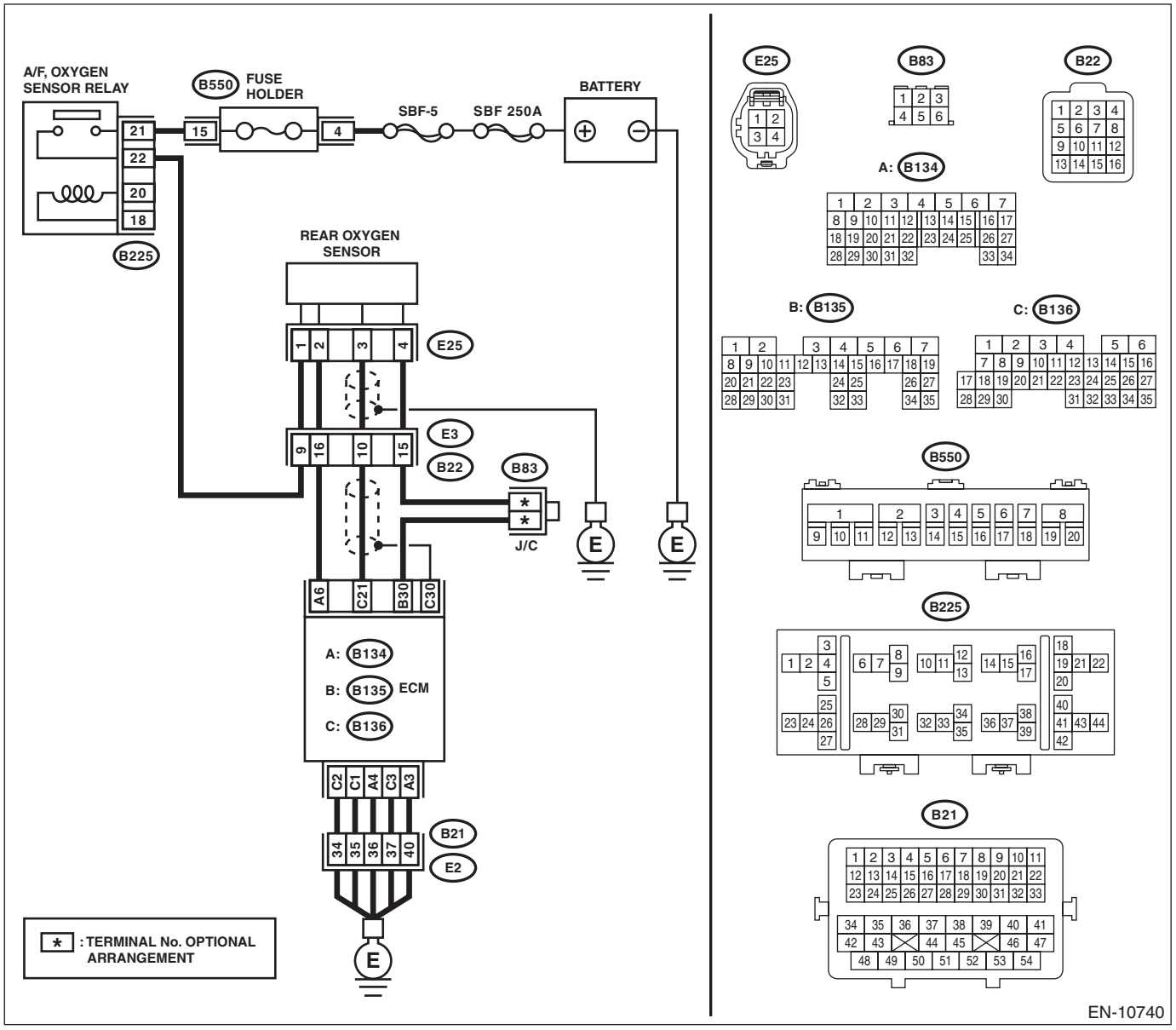
CAUTION:

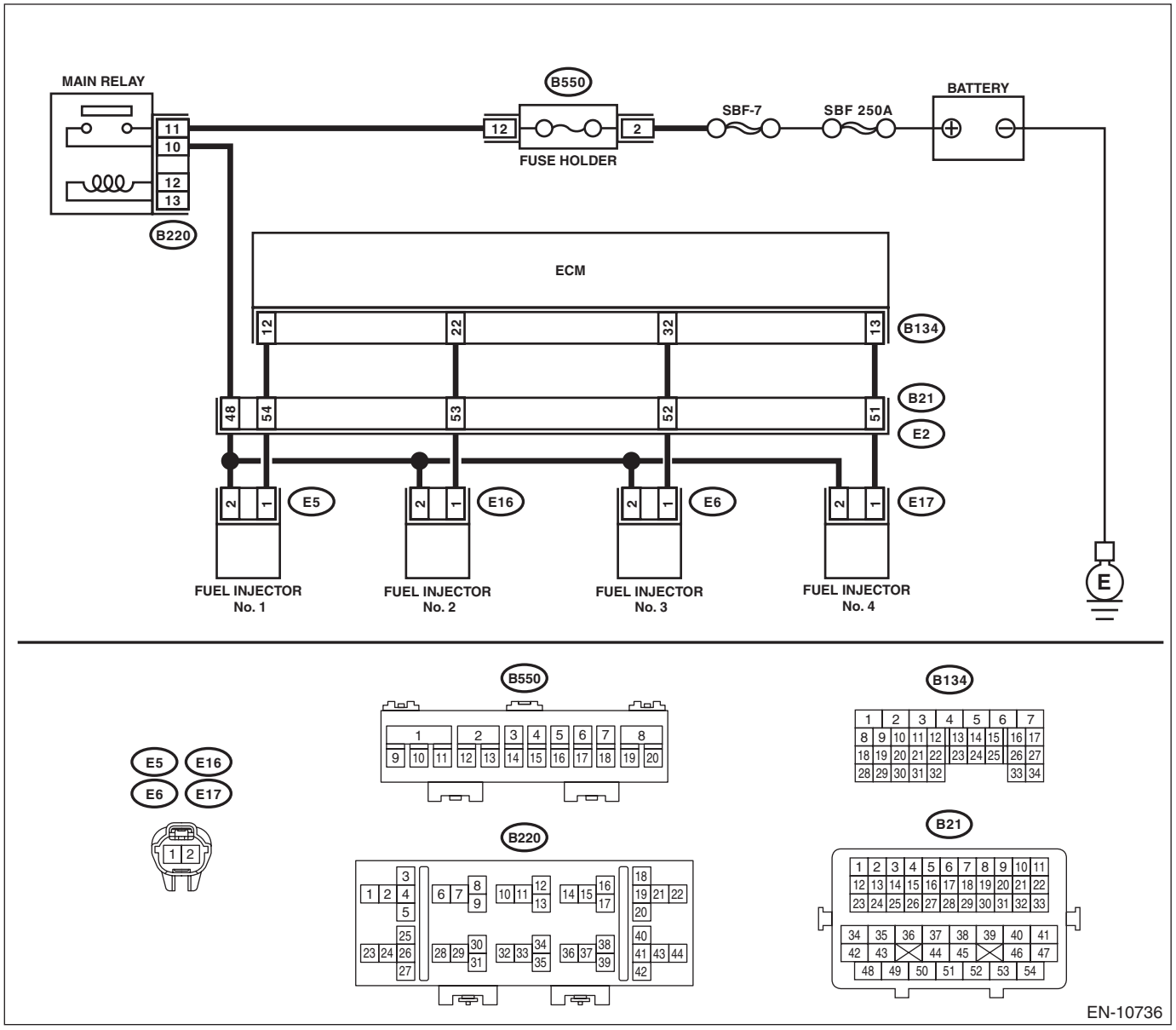
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>




A/F, OXYGEN SENSOR RELAY
B550
FUSE HOLDER
BATTERY
SBF-5
SBF 250A
21
22
20
18
15
4
B225
REAR OXYGEN SENSOR
E25
E3
B22
B83
J/C
A6
C21
B30
C30
A: B134
B: B135
C: B136
ECM
C2
C1
A4
C3
A3
B21
E2
34
35
36
37
40
E
: TERMINAL No. OPTIONAL ARRANGEMENT
B550
B225
B21
EN-10740



Step		Check	Yes	No
1	**CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 18 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector

	Step	Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** Measure the resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 19 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
4	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):***	Is the voltage 4.5 V or more?	Go to step **6**.	Go to step **5**.
5	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 4.95 V or more?	Go to step **6**.	Go to step **7**.
6	**CHECK OUTPUT SIGNAL FOR ECM.** Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. ***Connector & terminal*** ***(E24) No. 3 (+) — Chassis ground (–):*** ***(E24) No. 4 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
7	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **8**.
8	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **9**.
9	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **10**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(HEV))-129, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(HEV))-161, INSPECTION, Fuel Delivery and Evaporation Lines.>

	Step	Check	Yes	No
10	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **11**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>
11	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in "P" range or "N" range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step **12**.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>
12	**CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) Place the select lever in "P" range or "N" range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value –10 — 50°C (–18 — 90°F)?	Go to step **13**.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO(HEV))-64, Mass Air Flow and Intake Air Temperature Sensor.>

	Step	Check	Yes	No
13	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.490 V or more?	Go to step **14**.	Go to step **15**.
14	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.250 V or less?	Go to step **16**.	Go to step **15**.
15	**CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **17**.
16	**CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL.** 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Oxygen sensor #12» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Oxygen sensor #12» 0.250 V or less for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>	Go to step **17**.

	Step	Check	Yes	No
17	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 21 — (E25) No. 3:*** ***(B135) No. 30 — (E25) No. 4:***	Is the resistance less than 1 Ω?	Go to step **18**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
18	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Chassis ground (–):***	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-79, Front Oxygen (A/F) Sensor.>	Go to step **19**.
19	**CHECK OUTPUT SIGNAL OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **24**.	Go to step **20**.
20	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector and engine ground on faulty cylinders. ***Connector & terminal*** ***#1 (E5) No. 1 — Engine ground:*** ***#2 (E16) No. 1 — Engine ground:*** ***#3 (E6) No. 1 — Engine ground:*** ***#4 (E17) No. 1 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **21**.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
21	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 — (E5) No. 1:*** ***#2 (B134) No. 22 — (E16) No. 1:*** ***#3 (B134) No. 32 — (E6) No. 1:*** ***#4 (B134) No. 13 — (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **22**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
22	**CHECK FUEL INJECTOR.** Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **23**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>

	Step	Check	Yes	No
23	**CHECK POWER SUPPLY LINE.** 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector connector of faulty cylinders and engine ground. ***Connector & terminal*** ***#1 (E5) No. 2 (+) — Engine ground (–):*** ***#2 (E16) No. 2 (+) — Engine ground (–):*** ***#3 (E6) No. 2 (+) — Engine ground (–):*** ***#4 (E17) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector
24	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on faulty cylinders. ***Connector & terminal*** ***#1 (B134) No. 12 (+) — Chassis ground (–):*** ***#2 (B134) No. 22 (+) — Chassis ground (–):*** ***#3 (B134) No. 32 (+) — Chassis ground (–):*** ***#4 (B134) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step **25**.
25	**CHECK FUEL INJECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 5 — 20 Ω?	Go to step **26**.	Replace the faulty fuel injector. <Ref. to FU(H4DO(HEV))-70, Fuel Injector.>
26	**CHECK INSTALLATION CONDITION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor. <Ref. to FU(H4DO(HEV))-54, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO(HEV))-49, INSTALLATION, Crankshaft Position Sensor.>	Go to step **27**.
27	**CHECK CRANKSHAFT POSITION SENSOR PLATE.**	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO(w/o HEV))-309, Cylinder Block.>	Go to step **28**.

	Step	Check	Yes	No
28	**CHECK INSTALLATION CONDITION OF TIMING CHAIN.** Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO(w/o HEV))-171, Timing Chain Assembly.>	Go to step **29**.
29	**CHECK FUEL LEVEL.**	Is the fuel meter indication higher than the “Lower” level?	Go to step **30**.	Refill the fuel so that the fuel meter indication is higher than the “Lower” level, and proceed to the next step. Go to step **30**.
30	**CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.** 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step **32**.	Go to step **31**.
31	**CHECK CAUSE OF MISFIRE.**	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
32	**CHECK AIR INTAKE SYSTEM.**	Is there any fault in air intake system?	Repair the air intake system. NOTE: Check the following items. • Are there air leaks or air suction caused by loose or dislocated nuts and bolts? • Are there cracks or any disconnection of hoses?	Go to step **33**.
33	**CHECK MISFIRE SYMPTOM.** 1) Turn the ignition switch to ON. 2) Check for DTC. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Does the Subaru Select Monitor or general scan tool indicate only one DTC?	Go to step **36**.	Go to step **34**.
34	**CHECK DTC.**	Is DTC P0301 and P0303 displayed on the Subaru Select Monitor or general scan tool?	Go to step **37**.	Go to step **35**.

Step		Check	Yes	No
35	CHECK DTC.	Is DTC P0302 and P0304 displayed on the Subaru Select Monitor or general scan tool?	Go to step **38**.	Go to step **39**.
36	ONLY ONE CYLINDER.	Is there any fault in the cylinder?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression	Go to DTC P0171. <Ref. to EN(H4DO HEV)(diag)-241, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
37	GROUP OF #1 AND #3 CYLINDERS.	Are there any faults in #1 and #3 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression • Skipping timing chain teeth	Go to DTC P0171. <Ref. to EN(H4DO HEV)(diag)-241, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
38	GROUP OF #2 AND #4 CYLINDERS.	Are there any faults in #2 and #4 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression • Skipping timing chain teeth	Go to DTC P0171. <Ref. to EN(H4DO HEV)(diag)-241, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
39	CYLINDER AT RANDOM.	Is the engine idle rough?	Go to DTC P0171. <Ref. to EN(H4DO HEV)(diag)-241, DTC P0171 SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression

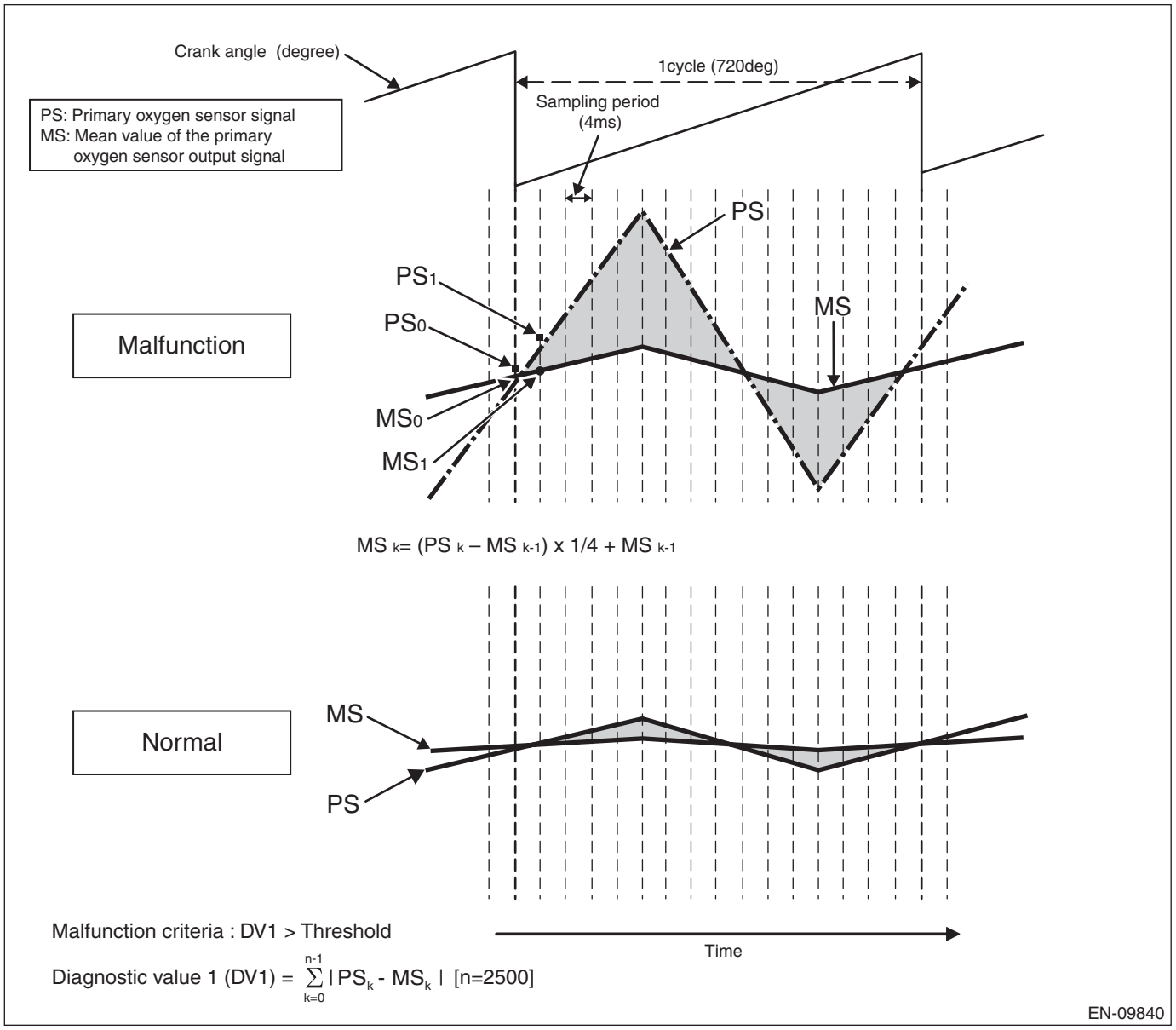
1. OUTLINE OF DIAGNOSIS

This diagnostic monitor performs a functional check of the fuel system to determine an air-fuel ratio cylinder imbalance.
This diagnosis is composed of two monitors.
The outline of “monitor A1” is as follows. When an air-fuel ratio cylinder imbalance occurs, the primary oxygen sensor output signal will oscillate with increased amplitude. This monitor utilizes this behavior to make a diagnosis. The monitor integrates the difference between the amplification value and the mean value of the first oxygen sensor output signal and compares it to a threshold to make a judgment.
The outline of “monitor B1” is as follows. Similarly, when an imbalance occurs, the engine speed also fluctuates with increased amplitude. This monitor utilizes this behavior to make a diagnosis. For reference, it should be noted that this imbalance monitor method is actually similar to the current misfire diagnostic monitor, and the parameter “domg360” (units: degrees CA) is shared between the imbalance and misfire monitors. The imbalance monitor is performed during idle condition when the engine is warm. The monitor integrates the count of “domg360” which exceeds a threshold in 1000 revolution.
When both the “monitor A1” value and the “monitor B1” value exceed a predetermined threshold, this monitor determines a malfunction and stores a fault code.

Monitor A1

When there is an air-fuel ratio cylinder imbalance malfunction, the primary oxygen sensor output fluctuates widely compared with a normal sensor, as shown by the chain line in Figure 1 below. This monitor makes a diagnosis based on this phenomenon. Each primary oxygen sensor signal (PS) and mean value of the primary oxygen sensor signal (MS) is calculated from the primary oxygen sensor signal. The absolute values of (PS – MS) are sampled every 4 ms as shown in the figure. Diagnostic value 1 (DV1) is obtained by integrating the absolute value of (PS – MS) for 2500 times. A malfunction is determined when DV1 exceeds the threshold. The judgment values are determined experimentally.

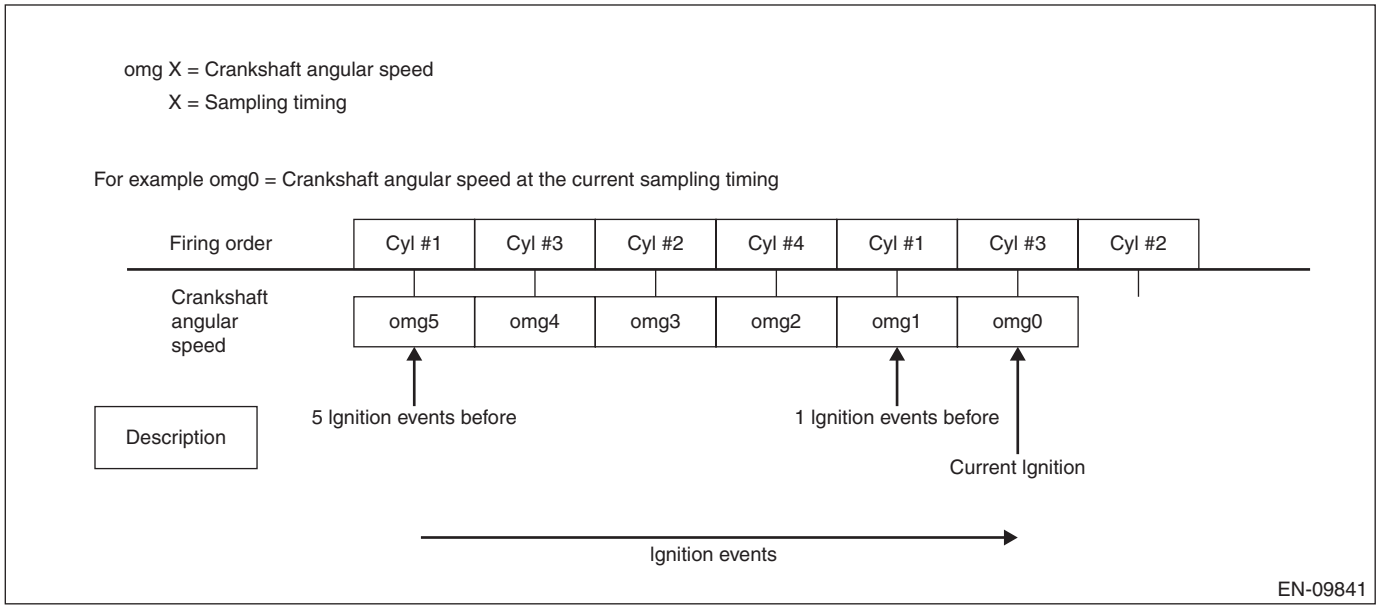
Figure 1. Compare malfunctioned primary oxygen sensor output with a normal sensor



Monitor B1

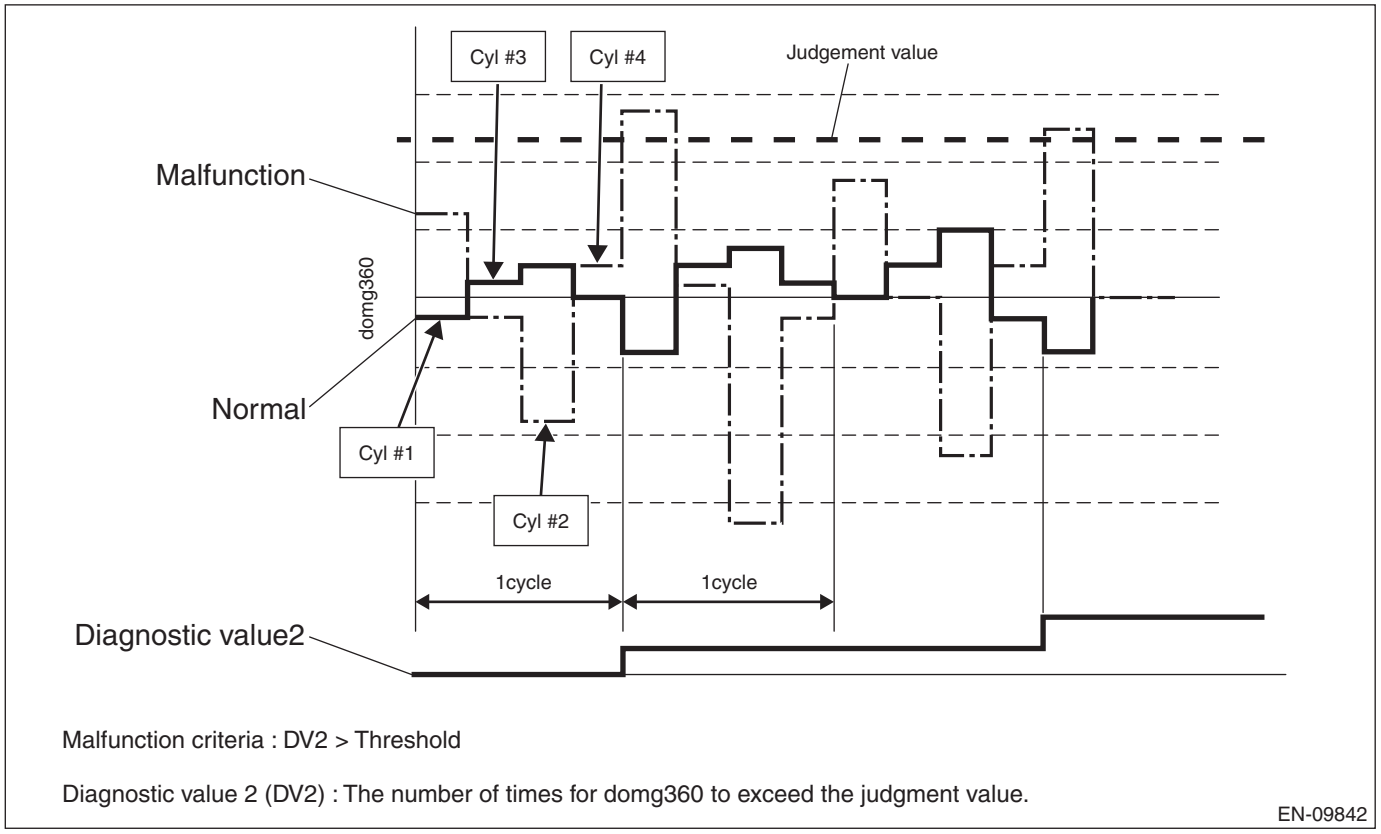
Method used: Difference method of 360 degrees CA
Monitor value: domg360 = (omg 1 – omg 0) – (omg 3 – omg 2) = angular speed
Each crankshaft angular speed is defined as Figure 2 below.

Figure 2. Description of domg360 output



This method uses the fact that the domg360 of lean conditioned cylinder caused by imbalance malfunction indicates big value, as shown by the chain line in Figure 3 below.
The number of times for domg360 to exceed the judgment value in 1000 revolutions (500 cycles) is calculated as diagnostic value 2 (DV2). A malfunction is determined when DV2 exceeds the threshold.

Figure 3. Compare malfunctioned domg360 output with a normal output



2. EXECUTION CONDITION

Monitor A1: Primary oxygen sensor fluctuation

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Barometric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
A/F main feedback function	In operation
Engine speed	> 1400 rpm and < 3000 rpm
Intake air amount per revolution of crankshaft	> 0.70 g/rev (0.02 oz/rev)

Monitor B1: Crankshaft speed fluctuation

Secondary Parameters	Execution condition
Misfiring diagnosis monitor	ON
Accelerator pedal position	≠ 0%
A/F main feedback function	In operation
Engine speed	> 1400 rpm and < 3000 rpm
Intake air amount per revolution of crankshaft	> 0.7 g/rev (0.02 oz/rev) and < 100 g/rev (3.53 oz/rev)

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when Monitor A1 and Monitor B1 are both NG, and when either is OK, judge as OK.

Monitor A1

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value 1 (DV1)	> Threshold value 1 (TV1)

Threshold value 1 (TV1):

$$\sum_{k=0}^{n-1} Map_k \qquad [n=2500]$$

EN-09888

Map

		Engine load (g/rev (oz/rev))				
		0.7 (0.02)	0.8 (0.03)	0.9 (0.03)	1 (0.04)	1.1 (0.04)
Engine speed (rpm)	1400	0.0076	0.0110	0.0153	0.0201	0.0201
	1600	0.0116	0.0144	0.0204	0.0269	0.0269
	1800	0.0130	0.0186	0.0247	0.0257	0.0257
	2000	0.0144	0.0197	0.0262	0.0303	0.0303
	2200	0.0134	0.0203	0.0289	0.0356	0.0356
	2400	0.0136	0.0199	0.0288	0.0343	0.0343
	2600	0.0149	0.0209	0.0304	0.0362	0.0362
	2800	0.0156	0.0218	0.0312	0.0373	0.0373
	3000	0.016	0.0198	0.0344	0.0388	0.0388

Time Needed for Diagnosis: 4 ms × 2500 time(s)
Monitor B1
Judge as NG when the following conditions are established.
Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value2 (DV2)	> 30 time(s)

Time Needed for Diagnosis: 1000 engine revs.
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FG:DTC P2270 O2 SENSOR SIGNAL BIASED/STUCK LEAN BANK 1 SENSOR 2

DTC DETECTING CONDITION:

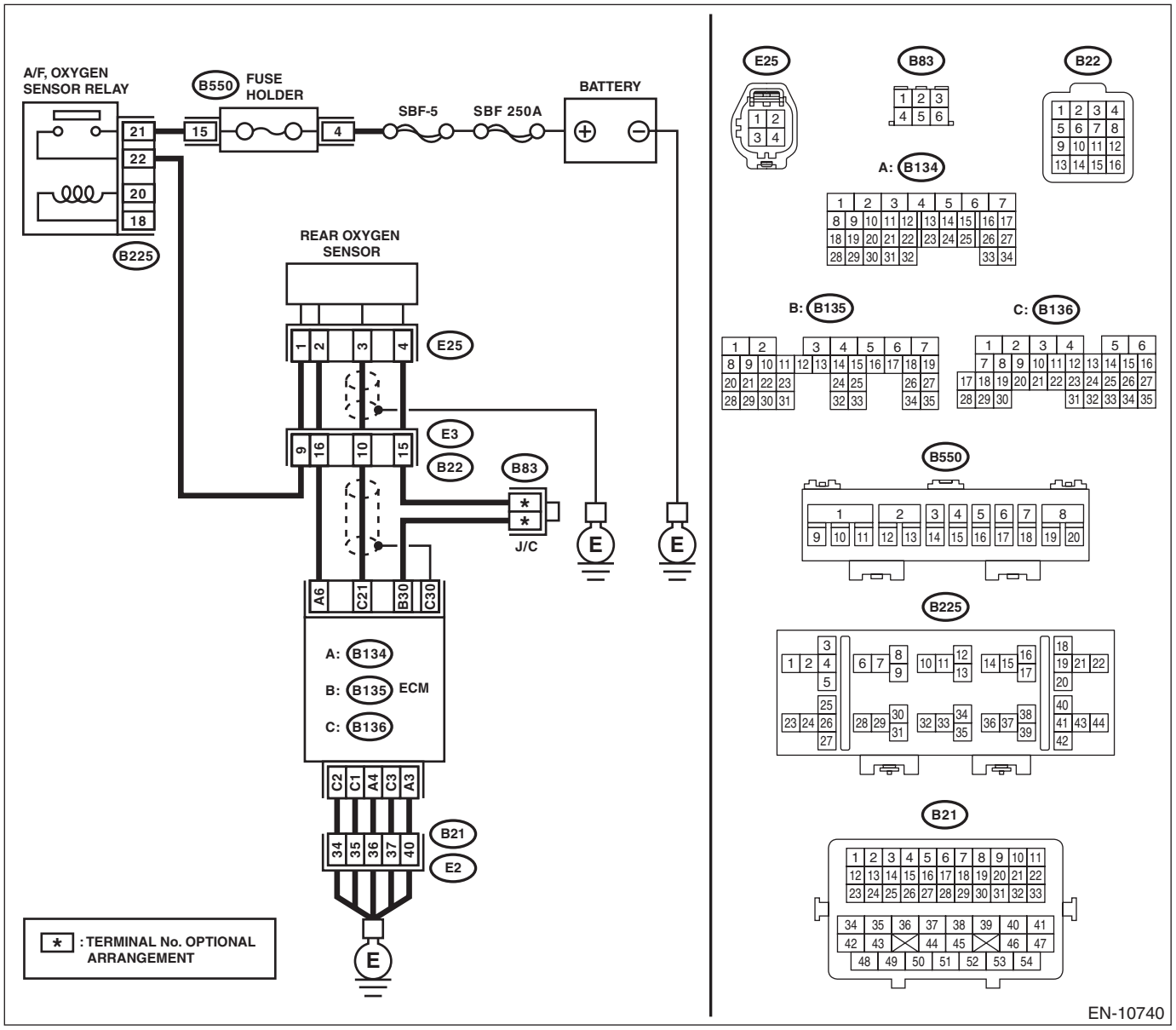
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



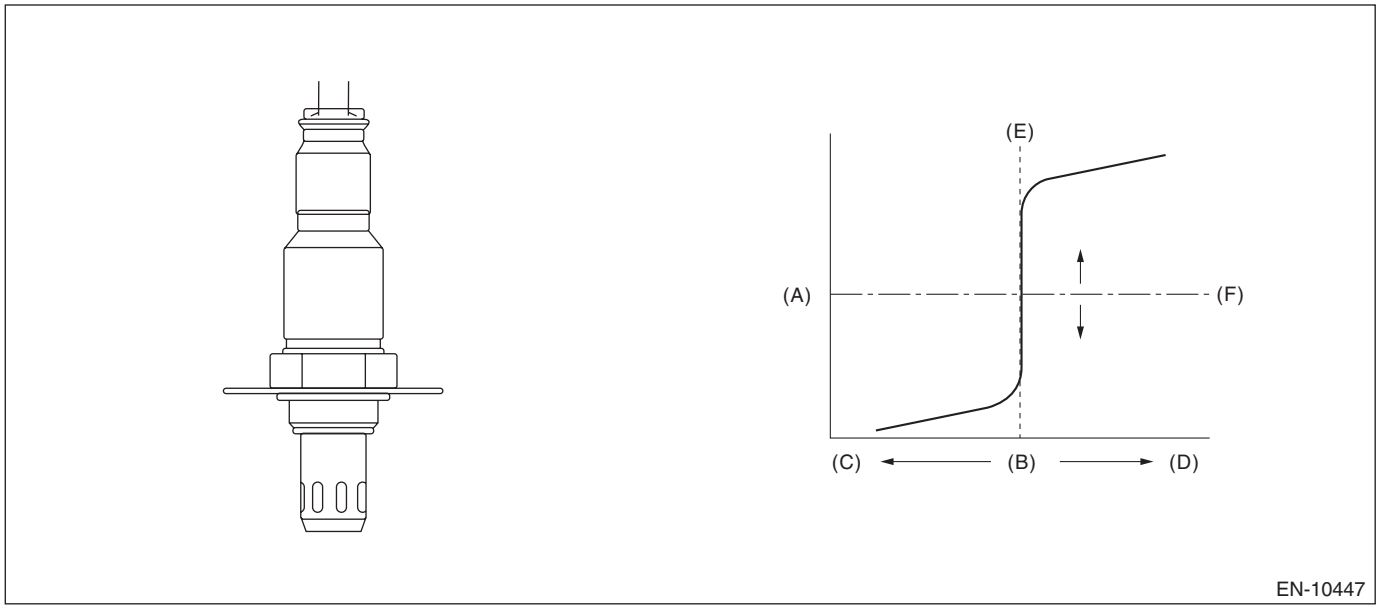
Step		Check	Yes	No
1	**CHECK REAR OXYGEN SENSOR CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B136) No. 30 — (E25) No. 4:*** ***(B135) No. 21 — (E25) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness between ECM connector and rear oxygen sensor connector.
3	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and engine ground. ***Connector & terminal*** ***(E25) No. 3 (+) — Engine ground (–):***	Is the voltage 0.15 V or more?	Repair the short circuit to power in the harness between ECM connector and rear oxygen sensor connector.	Go to step **4**.
4	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Damage (crack, hole etc.) between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the stuck of rear oxygen sensor voltage in lean state.
When rear oxygen sensor voltage remains below the threshold value for predetermined time, diagnosis interrupts target air fuel ratio for control and raises output voltage.
Judge as NG detecting the stuck in lean state when rear oxygen sensor voltage remains below the threshold value even after the interrupt control.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Lean
(D) Rich
(E) Theoretical air fuel ratio
(F) Comparative voltage

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Sub feedback	In operation
Amount of intake air	≥ 10 g/s (0.35 oz/s)
Estimated temperature of the rear oxygen sensor element	≥ 500 °C (932 °F)
Enable conditions at interrupt control are as follows	
Air fuel ratio reduced from target air fuel ratio	= Value of Map
Continuous time when rear oxygen sensor output voltage is less than 0.55 V	≥ 5000 ms

Map

Output voltage of rear oxygen sensor V	0.000	0.150	0.200	0.400	0.600
Air fuel ratio reduced from target air fuel ratio %	15	15	10	4	4

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the enable conditions have been established.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage of rear oxygen sensor	< 0.55 V

Time Needed for Diagnosis: 15000 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FH:DTC P2271 O2 SENSOR SIGNAL BIASED/STUCK RICH BANK 1 SENSOR 2

DTC DETECTING CONDITION:

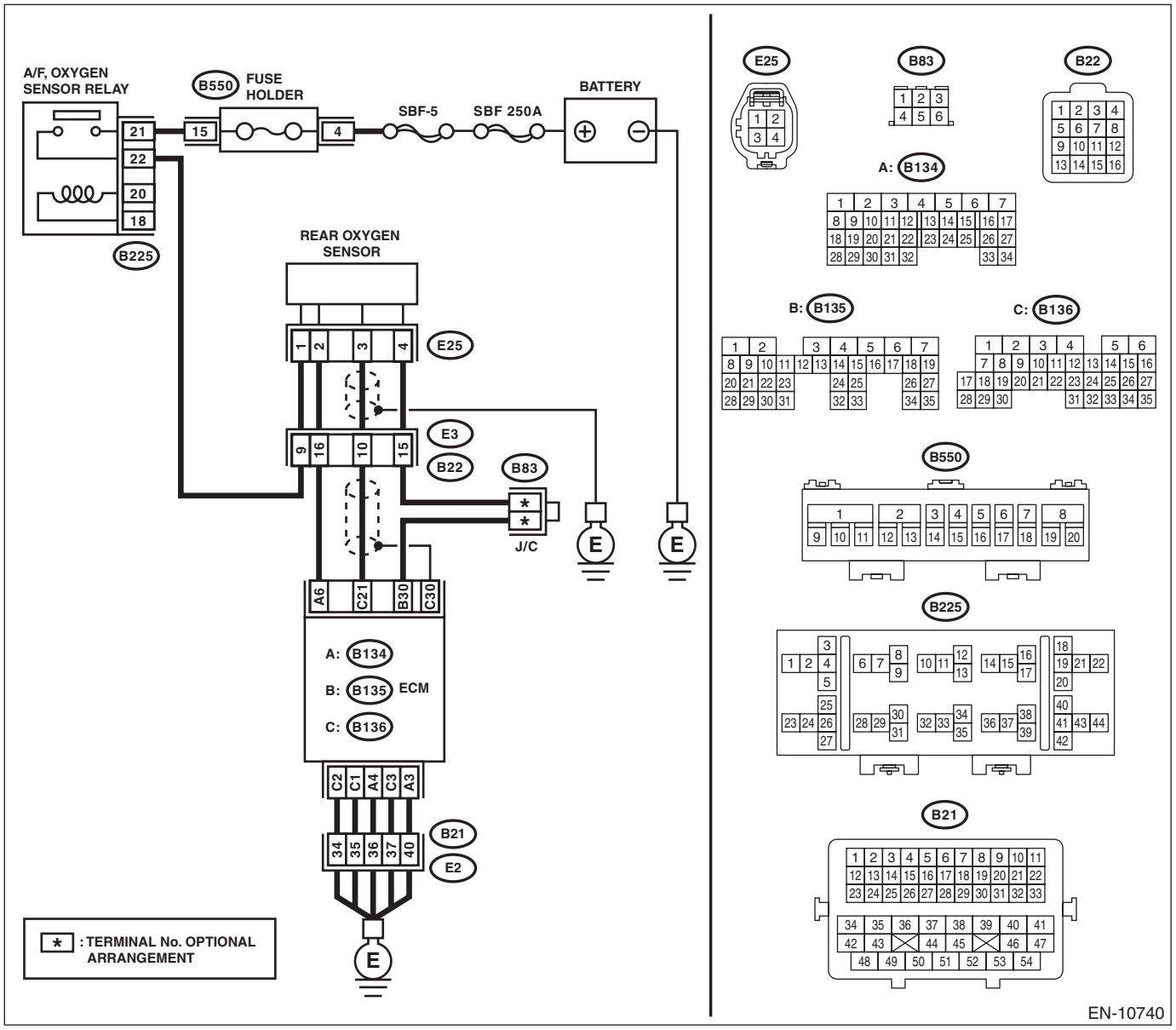
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



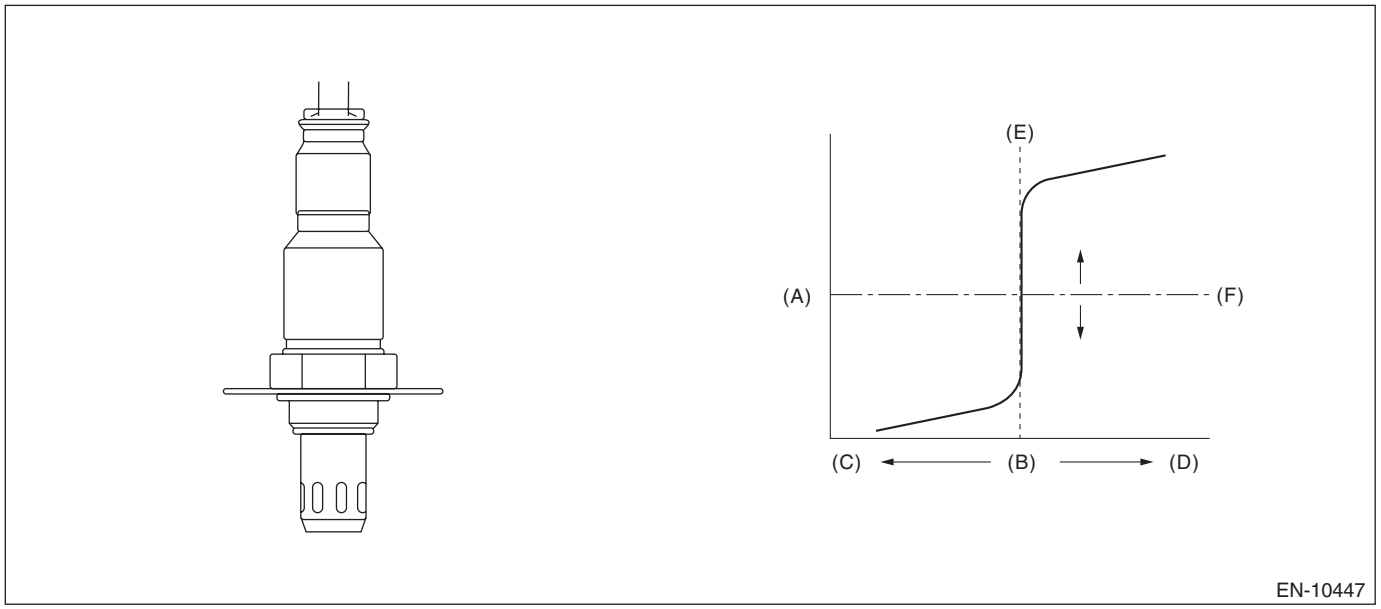
Step		Check	Yes	No
1	**CHECK REAR OXYGEN SENSOR CONNECTOR.**	Has water entered the connector?	Completely remove any water inside.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. ***Connector & terminal*** ***(B135) No. 30 — (E25) No. 4:*** ***(B135) No. 21 — (E25) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness between ECM connector and rear oxygen sensor connector.
3	**CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.** Measure the resistance between the ECM connector and engine ground. ***Connector & terminal*** ***(B135) No. 30 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit to ground in harness between ECM connector and rear oxygen sensor connector.
4	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Damage (crack, hole etc.) between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4DO(HEV))-83, Rear Oxygen Sensor.>

1. OUTLINE OF DIAGNOSIS

Detect the stuck of rear oxygen sensor voltage in rich state.
Detect the stuck in rich state and judge as NG if rear oxygen sensor voltage remains above the threshold value for predetermined time.

2. COMPONENT DESCRIPTION



(A) Electromotive force
(B) Air fuel ratio
(C) Lean
(D) Rich
(E) Theoretical air fuel ratio
(F) Comparative voltage

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Fuel cut time	≥ 5000 ms
Estimated temperature of the rear oxygen sensor element	≥ 500 °C (932 °F)

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after the enable conditions have been established.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage of rear oxygen sensor	> 0.15 V

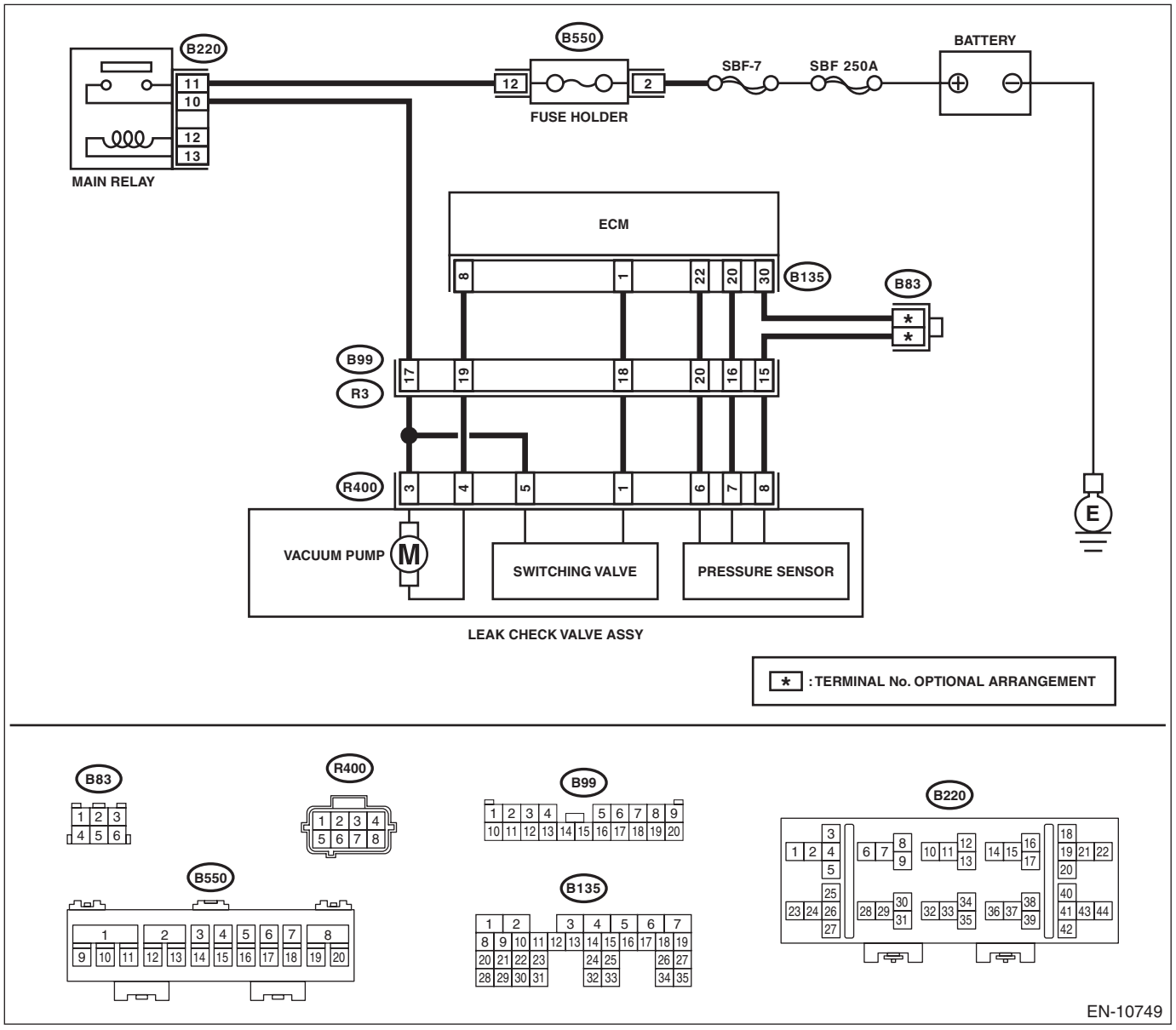
Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FI: DTC P2401 EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



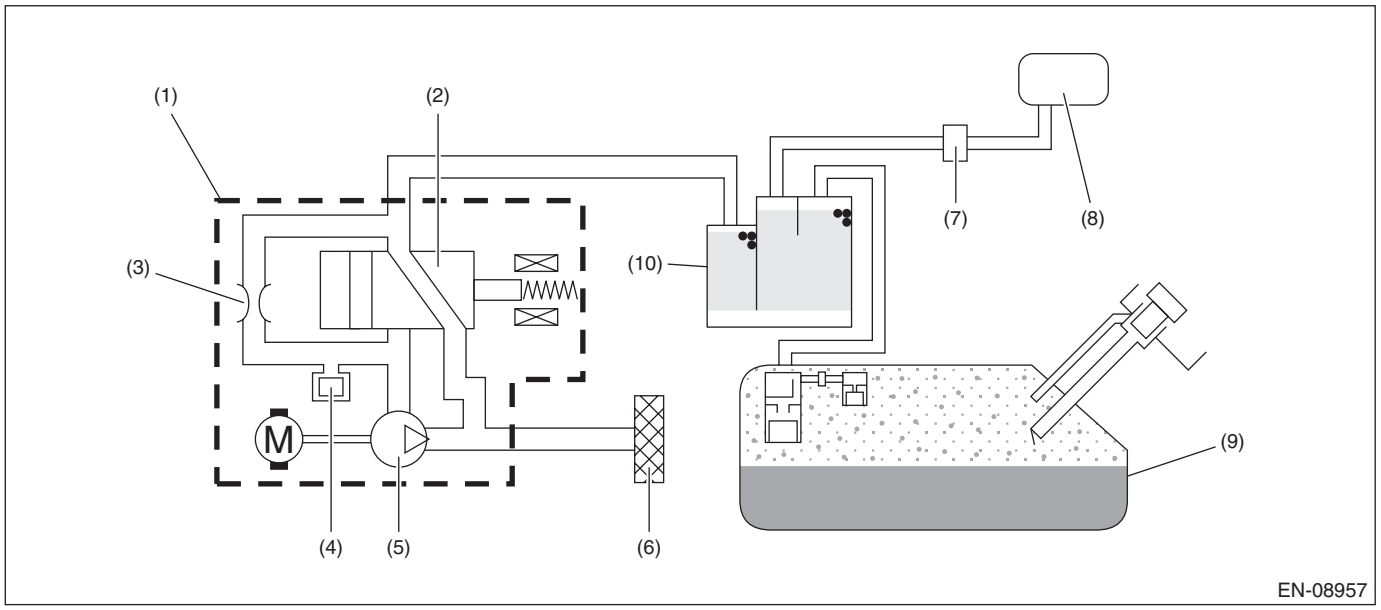
	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 8 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3	**CHECK POWER SUPPLY TO LEAK CHECK VALVE ASSEMBLY.** Measure the voltage between the leak check valve assembly connector and engine ground. ***Connector & terminal*** ***(R400) No. 3 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance between leak check valve assembly and chassis ground. ***Connector & terminal*** ***(R400) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
5	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 8 — (R400) No. 4:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector

Step		Check	Yes	No
6	**CHECK LEAK CHECK VALVE ASSEMBLY.** Check the vacuum pump of the leak check valve assembly. <Ref. to EC(H4DO(HEV))-48, CHECK VACUUM PUMP, INSPECTION, Leak Check Valve Assembly.>	Is the vacuum pump of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM vacuum pump.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9
ELCM vacuum pump drive signal	OFF

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage when ECM outputs OFF signal	≤ Battery voltage × 0.34

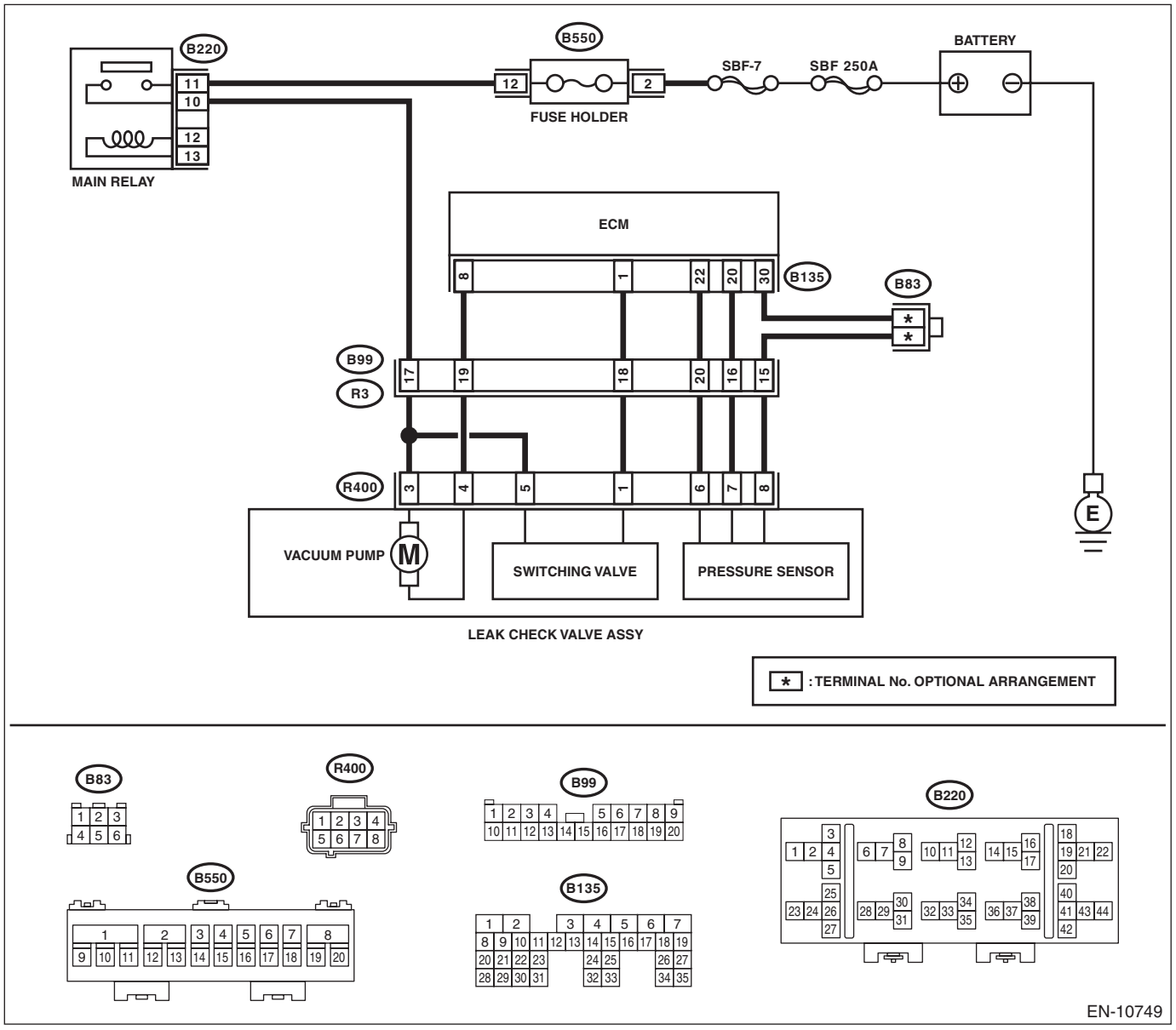
Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FJ: DTC P2402 EVAP SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

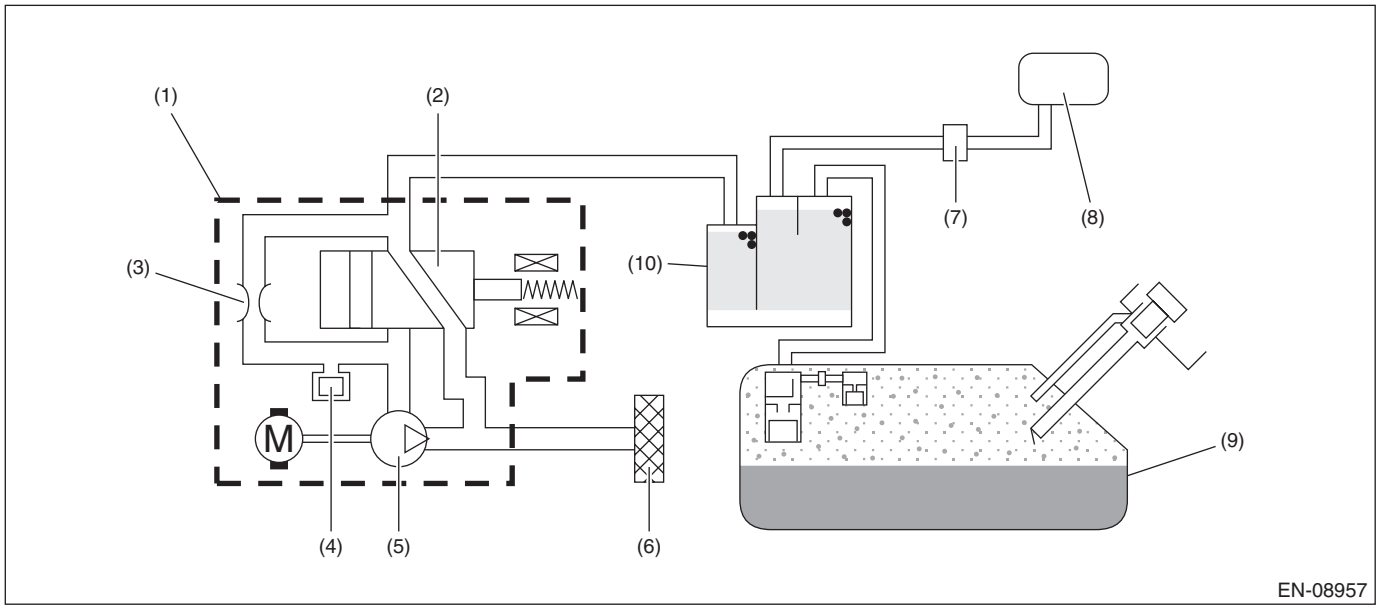


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between leak check valve assembly and chassis ground. ***Connector & terminal*** ***(R400) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Go to step **2**.
2	**CHECK LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Check the vacuum pump of the leak check valve assembly. <Ref. to EC(H4DO(HEV))-48, CHECK VACUUM PUMP, INSPECTION, Leak Check Valve Assembly.>	Is the vacuum pump of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM vacuum pump.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9
ELCM vacuum pump drive signal	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output current when ECM outputs ON signal	≥ 12 A

Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FK:DTC P2404 EVAP SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

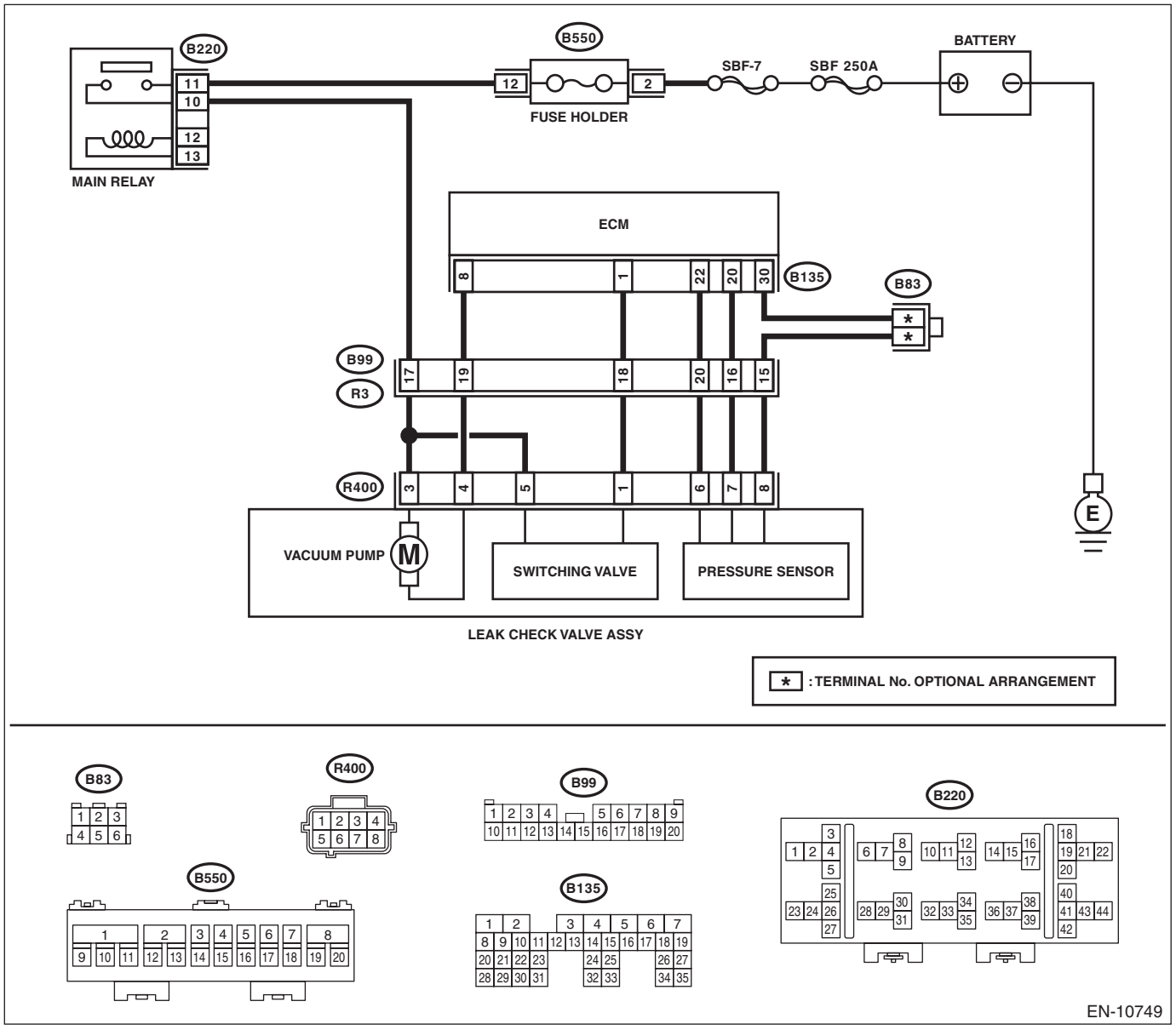
Detected when two consecutive driving cycles with fault occur.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



	Step	Check	Yes	No
1	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK ELCM PUMP.** Operate the ELCM pump using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the "Active Test". <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>	Does the ELCM pump operate?	Go to step **6**.	Go to step **3**.
3	**CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. ***Connector & terminal*** ***(R400) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay and the leak check valve assembly connector • Poor contact of main relay connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 8 — (R400) No. 4:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector
5	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 8 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.

	Step	Check	Yes	No
6	**CHECK ELCM SWITCHING VALVE.** Operate the ELCM switching valve using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to the "Active Test". <Ref. to EN(H4DO HEV)(diag)-69, Active Test.>	Does the ELCM switching valve operate?	Go to step **10**.	Go to step **7**.
7	**CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. ***Connector & terminal*** ***(R400) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **8**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay and the leak check valve assembly connector • Poor contact of main relay connector • Poor contact of coupling connector
8	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 1 — (R400) No. 1:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector
9	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
10	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM.** Perform drive cycle I. <Ref. to EN(H4DO HEV)(diag)-61, DRIVE CYCLE I, PROCEDURE, Drive Cycle.>	Is DTC P2404 displayed on the display?	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

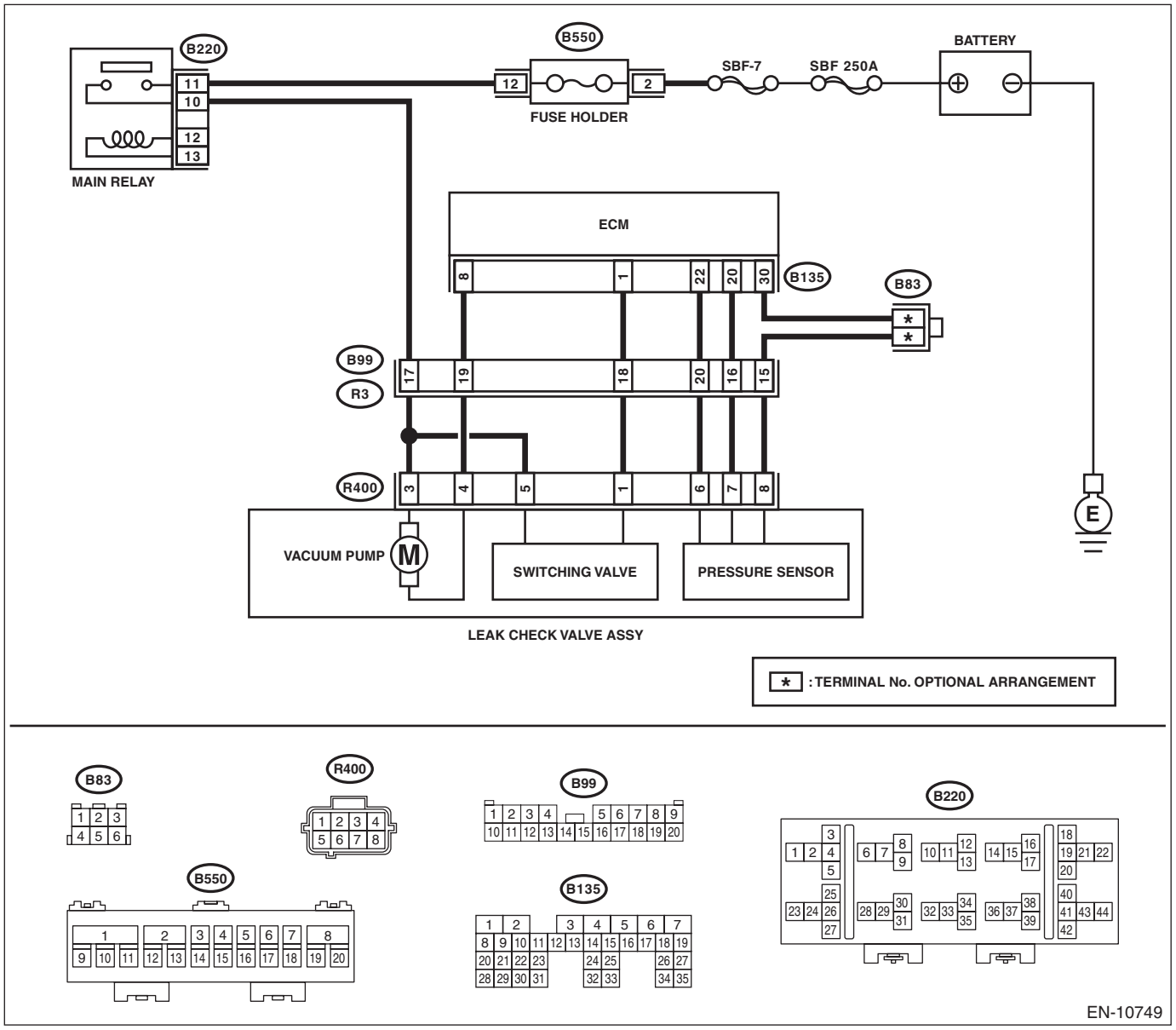
NOTE:
For the detection standard, refer to DTC P0455. <Ref. to EN(H4DO HEV)(diag)-335, DTC P0455 EVAP SYSTEM (CPC) LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

FL: DTC P2419 EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



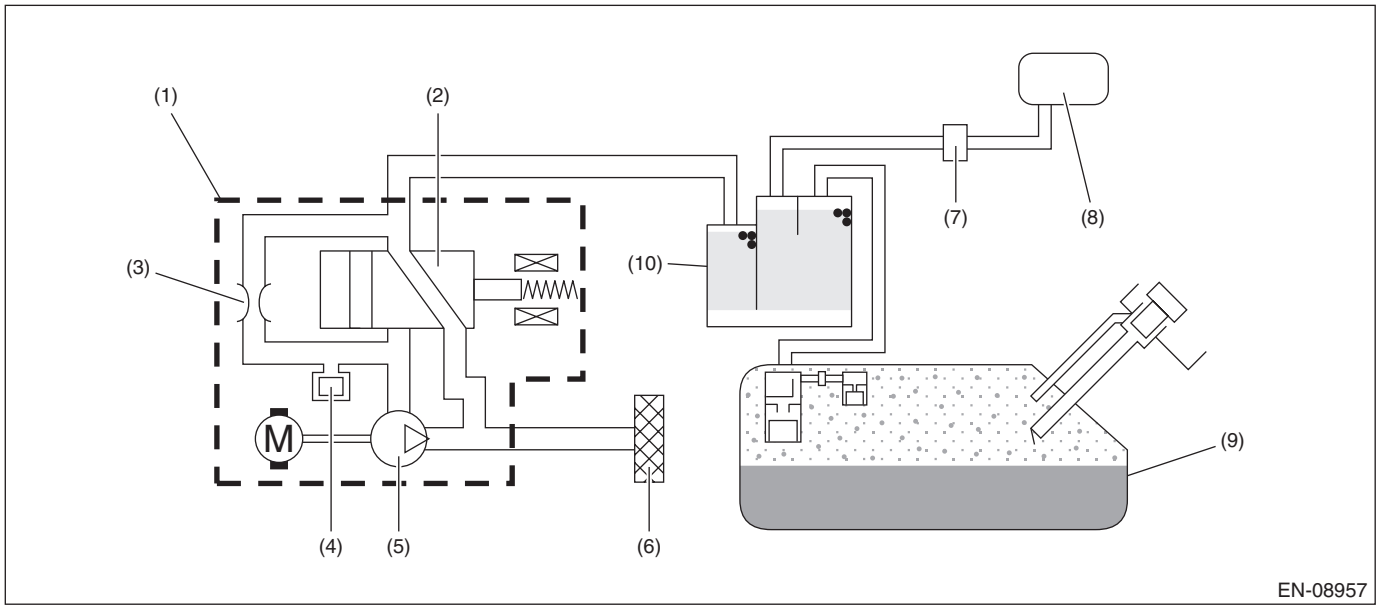
Step		Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Go to step **3**.

	Step	Check	Yes	No
2	**CHECK FOR POOR CONTACT.** Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3	**CHECK POWER SUPPLY TO LEAK CHECK VALVE ASSEMBLY.** Measure the voltage between the leak check valve assembly connector and engine ground. ***Connector & terminal*** ***(R400) No. 5 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance between leak check valve assembly and chassis ground. ***Connector & terminal*** ***(R400) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
5	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** Measure the resistance of harness between ECM connector and the leak check valve assembly connector. ***Connector & terminal*** ***(B135) No. 1 — (R400) No. 1:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector
6	**CHECK LEAK CHECK VALVE ASSEMBLY.** Check the switching valve of the leak check valve assembly. <Ref. to EC(H4DO(HEV))-47, CHECK SWITCHING VALVE, INSPECTION, Leak Check Valve Assembly.>	Is the switching valve of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM switching valve.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9
ELCM switching valve drive signal	OFF

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage when ECM outputs OFF signal	≤ Battery voltage × 0.34

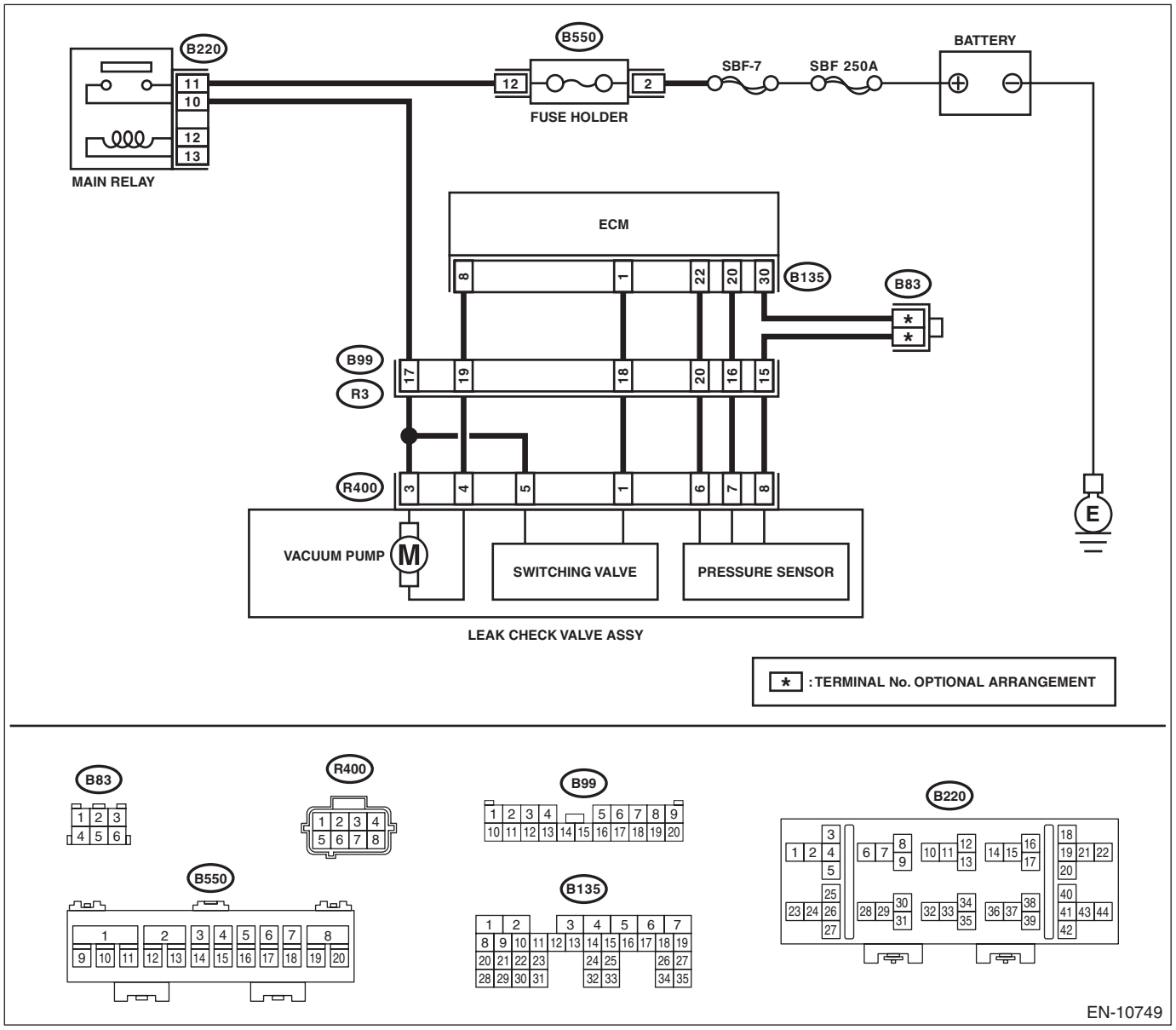
Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FM:DTC P2420 EVAP SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>

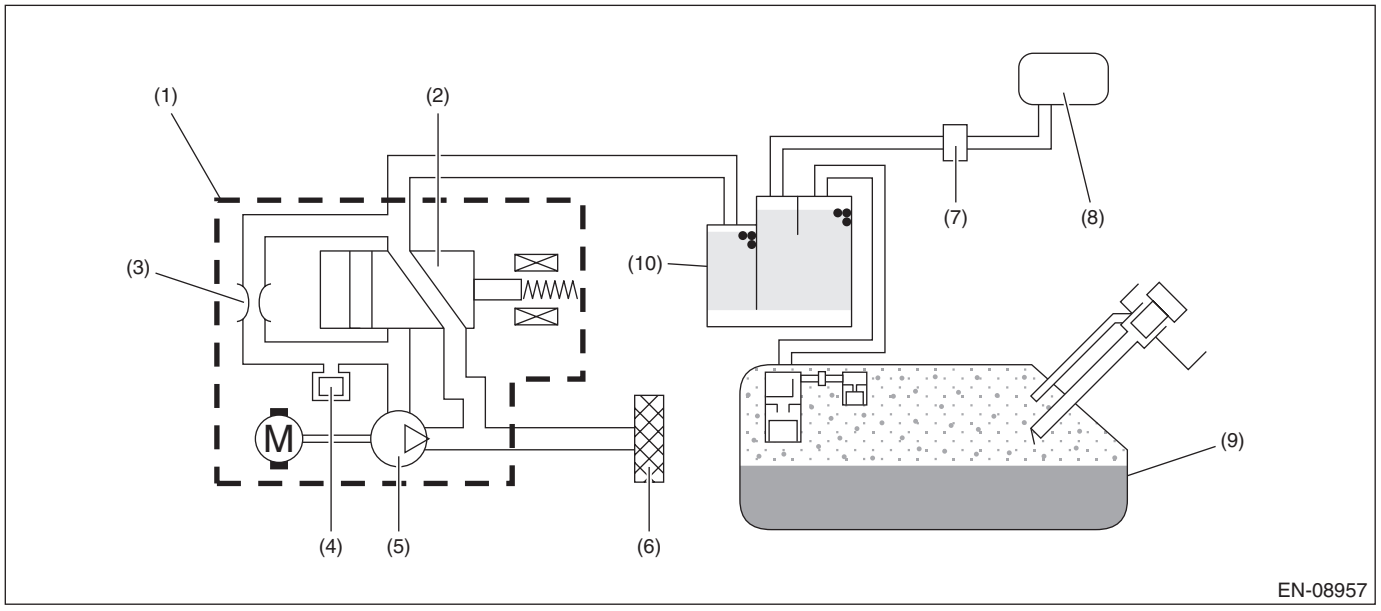


	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between leak check valve assembly and chassis ground. ***Connector & terminal*** ***(R400) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Go to step **2**.
2	**CHECK LEAK CHECK VALVE ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Check the switching valve of the leak check valve assembly. <Ref. to EC(H4DO(HEV))-47, CHECK SWITCHING VALVE, INSPECTION, Leak Check Valve Assembly.>	Is the switching valve of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO(HEV))-39, Leak Check Valve Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM switching valve.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM
(2) Switching valve
(3) Reference orifice (0.02 inch orifice)
(4) Pressure sensor
(5) Vacuum pump
(6) Drain filter
(7) Purge control solenoid valve
(8) Intake manifold
(9) Fuel tank
(10) Canister

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9
ELCM switching valve drive signal	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output current when ECM outputs ON signal	≥ 12 A

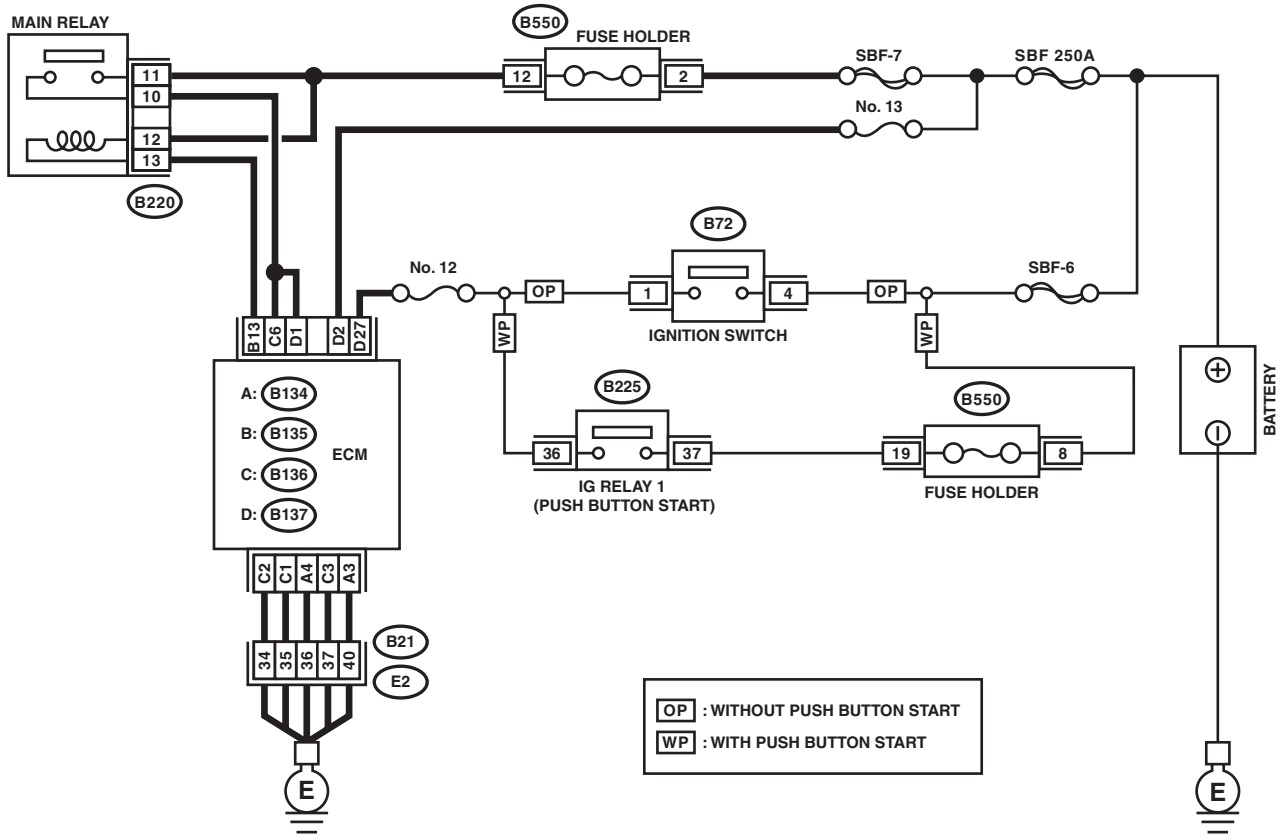
Time Needed for Diagnosis: 2500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

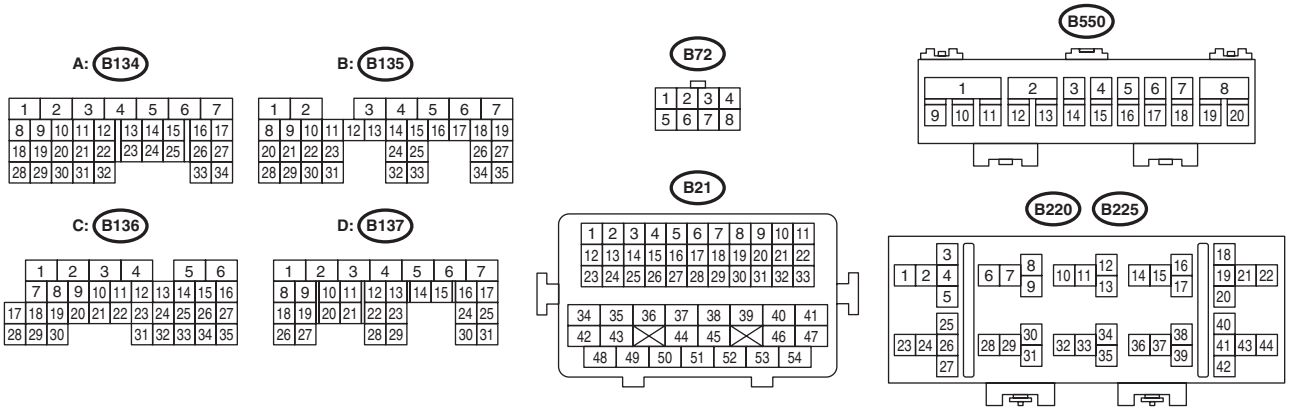
FN:DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Improper idling

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>





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	Step	Check	Yes	No
1	**CHECK ECM CONNECTOR.** Check the connecting condition of ECM connector.	Is the ECM connector correctly connected?	Go to step **2**.	Connect the ECM connector correctly.
2	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to ON. 2) Connect the check board. ST 18460AA050 CHECK BOARD 3) Measure the voltage between ECM connector and engine ground while wiggling the harness between ECM connector and F/B connector. ***Connector & terminal*** ***(B137) No. 2 (+) — Engine ground (–):***	Is the voltage 8 V or more all the time?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, the following items may be the cause of fault. • Open circuit or short circuit to ground in harness between ECM connector and F/B connector • Poor contact of fuse (F/B No. 5) • Poor contact of IG2 relay connector • Poor contact of IG2 relay	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between ECM connector and F/B connector • Poor contact of fuse (F/B No. 5) • Poor contact of IG2 relay connector • Poor contact of IG2 relay

1. OUTLINE OF DIAGNOSIS

Detect instantaneous open in ignition switch input circuit to ECM.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION

ECM monitors the voltage of the ignition switch input circuit. Judge as ignition switch ON when the voltage is the specified value or more.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V
Engine speed or Vehicle speed	≥ 550 rpm or ≥ 2 km/h(1.2 MPH)

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after the enable conditions have been established.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Number of instantaneous opens in ignition switch input circuit	≥ 5 time(s)

Time Needed for Diagnosis: 5000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FO:DTC P2610 ECM/PCM ENGINE OFF TIMER PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

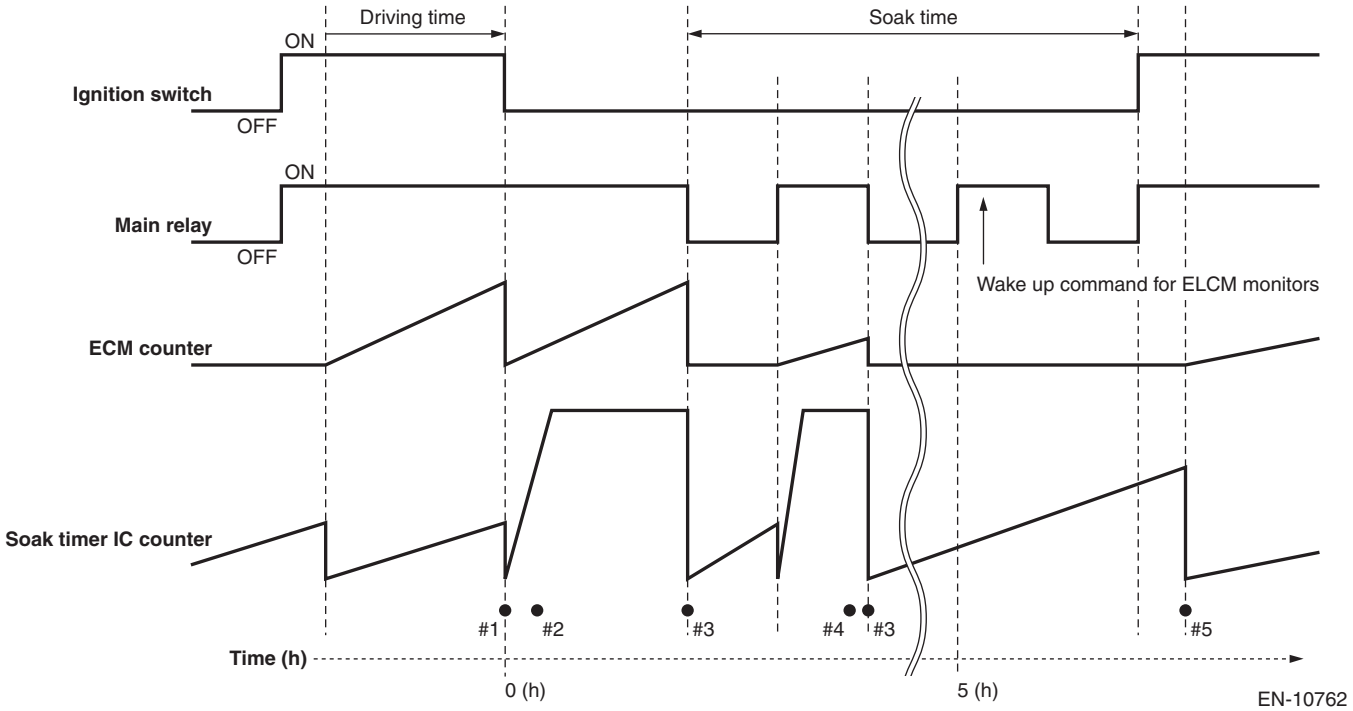
Step	Check	Yes	No
1 **CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).> NOTE: The soaking timer IC is built into the ECM.

1. OUTLINE OF DIAGNOSIS

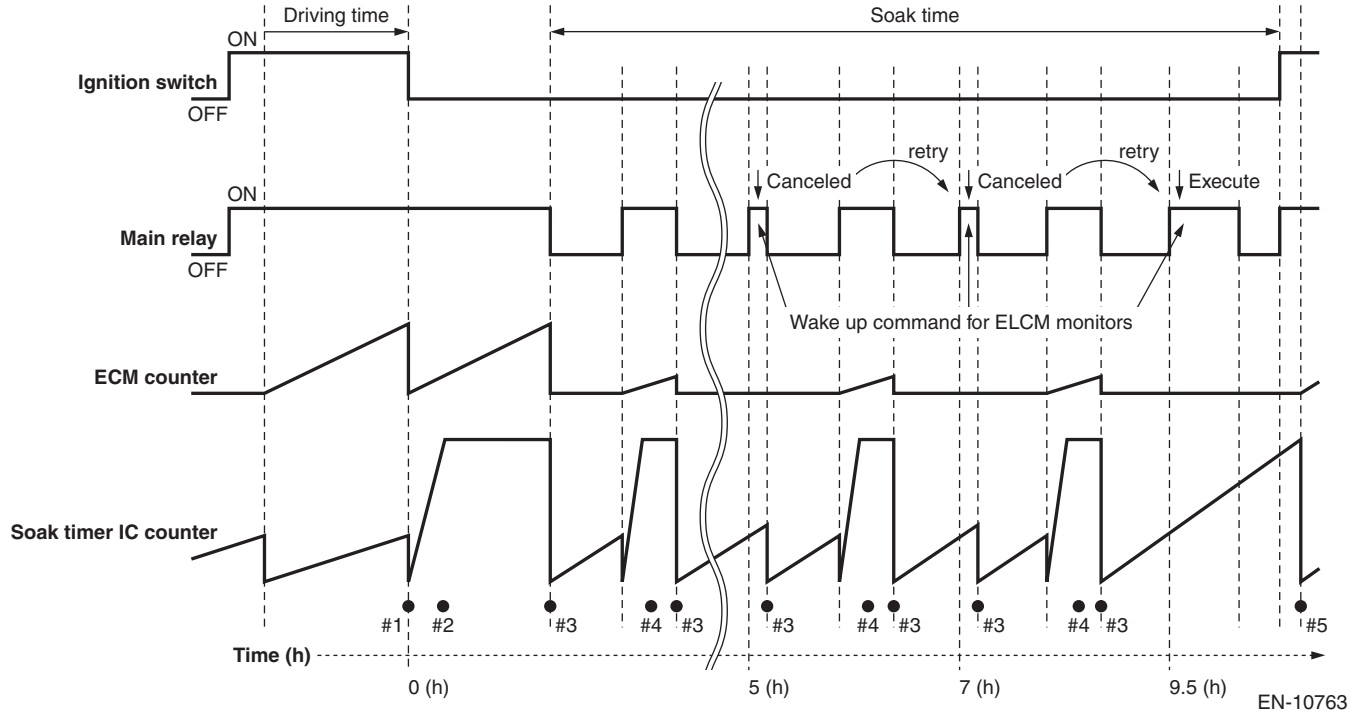
Detect malfunction of soaking timer IC by the five diagnoses below.

Monitor Number	Explanation	Time required for diagnosis
Monitor #1 <Timer diagnosis>	Perform diagnosis of the soaking timer IC accuracy	128 ms
Monitor #2 <Full count diagnosis>	Perform diagnosis of the soaking timer IC counter function	128 ms
Monitor #3 <Soaking timer IC setting diagnosis>	Perform diagnosis of communication between ECM and soaking timer IC	128 ms
Monitor #4 <Timer diagnosis (during soaking)>	Perform diagnosis of the soaking timer IC accuracy during soaking	None
Monitor #5 <Wake-up diagnosis>	Perform diagnosis of wake-up function	None

This is an example of ELCM monitor execution at soak time of 5 hours.



This is an example of ELCM monitor execution at soak time of 9.5 hours.



2. COMPONENT DESCRIPTION

The soaking timer IC is built into the ECM.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
<Timer diagnosis>	
Battery voltage	≥ 10.9 V
Ignition switch	OFF
Elapsed time after starting the engine	> 600 s and < 61380 s
<Full count diagnosis>	
Battery voltage	≥ 10.9 V
Ignition switch	OFF
Counter in ECM	≥ 4 s
<Soaking timer IC setting diagnosis>	
Battery voltage	≥ 10.9 V
Ignition switch	OFF
<Timer diagnosis (during soaking)>	
Battery voltage	≥ 10.9 V
Ignition switch	OFF
<Wake-up diagnosis>	
Ignition switch	ON
Time in the soaking timer IC	> 3600 s

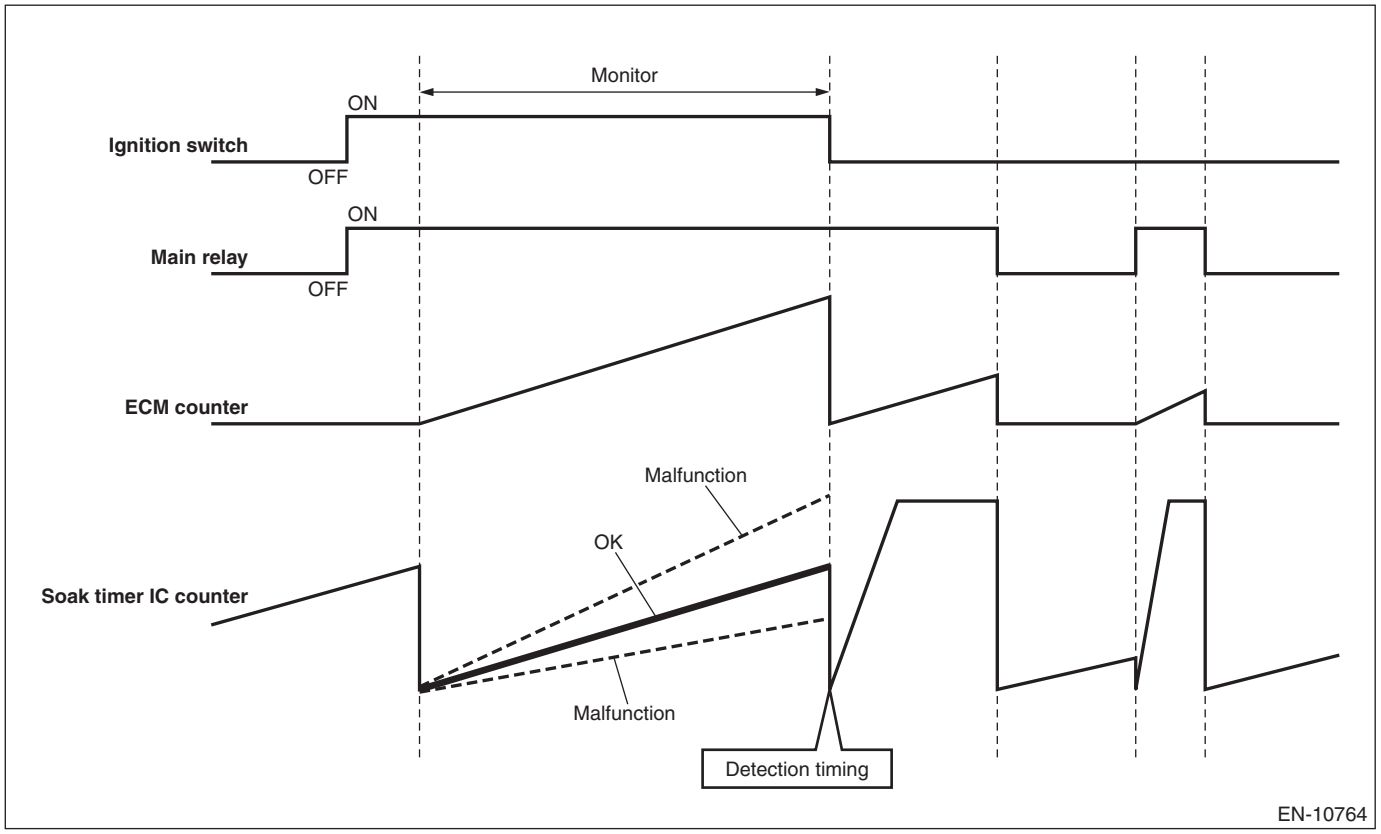
4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when the ignition switch is OFF and when the ignition switch is ON after the soaking of one hour or more.

5. DIAGNOSTIC METHOD

<Timer diagnosis>

Start the count up operation of counters in ECM and in soaking timer IC when the engine is started.
Judge as timer malfunction if the difference between the counter in ECM and counter in soaking timer IC exceeds the allowable limit when the ignition switch is OFF.



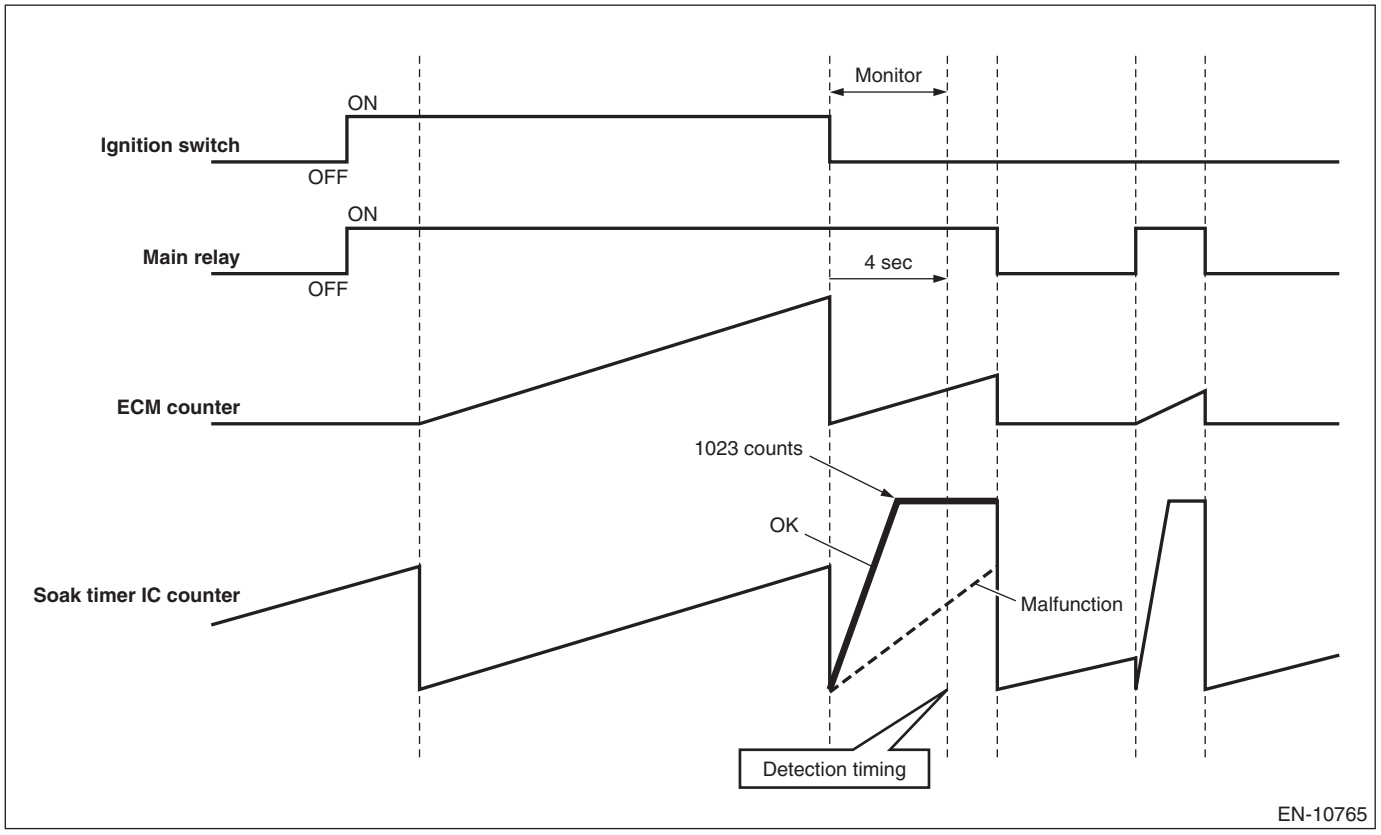
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
|osoaktimcpu – osoaktimic| / osoaktimcpu osoaktimcpu = Counter in ECM osoaktimic = Counter in soaking timer IC	> 0.24

<Full count diagnosis>

Reset the counter in soaking timer IC and start the count up operation.
Judge as full count diagnosis malfunction if counter in soaking timer IC is not $3FF (1023 count) after 4 seconds.



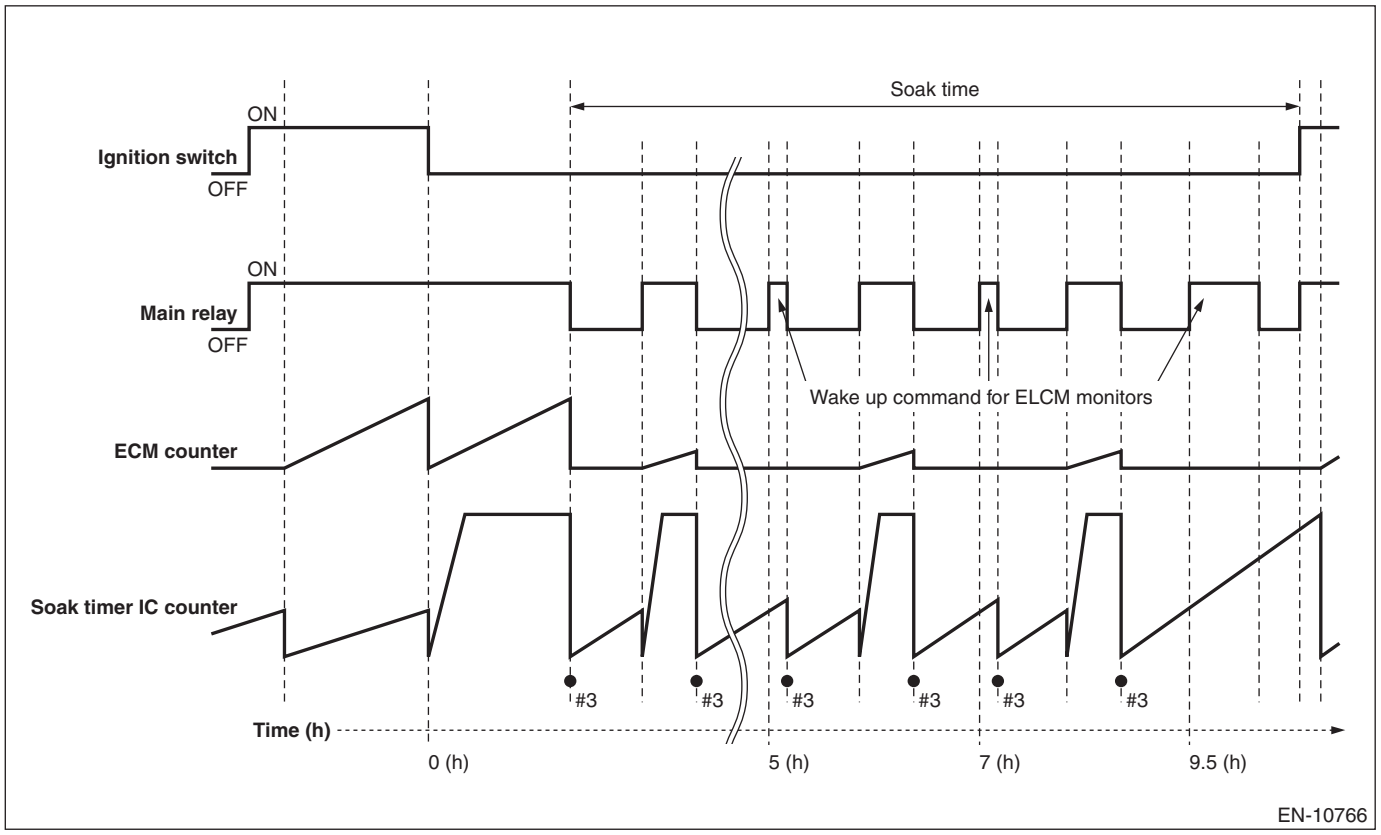
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
osoakfcntic osoakfcntic = Counter in soaking timer IC	≠ $3FF (1023 count)

<Soaking timer IC setting diagnosis>

When setting the activation setting time to soaking timer IC, compare the writing value to soaking timer IC with read out value. Judge as malfunction if the values do not match 3 times in a row.



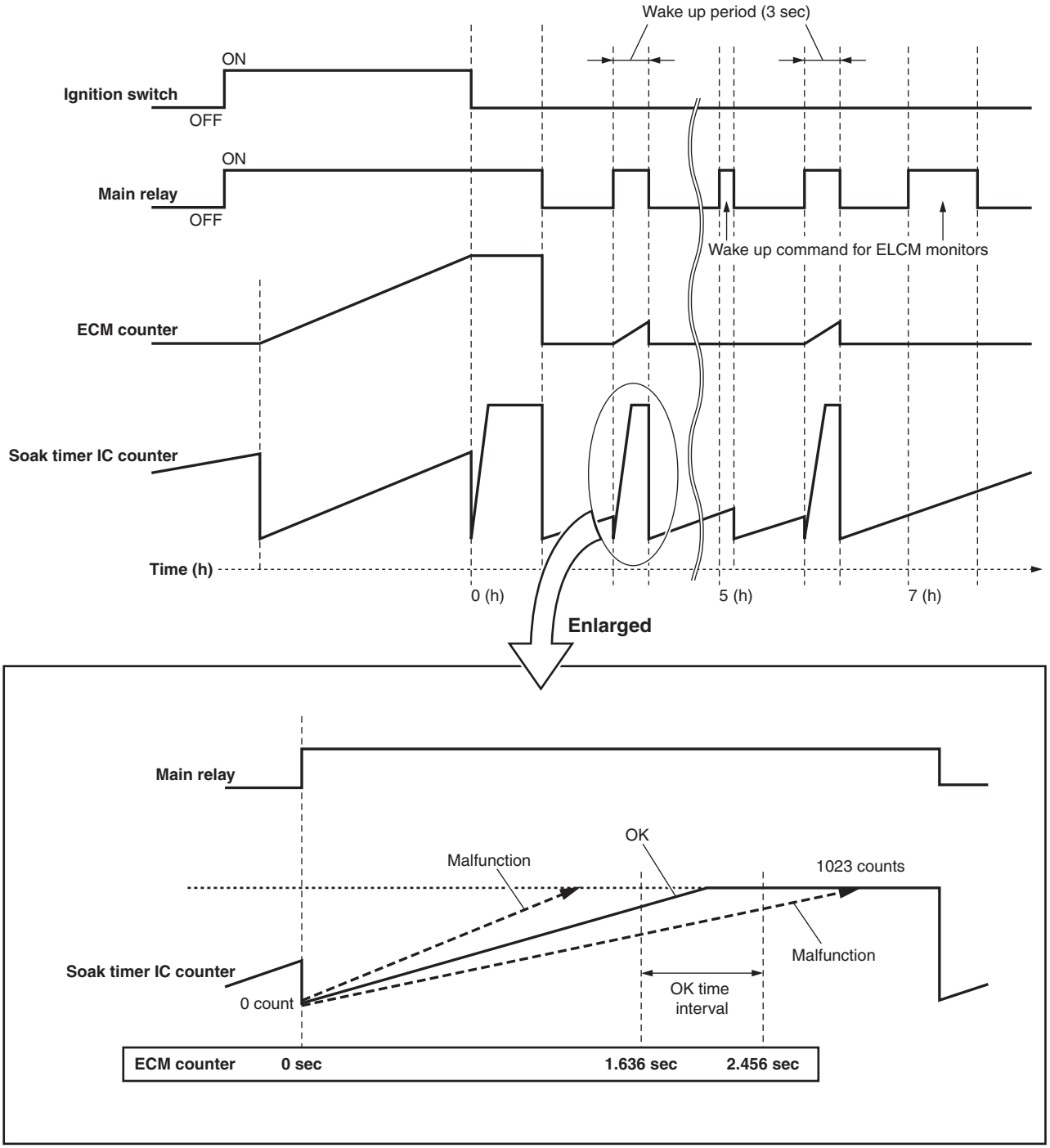
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Writing value and read out value when setting the soaking timer	Unmatch

<Timer diagnosis (during soaking)>

Wake-up at the predetermined interval until 5 or 7 or 9.5 hours have passed after the ignition switch is OFF, and compare the counter in soaking timer IC with the counter in ECM.
Judge as malfunction if the counter in soaking timer IC is counted up to maximum value (1023 count) when the counter in ECM is 1636 ms, or if the counter in soaking timer IC is not counted up to maximum value (1023 count) when the counter in ECM is 2456 ms.



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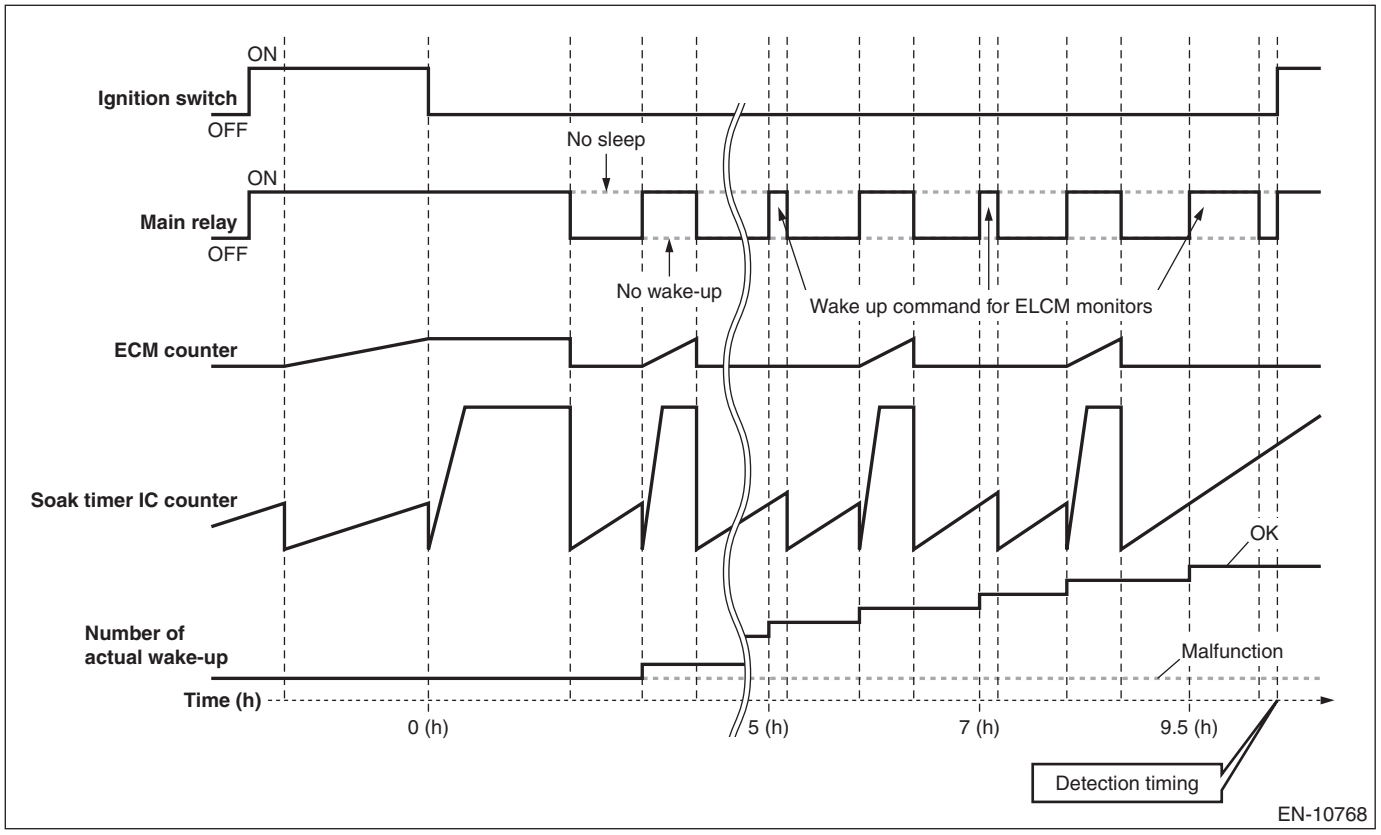
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
When any one of the followings is established:	
• All of the following conditions are established.	
Counter in ECM	≤ 1636 ms
Counter in soaking timer IC	= $3FF (1023 count)
• All of the following conditions are established.	
Counter in ECM	≥ 2456 ms
Counter in soaking timer IC	≠ $3FF (1023 count)

<Wake-up diagnosis>

Store the number of wake-up activation when the ECM wakes up by the soaking timer IC.
Next time when the ignition switch is ON, if the number of wake-up activation does not reach the predetermined value even though the counter in soaking timer IC operates 1 hour or more, judge as wake-up malfunction.



Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Number of wake-up	≠ Wake-up indication count

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Driving cycle	Completed
When any one of the followings is established:	
• Timer diagnosis	NG
• Full count diagnosis	NG
• Soaking timer IC setting diagnosis	NG
• Timer diagnosis (during soaking)	NG
• Wake-up diagnosis	NG

Time Needed for Diagnosis: Approx. 5 — 9.5 hours
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

FP:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 436 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FQ:DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after ignition switch ON.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 436 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FR:DTC U0101 LOST COMMUNICATION WITH TCM

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure between TCM, VDC CM and combination meter has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	Lost

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FS: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure between TCM, VDC CM and combination meter has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from vehicle dynamics control module	Lost

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FT: DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

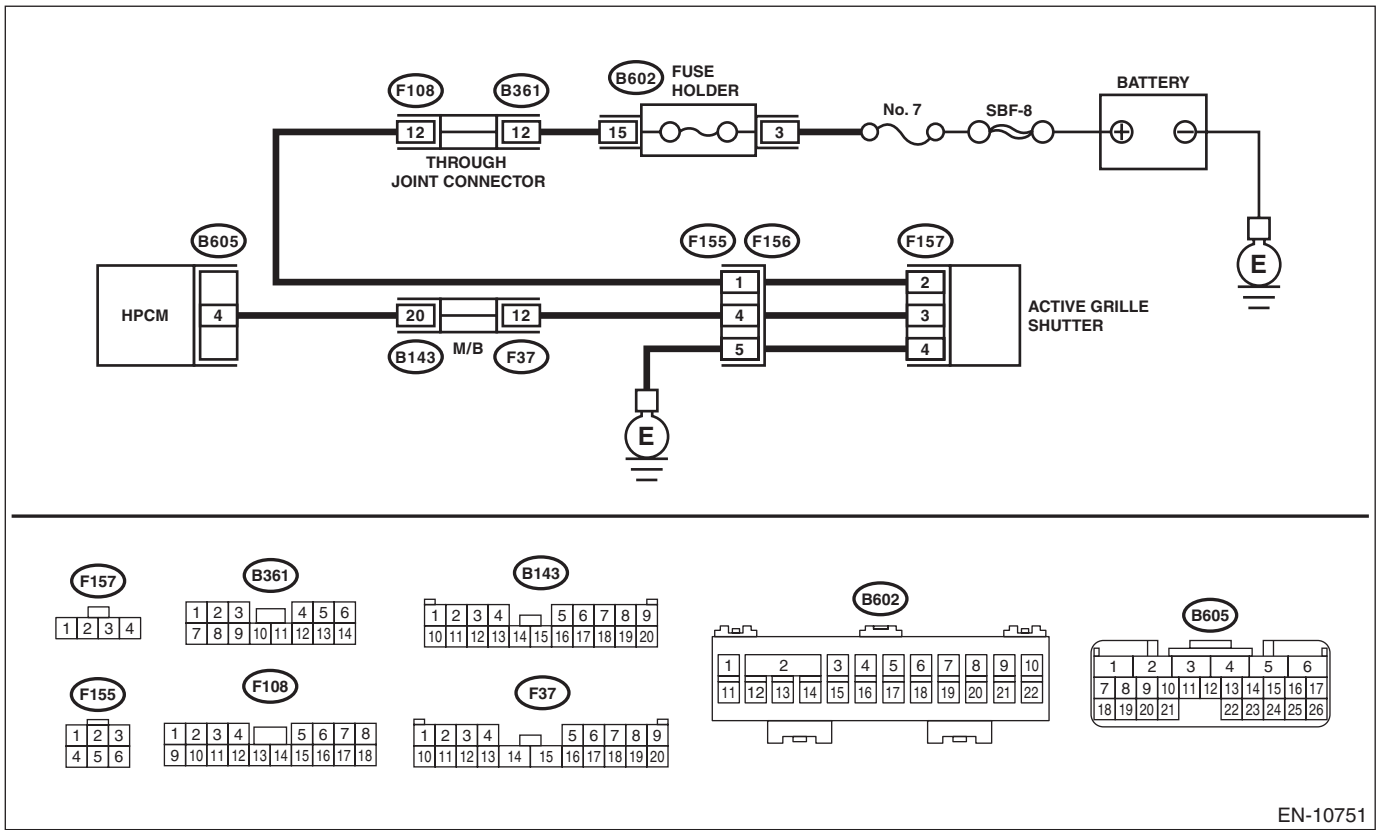
NOTE:
For the detection standard, refer to DTC U0101. <Ref. to EN(H4DO HEV)(diag)-549, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

FU:DTC U0284 LOST COMMUNICATION WITH ACTIVE GRILLE SHUTTER MODULE "A"

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:
Active grille shutter <Ref. to WI(HEV)-41, Active Grille Shutter.>



EN-10751

Step		Check	Yes	No
1	**CHECK DTC.** Check for DTC. <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is U0284 displayed in Present fault?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed for engine control system?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK DTC OF HYBRID POWERTRAIN CONTROL SYSTEM, DRIVE MOTOR CONTROL SYSTEM AND BATTERY ENERGY CONTROL SYSTEM.** Check DTC of hybrid powertrain control system, drive motor control system and battery energy control system.	Are DTCs of hybrid powertrain control system, drive motor control system or battery energy control system displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).>	Go to step **4**.
4	**CHECK HARNESS BETWEEN HPCM AND ACTIVE GRILLE SHUTTER CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the 12 volt auxiliary battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Disconnect the connector from HPCM and active grille shutter. 4) Measure the resistance between active grille shutter connector and chassis ground. ***Connector & terminal*** ***(F157) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit to ground in harness between HPCM and active grille shutter connector.
5	**CHECK HARNESS BETWEEN HPCM AND ACTIVE GRILLE SHUTTER CONNECTOR.** Measure the resistance between HPCM and active grille shutter connector. ***Connector & terminal*** ***(B605) No. 4 — (F157) No. 3:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between HPCM and active grille shutter connector • Poor contact of coupling connector
6	**CHECK ACTIVE GRILLE SHUTTER POWER SUPPLY.** 1) Connect the 12 volt auxiliary battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Measure the voltage between active grille shutter connector and chassis ground. ***Connector & terminal*** ***(F157) No. 2 (+) — Chassis ground (–):***	Is the voltage 9 V or more?	Go to step **7**.	Repair the power supply circuit.

Step		Check	Yes	No
7	**CHECK HARNESS BETWEEN ACTIVE GRILLE SHUTTER CONNECTOR AND CHASSIS GROUND.** Measure the resistance of harness between active grille shutter connector and chassis ground. ***Connector & terminal*** ***(F157) No. 4 — Chassis ground:***	Is the resistance less than 10 Ω?	Replace the active grille shutter. <Ref. to HEV-77, Active Grille Shutter.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between active grille shutter connector and chassis ground • Poor contact of coupling connector

1. OUTLINE OF DIAGNOSIS

Detect malfunction of LIN communication.
Judge as NG if LIN communication failure has occurred with the active grille shutter.

2. COMPONENT DESCRIPTION

(Common Specifications)
Communication protocol: LIN 2.0
Communication Speed: 19.20 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ID received from control module connected to LIN	None

Time Needed for Diagnosis: 2000 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FV:DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure occurs with HPCM MAIN-CAN.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after ignition switch ON.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ID received from HPCM MAIN-CAN	None

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FW:DTC U0402 INVALID DATA RECEIVED FROM TCM

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when data received from TCM, VDC CM and combination meter is not normal.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Data from control modules connected to CAN	No change or Parity error

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

FX:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC U0402. <Ref. to EN(H4DO HEV)(diag)-555, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

FY:DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

NOTE:
For the detection standard, refer to DTC U0402. <Ref. to EN(H4DO HEV)(diag)-555, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

FZ: DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when data from HPCM MAIN-CAN is not correct.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after ignition switch ON.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Data update from HPCM MAIN-CAN	None

Time Needed for Diagnosis: 564 ms
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Data from HPCM MAIN-CAN	Parity error

Time Needed for Diagnosis: 64 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

GA:DTC U1101 LOST COMMUNICATION WITH TCM PU-CAN

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure occurs with TCM PU-CAN.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after ignition switch ON.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ID received from TCM PU-CAN	None

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

GB:DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when CAN communication failure occurs with HPCM PU-CAN.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after ignition switch ON.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ID received from HPCM PU-CAN	None

Time Needed for Diagnosis: 500 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

GC:DTC U1402 INVALID DATA RECEIVED FROM TCM PU-CAN

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when data from TCM PU-CAN is not correct.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after ignition switch ON.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Data from TCM PU-CAN	Checksum error

Time Needed for Diagnosis: 64 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

GD:DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN

NOTE:
For the diagnostic procedure, refer to LAN section. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.
Judge as NG when data from HPCM PU-CAN is not correct.

2. COMPONENT DESCRIPTION

(Common Specifications)
CAN Protocol 2.0 B (Active)
Frame Format: 11 Bit ID Frame (Standard Frame)
Conforms to ISO11898
Communication Speed: 500 kbps

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after ignition switch ON.

5. DIAGNOSTIC METHOD

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Data update from HPCM PU-CAN	None

Time Needed for Diagnosis: 564 ms
Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Data from HPCM PU-CAN	Checksum error

Time Needed for Diagnosis: 64 ms
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

18.General Diagnostic Table

A: INSPECTION

1. ENGINE

NOTE:
Malfunction of parts other than those listed is also possible. <Ref. to ME(H4DO(w/o HEV))-425, Engine Trouble in General.>

Symptoms	Faulty parts
1. Engine stalls during idling.	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Ignition parts (*1) 4) Engine coolant temperature sensor (*2) 5) Crankshaft position sensor (*3) 6) Camshaft position sensor (*3) 7) Fuel injection parts (*4) 8) Electronic throttle control
2. Rough idling	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Engine coolant temperature sensor (*2) 4) Ignition parts (*1) 5) Air intake system (*5) 6) Fuel injection parts (*4) 7) Electronic throttle control 8) Crankshaft position sensor (*3) 9) Camshaft position sensor (*3) 10) Oxygen sensor 11) Fuel pump and fuel pump relay 12) EGR control valve
3. Engine does not return to idle.	1) Engine coolant temperature sensor 2) Electronic throttle control 3) Manifold absolute pressure sensor 4) Mass air flow and intake air temperature sensor 5) EGR control valve 6) Accelerator pedal position sensor 7) Engine oil temperature sensor
4. Poor acceleration	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Electronic throttle control 4) Fuel injection parts (*4) 5) Fuel pump and fuel pump relay 6) Engine coolant temperature sensor (*2) 7) Crankshaft position sensor (*3) 8) Camshaft position sensor (*3) 9) Engine torque control signal circuit 10) Ignition parts (*1) 11) EGR control valve 12) Accelerator pedal position sensor 13) Engine oil temperature sensor
5. Engine stalls, hesitates, or sputters at acceleration.	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Engine coolant temperature sensor (*2) 4) Crankshaft position sensor (*3) 5) Camshaft position sensor (*3) 6) Purge control solenoid valve 7) Fuel injection parts (*4) 8) Electronic throttle control 9) Fuel pump and fuel pump relay 10) EGR control valve

Symptoms	Faulty parts
6. Surging	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor (*2) 4) Crankshaft position sensor (*3) 5) Camshaft position sensor (*3) 6) Fuel injection parts (*4) 7) Electronic throttle control 8) Fuel pump and fuel pump relay 9) EGR control valve
7. Spark knock	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor 4) Knock sensor 5) Fuel injection parts (*4) 6) Fuel pump and fuel pump relay 7) EGR control valve
8. After burning in exhaust system	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor (*2) 4) Fuel injection parts (*4) 5) Fuel pump and fuel pump relay

*1: Check ignition coil and spark plug.
*2: Indicate the symptom occurring only in cold temperatures.
*3: Ensure the secure installation.
*4: Check fuel injector and fuel filter.
*5: Inspect air leak in air intake system.

TRANSMISSION SECTION

CONTROL SYSTEMS	CS
CONTINUOUSLY VARIABLE TRANSMISSION	CVT(TR580)
CONTINUOUSLY VARIABLE TRANSMISSION (DIAGNOSTICS)	CVT (w/o HEV)(diag)
CONTINUOUSLY VARIABLE TRANSMISSION	CVT(TH58A)
CONTINUOUSLY VARIABLE TRANSMISSION (DIAGNOSTICS)	CVT(HEV)(diag)
MANUAL TRANSMISSION AND DIFFERENTIAL	5MT
CLUTCH SYSTEM	CL

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD.

G1250BE4

CONTROL SYSTEMS

CS

Page

1. General Description 2
2. AT Shift Lock Control System 7
3. Select Lever 25
4. Select Cable 51
5. AT Shift Lock Solenoid and “P” Range Switch 59
6. Body Integrated Unit 62
7. MT Gear Shift Lever 63
8. General Diagnostic Table 84

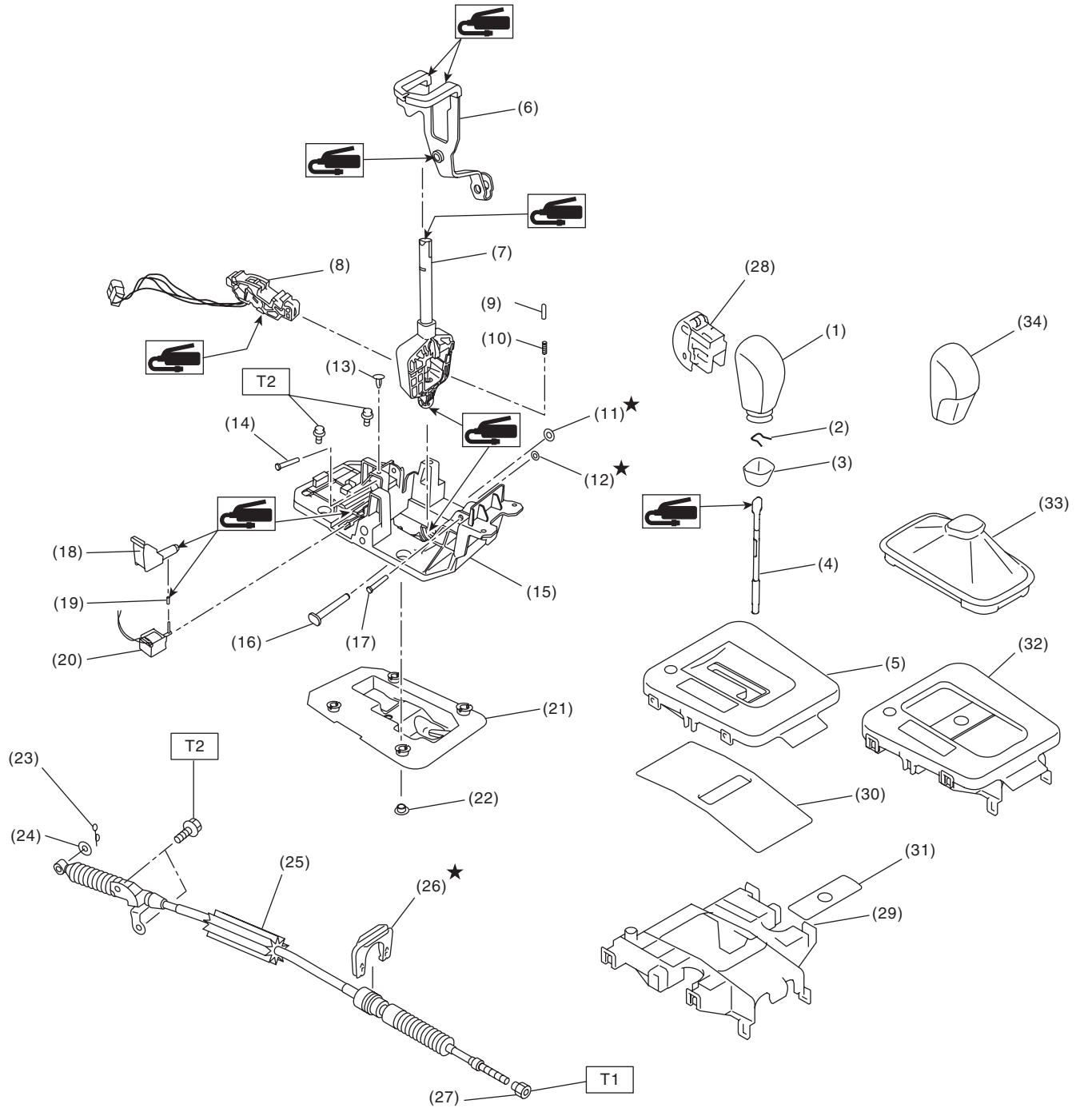
1. General Description

A: SPECIFICATION

Item	Specifications
Swing torque of rod against lever N (kgf, lb)	3.7 (0.38, 0.83) or less

B: COMPONENT

1. AT SELECT LEVER

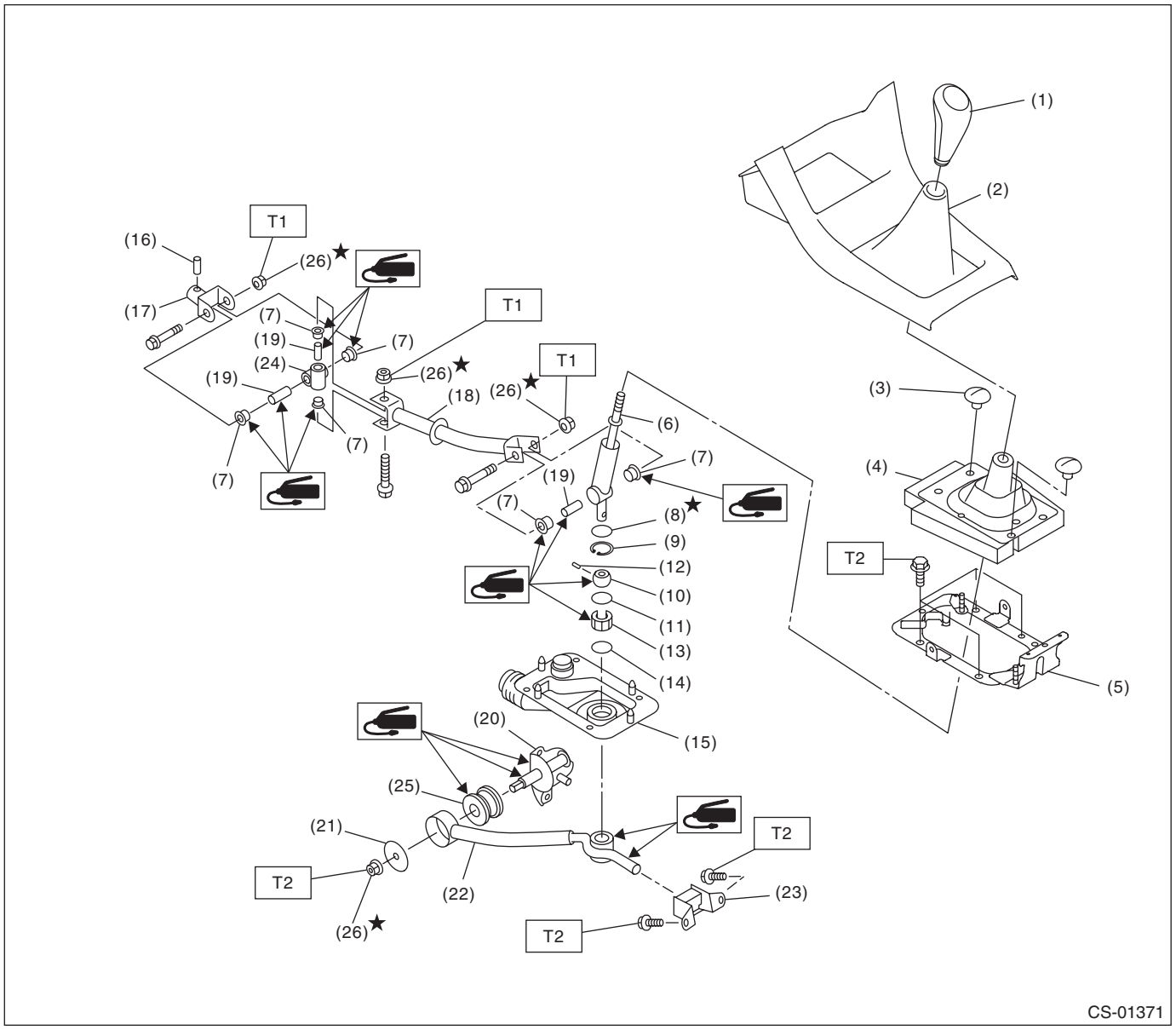


CS-01952

(1) Grip sub ASSY (model with gate shifter)
(2) Clamp grip pin
(3) Cover grip AT (model with gate shifter)
(4) Rod COMPL
(5) Indicator cover (model with gate shifter)
(6) Arm COMPL
(7) Select lever COMPL
(8) Plate guide
(9) Rod detent
(10) Detent spring
(11) Clamp push nut
(12) Clamp push nut
(13) Clamp pin
(14) Spacer pin guide
(15) Plate COMPL
(16) Shaft control
(17) Spacer pin guide
(18) Rod shift lock
(19) Cushion solenoid
(20) Solenoid unit
(21) Gasket
(22) Spacer plate
(23) Snap pin
(24) Washer
(25) Select cable
(26) Clamp
(27) Nut
(28) Button ASSY-AT
(29) Housing
(30) Blind A (model with gate shifter)
(31) Blind B (model with gate shifter)
(32) Indicator assembly (model with boot shifter)
(33) Boot ASSY (model with boot shifter)
(34) Grip sub ASSY (model with boot shifter)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.8, 5.5)
T2: 18 (1.8, 13.3)

2. 5MT GEAR SHIFT LEVER



(1) Gear shift knob
(2) Console front cover ASSY
(3) Clamp
(4) Boot and insulator ASSY
(5) Plate COMPL
(6) Lever
(7) Bushing
(8) Lock wire
(9) Snap ring
(10) Bushing
(11) O-ring
(12) Spring pin
(13) Bushing B
(14) O-ring
(15) Boot
(16) Spring pin
(17) Joint
(18) Rod
(19) Spacer
(20) Shift bracket
(21) Plate
(22) Stay
(23) Cushion rubber
(24) Boss
(25) Bushing
(26) Self-locking nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 12 (1.2, 8.9)
T2: 18 (1.8, 13.3)

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

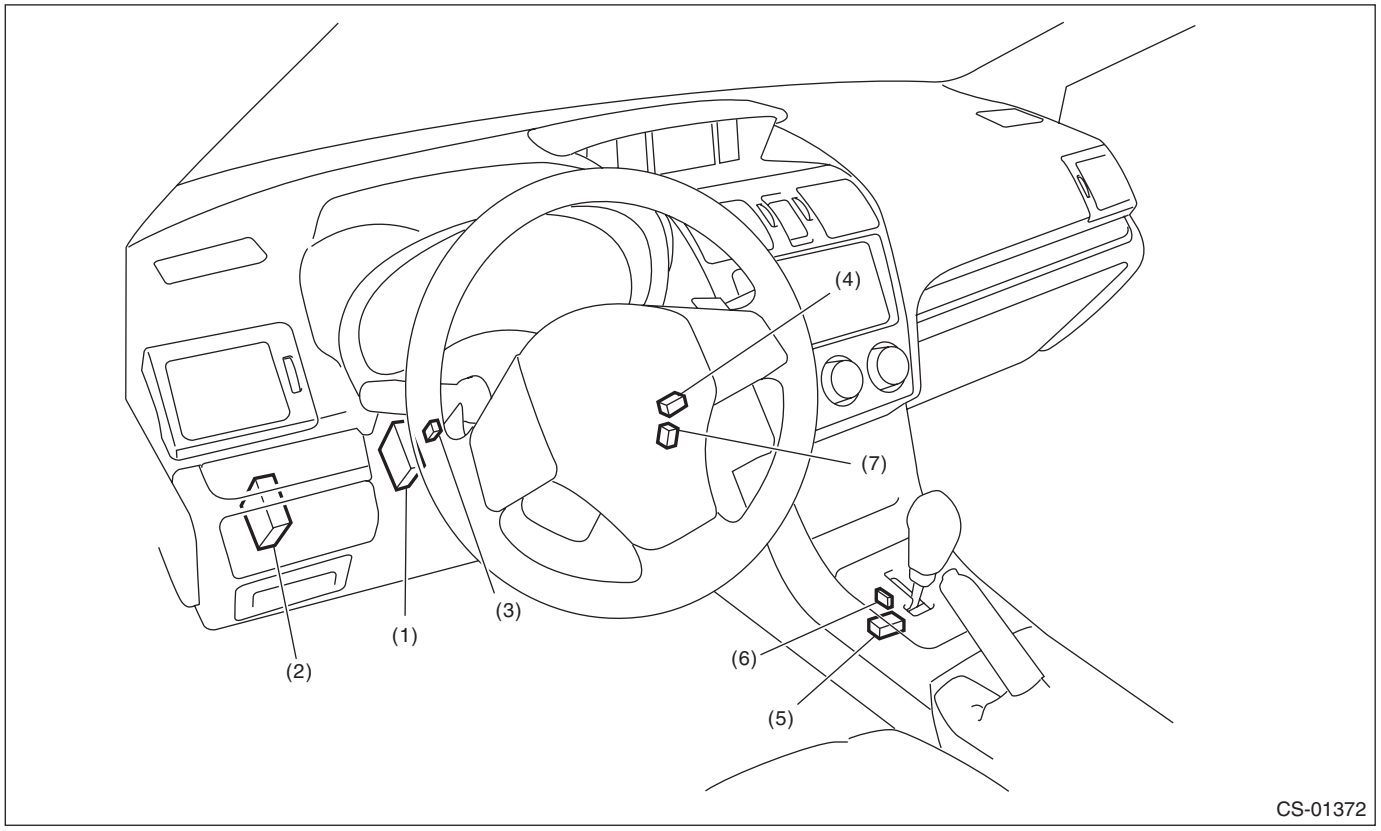
D: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Use SUBARU genuine fluid, grease etc. or equivalent. Do not mix fluid, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part in a vise, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vise.
- Before disconnecting electrical connectors, be sure to disconnect the negative terminal from battery.

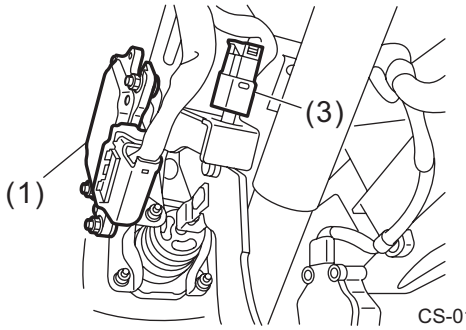
2. AT Shift Lock Control System

A: LOCATION

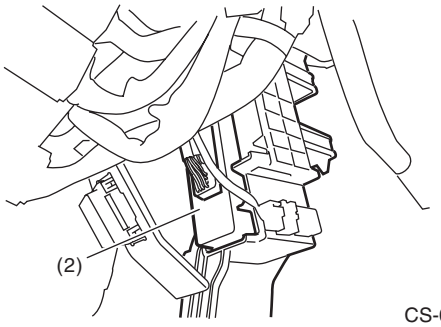
1. MODEL WITHOUT PUSH BUTTON IGNITION SWITCH



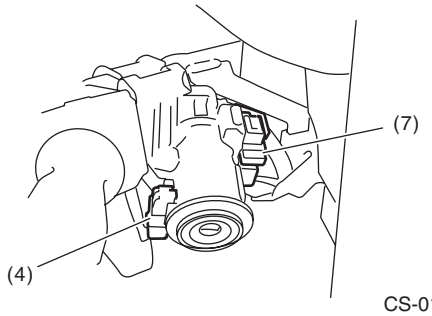
(1) TCM (“P” range)
(2) Body integrated unit
(3) Stop light and brake switch
(4) Key cylinder (with built-in key warning switch)
(5) Solenoid unit
(6) “P” range switch
(7) Key lock solenoid



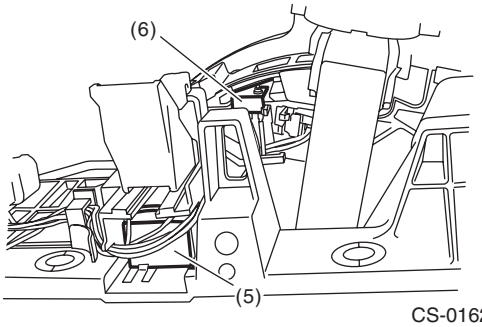
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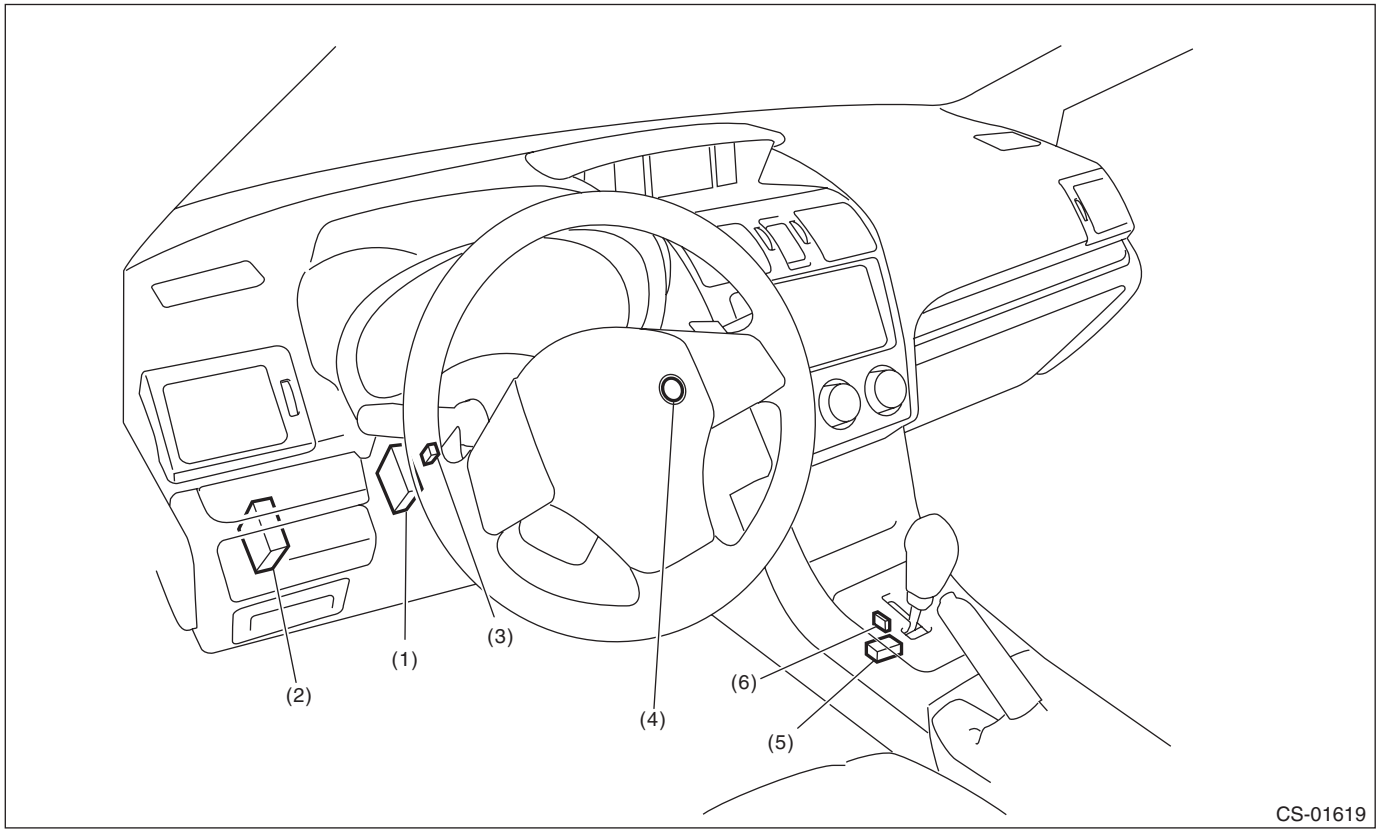


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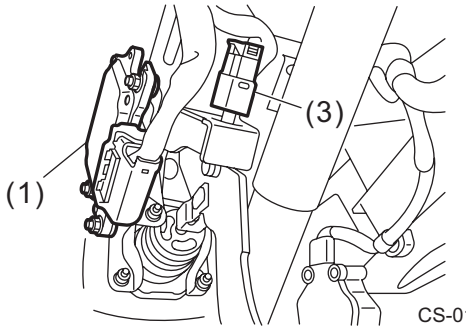


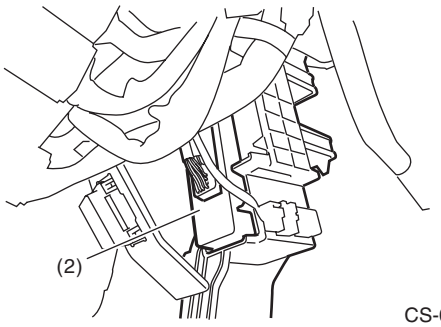
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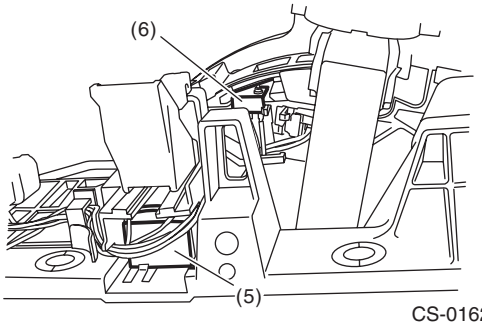
2. MODEL WITH PUSH BUTTON IGNITION SWITCH



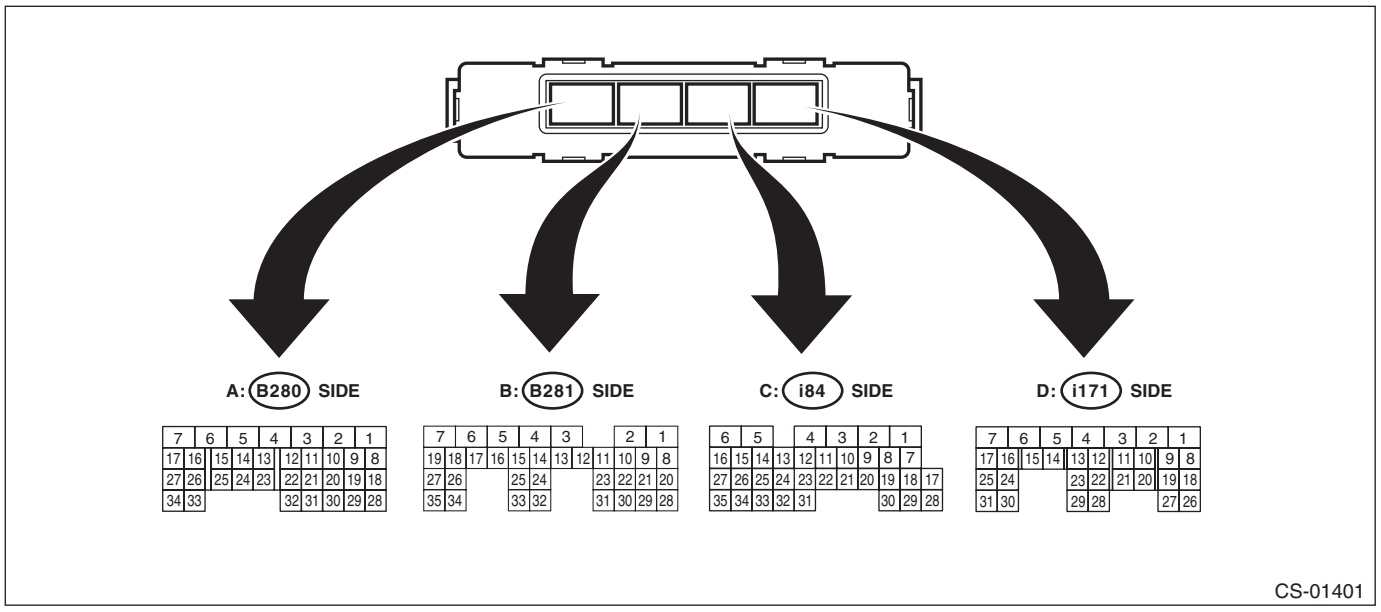
(1) TCM (“P” range)
(2) Body integrated unit
(3) Stop light and brake switch
(4) Push button ignition switch
(5) Solenoid unit
(6) “P” range switch







B: ELECTRICAL SPECIFICATION



- Model without push button ignition switch

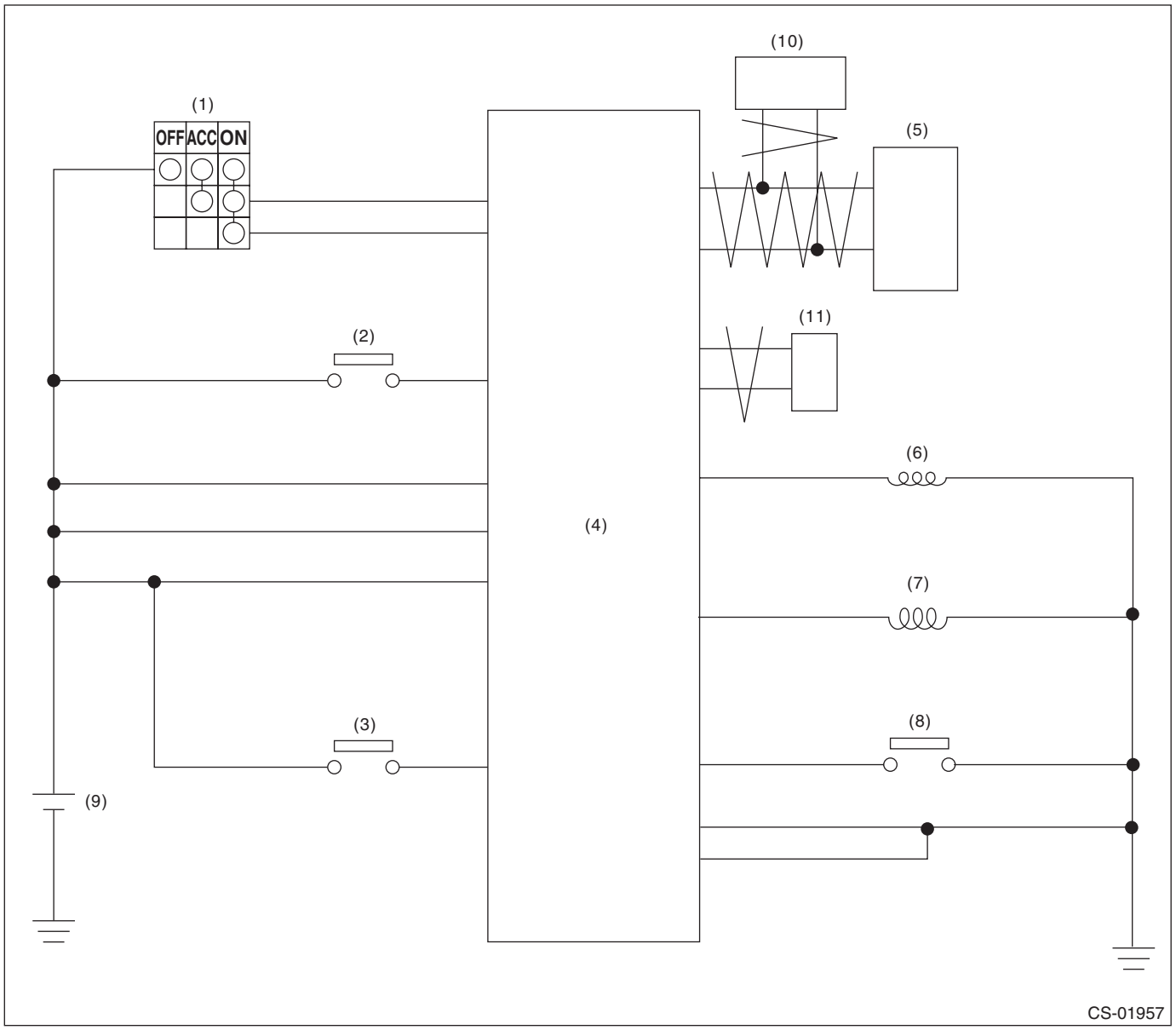
Item	Connector No.	Terminal No.	Input/Output signal
			Measured value and measuring conditions
Battery power supply	B281	6	9 — 16 V
		7	
	i84	6	
Ignition power supply	B280	32	10 — 15 V when ignition switch is at ACC.
	B281	3	10 — 15 V when ignition switch is at ON or START.
TCM (“P” range)	B281	20	Can not be measured because of digital communication
		28	
Stop light and brake switch	B280	10	9 — 16 V when the stop light & brake switch is ON. 0 V when the stop light & brake switch is OFF.
“P” range switch	B281	18	Less than 1.5 V when select lever is in “P” range 8 V or more when select lever is in positions other than “P” range.
Solenoid unit signal	B281	5	8.5 — 16 V when shift lock is released. 0 V when shift lock is operating.
Key warning switch signal	B280	4	9 — 16 V when key is inserted. 0 V when key is removed.
Key lock solenoid signal	B281	4	7.5 — 16 V when the key is inserted with the select lever shifted in positions other than “P” range. 0 V at other conditions than above.
Ground	B280	1	—
	i84	1	
Delivery (test) mode signal	i84	27	Can not be measured because of digital communication
		35	

- Model with push button ignition switch

Item	Connector No.	Terminal No.	Input/Output signal Measured value and measuring conditions
Battery power supply	B281	6	9 — 16 V
		7	
	i84	6	
Ignition power supply	B280	32	10 — 15 V when ignition switch is at ACC.
	B281	3	10 — 15 V when ignition switch is at ON or START.
TCM (“P” range)	B281	20	Can not be measured because of digital communication
		28	
Stop light and brake switch	B280	10	9 — 16 V when the stop light & brake switch is ON. 0 V when the stop light & brake switch is OFF.
“P” range switch	B281	18	Less than 1.5 V when select lever is in “P” range 8 V or more when select lever is in positions other than “P” range.
Solenoid unit signal	B281	5	8.5 — 16 V when shift lock is released. 0 V when shift lock is operating.
Ground	B280	1	—
	i84	1	
Delivery (test) mode signal	i84	27	Can not be measured because of digital communication
		35	

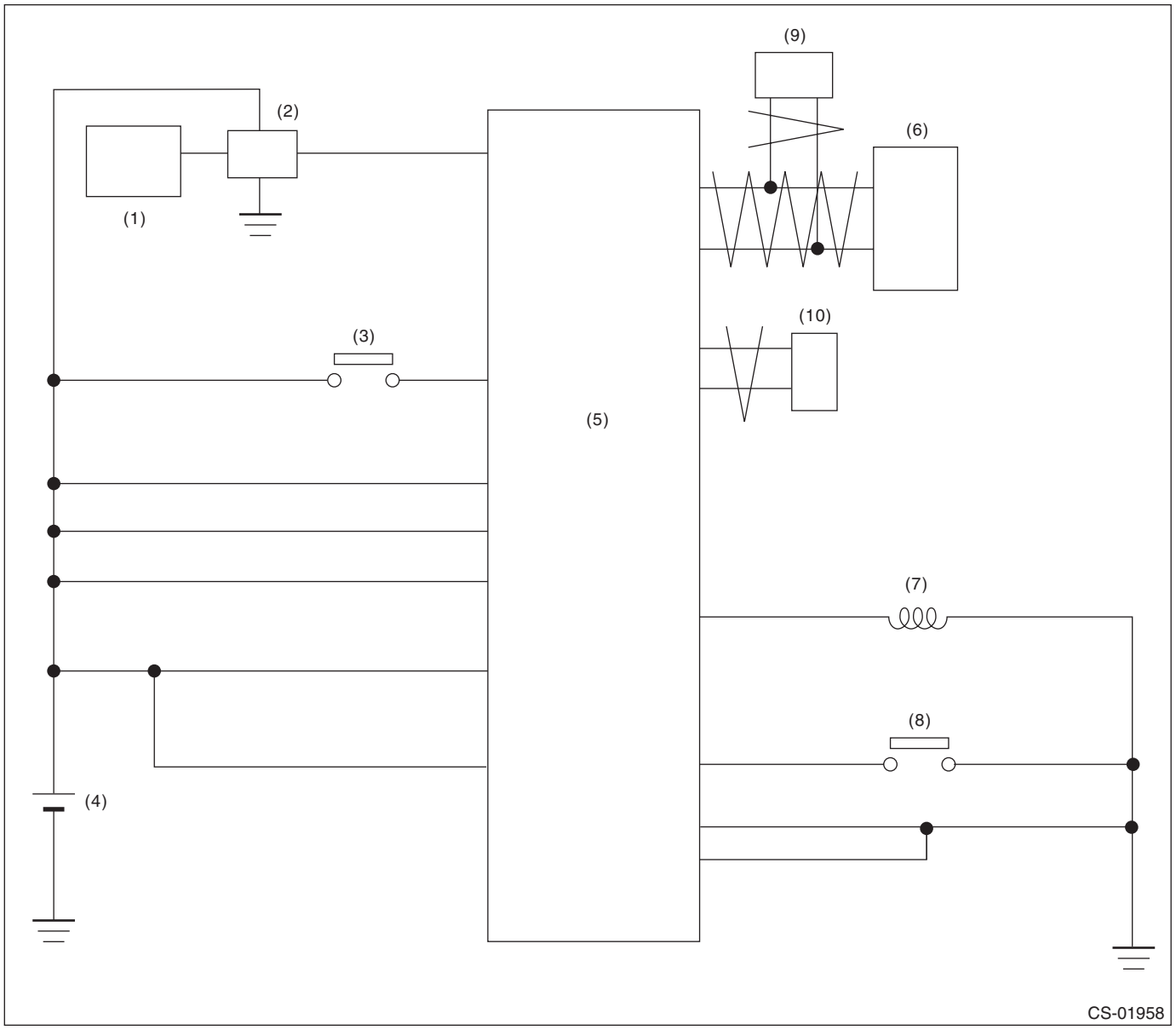
C: WIRING DIAGRAM

1. MODEL WITHOUT PUSH BUTTON IGNITION SWITCH



(1) Ignition switch
(2) Stop light and brake switch
(3) Key warning switch
(4) Body integrated unit
(5) TCM (shift range information)
(6) Key lock solenoid
(7) Shift lock solenoid
(8) “P” range switch
(9) Battery
(10) ECM (delivery (test) mode signal)
(11) VDC CM (vehicle speed information)

2. MODEL WITH PUSH BUTTON IGNITION SWITCH



(1) Keyless access CM
(2) IG relay 1 (push button start)
(3) Stop light and brake switch
(4) Battery
(5) Body integrated unit
(6) TCM (shift range information)
(7) Shift lock solenoid
(8) “P” range switch
(9) ECM (delivery (test) mode signal)
(10) VDC CM (vehicle speed information)

D: INSPECTION

1. SHIFT LOCK OPERATION

- Model without push button ignition switch

	Step	Check	Yes	No
1	**CHECK COMMUNICATION OF SUBARU SELECT MONITOR.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to all systems can be executed normally.	Is the system name displayed?	Go to step **2**.	Perform the inspection following the diagnostic procedure in BODY CONTROL SYSTEM (DIAGNOSTICS) section. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK SHIFT LOCK.** 1) Turn the ignition switch to ON. 2) Shift the select lever to “P” range.	While brake pedal is not depressed, is it possible to move the select lever from the “P” range to other ranges?	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-19, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>	Go to step **3**.
3	**CHECK SHIFT LOCK.**	While brake pedal is depressed, is it possible to move the select lever from the “P” range to other ranges?	Go to step **4**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-19, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
4	**CHECK SHIFT LOCK.** Shift the select lever to “N” range.	Is it possible to move the select lever from the “N” range to the “P” range?	Go to step **5**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-19, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>

	Step	Check	Yes	No
5	**CHECK SHIFT LOCK.** 1) Shift the select lever to “N” range. 2) Turn the ignition switch to ACC.	While brake pedal is depressed, is it possible to move the select lever from the “N” range to the “P” range?	Go to step **6**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-19, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
6	**CHECK KEY INTERLOCK.** 1) Turn the ignition switch to OFF. 2) Shift the select lever to other than “P” range.	Can the ignition key be removed?	Perform the inspection of “KEY INTERLOCK CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-22, KEY INTERLOCK CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>	Go to step **7**.
7	**CHECK KEY INTERLOCK.** Shift the select lever to “P” range.	Can the ignition key be removed?	AT shift lock system is normal.	Perform the inspection of “KEY INTERLOCK CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-22, KEY INTERLOCK CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>

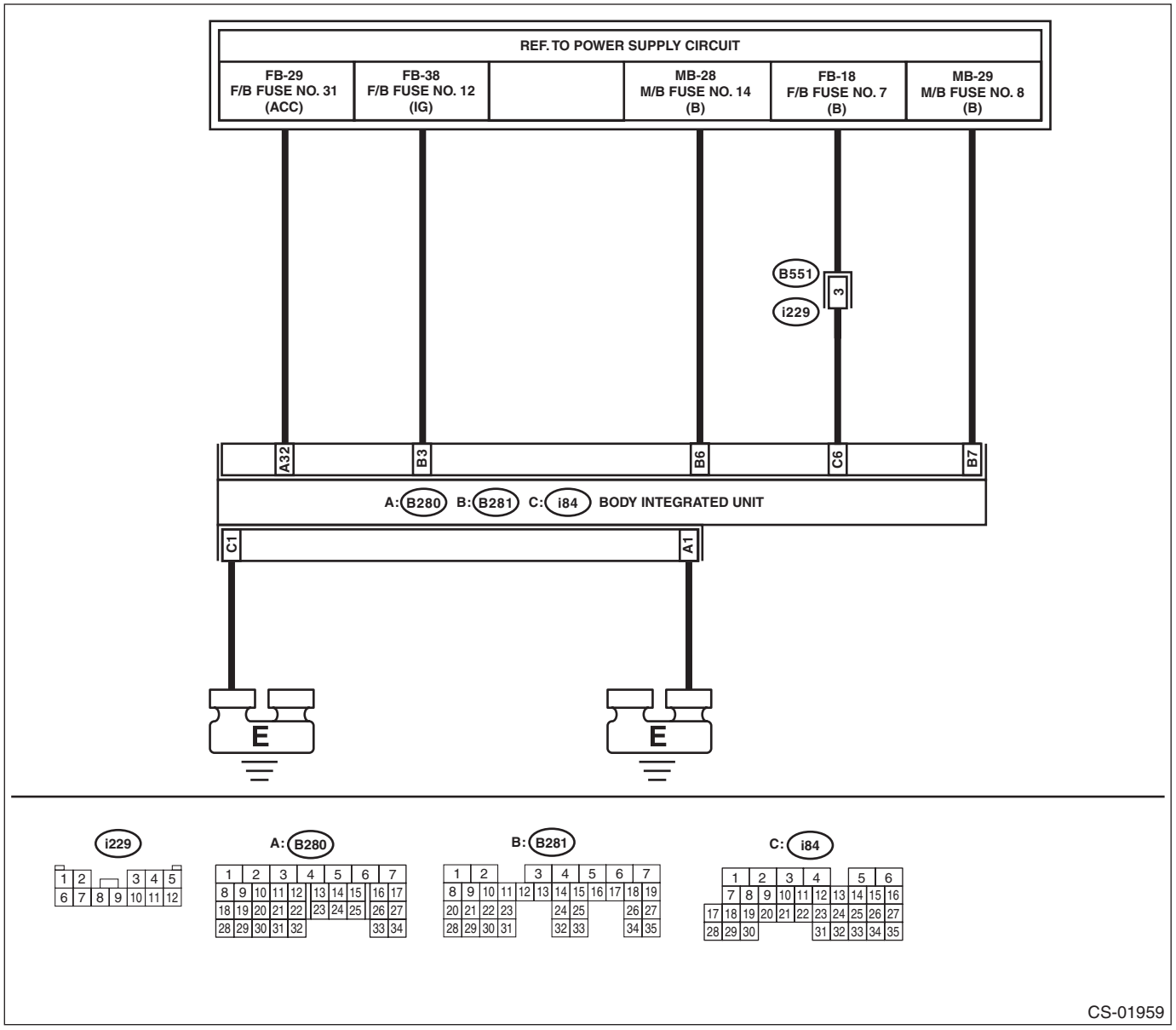
- Model with push button ignition switch

	Step	Check	Yes	No
1	**CHECK COMMUNICATION OF SUBARU SELECT MONITOR.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to all systems can be executed normally.	Is the system name displayed?	Go to step **2**.	Perform the inspection following the diagnostic procedure in BODY CONTROL SYSTEM (DIAGNOSTICS) section. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>

	Step	Check	Yes	No
2	**CHECK SHIFT LOCK.** 1) Turn the ignition switch to ON. 2) Shift the select lever to “P” range.	While brake pedal is not depressed, is it possible to move the select lever from the “P” range to other ranges?	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-19, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>	Go to step **3**.
3	**CHECK SHIFT LOCK.**	While brake pedal is depressed, is it possible to move the select lever from the “P” range to other ranges?	Go to step **4**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-19, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
4	**CHECK SHIFT LOCK.** Shift the select lever to “N” range.	Is it possible to move the select lever from the “N” range to the “P” range?	Go to step **5**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-19, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
5	**CHECK SHIFT LOCK.** 1) Shift the select lever to “N” range. 2) Turn the ignition switch to ACC.	While brake pedal is depressed, is it possible to move the select lever from the “N” range to the “P” range?	AT shift lock system is normal.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-19, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>

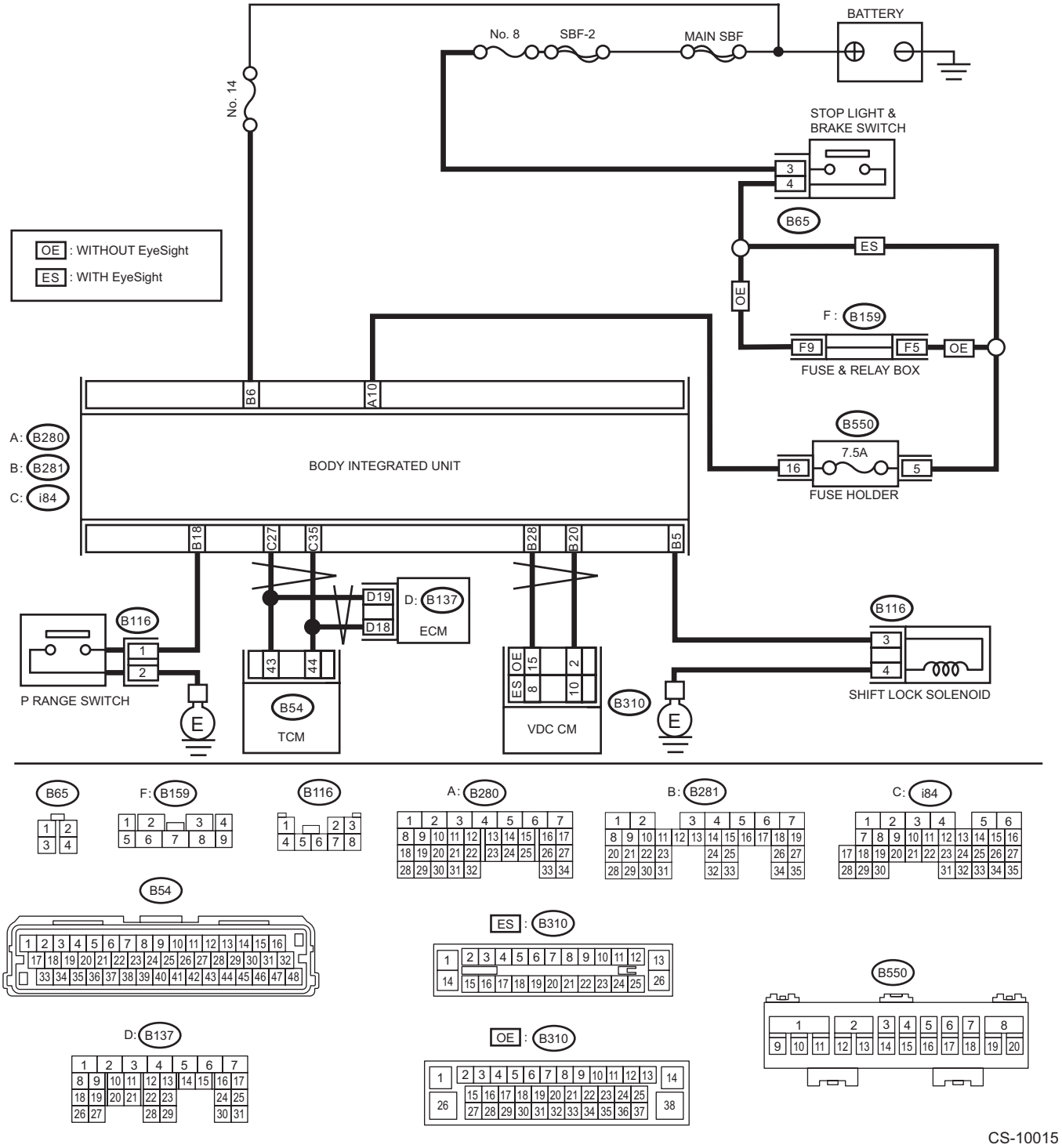
2. BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT

NOTE:
For the DC power supply circuit, refer to “WIRING DIAGRAMS”. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.> <Ref. to WI(HEV)-21, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK DTC OF BODY INTEGRATED UNIT.** Check DTC of body integrated unit. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is the DTC of power line displayed on body integrated unit?	Repair or replace it according to the DTC.	Go to step **2**.
2	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND BATTERY.** 1) Turn the ignition switch to ON. 2) Measure the voltage between body integrated unit and chassis ground. ***Connector & terminal*** ***(B281) No. 3 (+) — Chassis ground (–):*** ***(B280) No. 32 (+) — Chassis ground (–):*** ***(B281) No. 6 (+) — Chassis ground (–):*** ***(B281) No. 7 (+) — Chassis ground (–):*** ***(i84) No. 6 (+) — Chassis ground (–):***	Is the voltage 9 — 16 V?	Go to step **3**.	Check harness for open circuit between the body integrated unit and the battery (for HEV model, 12 volt auxiliary battery) or a blown fuse.
3	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Measure the harness resistance between the body integrated unit and chassis ground. ***Connector & terminal*** ***(B280) No. 1 — Chassis ground:*** ***(i84) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness between the body integrated unit and chassis ground.
4	**CHECK FOR POOR CONTACT.**	Is there poor contact of connector?	Repair the poor contact.	Check body integrated unit.

3. SELECT LEVER CANNOT BE LOCKED OR RELEASED



CS-10015

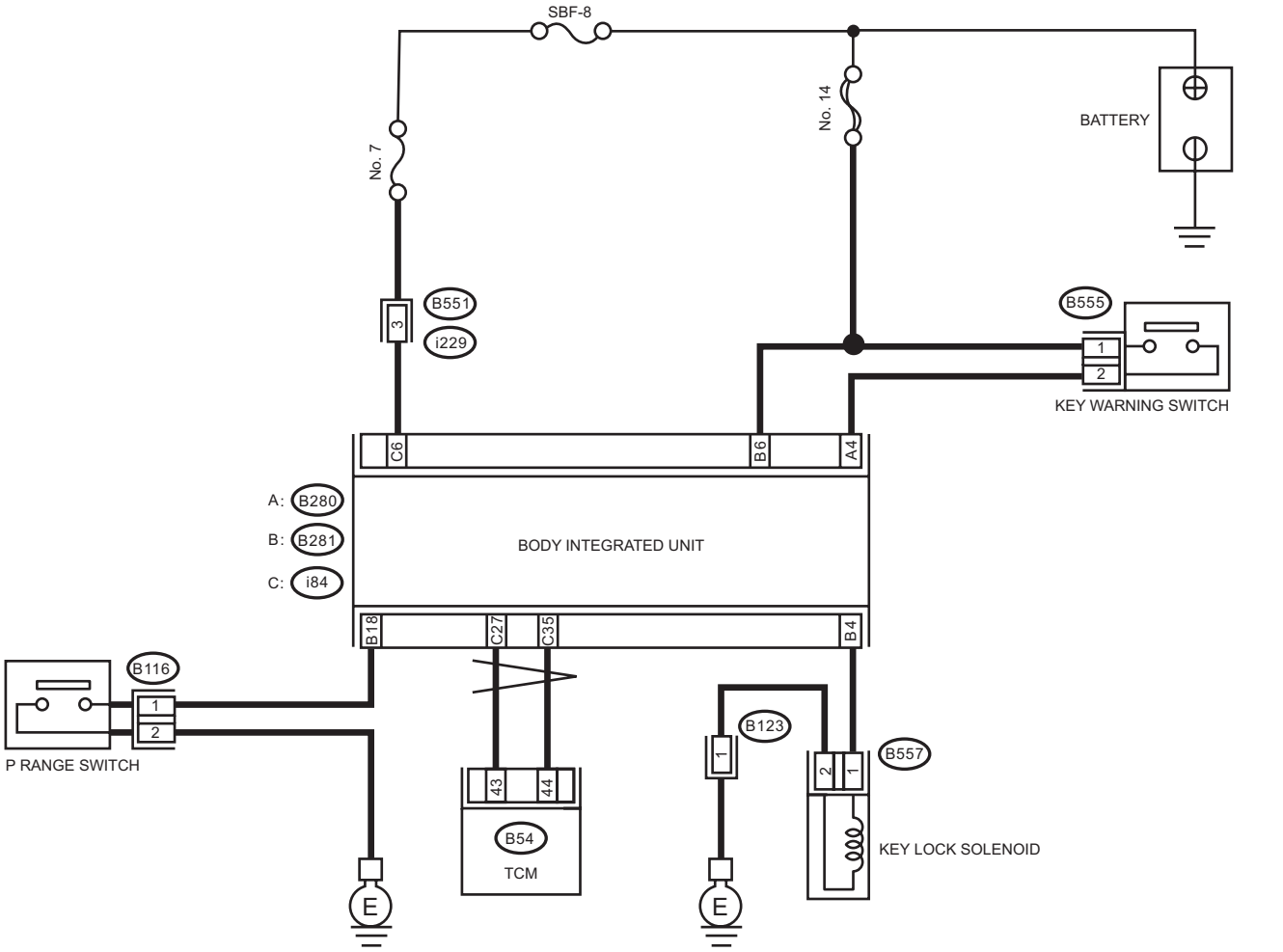
Step		Check	Yes	No
1	**CHECK BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT.** <Ref. to CS-17, BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, AT Shift Lock Control System.>	Is there any fault?	Follow the procedures to perform inspection and repair.	Go to step **2**.

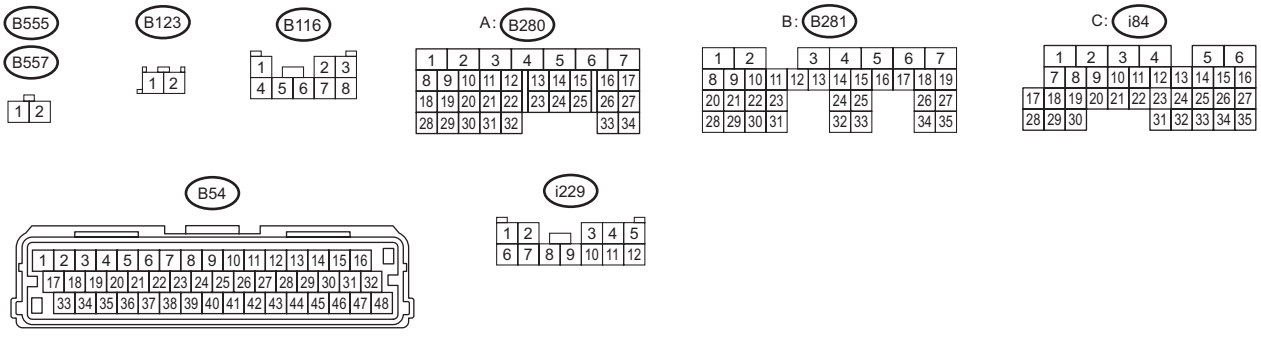
	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** 1) Connect the Subaru Select Monitor. 2) Shift the select lever to "P" range. 3) Turn the ignition switch to ON. 4) Select the current data display and display «P SW». <Ref. to BC(diag)-12, Read Current Data.>	Is the display "ON" in the P range and "OFF" in ranges other than P?	Go to step **3**.	Go to step **8**.
3	**CHECK CURRENT DATA.** Select the current data display and display «Stop Light Switch». <Ref. to BC(diag)-12, Read Current Data.>	Is "ON" displayed when the brake pedal is depressed and "OFF" displayed when the brake pedal is released?	Go to step **4**.	Go to step **11**.
4	**CHECK BODY INTEGRATED UNIT DTC.** Check the DTC of the body integrated unit when the brake pedal is pressed and when it is released. (Hold each condition for 5 seconds or more.)	Is there a DTC of a current malfunction?	Follow the DTC to perform inspection and repair.	Go to step **5**.
5	**CHECK CURRENT DATA.** Select the current data display and display «Shift lock solenoid output». <Ref. to BC(diag)-12, Read Current Data.>	Is "ON" displayed when the brake pedal is depressed and "OFF" displayed when the brake pedal is released?	Go to step **6**.	Replace the body integrated unit.
6	**CHECK CURRENT DATA.** Select the current data display and display «Shift Position». <Ref. to BC(diag)-12, Read Current Data.>	Is the display "P" in the P range and other than "P" in ranges other than P?	Go to step **7**.	Check the following items. • Inhibitor switch • Harness between inhibitor switch and TCM • TCM input signal • TCM CAN communication • Body integrated unit CAN receive
7	**CHECK CURRENT DATA.** 1) Select the current data display and display «Front Wheel Speed». <Ref. to BC(diag)-12, Read Current Data.> 2) Start the engine. 3) Raise vehicle speed gradually up to approximately 20 km/h (12 MPH).	Is a figure equivalent to the speedometer being indicated?	Go to step **12**.	Check the following items. • Wheel speed sensor • CAN communication by VDC unit • Body integrated unit CAN receive Replace the wheel speed sensor, VDC unit or body integrated unit, or both.
8	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND "P" RANGE SWITCH.** 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of "P" range switch. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and "P" range switch. ***Connector & terminal*** ***(B281) No. 18 — (B116) No. 1:***	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the "P" range switch.	Go to step **9**.

	Step	Check	Yes	No
9	**CHECK HARNESS BETWEEN "P" RANGE SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between "P" range switch and chassis ground. ***Connector & terminal*** ***(B116) No. 2 — Chassis ground:***	Is it less than 10 Ω?	Go to step **10**.	Repair the harness between the "P" range switch and chassis ground.
10	**CHECK "P" RANGE SWITCH.** Measure the resistance between "P" range switch connector terminals. ***Terminals*** ***No. 2 — No. 1:***	Is it less than 10 Ω in the "P" range, and 1 MΩ or more in ranges other than "P"?	Replace the body integrated unit.	Replace the "P" range switch.
11	**CHECK STOP LIGHT SWITCH INPUT SIGNAL.** 1) Disconnect the connector from body integrated unit. 2) Measure the voltage between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(B280) No. 10 (+) — Chassis ground (–):***	Is the voltage 9 V to 16 V when the brake pedal is depressed, and approx. 0 V when not depressed?	Replace the body integrated unit.	Check the stop light system.
12	**CHECK SOLENOID UNIT OPERATION.** Connect the battery to the solenoid unit connector terminal, and operate the solenoid unit. ***Terminals*** ***No. 3 (+) — No. 4 (–):***	Does the solenoid unit operate normally?	Check the lock mechanism of the select lever body.	Replace the solenoid unit.

4. KEY INTERLOCK CANNOT BE LOCKED OR RELEASED

NOTE:
Check of this item only applies to models without a push button ignition switch.





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Step		Check	Yes	No
1	**CHECK D CHECK FUSE.** Check that the D check fuse is disconnected.	Is the D check fuse disconnected?	Go to step **2**.	Remove the D check fuse and then turn the ignition switch to ON.

	Step	Check	Yes	No
2	**CHECK BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT.** <Ref. to CS-17, BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, AT Shift Lock Control System.>	Is there any fault?	Follow the procedures to inspect and repair.	Go to step **3**.
3	**CHECK CURRENT DATA.** 1) Connect the Subaru Select Monitor. 2) Shift the select lever to "P" range. 3) Turn the ignition switch to ON. 4) Select the current data display and display «P SW». <Ref. to BC(diag)-12, Read Current Data.>	Is the display "ON" in the P range and "OFF" in ranges other than P?	Go to step **4**.	Go to step **7**.
4	**CHECK CURRENT DATA.** 1) Select the current data display and display the «key-lock warning SW». <Ref. to BC(diag)-12, Read Current Data.> 2) Turn the ignition switch to OFF.	Does the display change from "ON" ←→ "OFF" when the key is inserted and removed?	Go to step **5**.	Go to step **10**.
5	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Select the current data display and display «Key lock solenoid output». <Ref. to BC(diag)-12, Read Current Data.>	Is the display "OFF" in the P range and "ON" in ranges other than P?	Go to step **11**.	Go to step **6**.
6	**CHECK DTC OF BODY INTEGRATED UNIT.** 1) Set the select lever to other than "P" range. 2) Check DTC of body integrated unit.	Is B1015 (key interlock circuit abnormal) a current malfunction?	Follow the DTC to perform inspection and repair.	Go to step **11**.
7	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND "P" RANGE SWITCH.** 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of "P" range switch. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and "P" range switch. ***Connector & terminal*** ***(B281) No. 18 — (B116) No. 1:***	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the "P" range switch.	Go to step **8**.
8	**CHECK HARNESS BETWEEN "P" RANGE SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between "P" range switch and chassis ground. ***Connector & terminal*** ***(B116) No. 2 — Chassis ground:***	Is it less than 10 Ω?	Go to step **9**.	Repair the harness between the "P" range switch and chassis ground.
9	**CHECK "P" RANGE SWITCH.** Measure the resistance between "P" range switch connector terminals. ***Terminals*** ***No. 2 — No. 1:***	Is it less than 10 Ω in the "P" range, and 1 MΩ or more in ranges other than "P"?	Replace the body integrated unit.	Replace the "P" range switch.
10	**CHECK HARNESS BETWEEN BATTERY AND KEY WARNING SWITCH AND BODY INTEGRATED UNIT.** 1) Disconnect the connector from body integrated unit. 2) Measure the voltage between body integrated unit and chassis ground. ***Connector & terminal*** ***(B280) No. 4 (+) — Chassis ground (–):***	Is the display 9 V or more when the key is inserted, and less than 1.5 V with the key removed?	Replace the body integrated unit.	Check the following items. • Key warning switch • Harness/fuse • Ignition circuit

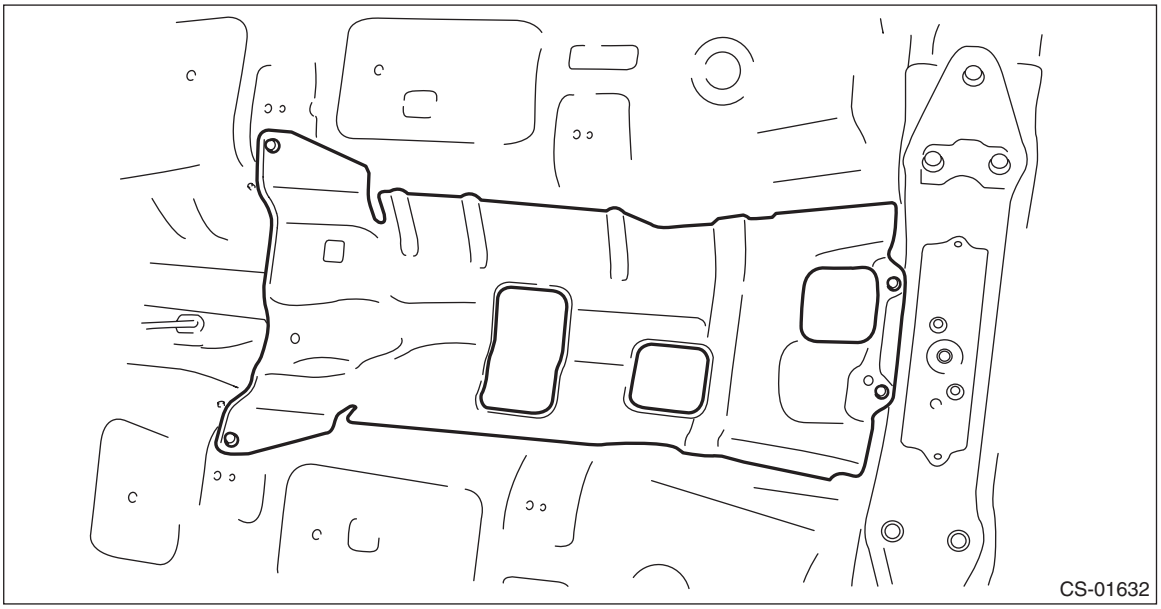
Step		Check	Yes	No
11	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND KEY LOCK SOLENOID.** 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of key lock solenoid. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and key lock solenoid. ***Connector & terminal*** ***(B281) No. 4 — (B557) No. 1:***	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the key lock solenoid.	Go to step **12**.
12	**CHECK HARNESS BETWEEN KEY LOCK SOLENOID AND CHASSIS GROUND.** Measure the resistance of harness between key lock solenoid and chassis ground. ***Connector & terminal*** ***(B557) No. 2 — Chassis ground:***	Is it less than 10 Ω?	Go to step **13**.	Repair or replace the harness between the key lock solenoid and chassis ground.
13	**CHECK KEY LOCK SOLENOID OPERATION.** Connect the battery to the key lock solenoid connector terminal, and operate the solenoid. ***Terminals*** ***No. 2 (+) — No. 1 (–):***	Does the key lock solenoid operate normally?	Go to step **14**.	Replace the key lock solenoid.
14	**CHECK OUTPUT OF BODY INTEGRATED UNIT.** 1) Connect all connectors. 2) Insert the key. 3) Measure the voltage between body integrated unit and chassis ground. ***Connector & terminal*** ***(B281) No. 4 — Chassis ground:***	Is it 7.5 V to 16 V in ranges other than “P”, and 0 V in the “P” range?	Check the lock mechanism of the steering lock body.	Replace the body integrated unit.

3. Select Lever

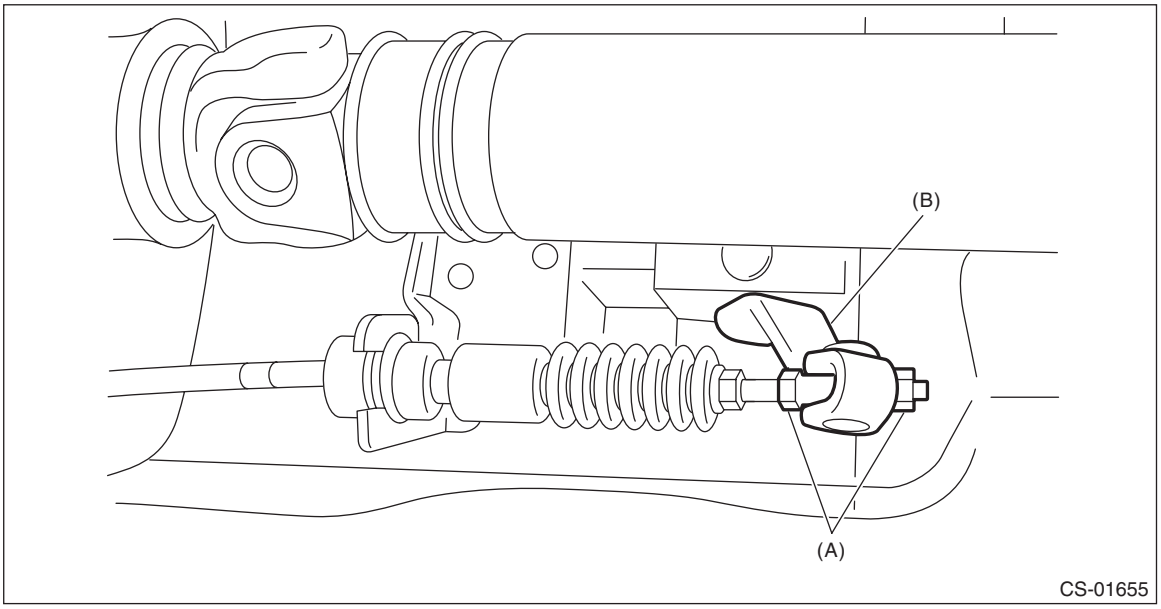
A: REMOVAL

1) Shift the select lever to “N” range.
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Lift up the vehicle.
4) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
5) Remove the center exhaust cover.

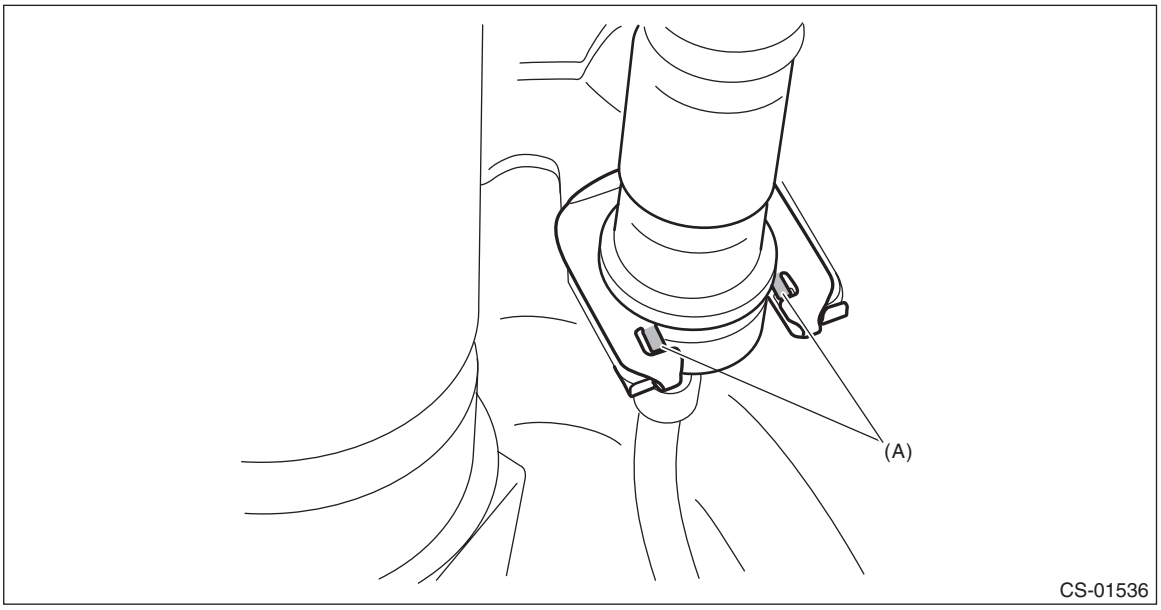


6) Disconnect the cable from the arm COMPL.



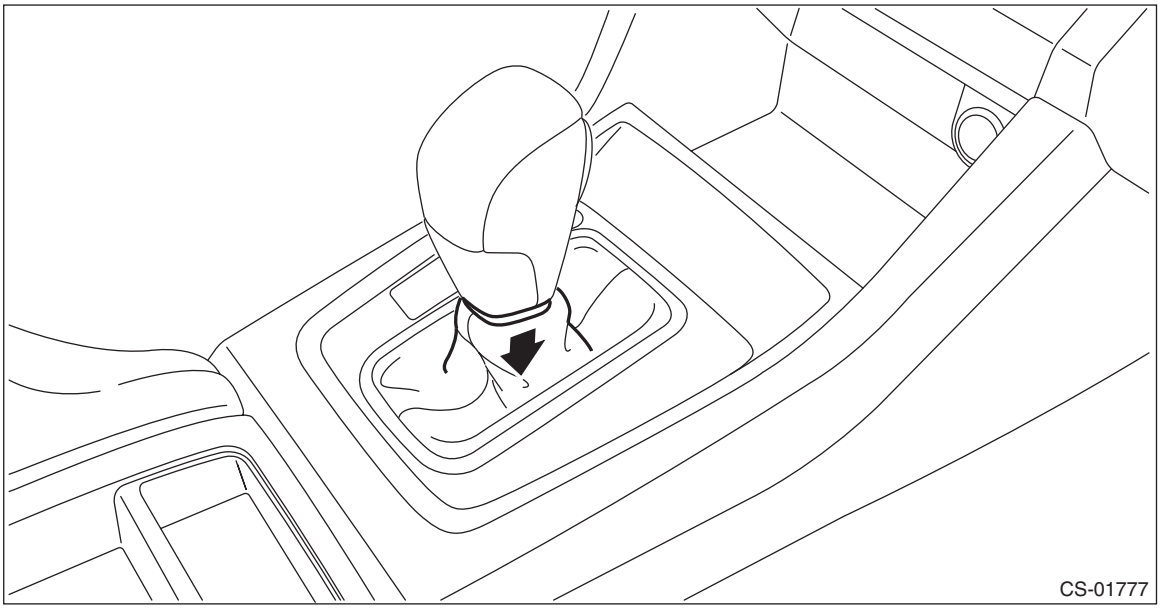
(A) Adjusting nut
(B) Arm COMPL

7) Raise the claw of clamp and remove the cable.

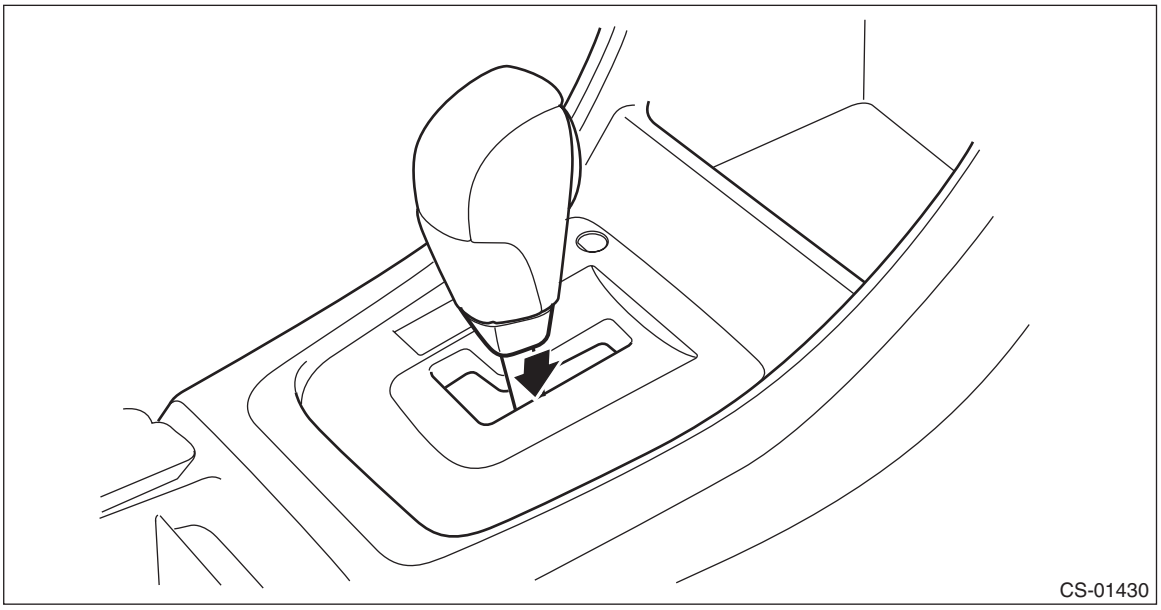


(A) Claw

8) Lower the vehicle.
9) Shift the select lever to “N” range.
10) Lower the boot assembly vertically toward the lever. (Model with boot shifter)

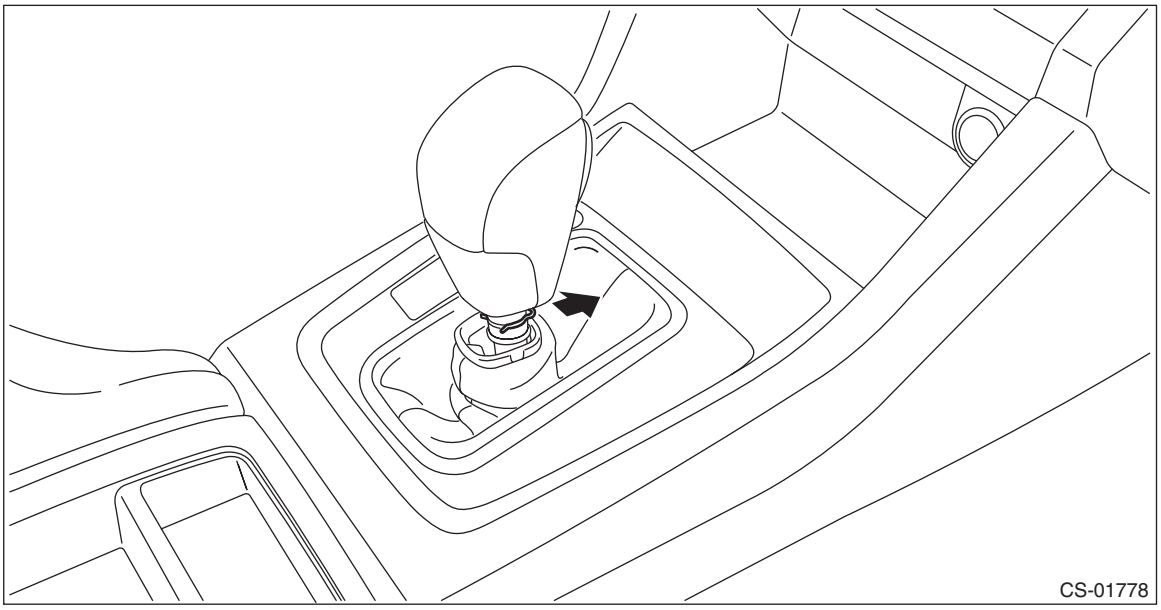


11) Lower the cover grip AT vertically toward the lever. (Model with gate shifter)

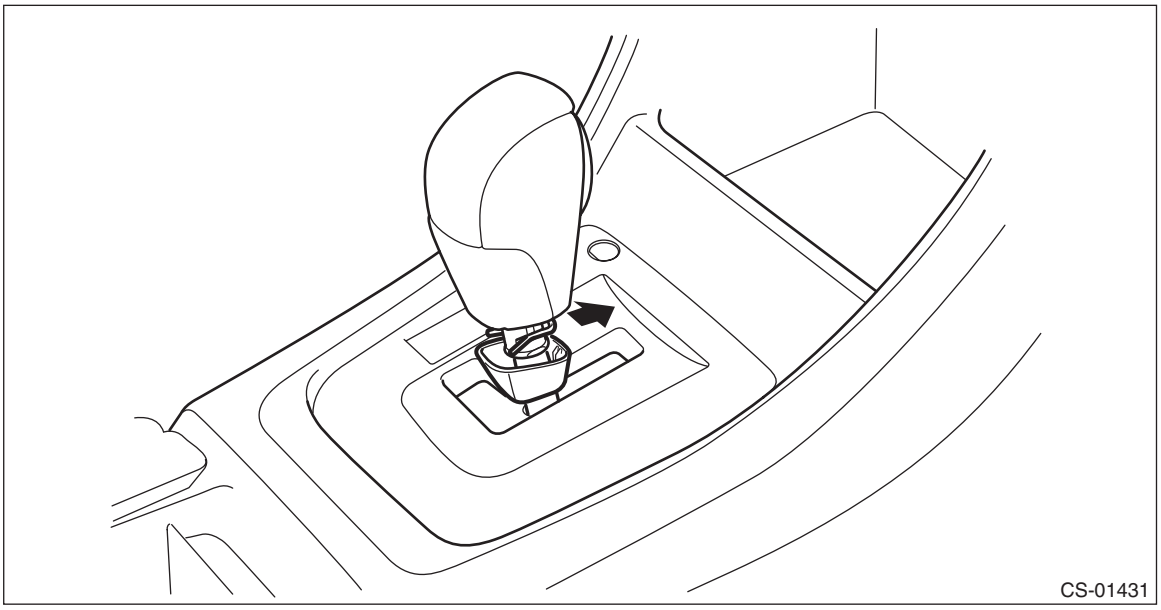


12) Remove the clamp grip pin.

- Model with boot shifter

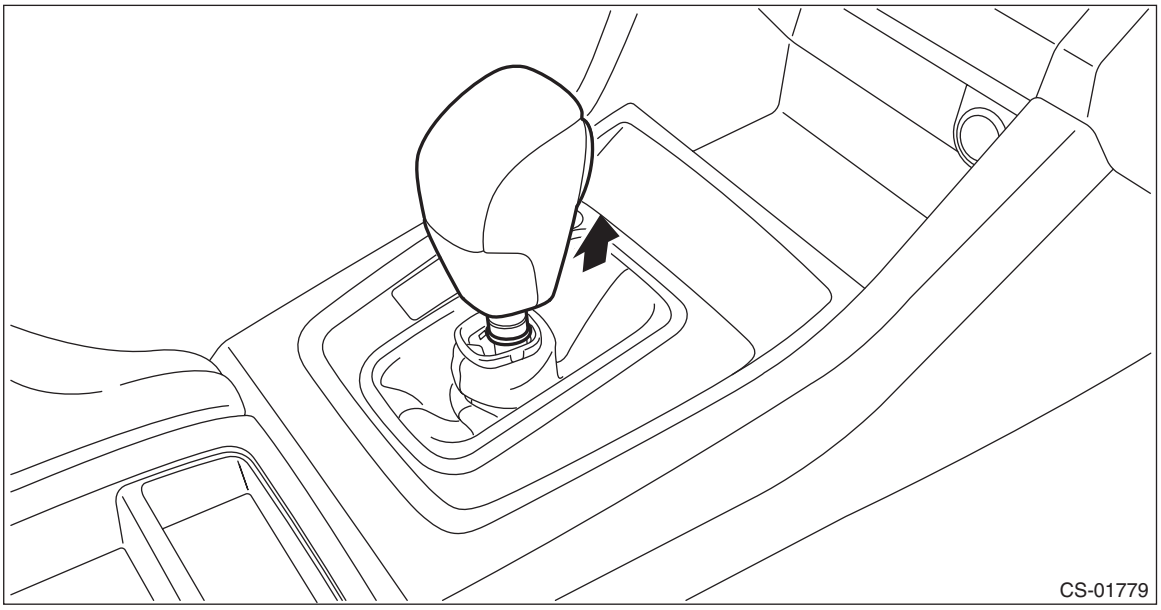


- Model with gate shifter

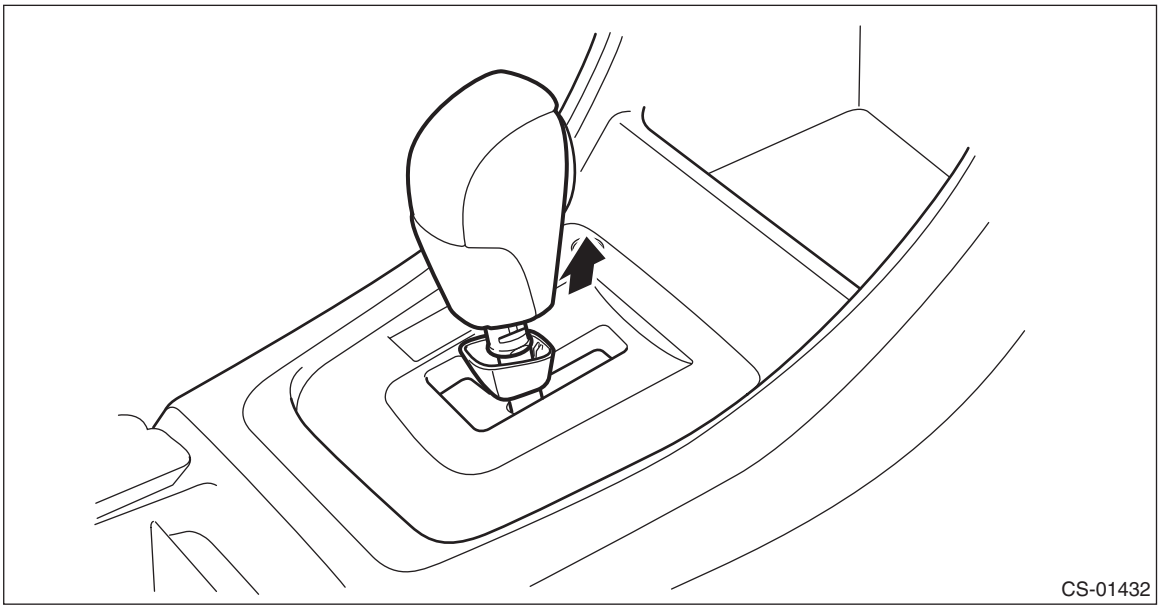


13) Remove the grip assembly.

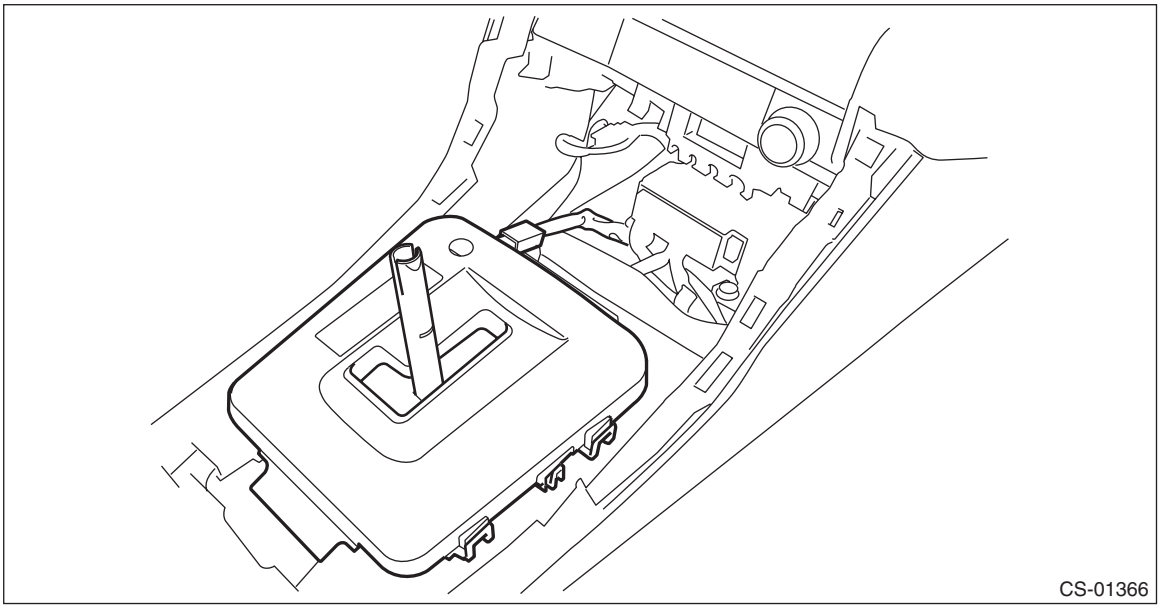
- Model with boot shifter



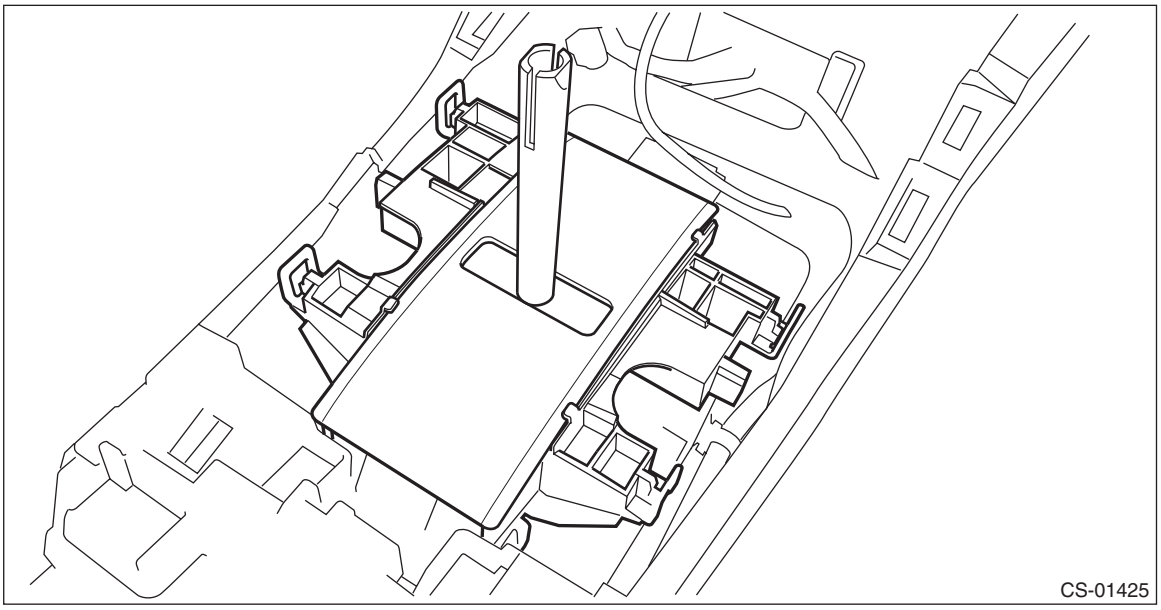
- Model with gate shifter



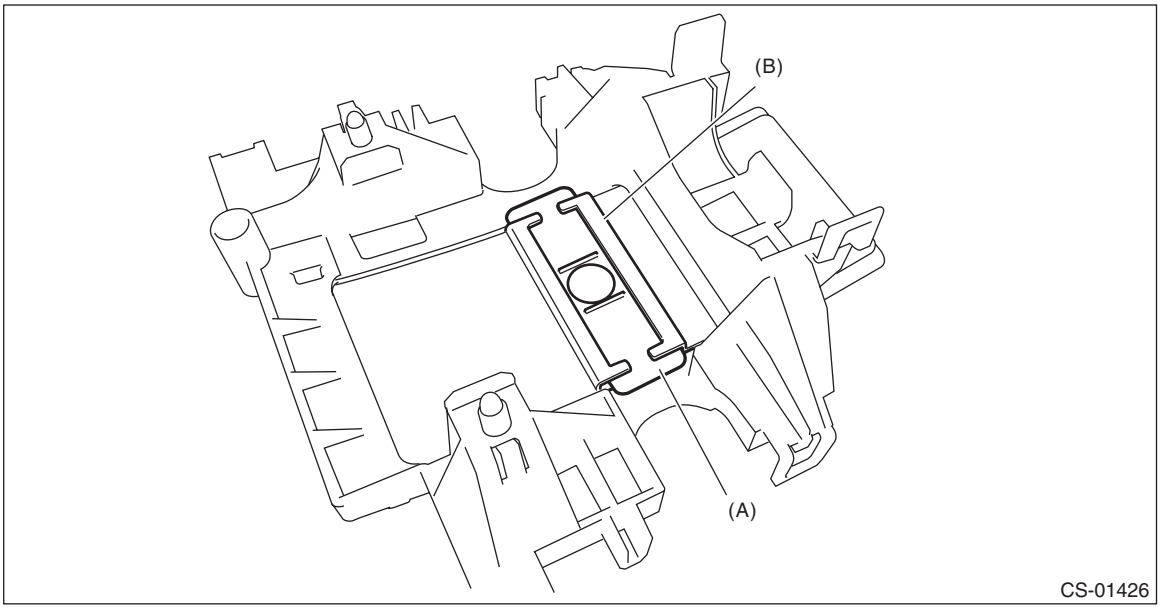
14) Remove the console box. <Ref. to EI-77, REMOVAL, Console Box.>
15) Remove the cover - shift lever. <Ref. to EI-77, REMOVAL, Console Box.>
16) Disconnect the connector, and remove the indicator cover from the housing. (Model with gate shifter)



17) Remove the housing with the blind A and blind B. (Model with gate shifter)

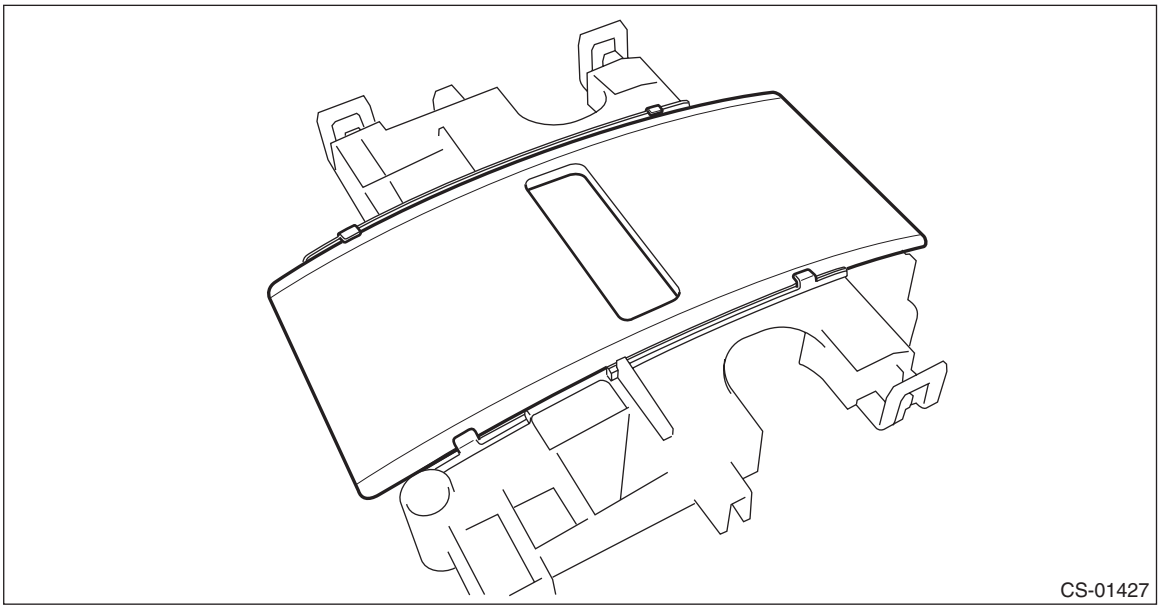


18) Remove the blind B. (Model with gate shifter)

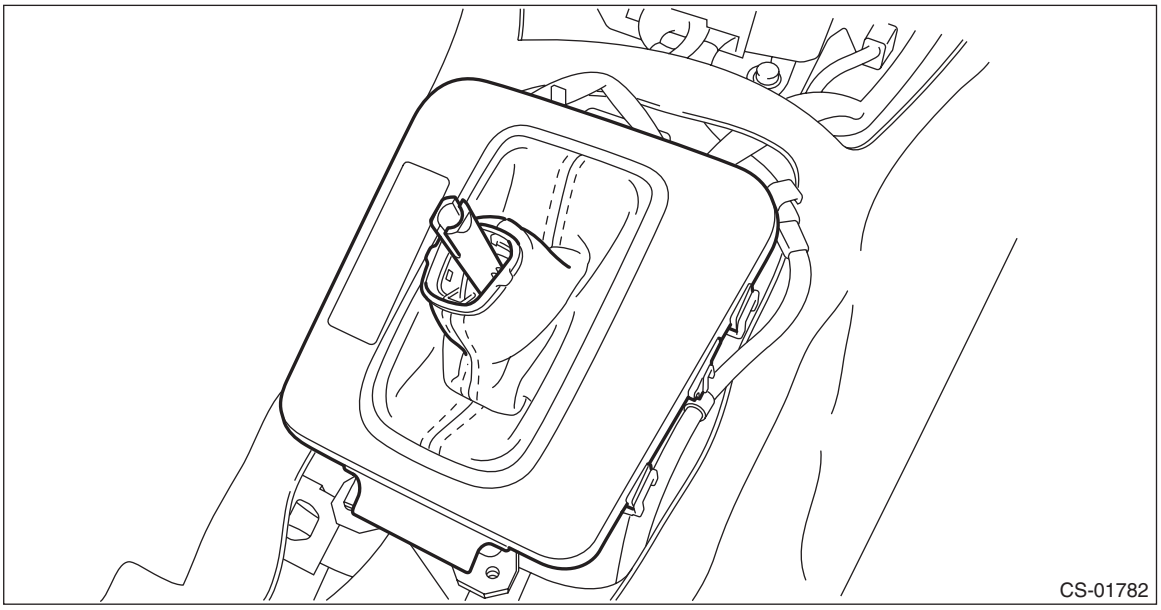


(A) Blind B
(B) Blind A

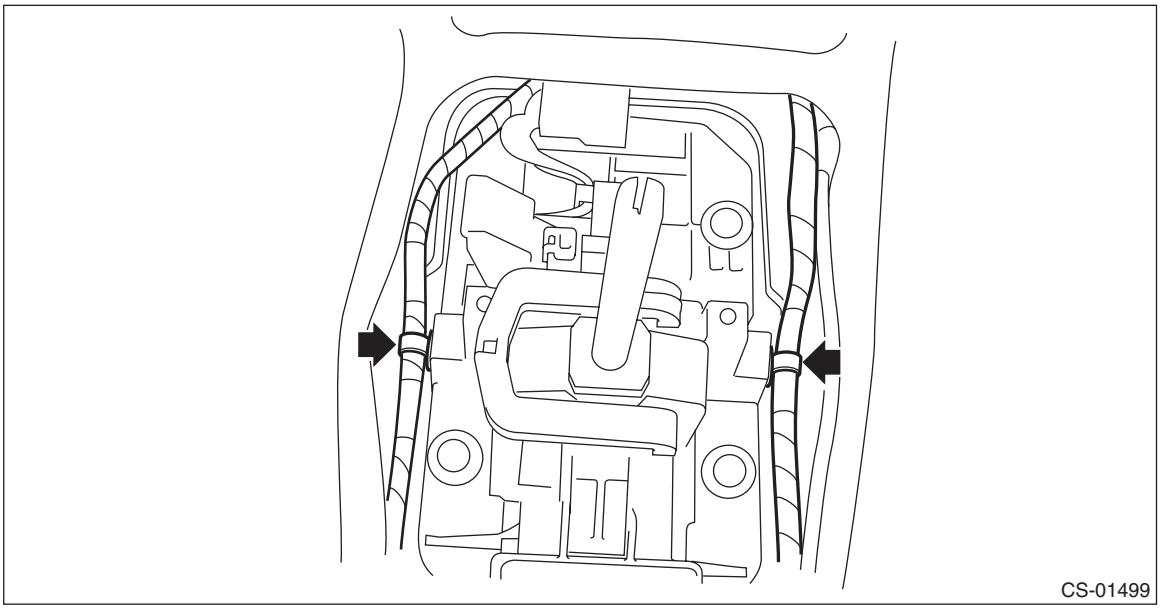
19) Remove the blind A from the housing. (Model with gate shifter)



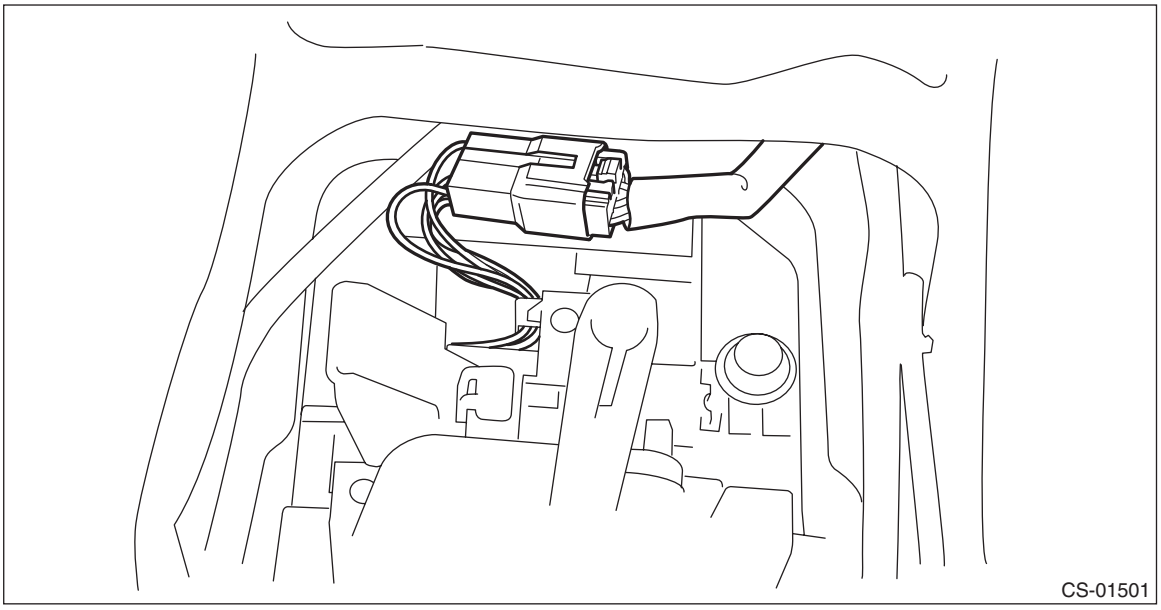
20) Remove the panel center LWR LH and RH. <Ref. to EI-77, REMOVAL, Console Box.>
21) Disconnect the connector, and remove the indicator assembly. (Model with boot shifter)



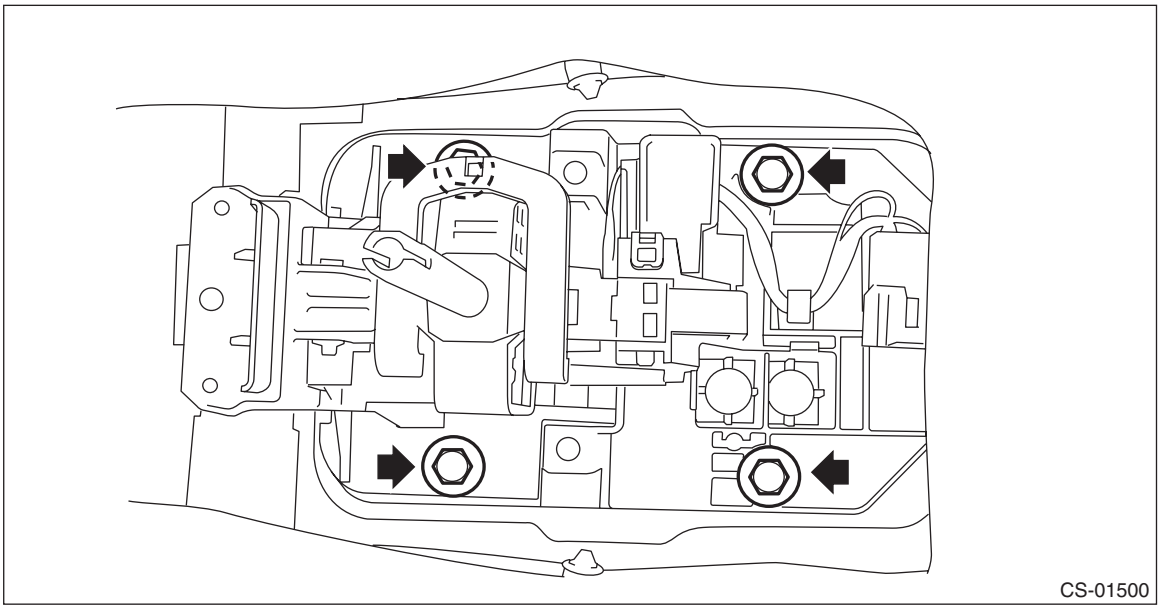
22) Remove the harness clip from the select lever assembly.



23) Disconnect the harness connector.



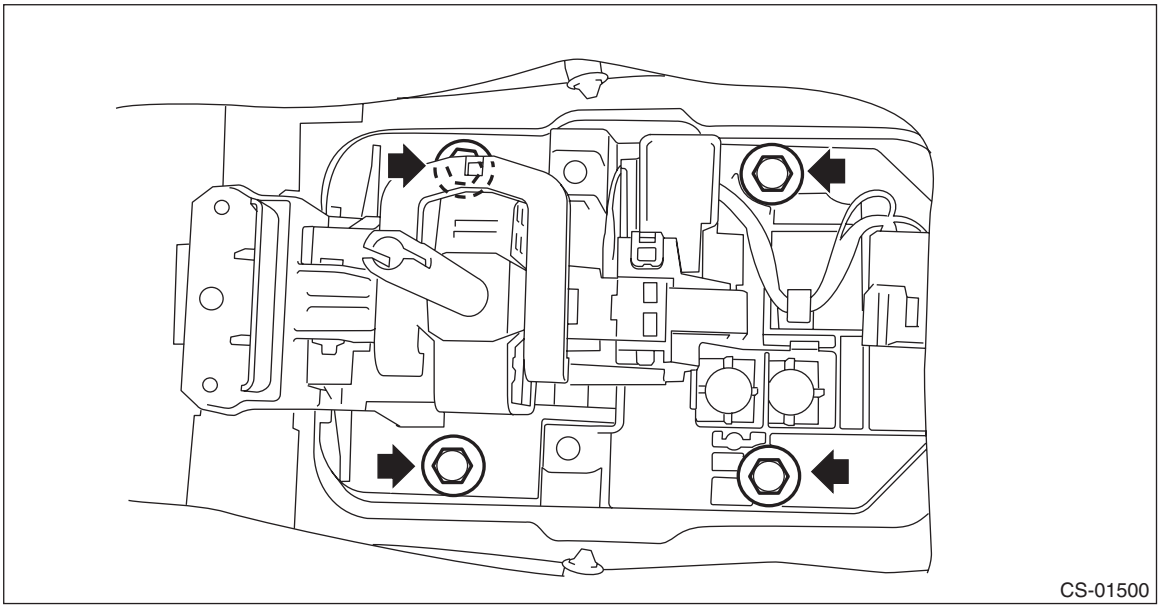
24) Remove the four bolts to remove the select lever assembly.



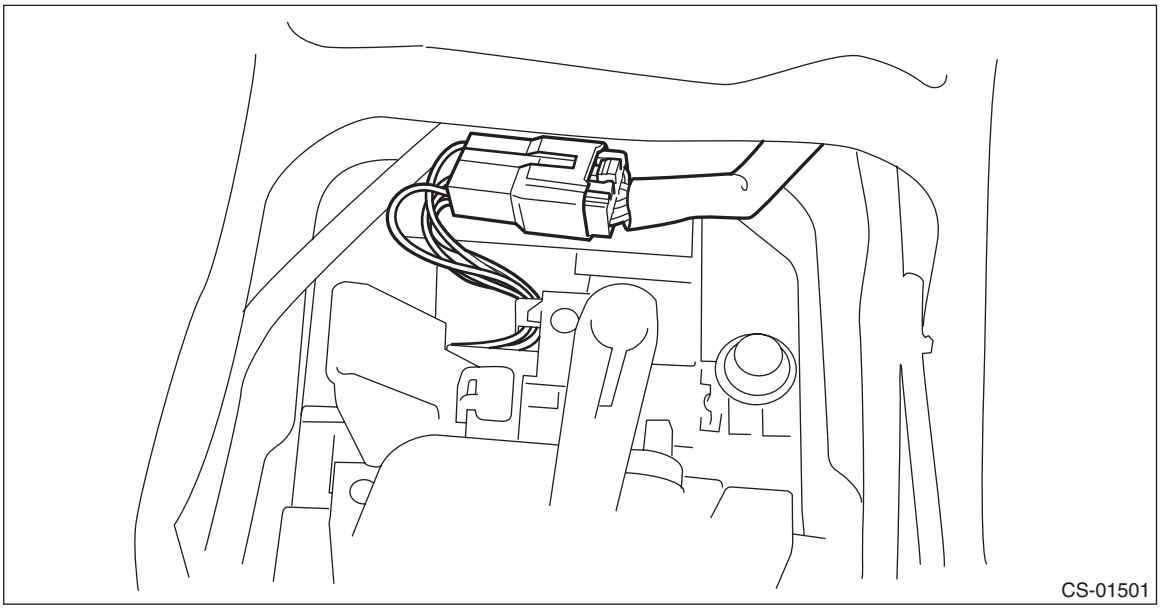
B: INSTALLATION

1) Set the select lever assembly to the vehicle body.
2) Tighten the four mounting bolts to attach the select lever assembly to the vehicle body.

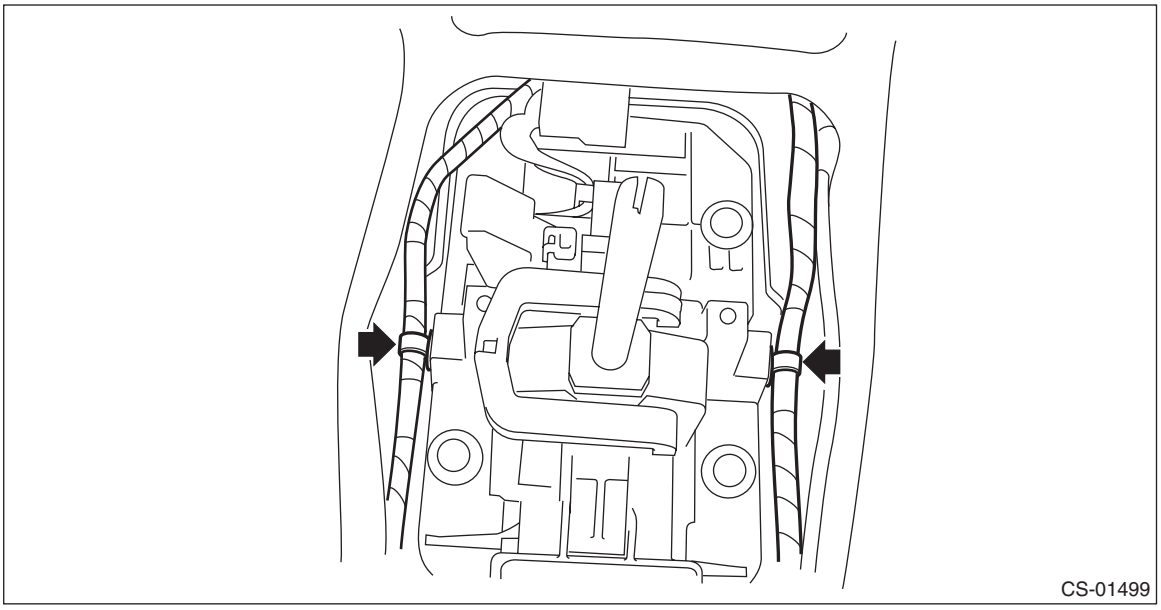
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



3) Connect the harness connector.

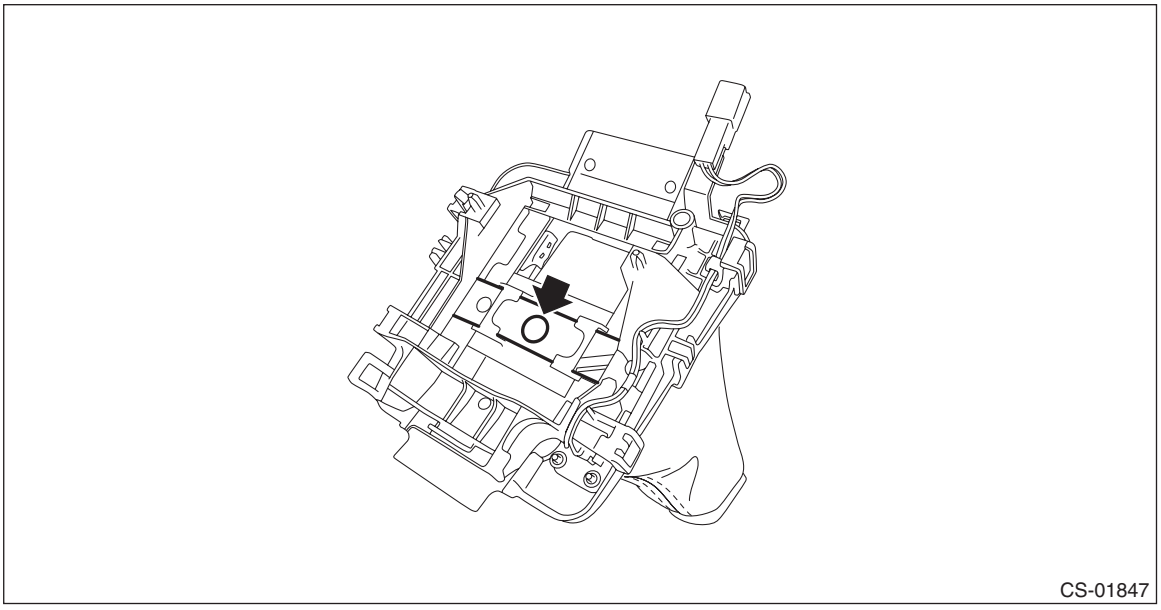


4) Install the harness clip to the select lever assembly.



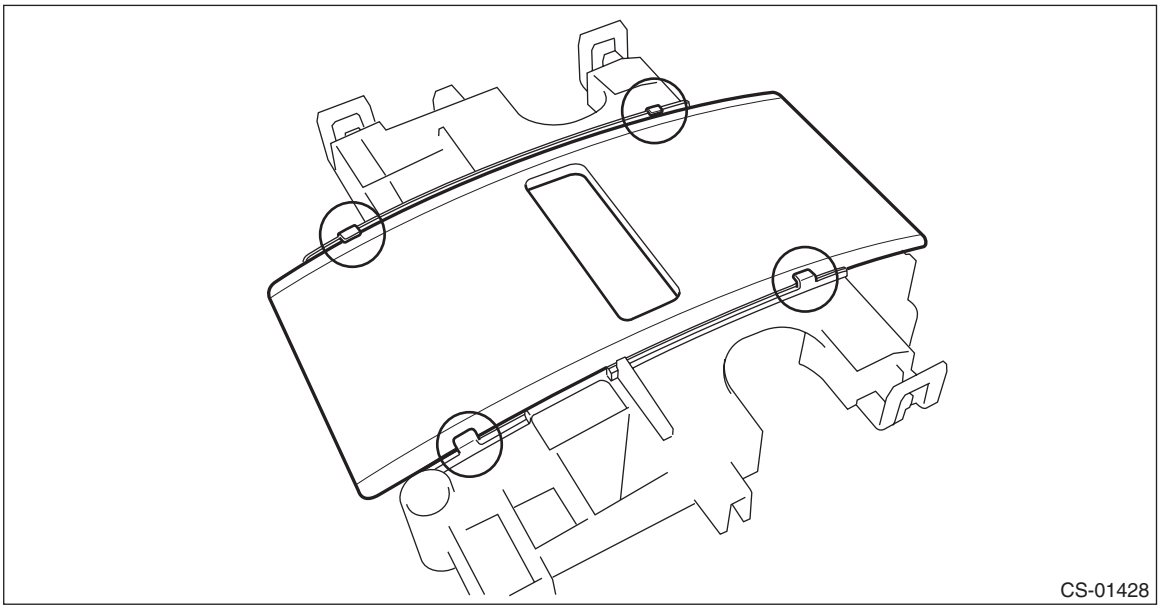
5) Shift the select lever to “N” range.
6) Install the indicator assembly, then connect the connector. (Model with boot shifter)

NOTE:
Insert the select lever through the blind hole sufficiently.

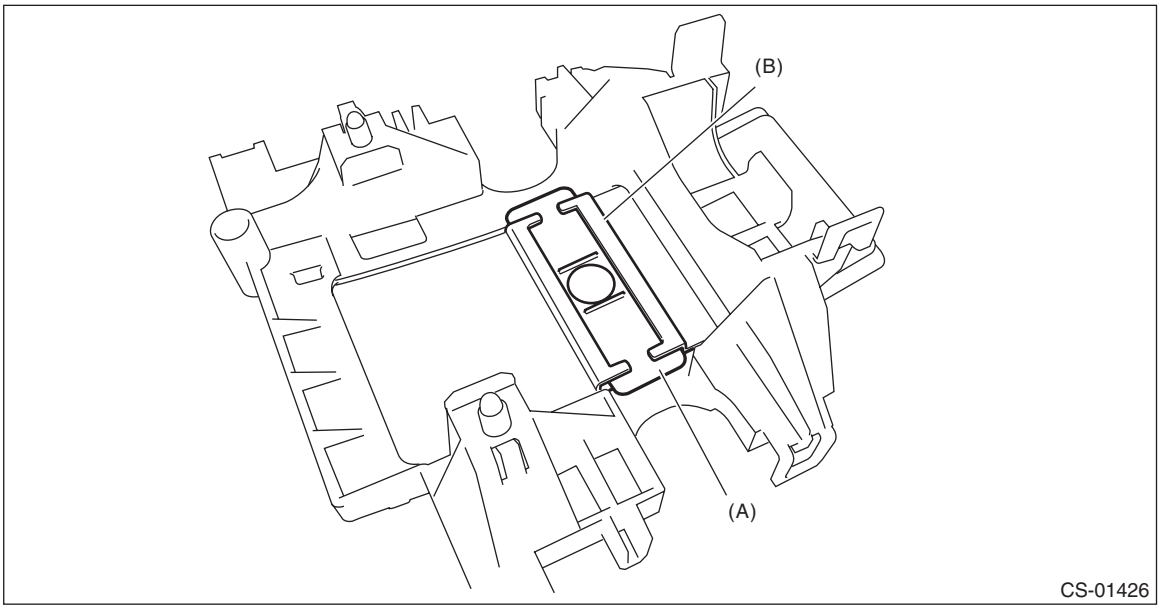

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7) Install the panel center LWR LH and RH. <Ref. to EI-78, INSTALLATION, Console Box.>
8) Install the blind A to the housing. (Model with gate shifter)

NOTE:
The blind A should be installed so that it is securely caught inside the tab of the housing.

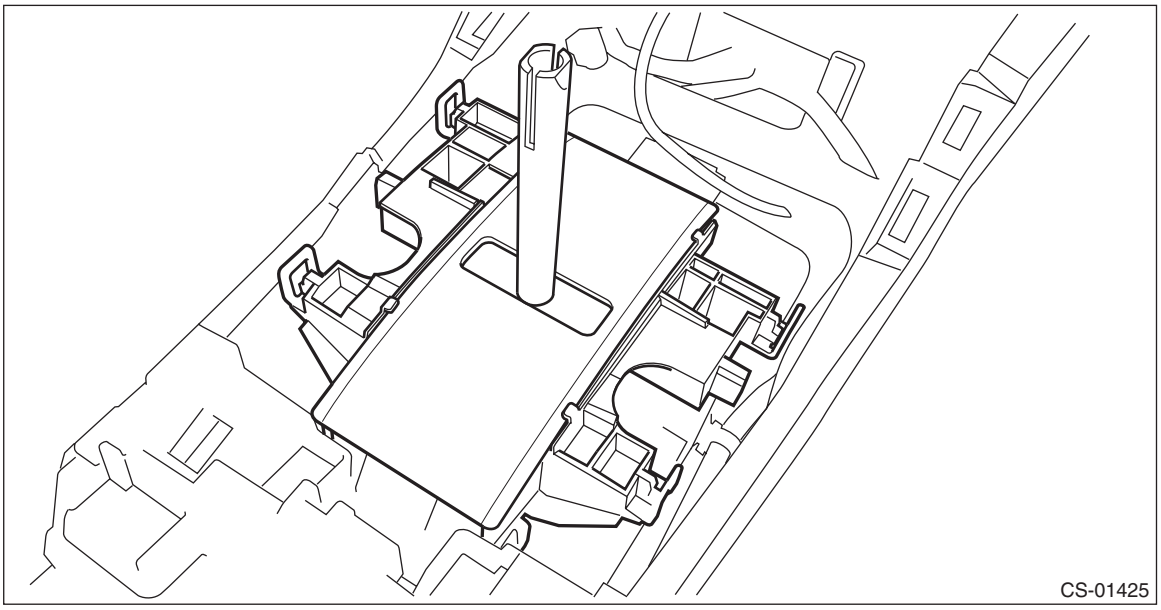

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9) Install the blind B behind the blind A. (Model with gate shifter)

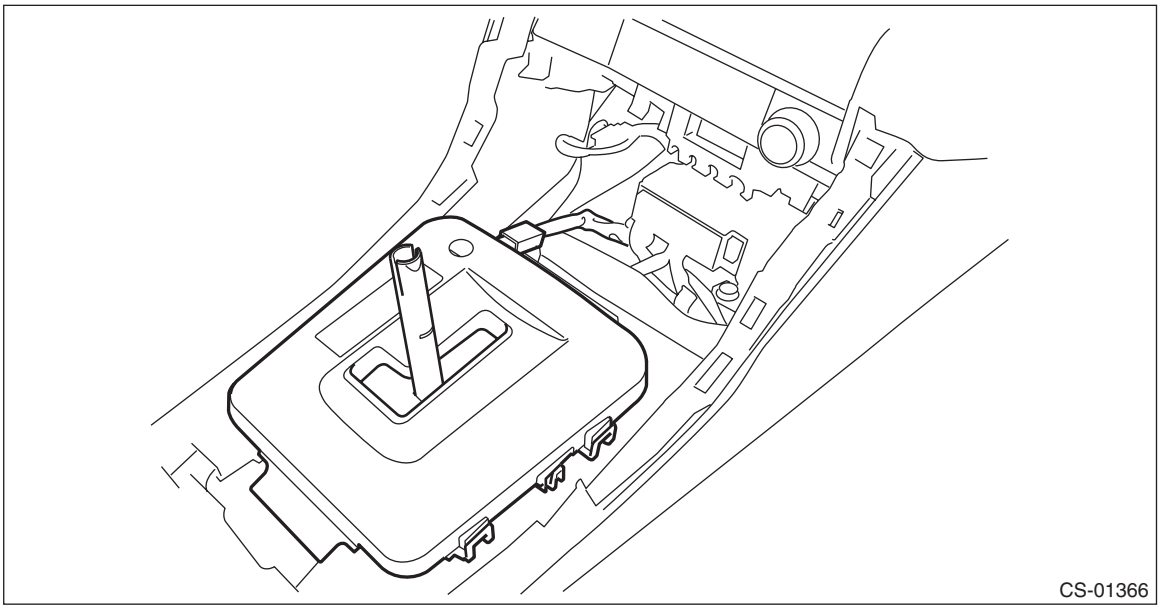


(A) Blind B
(B) Blind A

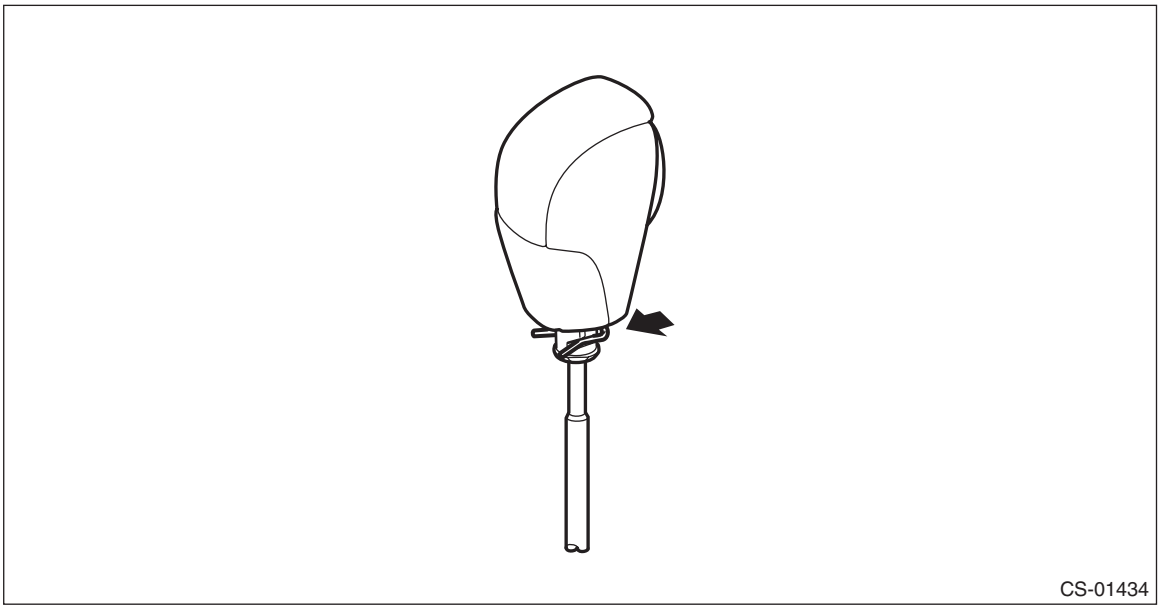
10) Install the housing. (Model with gate shifter)



11) Install the indicator cover, then connect the connector. (Model with gate shifter)

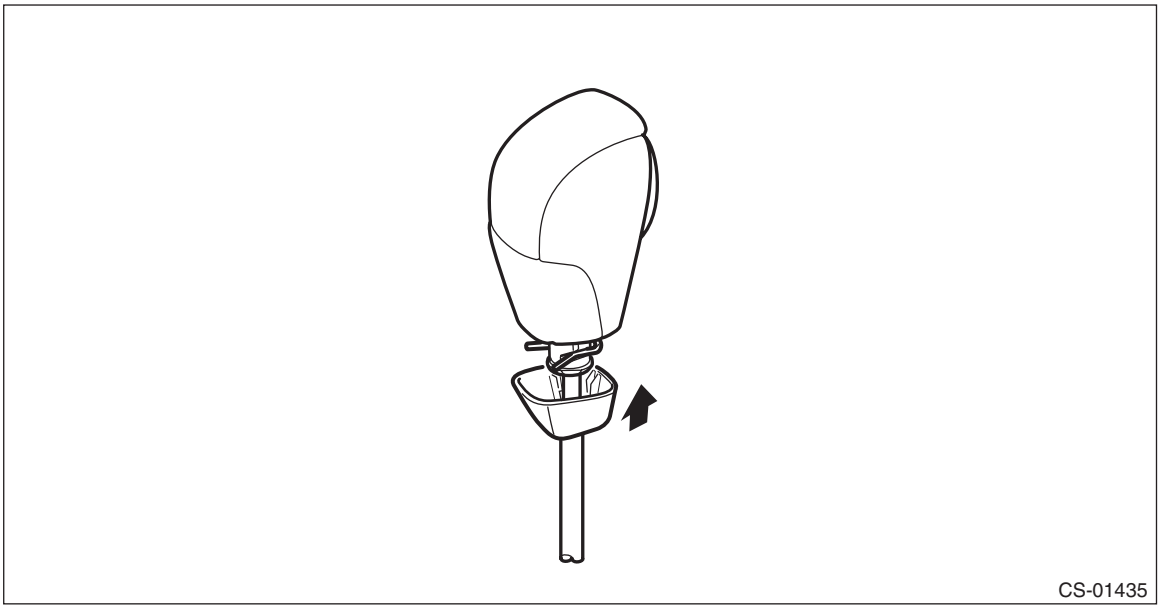


12) Install the cover shift lever. <Ref. to EI-78, INSTALLATION, Console Box.>
13) Accessing from the button side of the grip, attach the clamp grip pin.



14) Install the cover grip AT securely. (Model with gate shifter)

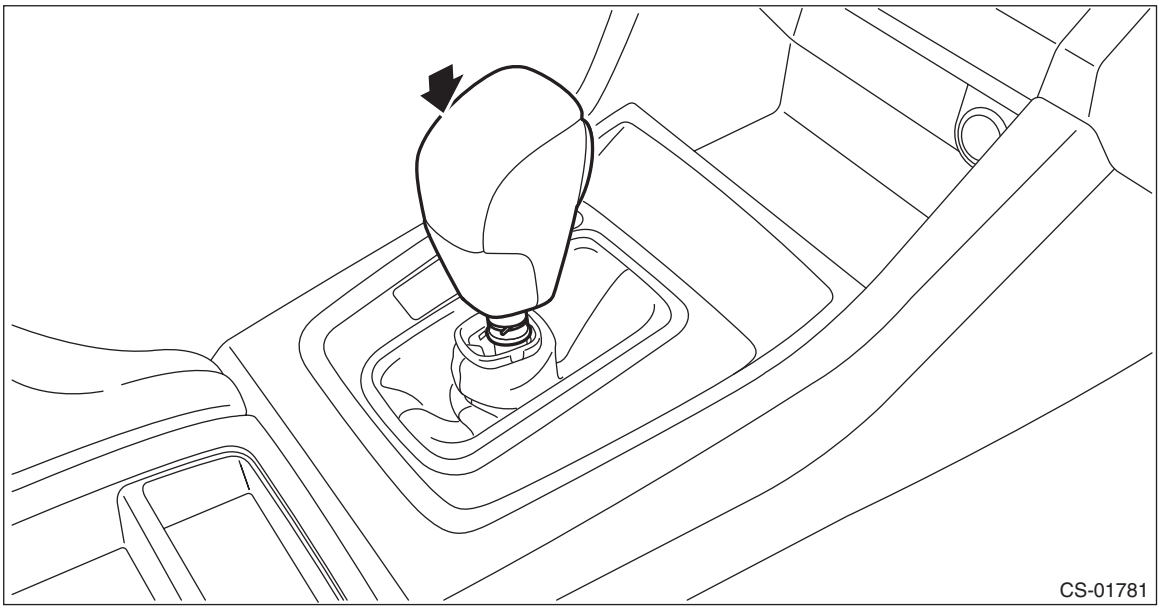
NOTE:
After installation, check that the cover grip AT cannot be detached.



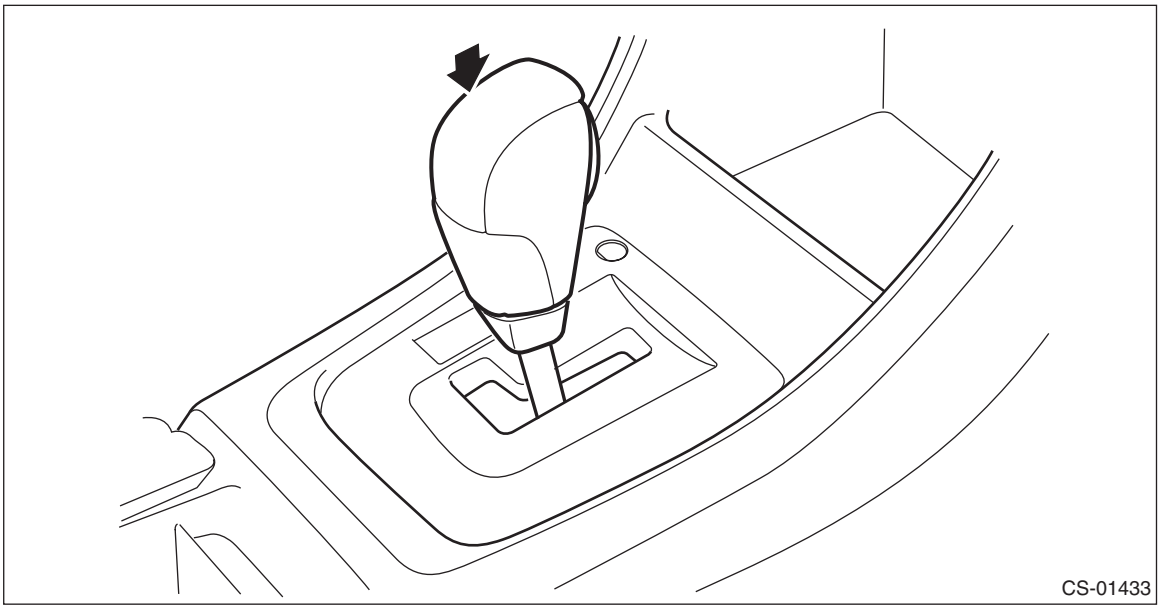
15) Insert the grip assembly to the select lever and press it down until a click is heard.

NOTE:
For the model with boot shifter, insert the grip assembly while holding with your fingers so that the clamp grip pin does not come out.

- Model with boot shifter

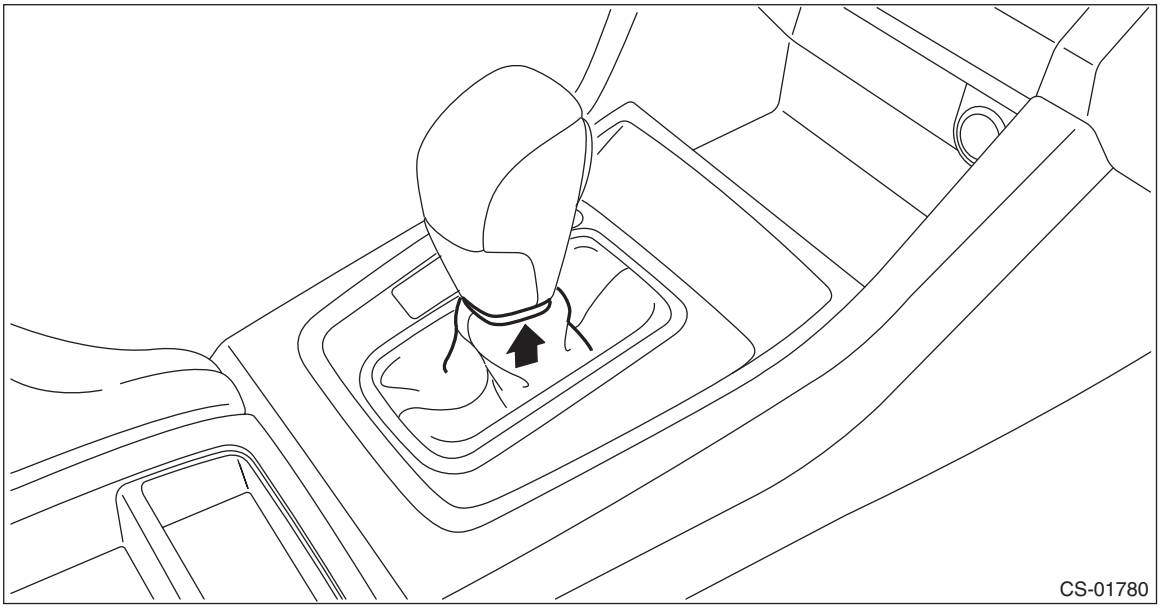


- Model with gate shifter



16) Securely install the boot assembly. (Model with boot shifter)

NOTE:
After installation, check that the boot assembly does not come off.



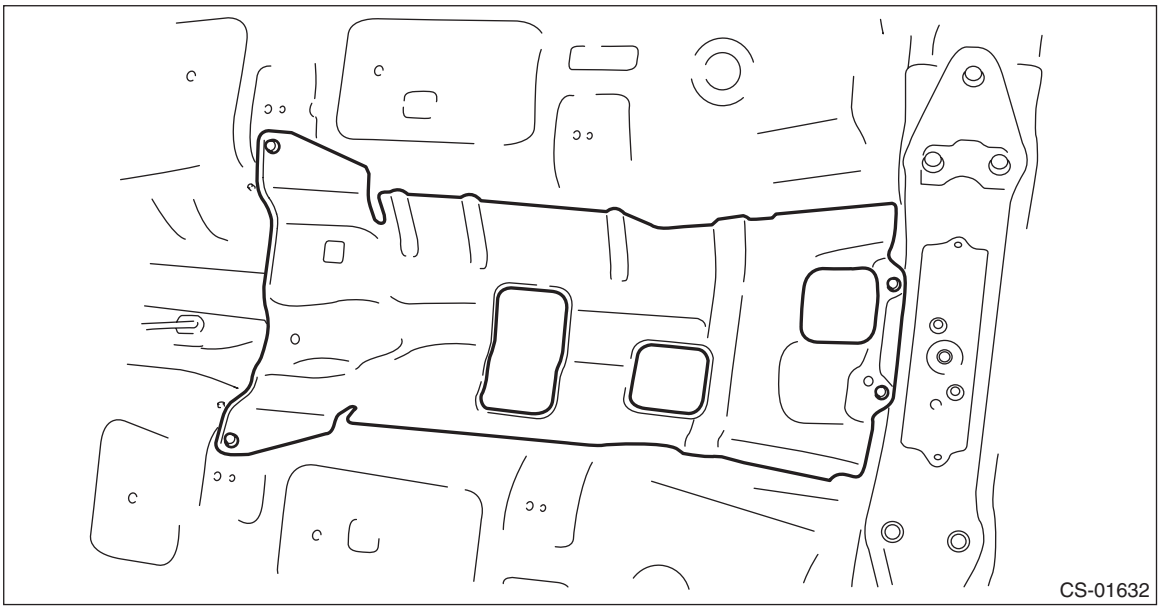
17) After installation of grip, check the following points.
- The grip will not come off.
- The button on the grip operates normally.

18) Install the console box. <Ref. to EI-78, INSTALLATION, Console Box.>
19) Shift the select lever to “N” range.
20) Lift up the vehicle.
21) Secure the cable to the bracket. <Ref. to CS-53, INSTALLATION, Select Cable.>
22) Adjust the select cable position. <Ref. to CS-57, ADJUSTMENT, Select Cable.>

23) After adjustment, confirm that the select lever operates properly at all range positions using the shift lock release button.

NOTE:
According to the select lever operation, confirm that the indicator positions are shown correctly.
24) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

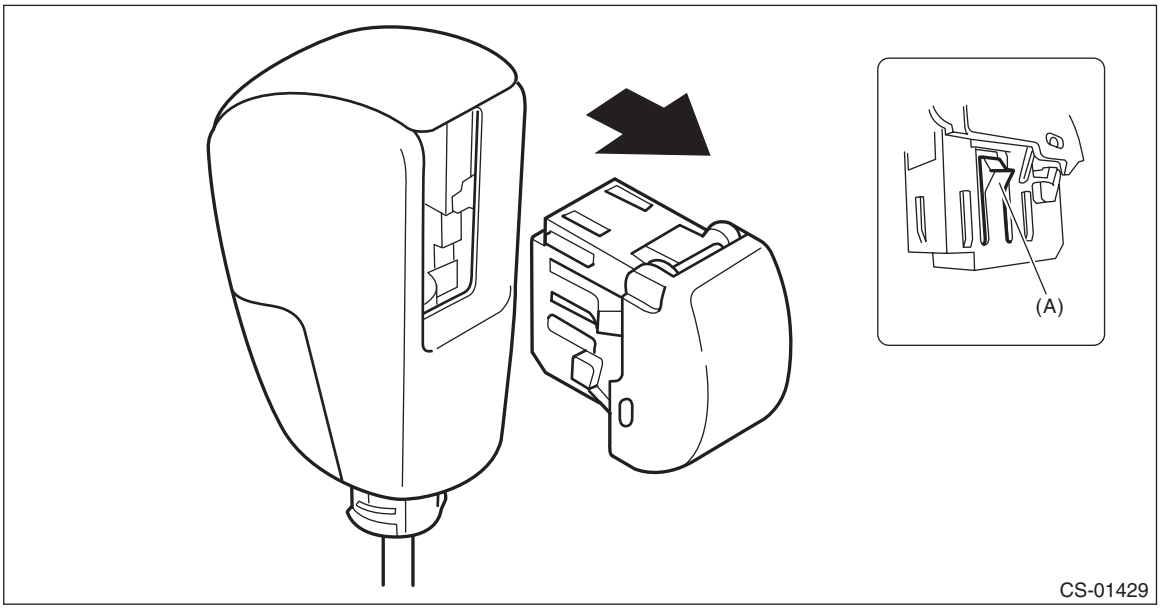


25) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
26) Lower the vehicle.
27) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
28) Inspect the following items. If a malfunction is found in the inspection, adjust the select cable or inhibitor switch.
(1) The shift lock operates normally. <Ref. to CS-14, SHIFT LOCK OPERATION, INSPECTION, AT Shift Lock Control System.>
(2) Engine starts when the select lever is in “P” or “N” range, but not in other ranges.
(3) Back-up light illuminates when the select lever is in the “R” range, but not in other ranges.
(4) Select lever and indicator positions are matched.

C: DISASSEMBLY

1. GRIP ASSY

1) Remove the button assembly_AT.

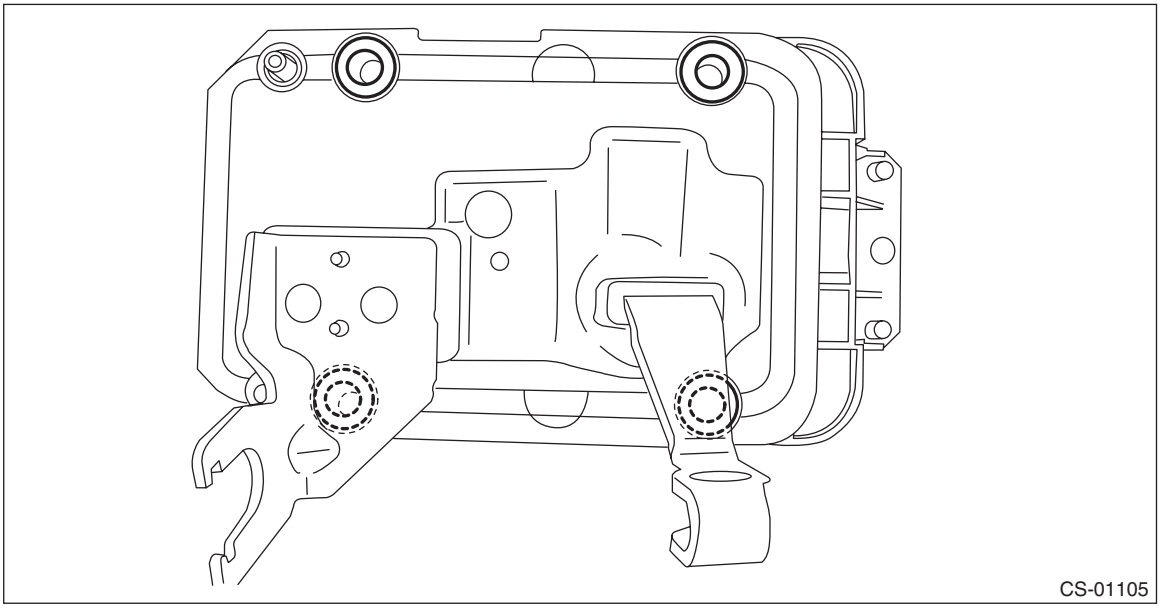


(A) Claw

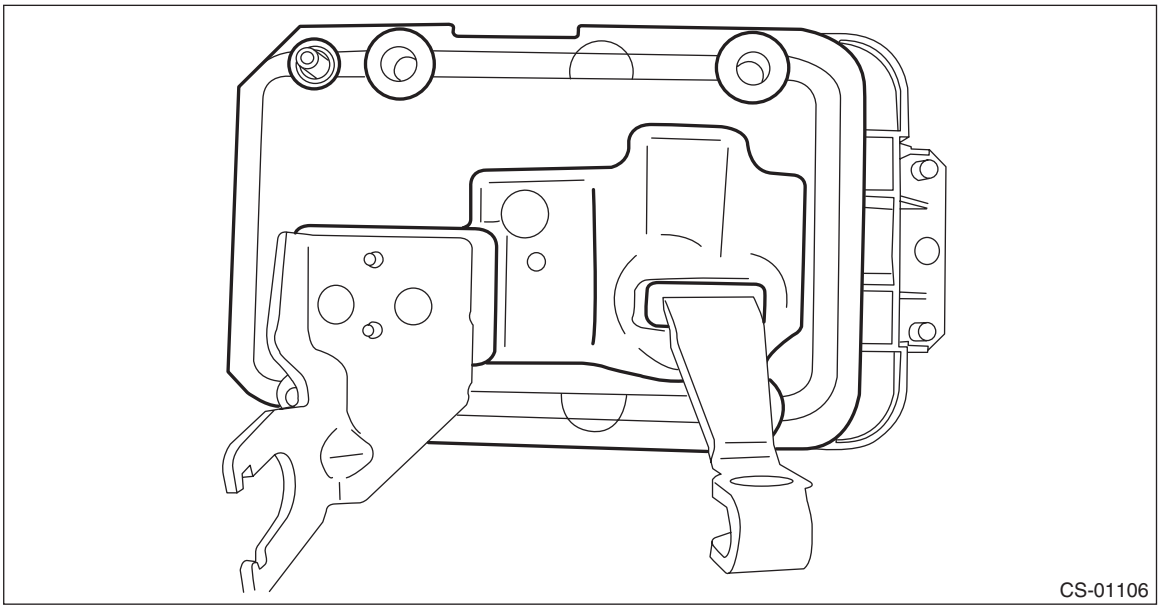
2) Remove the rod COMPL.

2. AT SELECT LEVER ASSEMBLY

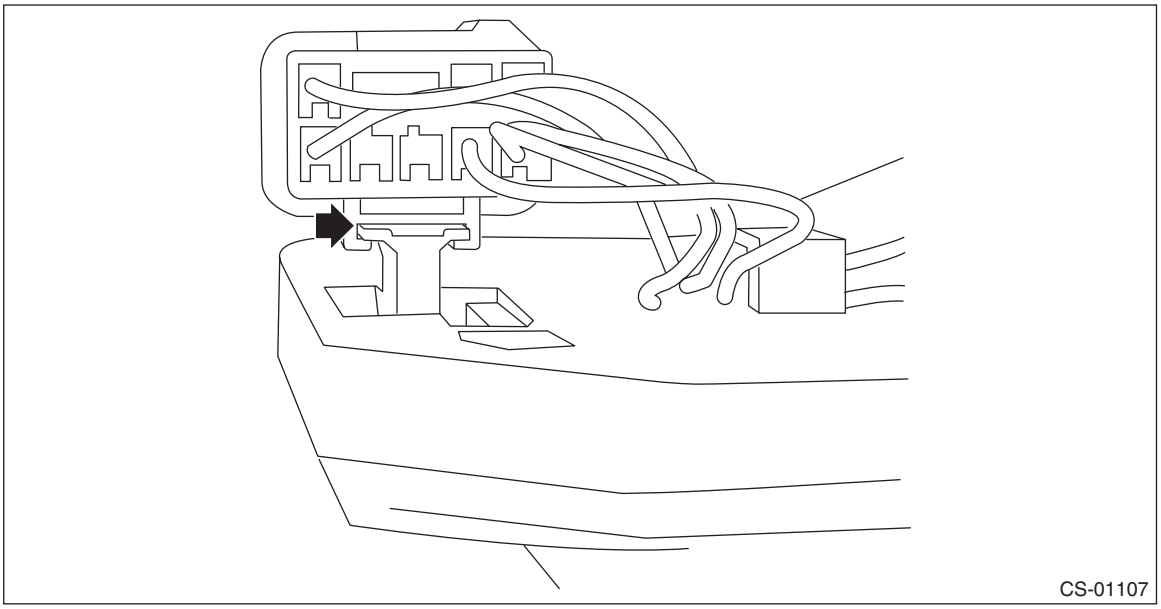
1) Remove the spacer plate.



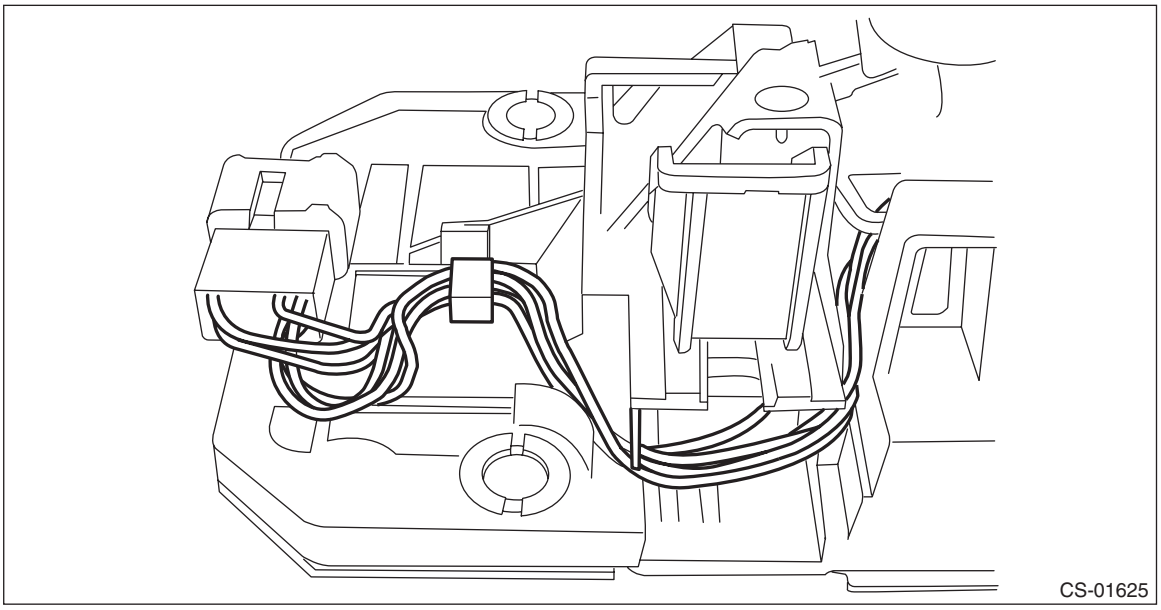
2) Remove the gasket.



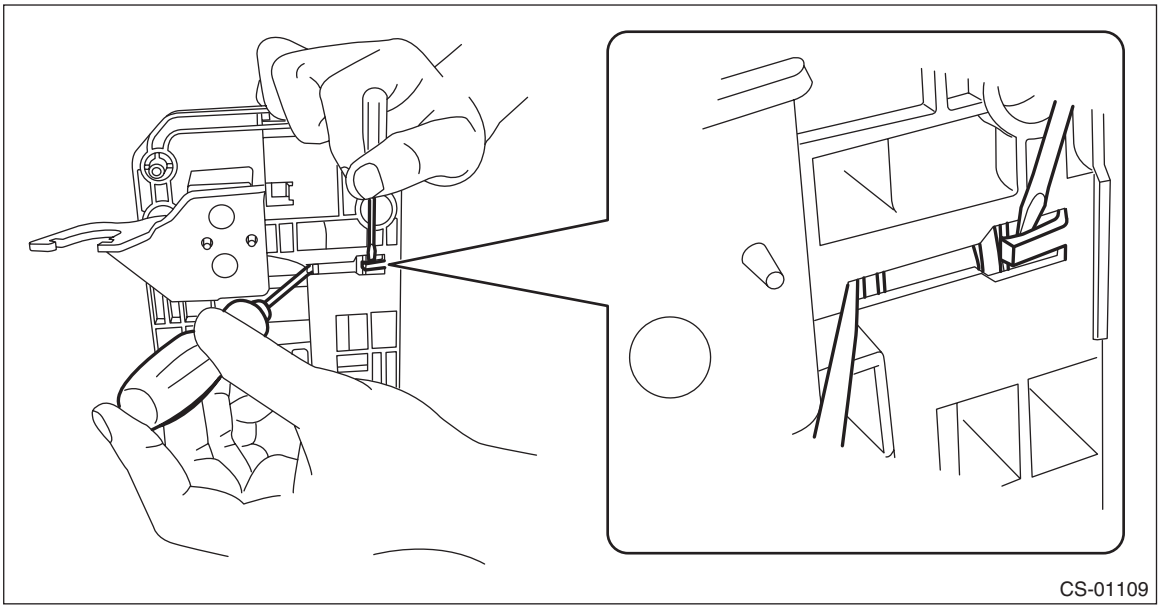
3) Insert a flat tip screwdriver with a thin tip under the connector and disconnect the harness connector from the plate COMPL.



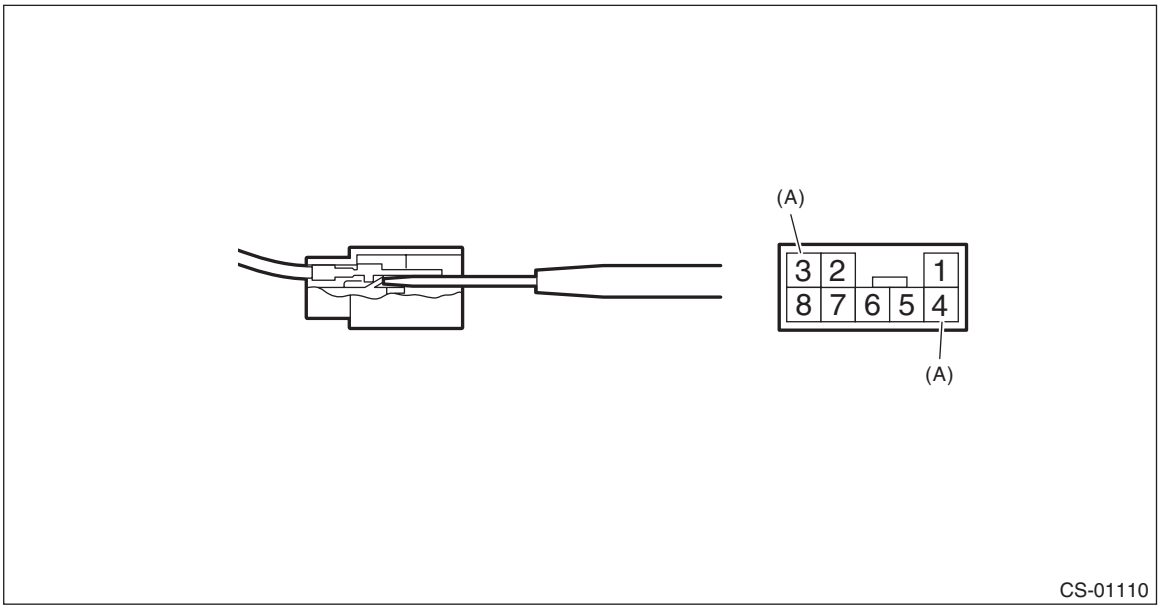
4) Remove the harness from the plate COMPL.



5) Raise the claw with a flat tip screwdriver with a thin tip and remove the solenoid unit.



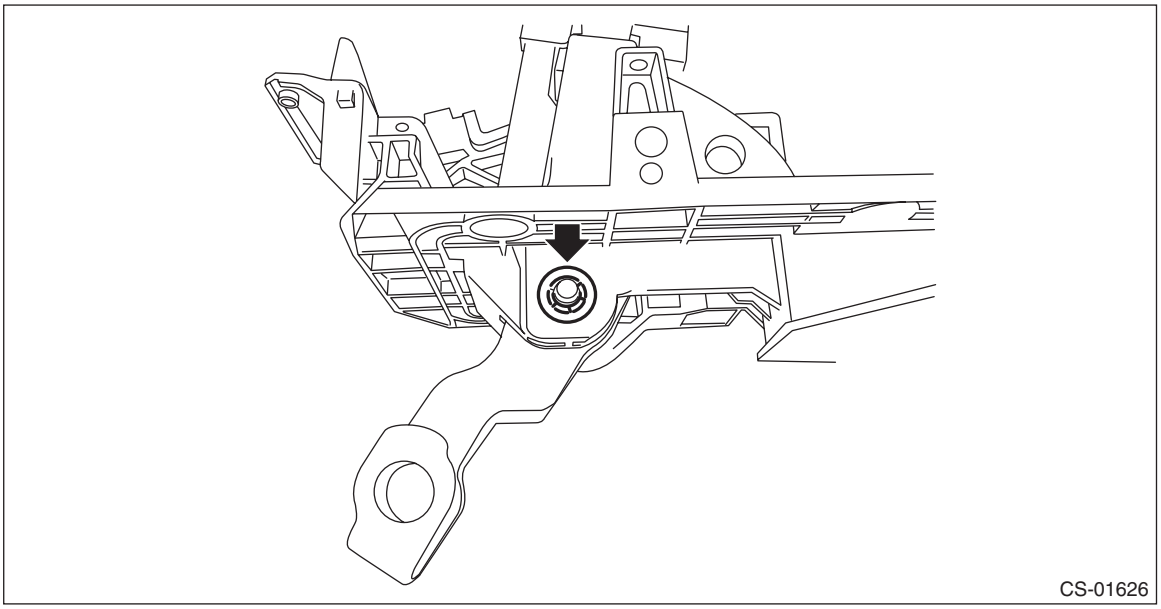
6) Remove the terminal of the solenoid unit using a flat tip precision screwdriver with a tip width of 1.3 mm (0.05 in) or less, KTC connector terminal tool ECC-1T or equivalent.



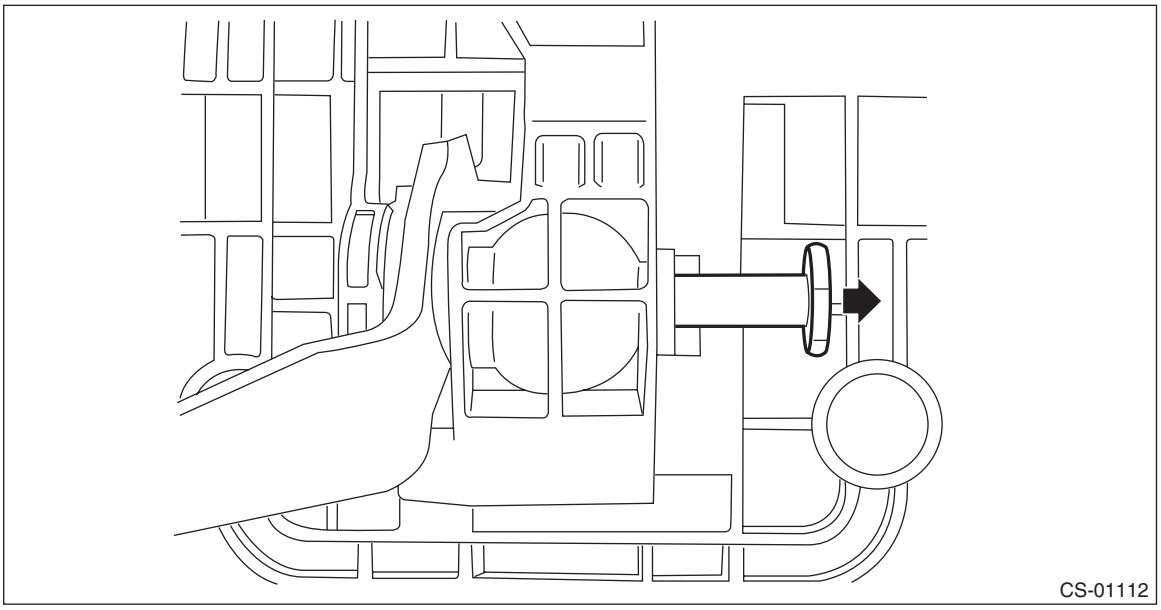
(A) Solenoid unit terminals

7) Remove the clamp push nut.

NOTE:
Replace the clamp push nut with a new part.

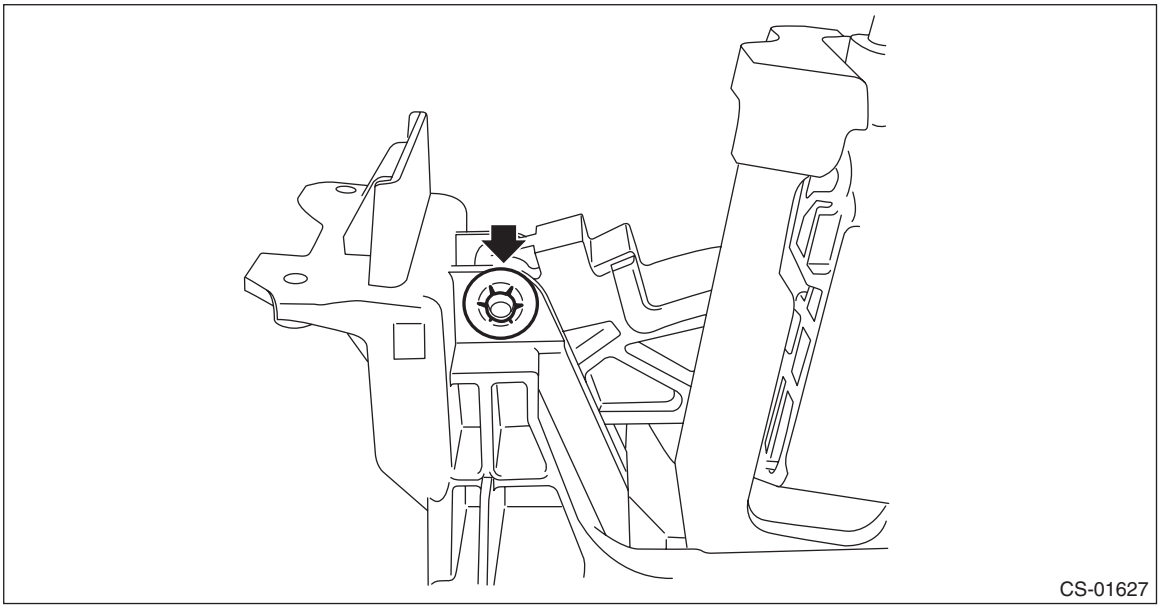


8) Pull out shaft control.

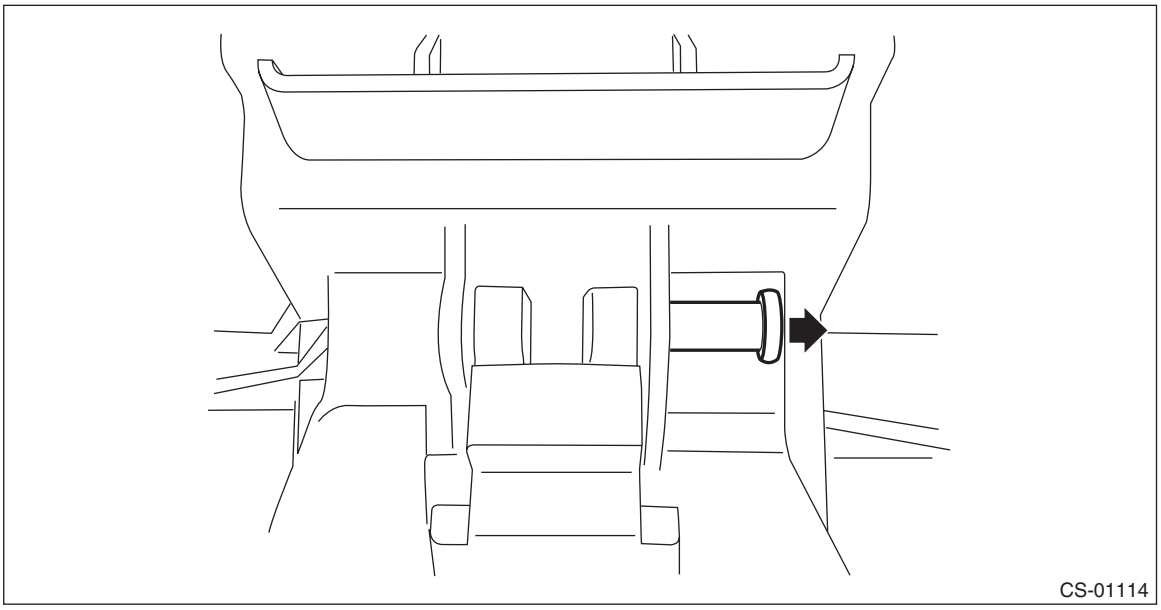


9) Remove the clamp push nut.

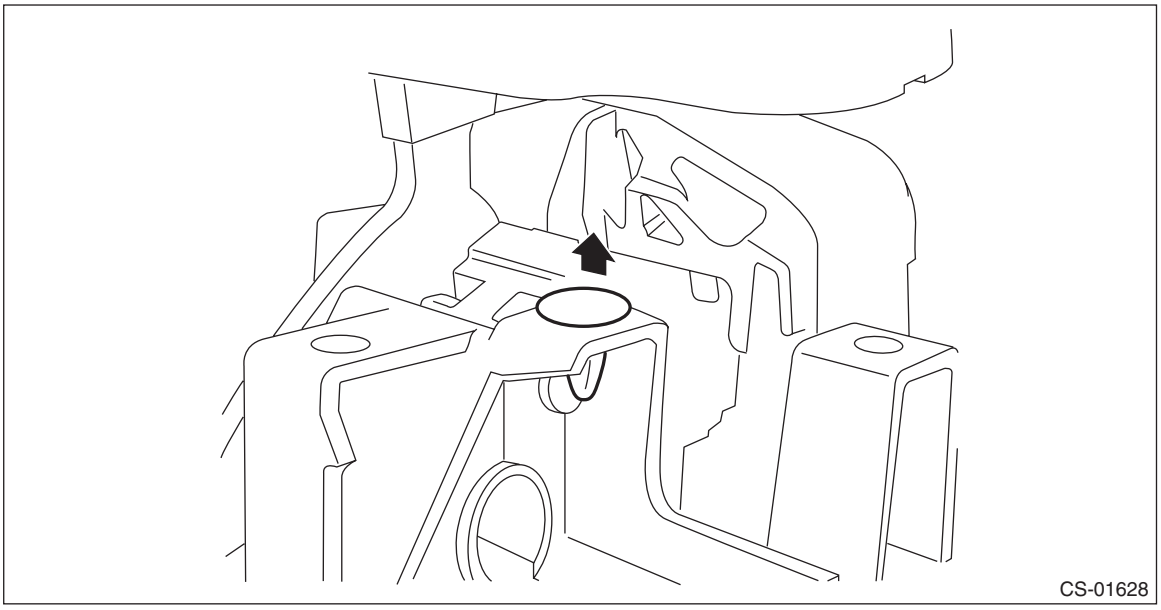
NOTE:
Replace the clamp push nut with a new part.



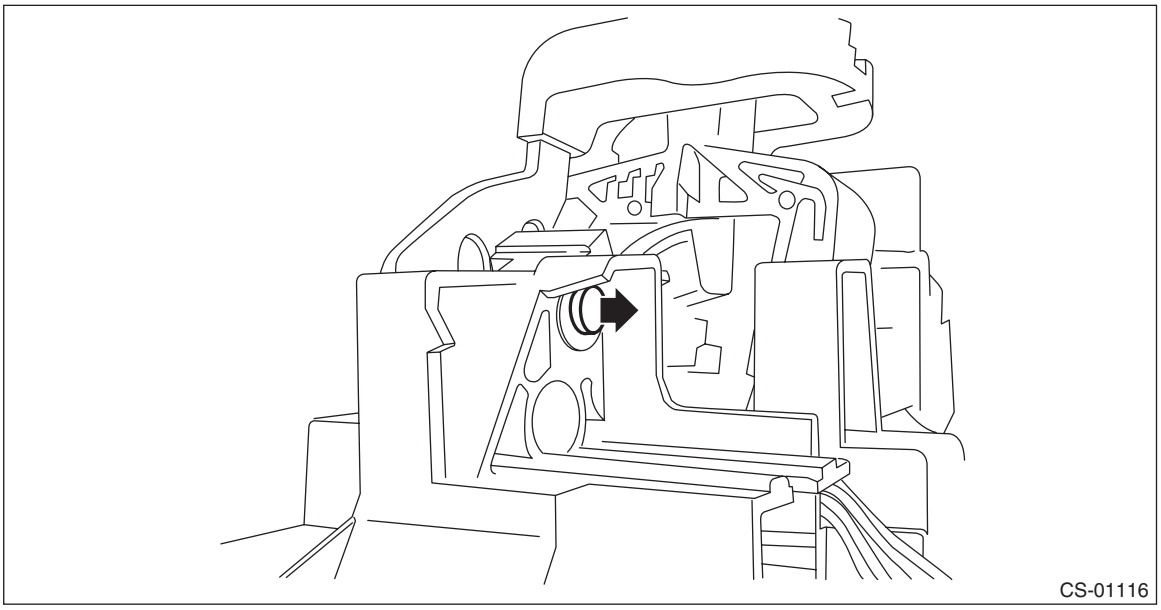
10) Pull out spacer pin guide.



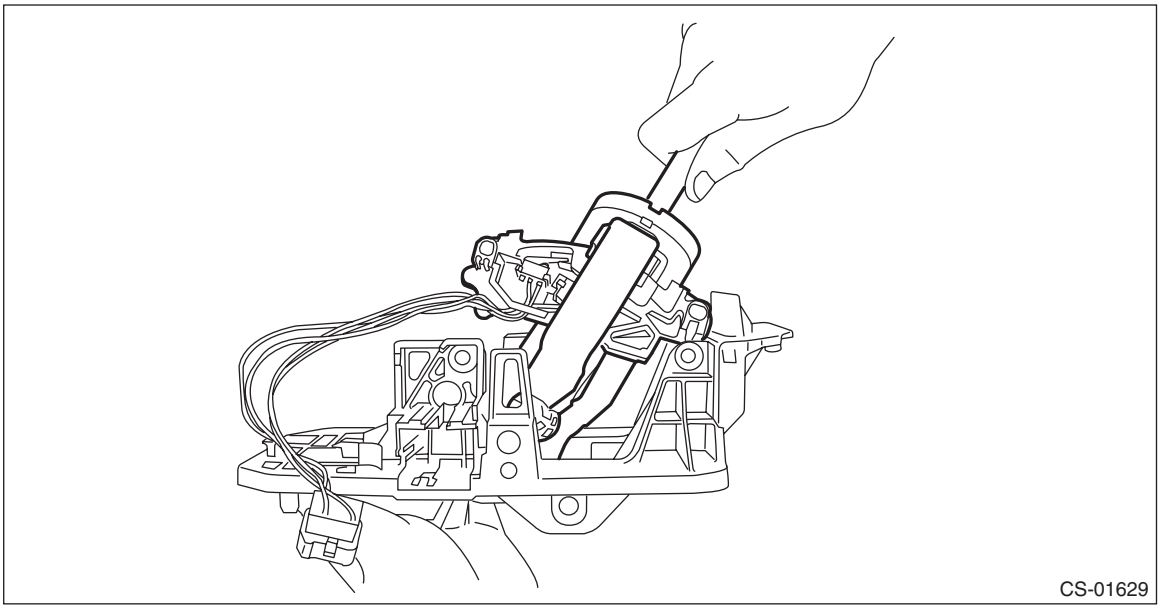
11) Remove the clamp pin.



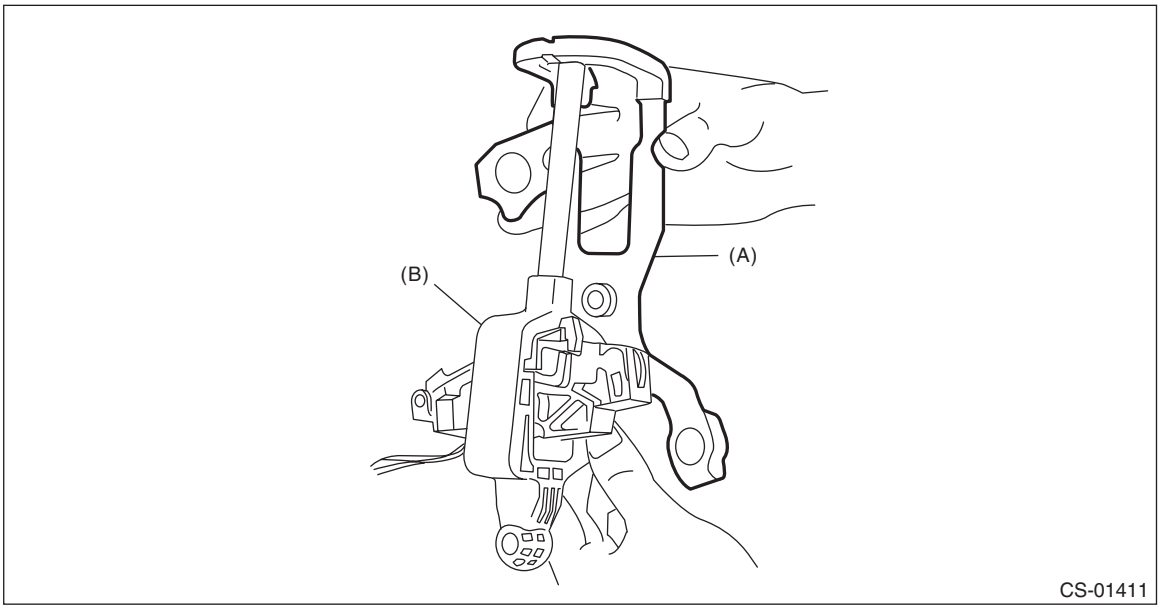
12) Remove the spacer pin guide.



13) Remove the select lever COMPL from the plate COMPL.

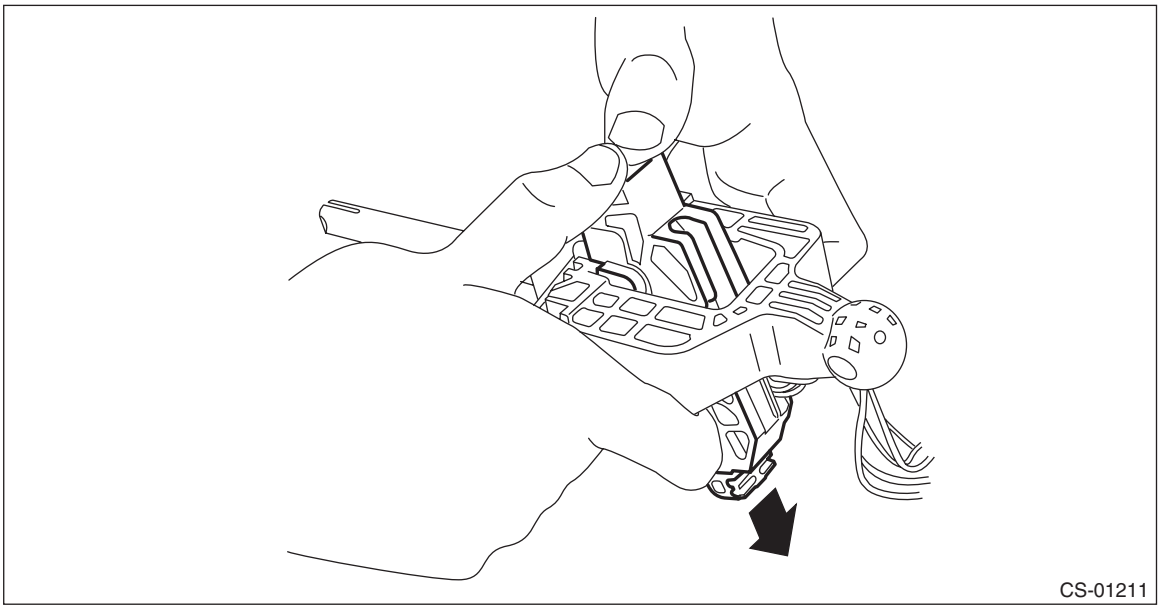


14) Remove the arm COMPL.

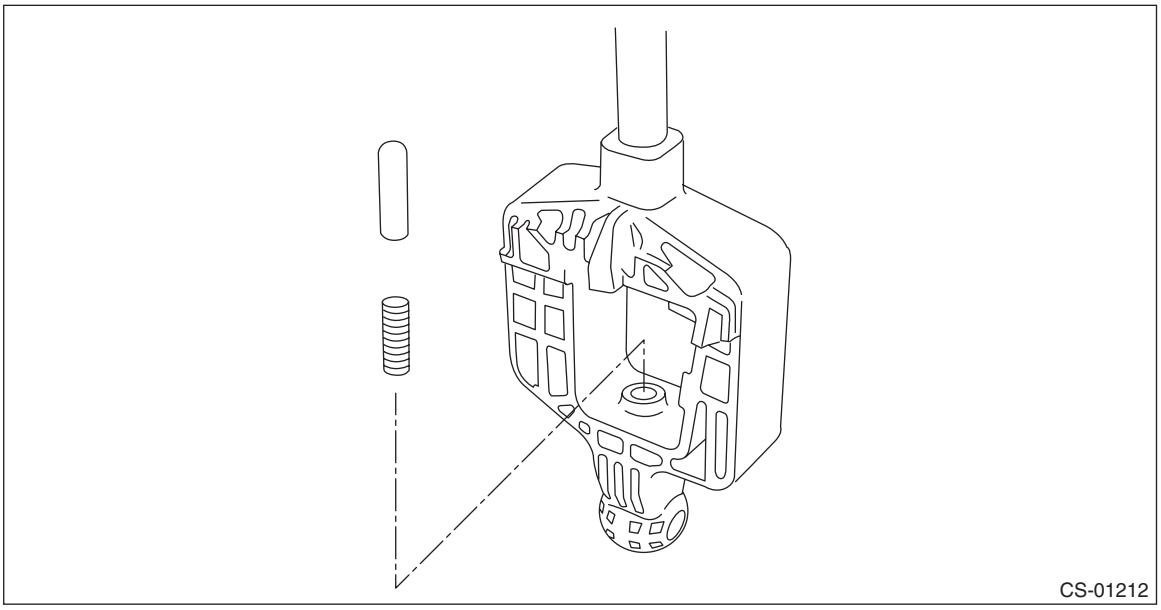


(A) Arm COMPL
(B) Select lever COMPL

15) Remove the plate guide from the select lever COMPL.



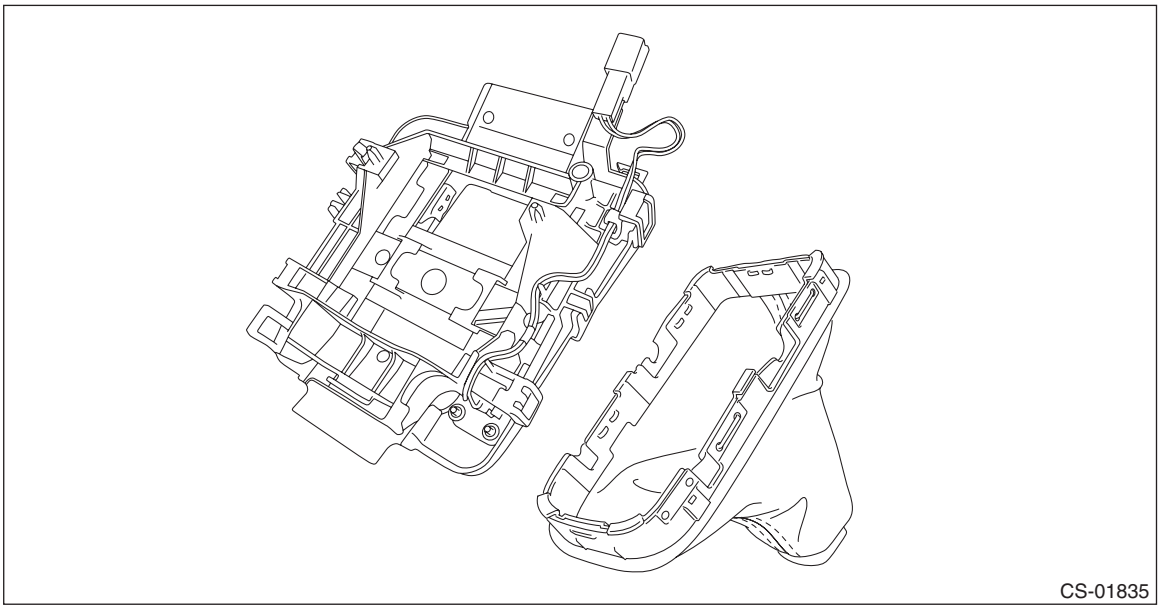
16) Remove the rod detent and detent spring from the select lever COMPL.



3. INDICATOR ASSY

1) Remove the boot assembly from the indicator assembly.

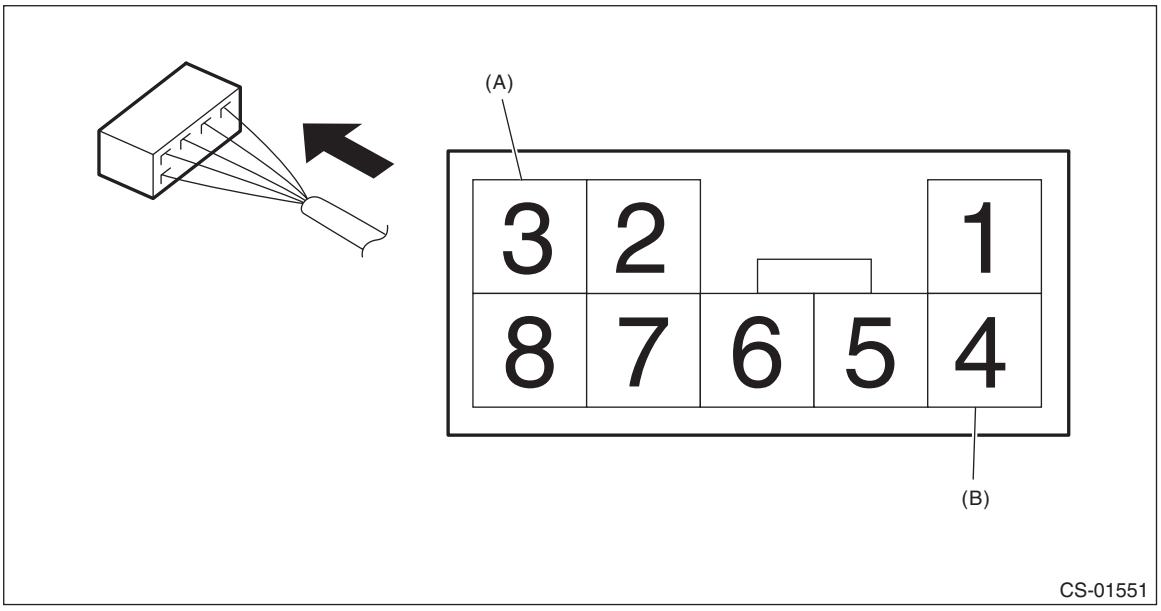
CAUTION:
When removing the boot assembly, be careful not to damage the boot assembly claws and adjacent parts.



D: ASSEMBLY

1) Clean all the parts before assembly.
2) Apply Multemp D or equivalent to the sliding portion of each part.
3) Assemble in the reverse order of disassembly.

NOTE:
Insert the solenoid unit terminals to the harness connector.



(A) Solenoid unit (color code: blue)
(B) Solenoid unit (color code: black)

4) After installation, check the following points.
• The select indicator matches the select lever position when the select lever is changed from “P” range to “D” range.
• The select lever position and the position mark match each other.
• Operating force to move the select lever from “P” to “D” range

E: INSPECTION

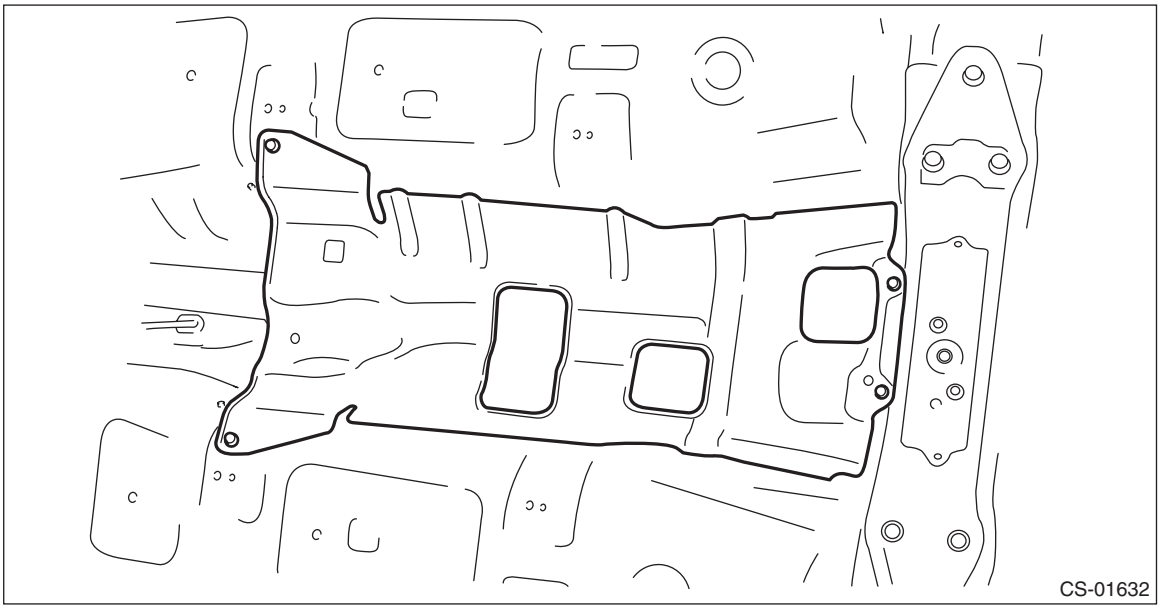
1) Inspect the removed parts by comparing with new parts for deformation, damage and wear. Repair or replace if defective.
2) Inspect the select lever assembly operating condition before assembly. Normal if it operates smoothly.

4. Select Cable

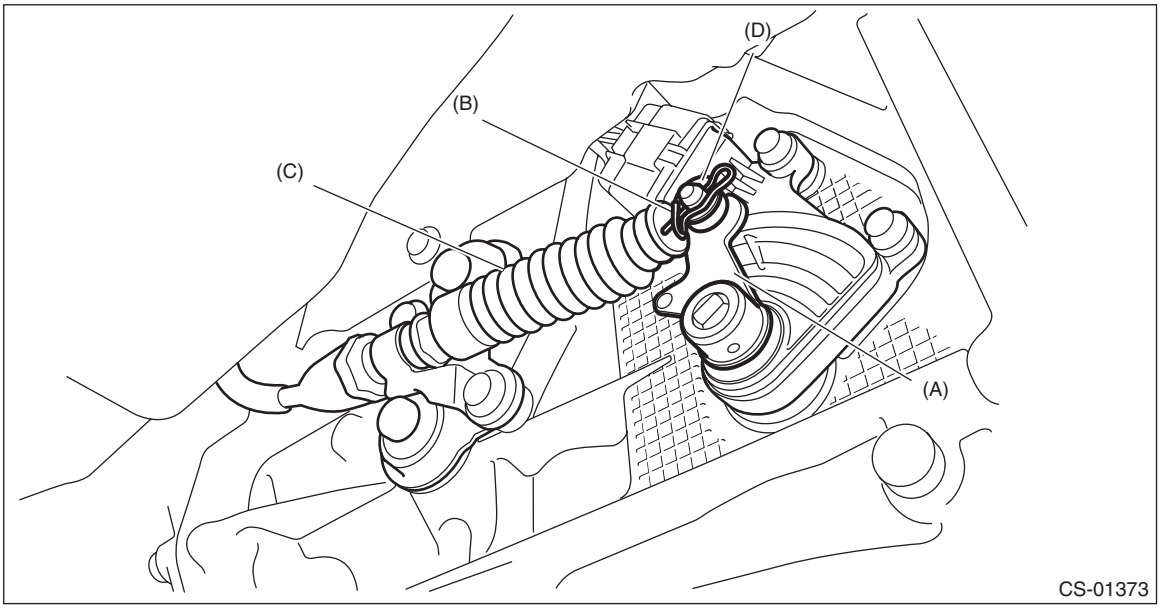
A: REMOVAL

1) Shift the select lever to “N” range.
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Lift up the vehicle.
4) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
5) Remove the center exhaust cover.

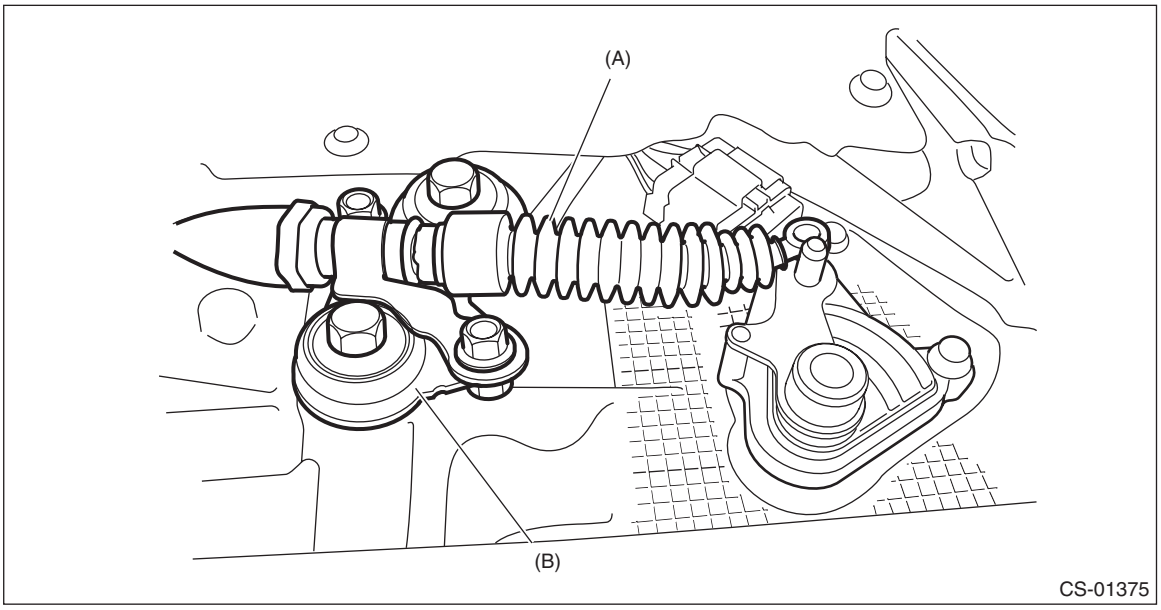


6) Remove the snap pin and washer from the shifter arm.



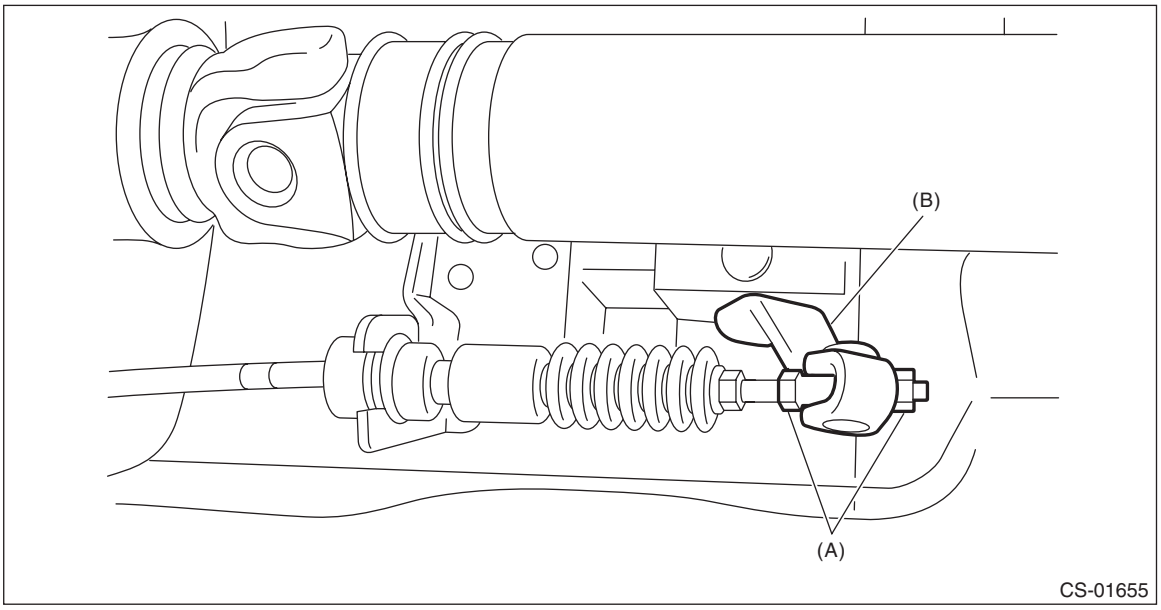
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

7) Remove the plate assembly from the transmission case.



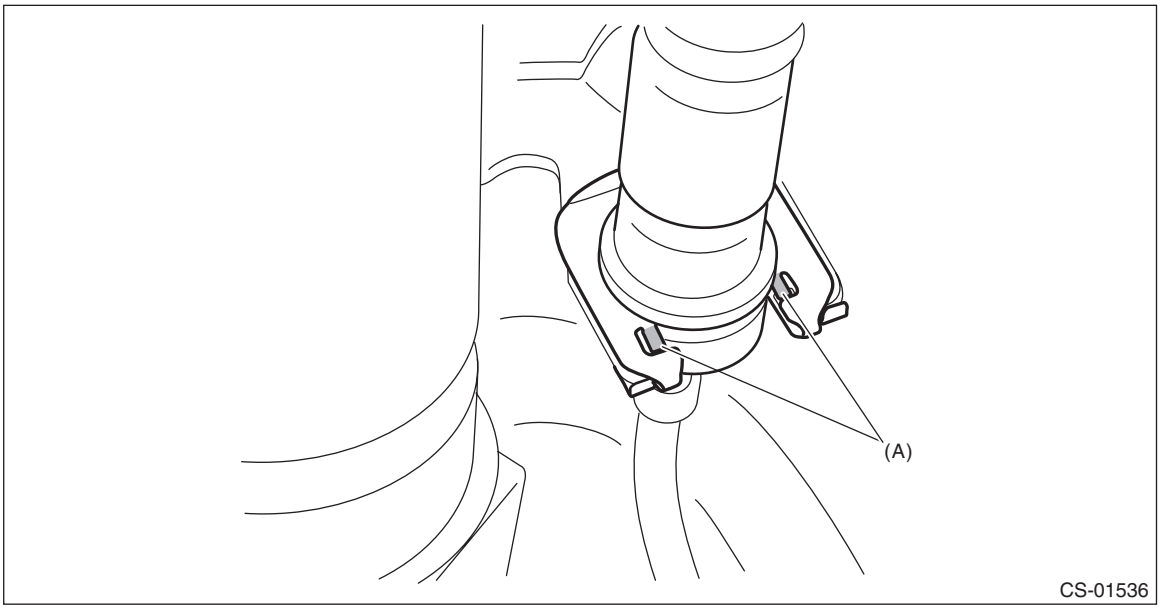
(A) Select cable
(B) Plate ASSY

8) Disconnect the cable from arm COMPL.



(A) Adjusting nut
(B) Arm COMPL

9) Raise the claw of clamp to remove the cable from bracket.



(A) Claw

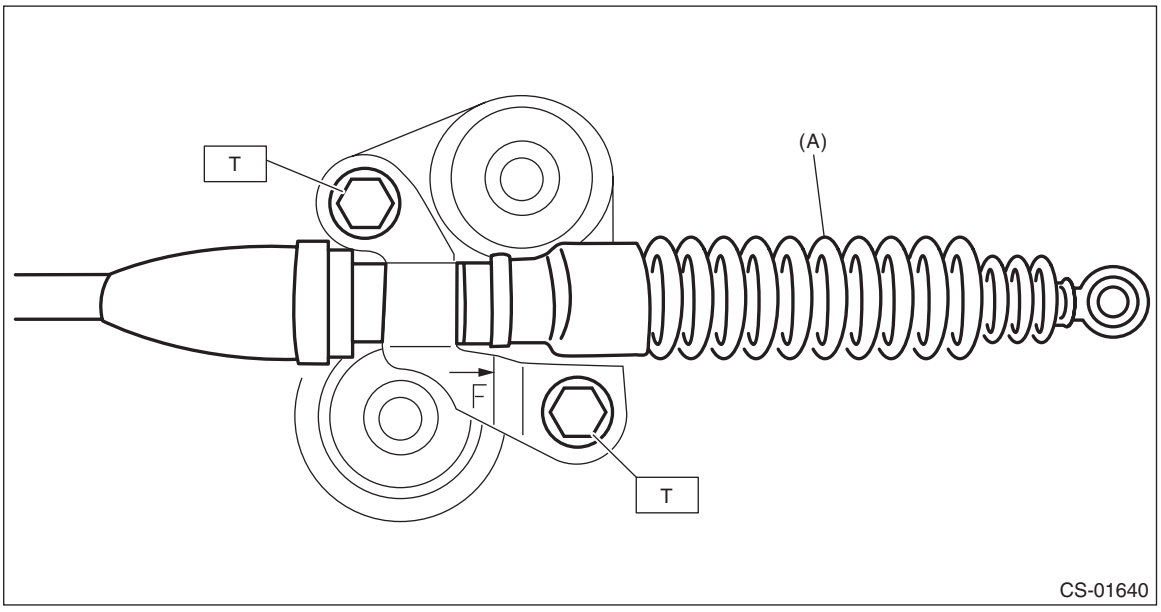
10) Remove the select cable from plate assembly.

B: INSTALLATION

1) Position the select cable as shown in the figure, and install it to the plate assembly.

CAUTION:
• If the cable is installed in the wrong direction, loosen the bracket bolts, and then reinstall the cable in the correct direction.
• Do not adjust the cable end direction by turning it forcibly to prevent the boot from being twisted.

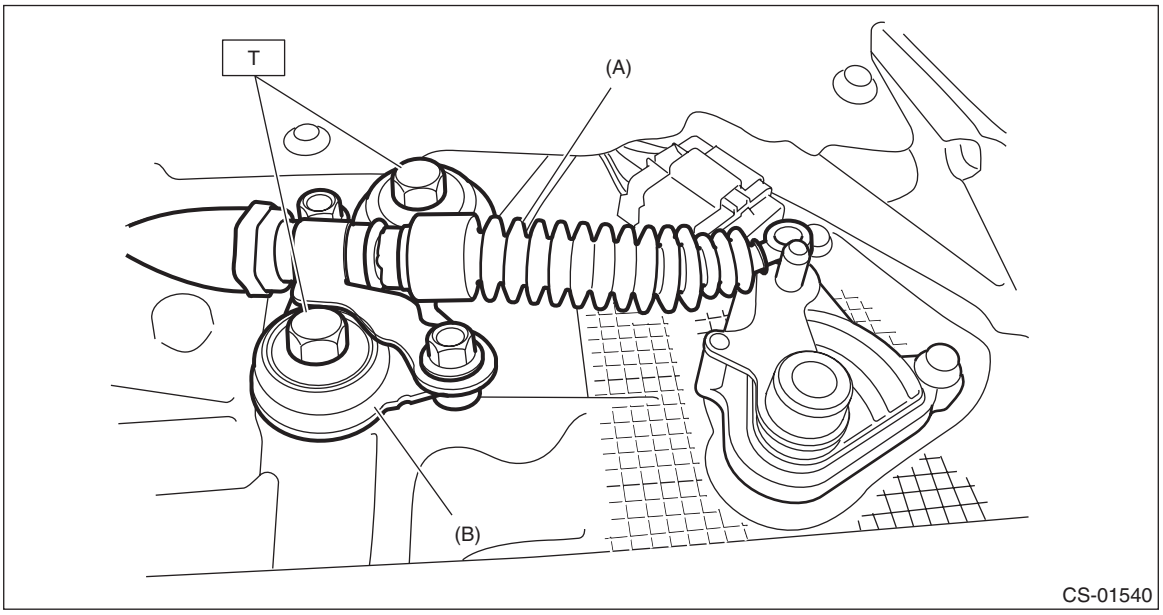
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



(A) Select cable

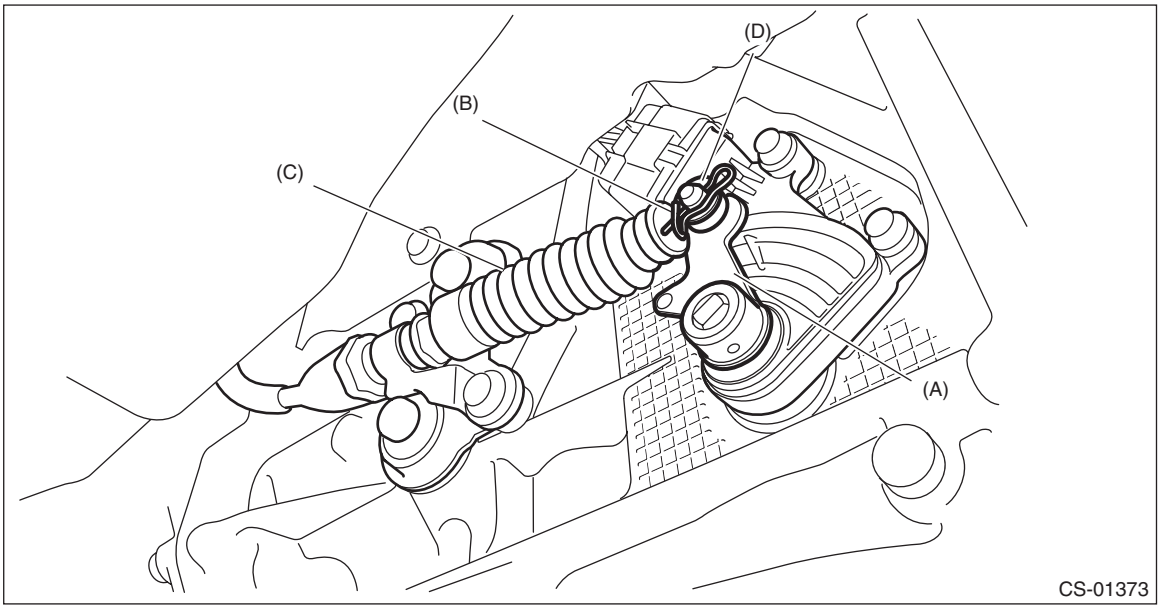
2) Install the select cable to the shifter arm.
3) Install the plate assembly to transmission.

Tightening torque:
T: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



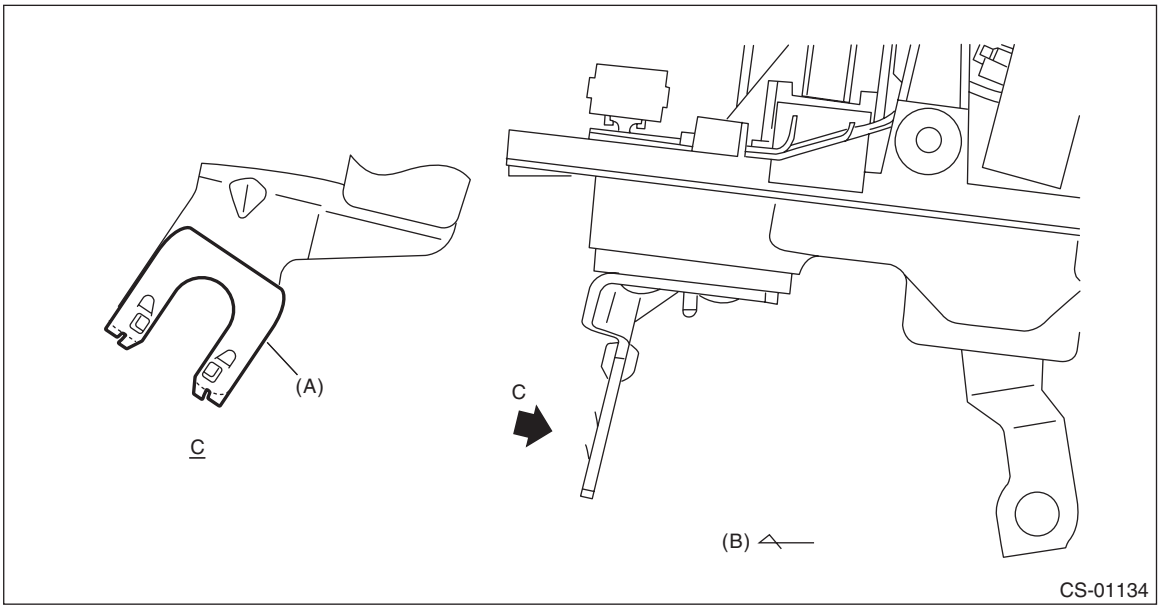
(A) Select cable
(B) Plate ASSY

4) Install the washer and snap pin to the shifter arm.



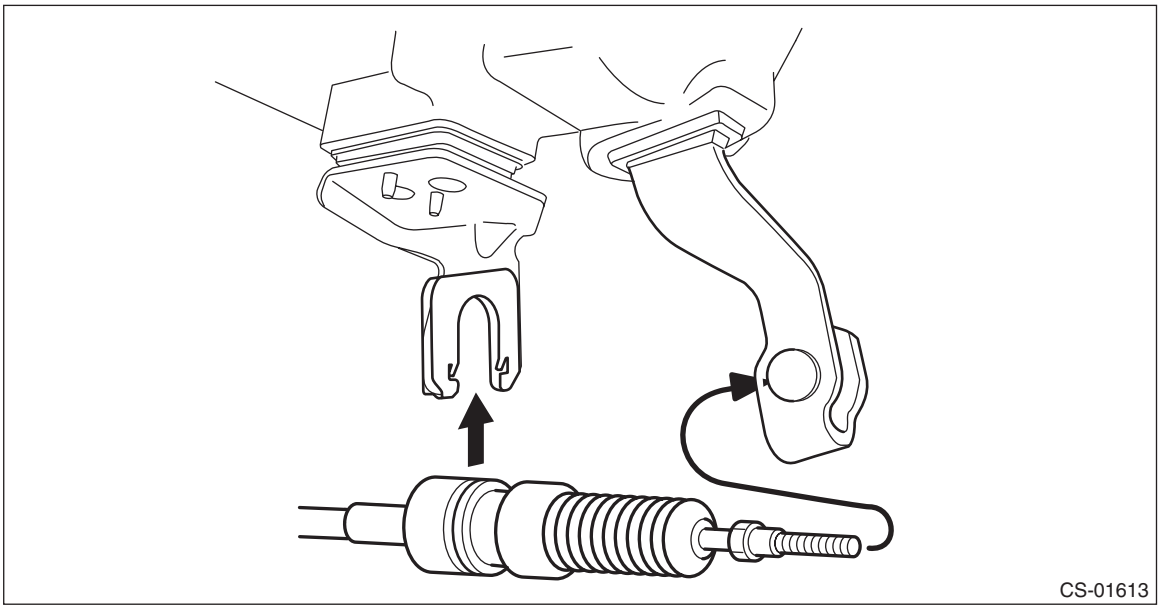
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

5) Install new clamp paying attention to the installing direction.



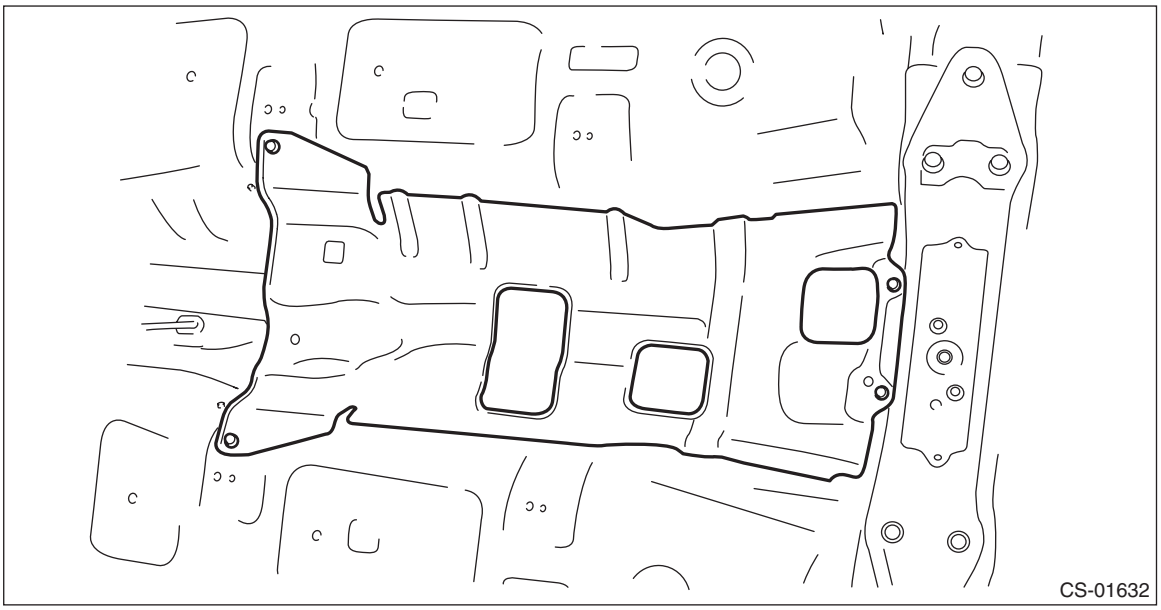
(A) Clamp
(B) Forward

6) Insert the tip of inner cable into connector hole of select lever, and fix the cable to bracket.



7) Shift the select lever to the “N” range, and then adjust the select cable position. <Ref. to CS-57, ADJUSTMENT, Select Cable.>
8) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



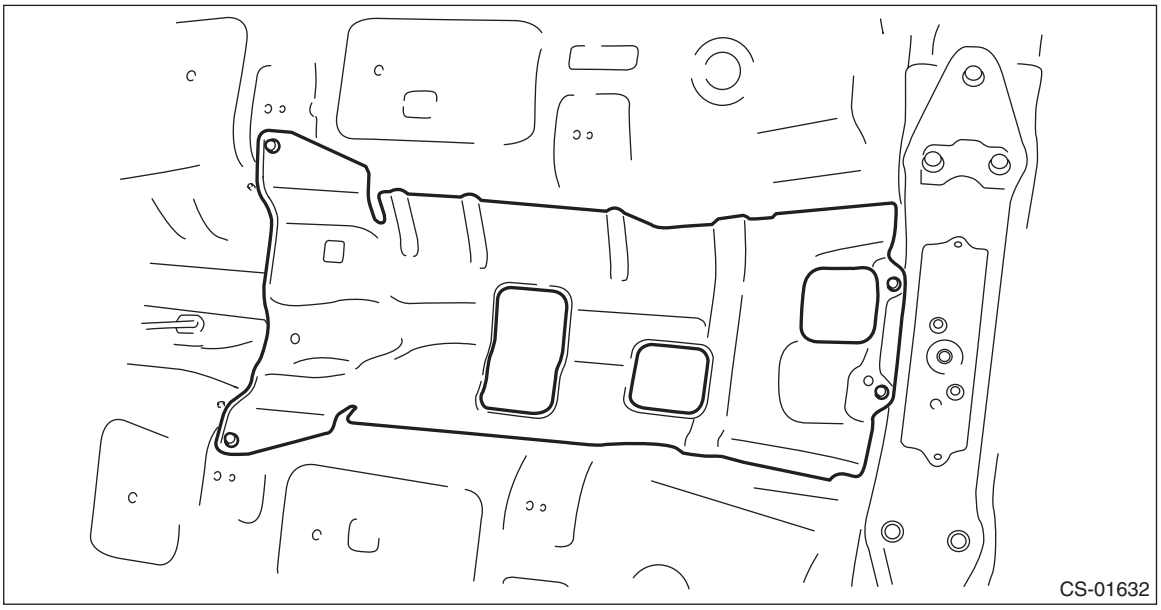
9) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
10) Lower the vehicle.
11) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

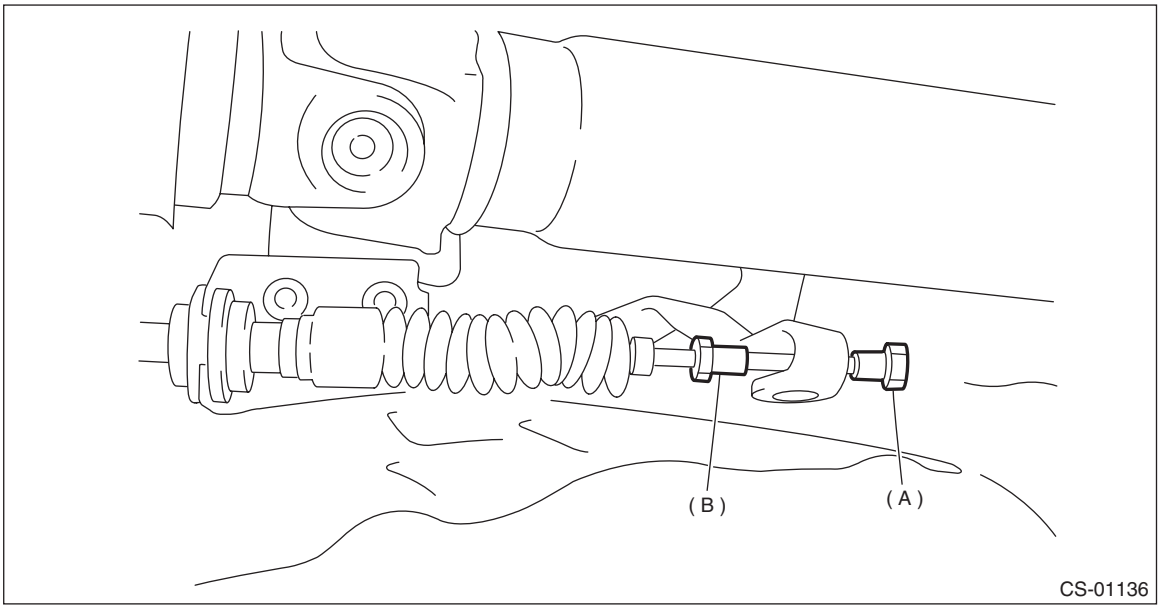
Check the removed cable and replace or adjust if damaged, rusty or malfunctioning.
1) Check the cable for smooth operation.
2) Check the inner cable for damage and rust.
3) Check the outer cable for damage, bends and cracks.
4) Check the boot for damage, cracks and deterioration.
5) Move the select lever from “P” to “D” range. Check the existence of feel to contact the detents in each range. If the detents cannot be felt or the position pointer is improperly aligned, adjust the cable.
6) Check if the starter motor rotates when the select lever is set to “P” range.
7) Check the back-up light illumination when the select lever is in “R” range.
8) Check the parking lock operation when the select lever is in “P” range.

D: ADJUSTMENT

1) Shift the select lever to “N” range.
2) Lift up the vehicle.
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Remove the center exhaust cover.

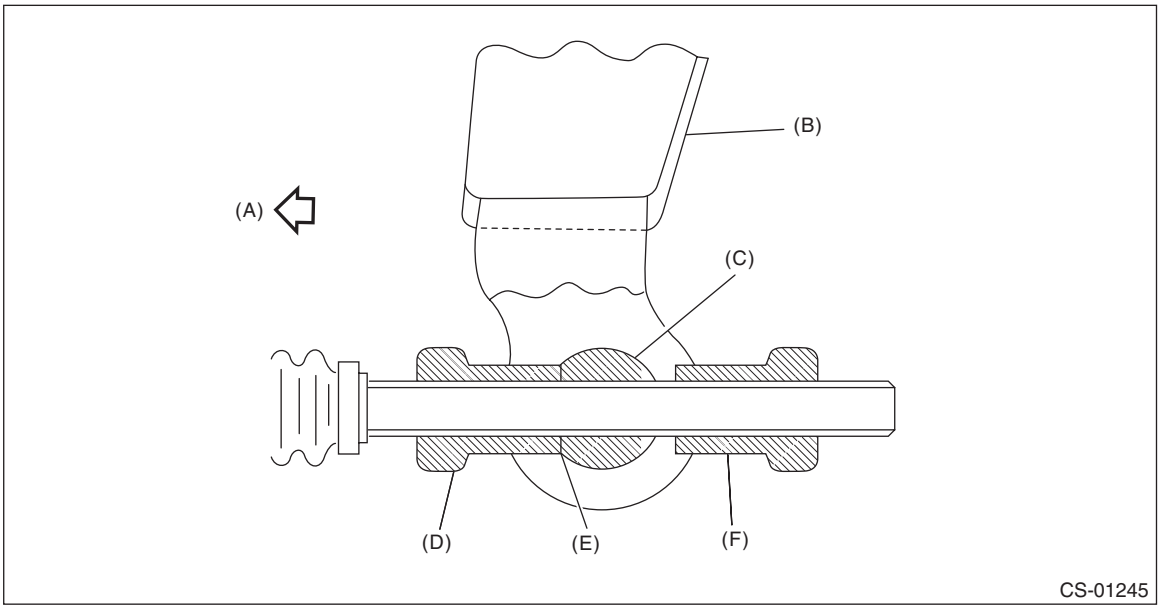


5) Loosen the adjusting nuts on both sides.



(A) Adjusting nut A
(B) Adjusting nut B

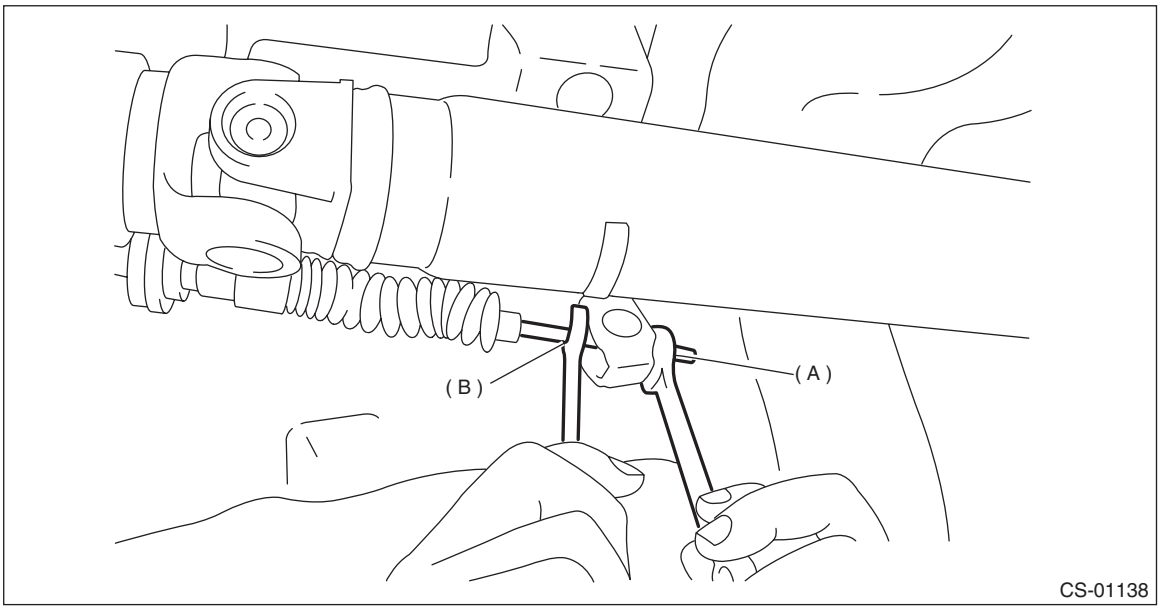
6) Turn adjusting nut B until it lightly touches the connector.



(A) Forward side
(B) Select lever
(C) Connector
(D) Adjusting nut B
(E) Contact point
(F) Adjusting nut A

7) Set a spanner wrench to adjusting nut B so that it does not rotate, and then tighten the adjusting nut A.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



(A) Adjusting nut A
(B) Adjusting nut B

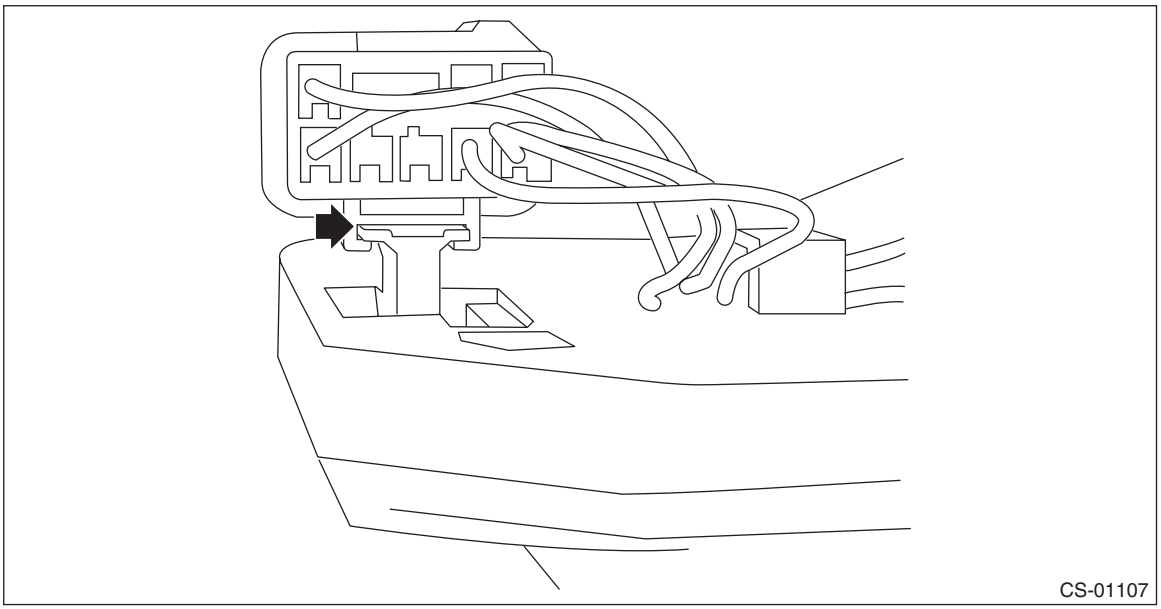
8) After the completion of adjustment, confirm that the select lever operates normally at all ranges.
9) Install in the reverse order of removal.

5. AT Shift Lock Solenoid and “P” Range Switch

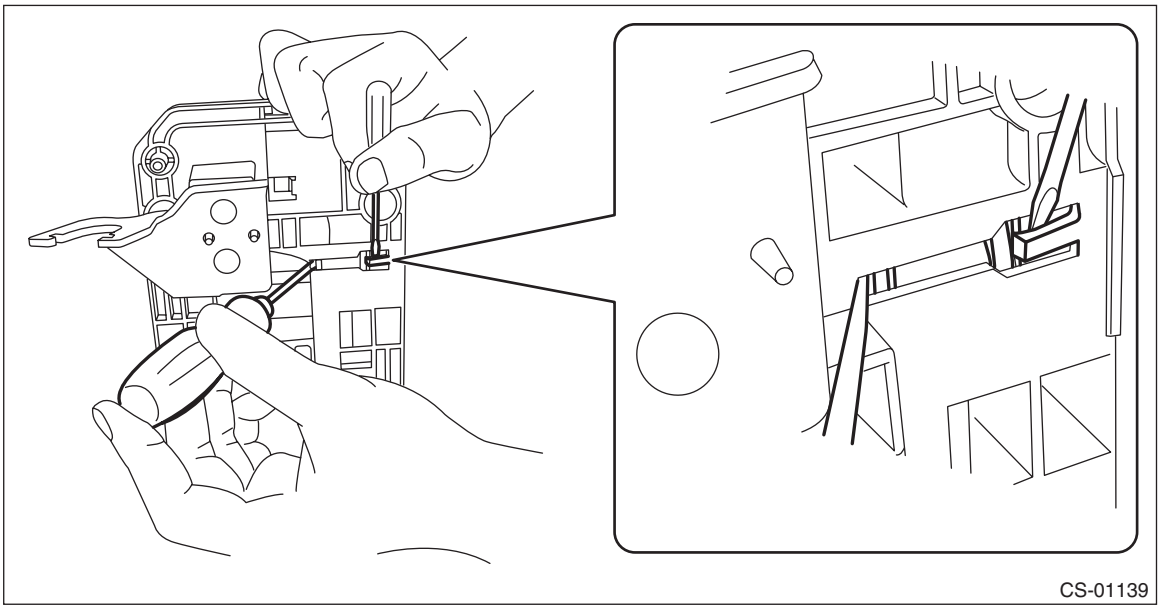
A: REMOVAL

1. SOLENOID UNIT

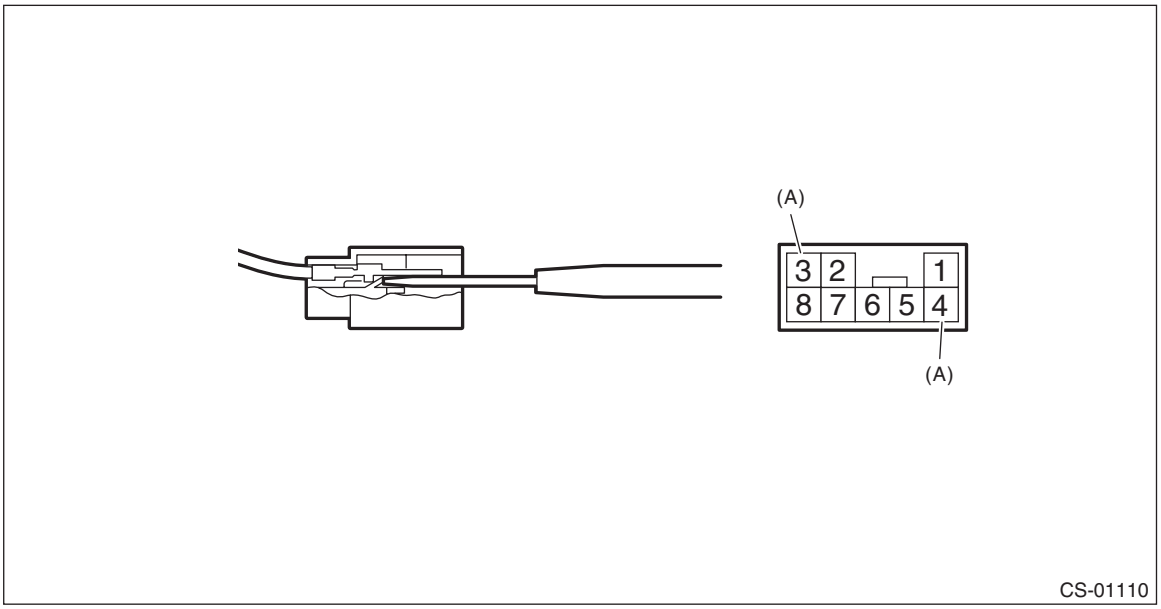
1) Remove the AT select lever. <Ref. to CS-25, REMOVAL, Select Lever.>
2) Remove the spacer and gasket. <Ref. to CS-41, DISASSEMBLY, Select Lever.>
3) Using a flat tip screwdriver with a thin tip, remove the harness connector from the plate COMPL.



4) Raise the claw using a flat tip screwdriver with a thin tip, and remove the solenoid unit from the plate COMPL.



5) Remove the terminal of the solenoid unit using a flat tip precision screwdriver with a tip width of 1.3 mm (0.05 in) or less, KTC connector terminal tool ECC-1T or equivalent.



(A) Solenoid unit terminals

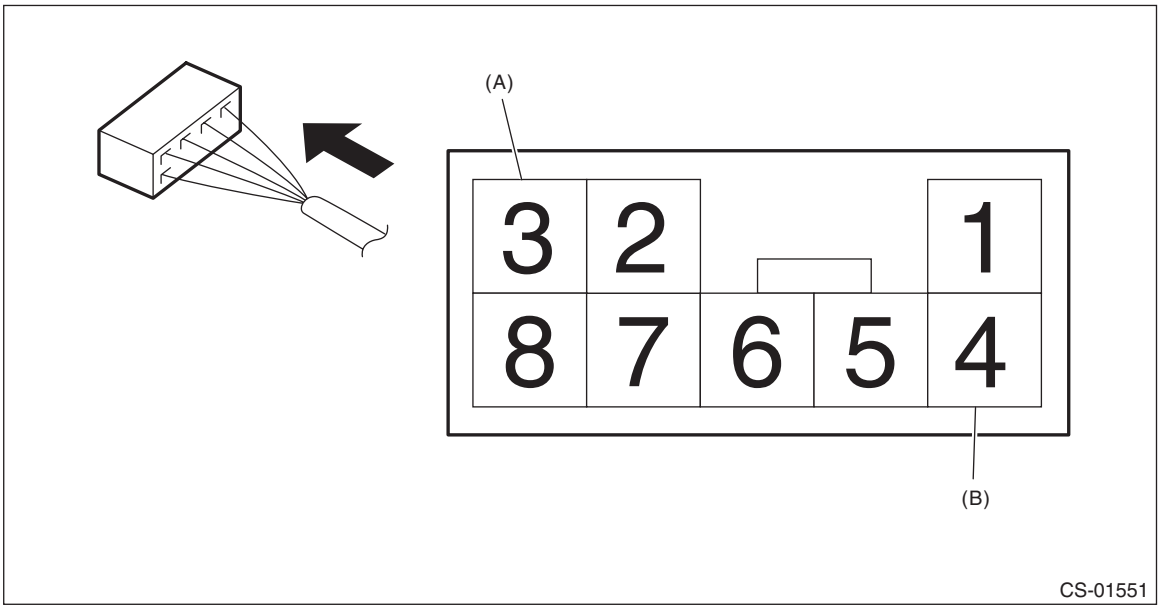
2. “P” RANGE SWITCH

For the removal of “P” range switch, refer to the procedure for AT select lever. <Ref. to CS-41, DISASSEMBLY, Select Lever.>

B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Insert the solenoid unit terminals to the harness connector.



(A) Solenoid unit (color code: blue)
(B) Solenoid unit (color code: black)

C: INSPECTION

	Step	Check	Yes	No
1	**CHECK SOLENOID UNIT.** Measure the resistance of solenoid unit connector terminals. ***Terminals*** ***No. 4 — No. 3:***	Is the resistance 27.6 — 30.5 Ω?	Go to step **2**.	Replace the solenoid unit. <Ref. to CS-59, AT Shift Lock Solenoid and “P” Range Switch.>
2	**CHECK SOLENOID UNIT.** Connect the battery to the solenoid unit connector terminals, and then operate the solenoid. ***Terminals*** ***No. 3 (+) — No. 4 (–):***	Does the solenoid unit operate normally?	Go to step **3**.	Replace the solenoid unit. <Ref. to CS-59, AT Shift Lock Solenoid and “P” Range Switch.>
3	**CHECK “P” RANGE SWITCH.** 1) Shift the select lever to “P” range. 2) Measure the resistance between “P” range switch connector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the “P” range switch. <Ref. to CS-59, AT Shift Lock Solenoid and “P” Range Switch.>
4	**CHECK “P” RANGE SWITCH.** 1) Set the select lever to other than “P” range. 2) Measure the resistance between “P” range switch connector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 1 MΩ or more?	Normal	Replace the “P” range switch. <Ref. to CS-59, AT Shift Lock Solenoid and “P” Range Switch.>

6. Body Integrated Unit

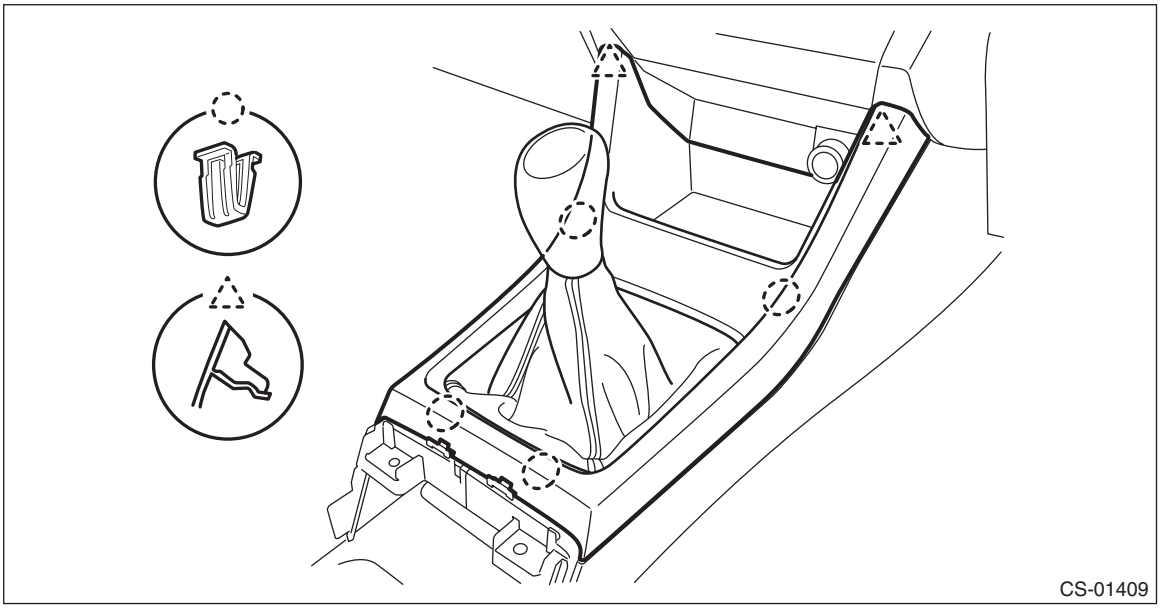
A: NOTE

Refer to “Body Integrated Unit” for removal and installation procedure. <Ref. to SL-80, Body Integrated Unit.>

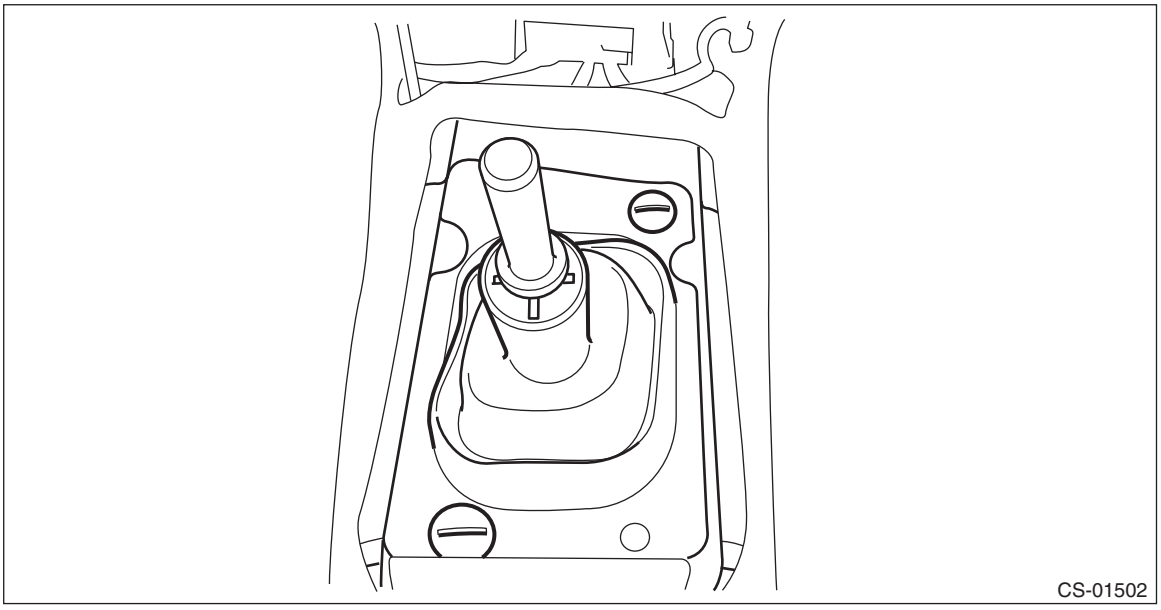
7. MT Gear Shift Lever

A: REMOVAL

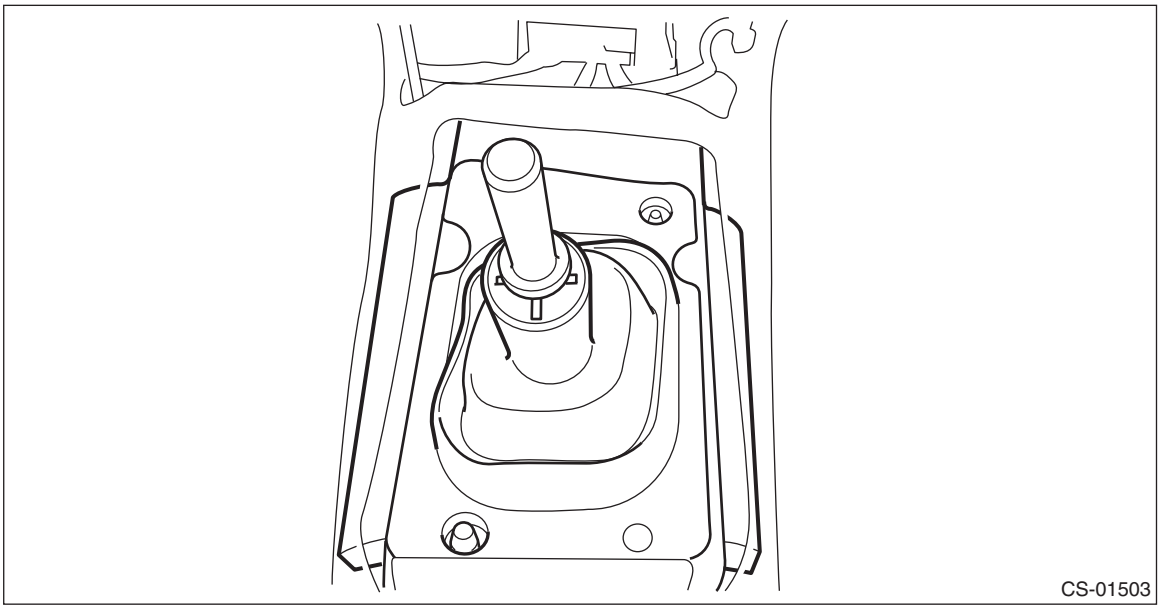
1) Disconnect the ground cable from battery.
2) Remove the console box. <Ref. to EI-77, REMOVAL, Console Box.>
3) Remove the gear shift knob and remove the cover - shift lever.



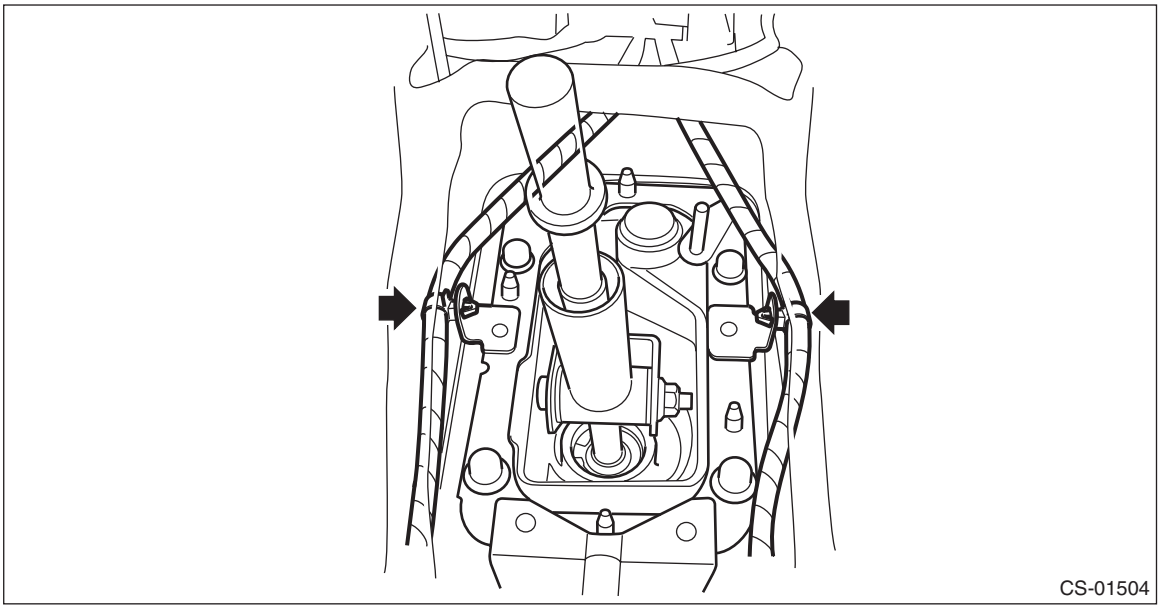
4) Remove the panel center LWR LH and RH. <Ref. to EI-77, REMOVAL, Console Box.>
5) Remove the clamp.



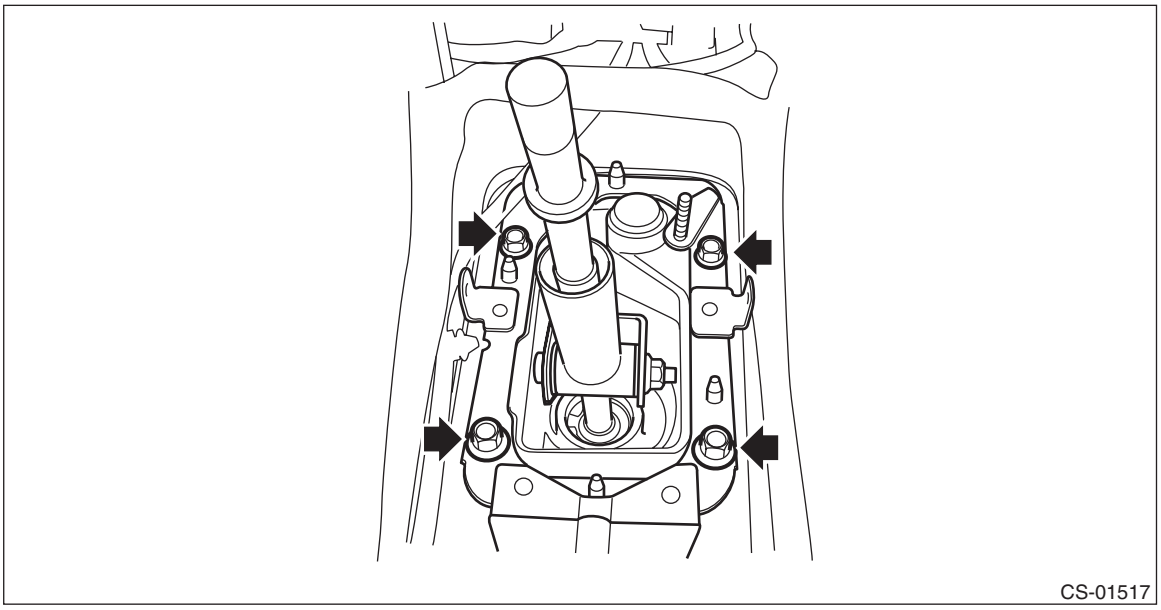
6) Remove the boot and insulator assembly.



7) Remove the harness clamp from the plate COMPL.



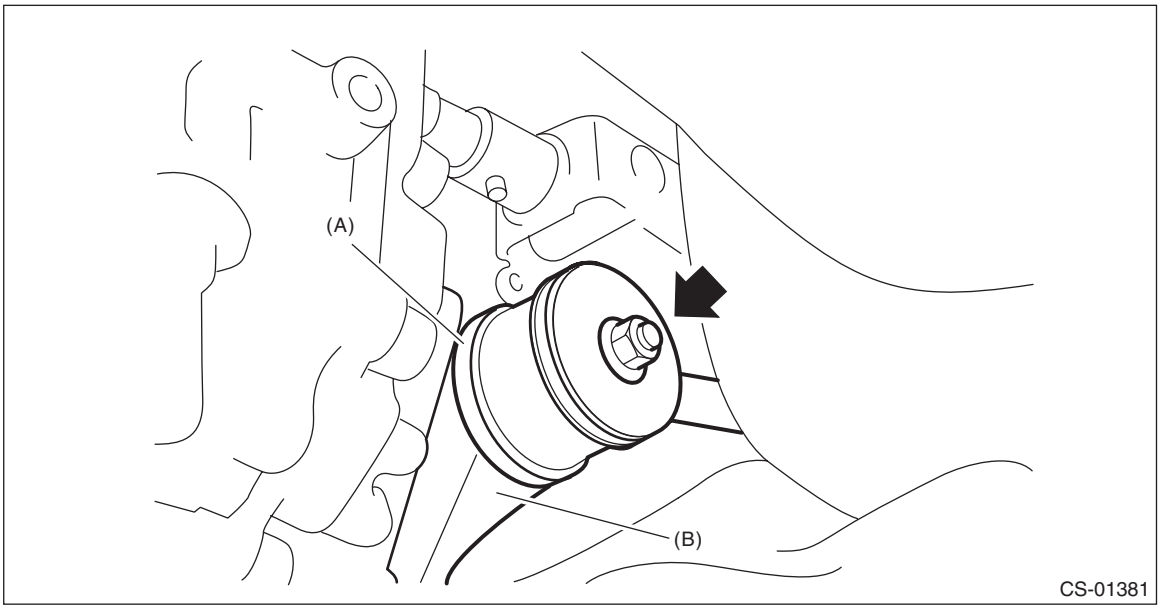
8) Remove the plate COMPL from the vehicle body.



9) Lift up the vehicle.
10) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
11) Remove the center exhaust cover.

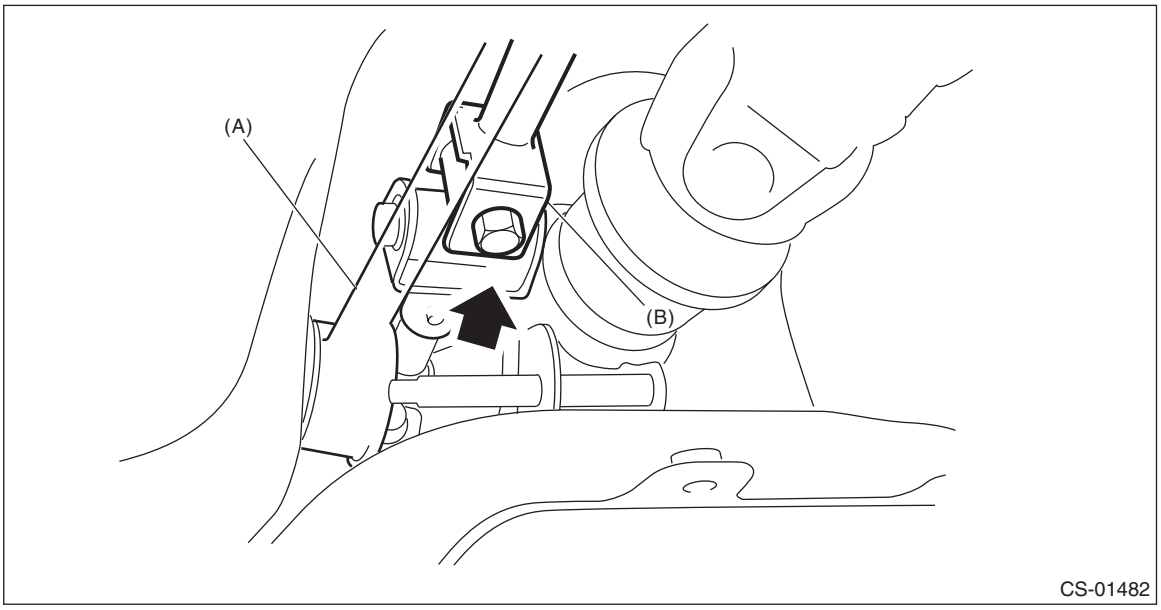


12) Remove the stay from the shift bracket.



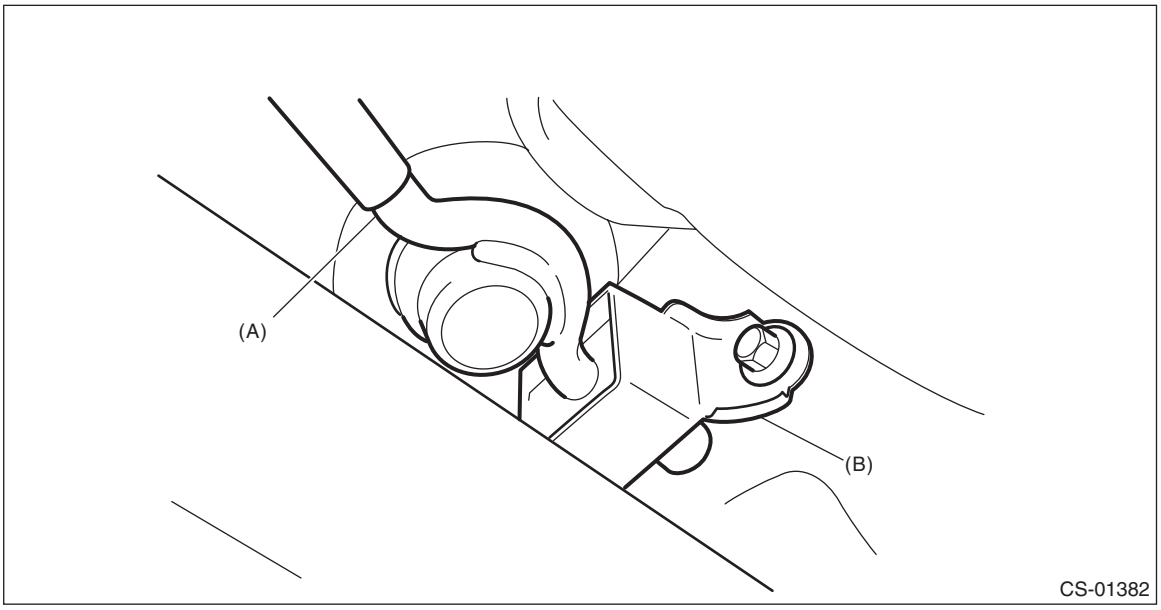
(A) Stay
(B) Shift bracket

13) Remove the rod from joint.



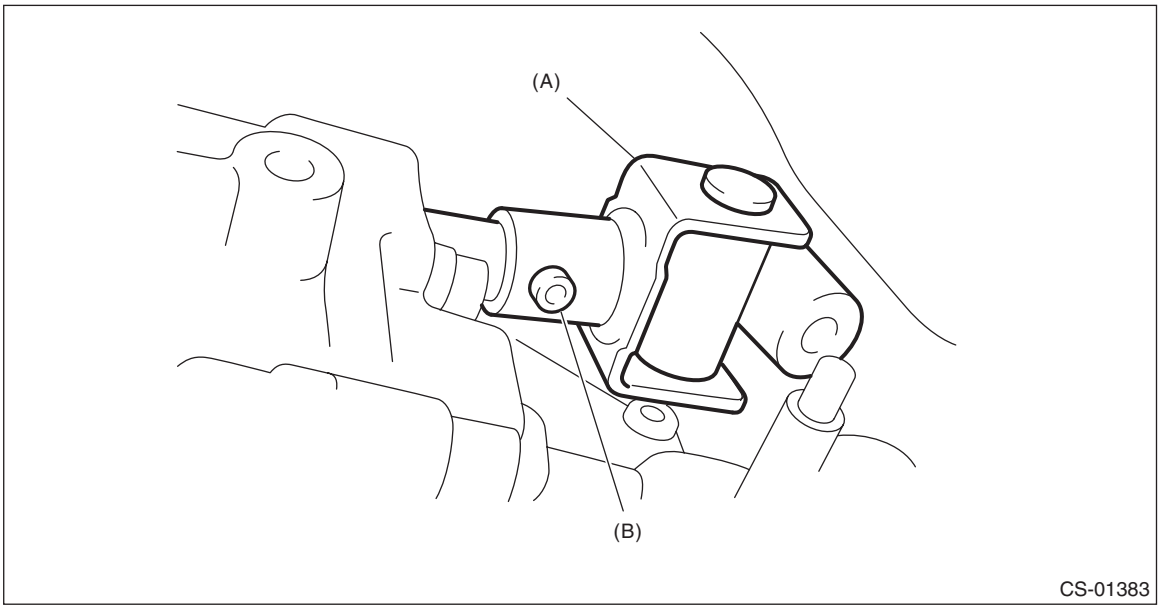
(A) Stay
(B) Rod

14) Remove the cushion rubber from the vehicle body.



(A) Stay
(B) Cushion rubber

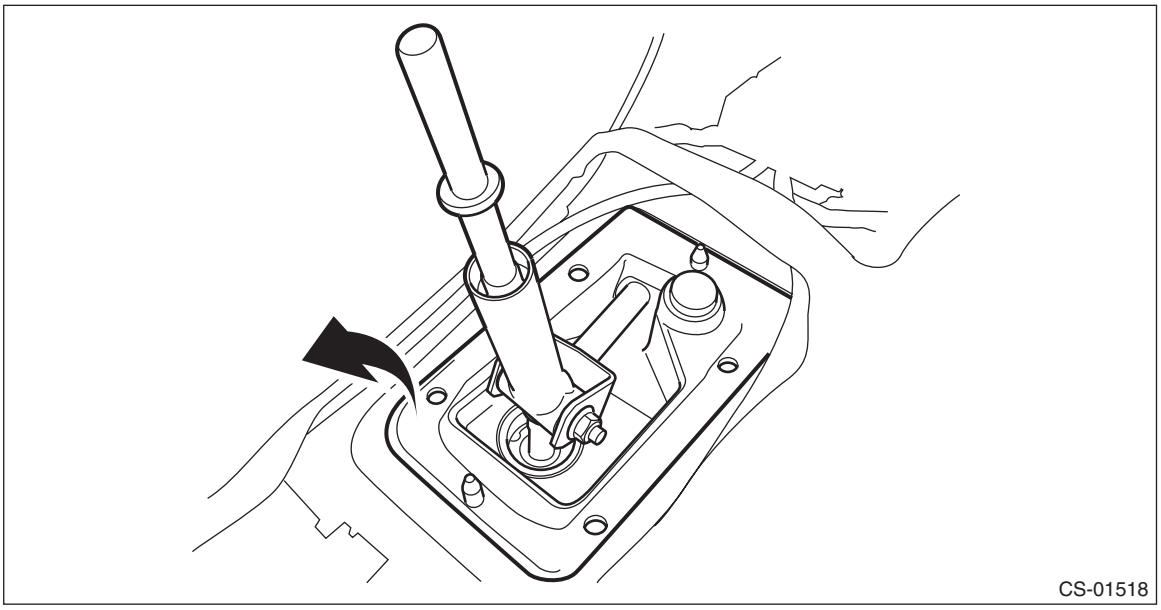
15) Extract the spring pin and remove the joint.



(A) Joint
(B) Spring pin

16) Lower the vehicle.

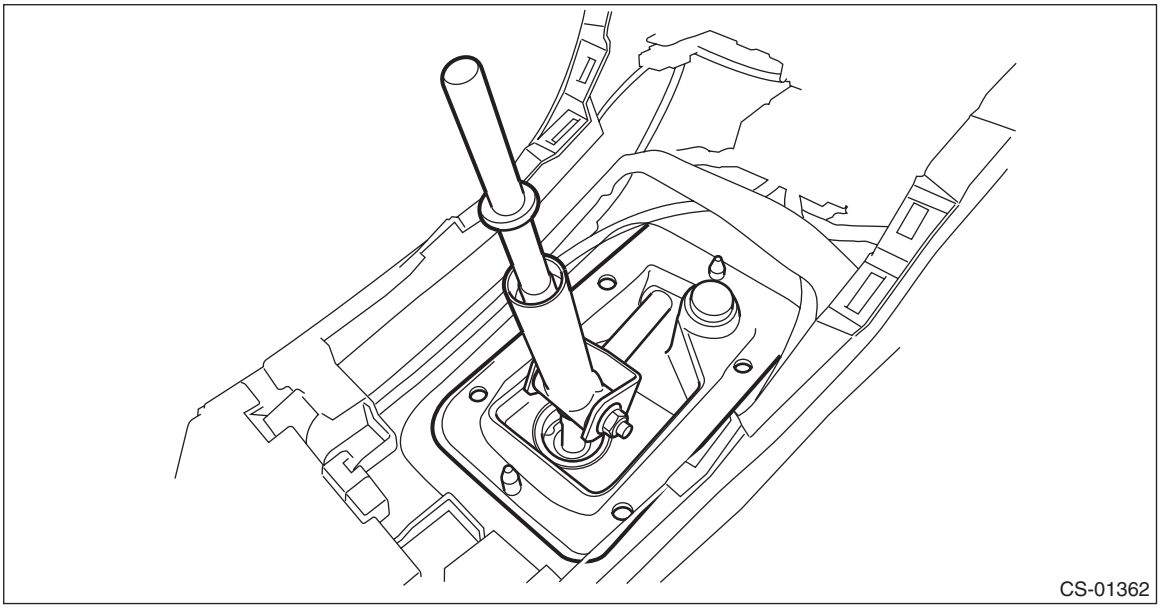
17) Remove the gear shift lever.



B: INSTALLATION

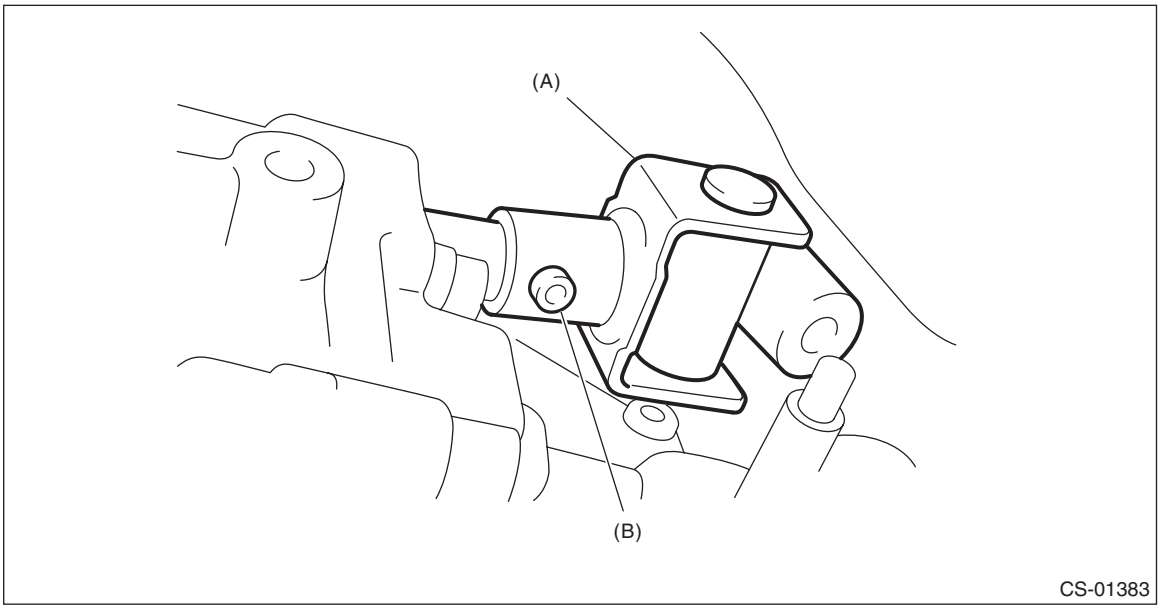
1) Insert the gear shift lever from the room side.

NOTE:
Insert the rod and the stay, and then temporarily set them onto the transmission mount.



2) Lift up the vehicle.

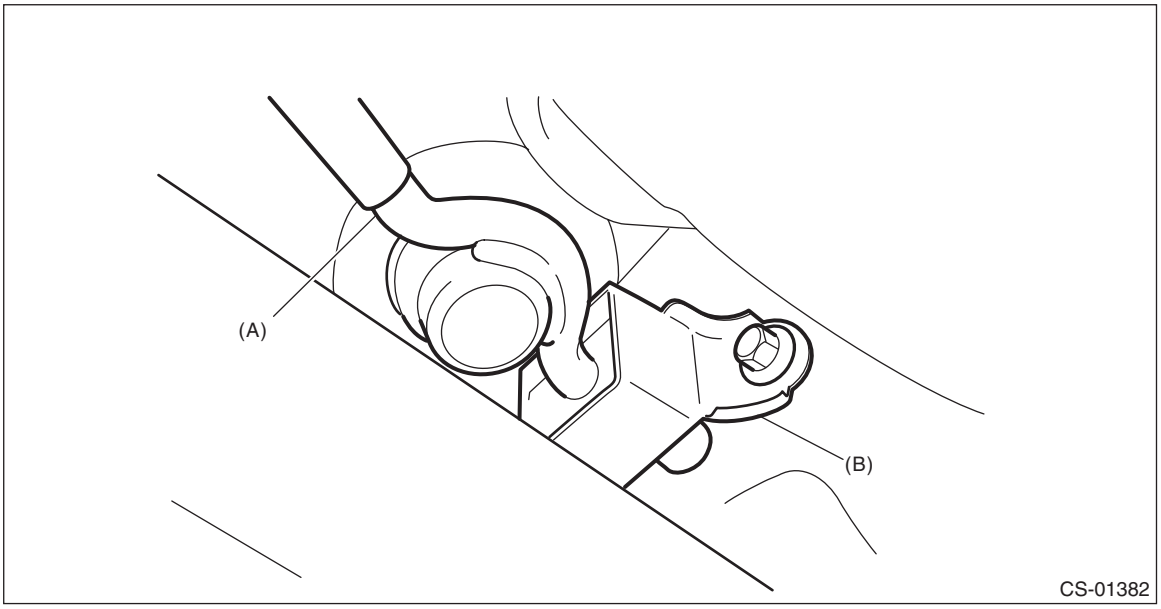
3) Install the joint to the transmission and secure with a spring pin.



(A) Joint
(B) Spring pin

4) Mount the cushion rubber on the vehicle body.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

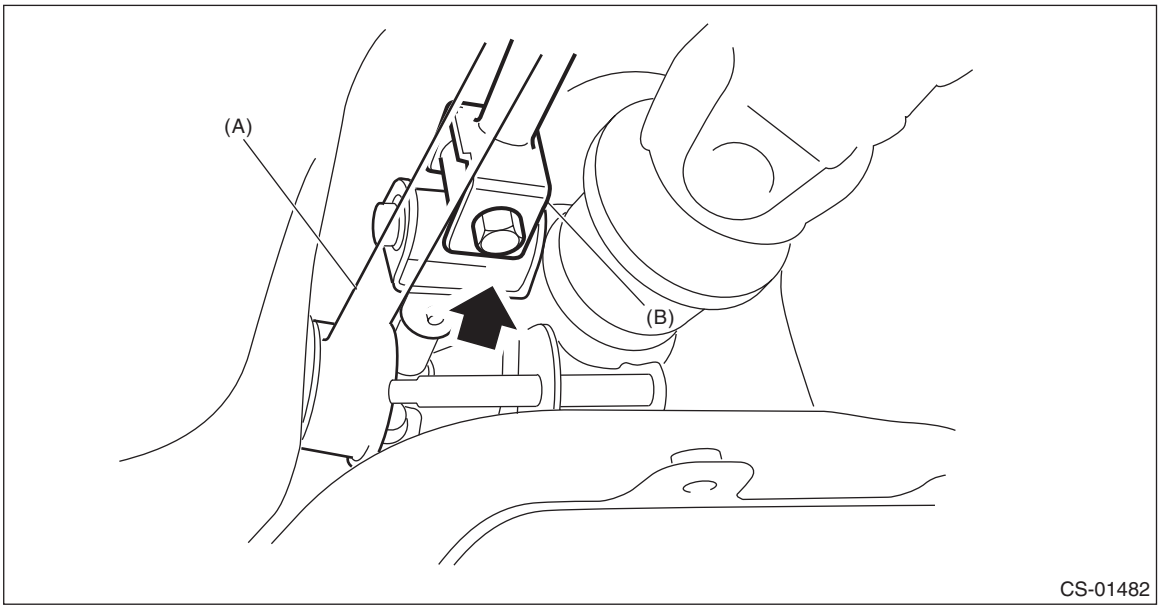


(A) Stay
(B) Cushion rubber

5) Connect the rod to the joint.

NOTE:
Use a new self-locking nut.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)

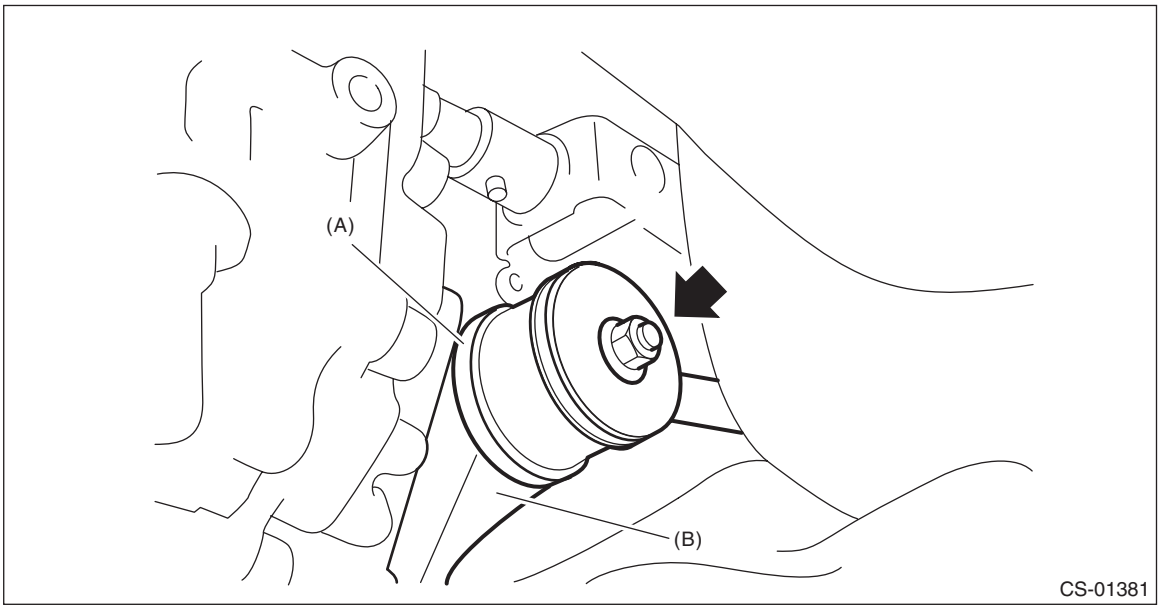


(A) Stay
(B) Rod

6) Connect the stay to the shift bracket, and tighten the self-locking nut.

NOTE:
Use a new self-locking nut.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



(A) Stay
(B) Shift bracket

7) Install the center exhaust cover.

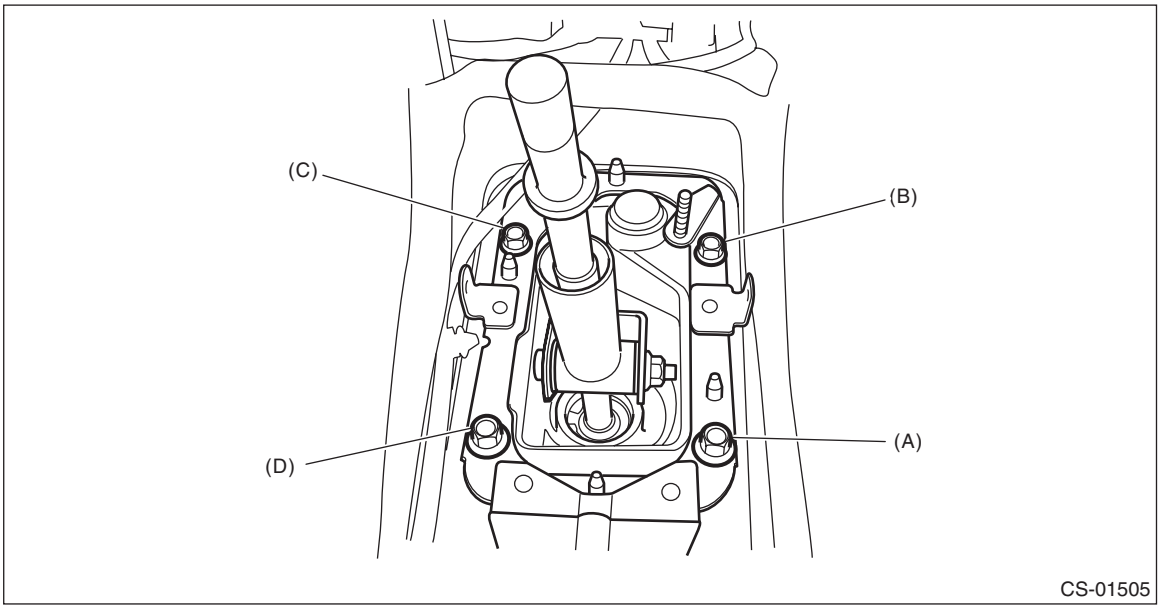
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



8) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
9) Lower the vehicle.
10) Install the plate COMPL to the body.

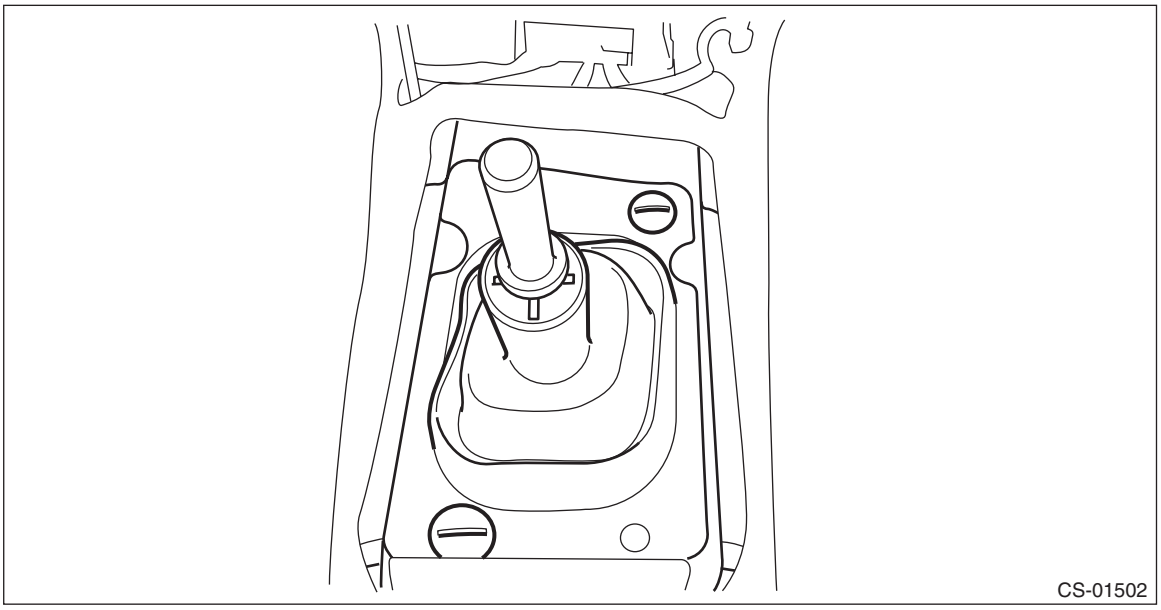
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

(1) Set the plate COMPL to the vehicle.
(2) Temporarily tighten the bolt (A).
(3) Tighten the bolt (B).
(4) Tighten the bolt (A).
(5) Tighten the bolts (C) and (D).



11) Install the harness clamp to the plate.

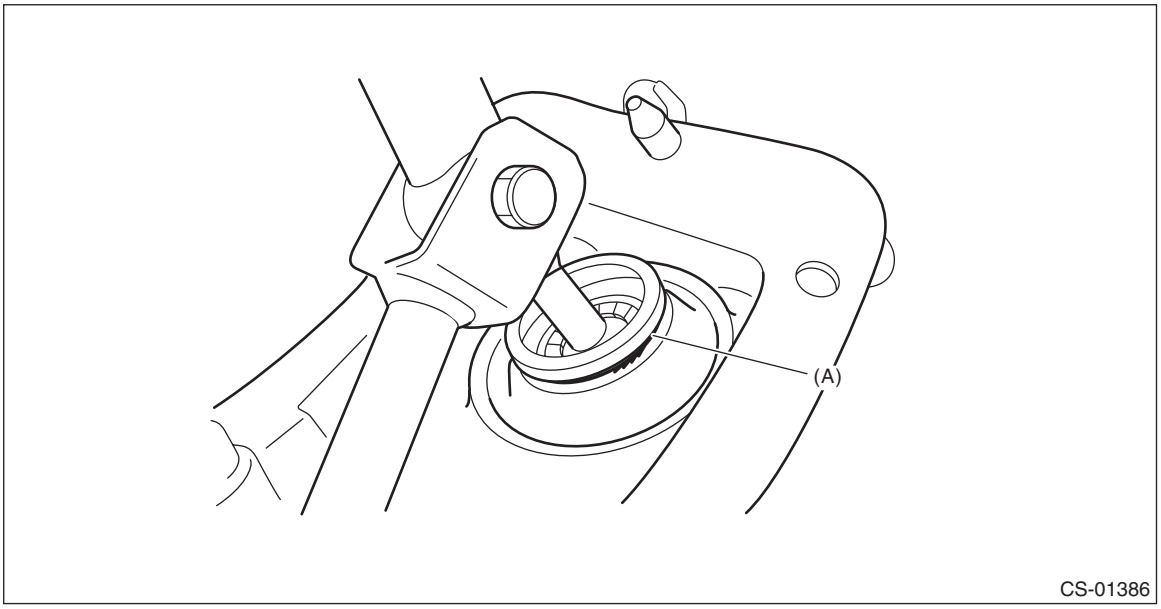
12) Install the boot and insulator assembly, and secure with a clamp.



13) Install the panel center LWR LH and RH. <Ref. to EI-78, INSTALLATION, Console Box.>
14) Install the cover - shift lever, and install the gear shift knob.
15) Install the console box. <Ref. to EI-78, INSTALLATION, Console Box.>
16) Make sure the gears can be shifted accurately into each gear.
17) Connect the battery ground terminal.

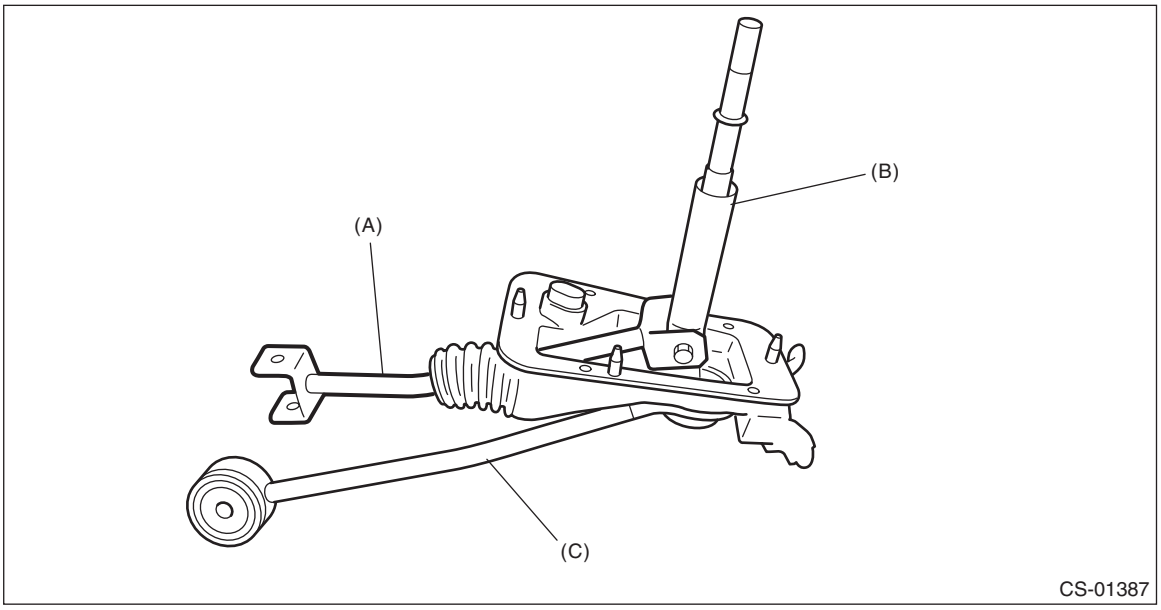
C: DISASSEMBLY

1) Remove the lock wires.



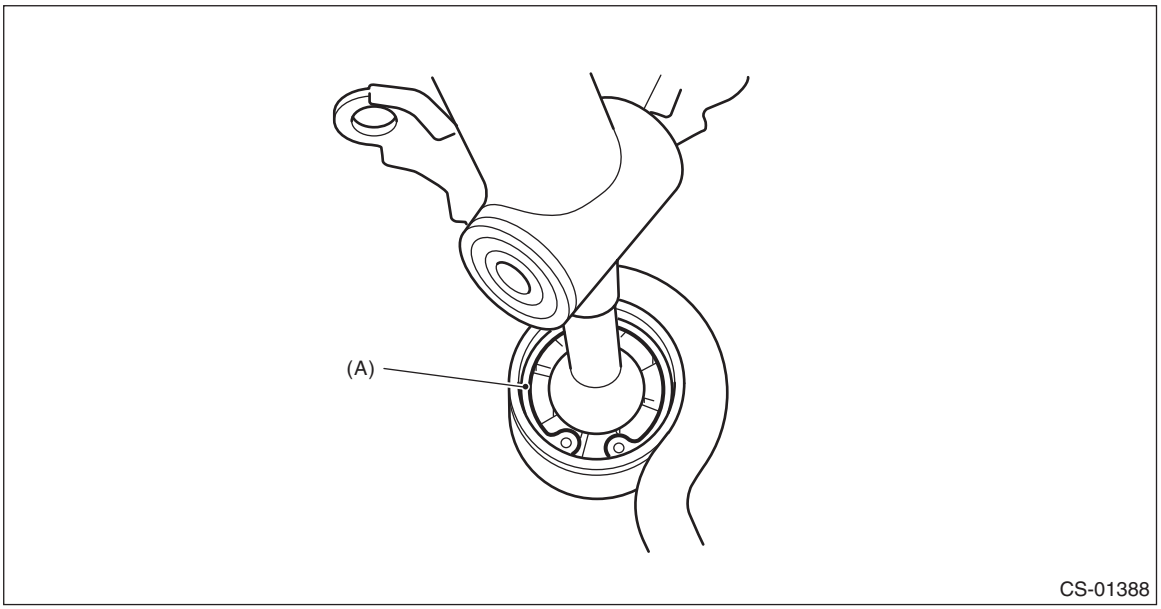
(A) Lock wire

2) Remove the rod from gear shift lever.



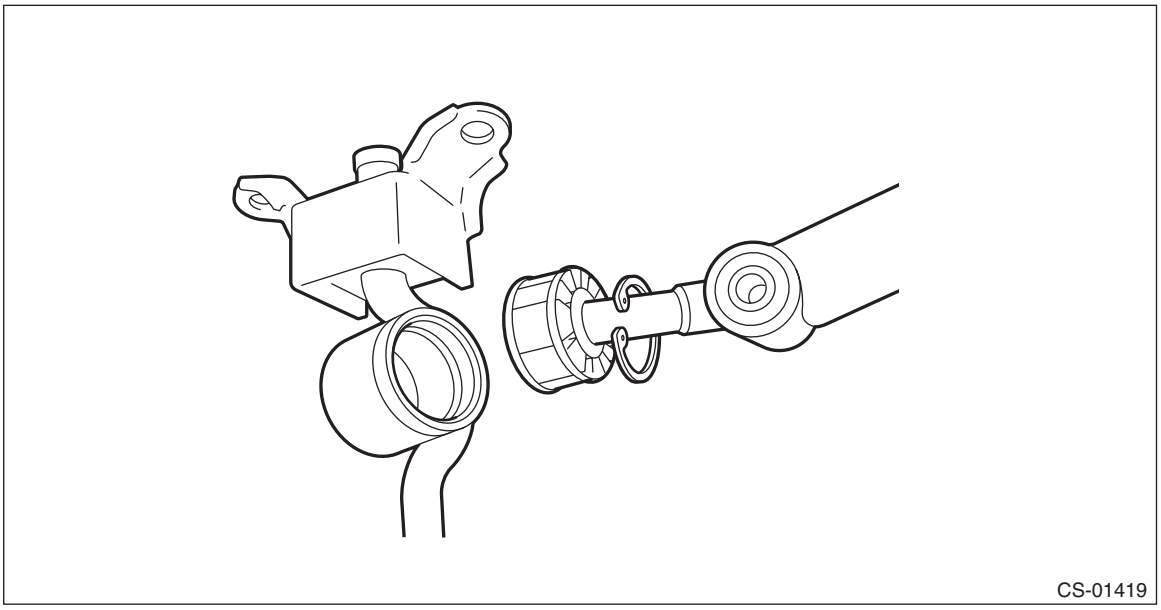
(A) Rod
(B) Lever
(C) Stay

3) Separate the rod and inner boot.
4) Remove the snap ring from the stay.

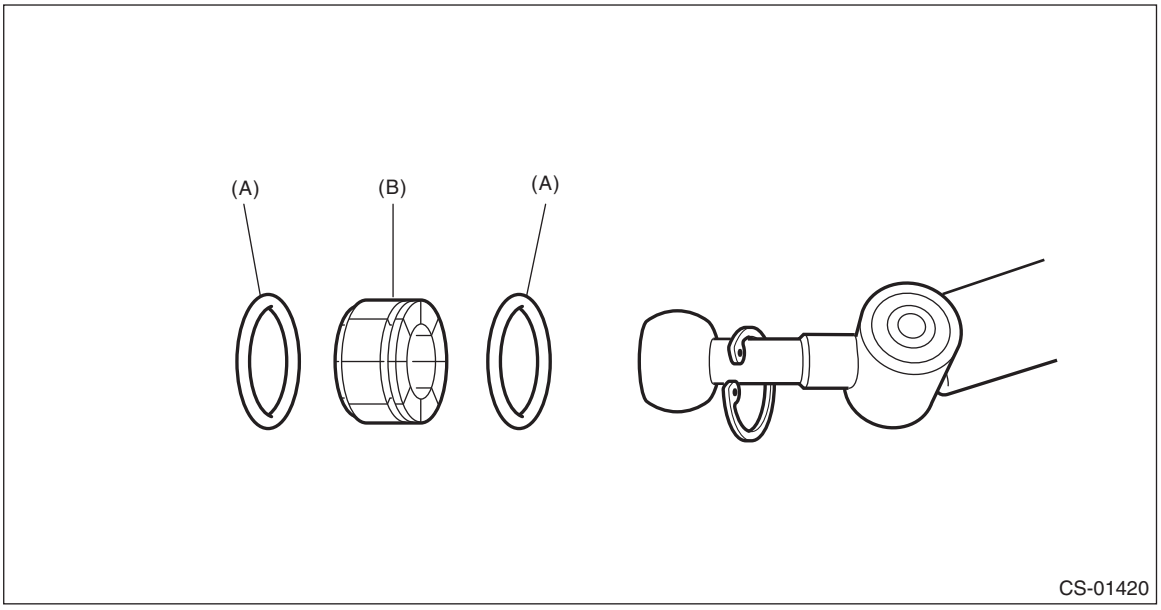


(A) Snap ring

5) Separate the gear shift lever and the stay.


CS-01419

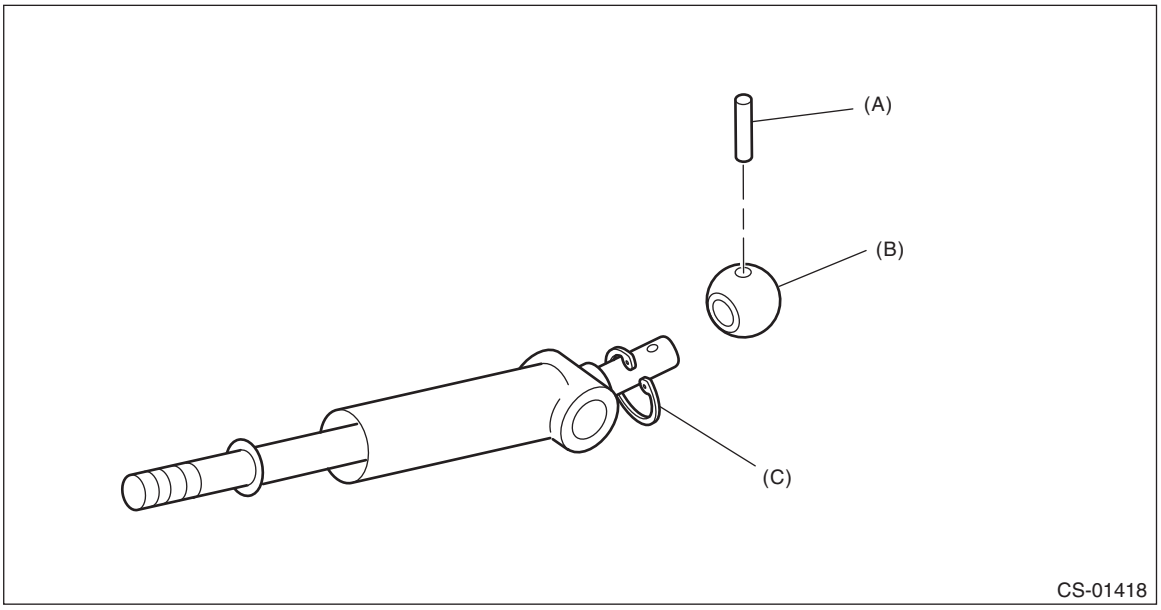
6) Remove the boot and bushing from the gear shift lever.



CS-01420

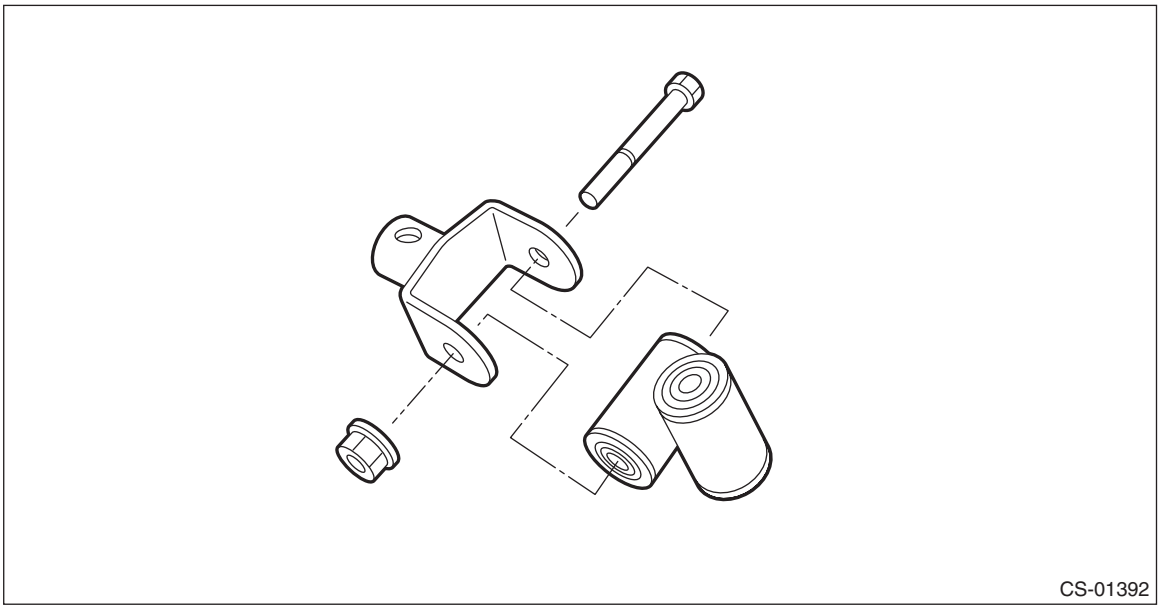
(A) O-ring
(B) Bushing

7) Remove the spring pin, and then remove the bushing and snap ring.

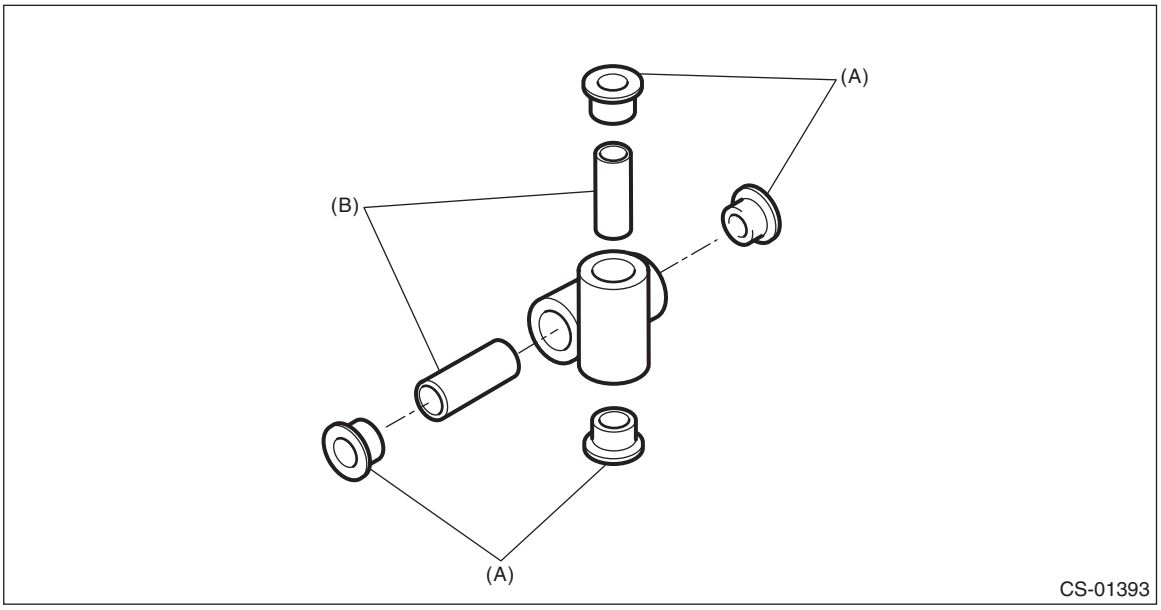


(A) Spring pin
(B) Bushing
(C) Snap ring

8) Remove the boss from the joint.

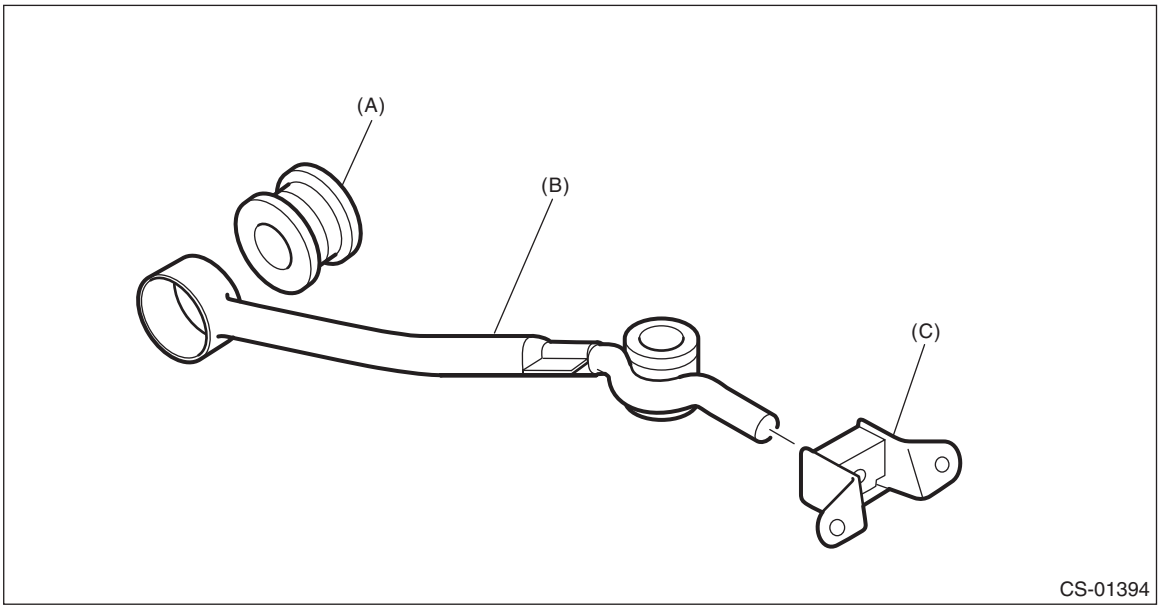


9) Remove the bushing and spacer from the boss.



(A) Bushing
(B) Spacer

10) Remove the bushing and cushion rubber from the stay.

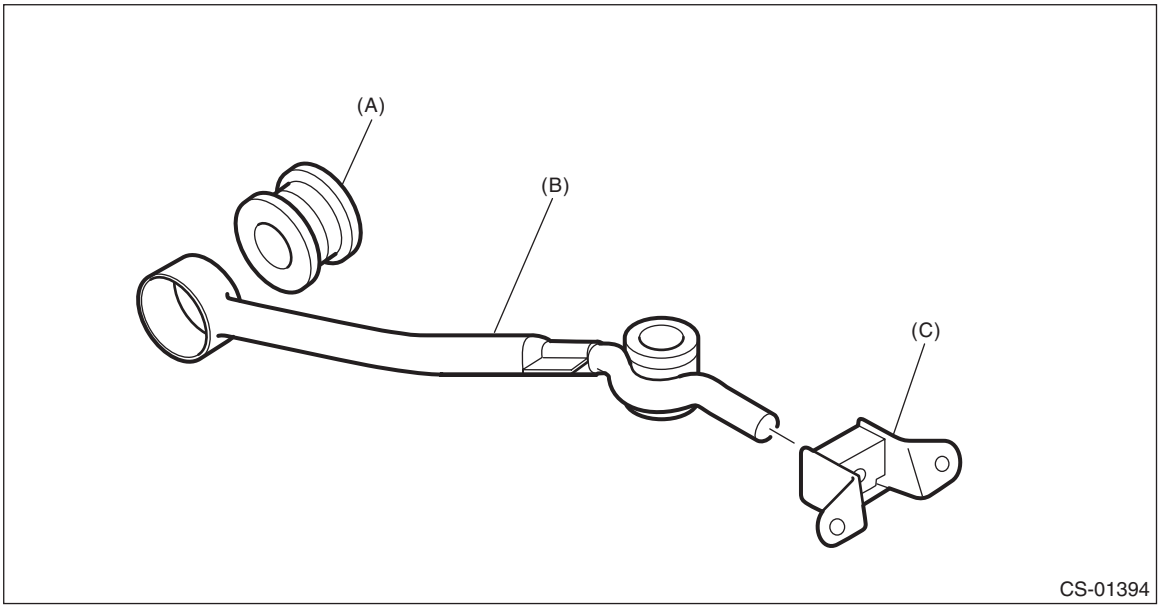


(A) Bushing B
(B) Stay
(C) Cushion rubber

D: ASSEMBLY

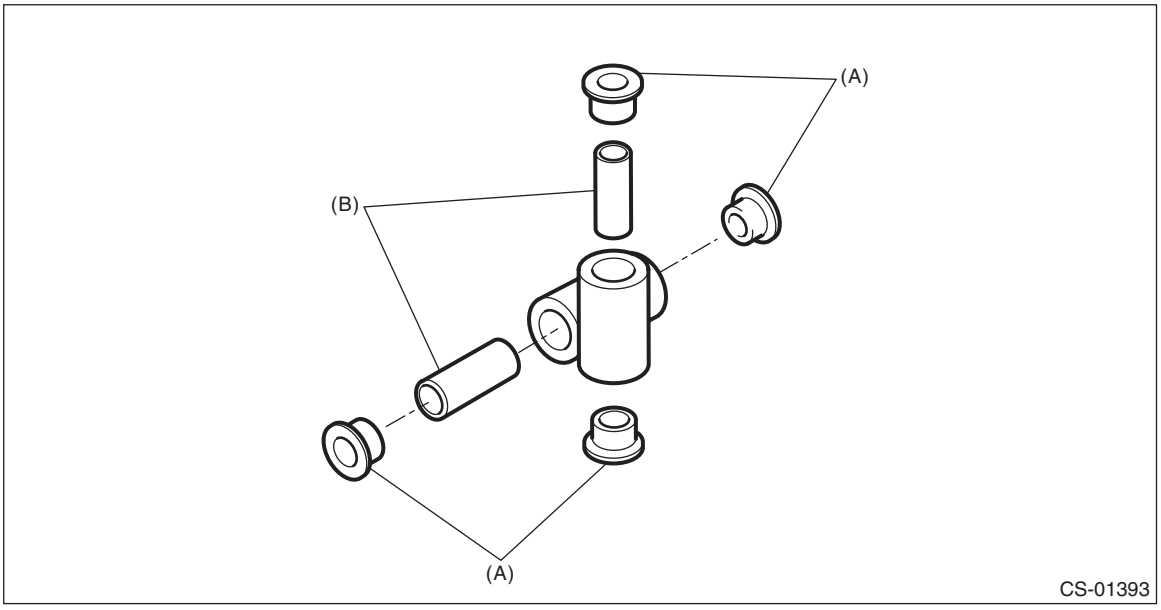
NOTE:
- Clean all the parts before assembly.
- Apply NIGTIGHT LYW No. 2 grease or equivalent to each part. <Ref. to CS-5, 5MT GEAR SHIFT LEVER, COMPONENT, General Description.>

1) Mount the bushing and cushion rubber to the stay.



(A) Bushing
(B) Stay
(C) Cushion rubber

2) Install the bushing and spacer to boss.

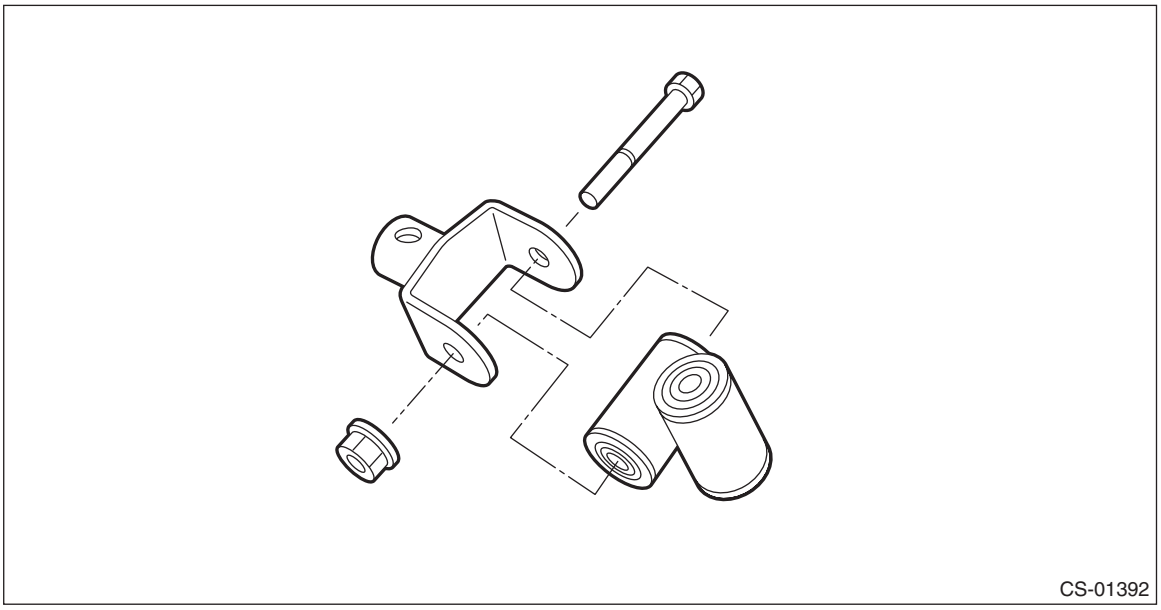


(A) Bushing
(B) Spacer

3) Install the boss to the joint.

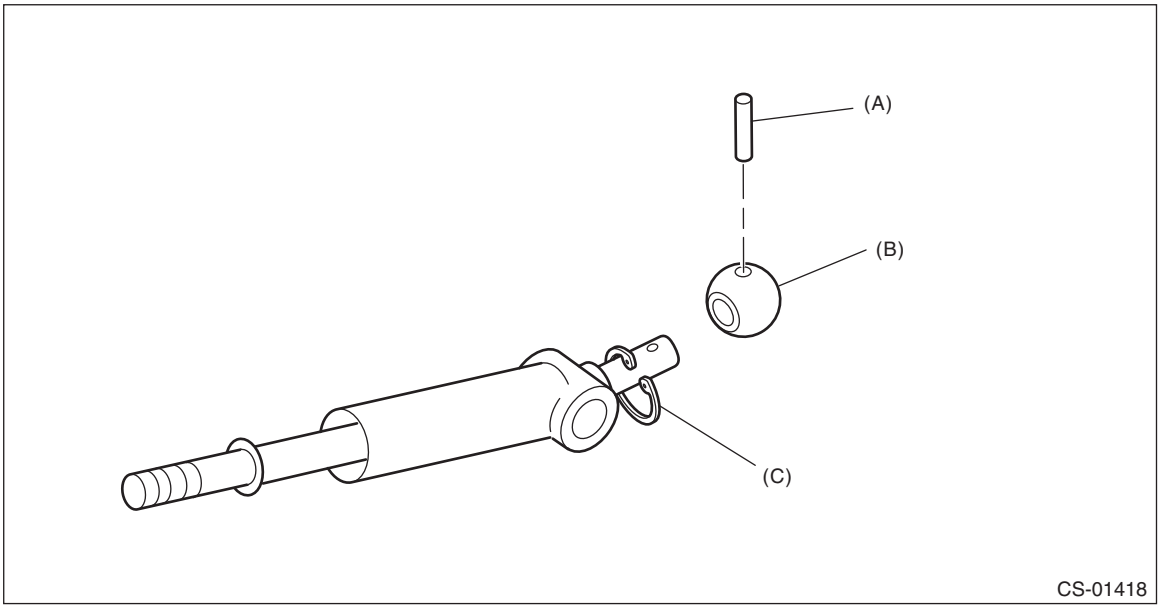
NOTE:
Use a new self-locking nut.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)



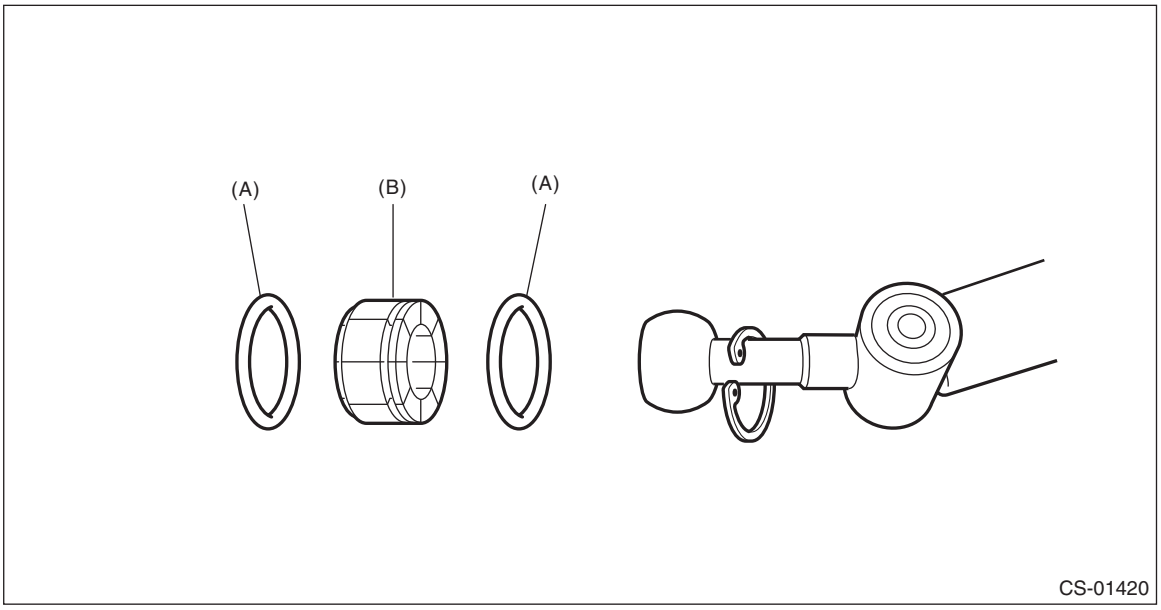
4) Install the snap ring to gear shift lever and install the bushing.

NOTE:
Apply grease to the bushing.



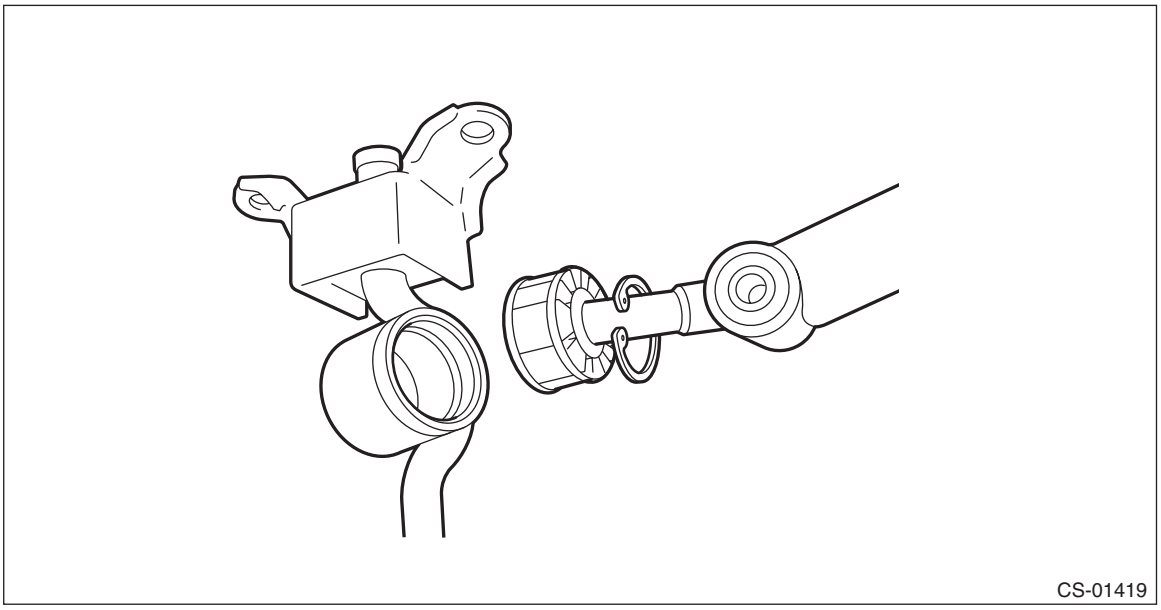
(A) Spring pin
(B) Bushing
(C) Snap ring

5) Apply grease to the bushing and O-ring, and then install to gear shift lever.

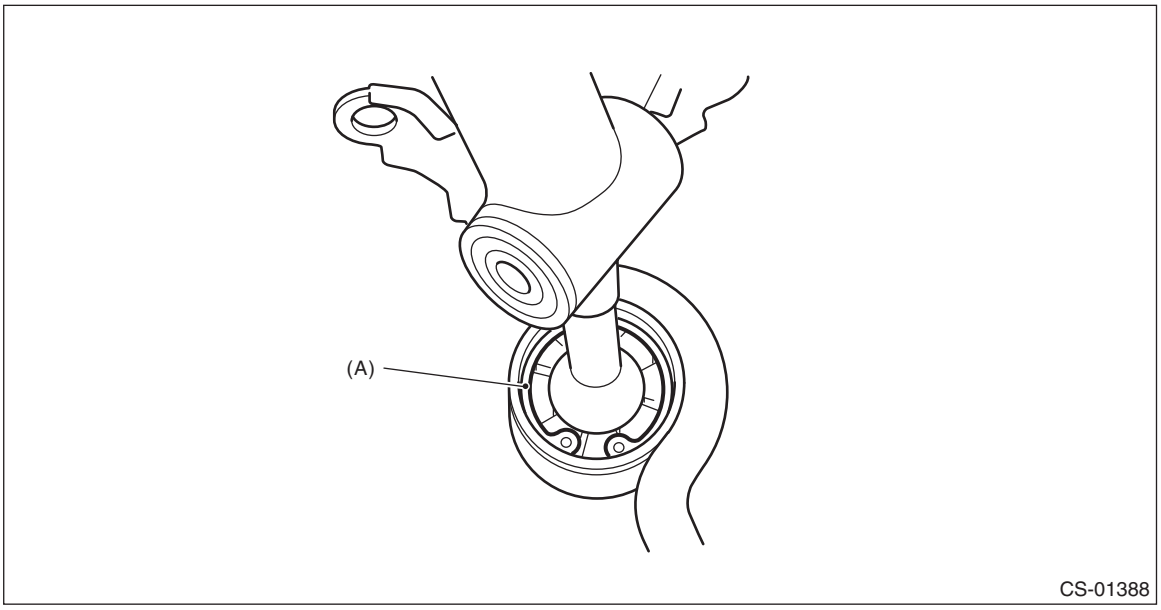


(A) O-ring
(B) Bushing

6) Apply sufficient grease into boss, and then install the gear shift lever to the stay.



7) Install the snap ring.

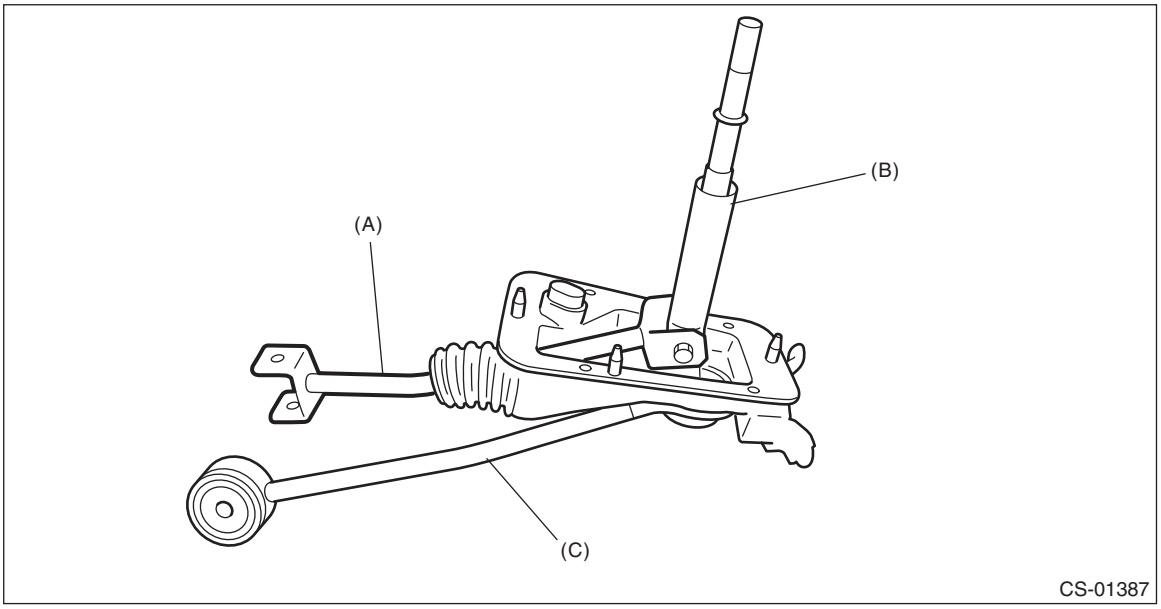


(A) Snap ring

8) Insert the gear shift lever and rod into boot hole.
9) Install the rod.

NOTE:
Use a new self-locking nut.

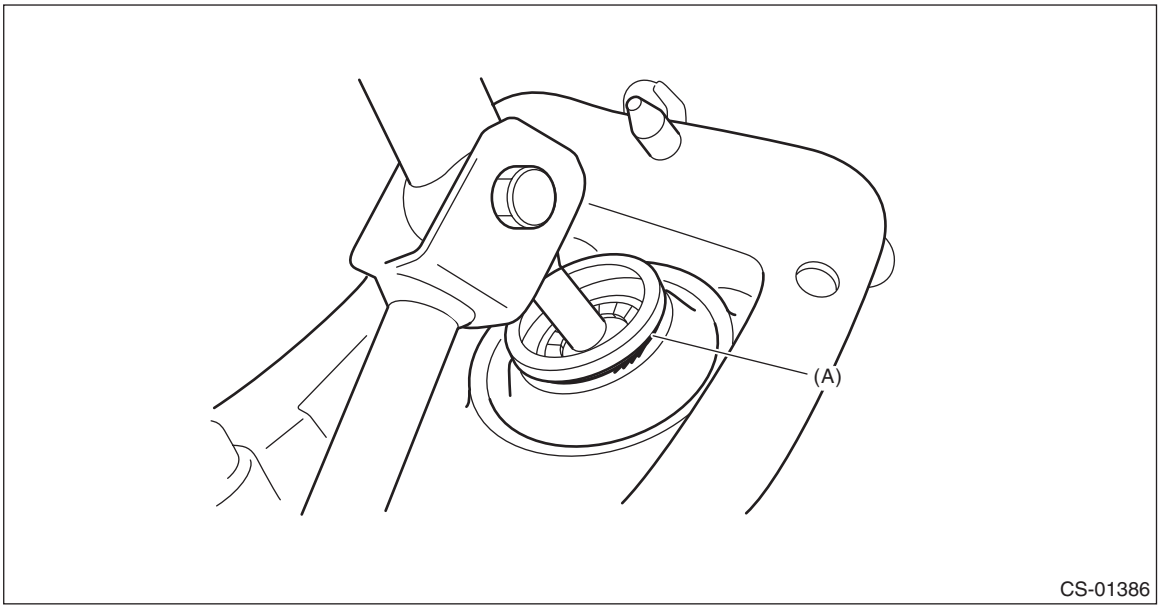
Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)



(A) Rod
(B) Lever
(C) Stay

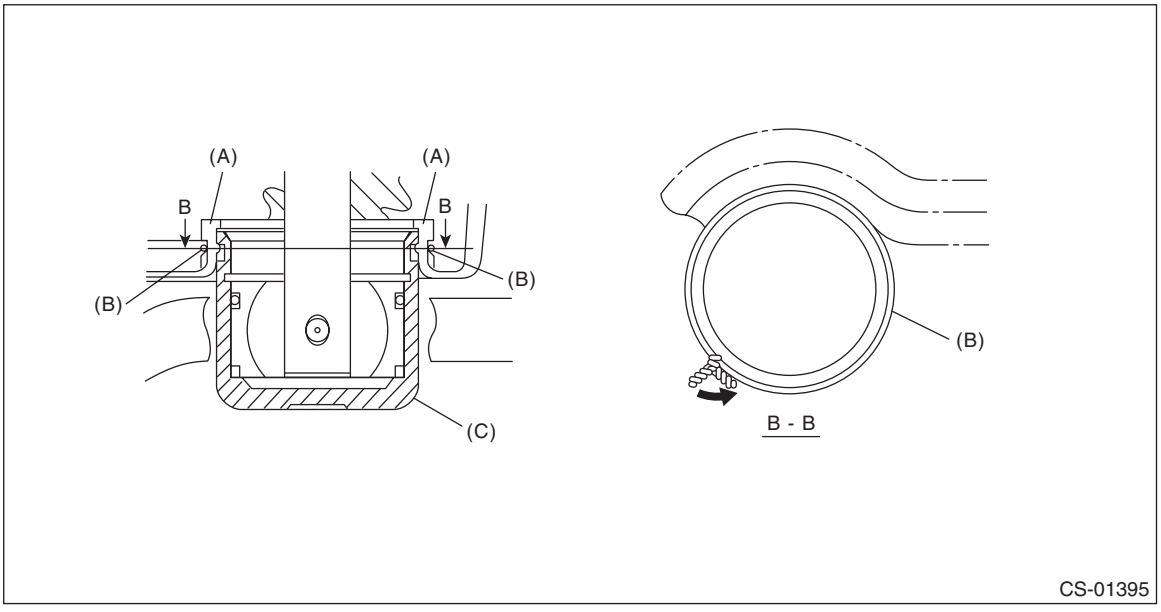
10) Install the lock wire.

NOTE:
Use a new lock wire.



(A) Lock wire

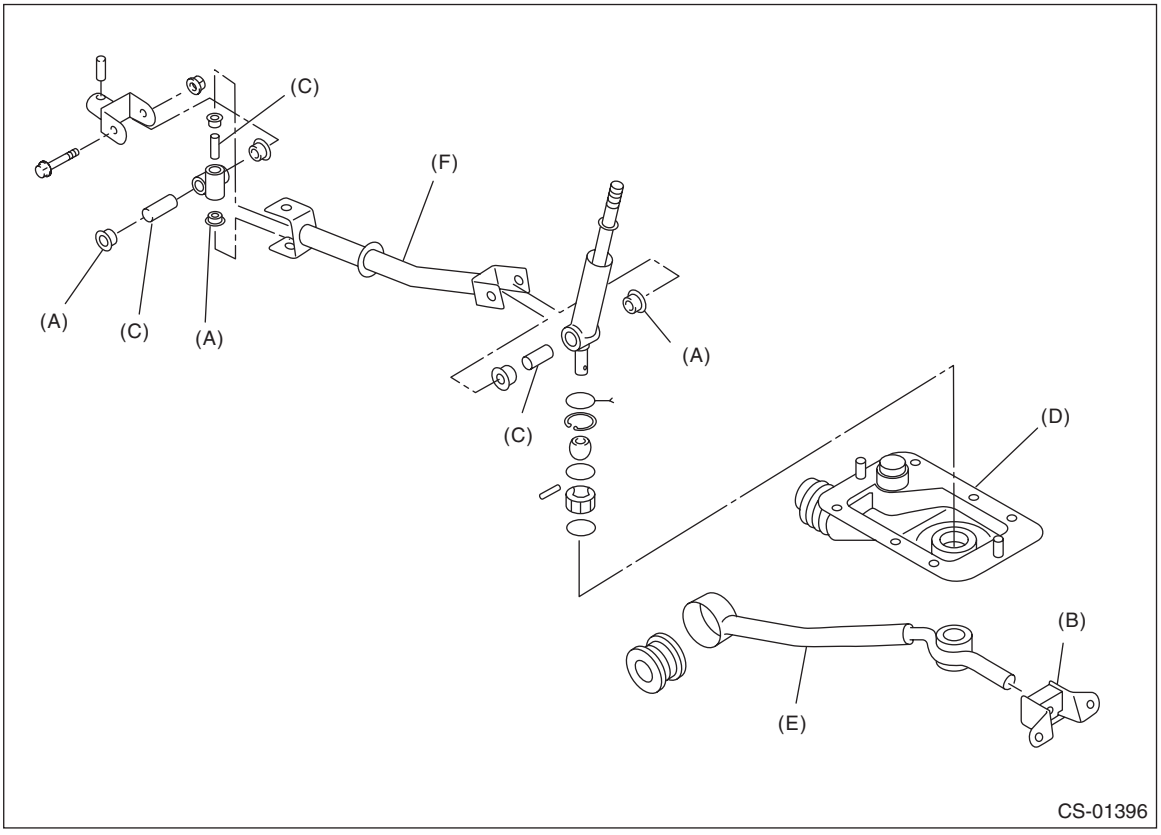
NOTE:
- Install the lock wire to the stay groove.
- Bend the extra wire to the same direction of lock wire winding.



(A) Inner boot
(B) Lock wire
(C) Stay

E: INSPECTION

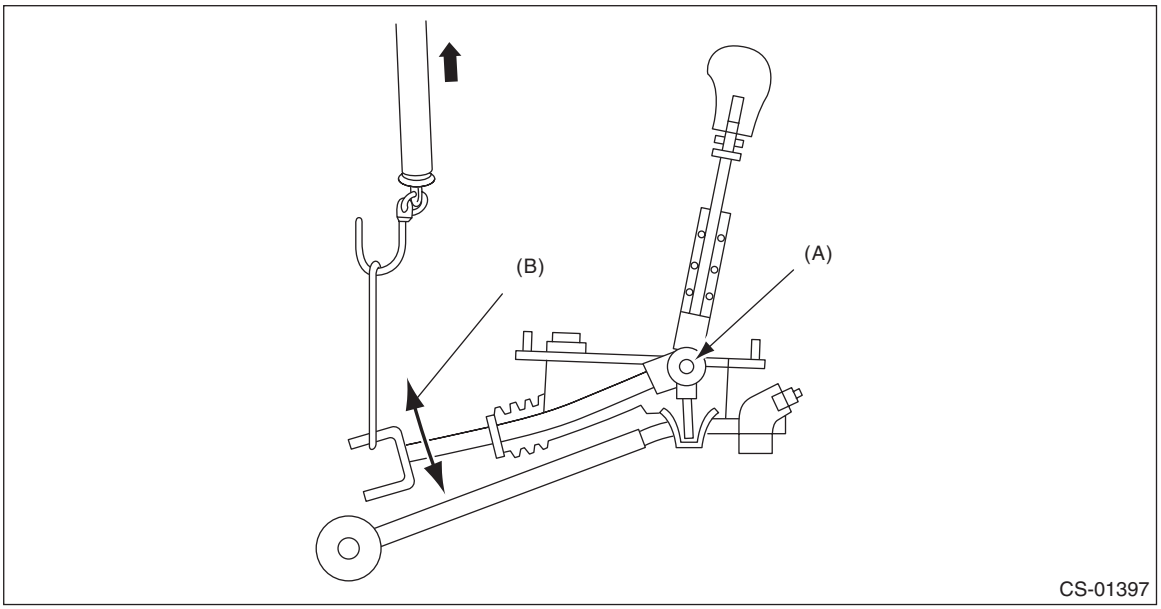
1) Check the parts (bushing, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. If necessary, correct or replace faulty parts. Compare the removed parts with new parts to judge if there are damages or not.



(A) Bushing
(B) Cushion rubber
(C) Spacer
(D) Boot
(E) Stay
(F) Rod

2) Check the swing torque of rod linked with the gear shift lever. If the torque exceeds the specifications, replace the bushing or retighten nuts.

Swing torque:
3.7 N (0.38 kgf, 0.83 lbf) or less



(A) Pivot
(B) Swing torque

8. General Diagnostic Table

A: INSPECTION

Symptoms	Possible cause	Corrective action
Select lever	Starter does not run.	Adjust the select cable and inhibitor switch, or inspect the circuit.
	Back-up light does not illuminate.	Adjust the select cable and inhibitor switch, or inspect the circuit.
	AT shift lock system does not operate normally.	Adjust the select cable and inhibitor switch, or inspect the circuit.
	Manual mode can not be set.	Inspect the mode switch and select lever, or inspect the circuit.
	Up-shift is not engaged at manual mode.	Check the shift-up switch and circuit.
	Down-shift is not engaged at manual mode.	Check the shift-down switch and circuit.

CONTINUOUSLY VARIABLE TRANSMISSION

CVT(TR580)

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38.	Variator Chain	254
39.	Reverse Brake Assembly	255
40.	Forward Clutch Assembly	270
41.	Drive Pinion Shaft Assembly	290
42.	Front Differential Assembly	319
43.	Oil Pump Chain	338

44. Oil Pump 347
45. Converter Case 350
46. Diagnostics with Phenomenon 354

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER

Model	DOHC non-turbo
Type	Symmetric, 3-element, single stage, 2-phase torque converter
Stall torque ratio	2.62
Nominal mm (in)	236 (9.29)
Stall speed (at sea level) r/min	2,150 — 2,800 (D range) 1,950 — 2,550 (R range)
One-way clutch	Sprag type one-way clutch

2. OIL PUMP

Type		Internal gear pump
Driving method		Driven by chain
Number of teeth	Inner rotor	8
	Outer rotor	9

3. TRANSMISSION CONTROL ELEMENT

Type	Forward continuously variable speed change, 1 reverse, planetary gear
Multi-plate clutch	1 set
Multi-plate brake	1 set

4. TRANSMISSION GEAR RATIO

Forward	Crosstrek model	3.581 — 0.570
	Except for Crosstrek model	3.420 — 0.544
Rev	Crosstrek model	3.667
	Except for Crosstrek model	3.502

5. PLATE

Number of forward clutch drive plates	3
Number of reverse brake drive plates	4

6. SELECTOR POSITION

P (Park)	Transmission neutral, output shaft locked, engine start enabled
R (Reverse)	Rev
N (Neutral)	Transmission neutral, engine start enabled
D (Drive)	Forward continuously variable speed change
M (Manual mode) (paddle shift +side)	Manual gear change 1st → 2nd → 3rd → 4th → 5th → 6th
M (Manual mode) (paddle shift –side)	Manual gear change 1st ← 2nd ← 3rd ← 4th ← 5th ← 6th
L (Low)	Forward continuously variable speed change (engine brake)

7. HYDRAULIC CONTROL AND LUBRICATION

Type	Electronic hydraulic control (gear ratio is changed by signals of vehicle speed and accelerator opening angle.)
Fluid	Specified fluid: SUBARU CVT FLUID LINEARTRONIC II **CAUTION:** **Always use specified CVTF. Using other fluid will cause malfunction.**
Fluid capacity L (US qt, Imp qt)	11.68 — 12.18 (12.3 — 12.9, 10.3 — 10.7)
Lubrication system	Forced feed lubrication with oil pump

8. COOLING AND HARNESS

Cooling system	CVTF cooler (with warmer feature)
Inhibitor switch harness	16 poles
Transmission harness	12 poles

9. TRANSFER

Transfer type	Multi-plate transfer (MP-T)
Number of transfer clutch drives & driven plates	4
Control method	Electronic hydraulic type
Reduction gear ratio	1.000 (43/43)

10.REDUCTION GEAR RATIO

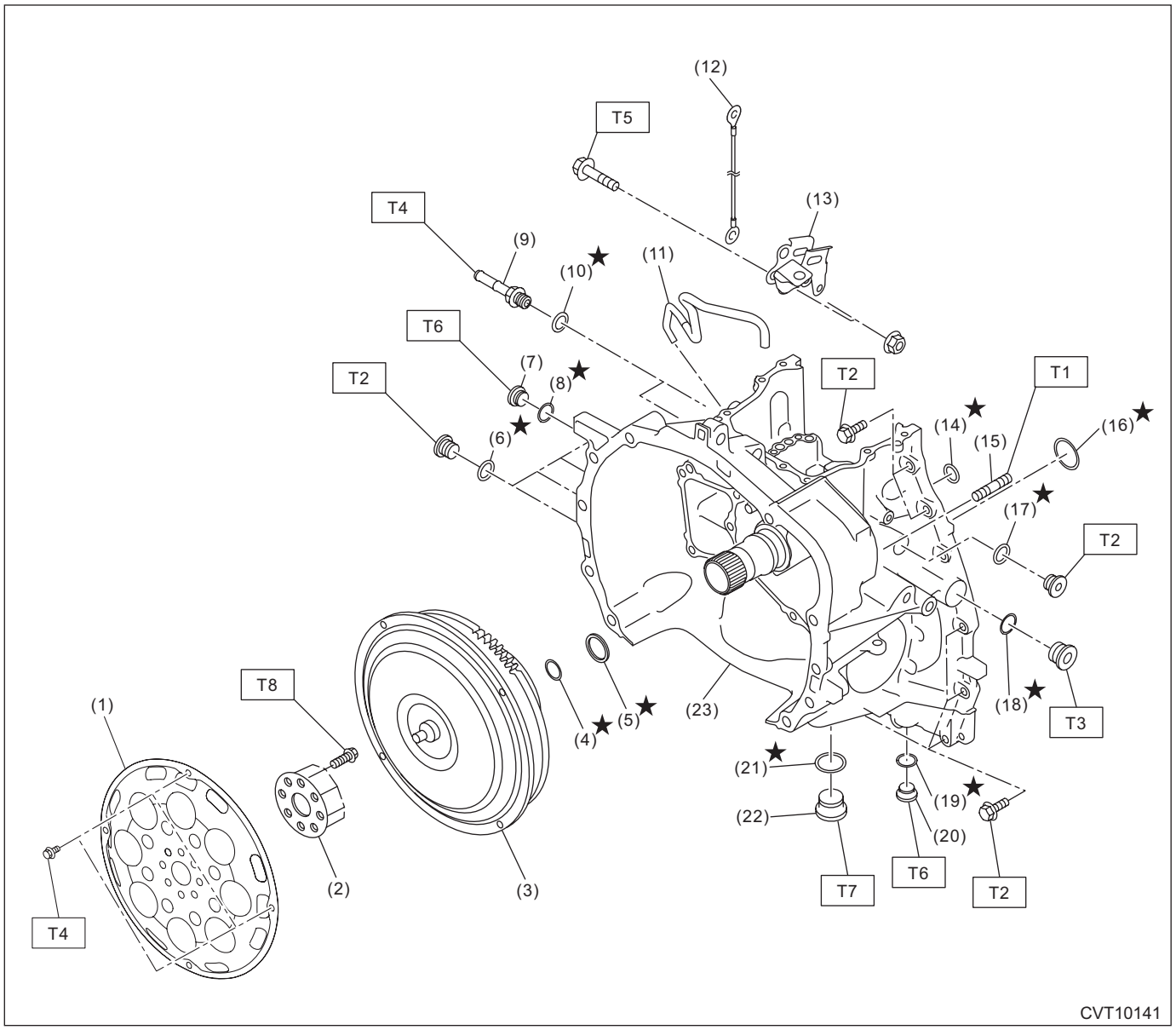
Front final reduction gear ratio	3.700

11.RECOMMENDED GEAR OIL

Lubrication oil	SUBARU GEAR OIL EXTRA MT or equivalent
Front differential oil capacity L (US qt, Imp qt)	1.14 — 1.24 (1.2 — 1.3, 1.0 — 1.1)

B: COMPONENT

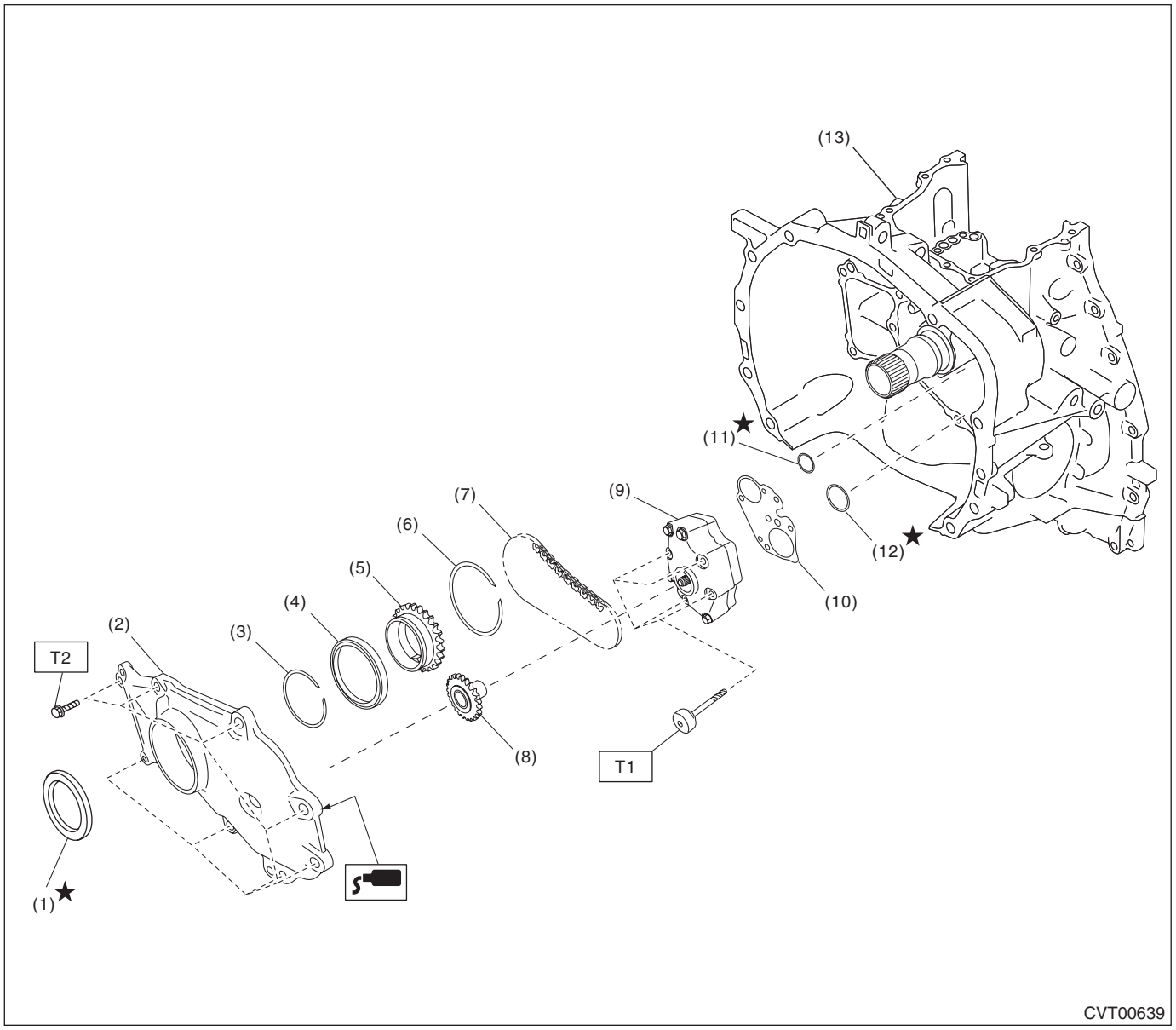
1. TORQUE CONVERTER ASSEMBLY AND CONVERTER CASE



(1) Drive plate
(2) Reinforcement drive plate
(3) Torque converter ASSY
(4) O-ring
(5) Seal ring
(6) O-ring
(7) Front differential gear oil filler plug
(8) O-ring
(9) Oil cooler pipe
(10) O-ring
(11) Air breather hose
(12) Transmission radio ground cord
(13) Pitching stopper bracket
(14) O-ring
(15) Stud bolt
(16) O-ring
(17) O-ring
(18) O-ring
(19) Gasket
(20) Overflow drain plug
(21) Gasket
(22) Front differential gear oil drain plug
(23) Converter case

Tightening torque: N·m (kgf-m, ft-lb)
T1: 18 (1.8, 13.3)
T2: 22 (2.2, 16.2)
T3: 22.5 (2.3, 16.6)
T4: 25 (2.5, 18.4)
T5: 41 (4.2, 30.2)
T6: 50 (5.1, 36.9)
T7: 70 (7.1, 51.6)
T8: <Ref. to CVT(TR580)-166, INSTALLATION, Drive Plate.>

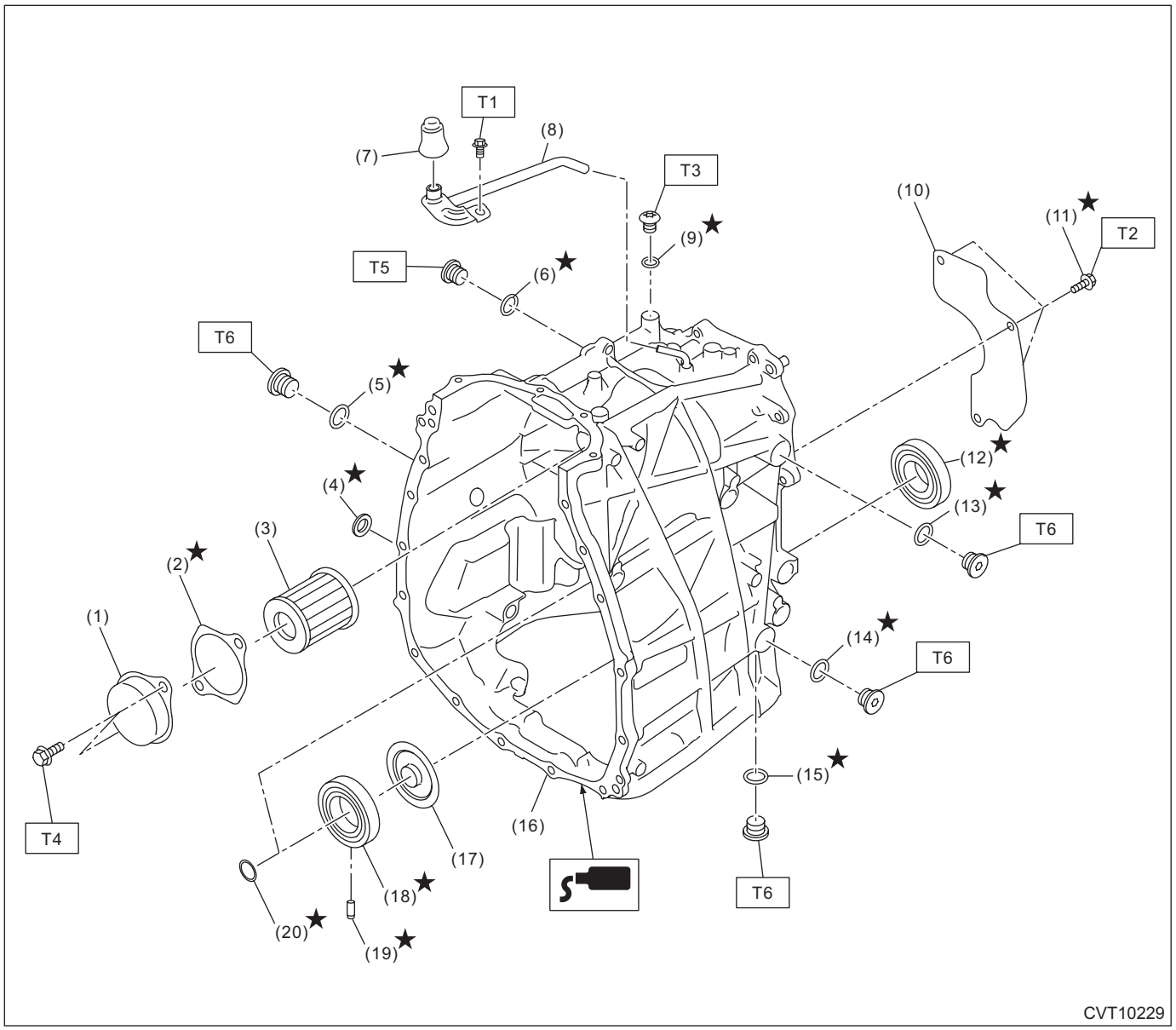
2. OIL PUMP ASSY



(1) Oil seal
(2) Oil pump chain cover
(3) Snap ring
(4) Ball bearing
(5) Drive sprocket
(6) Snap ring
(7) Oil pump chain
(8) Driven sprocket
(9) Oil pump ASSY
(10) Plate
(11) O-ring (small)
(12) O-ring (large)
(13) Converter case

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8.5 (0.9, 6.3)
T2: 21 (2.1, 15.5)

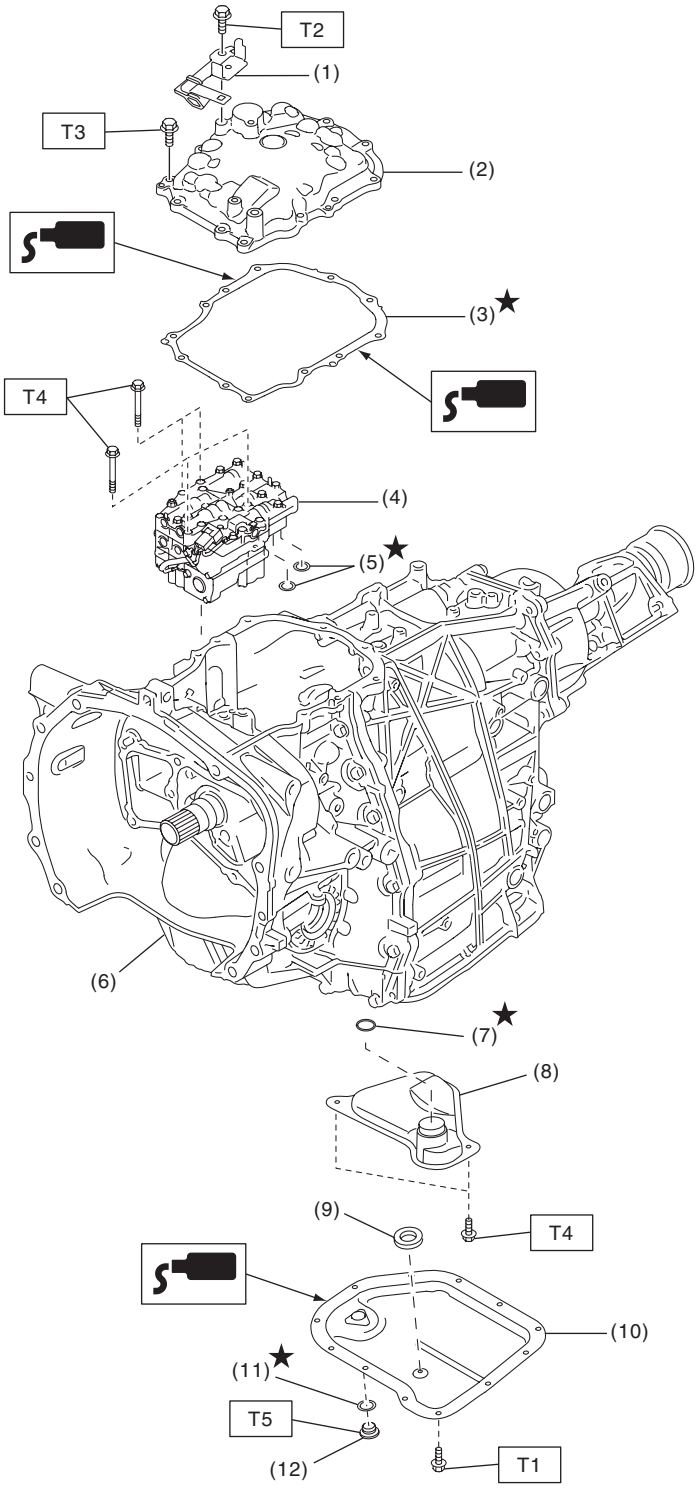
3. TRANSMISSION CASE



(1) CVTF filter cover
(2) Gasket
(3) CVTF filter
(4) Oil seal
(5) Gasket
(6) O-ring
(7) Air breather cap
(8) Air breather hose
(9) O-ring
(10) Oil stopper plate
(11) Micro-encapsulated bolt
(12) Ball bearing
(13) O-ring
(14) Gasket
(15) O-ring
(16) Transmission case
(17) Oil guide
(18) Ball bearing
(19) Roll pin
(20) Seal ring

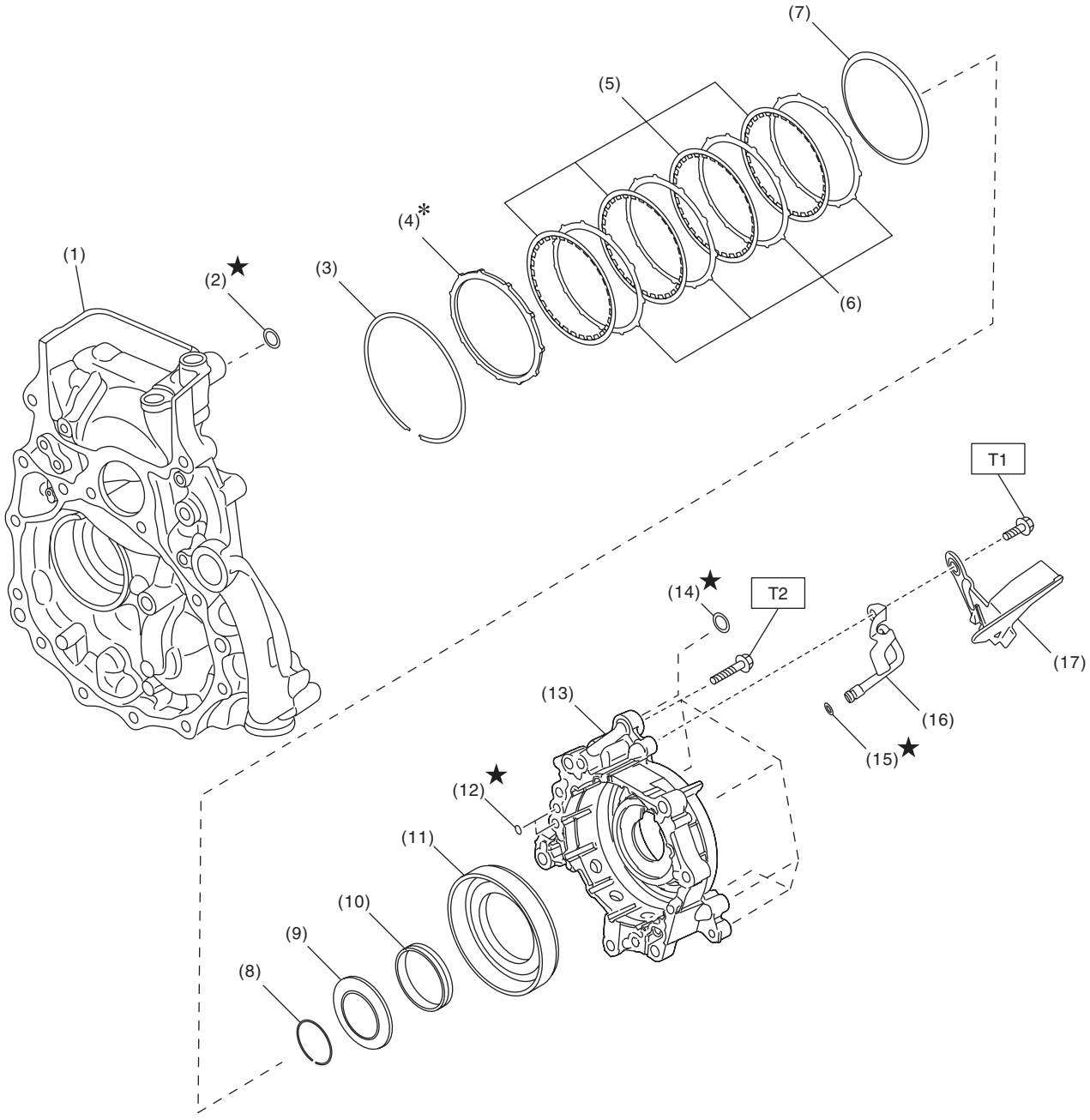
Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 9 (0.9, 6.6)
T3: 13 (1.3, 9.6)
T4: 17 (1.7, 12.5)
T5: 22 (2.2, 16.2)
T6: 50 (5.1, 36.9)

4. CONTROL VALVE BODY



(1)	Transmission harness stay	(7)	O-ring	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Valve cover	(8)	Oil strainer	***T1: 5 (0.5, 3.7)***
(3)	Gasket	(9)	Magnet	***T2: 7 (0.7, 5.2)***
(4)	Control valve body	(10)	Oil pan	***T3: 8 (0.8, 5.9)***
(5)	O-ring	(11)	Gasket	***T4: 9 (0.9, 6.6)***
(6)	Transmission ASSY	(12)	CVTF drain plug	***T5: 31 (3.2, 22.9)***

5. REVERSE BRAKE ASSEMBLY

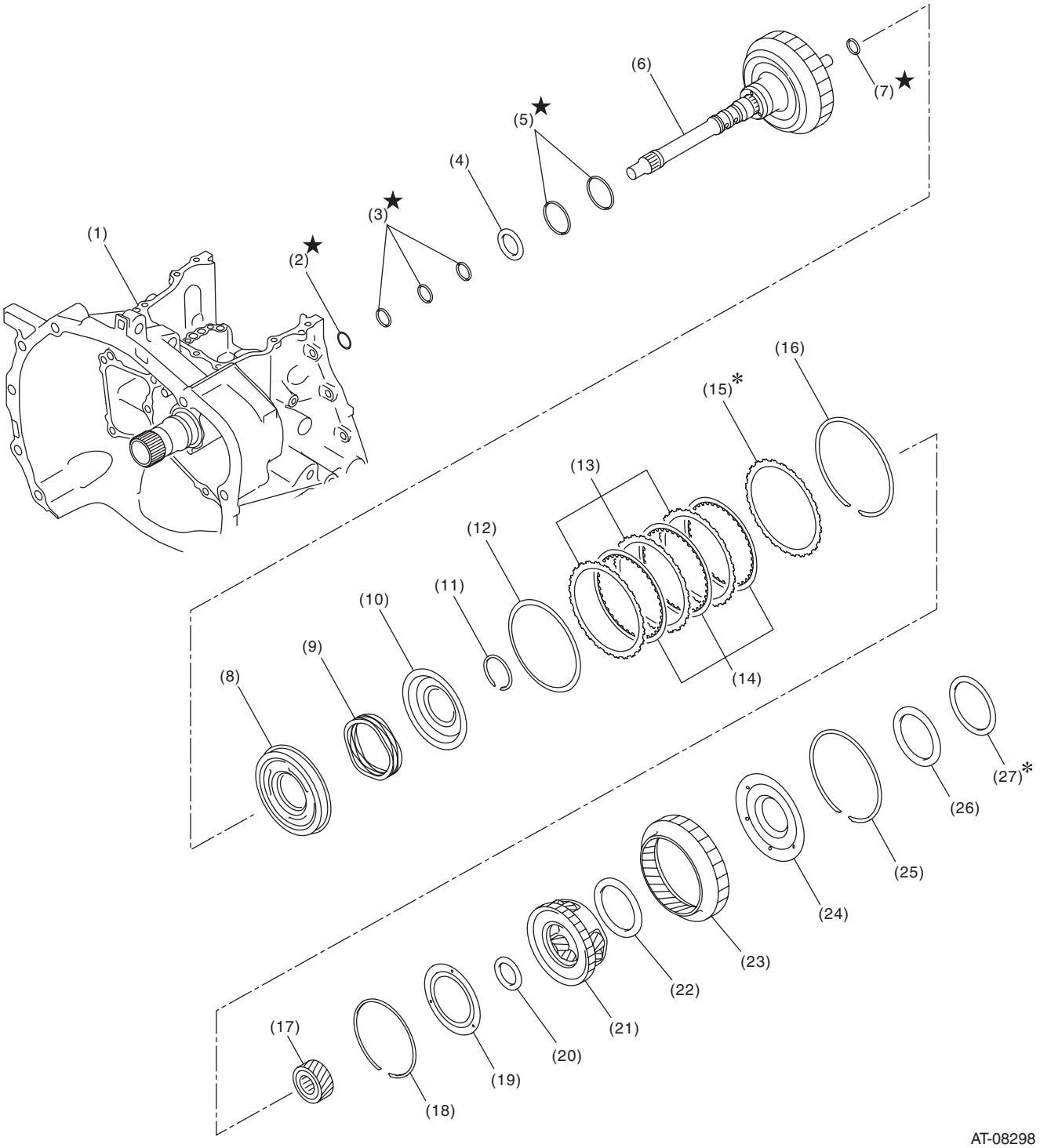


CVT00661

(1) Drive pinion retainer
(2) O-ring
(3) Snap ring
(4) Retaining plate
(5) Drive plate
(6) Driven plate
(7) Dish plate
(8) Snap ring
(9) Spring retainer
(10) Return spring
(11) Reverse brake piston
(12) O-ring
(13) Reverse brake housing
(14) O-ring
(15) O-ring
(16) Lubrication pipe
(17) Oil guide

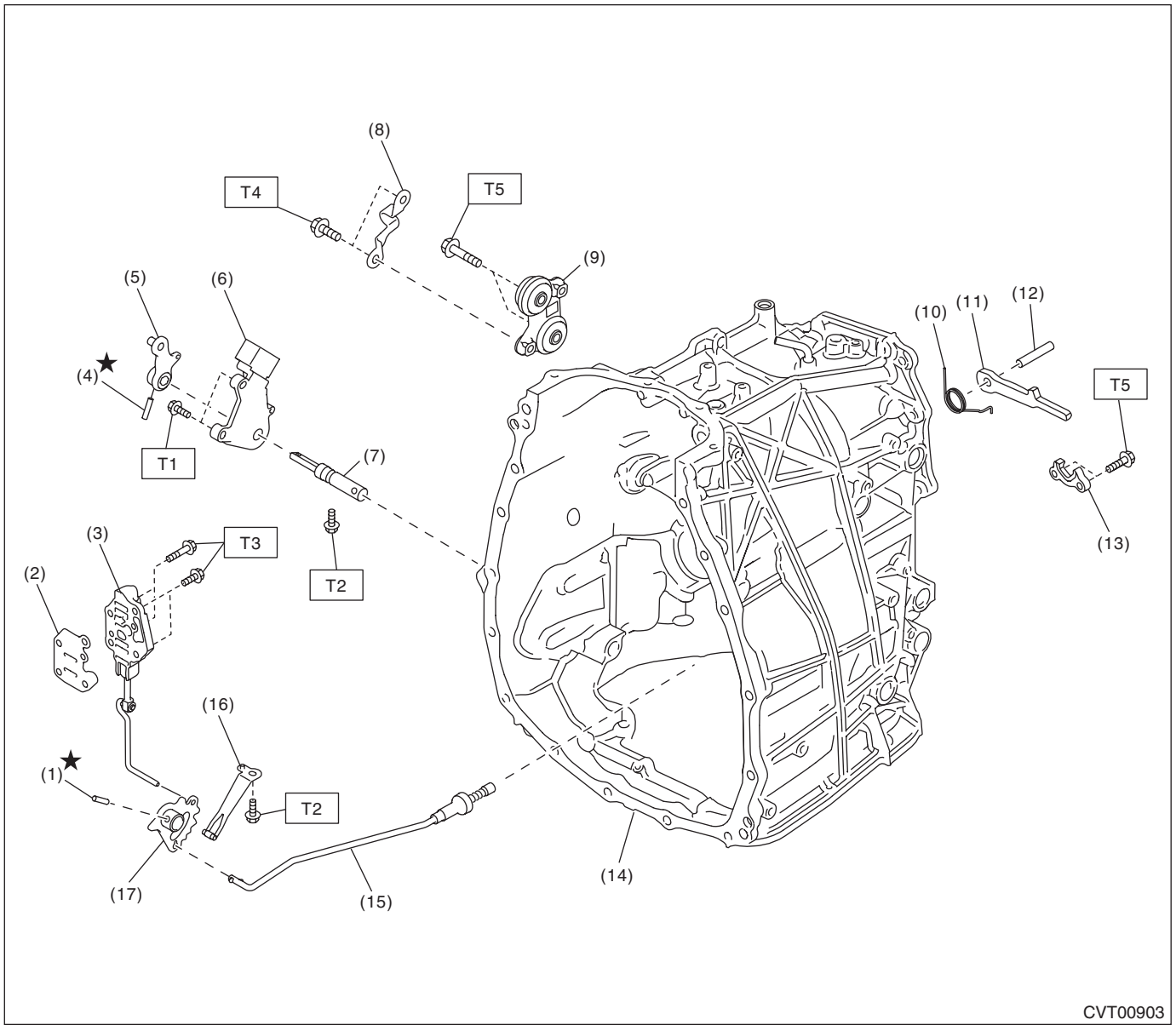
Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 37 (3.8, 27.3)

6. FORWARD CLUTCH ASSEMBLY



(1) Converter case
(2) O-ring
(3) Seal ring
(4) Thrust bearing
(5) Seal ring
(6) Forward clutch drum ASSY
(7) Seal ring
(8) Forward clutch piston
(9) Return spring
(10) Chamber COMPL
(11) Snap ring
(12) Dish plate
(13) Driven plate
(14) Drive plate
(15) Retaining plate
(16) Snap ring
(17) Sun gear
(18) Snap ring
(19) Balance oil guide
(20) Thrust bearing
(21) Planetary carrier ASSY
(22) Thrust bearing
(23) Internal gear
(24) Thrust gear plate
(25) Snap ring
(26) Thrust bearing
(27) Washer

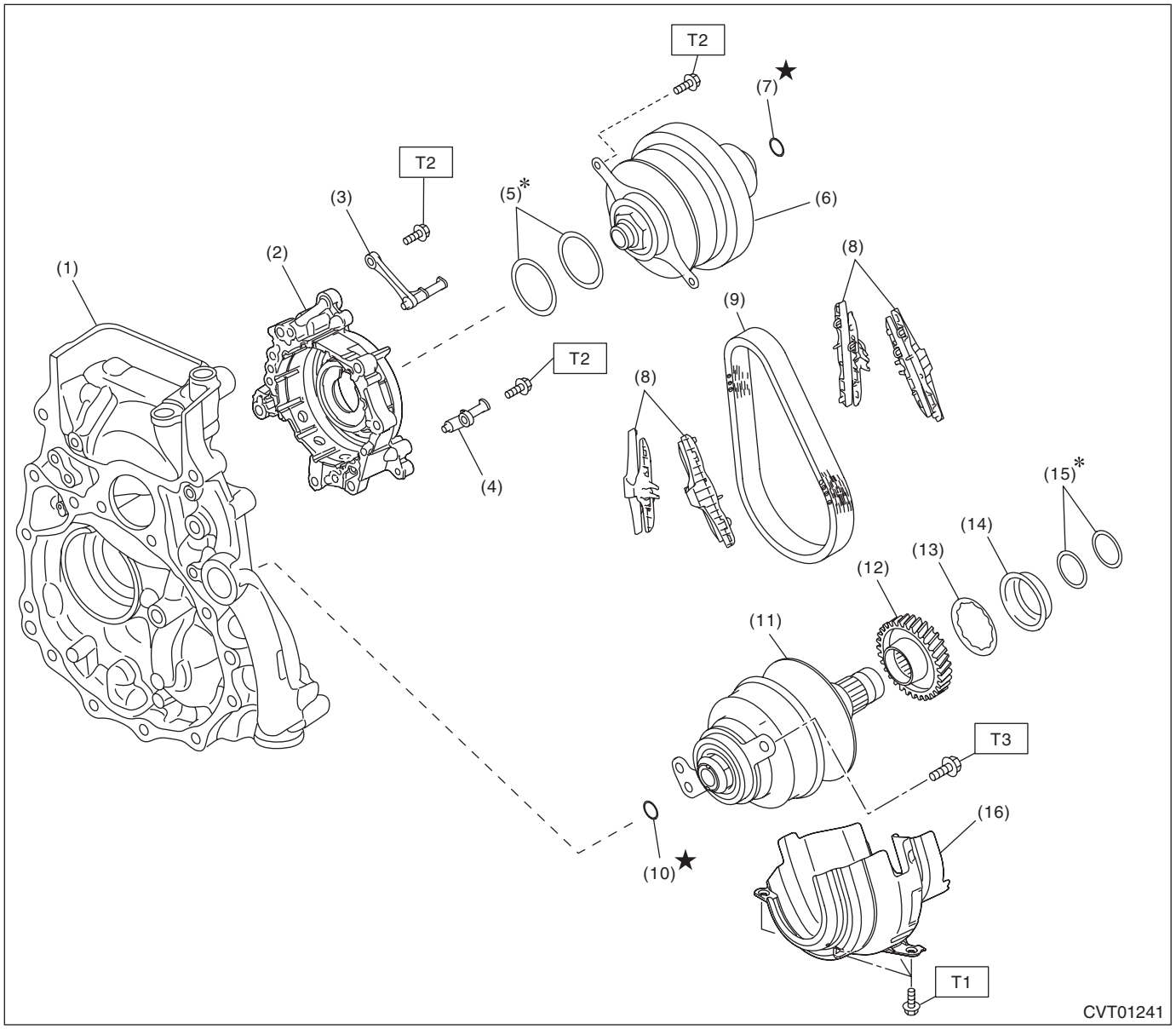
7. TRANSMISSION CONTROL DEVICE



(1) Spring pin
(2) Separator plate
(3) Manual valve ASSY
(4) Spring pin
(5) Shifter arm
(6) Inhibitor switch
(7) Shifter arm shaft
(8) Cable bracket
(9) Plate ASSY
(10) Return spring
(11) Parking pawl
(12) Shaft
(13) Parking support
(14) Transmission case
(15) Parking rod
(16) Detent spring
(17) Manual plate

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 7 (0.7, 5.2)
T3: 9 (0.9, 6.6)
T4: 18 (1.8, 13.3)
T5: 25 (2.5, 18.4)

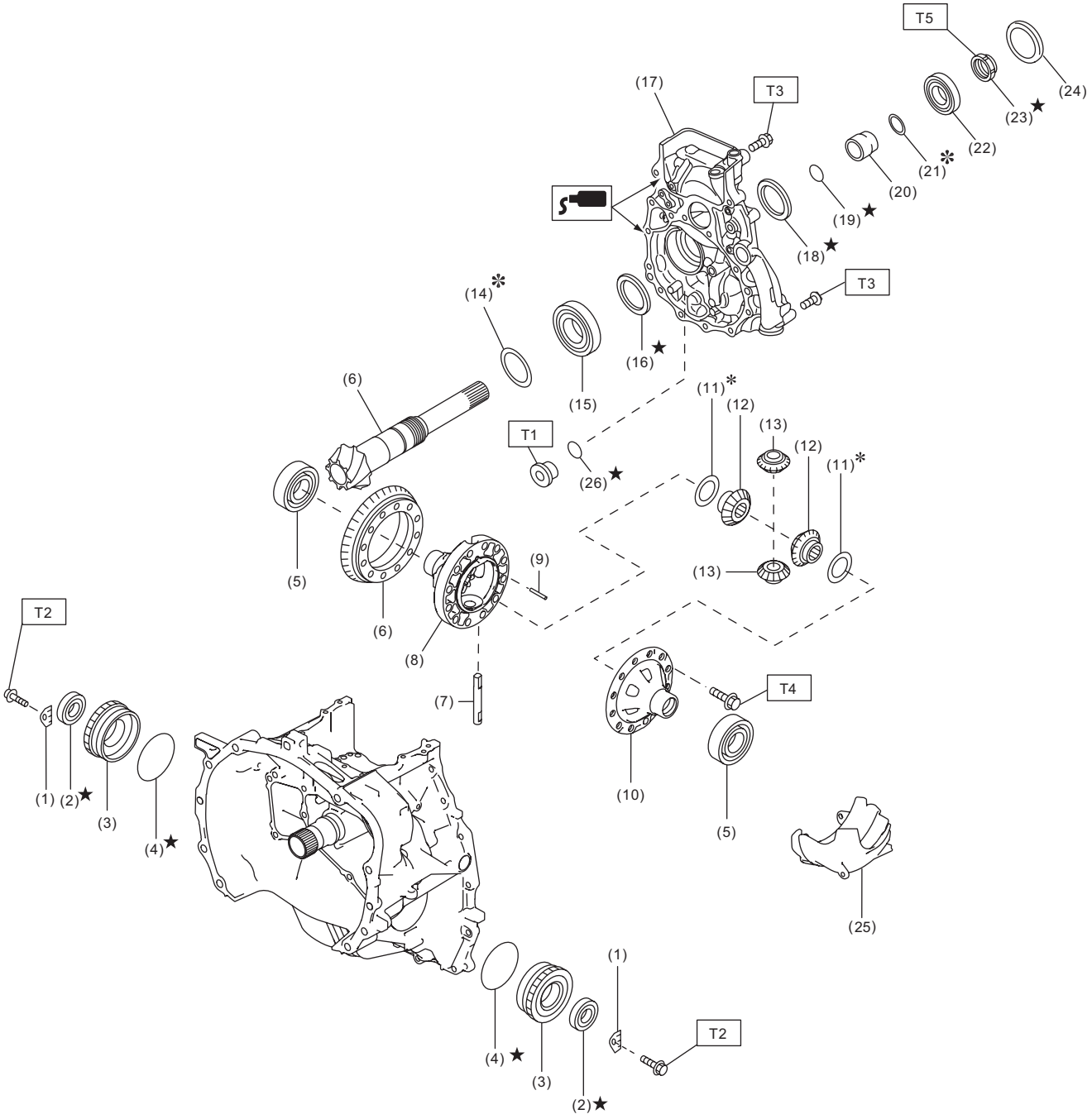
8. PRIMARY PULLEY, SECONDARY PULLEY & VARIATOR CHAIN AND REDUCTION DRIVE GEAR



(1) Drive pinion retainer
(2) Reverse brake housing
(3) Support rod
(4) Lubrication pipe
(5) Primary pulley shim
(6) Primary pulley ASSY
(7) Seal ring
(8) Chain guide
(9) Variator chain
(10) Seal ring
(11) Secondary pulley ASSY
(12) Reduction drive gear
(13) Dish plate
(14) Spring retainer
(15) Reduction gear shim
(16) Oil baffle

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 21 (2.1, 15.5)
T3: 67.5 (6.9, 49.8)

9. FRONT DIFFERENTIAL GEAR



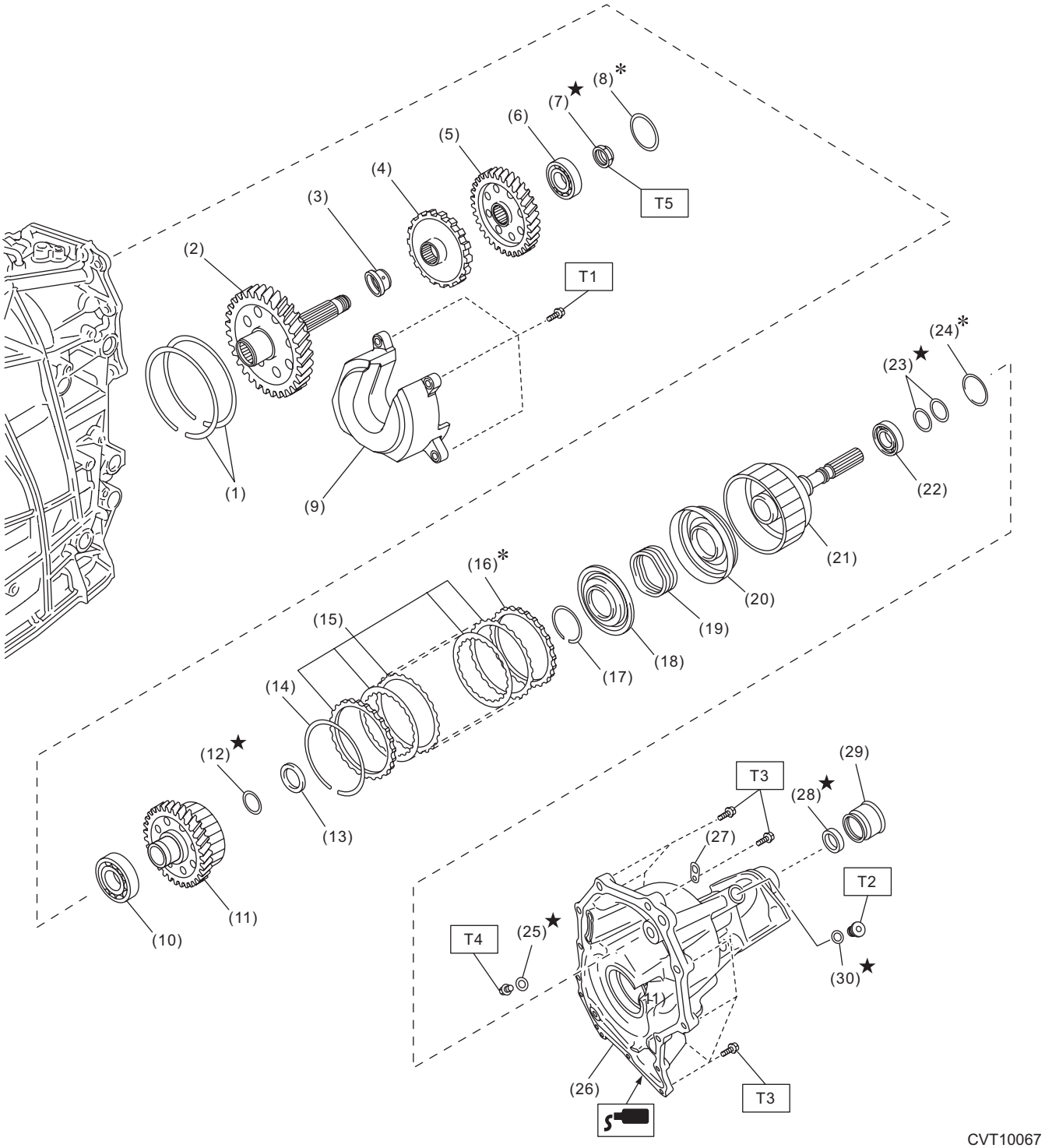
CVT10053

(1) Lock plate
(2) Oil seal
(3) Differential side retainer
(4) O-ring
(5) Taper roller bearing
(6) Drive pinion gear set
(7) Pinion shaft
(8) Differential case RH
(9) Straight pin
(10) Differential case LH
(11) Washer
(12) Differential bevel gear
(13) Differential bevel pinion
(14) Drive pinion shim
(15) Taper roller bearing
(16) Oil seal
(17) Drive pinion retainer
(18) Oil seal
(19) O-ring
(20) Drive pinion spacer
(21) Drive pinion washer
(22) Taper roller bearing
(23) Lock nut
(24) Plug
(25) Oil baffle
(26) O-ring

Tightening torque: N·m (kgf-m, ft-lb)

T1: 22 (2.2, 16.2)
T2: 25 (2.5, 18.4)
T3: 43 (4.4, 31.7)
T4: 64 (6.5, 47.2)
T5: <Ref. to CVT(TR580)-298, ASSEMBLY, Drive Pinion Shaft Assembly.>

10.TRANSFER AND EXTENSION CASE

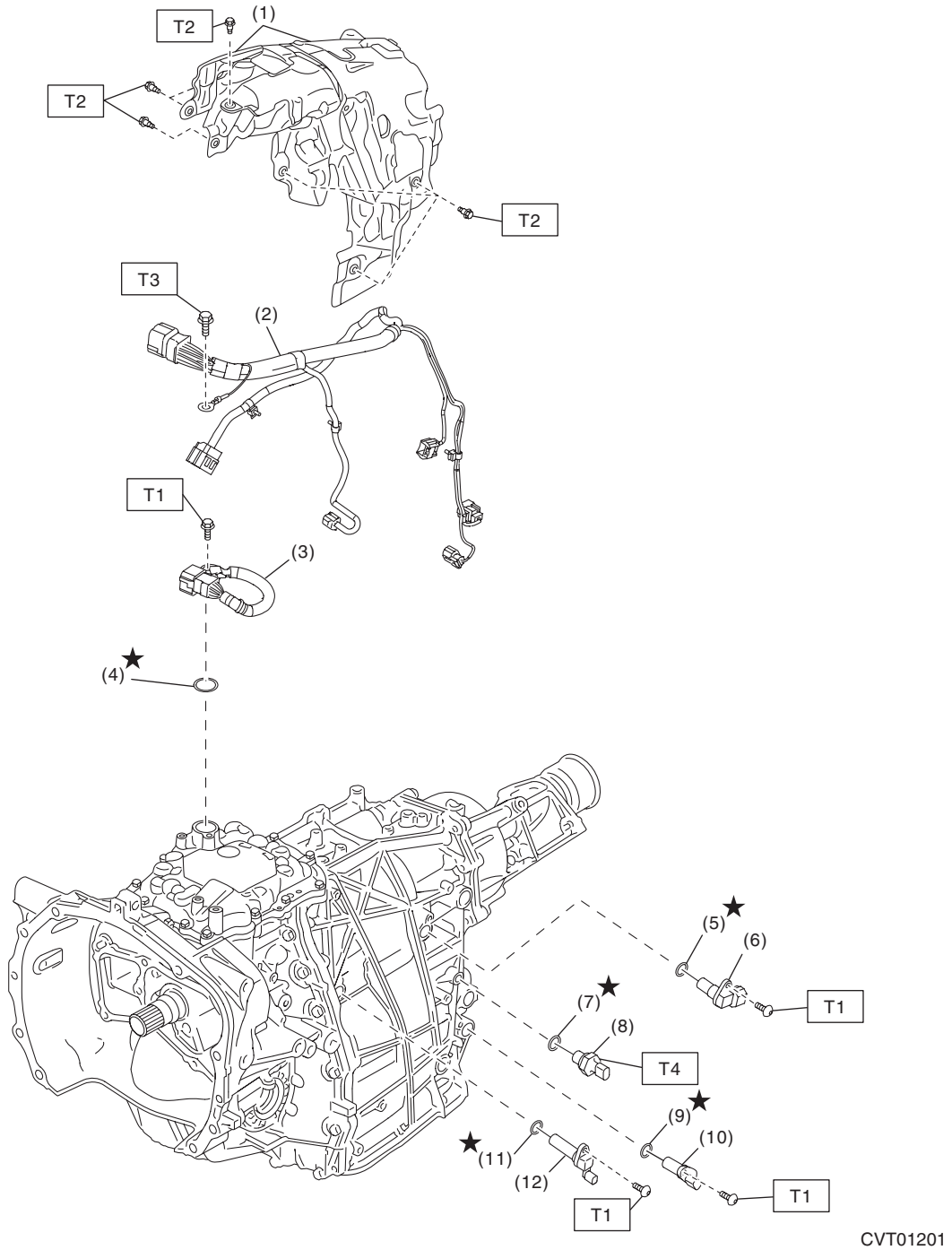


(1) Snap ring (Crosstrek model)
(2) Reduction driven gear COMPL
(3) Collar
(4) Parking gear
(5) Transfer drive gear
(6) Ball bearing
(7) Lock nut
(8) Transfer drive gear shim
(9) Spacer oil
(10) Ball bearing
(11) Transfer driven gear
(12) Seal ring
(13) Thrust bearing
(14) Snap ring
(15) Transfer clutch plate set
(16) Pressure plate
(17) Snap ring
(18) Transfer clutch piston seal
(19) Transfer clutch piston return spring
(20) Transfer clutch piston
(21) Rear drive shaft
(22) Ball bearing
(23) Seal ring
(24) Transfer driven gear shim
(25) Gasket
(26) Extension case
(27) Transmission hanger
(28) Oil seal
(29) Dust cover
(30) O-ring

Tightening torque: N·m (kgf-m, ft-lb)

T1: 17 (1.7, 12.5)
T2: 22 (2.2, 16.2)
T3: 25 (2.5, 18.4)
T4: 35 (3.6, 25.8)
T5: 95 (9.7, 70.1)

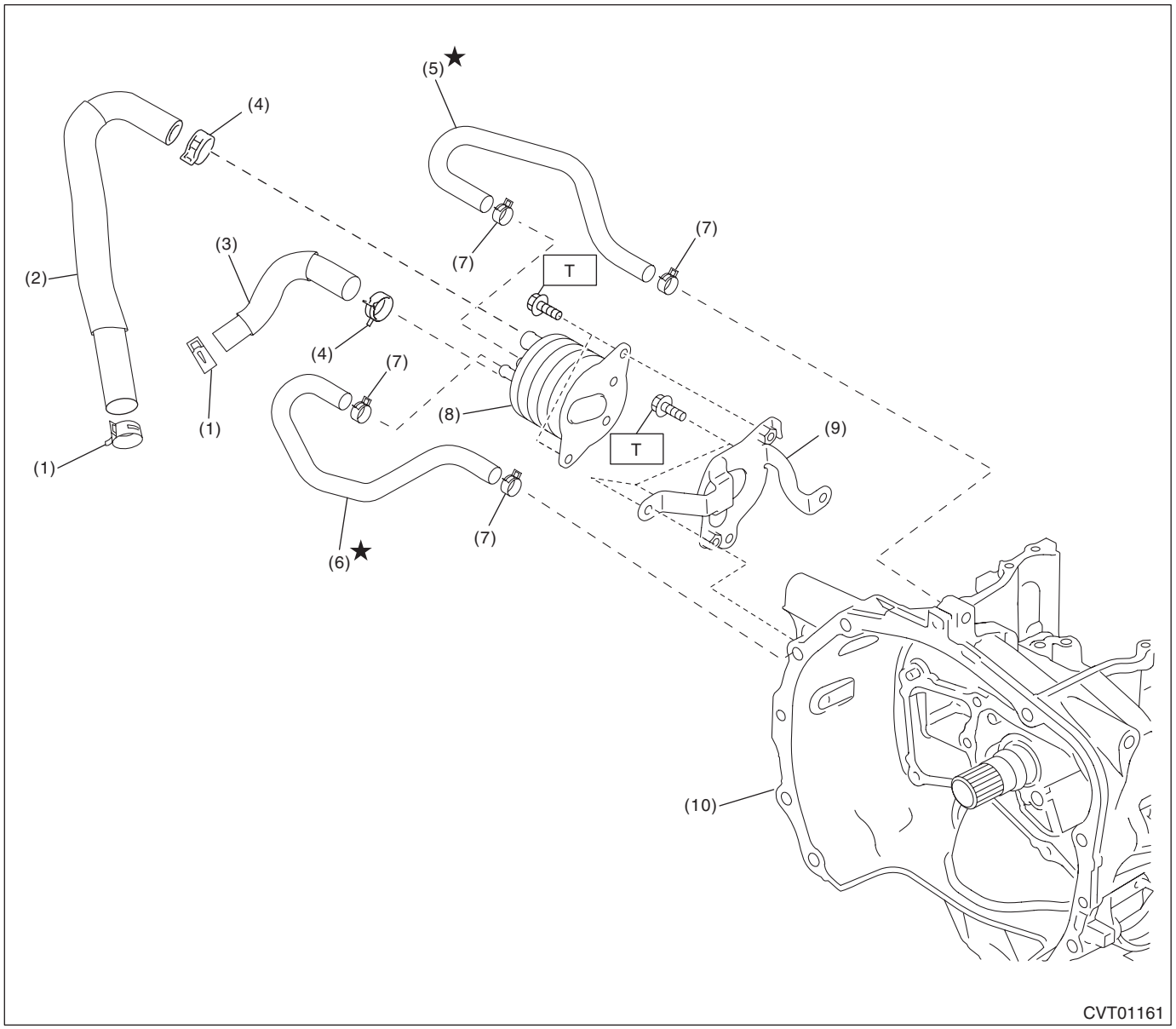
11.TRANSMISSION HARNESS AND SENSOR



(1)	Transmission case cover	(7)	O-ring	
(2)	Inhibitor harness	(8)	Secondary pressure sensor	
(3)	Transmission harness	(9)	O-ring	
(4)	O-ring	(10)	Secondary speed sensor	
(5)	O-ring	(11)	O-ring	
(6)	Primary speed sensor	(12)	Turbine speed sensor	

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.7, 3.7)
T2: 8 (0.8, 5.9)
T3: 14 (1.4, 10.3)
T4: 39 (4.0, 28.8)

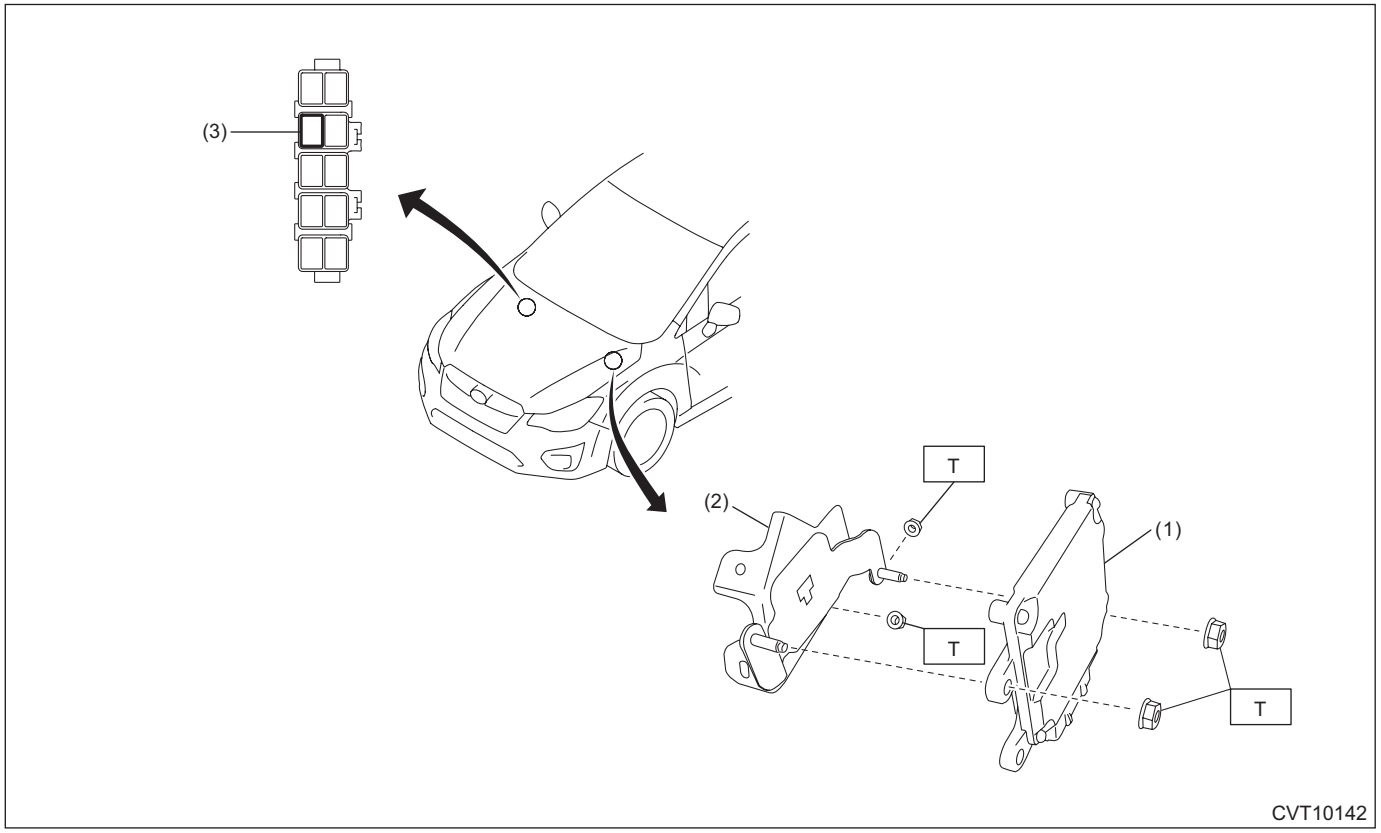
12.CVTF COOLER (WITH WARMER FEATURE)



(1)	Hose clamp	(6)	CVTF cooler outlet hose
(2)	Engine coolant outlet hose	(7)	Hose clamp
(3)	Engine coolant inlet hose	(8)	CVTF cooler (with warmer feature)
(4)	Hose clamp	(9)	CVTF cooler bracket
(5)	CVTF cooler inlet hose	(10)	Converter case

Tightening torque: N·m (kgf-m, ft-lb)
T: 23 (2.3, 17.0)

13.TRANSMISSION CONTROL MODULE

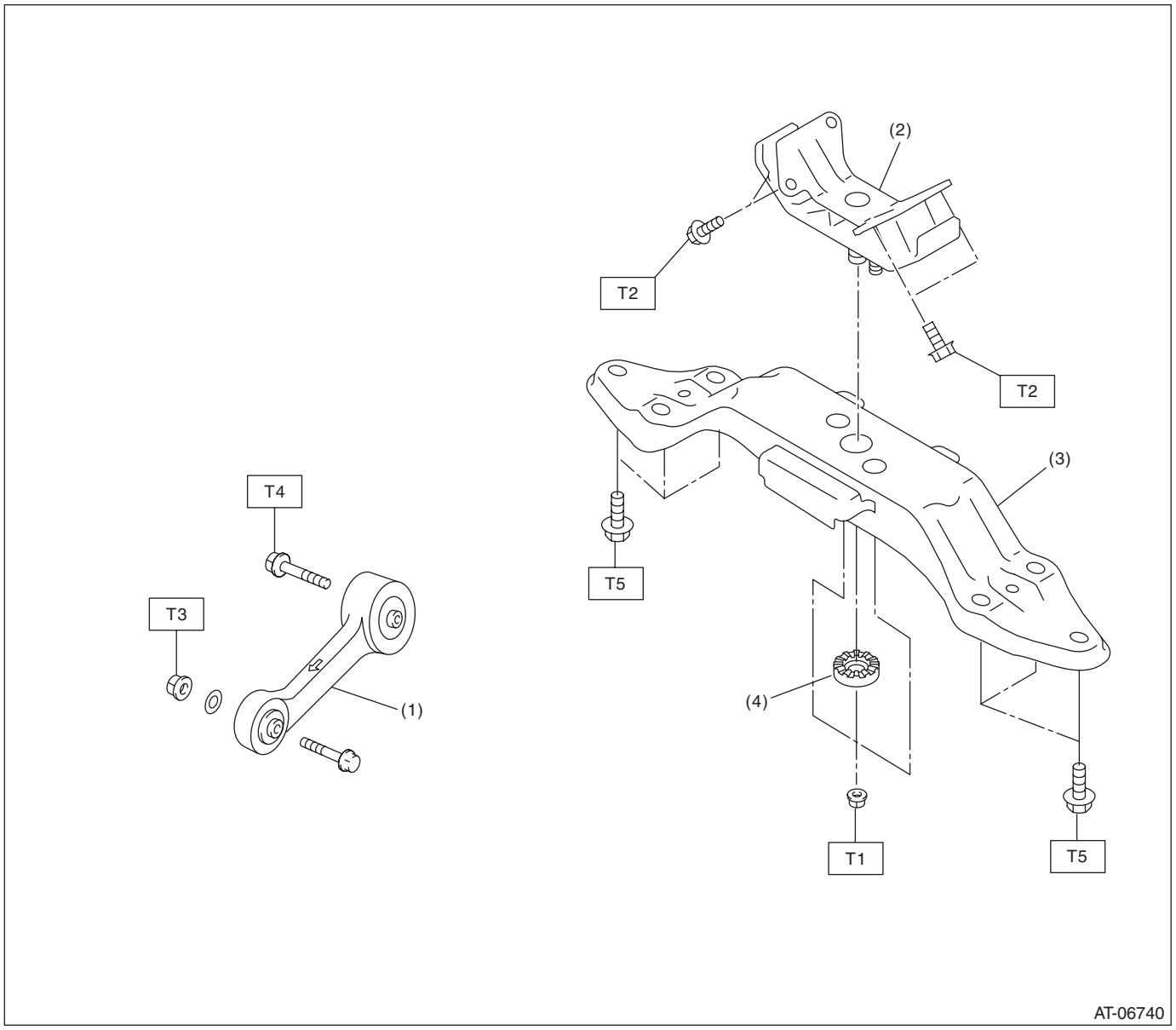


(1) Transmission control module (TCM)
(2) TCM bracket
(3) Relay

Tightening torque: N·m (kgf-m, ft-lb)

T: 7.5 (0.8, 5.5)

14.TRANSMISSION MOUNTING



(1) Pitching stopper
(2) Rear cushion rubber
(3) Transmission rear crossmember
(4) Stopper

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 40 (4.1, 29.5)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)

C: CAUTION

- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Do not place the valve cover with its inner side facing up until it is installed, to prevent intrusion of foreign matter into the control valve body.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine CVTF and recommended grease. Do not mix CVTF, grease etc. of different grades or manufacturers.
- Be sure to tighten bolts and nuts to the specified torque.
- Apply CVTF onto sliding or revolving surfaces before installation.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of CVTF or gear oil to appropriate locations in order to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove and clean the old liquid gasket.
- After removing the sensors, breather hose and plugs, plug the holes to avoid foreign materials intruding as necessary.
- During disassembly or assembly, be sure to use nylon gloves or paper towels. Do not use cloth gloves or waste cloth.
- Be careful of handling the oil seal, O-ring and gasket. If the contact surface of them is damaged, oil leakage may occur.
- When replacing the taper roller bearing, replace the outer race and inner race as a set.
- When replacing the hypoid gear, replace the hypoid gear and drive pinion shaft as a set.
- Replace the bolts if the seating surface or the thread surface is excessively rusted.

D: PREPARATION TOOL

1. SPECIAL TOOL

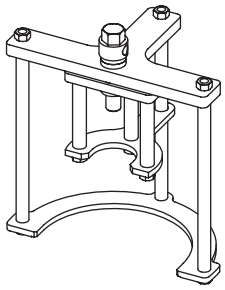
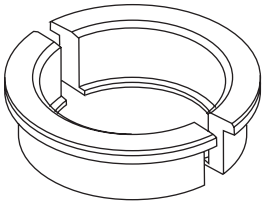
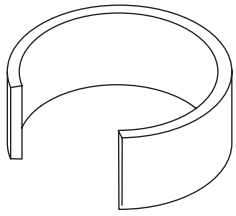
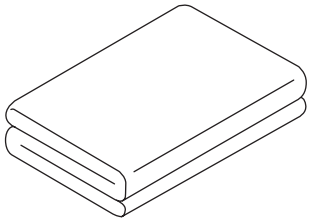
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18769AA010	18769AA010	EXPANDER PULLEY	Used for removing and installing the secondary pulley assembly.
 ST18767AA010	18767AA010	BEARING REMOVER	Used for removing the ball bearing of transfer clutch assembly.
 ST18762AA010	18762AA010	COMPRESSOR SPECIAL TOOL	Used for removing and installing snap ring of forward clutch assembly.
 ST18761AA010	18761AA010	SHEET SPECIAL TOOL	• Used for removing and installing control valve body. • Used for removing and installing valve cover. • Used for removing and installing transmission harness.

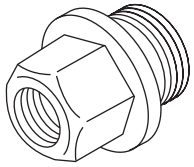
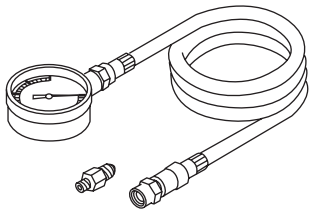
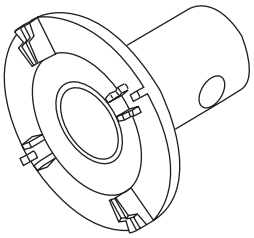
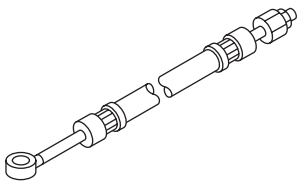
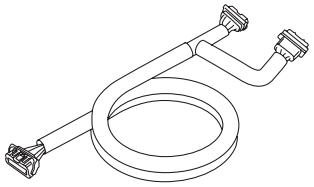
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18681AA010	18681AA010	PRESSURE GAUGE ADAPTER	Used for measuring the secondary pressure (line pressure). NOTE: Used together with the genuine O-ring (part No. 806916050).
 ST18801AA000	18801AA000	OIL PRESSURE GAUGE ASSY	Used for measuring the secondary pressure (line pressure).
 ST18658AA020	18658AA020	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.
 ST34099AC020	34099AC020	ADAPTER HOSE B	Used for measuring the transfer clutch hydraulic pressure. NOTE: Used with genuine union screw (Part No. 801914010) and gasket (Part No. 803914060).
 ST18460AA040	18460AA040	CHECK BOARD	Used for measuring the check board TCM terminal voltage.

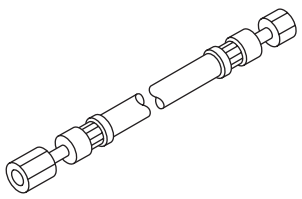
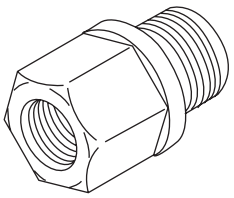
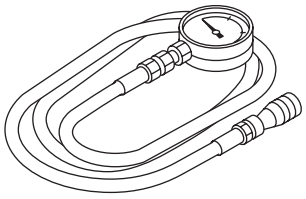
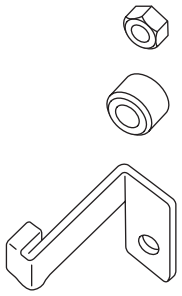
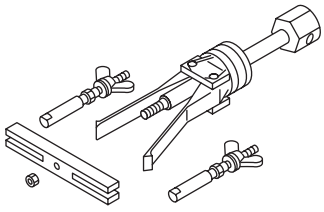
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST34099AC010	34099AC010	ADAPTER HOSE A	Used for measuring the transfer clutch hydraulic pressure.
 ST18681AA000	18681AA000	PRESSURE GAUGE ADAPTER	Used for measuring the transfer clutch hydraulic pressure. NOTE: Used together with the genuine O-ring (part No. 806911080).
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring the transfer clutch hydraulic pressure.
 ST-498277200	498277200	STOPPER SET	• Used for removing and installing transmission assembly to engine. • Used for preventing the torque converter from dropping off.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension case oil seal. • Used for removing the bearing outer race of the drive pinion shaft.

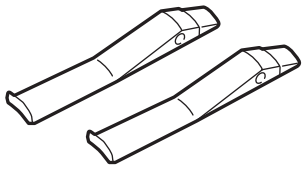
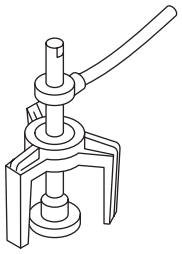
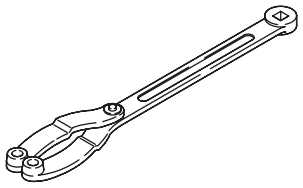
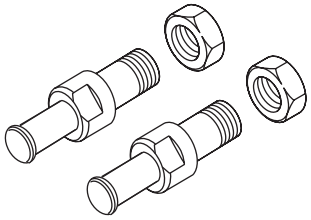
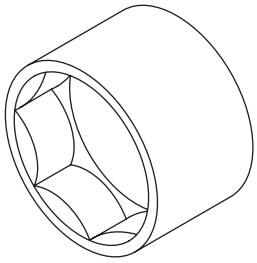
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18760AA000	18760AA000	CLAW	• Used for removing the bearing of transmission case. • Used together with PULLER ASSY (398527700).
 ST-398673600	398673600	COMPRESSOR	Used for removing and installing snap ring of forward clutch assembly.
 ST18355AA000	18355AA000	PULLEY WRENCH	• Used for removing and installing the lock nut of reduction driven gear. • Used together with PIN SET (18334AA000).
 ST18334AA000	18334AA000	PIN SET	• Used for removing and installing the lock nut of reduction driven gear. • Used together with PULLEY WRENCH (18355AA000).
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing the lock nut of reduction driven gear.

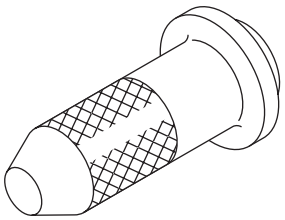
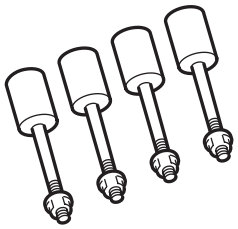
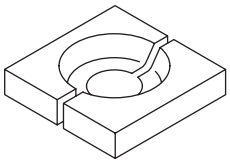
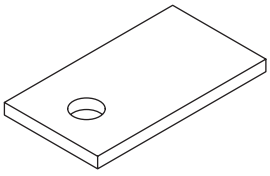
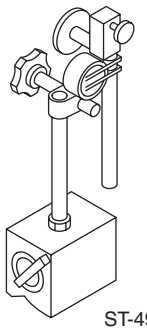
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498057300	498057300	OIL SEAL INSTALLER	Used for installing the extension case oil seal.
 ST18632AA000	18632AA000	STAND ASSY	Used for disassembling and assembling the transmission.
 ST-498515500	498515500	REMOVER	Used for removing the bearing inner race of the drive pinion shaft.
 ST-498255400	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247100).

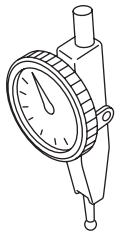
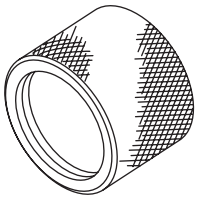
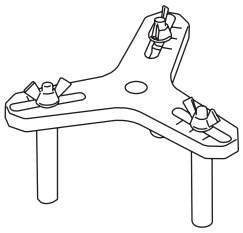
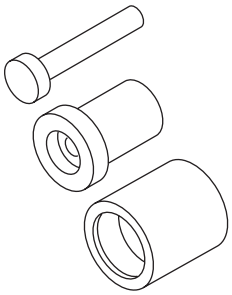
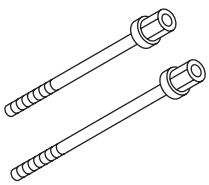
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247101).
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST18762AA001	18762AA001	COMPRESSOR SPECIAL TOOL	• Used for disassembling and installing the multi-plate clutch piston. • COMPRESSOR SPECIAL TOOL (18762AA000) can also be used.
 ST-927720000	927720000	HOUSING BUSHING INSTALLER AND REMOVER	• Used for installing the oil seal. • Use BUSHING SHAFT (927880000).
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for measuring the backlash of hypoid gear.

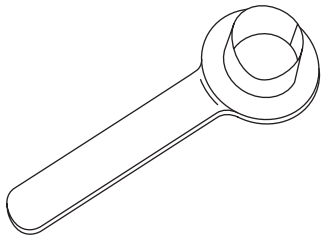
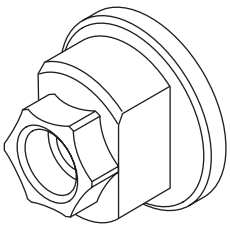
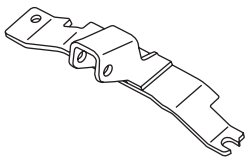
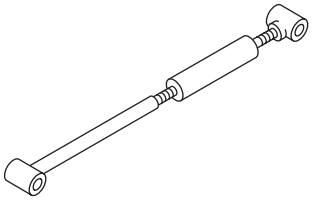
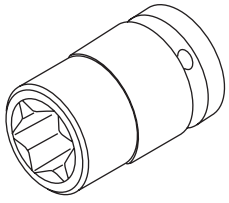
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.
 ST-498937110	498937110	HOLDER	• Used for removing and installing the drive pinion lock nut. • Used as a holder to rotate gear when checking tooth contact.
 ST41099AA012	41099AA012	ENGINE SUPPORT BRACKET	Used for supporting the engine.
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting the engine.
 ST18270KA020	18270KA020	SOCKET (E20)	• Used for removing and installing the hypoid driven gear. • Used for removing and installing the drive pinion shaft retainer.

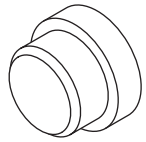
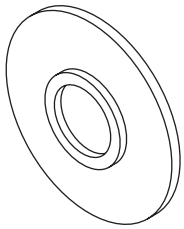
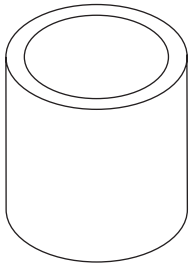
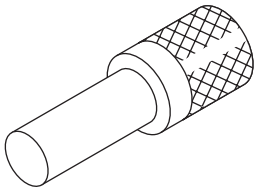
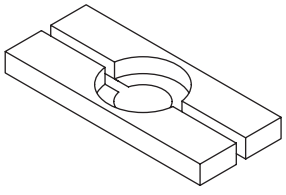
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398497701	398497701	SEAT	Used for removing and installing the bearing.
 ST-398177700	398177700	INSTALLER	• Used for installing the ball bearing. • Used for installing the parking gear. • Used for installing the bearing outer race. • Used for installing the plug.
 ST28499TC010	28499TC010	PRESS SNAP RING	• Used for installing the bearing outer race of drive pinion shaft. • Used for installing the ball bearing of the transmission case.
 ST-899864100	899864100	REMOVER	• Used for removing and installing the ball bearing. • Used for removing the parking gear and transfer drive gear. • Used for removing the bearing inner race of the front differential.
 ST-498077000	498077000	REMOVER	Used for removing the bearing inner race of the front differential.

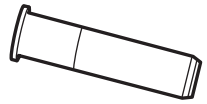
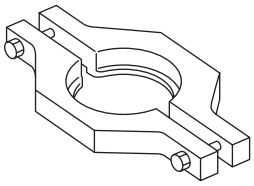
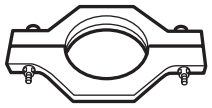
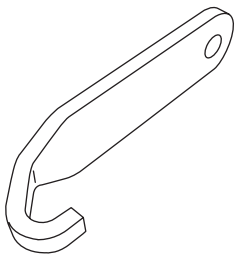
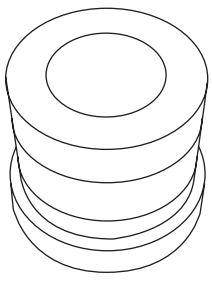
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18657AA010	18657AA010	INSTALLER	Used for installing the oil seal at shifter arm shaft portion.
 ST-498077600	498077600	REMOVER	Used for removing the ball bearing of drive sprocket.
 ST18720AA000	18723AA000	REMOVER	Used for removing the ball bearing of transfer clutch assembly.
 ST-498497300	498497300	CRANKSHAFT STOPPER	Used for stopping the drive plate rotation when removing and installing the drive plate.
 ST-399513600	399513600	INSTALLER	Used for removing the ball bearing of drive sprocket.

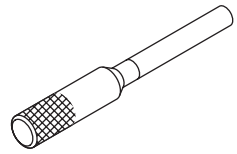
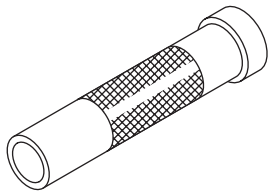
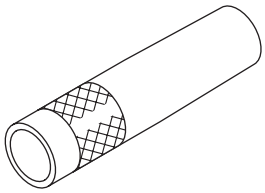
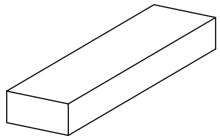
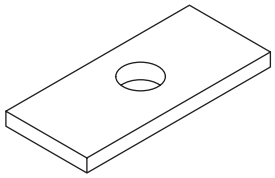
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499267300	499267300	STOPPER PIN	Used for adjusting the inhibitor switch.
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	• Used for installing the ball bearing. • Used for installing the bearing inner race.
 ST-499277200	499277200	INSTALLER	Used for installing the ball bearing of the transfer clutch assembly.
 ST-499575400	499575400	GAUGE	Used for measuring height of end play.
 ST-499575500	499575500	GAUGE	Used for measuring height of end play.

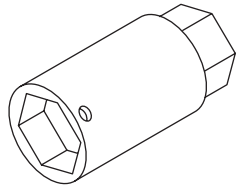
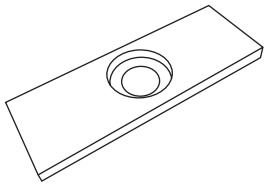
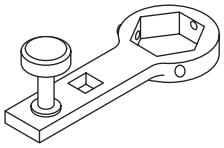
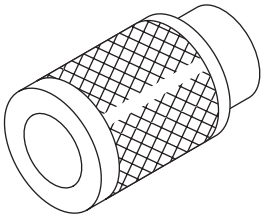
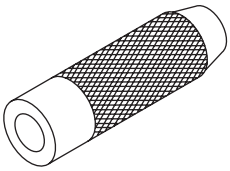
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787500	499787500	ADAPTER	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 ST-499575600	499575600	GAUGE	Used for measuring height of end play.
 ST-499787700	499787700	WRENCH	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 ST-499757002	499757002	INSTALLER	• Used for removing the bearing of reduction driven gear. • Used for installing the parking gear. • Used for installing the transfer drive gear.
 ST-899580100	899580100	INSTALLER	• Used for installing the collar of reduction driven gear. • Used for installing the ball bearing of the transfer driven gear. • Used for installing the bearing inner race of drive pinion shaft.

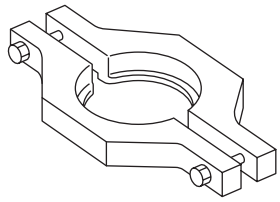
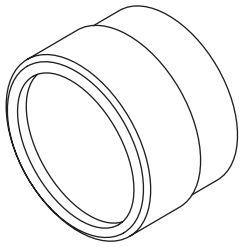
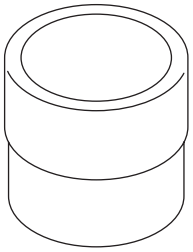
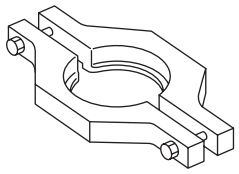
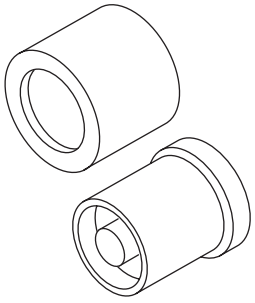
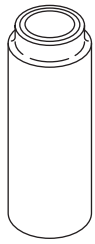
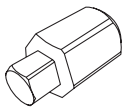
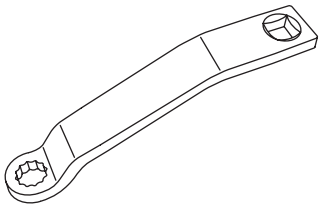
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077300	498077300	REMOVER	Used for installing the ball bearing of reduction driven gear.
 ST-499755502	499755502	PRESS SNAP RING	Used for installing the drive sprocket ball bearing.
 ST-499755602	499755602	PRESS SNAP RING	• Used for installing the oil seal. • Used for installing the plug.
 ST-498077400	498077400	REMOVER	Used for removing the ball bearing of transfer driven gear.
 ST20099AE020	20099AE020	INSTALLER	Used for installing the bearing outer race of drive pinion shaft.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927130000	927130000	EXTENSION DRIVE SHAFT	Used for installing the bearing inner race of drive pinion shaft.
 ST18270AA040	18270AA040	SOCKET	Used for removing and installing the transfer clutch pressure test plug.
 ST73099SG000	73099SG000	SPECIAL TOOL CONDENSER	Used for installing the transfer clutch pressure test plug.
 STSSM4	- (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Thickness gauge	Used for measuring the clearance in reverse brake, forward clutch and transfer clutch.
Caliper	Used for measuring the dimension.
Spring scale	Used for measuring the starting torque of the drive pinion.
TORX® bit T70	Used for removing and installing differential gear oil drain plug.
Straight pin remover	Used for removing and installing the straight pin and spring pin.
Push/pull gauge	Used for measuring clutch clearance.
Angle gauge	Used for installing the drive plate.

TOOL NAME	REMARKS
DST-i	Used together with Subaru Select Monitor 4.

2. CVTF

A: INSPECTION

Check for leakage of CVTF from transmission.

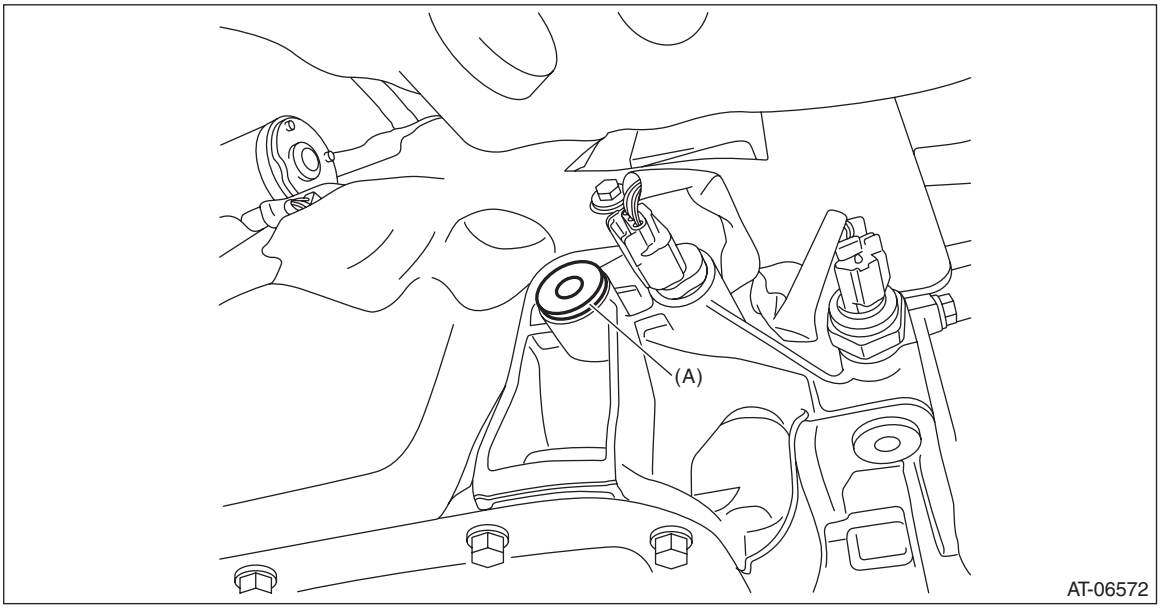
B: ADJUSTMENT

CAUTION:
• CVTF level changes along with CVTF temperature. When inspecting CVTF level, observe the specified CVTF temperature.
• Always use specified CVTF. Using other fluid will cause malfunction.

1) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
2) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.
3) With the engine running, lift up the vehicle and remove the filler plug.

CAUTION:
Pay special attention to the following operations as the engine is at idle.

NOTE:
CVTF is at the specified level when it is up to the filler plug hole lower section.

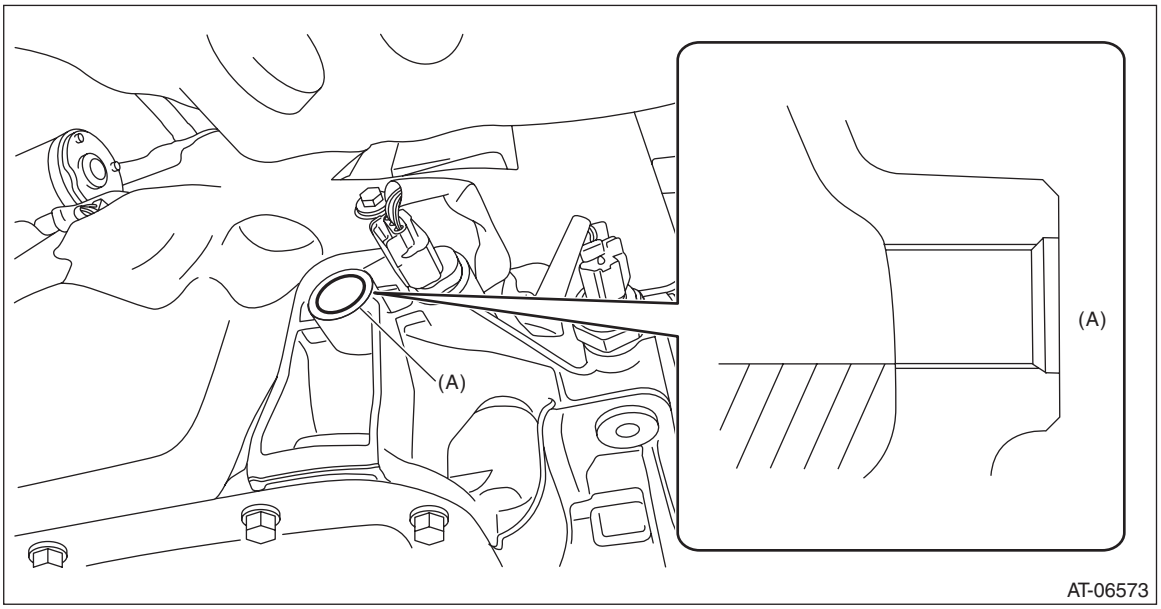


(A) Filler plug

4) When there is no CVTF leakage from the transmission, add the specified fluid up to the filler plug hole lower section.

Specified fluid:
<Ref. to CVT(TR580)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

CAUTION:
Note that when CVTF is added up to the lower section of filler plug while the transmission is in cold condition, overfilling of CVTF occurs, causing the oil to spill out.



(A) Filler plug hole

5) Install the filler plug.

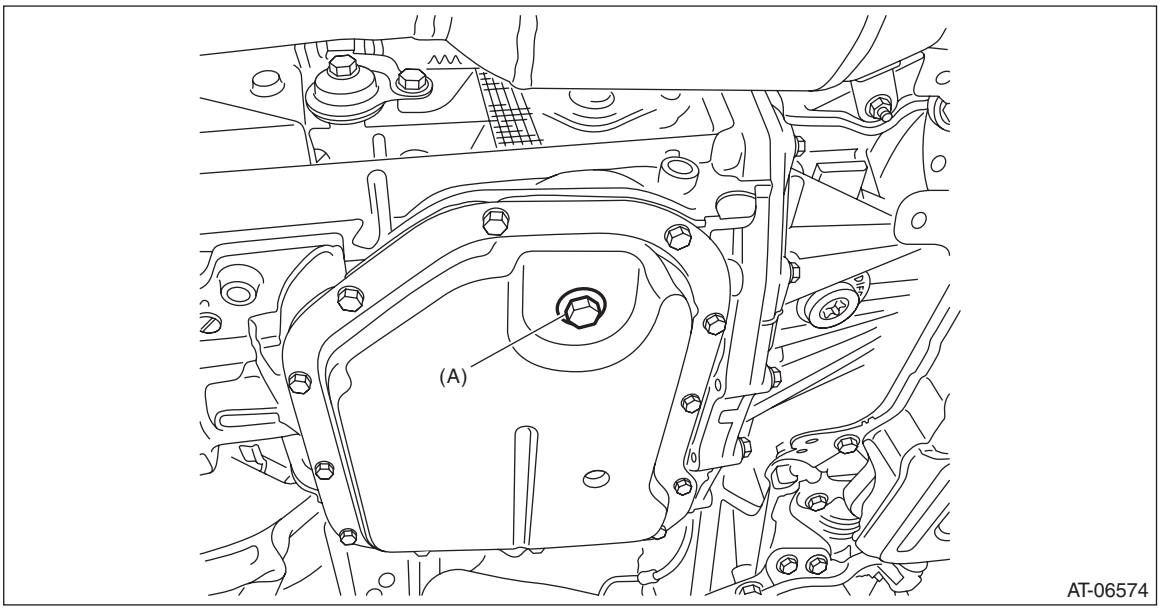
NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

C: REPLACEMENT

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill the CVTF on exhaust pipe to prevent it from emitting smoke or causing fires. If CVTF adheres, wipe it off completely.
• Always use specified CVTF. Using other fluid will cause malfunction.

1) Lift up the vehicle, and remove the CVTF drain plug.



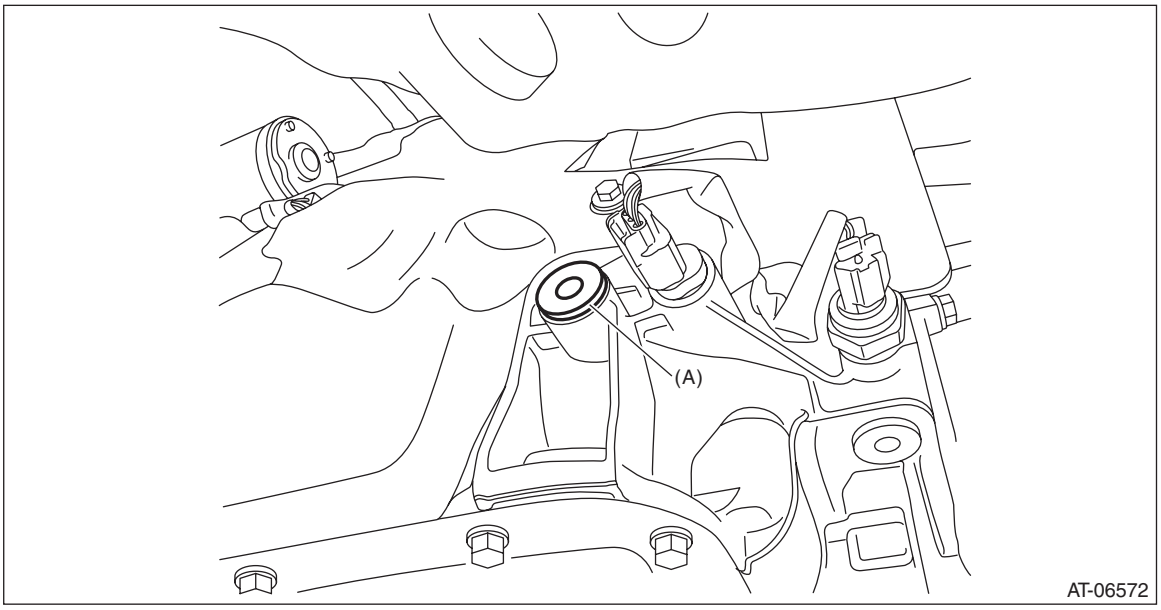
(A) CVTF drain plug

2) Check the CVTF condition. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
3) Install the CVTF drain plug and gasket.

NOTE:
• Use a new gasket.

Tightening torque:
31 N·m (3.2 kgf-m, 22.9 ft-lb)

4) Remove the filler plug.



(A) Filler plug

5) Add the specified fluid up to the filler plug hole lower section.

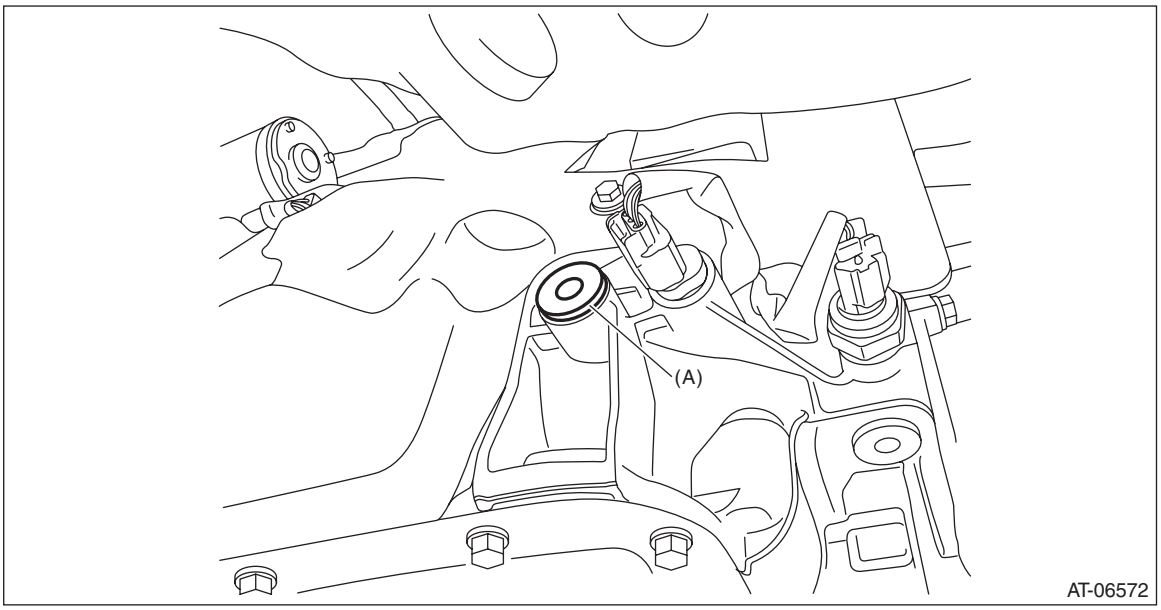
Specified fluid:
<Ref. to CVT(TR580)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

6) Temporarily tighten the filler plug.
7) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
8) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.

CAUTION:
Pay special attention to the following operations as the engine is at idle.

9) With the select lever shifted to “P” range and the engine started, lift up the vehicle. Adjust the CVTF level and check for leakage. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>
10) Replace with a new gasket, and attach the filler plug.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



(A) Filler plug

D: CONDITION CHECK

NOTE:
When replacing CVTF, determine the condition inside the transmission body by inspecting the drained CVTF.

Fluid condition	Trouble and possible cause	Corrective action
Metal particles.	Excessive wear of the internal of the transmission body.	Replace CVTF and check if CVT operates correctly.
Thick and varnish-form fluid.	Burnt clutches	Replace CVTF and check the CVT body or vehicle for faulty.
Clouded CVTF or bubbles.	Water mixed in fluid.	Replace CVTF and check the water entering point.

3. Differential Gear Oil

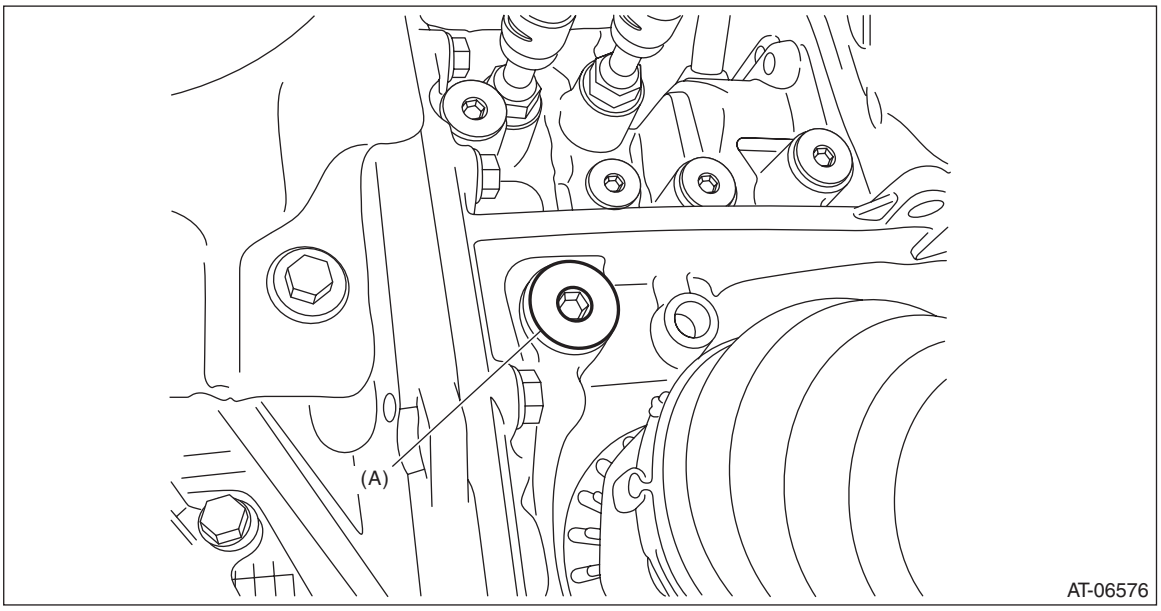
A: INSPECTION

Check that there is no leakage of differential gear oil from the converter case.

B: ADJUSTMENT

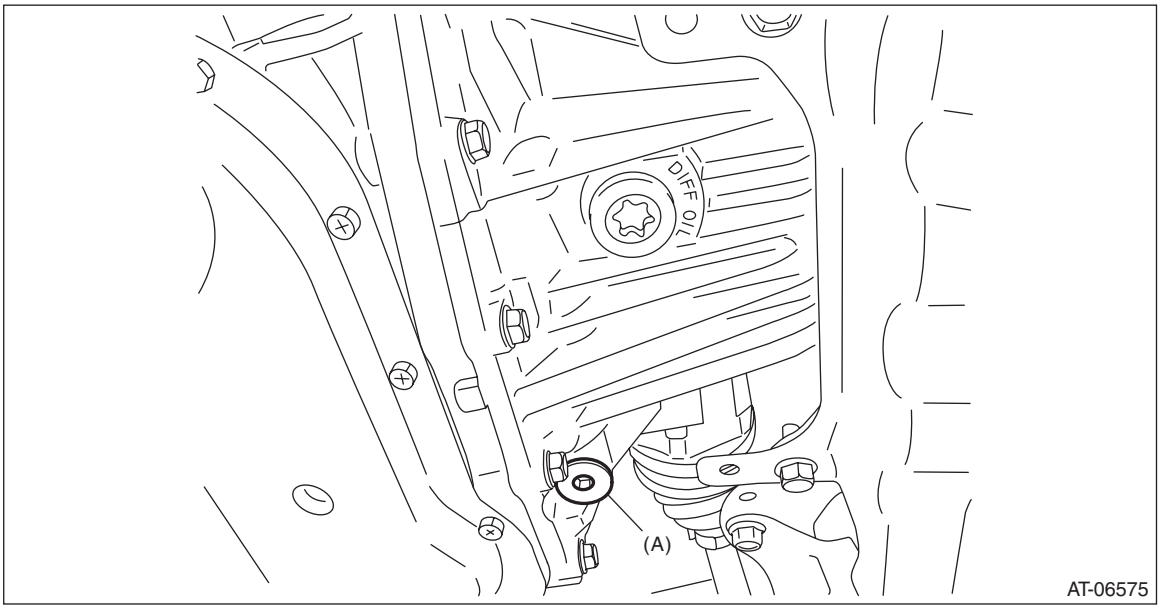
NOTE:
Immediately after removing the overflow drain plug, remaining gear oil (approx. 8 cc) may come out of the overflow pipe. This is not included in the specified amount. When removing the overflow drain plug, make sure the gear oil flows out of the overflow drain plug hole by filling with gear oil.

1) Turn the ignition switch to OFF.
2) Lift up the vehicle.
3) Remove the filler plug.



(A) Filler plug

4) Remove the overflow drain plug.



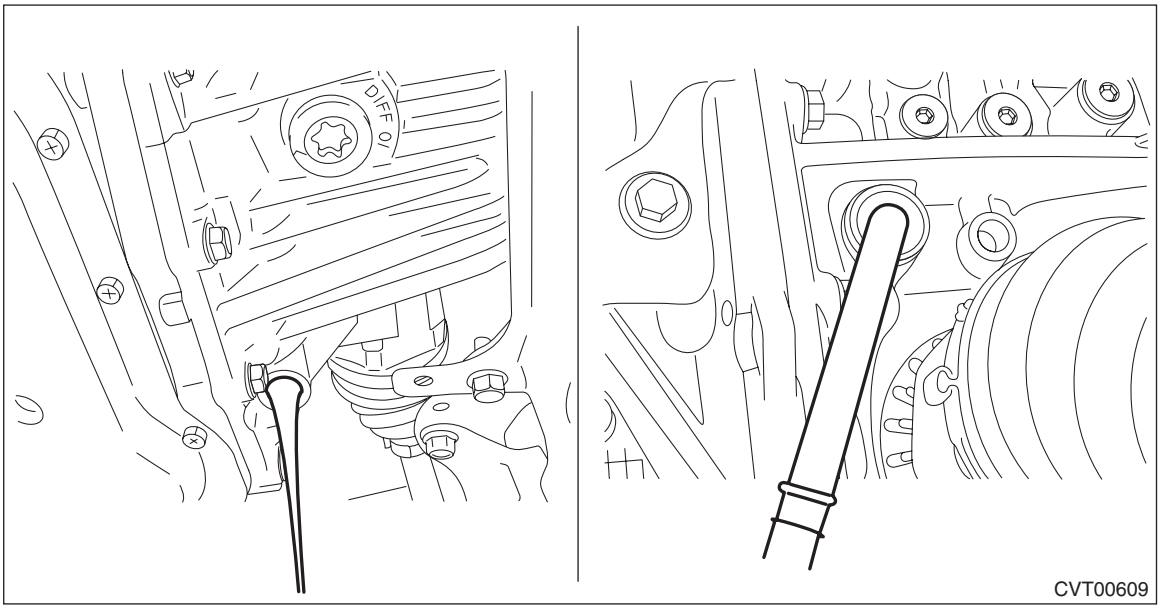
(A) Overflow drain plug

5) Fill in the differential gear oil through the filler plug hole up to where the oil flows out of the overflow drain plug.

Recommended gear oil:
<Ref. to CVT(TR580)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>
6) When the flow of the differential gear oil turns into a narrow stream, install the overflow drain plug.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



7) Install the filler plug.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

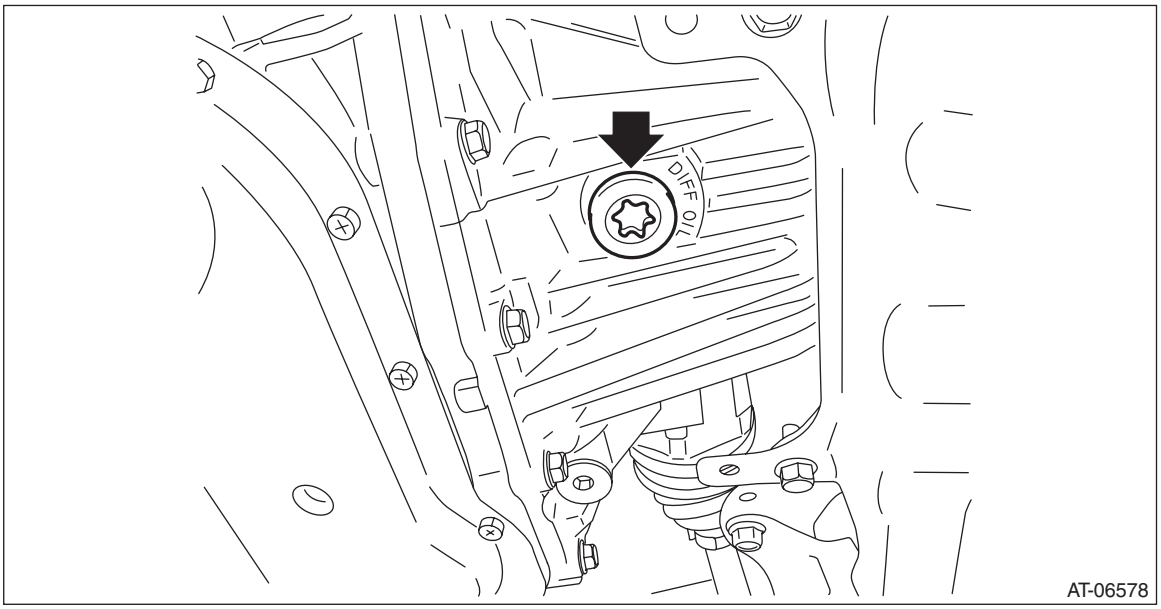
C: REPLACEMENT

CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
• Be careful not to spill differential gear oil on the exhaust pipe to prevent it from emitting smoke or causing a fire. If gear oil adheres, wipe it off completely.

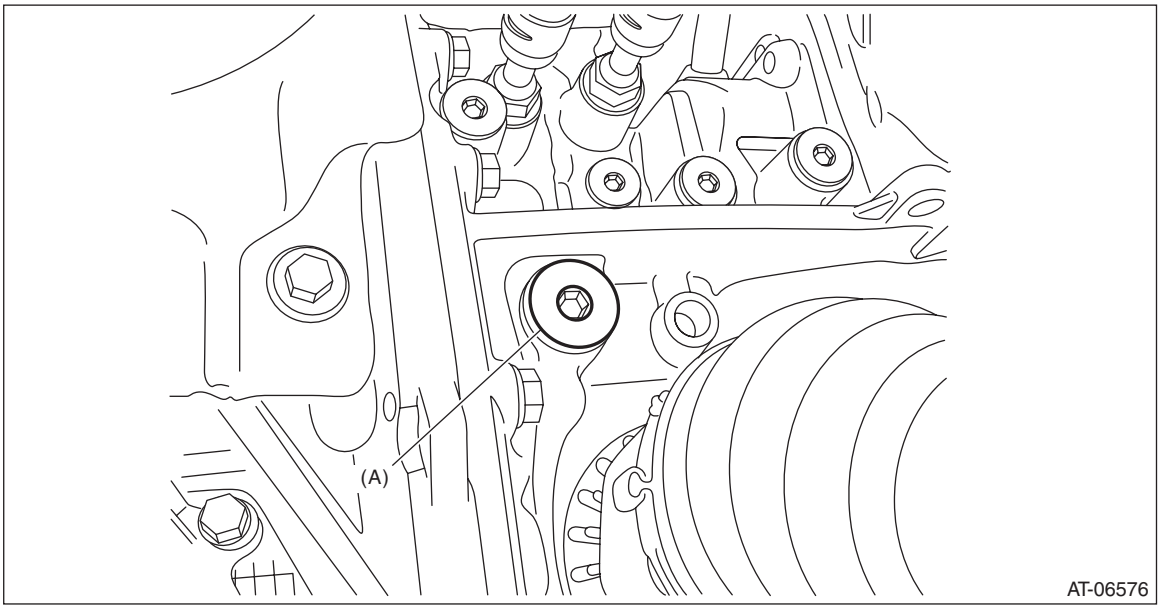
1) Lift up the vehicle.
2) Remove the differential gear oil drain plug using TORX® bit T70. Drain differential gear oil.
3) Install the differential gear oil drain plug using TORX® bit T70.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



4) Remove the filler plug.

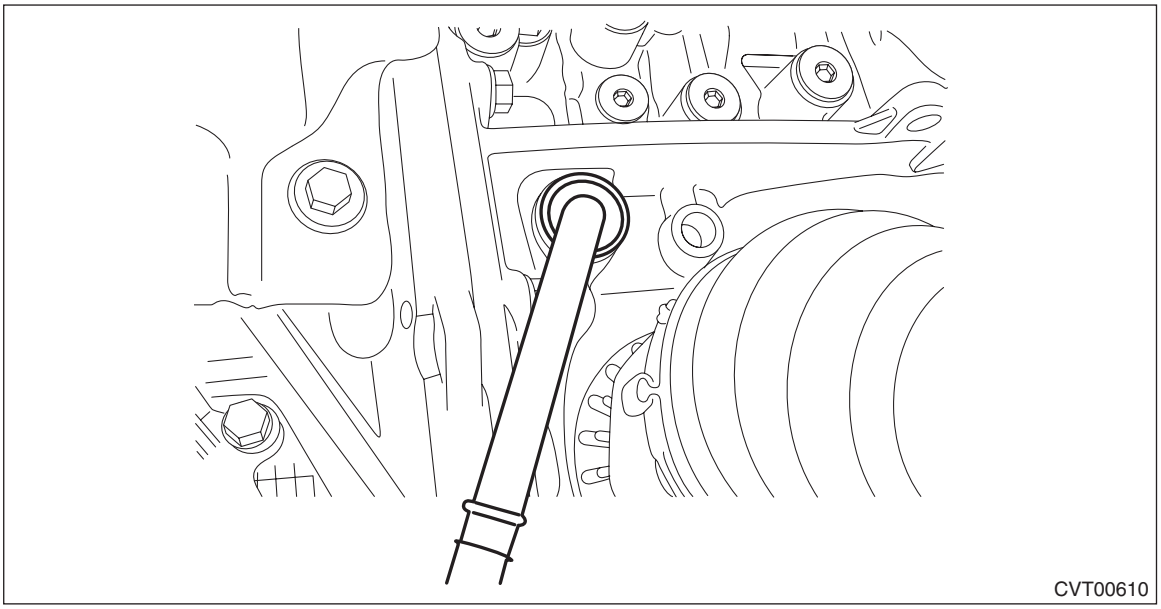


(A) Filler plug

5) Pour gear oil into the filler plug hole.

Recommended gear oil:
<Ref. to CVT(TR580)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:
<Ref. to CVT(TR580)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>



6) Adjust the level of differential gear oil. <Ref. to CVT(TR580)-43, ADJUSTMENT, Differential Gear Oil.>

4. AWD ON/OFF Switching Mode

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- Perform as necessary in FWD mode.
- When switched to FWD, AWD light illuminates.

B: PROCEDURE

CAUTION:
• Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
• On completing the work in FWD, switch back in AWD.
1) Shift the select lever to “P” range.
2) Connect the Subaru Select Monitor to data link connector.
3) Turn the ignition switch to ON.
4) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger.
5) Select «Diagnosis» in the «Start» screen of Subaru Select Monitor.
6) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
7) On «Main Menu» display, select «Each System».
8) On «Select System» display, select «Transmission Control System».
9) On «Select Function» display, select «Work Support».
10) Select «AWD ON/OFF switching mode» in the «Work Support» screen.
11) Follow the messages displayed on the Subaru Select Monitor screen when working.
Switching completes successfully if any of the following messages is displayed.
- When switching from AWD to FWD: {Switched to FF. To return to AWD, perform basic mode again.}
- When switching from FWD to AWD: {Switched to AWD. To return to FF, perform basic mode again.}

NOTE:
- If communication error occurs during switching mode, start the «AWD ON/OFF switching mode» again.
- If operation is interrupted before the successful end message is displayed, perform the {AWD ON/OFF switching mode} from the beginning until confirming the operation is successfully ended. If this mode fails to complete successfully, the cause is as follows.
  - Select lever is not in “P” range.
  - Engine is running.
- For detailed operation procedures, refer to “Application help”.

5. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

Road tests should be conducted to properly diagnose the condition of CVT.

CAUTION:
Always observe the local traffic laws when performing the test.

2. D RANGE SHIFT FUNCTION

Make sure that the engine speed is 1,100 — 1,400 r/min while driving on the level road at 50 km/h (31 MPH) after accelerating from halting up to 1/4 of accelerator opening angle. Then stop the vehicle. Check normal gear change has occurred while the vehicle speed changes from a constant speed to zero.

3. KICK-DOWN FUNCTION

Check if engine speed will rise by operating the accelerator opening angle to the full from a constant speed of 50 km/h (31 MPH) or more.

4. ENGINE BRAKE OPERATION

• Model with manual mode

• Drive in “6th speed of manual mode” [70 — 80 km/h (43 — 50 MPH)], and shift down from 6th to 5th. Check if the indicator of combination meter switches “6” → “5”. At the same time, check the engine brake in 5th gear.
• Drive in “5th speed of manual mode” [60 — 70 km/h (37 — 43 MPH)], and shift down from 5th to 4th. Check if the indicator of combination meter switches “5” → “4”. At the same time, check the engine brake in 4th gear.
• Drive in “4th speed of manual mode” [50 — 60 km/h (31 — 37 MPH)], and shift down from 4th to 3rd. Check if the indicator of combination meter switches “4” → “3”. At the same time, check the engine brake in 3rd gear.
• Drive in “3rd speed of manual mode” [40 — 50 km/h (25 — 31 MPH)], and shift down from 3rd to 2nd. Check if the indicator of combination meter switches “3” → “2”. At the same time, check the engine brake in 2nd gear.
• Drive in “2nd speed of manual mode” [20 — 30 km/h (12 — 19 MPH)], and shift down from 2nd to 1st. Check if the indicator of combination meter switches “2” → “1”. At the same time, check the engine brake in 1st gear.

• Model without manual mode

Drive in D range at [50 — 60 km/h (31 — 37 MPH)], and shift to “L” range. Check if the indicator of combination meter switches “D” → “L”. At the same time, check the engine brake in L range.

5. LOCK-UP FUNCTION

When the accelerator is lightly depressed while driving on a flat road in “D” range, check that rpm does not change abruptly.

6. P RANGE OPERATION

Stop the vehicle on an uphill grade of 5% or more and shift to the “P” range and apply the parking brake. Check that the vehicle does not move when the parking brake is released.

7. NOISE AND VIBRATION

Check for noise and vibration during a constant driving, accelerating, decelerating and manual shift operation.

8. OIL LEAKAGE

After the driving test, inspect for leakage of CVTF and differential gear oil from the transmission body.

6. Stall Test

A: INSPECTION

CAUTION:
Make sure no other person is around the vehicle during stall test measurement.

NOTE:
Stall test is extremely important in diagnosing the condition of CVT and engine. The test is necessary to measure the engine stall speeds in “R” and “D” range.
Purposes of the stall test:

- Operational check of forward clutch and reverse brake
- Operational check of the torque converter assembly
- Engine performance check

1) Place wheel chocks at the front and rear of all wheels and engage the parking brake.
2) Turn the A/C OFF.
3) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.>
4) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, Engine Oil.>
5) Check the coolant level. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
6) Adjust the CVTF level. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>
7) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to “N” or “P” range.
8) Hold down the pre-collision brake OFF switch to turn OFF the pre-collision brake function. (With EyeSight)
9) Shift the select lever to “D” range.
10) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
11) When the engine speed stabilizes, quickly record the engine speed and release accelerator pedal. Shift the select lever to “N” range. Let the engine idle for one minute or more to cool it down.
12) Shift to “R” range and perform the same stall test.

NOTE:

- Do not perform a stall test for over 5 seconds at a time. (From closed throttle, fully open throttle to stall speed reading.) Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
- Be sure to cool down the engine for at least one minute after each stall test with the select lever set in the “P” or “N” range and with the idle speed of 1,200 r/min or less.
- If the stall speed is higher than the specified range, attempt to finish the stall test in as short a time as possible, in order to prevent the CVT from sustaining damage.

Stall speed standard:
D range: 2,150 — 2,800 r/min
R range: 1,950 — 2,550 r/min

Stall test judgment

Stall speed (at sea level)	Range	Probable cause
Lower than standard value	D, R	• Insufficient engine output • Torque converter malfunction
Higher than standard value	D	• Forward clutch slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction
	R	• Reverse brake slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction
	D, R	• Torque converter malfunction • Control valve body malfunction • TCM malfunction • Damaged harness and harness connector

7. Time Lag Test

A: INSPECTION

NOTE:
When the select lever is shifted while the engine is idling, there will be a certain time elapse or lag before shock is felt. This symptom helps to check the condition of forward clutch and reverse brake.
- Perform the test at normal operation CVTF temperature of 60 — 80°C (140 — 176°F).
- Be sure to allow one minute or more interval between tests.
- Make three measurements and take the average value.

1) Apply the parking brake.
2) Start the engine. Check the idle speed. (A/C OFF)
3) Shift the select lever from “N” to “D” range. Using a stop watch, measure the time elapsed from shifting the lever until the shock is felt.

Time lag standard:
1.5 seconds or less

If “N” → “D” time lag is longer than specified:
- Secondary pressure (line pressure) is too low.
- Forward clutch worn
- Forward clutch piston malfunction
- Control valve body malfunction
- Learning incomplete

4) In the same manner, measure the time lag when shifting from “N” range to “R” range.

Time lag standard:
1.5 seconds or less

If “N” → “R” time lag is longer than specified:
- Secondary pressure (line pressure) is too low.
- Reverse brake worn
- Reverse brake piston malfunction
- Control valve body malfunction
- Learning incomplete

8. Secondary Pressure (Line Pressure) Test

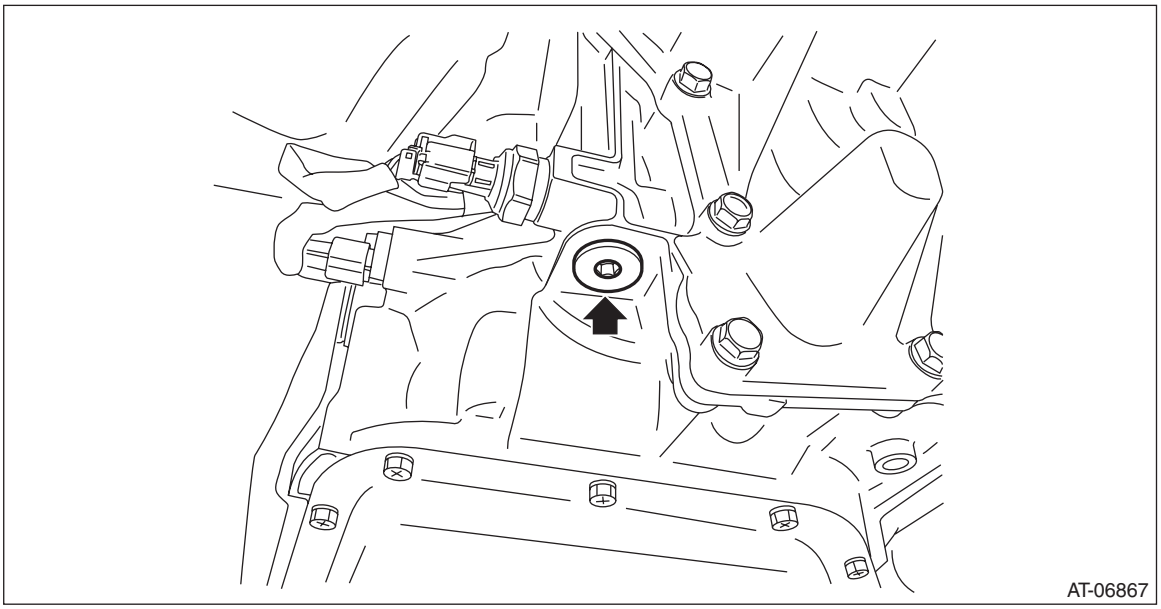
A: INSPECTION

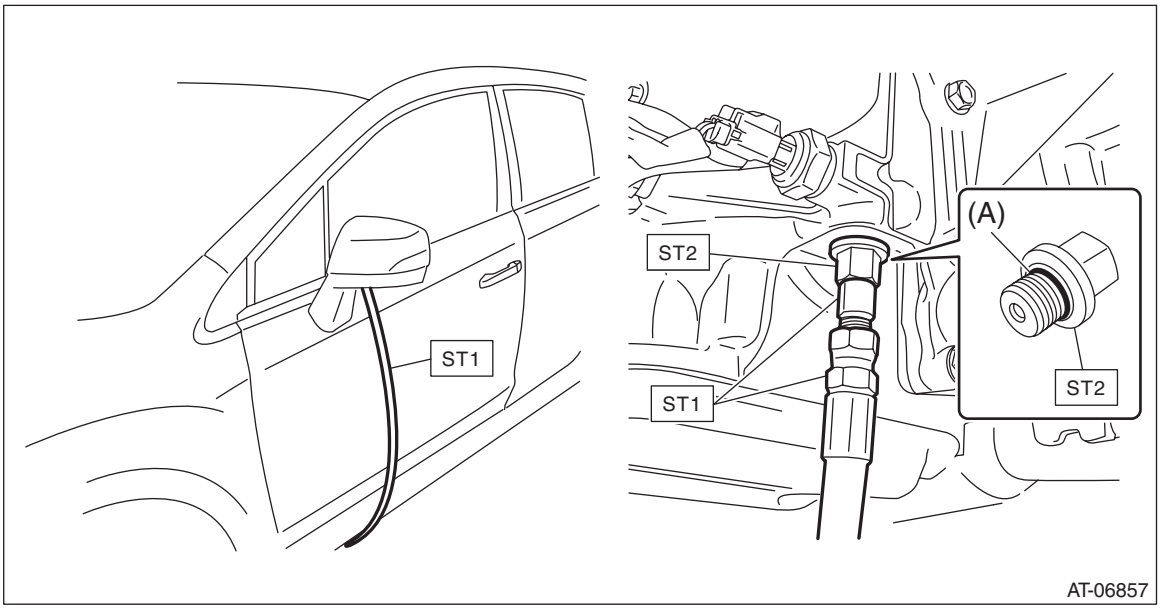
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during secondary pressure (line pressure) test measurement.
• After performing the secondary pressure (line pressure) test measurement, adjust the CVTF level.

NOTE:
• If the pulley and variator chain, clutch or brake show signs of slipping or shift feel is not correct, check the secondary pressure (line pressure).
• Connect Subaru Select Monitor to vehicle so as to measure the engine speed and actual secondary pressure (secondary pressure (line pressure)).
• In many cases, slippage or inability to operate the vehicle may be due to insufficient oil pressure for the operation of clutch, brake or control valve.
1) Lift up the vehicle.
2) Remove the secondary pressure (line pressure) test plug, and install ST1 and ST2.

CAUTION:
Removal of the test plug and installation of the ST shall be both performed quickly.

NOTE:
Use ST2 PRESSURE GAUGE ADAPTER with genuine O-ring (Part No. 806916050) attached.
ST1 18801AA000 OIL PRESSURE GAUGE ASSY
ST2 18681AA010 PRESSURE GAUGE ADAPTER





(A) O-ring (genuine part)

3) Lower the vehicle.
4) Set the gauge so that it can be seen from the driver's seat.
5) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.>
6) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, Engine Oil.>
7) Check the coolant level. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
8) Adjust the CVTF level. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>
9) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to "N" or "P" range.
10) Hold down the pre-collision brake OFF switch to turn OFF the pre-collision brake function. (With EyeSight)

11) Shift the select lever to “D” range.
12) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
13) Immediately after the engine speed becomes steady, record the reading of the secondary pressure (line pressure), engine speed and actual secondary pressure on Subaru Select Monitor. And then release the accelerator pedal. Shift the select lever to “N” range. Let the engine idle for one minute or more to cool it down.

NOTE:
• Do not continue the stall test for 5 seconds or more at a time (from fully closed throttle, fully open throttle to secondary pressure (line pressure) reading). Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
• After performing the secondary pressure (line pressure) test, be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range and with the idle speed at 1,200 r/min or less.
• Under each condition, check that the measured pressure matches almost totally with actual secondary pressure.
• When both measured pressure and actual secondary pressure are out of specification, judge as control valve malfunction.
• The value at stall is for reference because the pressure changes under different conditions or circumstances.
• The value at idling is steady because it is not affected by any condition or circumstance.
• When the engine is started with the select lever in the “P” range and the secondary pressure at idling is measured without shifting the select lever, the value may be higher than the standard. Shift the select lever to the “D” or “R” range, then measure the value.

Secondary pressure (line pressure) standard				
	Range	Throttle	Brake	Secondary pressure (line pressure) (MPa (kgf/cm^2, psi))
Stall	D, R	Full open	ON	4.5 — 6.0 (45.9 — 61.2, 652 — 870)
Idling	P, N	Full closed	OFF	0.5 — 1.5 (5.1 — 15.3, 72 — 218)

14) Remove the ST and install the plug after measurement.

CAUTION:
Removal of the ST and installation of the test plug shall be both performed quickly.

NOTE:
• Use new O-rings.
• Apply CVTF to the O-rings.

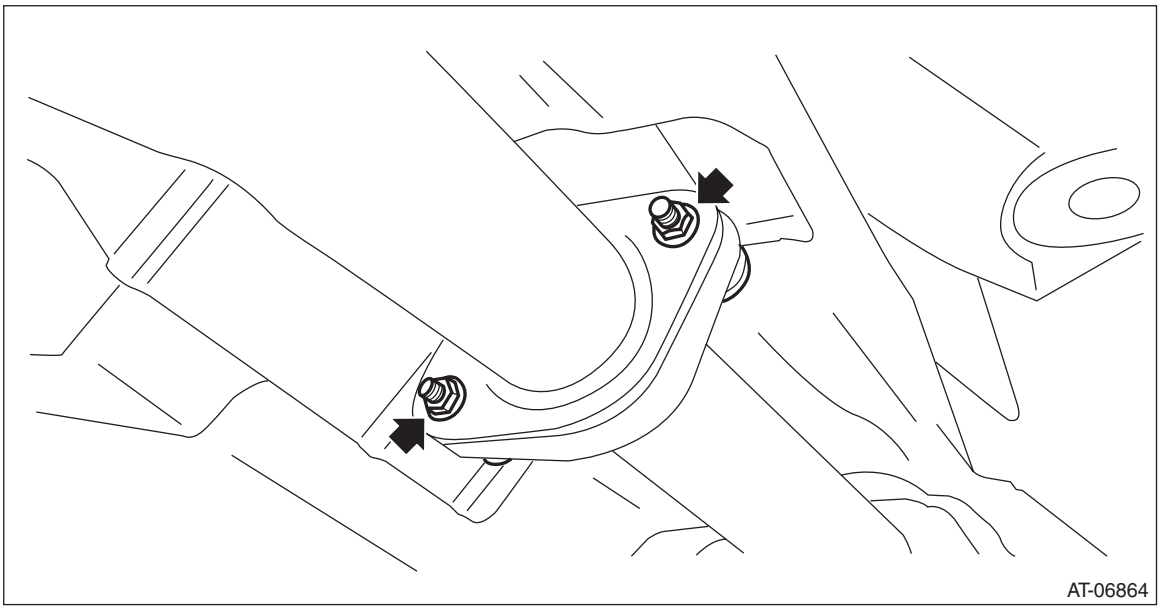
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)
15) Adjust the CVTF level. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

9. Transfer Clutch Pressure Test

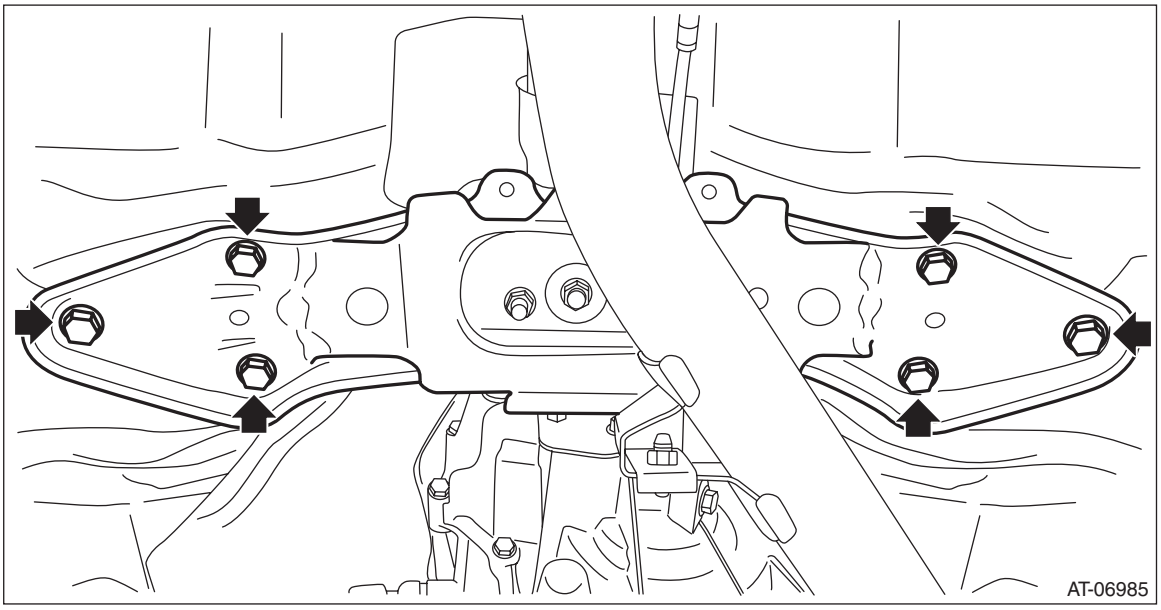
A: INSPECTION

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during transfer clutch pressure test measurement.

1) Lift up the vehicle.
2) Remove the rear exhaust pipe from center exhaust pipe.

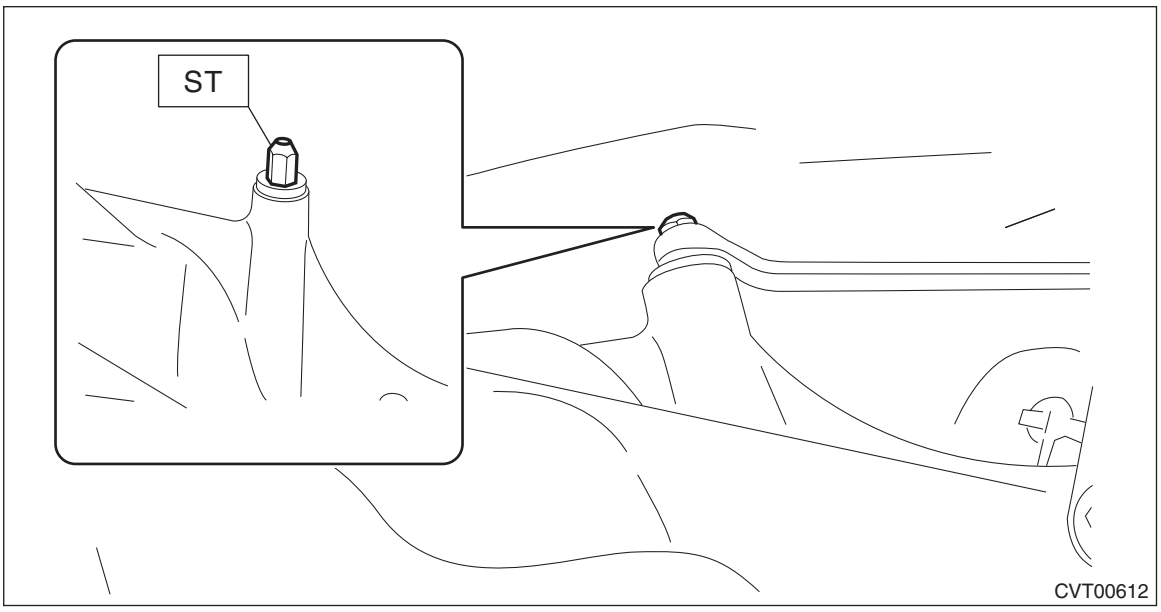


3) Remove the center exhaust cover.
4) Set the transmission jack under the transmission.
5) Remove the mounting bolt of rear crossmember.



6) Lower the rear side of transmission until the transfer clutch pressure test plug can be removed.

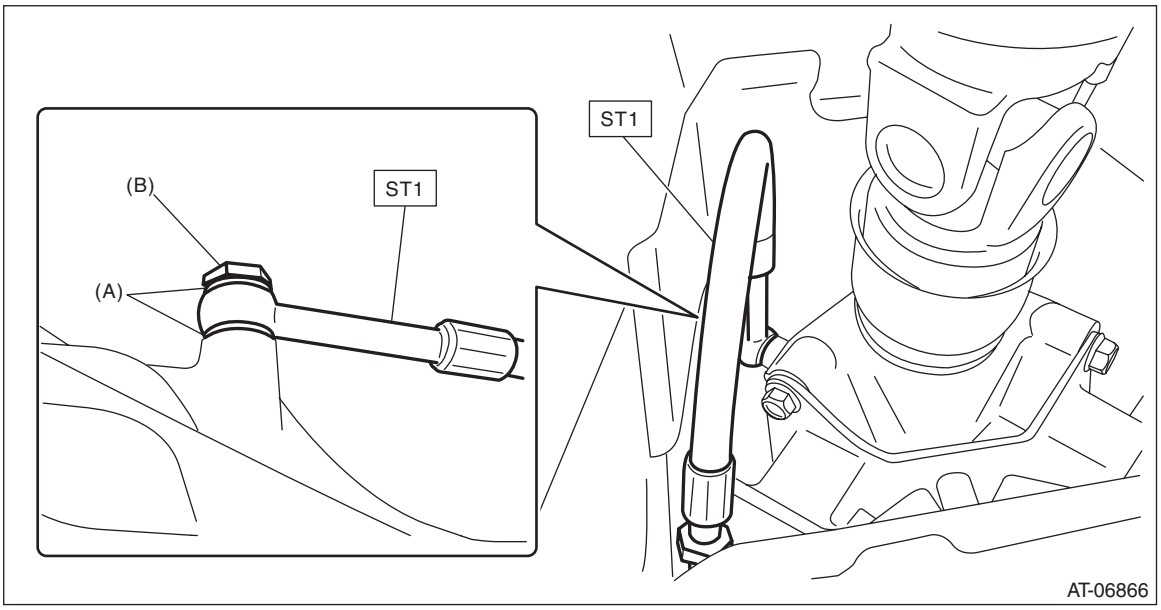
7) Using the ST, remove the transfer clutch pressure test plug.
ST 18270AA040 SOCKET



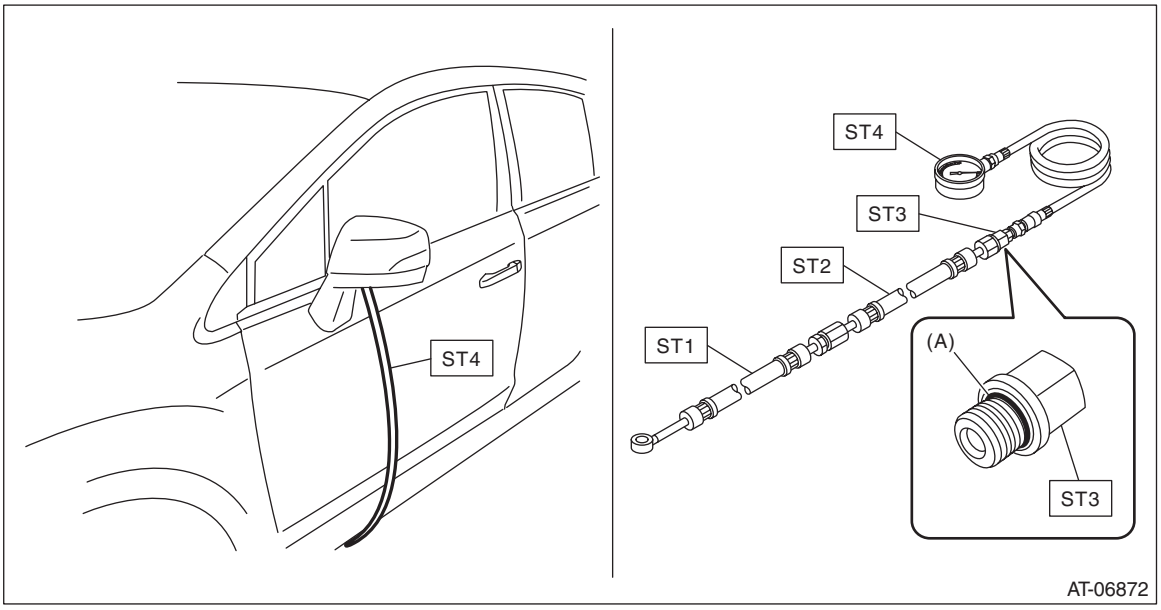
8) Set the ST1, ST2, ST3 and ST4 to the transmission.

NOTE:
• Use ST1 ADAPTER HOSE B with genuine union screw (Part No. 801914010) and gasket (Part No. 803914060) attached.
• Use ST3 PRESSURE GAUGE ADAPTER with genuine O-ring (Part No. 806911080) attached.

ST1 34099AC020 ADAPTER HOSE B
ST2 34099AC010 ADAPTER HOSE A
ST3 18681AA000 PRESSURE GAUGE ADAPTER
ST4 498575400 OIL PRESSURE GAUGE ASSY



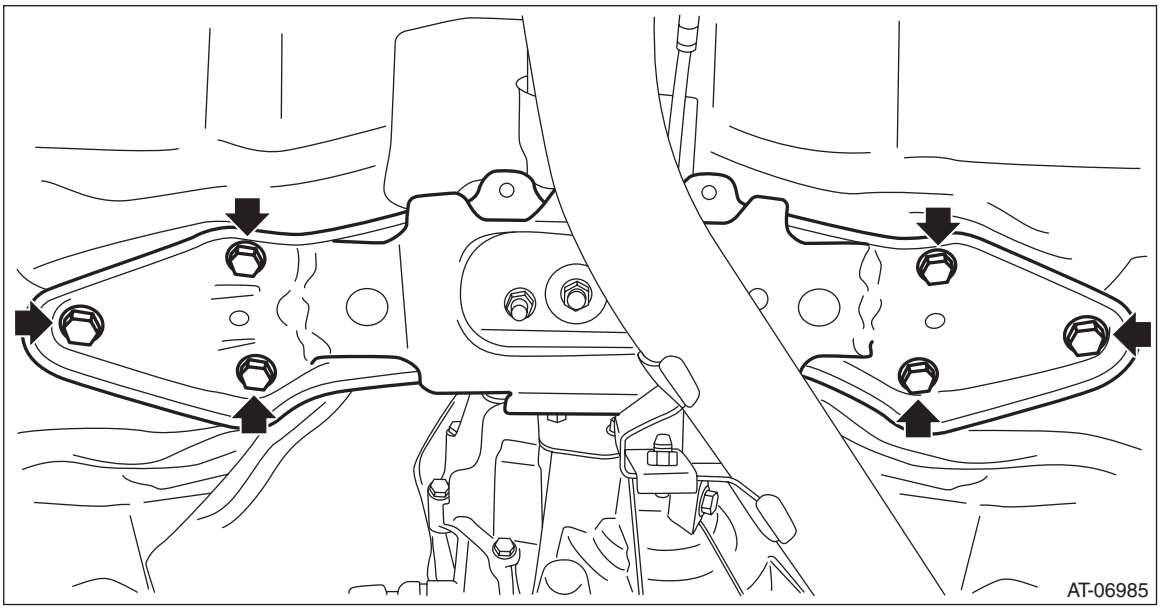
(A) Gasket (genuine part)
(B) Union screw (genuine part)



(A) O-ring (genuine part)

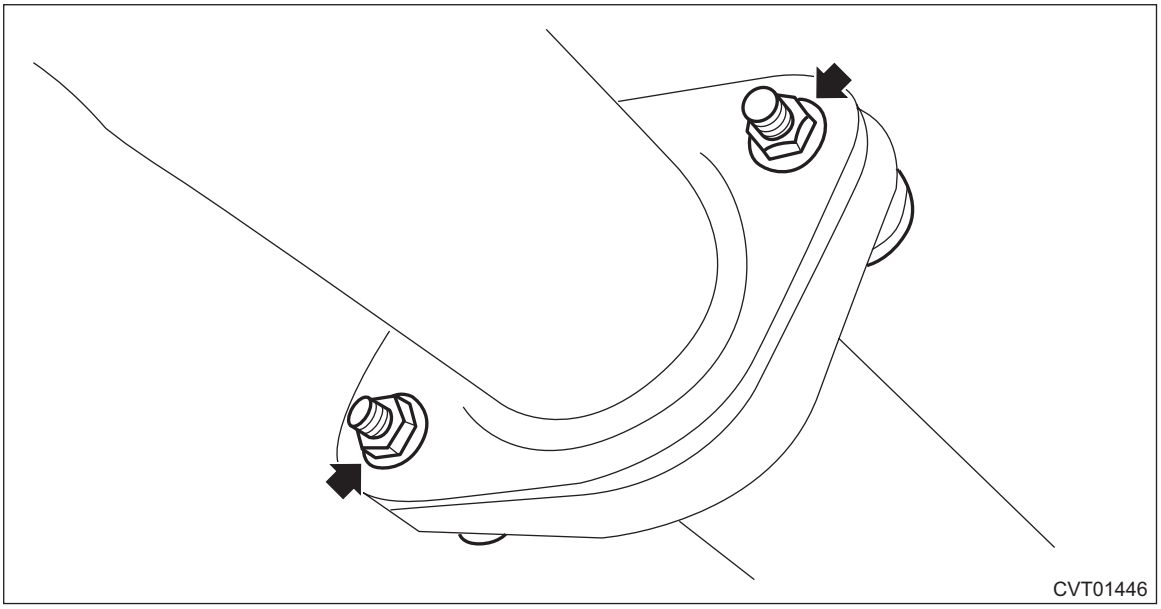
9) Raise the transmission, and install the rear crossmember.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



10) Install the rear exhaust pipe to center exhaust pipe.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

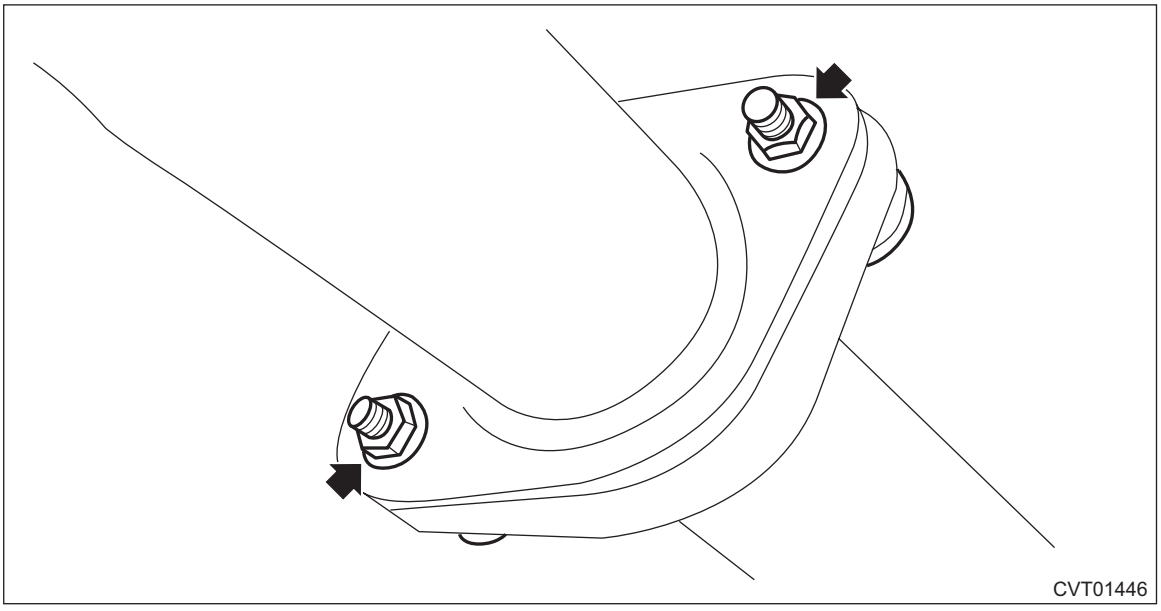


11) Lower the vehicle.
12) Connect the Subaru Select Monitor to the data link connector and read the current data.
13) Check the transfer clutch pressure as in secondary pressure (line pressure) test. <Ref. to CVT(TR580)-52, Secondary Pressure (Line Pressure) Test.>

NOTE:
• Use Subaru Select Monitor for switching to FWD mode. <Ref. to CVT(TR580)-47, AWD ON/OFF Switching Mode.>
• If no oil pressure is produced, if it does not change in AWD mode or if oil pressure is produced in FWD mode, there may be a problem in the control valve body.

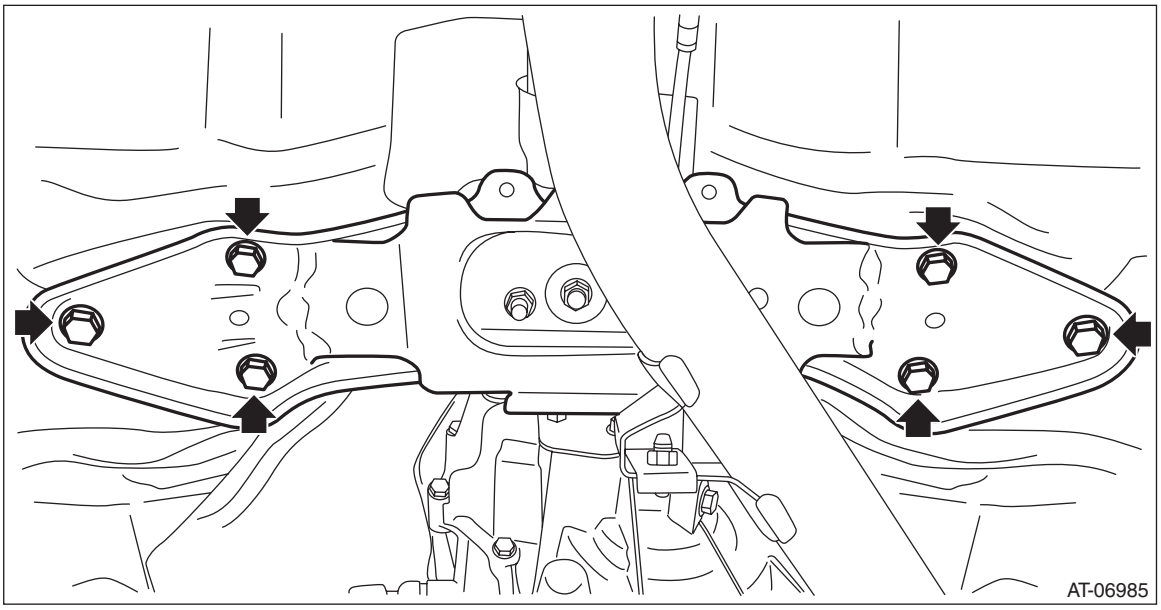
Range position	ON Duty ratio (%)	Accelerator pedal opening angle (%)	Standard transfer clutch pressure kPa (kgf/cm^2, psi)	
			AWD mode	FWD mode
D	95 — 100	Fully opened (100)	1,000 — 1,200 (10.2 — 12.2, 145 — 174)	—
	60	Adjust ON Duty ratio to 60%.	400 — 700 (4.1 — 7.1, 58 — 102)	—
	0	Fully closed (0)	—	0 (0, 0)
N or P	0	Fully closed (0)	0	—

14) Lift up the vehicle.
15) Remove the rear exhaust pipe from center exhaust pipe.



16) Set the transmission jack under the transmission.

17) Remove the mounting bolt of rear crossmember.

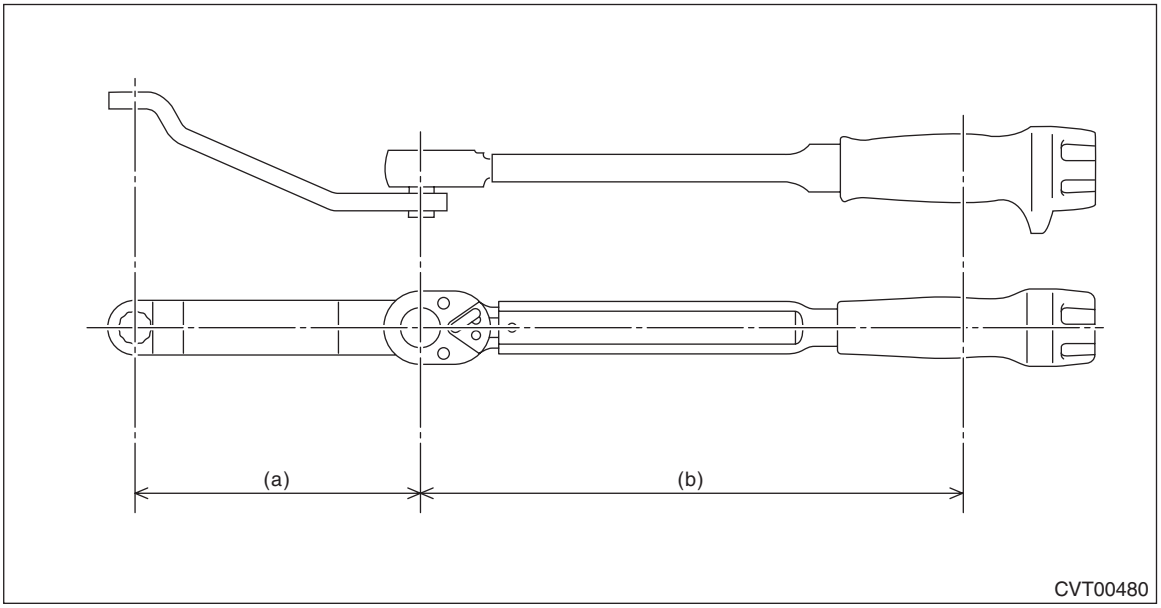


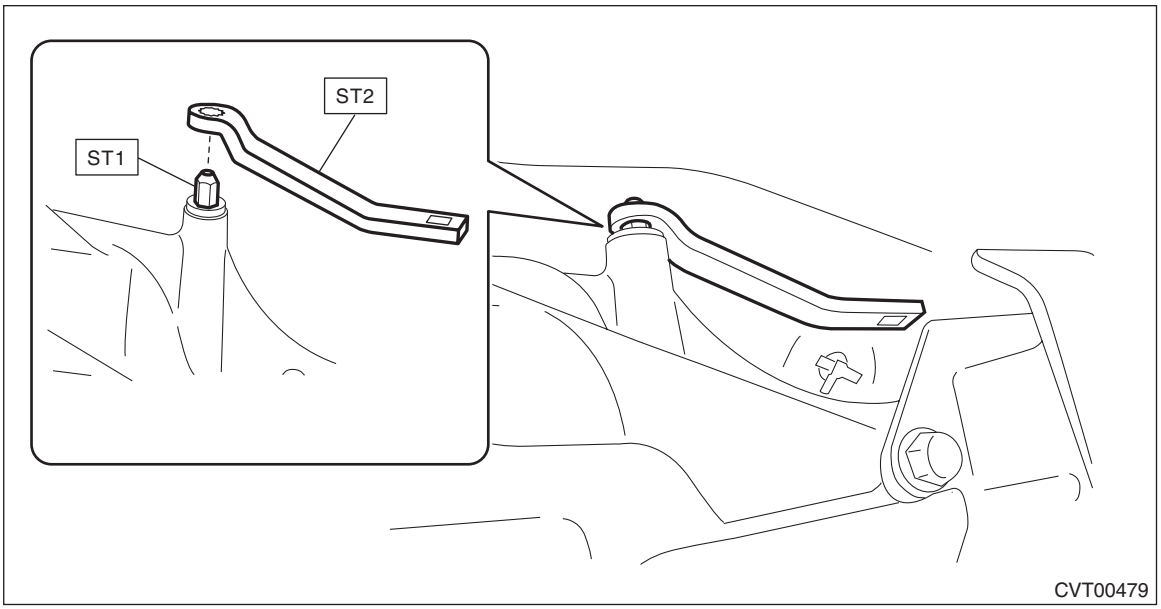
18) Lower the rear side of transmission until the ST can be removed.
19) Install the test plug using ST1 and ST2.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.
- Tighten the test plug while directly aligning ST2 and torque wrench.

ST1 18270AA040 SOCKET
ST2 73099SG000 SPECIAL TOOL CONDENSER
Using the following formula, calculate the tightening torque for a torque wrench.
$T2 = L2/(L1 + L2) \times T1$
T1: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
L1: ST2 length 0.1 m (3.94 in) (a)
L2: Torque wrench length (b) m (in)

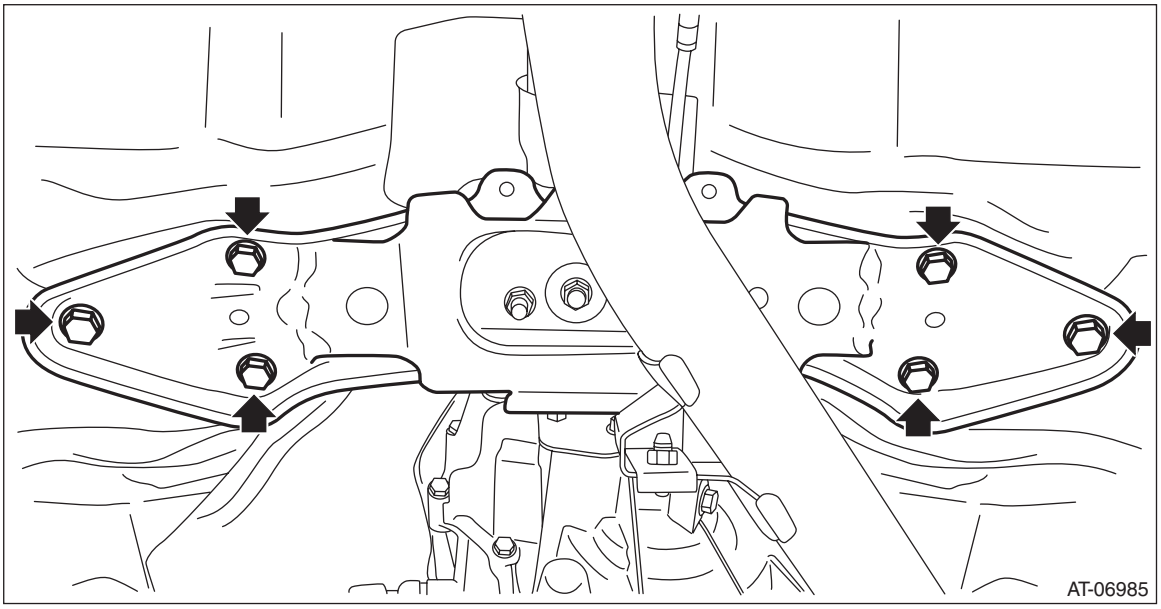
[Required torque setting]
T2: Tightening torque: N·m (kgf-m, ft-lb)





20) Raise the transmission, and install the rear crossmember.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



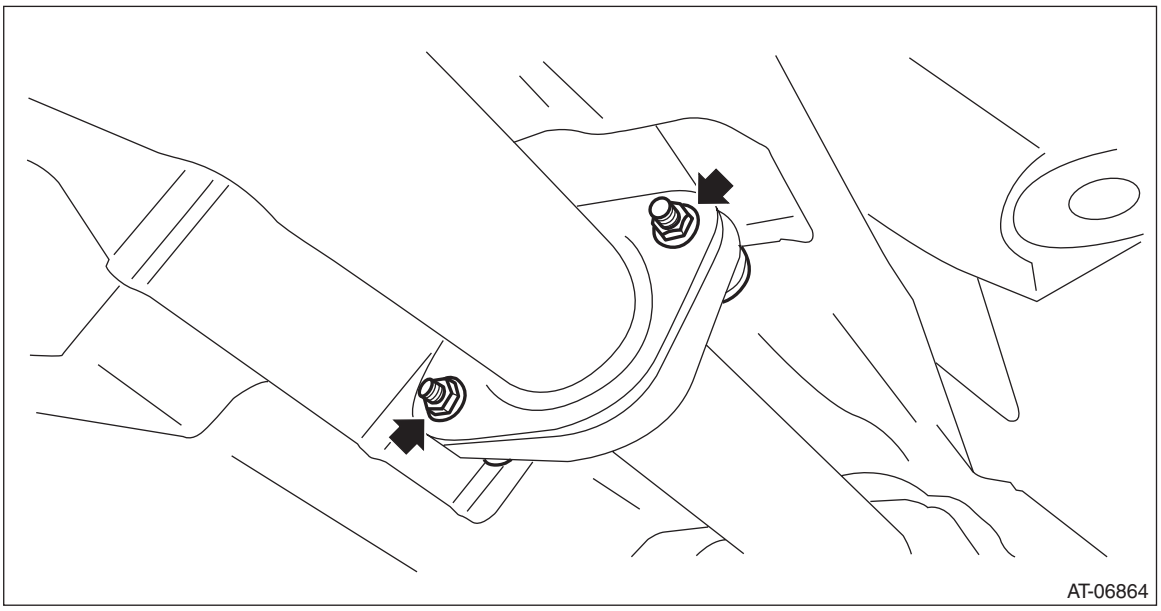
21) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

22) Install the rear exhaust pipe to center exhaust pipe.

NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

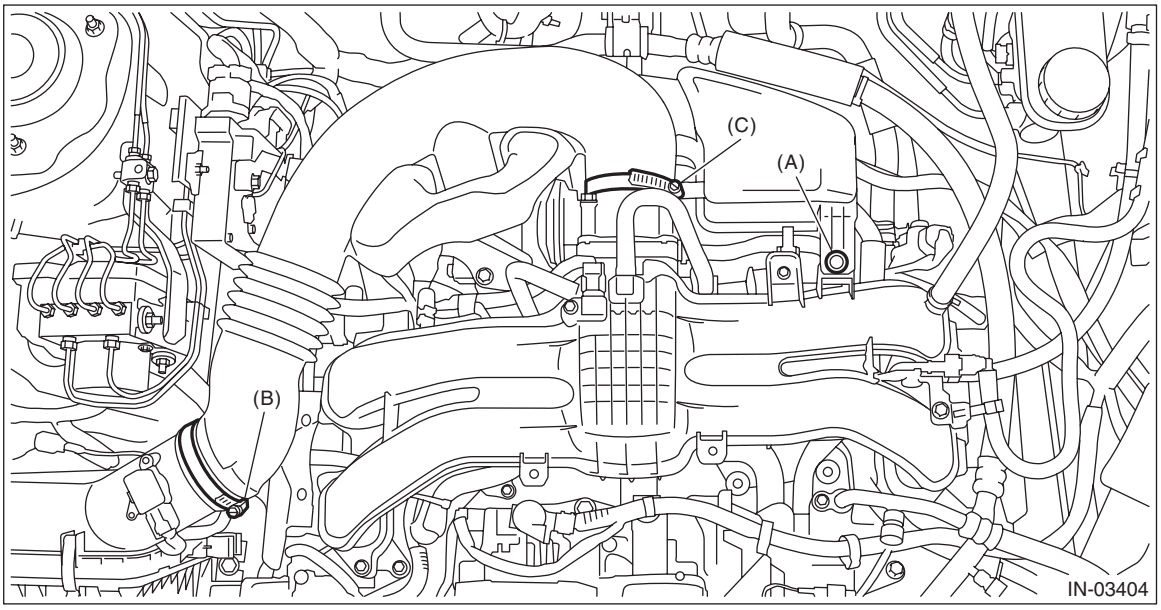


23) Lower the vehicle.

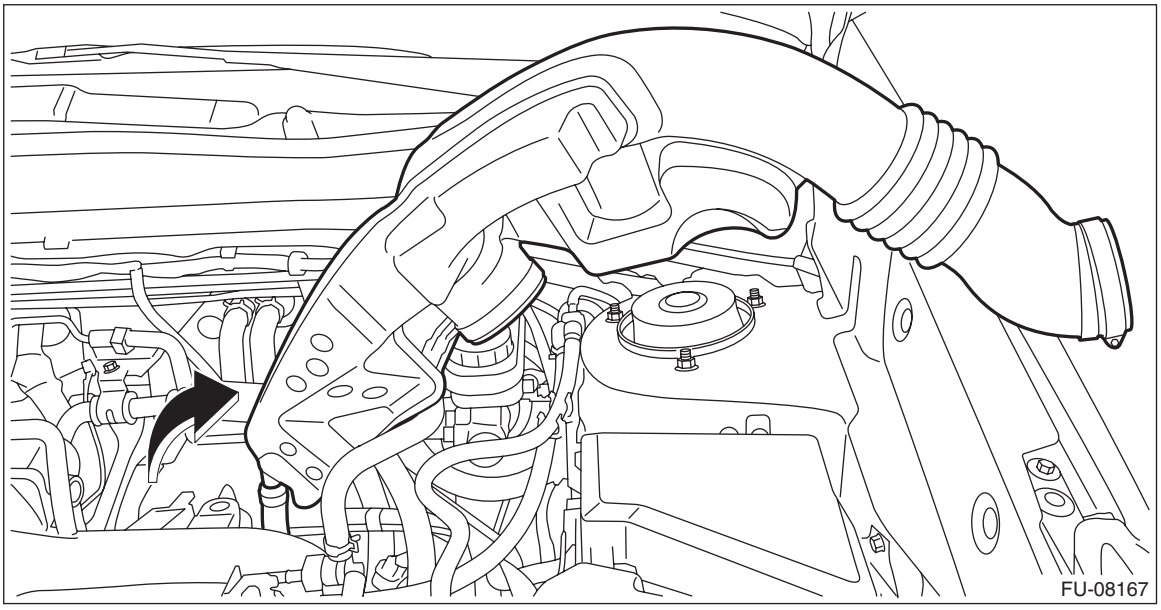
10.Automatic Transmission Assembly

A: REMOVAL

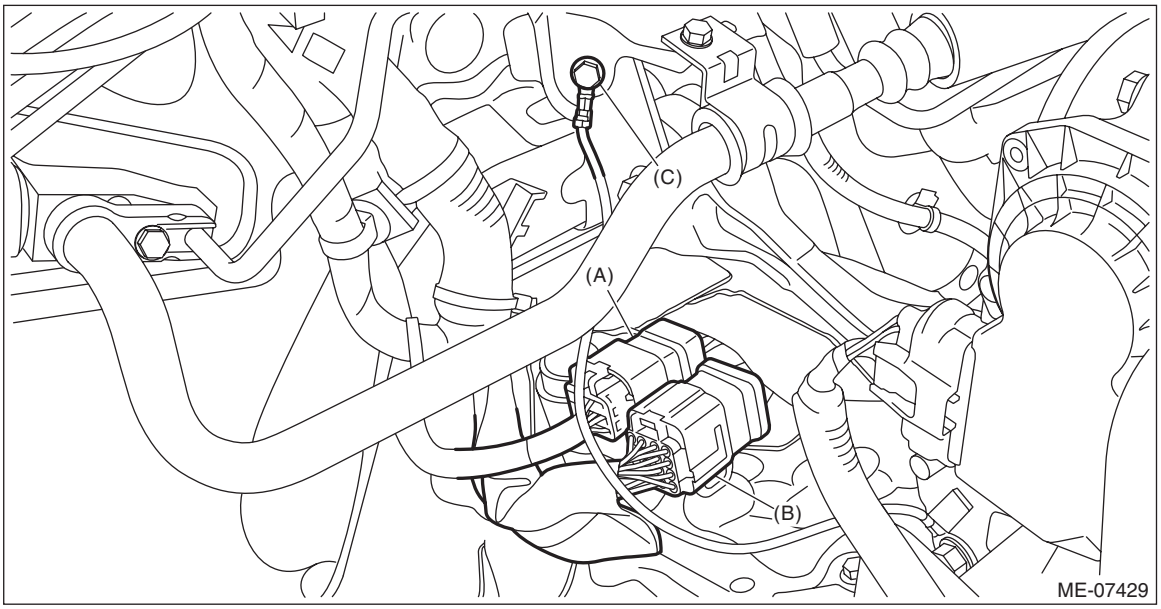
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

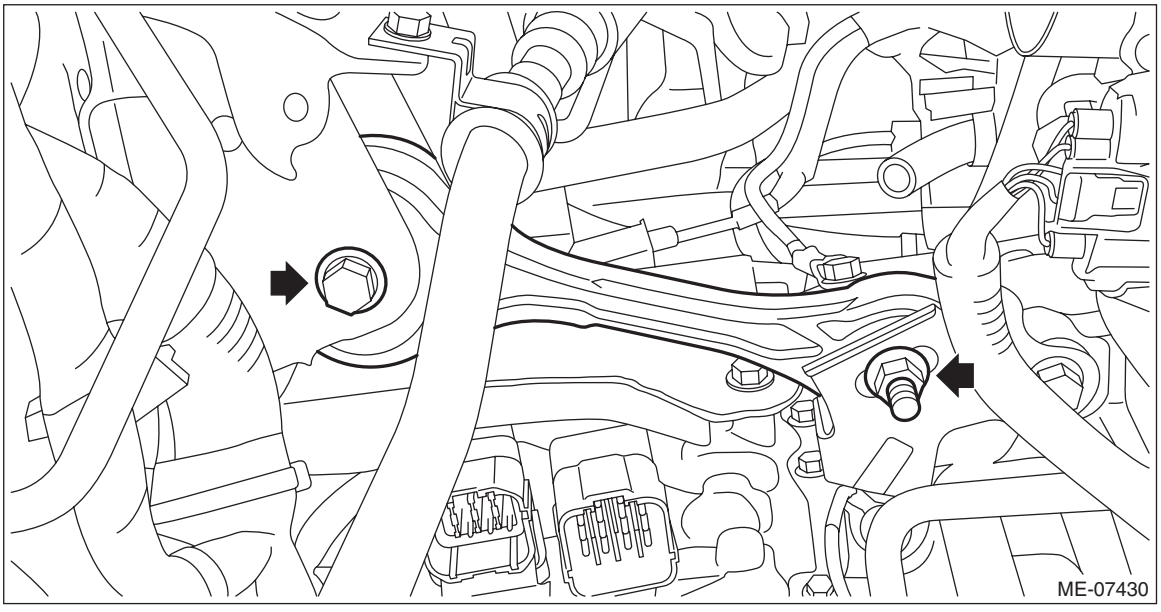


6) Disconnect the following connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

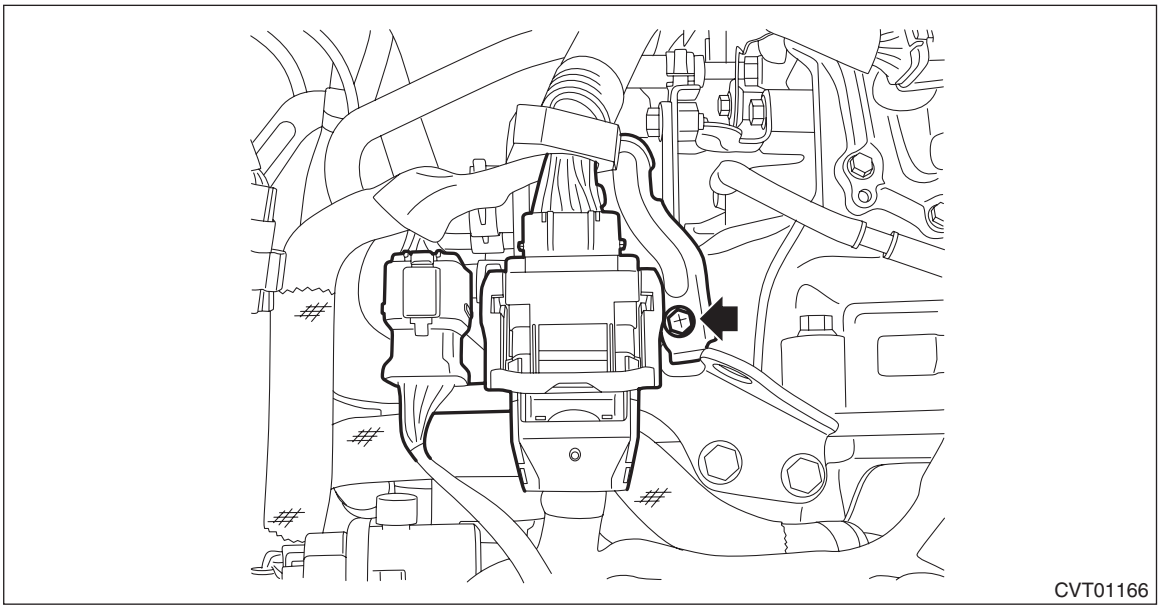


(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

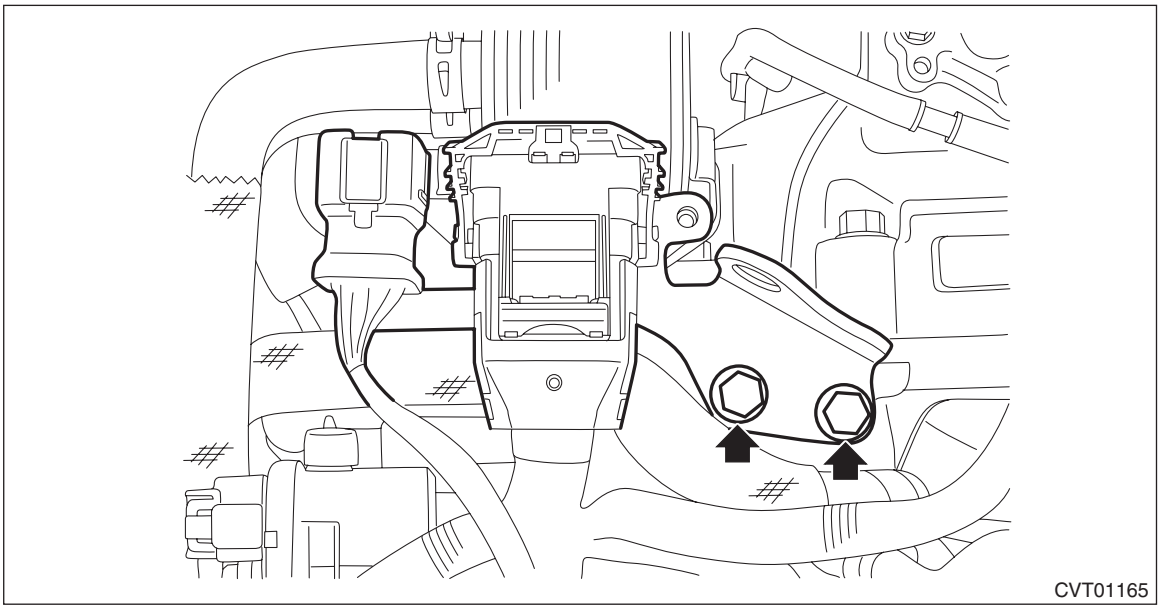
7) Remove the starter. <Ref. to SC(H4DO(w/o HEV))-8, REMOVAL, Starter.>
8) Remove the pitching stopper.



9) Remove the harness bracket, and then remove the engine harness.

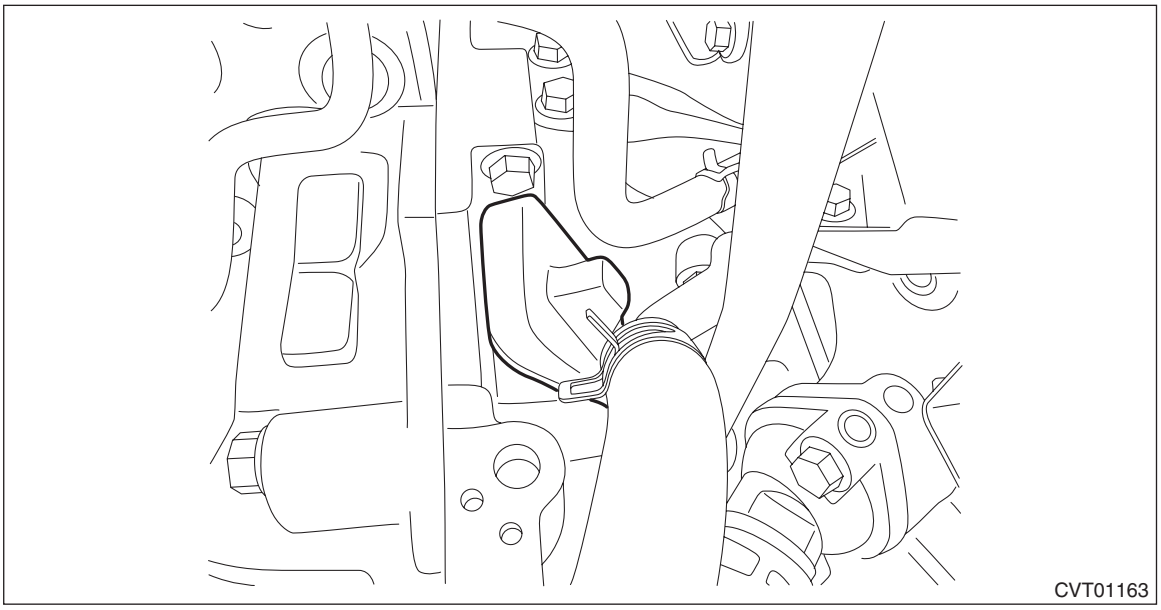


10) Disconnect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
11) Remove the engine hanger rear.



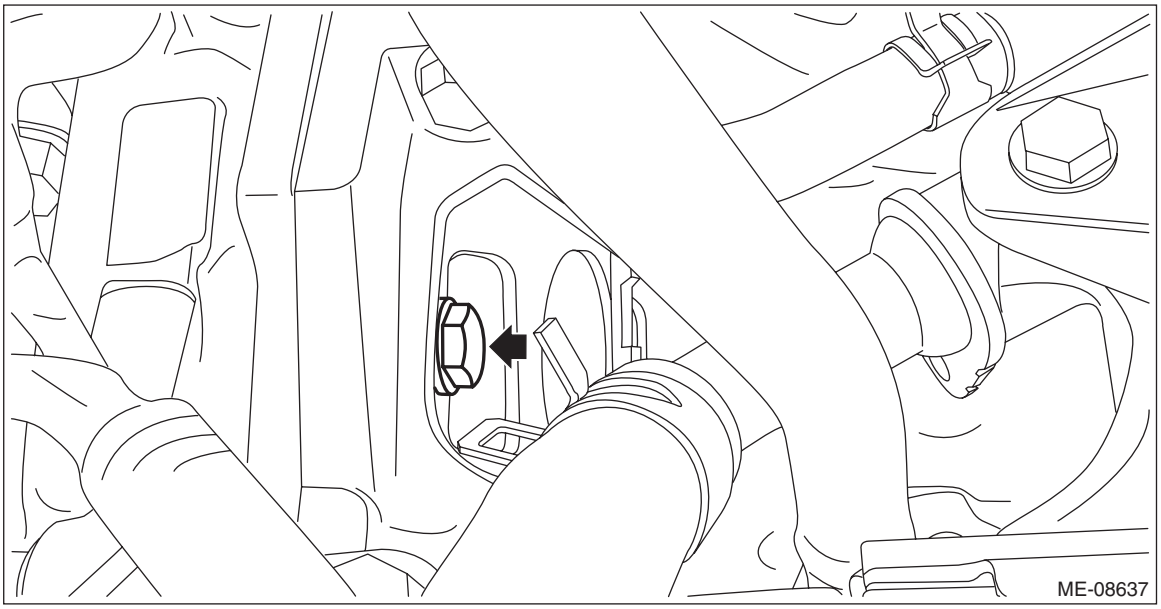
12) Remove the throttle valve body. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.>

13) Remove the service hole plug.



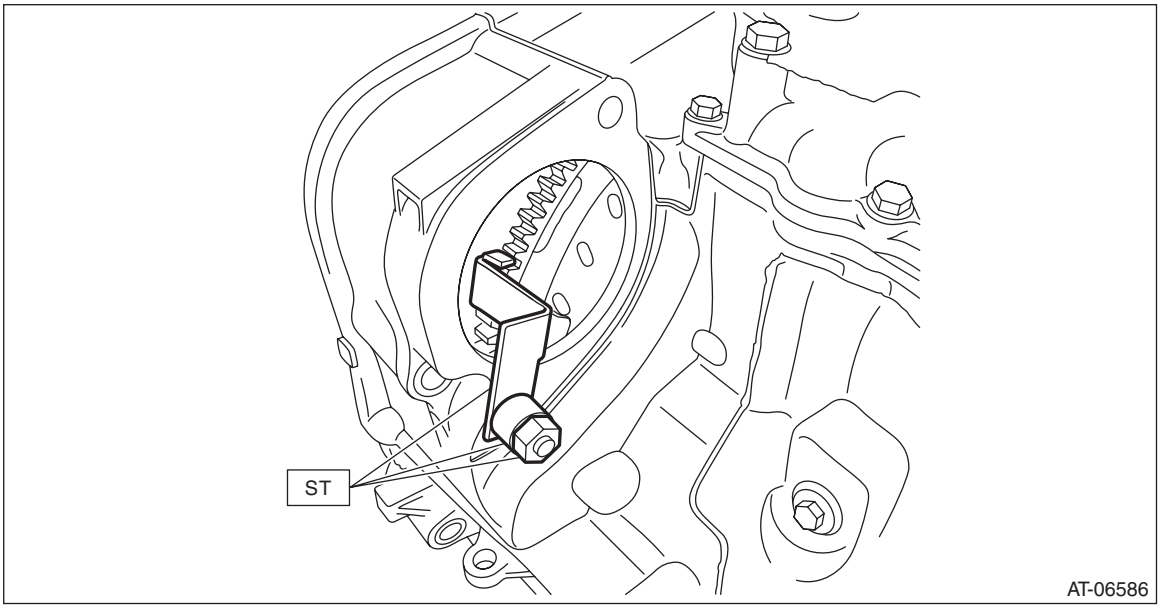
14) Remove the four bolts combining the torque converter and drive plate while rotating the crank pulley a little at a time in the same direction as engine revolution.

CAUTION:
- **Be careful not to drop bolts into the converter housing.**
- **Be careful not to damage the mounting bolts.**

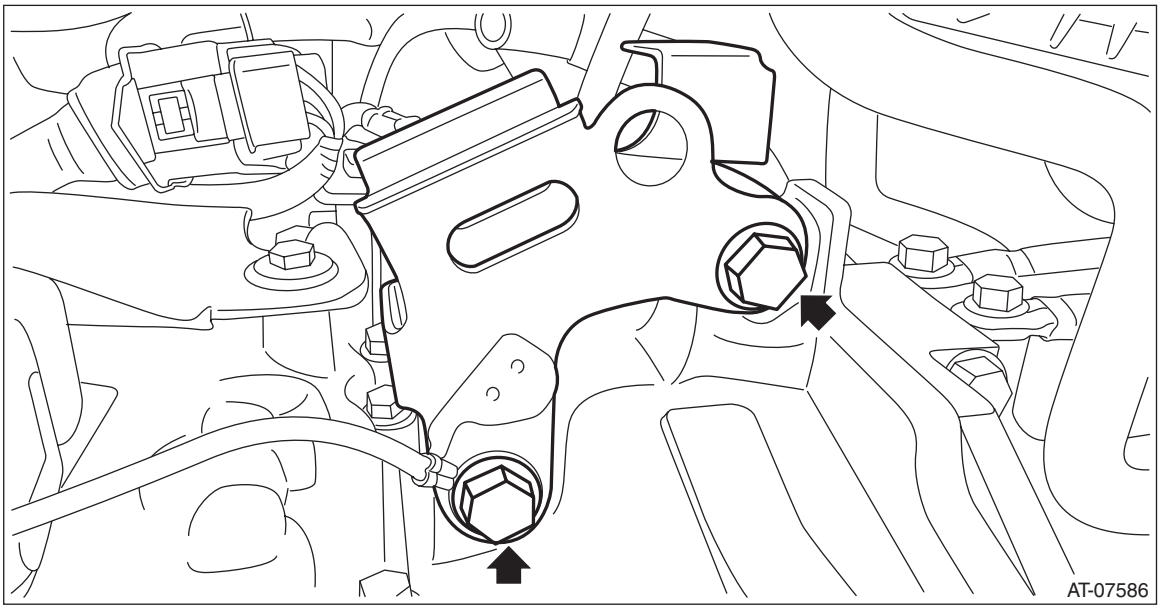


15) Make sure the torque converter moves freely by rotating with finger through the starter installation hole.

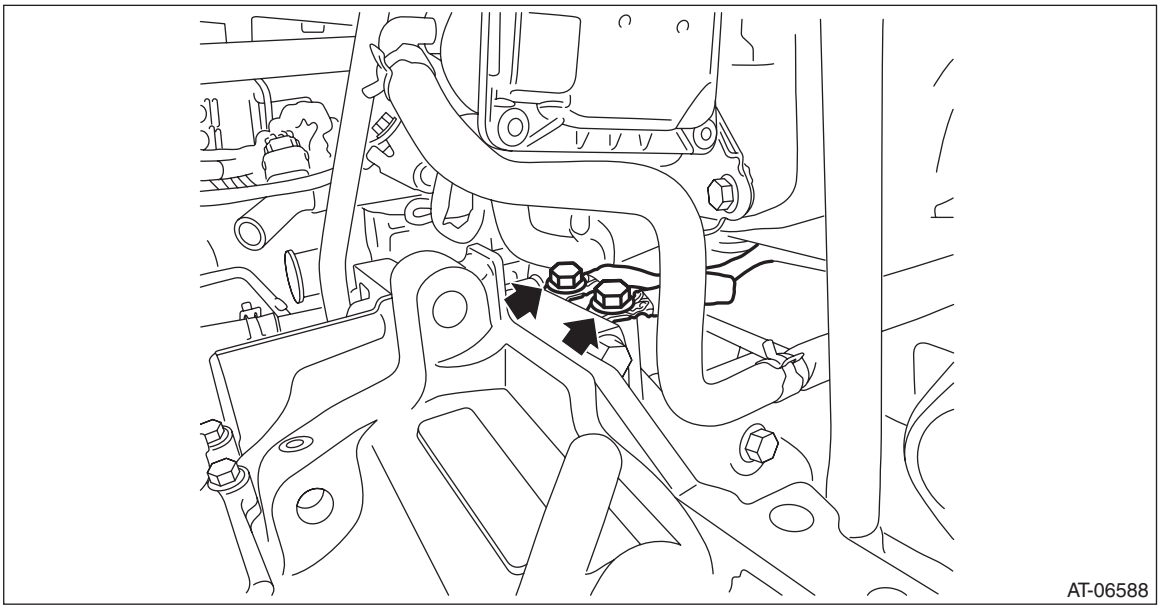
16) Attach the ST to the converter case.
ST 498277200 STOPPER SET



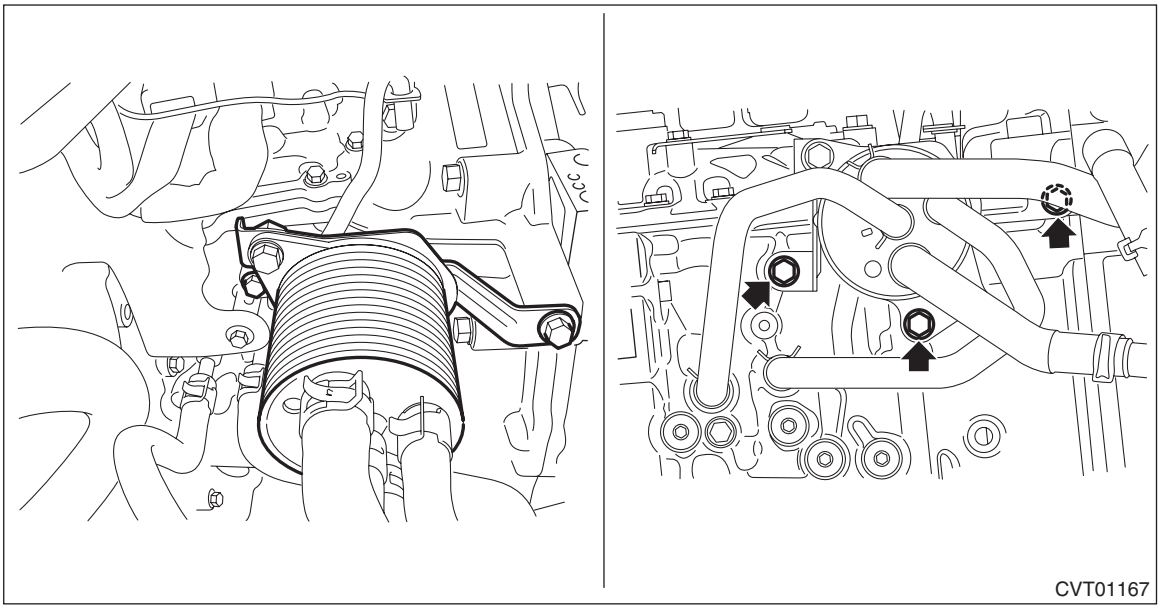
17) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



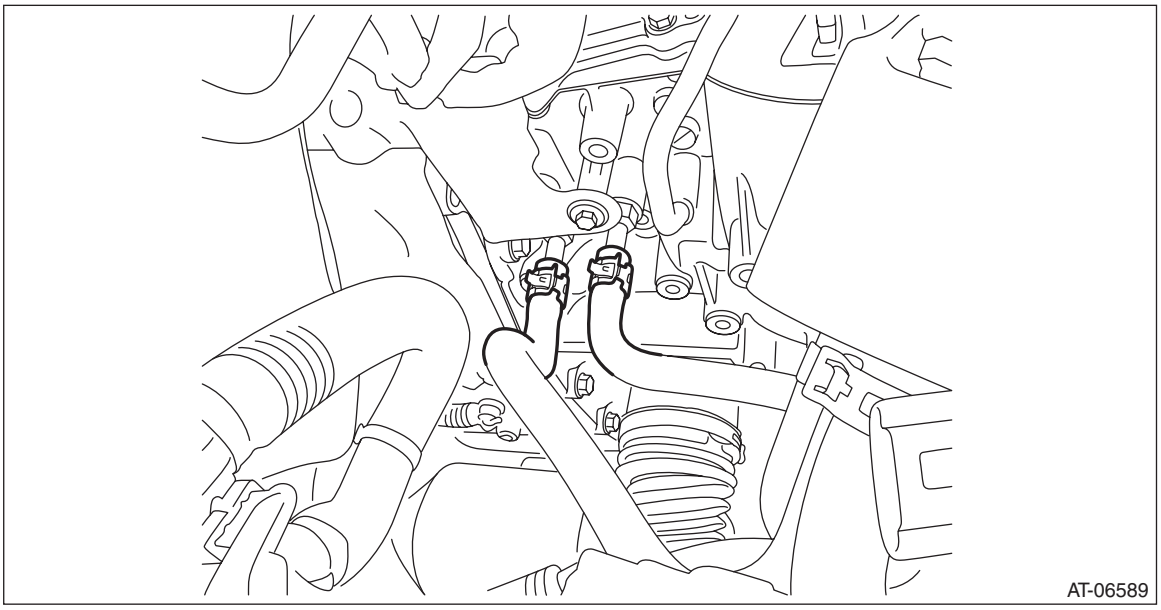
18) Remove the engine ground terminal.



19) Remove the CVTF cooler (with warmer feature) from the transmission, and using a piece of wire, affix to a location of the body where it will not interfere with the removal/installation of the transmission.

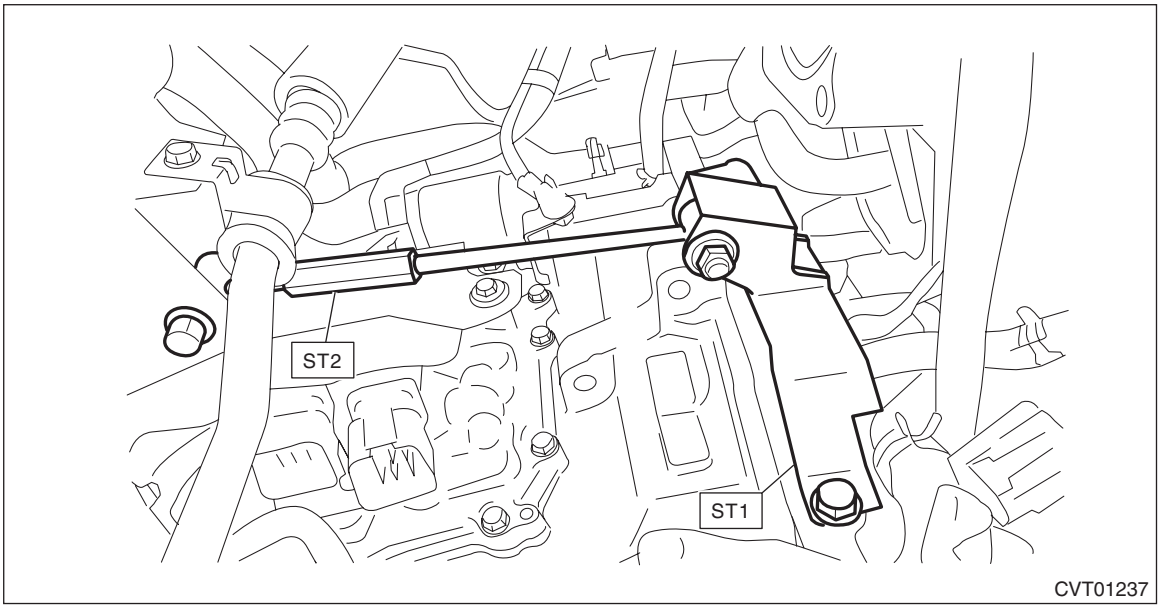


20) Remove the CVTF inlet hose and outlet hose from the pipe.

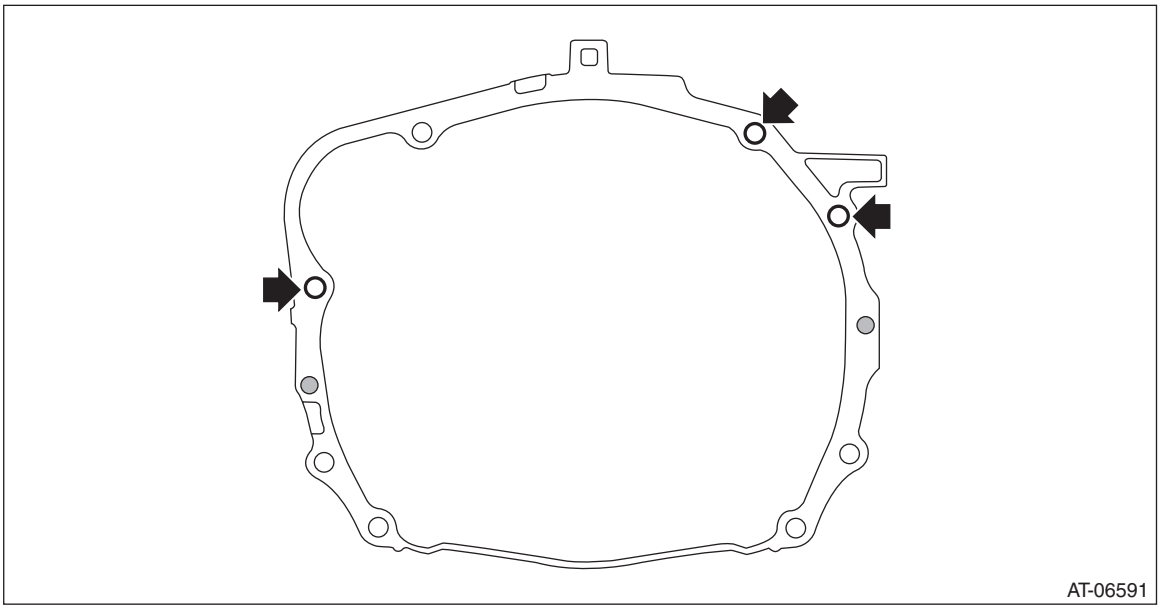


21) Set the ST.

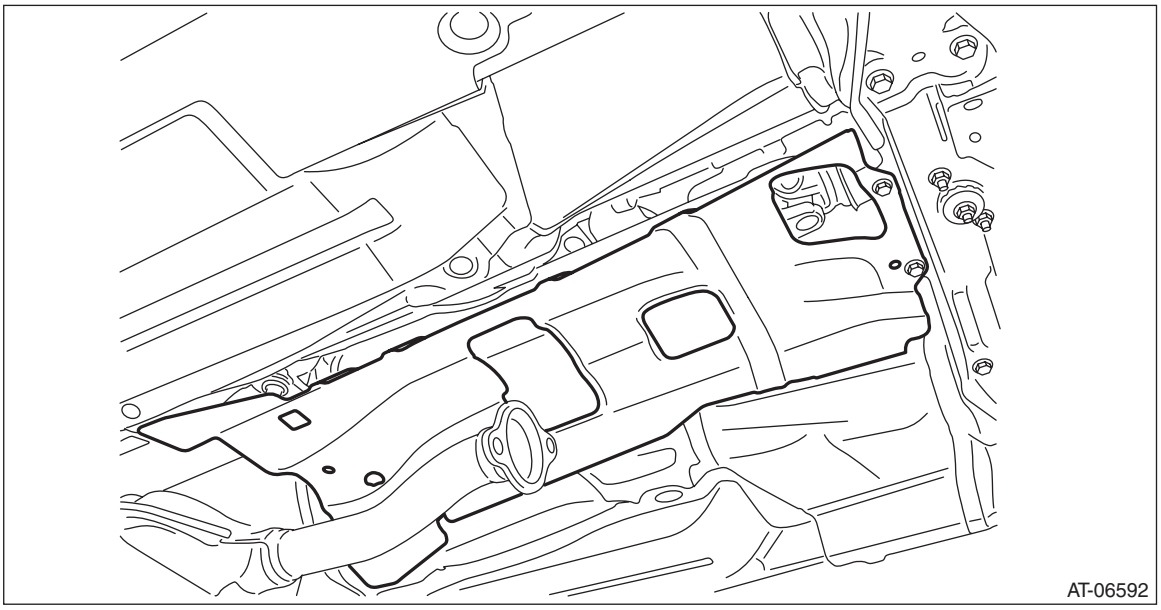
ST1 41099AA012 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT



22) Remove the three transmission connecting bolts.

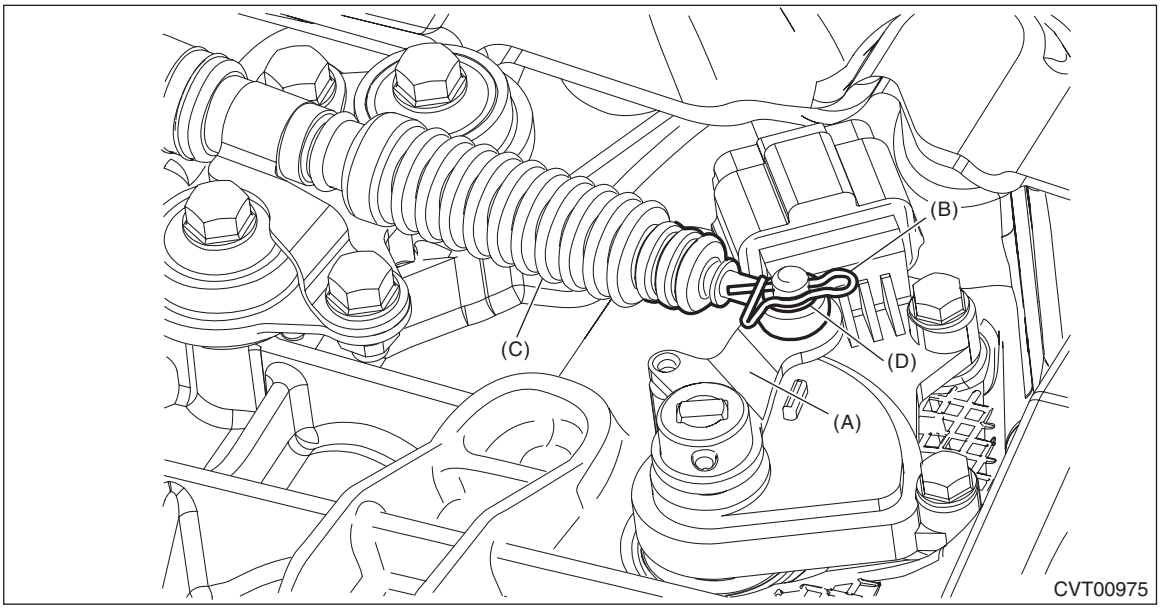


23) Lift up the vehicle.
24) Remove the front tires. <Ref. to WT-5, REMOVAL, Tire and Wheel.>
25) Remove the under cover.
26) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
27) Remove the center exhaust cover.



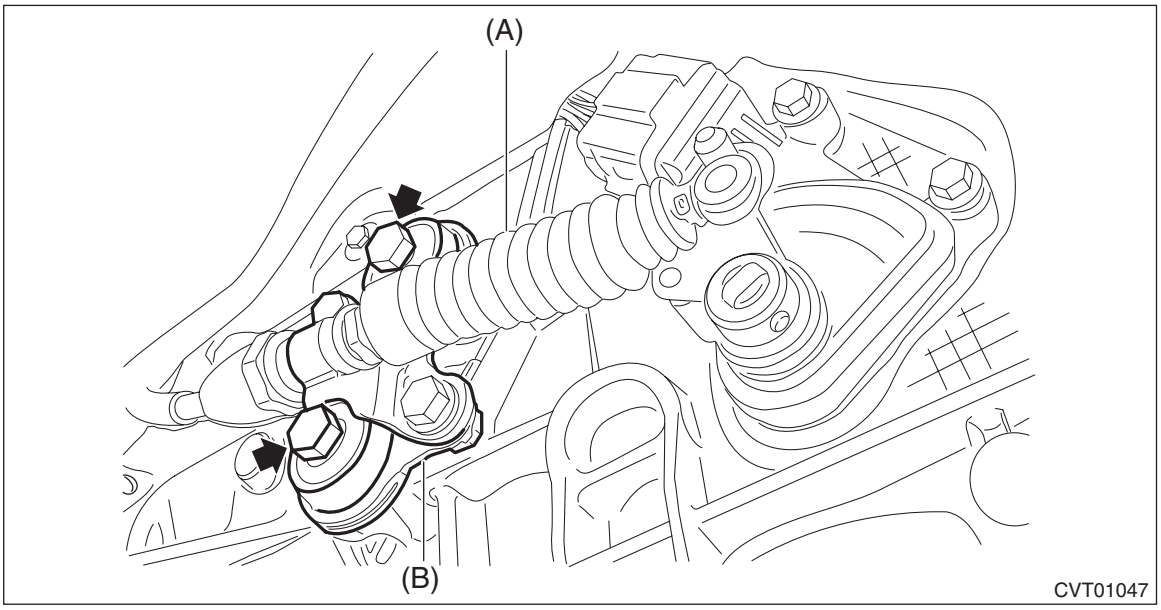
28) Remove the CVTF drain plug to drain CVTF. <Ref. to CVT(TR580)-40, REPLACEMENT, CVTF.>
29) Drain differential gear oil. <Ref. to CVT(TR580)-45, REPLACEMENT, Differential Gear Oil.>

30) Remove the snap pin and washer from shifter arm and remove the select cable from shifter arm.



(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

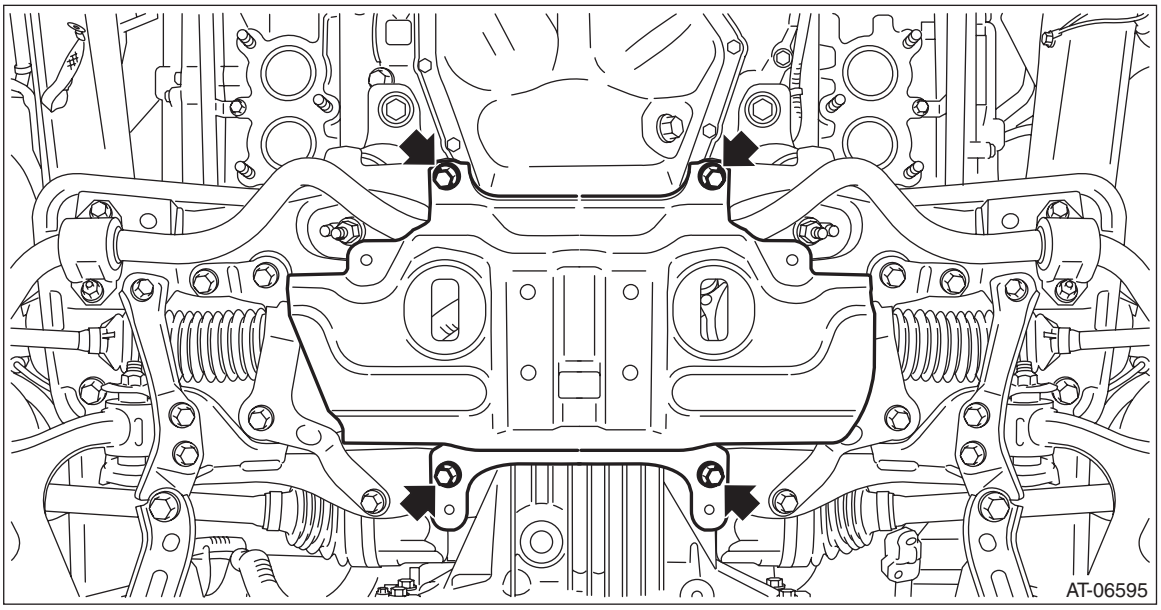
31) Remove the plate assembly from the transmission case.



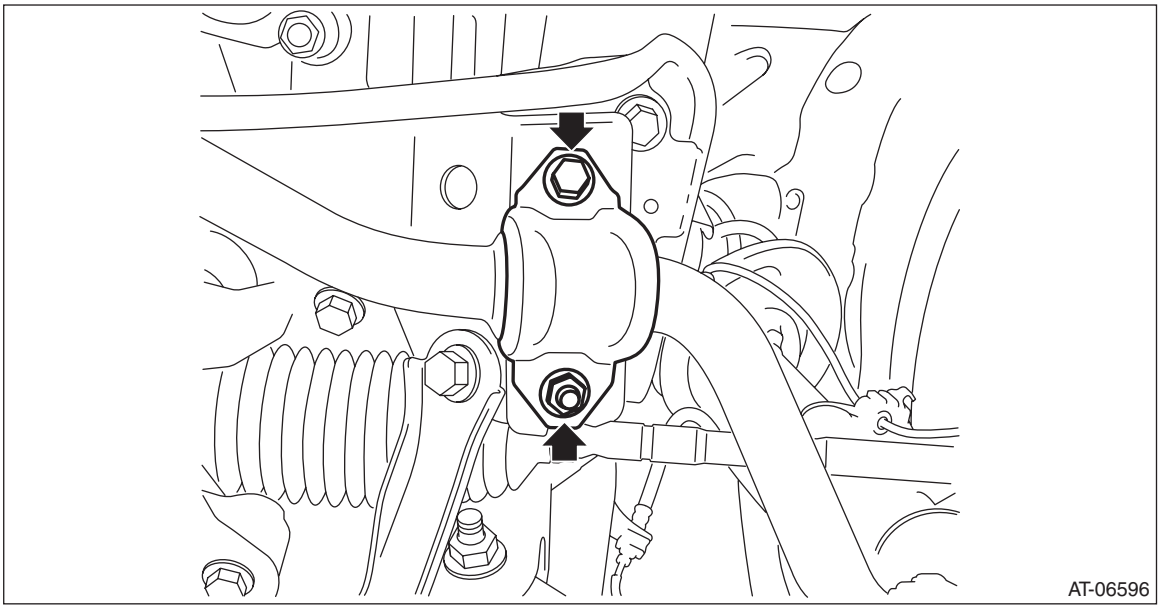
(A) Select cable
(B) Plate ASSY

32) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>

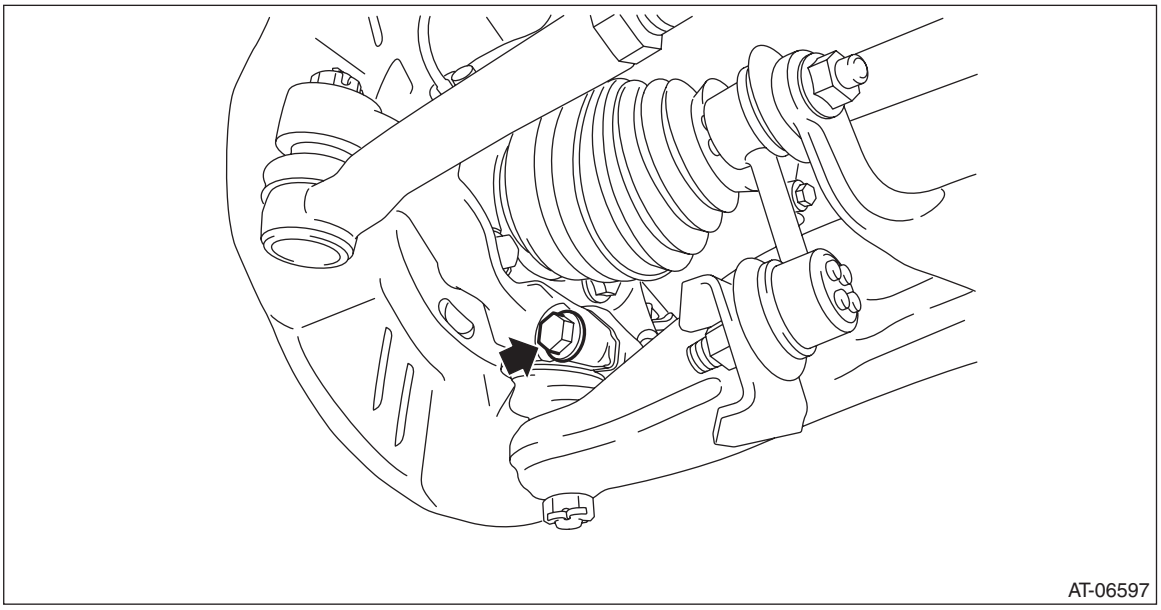
33) Remove the jack-up plate.



34) Remove the stabilizer bracket.



35) Remove the bolts which secure to the front housing, and separate the front arm and housing.



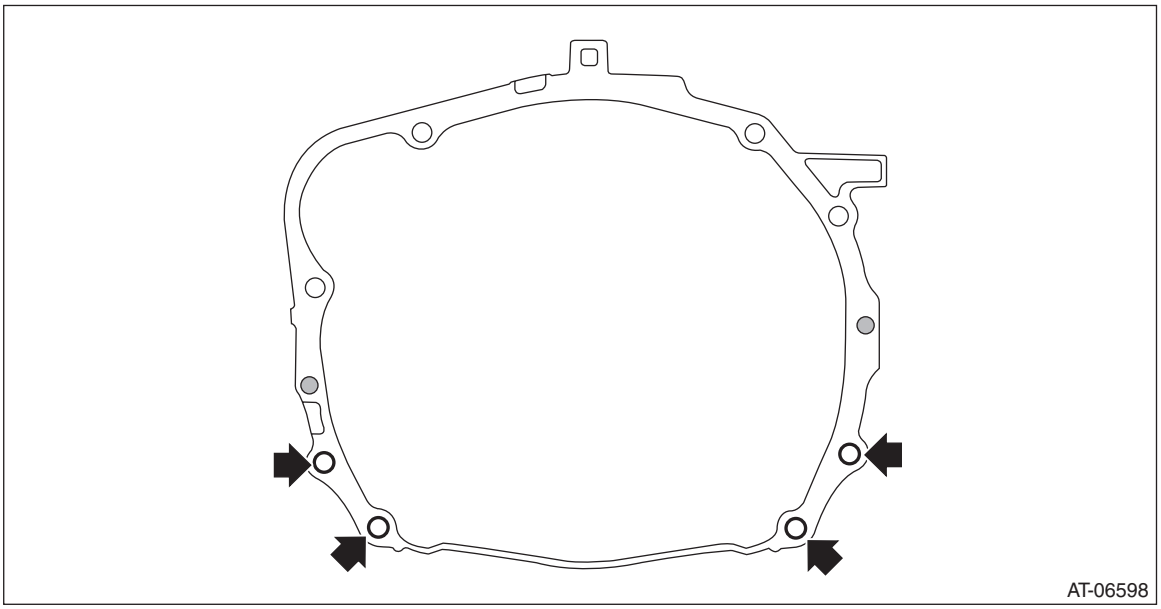
36) Using a tire lever or a crow bar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the tire lever or bar and the transmission in order to avoid damaging the transmission side retainer.

37) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.

NOTE:
- Before pulling the RH front drive shaft from transmission, turn the steering wheel to the right hand at full lock.
- Before pulling the LH front drive shaft from transmission, turn the steering wheel to the left hand at full lock.

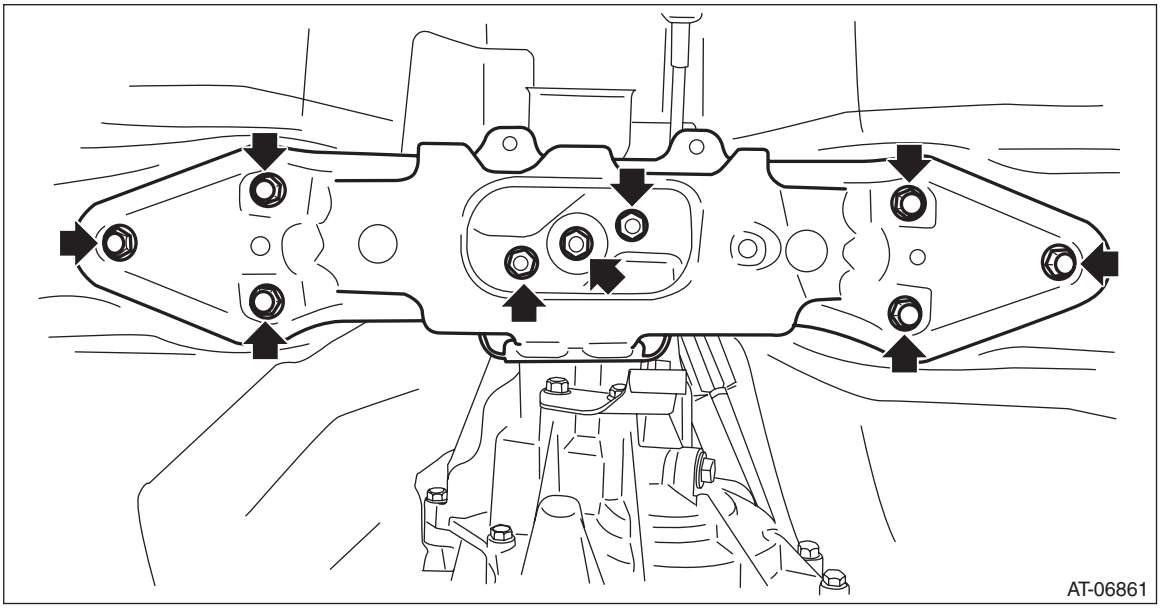
38) Remove the two transmission connecting bolts and two nuts (lower side).



39) Set the transmission jack under the transmission.

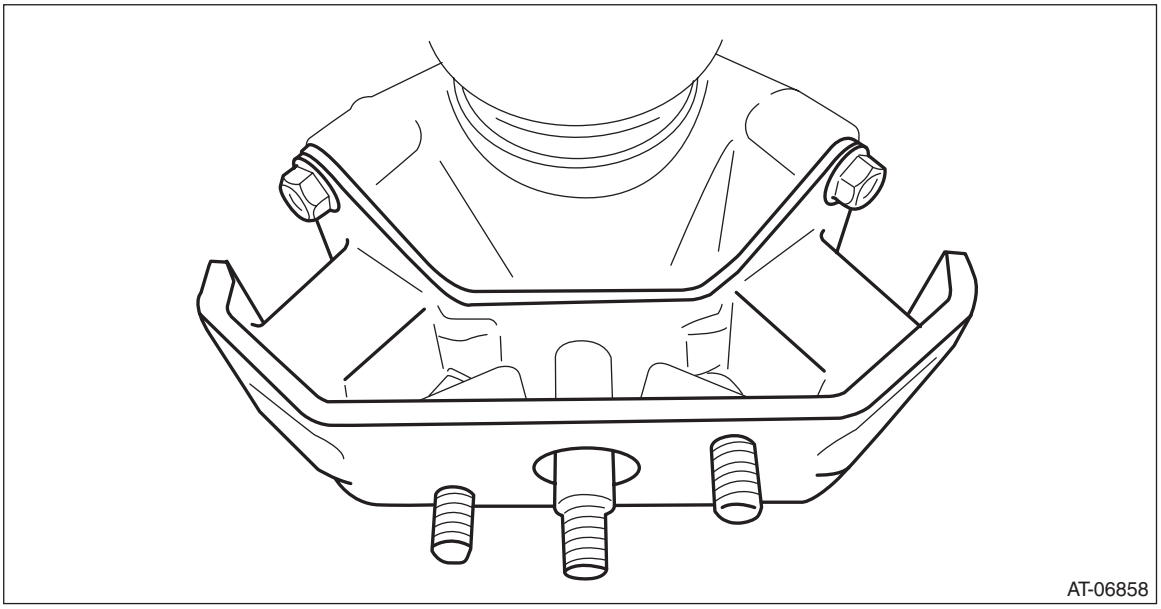
NOTE:
Make sure that the support plates of transmission jack do not touch the oil pan.

40) Remove the hanger bracket.
41) Remove the transmission rear crossmember from the vehicle.



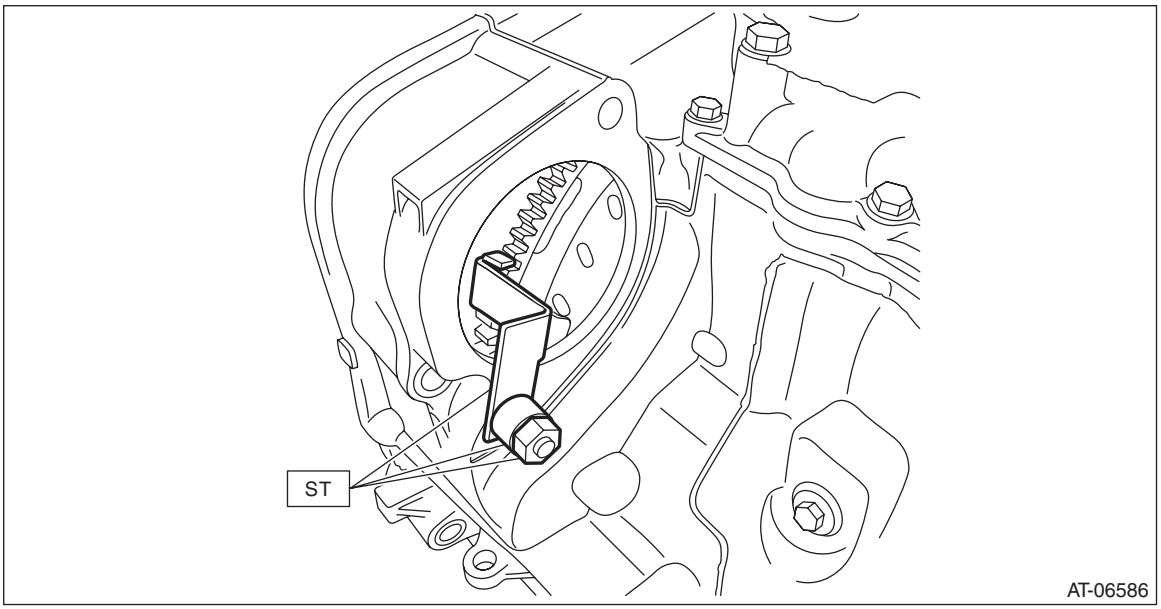
42) While lowering the transmission jack gradually, fully retract the engine support, and then tilt the engine rearward.
43) Remove the transmission assembly.

NOTE:
Remove it while moving the transmission jack up and down so that the engine and transmission remain directly aligned.
44) Remove the rear cushion rubber.



B: INSTALLATION

1) Attach the ST to converter case.
ST 498277200 STOPPER SET

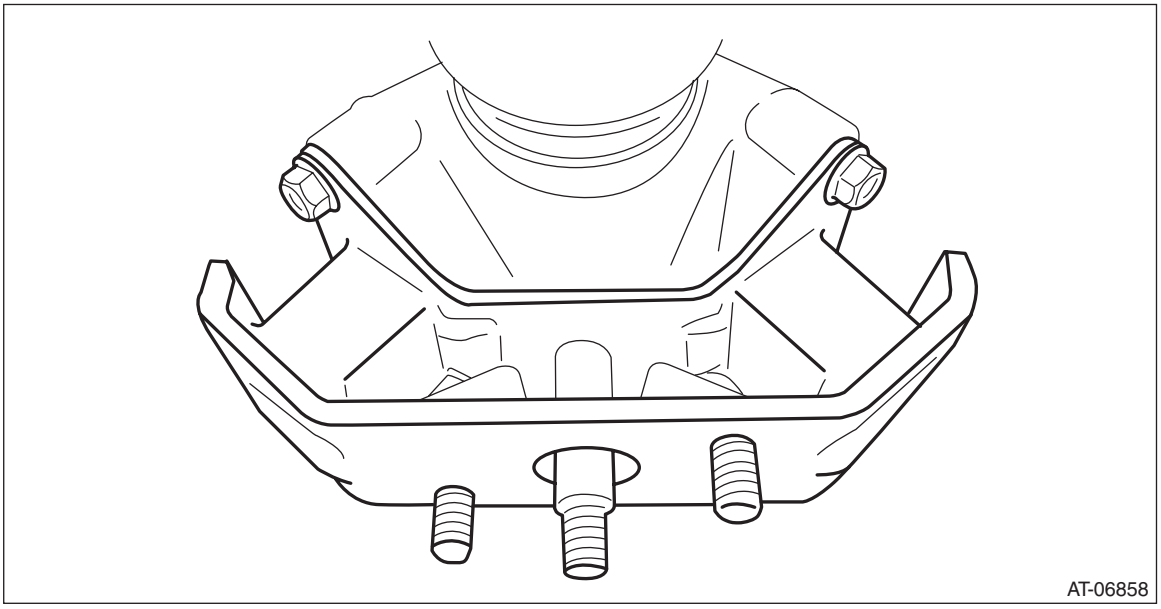


2) When completely overhauling the transmission, refill CVTF through the transmission right side plug. <Ref. to CVT(TR580)-170, Preparation for Overhaul.>
3) Replace the front differential side retainer oil seal. <Ref. to CVT(TR580)-94, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:
- Be sure to replace the differential side retainer oil seal with a new part whenever the front drive shaft is removed from the transmission.
- When a new differential side retainer oil seal has been installed, replacement is not required.

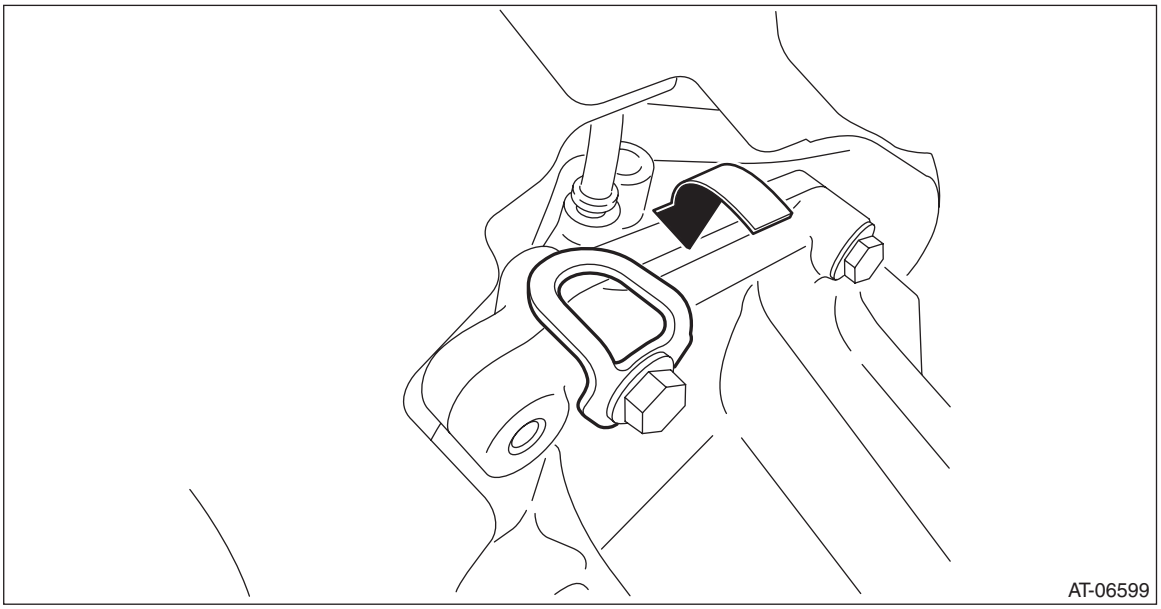
4) Install the rear cushion rubber on the transmission.

Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)



5) Mount the transmission onto the transmission jack.
6) Strike and bend the transmission hanger of transmission rear with a rubber hammer etc. so that it gets in contact with the transmission case.

CAUTION:
Do not apply extra overload or impact to the transmission case.

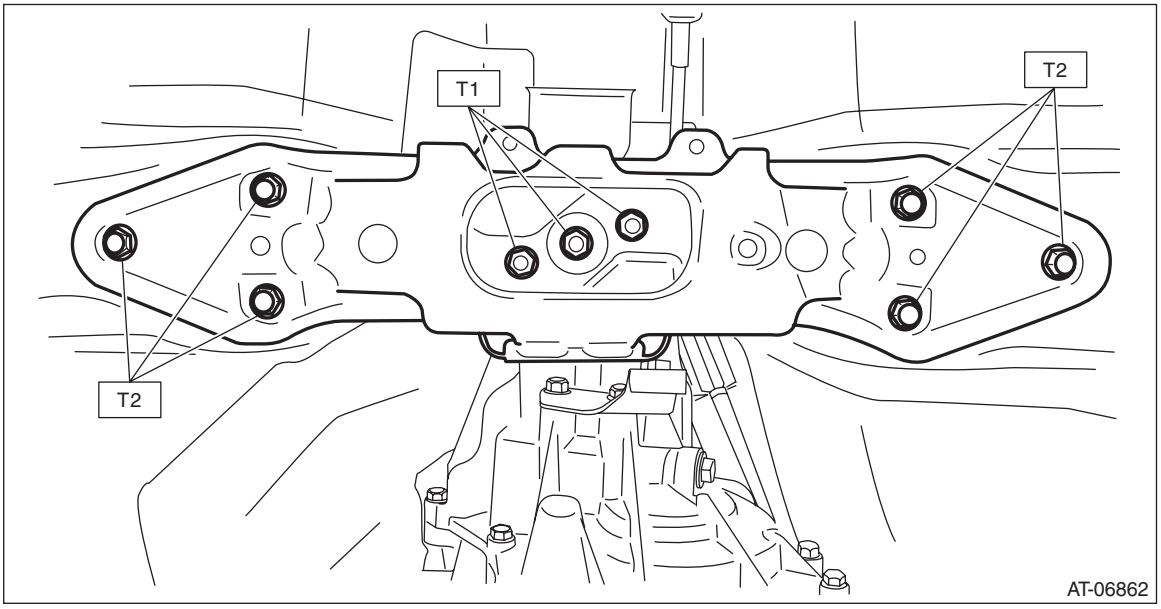


7) Remove the pitching stopper bracket, if mounted.
8) Install the transmission onto the engine.

NOTE:
- While raising the transmission jack gradually, turn the screw of engine support, then tilt the engine forward.
- Temporarily attach the two engine connecting bolts and two nuts (lower side).

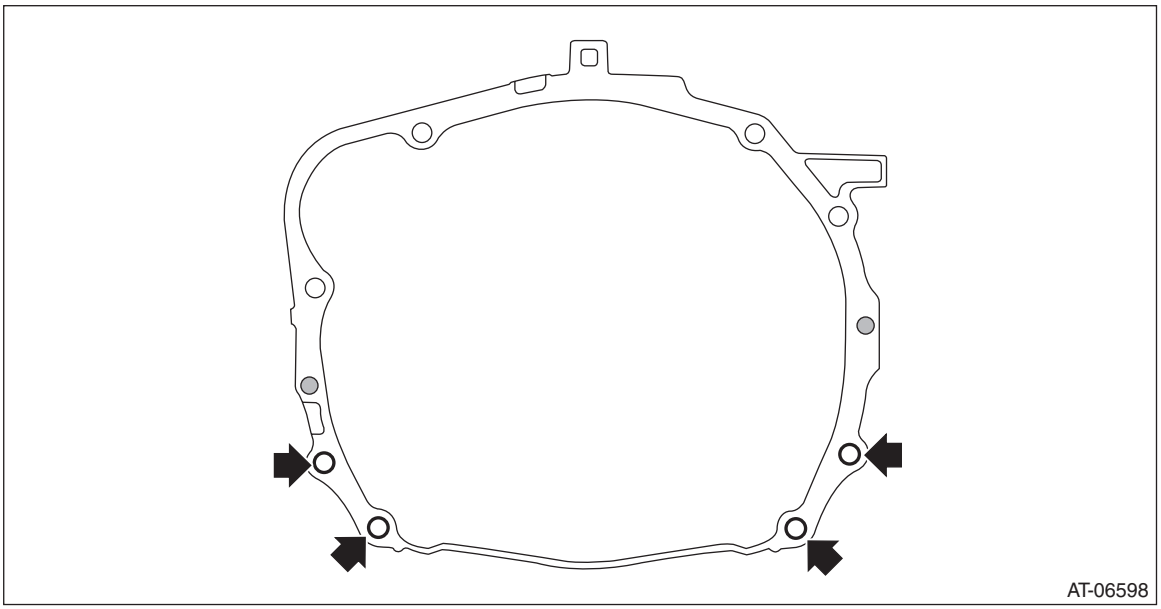
9) Install the transmission rear crossmember.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



10) Tighten the two engine connecting bolts and two nuts (lower side).

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

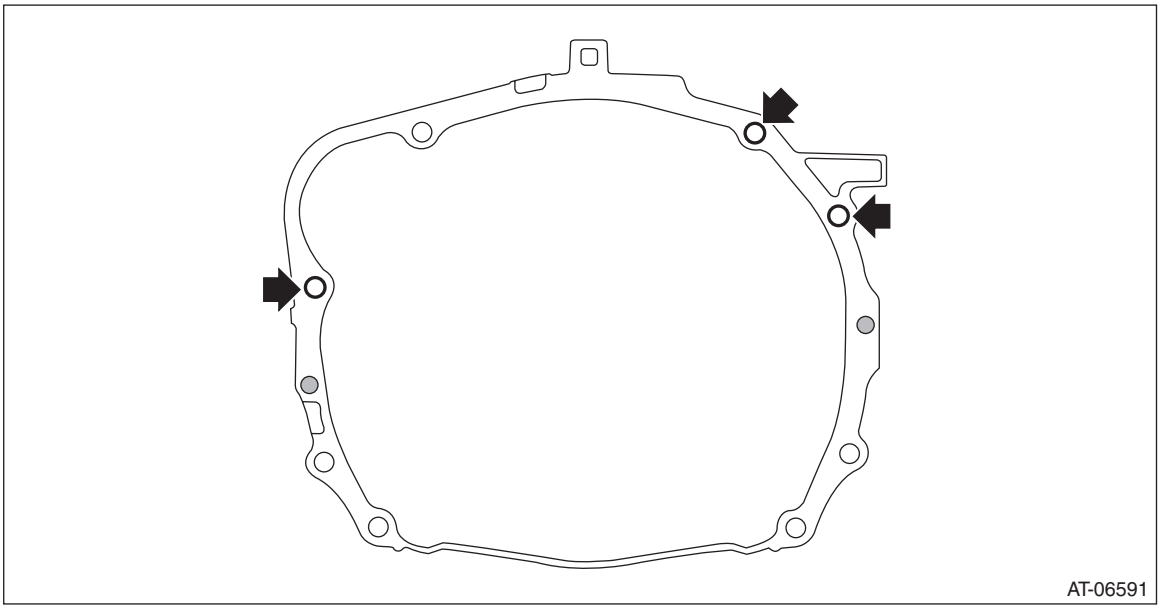


11) Tighten the hanger bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)

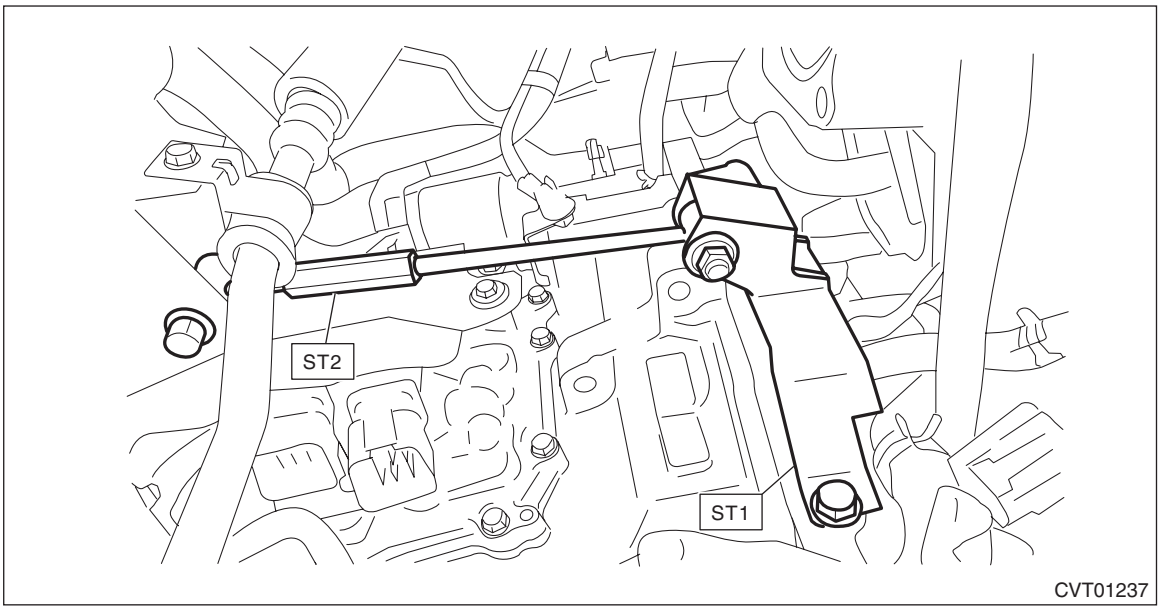
12) Remove the transmission jack.
13) Lower the vehicle.
14) Install the three engine mounting bolts (upper side).

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



15) Remove the ST (STOPPER SET) from converter case.

16) Remove the ST (ENGINE SUPPORT BRACKET and ENGINE SUPPORT).
ST1 41099AA012 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT



17) Match the torque converter screw hole with drive plate hole to install the bolt.

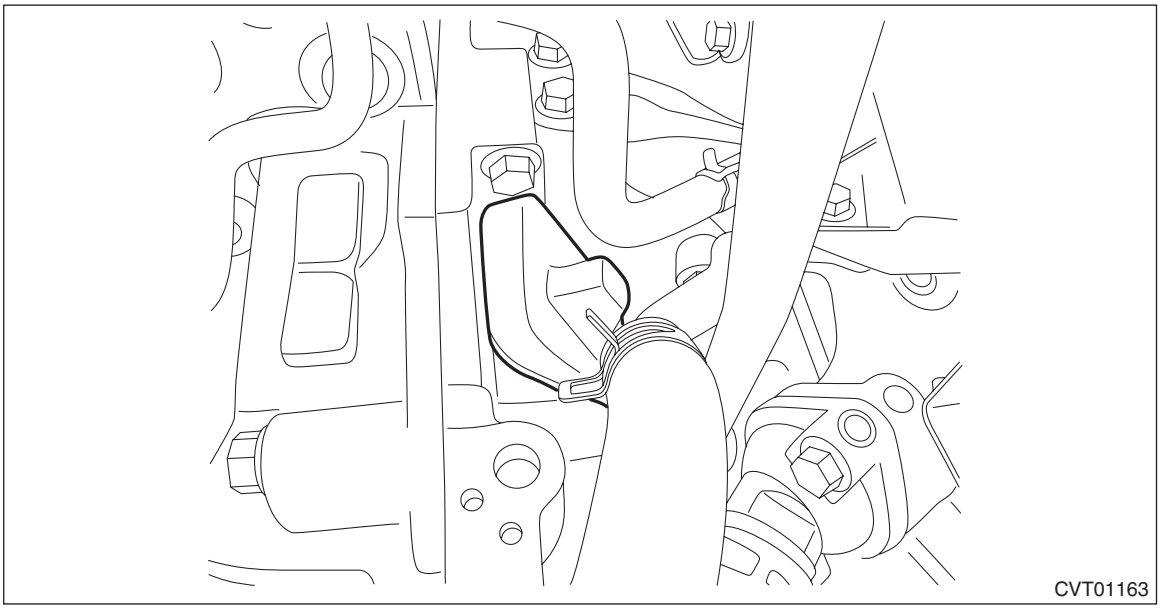
CAUTION:
- **Do not drop the mounting bolt in the converter housing.**
- **Do not damage the mounting bolt.**

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

18) Install the remaining three bolts by rotating the crank pulley a little at a time in the same direction as engine revolution.

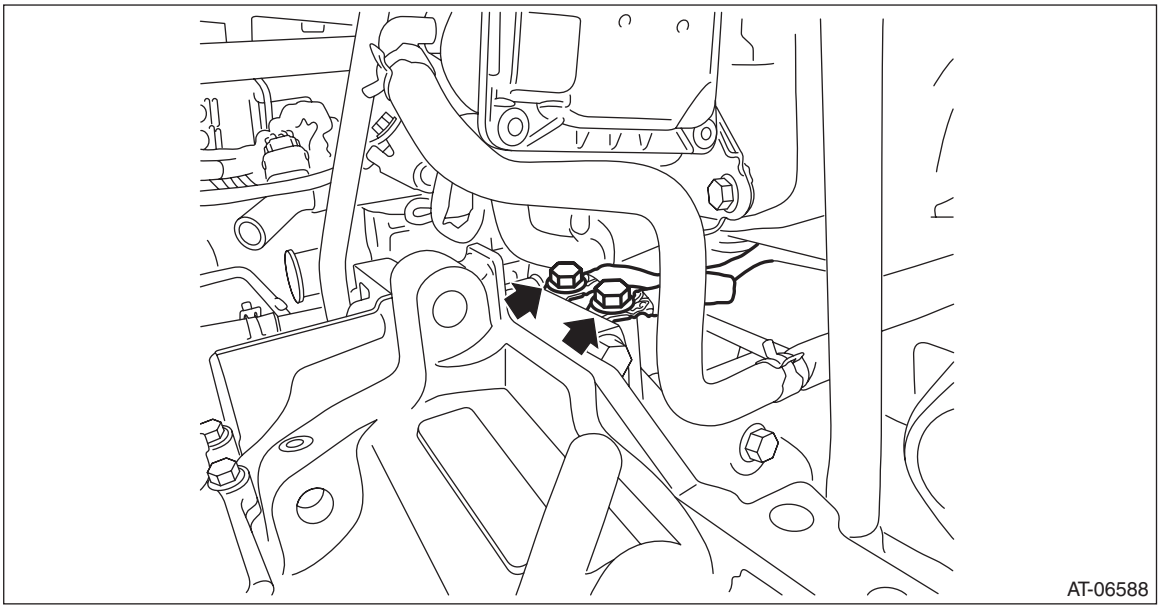
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

19) Install the service hole plug.

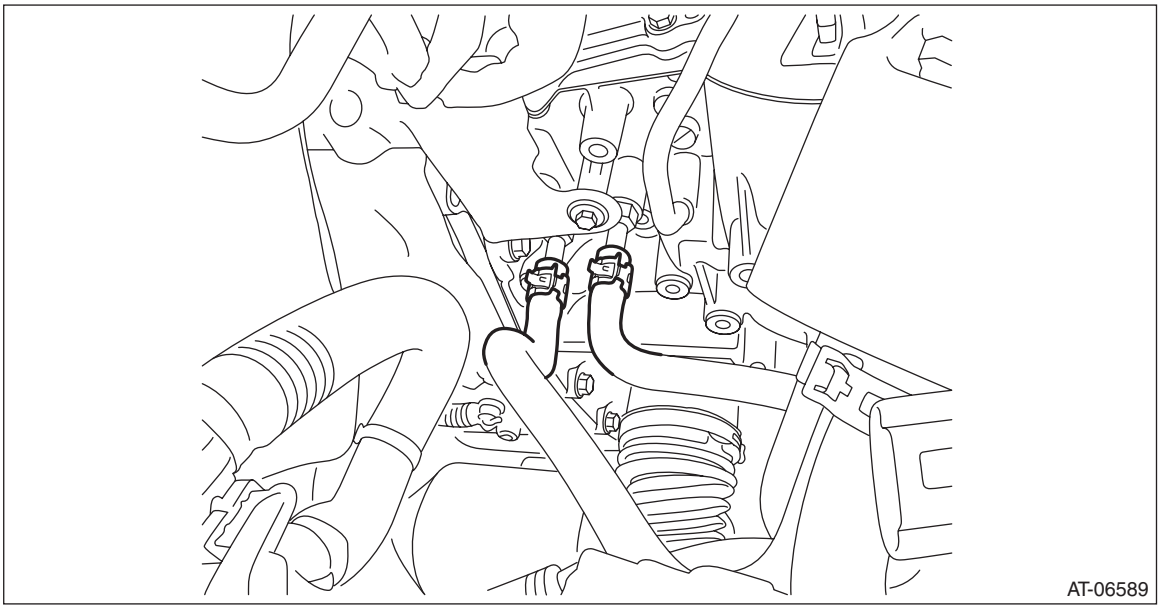


20) Install the throttle valve body. <Ref. to FU(H4DO(w/o HEV))-17, INSTALLATION, Throttle Body.>
21) Install the engine ground terminals.

Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)

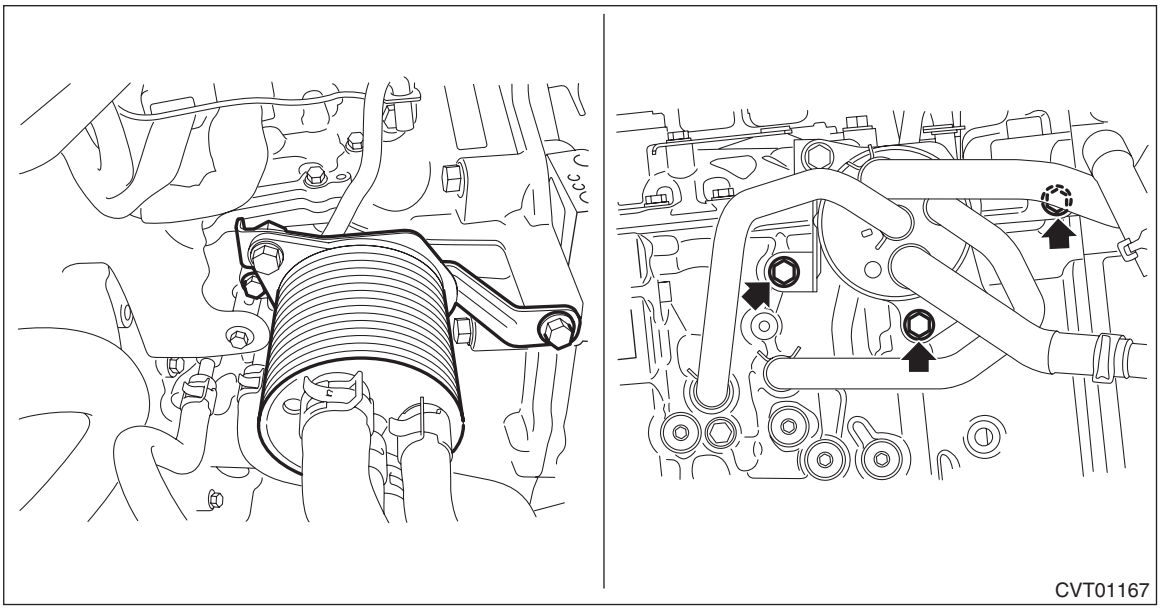


22) Replace the CVTF inlet hose and CVTF outlet hose. <Ref. to CVT(TR580)-153, REMOVAL, CVTF Cooler (With Warmer Function).> <Ref. to CVT(TR580)-157, INSTALLATION, CVTF Cooler (With Warmer Function).>
23) Install the CVTF inlet hose and CVTF outlet hose to transmission.



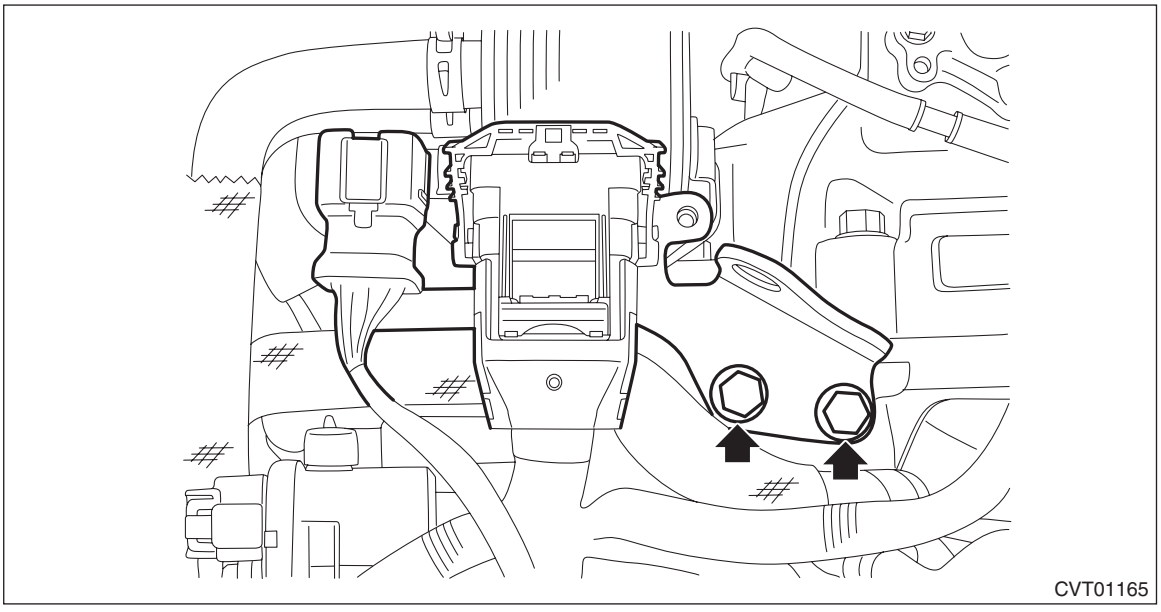
24) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



25) Install the starter. <Ref. to SC(H4DO(w/o HEV))-10, INSTALLATION, Starter.>
26) Install the engine hanger rear.

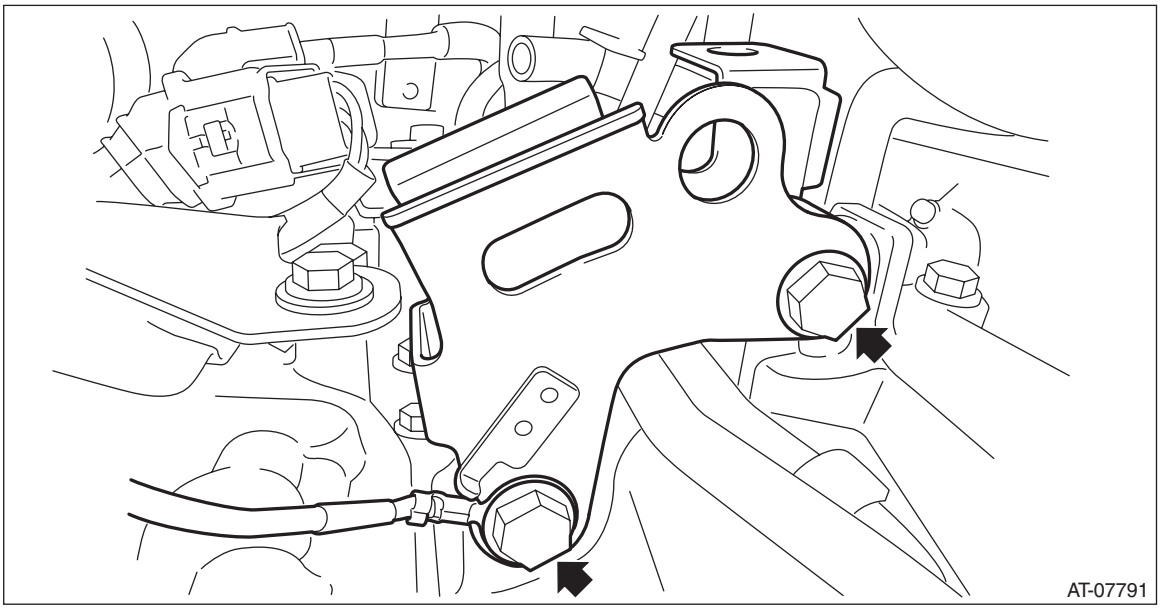
Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



27) Install the pitching stopper bracket and transmission radio ground cord.

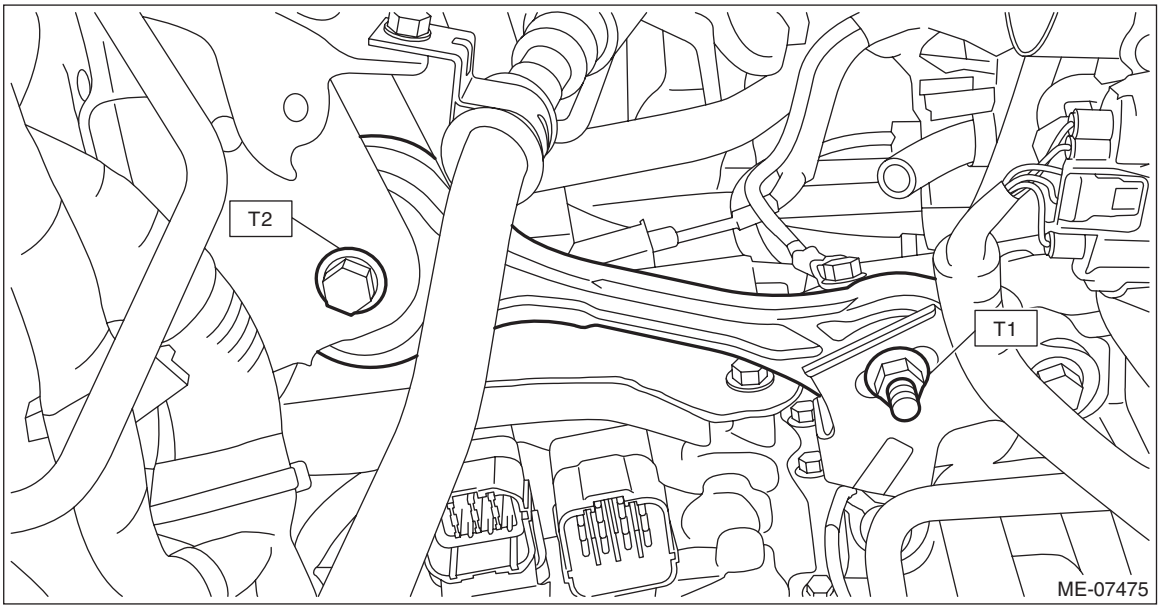
CAUTION:
Be careful not to deform or damage the terminal of transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



28) Install the air breather hose to the pitching stopper bracket.
29) Install the pitching stopper.

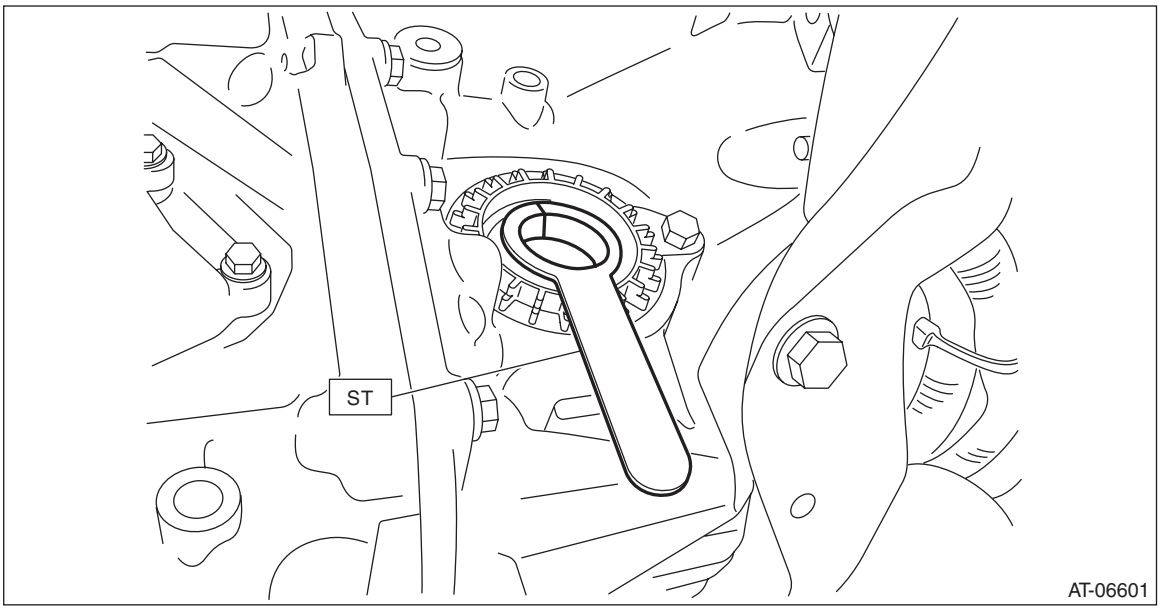
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



30) Connect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
31) Connect the engine harness connectors, then install the harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
32) Lift up the vehicle.

33) Apply grease to the side retainer oil seal lip.
34) Set the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR



35) Replace the circlip of the drive shaft with a new part.
36) Insert the front drive shaft spline section into transmission and remove the ST (OIL SEAL PROTECTOR).

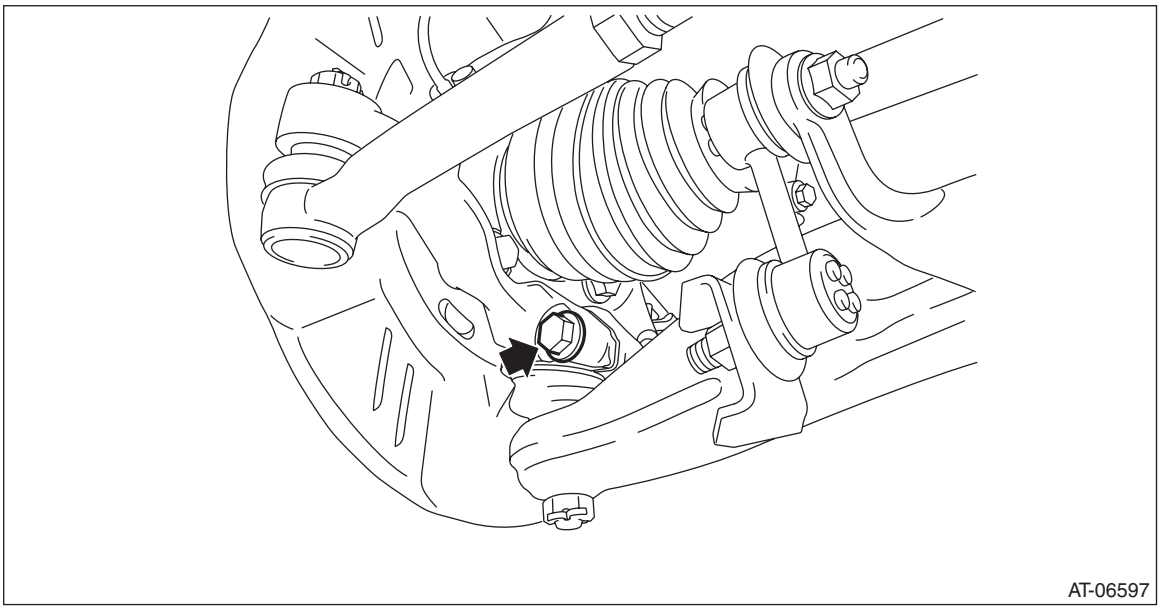
NOTE:
• Before inserting the RH front drive shaft into transmission, turn the steering wheel to the right hand at full lock.
• Before inserting the LH front drive shaft into transmission, turn the steering wheel to the left hand at full lock.

37) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.

38) Insert the ball joint into housing and secure with bolt.

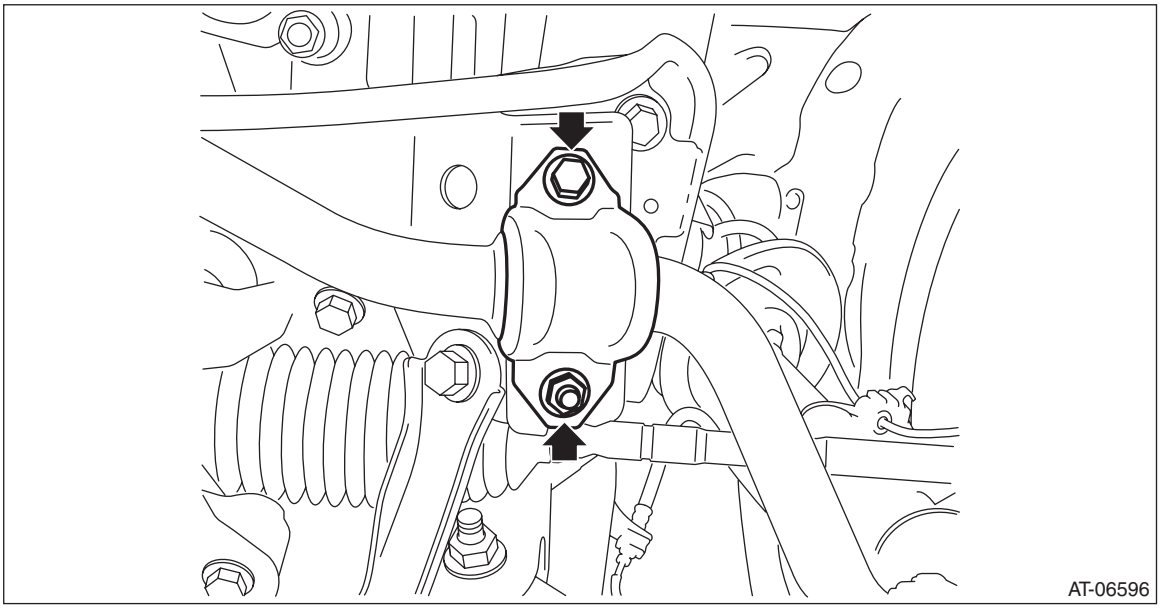
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.**



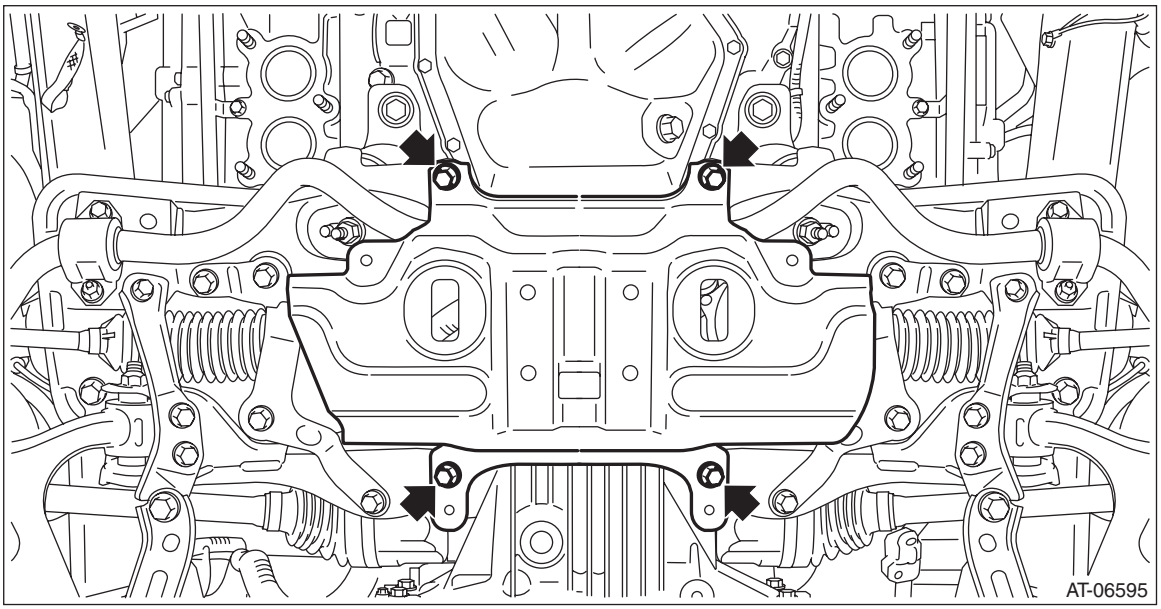
39) Install the stabilizer bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



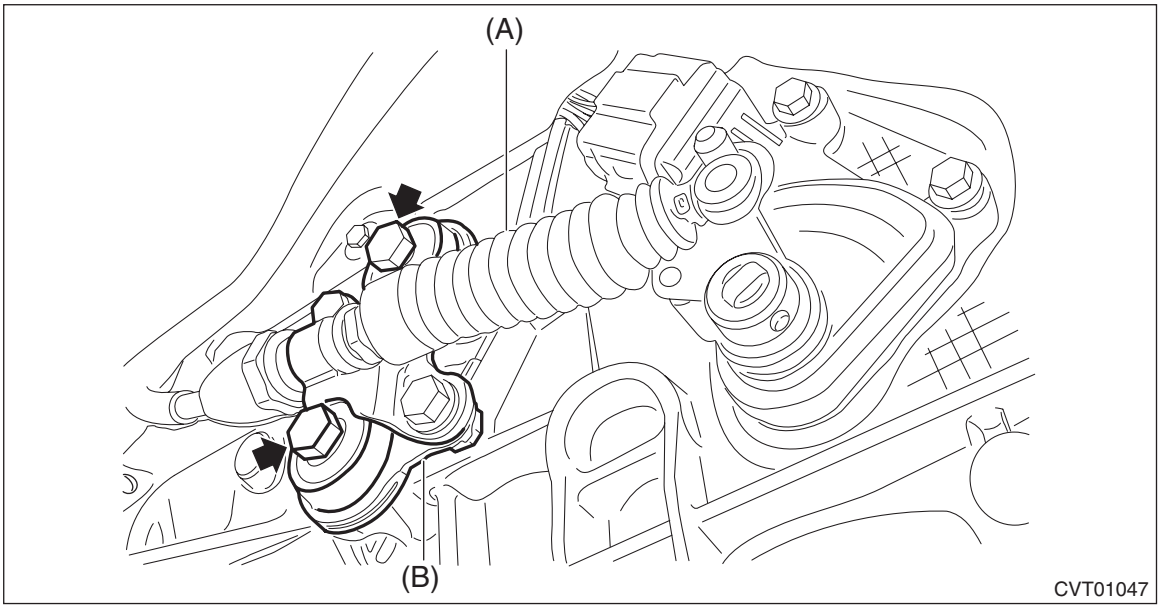
40) Install the jack-up plate.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



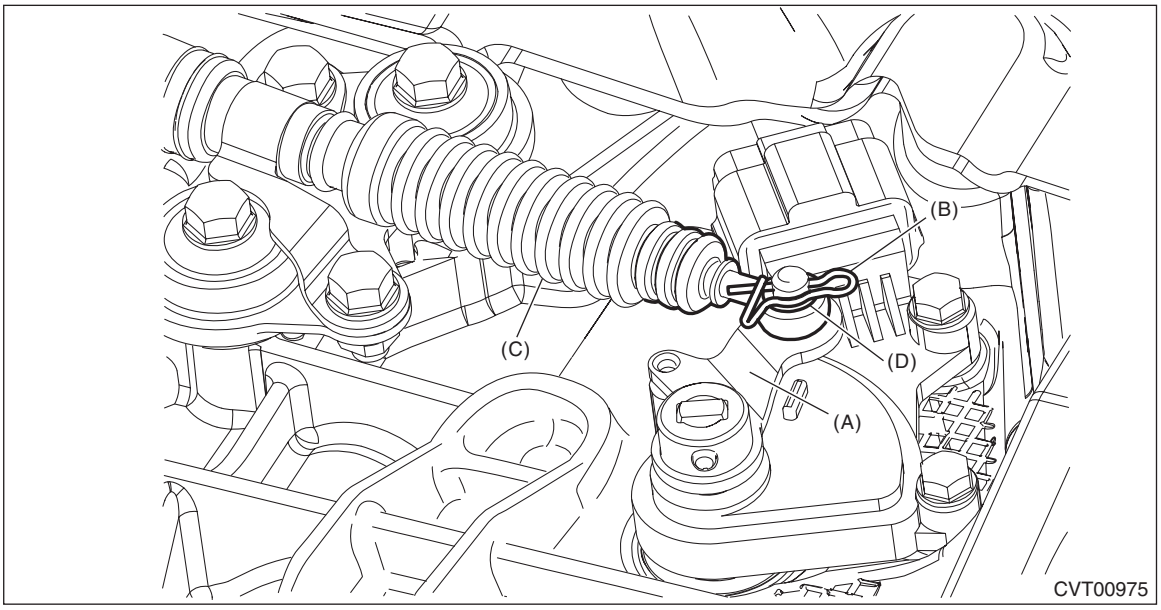
41) Install the plate assembly to transmission.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Select cable
(B) Plate ASSY

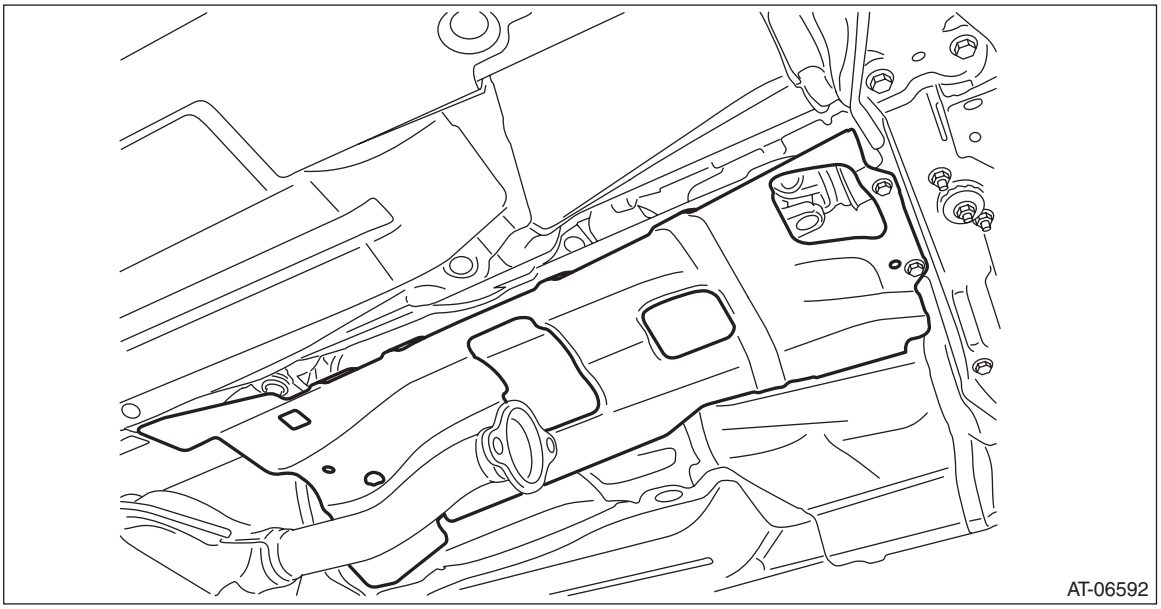
42) Install the washer and snap pin to the shifter arm.



(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

43) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
44) Install the center exhaust cover.

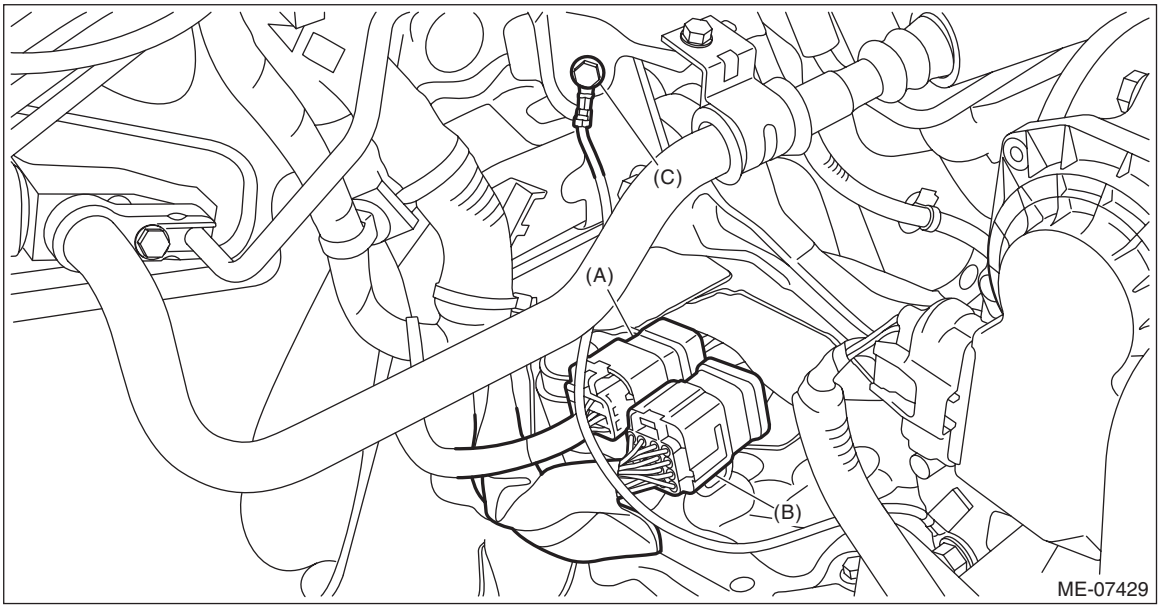
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



45) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
46) Install the under cover.
47) Lower the vehicle.

48) Connect the following harness connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

49) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
50) Install the front tires. <Ref. to WT-5, INSTALLATION, Tire and Wheel.>
51) Connect the battery ground terminal.
52) Refill differential gear oil to adjust the differential gear oil amount. <Ref. to CVT(TR580)-43, Differential Gear Oil.>
53) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TR580)-38, CVTF.>
54) Perform the operation for clearing AT learning value. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.>
55) Perform the operation of AT learning mode. <Ref. to CVT(w/o HEV)(diag)-26, Learning Control.>
56) Execute the rear differential inspection mode. <Ref. to DI-67, Rear Differential Inspection Mode.>

CAUTION:
Always execute the rear differential inspection mode at the replacement of the following.
- **Replacement of transmission assembly**
- **Replacement of front differential hypoid gear set**

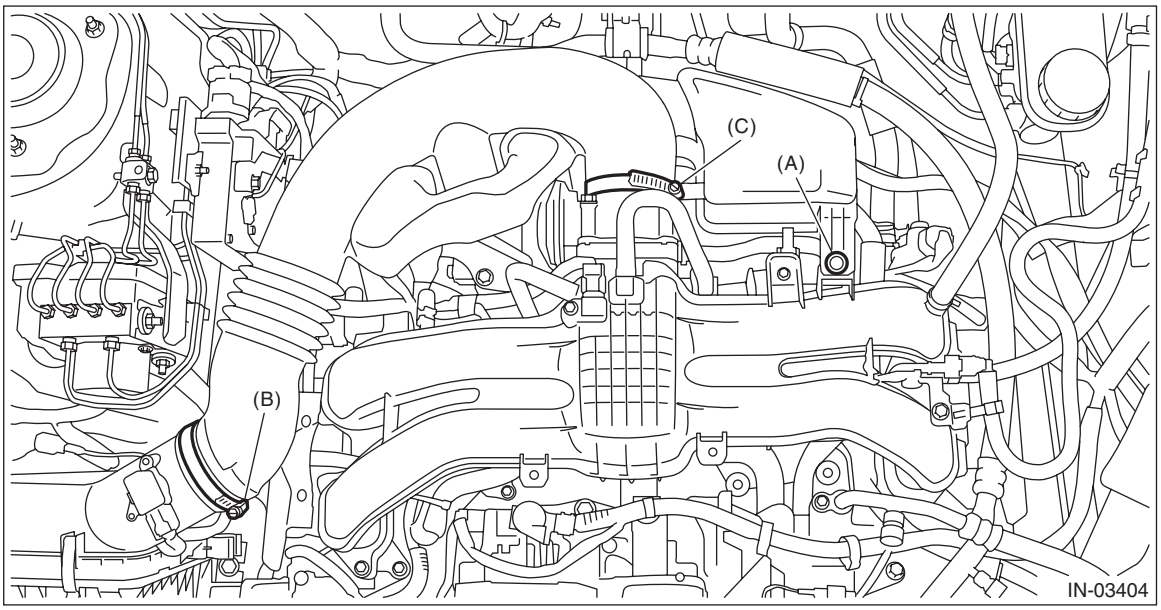
57) Perform the road test to make sure there is no fault. <Ref. to CVT(TR580)-48, INSPECTION, Road Test.>

11.Transmission Mounting System

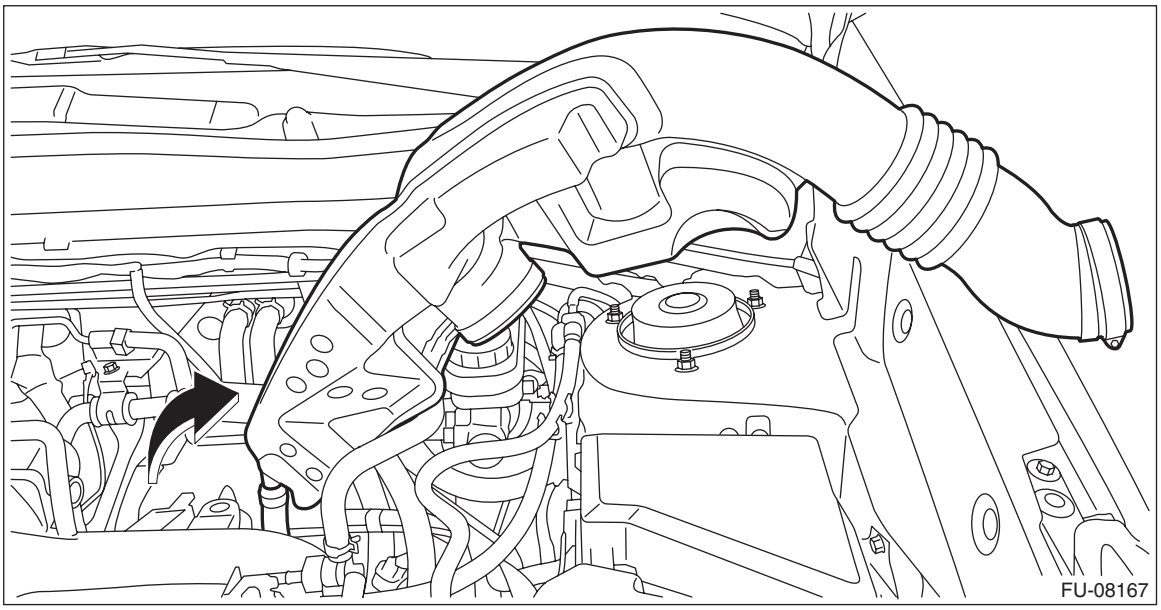
A: REMOVAL

1. PITCHING STOPPER

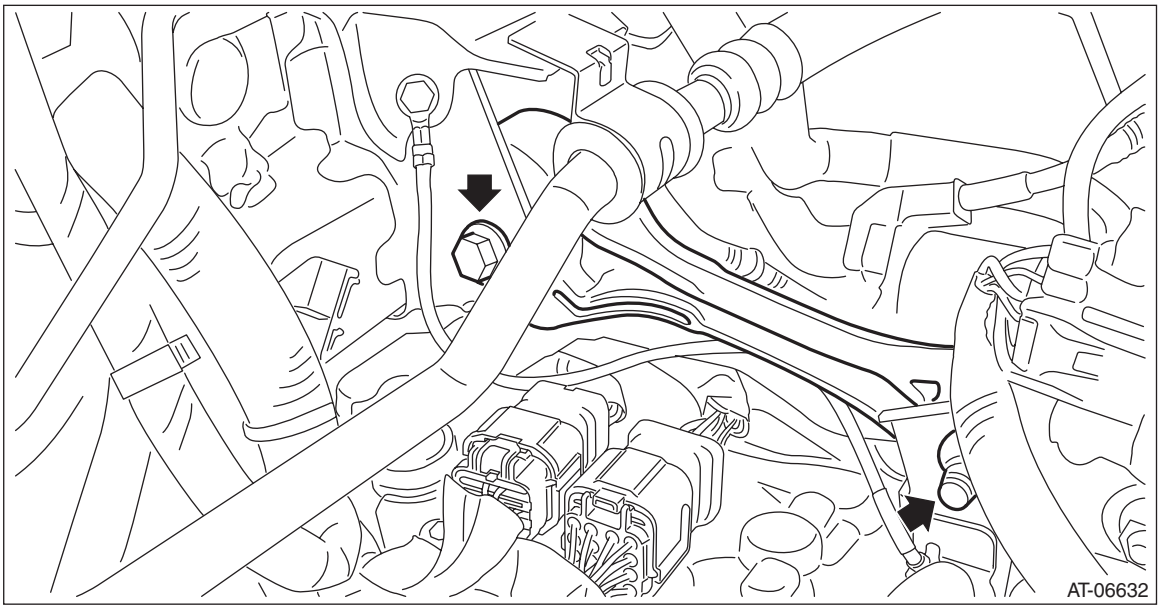
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

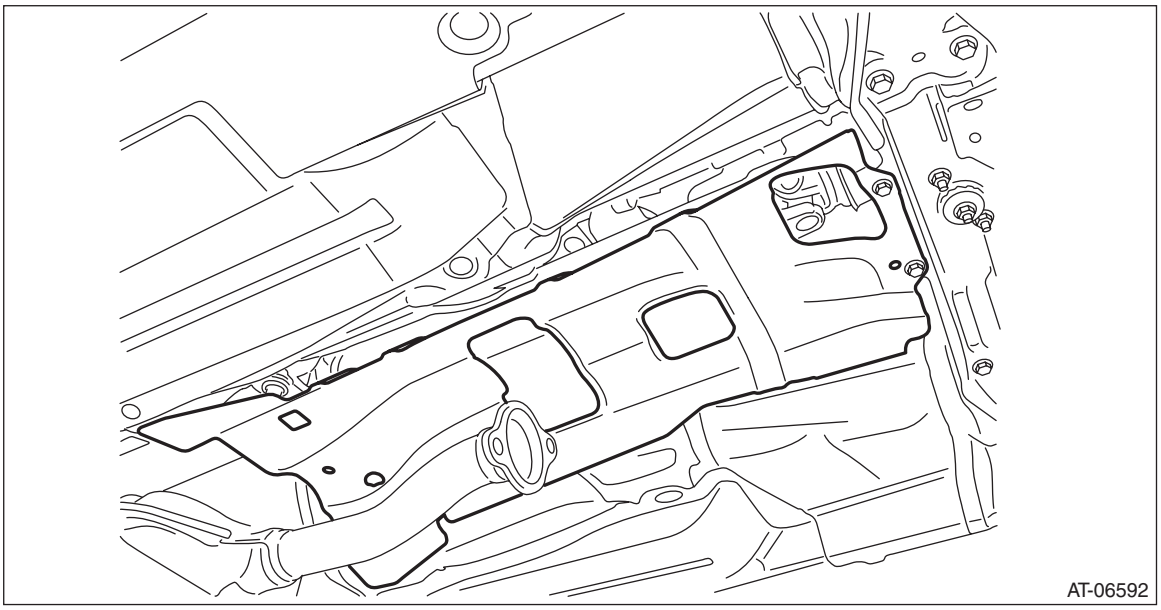


6) Remove the pitching stopper.



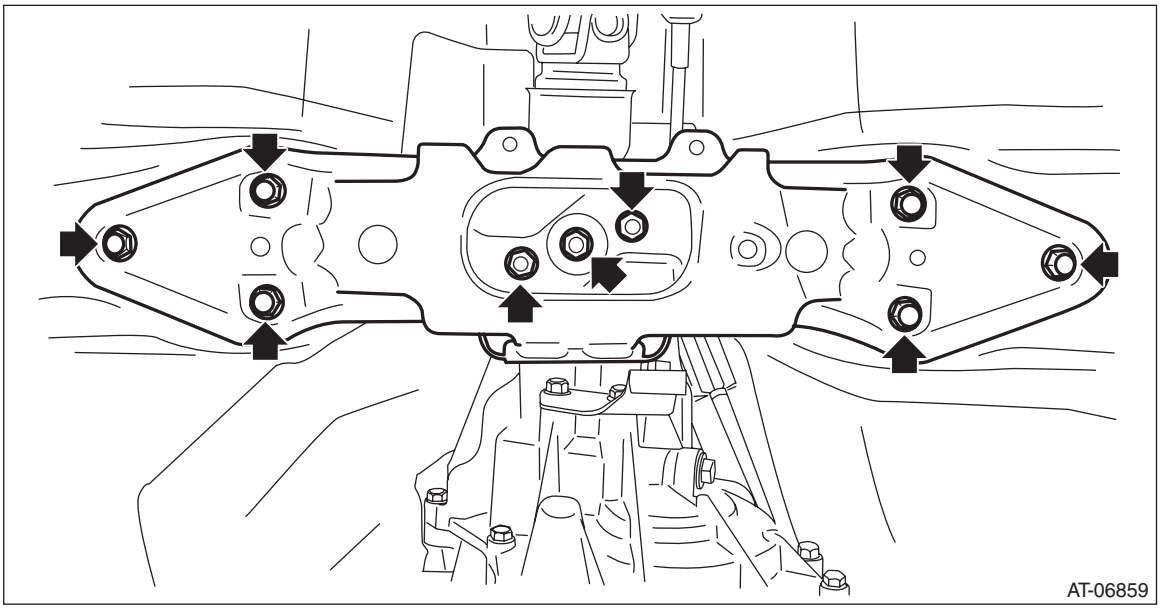
2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Remove the center exhaust cover.

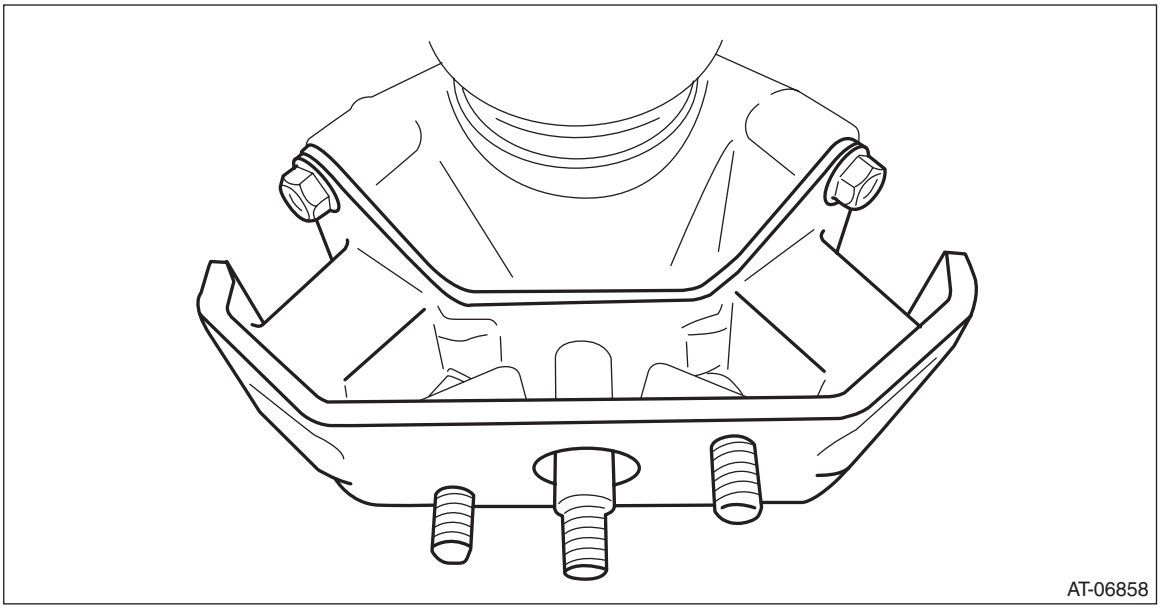


5) Set the transmission jack under the transmission. Make sure that the support plate of transmission jack does not touch the oil pan.

6) Remove the transmission rear crossmember.



7) Remove the rear cushion rubber.

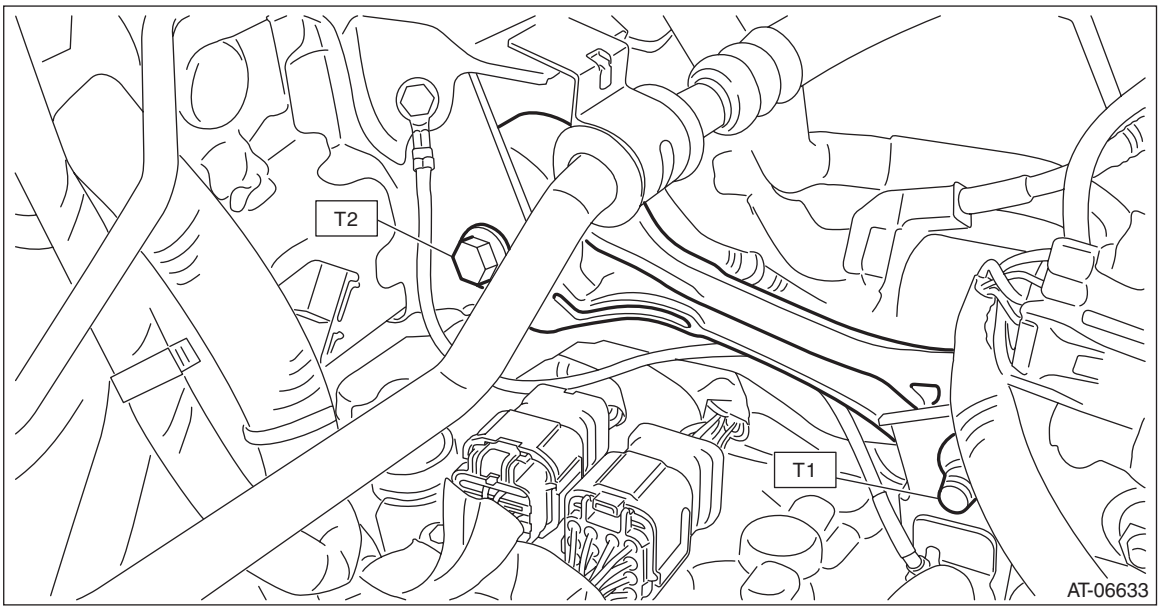


B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)

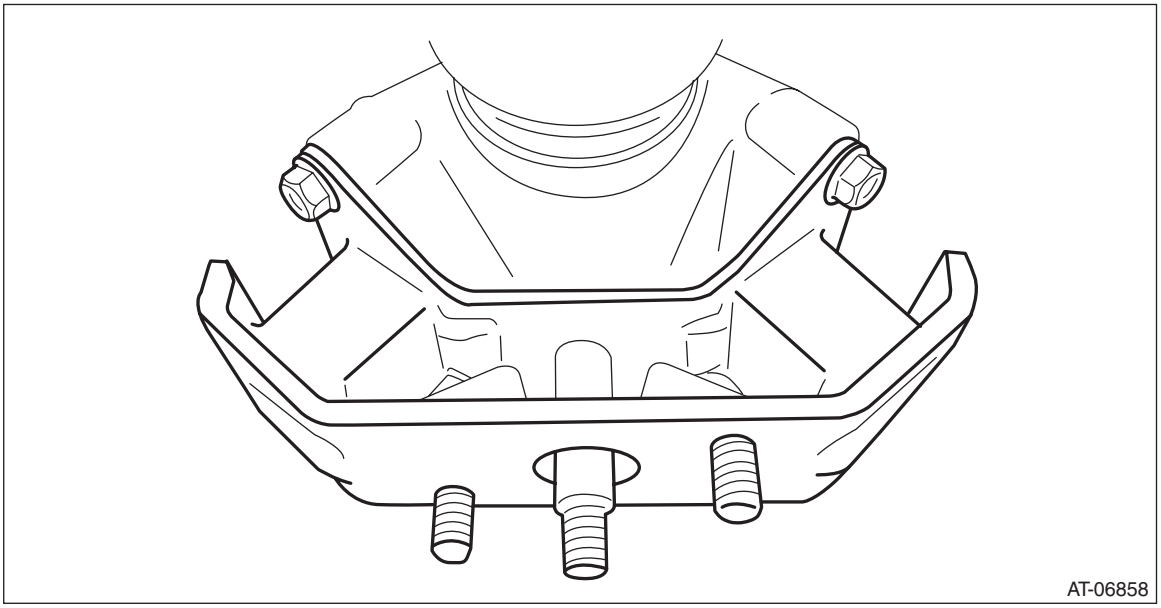


2) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
3) Connect the battery ground terminal.

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

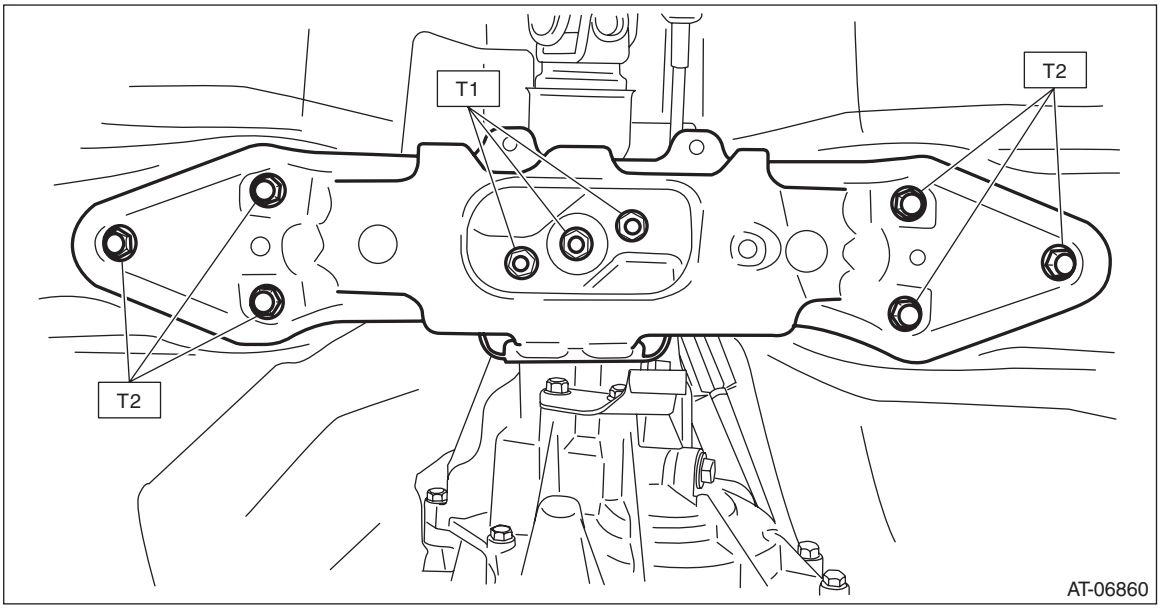
1) Attach the rear cushion rubber to the transmission.

Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)



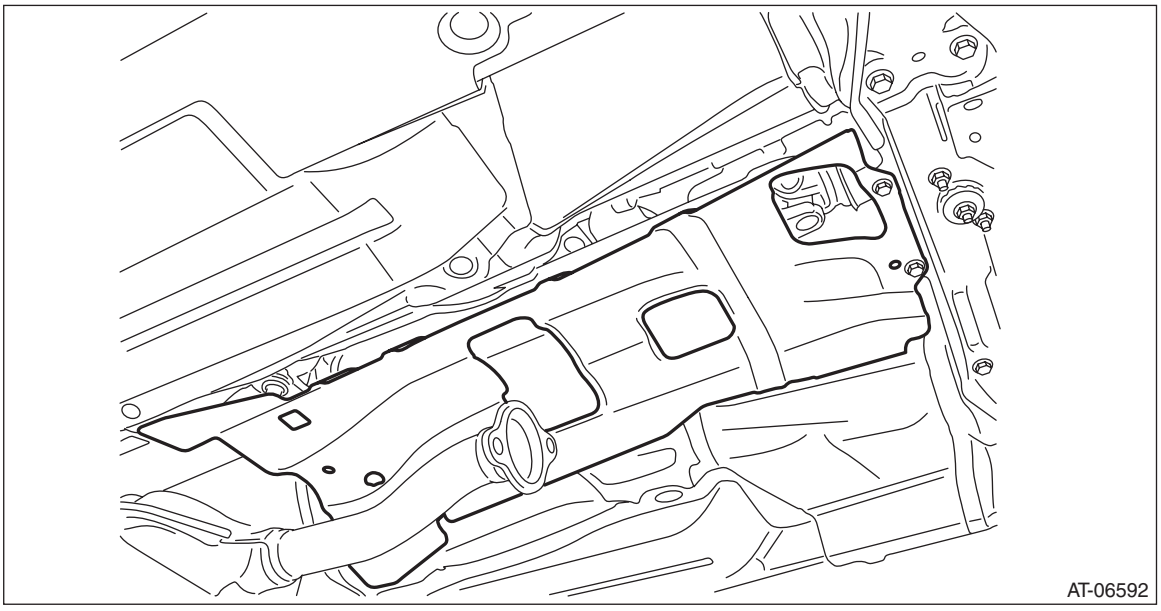
2) Install the crossmember.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



3) Remove the transmission jack.
4) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



5) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
6) Connect the battery ground terminal.

C: INSPECTION

- Check the crossmember for bends or damage.
- Check that the cushion rubber is not stiff, cracked or otherwise damaged.
- Check the pitching stopper for bends or damage.

12.Extension Case Oil Seal

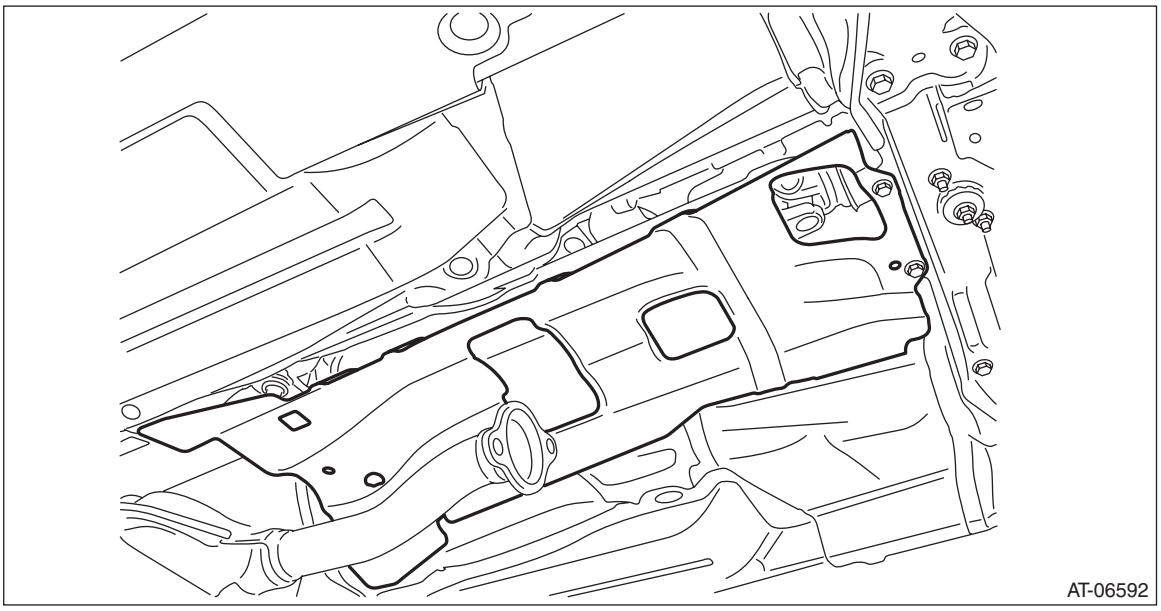
A: INSPECTION

Check for leakage of CVTF from the joint section of transmission and propeller shaft. If a leak is found, inspect the propeller shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:
Immediately after the vehicle has been running or after idling for a long time, the CVTF will be hot. Be careful not to burn yourself.

1) Lift up the vehicle.
2) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
3) Remove the center exhaust cover.



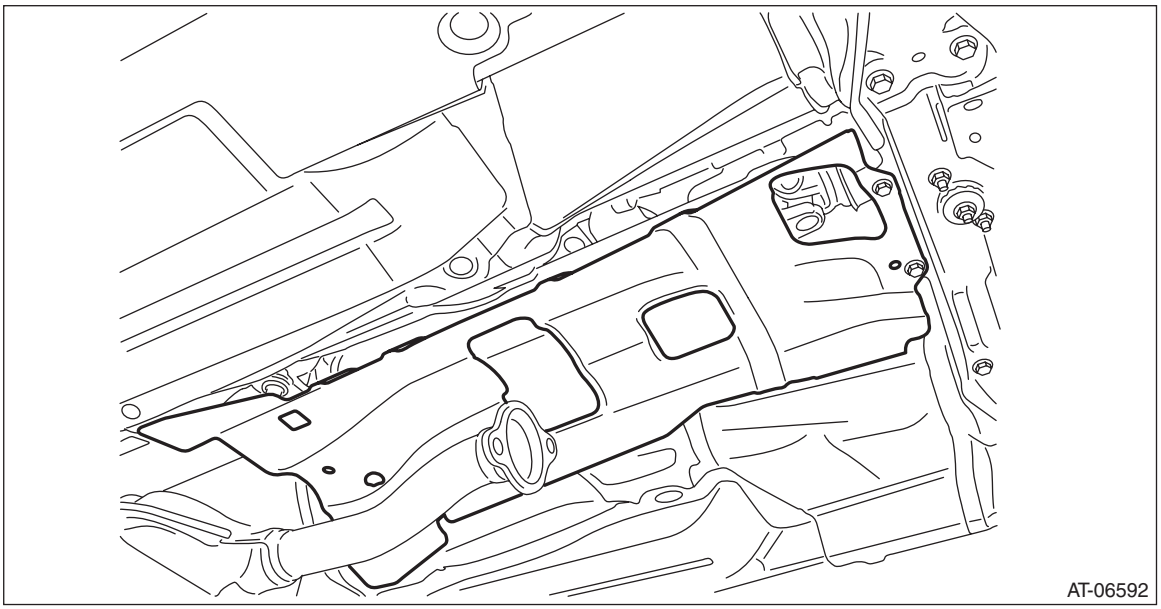
4) Clean the transmission exterior.
5) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
6) Using a screwdriver or ST, remove the oil seal trying not to damage the extension case.
ST 398527700 PULLER ASSY
7) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

ST 498057300 OIL SEAL INSTALLER
8) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>

9) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



10) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
11) Adjust the CVTF level and check there is no leakage. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

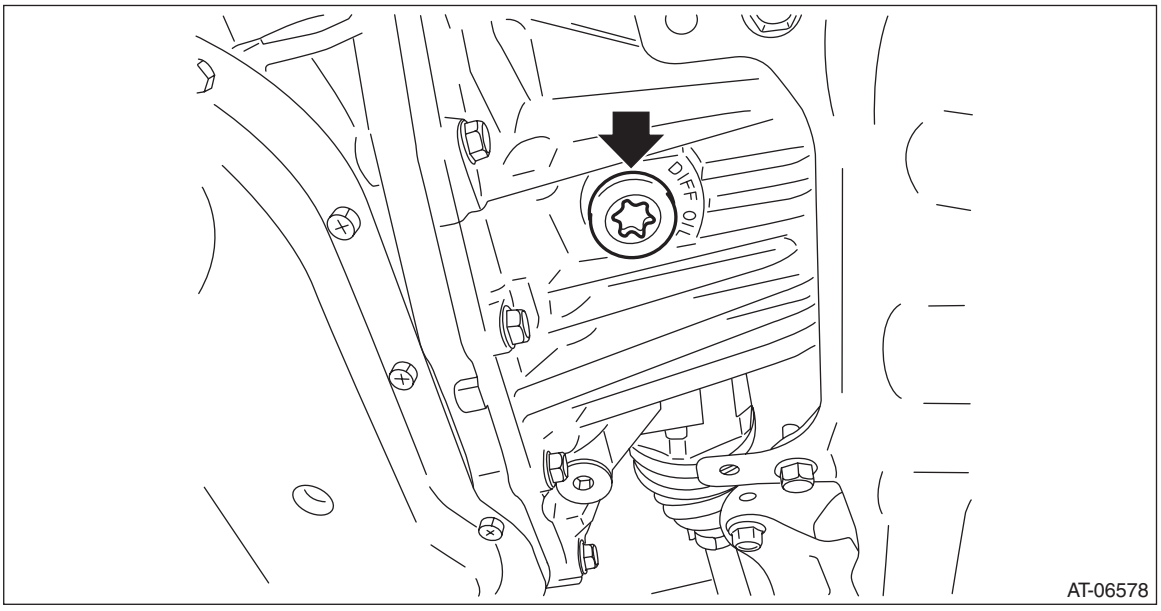
13.Differential Side Retainer Oil Seal

A: INSPECTION

Check for leakage of gear oil from differential side retainer oil seal part. If there is an oil leak, inspect the front drive shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
• Be careful not to spill the differential gear oil on exhaust pipe to prevent it from emitting smoke or fire. If differential gear oil is spilled on the exhaust pipe, wipe it off completely.
1) Remove the front tires. <Ref. to WT-5, REMOVAL, Tire and Wheel.>
2) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
3) Remove the differential gear oil drain plug using TORX® bit T70, and then drain differential gear oil.

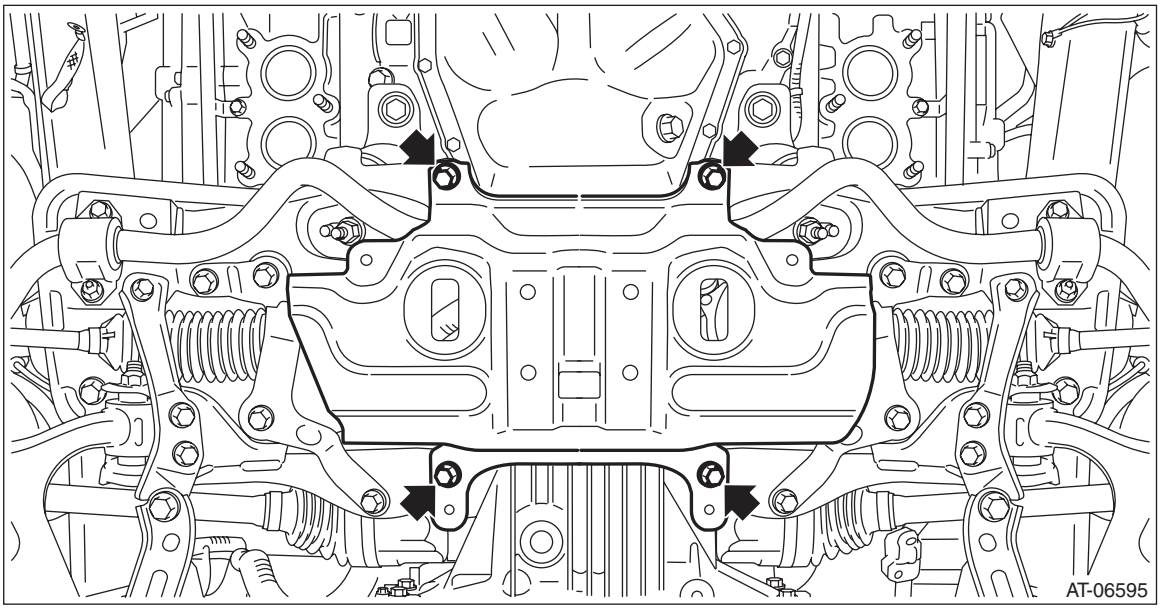


4) Tighten the differential gear oil drain plug.

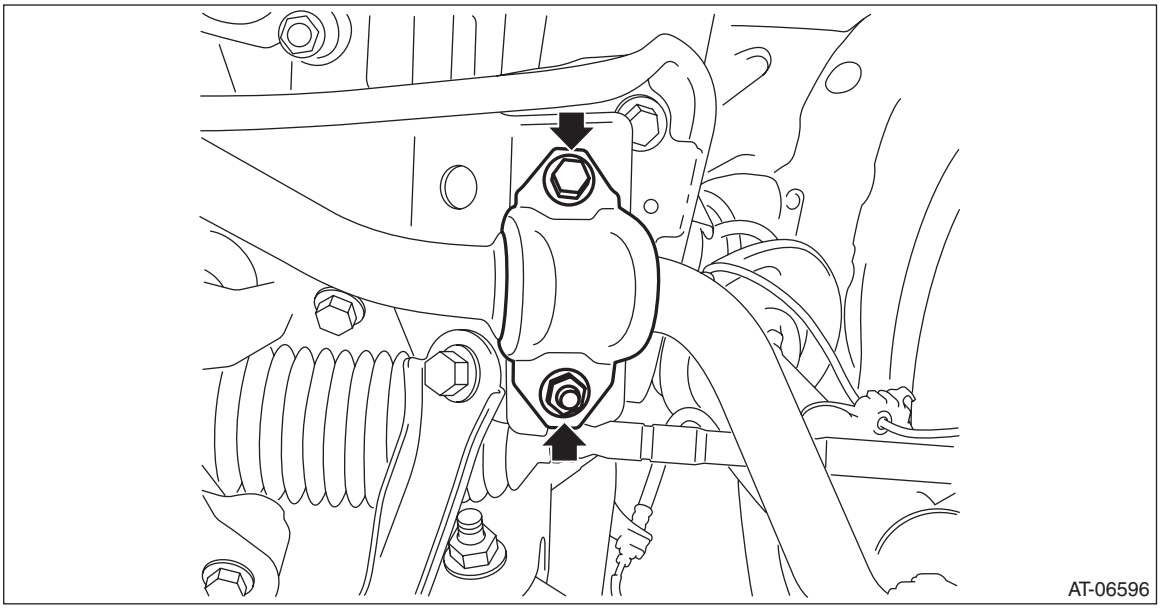
NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

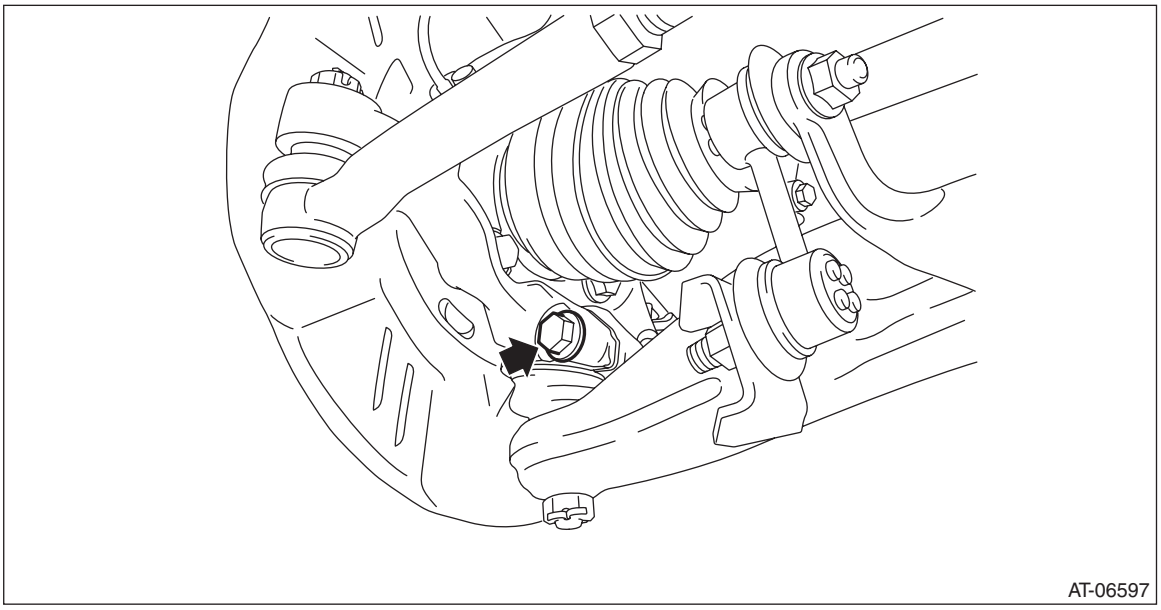
5) Remove the jack-up plate.



6) Remove the stabilizer bracket.



7) Remove the bolts which secure to the front housing, and separate the front arm and housing.



8) Using a crowbar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the crowbar and the transmission in order to avoid damaging the transmission side retainer.

9) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.

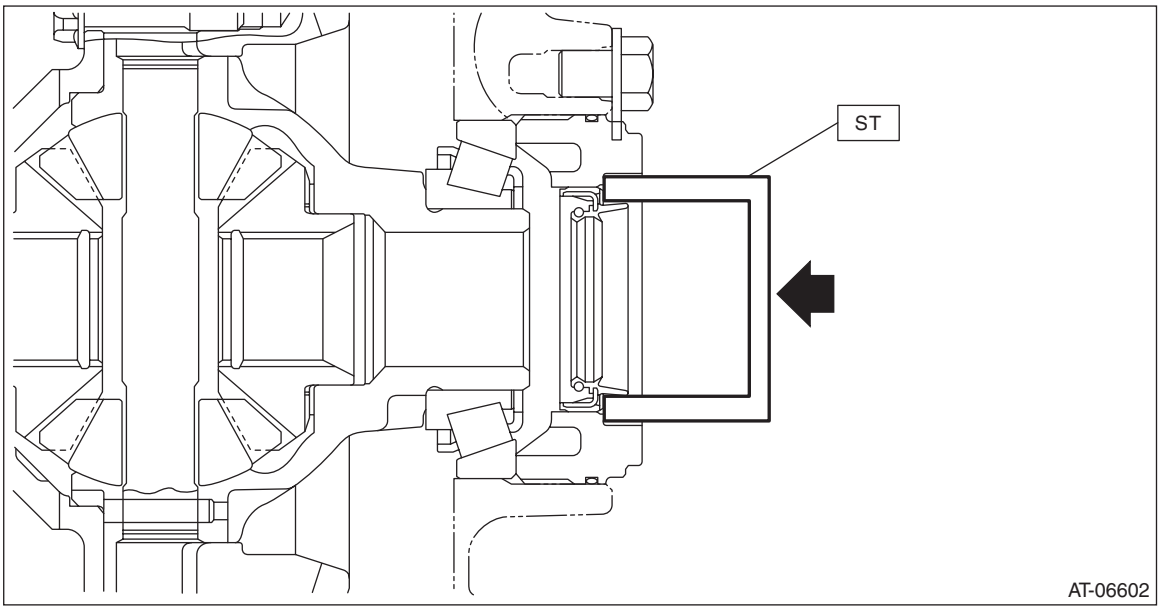
NOTE:
- Before pulling the RH front drive shaft from transmission, turn the steering wheel to the right hand at full lock.
- Before pulling the LH front drive shaft from transmission, turn the steering wheel to the left hand at full lock.

10) Remove the differential side retainer oil seal using driver wrapped with vinyl tape etc.

11) Using the ST, install the differential side retainer oil seal by lightly tapping with a hammer.

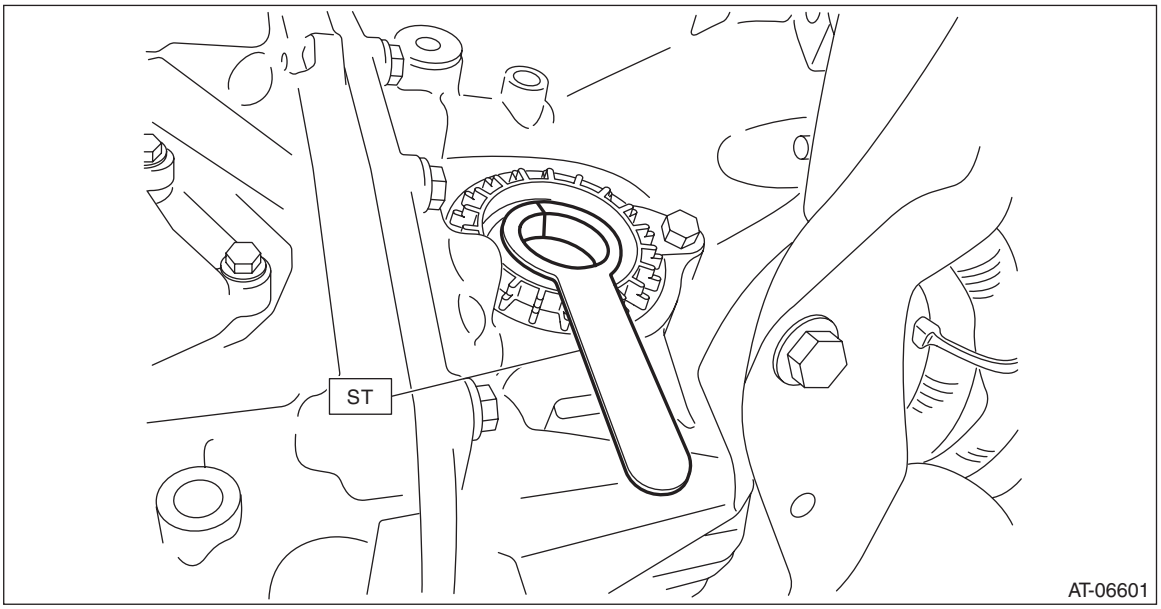
NOTE:
- Apply differential gear oil to the lip surface, so that the oil seal lip is not deformed.
- Apply differential gear oil to the press-fitting surface of oil seal and the differential side retainer.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



12) Apply grease to the side retainer oil seal lip.
13) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR



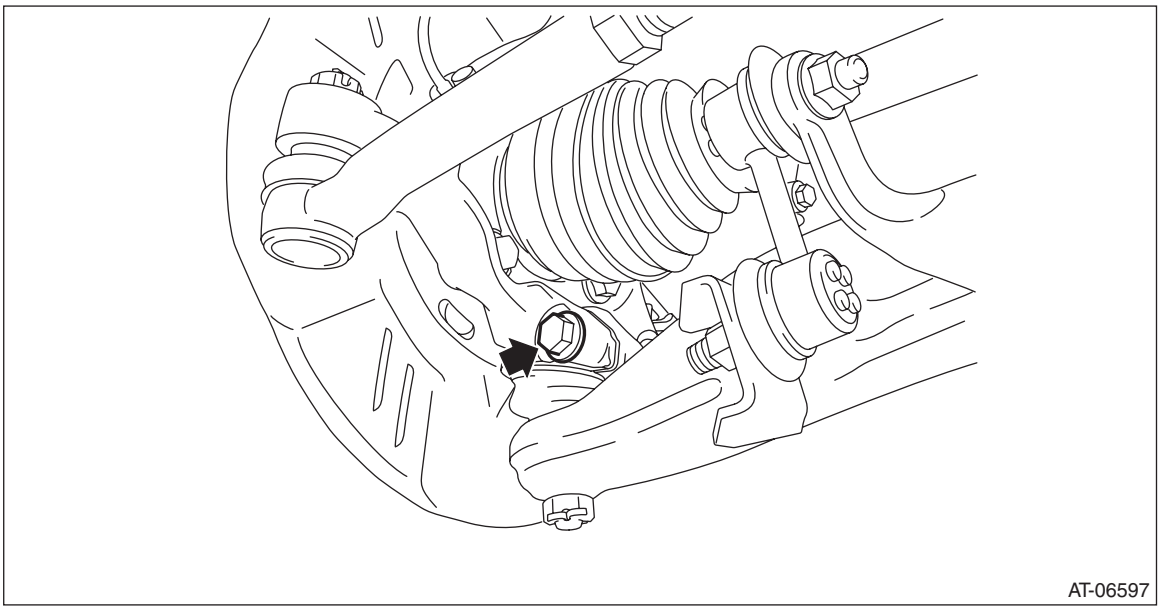
14) Replace the circlip of the drive shaft with a new part.
15) Insert the front drive shaft spline section into transmission and remove the ST (DIFFERENTIAL SIDE OIL SEAL INSTALLER).

NOTE:
- Before inserting the RH front drive shaft into transmission, turn the steering wheel to the right hand at full lock.
- Before inserting the LH front drive shaft into transmission, turn the steering wheel to the left hand at full lock.

16) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.
17) Insert the ball joint into housing and secure with bolt.

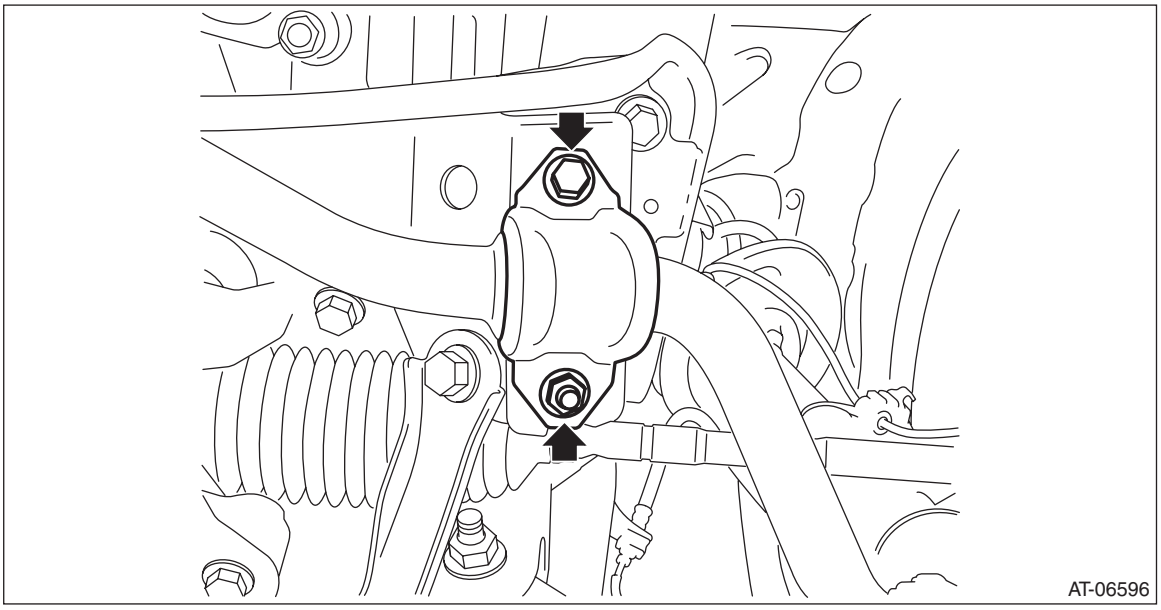
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.**


AT-06597

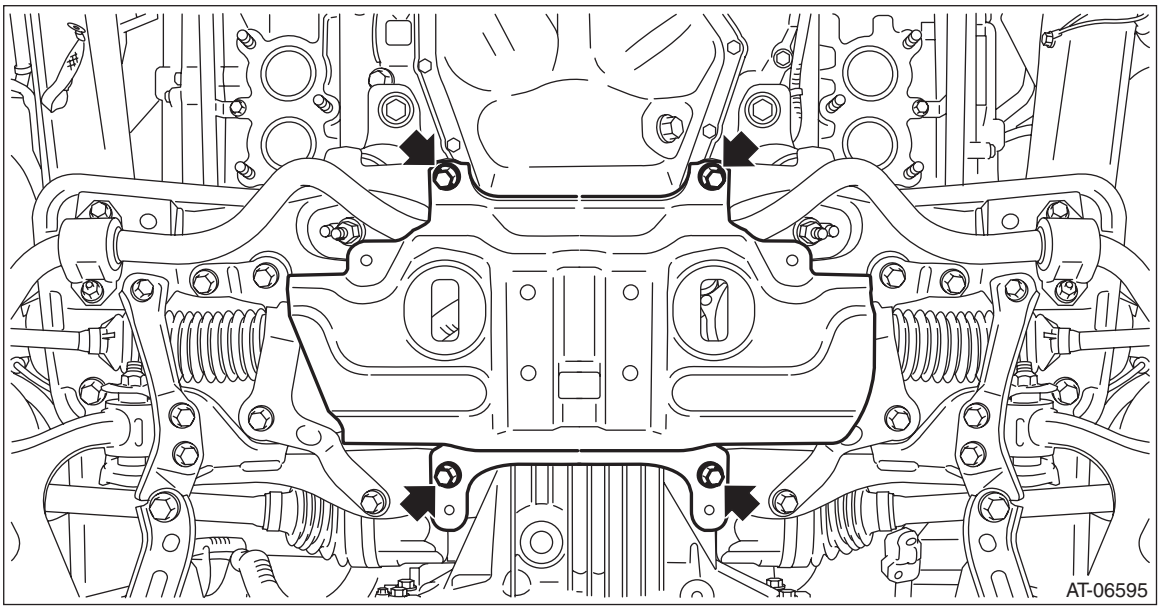
18) Install the stabilizer bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


AT-06596

19) Install the jack-up plate.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



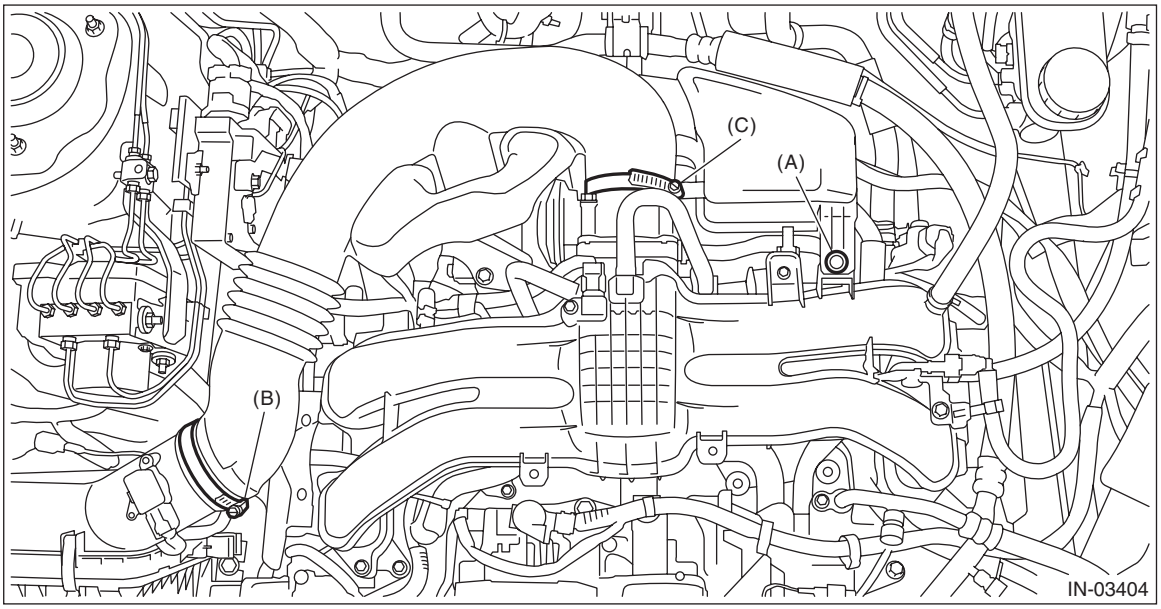
20) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
21) Fill differential gear oil. <Ref. to CVT(TR580)-43, Differential Gear Oil.>
22) Adjust the differential gear oil level, and check for leakage. <Ref. to CVT(TR580)-43, ADJUSTMENT, Differential Gear Oil.>
23) Install the front tires. <Ref. to WT-5, INSTALLATION, Tire and Wheel.>

14.Inhibitor Switch

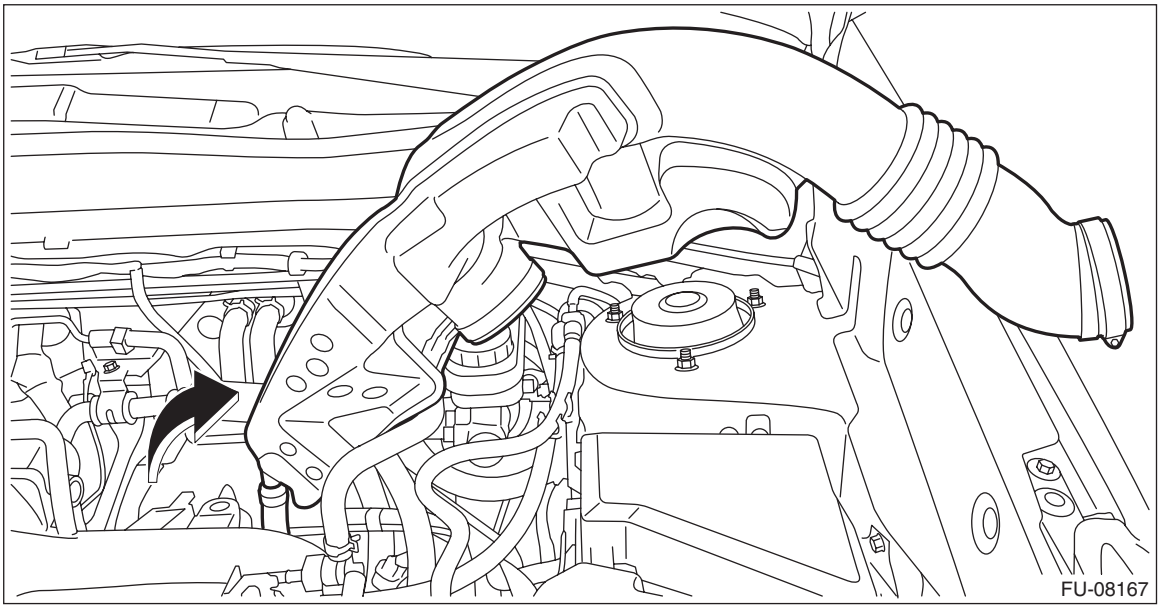
A: INSPECTION

When the driving condition or starter motor operation is improper, first check the shift linkage for improper operation. If the shift linkage is functioning properly, check the inhibitor switch.

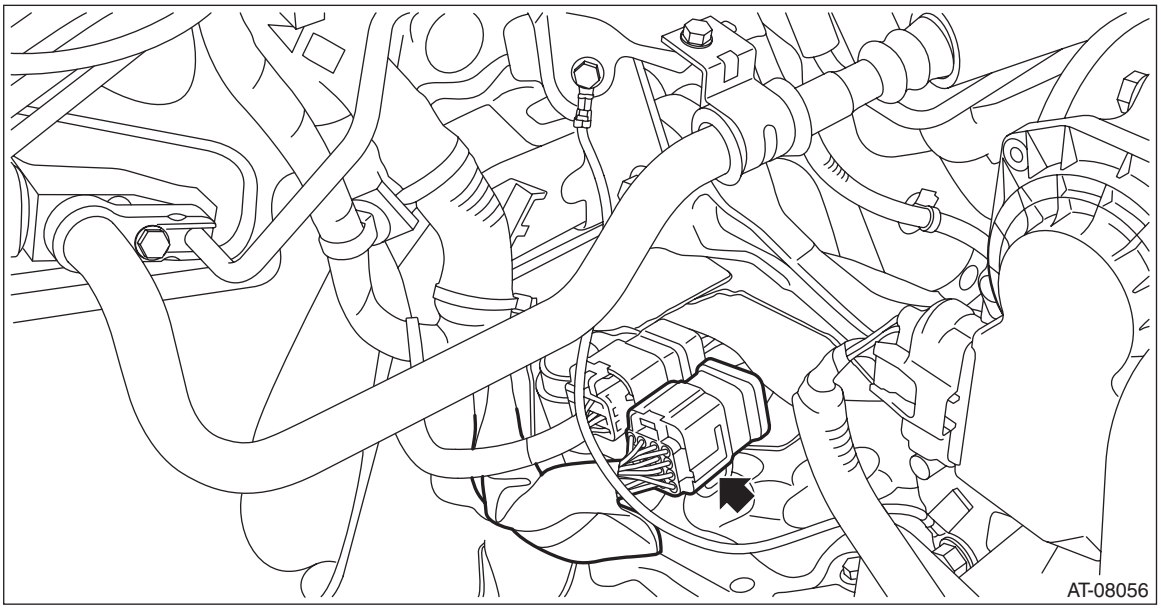
1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



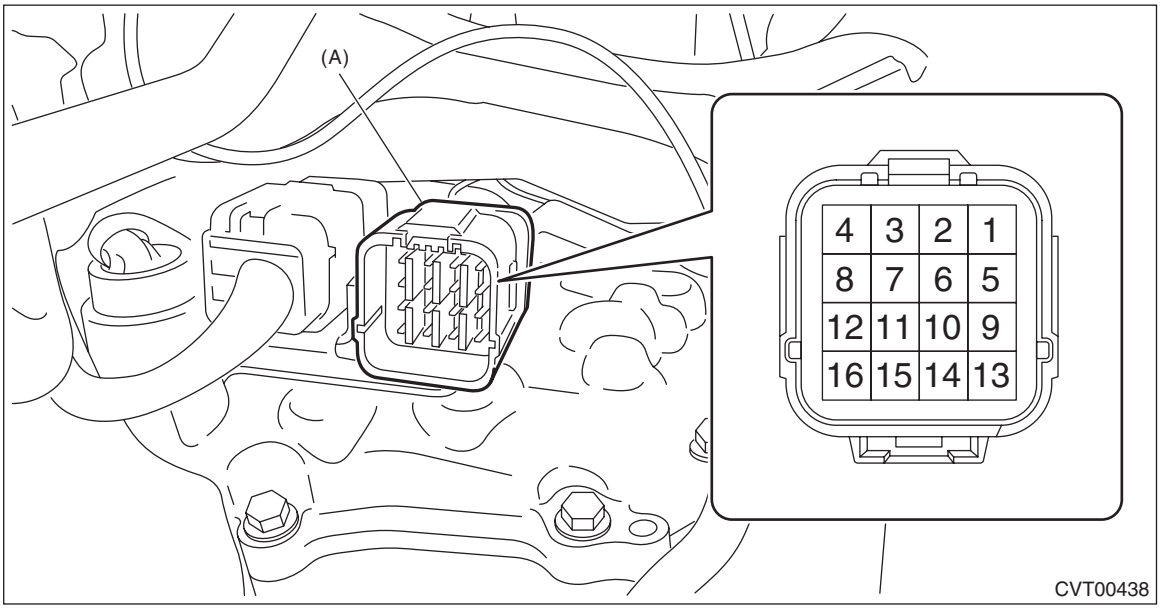
5) Disconnect the inhibitor harness connector.



6) Check for continuity in inhibitor switch circuit by shifting the select lever in “P”, “R”, “N” and “D” respectively.

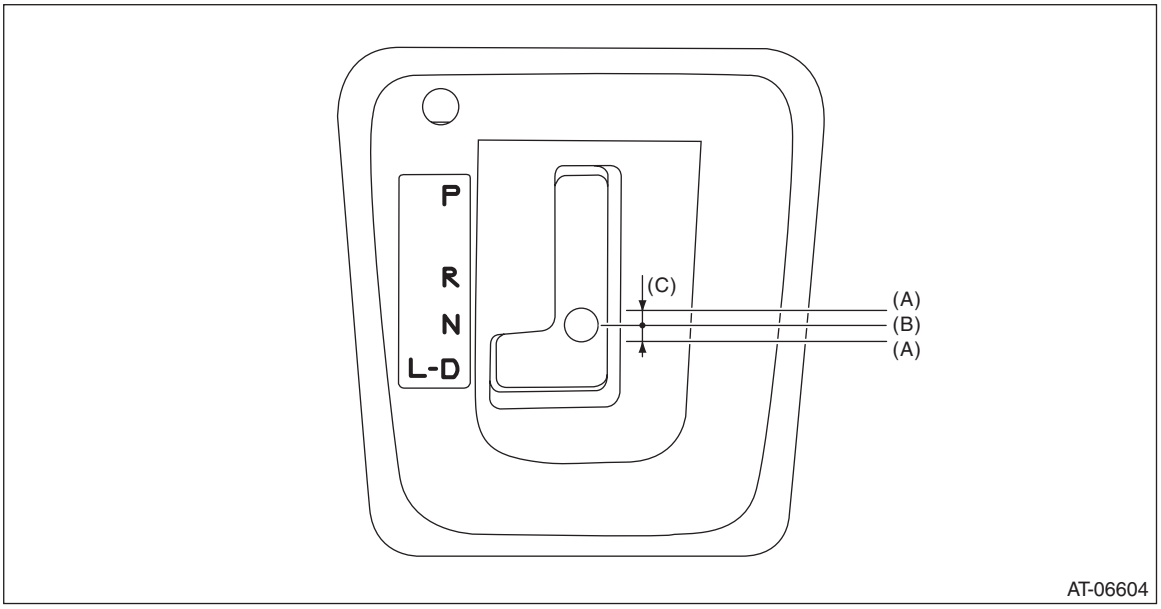
NOTE:
- Check that there is no continuity in the starter circuit when the select lever is in the “R” and “D” ranges.
- When inhibitor switch is normal, check there is no poor contact in vehicle side connector and no open circuit in harness.

	Range	Terminal No.
Signal sent to TCM	P	1 — 7
	R	2 — 7
	N	3 — 7
	D	4 — 7
Starter circuit	P/N	15 — 16
Back-up light circuit	R	13 — 14



(A) Inhibitor harness connector

7) Check that there is continuity at equal points when the select lever is moved 1.5° in both directions from the “N” range.
If there is continuity in only one direction or in other points, adjust the inhibitor switch. <Ref. to CVT(TR580)-102, ADJUSTMENT, Inhibitor Switch.>

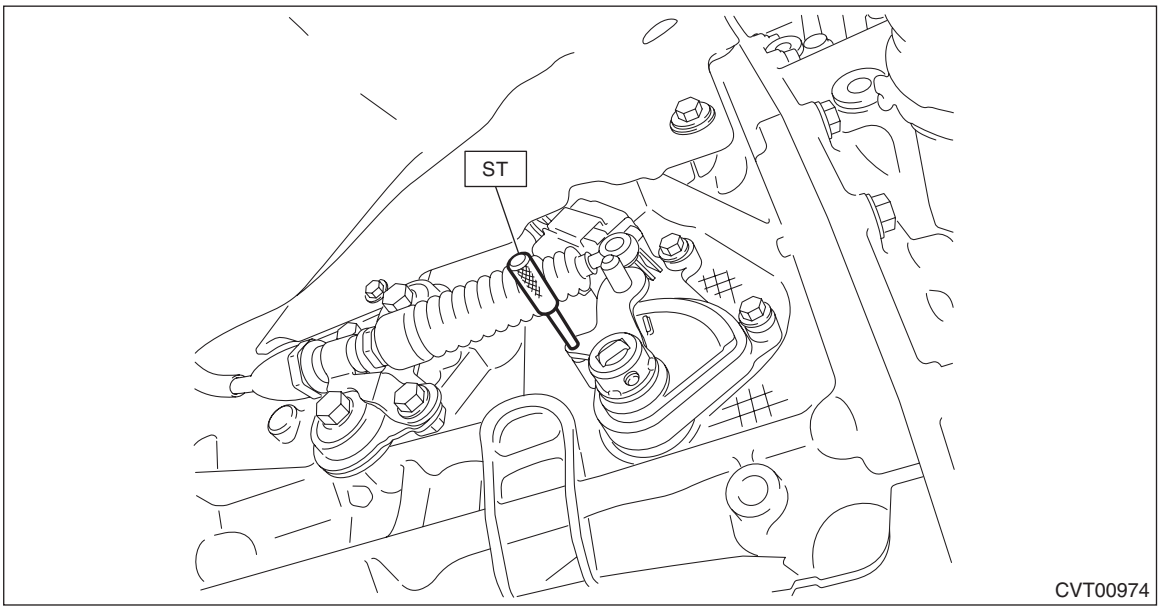


(A) Continuity does not exist.
(B) Continuity exists.
(C) 1.5°

8) Repeat the above inspection in other gear ranges. If there is fault, adjust the inhibitor switch and select cable. <Ref. to CVT(TR580)-102, ADJUSTMENT, Inhibitor Switch.> <Ref. to CS-57, ADJUSTMENT, Select Cable.>

B: ADJUSTMENT

1) Shift the select lever to “N” range.
2) Loosen the two bolts holding the inhibitor switch.
3) Insert the ST vertically into the holes of the shifter arm and switch body.
ST 499267300 STOPPER PIN



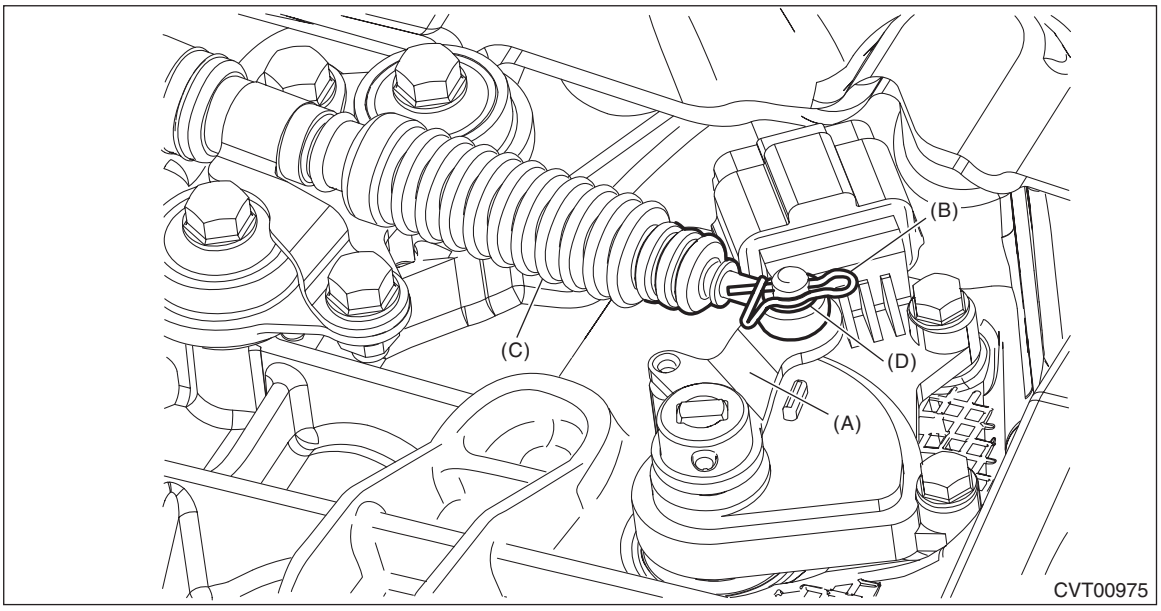
4) Tighten the two bolts holding the inhibitor switch.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

5) Repeat the inspection of the inhibitor switch. If the inhibitor switch is determined to be “faulty”, replace it.

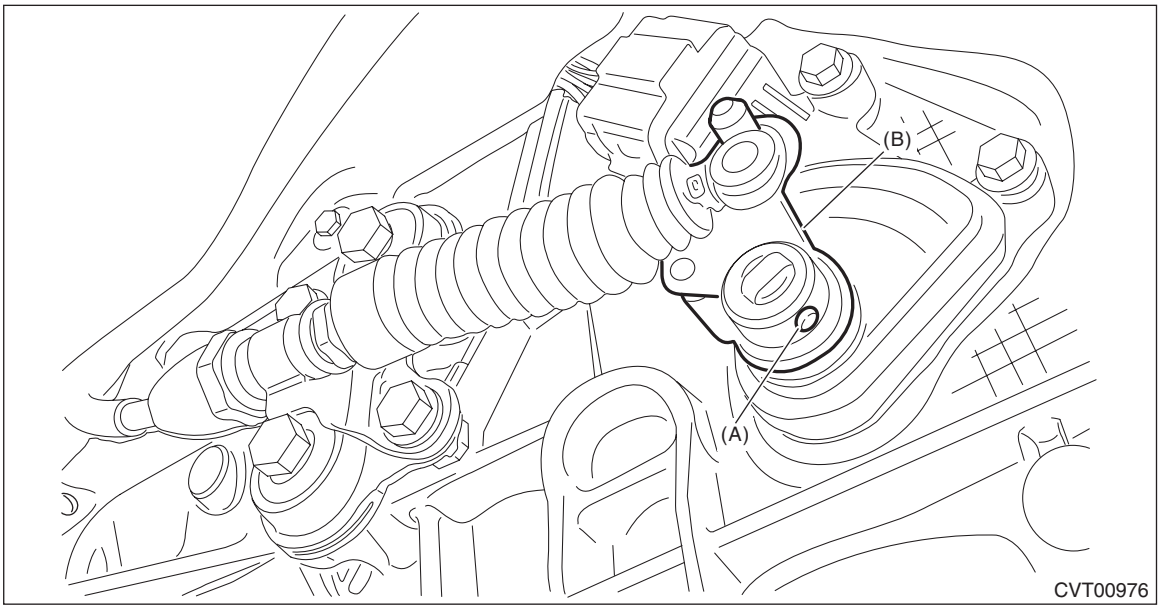
C: REMOVAL

1) Shift the select lever to “N” range.
2) Disconnect the ground cable from battery.
3) Lift up the vehicle.
4) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
5) Remove the snap pin and washer from the shifter arm.



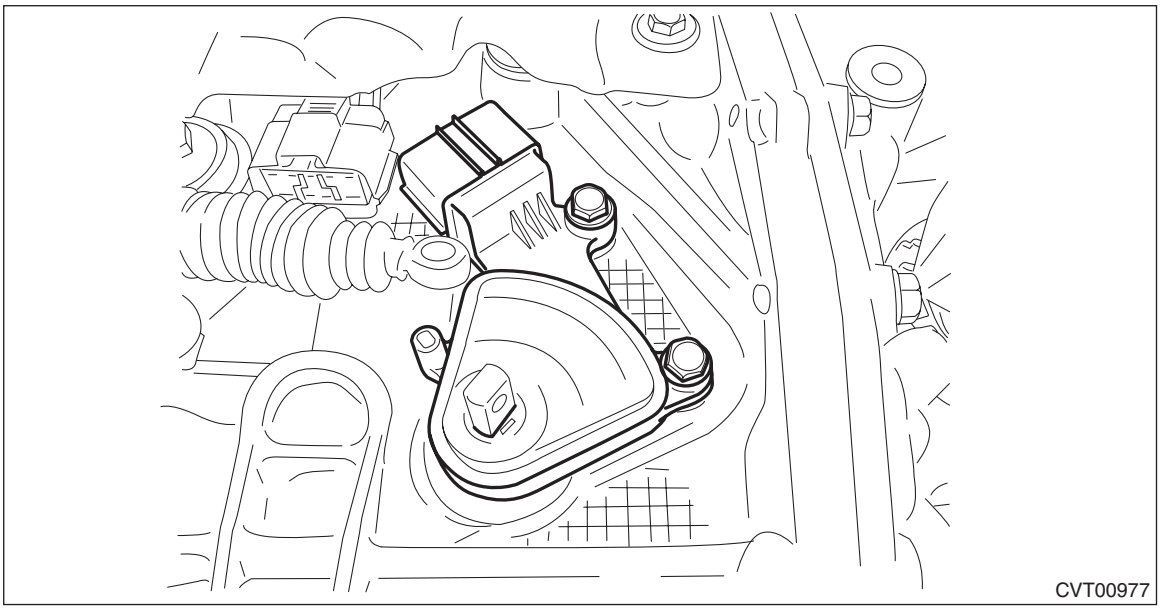
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

6) Remove the spring pin and shifter arm.



(A) Spring pin
(B) Shifter arm

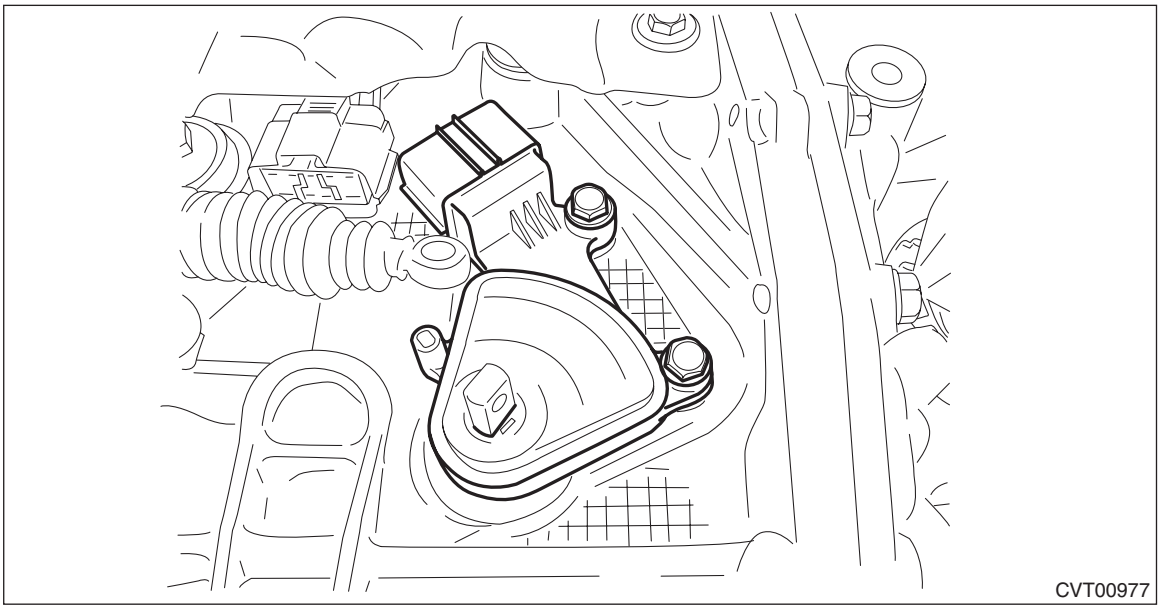
7) Remove the inhibitor harness connector from inhibitor switch.
8) Remove the two inhibitor switch securing bolts.



9) Remove the inhibitor switch from the transmission case.

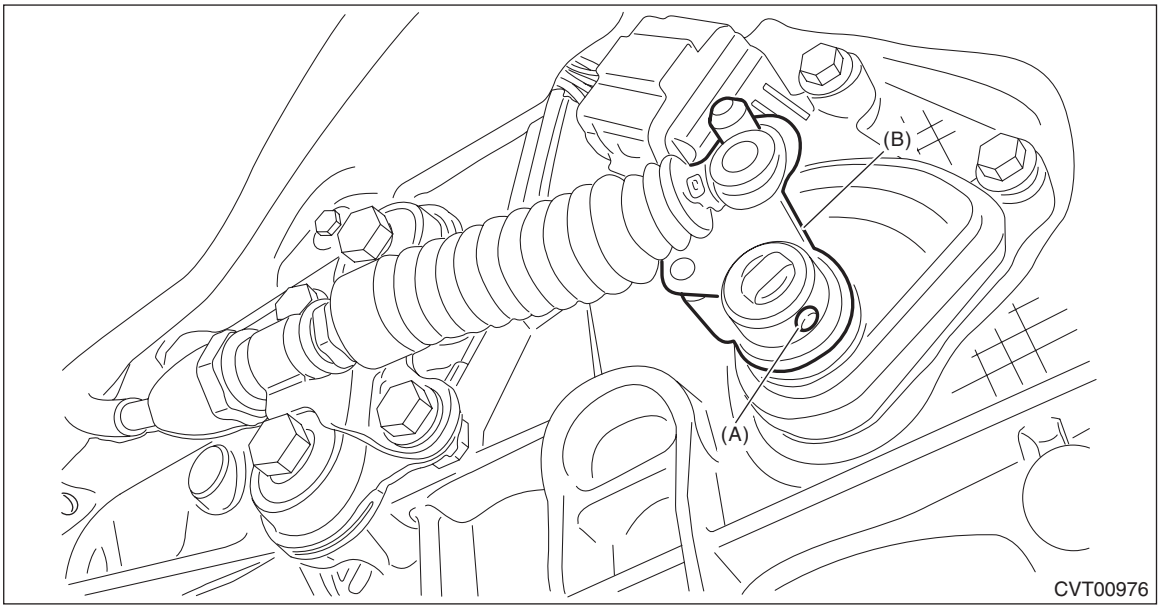
D: INSTALLATION

1) Install the inhibitor switch to the transmission case temporarily.



2) Connect the inhibitor harness connector to the inhibitor switch.
3) Install the shifter arm and fix with the spring pin.

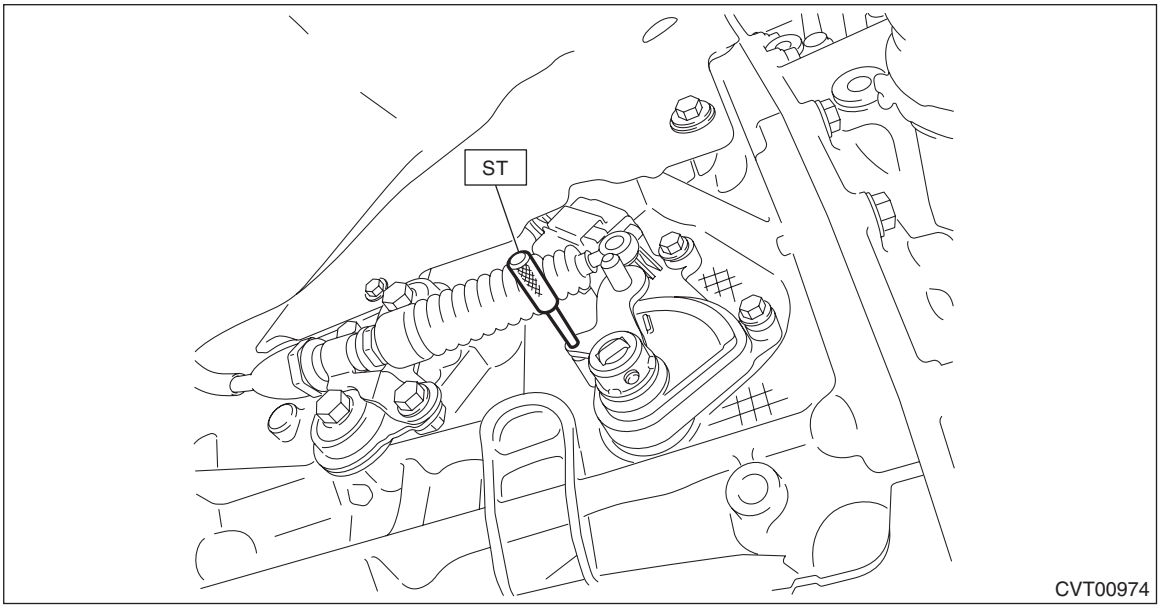
NOTE:
Use new spring pin.



(A) Spring pin
(B) Shifter arm

4) Shift the shifter arm to “N” range.

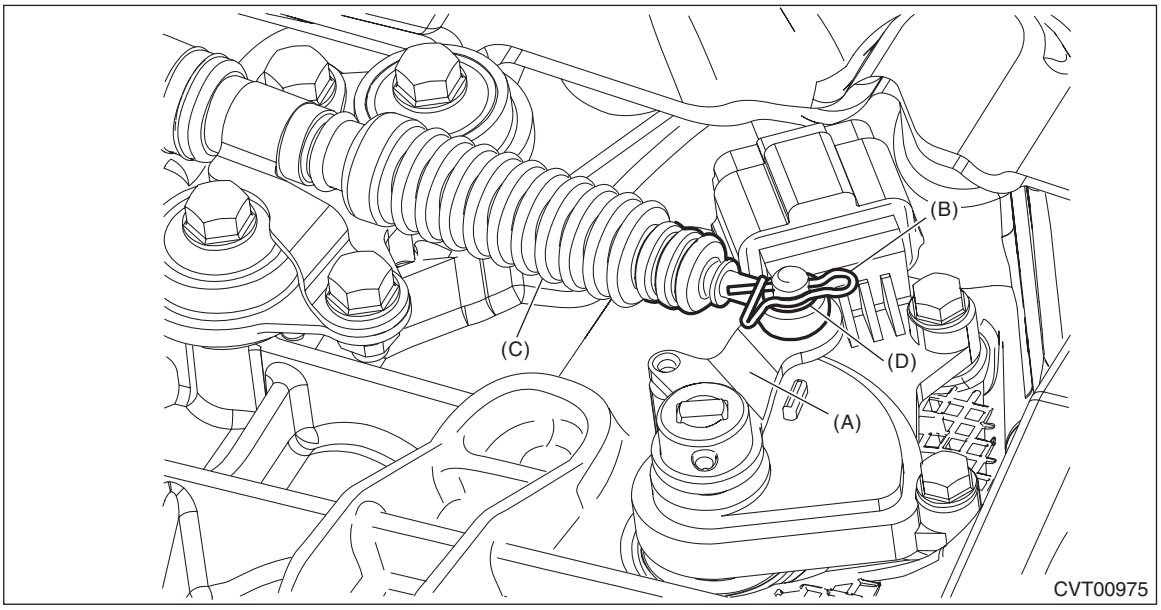
5) Install the ST vertically in the cutout of shifter arm and the hole of switch body.
ST 499267300 STOPPER PIN



6) Tighten the two bolts holding the inhibitor switch.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

7) Install the select cable to the shifter arm.
8) Install the washer and snap pin to the shifter arm.



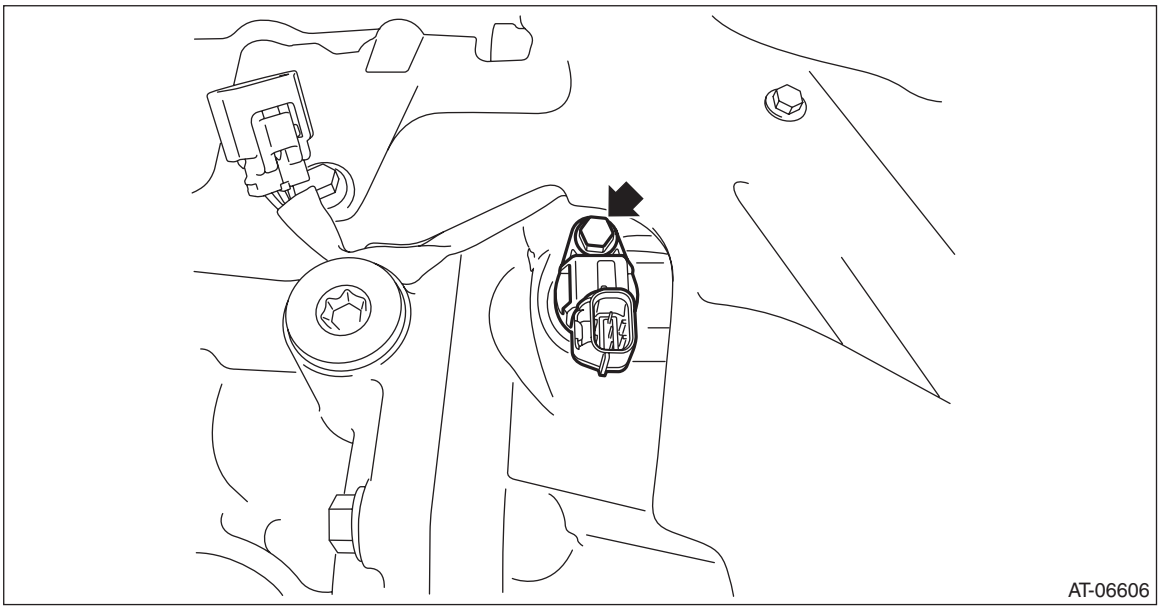
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

9) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
10) Lower the vehicle.
11) Connect the battery ground terminal.
12) Check the inhibitor switch. <Ref. to CVT(TR580)-100, INSPECTION, Inhibitor Switch.>

15.Turbine Speed Sensor

A: REMOVAL

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.
1) Lift up the vehicle.
2) Remove the harness connector from turbine speed sensor.
3) Remove the turbine speed sensor.



B: INSTALLATION

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.
Install in the reverse order of removal.

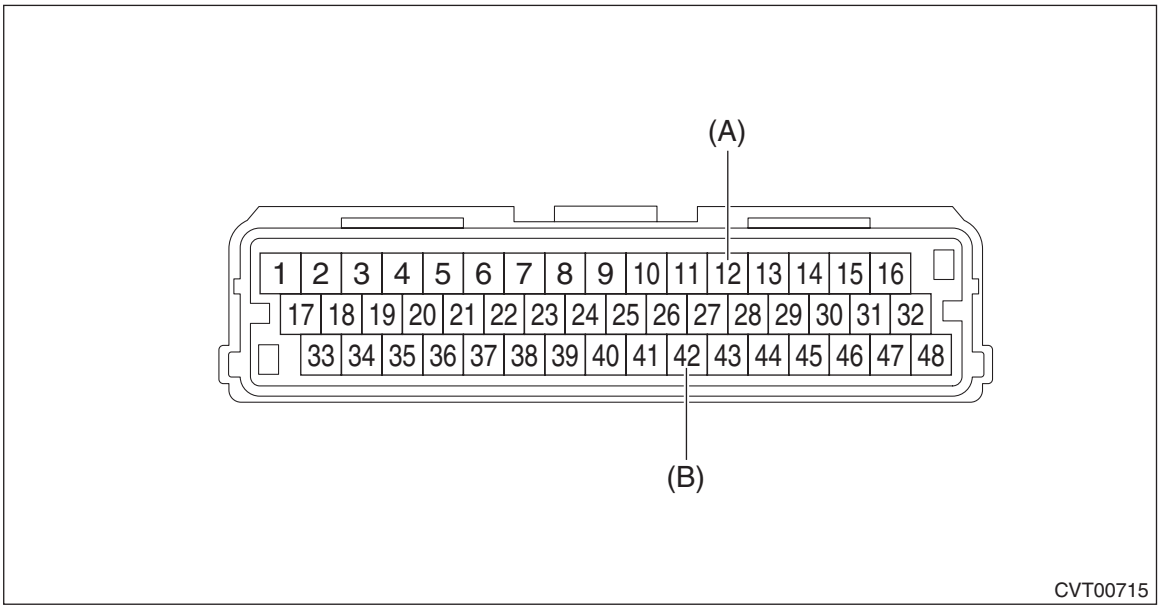
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the ST between the TCM and bulkhead harness.
ST 18460AA040 CHECK BOARD
2) Set the probe of oscilloscope to the check board connector.

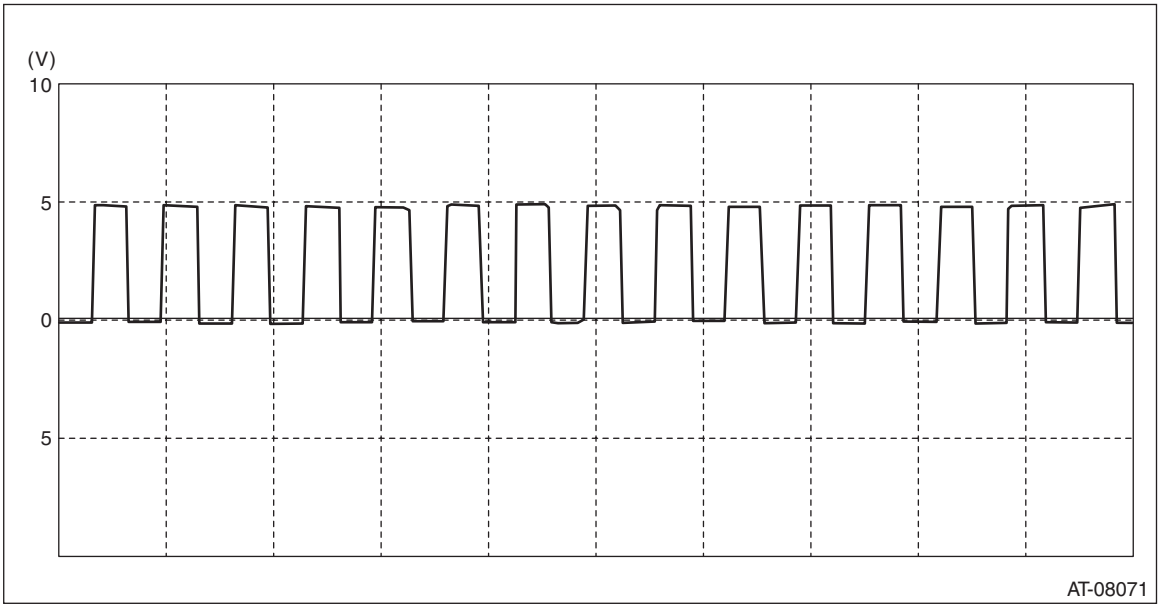
Connector & terminal
No. 12 (+) — No. 42 (–):



(A) + probe
(B) – probe

3) Start and warm up the engine.
4) Check the waveform and output voltage of the turbine speed sensor with engine idling.

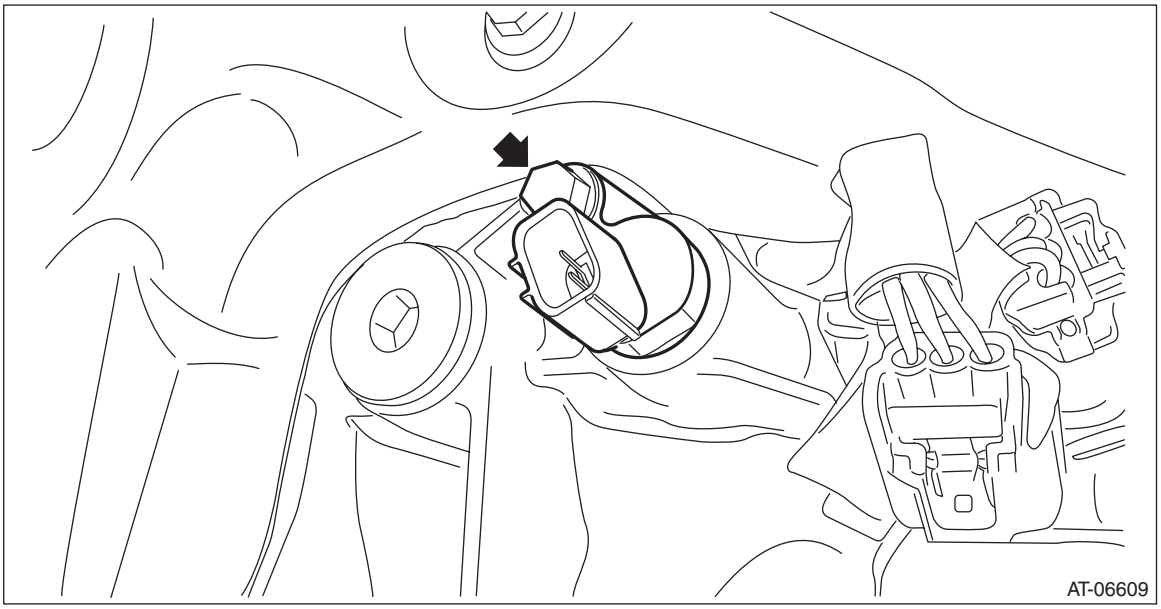
NOTE:
The waveform cycle changes as the speed changes.



16.Secondary Speed Sensor

A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
• When secondary speed sensor is removed, CVTF leaks. After installing the secondary speed sensor, adjust the CVTF level.
1) Lift up the vehicle.
2) Remove the harness connector from secondary speed sensor.
3) Remove the secondary speed sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
• After installing the secondary speed sensor, adjust the CVTF level.
Install in the reverse order of removal.

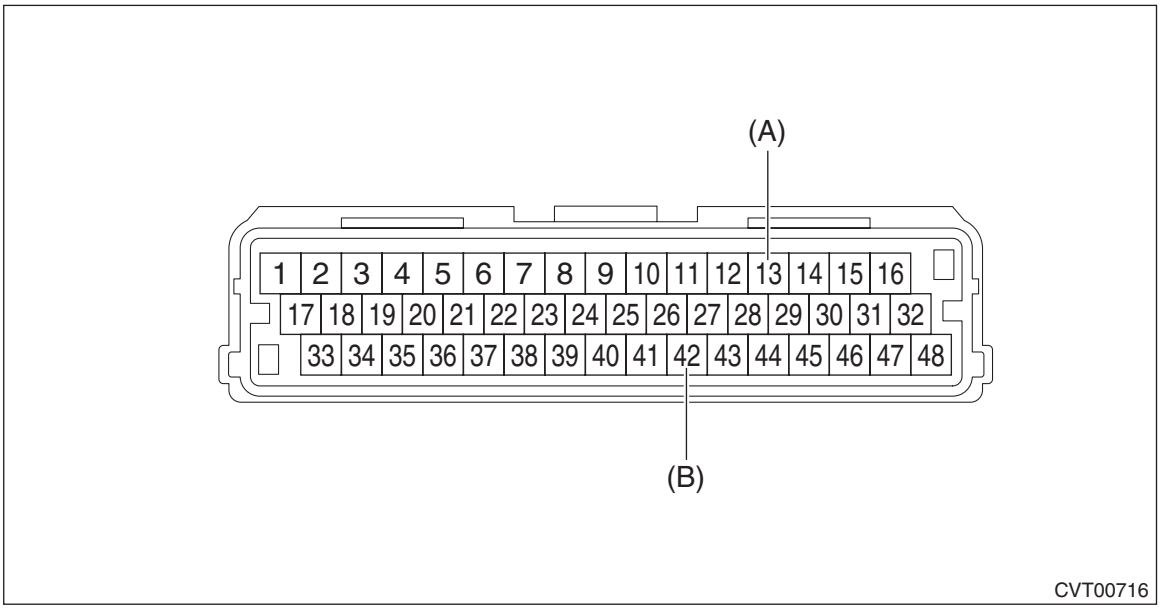
NOTE:
• Use new O-rings.
• Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the ST between the TCM and bulkhead harness.
ST 18460AA040 CHECK BOARD
2) Set the probe of oscilloscope to the check board connector.

Connector & terminal
No. 13 (+) — No. 42 (–):



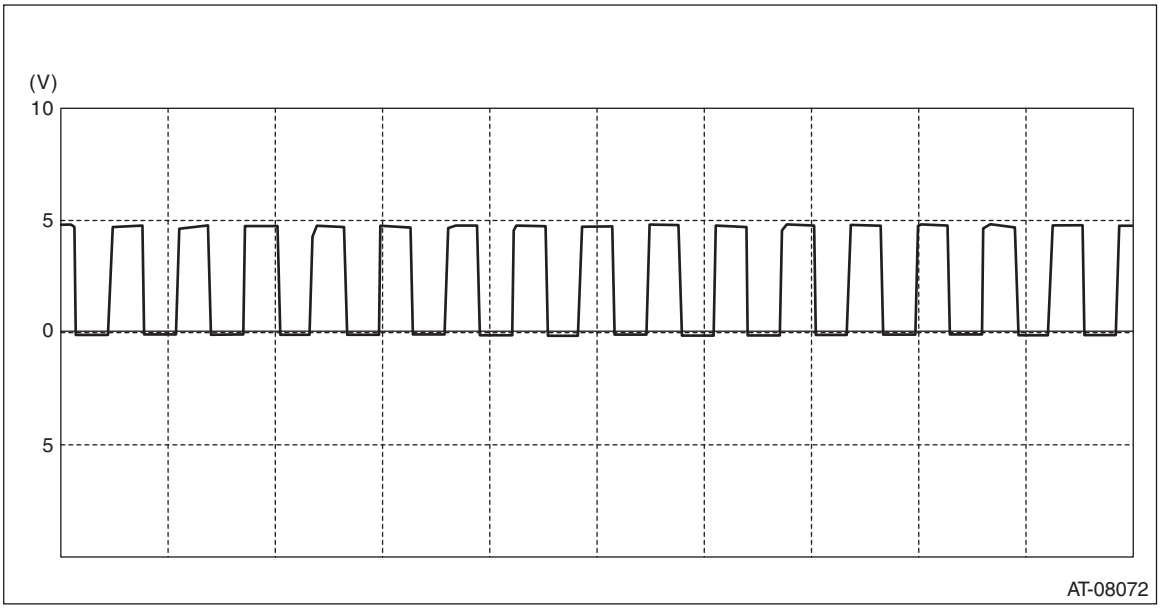
(A) + probe
(B) – probe

3) Start and warm up the engine.
4) Lift up the vehicle.

CAUTION:
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.
5) Shift the select lever to “D” range.

6) Check the waveform and output voltage of the secondary speed sensor with engine idling.

NOTE:
The waveform cycle changes as the speed changes.

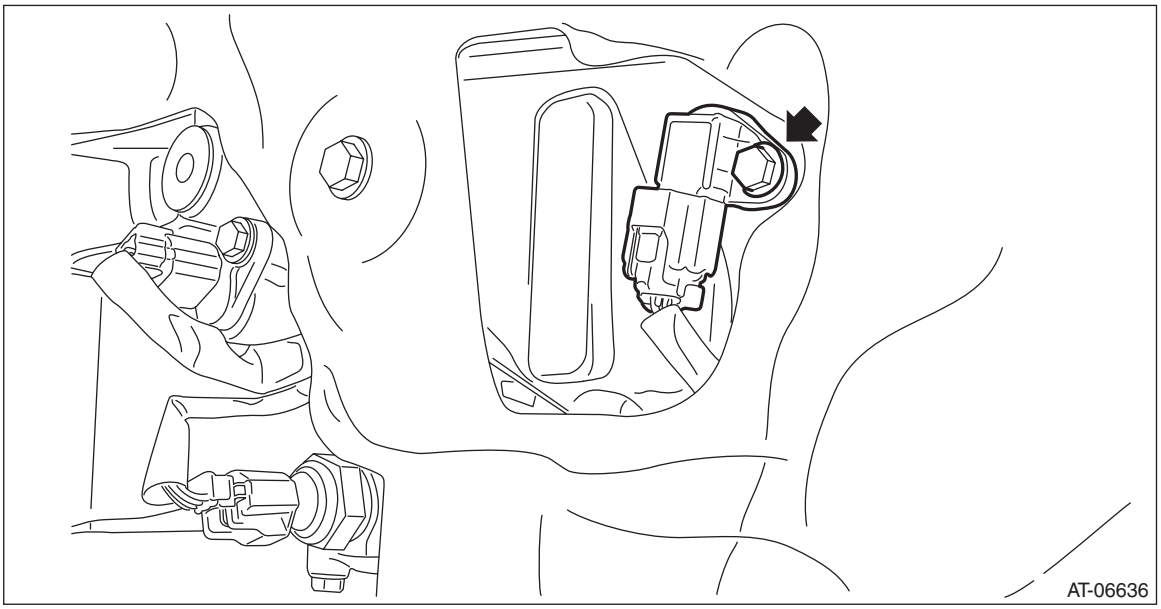


17.Primary Speed Sensor

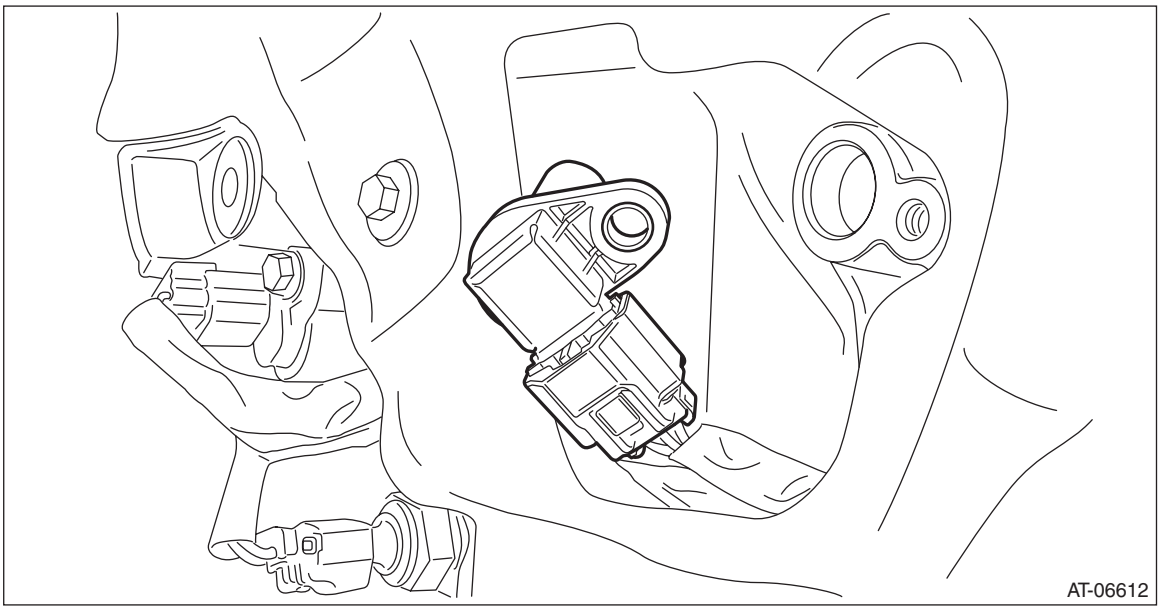
A: REMOVAL

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of primary speed sensor. If adhesion occurs, replace with a new part.

1) Remove the transmission assembly. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the primary speed sensor.



3) Remove the harness connector from primary speed sensor.



B: INSTALLATION

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of primary speed sensor. If adhesion occurs, replace with a new part.
Install in the reverse order of removal.

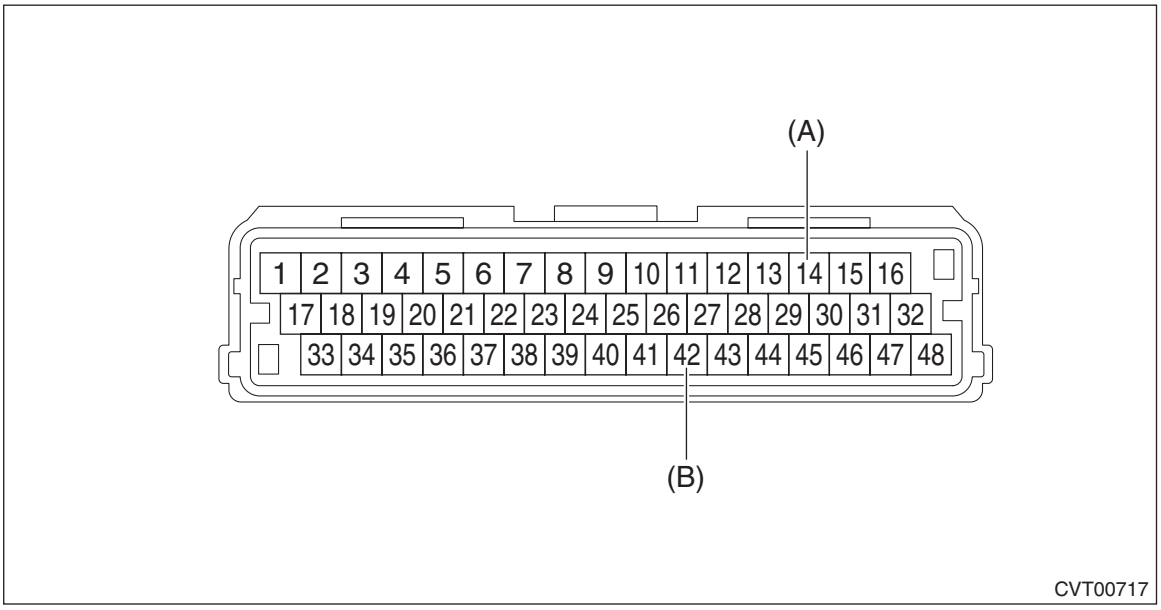
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the ST between the TCM and bulkhead harness.
ST 18460AA040 CHECK BOARD
2) Set the probe of oscilloscope to the check board connector.

Connector & terminal
No. 14 (+) — No. 42 (–):



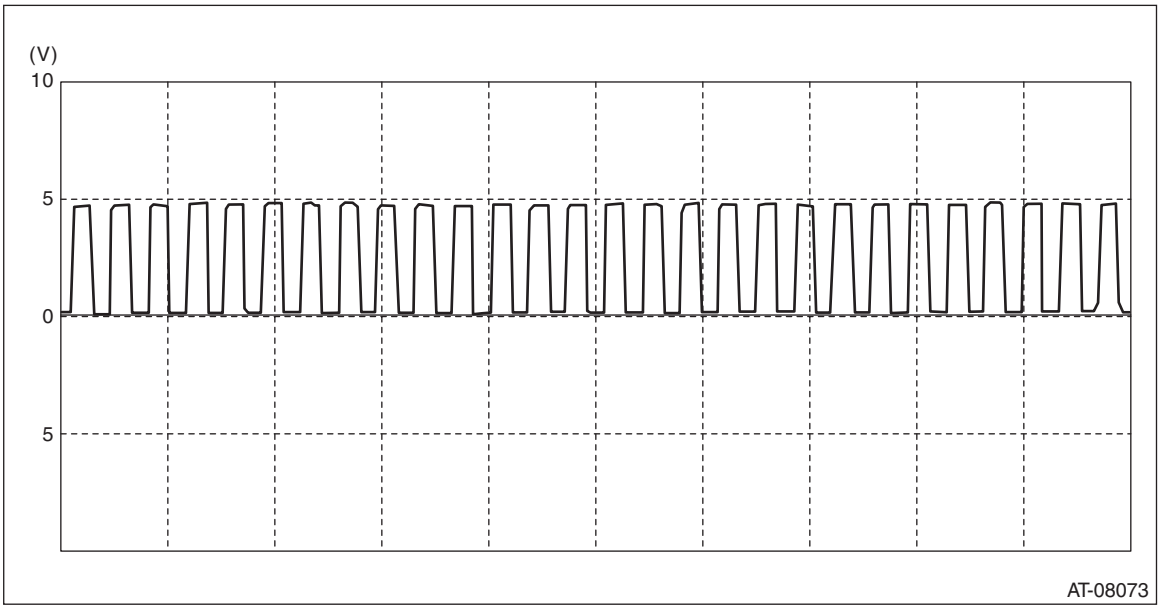
(A) + probe
(B) – probe

3) Start and warm up the engine.
4) Lift up the vehicle.

CAUTION:
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.

5) Shift the select lever to “D” range.
6) Check the waveform of primary speed sensor with engine idling running.

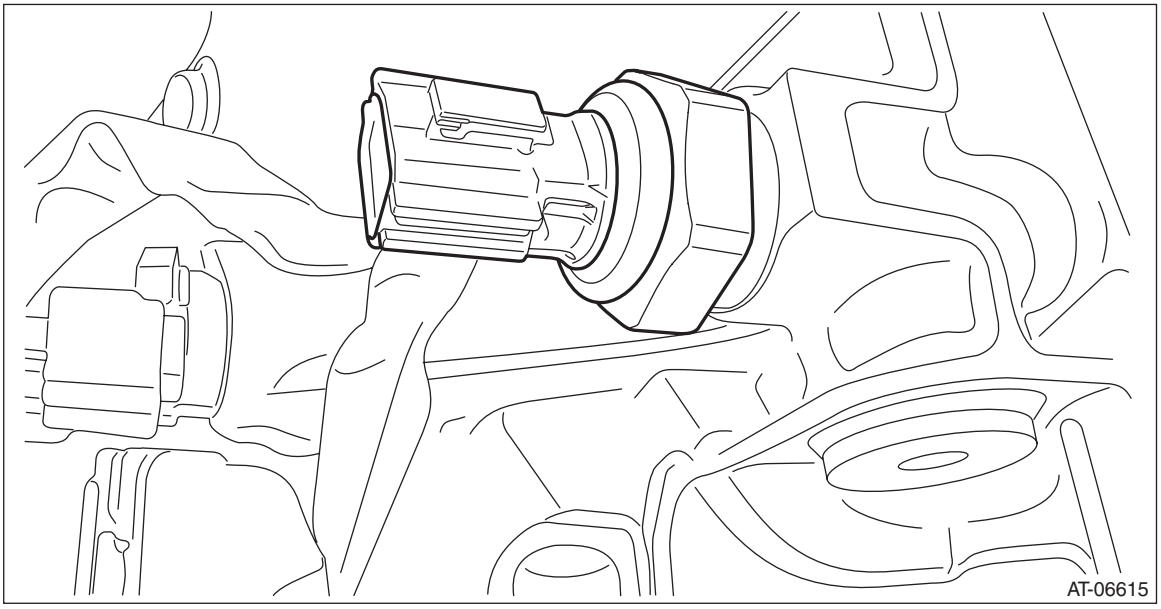
NOTE:
The waveform cycle changes as the speed changes.



18.Secondary Pressure Sensor

A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
• When secondary pressure sensor is removed, CVTF leaks. After installing the secondary pressure sensor, adjust the CVTF level.
1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Remove the secondary pressure sensor connector.
4) Remove the secondary pressure sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
• After installing the secondary pressure sensor, adjust the CVTF level.
Install in the reverse order of removal.

NOTE:
Use new O-rings.

Tightening torque:
39 N·m (4.0 kgf-m, 28.8 ft-lb)

C: INSPECTION

1) Start and warm up the engine.
2) Depress the brake pedal, and shift the select lever to “D” range.
3) Shift the select lever to “P” or “N” range.
4) Depress the brake pedal and hold it.
5) Check «secondary pressure sensor voltage» by using Subaru Select Monitor while the engine is idling. <Ref. to CVT(w/o HEV)(diag)-15, OPERATION, Subaru Select Monitor.>

Standard
Approx. 0.8 V

6) Check «secondary pressure sensor voltage» by using Subaru Select Monitor while the engine is stopped and the ignition switch is turned on. <Ref. to CVT(w/o HEV)(diag)-15, OPERATION, Subaru Select Monitor.>

Specification:
Approx. 0.5 V

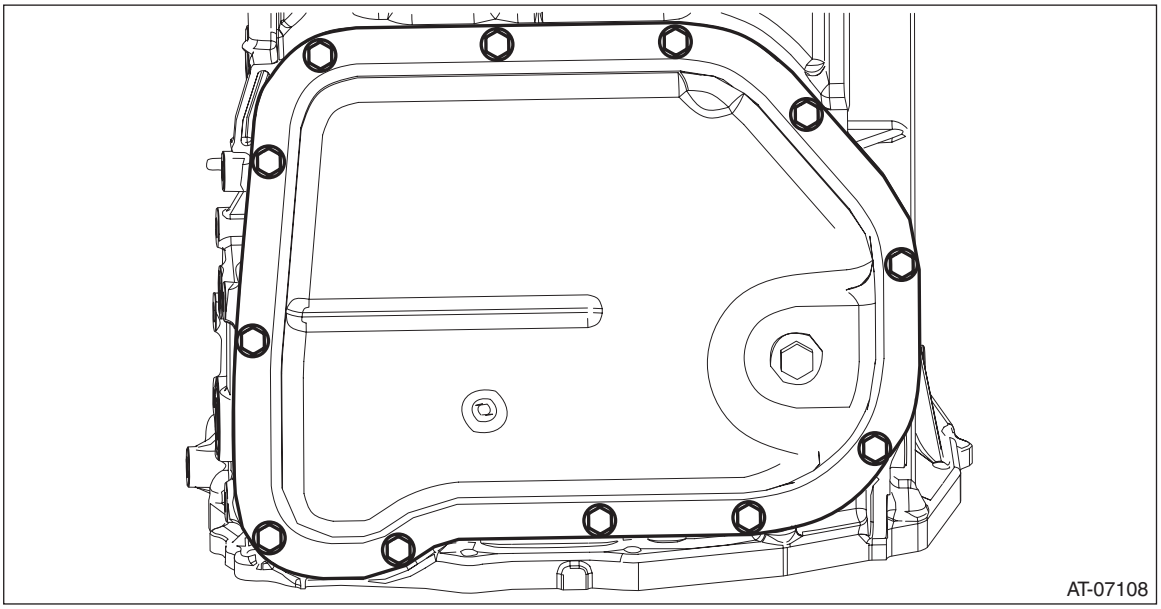
19.Oil Pan and Strainer

A: REMOVAL

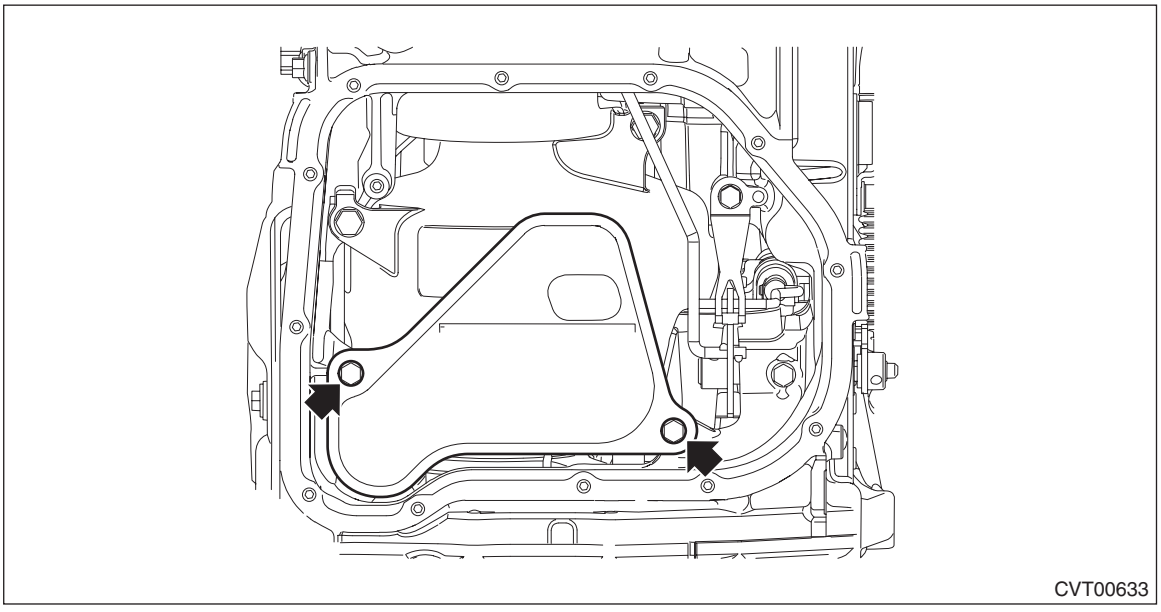
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.

1) Lift up the vehicle.
2) Clean the transmission exterior.
3) Remove the CVTF drain plug to drain CVTF.
4) Remove the oil pan.

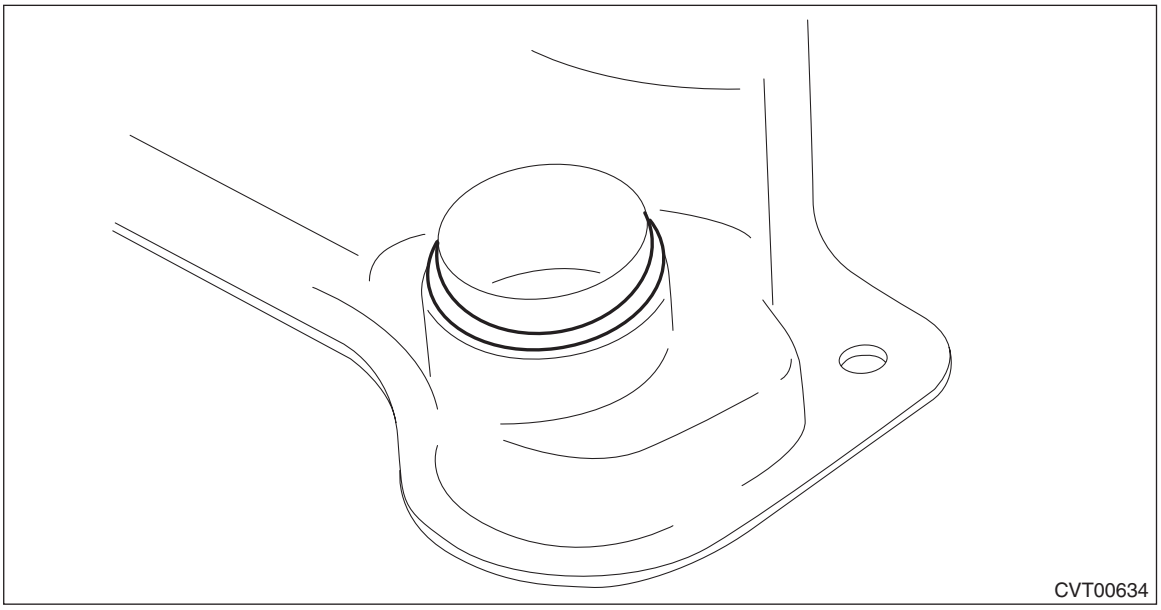
CAUTION:
Be careful not to allow foreign matter such as dust or dirt to enter the oil pan.


AT-07108

5) Remove the magnet.
6) Remove the oil strainer.


CVT00633

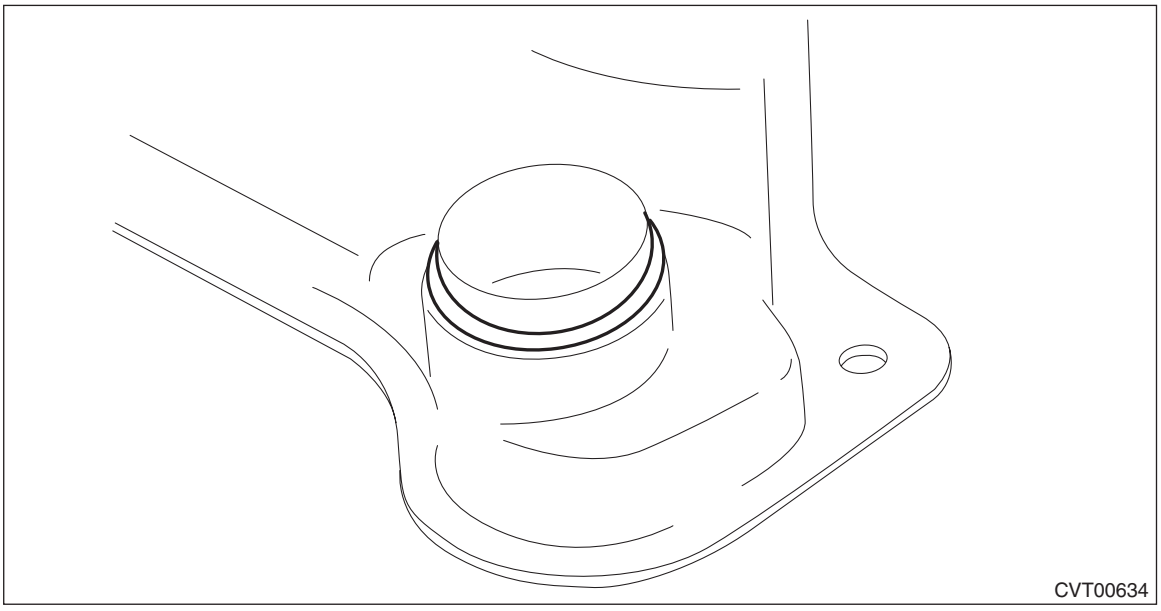
7) Remove the O-ring from oil strainer.



B: INSTALLATION

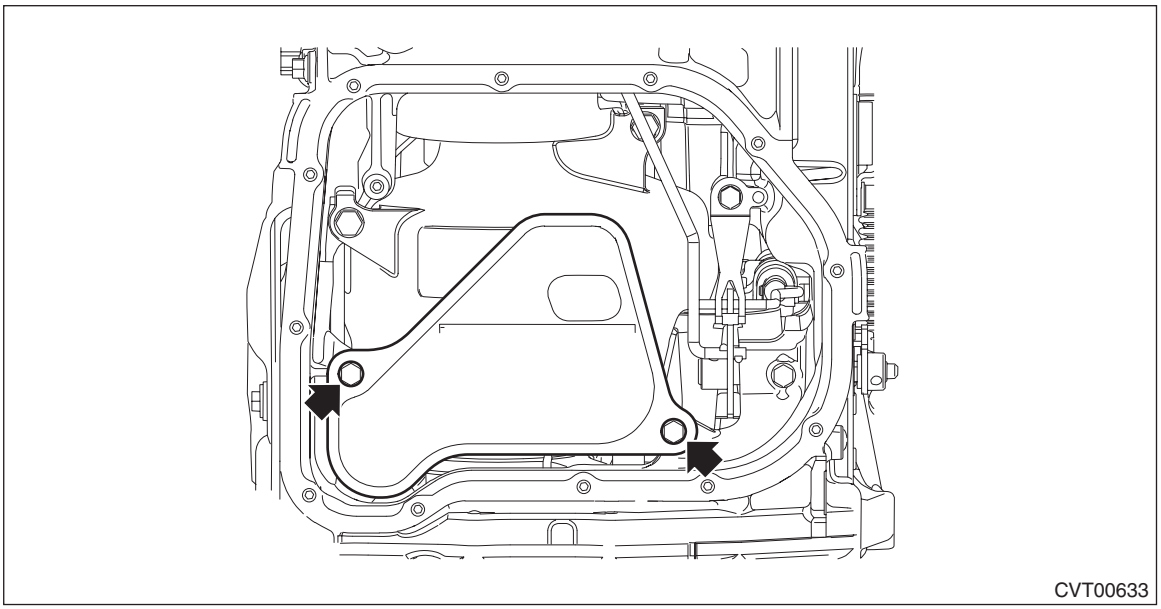
1) Clean the mating surface of oil pan and transmission case.
2) Install the O-ring to the oil strainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



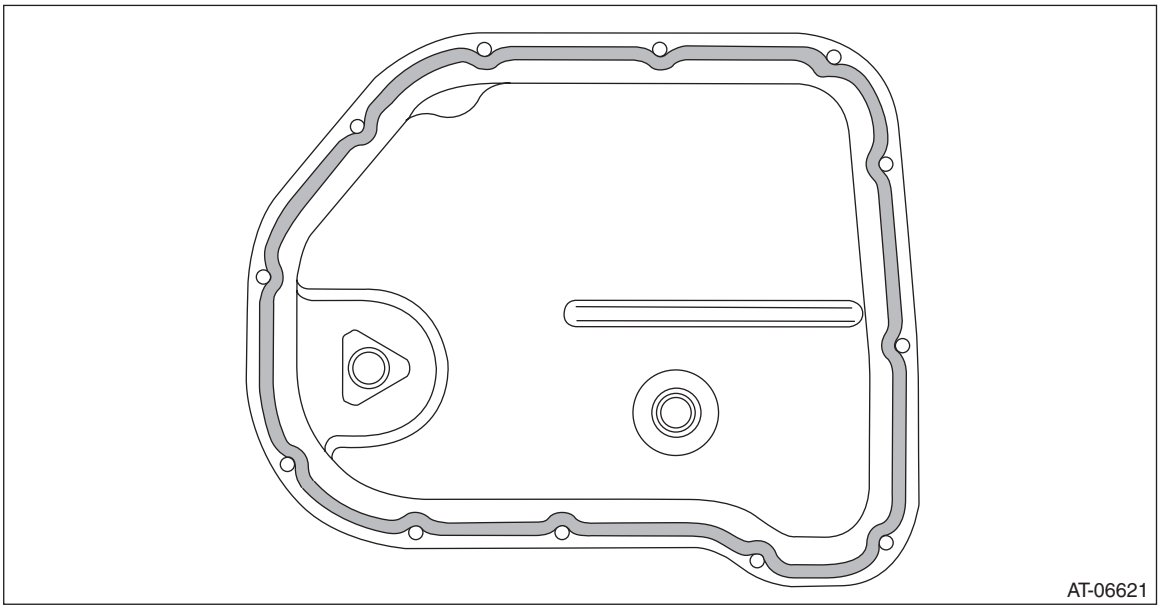
3) Install the oil strainer.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)


CVT00633

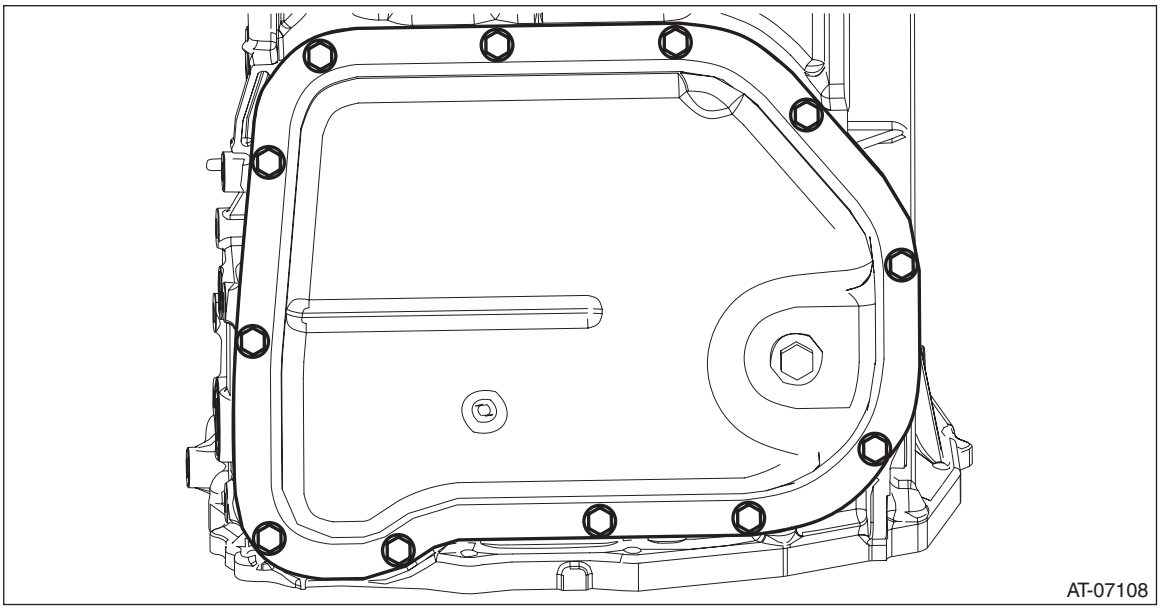
4) Clean the magnet.
5) Attach the magnet at the specified position of the oil pan.
6) Apply liquid gasket all around the oil pan mating surface seamlessly.

Liquid gasket:
THREE BOND 1217B (Part No. K0877YA020) or equivalent


AT-06621

7) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)



8) Refill CVTF and adjust the level. <Ref. to CVT(TR580)-40, REPLACEMENT, CVTF.>

C: INSPECTION

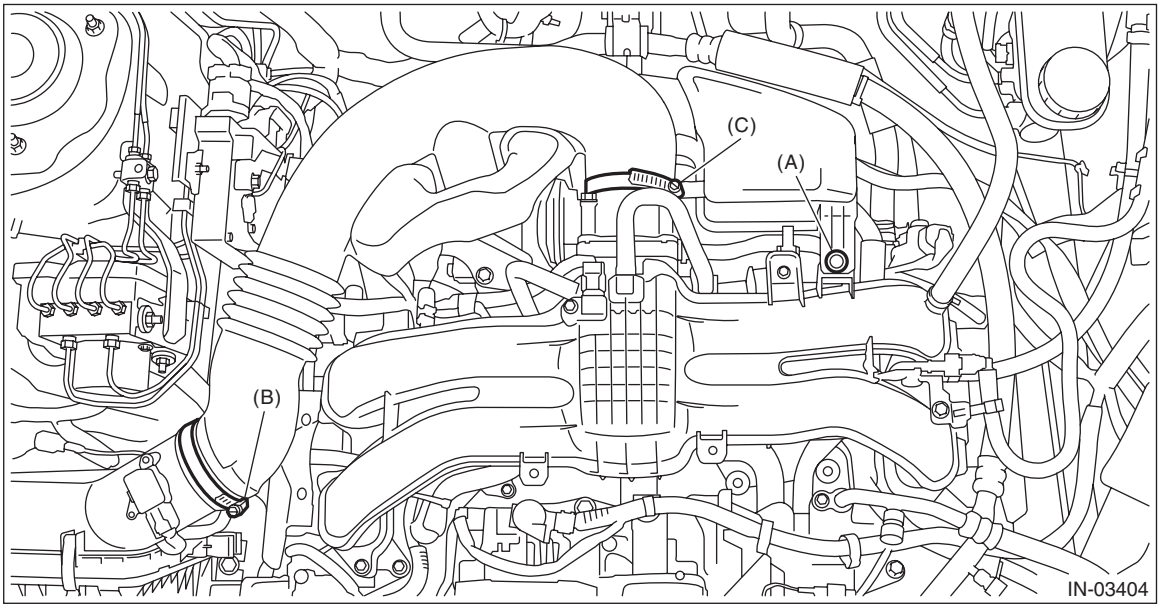
- Check each part for damage or dust.
- Check oil strainer for clogging.

20.Control Valve Body

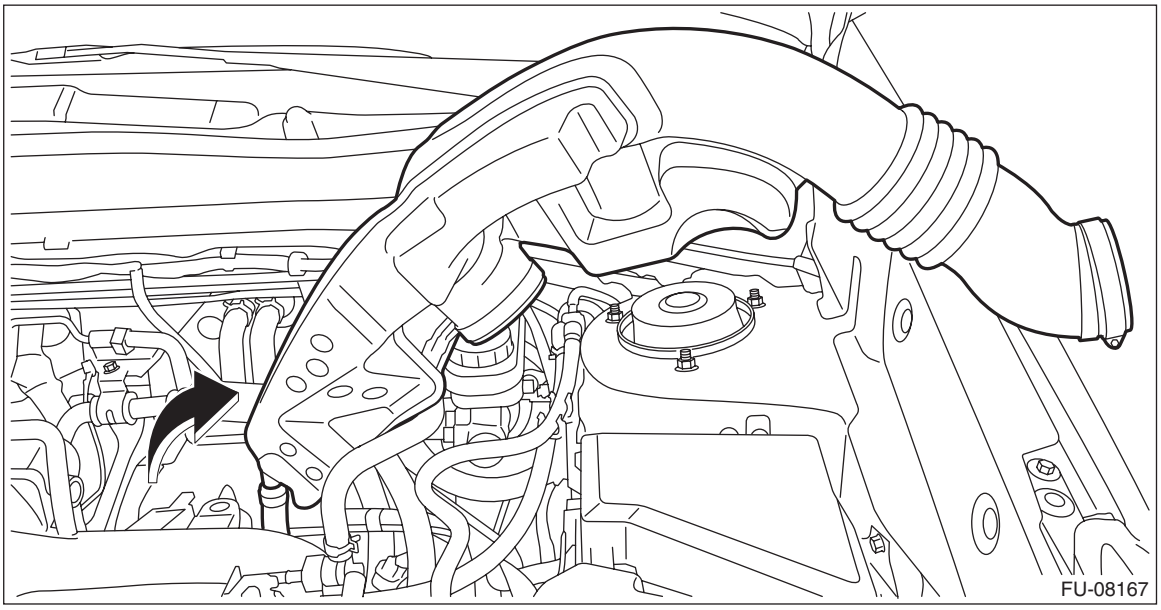
A: REMOVAL

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the engine compartment before removal.

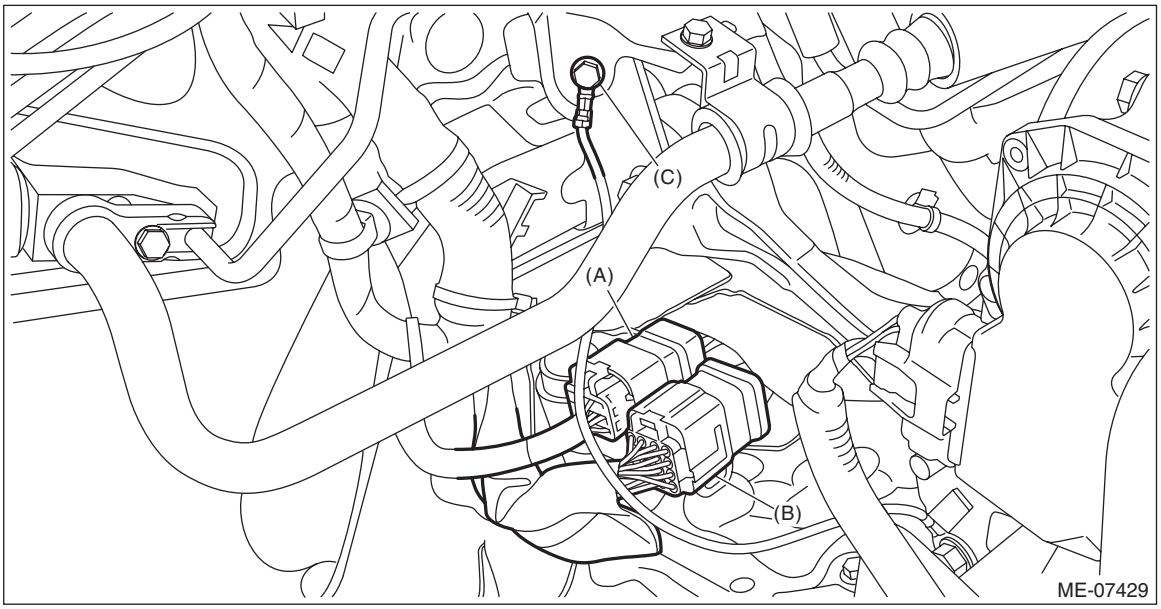
NOTE:
The control valve body is replaced as an assembly only, because it is a non-disassembly part.
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

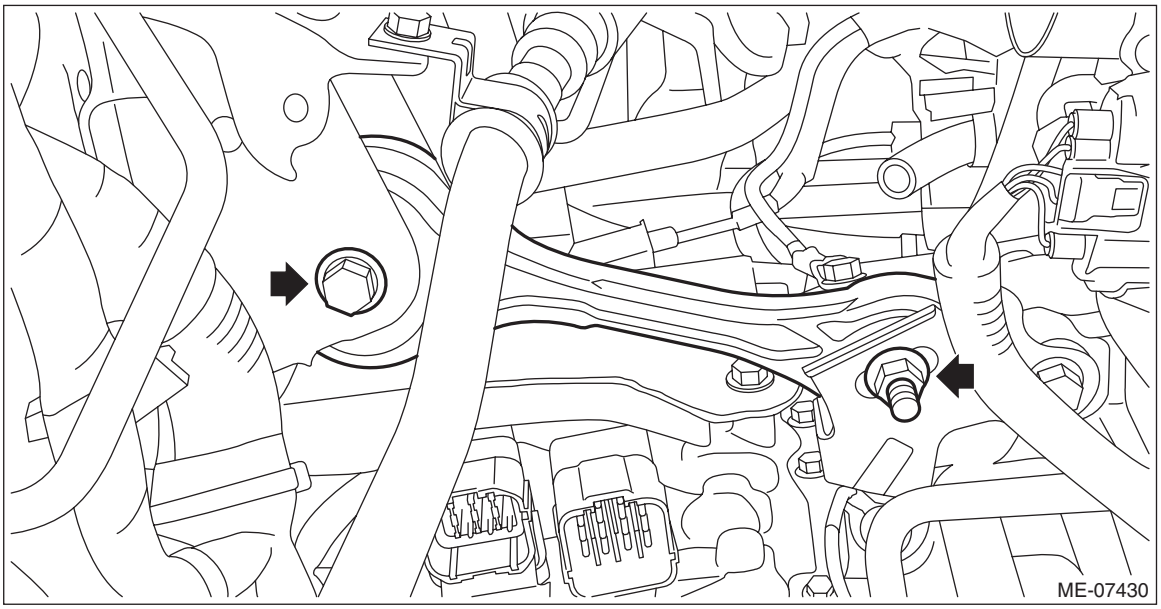


6) Disconnect the following connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

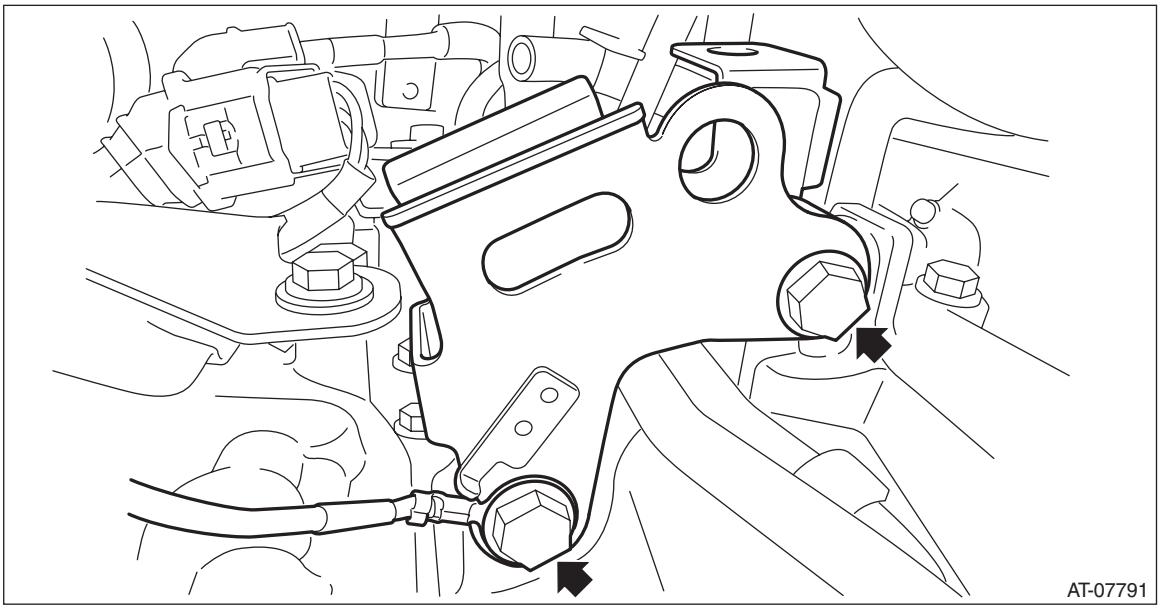


(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

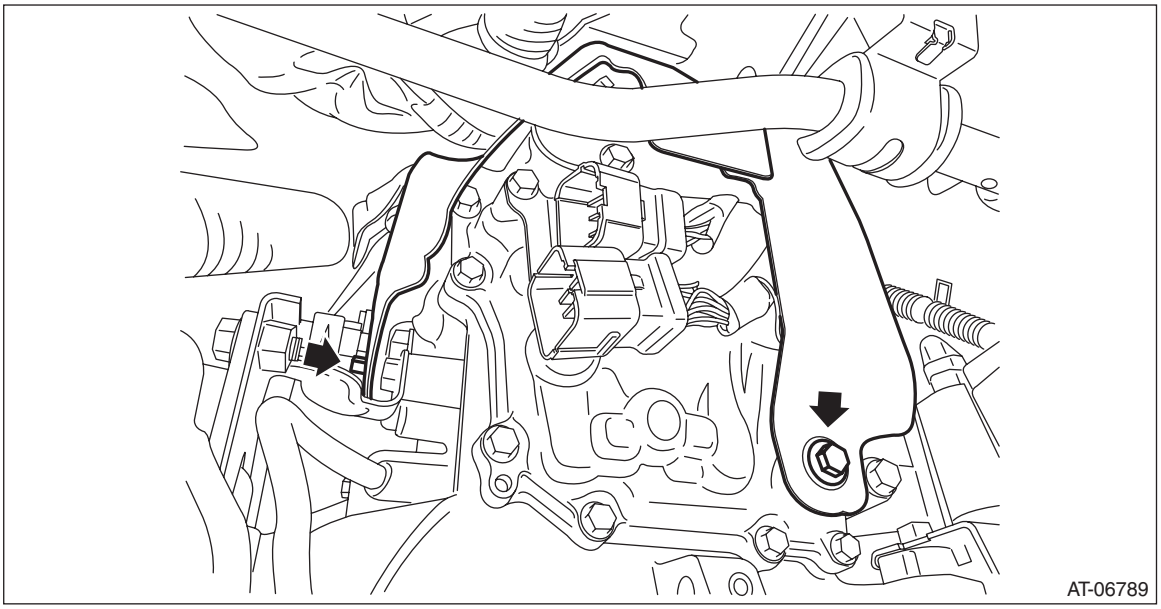
7) Remove the pitching stopper.



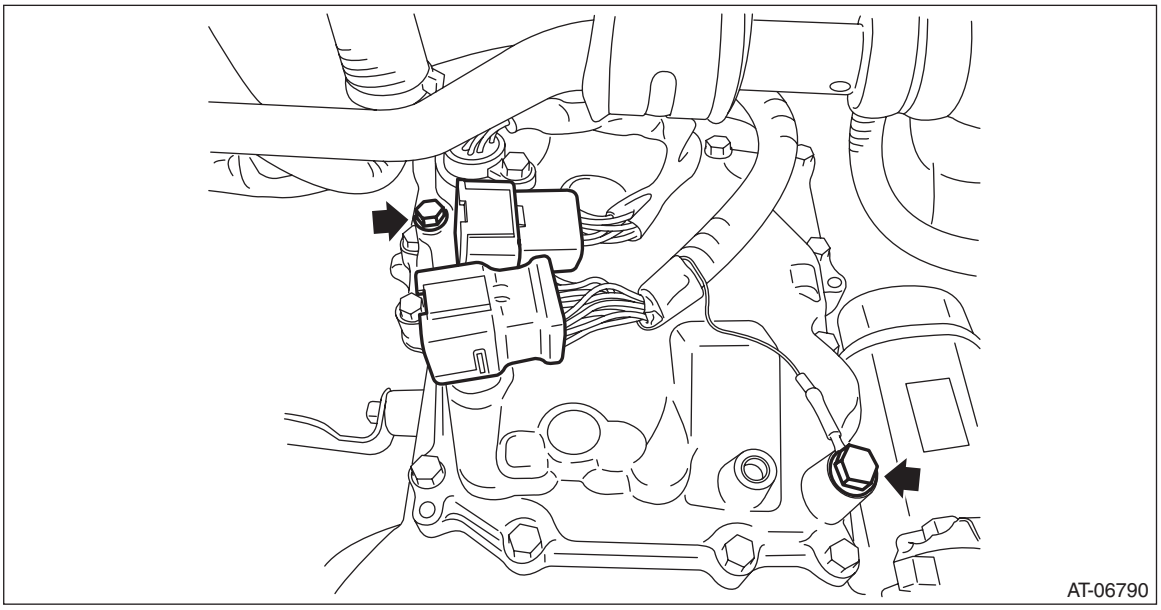
8) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



9) Remove the transmission case cover.



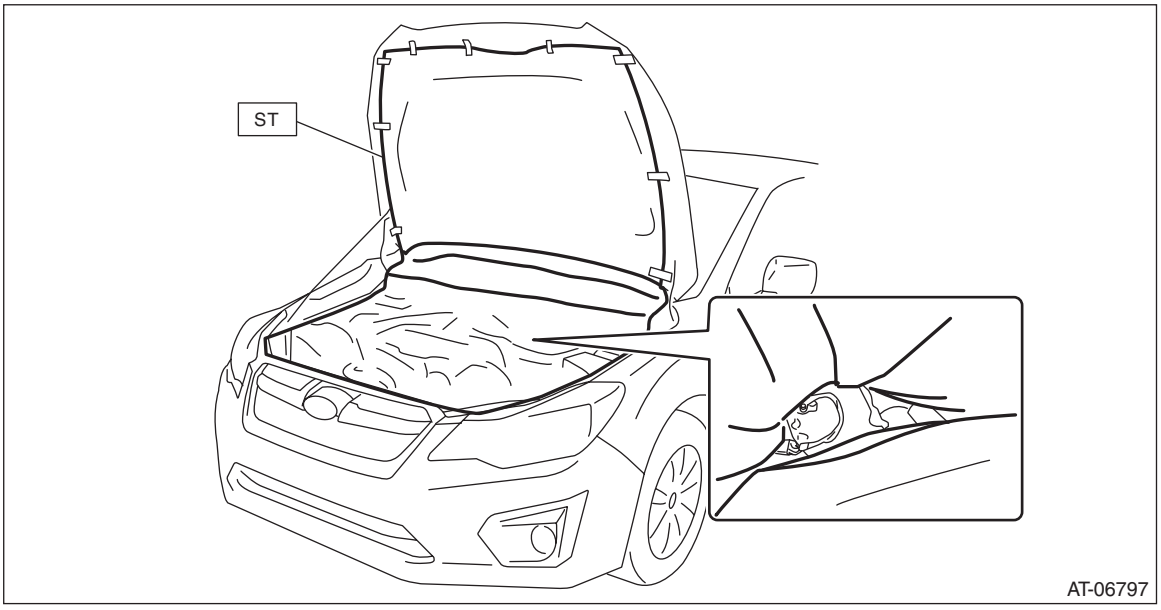
10) Remove the transmission harness stay and ground terminal.



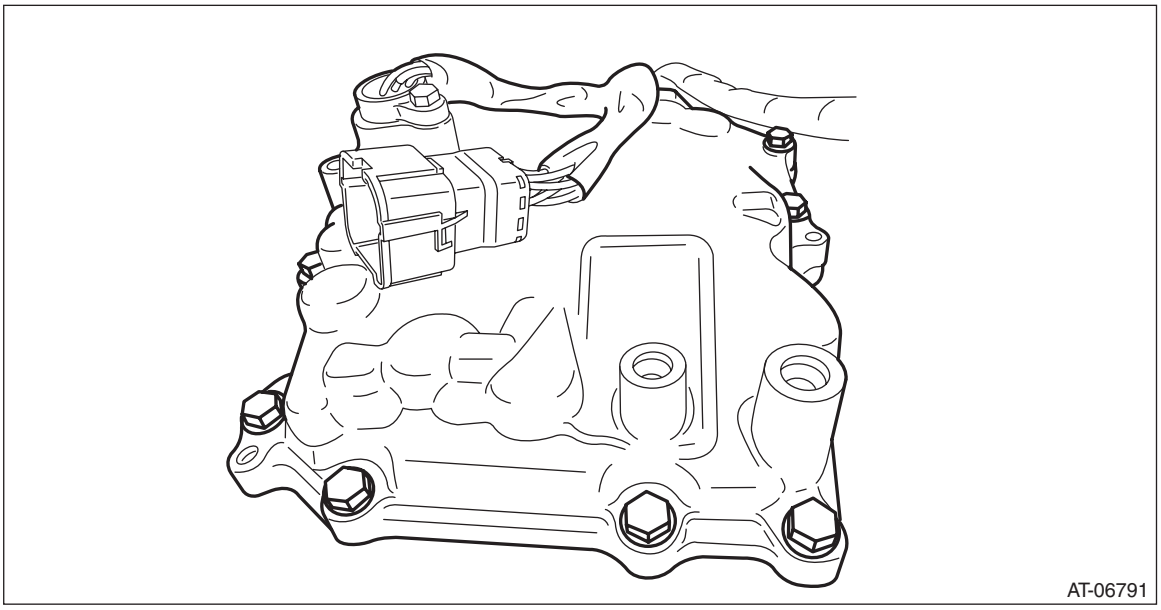
11) Remove the transmission harness connector from the harness stay.
12) Remove the throttle body, and move it aside so that it will not interfere with the removal of the control valve. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.>

NOTE:
Do not remove the preheater hose.
13) Clean the transmission exterior.
14) Fix the ST with tape, and set the ST to the vehicle.

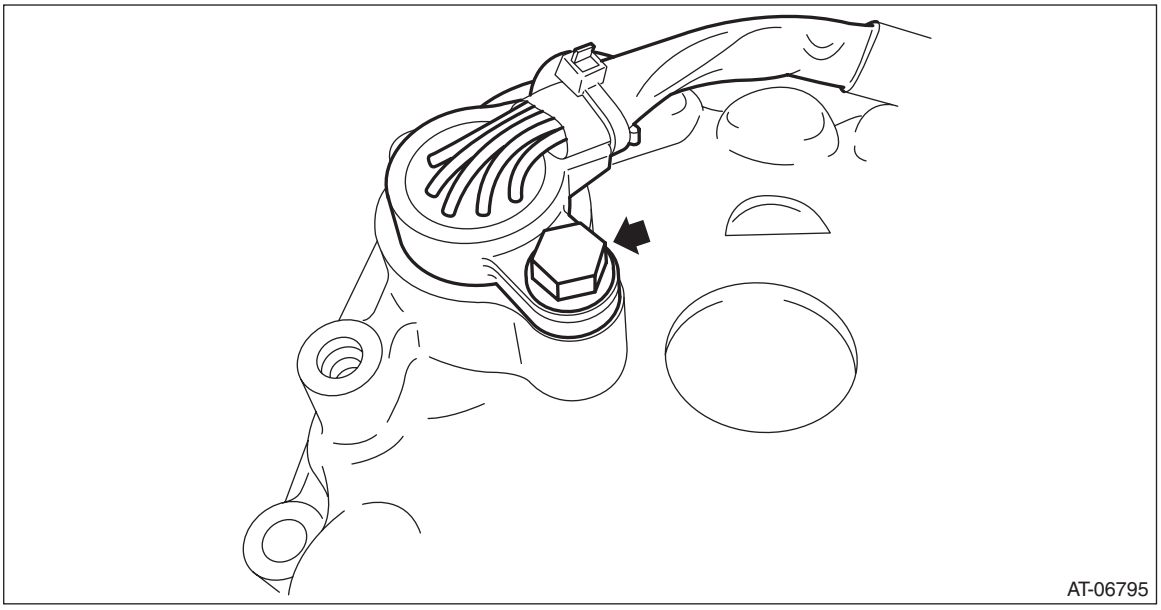
NOTE:
When replacing the control valve body, the sheet is included in the control valve body for repairs.
ST 18761AA010 SHEET SPECIAL TOOL



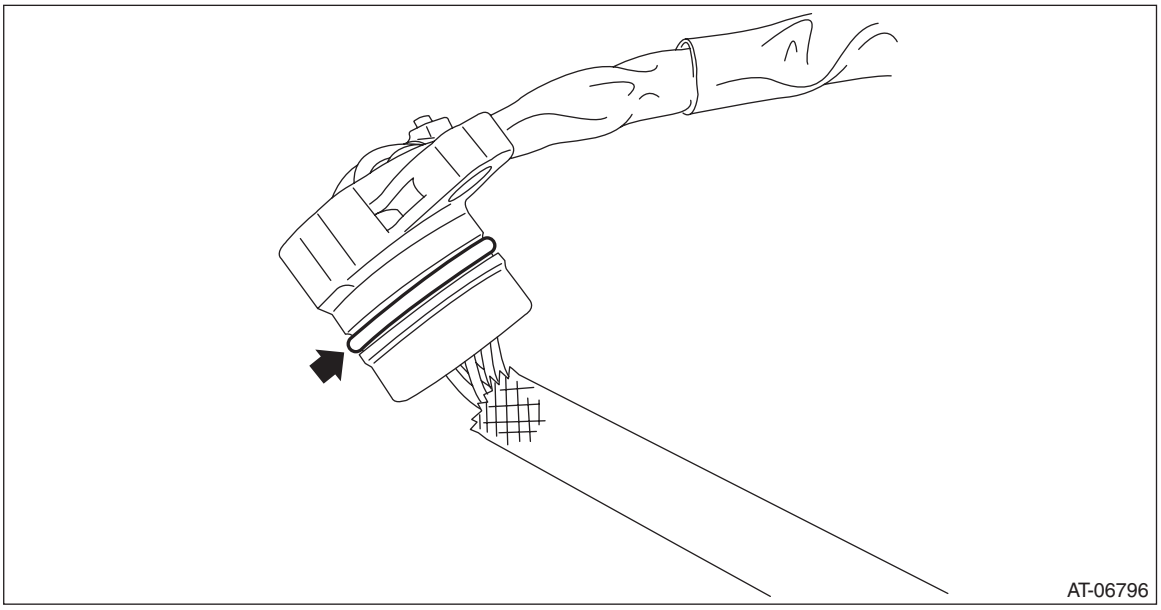
15) Remove the valve cover and gasket.



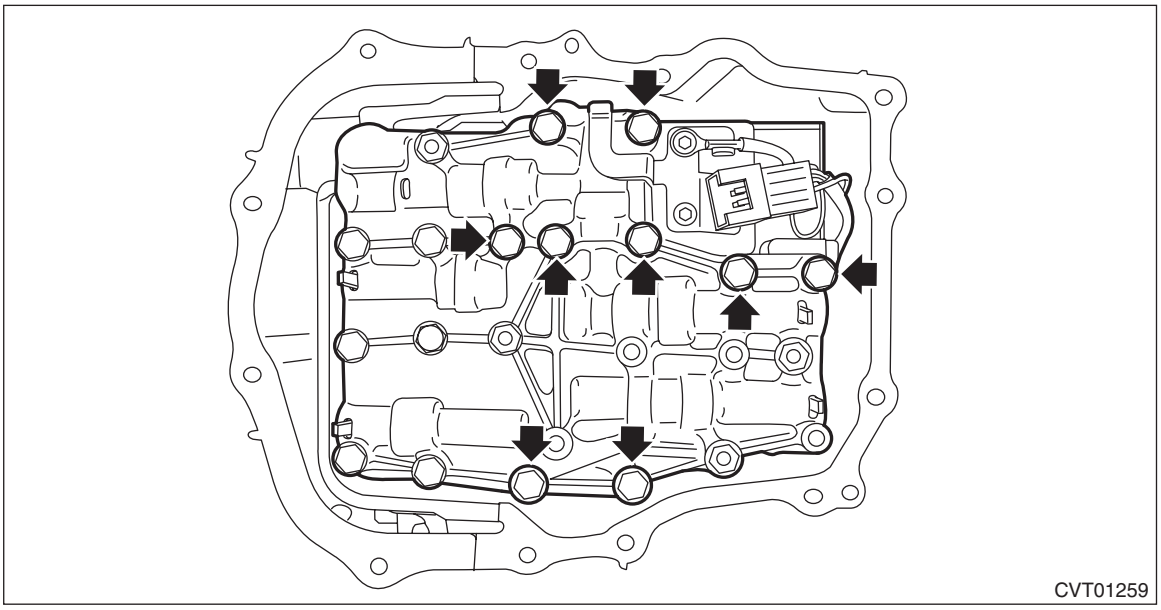
16) Remove the transmission harness from the valve cover.



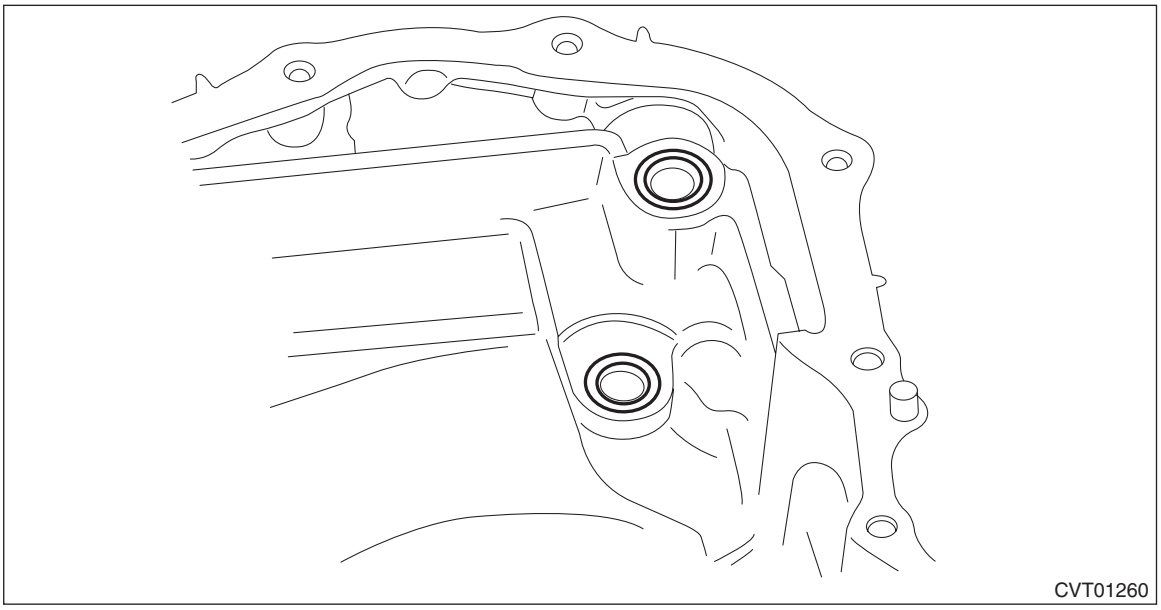
17) Remove the O-ring from the transmission harness.



18) Disconnect the harness connector from the control valve body.
19) Remove the control valve body.



20) Remove the O-ring from the transmission.



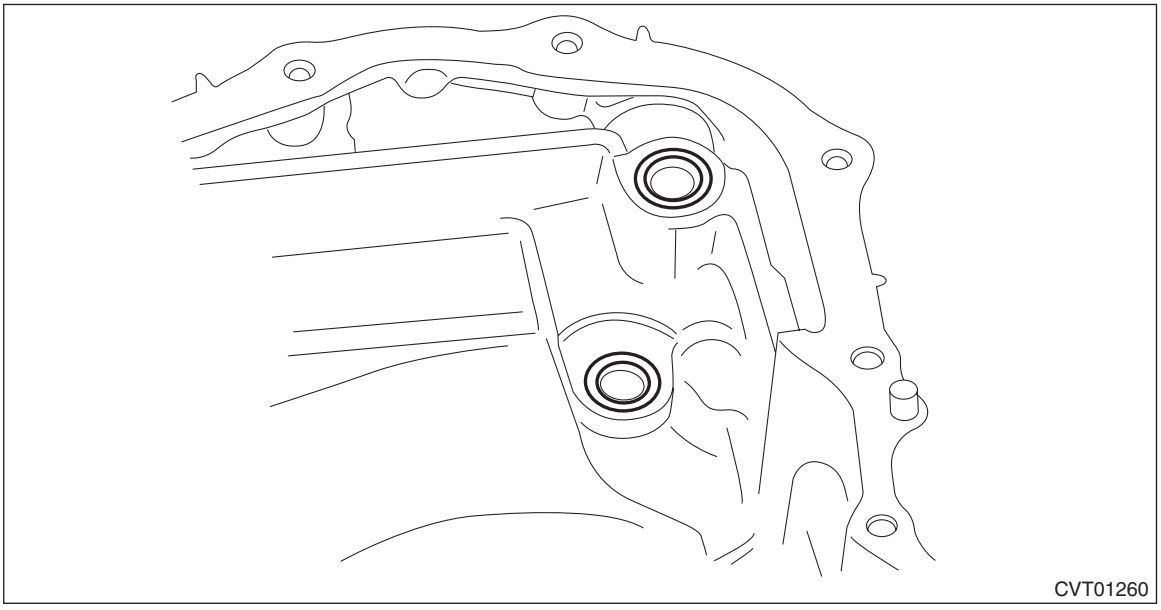
B: INSTALLATION

1) Clean the mating surface of valve cover and transmission side.

CAUTION:
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.
3) Install the O-rings.

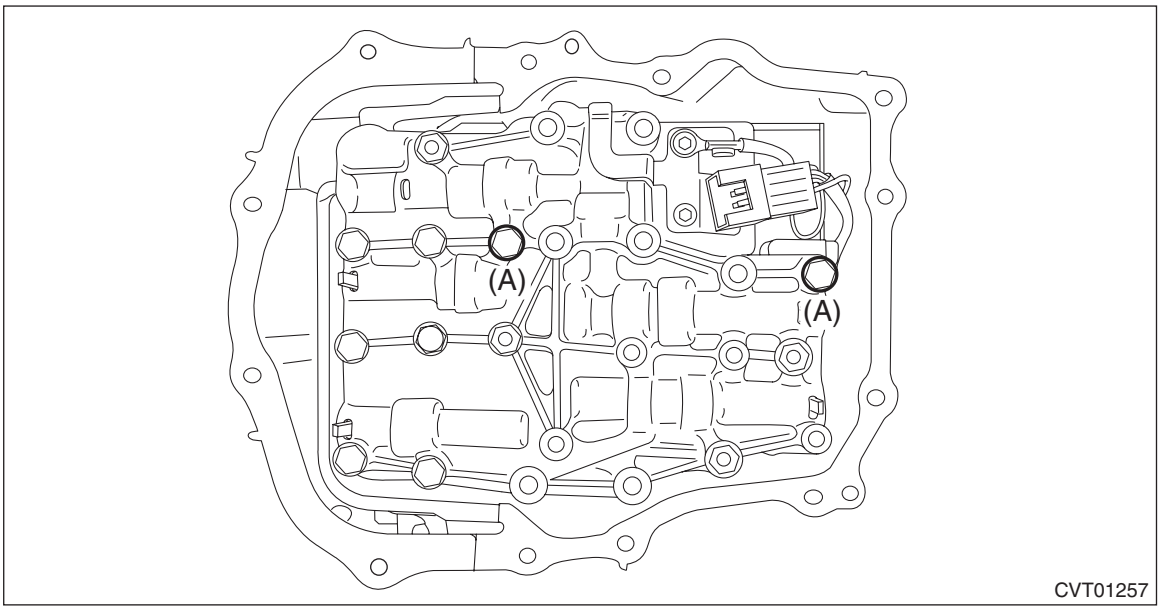
NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



4) Install the control valve body.
(1) Install the control valve body to the transmission.

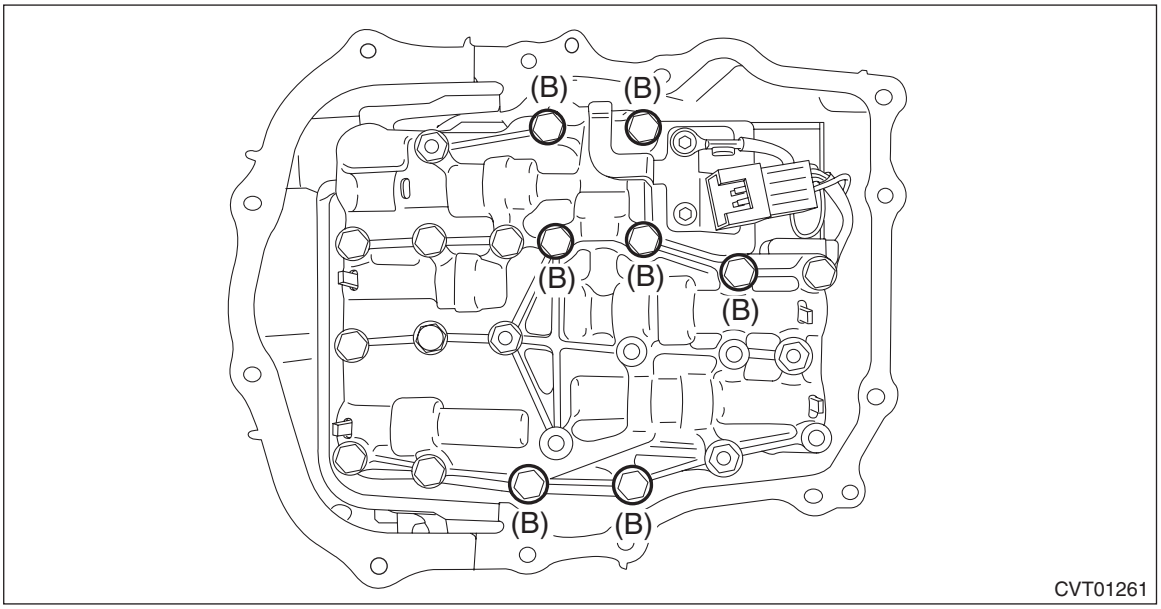
CAUTION:
- **Do not damage the O-ring.**
- **Perform installation so that the O-ring is not displaced.**

(2) Temporarily tighten the bolt (A: silver).



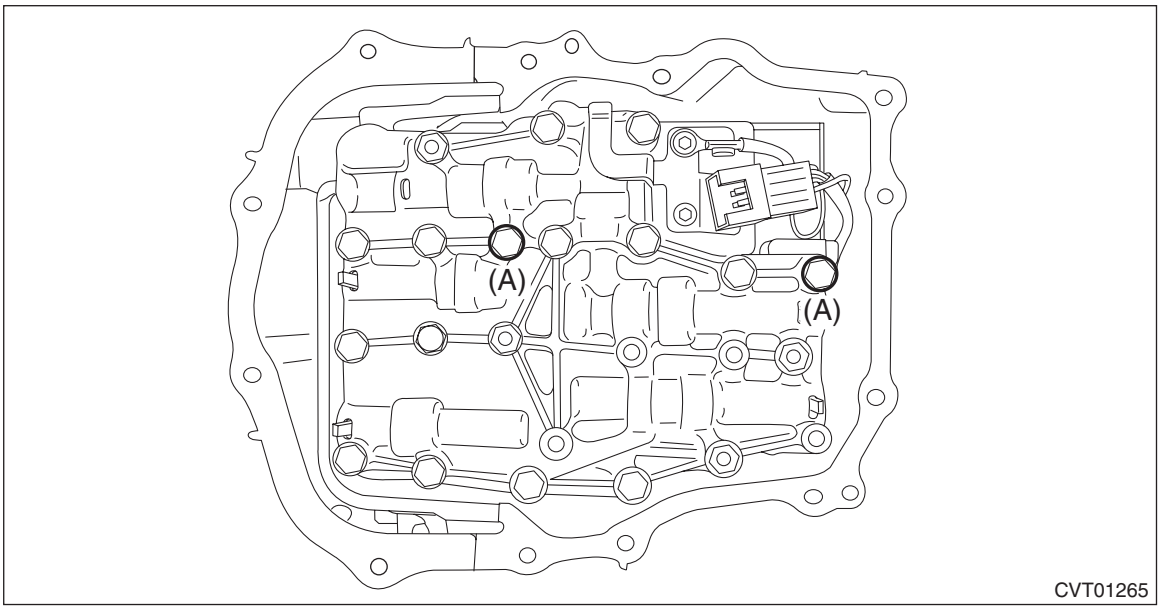
(3) Attach the bolt (B).

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



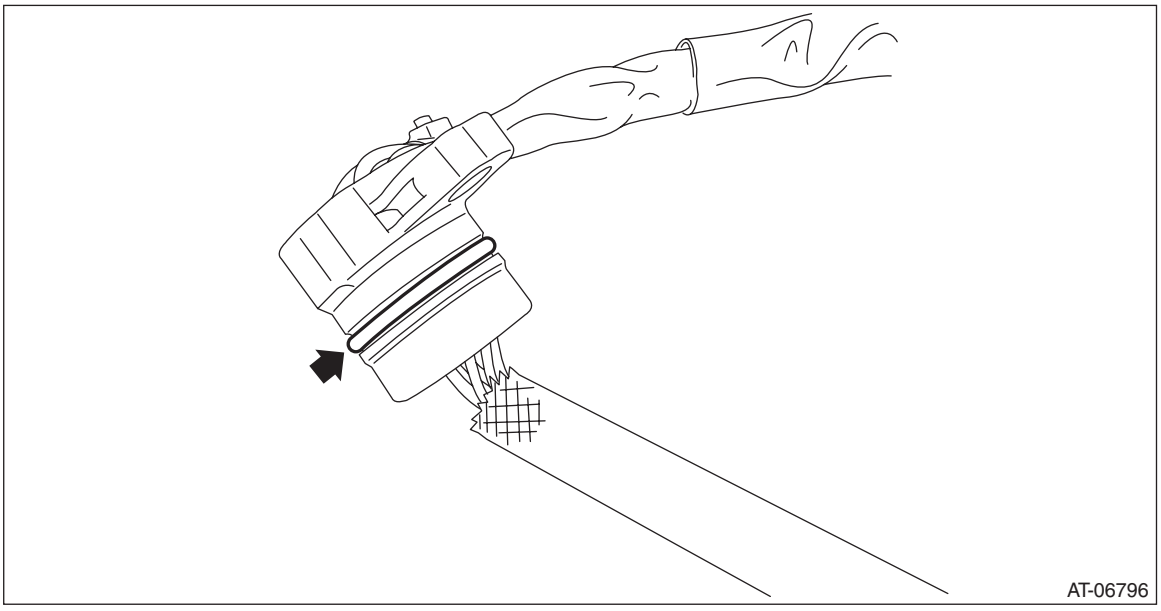
(4) Tighten the bolt (A: silver).

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



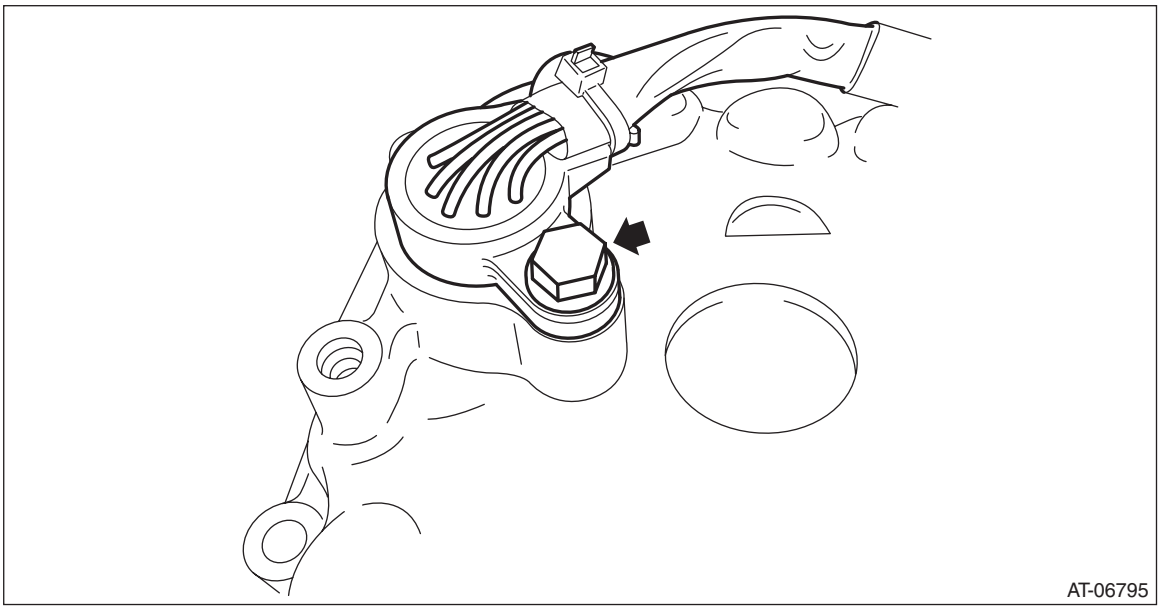
5) Install the O-ring to the transmission harness.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



6) Install the transmission harness to the valve cover.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

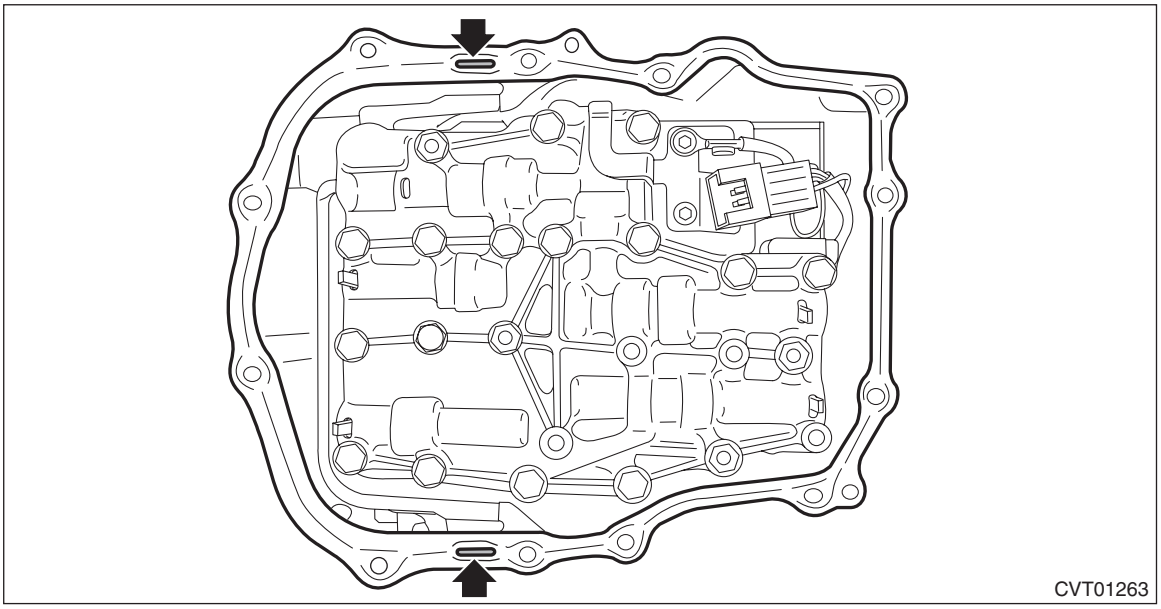


7) Install the gasket to the transmission.

NOTE:
Use a new gasket.

8) Apply liquid gasket to the oval hole of gasket.

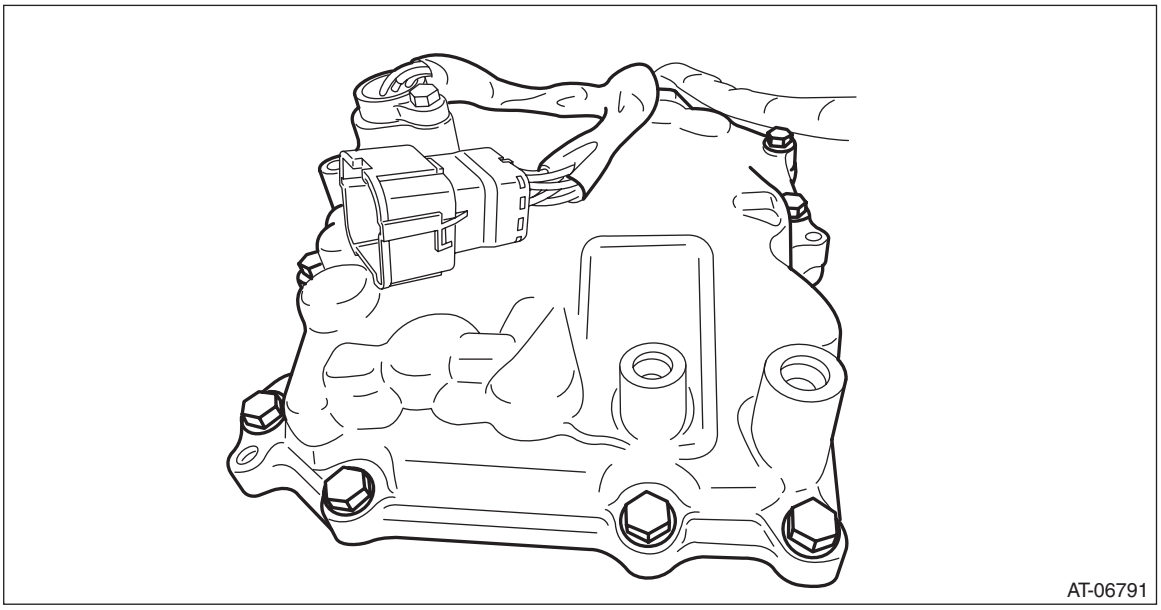
Liquid gasket:
THREE BOND 1215B or equivalent



9) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

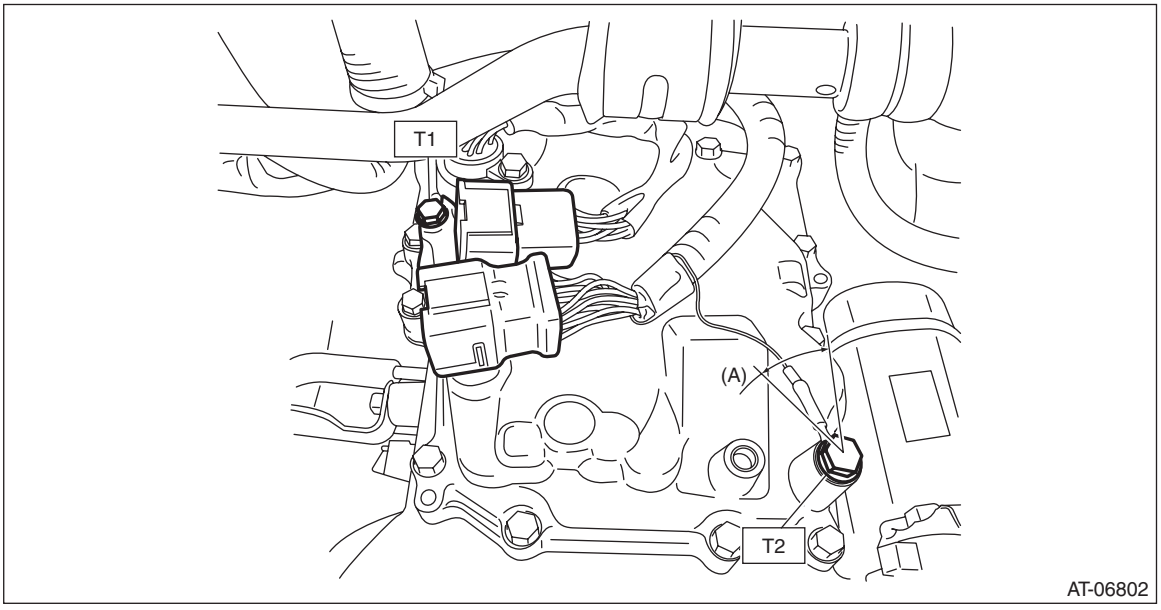
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



10) Remove the ST (SHEET SPECIAL TOOL).
11) Install the throttle body. <Ref. to FU(H4DO(w/o HEV))-17, INSTALLATION, Throttle Body.>
12) Install the transmission harness connector to the harness stay.
13) Install the transmission harness stay and transmission ground terminal.

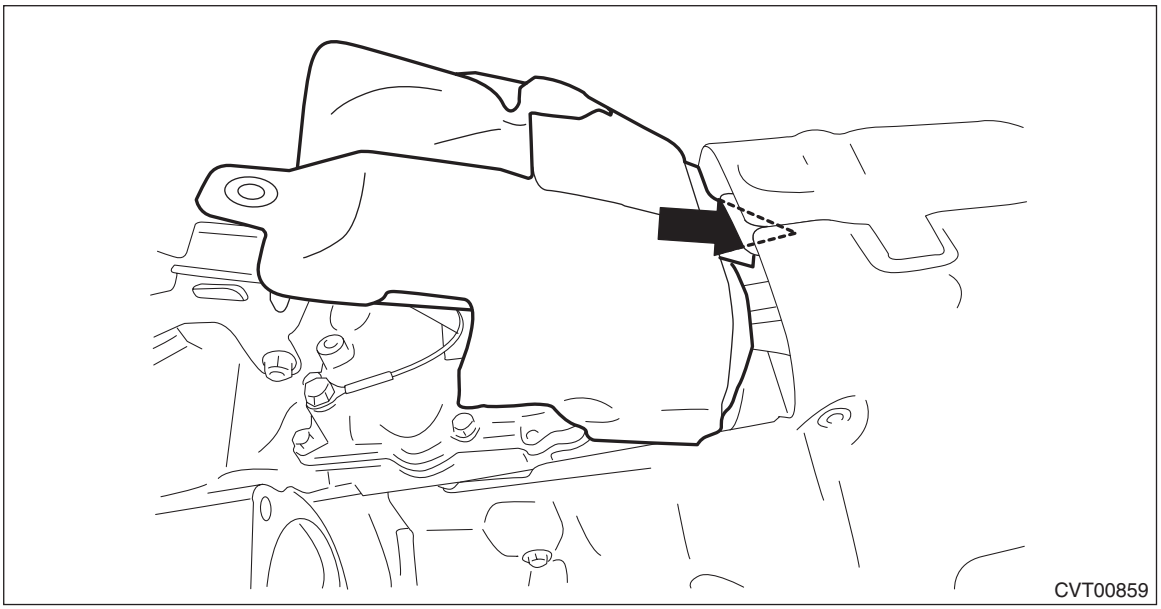
NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

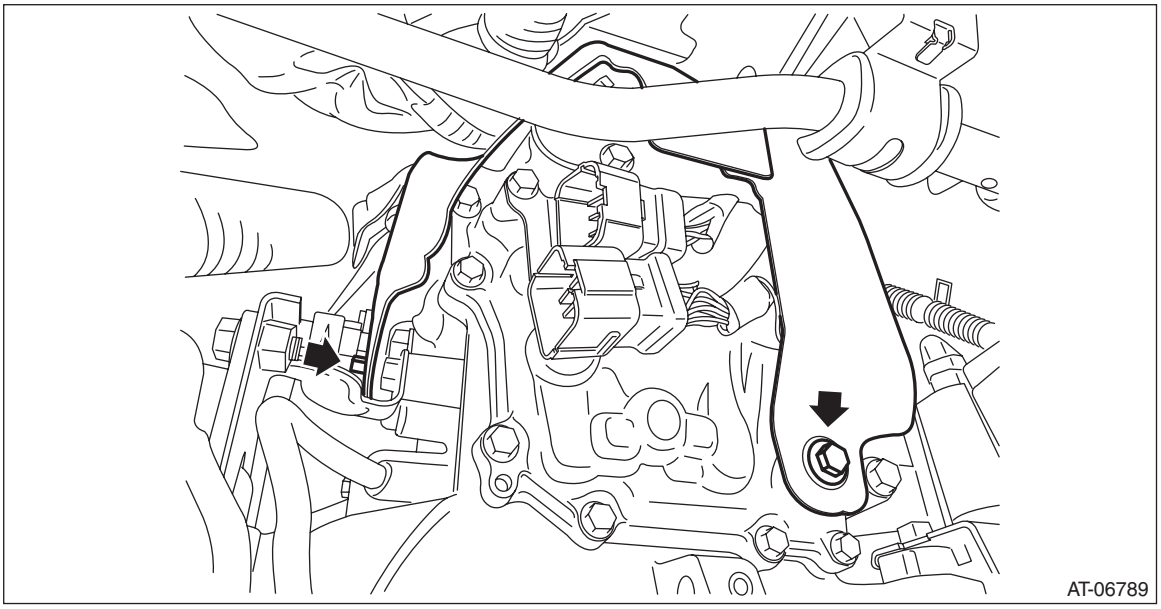
Tightening torque:
T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



14) Insert the transmission case cover (small) between transmission case cover (large) and transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

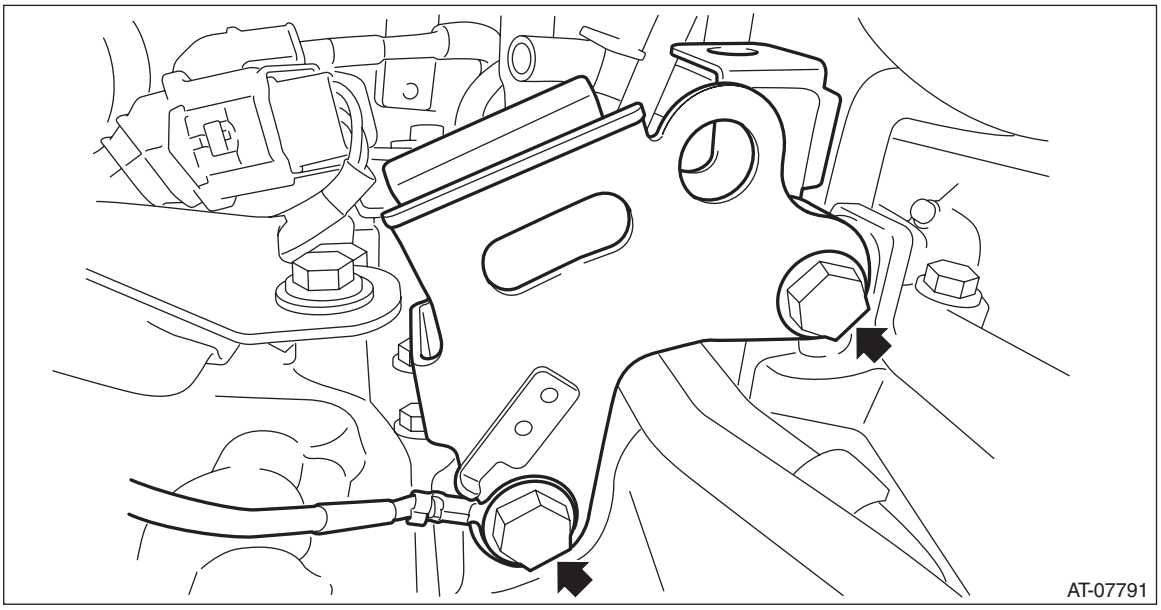




15) Install the pitching stopper bracket and transmission radio ground cord.

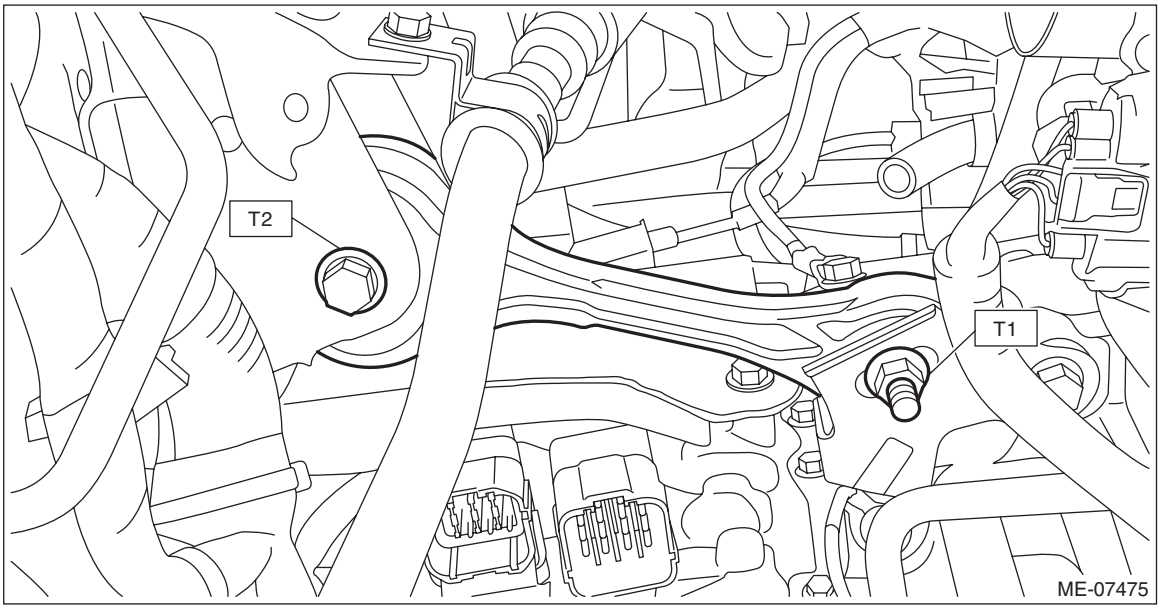
CAUTION:
Be careful not to deform or damage the terminal of transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



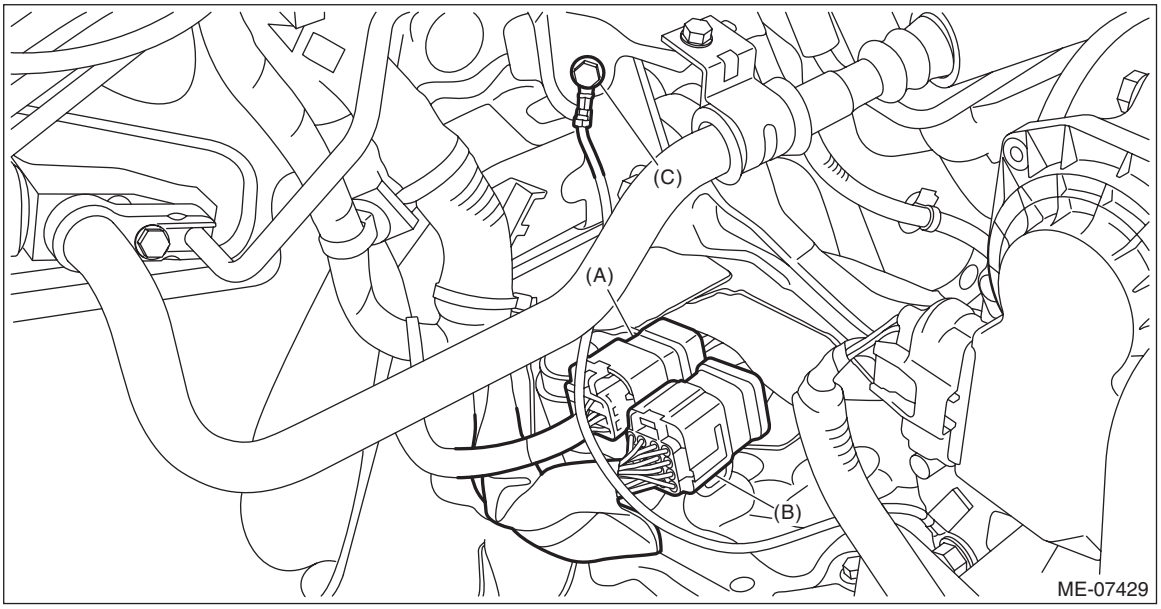
16) Install the air breather hose to the pitching stopper bracket.
17) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



18) Connect the following harness connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



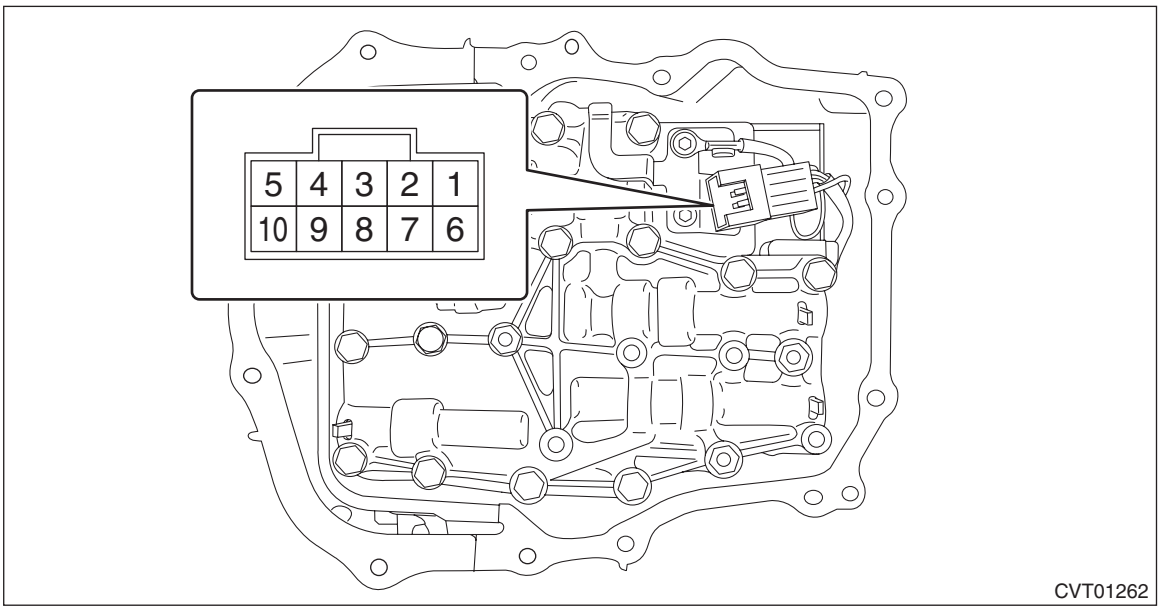
(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

19) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
20) Adjust the CVTF level. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>
21) Perform the operation of AT learning mode. <Ref. to CVT(w/o HEV)(diag)-26, Learning Control.>

C: INSPECTION

- Check each part for damage or dust.
- Measure the resistance of each solenoid, sensor and ground wire.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).



- **Solenoid**

Solenoid	Terminal No.	Standard
Primary UP solenoid	No. 2 — control valve body	Approx. 10 — 13.5 Ω
Secondary solenoid	No. 3 — control valve body	Approx. 5 — 7 Ω
F&R clutch solenoid	No. 4 — control valve body	Approx. 4 — 6 Ω
Primary DOWN solenoid	No. 7 — control valve body	Approx. 10 — 13.5 Ω
Lock-up duty solenoid	No. 9 — control valve body	Approx. 10 — 13.5 Ω
AWD solenoid	No. 10 — control valve body	Approx. 2 — 4.5 Ω

- **Oil temperature sensor**

Sensor	Terminal No.	Standard At 20°C (68°F)
Oil temperature sensor	No. 1 — No. 6	Approx. 2.5 kΩ

- **Transmission ground**

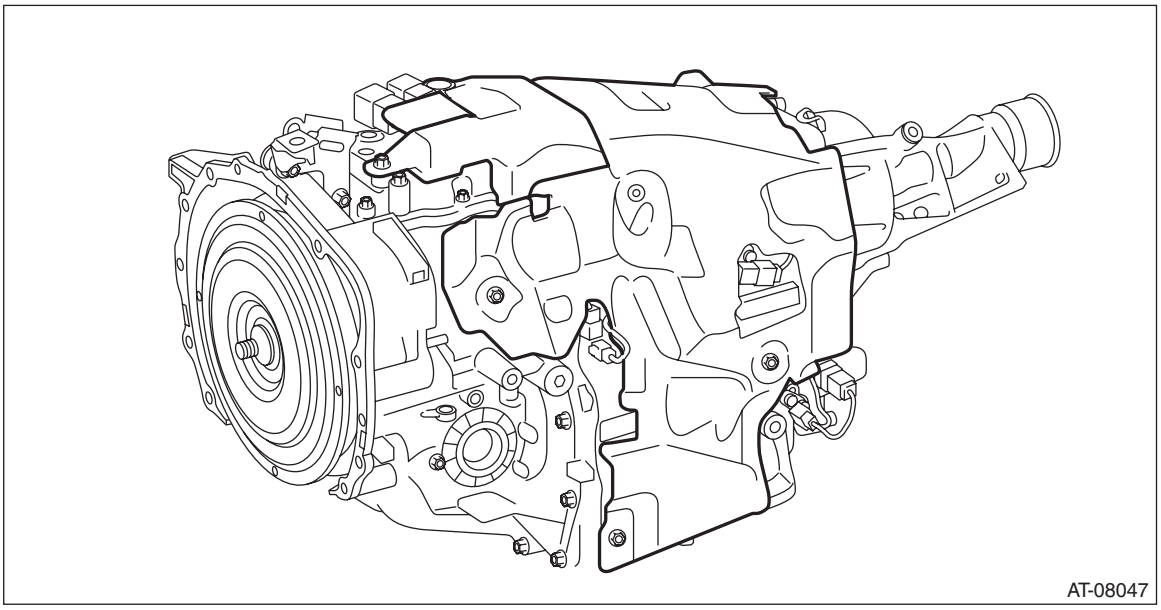
Terminal No.	Standard
No. 8 — control valve body	Less than 1 Ω

21.Transmission Harness

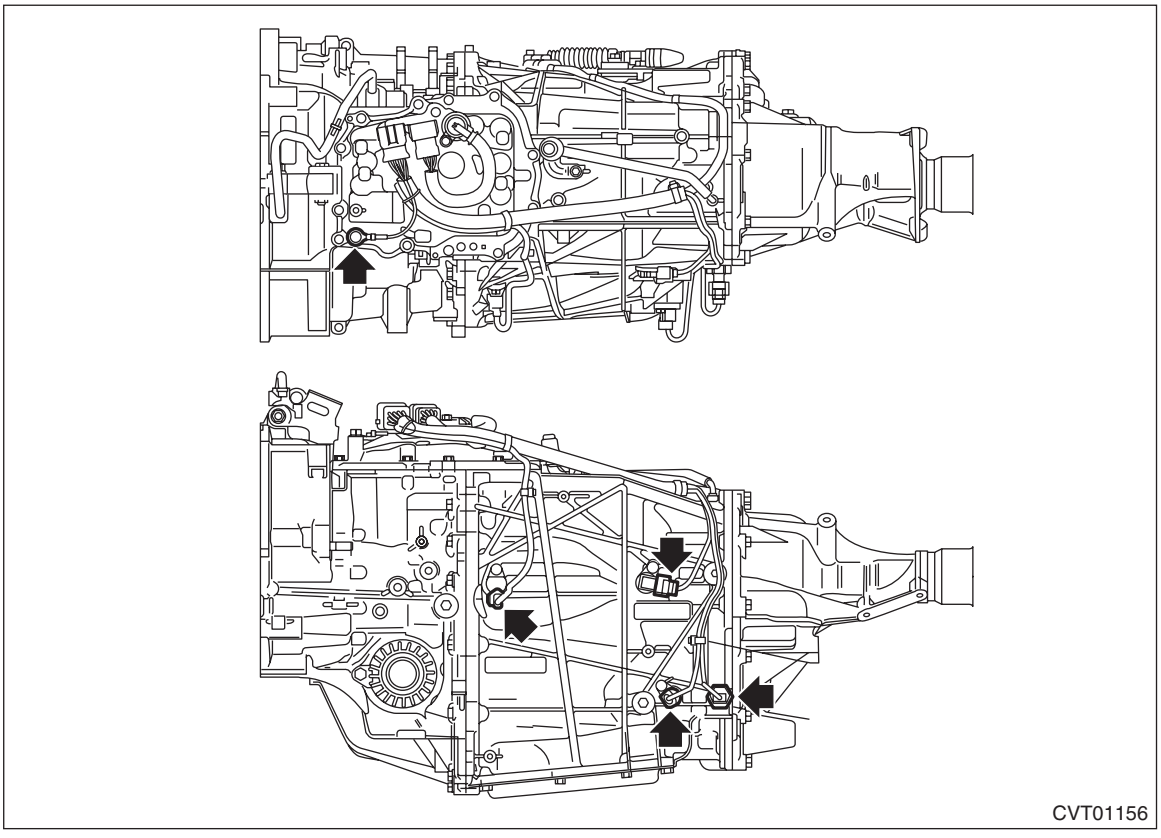
A: REMOVAL

1. INHIBITOR HARNESS

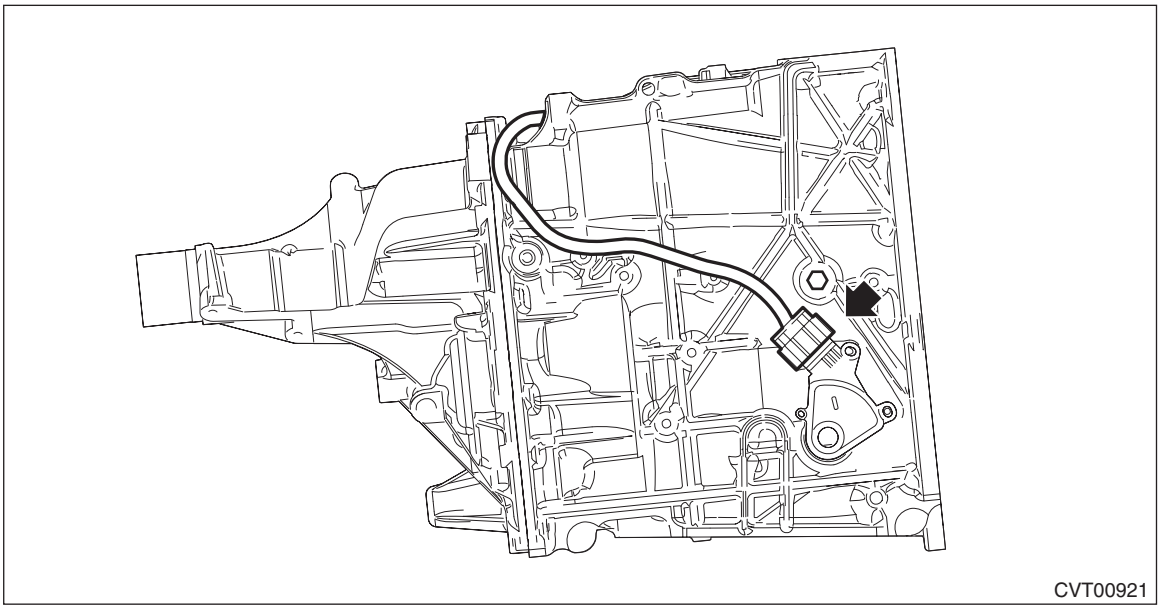
1) Remove the transmission from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the transmission case cover.



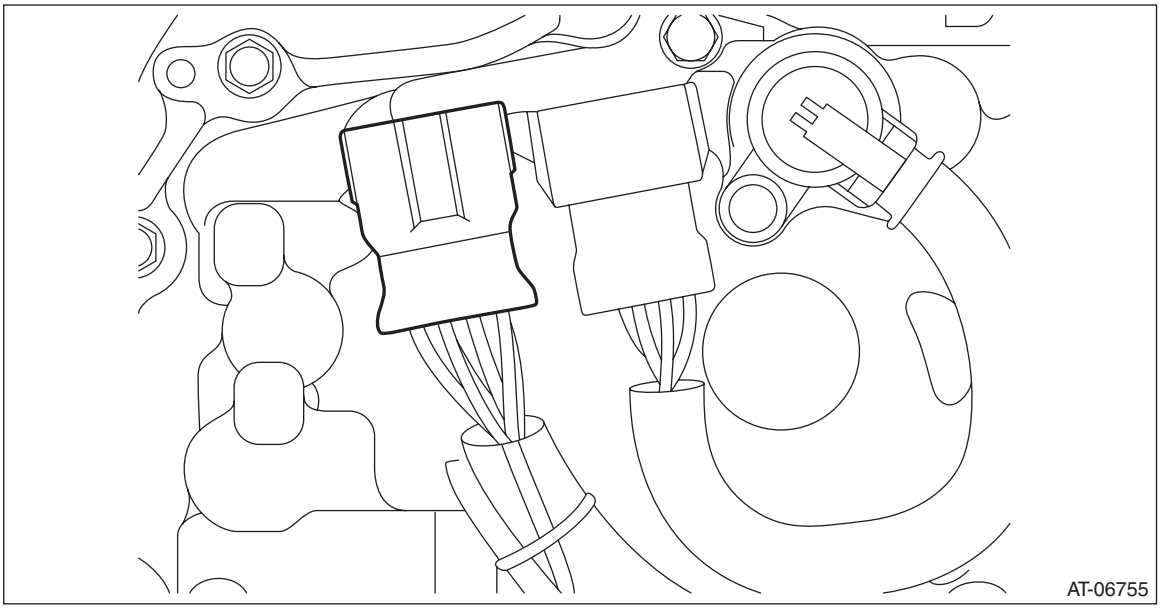
3) Remove the harness connector from the ground terminal, turbine speed sensor, primary speed sensor, secondary speed sensor and secondary pressure sensor.



4) Remove the harness connector from inhibitor switch.



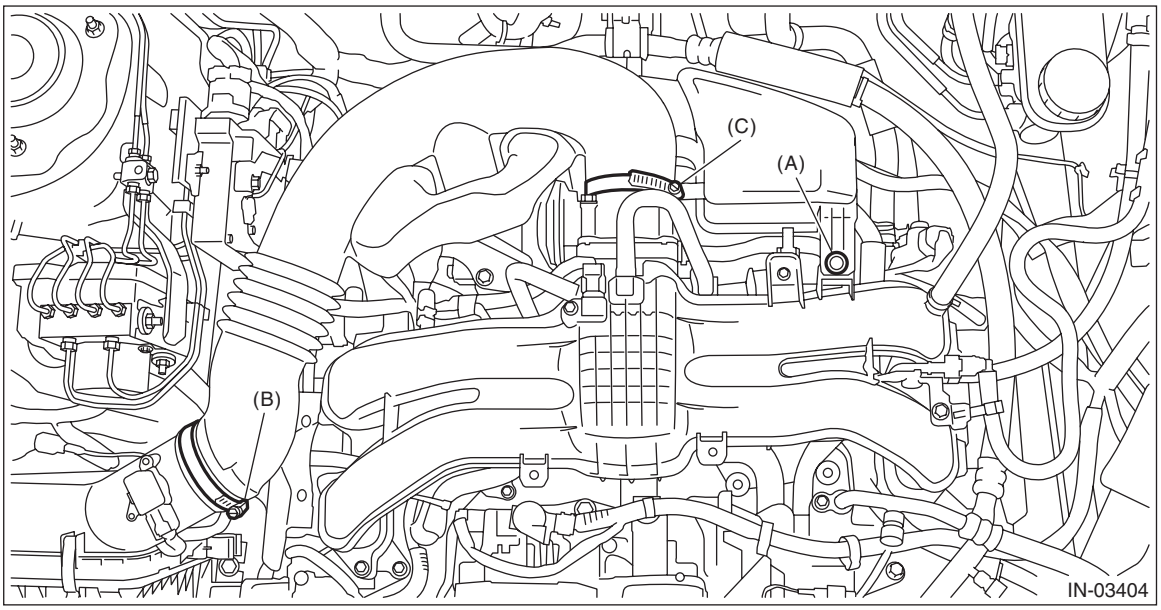
5) Remove the inhibitor harness connector from the transmission harness stay.



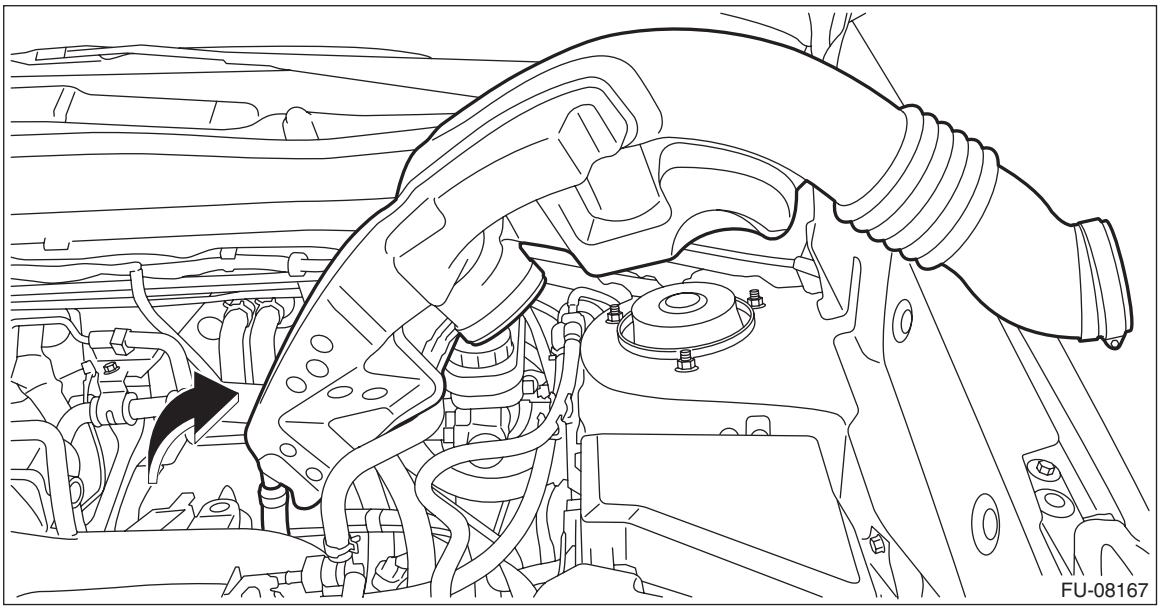
6) Remove the harness clip from the transmission, and remove the inhibitor harness.

2. TRANSMISSION HARNESS

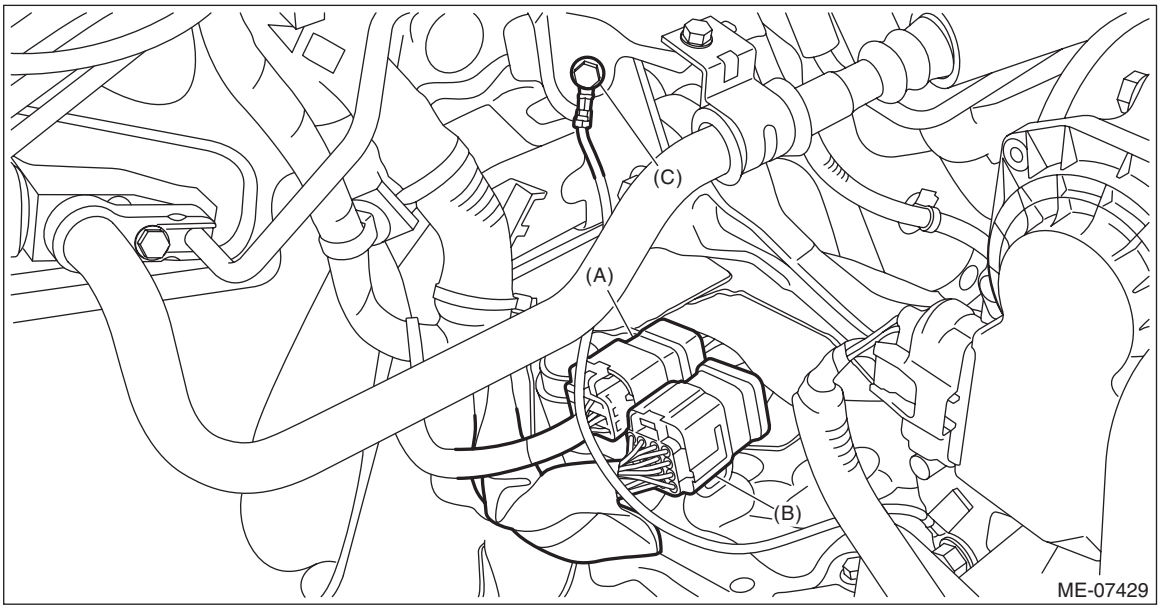
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

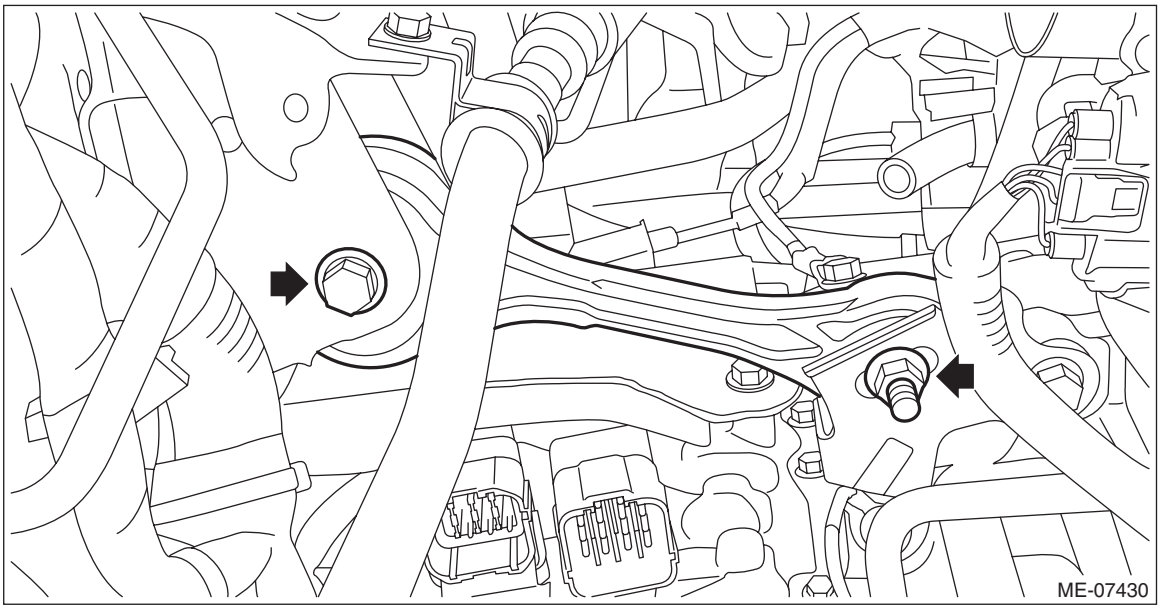


6) Disconnect the following connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

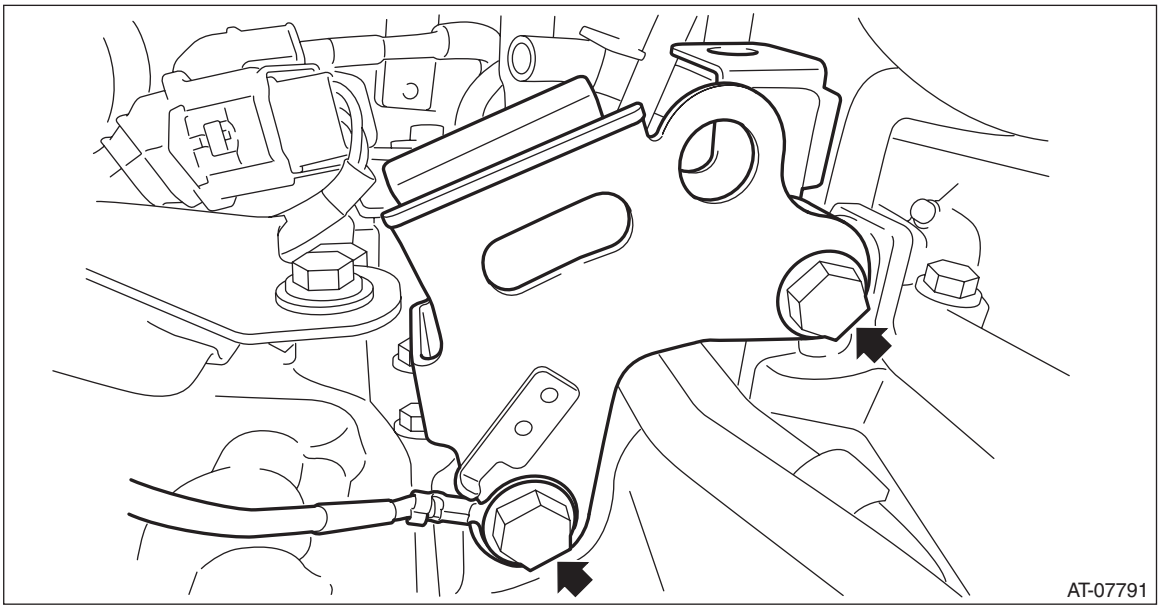


(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

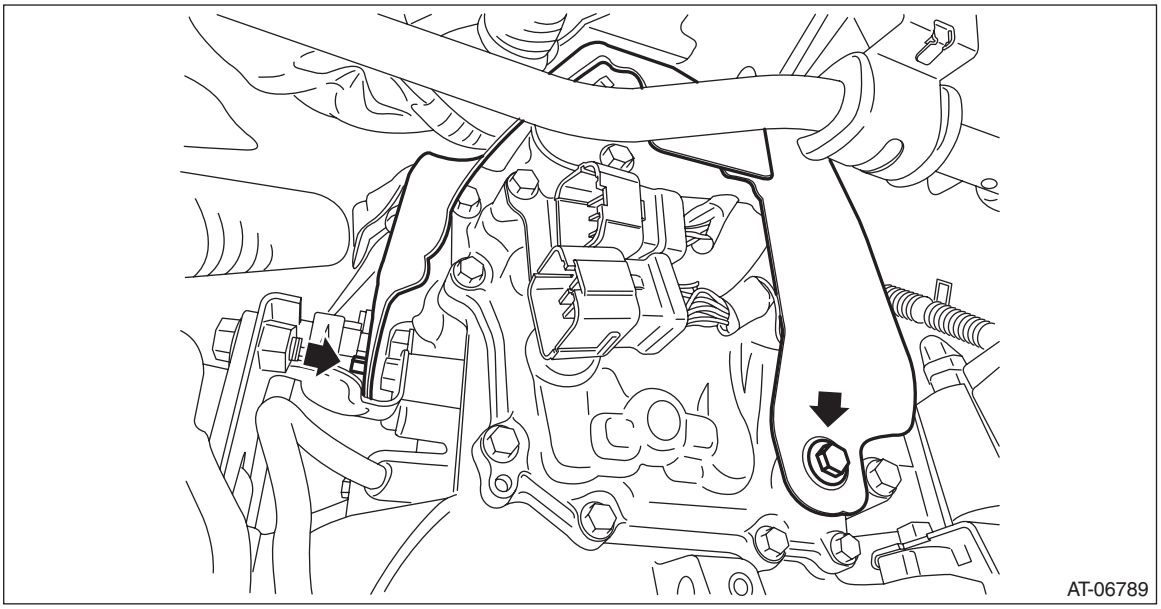
7) Remove the pitching stopper.



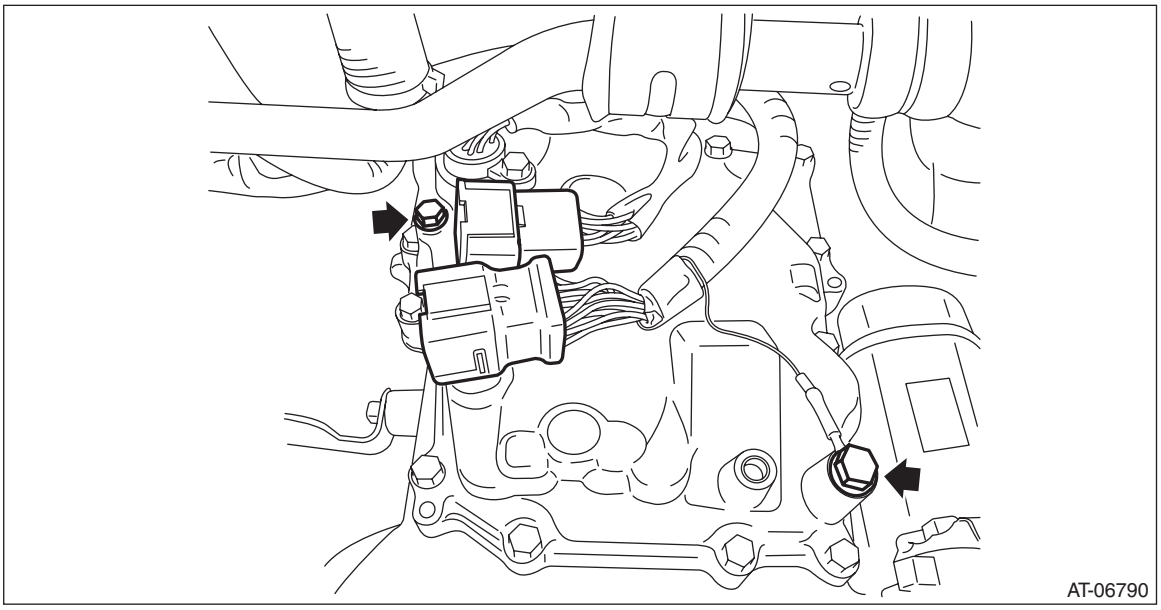
8) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



9) Remove the transmission case cover.

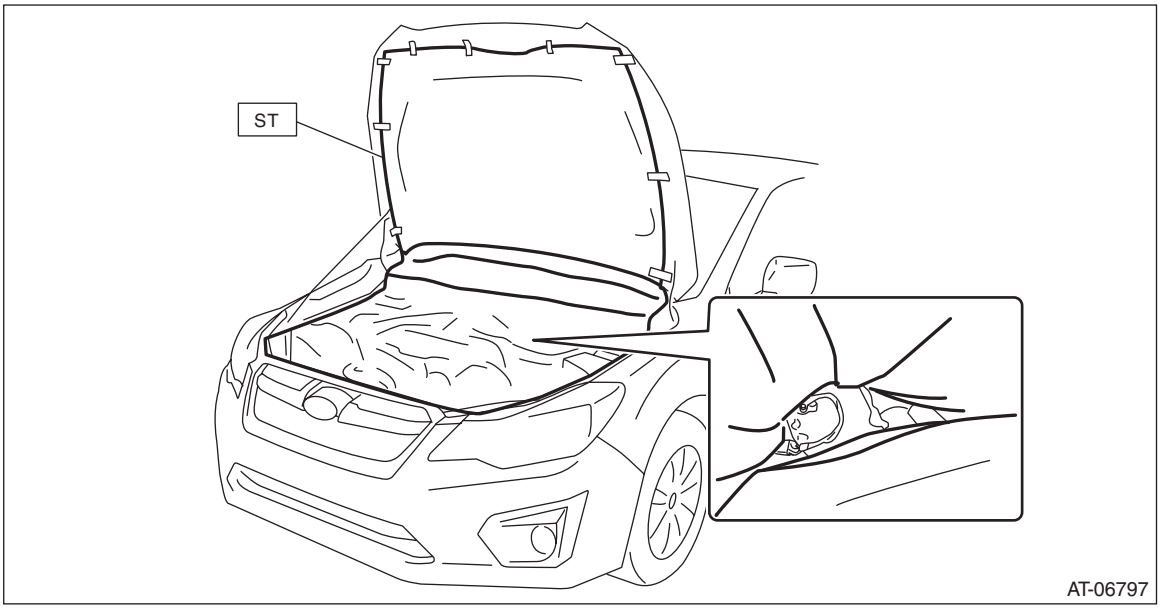


10) Remove the transmission harness stay and ground terminal.

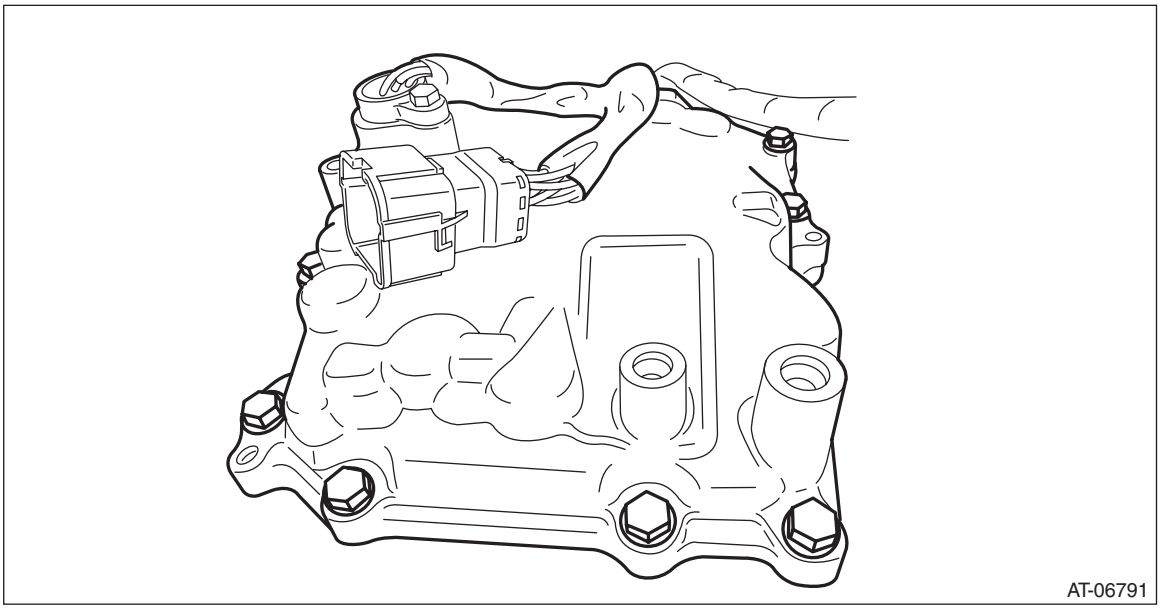


11) Remove the transmission harness connector from the harness stay.
12) Clean the transmission exterior.
13) Set the ST on the vehicle.

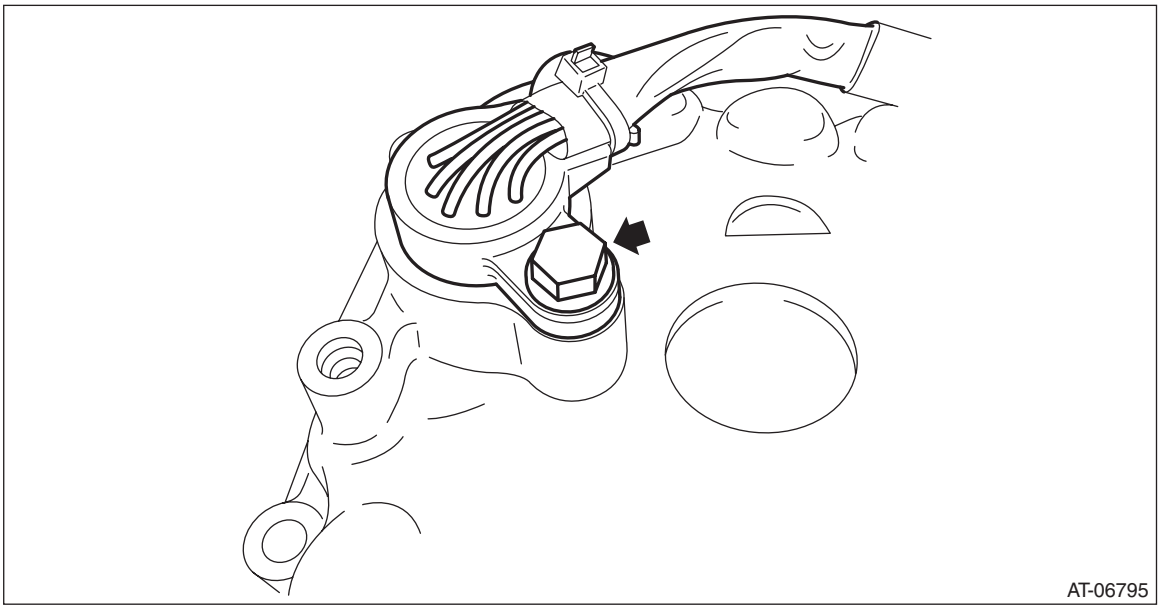
ST 18761AA010 SHEET SPECIAL TOOL



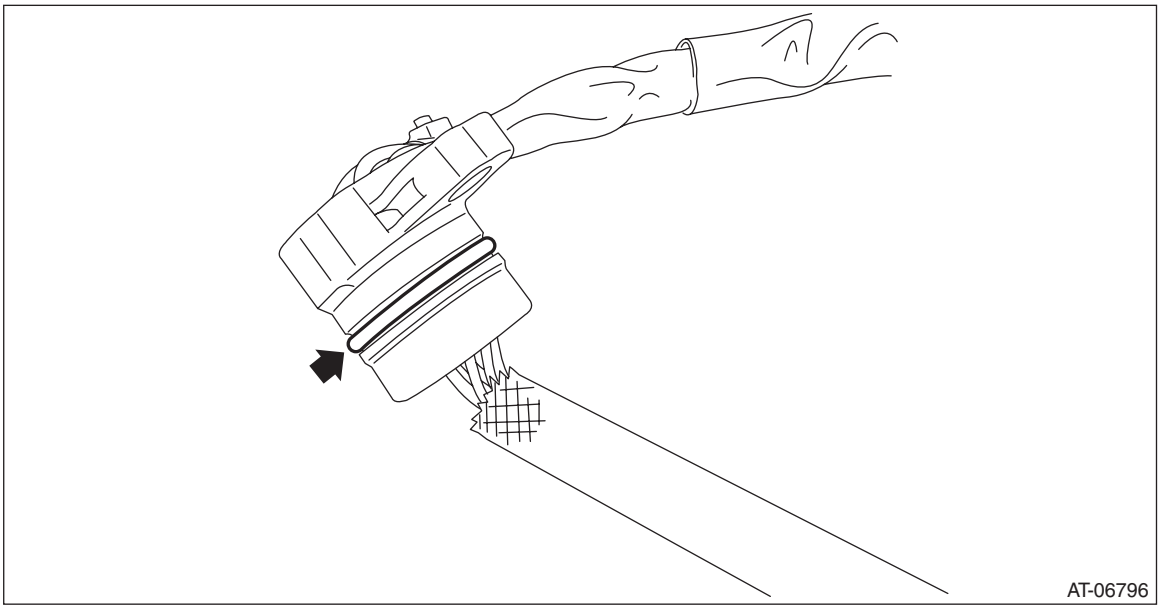
14) Remove the valve cover and gasket.



15) Remove the transmission harness connector from the control valve body.
16) Remove the transmission harness from the valve cover.



17) Remove the O-ring from the transmission harness.



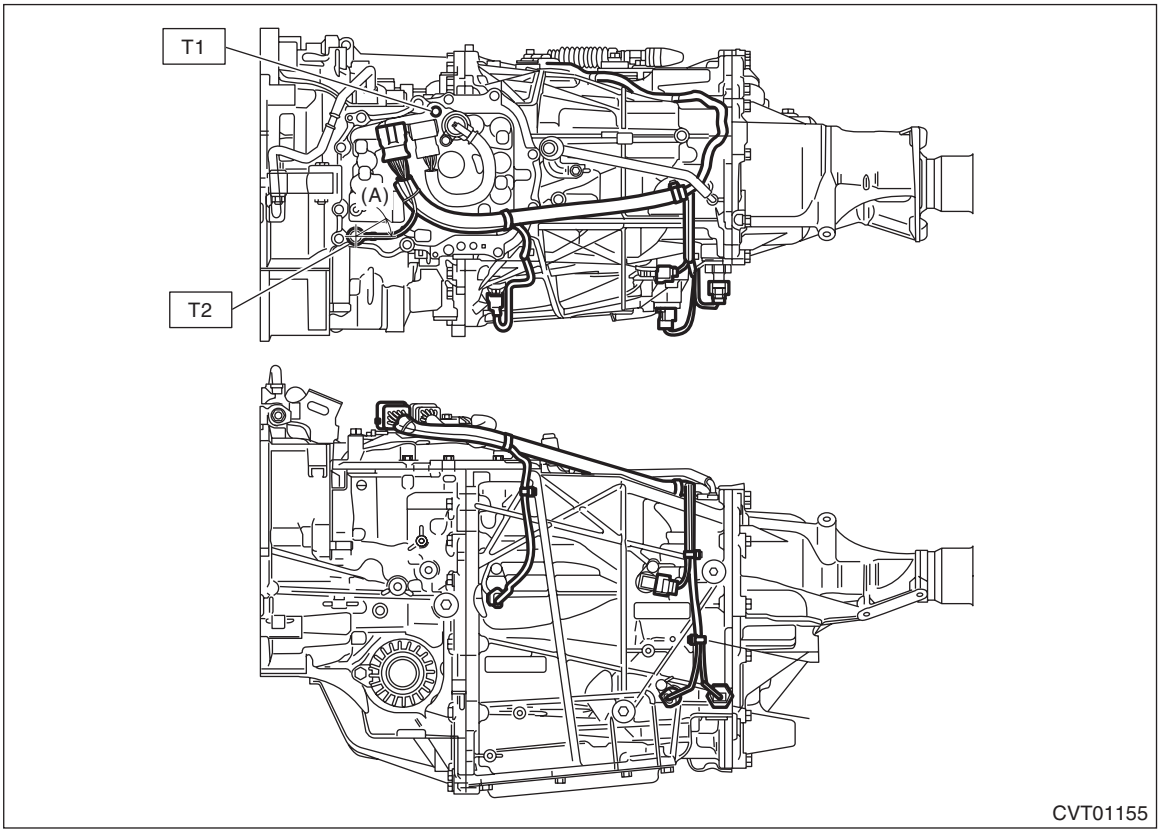
B: INSTALLATION

1. INHIBITOR HARNESS

Install in the reverse order of removal.

NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

Tightening torque:
T1: 7 N·m (0.7 kgf-m, 3.7 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



2. TRANSMISSION HARNESS

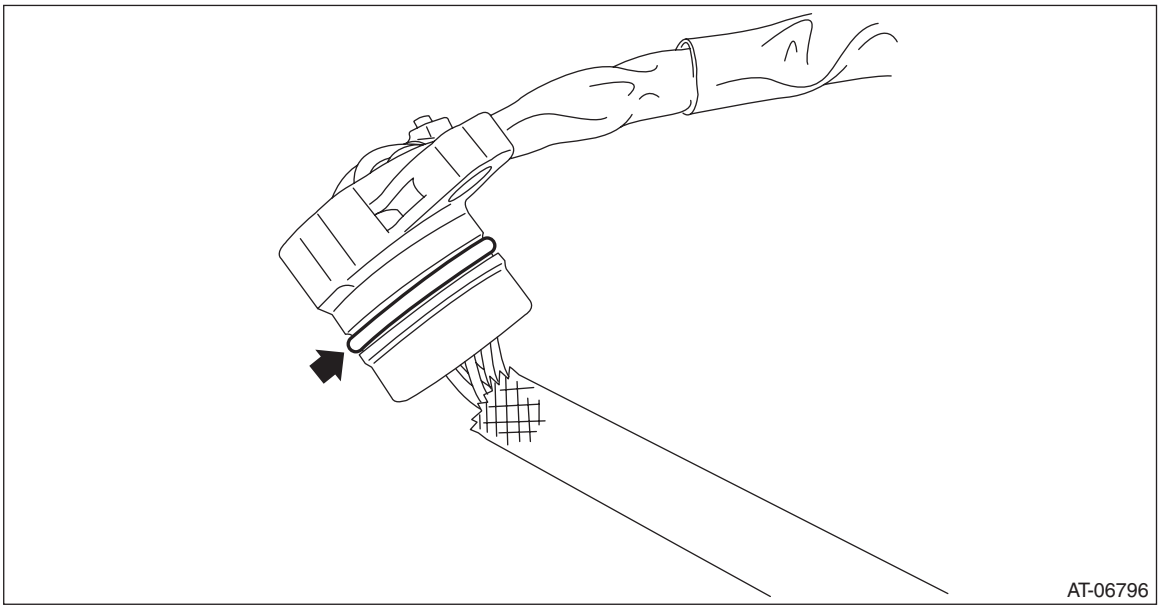
1) Clean the mating surface of valve cover and transmission side.

CAUTION:
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.

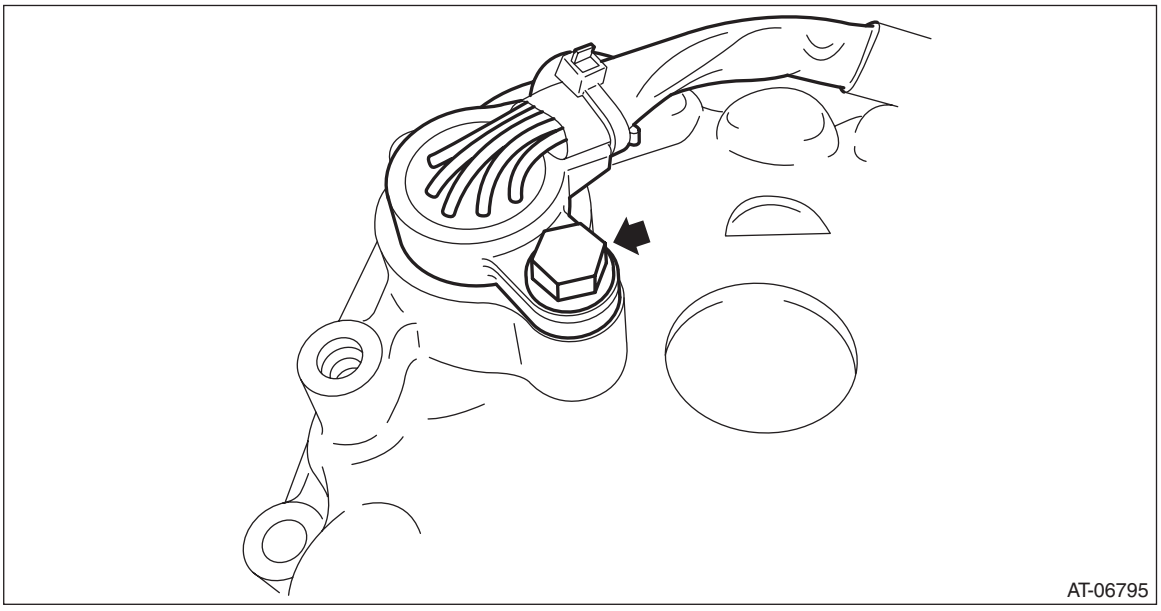
3) Install the O-ring to the transmission harness.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



4) Install the transmission harness to the valve cover.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

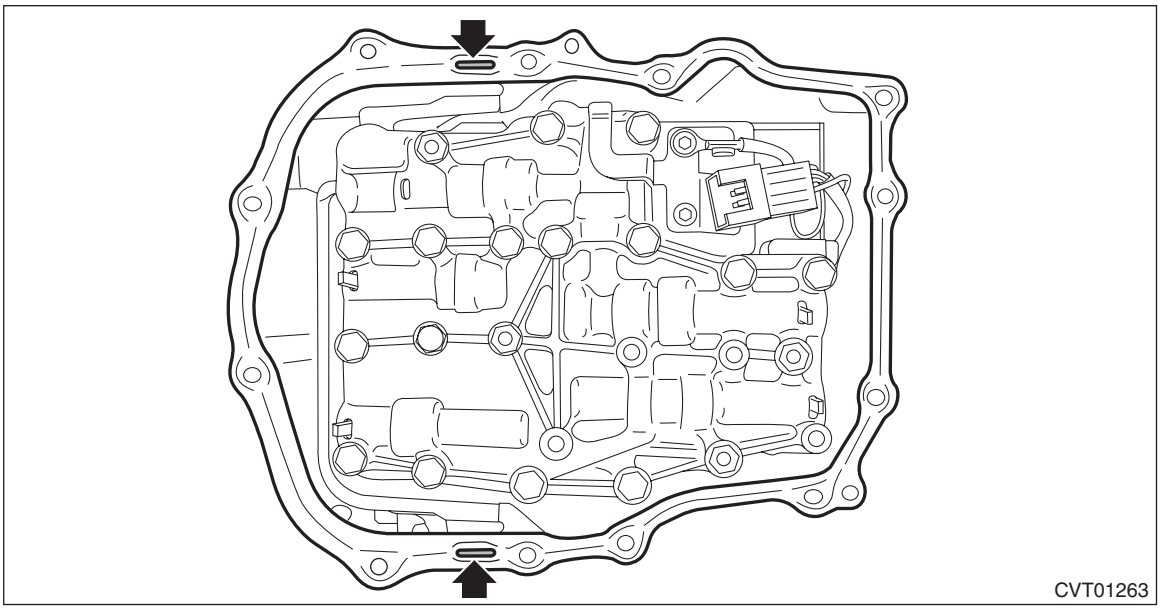


5) Install the gasket to the transmission.

NOTE:
Use a new gasket.

6) Apply liquid gasket to the oval hole of gasket.

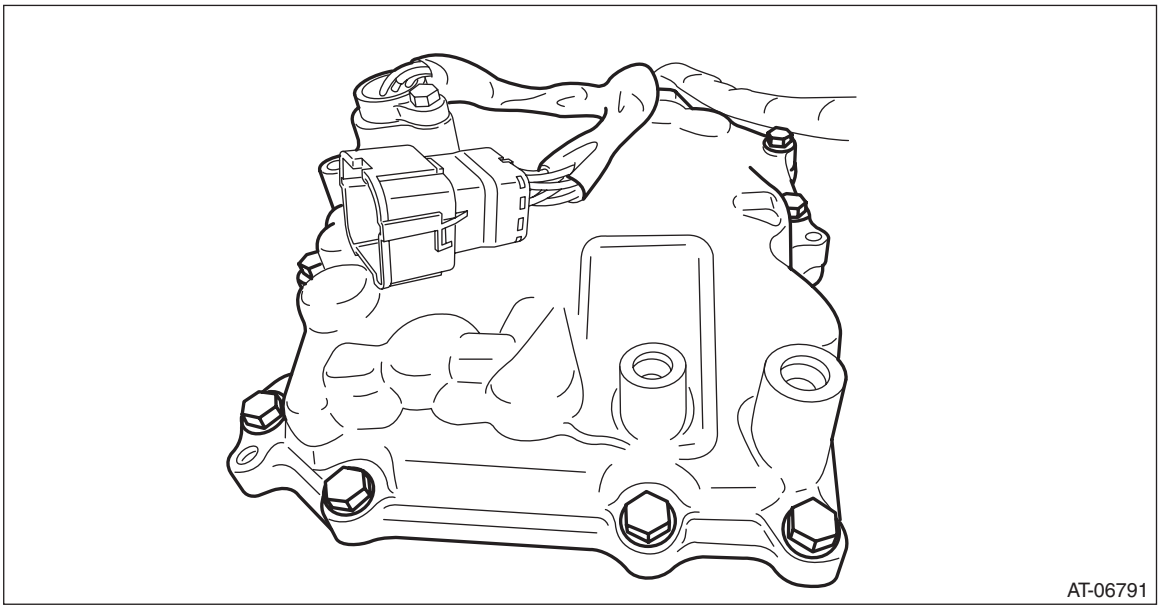
Liquid gasket:
THREE BOND 1215B or equivalent



7) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

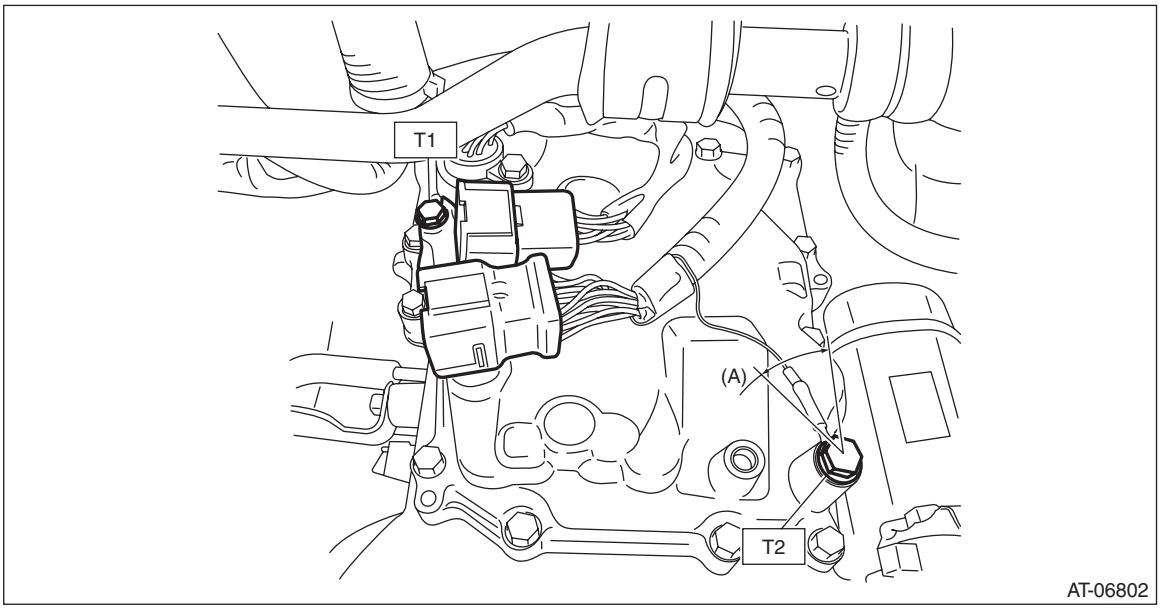
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



8) Remove the ST (SHEET SPECIAL TOOL).
9) Install the transmission harness connector to the harness stay.
10) Install the transmission harness stay and transmission ground terminal.

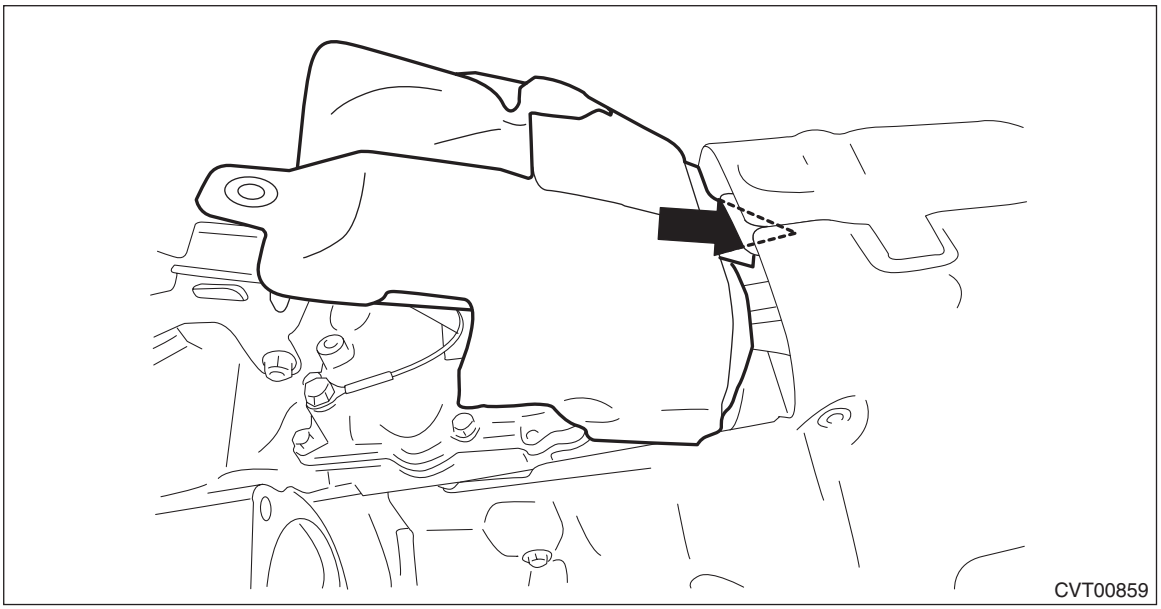
NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

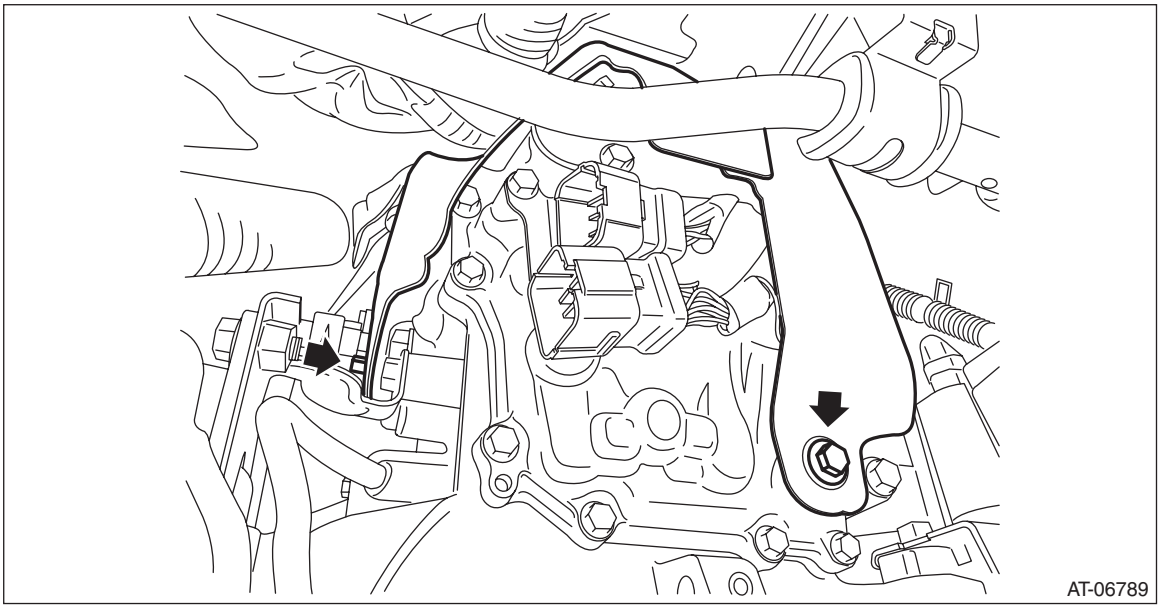
Tightening torque:
T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



11) Insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

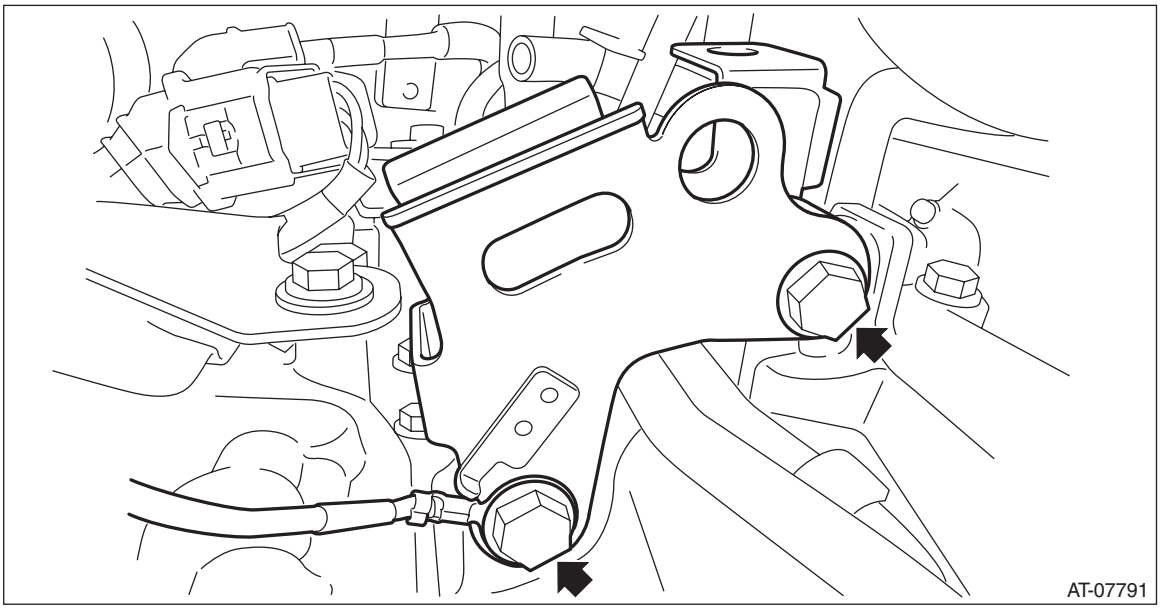




12) Install the pitching stopper bracket and transmission radio ground cord.

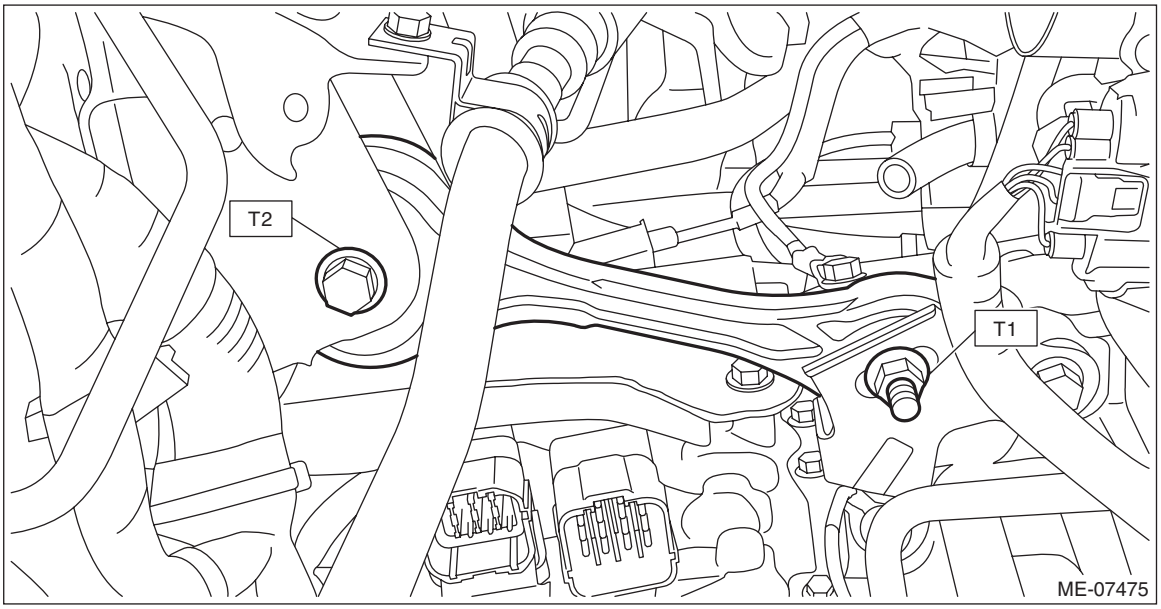
CAUTION:
Be careful not to deform or damage the terminal of transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



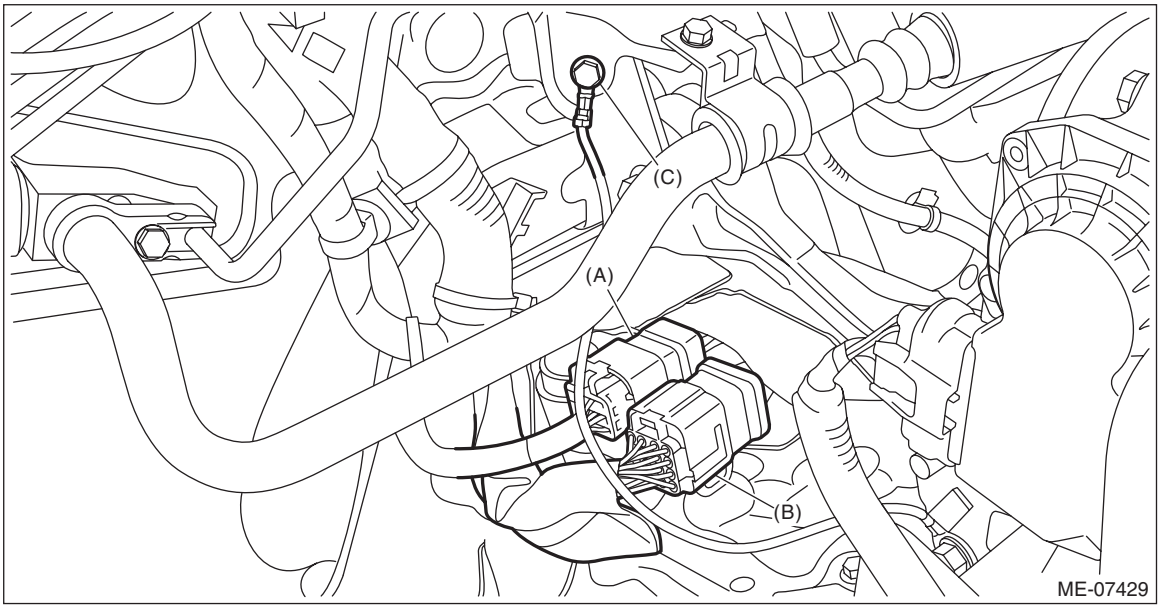
13) Install the air breather hose to the pitching stopper bracket.
14) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



15) Connect the following harness connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

16) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
17) Adjust the CVTF level. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

C: INSPECTION

1) Visually check the harness and connector for damage or crack.
2) Check the harness terminal for rust, disconnection or poor contact.
3) Check the continuity between harness terminals.

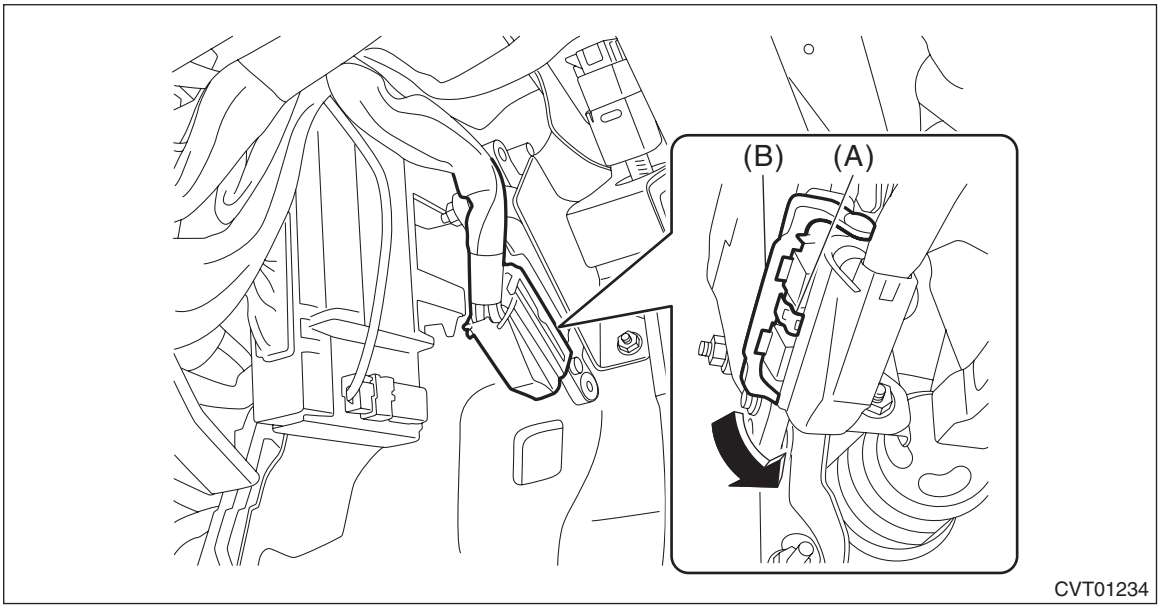
NOTE:
For details of transmission harness circuit, refer to wiring diagram. <Ref. to WI(w/o HEV)-94, WIRING DIAGRAM, CVT Control System.>

Harness continuity standard
Less than 1 Ω

22.Transmission Control Module (TCM)

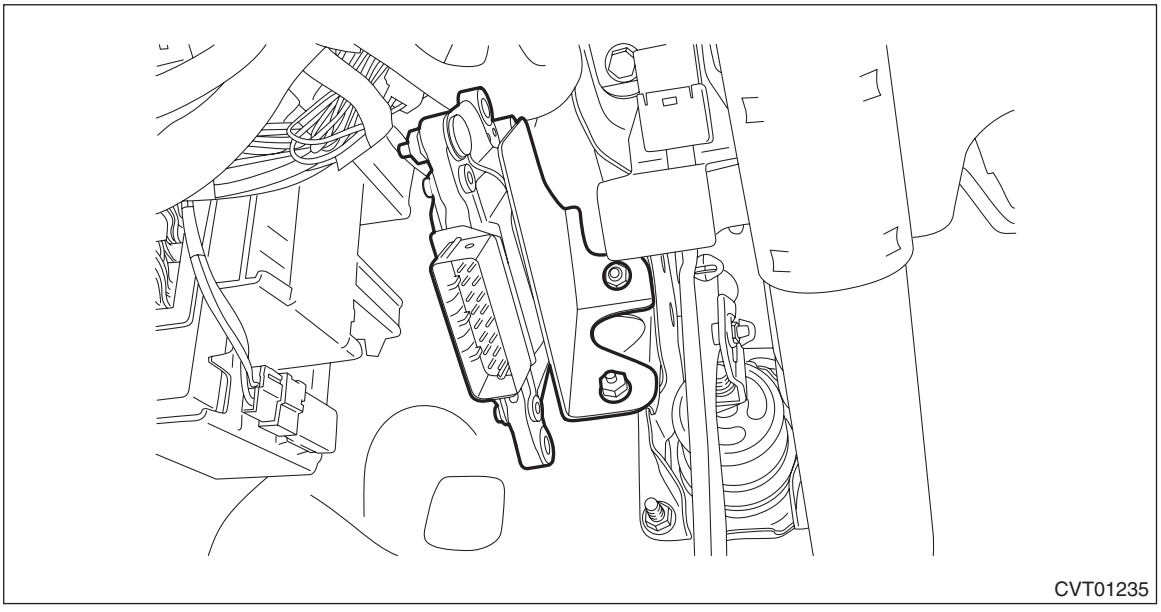
A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the instrument panel lower cover. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Move the lock lever in the arrow direction while pressing the lock button, and disconnect the connector.

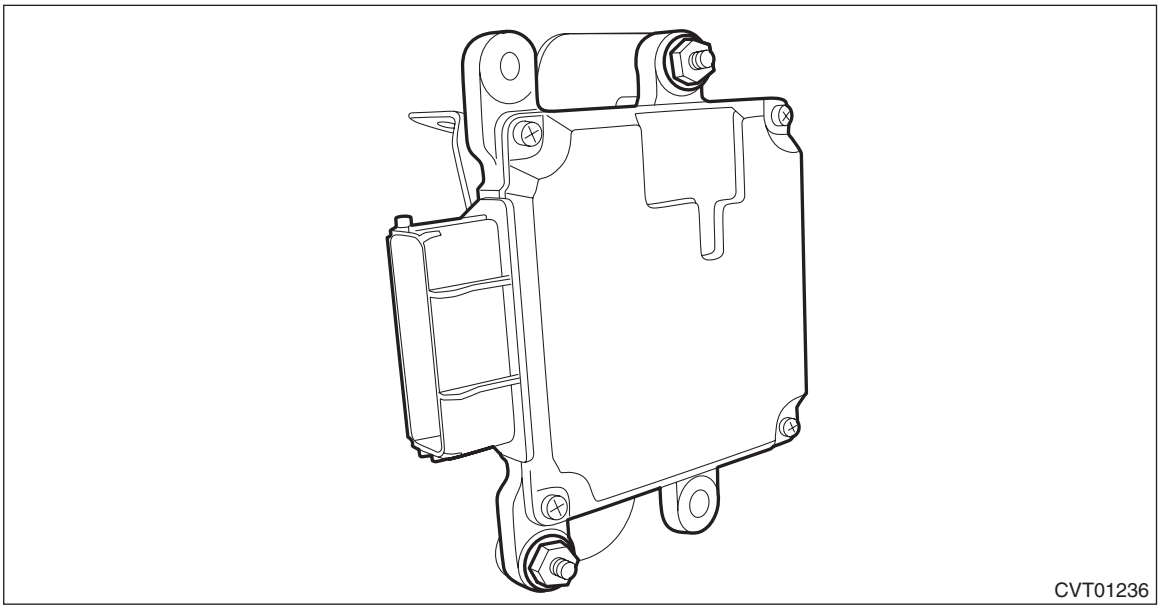


(A) Lock button
(B) Lock lever

4) Remove the TCM.



5) Remove the TCM from the bracket.


CVT01236

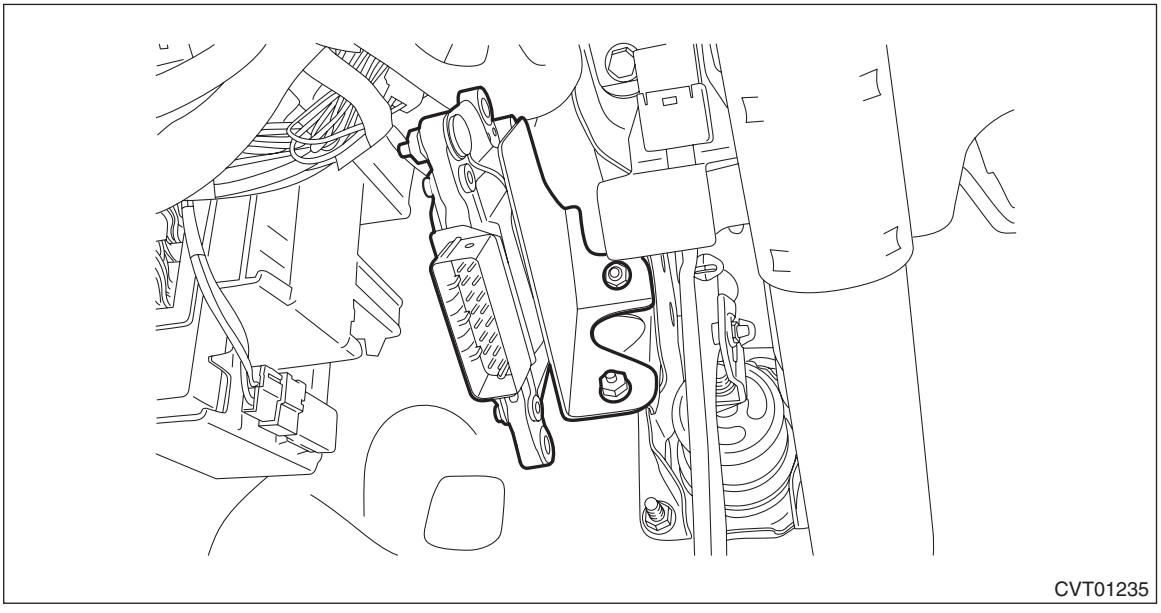
B: INSTALLATION

1) Install the bracket to the TCM.
2) Install the TCM to the bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

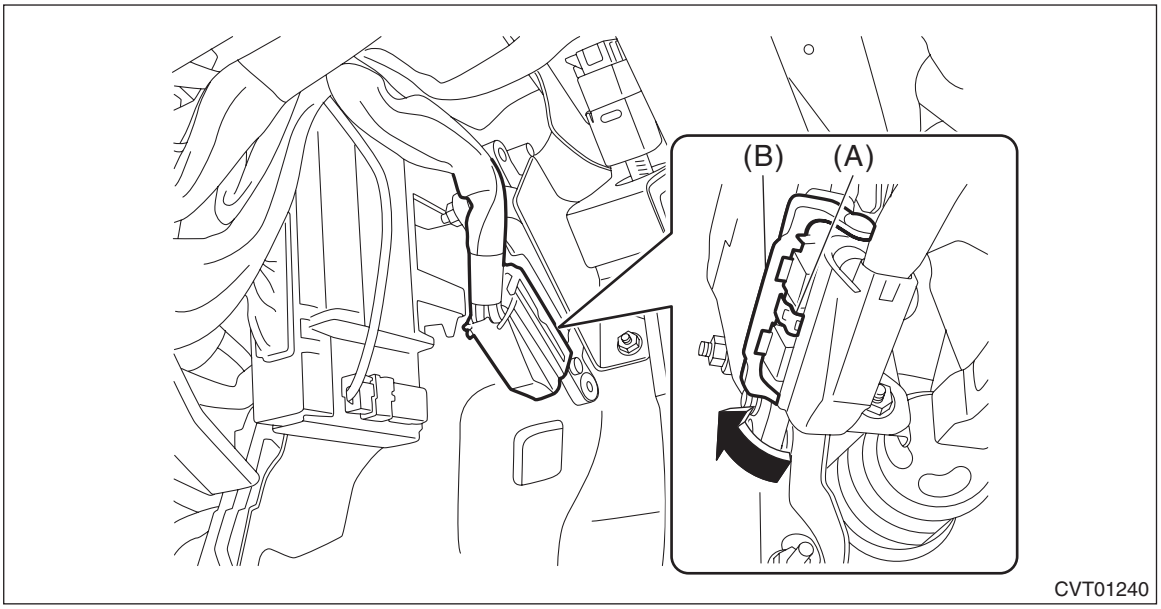
3) Install the TCM.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)


CVT01235

4) Install the harness connector to TCM.

NOTE:
Move the lock lever in the arrow direction, and confirm that a clicking sound is heard.



(A) Lock button
(B) Lock lever

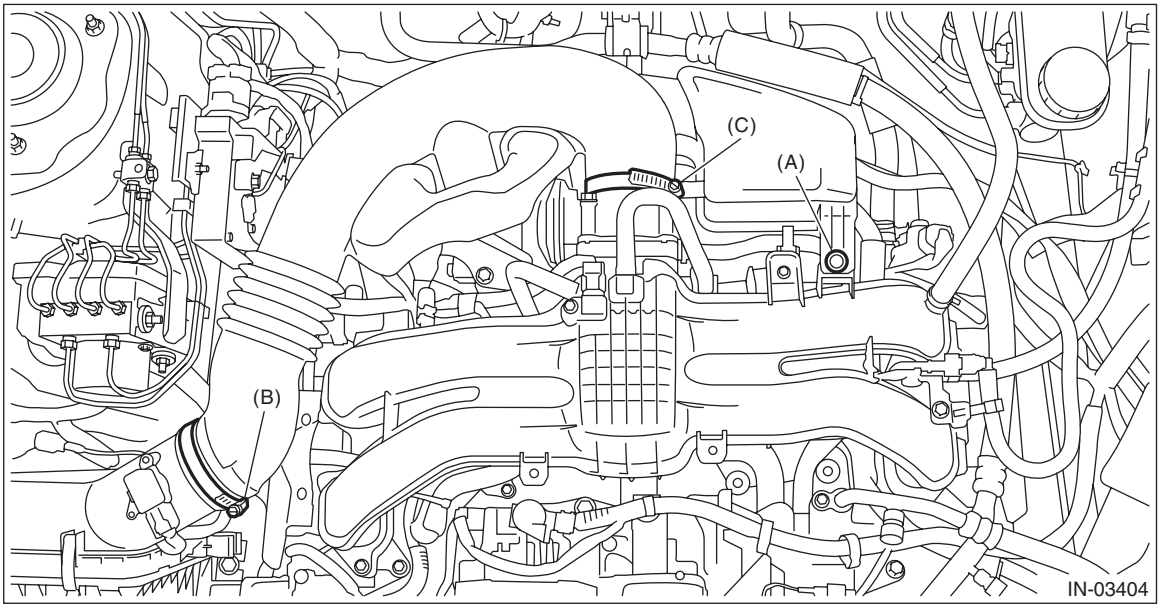
5) Install the instrument panel lower cover. <Ref. to EI-73, INSTALLATION, Instrument Panel Lower Cover.>
6) Perform the operation of AT learning mode. <Ref. to CVT(w/o HEV)(diag)-26, Learning Control.>

23.CVTF Cooler (With Warmer Function)

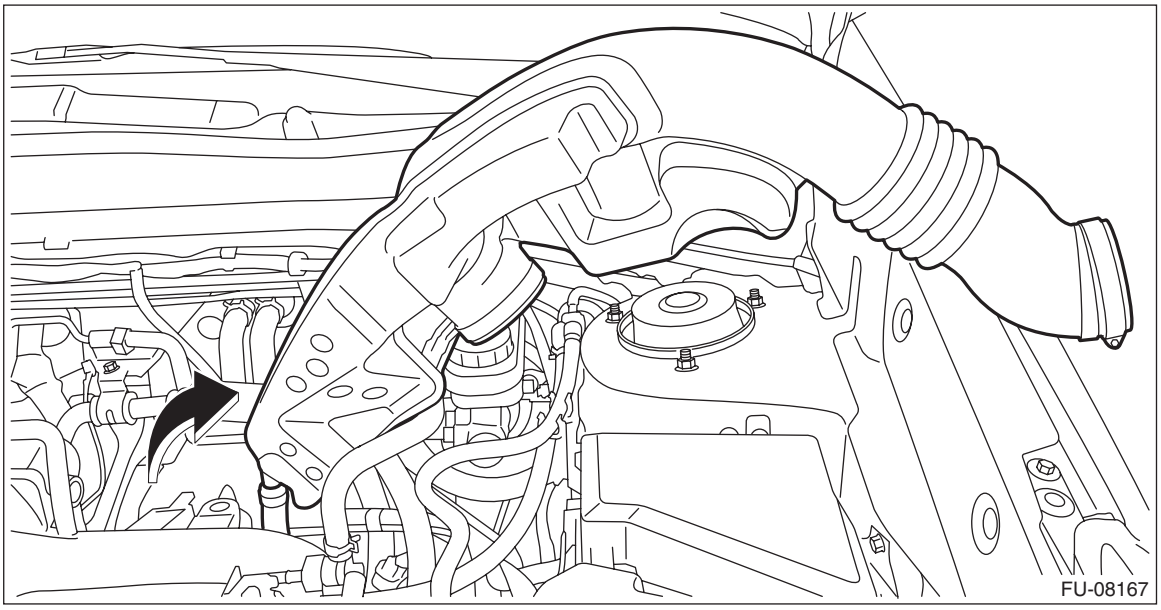
A: REMOVAL

CAUTION:
If the CVTF and engine coolant is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

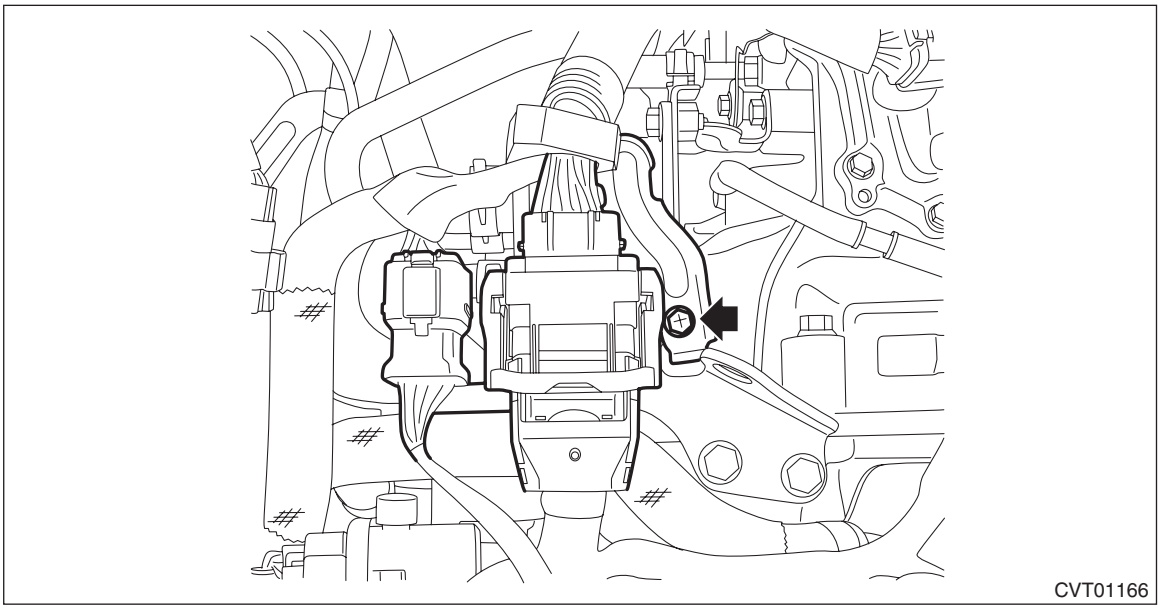
1) Disconnect the ground cable from battery.
2) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
3) Remove the clip (A) from the air intake boot.
4) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
5) Loosen the clamp (C) which connects the air intake boot and throttle body.



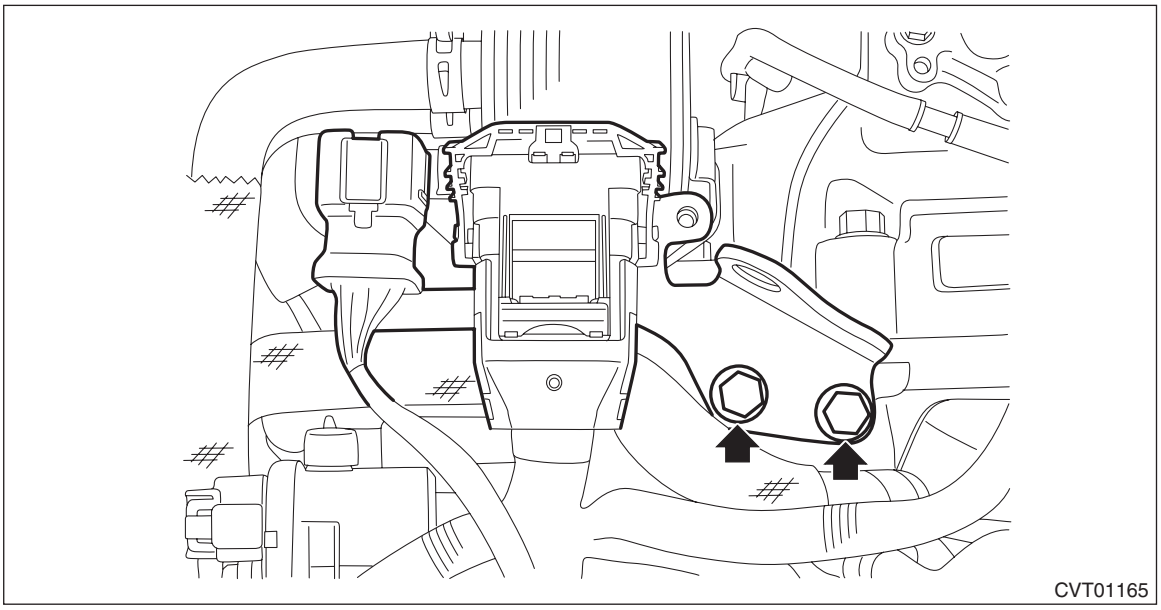
6) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



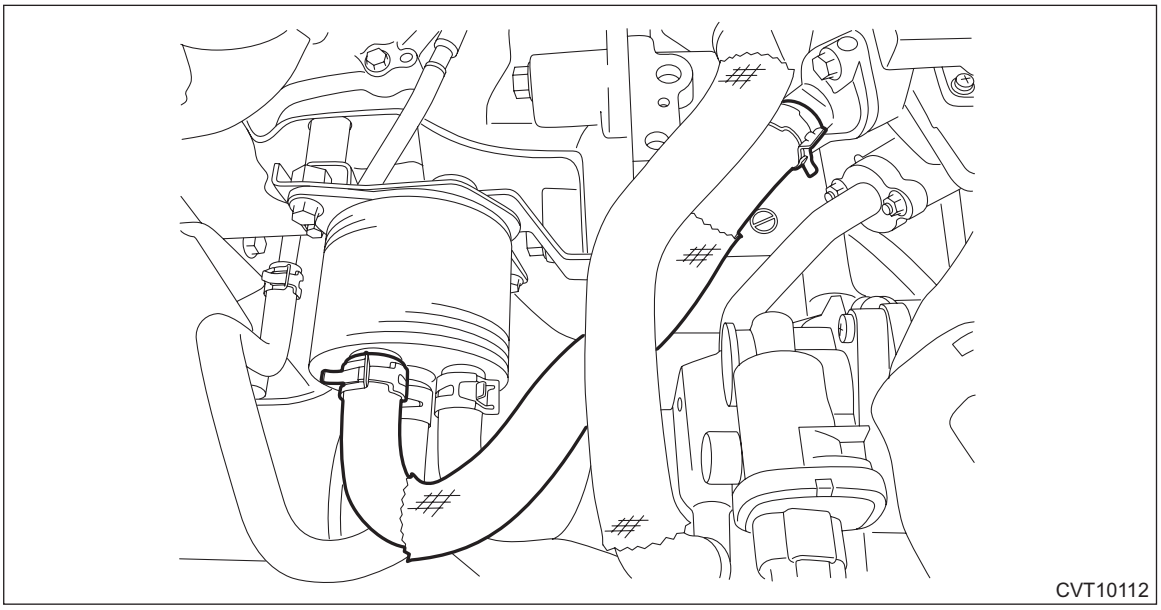
7) Remove the harness bracket, and then remove the engine harness.



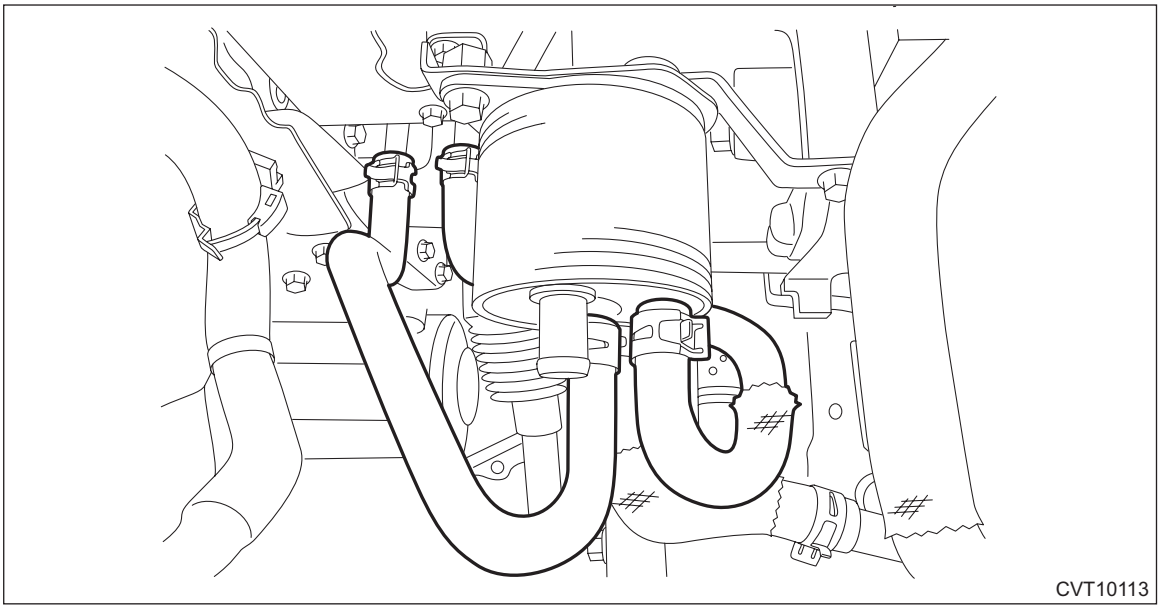
8) Disconnect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
9) Remove the engine hanger rear.



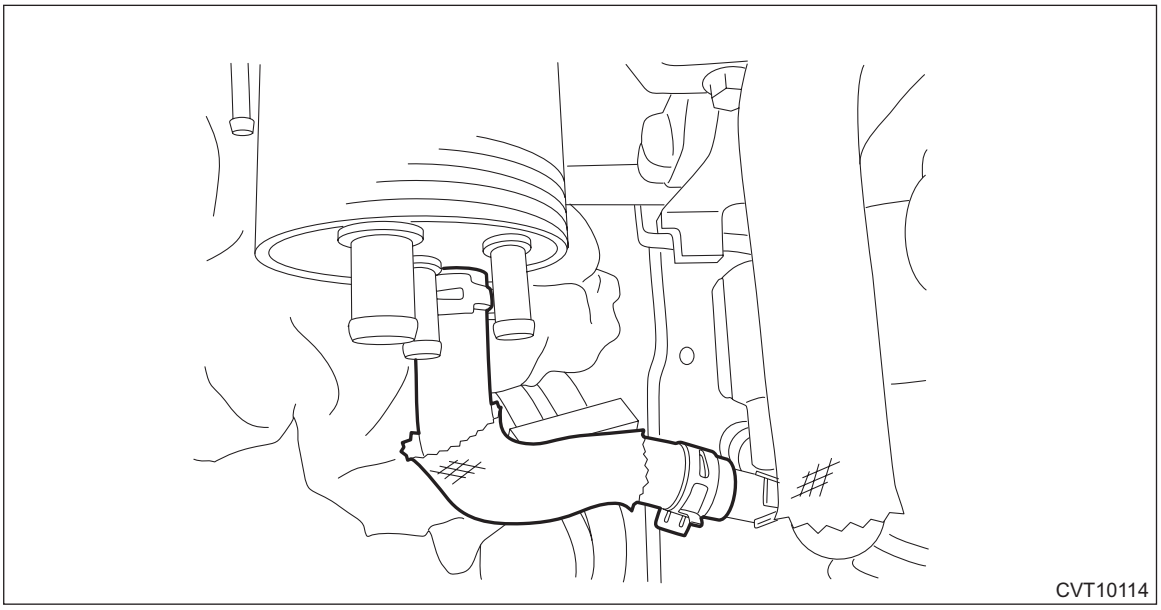
10) Remove the engine coolant outlet hose.



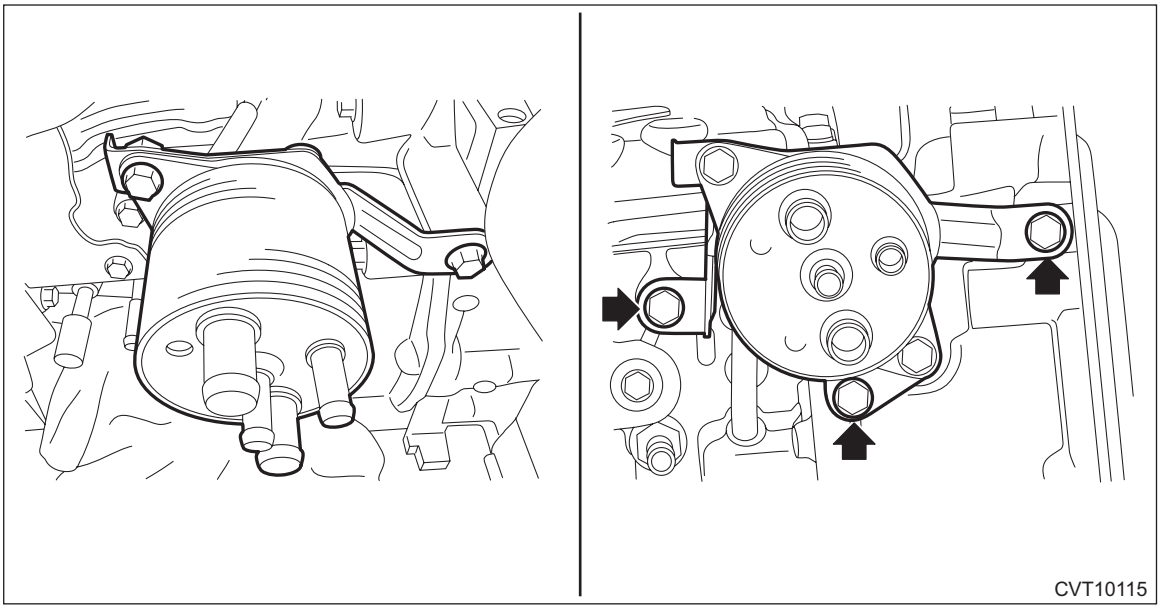
11) Remove the CVTF inlet hose and outlet hose.



12) Remove the engine coolant inlet hose.



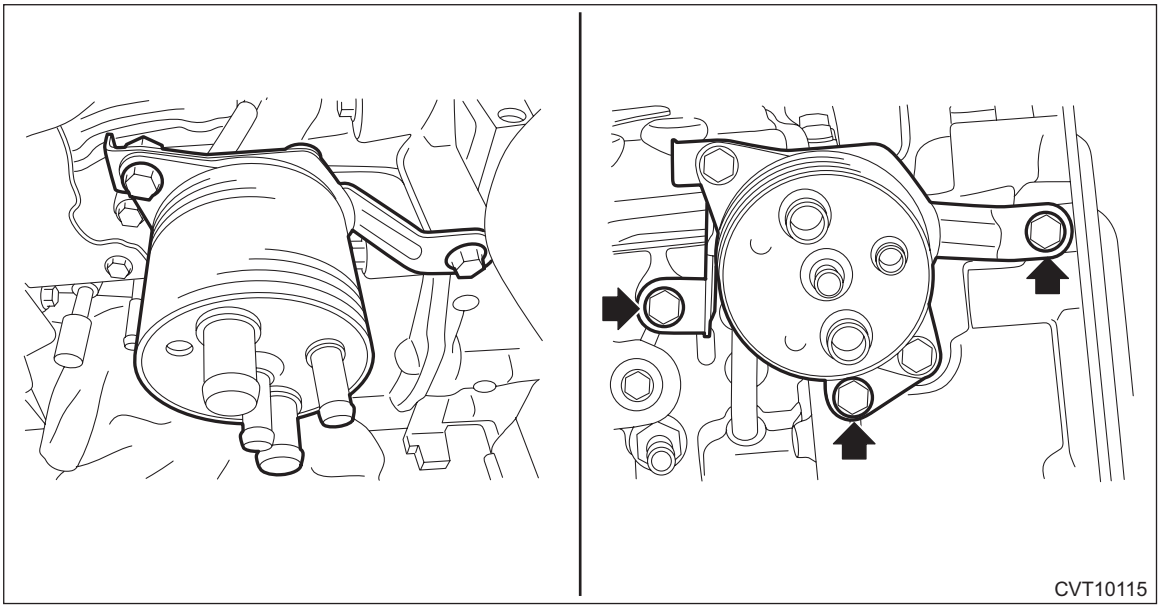
13) Remove the CVTF cooler (with warmer feature) from the transmission.



B: INSTALLATION

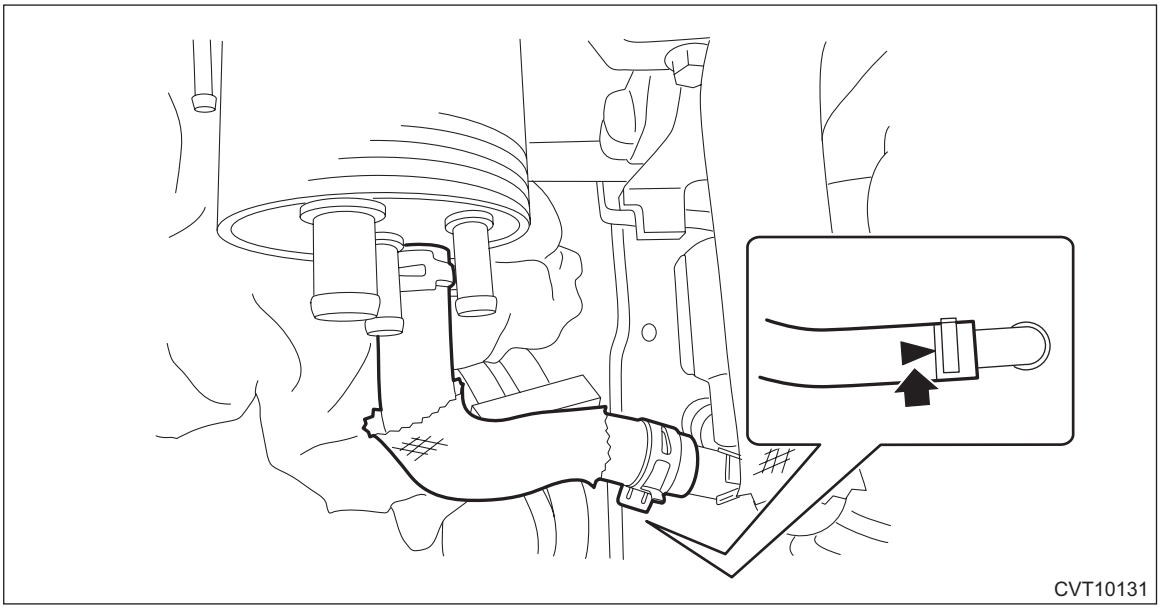
1) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



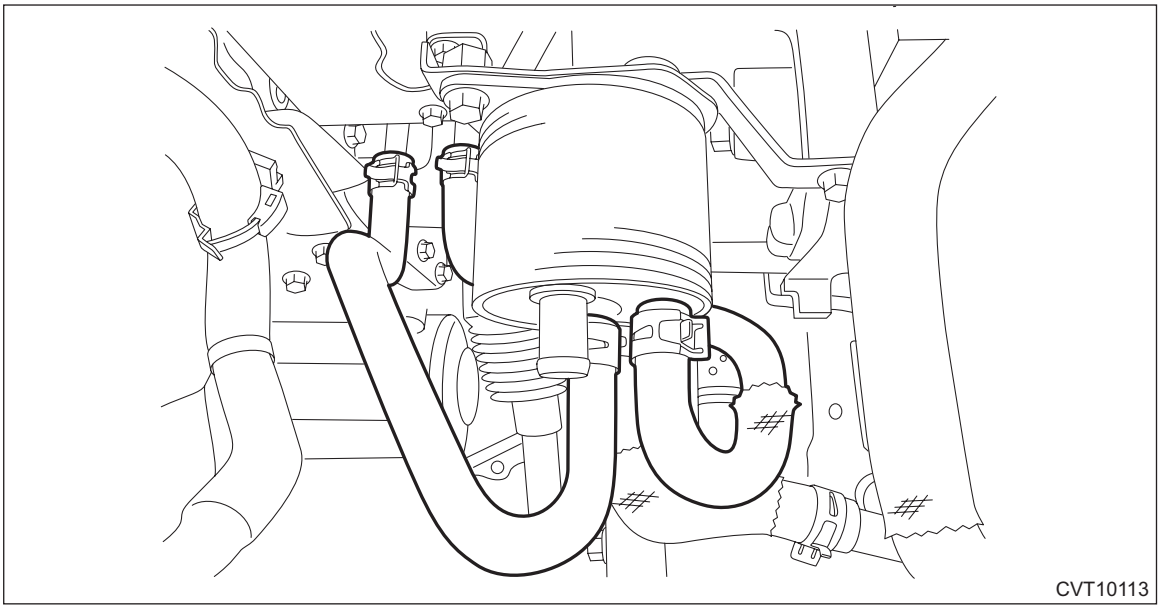
2) Install the engine coolant inlet hose.

NOTE:
With the triangle mark on the engine coolant inlet hose facing the vehicle outside, install the hose to the EGR cooler.

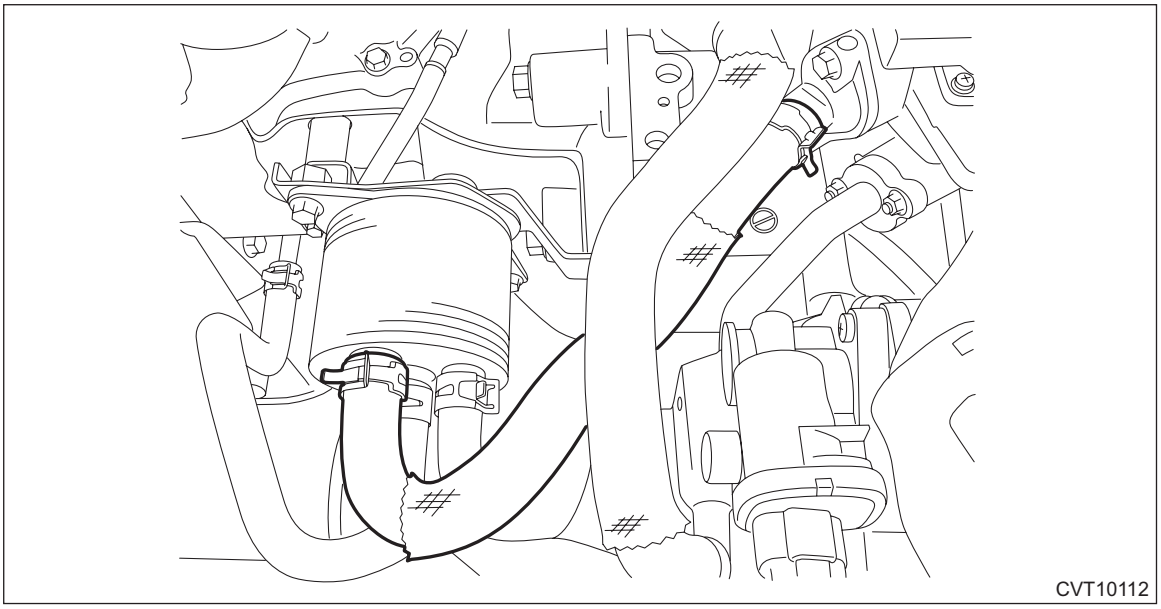


3) Install the CVTF inlet hose and CVTF outlet hose to transmission.

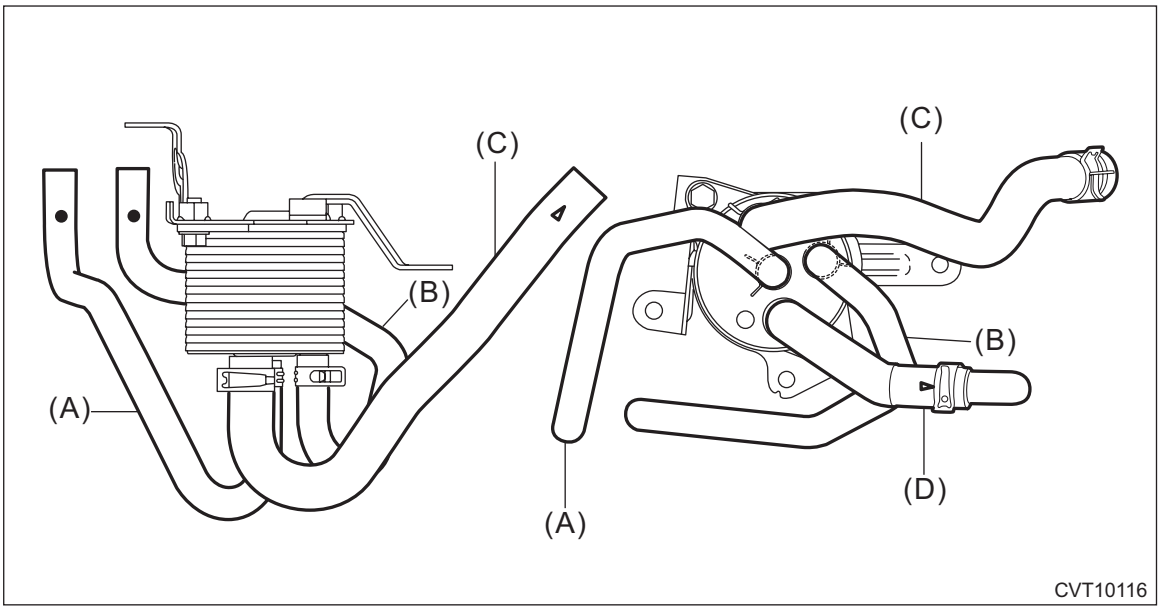
NOTE:
Use the new CVTF inlet hose and CVTF outlet hose.



4) Connect the engine coolant outlet hose.



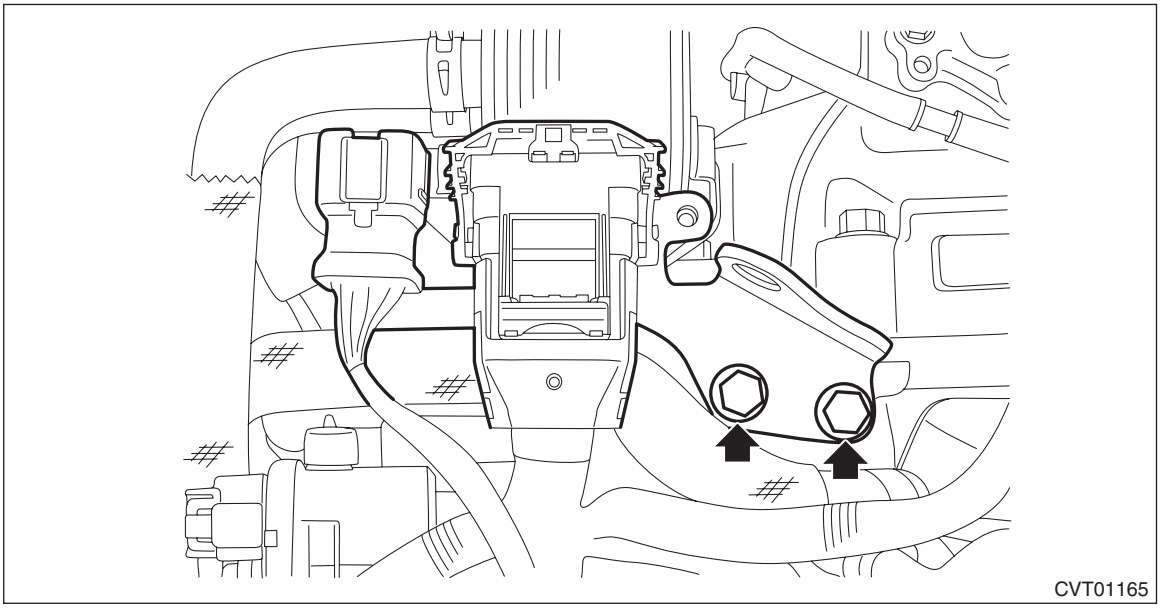
5) Check installation condition of each hose.
- Make sure the hoses do not interfere with each other or with other components.
- Check each hose for bent, excess curve, and twisting conditions.



(A) CVTF cooler inlet hose
(B) CVTF cooler outlet hose
(C) Engine coolant outlet hose
(D) Engine coolant inlet hose

6) Install the engine hanger rear.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



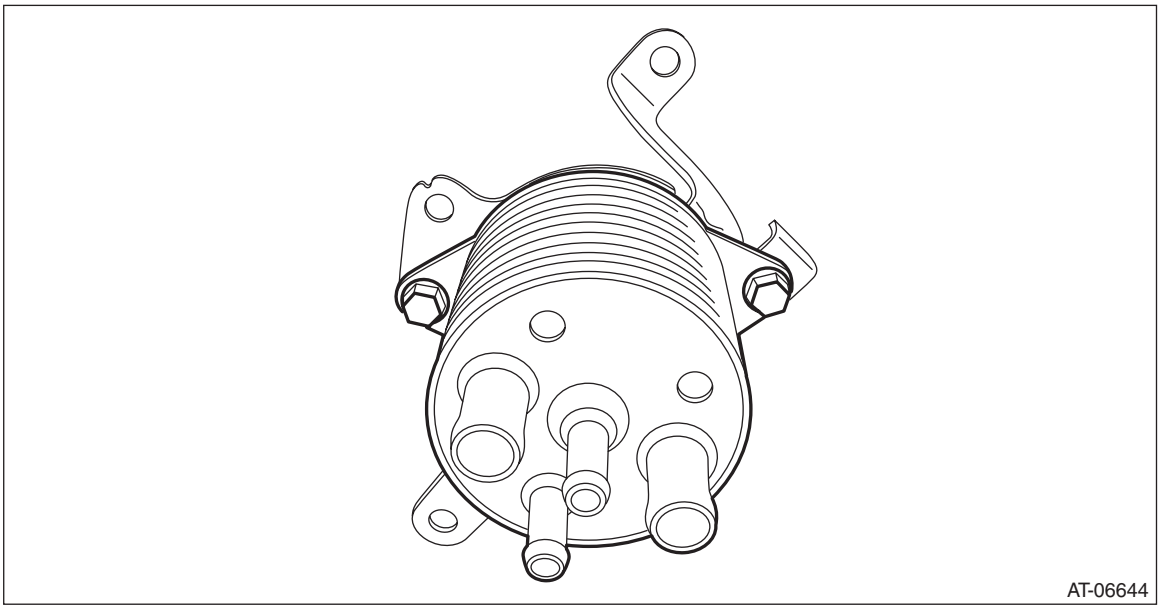
7) Connect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
8) Connect the engine harness connectors, then install the harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
9) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>

10) Connect the battery ground terminal.
11) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
12) Adjust the CVTF level. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

C: DISASSEMBLY

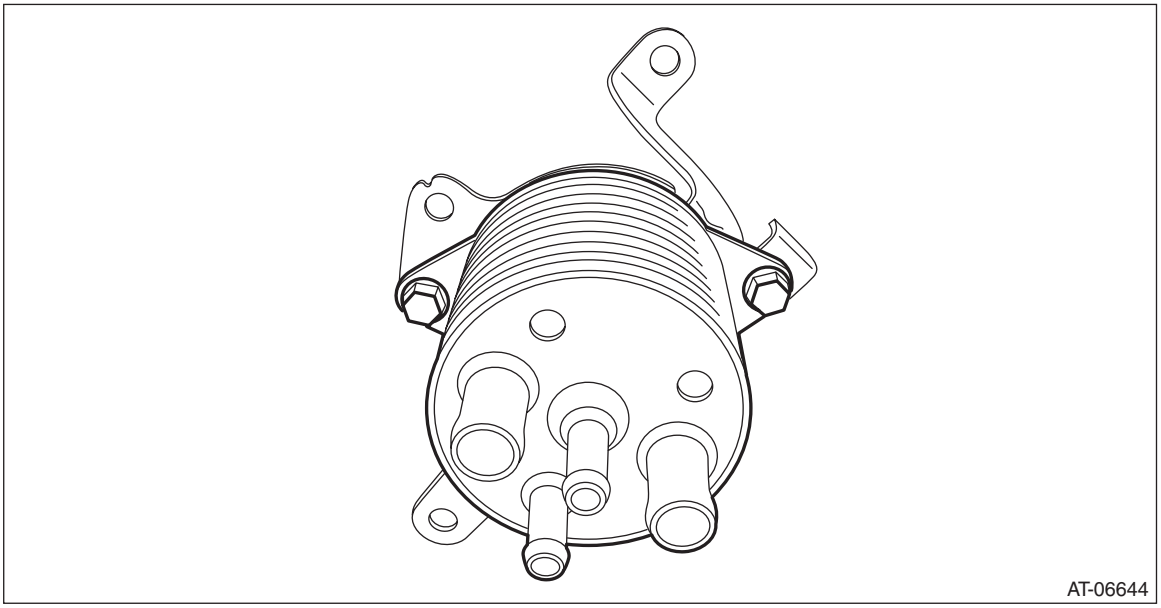
1) Remove the bracket from the CVTF cooler (with warmer feature).



D: ASSEMBLY

1) Attach the bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



E: INSPECTION

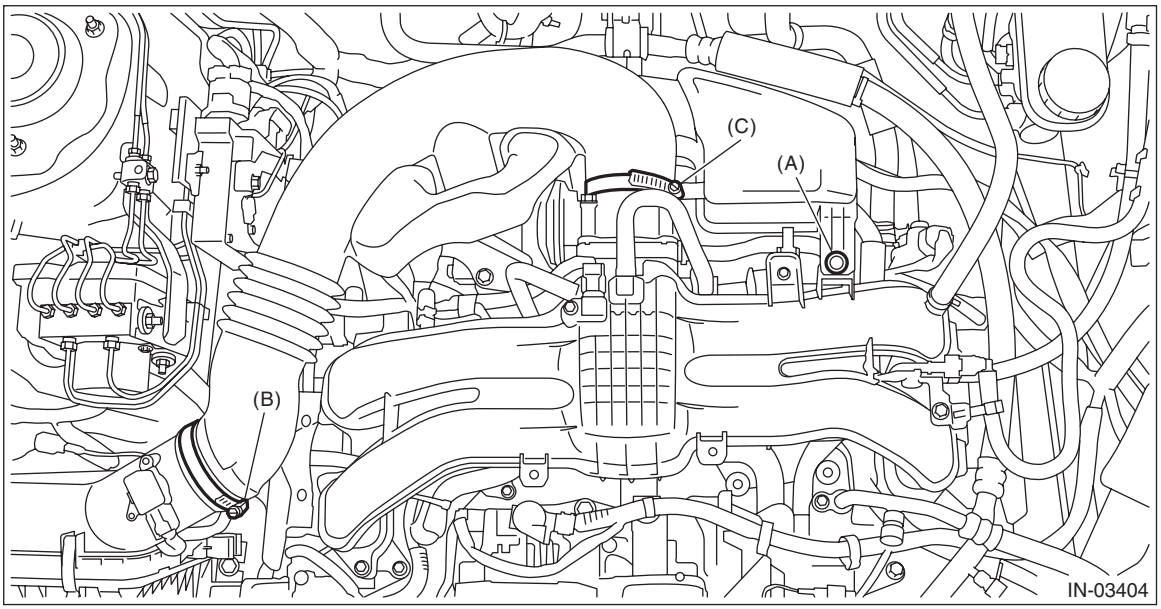
Replace any faulty CVTF cooler hoses, CVTF cooler pipes and clamps found in the inspection below.
1) Check that there are no CVTF or engine coolant leaks from the connections.
2) Check the clamp for deformation.
3) Lightly bend the CVTF cooler hose and check for cracks in the surface or other damages.
4) Pinch the CVTF cooler hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
5) Check for peeling, cracks, and deformation at the tip of the hose.
6) Check the CVTF cooler (with warmer feature) for any damage.

24.Air Breather Hose

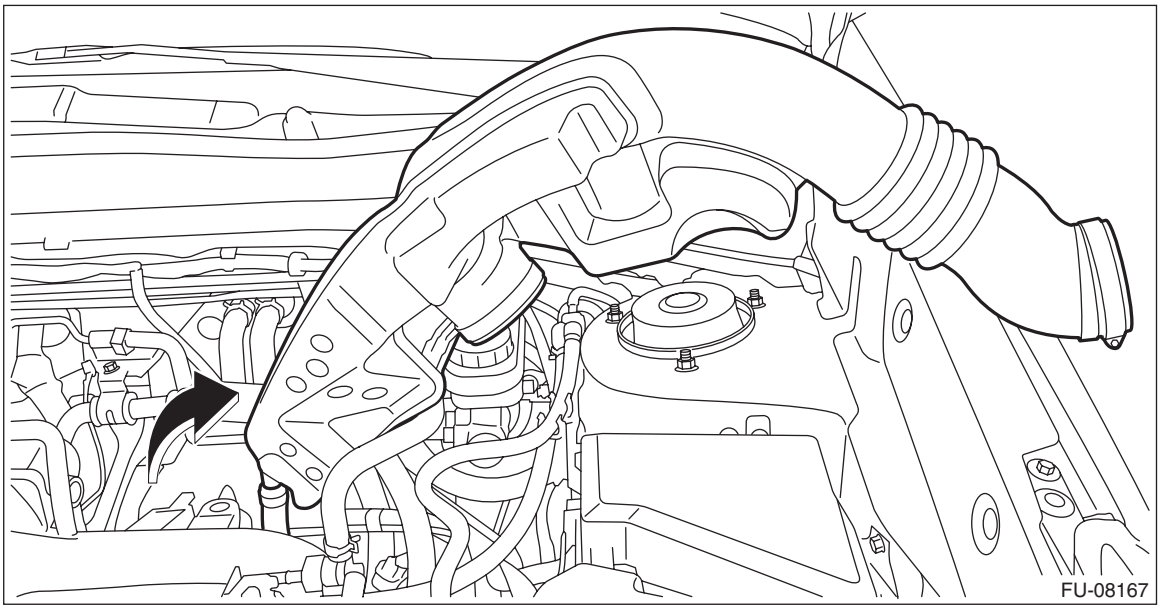
A: REMOVAL

1. FRONT DIFFERENTIAL SIDE

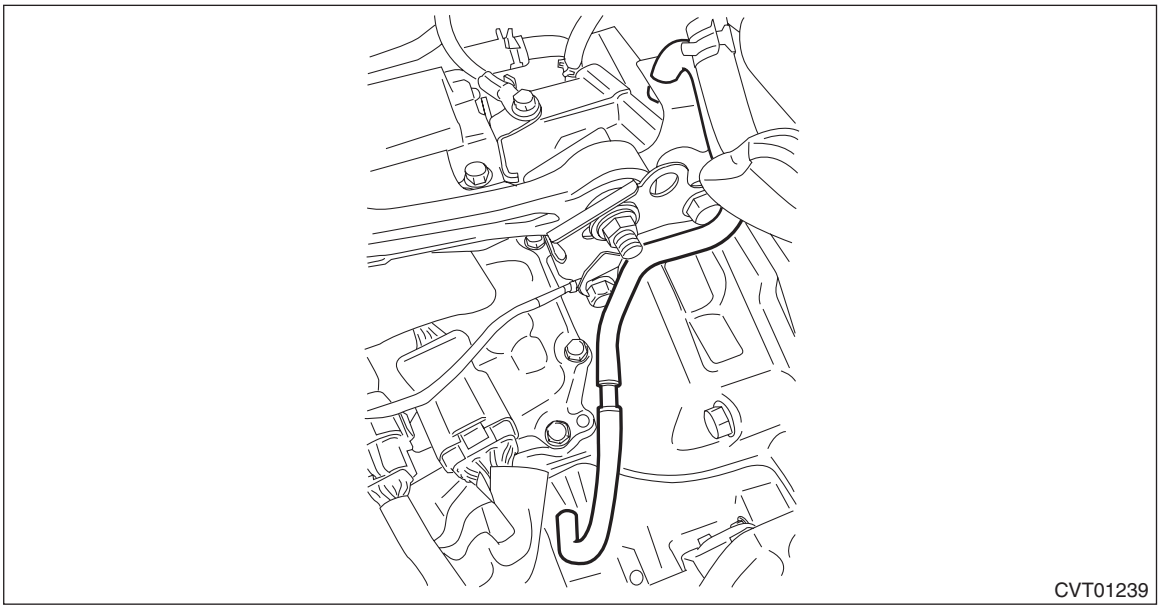
1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

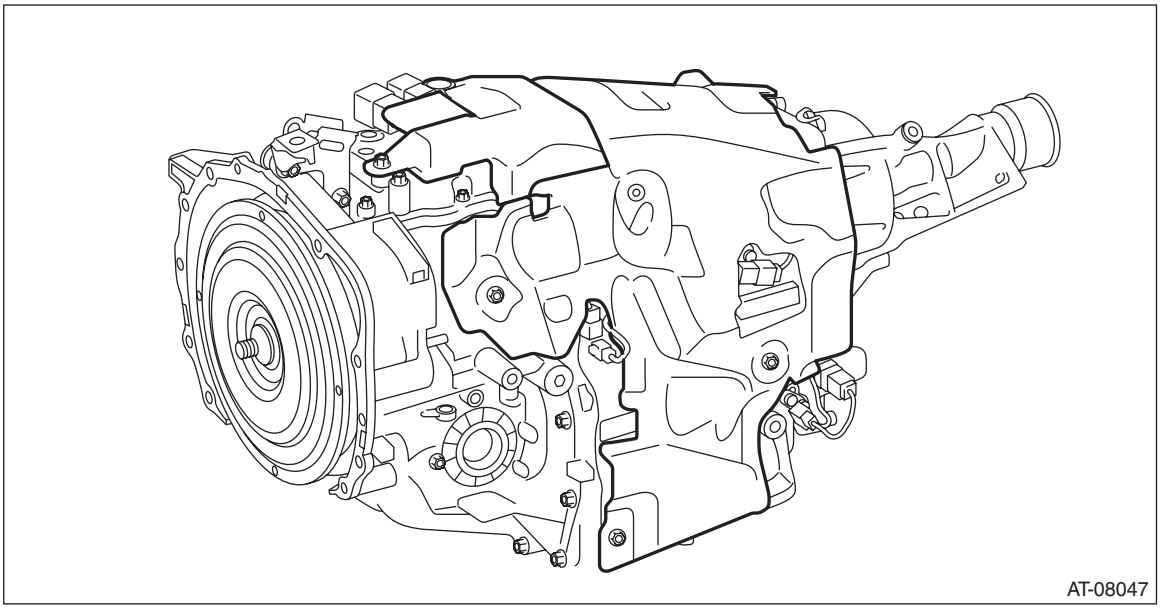


5) Remove the air breather hose.

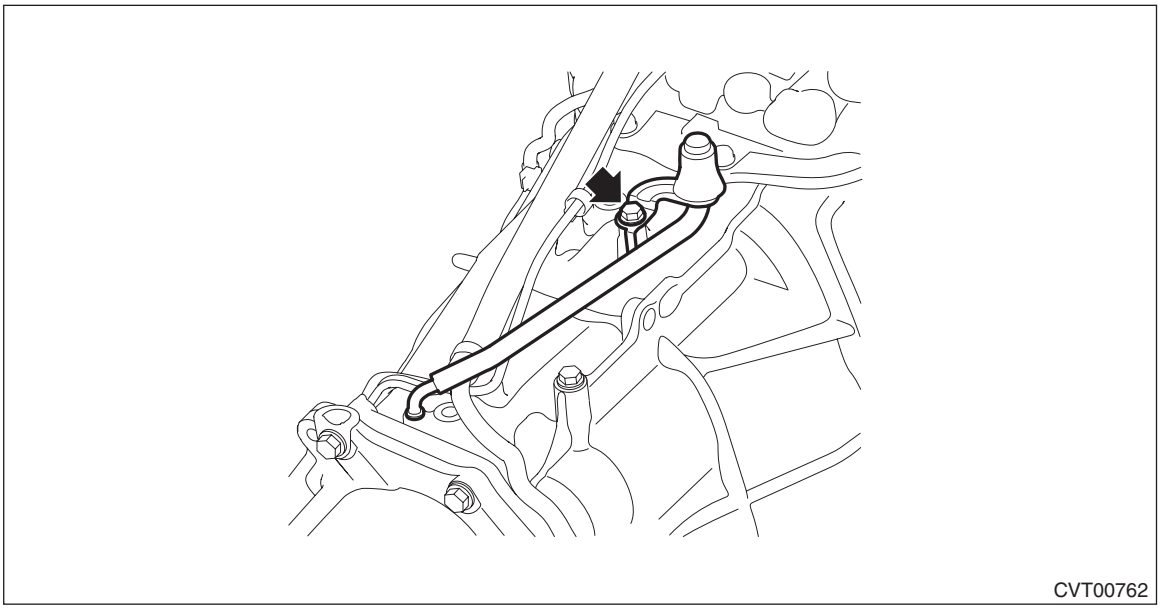


2. TRANSMISSION CASE SIDE

1) Remove the transmission assembly. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the transmission case cover.



3) Remove the air breather hose.



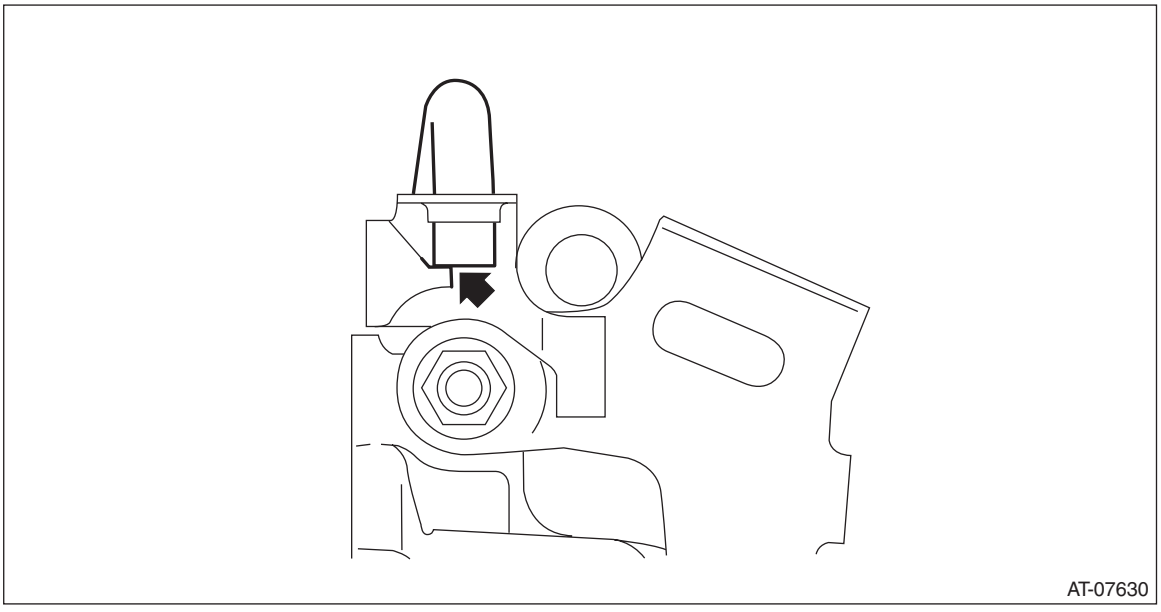
4) Remove the air breather cap.

B: INSTALLATION

1. FRONT DIFFERENTIAL SIDE

Install in the reverse order of removal.

NOTE:
Securely insert the air breather hose until the hose end contacts the catch of the pitching stopper bracket.

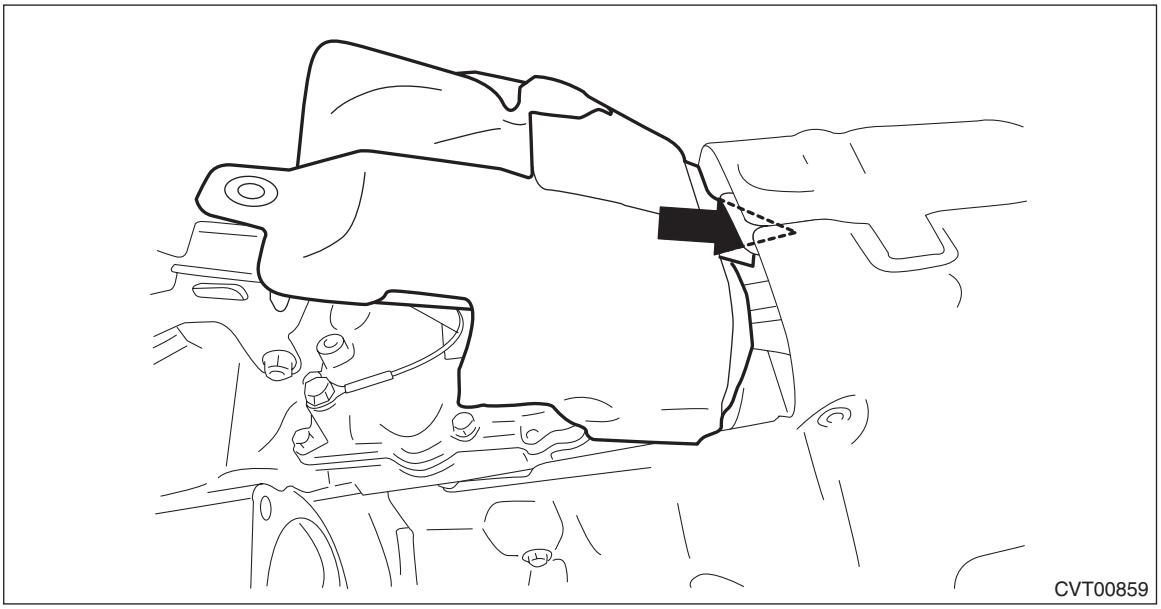


2. TRANSMISSION CASE SIDE

Install in the reverse order of removal.

Tightening torque:
Transmission case cover:
8 N·m (0.8 kgf-m, 5.9 ft-lb)
Air breather hose:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

NOTE:
After the transmission case cover (large) is installed, insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.



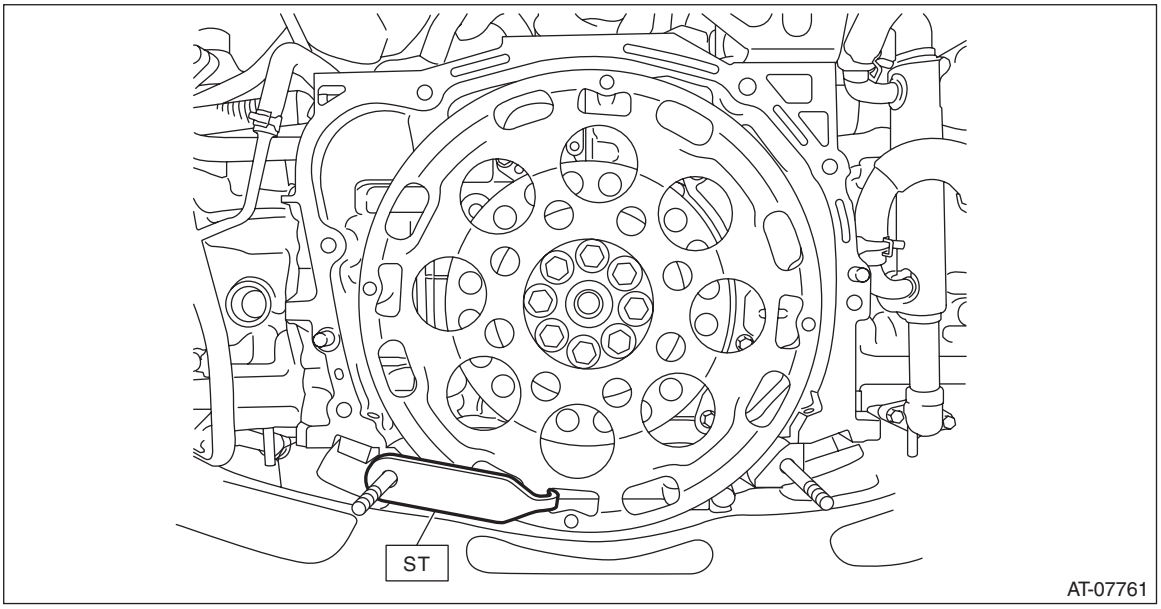
C: INSPECTION

Check the hose for peeling, crack or clogging.

25.Drive Plate

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Set the ST.
ST 498497300 CRANKSHAFT STOPPER

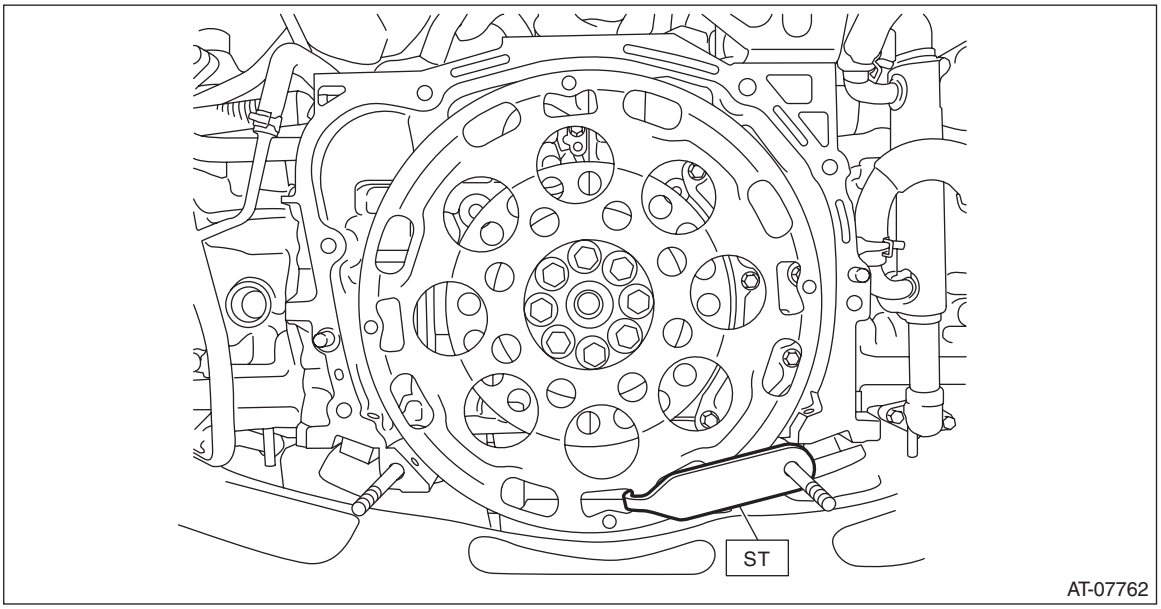


3) Remove the drive plate and reinforcement drive plate.

B: INSTALLATION

1) Temporarily install the drive plate and reinforcement drive plate.

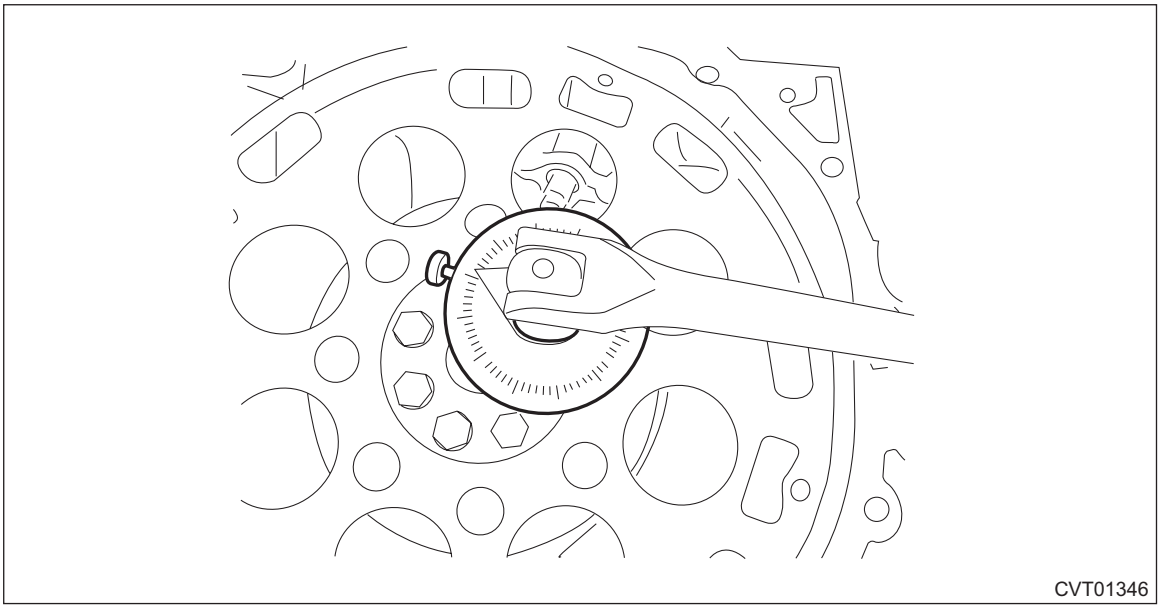
NOTE:
Align the knock pin hole of the crankshaft position sensor plate to the knock pin of the crankshaft to secure the knock pin.
2) Set the ST.
ST 498497300 CRANKSHAFT STOPPER



3) Tighten the drive plate mounting bolt in two stages.
(1) Tighten the drive plate mounting bolt.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)
(2) While checking the tightening angle with the angle gauge, tighten the drive plate mounting bolts to the specified angle.

Tightening angle:
30° — 35°


CVT01346

4) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

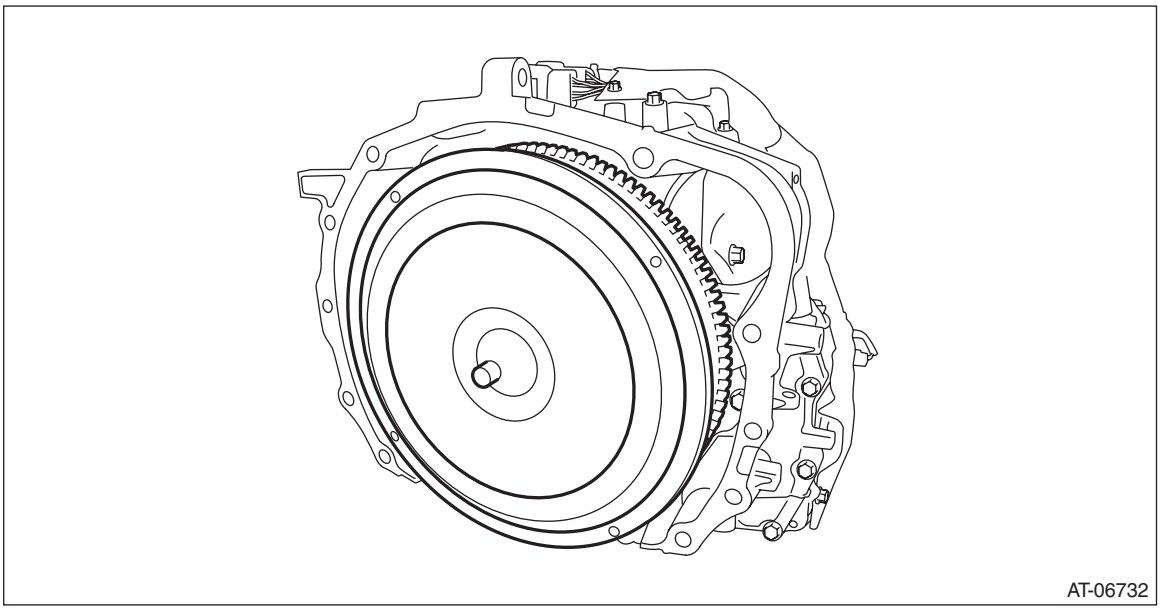
Check the drive cable for damage.

26.Torque Converter Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly horizontally.

CAUTION:
Do not scratch the inside of engaging parts.



3) Remove the O-ring from the input shaft.

B: INSTALLATION

1) Install the O-ring to the input shaft.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

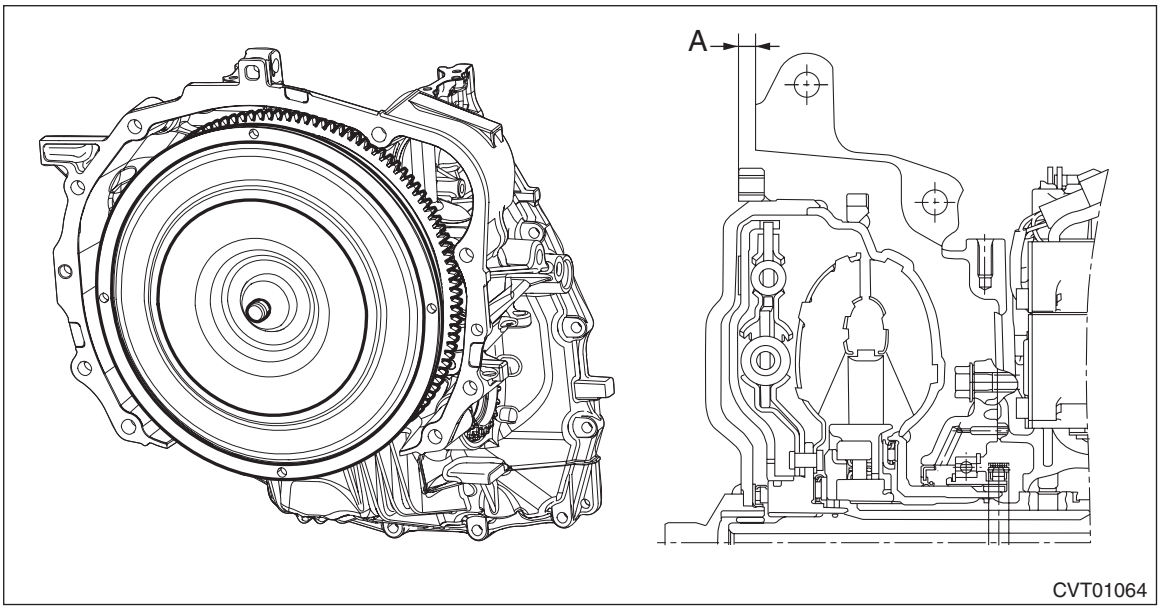
2) While holding the torque converter assembly by hand, carefully install it into the torque converter case.

NOTE:
- Apply CVTF to the oil seal lip.
- Do not damage the oil seal and O-ring.

3) Engage the splines while gently rotating the torque converter assembly by hand, and securely insert the assembly.

4) Measure depth “A”, from converter case end surface to drive plate contacting surface.

Standard (reference):
6.8 mm (0.268 in) or less



5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

- Check the protrusion of torque converter center (front boss) is not deformed or damaged.
- Check the ring gear and exterior for break or damage.

27.Preparation for Overhaul

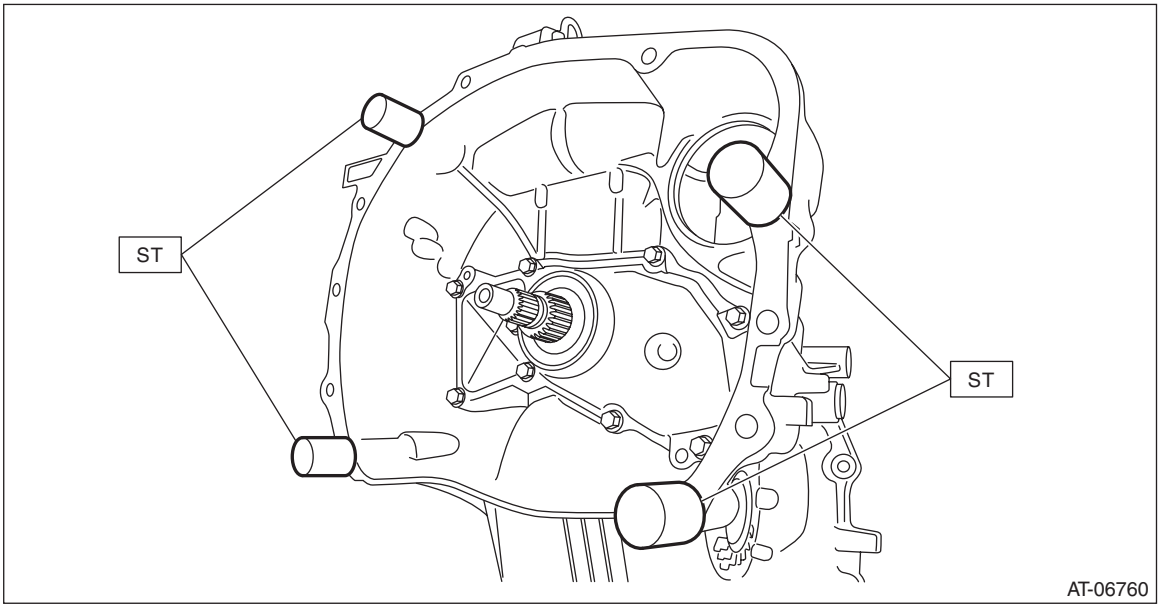
A: GENERAL DESCRIPTION

Before disassembling and assembling the transmission, follow the following procedures to prepare.

B: PROCEDURE

1) Clean the transmission exterior.
2) Remove the torque converter assembly. <Ref. to CVT(TR580)-168, Torque Converter Assembly.>
3) Attach the ST on the transmission.

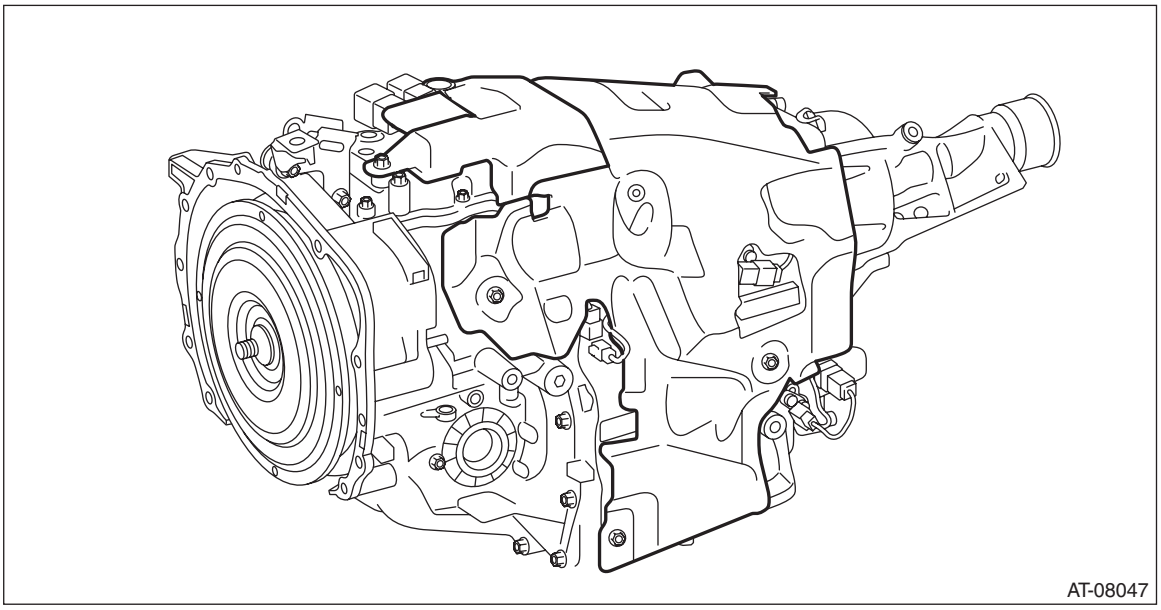
ST 18632AA000 STAND ASSY

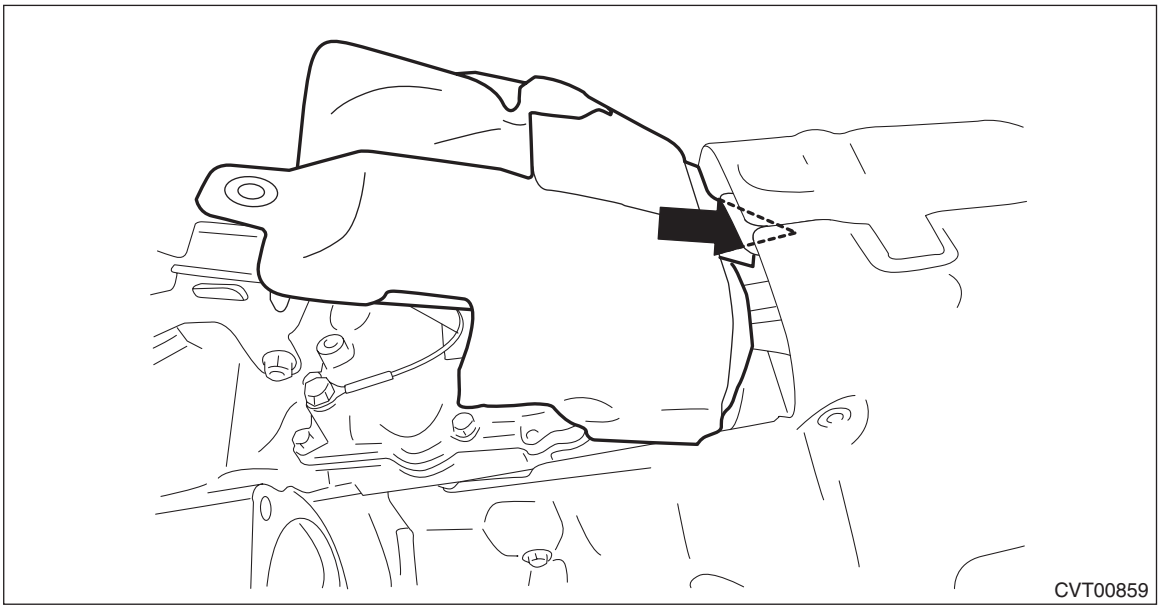


4) Remove the transmission case cover on the transmission upper side.

NOTE:
After the transmission case cover (large) is installed, insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)


AT-08047

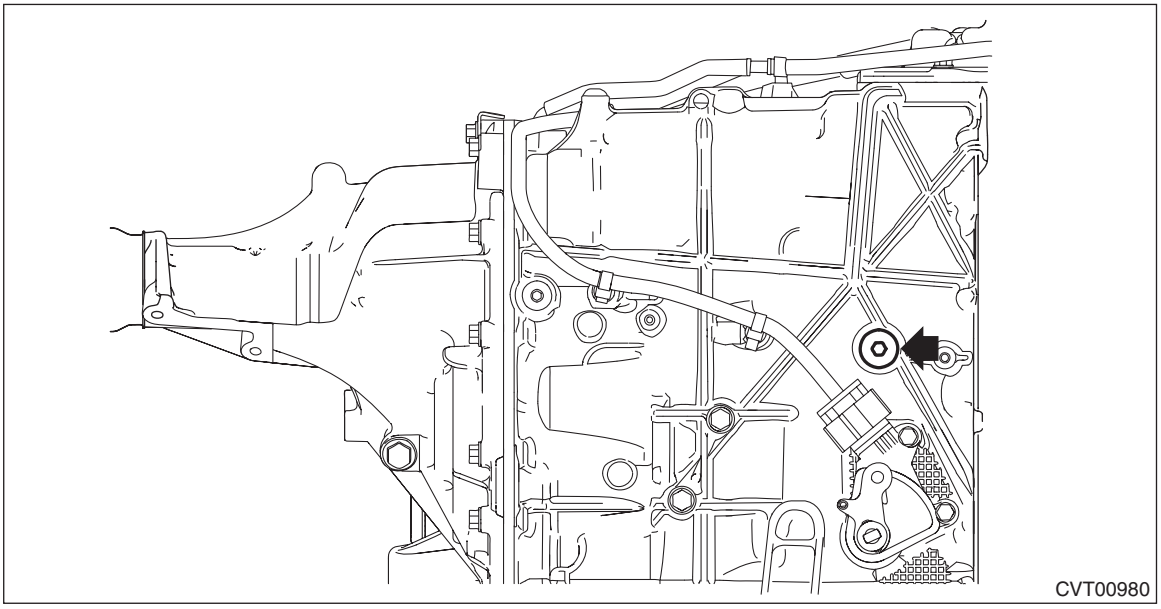

CVT00859

5) Place the transmission assembly on end.
6) When completely overhauling the transmission, refill approx. 10 L (2.6 US qt, 8.8 Imp qt) of CVTF through the transmission right side plug, and install the plug. Finally, install the transmission case cover.

CAUTION:
Always use specified CVTF. Using other fluid will cause malfunction. <Ref. to CVT(TR580)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

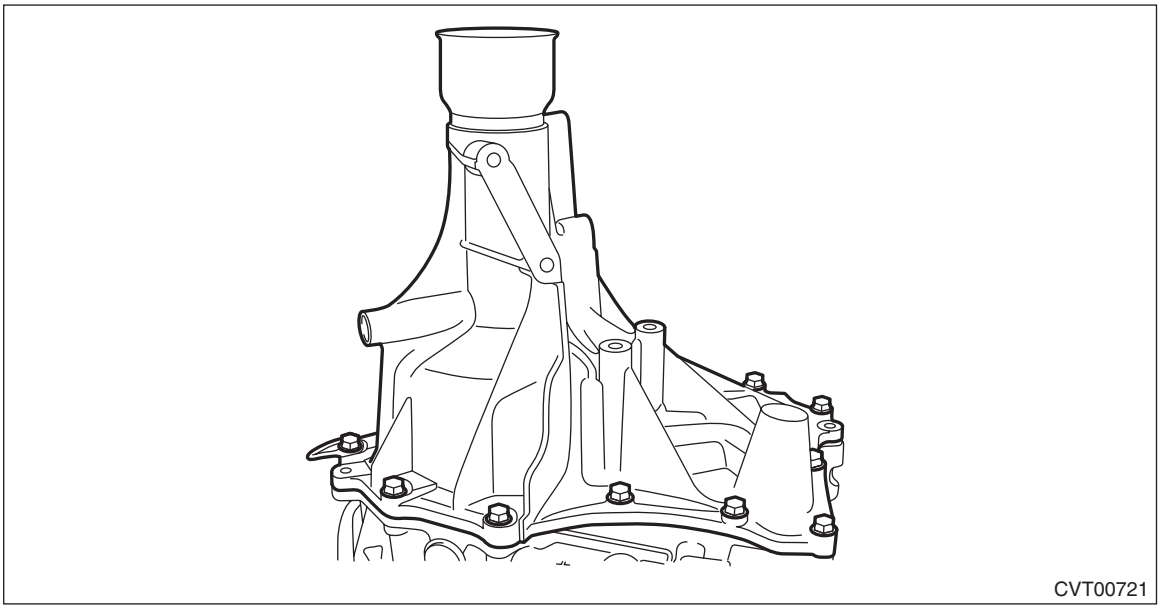


28.Extension Case

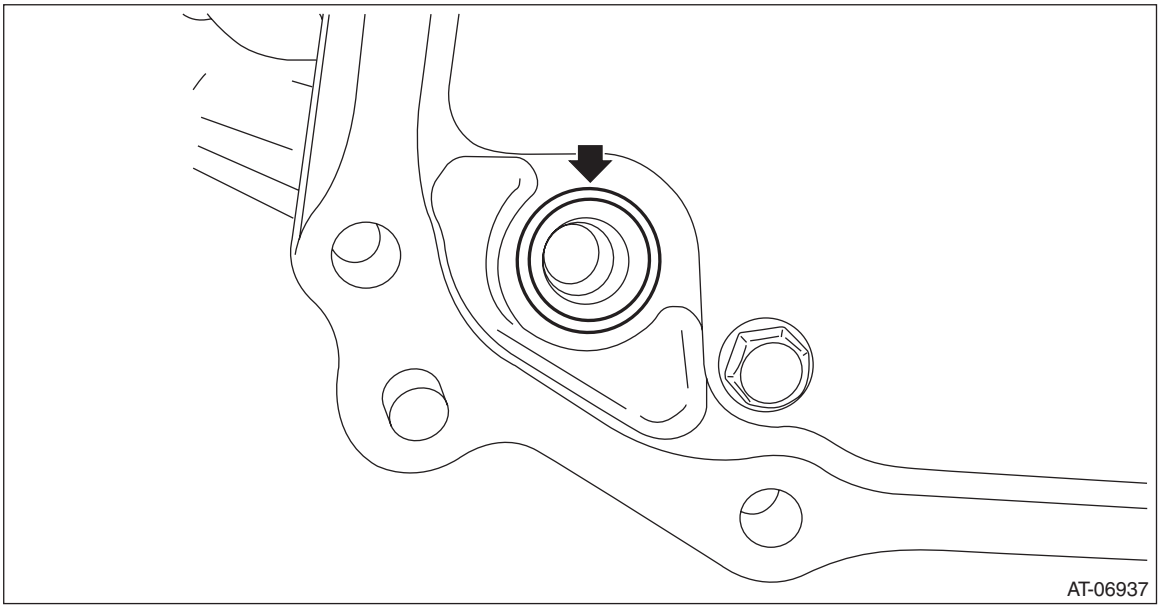
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case and transmission hanger.

NOTE:
The total number of extension case mounting bolts is 13.


CVT00721

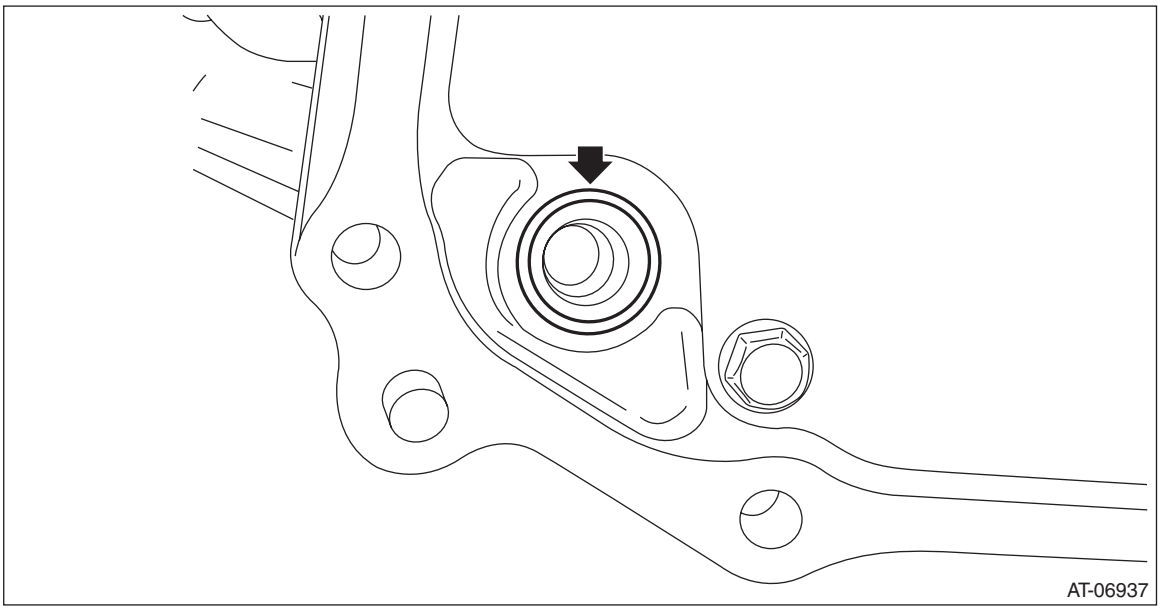
3) Remove the O-ring.


AT-06937

B: INSTALLATION

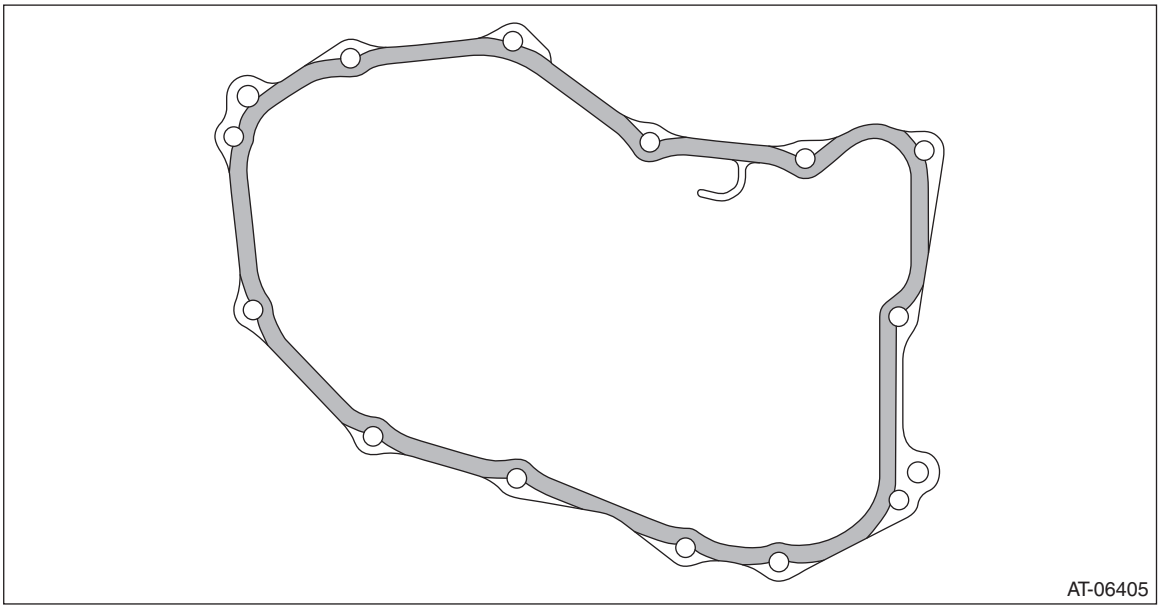
1) Clean the mating surface of extension case and transmission case.
2) Select the transfer drive gear shim. <Ref. to CVT(TR580)-232, ADJUSTMENT, Reduction Drive Gear.>
3) Select the transfer driven gear shim. <Ref. to CVT(TR580)-189, ADJUSTMENT, Transfer Clutch.>
4) Attach the selected transfer drive gear shim to extension case with vaseline.
5) Attach the selected transfer driven gear shim to extension case with vaseline.
6) Install the O-ring to the transmission case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



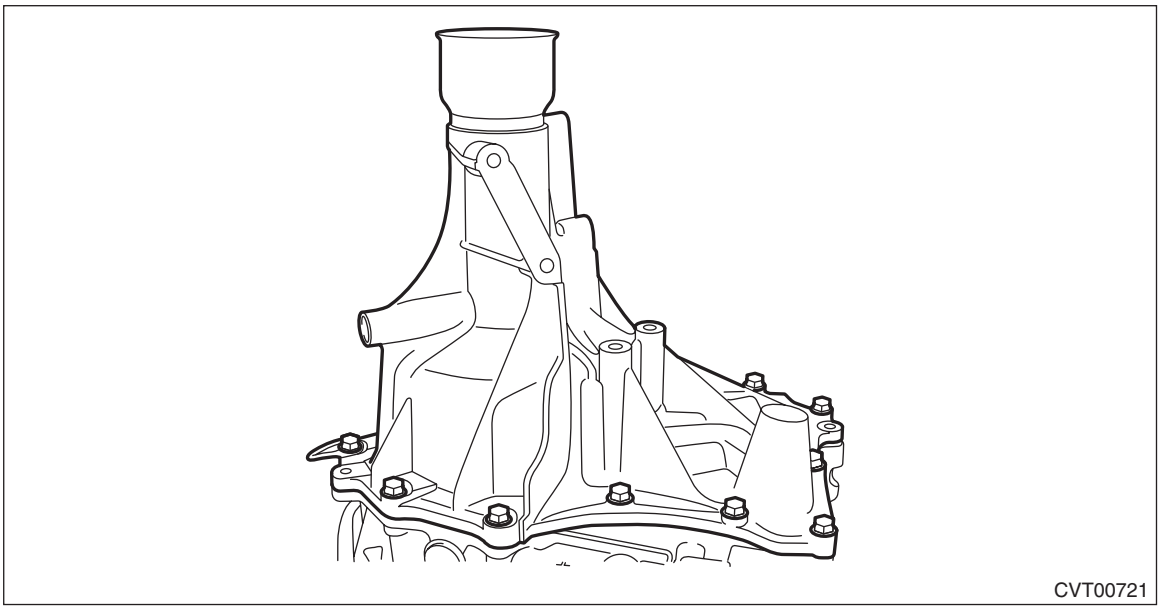
7) Apply liquid gasket to extension case seamlessly.

Liquid gasket:
THREE BOND 1215B or equivalent



8) Install the extension case to transmission hanger.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



9) Install the transmission assembly. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

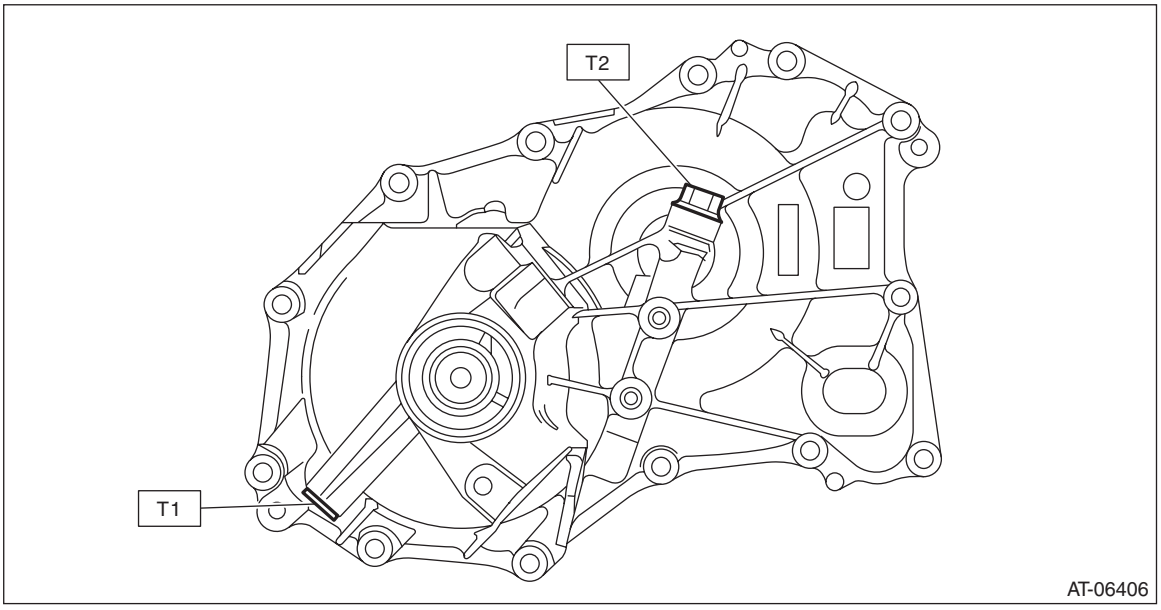
1) Remove the dust cover from extension case.
2) Remove the extension case oil seal from the extension case. <Ref. to CVT(TR580)-94, REPLACEMENT, Differential Side Retainer Oil Seal.>
3) Remove all plugs.

D: ASSEMBLY

1) Press-fit the dust cover into extension case.
2) Install the extension case oil seal to extension case. <Ref. to CVT(TR580)-94, REPLACEMENT, Differential Side Retainer Oil Seal.>
3) Install all plugs.

NOTE:
- Use a new O-ring or a gasket.
- Apply CVTF to the O-rings.

Tightening torque:
T1: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
T2: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



E: INSPECTION

- Check there is no leak of CVTF from the joint between extension case and transmission case.
- Check there is no damage or cracks on the extension case and other parts.

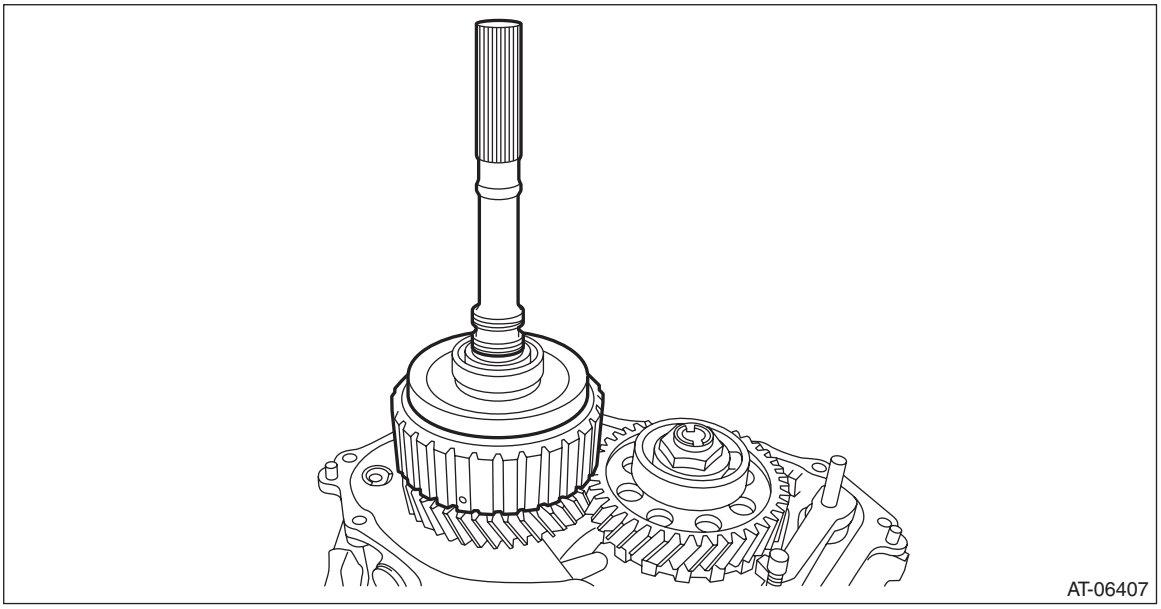
F: ADJUSTMENT

NOTE:
When replacing the extension case, select the transfer drive gear shim and transfer driven gear shim. <Ref. to CVT(TR580)-232, ADJUSTMENT, Reduction Drive Gear.> <Ref. to CVT(TR580)-189, ADJUSTMENT, Transfer Clutch.>

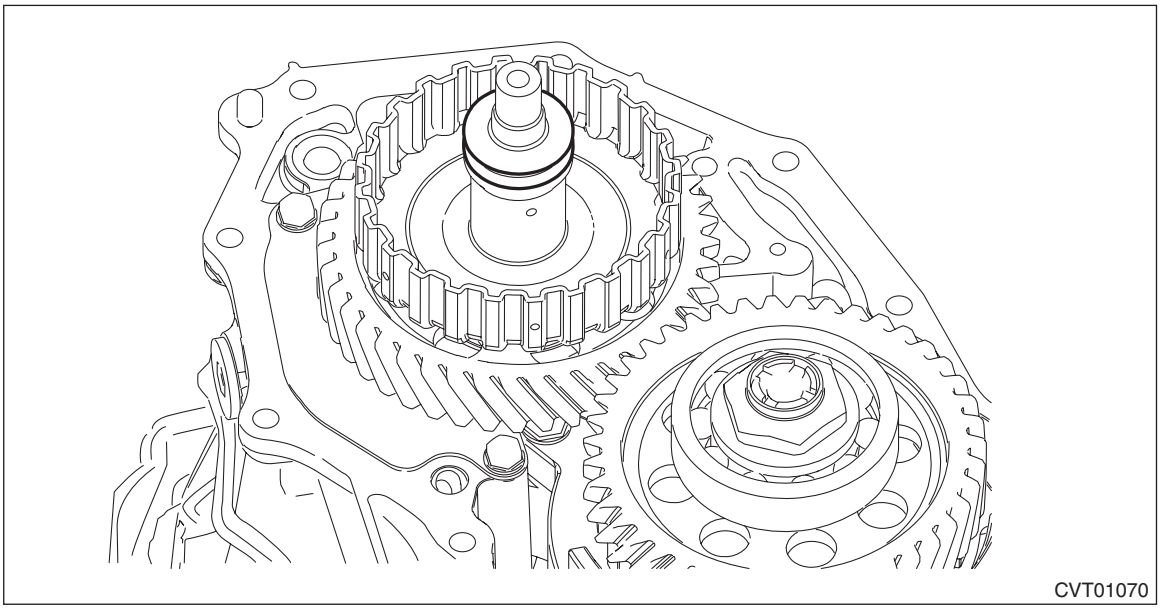
29.Transfer Clutch

A: REMOVAL

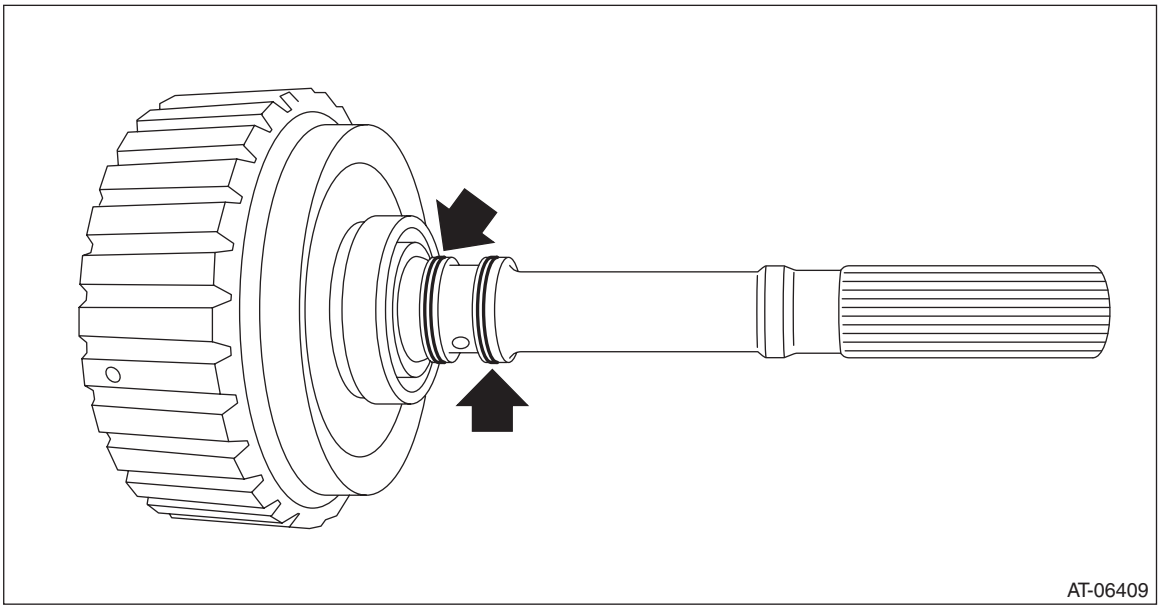
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly.



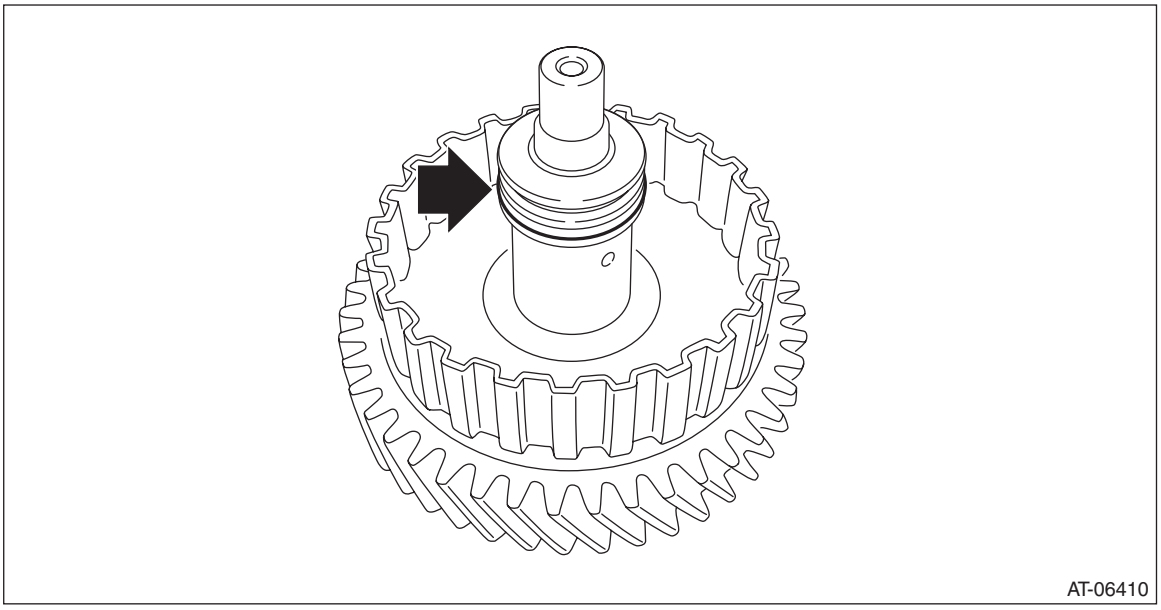
4) Remove the thrust bearing.



5) Remove the seal ring from transfer clutch assembly.



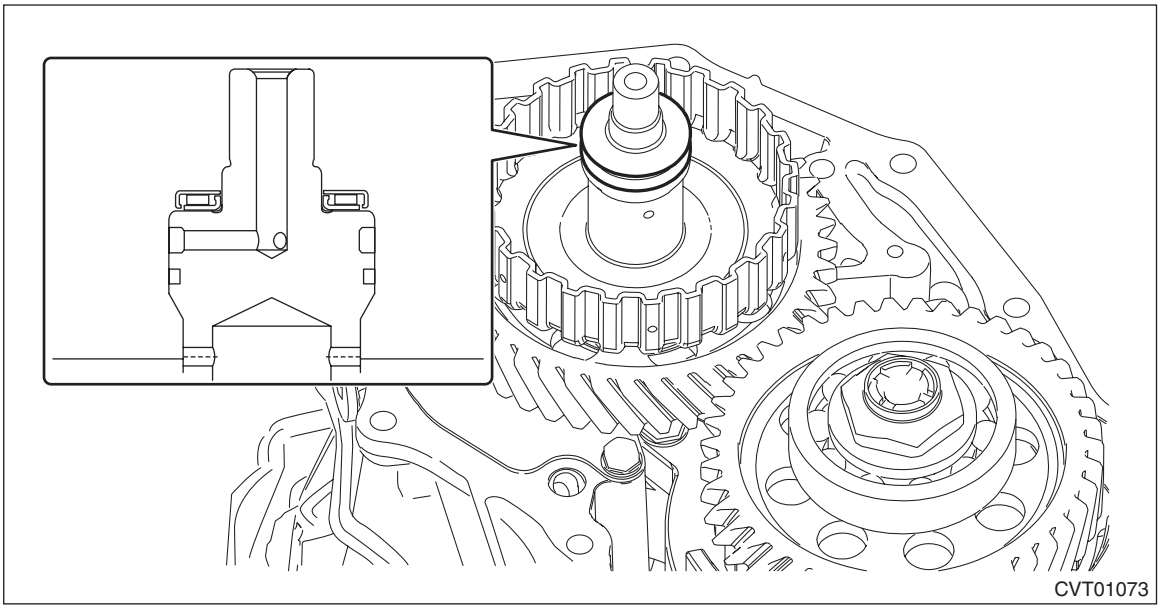
6) Remove the seal ring from the transfer driven gear assembly.



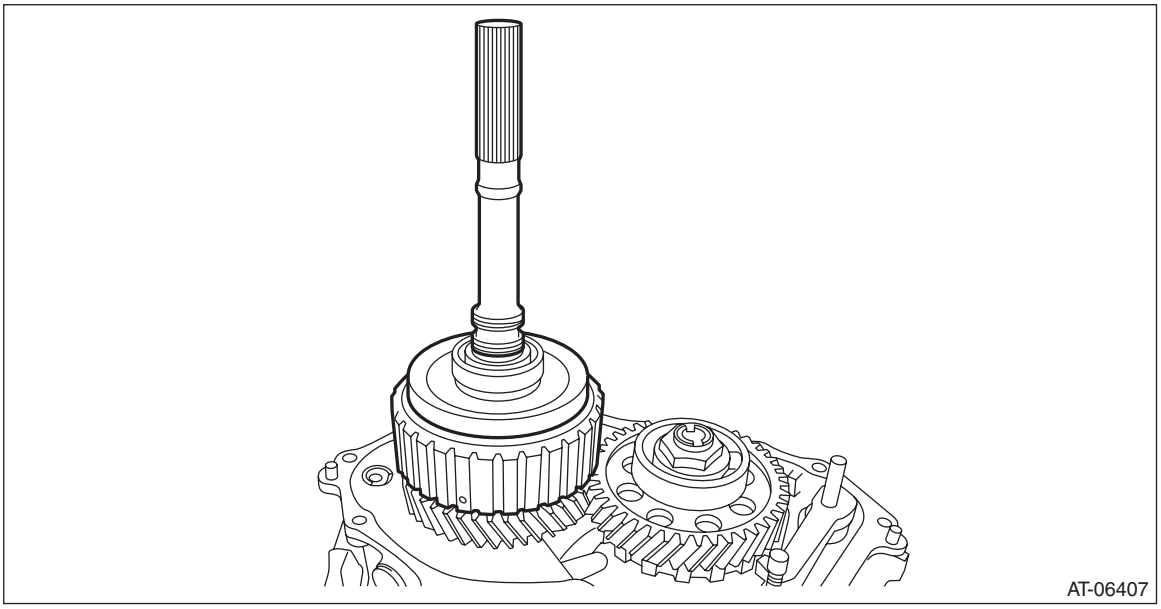
B: INSTALLATION

1) Install the thrust bearing.

NOTE:
Make sure to install in the right direction.



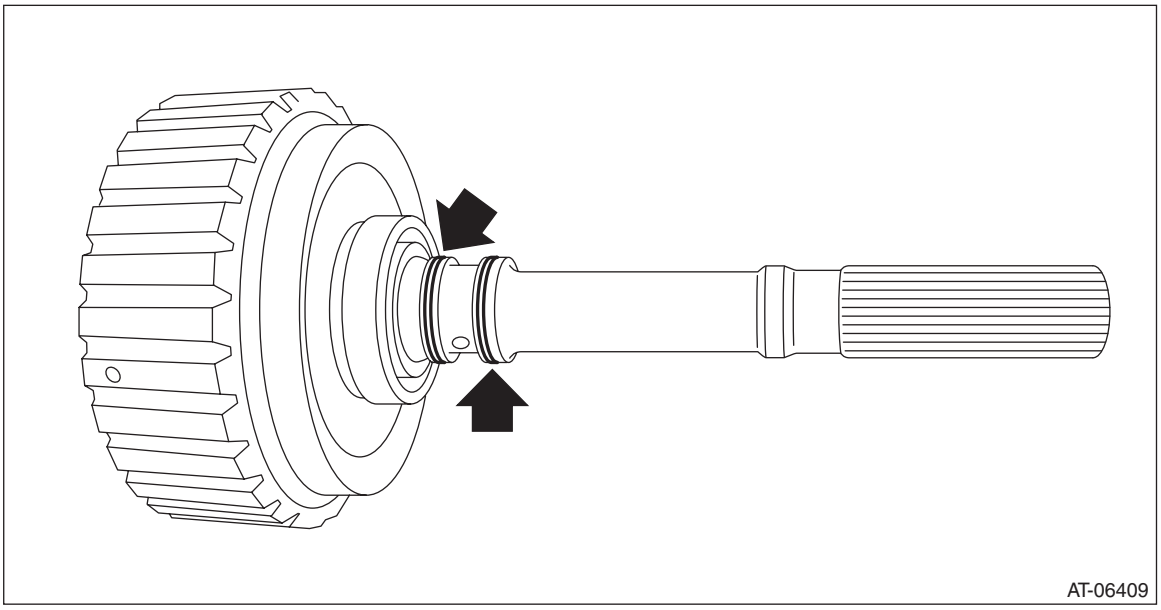
2) Install the transfer clutch assembly.



3) Select the transfer driven gear shim. <Ref. to CVT(TR580)-189, ADJUSTMENT, Transfer Clutch.>
4) Attach the selected transfer driven gear shim to extension case with vaseline.
5) Remove the transfer clutch assembly.
6) Install the seal ring to the transfer clutch assembly.

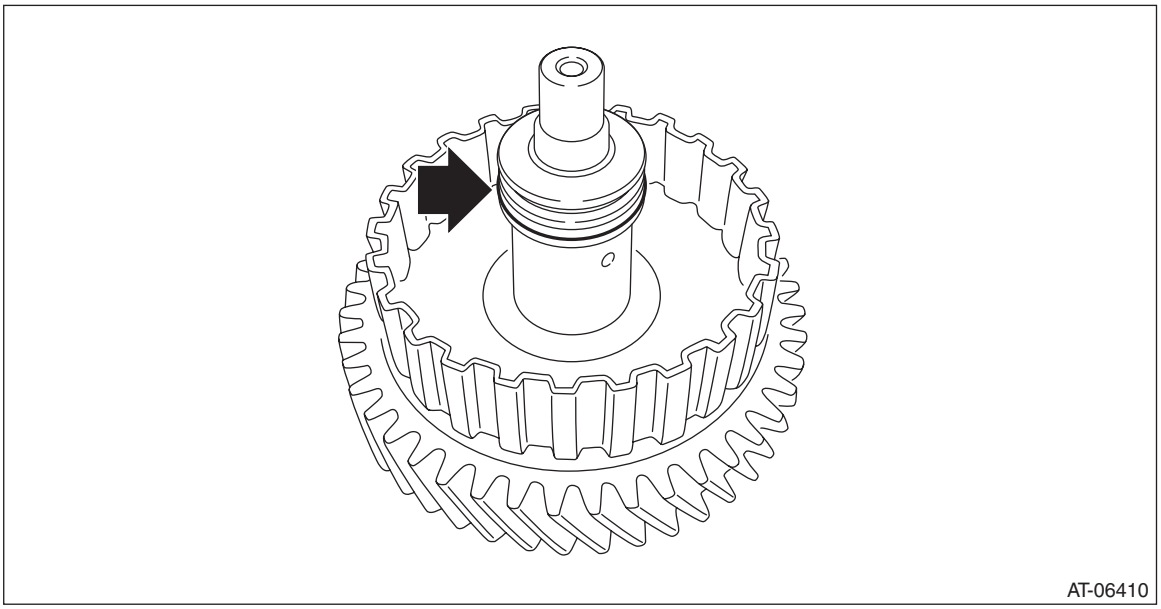
NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.

- Apply CVTF to the seal rings.



7) Install the seal ring to the transfer driven gear assembly.

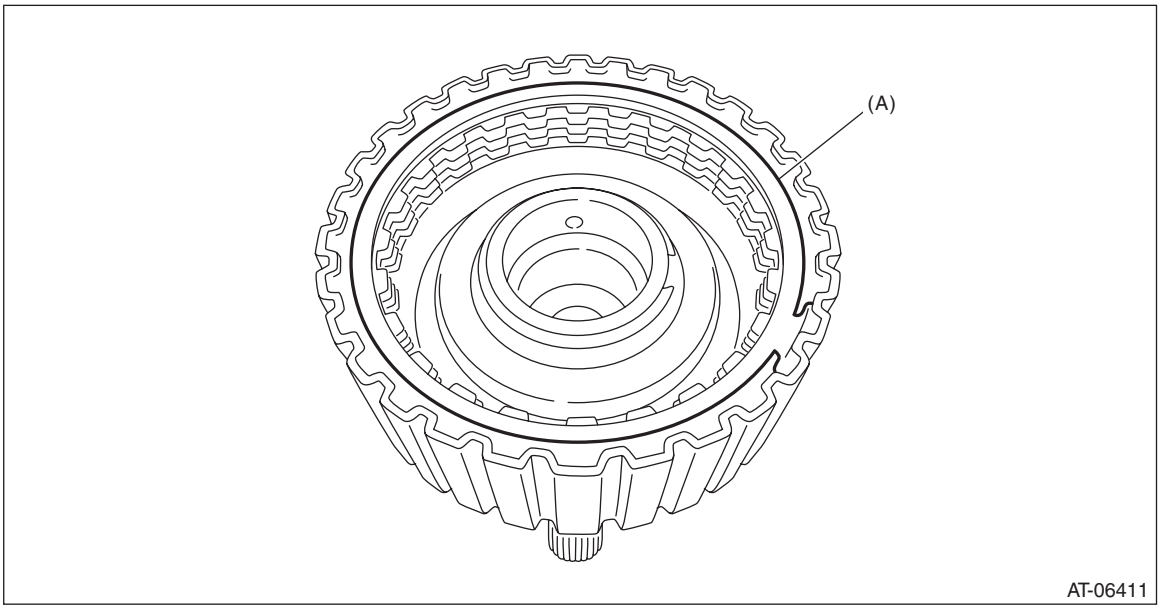
NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



8) Install the transfer clutch assembly.
9) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
10) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

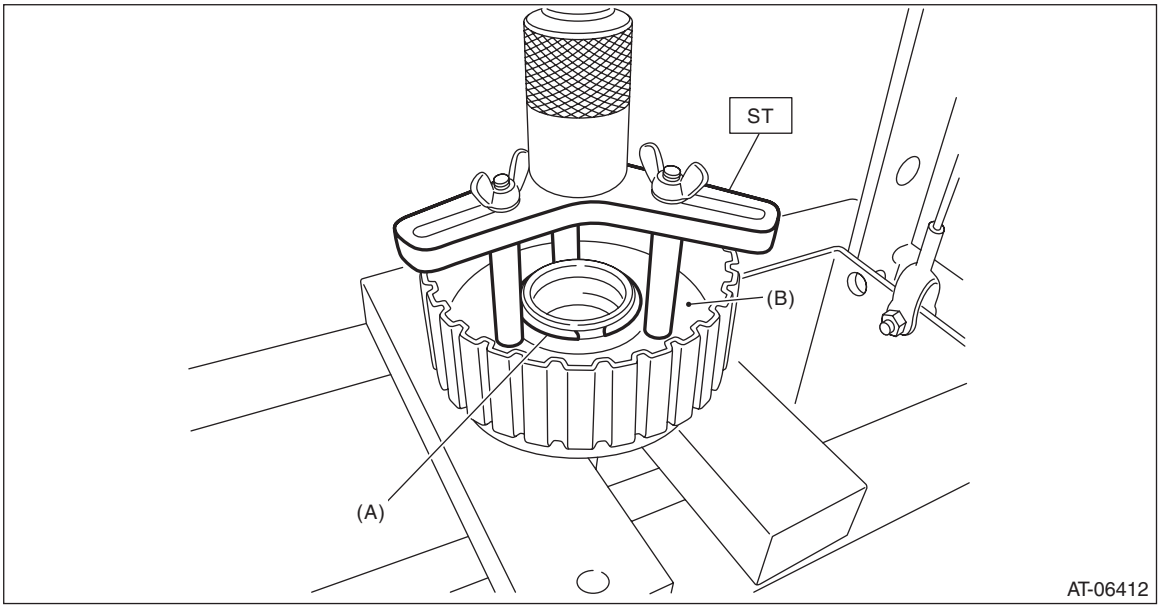
C: DISASSEMBLY

1) Remove the snap ring, and then remove the retaining plate, drive plate and driven plate.



(A) Snap ring

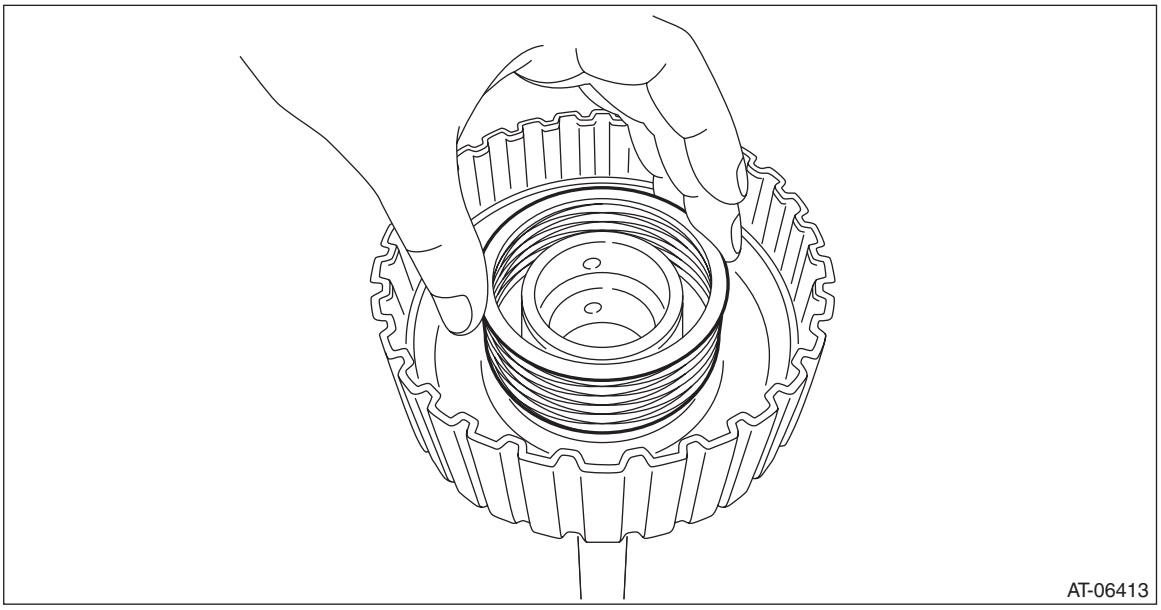
2) Compress the return spring using the ST to remove the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring
(B) Transfer clutch piston seal

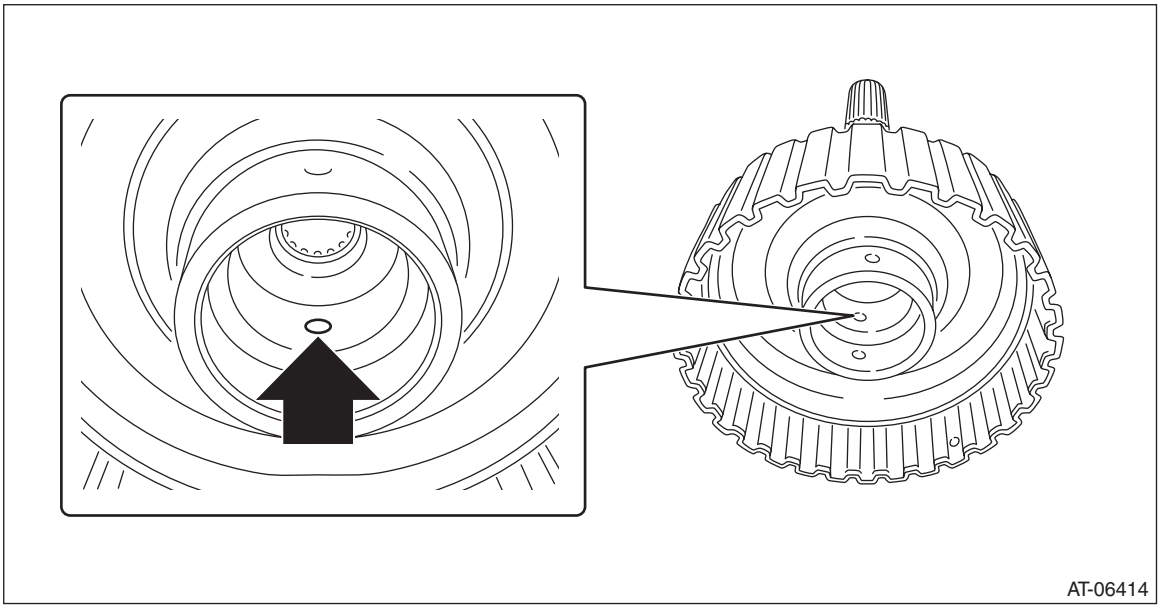
3) Remove the transfer clutch piston seal.

4) Remove the return spring.

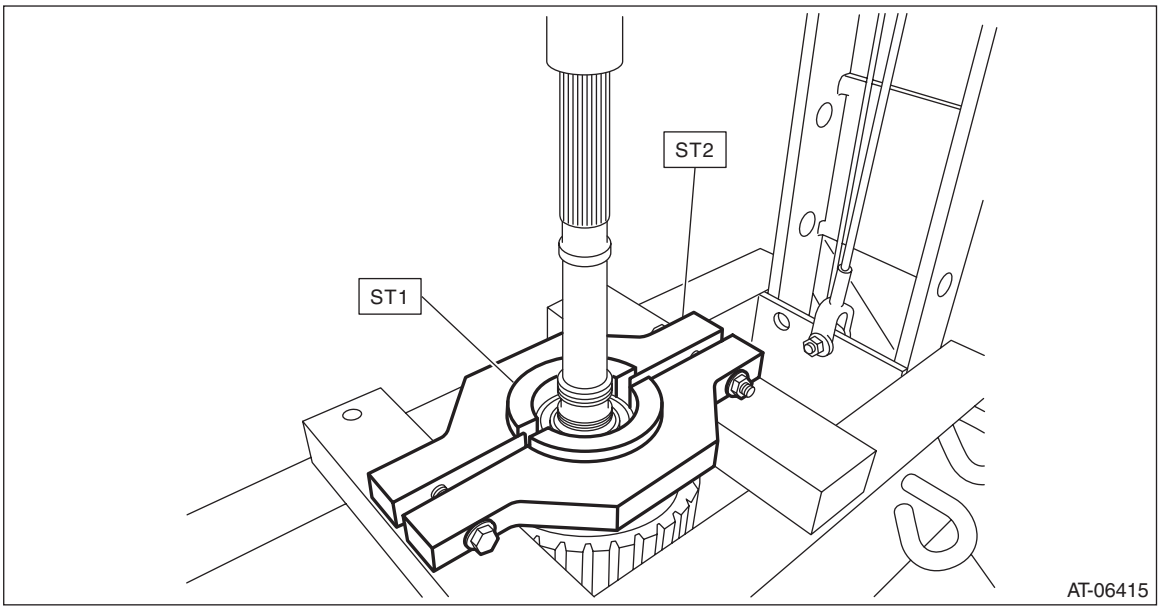


5) Remove the transfer clutch piston by blowing compressed air through transfer clutch assembly hole.

NOTE:
Plug the holes through which the compressed air is not blown.



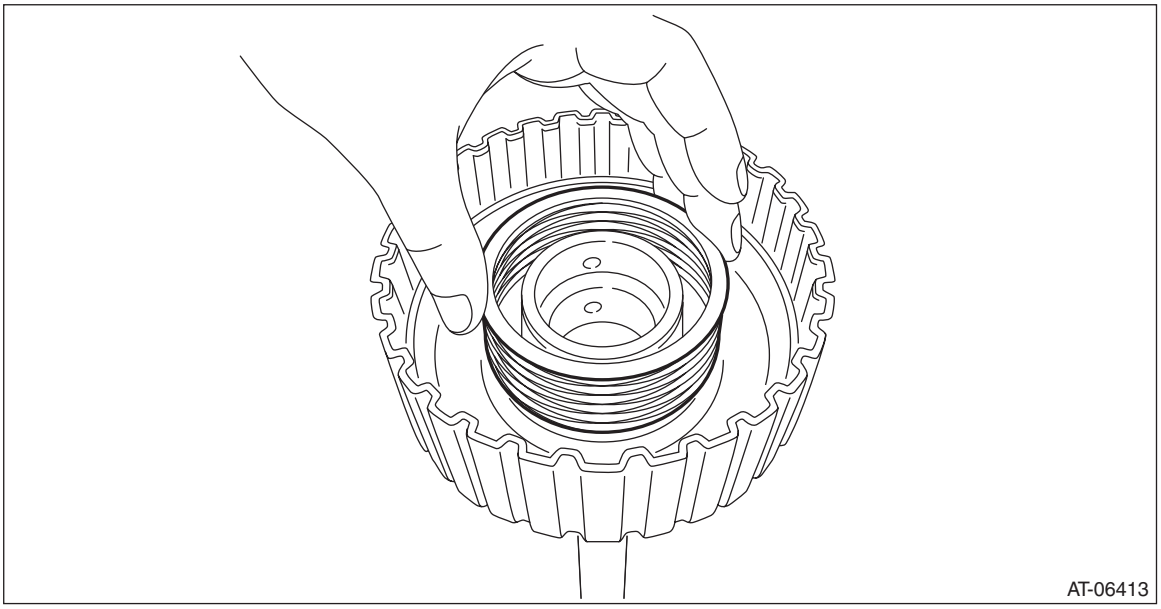
6) Remove the ball bearing using ST.
ST1 18767AA010 BEARING REMOVER
ST2 18723AA000 REMOVER



D: ASSEMBLY

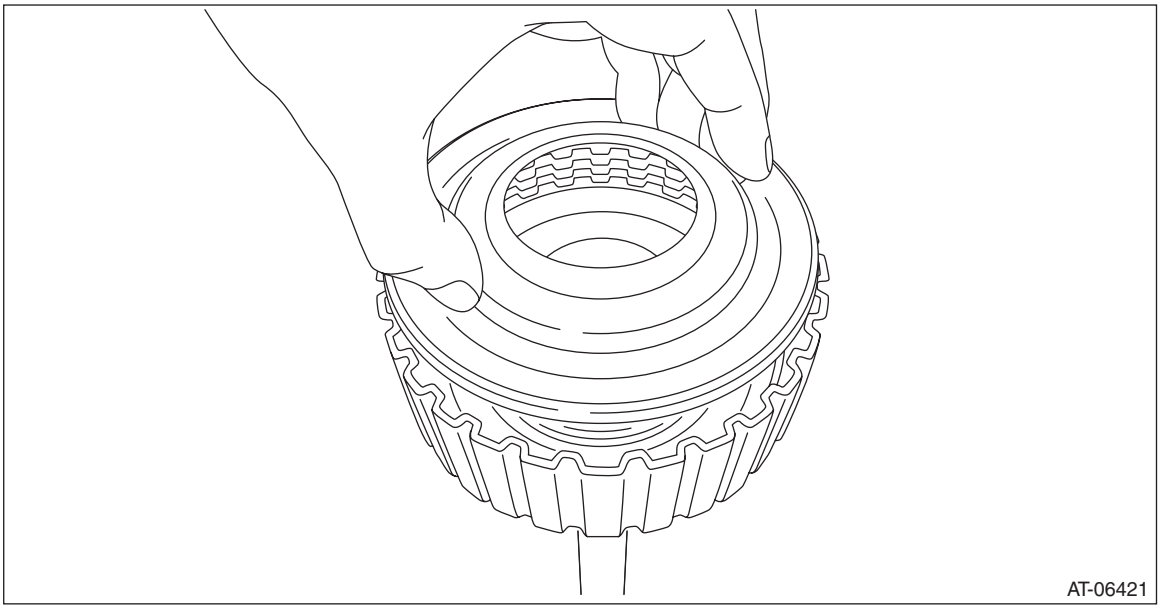
1) Install the transfer clutch piston.

NOTE:
Apply CVTF to the transfer clutch piston lip.
2) Install the return spring.

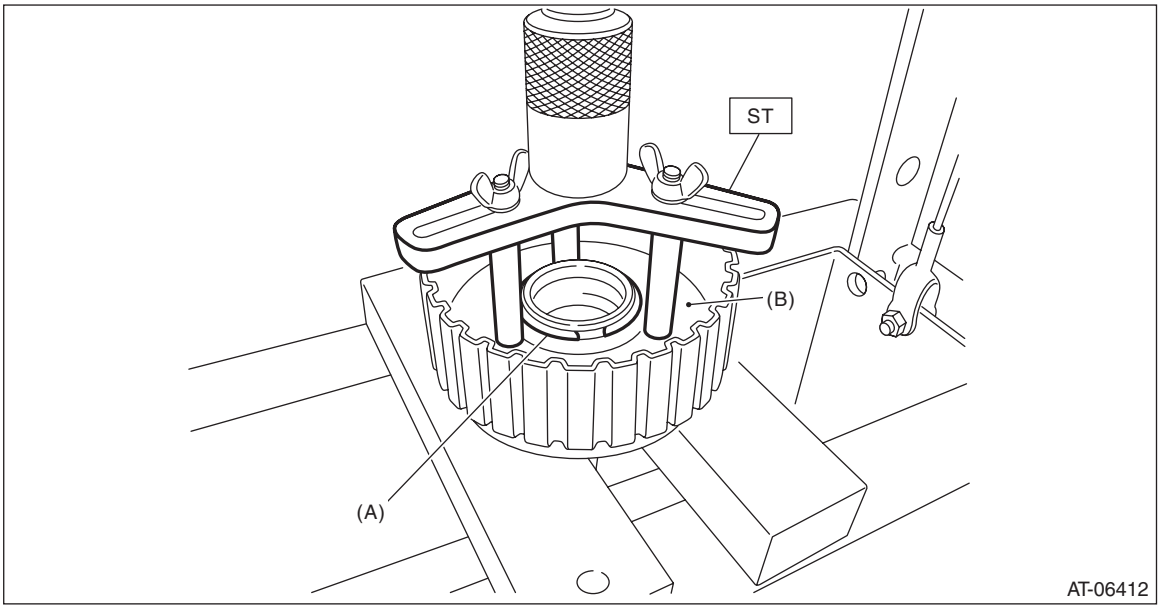


3) Install the transfer clutch piston seal.

NOTE:
Apply CVTF to the lip section of transfer clutch piston seal.

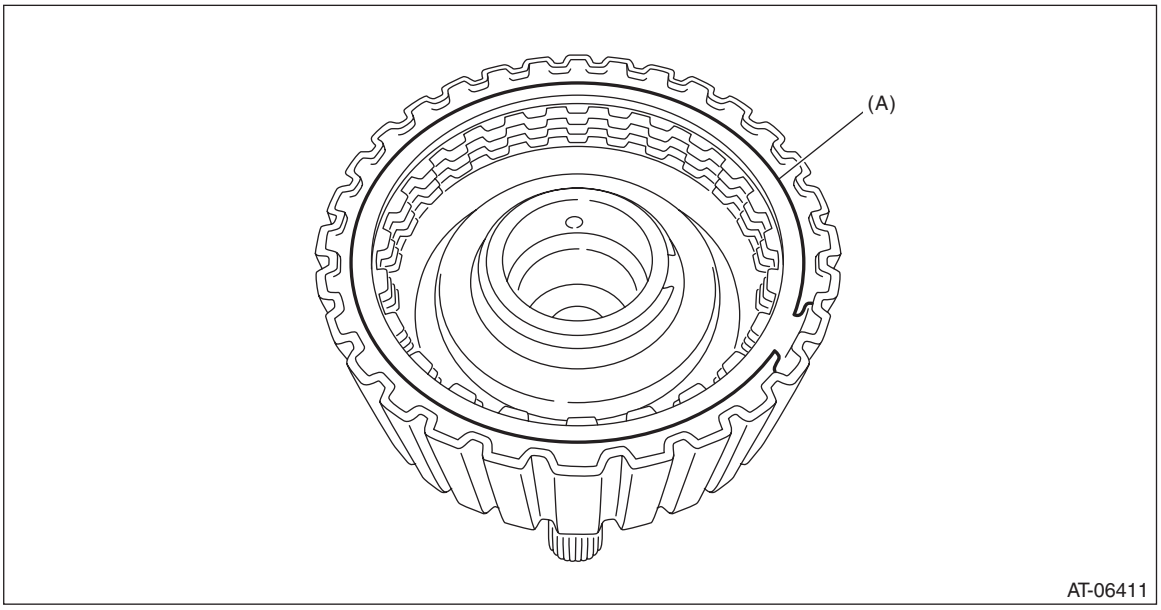


4) Compress the return spring using the ST to install the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring
(B) Transfer clutch piston seal

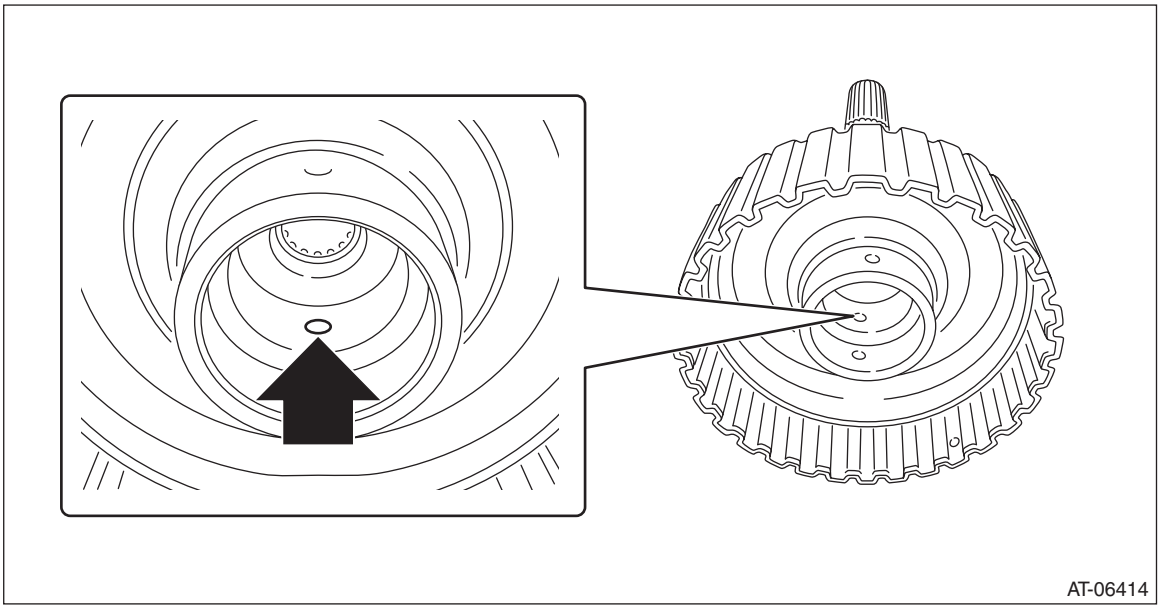
5) Install the pressure plate, driven plate, drive plate and snap ring.



(A) Snap ring

6) Blow compressed air through transfer clutch assembly hole, and check the transfer clutch piston operation.

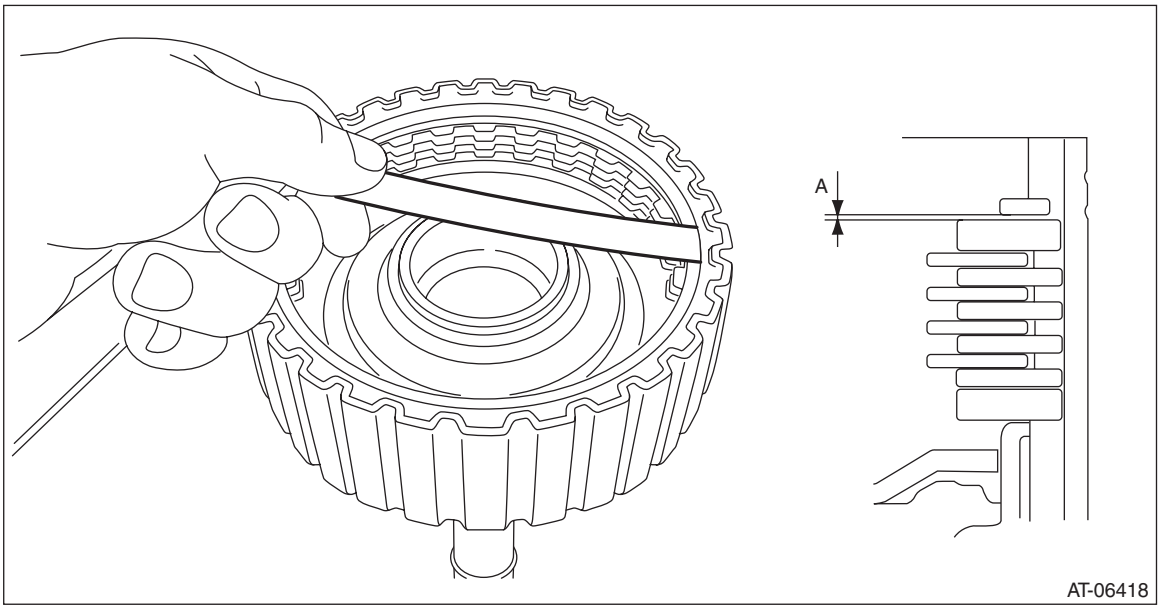
NOTE:
Plug the holes through which the compressed air is not blown.



7) Before measuring clearance “A”, place same thickness shims on both sides to prevent the plate from tilting.
8) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select and adjust the pressure plate within the initial specified value.

Initial standard:
0.7 — 1.1 mm (0.028 — 0.043 in)

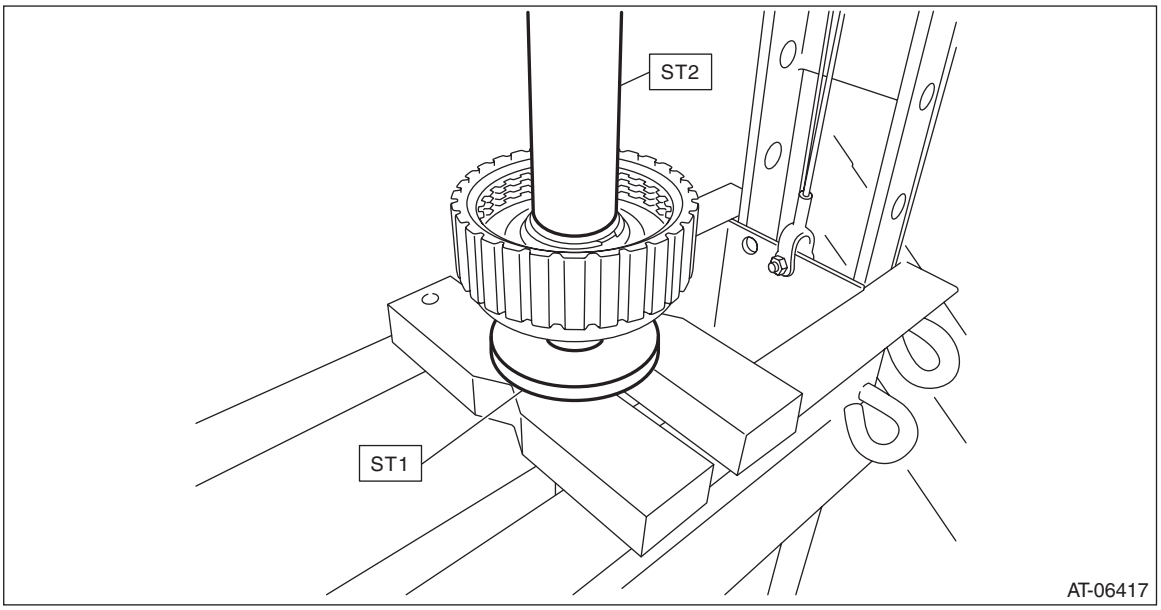
Limit thickness:
1.3 mm (0.051 in)



Pressure plate	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)

9) Recheck the clearance. <Ref. to CVT(TR580)-187, INSPECTION, Transfer Clutch.>
10) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST1 398177700 INSTALLER
ST2 499277000 INSTALLER



E: INSPECTION

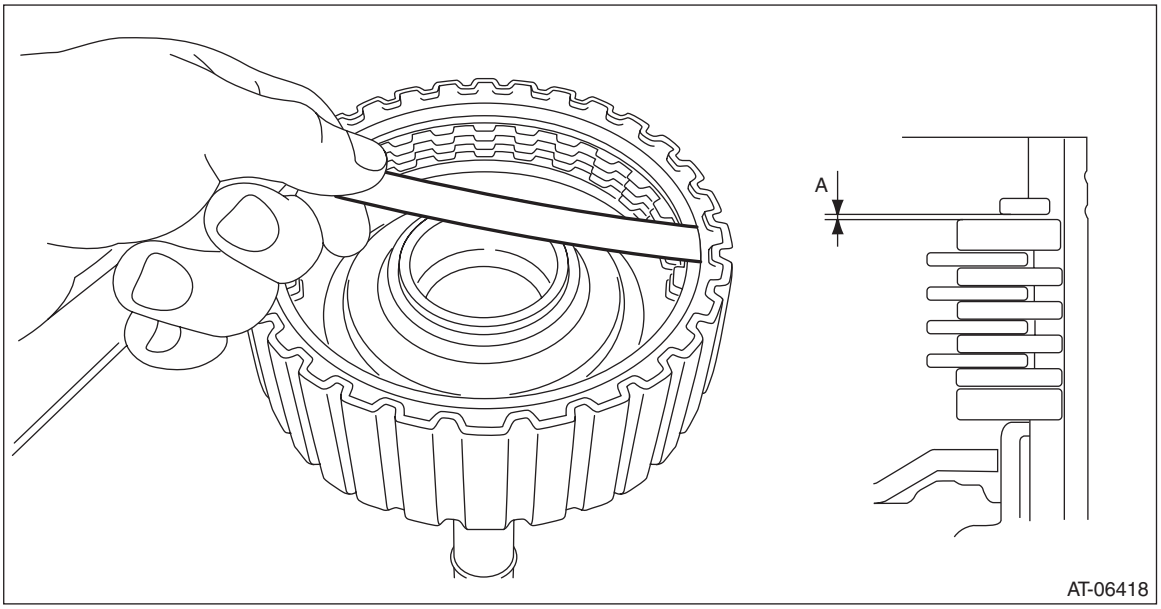
- Inspect the drive plate facing for wear and damage.
- Driven plate for discoloration (burned color)
- Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
- Check the lip seal for damage.
- Inspect the extension end play, and adjust it to within the standard value. <Ref. to CVT(TR580)-189, ADJUSTMENT, Transfer Clutch.>

1) Before measuring clearance “A” between snap ring and driven plate, place same thickness shims on both sides to prevent the plate from tilting.

2) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select the pressure plate within the initial specified value.

Initial standard:
0.7 — 1.1 mm (0.028 — 0.043 in)

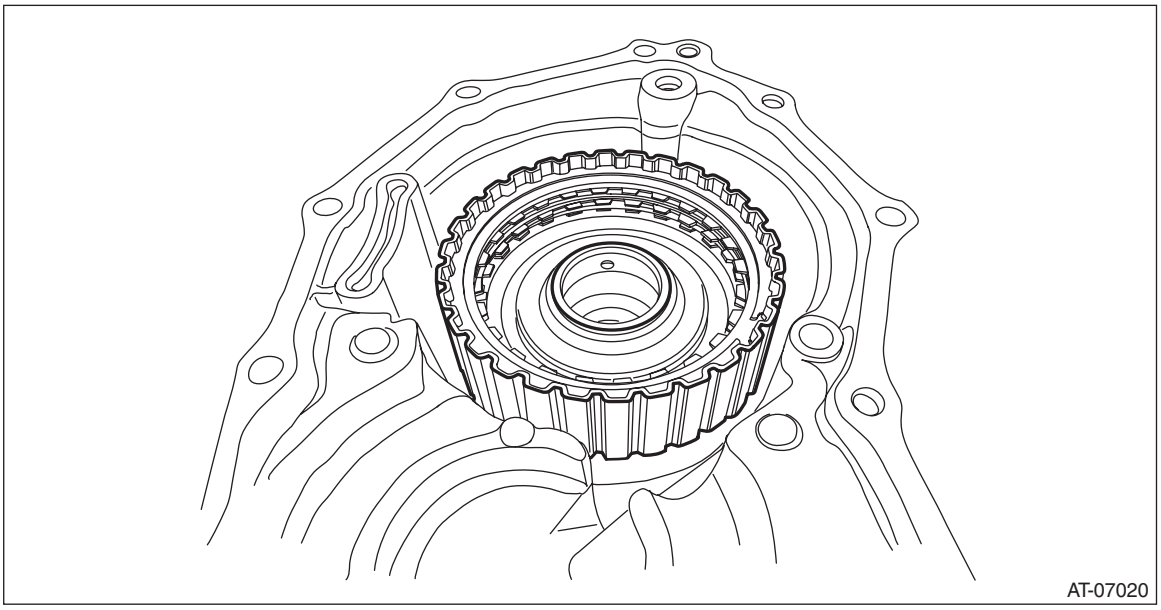
Limit thickness:
1.3 mm (0.051 in)



3) Check for tight corner braking phenomenon when the vehicle is moved forward with the steering fully turned. If tight corner braking occurs, perform the following procedures.
(1) With the steering wheel held at fully turned position, drive the vehicle in “D” range and with vehicle speed at approx. 5 km/h (3 MPH) in both clockwise and counterclockwise directions for approx. ten times each, while repeating acceleration and braking intermittently.
(2) If the tight corner braking phenomenon still persists, drive the vehicle again in a circle for several laps.

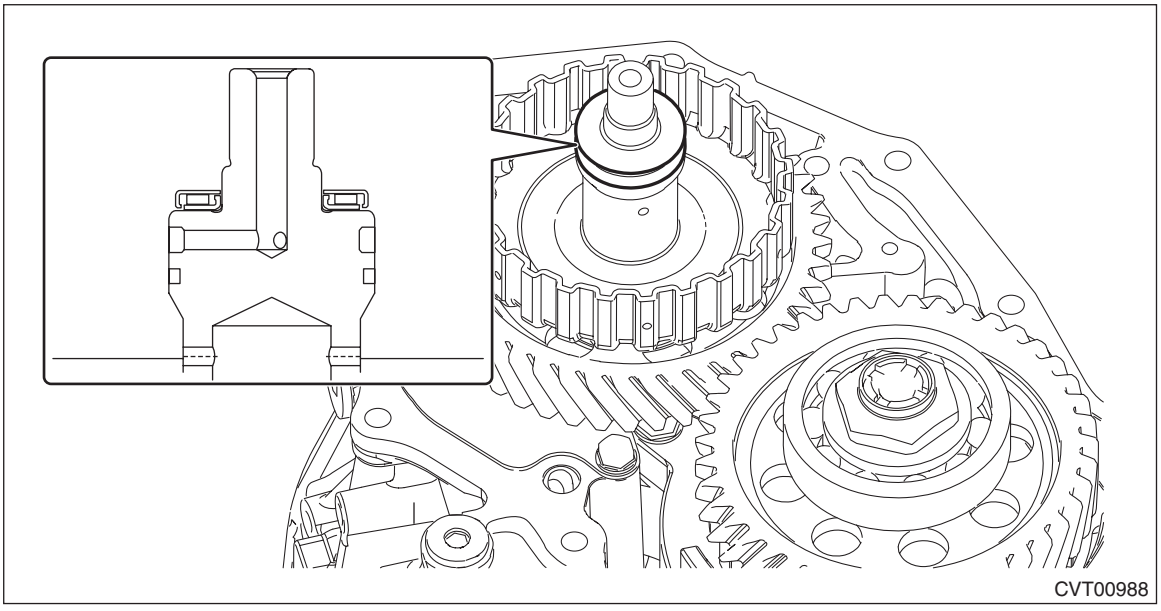
F: ADJUSTMENT

1) Install the transfer clutch assembly to the extension case with the transfer driven gear shims and thrust bearings removed.

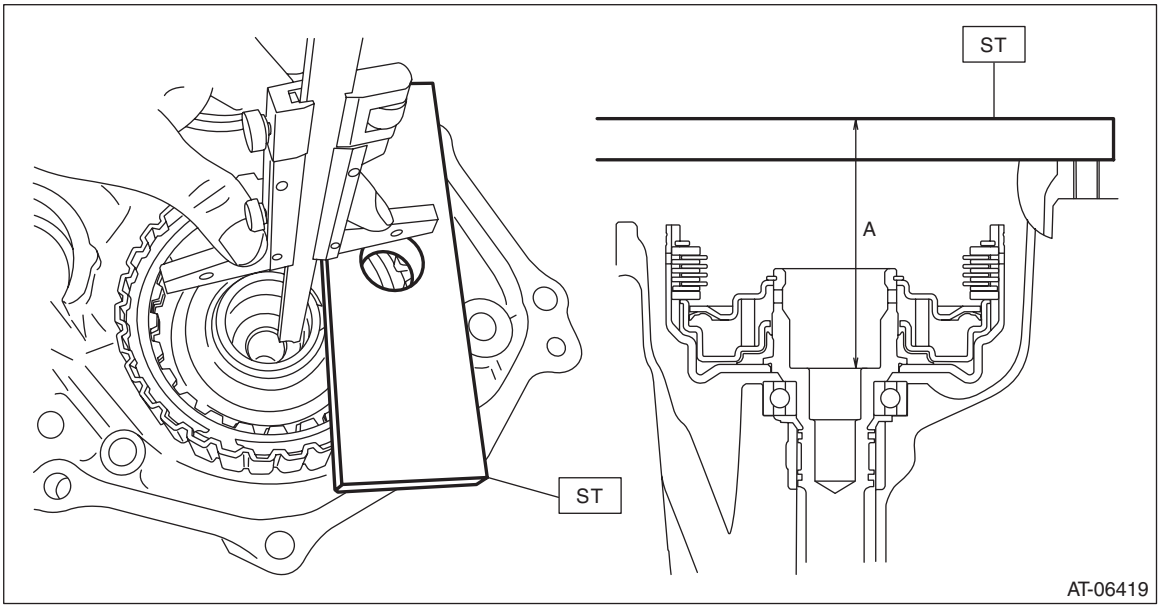


2) Install the thrust bearing to the transfer driven gear.

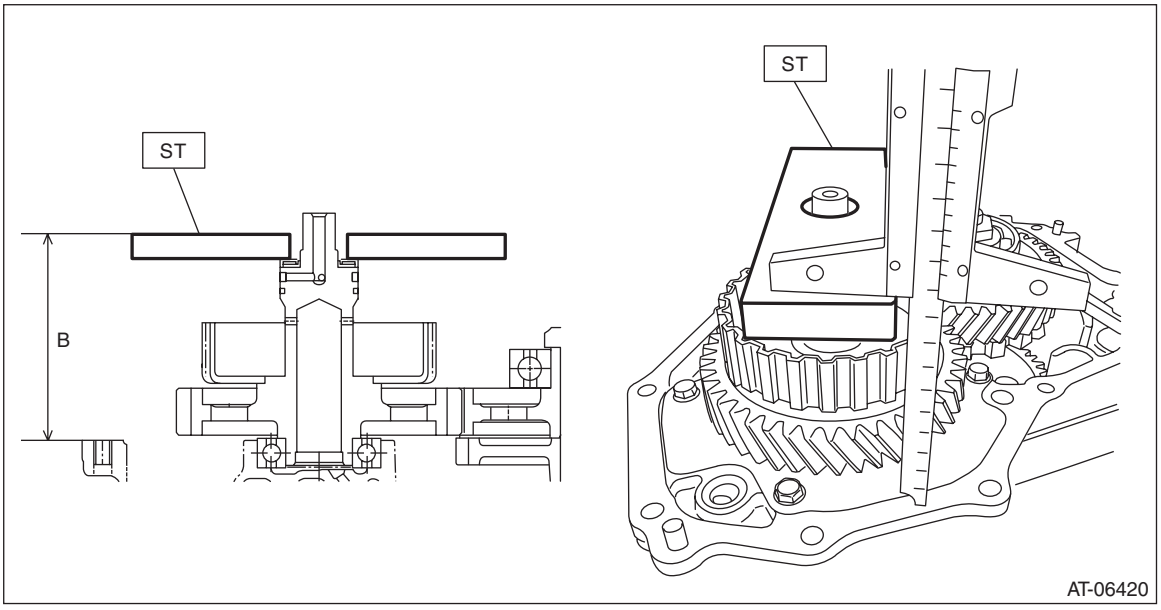
NOTE:
Make sure to install in the right direction.



3) Using the ST, measure the height “A” from the ST end face to the thrust bearing catch surface of the transfer clutch assembly.
ST 499575500 GAUGE



4) Using the ST, measure the height “B” from the transmission case mating surface to the end of ST.
ST 499575500 GAUGE



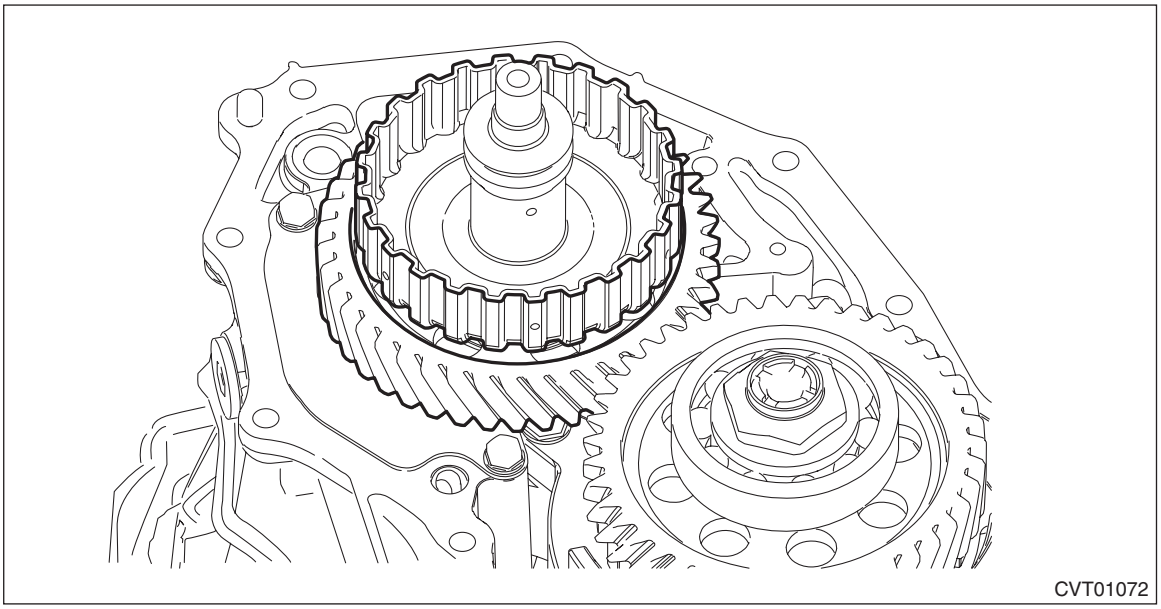
5) Obtain the thickness of transfer driven gear shim using the following formula to select one to three transfer driven gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Transfer driven gear shim thickness
A: Height from the ST end face to the transfer clutch assembly thrust bearing catch surface
B: Height from the mating surface of the transmission case to the end of the ST
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Transfer driven gear shim	
Part No.	Thickness mm (in)
33280AA030	0.3 (0.012)
33280AA040	0.4 (0.016)
33280AA050	0.5 (0.020)

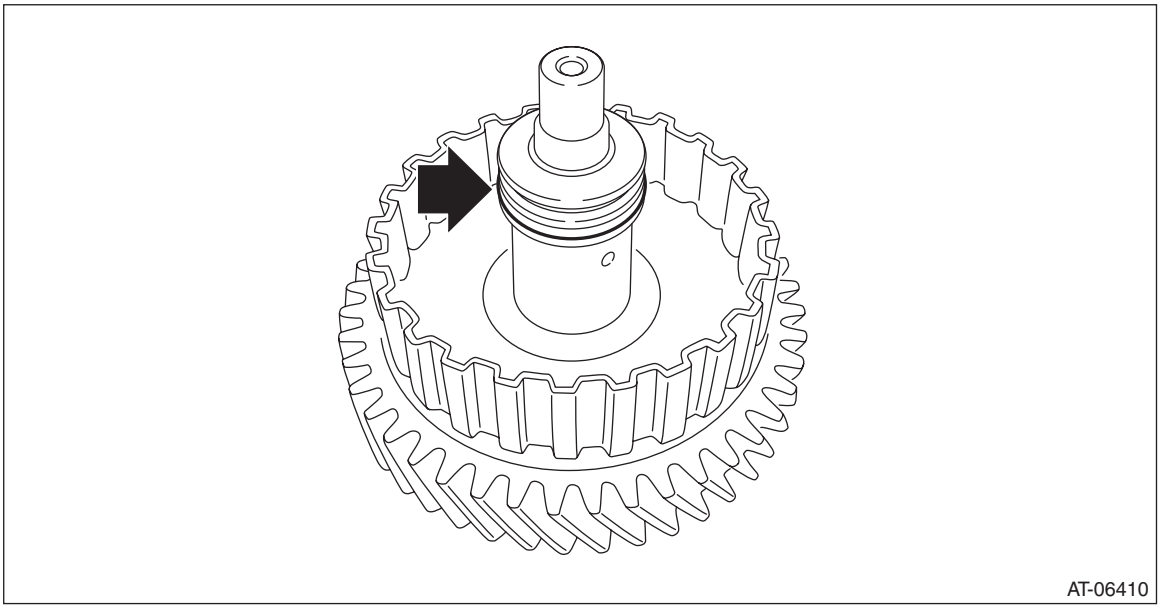
30.Transfer Driven Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly.

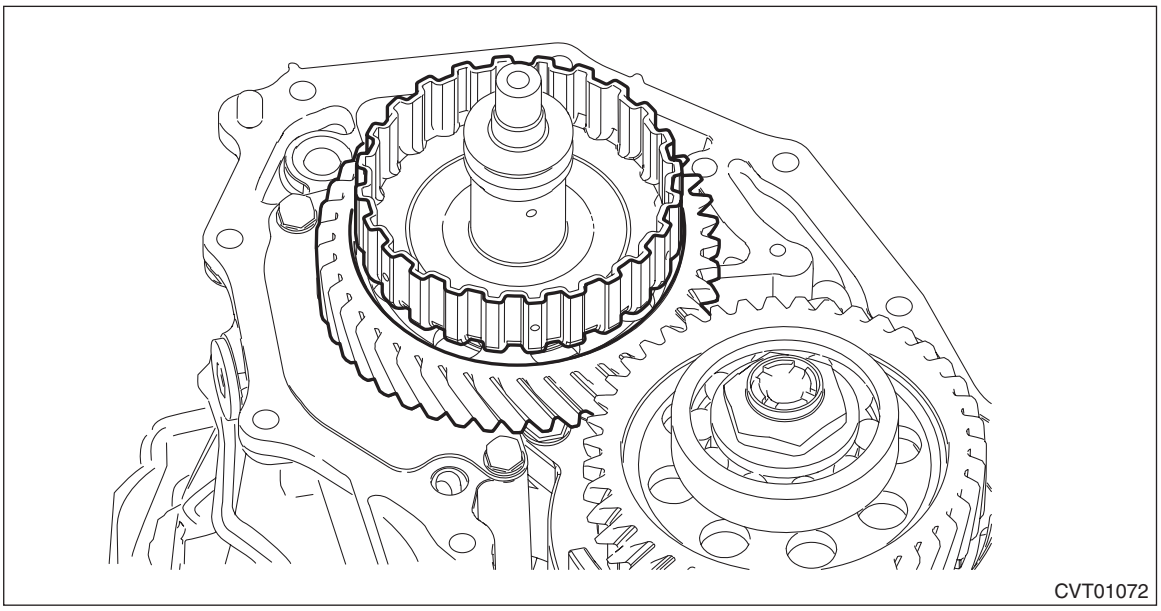

CVT01072

5) Remove the seal ring from the transfer driven gear assembly.


AT-06410

B: INSTALLATION

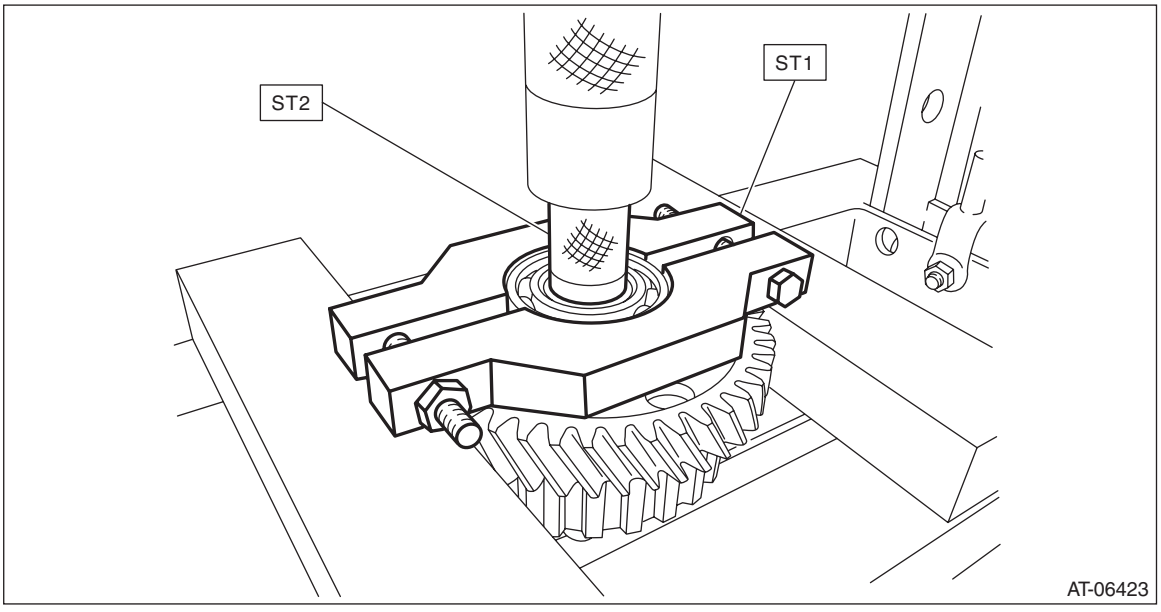
1) Install the transfer driven gear assembly.



2) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
3) Select the transfer driven gear shim. <Ref. to CVT(TR580)-189, ADJUSTMENT, Transfer Clutch.>
4) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

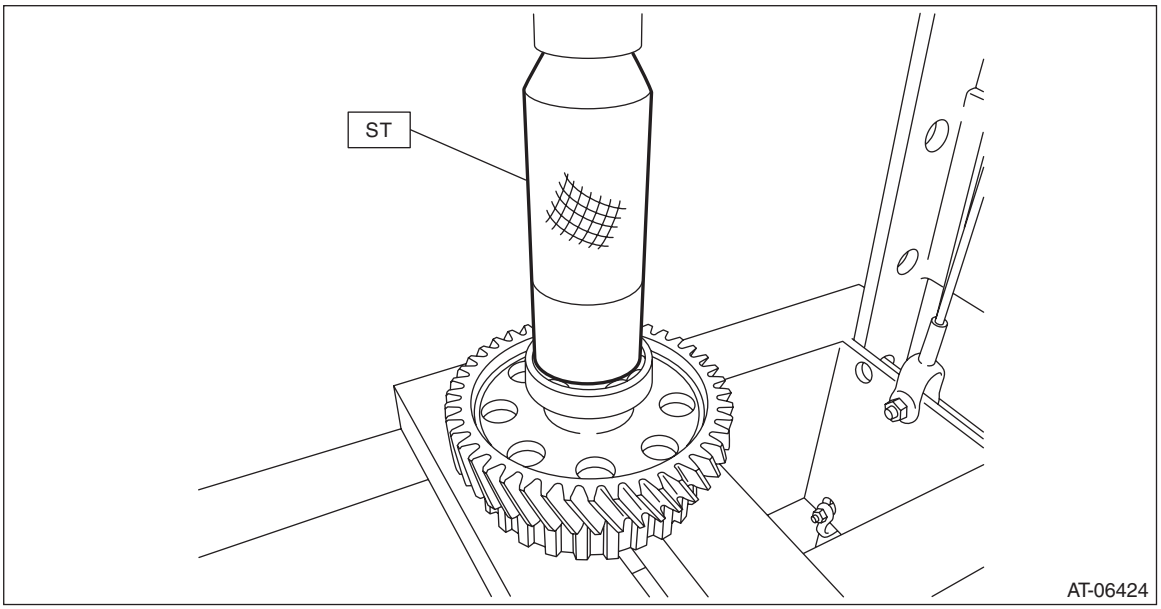
C: DISASSEMBLY

1) Remove the ball bearing using ST.
ST1 498077400 BEARING REMOVER
ST2 899864100 REMOVER



D: ASSEMBLY

1) Using the ST, install the ball bearing.
ST 899580100 INSTALLER



E: INSPECTION

- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Check the transfer driven gear for breakage or damage.

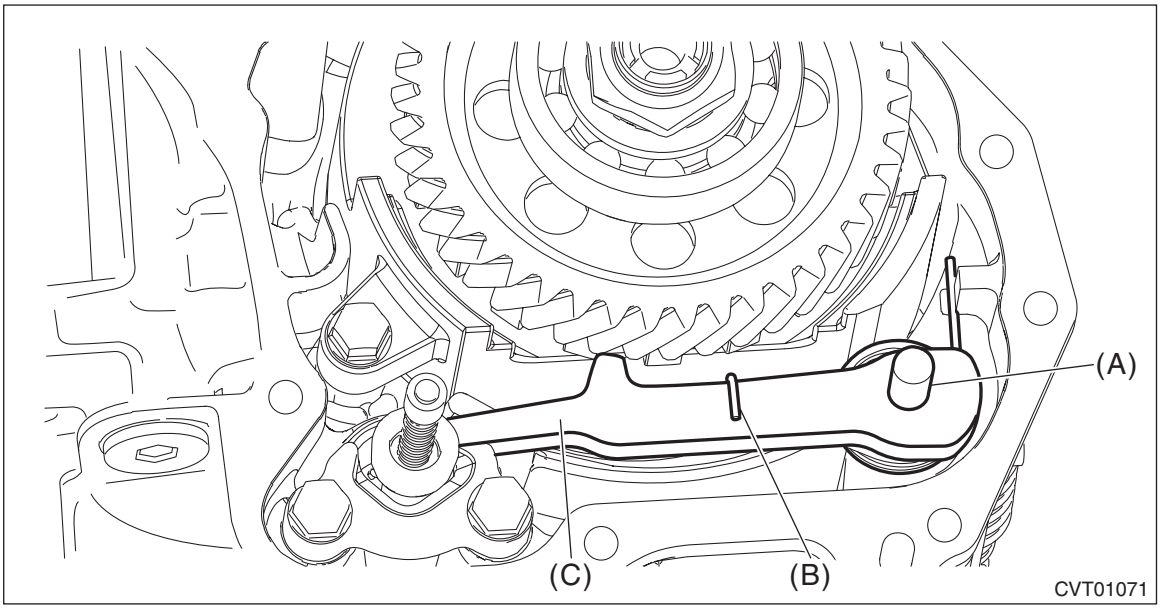
F: ADJUSTMENT

NOTE:
When the transfer driven gear or bearing is replaced, select the transfer driven gear shim. <Ref. to CVT(TR580)-189, ADJUSTMENT, Transfer Clutch.>

31.Parking Pawl

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Shift the range select lever to “N” range.
3) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
4) Remove the parking pawl shaft, return spring and parking pawl.

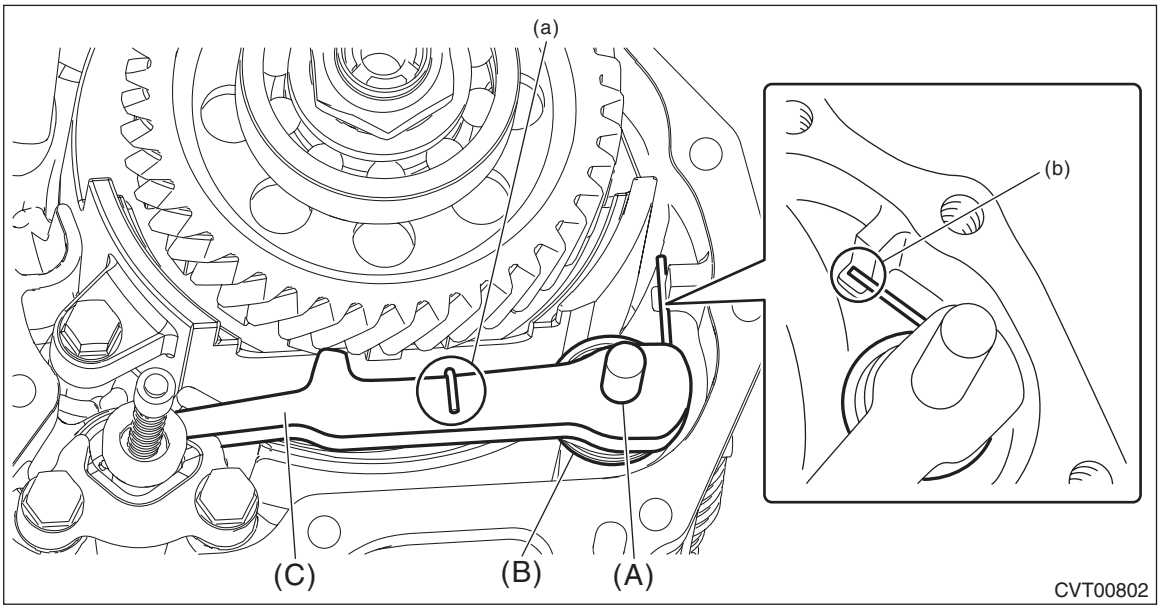


(A) Parking pawl shaft
(B) Return spring
(C) Parking pawl

B: INSTALLATION

1) Set the range select lever to the “N” range.
2) Install the parking pawl shaft, return spring and parking pawl.

NOTE:
Make sure that the end of return spring sticks out of parking pawl as shown in (a). Make sure that the other end contacts the rib of transmission case as shown in (b).



(A) Parking pawl shaft
(B) Return spring
(C) Parking pawl

3) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
4) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

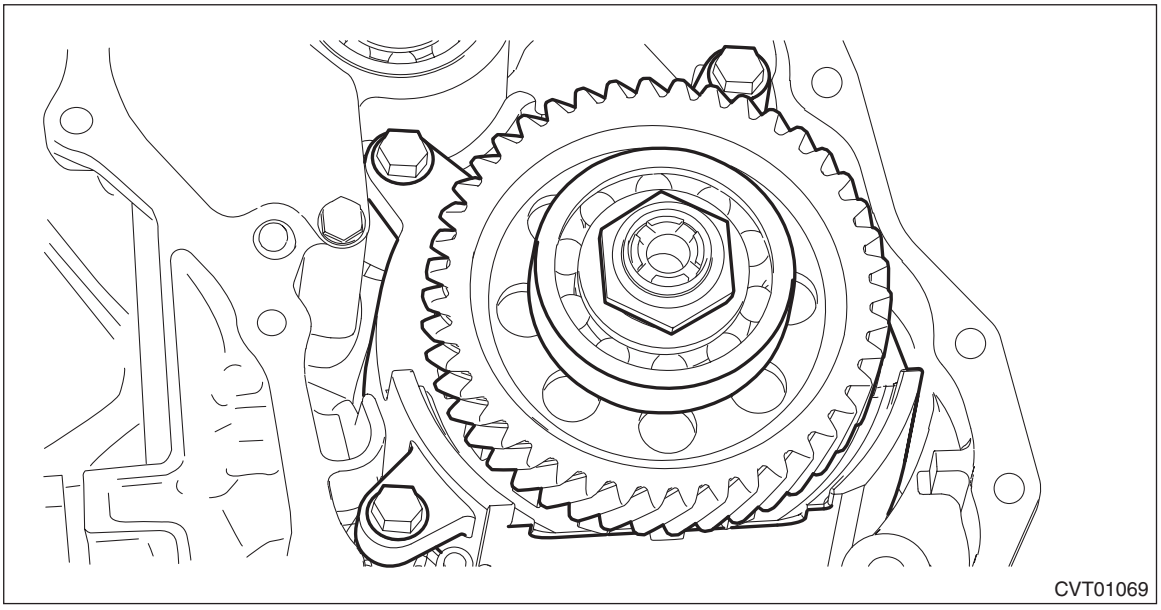
C: INSPECTION

- Check the parking pawl for breakage or damage.
- Check for worn, broken and/or damaged return spring.

32.Reduction Driven Gear

A: REMOVAL

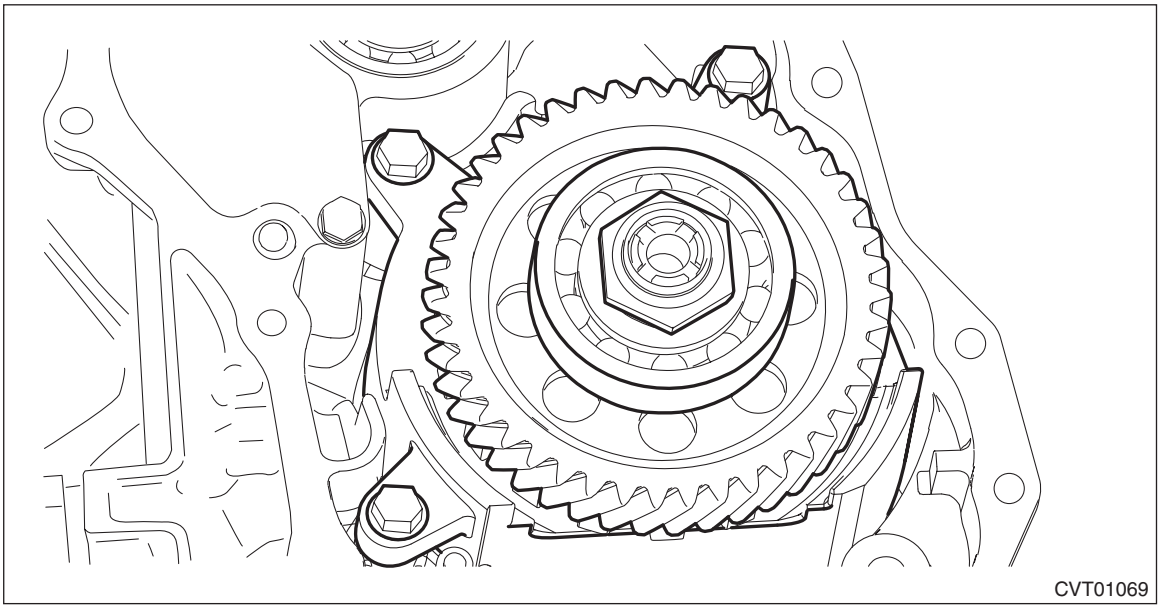
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
5) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
6) Remove the reduction driven gear assembly and spacer oil.



B: INSTALLATION

1) Install the reduction driven gear assembly and spacer oil.

Tightening torque:
17 N·m (1.7 kgf-m, 12.5 ft-lb)

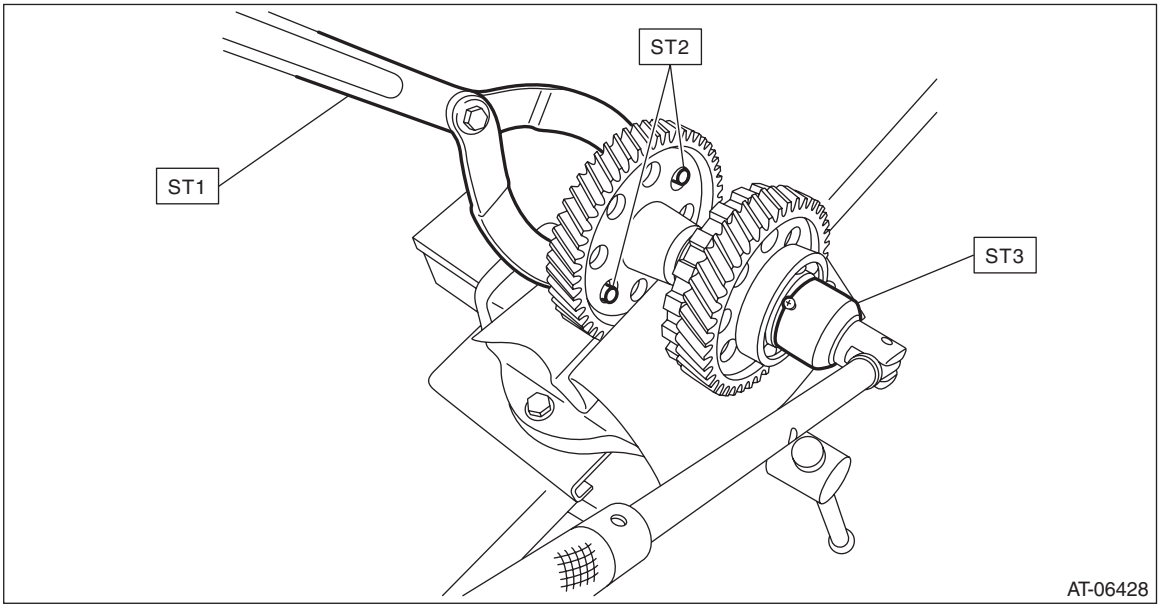


2) Select the transfer drive gear shim. <Ref. to CVT(TR580)-232, ADJUSTMENT, Reduction Drive Gear.>
3) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>

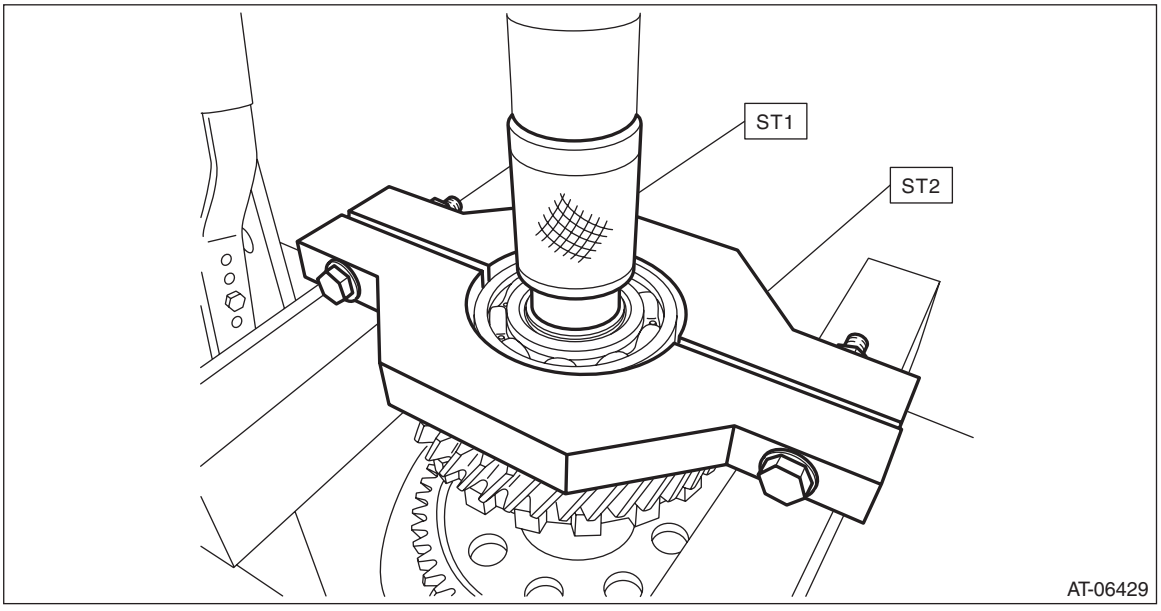
4) Attach the selected transfer drive gear shim to extension case with vaseline.
5) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>
6) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
7) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
8) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

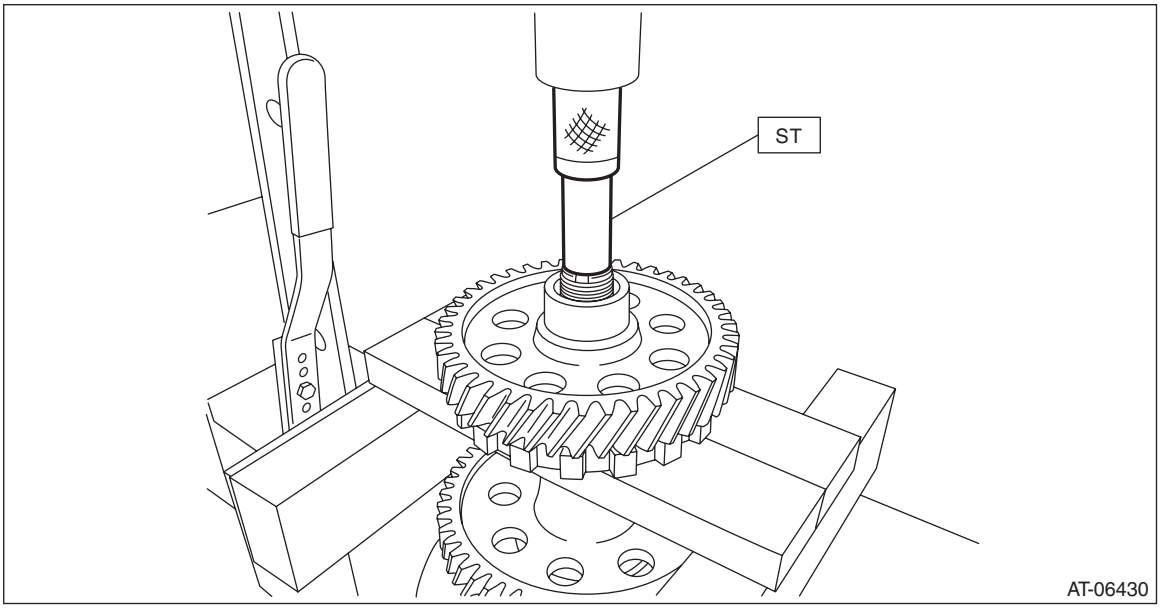
1) Flatten the tab of the lock nut.
2) Using the ST, counter the rotation of the reduction driven gear assembly, and remove the lock nut.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PIN SET
ST3 499987003 SOCKET WRENCH (35)



3) Remove the ball bearing using ST.
ST1 499757002 INSTALLER
ST2 498077300 REMOVER

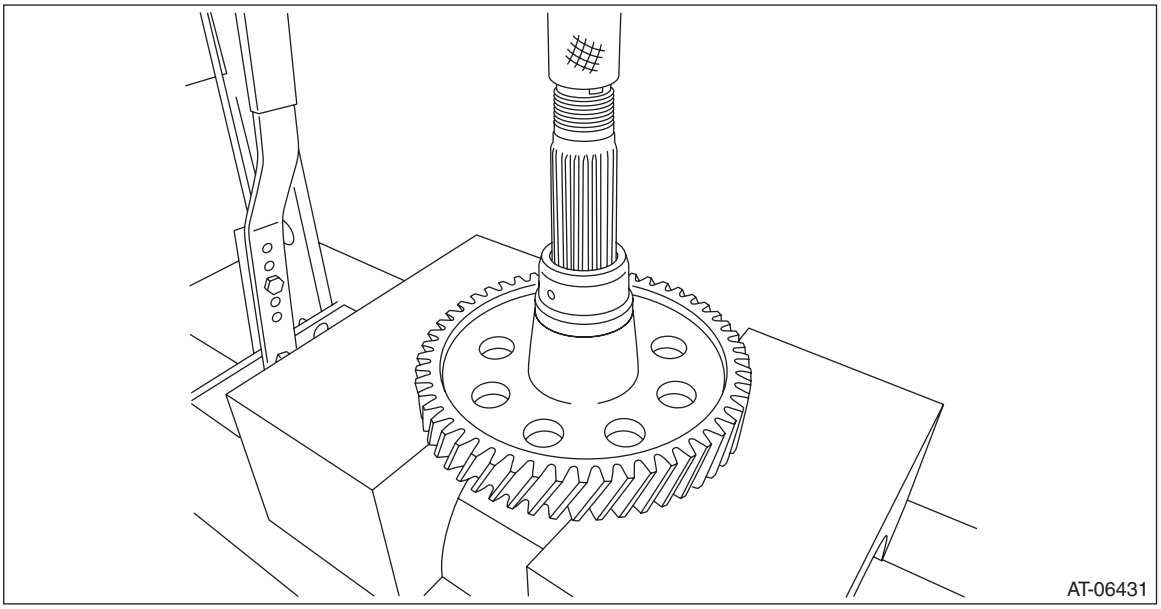


4) Using the ST, remove the parking gear and transfer drive gear.
ST 899864100 REMOVER



5) Remove the collar.

NOTE:
When collar has been removed, do not reuse the reduction driven gear and/or shaft, and replace it with reduction driven gear COMPL.

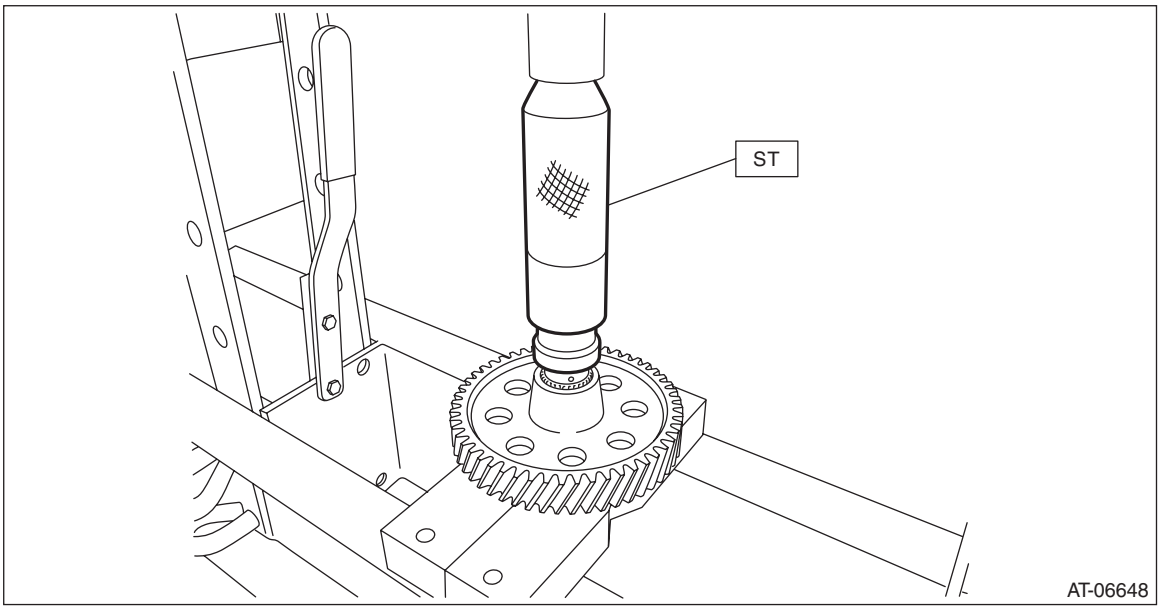


D: ASSEMBLY

1) Using the ST, attach the collar.

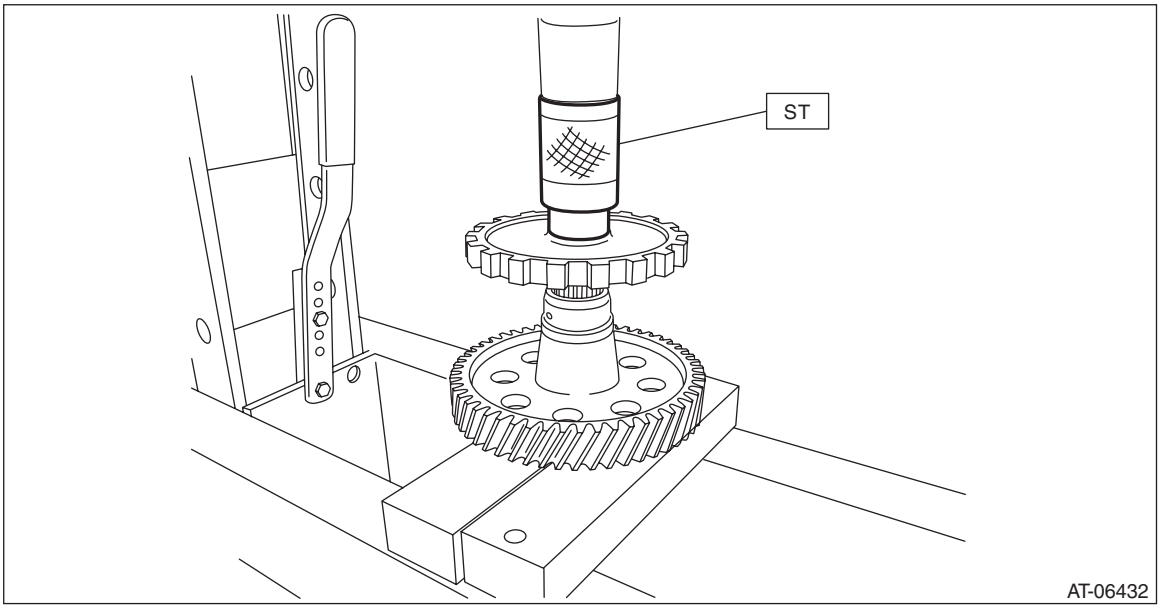
NOTE:
- Attach the collar in the correct direction.
- Use a new reduction driven gear COMPL.

ST 899580100 INSTALLER

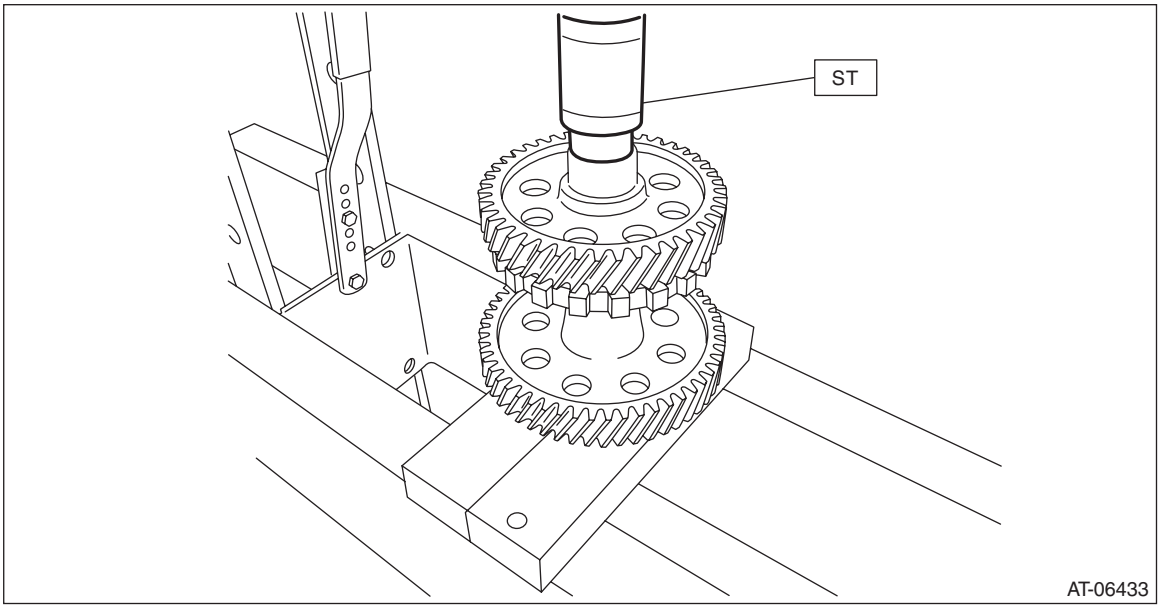


2) Using the ST, install the parking gear.

ST 499757002 INSTALLER

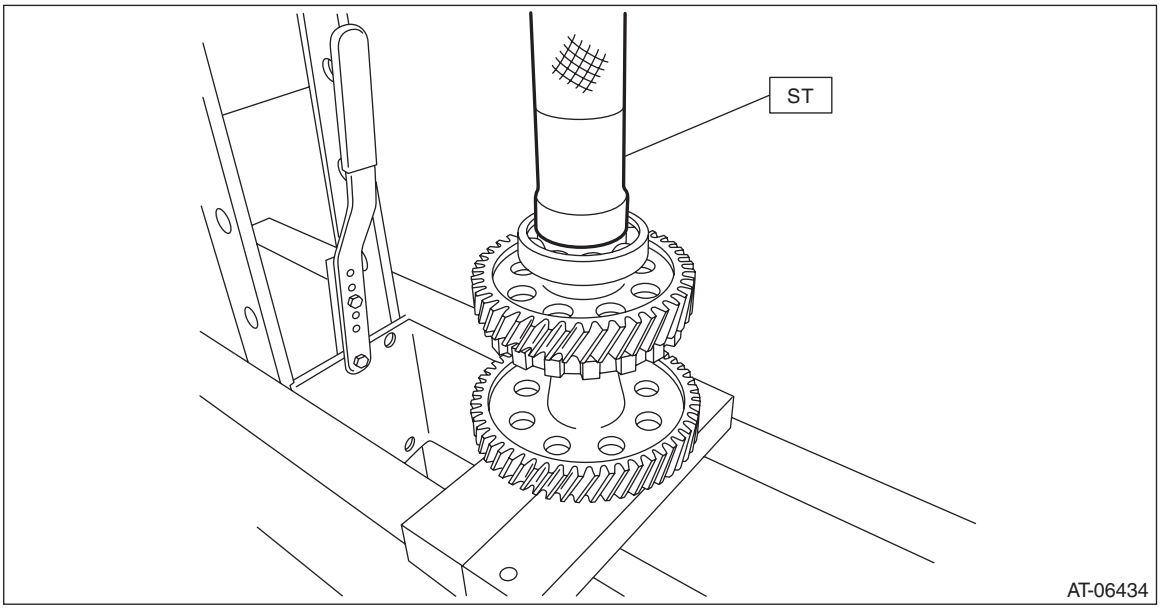


3) Using the ST, install the transfer drive gear.
ST 499757002 INSTALLER



4) Using the ST, install the ball bearing.

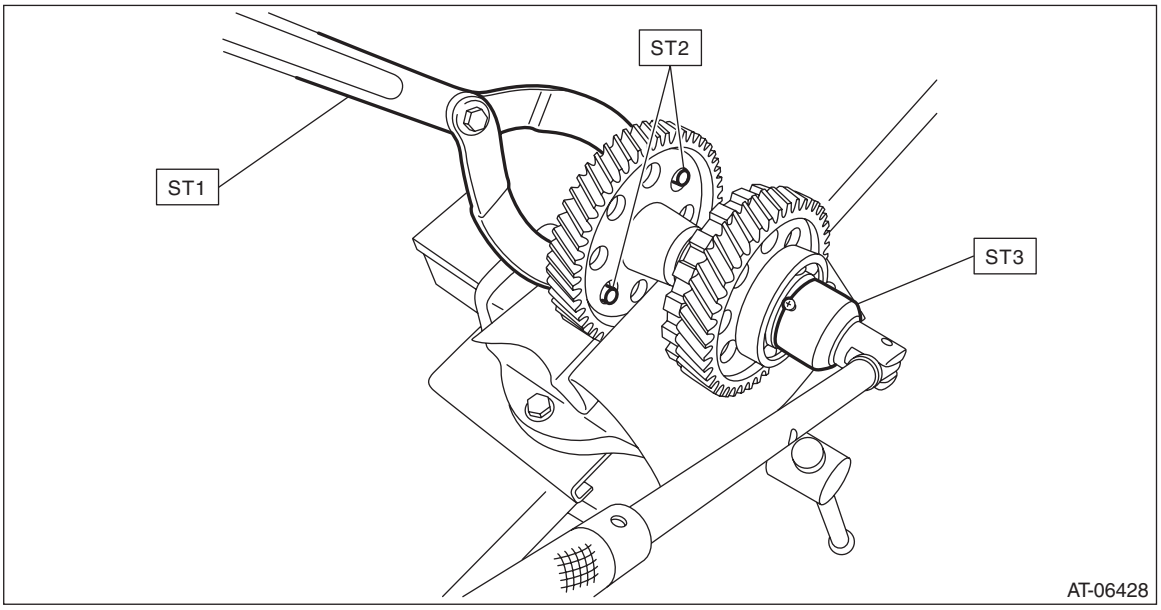
NOTE:
Use a new ball bearing.
ST 499277100 BUSHING 1-2 INSTALLER



5) Using the ST, counter the rotation of the reduction drive gear assembly, and install the lock nut.

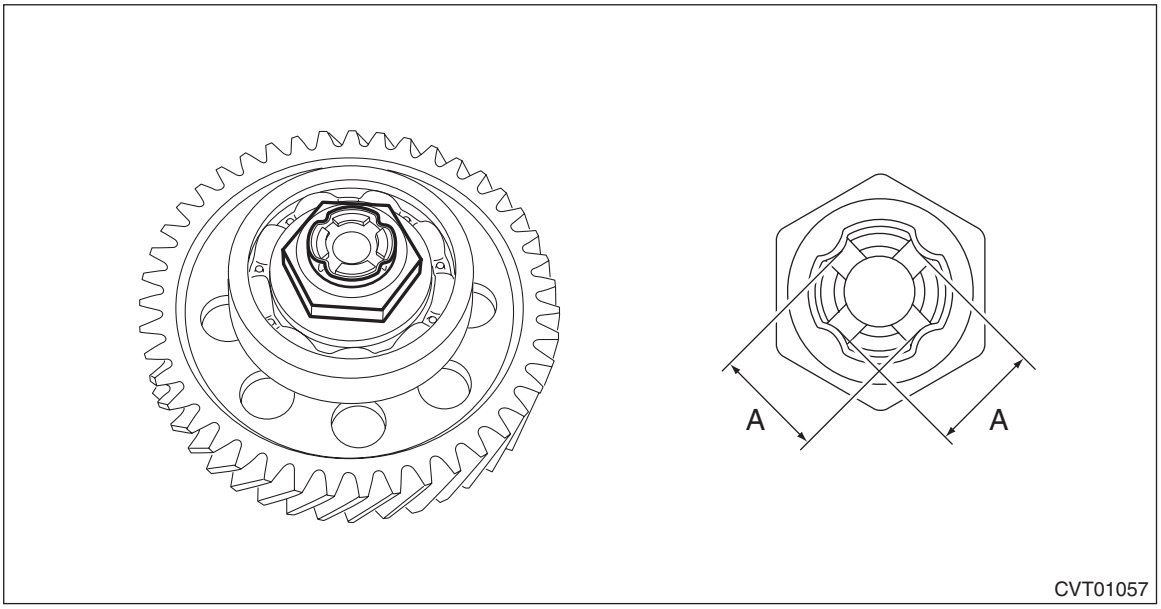
NOTE:
Use a new lock nut.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PIN SET
ST3 499987003 SOCKET WRENCH (35)

Tightening torque:
95 N·m (9.7 kgf-m, 70.1 ft-lb)



6) Crimp the lock nut at four locations so that the dimension of A becomes 18.9 mm (0.74 in) or less.

CAUTION:
Do not allow the lock nut to be cracked during crimping operation.

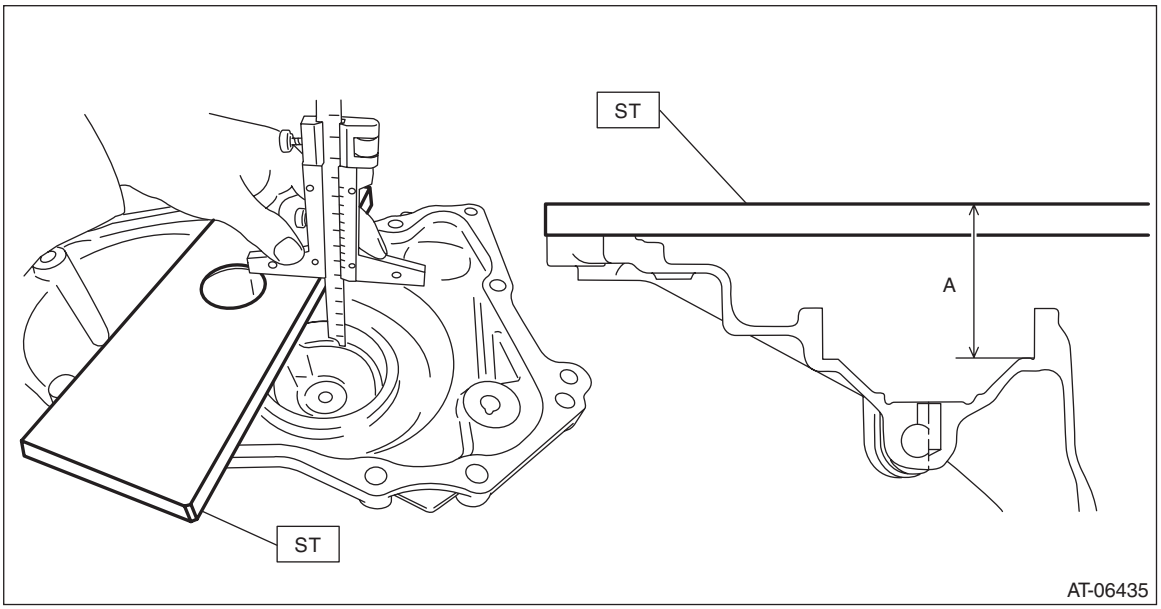


E: INSPECTION

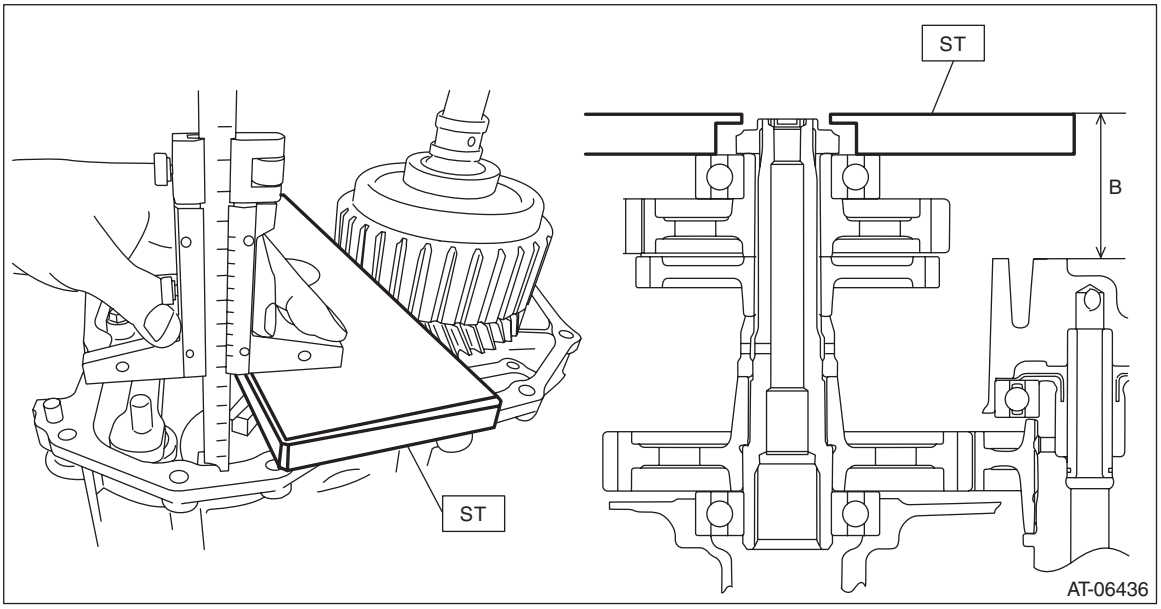
- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Make sure each gear is not broken or damaged.

F: ADJUSTMENT

1) Measure the height “A” from the ST upper face to the ball bearing catch surface.
ST 499575600 GAUGE



2) Measure the height “B” from the ST to the mating surface of the transmission case.
ST 499575600 GAUGE



3) Obtain the thickness of transfer drive gear shim using the following formula to select one to three transfer drive gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Shim thickness
A: Height from the ST upper face to the ball bearing catch surface
B: Height from ST to transmission case mating surface
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

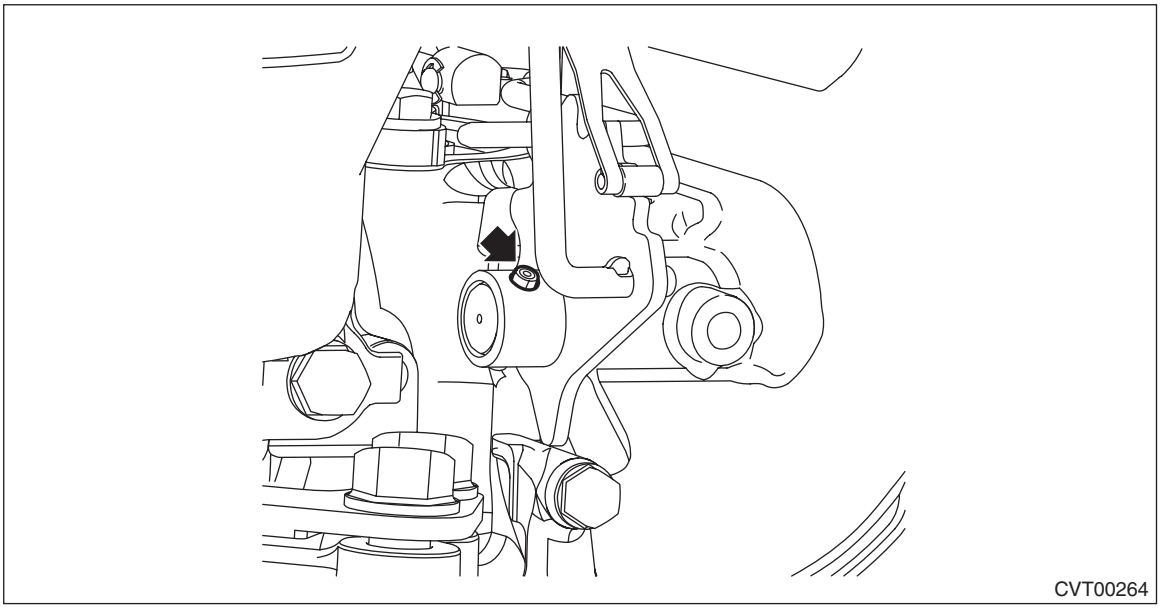
Transfer drive gear shim	
Part No.	Thickness mm (in)
33279AA090	0.3 (0.012)
33279AA100	0.4 (0.016)
33279AA110	0.5 (0.020)

33.Transmission Control Device

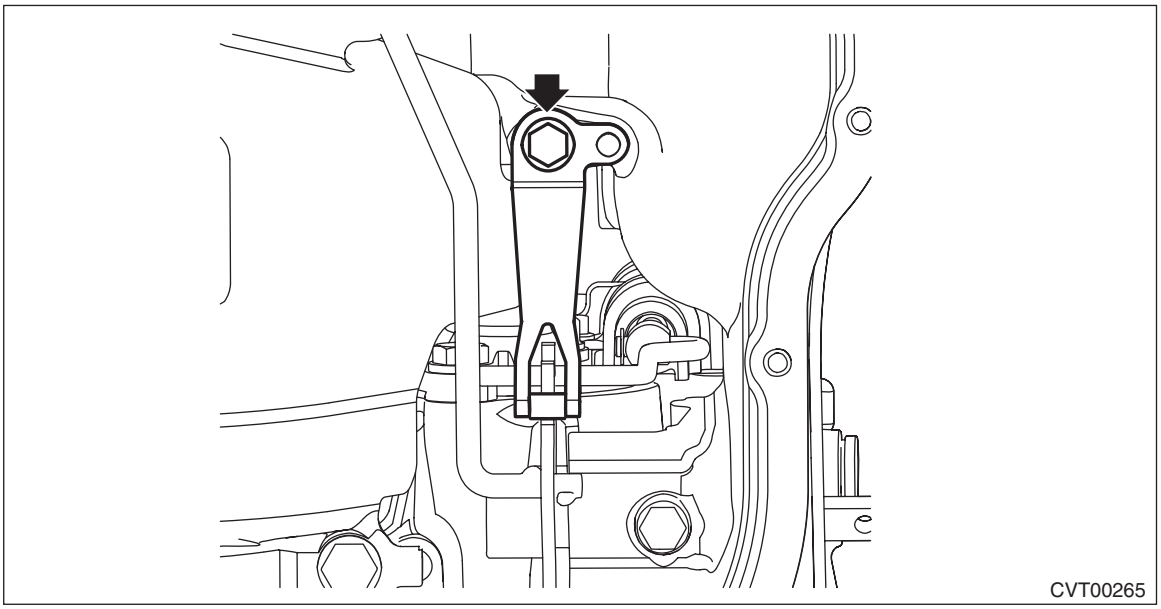
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
3) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
4) Shift the manual plate to “N” range, and remove the spring pin.

NOTE:
Prevent the spring pin from dropping in the transmission using paper towel etc.

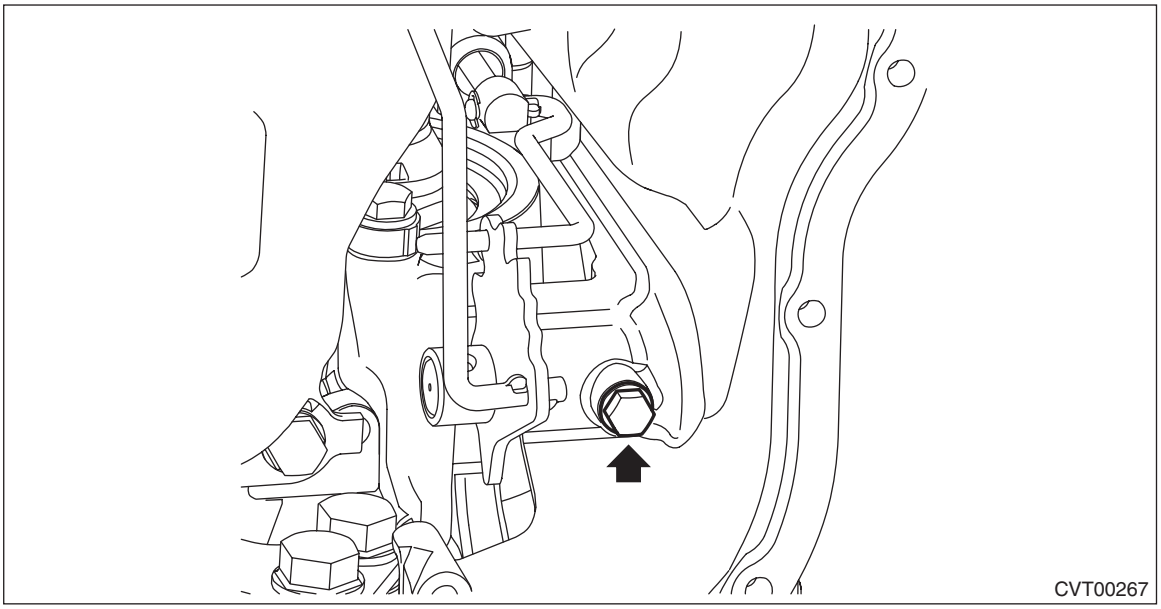

CVT00264

5) Remove the detent spring.

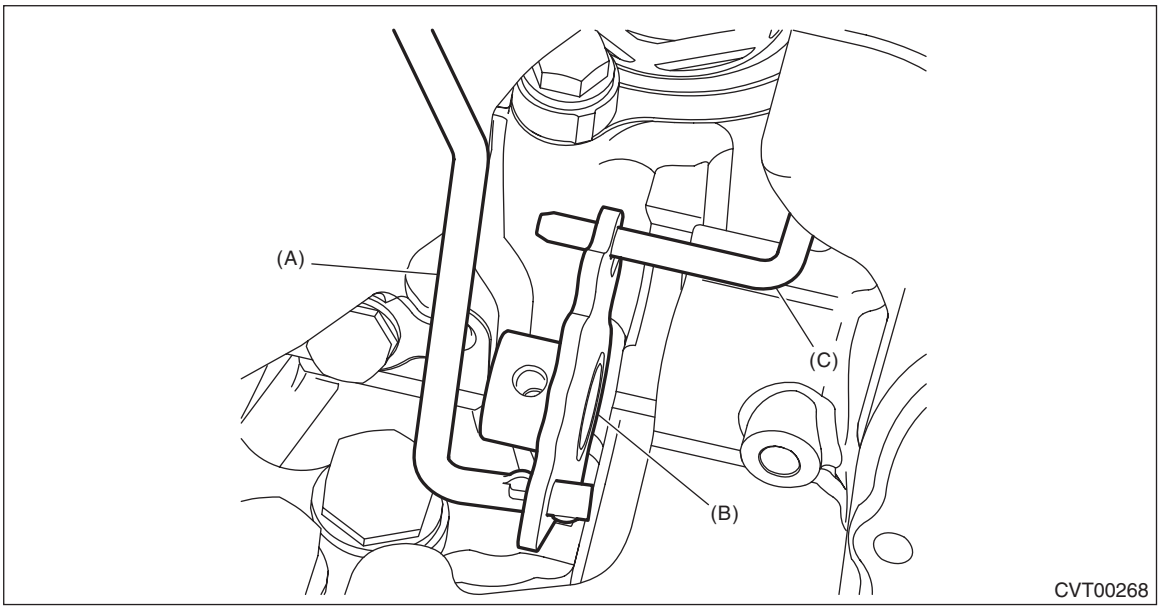

CVT00265

6) Remove the bolt, and remove the shifter arm shaft.

NOTE:
Do not damage the lip of oil seal press-fitted in the case.



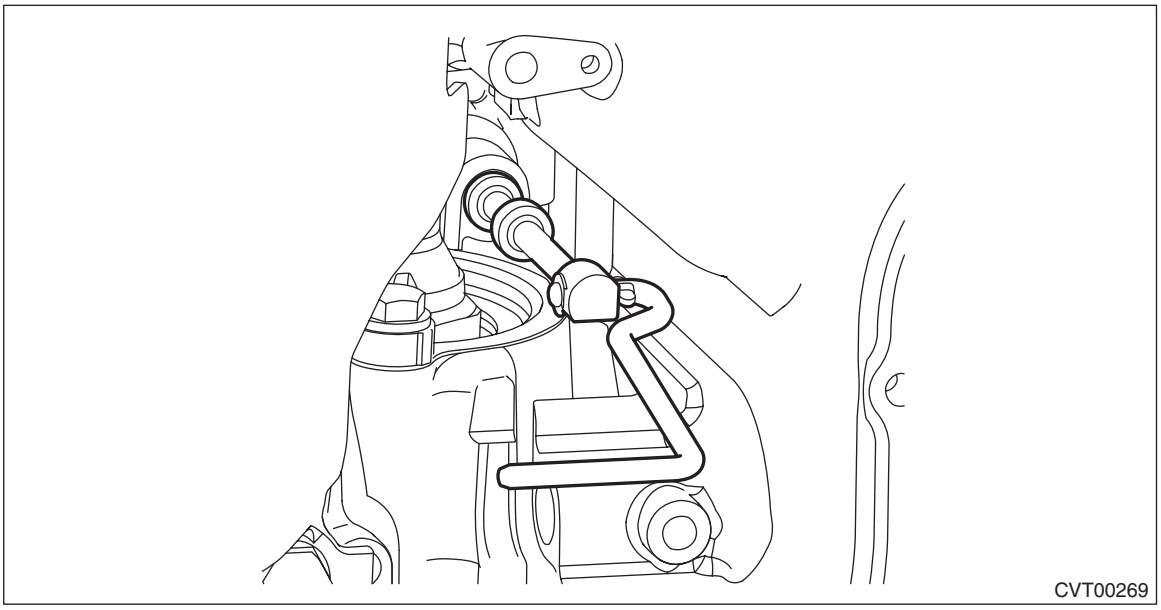
7) Remove the manual plate from the shifter arm shaft, and remove the shift connecting rod of the manual valve.



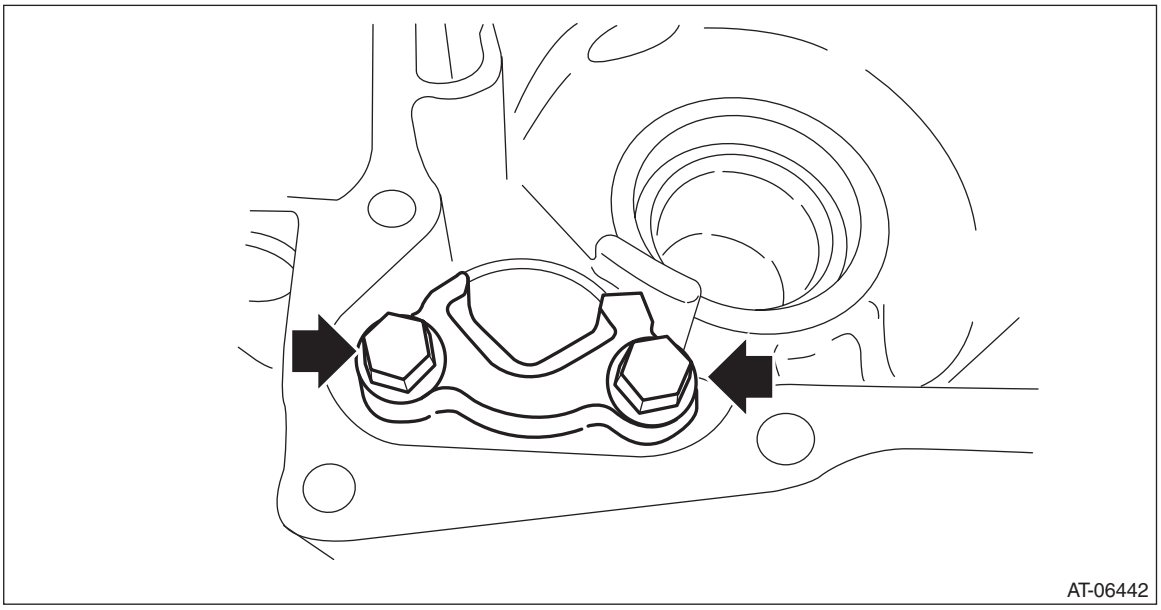
(A) Parking rod
(B) Manual plate
(C) Shift connecting rod

8) Remove the manual plate and parking rod.

9) Remove the manual valve.



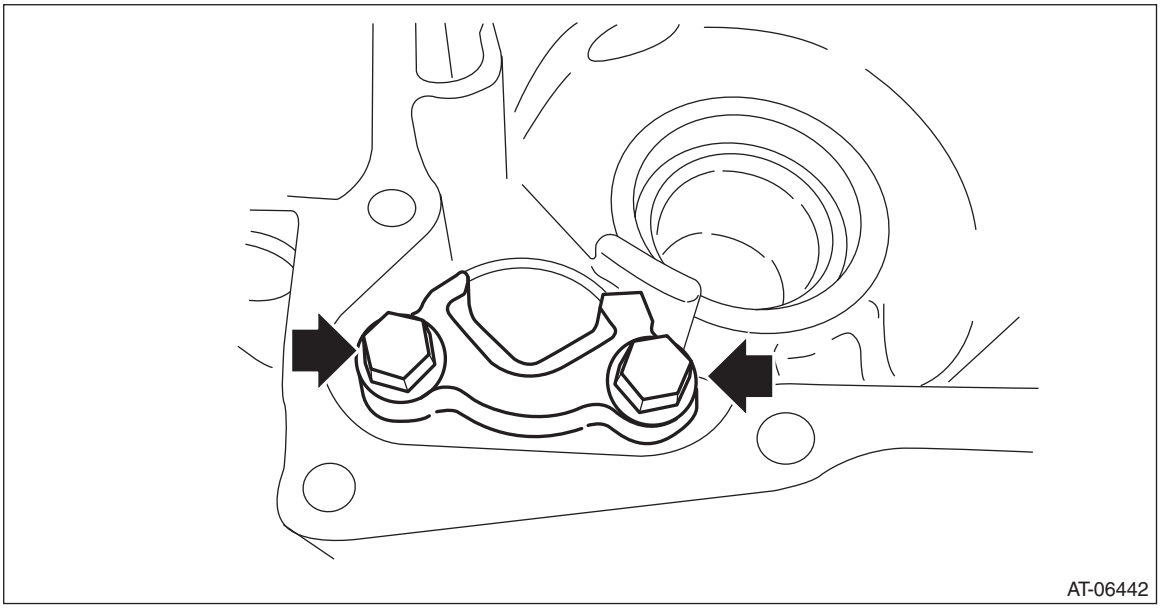
10) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
11) Remove the parking support.



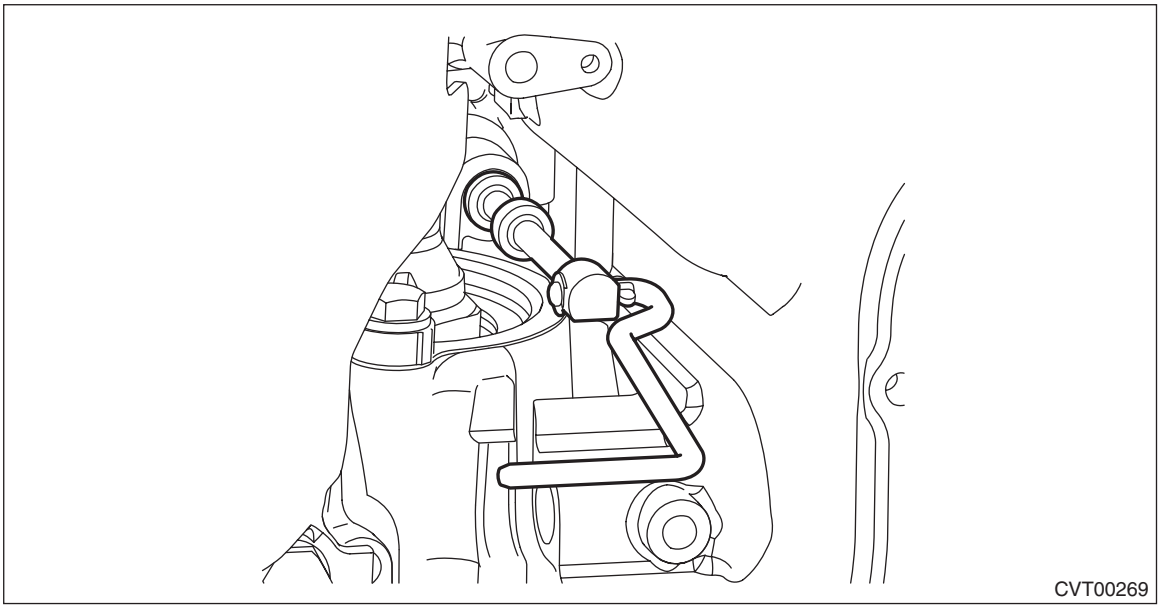
B: INSTALLATION

1) Install the parking support.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

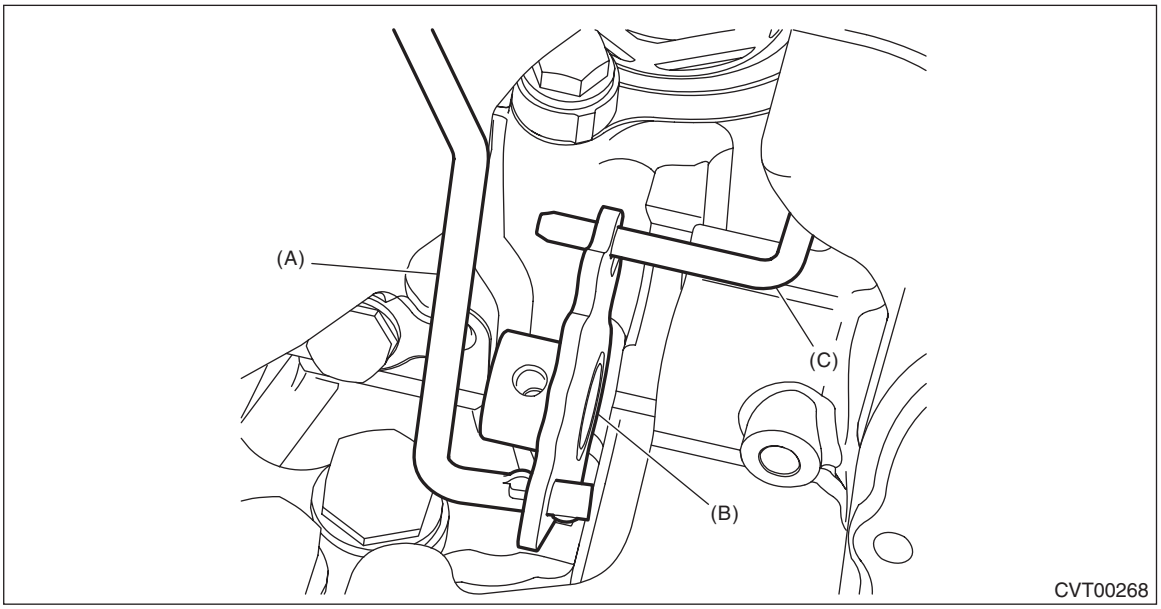


2) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
3) Install the manual valve.



4) Install the parking rod to the manual plate.

5) Insert the parking rod into the transmission case, and install the shift connecting rod of the manual valve to the manual plate.

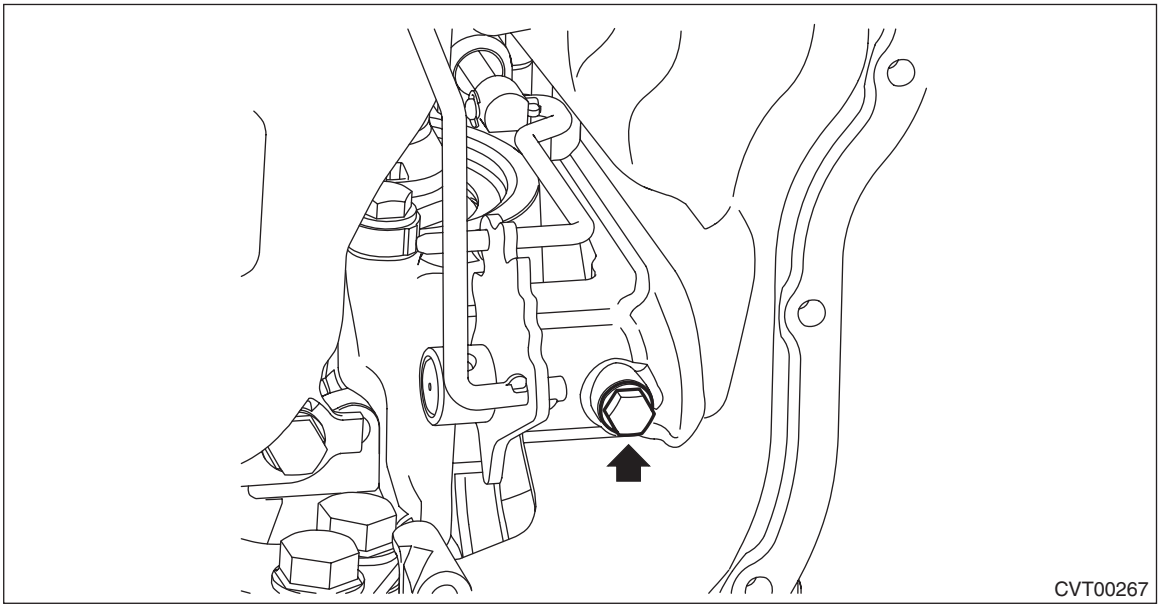


(A) Parking rod
(B) Manual plate
(C) Shift connecting rod

6) Insert the shifter arm shaft to the transmission assembly, install the manual plate to the shifter arm shaft, and secure the shifter arm shaft with a bolt.

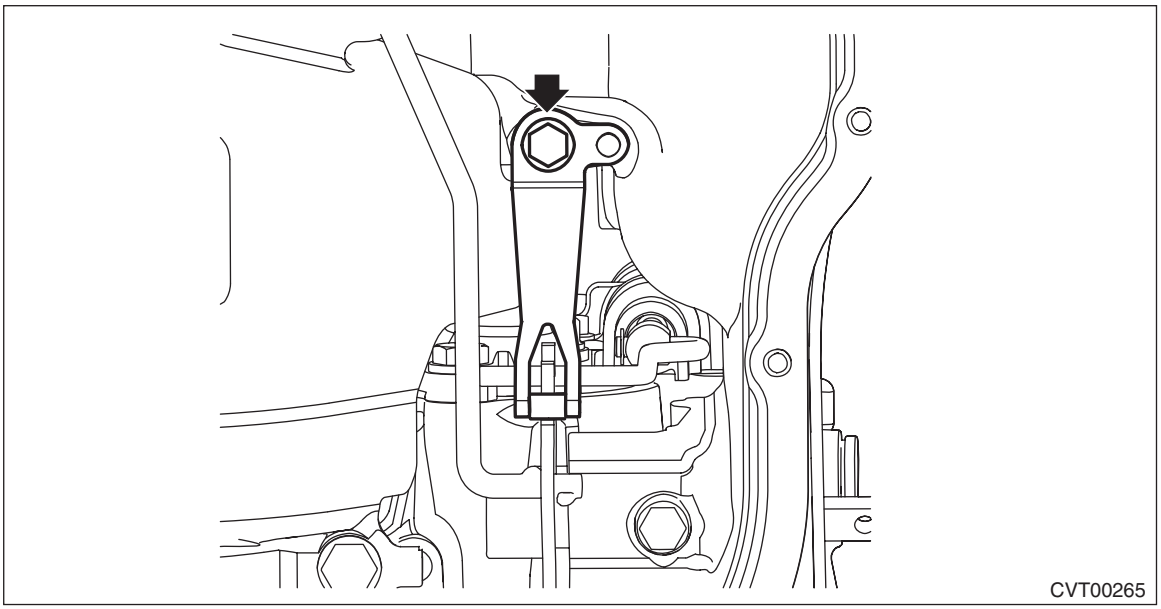
NOTE:
Do not damage the lip of oil seal press-fitted in the case.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



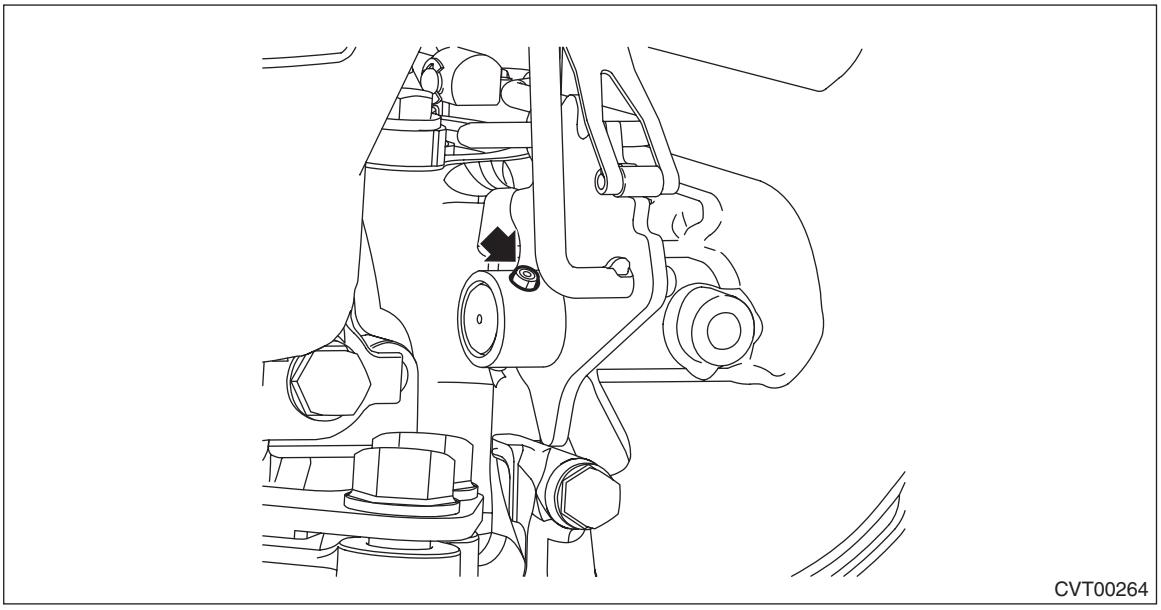
7) Install the detent spring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



8) Install the spring pin.

NOTE:
Use new spring pin.



9) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
10) Adjust the inhibitor switch. <Ref. to CVT(TR580)-102, ADJUSTMENT, Inhibitor Switch.>
11) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>
12) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

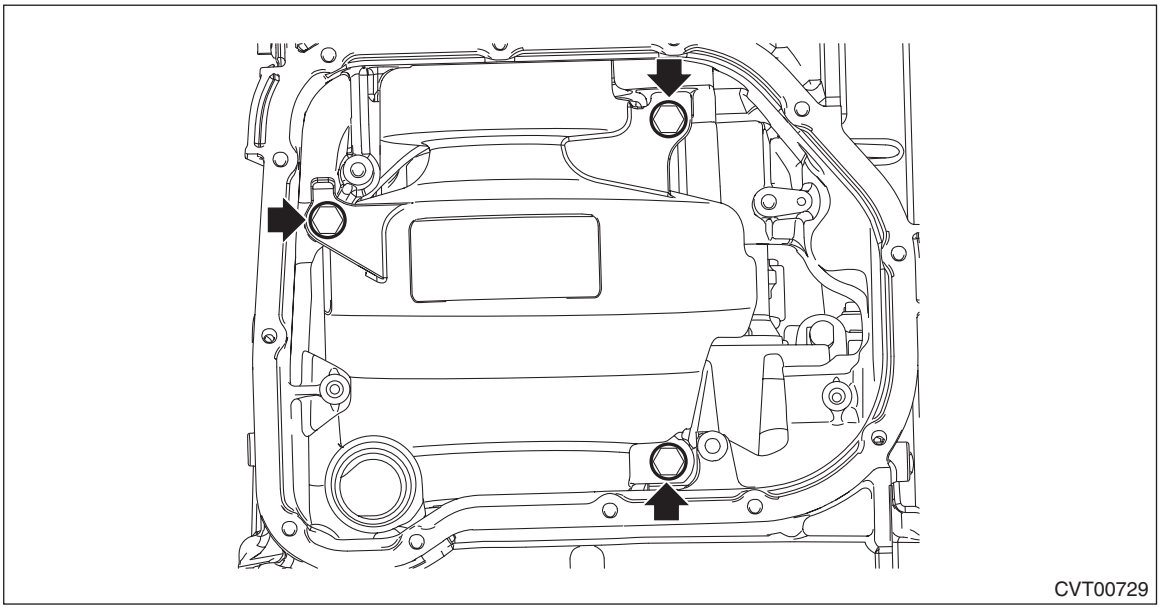
C: INSPECTION

Make sure that the manual plate and detent spring are not worn or otherwise damaged.

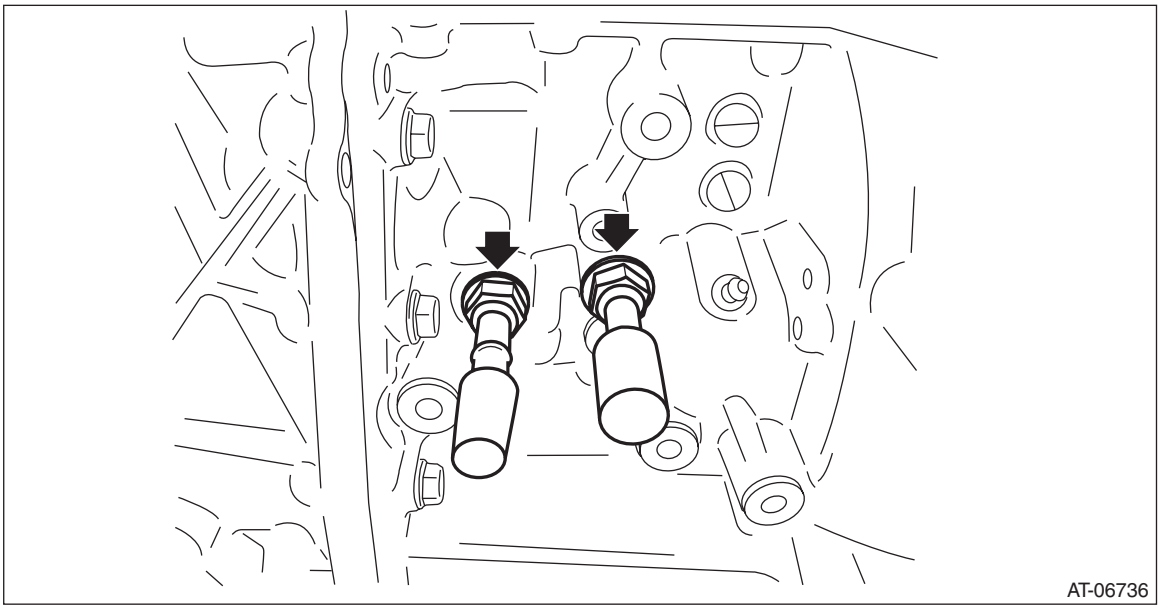
34.Transmission Case

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-162, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-121, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-136, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-107, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-109, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-112, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-197, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Control Device.>
16) Remove the oil baffle securing bolt.



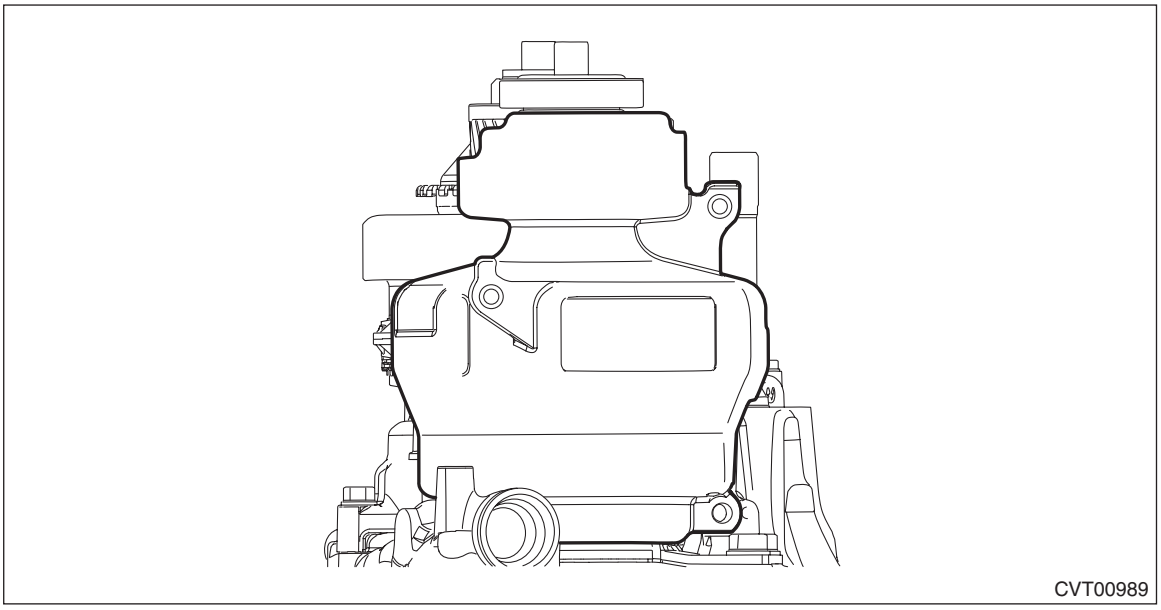
17) Remove the oil cooler pipe.



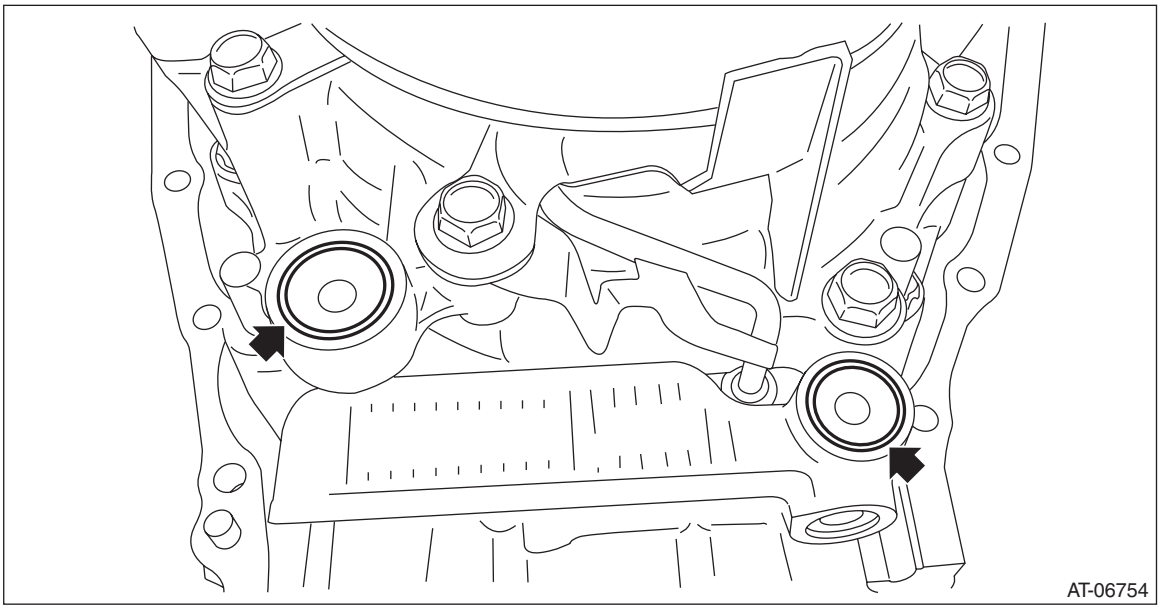
18) Remove the transmission case.

NOTE:
The total number of transmission case mounting bolts is 15.

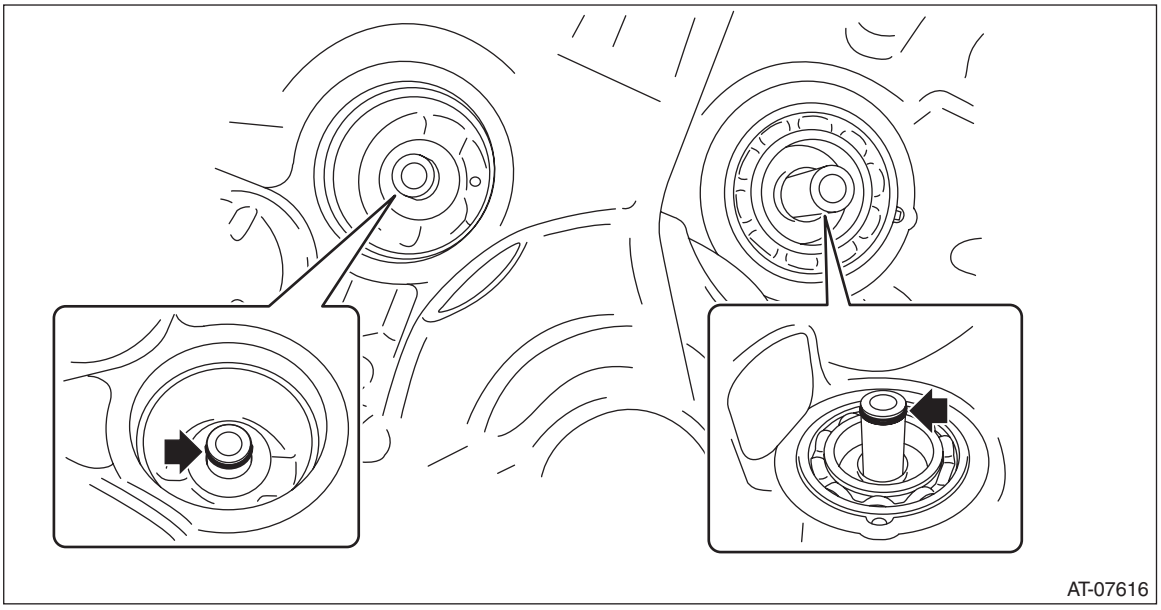
19) Remove the oil baffle.



20) Remove the O-ring.



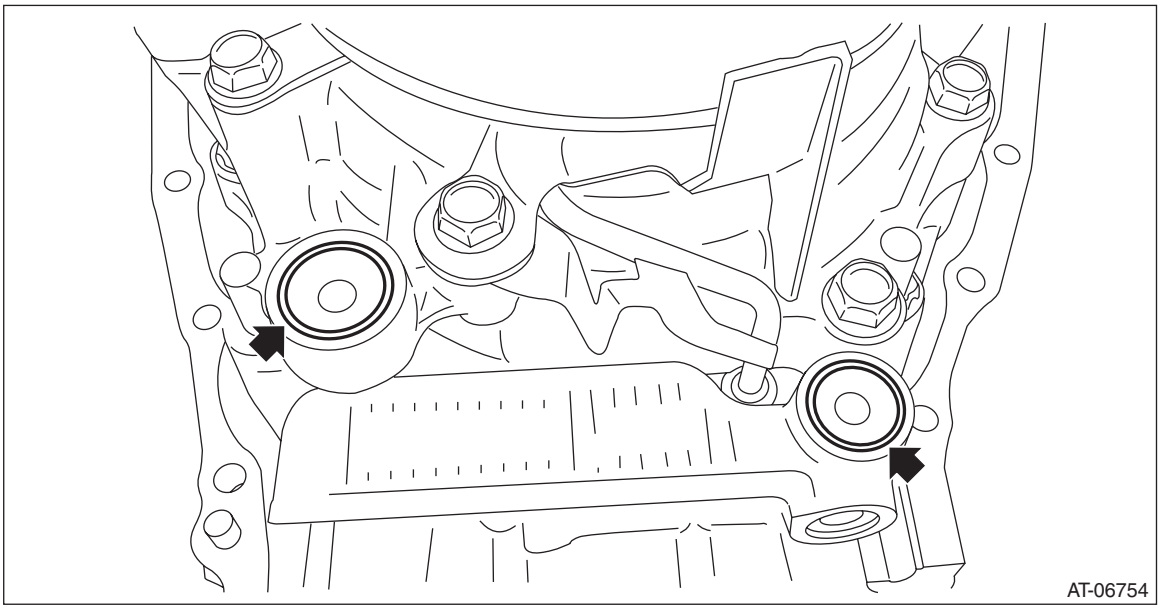
21) Remove the seal ring from the transmission case.



B: INSTALLATION

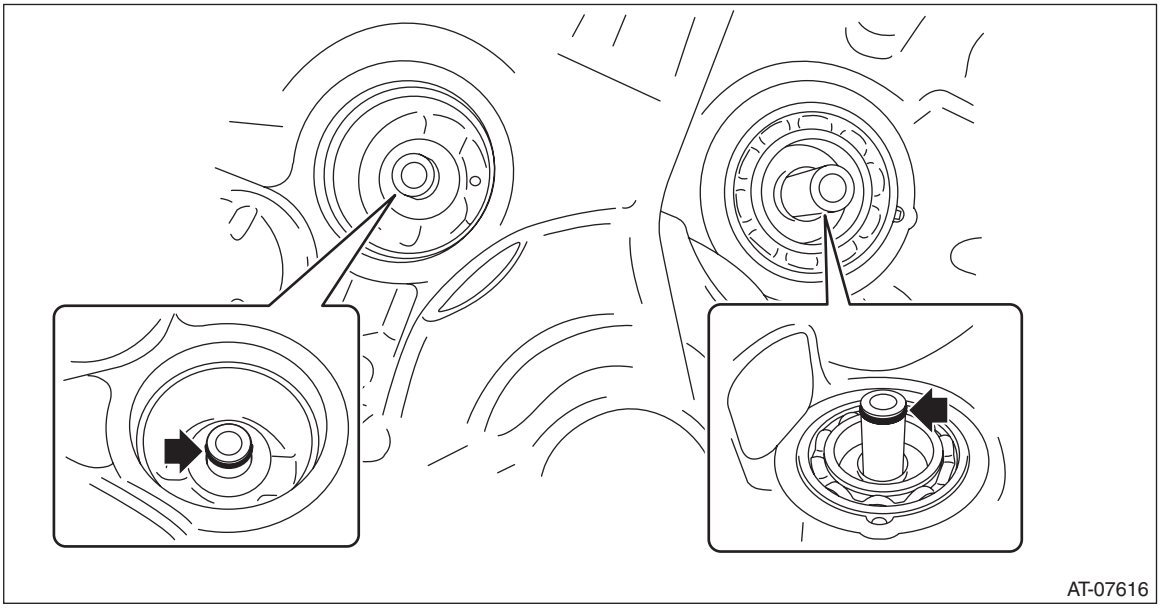
1) Clean the mating surface of transmission case and converter case.
2) Select the reduction gear shim. <Ref. to CVT(TR580)-232, ADJUSTMENT, Reduction Drive Gear.>
3) Remove the transmission case, and install the selected reduction gear shim to the reduction drive gear.
4) Install the O-rings to the reverse clutch housing and drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

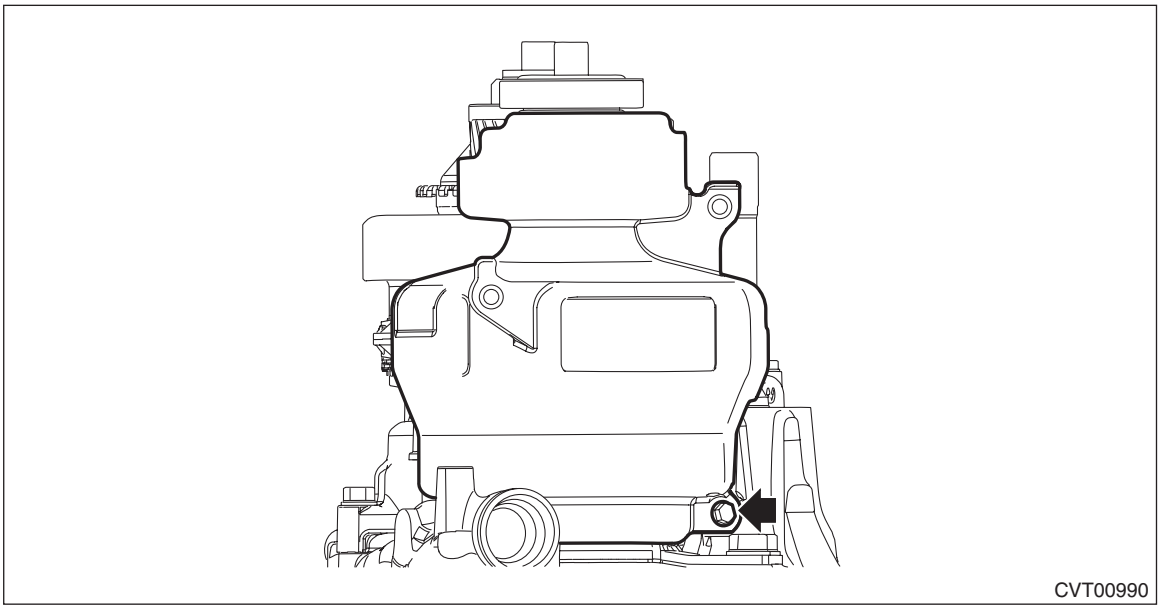


5) Install the seal ring to the transmission case.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.

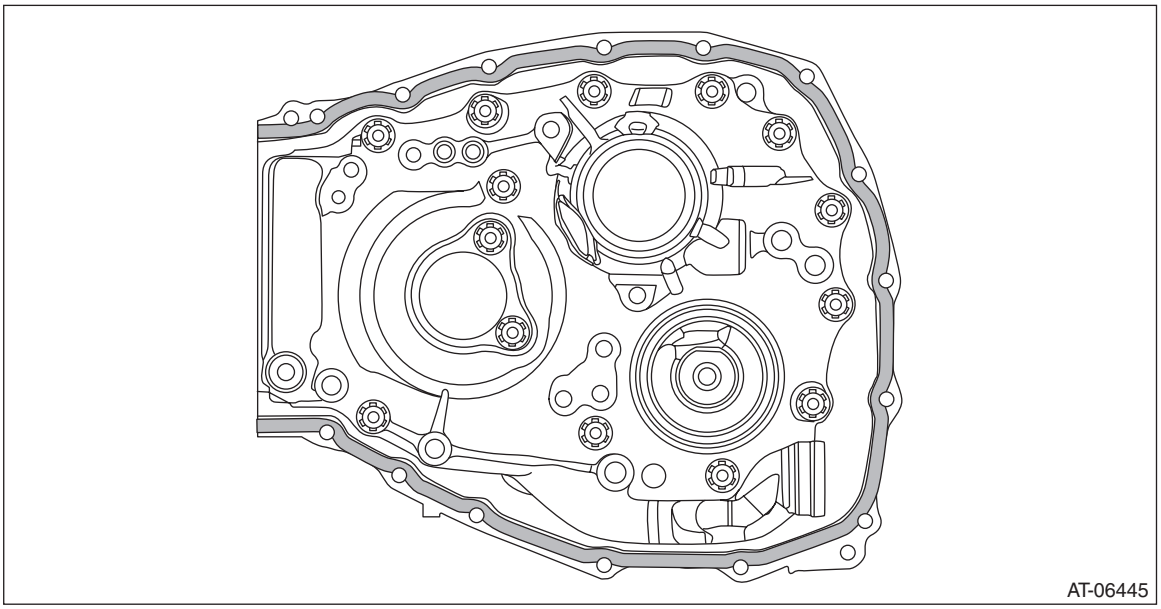


6) Cover the secondary pulley with the oil baffle, and temporarily install it with bolts.



7) Apply liquid gasket seamlessly to the mating surface of transmission case.

Liquid gasket:
THREE BOND 1215B or equivalent



8) Install the transmission case.

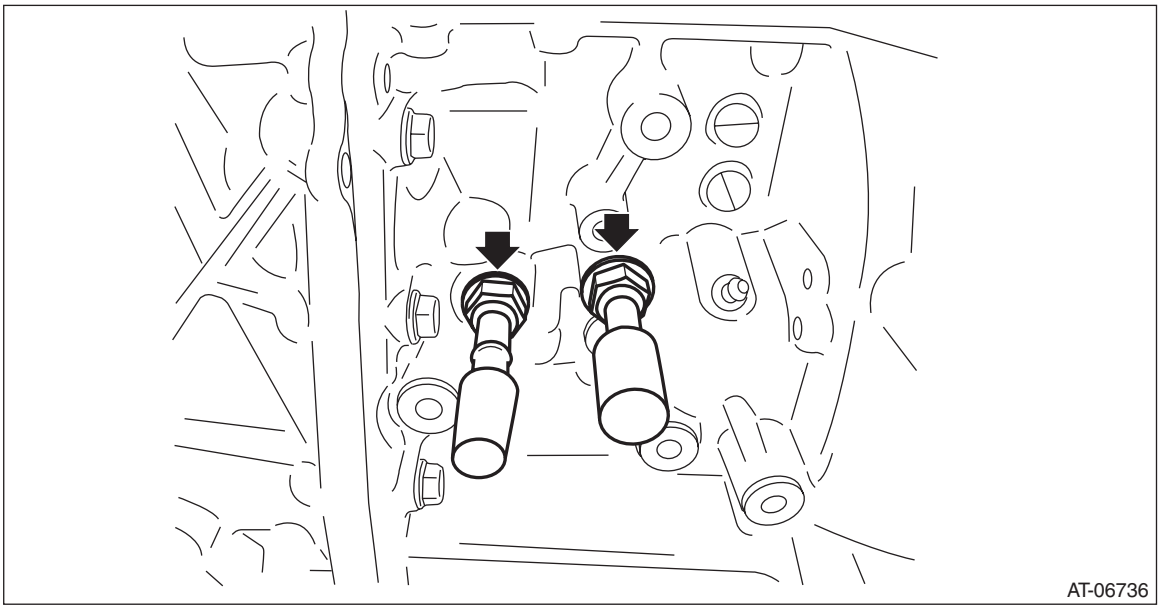
NOTE:
The total number of transmission case mounting bolts is 15.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

9) Install the oil cooler pipe.

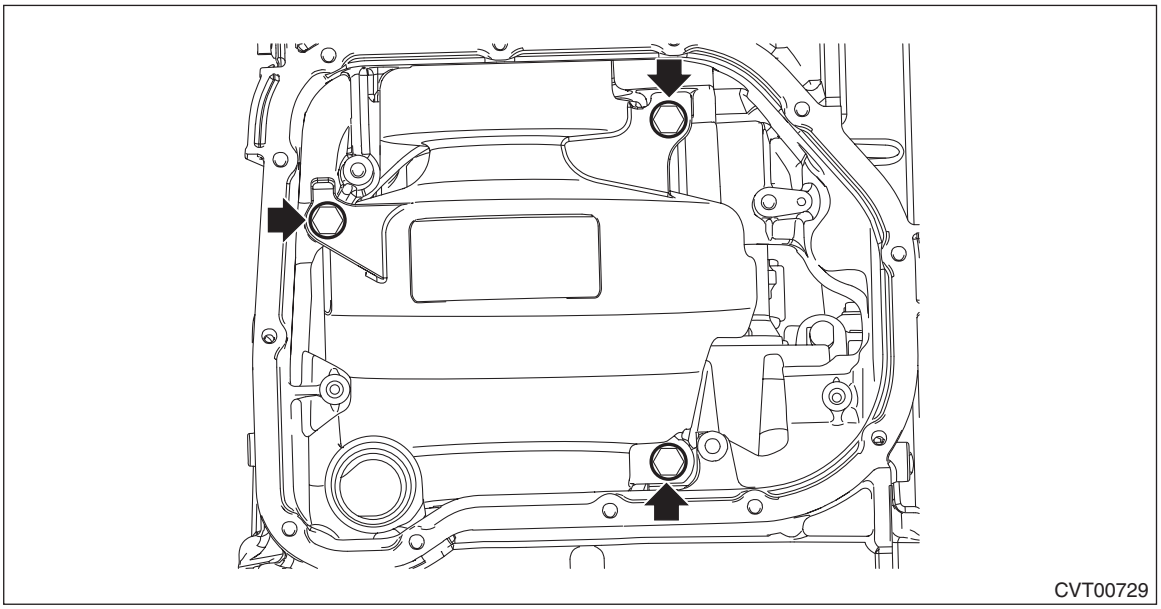
NOTE:
Use new O-rings.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



10) Install the oil baffle securing bolt.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)

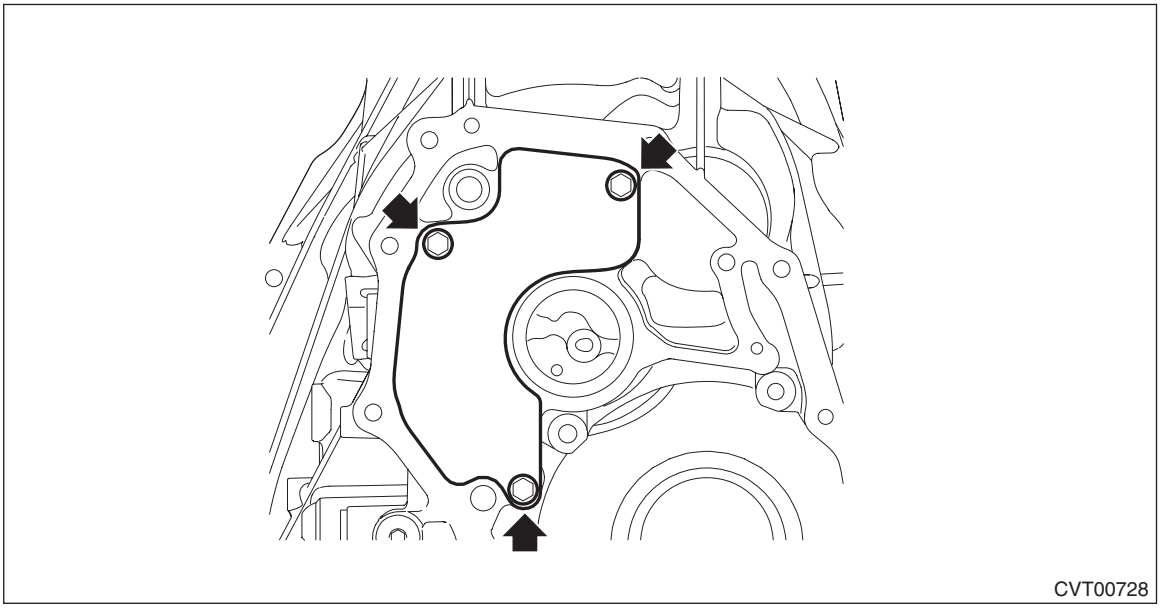


11) Install the transmission control device. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Control Device.>
12) Install the oil pan and oil strainer. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>
13) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-197, INSTALLATION, Reduction Driven Gear.>
14) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>
15) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>
16) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>

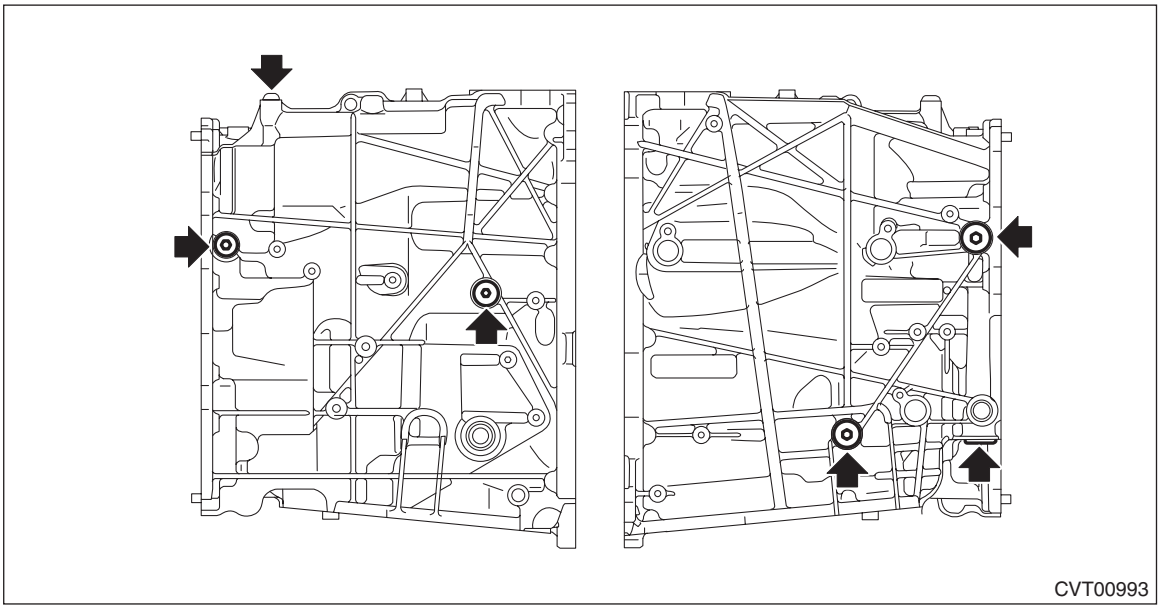
17) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
18) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
19) Install the secondary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Secondary Speed Sensor.>
20) Install the primary speed sensor. <Ref. to CVT(TR580)-113, INSTALLATION, Primary Speed Sensor.>
21) Install the turbine speed sensor. <Ref. to CVT(TR580)-107, INSTALLATION, Turbine Speed Sensor.>
22) Install the transmission harness. <Ref. to CVT(TR580)-143, INSTALLATION, Transmission Harness.>
23) Install the control valve body. <Ref. to CVT(TR580)-127, INSTALLATION, Control Valve Body.>
24) Install the air breather hose. <Ref. to CVT(TR580)-164, INSTALLATION, Air Breather Hose.>
25) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

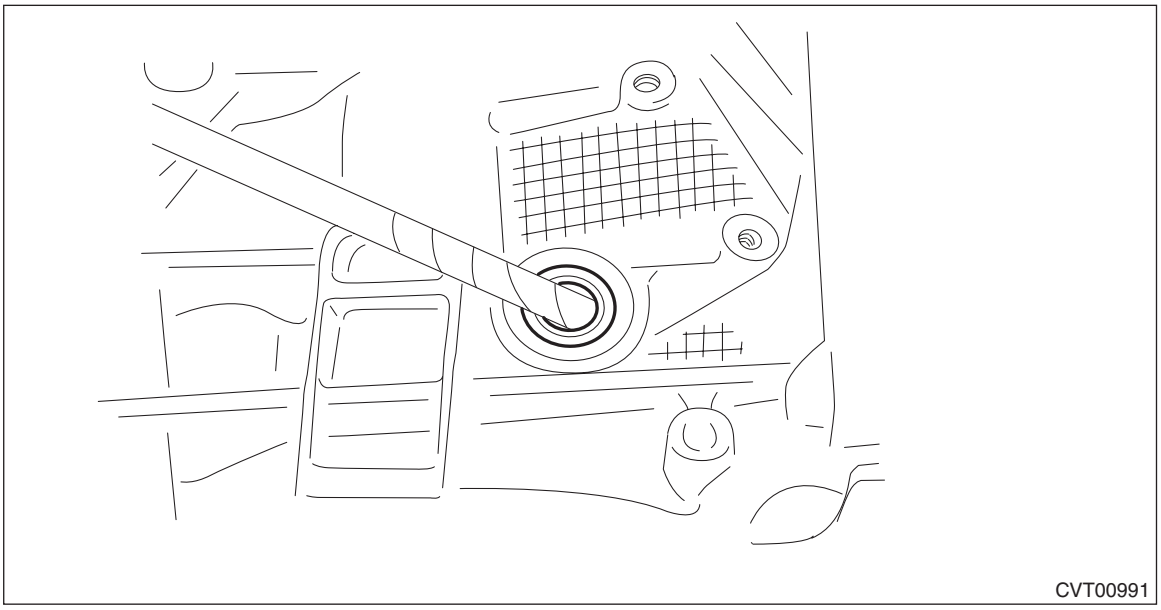
1) Remove the oil stopper plate.


CVT00728

2) Remove all plugs from the transmission case.

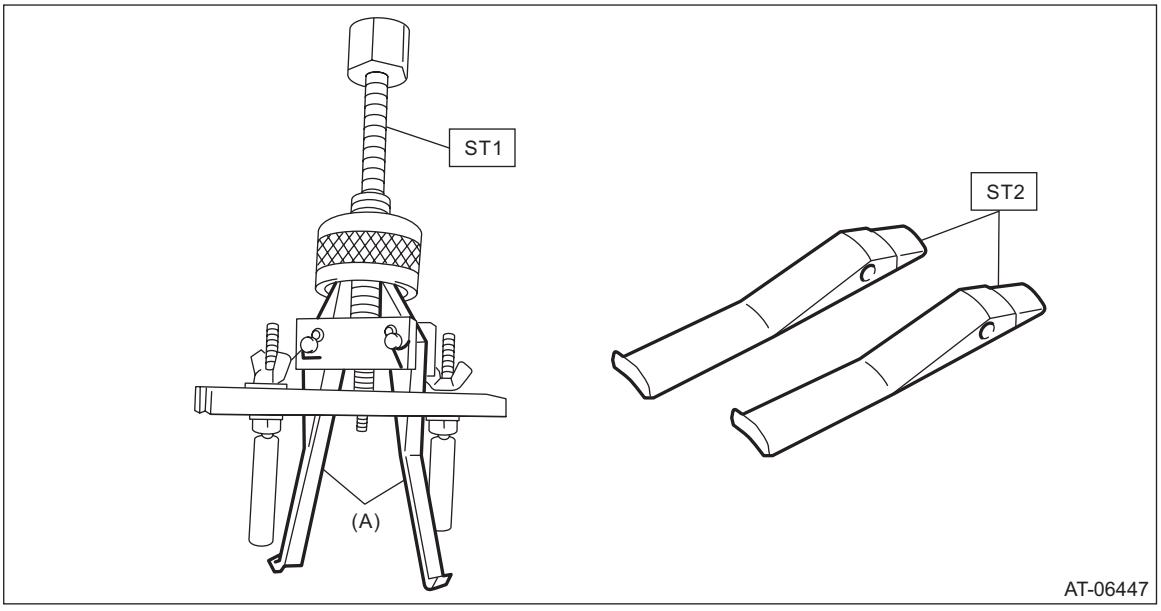

CVT00993

3) Remove the oil seal using a screwdriver wrapped with cloth etc.



4) Using the ST, remove the ball bearing of the secondary pulley.
(1) Remove the claw of ST1, and attach the claw of ST2.

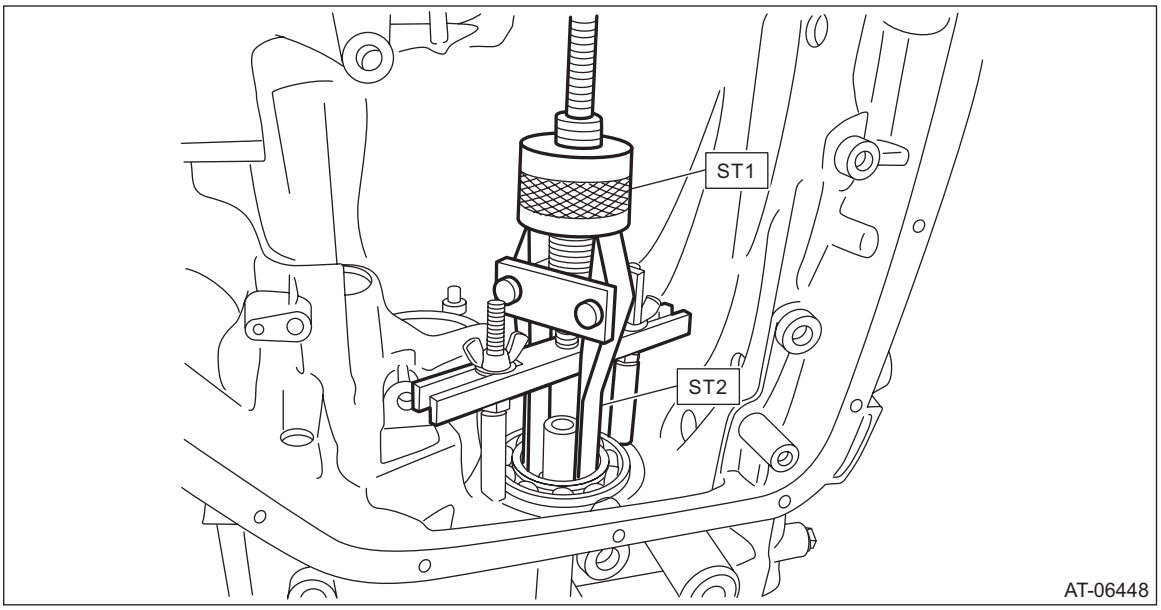
ST1 398527700 PULLER ASSY
ST2 18760AA000 CLAW



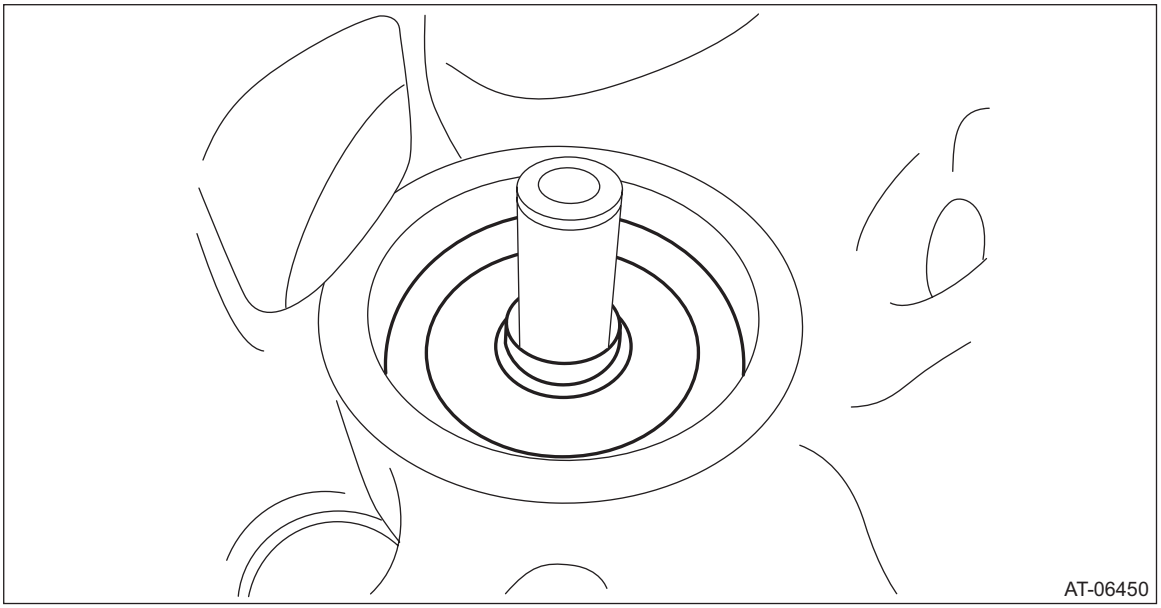
(A) Claw

(2) Using the ST, remove the ball bearing of the secondary pulley.

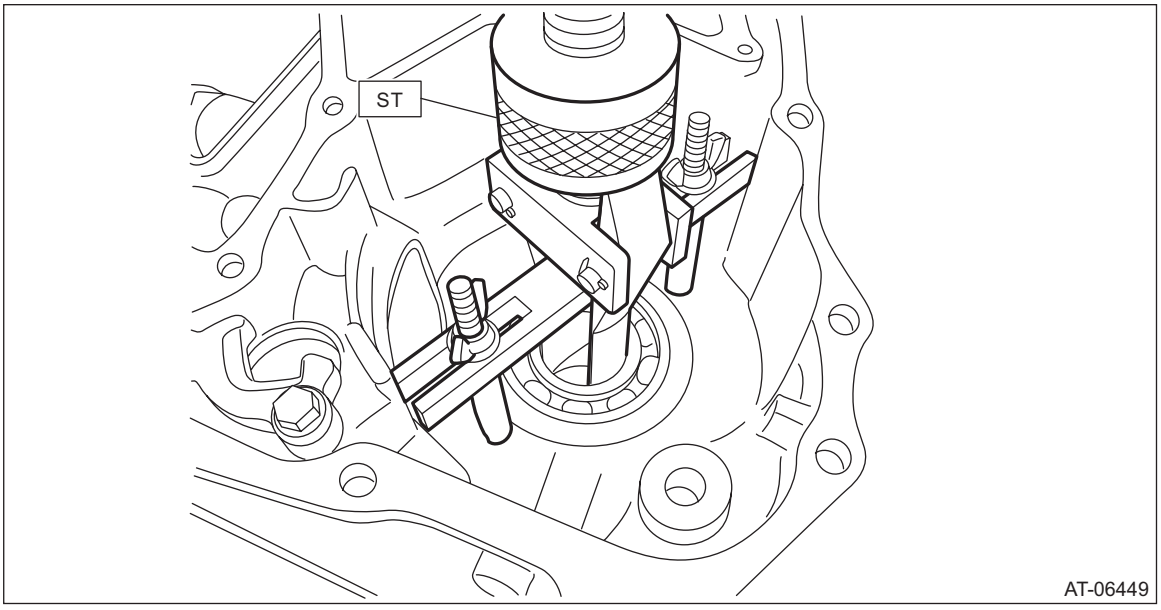
ST1 398527700 PULLER ASSY
ST2 18760AA000 CLAW



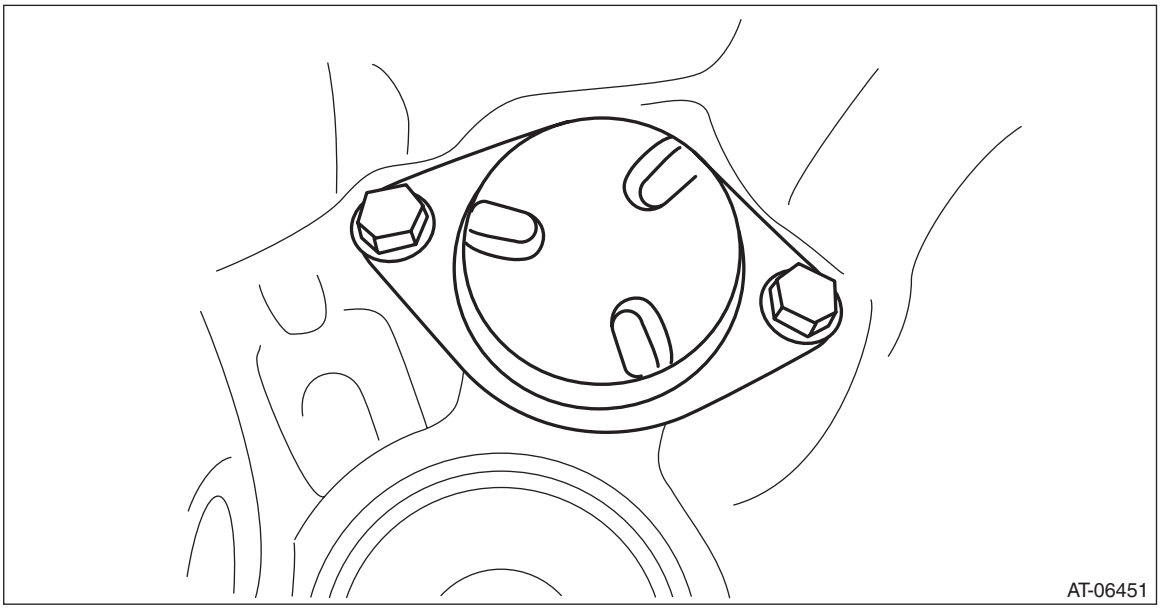
5) Remove the oil guide.



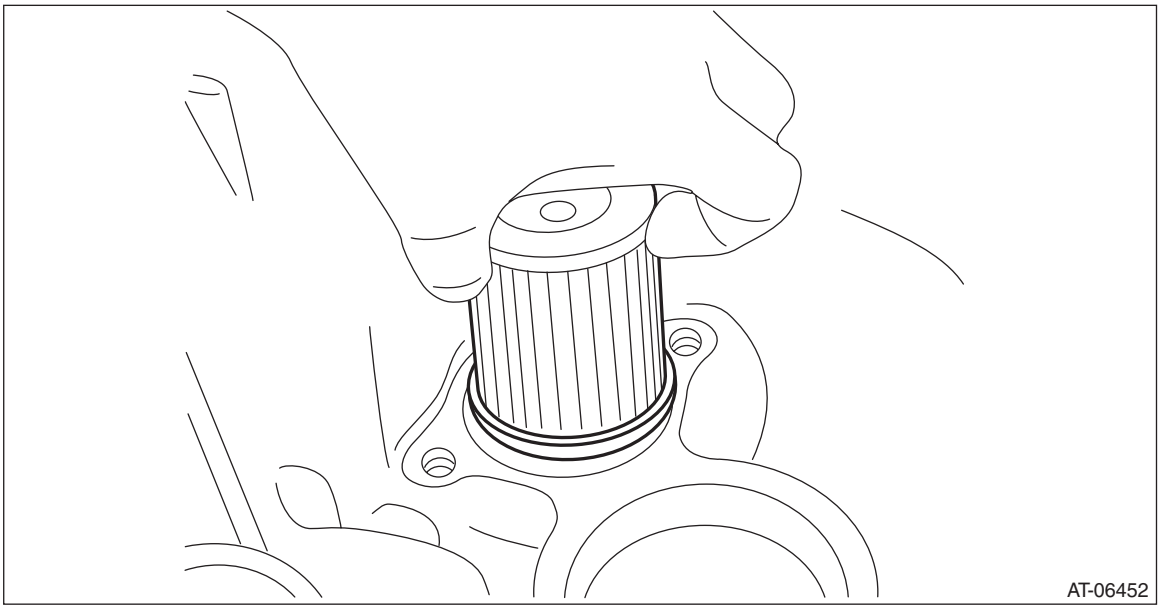
6) Remove the ball bearing from reduction driven gear using ST.
ST 398527700 PULLER ASSY



7) Remove the CVTF filter cover and gasket.



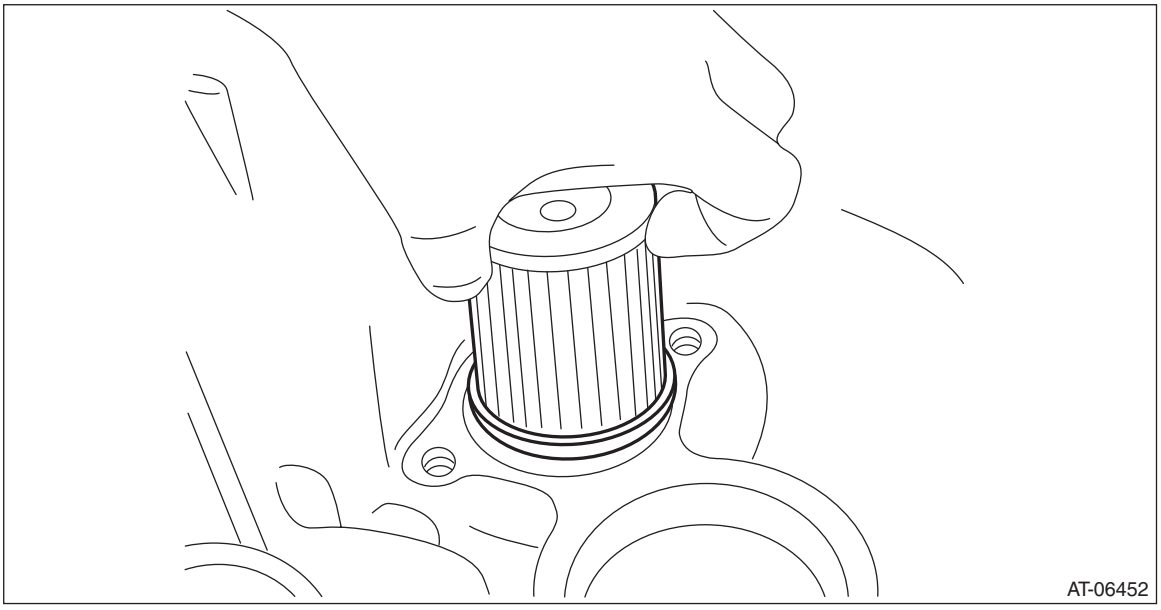
8) Remove the CVTF filter.



D: ASSEMBLY

1) Face the O-ring side of the CVTF filter to the transmission case side, and install the CVTF filter.

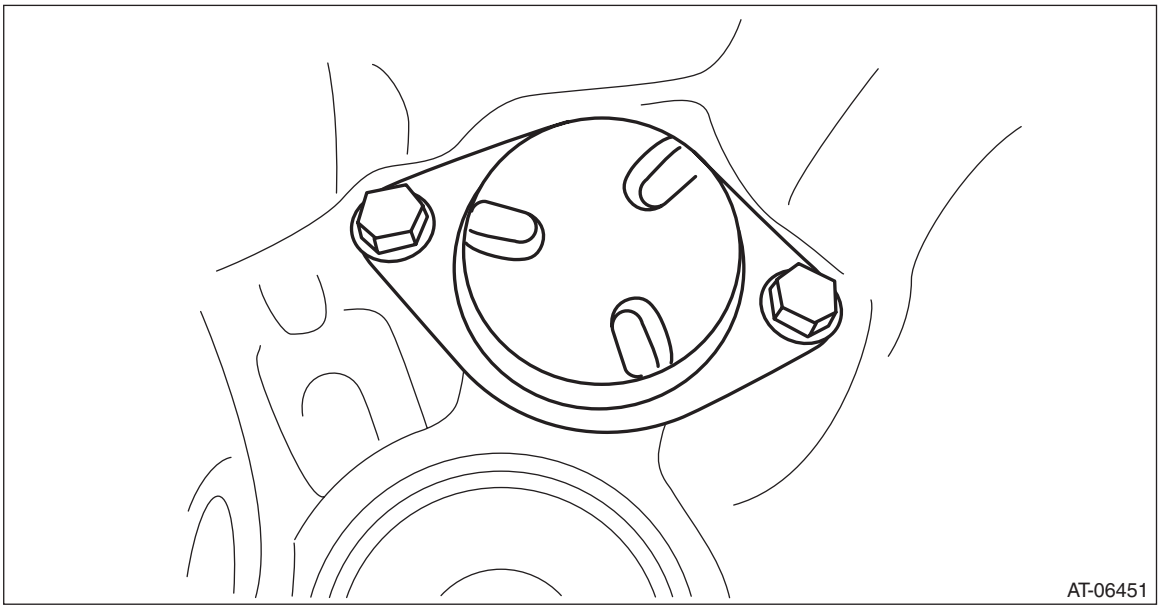
NOTE:
Apply CVTF to the O-ring of CVTF filter.



2) Install the CVTF filter cover and gasket.

NOTE:
Use a new gasket.

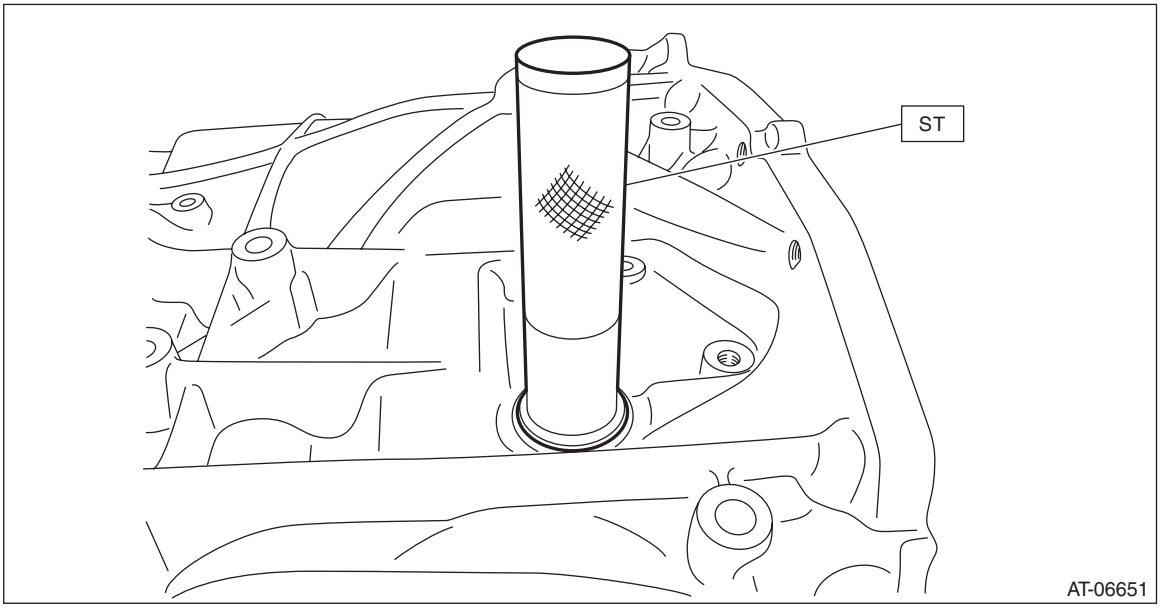
Tightening torque:
17 N·m (1.7 kgf-m, 12.5 ft-lb)



3) Using the ST, install the oil seal.

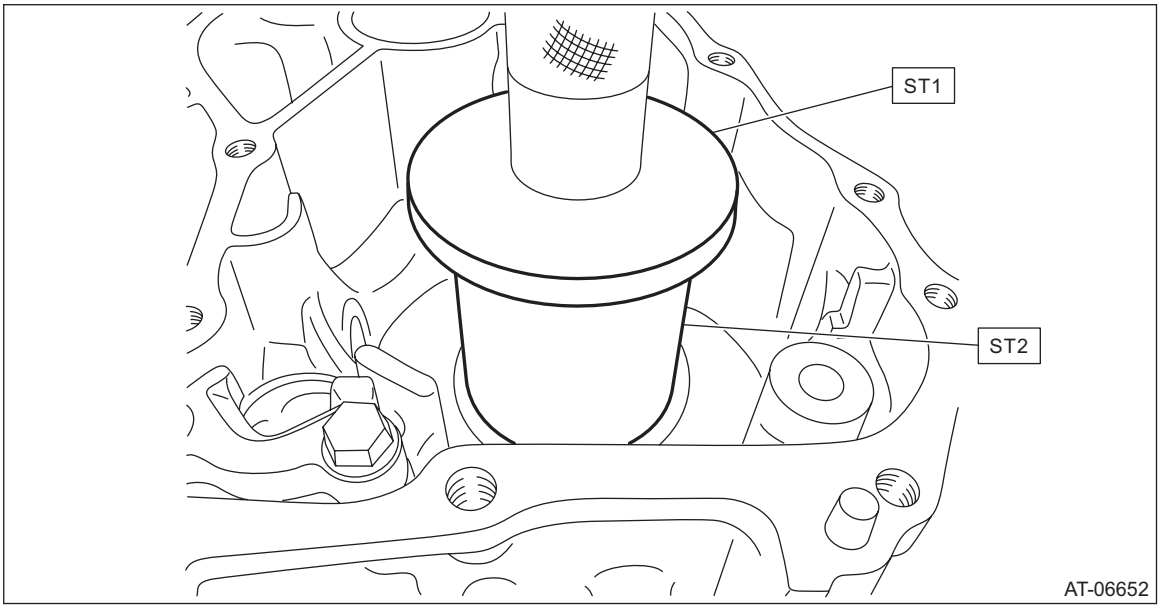
NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

ST 18657AA000 INSTALLER

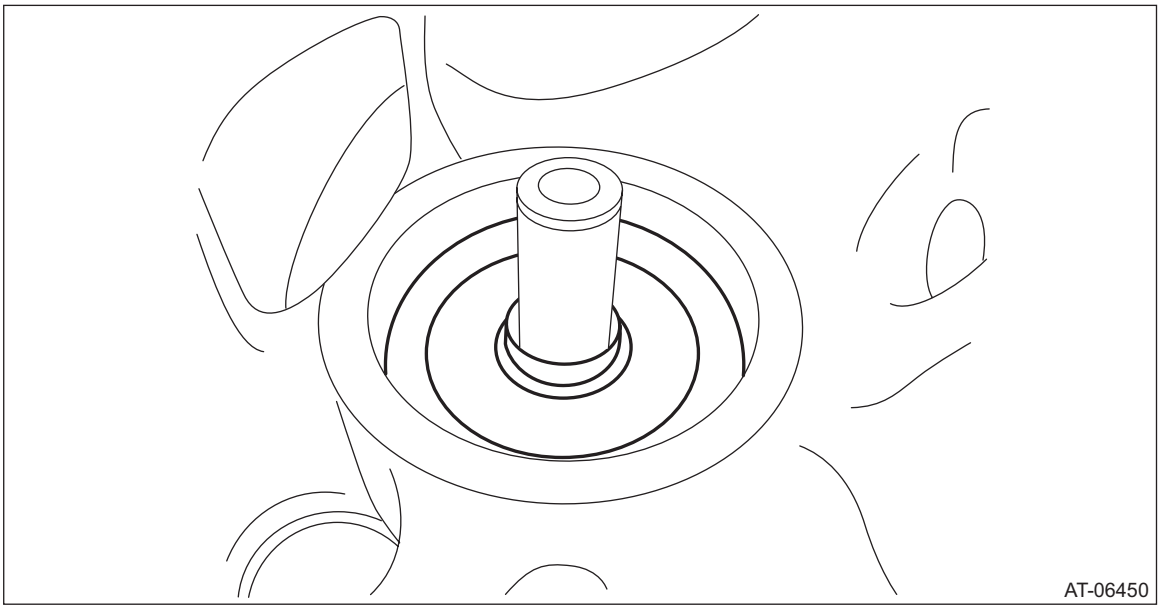


4) Using ST1 and ST2, install the ball bearing on the reduction driven gear side.

NOTE:
Use a new ball bearing.
ST1 398177700 INSTALLER
ST2 28499TC010 PRESS SNAP RING

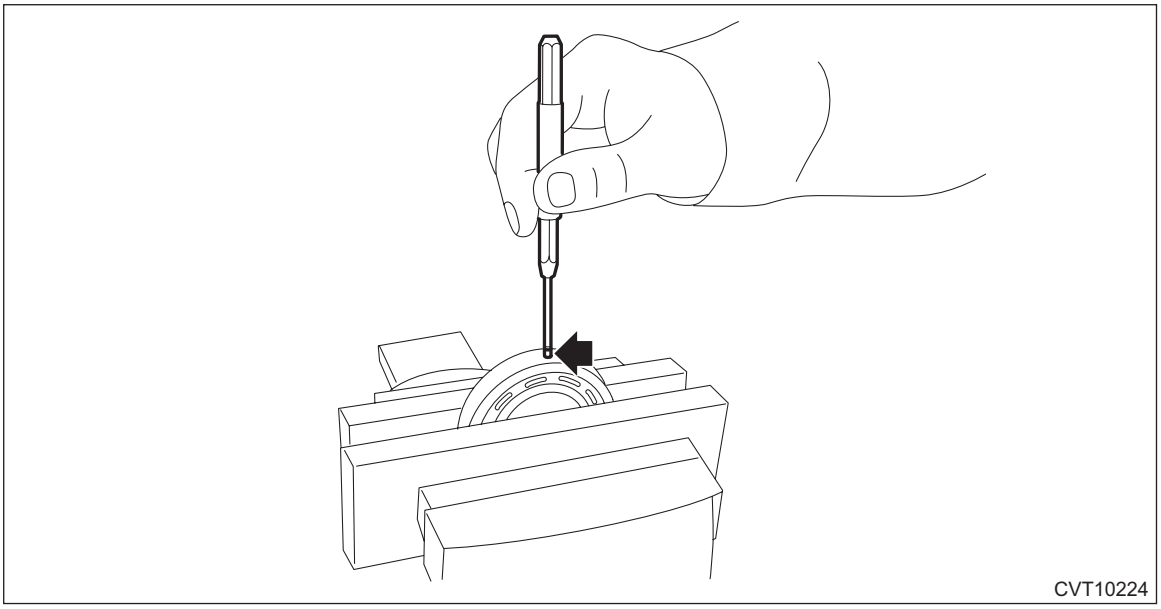


5) Install the oil guide.



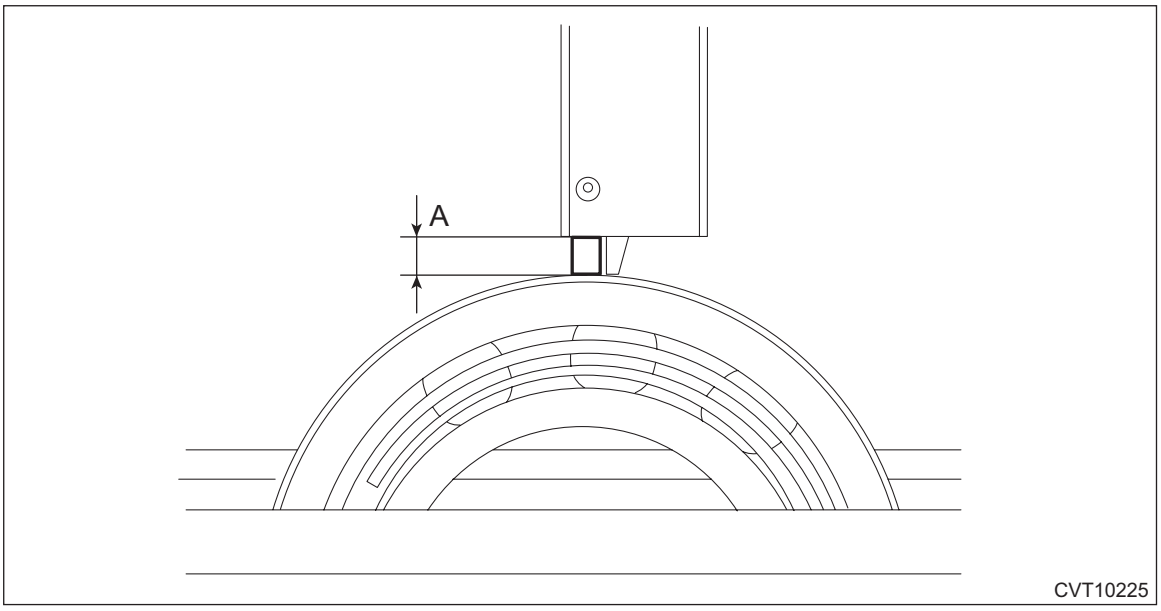
6) Press-fit the roll pin into the ball bearing on the secondary pulley side.
(1) Hold the roll pin with a knock pin punch or the like, and press-fit with a hammer.

NOTE:
- Use a new ball bearing.
- When securing the ball bearing with a vise, place a wood piece therebetween to avoid scratching the bearing race.



(2) Measure the height “A” of the roll pin.

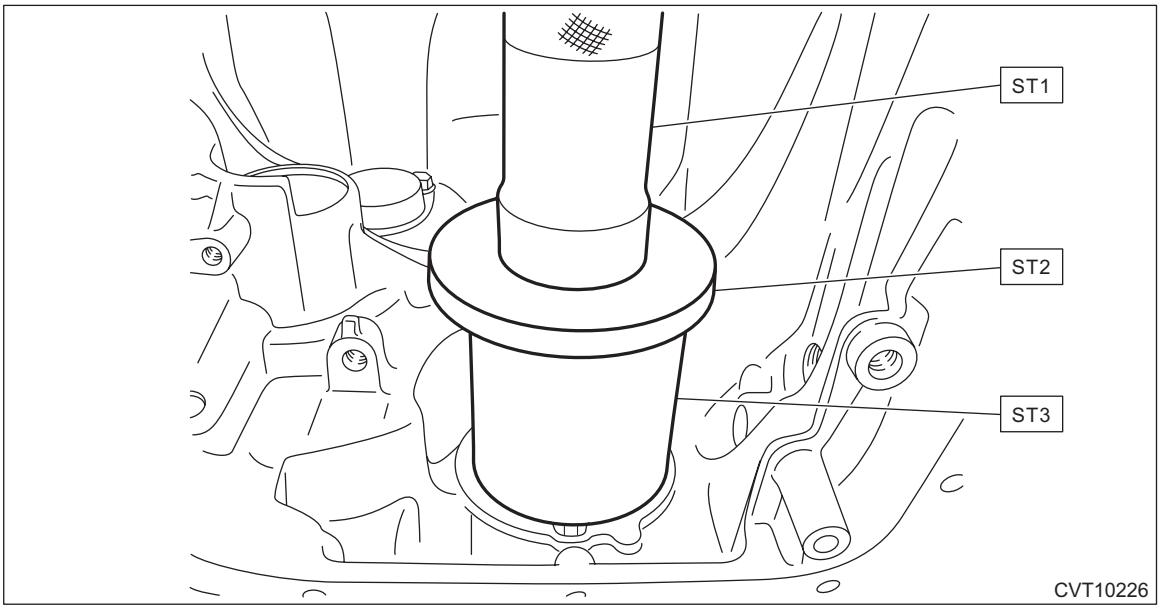
Specification:
4.4 mm (0.173 in) or less

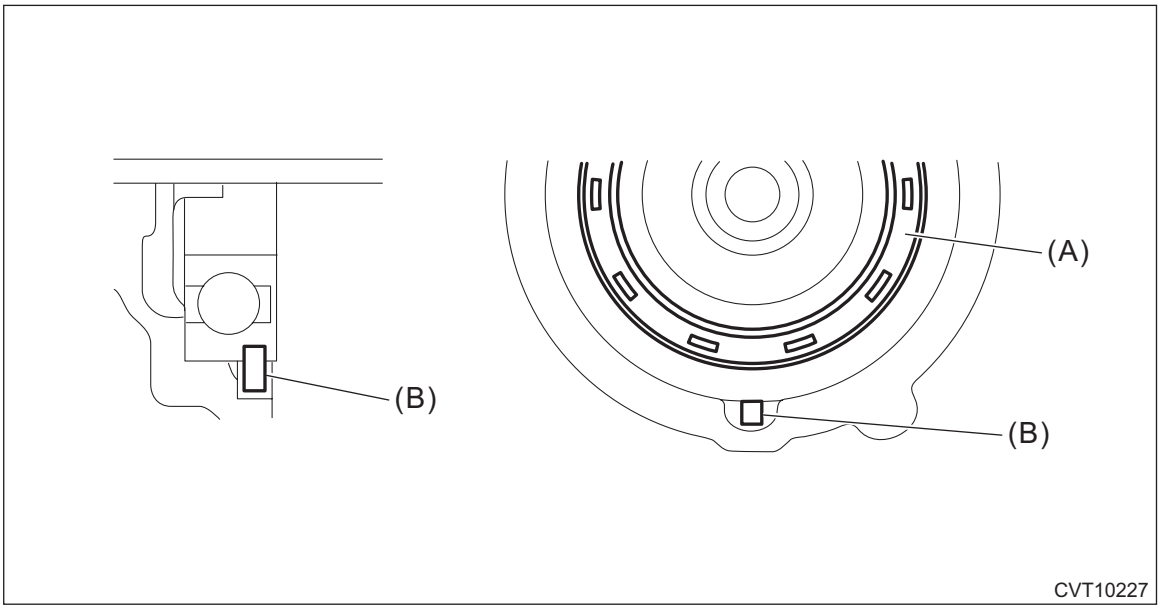


7) Using ST1, ST2 and ST3, install the ball bearing on the secondary pulley side.

NOTE:
- Align the roll pin to the cutout of the transmission case.
- Press-fit the pin so that it is positioned on near side (the retainer should be seen on your side).

ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398177700 INSTALLER
ST3 28499TC010 PRESS SNAP RING



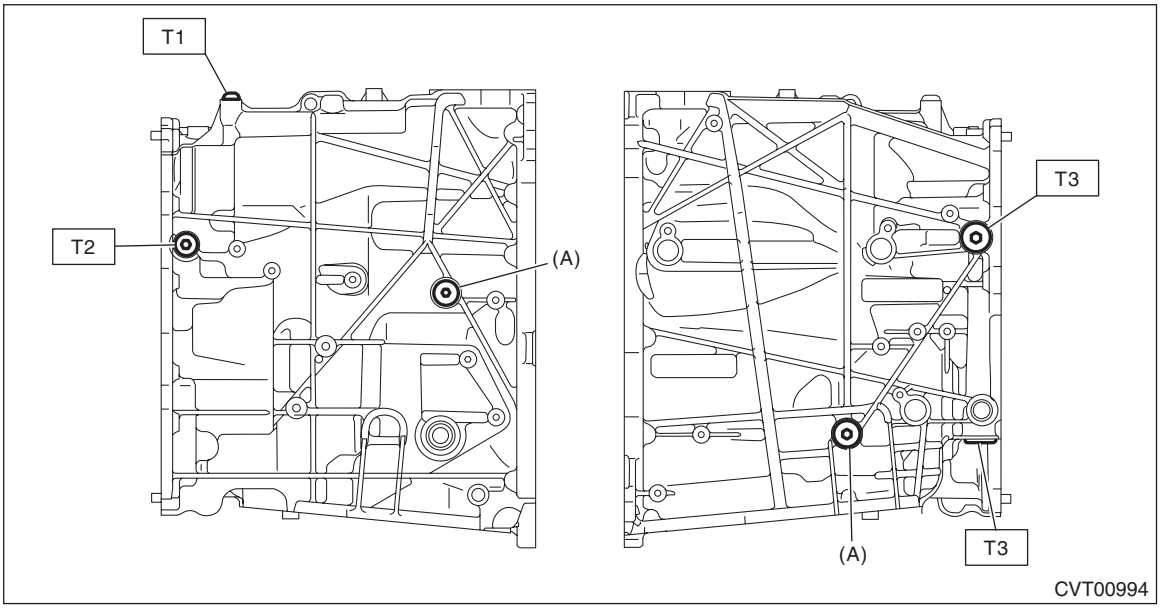


(A) Retainer
(B) Roll pin

8) Install all plugs.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.
- For the plug (A), fill the CVTF, and then tighten the plug using a new O-ring.

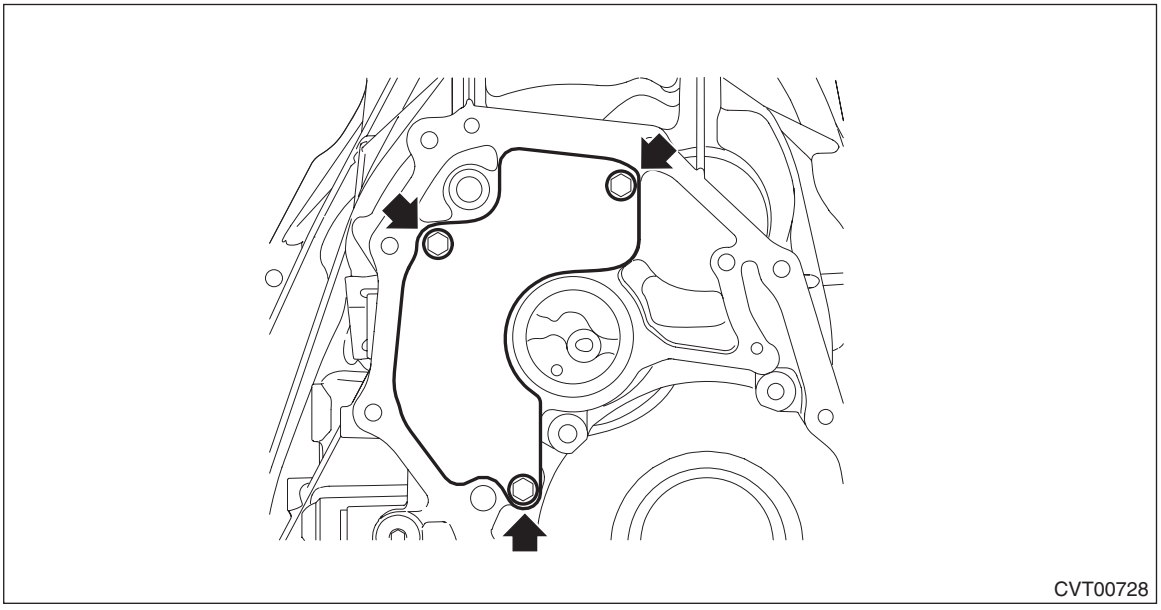
Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
T3: 50 N·m (5.1 kgf-m, 36.9 ft-lb)



9) Install the oil stopper plate.

NOTE:
Use a new bolt.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



E: INSPECTION

- Check the transmission case for damage.
- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check the bearing for smooth operation.
- Check the bearing for seizure or wear.

F: ADJUSTMENT

NOTE:
When replacing the transmission case with a new part, perform the following check and adjustment for the selection.

- Select the transfer driven gear shim. <Ref. to CVT(TR580)-189, ADJUSTMENT, Transfer Clutch.>
- Select the transfer drive gear shim. <Ref. to CVT(TR580)-203, ADJUSTMENT, Reduction Driven Gear.>
- Select the reduction drive gear shim. <Ref. to CVT(TR580)-232, ADJUSTMENT, Reduction Drive Gear.>

35.CVTF Filter

A: REMOVAL

NOTE:
• Although CVTF filter is a maintenance-free part, replace it if a large quantity of wear debris and metal particles are found in CVTF and CVTF filter.
• For removal of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TR580)-211, REMOVAL, Transmission Case.> <Ref. to CVT(TR580)-217, DISASSEMBLY, Transmission Case.>

B: INSTALLATION

NOTE:
For installation of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TR580)-221, ASSEMBLY, Transmission Case.> <Ref. to CVT(TR580)-214, INSTALLATION, Transmission Case.>

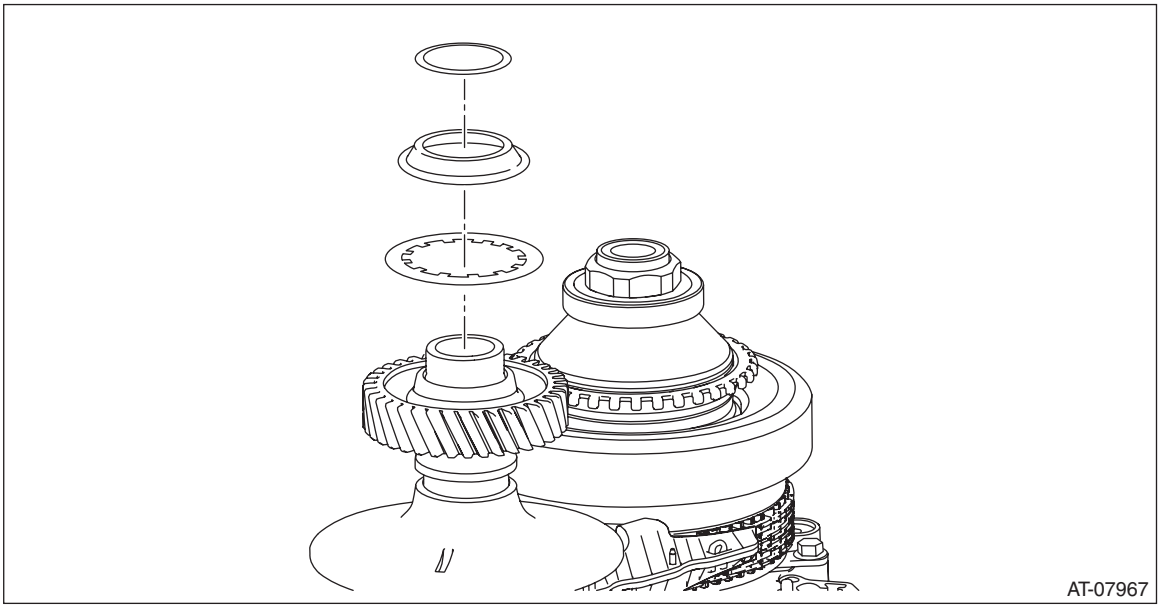
C: INSPECTION

- Check if a large quantity of wear debris or metal particles are in CVTF and CVTF filter.
- Check for broken part or damaged O-ring.

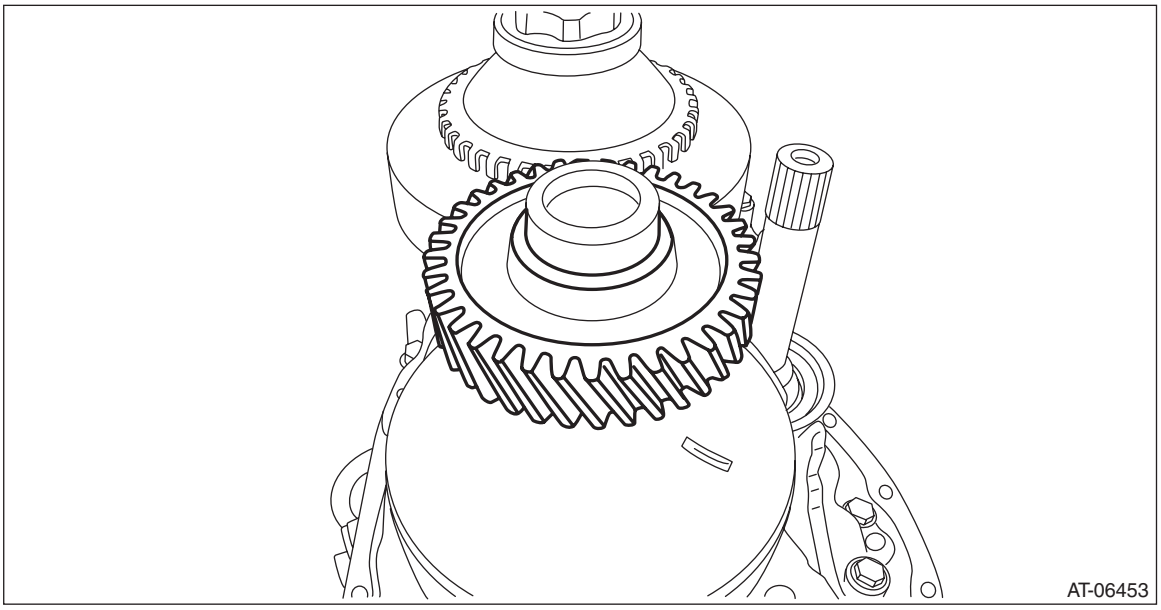
36.Reduction Drive Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-162, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-121, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-136, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-107, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-109, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-112, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-197, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-211, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear shims, spring retainers, and dish plates.

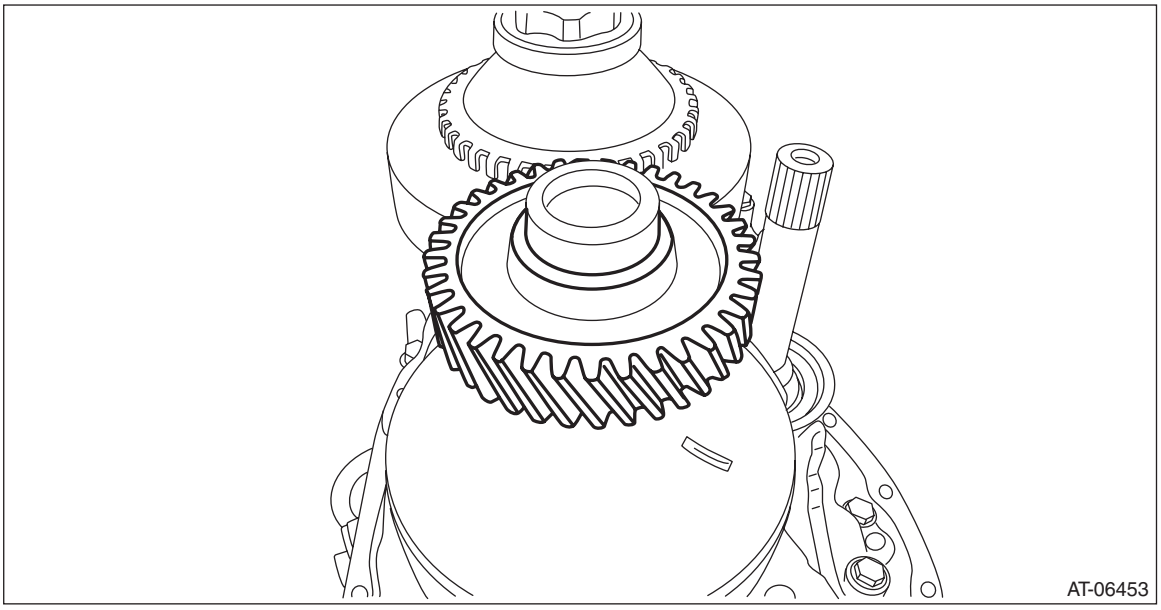


18) Remove the reduction drive gear.



B: INSTALLATION

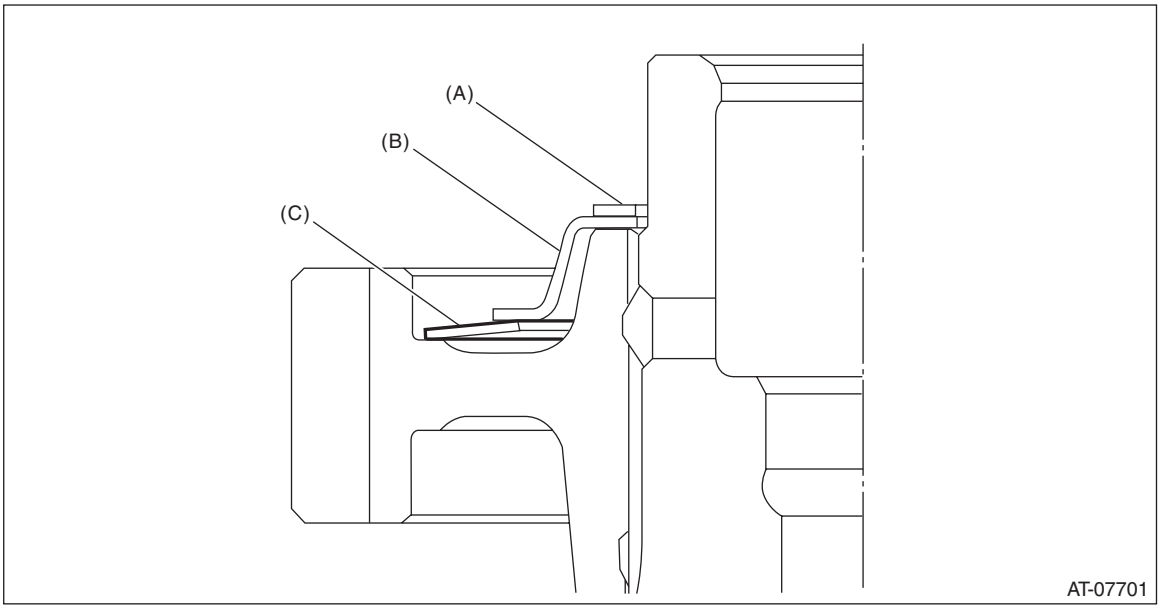
1) Install the reduction drive gear to secondary pulley.



2) Select the reduction drive gear shim. <Ref. to CVT(TR580)-232, ADJUSTMENT, Reduction Drive Gear.>

3) Install the dish plates, spring retainers, and selected reduction drive gear shims.

NOTE:
Install the dish plate in the correct direction.



(A) Reduction drive gear shim
(B) Spring retainer
(C) Dish plate

4) Install the transmission case. <Ref. to CVT(TR580)-214, INSTALLATION, Transmission Case.>
5) Install the transmission control device. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Control Device.>
6) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>
7) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-197, INSTALLATION, Reduction Driven Gear.>
8) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>
9) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>
10) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
11) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
12) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
13) Install the secondary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Secondary Speed Sensor.>
14) Install the primary speed sensor. <Ref. to CVT(TR580)-113, INSTALLATION, Primary Speed Sensor.>
15) Install the turbine speed sensor. <Ref. to CVT(TR580)-107, INSTALLATION, Turbine Speed Sensor.>
16) Install the transmission harness. <Ref. to CVT(TR580)-143, INSTALLATION, Transmission Harness.>
17) Install the control valve body. <Ref. to CVT(TR580)-127, INSTALLATION, Control Valve Body.>
18) Install the air breather hose. <Ref. to CVT(TR580)-164, INSTALLATION, Air Breather Hose.>
19) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

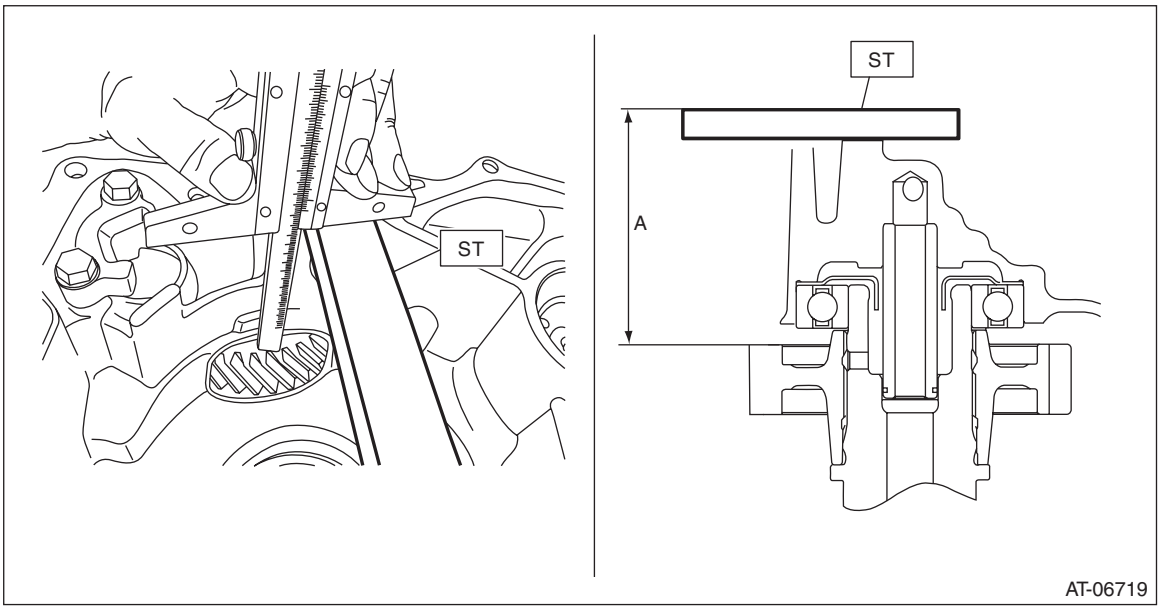
Check the reduction drive gear for breakage or damage.

D: ADJUSTMENT

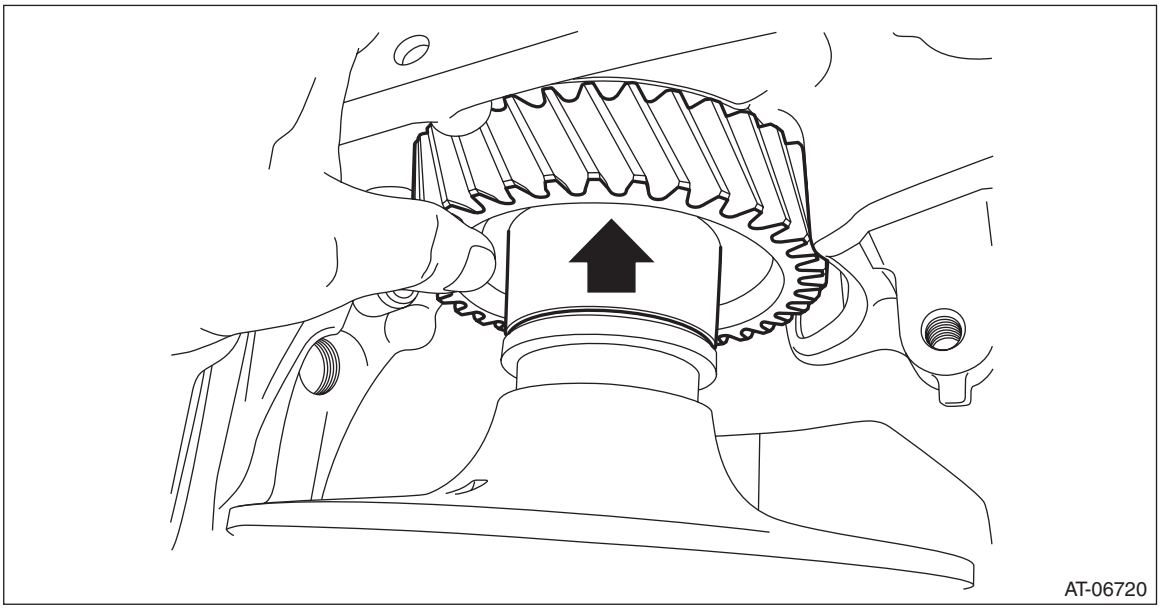
1) Remove the retaining springs and reduction drive gear shims.
2) Install the transmission case, and secure it with four or five bolts.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

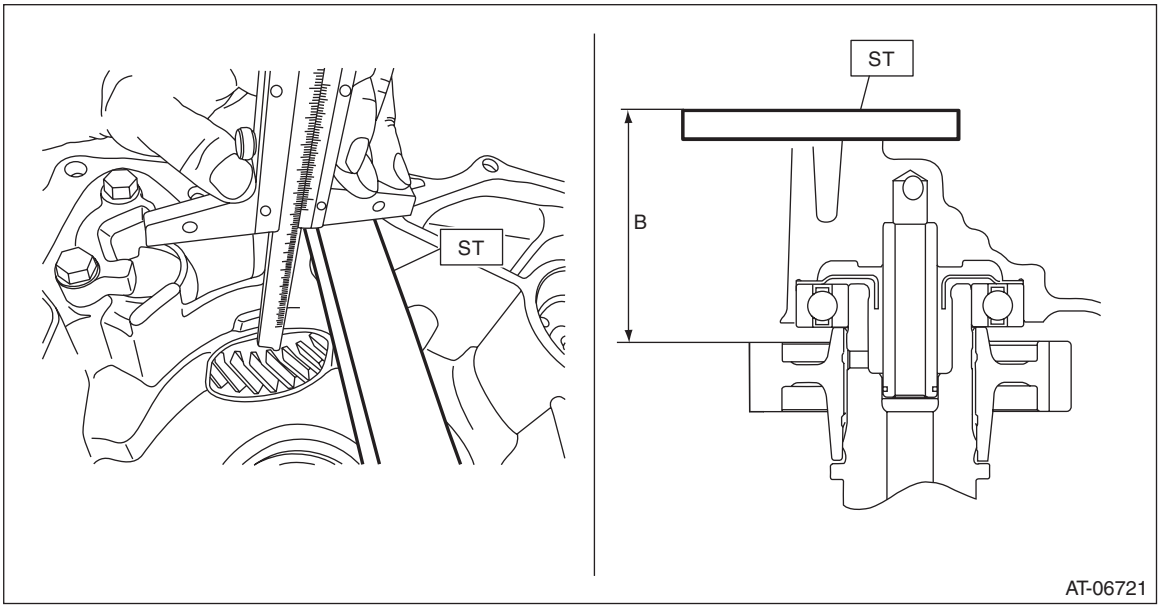
3) Measure depth “A” from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



4) Raise and hold the reduction drive gear.



5) Measure depth “B” from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



6) Calculate the following formula.
T mm = A – B – 1.0
[T in = A – B – 0.039]
T: Moving distance of reduction drive gear shim
A: Depth from the ST upper face to the reduction drive gear end surface
B: Depth from the ST upper face to the reduction drive gear end surface
1.0 mm (0.039 in): Thickness of spring retainer

Moving distance of transfer drive gear [T]	Total shim thickness mm (in)
0.420 — 0.519(0.0165 — 0.0204)	0.3 (0.012)
0.520 — 0.619(0.0205 — 0.0242)	0.4 (0.016)
0.620 — 0.719(0.0244 — 0.0283)	0.5 (0.020)
0.720 — 0.819(0.0283 — 0.0322)	0.6 (0.024)
0.820 — 0.919(0.0323 — 0.0362)	0.7 (0.028)
0.920 — 1.019(0.0362 — 0.0401)	0.8 (0.031)
1.020 — 1.119(0.0402 — 0.0441)	0.9 (0.035)
1.120 — 1.219(0.0441 — 0.0480)	1.0 (0.039)
1.220 — 1.319(0.0480 — 0.0519)	1.1 (0.043)
1.320 — 1.419(0.0520 — 0.0559)	1.2 (0.047)
1.420 — 1.519(0.0559 — 0.0598)	1.3 (0.051)
1.520 — 1.619(0.0598 — 0.0637)	1.4 (0.055)
1.620 — 1.719(0.0638 — 0.0677)	1.5 (0.059)
1.720 — 1.819(0.0677 — 0.0716)	1.6 (0.063)
1.820 — 1.920(0.0717 — 0.0756)	1.7 (0.067)

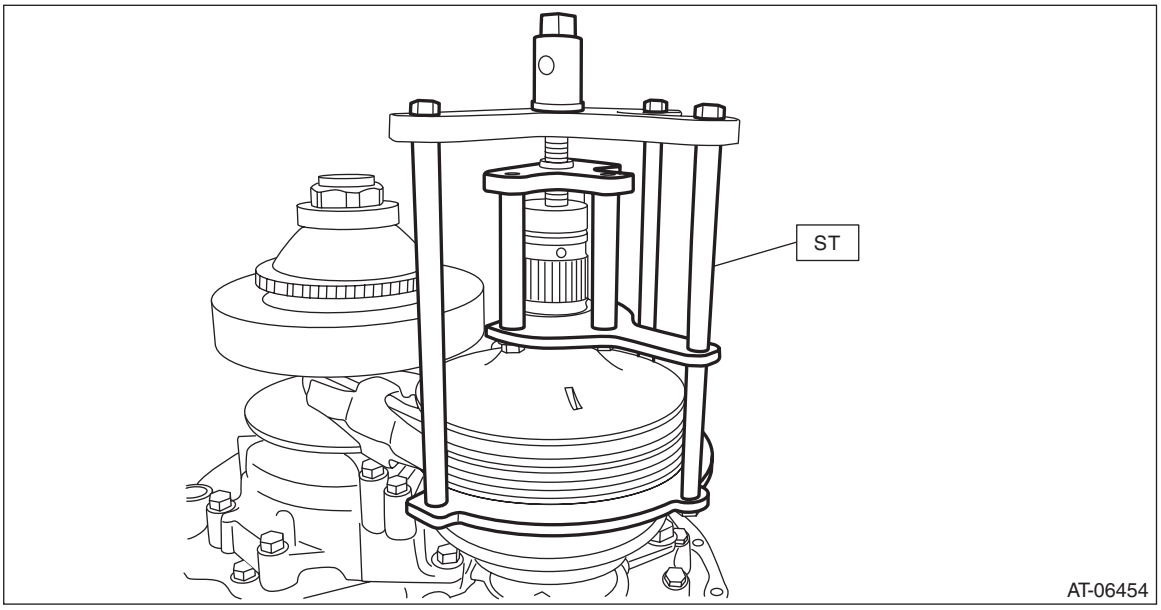
7) Select one to three reduction drive gear shims so that the total thickness meets the value obtained from step 6).

Part No.	Reduction drive gear shim thickness mm (in)
31288AA260	0.3 (0.012)
31288AA270	0.4 (0.016)
31288AA280	0.5 (0.020)
31288AA290	0.6 (0.024)

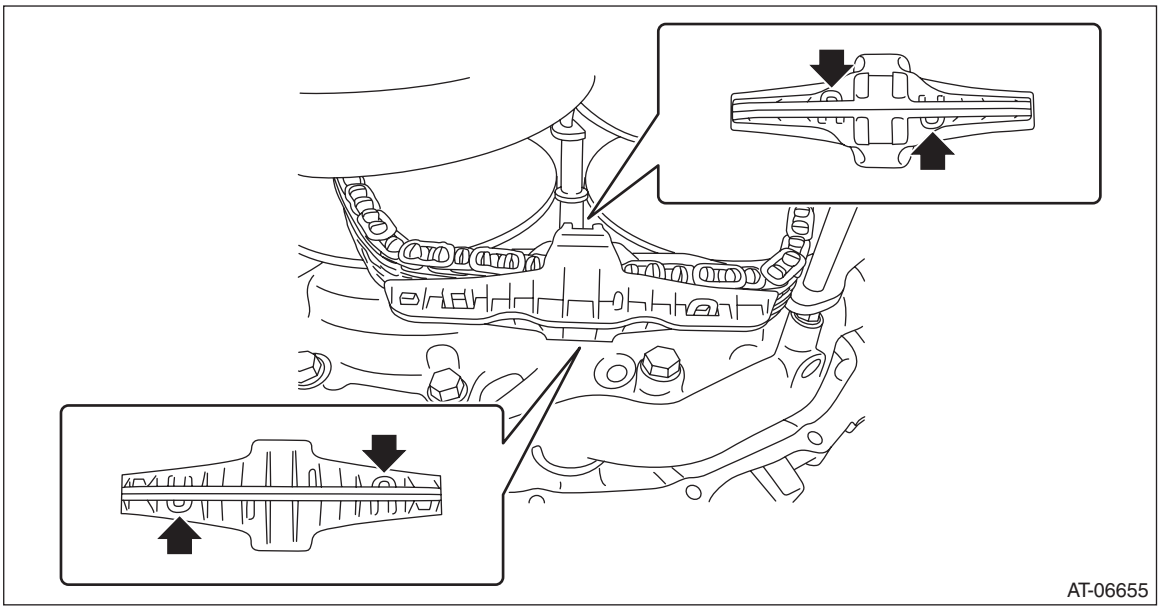
37.Primary Pulley and Secondary Pulley

A: REMOVAL

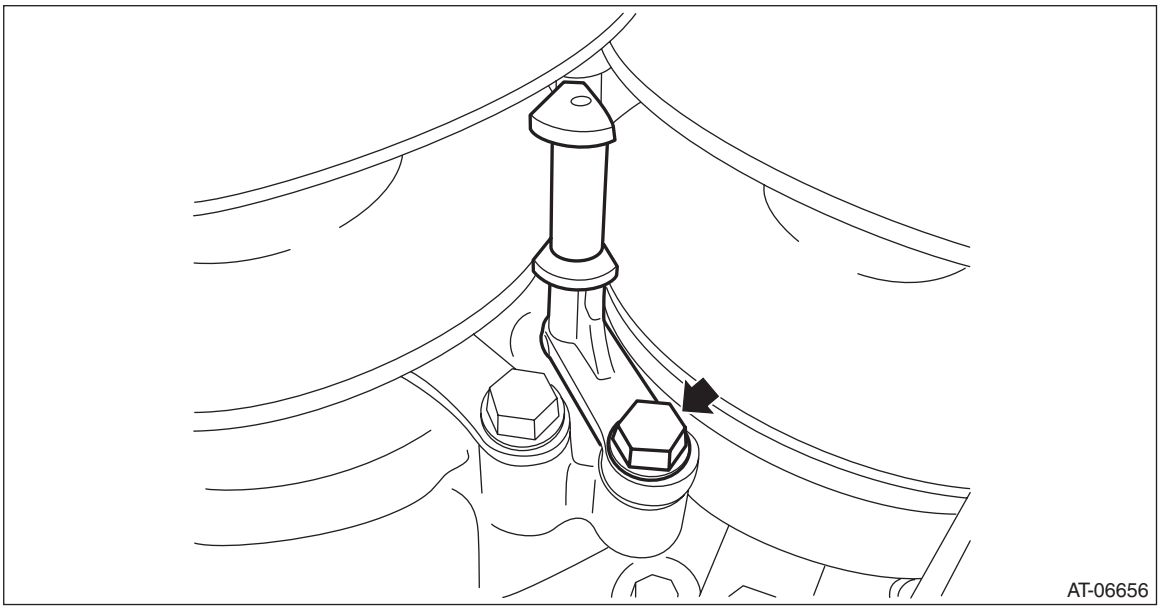
NOTE:
Always replace primary pulley and secondary pulley as an assembly because they are non-disassembled parts.
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-162, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-121, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-136, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-107, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-109, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-112, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-197, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-211, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-229, REMOVAL, Reduction Drive Gear.>
18) Set the ST to secondary pulley, expand the V groove of pulley, and then completely loosen the variator chain.
ST 18769AA010 EXPANDER PULLEY



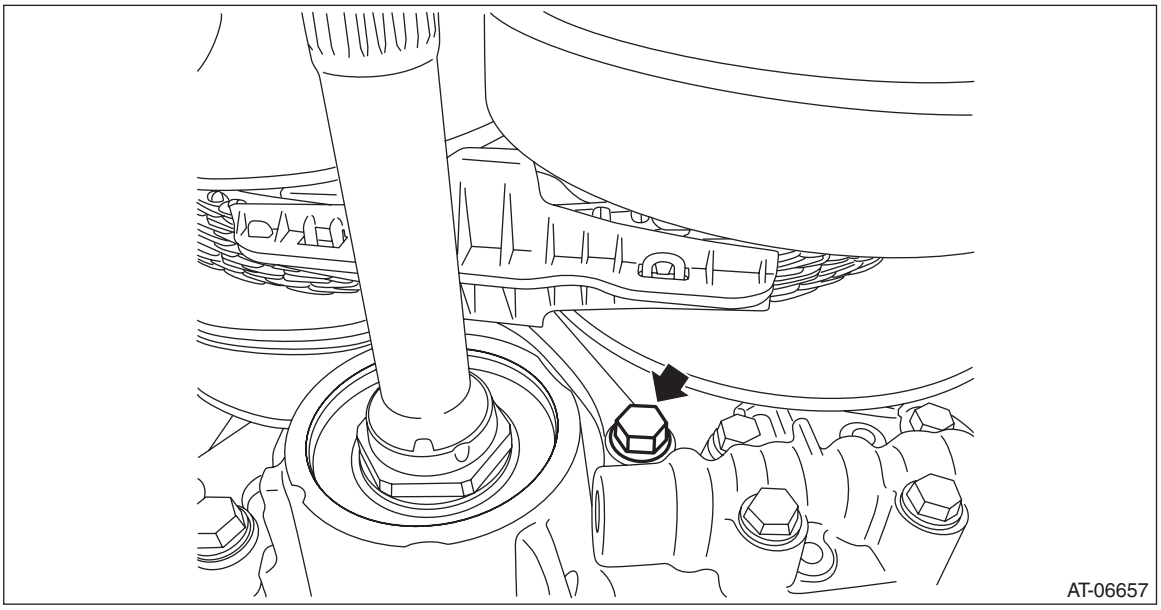
19) Remove the chain guide.
(1) Remove the chain guide from lubrication pipe.
(2) Detach the four claws to remove the chain guide.


AT-06655

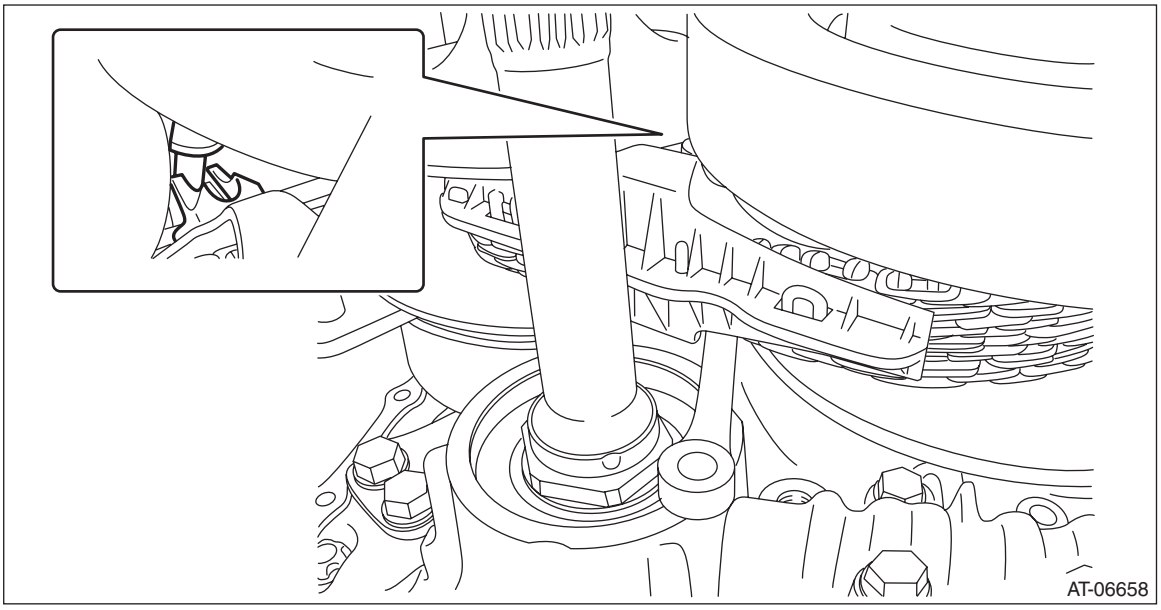
(3) Remove the lubrication pipe.


AT-06656

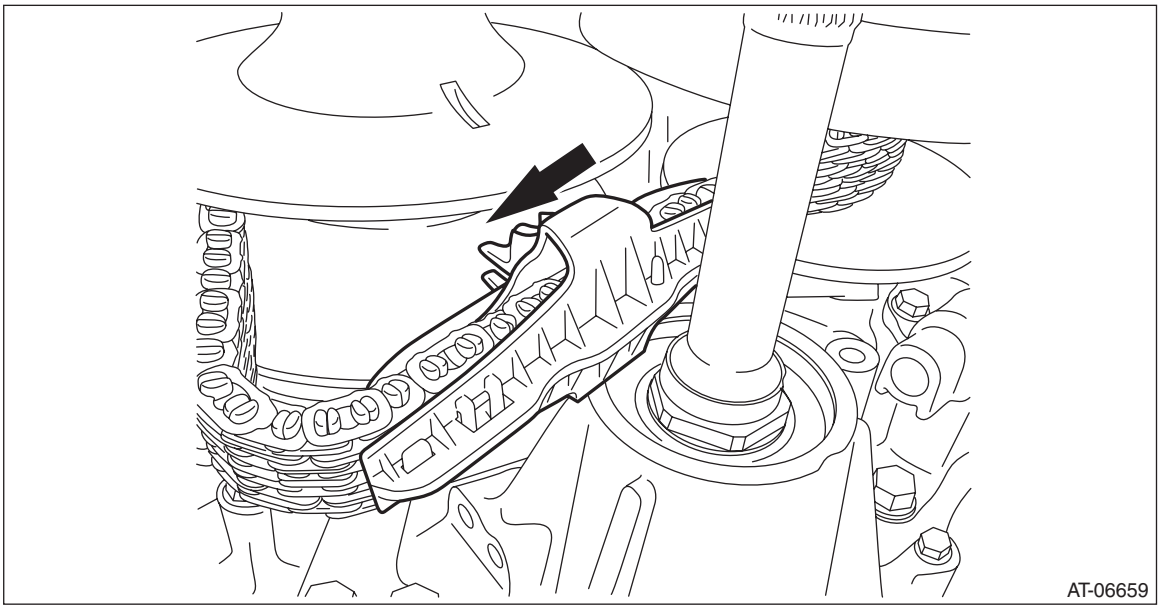
(4) Remove the support rod mounting bolts.



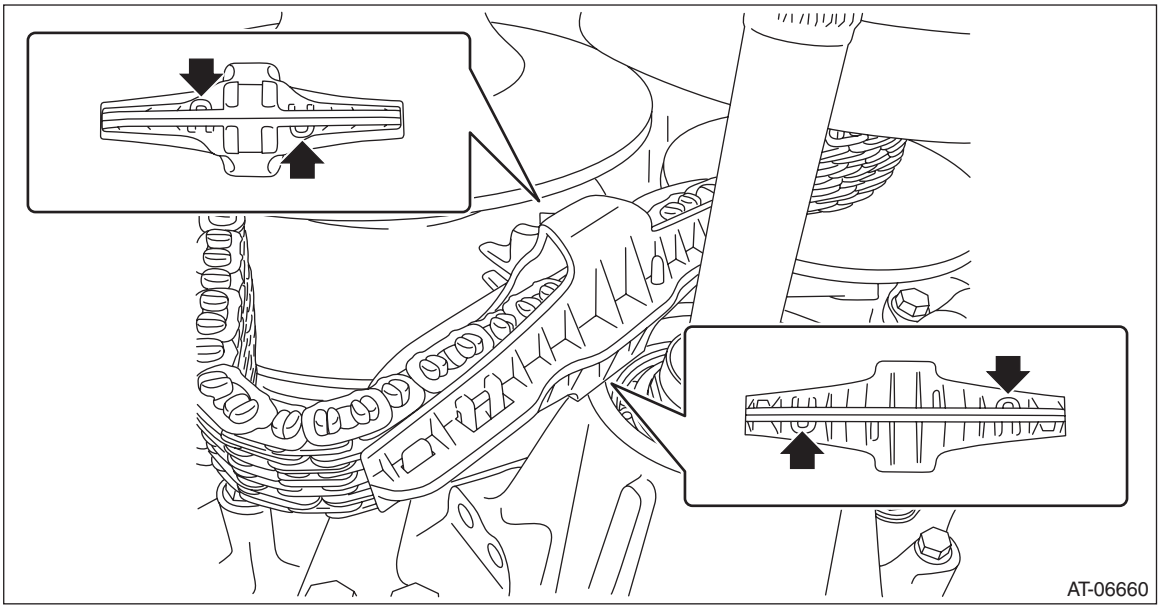
(5) Raise the support rod to remove the chain guide.



(6) Move the chain guide to the secondary pulley side.

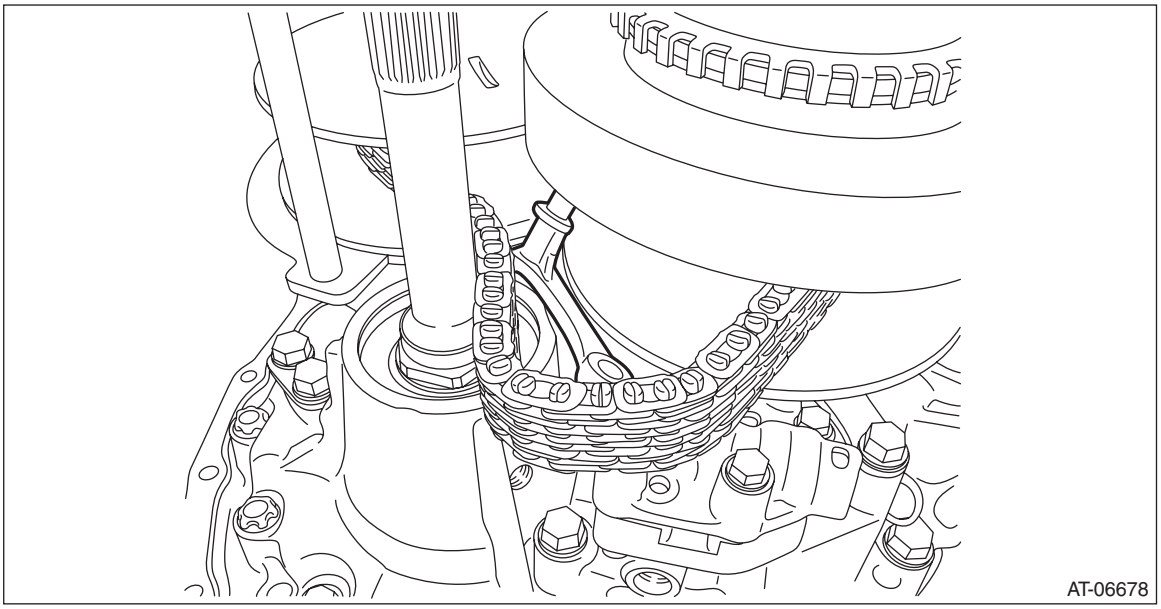


(7) Detach the four claws to remove the chain guide.

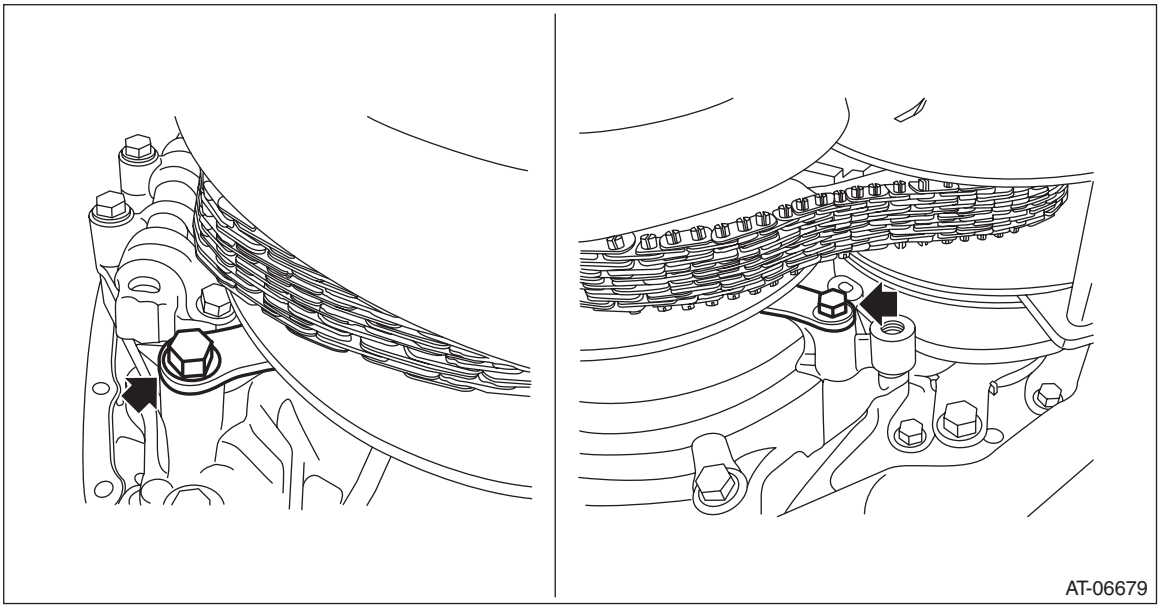


(8) Remove the support rod.

CAUTION:
Protect the both pulleys and variator chain from scratching.

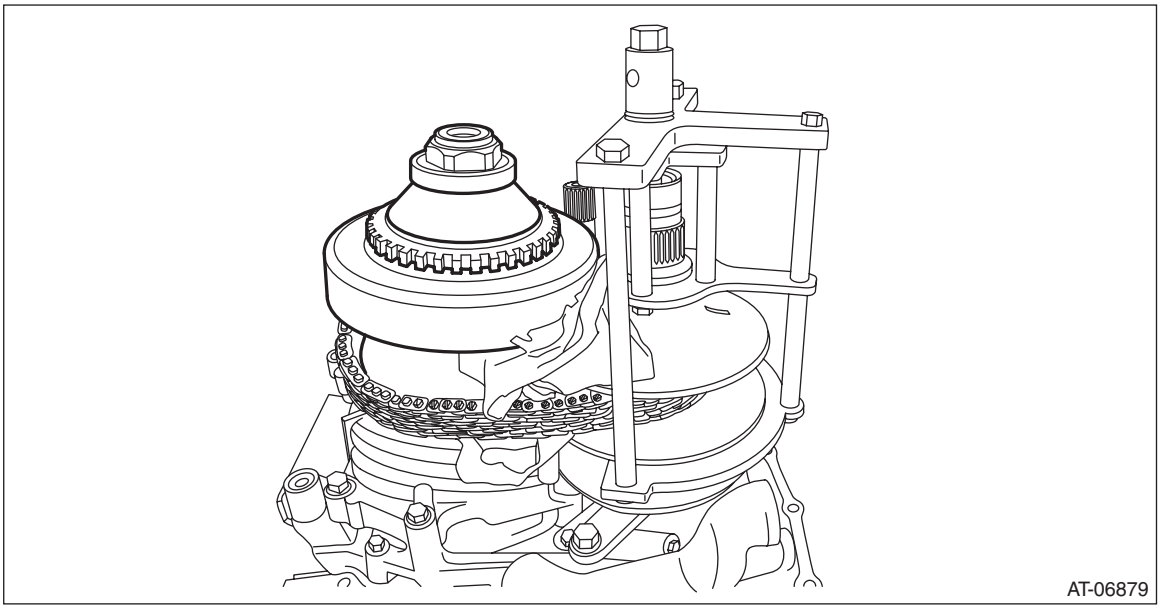


20) Remove the primary pulley mounting bolt.

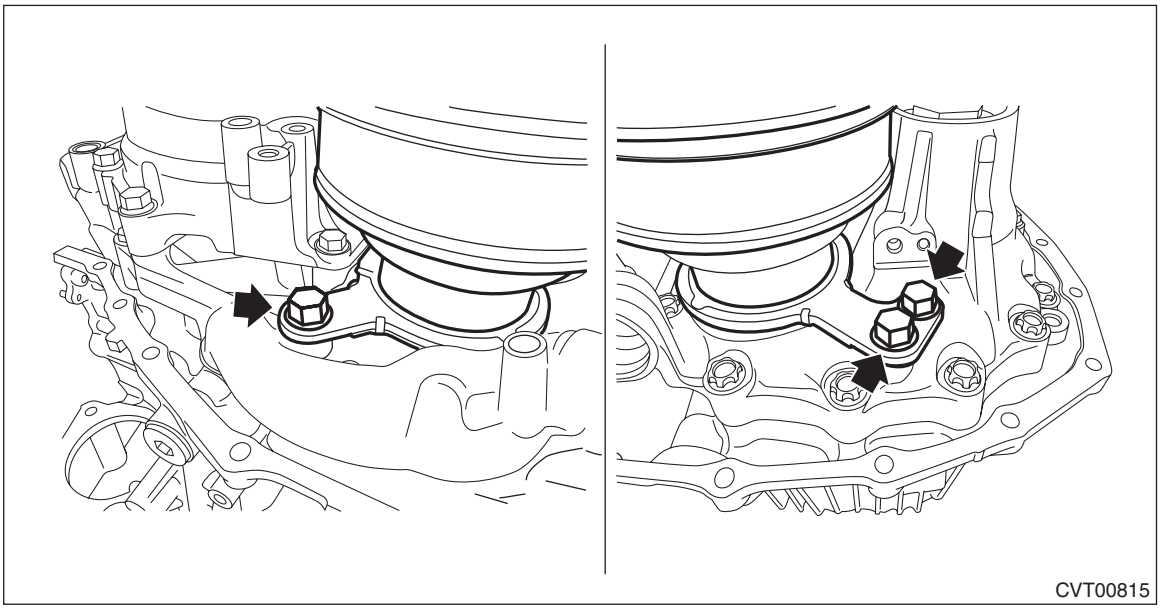


21) Remove the primary pulley from the reverse brake housing and intersect the V groove of secondary pulley and the V groove of primary pulley. Remove the variator chain from primary pulley, and remove the primary pulley.

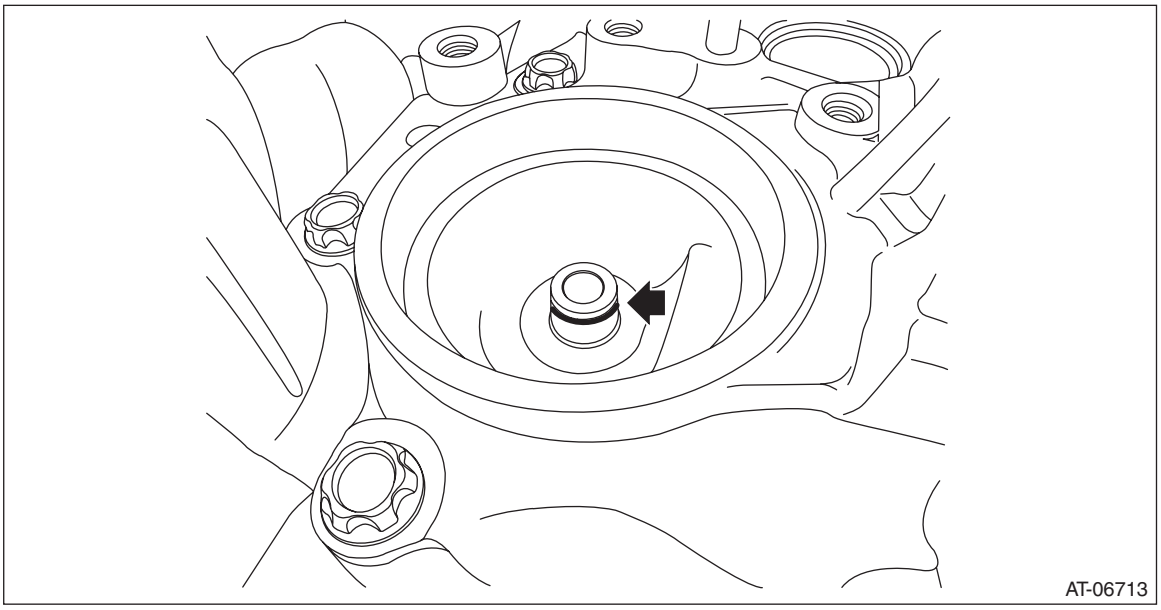
CAUTION:
Cover the V grooves of secondary pulley and primary pulley with cloth to protect the both pulleys and variator chain from scratching.



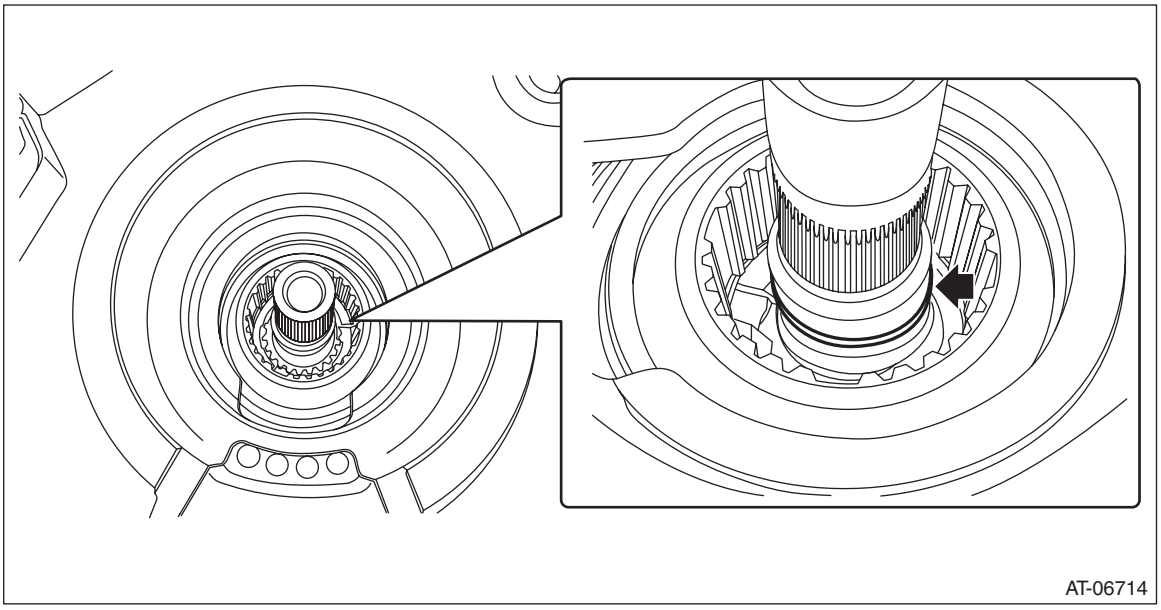
22) Remove the ST (EXPANDER PULLEY) from the secondary pulley.
23) Remove the variator chain from secondary pulley.
24) Remove the secondary pulley mounting bolts, and remove the secondary pulley.



25) Remove the seal ring from drive pinion retainer.



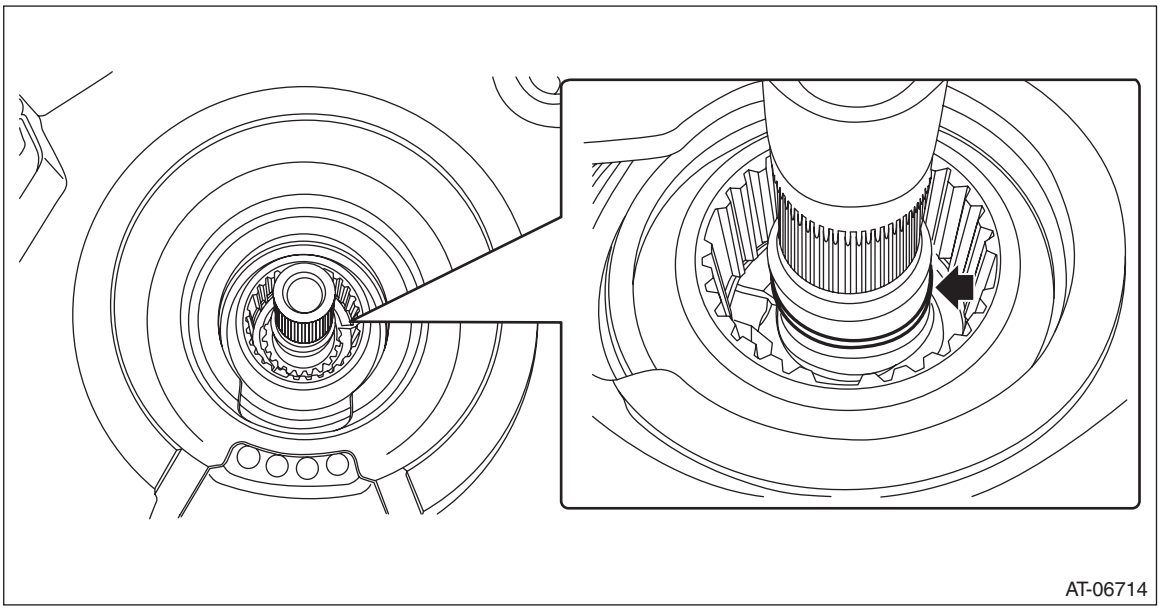
26) Remove the seal ring from the input shaft.



B: INSTALLATION

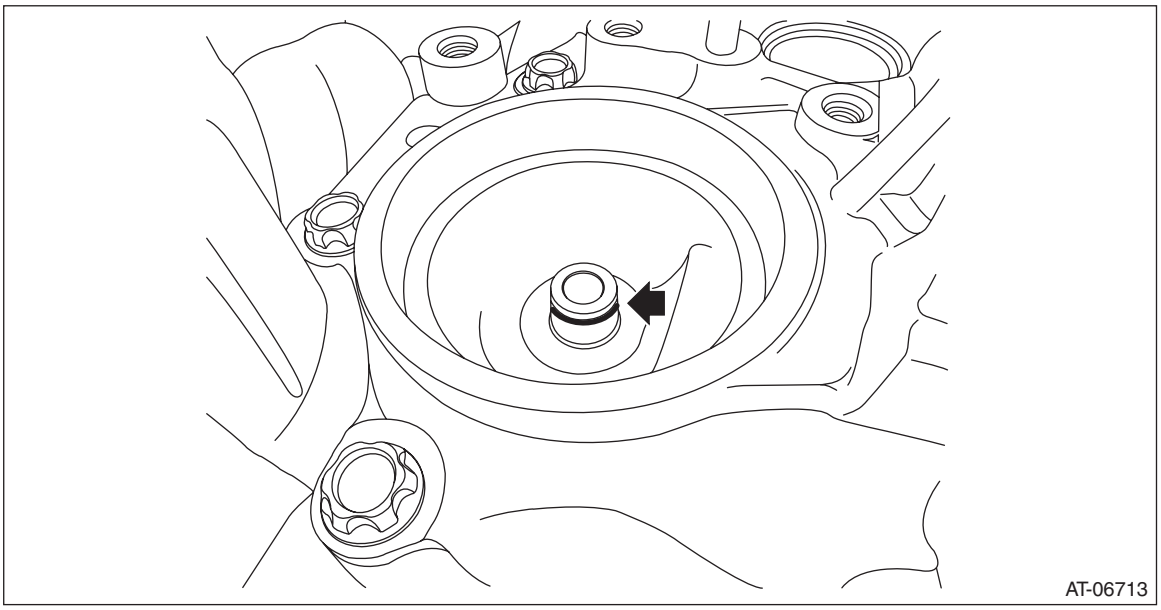
1) Select shims for pulley alignment. <Ref. to CVT(TR580)-248, ADJUSTMENT, Primary Pulley and Secondary Pulley.>
2) Install the seal ring to the input shaft.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.

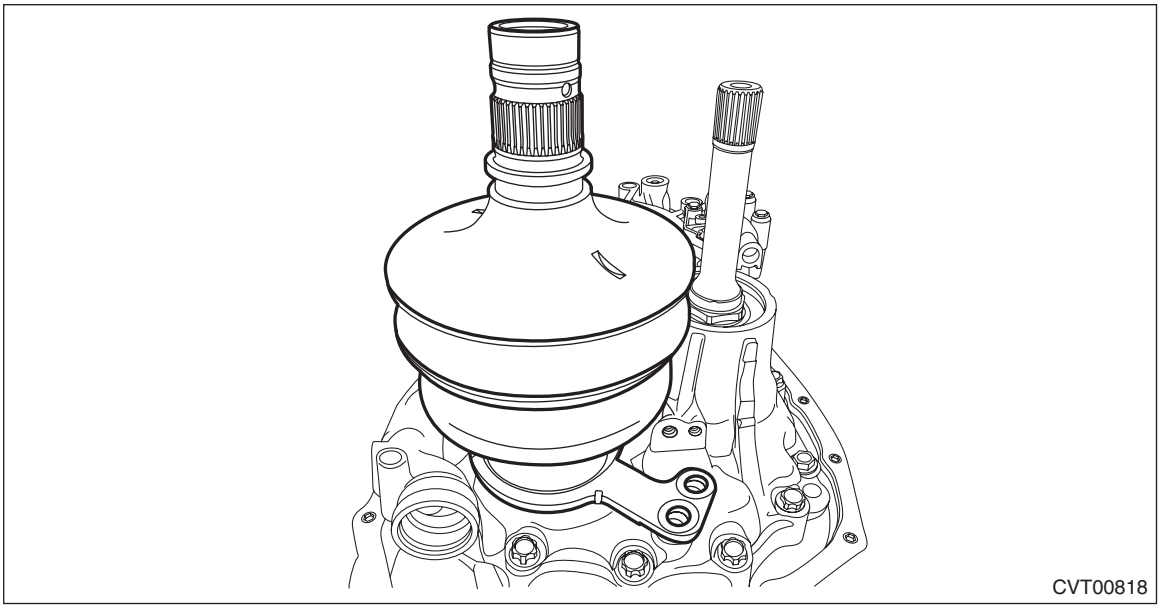


3) Install the seal ring to drive pinion retainer.

NOTE:
- Use a new seal ring.
- Apply CVTF to the seal rings.

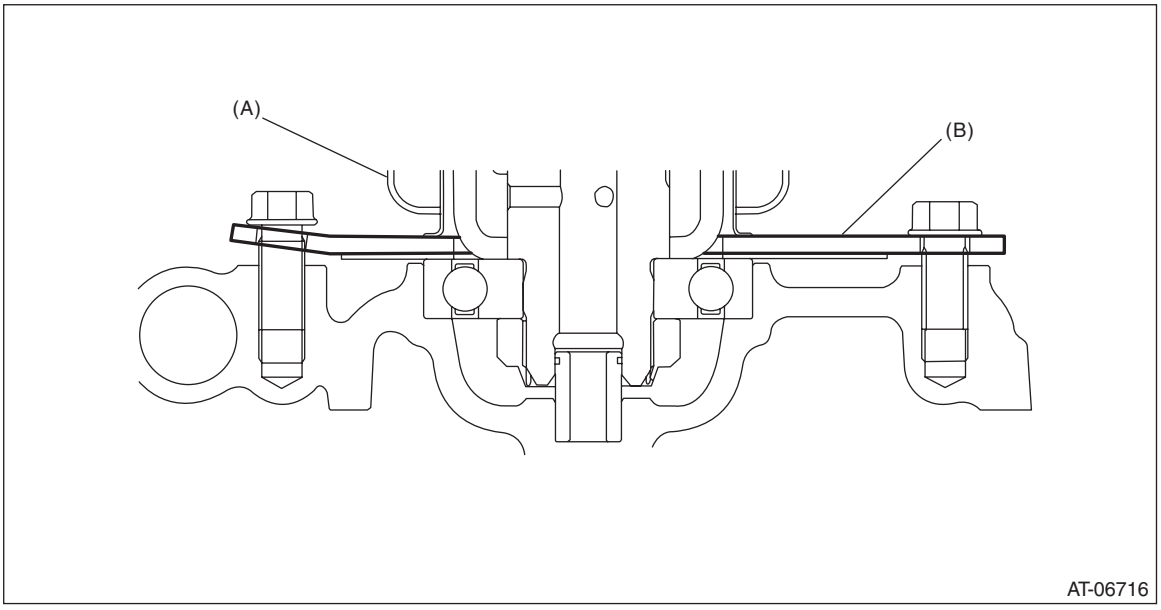


4) Install the selected shims to the primary pulley bearing catch surface.
5) Install the secondary pulley to the drive pinion retainer.



6) Install and tighten the secondary pulley securing bolts.
   (1) Tighten the three bolts until the seating surfaces contact the bearing retainer.

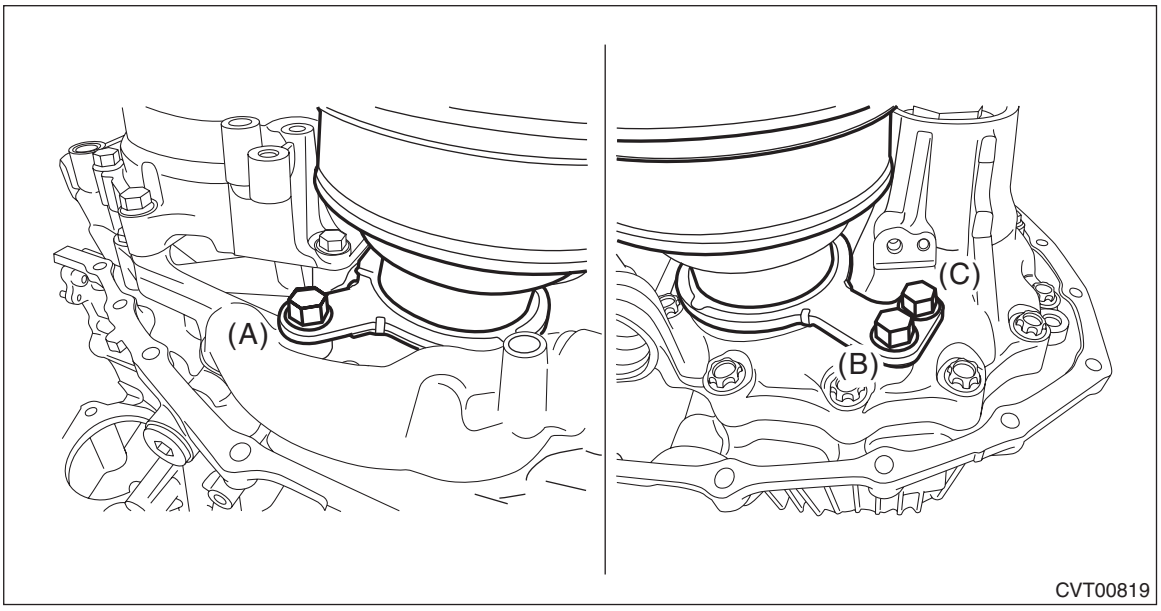
NOTE:
- Be careful not to tilt the bearing retainer of the secondary pulley.
- Apply CVTF to the bolt.



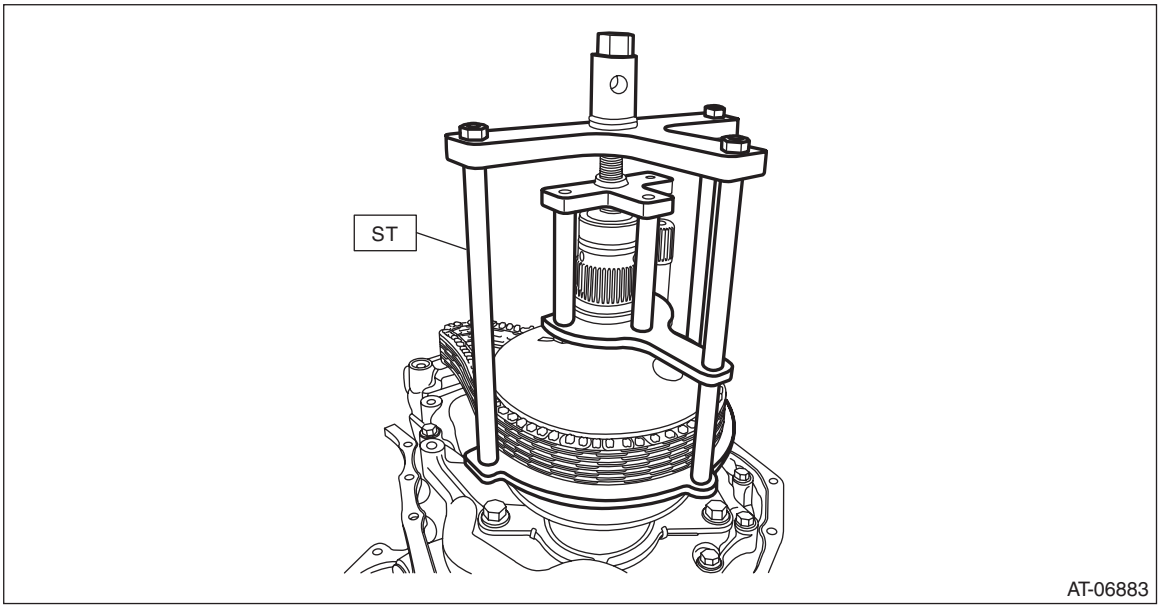
(A) Secondary pulley
(B) Bearing retainer

(2) Tighten the bolts in the order of (A) → (B) → (C) → (B).

Tightening torque:
67.5 N·m (6.9 kgf-m, 49.8 ft-lb)



7) Place the variator chain on the V groove of the secondary pulley, and set the ST.
ST 18769AA010 EXPANDER PULLEY

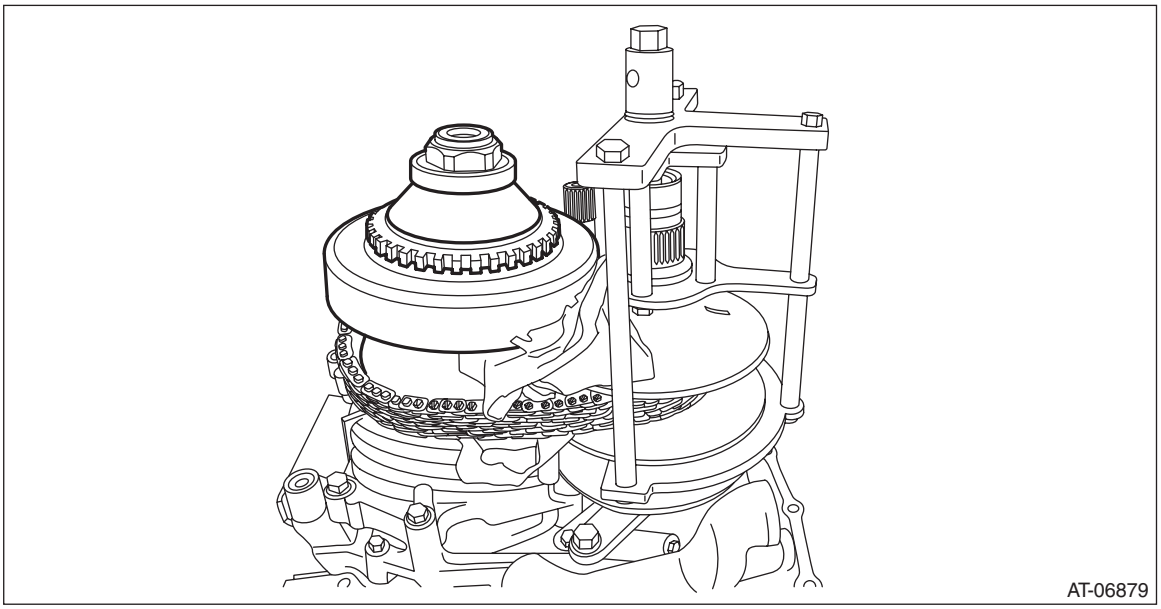


8) Expand the V groove of the secondary pulley.

9) Install the primary pulley to the reverse brake housing together with the variator chain.

CAUTION:
Cover the V grooves of primary pulley and secondary pulley with cloth to protect the both pulleys and variator chain from scratching.

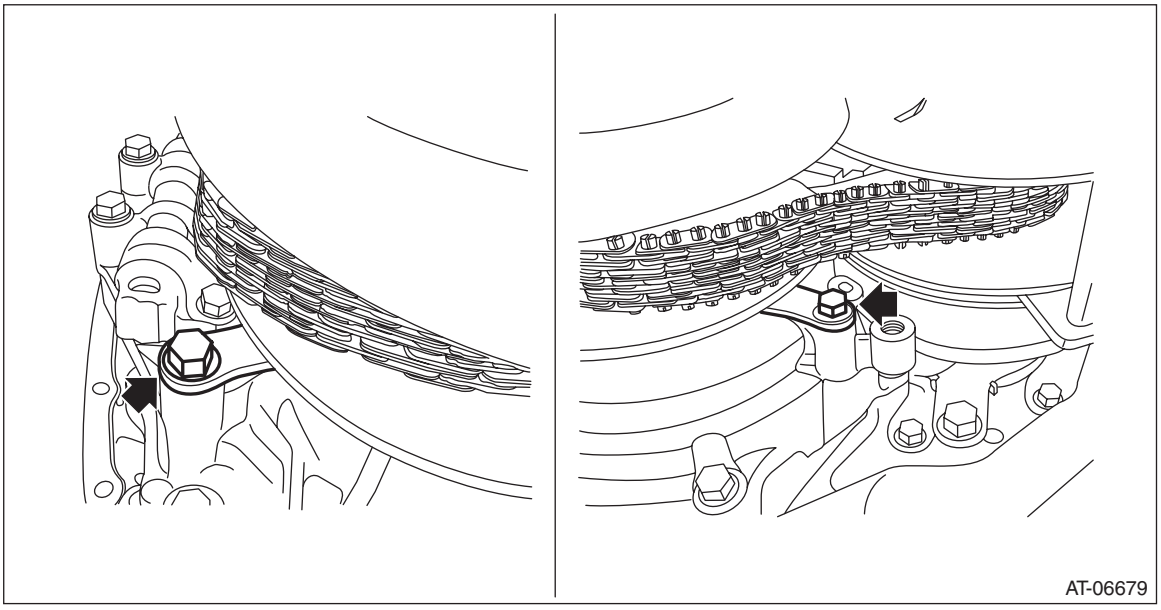
(1) Intersect the V groove of primary pulley and the V groove of secondary pulley and install the secondary pulley while placing the variator chain on secondary pulley.



(2) Install the primary pulley to the reverse brake housing so that the bolt hole of primary bearing retainer and the bolt hole of reverse brake housing are aligned.

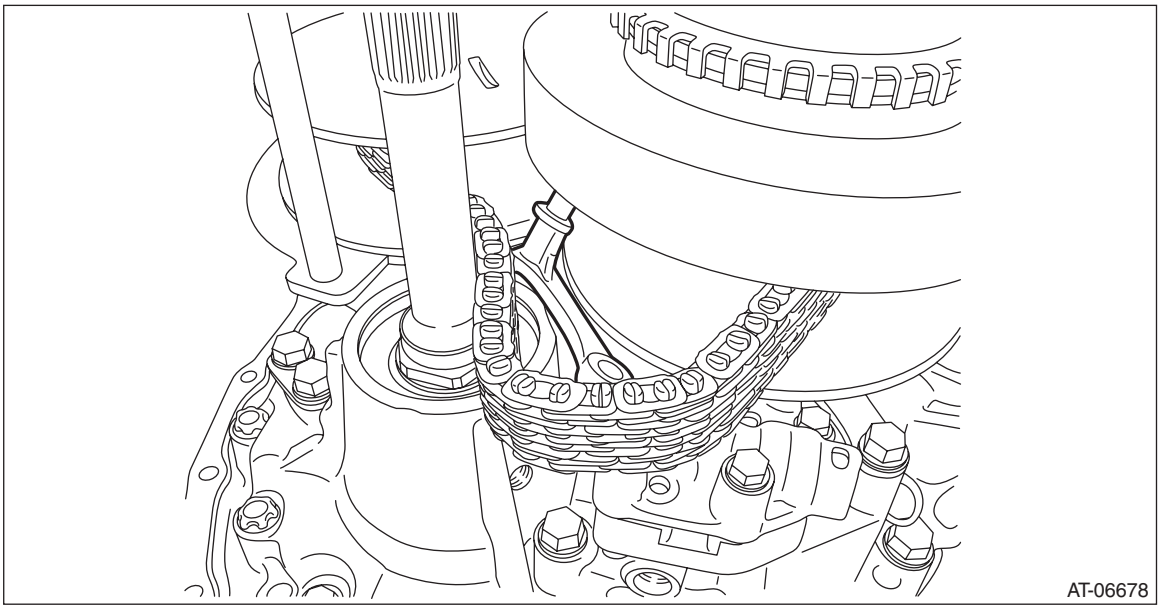
10) Install the primary pulley bolt.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

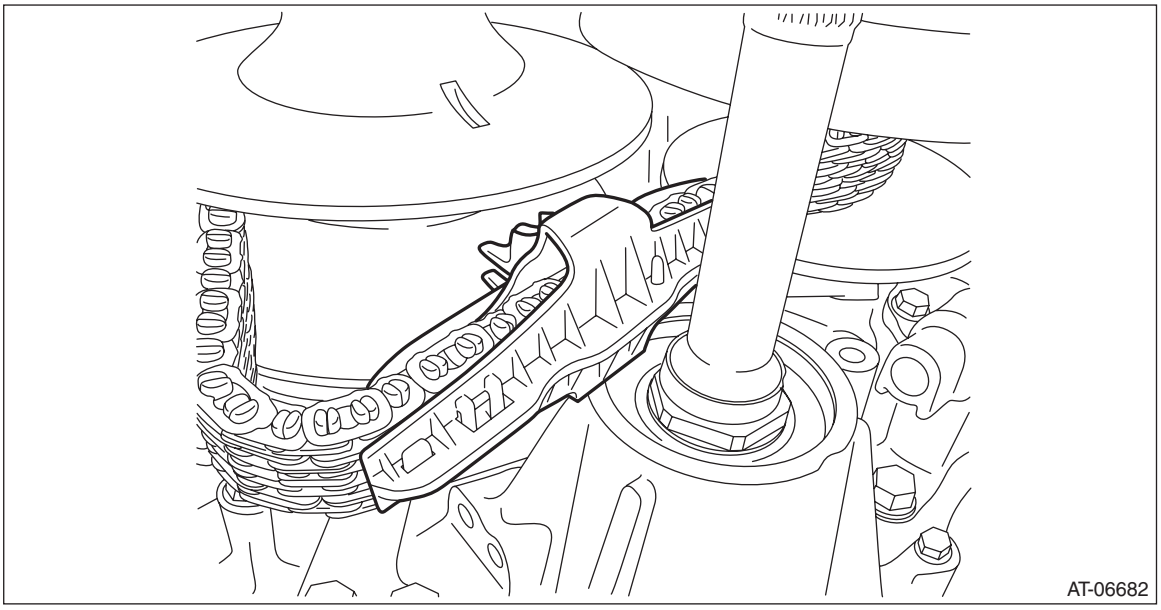


11) Install the chain guide.
(1) Place the support rod inside of the variator chain.

CAUTION:
Protect the both pulleys and variator chain from scratching.

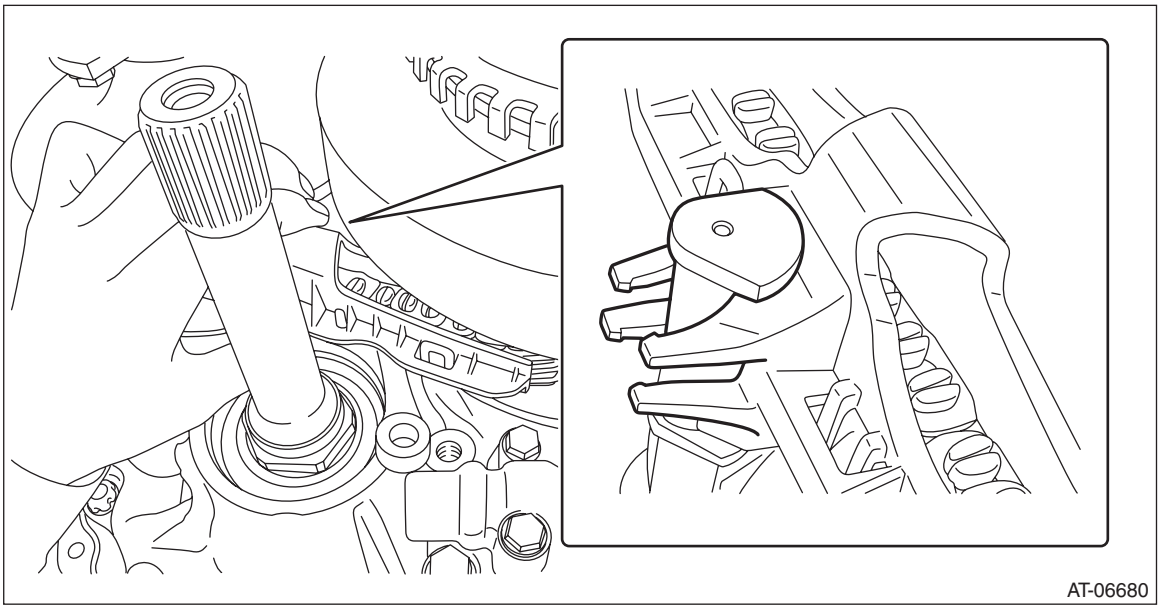

AT-06678

(2) Install the chain guide to the variator chain.


AT-06682

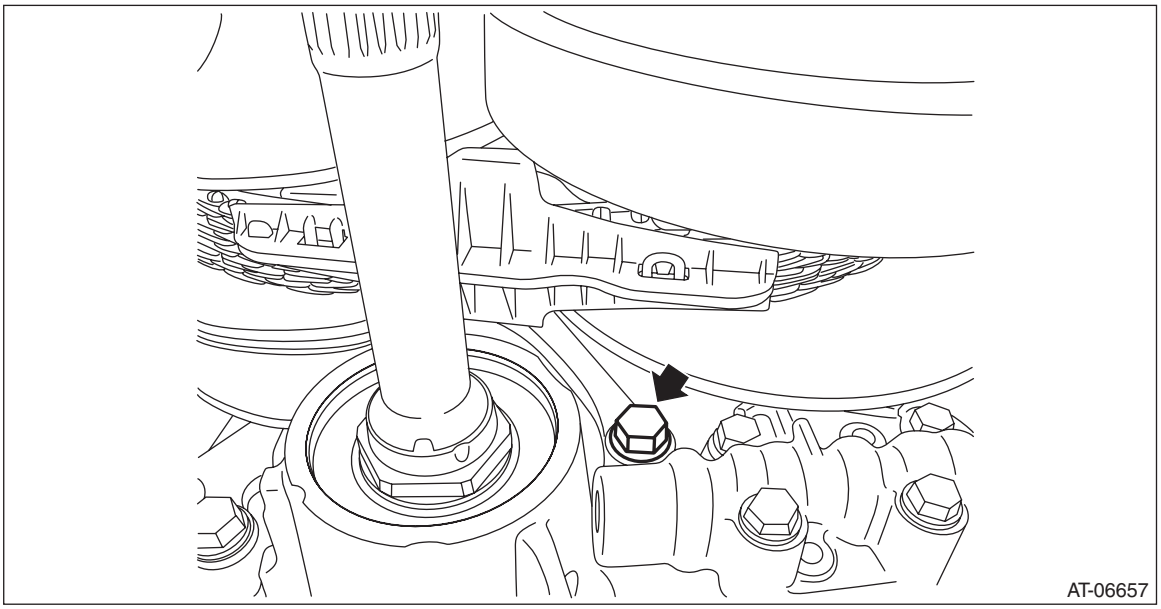
(3) Move the chain guide to the support rod side.

(4) While holding the support rod, press the chain guide so that the support rod runs through between the protrusions of chain guide and install the chain guide to the support rod.



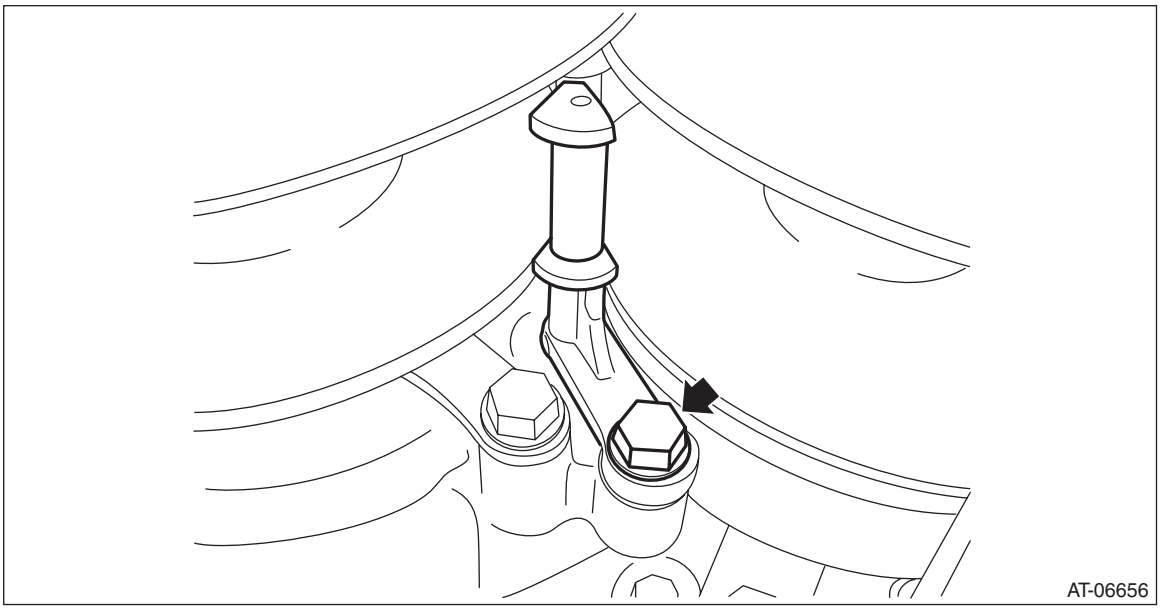
(5) Install the support rod.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

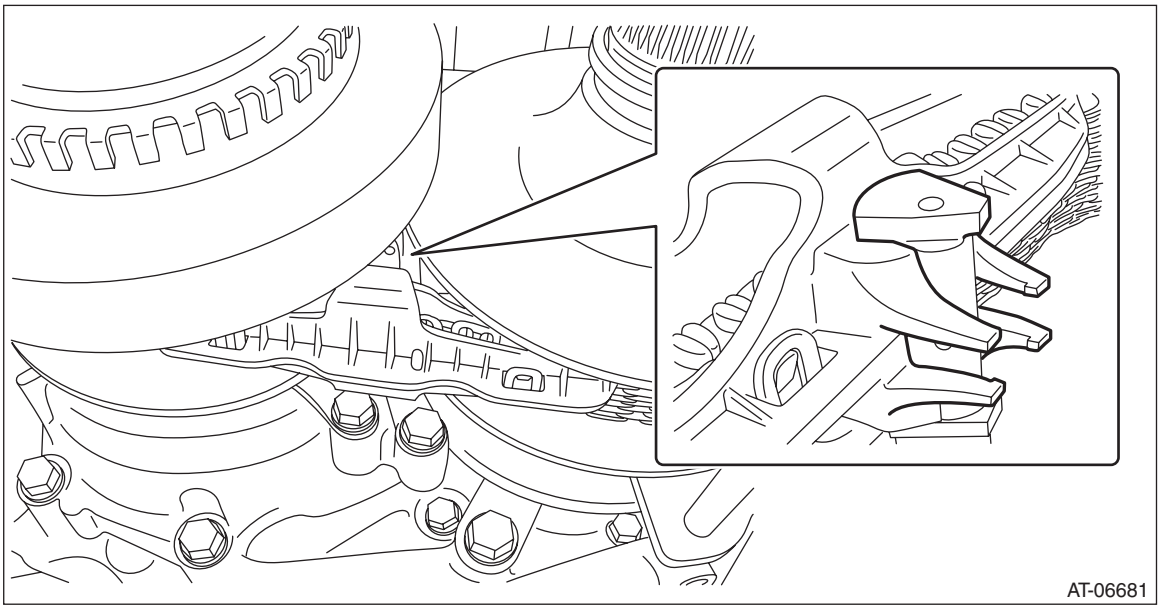


(6) Install the lubrication pipe.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



(7) Install the chain guide so that the lubrication pipe runs through between the protrusions of each chain guide. Then remove the ST (PULLEY EXPANDER).



12) Install the reduction drive gear. <Ref. to CVT(TR580)-230, INSTALLATION, Reduction Drive Gear.>
13) Select the reduction drive gear shim. <Ref. to CVT(TR580)-232, ADJUSTMENT, Reduction Drive Gear.>
14) Install the transmission case. <Ref. to CVT(TR580)-214, INSTALLATION, Transmission Case.>
15) Install the transmission control device. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Control Device.>
16) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>
17) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-197, INSTALLATION, Reduction Driven Gear.>
18) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>
19) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
20) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>
21) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>

22) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
23) Install the secondary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Secondary Speed Sensor.>
24) Install the primary speed sensor. <Ref. to CVT(TR580)-113, INSTALLATION, Primary Speed Sensor.>
25) Install the turbine speed sensor. <Ref. to CVT(TR580)-107, INSTALLATION, Turbine Speed Sensor.>
26) Install the transmission harness. <Ref. to CVT(TR580)-143, INSTALLATION, Transmission Harness.>
27) Install the control valve body. <Ref. to CVT(TR580)-127, INSTALLATION, Control Valve Body.>
28) Install the air breather hose. <Ref. to CVT(TR580)-164, INSTALLATION, Air Breather Hose.>
29) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

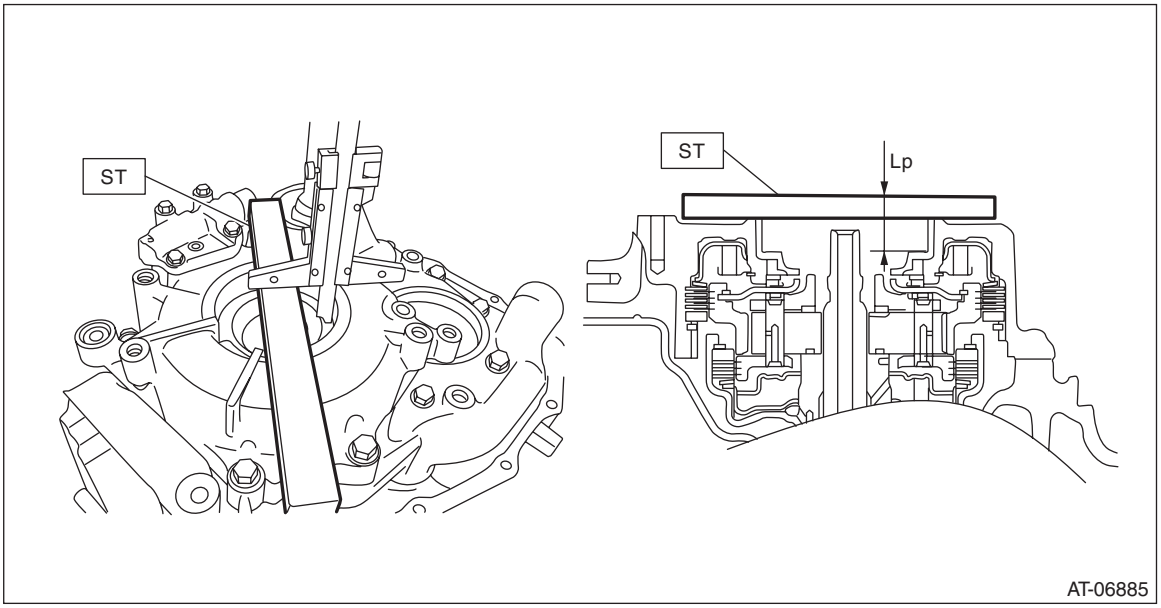
C: INSPECTION

- Check the surface of primary and secondary pulley cones for damage or wear.
- Check the primary and secondary pulley for damage.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.

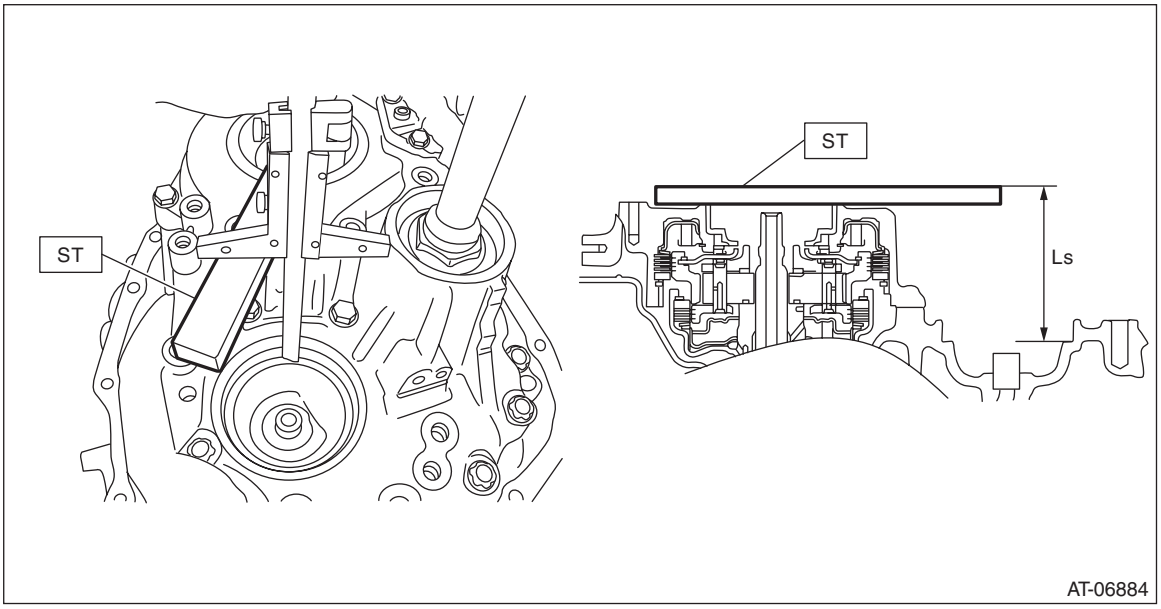
D: ADJUSTMENT

1. PROCEDURE IN REPLACEMENT OF PRIMARY AND SECONDARY PULLEY, OR IN REPLACEMENT OF PRIMARY PULLEY, SECONDARY PULLEY AND VARIATOR CHAIN

1) Measure depth “Lp” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



2) Measure the depth “Ls” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



3) Calculate the following formula.
Calculation formula:
T (mm) = B – A + Lp – Ls – 28.602
[T (in) = B – A + Lp – Ls – 1.126]
T: Pulley alignment
A: Specified primary pulley dimension
B: Specified secondary pulley dimension
Lp: Depth from the ST upper face to the primary pulley bearing catch surface
Ls: Depth from the ST upper face to the secondary pulley bearing catch surface
28.602 mm (1.126 in): Constant

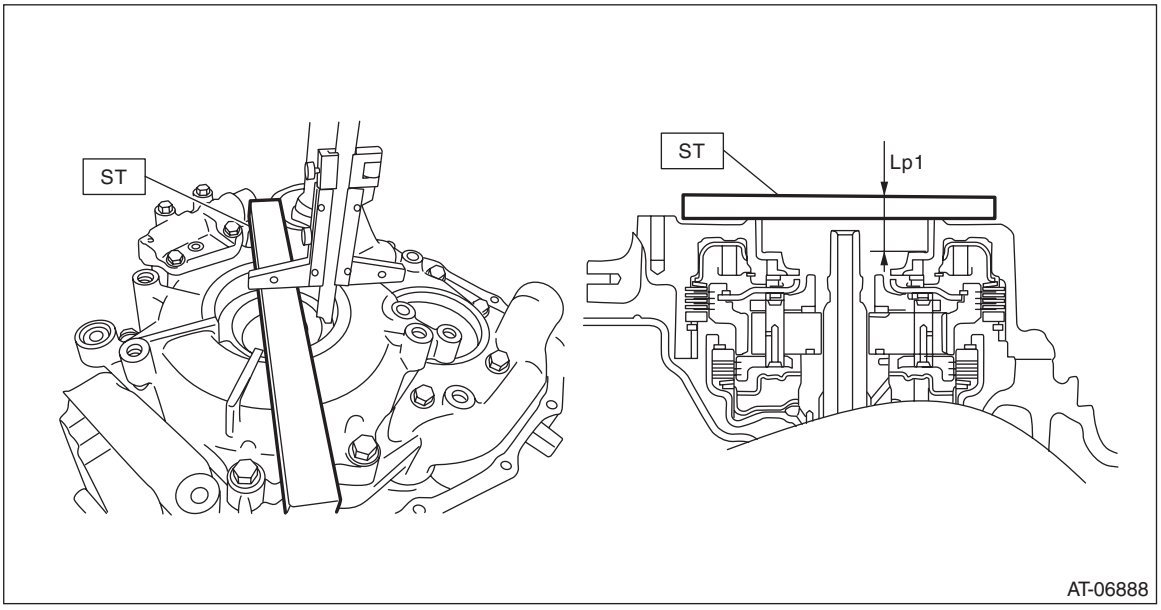
Pulley alignment T mm (in)	Thickness of shim mm (in)
-0.05 — 0.049 (-0.002 — 0.002)	No shims
0.050 — 0.149 (0.002 — 0.006)	0.1 (0.004)
0.150 — 0.249 (0.006 — 0.010)	0.2 (0.008)
0.250 — 0.349 (0.010 — 0.014)	0.3 (0.012)
0.350 — 0.449 (0.014 — 0.018)	0.4 (0.016)
0.450 — 0.549 (0.018 — 0.022)	0.5 (0.020)
0.550 — 0.649 (0.022 — 0.026)	0.6 (0.024)
0.650 — 0.749 (0.026 — 0.029)	0.7 (0.028)
0.750 — 0.849 (0.029 — 0.033)	0.8 (0.031)
0.850 — 0.949 (0.033 — 0.037)	0.9 (0.035)
0.950 — 1.049 (0.037 — 0.041)	1.0 (0.039)
1.050 — 1.149 (0.041 — 0.045)	1.1 (0.043)

4) Select one to two shims so that the total thickness meets the value obtained from step 3).

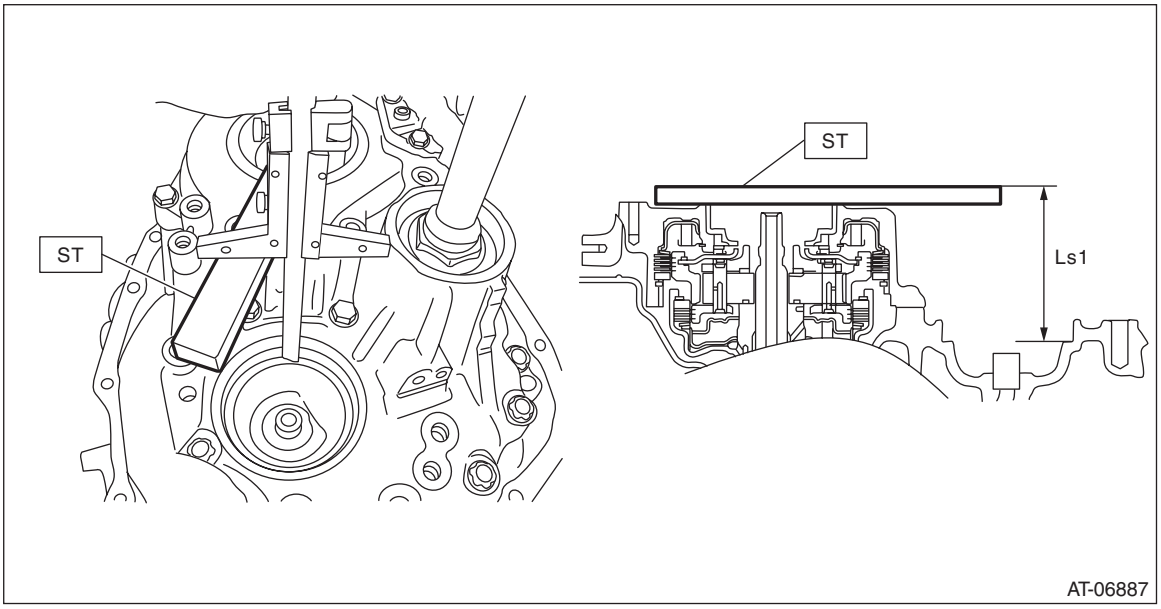
Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

2. PROCEDURE WHEN REPLACING ONLY DRIVE PINION RETAINER OR REVERSE BRAKE HOUSING

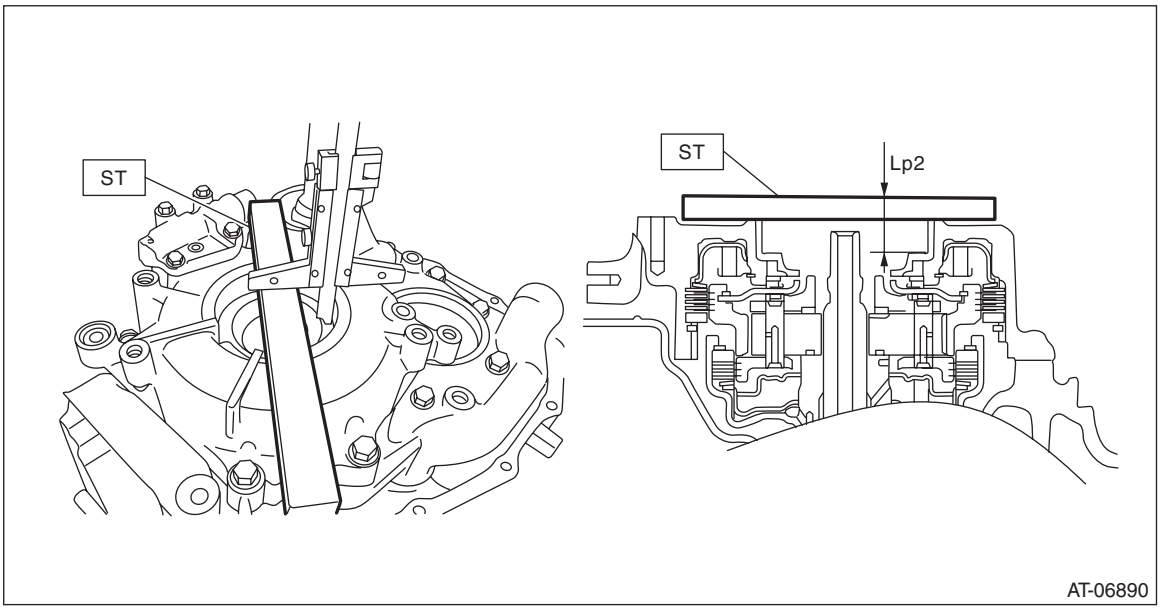
1) Clean the mating surface of current drive pinion retainer and converter case.
2) Measure and record the shim thickness that is attached on the current reverse brake housing.
3) Using the current drive pinion retainer, measure depth “Lp1” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



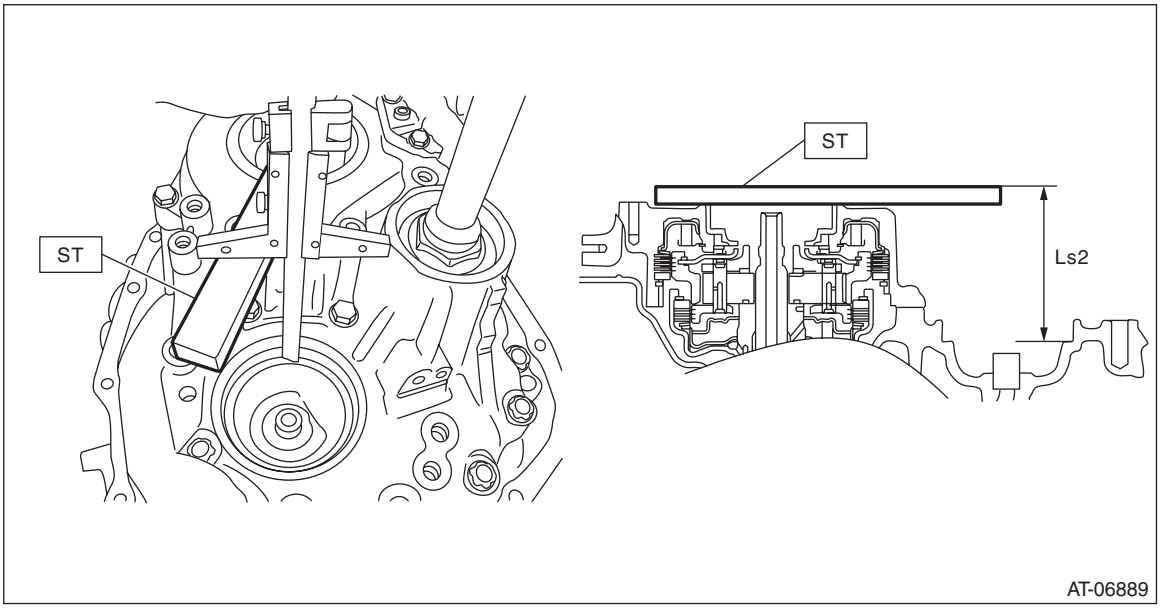
4) Using the current drive pinion retainer or current reverse brake housing, measure the depth “Ls1” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



5) Calculate the “LD1” using the following formula and record it.
Calculation formula:
LD1 mm (in) = Ls1 – Lp1
LD1: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface
Lp1: Depth from the ST upper face to the primary pulley bearing catch surface
Ls1: Depth from the ST upper face to the secondary pulley bearing catch surface
6) Using the new drive pinion retainer or new reverse brake housing, measure the depth “Lp2” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



7) Using the new drive pinion retainer or new reverse brake housing, measure the depth “Ls2” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



8) Calculate the “LD2” using the following formula and record it.
Calculation formula:
LD2 mm (in) = Ls2 – Lp2
LD2: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface
Lp2: Depth from the ST upper face to the primary pulley bearing catch surface
Ls2: Depth from the ST upper face to the secondary pulley bearing catch surface
9) Calculate the recorded values of “LD1” and “LD2” to obtain the positive number to select the shims.
Calculation formula: T1 mm (in) = LD1 – LD2 or T2 mm (in) = LD2 – LD1
T1, T2: Difference between new drive pinion retainer or new reverse brake housing and current drive pinion retainer or current reverse brake housing
LD1: Calculated value of current drive pinion retainer or current reverse brake housing
LD2: Calculated value of new drive pinion retainer or new reverse brake housing

Difference of the case (T1) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.

Difference of the case (T2) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.

Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

38.Variator Chain

A: REMOVAL

For removal of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TR580)-234, REMOVAL, Primary Pulley and Secondary Pulley.>

B: INSTALLATION

For installation of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TR580)-241, INSTALLATION, Primary Pulley and Secondary Pulley.>

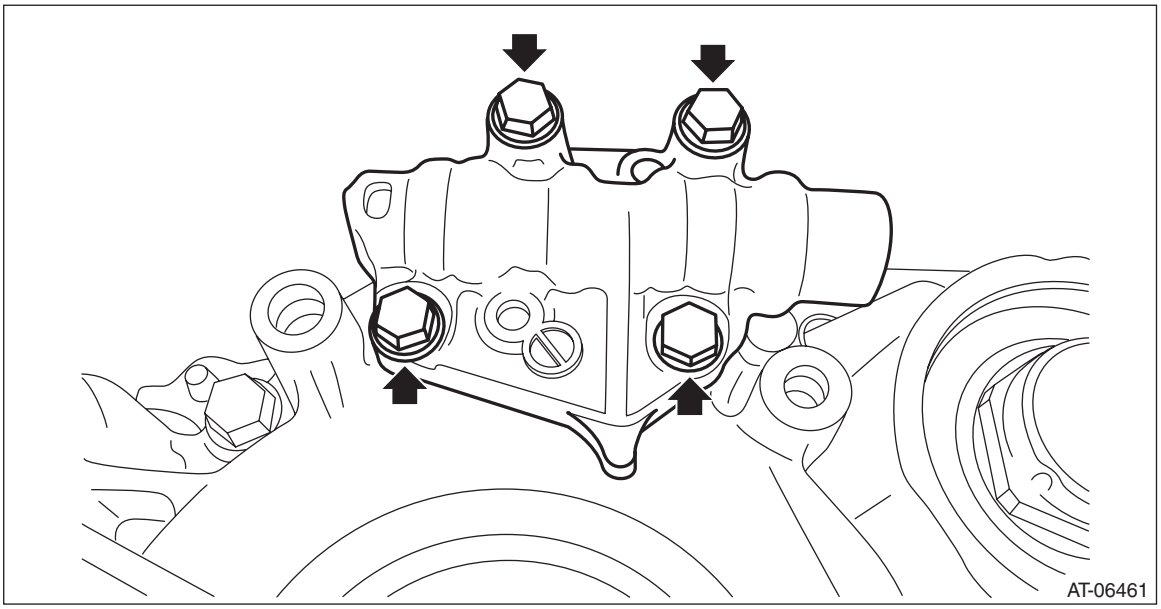
C: INSPECTION

Check the variator chain for damage and wear.

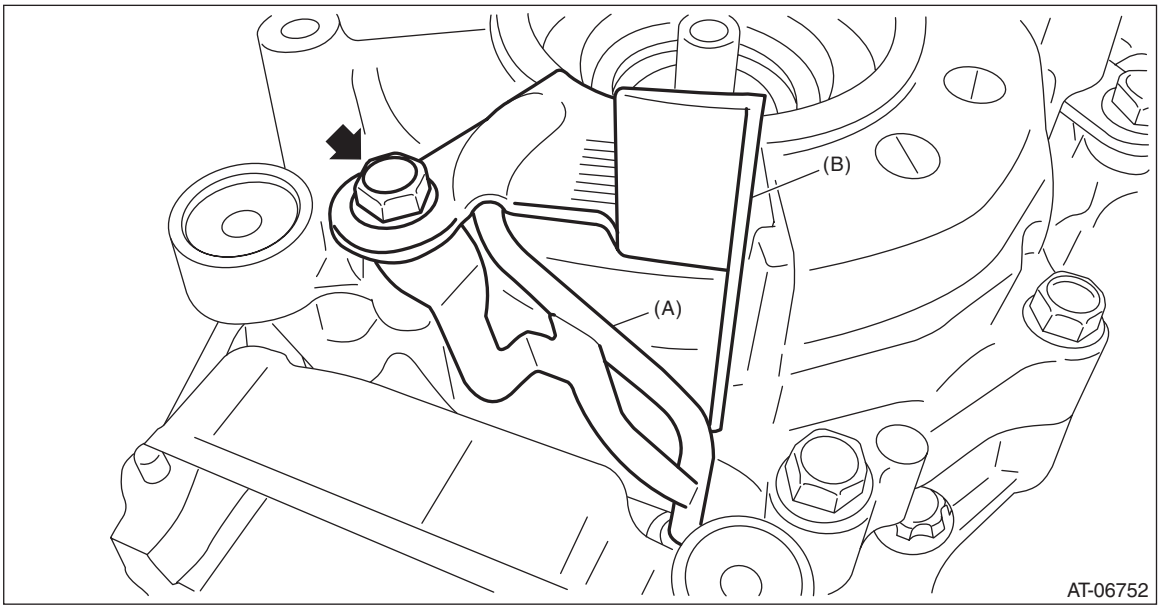
39.Reverse Brake Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-162, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-121, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-136, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-107, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-109, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-112, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-197, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-211, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-229, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-234, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the manual valve assembly.

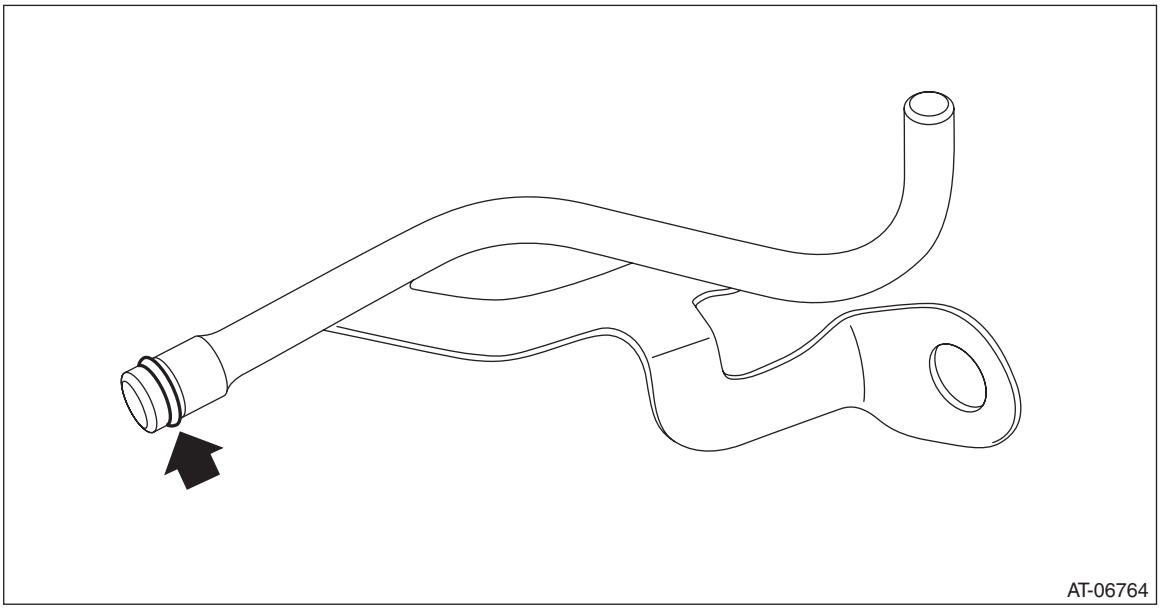


20) Remove the oil guide and lubrication pipe.

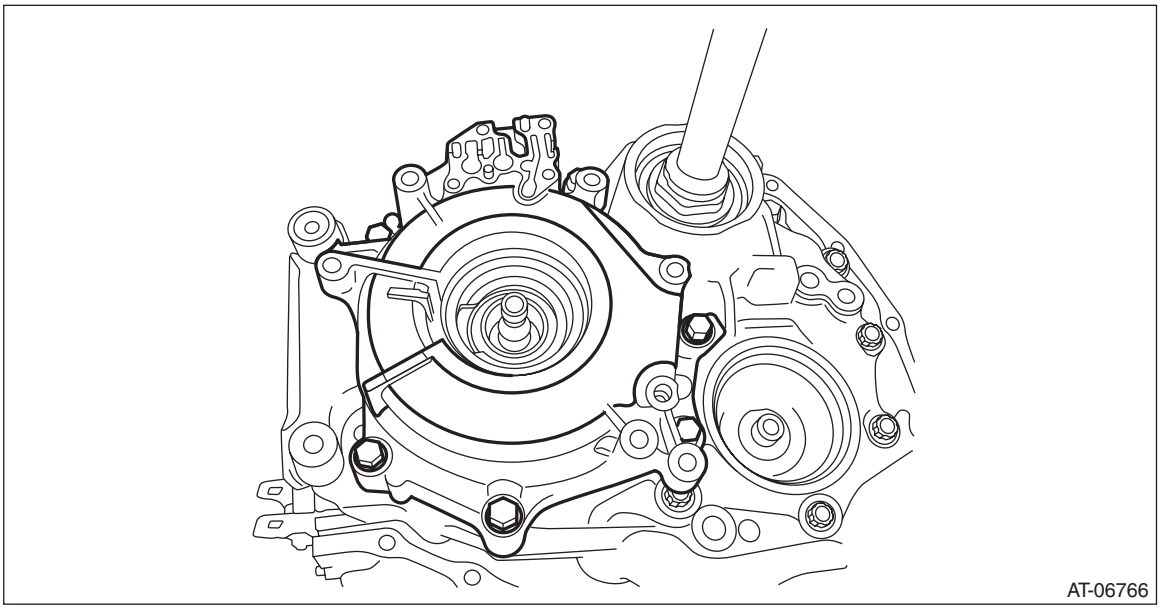


(A) Lubrication pipe
(B) Oil guide

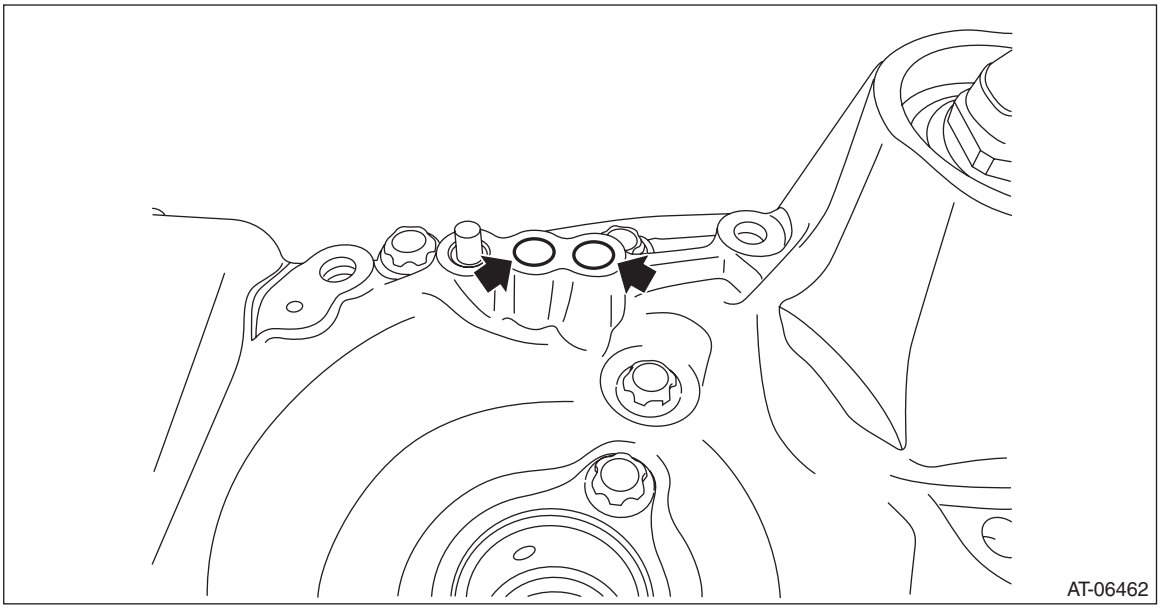
21) Remove the O-ring from lubrication pipe.



22) Remove the reverse brake assembly.

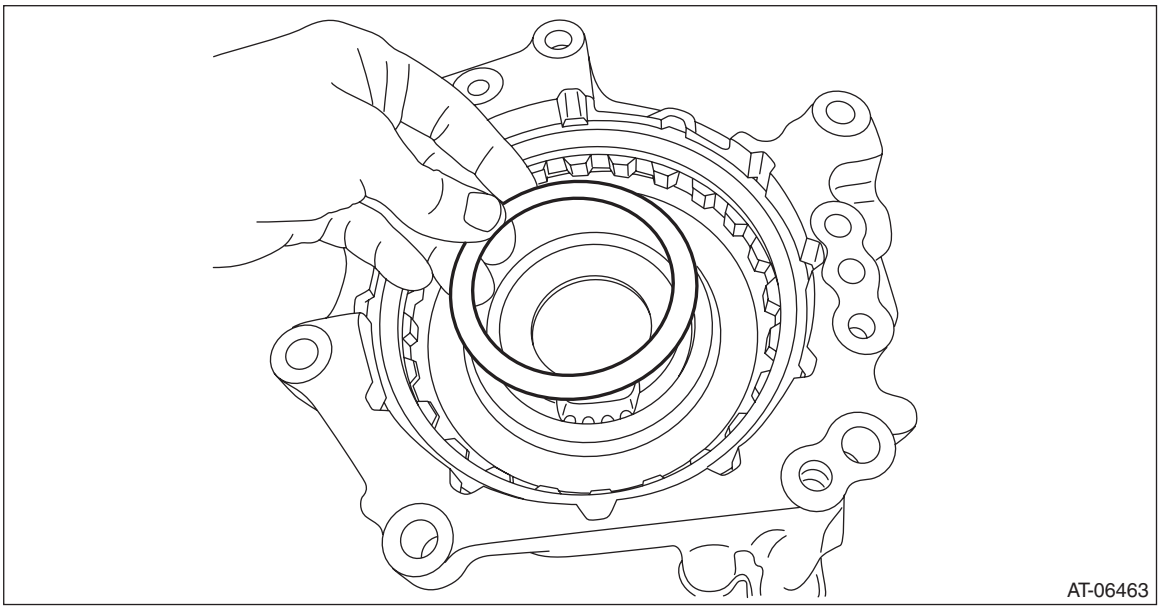


23) Remove the O-ring.



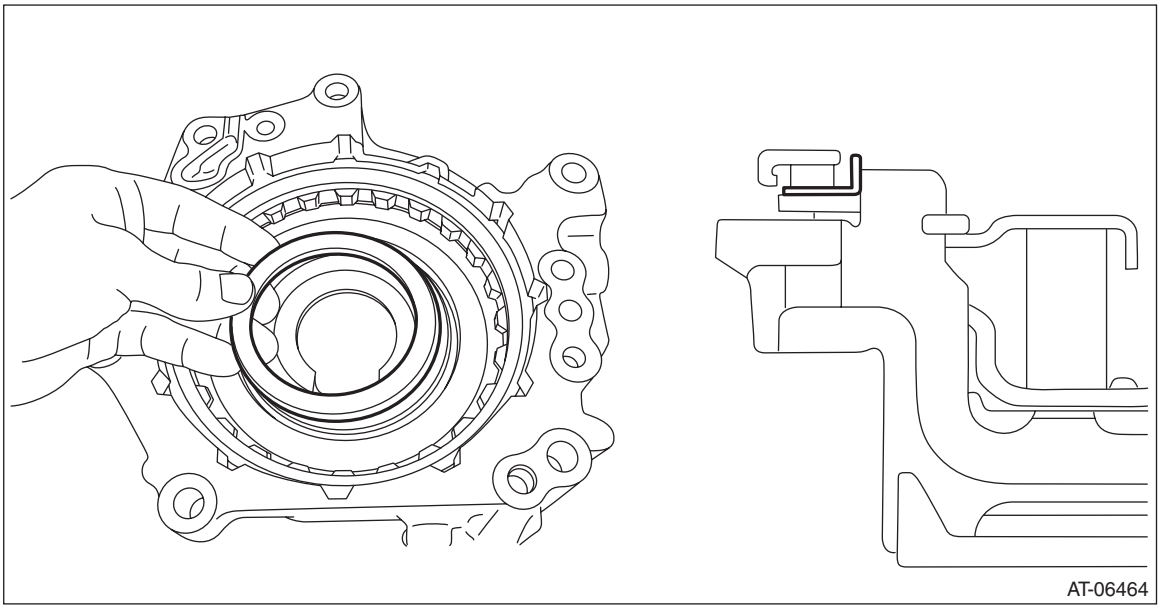
B: INSTALLATION

1) Select a washer. <Ref. to CVT(TR580)-288, ADJUSTMENT, Forward Clutch Assembly.>
2) Install the selected washer to the reverse brake housing.

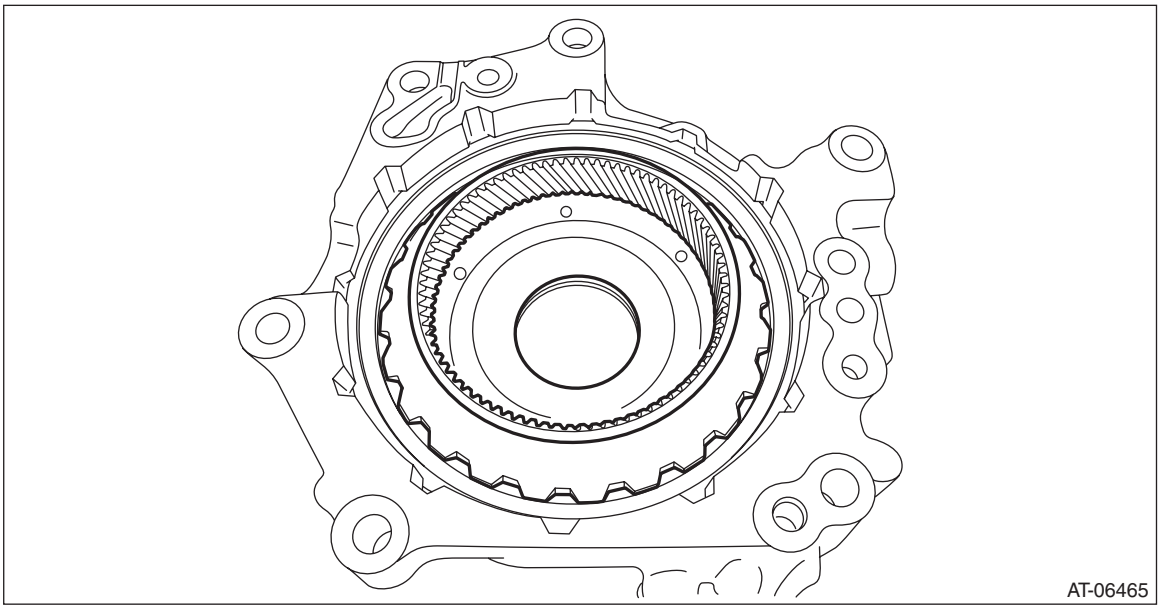


3) Install the thrust bearing to the reverse brake housing.

NOTE:
Face the temper color surface to the reverse brake side.

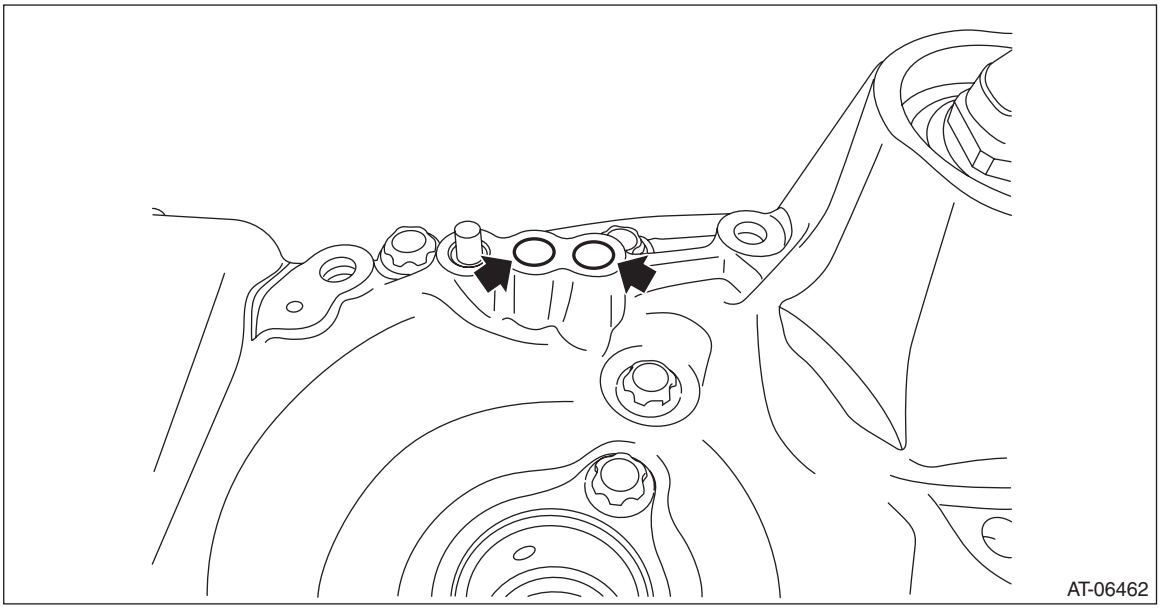


4) Remove the internal gear from the forward clutch assembly, and install it to the reverse brake housing.



5) Install the O-ring.

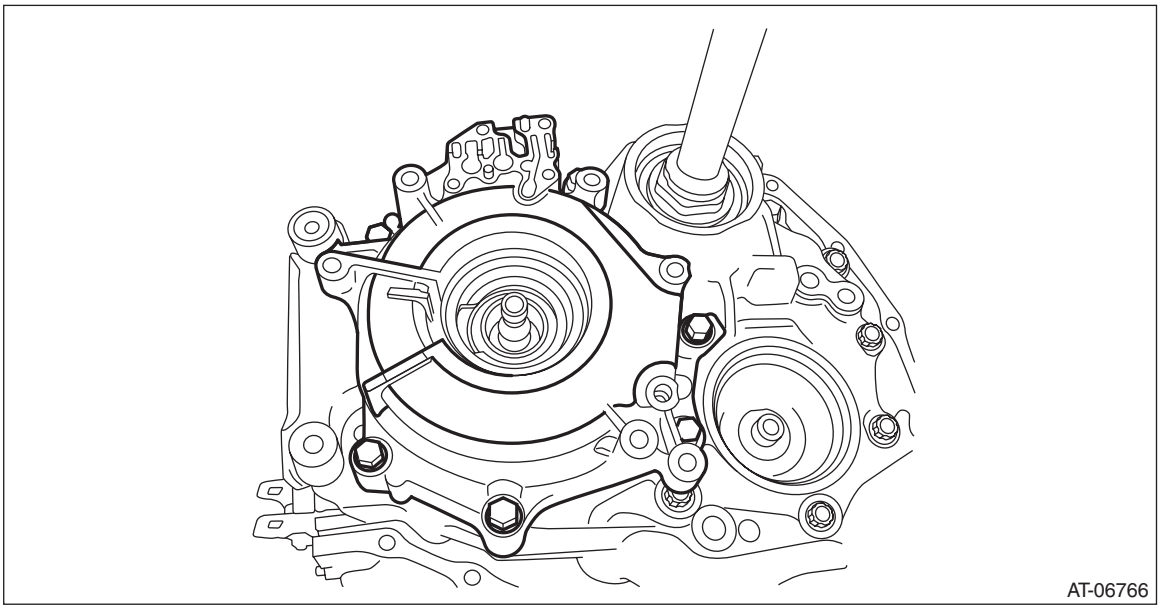
NOTE:
- Install a new O-ring.
- Apply CVTF to the O-ring.



6) Install the reverse brake assembly and internal gear as a unit to the drive pinion retainer.

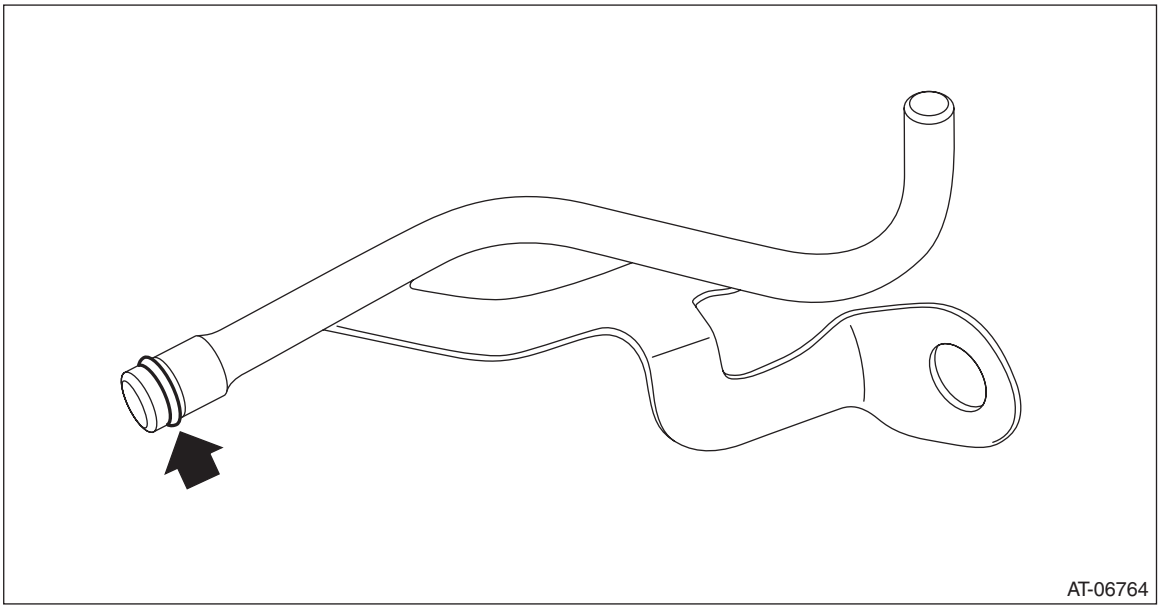
NOTE:
Slowly rotate the input shaft by hand to engage the internal gear and pinion gear of planetary carrier.

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)



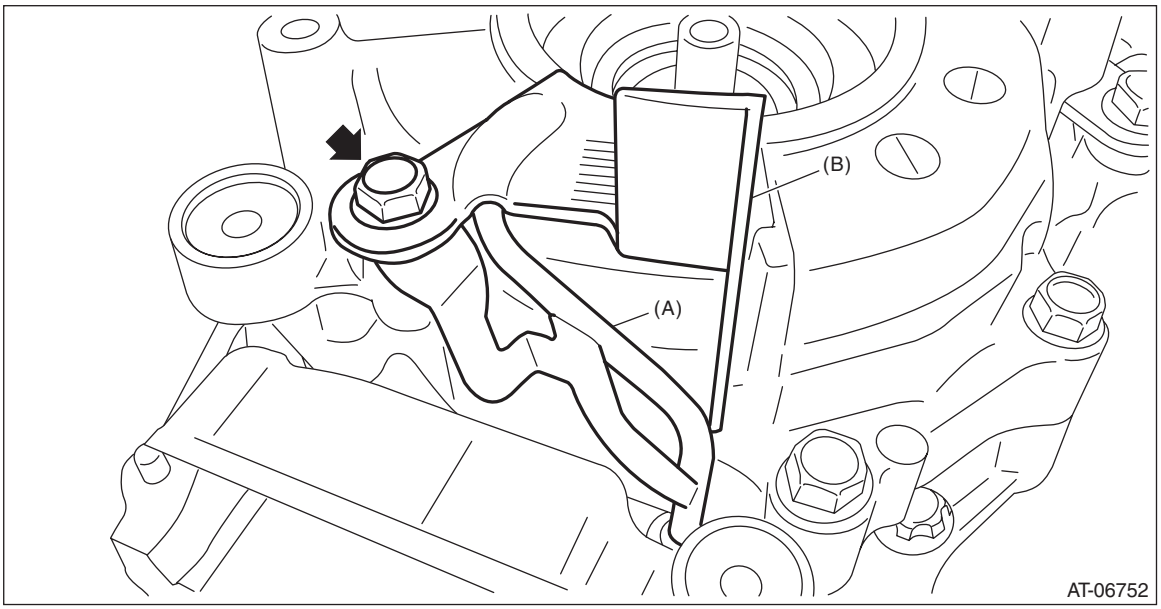
7) Install the O-ring to the lubrication pipe.

NOTE:
- Install a new O-ring.
- Apply CVTF to the O-ring.



8) Install the lubrication pipe and oil guide.

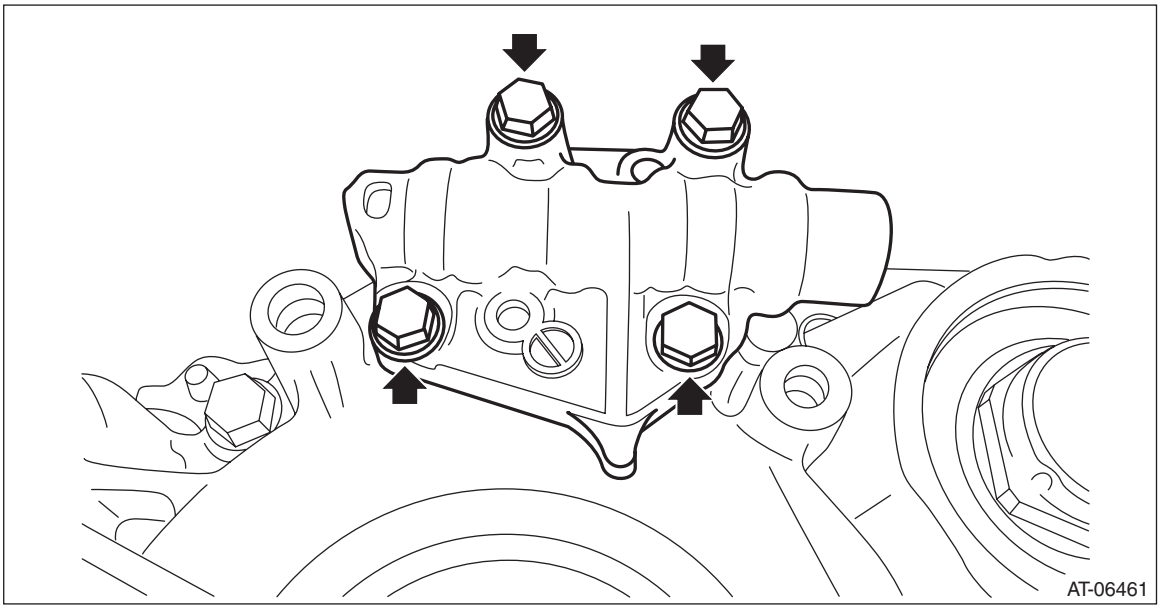
Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) Lubrication pipe
(B) Oil guide

9) Install the manual valve assembly and separator plate.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)

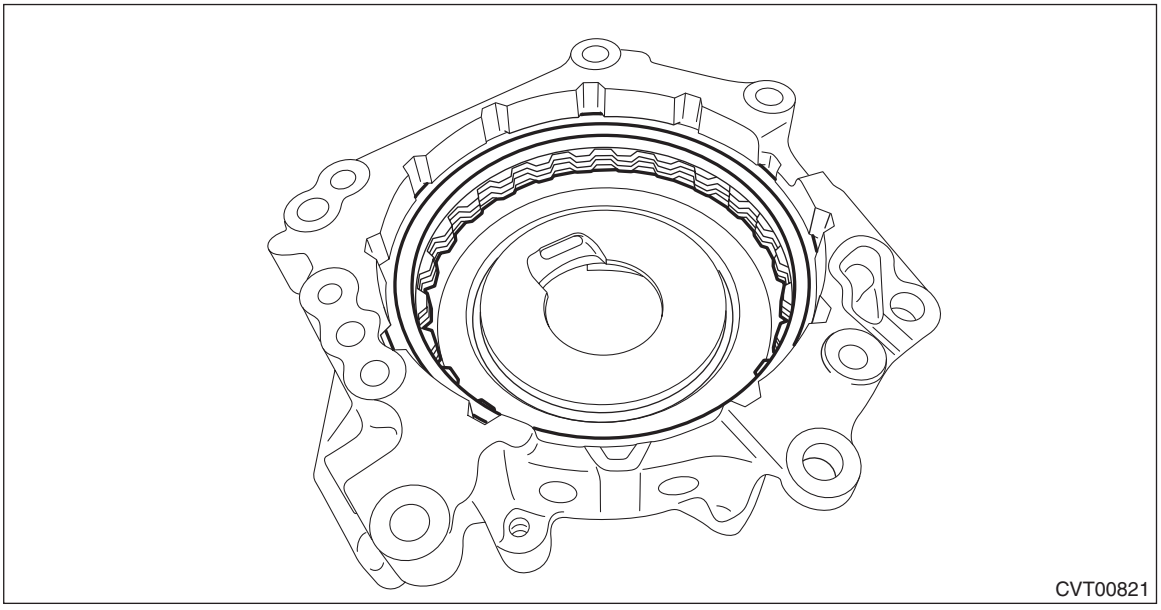


10) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-241, INSTALLATION, Primary Pulley and Secondary Pulley.>
11) Select shims for pulley alignment. <Ref. to CVT(TR580)-248, ADJUSTMENT, Primary Pulley and Secondary Pulley.>
12) Install the reduction drive gear. <Ref. to CVT(TR580)-230, INSTALLATION, Reduction Drive Gear.>
13) Install the transmission case. <Ref. to CVT(TR580)-214, INSTALLATION, Transmission Case.>
14) Install the transmission control device. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Control Device.>

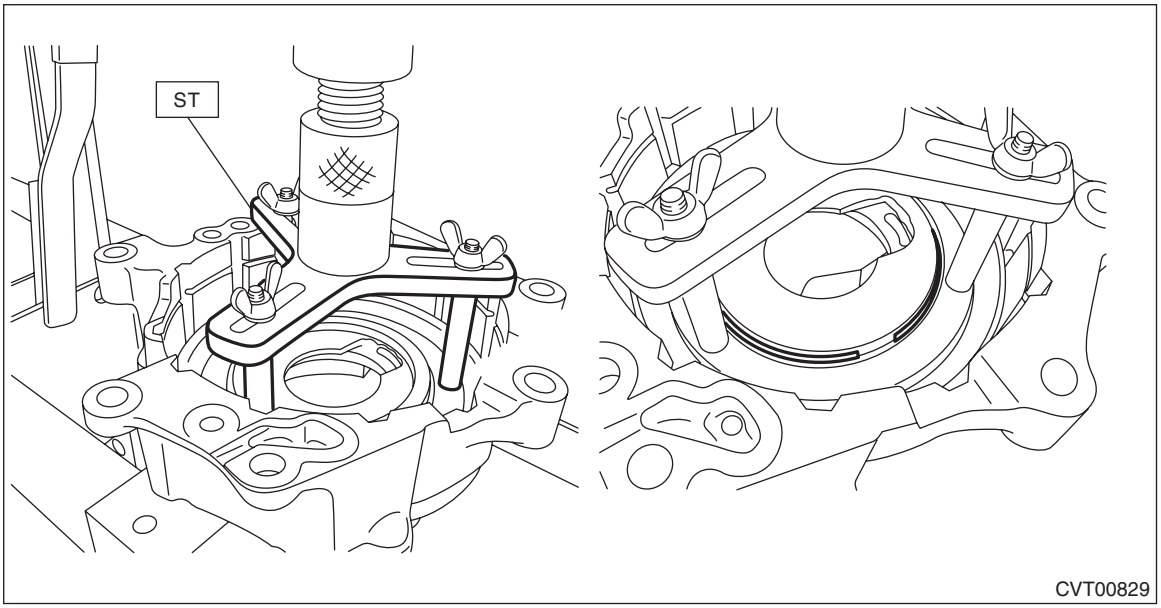
15) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>
16) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-197, INSTALLATION, Reduction Driven Gear.>
17) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>
18) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
19) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>
20) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
21) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
22) Install the secondary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Secondary Speed Sensor.>
23) Install the primary speed sensor. <Ref. to CVT(TR580)-113, INSTALLATION, Primary Speed Sensor.>
24) Install the turbine speed sensor. <Ref. to CVT(TR580)-107, INSTALLATION, Turbine Speed Sensor.>
25) Install the transmission harness. <Ref. to CVT(TR580)-143, INSTALLATION, Transmission Harness.>
26) Install the control valve body. <Ref. to CVT(TR580)-127, INSTALLATION, Control Valve Body.>
27) Install the air breather hose. <Ref. to CVT(TR580)-164, INSTALLATION, Air Breather Hose.>
28) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

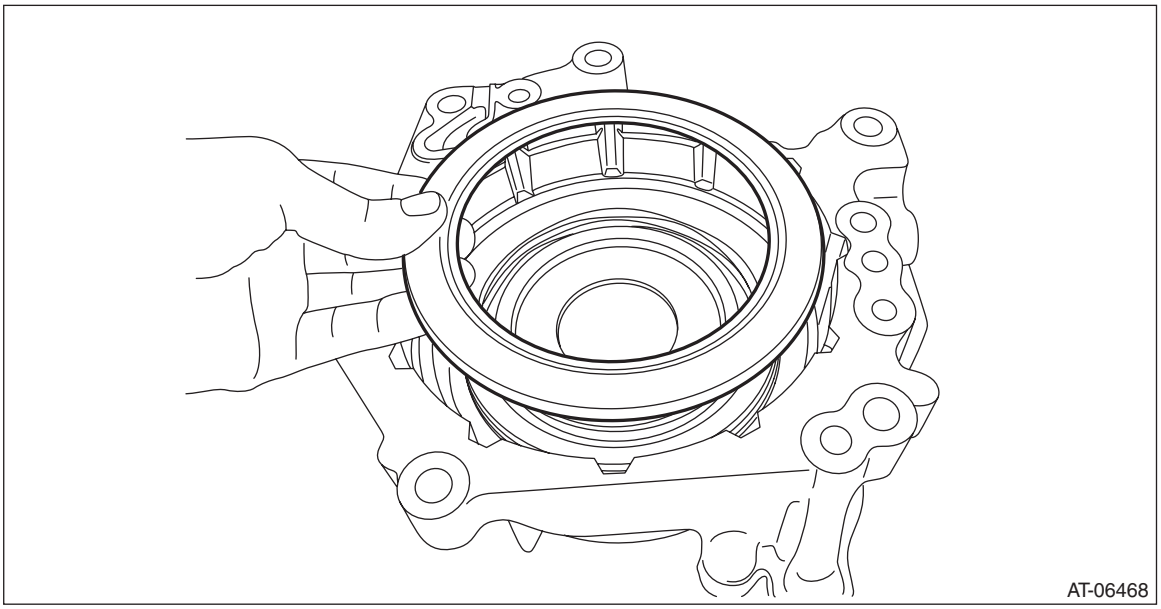
1) Remove the snap ring.
2) Remove the retaining plate, drive plate, driven plate and dish plate.



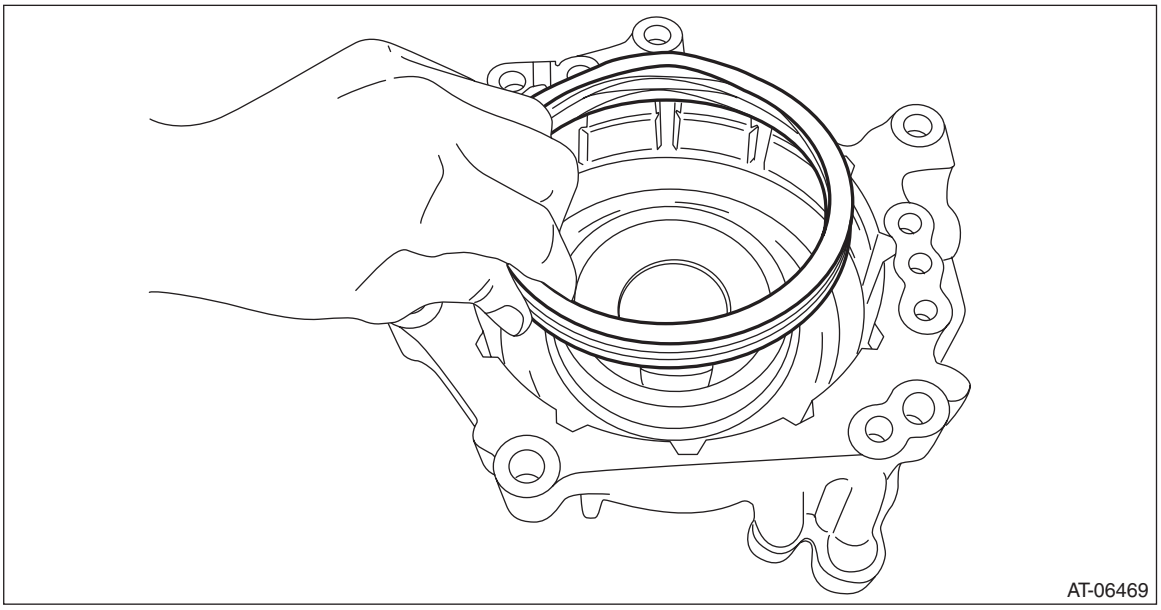
3) Compress the return spring using the ST to remove the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



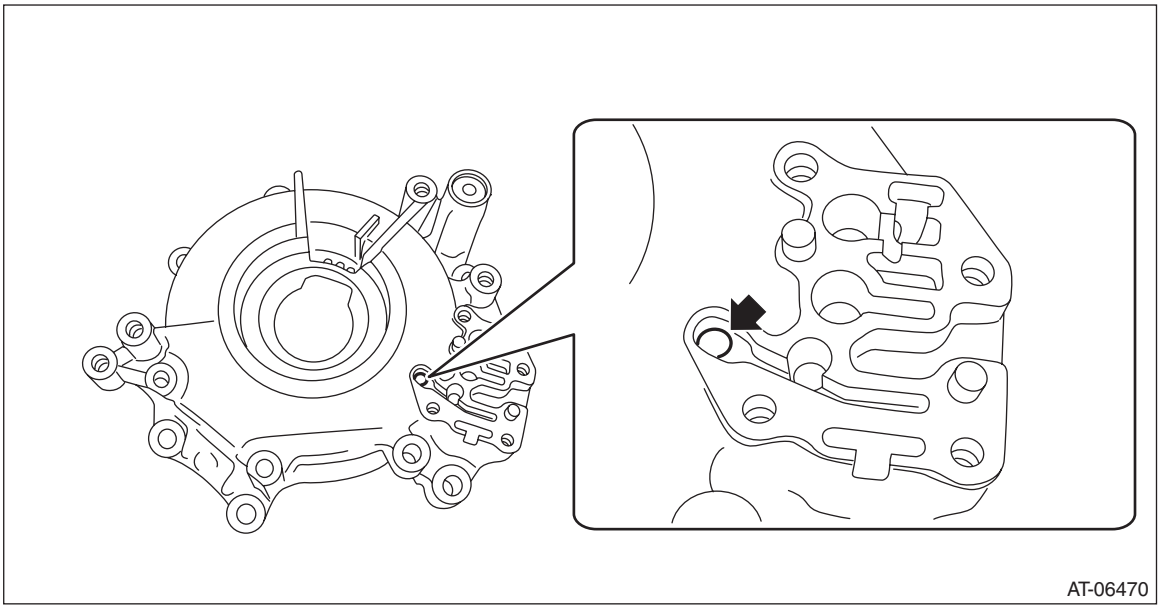
4) Using the ST, remove the snap ring and spring retainer.



5) Remove the return spring.



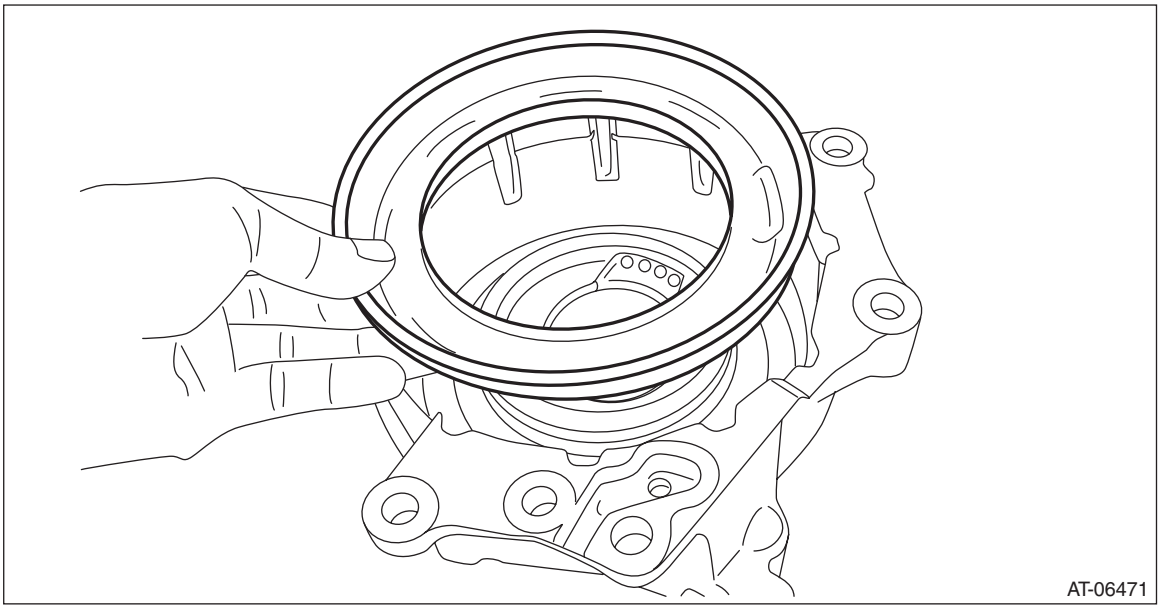
6) Remove the reverse brake piston by blowing compressed air intermittently from reverse brake housing hole.



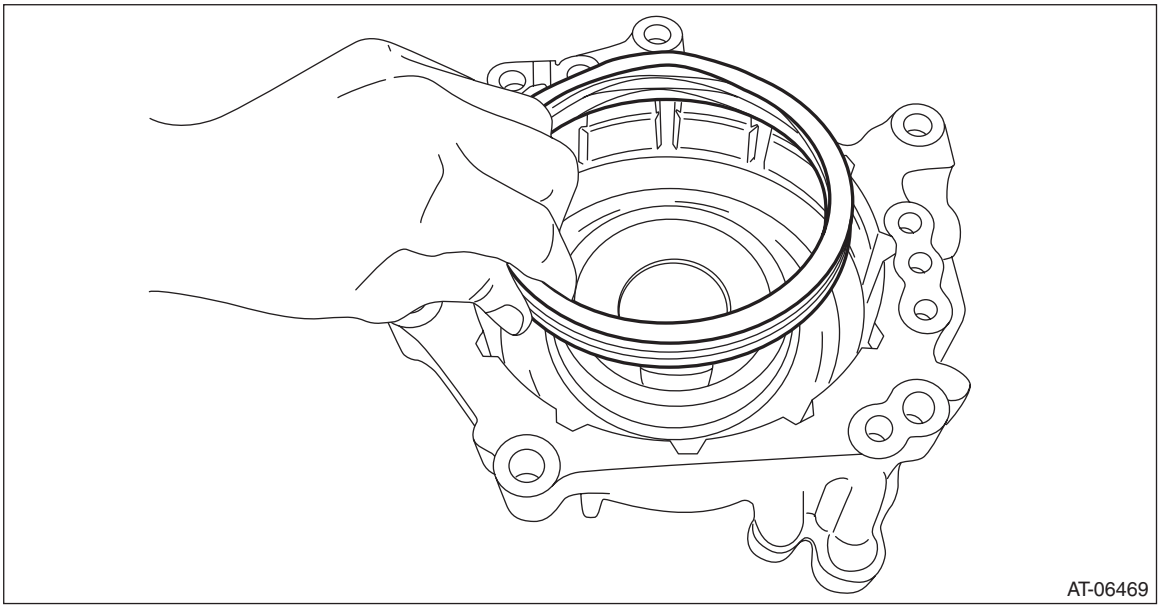
D: ASSEMBLY

1) Install the reverse brake piston.

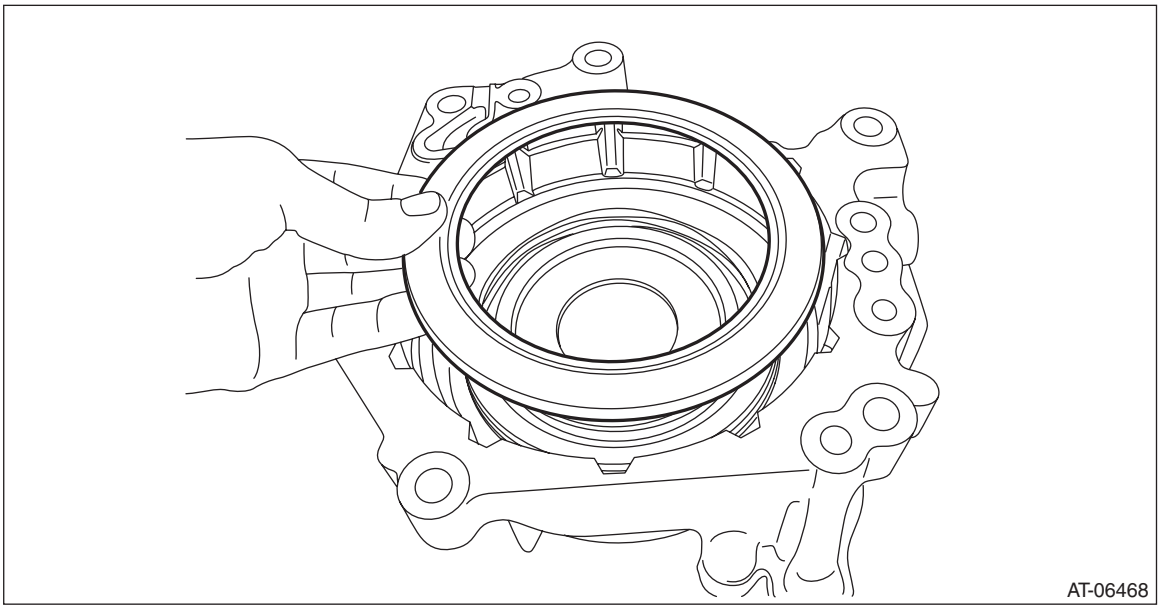
NOTE:
Apply CVTF to the sealing area of reverse brake piston.



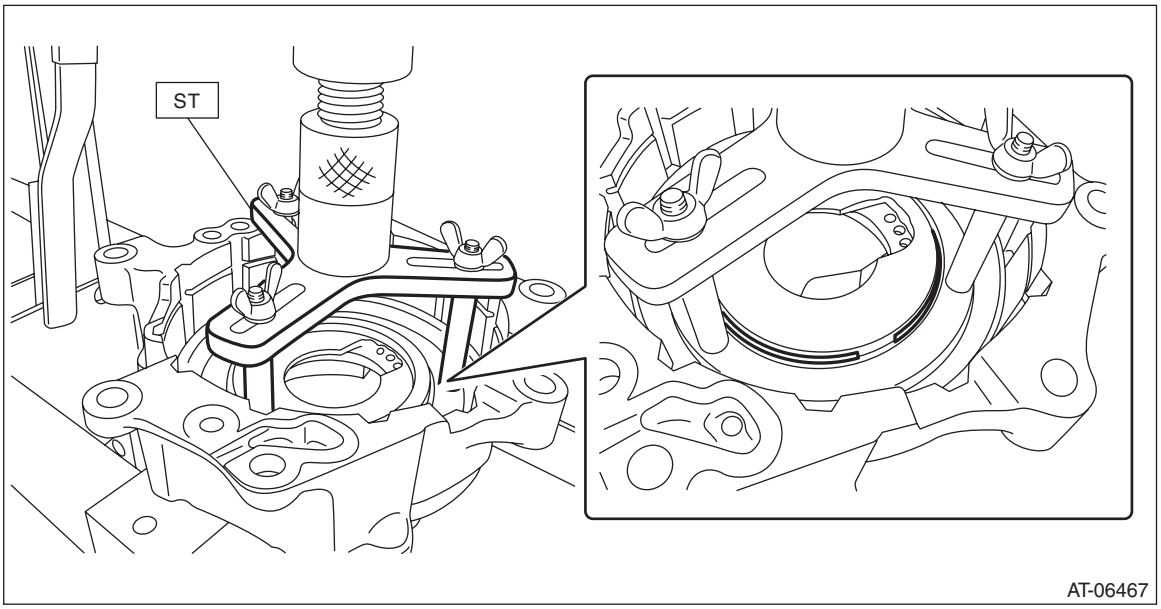
2) Install the return spring.



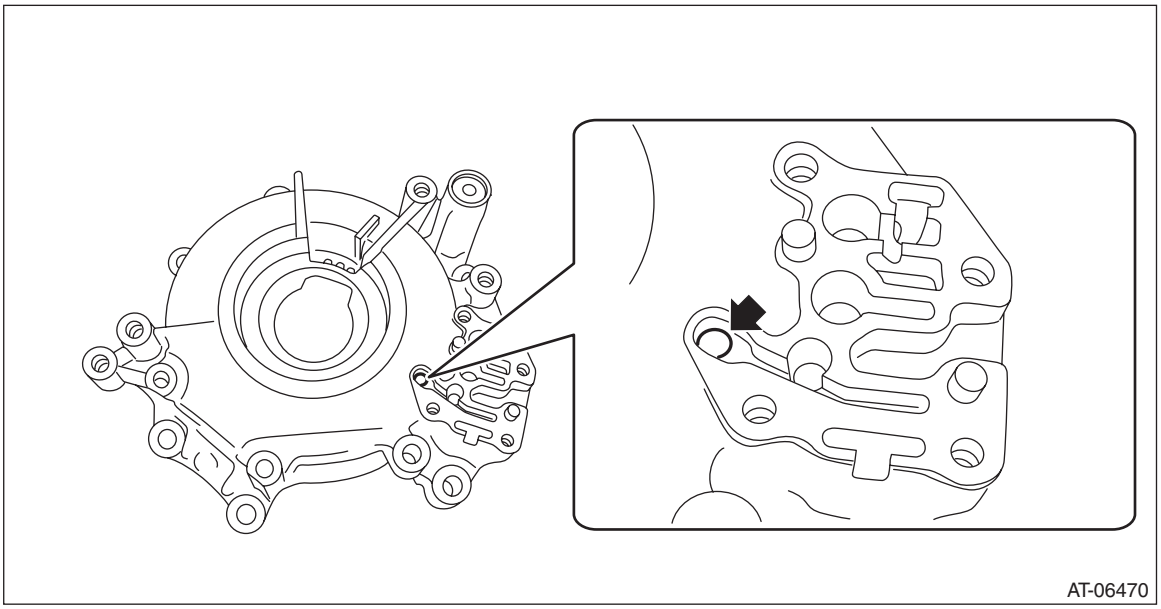
3) Install the spring retainer.



4) Compress the return spring using the ST to install the snap ring.
ST1 18762AA001 COMPRESSOR SPECIAL TOOL



5) Check the operation of reverse brake piston by blowing compressed air intermittently from reverse brake housing hole.



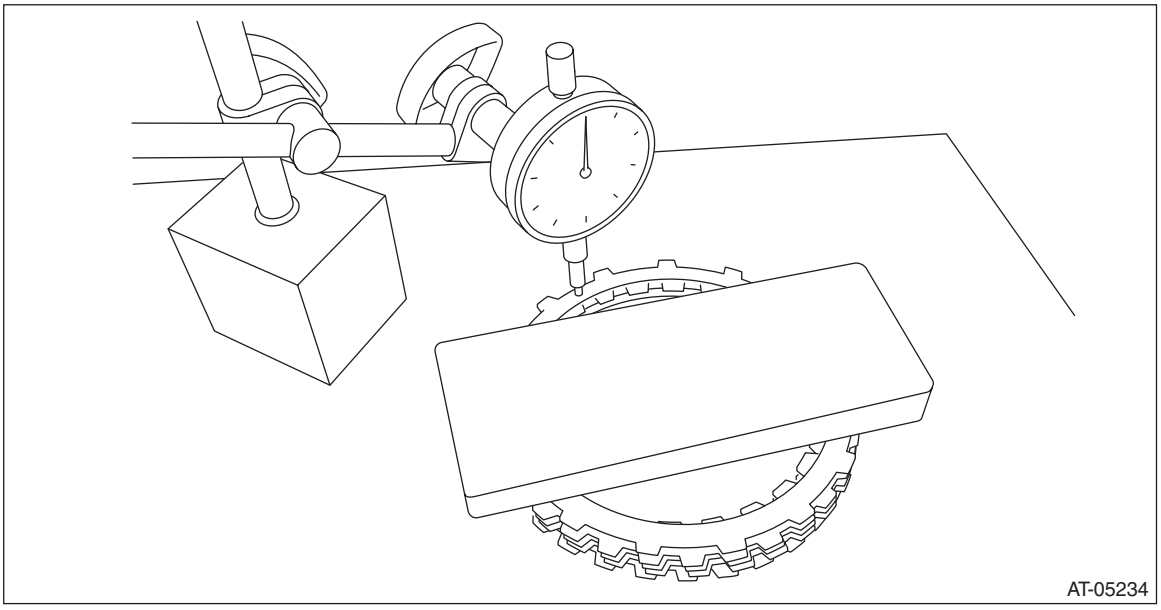
6) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
7) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.

8) Scale and record the weight "Z" of a flat board which will be put on retaining plate.

NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 29 N (3.0 kgf, 6.5 lb).

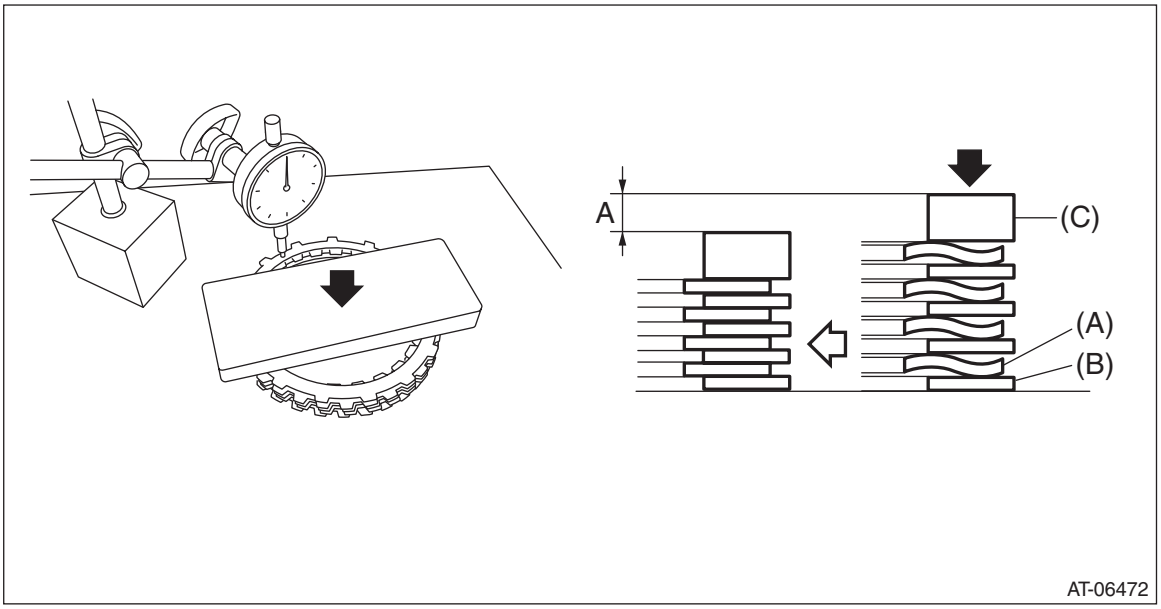
9) Put the flat board on retaining plate.



10) Using the following formula, read the push/pull gauge and calculate "N".
N = 29 N (3.0 kgf, 6.5 lb) – Z
29 N (3.0 kgf, 6.5 lb) : Load applied to clutch plate
Z: Flat board weight

11) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

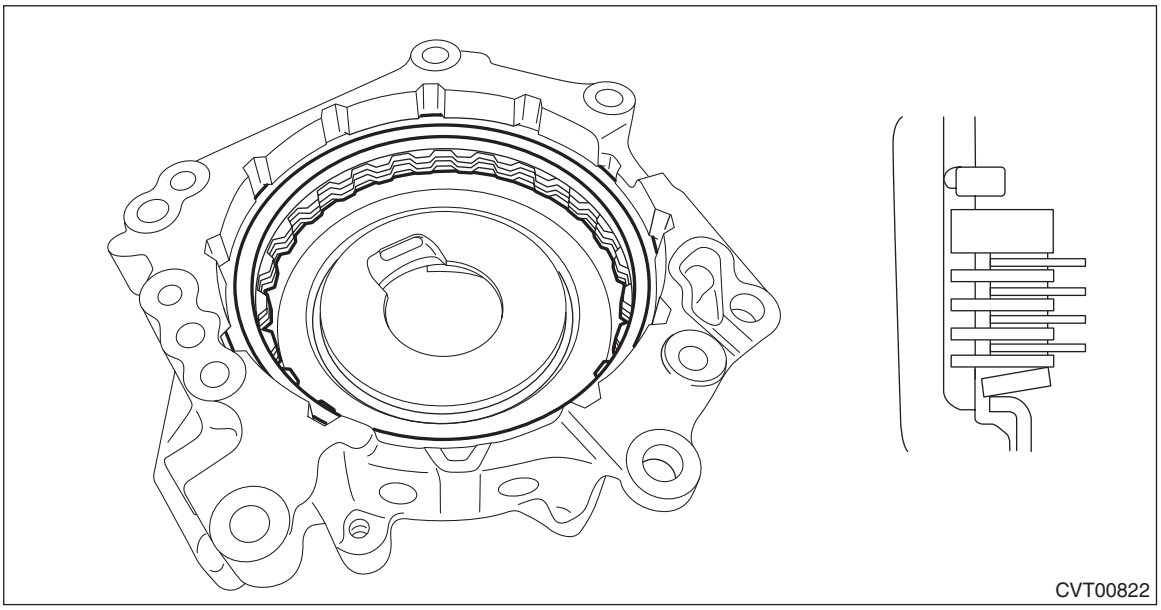
NOTE:
Measure at four points with a 90° interval and calculate the average.



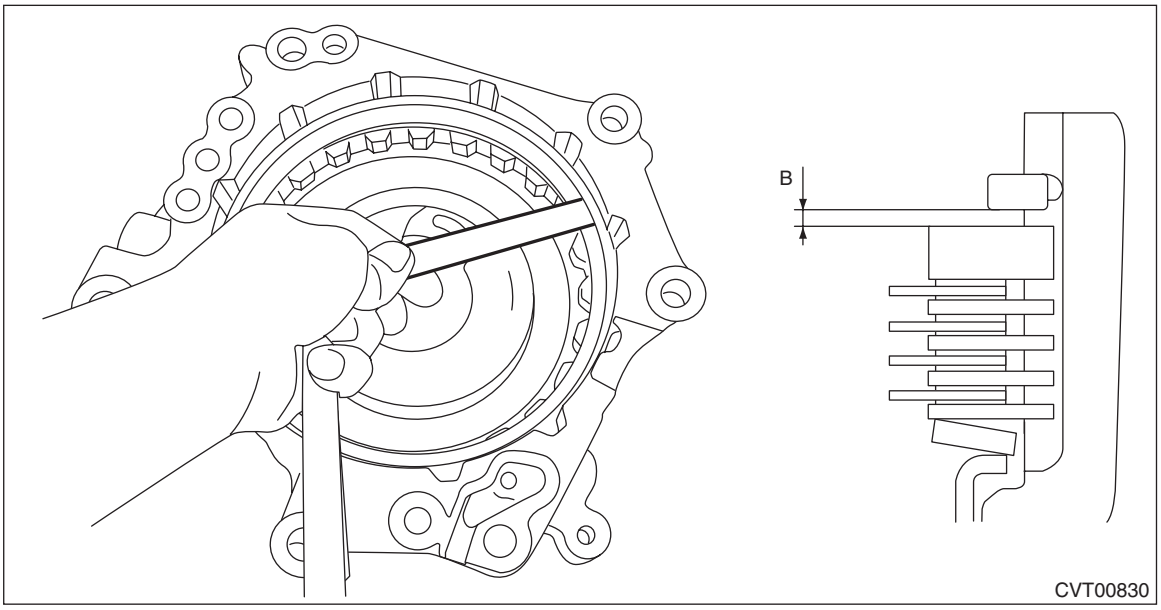
(A) Drive plate
(B) Driven plate
(C) Retaining plate

12) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the reverse brake housing.

NOTE:
Install the dish plate in the correct direction.



13) Measure and record the clearance “B” between the retaining plate and snap ring.



14) Piston stroke calculation

Calculate with A and B dimensions recorded before. If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.

S mm (in) = A + B

S: Piston stroke

A: Compression amount of drive plate and dish plate

B: Clearance between retaining plate and snap ring

Initial standard:

2.3 — 2.7 mm (0.091 — 0.106 in)

Limit thickness:

2.9 mm (0.114 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB750	4.2 (0.165)
31567AB800	4.4 (0.173)
31567AB810	4.6 (0.181)
31567AB820	4.8 (0.189)

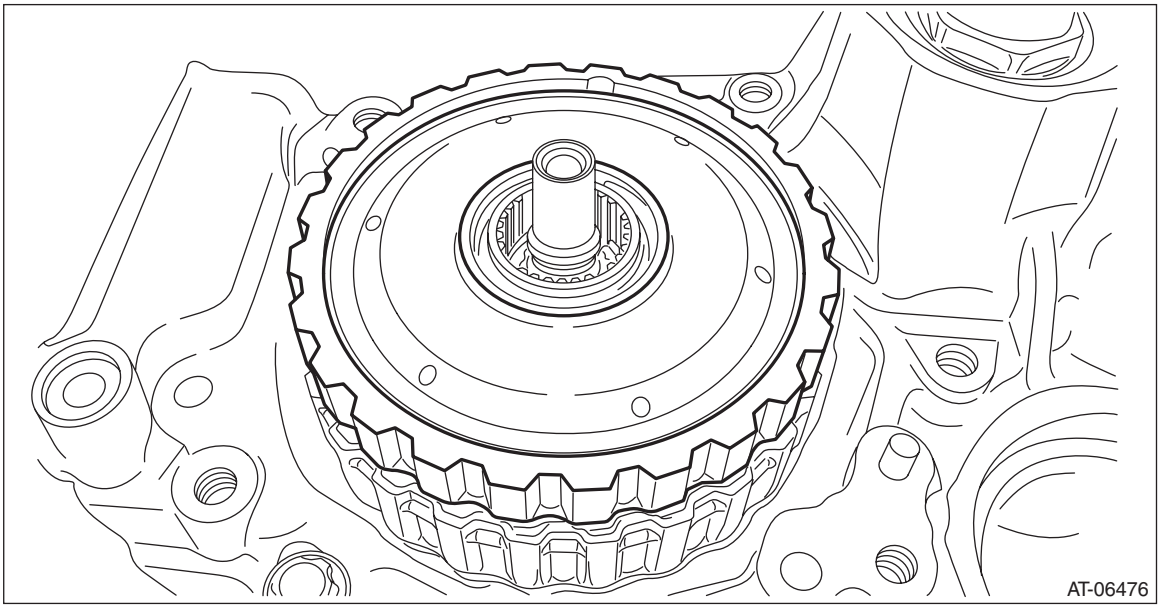
E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and snap ring of reverse brake is within the limit. If it exceeds the limit, replace with a new drive plate and select and adjust the retaining plate within the initial standard value. <Ref. to CVT(TR580)-265, ASSEMBLY, Reverse Brake Assembly.>

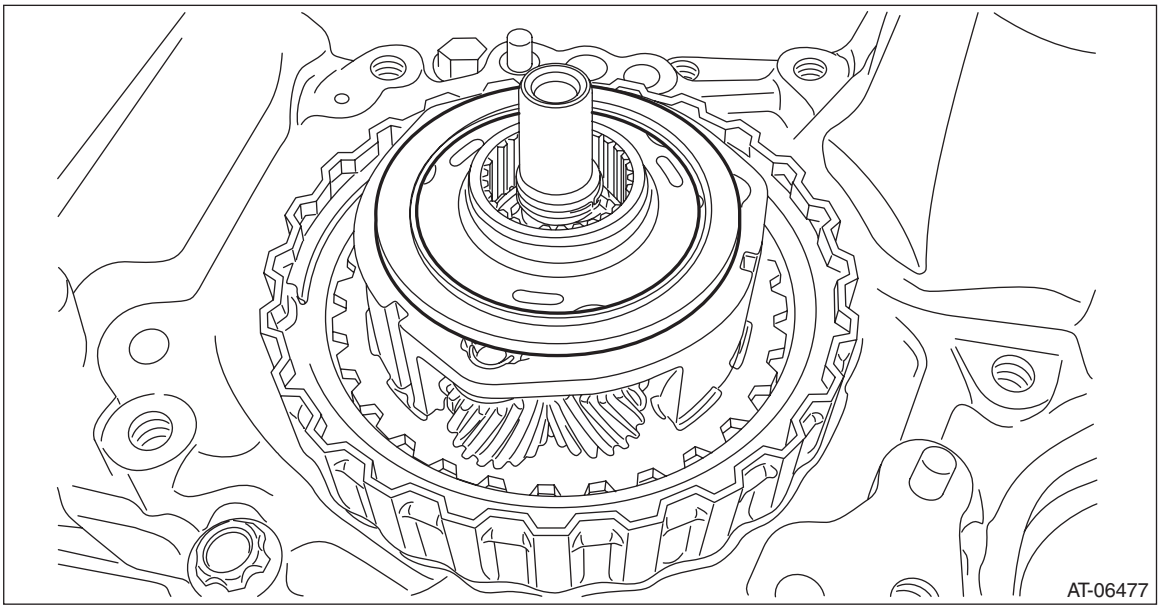
40.Forward Clutch Assembly

A: REMOVAL

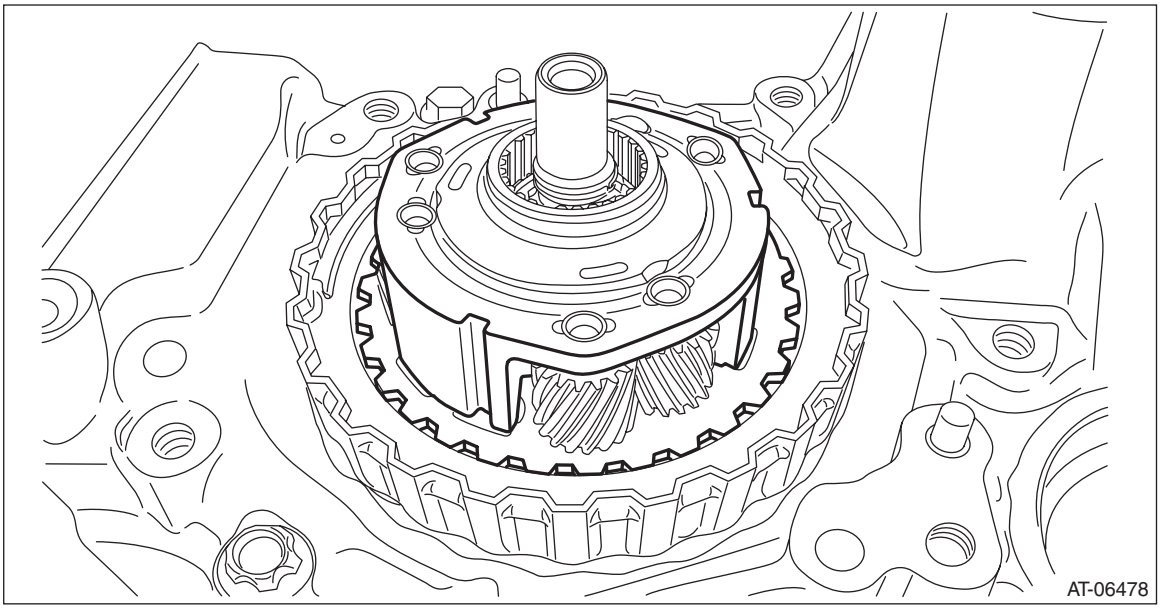
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-162, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-121, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-136, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-107, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-109, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-112, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-197, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-211, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-229, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-234, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-255, REMOVAL, Reverse Brake Assembly.>
20) Remove the internal gear.



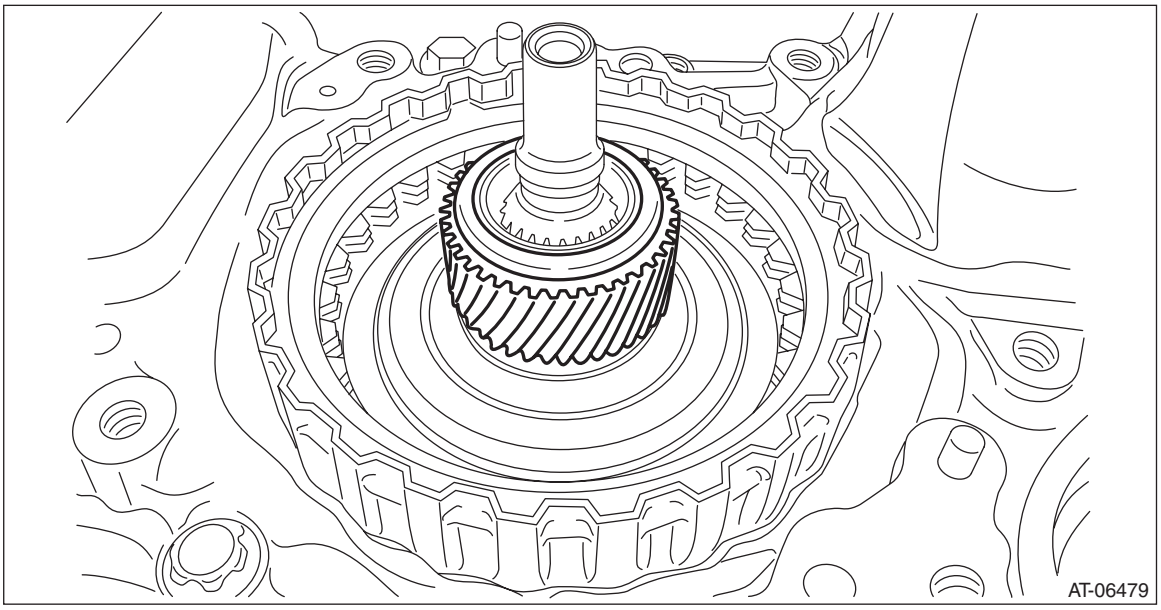
21) Remove the thrust bearing.



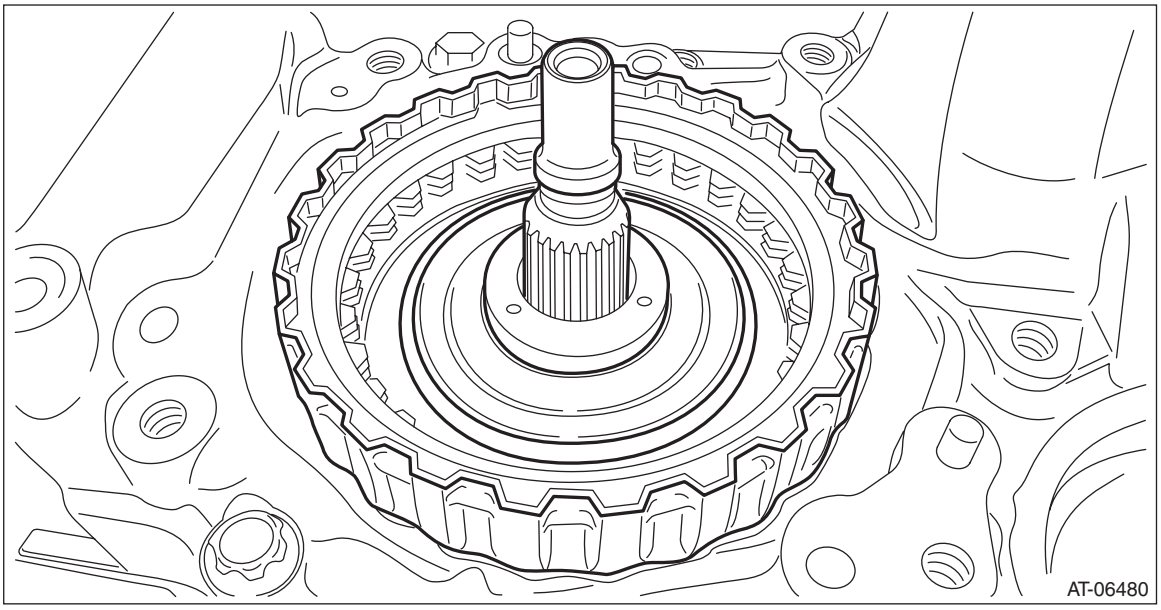
22) Remove the planetary carrier.



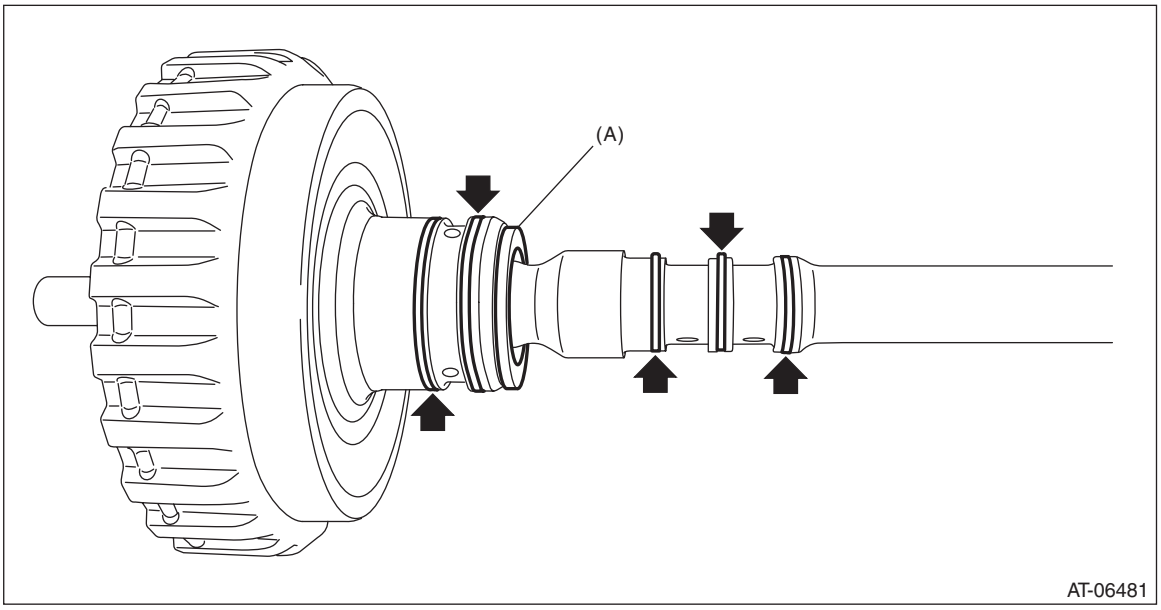
23) Remove the thrust bearing and sun gear.



24) Remove the forward clutch assembly.



25) Remove the thrust bearing and seal ring.

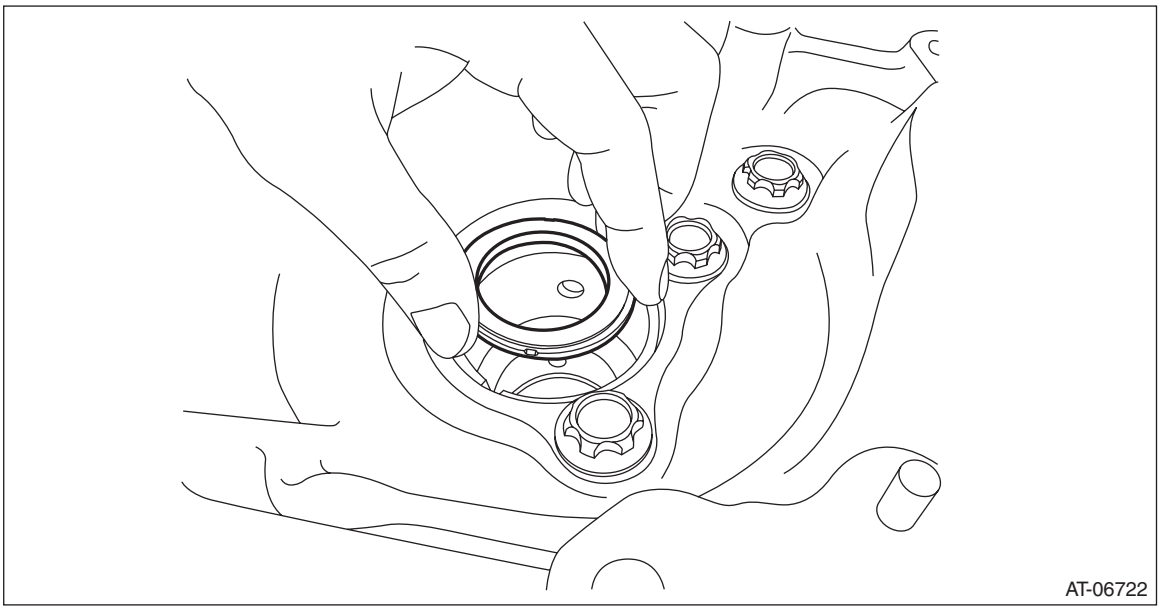


(A) Thrust bearing

B: INSTALLATION

1) Install the thrust bearing to the converter case.

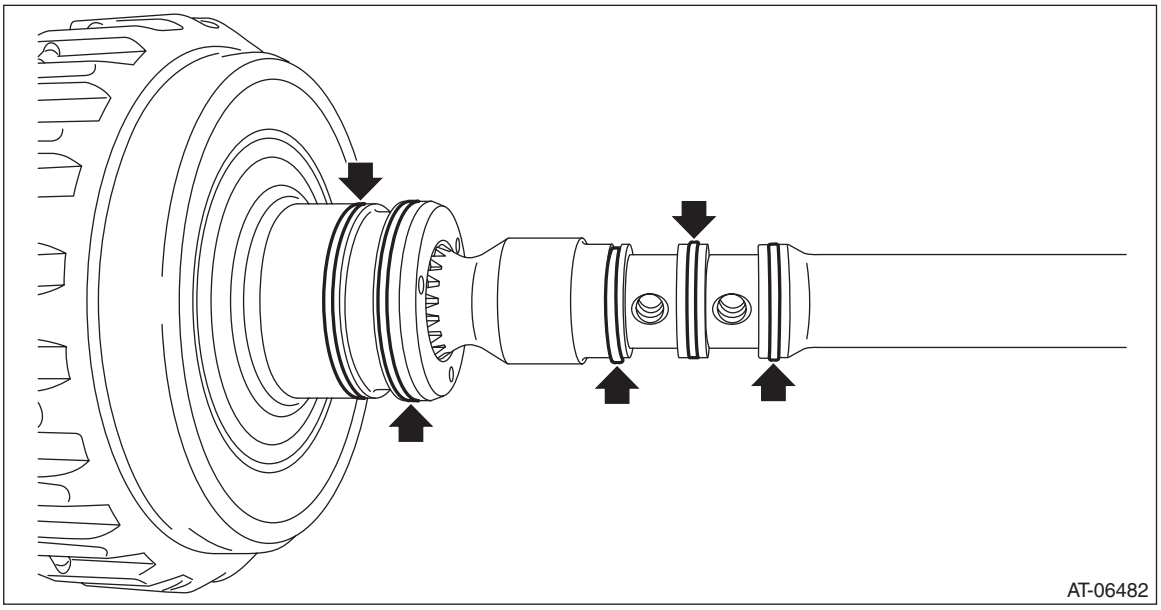
NOTE:
Face the temper color surface to the converter case side.



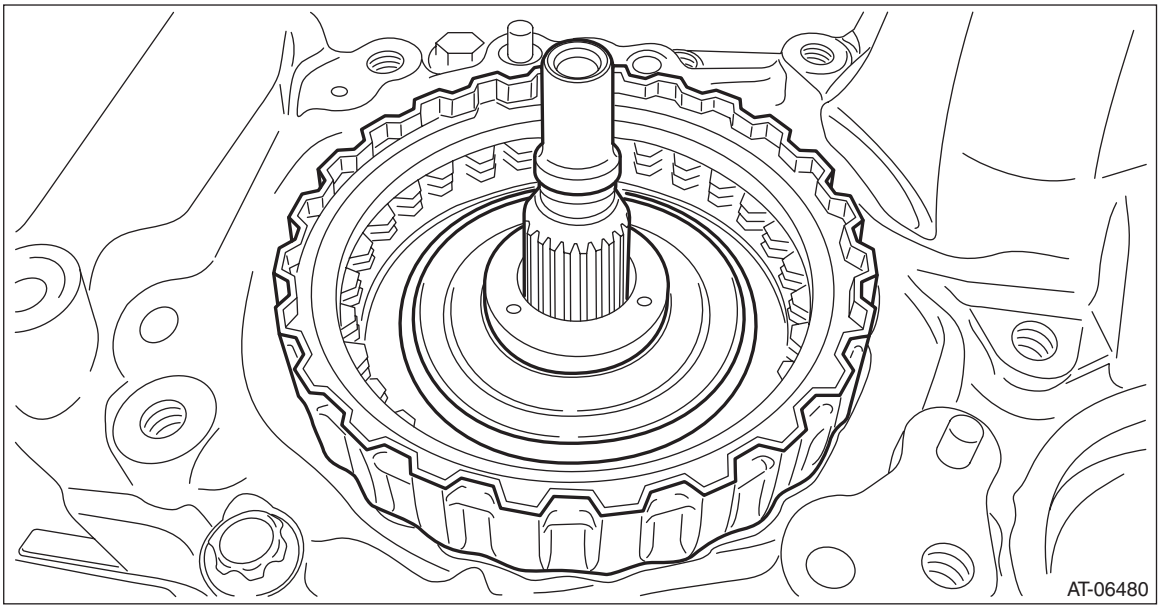
2) Install the seal ring to the input shaft.

NOTE:
- Use new seal rings.
- When installing the seal rings, do not expand the seal rings too much.

- Apply CVTF to the seal rings.

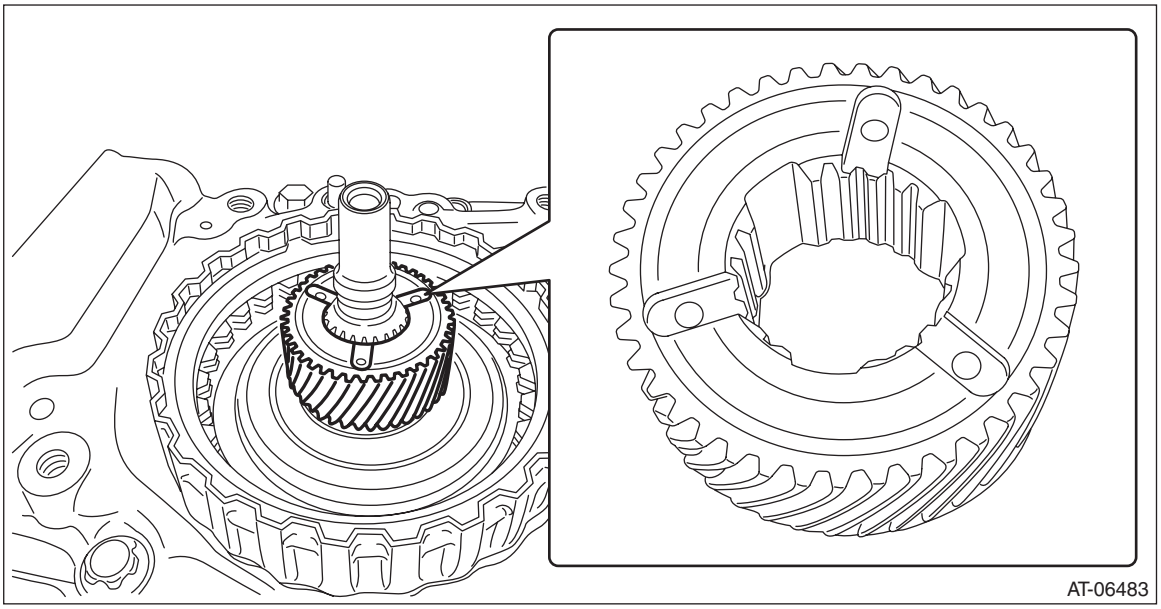


3) Install the forward clutch assembly to the converter case.



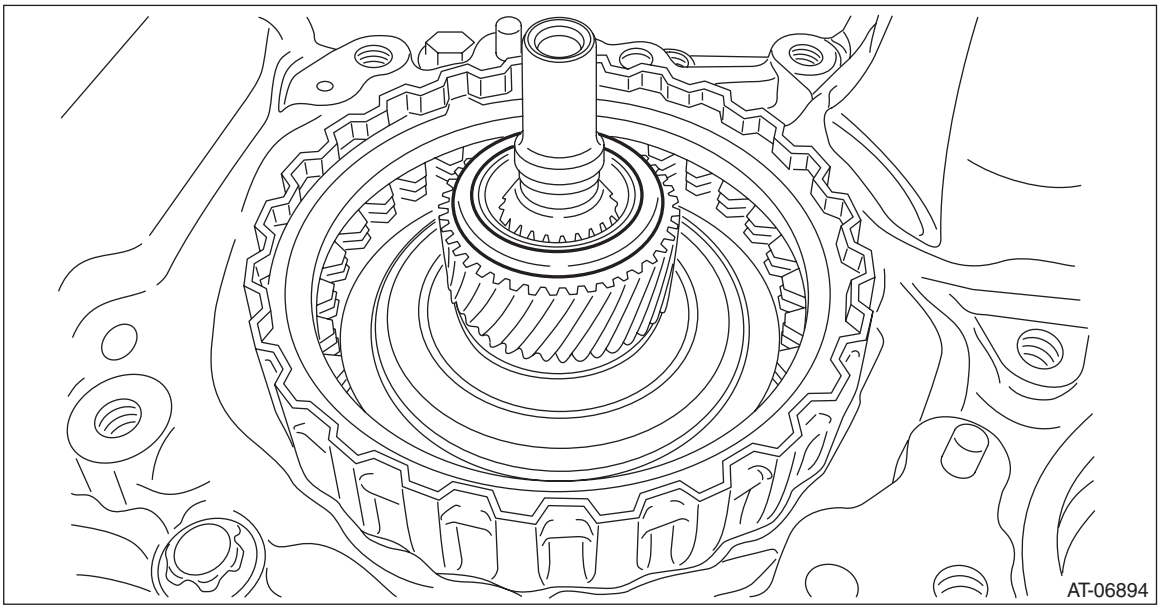
4) Install the sun gear.

NOTE:
Face the end face of the sun gear to the reverse brake side as shown in the figure.

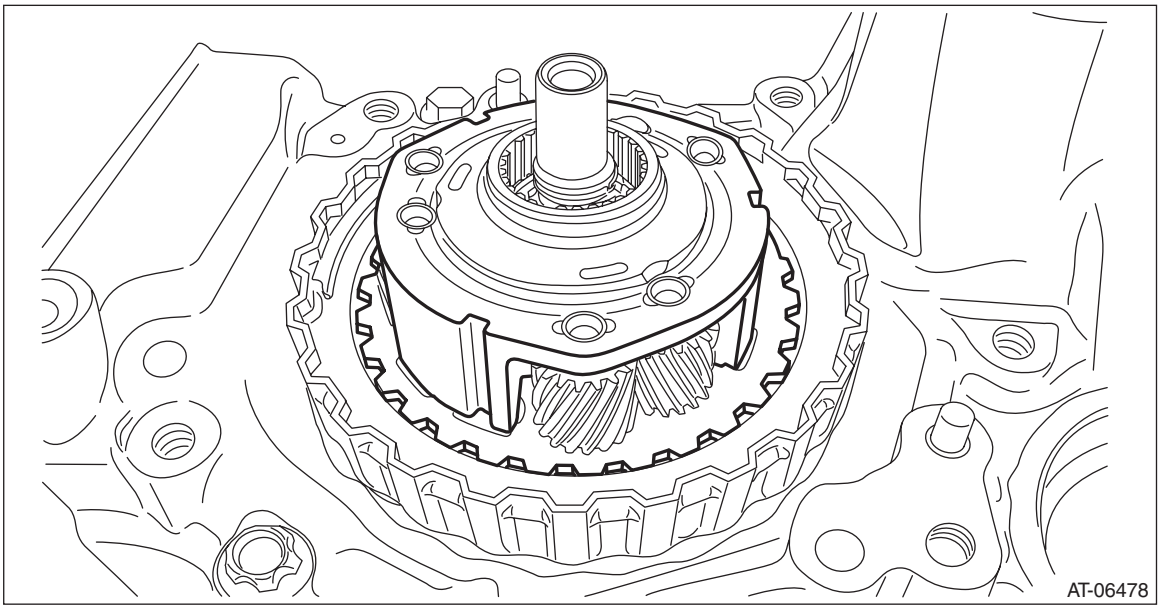


5) Install the thrust bearing to the sun gear.

NOTE:
Face the temper color surface to the reverse brake side.

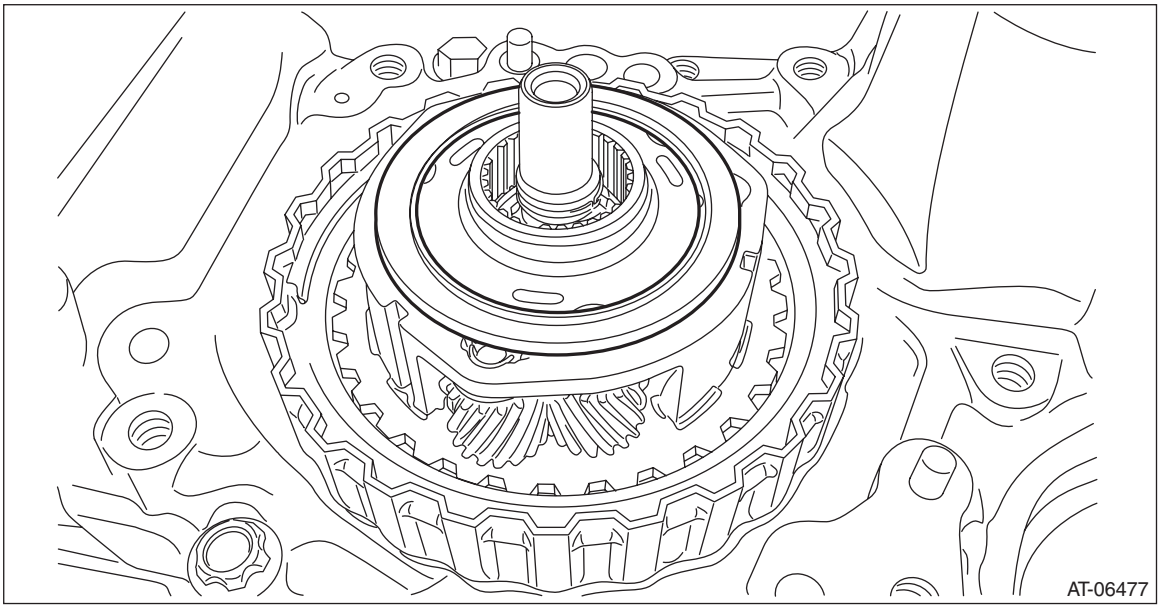


6) Install the planetary carrier.

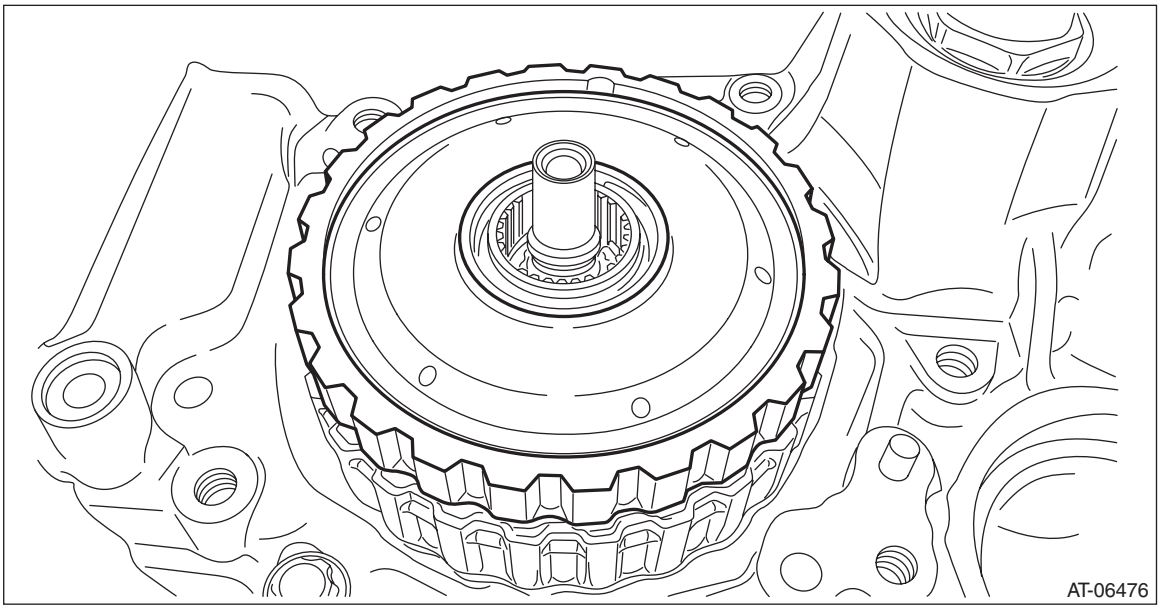


7) Install the thrust bearing.

NOTE:
Face the temper color surface to the reverse brake side.

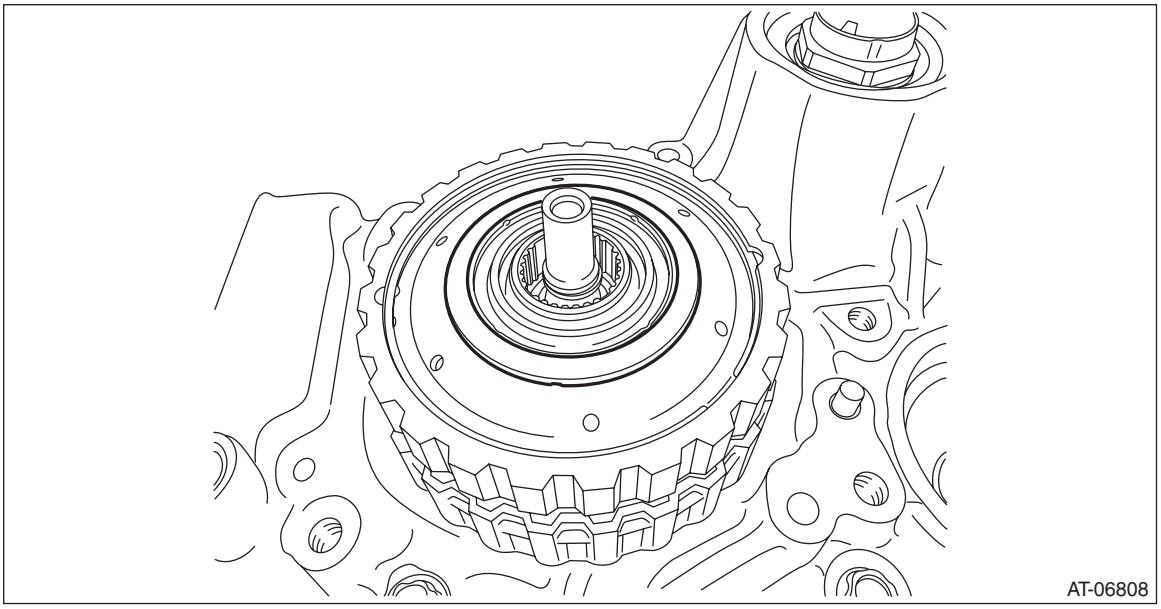


8) Install the internal gear.



9) Install the thrust bearing to the internal gear.

NOTE:
Face the temper color surface to the reverse brake side.



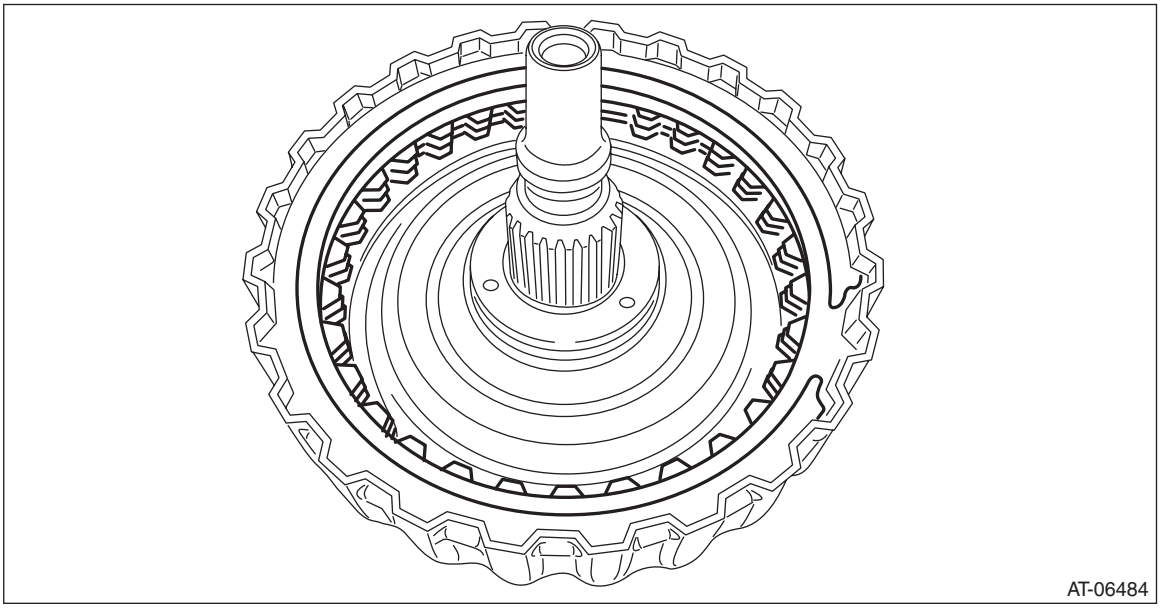
10) Select a washer. <Ref. to CVT(TR580)-288, ADJUSTMENT, Forward Clutch Assembly.>
11) Install the reverse brake assembly. <Ref. to CVT(TR580)-258, INSTALLATION, Reverse Brake Assembly.>
12) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-241, INSTALLATION, Primary Pulley and Secondary Pulley.>
13) Install the reduction drive gear. <Ref. to CVT(TR580)-230, INSTALLATION, Reduction Drive Gear.>
14) Install the transmission case. <Ref. to CVT(TR580)-214, INSTALLATION, Transmission Case.>
15) Install the transmission control device. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Control Device.>
16) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>
17) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-197, INSTALLATION, Reduction Driven Gear.>
18) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>

19) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
20) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>
21) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
22) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
23) Install the secondary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Secondary Speed Sensor.>
24) Install the primary speed sensor. <Ref. to CVT(TR580)-113, INSTALLATION, Primary Speed Sensor.>
25) Install the turbine speed sensor. <Ref. to CVT(TR580)-107, INSTALLATION, Turbine Speed Sensor.>
26) Install the transmission harness. <Ref. to CVT(TR580)-143, INSTALLATION, Transmission Harness.>
27) Install the control valve body. <Ref. to CVT(TR580)-127, INSTALLATION, Control Valve Body.>
28) Install the air breather hose. <Ref. to CVT(TR580)-164, INSTALLATION, Air Breather Hose.>
29) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

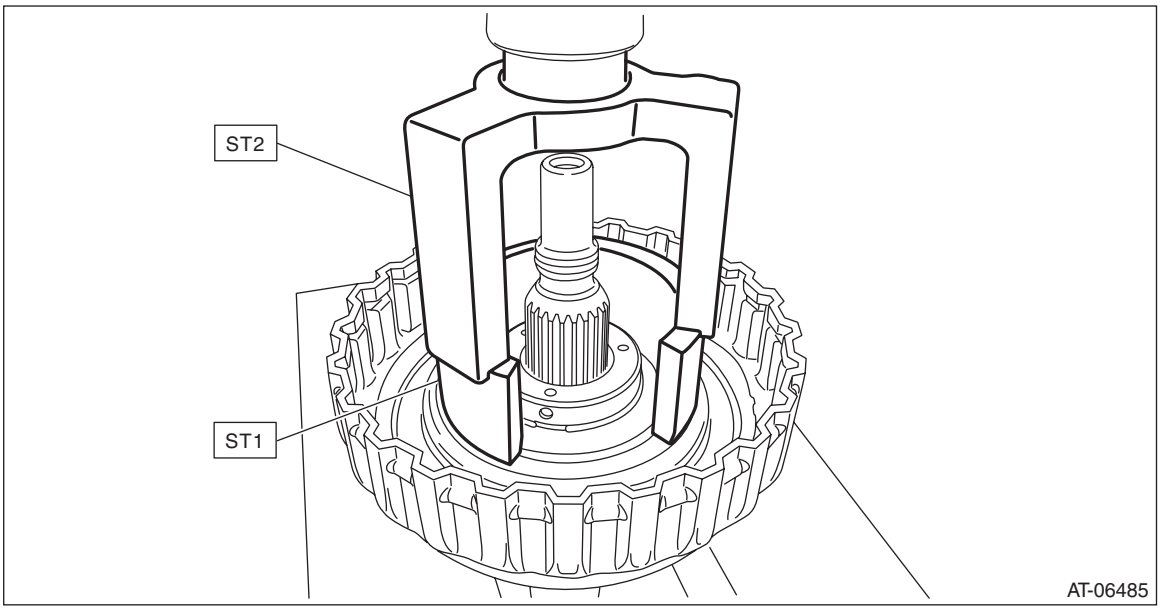
C: DISASSEMBLY

1. FORWARD CLUTCH ASSEMBLY

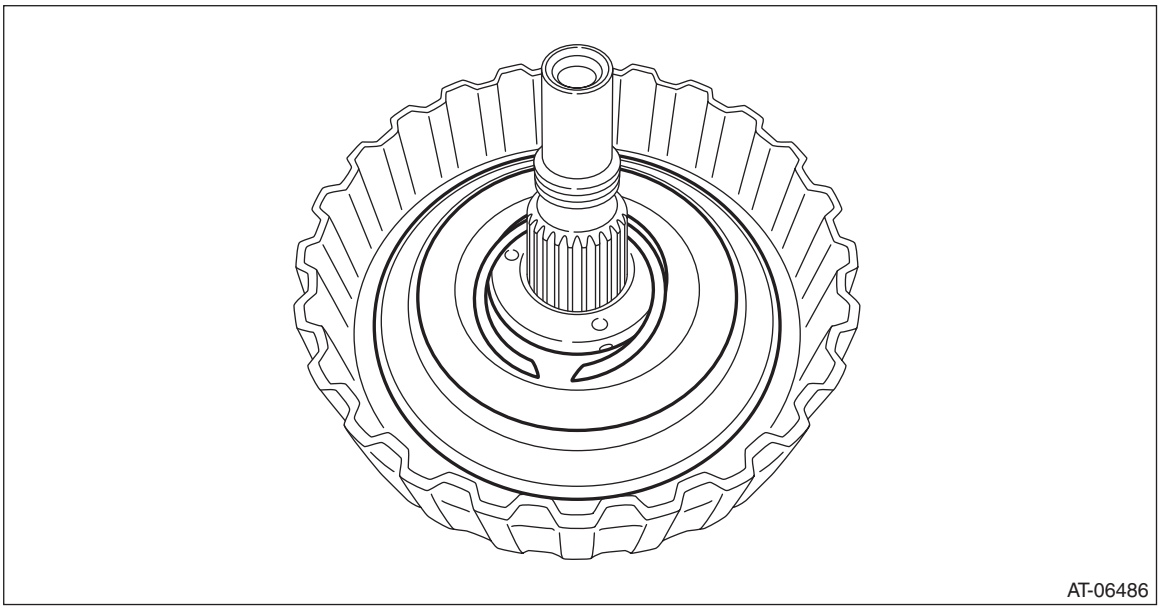
1) Remove the snap ring.
2) Remove the retaining plate, drive plate, driven plate and dish plate.



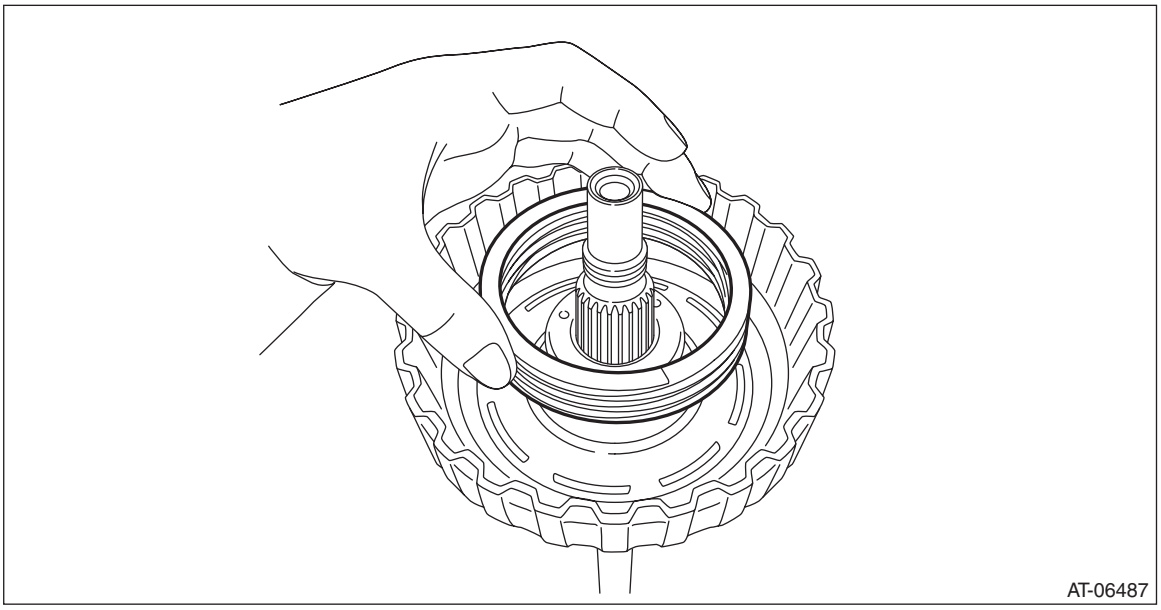
3) Compress the return spring using the ST to remove the snap ring.
ST1 18762AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



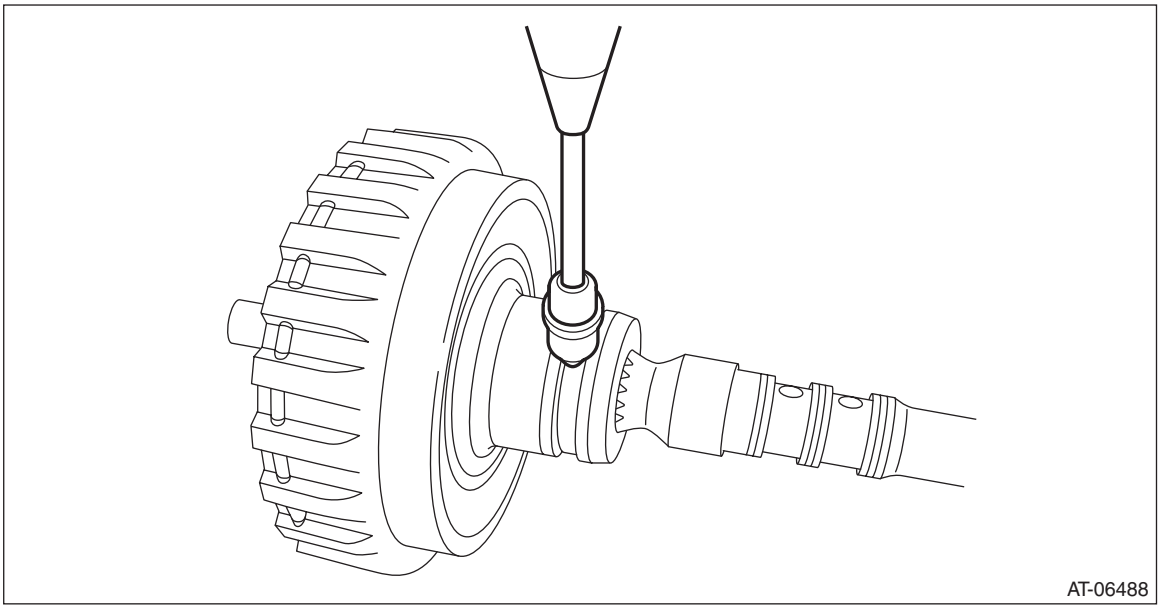
4) Remove the chamber COMPL and snap ring.



5) Remove the return spring.

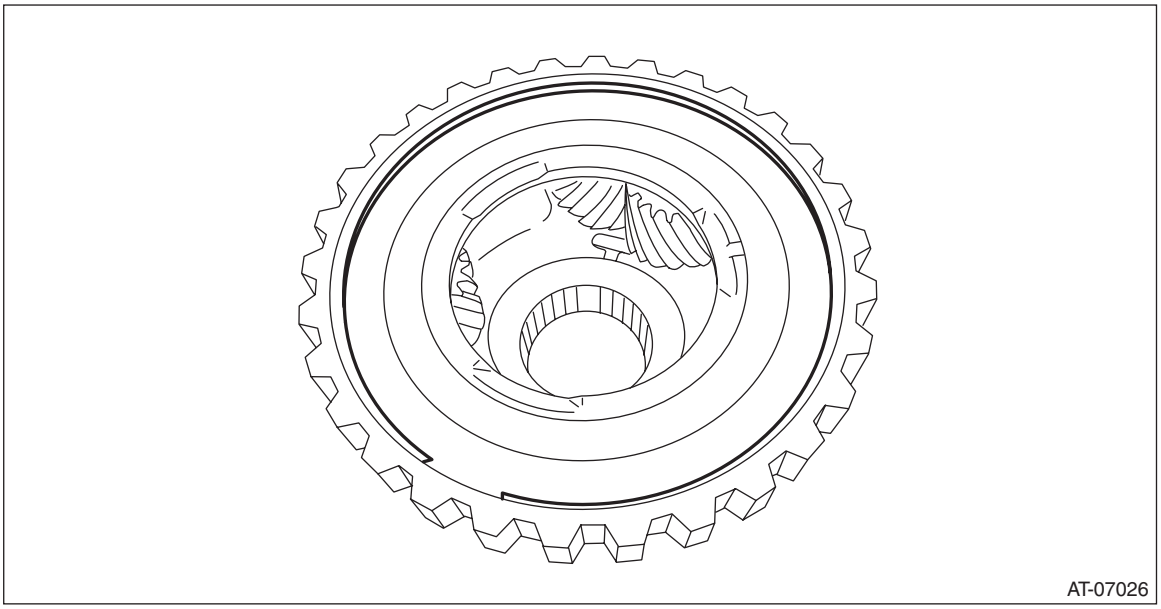


6) Remove the forward clutch piston by blowing compressed air intermittently from the forward clutch carrier hole.



2. PLANETARY CARRIER ASSY

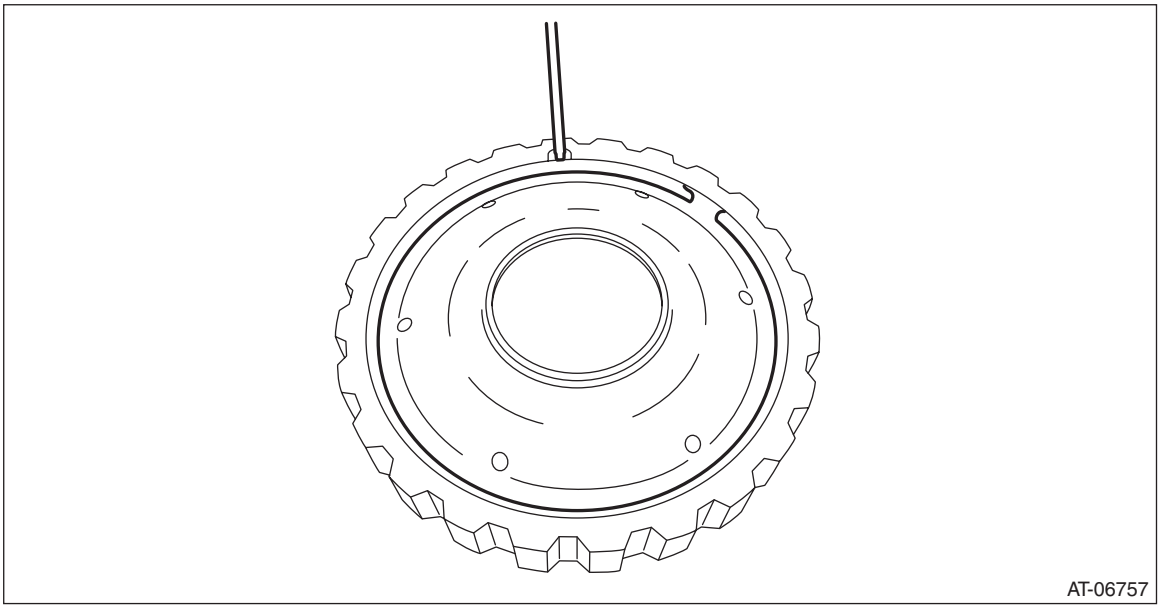
NOTE:
Disassemble the balance oil guide only.
1) Remove the snap ring.



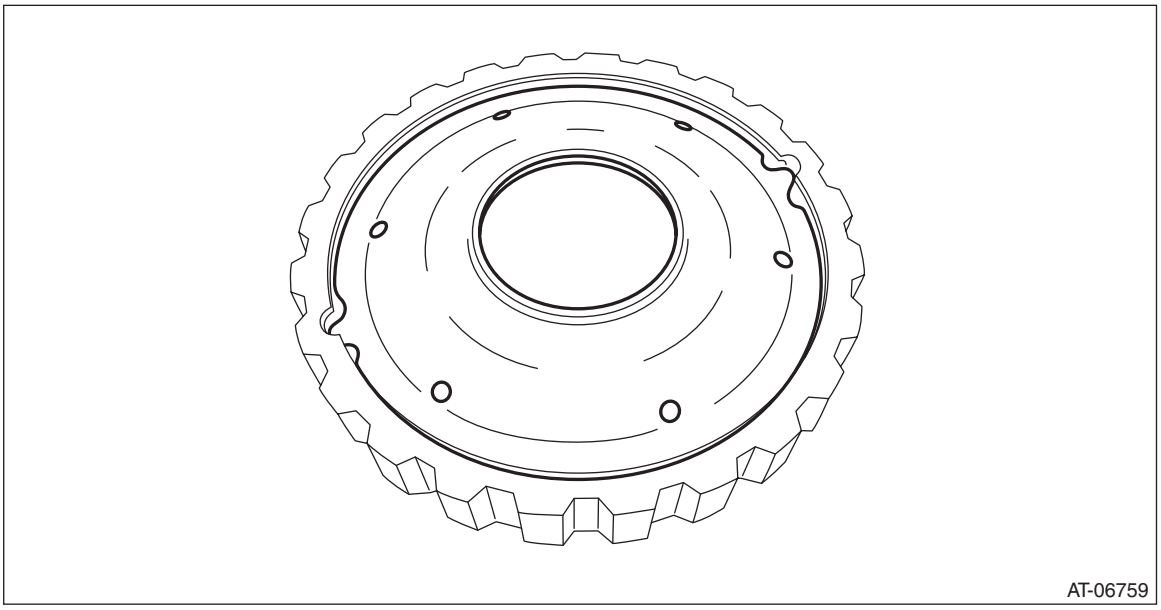
2) Remove the balance oil guide.

3. INTERNAL GEAR

1) Remove the snap ring.



2) Remove the thrust gear plate.

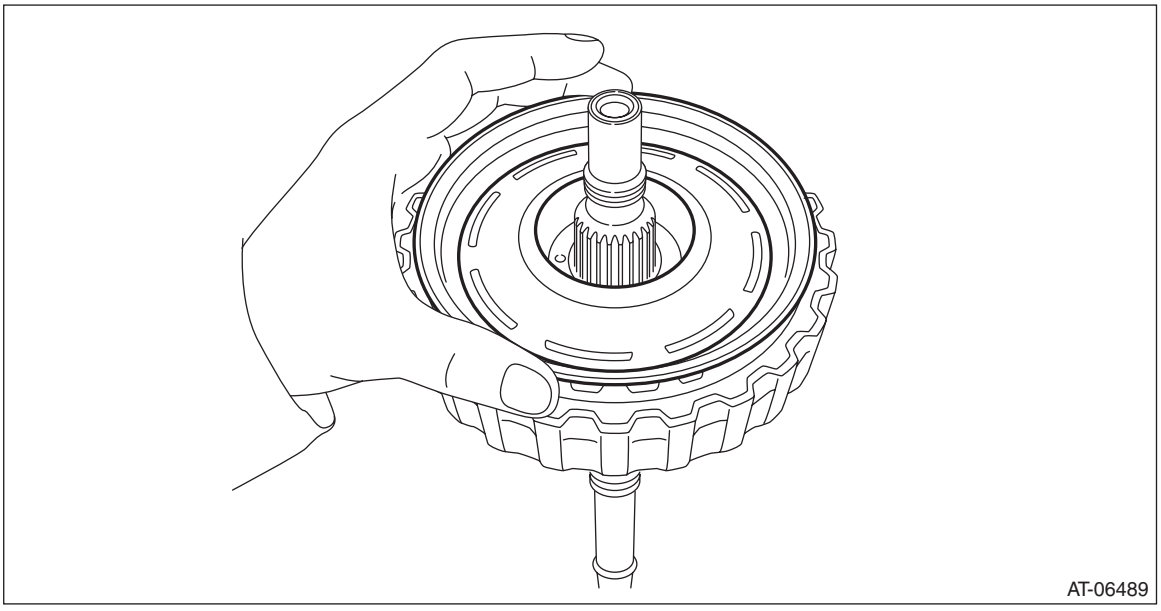


D: ASSEMBLY

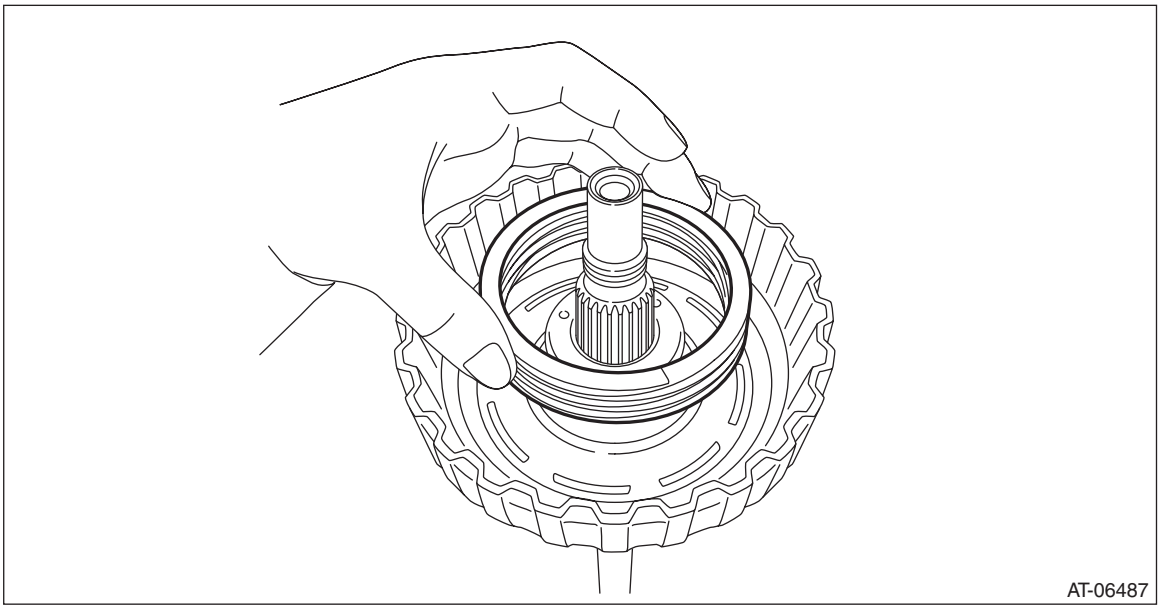
1. FORWARD CLUTCH ASSEMBLY

1) Install the forward clutch piston to forward clutch drum.

NOTE:
- Apply CVTF to the seal of forward clutch piston.
- Insert it all the way to the end.

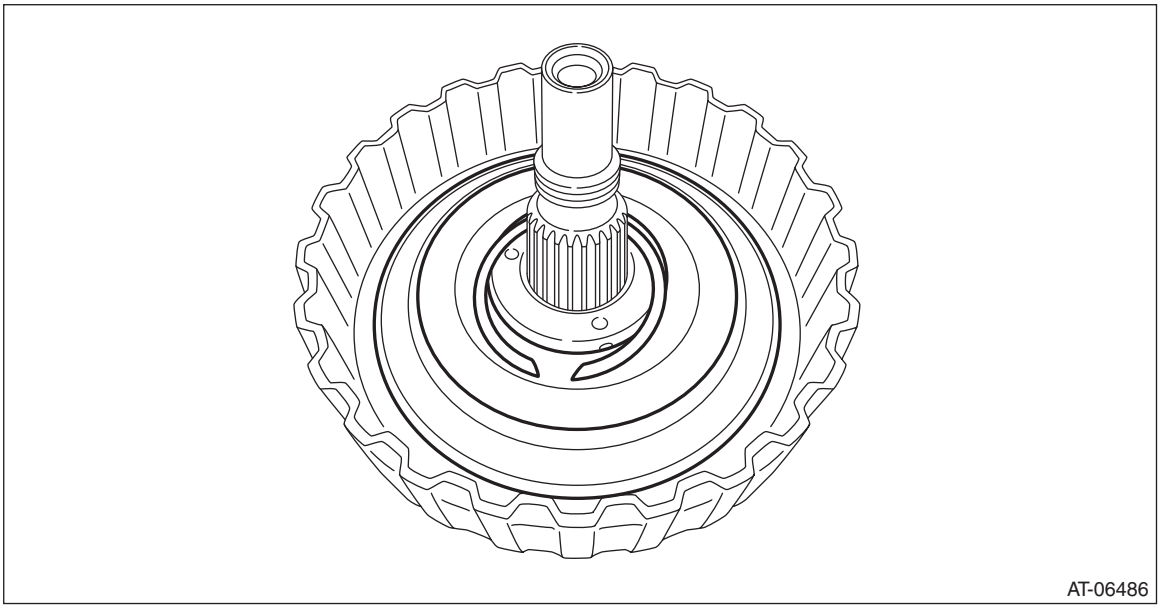


2) Install the return spring.

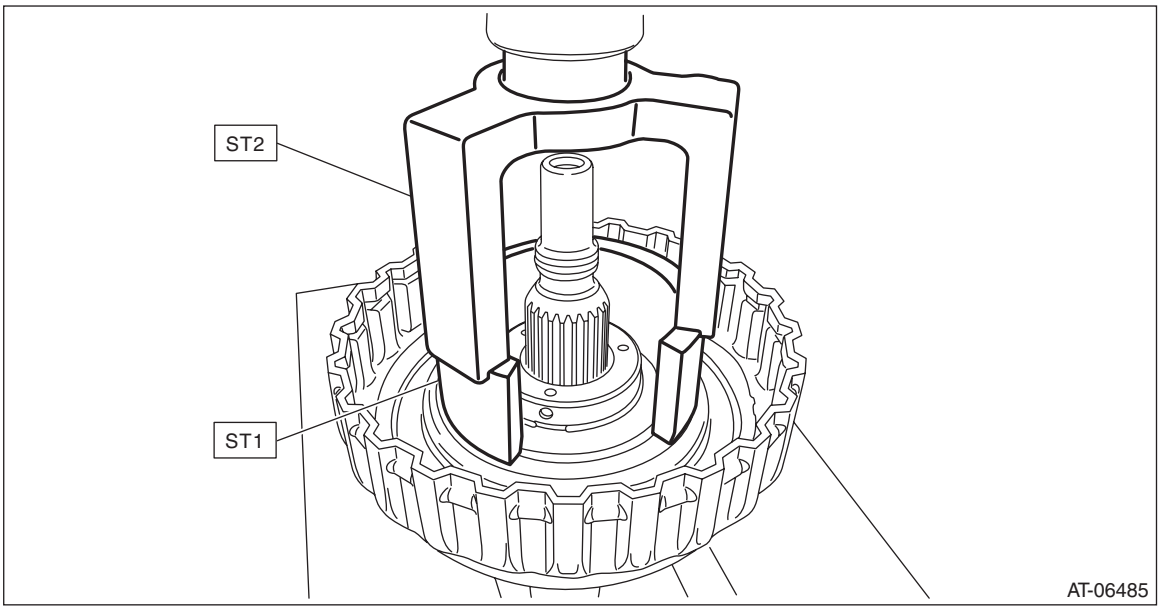


3) Install the chamber COMPL.

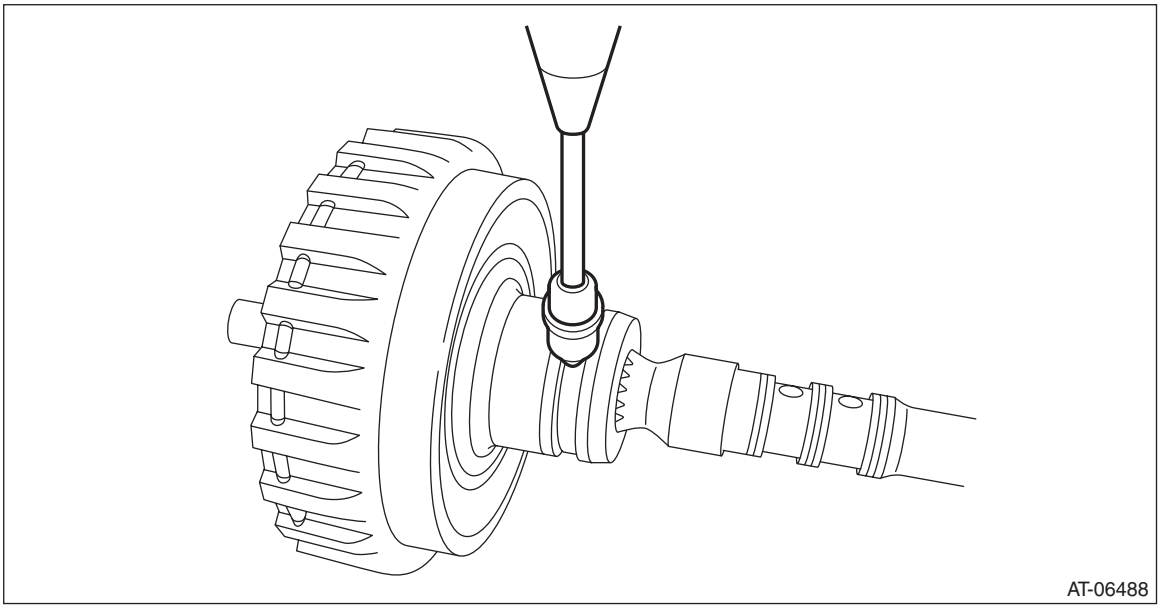
NOTE:
Apply CVTF to the sealing area of chamber COMPL.



4) Compress the return spring using the ST to install the snap ring.
ST1 18762AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



5) Check the operation of forward clutch piston by blowing compressed air intermittently from forward clutch carrier hole.

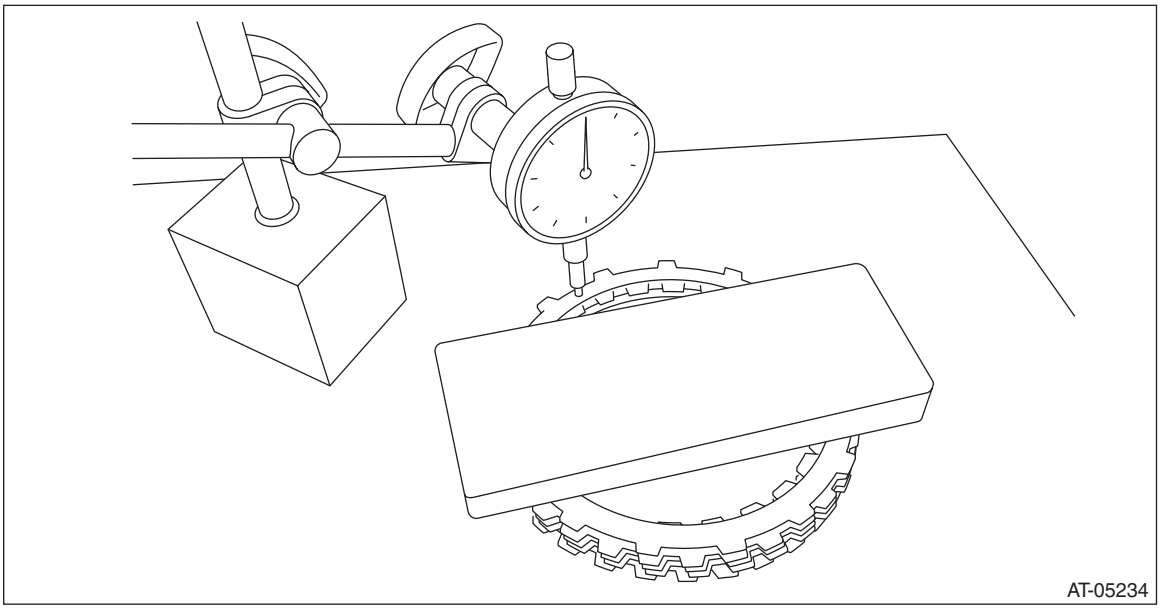


6) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
7) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.
8) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

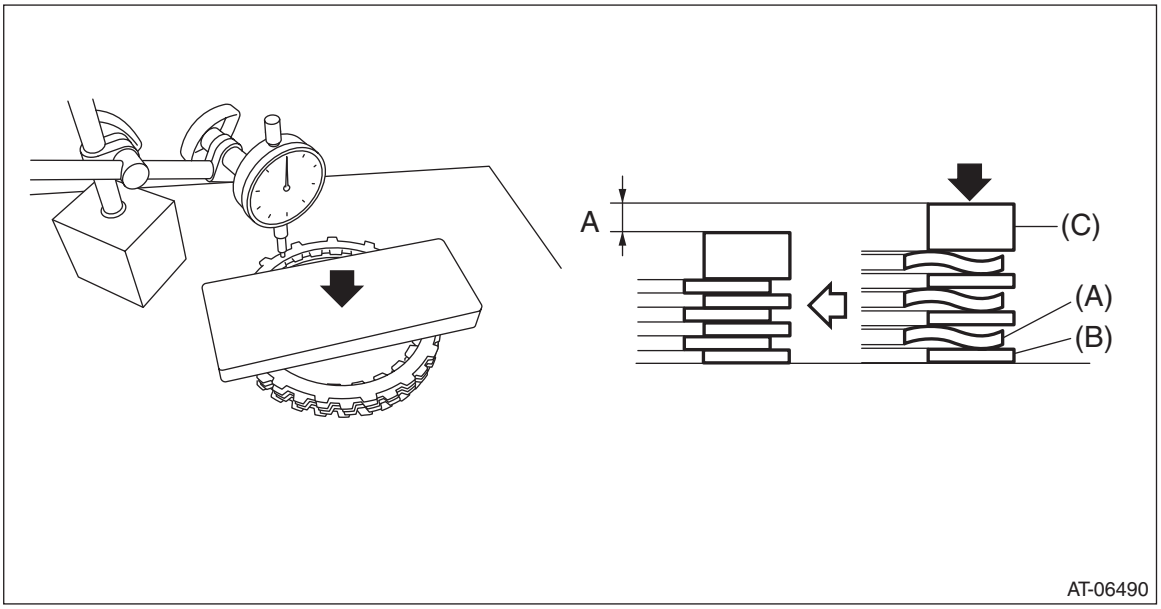
NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 52 N (5.3 kgf, 11.7 lb).

9) Put the flat board on retaining plate.



10) Using the following formula, read the push/pull gauge and calculate “N”.
N = 52 N (5.3 kgf, 11.7 lb) – Z
52 N (5.3 kgf, 11.7 lb) : Load applied to clutch plate
Z: Flat board weight
11) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

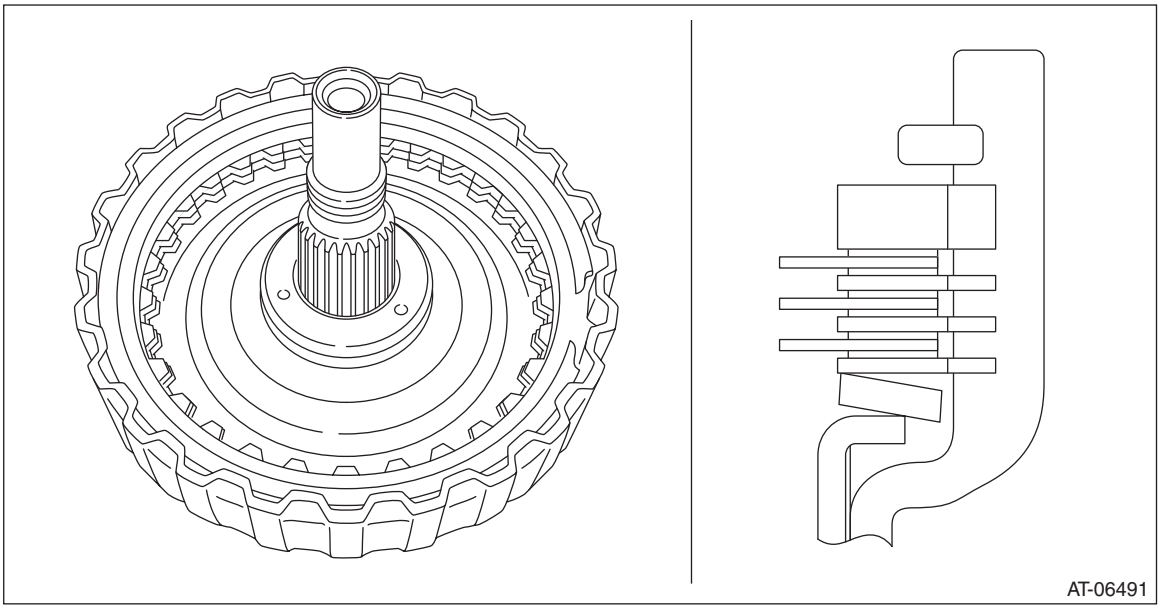
NOTE:
Measure at four points with a 90° interval and calculate the average.



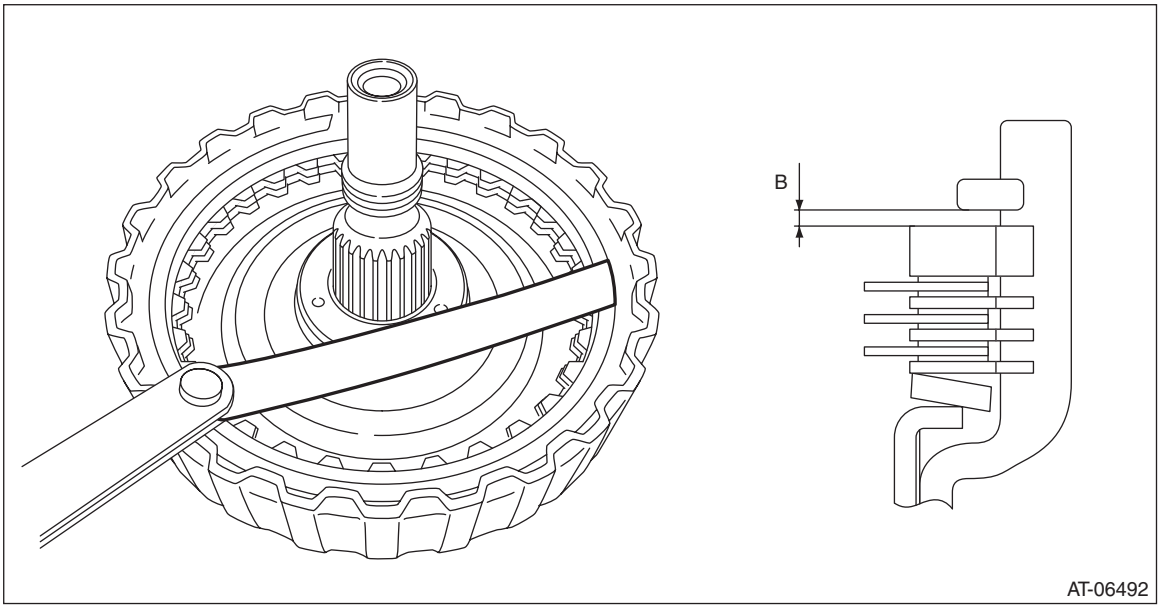
(A) Driven plate
(B) Drive plate
(C) Retaining plate

12) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the forward clutch carrier.

NOTE:
Install the dish plate in the correct direction.



13) Measure and record the clearance “B” between the retaining plate and snap ring.



14) Piston stroke calculation
Calculate with A and B dimensions recorded before.
If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.
S mm (in) = A + B
S: Piston stroke
A: Compression amount of drive plate and dish plate
B: Clearance between retaining plate and snap ring

Initial standard:
1.0 — 1.4 mm (0.040 — 0.055 in)

Limit thickness:
1.6 mm (0.063 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB760	4.2 (0.165)
31567AB770	4.4 (0.173)
31567AB780	4.6 (0.181)
31567AB790	4.8 (0.189)
31567AB830	5.0 (0.197)

2. PLANETARY CARRIER ASSY

NOTE:
Assemble in the reverse order of disassembly.

3. INTERNAL GEAR

NOTE:
Assemble in the reverse order of disassembly.

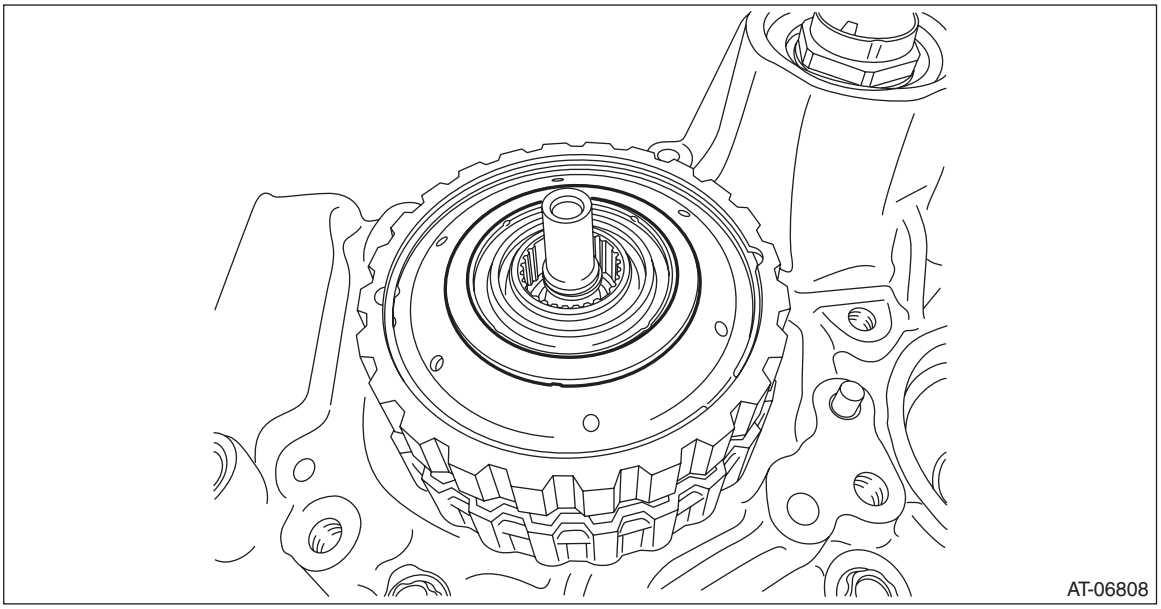
E: INSPECTION

- Check the forward clutch drum, internal gear, sun gear and forward clutch piston lip for wear or damage.
- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and internal gear of forward clutch is within the limit. If it exceeds the standard, replace the forward clutch. <Ref. to CVT(TR580)-282, ASSEMBLY, Forward Clutch Assembly.>

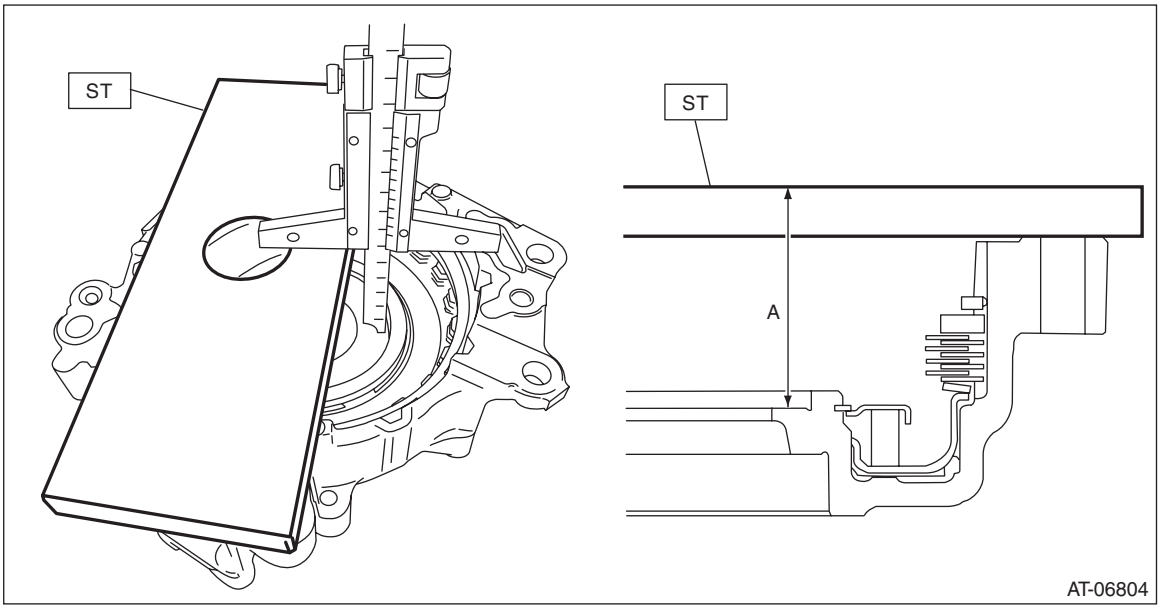
F: ADJUSTMENT

1) Install the thrust bearing to the internal gear.

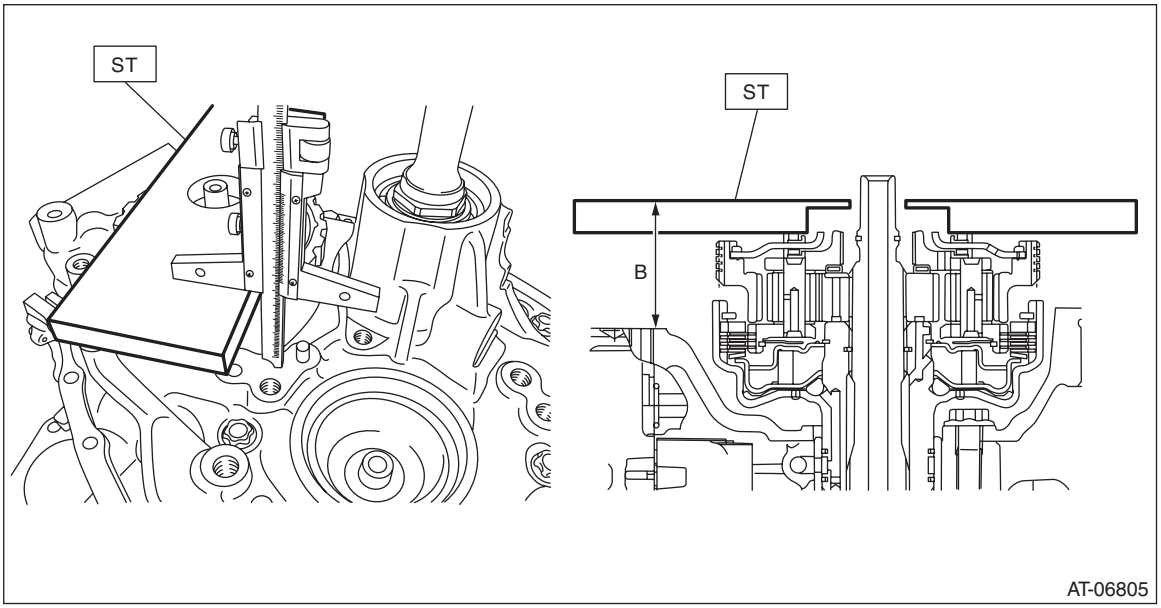
NOTE:
Face the temper color surface to the reverse brake side.



2) Measure depth “A” from the ST upper face to the washer mounting surface.
ST 499575600 GAUGE



3) Measure the height “B” from the ST upper face to the mating surface of the drive pinion retainer.
ST 499575600 GAUGE



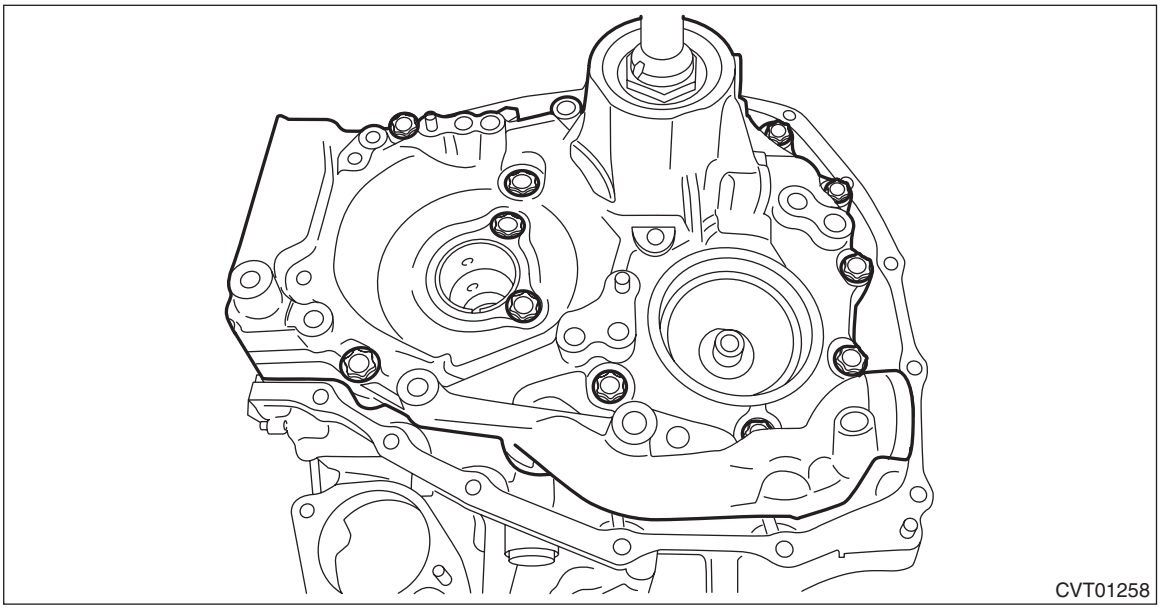
4) Obtain the thickness of washer using the following formula to select the washer.
T (mm) = A – B – (0.35 — 0.70)
[T (in) = A – B – (0.014 — 0.028)]
T: Shim thickness
A: Depth from the ST upper face to the washer mounting surface
B: Height from ST upper face to the drive pinion retainer mating surface
0.35 — 0.70 mm (0.014 — 0.028 in): Clearance

Washer	
Part No.	Thickness mm (in)
803064020	1.3 (0.051)
803064021	1.55 (0.061)
803064022	1.8 (0.071)
803064023	2.05 (0.081)
803064024	2.3 (0.091)
803064025	2.55 (0.100)

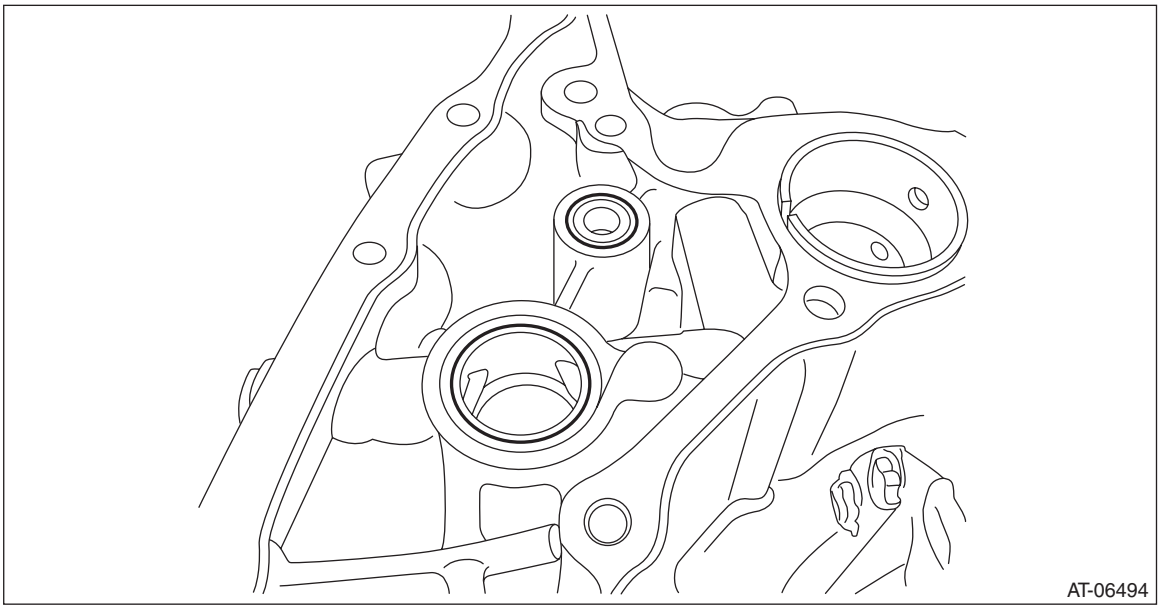
41.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-162, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-121, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-136, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-107, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-109, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-112, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-197, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-211, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-229, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-234, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-255, REMOVAL, Reverse Brake Assembly.>
20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-270, REMOVAL, Forward Clutch Assembly.>
21) Using the ST, remove the drive pinion retainer.
ST 18270KA020 SOCKET (E20)



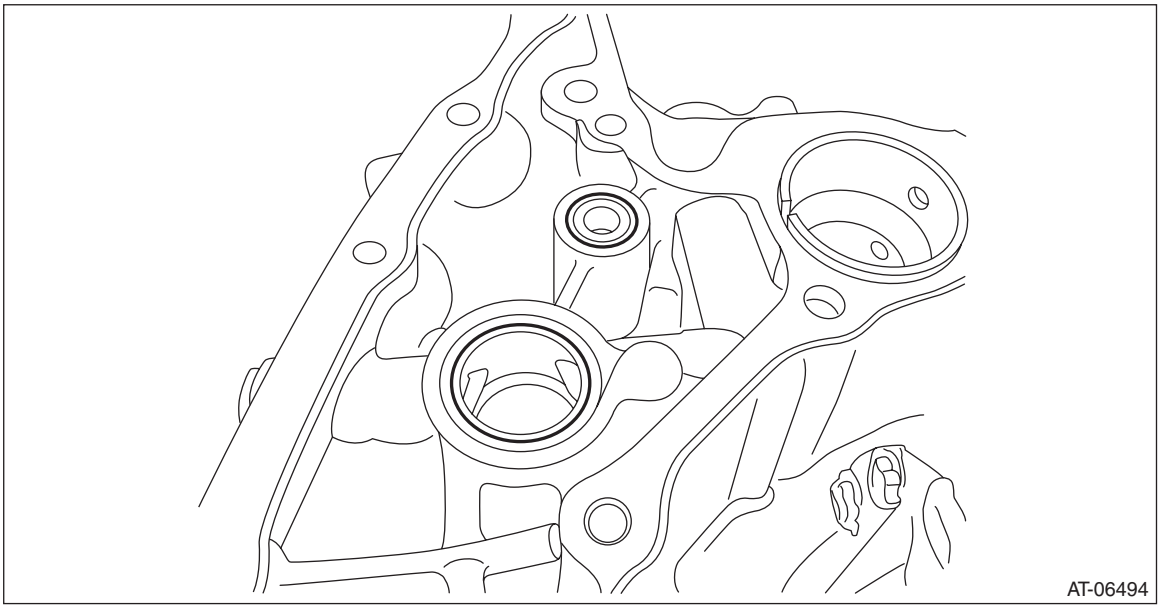
22) Remove the O-ring.



B: INSTALLATION

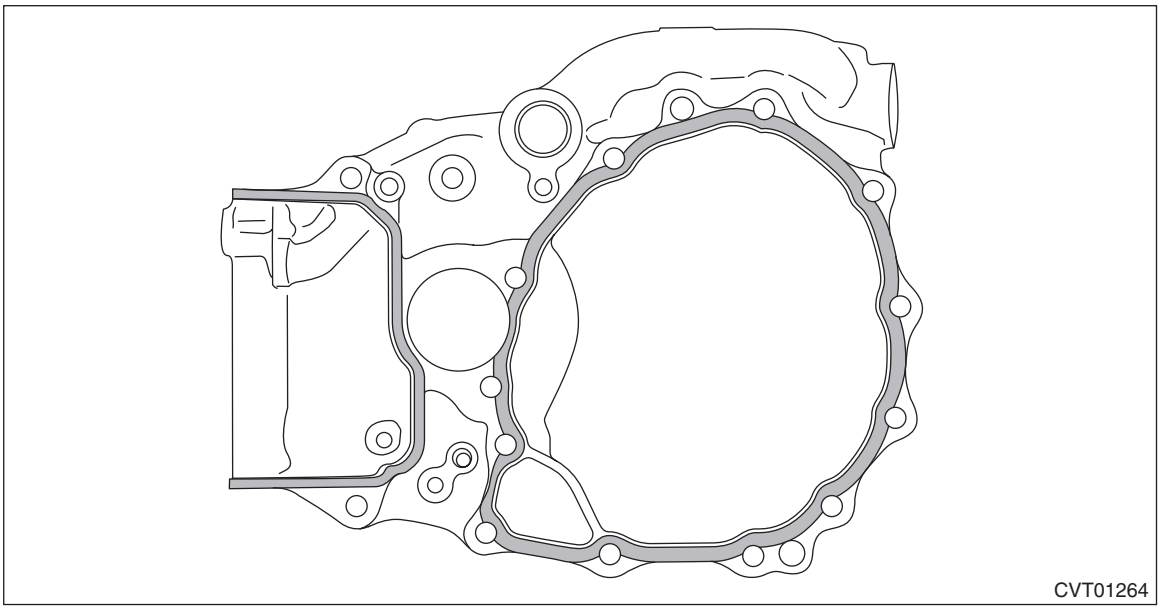
1) Clean the mating surface of drive pinion retainer and converter case.
2) Adjust the backlash and tooth contact between drive pinion shaft assembly and the front differential side gear. <Ref. to CVT(TR580)-312, ADJUSTMENT, Drive Pinion Shaft Assembly.>
3) Install O-rings in two locations to the converter case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



4) Apply liquid gasket seamlessly to the mating surface of drive pinion retainer.

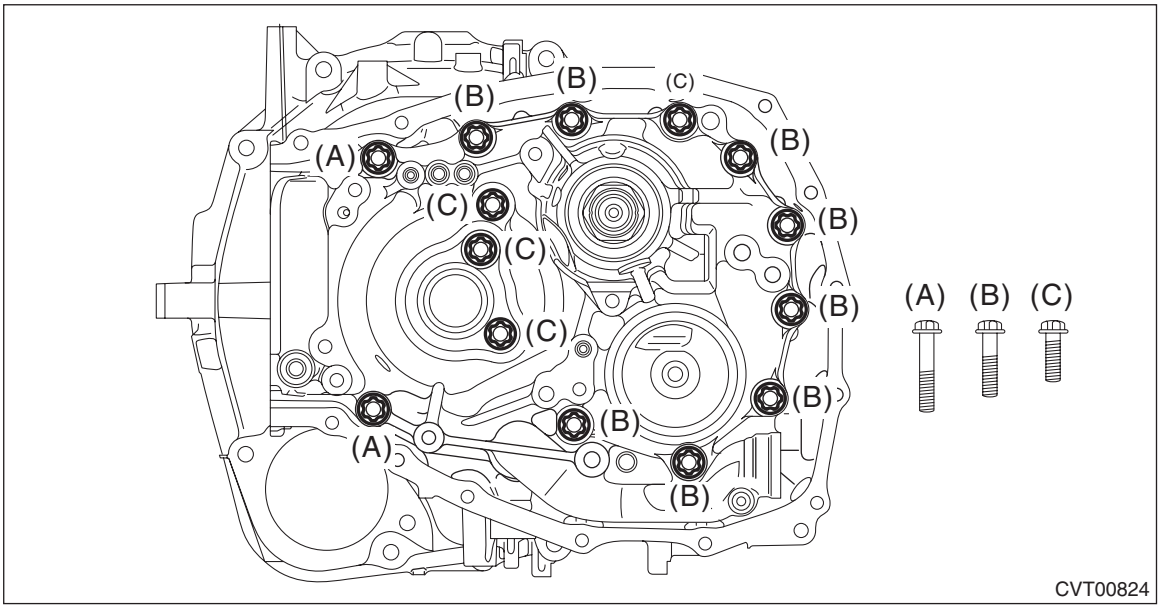
Liquid gasket:
THREE BOND 1215B or equivalent



5) Install the drive pinion retainer to converter case, and tighten the bolt using the ST.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



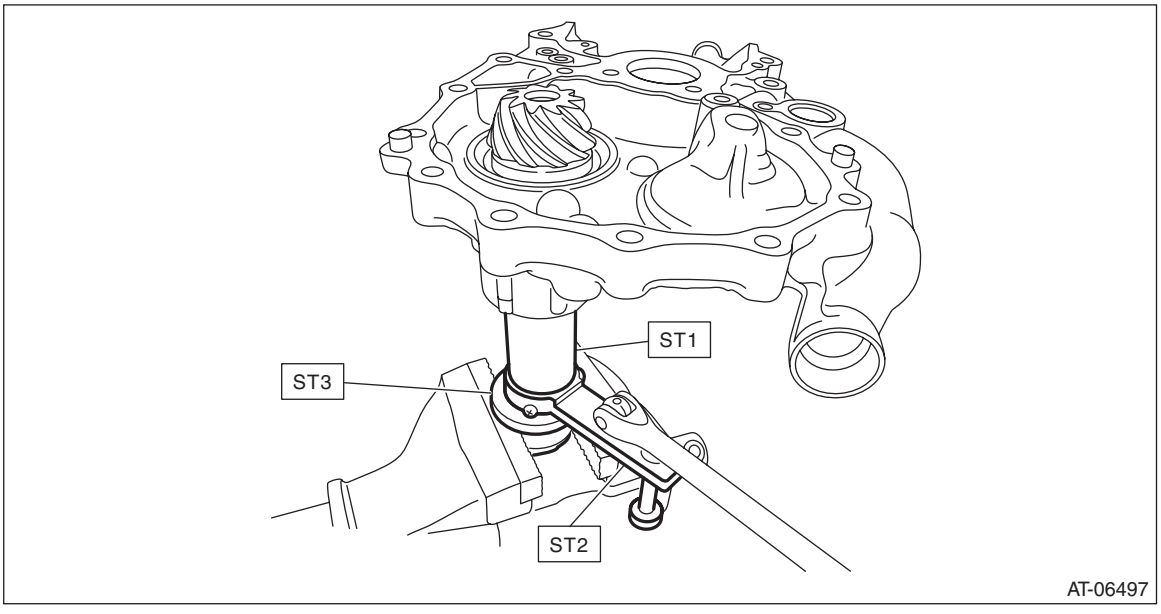
6) Install the forward clutch assembly. <Ref. to CVT(TR580)-273, INSTALLATION, Forward Clutch Assembly.>
7) Install the reverse brake assembly. <Ref. to CVT(TR580)-258, INSTALLATION, Reverse Brake Assembly.>
8) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-241, INSTALLATION, Primary Pulley and Secondary Pulley.>
9) Install the reduction drive gear. <Ref. to CVT(TR580)-230, INSTALLATION, Reduction Drive Gear.>
10) Install the transmission case. <Ref. to CVT(TR580)-214, INSTALLATION, Transmission Case.>

11) Install the transmission control device. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Control Device.>
12) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>
13) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-197, INSTALLATION, Reduction Driven Gear.>
14) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>
15) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
16) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>
17) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
18) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
19) Install the secondary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Secondary Speed Sensor.>
20) Install the primary speed sensor. <Ref. to CVT(TR580)-113, INSTALLATION, Primary Speed Sensor.>
21) Install the turbine speed sensor. <Ref. to CVT(TR580)-107, INSTALLATION, Turbine Speed Sensor.>
22) Install the transmission harness. <Ref. to CVT(TR580)-143, INSTALLATION, Transmission Harness.>
23) Install the control valve body. <Ref. to CVT(TR580)-127, INSTALLATION, Control Valve Body.>
24) Install the air breather hose. <Ref. to CVT(TR580)-164, INSTALLATION, Air Breather Hose.>
25) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

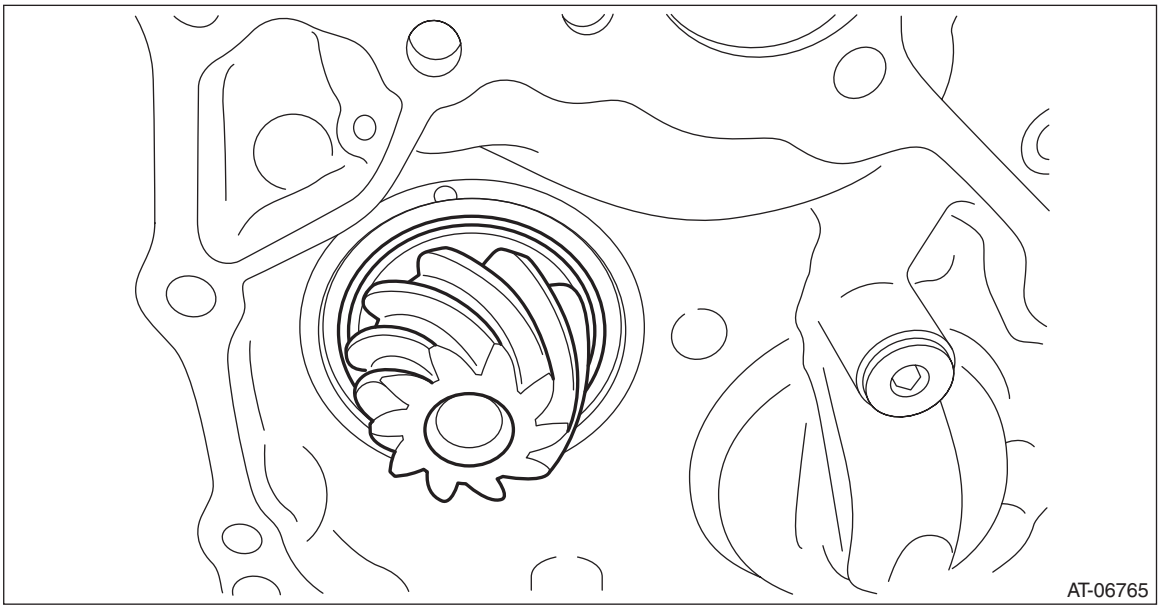
C: DISASSEMBLY

1) Flatten the tab of the lock nut.
2) Using ST1, ST2 and ST3, fix at the spline portion of drive pinion shaft to remove the lock nut.

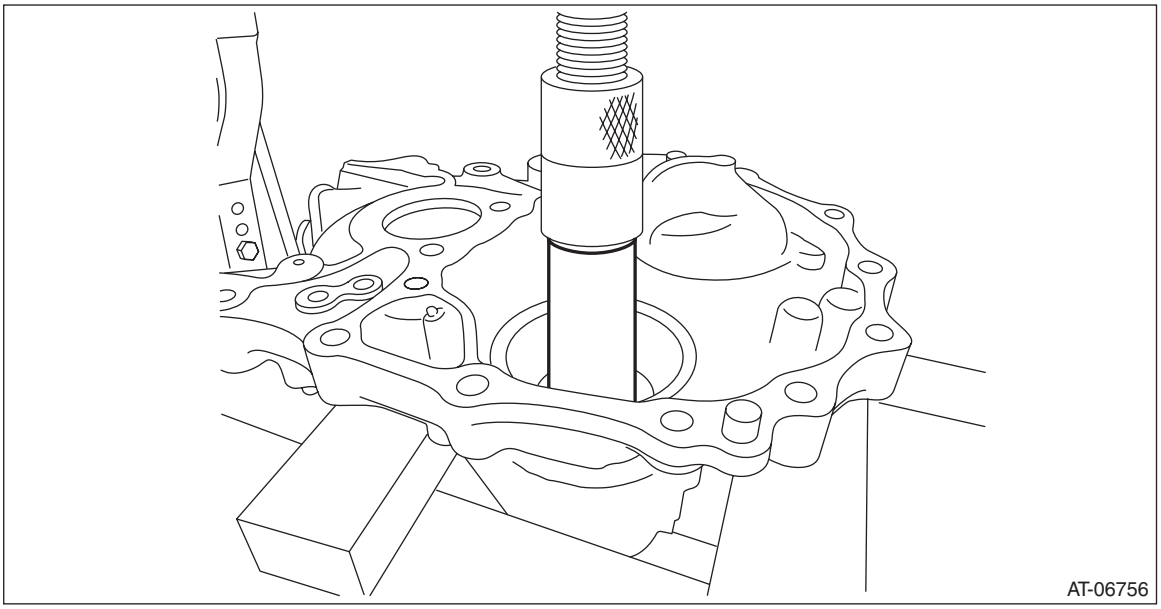
ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER



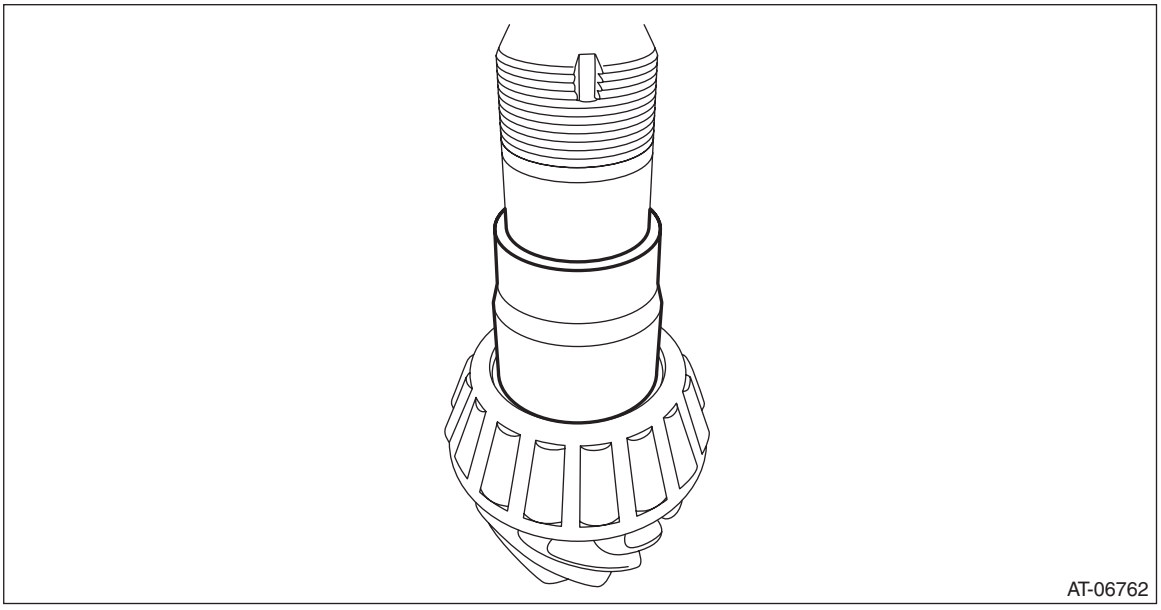
3) Remove the drive pinion shaft from the drive pinion retainer.



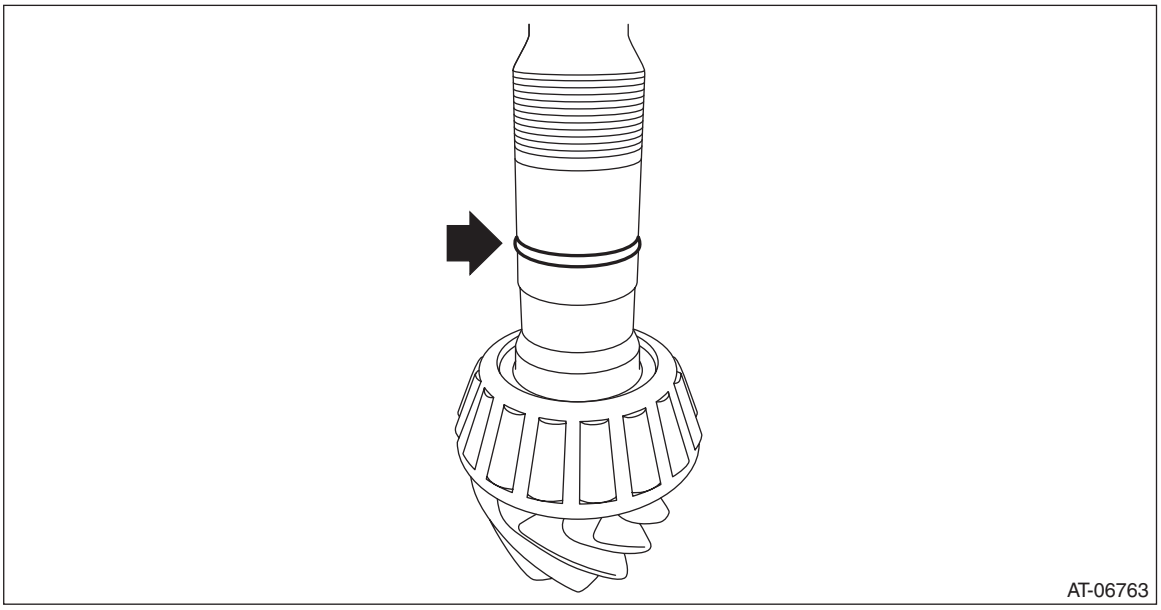
4) Using the round bar with diameter of 36 mm (1.42 in) or 37 mm (1.46 in), remove the bearing inner race and plug.



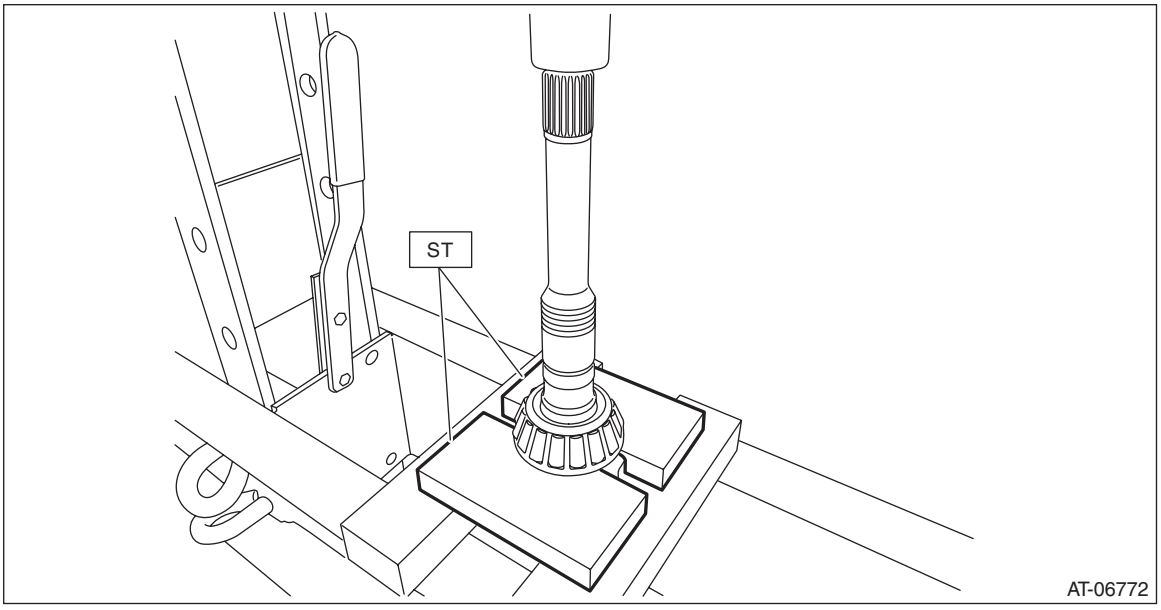
5) Remove the drive pinion washer.
6) Remove the drive pinion spacer.



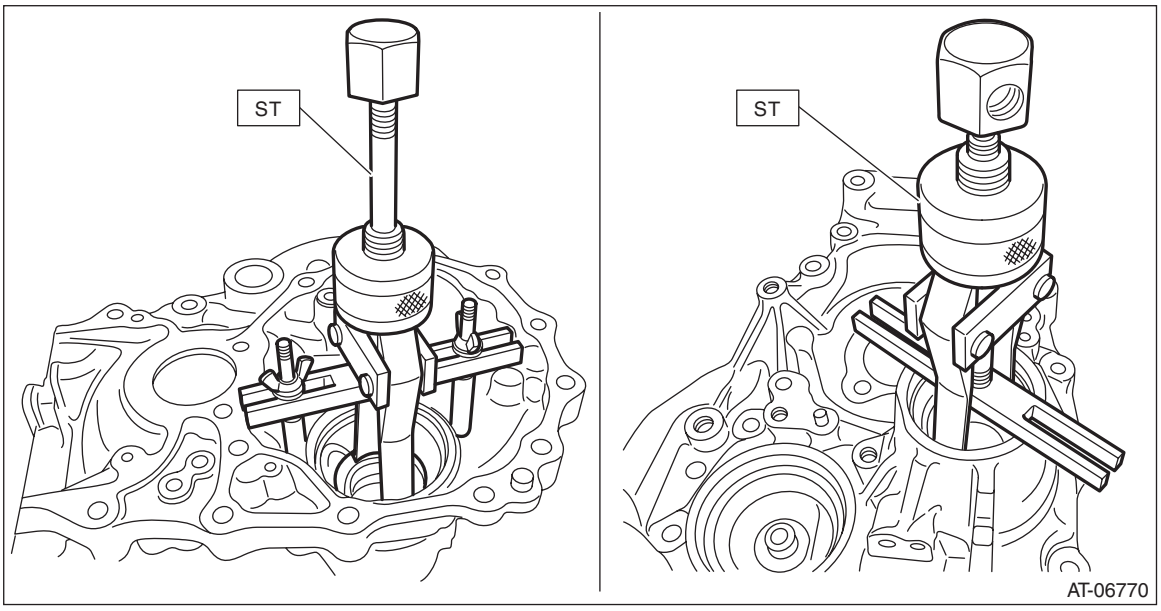
7) Remove the O-ring.



8) Remove the inner race and drive pinion shim from drive pinion shaft using ST.
ST 498515500 REMOVER

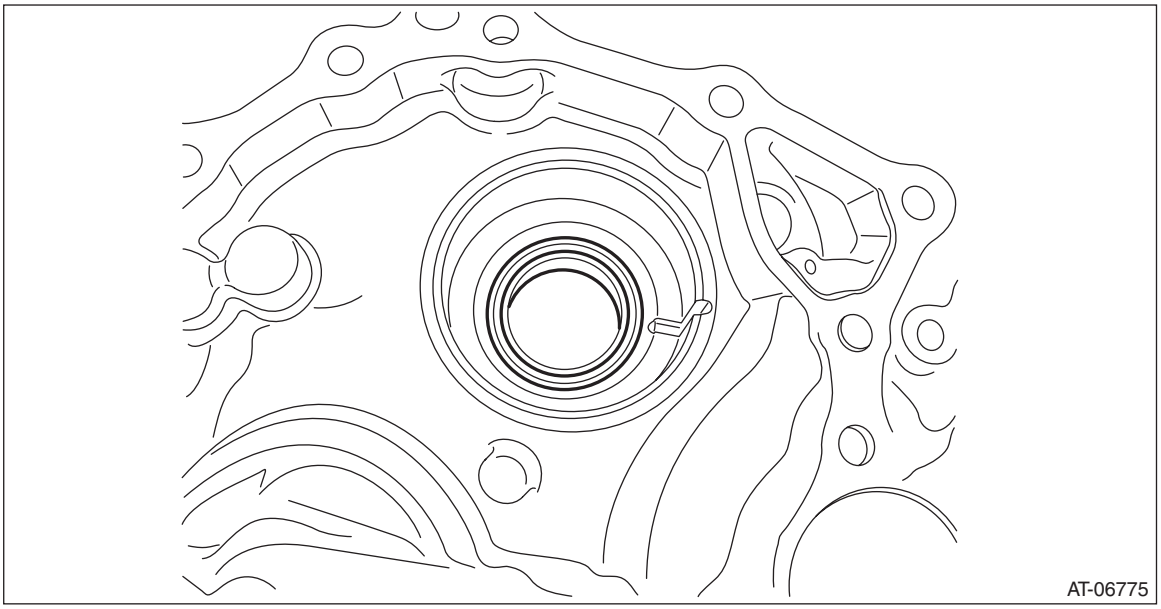


9) Using the ST, remove the outer race.
ST 398527700 PULLER ASSY

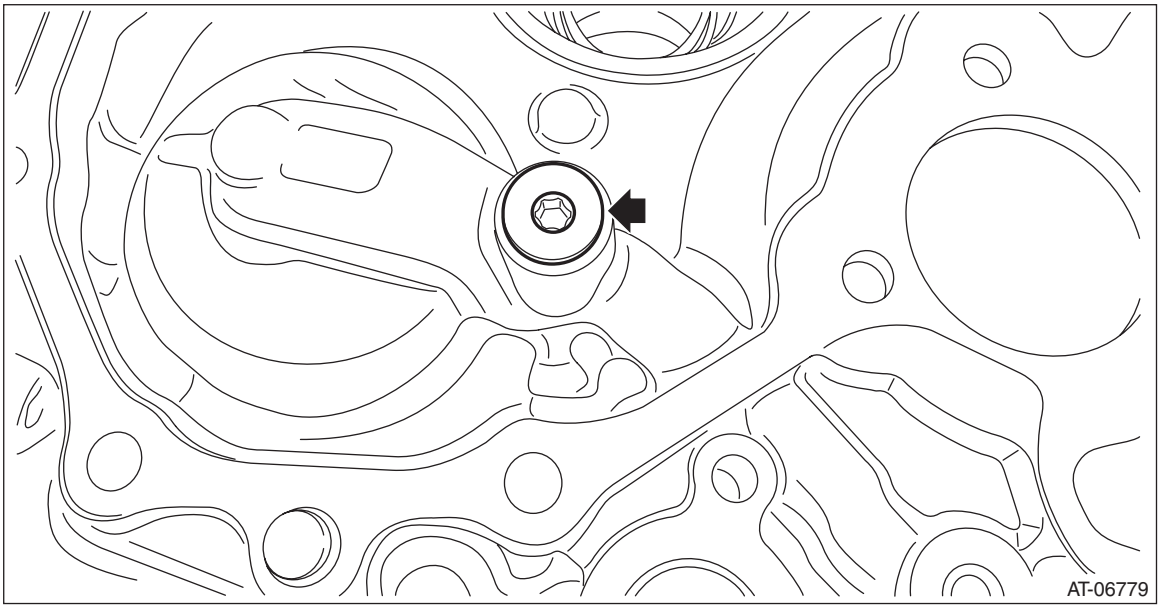


10) Remove the two oil seals using a screwdriver wrapped with cloth etc.

CAUTION:
Do not damage the fitting surface of oil seal.



11) Remove the plug from drive pinion retainer.

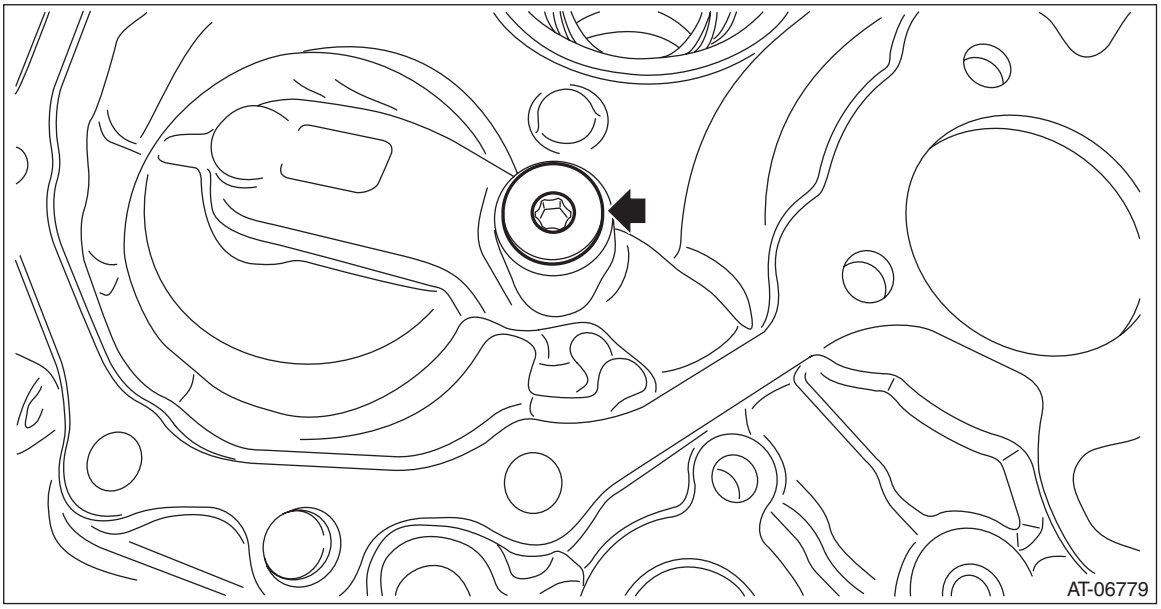


D: ASSEMBLY

1) Install the plug to drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.

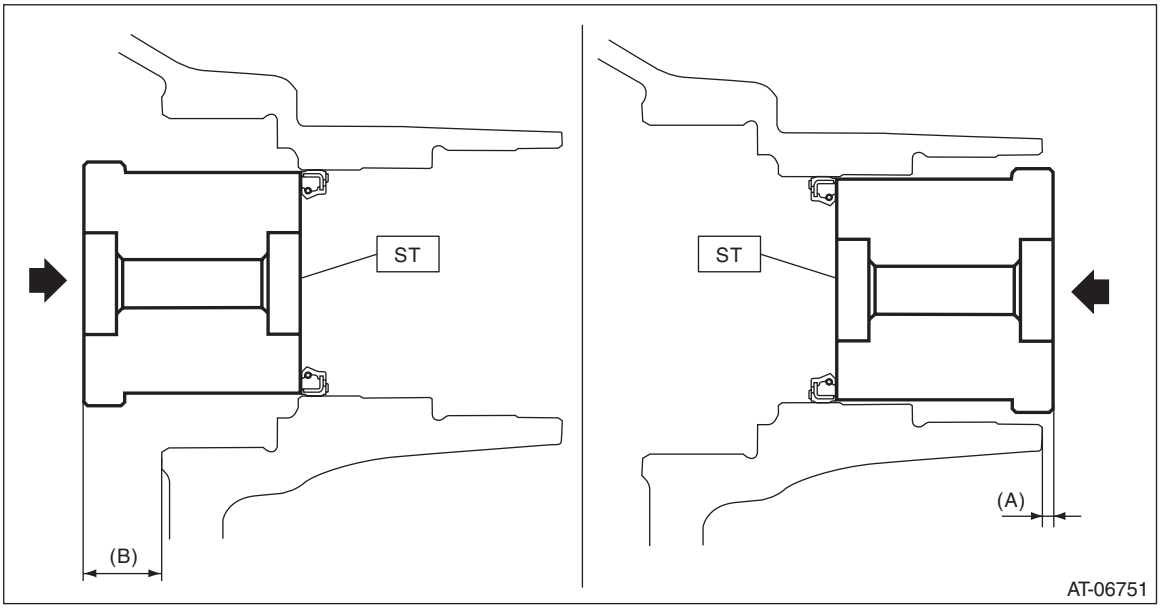
Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)



2) Using the ST, install the oil seal to drive pinion retainer.

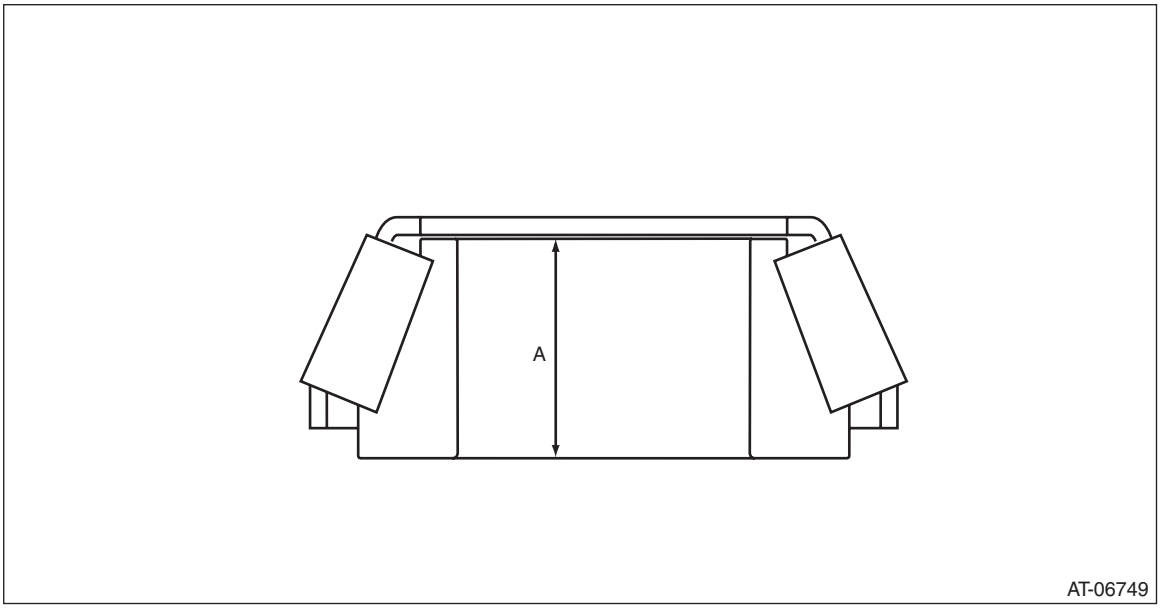
NOTE:
- Apply CVTF to the oil seal press-fitting surface and lip.
- Install the oil seal in the correct direction.

ST 927720000 HOUSING BUSHING INSTALLER AND REMOVER

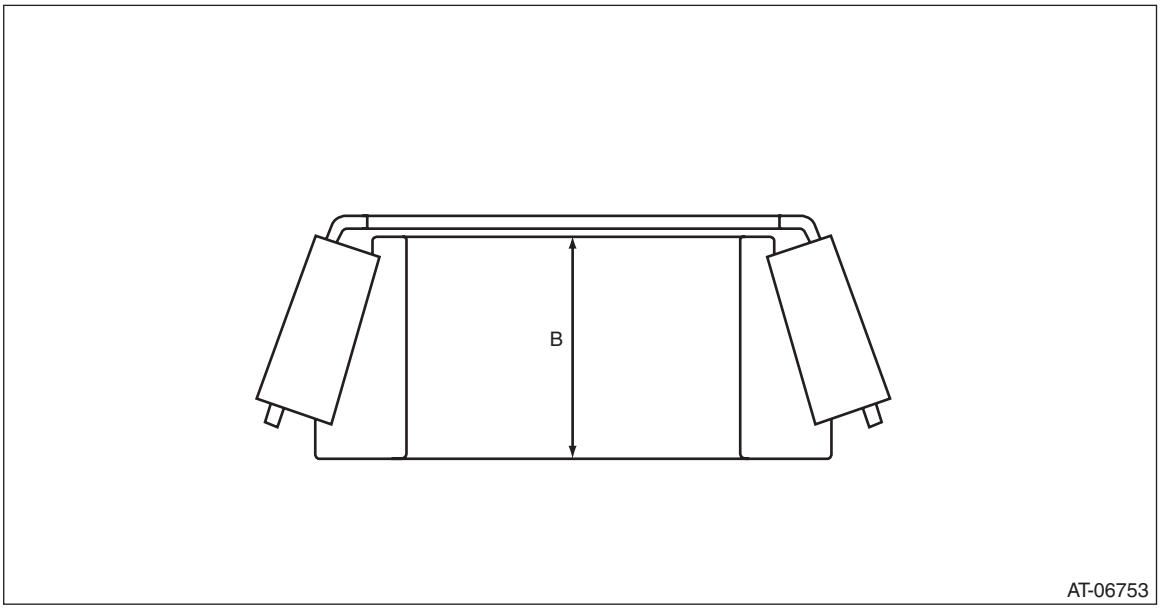


(A) 2.8 mm (0.11 in)
(B) 18.7 mm (0.74 in)

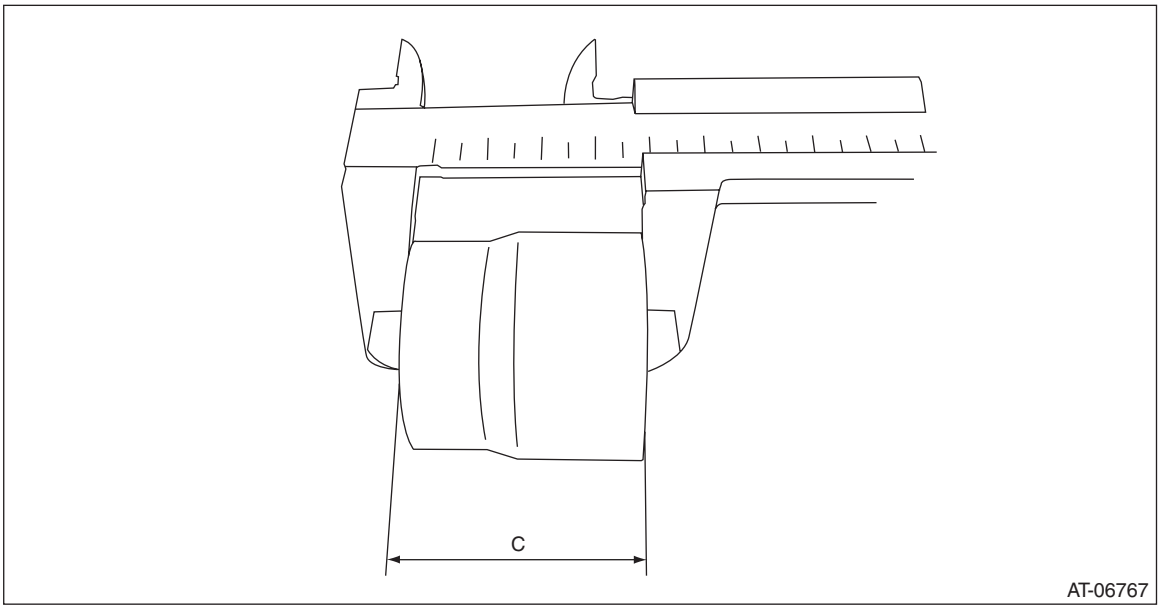
3) Select the drive pinion washer.
(1) Measure the roller bearing inner race width “A” on the front side.



(2) Measure the roller bearing inner race width “B” on the rear side.

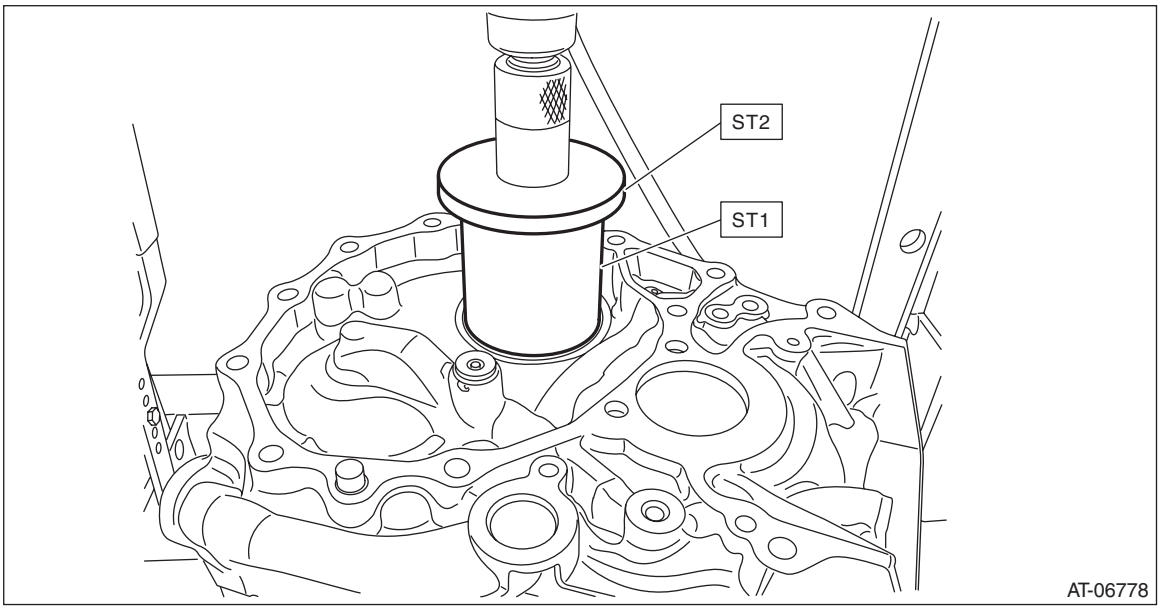


(3) Measure the spacer width “C”.

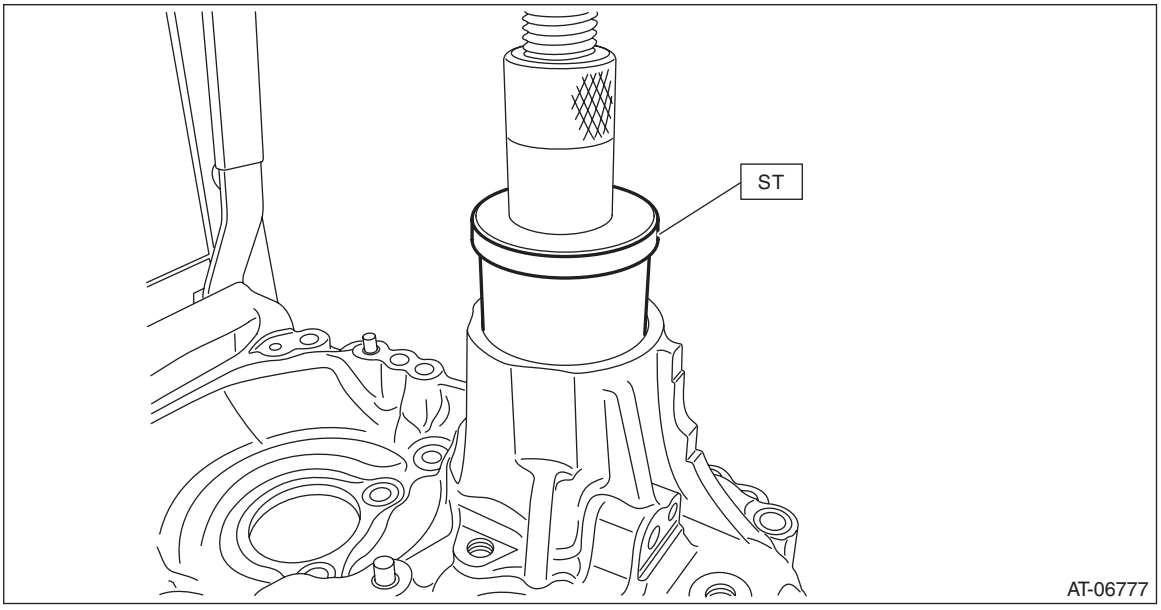


(4) Using the ST, install the front roller bearing outer race to the drive pinion retainer.

ST1 28499TC010 INSTALLER
ST2 398177700 INSTALLER



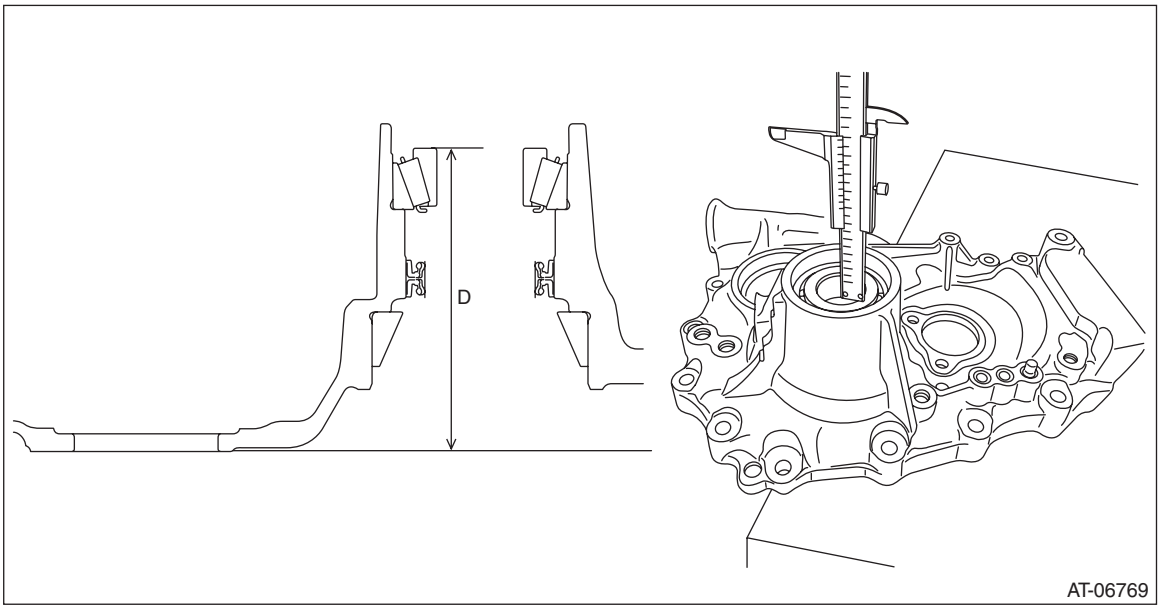
(5) Using the ST, install the rear roller bearing outer race to the drive pinion retainer.
ST 20099AE020 INSTALLER



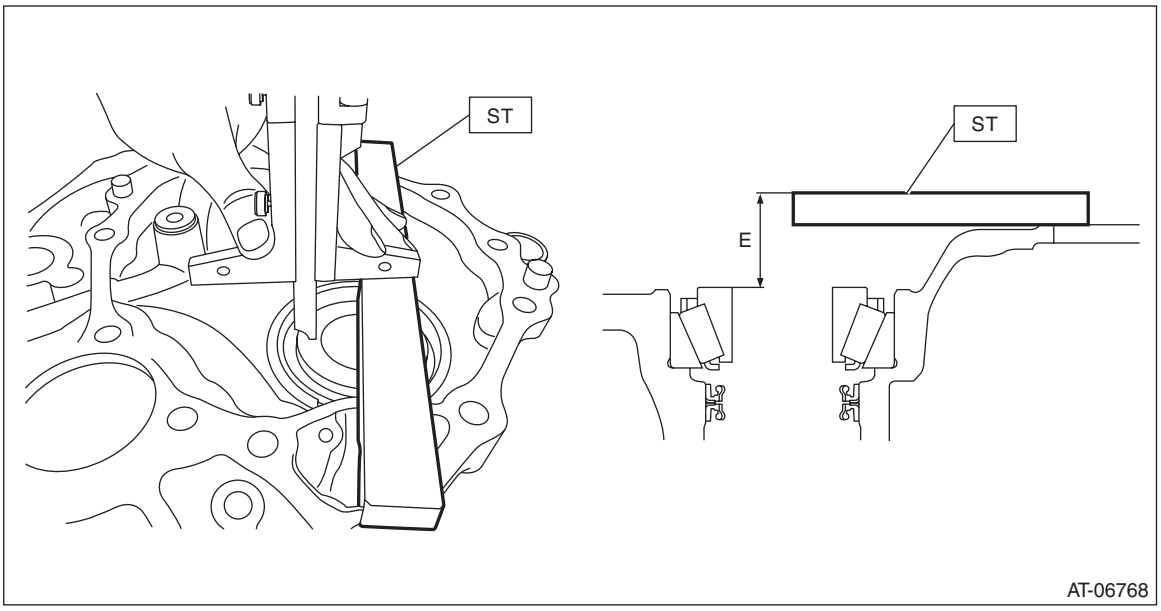
(6) Place the drive pinion retainer on the surface plate, and install the inner race to the rear roller bearing outer race.

NOTE:
Place the drive pinion retainer so that the mating surface of the drive pinion retainer (mating surface with the converter case) contacts the surface plate.

(7) Measure the height “D” from the end face of the rear roller bearing inner race to the surface plate.



(8) Install the inner race to the front roller bearing outer race.
(9) Measure the depth “E” from the end face of the front roller bearing inner race to the end face of the ST.
ST 499575400 GAUGE

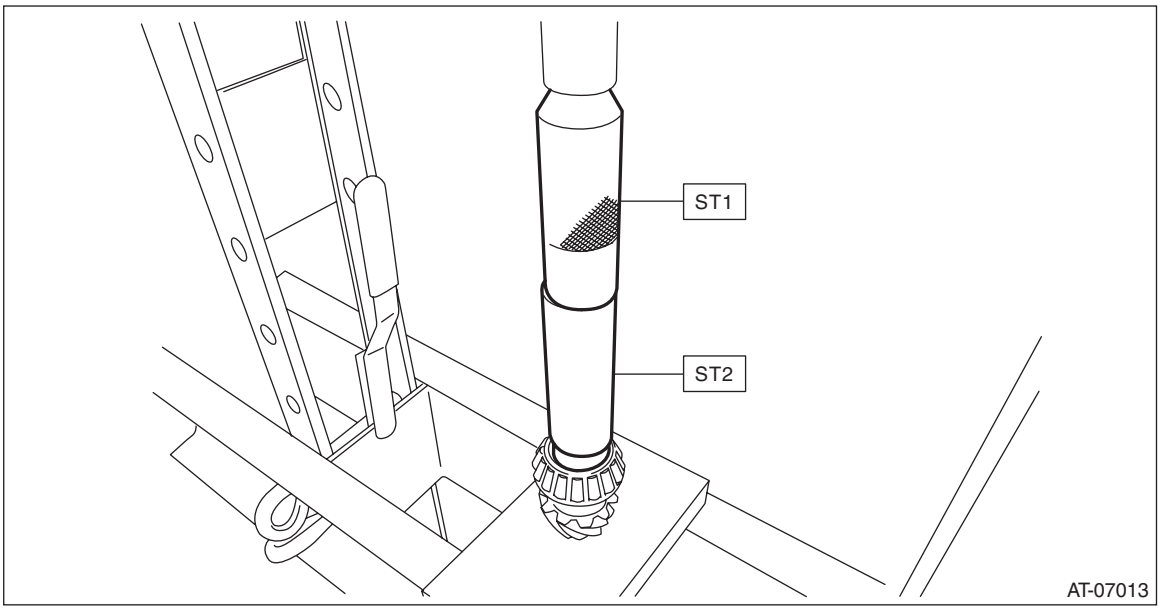


(10) Using following formula, select one to three drive pinion washers.
T (mm) = D – (A + B + C + E – 15) – (0±0.0125)
[T (in) = D – (A + B + C + E – 0.591) – (0±0.0005)]
A: Front roller bearing width
B: Rear roller bearing width
C: Spacer width
D: Height from end face of rear roller bearing inner race to surface plate
E: Depth from end face of front roller bearing inner race to end face of ST
15 mm (0.591 in): Thickness of ST
T: Drive pinion washer thickness
0±0.0125 mm (0±0.0005 in): Clearance

Drive pinion washer	
Part No.	Thickness mm (in)
38336AA750	0.150 (0.0059)
38336AA760	0.175 (0.0069)
38336AA770	0.200 (0.0079)
38336AA780	0.225 (0.0089)
38336AA790	0.250 (0.0098)
38336AA800	0.275 (0.0108)
38336AA810	0.300 (0.0118)
38336AA820	0.400 (0.0157)

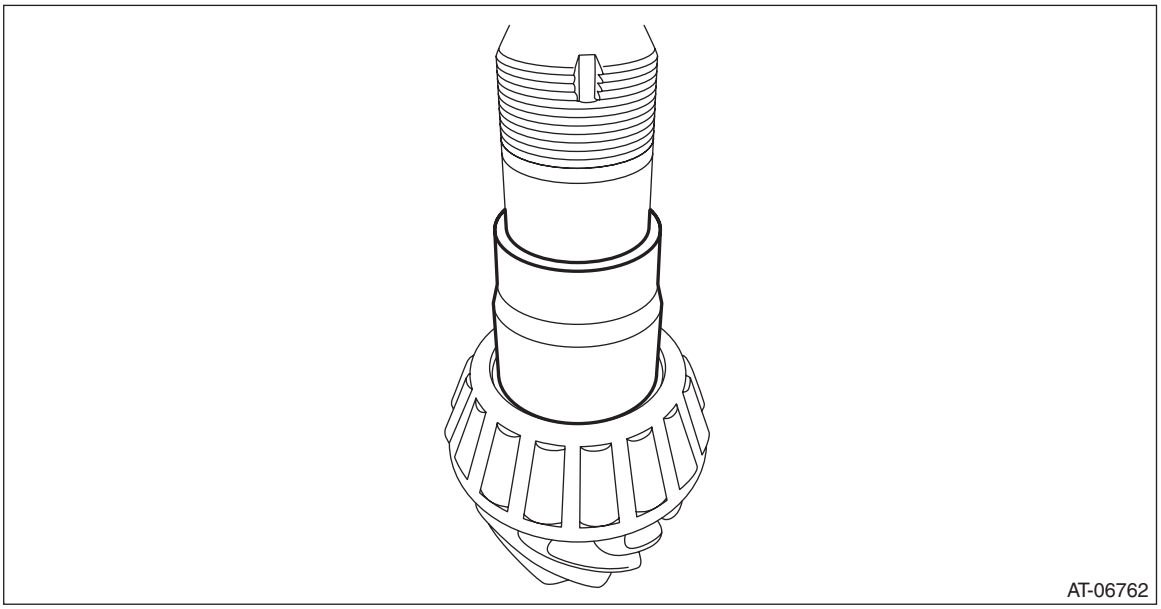
4) Measure and record the drive pinion shim thickness to be reused.
5) Install the drive pinion shim that is reused for the drive pinion shaft.

6) Using the ST1 and ST2, press-fit the inner race to the drive pinion shaft.
ST1 899580100 INSTALLER
ST2 927130000 EXTENSION DRIVE SHAFT

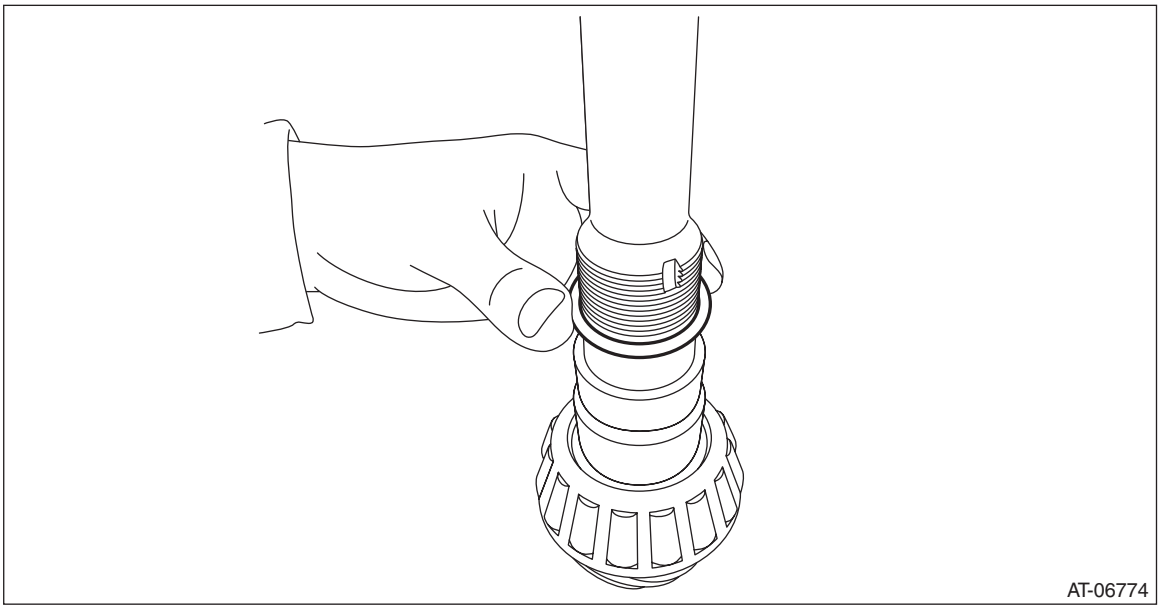


7) Install the drive pinion spacer.

NOTE:
Replace the O-ring with a new part after tooth contact inspection.



8) Install the selected drive pinion washer.

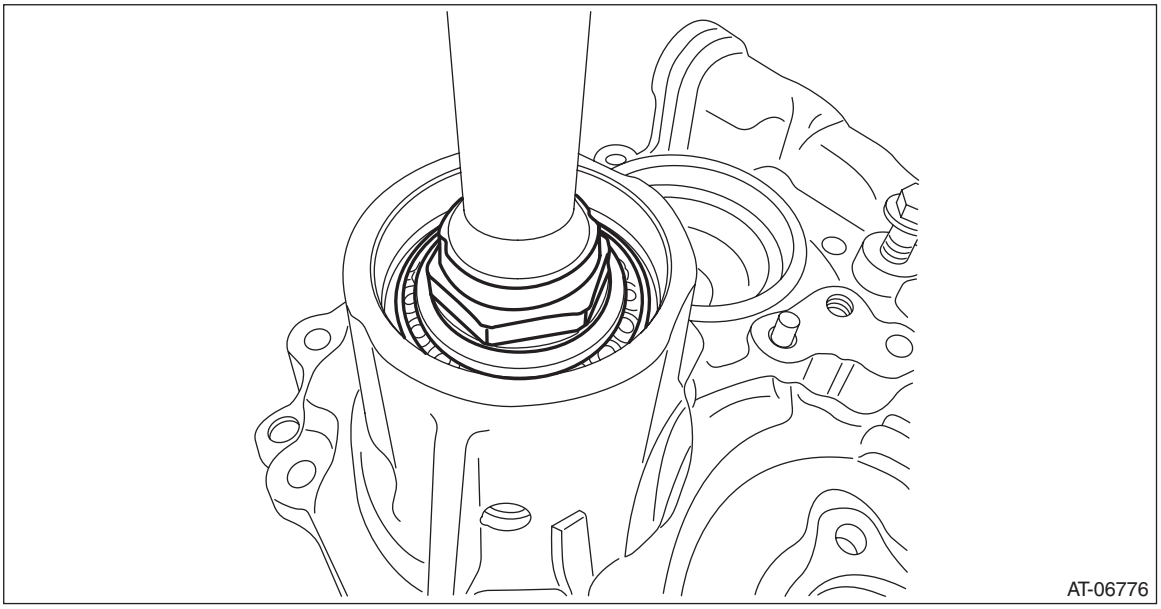


9) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.

10) Install the inner bearing and lock nut.

NOTE:
Use a new lock nut.



11) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

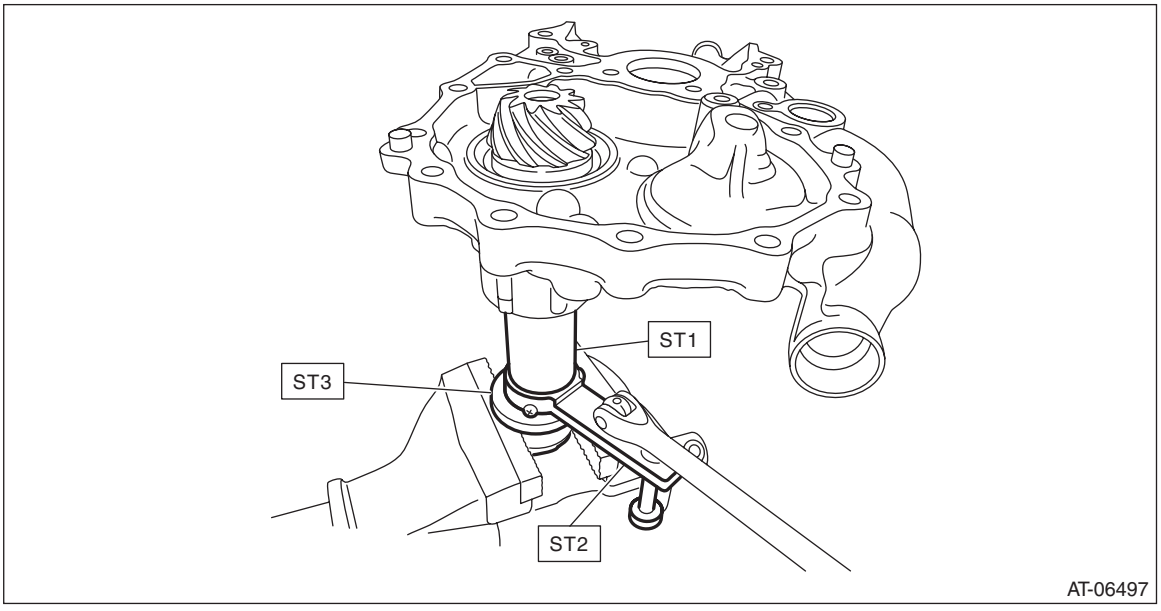
NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

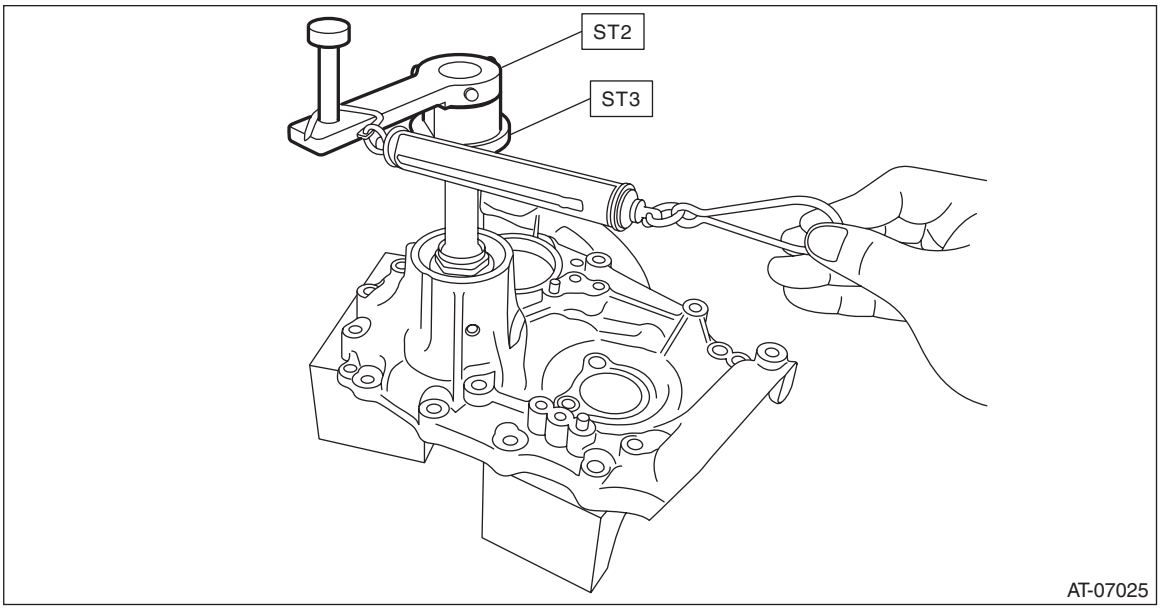
Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.
$T2 = L2/(L1 + L2) \times T1$
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

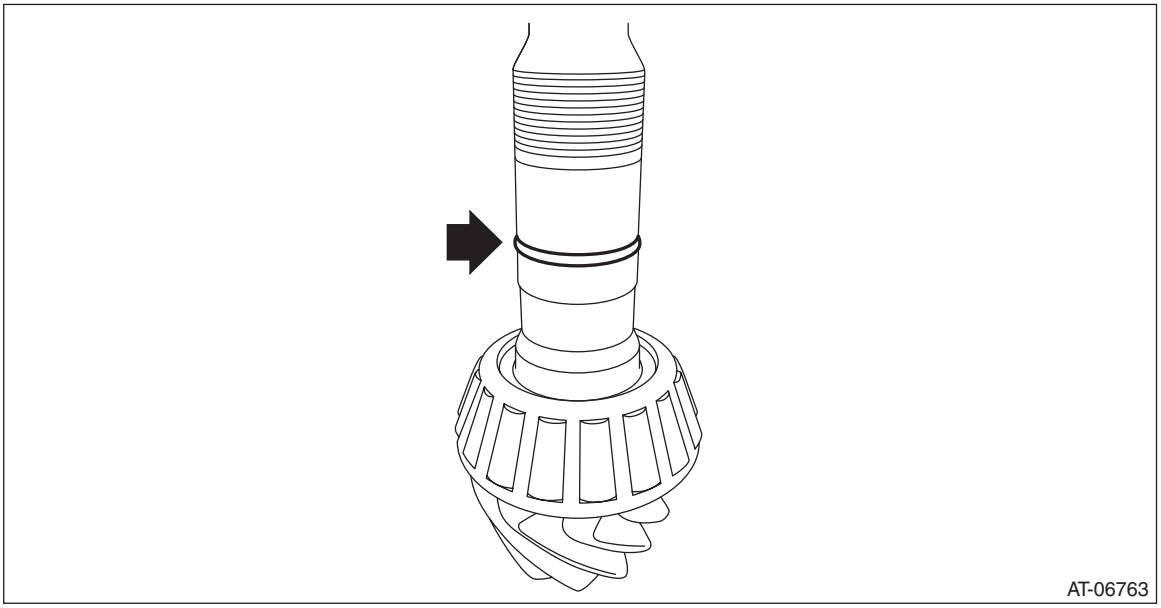
Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)



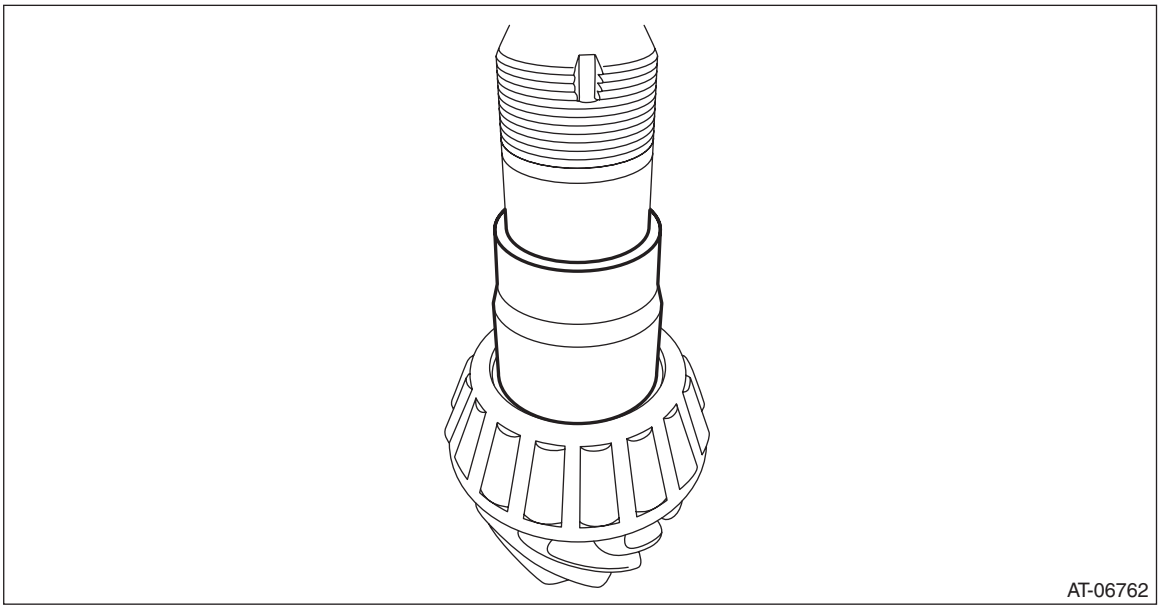


12) Install the drive pinion retainer to the converter case, and check the backlash and tooth contact. <Ref. to CVT(TR580)-312, ADJUSTMENT, Drive Pinion Shaft Assembly.> <Ref. to CVT(TR580)-334, ADJUSTMENT, Front Differential Assembly.>
13) Remove the drive pinion retainer from converter case. <Ref. to CVT(TR580)-290, REMOVAL, Drive Pinion Shaft Assembly.>
14) Remove the drive pinion spacer from the drive pinion shaft. <Ref. to CVT(TR580)-293, DISASSEMBLY, Drive Pinion Shaft Assembly.>
15) Install the O-ring to the drive pinion shaft.

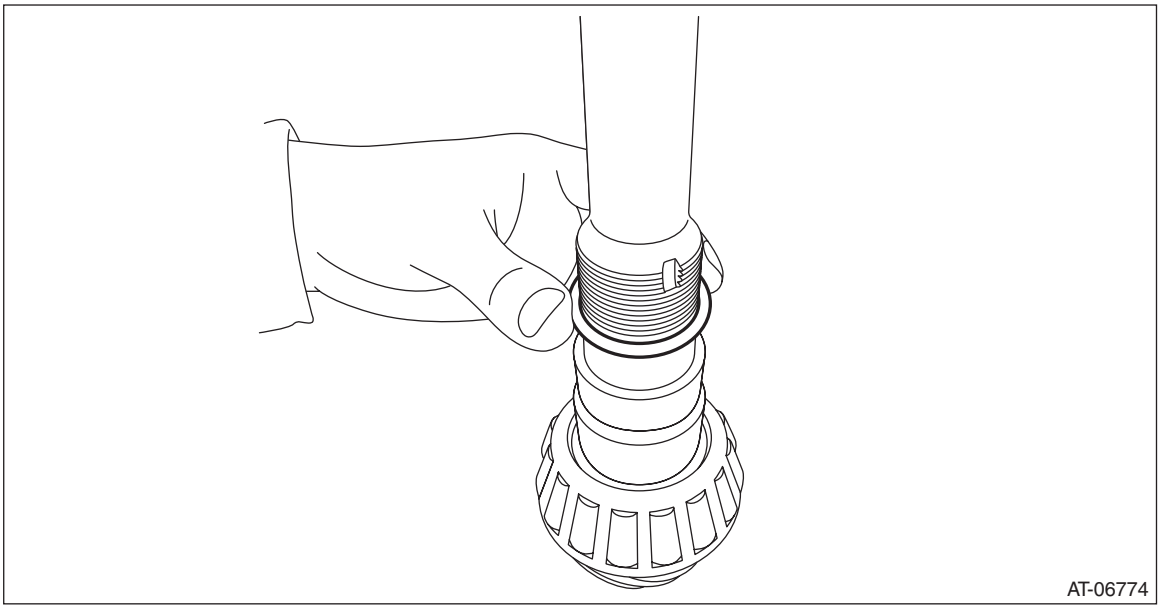
NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



16) Install the drive pinion spacer to the drive pinion shaft.

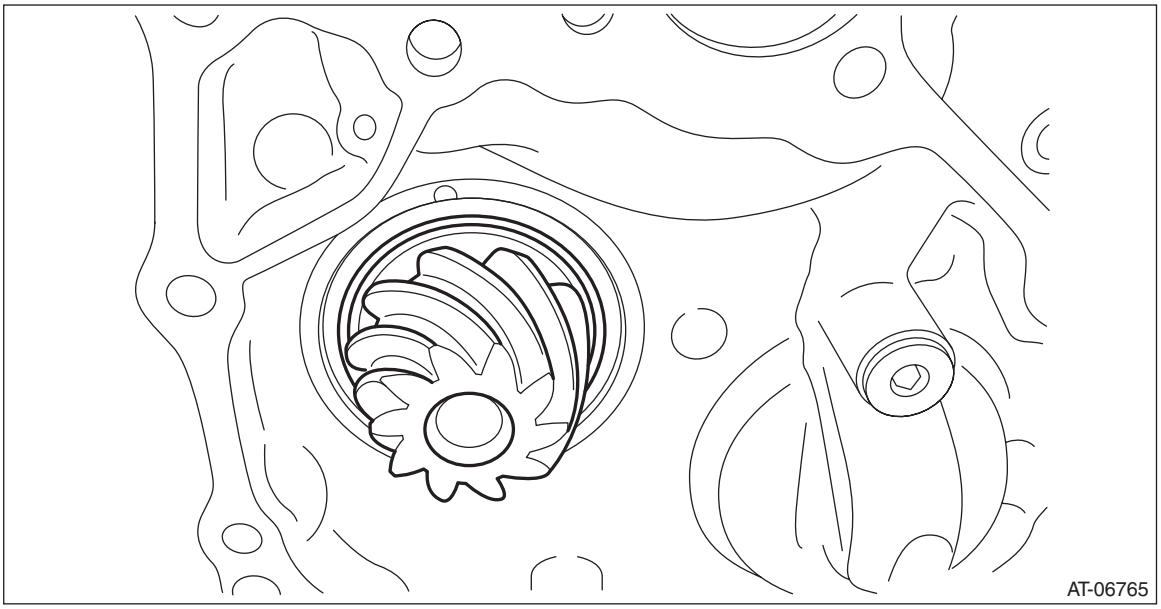


17) Install the drive pinion washer.

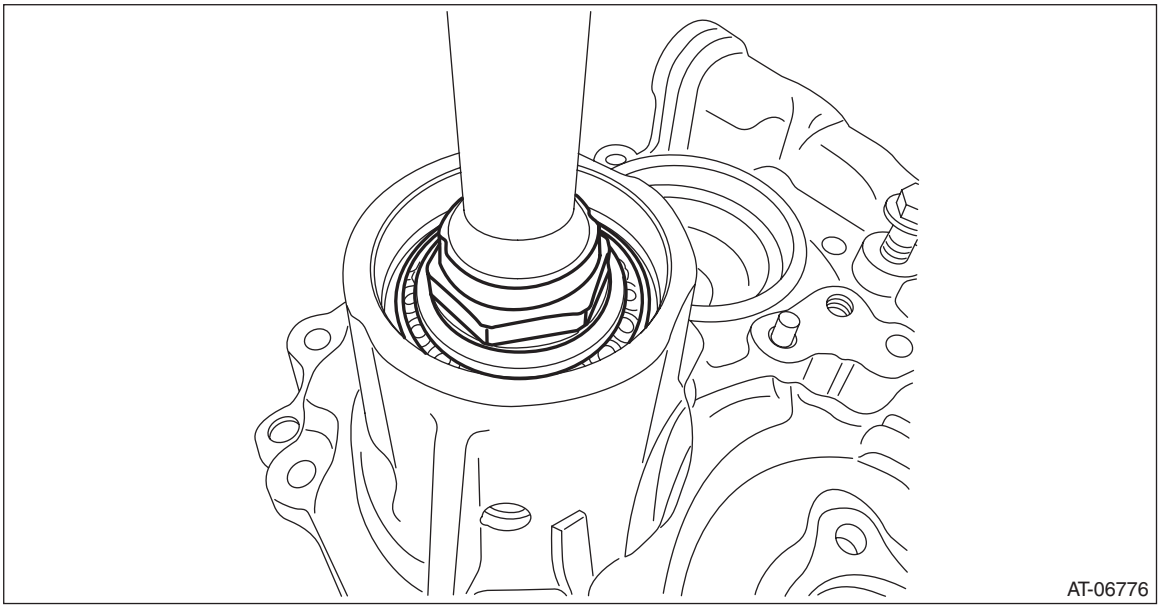


18) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.



19) Install the inner bearing and lock nut.



20) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

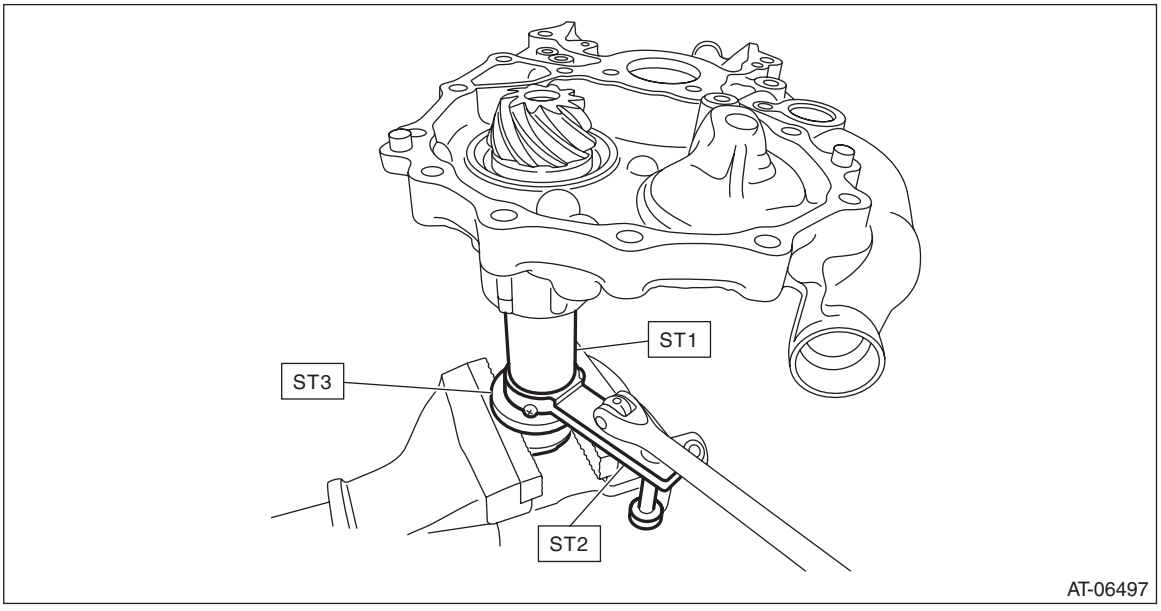
NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

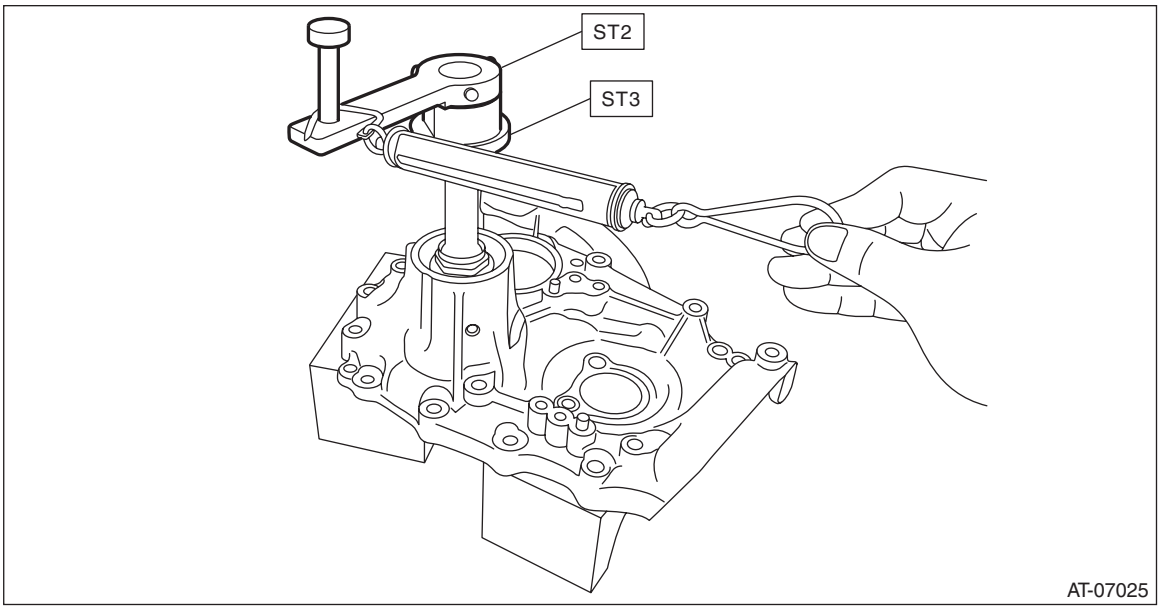
Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

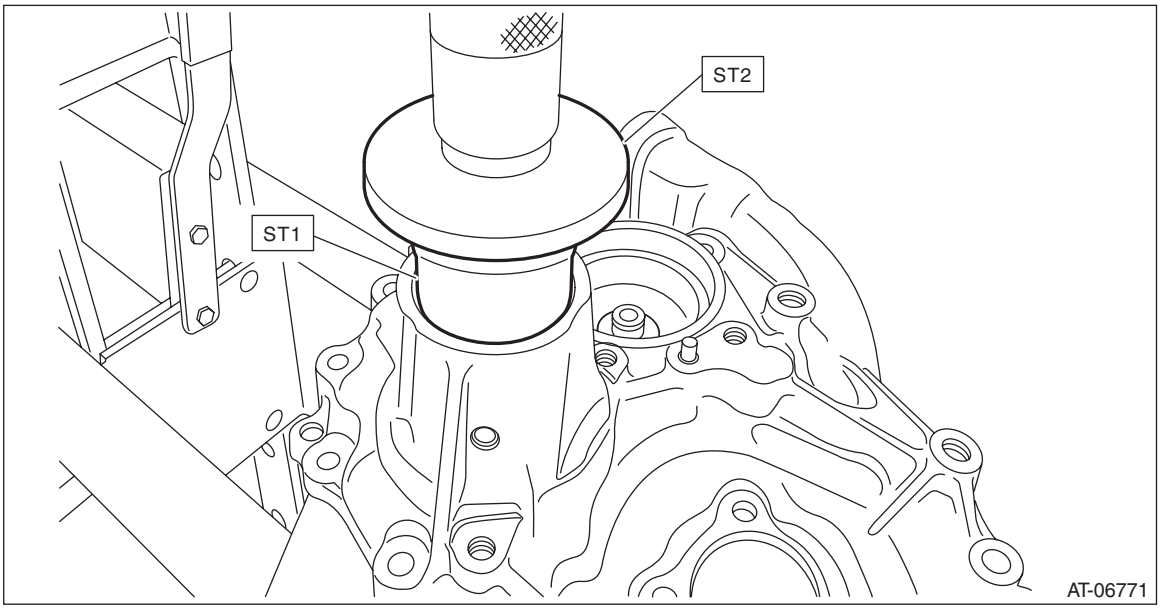
Using the following formula, calculate the tightening torque for a torque wrench.
$T2 = L2/(L1 + L2) \times T1$
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)





21) Crimp the lock nut in 2 locations.
22) Using the ST, install the plug.
ST1 499755602 PRESS SNAP RING
ST2 398177700 INSTALLER

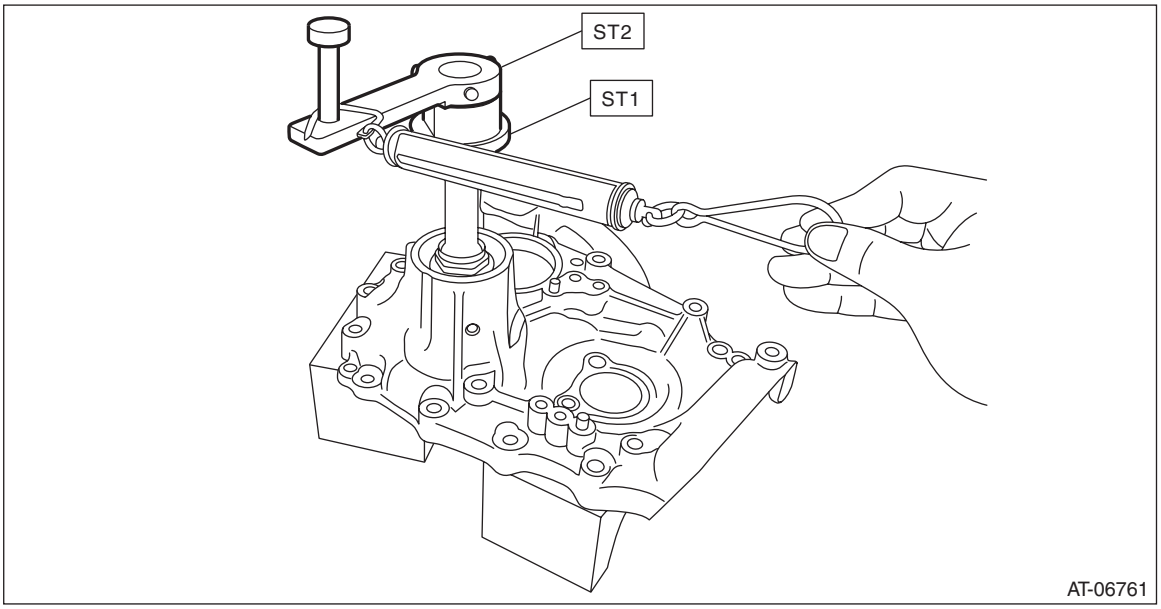


E: INSPECTION

- Make sure that all component parts are free of scratches, holes and other faults.
- Check the tooth contact. <Ref. to CVT(TR580)-312, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the starting torque of drive pinion shaft.

CAUTION:
Before measuring, apply differential gear oil to roller of bearing and rotate the bearing several times.
ST1 498937110 HOLDER
ST2 499787700 WRENCH

Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

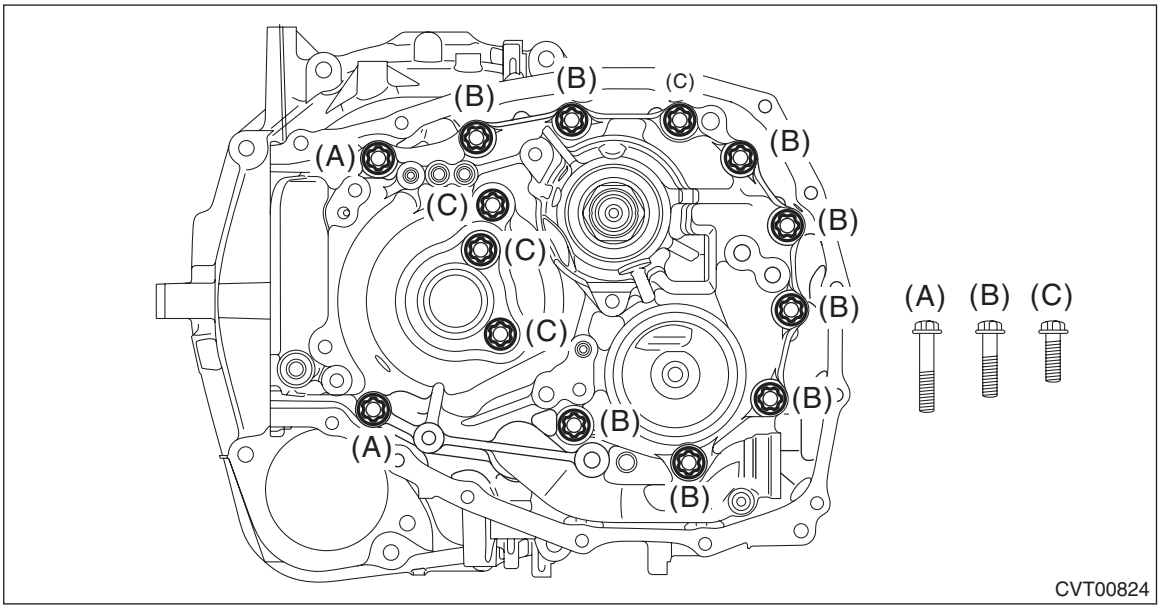


F: ADJUSTMENT

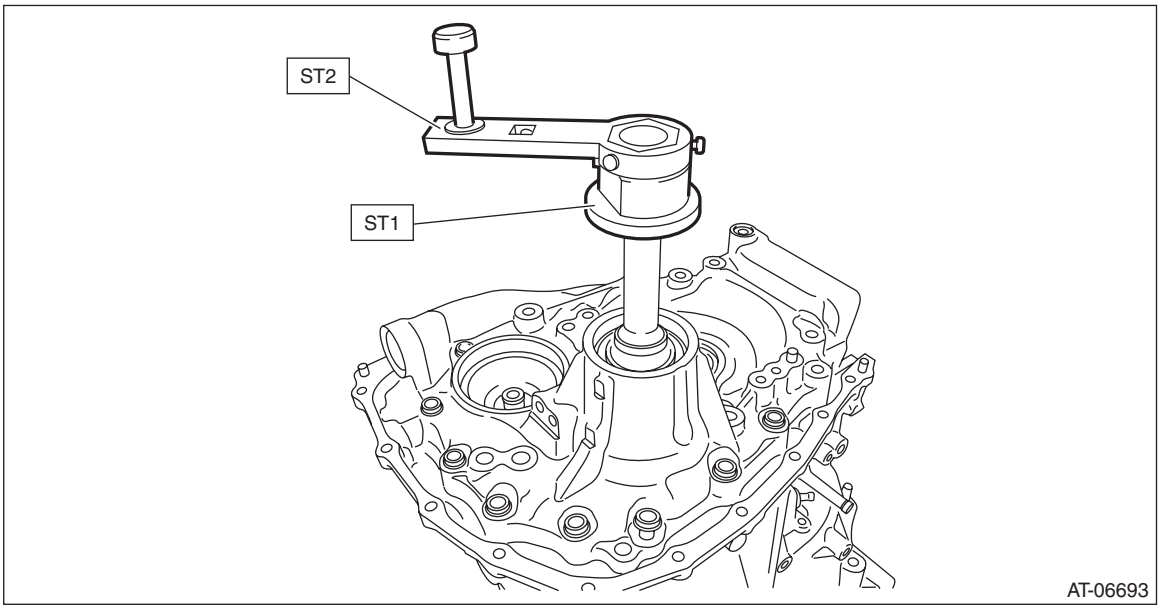
1) Remove the liquid gasket from the mating surface completely.
2) Using the ST, install the drive pinion retainer to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



3) Rotate the drive pinion several times using ST1 and ST2.
ST1 498937110 HOLDER
ST2 499787700 WRENCH



4) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to CVT(TR580)-334, ADJUSTMENT, Front Differential Assembly.>
5) Using the ST, remove the drive pinion retainer from converter case.
ST 18270KA020 SOCKET (E20)

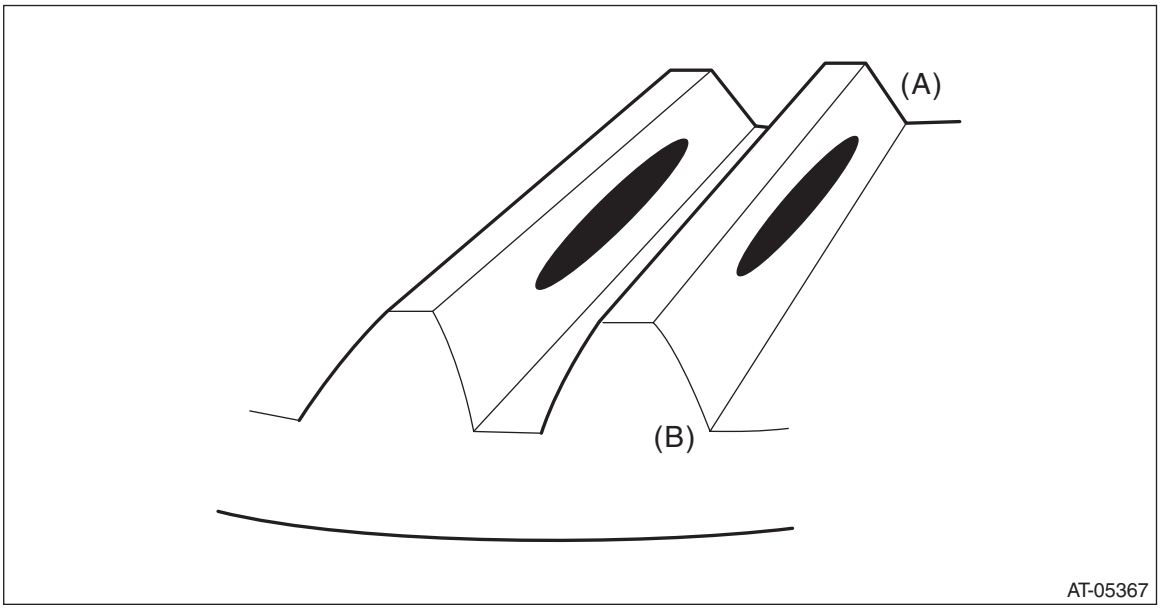
6) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Then install the drive pinion retainer and rotate the drive pinion in both directions several times. Remove the drive pinion retainer and check the tooth contact pattern.
If the teeth contact is inappropriate, adjust the backlash or thickness of the shim. <Ref. to CVT(TR580)-334, ADJUSTMENT, Front Differential Assembly.>

NOTE:
After correction, wipe off the lead-free red dye.

Drive pinion shim	
Part No.	Thickness mm (in)
31451AA320	0.150 (0.0059)
31451AA330	0.175 (0.0069)
31451AA340	0.200 (0.0079)
31451AA350	0.225 (0.0089)
31451AA360	0.250 (0.0098)
31451AA370	0.275 (0.0108)

- Correct tooth contact

Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)

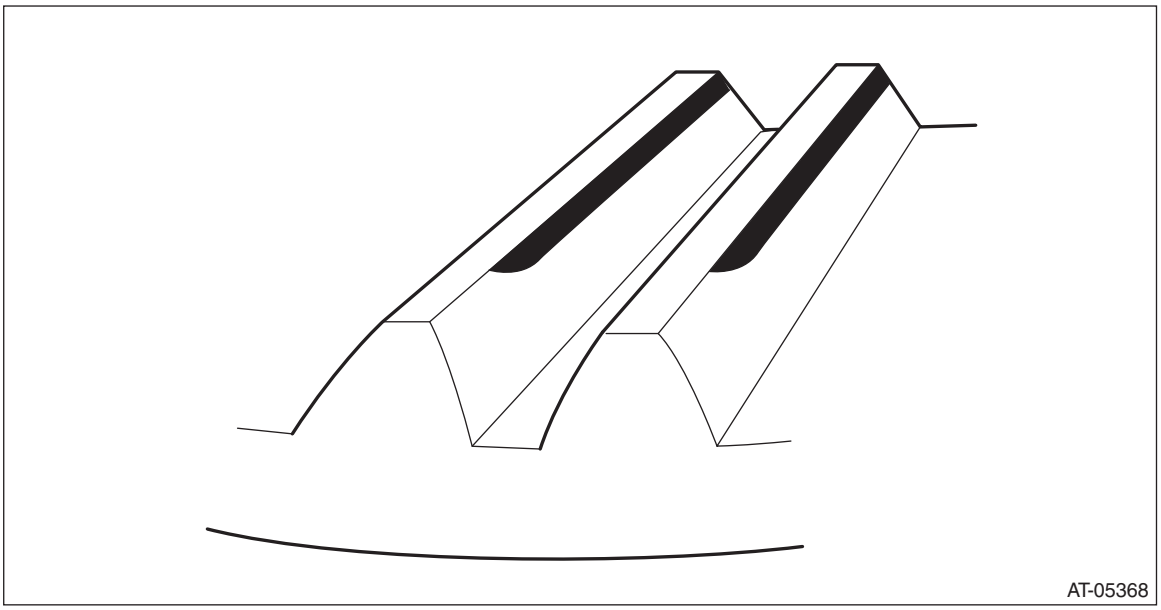


(A) Toe side
(B) Heel side

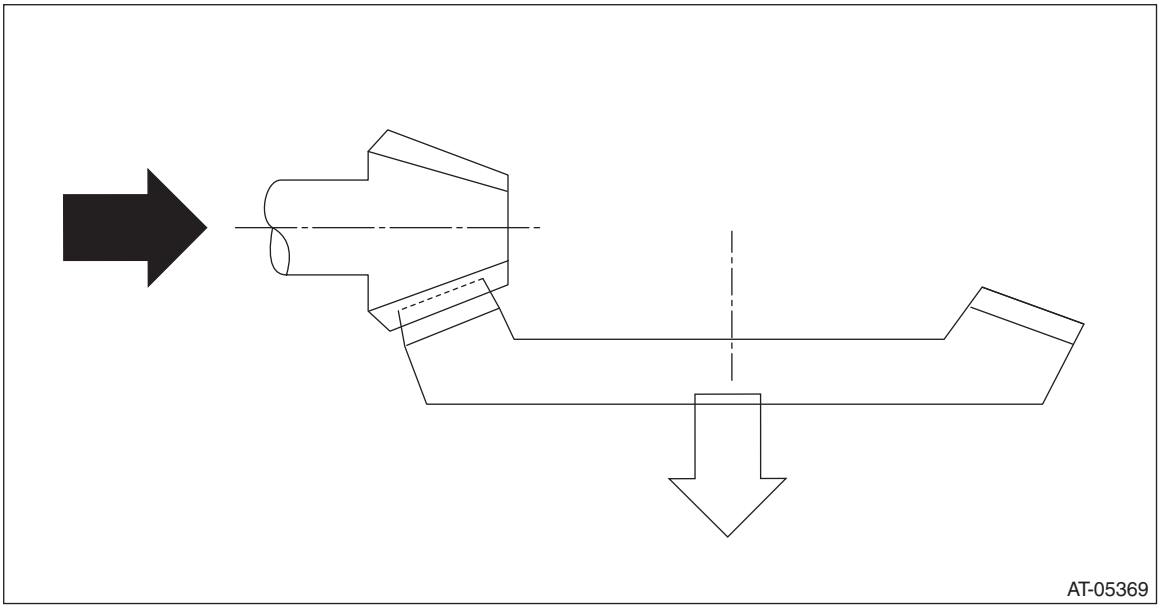
- Face contact

Check item: Backlash is too large.

Contact pattern



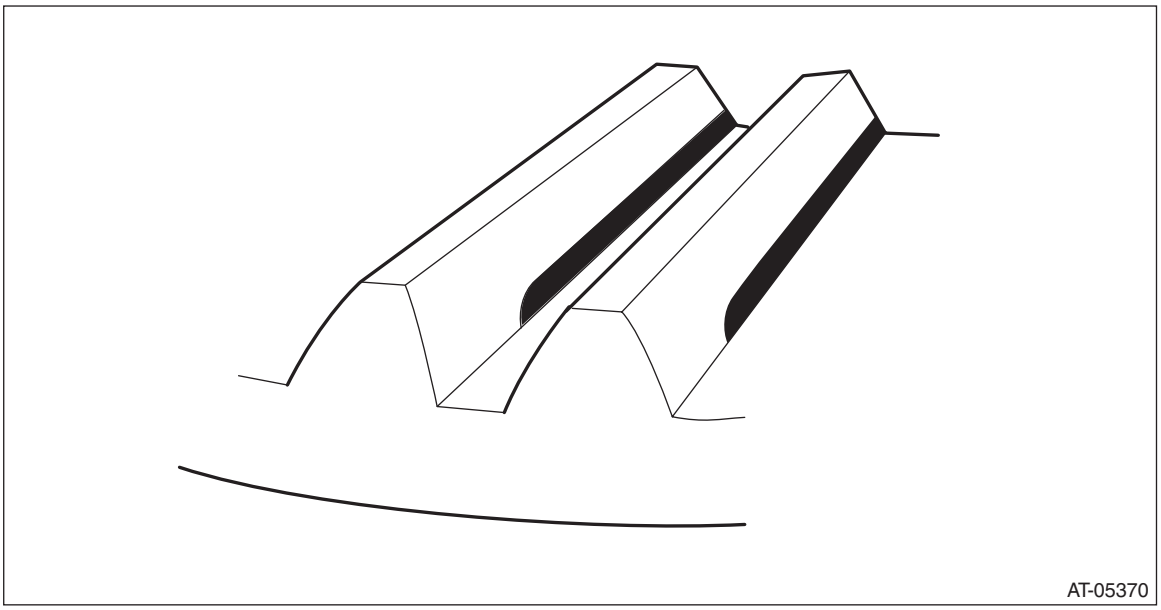
Corrective action: Increase thickness of drive pinion shim according to the procedures for moving the drive pinion close to hypoid driven gear.



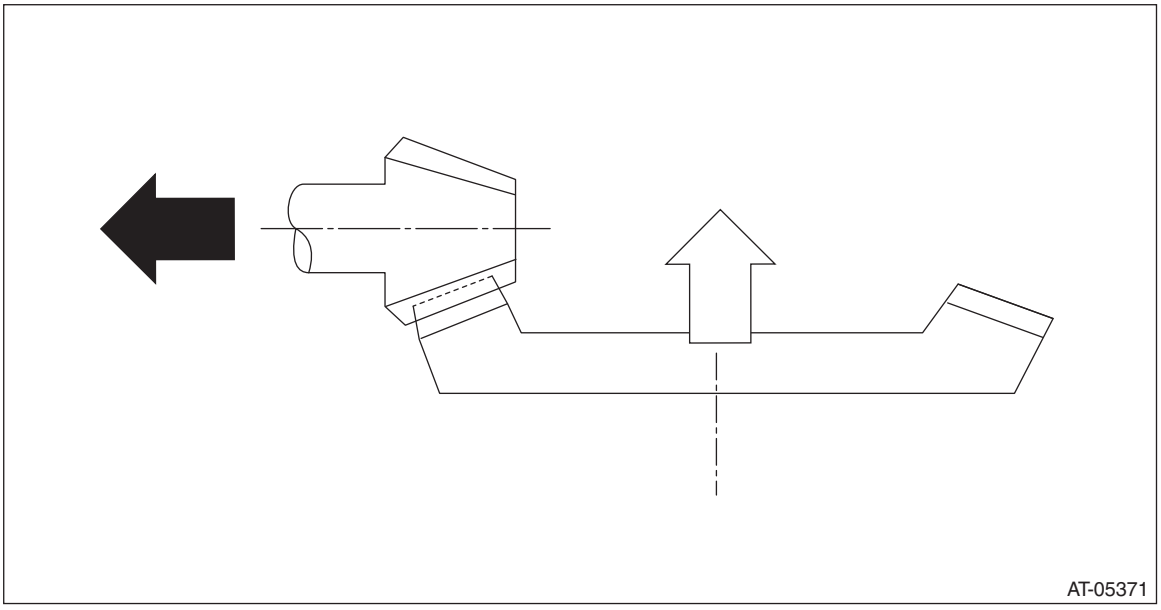
- Flank contact

Check item: Backlash is too small.

Contact pattern



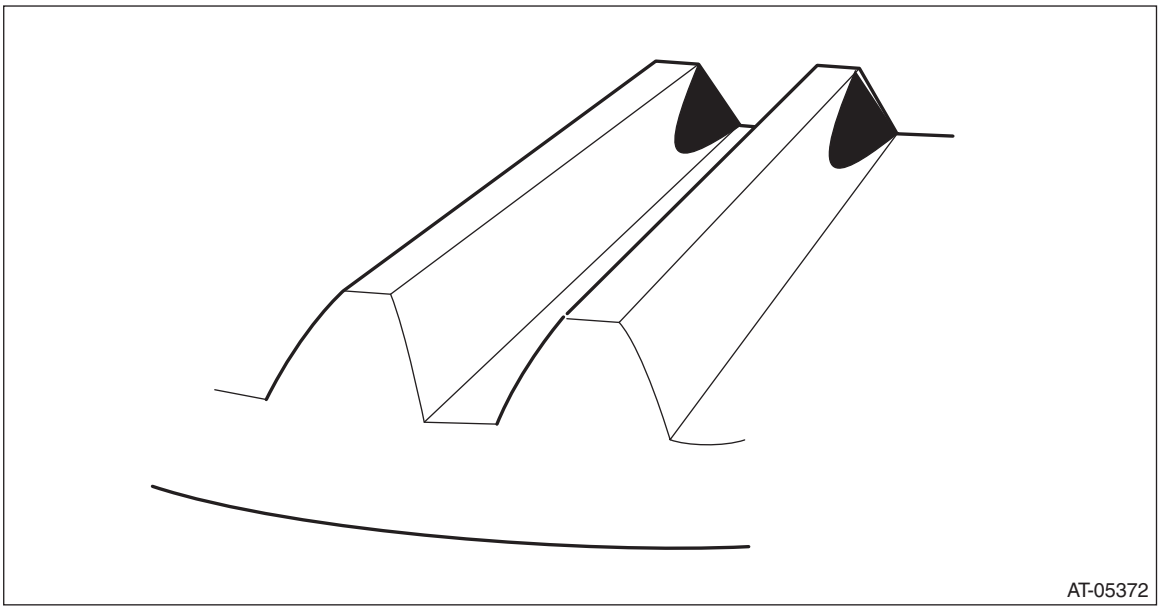
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear.



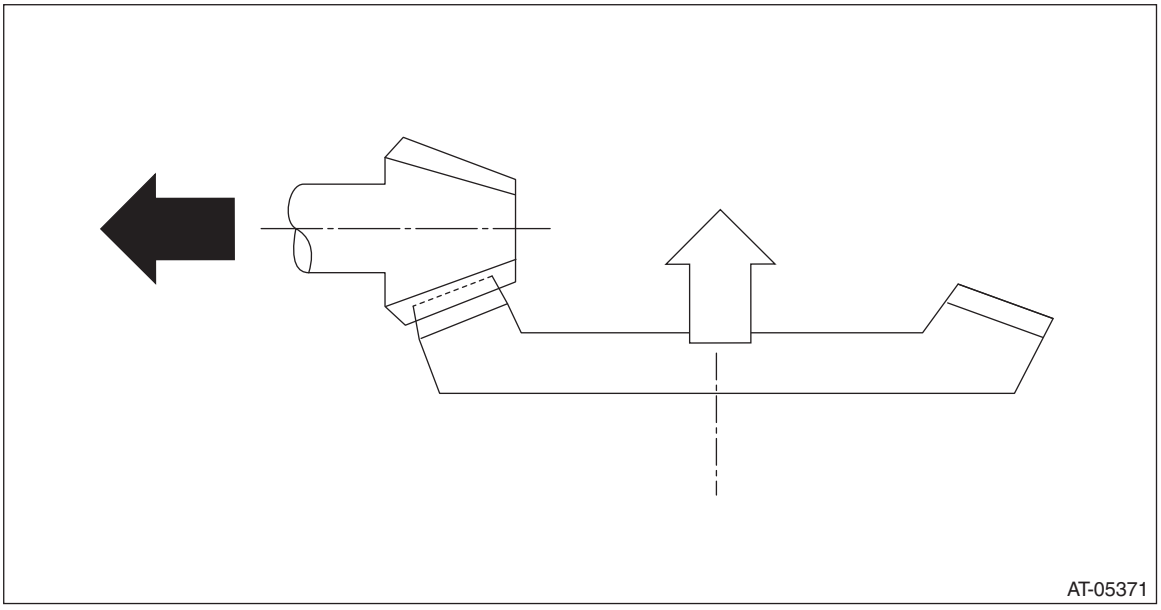
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



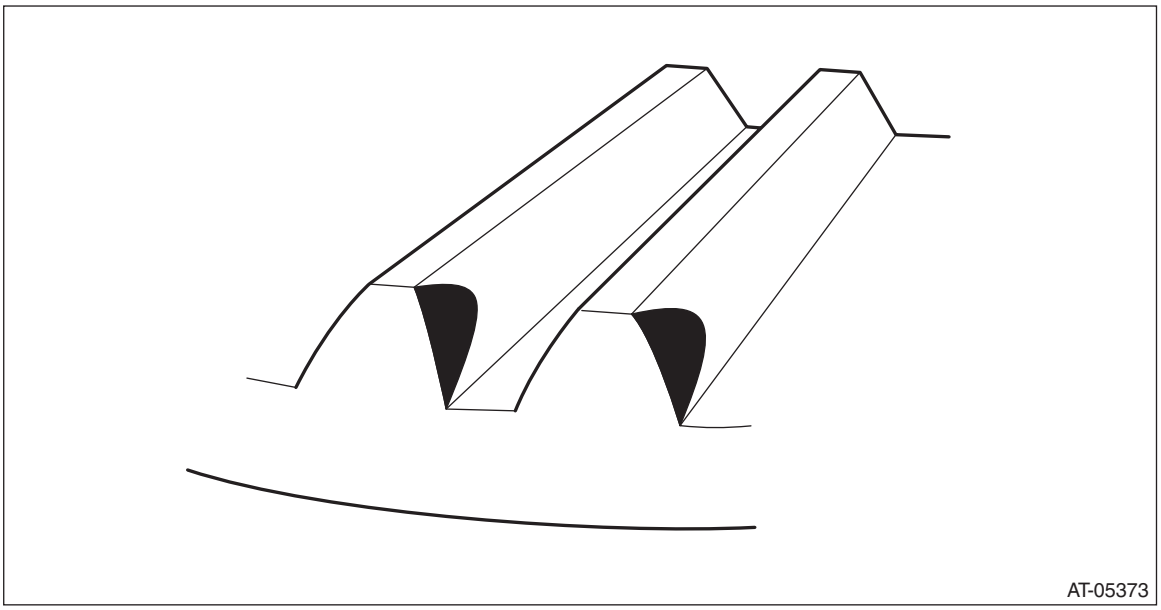
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear side.



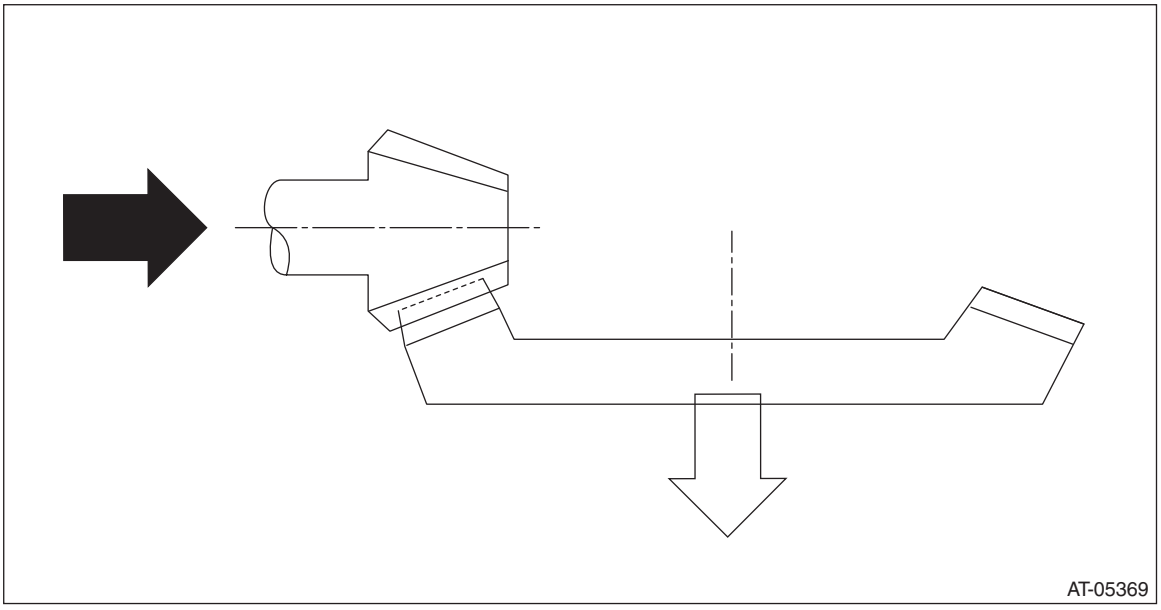
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Increase the thickness of the drive pinion shim according to the procedures for moving the drive pinion closer to the hypoid driven gear.



7) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER

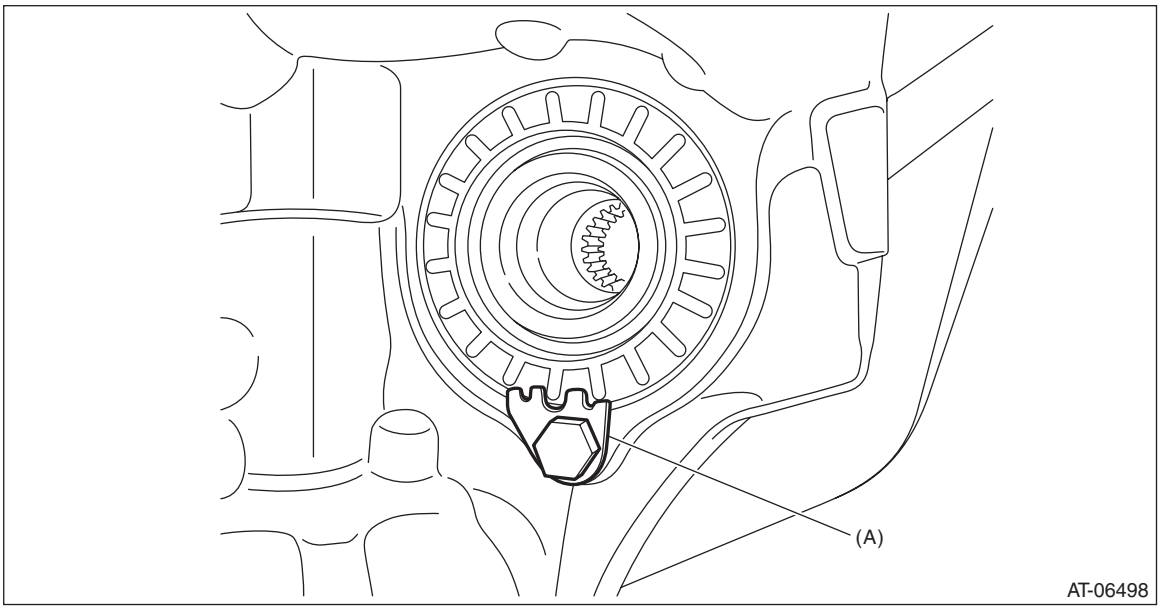
8) Using the ST, tighten the retainer to the position before it is loosened.

ST 18658AA020 WRENCH COMPL RETAINER

9) Replace the differential side retainer oil seal with a new part. <Ref. to CVT(TR580)-94, Differential Side Retainer Oil Seal.>

10) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

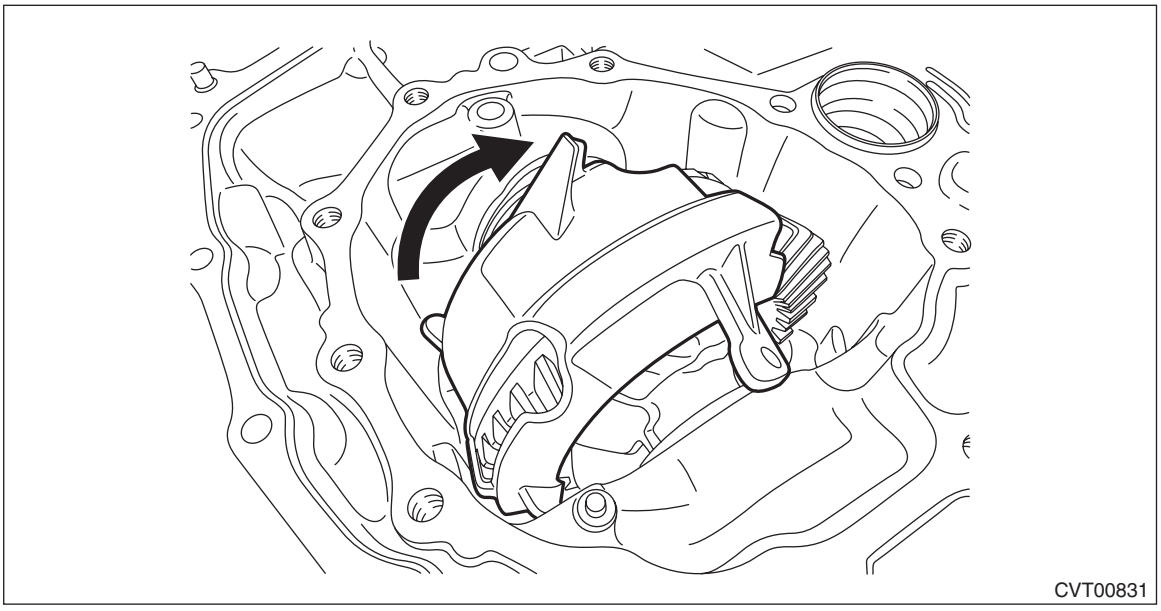


(A) Lock plate

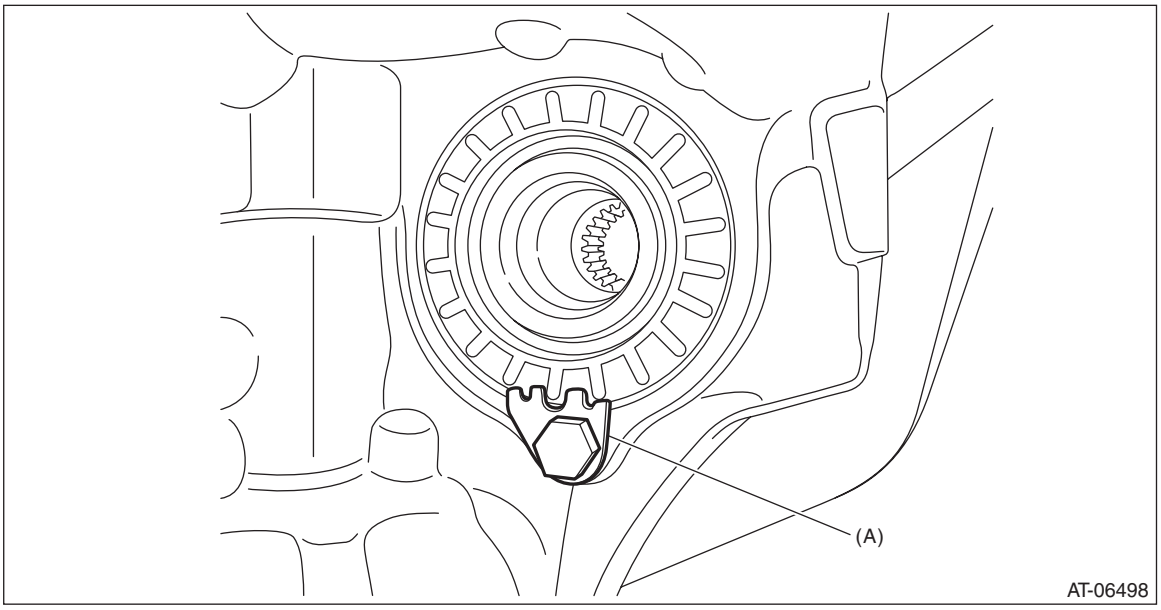
42.Front Differential Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-162, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-121, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-136, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-107, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-109, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-112, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-197, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-211, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-229, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-234, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-255, REMOVAL, Reverse Brake Assembly.>
20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-270, REMOVAL, Forward Clutch Assembly.>
21) Remove the drive pinion shaft assembly. <Ref. to CVT(TR580)-290, REMOVAL, Drive Pinion Shaft Assembly.>
22) Remove the oil baffle.


CVT00831

23) Remove the lock plates on both sides.

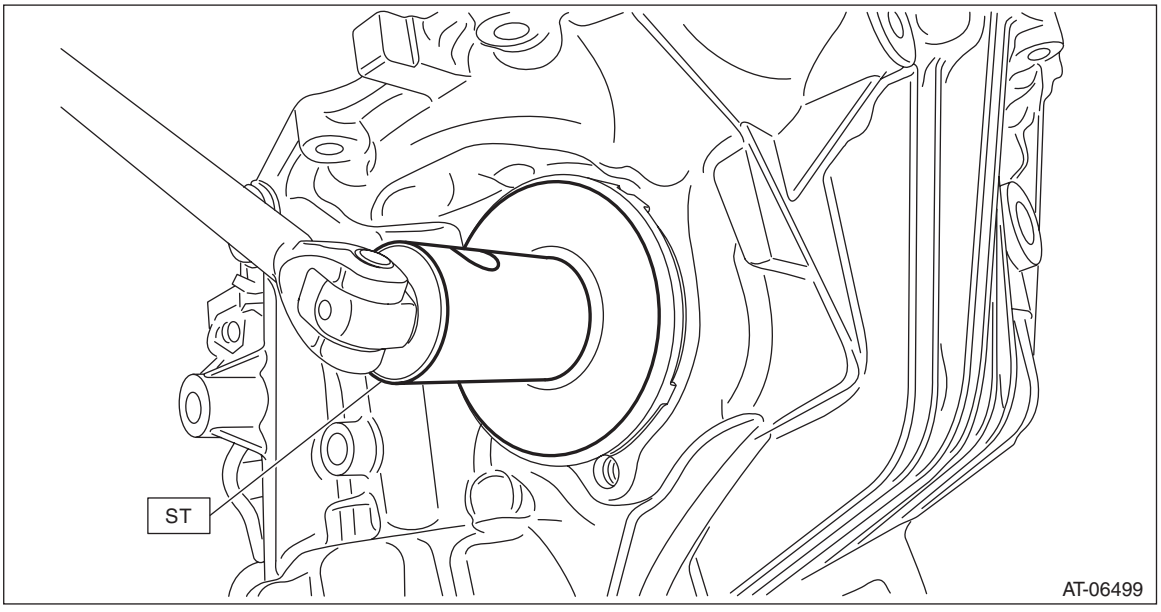


(A) Lock plate

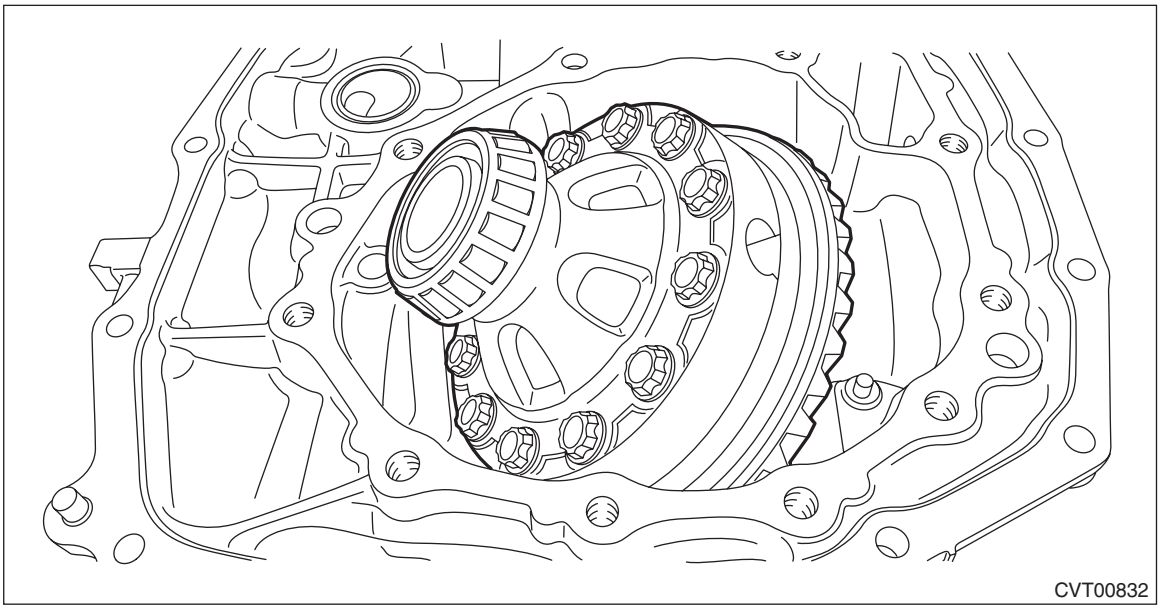
24) Remove the differential side retainers using ST.

NOTE:
• When the wrench COMPL retainer interferes with the converter case, align the cutout portion with the interference part.
• Support the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.
• Keep the left and right differential side retainers and left and right bearing outer races by attaching tags or in similar ways to make it possible to identify RH and LH sides.

ST 18658AA020 WRENCH COMPL RETAINER



25) Remove the front differential assembly while being careful not to damage the attachment part of the retainer.

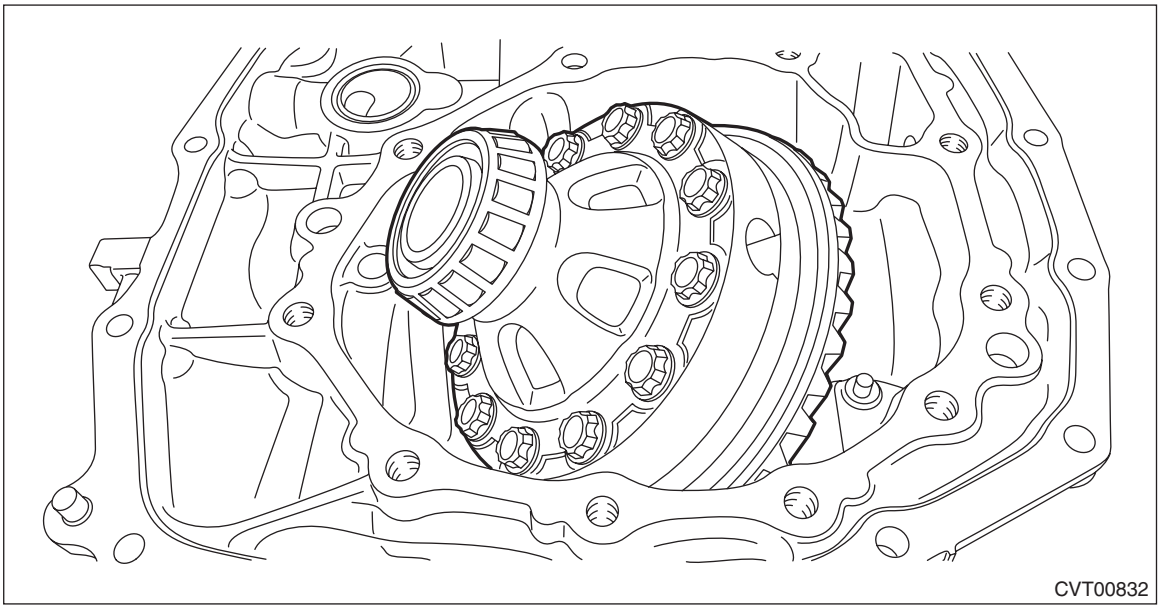


26) Remove the oil seals and O-rings from both differential side retainers. <Ref. to CVT(TR580)-327, SIDE RETAINER, DISASSEMBLY, Front Differential Assembly.>

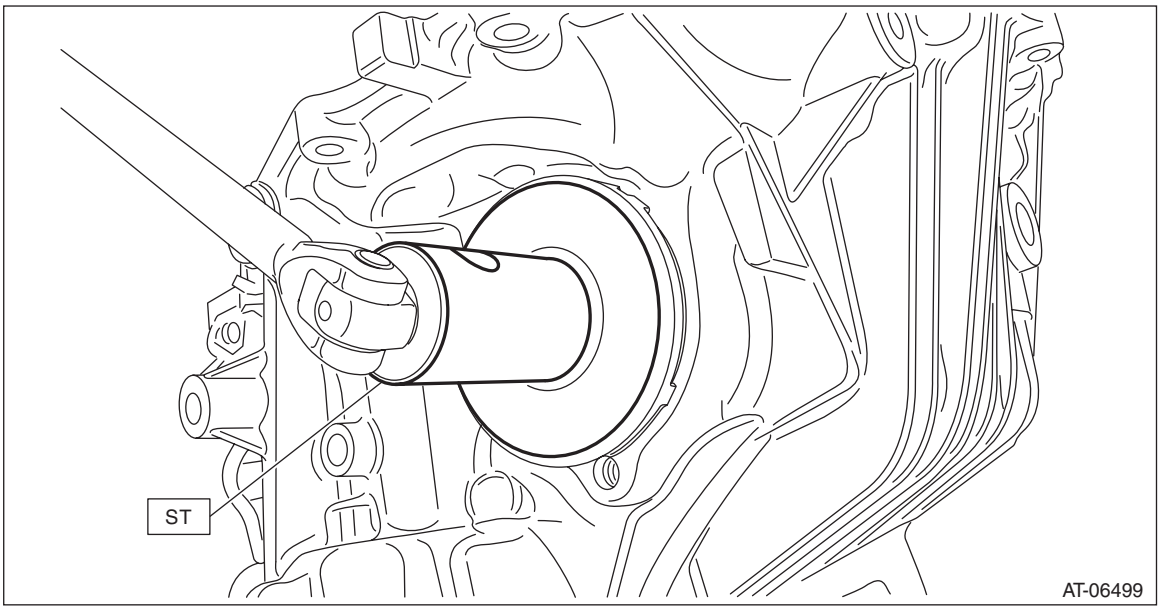
B: INSTALLATION

1) Install the front differential assembly to the converter case.

NOTE:
Be careful not to damage the inside of the case (especially the mounting surface of the differential side retainers).



2) Install the bearing outer race.
3) Temporarily install the differential side retainers using ST.
ST 18658AA020 WRENCH COMPL RETAINER



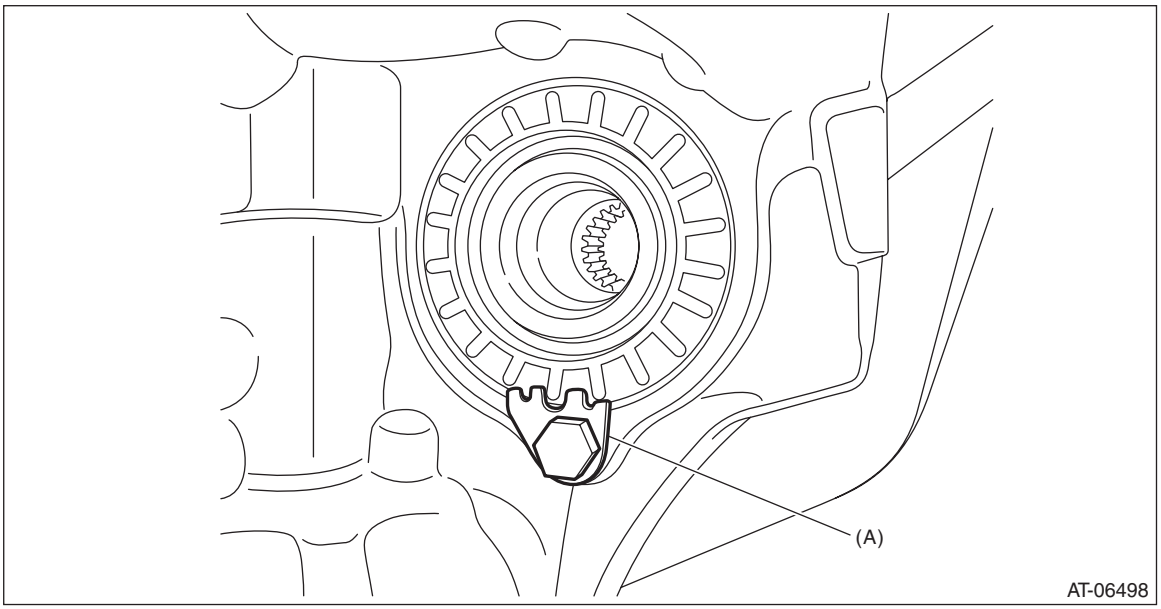
4) Adjust the backlash of the front differential. <Ref. to CVT(TR580)-334, ADJUSTMENT, Front Differential Assembly.>
5) Inspect and adjust the tooth contact. <Ref. to CVT(TR580)-312, ADJUSTMENT, Drive Pinion Shaft Assembly.>
6) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER
7) Using the ST, tighten the retainer to the position before it is loosened.
ST 18658AA020 WRENCH COMPL RETAINER
8) Install the oil seal to the differential side retainer. <Ref. to CVT(TR580)-94, Differential Side Retainer Oil Seal.>

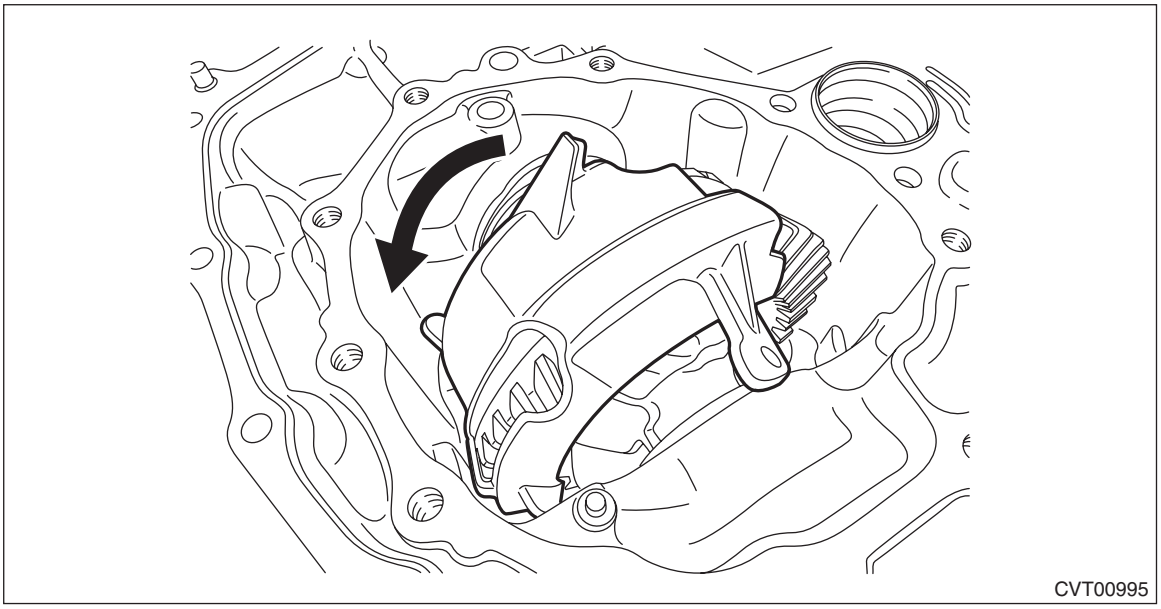
9) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Lock plate

10) Install the oil baffle.



11) Install the drive pinion shaft assembly. <Ref. to CVT(TR580)-291, INSTALLATION, Drive Pinion Shaft Assembly.>
12) Install the forward clutch assembly. <Ref. to CVT(TR580)-273, INSTALLATION, Forward Clutch Assembly.>
13) Install the reverse brake assembly. <Ref. to CVT(TR580)-258, INSTALLATION, Reverse Brake Assembly.>
14) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-241, INSTALLATION, Primary Pulley and Secondary Pulley.>
15) Install the reduction drive gear. <Ref. to CVT(TR580)-230, INSTALLATION, Reduction Drive Gear.>
16) Install the transmission case. <Ref. to CVT(TR580)-214, INSTALLATION, Transmission Case.>
17) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>

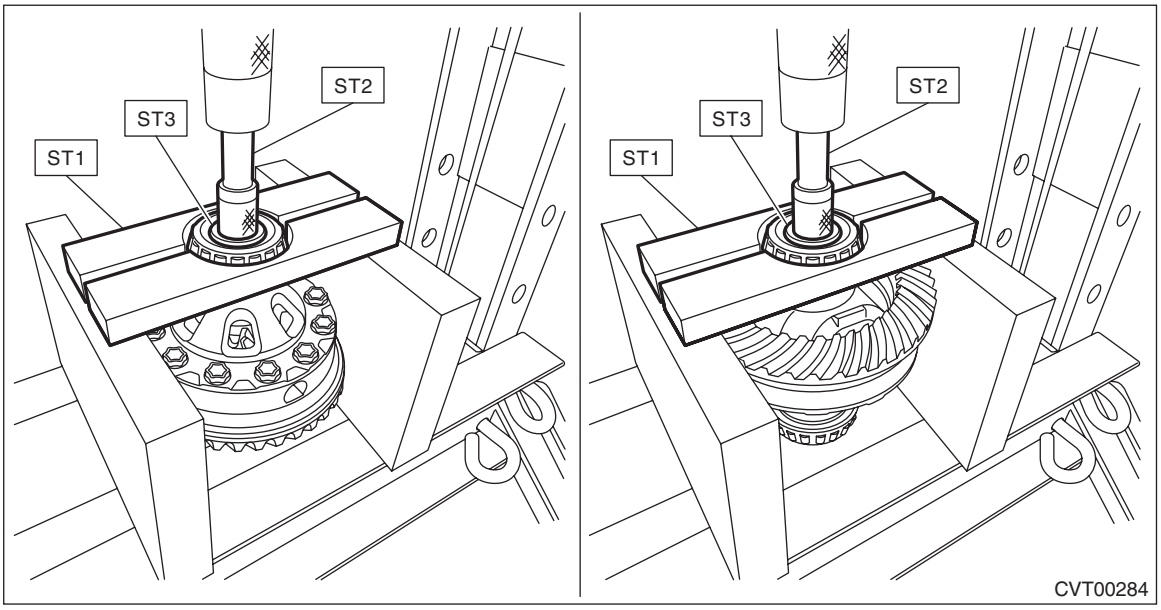
18) Install the transmission control device. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Control Device.>
19) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-197, INSTALLATION, Reduction Driven Gear.>
20) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>
21) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
22) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>
23) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
24) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
25) Install the secondary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Secondary Speed Sensor.>
26) Install the primary speed sensor. <Ref. to CVT(TR580)-113, INSTALLATION, Primary Speed Sensor.>
27) Install the turbine speed sensor. <Ref. to CVT(TR580)-107, INSTALLATION, Turbine Speed Sensor.>
28) Install the transmission harness. <Ref. to CVT(TR580)-143, INSTALLATION, Transmission Harness.>
29) Install the control valve body. <Ref. to CVT(TR580)-127, INSTALLATION, Control Valve Body.>
30) Install the air breather hose. <Ref. to CVT(TR580)-164, INSTALLATION, Air Breather Hose.>
31) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

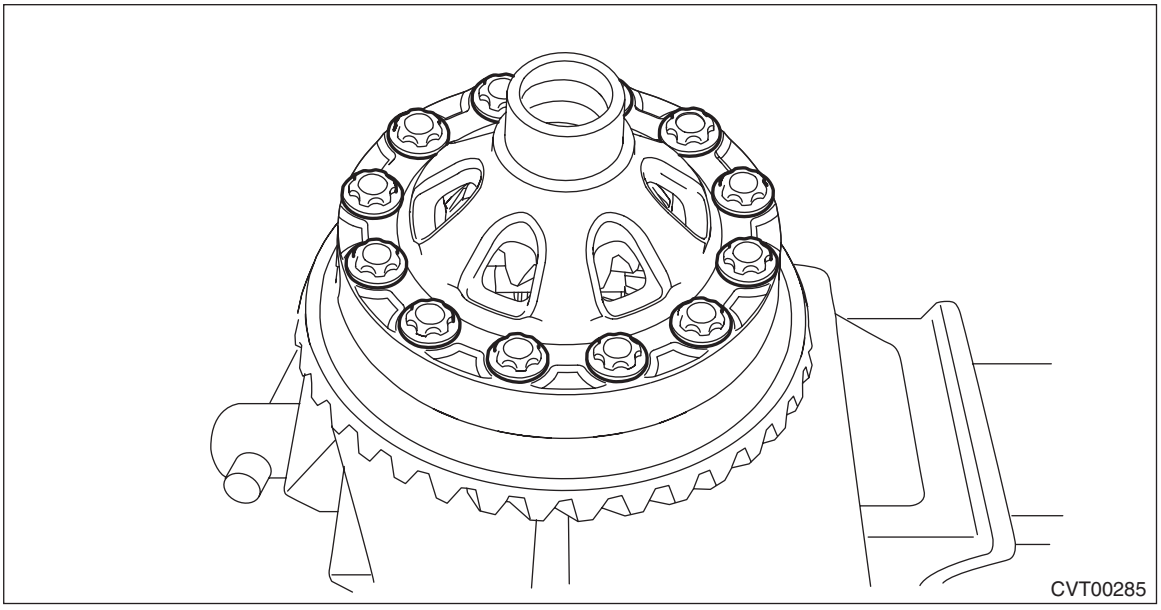
1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the taper roller bearing using the ST.

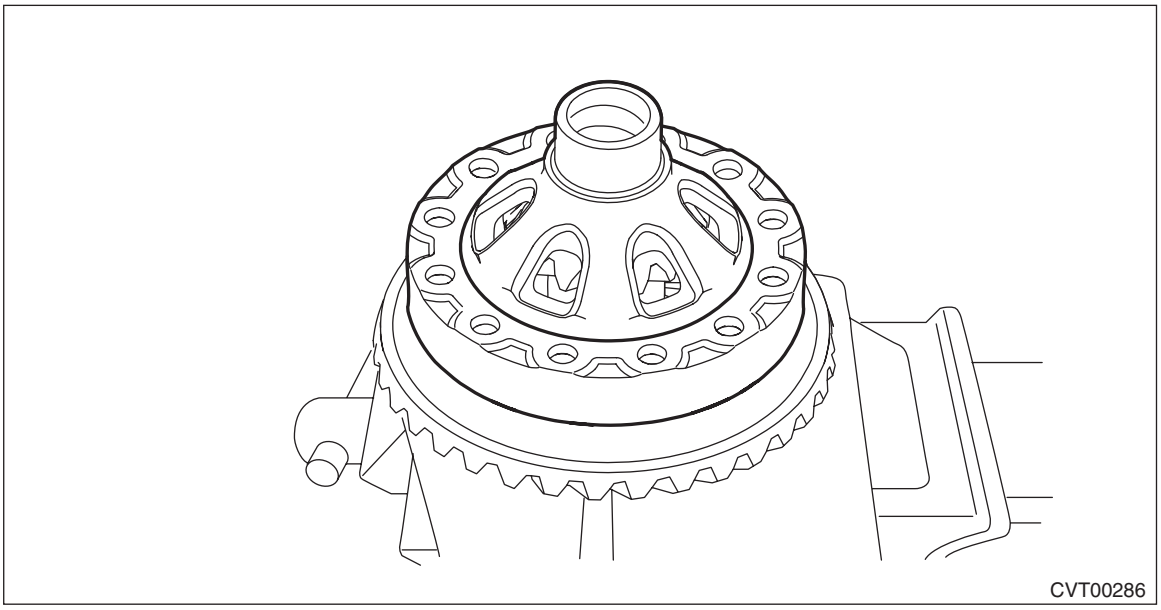
ST1	498077000	REMOVER
ST2	899864100	REMOVER
ST3	398497701	SEAT



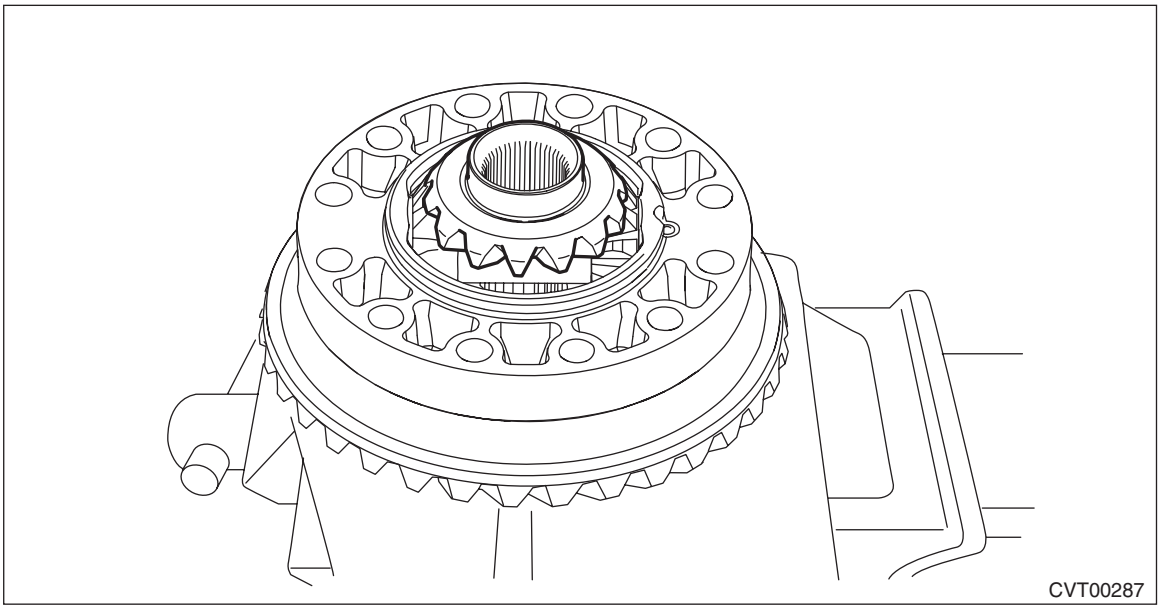
2) Remove the hypoid driven gear mounting bolt using the ST.
ST 18270KA020 SOCKET (E20)



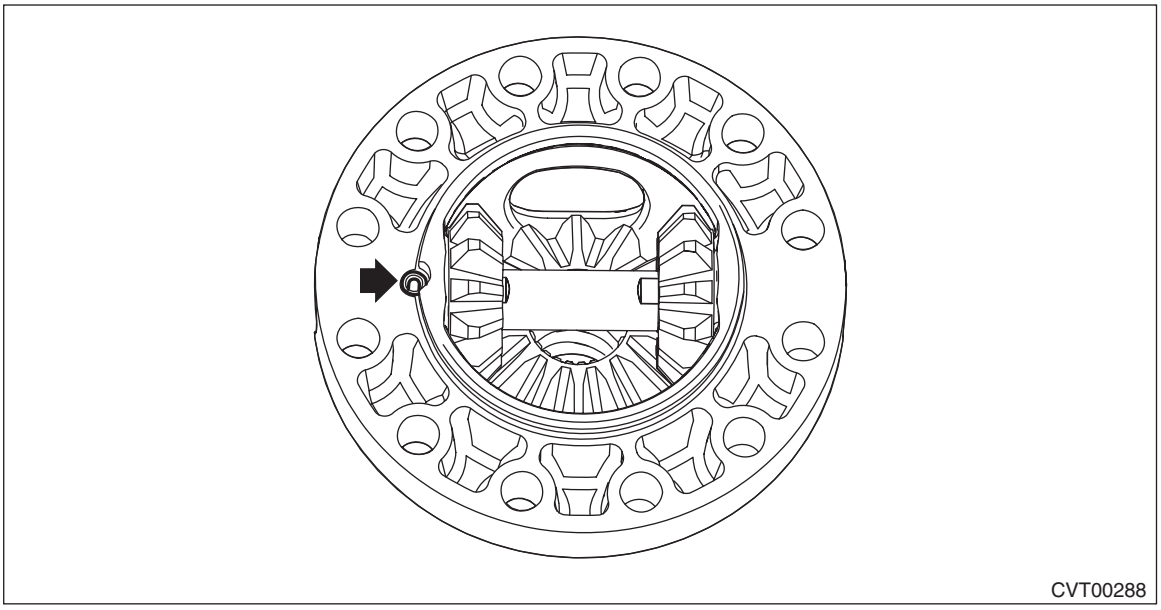
3) Remove the differential case (LH).



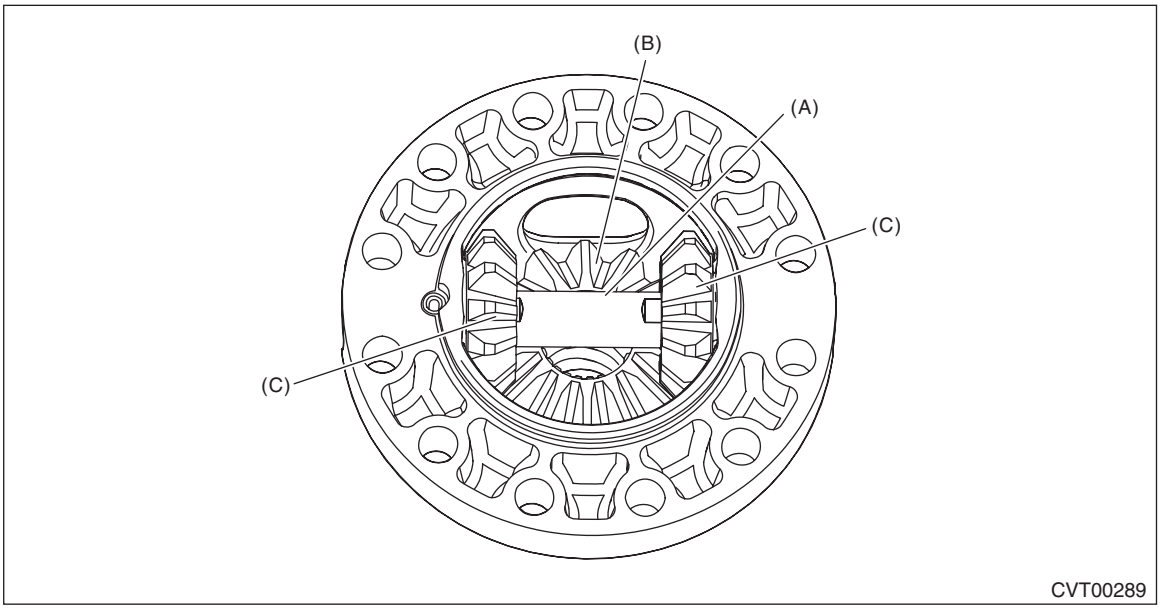
4) Remove the differential bevel gear and washer from differential case.


CVT00287

5) Remove the straight pin.


CVT00288

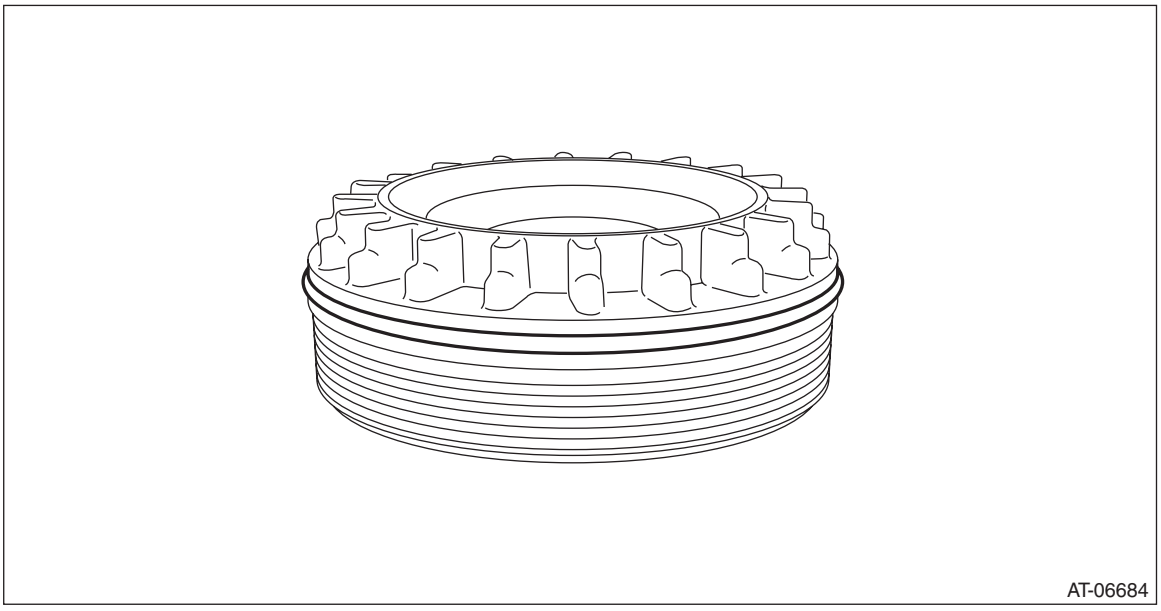
6) Remove the pinion shaft, then remove the differential bevel gear, washer and differential bevel pinion.



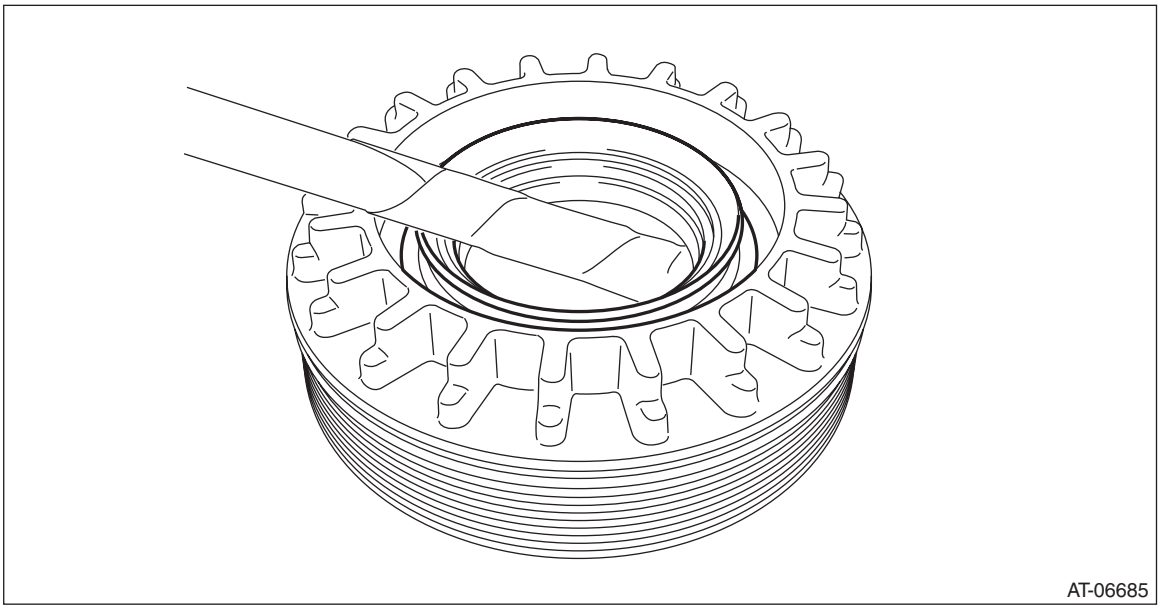
(A) Pinion shaft
(B) Differential bevel gear
(C) Differential bevel pinion

2. SIDE RETAINER

NOTE:
After adjusting the drive pinion backlash and tooth contact, replace the oil seal and O-ring with new parts.
1) Remove the O-ring.



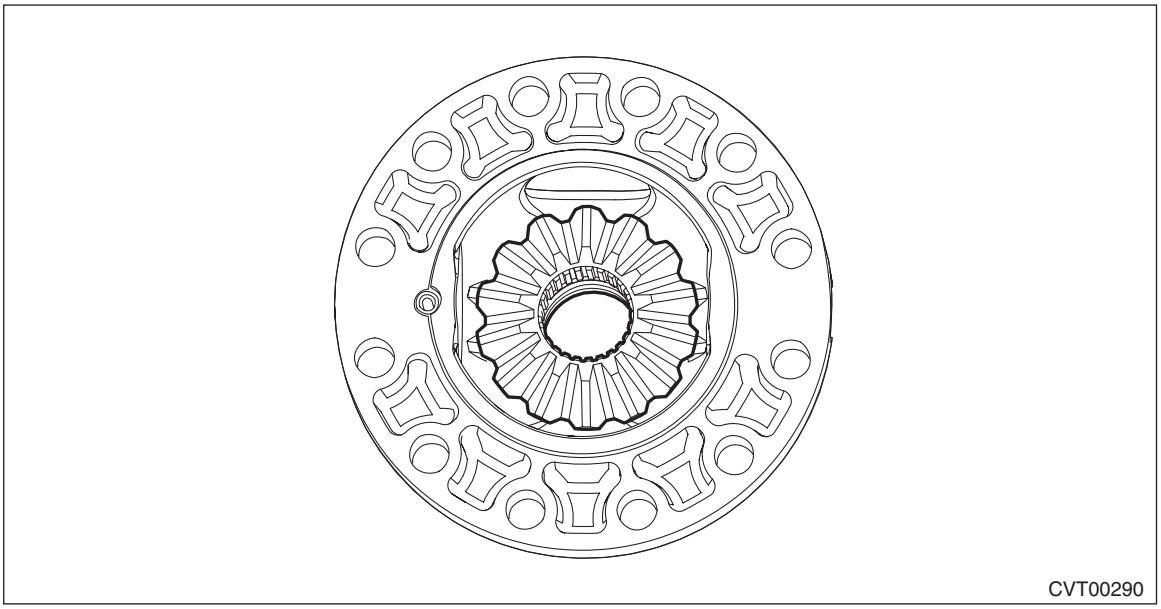
2) Remove the oil seal.



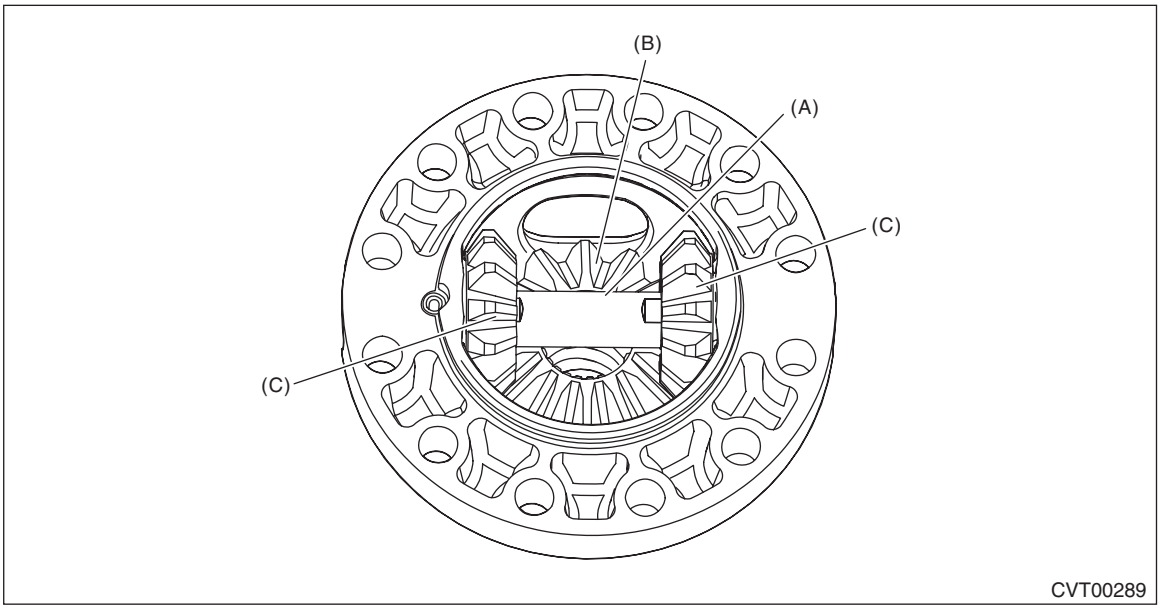
D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the washer and differential bevel gear into the differential case (RH).

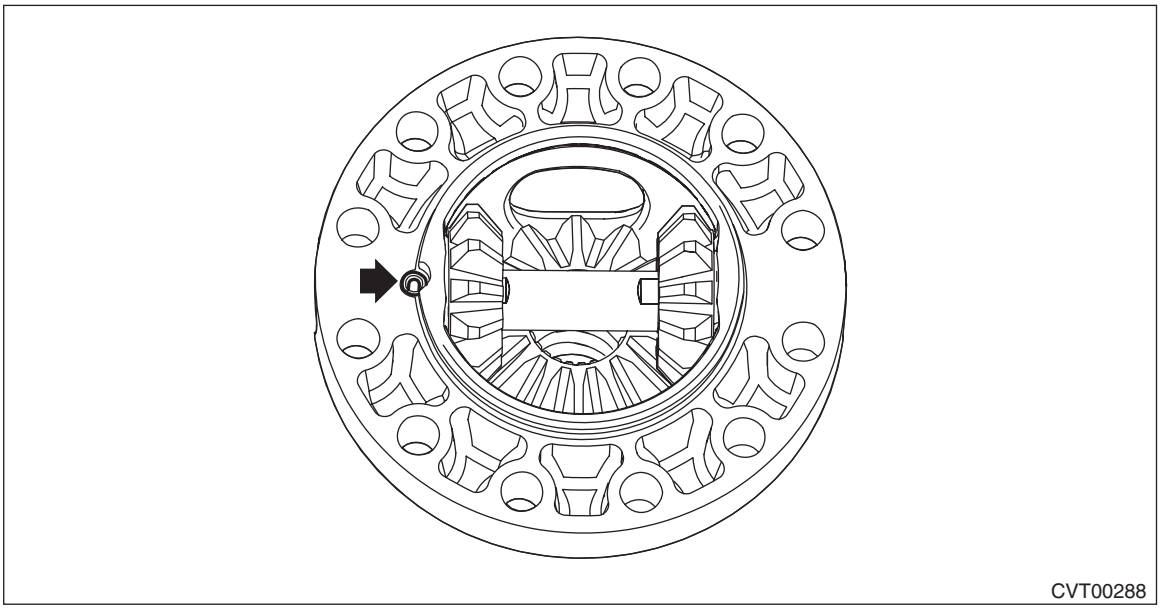


2) Install the differential bevel pinions into differential case (RH) and install the pinion shaft.

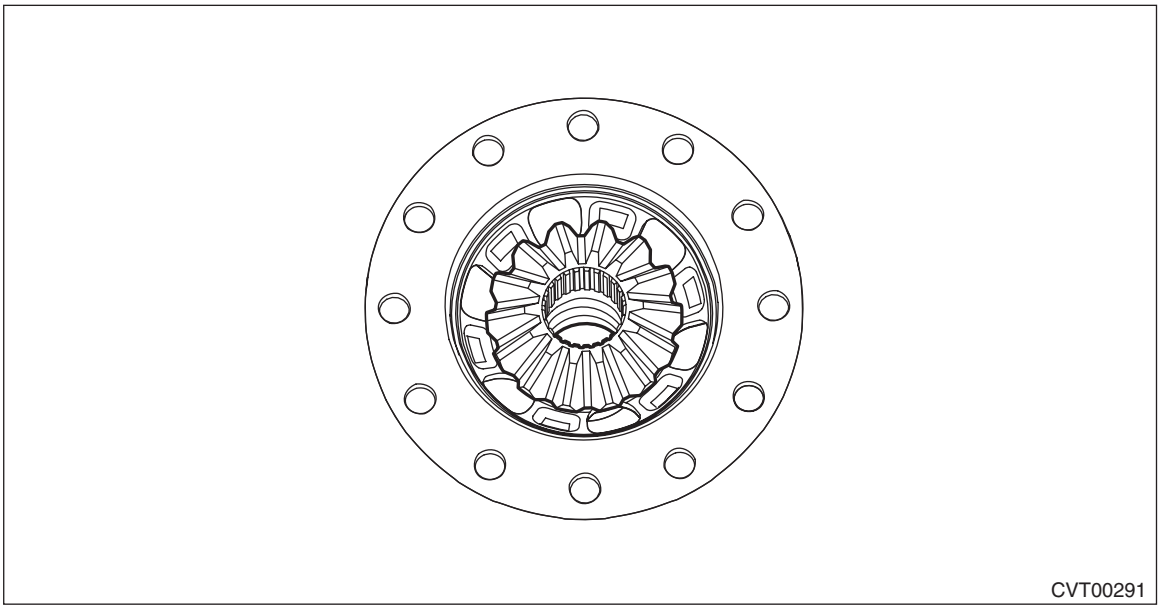


(A) Pinion shaft
(B) Differential bevel gear
(C) Differential bevel pinion

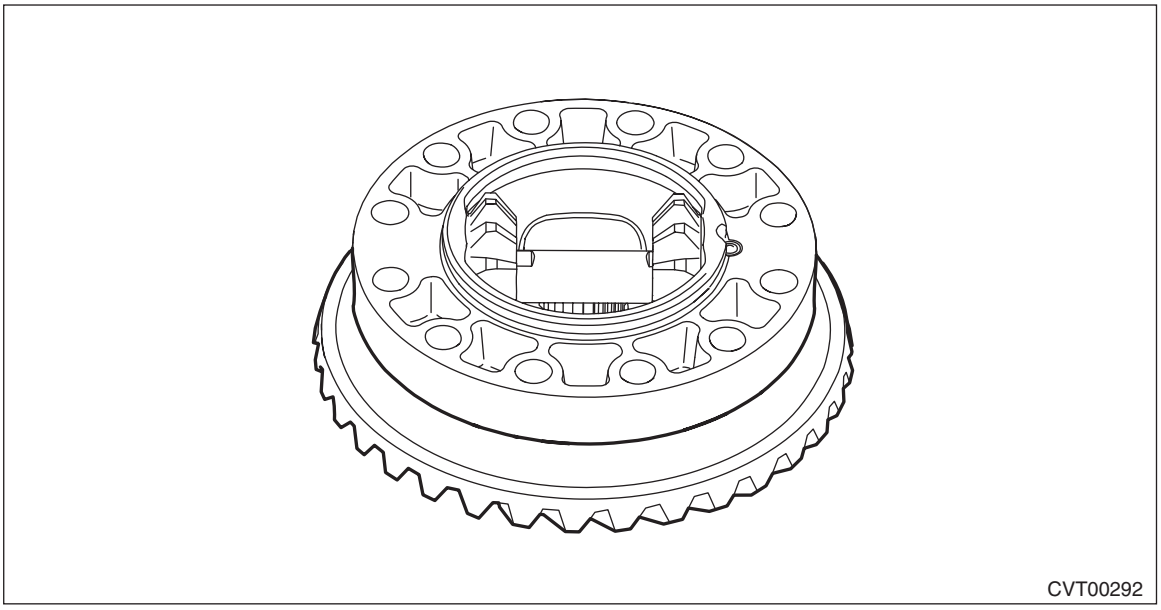
3) Install the straight pin.



4) Install the washer and differential bevel gear to the differential case (LH).

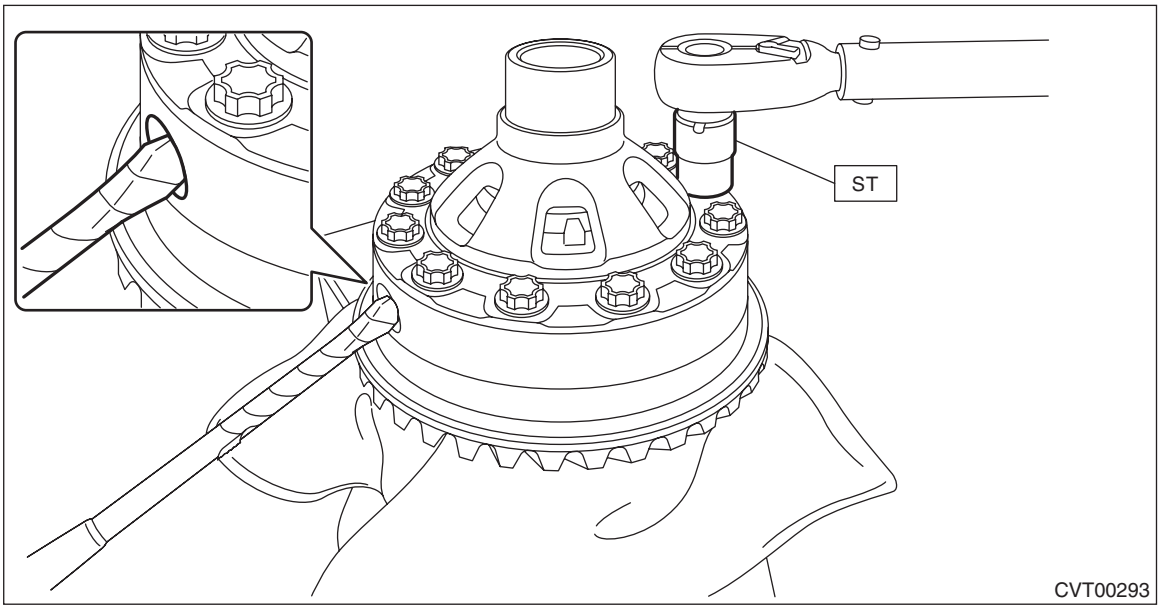

CVT00291

5) Install the differential case (RH) to the hypoid driven gear.


CVT00292

6) Install the differential case (LH) to the differential case (RH).
7) Using the ST, install the hypoid driven gear by tightening the installation bolt.
ST 18270KA020 SOCKET (E20)

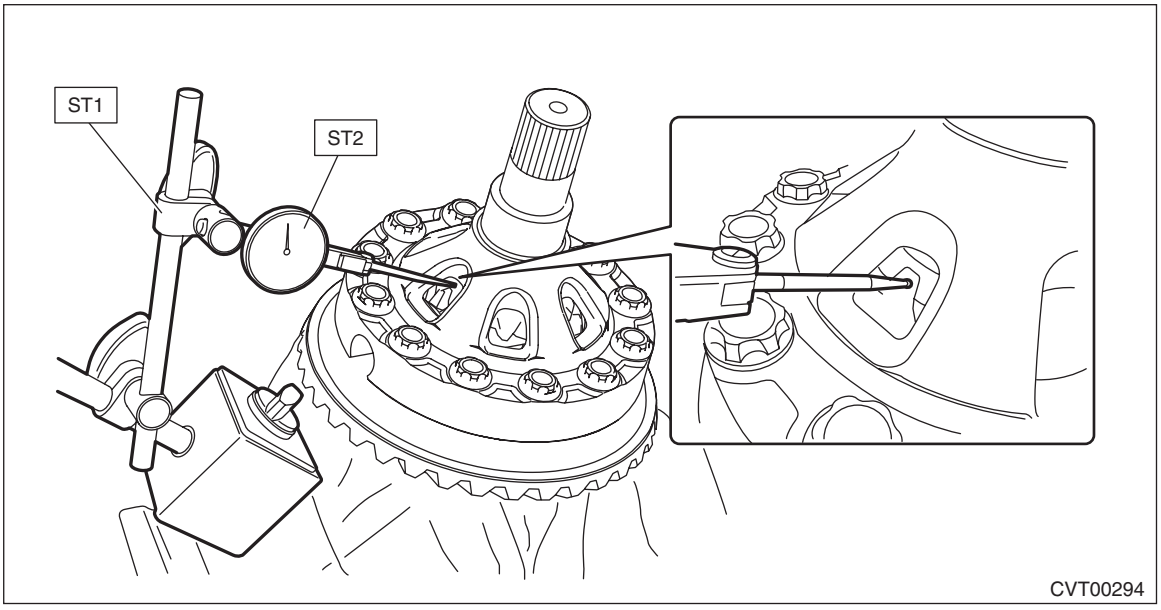
Tightening torque:
64 N·m (6.5 kgf-m, 47.2 ft-lb)



8) Measure the backlash, and select the washer.
(1) Install the SUBARU genuine axle shaft to differential case.
Part No. 38415AA070 Axle shaft
(2) Using ST1 and ST2, insert the ST2 through the window of differential case. Measure the backlash of the gear.

NOTE:
• Measure the backlash by applying a differential bevel pinion tooth between two differential bevel gear teeth.
• When measuring, fix the differential bevel pinion in place with a screwdriver covered with cloth, or a similar tool.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

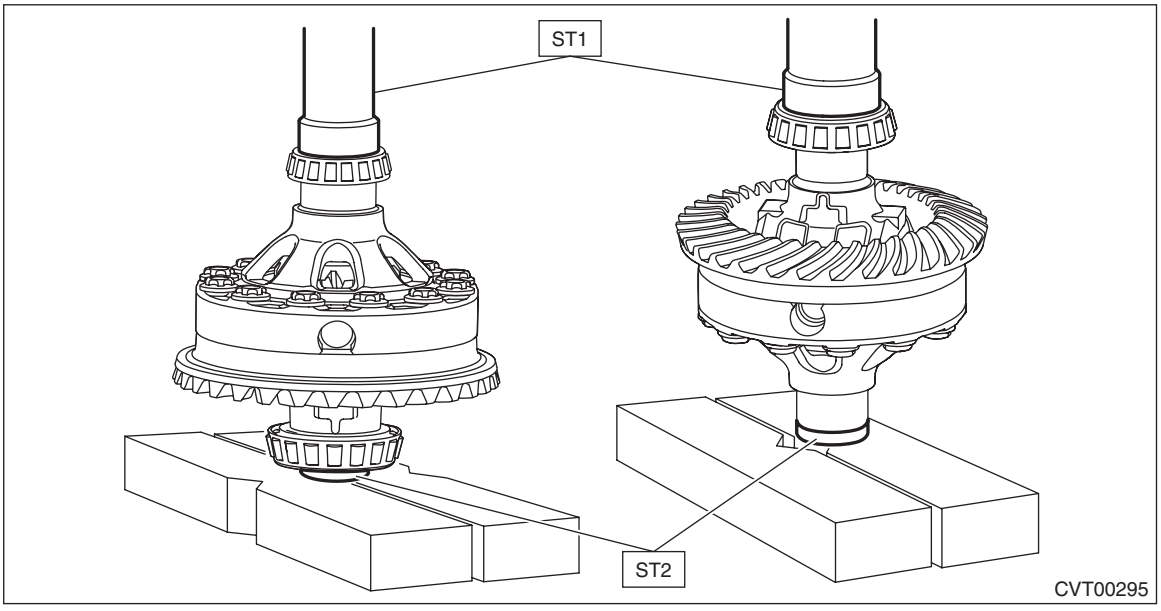
Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



(3) If the backlash is not within specification, select a washer from the table below and replace.

Washer	
Part No.	Thickness mm (in)
803038021	0.95 (0.037)
803038022	1.00 (0.039)
803038023	1.05 (0.041)

9) Using the ST, install the left and right taper roller bearings.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 SEAT

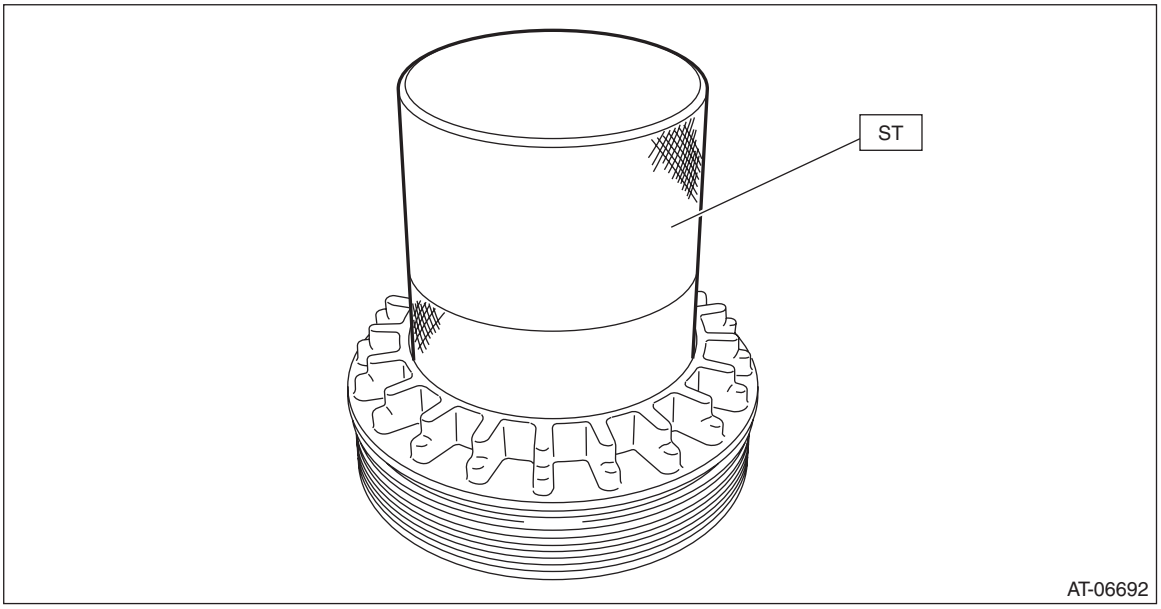


2. SIDE RETAINER

NOTE:
After adjusting the backlash and tooth contact, replace the oil seal and O-ring of side retainer with new parts.
1) Using the ST, install the oil seal.

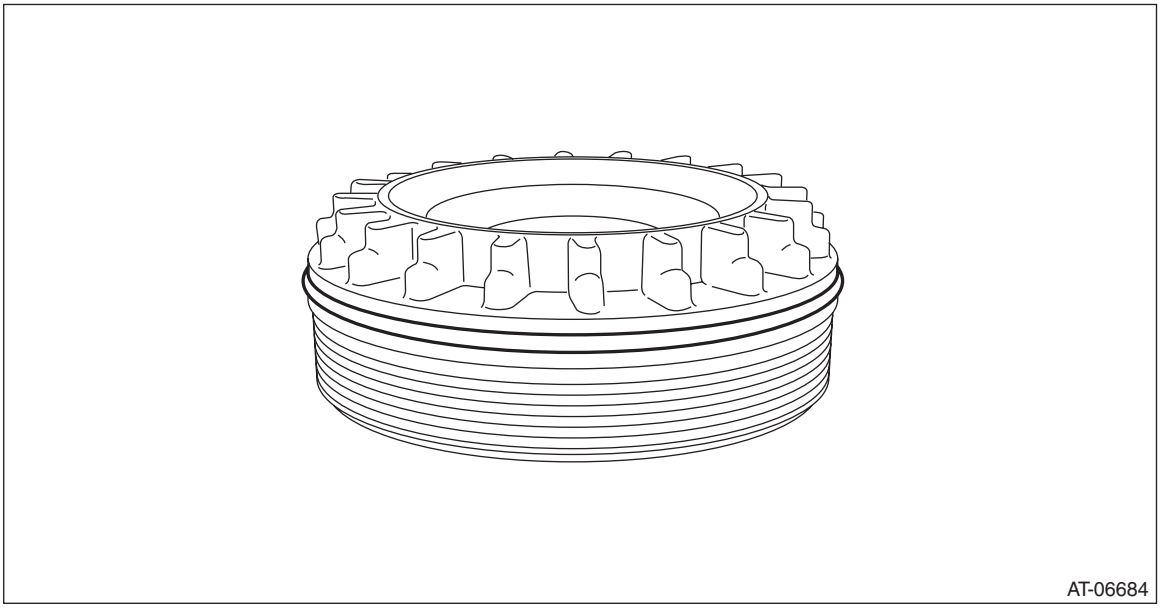
NOTE:
- Use a new oil seal.
- Apply differential gear oil to the oil seal lip and press-fitting surface.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



2) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply the differential gear oil to O-ring.

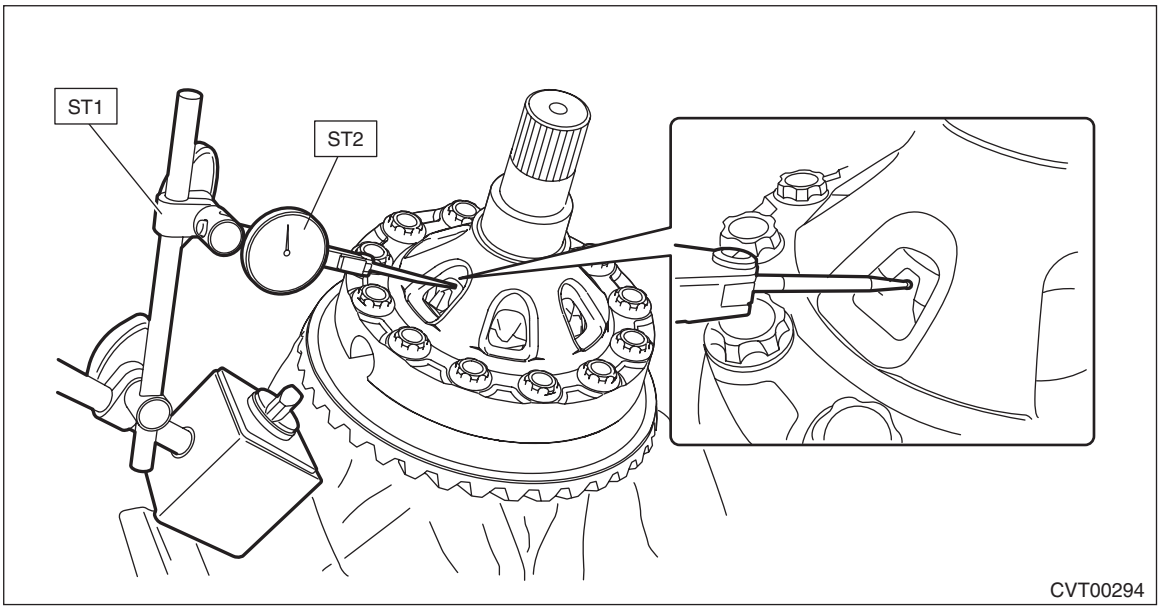


E: INSPECTION

- Check each component for scratches, damage or other faults.
- Using the ST, check the backlash of pinion gear.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)

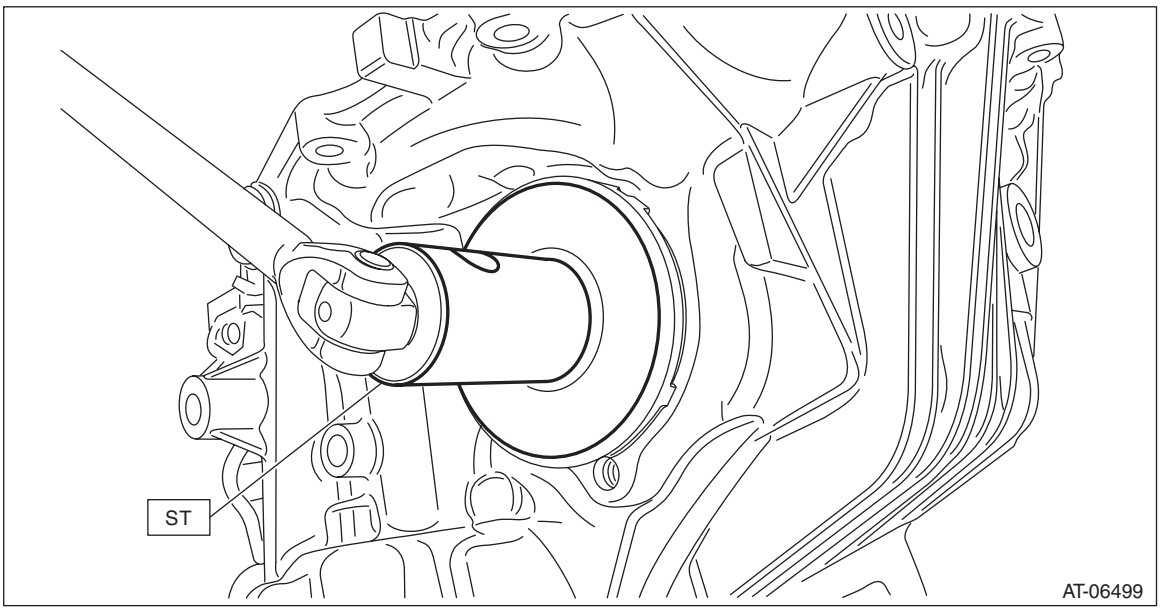


- Measure the hypoid gear backlash, and then adjust it to be within specification. <Ref. to CVT(TR580)-334, ADJUSTMENT, Front Differential Assembly.>

F: ADJUSTMENT

1) Using the ST, screw-in the retainer until resistance is felt.

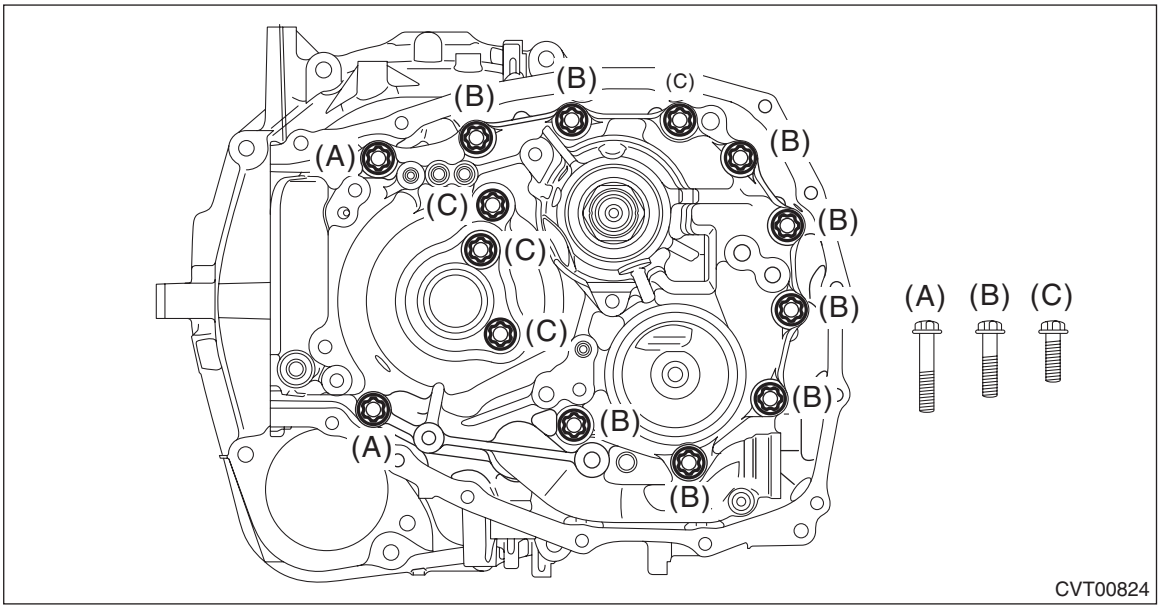
NOTE:
RH side should be screwed-in more than LH side.
ST 18658AA020 WRENCH COMPL RETAINER



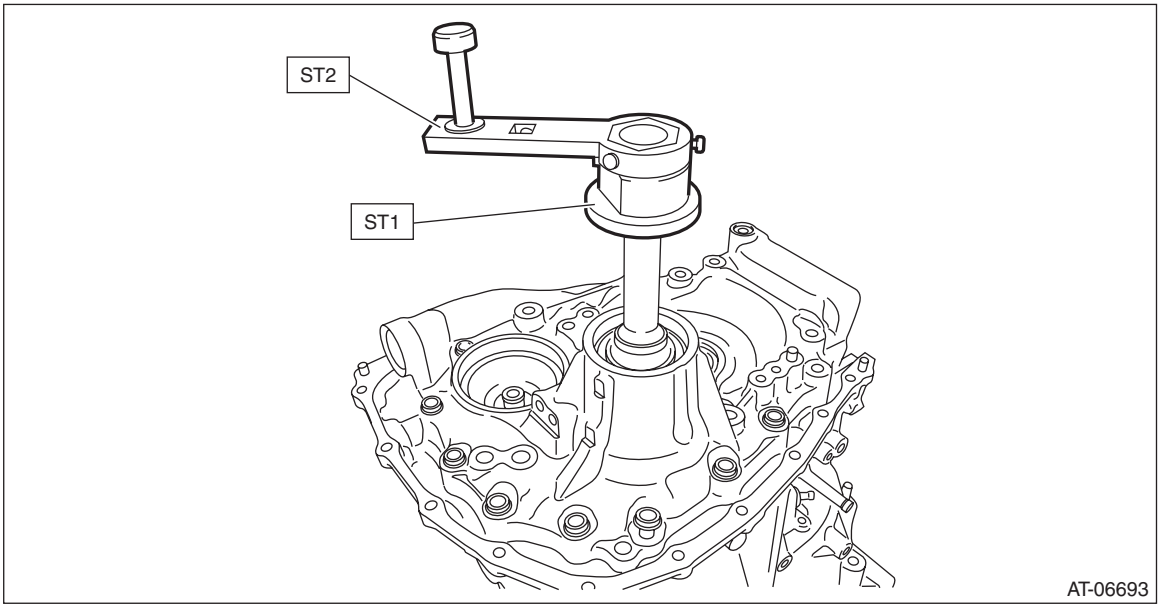
2) Remove the remaining liquid gasket from the mating surface completely.
3) Using the ST, install the drive pinion assembly to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

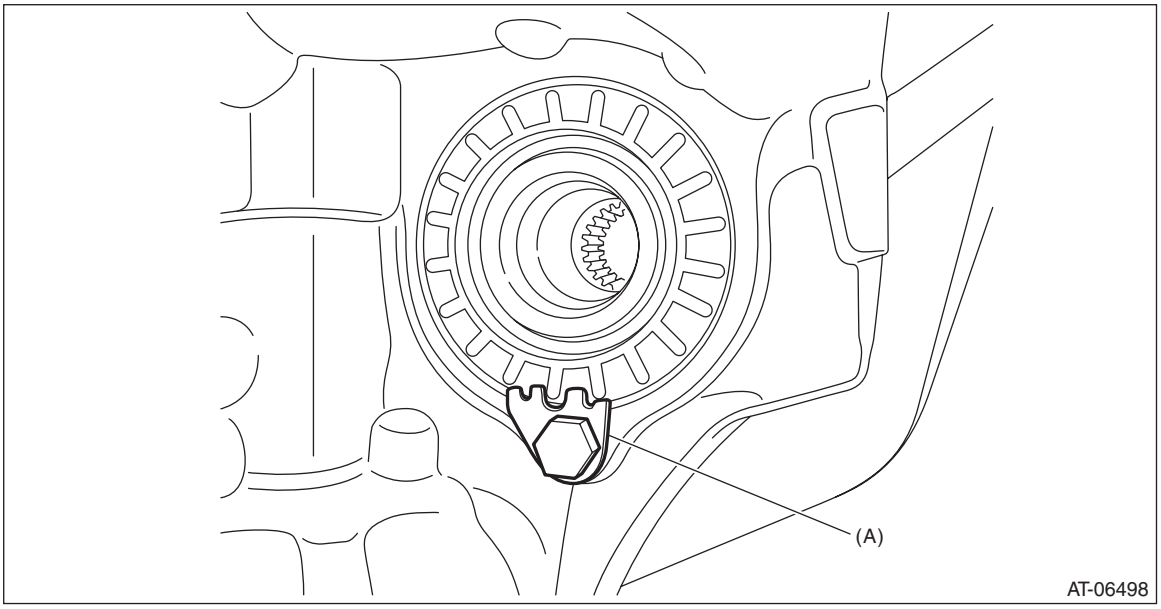
Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



4) Rotate the drive pinion shaft ten times or more using ST1 and ST2.
ST1 18667AA010 HOLDER
ST2 499787700 WRENCH

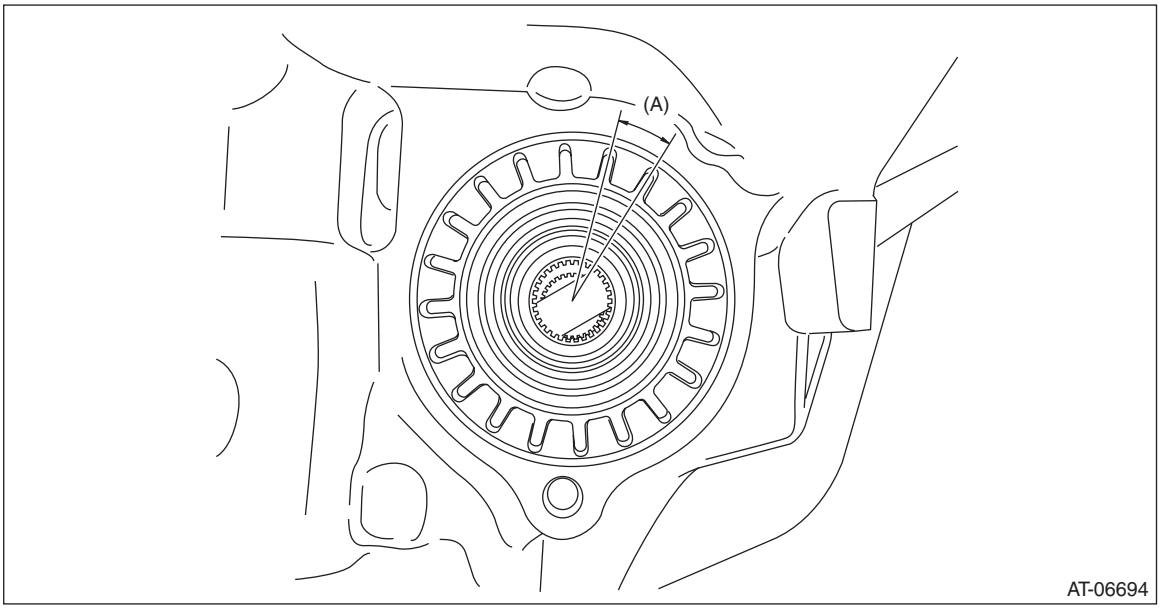


5) While rotating the pinion shaft, tighten the retainer LH and loosen the retainer RH until the shaft can't be turned anymore. The backlash is “zero” when the pinion shaft comes to the point where it doesn't rotate.
6) After the “zero” state is established, loosen the retainer LH by 3 notches and secure it with the lock plate. Retighten the retainer RH until it stops. Rotate the drive pinion 2 or 3 times. Tighten the retainer RH further 1-3/4 notches. This sets the preload. Finally, secure the retainer with its lock plate.



(A) Lock plate

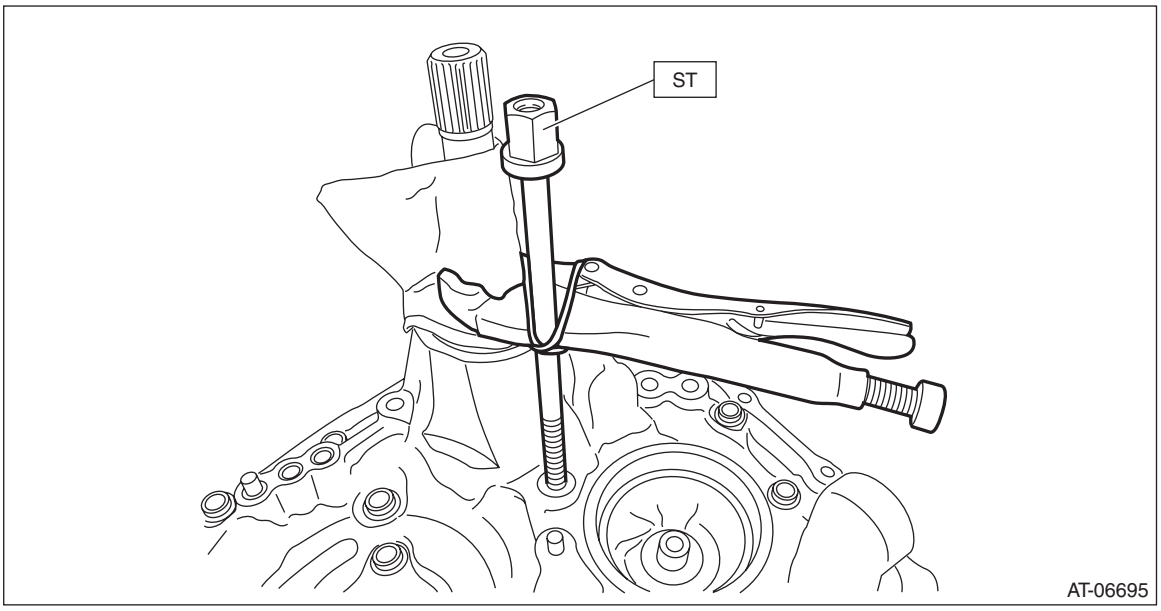
NOTE:
Turning the retainer by every one tooth changes the backlash approx. 0.05 mm (0.0020 in).



(A) 1 tooth

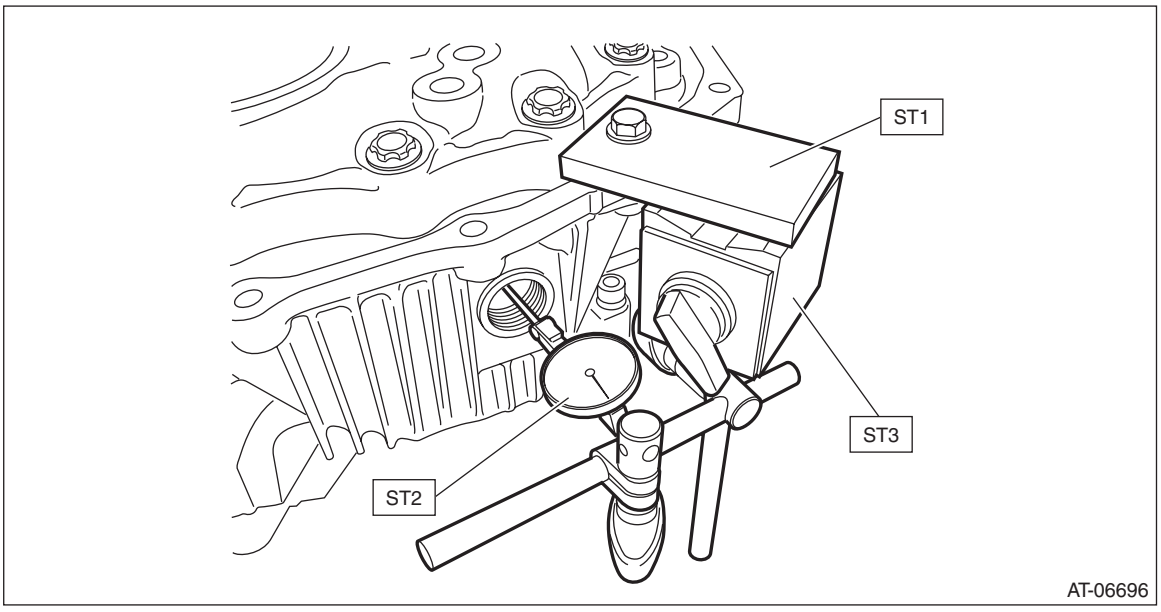
7) Insert the two SUBARU genuine axle shafts into differential case.
Part No. 38415AA070 Axle shaft

8) Install the ST to the drive pinion retainer, and wrap the drive pinion shaft with cloth and pinch with vise pliers. Using a tie-wrap or a wire, fix the vise pliers to the ST.
Make sure the drive pinion shaft does not move.
ST 18763AA000 COMPRESSOR SHAFT



9) Check the backlash is within specification using ST1, ST2 and ST3.
ST1 498255400 PLATE
ST2 498247100 DIAL GAUGE
ST3 498247001 MAGNET BASE

Backlash:
0.13 — 0.18 mm (0.005 — 0.007 in)



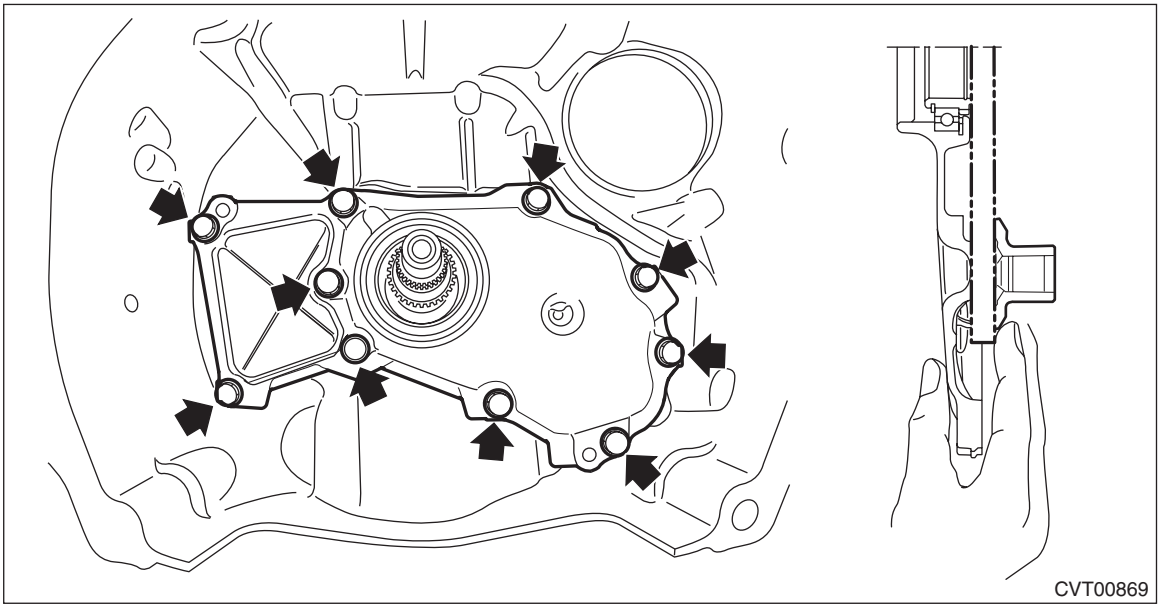
10) Adjust the teeth contact of the front differential and drive shaft. <Ref. to CVT(TR580)-312, ADJUSTMENT, Drive Pinion Shaft Assembly.>

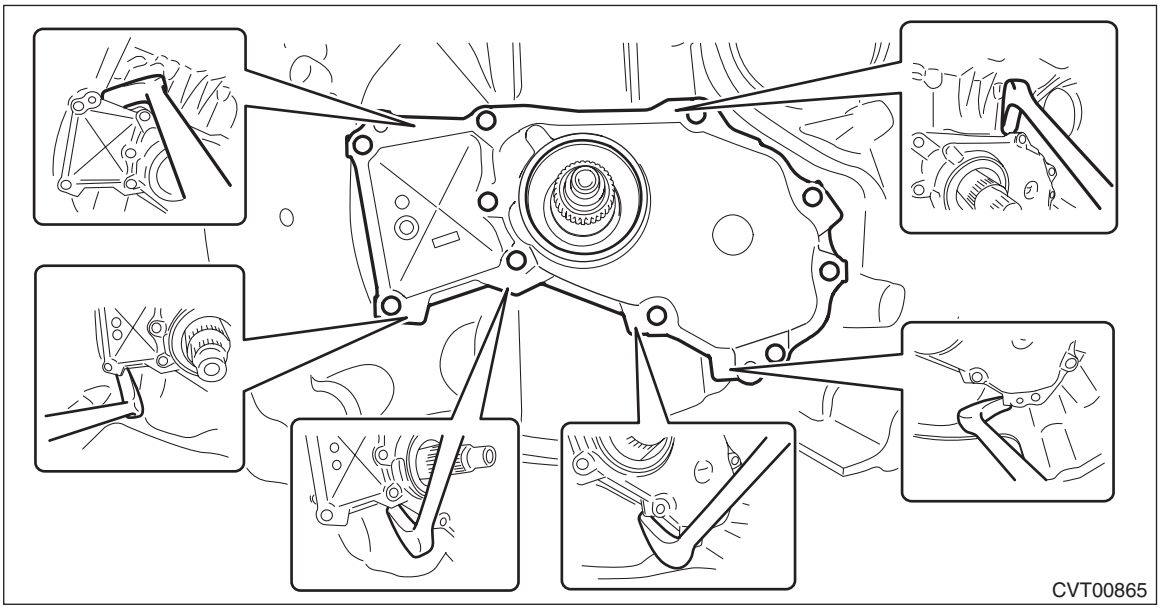
43.Oil Pump Chain

A: REMOVAL

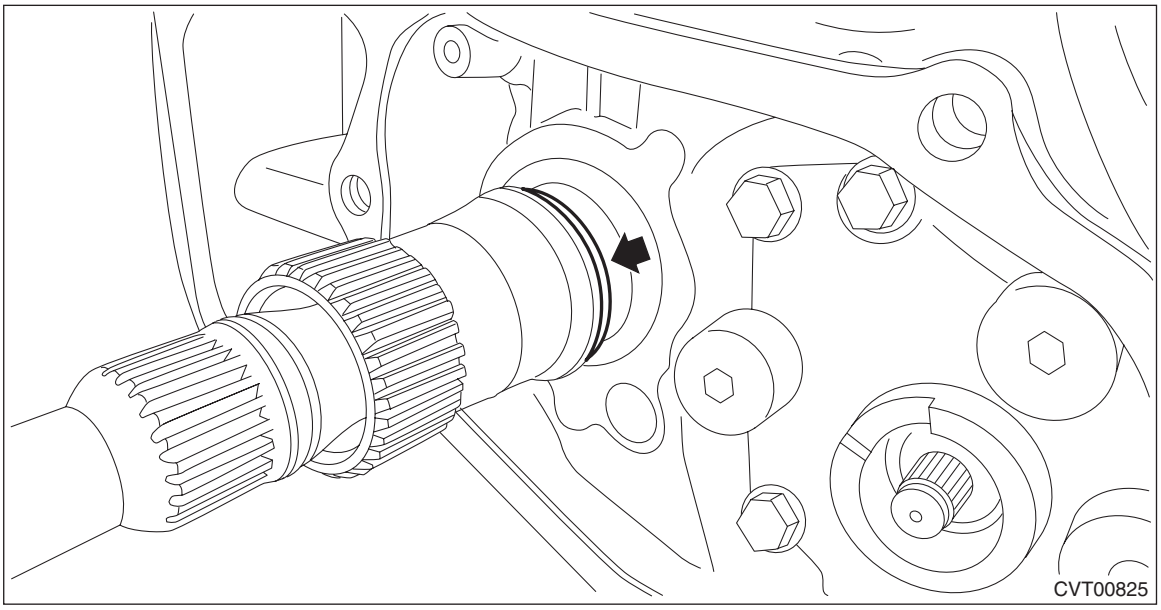
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to CVT(TR580)-168, REMOVAL, Torque Converter Assembly.>
3) Remove the oil pump chain, oil pump sprocket, driven sprocket and oil pump chain cover.

NOTE:
Oil pump chain cover may be hard to remove because the driven sprocket is installed to the shaft side of the oil pump. Do not remove it forcibly. Remove it while holding the driven sprocket by hand.



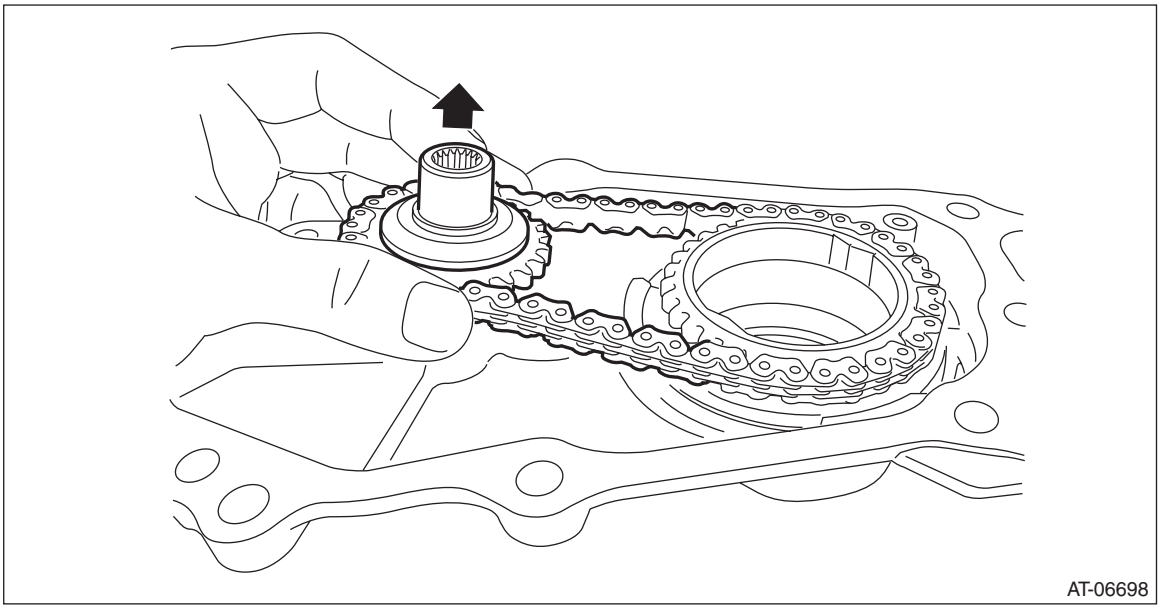


4) Remove the seal rings.

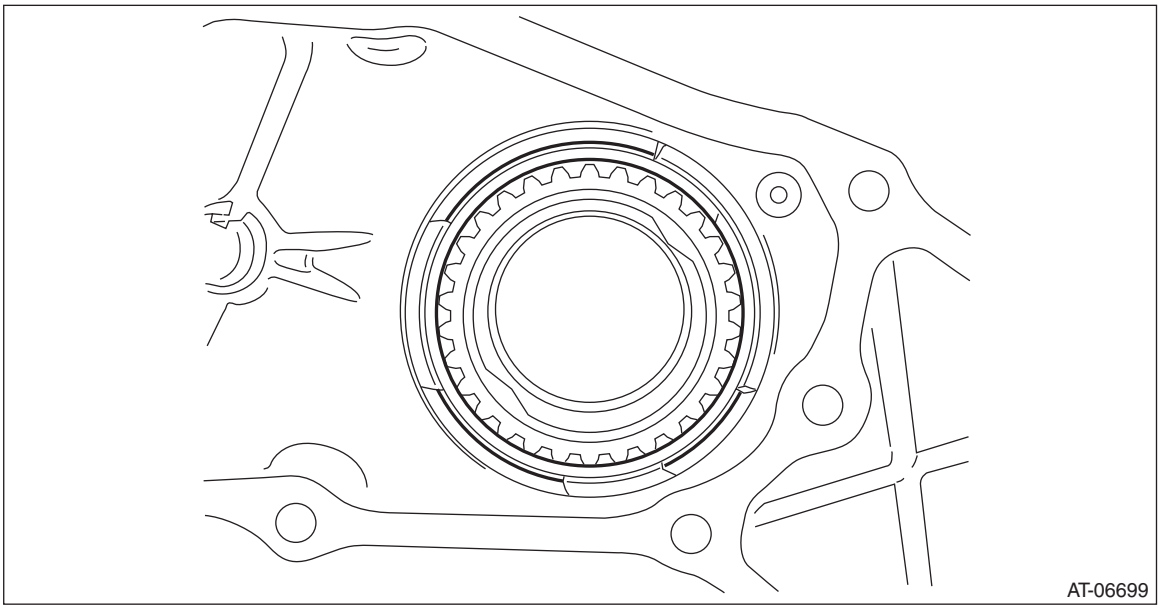


5) Remove the driven sprocket from oil pump chain cover to remove the oil pump chain.

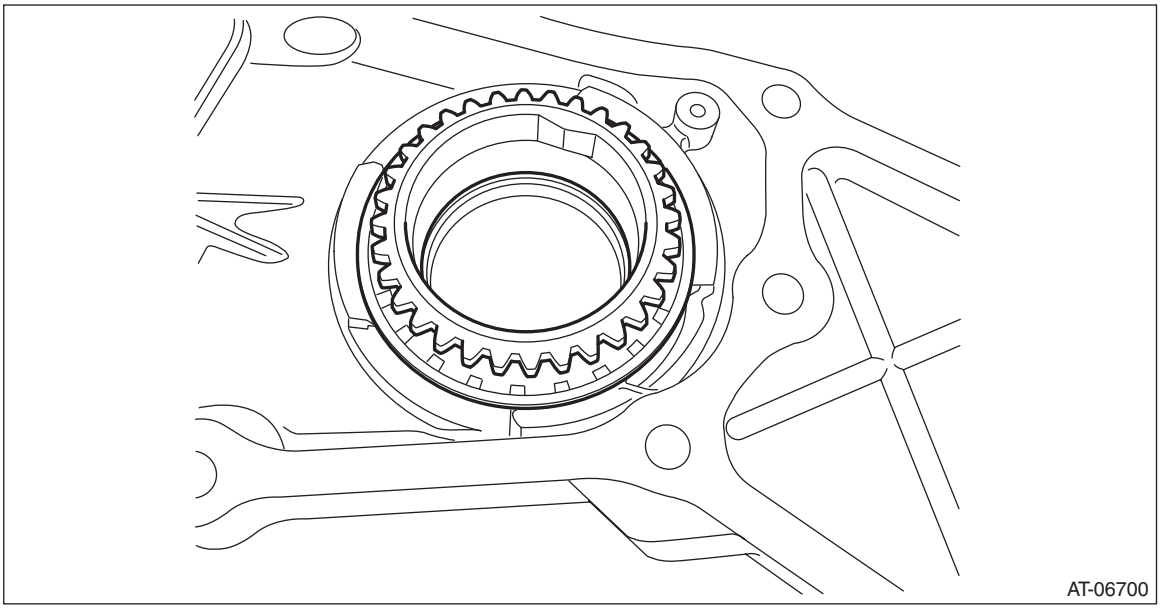
NOTE:
- The driven sprocket is replaced as an assembly only, because it is a non-disassembly part.
- If the ball bearing is removed from the driven sprocket, replace with a new part.



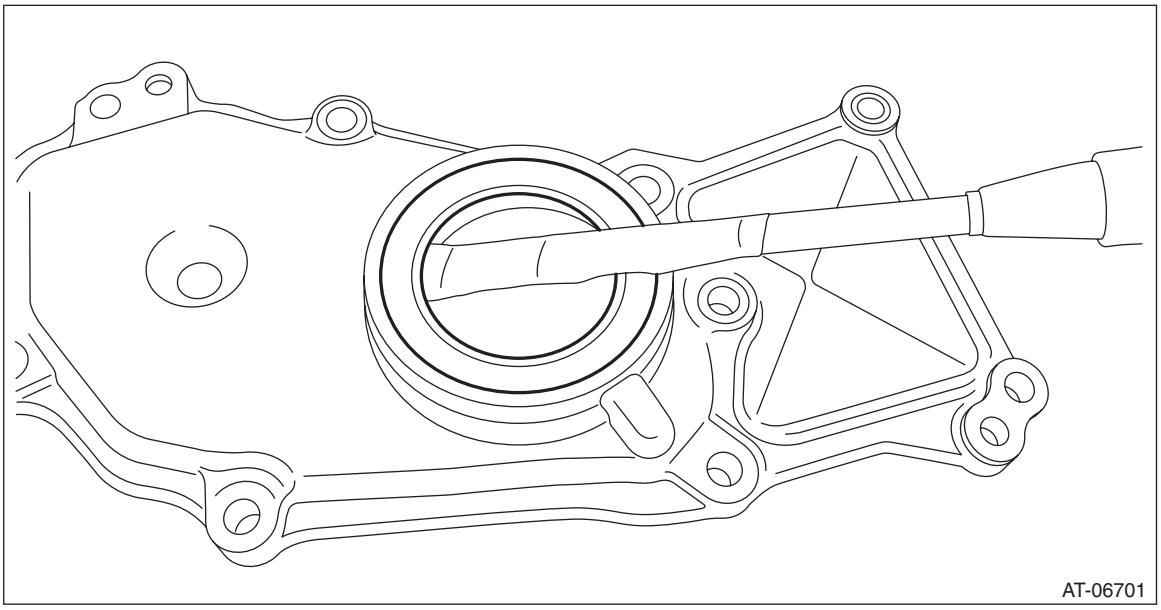
6) Remove the snap ring.



7) Remove the drive sprocket.



8) Remove the oil seal from the oil pump chain cover.

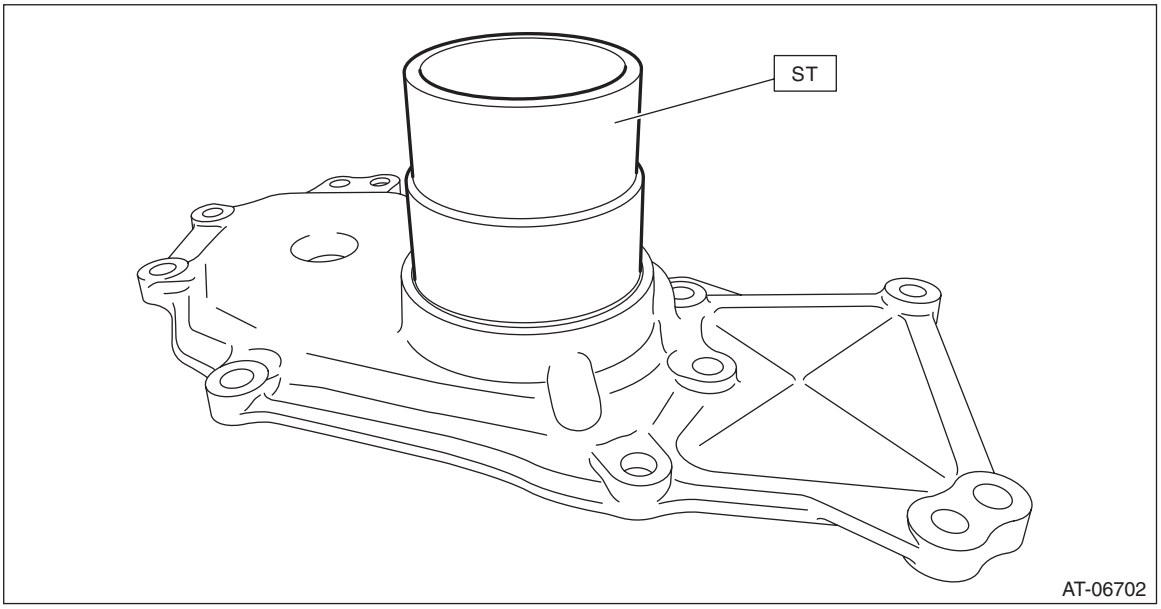


B: INSTALLATION

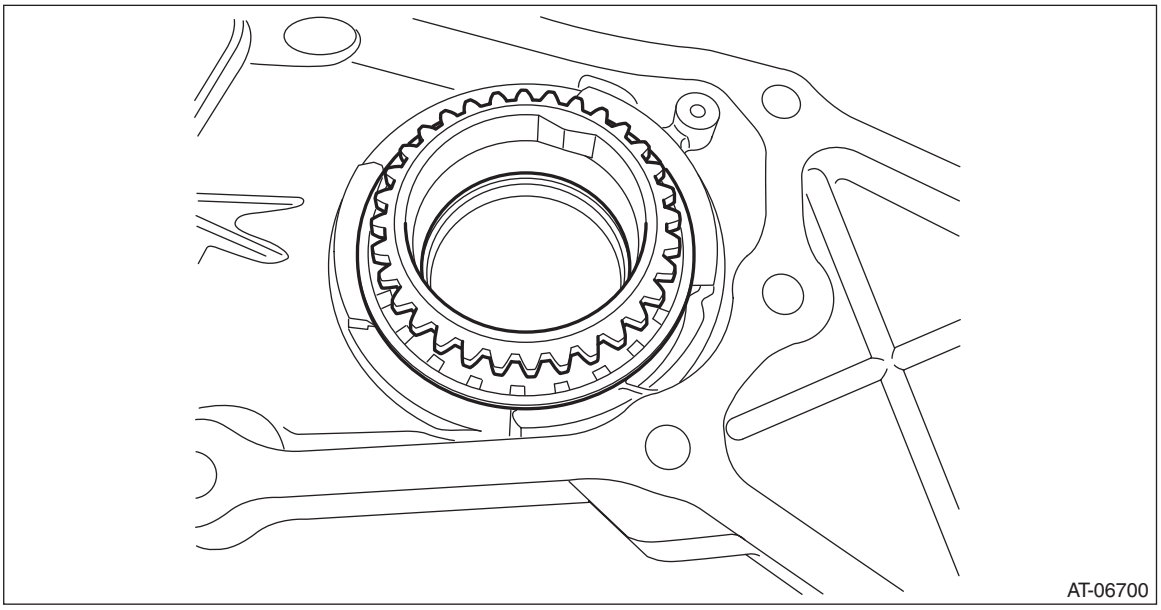
1) Clean the mating surface of oil pump chain cover and converter case.
2) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

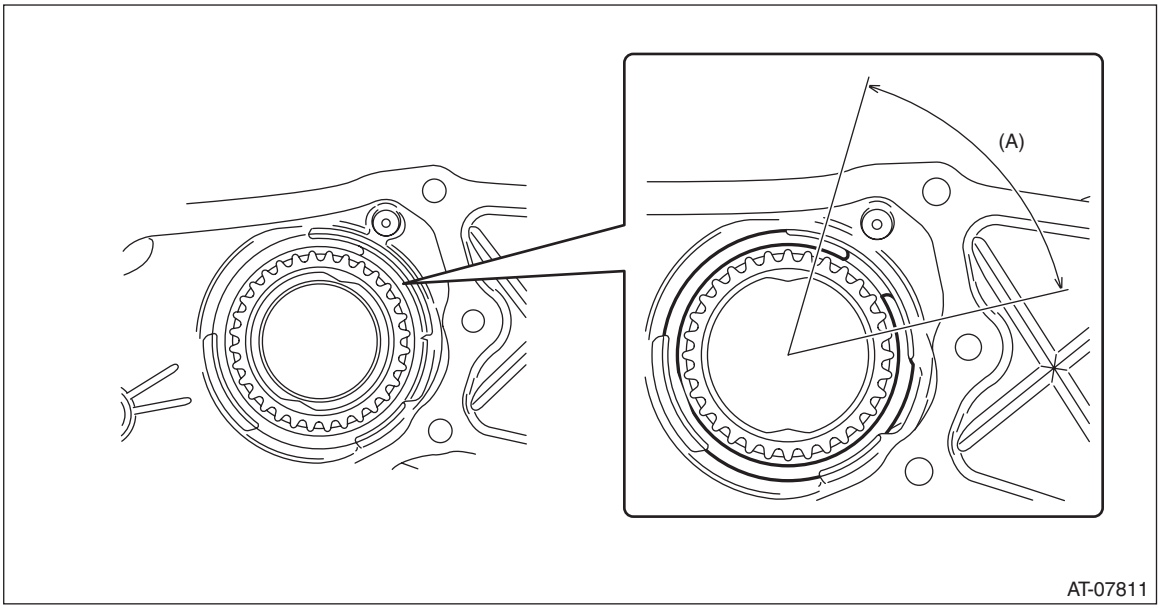
ST 499755602 PRESS SNAP RING



3) Install the drive sprocket.



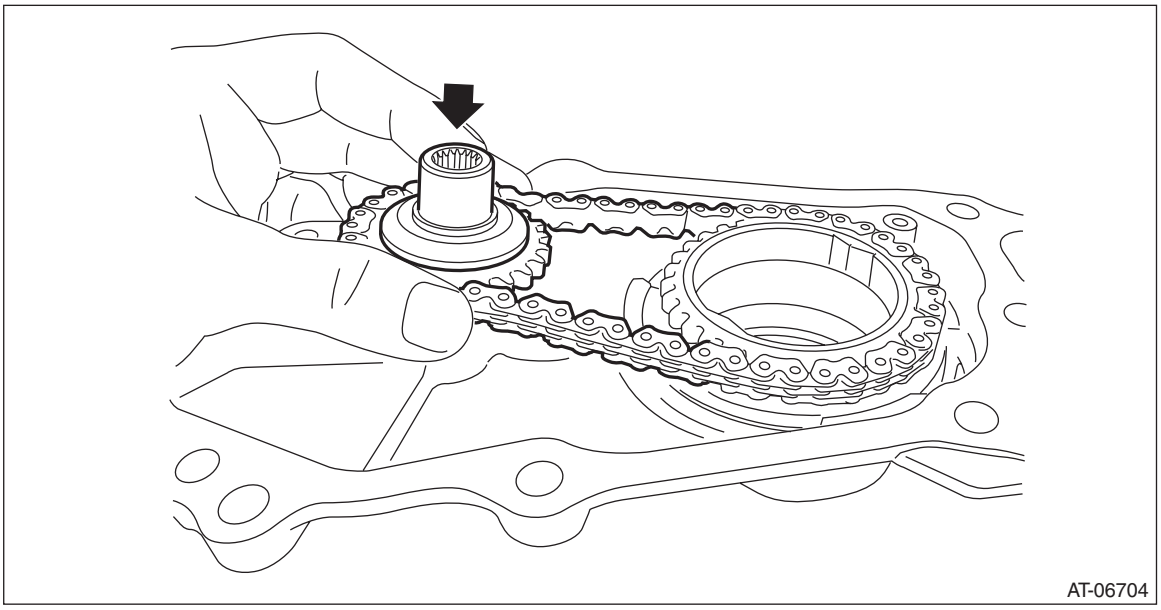
4) Install the snap ring so that its cutout portion is securely fitted into the snap ring groove of the oil pump chain cover.



(A) Installation range of cutout portion for snap ring

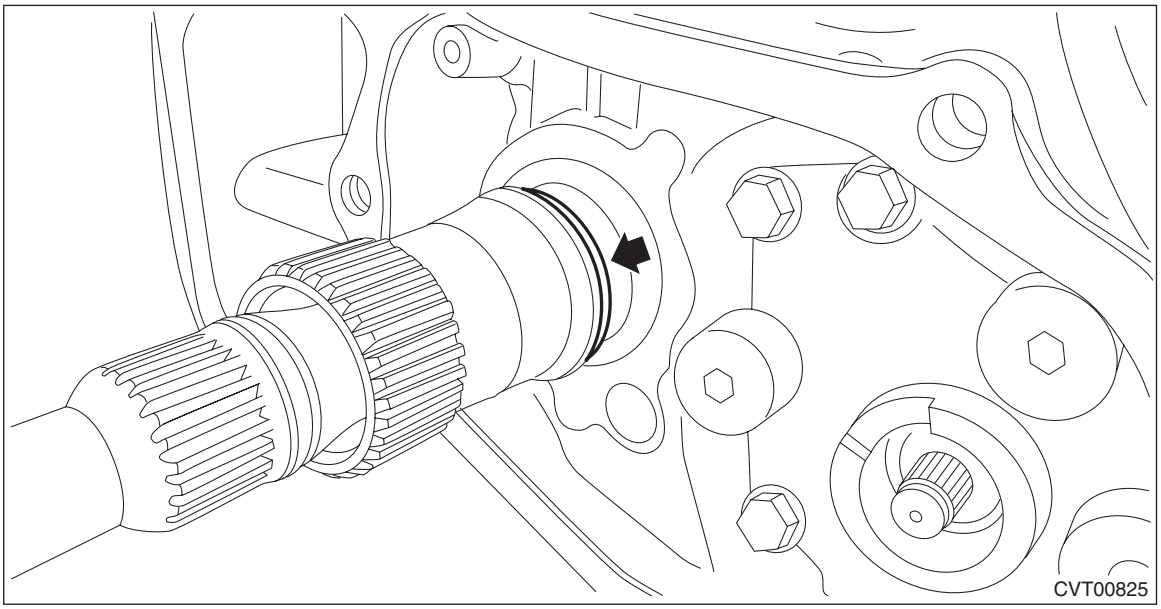
5) Place the oil pump chain on drive sprocket.

6) Place the oil pump chain on driven sprocket and install the driven sprocket to oil pump chain cover.



7) Install the seal ring.

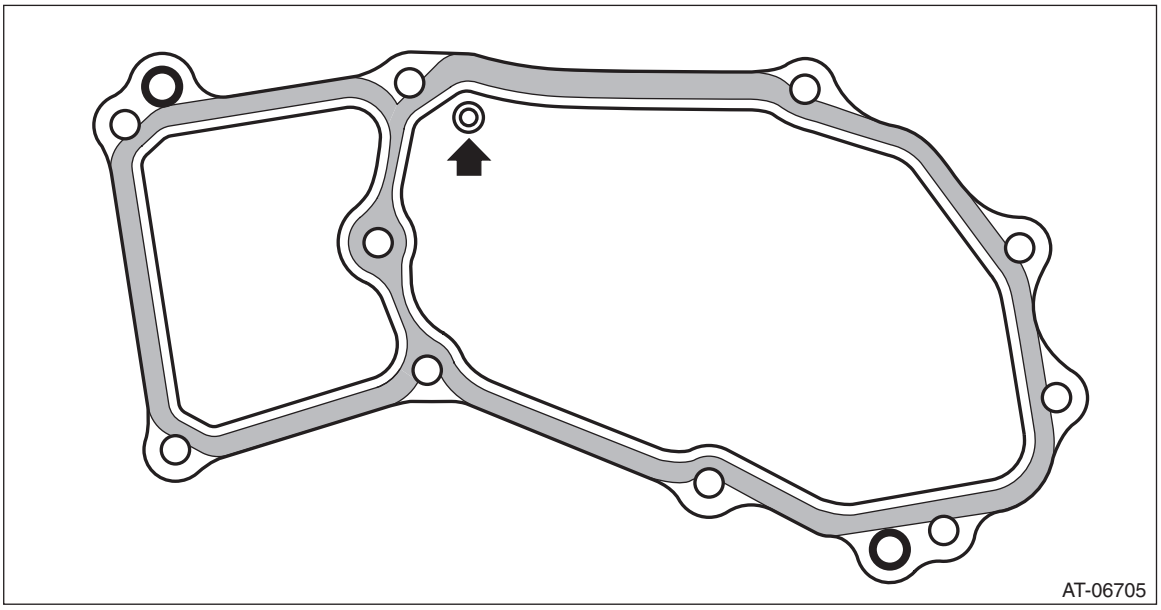
NOTE:
- Use a new seal ring.
- Apply CVTF to the seal rings.
- When installing the seal ring, do not expand the seal ring too much.



8) Apply liquid gasket seamlessly to the mating surface of oil pump chain cover.

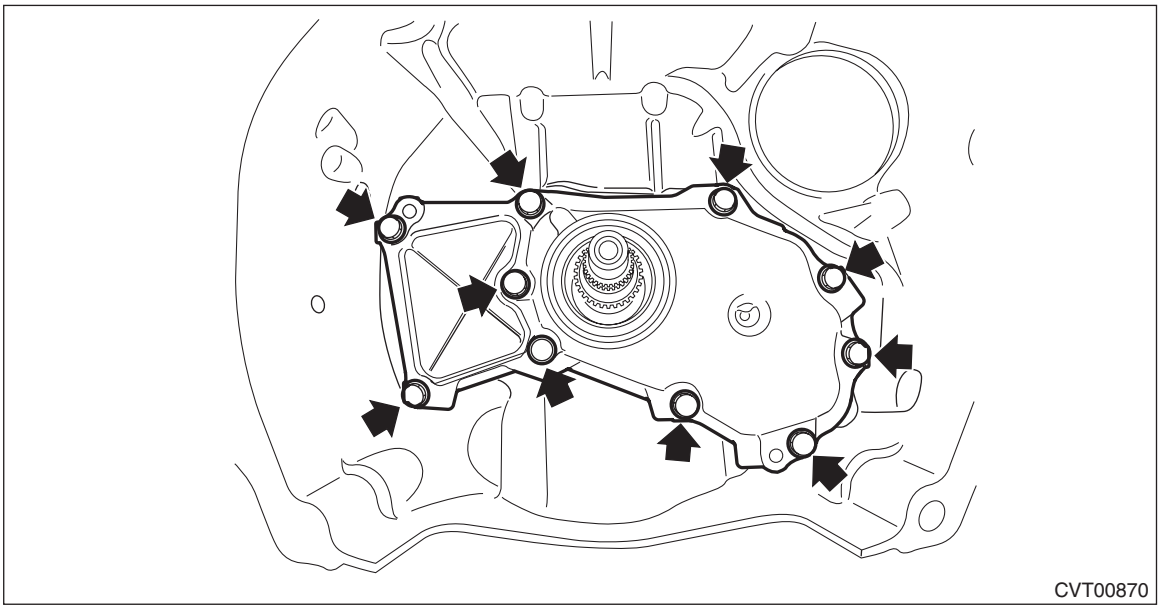
CAUTION:
Do not apply liquid gasket at the arrowed hole.

Liquid gasket:
THREE BOND 1215B or equivalent



9) Install the oil pump chain cover.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

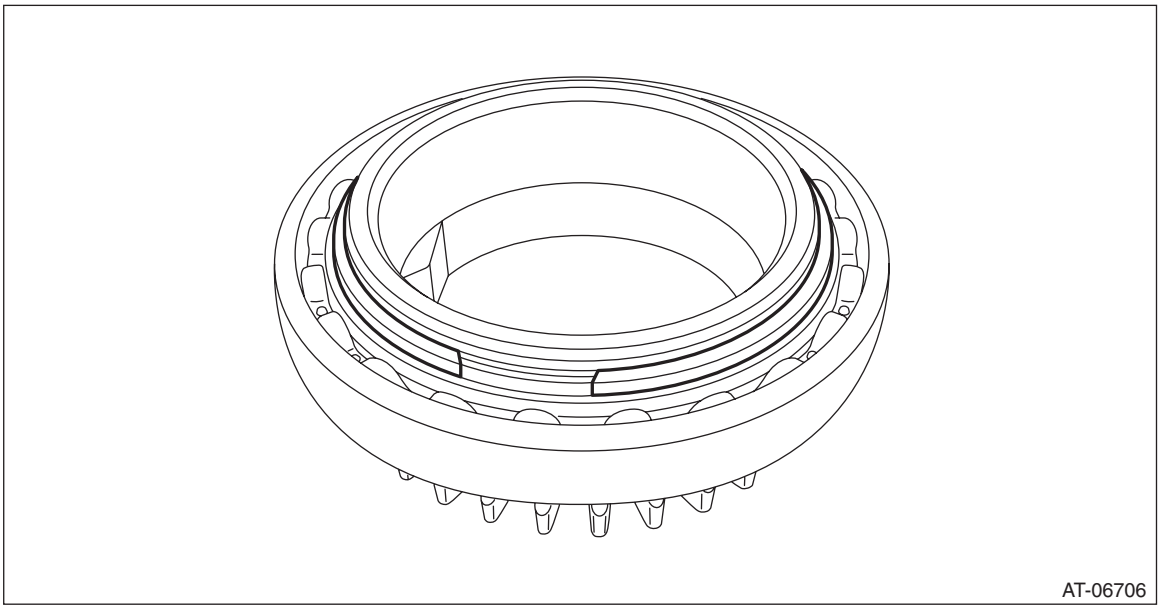


10) Install the torque converter assembly. <Ref. to CVT(TR580)-168, INSTALLATION, Torque Converter Assembly.>
11) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

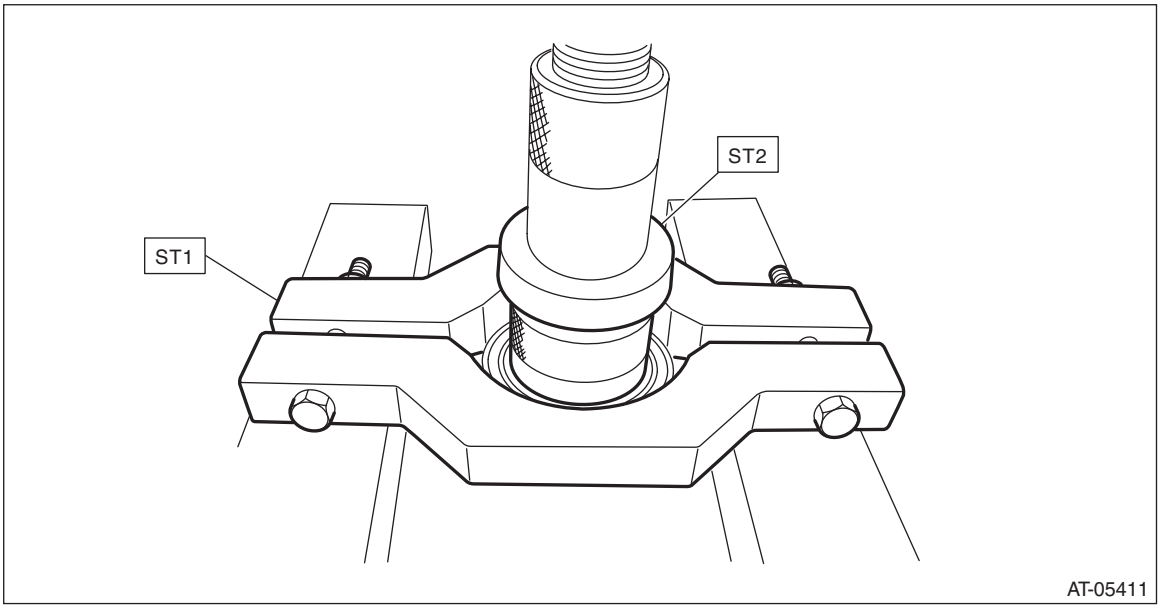
C: DISASSEMBLY

1. DRIVE SPROCKET

1) Remove the snap ring.



2) Remove the ball bearing using ST.
ST1 498077600 REMOVER
ST2 399513600 INSTALLER

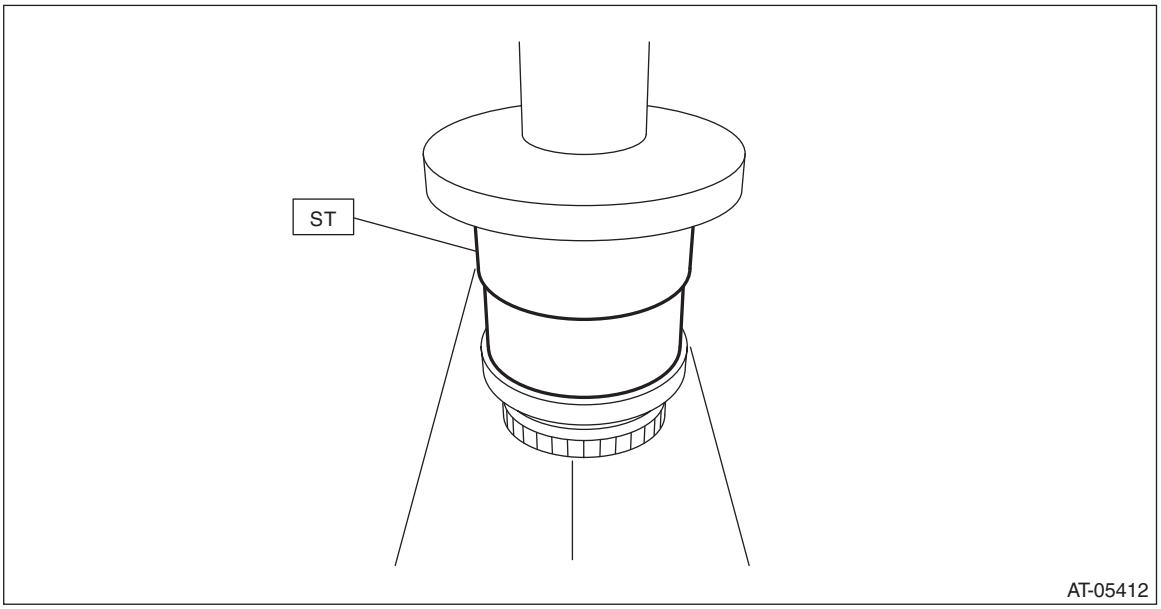


D: ASSEMBLY

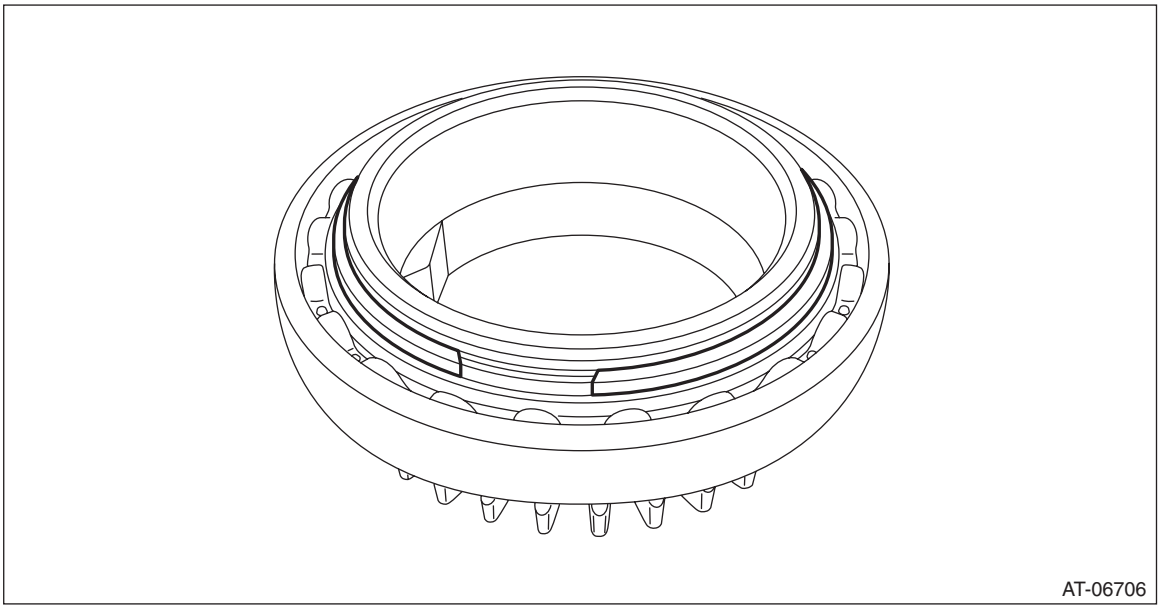
1. DRIVE SPROCKET

1) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST 499755502 PRESS SNAP RING



2) Install the snap ring.



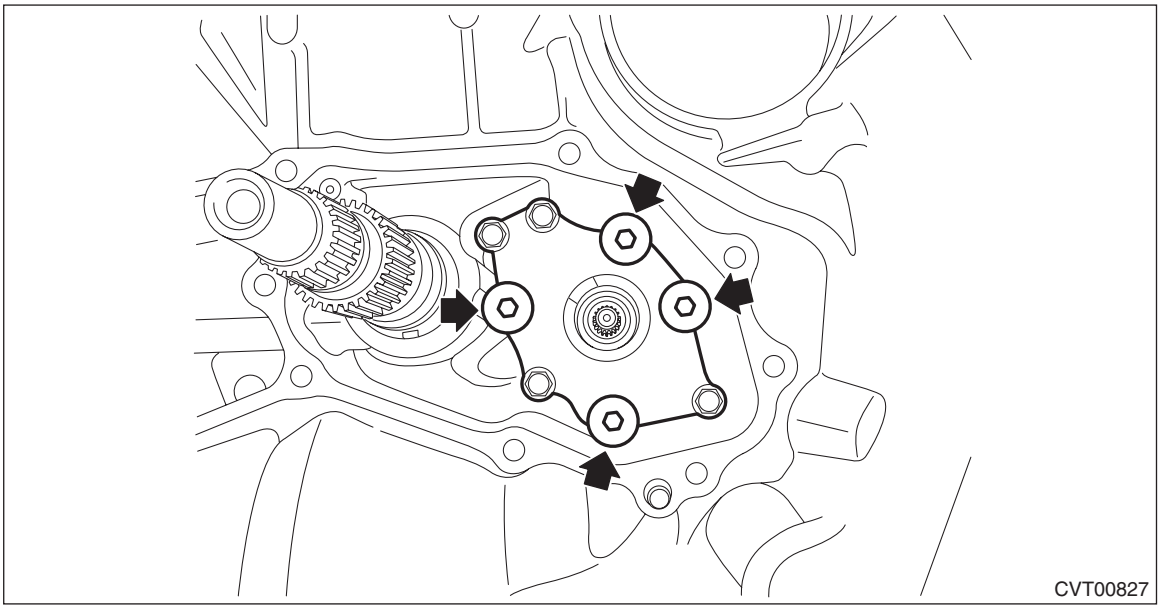
E: INSPECTION

- Check the oil pump chain for damage.
- Replace if gear teeth are broken, damaged, sharpen or excessively worn.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the oil pump chain cover for damage.
- Check for leakage of CVTF from the mating surface of oil pump chain cover.
- Check the oil seal for damage.

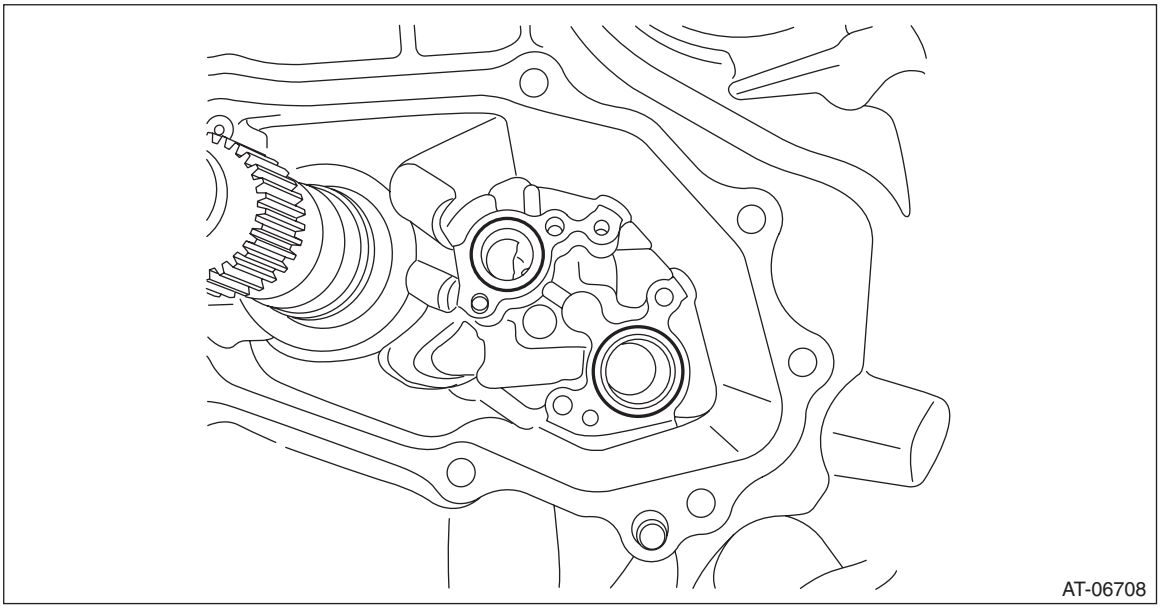
44.Oil Pump

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to CVT(TR580)-168, REMOVAL, Torque Converter Assembly.>
3) Remove the oil pump chain cover. <Ref. to CVT(TR580)-338, REMOVAL, Oil Pump Chain.>
4) Remove the oil pump and the plate.



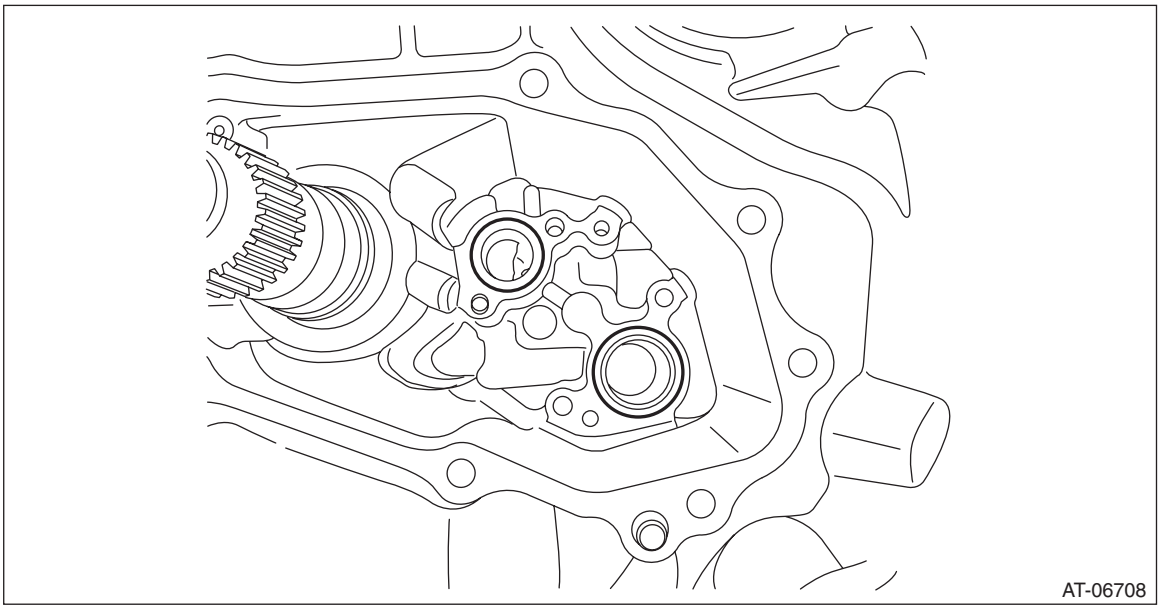
5) Remove the O-ring.



B: INSTALLATION

1) Install the O-ring.

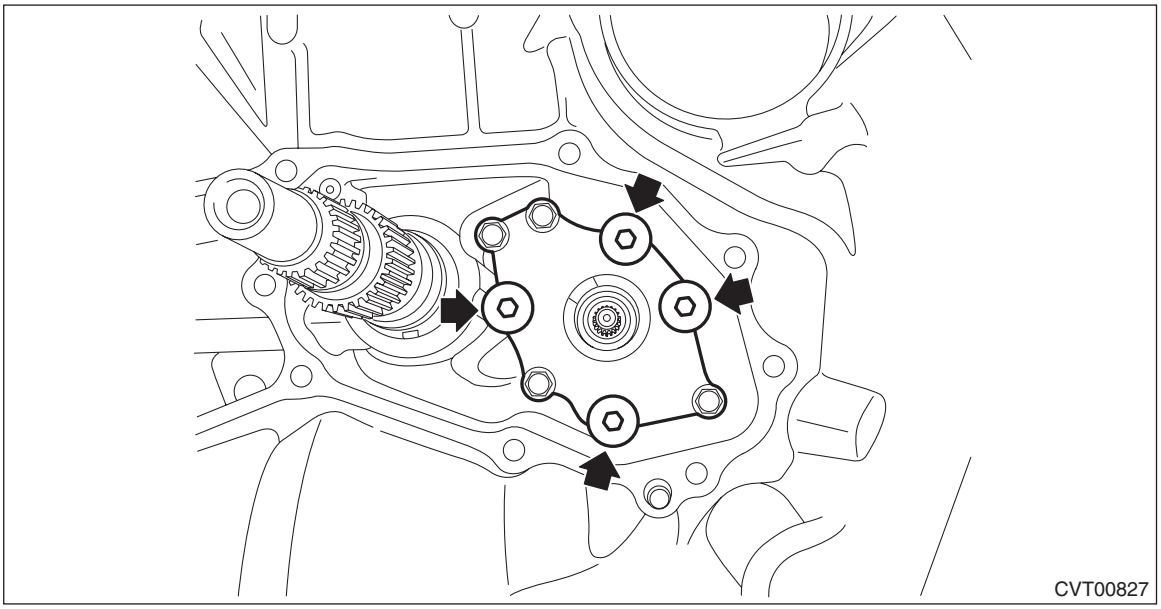
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



2) Install the plate and the oil pump.

NOTE:
Apply CVTF to the bolt.

Tightening torque:
8.5 N·m (0.9 kgf-m, 6.3 ft-lb)



3) Install the oil pump chain cover. <Ref. to CVT(TR580)-341, INSTALLATION, Oil Pump Chain.>
4) Install the torque converter assembly. <Ref. to CVT(TR580)-168, INSTALLATION, Torque Converter Assembly.>
5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

Check the following items.
- Check the oil pump for damage and wear.
- Rotate the oil pump by hand, and check that it rotates smoothly.

1) Measure the secondary pressure. <Ref. to CVT(TR580)-52, INSPECTION, Secondary Pressure (Line Pressure) Test.>
2) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
3) Check oil strainer for clogging.
When oil strainer has no clogging, replace the oil pump.

45.Converter Case

A: REMOVAL

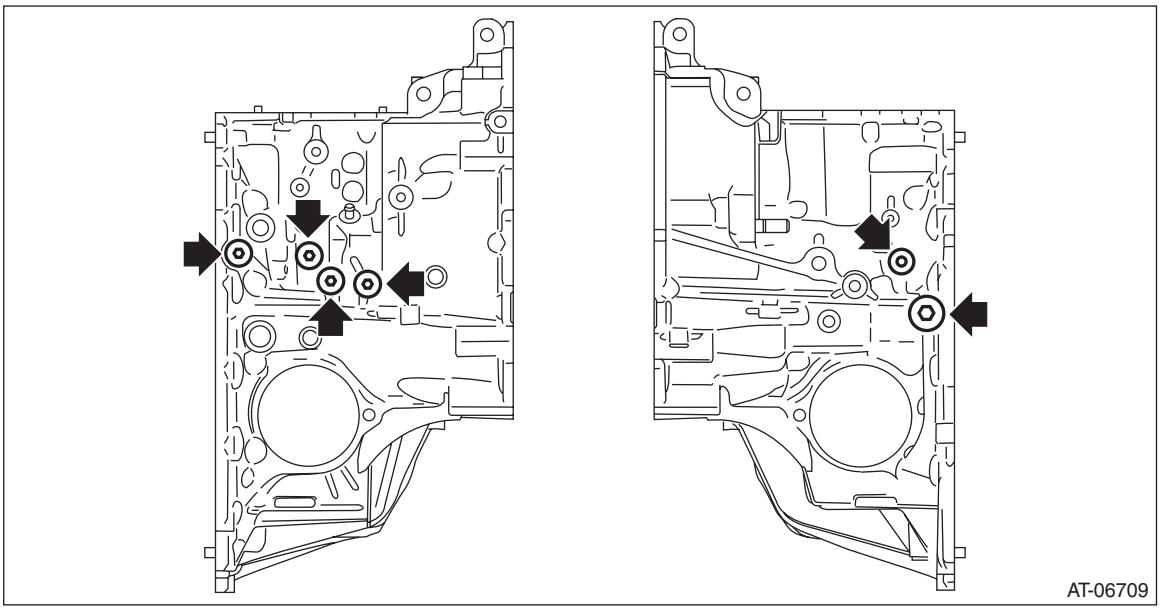
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-162, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-121, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-136, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-107, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-109, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-112, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-103, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-173, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-177, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-192, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-195, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-197, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-211, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-229, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-234, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-255, REMOVAL, Reverse Brake Assembly.>
20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-270, REMOVAL, Forward Clutch Assembly.>
21) Remove the drive pinion shaft assembly. <Ref. to CVT(TR580)-290, REMOVAL, Drive Pinion Shaft Assembly.>
22) Remove the front differential assembly. <Ref. to CVT(TR580)-319, REMOVAL, Front Differential Assembly.>
23) Remove the oil pump chain cover. <Ref. to CVT(TR580)-338, REMOVAL, Oil Pump Chain.>
24) Remove the oil pump. <Ref. to CVT(TR580)-347, REMOVAL, Oil Pump.>

B: INSTALLATION

1) Install the oil pump. <Ref. to CVT(TR580)-348, INSTALLATION, Oil Pump.>
2) Install the oil pump chain cover. <Ref. to CVT(TR580)-341, INSTALLATION, Oil Pump Chain.>
3) Install the front differential assembly. <Ref. to CVT(TR580)-321, INSTALLATION, Front Differential Assembly.>
4) Install the drive pinion shaft assembly. <Ref. to CVT(TR580)-291, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install the forward clutch assembly. <Ref. to CVT(TR580)-273, INSTALLATION, Forward Clutch Assembly.>
6) Install the reverse brake assembly. <Ref. to CVT(TR580)-258, INSTALLATION, Reverse Brake Assembly.>
7) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-241, INSTALLATION, Primary Pulley and Secondary Pulley.>
8) Install the reduction drive gear. <Ref. to CVT(TR580)-230, INSTALLATION, Reduction Drive Gear.>
9) Install the transmission case. <Ref. to CVT(TR580)-214, INSTALLATION, Transmission Case.>
10) Install the transmission control device. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Control Device.>
11) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-118, INSTALLATION, Oil Pan and Strainer.>
12) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-197, INSTALLATION, Reduction Driven Gear.>
13) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-193, INSTALLATION, Transfer Driven Gear.>
14) Install the transfer clutch assembly. <Ref. to CVT(TR580)-179, INSTALLATION, Transfer Clutch.>
15) Install the parking pawl. <Ref. to CVT(TR580)-196, INSTALLATION, Parking Pawl.>
16) Install the extension case. <Ref. to CVT(TR580)-174, INSTALLATION, Extension Case.>
17) Install the inhibitor switch. <Ref. to CVT(TR580)-105, INSTALLATION, Inhibitor Switch.>
18) Install the secondary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Secondary Speed Sensor.>
19) Install the primary speed sensor. <Ref. to CVT(TR580)-113, INSTALLATION, Primary Speed Sensor.>
20) Install the turbine speed sensor. <Ref. to CVT(TR580)-107, INSTALLATION, Turbine Speed Sensor.>
21) Install the transmission harness. <Ref. to CVT(TR580)-143, INSTALLATION, Transmission Harness.>
22) Install the control valve body. <Ref. to CVT(TR580)-127, INSTALLATION, Control Valve Body.>
23) Install the air breather hose. <Ref. to CVT(TR580)-164, INSTALLATION, Air Breather Hose.>
24) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-75, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the pitching stopper bracket and transmission radio ground cord, if mounted.
2) Remove the filler plug, oil drain plug and overflow drain plug. <Ref. to CVT(TR580)-45, REPLACEMENT, Differential Gear Oil.>
3) Remove all plugs.



D: ASSEMBLY

1) Install the oil drain plug.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

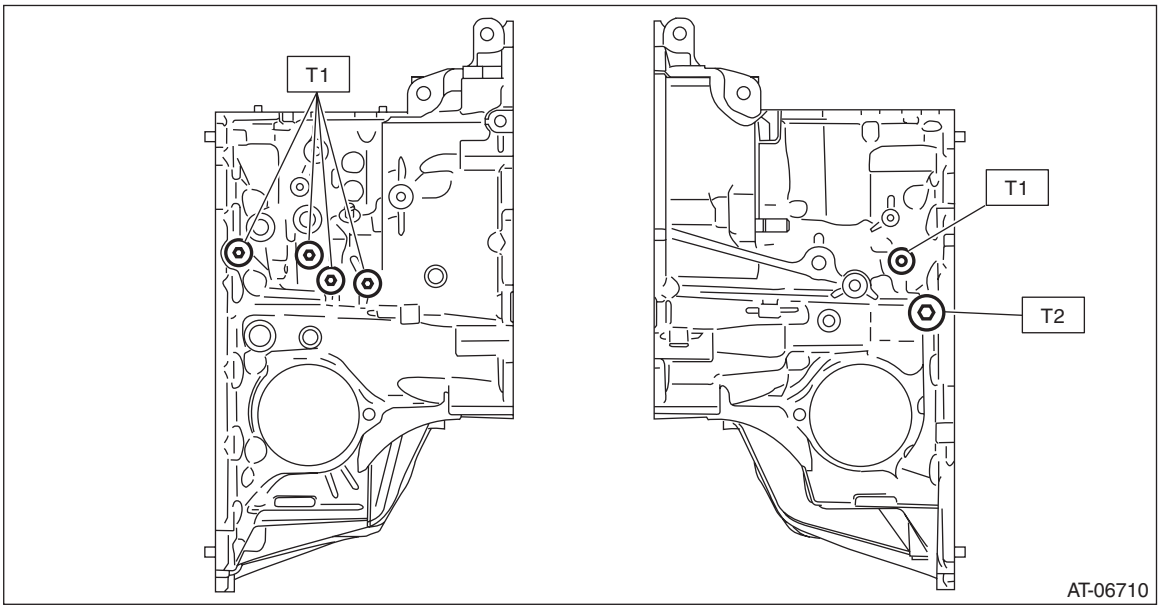
2) Install the overflow drain plug.

NOTE:
Overflow plug of differential gear oil is temporarily attached.

3) Install all plugs.

NOTE:
Use new O-rings.

Tightening torque:
T1: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
T2: 22.5 N·m (2.3 kgf-m, 16.6 ft-lb)



4) Install the pitching stopper bracket and transmission radio ground cord.

CAUTION:
Be careful not to deform or damage the terminal of transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

E: INSPECTION

- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check there is no damage or cracks on the converter case.

46.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
Stall speed is low after warming-up, with select lever in “D” or “R” range.	Engine control system
Vehicle does not move despite engine speed rising up, with select lever in “D” or “R” range.	• Engine control system • Select cable • CVTF • Secondary pressure circuit • Pulley, gear and variator chain • Forward/reverse changeover section • TCM • Control valve body • Inhibitor switch
Vehicle does not move by engine stall, with select lever in “D” or “R” range.	• Parking mechanism • Select cable • Bearing • Forward/reverse changeover section
Excessive shock occurs at starting, with select lever in “D” or “R” range.	• Secondary pressure circuit • Pulley, gear and variator chain
Acceleration speed from standstill is insufficient, with select lever in “D” or “R” range.	• Control valve body • Forward/reverse changeover section
Engine speed suddenly rises up during driving, with select lever in “D” or “R” range.	• Control valve body • Secondary pressure circuit • Primary pressure circuit
Vibration occurs during driving, with select lever in “D” or “R” range.	• Secondary pressure circuit • Primary pressure circuit • Forward/reverse changeover section • Pulley and variator chain • Torque converter assembly • Hydraulic pressure circuit to torque converter • Control valve body
Sudden braking occurs during driving, with select lever in “D” or “R” range.	• Secondary pressure circuit • Primary pressure circuit • Control valve body
During deceleration, lockup clutch does not disengage until just before halting, with select lever in “D” or “R” range.	• Control valve body • Torque converter assembly
Engine stalls with vehicle at a standstill, with select lever in “D” or “R” range.	• Engine control system • Control valve body
Excessive lockup shock occurs during driving, with select lever in “D” range.	Control valve body
Slipping occurs at lockup, or lockup does not occur during driving, with select lever in “D” range.	• Control valve body • Lockup hydraulic line • Torque converter assembly
Excessive shift shock occurs when shifting the select lever from “N” range to “D” range, or from “N” range to “R” range.	• Inhibitor switch • Control valve body • Forward/reverse changeover section
Vehicle does not keep at standstill with select lever in “P” range, or parking cannot be released when shifting from “P” range to another range.	• Select cable • Parking mechanism
Select lever does not shift smoothly.	• Select cable • Inhibitor switch • Detent spring • Manual plate

CONTINUOUSLY VARIABLE TRANSMISSION (DIAGNOSTICS)

CVT(w/o HEV)(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

Step		Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to CVT(w/o HEV)(diag)-4, Check List for Interview.> 2) Before performing diagnostics, check the following items which might affect CVT problems. • General inspection <Ref. to CVT(w/o HEV)(diag)-5, INSPECTION, General Description.> • Disconnection of harness connector • Visual check for harness damage • Oil leakage • Stall speed test <Ref. to CVT(TR580)-49, Stall Test.> • Secondary pressure test <Ref. to CVT(TR580)-52, Secondary Pressure (Line Pressure) Test.> • Transfer clutch pressure test <Ref. to CVT(TR580)-55, Transfer Clutch Pressure Test.> • Time lag test <Ref. to CVT(TR580)-51, Time Lag Test.> • Road test <Ref. to CVT(TR580)-48, Road Test.> • Inhibitor switch <Ref. to CVT(TR580)-100, Inhibitor Switch.>	Is the item that is thought to influence the CVT problem working properly?	Go to step **2**.	Repair the items which may be affecting the CVT trouble.
2	**CHECK AT OIL TEMP LIGHT.** Turn the ignition switch to ON and wait for at least 2 seconds.	Does the AT OIL TEMP light illuminate?	Go to step **3**.	Check the AT OIL TEMP light.
3	**CHECK AT OIL TEMP LIGHT.** Start the engine and wait for 2 seconds or more.	Does the AT OIL TEMP light blink?	Go to step **4**.	Go to step **5**.
4	**CHECK DTC DISPLAY.** Read the DTC. NOTE: If the communication function of Subaru Select Monitor cannot be executed normally, check the communication circuit. <Ref. to CVT(w/o HEV)(diag)-34, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.>	Is DTC displayed on Subaru Select Monitor?	Record the DTC, time stamp and freeze frame data. Go to step **6**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Go to step **5**.

	Step	Check	Yes	No
5	**PERFORM GENERAL DIAGNOSTICS.** 1) Inspect using “Diagnostic Procedure without Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-162, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Inspect using “Diagnostics with Phenomenon”. <Ref. to CVT(w/o HEV)(diag)-163, Diagnostics with Phenomenon.> 3) Perform the Inspection Mode. <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.> 4) Read the DTC.	Is DTC displayed on Subaru Select Monitor?	Go to step **6**.	Finish the diagnosis.
6	**PERFORM DIAGNOSIS.** 1) Inspect by referring to “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-41, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For the DTC table, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-36, List of Diagnostic Trouble Code (DTC).> 2) Repair the trouble cause. 3) Perform the Clear Memory Mode. 4) Perform the Inspection Mode. <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.> 5) Read the DTC.	Is DTC displayed on Subaru Select Monitor?	Inspect by referring to “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-41, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Check the following items when a problem has occurred.

NOTE:
Use copies of this page for interviewing customers.

Customer's name			
Date of purchase			
Date of repair			
Transmission model	Transmission	V.I.N.	
Odometer reading	km (miles)		
Frequency	❑ Continuous ❑ Intermittent (times/day)		
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Other ( )		
Place	❑ Highland ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Downhill ❑ Rough road ❑ Other ( )		
Ambient air temperature	❑ Hot ❑ Warm ❑ Cool ❑ Cold		
Vehicle speed	km/h (MPH)		
AT OIL TEMP light	❑ Blinks continuously	❑ Does not blink	
Select lever position	❑ P ❑ R ❑ N ❑ D ❑ Manual mode ❑ L range		
Driving condition	❑ Not affected ❑ At racing ❑ While decelerating	❑ At starting ❑ While accelerating ❑ While turning (❑ RH/❑ LH)	❑ While idling ❑ When cruising (Vehicle speed km/h) ❑ Immediately after starting the engine
Manual mode	❑ ON ❑ OFF		
Symptoms	❑ Vehicle does not move (❑ Any position ❑ Particular position)		
	❑ Vehicle does not move (no load racing condition as in N range)		
	❑ Vehicle does not move (engine speed does not increase, felt as stall condition)		
	❑ Noise or vibration (Describe concretely:)		
	❑ Shock felt at N → D selection (seconds after shifting, when engine cold or after warm-up)		
	❑ Shock felt at N → R selection (seconds after shifting, when engine cold or after warm-up)		
	❑ Shifting is wrong (Describe concretely:)		
	❑ Shock or judder during driving		
	❑ Fails to accelerate.		
	❑ Engine speed increases abruptly during driving		
	❑ Shock or judder during standing start		
	❑ Select lever does not move		
	❑ Other ( )		

3. General Description

A: CAUTION

1) The airbag system wiring harness is routed near the TCM.

CAUTION:
• All the airbag system wiring harnesses and connectors are colored yellow. Do not use an electric test equipment to check these circuits.
• Be careful not to damage the airbag system wiring harness when performing diagnostics or servicing the TCM.

2) When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal. Never insert the tapered pin into the terminal because it deforms inside which may lead to malfunction.

CAUTION:
If a pin (or similar) was inserted in TCM connector, replace the TCM connector.

3) The TCM connector is waterproof. When measuring the TCM connector terminal voltage, or the resistance between the terminals, use the ST.
ST 18460AA040 CHECK BOARD

B: INSPECTION

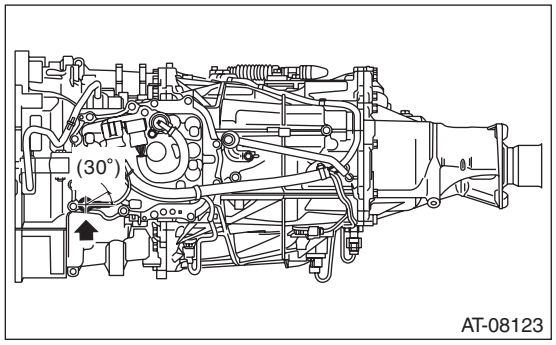
1. BATTERY

Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

Tightening torque:
14 N·m (1.4 kgf-m, 10.3 ft-lb)



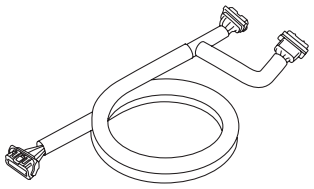
3. OPERATION OF SHIFT SELECT LEVER

Make sure there is no noise, dragging or contact pattern in each select lever range.

WARNING:
Stop the engine while checking operation of the select lever.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (New tools)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.
 ST18460AA040	18460AA040	CHECK BOARD	Used for measuring the TCM terminal voltage.

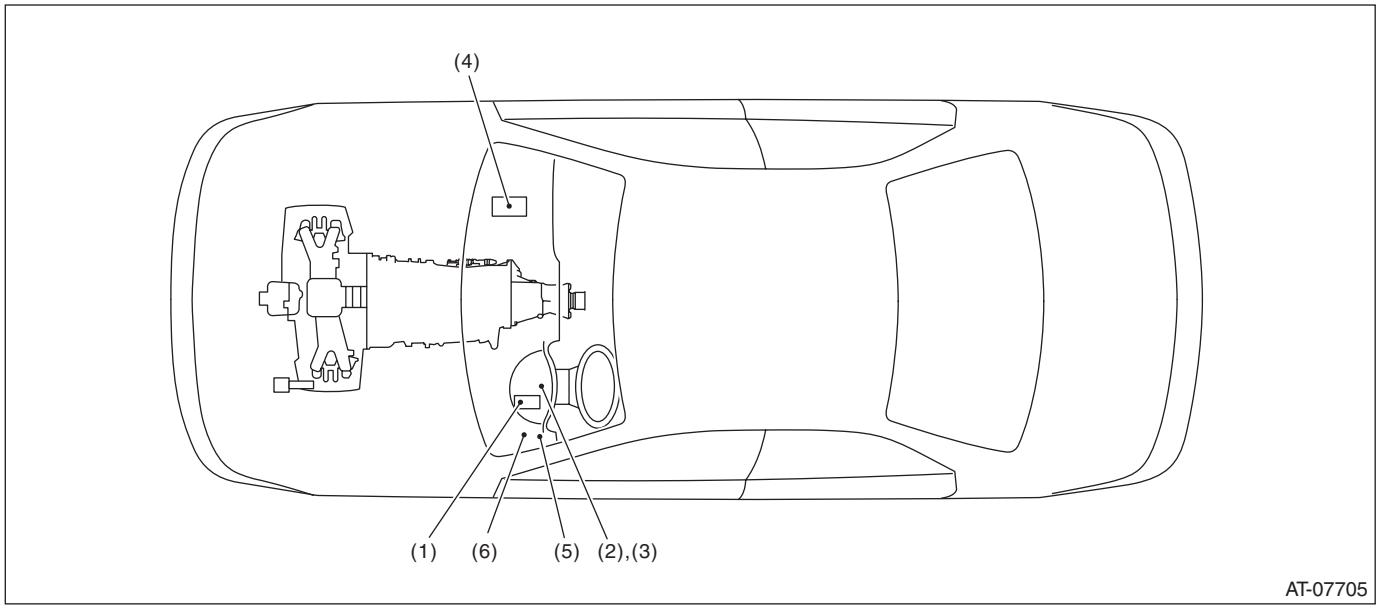
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.
DST-i	Used together with Subaru Select Monitor 4.

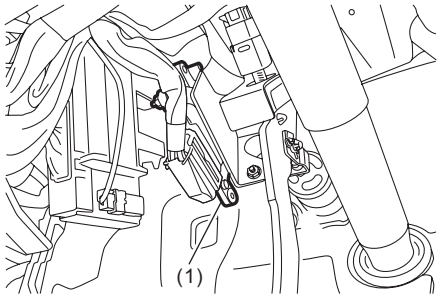
4. Electrical Component Location

A: LOCATION

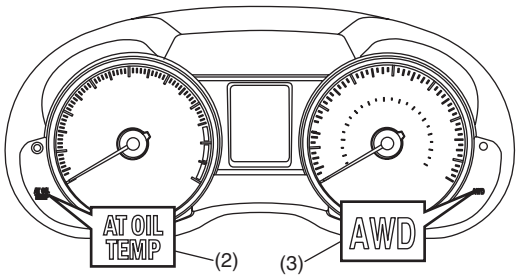
1. CONTROL MODULE



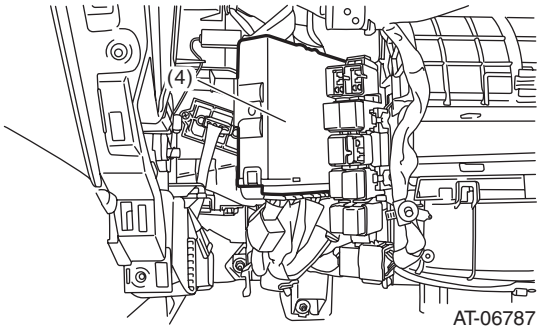
(1)	Transmission control module (TCM)	(3)	AWD light	(5)	Body integrated unit
(2)	AT OIL TEMP light	(4)	Engine control module (ECM)	(6)	Data link connector



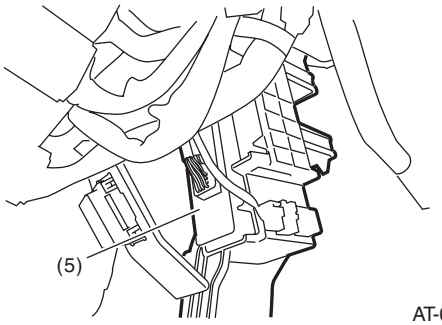
CVT01447



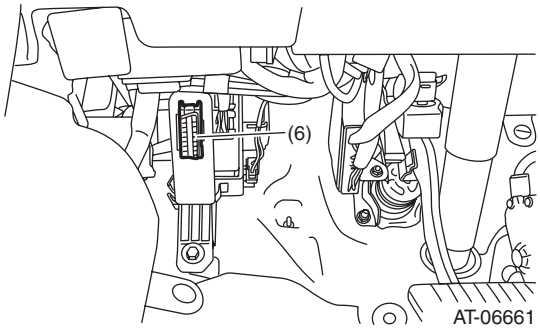
AT-06788



AT-06787

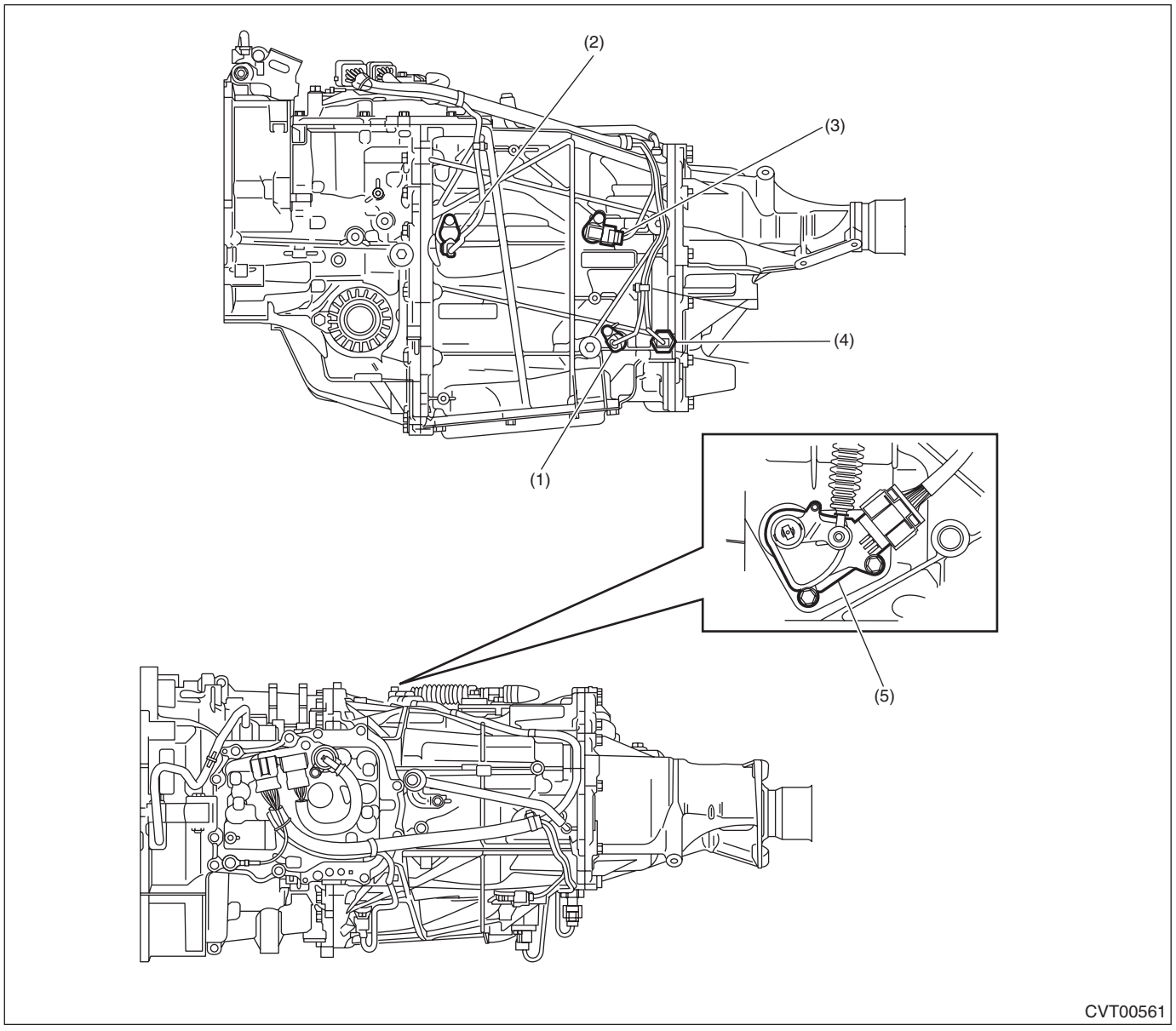


AT-06910



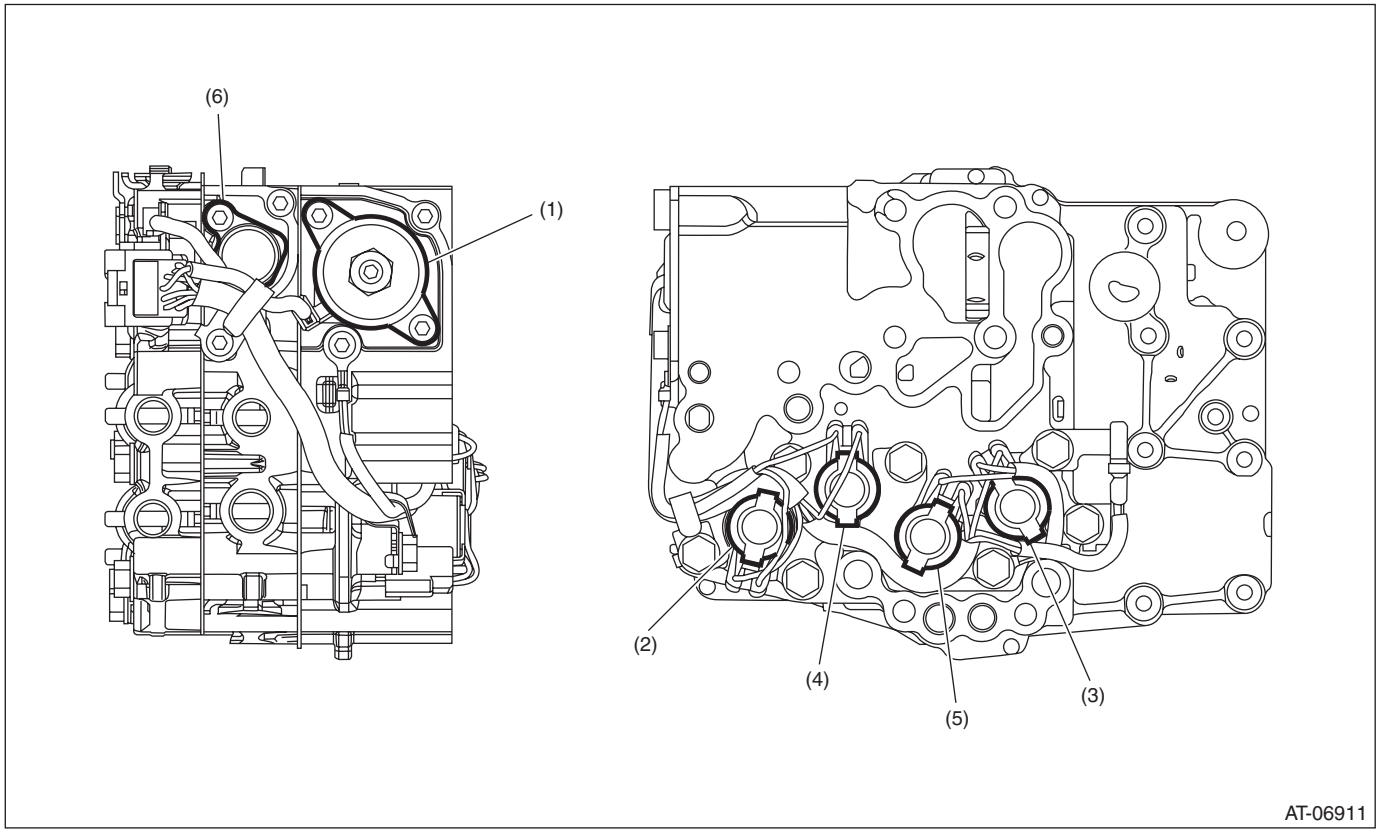
AT-06661

2. SENSOR



(1) Secondary speed sensor
(2) Turbine speed sensor
(3) Primary speed sensor
(4) Secondary pressure sensor
(5) Inhibitor switch

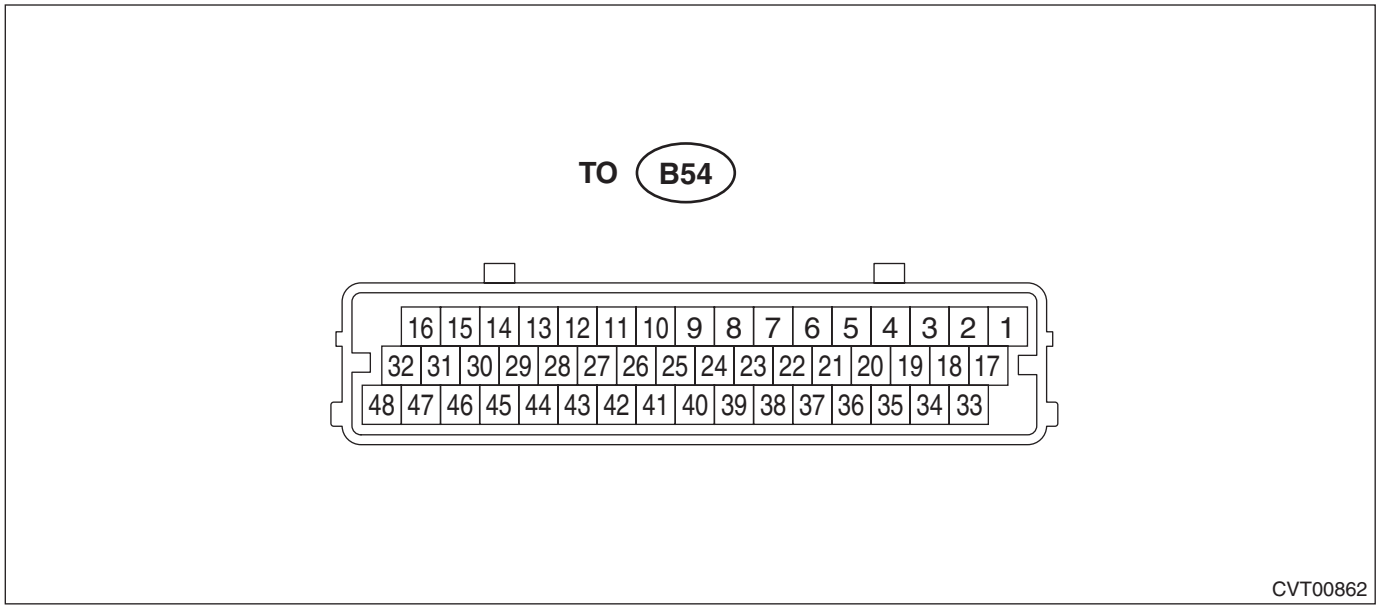
3. SOLENOID



(1) Secondary solenoid
(2) AWD solenoid
(3) Lock-up duty solenoid
(4) Primary DOWN solenoid
(5) Primary UP solenoid
(6) F&R solenoid

5. Transmission Control Module (TCM) I/O Signal

A: ELECTRICAL SPECIFICATION



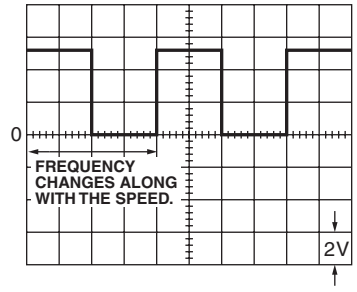
NOTE:
Measure after warming up.

Item	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
Backup power supply	34	—	10 — 13 V	—	
Ignition power supply	41	—	10 — 13 V	—	
Main power supply	8	—	10 — 13 V	—	
Main power supply	24	—	10 — 13 V	—	
Main power supply	40	—	10 — 13 V	—	
Manual mode switch/L range switch	20	Manual mode switch/L range switch ON	Less than 1 V	—	
		Manual mode switch/L range switch OFF	8 V or more	—	
Manual mode UP switch	19	Manual mode UP switch ON	Less than 1 V	—	
		Manual mode UP switch OFF	8 V or more	—	
Manual mode DOWN switch	18	Manual mode DOWN switch ON	Less than 1 V	—	
		Manual mode DOWN switch OFF	8 V or more	—	
Stop light switch	29	Stop light switch ON	8 V or more	—	
		Stop light switch OFF	Less than 1 V	—	
P range switch	38	P range	Less than 1 V	—	
		Except for P range	8 V or more	—	
R range switch	37	R range	Less than 1 V	—	
		Except for R range	8 V or more	—	
N range switch	36	N range	Less than 1 V	—	
		Except for N range	8 V or more	—	
D range switch	35	D range	Less than 1 V	—	
		Except for D range	8 V or more	—	

Item	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
ATF temperature sensor	6	ATF temperature at 20°C (68°F)	Approx. 2.5 V	Approx. 2.5 kΩ	
		ATF temperature at 80°C (176°F)	Approx. 0.7 V	Approx. 330 Ω	
ATF temperature sensor GND	1	Always	Approx. 0 V	—	
Secondary pressure sensor power supply output	33	Ignition switch ON	5 V	—	
Secondary pressure sensor	5	Ignition switch ON, engine OFF	Approx. 0.5 V (0 MPa)	—	Value increases with increase of engine load. (0.5 — 4.5 V)
		Ignition switch ON, engine ON	Approx. 1.0 V (1.0 MPa)	—	
Secondary pressure sensor GND	2	Always	Approx. 0 V	—	
Primary speed sensor	14	While driving	0 or 5 V	—	Refer to the waveform (sensor)
Secondary speed sensor	13	While driving	0 or 5 V	—	Refer to the waveform (sensor)
Turbine speed sensor	12	Engine ON, “P” or “N” range	0 or 5 V	—	Refer to the waveform (sensor)
Self shut output	25	For three seconds after ignition switch ON and OFF	Less than 1 V	—	
		Ignition switch OFF	8 V or more		
F&R solenoid	16	Engine ON	Refer to the waveform (solenoid (1))	Approx. 4 — 6 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Secondary solenoid	32	Engine ON	Refer to the waveform (solenoid (2))	Approx. 5 — 7 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Primary UP solenoid	47	Engine ON, while UP shifting	Refer to the waveform (solenoid (3))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Primary DOWN solenoid	30	Engine ON, while DOWN shifting	Refer to the waveform (solenoid (4))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Lock-up duty solenoid	15	Lock-up ON	Refer to the waveform (solenoid (5))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
AWD solenoid	48	Engine ON, “P” or “N” range	Refer to the waveform (solenoid (6))	Approx. 2 — 4.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
		Engine ON, “D” range, brake ON	Refer to the waveform (solenoid (7))		
CAN communication line (+)	43	—	—	—	
CAN communication line (–)	44	—	—	—	
GND	26	Always	Approx. 0 V	—	
GND	42	Always	Approx. 0 V	—	

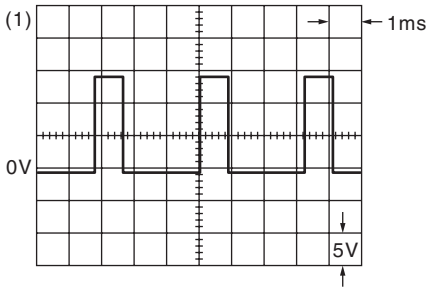
B: WAVEFORM

1. SENSOR

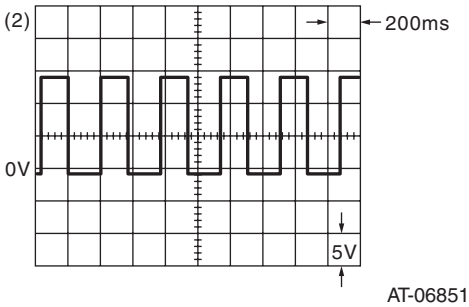


AT-04690

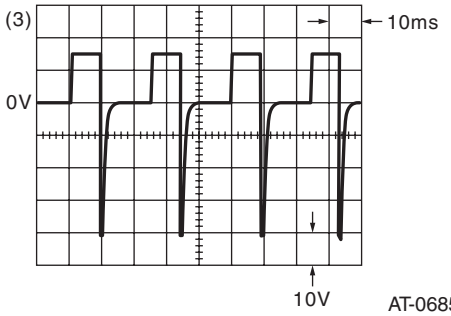
2. SOLENOID



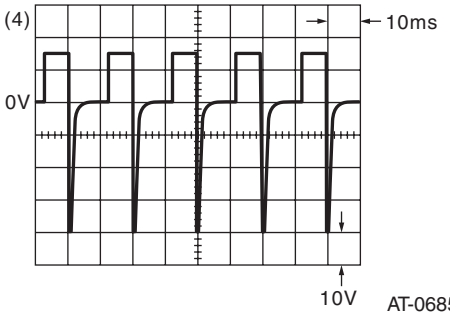
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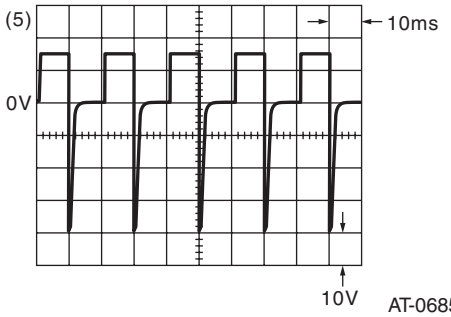
AT-06851



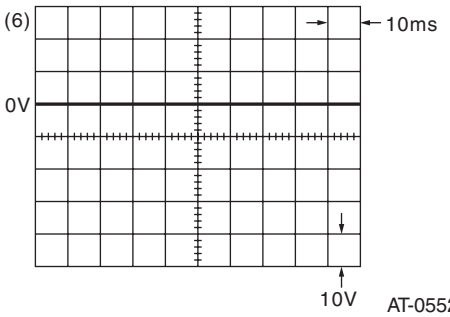
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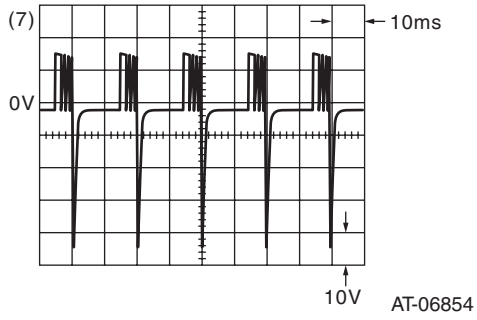
AT-06850



AT-06853



AT-05527

(7) 10ms 0V 10V AT-06854	

6. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

For detailed operation procedures, refer to “Application help”.

2. READ CURRENT DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «Data Monitor».

Display	Contents	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Revolution Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the secondary axis rotation speed.	km/h or MPH
ATF Temperature	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—
Primary Rev Speed	Primary pulley rotation speed calculated by the TCM using signals from the primary speed sensor.	rpm
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Stop Light Switch	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
Commanded Forward & Reverse Linear Solenoid Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA
Actual Forward & Reverse Linear Solenoid Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
L-range	L range signal. Set to ON when the select lever is in the L range gate. TCM input value.	ON or OFF

Display	Contents	Unit of measure
Shift Step in Manual Mode	Gear shift position in manual mode or in multi-stage shifting mode. TCM output value.	—
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
secondary pressure sensor voltage.	Voltage value after an analog/digital conversion is done inside the TCM using the signal input from the secondary pressure sensor. TCM input value.	V
ATF Temp sensor voltage.	Sensor voltage value input from the ATF temperature sensor to the TCM. TCM input value.	V
Diagnosis Lamp	Transmission failure detection status. Set to ON when a failure is detected. AT oil temperature warning light blinks at 2 Hz. TCM output value.	ON or OFF
ATF Temperature Lamp	ATF high temperature detection status. Set to ON when high temperature is detected. AT oil temperature warning light illuminates. TCM output value.	ON or OFF
AT learning	AT initial learning completion status. AT oil temperature warning light blinks at 4 Hz when the learning is not completed. TCM output value.	Complete or Not Completed
Ignition SW ON Count	Number of times the ignition switch is turned ON since the vehicle was manufactured.	times
Count	Shows whether the elapsed time counter after turning ON the ignition switch is synchronized with the integrated unit (master unit) or an original counter. “Common” means the integrated unit, and “Originally” means that the original counter is used.	—
Time Count	Shows the elapsed time after turning ON the ignition switch.	ms
Actual secondary pressure	Pressure value applied to the secondary pulley cylinder (line pressure) detected by the secondary pressure sensor.	MPa
System Voltage	Power supply voltage supplied to the backup power supply (≈ battery voltage).	V

NOTE:
For detailed operation procedures, refer to “Application help”.

3. READ FREEZE FRAME DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

Display	Contents	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Revolution Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the secondary axis rotation speed.	km/h or MPH
ATF Temperature	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—

Display	Contents	Unit of measure
Primary Rev Speed	Primary pulley rotation speed calculated by the TCM using signals from the primary speed sensor.	rpm
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Stop Light Switch	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
Commanded Forward & Reverse Linear Solenoid Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA
Actual Forward & Reverse Linear Solenoid Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
Shift Step in Manual Mode	Gear shift position in manual mode or in multi-stage shifting mode. TCM output value.	—
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
secondary pressure sensor voltage.	Voltage value after an analog/digital conversion is done inside the TCM using the signal input from the secondary pressure sensor. TCM input value.	V
ATF Temp sensor voltage.	Sensor voltage value input from the ATF temperature sensor to the TCM. TCM input value.	V
Diagnosis Lamp	Transmission failure detection status. Set to ON when a failure is detected. AT oil temperature warning light blinks at 2 Hz. TCM output value.	ON or OFF
ATF Temperature Lamp	ATF high temperature detection status. Set to ON when high temperature is detected. AT oil temperature warning light illuminates. TCM output value.	ON or OFF
Ignition SW ON Count	Number of times the ignition switch is turned ON since the vehicle was manufactured.	times
Count	Shows whether the elapsed time counter after turning ON the ignition switch is synchronized with the integrated unit (master unit) or an original counter. “Common” means the integrated unit, and “Originally” means that the original counter is used.	—
Time Count	Shows the elapsed time after turning ON the ignition switch.	ms
Actual secondary pressure	Pressure value applied to the secondary pulley cylinder (line pressure) detected by the secondary pressure sensor.	MPa
System Voltage	Power supply voltage supplied to the backup power supply (≈ battery voltage).	V

NOTE:
For detailed operation procedures, refer to “Application help”.

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «DTC».

NOTE:
- For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC). <Ref. to CVT(w/o HEV)(diag)-36, List of Diagnostic Trouble Code (DTC).>
- For detailed operation procedures, refer to “Application help”.

8. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

9. Inspection Mode

A: PROCEDURE

<Ref. to CVT(TR580)-48, Road Test.>

10.Drive Cycle

A: PROCEDURE

It is possible to complete diagnosis of the DTC by performing the indicated drive cycle. After the repair for the DTC, perform a necessary drive cycle and make sure the function recovers and the DTC is recorded.

1. PREPARATION FOR DRIVE CYCLE

1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) After performing the diagnostics and Clear Memory Mode, check that no DTC remains. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.>

NOTE:
Perform the drive cycle after warming up the engine except when the ATF temperature at engine start is specified.

2. DRIVE CYCLE A

DTC	Item	Condition
P0601	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR	Perform the drive cycle A twice.
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	Perform the drive cycle A twice.
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	Perform the drive cycle A twice.
P0712	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW	—
P0776	PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF	Perform the drive cycle D, then the drive cycle A, and perform the drive cycle D again.
P0842	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT LOW	—
P0843	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT HIGH	—
P0890	TCM POWER RELAY SENSE CIRCUIT LOW	—
P0962	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW	—
P0963	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH	—
P0966	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT LOW	—
P0967	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT HIGH	—
P160A	RANDOM ACCESS MEMORY (RAM) ERROR	Perform the drive cycle A twice.
P2530	IGNITION SWITCH RUN POSITION CIRCUIT	—
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH	Perform the drive cycle A, then perform the drive cycle C.

Diagnostic procedure:
1) Start the engine.
2) Depress the brake pedal and move the select lever to each range at an interval of five seconds.

NOTE:
Move the select lever in the following order: “P” → “R” → “N” → “D” → “N” → “R” → “P”.

3. DRIVE CYCLE B

DTC	Item	Condition
P0711	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	Perform the drive cycle B twice.

Diagnostic procedure:
1) Start the engine under condition that ATF temperature is at 20°C (68°F) or below.
2) Drive in any driving pattern for 20 minutes. (Include driving at a constant legal speed (for 20 seconds) at least once.)

4. DRIVE CYCLE C

DTC	Item	Condition
P0500	VEHICLE SPEED SENSOR "A" CIRCUIT	—
P0716	INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—
P0717	INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL	—
P0970	PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT LOW	—
P0971	PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT HIGH	—
P0973	SHIFT SOLENOID "A" CONTROL CIRCUIT LOW	—
P0974	SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH	—
P0976	SHIFT SOLENOID "B" CONTROL CIRCUIT LOW	—
P0977	SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH	—
P2158	VEHICLE SPEED SENSOR "B" CIRCUIT	—
P2746	INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT RANGE/PERFORMANCE	—
P2747	INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL	—
P2750	INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT RANGE/PERFORMANCE	—
P2751	INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL	—
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH	Perform the drive cycle A, then perform the drive cycle C.
P2764	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW	—

Diagnostic procedure:
1) Start the engine.
2) Accelerate slowly to a legal speed, and then decelerate slowly to a stop.

5. DRIVE CYCLE D

DTC	Item	Condition
P0713	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH	—
P0730	INCORRECT GEAR RATIO	—
P0746	PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P0747	PRESSURE CONTROL SOLENOID "A" STUCK ON	Perform the drive cycle D twice.
P0751	SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P0752	SHIFT SOLENOID "A" STUCK ON	Perform the drive cycle D twice.
P0756	SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P0757	SHIFT SOLENOID "B" STUCK ON	Perform the drive cycle D twice.
P0776	PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF	Perform the drive cycle D, then the drive cycle A, and perform the drive cycle D again.
P0841	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE	—
P0961	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE	—
P0965	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT RANGE/PERFORMANCE	—
P2757	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P2758	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON	Perform the drive cycle D twice.

Diagnostic procedure:
1) Start the engine.
2) Drive in any driving pattern for 20 minutes. (Include driving at a constant legal speed (for 20 seconds) at least once.)

6. DRIVE CYCLE E

DTC	Item	Condition
P0801	REVERSE INHIBIT CONTROL CIRCUIT/OPEN	—
U0073	CONTROL MODULE COMMUNICATION BUS OFF	—
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	—
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	—
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	—
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	—
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE	—
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	—
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	—
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	—
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	—
U0424	INVALID DATA RECEIVED FROM HVAC CONTROL MODULE	—
U1235	LOST COMMUNICATION WITH EyeSight	—
U1433	INVALID DATA RECEIVED FROM EyeSight	—

Diagnostic procedure:
1) Start the engine.

7. DRIVE CYCLE F

DTC	Item	Condition
P0705	TRANSMISSION RANGE SENSOR "A" CIRCUIT (PRNDL INPUT)	—

Diagnostic procedure:
1) Start the engine.
2) Depress the brake pedal and move the select lever to each range at an interval of five seconds.

NOTE:
Move the select lever in the following order: “P” → “R” → “N” → “D”.
3) Maintain the engine speed to 2,000 rpm for five seconds or more.

8. DRIVE CYCLE G

DTC	Item	Condition
P0708	TRANSMISSION RANGE SENSOR "A" CIRCUIT HIGH	—

Diagnostic procedure:
1) Start the engine.
2) Drive for three seconds at 16 km/h (10 MPH).

NOTE:
Drive in “D” range and “R” range.

9. DRIVE CYCLE H

DTC	Item	Condition
P0719	BRAKE SWITCH "B" CIRCUIT LOW	—
P0724	BRAKE SWITCH "B" CIRCUIT HIGH	—
P0951	AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/PERFORMANCE	—
P170A	L-RANGE SWITCH	—

Diagnostic procedure:
1) Start the engine.
2) Operate the stop light switch or the manual mode switch.

NOTE:
Drive in “D” range and “R” range.
3) Read the data of the stop light switch or the manual mode switch using the Subaru Select Monitor. Or measure the terminal voltage.

11.Active Test

A: OPERATION

CAUTION:
- **Be sure to perform the active test while the engine is not running.**
- **After executing the active test, execute the Clear Memory Mode.**

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «Active Test».

Item	SSM display	Execution condition
Activating the actuator ON/OFF	F&R Clutch Solenoid	When all of the following conditions are met: • P range • Ignition switch is ON (engine stops) • Battery voltage is 10.9 V or more
	Secondary Solenoid	
	Primary Down Solenoid	
	Primary Up Solenoid	
	AWD Solenoid	
	Lock-Up Duty Solenoid	

NOTE:
For detailed operation procedures, refer to “Application help”.

12.Learning Control

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- When the following work is performed, perform learning work for the transmission.

Replacement of TCM/Replacement or disassembly of transmission assembly/Replacement of control valve body/Clearing AT leaning value is executed.

B: PROCEDURE

1. PREPARATION FOR LEARNING

1) Warm up or cool down until the ATF temperature displayed on the Subaru Select Monitor is 40 — 65°C (104 — 149°F).
2) After stopping the vehicle, shift the select lever to “P” range.
3) Fully apply the parking brake.
4) Lift up the vehicle.

CAUTION:
While working, be sure to keep the lower edge of the tires 30 cm or more above the ground as vehicle will vibrate.

5) Connect the Subaru Select Monitor to data link connector.
6) Turn the ignition switch to ON.
7) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger, etc.

2. SIMPLE LEARNING

NOTE:
Simple learning is performed with the vehicle lifted, without actually running the vehicle.

CAUTION:
Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «Work Support».
6) On «Work Support» display, select «AT learning mode».
7) Follow the messages displayed on the screen when working.

NOTE:
During AT learning in progress, AT OIL TEMP light in the combination meter starts flashing at 2 Hz and the learning operation starts. The following message is displayed on the screen when the AT OIL TEMP light which was flashing at 2 Hz turns off.

8) When «AT learning normally ended.» is displayed, simple AT learning is completed.

NOTE:
- If communication error occurs during learning, retry the “AT learning mode” from the beginning.
- If the message «Execute AT learning again after fixing troubles of the vehicle» appears during learning, select [OK] and display the DTC list. After repairing the locations indicated by the DTC, start the “AT learning mode” over from the beginning.
- When communication error occurs during learning, select lever does not shift occasionally. If select lever does not shift, turn the ignition switch to OFF before operating the select lever.
- If the message «AT learning ended abnormally. Try again from the beginning.» is displayed, start the “AT learning mode” over from the beginning.

Display	Main causes for abnormal termination
AT learning ended abnormally. Try again from the beginning.	• Fault is detected during AT learning. • The accelerator pedal is depressed during AT learning. • An unspecified operation was performed during AT learning • ATF temperature becomes out of specification during AT learning. • Battery voltage is low. • Malfunction indicator light illuminates. • Parking brake not applied strongly enough. • Brake pedal is not fully depressed. • Abnormal idle speed increase, etc.

- For detailed operation procedures, refer to “Application help”.

13.AT OIL TEMP Warning Light Display

A: OPERATION

The AT OIL TEMP light illuminates or blinks, when the ATF temperature is high and malfunction occurs in CVT.

- At normal condition

After turning the ignition switch to ON, illuminates for 2 seconds then goes off.

- When ATF temperature is high

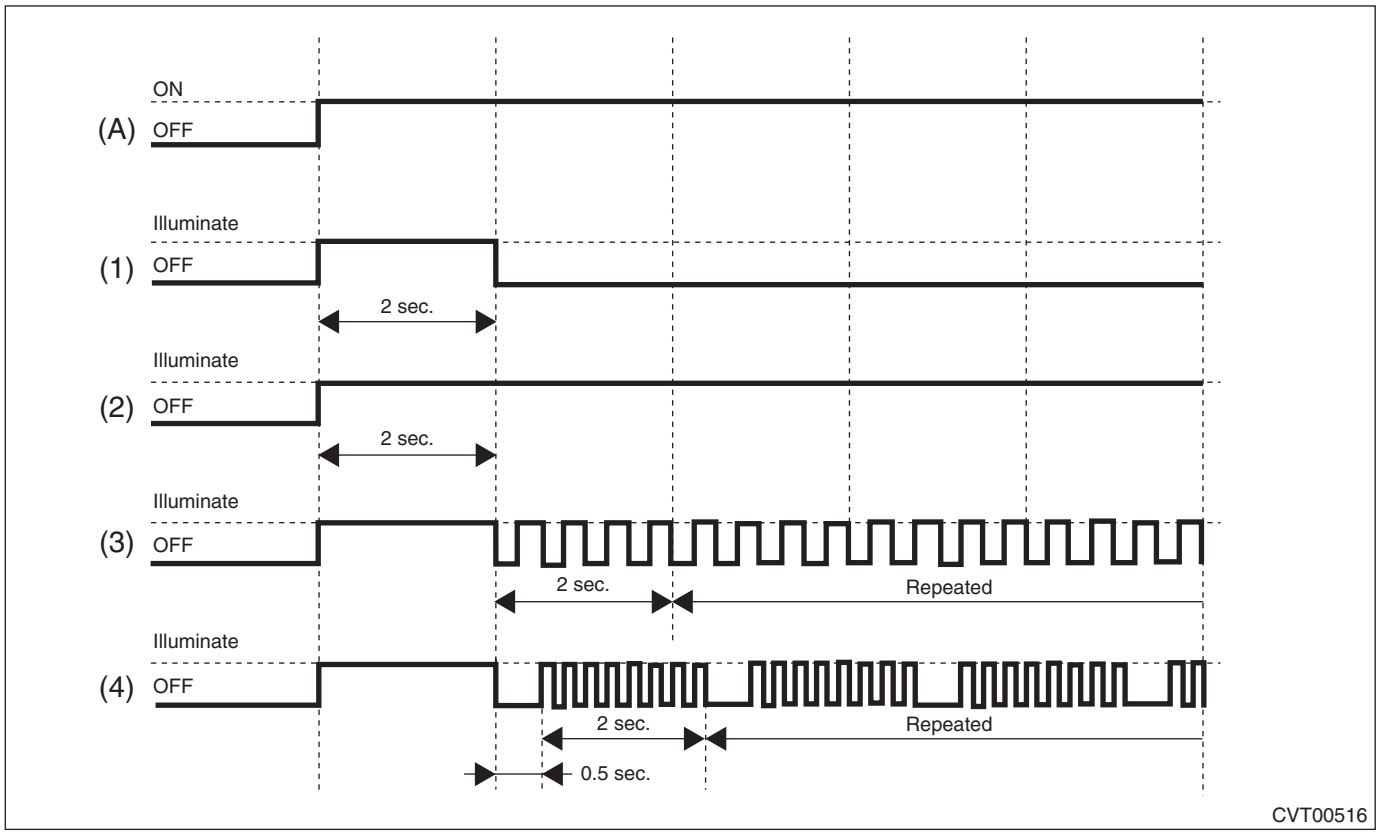
AT OIL TEMP light illuminates when the ATF temperature is abnormally high with the ignition switch ON.

- When malfunction is detected

AT OIL TEMP light blinks at 2 Hz when the TCM detects the malfunction of CVT with the ignition switch ON. In this case, inspect using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-41, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

- When AT learning is not finished

AT OIL TEMP light repeats “Blinking at 4 Hz → Turning OFF” every two seconds, when the AT learning is not completed with the ignition switch ON. In this case, perform the “Learning”. (During AT learning, the light blinks at 2 Hz or illuminates.) <Ref. to CVT(w/o HEV)(diag)-26, Learning Control.>



(A) Ignition switch condition

(1) At normal condition
(2) When ATF temperature is high
(3) When malfunction is detected
(4) When AT learning is not finished

If the AT OIL TEMP light does not illuminate, or illumination patterns are not as above, check the AT OIL TEMP light circuit. <Ref. to CVT(w/o HEV)(diag)-29, INSPECTION, AT OIL TEMP Warning Light Display.>

B: INSPECTION

DIAGNOSIS:

- CAN communication is lost with the combination meter.
- Combination meter malfunction
- TCM is in special control mode.
- AT learning is not finished.

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON, the AT OIL TEMP light does not illuminate.
- AT OIL TEMP light remains lit after engine start.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC U0155 or U0423 displayed?	Perform the self-diagnosis of combination meter.	Go to step **2**.
2	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Are DTCs other than U0155 and U0423 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** Read DTC of combination meter.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK AT OIL TEMP LIGHT.** Turn the ignition switch to ON.	Does AT OIL TEMP light illuminate and then go off in 2 seconds?	Go to step **5**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
5	**CHECK AT OIL TEMP LIGHT.** Start the engine.	Does the AT OIL TEMP light go off?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **6**.
6	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **7**.
7	**CHECK TCM.** Read the data of «ATF Temperature Lamp» using the Subaru Select Monitor.	Is “ON” displayed?	Go to step **8**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
8	**CHECK TCM.** Read the data of «ATF Temp.» using the Subaru Select Monitor.	Is the display 125°C or more?	Go to step **9**.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

	Step	Check	Yes	No
9	**CHECK ATF TEMPERATURE.** Check the real fluid temperature from the transmission case surface temperature.	Does it clearly differ from the «ATF Temp.» displayed on Subaru Select Monitor?	Perform the diagnosis according to DTC P0712. If there is no problem, perform the diagnosis according to DTC P0713.	When ATF temperature can be judged as actually high, perform the diagnosis again after the ATF temperature lowers.

14.AWD Warning Light Display

A: OPERATION

AWD light illuminates or blinks, when the AWD is in special control condition and AWD has malfunction.

- At normal condition

After turning the ignition switch to ON, illuminates for 2 seconds then goes off.

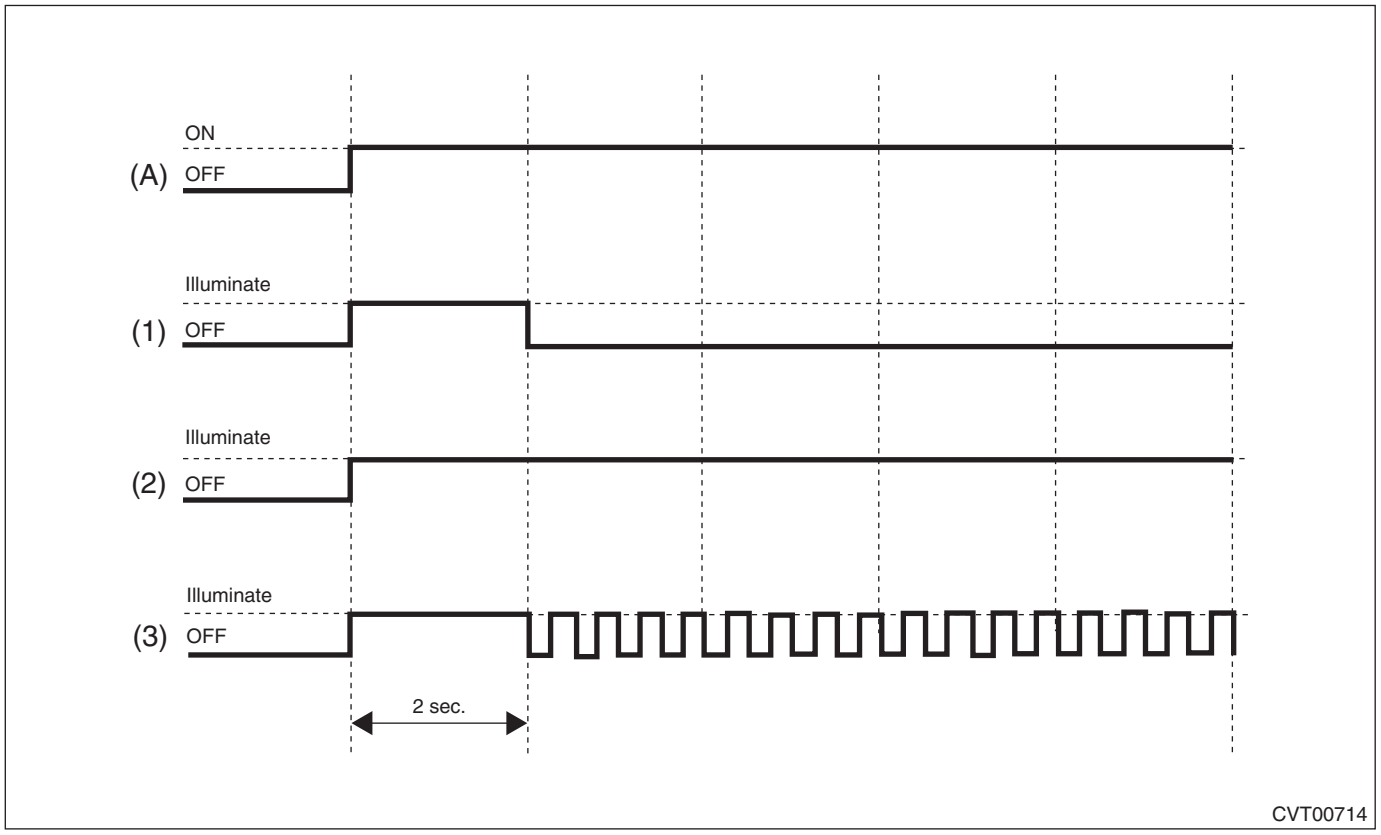
- When FF mode is selected

AWD light illuminates when the AWD ON/OFF switching function is set to “FF mode” with the ignition switch ON.

- When malfunction is detected

AWD light blinks at 2 Hz when any of the following malfunctions are detected with the ignition switch ON.

1. When tire with different diameter is installed, or air pressure of any of four wheels is excessively low.
2. When “Rear differential inspection mode” is judged as NG <Ref. to DI-67, Rear Differential Inspection Mode.>



(A) Ignition switch condition

(1) At normal condition (2) When FF mode is selected (3) When malfunction is detected

If the AWD light does not illuminate, or illumination patterns are not as above, check the AWD light circuit. <Ref. to CVT(w/o HEV)(diag)-32, INSPECTION, AWD Warning Light Display.>

B: INSPECTION

DIAGNOSIS:

- CAN communication is lost with the combination meter.
- Combination meter malfunction
- TCM is in AWD special control mode.

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON, the AWD light does not illuminate.
- AWD light remains lit after engine start.
- AWD light is blinking immediately after engine start.

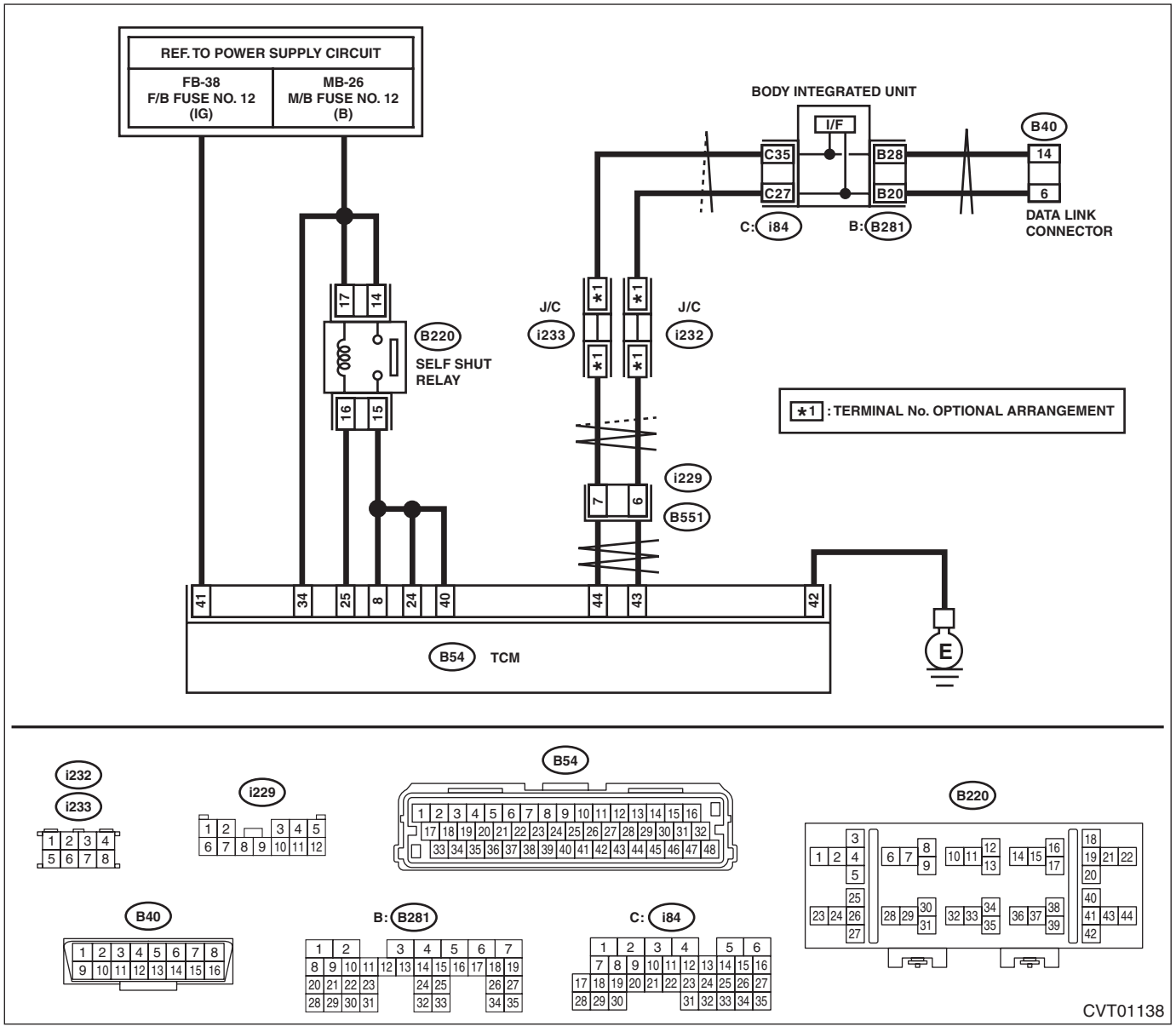
	Step	Check	Yes	No
1	**CHECK TCM.** Check the DTC relating the TCM using the Subaru Select Monitor.	Is DTC U0155 or U0423 displayed?	Perform the self-diagnosis of combination meter.	Go to step **2**.
2	**CHECK TCM.** Check the DTC relating the TCM using the Subaru Select Monitor.	Are DTCs other than U0155 and U0423 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** Check the DTC of combination meter.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK AWD LIGHT.** Turn the ignition switch to ON.	Does AWD light illuminate and then go off in 2 seconds?	Go to step **5**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
5	**CHECK AWD LIGHT.** Start the engine.	Does the AWD light go off?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **6**.
6	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **7**.
7	**CHECK AWD LIGHT.** Check the display of AWD light after engine start.	Is AWD light illuminating?	Go to step **9**.	Go to step **8**.
8	**CHECK AWD LIGHT.** Check the display of AWD light after engine start.	Is AWD light blinking at 2 Hz?	Go to step **10**.	Go to step **11**.
9	**CHECK AWD ON/OFF SWITCHING FUNCTION.** Using the Subaru Select Monitor, select the «AWD ON/OFF switching mode» in «Work Support» display, and check the current mode. <Ref. to CVT(TR580)-47, AWD ON/OFF Switching Mode.>	Is the message «At present, the vehicle is in AWD. Switch to FF?» displayed?	Go to step **11**.	If the message «At present, the vehicle is in FF. Switch to AWD?» is displayed, select “OK”, and switch to AWD mode.

	Step	Check	Yes	No
10	**CHECK REAR DIFFERENTIAL.** Using the Subaru Select Monitor, select and check «Rear differential inspection mode» in «Work Support» display. <Ref. to DI-67, Rear Differential Inspection Mode.>	Does AWD light go off after inspection is finished normally?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **11**.
11	**CHECK COMBINATION METER.** Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is there any trouble with the combination meter?	Repair the combination meter.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

15.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Defective harness connector
TROUBLE SYMPTOM:
Subaru Select Monitor communication failure
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select the transmission using the Subaru Select Monitor.

	Step	Check	Yes	No
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.**	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.
4	**CHECK INSTALLATION OF TCM CONNECTOR.** Turn the ignition switch to OFF.	Is the TCM connector inserted into the TCM until the clamp locks?	Go to step **5**.	Insert the TCM connector to TCM.
5	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **6**.
6	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Check whether communication to transmission system can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Check DTC of TCM. <Ref. to CVT(w/o HEV)(diag)-18, Read Diagnostic Trouble Code (DTC).>	Go to step **7**.
7	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. (Engine OFF) 2) Measure the ignition power supply voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 8 (+) — Chassis ground (–):*** ***(B54) No. 24 (+) — Chassis ground (–):*** ***(B54) No. 34 (+) — Chassis ground (–):*** ***(B54) No. 40 (+) — Chassis ground (–):*** ***(B54) No. 41 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **8**.	Repair the open circuit of harness between TCM and battery.
8	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 42 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **9**.	Repair the open circuit of the TCM ground circuit and poor contact of connector.
9	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of control module power supply, ground circuit and data link connector?	Repair the connector.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

16.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
P0500	VEHICLE SPEED SENSOR "A" CIRCUIT	Wheel speed data from VDC CM&H/U is abnormal.	<Ref. to CVT(w/o HEV)(diag)-41, DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0601	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR	TCM ROM is faulty.	<Ref. to CVT(w/o HEV)(diag)-42, DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	TCM RAM is faulty.	<Ref. to CVT(w/o HEV)(diag)-43, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	TCM EEPROM is faulty.	<Ref. to CVT(w/o HEV)(diag)-44, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0705	TRANSMISSION RANGE SENSOR "A" CIRCUIT (PRNDL INPUT)	Inhibitor switch malfunction or short circuit	<Ref. to CVT(w/o HEV)(diag)-45, DTC P0705 TRANSMISSION RANGE SENSOR "A" CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0708	TRANSMISSION RANGE SENSOR "A" CIRCUIT HIGH	Inhibitor switch malfunction or open circuit	<Ref. to CVT(w/o HEV)(diag)-47, DTC P0708 TRANSMISSION RANGE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0711	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	ATF temperature sensor is faulty or input signal circuit is faulty.	<Ref. to CVT(w/o HEV)(diag)-50, DTC P0711 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0712	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW	ATF temperature sensor is faulty or input signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-51, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0713	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH	ATF temperature sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-53, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0716	INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT RANGE/PERFORMANCE	Turbine speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-56, DTC P0716 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0717	INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL	Turbine speed sensor signal no input	<Ref. to CVT(w/o HEV)(diag)-57, DTC P0717 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0719	BRAKE SWITCH "B" CIRCUIT LOW	Brake switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-61, DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0724	BRAKE SWITCH "B" CIRCUIT HIGH	Brake switch is faulty or input signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-64, DTC P0724 BRAKE SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0730	INCORRECT GEAR RATIO	Primary speed sensor, secondary speed sensor, control valve, or chain is faulty.	<Ref. to CVT(w/o HEV)(diag)-67, DTC P0730 INCORRECT GEAR RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0746	PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF	Secondary solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-69, DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0747	PRESSURE CONTROL SOLENOID "A" STUCK ON	Secondary solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(w/o HEV)(diag)-72, DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0751	SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF	Primary UP solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-75, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0752	SHIFT SOLENOID "A" STUCK ON	Primary UP solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(w/o HEV)(diag)-78, DTC P0752 SHIFT SOLENOID "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0756	SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF	Primary DOWN solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-81, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0757	SHIFT SOLENOID "B" STUCK ON	Primary DOWN solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(w/o HEV)(diag)-84, DTC P0757 SHIFT SOLENOID "B" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0776	PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF	F&R solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-87, DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0801	REVERSE INHIBIT CONTROL CIRCUIT/OPEN	Shift lock solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-90, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0841	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE	Secondary pressure sensor or control valve is faulty	<Ref. to CVT(w/o HEV)(diag)-91, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0842	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT LOW	Secondary pressure sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-95, DTC P0842 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0843	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT HIGH	Secondary pressure sensor is faulty or input signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-97, DTC P0843 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0890	TCM POWER RELAY SENSE CIRCUIT LOW	Self-shut relay is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-99, DTC P0890 TCM POWER RELAY SENSE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0951	AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/PERFORMANCE	Manual mode switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-101, DTC P0951 AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0961	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE	Characteristics of secondary solenoid is abnormal.	<Ref. to CVT(w/o HEV)(diag)-103, DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0962	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW	Secondary solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-105, DTC P0962 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0963	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH	Secondary solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-107, DTC P0963 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0965	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT RANGE/PERFORMANCE	F&R solenoid, forward clutch or control valve is faulty.	<Ref. to CVT(w/o HEV)(diag)-109, DTC P0965 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0966	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT LOW	F&R solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-111, DTC P0966 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0967	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT HIGH	F&R solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-113, DTC P0967 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0970	PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT LOW	AWD solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-115, DTC P0970 PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0971	PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT HIGH	AWD solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-117, DTC P0971 PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0973	SHIFT SOLENOID "A" CONTROL CIRCUIT LOW	Primary UP solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-119, DTC P0973 SHIFT SOLENOID "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0974	SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH	Primary UP solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-121, DTC P0974 SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0976	SHIFT SOLENOID "B" CONTROL CIRCUIT LOW	Primary DOWN solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-123, DTC P0976 SHIFT SOLENOID "B" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0977	SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH	Primary DOWN solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-125, DTC P0977 SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P160A	RANDOM ACCESS MEMORY (RAM) ERROR	TCM RAM is faulty.	<Ref. to CVT(w/o HEV)(diag)-127, DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P170A	L-RANGE SWITCH	L range switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-128, DTC P170A L-RANGE SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2158	VEHICLE SPEED SENSOR "B" CIRCUIT	Wheel speed data from VDC CM&H/U is abnormal.	<Ref. to CVT(w/o HEV)(diag)-129, DTC P2158 VEHICLE SPEED SENSOR "B" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P2530	IGNITION SWITCH RUN POSITION CIRCUIT	Ignition SW circuit is faulty.	<Ref. to CVT(w/o HEV)(diag)-130, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2746	INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT RANGE/PERFORMANCE	Primary speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-132, DTC P2746 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2747	INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL	Primary speed sensor signal no input	<Ref. to CVT(w/o HEV)(diag)-134, DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2750	INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT RANGE/PERFORMANCE	Secondary speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-138, DTC P2750 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2751	INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL	Secondary speed sensor signal no input	<Ref. to CVT(w/o HEV)(diag)-139, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2757	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF	Lock-up duty solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-143, DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2758	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON	Lock-up duty solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(w/o HEV)(diag)-147, DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH	Lock-up duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-151, DTC P2763 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2764	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW	Lock-up duty solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-153, DTC P2764 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	CAN bus is shorted or communication error.	<Ref. to CVT(w/o HEV)(diag)-155, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	Detected that the engine data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-155, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Detected that the VDC data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-156, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Detected that the body integrated unit data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-156, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	Detected that the meter data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-157, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE	Detected that the air conditioner data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-157, DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	Detected abnormality of the engine data.	<Ref. to CVT(w/o HEV)(diag)-158, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	Detected abnormality of the VDC data.	<Ref. to CVT(w/o HEV)(diag)-158, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	Detected abnormality of the body integrated unit data.	<Ref. to CVT(w/o HEV)(diag)-159, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	Detected abnormality of the meter data.	<Ref. to CVT(w/o HEV)(diag)-159, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0424	INVALID DATA RECEIVED FROM HVAC CONTROL MODULE	Detected abnormality of the air conditioner data.	<Ref. to CVT(w/o HEV)(diag)-160, DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1235	LOST COMMUNICATION WITH EyeSight	Detected that the EyeSight data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-160, DTC U1235 LOST COMMUNICATION WITH EyeSight, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1433	INVALID DATA RECEIVED FROM EyeSight	Detected abnormality of the EyeSight data.	<Ref. to CVT(w/o HEV)(diag)-161, DTC U1433 INVALID DATA RECEIVED FROM EyeSight, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

17.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
VDC does not operate.

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC of VDC system using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of connector and harness between VDCCM&H/U and wheel speed sensor.

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction of VDC wheel speed sensor.
- Judge as NG when the wheel speed sensor normal status signal from VDC is cleared.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from Vehicle Dynamics Control Module NOTE: The VDC controller detects malfunction if one of the speed sensors does not output a signal and the other vehicle speed sensor output signal is above 7.46 MPH.	ON

Time Needed for Diagnosis: 2.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

B: DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
TCM ROM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0601 displayed?	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction in ROM area of the TCM.
- Judge as NG when the consistency in the ROM area is lost.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

C: DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
TCM RAM malfunction

Step		Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0604 displayed?	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction in RAM area of the TCM.
- Judge as NG if an attempt to write to RAM area failed.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (RAM) NOTE: This check is carried out about the RAM only used for CAN communication.	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

D: DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
TCM EEPROM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 2) Read the DTC.	Is DTC P062F displayed?	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Judge the malfunction in EEPROM area of the TCM.
- Judge as NG if an attempt to write to EEPROM area failed.

Diagnosis 2
- Judge the malfunction in EEPROM area of the TCM.
- Judge as malfunction when the consistency in the EEPROM area is lost.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

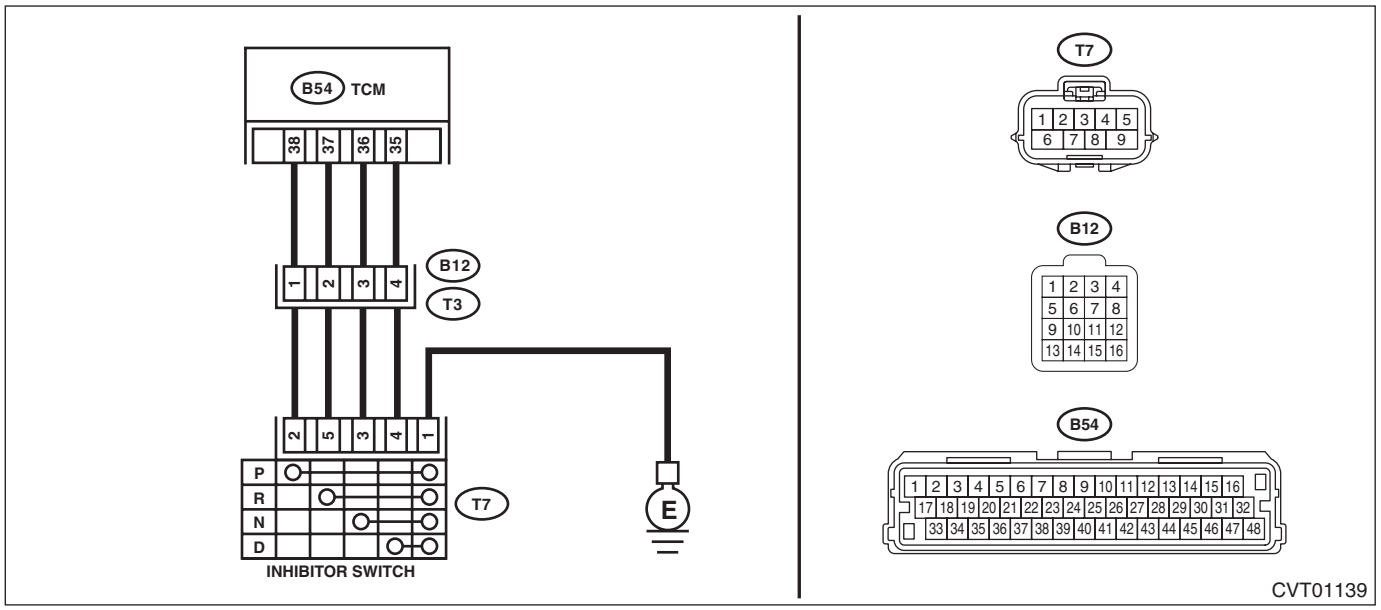
Malfunction Criteria	Threshold Value
Diagnosis 1	
Writing-check (EEPROM)	Error
Diagnosis 2	
Checksum (EEPROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

E: DTC P0705 TRANSMISSION RANGE SENSOR "A" CIRCUIT (PRNDL INPUT)

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range», «R Range Signal», «N Range» and «D Range Signal» using the Subaru Select Monitor.	Is display “OFF” for the range other than corresponding range?	Go to step **5**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 38 — Chassis ground:*** ***(B54) No. 37 — Chassis ground:*** ***(B54) No. 36 — Chassis ground:*** ***(B54) No. 35 — Chassis ground:***	Is each resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of body harness.
3	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 1 — Chassis ground:*** ***(T3) No. 2 — Chassis ground:*** ***(T3) No. 3 — Chassis ground:*** ***(T3) No. 4 — Chassis ground:***	Is each resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of transmission harness.

	Step	Check	Yes	No
4	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 5 — No. 1:*** ***No. 3 — No. 1:*** ***No. 4 — No. 1:***	Is the resistance other than corresponding range 1 MΩ or more?	Go to step **5**.	Replace the inhibitor switch. <Ref. to CVT(TR580)-100, Inhibitor Switch.>
5	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of Range Switch.
- Judge as NG if more than one input of Range Switch are detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

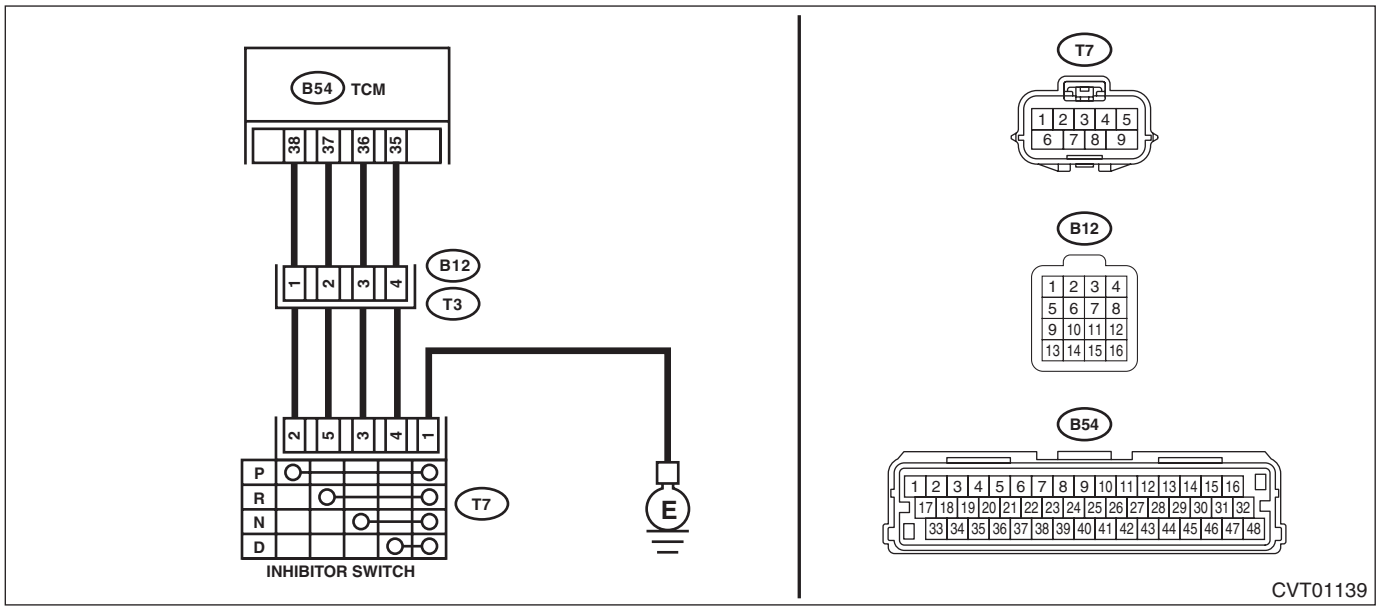
Malfunction Criteria	Threshold Value
Two or more transmission range switches ON NOTE: "Transmission range switch ON" is defined as transmission range switch input voltage < 1.7 V.	True

Time Needed for Diagnosis: 3 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

F: DTC P0708 TRANSMISSION RANGE SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range», «R Range Signal», «N Range» and «D Range Signal» using the Subaru Select Monitor.	Is the display of the corresponding range “ON”?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 38 — (B12) No. 1:*** ***(B54) No. 37 — (B12) No. 2:*** ***(B54) No. 36 — (B12) No. 3:*** ***(B54) No. 35 — (B12) No. 4:***	Is each resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 1 — (T7) No. 2:*** ***(T3) No. 2 — (T7) No. 5:*** ***(T3) No. 3 — (T7) No. 3:*** ***(T3) No. 4 — (T7) No. 4:***	Is each resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 5 — No. 1:*** ***No. 3 — No. 1:*** ***No. 4 — No. 1:***	Is the resistance of the corresponding range less than 1 MΩ?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TR580)-100, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 1 (+) — Chassis ground (–):*** ***(B12) No. 2 (+) — Chassis ground (–):*** ***(B12) No. 3 (+) — Chassis ground (–):*** ***(B12) No. 4 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 2 (+) — Chassis ground (–):*** ***(T7) No. 5 (+) — Chassis ground (–):*** ***(T7) No. 3 (+) — Chassis ground (–):*** ***(T7) No. 4 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of Range Switch.
- Judge as NG if there is no input from all Range Switches.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Vehicle speed (calculated from secondary pulley shaft speed)	≥ 6 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
All transmission range switches OFF NOTE: “Transmission range switch OFF” is defined as transmission range switch input voltage ≥ 3.4 V.	True

Time Needed for Diagnosis: 3 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

G: DTC P0711 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Excessive shift shock
- Shift characteristics malfunction

NOTE:
For the diagnostic procedure, perform the diagnosis according to DTC P0712 and P0713. <Ref. to CVT(w/o HEV)(diag)-51, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> <Ref. to CVT(w/o HEV)(diag)-53, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Judge the malfunction of transmission oil temperature sensor characteristics (stuck to low temperature side).
- Judge as NG if the amount of oil temperature change since ignition ON is equal to or below the predetermined value.

Diagnosis 2
- Judge the malfunction of transmission oil temperature sensor characteristics (stuck to high temperature side).
- Judge as malfunction when the difference of engine coolant temperature and CVT oil temperature at starting is a predetermined value or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Engine speed (The timer is held when the following conditions are not satisfied.)	> 600 rpm
Transmission range	Drive
Vehicle speed (calculated from secondary pulley shaft speed)	≥ 21.9 MPH
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Engine coolant temperature at the end of the previous drive cycle – Engine coolant temperature at engine start	≥ 40 degC

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute change of measured Transmission fluid temperature sensor input voltage	≤ 0.049 V
Transmission fluid temperature	< 20 degC
Diagnosis 2	
Transmission fluid temperature – Engine coolant temperature at engine start	> 46 degC

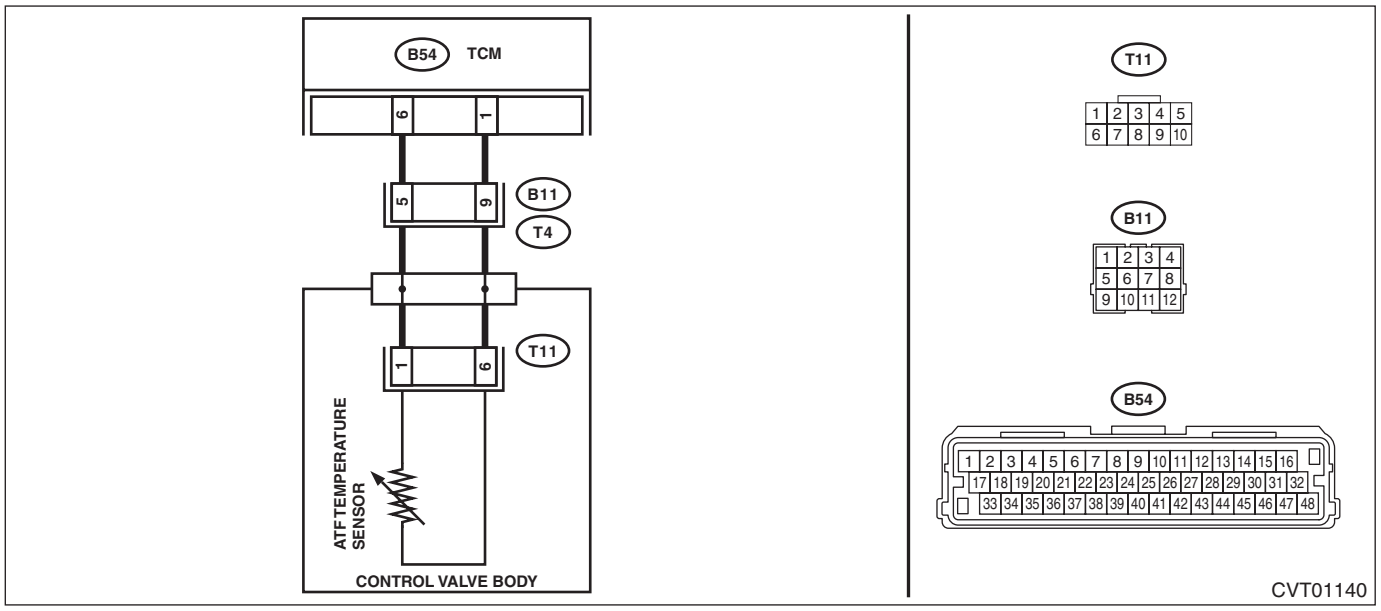
Time Needed for Diagnosis:
- **Diagnosis 1:** 600 s
- **Diagnosis 2:** 300 s

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

H: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Excessive shift shock
- Shift characteristics malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 1 — Chassis ground:*** ***(B54) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the transmission connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 5 — Transmission body:*** ***(T4) No. 9 — Transmission body:***	Is the resistance 1 MΩ or more?	Repair the short circuit of body harness.	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T11) No. 1 — No. 6:*** NOTE: Perform the measurements using multiple oil temperatures.	Is resistance as follows? Fluid temperature 0°C → Approx. 6.0 kΩ Fluid temperature 20°C → Approx. 2.5 kΩ Fluid temperature 80°C → Approx. 330 Ω	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>

1. OUTLINE OF DIAGNOSIS

- Detect the ground short circuit of transmission oil temperature sensor.
- Judge as NG if the voltage detected by the transmission oil temperature sensor is lower than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

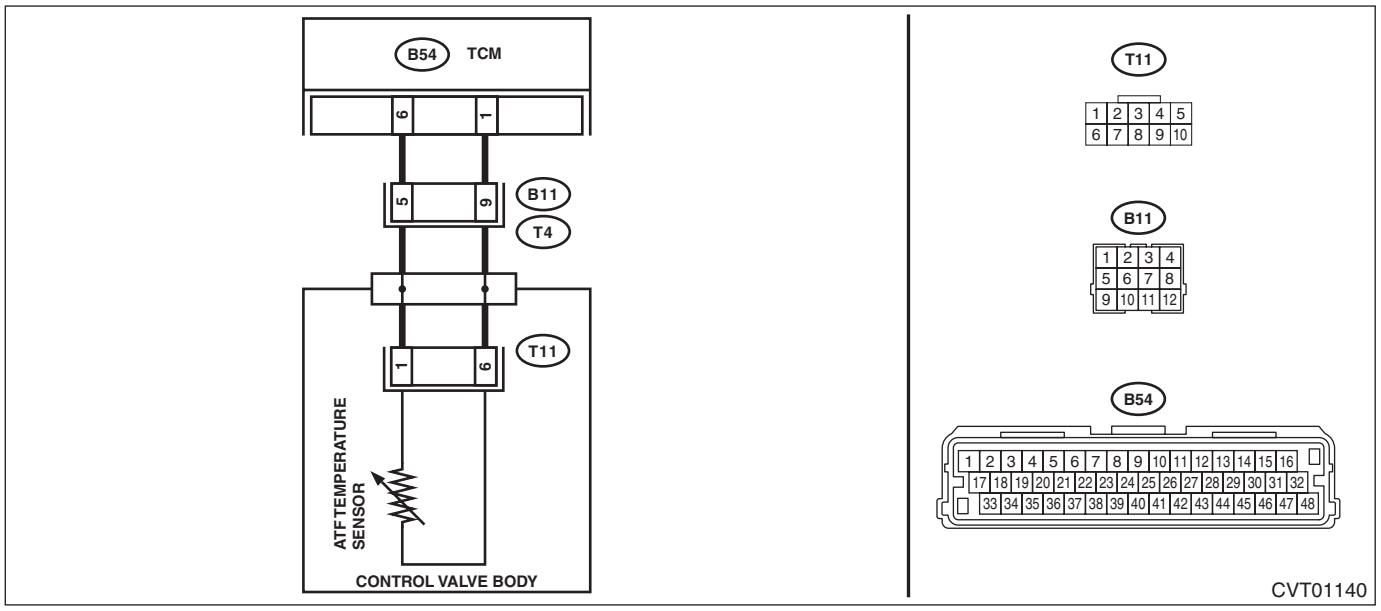
Malfunction Criteria	Threshold Value
Measured Transmission fluid temperature sensor input voltage (Transmission fluid temperature)	< 0.117 V (> 146 degC)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

I: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Excessive shift shock
- Shift characteristics malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 6 (+) — (B54) No. 1 (–):***	Is the voltage 5 V or more?	Repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 6 — (B11) No. 5:*** ***(B54) No. 1 — (B11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Go to step **5**.

	Step	Check	Yes	No
4	**CHECK HARNESS.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 5 — (T11) No. 1:*** ***(T4) No. 9 — (T11) No. 6:***	Is the resistance less than 1 Ω?	Repair the open circuit of transmission harness on the control valve side.	Repair the open circuit of transmission harness on the outside of the transmission.
5	**CHECK ATF TEMPERATURE SENSOR.** 1) Connect the connectors to TCM and transmission. 2) Start the engine. 3) Warm up until the ATF temperature exceeds 50°C (122°F). 4) Turn the ignition switch to OFF. 5) Disconnect the transmission connector. 6) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Is the resistance 650 — 990 Ω?	Go to step **6**.	Go to step **8**.
6	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Does the resistance value increase gradually while the ATF temperature decreases?	Go to step **7**.	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connector to transmission. 2) Turn the ignition switch to ON. (Do not start engine.) 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Check for poor contact of the ATF temperature sensor and transmission connector harness, and repair the defective part.	Go to step **8**.
8	**CHECK FOR POOR CONTACT.**	Is there poor contact of ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the transmission oil temperature sensor 5 V system.
- Judge as NG if the voltage detected by the transmission oil temperature sensor is higher than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Vehicle speed (calculated from secondary pulley speed)	≥ 6.3 MPH
Above condition satisfied for	≥ 50 s

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Transmission fluid temperature sensor input voltage	> 4.507 V
(Transmission fluid temperature)	(< – 52 degC)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

J: DTC P0716 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT RANGE/ PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- No lock-up occurs.
- Shock occurs when selecting shift position.
- Shift control malfunction

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0716, is DTC U0122 or U0416 displayed?	Perform the diagnosis according to DTCs other than P0716.	Perform the diagnosis according to DTC P0717. <Ref. to CVT(w/o HEV)(diag)-57, DTC P0717 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of turbine speed sensor signal characteristics.
- Judge as NG if the turbine speed against the engine speed is outside the possible range considering the hardware capabilities.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured turbine shaft speed	< Table 1 rpm

Table 1

Engine speed (rpm)	3700	3727	3755	3782	3856	4019	4213	4456
Measured turbine shaft speed (rpm)	0	500	1000	1500	2000	2500	3000	3500

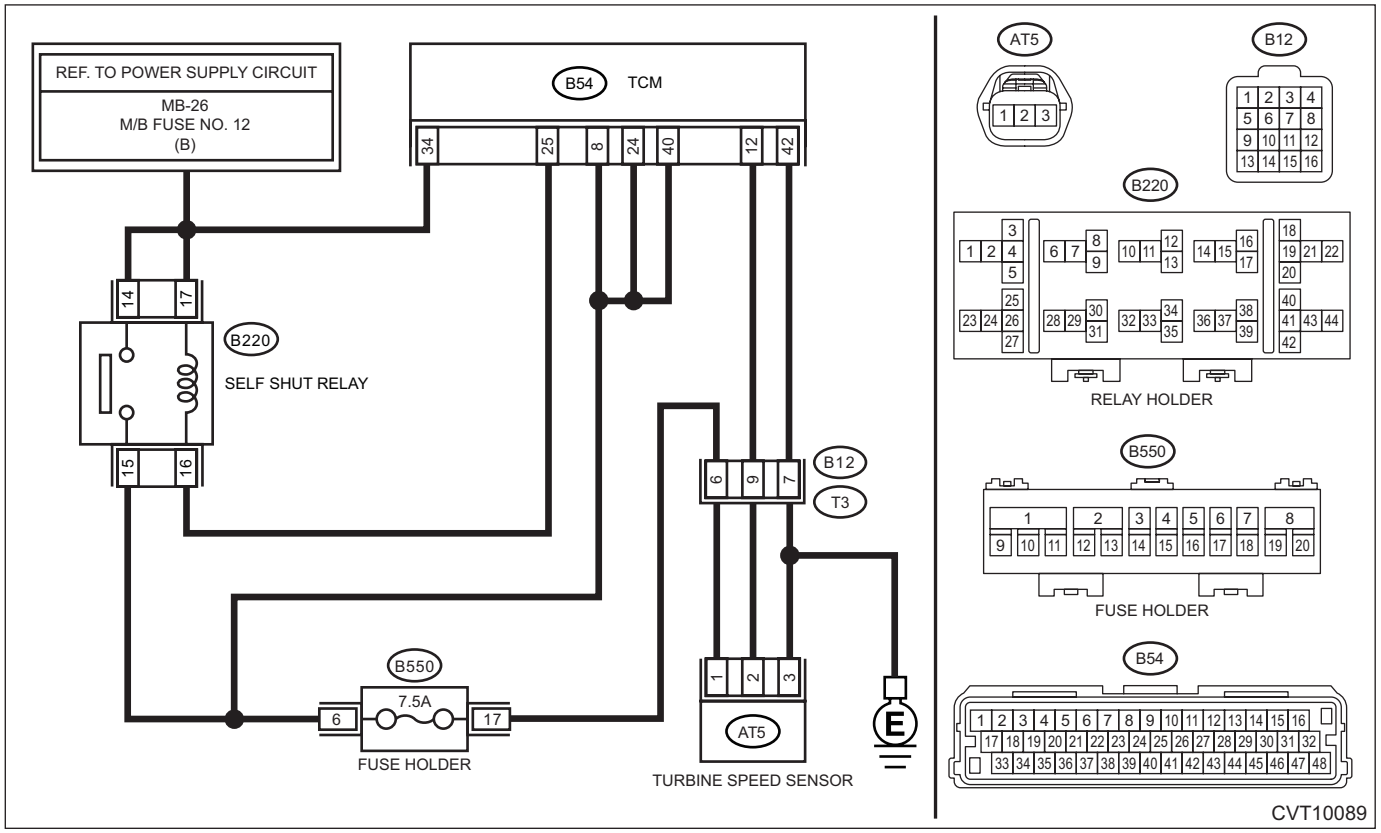
Engine speed (rpm)	4786	5213	5651	6101	6569	7044	7520
Measured turbine shaft speed (rpm)	4000	4500	5000	5500	6000	6500	7000

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

K: DTC P0717 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Standing start problems
- Shock occurs when engaging the lockup clutch.
- Shock occurs when selecting shift position.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse OK?	Go to step **2**.	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B54) No. 25 — (B220) No. 16:*** ***(B54) No. 8 — (B220) No. 15:*** ***(B54) No. 24 — (B220) No. 15:*** ***(B54) No. 40 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:*** ***(B54) No. 8 — Chassis ground:*** ***(B54) No. 24 — Chassis ground:*** ***(B54) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 12 — (B12) No. 9:*** ***(B54) No. 42 — (B12) No. 7:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the open circuit of harness.
9	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **10**.	Repair the short circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness.
11	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector terminals. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **12**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to OFF. 2) Connect the transmission connector. 3) Lift up the vehicle. 4) Start the engine. 5) Read the data of «Turbine Revolution Speed» using the Subaru Select Monitor.	Does the value of «Turbine Revolution Speed» change according to the engine speed?	Current condition is normal. Repair the poor contacts of harnesses of turbine speed sensor and transmission connector.	Go to step **13**.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Disconnect the turbine speed sensor connector. 4) Measure the resistance between transmission connector and turbine speed sensor connector. ***Connector & terminal*** ***(T3) No. 6 — (AT5) No. 1:*** ***(T3) No. 7 — (AT5) No. 3:*** ***(T3) No. 9 — (AT5) No. 2:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK TURBINE SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 6 — Chassis ground:*** ***(T3) No. 9 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK TURBINE SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the turbine speed sensor. <Ref. to CVT(TR580)-107, Turbine Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0717 displayed?	Go to step **16**.	The original turbine speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0717 displayed?	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	The original self shut relay is defective.

1. OUTLINE OF DIAGNOSIS

- Detect the no input signal from the turbine speed sensor.
- Judge as NG if there is no input signal from the turbine speed sensor, while the primary speed sensor on the same shaft has the input signal with the forward/reverse clutch engaged.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm
Transmission range	Drive or Reverse
Measured primary pulley shaft speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

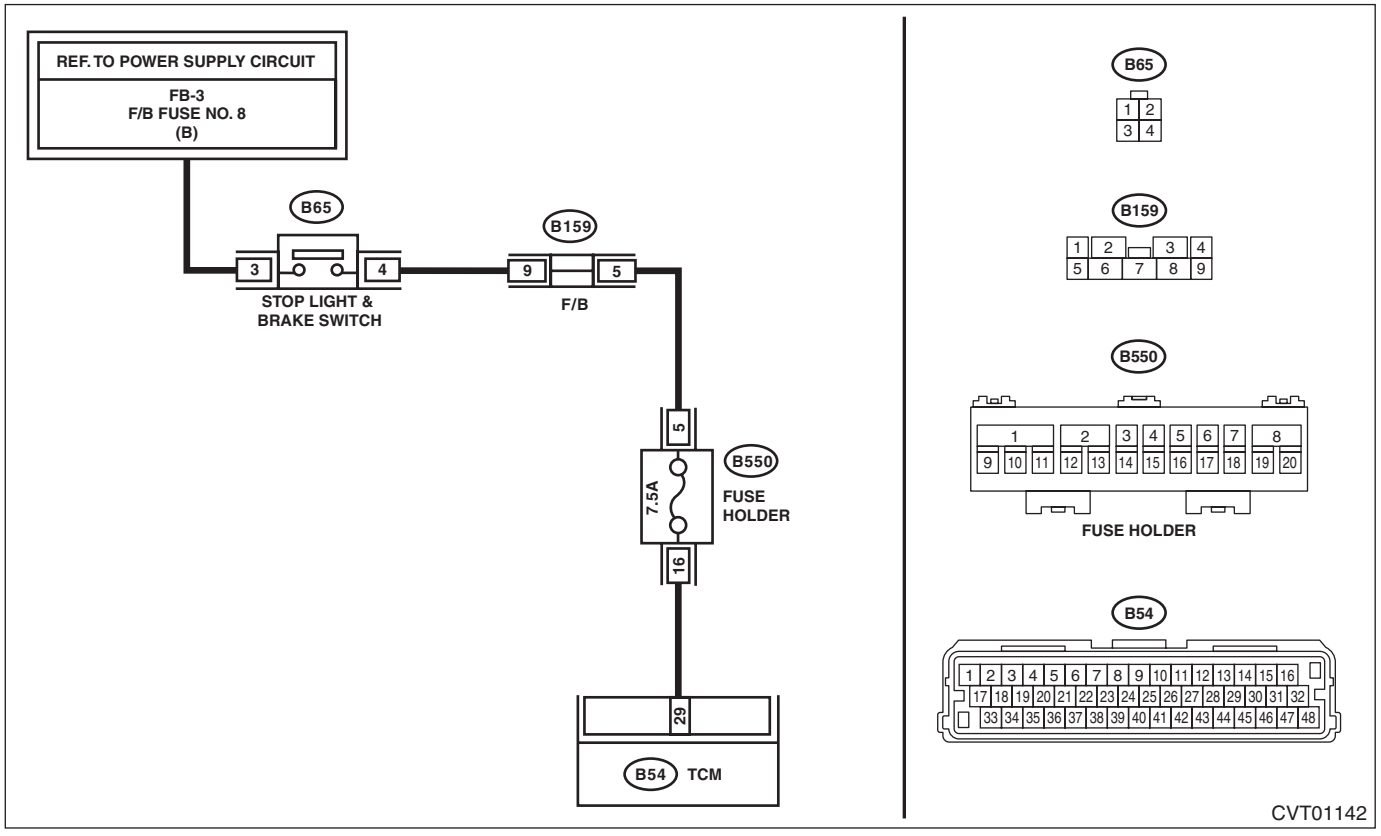
Malfunction Criteria	Threshold Value
Measured turbine shaft speed	0 rpm

Time Needed for Diagnosis: 0.6 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

L: DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW

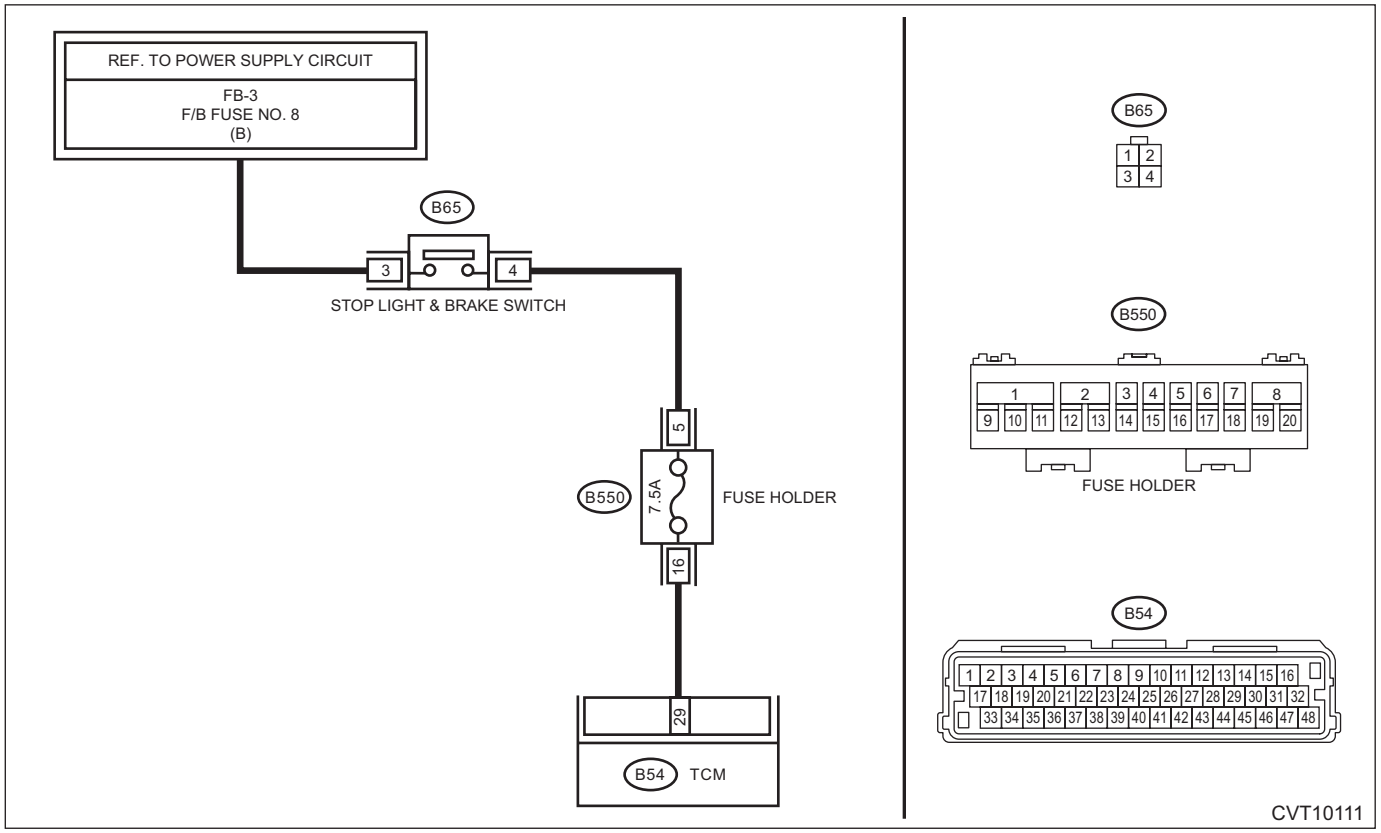
DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not shifted down when climbing a hill or driving down a hill.
WIRING DIAGRAM:
- Without EyeSight

Stop light system <Ref. to WI(w/o HEV)-219, 4 DOOR MODEL (WITHOUT EyeSight), WIRING DIAGRAM, Stop Light System.> <Ref. to WI(w/o HEV)-222, 5 DOOR MODEL (WITHOUT EyeSight), WIRING DIAGRAM, Stop Light System.>



• With EyeSight

Stop light system <Ref. to WI(w/o HEV)-220, 4 DOOR MODEL (WITH EyeSight), WIRING DIAGRAM, Stop Light System.> <Ref. to WI(w/o HEV)-223, 5 DOOR MODEL (WITH EyeSight), WIRING DIAGRAM, Stop Light System.>



	Step	Check	Yes	No
1	**CHECK FUSE (NO. 8).** 1) Turn the ignition switch to OFF. 2) Remove the fuse (No. 8).	Is the fuse (No. 8) blown out?	Replace the fuse (No. 8). If the new fuse (No. 8) has blown out easily, repair the short circuit of harness between fuse (No. 8) and stop light switch.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and stop light switch connector. 3) Measure the resistance between TCM connector and stop light switch connector. ***Connector & terminal*** ***(B54) No. 29 — (B65) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** Measure the resistance between the stop light switch connector and fuse (No. 8). ***Connector & terminal*** ***(B65) No. 3 — fuse (No. 8):***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Install the fuse (No. 8). 2) Connect the TCM and stop light switch connector. 3) Depress the brake pedal. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 29 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Replace the stop light switch. <Ref. to BR-75, Stop Light Switch.>
5	**CHECK INPUT SIGNAL FOR TCM.** With brake pedal depressed, read the data of «Stop Light Switch» using Subaru Select Monitor.	Is "ON" displayed?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **6**.
6	**CHECK FOR POOR CONTACT.**	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect no input from the brake signal.
- Judge as NG if a predetermined number of deceleration occurs while the cruise control is set to OFF and the brake is OFF.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Cruise control	OFF
Malfunctions listed on the right column are not detected:	P0717

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

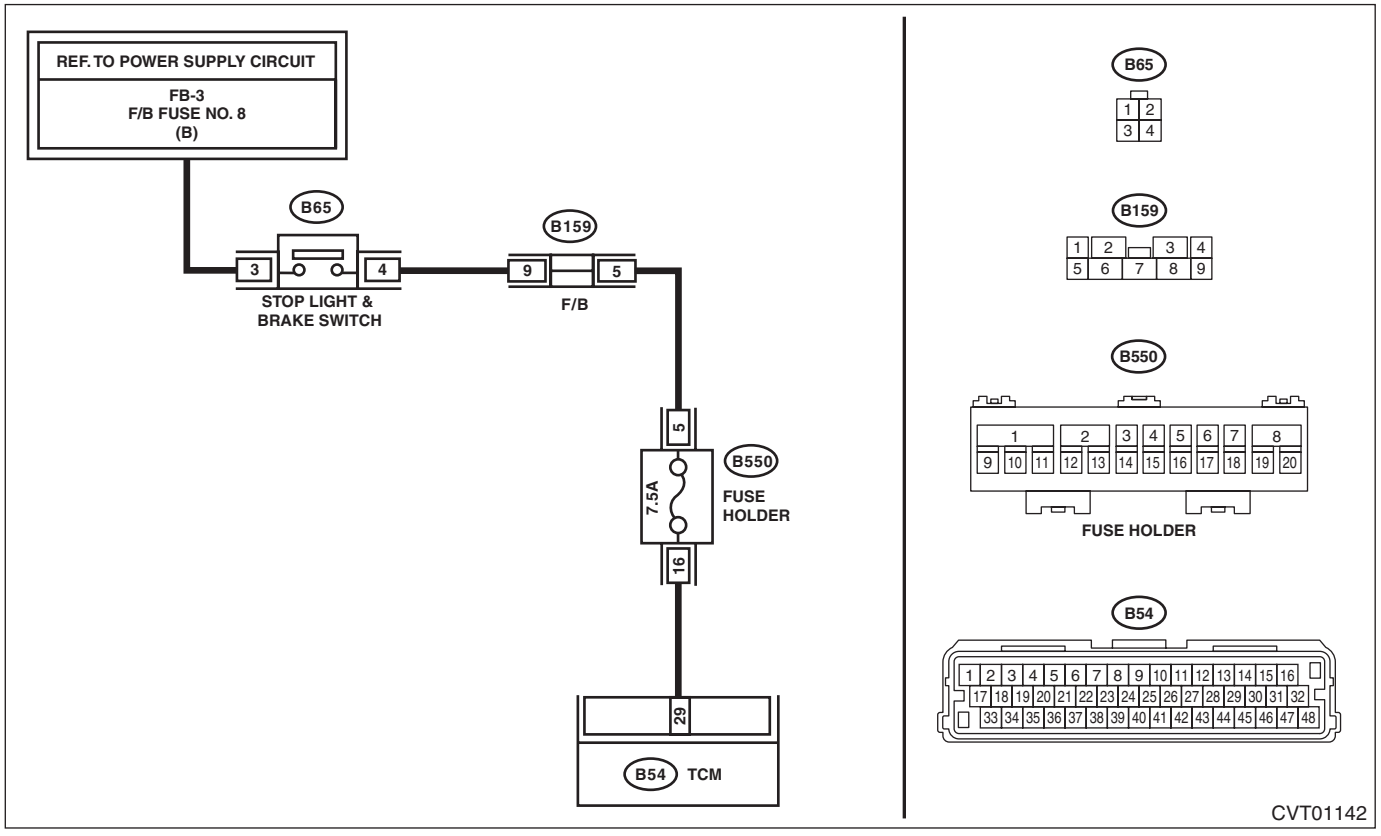
Malfunction Criteria	Threshold Value
Number of times that vehicle speed changes from 30 km/h to 1 km/h while the brake SW is OFF	> 10 count

Malfunction Indicator Light Illumination: Does not illuminate.

M: DTC P0724 BRAKE SWITCH "B" CIRCUIT HIGH

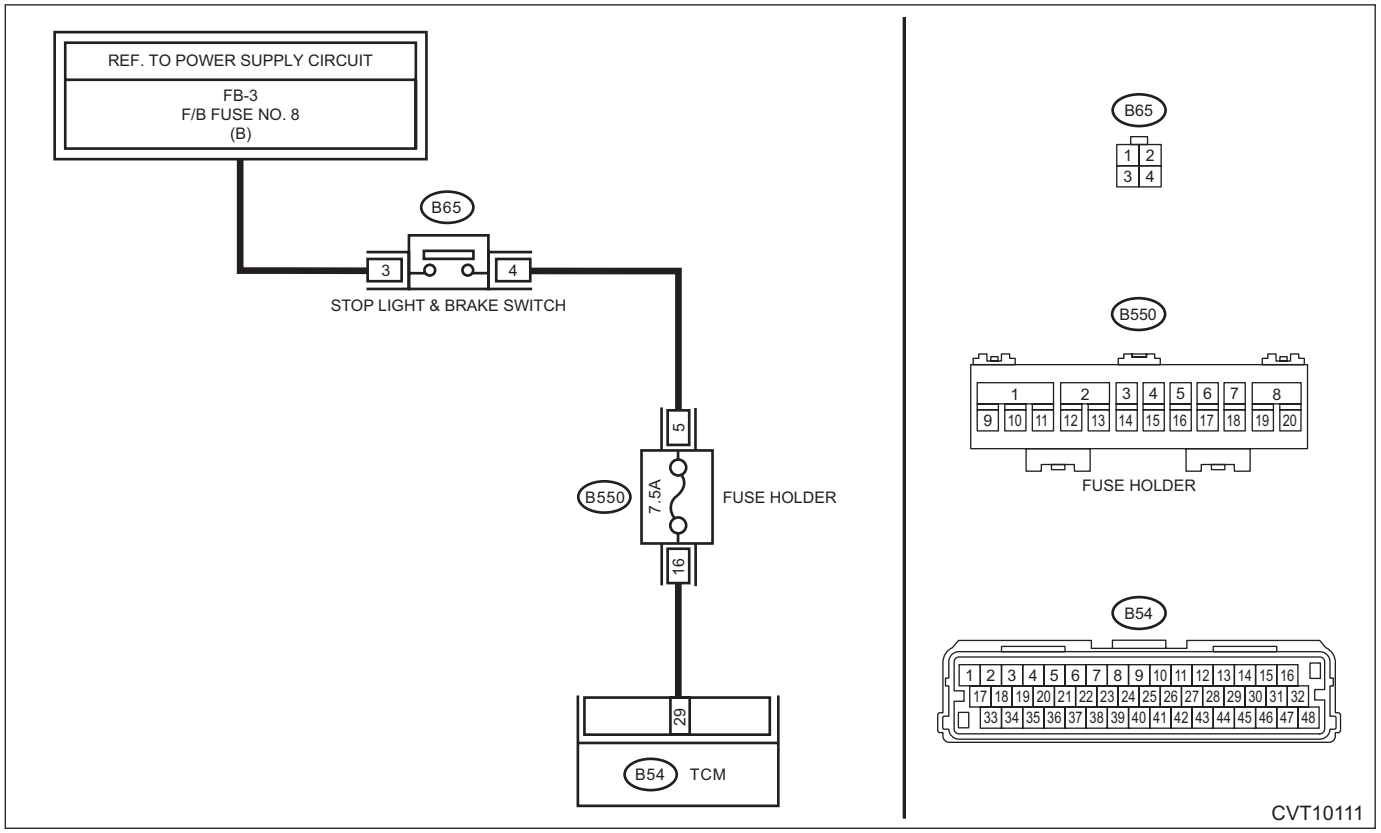
DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not shifted down when climbing a hill or driving down a hill.
WIRING DIAGRAM:
- Without EyeSight

Stop light system <Ref. to WI(w/o HEV)-219, 4 DOOR MODEL (WITHOUT EyeSight), WIRING DIAGRAM, Stop Light System.> <Ref. to WI(w/o HEV)-222, 5 DOOR MODEL (WITHOUT EyeSight), WIRING DIAGRAM, Stop Light System.>



• With EyeSight

Stop light system <Ref. to WI(w/o HEV)-220, 4 DOOR MODEL (WITH EyeSight), WIRING DIAGRAM, Stop Light System.> <Ref. to WI(w/o HEV)-223, 5 DOOR MODEL (WITH EyeSight), WIRING DIAGRAM, Stop Light System.>



	Step	Check	Yes	No
1	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light switch connector. 3) Measure the resistance between stop light switch. ***Terminals*** ***No. 3 — No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Replace the stop light switch. <Ref. to BR-75, Stop Light Switch.>
2	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 29 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit of harness.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the TCM and stop light switch connector. 2) Turn the ignition switch to ON. 3) Read the data of «Stop Light Switch» using Subaru Select Monitor.	Is “OFF” displayed?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **4**.
4	**CHECK FOR POOR CONTACT.**	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the brake signal stuck to ON.
- Judge as NG if a predetermined number of acceleration occurs while the cruise control is set to OFF and the brake is ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Cruise control	OFF
Malfunctions listed on the right column are not detected:	P0717

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Number of times that vehicle speed changes from 1 km/h to 30 km/h while the brake SW is ON	> 10 count

Malfunction Indicator Light Illumination: Does not illuminate.

N: DTC P0730 INCORRECT GEAR RATIO

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

	Step	Check	Yes	No
1	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **2**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>
2	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **3**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **4**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(w/o HEV)(diag)-91, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **5**.	Go to step **6**.
5	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **6**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
6	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0730 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

- Detect the abnormality in transmission gear ratio control function.
- Judge as NG if a discrepancy between the transmission target gear ratio (as internal data) and the actual gear ratio becomes the specified value or more. (Compare the value of "Gear Ratio Target × Secondary pulley speed ≈ Target primary speed equivalent value" with the value of primary pulley speed sensor.)

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm
Transmission range	Drive

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

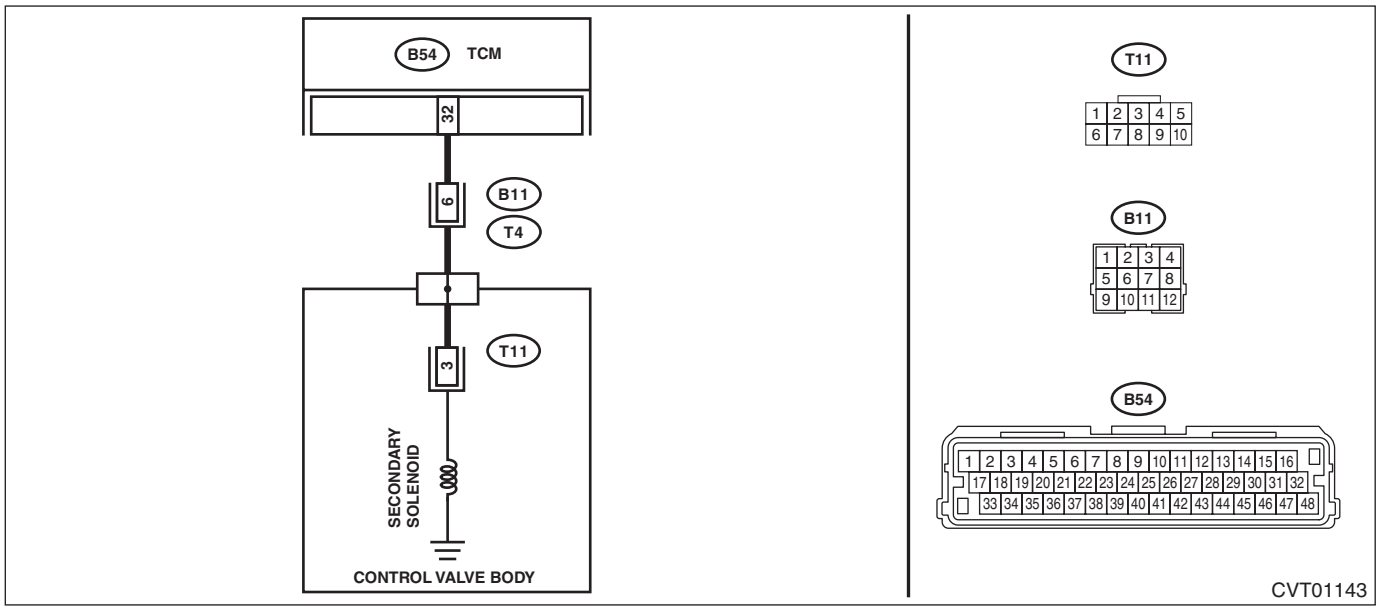
Malfunction Criteria	Threshold Value
|Target primary pulley shaft speed – Measured primary pulley shaft speed|	≥ 600 rpm
(Commanded duty of shift up pressure control solenoid valve	≥ 90%
or	
Commanded duty of shift down pressure control solenoid valve)	≥ 90%

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

O: DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Shift control malfunction
- CVT chain slippage

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0746, is any of the DTCs P0842, P0843, P0962 and P0963 displayed?	Perform the diagnosis according to DTCs other than P0746.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the secondary solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 500 mA appear repeatedly during forced operation, and does operating sound emit during indicating 500 mA?	Go to step **5**.	Go to step **3**.
3	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Keep the engine speed at 3,000 rpm. 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» higher than step 7 value? Does the value change according to the engine speed, within the range of 1.5 — 2.5 MPa?	Go to step **9**.	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>
9	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Apply the parking brake. 2) Set the select lever to "D" range. 3) Depress the brake pedal firmly. 4) Slowly open the accelerator fully, and stabilize the engine speed. 5) Read the data of «Actual secondary pressure» using Subaru Select Monitor. **CAUTION:** **Do not perform a stall test for over 5 seconds at a time.**	Is the «Actual secondary pressure» higher than step 8 value? Does the value change according to the engine speed, within the range of 4.5 — 6.0 MPa?	Go to step **10**.	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0746 displayed?	Perform the secondary pressure test. <Ref. to CVT(TR580)-52, Secondary Pressure (Line Pressure) Test.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of transmission line pressure solenoid and hydraulic circuit (stuck to low pressure side).
• Judge as NG if “Target line pressure – Actual line pressure” becomes the predetermined value or more, while the actual line pressure is equal to or more than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Measured line pressure control solenoid valve current	≤ 0.78 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	< Map1 kPa

Map 1

		Engine speed (rpm)						
		0	500	1000	1500	2000	2500	3000
Transmission fluid temperature (degC)	– 40	0	0	340	404	478	558	643
	– 20	0	0	340	404	478	558	643
	0	0	0	324	382	454	532	616
	20	0	0	366	425	490	565	649
	40	0	0	345	400	466	536	613
	60	0	0	341	389	447	512	591
	80	0	0	319	371	429	488	571
	100	0	0	298	356	412	476	551
	120	0	0	271	329	384	451	519
	140	0	0	243	302	357	425	487

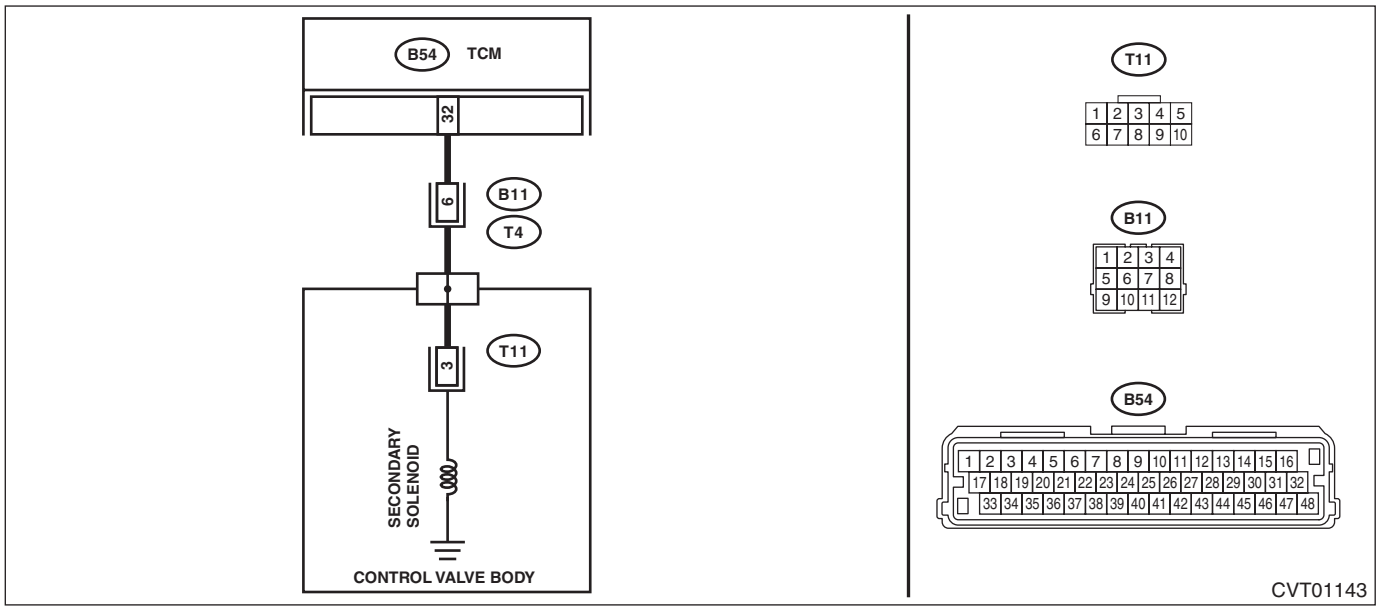
		Engine speed (rpm)						
		3500	4000	4500	5000	5500	6000	6500
Transmission fluid temperature (degC)	– 40	751	883	1042	1167	1264	1292	1274
	– 20	751	883	1042	1167	1264	1342	1424
	0	722	840	991	1135	1240	1319	1395
	20	751	861	1000	1160	1258	1350	1417
	40	708	817	943	1103	1223	1312	1385
	60	677	779	906	1064	1187	1266	1339
	80	652	748	874	1000	1135	1223	1299
	100	629	719	831	947	1069	1181	1251
	120	593	678	780	880	990	1109	1171
	140	557	637	728	813	911	1037	1090

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

P: DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0747, is any of the DTCs P0842, P0843, P0962 and P0963 displayed?	Perform the diagnosis according to DTCs other than P0747.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the secondary solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 500 mA appear repeatedly during forced operation, and does operating sound emit during indicating 500 mA?	Go to step **5**.	Go to step **3**.
3	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Keep the engine speed at 3,000 rpm. 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» higher than step 7 value? Does the value change according to the engine speed, within the range of 1.5 — 2.5 MPa?	Go to step **9**.	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>
9	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Apply the parking brake. 2) Set the select lever to "D" range. 3) Depress the brake pedal firmly. 4) Slowly open the accelerator fully, and stabilize the engine speed. 5) Read the data of «Actual secondary pressure» using Subaru Select Monitor. **CAUTION:** **Do not perform a stall test for over 5 seconds at a time.**	Is the «Actual secondary pressure» higher than step 8 value? Does the value change according to the engine speed, within the range of 4.5 — 6.0 MPa?	Go to step **10**.	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0747 displayed?	Perform the secondary pressure test. <Ref. to CVT(TR580)-52, Secondary Pressure (Line Pressure) Test.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of transmission line pressure solenoid and hydraulic circuit (stuck to high pressure side).
• Judge as NG if “Target line pressure – Actual line pressure” becomes the predetermined value or less, while the actual line pressure is equal to or more than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Measured line pressure control solenoid valve current	≥ 0.5 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	> Map1 kPa

Map 1

		Engine speed (rpm)						
		0	500	1000	1500	2000	2500	3000
Transmission fluid temperature (degC)	– 40	25600	25600	6231	6302	6341	6375	6404
	– 20	25600	25600	6231	6302	6341	6375	6404
	0	25600	25600	5977	6055	6102	6138	6120
	20	25600	25600	5624	5708	5764	5801	5836
	40	25600	25600	5547	5659	5726	5769	5804
	60	25600	25600	5420	5420	5540	5600	5643
	80	25600	25600	5351	5351	5487	5568	5609
	100	25600	25600	5422	5422	5422	5514	5553
	120	25600	25600	5266	5266	5266	5375	5444
	140	25600	25600	5236	5236	5236	5236	5335

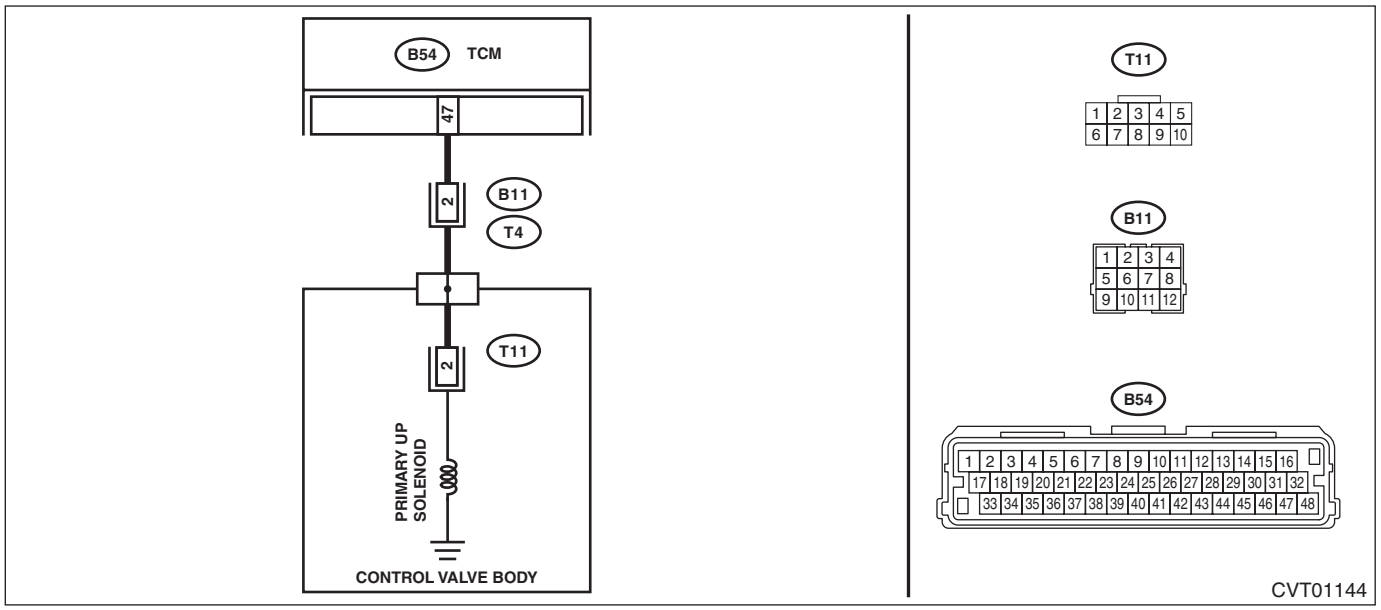
		Engine speed (rpm)						
		3500	4000	4500	5000	5500	6000	6500
Transmission fluid temperature (degC)	– 40	6428	6462	6498	6532	6562	6588	6613
	– 20	6428	6462	6498	6532	6562	6588	6613
	0	6147	6184	6224	6260	6288	6314	6338
	20	5867	5905	5950	5988	6013	6041	6062
	40	5838	5878	5920	5956	5983	6008	6036
	60	5678	5718	5755	5785	5816	5836	5880
	80	5646	5680	5718	5745	5785	5816	5859
	100	5596	5635	5677	5711	5743	5780	5817
	120	5489	5522	5564	5600	5639	5682	5685
	140	5381	5408	5451	5489	5535	5585	5552

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Q: DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Shift control malfunction
- Engine speed increases abruptly.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0751, is any of the DTCs P0973, P0974, P0976, P0977, P2747 and P2751 displayed?	Perform the diagnosis according to DTCs other than P0751.	Go to step **2**.
2	**CHECK PRIMARY UP SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the primary UP solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK PRIMARY UP SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **10**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0751 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-up fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG if the amount of gear rate change per second is equal to or larger than the predetermined value, even though the up-shift command is issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Commanded duty of shift down pressure control solenoid	0%
Actual pulley ratio*	> 1.5 and < 2.549

* Actual pulley ratio: Measured primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

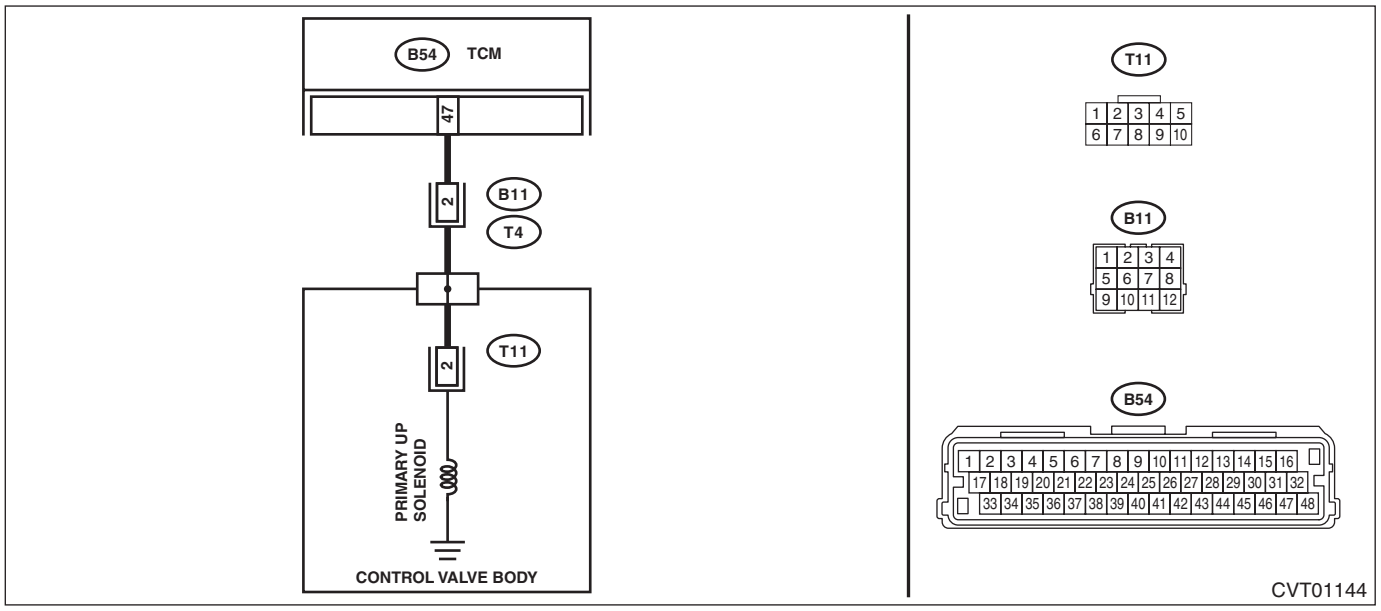
Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.08
Commanded duty of shift up pressure control solenoid	≥ 90%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

R: DTC P0752 SHIFT SOLENOID "A" STUCK ON

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0752, is any of the DTCs P0973, P0974, P0976, P0977, P2747 and P2751 displayed?	Perform the diagnosis according to DTCs other than P0752.	Go to step **2**.
2	**CHECK PRIMARY UP SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the primary UP solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK PRIMARY UP SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **10**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0752 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-up fluid pressure control solenoid and hydraulic circuit characteristics (stuck to high pressure side).
• Judge as NG if the amount of gear rate change per second is within the predetermined value, even though the down-shift command is issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Commanded duty of shift up pressure control solenoid	0%
Actual pulley ratio*	< 0.5

* Actual pulley ratio: Measured primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

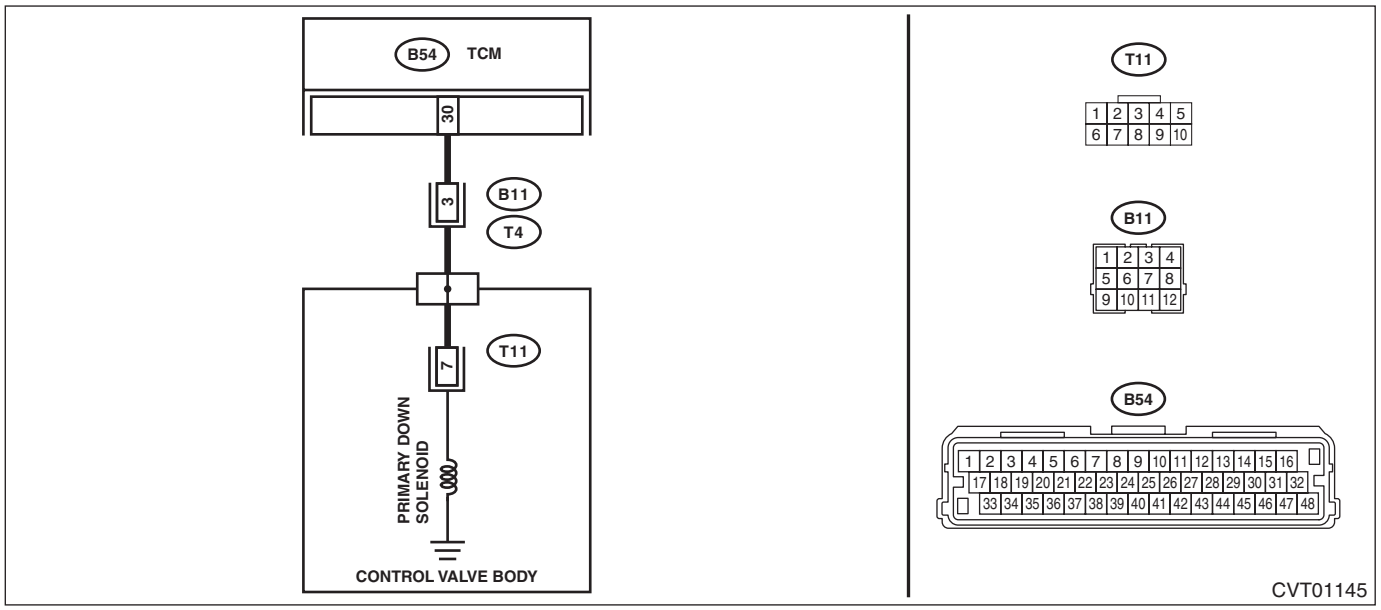
Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.08 and < 0.08
Commanded duty of shift down pressure control solenoid	> 80%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

S: DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0756, is any of the DTCs P0973, P0974, P0976, P0977, P2747 and P2751 displayed?	Perform the diagnosis according to DTCs other than P0756.	Go to step **2**.
2	**CHECK PRIMARY DOWN SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the primary DOWN solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK PRIMARY DOWN SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **10**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0756 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-down fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG if the amount of gear rate change per second is within the predetermined value, even though the down-shift command is issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Commanded duty of shift up pressure control solenoid	0%
Actual pulley ratio*	≥ 0.406 and ≤ 2.549

* Actual pulley ratio: Measured primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

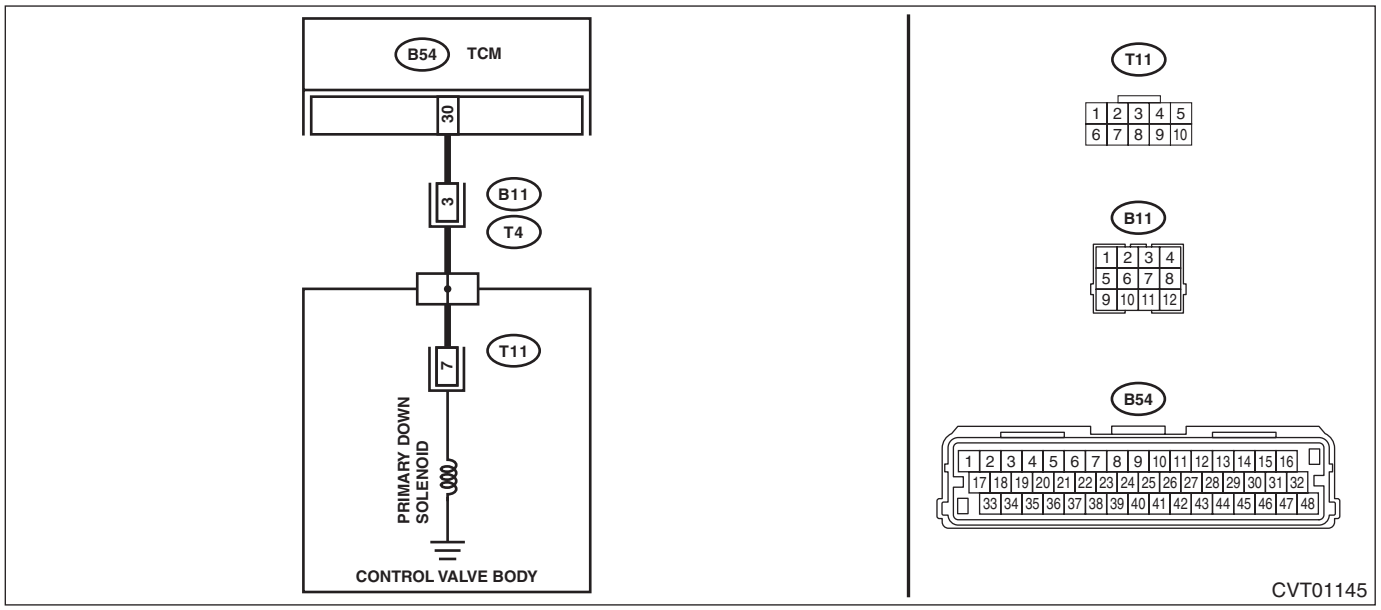
Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.08 and < 0.08
Commanded duty of shift down pressure control solenoid	> 80%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

T: DTC P0757 SHIFT SOLENOID "B" STUCK ON

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Vibration occurs at shift change.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0757, is any of the DTCs P0973, P0974, P0976, P0977, P2747 and P2751 displayed?	Perform the diagnosis according to DTCs other than P0757.	Go to step **2**.
2	**CHECK PRIMARY DOWN SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the primary DOWN solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK PRIMARY DOWN SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **10**.	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0757 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-down fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to high pressure side).
• Judge as NG if the amount of gear rate change per second is equal to or larger than the predetermined value, even though the up-shift command is issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Commanded duty of shift down pressure control solenoid	0%
Actual pulley ratio*	≥ 0.406 and ≤ 2.549

* Actual pulley ratio: Measured primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

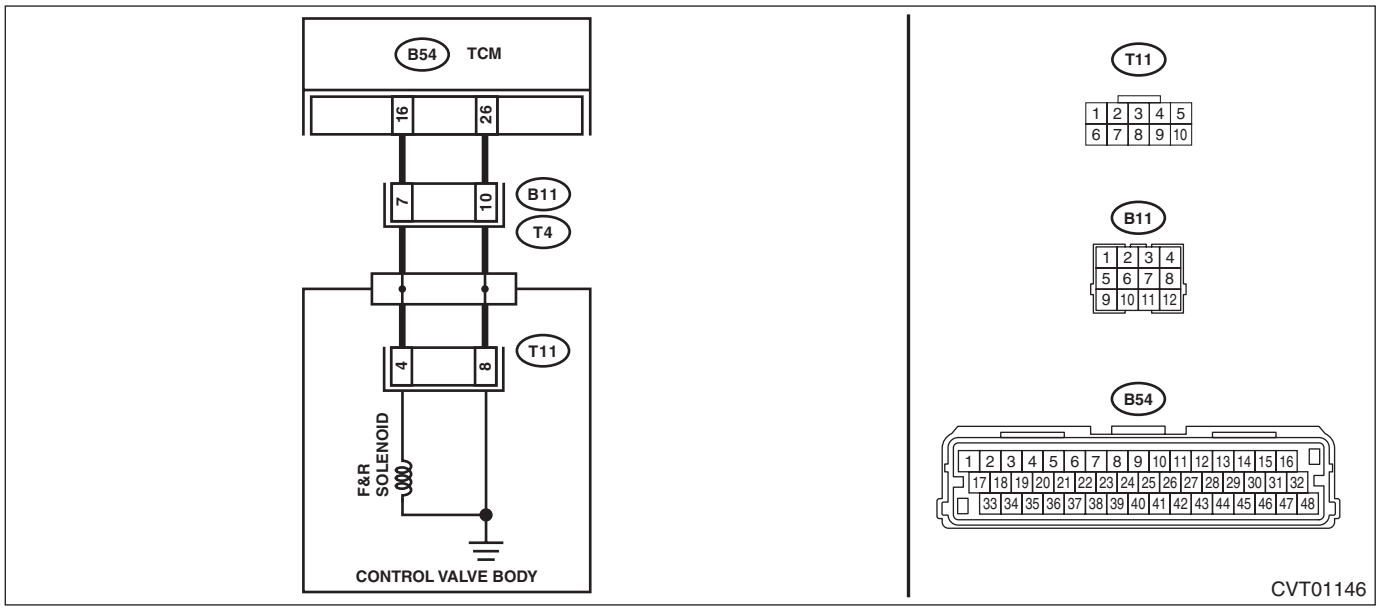
Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> 0.04
Commanded duty of shift up pressure control solenoid	> 50%

Time Needed for Diagnosis: 1 s × 10 times
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

U: DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0776, is any of the DTC P0717, P0966, P0967 or P2747 displayed?	Perform the diagnosis according to DTCs other than P0776.	Go to step **2**.
2	**CHECK F&R SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the F&R solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 500 mA appear repeatedly during forced operation, and does operating sound emit during indicating 500 mA?	Go to step **5**.	Go to step **3**.
3	**CHECK F&R SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to "D" range. 4) Shift the select lever to "P" range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(w/o HEV)(diag)-91, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
8	**STALL TEST.** Perform the stall test. <Ref. to CVT(TR580)-49, Stall Test.>	Is the stall test normal?	Go to step **9**.	Replace the transmission assembly if the stall speed is higher than the standard value of the stall test. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-20, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0776 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of transmission forward/reverse clutch pressure solenoid and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG if the value calculated by "turbine speed – primary pulley speed" becomes the predetermined value or more, even though the forward/reverse clutch is engaged.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Measured turbine shaft speed	≥ 100 rpm
Measured primary pulley shaft speed	≥ 100 rpm
Commanded forward & reverse clutch pressure control solenoid current	< 0.9 A
Engine speed	≥ 500 rpm
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Measured turbine shaft speed	> 2000 rpm
Commanded forward & reverse clutch pressure control solenoid current	< 0.9 A
Accelerator pedal position (from ECM)	> 6%
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
ABS (Measured turbine shaft speed – Measured primary pulley shaft speed)	> Table 1 rpm
Diagnosis 2	
Measured turbine shaft speed	> 2000 rpm

Table 1

Vehicle speed (MPH)	0	13	25	38	50	63	75
ABS (Measured turbine shaft speed – Measured primary pulley shaft speed) (rpm)	150	100	100	100	100	100	100

Vehicle speed (MPH)	88	100	113	125	138	150	159
ABS (Measured turbine shaft speed – Measured primary pulley shaft speed) (rpm)	100	100	100	100	100	100	100

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

V: DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT/OPEN

DTC DETECTING CONDITION:
Immediately at fault recognition

NOTE:
For diagnostic procedures, refer to “BODY CONTROL SYSTEM (DIAGNOSTICS)”. <Ref. to BC(diag)-38, DTC B1016 SHIFT LOCK CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of shift lock solenoid or circuit.
- Judge as NG if abnormal signal from the integrated unit is received, when bus off is not detected and there is no trouble in CAN between the integrated unit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Malfunctions listed on the right column are not detected:	U0073 U0140, U0422

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Shift lock solenoid system circuit abnormal (received from BIU)	ON

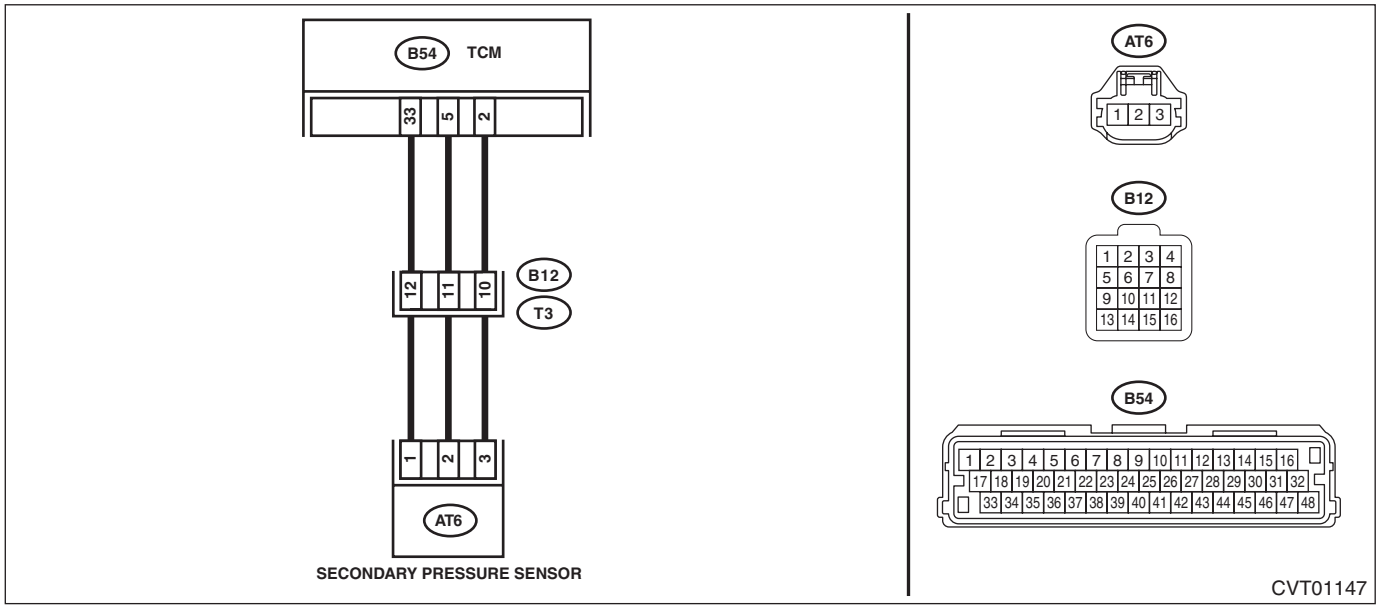
Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Does not illuminate.

W: DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

CAUTION:
- **Before performing diagnosis, record the freeze frame data.**
- **Use the check board when measuring the TCM terminal voltage and resistance.**

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



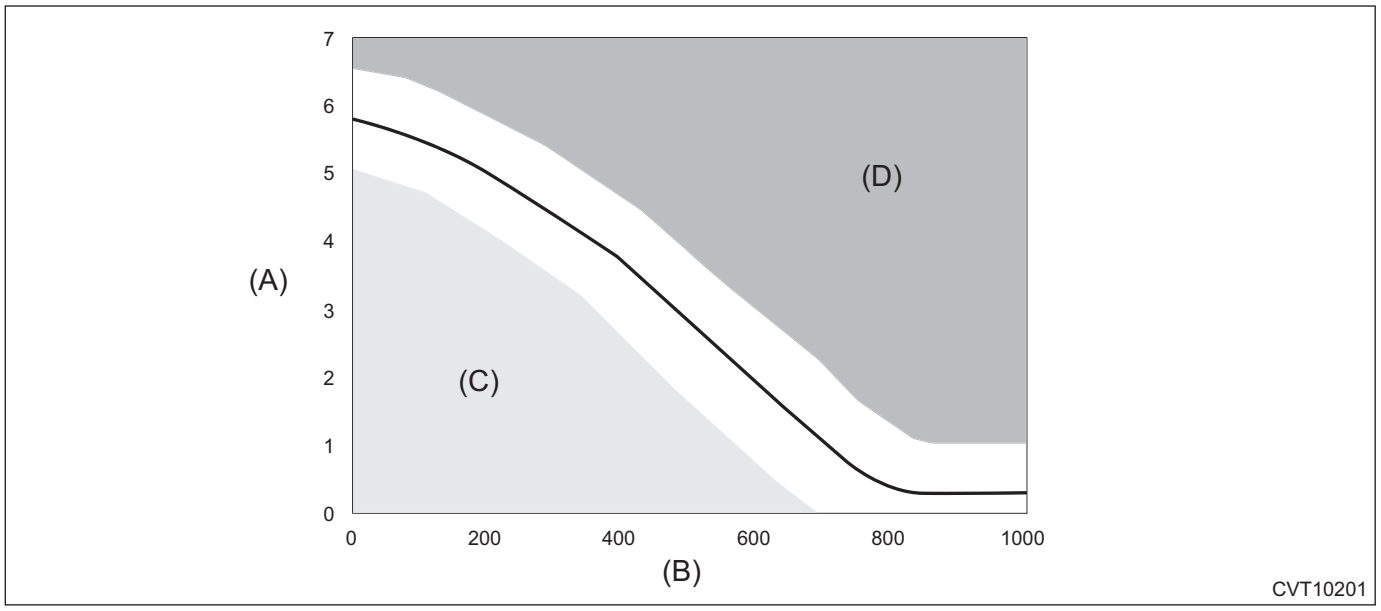
Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Are DTCs other than P0841 displayed?	Perform the diagnosis according to DTC. After the diagnosis, start the engine, and drive for 20 minutes in any driving pattern. (Include driving at a constant legal speed (for 20 seconds) at least once.) Read the DTC, and if P0841 alone is detected, Go to step **2**.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Read the data of «secondary pressure sensor voltage» using Subaru Select Monitor. (While shaking the secondary pressure sensor harness)	Is the value of «secondary pressure sensor voltage» 0.39 — 0.61 V?	Go to step **10**.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of TCM and secondary pressure sensor. 3) Measure the resistance between TCM connector and secondary pressure sensor connector. ***Connector & terminal*** ***(B54) No. 2 — (AT6) No. 3:*** ***(B54) No. 5 — (AT6) No. 2:*** ***(B54) No. 33 — (AT6) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** Measure the resistance between TCM connectors. ***Connector & terminal*** ***(B54) No. 2 — (B54) No. 33:*** ***(B54) No. 5 — (B54) No. 2:*** ***(B54) No. 33 — (B54) No. 5:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit of harness.
5	**CHECK HARNESS.** Measure the resistance between TCM connector and transmission body. ***Connector & terminal*** ***(B54) No. 2 — Transmission body:*** ***(B54) No. 5 — Transmission body:*** ***(B54) No. 33 — Transmission body:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 33 (+) — (B54) No. 2 (–):***	Is the voltage 4.6 — 5.4 V?	Go to step **7**.	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>
7	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Connect the secondary pressure sensor connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 33 (+) — (B54) No. 2 (–):***	Is the voltage 4.6 — 5.4 V?	Go to step **8**.	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-115, Secondary Pressure Sensor.>
8	**CHECK SECONDARY PRESSURE SENSOR OUTPUT.** Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 5 (+) — (B54) No. 2 (–):***	Is the voltage 0.39 — 0.61 V?	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **9**.
9	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of TCM and secondary pressure sensor. 3) Check the TCM connector (B54) and the secondary pressure sensor connector (AT6).	Is there any fault in the TCM connector or the secondary pressure connector?	Repair the connector, or replace harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK TRANSMISSION FLUID.** 1) Connect all connectors. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **11**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.> Go to step **11**.
11	**CHECK INPUT SIGNAL FOR TCM.** 1) Perform the Clear Memory Mode. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal and move the select lever to each range at an interval of five seconds. NOTE: Move the select lever in the following order: “P” → “R” → “N” → “D” → “N” → “R” → “P”. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **12**.	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-115, Secondary Pressure Sensor.>
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift the select lever to “P” range. 2) Keep the engine speed at 3,000 rpm. 3) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 1.5 — 2.5 MPa? And is the difference of the actual oil pressure 0.2 MPa or more compared with the value measured in step 11?	Go to step **13**.	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-115, Secondary Pressure Sensor.>
13	**CHECK FREEZE FRAME DATA.** 1) Turn the ignition switch to OFF. 2) Check the recorded freeze frame data.	Was the detected symptom low-voltage malfunction? <Ref. to CVT(w/o HEV)(diag)-94, CLASSIFICATION OF SYMPTOM USING FREEZE FRAME DATA, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Go to step **14**.
14	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Lift up the vehicle. 2) Start the engine. 3) Apply the parking brake. 4) Set the select lever to “D” range. 5) Depress the brake pedal firmly. 6) Slowly open the accelerator fully, and stabilize the engine speed. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 4.5 — 6.0 MPa?	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Go to step **15**.
15	**CHECK TCM INPUT SIGNAL (STALL TEST).** Check the «Actual Secondary Pressure» in step 14.	Is the «Actual secondary pressure» 4.5 MPa or less?	Replace the transmission assembly. <Ref. to CVT(TR580)-63, Automatic Transmission Assembly.>	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>

1. CLASSIFICATION OF SYMPTOM USING FREEZE FRAME DATA

Apply the values of «Actual Secondary Pressure» and «Secondary Actual Current» recorded in the freeze frame data onto the graph shown in the following figure, and judge if either low-voltage malfunction or high-voltage malfunction occurs.



(A) Actual secondary pressure (MPa)
(B) Secondary actual current (mA)
(C) Low-voltage malfunction
(D) High-voltage malfunction

NOTE:
Symptom that the DTC P0841 illuminates can be classified into 2 patterns.
- Low-voltage malfunction: detected due to insufficient oil pressure
- High-voltage malfunction: detected due to excessive oil pressure

2. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission fluid pressure control function.
- Judge as NG if a discrepancy between the target secondary oil pressure (as internal data) and the detected value of the secondary oil pressure sensor becomes the specified value or more.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ Table 1 rpm

Table 1

Target line pressure (kPa)	0	500	1000	1500	2000	3000	4000	5000	6000
Engine speed (rpm)	400	600	965	1180	1370	1670	1930	2150	2340

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

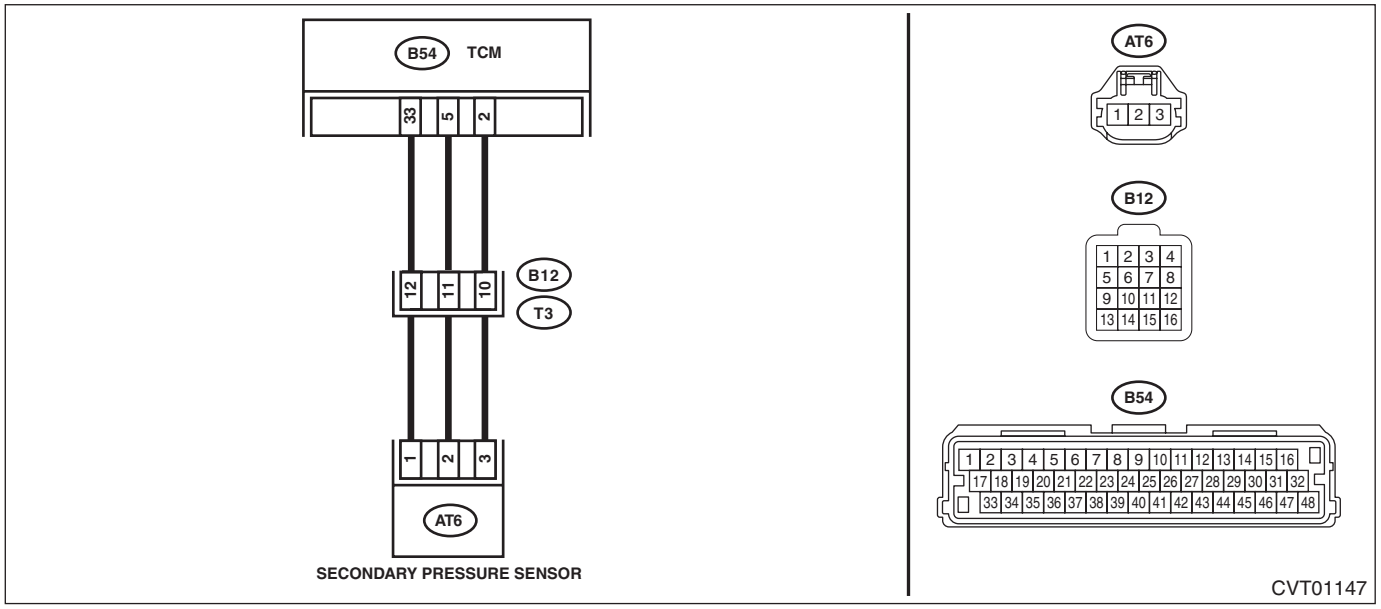
Judgment Value

Malfunction Criteria	Threshold Value
|Target line pressure – Measured line pressure|	≥ 500 kPa

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

X: DTC P0842 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Shift characteristics malfunction
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 2 — (B12) No. 10:*** ***(B54) No. 5 — (B12) No. 11:*** ***(B54) No. 33 — (B12) No. 12:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 33 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK TRANSMISSION HARNESS.** 1) Disconnect the secondary pressure sensor connector. 2) Measure the resistance between transmission connector and secondary pressure sensor connector. ***Connector & terminal*** ***(T3) No. 10 — (AT6) No. 3:*** ***(T3) No. 11 — (AT6) No. 2:*** ***(T3) No. 12 — (AT6) No. 1:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness.
5	**CHECK TRANSMISSION HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 11 — Chassis ground:*** ***(T3) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Connect the connectors of TCM and transmission. 2) Turn the ignition switch to ON. 3) Measure the voltage between secondary pressure sensor connector terminals. ***Connector & terminal*** ***(AT6) No. 1 (+) — (AT6) No. 3 (–):***	Is the voltage 4.5 V or more?	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-115, Secondary Pressure Sensor.> If the replacement of the sensor do not eliminate the malfunction, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the ground short circuit of the transmission line pressure sensor.
- Judge as NG if the voltage detected by the transmission line pressure sensor is lower than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

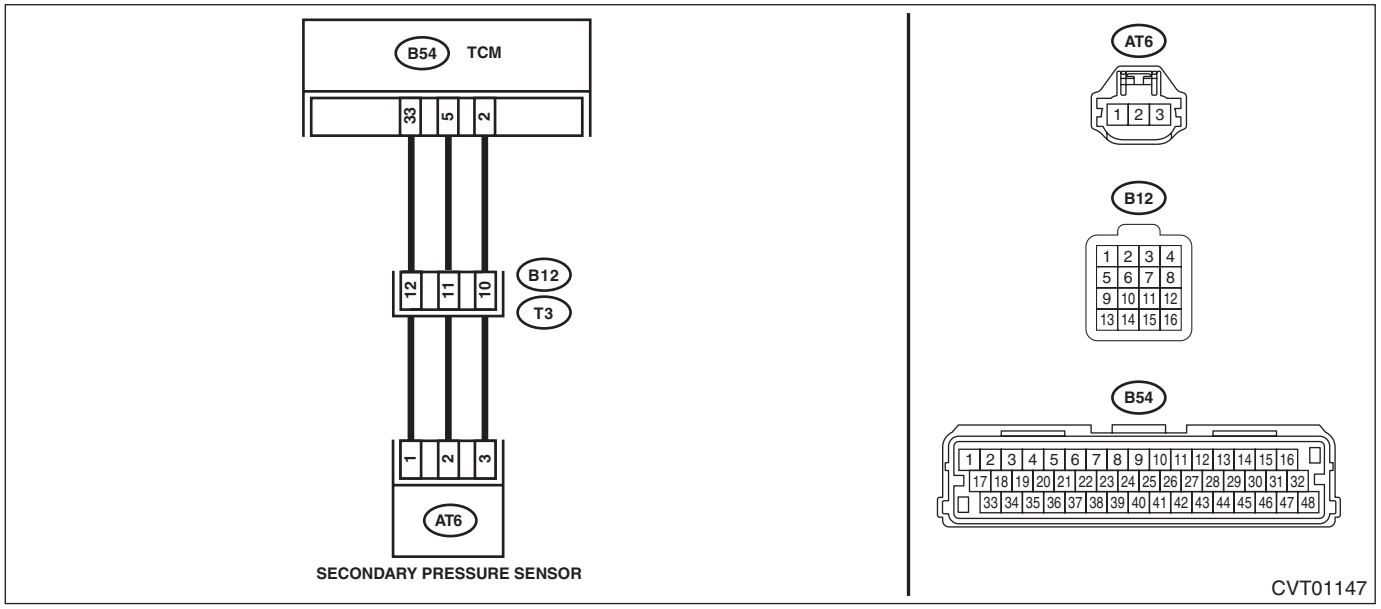
Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure sensor input voltage (Line pressure)	< 0.195 V (< – 574 kPa)

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Y: DTC P0843 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Shift characteristics malfunction
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Turn the ignition switch to ON. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 5 (+) — Chassis ground (–):*** ***(B54) No. 33 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 5 — (B54) No. 33:***	Is the resistance less than 1 Ω?	Repair the short circuit of harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK TRANSMISSION HARNESS.** 1) Disconnect the secondary pressure sensor connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 11 (+) — Chassis ground (–):*** ***(T3) No. 12 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **5**.	Repair the short circuit of harness.
5	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T3) No. 11 — (T3) No. 12:***	Is the resistance less than 1 Ω?	Repair the short circuit of harness.	Go to step **6**.
6	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Connect the connectors of TCM and transmission. 2) Turn the ignition switch to ON. 3) Measure the voltage between secondary pressure sensor connector terminals. ***Connector & terminal*** ***(AT6) No. 1 (+) — (AT6) No. 3 (–):***	Is the voltage 4.5 V or more?	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-115, Secondary Pressure Sensor.> If the replacement of the sensor do not eliminate the malfunction, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the transmission line pressure sensor 5 V system.
- Judge as NG if the voltage detected by the transmission line pressure sensor is higher than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

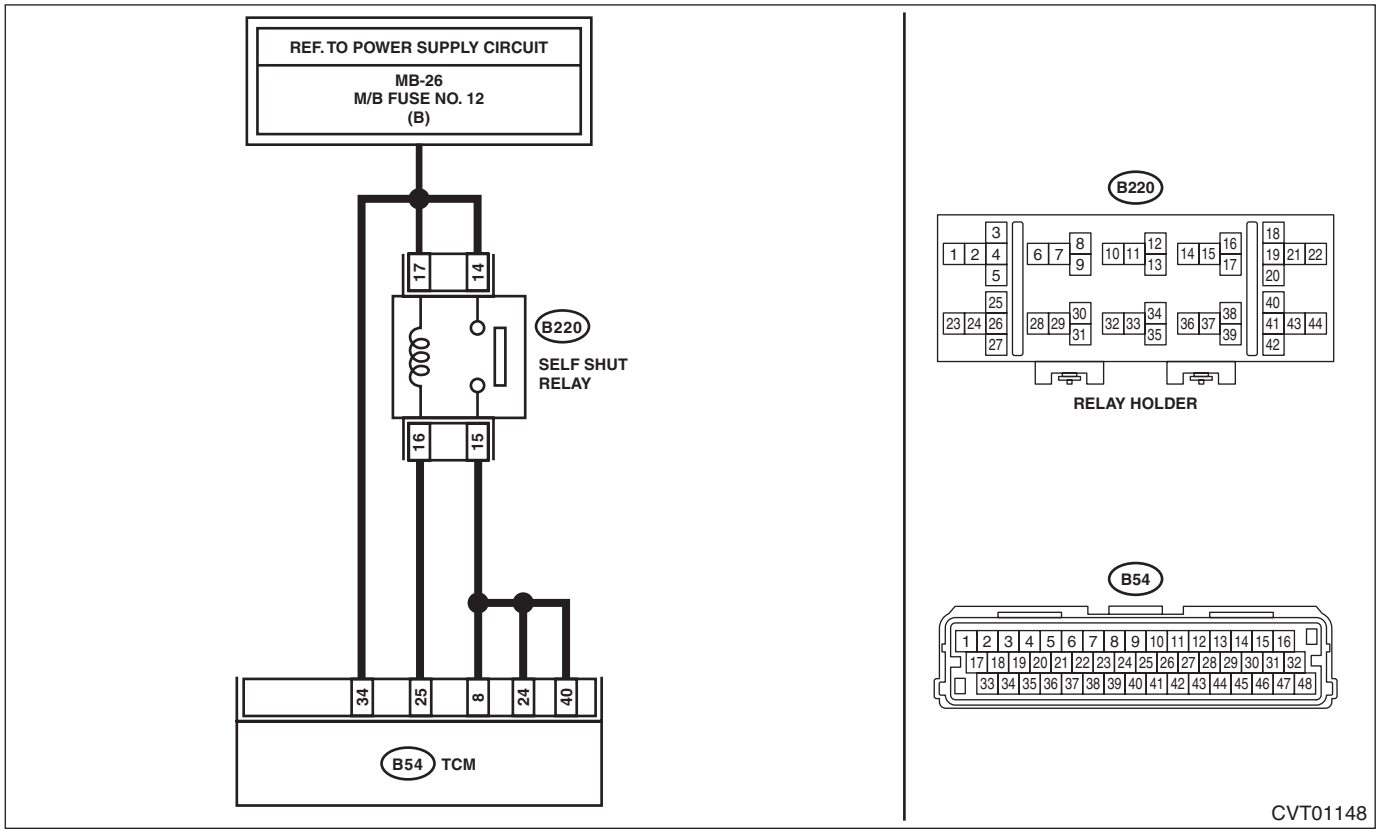
Malfunction Criteria	Threshold Value
Measured line pressure sensor input voltage (Line pressure)	> 4.883 V (> 8200 kPa)

Time Needed for Diagnosis: 1.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Z: DTC P0890 TCM POWER RELAY SENSE CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed.

CAUTION:
After diagnosis, perform Clear Memory Mode for ECM. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B54) No. 25 — (B220) No. 16:*** ***(B54) No. 8 — (B220) No. 15:*** ***(B54) No. 24 — (B220) No. 15:*** ***(B54) No. 40 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:*** ***(B54) No. 8 — Chassis ground:*** ***(B54) No. 24 — Chassis ground:*** ***(B54) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.

	Step	Check	Yes	No
3	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 11 — 13 V or more?	Go to step **4**.	Repair the open or short circuit of harness.
4	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **5**.	Replace the self shut relay.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the self shut relay.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **7**.
7	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0890 displayed?	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	The original self shut relay is defective.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission fluid pressure solenoid drive power supply relay circuit.
- Judge as NG if the transmission fluid pressure solenoid drive power supply voltage is lower than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Ignition state	Run or Crank

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

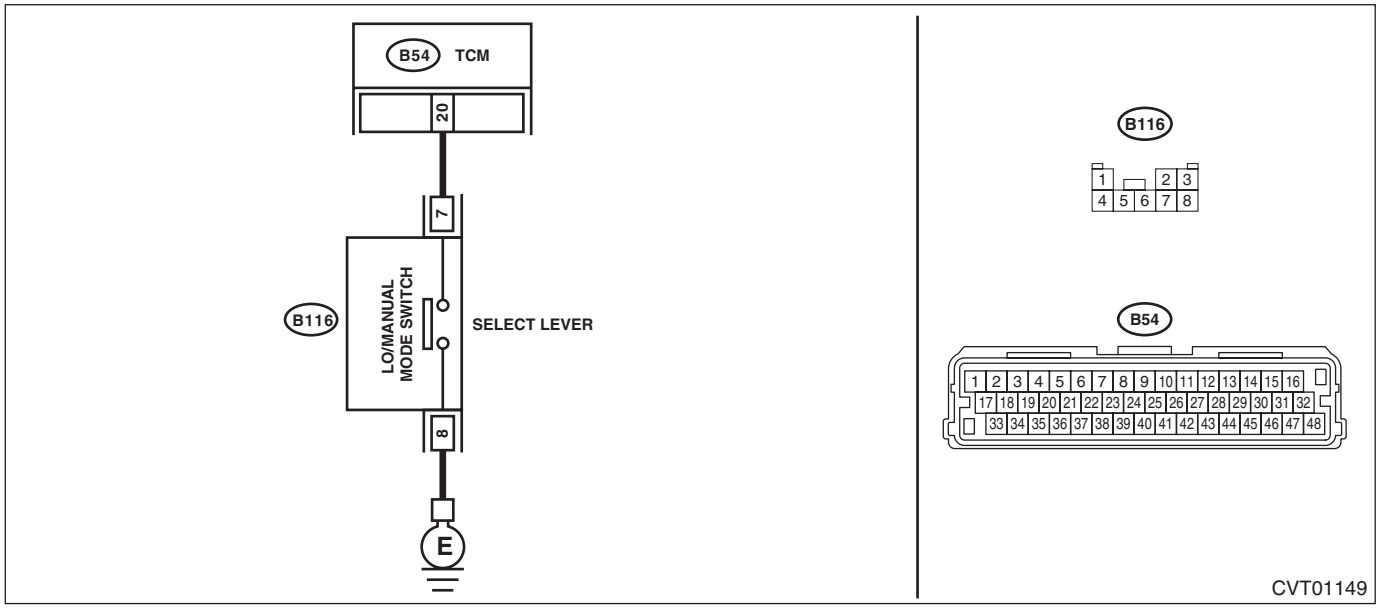
Judgment Value

Malfunction Criteria	Threshold Value
Measured TCM input voltage which is supplied from 12 V battery system through the TCM Power Relay	< 2 V

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AA:DTC P0951 AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Manual mode can not be set.
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the manual mode switch connector. 3) Measure the resistance between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 8 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK MANUAL MODE SWITCH.** Measure the resistance between manual mode switch terminals. ***Terminals*** ***No. 7 — No. 8:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Replace the select lever assembly. <Ref. to CS-25, Select Lever.>
3	**CHECK MANUAL MODE SWITCH.** 1) Shift the select lever to manual mode. 2) Measure the resistance between manual mode switch terminals. ***Terminals*** ***No. 7 — No. 8:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the select lever assembly. <Ref. to CS-25, Select Lever.>
4	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance between TCM connector and manual mode switch connector. ***Connector & terminal*** ***(B54) No. 20 — (B116) No. 7:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness or poor contact of connector.

Step		Check	Yes	No
5	**CHECK HARNESS.** Measure the resistance between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the TCM and manual mode switch connector. 2) Turn the ignition switch to ON. 3) Set the select lever to “D” range. 4) Read the data of «Tiptronic Mode Switch» using Subaru Select Monitor.	Does the value of «Tiptronic Mode Switch» change to “ON” with select lever in manual mode, and “OFF” with select lever in other than manual mode?	Current condition is normal.	Go to step **7**.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact of the manual mode switch circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short (ground-fault) in manual SW circuit.
- Judge as NG if the manual SW is ON in P, R or N range.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Malfunctions listed on the right column are not detected:	P0705, P0708

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

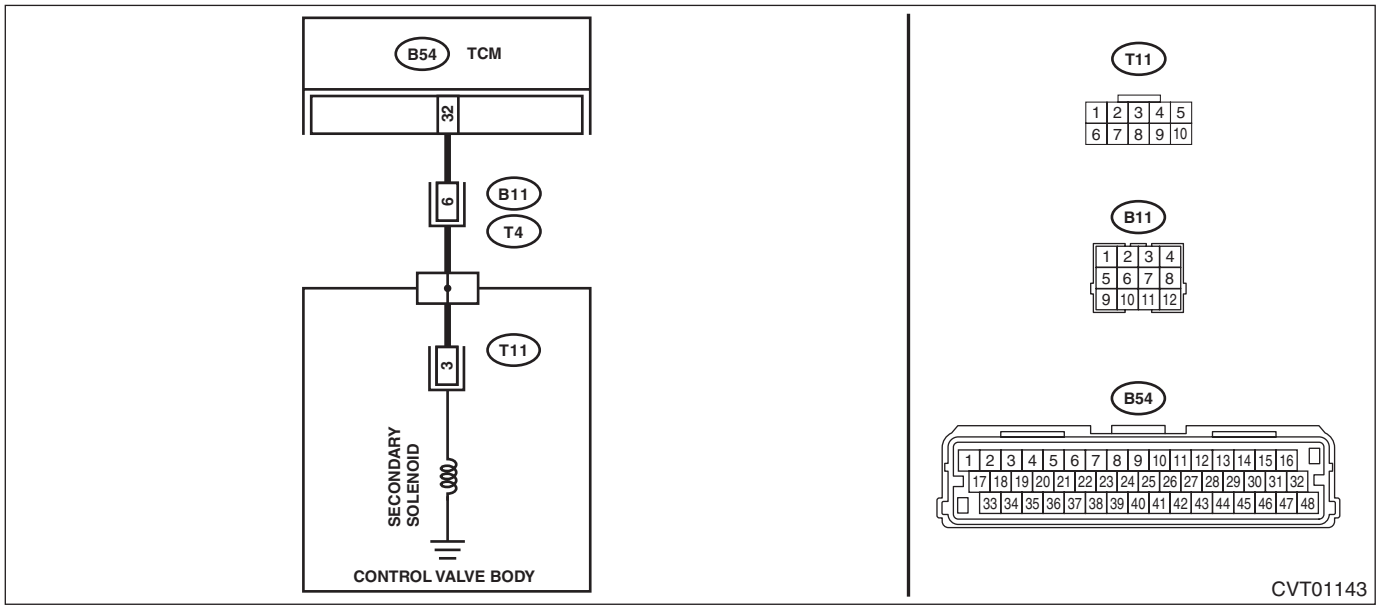
Malfunction Criteria	Threshold Value
Manual SW status in other than D range	ON

Time Needed for Diagnosis: 5 s
Malfunction Indicator Light Illumination: Does not illuminate.

AB:DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0961, is DTC P0962 or P0963 displayed?	Perform the diagnosis according to DTCs other than P0961.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the secondary solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication change as 300 → 500 → 700 mA during forced operation, and does «Sec. Sol. Actual Current» synchronize with «Sec. Sol. Set Current»?	Go to step **3**.	Go to step **4**.
3	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and secondary solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>
4	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Repair or replace the harness.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission line pressure solenoid drive circuit.
- Judge as NG when the deviation between target current and actual current of the transmission line pressure solenoid becomes equal to or larger than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Target line pressure control solenoid valve current – Measured line pressure control solenoid valve current)	> 0.2 A

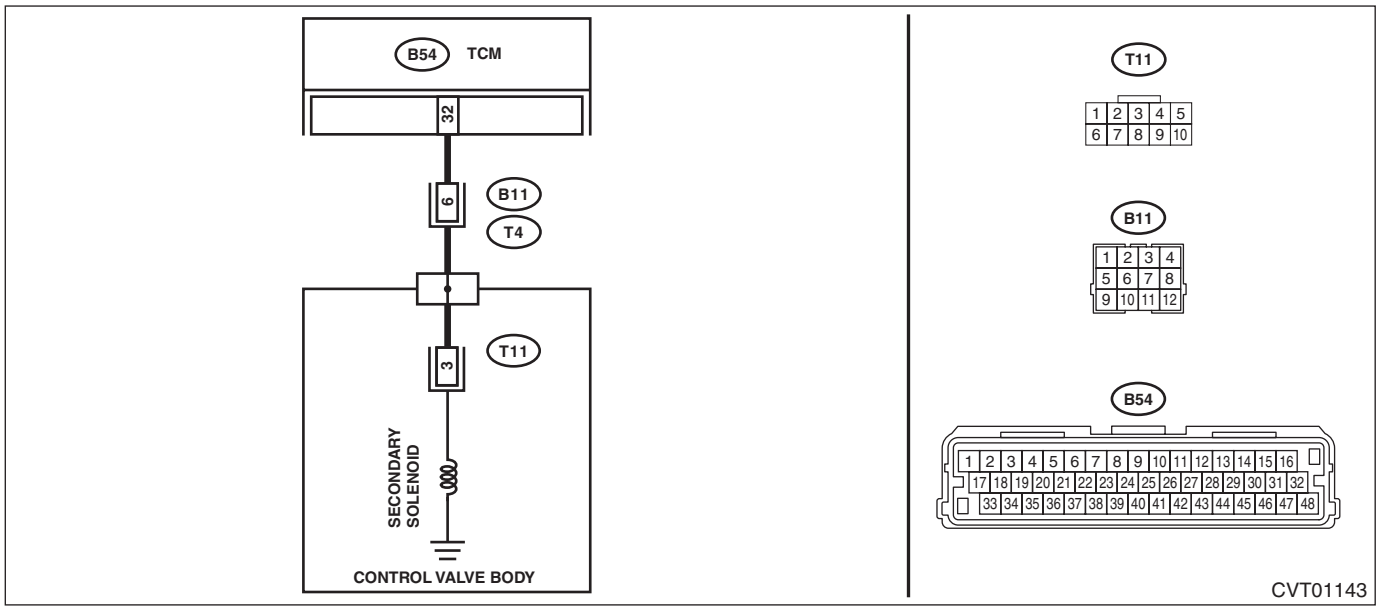
Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AC:DTC P0962 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not start.
- Engine speed increases abruptly during driving.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "N" range. 2) Read the data of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» using Subaru Select Monitor.	Does the value of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 32 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK SECONDARY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the ground short of the transmission line pressure solenoid drive circuit.
- Judge as NG if the transmission line pressure solenoid drive current is higher than the predetermined value.

Diagnosis 2
- Detect the ground short of the transmission line pressure solenoid drive circuit.
- Judge as NG if an overcurrent is detected more than 10 times in the transmission line pressure solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Commanded line pressure control solenoid valve current	≥ 0.1 A
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

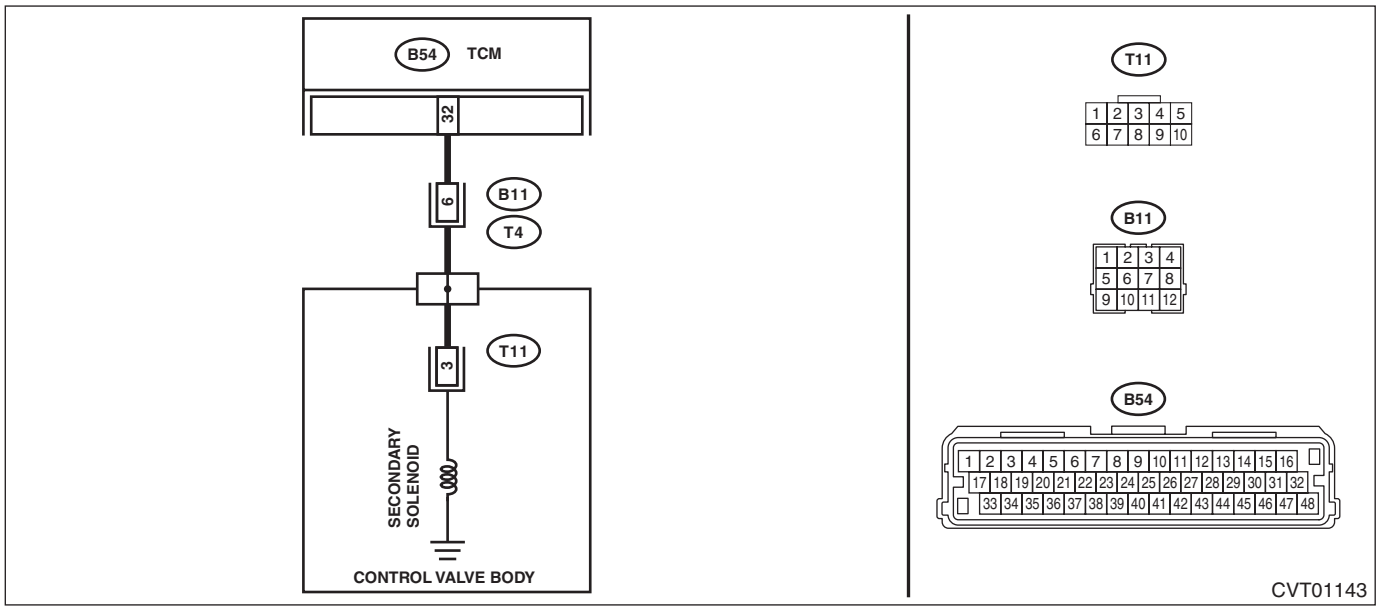
Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured line pressure control solenoid valve current	≥ 1.1 A
Diagnosis 2	
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured line pressure control solenoid valve current ≥ 1.2 A	

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AD:DTC P0963 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not start.
- Engine speed increases abruptly during driving.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "N" range. 2) Read the data of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» using Subaru Select Monitor.	Does the value of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 32 — (B11) No. 6:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 32 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK SECONDARY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **6**.
6	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the transmission line pressure solenoid drive circuit.
- Judge as NG if the transmission line pressure solenoid drive current is lower than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded line pressure control solenoid valve current	≥ 0.2 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

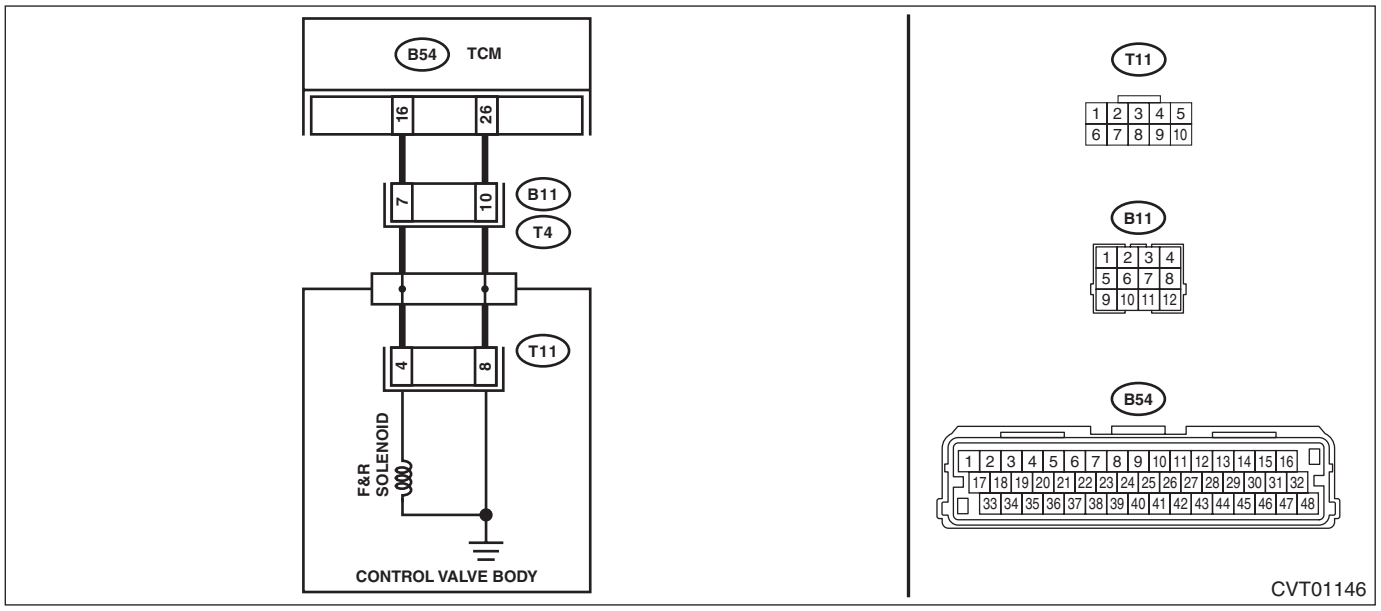
Malfunction Criteria	Threshold Value
Measured line pressure control solenoid valve current	< 0.1 A

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AE:DTC P0965 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0965, is any of the DTC P0717, P0966, P0967 or P2747 displayed?	Perform the diagnosis according to DTCs other than P0965.	Go to step **2**.
2	**CHECK F&R SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the F&R solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication change as 300 → 500 → 700 mA during forced operation, and does «F&R Linear Solenoid Actual Current» synchronize with «F&R Linear Solenoid Set Current»?	Go to step **3**.	Go to step **4**.
3	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and F&R solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>
4	**CHECK F&R SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Repair or replace the harness.

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
• Detect the malfunction of transmission forward/reverse clutch pressure solenoid drive circuit characteristics.
• Judge as NG when the deviation between set current and actual current of the transmission forward/reverse clutch pressure solenoid drive circuit becomes equal to or larger than the predetermined value.
Diagnosis 2
• Detect the malfunction of transmission forward/reverse clutch pressure solenoid drive circuit characteristics.
• Judge as NG when the transmission forward/reverse clutch pressure solenoid drive current is within the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

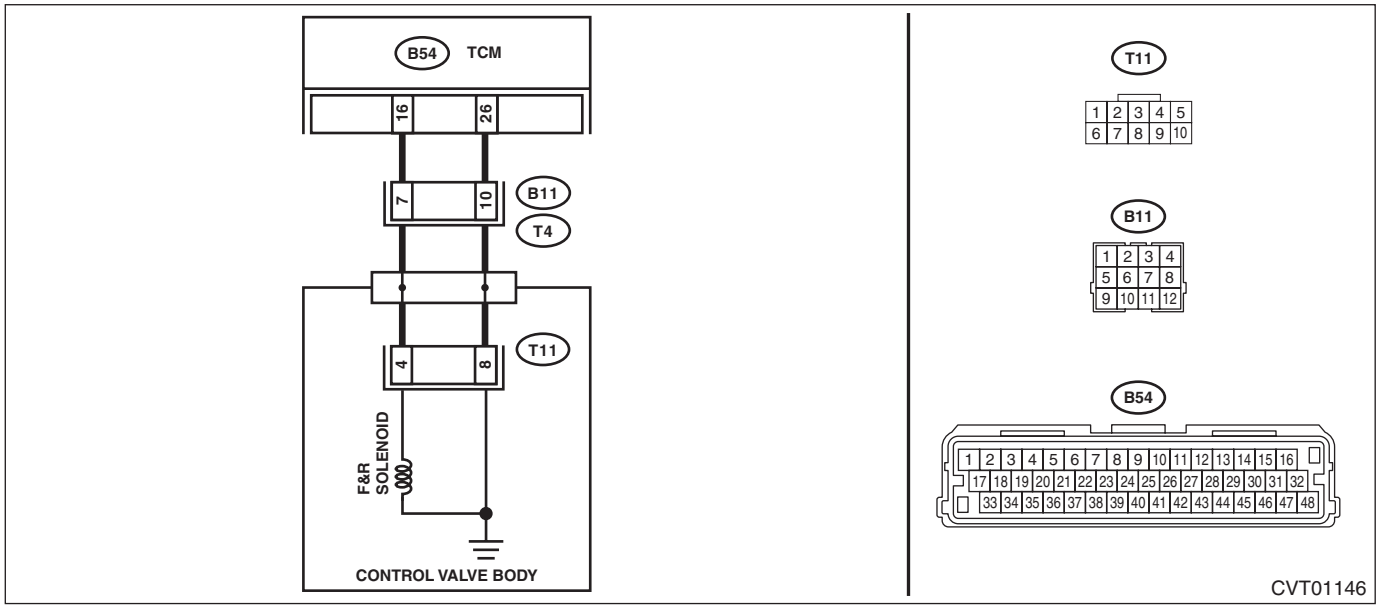
Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
ABS (Target forward & reverse clutch pressure control solenoid current – Measured forward & reverse clutch pressure control solenoid current)	> 0.2 A
Diagnosis 2	
Measured forward & reverse clutch pressure control solenoid current	> 1.08 A and ≤ 1.6 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AF:DTC P0966 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Excessive shift shock
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK F&R SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short in transmission forward/reverse clutch pressure solenoid circuit.
- Judge as NG if an overcurrent is detected more than 10 times in the transmission forward/reverse clutch pressure solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

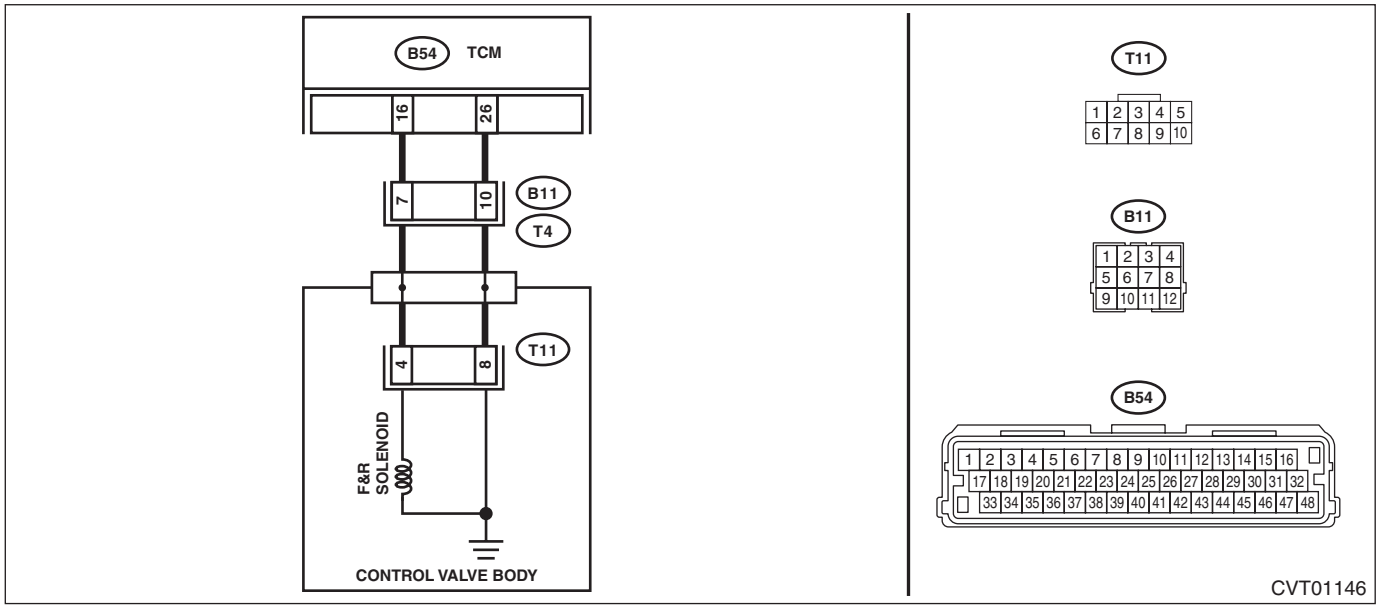
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured forward & reverse clutch pressure control solenoid current > 1.6 A	ON

Time Needed for Diagnosis: 0.02 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AG:DTC P0967 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Engine speed increases abruptly, and can not start.
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 16 — (B11) No. 7:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK F&R SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **6**.
6	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect open circuit or power supply-output short circuit in the transmission forward/reverse clutch pressure solenoid circuit.
• Judge as NG if the transmission forward/reverse clutch pressure solenoid drive current is lower than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Target forward & reverse clutch pressure control solenoid current	≥ 0.3 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

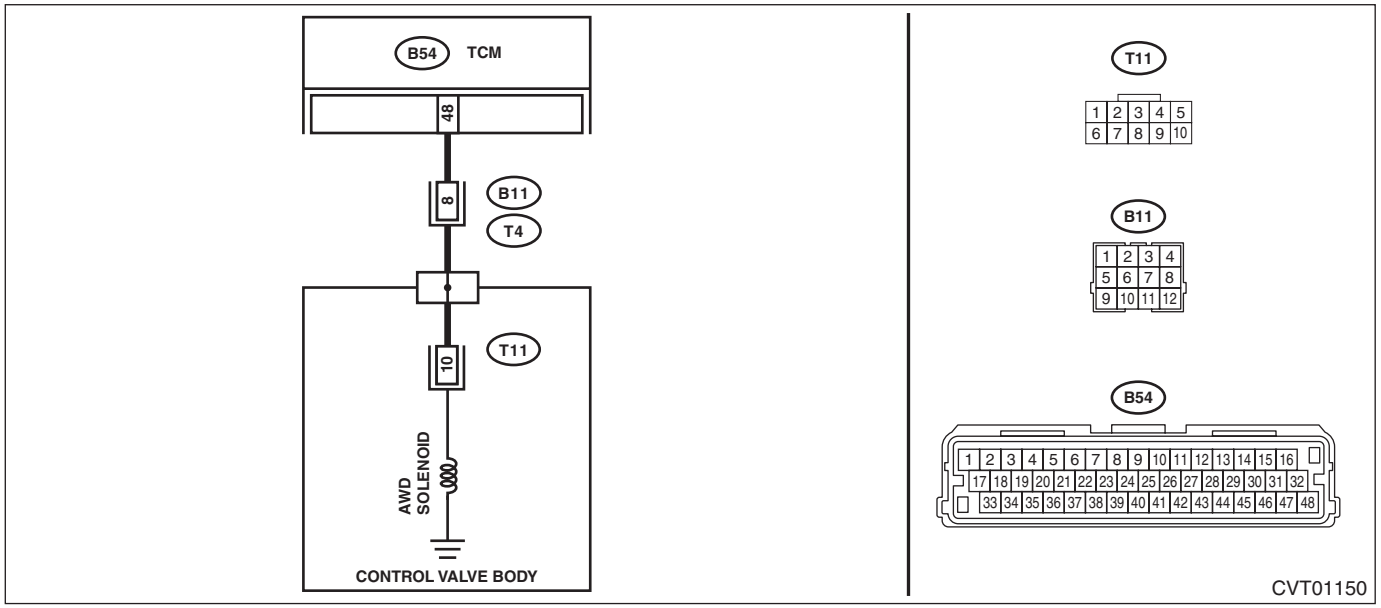
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured forward & reverse clutch pressure control solenoid current < 5.9 mA	ON

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AH:DTC P0970 PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Drivability getting worse.
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 48 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK AWD SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance approx. 2 — 4.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short in transfer solenoid circuit.
- Judge as NG if a ground short circuit is detected more than 10 times via the detection circuit for the transfer solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Target duty cycle	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal from solenoid driver IC	≥ 10 count

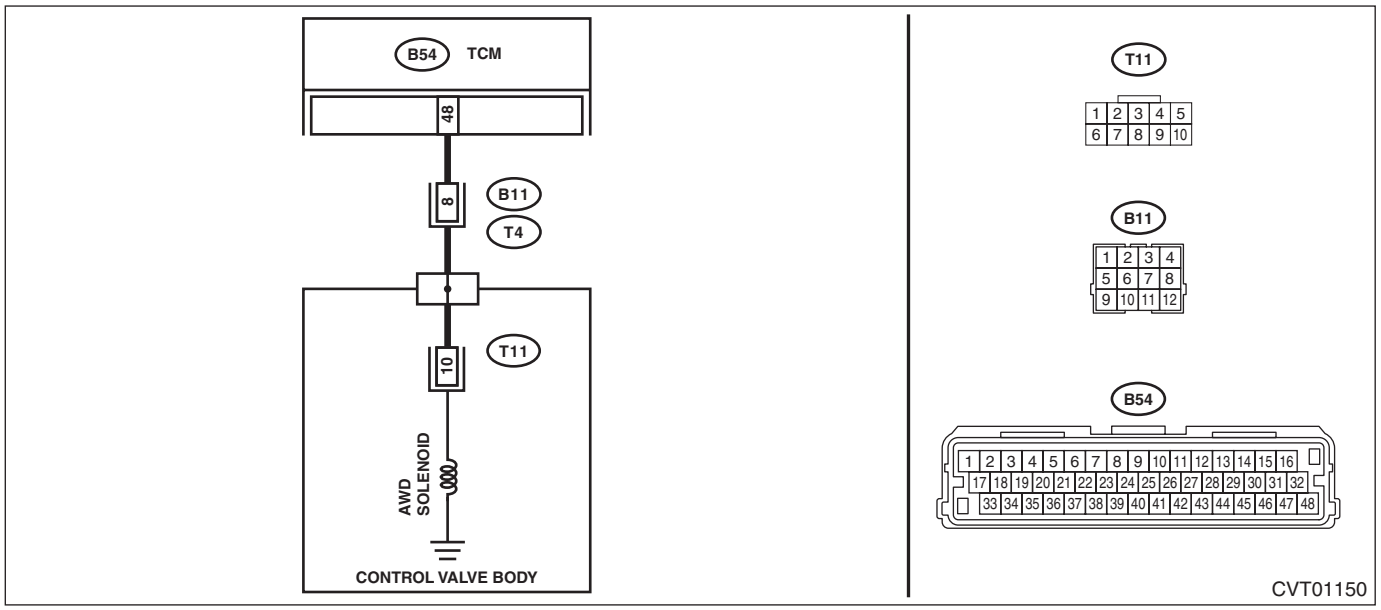
Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Does not illuminate.

AI: DTC P0971 PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition

TROUBLE SYMPTOM:
- Tight corner braking phenomenon occurs.
- Drivability getting worse.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 48 — (B11) No. 8:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 48 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK AWD SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance approx. 2 — 4.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or power supply-output short circuit in the transfer solenoid circuit.
- Judge as NG if an open circuit or a short circuit to ground is detected more than 10 times via the detection circuit in the transfer solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Target duty cycle	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

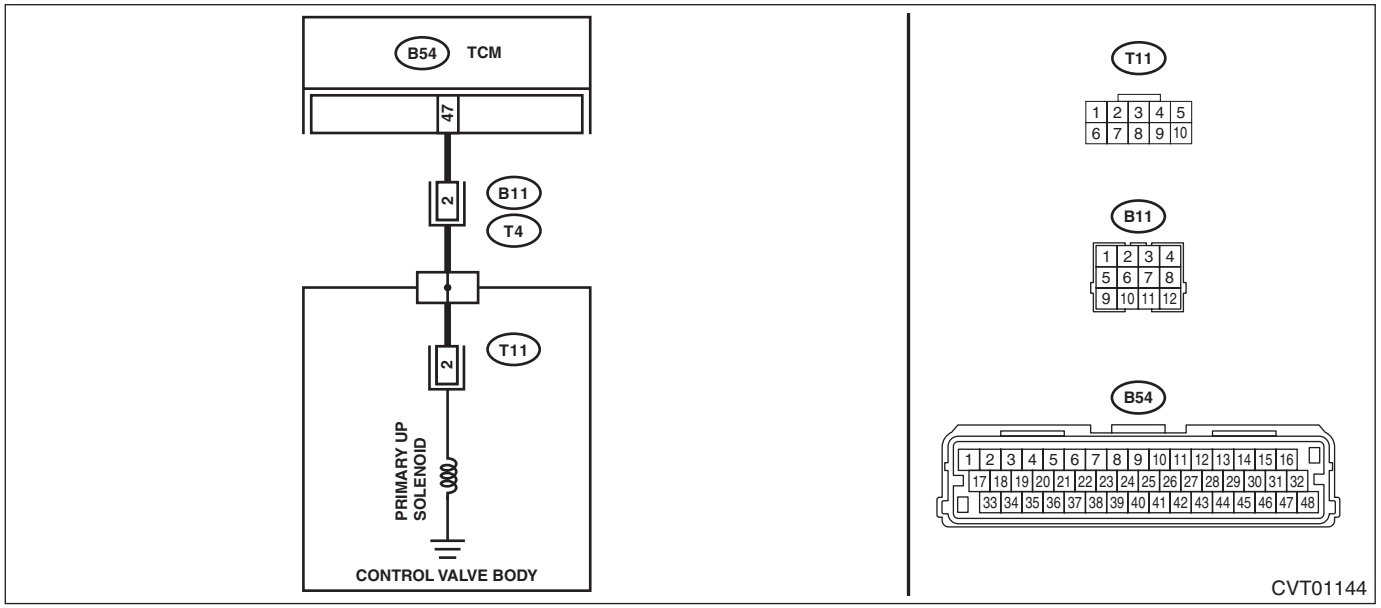
Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal from solenoid driver IC	≥ 10 count

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Does not illuminate.

AJ:DTC P0973 SHIFT SOLENOID "A" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed. (No up-shift)
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 47 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK PRIMARY UP SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the shift-up fluid pressure control solenoid drive circuit.
- Judge as NG if a ground short circuit is detected more than 10 times in the shift-up fluid pressure control solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of shift up pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

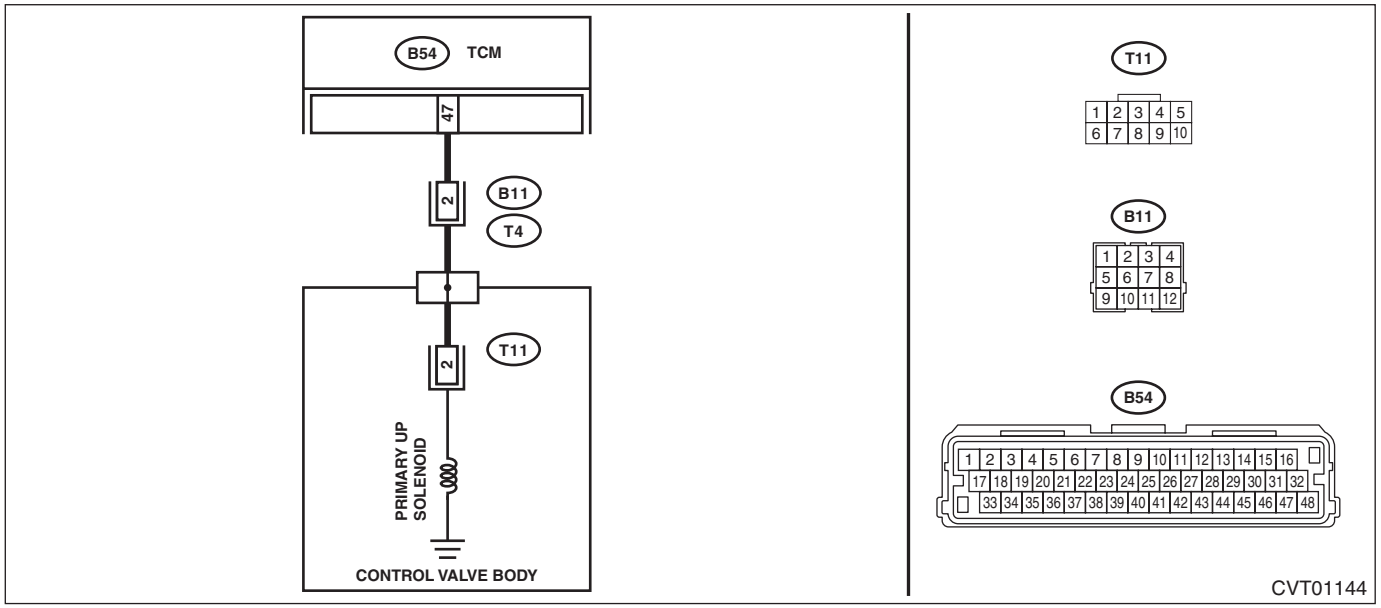
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured shift up pressure control solenoid voltage ≤ 0.8 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AK:DTC P0974 SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed. (No up-shift)
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 47 — (B11) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 47 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK PRIMARY UP SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the shift-up fluid pressure control solenoid drive circuit.
• Judge as NG if an open circuit or a power-supply short circuit is detected more than 10 times in the shift-up fluid pressure control solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of shift up pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

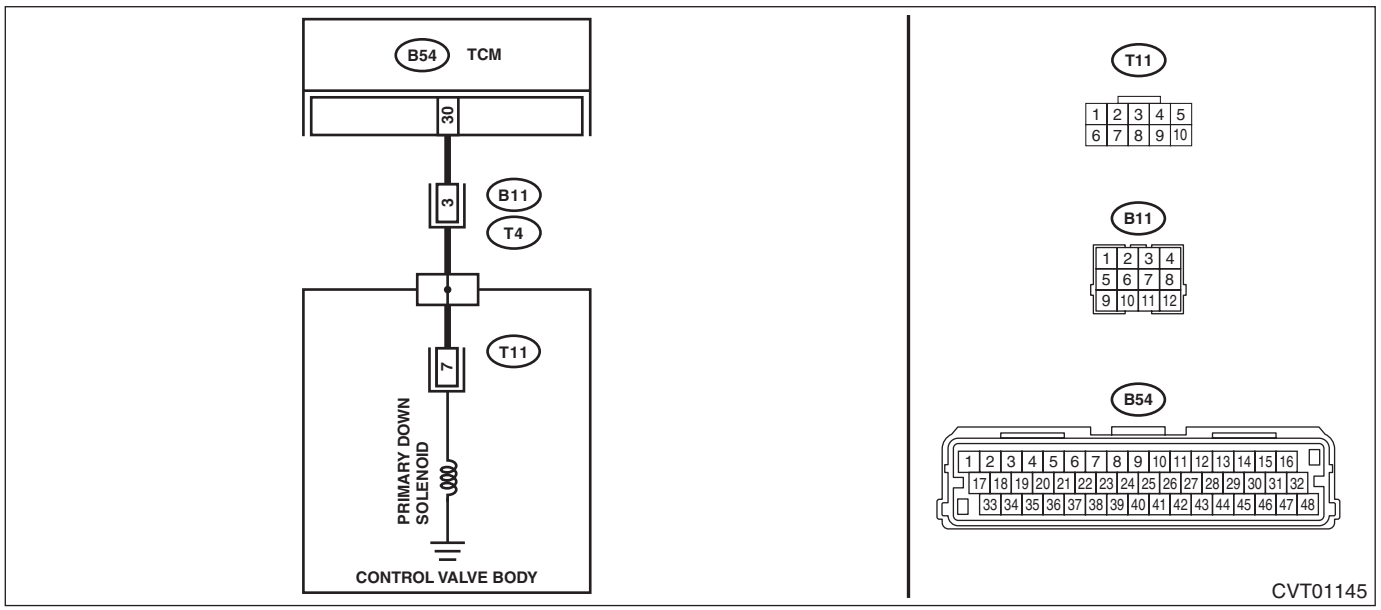
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift up pressure control solenoid voltage ≥ 2.5 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AL:DTC P0976 SHIFT SOLENOID "B" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed. (No down-shift)
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 30 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK PRIMARY DOWN SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the shift-down fluid pressure control solenoid drive circuit.
- Judge as NG if a ground short circuit is detected more than 10 times in the shift-down fluid pressure control solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of shift down pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

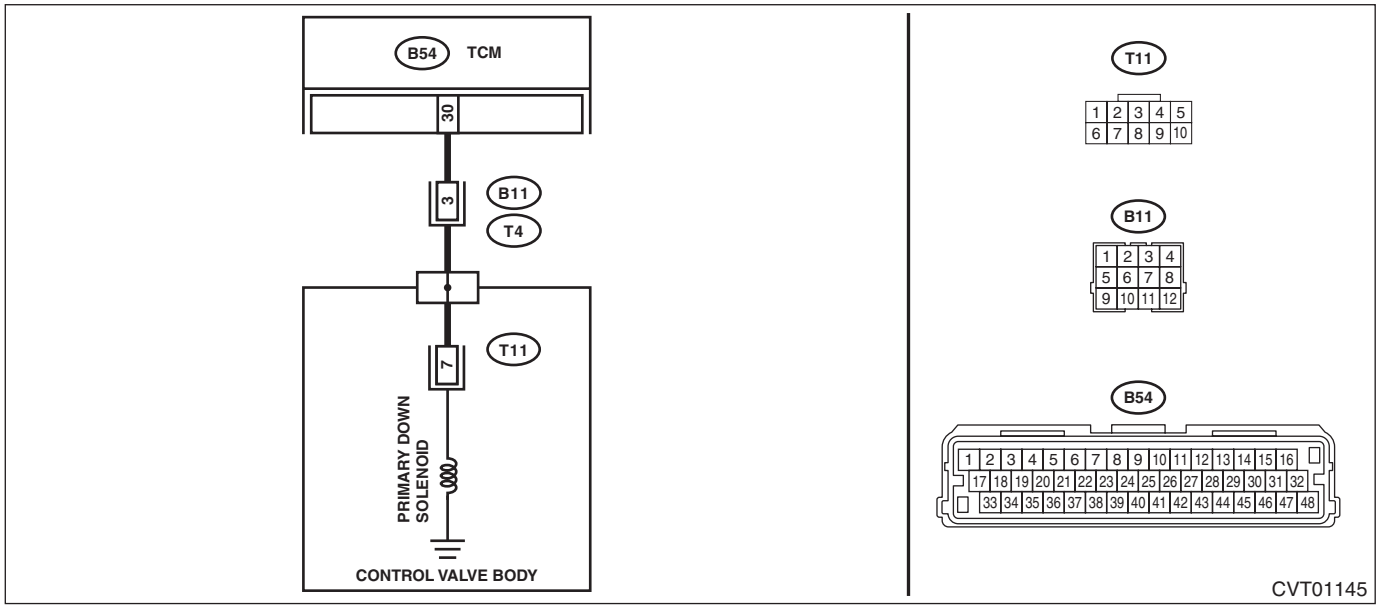
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift down pressure control solenoid voltage ≤ 0.8 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AM:DTC P0977 SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed. (No down-shift)
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 30 — (B11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 30 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK PRIMARY DOWN SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the shift-down fluid pressure control solenoid drive circuit.
• Judge as NG if an open circuit or a power-supply short circuit is detected more than 10 times in the shift-down fluid pressure control solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of shift down pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift down pressure control solenoid voltage ≥ 2.5 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AN:DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
TCM RAM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 2) Read the DTC.	Is DTC P160A displayed?	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction in RAM area of the TCM.
- Judge as NG if an attempt to write to RAM area failed.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (RAM) NOTE: This check is carried out about the RAM used except for CAN communication.	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AO:DTC P170A L-RANGE SWITCH

DTC DETECTING CONDITION:
Immediately at fault recognition

NOTE:
Refer to “DTC P0951 AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/PERFORMANCE” for diagnostic procedure. <Ref. to CVT(w/o HEV)(diag)-101, DTC P0951 AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short (ground-fault) in L range SW circuit.
- Judge as NG if the L range SW is ON in P, R or N range.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Malfunctions listed on the right column are not detected:	P0705, P0708

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
L range SW status in other than D range	ON

Time Needed for Diagnosis: 5 s
Malfunction Indicator Light Illumination: Does not illuminate.

AP:DTC P2158 VEHICLE SPEED SENSOR "B" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
VDC does not operate.

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC of VDC system using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of connector and harness between VDCCM&H/U and wheel speed sensor.

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction of VDC wheel speed sensor.
- Judge as NG when the wheel speed sensor normal status signal from VDC is cleared.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V

3. DIAGNOSTIC METHOD

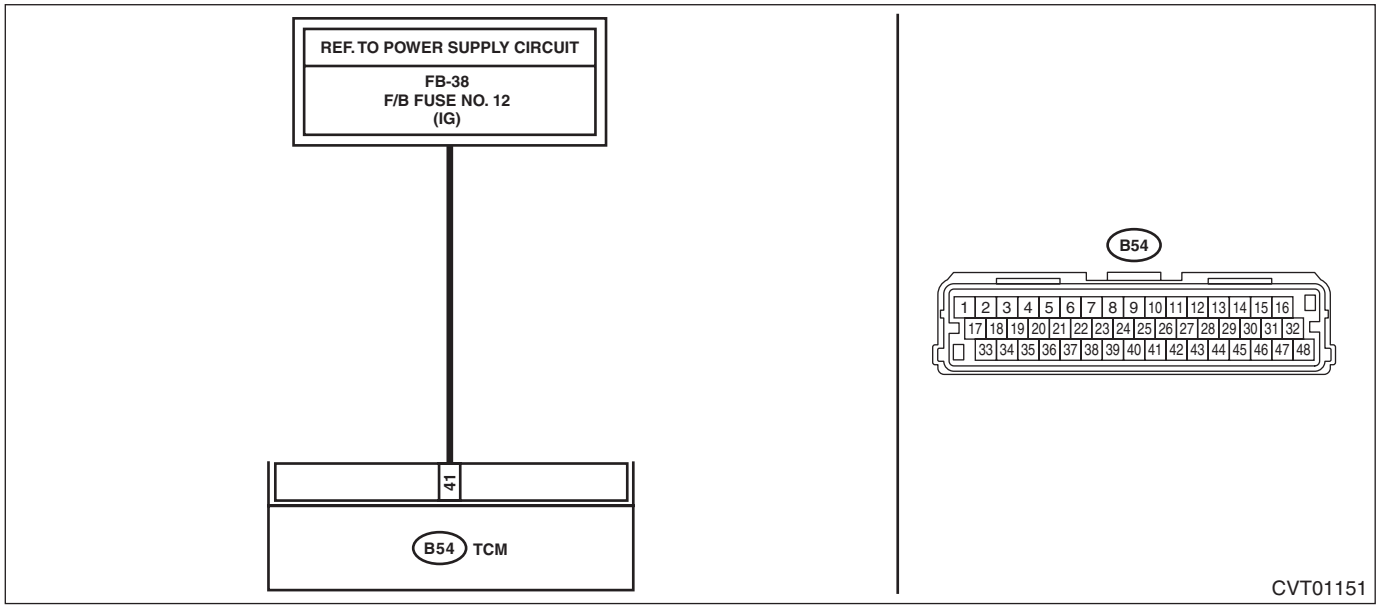
If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from Vehicle Dynamics Control Module NOTE: The VDC controller detects malfunction if one of the speed sensors does not output a signal and the other vehicle speed sensor output signal is above 7.46 MPH.	ON

Time Needed for Diagnosis: 2.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AQ:DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Faulty TCM operation
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK CONNECTOR.** Check the installing condition of TCM connector.	Is the TCM connector installed properly?	Go to step **2**.	Install the TCM connector.

Step		Check	Yes	No
2	**CHECK INPUT VOLTAGE OF TCM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. (While wiggling the harness) ***Connector & terminal*** ***(B54) No. 41 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, the following items may be the cause of fault. • Open circuit or short circuit to ground of harness between TCM connector and ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch (IG relay 1 for model with push button start)	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground of harness between TCM connector and ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch (IG relay 1 for model with push button start)

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of ignition SW circuit.
- Judge as NG if the ignition SW signals are lost 5 times or more even though the engine is ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Count of temporarily discontinuous input of ignition switch	≥ 5 count

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AR:DTC P2746 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT RANGE/ PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Standing start problems
- Shock occurs when engaging the lockup clutch.
- Shock occurs when selecting shift position.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2746, is DTC P2747 or P2751 displayed?	Perform the diagnosis according to DTCs other than P2746.	Perform the diagnosis according to DTC P2747. <Ref. to CVT(w/o HEV)(diag)-134, DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the malfunction of primary speed sensor signal characteristics.
- Judge as NG if the primary speed, compared with the speeds of other parts, is outside the possible range considering the hardware capabilities.

Diagnosis 2
- Detect the malfunction of primary speed sensor signal characteristics.
- Judge as NG if the primary speed exceeds the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
(Measured turbine shaft speed / Measured secondary pulley shaft speed)	≥ 0.4 and ≤ 2.55
Diagnosis 2	
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
(Measured turbine shaft speed / Measured secondary pulley shaft speed)	≥ 0.4 and ≤ 2.55

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

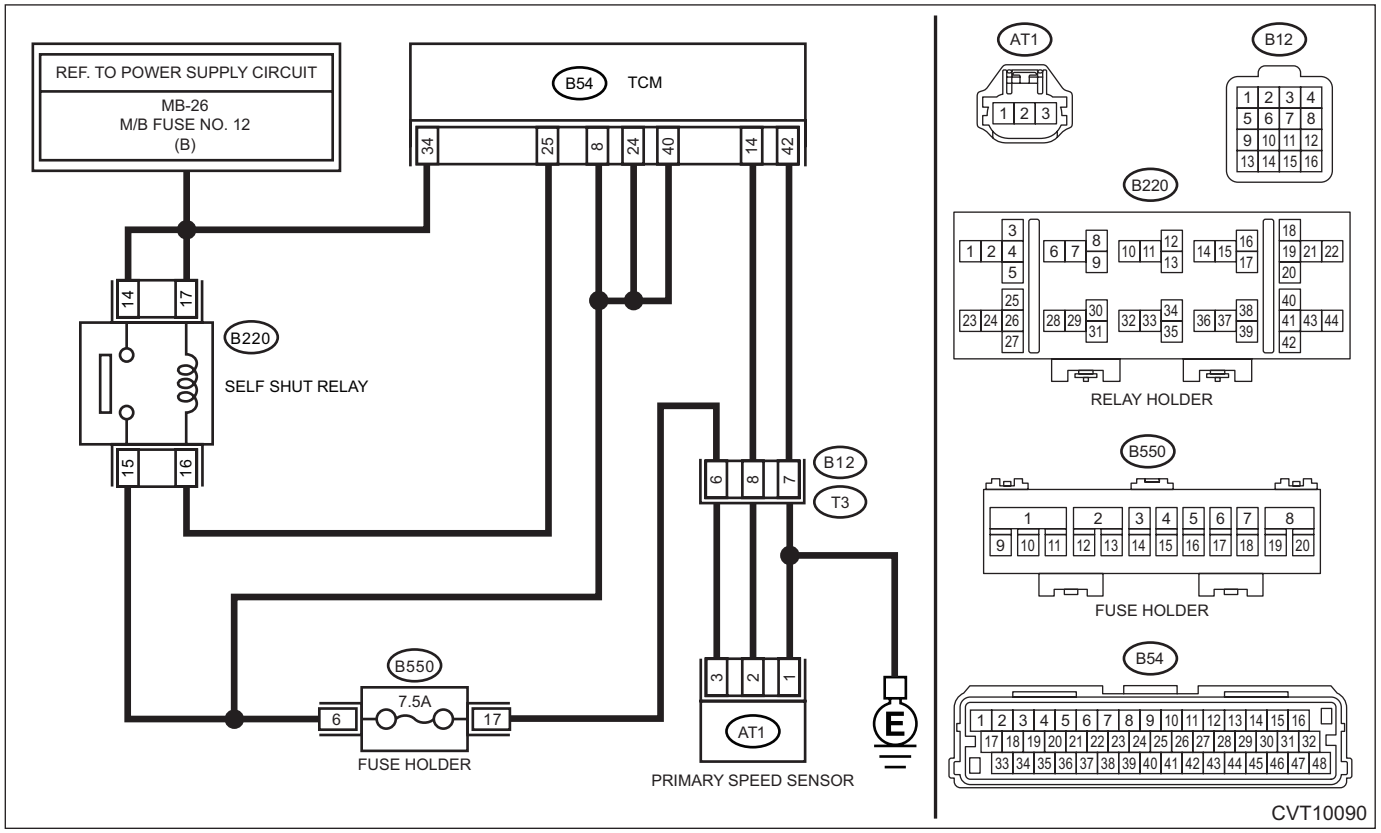
Malfunction Criteria	Threshold Value
Diagnosis 1	
(Measured primary pulley shaft speed / Measured secondary pulley shaft speed)	< 0.36 or > 2.80
Diagnosis 2	
Measured primary pulley shaft speed	> 7140 rpm

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AS:DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Standing start problems
- Shock occurs when engaging the lockup clutch.
- Shock occurs when selecting shift position.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse OK?	Go to step **2**.	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B54) No. 25 — (B220) No. 16:*** ***(B54) No. 8 — (B220) No. 15:*** ***(B54) No. 24 — (B220) No. 15:*** ***(B54) No. 40 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:*** ***(B54) No. 8 — Chassis ground:*** ***(B54) No. 24 — Chassis ground:*** ***(B54) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 14 — (B12) No. 8:*** ***(B54) No. 42 — (B12) No. 7:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the open circuit of harness.
9	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 14 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **10**.	Repair the short circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness.
11	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector terminals. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **12**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to OFF. 2) Connect the transmission connector. 3) Lift up the vehicle. 4) Start the engine. 5) Set the select lever to “D” range. 6) Read the data of «Primary Pulley Speed» using Subaru Select Monitor.	Does the value of «Primary Pulley Speed» change according to those of «Turbine Revolution Speed»?	Current condition is normal. Repair the poor contacts of harnesses of primary speed sensor and transmission connector.	Go to step **13**.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Disconnect the primary speed sensor connector. 4) Measure the resistance between transmission connector and primary speed sensor connector. ***Connector & terminal*** ***(T3) No. 6 — (AT1) No. 3:*** ***(T3) No. 7 — (AT1) No. 1:*** ***(T3) No. 8 — (AT1) No. 2:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK PRIMARY SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 6 — Chassis ground:*** ***(T3) No. 8 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK PRIMARY SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the primary speed sensor. <Ref. to CVT(TR580)-112, Primary Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2747 displayed?	Go to step **16**.	The original primary speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2747 displayed?	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	The original self shut relay is defective.

1. OUTLINE OF DIAGNOSIS

- Detect no input signal from the primary speed sensor.
- Judge as NG if there is no input signal from the primary pulley speed sensor, while the secondary pulley speed sensor has the input signal although the primary and secondary pulleys are interlocked via the chain.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Measured secondary pulley shaft speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured primary pulley shaft speed	0 rpm

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AT:DTC P2750 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT RANGE/ PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shifting shock is felt.
- Acceleration is poor during standing start.
- Shift control malfunction

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2750, is any of the DTC P2751, U0122 or U0416 displayed?	Perform the diagnosis according to DTCs other than P2750.	Perform the diagnosis according to DTC P2751. <Ref. to CVT(w/o HEV)(diag)-139, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the secondary speed sensor characteristics.
- Judge as NG if the deviation of vehicle speed between VDC and the secondary speed sensor becomes the predetermined value or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Vehicle speed (calculated from wheel speed sensor)	≥ 5 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.
Judgment Value

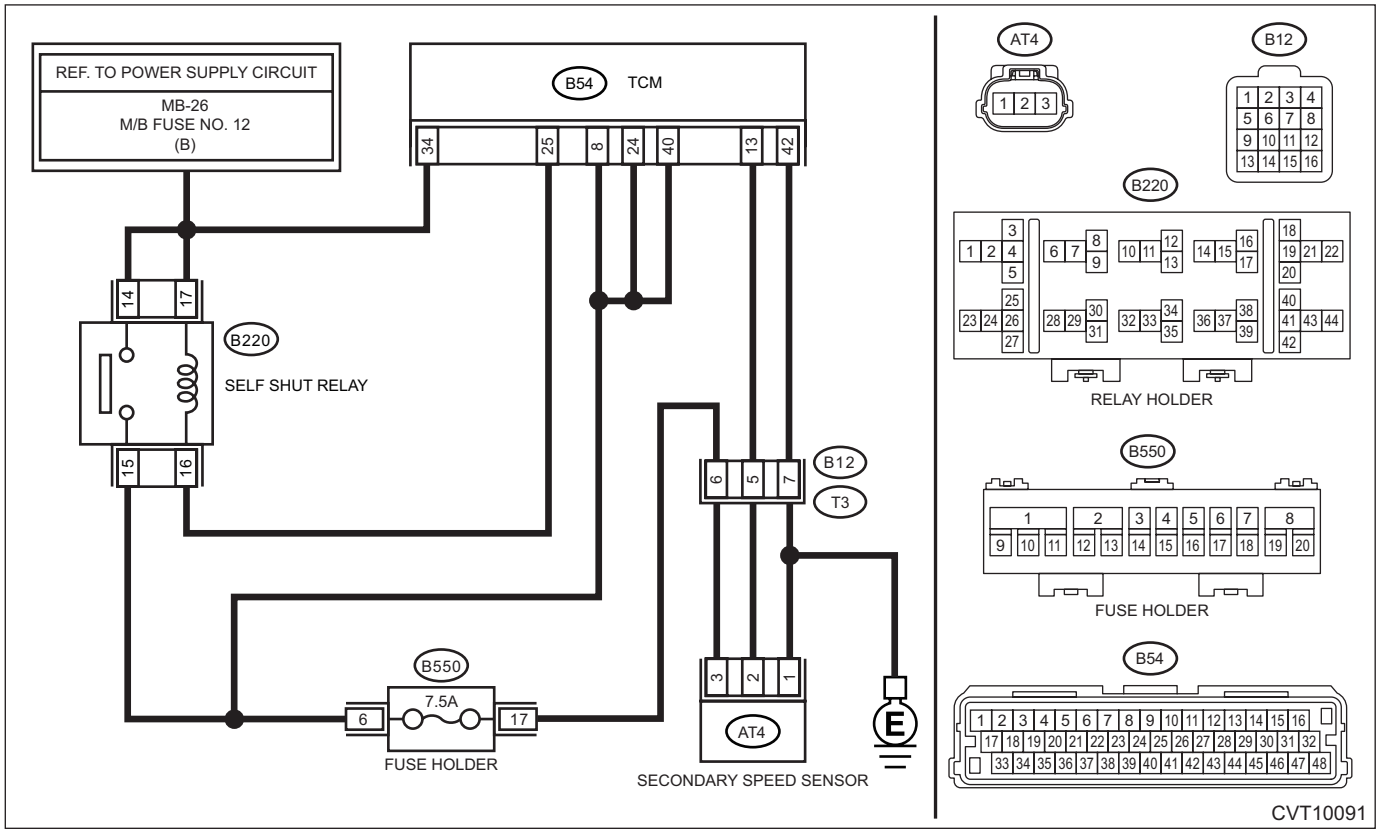
Malfunction Criteria	Threshold Value
ABS (Vehicle speed (calculated from secondary pulley shaft speed) – Vehicle speed (calculated from wheel speed sensor))	> 10 MPH

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AU:DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shifting shock is felt.
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse OK?	Go to step **2**.	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B54) No. 25 — (B220) No. 16:*** ***(B54) No. 8 — (B220) No. 15:*** ***(B54) No. 24 — (B220) No. 15:*** ***(B54) No. 40 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:*** ***(B54) No. 8 — Chassis ground:*** ***(B54) No. 24 — Chassis ground:*** ***(B54) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 13 — (B12) No. 5:*** ***(B54) No. 42 — (B12) No. 7:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the open circuit of harness.
9	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 13 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **10**.	Repair the short circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness.
11	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector terminals. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **12**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to OFF. 2) Connect the transmission connector. 3) Lift up the vehicle. 4) Start the engine. 5) Set the select lever to “D” range. 6) Read the data of «Secondary Pulley Speed» using Subaru Select Monitor.	Does the value of «Secondary Pulley Speed» change according to those of «Front Wheel Speed»?	Current condition is normal. Repair the poor contacts of harnesses of secondary speed sensor and transmission connector.	Go to step **13**.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Disconnect the secondary speed sensor connector. 4) Measure the resistance between transmission connector and secondary speed sensor connector. ***Connector & terminal*** ***(T3) No. 5 — (AT4) No. 2:*** ***(T3) No. 6 — (AT4) No. 3:*** ***(T3) No. 7 — (AT4) No. 1:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK SECONDARY SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 5 — Chassis ground:*** ***(T3) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK SECONDARY SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the secondary speed sensor. <Ref. to CVT(TR580)-109, Secondary Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2751 displayed?	Go to step **16**.	The original secondary speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2751 displayed?	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	The original self shut relay is defective.

1. OUTLINE OF DIAGNOSIS

- Detect the no input signal from the secondary speed sensor.
- Judge as NG if there is no input signal from the secondary pulley speed sensor, while the primary pulley speed sensor has the input signal although the primary and secondary pulleys are interlocked via the chain.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
Measured primary pulley shaft speed	≥ 1000 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

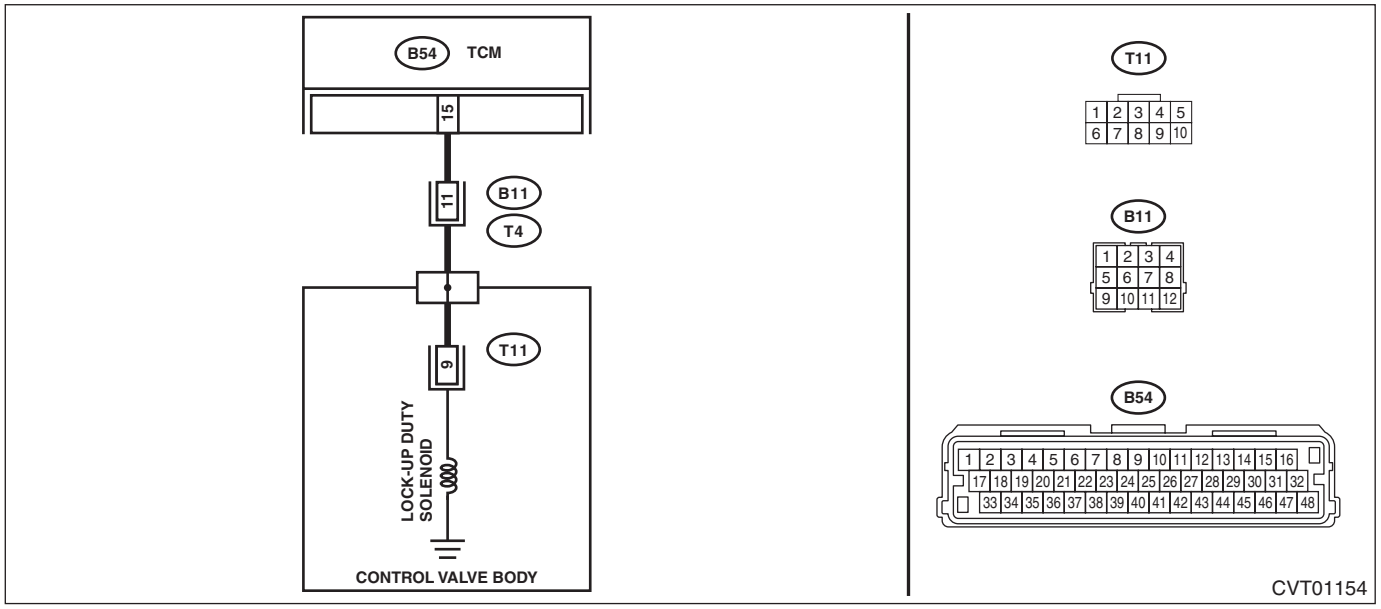
Judgment Value

Malfunction Criteria	Threshold Value
Measured secondary pulley shaft speed	0 rpm

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AV:DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
No lock-up occurs.
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Is a DTC other than DTC P2757 displayed?	Perform the diagnosis according to DTCs other than P2757.	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the lock-up duty solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **8**.	Go to step **3**.
3	**CHECK LOCK-UP DUTY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Go to step **4**.
4	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 15 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness.
5	**CHECK HARNESS.** Measure the resistance between TCM connector and transmission body. ***Connector & terminal*** ***(B54) No. 15 — Transmission body:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.

	Step	Check	Yes	No
6	**CHECK HARNESS.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Disconnect the control valve body connector. 3) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 11 — (T11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair the open circuit of harness.
7	**CHECK HARNESS.** Measure the resistance between transmission connector and control valve body. ***Connector & terminal*** ***(T11) No. 9 — Control valve body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Repair the short circuit of harness.
8	**CHECK TRANSMISSION FLUID.** 1) Connect all connectors. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the check result OK?	Go to step **9**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>
9	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the check result OK?	Go to step **10**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
10	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual Secondary Pressure» using Subaru Select Monitor.	Is the «Actual Secondary Pressure» 0.5 — 1.5 MPa?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.> Go to step **11**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(w/o HEV)(diag)-91, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

	Step	Check	Yes	No
11	**DRIVING CHECK FOR LOCK-UP CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 50°C. 5) Drive the vehicle for one minute or more while keeping such constant speed that «Lock Up Duty Ratio» is 70% or more, and «Front Wheel Speed» is 40 km/h (25 MPH) or more, which are displayed on the Subaru Select Monitor. 6) Turn the ignition switch to OFF. 7) Start the engine. 8) Perform the procedure in step 5) again. 9) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P2757 displayed?	Replace the torque converter assembly. <Ref. to CVT(TR580)-168, Torque Converter Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of lock-up fluid pressure control solenoid, and hydraulic circuit, or drive circuit characteristics (stuck to low pressure side).
• Judge as NG if the deviation between engine speed and turbine speed is the predetermined value or more, even though the lock-up request has been issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Transmission range	Drive
Commanded duty of torque converter clutch pressure control solenoid	≥ 95%
Measured turbine shaft speed	> Table1 rpm

Table 1

Engine speed (rpm)	3700	3727	3755	3782	3856	4019	4213	4456
Measured turbine shaft speed (rpm)	0	500	1000	1500	2000	2500	3000	3500

Engine speed (rpm)	4786	5213	5651	6101	6569	7044	7520
Measured turbine shaft speed (rpm)	4000	4500	5000	5500	6000	6500	7000

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Engine speed – Measured turbine shaft speed)	> Table2 rpm

Table 2

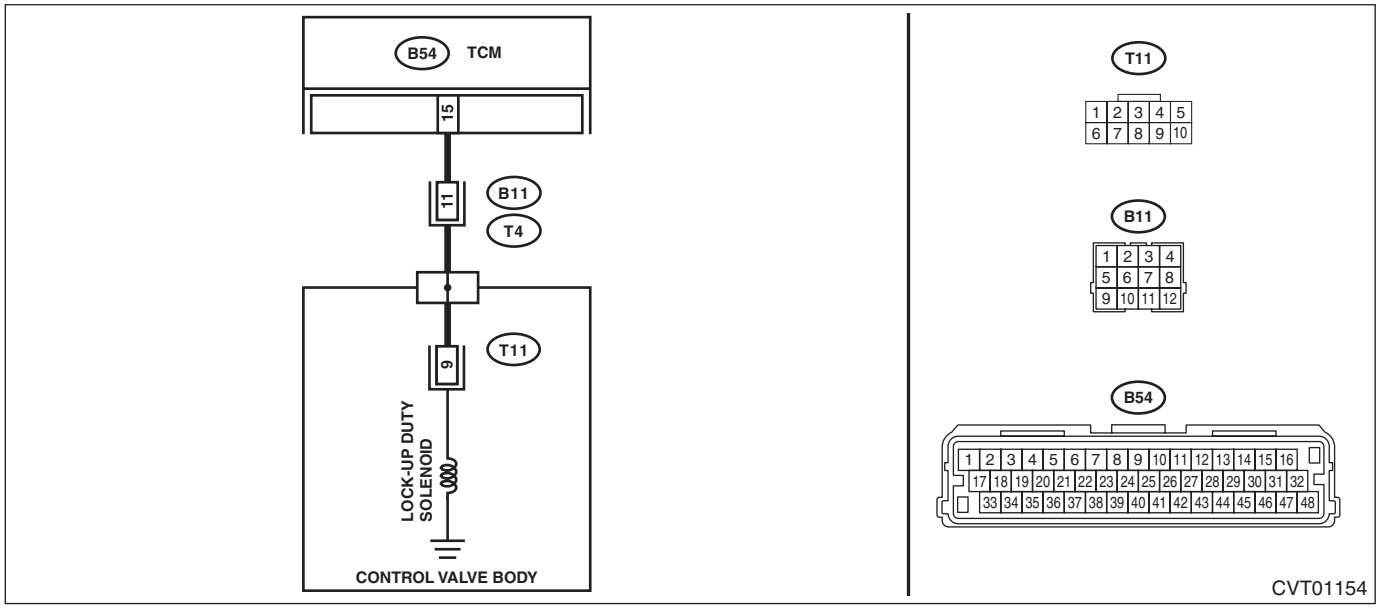
Engine speed (rpm)	0	500	1000	1500	2000	2500	3000	3500
ABS (Engine speed – Measured turbine shaft speed) (rpm)	200	200	200	200	200	200	200	200

Engine speed (rpm)	4000	4500	5000	5500	6000	6500	7000
ABS (Engine speed – Measured turbine shaft speed) (rpm)	200	200	200	200	200	200	200

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AW:DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
The engine stalls when the vehicle is stopped.
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Is a DTC other than DTC P2758 displayed?	Perform the diagnosis according to DTCs other than P2758.	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID (ACTIVE TEST).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the lock-up duty solenoid. <Ref. to CVT(w/o HEV)(diag)-25, Active Test.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **8**.	Go to step **3**.
3	**CHECK LOCK-UP DUTY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Go to step **4**.
4	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 15 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness.
5	**CHECK HARNESS.** Measure the resistance between TCM connector and transmission body. ***Connector & terminal*** ***(B54) No. 15 — Transmission body:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.

	Step	Check	Yes	No
6	**CHECK HARNESS.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Disconnect the control valve body connector. 3) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 11 — (T11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair the open circuit of harness.
7	**CHECK HARNESS.** Measure the resistance between transmission connector and control valve body. ***Connector & terminal*** ***(T11) No. 9 — Control valve body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Repair the short circuit of harness.
8	**CHECK TRANSMISSION FLUID.** 1) Connect all connectors. 2) Check the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>	Is the check result OK?	Go to step **9**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-38, ADJUSTMENT, CVTF.>
9	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>	Is the check result OK?	Go to step **10**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-42, CONDITION CHECK, CVTF.>
10	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual Secondary Pressure» using Subaru Select Monitor.	Is the «Actual Secondary Pressure» 0.5 — 1.5 MPa?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.> Go to step **11**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(w/o HEV)(diag)-91, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

	Step	Check	Yes	No
11	**DRIVING CHECK FOR LOCK-UP CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 50°C. 5) Drive the vehicle for one minute or more while keeping such constant speed that «Lock Up Duty Ratio» is 0%, and «Front Wheel Speed» is 5 km/h (3 MPH) or less, which are displayed on the Subaru Select Monitor. 6) Turn the ignition switch to OFF. 7) Start the engine. 8) Perform the procedure in step 5) again. 9) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P2758 displayed? Or does the engine stall?	Replace the torque converter assembly. <Ref. to CVT(TR580)-168, Torque Converter Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of lock-up fluid pressure control solenoid, and hydraulic circuit, or drive circuit characteristics (stuck to high pressure side).
• Judge as NG if the deviation between engine speed and turbine speed is the predetermined value or less, even though the lock-up open request has been issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Transmission range	Drive
Engine torque	> Table 1 N·m
Commanded duty of torque converter clutch pressure control solenoid	≤ 0%

Table 1

Engine coolant temperature (degC)	– 40	– 20	0	20	40	60	80	100
Engine torque (N·m)	80	80	80	80	80	50	50	50

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Engine speed – Measured turbine shaft speed)	< Table 2 rpm

Table 2

Engine speed (rpm)	0	500	1000	1500	2000	2500	3000	3500
ABS (Engine speed – Measured turbine shaft speed) (rpm)	0	0	50	50	50	50	50	50

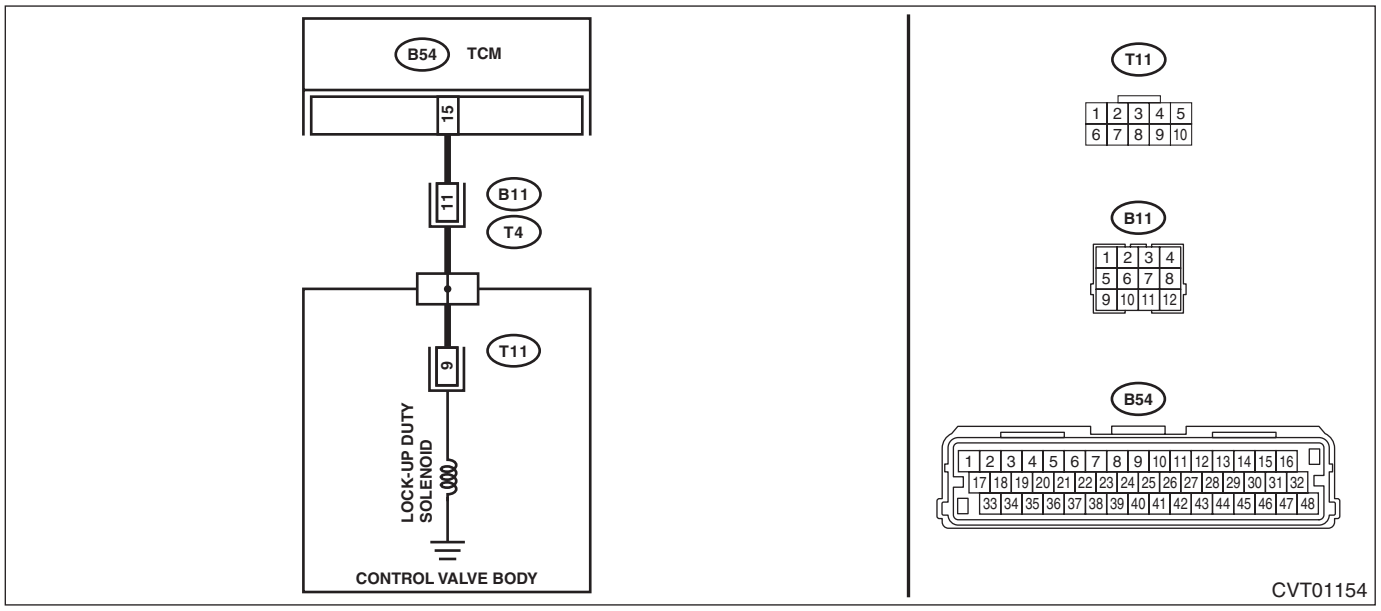
Engine speed (rpm)	4000	4500	5000	5500	6000	6500	7000
ABS (Engine speed – Measured turbine shaft speed) (rpm)	50	50	50	50	50	50	50

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AX:DTC P2763 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- No lock-up occurs.
- Engine stalls.

WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 15 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 15 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK LOCK-UP DUTY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the lock-up clutch pressure control solenoid drive circuit.
• Judge as NG if an open circuit or a power-supply short circuit is detected more than 10 times in the lock-up clutch pressure control solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of torque converter clutch pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

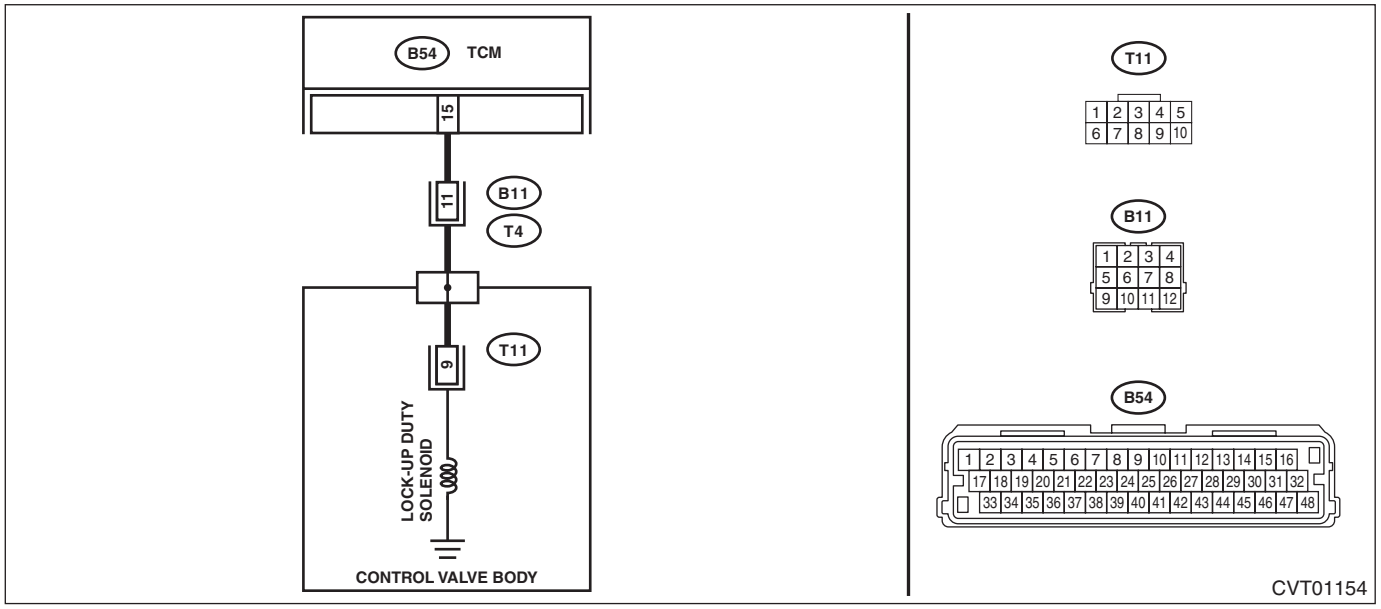
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured torque converter clutch pressure control solenoid voltage ≥ 2.5 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AY:DTC P2764 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
No lock-up occurs.
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-94, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 15 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK LOCK-UP DUTY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-121, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the lock-up clutch pressure control solenoid drive circuit.
- Judge as NG if a ground short circuit is detected more than 10 times in the lock-up clutch pressure control solenoid drive circuit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of torque converter clutch pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured torque converter clutch pressure control solenoid voltage ≤ 0.8 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AZ:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure has occurred.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BA:DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the ECM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BB:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with VDCCM is not possible.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BC:DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the body integrated unit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Turbine shaft speed	> 0 rpm
or	
D range switch	ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BIU	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BD:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the combination meter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Turbine shaft speed	> 0 rpm
or	
D range switch	ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from combination meter	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BE:DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the A/C control panel.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Turbine shaft speed	> 0 rpm
or	
D range switch	ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from A/C control panel	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BF:DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM "A"

NOTE:
Refer to "LAN SYSTEM (DIAGNOSTICS)" for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from ECM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BG:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to "LAN SYSTEM (DIAGNOSTICS)" for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the VDCCM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BH:DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the body integrated unit is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BIU	Freeze

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BI: DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the combination meter is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from combination meter	Freeze

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BJ:DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the A/C control panel is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from A/C control panel	Freeze

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BK:DTC U1235 LOST COMMUNICATION WITH EyeSight

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the stereo camera.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from stereo camera	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BL:DTC U1433 INVALID DATA RECEIVED FROM EyeSight

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the stereo camera is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from stereo camera	Freeze

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

18.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK SHIFT INDICATOR

DIAGNOSIS:

- CAN communication is abnormal with the combination meter.
- Combination meter malfunction

TROUBLE SYMPTOM:

- Shift indicator does not display or remains displayed.
- Shift indicator display does not change.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC U0155 or U0423 displayed?	Perform the self-diagnosis of combination meter.	Go to step **2**.
2	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Are DTCs other than U0155 and U0423 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** Read DTC of combination meter.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK TCM.** 1) Operate the + side of the paddle shift switch. 2) Read the data of «Up Switch» using the Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Go to step **5**.	Check for poor contact between TCM and paddle shift UP switch, and repair the defective part.
5	**CHECK TCM.** 1) Operate the – side of the paddle shift switch. 2) Read the data of «Down Switch» using the Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Go to step **6**.	Check for poor contact between TCM and paddle shift down switch, and repair the defective part.
6	**CHECK TCM.** 1) Turn the ignition switch OFF, then turn it ON again. 2) Shift the select lever to manual mode. 3) Read the data of «Shift step in Manu. mode» using the Subaru Select Monitor.	Is “1” displayed?	Go to step **7**.	Perform the diagnosis according to DTC P0951. <Ref. to CVT(w/o HEV)(diag)-101, DTC P0951 AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/ PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
7	**CHECK TCM.** 1) Shift up the select lever. 2) Read the data of «Shift step in Manu. mode» using the Subaru Select Monitor.	Is “2” displayed?	Currently, shift indicator is normal.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

19.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
Engine stalls when driving in “D” or “R” range, or selecting “N” → “D”, “N” → “R”.	• Control valve • Engine control system
While driving in “D” range, vibration occurs immediately before the stop or engine stalls.	• Control valve • Torque converter
Vehicle cannot shift while driving in “D” range.	• Control valve • TCM • Shift mechanism • Power supply system
Excessive shock when selecting “N” → “D”, and “N” → “R”.	• Control valve • TCM • F&R clutch pack • ATF deterioration or lack
Excessive shock at standing start in “D” range.	• Control valve • TCM • F&R clutch pack • ATF deterioration or lack
Engine speed increases abruptly during driving in “D” or “R” range.	• Control valve • Secondary pressure sensor • F&R clutch pack • ATF deterioration or lack
Vehicle can not start when depressing the accelerator pedal in “D” or “R” range, or acceleration is very poor. (without abrupt engine increase)	• Control valve • F&R clutch pack • Shift mechanism • Parking mechanism • Engine control system • Power supply system
Shift indicator in combination meter displays the position which differs from select lever position.	• Inhibitor switch • Select cable related • Combination meter
Manual mode enters even though the select lever and paddle shift switch is not operated.	• Manual mode switch • Paddle shift switch • Select lever • TCM
Engine speed increases abruptly in “D” or “R” range, vehicle can not start.	• F&R clutch pack • Select cable related
Manual mode can not be set	• Select lever • TCM

CONTINUOUSLY VARIABLE TRANSMISSION

CVT(TH58A)

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1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER

Model		HEV
Type		Symmetric, 3-element, single stage, 2-phase torque converter
Stall torque ratio		2.07
Nominal	mm (in)	236 (9.29)
Stall speed (at sea level)	r/min	2,000 — 2,750 (D range) 1,800 — 2,500 (R range)
One-way clutch		Sprag type one-way clutch

2. OIL PUMP

Type		Internal gear pump
Driving method		Driven by chain
Number of teeth	Inner rotor	8
	Outer rotor	9

3. TRANSMISSION CONTROL ELEMENT

Type	Forward continuously variable speed change, 1 reverse, planetary gear
Multi-plate clutch	1 set
Multi-plate brake	1 set

4. OUTPUT CLUTCH

Multi-plate clutch	1 set
Control method	Electronic hydraulic type

5. TRANSMISSION GEAR RATIO

Forward	3.420 — 0.544
Rev	3.502

6. PLATE

Number of forward clutch drive plates	3
Number of reverse brake drive plates	4
Number of output clutch drive plates	7

7. SELECTOR POSITION

P (Park)	Transmission neutral, output shaft locked, engine start enabled
R (Reverse)	Rev
N (Neutral)	Transmission neutral, engine start enabled
D (Drive)	Forward continuously variable speed change
M (Manual mode) (paddle shift +side)	Manual gear change 1st → 2nd → 3rd → 4th → 5th → 6th
M (Manual mode) (paddle shift –side)	Manual gear change 1st ← 2nd ← 3rd ← 4th ← 5th ← 6th

8. HYDRAULIC CONTROL AND LUBRICATION

Type	Electronic hydraulic control (gear ratio is changed by signals of vehicle speed and accelerator opening angle.)
Fluid	Specified fluid: SUBARU CVT FLUID LINEARTRONIC II **CAUTION:** **Always use specified CVTF. Using other fluid will cause malfunction.**
Fluid capacity L (US qt, Imp qt)	13.67 — 14.17 (14.4 — 15.0, 12.0 — 12.5)
Lubrication system	Forced feed lubrication with oil pump

9. COOLING AND HARNESS

Cooling system	CVTF cooler (with warmer feature)
Inhibitor switch harness	16 poles
Transmission harness	12 poles
Drive motor harness	20 poles

10.DRIVE MOTOR

Type	Three-phase AC synchronous motor
Rated voltage V	100

11.TRANSFER

Transfer type	Multi-plate transfer (MP-T)
Number of transfer clutch drives & driven plates	5
Control method	Electronic hydraulic type
Reduction gear ratio	1.000 (43/43)

12.REDUCTION GEAR RATIO

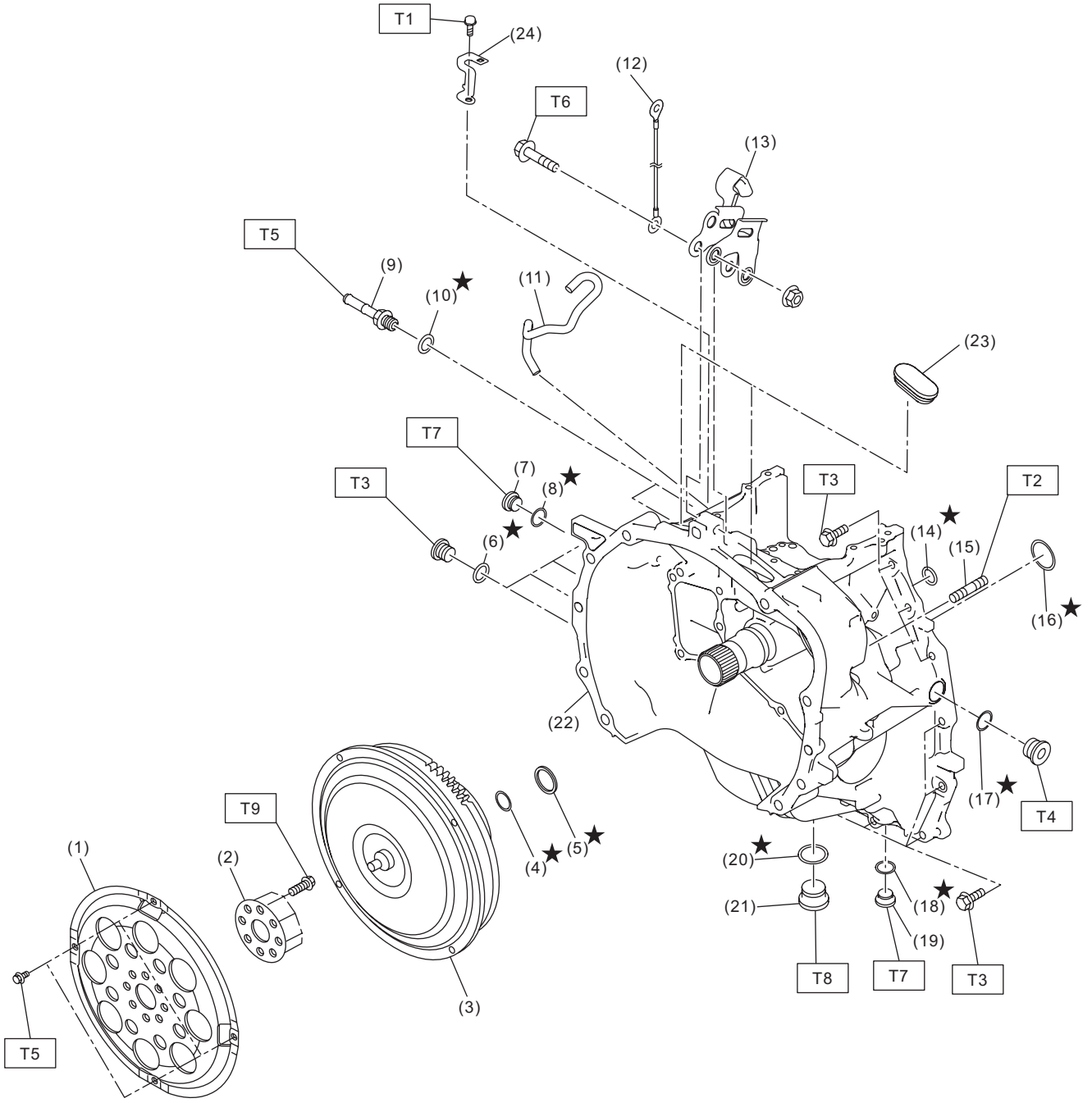
Front final reduction gear ratio	3.700

13.RECOMMENDED GEAR OIL

Lubrication oil	SUBARU GEAR OIL EXTRA MT or equivalent
Front differential oil capacity L (US qt, Imp qt)	1.3 — 1.4 (1.4 — 1.5, 1.1 — 1.2)

B: COMPONENT

1. TORQUE CONVERTER ASSEMBLY AND CONVERTER CASE



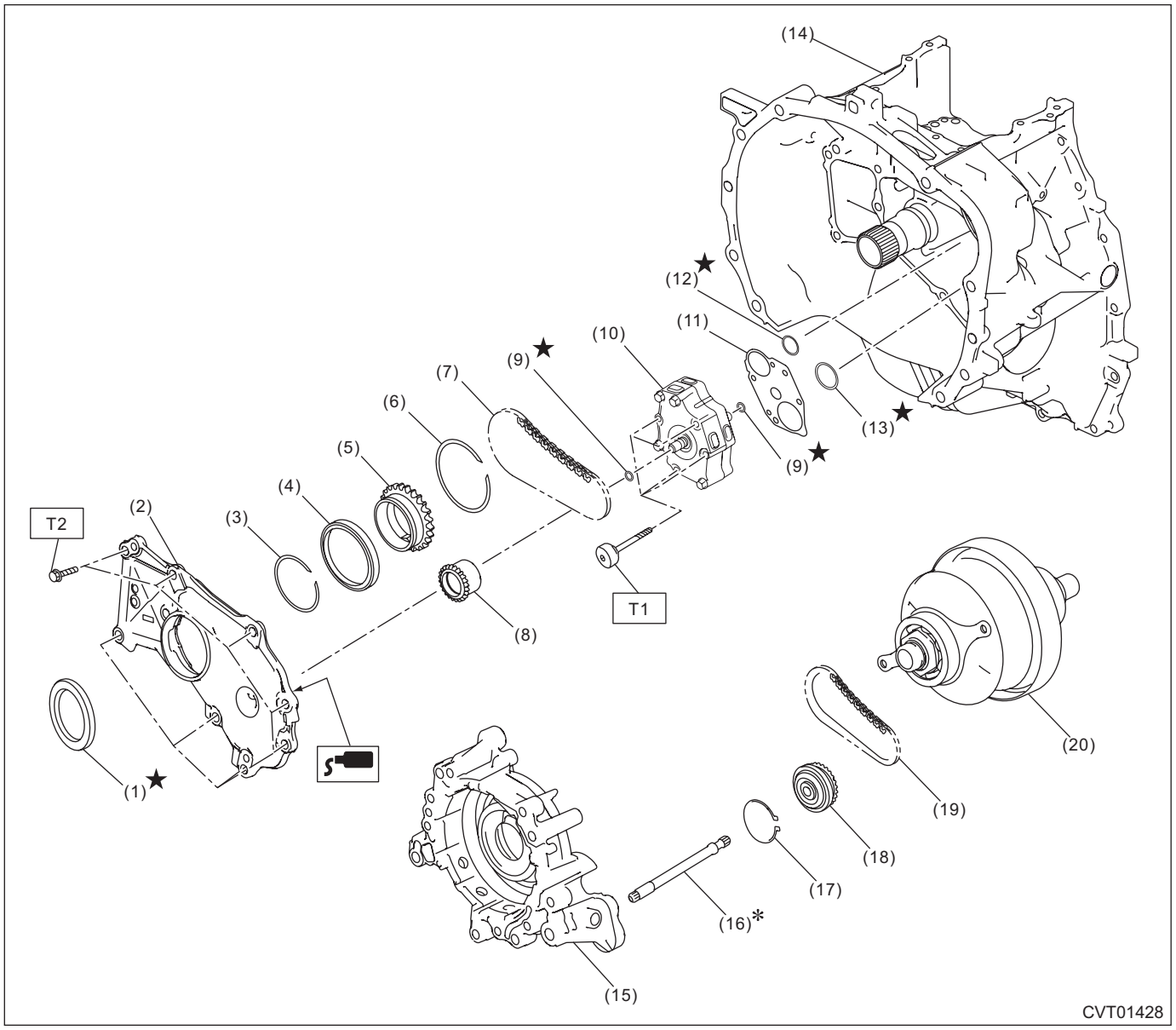
CVT10143

(1)	Drive plate	(13)	Pitching stopper bracket
(2)	Reinforcement drive plate	(14)	O-ring
(3)	Torque converter ASSY	(15)	Stud bolt
(4)	O-ring	(16)	O-ring
(5)	Seal ring	(17)	O-ring
(6)	O-ring	(18)	Gasket
(7)	Front differential gear oil filler plug	(19)	Overflow drain plug
(8)	O-ring	(20)	Gasket
(9)	Oil cooler pipe	(21)	Front differential gear oil drain plug
(10)	O-ring	(22)	Converter case
(11)	Air breather hose	(23)	Rubber cap
(12)	Transmission radio ground cord	(24)	Drive motor harness stay

Tightening torque: N·m (kgf-m, ft-lb)

- ***T1: 7 (0.7, 5.2)***
- ***T2: 18 (1.8, 13.3)***
- ***T3: 22 (2.2, 16.2)***
- ***T4: 22.5 (2.3, 16.6)***
- ***T5: 25 (2.5, 18.4)***
- ***T6: 41 (4.2, 30.2)***
- ***T7: 50 (5.1, 36.9)***
- ***T8: 70 (7.1, 51.6)***
- ***T9: <Ref. to CVT(TH58A)-176, INSTALLATION, Drive Plate.>***

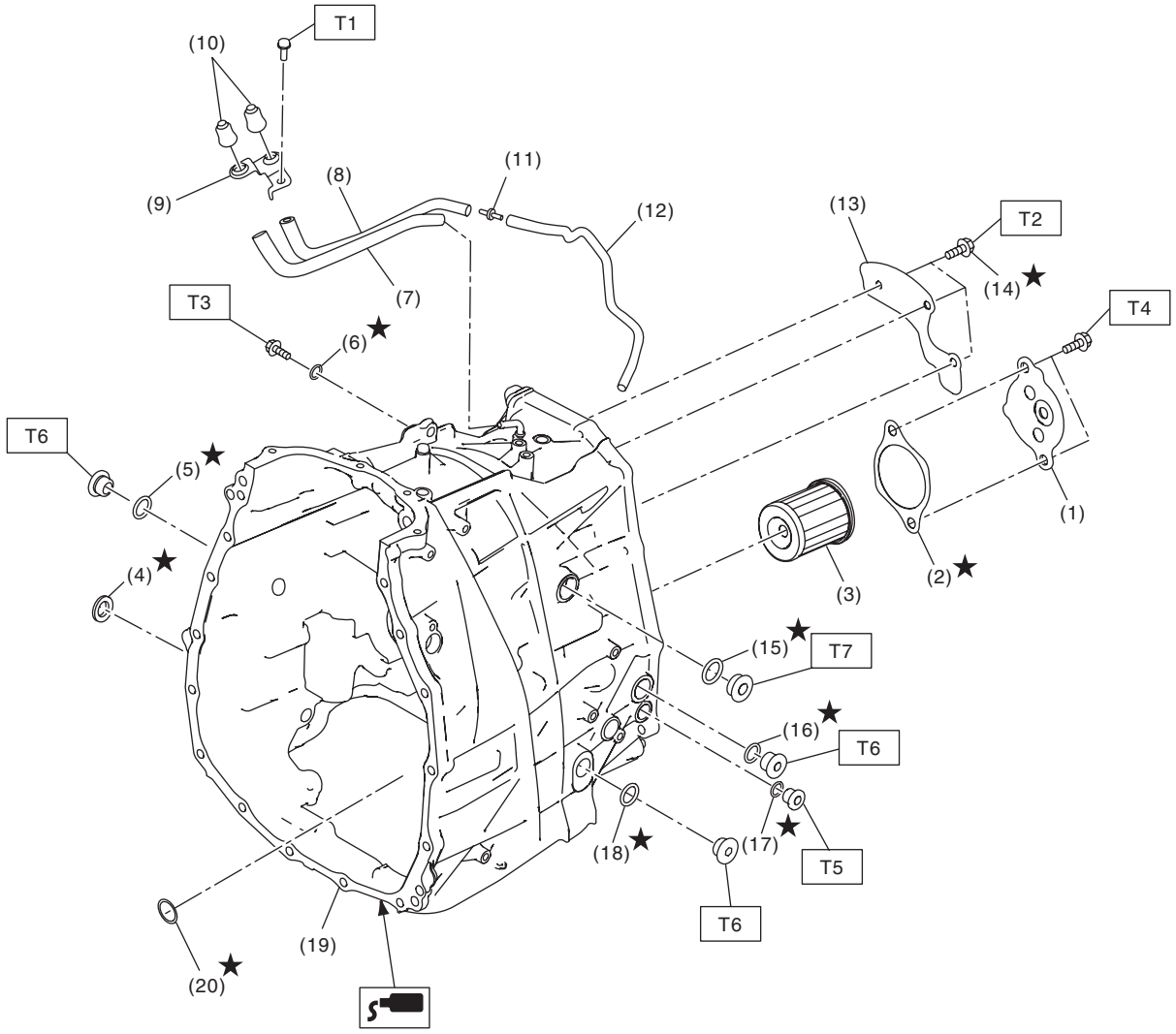
2. OIL PUMP ASSEMBLY



(1) Oil seal
(2) Oil pump chain cover
(3) Snap ring
(4) Ball bearing
(5) Drive sprocket
(6) Snap ring
(7) Oil pump chain front
(8) Oil pump sprocket front
(9) O-ring
(10) Oil pump ASSY
(11) Plate
(12) O-ring (small)
(13) O-ring (large)
(14) Converter case
(15) Reverse brake housing
(16) Oil pump shaft
(17) Snap ring
(18) Oil pump sprocket rear
(19) Oil pump chain rear
(20) Primary pulley ASSY

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8.5 (0.9, 6.3)
T2: 21 (2.1, 15.5)

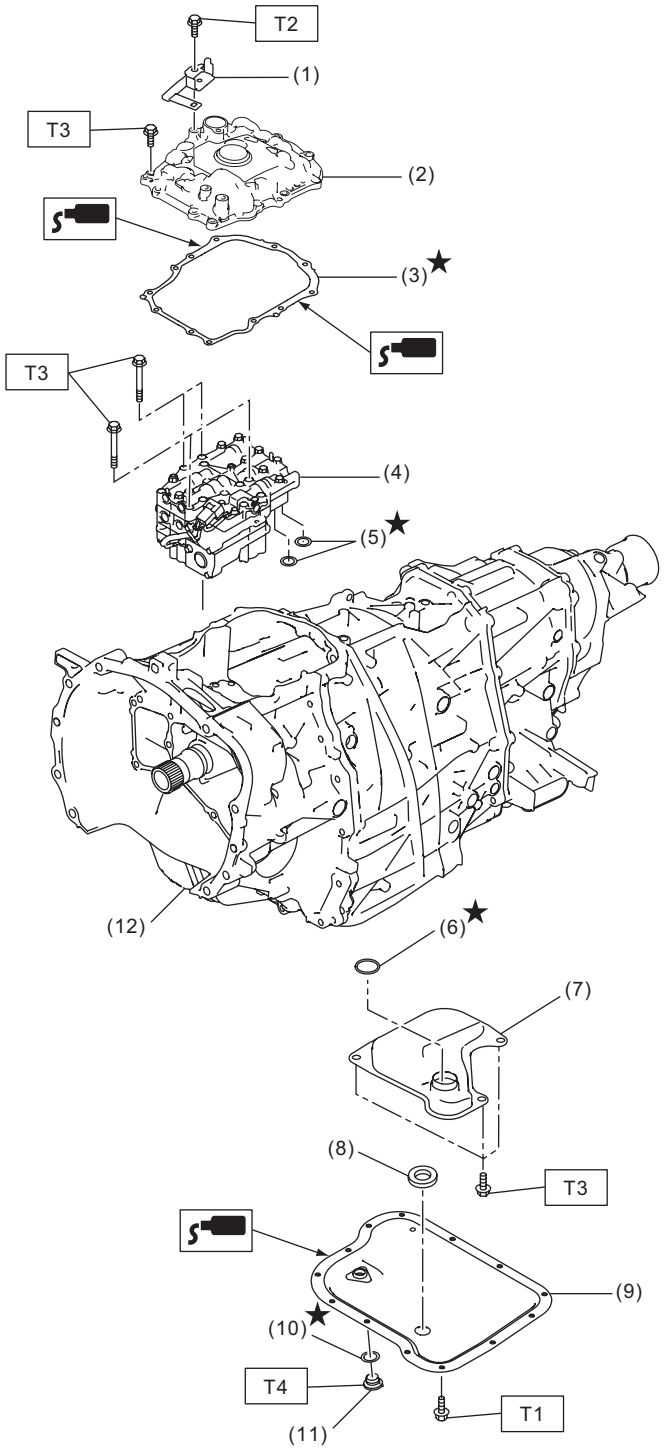
3. TRANSMISSION CASE



(1)	CVTF filter cover	(11)	Hose connector
(2)	Gasket	(12)	Air breather hose
(3)	CVTF filter	(13)	Oil stopper plate
(4)	Oil seal	(14)	Micro-encapsulated bolt
(5)	Gasket	(15)	Gasket
(6)	O-ring	(16)	O-ring
(7)	Air breather hose	(17)	O-ring
(8)	Air breather hose	(18)	Gasket
(9)	Bracket	(19)	Transmission case
(10)	Air breather cap	(20)	Seal ring

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 9 (0.9, 6.6)
T3: 13 (1.3, 9.6)
T4: 17 (1.7, 12.5)
T5: 22 (2.2, 16.2)
T6: 50 (5.1, 36.9)
T7: 60 (6.1, 44.3)

4. CONTROL VALVE BODY

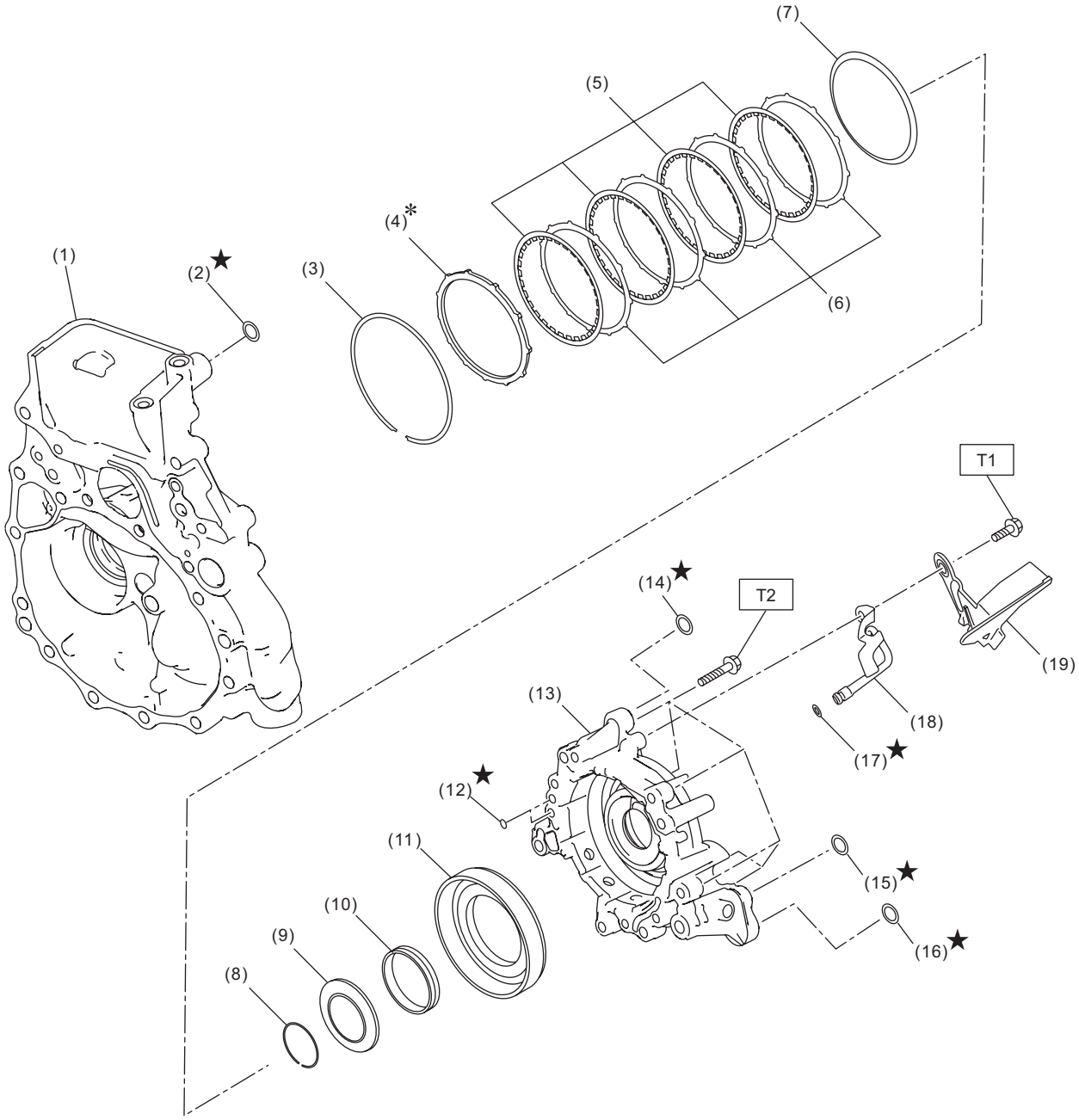


CVT00547

(1)	Transmission harness stay	(7)	Oil strainer	
(2)	Valve cover	(8)	Magnet	
(3)	Gasket	(9)	Oil pan	
(4)	Control valve body	(10)	Gasket	
(5)	O-ring	(11)	CVTF drain plug	
(6)	O-ring	(12)	Transmission ASSY	

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 7 (0.7, 5.2)
T3: 9 (0.9, 6.6)
T4: 31 (3.2, 22.9)

5. REVERSE BRAKE ASSEMBLY

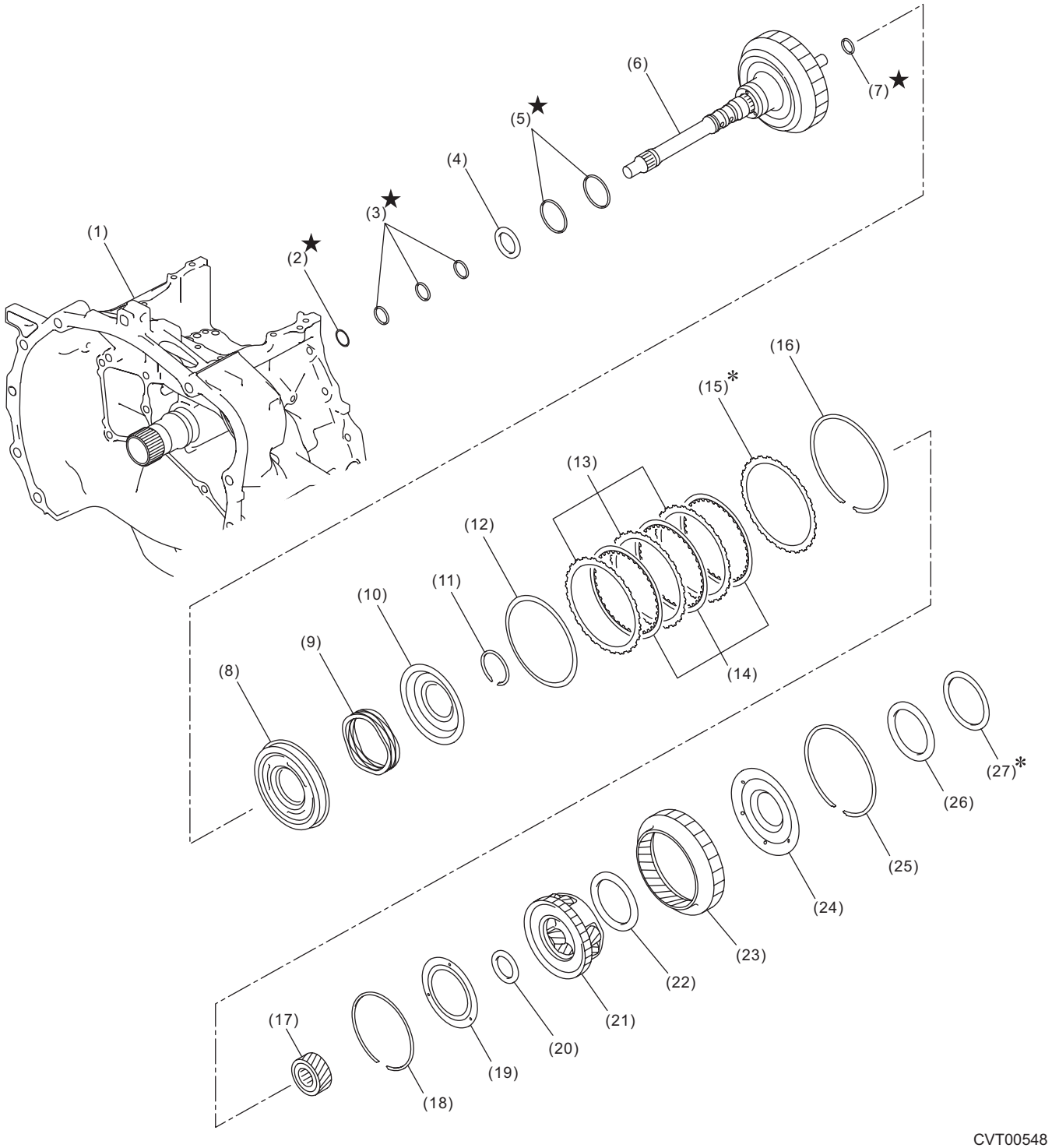


CVT01429

(1) Drive pinion retainer
(2) O-ring
(3) Snap ring
(4) Retaining plate
(5) Drive plate
(6) Driven plate
(7) Dish plate
(8) Snap ring
(9) Spring retainer
(10) Return spring
(11) Reverse brake piston
(12) O-ring
(13) Reverse brake housing
(14) O-ring
(15) O-ring
(16) O-ring
(17) O-ring
(18) Lubrication pipe
(19) Oil guide

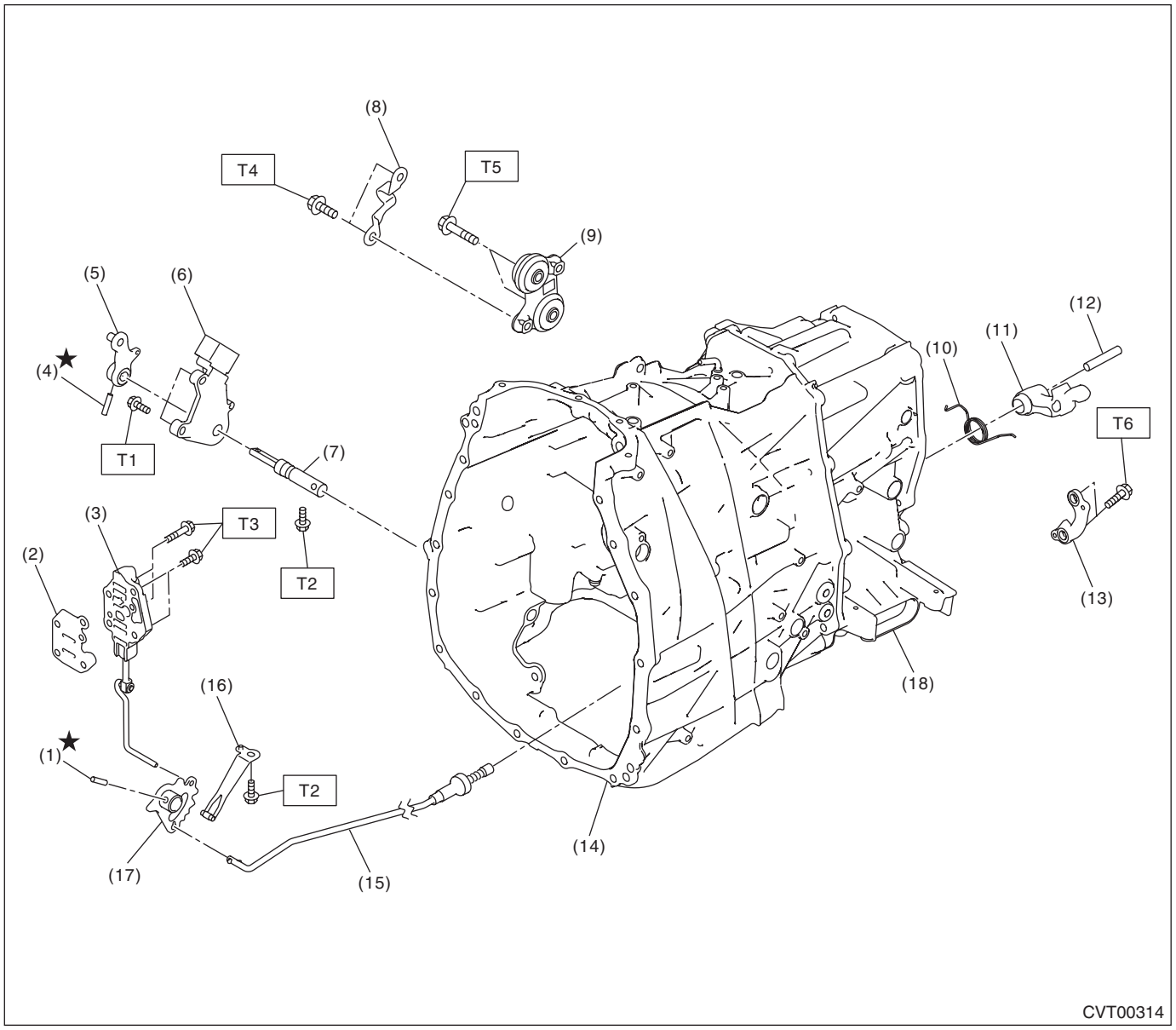
Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 37 (3.8, 27.3)

6. FORWARD CLUTCH ASSEMBLY



(1) Converter case
(2) O-ring
(3) Seal ring
(4) Thrust bearing
(5) Seal ring
(6) Forward clutch drum ASSY
(7) Seal ring
(8) Forward clutch piston
(9) Return spring
(10) Chamber COMPL
(11) Snap ring
(12) Dish plate
(13) Driven plate
(14) Drive plate
(15) Retaining plate
(16) Snap ring
(17) Sun gear
(18) Snap ring
(19) Balance oil guide
(20) Thrust bearing
(21) Planetary carrier ASSY
(22) Thrust bearing
(23) Internal gear
(24) Thrust gear plate
(25) Snap ring
(26) Thrust bearing
(27) Washer

7. TRANSMISSION CONTROL DEVICE

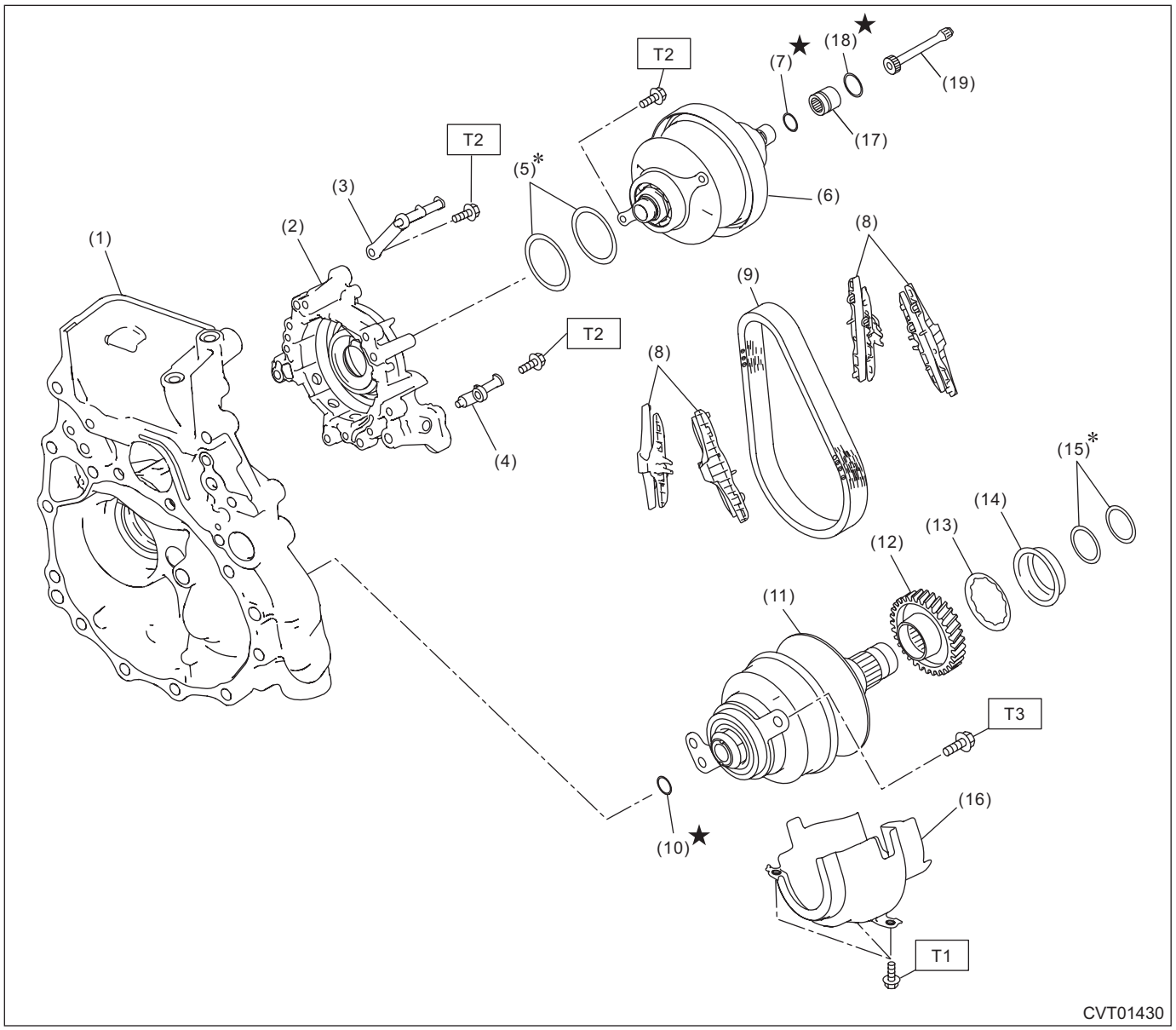


(1)	Spring pin	(10)	Return spring
(2)	Separator plate	(11)	Parking pawl
(3)	Manual valve ASSY	(12)	Shaft
(4)	Spring pin	(13)	Parking support
(5)	Shifter arm	(14)	Transmission case
(6)	Inhibitor switch	(15)	Parking rod
(7)	Shifter arm shaft	(16)	Detent spring
(8)	Cable bracket	(17)	Manual plate
(9)	Plate ASSY	(18)	Drive motor ASSY

Tightening torque: N·m (kgf-m, ft-lb)

- ***T1: 5 (0.5, 3.7)***
- ***T2: 7 (0.7, 5.2)***
- ***T3: 9 (0.9, 6.6)***
- ***T4: 18 (1.8, 13.3)***
- ***T5: 25 (2.5, 18.4)***
- ***T6: <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>***

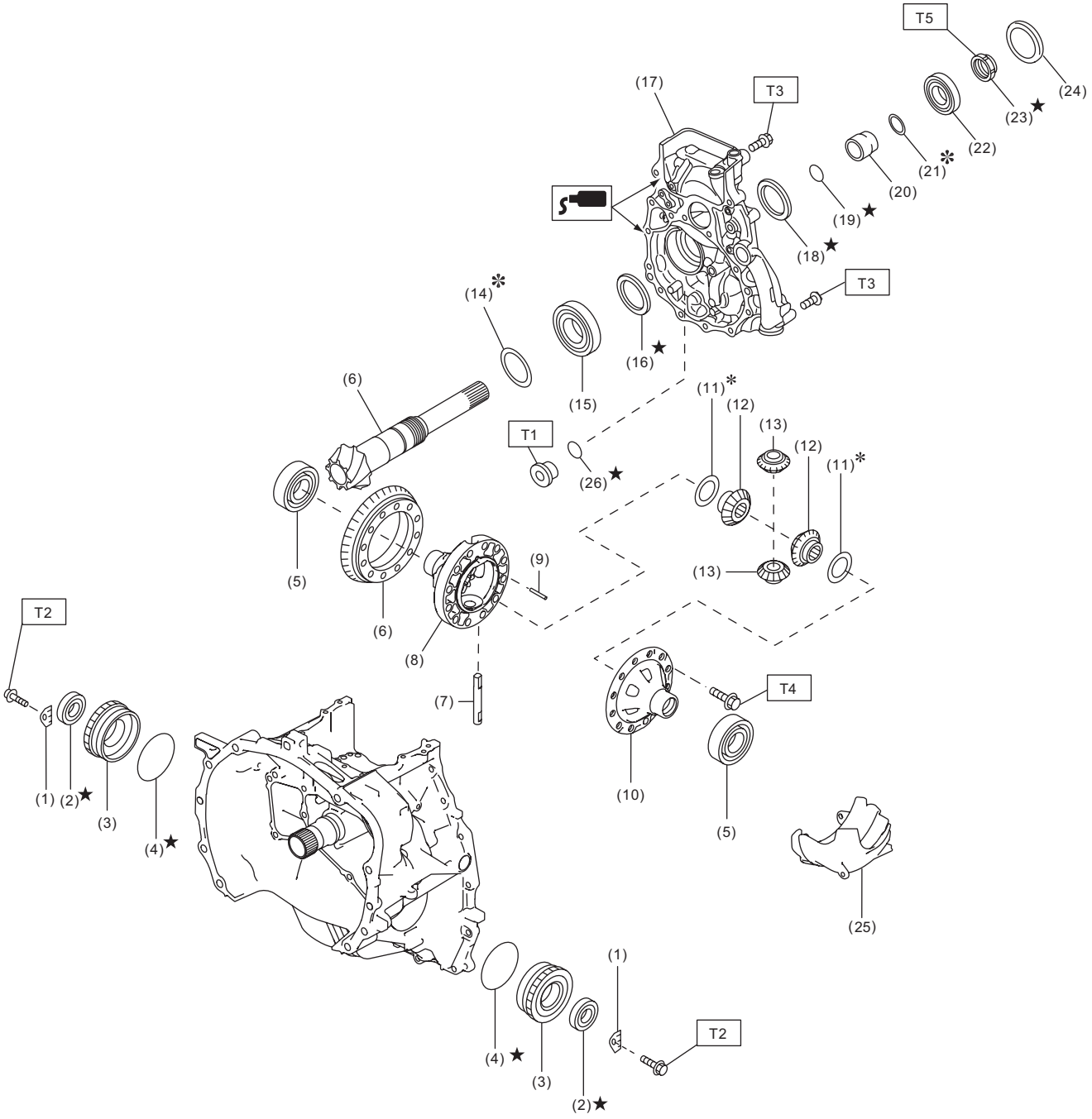
8. PRIMARY PULLEY, SECONDARY PULLEY & VARIATOR CHAIN AND REDUCTION DRIVE GEAR



(1) Drive pinion retainer
(2) Reverse brake housing
(3) Support rod
(4) Lubrication pipe
(5) Primary pulley shim
(6) Primary pulley ASSY
(7) O-ring
(8) Chain guide
(9) Variator chain
(10) Seal ring
(11) Secondary pulley ASSY
(12) Reduction drive gear
(13) Dish plate
(14) Spring retainer
(15) Reduction gear shim
(16) Oil baffle
(17) Sleeve
(18) O-ring
(19) Intermediate shaft

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 21 (2.1, 15.5)
T3: 67.5 (6.9, 49.8)

9. FRONT DIFFERENTIAL GEAR



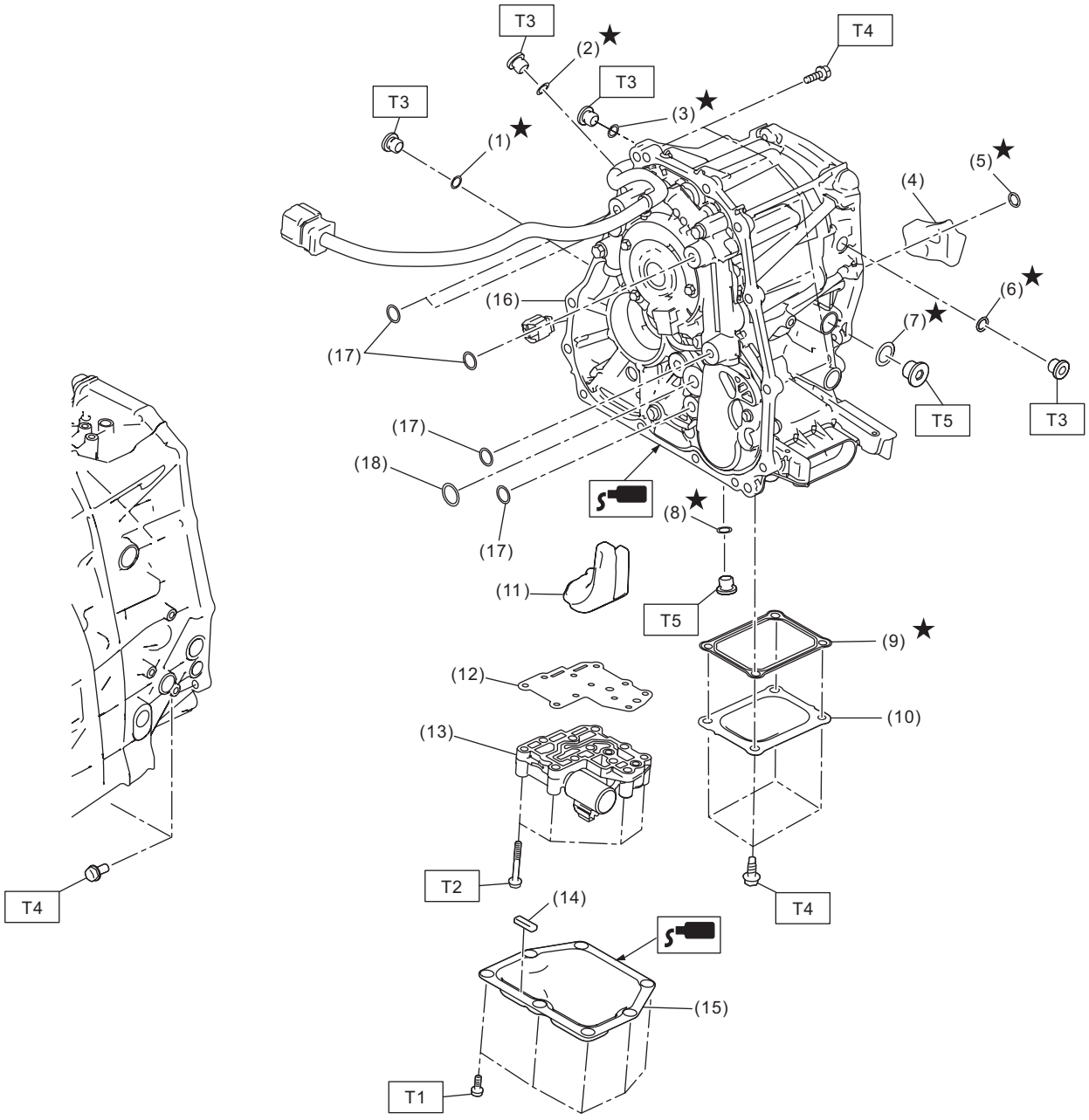
CVT10053

(1) Lock plate
(2) Oil seal
(3) Differential side retainer
(4) O-ring
(5) Taper roller bearing
(6) Drive pinion gear set
(7) Pinion shaft
(8) Differential case RH
(9) Straight pin
(10) Differential case LH
(11) Washer
(12) Differential bevel gear
(13) Differential bevel pinion
(14) Drive pinion shim
(15) Taper roller bearing
(16) Oil seal
(17) Drive pinion retainer
(18) Oil seal
(19) O-ring
(20) Drive pinion spacer
(21) Drive pinion washer
(22) Taper roller bearing
(23) Lock nut
(24) Plug
(25) Oil baffle
(26) O-ring

Tightening torque: N·m (kgf-m, ft-lb)

T1: 22 (2.2 16.2)
T2: 25 (2.5, 18.4)
T3: 43 (4.4, 31.7)
T4: 64 (6.5, 47.2)
T5: <Ref. to CVT(TH58A)-336, ASSEMBLY, Drive Pinion Shaft Assembly.>

10.DRIVE MOTOR ASSY

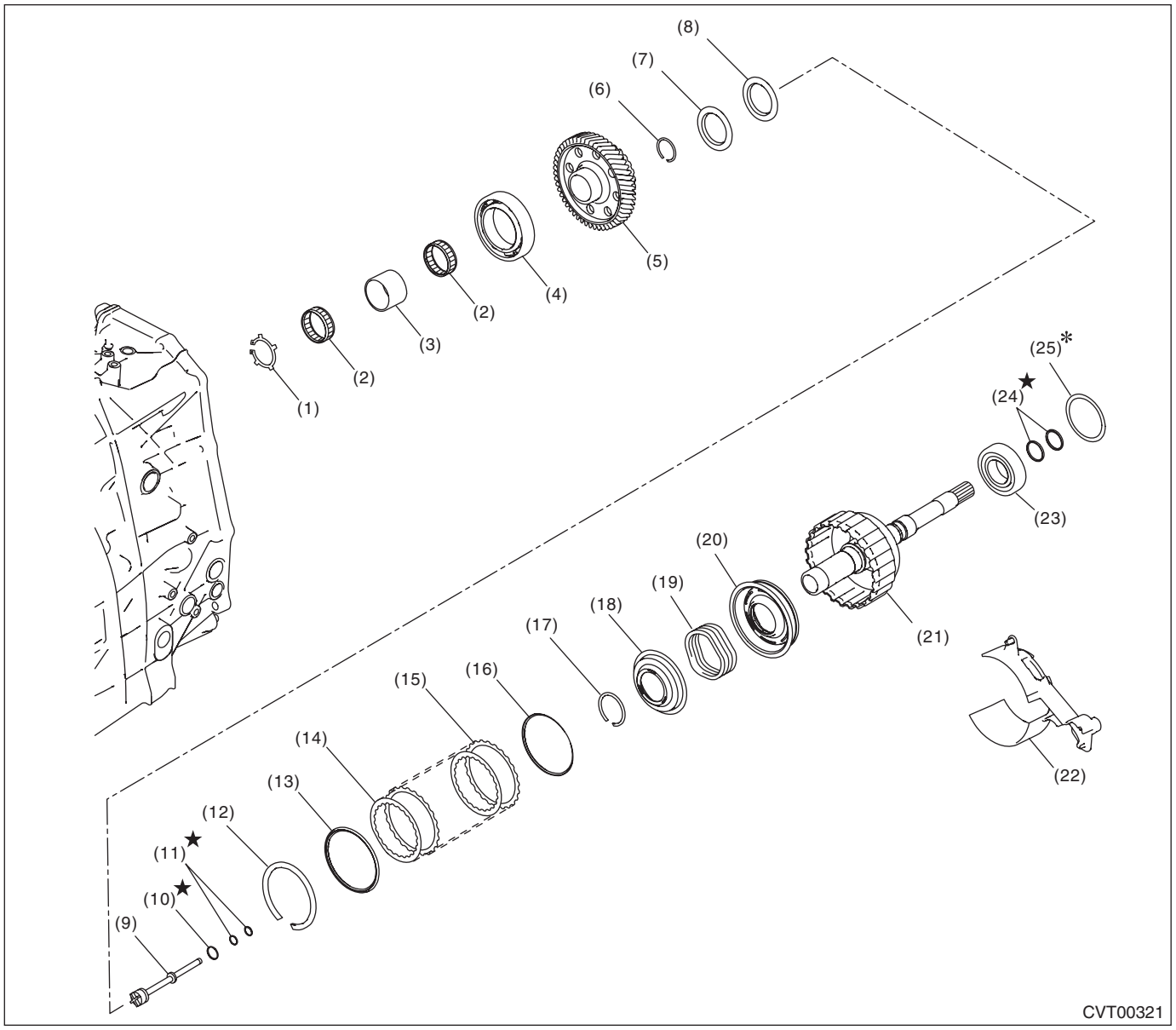


CVT10103

(1) O-ring
(2) O-ring
(3) O-ring
(4) Oil spacer
(5) O-ring
(6) O-ring
(7) O-ring
(8) O-ring
(9) Gasket
(10) Power connect cover
(11) Oil spacer
(12) Separator plate
(13) Output clutch control valve body
(14) Magnet
(15) Oil pan
(16) Drive motor case ASSY
(17) O-ring
(18) O-ring

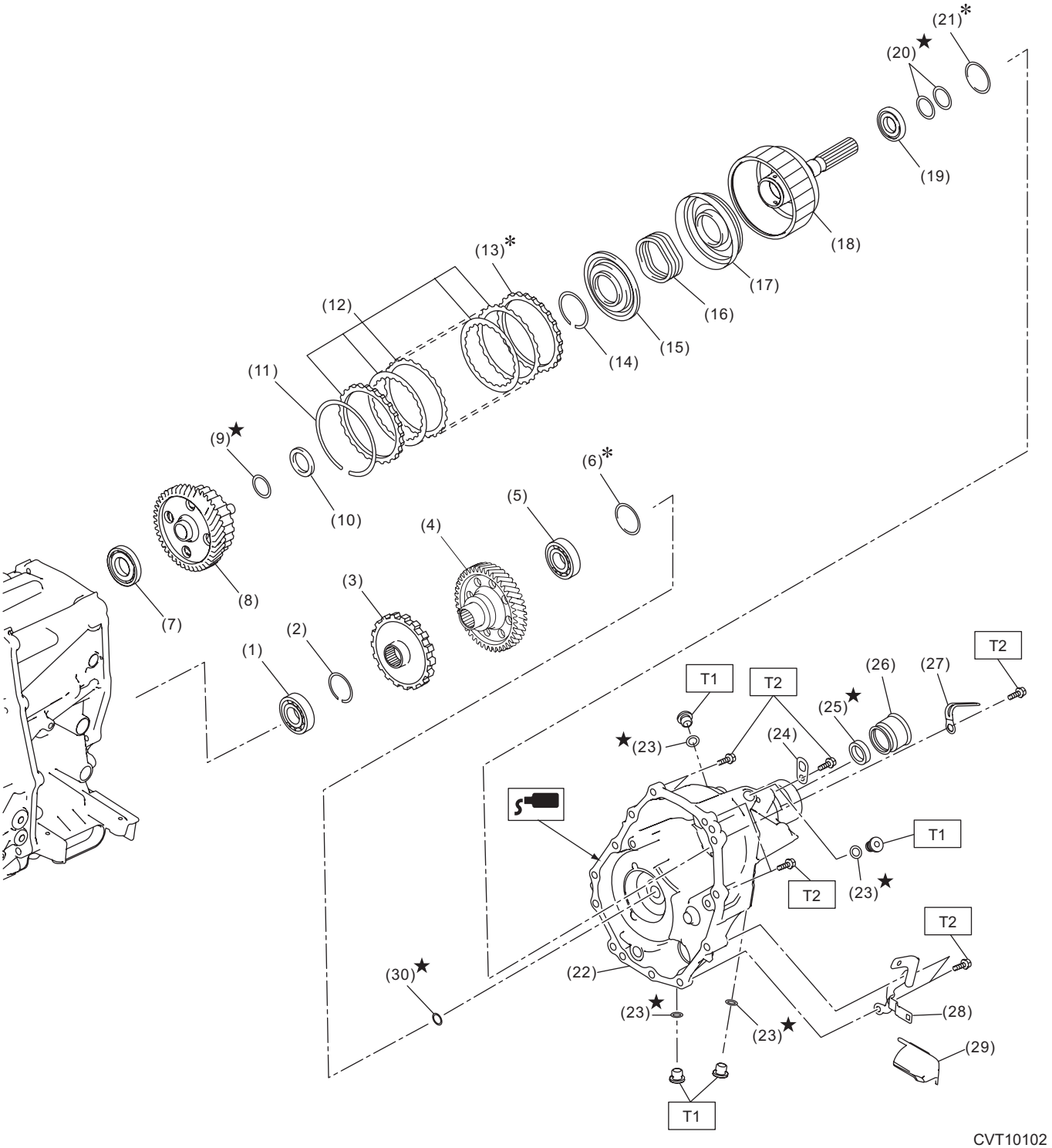
Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 9 (0.9, 6.6)
T3: 22 (2.2 16.2)
T4: 25 (2.5, 18.4)
T5: 50 (5.1, 36.9)

11.OUTPUT CLUTCH ASSEMBLY



(1) Snap ring
(2) Needle bearing
(3) Reduction driven gear bushing
(4) Ball bearing
(5) Reduction driven gear
(6) Snap ring
(7) Thrust bearing
(8) Thrust washer
(9) Oil pipe
(10) O-ring
(11) O-ring
(12) Snap ring
(13) Retaining plate
(14) Drive plate
(15) Driven plate
(16) Dish plate
(17) Snap ring
(18) Balance chamber
(19) Clutch piston return spring
(20) Clutch piston
(21) Driven shaft
(22) Oil baffle
(23) Ball bearing
(24) Seal ring
(25) Reduction driven gear shim

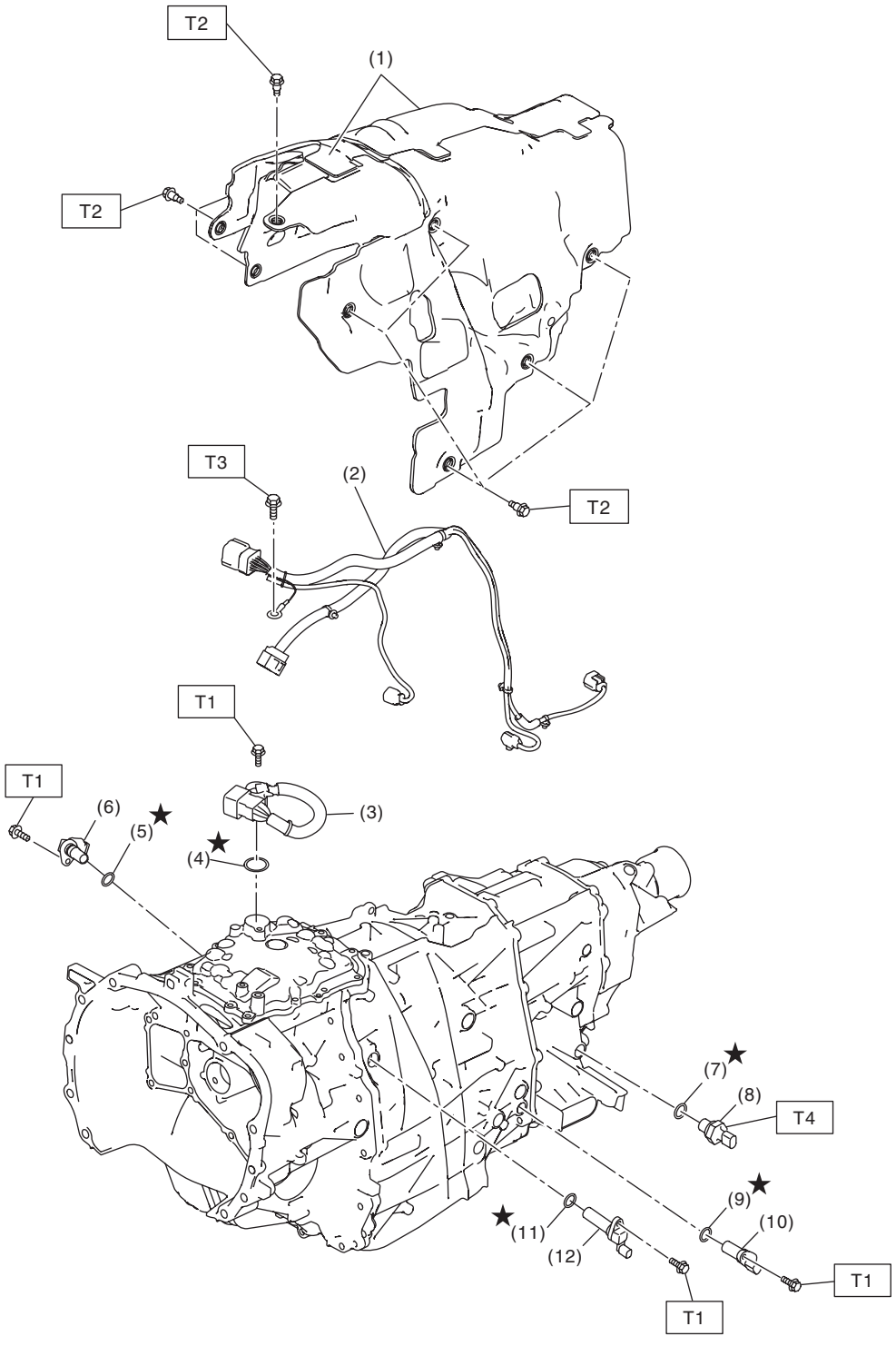
12.TRANSFER AND EXTENSION CASE



(1) Ball bearing
(2) Snap ring
(3) Parking gear
(4) Transfer drive gear
(5) Ball bearing
(6) Transfer drive gear shim
(7) Ball bearing
(8) Transfer driven gear
(9) Seal ring
(10) Thrust bearing
(11) Snap ring
(12) Transfer clutch plate set
(13) Pressure plate
(14) Snap ring
(15) Transfer clutch piston seal
(16) Transfer clutch piston return spring
(17) Transfer clutch piston
(18) Rear drive shaft
(19) Ball bearing
(20) Seal ring
(21) Transfer driven gear shim
(22) Extension case
(23) O-ring
(24) Transmission hanger
(25) Oil seal
(26) Dust cover
(27) Clip
(28) Harness bracket
(29) Sensor cover
(30) Seal ring

Tightening torque: N·m (kgf-m, ft-lb)
T1: 22 (2.2 16.2)
T2: 25 (2.5, 18.4)

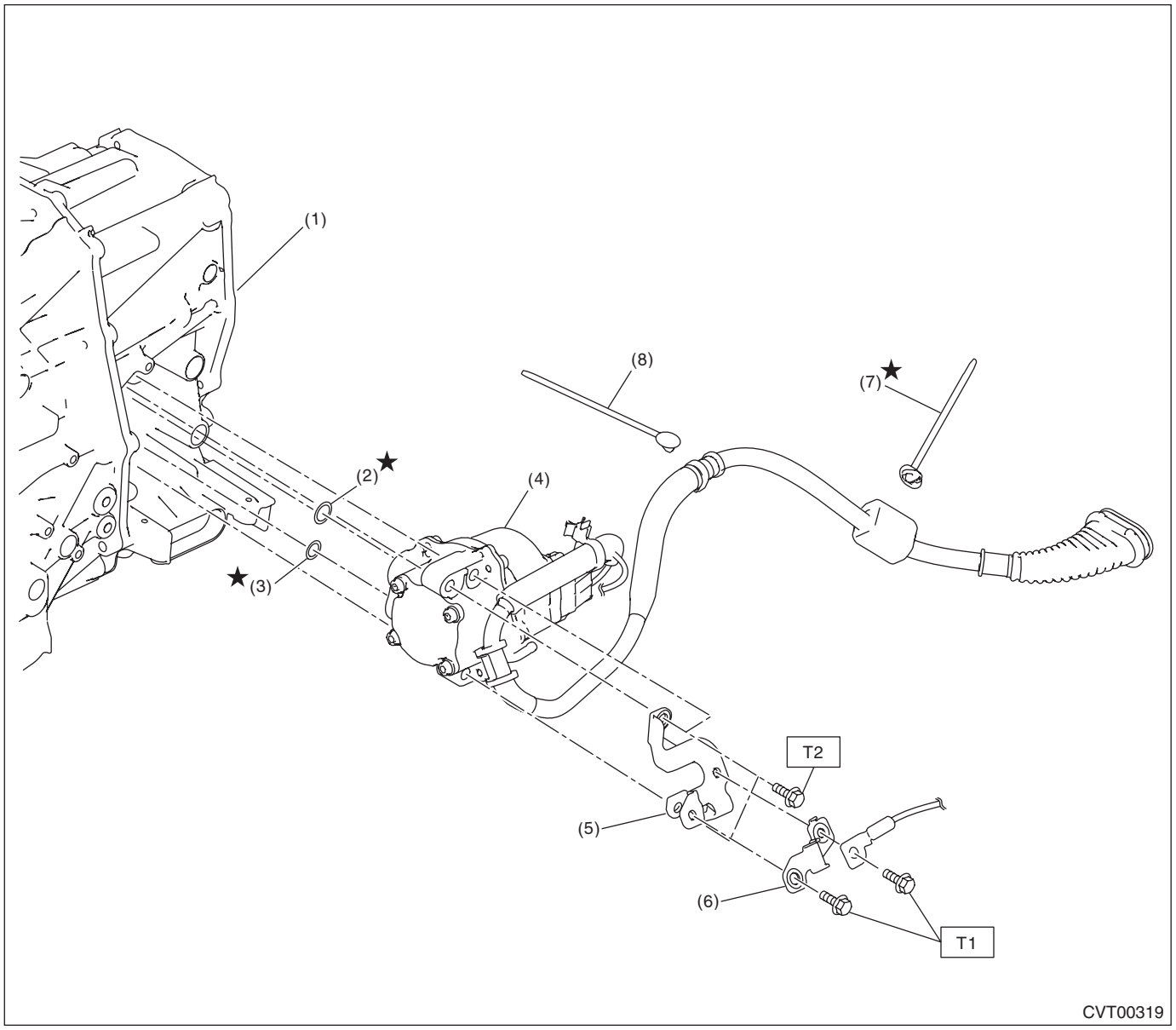
13.TRANSMISSION HARNESS AND SENSOR



(1)	Transmission case cover	(7)	O-ring
(2)	Inhibitor harness	(8)	Secondary pressure sensor
(3)	Transmission harness	(9)	O-ring
(4)	O-ring	(10)	Secondary speed sensor
(5)	O-ring	(11)	O-ring
(6)	Front wheel speed sensor	(12)	Turbine speed sensor

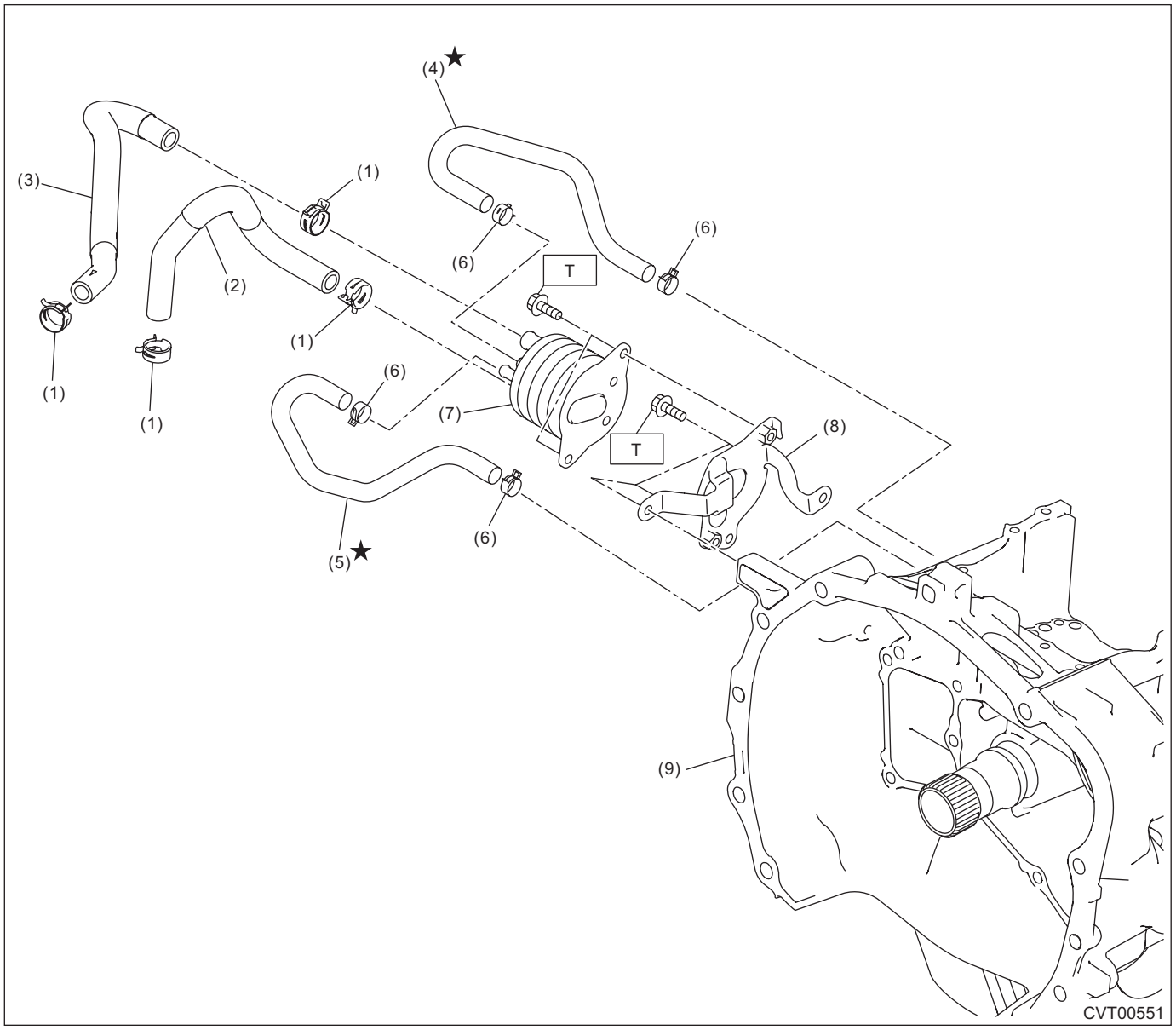
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.7, 3.7)
T2: 8 (0.8, 5.9)
T3: 14 (1.4, 10.3)
T4: 39 (4.0, 28.8)

14.ELECTRIC OIL PUMP



(1)	Drive motor ASSY	(5)	Harness bracket	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	O-ring	(6)	Harness bracket COMP	***T1: 8 (0.8, 5.2)***
(3)	O-ring	(7)	Electric oil pump harness clip	***T2: 22 (2.2, 16.2)***
(4)	Electric oil pump ASSY	(8)	Electric oil pump harness clip	

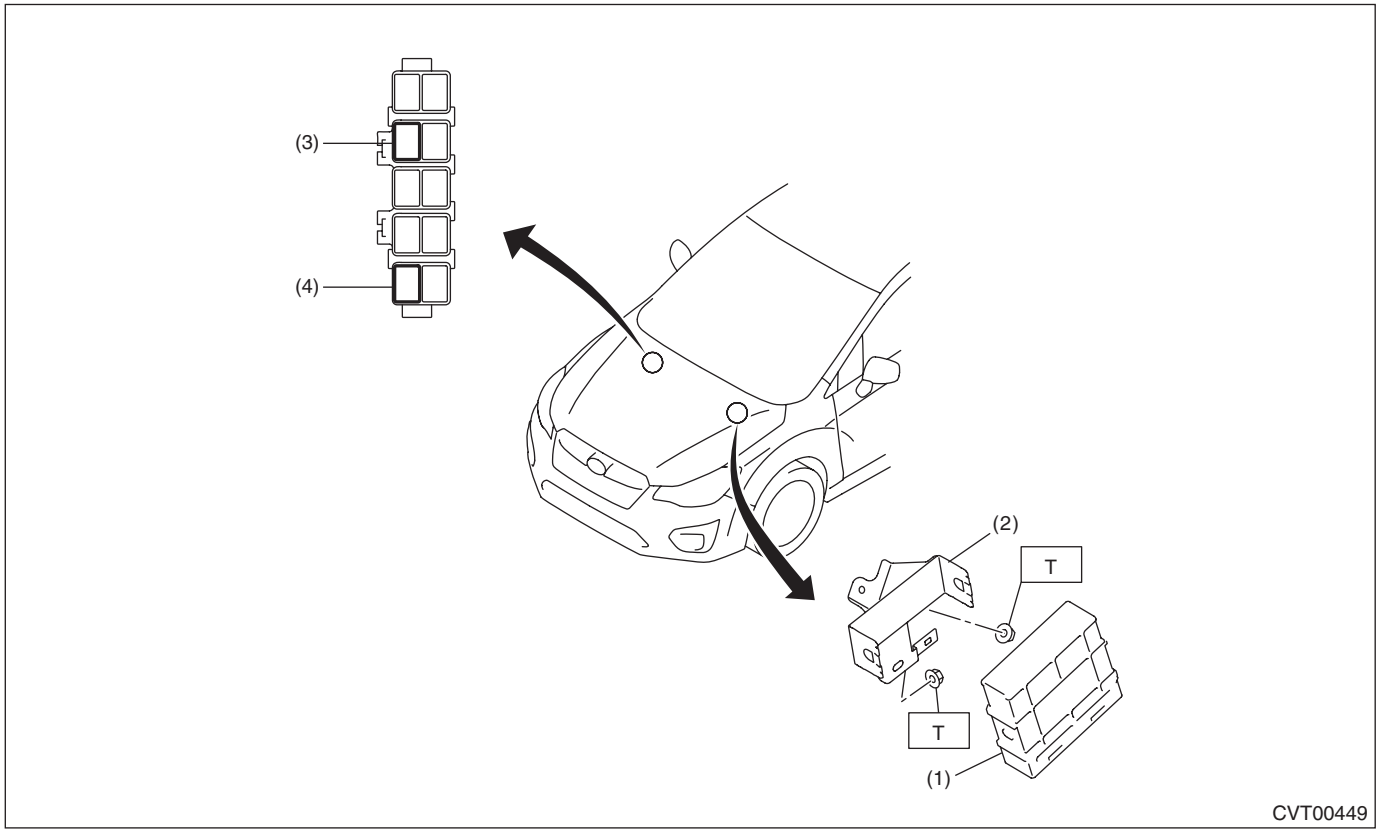
15.CVTF COOLER (WITH WARMER FEATURE)



(1) Hose clamp
(2) Engine coolant inlet hose
(3) Engine coolant outlet hose
(4) CVTF cooler outlet hose
(5) CVTF cooler inlet hose
(6) Hose clamp
(7) CVTF cooler (with warmer feature)
(8) CVTF cooler bracket
(9) Converter case

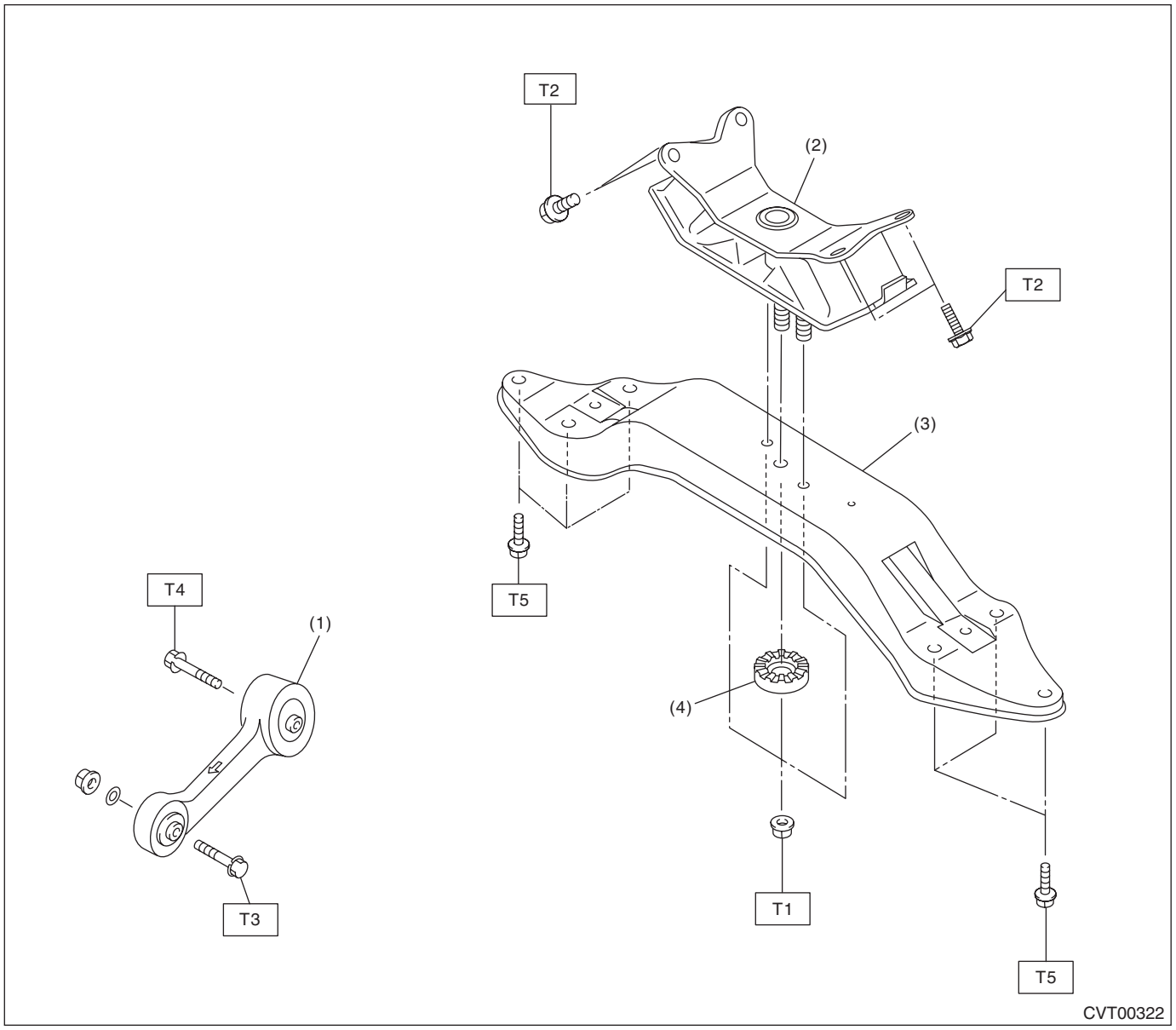
Tightening torque: N·m (kgf-m, ft-lb)
T: 23 (2.3, 17.0)

16.TRANSMISSION CONTROL MODULE



(1)	Transmission control module (TCM)	(3)	Self shut relay	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	TCM bracket	(4)	R range relay	***T: 7.5 (0.8, 5.5)***

17.TRANSMISSION MOUNTING



(1) Pitching stopper
(2) Rear cushion rubber
(3) Transmission rear crossmember
(4) Stopper

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 40 (4.1, 29.5)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)

C: CAUTION

• The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

• Wear appropriate work clothing, including insulated gloves, a cap, protective goggles and protective shoes when performing any work.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust and dirt.
• Do not place the valve cover with its inner side facing up until it is installed, to prevent intrusion of foreign matter into the main control valve body.
• Do not place the oil pan with its inner side facing up until it is installed, to prevent intrusion of foreign matter into the output clutch control valve body.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry apart with screwdrivers or other tools.
• Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
• Use SUBARU genuine CVTF and recommended grease. Do not mix CVTF, grease etc. of different grades or manufacturers.
• Be sure to tighten bolts and nuts to the specified torque.
• Apply CVTF onto sliding or revolving surfaces before installation.
• Replace deformed or damaged snap rings with new parts.
• Before installing O-rings or oil seals, apply sufficient amount of CVTF or gear oil to appropriate locations in order to avoid damage and deformation.
• Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
• Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
• Avoid damaging the mating surface of the case.
• Before applying liquid gasket, completely remove and clean the old liquid gasket.
• After removing the sensors, breather hose and plugs, plug the holes to avoid foreign materials intruding as necessary.
• During disassembly or assembly, be sure to use nylon gloves or paper towels. Do not use cloth gloves or waste cloth.
• Be careful of handling the oil seal, O-ring and gasket. If the contact surface of them is damaged, oil leakage may occur.
• When replacing the taper roller bearing, replace the outer race and inner race as a set.
• When replacing the hypoid gear, replace the hypoid gear and drive pinion shaft as a set.
• Replace the bolts if the seating surface or the thread surface is excessively rusted.

D: PREPARATION TOOL

1. SPECIAL TOOL

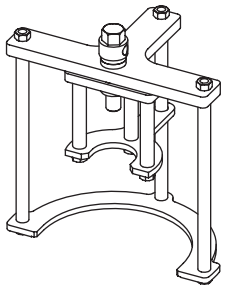
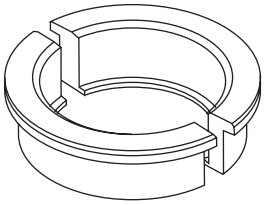
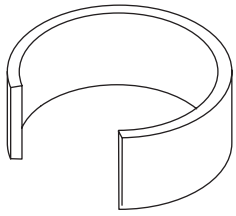
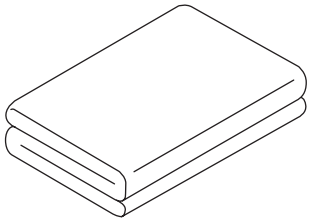
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18769AA010	18769AA010	EXPANDER PULLEY	Used for removing and installing the secondary pulley assembly.
 ST18767AA020	18767AA020	BEARING REMOVER	Used for removing the ball bearing of transfer clutch assembly and the ball bearing of transfer driven gear.
 ST18762AA010	18762AA010	COMPRESSOR SPECIAL TOOL	Used for removing and installing snap ring of forward clutch assembly and output clutch assembly.
 ST18761AA010	18761AA010	SHEET SPECIAL TOOL	• Used for removing and installing control valve body. • Used for removing and installing valve cover. • Used for removing and installing transmission harness.

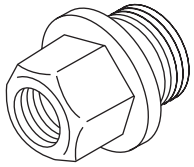
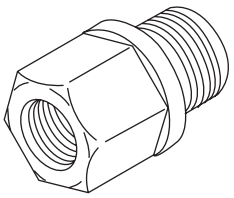
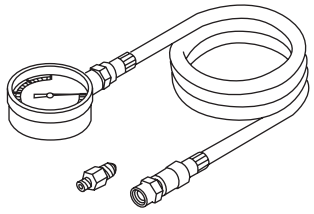
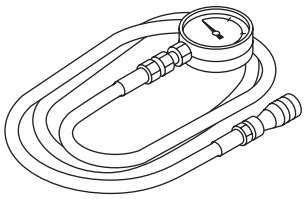
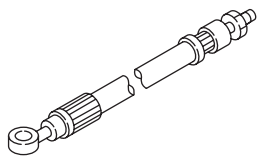
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18681AA010	18681AA010	PRESSURE GAUGE ADAPTER	Used for measuring the secondary pressure (line pressure). NOTE: Used together with the genuine O-ring (part No. 806916050).
 ST18681AA000	18681AA000	PRESSURE GAUGE ADAPTER	Used for measuring the hydraulic pressure of transfer clutch and output clutch pressure. NOTE: Used together with the genuine O-ring (part No. 806911080).
 ST18801AA000	18801AA000	OIL PRESSURE GAUGE ASSY	Used for measuring the hydraulic pressure of secondary pressure (line pressure) and output clutch pressure.
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring the transfer clutch hydraulic pressure.
 ST-498897800	498897800	OIL PRESSURE ADAPTER	Used for measuring the output clutch hydraulic pressure.

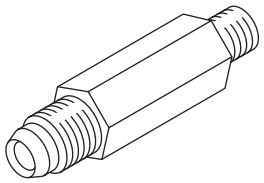
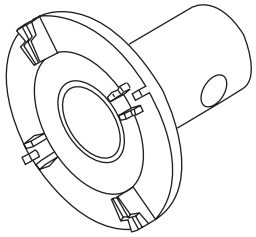
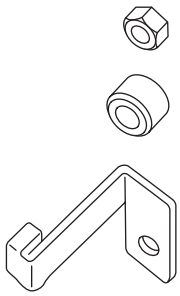
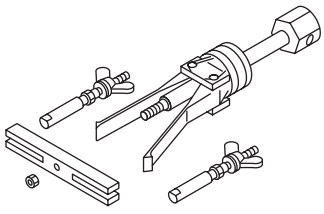
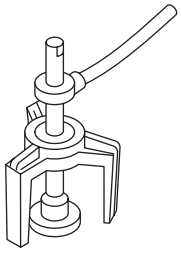
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498897200	498897200	OIL PRESSURE GAUGE ASSY	Used for measuring the transfer clutch hydraulic pressure.
 ST18658AA020	18658AA020	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.
 ST-498277200	498277200	STOPPER SET	• Used for removing and installing transmission assembly to engine. • Used for preventing the torque converter from dropping off.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension case oil seal. • Used for removing the bearing outer race of the drive pinion shaft.
 ST-398673600	398673600	COMPRESSOR	Used for removing and installing snap ring of forward clutch assembly and output clutch.

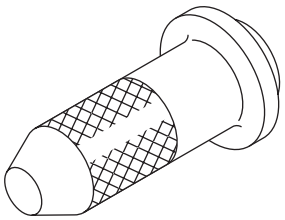
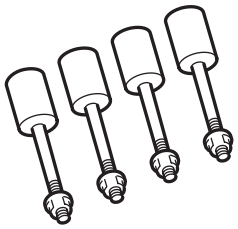
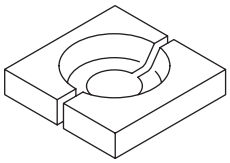
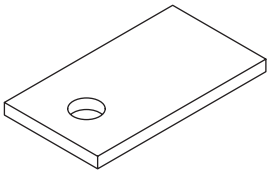
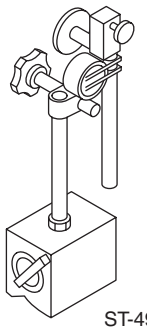
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498057300	498057300	OIL SEAL INSTALLER	Used for installing the extension case oil seal.
 ST18632AA000	18632AA000	STAND ASSY	Used for disassembling and assembling the transmission.
 ST-498515500	498515500	REMOVER	Used for removing the bearing inner race of the drive pinion shaft.
 ST-498255400	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247100).

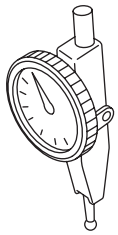
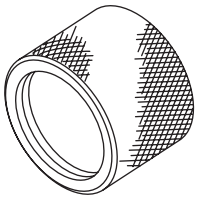
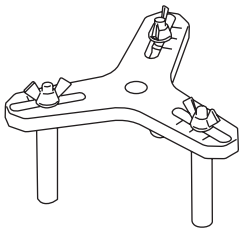
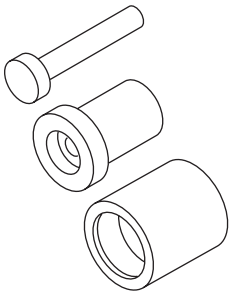
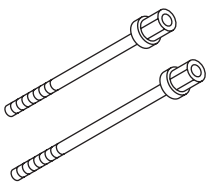
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247101).
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST18762AA001	18762AA001	COMPRESSOR SPECIAL TOOL	• Used for disassembling and installing the multi-plate clutch piston. • COMPRESSOR SPECIAL TOOL (18762AA000) can also be used.
 ST-927720000	927720000	HOUSING BUSHING INSTALLER AND REMOVER	• Used for installing the oil seal. • Use BUSHING SHAFT (927880000).
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for measuring the backlash of hypoid gear.

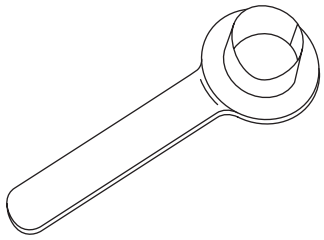
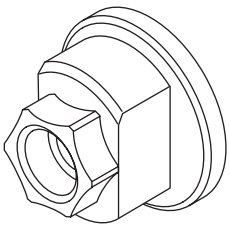
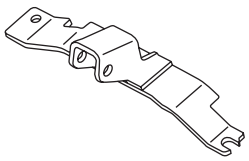
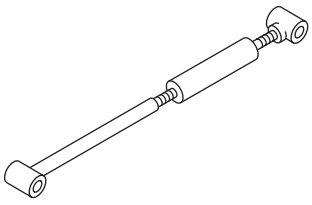
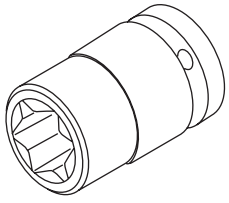
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.
 ST-498937110	498937110	HOLDER	• Used for removing and installing the drive pinion lock nut. • Used as a holder to rotate gear when checking tooth contact.
 ST41099AA012	41099AA012	ENGINE SUPPORT BRACKET	• Used for supporting the engine. • ENGINE SUPPORT BRACKET (41099AA011) can also be used.
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting the engine.
 ST18270KA020	18270KA020	SOCKET (E20)	• Used for removing and installing the hypoid driven gear. • Used for removing and installing the drive pinion shaft retainer.

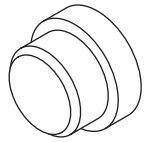
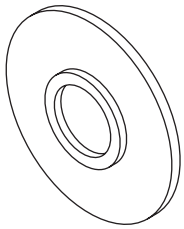
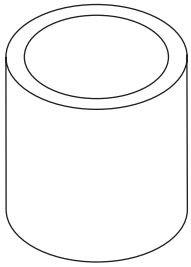
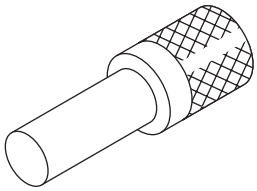
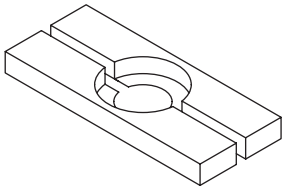
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398497701	398497701	SEAT	Used for removing and installing the bearing.
 ST-398177700	398177700	INSTALLER	• Used for installing the ball bearing. • Used for installing the bearing outer race. • Used for installing the plug.
 ST28499TC010	28499TC010	PRESS SNAP RING	Used for installing the bearing outer race of drive pinion shaft.
 ST-899864100	899864100	REMOVER	• Used for removing and installing the ball bearing. • Used for removing the transfer drive gear. • Used for removing the bearing inner race of the front differential.
 ST-498077000	498077000	REMOVER	Used for removing the bearing inner race of the front differential.

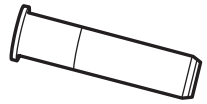
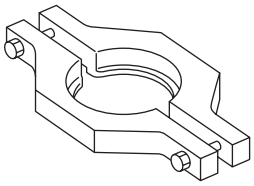
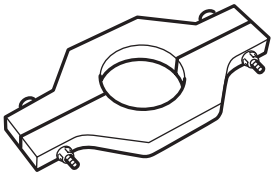
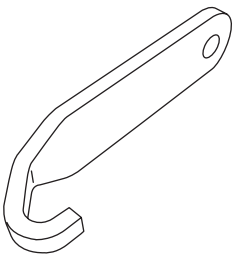
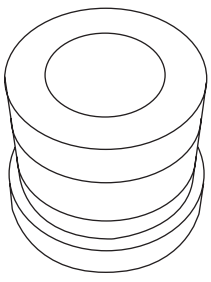
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18657AA010	18657AA010	INSTALLER	Used for installing the oil seal at shifter arm shaft portion.
 ST-498077600	498077600	REMOVER	Used for removing the ball bearing of drive sprocket.
 ST18723AA000	18723AA000	REMOVER	Used for removing the ball bearings of transfer clutch assembly and transfer driven gear.
 ST-498497300	498497300	CRANKSHAFT STOPPER	Used for stopping the drive plate rotation when removing and installing the drive plate.
 ST-399513600	399513600	INSTALLER	Used for removing the ball bearing of drive sprocket.

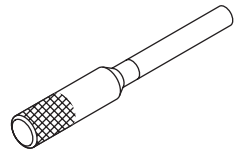
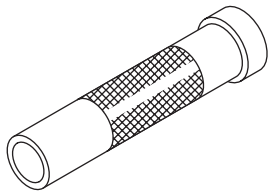
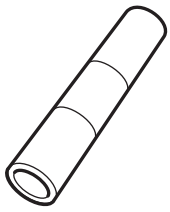
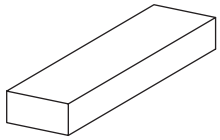
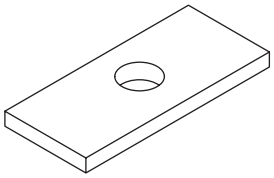
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499267300	499267300	STOPPER PIN	Used for adjusting the inhibitor switch.
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	• Used for installing the ball bearing. • Used for installing the bearing inner race.
 ST18651AA000	18651AA000	INSTALLER	Used for installing the ball bearing.
 ST-499575400	499575400	GAUGE	Used for measuring height of end play.
 ST-499575500	499575500	GAUGE	Used for measuring height of end play.

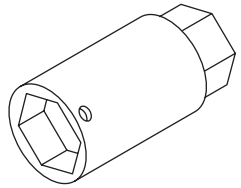
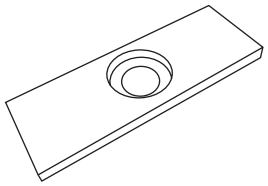
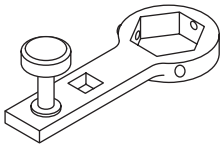
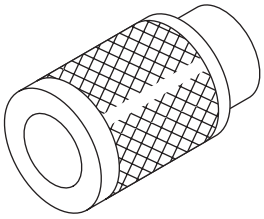
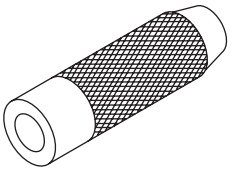
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787500	499787500	ADAPTER	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 ST-499575600	499575600	GAUGE	Used for measuring height of end play.
 ST-499787700	499787700	WRENCH	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 ST-499757002	499757002	INSTALLER	• Used for removing the bearing of reduction driven gear. • Used for installing the transfer drive gear.
 ST-899580100	899580100	INSTALLER	Used for installing the bearing inner race of drive pinion shaft.

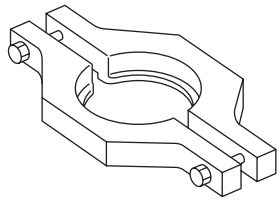
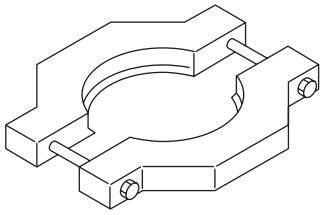
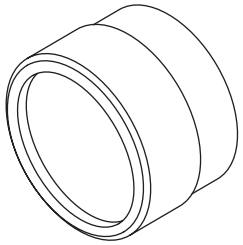
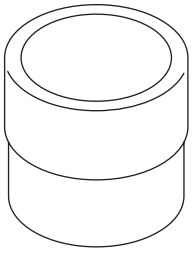
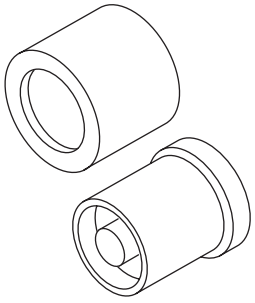
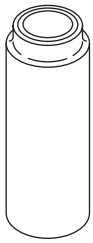
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077300	498077300	REMOVER	Used for removing the ball bearings of the reduction driven gear and output clutch assembly.
 ST18767AA000	18767AA000	REMOVER	Used for removing the parking gear.
 ST-499755502	499755502	PRESS SNAP RING	Used for installing the drive sprocket ball bearing.
 ST-499755602	499755602	PRESS SNAP RING	• Used for installing the oil seal. • Used for installing the ball bearing and roller bearing. • Used for installing the plug. • Used for installing the parking gear.
 ST20099AE020	20099AE020	INSTALLER	Used for installing the bearing outer race of drive pinion shaft.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927130000	927130000	EXTENSION DRIVE SHAFT	Used for installing the bearing inner race of drive pinion shaft.
STSSM4	- (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Thickness gauge	Used for measuring the clearance in reverse brake, forward clutch, output clutch and transfer clutch.
Oil pressure gauge	Used for measuring the electric oil pump hydraulic pressure.
Caliper	Used for measuring the dimension.
Spring scale	Used for measuring the starting torque of the drive pinion.
TORX® bit T70	Used for removing and installing differential gear oil drain plug.
Straight pin remover	Used for removing and installing the straight pin and spring pin.
Push/pull gauge	Used for measuring clutch clearance.
Angle gauge	Used for installing the drive plate.
Insulated gloves	Used for high voltage system operation.
Insulated tools	Used for high voltage system operation.
Insulating tape	Used for insulation by wrapping high voltage system cable connectors and terminals with it.
Insulation multimeter	Used for measuring high voltage system resistance and voltage.
DST-i	Used together with Subaru Select Monitor 4.

2. CVTF

A: INSPECTION

Check for leakage of CVTF from transmission.

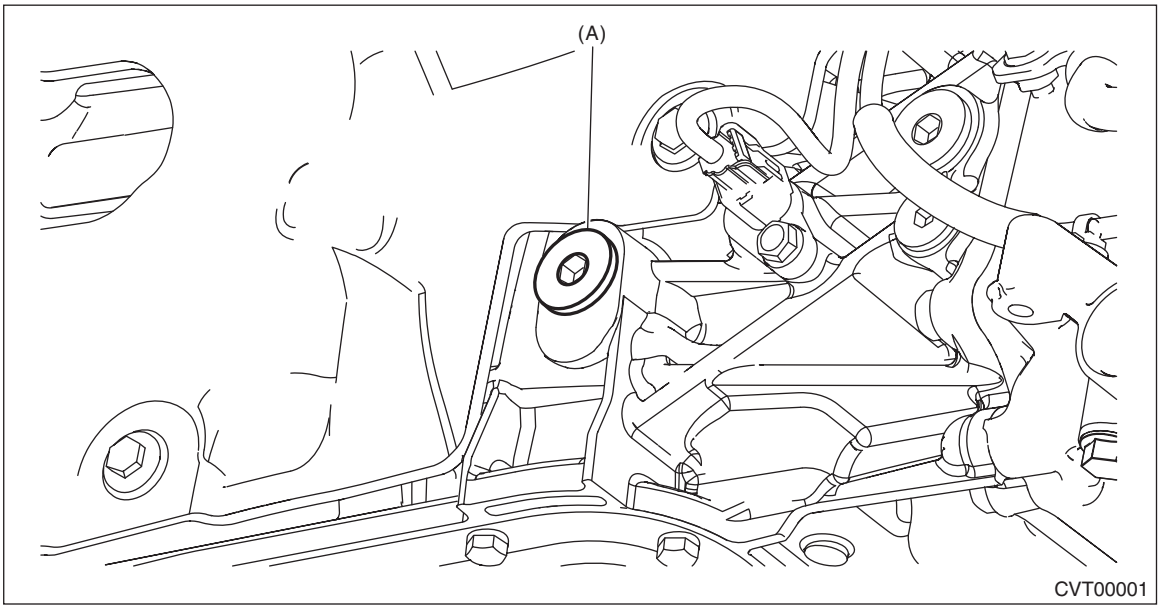
B: ADJUSTMENT

CAUTION:
• CVTF level changes along with CVTF temperature. When inspecting CVTF level, observe the specified CVTF temperature.
• Always use specified CVTF. Using other fluid will cause malfunction.

1) Perform “Engine only Drive Mode” using the Subaru Select Monitor. <Ref. to HEV(diag)-69, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, System Operation Check Mode.>
2) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
3) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.
4) While the select lever is in “P” range and the engine is running, lift up the vehicle and remove the filler plug.

CAUTION:
Pay special attention to the following operations as the engine is at idle.

NOTE:
CVTF is at the specified level when it is up to the filler plug hole lower section.

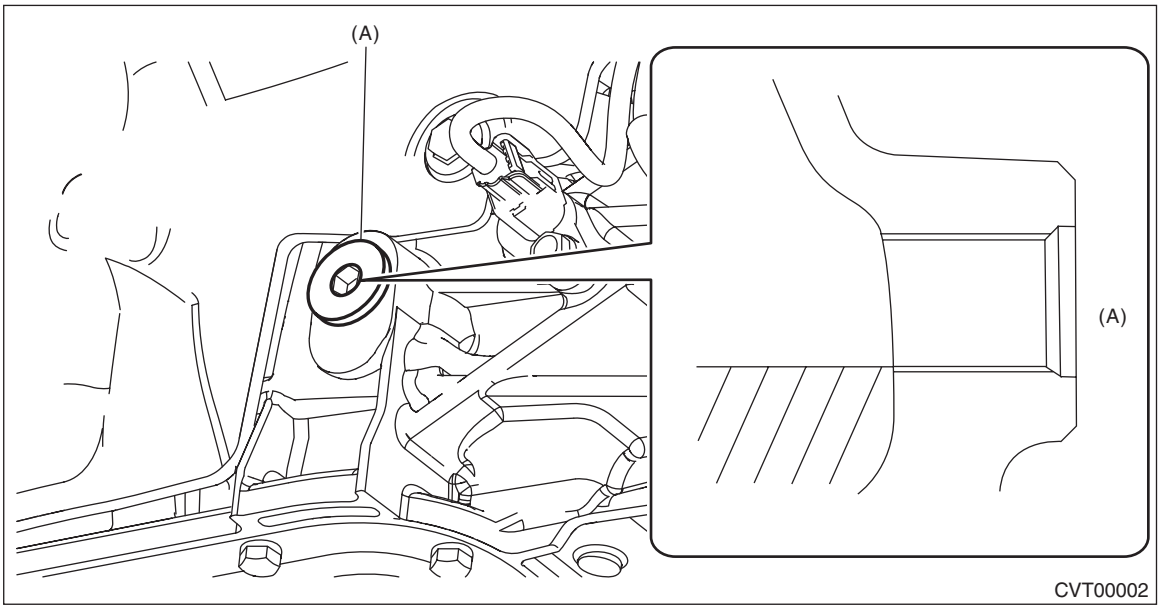


(A) Filler plug

5) When there is no CVTF leakage from the transmission, add the specified fluid up to the filler plug hole lower section.

Specified fluid:
<Ref. to CVT(TH58A)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

CAUTION:
Note that when CVTF is added up to the lower section of filler plug while the transmission is in cold condition, overfilling of CVTF occurs, causing the oil to spill out.



(A) Filler plug hole

6) Install the filler plug.

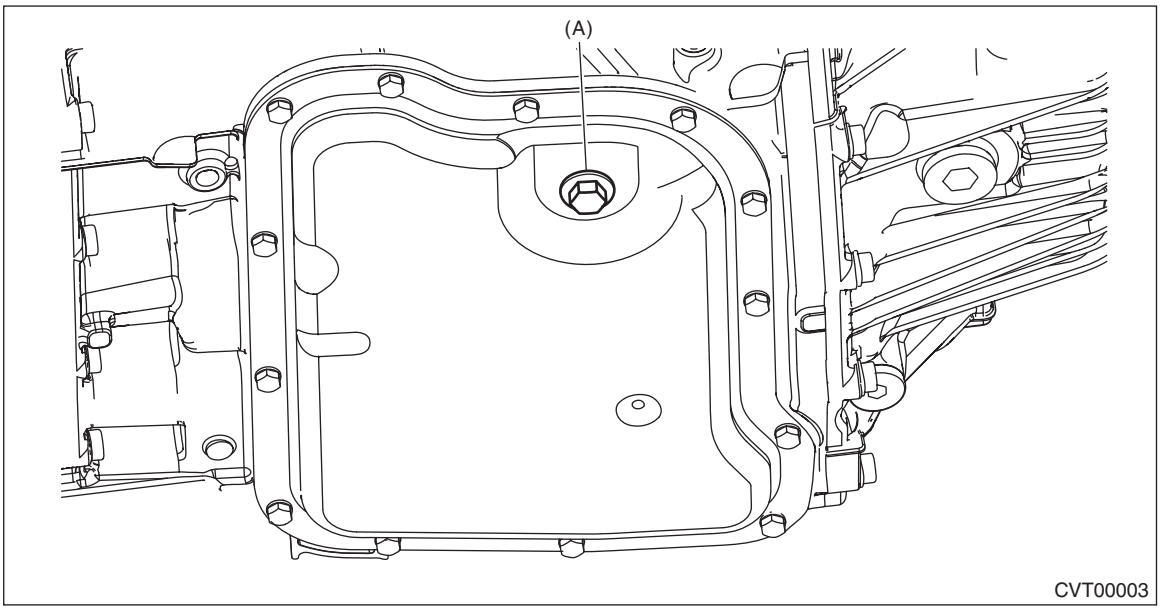
NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

C: REPLACEMENT

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill the CVTF on exhaust pipe to prevent it from emitting smoke or causing fires. If CVTF adheres, wipe it off completely.
• Always use specified CVTF. Using other fluid will cause malfunction.

1) Lift up the vehicle, and remove the CVTF drain plug.



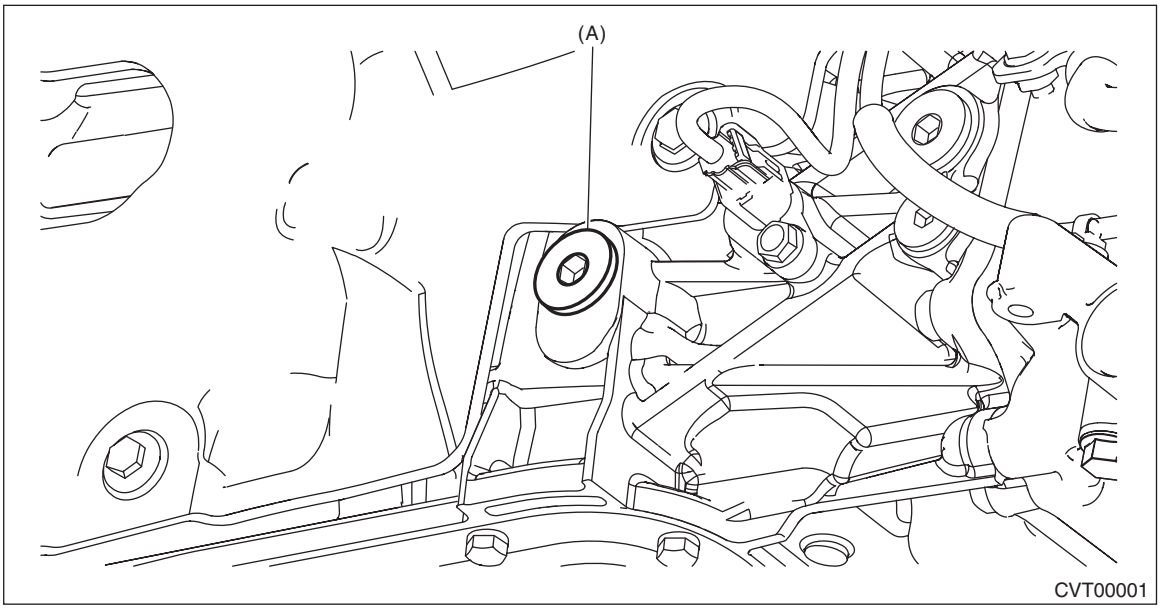
(A) CVTF drain plug

2) Check the CVTF condition. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
3) Install the CVTF drain plug and gasket.

NOTE:
Use a new gasket.

Tightening torque:
31 N·m (3.2 kgf-m, 22.9 ft-lb)

4) Remove the filler plug.



(A) Filler plug

5) Add the specified fluid up to the filler plug hole lower section.

Specified fluid:
<Ref. to CVT(TH58A)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

6) Temporarily tighten the filler plug.
7) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
8) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.

CAUTION:
Pay special attention to the following operations as the engine is at idle.

9) With the select lever shifted to “P” range and the engine started, lift up the vehicle. Adjust the CVTF level and check for leakage. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
10) Install the filler plug.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

D: CONDITION CHECK

NOTE:
When replacing CVTF, determine the condition inside the transmission body by inspecting the drained CVTF.

Fluid condition	Trouble and possible cause	Corrective action
Metal particles.	Excessive wear of the internal of the transmission body.	Replace CVTF and check if CVT operates correctly.
Thick and varnish-form fluid.	Burnt clutches	Replace CVTF and check the CVT body or vehicle for faulty.
Clouded CVTF or bubbles.	Water mixed in fluid.	Replace CVTF and check the water entering point.

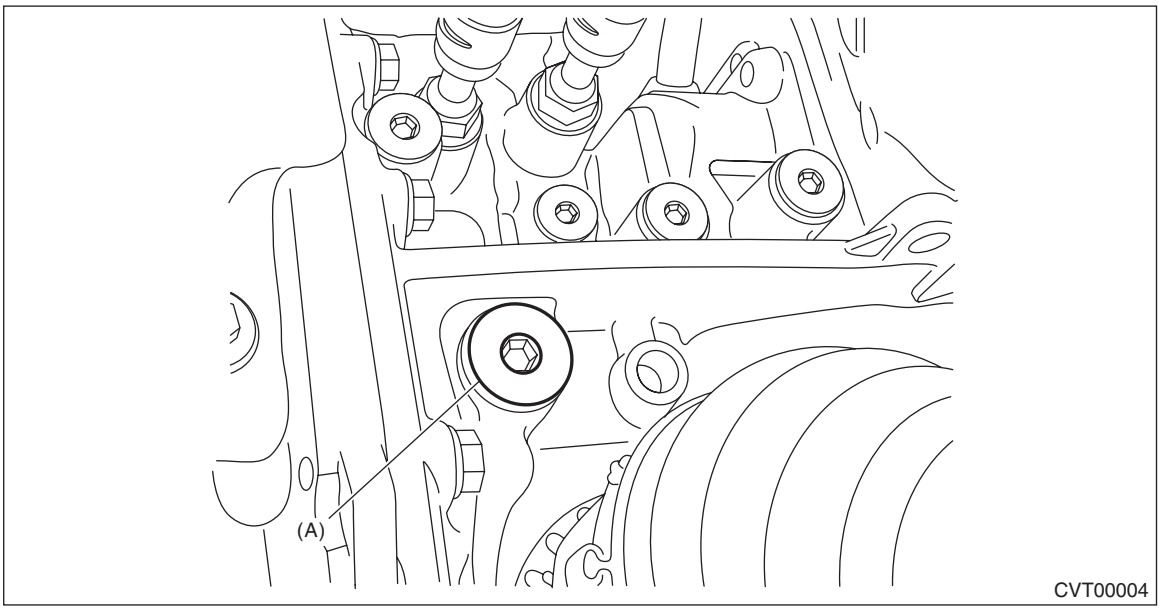
3. Differential Gear Oil

A: INSPECTION

Check that there is no leakage of differential gear oil from the converter case.

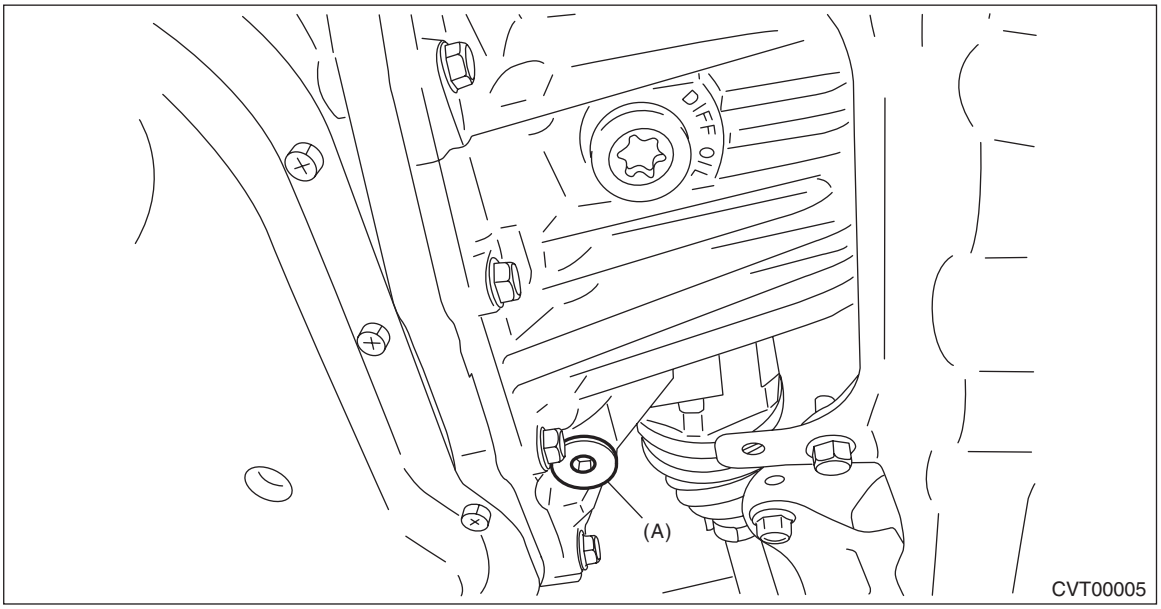
B: ADJUSTMENT

NOTE:
Immediately after removing the overflow drain plug, remaining gear oil (approx. 8 cc) may come out of the overflow pipe. This is not included in the specified amount. When removing the overflow drain plug, make sure the gear oil flows out of the overflow drain plug hole by filling with gear oil.
1) Turn the ignition switch to OFF.
2) Lift up the vehicle.
3) Remove the filler plug.



(A) Filler plug

4) Remove the overflow drain plug.



(A) Overflow drain plug

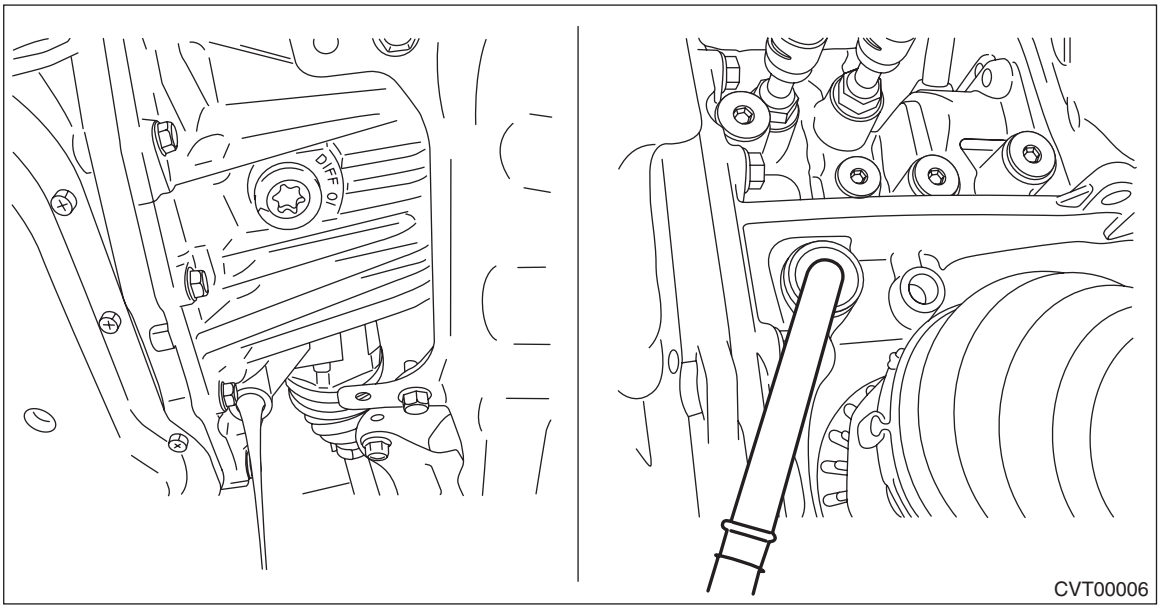
5) Fill in the differential gear oil through the filler plug hole up to where the oil flows out of the overflow drain plug.

Recommended gear oil:
<Ref. to CVT(TH58A)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

6) When the flow of the differential gear oil turns into a narrow stream, install the overflow drain plug.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



7) Install the filler plug.

NOTE:
Use a new gasket.

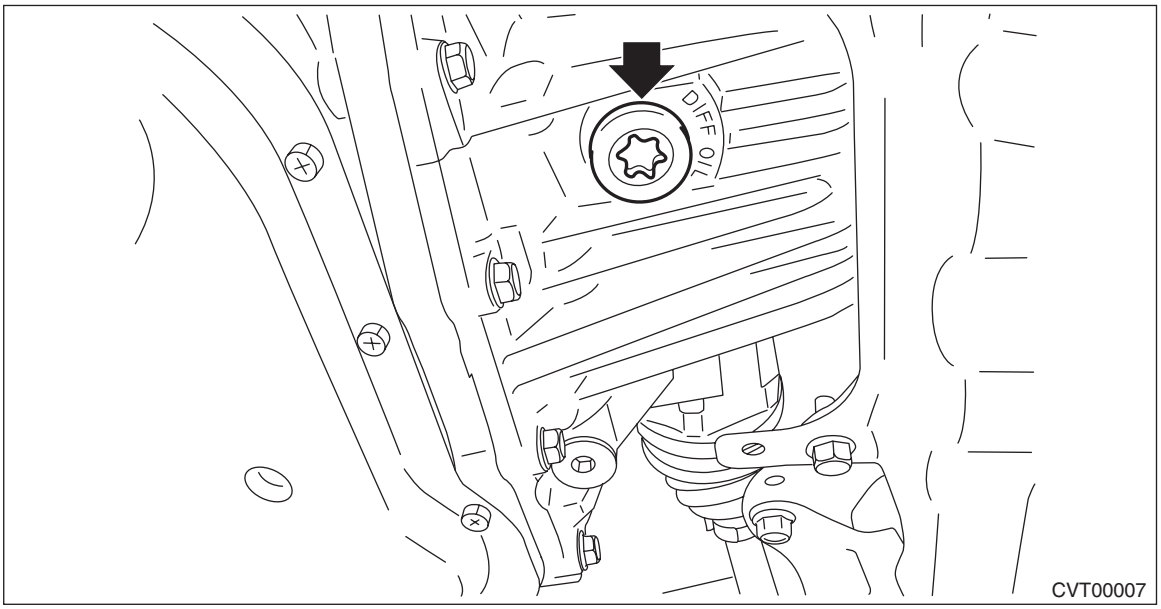
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

C: REPLACEMENT

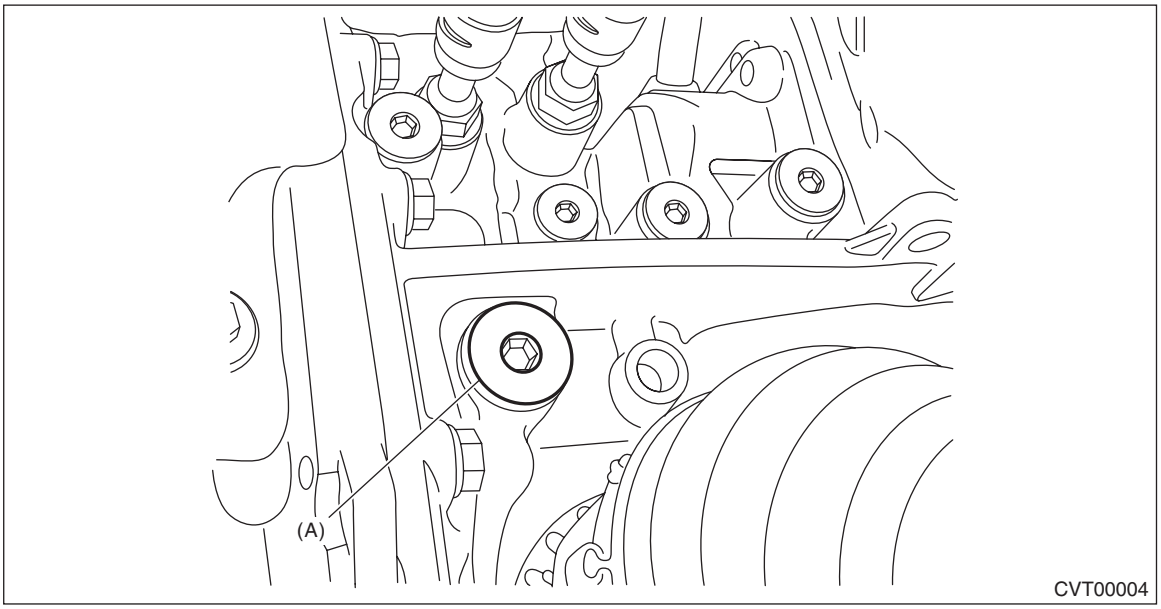
CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
• Be careful not to spill differential gear oil on the exhaust pipe to prevent it from emitting smoke or causing a fire. If gear oil adheres, wipe it off completely.
1) Lift up the vehicle.
2) Remove the differential gear oil drain plug using TORX® bit T70. Drain differential gear oil.
3) Install the differential gear oil drain plug using TORX® bit T70.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



4) Remove the filler plug.

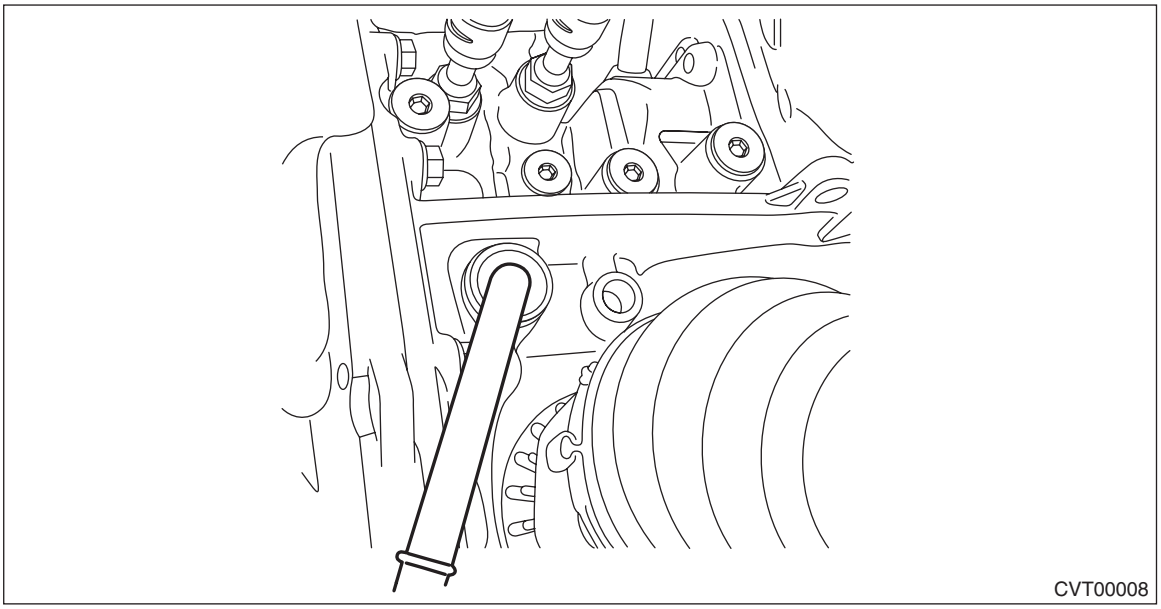


(A) Filler plug

5) Pour gear oil into the filler plug hole.

Recommended gear oil:
<Ref. to CVT(TH58A)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:
<Ref. to CVT(TH58A)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>



6) Adjust the level of differential gear oil. <Ref. to CVT(TH58A)-45, ADJUSTMENT, Differential Gear Oil.>

4. AWD ON/OFF Switching Mode

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- Perform as necessary in FWD mode.
- When switched to FWD, AWD light illuminates.

B: PROCEDURE

CAUTION:
• Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
• On completing the work in FWD, switch back in AWD.
• Perform the AWD ON/OFF changeover operation with the engine OFF.
1) Shift the select lever to “P” range.
2) Connect the Subaru Select Monitor to data link connector.
3) Press the push button ignition switch twice without depressing the brake pedal.
4) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger.
5) Select «Diagnosis» in the «Start» screen of Subaru Select Monitor.
6) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
7) On «Main Menu» display, select «Each System».
8) On «Select System» display, select «Transmission Control System».
9) On «Select Function» display, select «Work Support».
10) Select «AWD ON/OFF switching mode» in the «Work Support» screen.
11) Follow the messages displayed on the Subaru Select Monitor screen when working.
Switching completes successfully if any of the following messages is displayed.
- When switching from AWD to FWD: «Switched to FF. To return to AWD, perform basic mode again.»
- When switching from FWD to AWD: «Switched to AWD. To return to FF, perform basic mode again.»

NOTE:
- If communication error occurs during switching mode, start the «AWD ON/OFF switching mode» again.
- If operation is interrupted before the successful end message is displayed, perform the «AWD ON/OFF switching mode» from the beginning until confirming the operation is successfully ended. If this mode fails to complete successfully, the cause is as follows.
  - Select lever is not in “P” range.
  - Engine is running.
- For detailed operation procedures, refer to “Application help”.
- When performing the 2-wheel speed tester operation after FWD mode, place the vehicle on the speed tester, turn the ignition switch from OFF to ON, and then use the FWD mode. Failure to do so may cause a DTC on the hybrid system.

5. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

Road tests should be conducted to properly diagnose the condition of CVT.

CAUTION:
Always observe the local traffic laws when performing the test.

2. D RANGE SHIFT FUNCTION

Make sure that the engine speed is 950 — 1,400 r/min while driving on the level road at 50 km/h (31 MPH) after accelerating from halting up to 1/4 of accelerator opening angle. Then stop the vehicle. Check normal gear change has occurred while the vehicle speed changes from a constant speed to zero.

3. KICK-DOWN FUNCTION

Check if engine speed will rise by operating the accelerator opening angle to the full from a constant speed of 50 km/h (31 MPH) or more.

4. ENGINE BRAKE OPERATION

- Drive in “6th speed of manual mode” [70 — 80 km/h (43 — 50 MPH)], and shift down from 6th to 5th. Check if the indicator of combination meter switches “6” → “5”. At the same time, check the engine brake in 5th gear.
- Drive in “5th speed of manual mode” [60 — 70 km/h (37 — 43 MPH)], and shift down from 5th to 4th. Check if the indicator of combination meter switches “5” → “4”. At the same time, check the engine brake in 4th gear.
- Drive in “4th speed of manual mode” [50 — 60 km/h (31 — 37 MPH)], and shift down from 4th to 3rd. Check if the indicator of combination meter switches “4” → “3”. At the same time, check the engine brake in 3rd gear.
- Drive in “3rd speed of manual mode” [40 — 50 km/h (25 — 31 MPH)], and shift down from 3rd to 2nd. Check if the indicator of combination meter switches “3” → “2”. At the same time, check the engine brake in 2nd gear.
- Drive in “2nd speed of manual mode” [20 — 30 km/h (12 — 19 MPH)], and shift down from 2nd to 1st. Check if the indicator of combination meter switches “2” → “1”. At the same time, check the engine brake in 1st gear.

5. LOCK-UP FUNCTION

When the accelerator is lightly depressed while driving on a flat road in “D” range, check that rpm does not change abruptly.

6. P RANGE OPERATION

Stop the vehicle on an uphill grade of 5% or more and shift to the “P” range and apply the parking brake. Check that the vehicle does not move when the parking brake is released.

7. NOISE AND VIBRATION

Check for noise and vibration during driving at a constant speed, accelerating, decelerating and manual shift operation.

8. OIL LEAKAGE

After the driving test, inspect for leakage of CVTF and differential gear oil from the transmission body.

9. Auto Start Stop

NOTE:
- Perform inspection without using a lift and with the wheels in full contact with the ground.
- Measurement should be performed at CVTF temperature of 60°C (140°F) or more.

1) Start the engine.
2) Using the Subaru Select Monitor, check that Auto Start Stop cooperation prohibition demand is ON. <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>

NOTE:
If Auto Start Stop cooperation prohibition demand is «OFF», turn it to «ON».
   (1) Start the engine.
   (2) Check that no DTCs are recorded in TCM, ECM, VDCCM, BECM, DMCM and HPCM.
   (3) Check that ATF OIL TEMP or AWD light is not blinking or illuminating.
   (4) Check that the CVTF temperature reaches 60 — 90°C (140 — 194°F). <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>
   (5) Drive in D range at [20 — 30 km/h (12 — 19 MPH)], and slowly depress the brake pedal to decelerate the vehicle.
   (6) Check that «Auto Start Stop cooperation prohibition demand» is «ON». <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>
   When the cooperation prohibition demand is «OFF», repeat the procedure from step (1).
3) Shift the select lever to “D” range.
4) Set the vehicle to Auto Start Stop condition, and keep the condition for 5 seconds or more.
5) Release the brake pedal, depress the accelerator pedal firmly and start the engine to accelerate.
6) Stop the vehicle by depressing the brake pedal, and set the vehicle to Auto Start Stop condition.
7) Shift the select lever to “N” range.
8) Repeat steps from 3) to 7) five times.
9) Check that no shift shock occurs during engine starting.

If any shift shock occurred, repeat the steps five more times.

6. Stall Test

A: INSPECTION

CAUTION:
Make sure no other person is around the vehicle during stall test measurement.

NOTE:
Stall test is extremely important in diagnosing the condition of CVT and engine. The test is necessary to measure the engine stall speeds in “R” and “D” range.
Purposes of the stall test:

- Operational check of forward clutch, reverse brake and output clutch
- Operational check of the torque converter assembly
- Engine performance check

1) Place wheel chocks at the front and rear of all wheels and engage the parking brake.
2) Turn the A/C OFF.
3) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO HEV)(diag)-37, OPERATION, Subaru Select Monitor.>
4) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, Engine Oil.>
5) Check the coolant level. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
6) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
7) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to “N” or “P” range.
8) Shift the select lever to “D” range.
9) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
10) When the engine speed stabilizes, quickly record the engine speed and release accelerator pedal. Shift the select lever to “N” range. Let the engine idle for one minute or more to cool it down.

11) Shift to “R” range and perform the same stall test.

NOTE:
• Do not perform a stall test for over 5 seconds at a time. (From closed throttle, fully open throttle to stall speed reading.) Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
• Be sure to cool down the engine for at least one minute after each stall test with the select lever set in the “P” or “N” range and with the idle speed of 1,200 r/min or less.
• If the stall speed is higher than the specified range, attempt to finish the stall test in as short a time as possible, in order to prevent the CVT from sustaining damage.

Stall speed standard:
D range: 2,000 — 2,750 r/min
R range: 1,800 — 2,500 r/min

Stall test judgment

Stall speed (at sea level)	Range	Probable cause
Lower than standard value	D, R	• Insufficient engine output • Torque converter malfunction
Higher than standard value	D	• Forward clutch slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction • Output clutch pressure is low. • Output clutch slippage
	R	• Reverse brake slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction • Output clutch pressure is low. • Output clutch slippage
	D, R	• Torque converter malfunction • Control valve body malfunction • TCM malfunction • Damaged harness and harness connector

7. Time Lag Test

A: INSPECTION

NOTE:
When the select lever is shifted while the engine is idling, there will be a certain time elapse or lag before shock is felt. This symptom helps to check the condition of forward clutch and reverse brake.
- Perform the test at normal operation CVTF temperature of 60 — 80°C (140 — 176°F).
- Be sure to allow one minute or more interval between tests.
- Make three measurements and take the average value.

1) Apply the parking brake.
2) Start the engine. Check the idle speed. (A/C OFF)
3) Perform “Engine only Drive Mode” using the Subaru Select Monitor. <Ref. to HEV(diag)-69, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, System Operation Check Mode.>
4) Shift the select lever from “N” to “D” range. Using a stop watch, measure the time elapsed from shifting the lever until the shock is felt.

Time lag standard:
1.5 seconds or less

If “N” → “D” time lag is longer than specified:
- Secondary pressure (line pressure) is too low.
- Forward clutch worn
- Forward clutch piston malfunction
- Control valve body malfunction
- Learning incomplete

5) In the same manner, measure the time lag when shifting from “N” range to “R” range.

Time lag standard:
1.5 seconds or less

If “N” → “R” time lag is longer than specified:
- Secondary pressure (line pressure) is too low.
- Reverse brake worn
- Reverse brake piston malfunction
- Control valve body malfunction
- Learning incomplete

8. Secondary Pressure (Line Pressure) Test

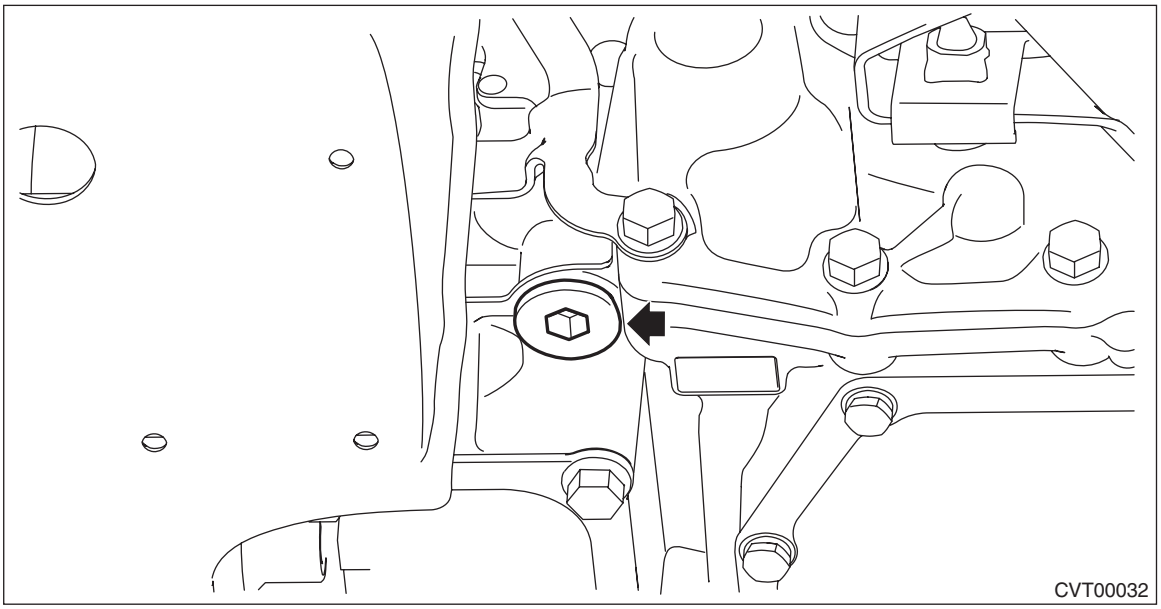
A: INSPECTION

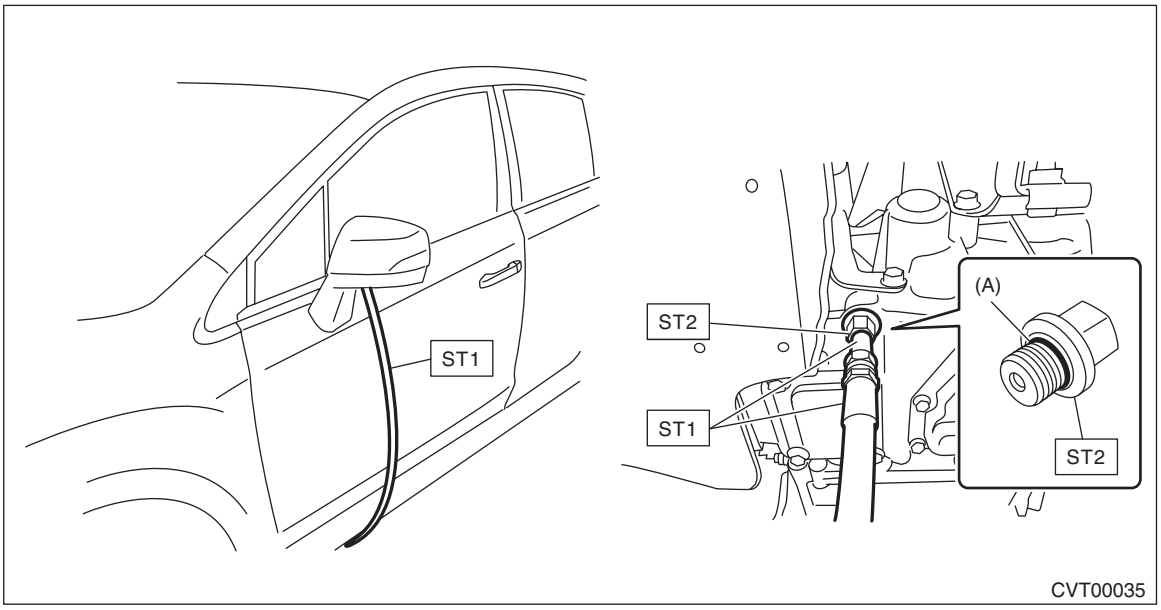
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during secondary pressure (line pressure) test measurement.
• After performing the secondary pressure (line pressure) test measurement, adjust the CVTF level.

NOTE:
• If the pulley and variator chain, clutch or brake show signs of slipping or shift feel is not correct, check the secondary pressure (line pressure).
• Connect Subaru Select Monitor to vehicle so as to measure the engine speed and actual secondary pressure (secondary pressure (line pressure)).
• In many cases, slippage or inability to operate the vehicle may be due to insufficient oil pressure for the operation of clutch, brake or control valve body.
1) Lift up the vehicle.
2) Remove the secondary pressure (line pressure) test plug, and install ST1 and ST2.

CAUTION:
Removal of the test plug and installation of the ST shall be both performed quickly.

NOTE:
Use ST2 PRESSURE GAUGE ADAPTER with genuine O-ring (Part No. 806916050) attached.
ST1 18801AA000 OIL PRESSURE GAUGE ASSY
ST2 18681AA010 PRESSURE GAUGE ADAPTER





(A) O-ring (genuine part)

3) Lower the vehicle.
4) Set the gauge so that it can be seen from the driver's seat.
5) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO HEV)(diag)-37, OPERATION, Subaru Select Monitor.>
6) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, Engine Oil.>
7) Check the coolant level. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
8) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
9) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to "N" or "P" range.
10) Shift the select lever to "D" range.
11) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.

12) Immediately after the engine speed becomes steady, record the reading of the secondary pressure (line pressure), engine speed and actual secondary pressure on Subaru Select Monitor. And then release the accelerator pedal. Shift the select lever to “N” range. Let the engine idle for one minute or more to cool it down.

NOTE:
• Do not continue the stall test for 5 seconds or more at a time (from fully closed throttle, fully open throttle to secondary pressure (line pressure) reading). Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
• After performing the secondary pressure (line pressure) test, be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range and with the idle speed at 1,200 r/min or less.
• Under each condition, check that the measured pressure matches almost totally with actual secondary pressure.
• When both measured pressure and actual secondary pressure are out of specification, judge as control valve body malfunction.
• The value at stall is for reference because the pressure changes under different conditions or circumstances.
• The value at idling is steady because it is not affected by any condition or circumstance.
• After starting the engine with the select lever set in “P” range, when the secondary pressure is measured during idling without performing shift operation, the result may exceed the standard. Shift the select lever to the “D” or “R” range, then measure the value.

Secondary pressure (line pressure) standard				
	Range	Throttle	Brake	Secondary pressure (line pressure) (MPa (kgf/cm^2, psi))
Stall	D, R	Full open	ON	4.5 — 6.0 (45.9 — 61.2, 652 — 870)
Idling	P, N	Full closed	OFF	0.5 — 1.5 (5.1 — 15.3, 72 — 218)

13) Remove the ST and install the plug after measurement.

CAUTION:
Removal of the ST and installation of the test plug shall be both performed quickly.

NOTE:
• Use new O-rings.
• Apply CVTF to the O-rings.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)
14) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

9. Output Clutch Pressure Test

A: INSPECTION

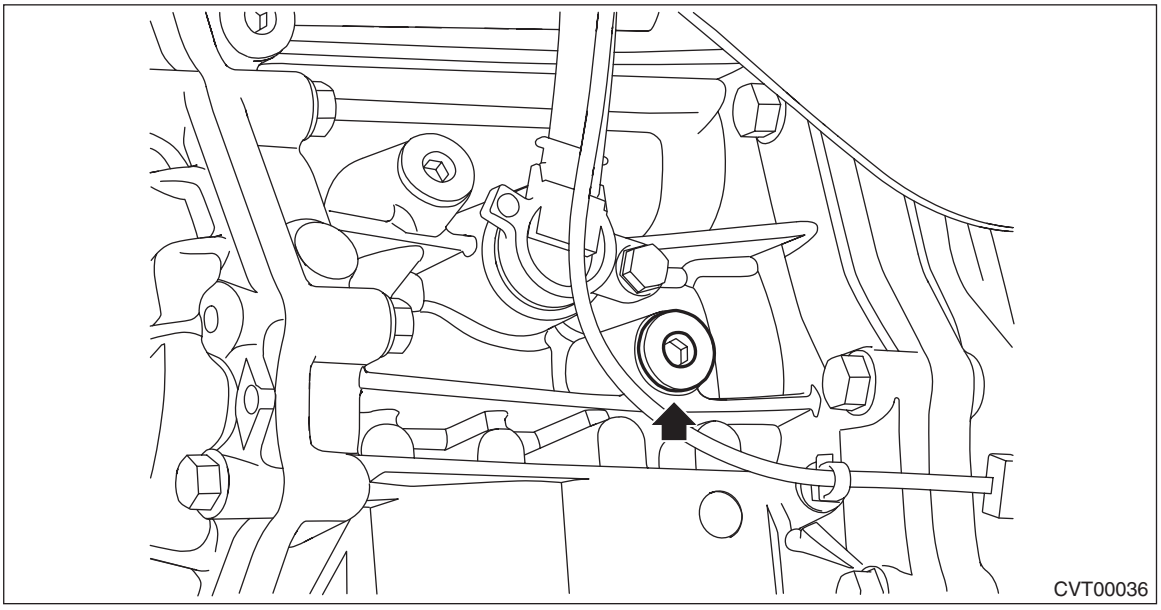
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during output clutch pressure test measurement.
• After performing the output clutch pressure test measurement, adjust the CVTF level.

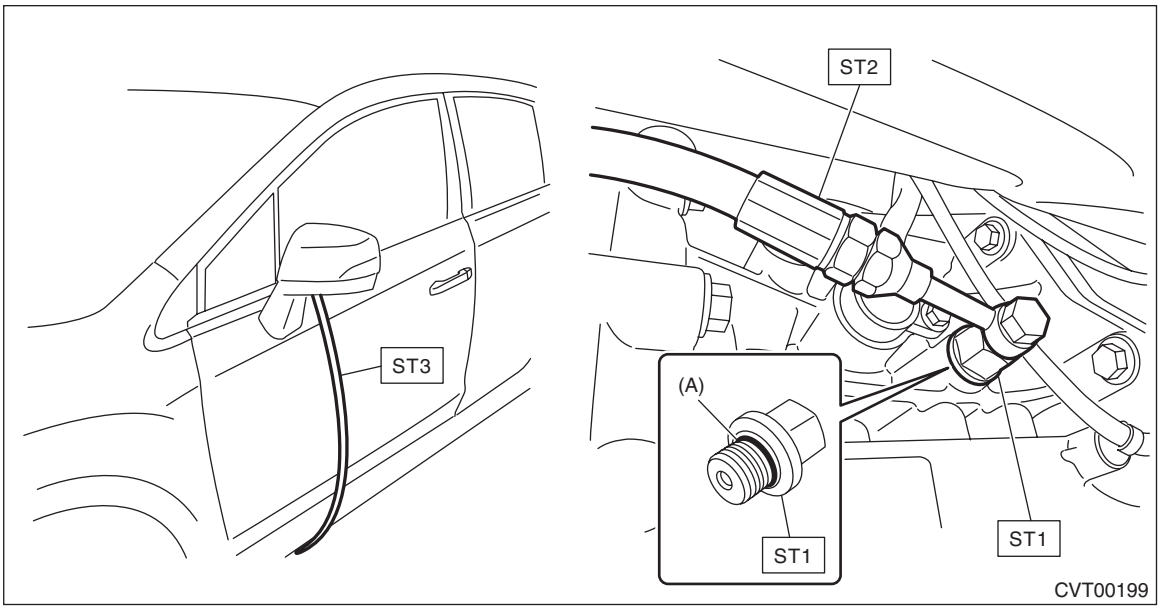
1) Lift up the vehicle.
2) Remove the output clutch pressure test plug, and install ST1, ST2 and ST3.

CAUTION:
• Be careful when setting tools so that the hoses do not touch the exhaust pipes.
• Be careful when setting tools so that the front wheel speed sensor harness does not touch ST1 and ST2.

NOTE:
Use ST1 (PRESSURE GAUGE ADAPTER) with genuine O-ring (part No. 806916050) attached.

ST1	18681AA000	PRESSURE GAUGE ADAPTER
ST2	498897800	OIL PRESSURE GAUGE ADAPTER SET
ST3	18801AA000	OIL PRESSURE GAUGE ASSY





(A) O-ring (genuine part)

3) Lower the vehicle.
4) Connect the Subaru Select Monitor to the data link connector and read the current data.
5) Check the output clutch pressure as in secondary pressure (line pressure) test. <Ref. to CVT(TH58A)-55, Secondary Pressure (Line Pressure) Test.>

Output clutch pressure standard value				
	Range	Throttle	Brake	MPa (kgf/cm^2, psi)
Stall	D	Full open	ON	1.5 — 4.0 (15.3 — 40.8, 217.5 — 580)
Idling (Engine speed: 1,000 r/min or less)	N	Full closed	OFF	0.5 — 1.3 (5.1 — 13.3, 72.5 — 188.5)

6) Lift up the vehicle.
7) Remove the ST and install the plug.

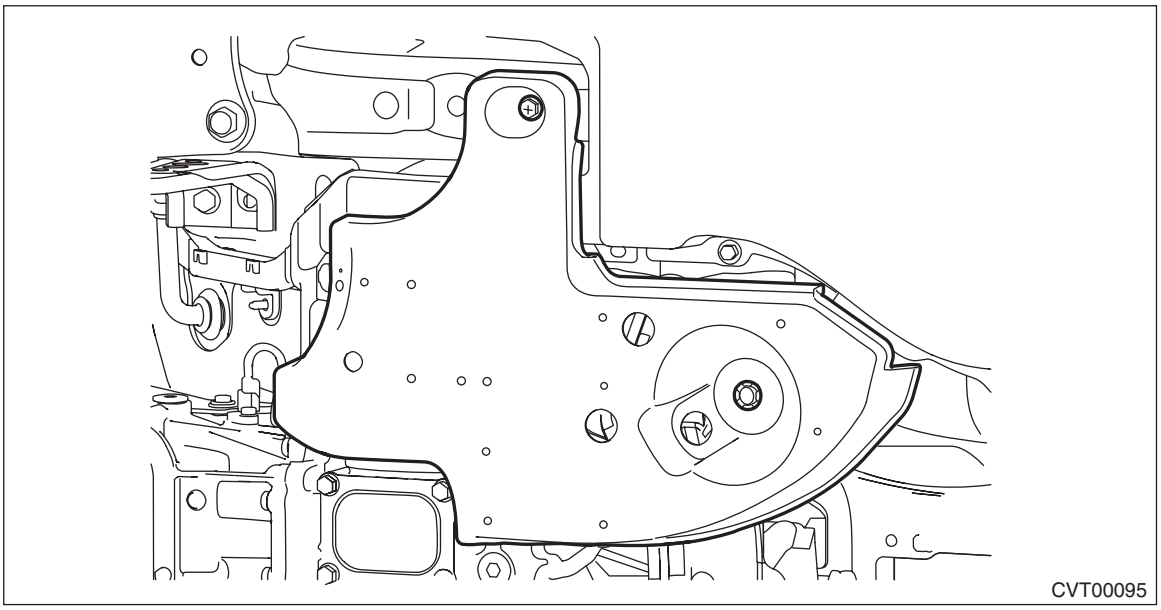
NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)
8) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

10.Transfer Clutch Pressure Test

A: INSPECTION

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during transfer clutch pressure test measurement.
1) Lift up the vehicle.
2) Remove the under cover front - cable.

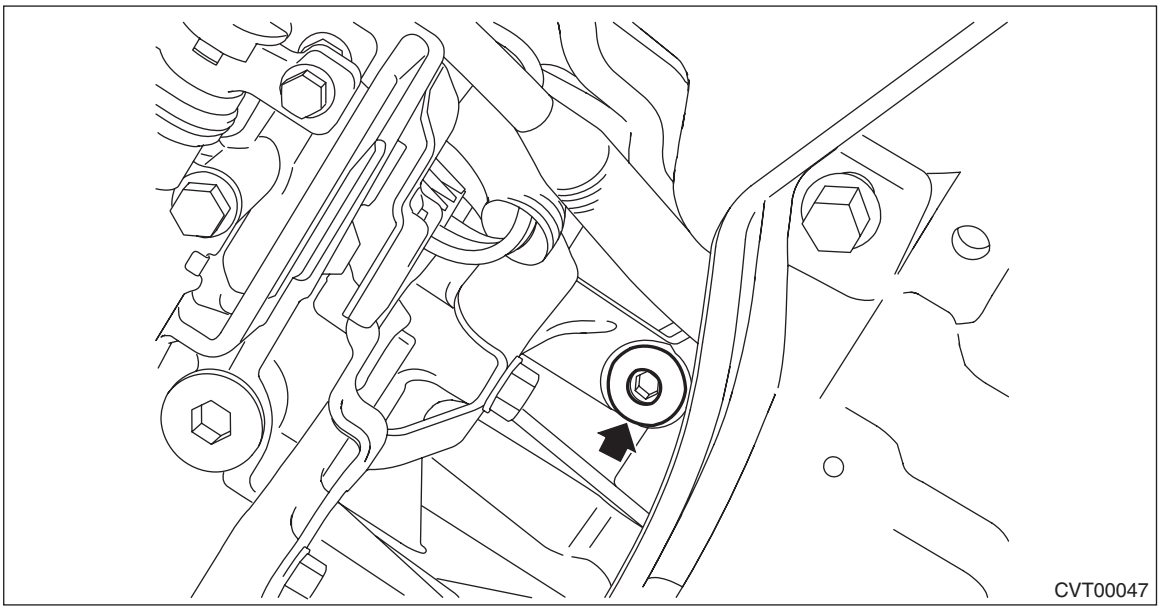


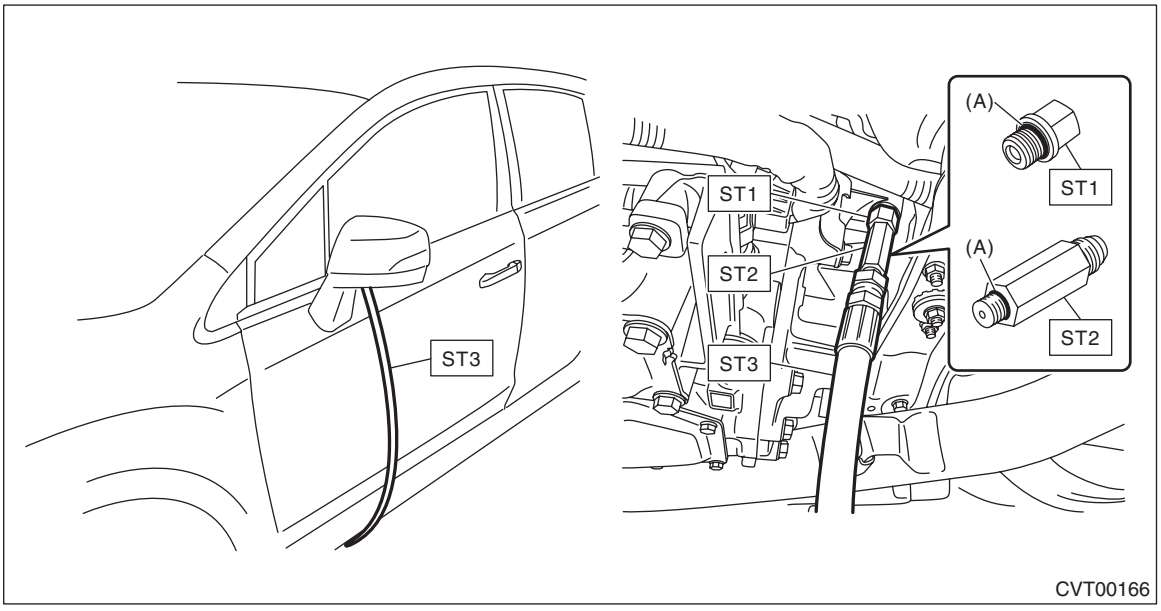
3) Remove the transfer clutch pressure test plug, and install ST1 and ST2.

CAUTION:
Removal of the test plug and installation of the ST shall be both performed quickly.

NOTE:
- Use ST1 (PRESSURE GAUGE ADAPTER) with genuine O-ring (part No. 806911080) attached.
- Use ST2 OIL PRESSURE GAUGE ADAPTER with genuine O-ring (Part No. 806908070) attached.

ST1 18681AA000 PRESSURE GAUGE ADAPTER
ST2 498897200 OIL PRESSURE GAUGE ADAPTER
ST3 498575400 OIL PRESSURE GAUGE ASSY





(A) O-ring (genuine part)

4) Lower the vehicle.
5) Connect the Subaru Select Monitor to the data link connector and read the current data.
6) Check the transfer clutch pressure as in secondary pressure (line pressure) test. <Ref. to CVT(TH58A)-55, Secondary Pressure (Line Pressure) Test.>

NOTE:
• Use Subaru Select Monitor for switching to FWD mode. <Ref. to CVT(TH58A)-49, AWD ON/OFF Switching Mode.>
• If no oil pressure is produced, if it does not change in AWD mode or if oil pressure is produced in FWD mode, there may be a problem in the control valve body.

Range position	ON Duty ratio (%)	Accelerator pedal opening angle (%)	Standard transfer clutch pressure kPa (kgf/cm^2, psi)	
			AWD mode	FWD mode
D	85 — 100	Fully opened (100)	800 — 1,200 (8.2 — 12.2, 117 — 174)	—
	60	Adjust ON Duty ratio to 60%.	400 — 700 (4.1 — 7.1, 58 — 102)	—
	0	Fully closed (0)	—	0 (0, 0)
N or P	25 — 40	Fully closed (0)	30 — 300 (0.3 — 3.1, 4 — 43)	—

7) Lift up the vehicle.
8) Remove the ST and install the plug.

NOTE:
• Use new O-rings.
• Apply CVTF to the O-rings.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)
9) Install the under cover front - cable.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
10) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

11.Automatic Transmission Assembly

A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

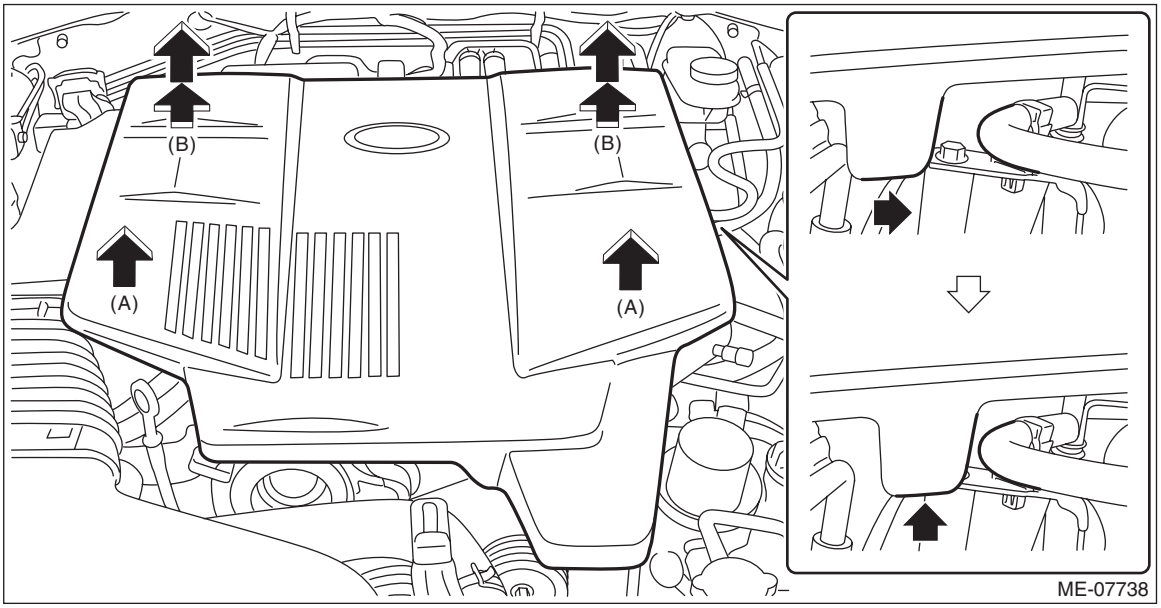
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>

WARNING:
After pulling out the service disconnect plug, a high voltage is accumulated in the condenser inside the inverter. If touching the high voltage parts, wiring harness, terminals and connectors is required, wait for 10 minutes before starting the operation.

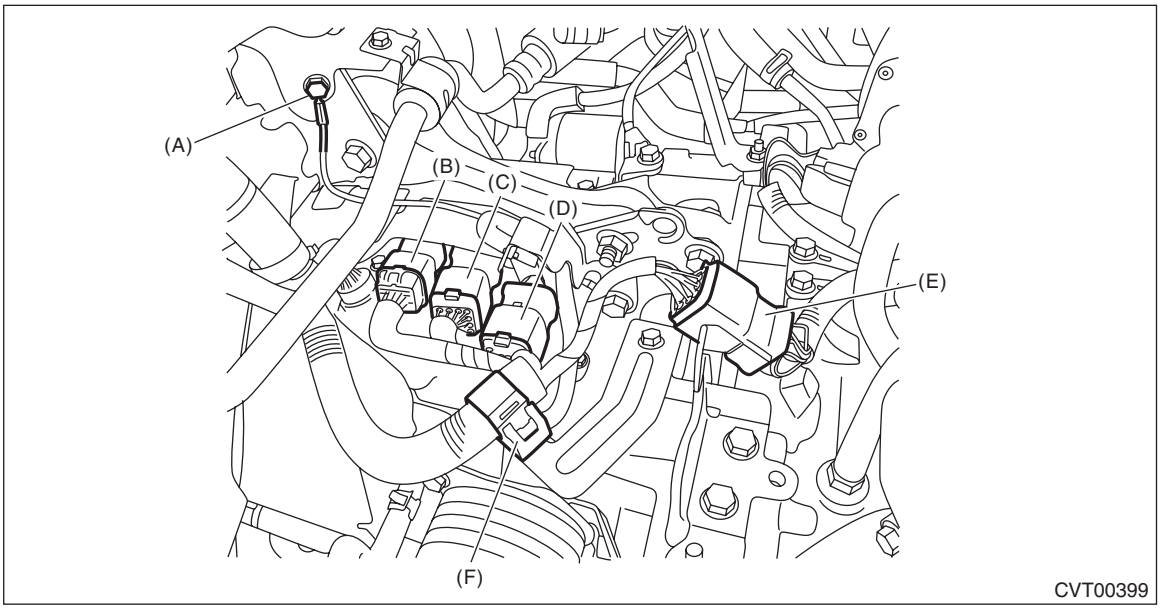
3) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



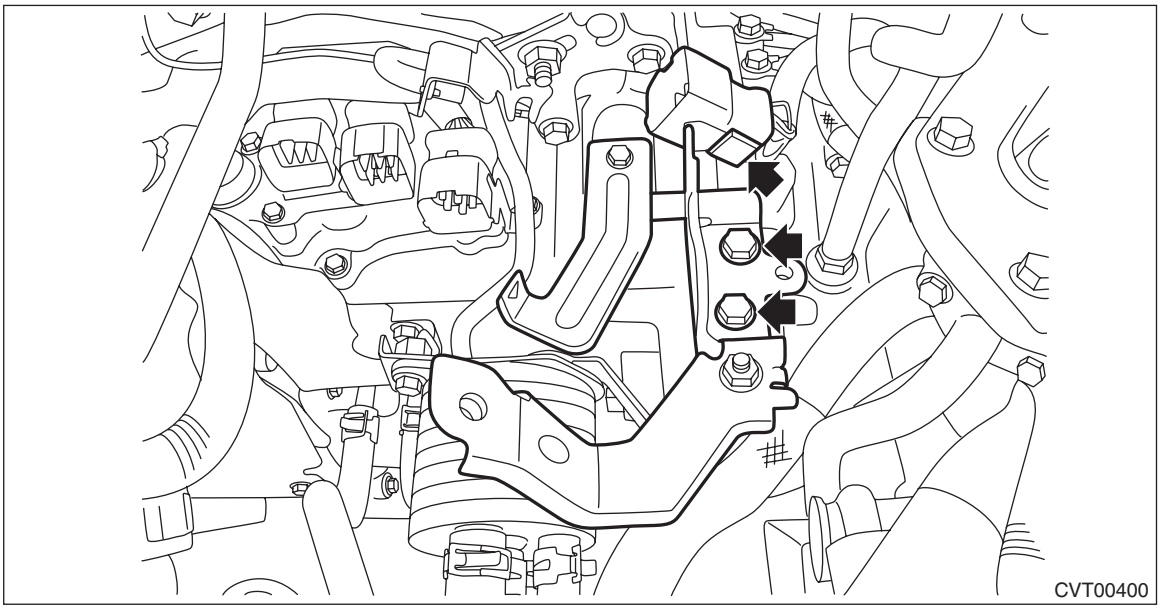
4) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
5) Disconnect the following connectors and harness clips.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors

- Harness clip

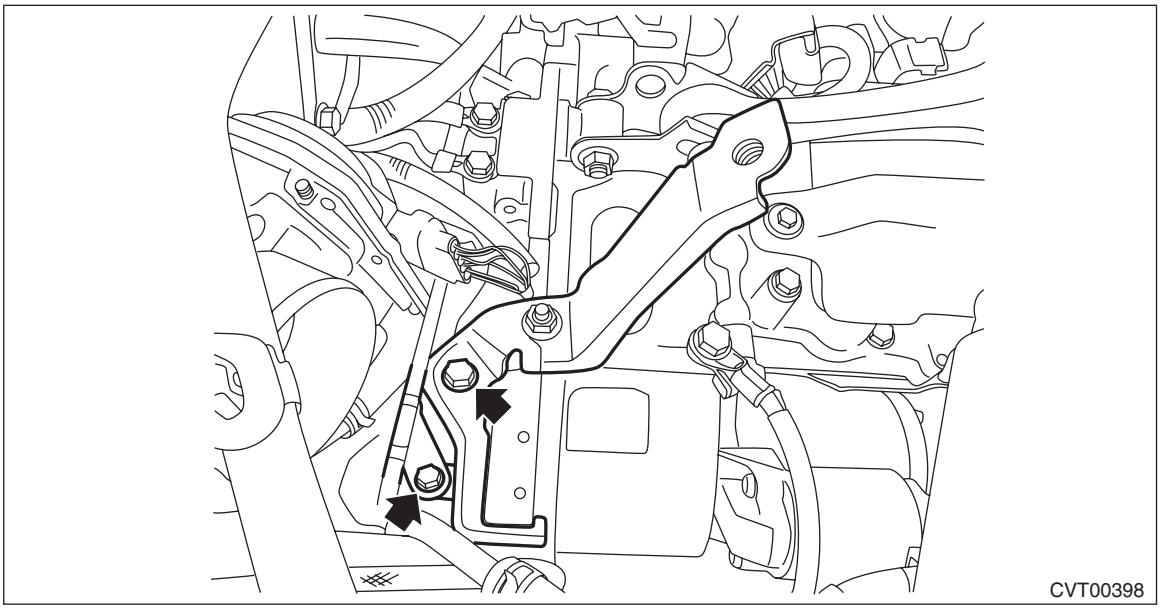


(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

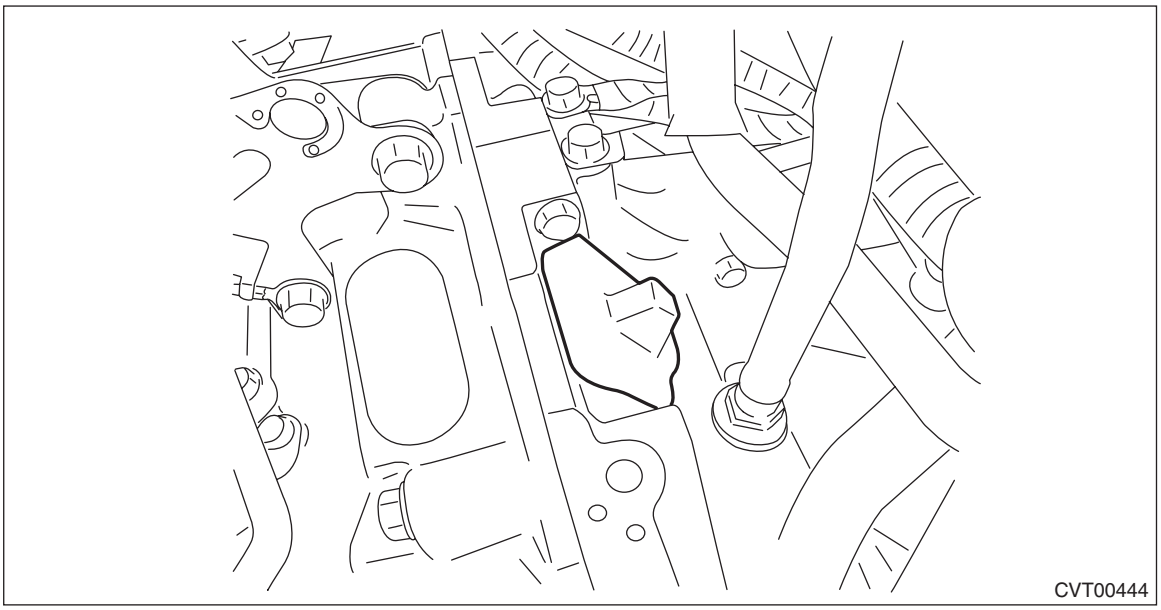
6) Remove the engine harness connector, and remove the engine hanger.



7) Remove the air cleaner case bracket LH.

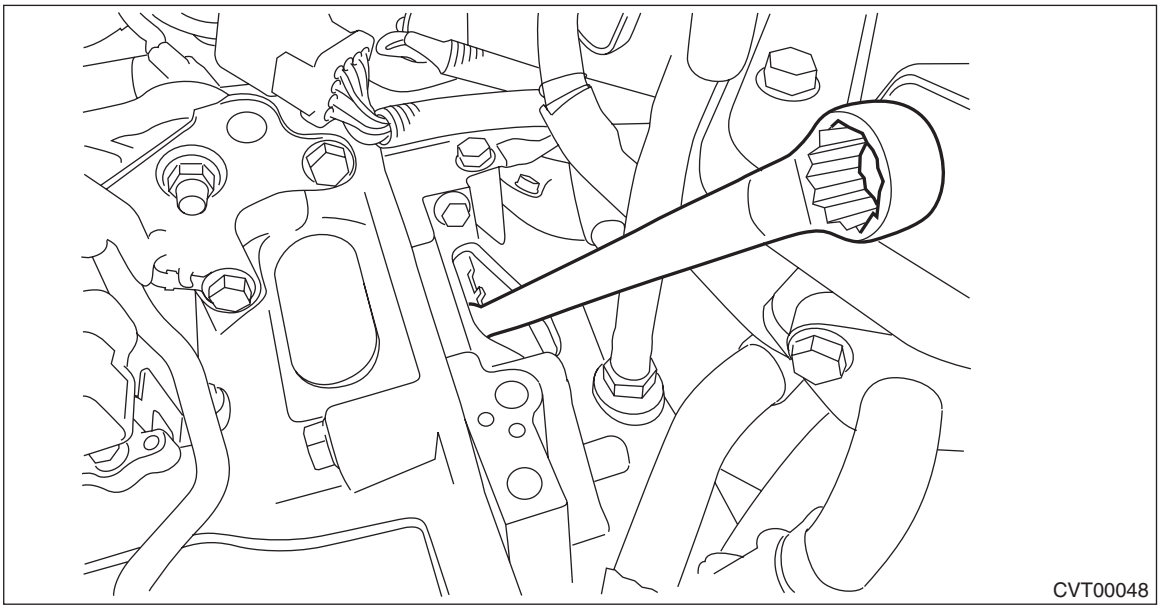


8) Remove the starter. <Ref. to SC(H4DO(HEV))-10, REMOVAL, Starter.>
9) Remove the pitching stopper. <Ref. to CVT(TH58A)-87, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>
10) Disconnect the throttle position sensor harness connector.
11) Remove the service hole plug.

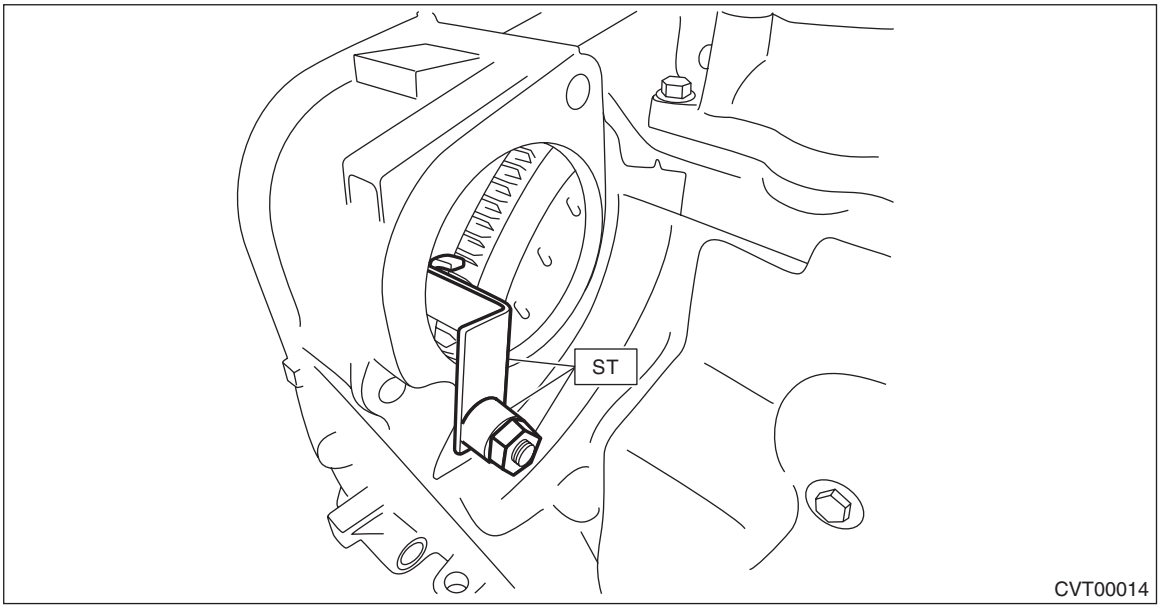


12) Remove the four bolts combining the torque converter and drive plate while rotating the crank pulley a little at a time in the same direction as engine revolution.

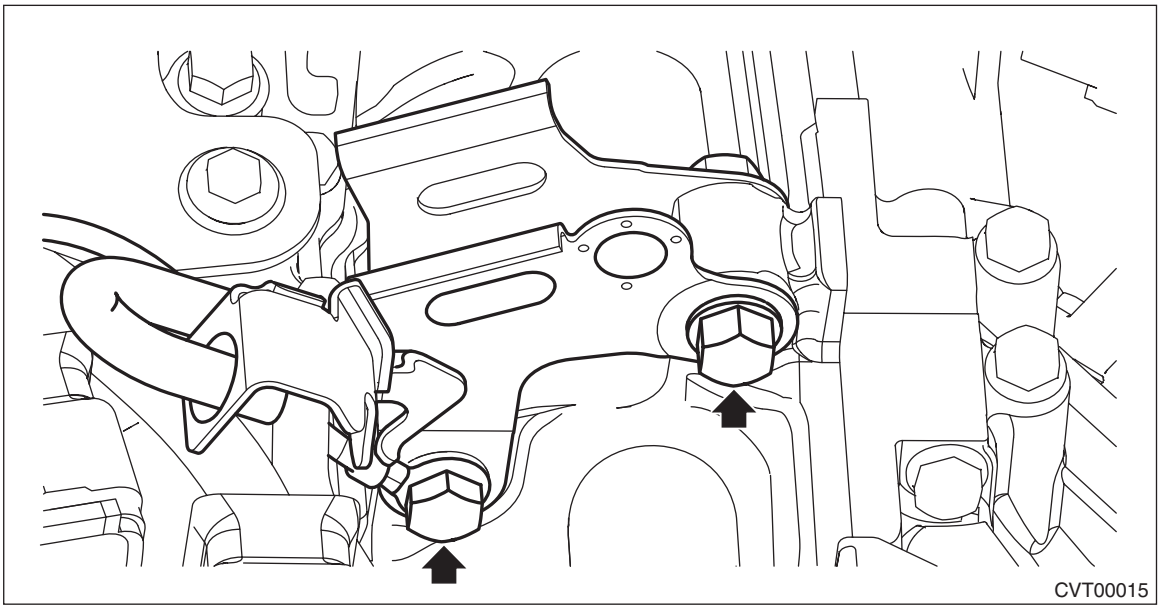
CAUTION:
- **Be careful not to drop bolts into the converter housing.**
- **Be careful not to damage the mounting bolts.**



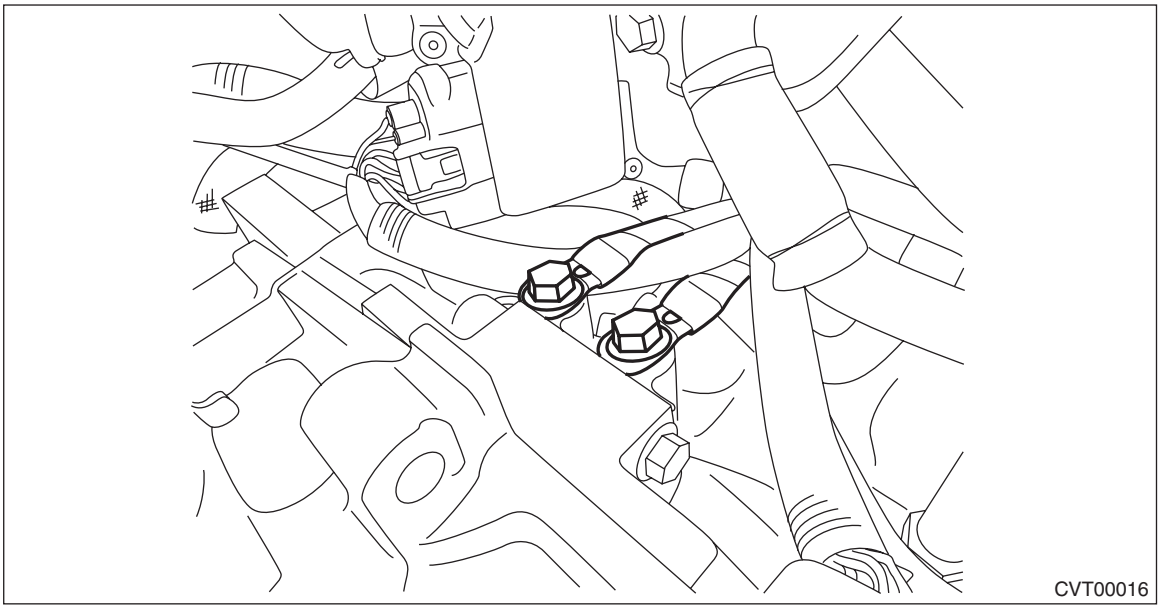
13) Make sure the torque converter moves freely by rotating with finger through the starter installation hole.
14) Attach the ST to the converter case.
ST 498277200 STOPPER SET



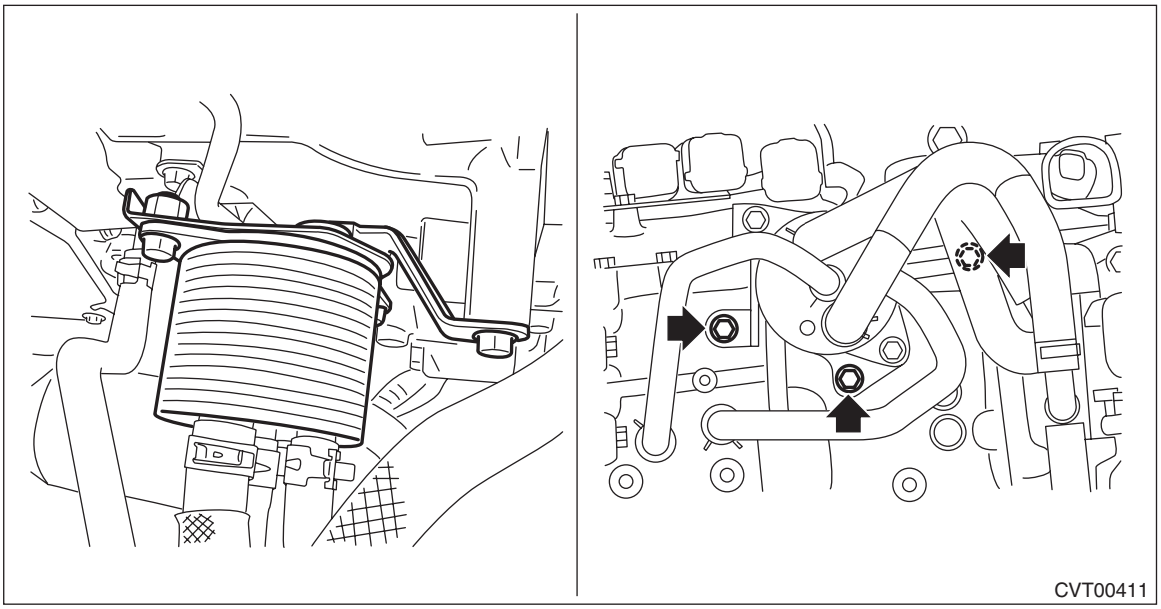
15) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



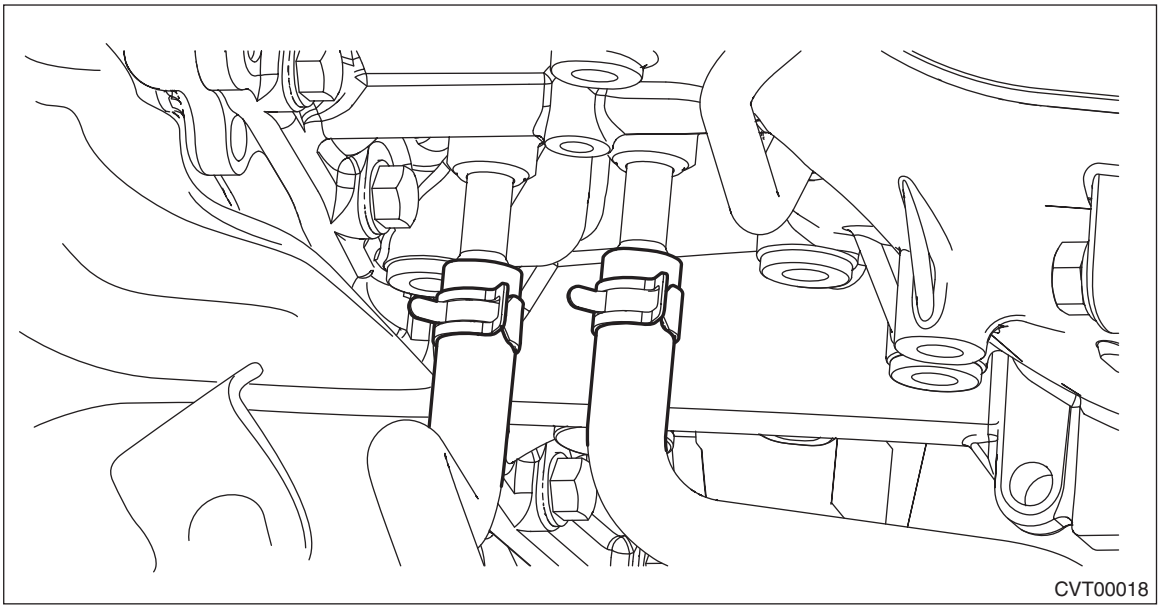
16) Disconnect the engine ground terminals.



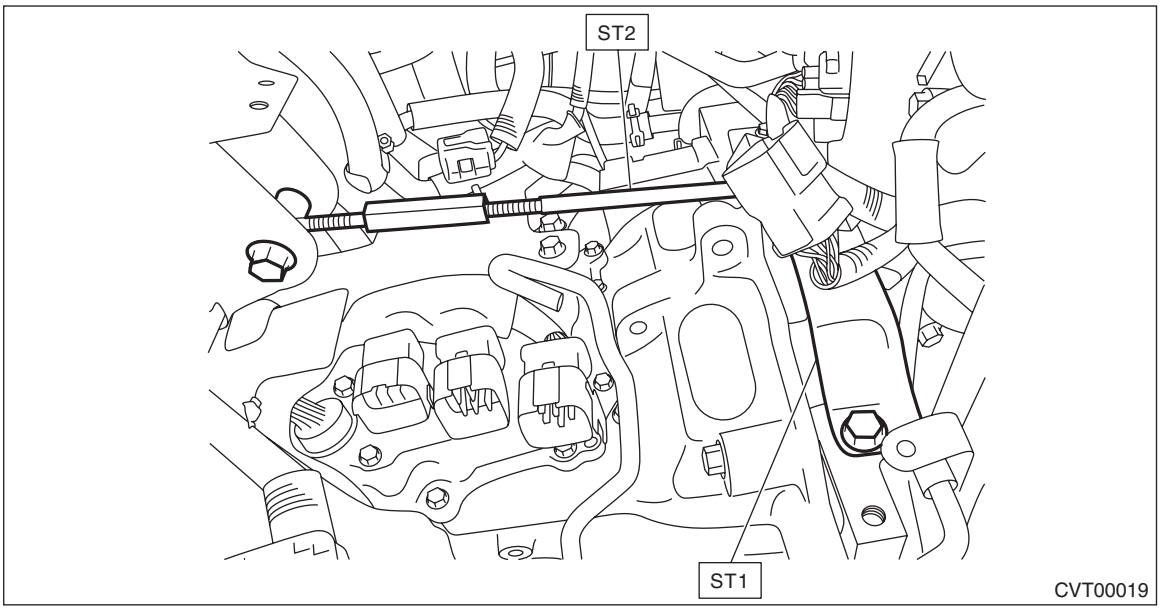
17) Remove the CVTF cooler (with warmer feature) from the transmission, and using a piece of wire, affix to a location of the body where it will not interfere with the removal/installation of the transmission.



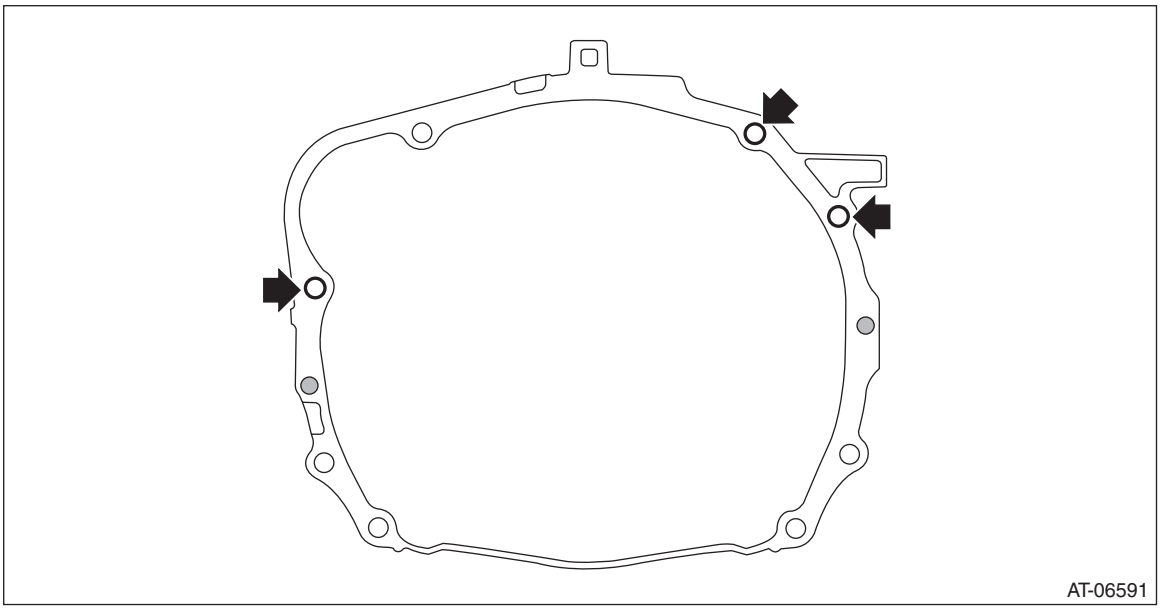
18) Remove the CVTF inlet hose and outlet hose from the pipe.



19) Set the ST.
ST1 41099AA012 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT

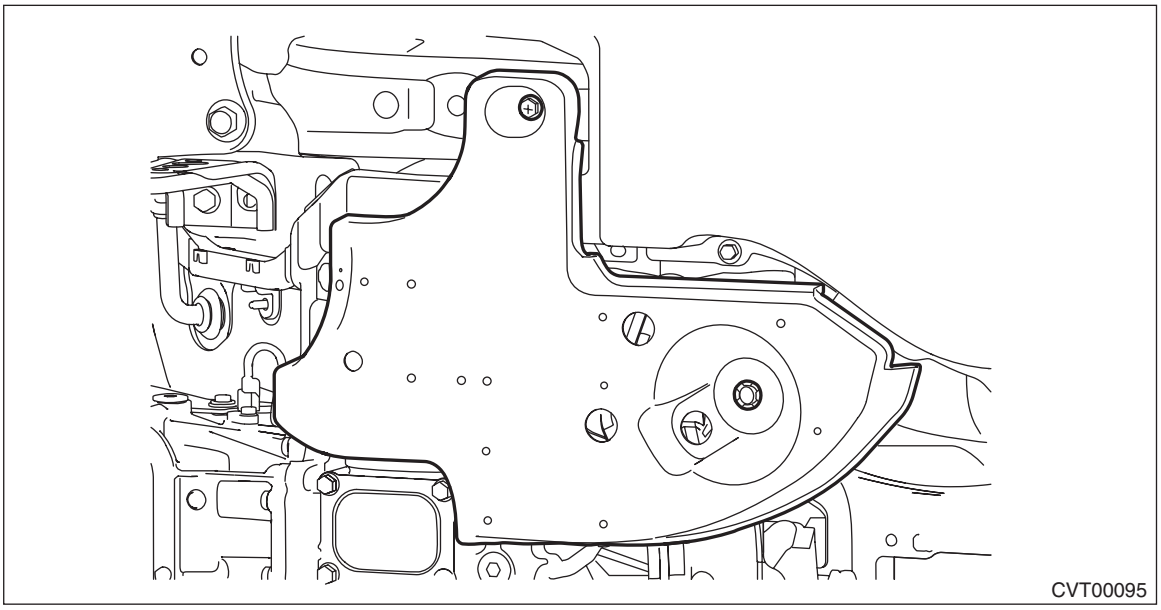


20) Remove the three transmission connecting bolts.

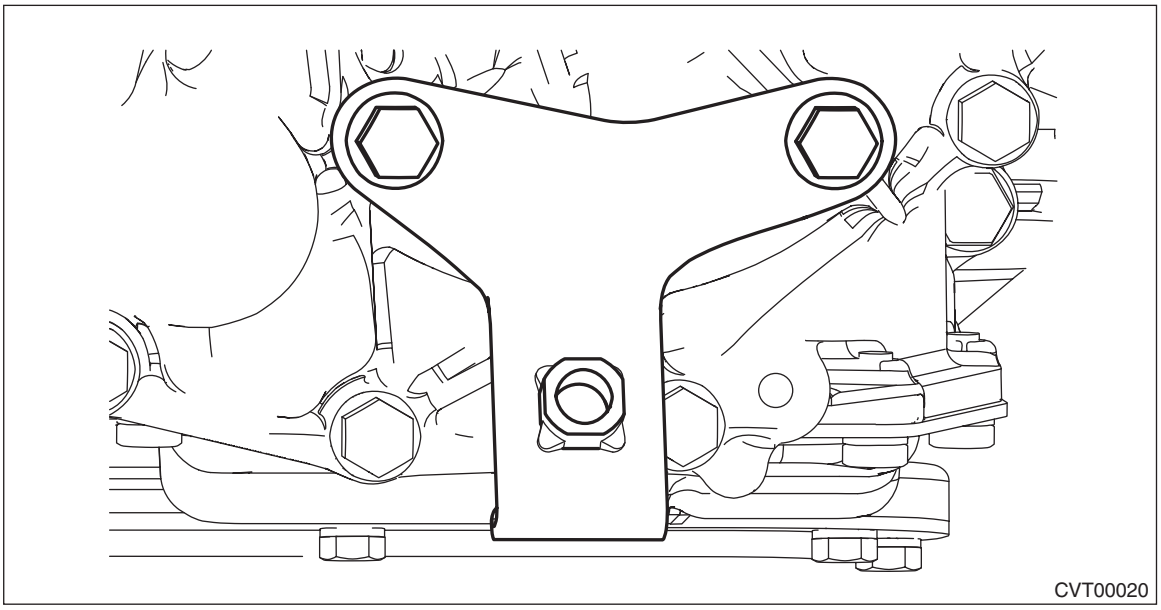


21) Lift up the vehicle.
22) Remove the front tires. <Ref. to WT-5, REMOVAL, Tire and Wheel.>
23) Remove the under cover - rear LH. <Ref. to EI-31, REMOVAL, Front Under Cover.>

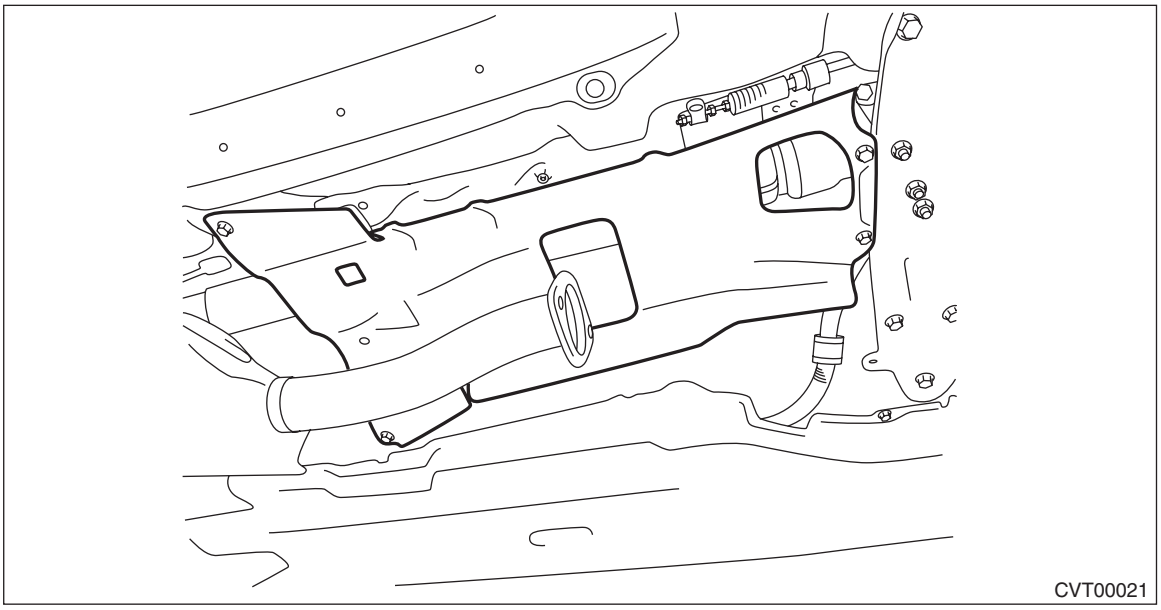
24) Remove the under cover front - cable.



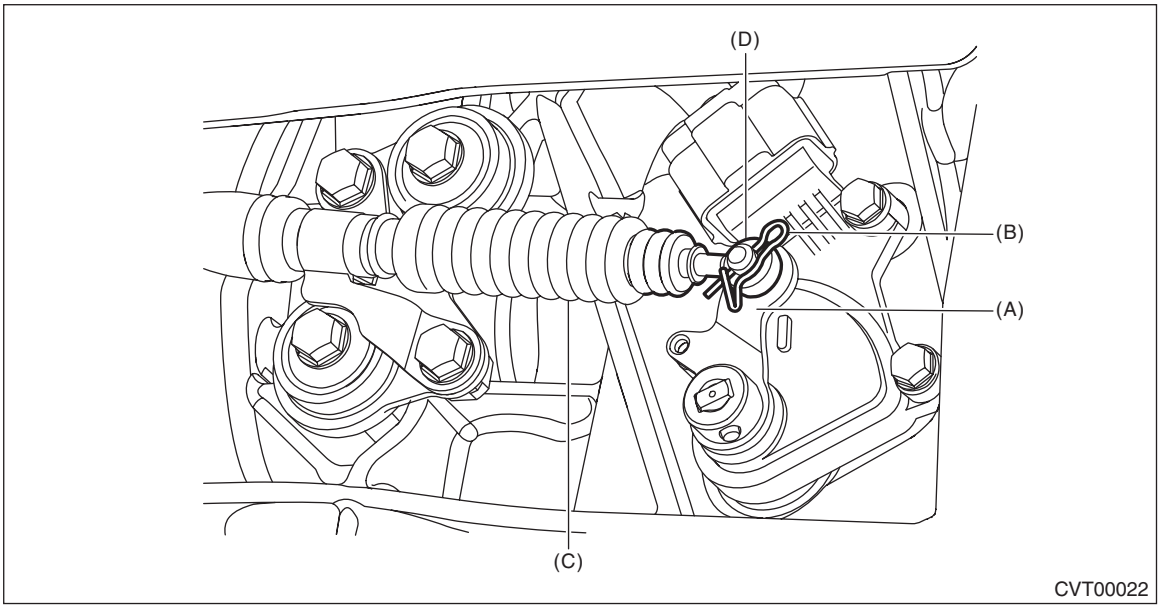
25) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
26) Remove the hanger bracket.



27) Remove the center exhaust cover.

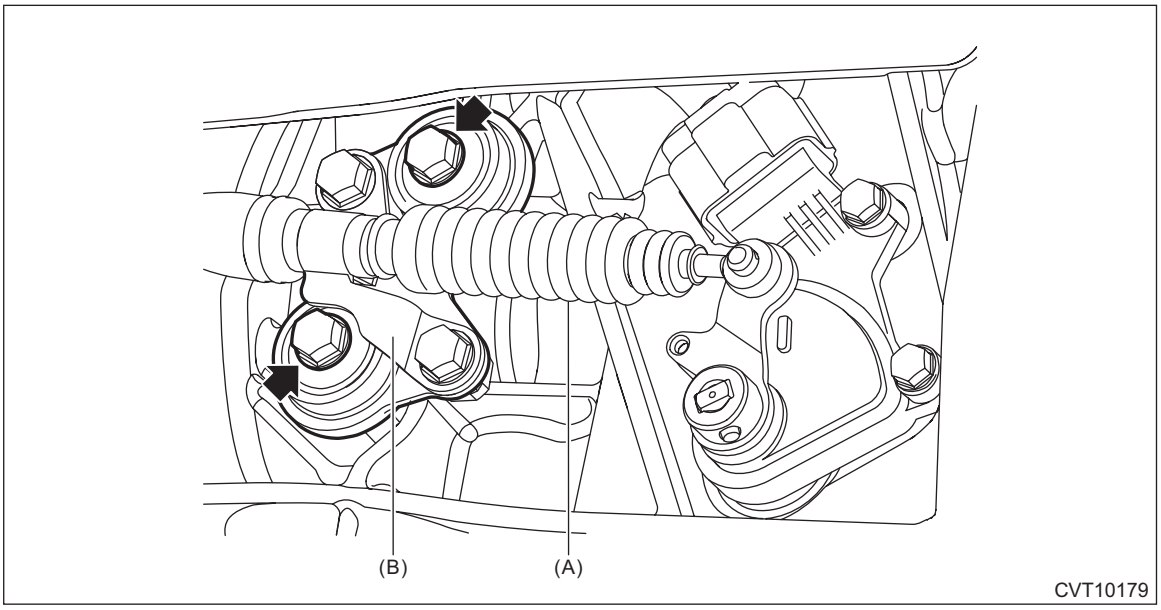


28) Remove the CVTF drain plug to drain CVTF. <Ref. to CVT(TH58A)-43, REPLACEMENT, CVTF.>
29) Drain differential gear oil. <Ref. to CVT(TH58A)-47, REPLACEMENT, Differential Gear Oil.>
30) Remove the snap pin and washer from shifter arm and remove the select cable from shifter arm.



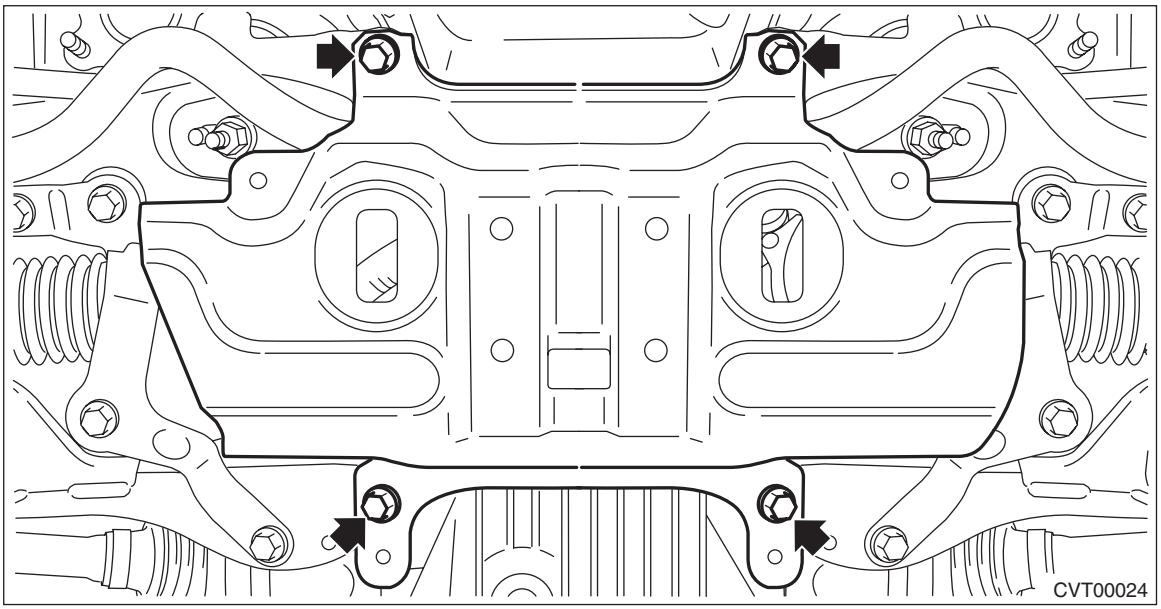
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

31) Remove the plate assembly from the transmission case.

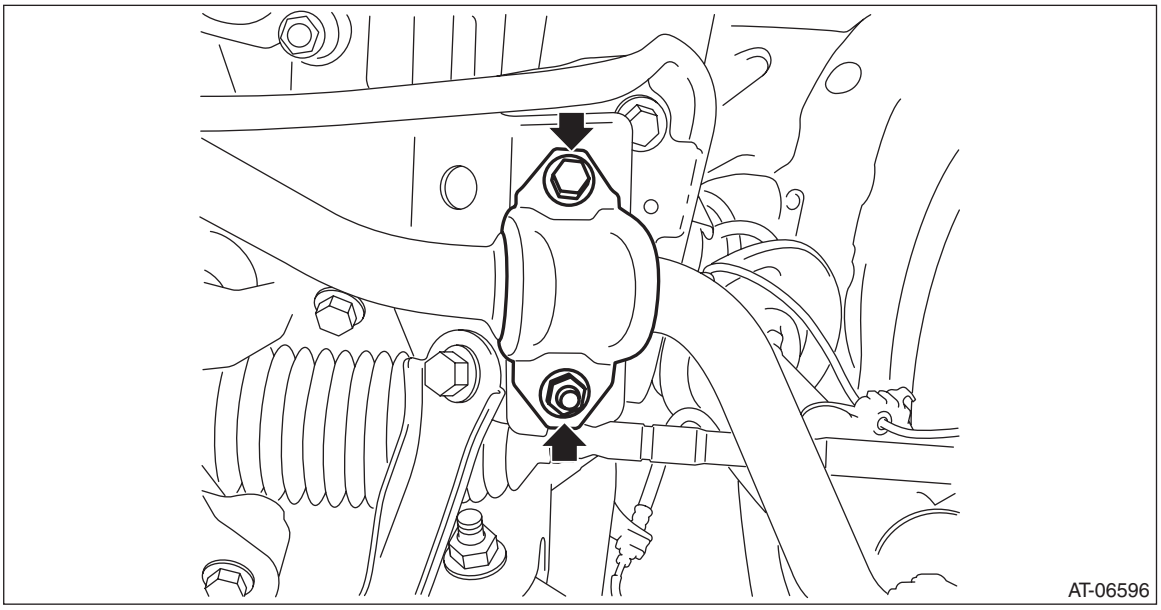


(A) Select cable
(B) Plate ASSY

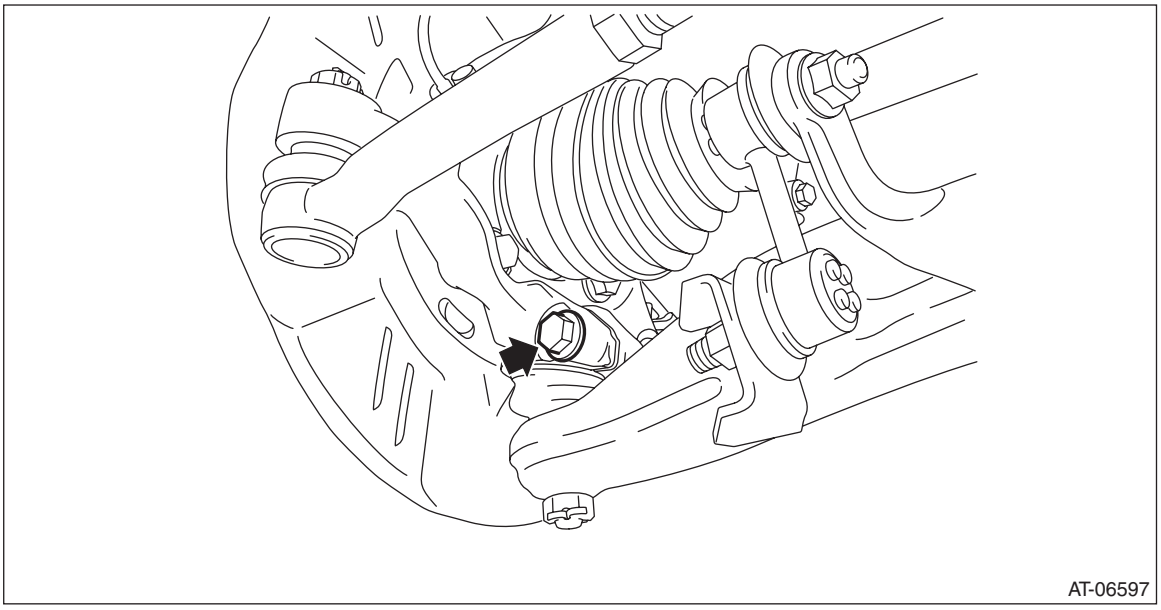
32) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
33) Remove the jack-up plate.



34) Remove the stabilizer bracket.



35) Remove the bolts which secure to the front housing, and separate the front arm and housing.



36) Using a tire lever or a crow bar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the tire lever or bar and the transmission in order to avoid damaging the transmission side retainer.

37) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.

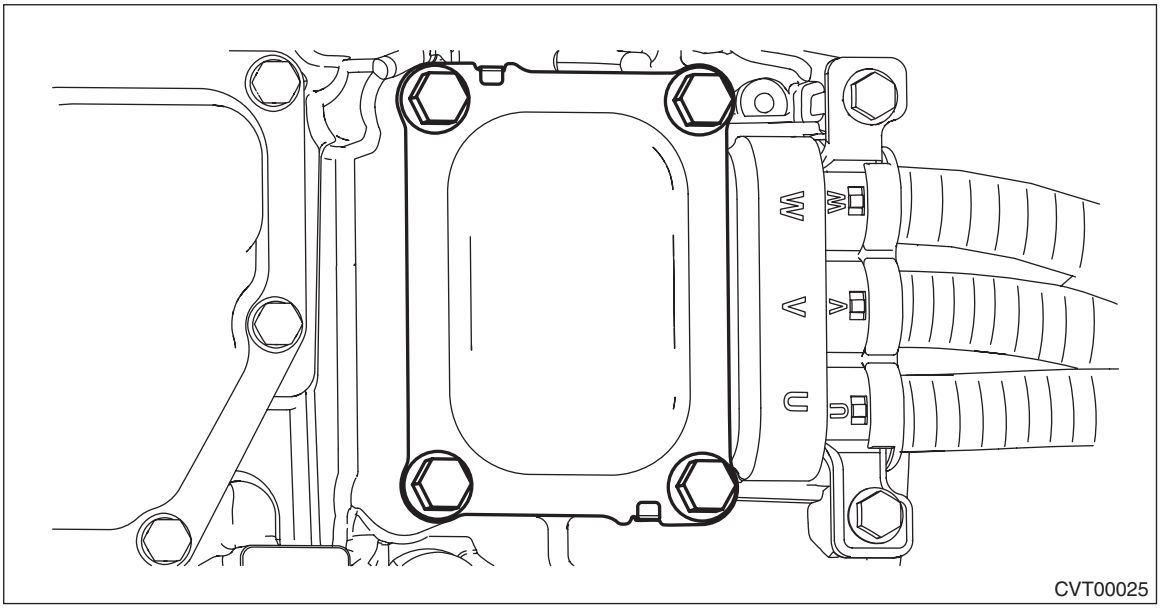
NOTE:
- Before pulling the RH front drive shaft from transmission, turn the steering wheel to the right hand at full lock.
- Before pulling the LH front drive shaft from transmission, turn the steering wheel to the left hand at full lock.

38) Remove the power cable.

WARNING:
Be sure to wear insulated gloves.

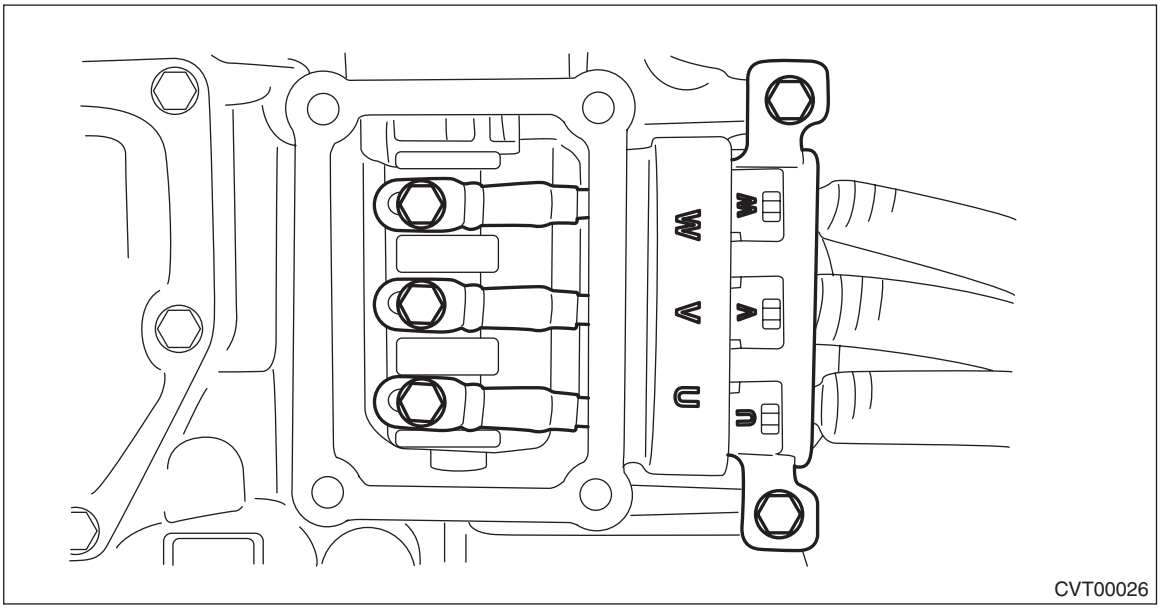
CAUTION:
- **Be sure to insulate the power cable terminal by wrapping it with insulating tape.**
- **When removing the power cable, do not apply excessive force or damage it.**

(1) Clean any water, dirt and sand thoroughly from the area around the power connect cover using air, etc.
(2) Remove the power connect cover and gasket.



(3) Remove the power cable terminal, and remove the terminal box assembly.

NOTE:
To prevent intrusion of foreign matter such as oil, water and dirt after removal, install the power connect cover and cover the terminal box assembly with tape.

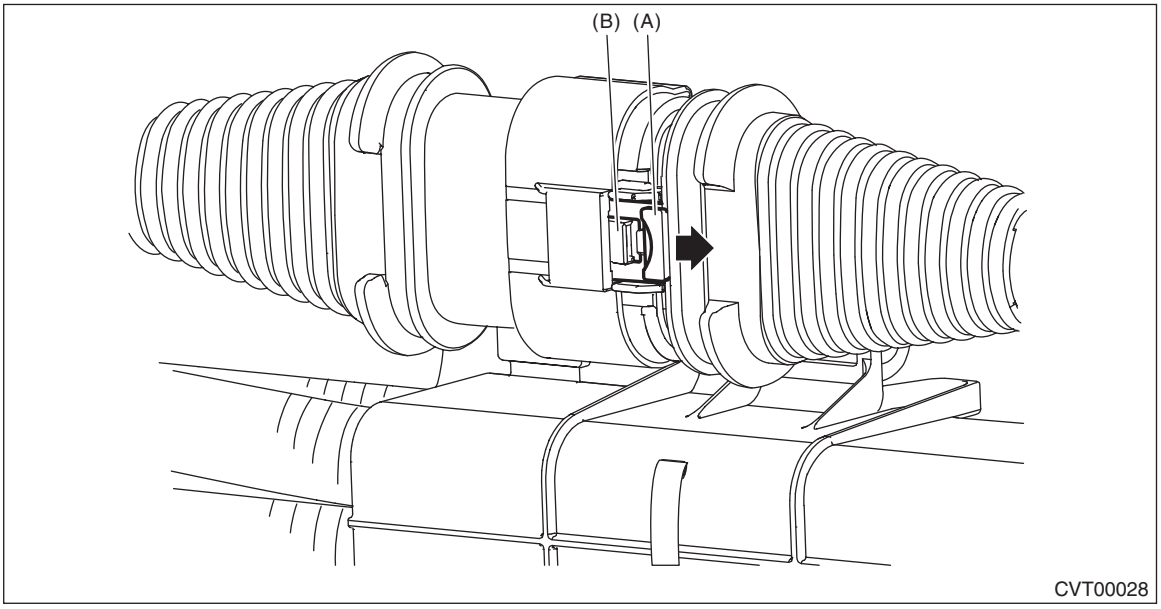


39) Remove the under cover - rear LH. <Ref. to EI-33, REMOVAL, Floor Under Protector.>
40) Remove the electric oil pump harness connector.

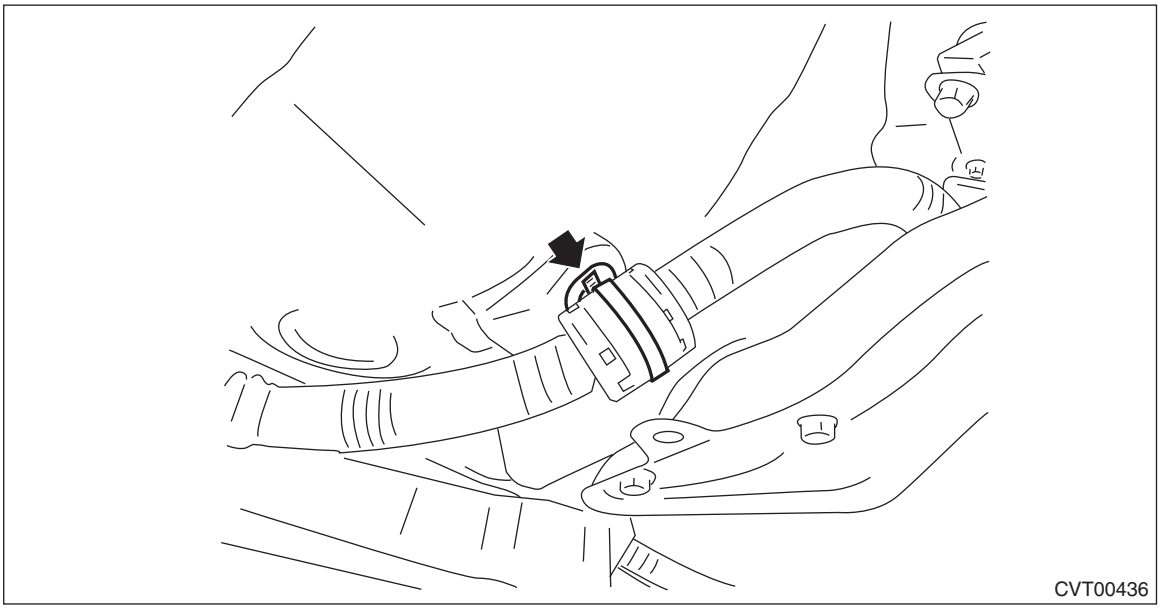
WARNING:
Be sure to wear insulated gloves.

CAUTION:
• To prevent intrusion of foreign matter such as oil, water and dirt after removal, cover the female side connector with a clean cloth or a plastic bag and cover the coupler portion of the male side connector with insulating tape.
• When foreign matter is found, remove it while paying attention not to damage the electrode inside. If water is attached, dry it completely.
• When disconnecting the electric oil pump harness connector, do not apply excessive force or damage it.

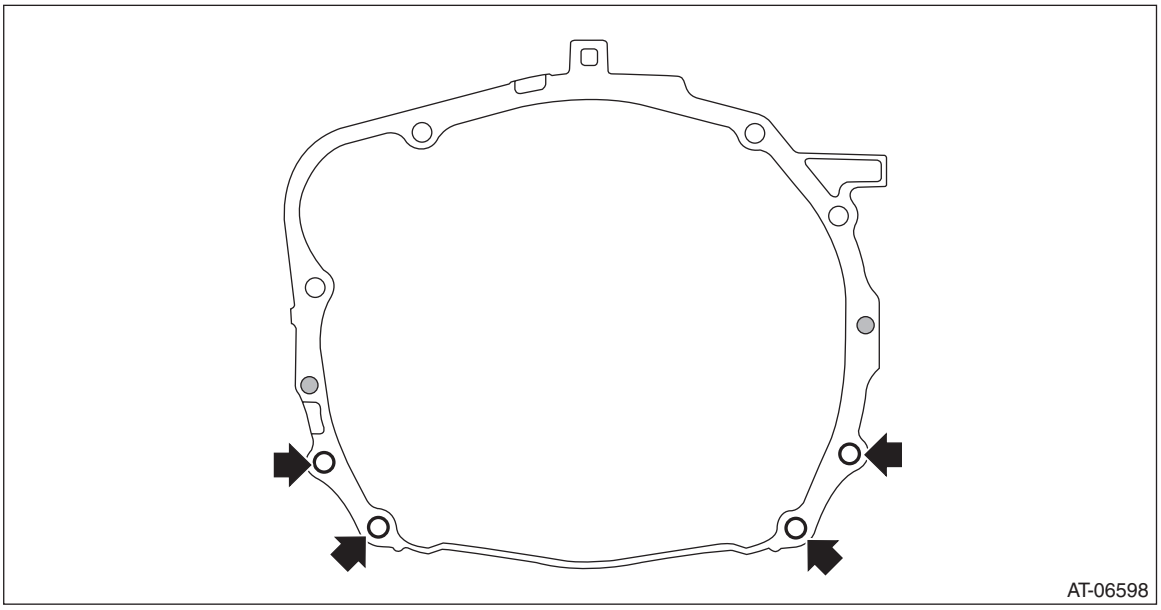
(1) Pull the slide lock (A) in the direction of arrow.
(2) Disconnect the harness connector by pushing the claw (B).



(3) Release the clip of the electric oil pump harness from the vehicle.



41) Remove the two transmission connecting bolts and two nuts (lower side).



42) Set the transmission jack under the transmission.

NOTE:
Make sure that the support plates of transmission jack do not touch the oil pan.

43) Release the clip of the electric oil pump harness from the transmission rear crossmember, and remove the transmission rear crossmember from the vehicle. <Ref. to CVT(TH58A)-88, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, REMOVAL, Transmission Mounting System.>

44) While lowering the transmission jack gradually, fully retract the engine support, and then tilt the engine rearward.

45) Remove the transmission assembly.

CAUTION:
Be careful not to damage the electric oil pump harness.

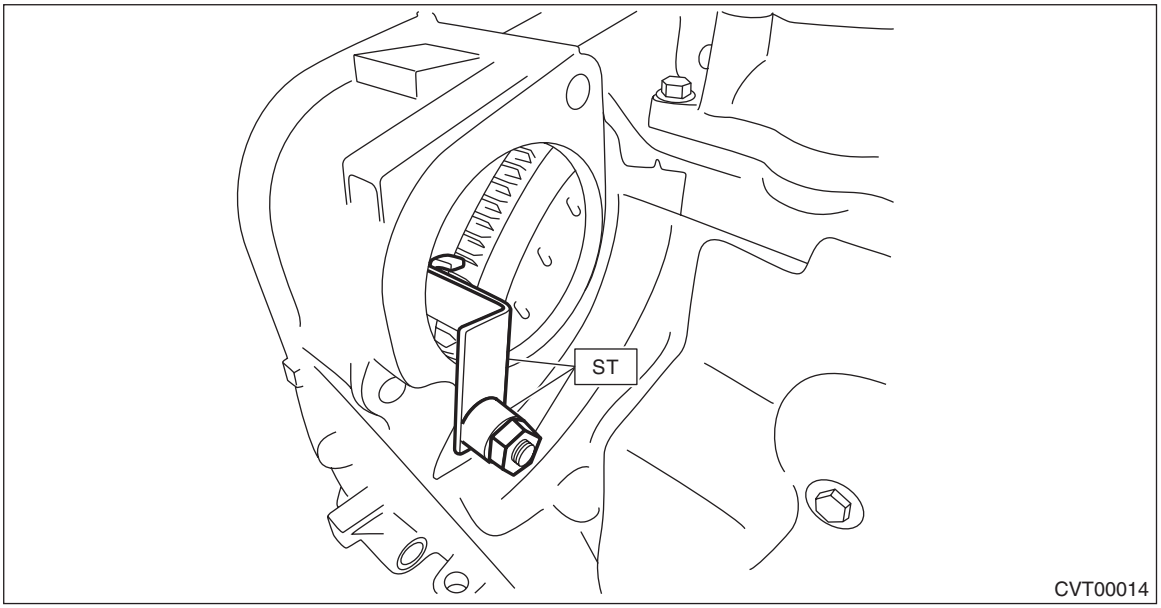
NOTE:
Remove it while moving the transmission jack up and down so that the engine and transmission remain directly aligned.

46) Remove the rear cushion rubber. <Ref. to CVT(TH58A)-88, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, REMOVAL, Transmission Mounting System.>

B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Attach the ST to converter case.
ST 498277200 STOPPER SET



2) When completely overhauling the transmission, refill CVTF through the transmission right side plug. <Ref. to CVT(TH58A)-180, Preparation for Overhaul.>
3) Replace the front differential side retainer oil seal. <Ref. to CVT(TH58A)-92, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:
- Be sure to replace the differential side retainer oil seal with a new part whenever the front drive shaft is removed from the transmission.
- When a new differential side retainer oil seal has been installed, replacement is not required.

4) Install the rear cushion rubber on the transmission. <Ref. to CVT(TH58A)-90, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, INSTALLATION, Transmission Mounting System.>
5) Mount the transmission onto the transmission jack.
6) Remove the pitching stopper bracket, if mounted.
7) Install the transmission assembly onto the engine.

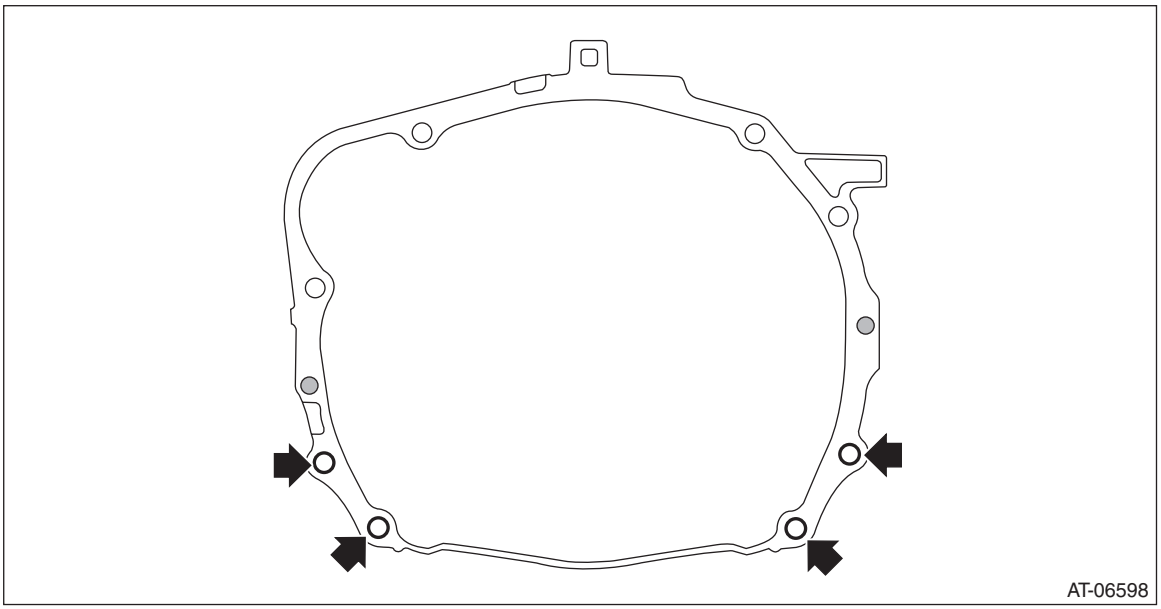
CAUTION:
Be careful not to damage the electric oil pump harness.

NOTE:
- While raising the transmission jack gradually, turn the screw of engine support, then tilt the engine forward.
- Temporarily attach the two engine connecting bolts and two nuts (lower side).

8) Attach the transmission rear crossmember, and install the clip of the electric oil pump cable to the transmission rear crossmember. <Ref. to CVT(TH58A)-90, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, INSTALLATION, Transmission Mounting System.>

9) Tighten the two engine connecting bolts and two nuts (lower side).

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



10) Remove the transmission jack.
11) Install the power cable.

WARNING:
Be sure to wear insulated gloves.

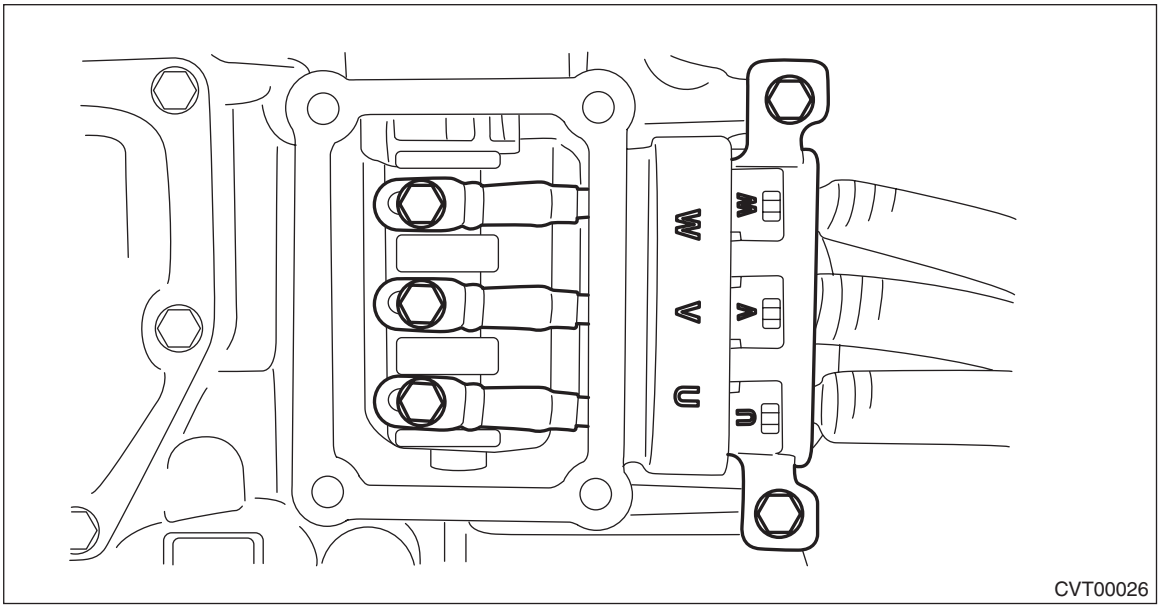
CAUTION:
• Do not allow foreign matter intrusion. If any foreign matter is found, remove them carefully so that the electrodes are not damaged.
• If water is attached, dry it completely before starting the operation.
• Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.

(1) Match the letters (U, V, and W) imprinted on both the power cable and the transmission body, then insert the cable to the transmission and fix securely.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

(2) Install the power cable terminal.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



CVT00026

(3) Install the power connect cover.

NOTE:
Use a new gasket.

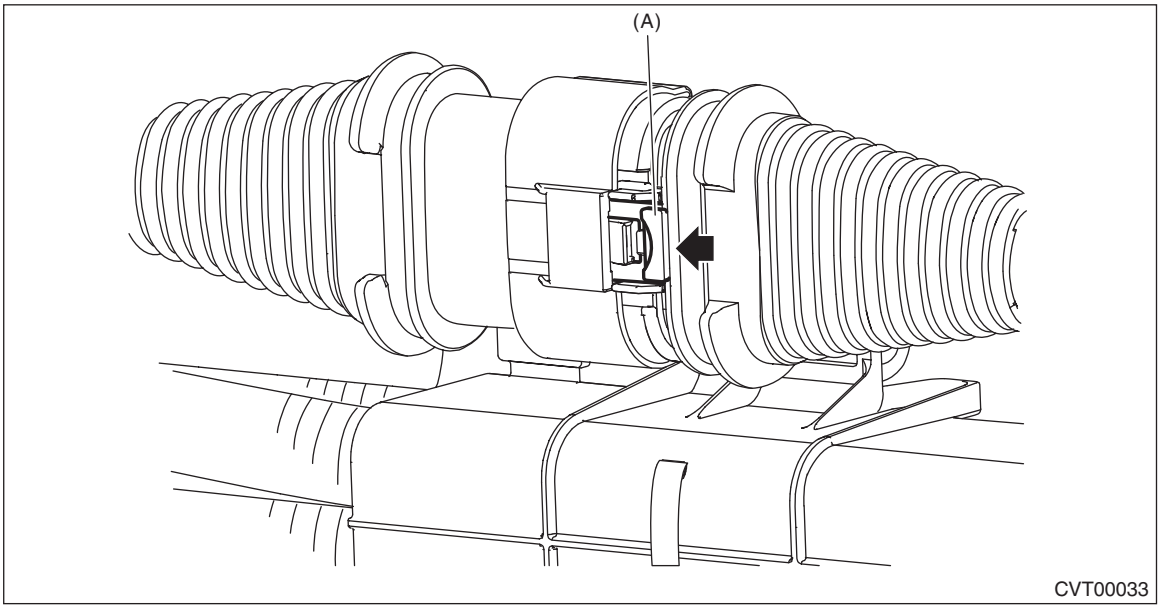
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

12) Install the electric oil pump harness connector.

WARNING:
Be sure to wear insulated gloves.

CAUTION:
• Do not allow foreign matter intrusion. When foreign matter is found inside, remove it while paying attention not to damage the electrode inside.
• If water is attached, dry it completely before starting the operation.

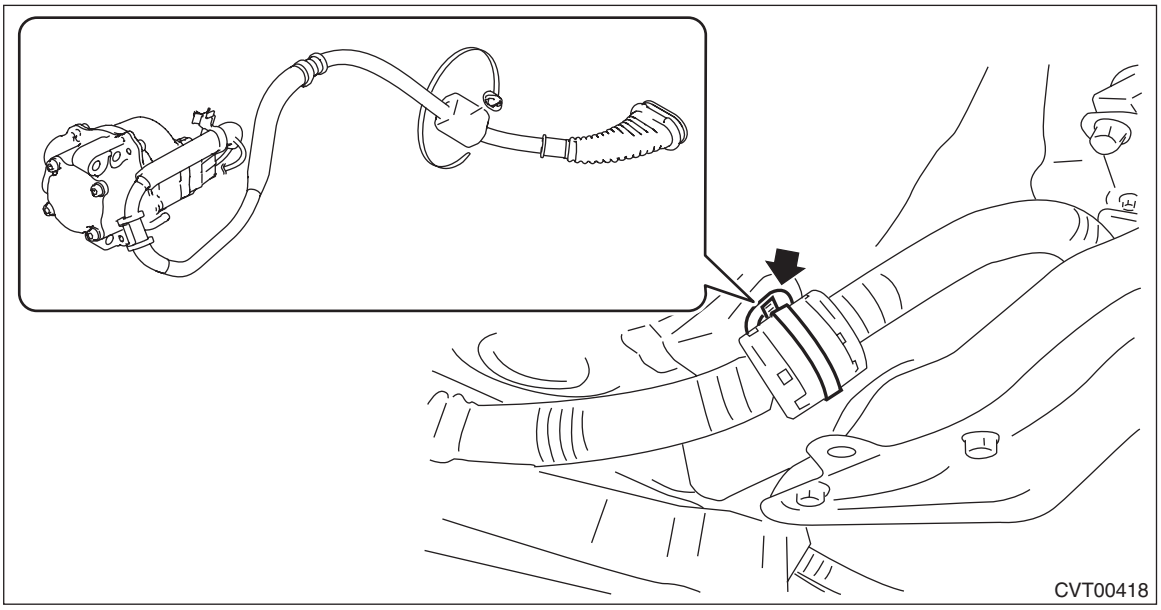
(1) Insert the harness connector until a click is heard, and move the slide lock (A) in the arrow direction to lock.



CVT00033

(2) Install the electric oil pump harness to the vehicle.

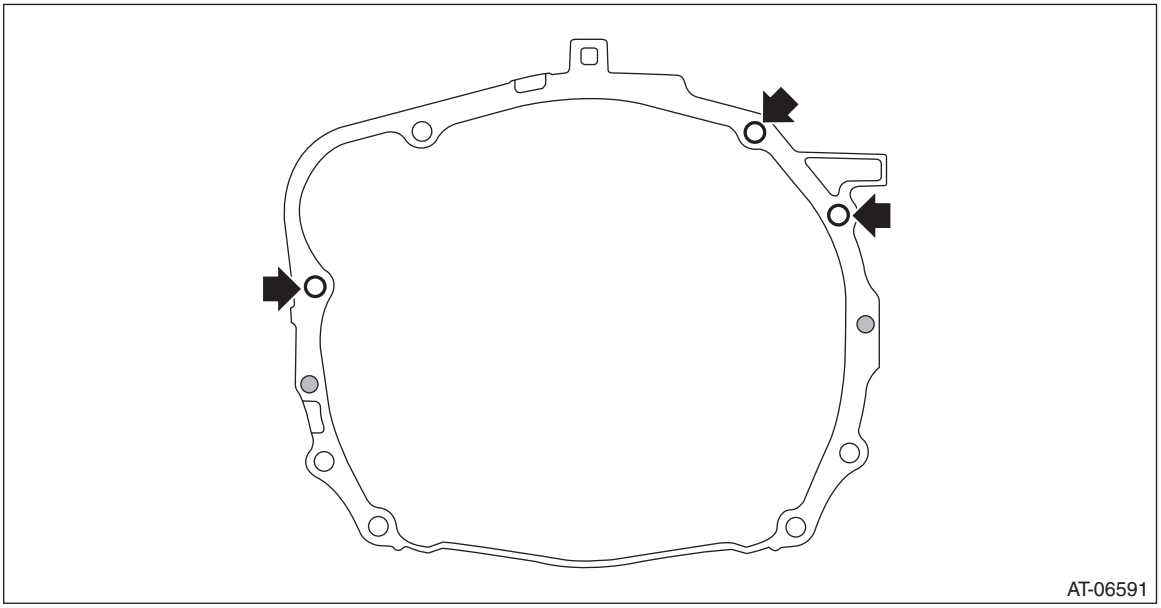
NOTE:
- Use a new electric oil pump harness clip.
- Install the electric oil pump harness clip as shown in the figure.



(3) Make sure that the electric oil pump harness does not interfere with other parts.

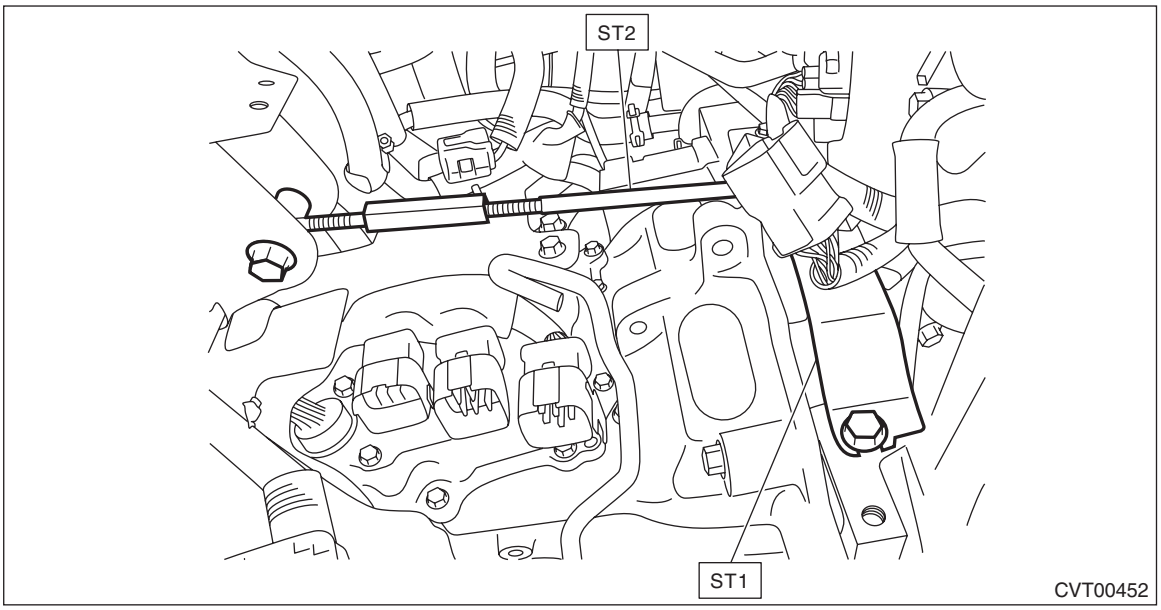
13) Install the under cover - rear LH. <Ref. to EI-33, INSTALLATION, Floor Under Protector.>
14) Lower the vehicle.
15) Install the three engine mounting bolts (upper side).

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



16) Remove the ST (STOPPER SET) from converter case.

17) Remove the ST (ENGINE SUPPORT BRACKET and ENGINE SUPPORT).
ST1 41099AA012 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT



18) Connect the throttle position sensor harness connector.
19) Match the torque converter screw hole with drive plate hole to install the bolt.

CAUTION:
- **Do not drop the mounting bolt in the converter housing.**
- **Do not damage the mounting bolt.**

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)
20) Install the remaining three bolts by rotating the crank pulley a little at a time in the same direction as engine revolution.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)
21) Install the service hole plug.
22) Install the engine ground terminals.

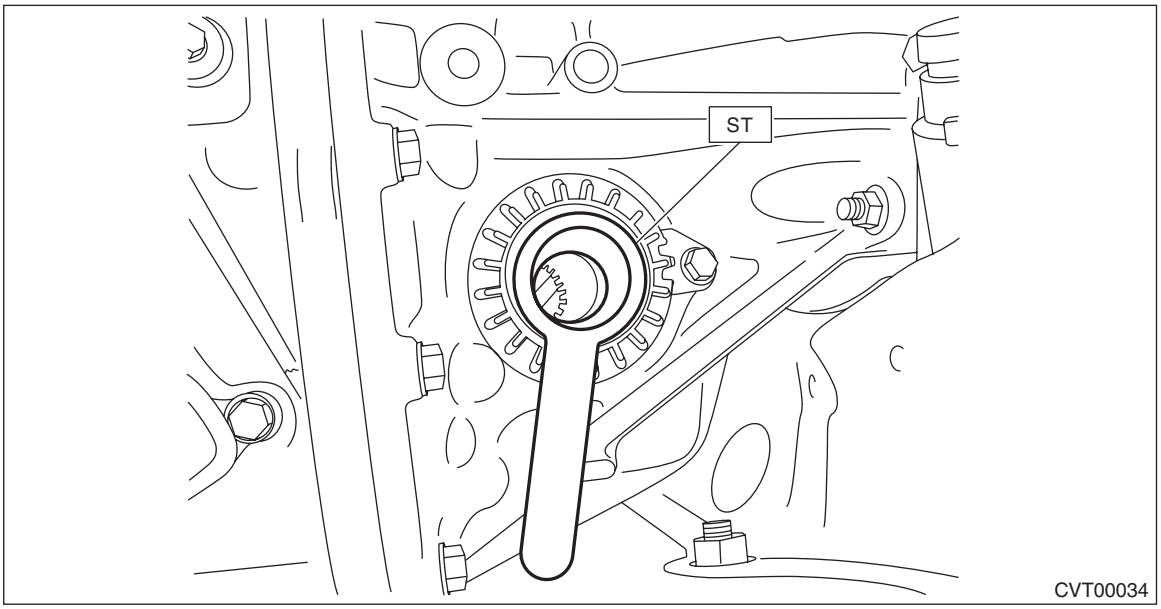
Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)
23) Replace the CVTF inlet hose and CVTF outlet hose. <Ref. to CVT(TH58A)-162, CVTF Cooler (With Warmer Function).>
24) Install the CVTF inlet hose and CVTF outlet hose to transmission.
25) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)
26) Install the starter. <Ref. to SC(H4DO(HEV))-11, INSTALLATION, Starter.>
27) Install the pitching stopper bracket and transmission radio ground cord.

CAUTION:
Be careful not to deform or damage the terminal of transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)
28) Install the air breather hose to the pitching stopper bracket. <Ref. to CVT(TH58A)-173, FRONT DIFFERENTIAL SIDE, INSTALLATION, Air Breather Hose.>
29) Install the pitching stopper. <Ref. to CVT(TH58A)-89, PITCHING STOPPER, INSTALLATION, Transmission Mounting System.>

30) Lift up the vehicle.
31) Apply grease to the side retainer oil seal lip.
32) Set the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR



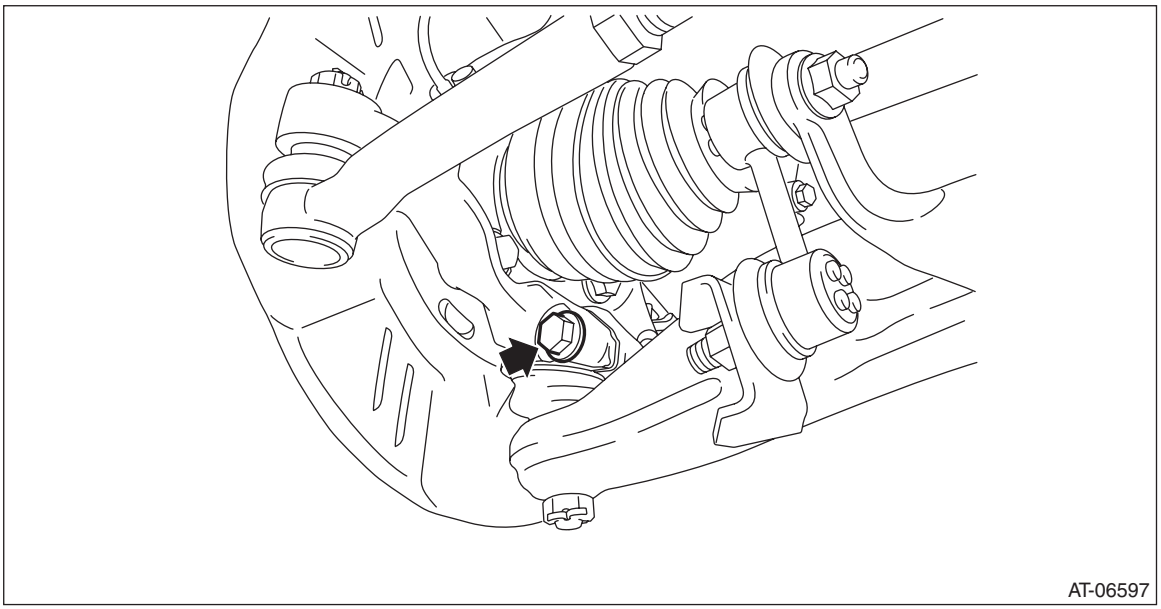
33) Replace the circlip of the drive shaft with a new part.
34) Insert the front drive shaft spline section into transmission and remove the ST (OIL SEAL PROTECTOR).

NOTE:
• Before inserting the RH front drive shaft into transmission, turn the steering wheel to the right hand at full lock.
• Before inserting the LH front drive shaft into transmission, turn the steering wheel to the left hand at full lock.
35) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.

36) Insert the ball joint into housing and secure with bolt.

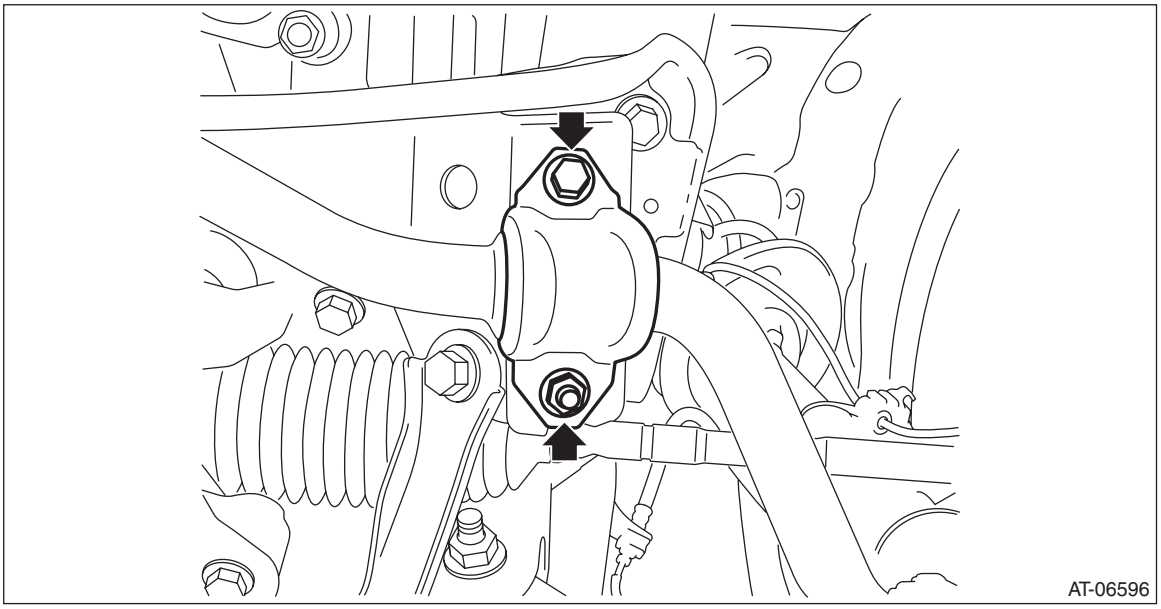
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.**


AT-06597

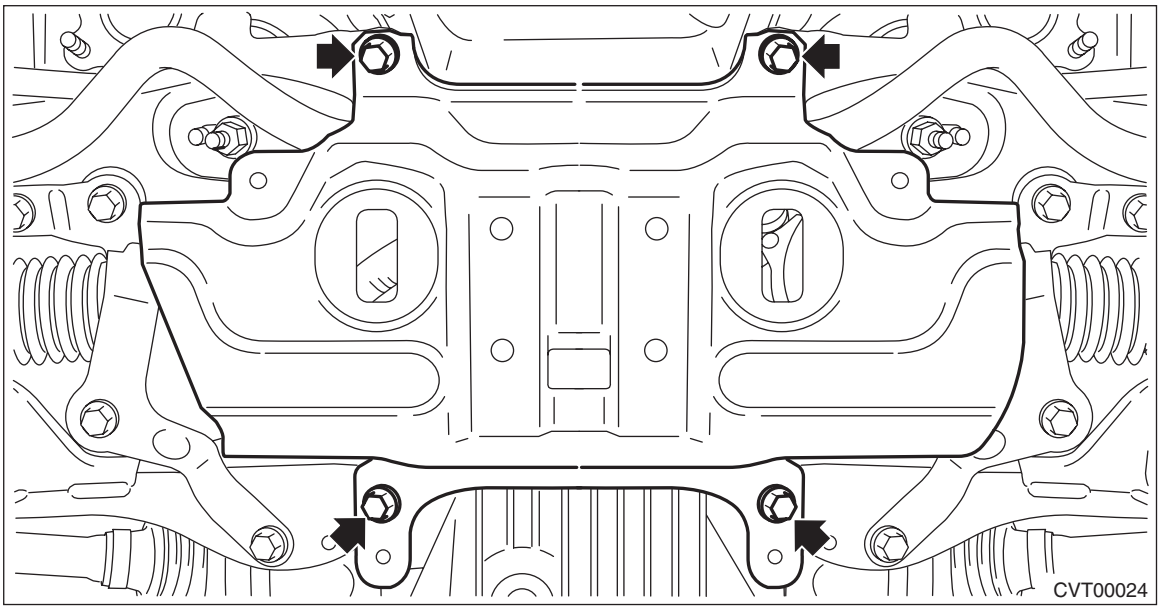
37) Install the stabilizer bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


AT-06596

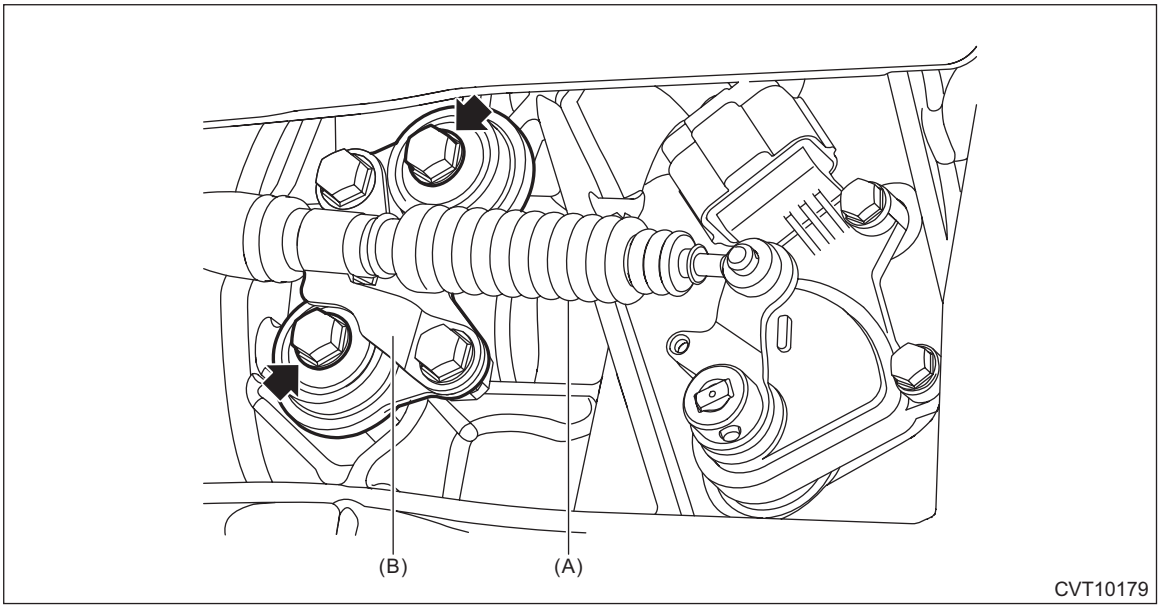
38) Install the jack-up plate.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



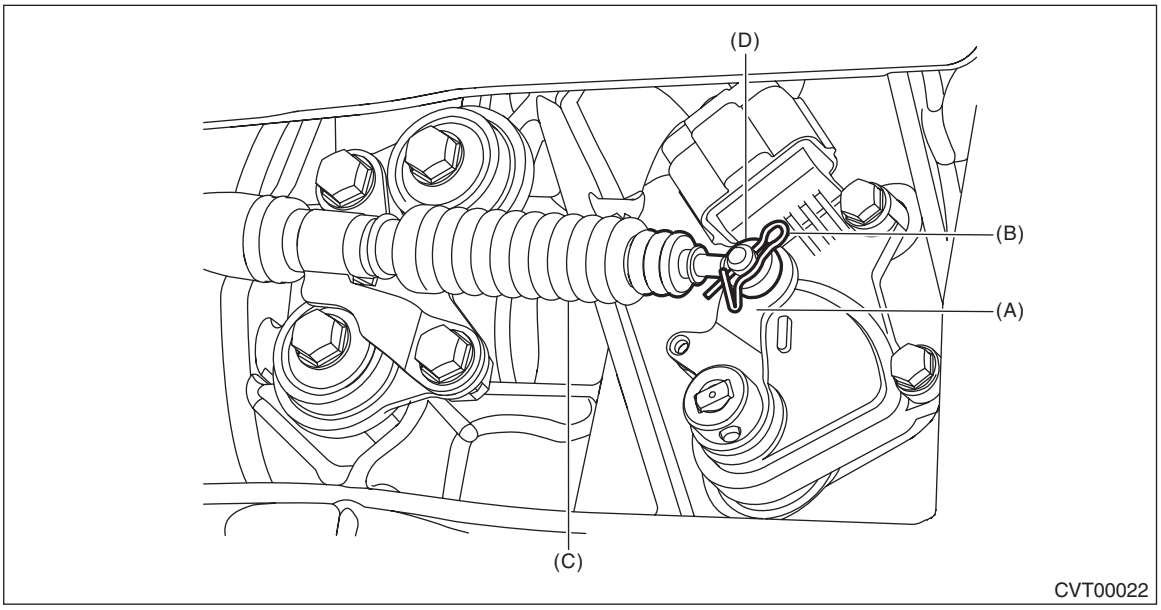
39) Install the plate assembly to transmission.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Select cable
(B) Plate ASSY

40) Install the washer and snap pin to the shifter arm.



(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

41) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
42) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
43) Install the hanger bracket.

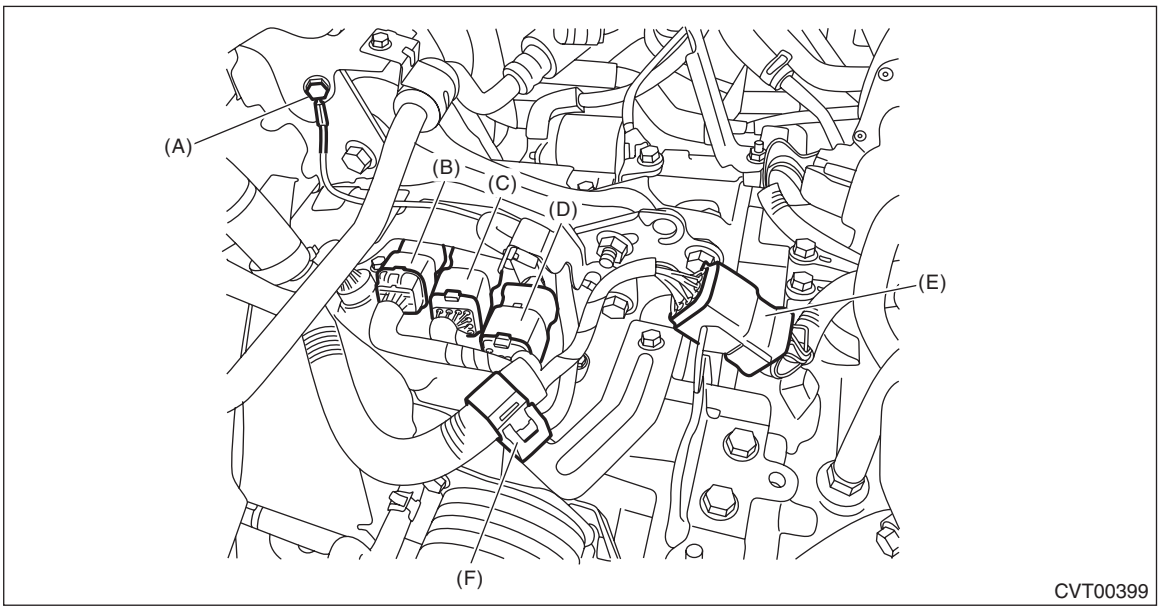
Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)
44) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
45) Install the under cover - rear LH. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
46) Install the under cover front - cable.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
47) Lower the vehicle.
48) Install the engine hanger rear and the vacuum pipe.

Tightening torque:
Engine hanger rear
21 N·m (2.1 kgf-m, 15.5 ft-lb)
Vacuum pipe
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
49) Install the air cleaner case bracket LH.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

50) Connect the following connectors and install the harness clip to the bracket.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip



(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

51) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
52) Install the front tires. <Ref. to WT-5, INSTALLATION, Tire and Wheel.>
53) Install the collector cover.
54) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>
55) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
56) Refill differential gear oil to adjust the differential gear oil amount. <Ref. to CVT(TH58A)-45, Differential Gear Oil.>
57) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, CVTF.>
58) Perform the operation for clearing AT learning value. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.>
59) Perform the operation of AT learning mode. <Ref. to CVT(HEV)(diag)-27, Learning Control.>
60) Execute the rear differential inspection mode. <Ref. to DI-67, Rear Differential Inspection Mode.>

CAUTION:
Always execute the rear differential inspection mode at the replacement of the following.
- **Replacement of transmission assembly**
- **Replacement of front differential hypoid gear set**

61) Perform the road test to make sure there is no fault. <Ref. to CVT(TH58A)-50, INSPECTION, Road Test.>

12.Transmission Mounting System

A: REMOVAL

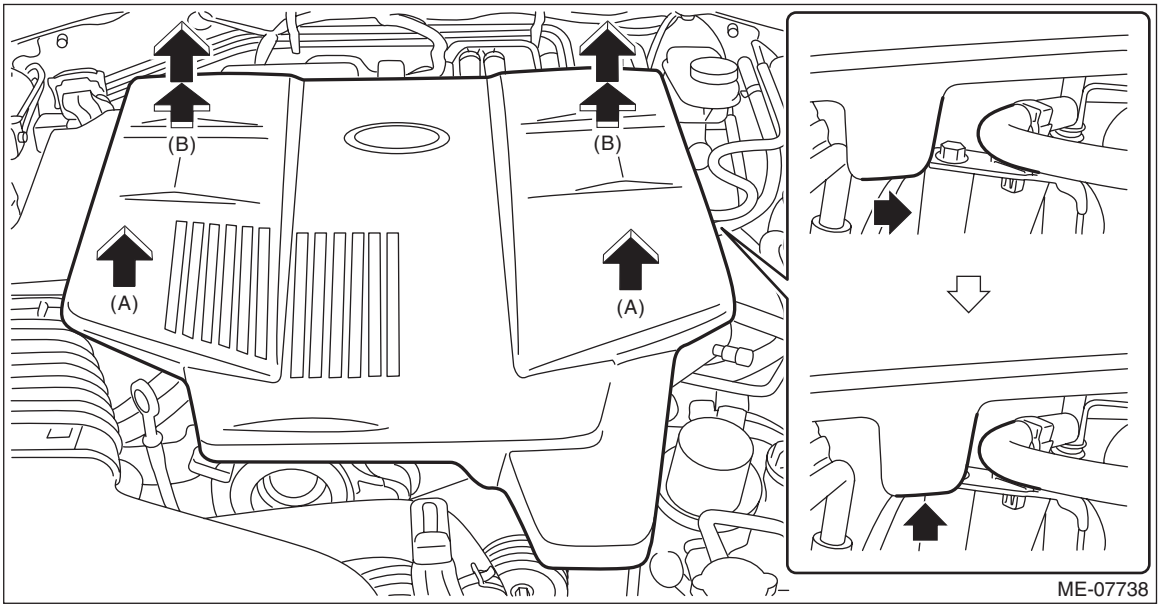
1. PITCHING STOPPER

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

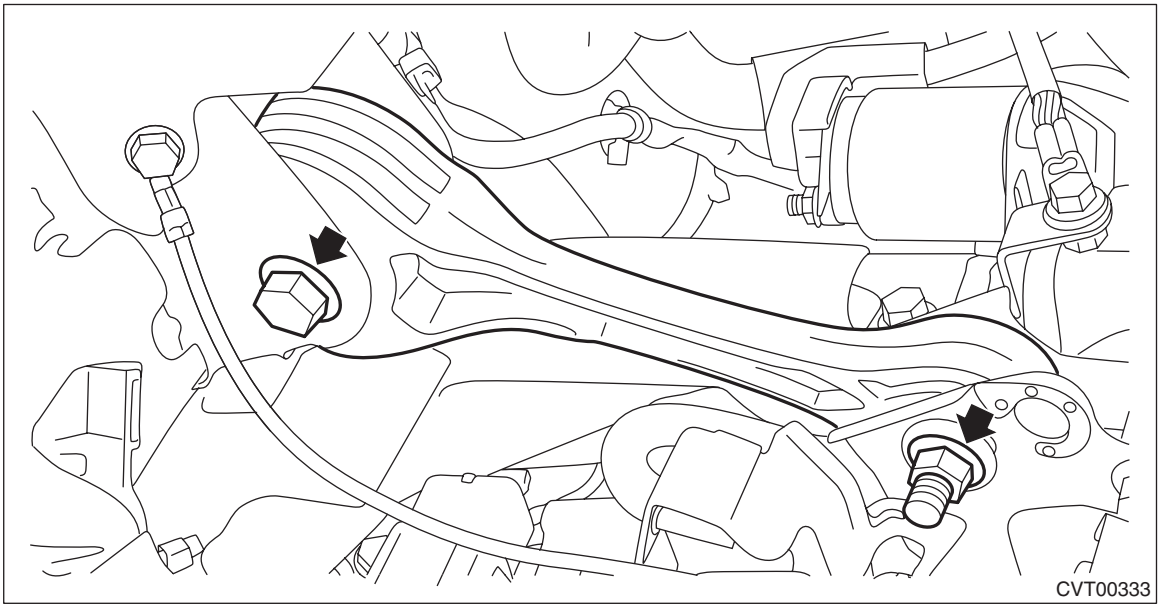
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Pull up the two points at the front of collector cover (A).
   (2) Pull up the two points at the rear of collector cover (B) while moving them rearward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



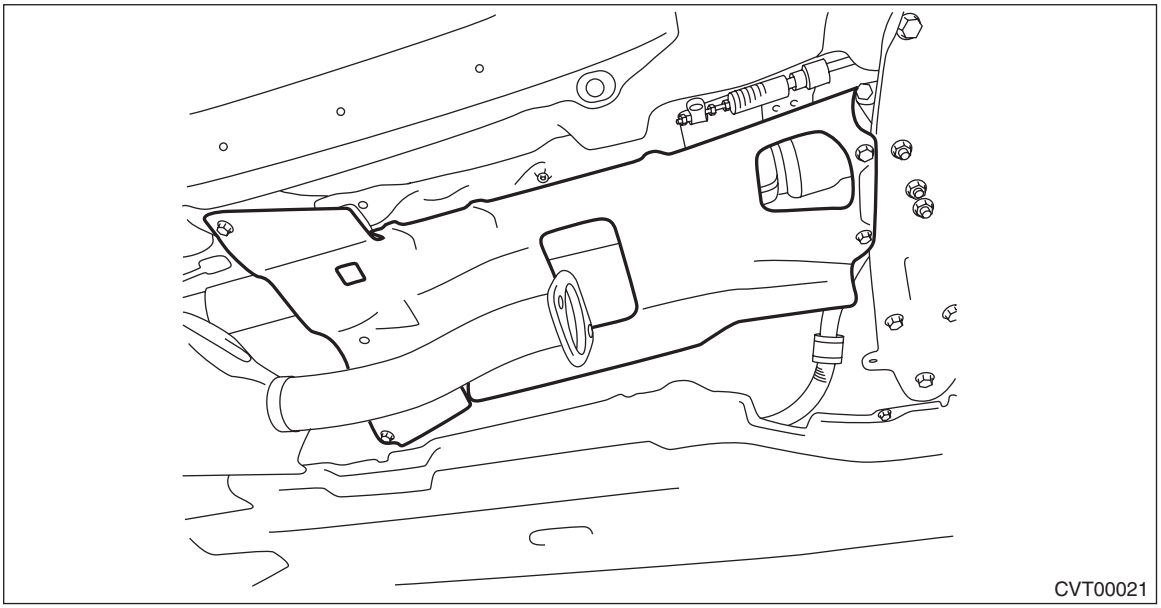
3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Remove the pitching stopper.



2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

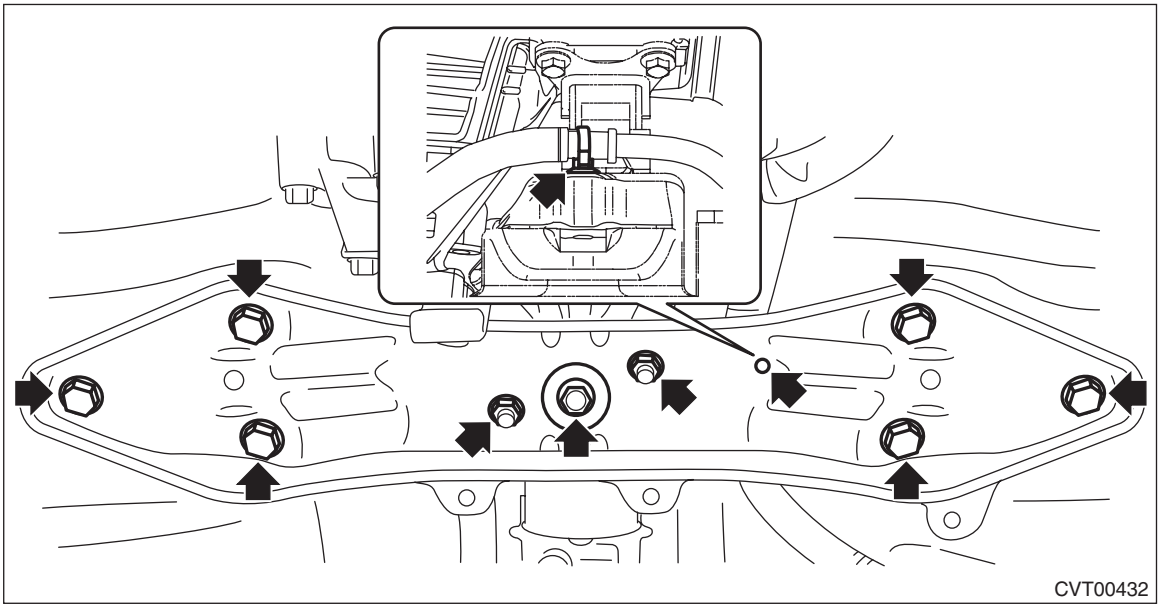
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Remove the center exhaust cover.

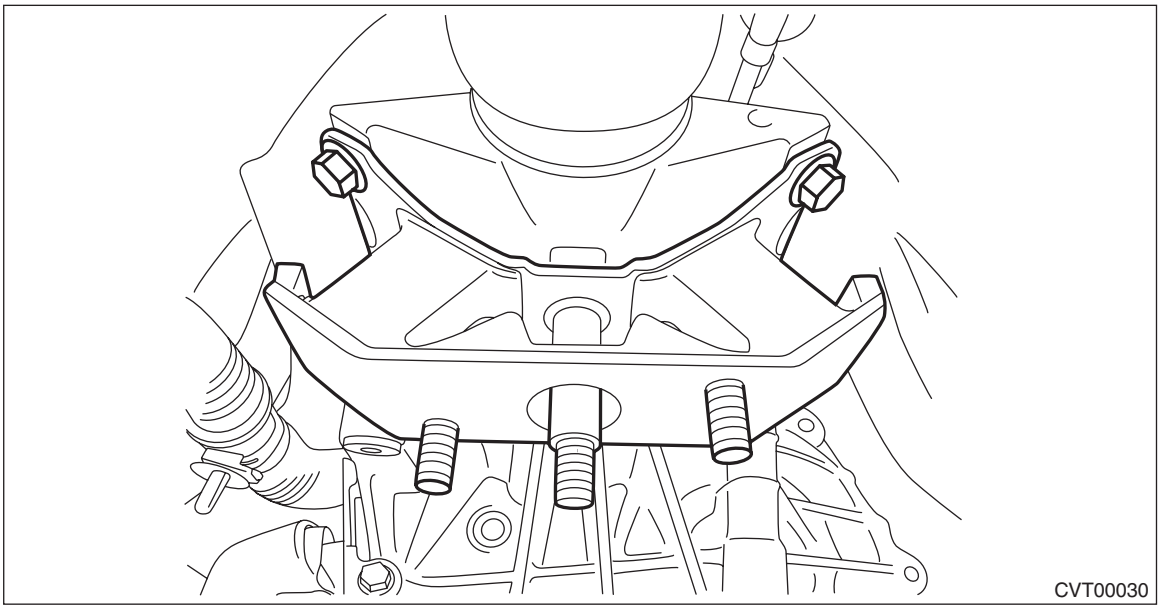

CVT00021

5) Set the transmission jack under the transmission.

NOTE:
Make sure that the support plate of transmission jack does not touch the oil pan.
6) Release the clip of the electric oil pump cable from the transmission rear crossmember, and remove the transmission rear crossmember.


CVT00432

7) Remove the rear cushion rubber.

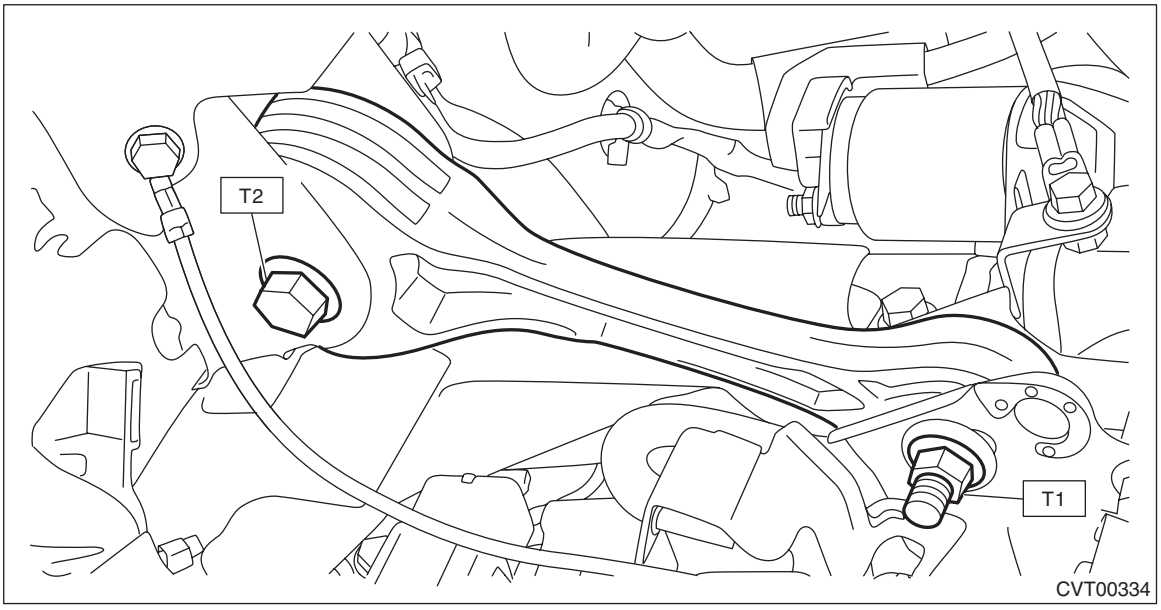


B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



2) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
3) Install the collector cover.
4) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

1) Attach the rear cushion rubber to the transmission.

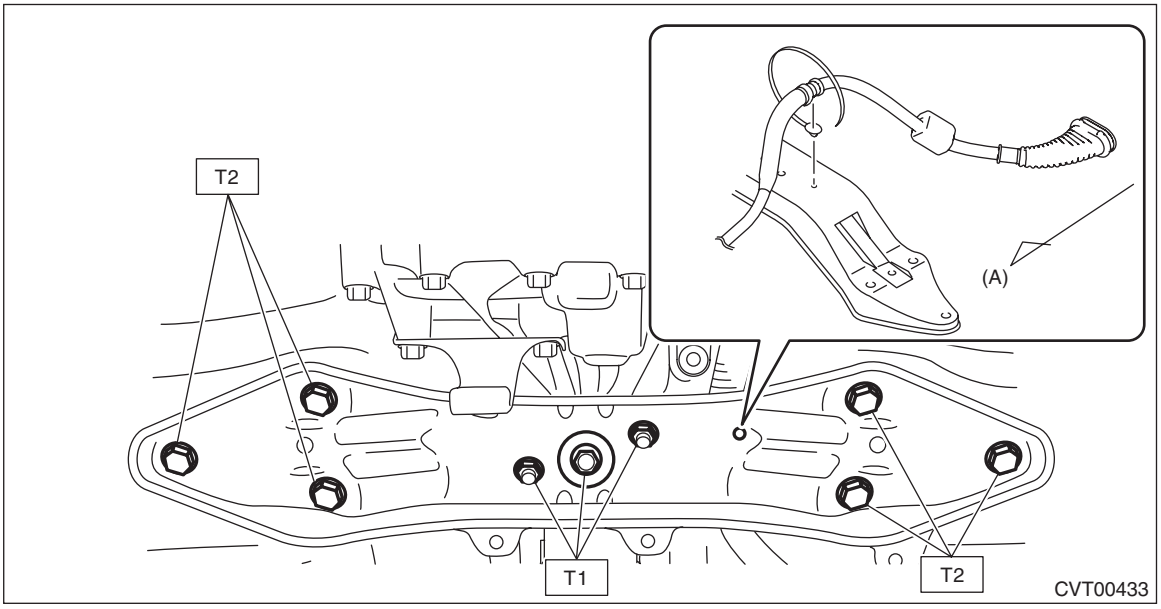
Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)

2) Attach the transmission rear crossmember, and install the electric oil pump harness clip to the transmission rear crossmember.

CAUTION:
- **Be careful not to damage the electric oil pump harness.**
- **Be careful not to pinch the harness.**

NOTE:
- If the electric oil pump harness clip is damaged, replace the harness clip.
- When replacing the electric oil pump harness clip, install the harness clip as shown in the figure.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



(A) Front side of vehicle

3) Remove the transmission jack.
4) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

5) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
6) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

- Check the crossmember for bends or damage.
- Check that the cushion rubber is not stiff, cracked or otherwise damaged.
- Check the pitching stopper for bends or damage.

13.Extension Case Oil Seal

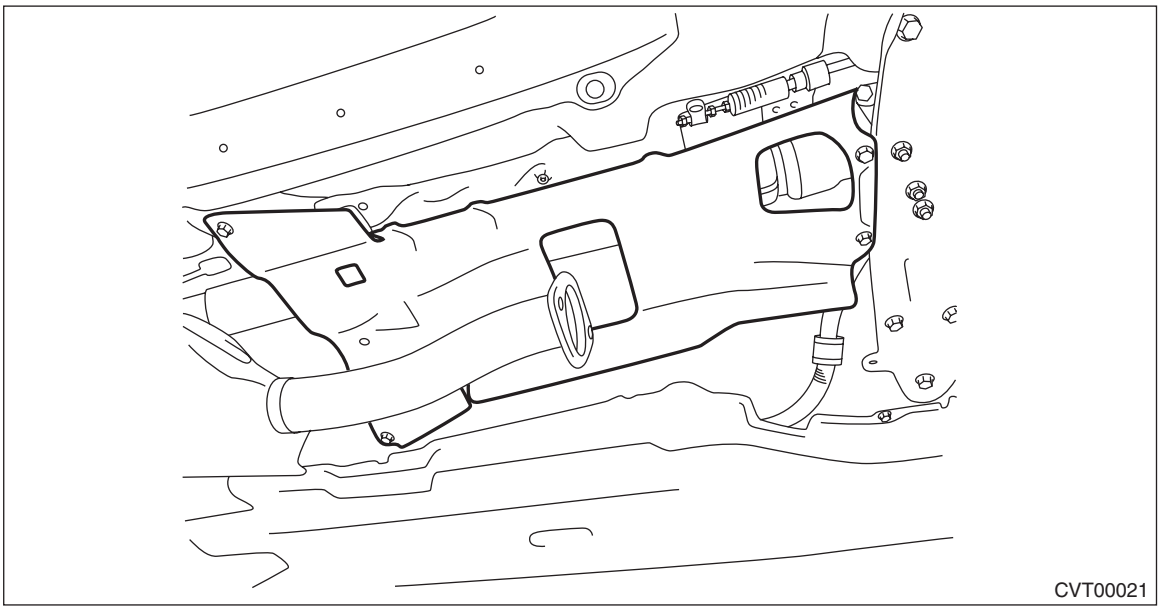
A: INSPECTION

Check for leakage of CVTF from the joint section of transmission and propeller shaft. If a leak is found, inspect the propeller shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:
Immediately after the vehicle has been running or after idling for a long time, the CVTF will be hot. Be careful not to burn yourself.

1) Lift up the vehicle.
2) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
3) Remove the center exhaust cover.


CVT00021

4) Clean the transmission exterior.
5) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
6) Using a screwdriver or ST, remove the oil seal trying not to damage the extension case.
ST 398527700 PULLER ASSY
7) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

ST 498057300 OIL SEAL INSTALLER
8) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
9) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

10) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
11) Adjust the CVTF level and check there is no leakage. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

14.Differential Side Retainer Oil Seal

A: INSPECTION

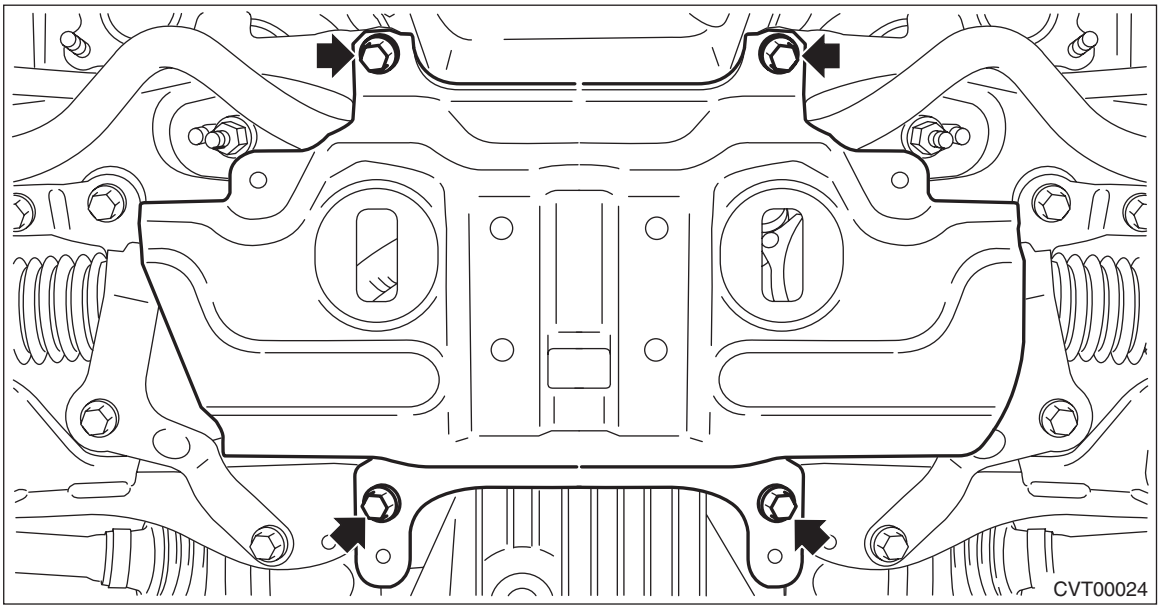
Check for leakage of gear oil from differential side retainer oil seal part. If there is an oil leak, inspect the front drive shaft and replace the oil seal.

B: REPLACEMENT

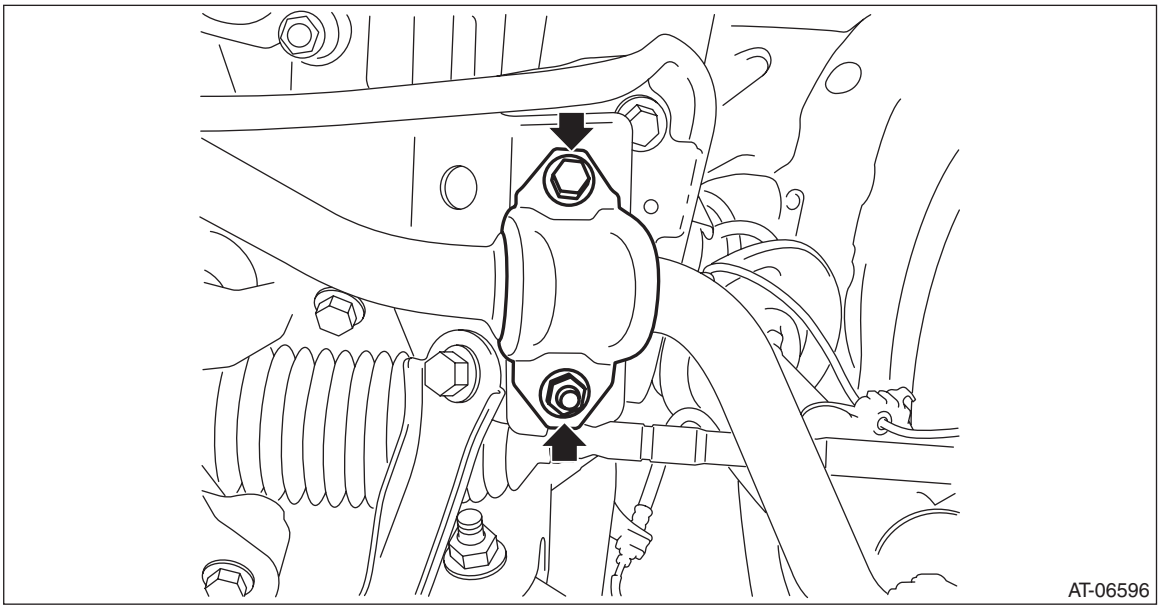
CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
• Be careful not to spill the differential gear oil on exhaust pipe to prevent it from emitting smoke or fire. If differential gear oil is spilled on the exhaust pipe, wipe it off completely.
1) Remove the front tires. <Ref. to WT-5, REMOVAL, Tire and Wheel.>
2) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
3) Drain differential gear oil. <Ref. to CVT(TH58A)-47, REPLACEMENT, Differential Gear Oil.>
4) Tighten the differential gear oil drain plug.

NOTE:
Use a new gasket.

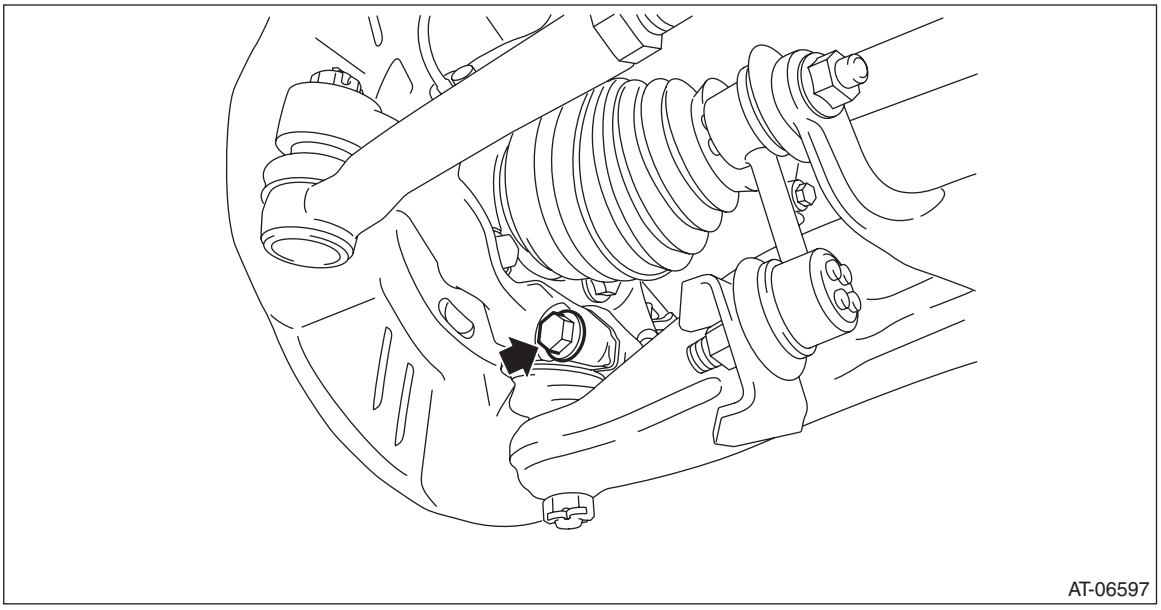
Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)
5) Remove the jack-up plate.



6) Remove the stabilizer bracket.



7) Remove the bolts which secure to the front housing, and separate the front arm and housing.



8) Using a crowbar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the crowbar and the transmission in order to avoid damaging the transmission side retainer.

9) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.

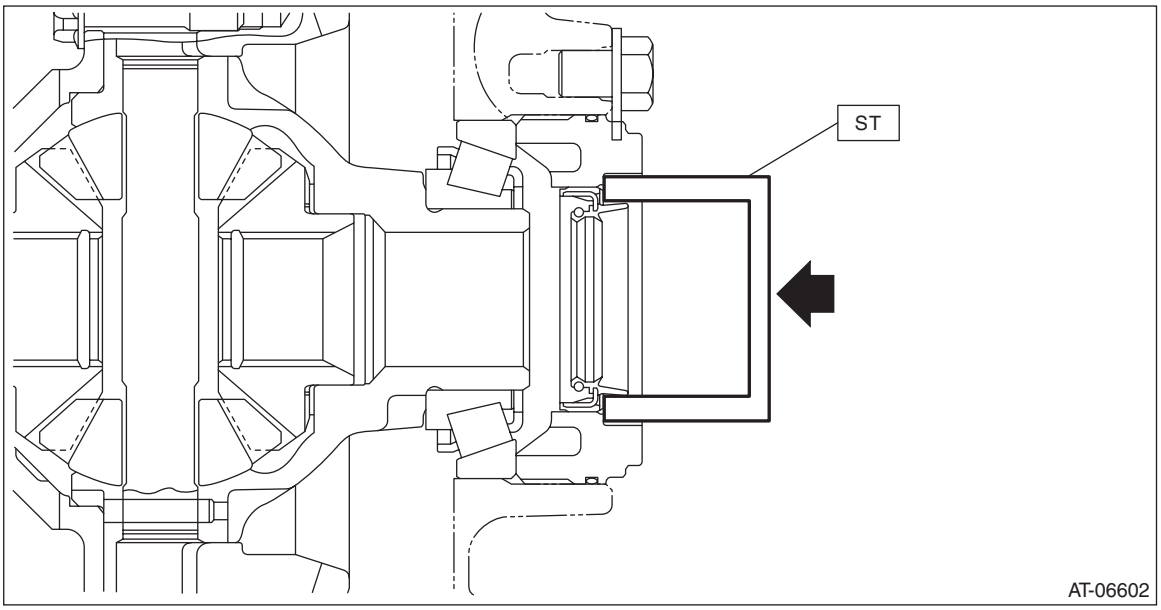
NOTE:
- Before pulling the RH front drive shaft from transmission, turn the steering wheel to the right hand at full lock.
- Before pulling the LH front drive shaft from transmission, turn the steering wheel to the left hand at full lock.

10) Remove the differential side retainer oil seal using driver wrapped with vinyl tape etc.

11) Using the ST, install the differential side retainer oil seal by lightly tapping with a hammer.

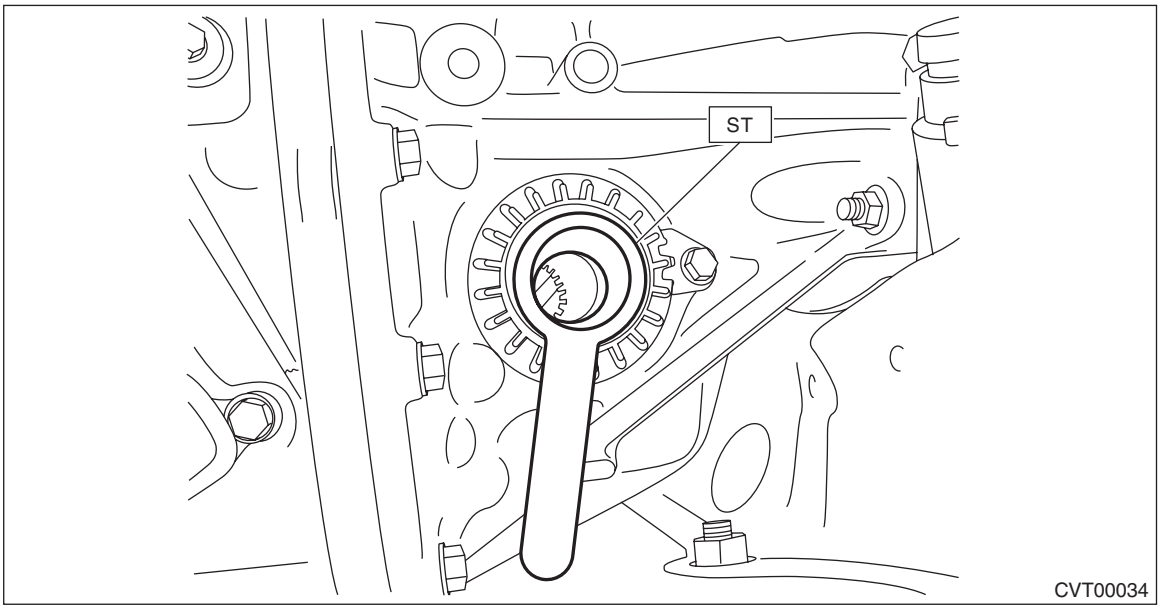
NOTE:
- Apply differential gear oil to the lip surface, so that the oil seal lip is not deformed.
- Apply differential gear oil to the press-fitting surface of oil seal and the differential side retainer.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



12) Apply grease to the side retainer oil seal lip.
13) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR



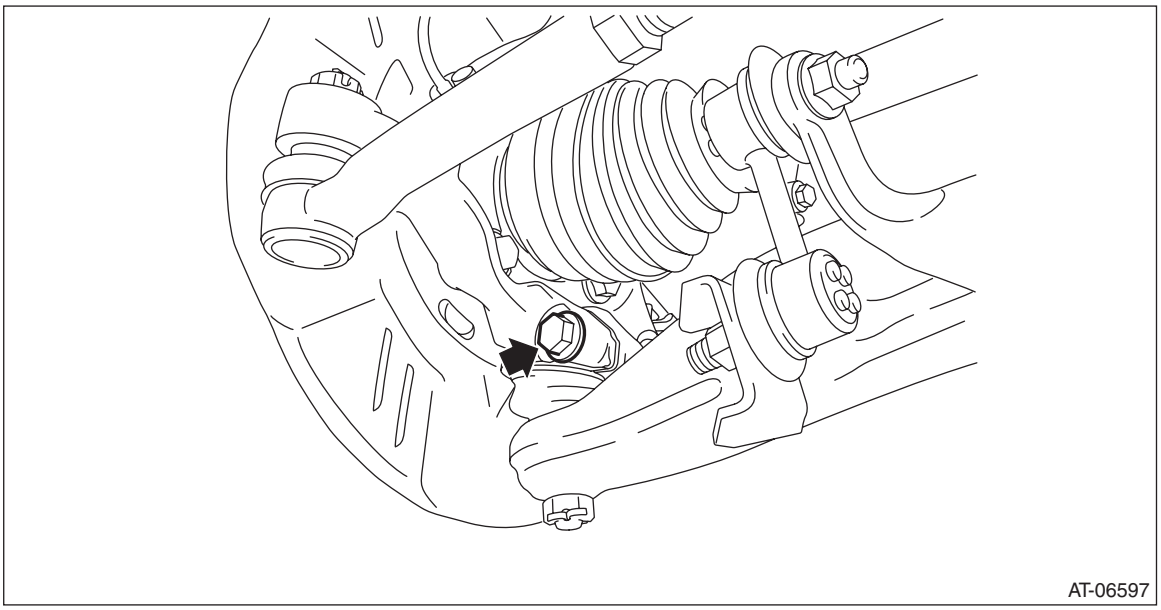
14) Replace the circlip of the drive shaft with a new part.
15) Insert the front drive shaft spline section into transmission and remove the ST (DIFFERENTIAL SIDE OIL SEAL INSTALLER).

NOTE:
- Before inserting the RH front drive shaft into transmission, turn the steering wheel to the right hand at full lock.
- Before inserting the LH front drive shaft into transmission, turn the steering wheel to the left hand at full lock.

16) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.
17) Insert the ball joint into housing and secure with bolt.

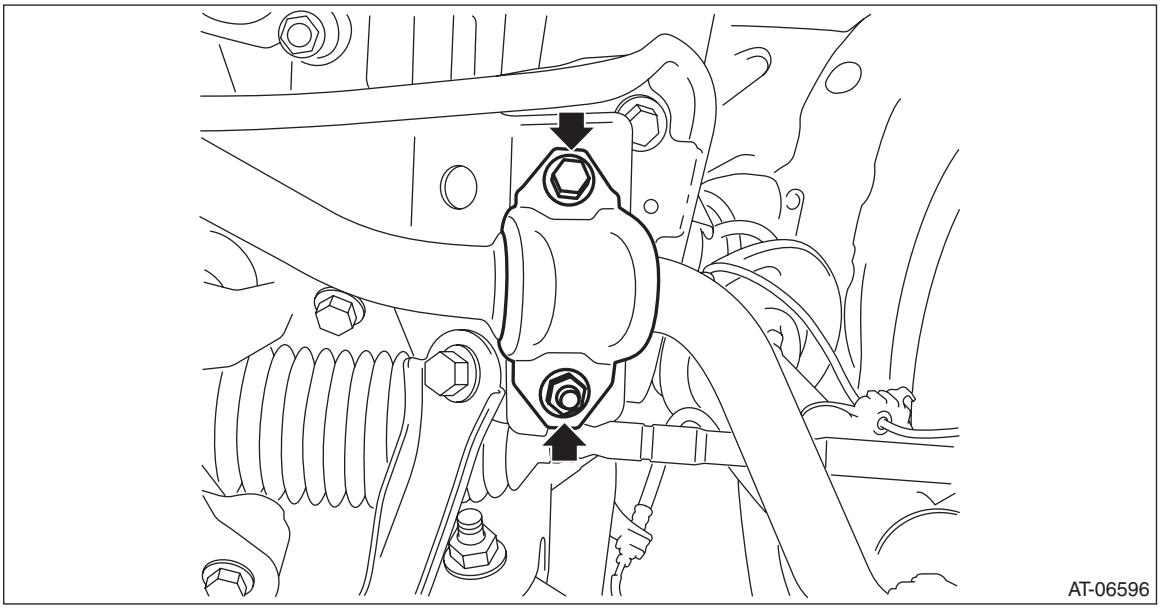
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.**


AT-06597

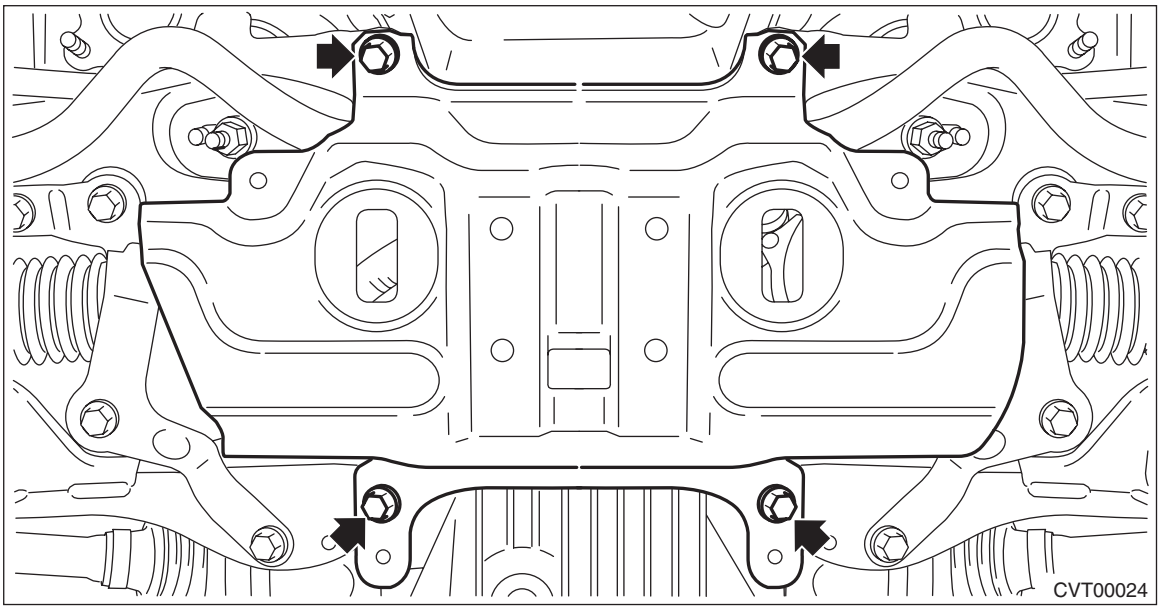
18) Install the stabilizer bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


AT-06596

19) Install the jack-up plate.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



20) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
21) Fill differential gear oil. <Ref. to CVT(TH58A)-45, Differential Gear Oil.>
22) Adjust the differential gear oil level, and check for leakage. <Ref. to CVT(TH58A)-45, ADJUSTMENT, Differential Gear Oil.>
23) Install the front tires. <Ref. to WT-5, INSTALLATION, Tire and Wheel.>

15.Inhibitor Switch

A: INSPECTION

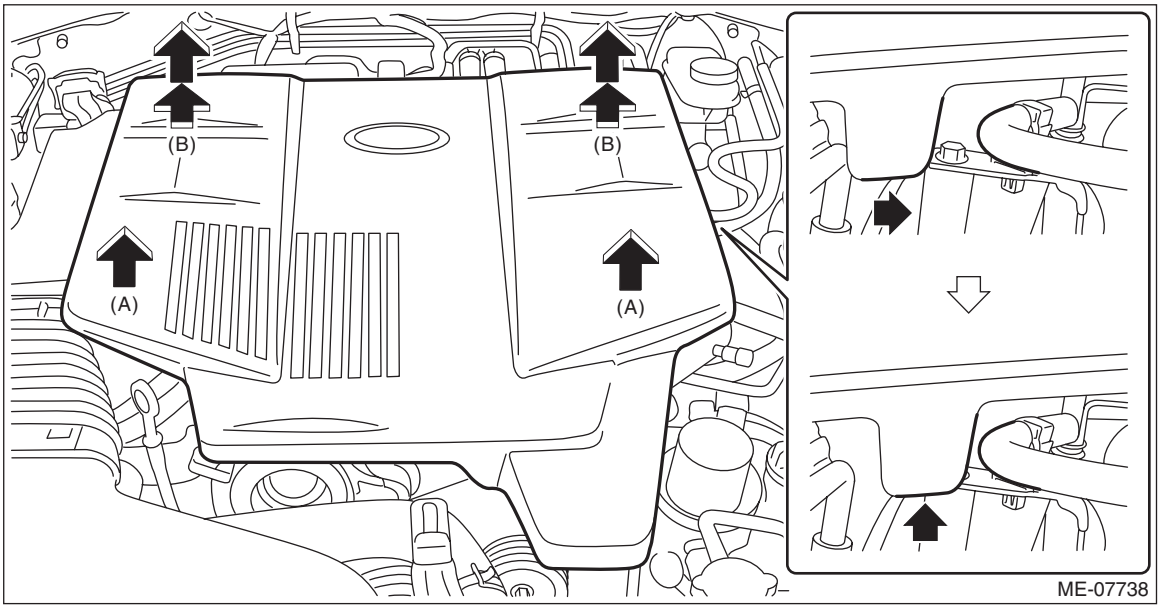
When the driving condition or starter motor operation is improper, first check the shift linkage for improper operation. If the shift linkage is functioning properly, check the inhibitor switch.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

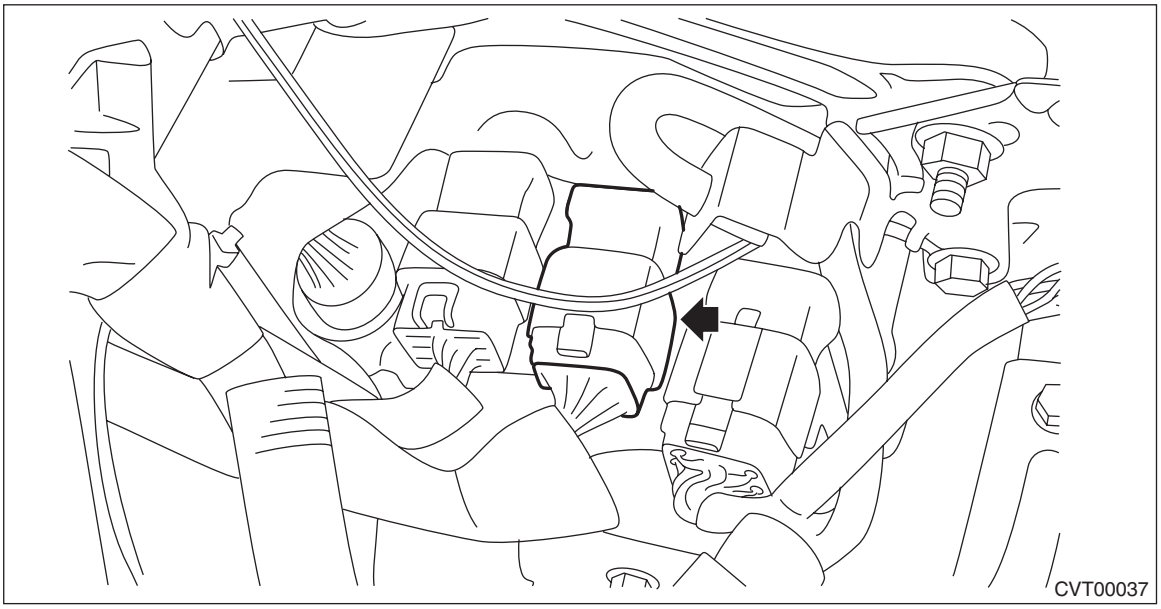
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



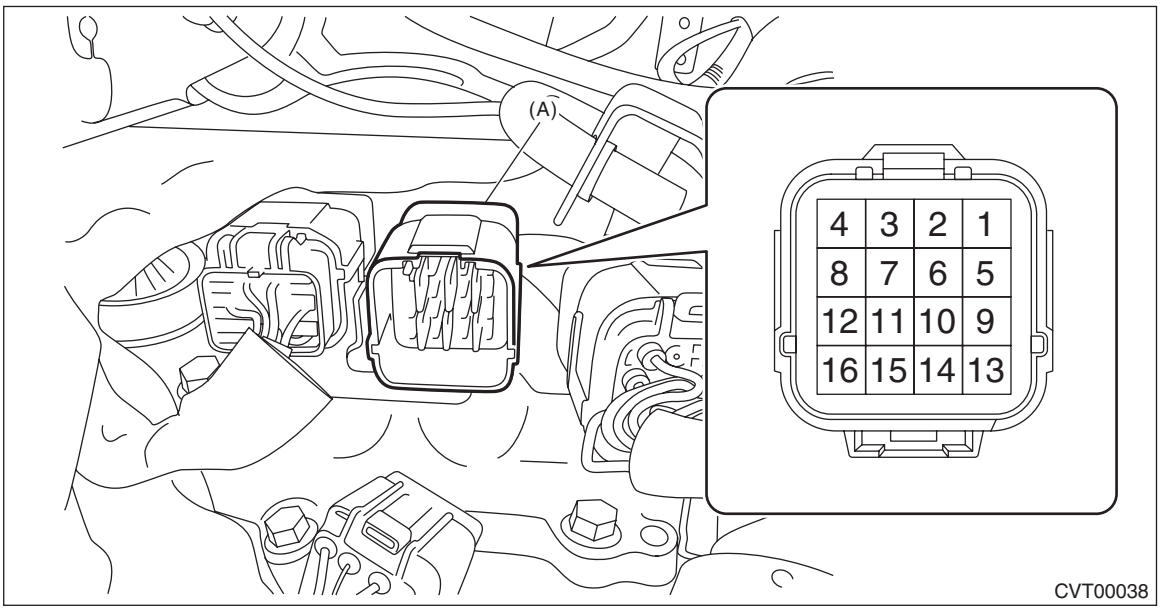
3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Disconnect the inhibitor harness connector.



5) Check for continuity in inhibitor switch circuit by shifting the select lever in “P”, “R”, “N” and “D” respectively.

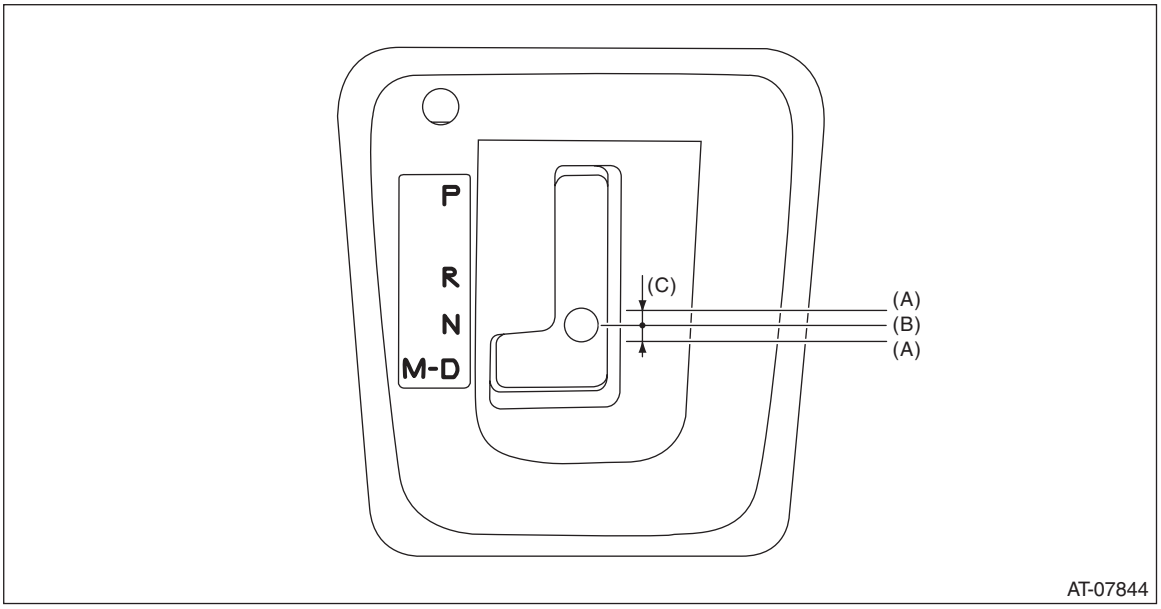
NOTE:
- Check that there is no continuity in the starter circuit when the select lever is in the “R” and “D” ranges.
- When inhibitor switch is normal, check there is no poor contact in vehicle side connector and no open circuit in harness.

	Range	Terminal No.
Signal sent to TCM	P	1 — 7
	R	2 — 7
	N	3 — 7
	D	4 — 7
Starter circuit	P/N	15 — 16
Back-up light circuit	R	13 — 14



(A) Inhibitor harness connector

6) Check that there is continuity at equal points when the select lever is moved 1.5° in both directions from the “N” range.
If there is continuity in only one direction or in other points, adjust the inhibitor switch. <Ref. to CVT(TH58A)-99, ADJUSTMENT, Inhibitor Switch.>

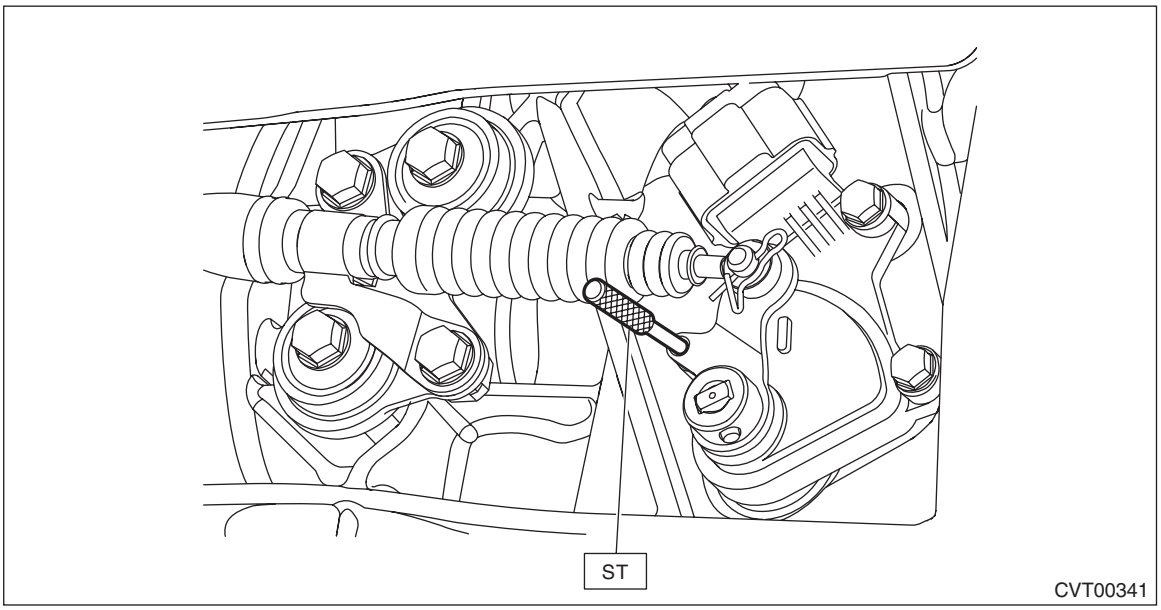


(A) Continuity does not exist.
(B) Continuity exists.
(C) 1.5°

7) Repeat the above inspection in other gear ranges. If there is fault, adjust the inhibitor switch and select cable. <Ref. to CVT(TH58A)-99, ADJUSTMENT, Inhibitor Switch.> <Ref. to CS-57, ADJUSTMENT, Select Cable.>

B: ADJUSTMENT

1) Shift the select lever to “N” range.
2) Loosen the two bolts holding the inhibitor switch.
3) Insert the ST vertically into the holes of the shifter arm and switch body.
ST 499267300 STOPPER PIN



4) Tighten the two bolts holding the inhibitor switch.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

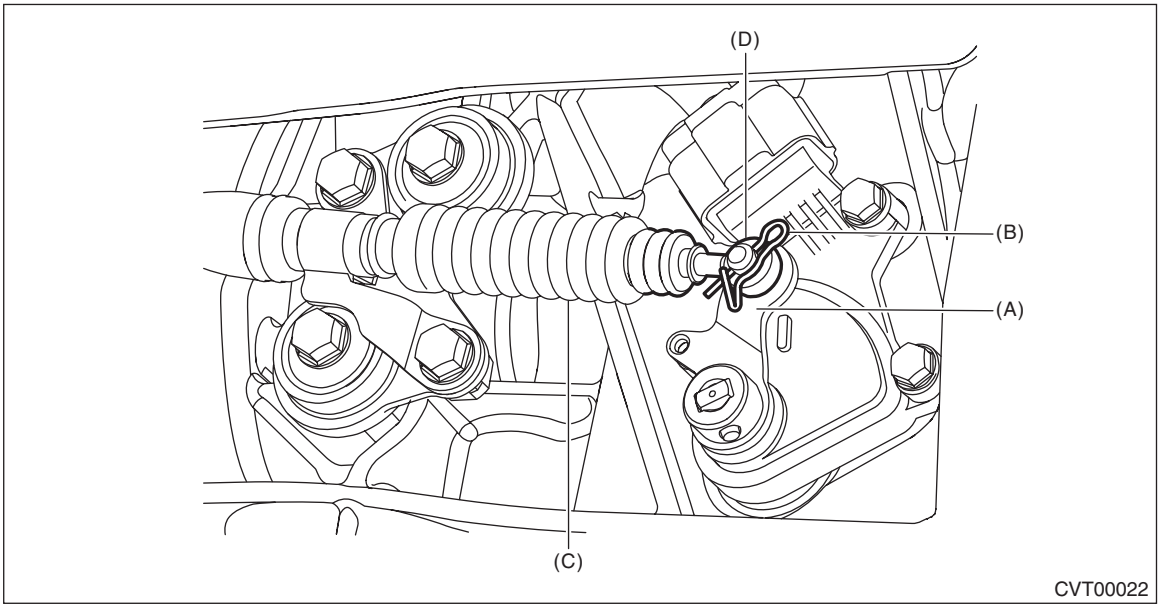
5) Repeat the inspection of the inhibitor switch. If the inhibitor switch is determined to be “faulty”, replace it.

C: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

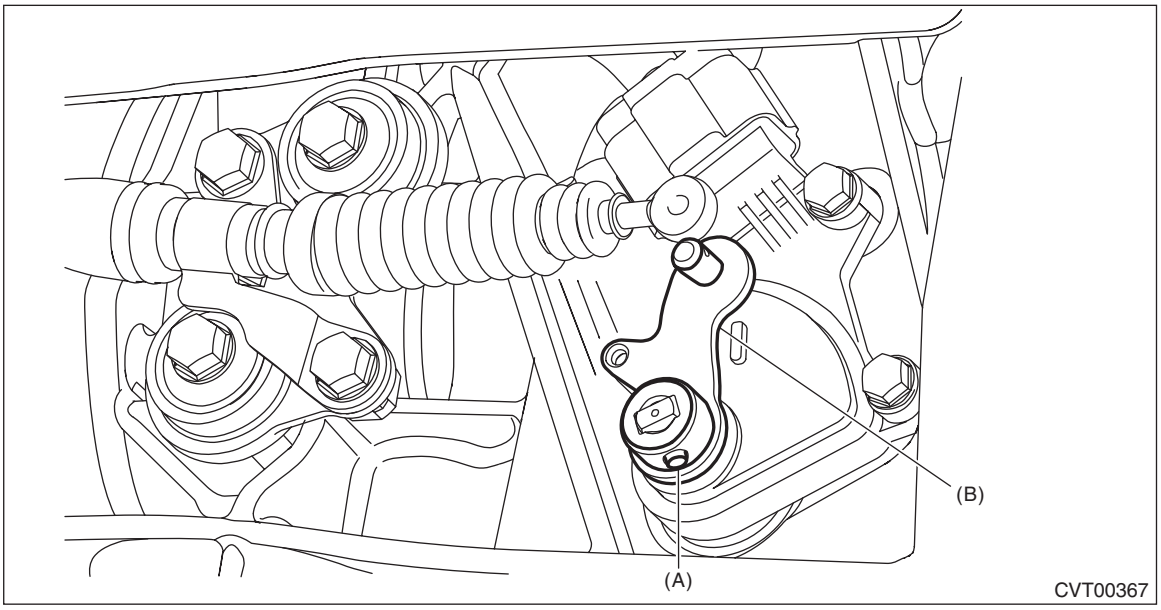
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Shift the select lever to “N” range.
3) Lift up the vehicle.
4) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
5) Remove the snap pin and washer from the shifter arm.



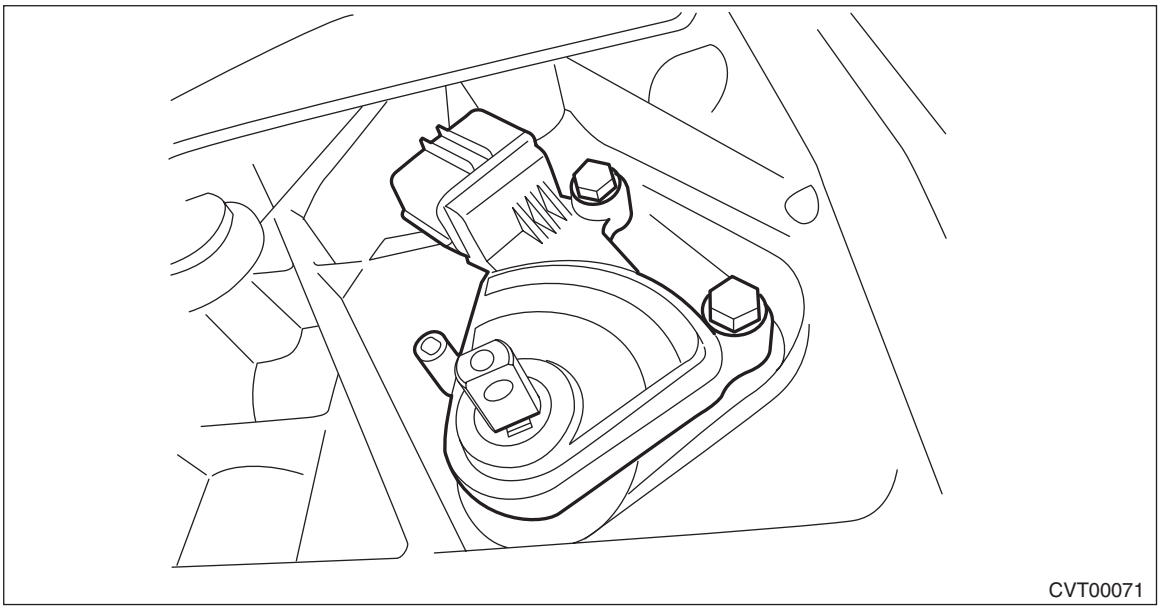
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

6) Remove the spring pin and shifter arm.



(A) Spring pin
(B) Shifter arm

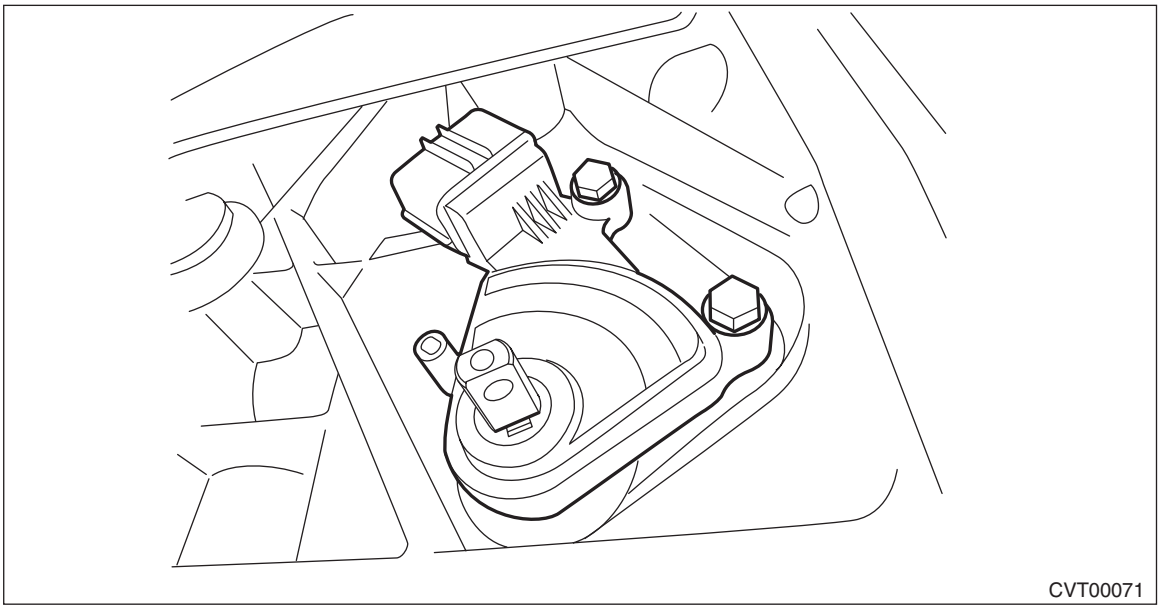
7) Remove the inhibitor harness connector from inhibitor switch.
8) Remove the two inhibitor switch securing bolts.



9) Remove the inhibitor switch from the transmission case.

D: INSTALLATION

1) Install the inhibitor switch to the transmission case temporarily.

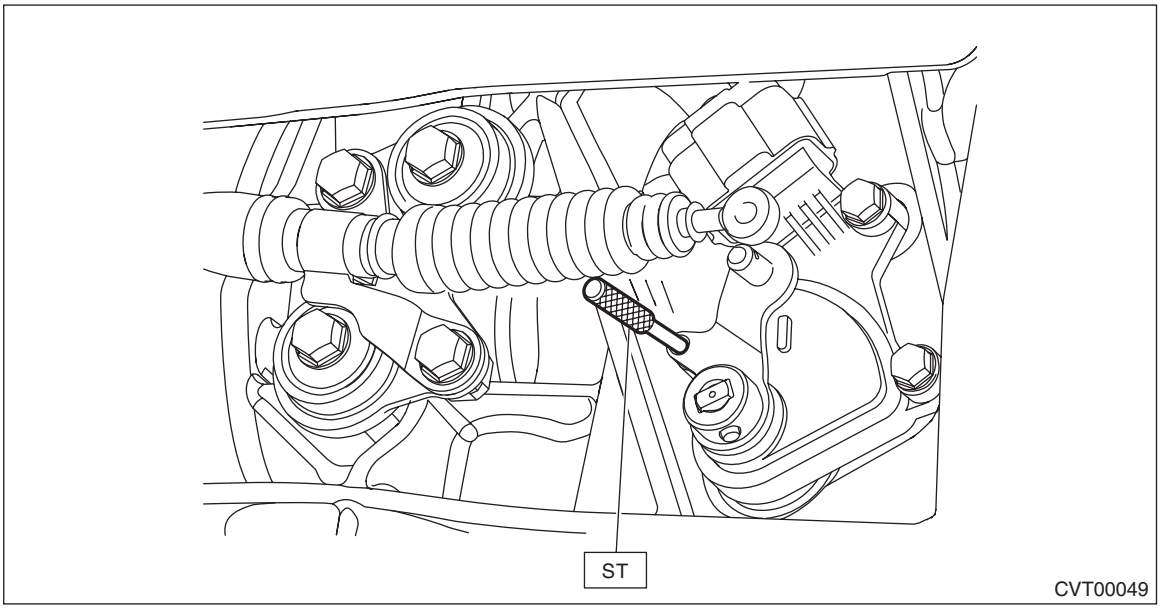


2) Connect the inhibitor harness connector to the inhibitor switch.
3) Install the shifter arm and fix with the spring pin.

NOTE:
Use new spring pin.

4) Shift the shifter arm to “N” range.
5) Install the ST vertically in the cutout of shifter arm and the hole of switch body.

ST 499267300 STOPPER PIN



6) Tighten the two bolts holding the inhibitor switch.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

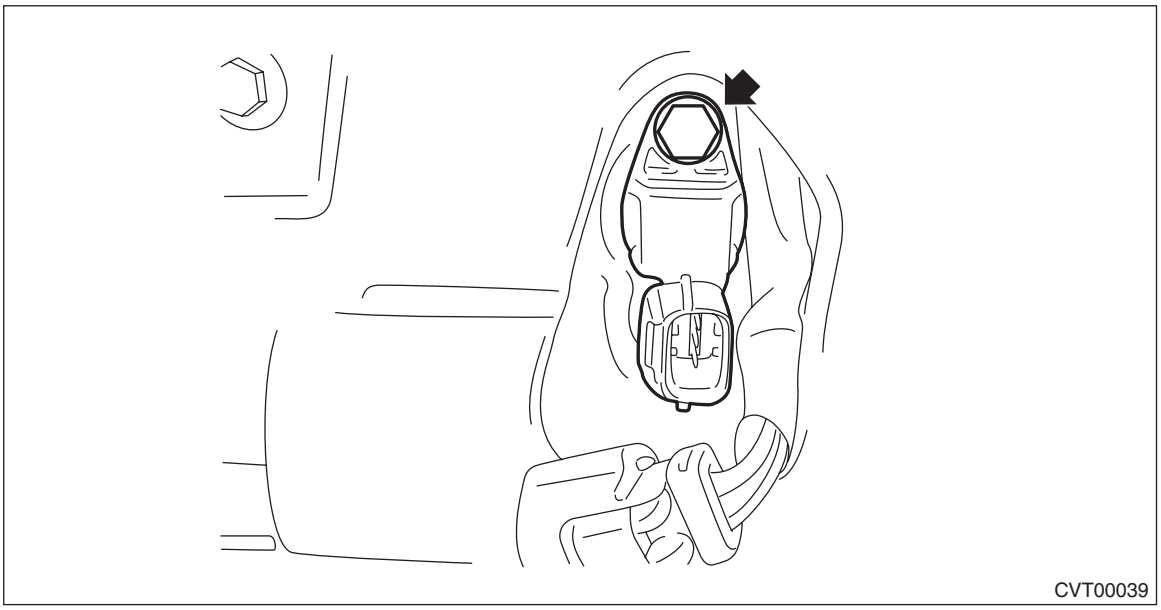
7) Install the select cable to the shifter arm.
8) Install the washer and snap pin to the shifter arm.
9) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
10) Lower the vehicle.
11) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
12) Check the inhibitor switch. <Ref. to CVT(TH58A)-97, INSPECTION, Inhibitor Switch.>

16.Turbine Speed Sensor

A: REMOVAL

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the harness connector from turbine speed sensor.
4) Remove the turbine speed sensor.



B: INSTALLATION

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.
Install in the reverse order of removal.

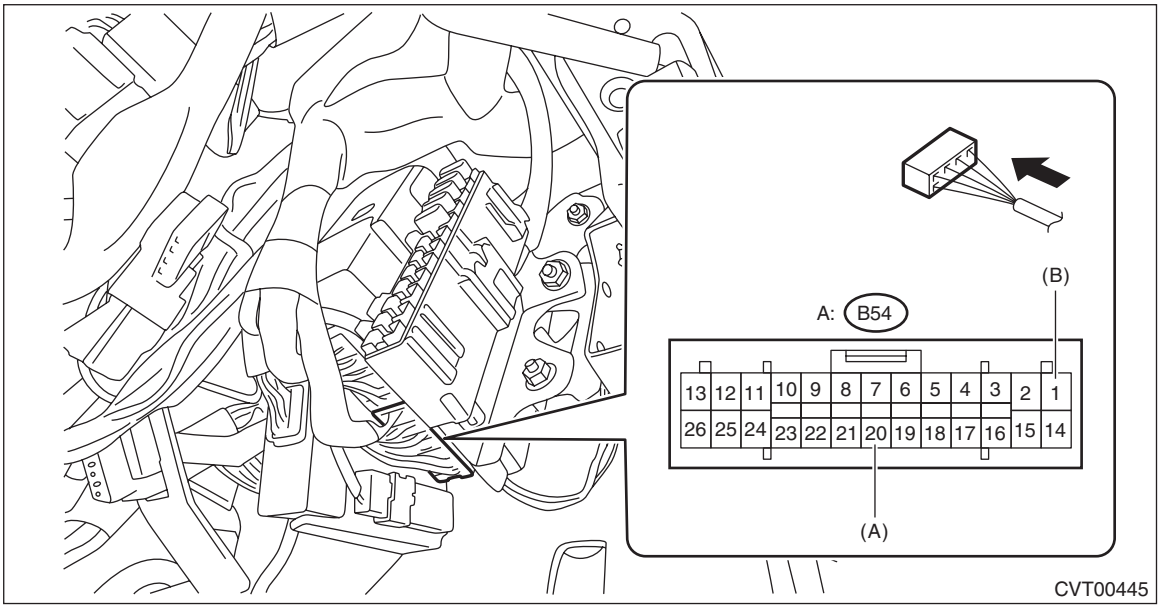
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

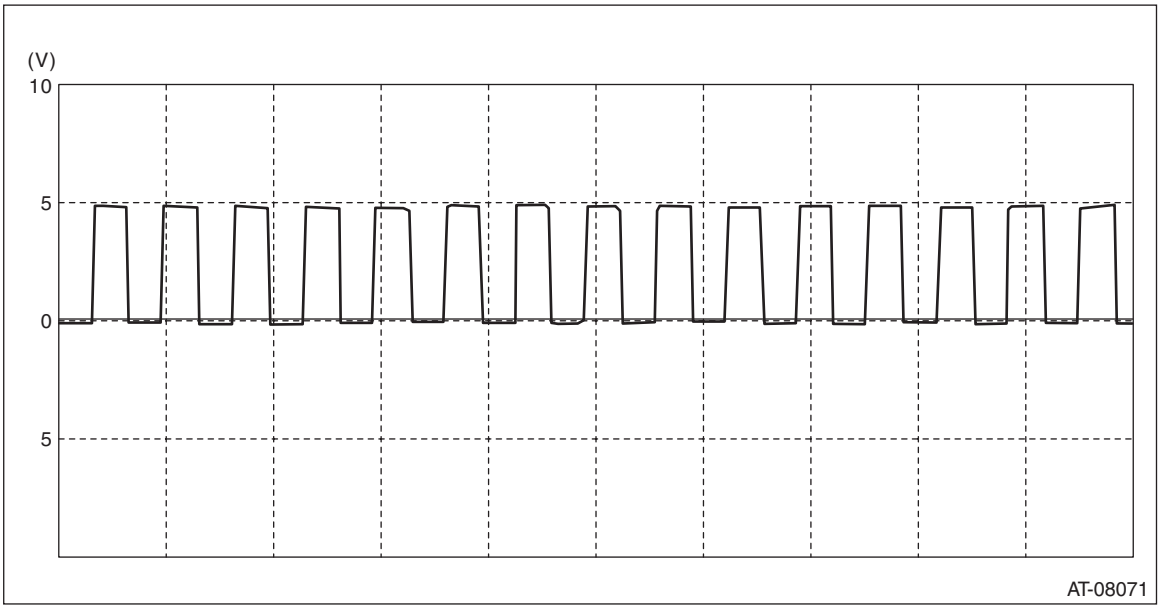
Connector & terminal
(B54) No. 20 (+) — No. 1 (–):



(A) + probe
(B) – probe

2) Start and warm up the engine.
3) Perform “Engine only Drive Mode” using the Subaru Select Monitor. <Ref. to HEV(diag)-69, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, System Operation Check Mode.>
4) Check the waveform and output voltage of the turbine speed sensor with engine idling.

NOTE:
The waveform cycle changes as the speed changes.



17.Secondary Speed Sensor

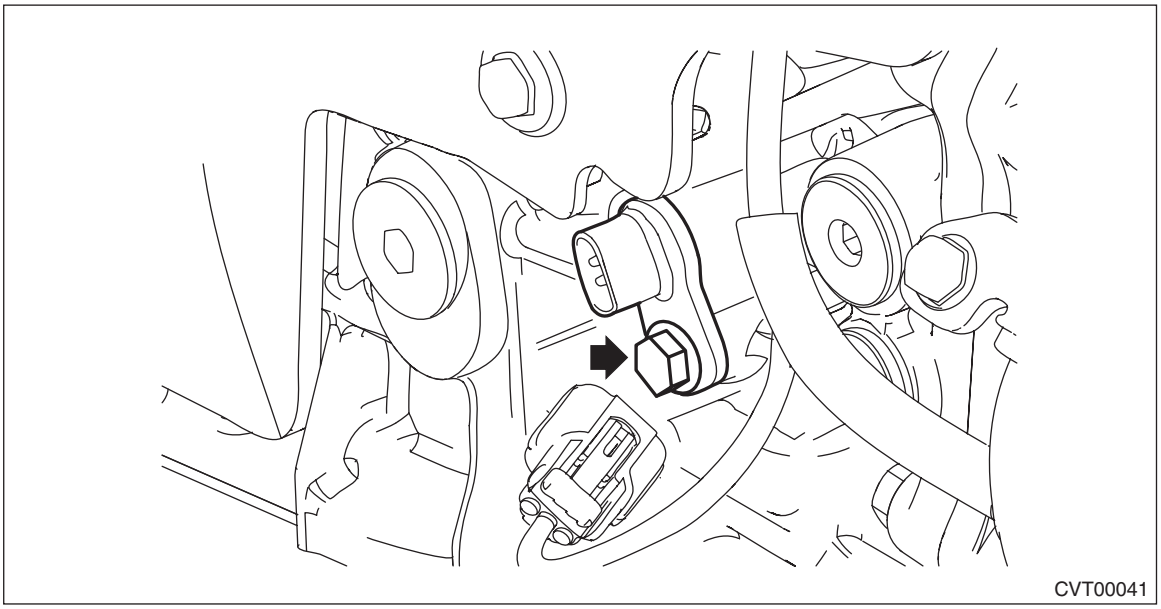
A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
• When secondary speed sensor is removed, CVTF leaks. After installing the secondary speed sensor, adjust the CVTF level.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle.
3) Remove the harness connector from secondary speed sensor.
4) Remove the secondary speed sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
• After installing the secondary speed sensor, adjust the CVTF level.

Install in the reverse order of removal.

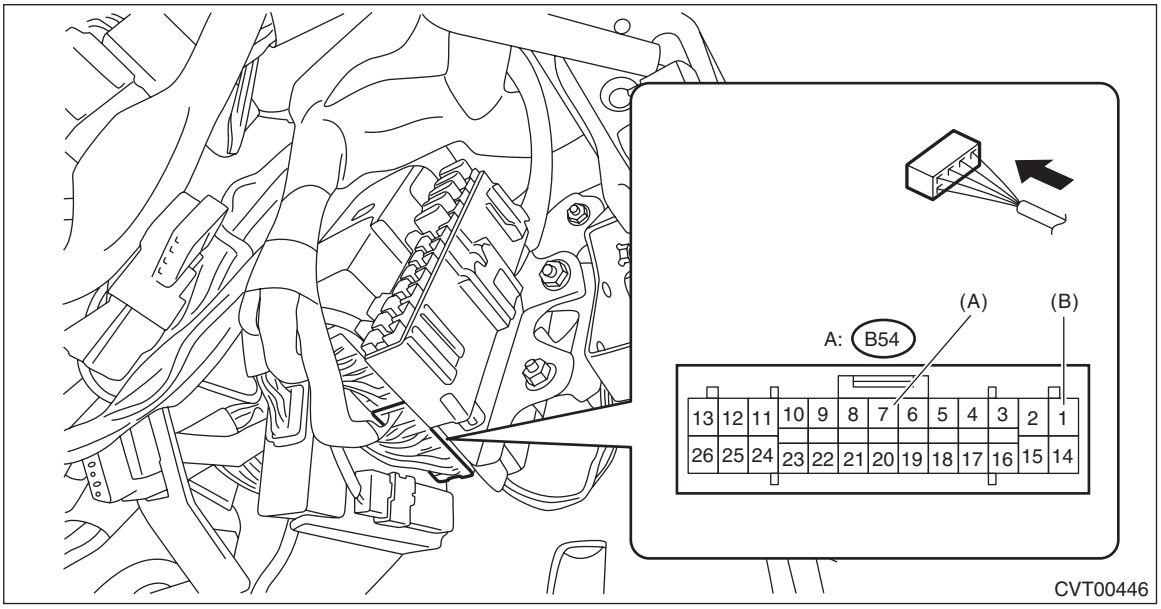
NOTE:
• Use new O-rings.
• Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

Connector & terminal
(B54) No. 7 (+) — No. 1 (–):

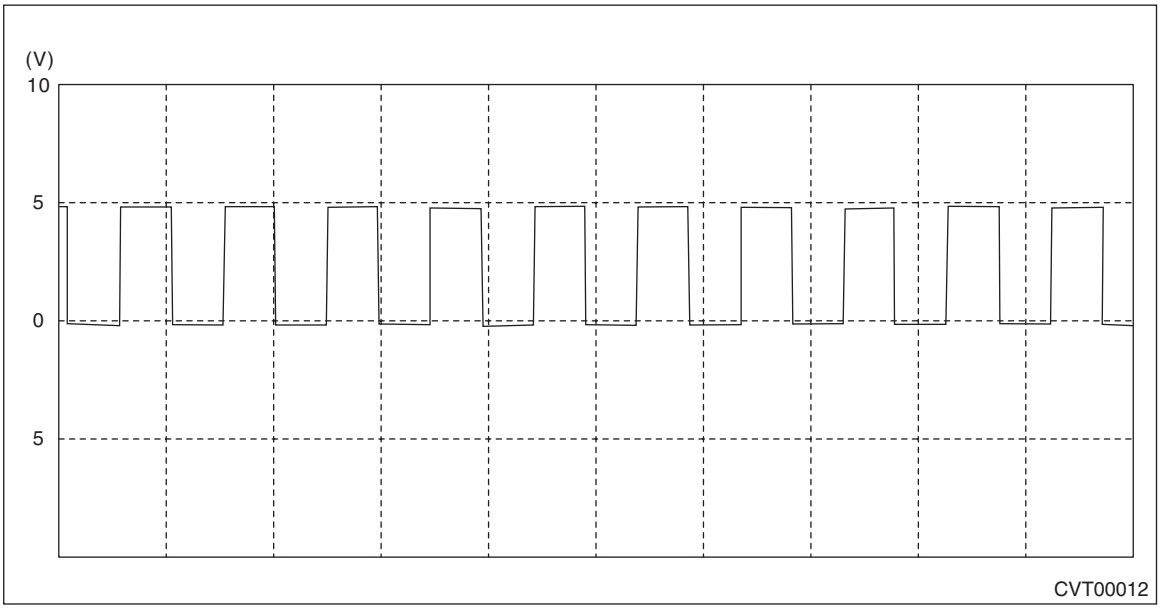


(A) + probe
(B) – probe

2) Start and warm up the engine.
3) Lift up the vehicle.

CAUTION:
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.
4) Shift the select lever to “D” range.
5) Check the waveform and output voltage of the secondary speed sensor with engine idling.

NOTE:
The waveform cycle changes as the speed changes.



18.Front Wheel Speed Sensor

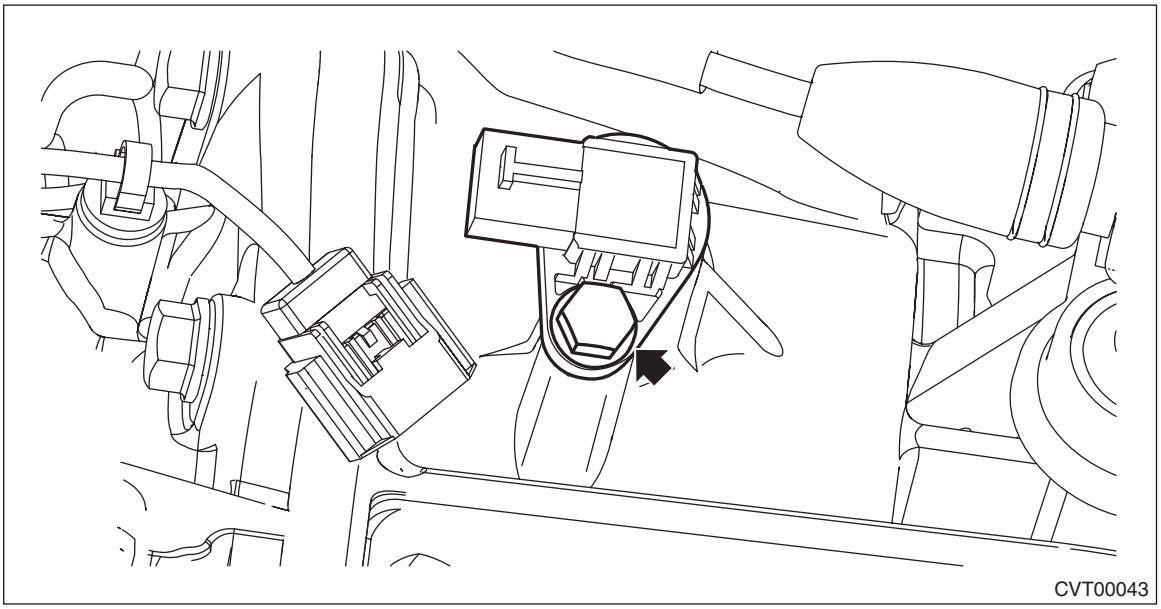
A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of front wheel speed sensor. If adhesion occurs, replace with a new part.
• When the front wheel speed sensor is removed, CVTF leaks. After installing the front wheel speed sensor, adjust the CVTF level.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle.
3) Remove the harness connector from front wheel speed sensor.
4) Remove the front wheel speed sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of front wheel speed sensor. If adhesion occurs, replace with a new part.
• After installing the front wheel speed sensor, adjust the CVTF level.

Install in the reverse order of removal.

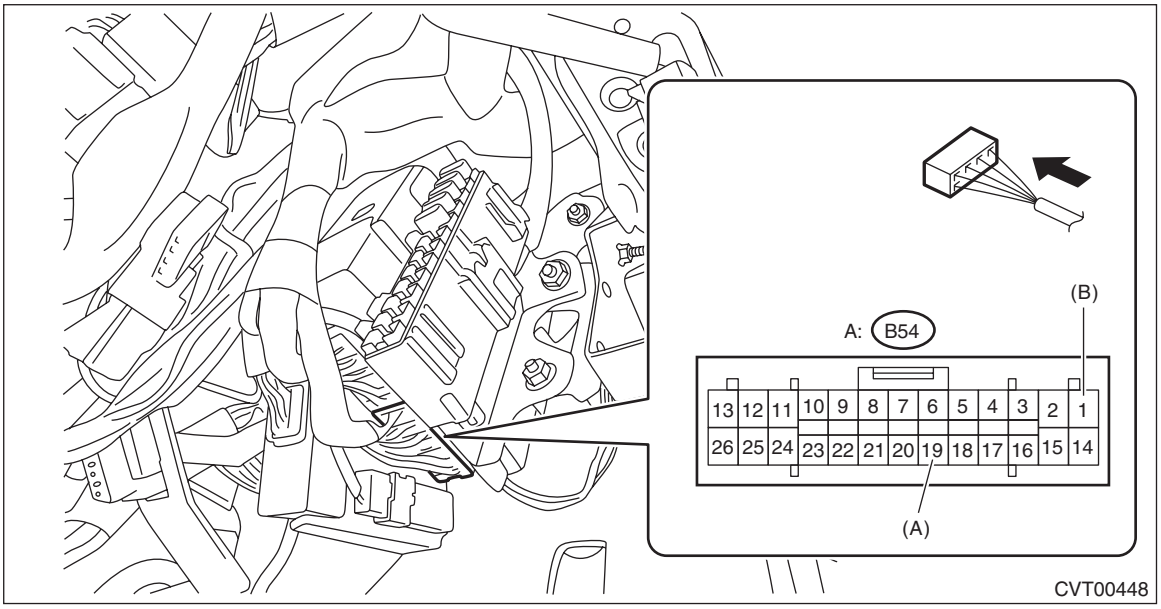
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

Connector & terminal
(B54) No. 19 (+) — No. 1 (–):

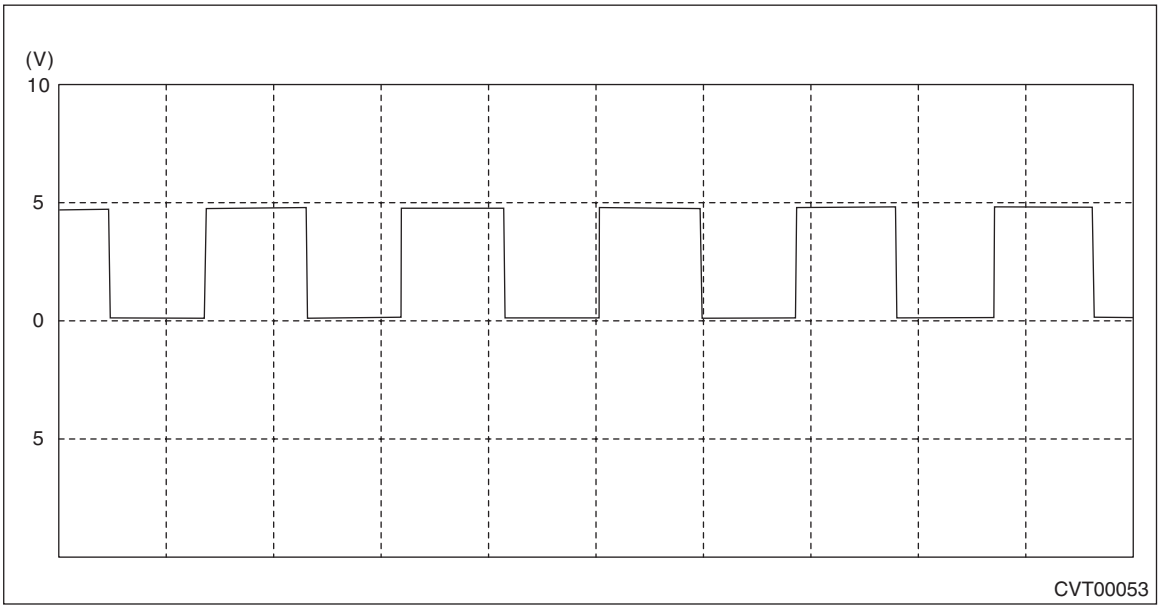


(A) + probe
(B) – probe

2) Start and warm up the engine.
3) Lift up the vehicle.

CAUTION:
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.
4) Shift the select lever to “D” range.
5) Check the waveform and output voltage of the front wheel speed sensor while driving with the engine idling.

NOTE:
The waveform cycle changes as the speed changes.



19.Secondary Pressure Sensor

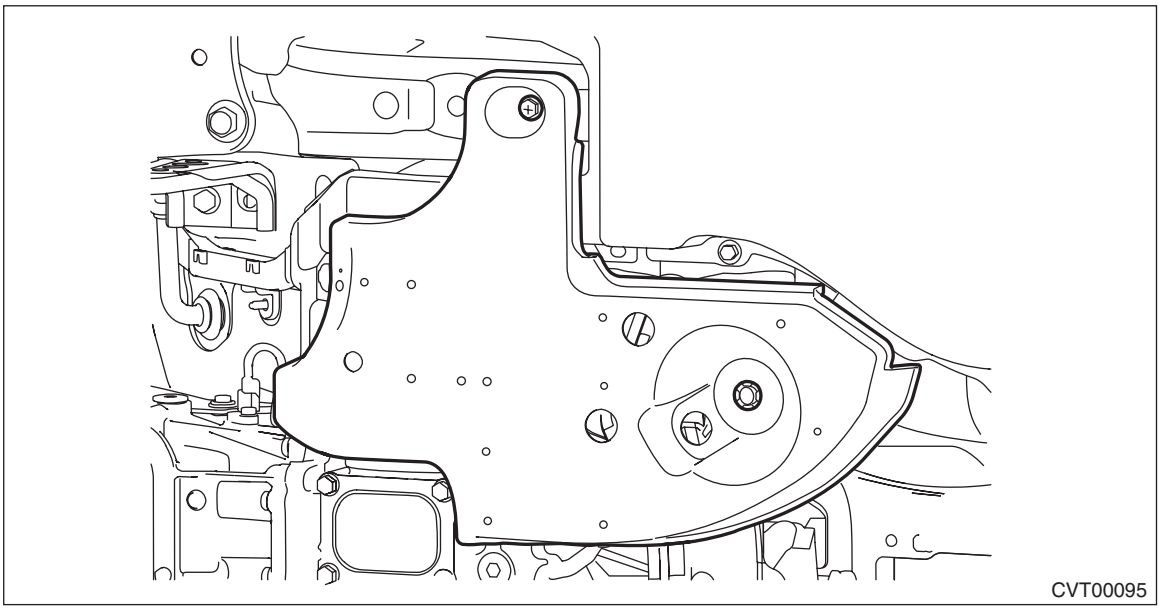
A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
• When secondary pressure sensor is removed, CVTF leaks. After installing the secondary pressure sensor, adjust the CVTF level.

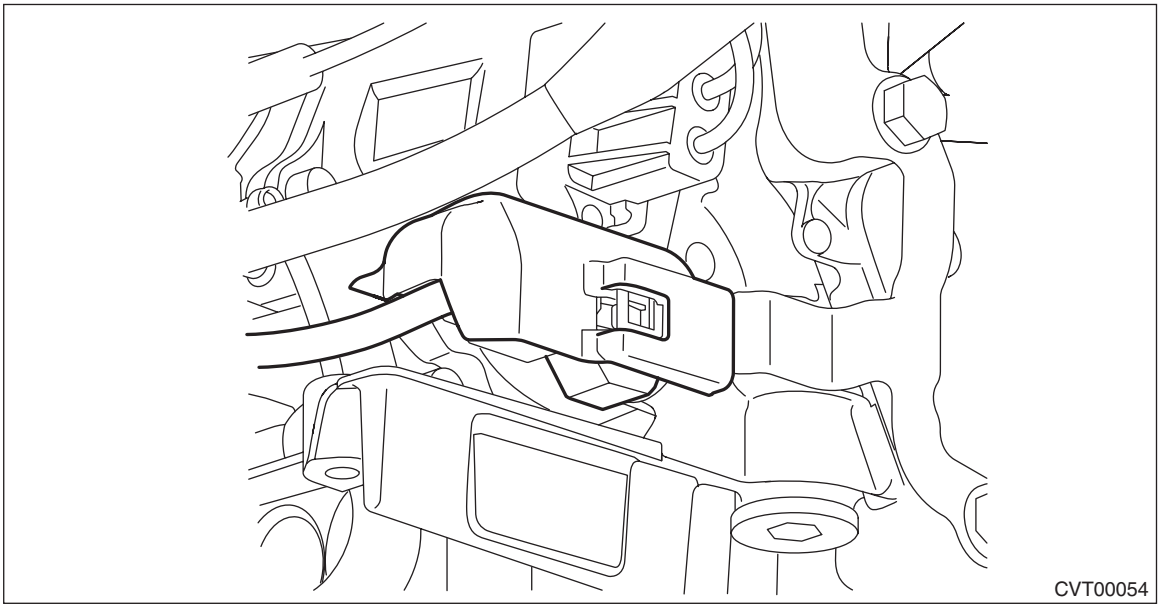
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

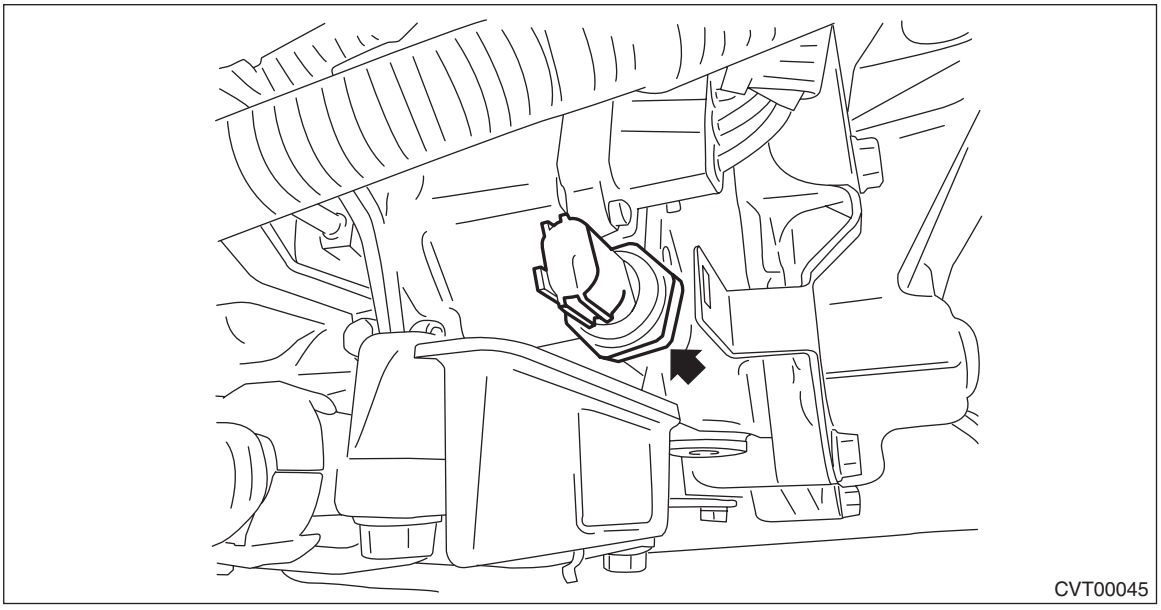
2) Lift up the vehicle.
3) Remove the under cover front - cable.


CVT00095

4) Remove the sensor cover.


CVT00054

5) Remove the secondary pressure sensor connector.
6) Remove the secondary pressure sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
• After installing the secondary pressure sensor, adjust the CVTF level.
Install in the reverse order of removal.

NOTE:
Use new O-rings.

Tightening torque:
Secondary pressure sensor
39 N·m (4.0 kgf-m, 28.8 ft-lb)
Under cover front - cable
18 N·m (1.8 kgf-m, 13.3 ft-lb)

C: INSPECTION

1) Start the engine in the “P” range, and warm up the engine.
2) Depress the brake pedal, and shift the select lever to “D” range.
3) Shift the select lever to “N” range.
4) Depress the brake pedal and hold it.
5) Check «secondary pressure sensor voltage» by using Subaru Select Monitor while the engine is idling. <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>

Specification:
Approx. 1.0 V
6) Check «secondary pressure sensor voltage» by using Subaru Select Monitor while the engine is stopped and the ignition switch is turned on. <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>

Specification:
Approx. 0.5 V

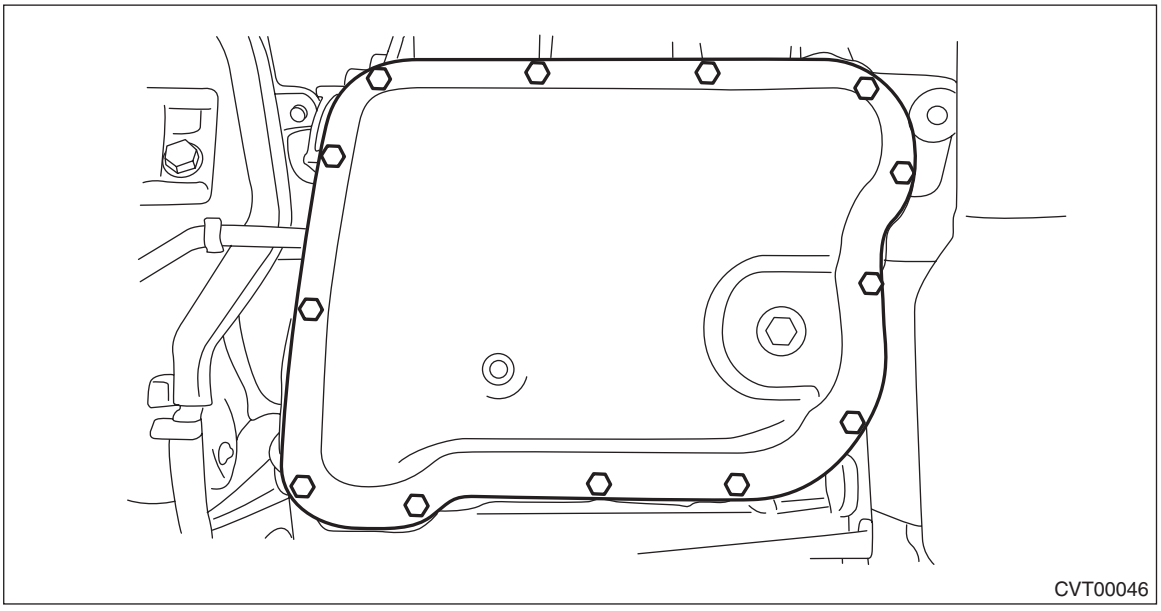
20.Oil Pan and Strainer

A: REMOVAL

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.

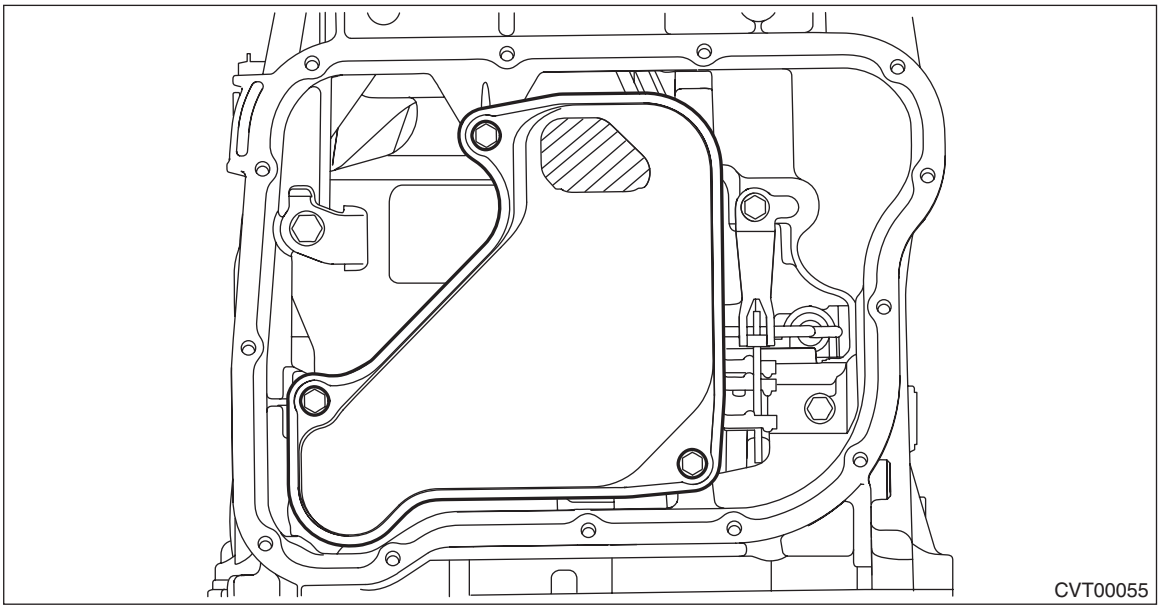
1) Lift up the vehicle.
2) Clean the transmission exterior.
3) Remove the CVTF drain plug to drain CVTF. <Ref. to CVT(TH58A)-41, CVTF.>
4) Remove the oil pan.

CAUTION:
Be careful not to allow foreign matter such as dust or dirt to enter the oil pan.

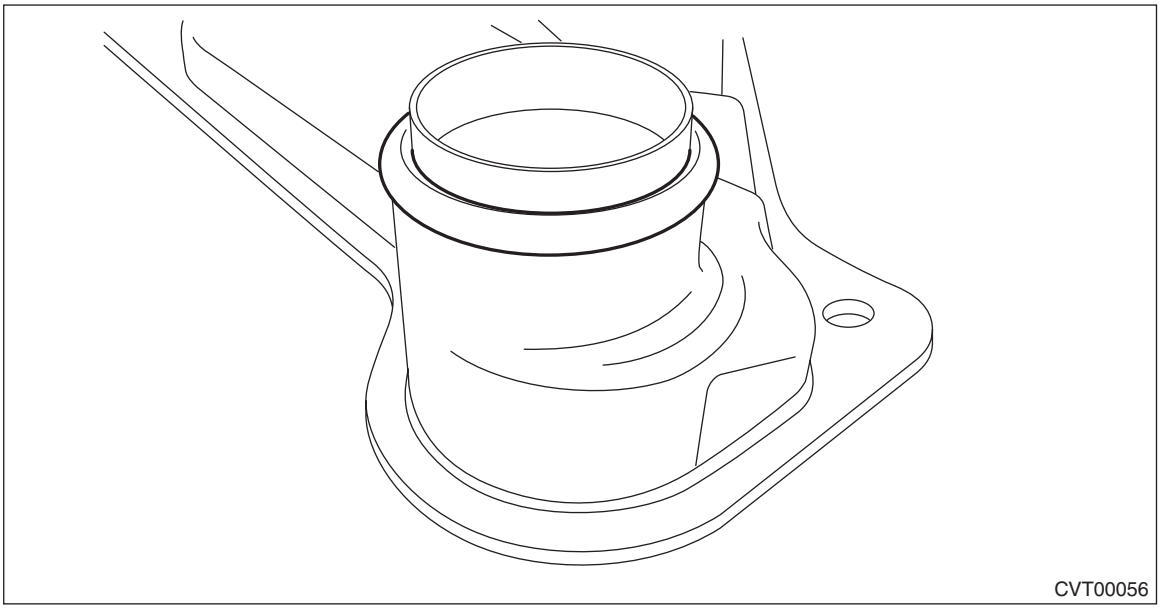


5) Remove the magnet.
6) Remove the oil strainer.

CAUTION:
Be careful not to touch the oil strainer filter.


CVT00055

7) Remove the O-ring from oil strainer.


CVT00056

B: INSTALLATION

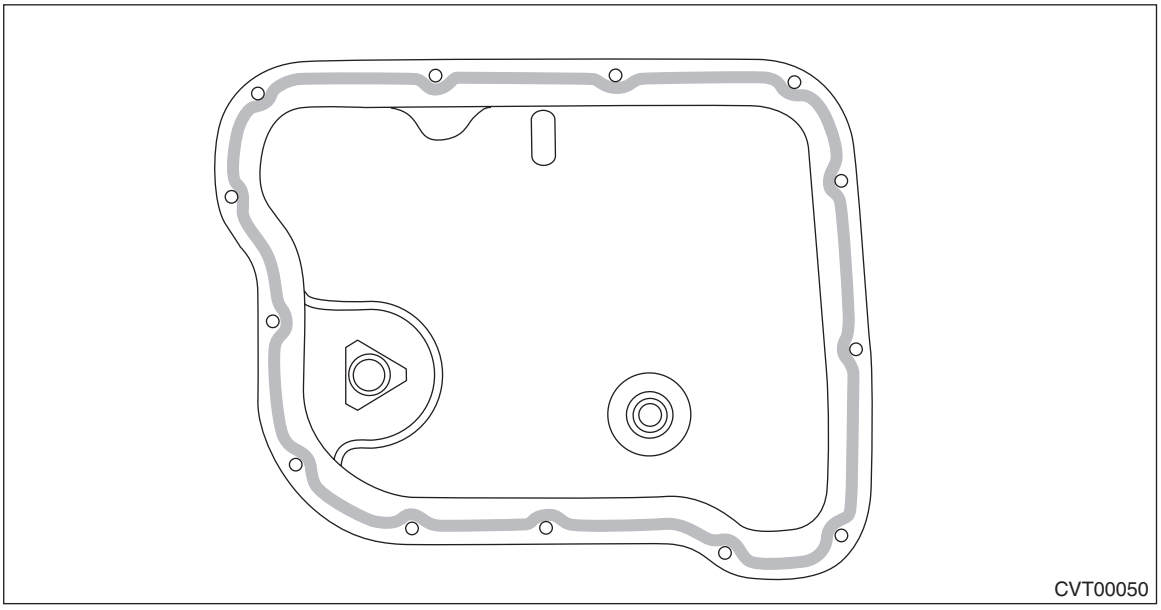
CAUTION:
Be careful not to touch the oil strainer filter.
1) Clean the mating surface of oil pan and transmission case.
2) Install the O-ring to the oil strainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

3) Install the oil strainer.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)
4) Clean the magnet.
5) Attach the magnet at the specified position of the oil pan.
6) Apply liquid gasket all around the oil pan mating surface seamlessly.

Liquid gasket:
THREE BOND 1217B (Part No. K0877YA020) or equivalent



7) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)
8) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, CVTF.>

C: INSPECTION

- Check each part for damage or dust.
- Check oil strainer for clogging.

21.Control Valve Body

A: REMOVAL

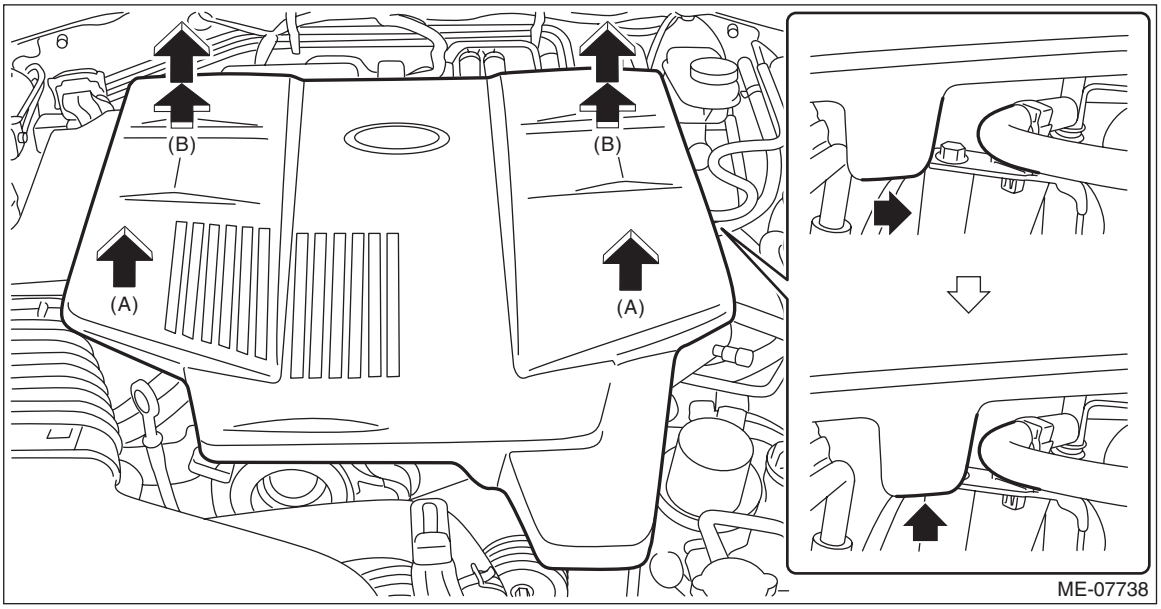
1. MAIN CONTROL VALVE BODY

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the engine compartment before removal.

NOTE:
The control valve body is replaced as an assembly only, because it is a non-disassembly part.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

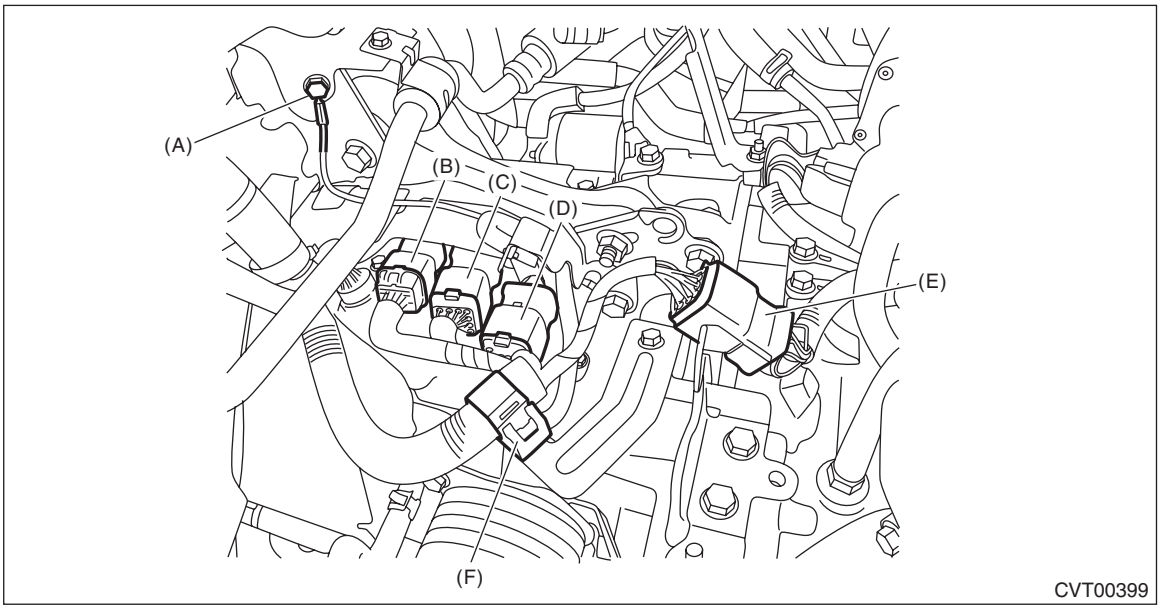
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the collector cover.
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



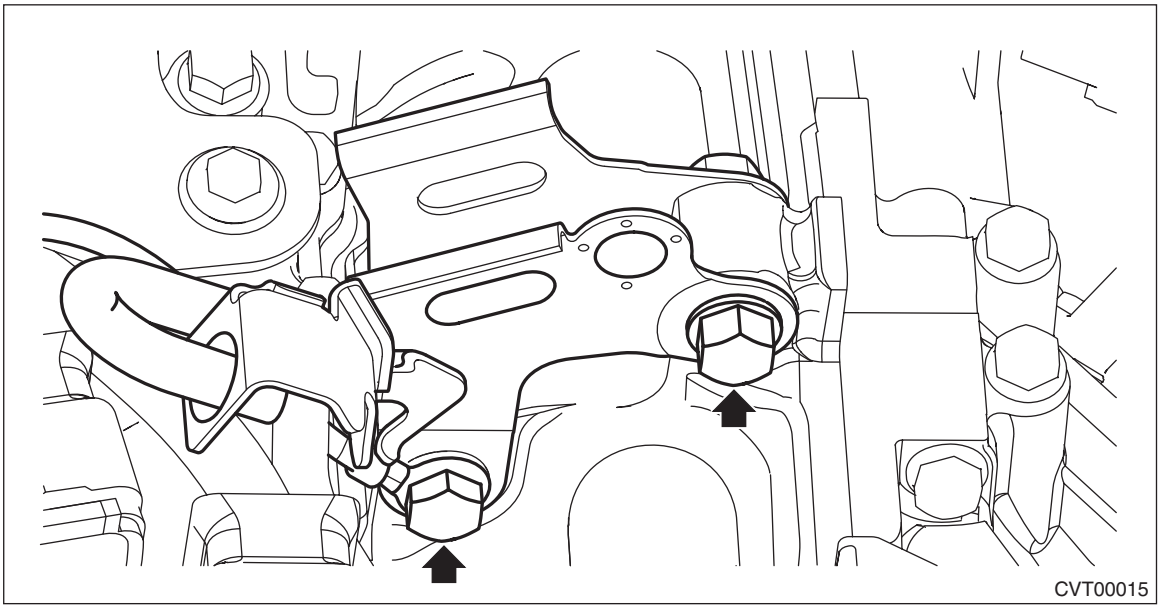
3) Remove the air cleaner case and bracket. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>

4) Disconnect the following connectors and harness clips.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip

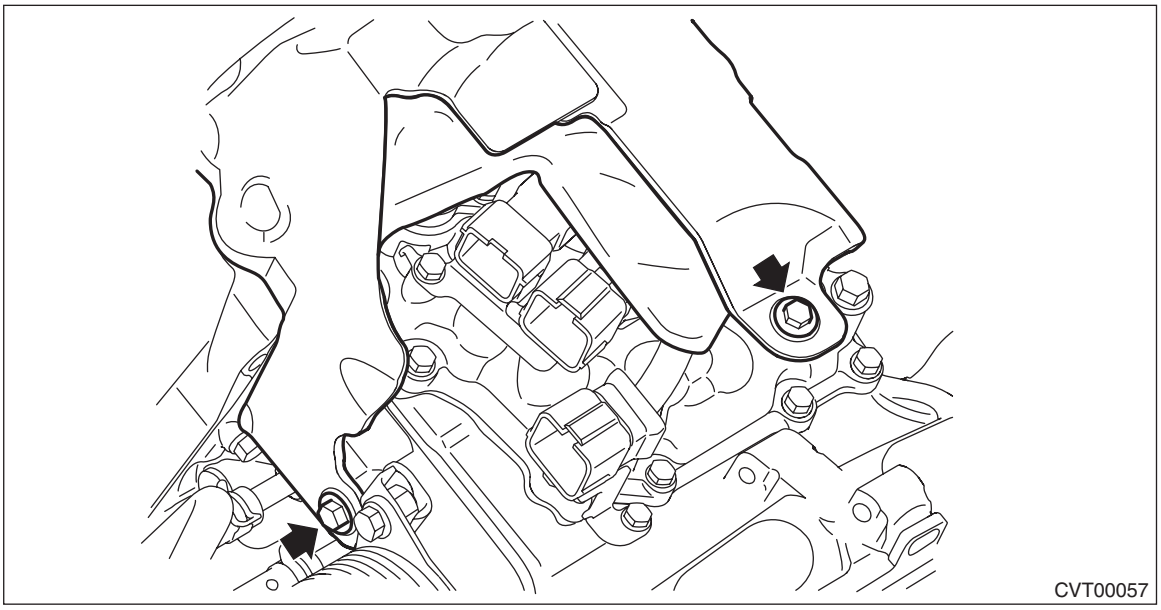


(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

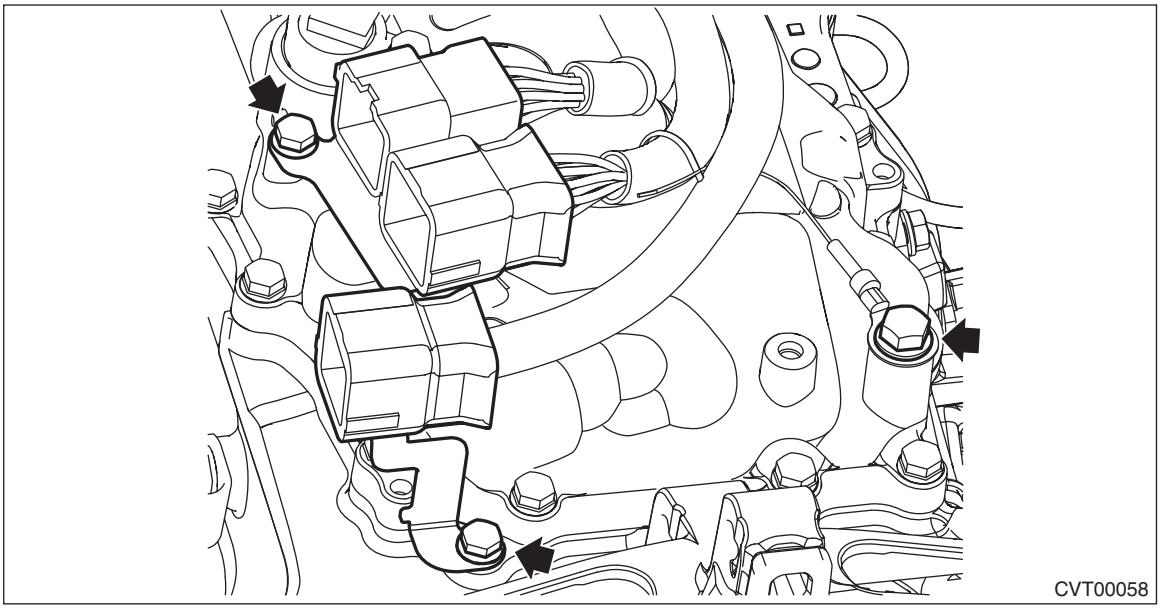
5) Remove the pitching stopper. <Ref. to CVT(TH58A)-87, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>
6) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



7) Remove the transmission case cover.



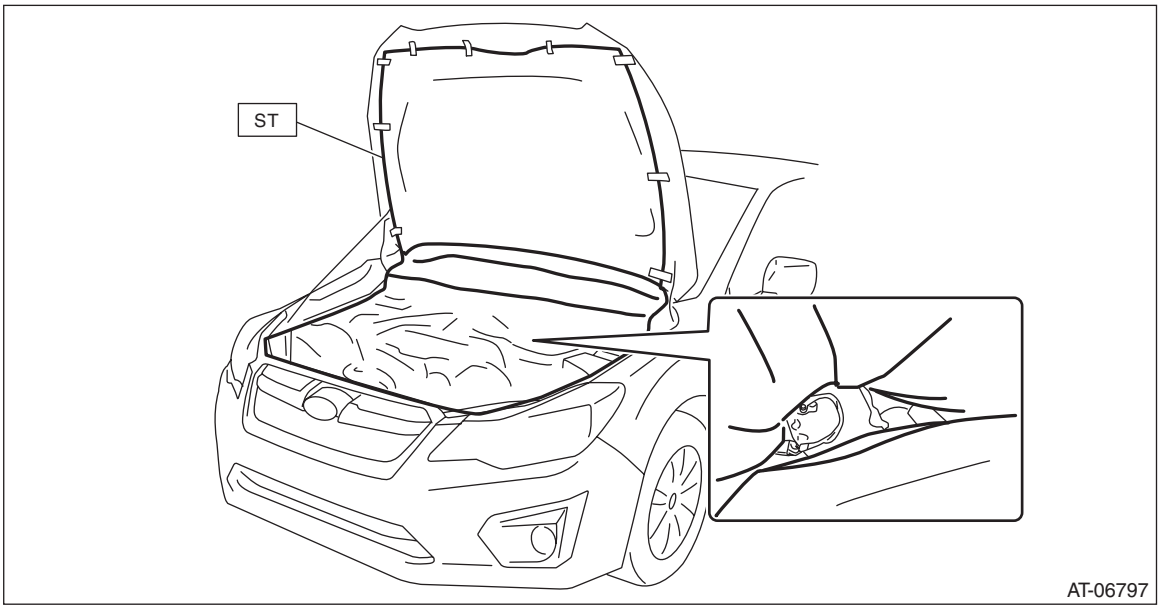
8) Remove the transmission harness stay, drive motor harness stay and transmission ground terminal.



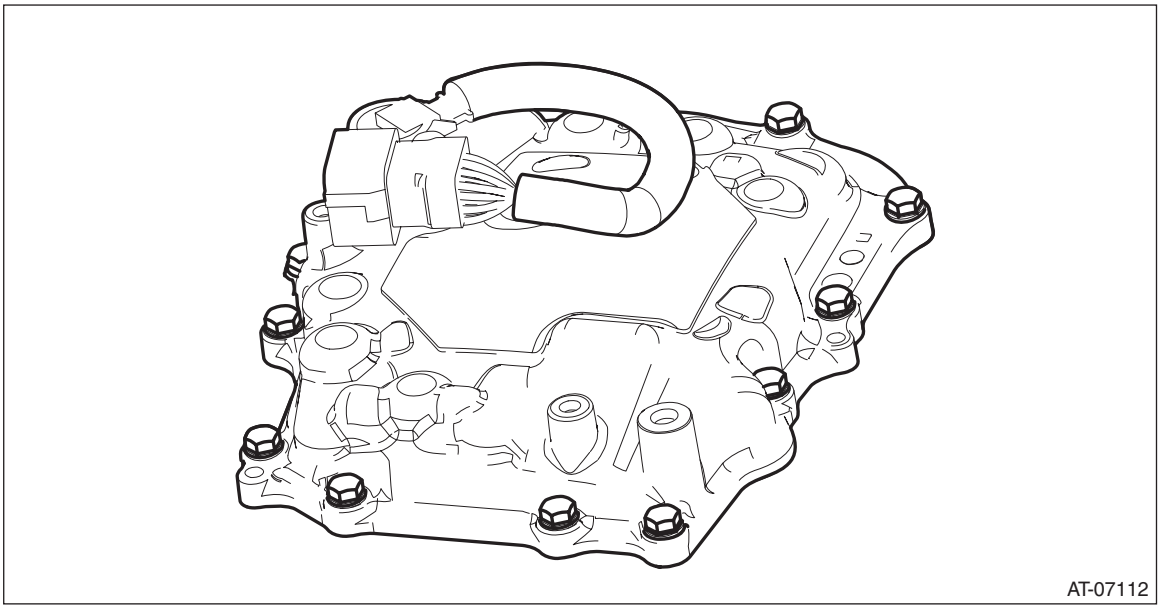
9) Remove the transmission harness connector from the harness stay.
10) Clean the transmission exterior.

11) Fix the ST with tape, and set the ST to the vehicle.

NOTE:
When replacing the control valve body, the sheet is included in the control valve body for repairs.
ST 18761AA010 SHEET SPECIAL TOOL

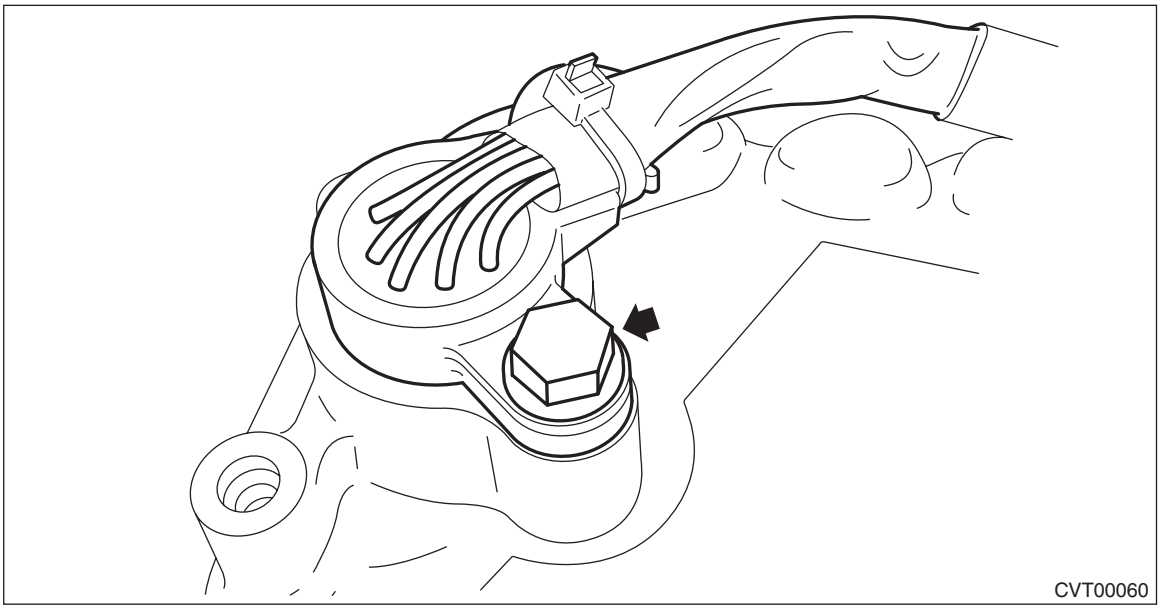


12) Remove the valve cover and gasket.

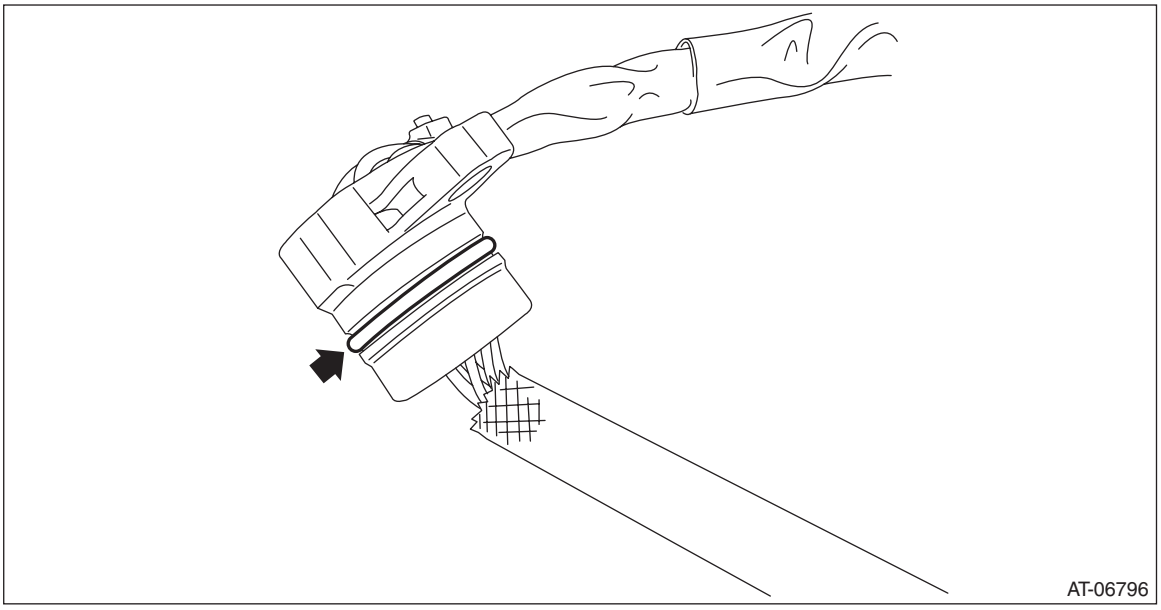


13) Disconnect the harness connector from the control valve body.

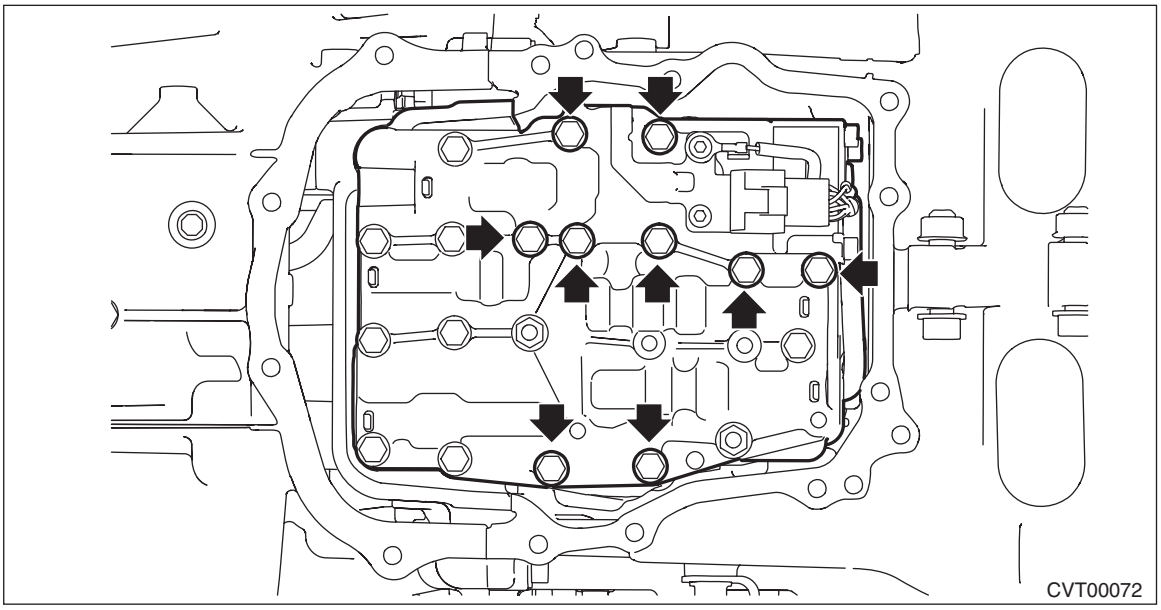
14) Remove the transmission harness from the valve cover.



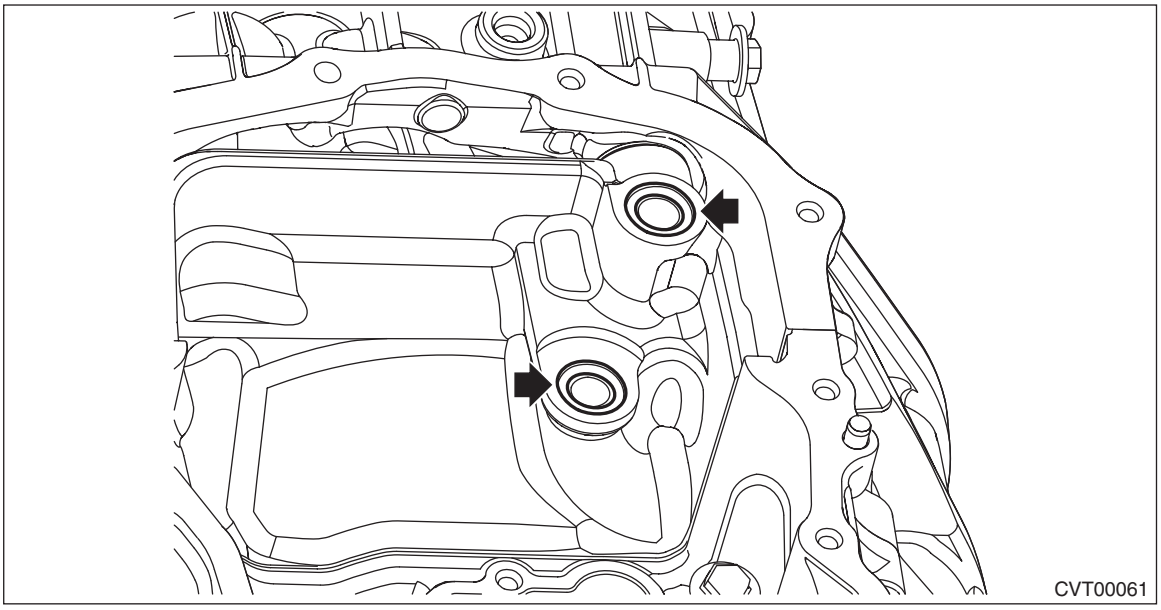
15) Remove the O-ring from the transmission harness.



16) Remove the control valve body.



17) Remove the O-ring from the transmission.



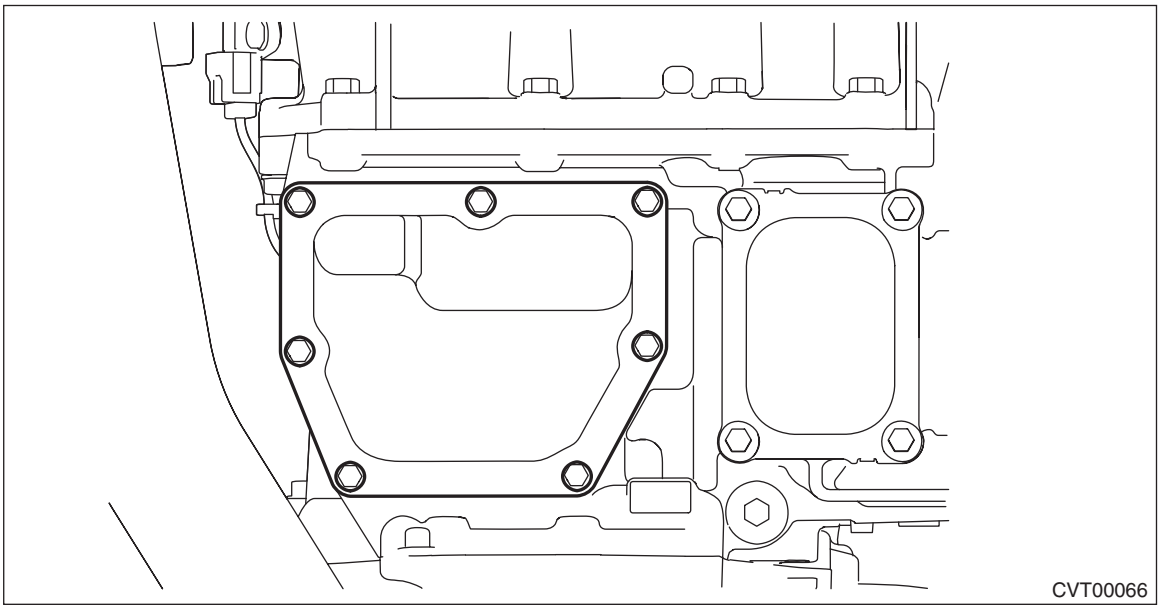
2. OUTPUT CLUTCH CONTROL VALVE BODY

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the transmission before removal.

NOTE:
The output clutch control valve body is replaced as an assembly only, because it is a non-disassembly part.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the oil pan.

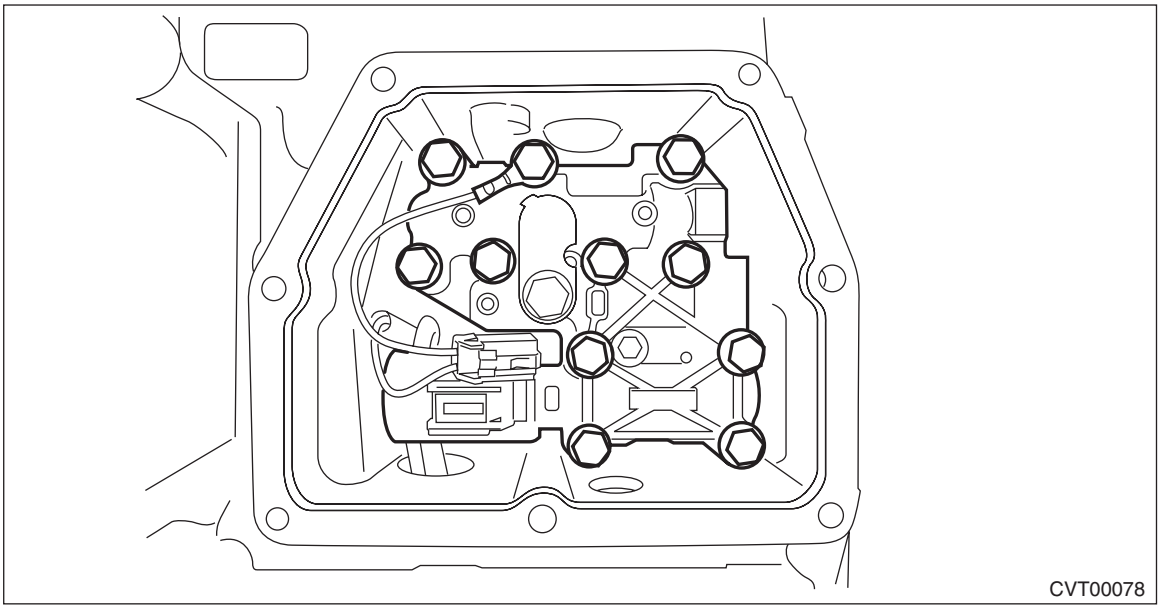
CAUTION:
Be careful not to allow foreign matter such as dust or dirt to enter the oil pan.



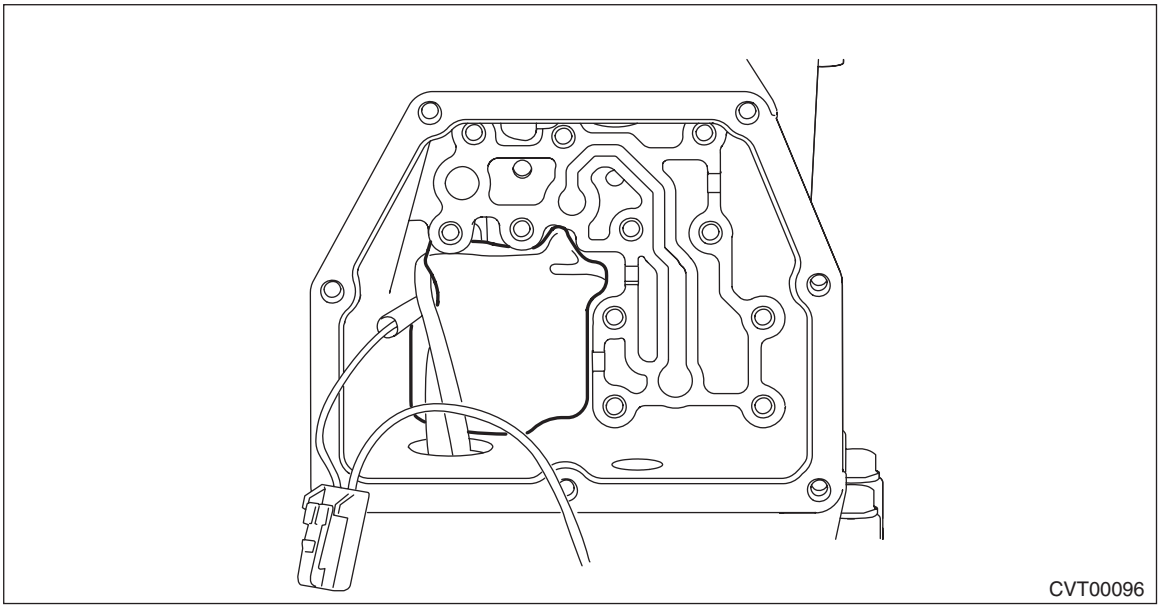
4) Remove the magnet.
5) Disconnect the harness connector from the solenoid.

6) Remove the control valve body and separate plate.

CAUTION:
Do not remove any bolts other than specified.



7) Remove the oil spacer.



B: INSTALLATION

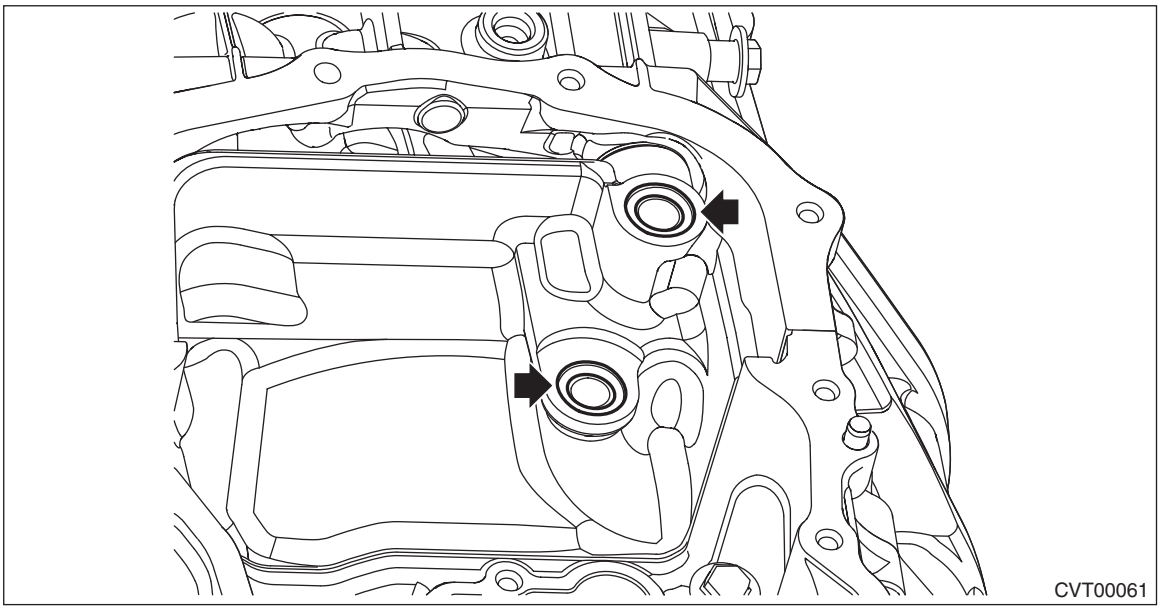
1. MAIN CONTROL VALVE BODY

1) Clean the mating surface of valve cover and transmission side.

CAUTION:
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.
3) Install the O-rings.

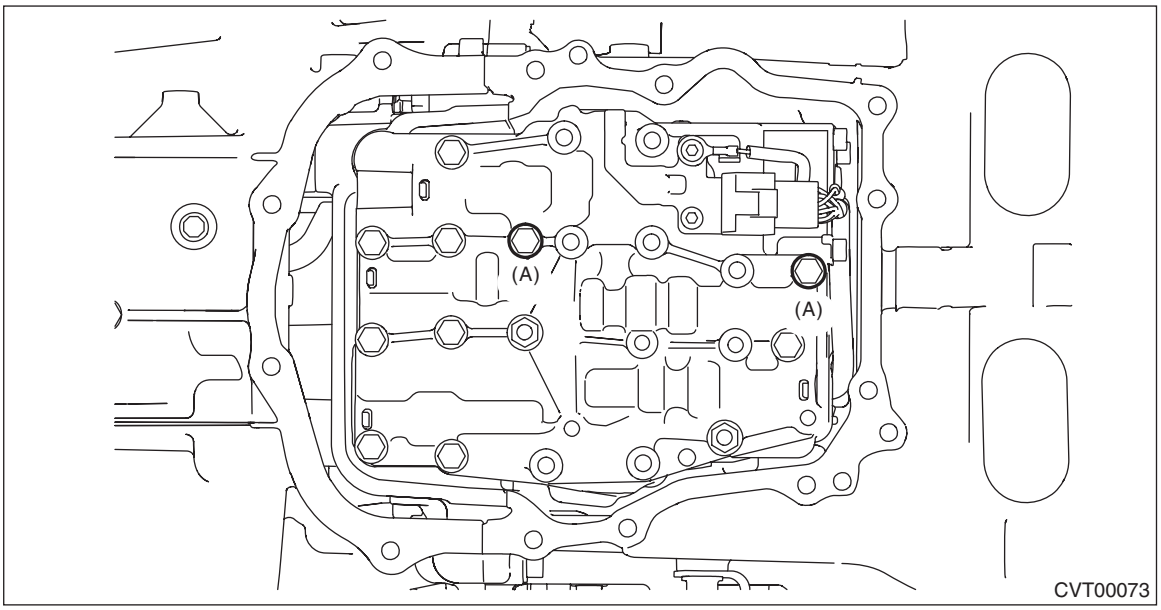
NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



4) Install the control valve body.
(1) Install the control valve body to the transmission.

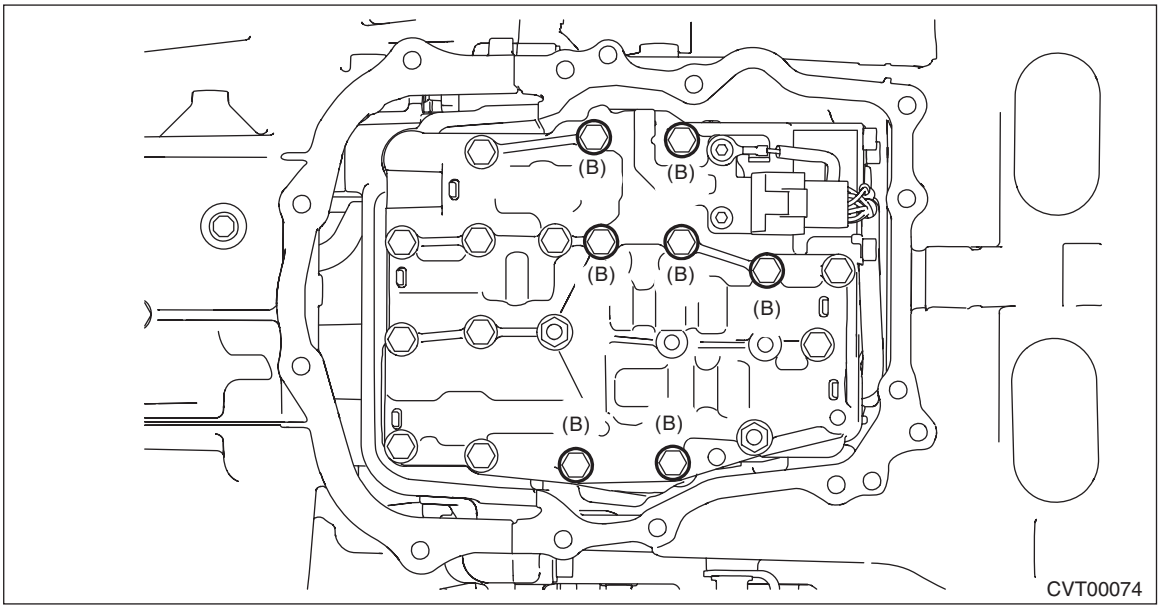
CAUTION:
- **Do not damage the O-ring.**
- **Perform installation so that the O-ring is not displaced.**

(2) Temporarily tighten the bolt (A: silver).



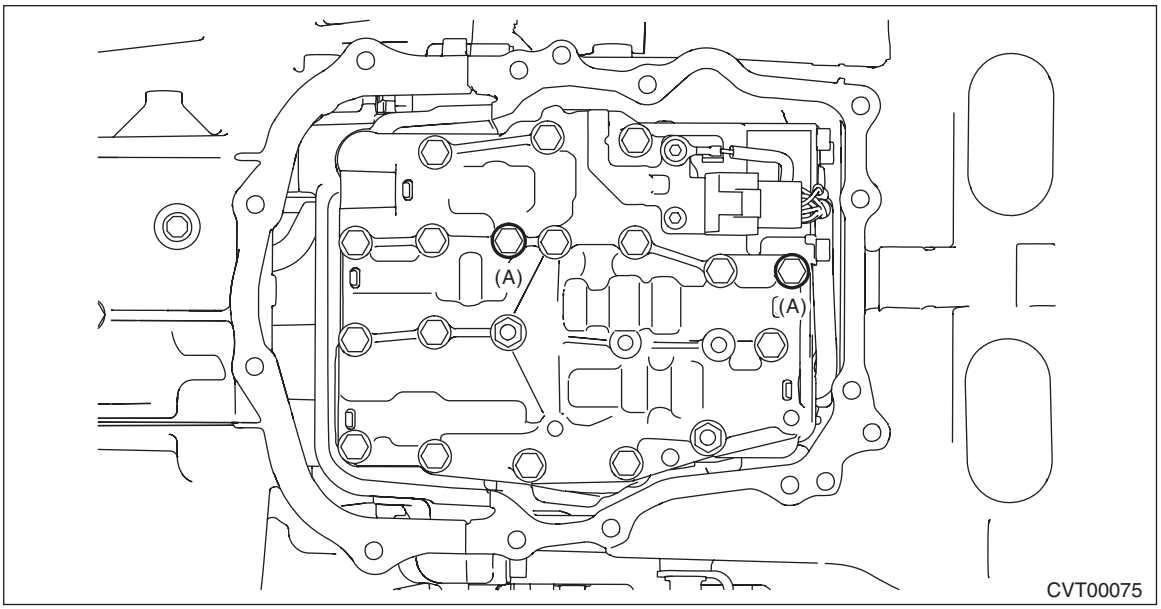
(3) Attach the bolt (B).

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



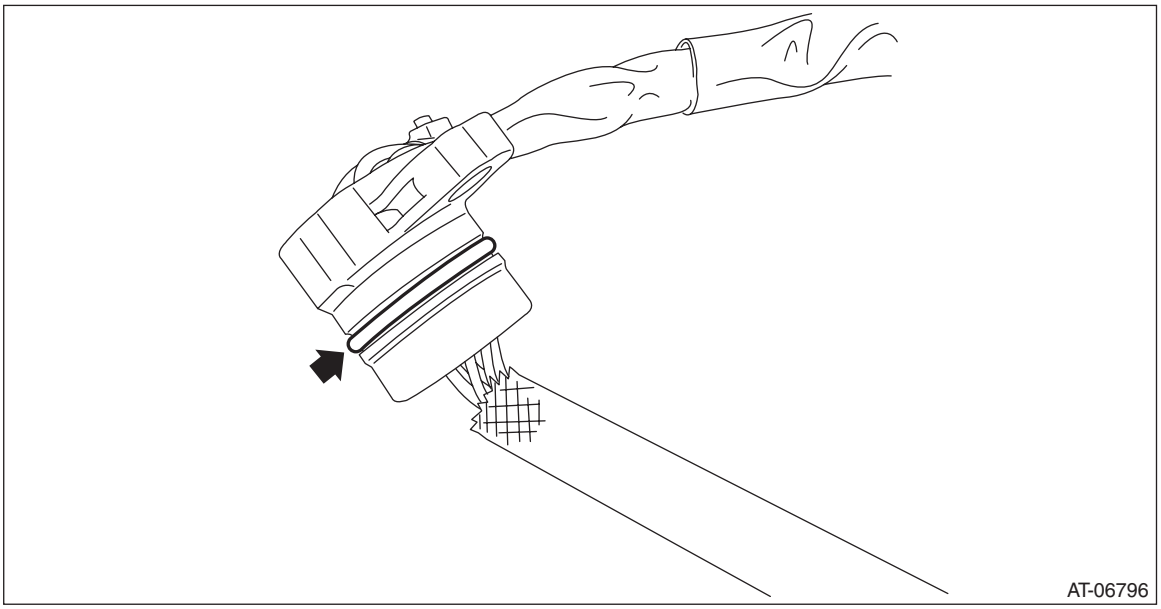
(4) Tighten the bolt (A: silver).

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



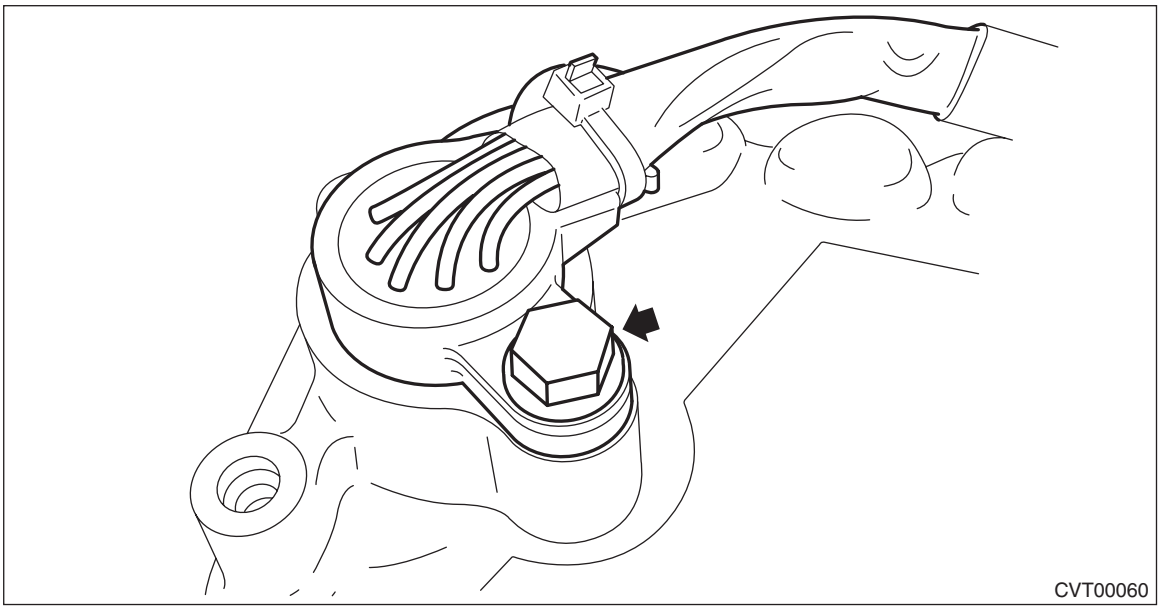
5) Install the O-ring to the transmission harness.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



6) Install the transmission harness to the valve cover.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

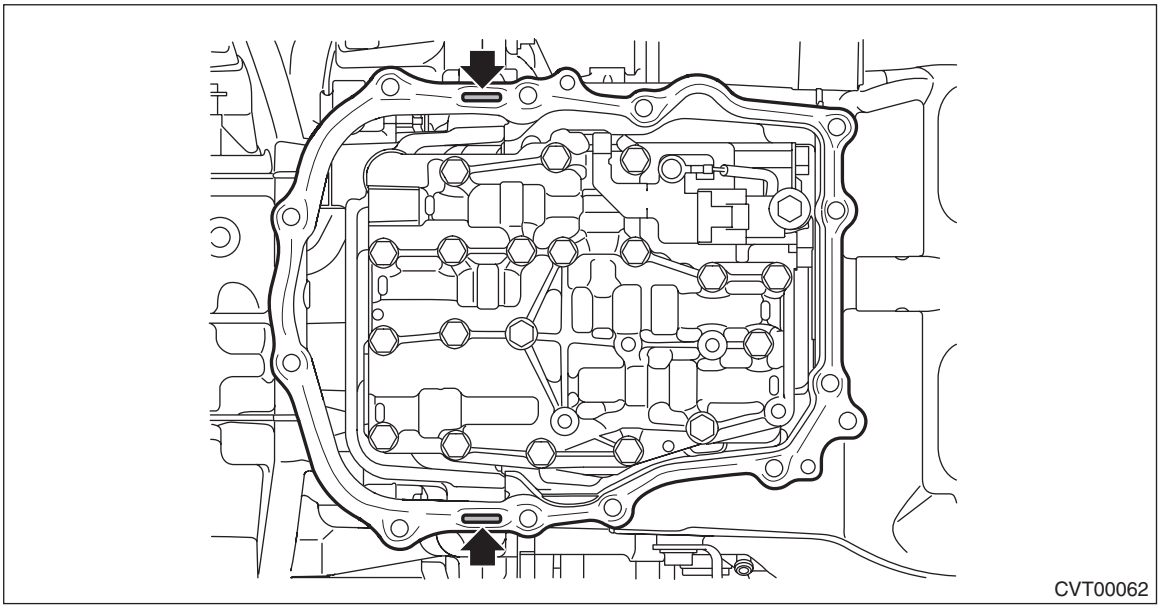


7) Install the gasket to the transmission.

NOTE:
Use a new gasket.

8) Apply liquid gasket to the oval hole of gasket.

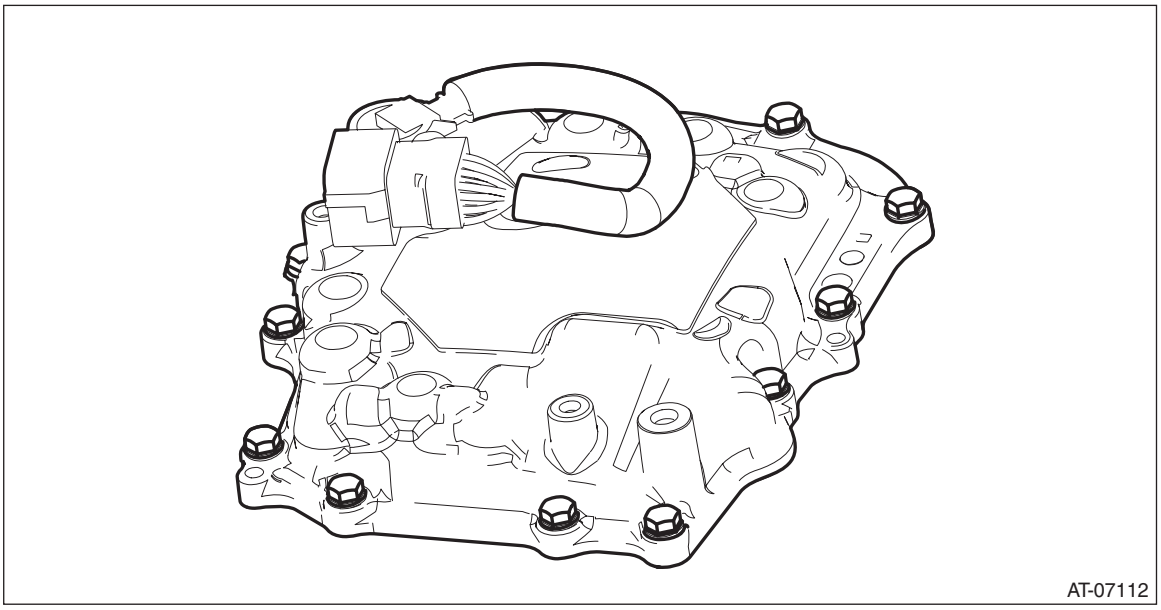
Liquid gasket:
THREE BOND 1215B or equivalent



9) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

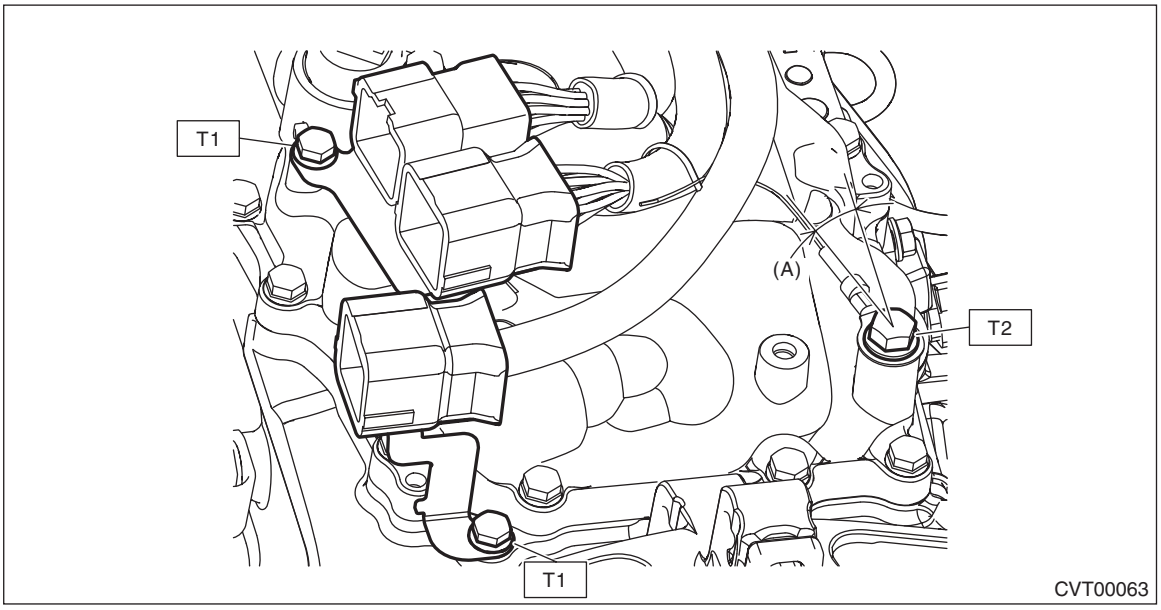
Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



10) Remove the ST (SHEET SPECIAL TOOL).
11) Install the transmission harness connector to the harness stay.
12) Install the transmission harness stay, drive motor harness stay and transmission ground terminal.

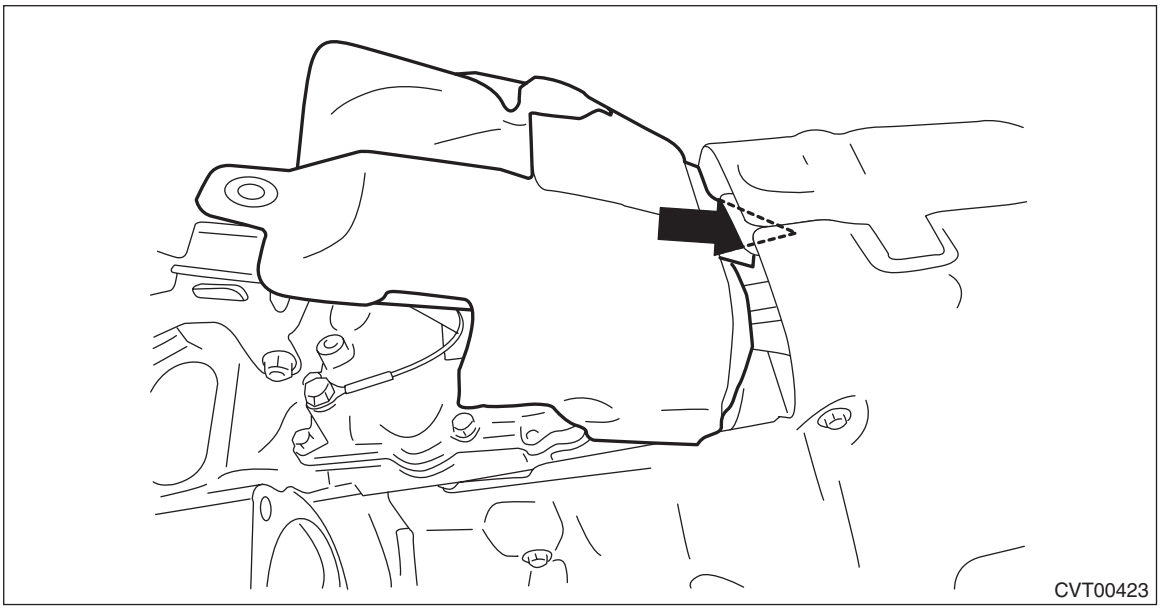
NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

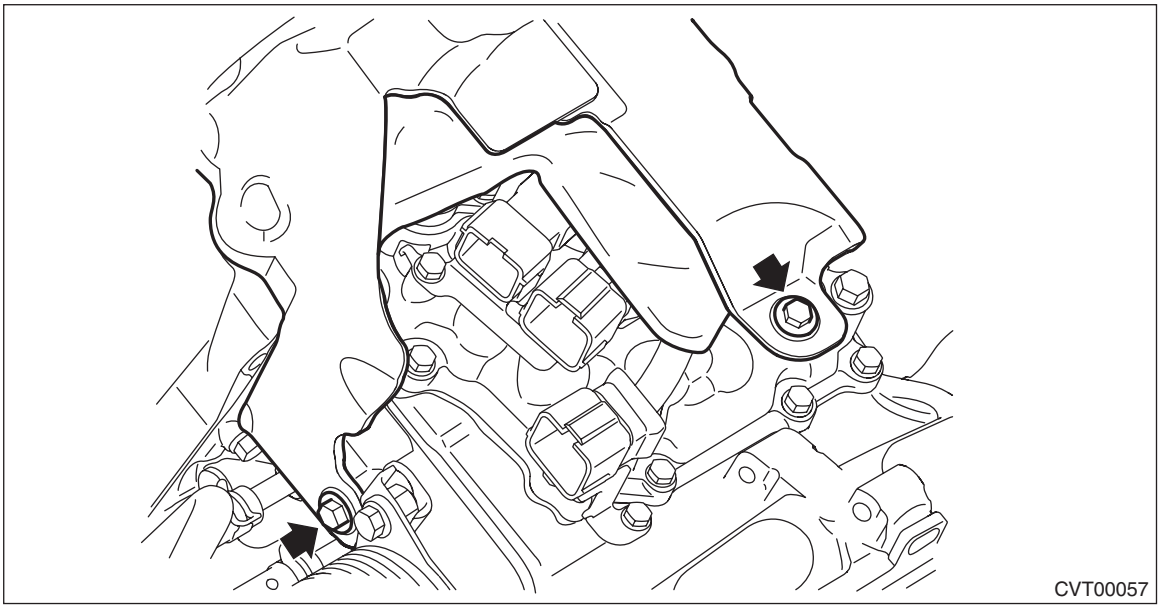
Tightening torque:
T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



13) Insert the transmission case cover (small) between transmission case cover (large) and transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)





14) Install the pitching stopper bracket and transmission radio ground cord.

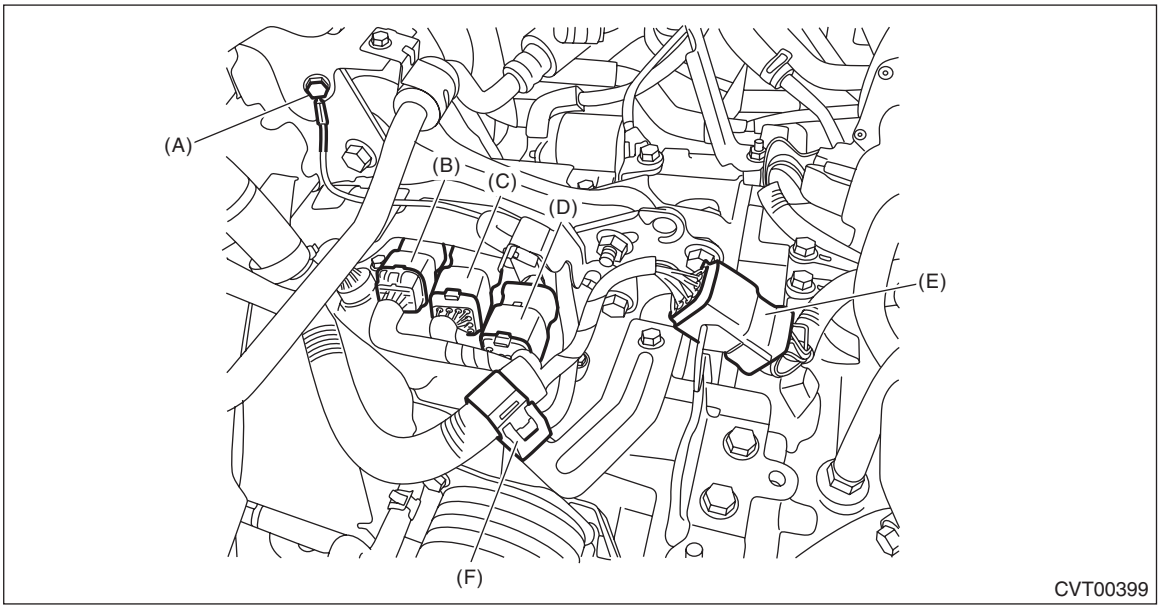
CAUTION:
Be careful not to deform or damage the terminal of transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

15) Install the air breather hose to the pitching stopper bracket. <Ref. to CVT(TH58A)-173, FRONT DIFFERENTIAL SIDE, INSTALLATION, Air Breather Hose.>

16) Install the pitching stopper. <Ref. to CVT(TH58A)-89, PITCHING STOPPER, INSTALLATION, Transmission Mounting System.>
17) Connect the following connectors and install the harness clip to the bracket.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



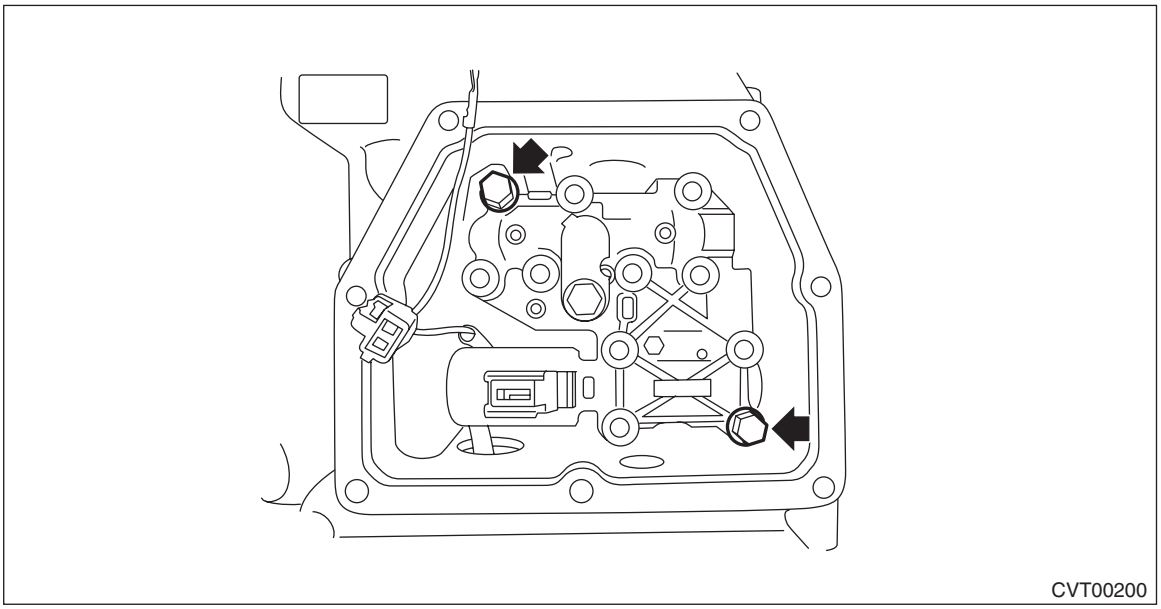
(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

18) Install the air cleaner case and bracket. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
19) Install the collector cover.
20) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
21) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
22) Perform the operation of AT learning mode. <Ref. to CVT(HEV)(diag)-27, Learning Control.>

2. OUTPUT CLUTCH CONTROL VALVE BODY

1) Clean the mating surface of oil pan and drive motor case.
2) Clean the magnet.
3) Attach the magnet at the specified position of the oil pan.
4) Install the oil spacer.
5) Install the control valve body.
   (1) Temporarily attach the separator plate and output clutch control valve with two bolts.

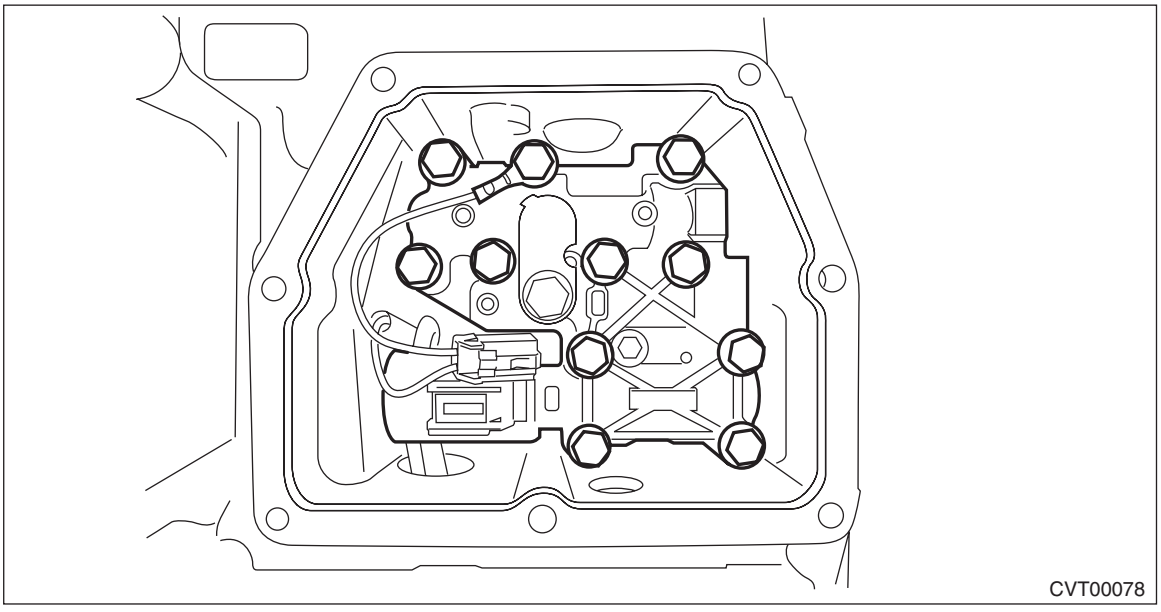
NOTE:
Apply CVTF to the bolt seating surface.



   (2) Install the bolt and the ground terminal.

NOTE:
Apply CVTF to the bolt seating surface.

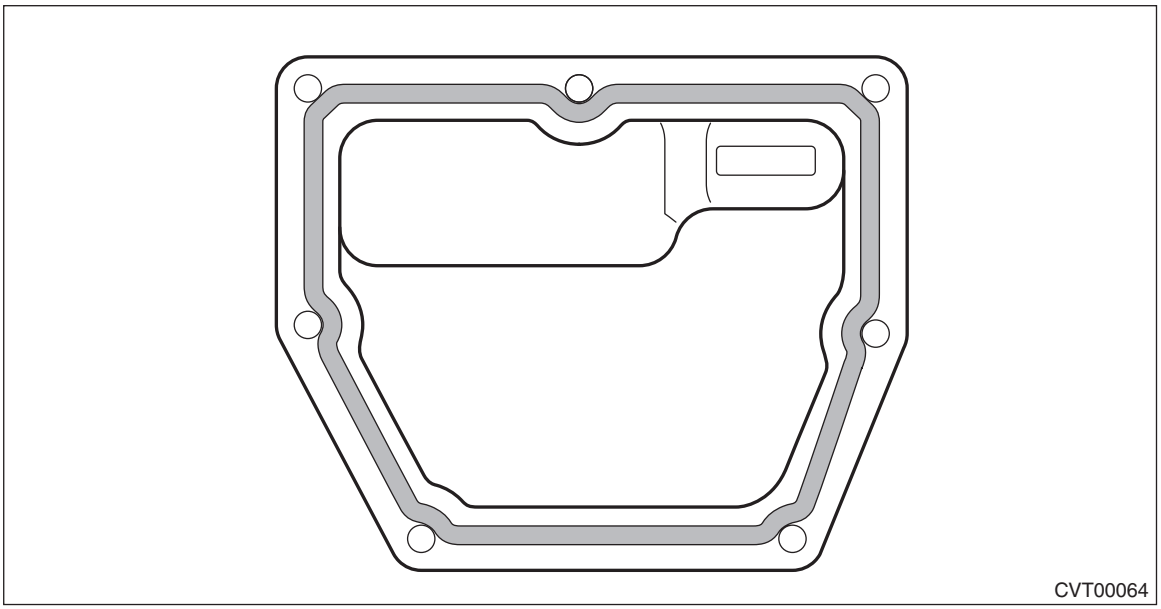
Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



   (3) Install the harness connector to the solenoid.

6) Apply liquid gasket all around the oil pan mating surface seamlessly.

Liquid gasket:
THREE BOND 1217B (Part No. K0877YA020) or equivalent



7) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

8) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
9) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
10) Perform the operation of AT learning mode five times. <Ref. to CVT(HEV)(diag)-27, Learning Control.>

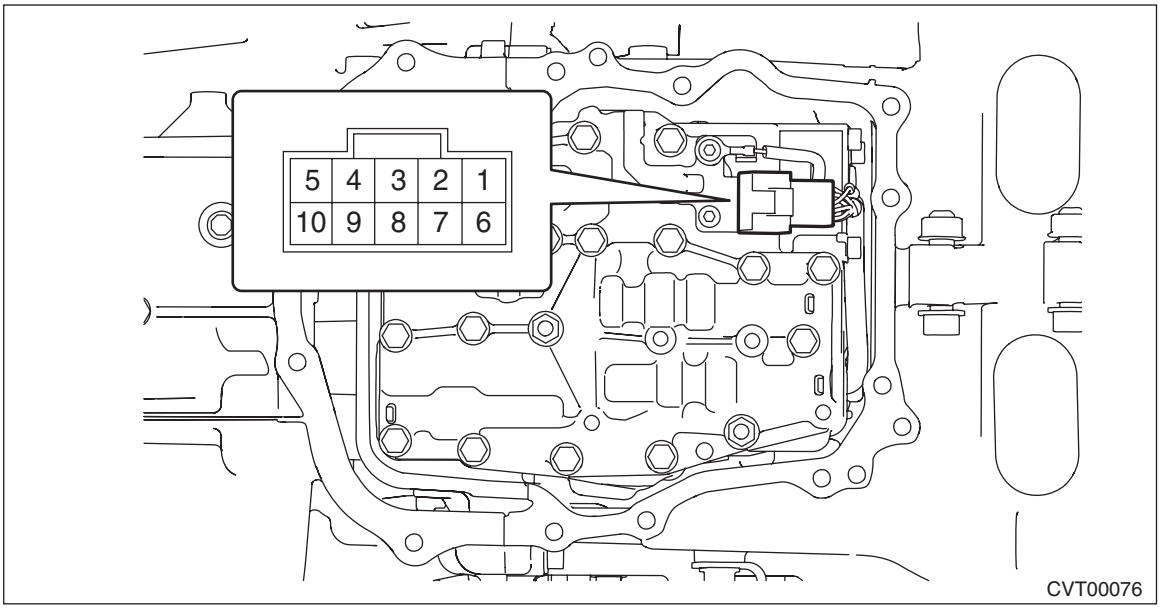
C: INSPECTION

- Check each part for damage or dust.
- Measure the resistance of each solenoid, sensor and ground wire.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

1. MAIN CONTROL VALVE BODY

- **Solenoid**



Solenoid	Terminal No.	Standard (Ω)
Primary UP solenoid	No. 2 — control valve body	Approx. 10 — 13.5 Ω
Secondary solenoid	No. 3 — control valve body	Approx. 5 — 7 Ω
F&R clutch solenoid	No. 4 — control valve body	Approx. 4 — 6 Ω
Primary DOWN solenoid	No. 7 — control valve body	Approx. 10 — 13.5 Ω
Lock-up duty solenoid	No. 9 — control valve body	Approx. 10 — 13.5 Ω
AWD solenoid	No. 10 — control valve body	Approx. 2 — 4.5 Ω

- **Oil temperature sensor**

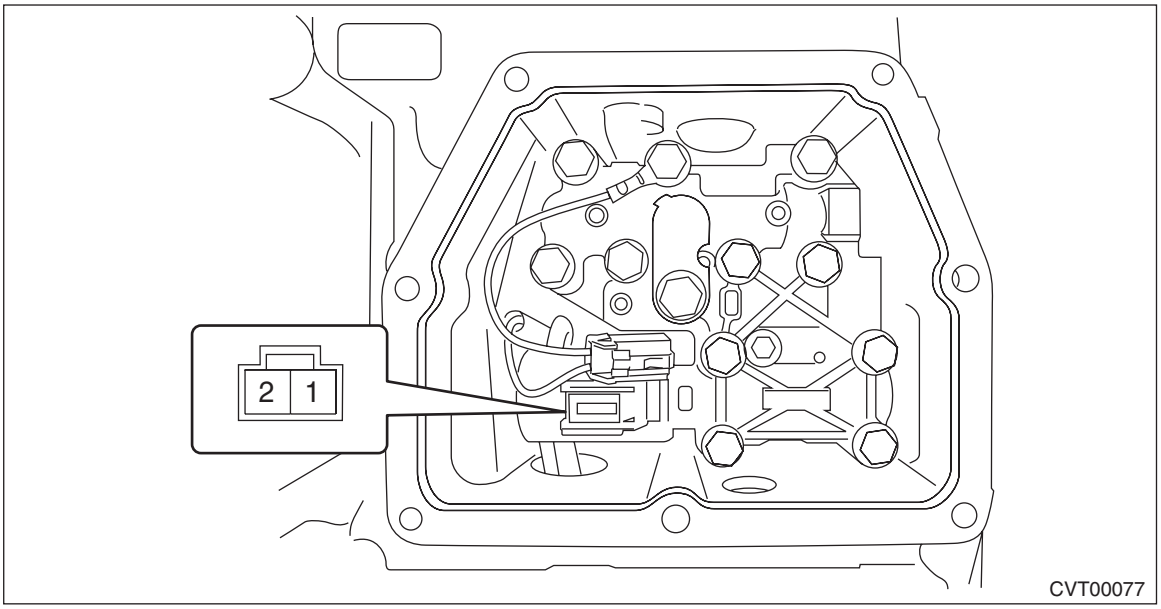
Sensor	Terminal No.	Standard (Ω) At 20°C (68°F)
Oil temperature sensor	No. 1 — No. 6	Approx. 2.5 kΩ

- **Transmission ground**

Terminal No.	Standard (Ω)
No. 8 — control valve body	Less than 1 Ω

2. OUTPUT CLUTCH CONTROL VALVE BODY

- **Solenoid**



Solenoid	Terminal No.	Standard (Ω)
Output clutch solenoid	No. 1 — No. 2	Approx. 4 — 6 Ω

22.Electric Fluid Pump

A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

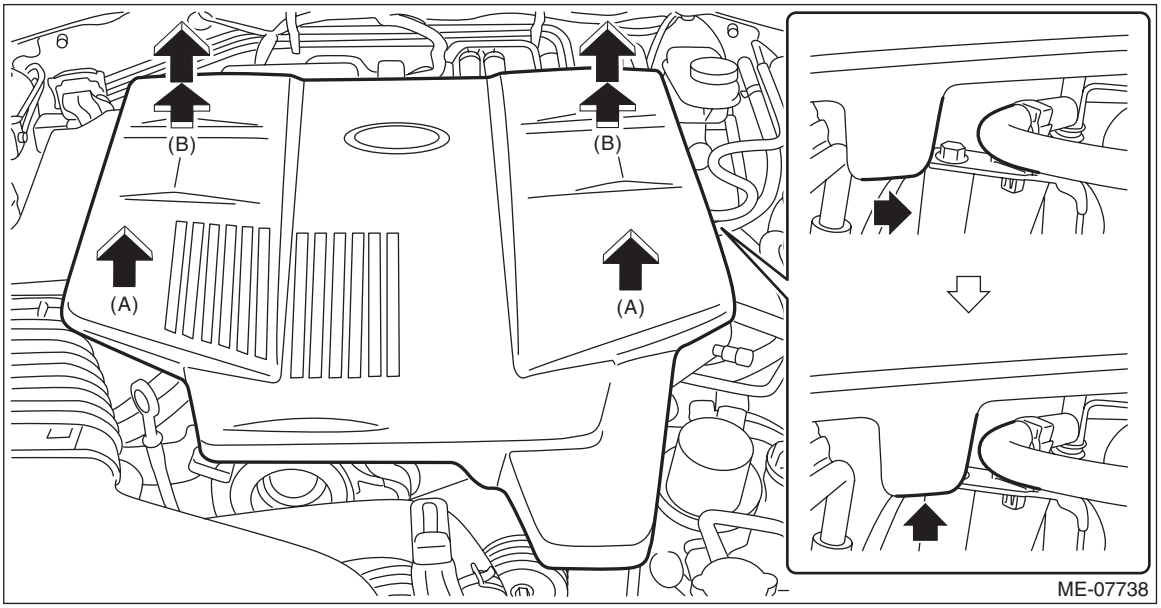
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the transmission before removal.

NOTE:
The electric oil pump is replaced as an assembly only, because it is a non-disassembly part.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>

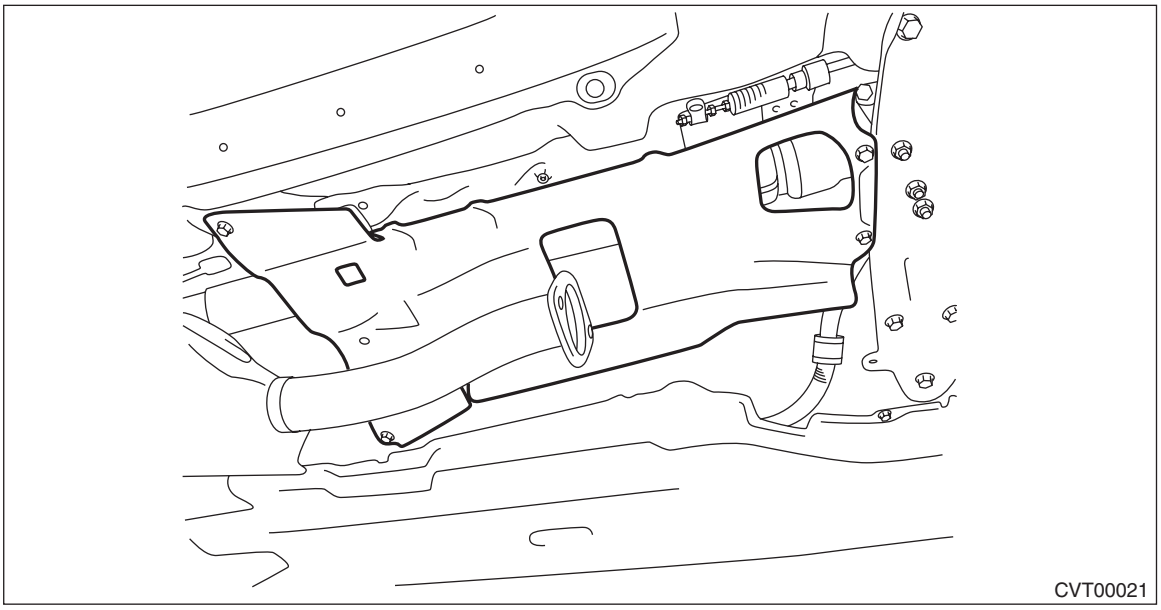
WARNING:
After pulling out the service disconnect plug, a high voltage is accumulated in the condenser inside the inverter. If touching the high voltage parts, wiring harness, terminals and connectors is required, wait for 10 minutes before starting the operation.
3) Remove the collector cover.
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

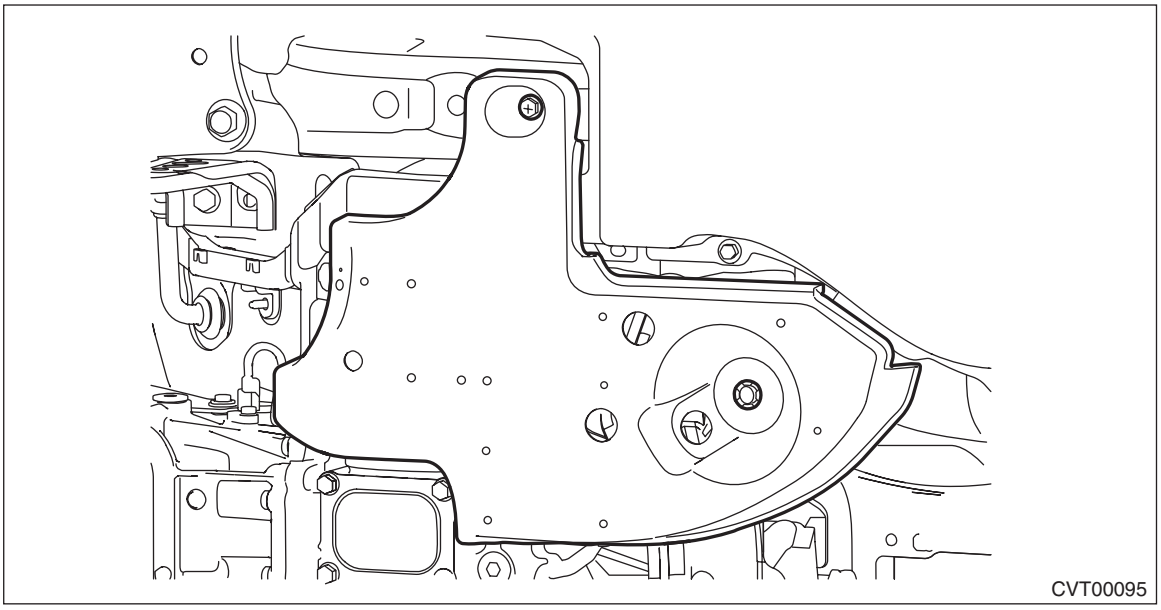


4) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
5) Remove the pitching stopper. <Ref. to CVT(TH58A)-87, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>
6) Lift up the vehicle.
7) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>

8) Remove the center exhaust cover.



9) Remove the under cover - cable.



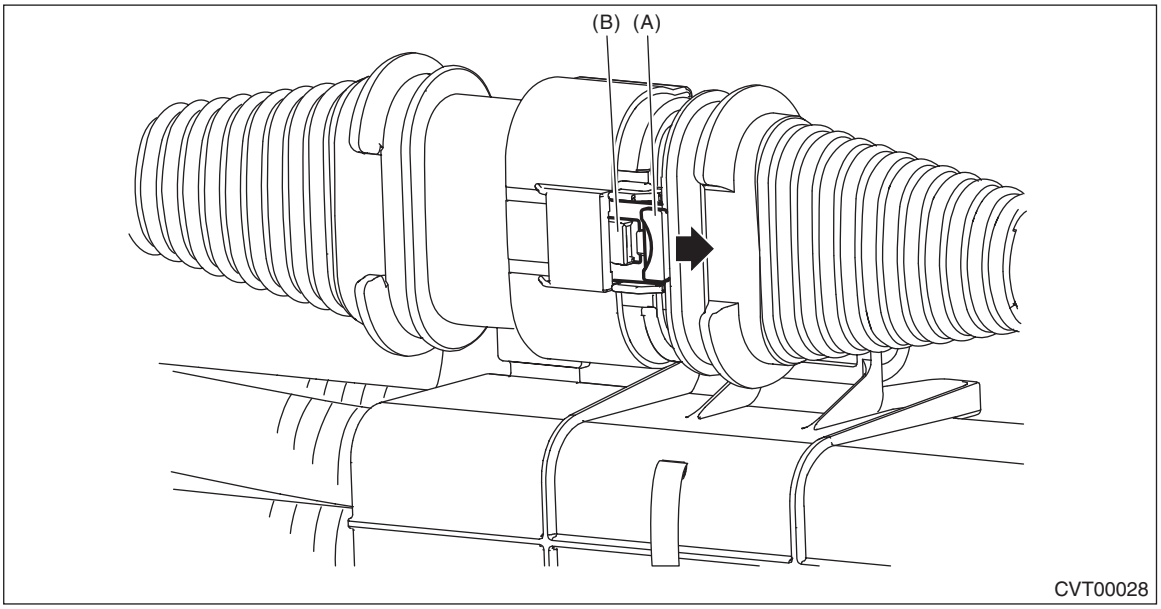
10) Remove the under cover - rear LH. <Ref. to EI-33, REMOVAL, Floor Under Protector.>

11) Remove the electric oil pump harness connector.

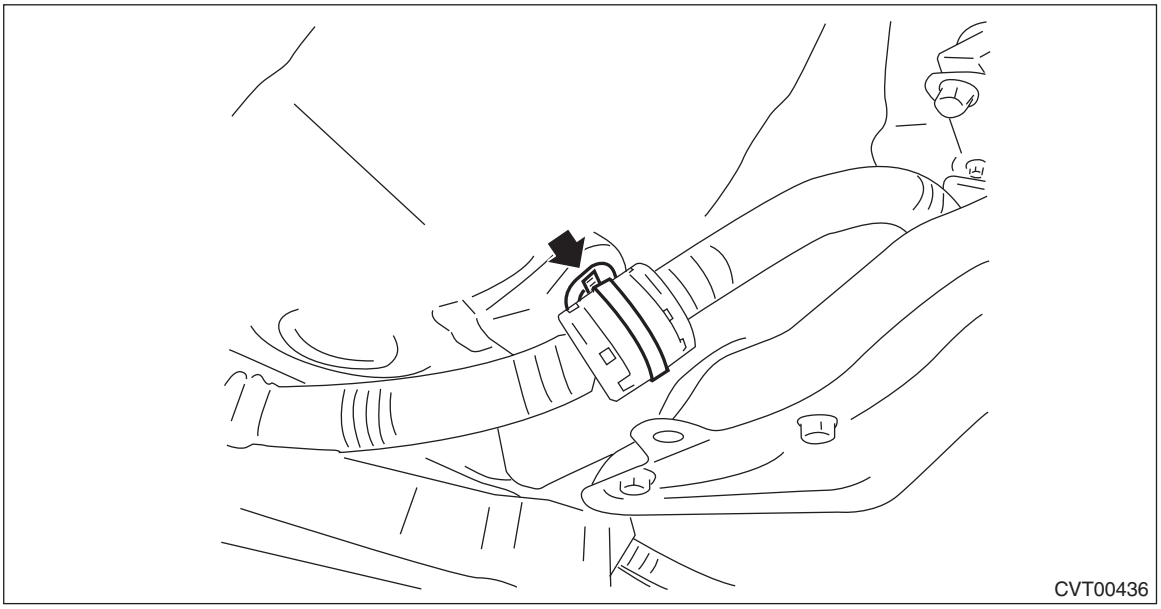
WARNING:
Be sure to wear insulated gloves.

CAUTION:
• To prevent intrusion of foreign matter such as oil, water and dirt after removal, cover the female side connector with a clean cloth or a plastic bag and cover the coupler portion of the male side connector with insulating tape.
• When foreign matter is found, remove it while paying attention not to damage the electrode inside. If water is attached, dry it completely.
• When disconnecting the electric oil pump harness connector, do not apply excessive force or damage it.

(1) Pull the slide lock (A) in the direction of arrow.
(2) Disconnect the harness connector by pushing the claw (B).

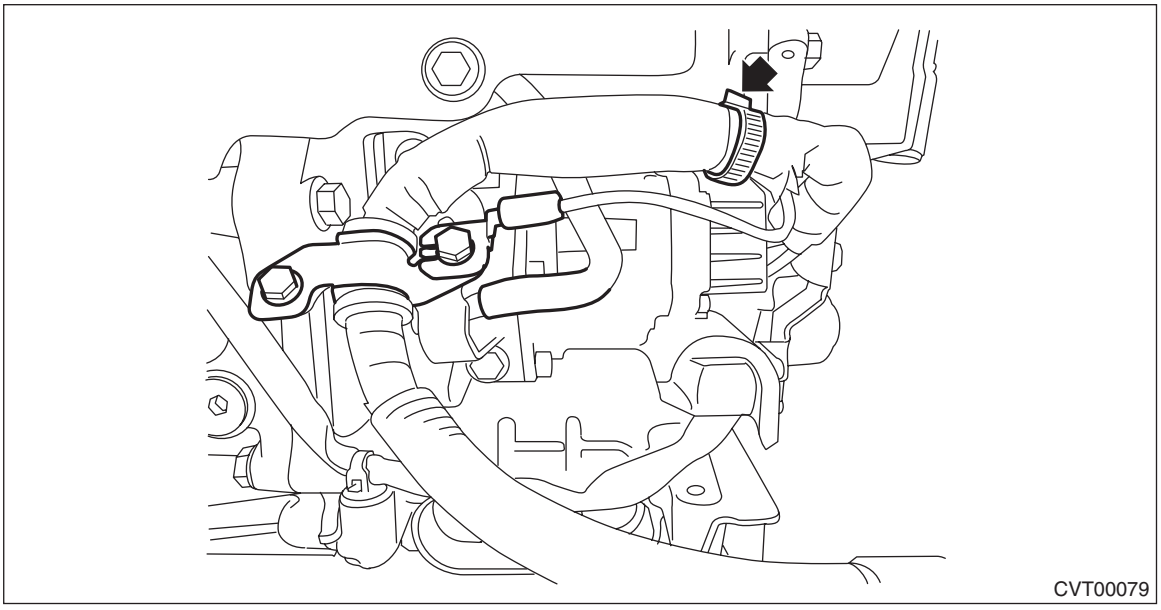


(3) Release the clip of the electric oil pump harness from the vehicle.

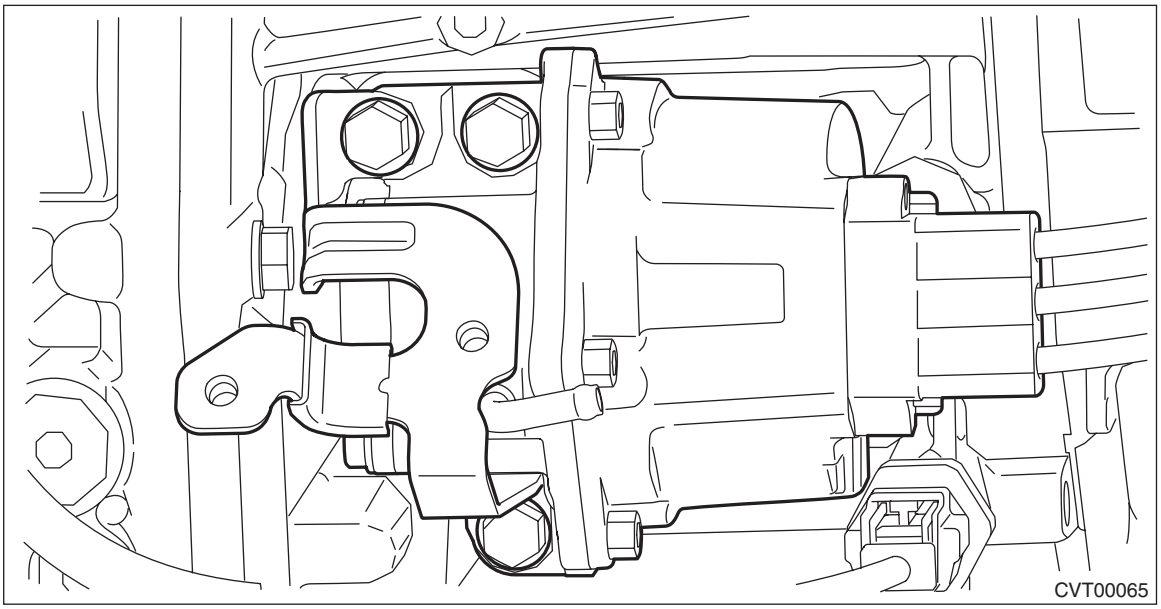


12) Set the transmission jack under the transmission.
13) Remove the rear crossmember. <Ref. to CVT(TH58A)-88, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, REMOVAL, Transmission Mounting System.>

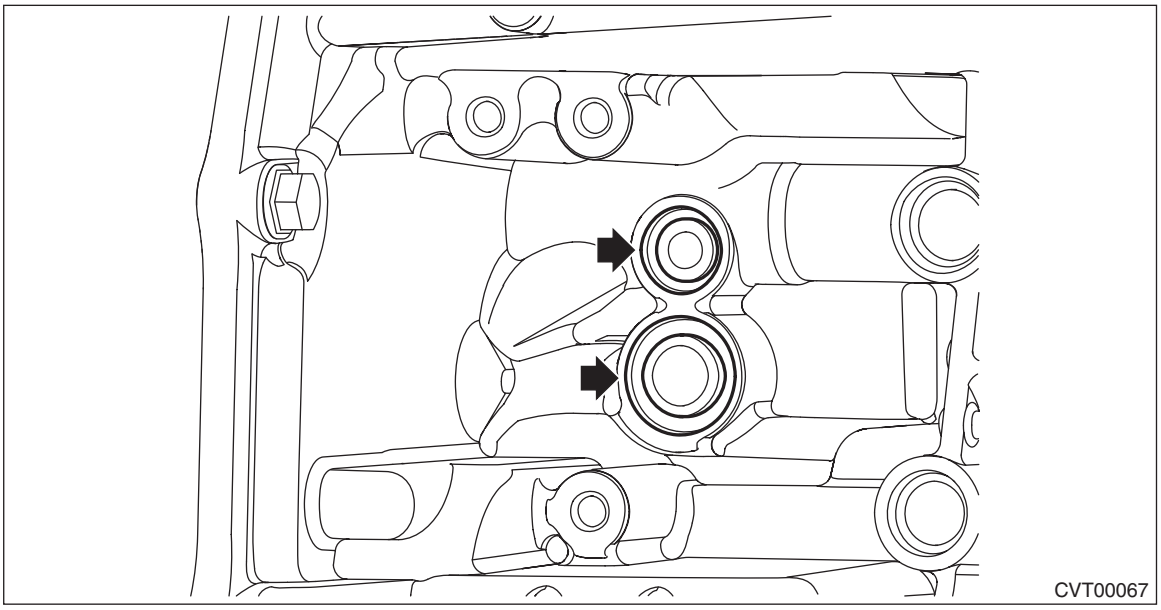
14) Lower the transmission.
15) Release the harness clips, then remove the air breather hose, harness bracket and ground terminal.



16) Remove the electric oil pump assembly and the harness bracket COMP.



17) Remove the O-rings.



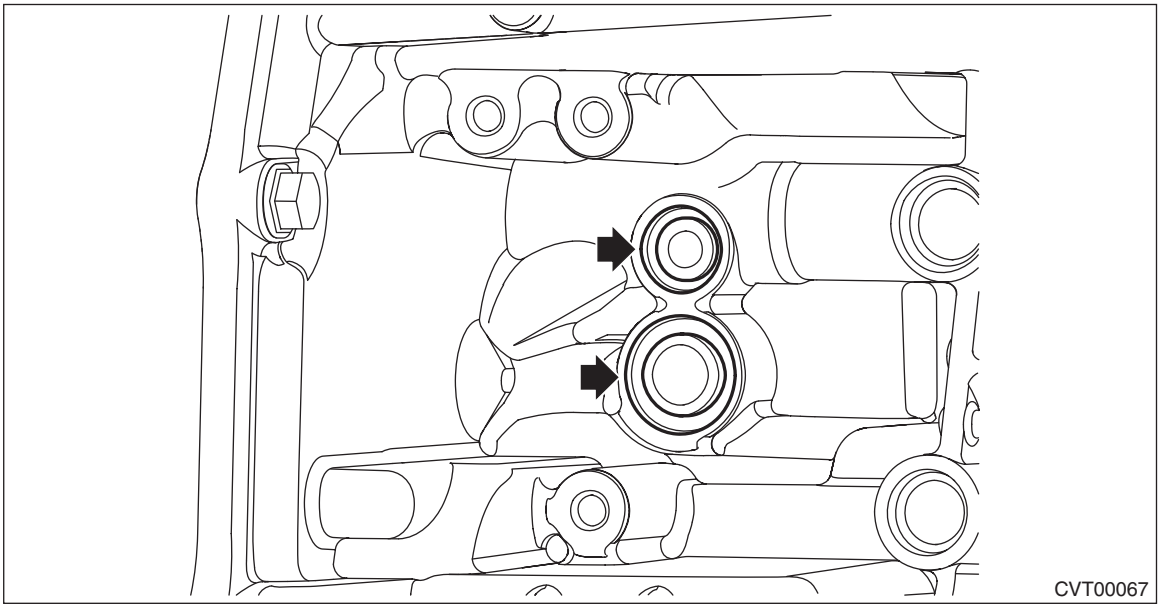
B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

CAUTION:
- **Do not apply excessive force or damage the electric oil pump harness.**
- **Be careful not to twist the electric oil pump harness.**
- **When cleaning the mating surface of the transmission side, be careful not to allow any dust or dirt to enter the transmission.**

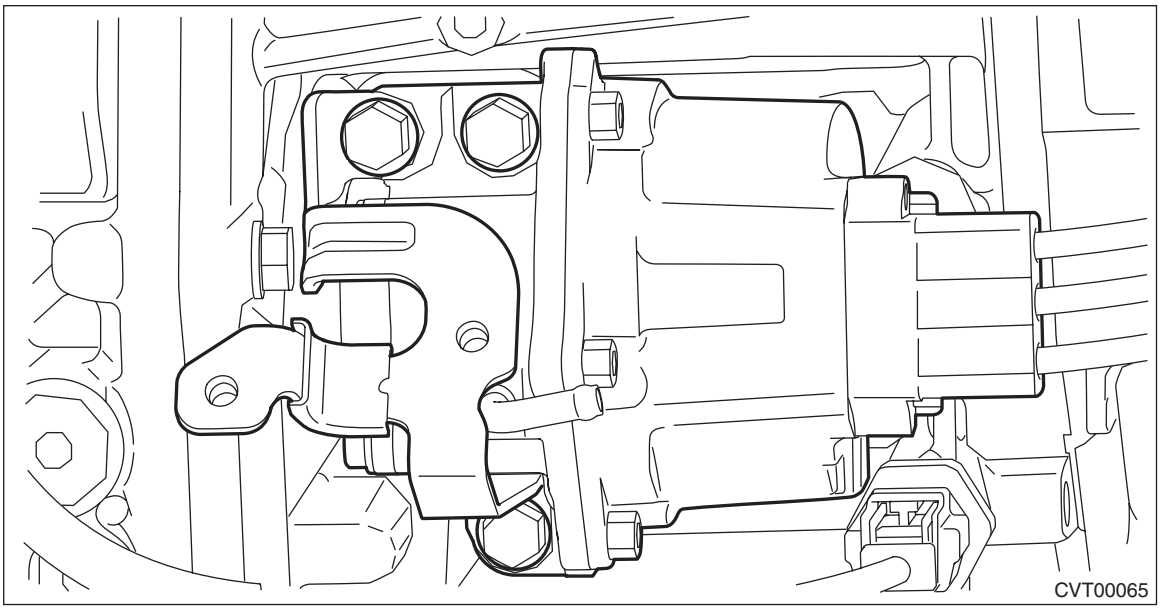
1) Install the O-ring to the transmission case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



2) Install the electric oil pump assembly and the harness bracket COMP.

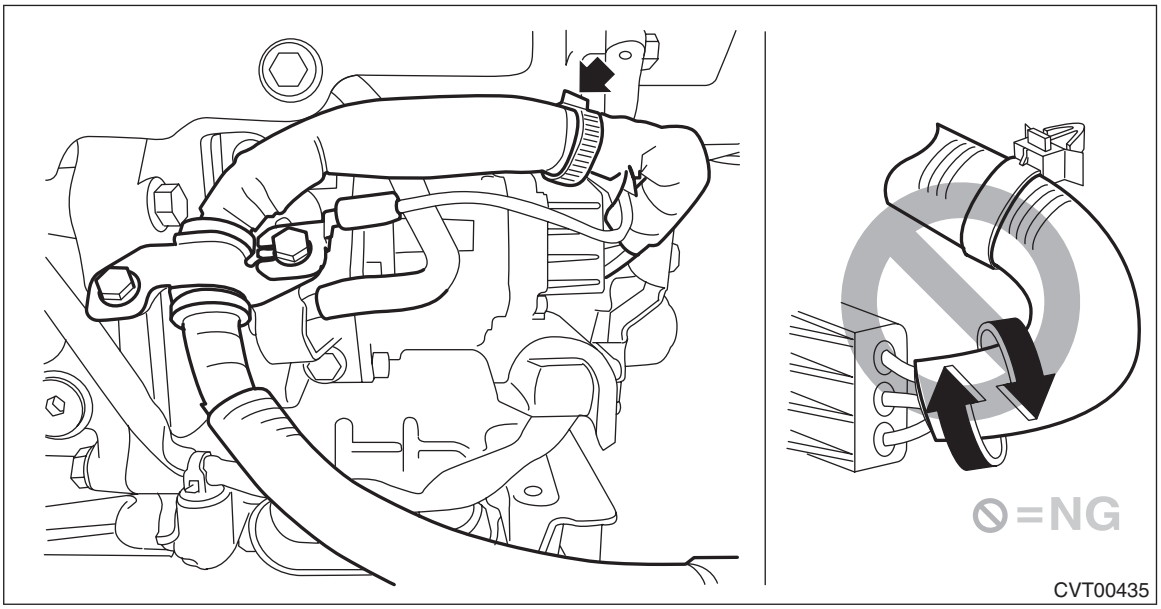
Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)



3) Install the harness clips to the bracket, then install the air breather hose, electric oil pump harness, harness bracket and ground terminal.

CAUTION:
When installing the electric oil pump harness clips, be careful not to twist the electric oil pump harness by 360°.

Tightening torque:
8 N·m (0.8 kgf-m, 13.3 ft-lb)



4) Raise the transmission, and install the rear crossmember. <Ref. to CVT(TH58A)-90, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, INSTALLATION, Transmission Mounting System.>
5) Install the exhaust cover.

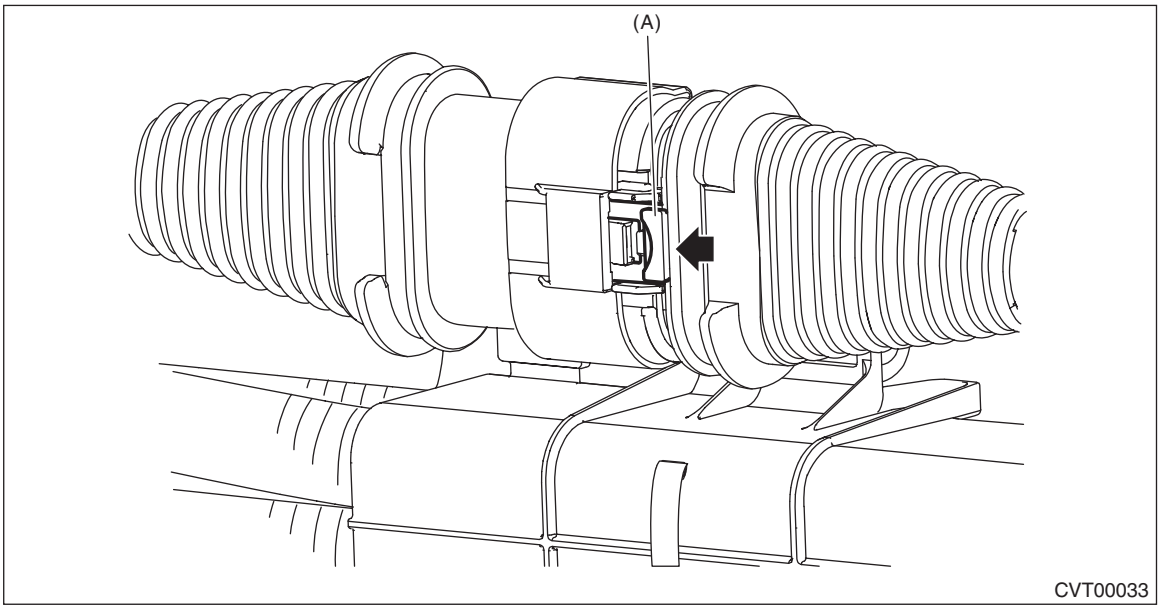
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

6) Install the electric oil pump harness connector.

WARNING:
Be sure to wear insulated gloves.

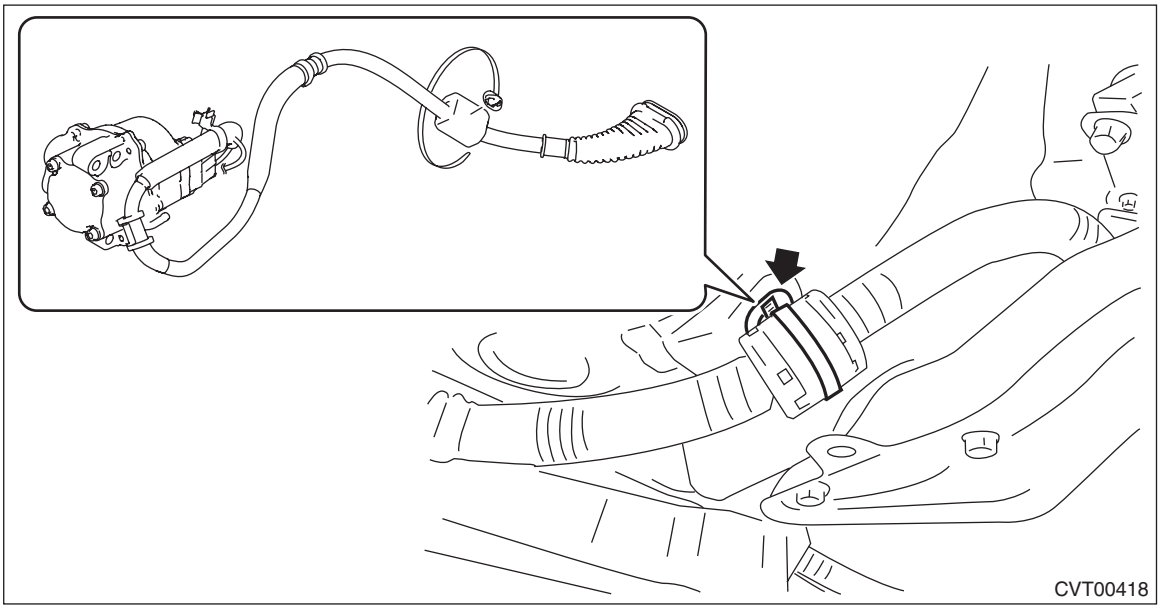
CAUTION:
• Do not allow foreign matter intrusion. When foreign matter is found inside, remove it while paying attention not to damage the electrode inside.
• If water is attached, dry it completely before starting the operation.

(1) Insert the harness connector until a click is heard, and move the slide lock (A) in the arrow direction to lock.



(2) Install the electric oil pump harness to the vehicle.

NOTE:
• Use a new electric oil pump harness clip.
• Install the electric oil pump harness clip as shown in the figure.



(3) Make sure that the electric oil pump harness does not interfere with other parts.

7) Install the under cover - rear LH. <Ref. to EI-33, INSTALLATION, Floor Under Protector.>
8) Install the under cover - cable.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
9) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
10) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
11) Lower the vehicle.
12) Install the pitching stopper. <Ref. to CVT(TH58A)-89, PITCHING STOPPER, INSTALLATION, Transmission Mounting System.>
13) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
14) Install the collector cover.
15) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>
16) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
17) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, CVTF.>

C: INSPECTION

1. GENERAL DESCRIPTION

Perform this inspection as necessary when replacing or troubleshooting the electric oil pump to check that the electric oil pump works correctly.

2. PROCEDURE

CAUTION:
Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
1) Idle the engine until the CVTF temperature becomes 60 — 100°C (140 — 212°F) on Subaru Select Monitor.
2) Turn the ignition switch to OFF.
3) Apply the parking brake.
4) Connect the Subaru Select Monitor to data link connector.
5) Turn the ignition switch to ON.
6) Shift the select lever to “P” range.
7) Select «Diagnosis» in the «Start» screen of Subaru Select Monitor.
8) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
9) On «Main Menu» display, select «Each System».
10) On «Select System» display, select «Transmission Control System».
11) On «Select Function» display, select «Work Support».
12) On «Work Support» display, select «Electric Fluid Pump inspection mode».
13) Follow the messages displayed on the Subaru Select Monitor screen when working.

NOTE:
If the operation does not follow the messages displayed on the Subaru Select Monitor screen, the inspection mode is finished.

14) The results of the electric oil pump inspection mode are displayed on the Subaru Select Monitor screen.
- Malfunction of TCM is detected or TCM is out of conditions: «Finished by abnormality of TCU.»
- The operation is ended normally: «Successful Turn off the ignition switch.»
- Malfunction of hybrid system is detected or it is out of conditions: «Aborted»
- Another malfunction is detected: «By high pressure abnormality of the secondary pressure, finished work.» or «Abnormal termination by Time out»

NOTE:
- For detailed operation procedures, refer to “Application help”.
- If the hybrid system is defective, perform the remedy displayed on the Subaru Select Monitor and inspect the electric oil pump again.
- When the inspection mode does not end normally, the following message is displayed.

Message	Main reasons for abnormal termination and actions to take
“By high pressure abnormality of the secondary pressure, finished work.”	• The secondary pressure is high. • The relief valve is damaged. Replace the drive motor assembly.
“Abnormal termination by Time out”	• The actual speed of electric oil pump does not follow the specified speed. Inspect the electric oil pump again. • The secondary pressure does not increase more than necessary. • Check the CVTF level. • Inspect the electric oil pump again. • Check for oil leaks in the secondary pressure oil passage. • If no malfunctions are found, the relief valve or the spring is damaged. Replace the drive motor assembly.
“Finished by abnormality of TCU”	• TCM detects a trouble code. Repair it according to the trouble code. • Other than P range is detected. Do not shift the select lever to other than P range during inspection. In addition, make sure the range SW is in the P range continuously using Subaru Select Monitor. • Engine speed is detected. • The CVTF temperature is out of 60 — 100°C (140 — 212°F). The CVTF temperature should be within 60 — 100°C (140 — 212°F). • Vehicle speed is detected. • 12 V battery voltage is low. • Malfunction of CAN communication with other than TCM is detected. Stop the inspection, and after starting the engine, check that no U codes exist in the current and past malfunctions of transmission using Subaru Select Monitor. • Electric oil pump temperature is high. Turn the ignition switch to OFF, stop the electric oil pump for approx. 60 seconds, and then perform the inspection mode again.
“Hybrid system is out of order”	• The hybrid system has a failure. Check the hybrid system.
“Safety plug has not been set”	• The safety plug is out of position or is not set properly. Inspect according to the troubleshooting for the battery energy control module.
“High voltage battery capacity is low”	• The battery remaining capacity of high voltage battery is low. Charge the high voltage battery.
“12 V battery capacity is low”	• 12 V battery voltage is low. Charge the 12 V battery.
“Can not Test for a Hybrid system of other factors”	• High voltage start is inhibited by immobilizer. • A collision is detected. (P1C1E) Check the hybrid system.

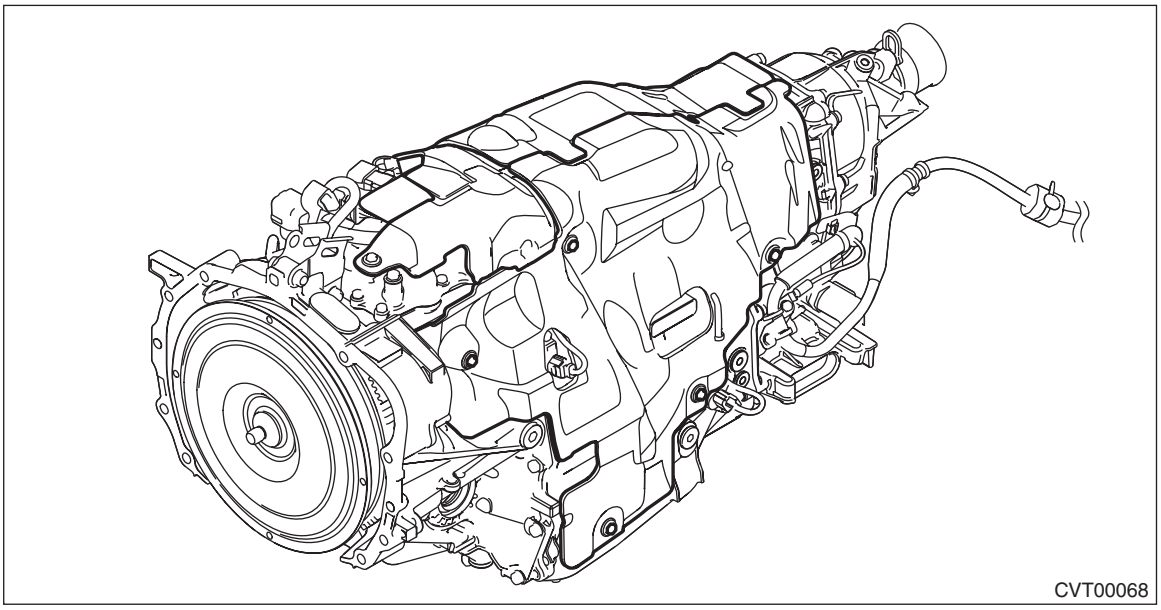
15) After the message «Successful Turn off the ignition switch.» appears, turn the ignition switch to OFF and finish the electric oil pump inspection mode.

23.Transmission Harness

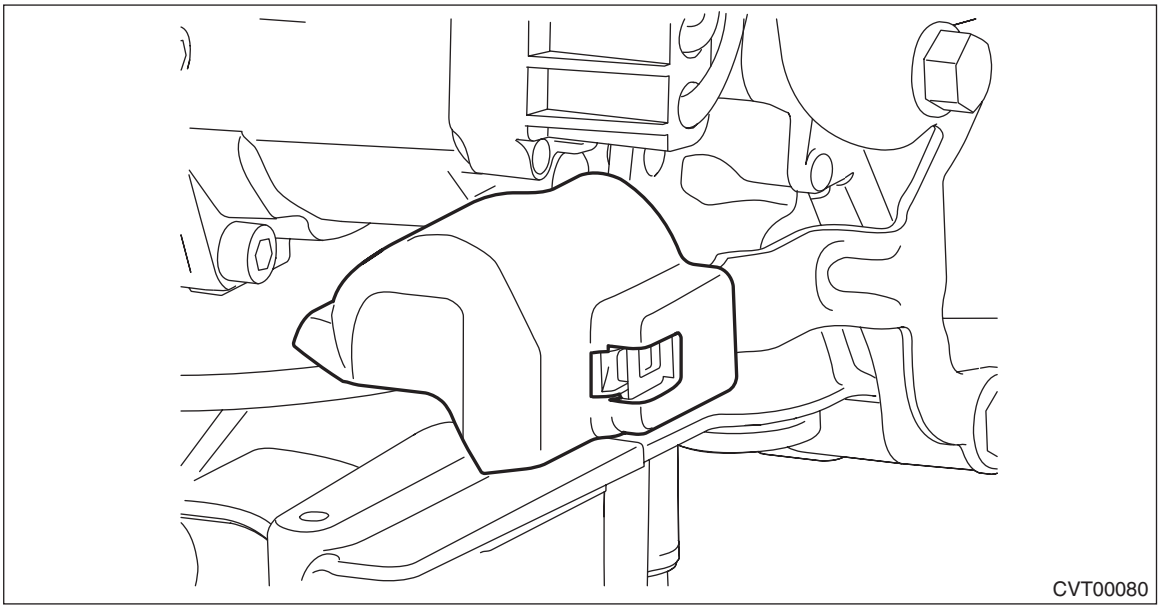
A: REMOVAL

1. INHIBITOR HARNESS

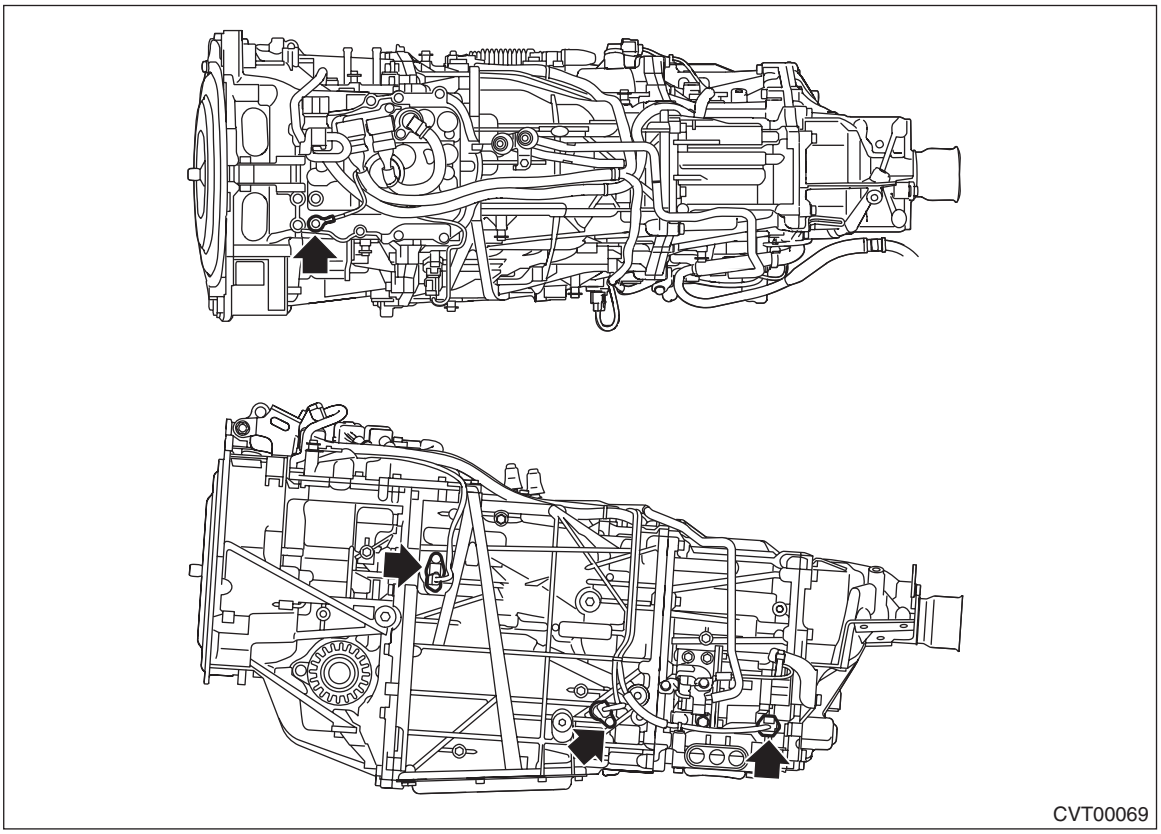
1) Remove the transmission from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the transmission case cover.



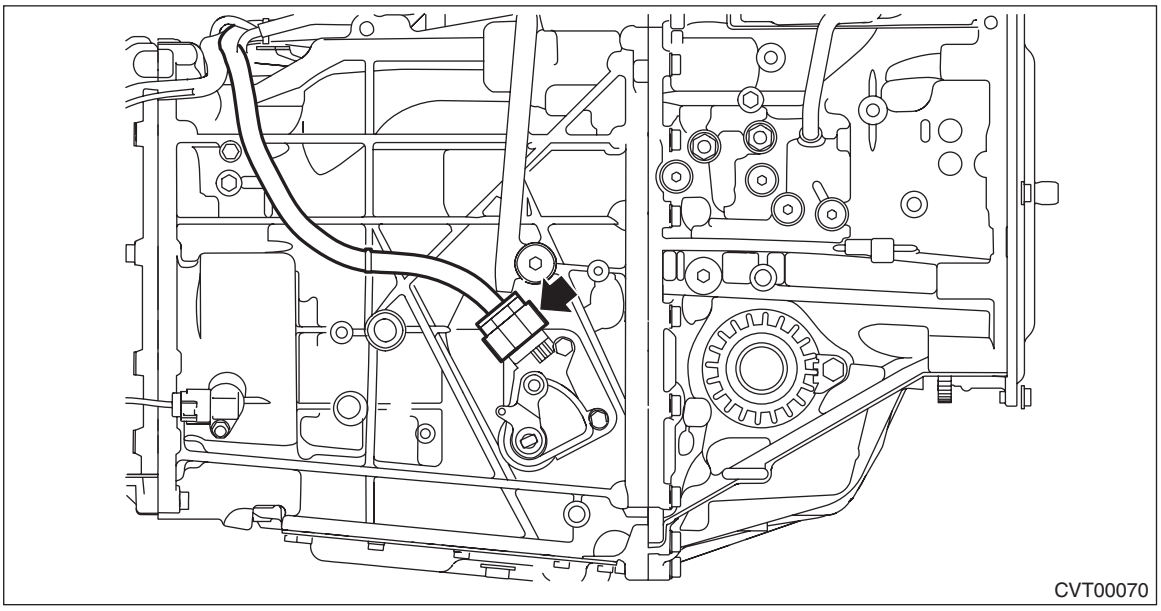
3) Remove the sensor cover.



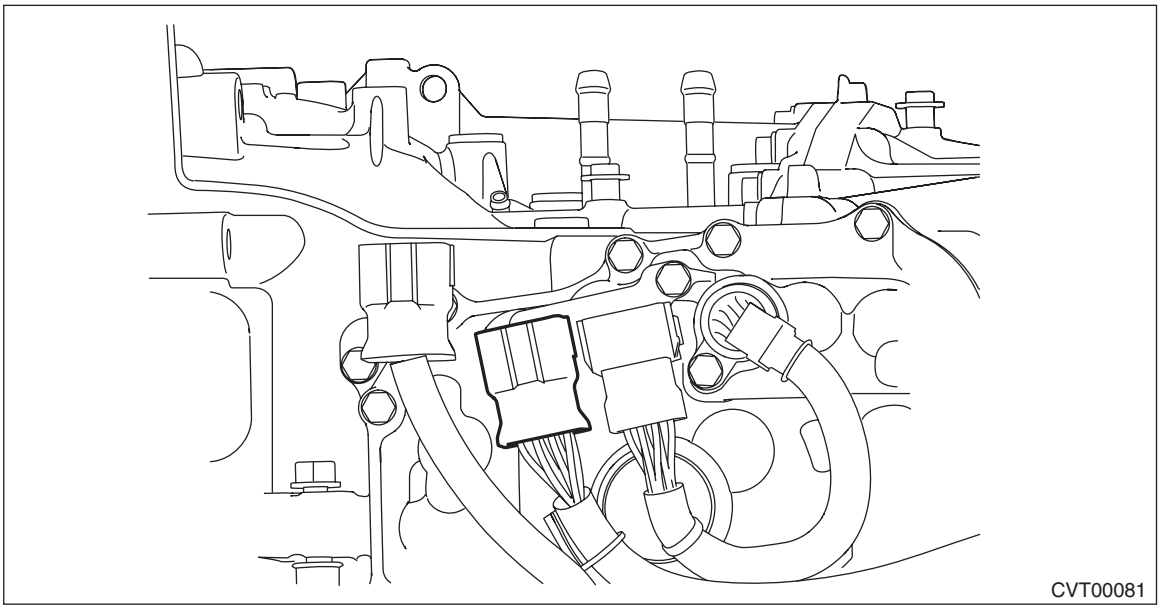
4) Remove the harness connector from the ground terminal, turbine speed sensor, secondary speed sensor and secondary pressure sensor.



5) Remove the harness connector from inhibitor switch.



6) Remove the inhibitor harness connector from the transmission harness stay.



7) Remove the harness clip from the transmission, and remove the inhibitor harness.

2. TRANSMISSION HARNESS

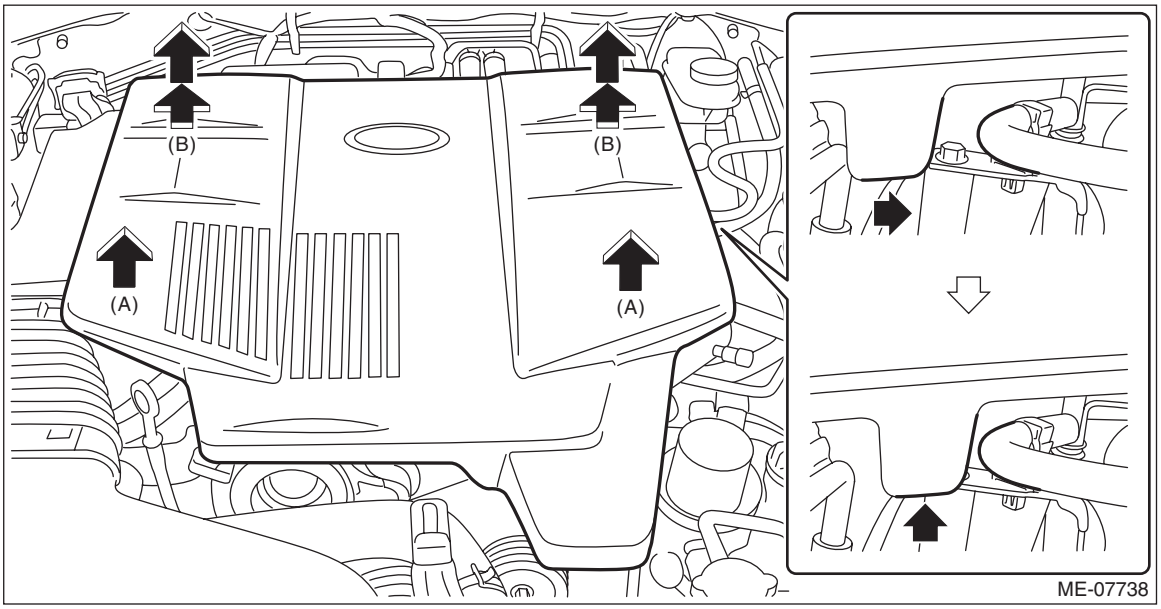
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the engine compartment before removal.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

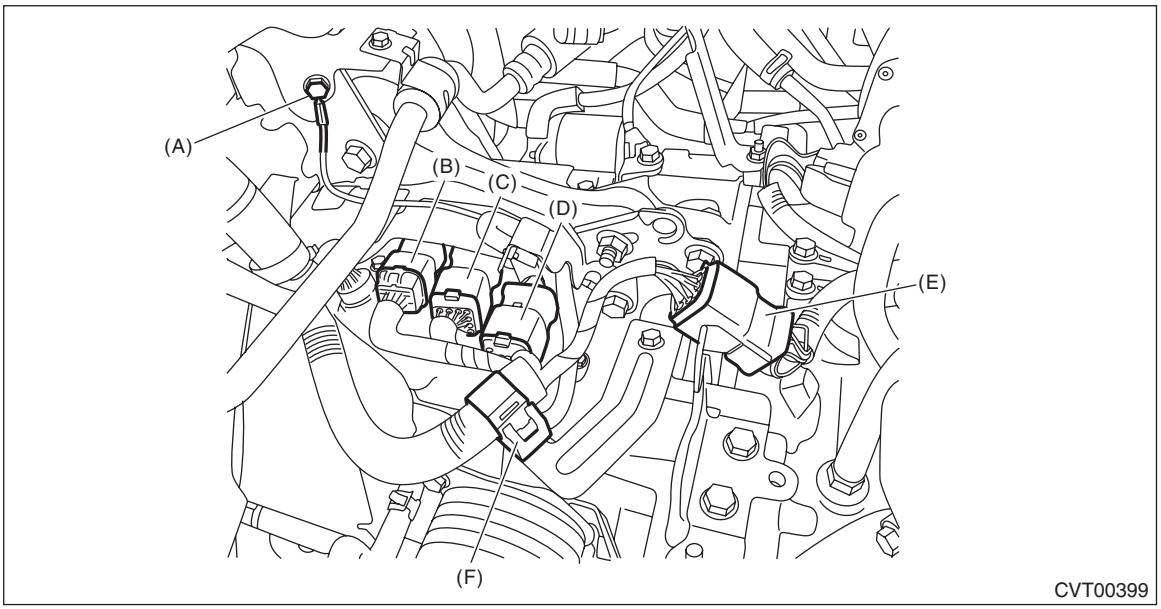
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



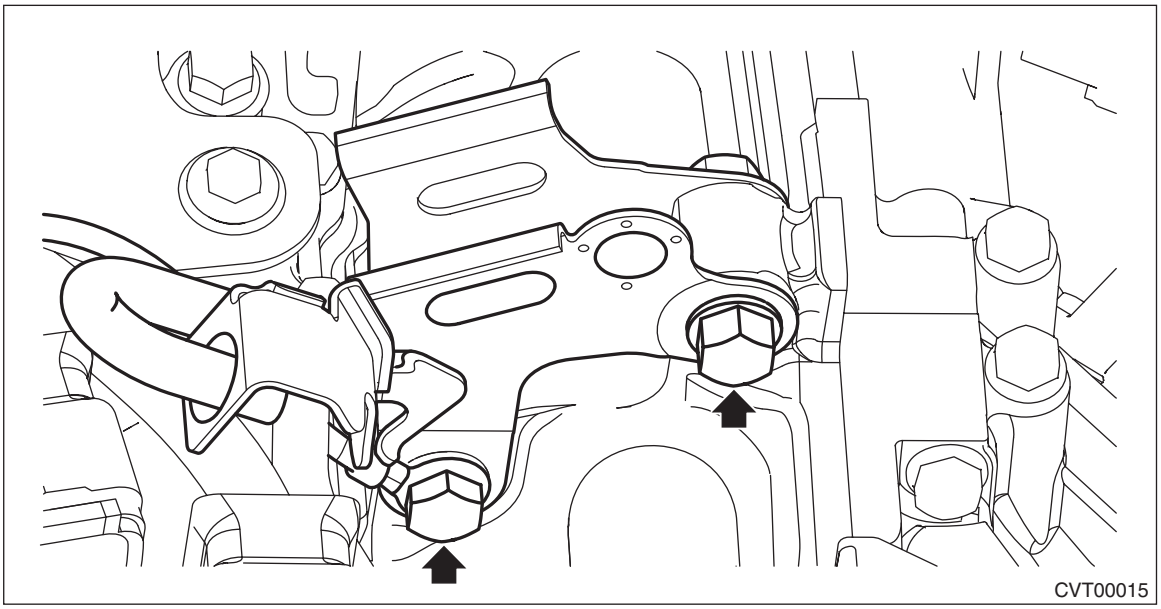
3) Remove the air cleaner case and bracket. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Disconnect the following connectors and harness clips.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip



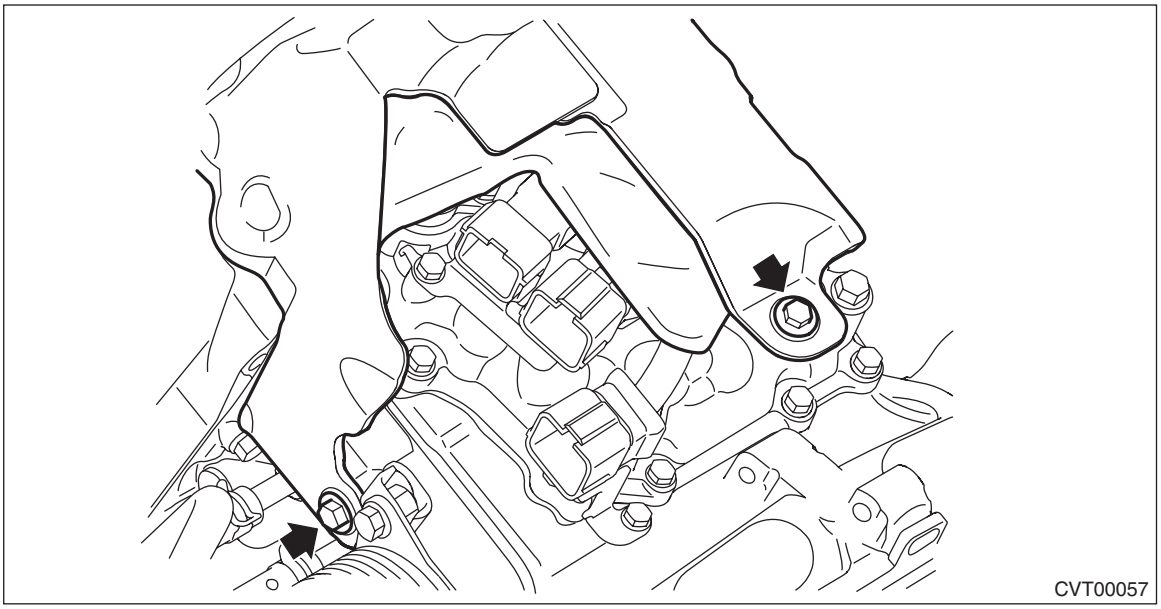
(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

5) Remove the pitching stopper. <Ref. to CVT(TH58A)-87, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>

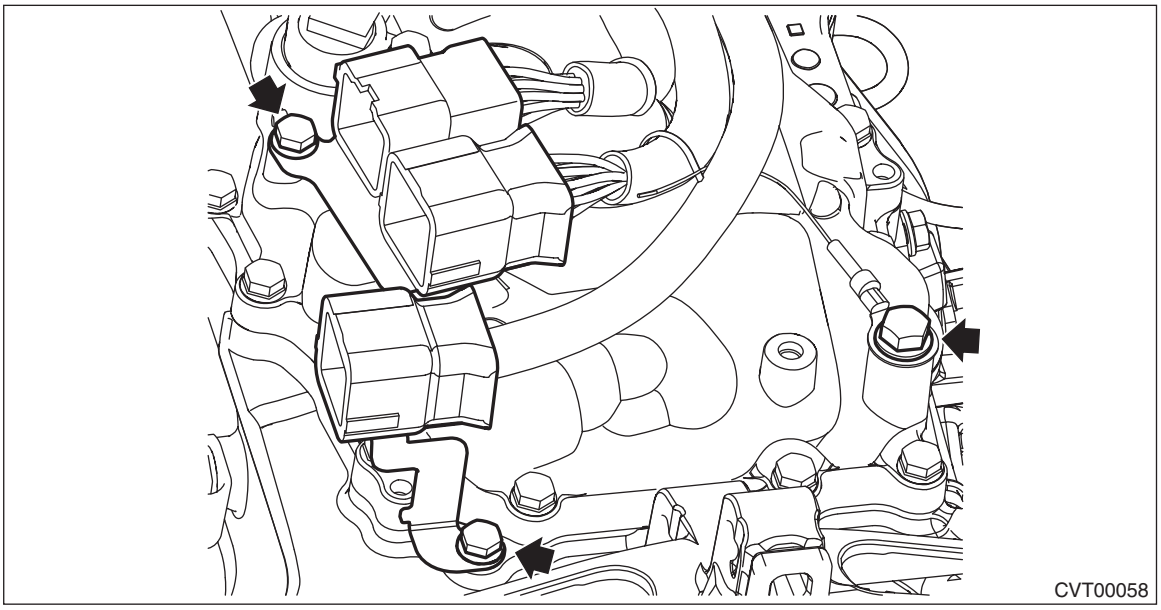
6) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



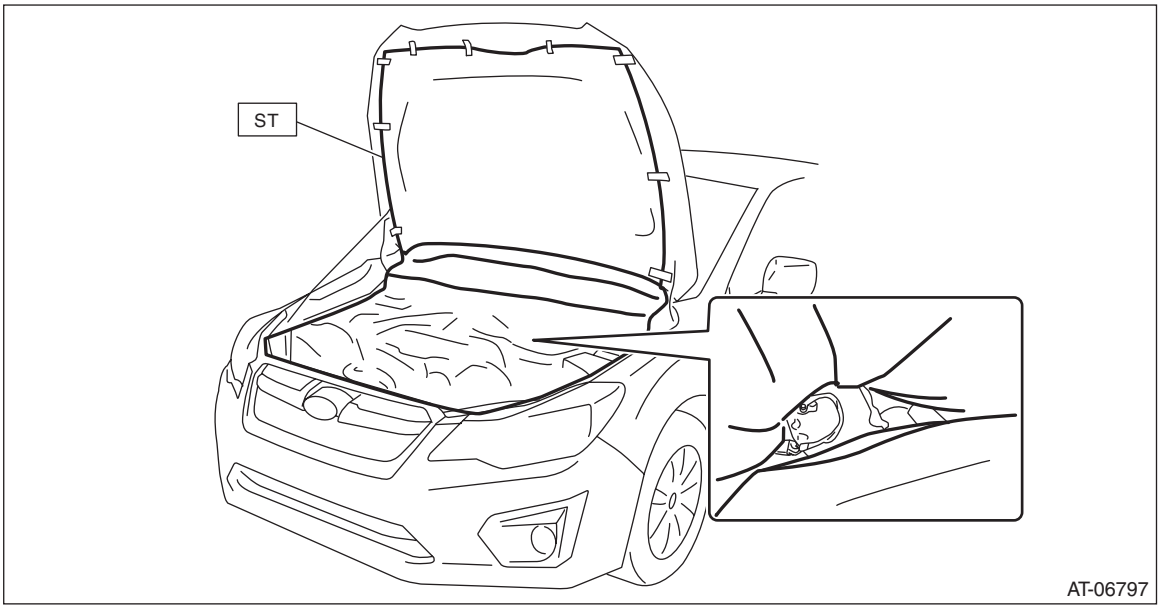
7) Remove the transmission case cover.



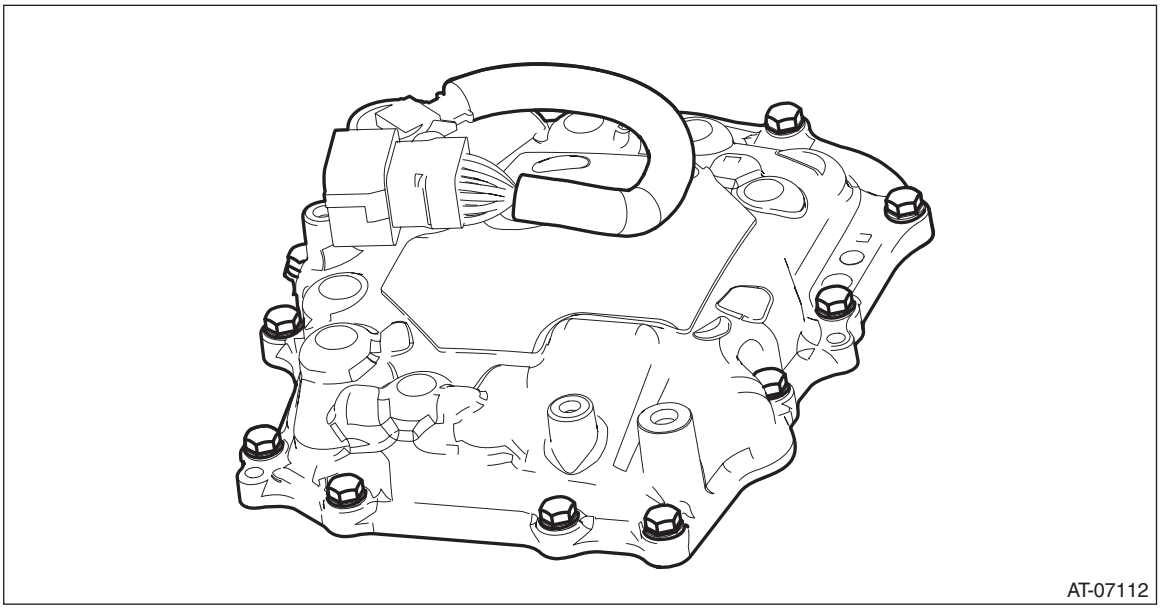
8) Remove the transmission harness stay, drive motor harness stay and transmission ground terminal.



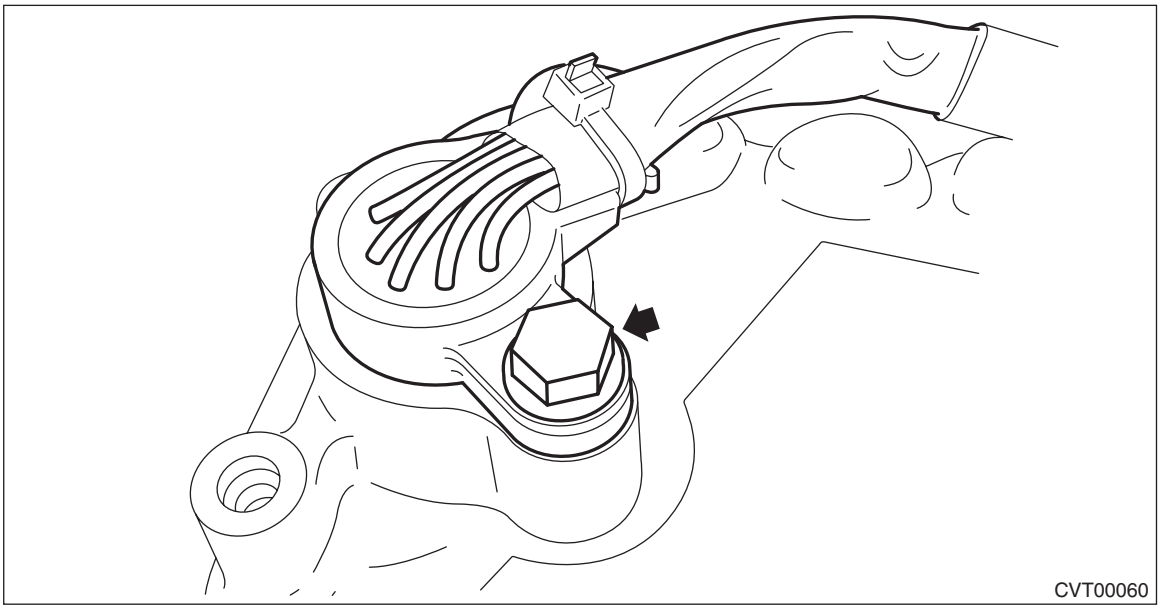
9) Remove the transmission harness connector from the harness stay.
10) Clean the transmission exterior.
11) Fix the ST with tape, and set the ST to the vehicle.
ST 18761AA010 SHEET SPECIAL TOOL



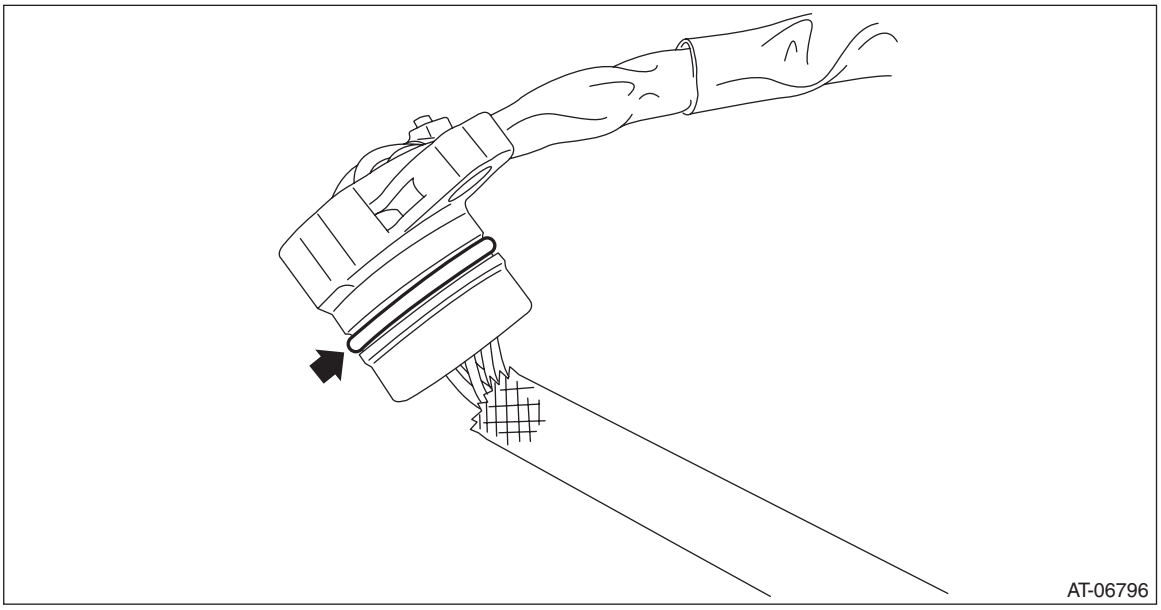
12) Remove the valve cover and gasket.



13) Disconnect the harness connector from the control valve body.
14) Remove the transmission harness from the valve cover.



15) Remove the O-ring from the transmission harness.



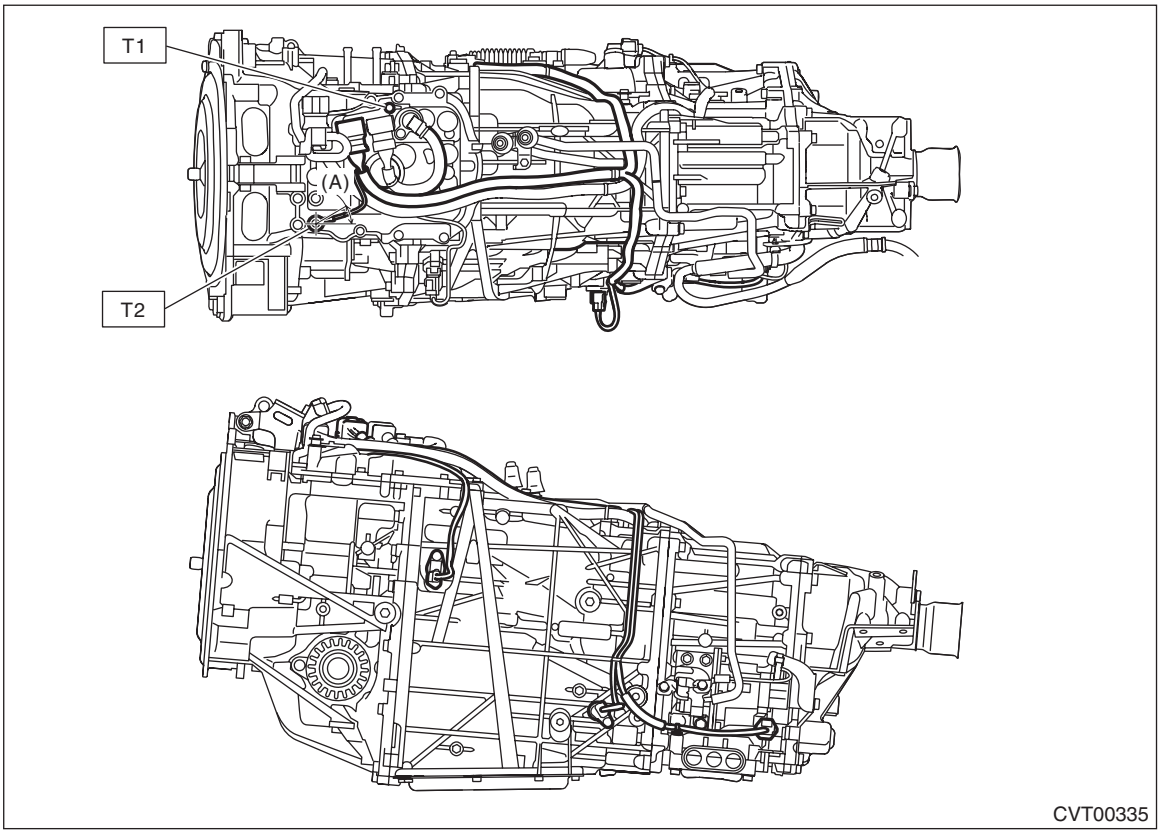
B: INSTALLATION

1. INHIBITOR HARNESS

Install in the reverse order of removal.

NOTE:
- Install the transmission ground terminal in the direction within the range of approx. 30° (A).
- Install the transmission harness through the lower side of air breather hose.

Tightening torque:
T1: 7 N·m (0.7 kgf-m, 3.7 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



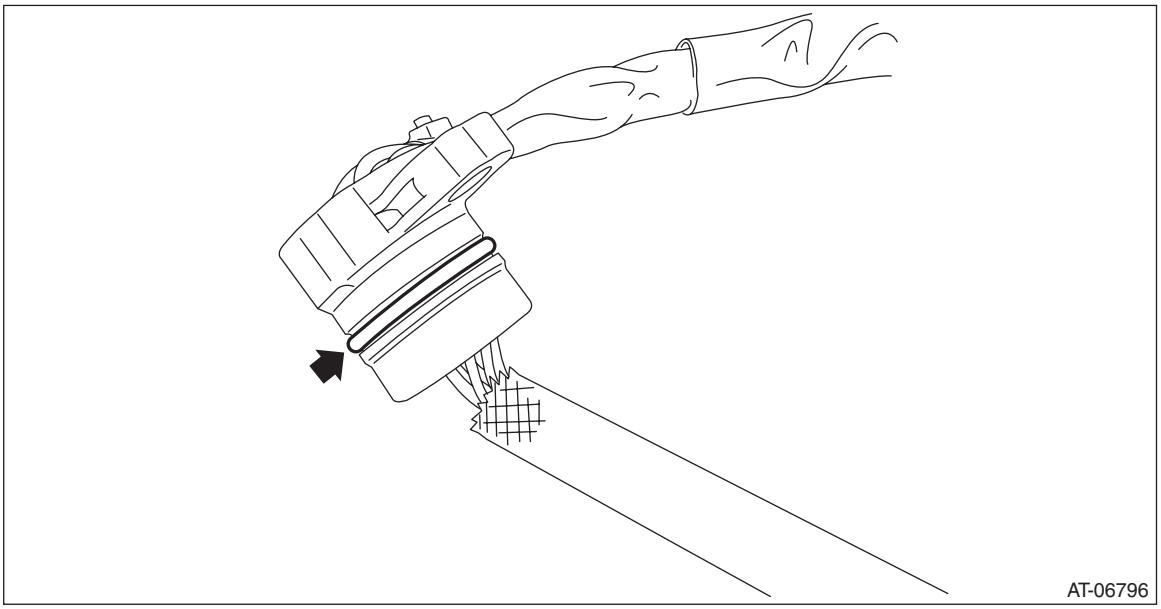
2. TRANSMISSION HARNESS

1) Clean the mating surface of valve cover and transmission side.

CAUTION:
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

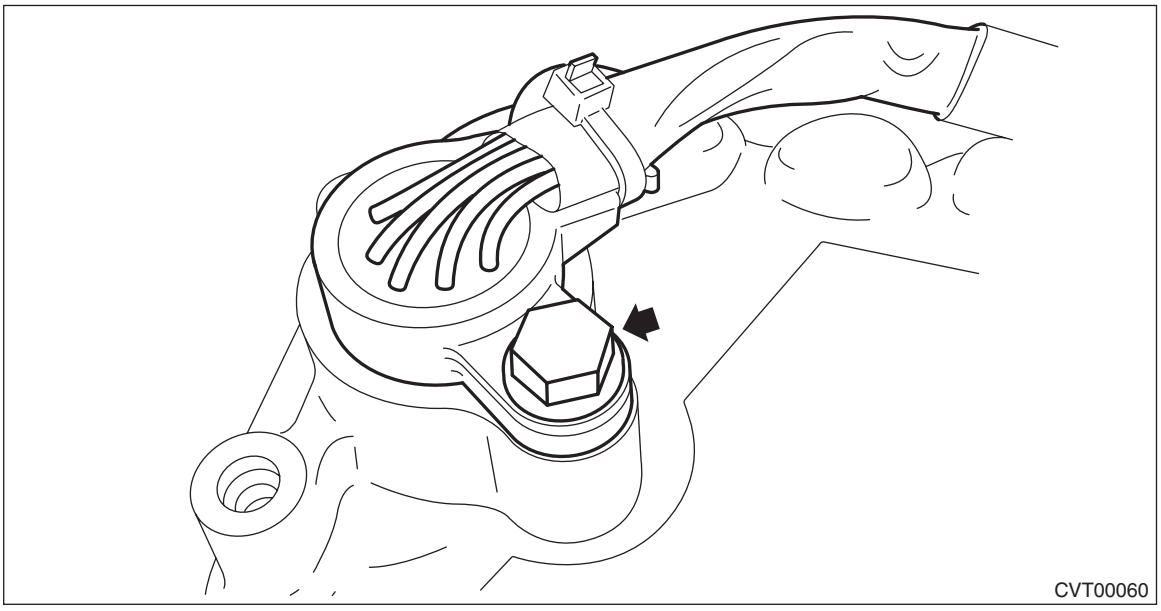
2) Check the control valve body for dust and other foreign matter.
3) Install the O-ring to the transmission harness.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



4) Install the transmission harness to the valve cover.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

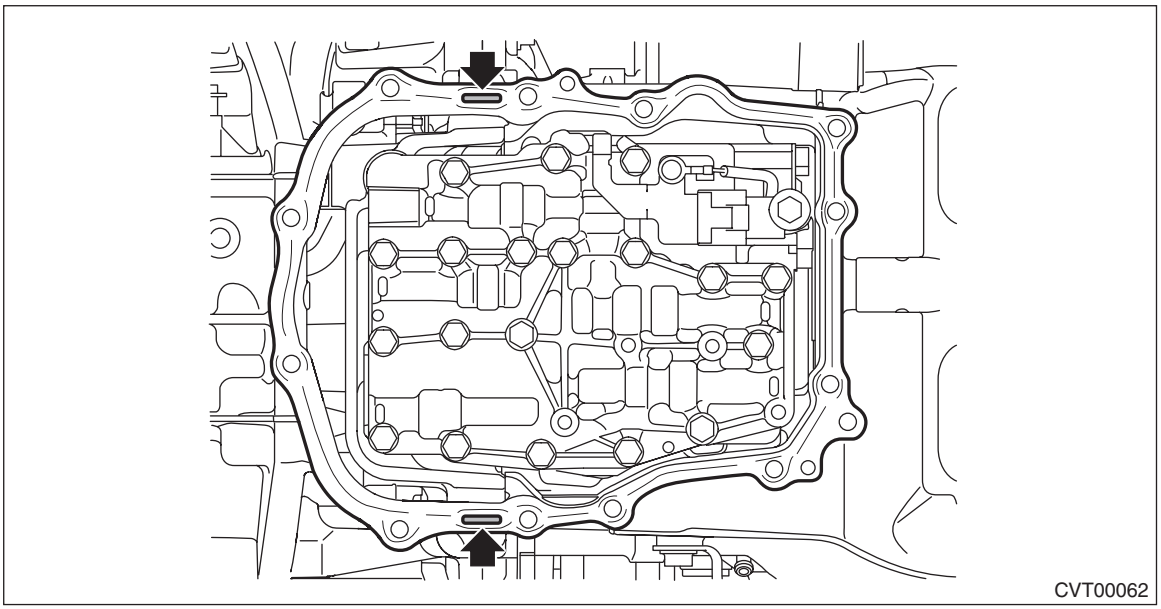


5) Install the gasket to the transmission.

NOTE:
Use a new gasket.

6) Apply liquid gasket to the oval hole of gasket.

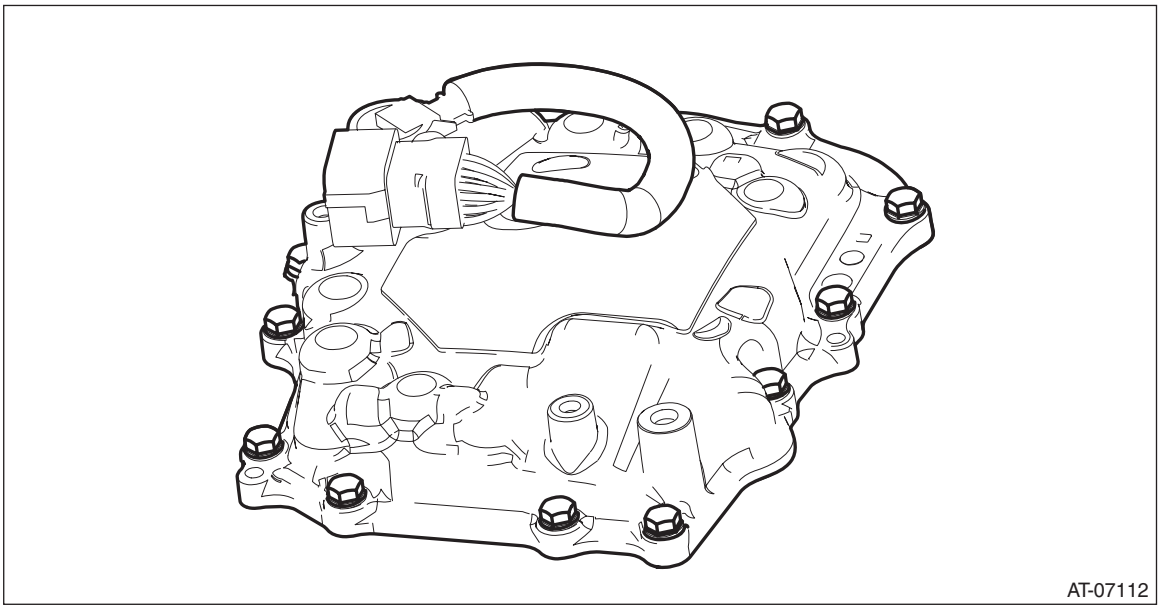
Liquid gasket:
THREE BOND 1215B or equivalent



7) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)

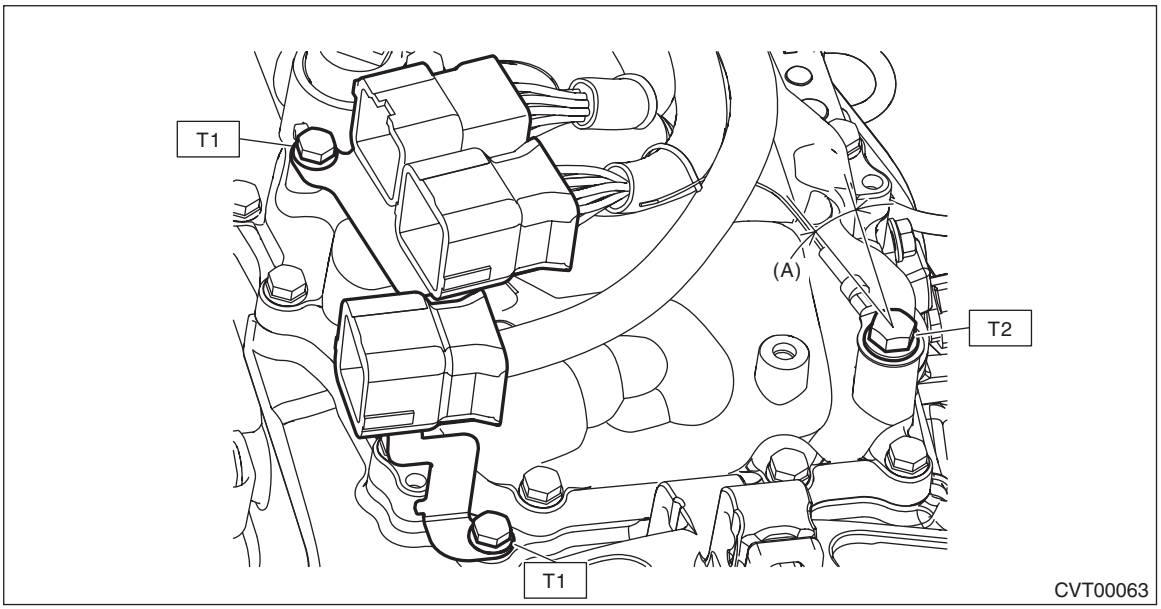


8) Remove the ST (SHEET SPECIAL TOOL).
9) Install the transmission harness connector to the harness stay.

10) Install the transmission harness stay, drive motor harness stay and transmission ground terminal.

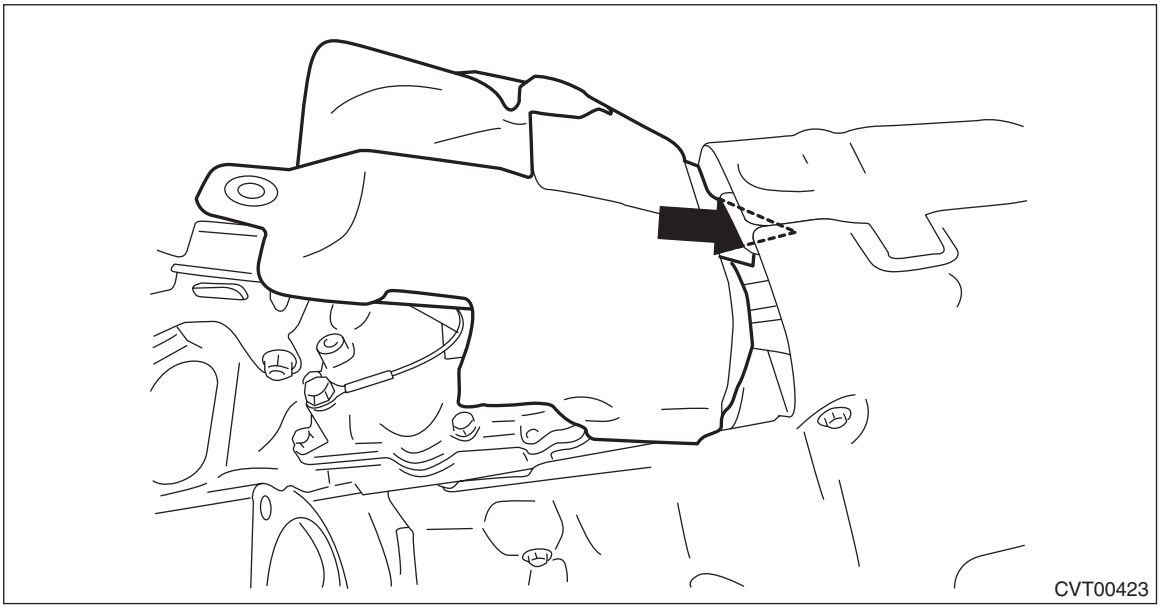
NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

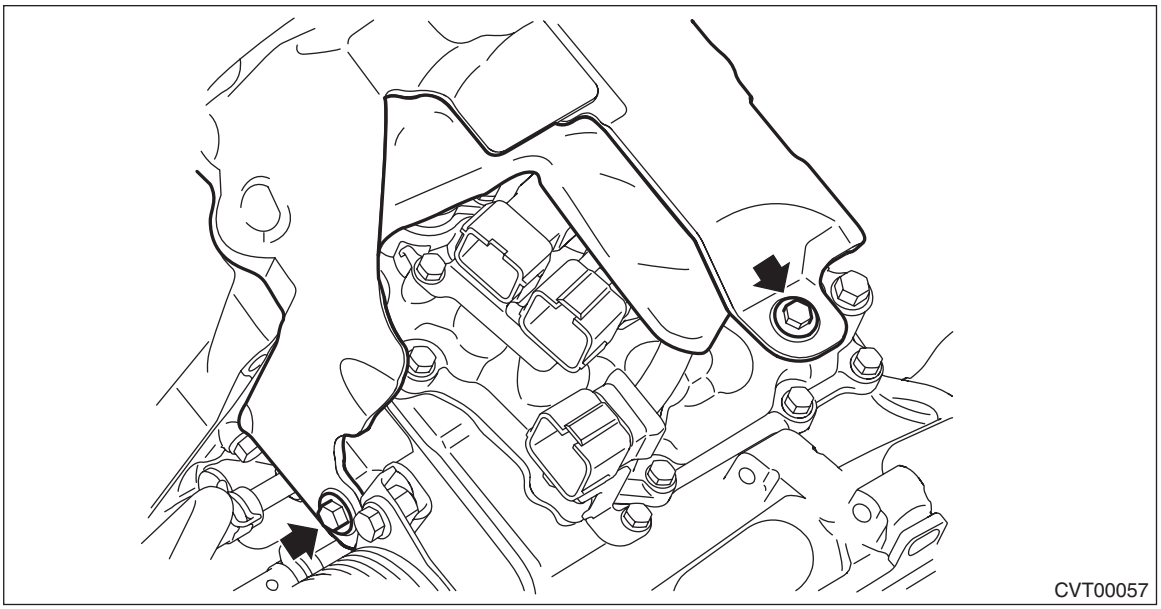
Tightening torque:
T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



11) Insert the transmission case cover (small) between transmission case cover (large) and transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)





12) Install the pitching stopper bracket and transmission radio ground cord.

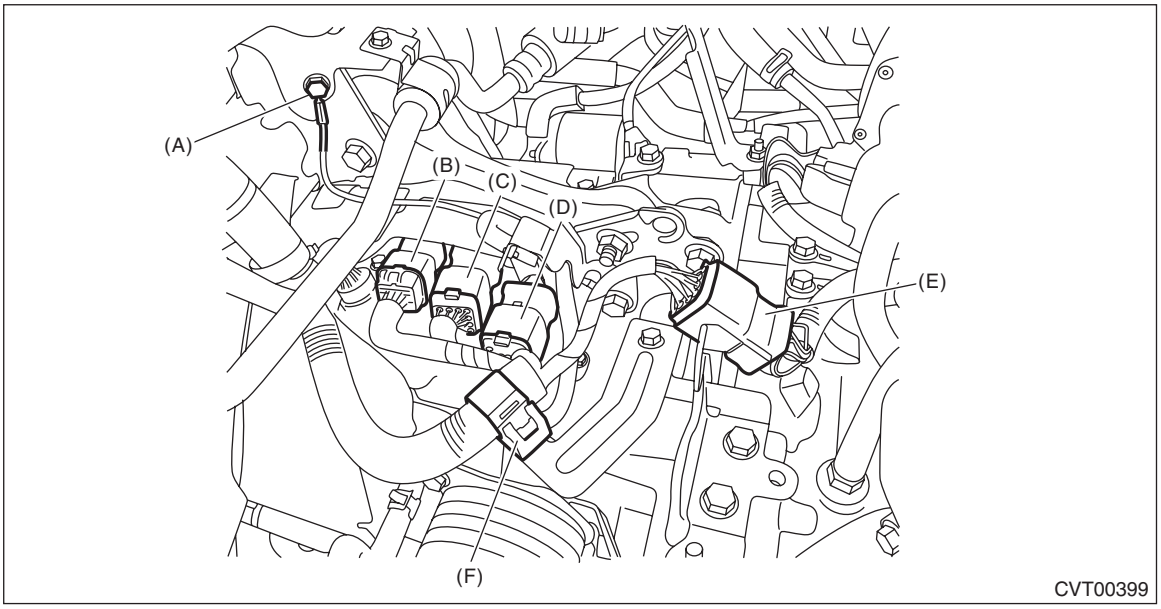
CAUTION:
Be careful not to deform or damage the terminal of transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

13) Install the air breather hose to the pitching stopper bracket. <Ref. to CVT(TH58A)-173, FRONT DIFFERENTIAL SIDE, INSTALLATION, Air Breather Hose.>
14) Install the pitching stopper. <Ref. to CVT(TH58A)-89, PITCHING STOPPER, INSTALLATION, Transmission Mounting System.>

15) Connect the following connectors and install the harness clip to the bracket.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

16) Install the air cleaner case and bracket. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
17) Install the collector cover.
18) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Visually check the harness and connector for damage or crack.
2) Check the harness terminal for rust, disconnection or poor contact.
3) Check the continuity between harness terminals.

NOTE:
For details of transmission harness circuit, refer to wiring diagram. <Ref. to WI(w/o HEV)-94, WIRING DIAGRAM, CVT Control System.>

Harness continuity standard:
Less than 1 Ω

24.Drive Motor Control Module

A: REMOVAL

NOTE:
For removal of the drive motor control module, refer to “HEV” section. <Ref. to HEV-74, Drive Motor Control Module.>

B: INSTALLATION

NOTE:
For installation of the drive motor control module, refer to HEV section. <Ref. to HEV-74, Drive Motor Control Module.>

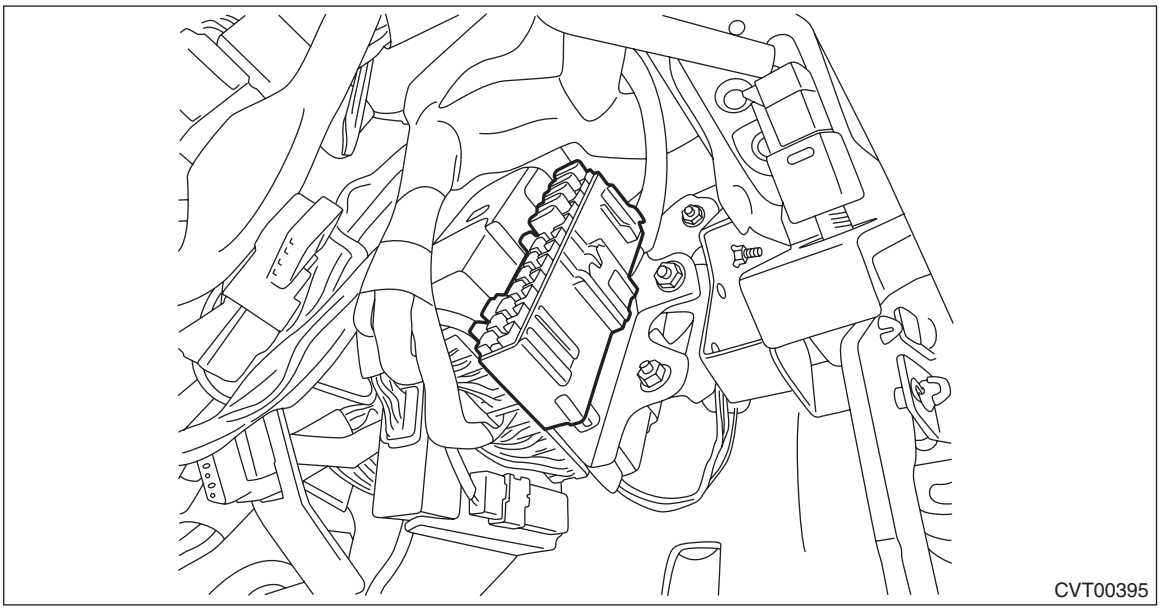
25.Transmission Control Module (TCM)

A: REMOVAL

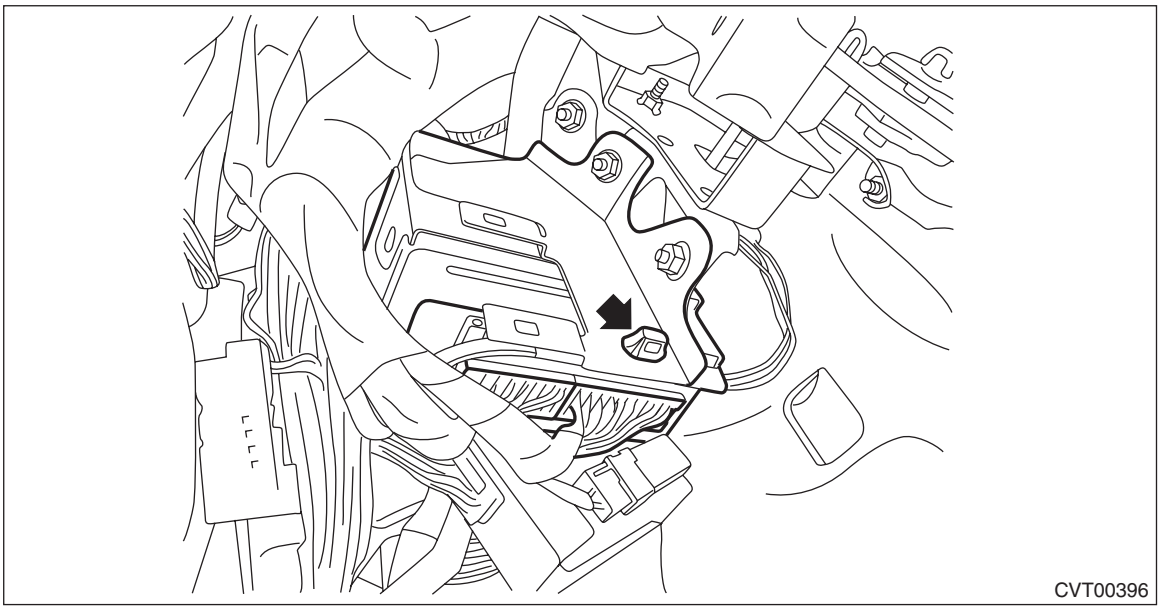
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the fuse holder.



3) Release the harness clips, and disconnect the bulk head harness connector from TCM.



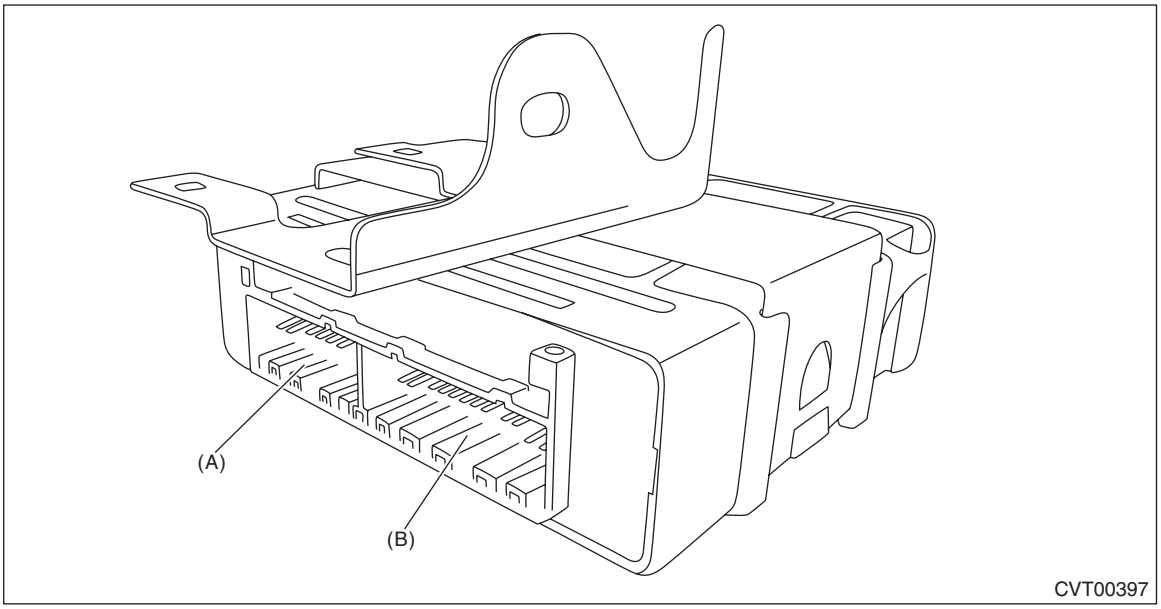
4) Remove the TCM.

NOTE:
Replace the TCM and bracket as a set.

B: INSTALLATION

1) Install the TCM to the bracket.

CAUTION:
To avoid the damage to bracket and TCM, do not remove after installing TCM to bracket. If installed by mistake, the part must be replaced with a new part.



(A) 22-pin connector side
(B) 26-pin connector side

2) Install the TCM.

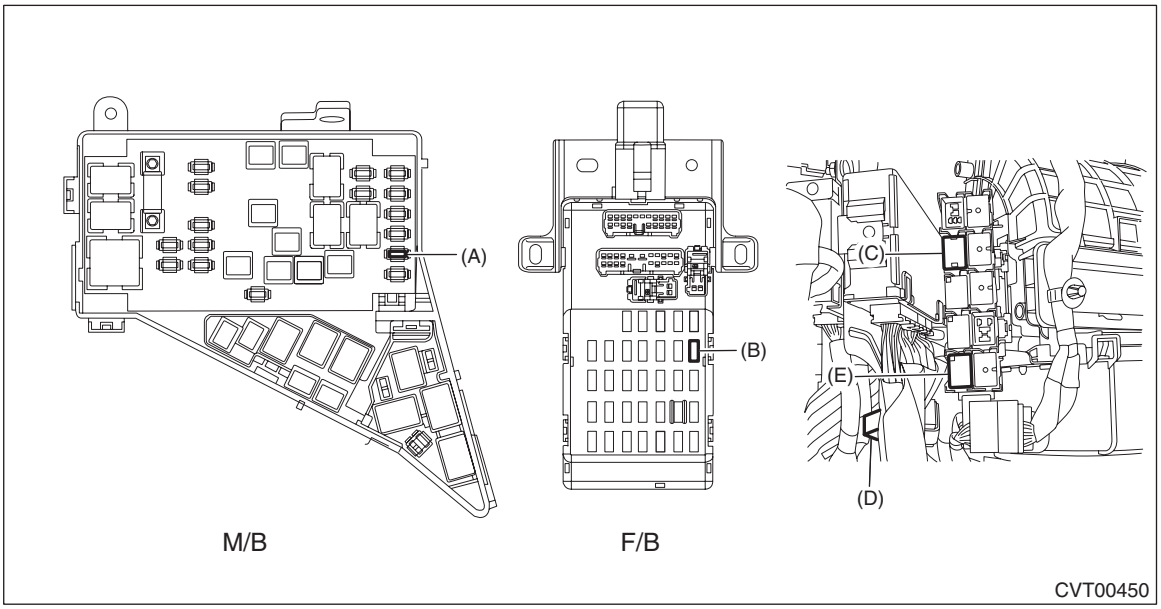
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

3) Install the harness connector and harness clip to TCM.
4) Install the fuse holder.
5) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
6) Perform the operation of AT learning mode. <Ref. to CVT(HEV)(diag)-27, Learning Control.>

26.Relay and Fuse

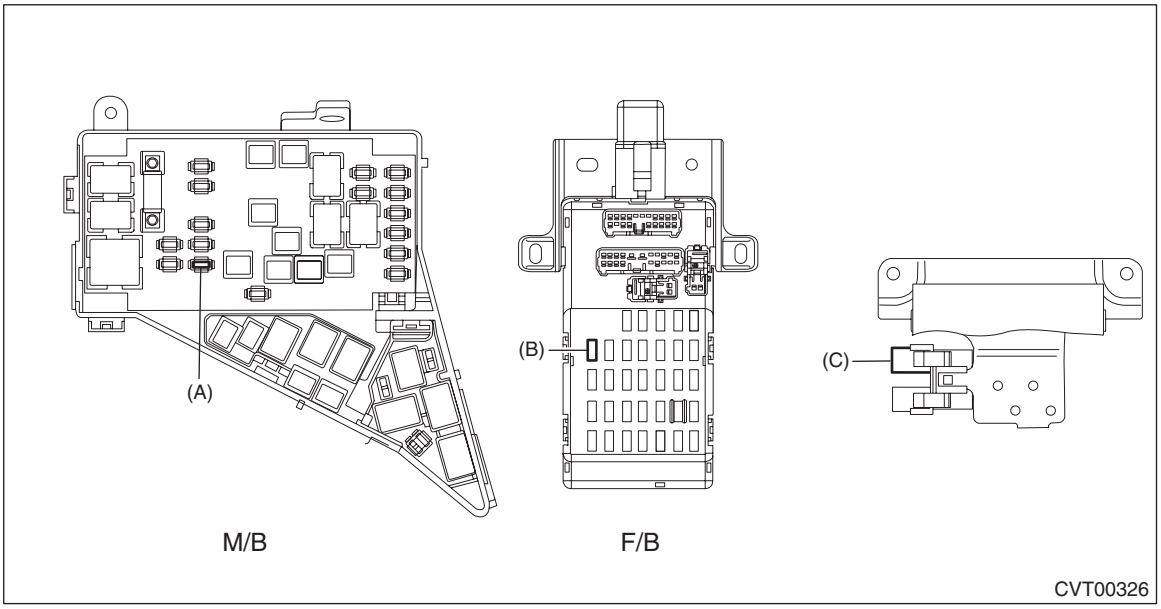
A: LOCATION

1. TRANSMISSION CONTROL MODULE (TCM)



Main fuse box	Fuse 20 A	(A)
Relay & fuse box	Fuse 15 A	(B)
Relay holder	Self shut relay	(C)
Relay holder	Linear solenoid relay	(D)
Relay holder	R range relay	(E)

2. DRIVE MOTOR CONTROL MODULE



Main fuse box	Fuse 25 A	(A)
Relay & fuse box	Fuse 7.5 A	(B)
Drive motor control module	Drive motor control module relay	(C)

B: INSPECTION

1. CHECK FUSE

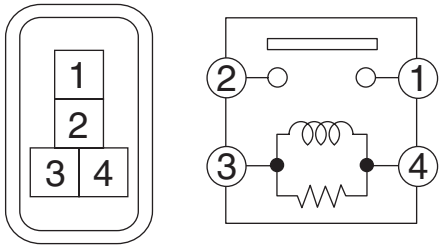
Remove the fuse and inspect visually. If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system.

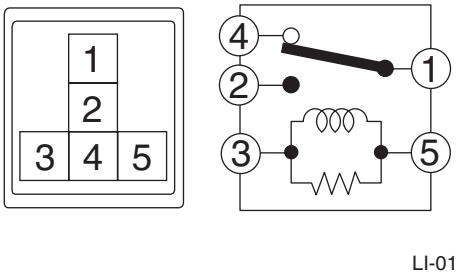
2. CHECK RELAY

Check the resistance between relay terminals. If it is not within the standard, replace the relay.

- Drive motor control module relay and self shut relay

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01273
1 — 2	Apply battery voltage between terminals 4 and 3.	Less than 1 Ω	

- Linear solenoid relay and R range relay

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01274
1 — 4	Always	Less than 1 Ω	
1 — 2	Apply battery voltage between terminals 3 and 5.	Less than 1 Ω	

27.CVTF Cooler (With Warmer Function)

A: REMOVAL

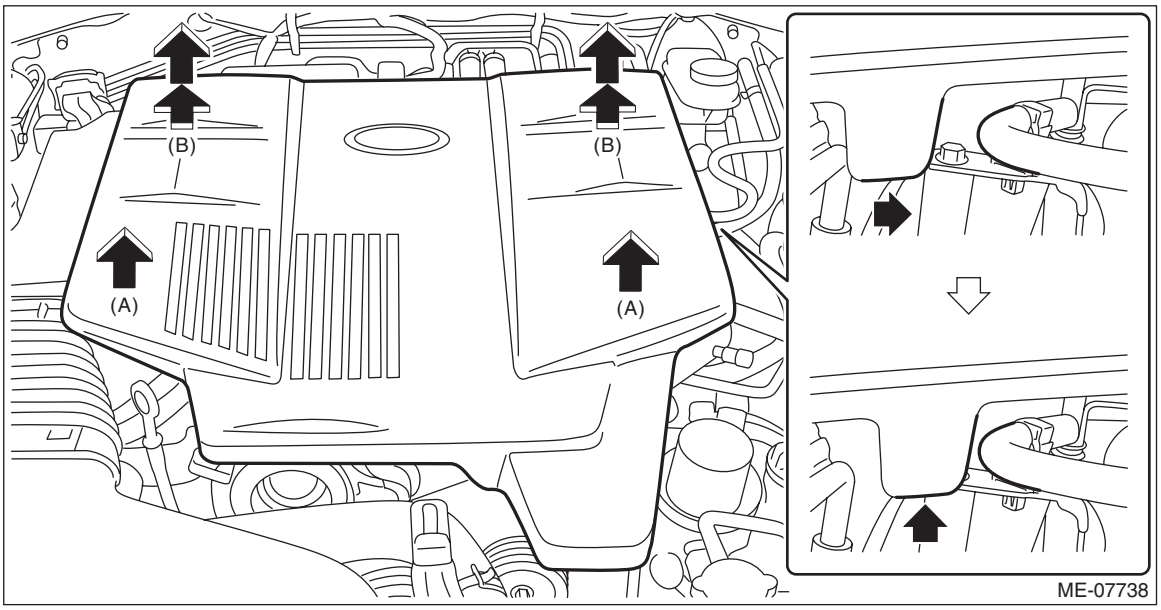
CAUTION:
If the CVTF and engine coolant is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

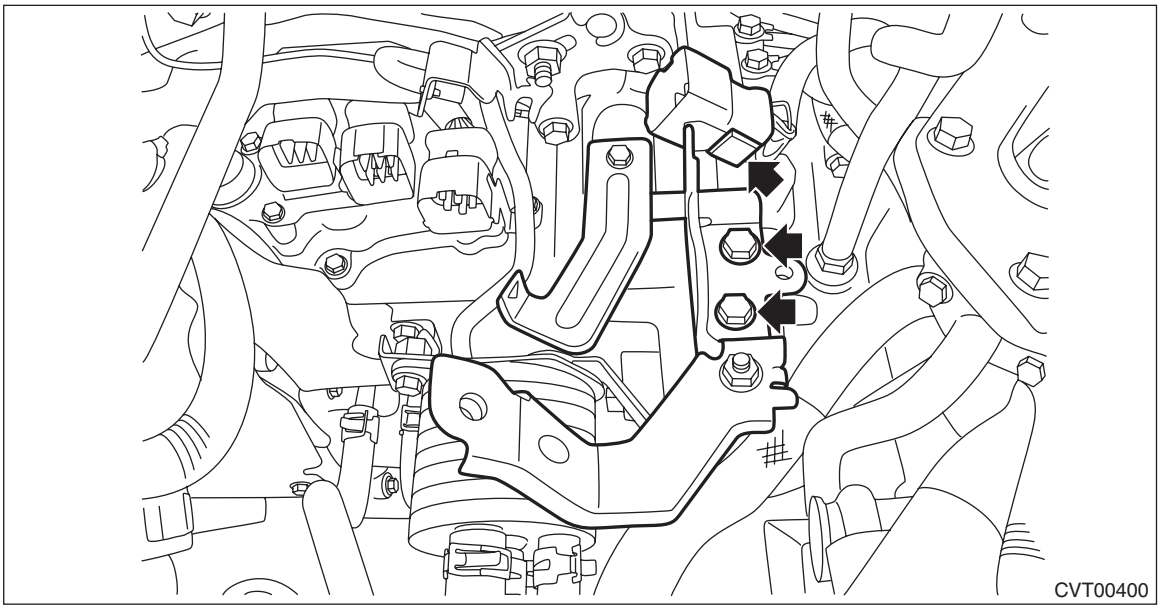
2) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
3) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

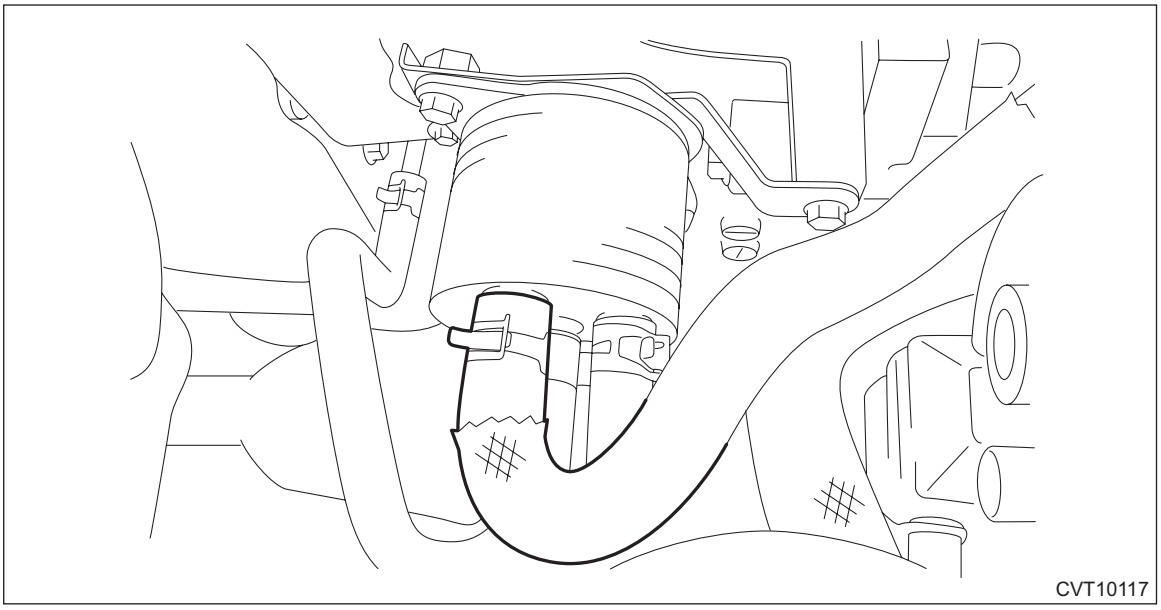


4) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
5) Disconnect the drive motor harness connector, and detach the harness clip.

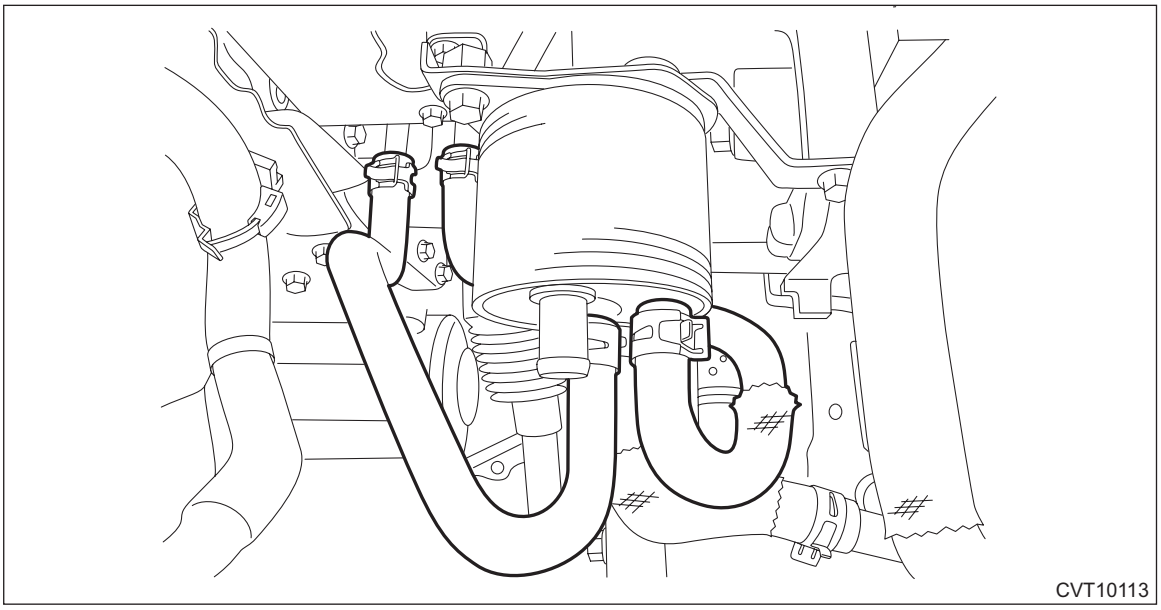
6) Remove the engine harness connector, and remove the engine hanger rear.



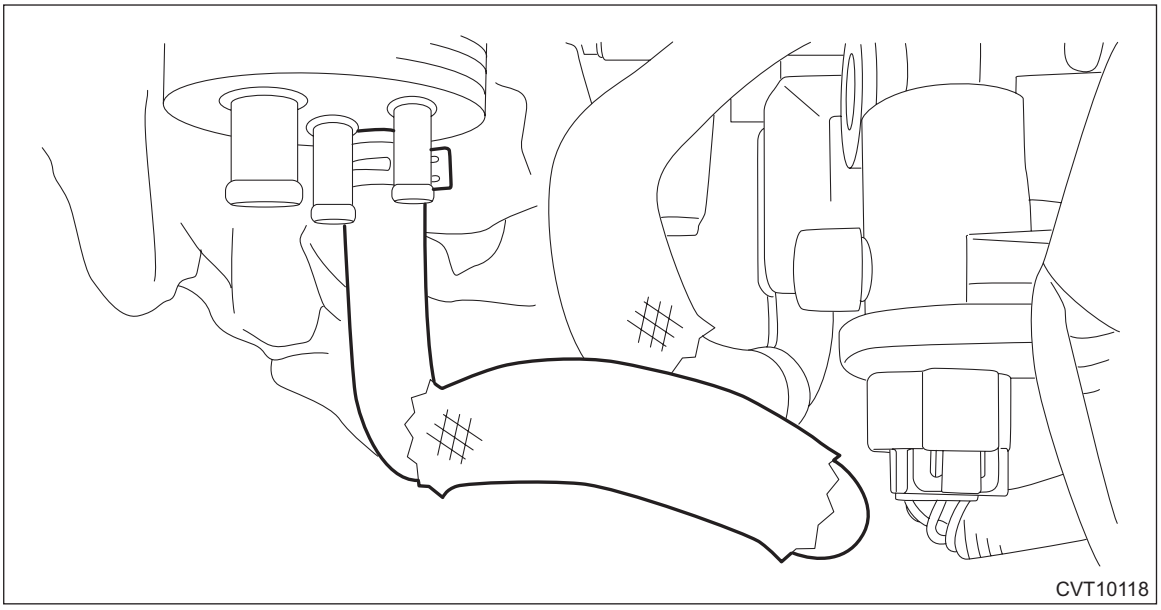
7) Remove the engine coolant outlet hose.



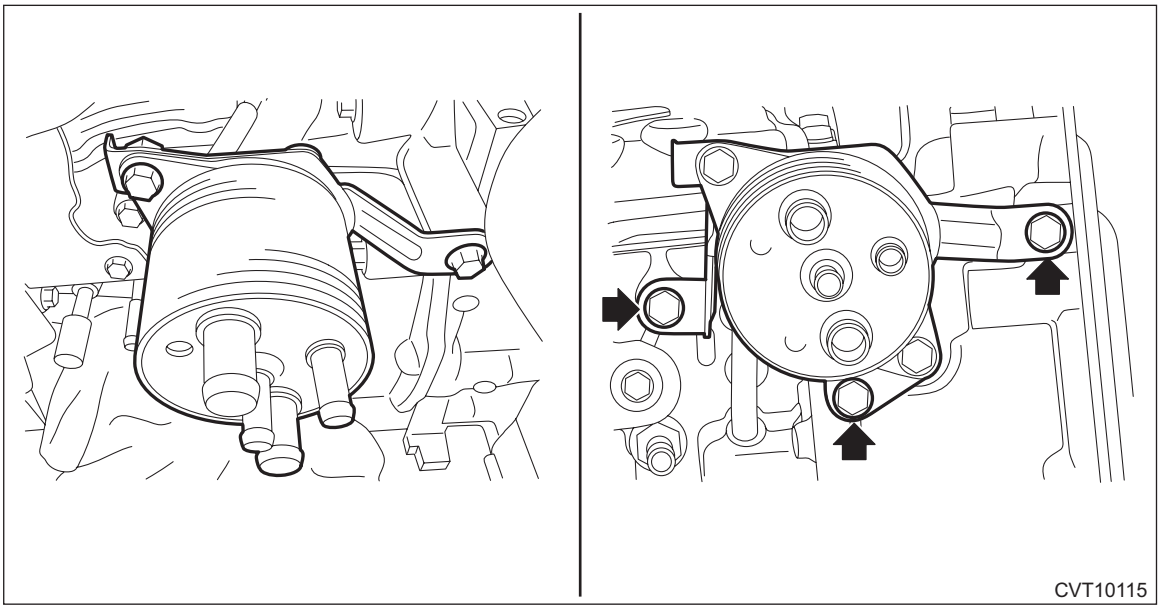
8) Remove the CVTF inlet hose and outlet hose.



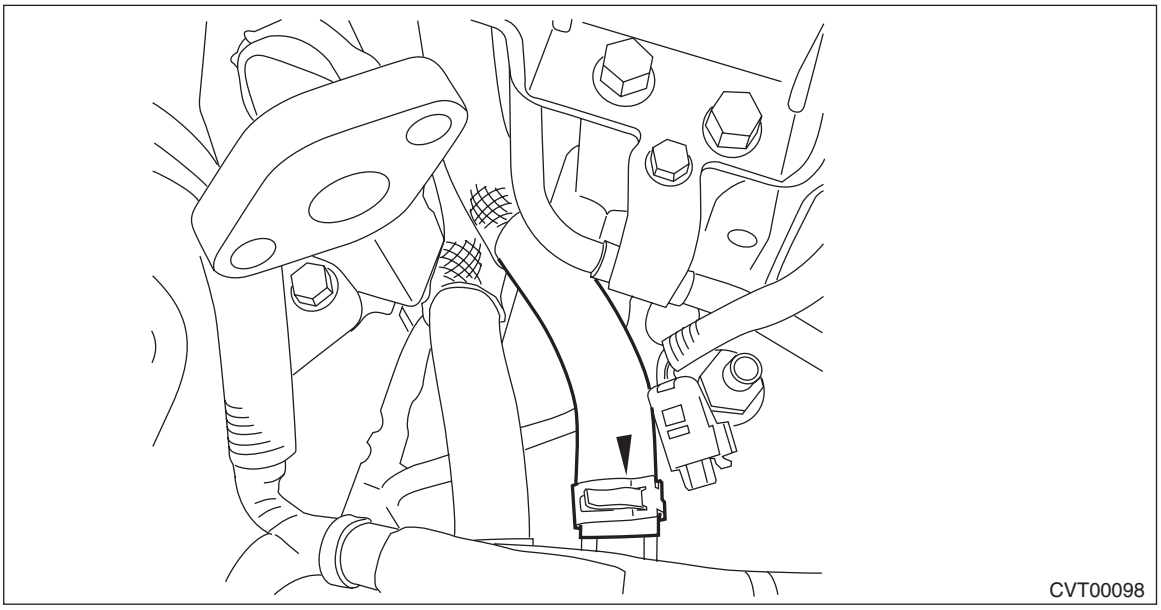
9) Remove the engine coolant inlet hose.



10) Remove the CVTF cooler (with warmer feature) from the transmission.



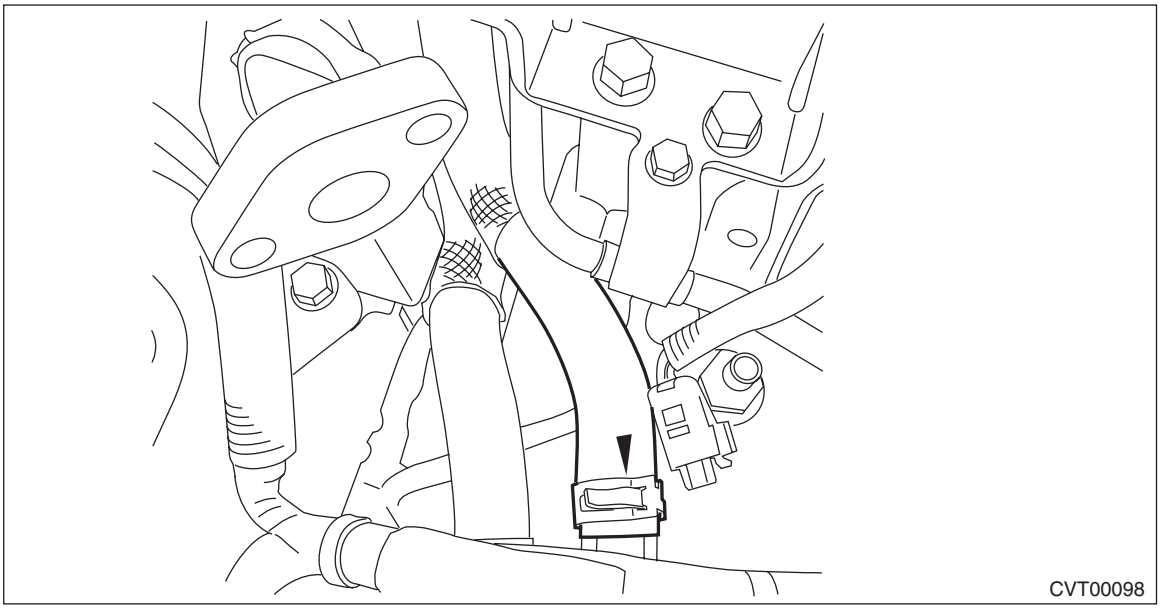
11) Remove the intake manifold. <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
12) Remove the engine coolant outlet hose.



B: INSTALLATION

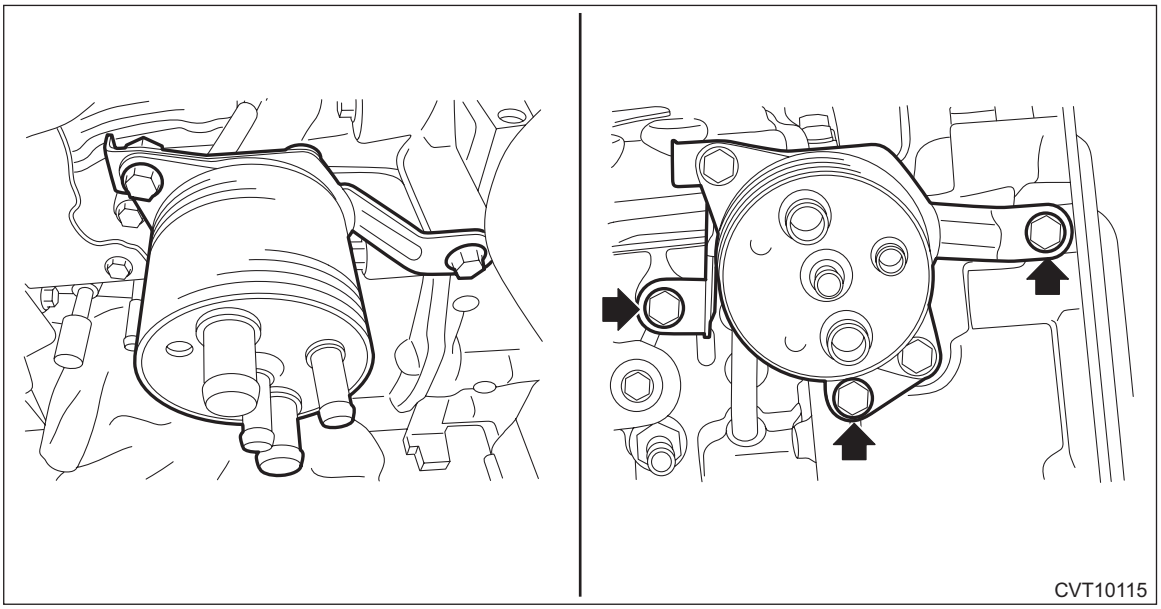
1) Connect the engine coolant outlet hose.

NOTE:
When installing the engine coolant outlet hose, the triangle marking should face upward.



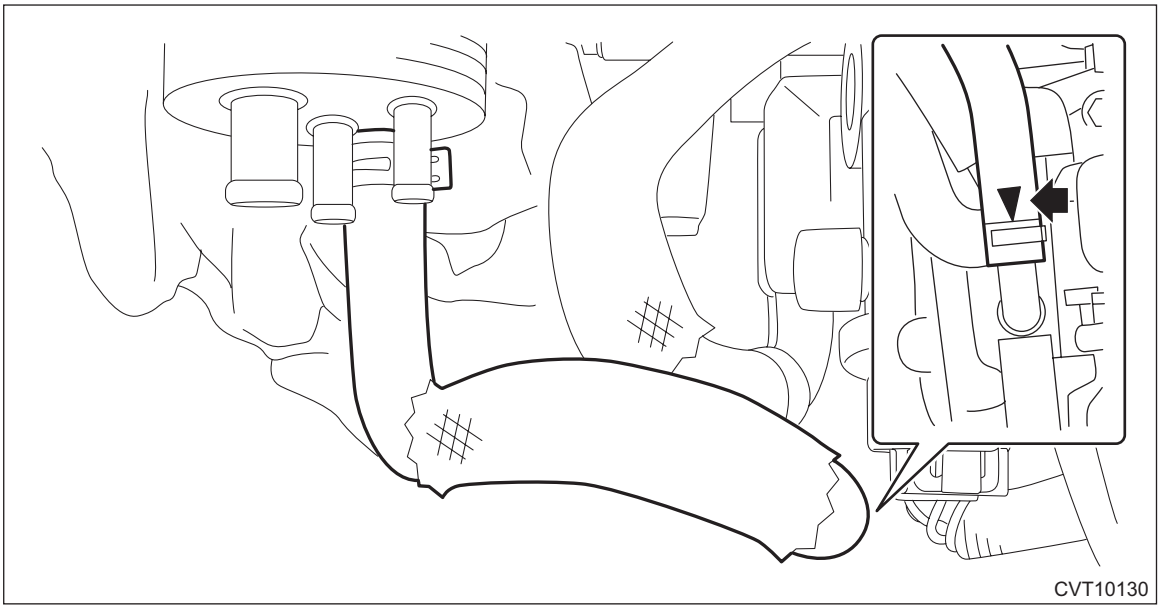
2) Install the intake manifold. <Ref. to FU(H4DO(w/o HEV))-30, INSTALLATION, Intake Manifold.>
3) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



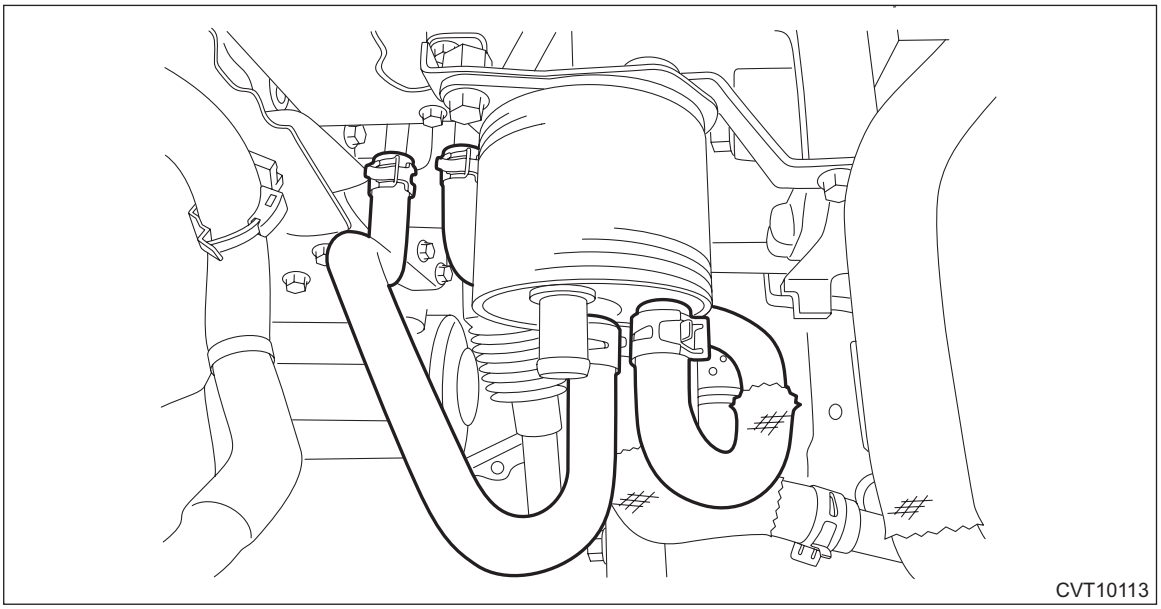
4) Install the engine coolant inlet hose.

NOTE:
With the triangle mark on the engine coolant inlet hose facing the vehicle outside, install the hose to the EGR cooler.

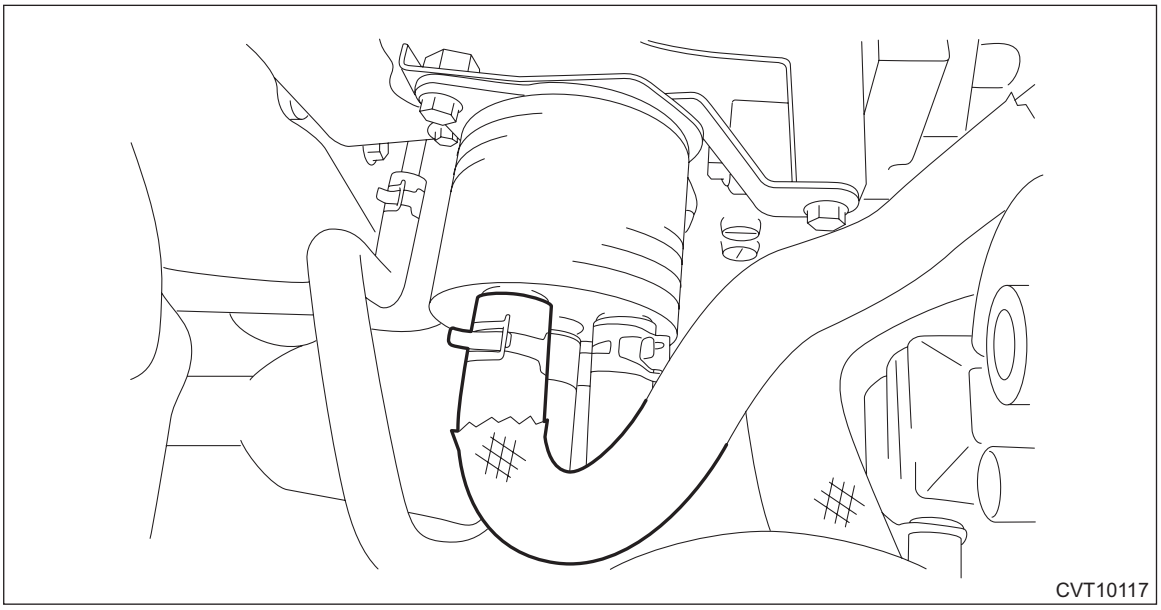


5) Install the CVTF inlet hose and CVTF outlet hose to transmission.

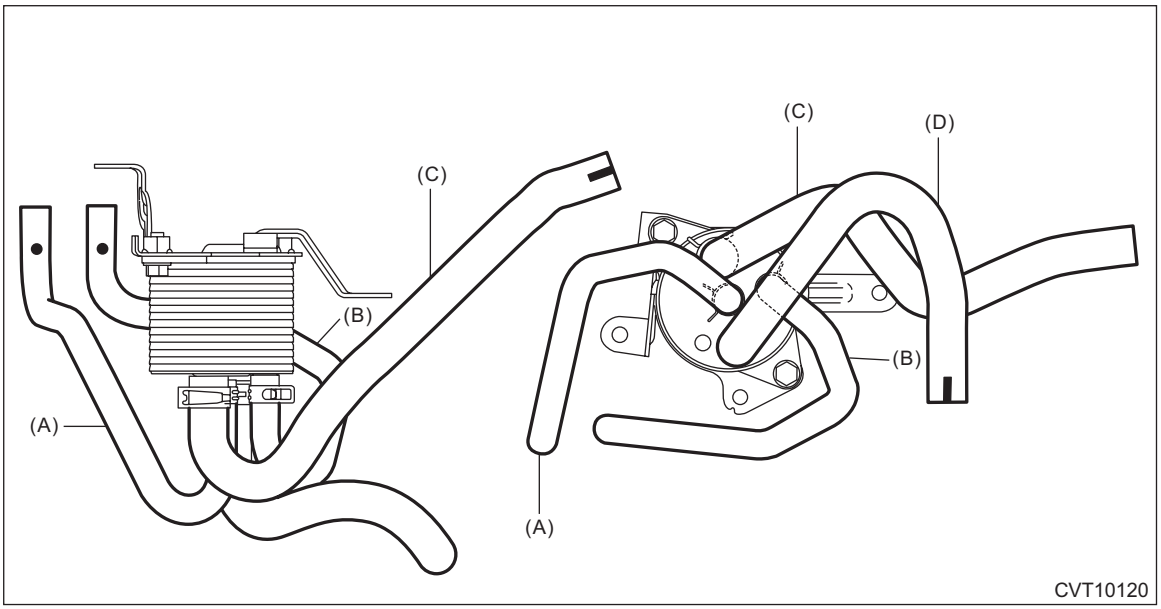
NOTE:
Use the new CVTF inlet hose and CVTF outlet hose.



6) Connect the engine coolant outlet hose.



7) Check installation condition of each hose.
- Make sure the hoses do not interfere with each other or with other components.
- Check each hose for bent, excess curve, and twisting conditions.



(A) CVTF cooler inlet hose
(B) CVTF cooler outlet hose
(C) Engine coolant outlet hose
(D) Engine coolant inlet hose

8) Install the engine hanger rear and the vacuum pipe.

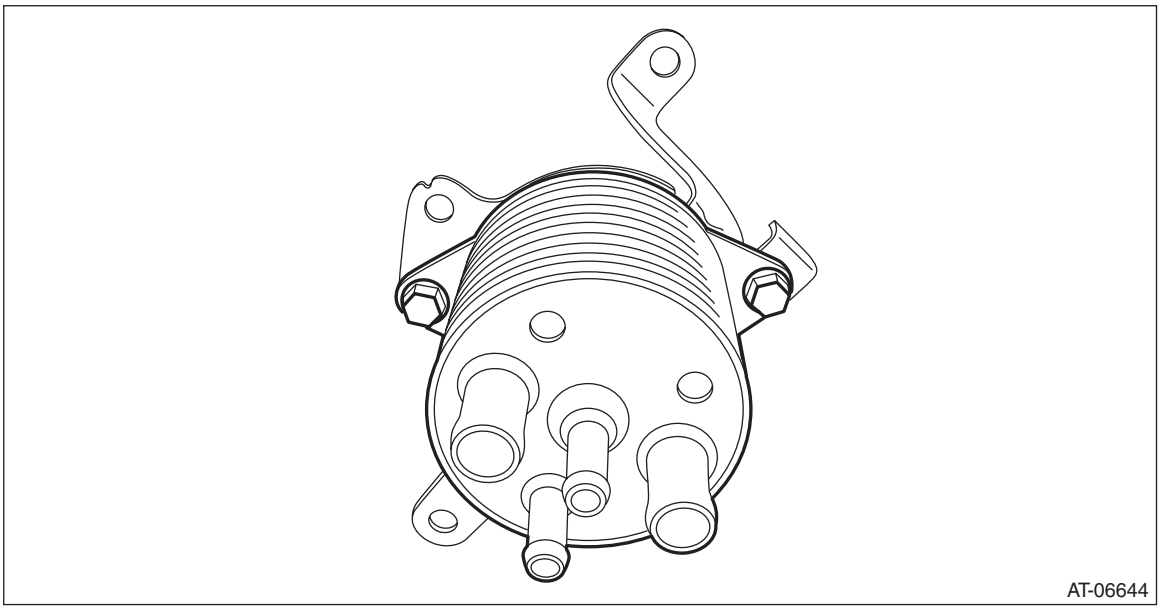
Tightening torque:
Engine hanger rear
21 N·m (2.1 kgf-m, 15.5 ft-lb)
Vacuum pipe
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

9) Install the engine harness connector to the bracket, and then connect the engine harness.
10) Install the drive motor harness connector, and then install the harness clip.

11) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
12) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
13) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
14) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

C: DISASSEMBLY

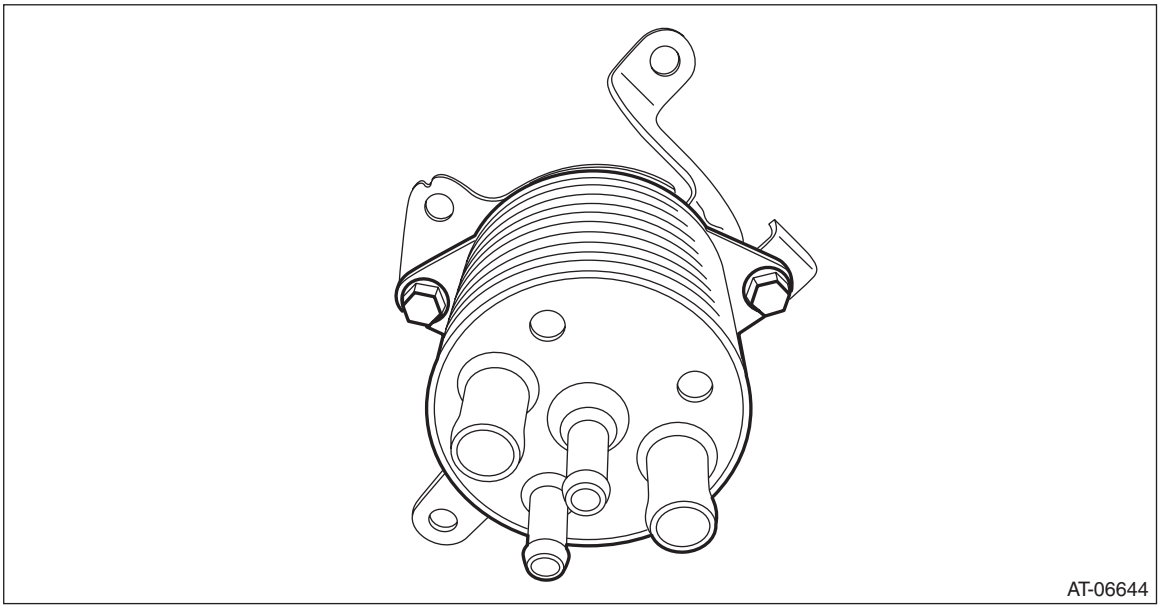
1) Remove the bracket from the CVTF cooler (with warmer feature).



D: ASSEMBLY

1) Attach the bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



E: INSPECTION

If any malfunction is found in hoses and clamps resulting from the following inspection, replace them.
1) Check that there are no CVTF or engine coolant leaks from the connections.
2) Check the clamp for deformation.
3) Lightly bend the CVTF cooler hose and check for cracks in the surface or other damages.
4) Pinch the CVTF cooler hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
5) Check for peeling, cracks, and deformation at the tip of the hose.
6) Check the CVTF cooler (with warmer feature) for any damage.

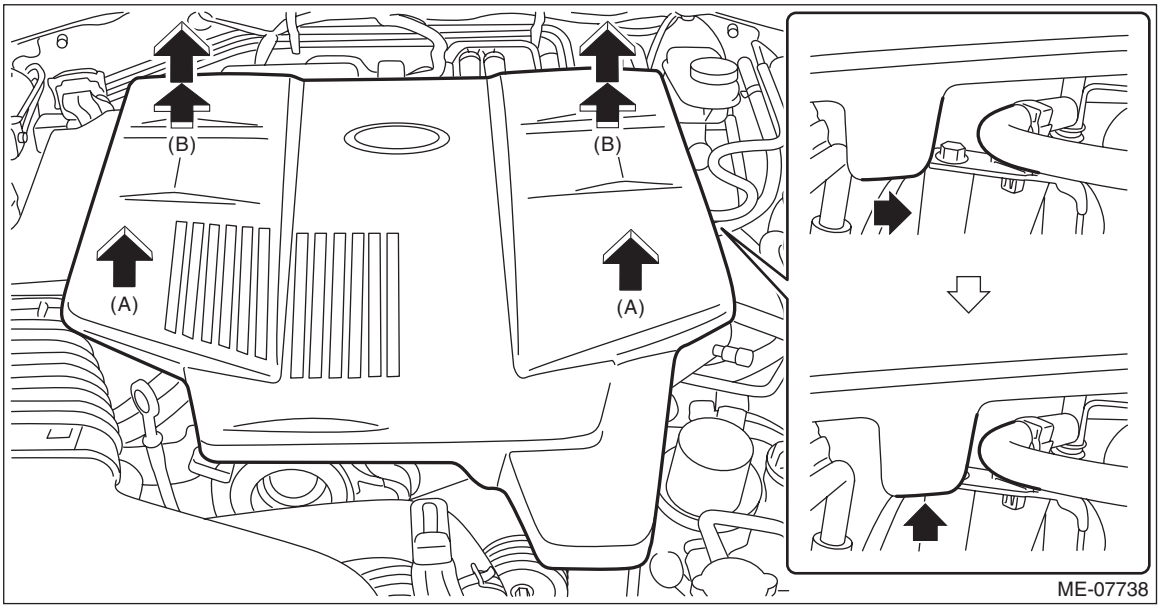
28.Air Breather Hose

A: REMOVAL

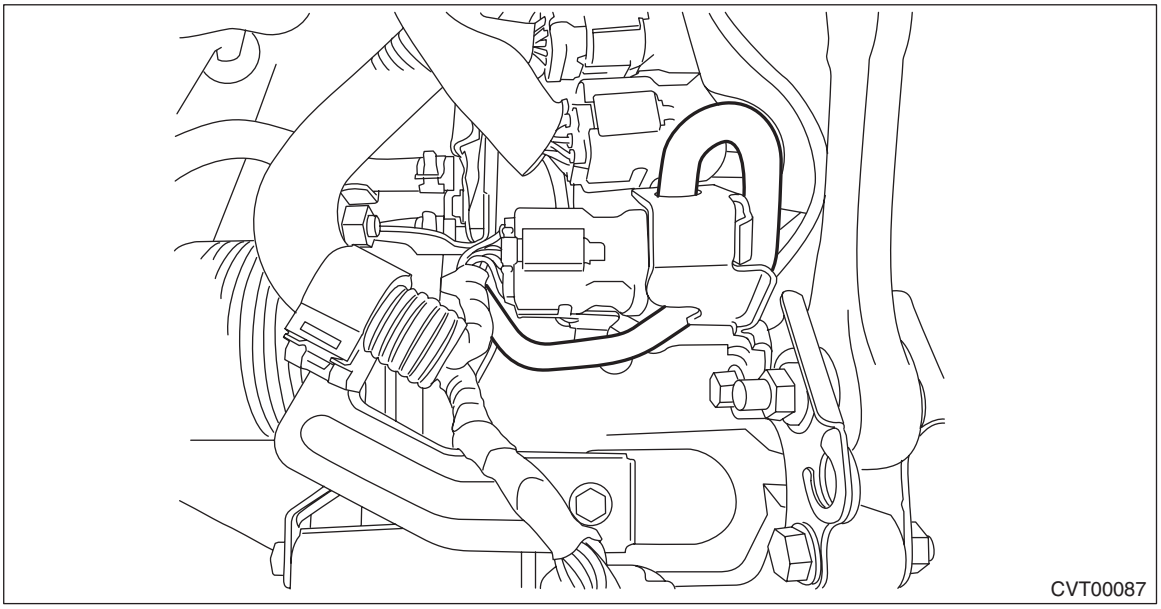
1. FRONT DIFFERENTIAL SIDE

1) Turn the ignition switch to OFF.
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

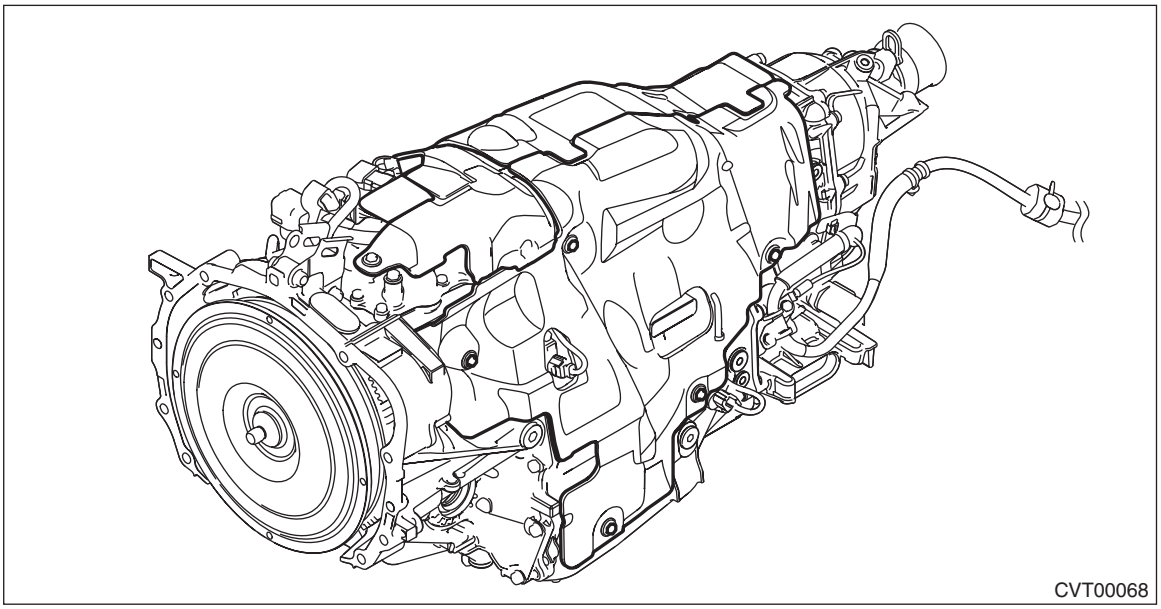


3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Remove the air breather hose.

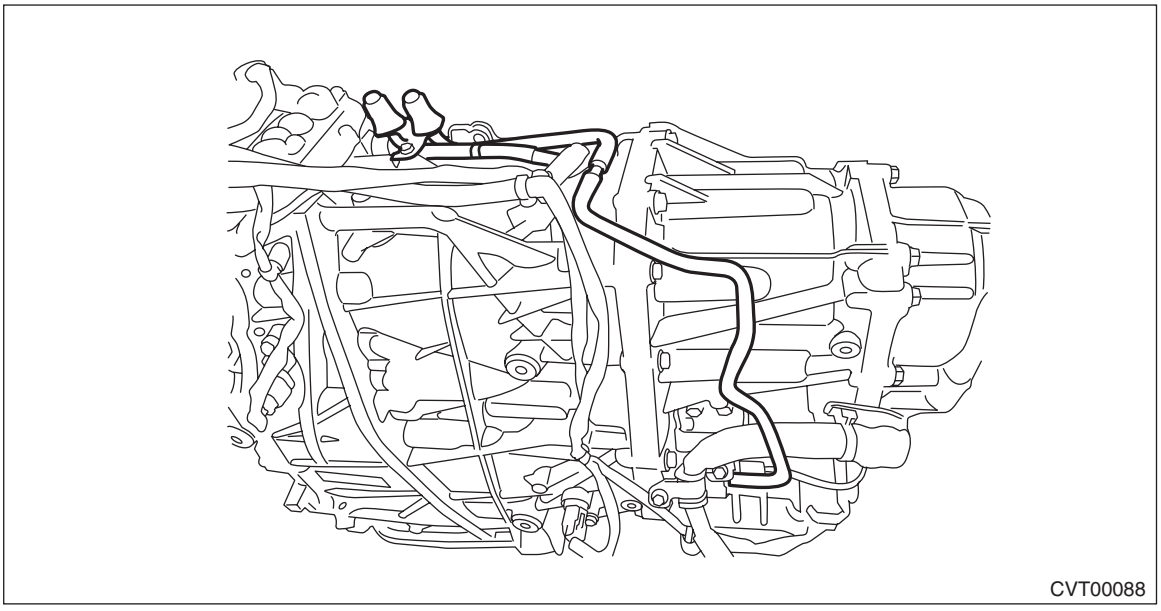


2. TRANSMISSION CASE SIDE

1) Remove the transmission assembly. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the transmission case cover.


CVT00068

3) Remove the two air breather hoses.


CVT00088

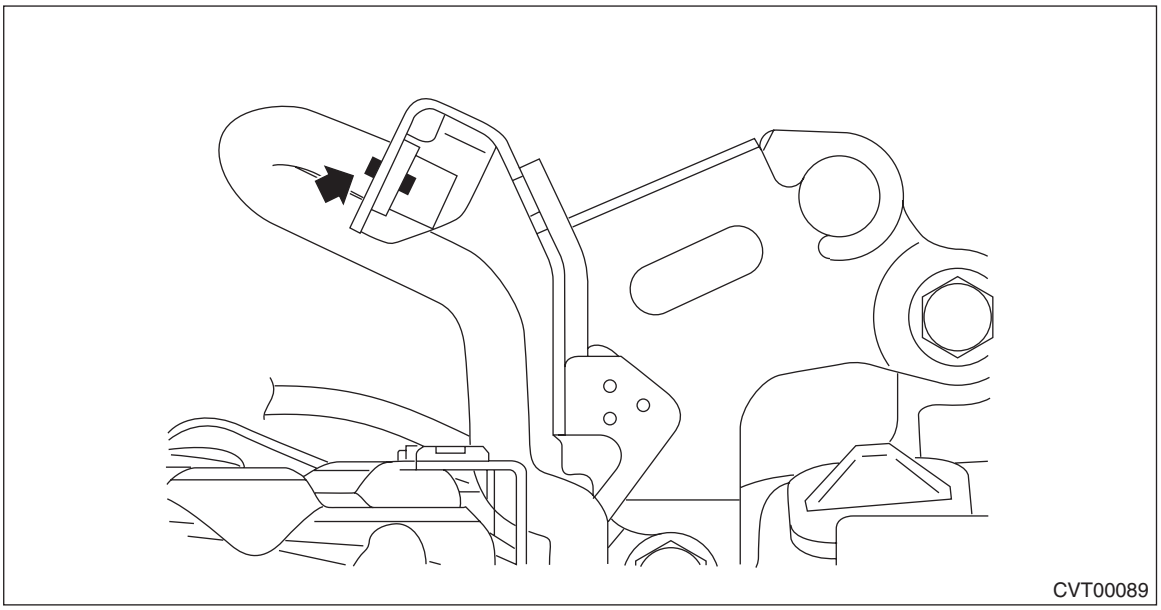
4) Remove the air breather cap, air breather hose and bracket.

B: INSTALLATION

1. FRONT DIFFERENTIAL SIDE

Install in the reverse order of removal.

NOTE:
Place the bracket between the markings of the hose during installation.

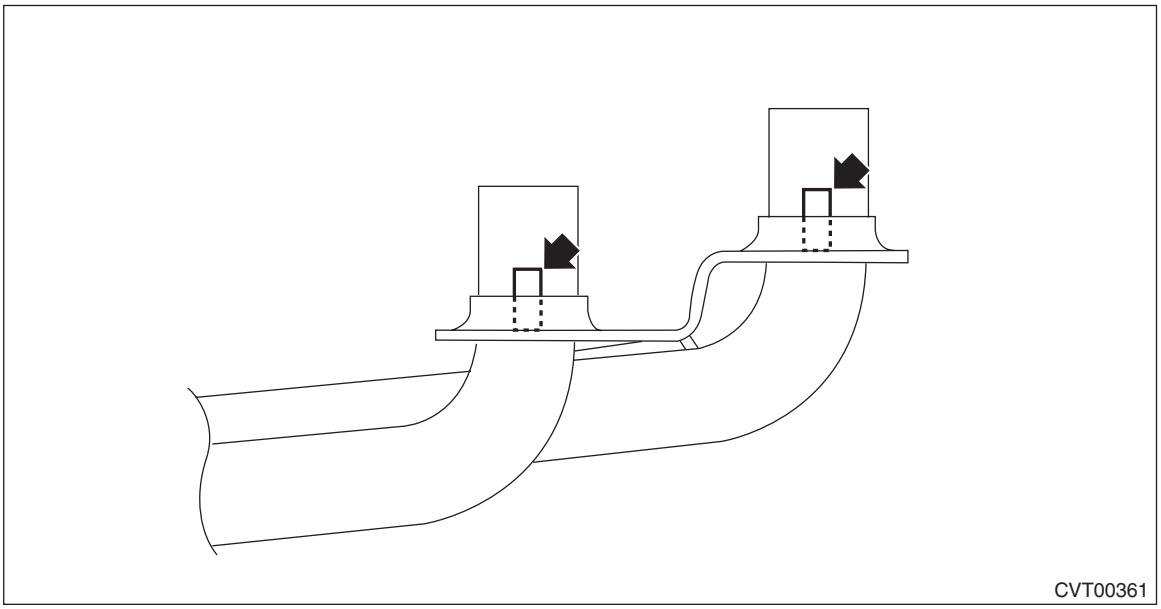


2. TRANSMISSION CASE SIDE

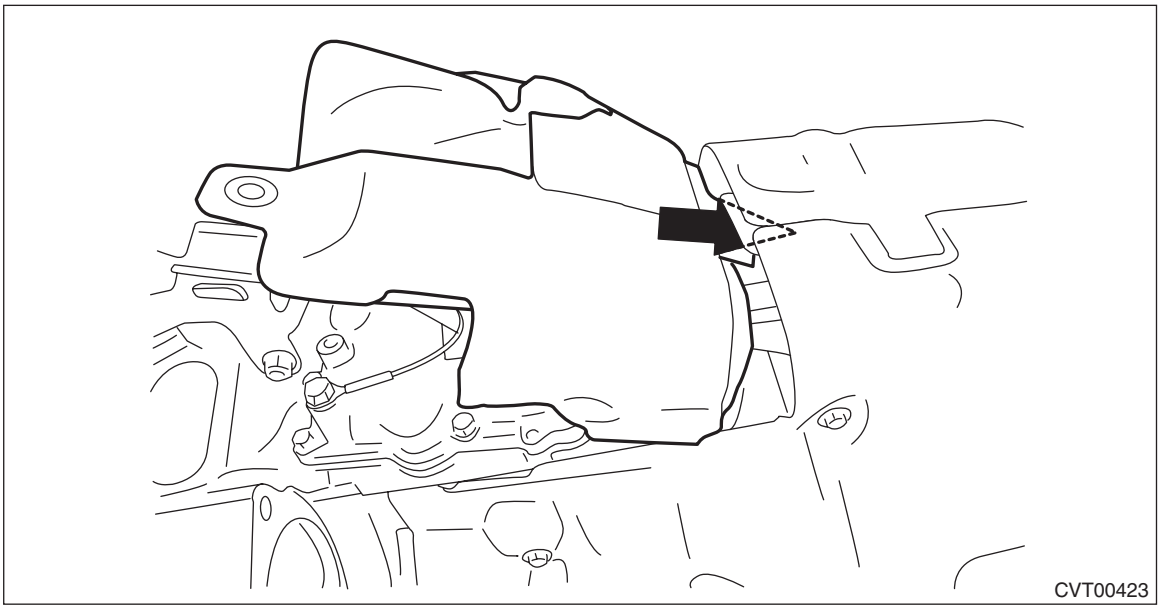
Install in the reverse order of removal.

Tightening torque:
Transmission case cover
8 N·m (0.8 kgf-m, 5.9 ft-lb)
Air breather
5 N·m (0.5 kgf-m, 3.7 ft-lb)

NOTE:
- Place the bracket between the markings of the hose during installation.



• After the transmission case cover (large) is installed, insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.



• Pass the air breather hose through the upper side of the transmission harness and inside of the electric oil pump harness.

C: INSPECTION

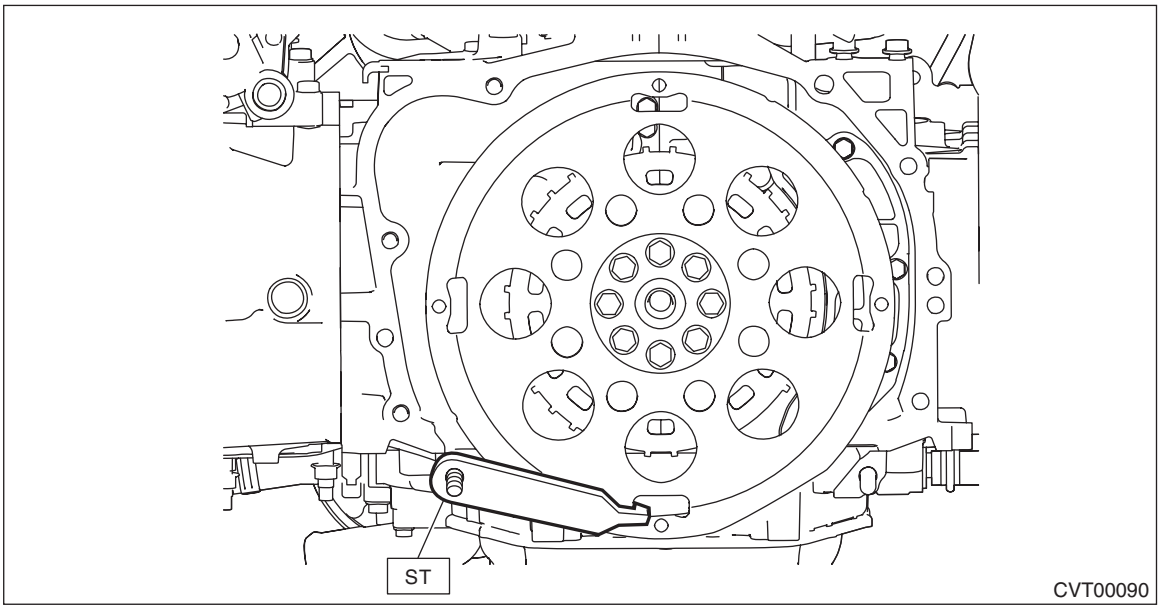
Check the hose for peeling, crack or clogging.

29.Drive Plate

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Set the ST.

NOTE:
Set the ST to the drive plate referring to the illustration.
ST 498497300 CRANKSHAFT STOPPER



3) Remove the drive plate and reinforcement drive plate.

B: INSTALLATION

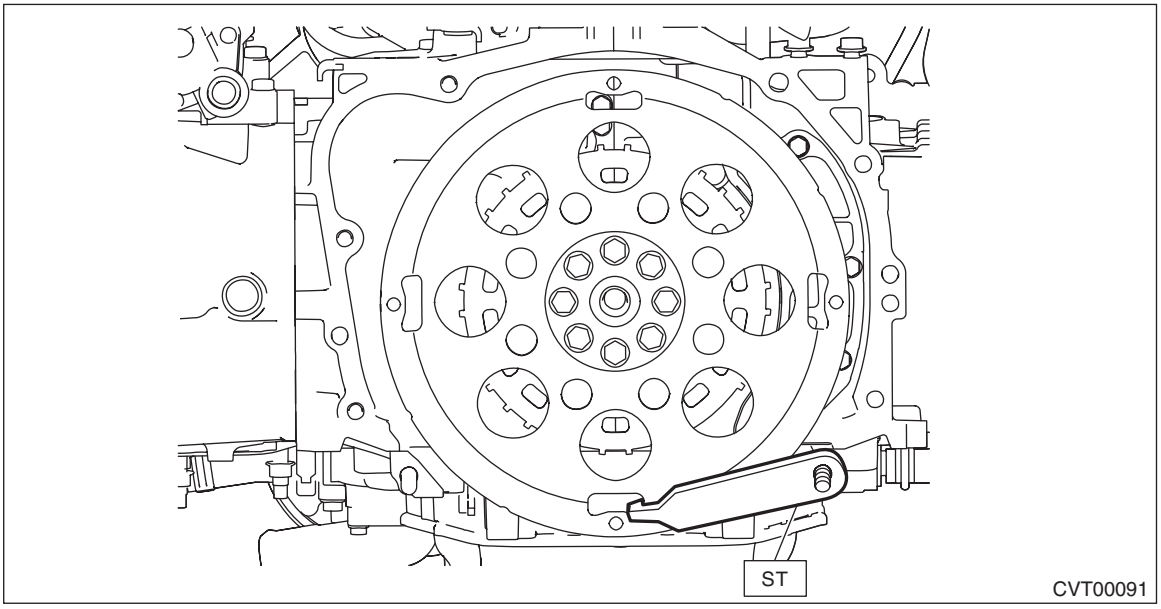
1) Temporarily install the drive plate and reinforcement drive plate.

NOTE:
Align the knock pin hole of the crankshaft position sensor plate to the knock pin of the crankshaft to secure the knock pin.

2) Set the ST.

NOTE:
Set the ST to the drive plate referring to the illustration.

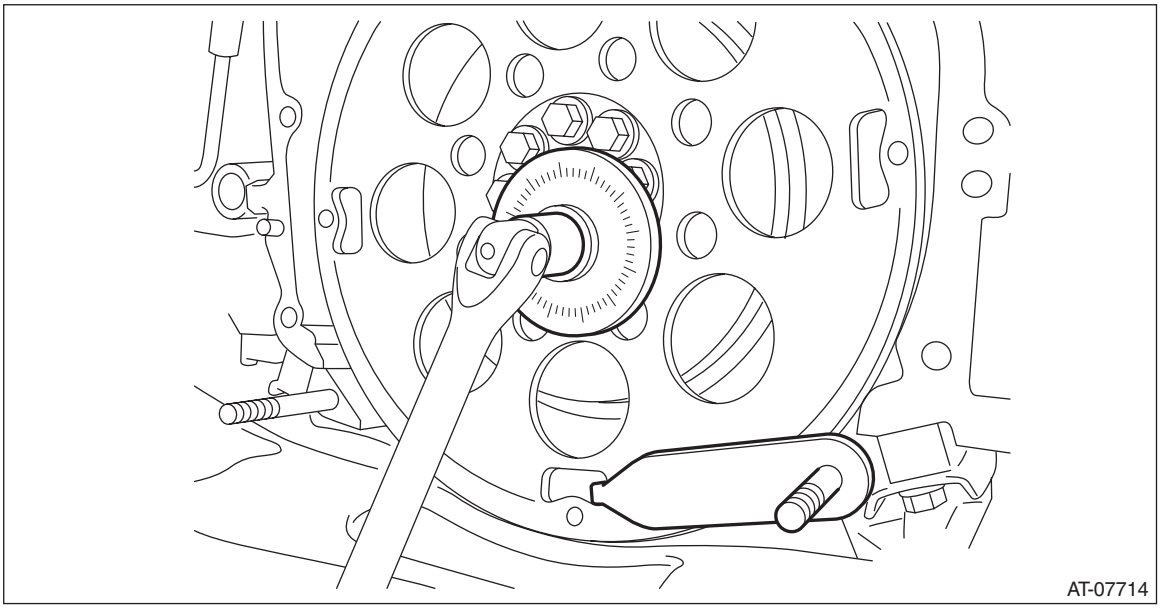
ST 498497300 CRANKSHAFT STOPPER



3) Tighten the drive plate mounting bolt in two stages.
(1) Tighten the drive plate mounting bolt.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)
(2) While checking the tightening angle with the angle gauge, tighten the drive plate mounting bolts to the specified angle.

Tightening angle:
30° — 35°



4) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

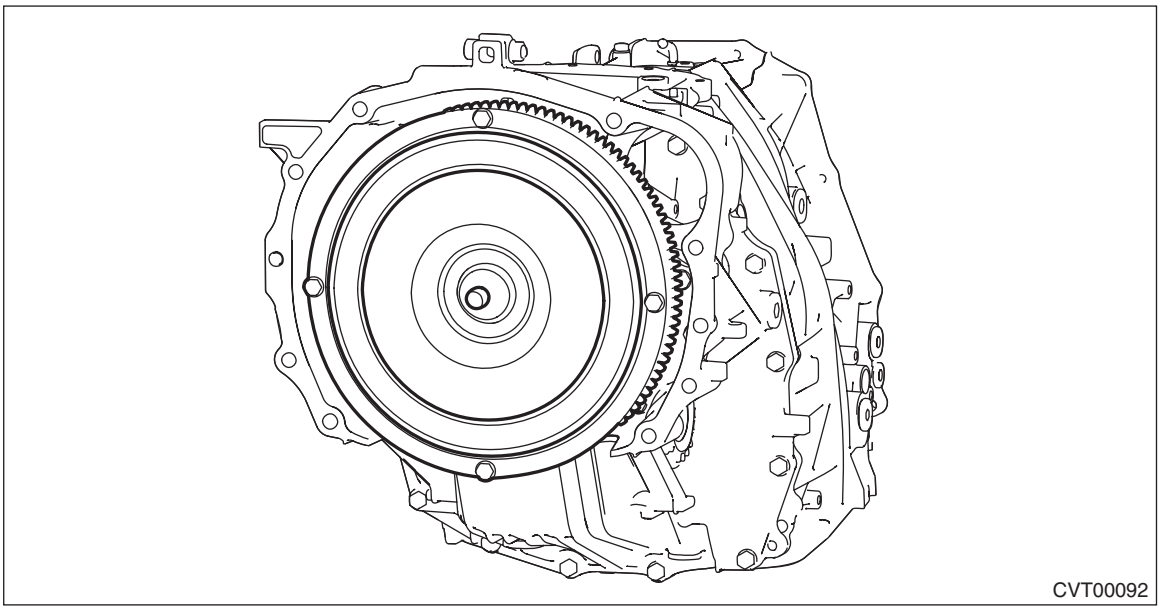
Check the drive cable for damage.

30.Torque Converter Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly horizontally.

CAUTION:
Do not scratch the inside of engaging parts.



3) Remove the O-ring from the input shaft.

B: INSTALLATION

1) Install the O-ring to the input shaft.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

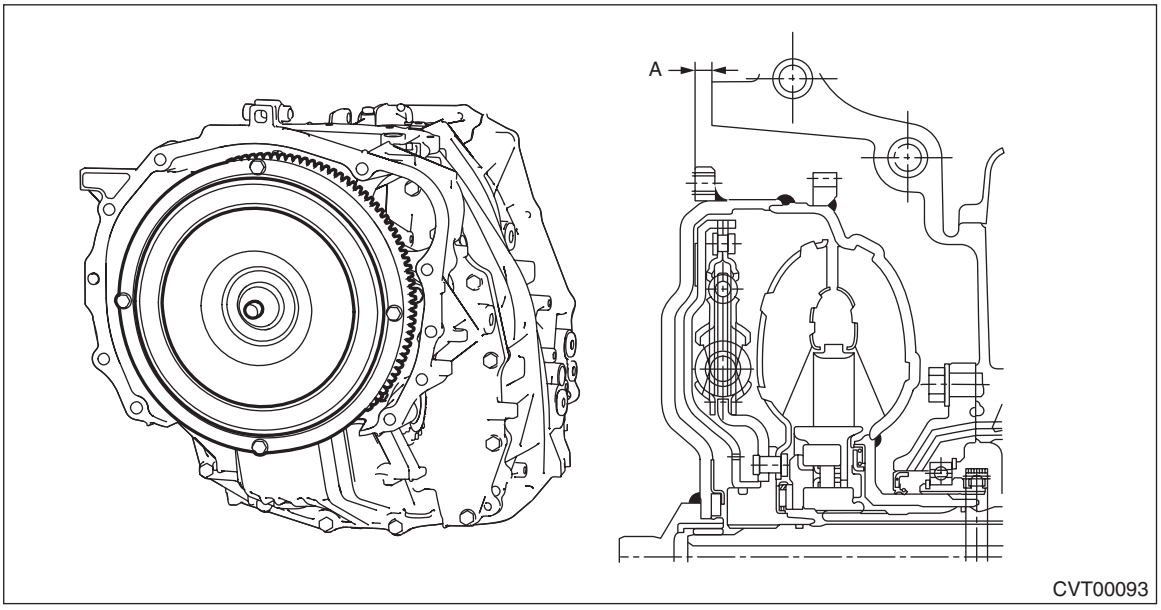
2) While holding the torque converter assembly by hand, carefully install it into the torque converter case.

NOTE:
- Apply CVTF to the oil seal lip.
- Do not damage the oil seal and O-ring.

3) Engage the splines while gently rotating the torque converter assembly by hand, and securely insert the assembly.

4) Measure depth “A”, from converter case end surface to drive plate contacting surface.

Standard (reference):
6.8 mm (0.268 in) or less



5) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

- Check the protrusion of torque converter center (front boss) is not deformed or damaged.
- Check the ring gear and exterior for break or damage.

31.Preparation for Overhaul

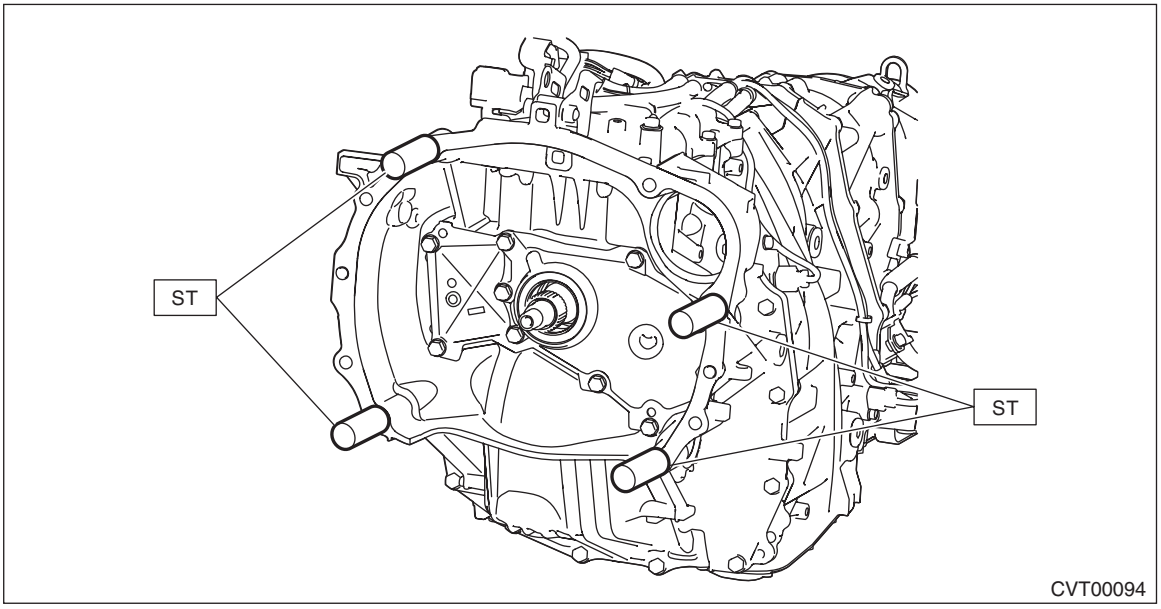
A: GENERAL DESCRIPTION

Before disassembling and assembling the transmission, follow the following procedures to prepare.

B: PROCEDURE

1) Clean the transmission exterior.
2) Remove the torque converter assembly. <Ref. to CVT(TH58A)-178, Torque Converter Assembly.>
3) Attach the ST on the transmission.

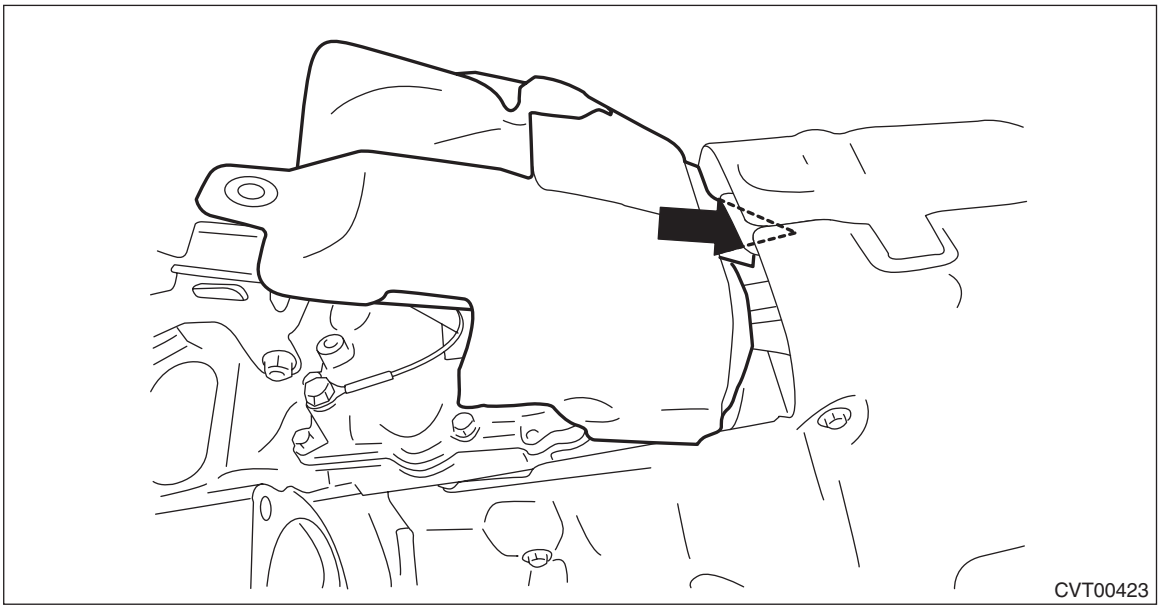
ST 18632AA000 STAND ASSY

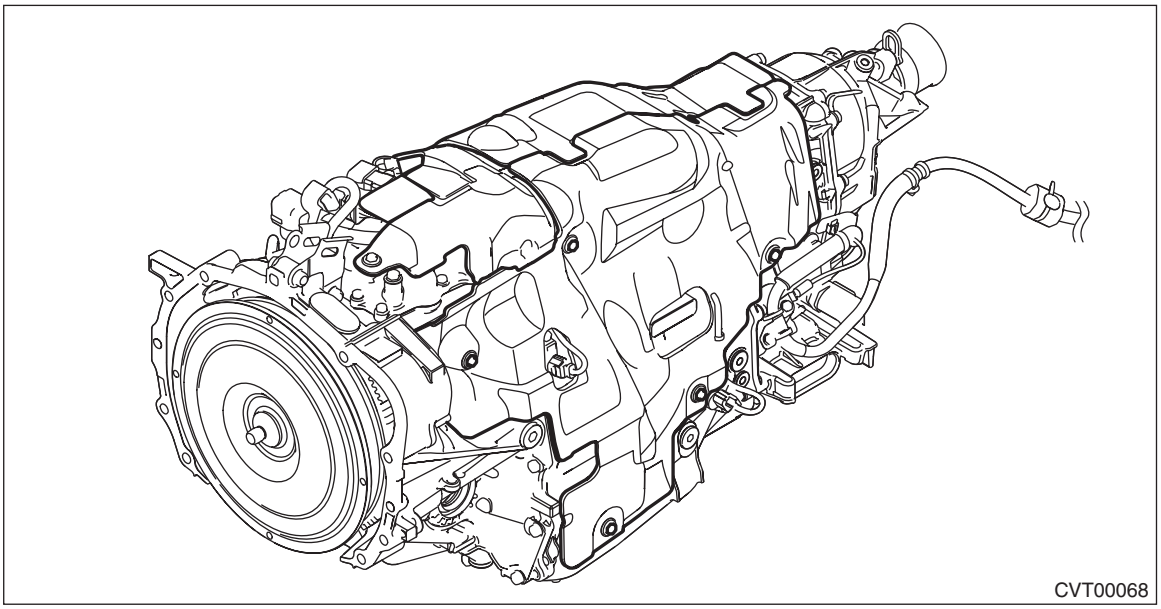


4) Remove the transmission case cover on the transmission upper side.

NOTE:
After the transmission case cover (large) is installed, insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)


CVT00423

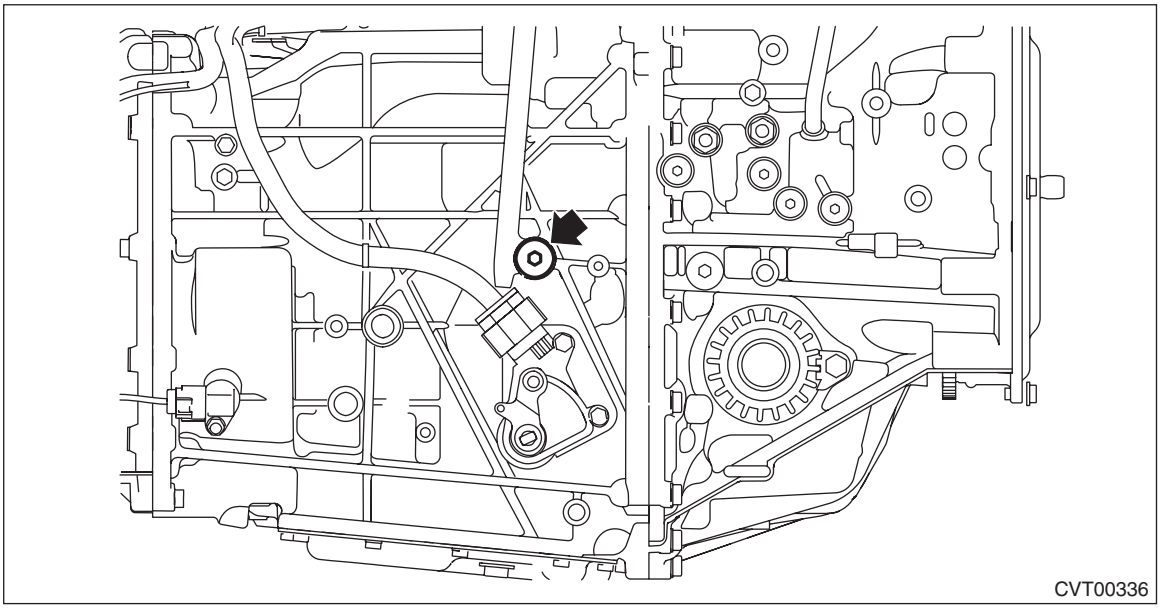

CVT00068

5) Place the transmission assembly on end.
6) When completely overhauling the transmission, refill it with CVTF through the transmission right side plug, and install the plug.

CAUTION:
• Always use specified CVTF. Using other fluid will cause malfunction. <Ref. to CVT(TH58A)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>
• After the transmission is installed to the engine, be sure to adjust the CVTF level.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

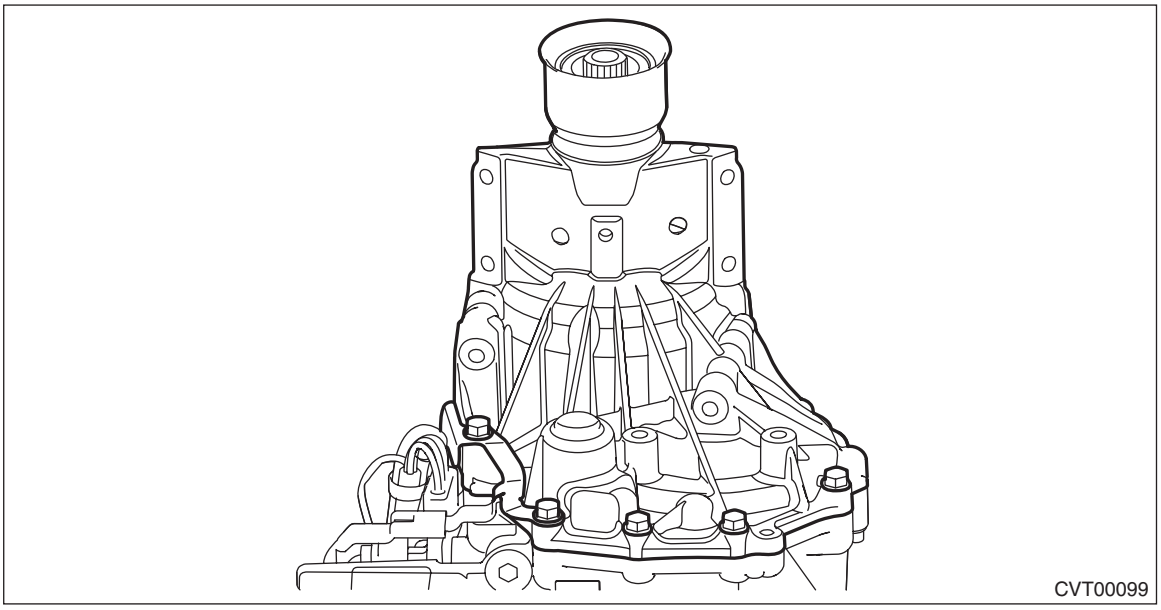


32.Extension Case

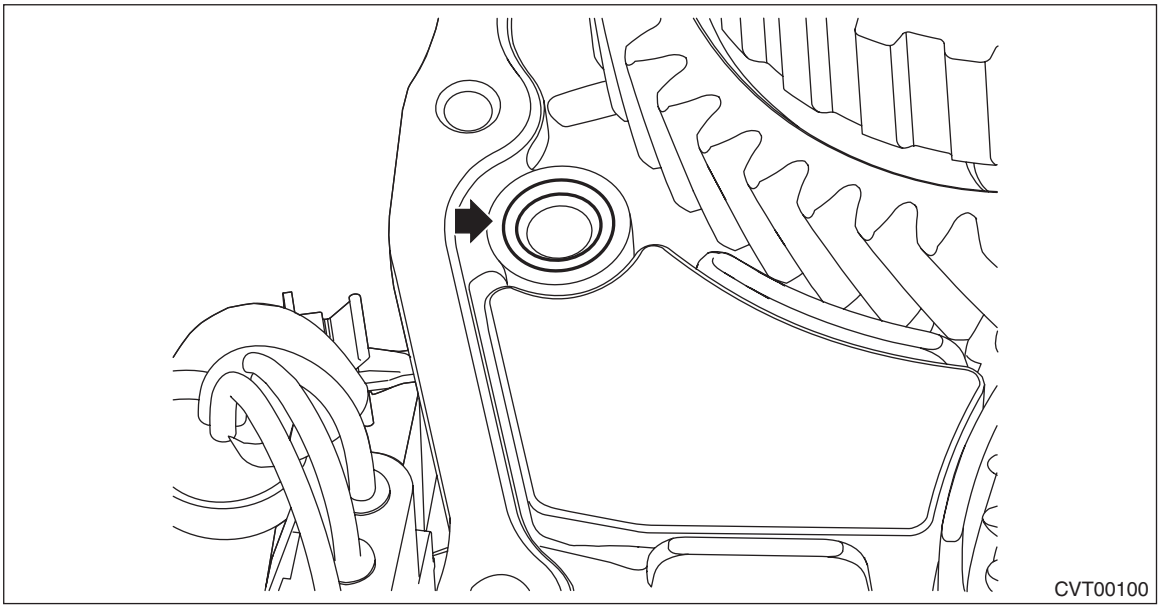
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case and the clip.

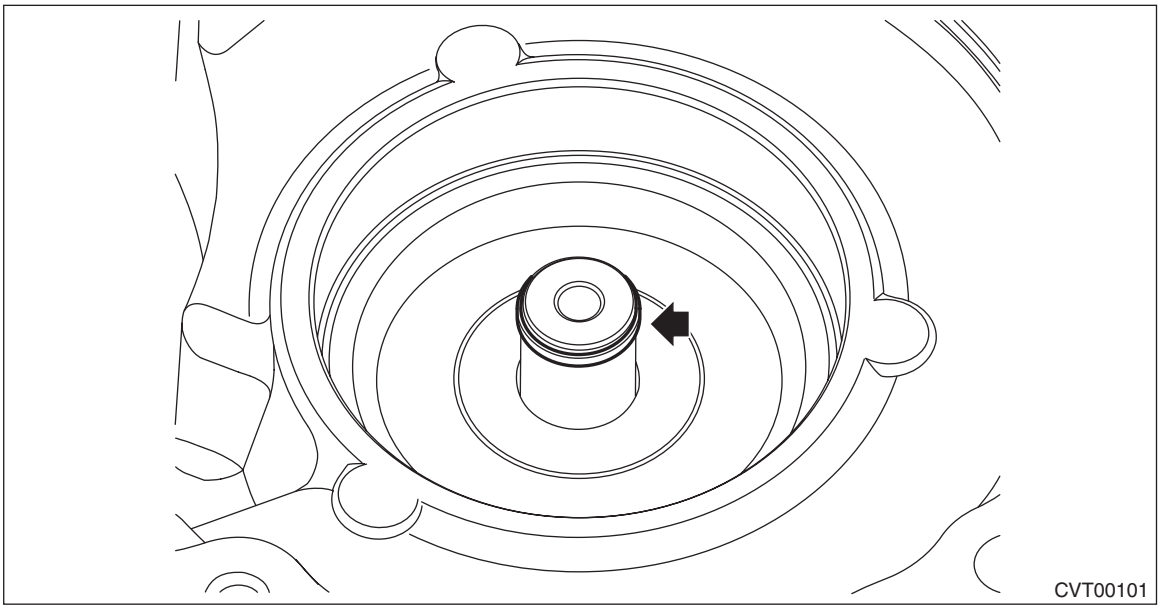
NOTE:
The total number of extension case mounting bolts is 12.



3) Remove the O-ring.



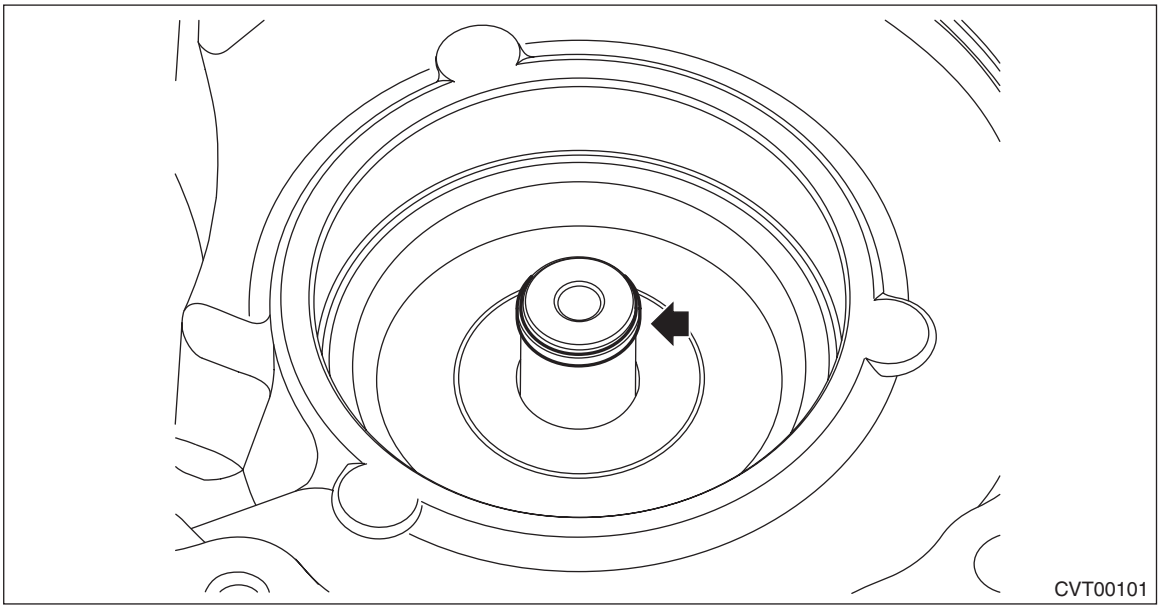
4) Remove the seal ring.



B: INSTALLATION

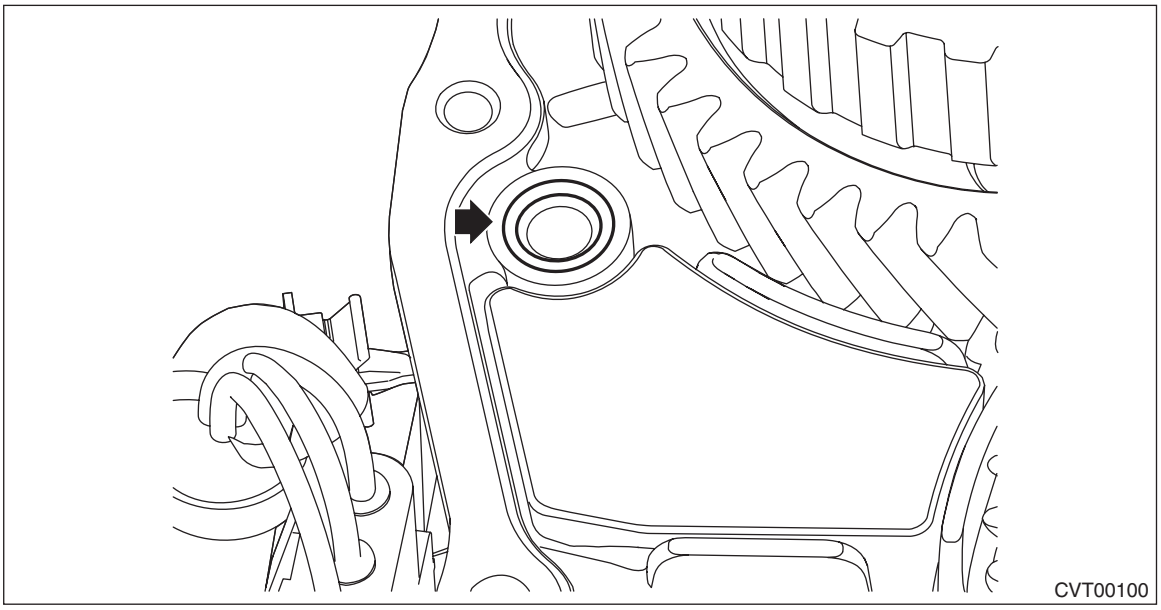
1) Clean the mating surface of extension case and transmission case.
2) Select the transfer drive gear shim. <Ref. to CVT(TH58A)-266, ADJUSTMENT, Reduction Drive Gear.>
3) Select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>
4) Attach the selected transfer drive gear shim to extension case with vaseline.
5) Attach the selected transfer driven gear shim to extension case with vaseline.
6) Install the seal ring to the extension case.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



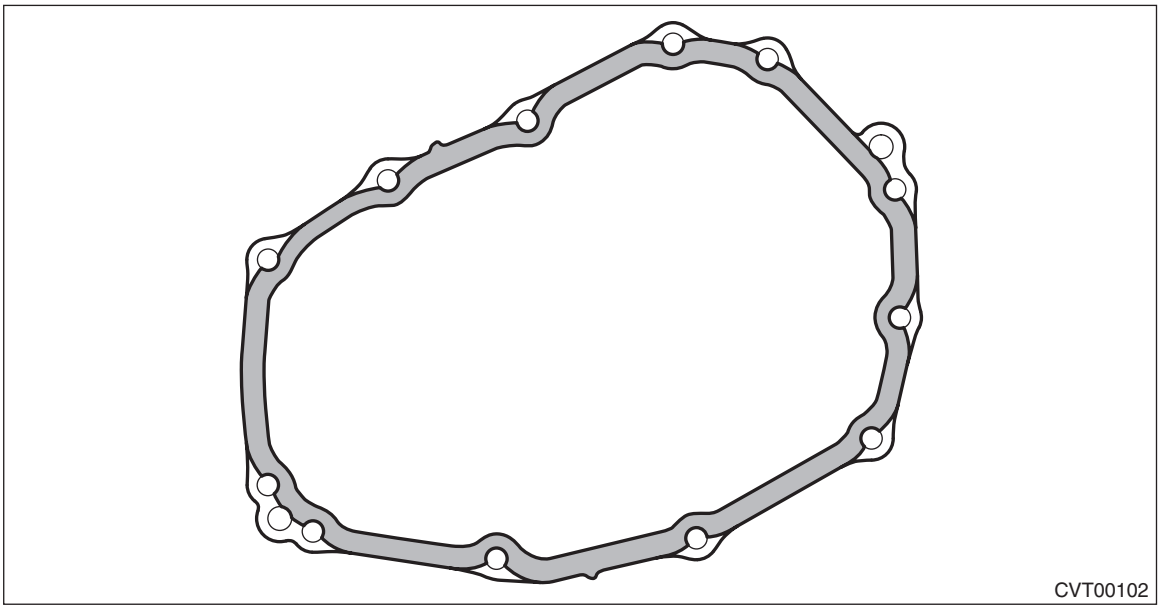
7) Install the O-ring to the transmission case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



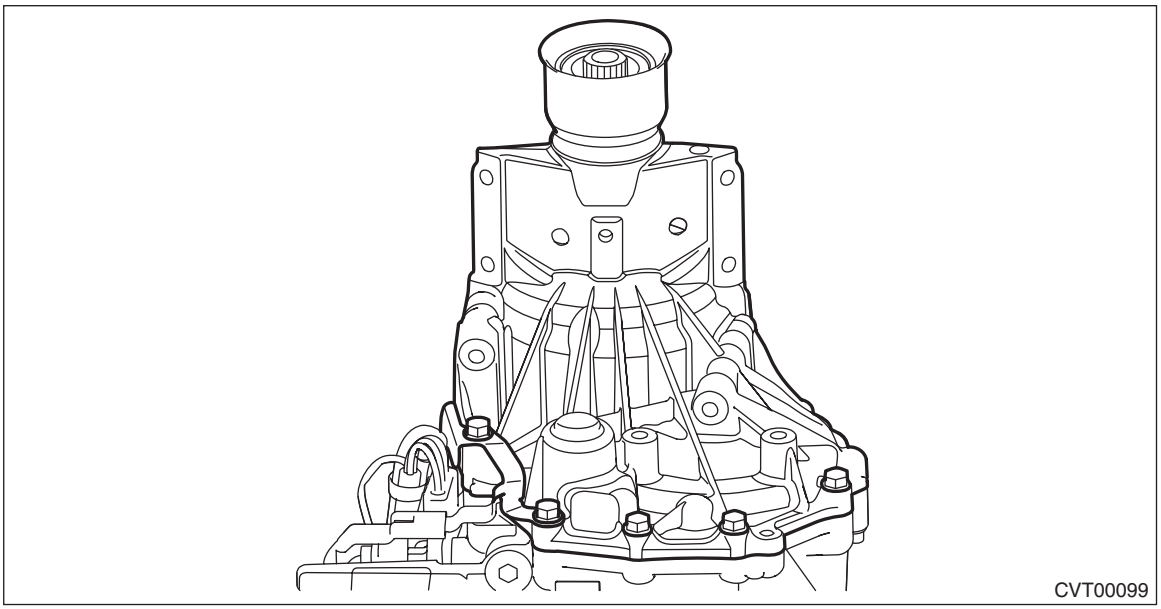
8) Apply liquid gasket to the drive motor assembly seamlessly.

Liquid gasket:
THREE BOND 1215B or equivalent



9) Install the extension case, clip and harness bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



10) Install the transmission assembly. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the transmission hanger.
2) Remove the dust cover from extension case.
3) Remove the extension case oil seal from the extension case.
4) Remove all plugs.

D: ASSEMBLY

1) Press-fit the dust cover into extension case.
2) Install the extension case oil seal to extension case.
3) Install all plugs.

NOTE:
- Use a new O-ring or a gasket.
- Apply CVTF to the O-rings.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

4) Install the transmission hanger.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

E: INSPECTION

- Check there is no leak of CVTF from the joint between extension case and transmission case.
- Check there is no damage or cracks on the extension case and other parts.

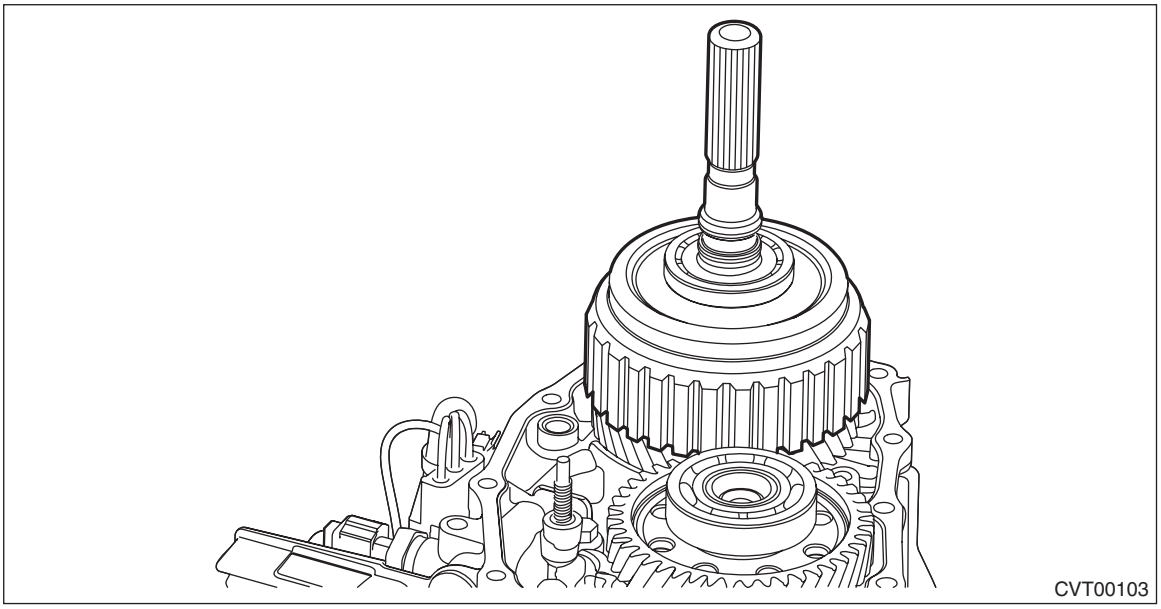
F: ADJUSTMENT

NOTE:
When replacing the extension case, select the transfer drive gear shim and transfer driven gear shim. <Ref. to CVT(TH58A)-207, ADJUSTMENT, Transfer Drive Gear.> <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>

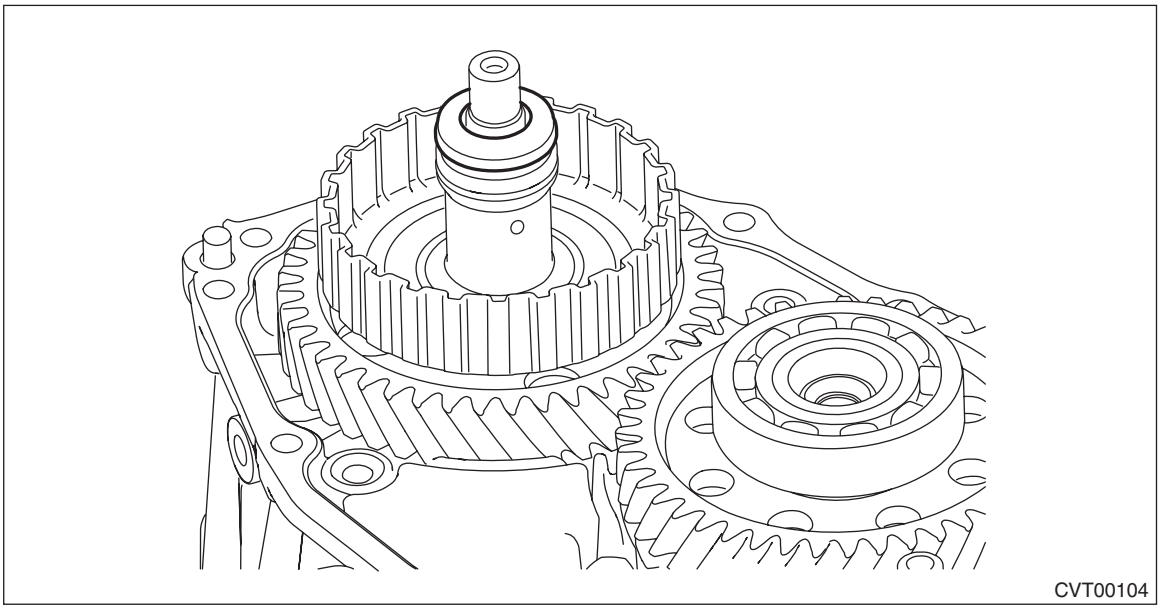
33.Transfer Clutch

A: REMOVAL

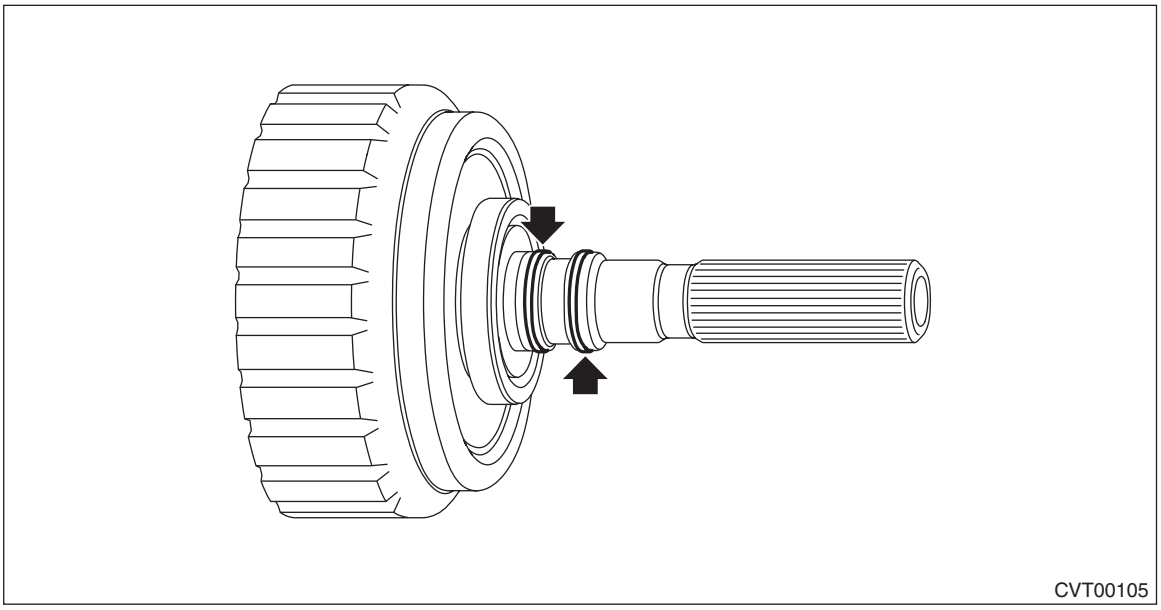
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly.


CVT00103

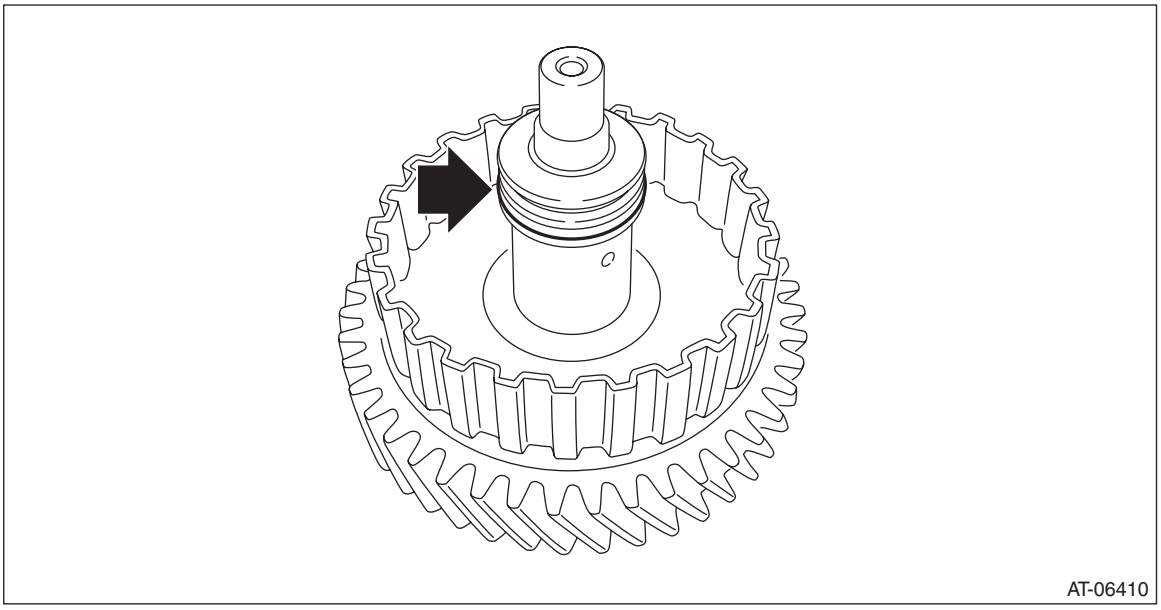
4) Remove the thrust bearing.


CVT00104

5) Remove the seal ring from transfer clutch assembly.



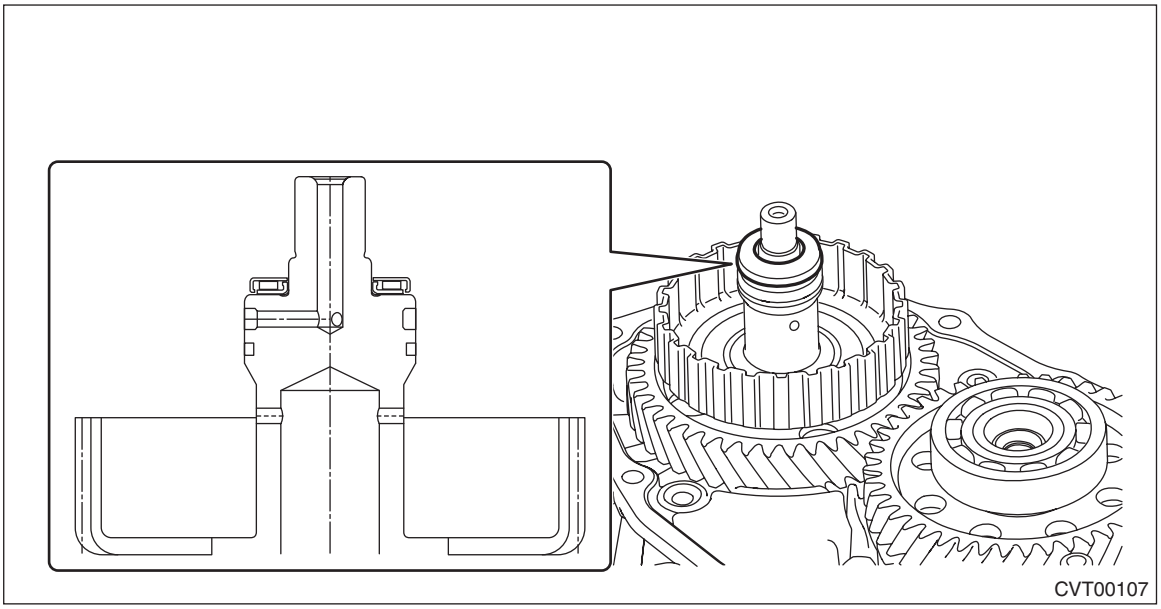
6) Remove the seal ring from the transfer driven gear assembly.



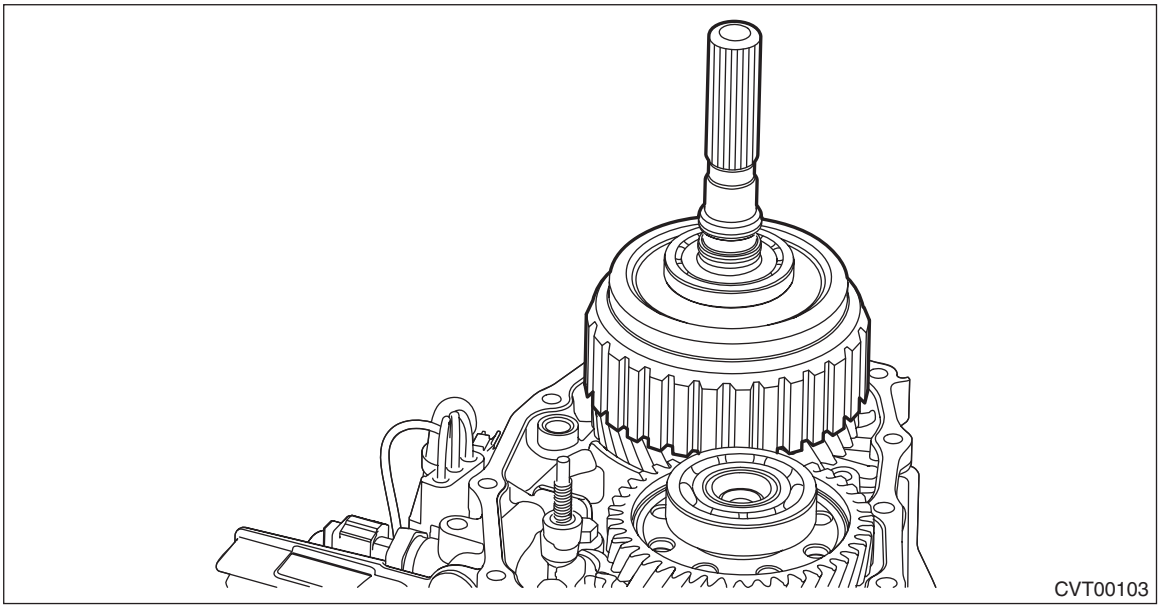
B: INSTALLATION

1) Install the thrust bearing.

NOTE:
Make sure to install in the right direction.

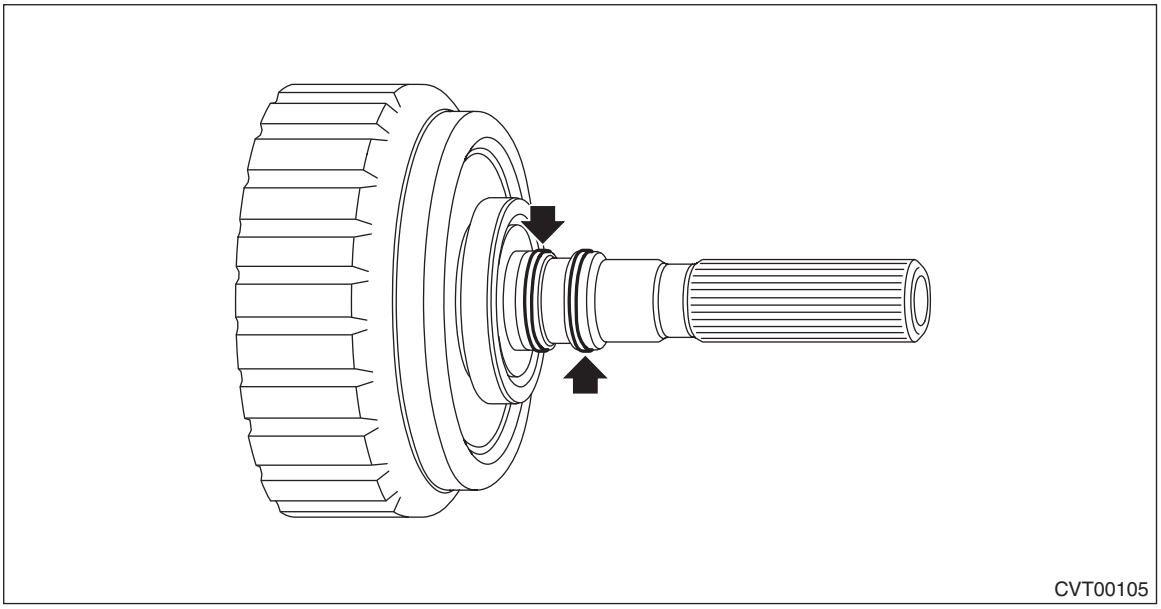

CVT00107

2) Install the transfer clutch assembly.


CVT00103

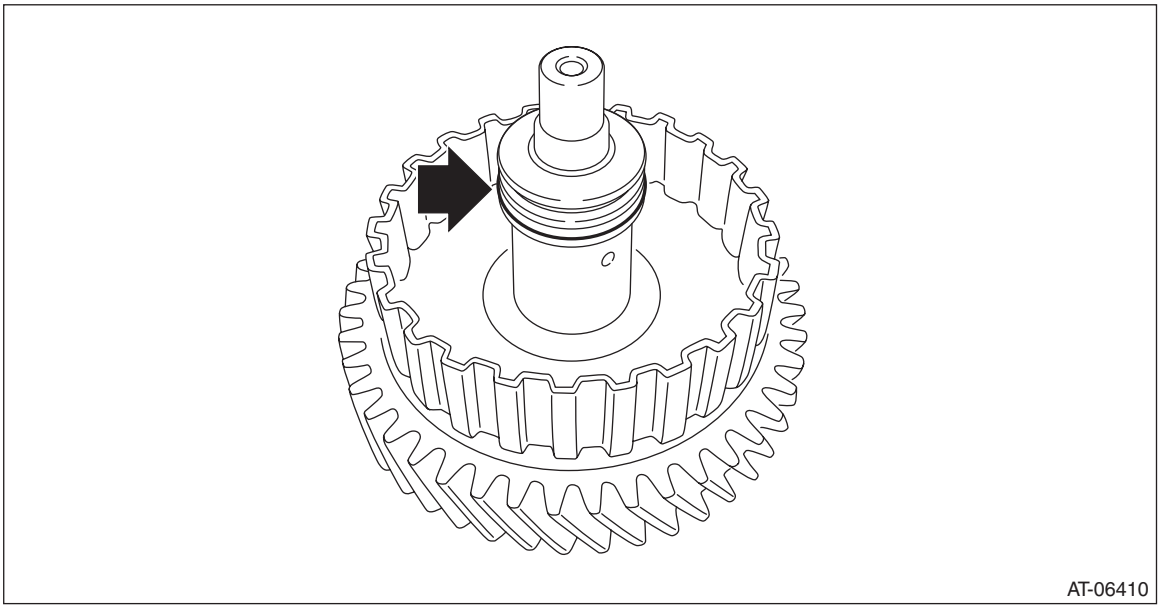
3) Select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>
4) Attach the selected transfer driven gear shim to extension case with vaseline.
5) Remove the transfer clutch assembly.
6) Install the seal ring to the transfer clutch assembly.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



7) Install the seal ring to the transfer driven gear assembly.

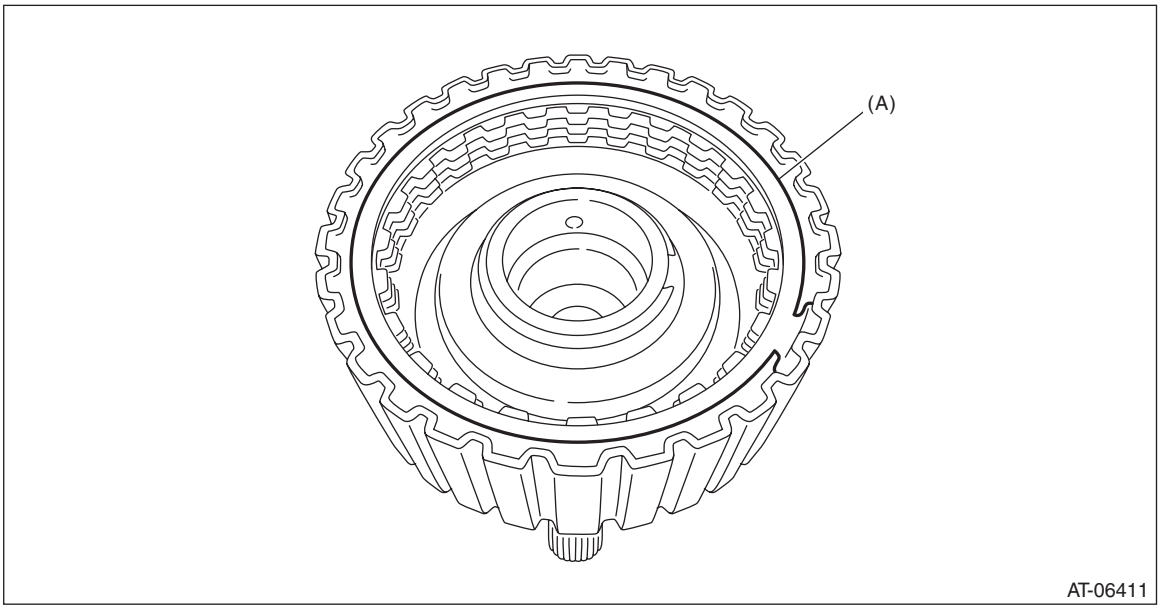
NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



8) Install the transfer clutch assembly.
9) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
10) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

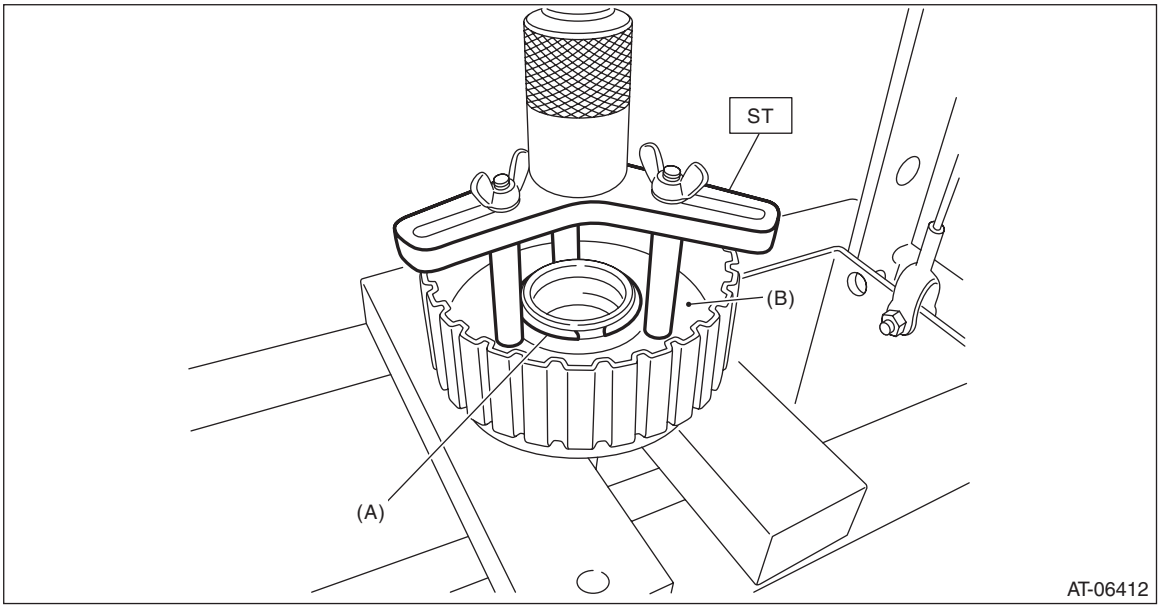
C: DISASSEMBLY

1) Remove the snap ring, and then remove the retaining plate, drive plate and driven plate.



(A) Snap ring

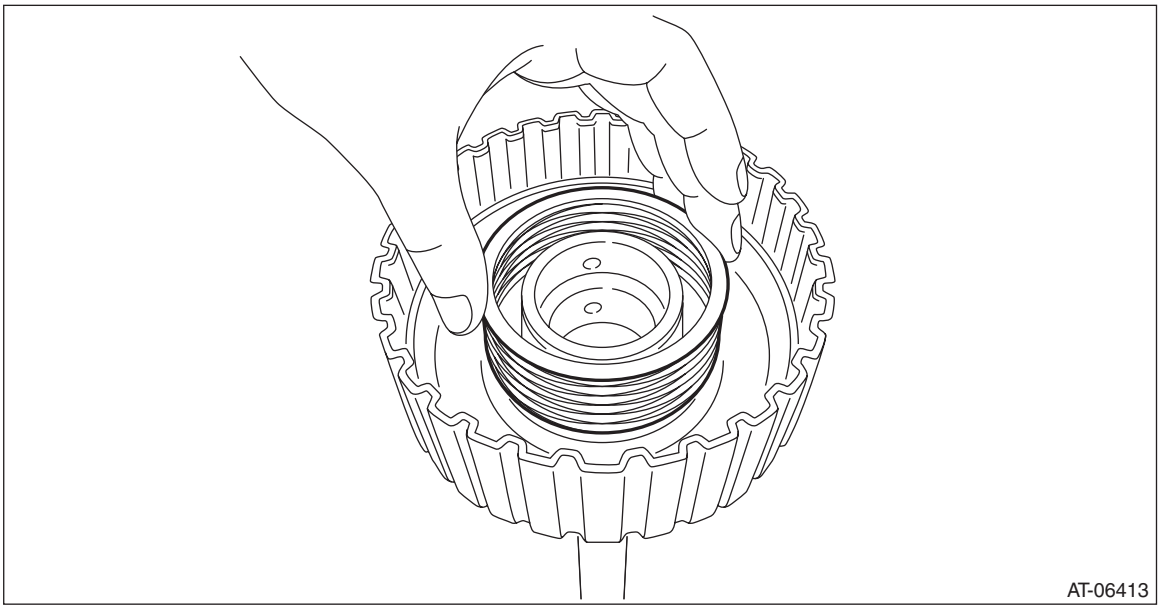
2) Compress the return spring using the ST to remove the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring
(B) Transfer clutch piston seal

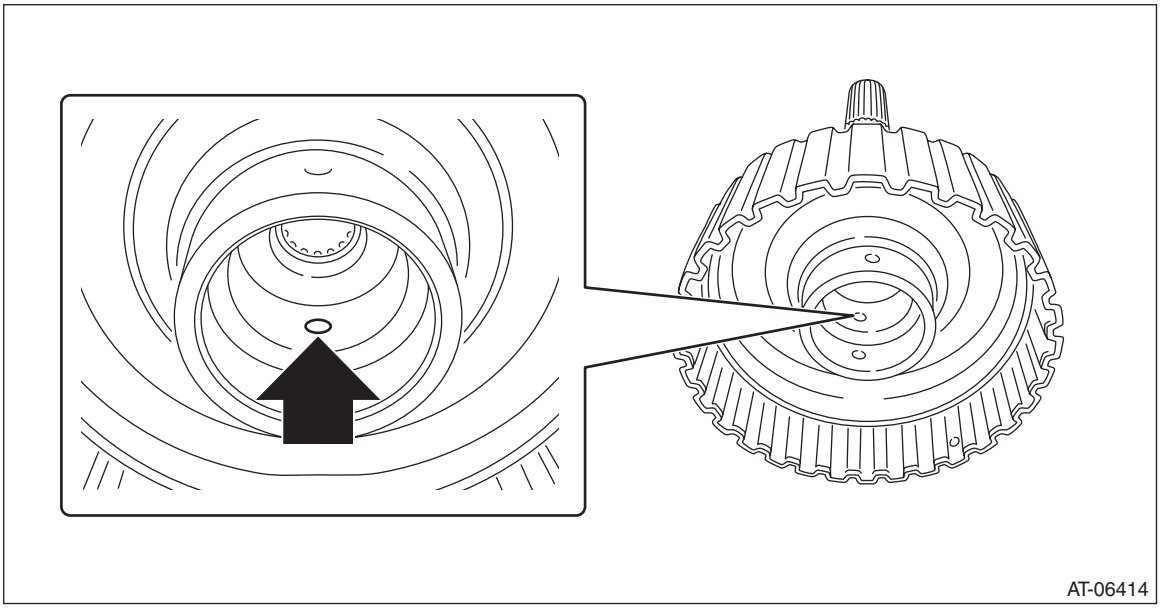
3) Remove the transfer clutch piston seal.

4) Remove the return spring.

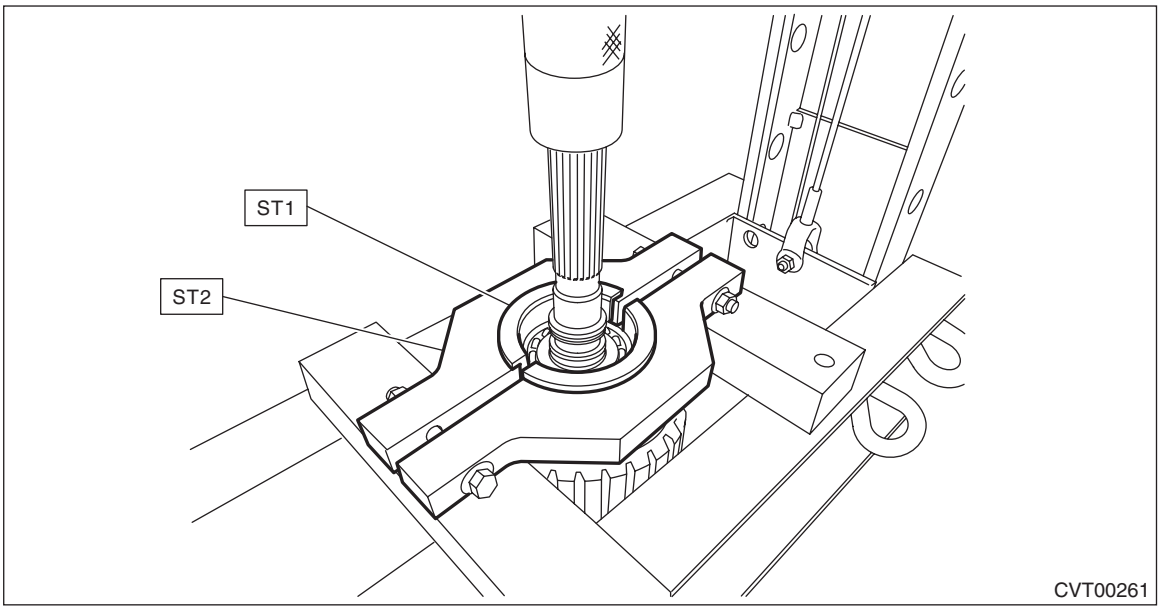


5) Remove the transfer clutch piston by blowing compressed air through transfer clutch assembly hole.

NOTE:
Plug the holes through which the compressed air is not blown.



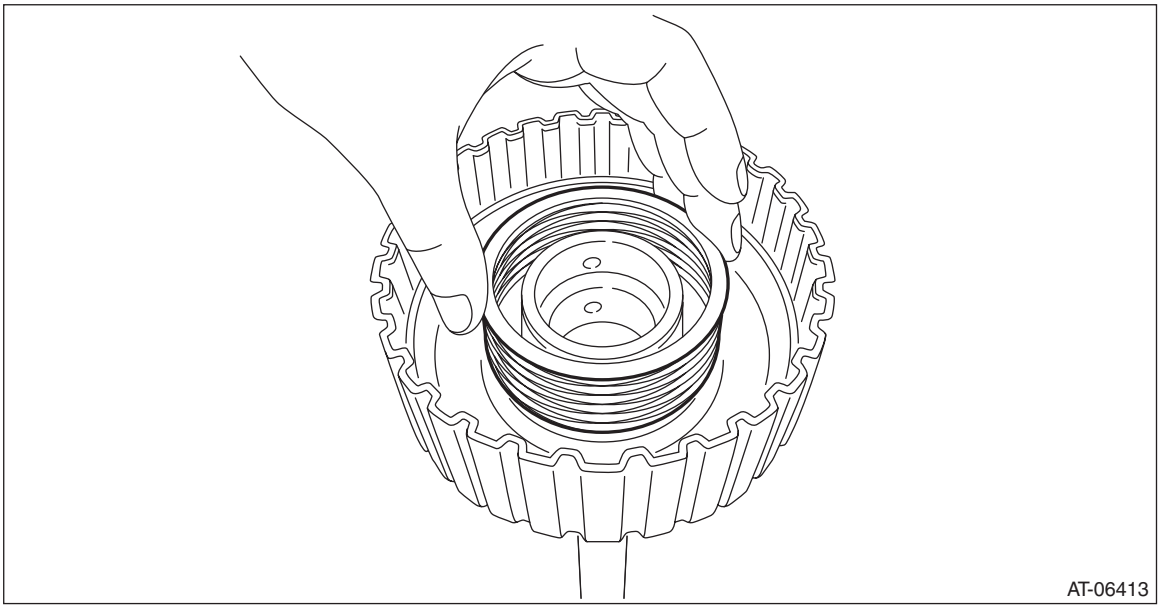
6) Remove the ball bearing using ST.
ST1 18767AA020 BEARING REMOVER
ST2 18723AA000 REMOVER



D: ASSEMBLY

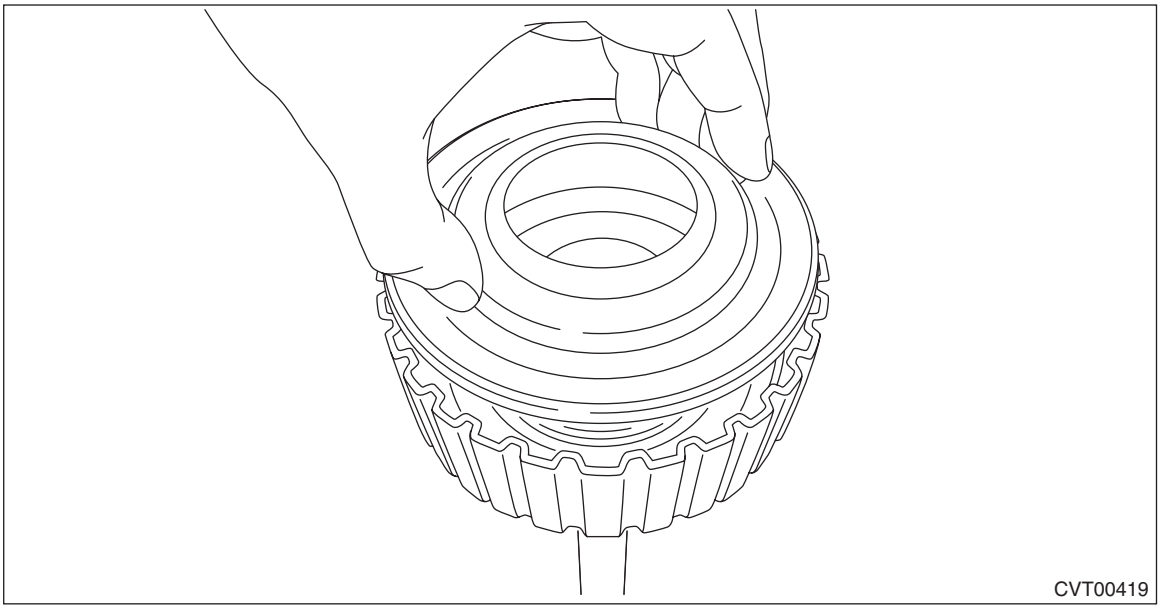
1) Install the transfer clutch piston.

NOTE:
Apply CVTF to the transfer clutch piston lip.
2) Install the return spring.

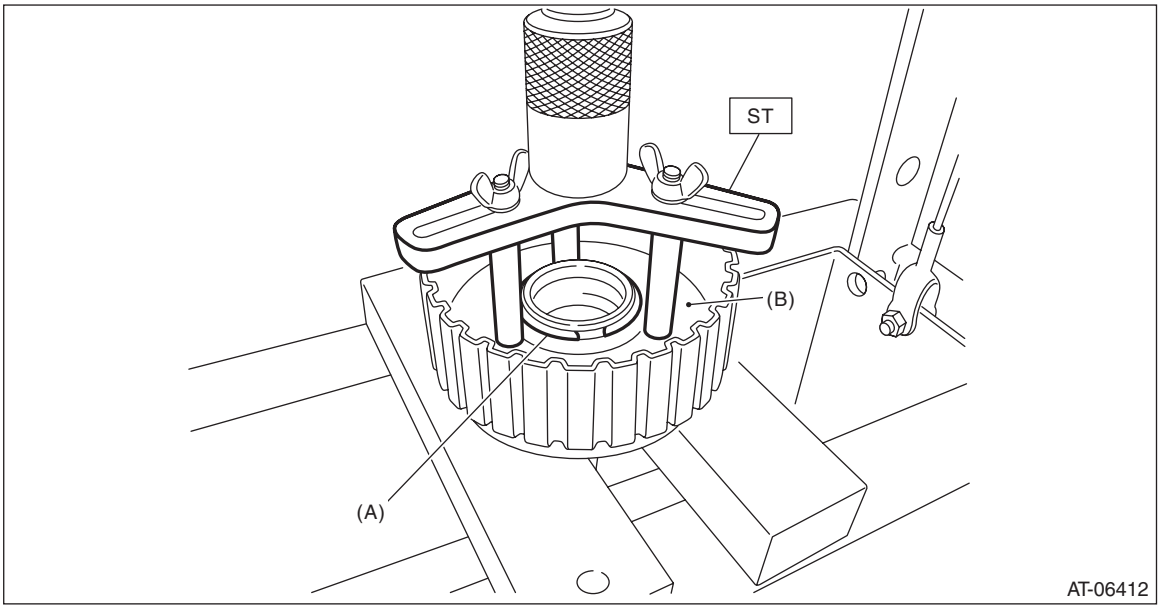


3) Install the transfer clutch piston seal.

NOTE:
Apply CVTF to the lip section of transfer clutch piston seal.

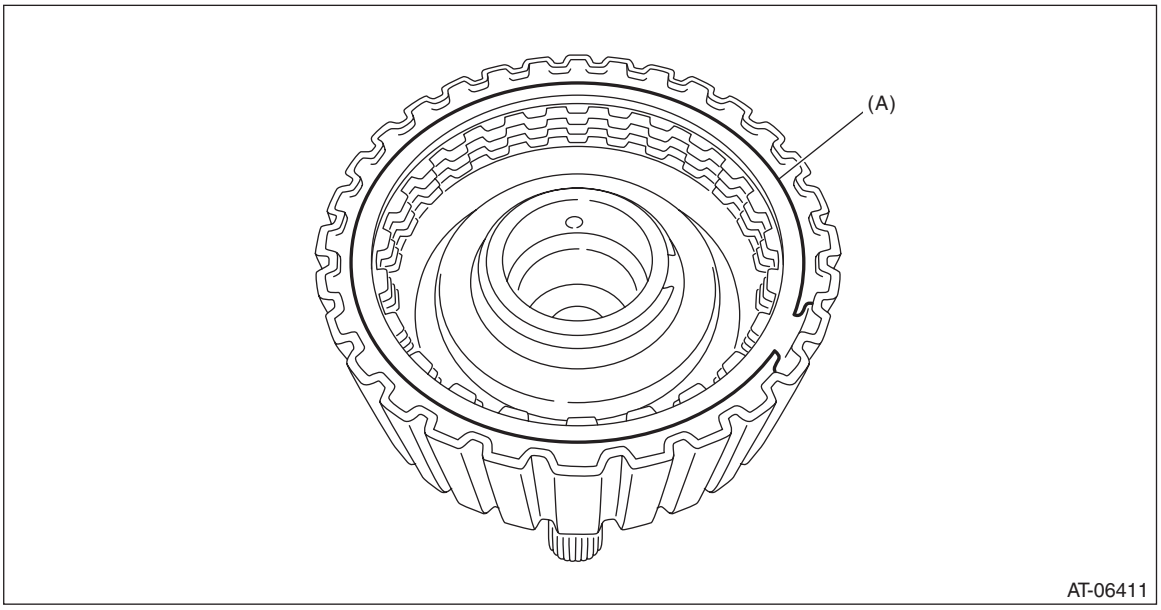


4) Compress the return spring using the ST to install the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring
(B) Transfer clutch piston seal

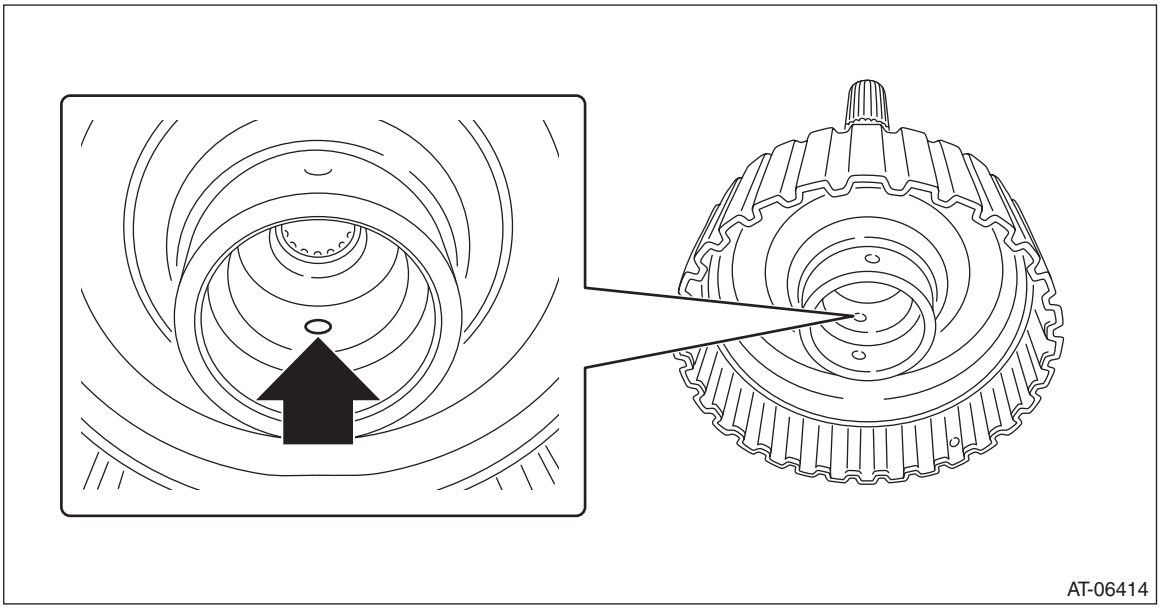
5) Install the pressure plate, driven plate, drive plate and snap ring.



(A) Snap ring

6) Blow compressed air through transfer clutch assembly hole, and check the transfer clutch piston operation.

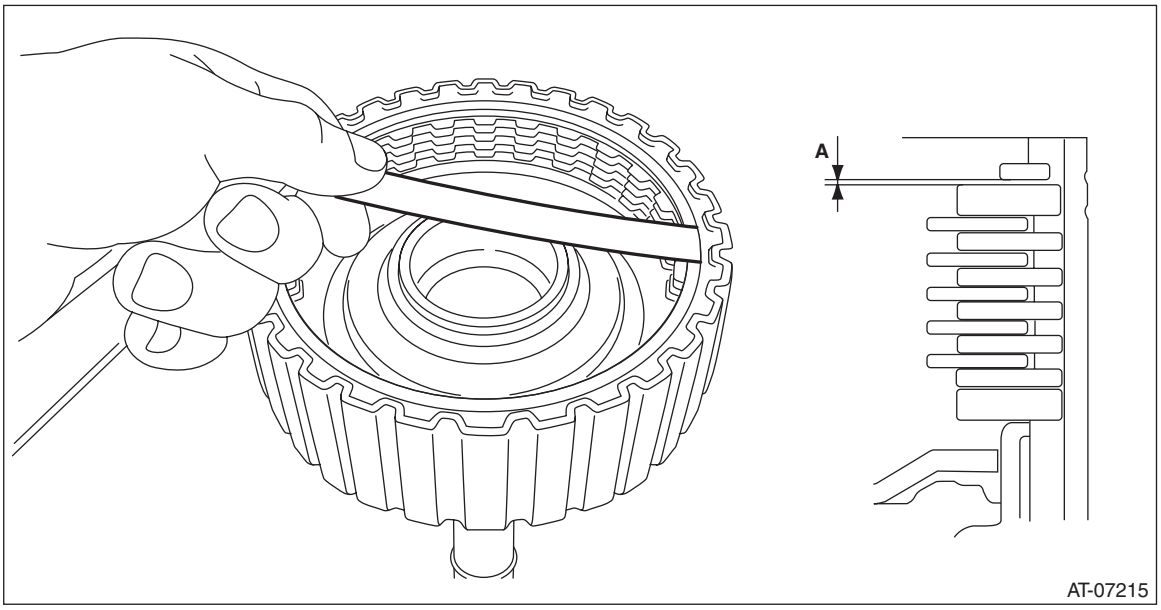
NOTE:
Plug the holes through which the compressed air is not blown.



7) Before measuring clearance “A”, place same thickness shims on both sides to prevent the plate from tilting.
8) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select and adjust the pressure plate within the initial specified value.

Initial standard:
0.7 — 1.1 mm (0.028 — 0.043 in)

Limit thickness:
1.45 mm (0.057 in)

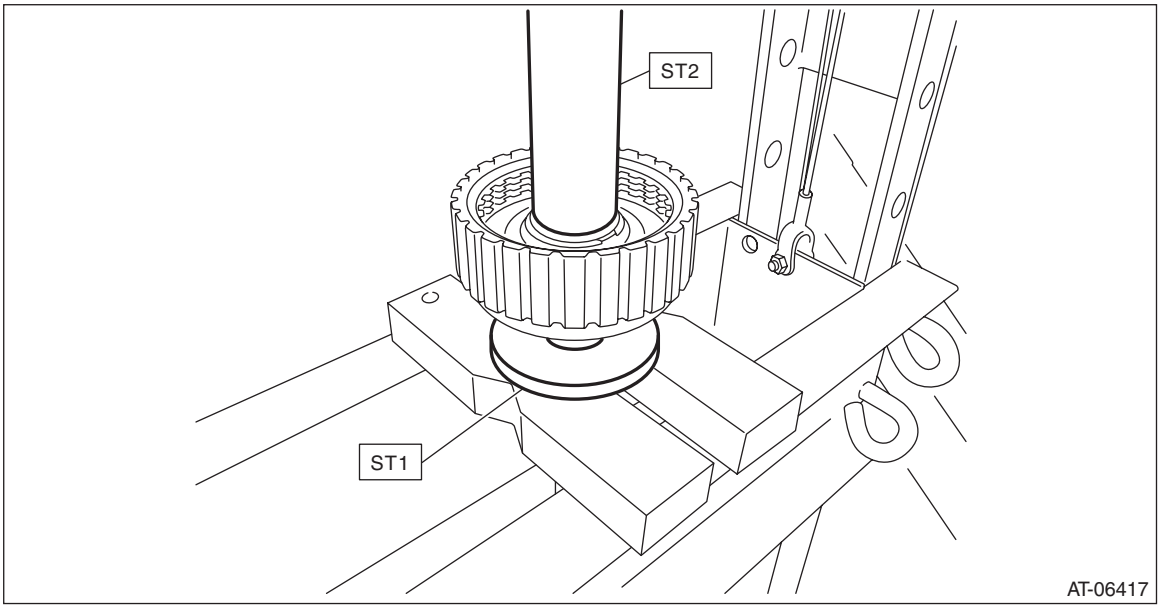


Pressure plate	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)

9) Recheck the clearance. <Ref. to CVT(TH58A)-197, INSPECTION, Transfer Clutch.>

10) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST1 398177700 INSTALLER
ST2 499277100 INSTALLER



E: INSPECTION

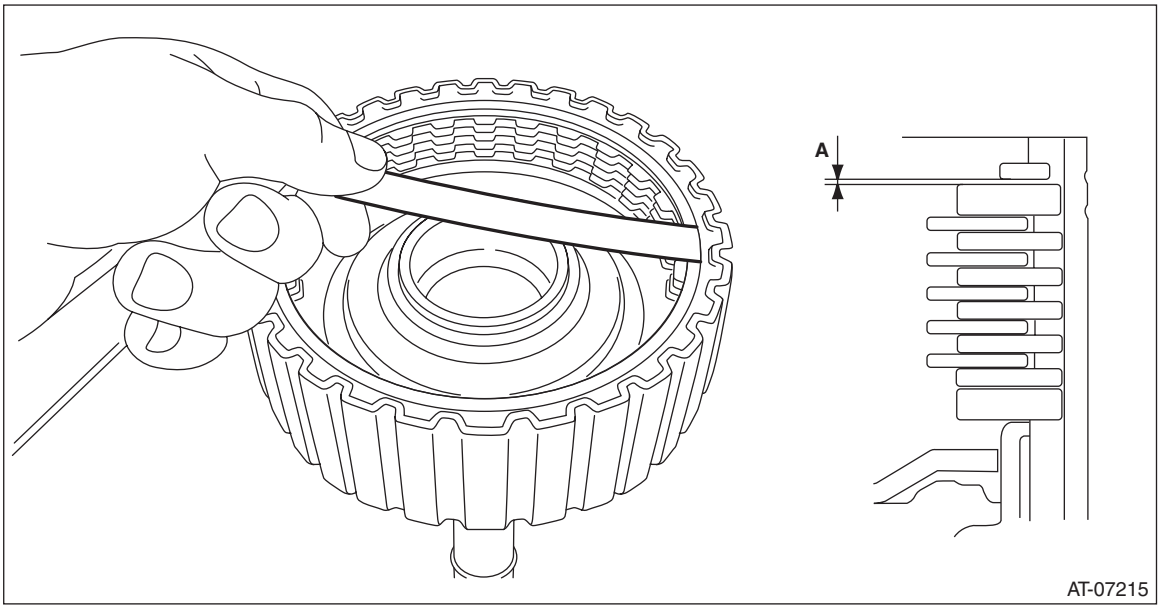
- Inspect the drive plate facing for wear and damage.
- Driven plate for discoloration (burned color)
- Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
- Check the lip seal for damage.
- Inspect the extension end play, and adjust it to within the standard value. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>

1) Before measuring clearance “A” between snap ring and driven plate, place same thickness shims on both sides to prevent the plate from tilting.

2) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select the pressure plate within the initial specified value.

Initial standard:
0.7 — 1.1 mm (0.028 — 0.043 in)

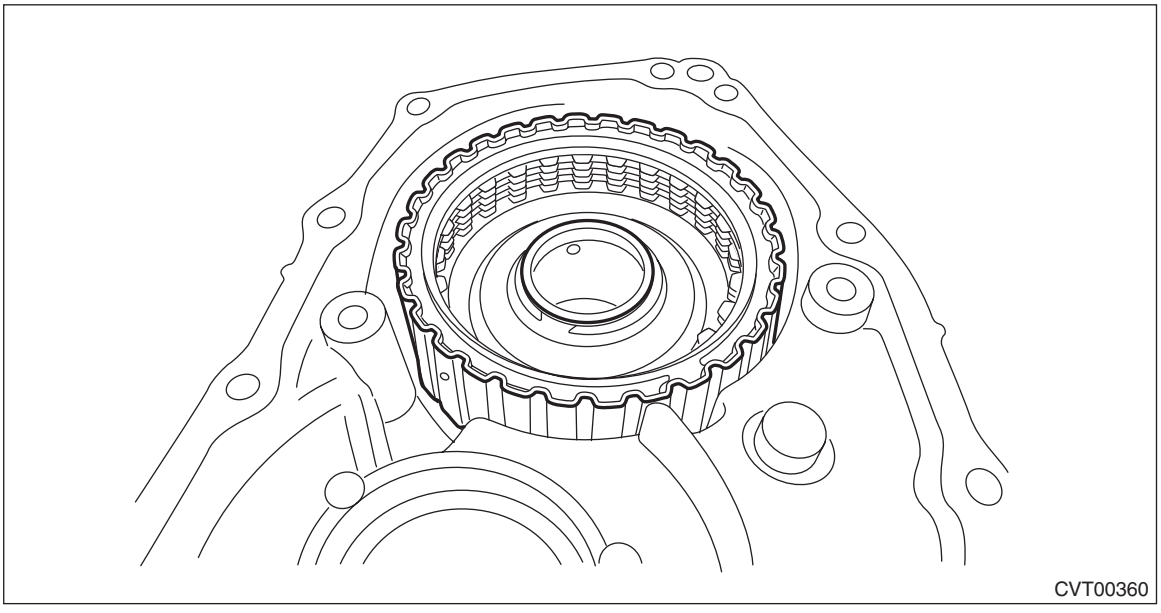
Limit thickness:
1.45 mm (0.057 in)



3) Check for tight corner braking phenomenon when the vehicle is moved forward with the steering fully turned. If tight corner braking occurs, perform the following procedures.
(1) With the steering wheel held at fully turned position, drive the vehicle in “D” range and with vehicle speed at approx. 5 km/h (3 MPH) in both clockwise and counterclockwise directions for approx. ten times each, while repeating acceleration and braking intermittently.
(2) If the tight corner braking phenomenon still persists, drive the vehicle again in a circle for several laps.

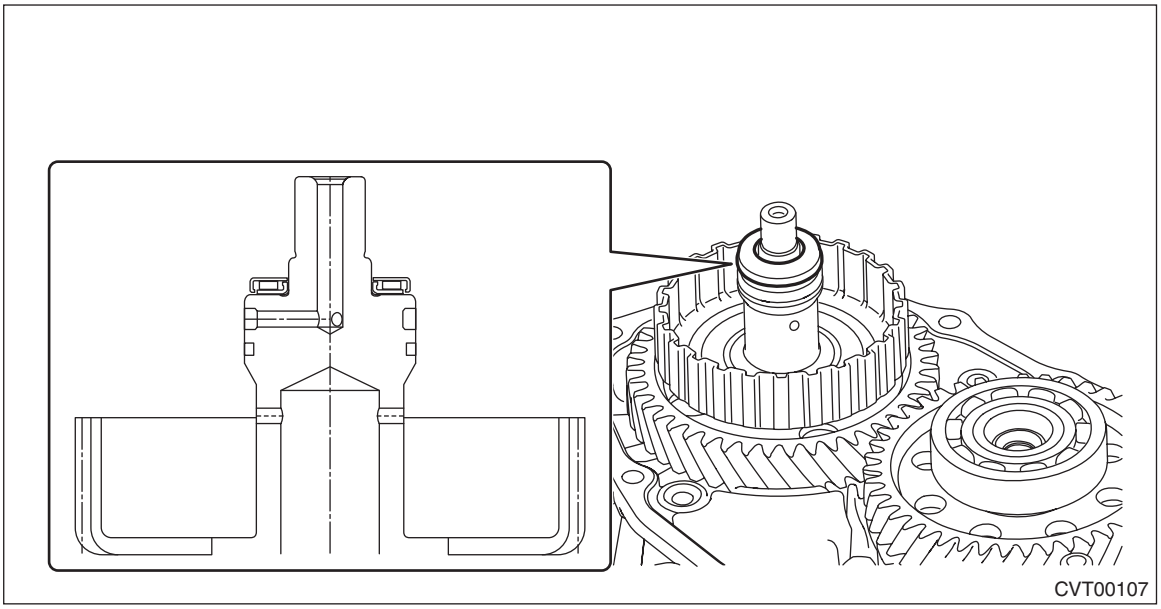
F: ADJUSTMENT

1) Install the transfer clutch assembly to the extension case with the transfer driven gear shims and thrust bearings removed.

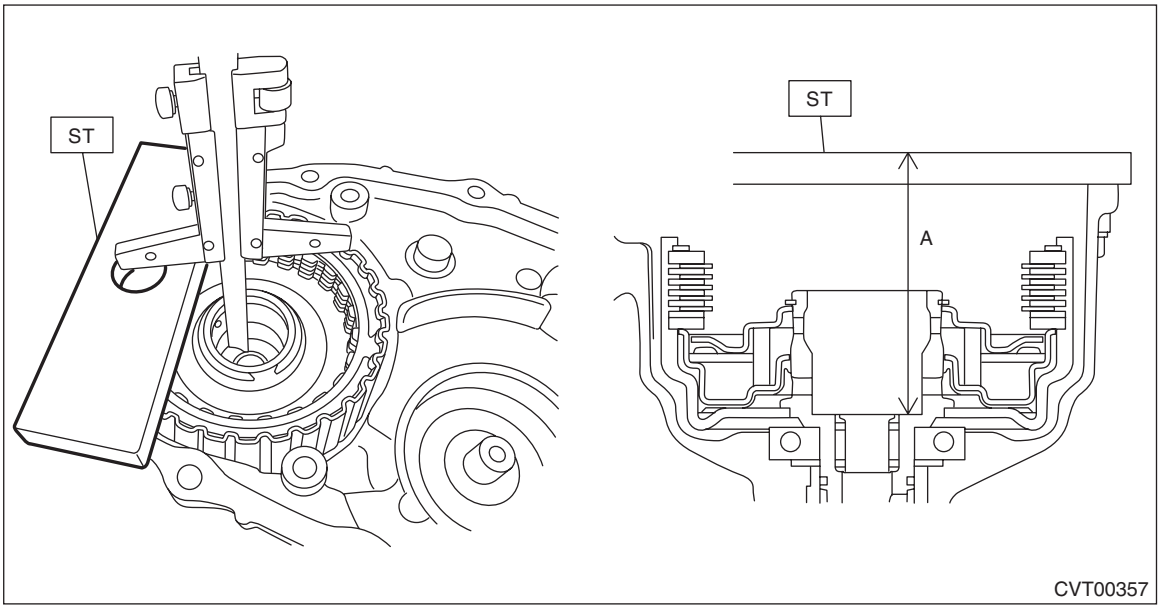


2) Install the thrust bearing to the transfer driven gear.

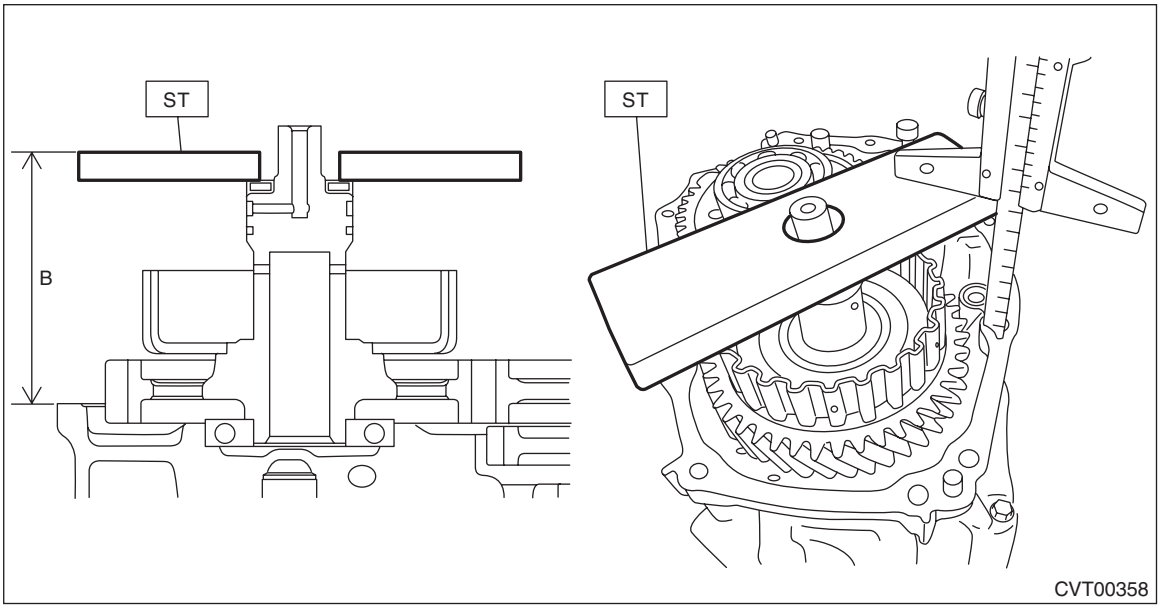
NOTE:
Make sure to install in the right direction.



3) Using the ST, measure the height “A” from the ST end face to the thrust bearing catch surface of the transfer clutch assembly.
ST 499575500 GAUGE



4) Using the ST, measure the height “B” from the transmission case mating surface to the end of ST.
ST 499575500 GAUGE



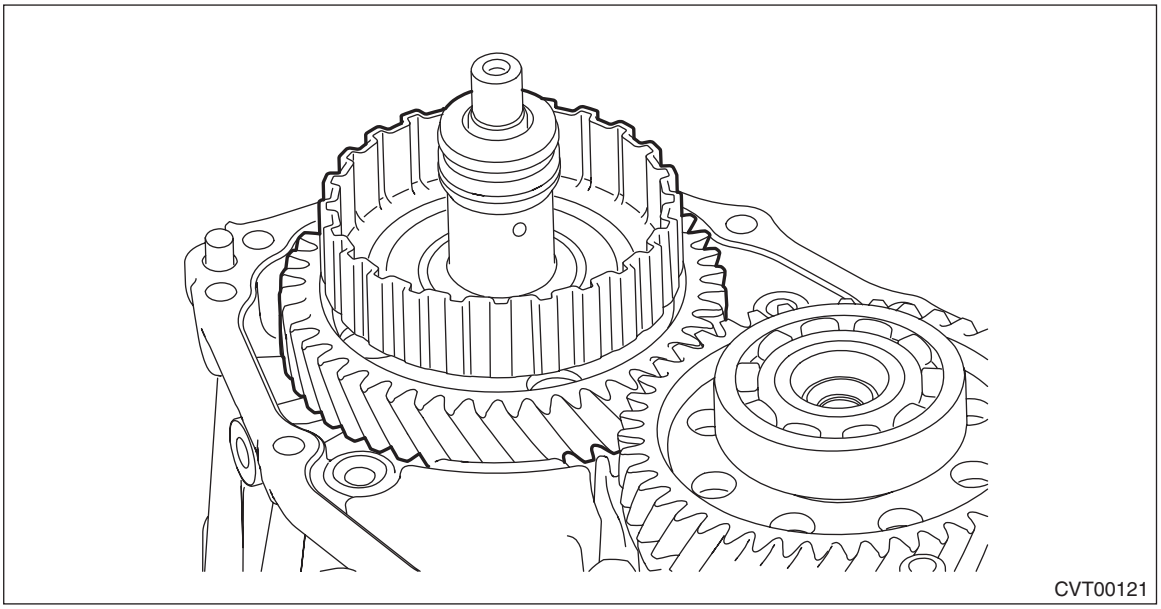
5) Obtain the thickness of transfer driven gear shim using the following formula to select zero to three transfer driven gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Transfer driven gear shim thickness
A: Height from the ST end face to the transfer clutch assembly thrust bearing catch surface
B: Height from the mating surface of the transmission case to the end of the ST
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Transfer driven gear shim	
Part No.	Thickness mm (in)
33280AA060	0.3 (0.012)
33280AA070	0.4 (0.016)
33280AA080	0.5 (0.020)

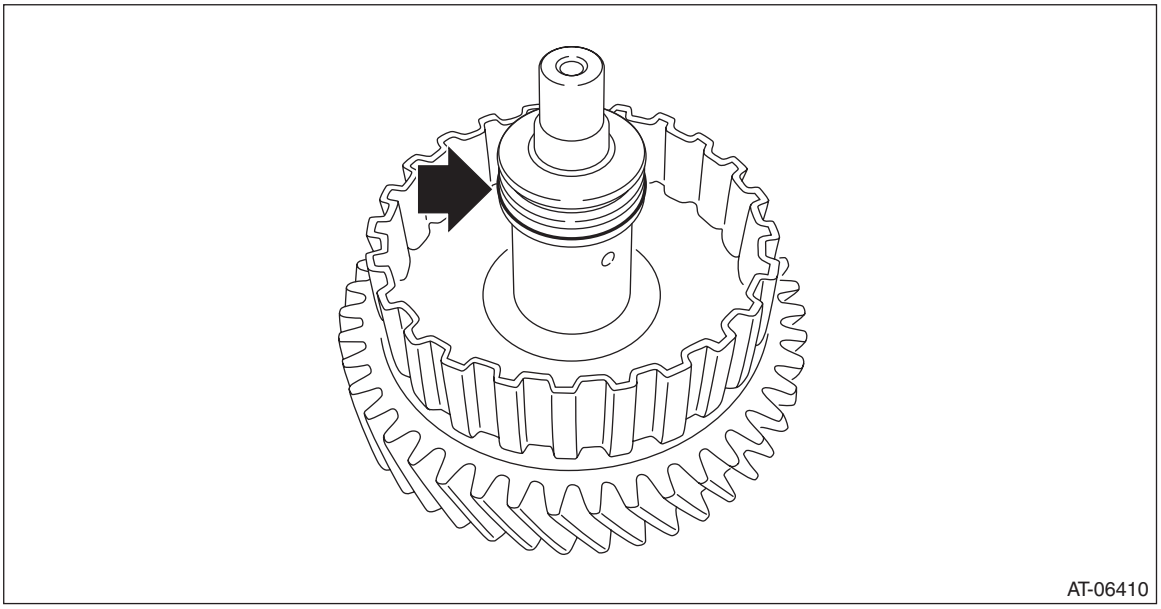
34.Transfer Driven Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly.

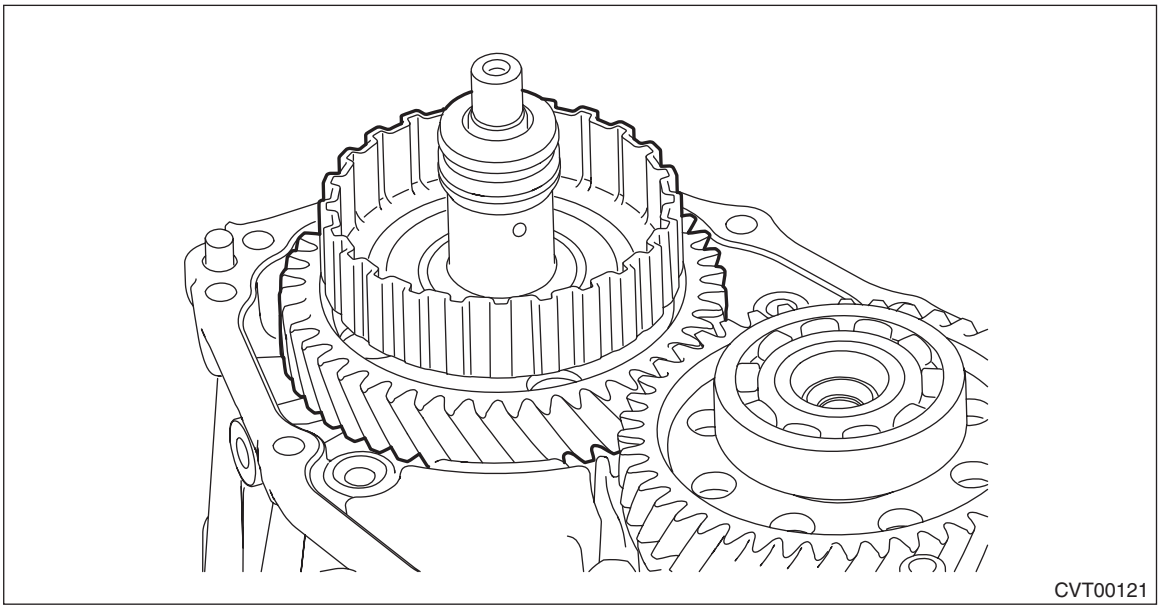

CVT00121

5) Remove the seal ring from the transfer driven gear assembly.


AT-06410

B: INSTALLATION

1) Install the transfer driven gear assembly.

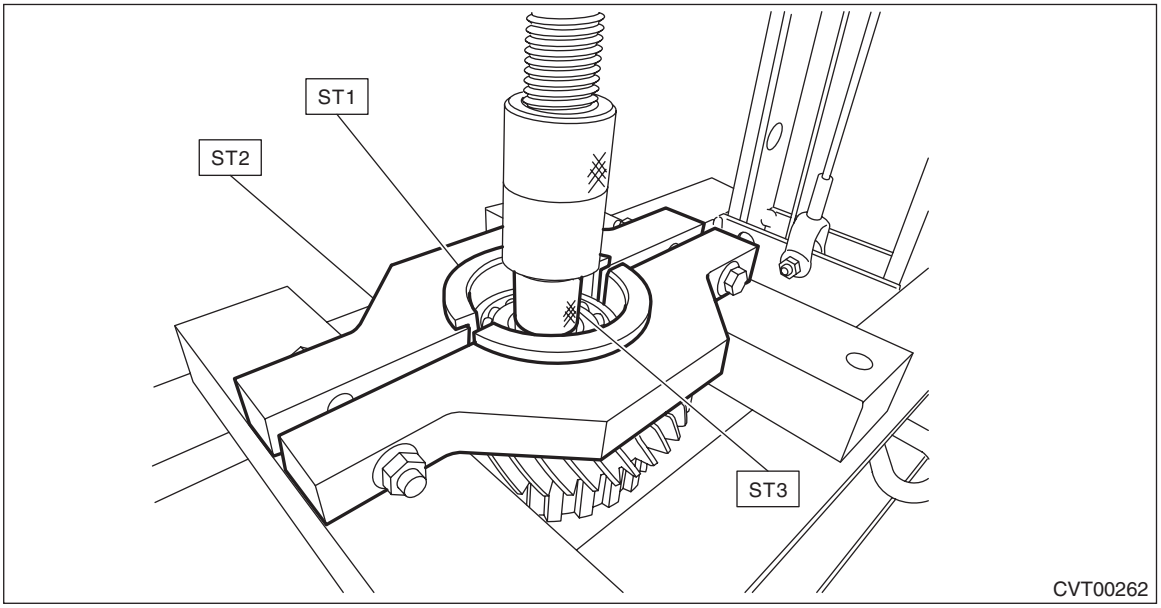


2) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
3) Select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>
4) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
5) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

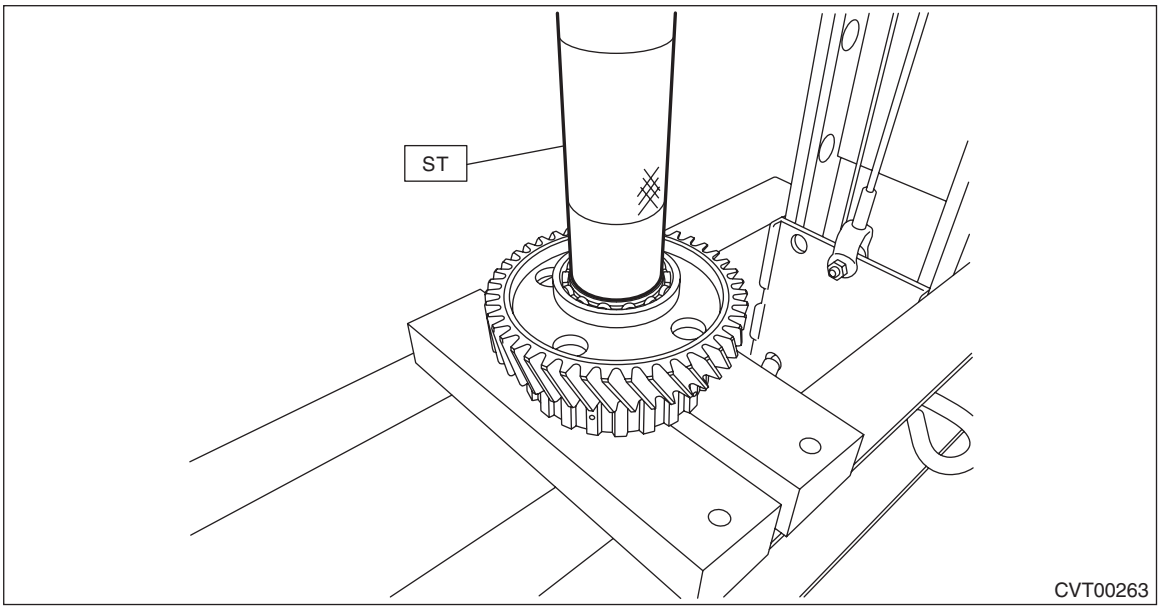
1) Remove the ball bearing using ST.

ST1	18767AA020	BEARING REMOVER
ST2	18723AA000	REMOVER
ST3	899864100	REMOVER



D: ASSEMBLY

1) Using the ST, install the ball bearing.
ST 18651AA000 INSTALLER



E: INSPECTION

- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Check the transfer driven gear for breakage or damage.

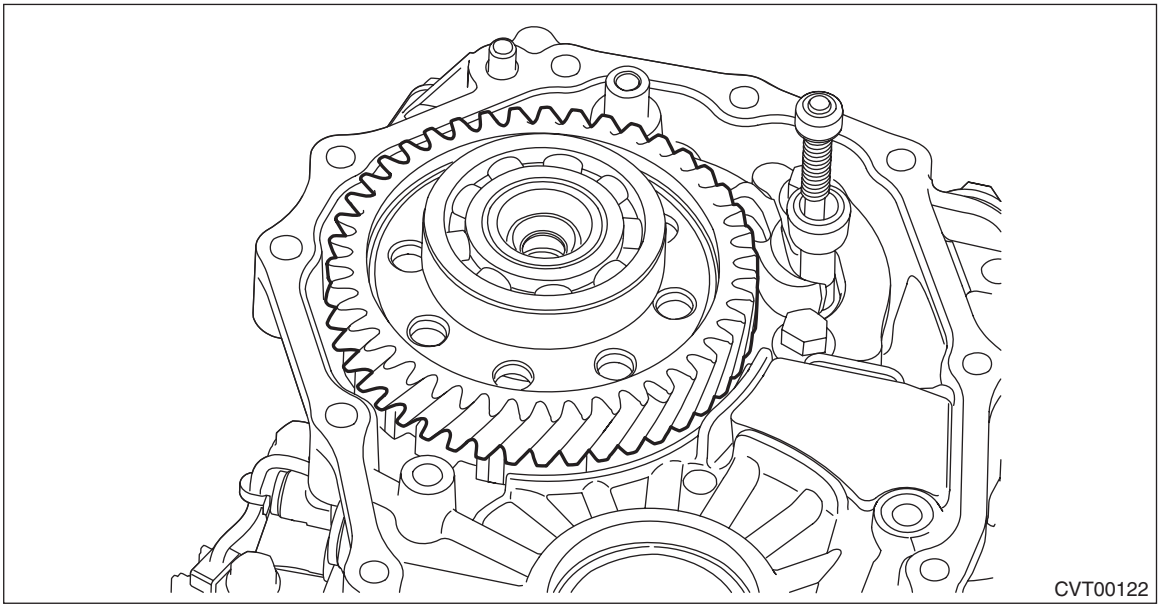
F: ADJUSTMENT

NOTE:
When the transfer driven gear or bearing is replaced, select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>

35.Transfer Drive Gear

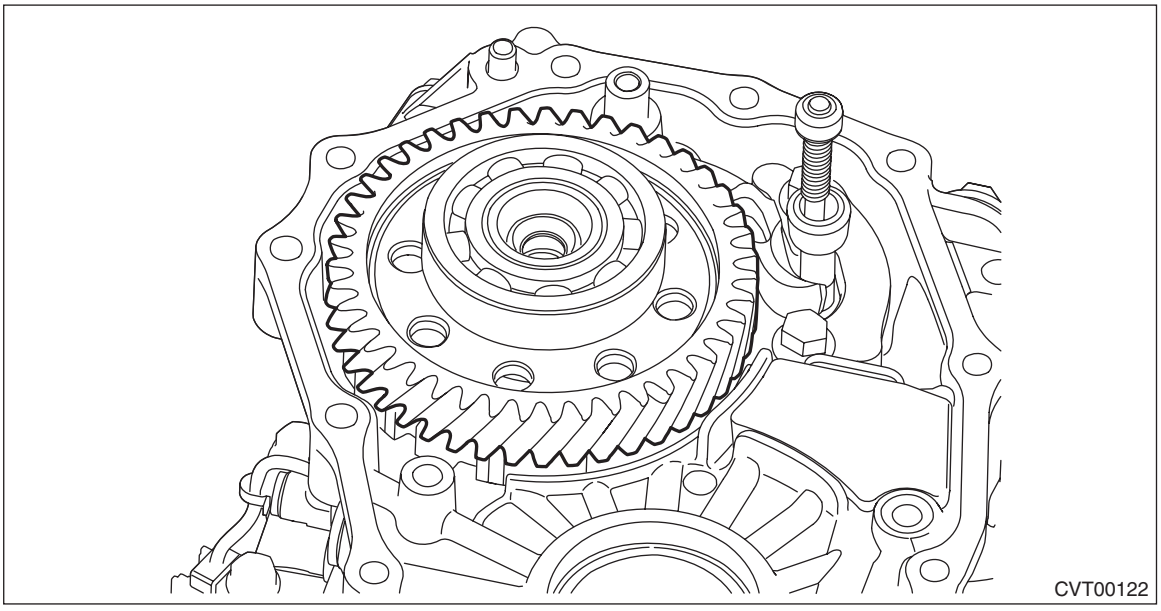
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
5) Remove the transfer drive gear assembly.



B: INSTALLATION

1) Install the transfer drive gear assembly.

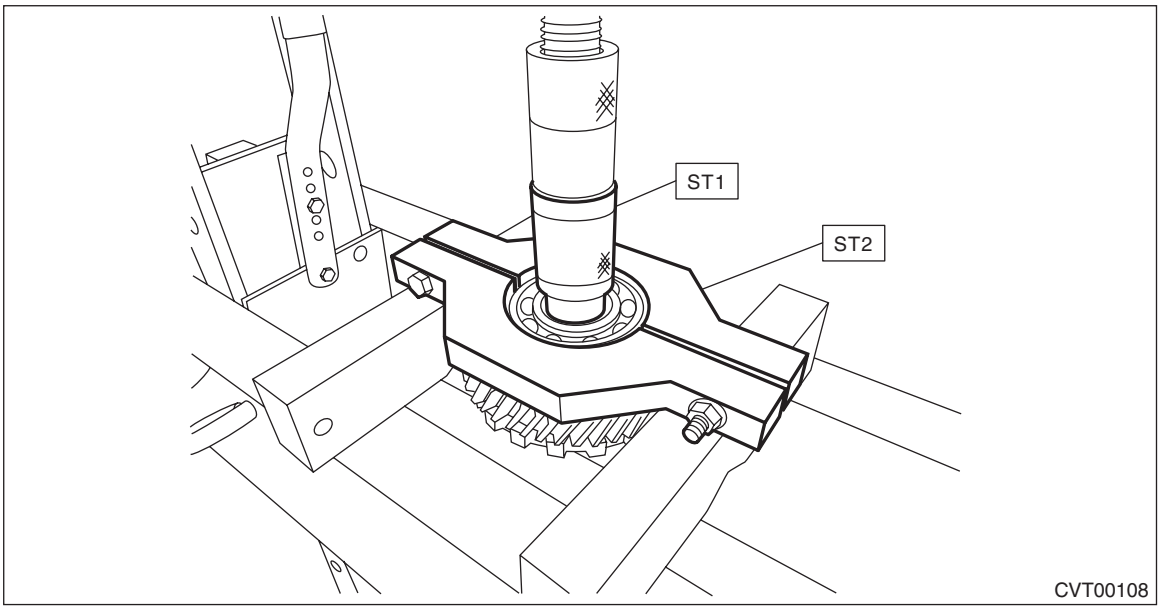


2) Select the transfer drive gear shim. <Ref. to CVT(TH58A)-207, ADJUSTMENT, Transfer Drive Gear.>
3) Attach the selected transfer drive gear shim to extension case with vaseline.
4) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
5) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>

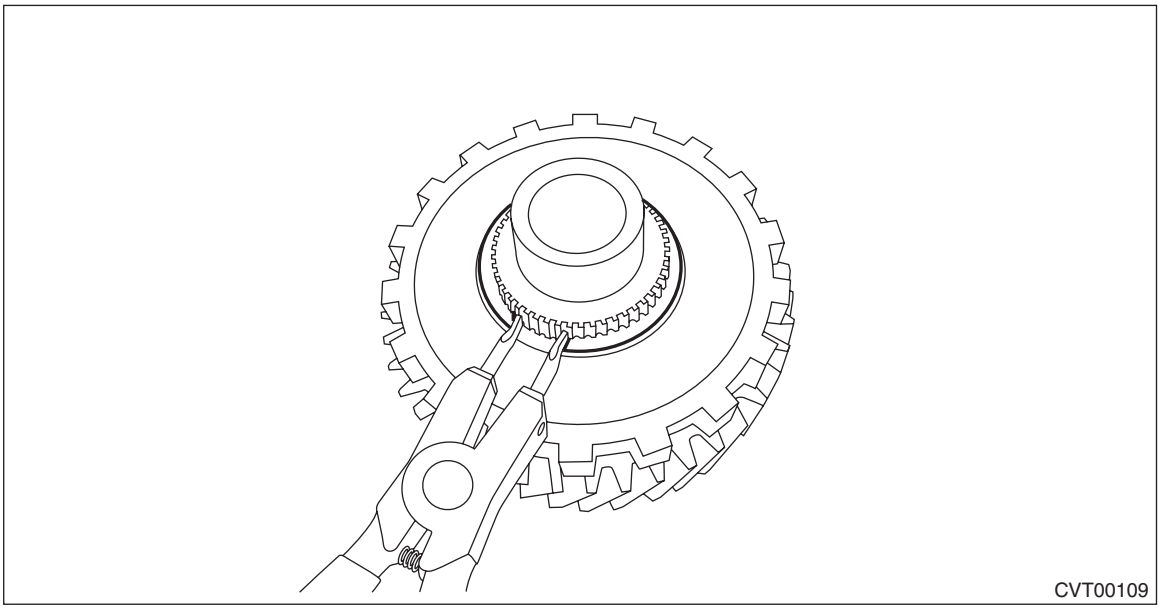
6) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
7) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

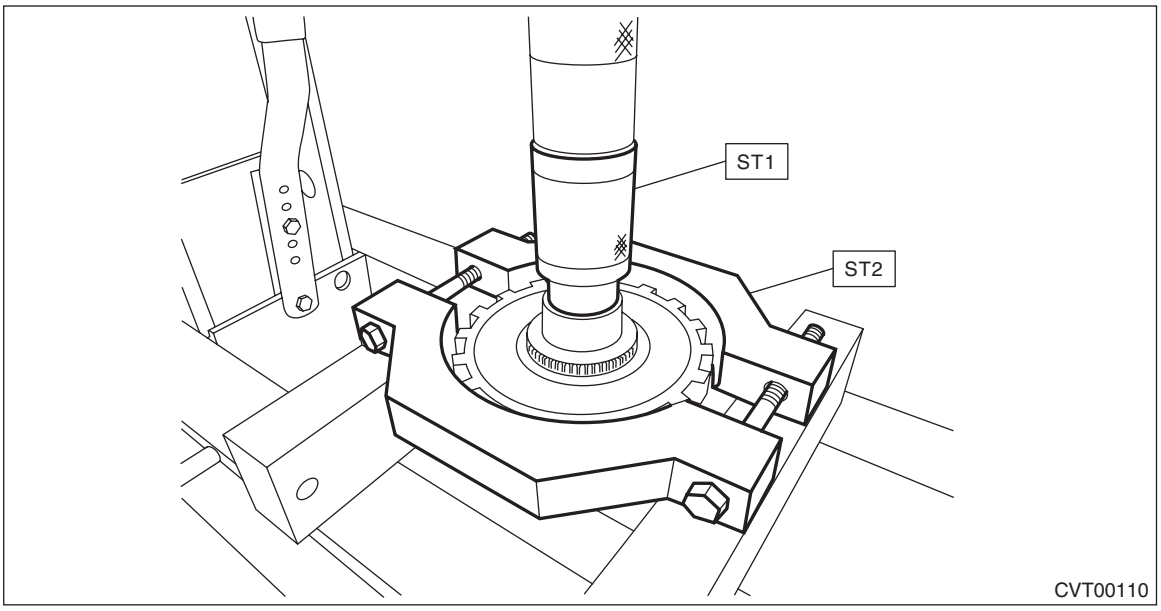
1) Remove the ball bearing using ST.
ST1 499757002 INSTALLER
ST2 498077300 REMOVER



2) Remove the snap ring.

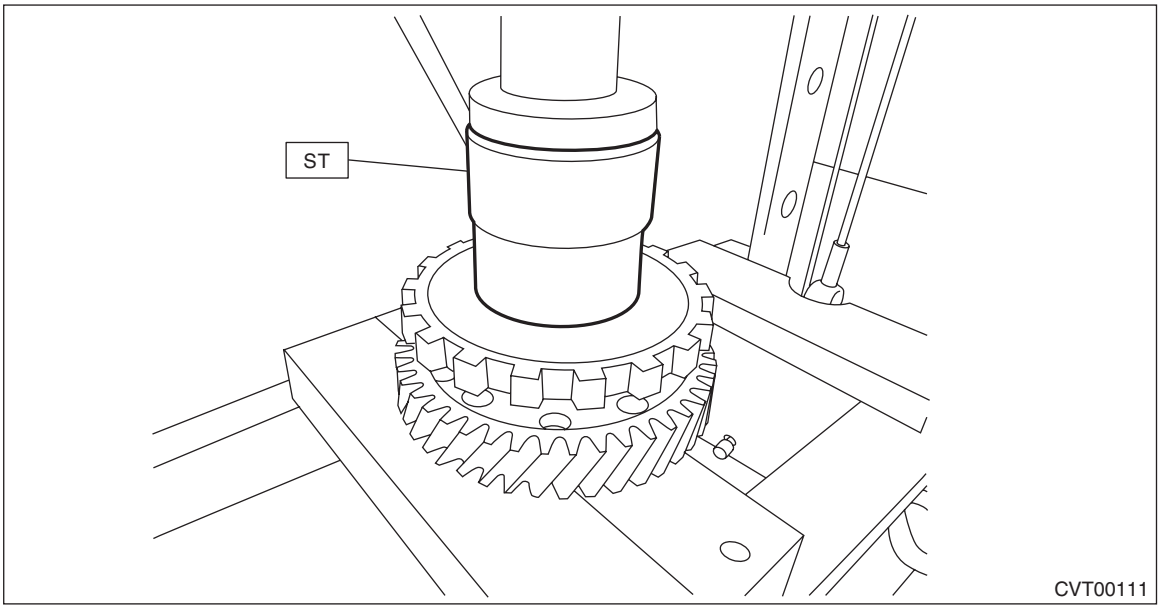


3) Using the ST, remove the parking gear from transfer reduction drive gear.
ST1 499757002 INSTALLER
ST2 18767AA000 BEARING REMOVER



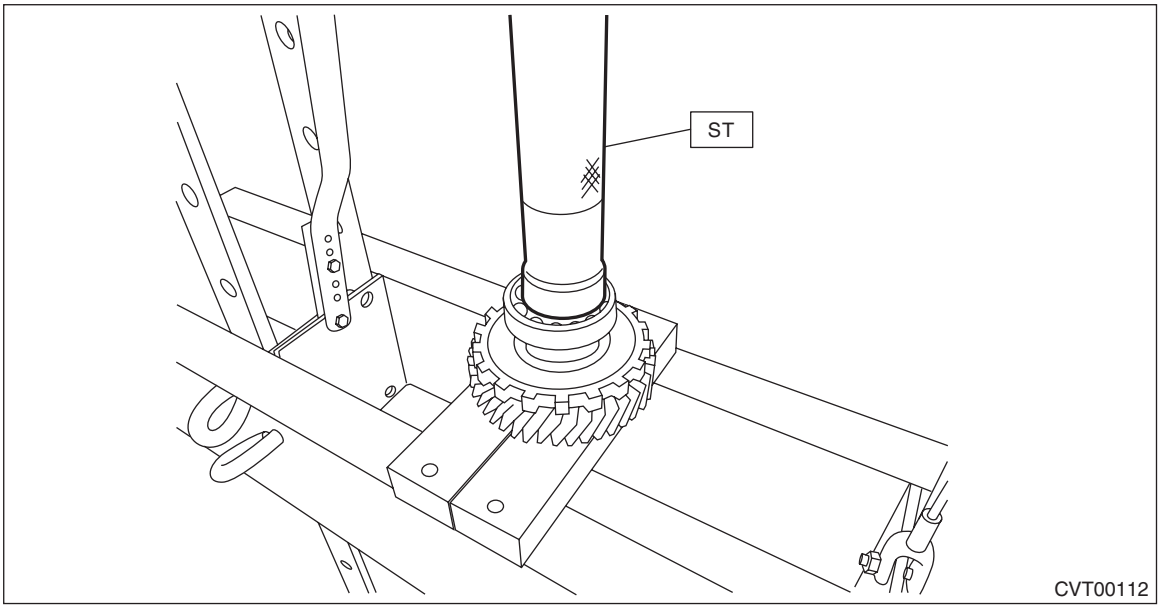
D: ASSEMBLY

1) Using the ST, install the transfer drive gear.
ST 499755602 INSTALLER



2) Install the snap ring.
3) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST 499277100 BUSHING 1-2 INSTALLER

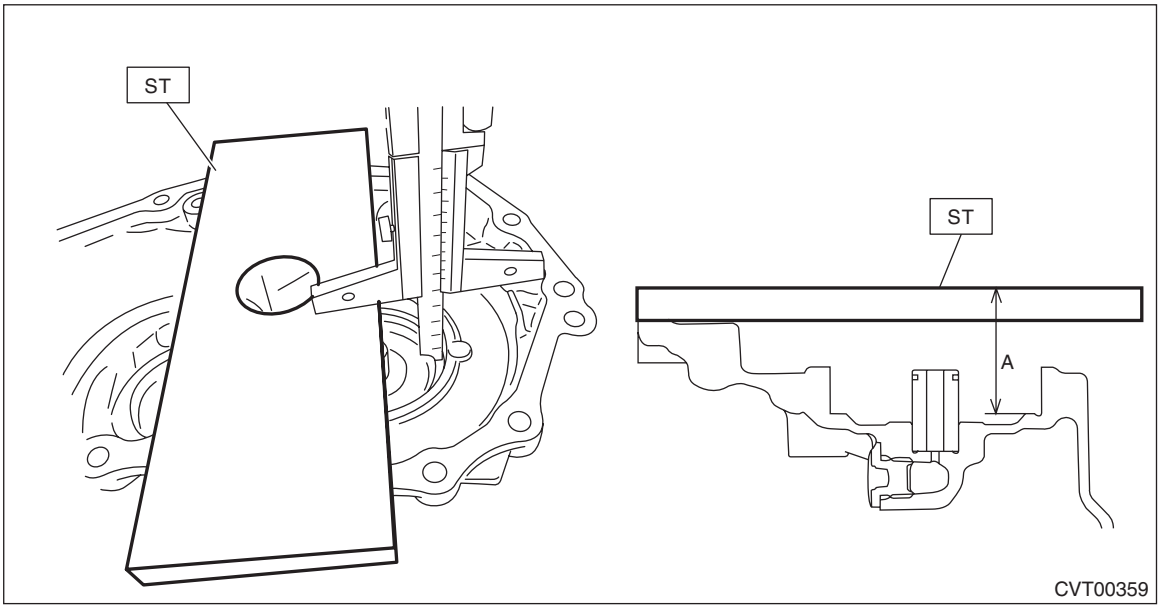


E: INSPECTION

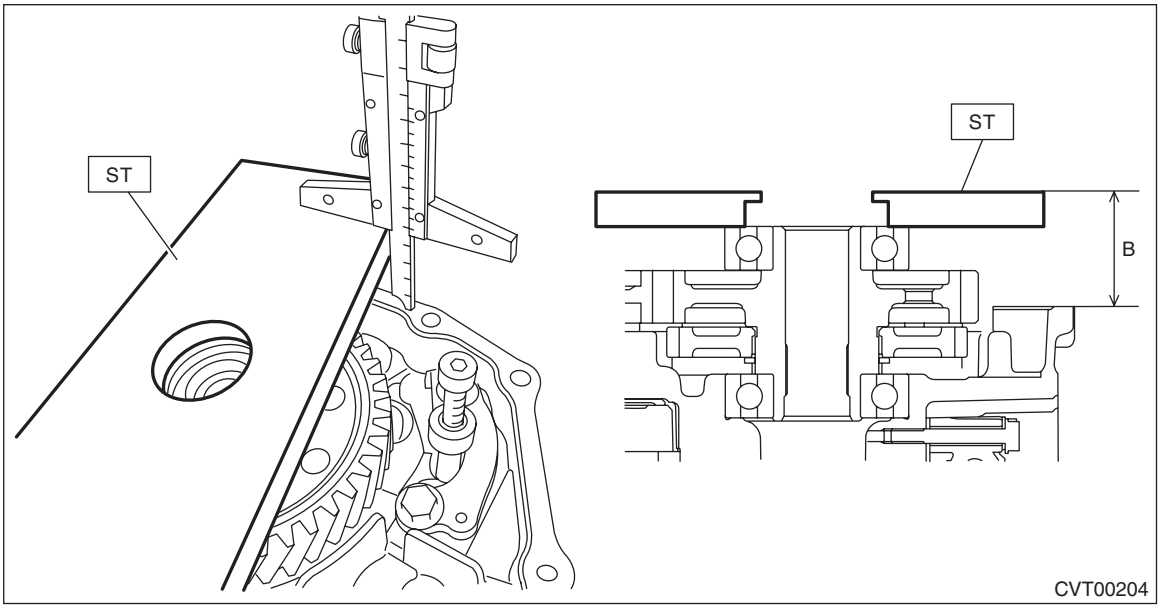
- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Make sure each gear is not broken or damaged.

F: ADJUSTMENT

1) Measure the height “A” from the ST upper face to the ball bearing catch surface.
ST 499575600 GAUGE



2) Measure the height “B” from the ST to the mating surface of the transmission case.
ST 499575600 GAUGE



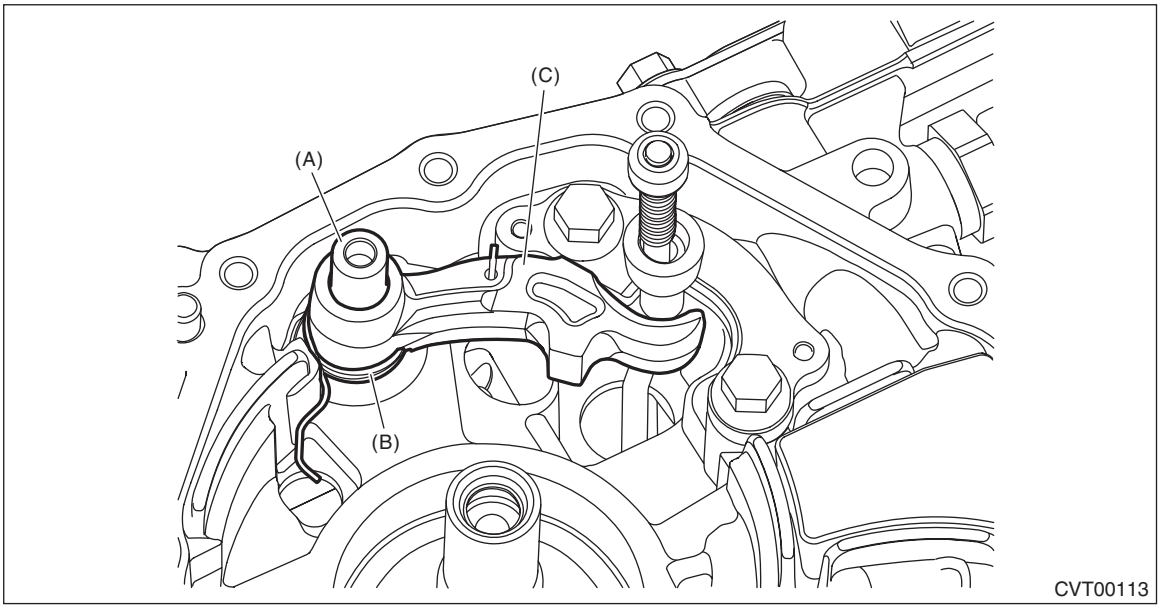
3) Obtain the thickness of transfer drive gear shim using the following formula to select zero to three transfer drive gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Shim thickness
A: Height from the ST upper face to the ball bearing catch surface
B: Height from ST to transmission case mating surface
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Transfer drive gear shim	
Part No.	Thickness mm (in)
33279AA090	0.3 (0.012)
33279AA100	0.4 (0.016)
33279AA110	0.5 (0.020)

36.Parking Pawl

A: REMOVAL

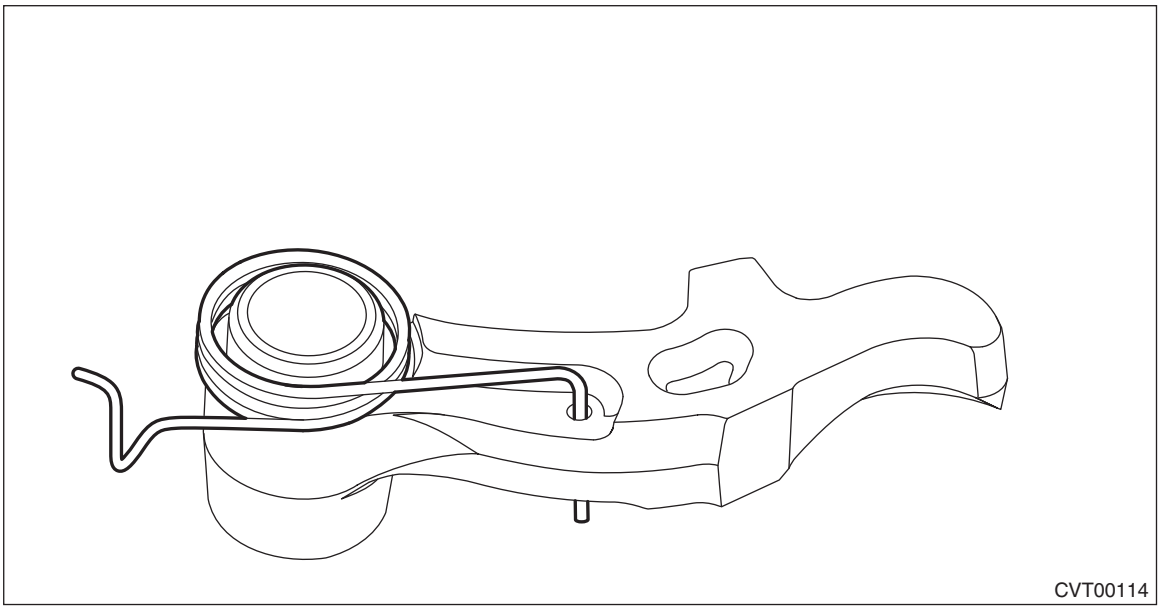
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
5) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
6) Remove the parking pawl shaft, return spring and parking pawl.



(A) Parking pawl shaft
(B) Return spring
(C) Parking pawl

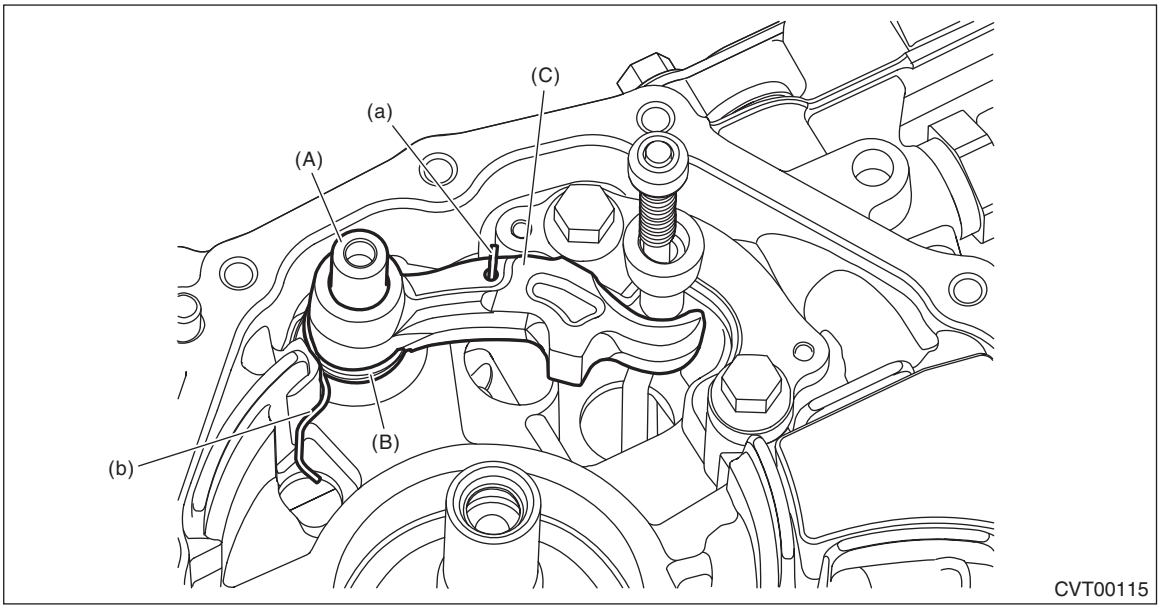
B: INSTALLATION

1) Set the range select lever to the “N” range.
2) Install the return spring to parking pawl.



3) Install the parking pawl and parking pawl shaft.

NOTE:
Make sure that the end of return spring sticks out of the hole of parking pawl as shown in (a). Make sure that the other end contacts the rib of transmission case as shown in (b).



(A) Parking pawl shaft
(B) Return spring
(C) Parking pawl

4) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
5) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
6) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
7) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
8) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

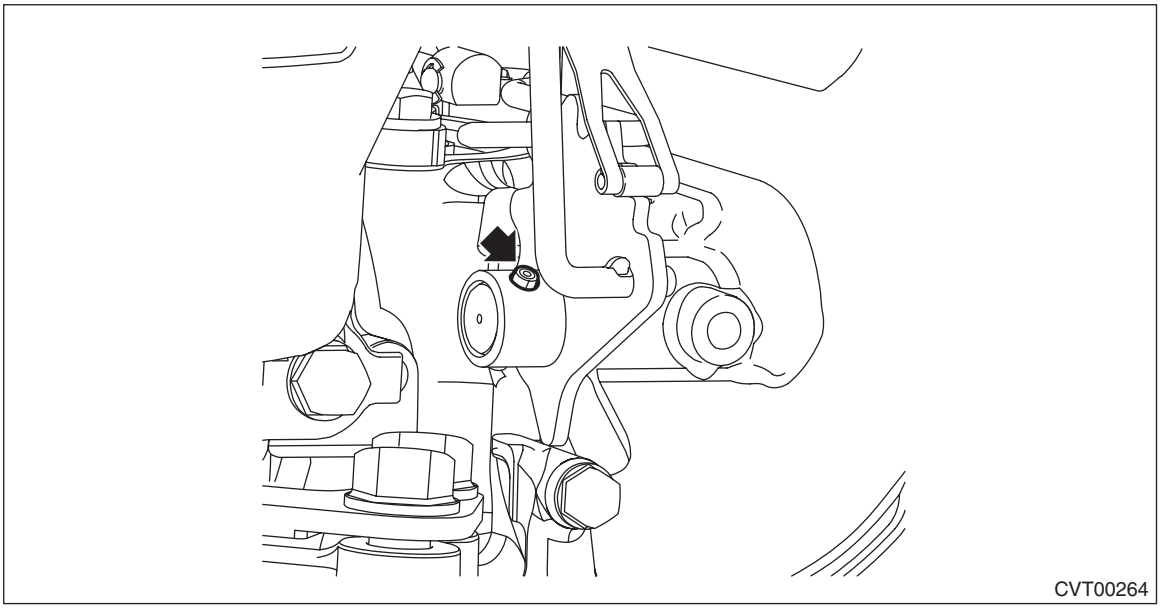
- Check the parking pawl for breakage or damage.
- Check for worn, broken and/or damaged return spring.

37.Transmission Control Device

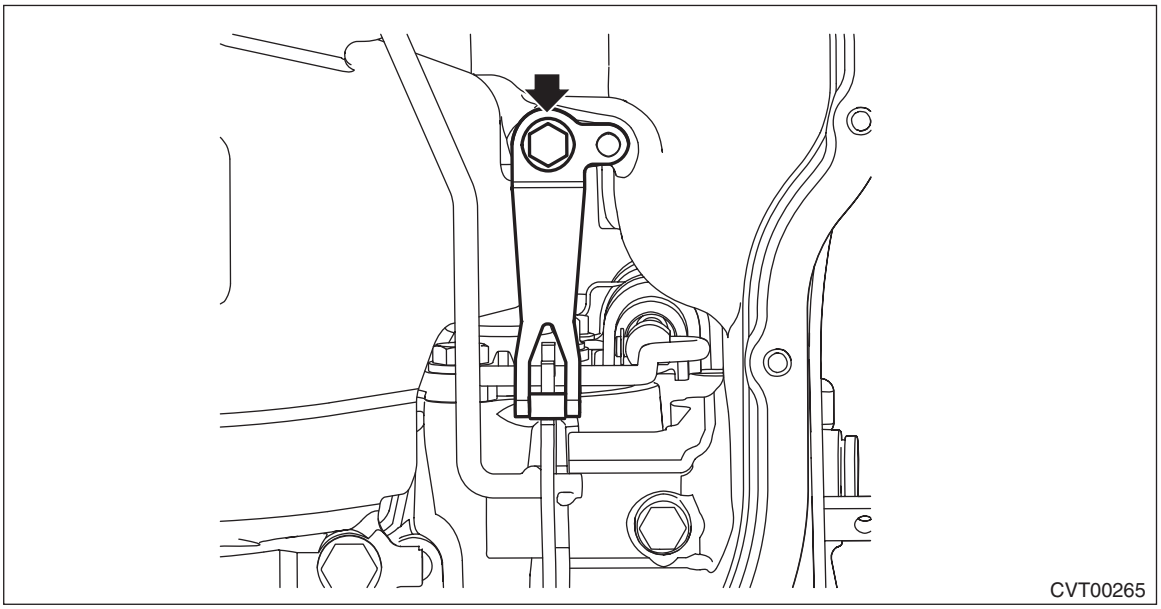
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
3) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
4) Shift the manual plate to “N” range, and remove the spring pin.

NOTE:
Prevent the spring pin from dropping in the transmission using paper towel etc.

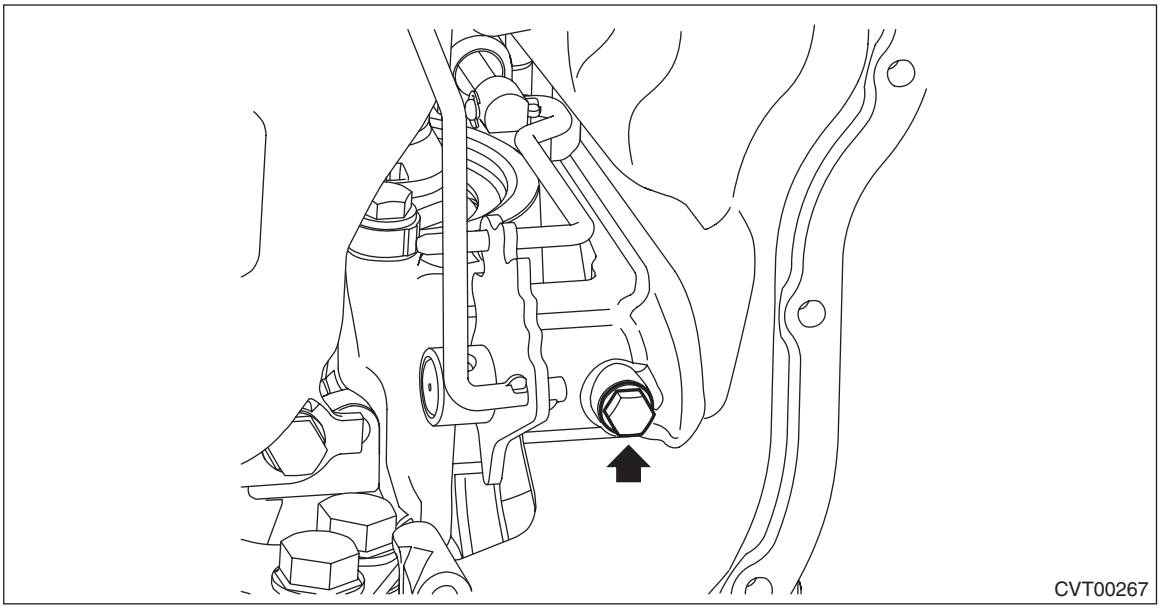

CVT00264

5) Remove the detent spring.

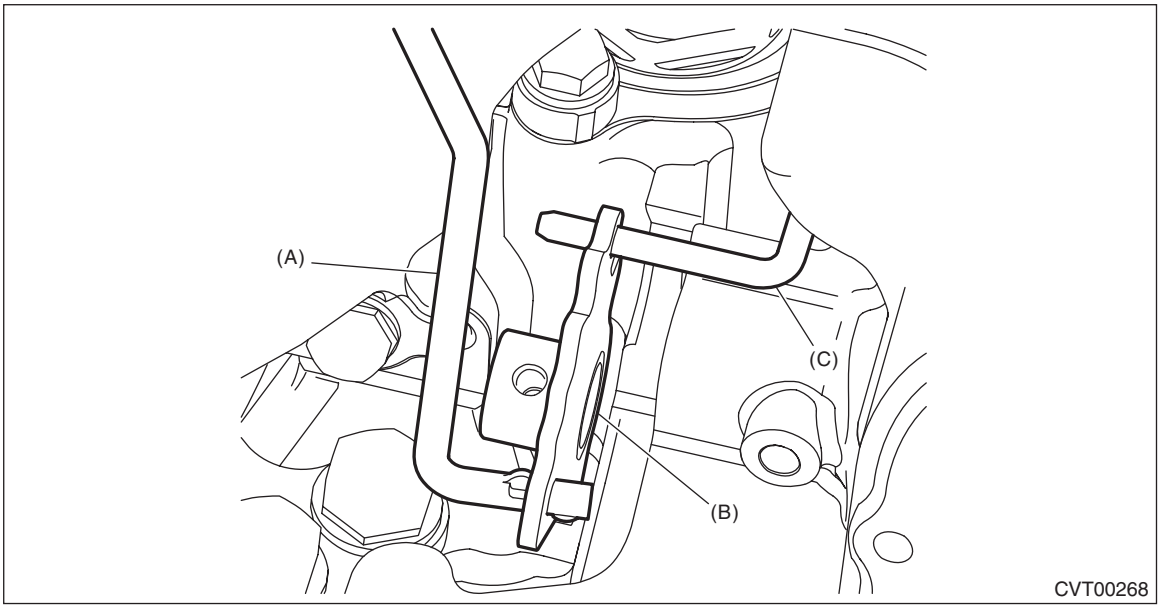

CVT00265

6) Remove the shifter arm shaft.

NOTE:
Do not damage the lip of oil seal press-fitted in the case.



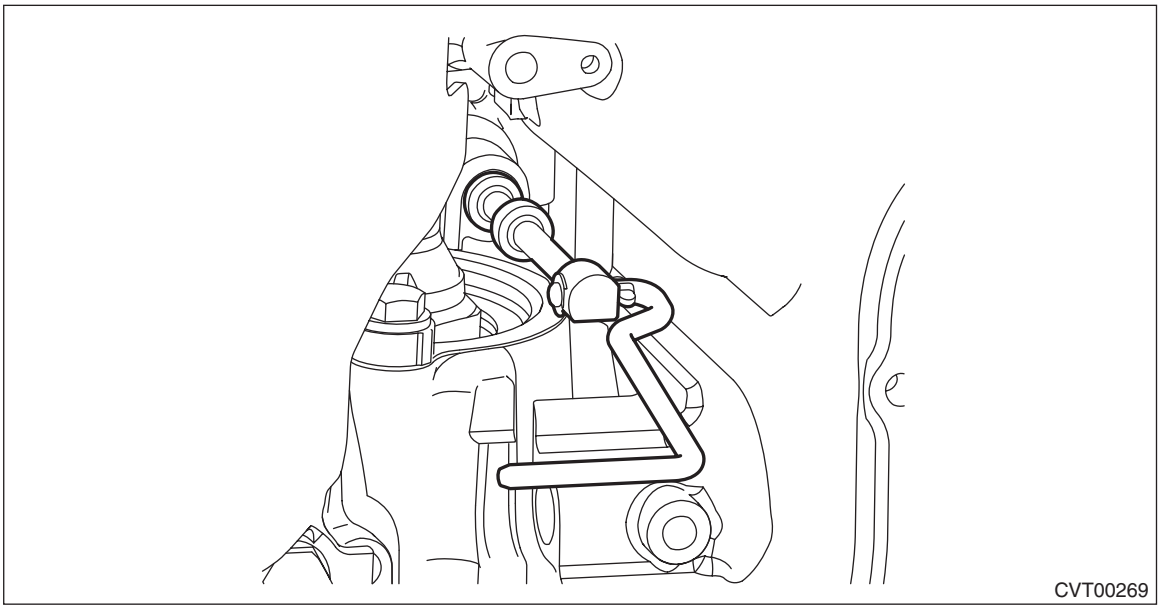
7) Remove the shift connecting rod of manual valve.



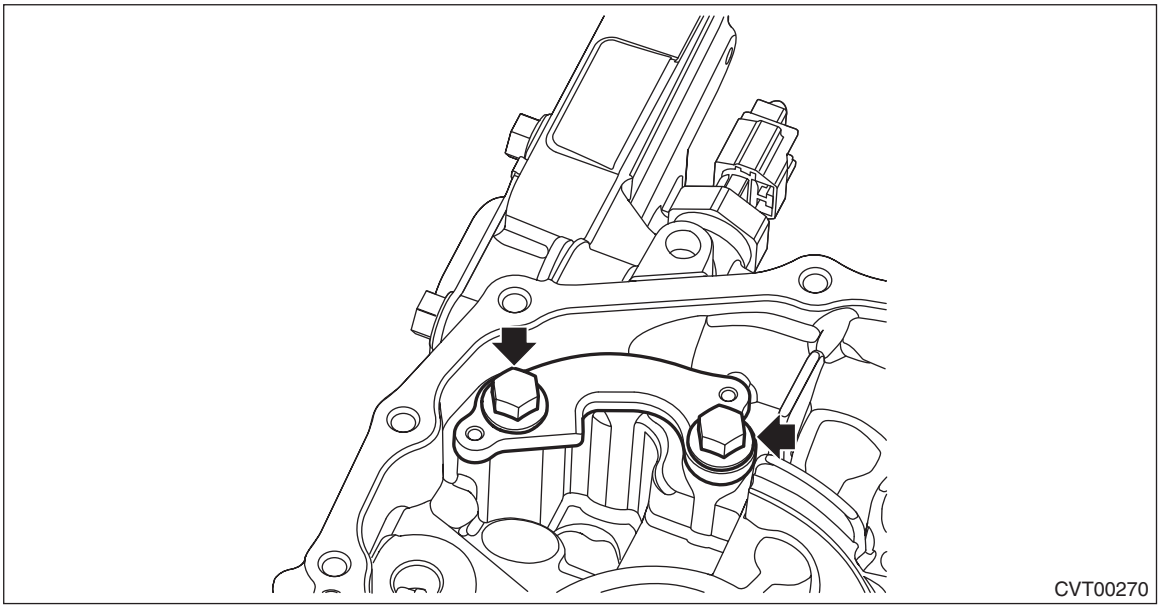
(A) Parking rod
(B) Manual plate
(C) Shift connecting rod

8) Remove the manual plate and parking rod.

9) Remove the manual valve.



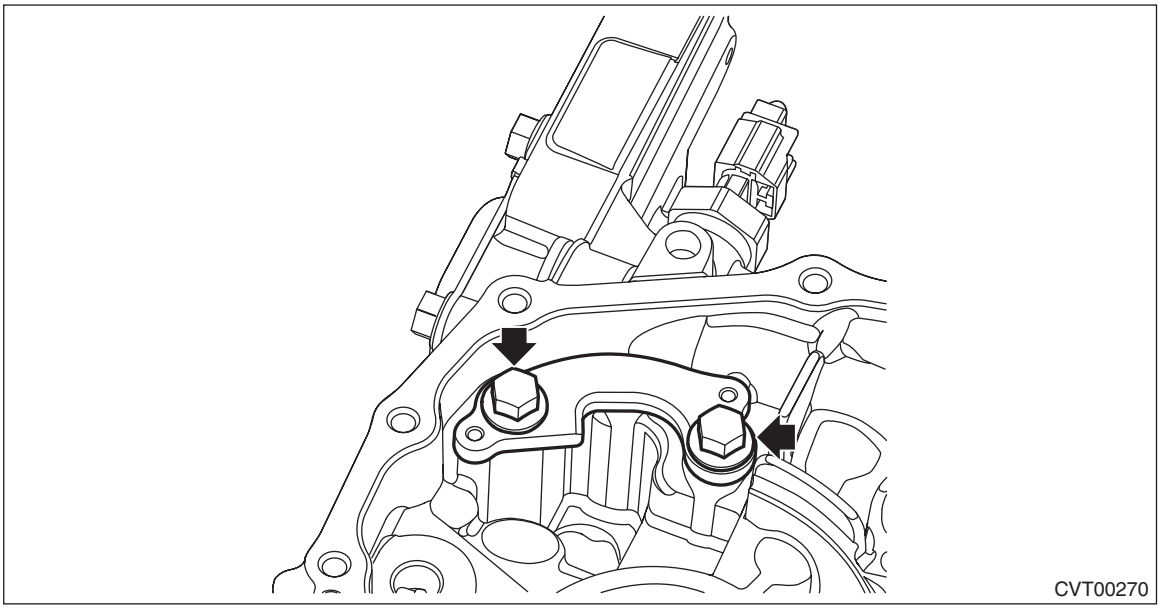
10) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
11) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
12) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
13) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
14) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
15) Remove the parking support.



B: INSTALLATION

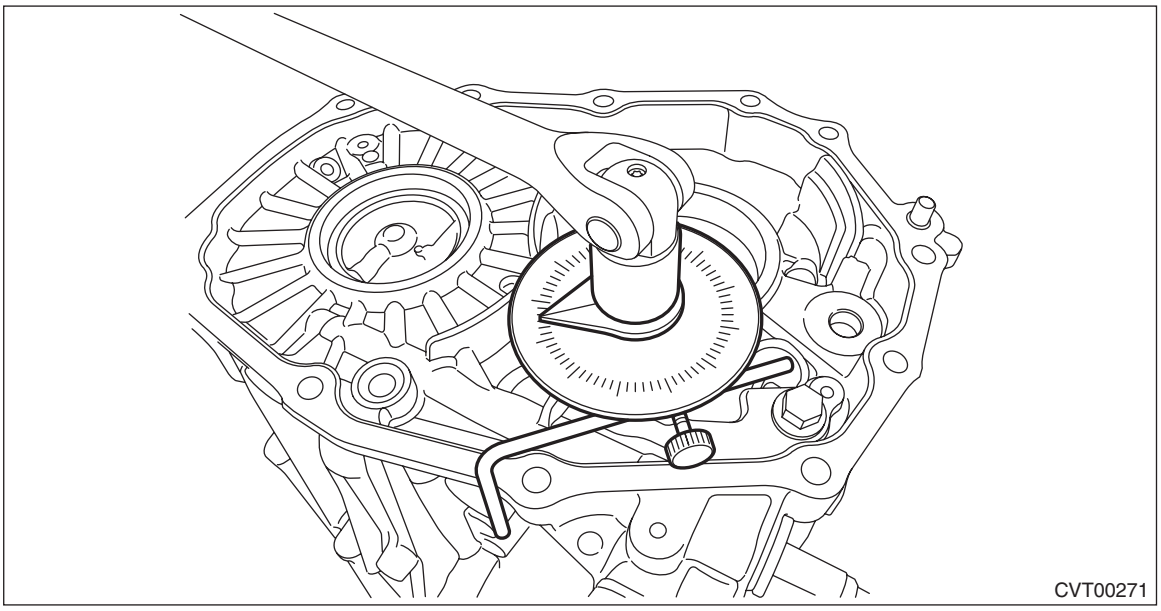
1) Install the parking support.
   (1) Install the parking support.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

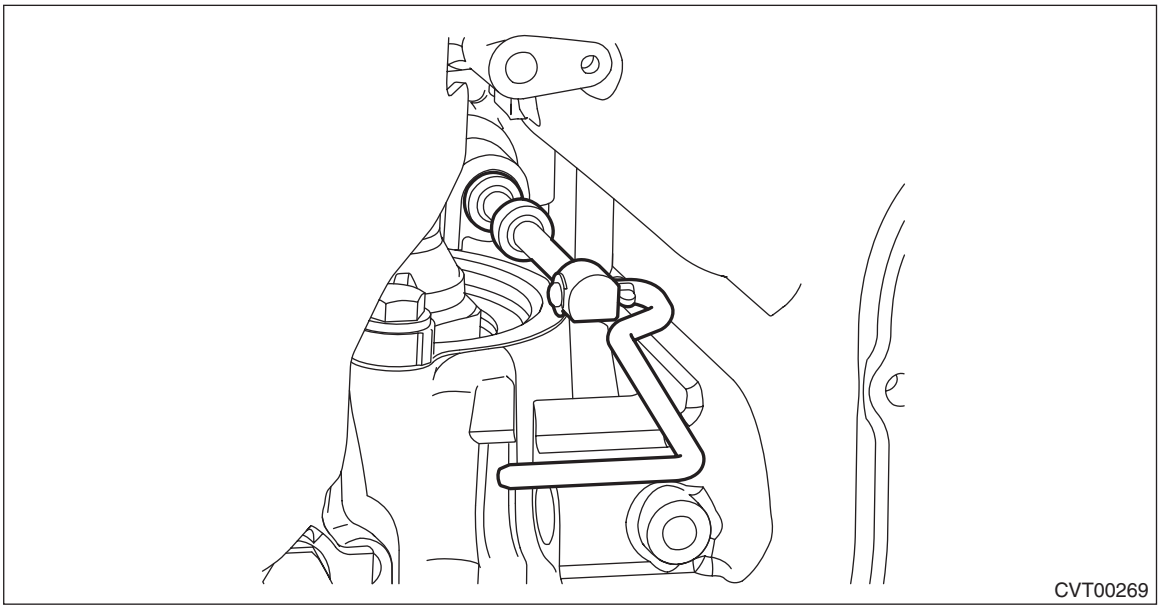


(2) While checking the tightening angle with the angle gauge, tighten the parking support mounting bolts to the specified angle.

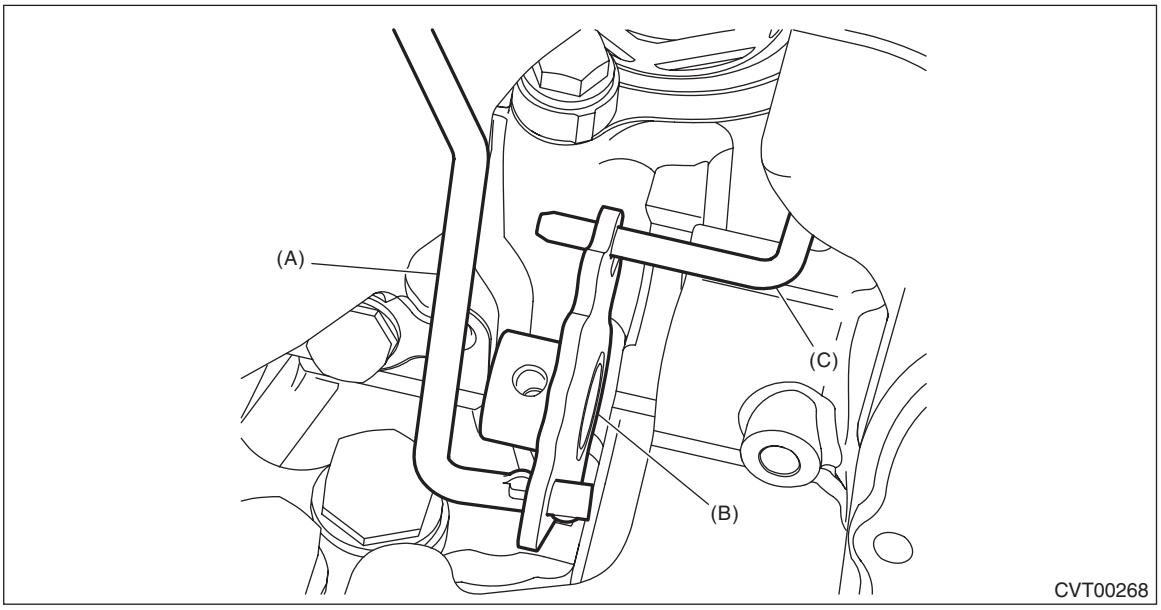
Tightening angle:
15° — 19°



2) Install the manual valve.



3) Install the parking rod to the manual plate.
4) Insert the parking rod into the transmission case, and install the shift connecting rod of the manual valve to the manual plate.

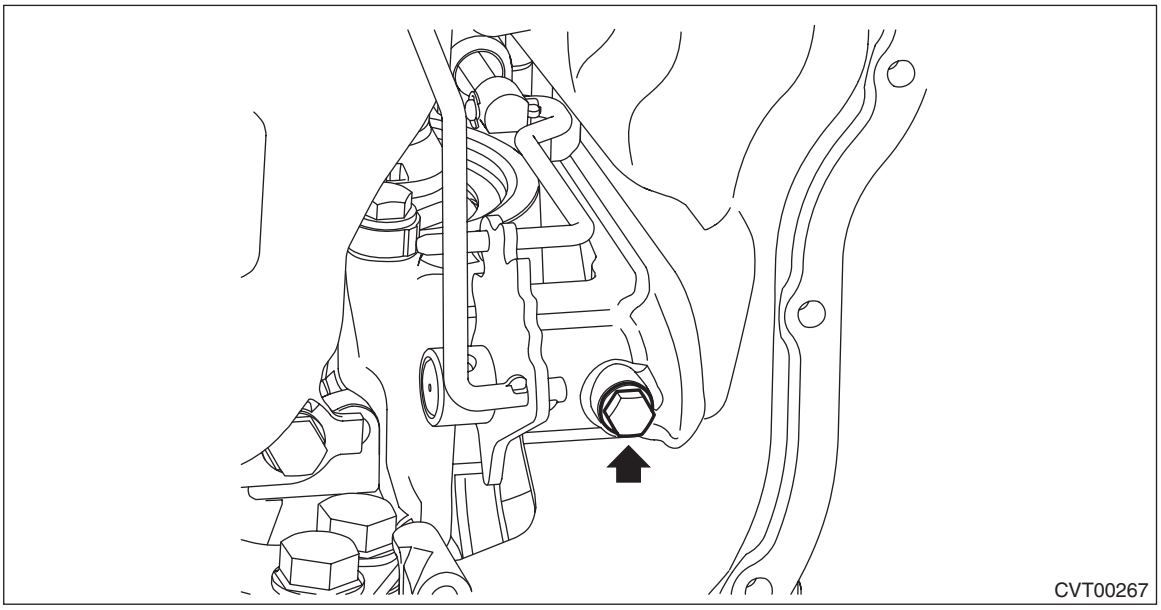


(A) Parking rod
(B) Manual plate
(C) Shift connecting rod

5) Insert the shifter arm shaft to the transmission, install the manual plate to the shifter arm shaft, and secure the shifter arm shaft with bolt.

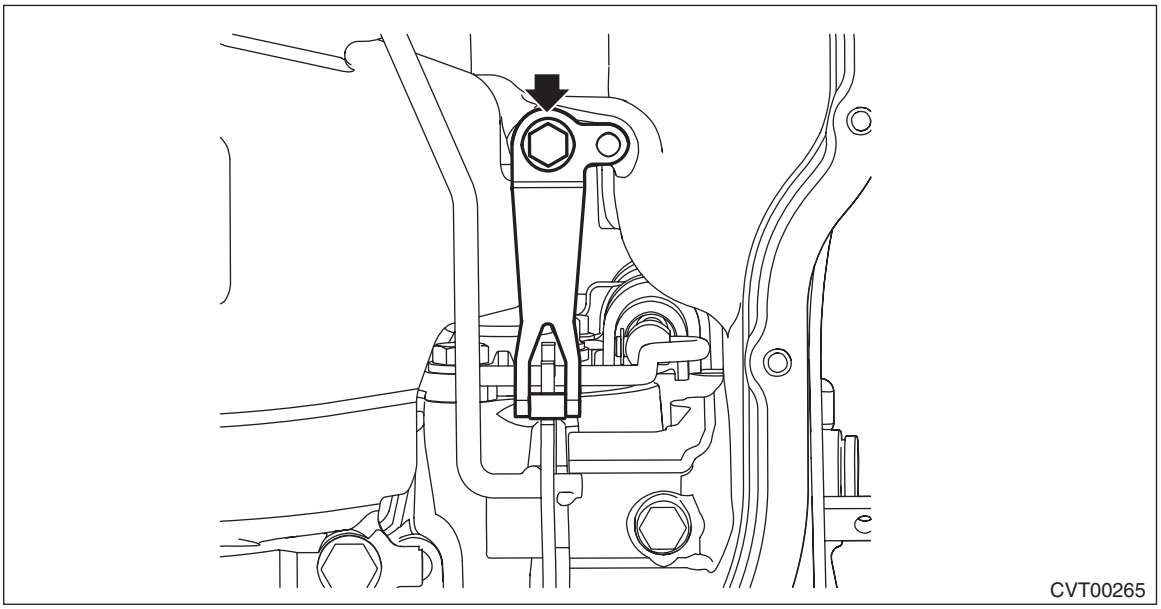
NOTE:
Do not damage the lip of oil seal press-fitted in the case.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



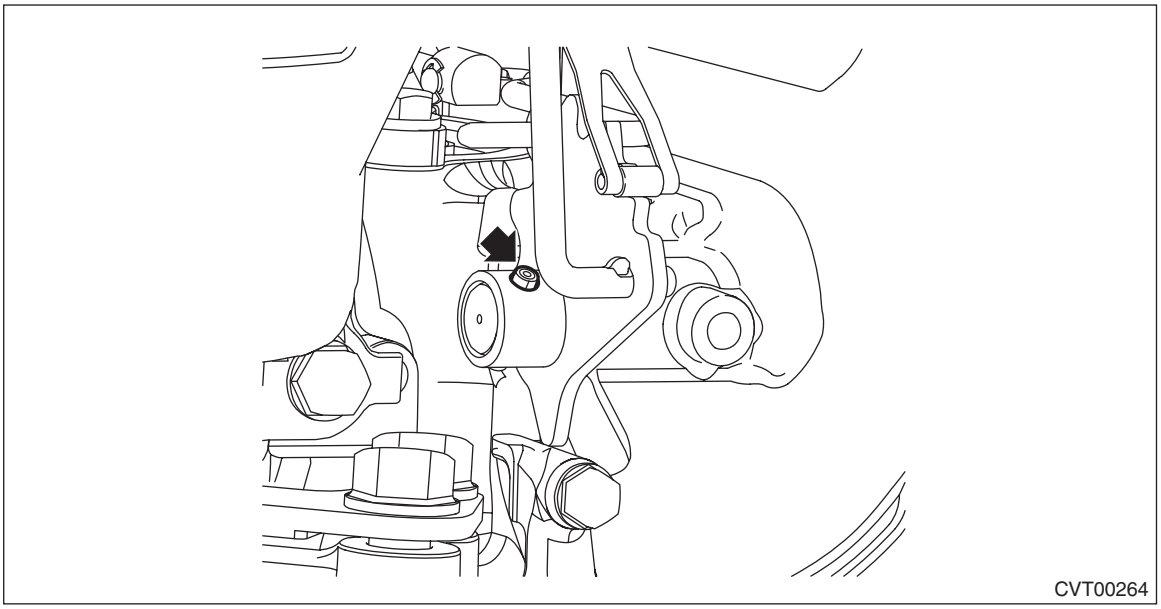
6) Install the detent spring to the transmission case.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



7) Install the spring pin.

NOTE:
Use new spring pin.



8) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
9) Adjust the inhibitor switch. <Ref. to CVT(TH58A)-99, ADJUSTMENT, Inhibitor Switch.>
10) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
11) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
12) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
13) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
14) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
15) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
16) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

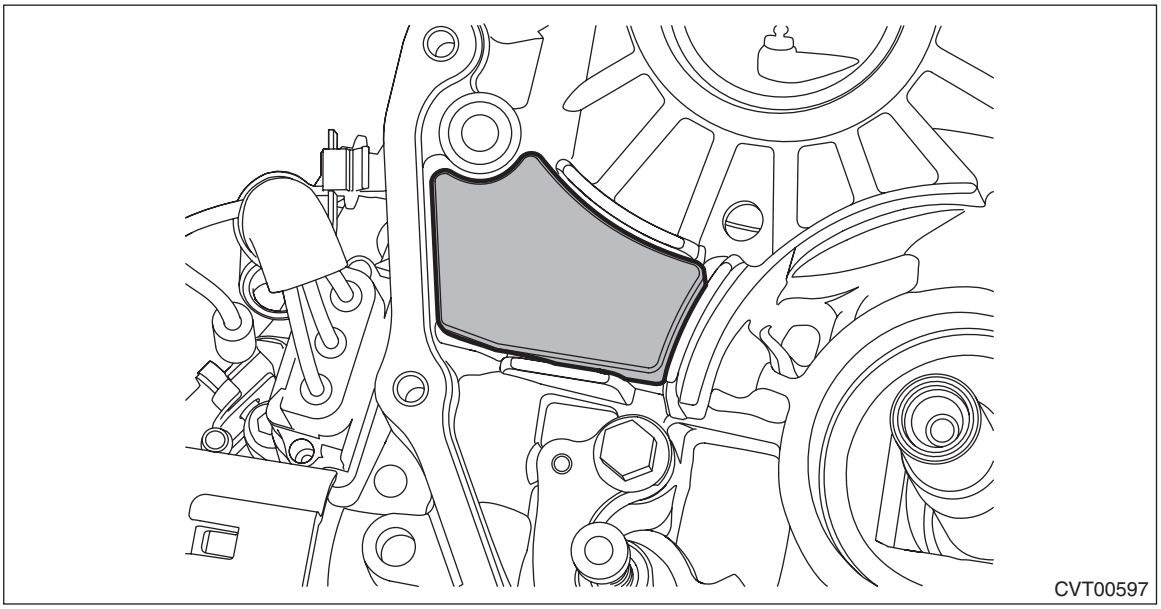
C: INSPECTION

Make sure that the manual plate and detent spring are not worn or otherwise damaged.

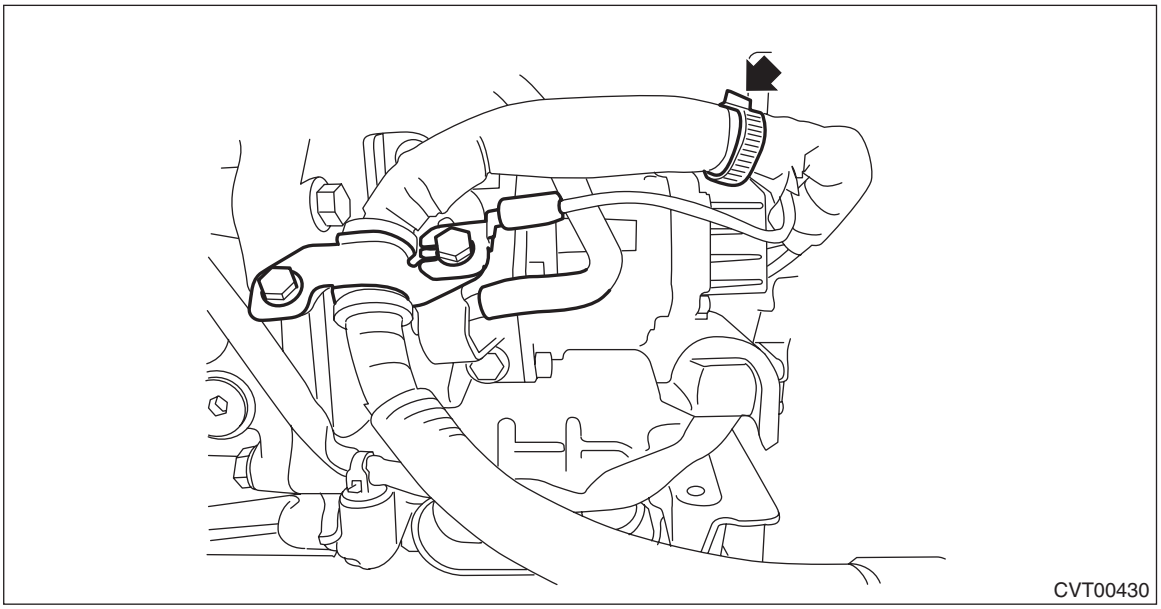
38.Drive Motor Assembly

A: REMOVAL

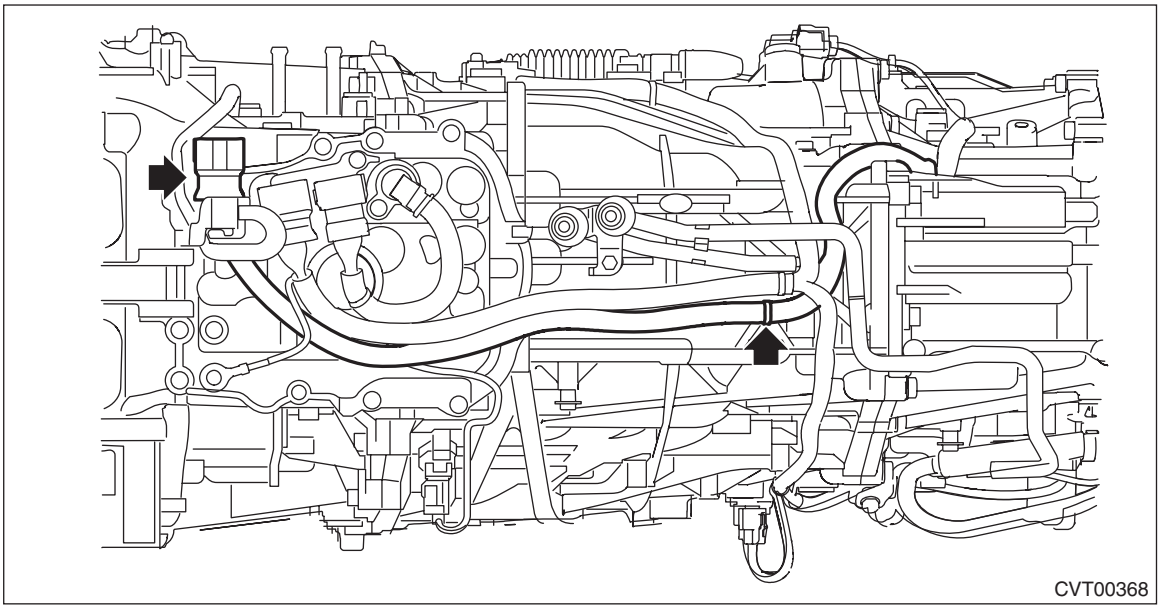
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the sensor cover. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
3) Remove the secondary pressure sensor harness connector, and remove the harness clip. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
5) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
6) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
7) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
8) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
9) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
10) Remove the oil spacer.



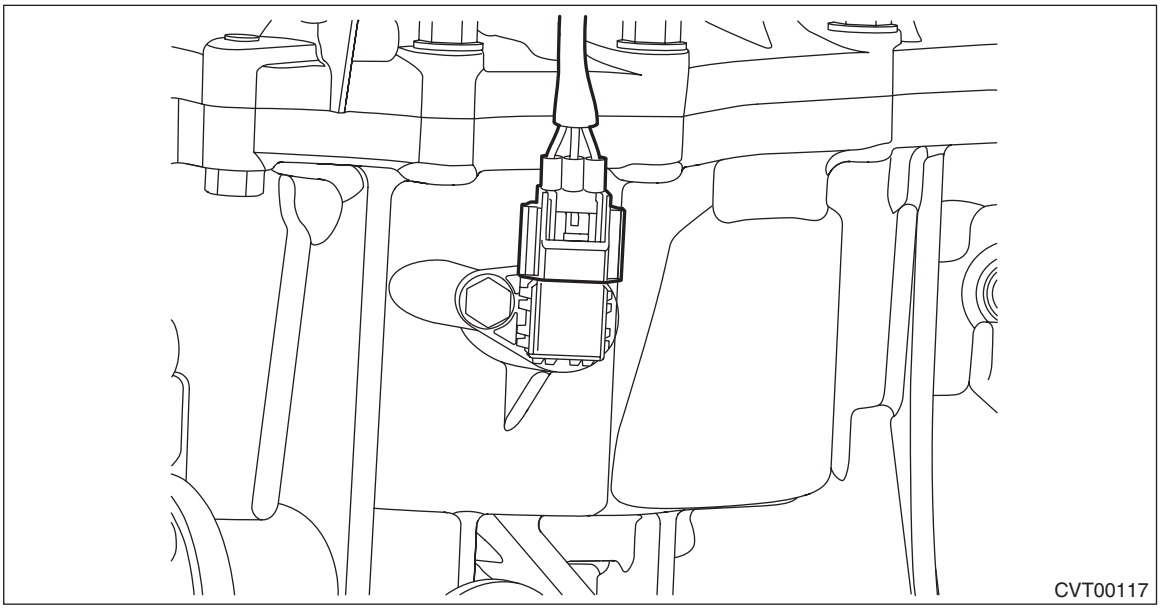
11) Release the harness clips from the harness bracket, then remove the air breather hose, harness bracket and ground terminal.



12) Remove the drive motor harness connector from the stay, and release the drive motor harness clips.



13) Remove the front wheel speed sensor harness connector.

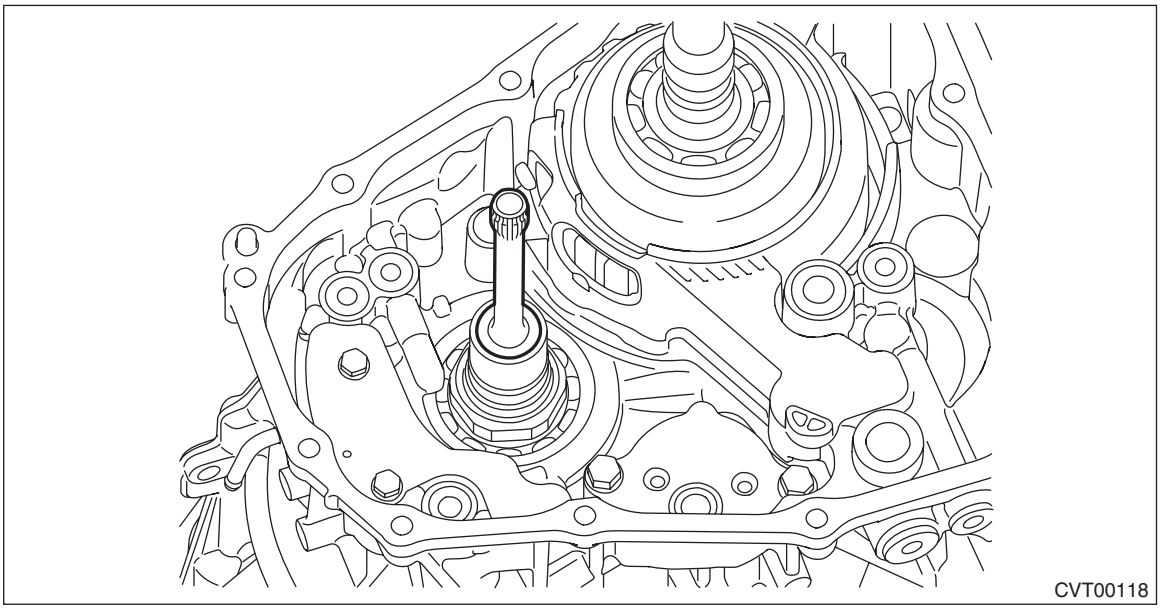


14) Remove the drive motor assembly.

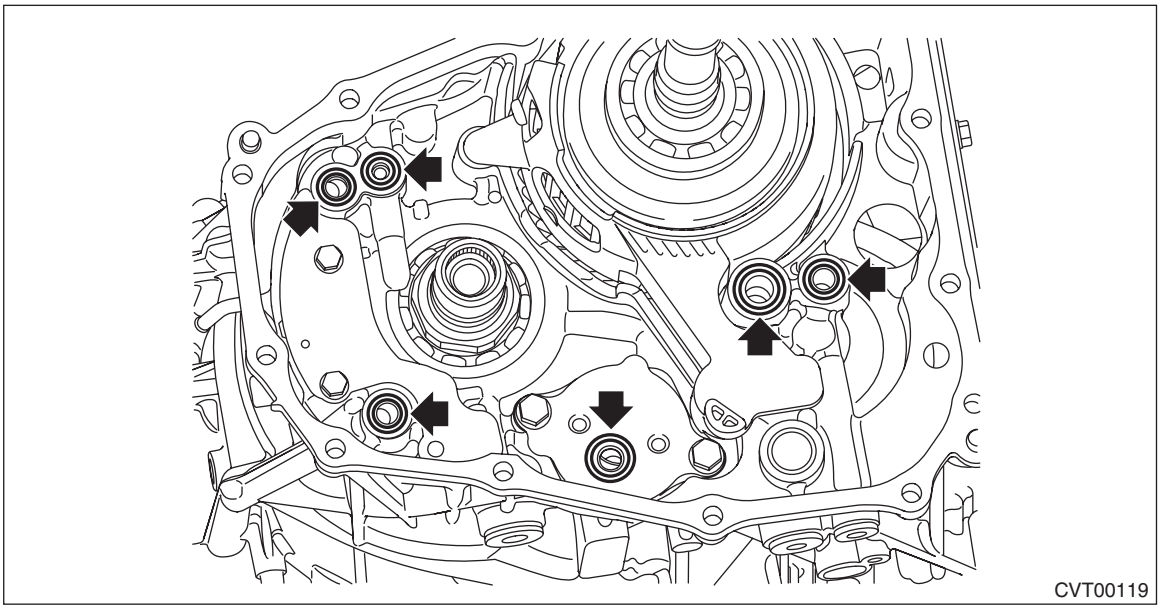
CAUTION:
Do not apply excessive force or damage the electric oil pump harness.

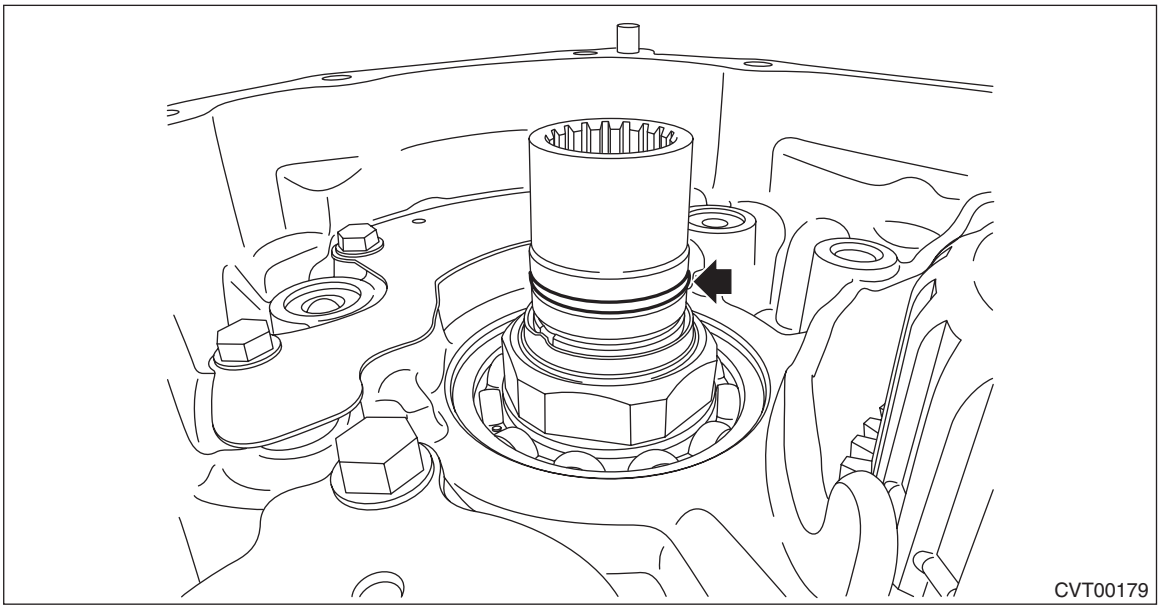
NOTE:
- The total number of drive motor assembly mounting bolts is 14.
- Perform this operation with two persons.
- After removal, do not place it with the drive motor side facing downward.

15) Remove the intermediate shaft.

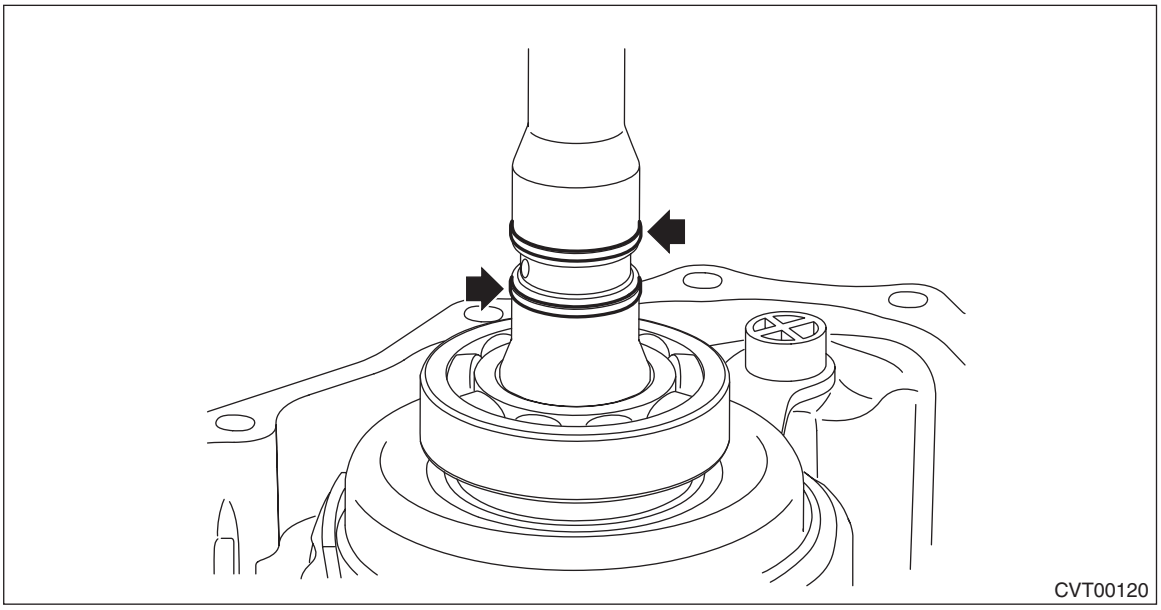


16) Remove the O-ring.





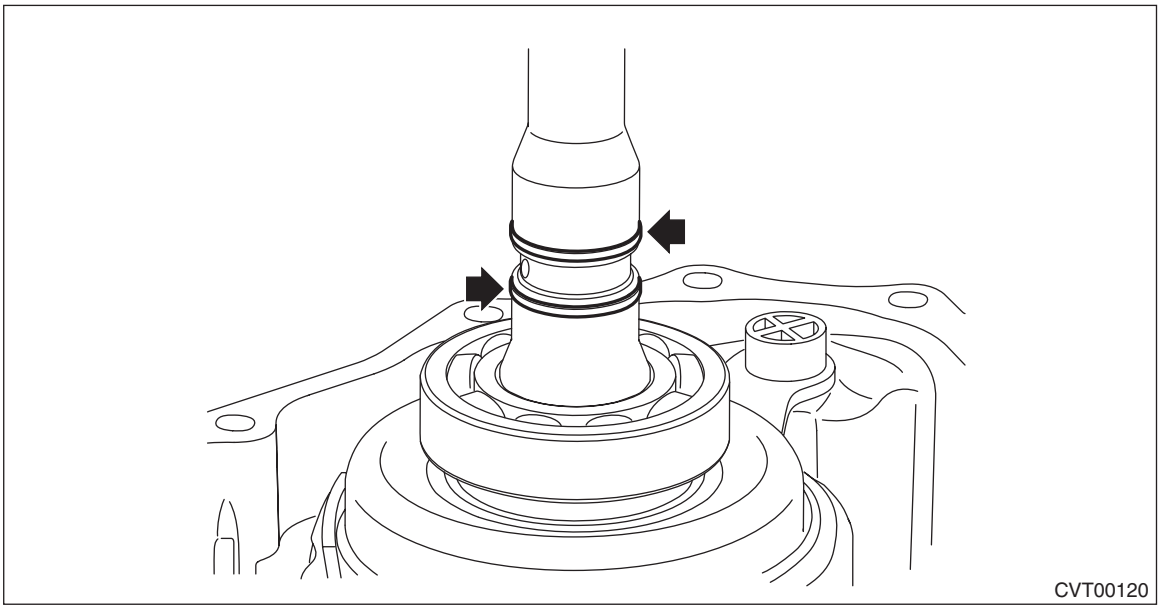
17) Remove the seal ring.



B: INSTALLATION

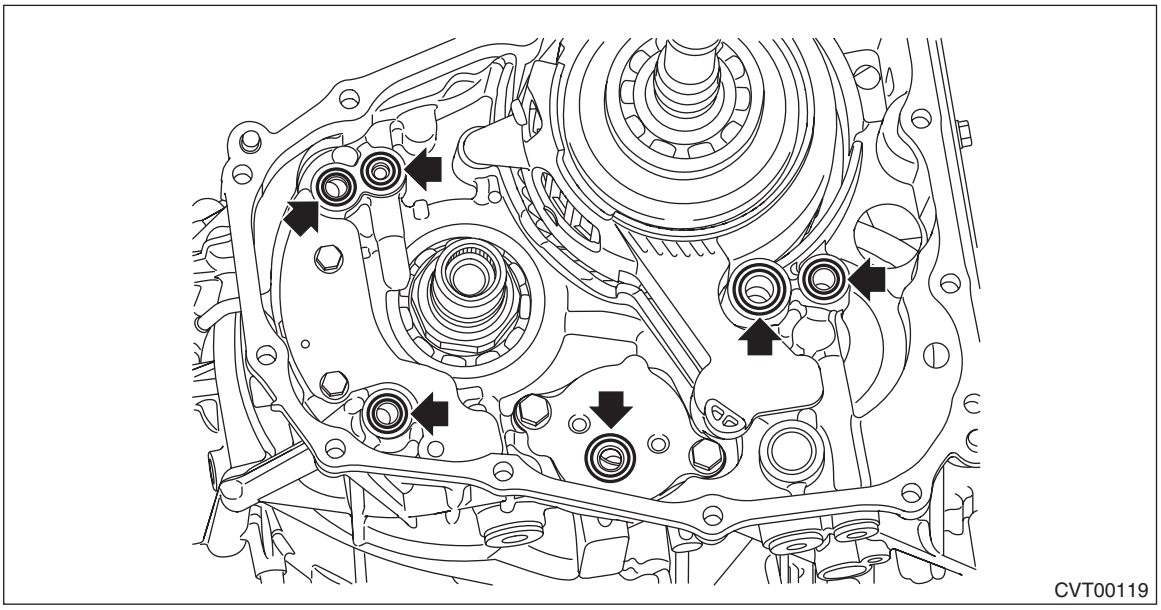
1) Install the seal ring.

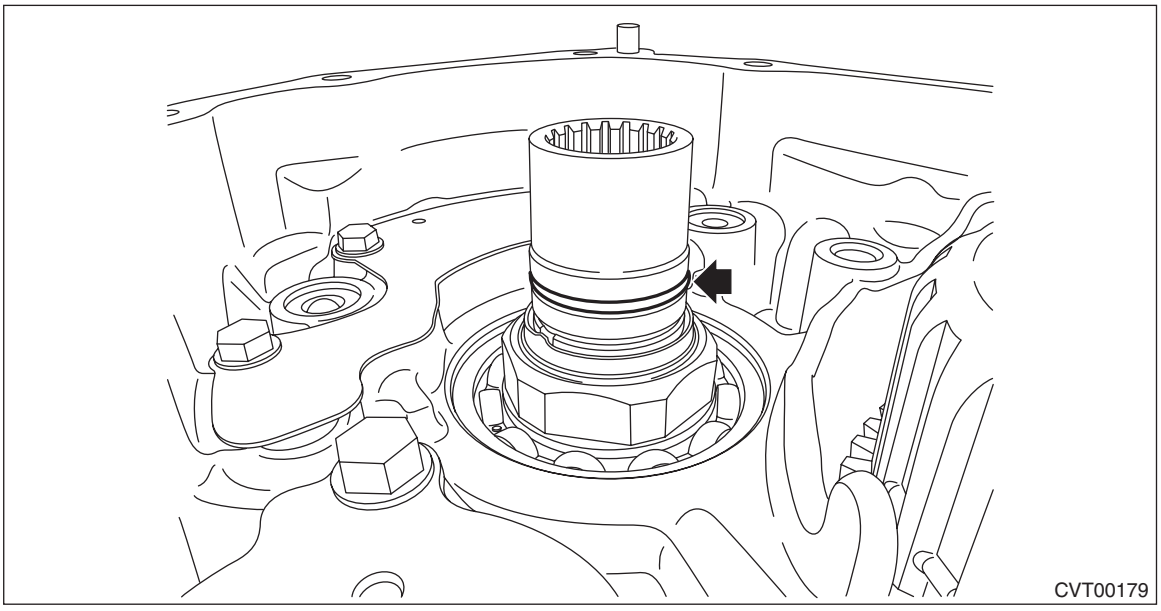
NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



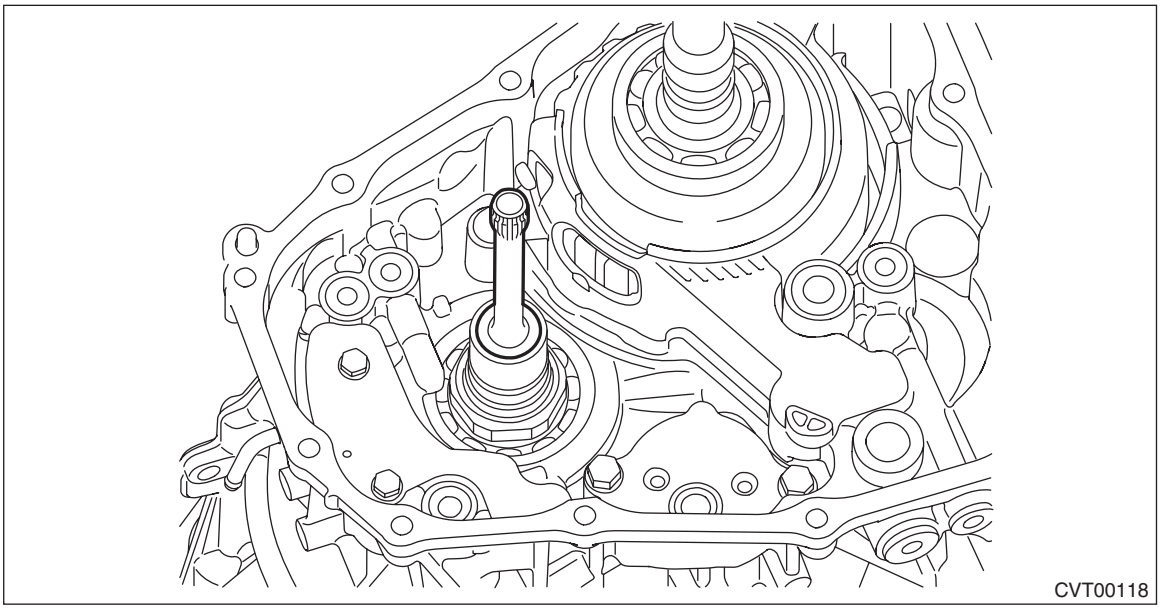
2) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.


CVT00119

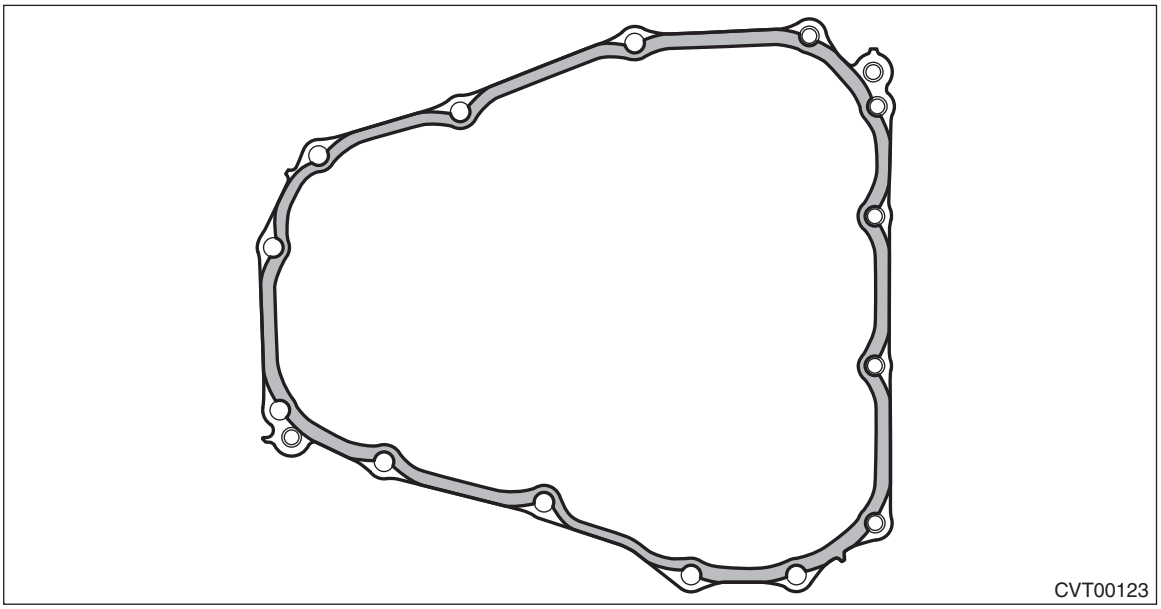

CVT00179

3) Install the intermediate shaft.



4) Apply liquid gasket to the transmission case seamlessly.

Liquid gasket:
THREE BOND 1215B or equivalent



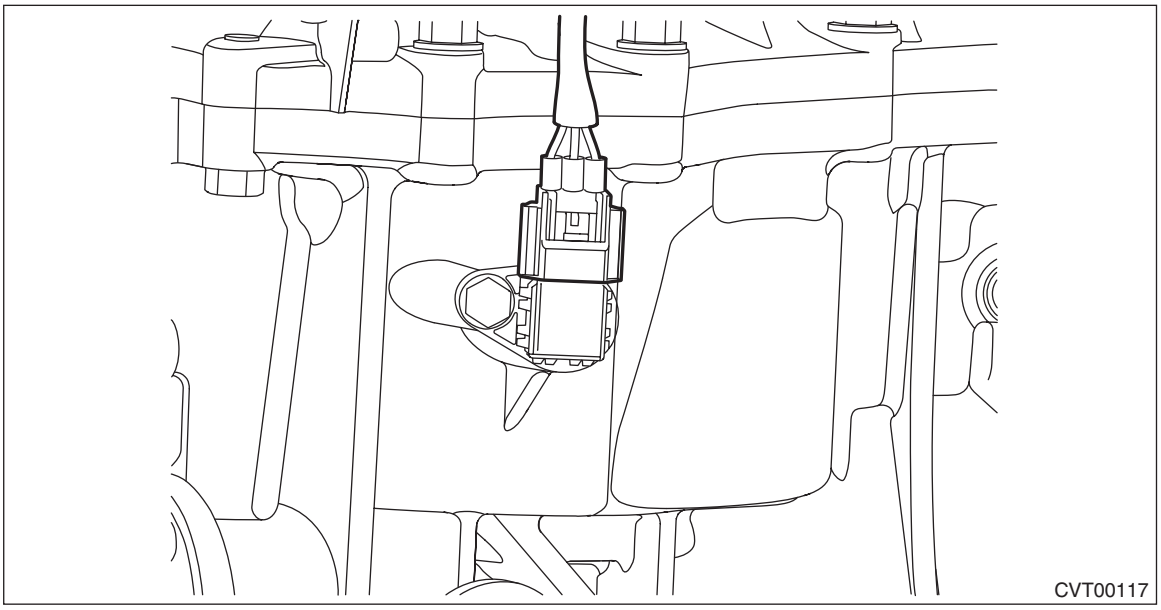
5) Install the drive motor assembly.

CAUTION:
Do not apply excessive force or damage the electric oil pump harness.

NOTE:
- The total number of drive motor assembly mounting bolts is 14.
- Perform this operation with two persons.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

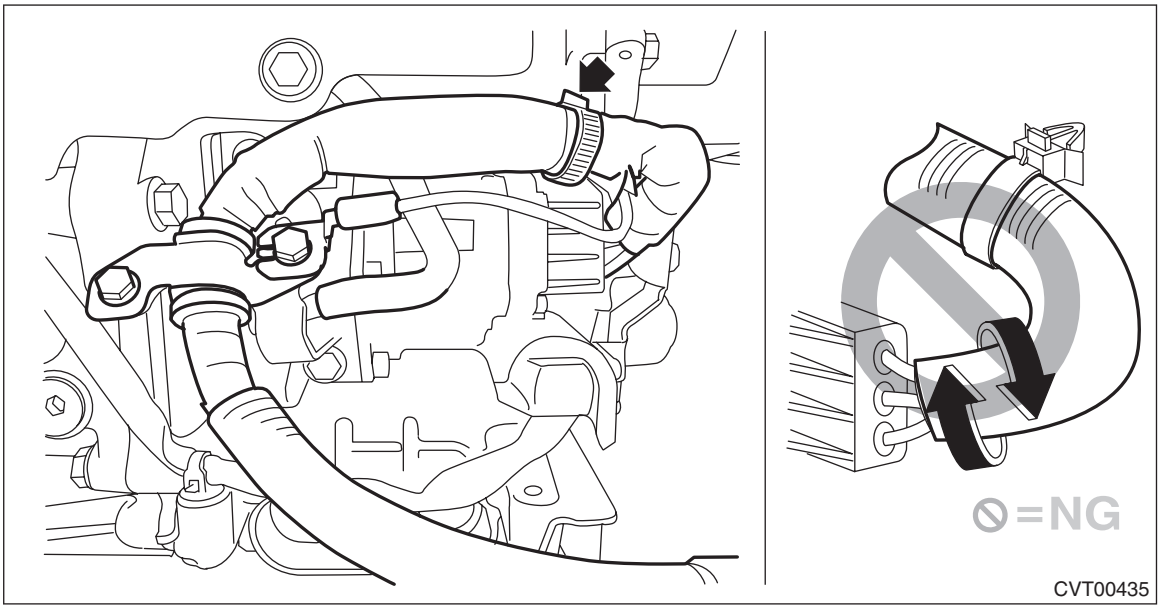
6) Install the front wheel speed sensor harness connector.



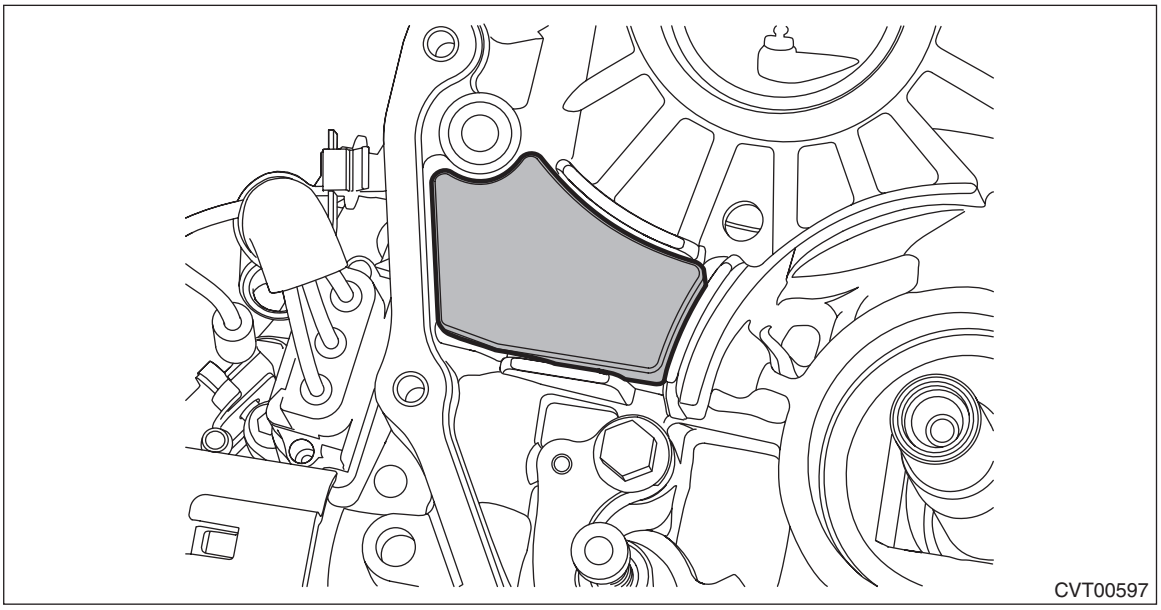
7) Install the harness bracket to the harness clip, then install the air breather hose, electric oil pump harness, harness bracket and ground terminal.

CAUTION:
When installing the electric oil pump harness, be careful not to twist the harness by 360°.

Tightening torque:
8 N·m (0.8 kgf-m, 13.3 ft-lb)

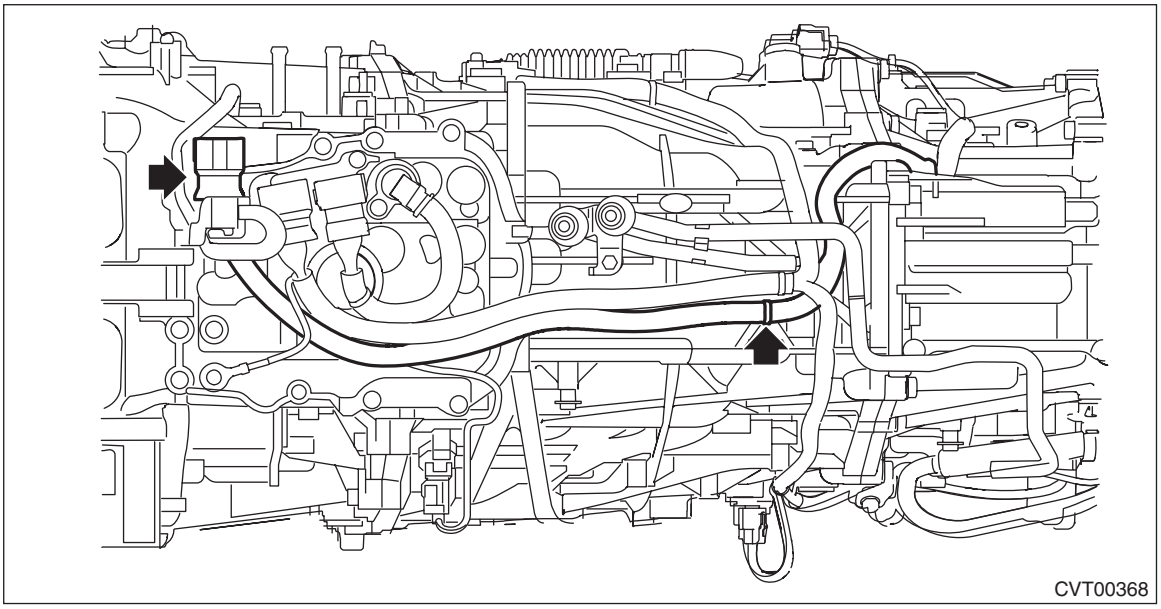


8) Install the oil spacer.



9) Install the drive motor harness clip, and then install the drive motor harness connector to the stay.

NOTE:
Install the drive motor harness through the lower side of air breather hose and the transmission harness.

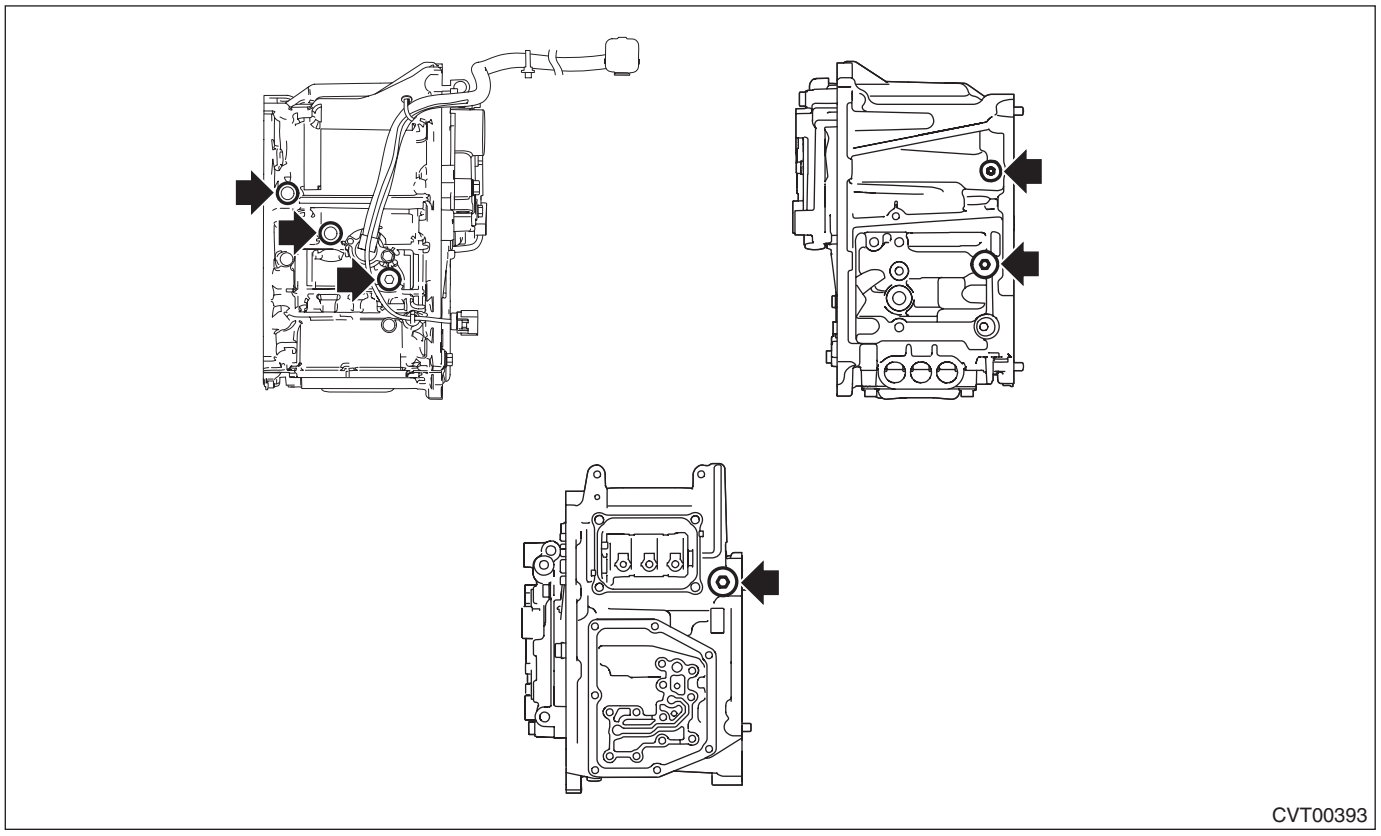


10) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
11) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
12) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
13) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
14) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
15) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
16) Install the secondary pressure sensor harness connector, and then install the harness clip. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
17) Install the sensor cover. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
18) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

CAUTION:
For disassembly, follow the instructions in this manual. Do not disassemble other than the specified parts.

1) Remove the electric oil pump. <Ref. to CVT(TH58A)-134, REMOVAL, Electric Fluid Pump.>
2) Remove the output clutch control valve body. <Ref. to CVT(TH58A)-121, OUTPUT CLUTCH CONTROL VALVE BODY, REMOVAL, Control Valve Body.>
3) Remove the power connect cover, if mounted.
4) Remove the secondary pressure sensor. <Ref. to CVT(TH58A)-110, REMOVAL, Secondary Pressure Sensor.>
5) Remove all plugs.

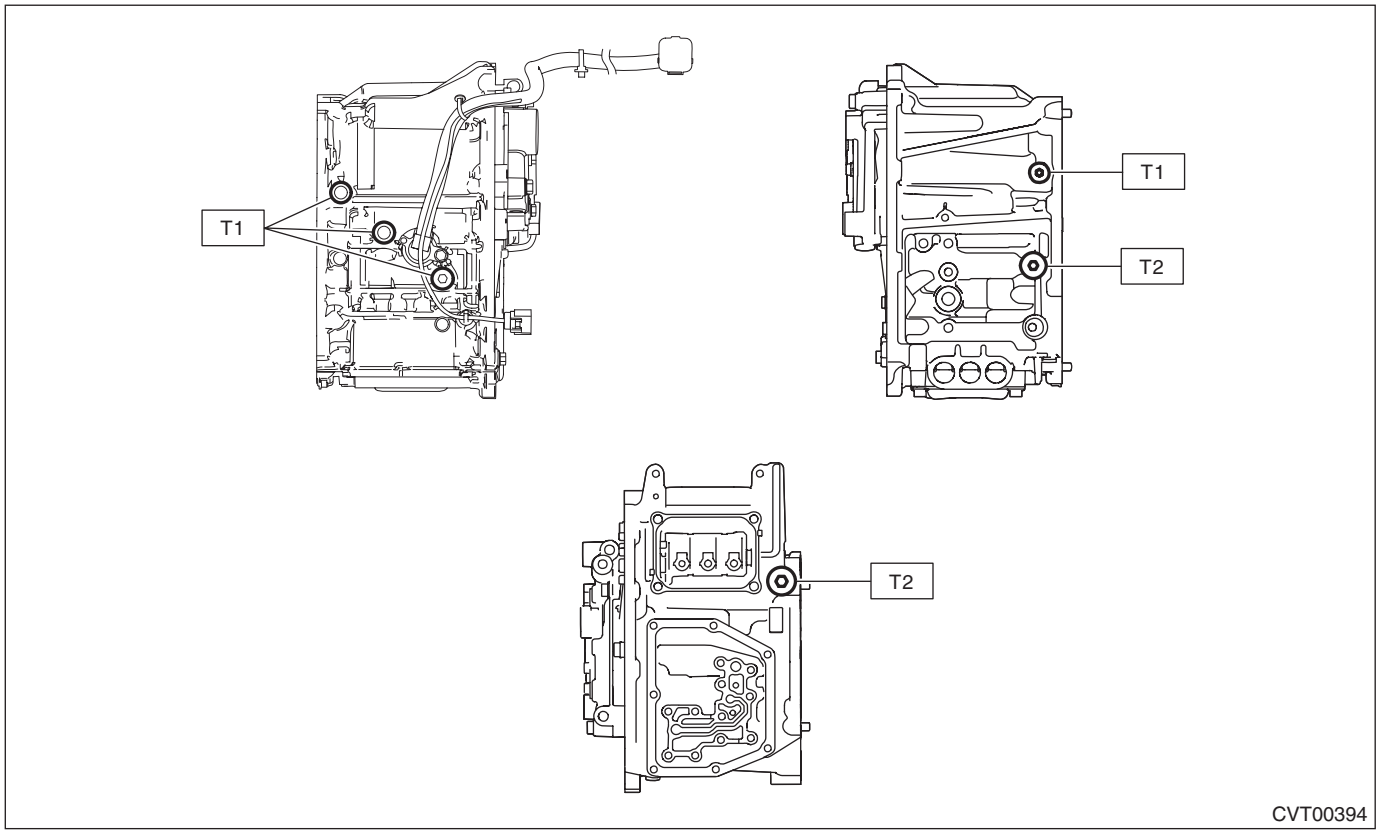


D: ASSEMBLY

1) Install all plugs.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.

Tightening torque:
T1: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
T2: 50 N·m (5.1 kgf-m, 36.9 ft-lb)



2) Install the secondary pressure sensor. <Ref. to CVT(TH58A)-111, INSTALLATION, Secondary Pressure Sensor.>
3) Temporarily attach the power connect cover.
4) Install the output clutch control valve body. <Ref. to CVT(TH58A)-121, OUTPUT CLUTCH CONTROL VALVE BODY, REMOVAL, Control Valve Body.>
5) Install the electric oil pump. <Ref. to CVT(TH58A)-138, INSTALLATION, Electric Fluid Pump.>

E: INSPECTION

- Check there is no damage or cracks on the drive motor assembly case and other parts.
- Check there is no leak of CVTF from the joint between drive motor assembly case and transmission case.

1. INSPECTION WHILE DTC P172A AND P0B0B LIGHTS ARE ON

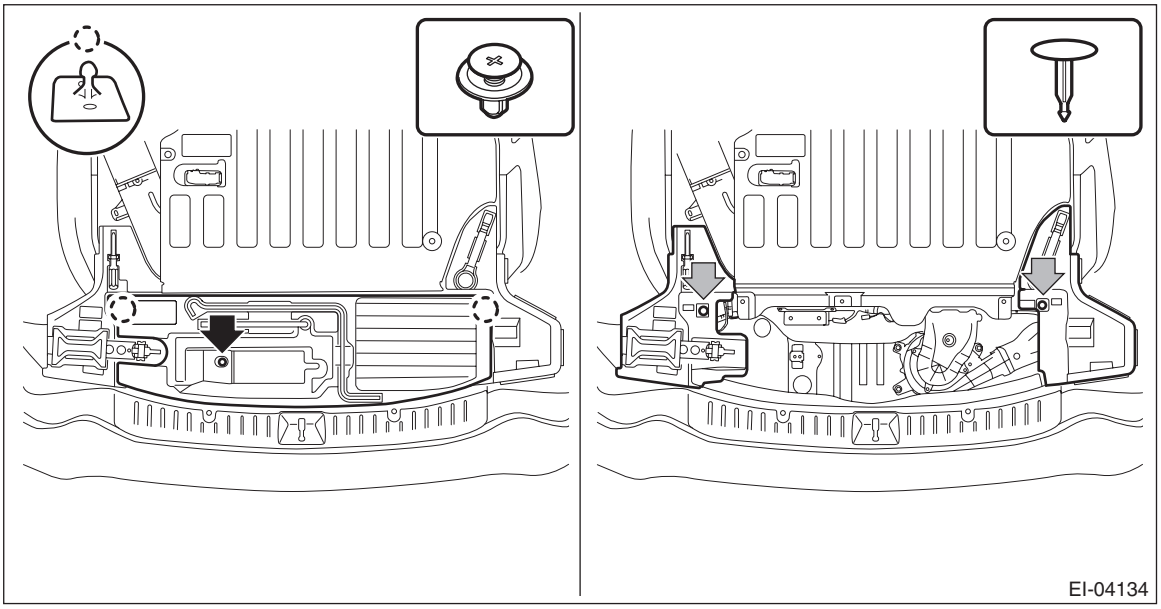
WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

NOTE:
Inspection should be performed at CVTF temperature of 40°C (104°F) or less.

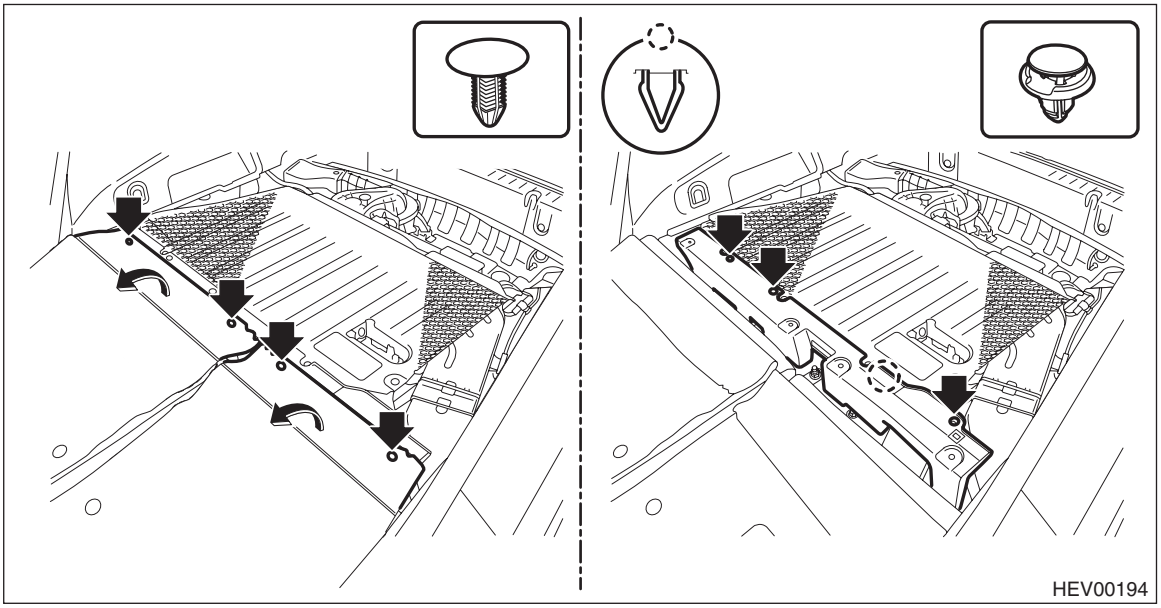
1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>

WARNING:
• Carry the removed service disconnect plug in your pocket in order to prevent other engineers from accidentally installing the plug during work.
• After removal of the service disconnect plug, the condenser inside the inverter still have been charged to a high voltage. Wait for at least 10 minutes before handling the high voltage components, wiring, terminals or connectors.

2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.

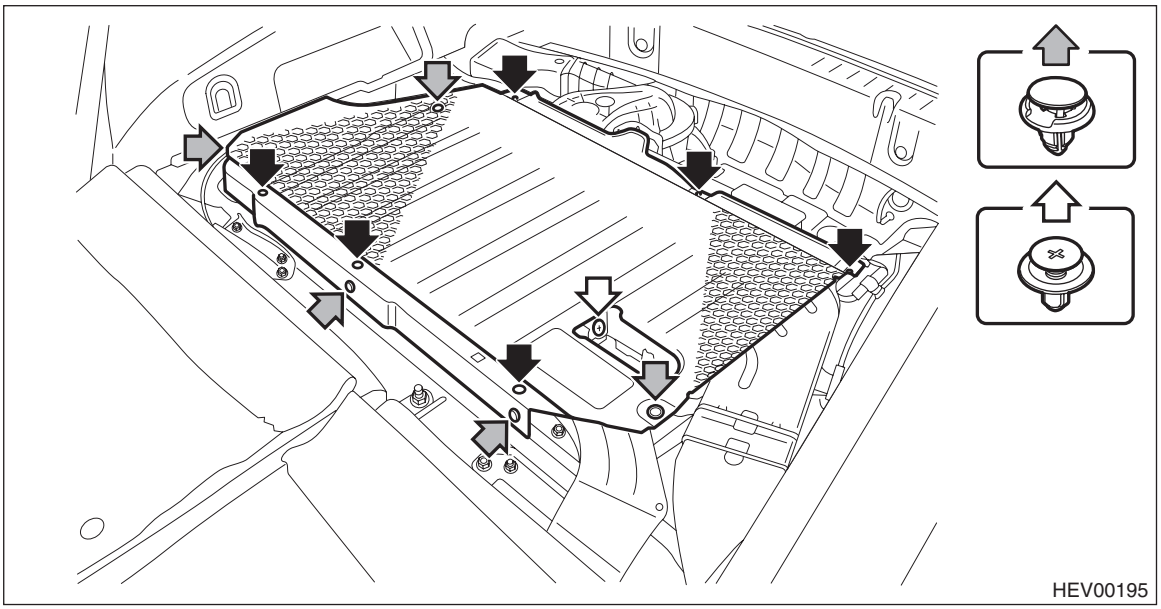


3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the spacer - rear floor front.
(1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
(2) Release the clips and claws, then detach the spacer - rear floor front.



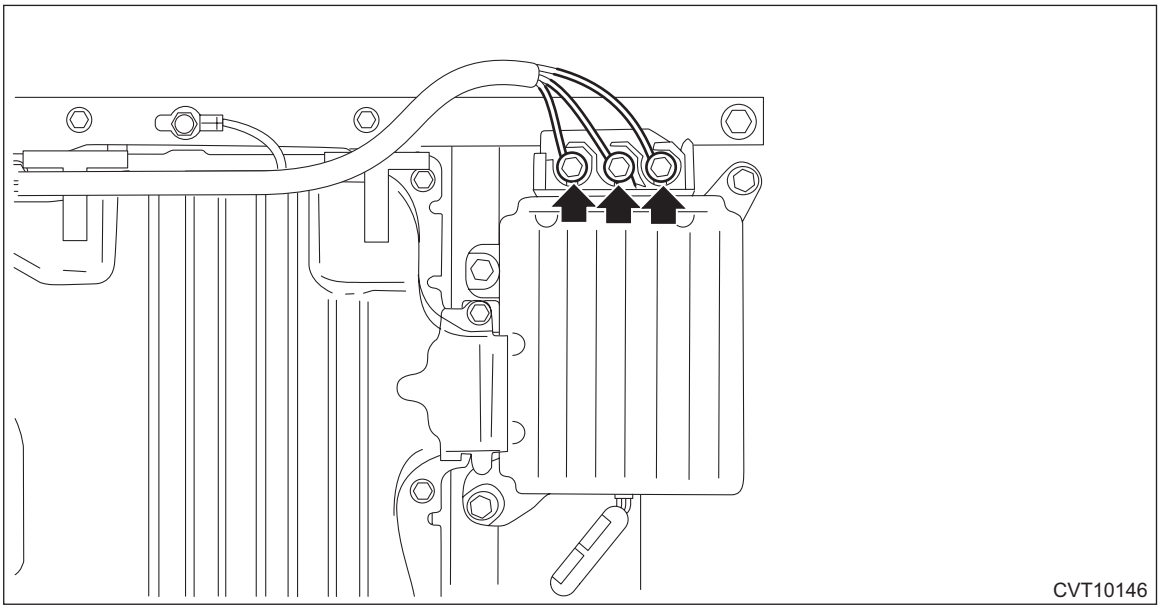
5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30

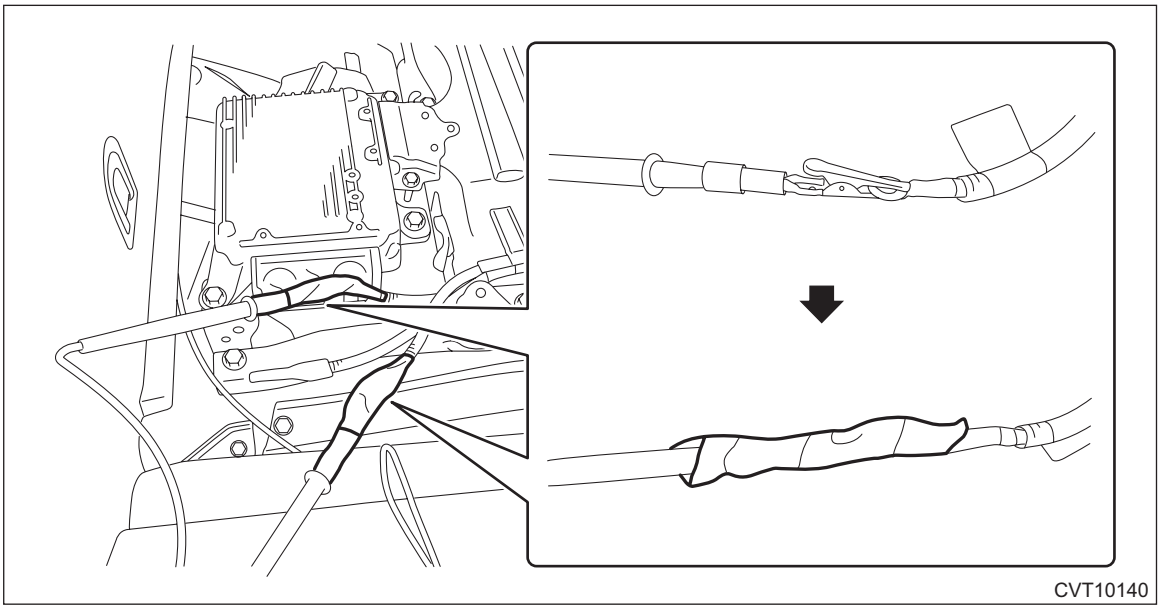


6) Remove the bolt from the electric oil pump inverter, and disconnect the power cable (100 V).

CAUTION:
- **Be careful not to use excessive force when disconnecting the power cable to avoid any damage.**
- **Always wrap the electric oil pump inverter terminal with insulating tape.**



7) Connect the positive (+) side of the tester to the U side of the power cable round terminal, and the negative (-) side of the tester to the V side. Wrap each round terminal of U·V·W with insulating tape.



8) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>
9) Switch the insulation multimeter to the alternating-current voltage measurement mode (ACV).
10) Check that the CVTF temperature is 40°C (104°F) or less using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
11) Start the engine and maintain the engine speed at approx. 1,800 r/min in P range, then measure the voltage.
If the measured value is 0.5 V or more, replace the drive motor assembly.

NOTE:
Although the AT OIL TEMP warning light illuminate, it is not a malfunction. After completion of the inspection, perform all diagnostic trouble codes and execute all Clear Memory operations.
12) Install in the reverse order of removal. <Ref. to HEV-50, ELECTRIC OIL PUMP INVERTER, INSTALLATION, Inverter.>

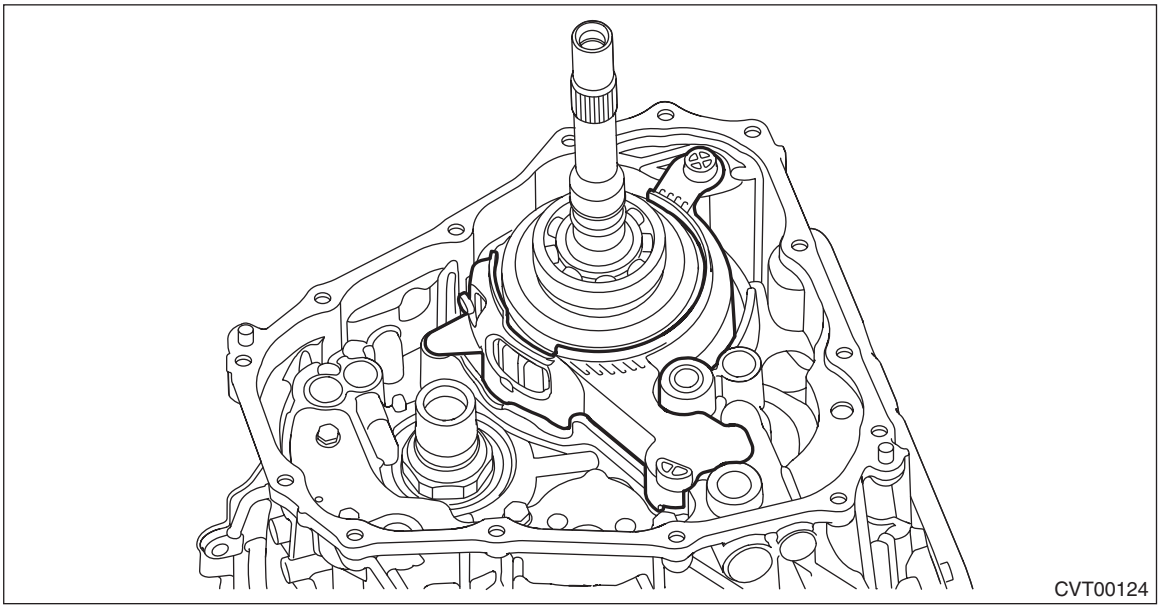
F: ADJUSTMENT

NOTE:
When replacing the drive motor assembly with a new part, perform the following check and adjustment for the selection.
- Select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>
- Select the transfer drive gear shim. <Ref. to CVT(TH58A)-207, ADJUSTMENT, Transfer Drive Gear.>
- Select the reduction driven gear shim. <Ref. to CVT(TH58A)-248, ADJUSTMENT, Output Clutch Assembly.>

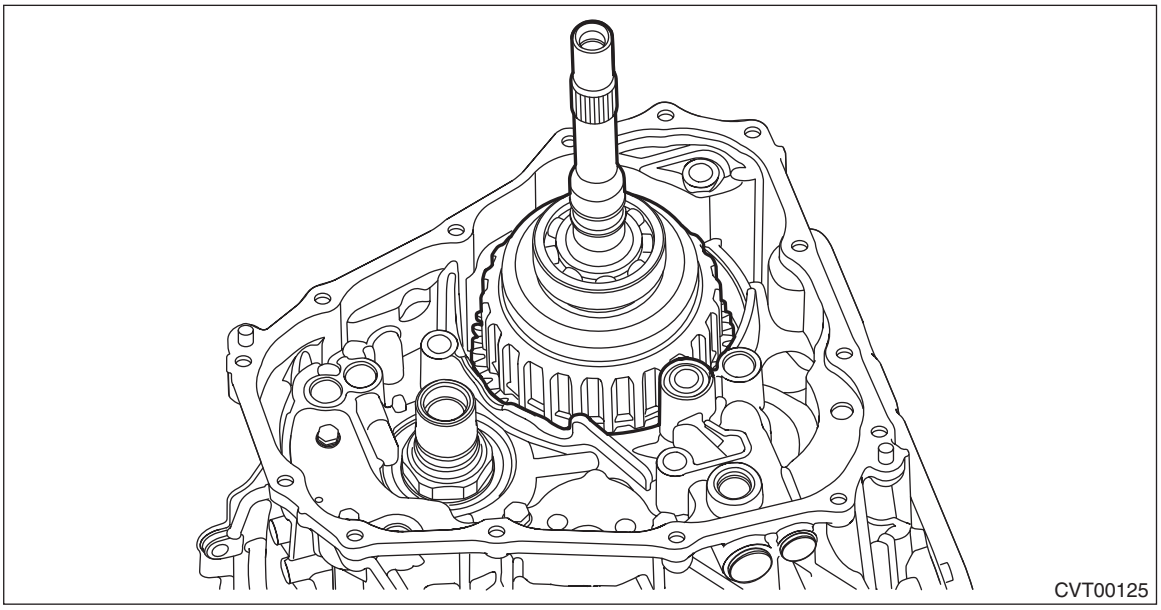
39.Output Clutch Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the sensor cover. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
3) Remove the secondary pressure sensor harness connector, and remove the harness clip. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
5) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
6) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
7) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
8) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
9) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
10) Remove the drive motor assembly. <Ref. to CVT(TH58A)-219, REMOVAL, Drive Motor Assembly.>
11) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
12) Remove the oil baffle.

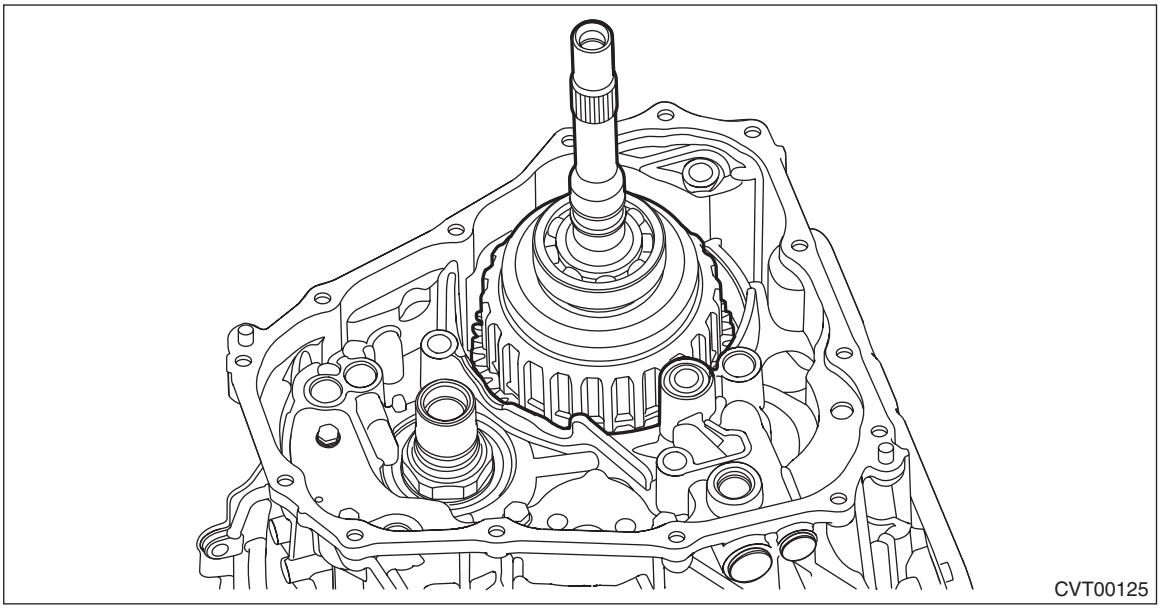


13) Remove the output clutch assembly.



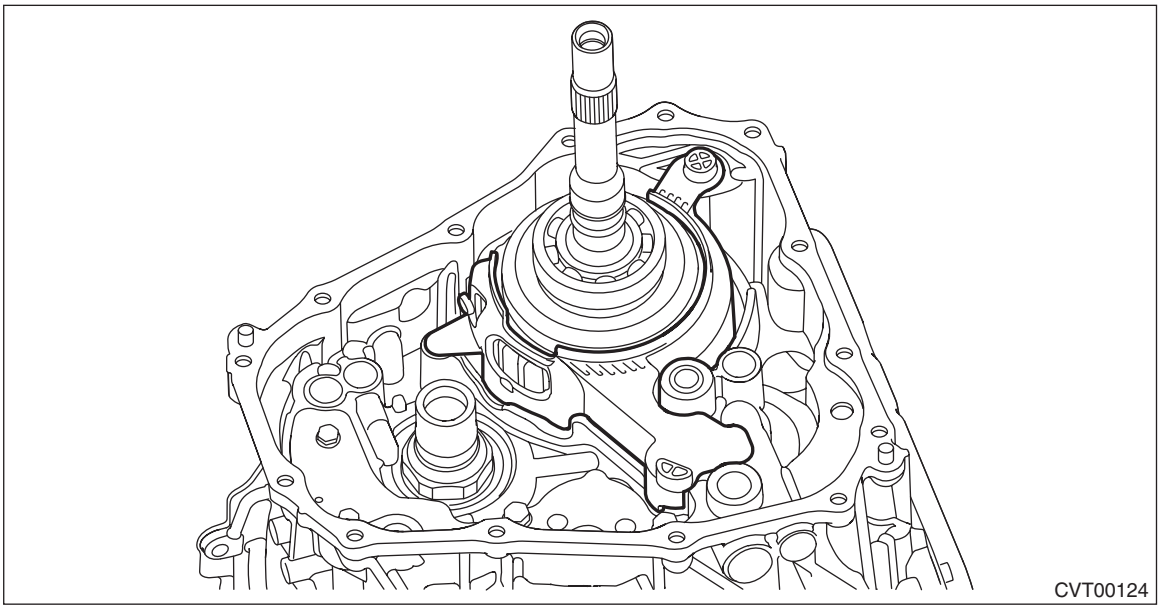
B: INSTALLATION

1) Install the output clutch assembly.



2) Select the reduction driven gear shim. <Ref. to CVT(TH58A)-248, ADJUSTMENT, Output Clutch Assembly.>
3) Attach the selected reduction driven gear shim to drive motor assembly with vaseline.

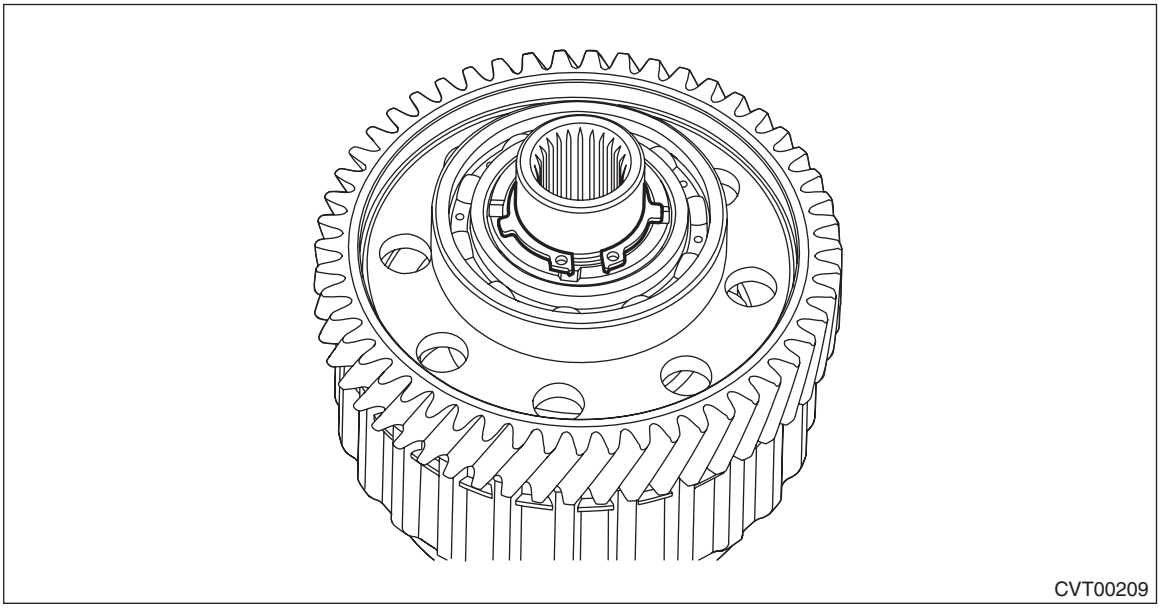
4) Install the oil baffle.



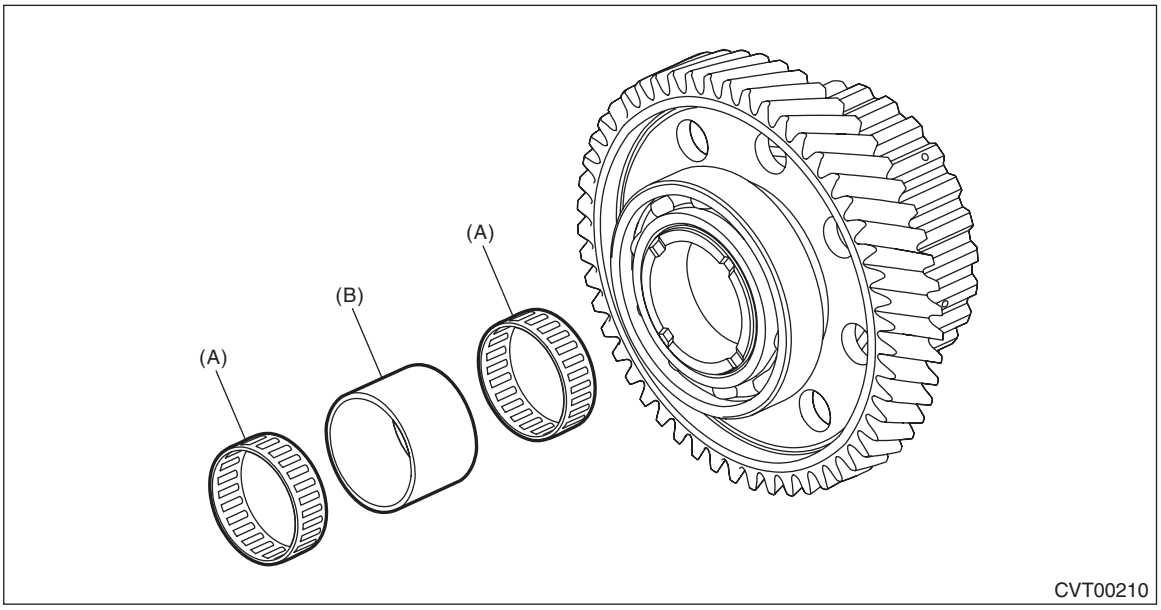
5) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
6) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
7) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
8) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
9) Install the transfer drive gear. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
10) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
11) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
12) Install the secondary pressure sensor harness connector, and then install the harness clip. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
13) Install the sensor cover. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
14) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the snap ring.

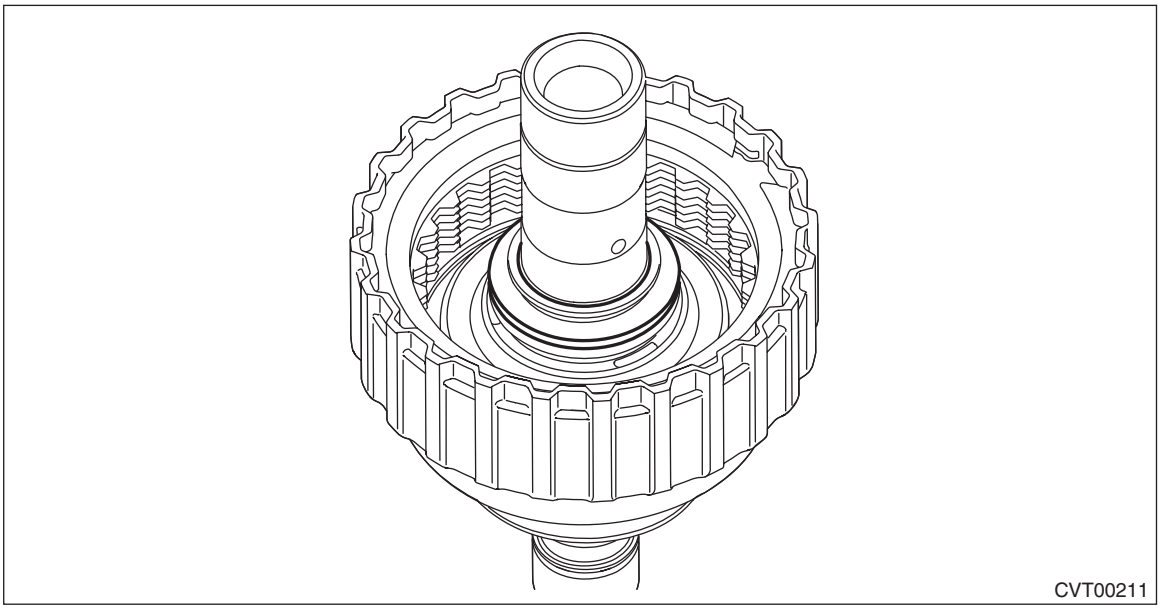


2) Remove the reduction driven gear assembly needle bearing and reduction driven gear bushing.



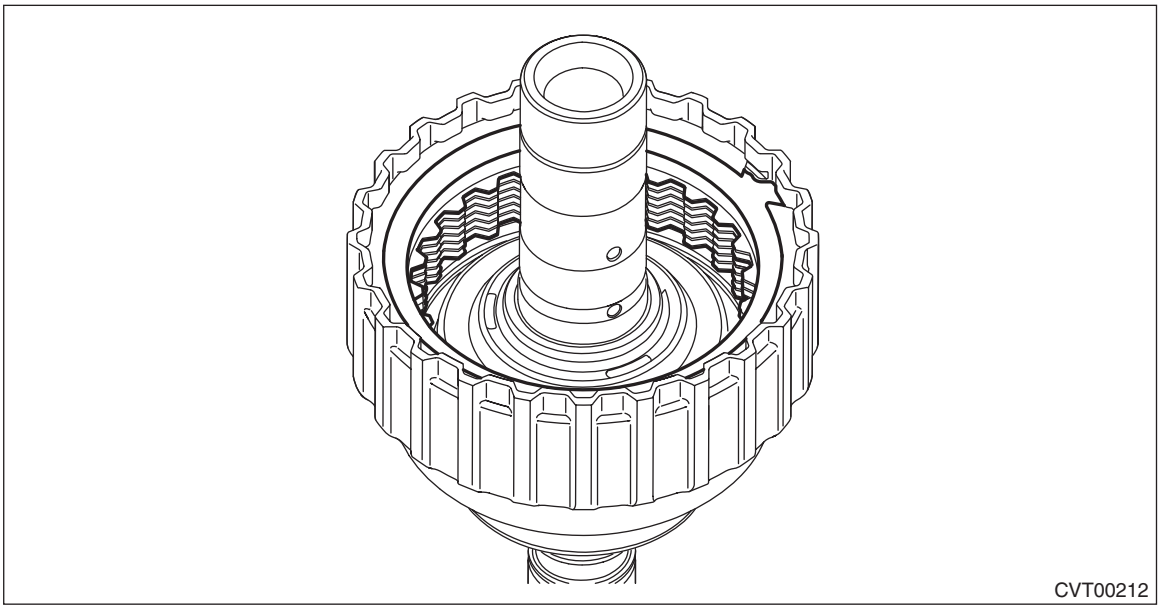
(A) Needle bearing
(B) Reduction driven gear bushing

3) Remove the thrust bearing and thrust washer.



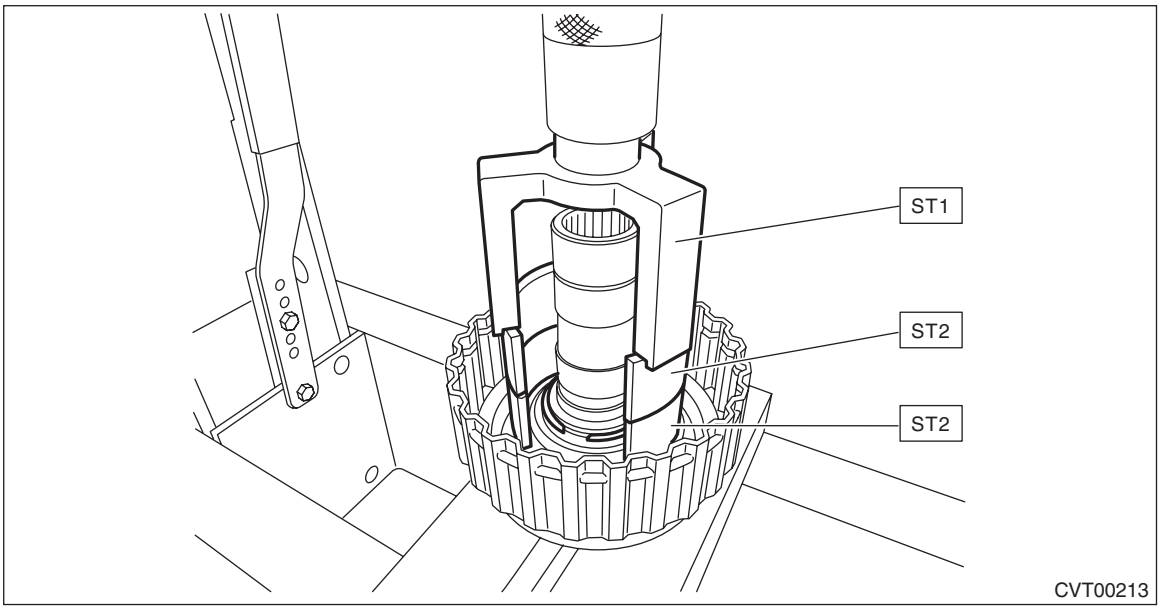
4) Remove the snap ring.

5) Remove the retaining plate, drive plate, driven plate and dish plate.

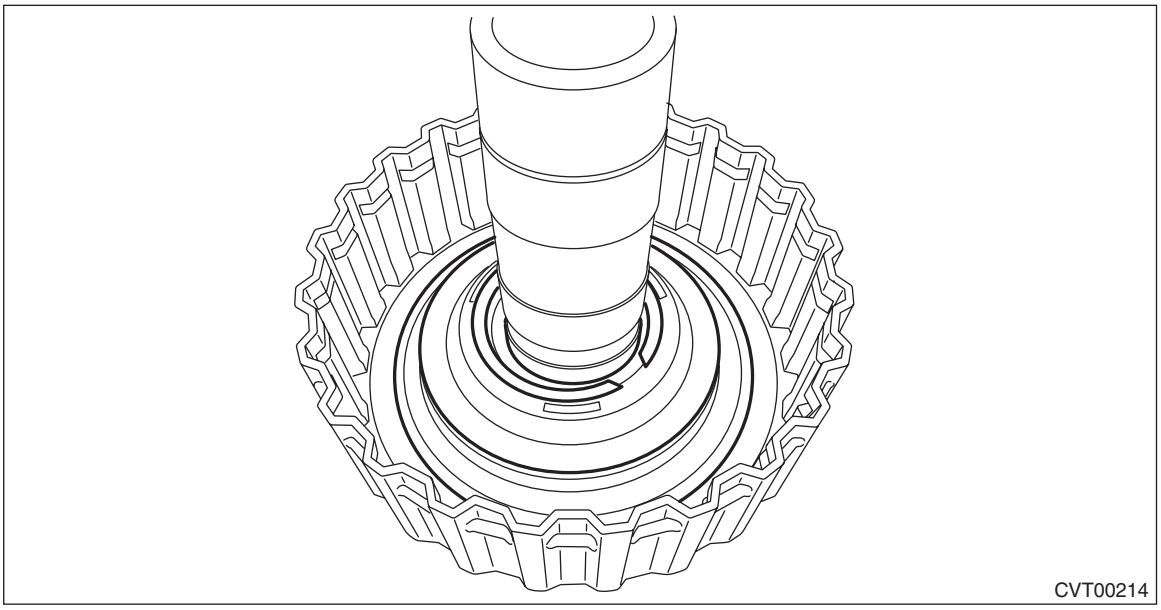


6) Compress the return spring using the ST to remove the snap ring.

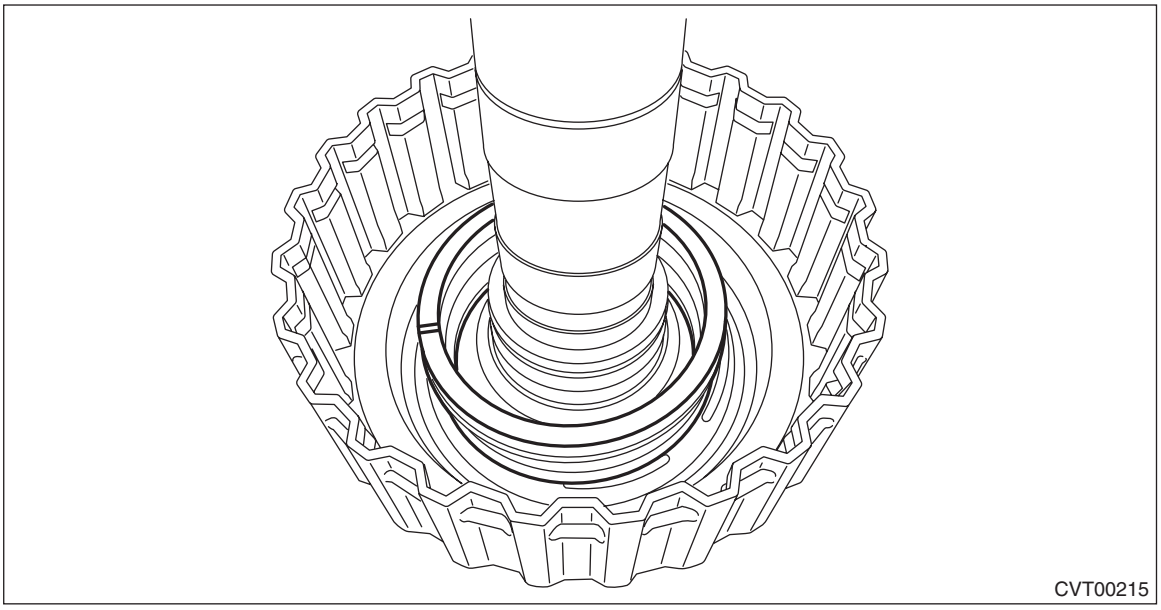
ST1 18769AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



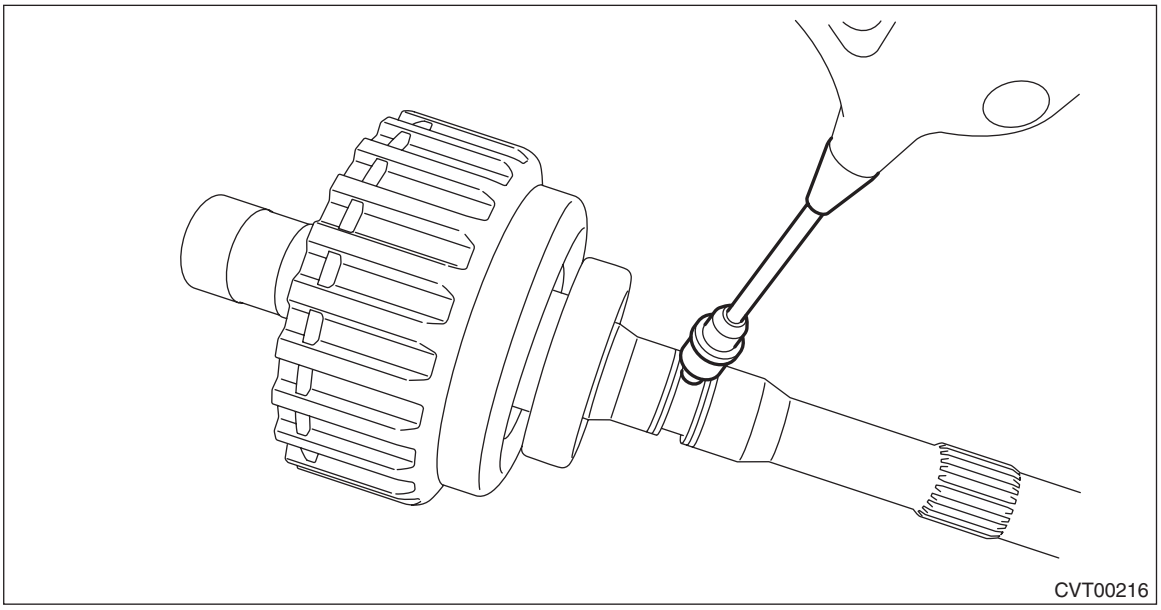
7) Remove the chamber COMPL and snap ring.


CVT00214

8) Remove the return spring.

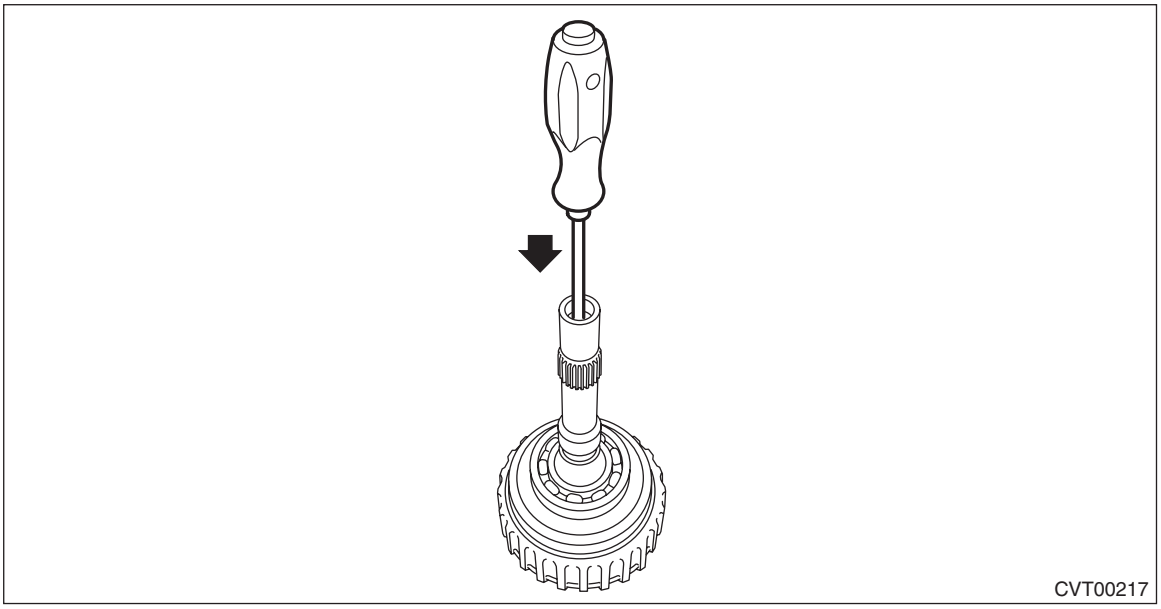

CVT00215

9) Remove the clutch piston by blowing compressed air intermittently from the shaft hole.

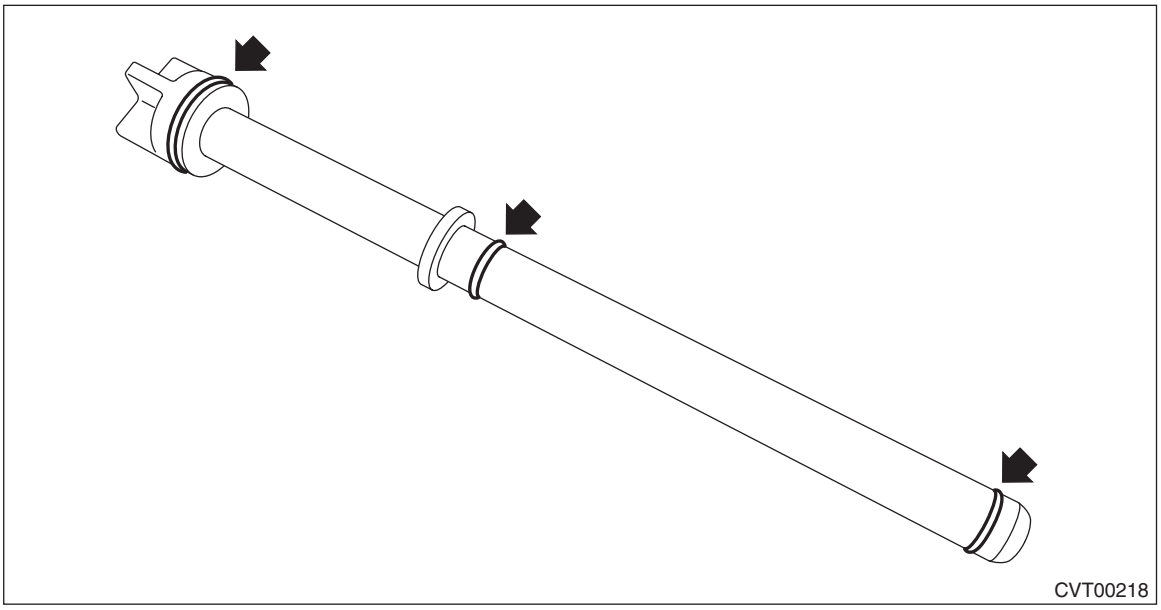


10) Using a round bar with diameter of 5 mm (0.2 in), remove the oil pipe assembly.

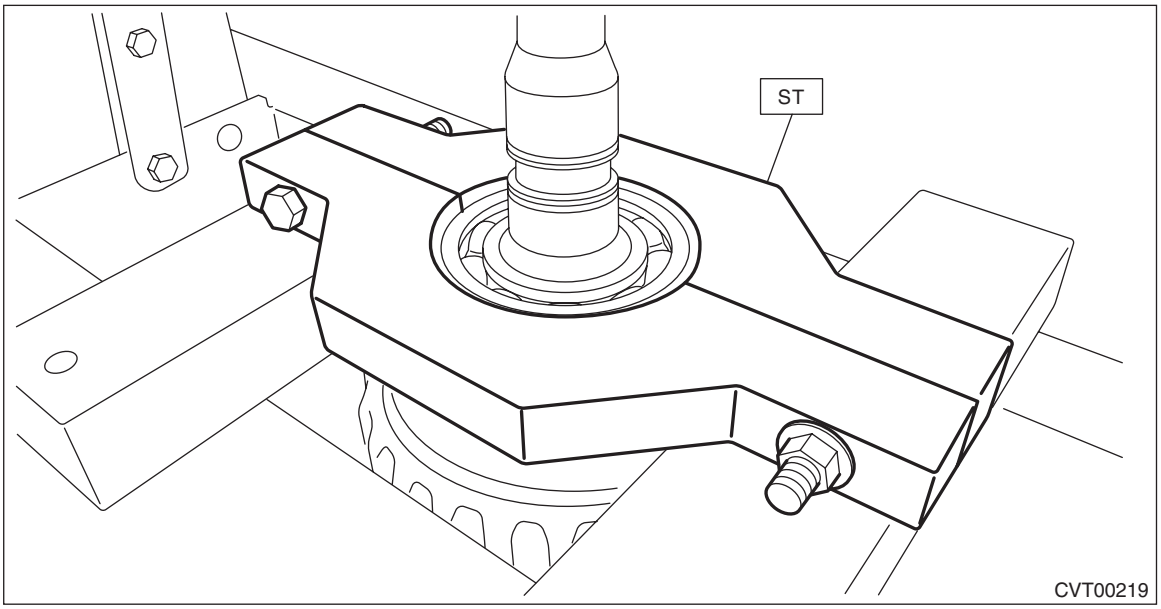
NOTE:
Apply vinyl tape to the tip of round bar.



11) Remove the O-ring from the oil pipe assembly.

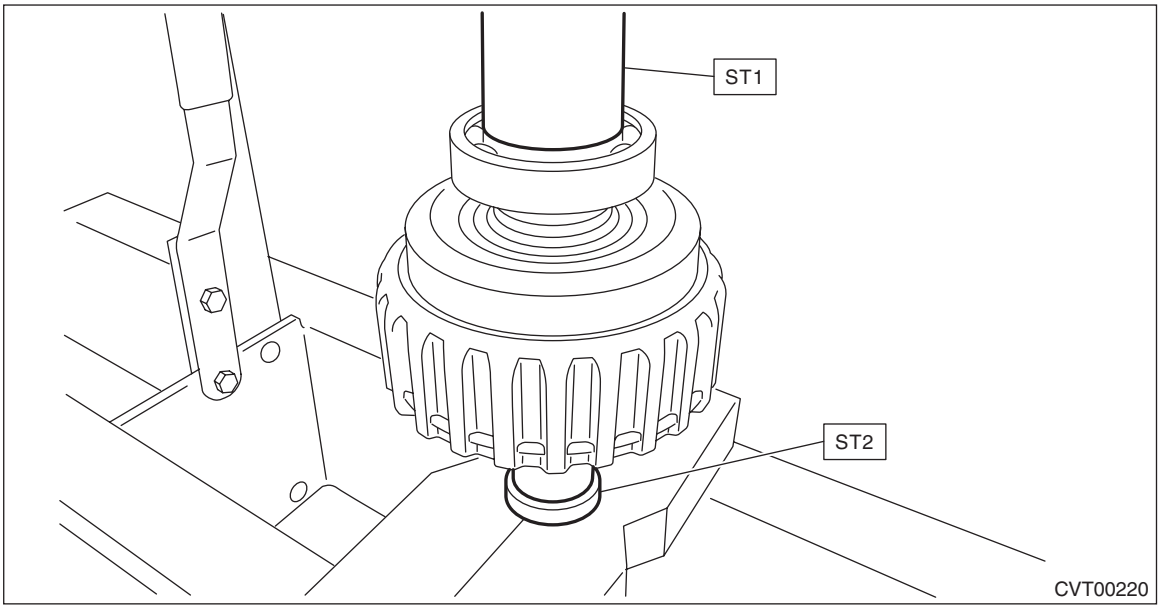


12) Remove the ball bearing using ST.
ST 498077300 REMOVER



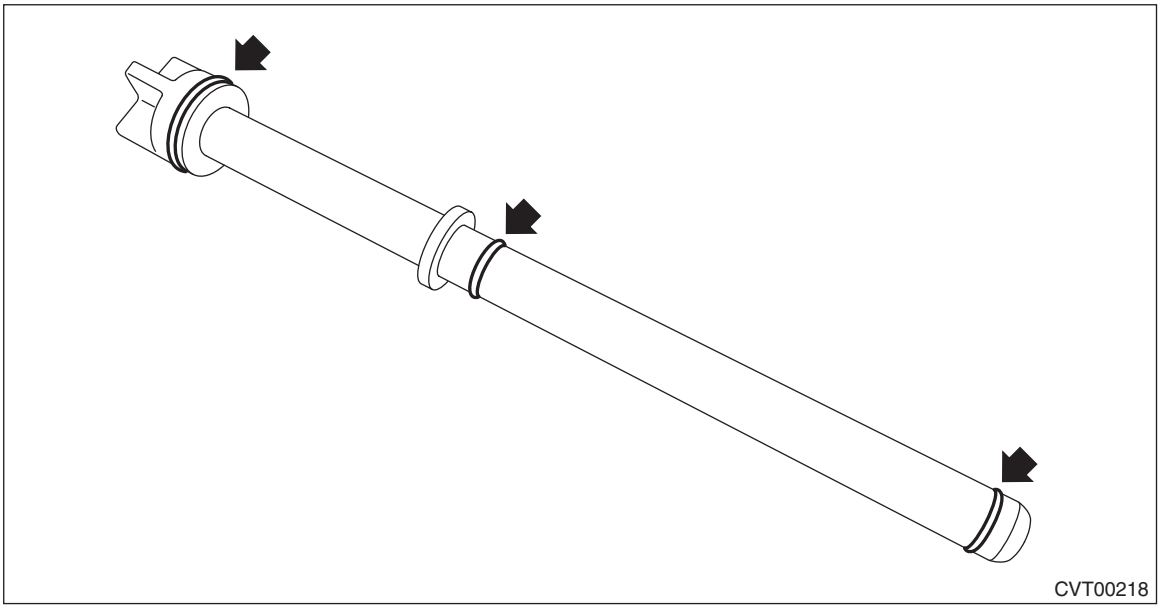
D: ASSEMBLY

1) Using the ST, install the ball bearing.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 SEAT

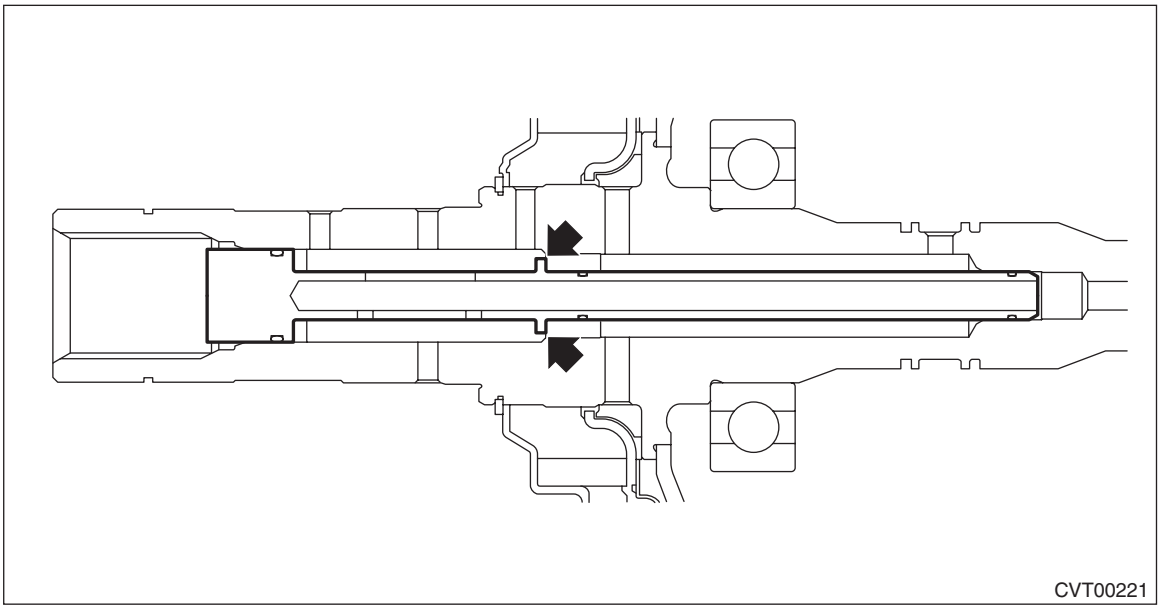


2) Install the O-ring to the oil pipe assembly.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

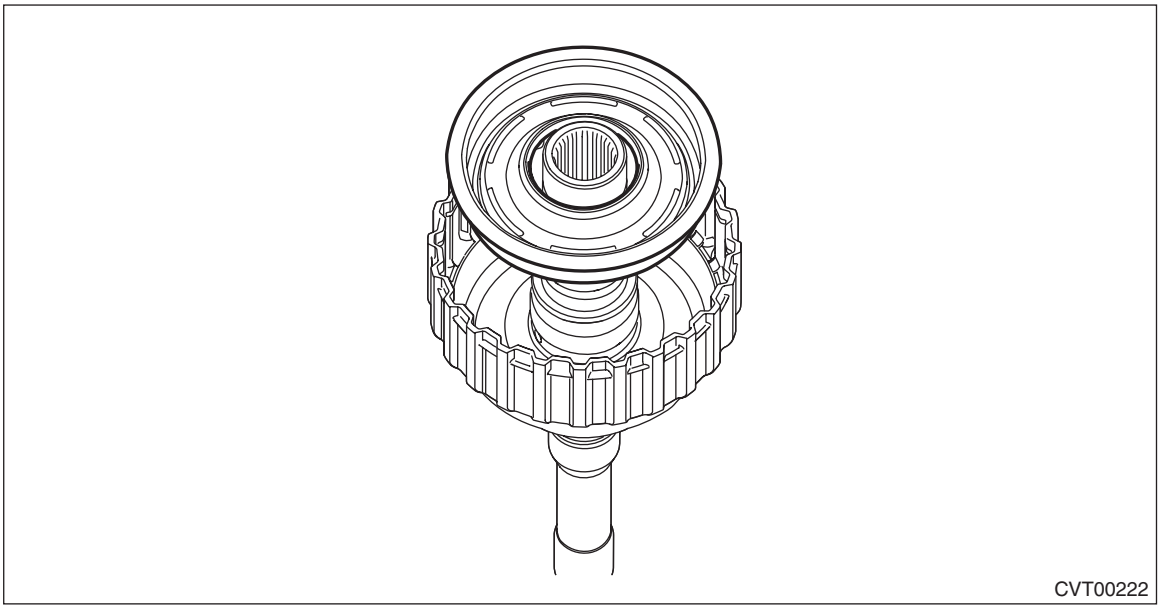


3) Insert the oil pipe assembly into the shaft, and press into the end.

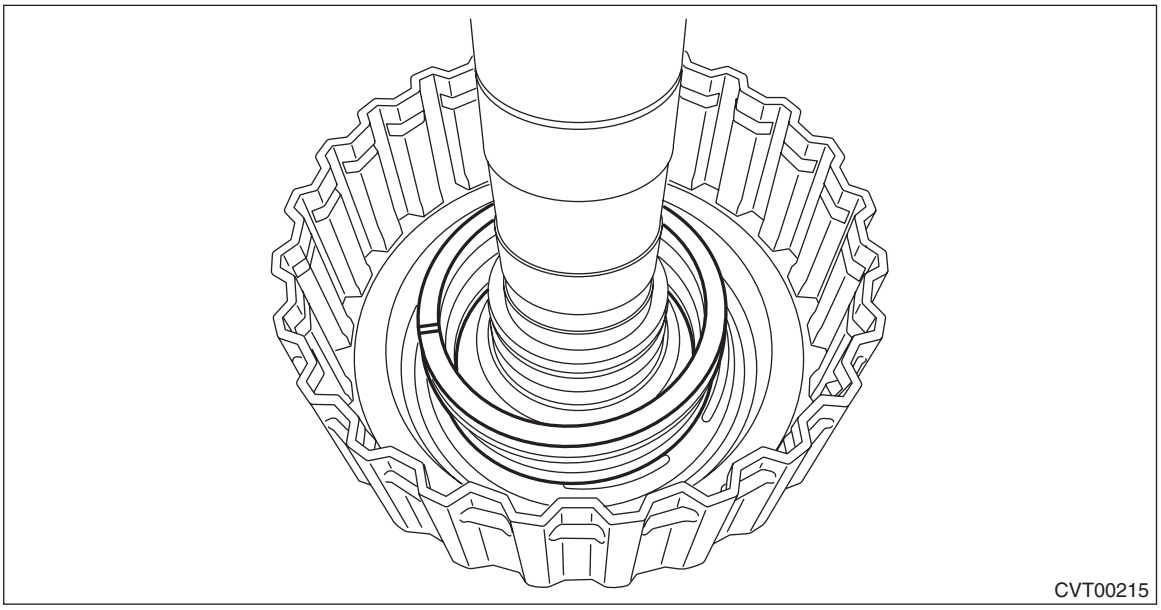

CVT00221

4) Install the output clutch piston to the clutch drum.

NOTE:
- Apply CVTF to the sealing area of the output clutch piston.
- Insert it all the way to the end.

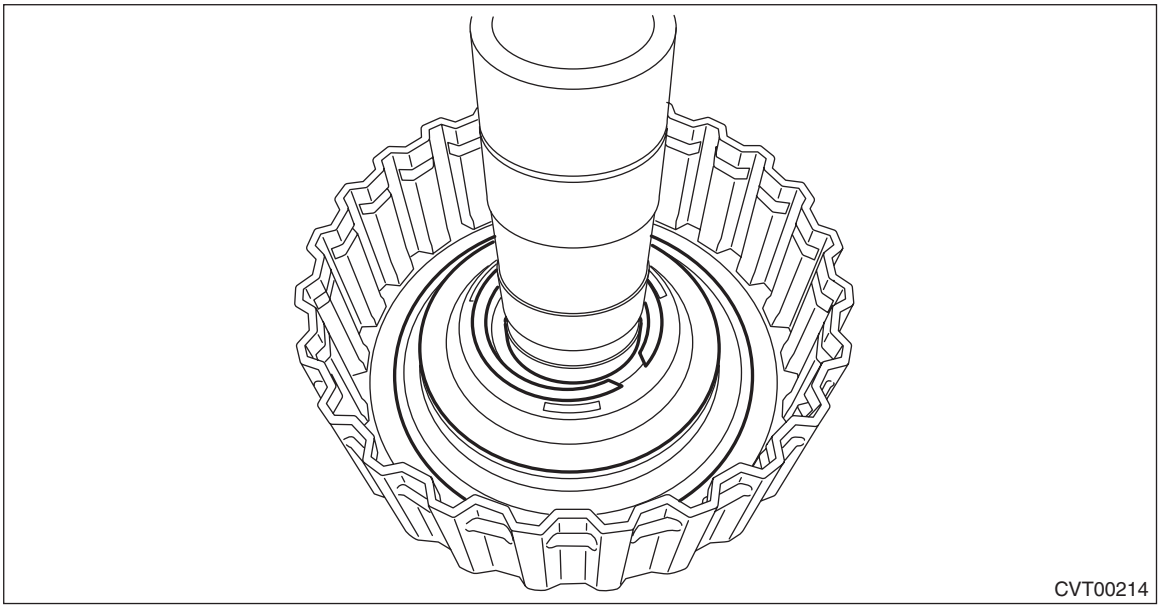

CVT00222

5) Install the return spring.

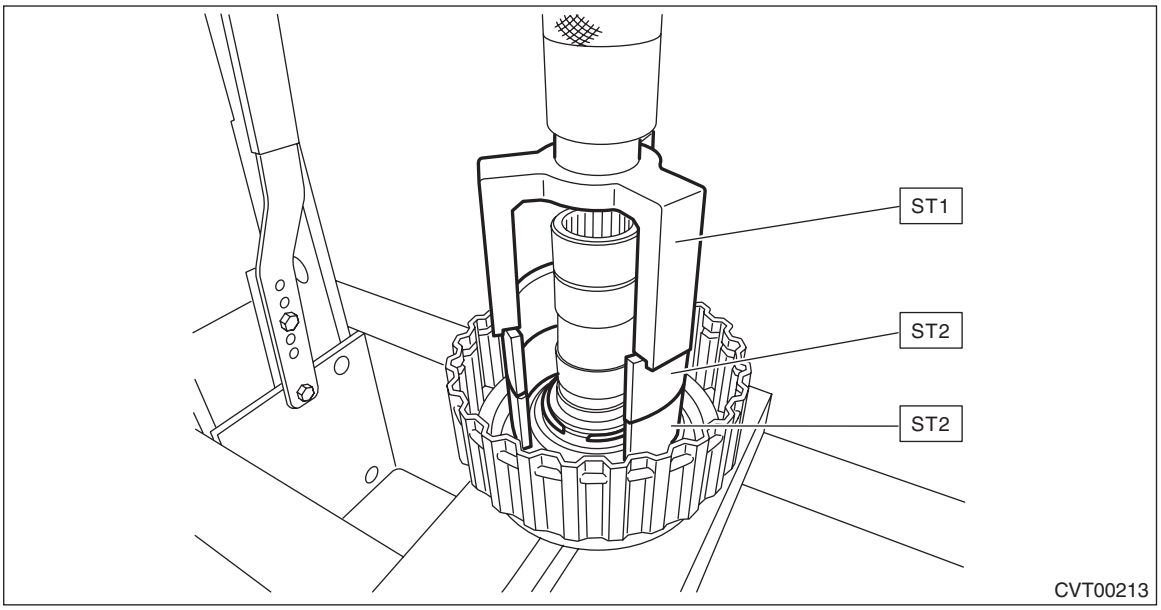

CVT00215

6) Install the chamber COMPL and snap ring.

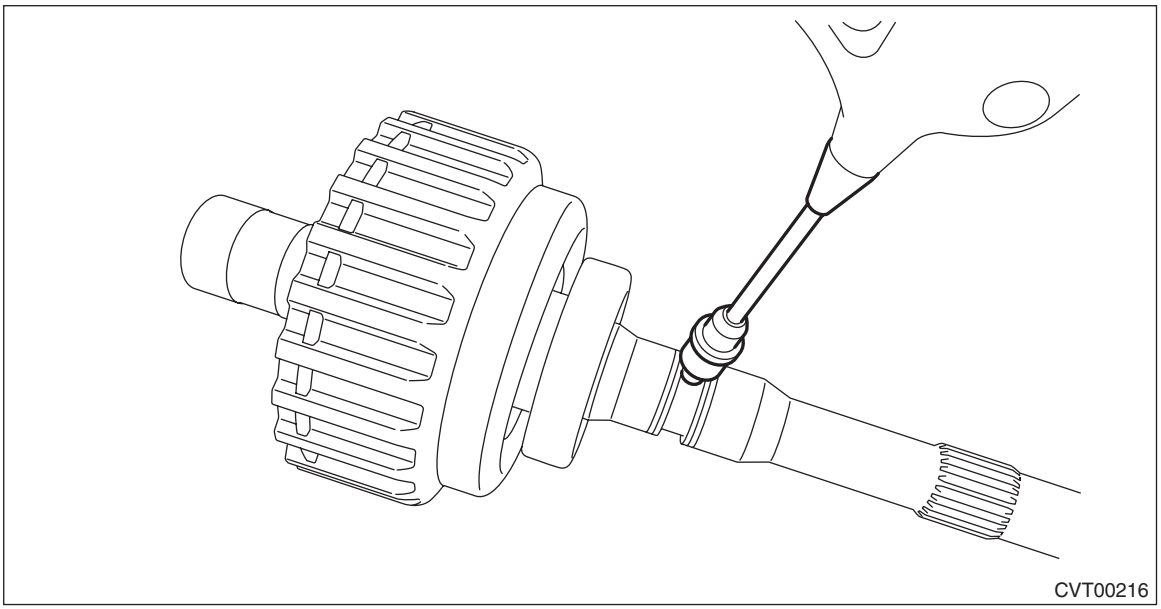
NOTE:
Apply CVTF to the sealing area of chamber COMPL.


CVT00214

7) Compress the return spring using the ST to install the snap ring.
ST1 18769AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



8) Check the operation of clutch piston by blowing compressed air intermittently from the shaft hole.

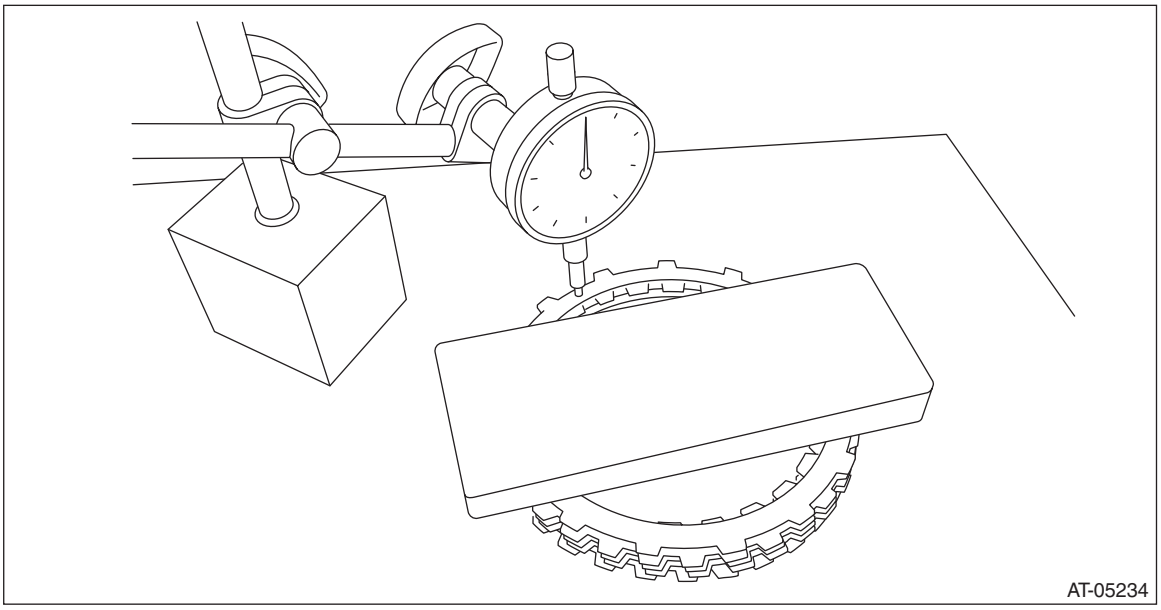


9) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
10) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.
11) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

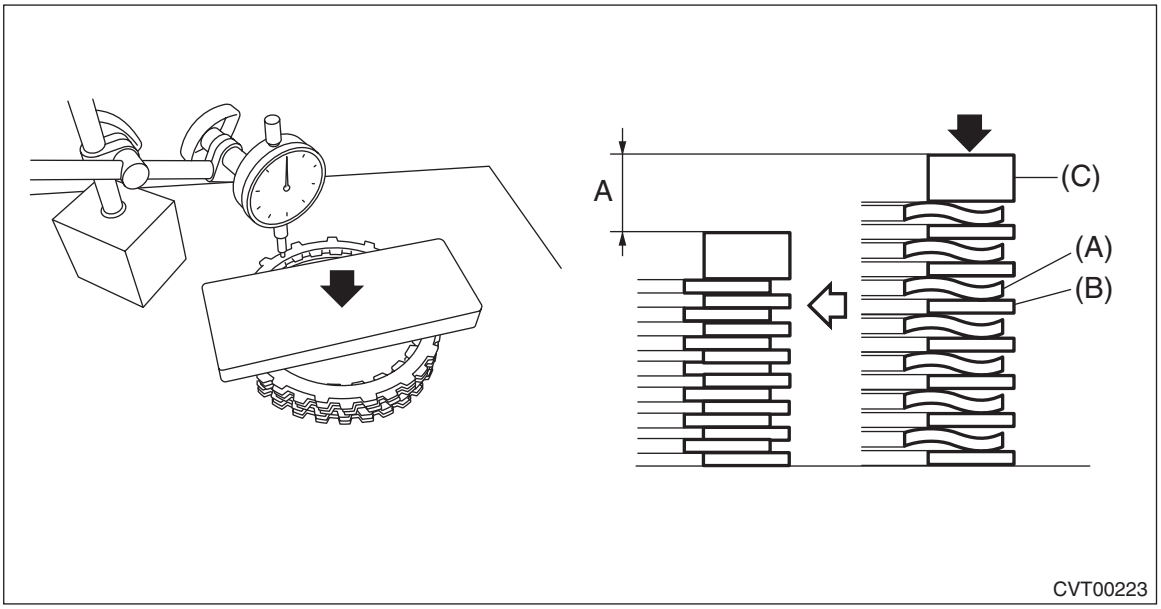
NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 135 N (13.8 kgf, 30.4 lb).

12) Put the flat board on retaining plate.



13) Using the following formula, read the push/pull gauge, and calculate “N”.
N = 135 — 162 N (13.8 — 16.5 kgf, 30.4 — 36.4 lb) – Z
135 — 162 N (13.8 — 16.5 kgf, 30.4 — 36.4 lb): Load on the clutch plate
Z: Flat board weight
14) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

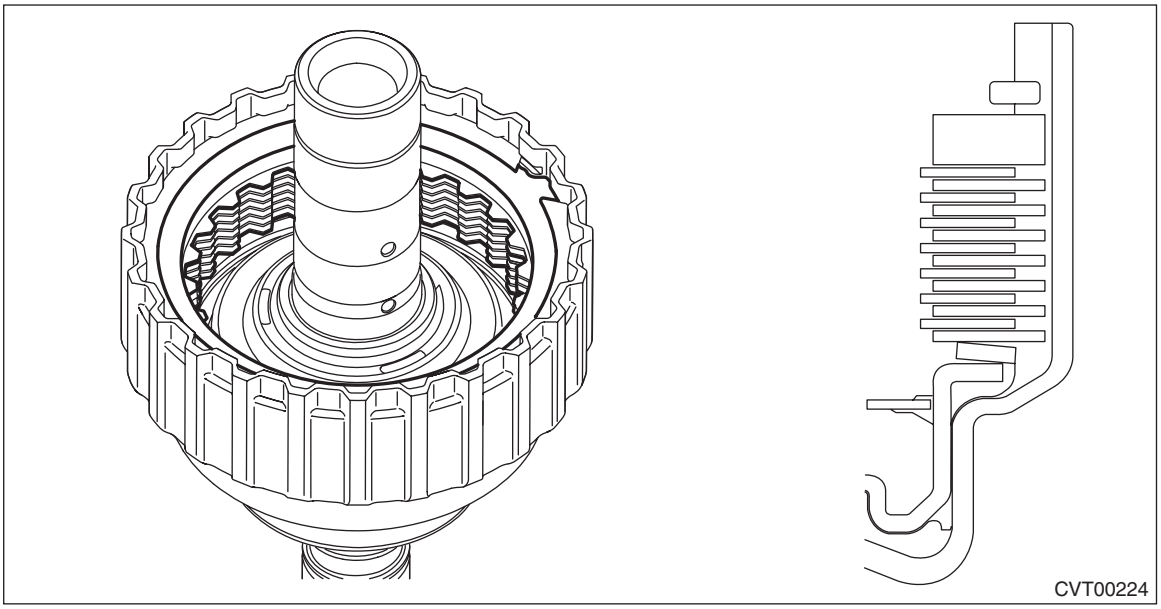
NOTE:
Measure at four points with a 90° interval and calculate the average.



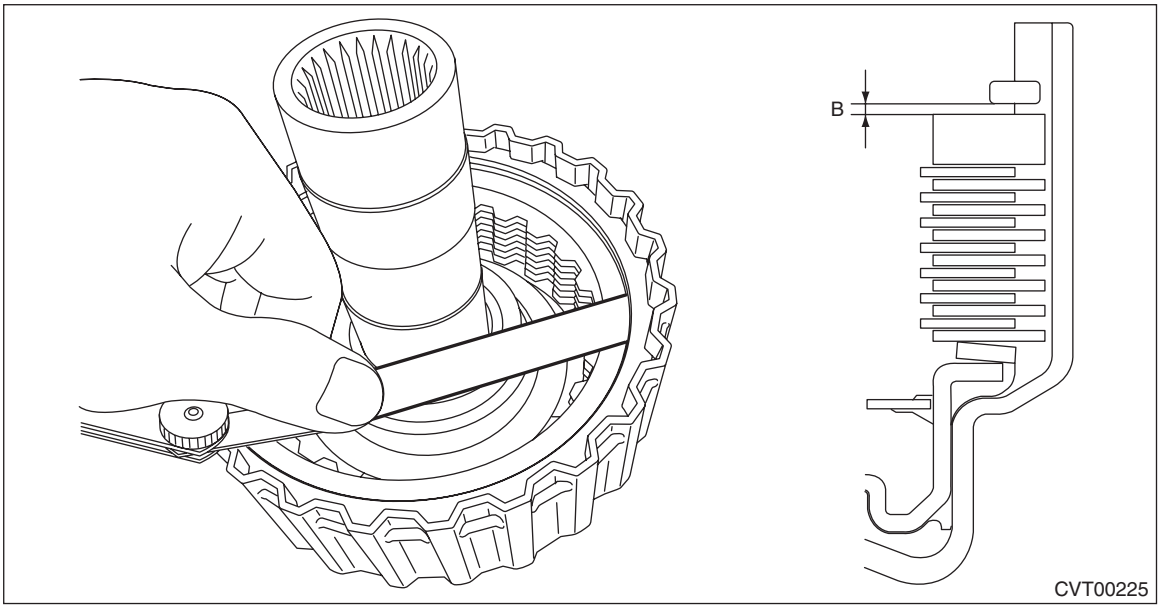
(A) Drive plate
(B) Driven plate
(C) Retaining plate

15) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the driven shaft.

NOTE:
Install the dish plate in the correct direction.



16) Measure and record the clearance “B” between the retaining plate and snap ring.



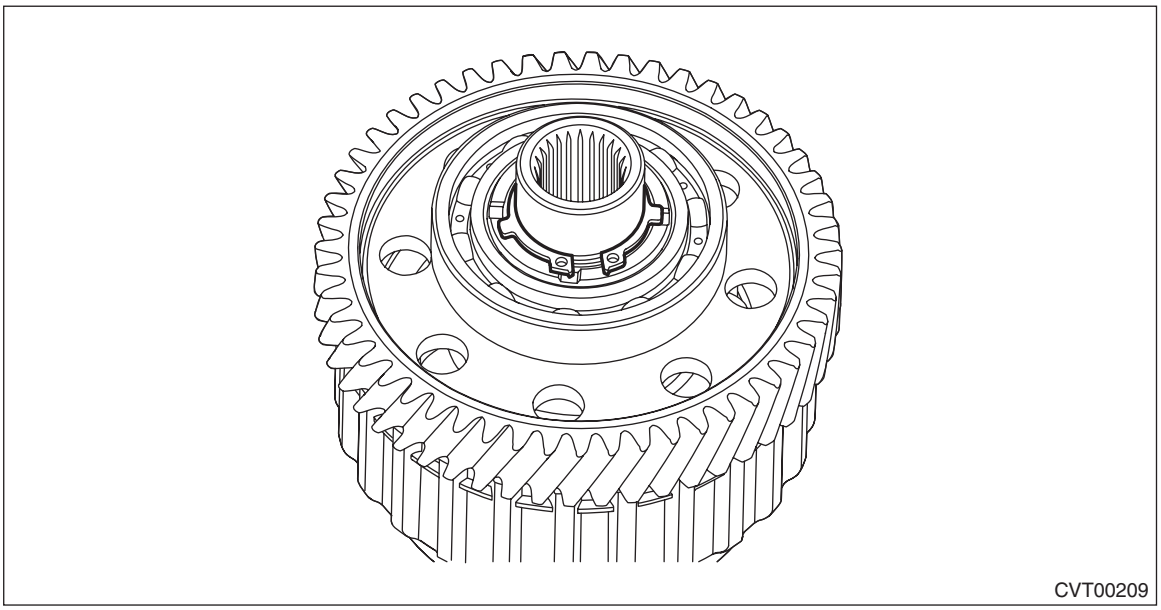
17) Piston stroke calculation
Calculate with A and B dimensions recorded before. If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.
S mm (in) = A + B
S: Piston stroke
A: Amount of drive plate compression
B: Clearance between retaining plate and snap ring

Initial standard:
2.65 — 3.05 mm (0.104 — 0.12 in)

Limit thickness:
4.05 mm (0.159 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB840	5.3 (0.209)
31567AB850	5.5 (0.217)
31567AB860	5.7 (0.224)
31567AB870	5.9 (0.232)
31567AB880	6.1 (0.240)

18) Install the snap ring to the reduction driven gear assembly.
19) Install the reduction driven gear assembly, needle bearing and reduction driven gear bushing to the output clutch assembly.
20) Install the snap ring.

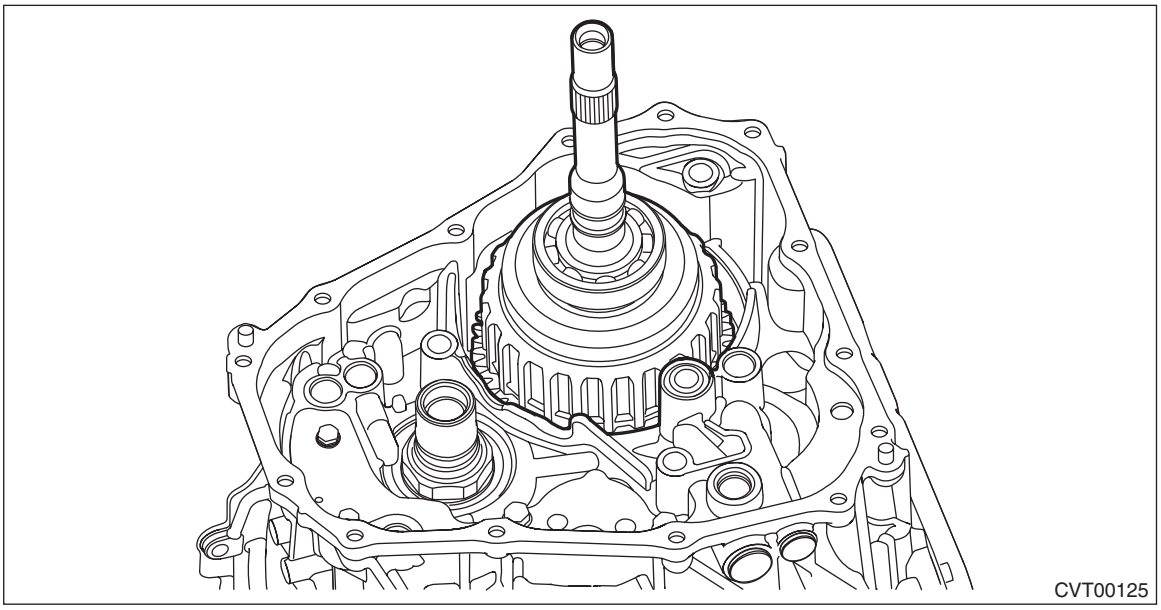


E: INSPECTION

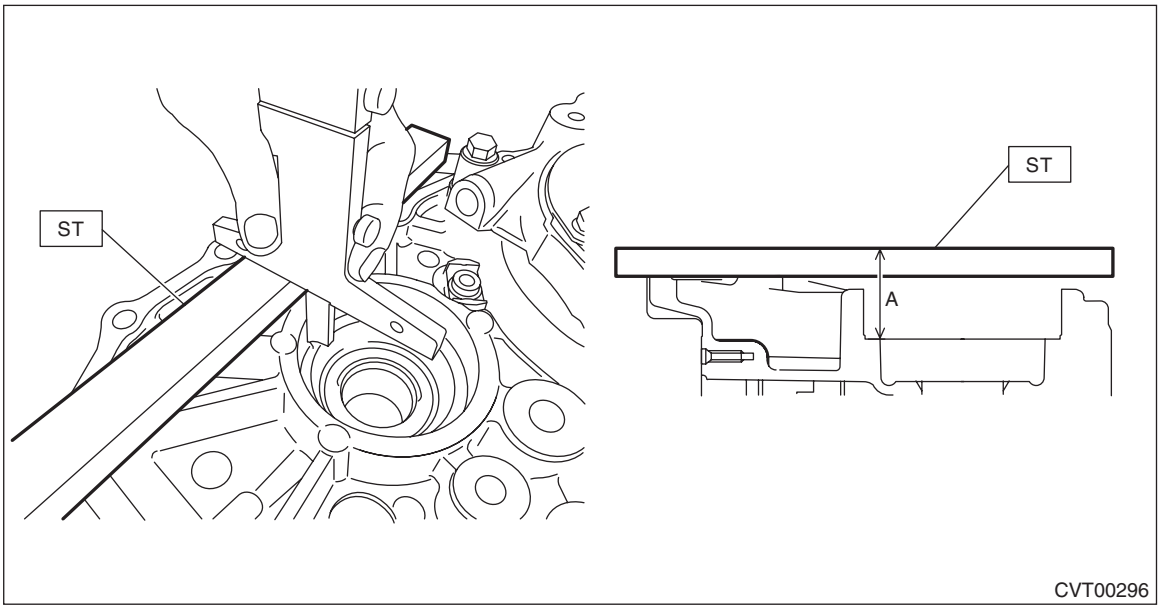
- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and snap ring of output clutch is within the limit. If it exceeds the limit, replace with a new drive plate and select and adjust the retaining plate within the initial standard value. <Ref. to CVT(TH58A)-241, ASSEMBLY, Output Clutch Assembly.>

F: ADJUSTMENT

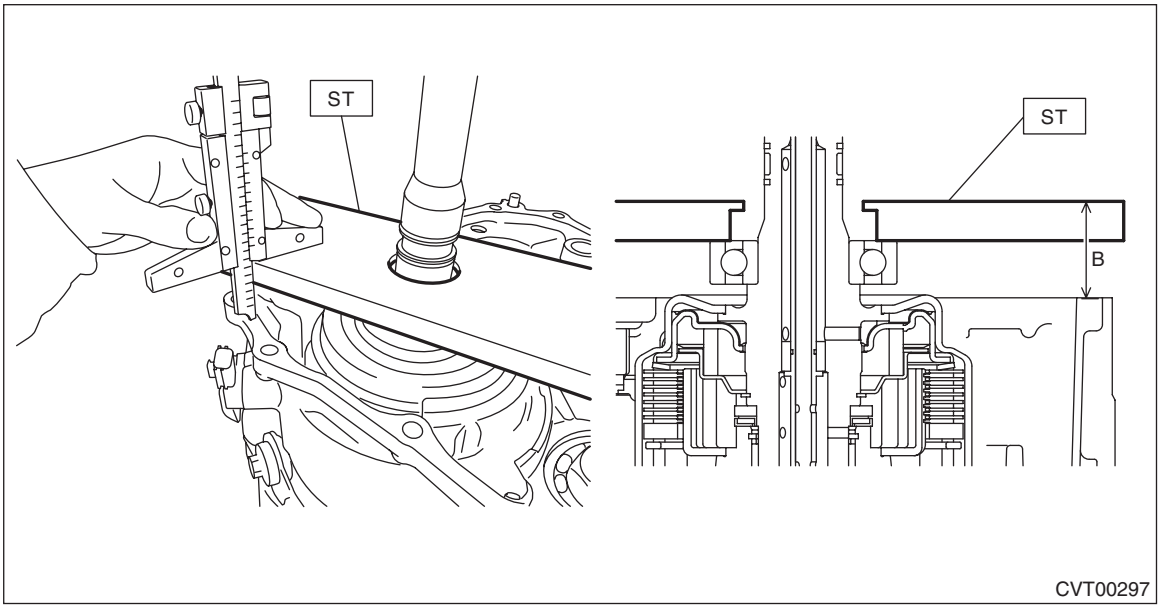
1) Install the output clutch assembly.



2) Measure the height “A” from the ST upper face to the ball bearing catch surface.
ST 499575400 GAUGE



3) Measure the height “B” from the ST to the mating surface of the transmission case.
ST 499575600 GAUGE



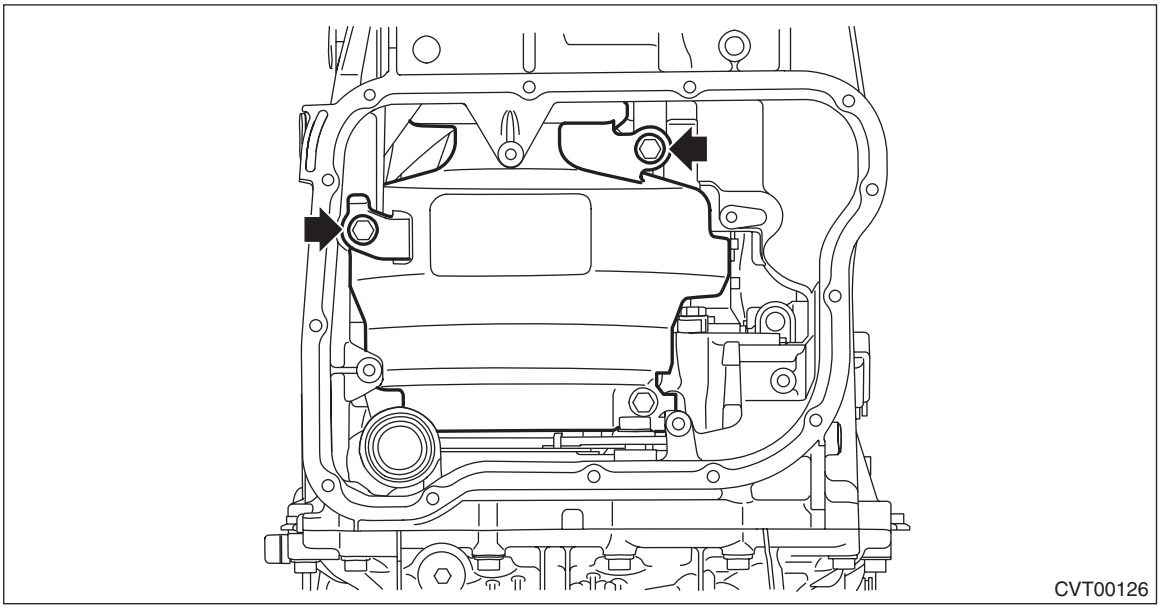
4) Obtain the thickness of reduction driven gear shim using the following formula to select zero to three reduction driven gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Shim thickness
A: Height from the ST upper face to the ball bearing catch surface
B: Height from ST to transmission case mating surface
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Reduction driven gear shim	
Part No.	Thickness mm (in)
33279AA090	0.3 (0.012)
33279AA100	0.4 (0.016)
33279AA110	0.5 (0.020)

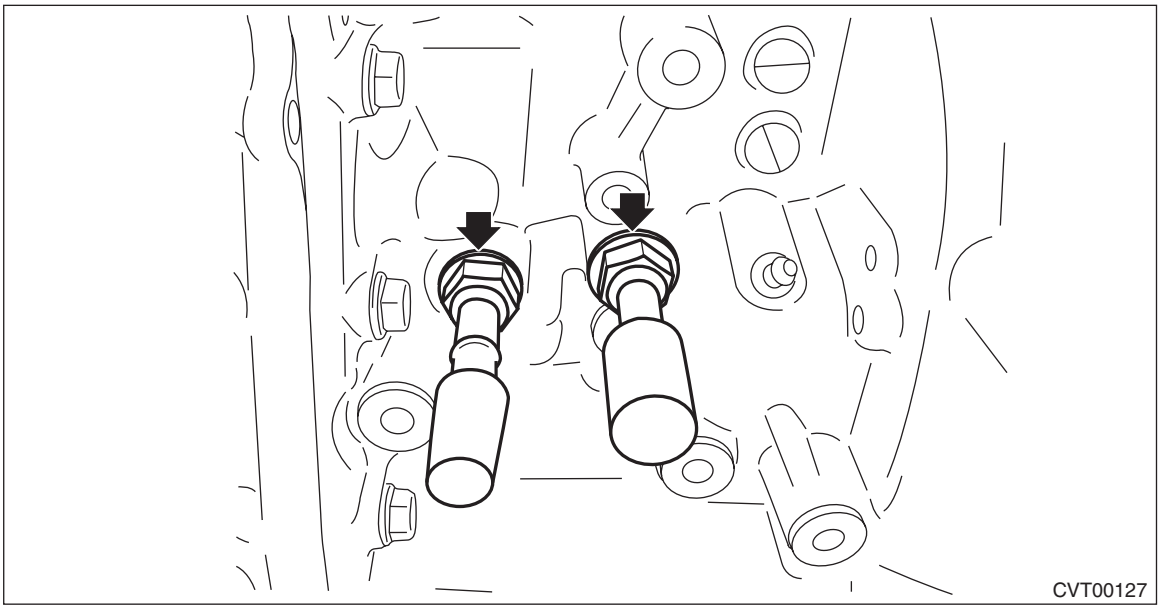
40.Transmission Case

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-219, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-233, REMOVAL, Output Clutch Assembly.>
18) Remove the two oil baffle mounting bolts.



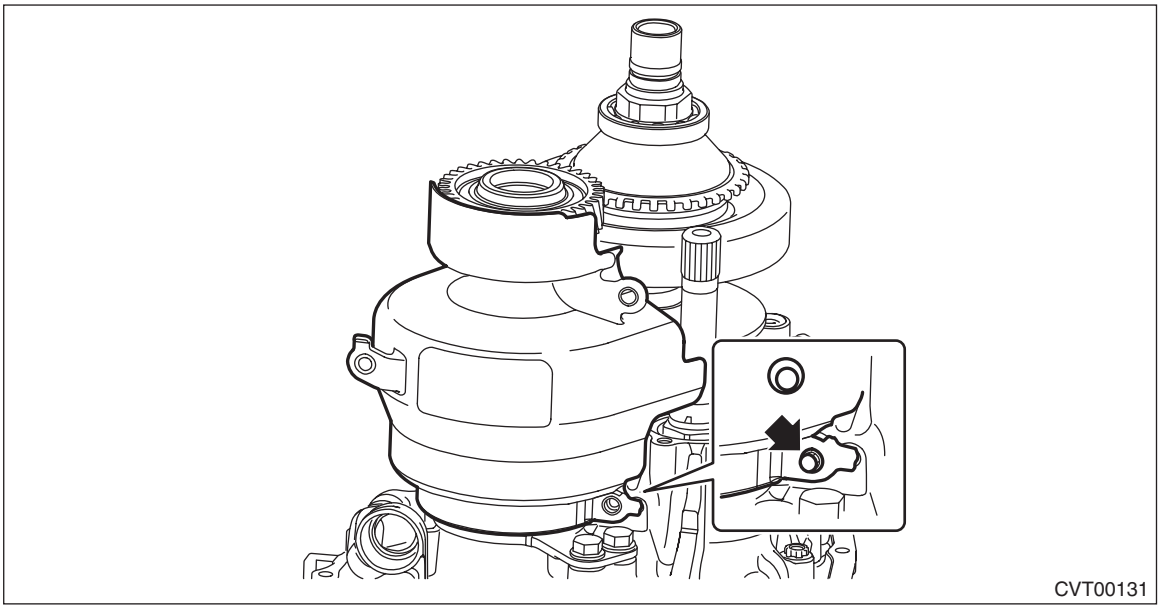
19) Remove the oil cooler pipe.



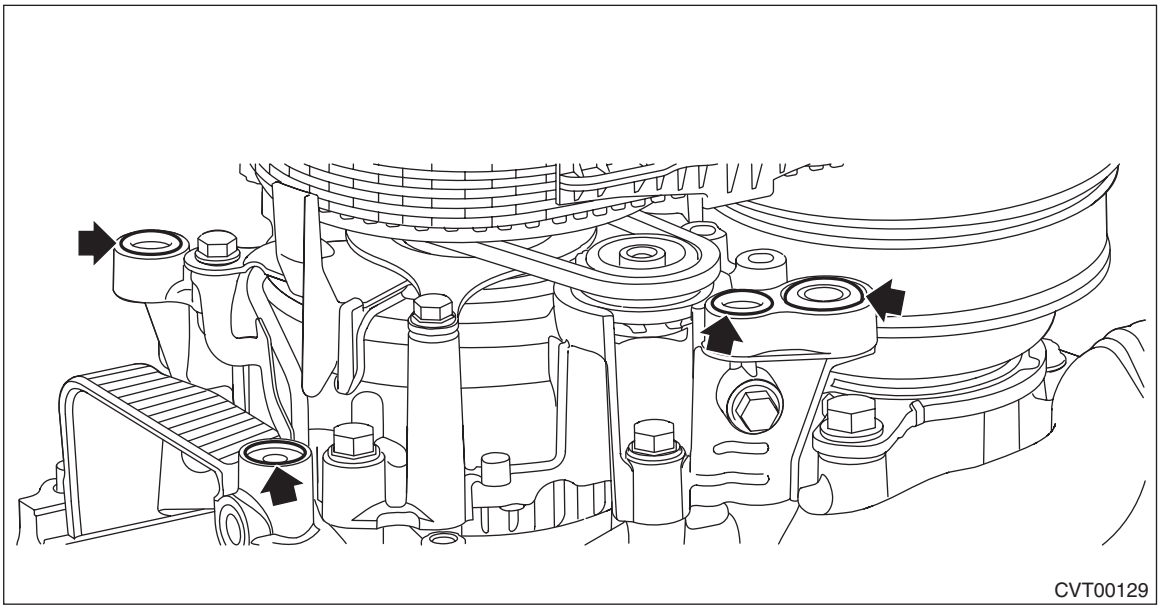
20) Remove the transmission case.

NOTE:
The total number of transmission case mounting bolts is 15.

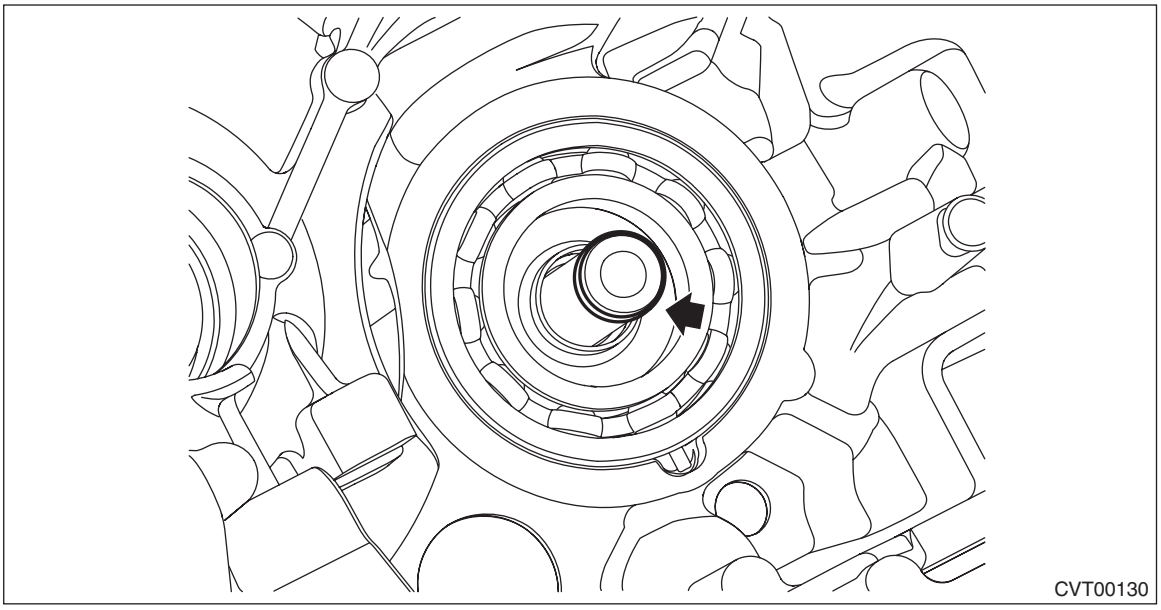
21) Remove the oil baffle.



22) Remove the O-ring.



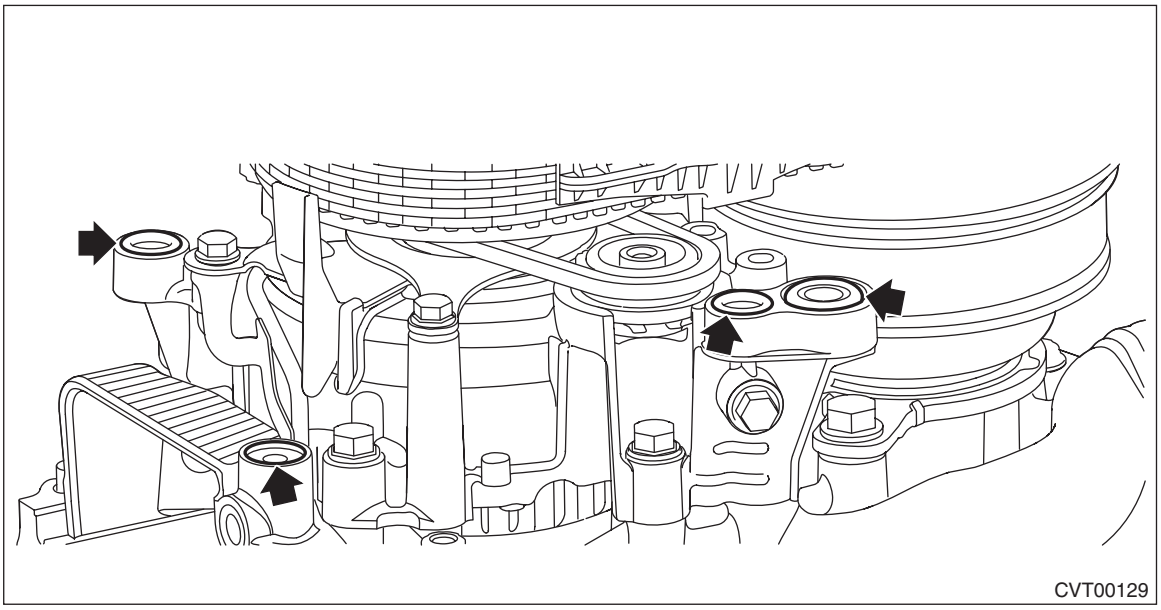
23) Remove the seal ring from the transmission case.



B: INSTALLATION

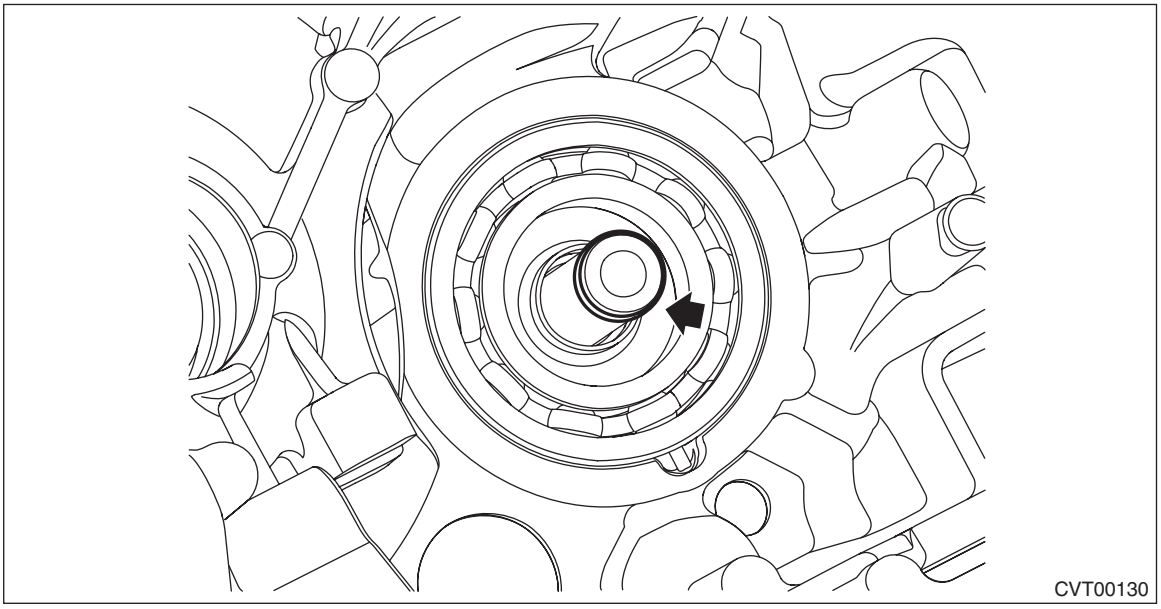
1) Clean the mating surface of transmission case and converter case.
2) Select the reduction gear shim. <Ref. to CVT(TH58A)-266, ADJUSTMENT, Reduction Drive Gear.>
3) Remove the transmission case, and install the selected reduction gear shim to the reduction drive gear.
4) Install the O-rings to the reverse clutch housing and drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

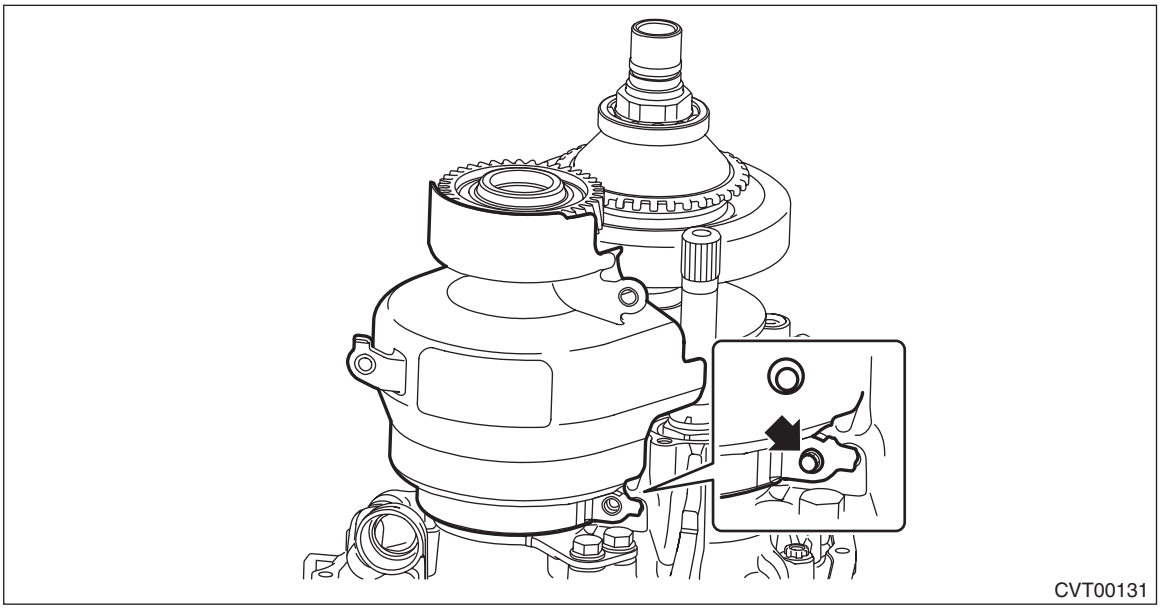

CVT00129

5) Install the seal ring to the transmission case.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.

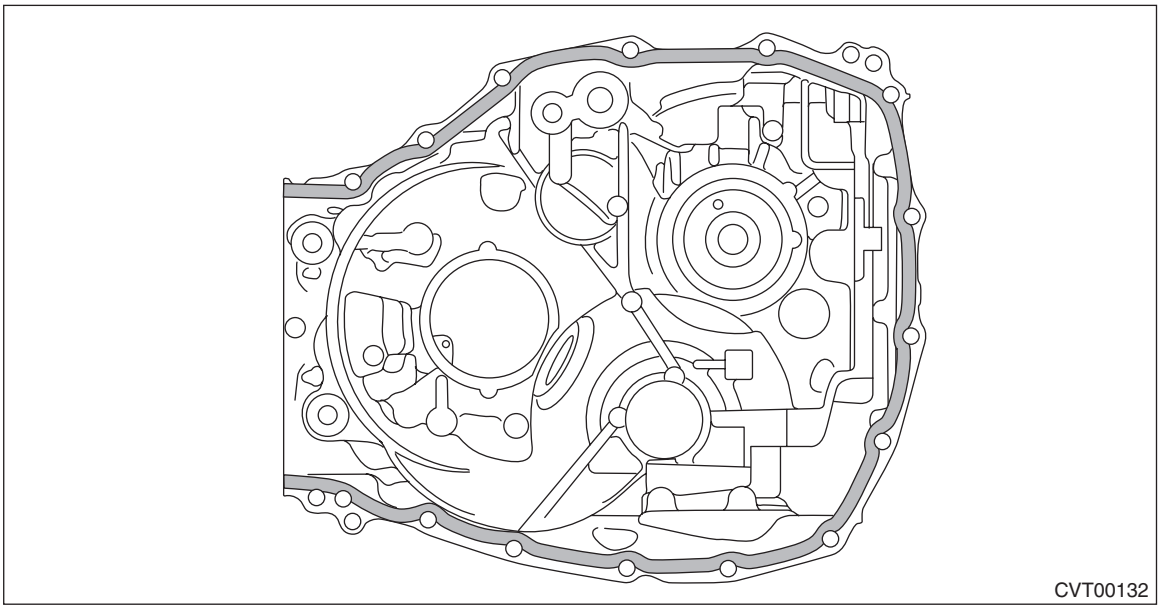

CVT00130

6) Cover the secondary pulley with the oil baffle, and temporarily install it with bolts.


CVT00131

7) Apply liquid gasket seamlessly to the mating surface of transmission case.

Liquid gasket:
THREE BOND 1215B or equivalent


CVT00132

8) Install the transmission case.

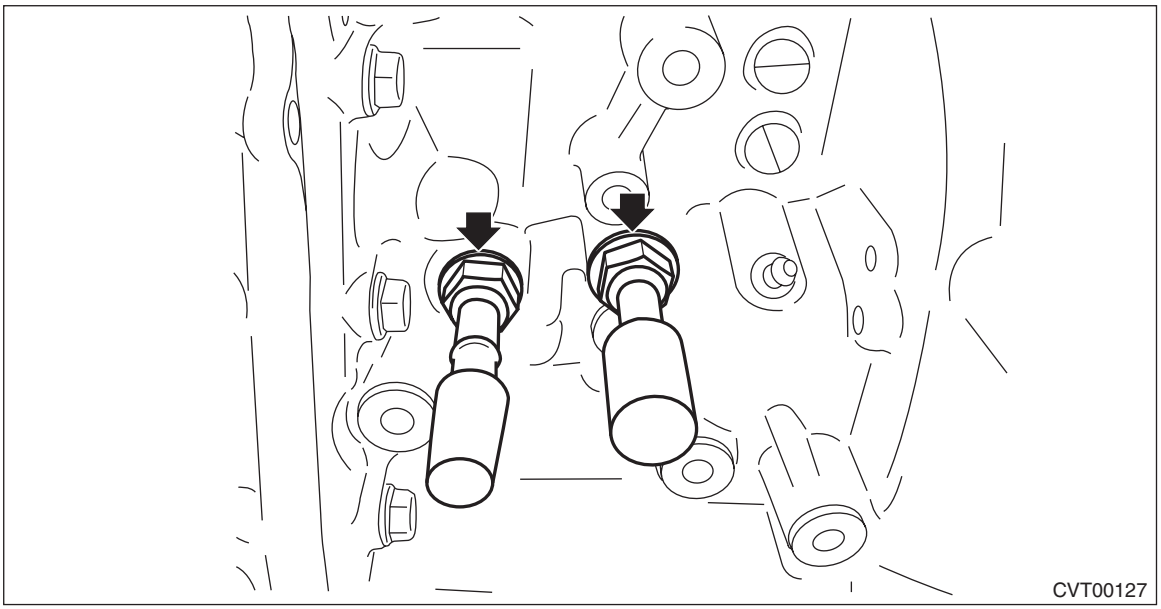
NOTE:
The total number of transmission case mounting bolts is 15.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

9) Install the oil cooler pipe.

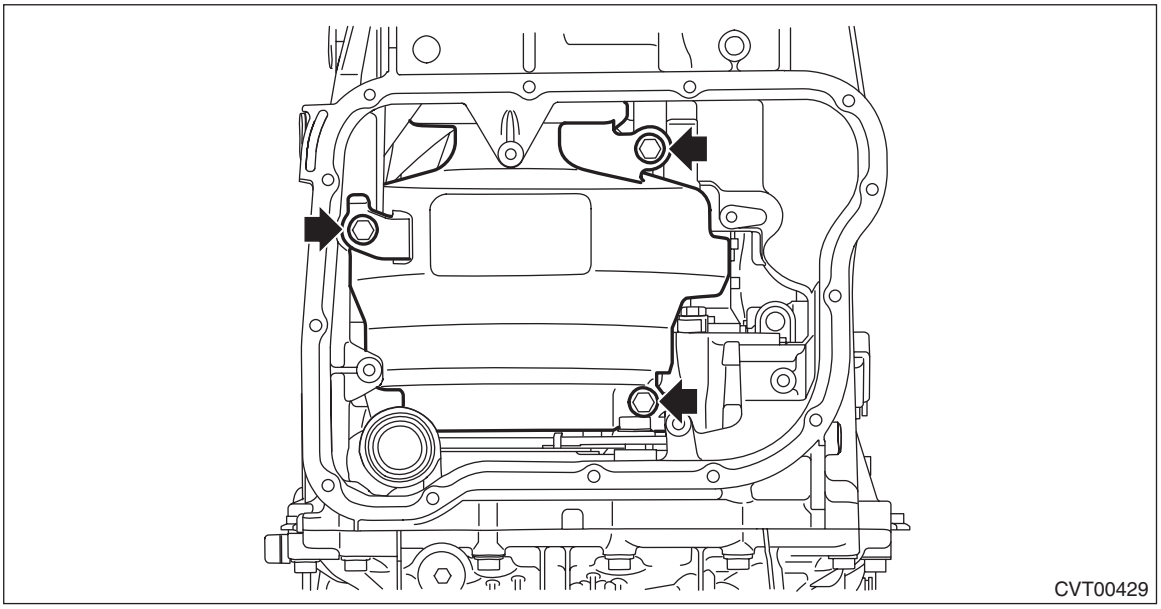
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



10) Install the oil baffle securing bolt.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)

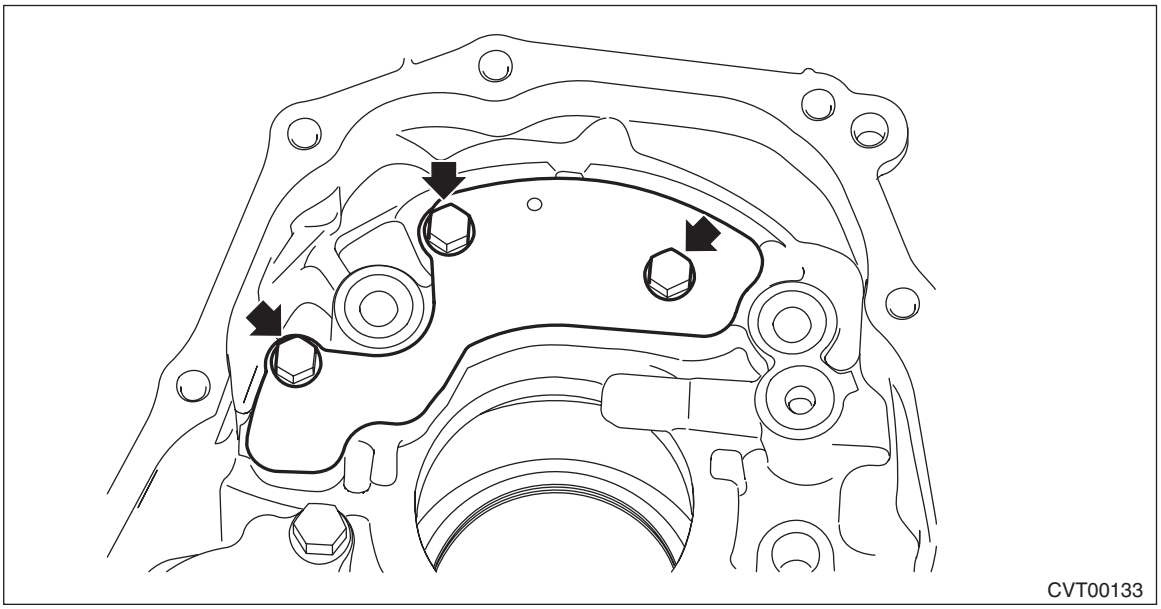


11) Install the output clutch assembly. <Ref. to CVT(TH58A)-234, INSTALLATION, Output Clutch Assembly.>
12) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
13) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
14) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
15) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>

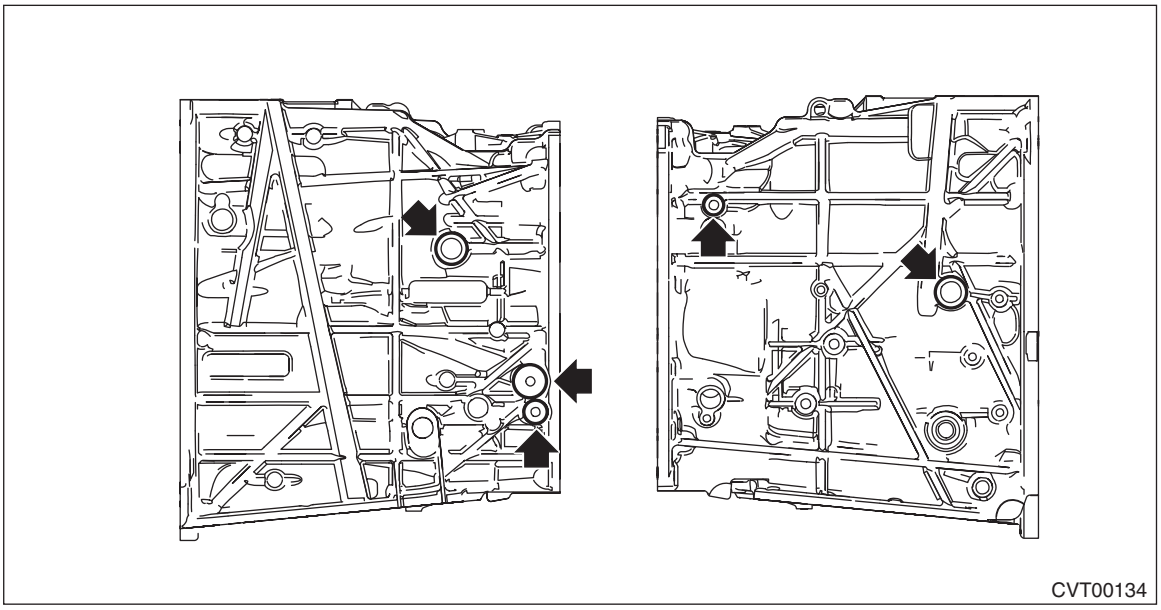
16) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
17) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
18) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
19) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
20) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
21) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
22) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
23) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
24) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
25) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
26) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
27) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

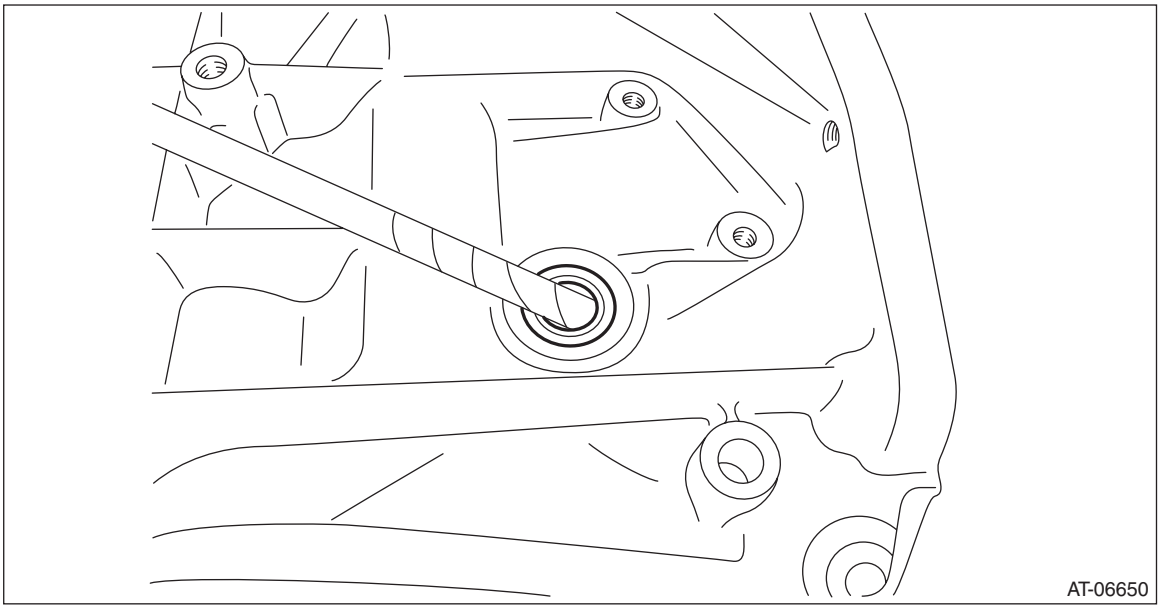
1) Remove the oil stopper plate.



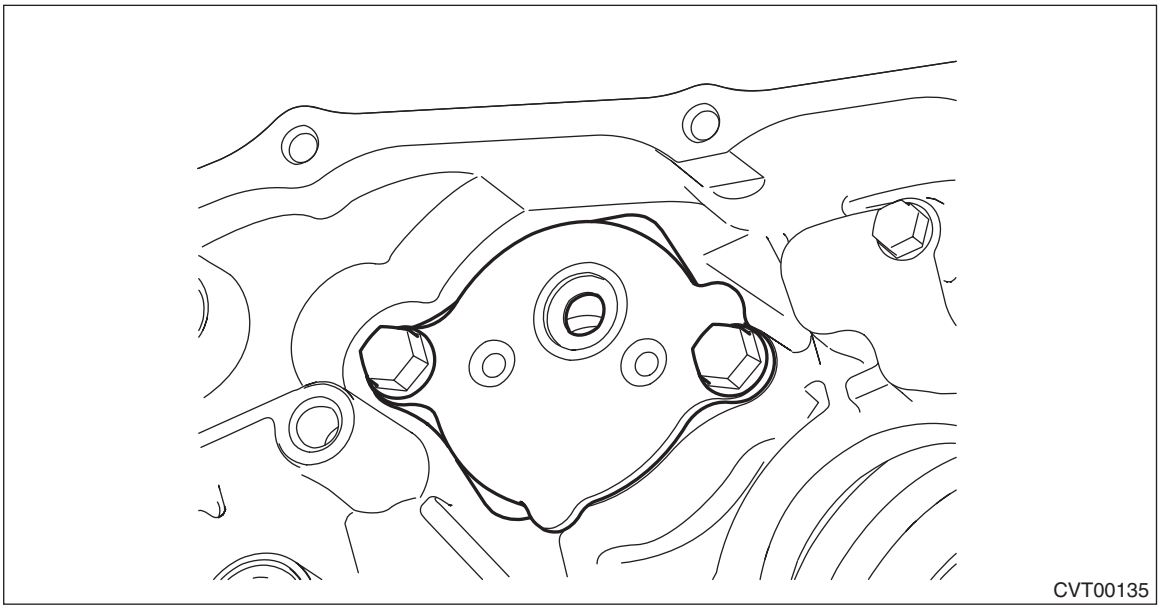
2) Remove all plugs from the transmission case.



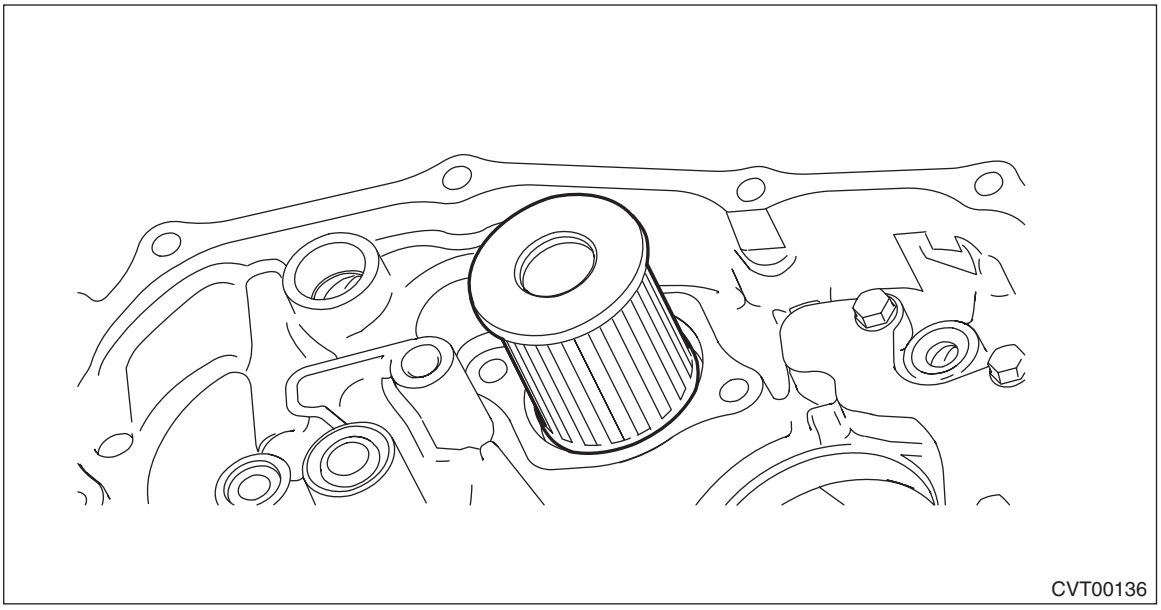
3) Remove the oil seal using a screwdriver wrapped with cloth etc.



4) Remove the CVTF filter cover and gasket.



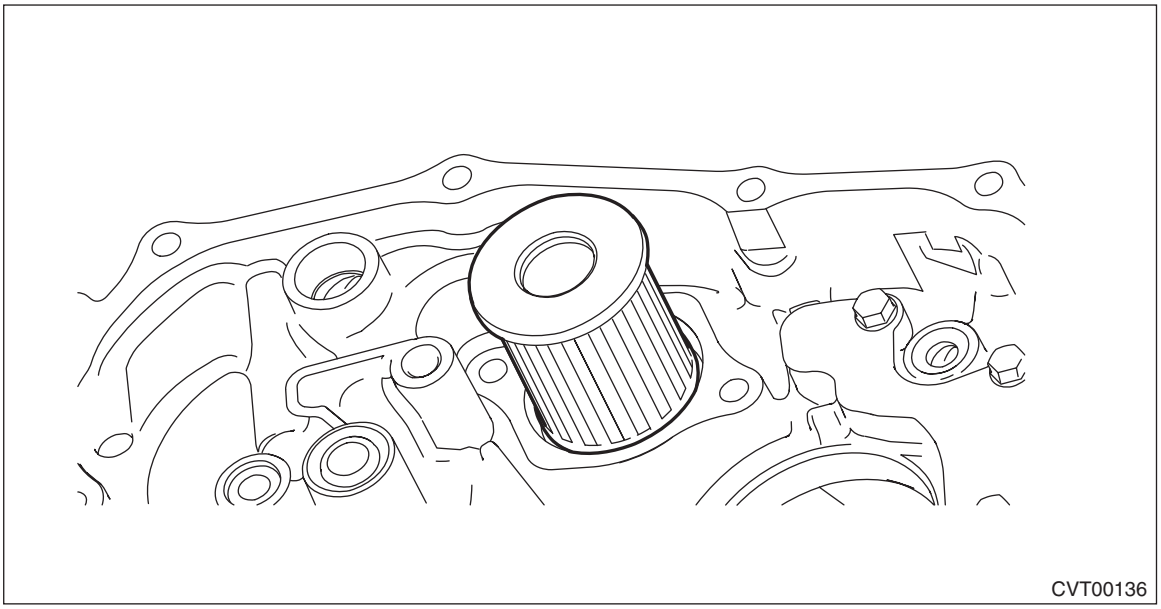
5) Remove the CVTF filter.



D: ASSEMBLY

1) Face the O-ring side of the CVTF filter to the CVTF filter cover side, and install the CVTF filter.

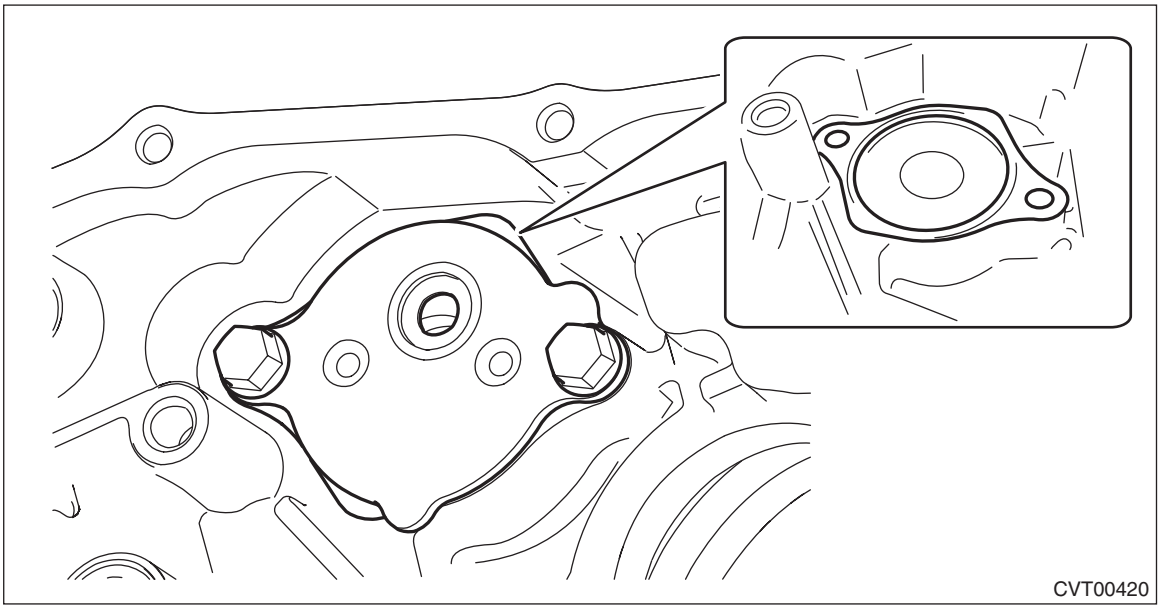
NOTE:
Apply CVTF to the O-ring of CVTF filter.



2) Install the CVTF filter cover and gasket.

NOTE:
- Use a new gasket.
- The gasket has the front side and back side. Install it as shown in the figure.

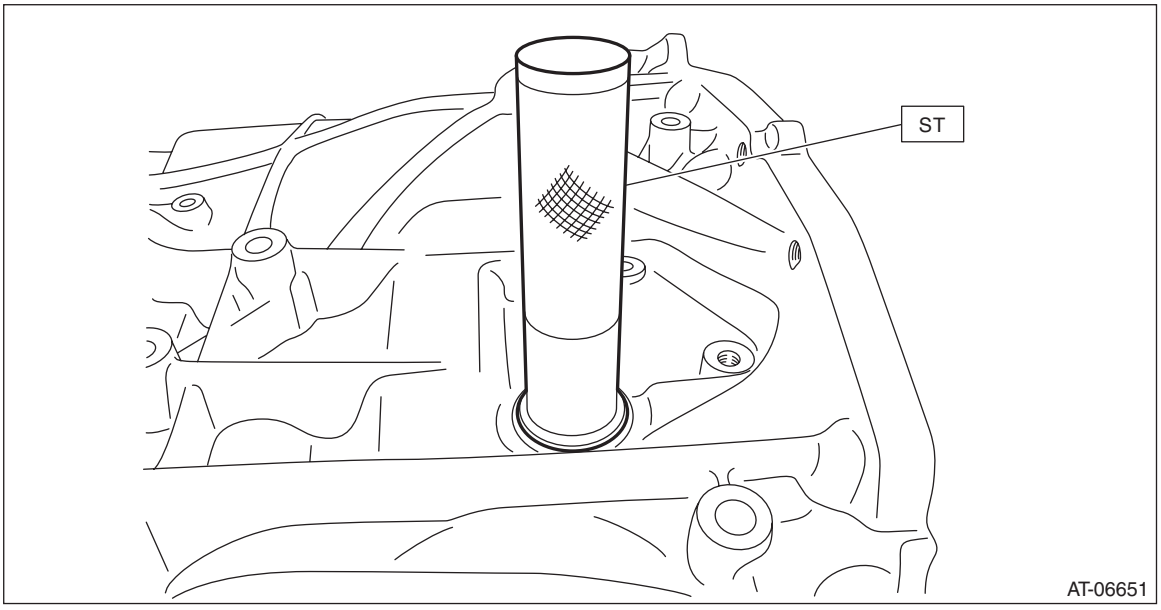
Tightening torque:
17 N·m (1.7 kgf-m, 12.5 ft-lb)



3) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

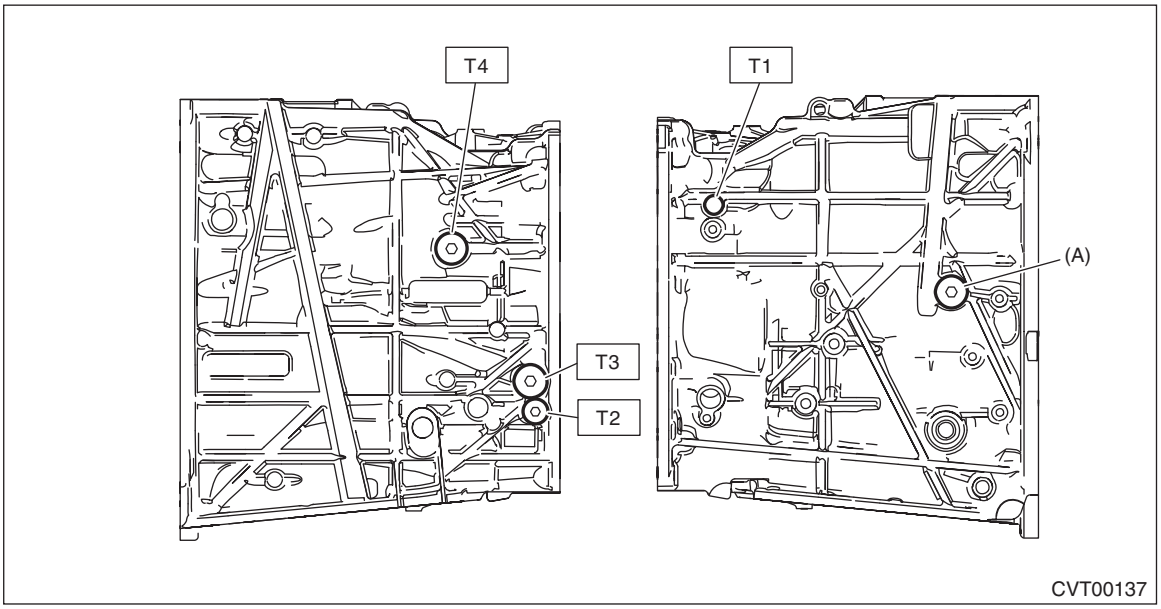
ST 18657AA000 INSTALLER



4) Install all plugs.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.
- For the plug (A), fill the CVTF, and then tighten the plug using a new gasket.

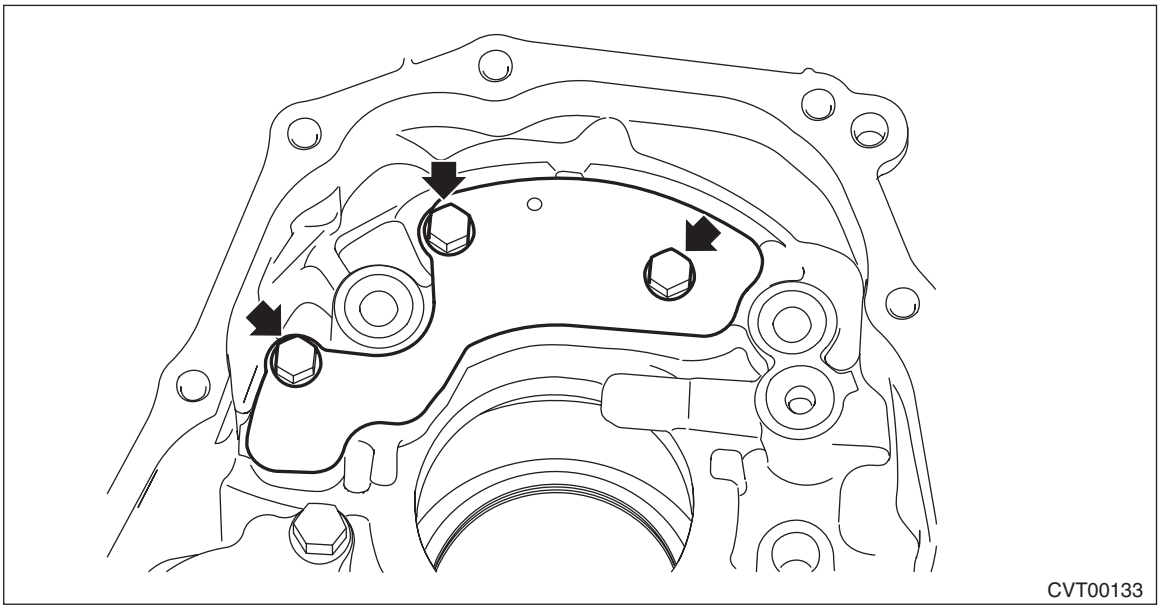
Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
T3: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T4: 60 N·m (6.0 kgf-m, 44.3 ft-lb)



5) Install the oil stopper plate.

NOTE:
Use a new bolt.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



E: INSPECTION

- Check the transmission case for damage.
- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check the bearing for smooth operation.
- Check the bearing for seizure or wear.
- Check each part for damage.

F: ADJUSTMENT

NOTE:
When replacing the transmission case with a new part, perform the following check and adjustment for the selection.

- Select the reduction driven gear shim. <Ref. to CVT(TH58A)-248, ADJUSTMENT, Output Clutch Assembly.>
- Select the reduction drive gear shim. <Ref. to CVT(TH58A)-266, ADJUSTMENT, Reduction Drive Gear.>

41.CVTF Filter

A: REMOVAL

NOTE:
• Although CVTF filter is a maintenance-free part, replace it if a large quantity of wear debris and metal particles are found in CVTF and CVTF filter.
• For removal of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TH58A)-250, REMOVAL, Transmission Case.> <Ref. to CVT(TH58A)-256, DISASSEMBLY, Transmission Case.>

B: INSTALLATION

NOTE:
For installation of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TH58A)-259, ASSEMBLY, Transmission Case.> <Ref. to CVT(TH58A)-253, INSTALLATION, Transmission Case.>

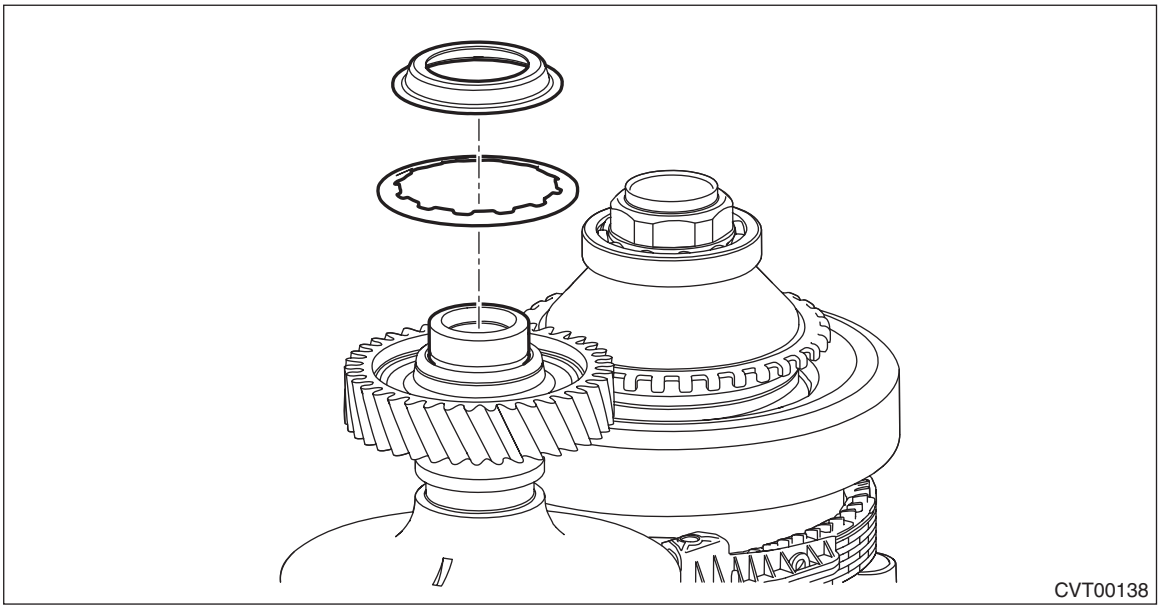
C: INSPECTION

- Check if a large quantity of wear debris or metal particles are in CVTF and CVTF filter.
- Check for broken part or damaged O-ring.

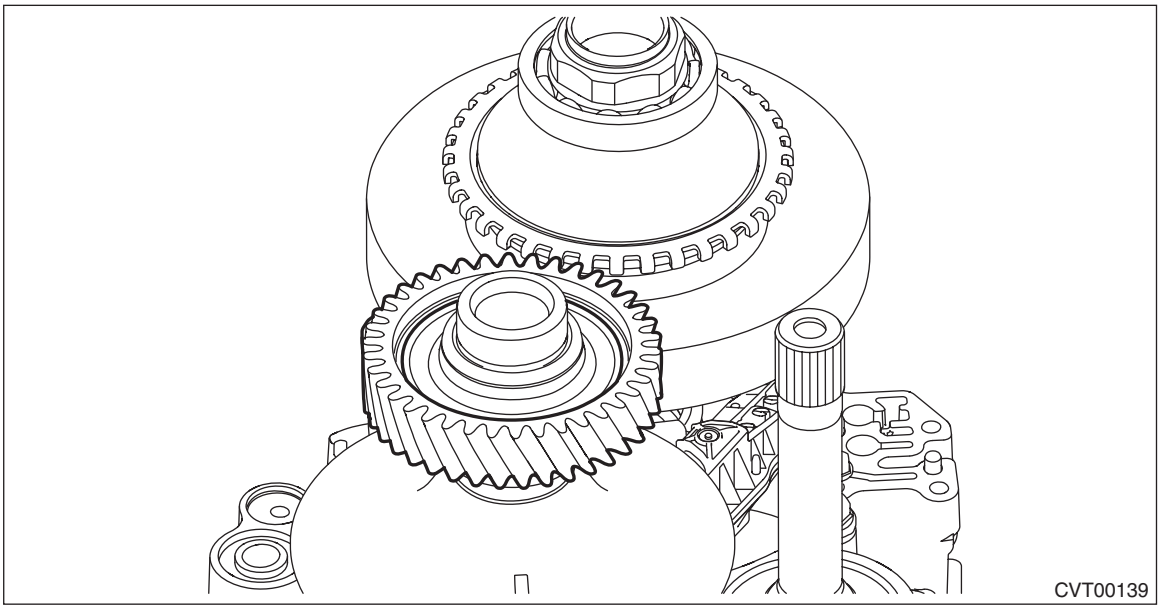
42.Reduction Drive Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-219, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-233, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-250, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear shims, spring retainers, and dish plates.

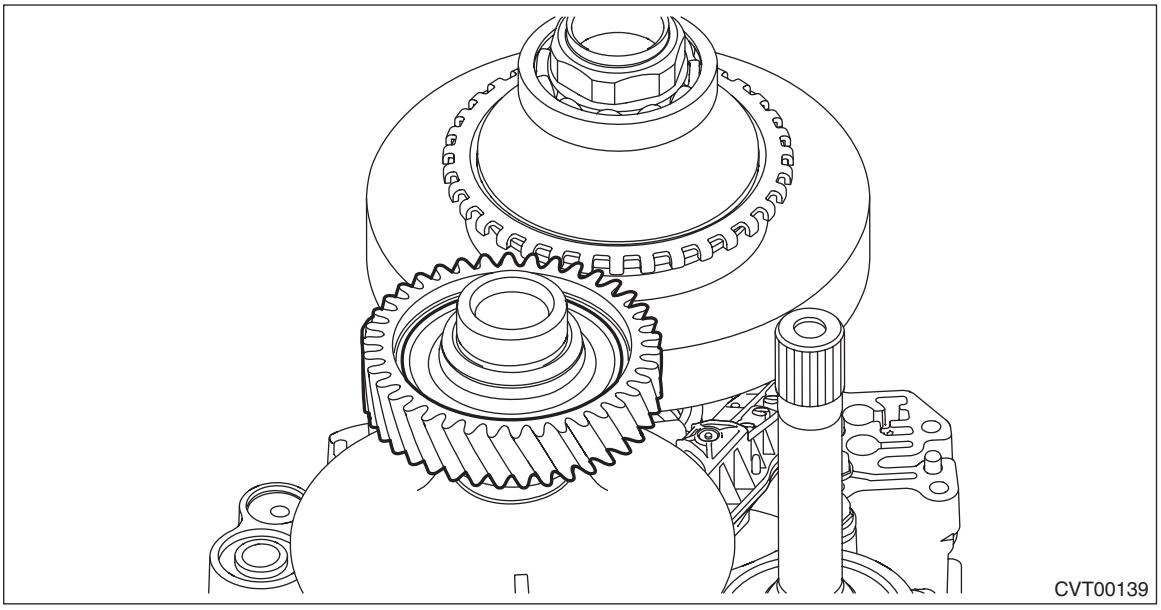


20) Remove the reduction drive gear.



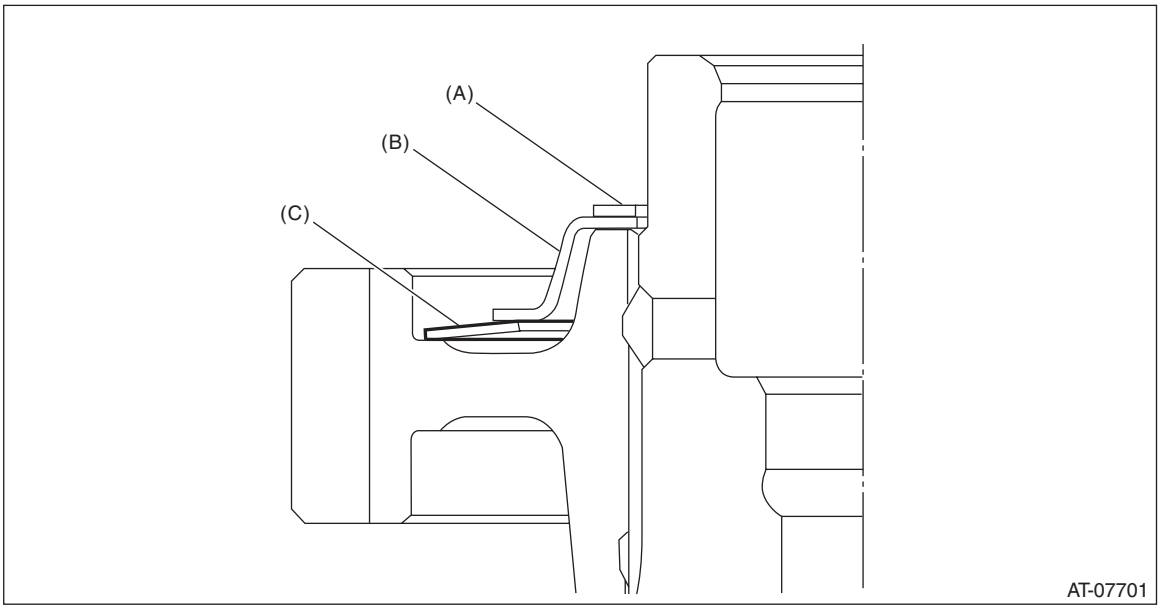
B: INSTALLATION

1) Install the reduction drive gear to secondary pulley.



2) Select the reduction drive gear shim. <Ref. to CVT(TH58A)-266, ADJUSTMENT, Reduction Drive Gear.>
3) Install the dish plates, spring retainers, and selected reduction drive gear shims.

NOTE:
Install the dish plate in the correct direction.



(A) Reduction drive gear shim
(B) Spring retainer
(C) Dish plate

4) Install the transmission case. <Ref. to CVT(TH58A)-253, INSTALLATION, Transmission Case.>
5) Install the output clutch assembly. <Ref. to CVT(TH58A)-234, INSTALLATION, Output Clutch Assembly.>
6) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
7) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
8) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
9) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
10) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
11) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
12) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
13) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
14) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
15) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
16) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
17) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
18) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
19) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
20) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
21) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

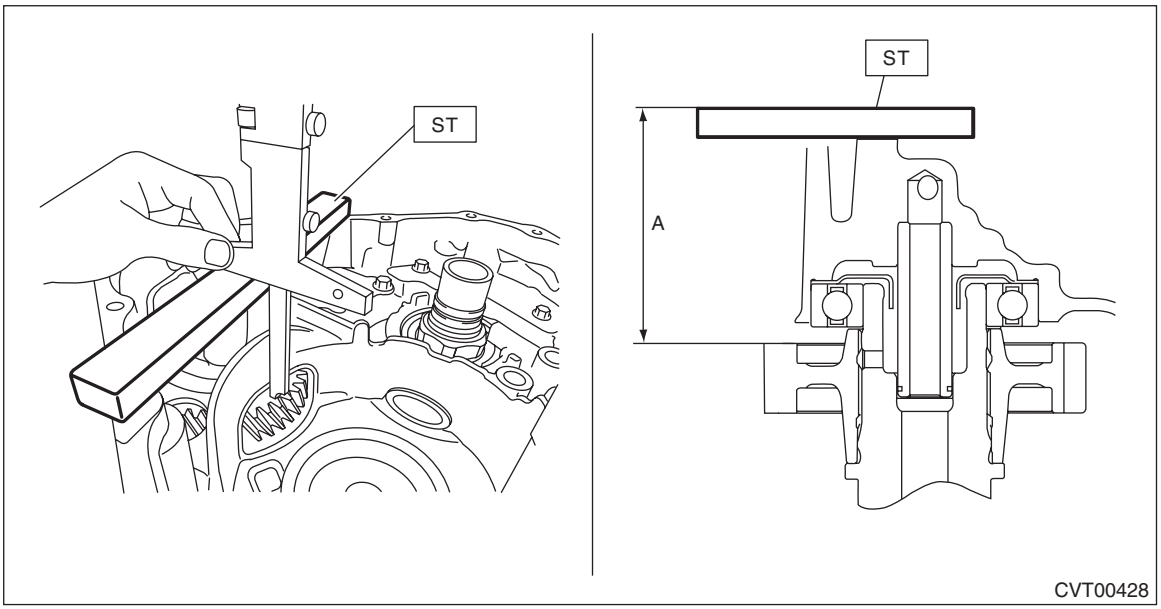
Check the reduction drive gear for breakage or damage.

D: ADJUSTMENT

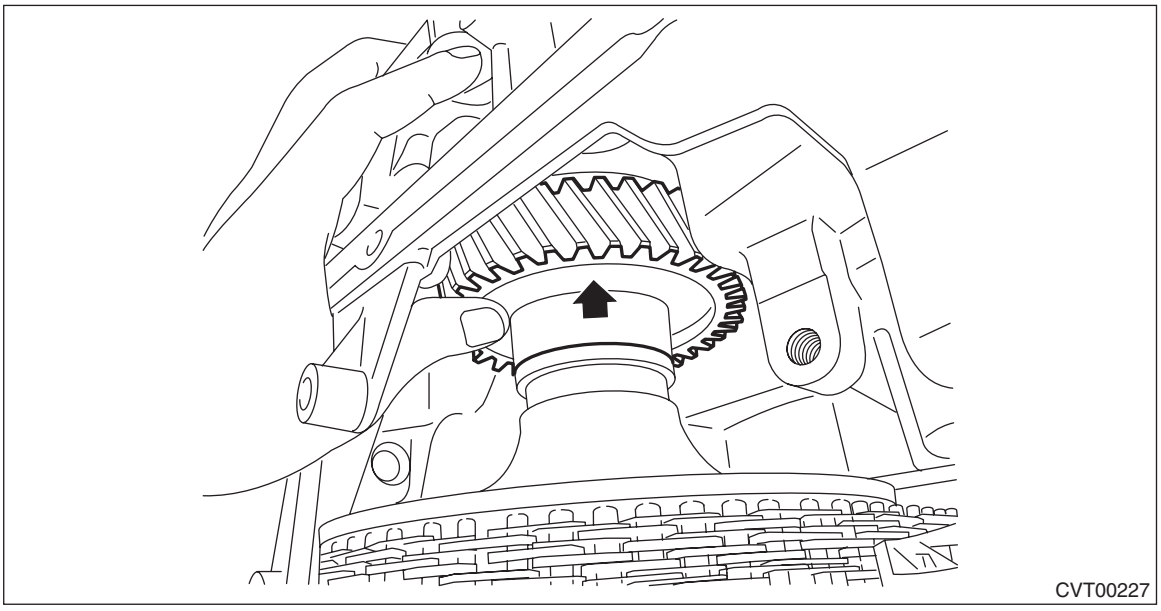
1) Remove the spring retainers and reduction drive gear shims.
2) Install the transmission case, and secure it with four or five bolts.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

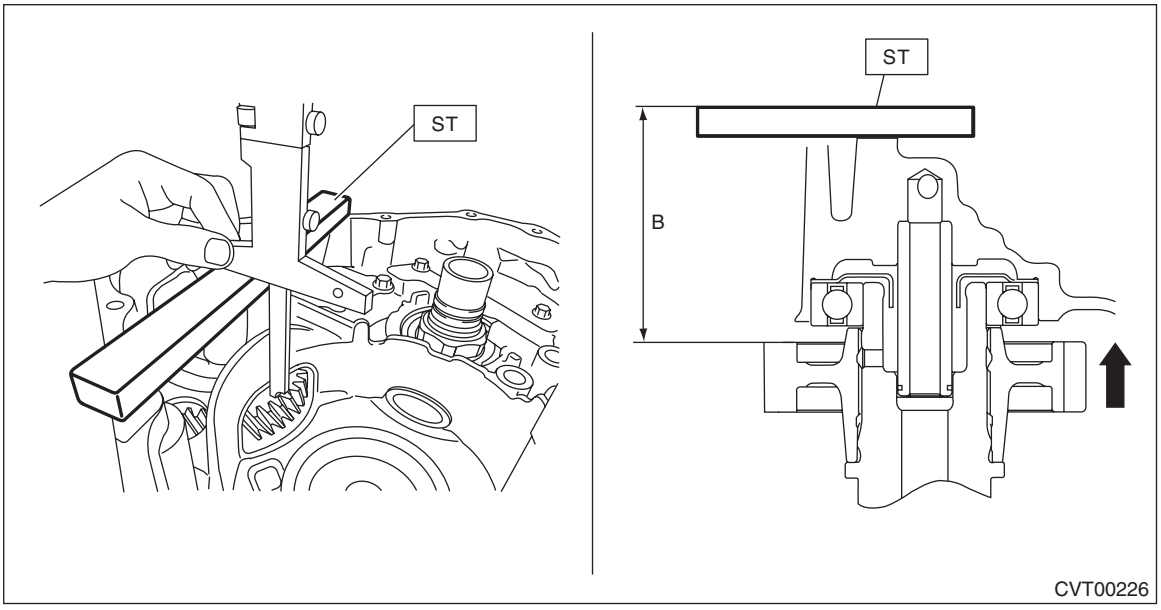
3) Measure depth “A” from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



4) Raise and hold the reduction drive gear.



5) Measure depth “B” from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



6) Calculate the following formula.
T mm = A – B – 1.0
[T in = A – B – 0.039]
T: Moving distance of reduction drive gear
A: Depth from the ST upper face to the reduction drive gear end surface
B: Depth from the ST upper face to the reduction drive gear end surface (with the gear raised)
1.0 mm (0.039 in): Thickness of spring retainer

Moving distance of transfer drive gear [T]	Total shim thickness mm (in)
0.420 — 0.519(0.0165 — 0.0204)	0.3 (0.012)
0.520 — 0.619(0.0205 — 0.0242)	0.4 (0.016)
0.620 — 0.719(0.0244 — 0.0283)	0.5 (0.020)
0.720 — 0.819(0.0283 — 0.0322)	0.6 (0.024)
0.820 — 0.919(0.0323 — 0.0362)	0.7 (0.028)
0.920 — 1.019(0.0362 — 0.0401)	0.8 (0.031)
1.020 — 1.119(0.0402 — 0.0441)	0.9 (0.035)
1.120 — 1.219(0.0441 — 0.0480)	1.0 (0.039)
1.220 — 1.319(0.0480 — 0.0519)	1.1 (0.043)
1.320 — 1.419(0.0520 — 0.0559)	1.2 (0.047)
1.420 — 1.519(0.0559 — 0.0598)	1.3 (0.051)
1.520 — 1.619(0.0598 — 0.0637)	1.4 (0.055)
1.620 — 1.719(0.0638 — 0.0677)	1.5 (0.059)
1.720 — 1.819(0.0677 — 0.0716)	1.6 (0.063)
1.820 — 1.920(0.0717 — 0.0756)	1.7 (0.067)

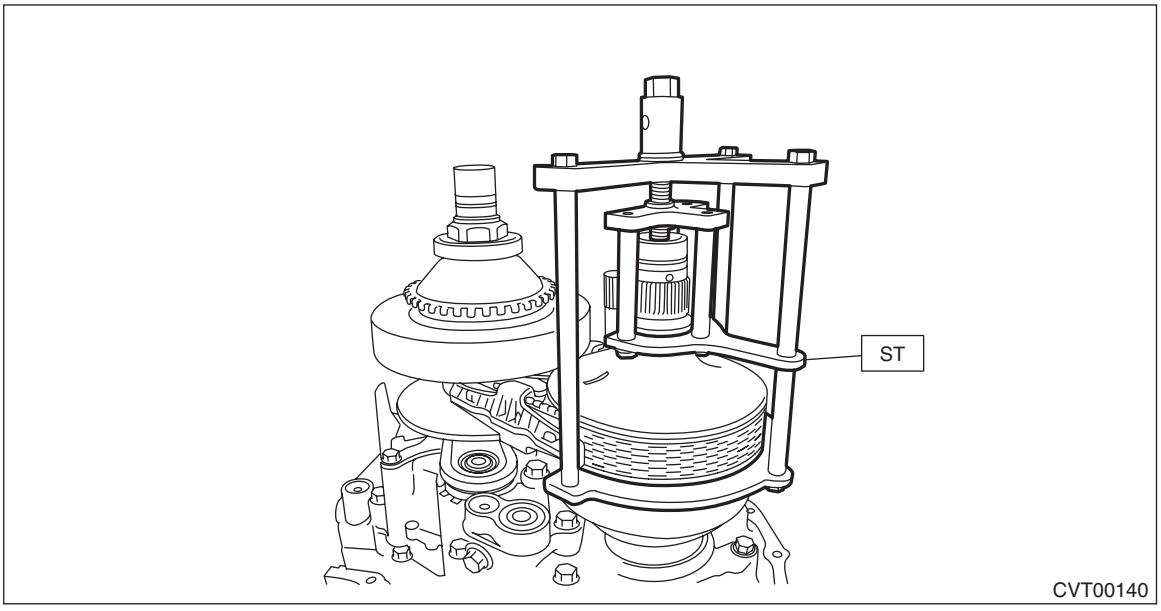
7) Select one to three reduction drive gear shims so that the total thickness meets the value obtained from step 6).

Part No.	Reduction drive gear shim thickness mm (in)
31288AA260	0.3 (0.012)
31288AA270	0.4 (0.016)
31288AA280	0.5 (0.020)
31288AA290	0.6 (0.024)

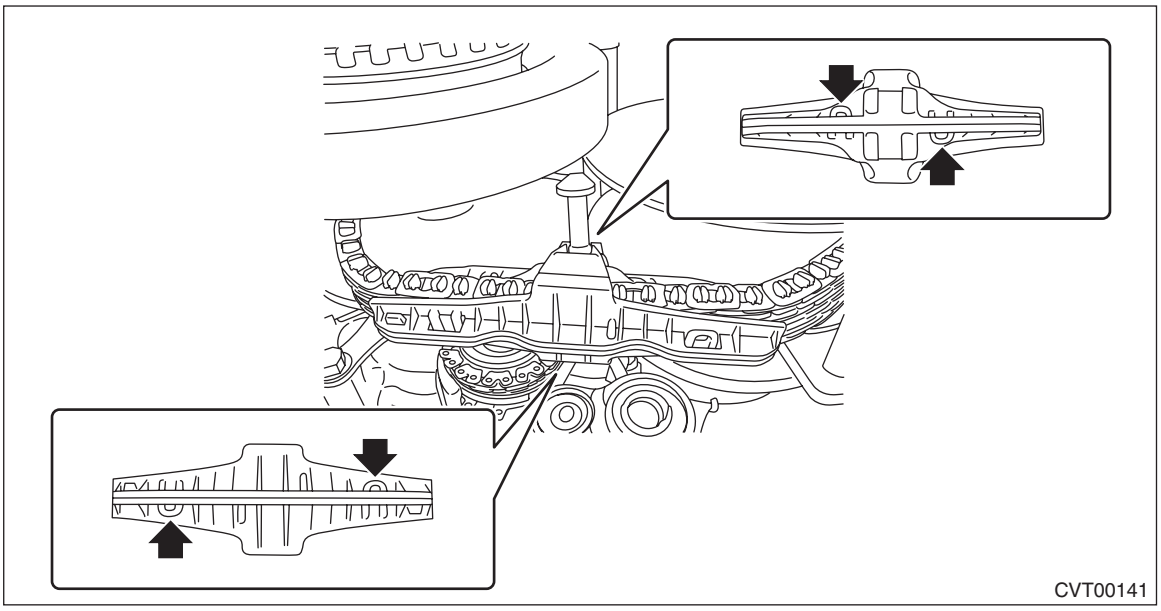
43.Primary Pulley and Secondary Pulley

A: REMOVAL

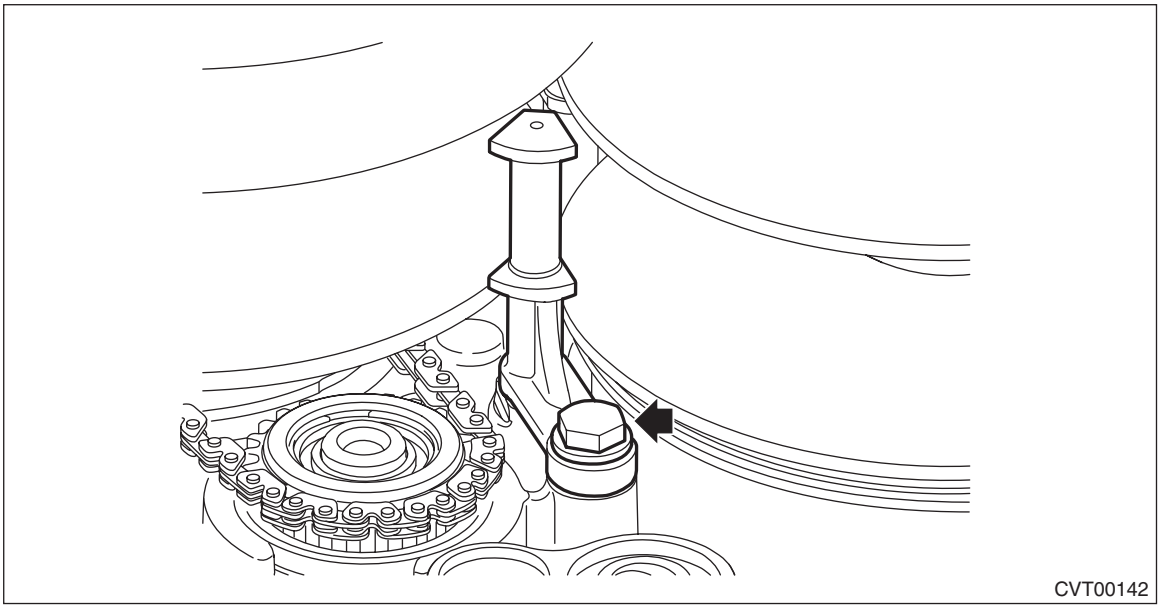
NOTE:
Always replace primary pulley and secondary pulley as an assembly because they are non-disassembled parts.
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-219, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-233, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-250, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-263, REMOVAL, Reduction Drive Gear.>
20) Set the ST to secondary pulley, expand the V groove of pulley, and then completely loosen the variator chain.
ST 18769AA010 EXPANDER PULLEY



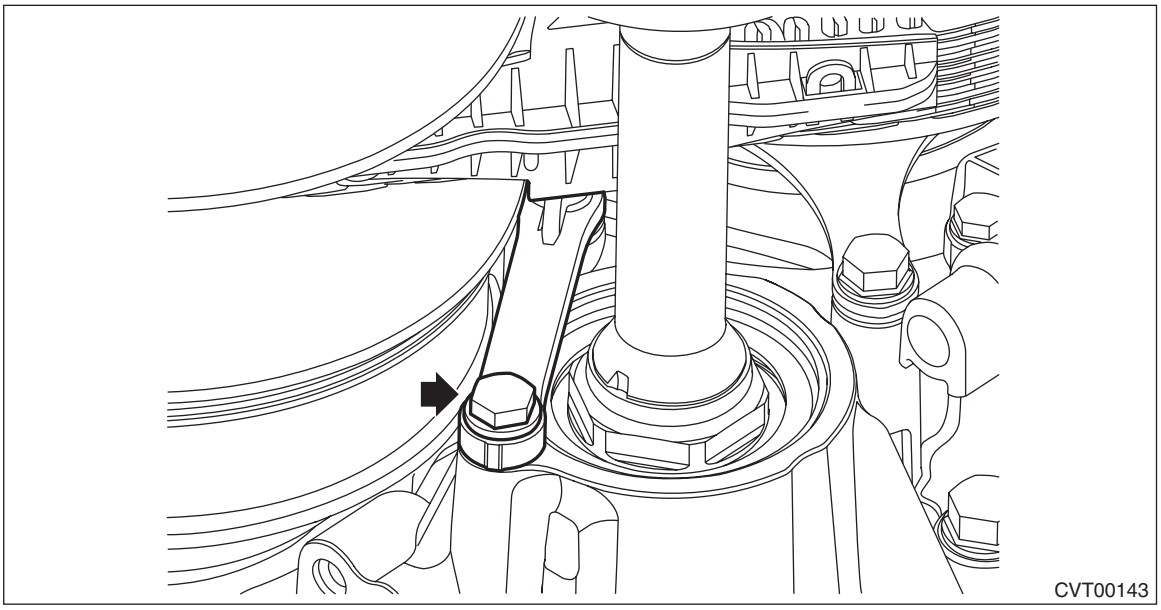
21) Remove the chain guide.
(1) Remove the chain guide from lubrication pipe.
(2) Detach the four claws to remove the chain guide.


CVT00141

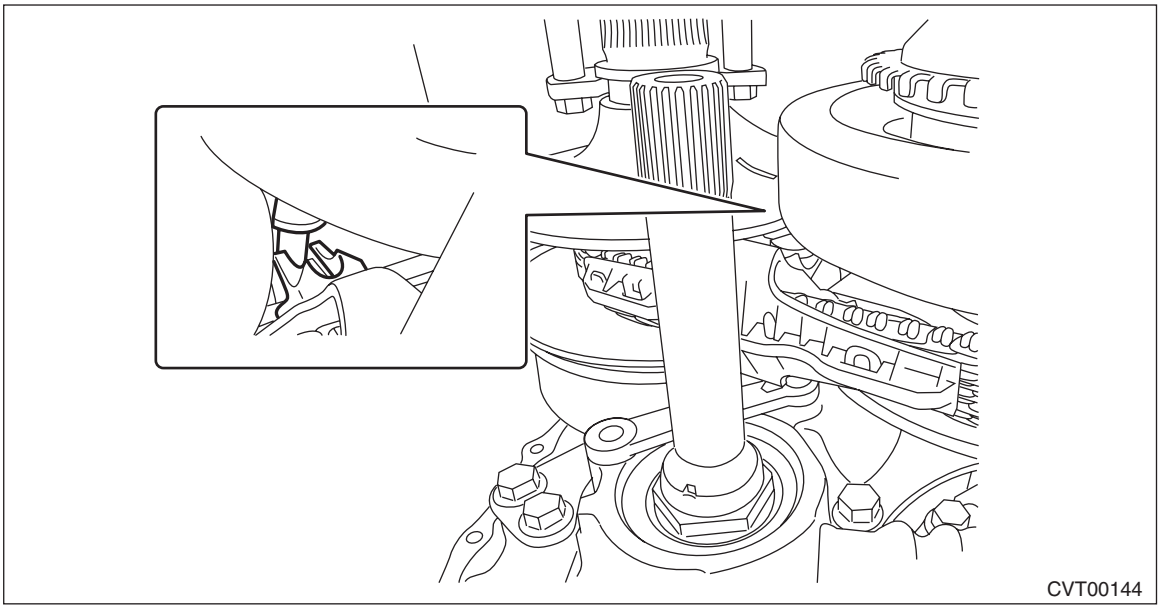
(3) Remove the lubrication pipe.


CVT00142

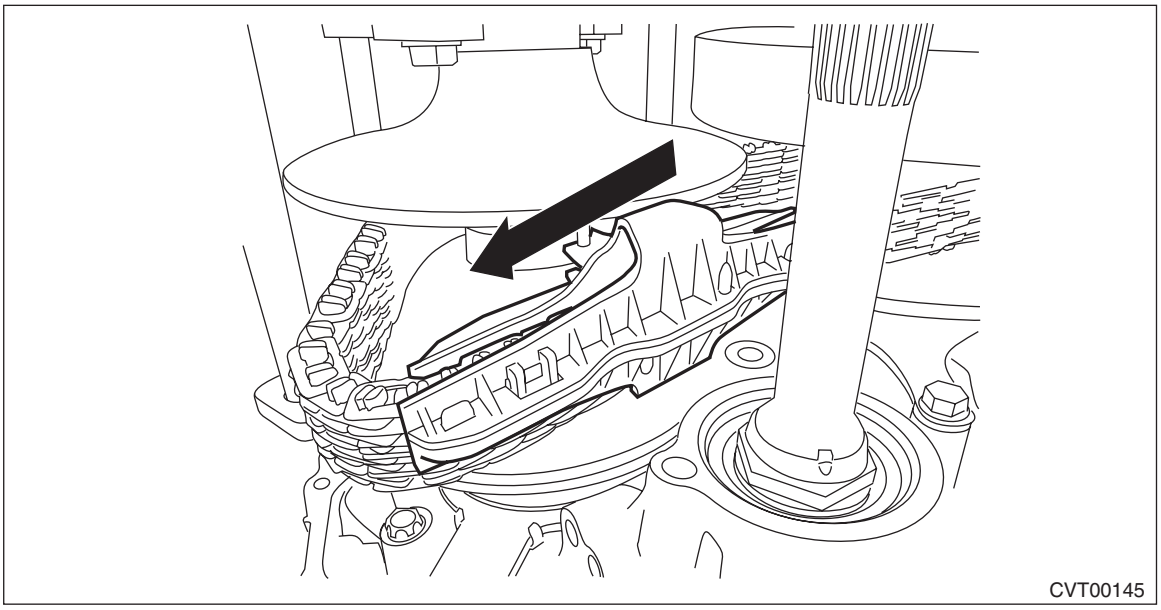
(4) Remove the support rod mounting bolts.



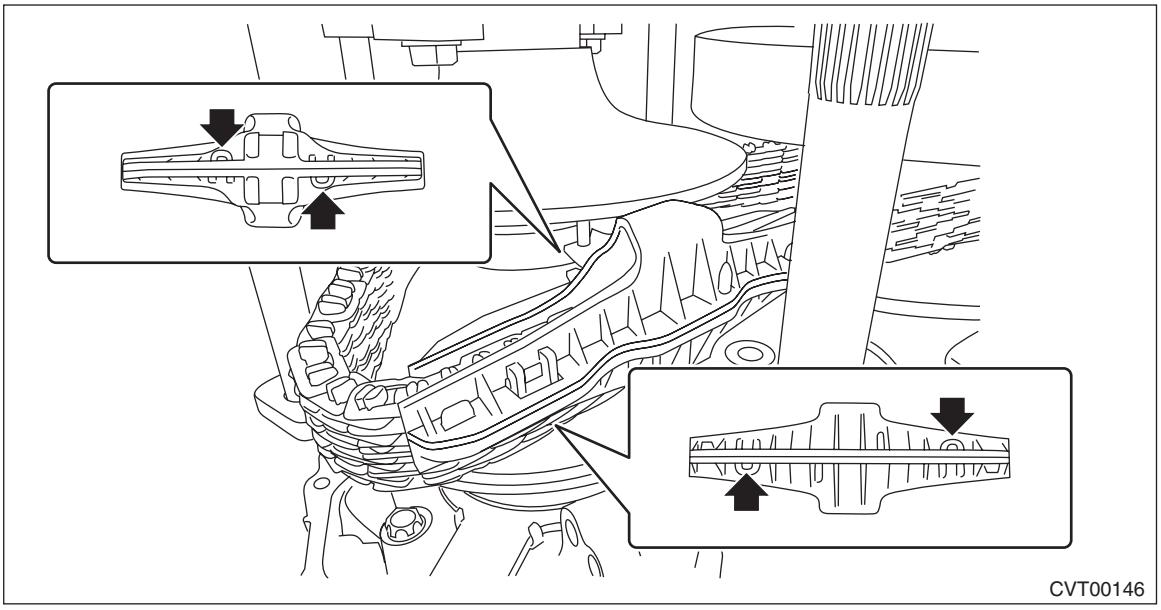
(5) Raise the support rod to remove the chain guide.



(6) Move the chain guide to the secondary pulley side.

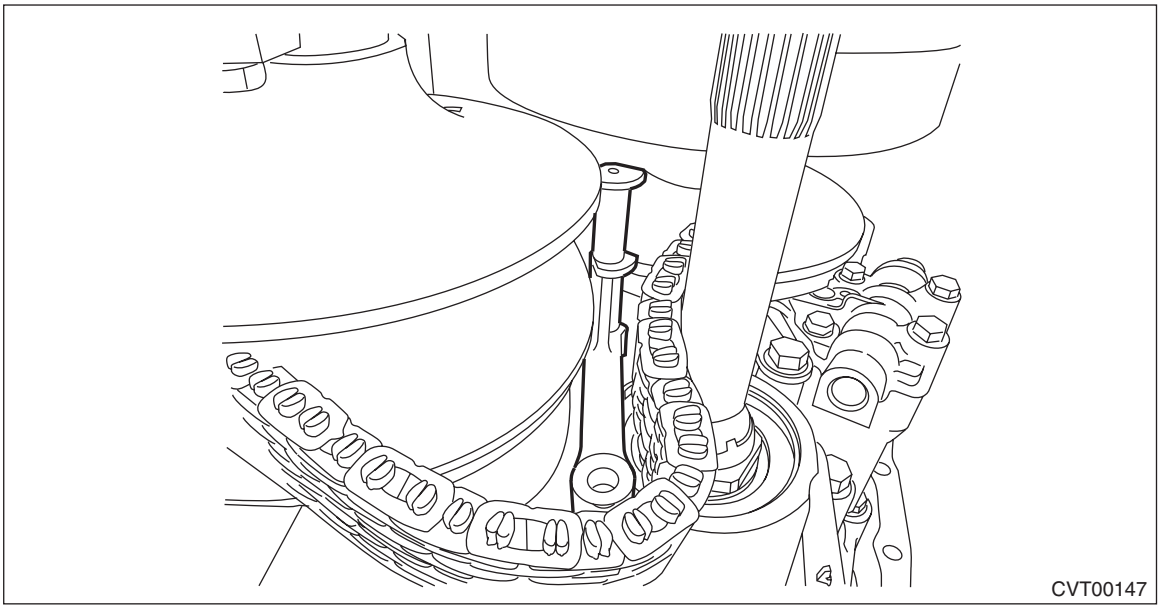


(7) Detach the four claws to remove the chain guide.

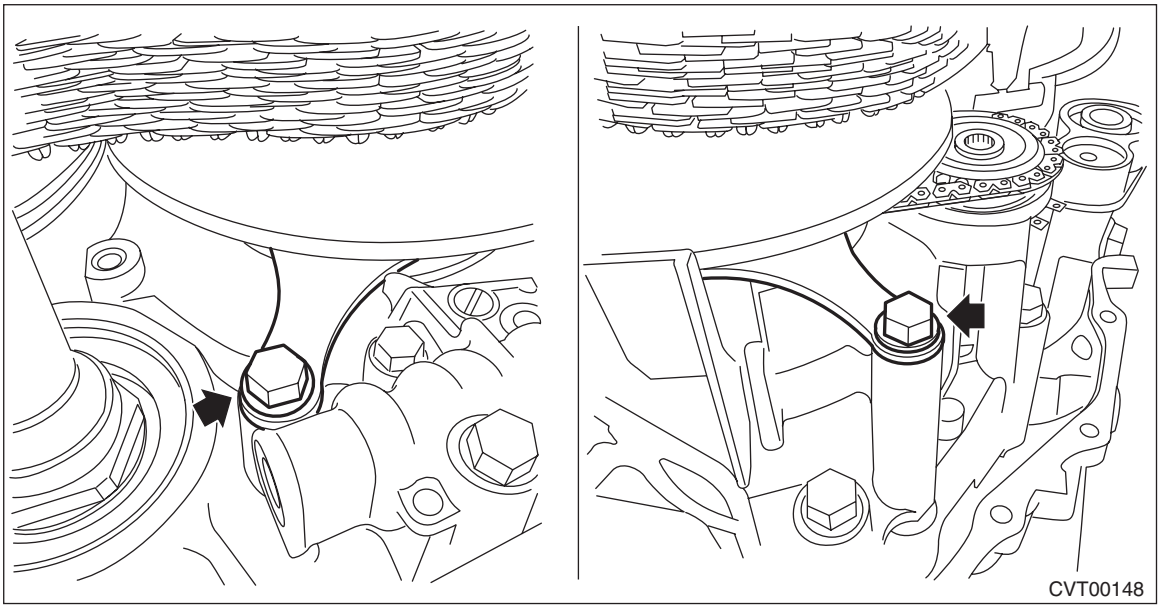


(8) Remove the support rod.

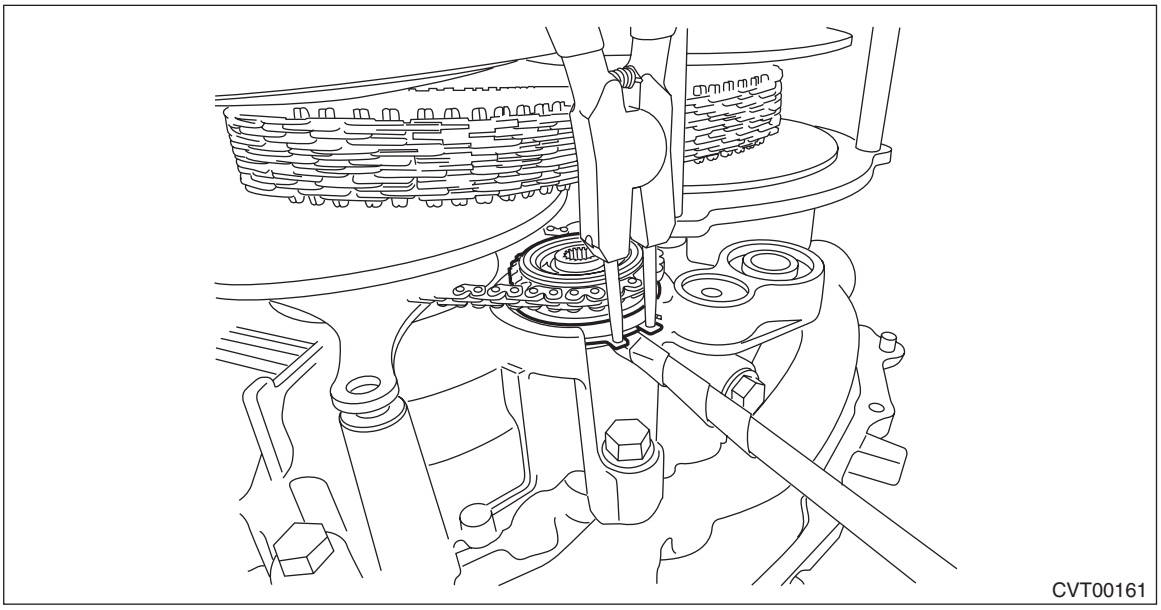
CAUTION:
Protect the both pulleys and variator chain from scratching.



22) Remove the primary pulley mounting bolt.



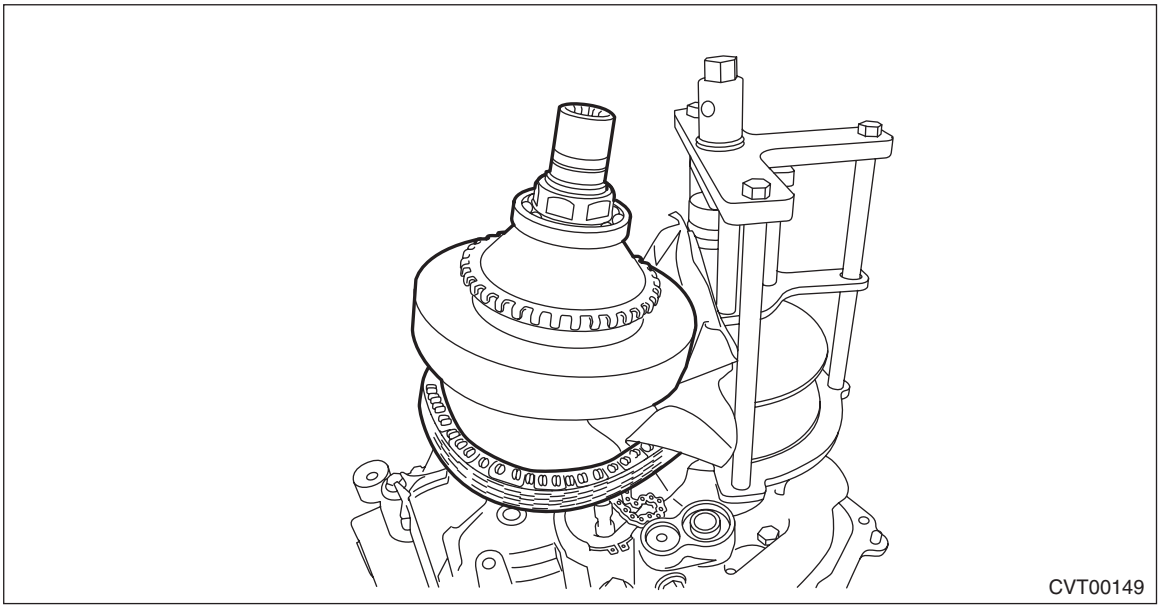
23) Spread the snap ring, and remove the snap ring from the oil pump sprocket (rear).



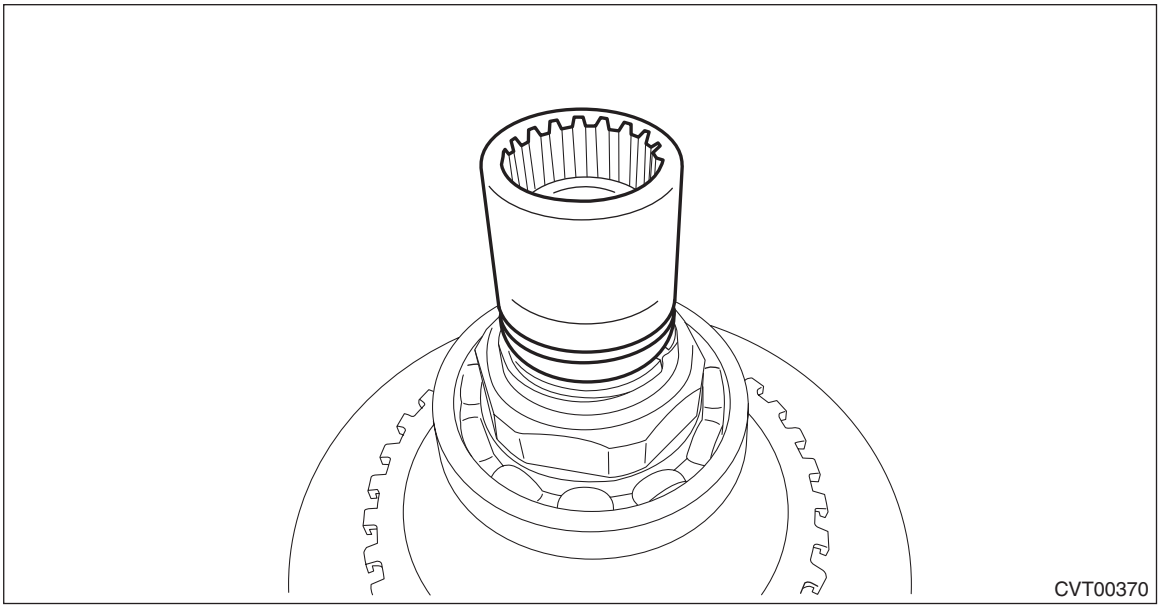
24) Remove the primary pulley.

CAUTION:
Cover the V grooves of secondary pulley and primary pulley with cloth to protect the both pulleys and variator chain from scratching.

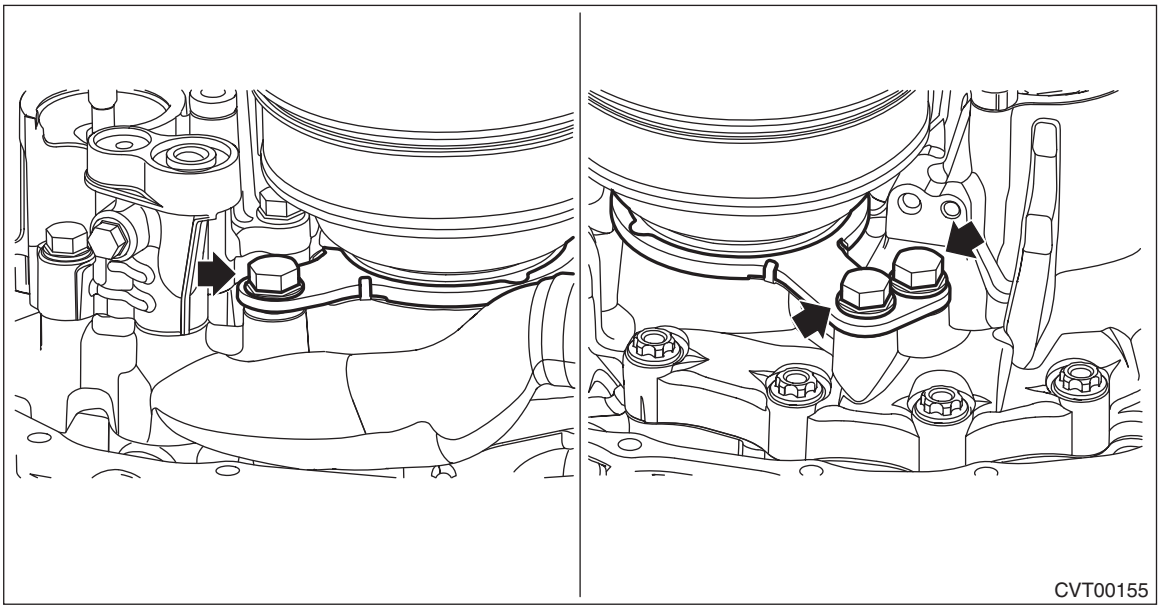
(1) Raise the primary pulley and the oil pump sprocket (rear) together, and remove the oil pump sprocket (rear).
(2) Remove the primary pulley from the reverse brake housing and intersect the V groove of secondary pulley and the V groove of primary pulley.
(3) Remove the variator chain from primary pulley, and remove the primary pulley.



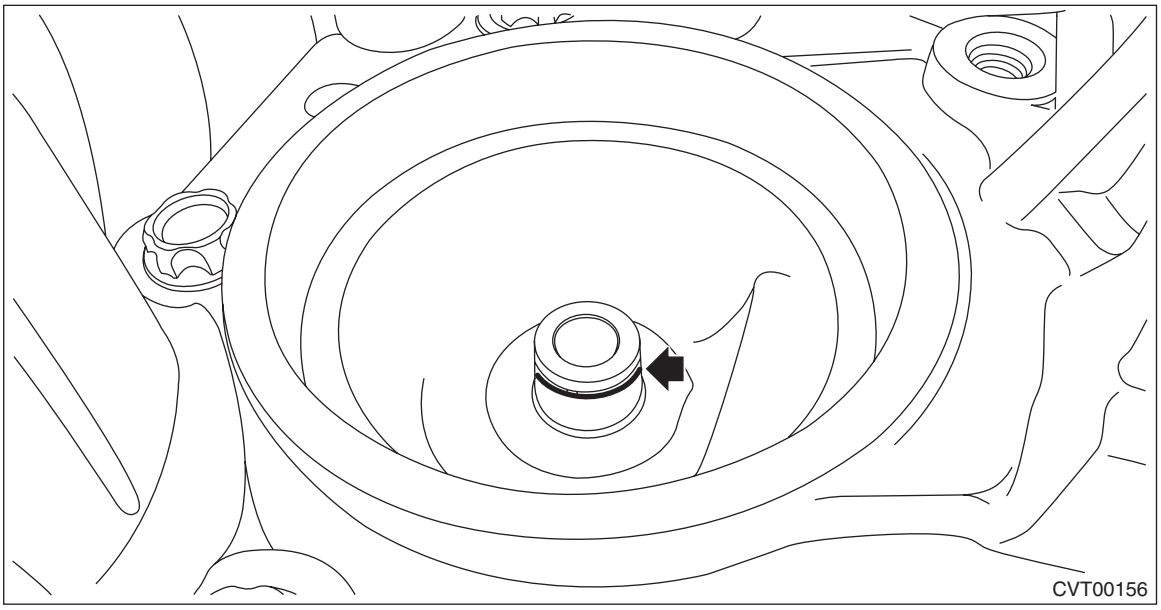
25) Remove the rear oil pump chain.
26) Remove the sleeve.



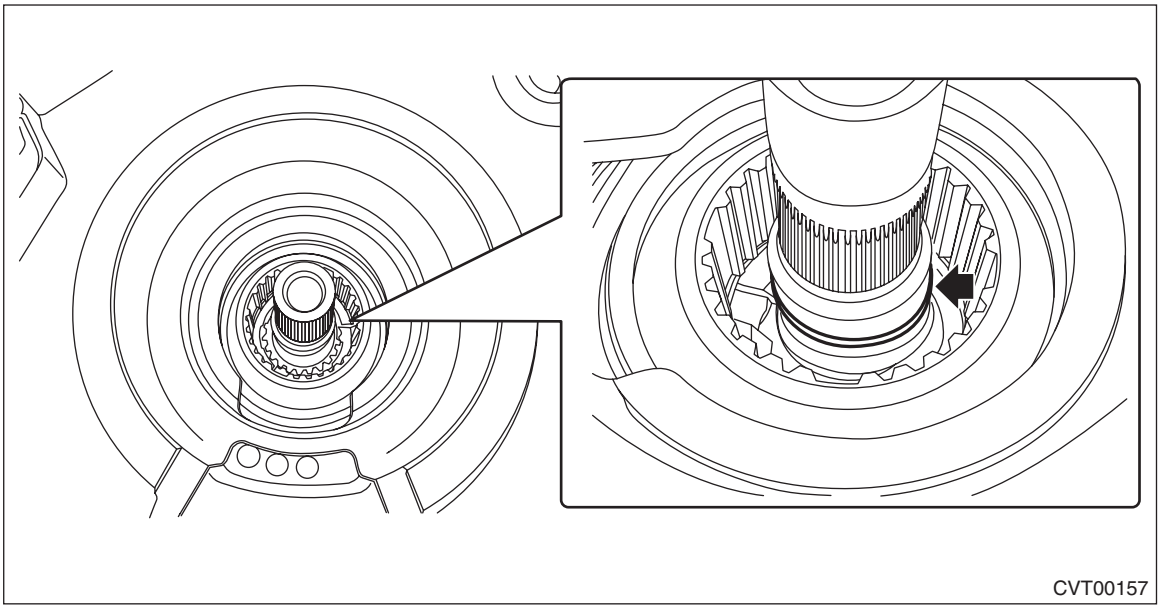
27) Remove the O-ring from the primary pulley assembly.
28) Remove the ST (EXPANDER PULLEY) from the secondary pulley.
29) Remove the variator chain from secondary pulley.
30) Remove the secondary pulley mounting bolts, and remove the secondary pulley.



31) Remove the seal ring from drive pinion retainer.



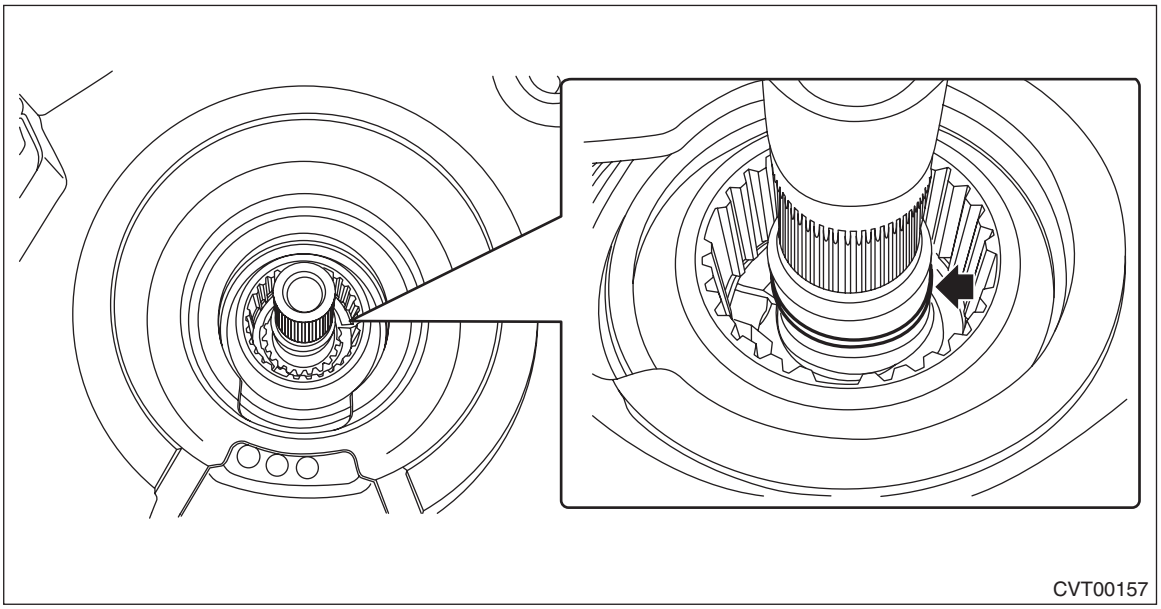
32) Remove the seal ring from the input shaft.



B: INSTALLATION

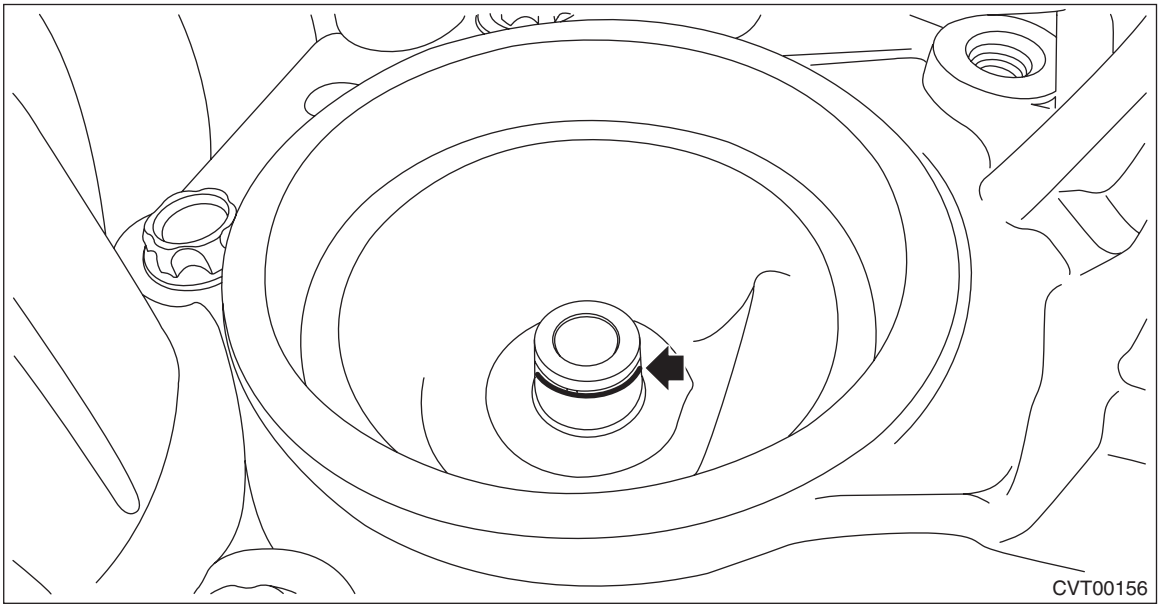
1) Select shims for pulley alignment. <Ref. to CVT(TH58A)-286, ADJUSTMENT, Primary Pulley and Secondary Pulley.>
2) When replacing the oil pump sprocket rear and the snap ring which secures the oil pump sprocket rear, select the oil pump shaft. <Ref. to CVT(TH58A)-391, ADJUSTMENT, Oil Pump.>
3) Install the seal ring to the input shaft.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



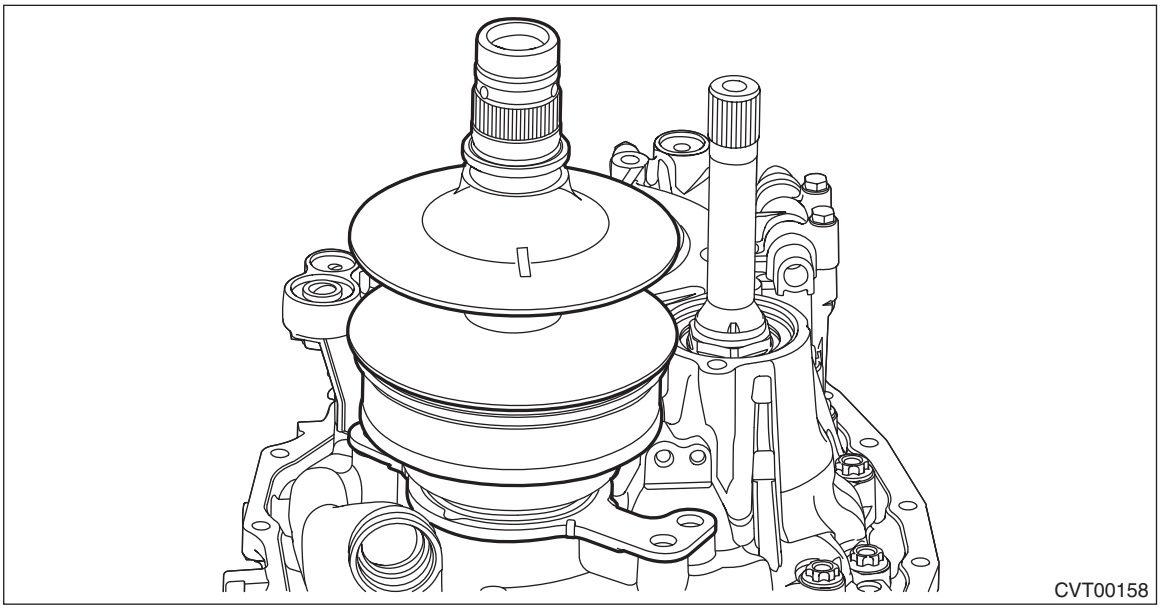
4) Install the seal ring to drive pinion retainer.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



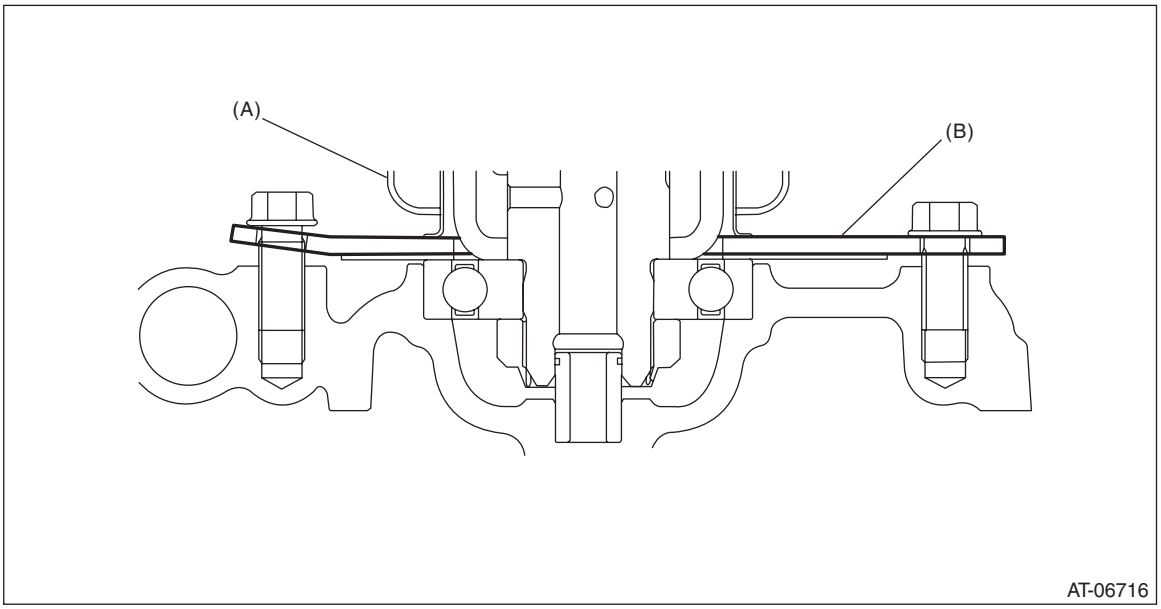
5) Install the selected shims to the primary pulley bearing catch surface.

6) Install the secondary pulley to the drive pinion retainer.



7) Install and tighten the secondary pulley securing bolts.
   (1) Tighten the three bolts until the seating surfaces contact the bearing retainer.

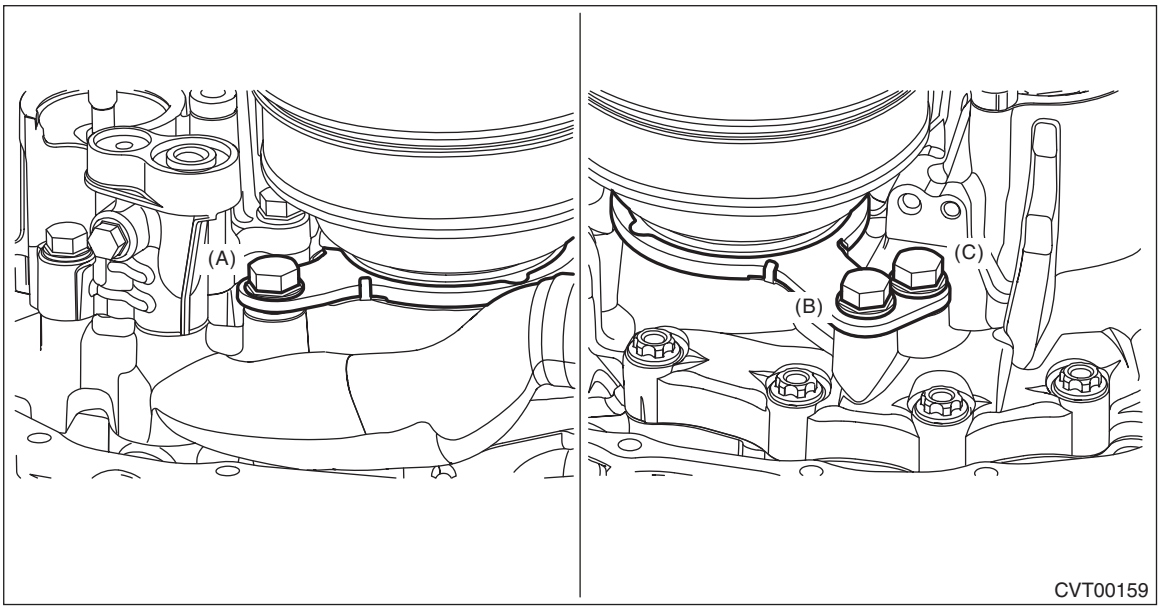
NOTE:
- Be careful not to tilt the bearing retainer of the secondary pulley.
- Apply CVTF to the bolt.



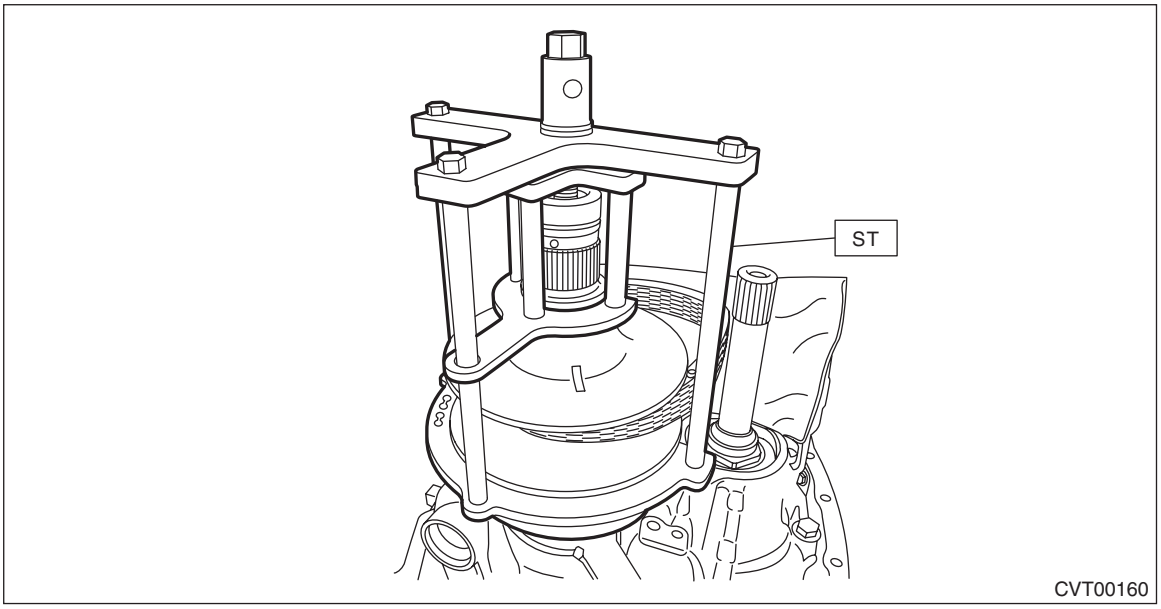
(A) Secondary pulley
(B) Bearing retainer

(2) Tighten the bolts in the order of (A) → (B) → (C) → (B).

Tightening torque:
67.5 N·m (6.9 kgf-m, 49.8 ft-lb)



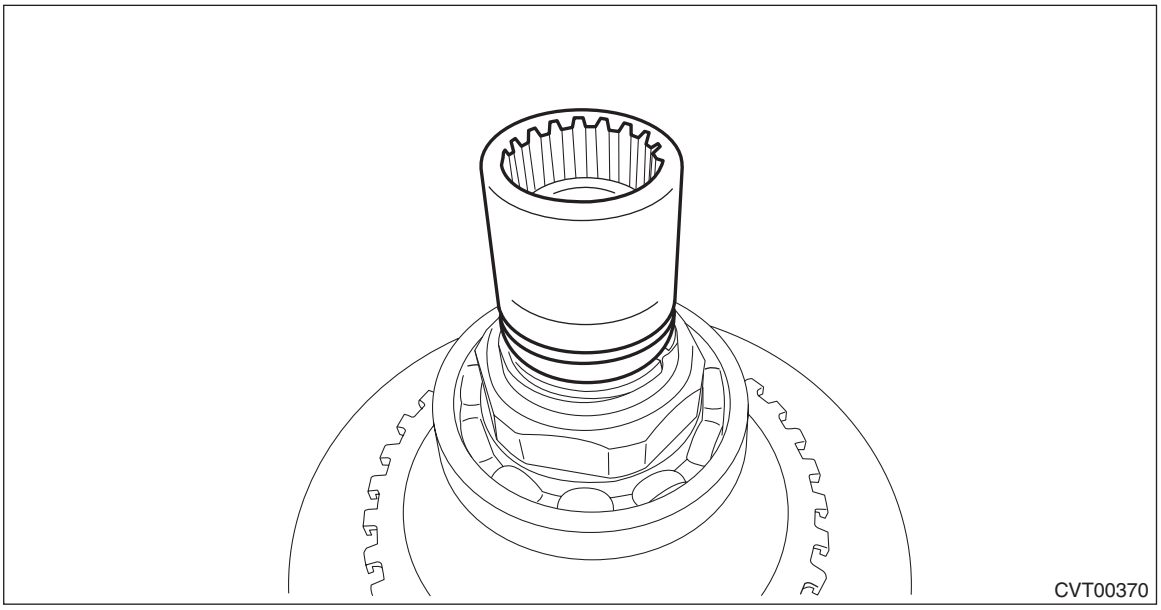
8) Place the variator chain on the V groove of the secondary pulley, and set the ST.
ST 18769AA010 EXPANDER PULLEY



9) Expand the V groove of the secondary pulley.
10) Install the O-ring to the primary pulley.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

11) Install the sleeve.

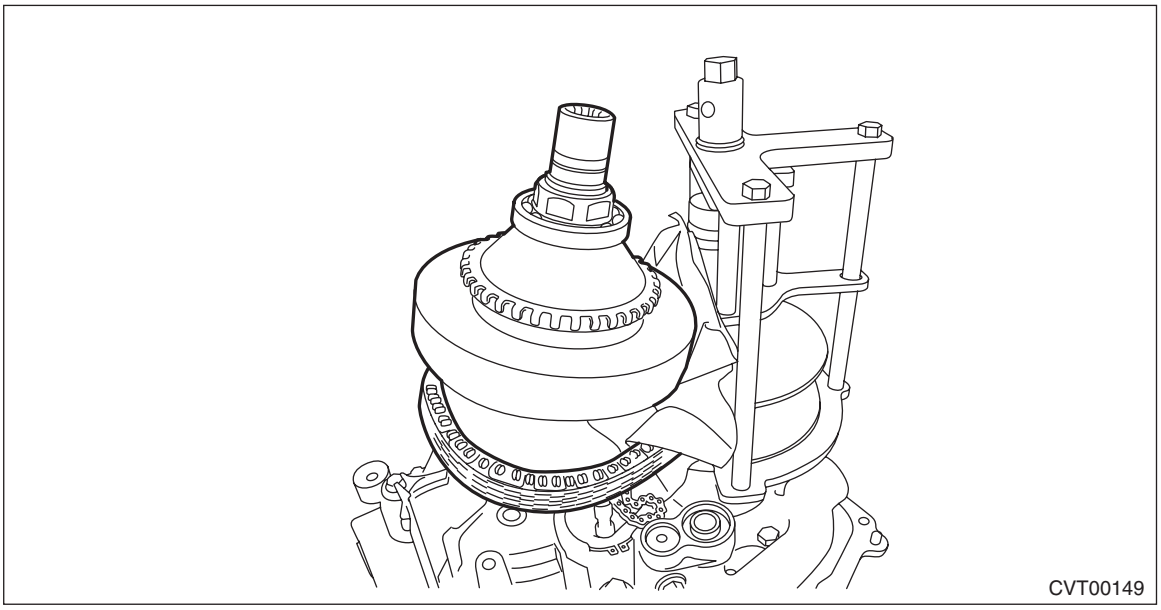


12) Install the primary pulley.

CAUTION:
Cover the V grooves of primary pulley and secondary pulley with cloth to protect the both pulleys and variator chain from scratching.

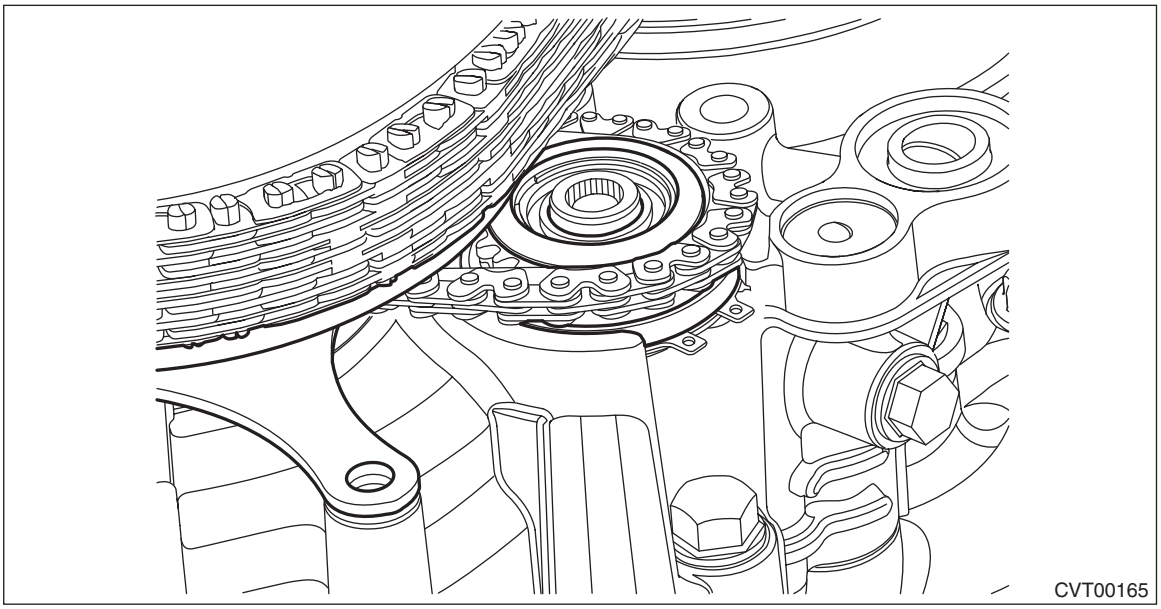
(1) Install the oil pump chain rear to the primary pulley.

(2) Intersect the V groove of primary pulley and the V groove of secondary pulley, and attach the variator chain to the primary pulley.

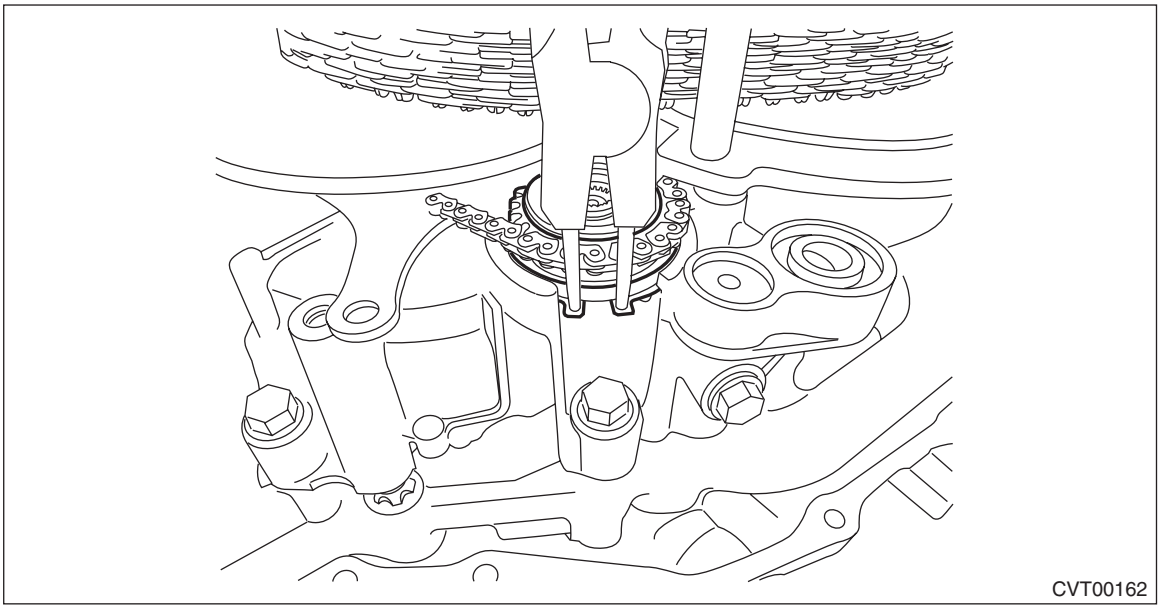


(3) Attach the oil pump chain rear to the primary pulley sprocket, and install the oil pump sprocket rear.

(4) Align the bolt hole of primary bearing retainer and the bolt hole of reverse brake housing, and install the primary pulley and the oil pump sprocket rear to the reverse brake housing.



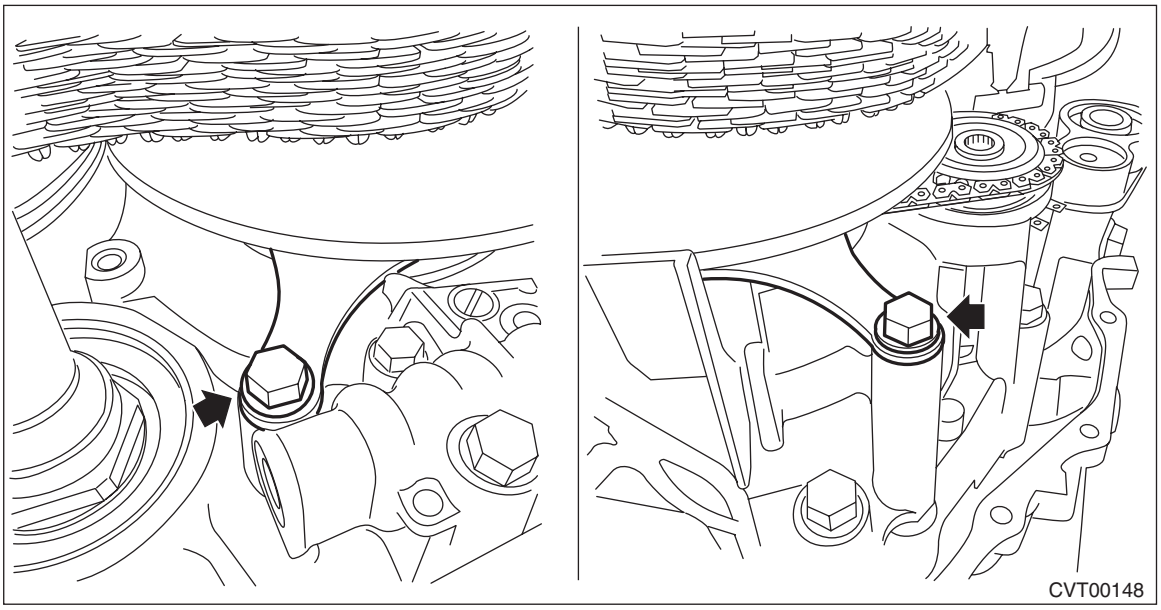
13) Spread the snap ring, align the snap ring with the bearing groove, and install the oil pump sprocket rear.



14) Install the primary pulley bolt.

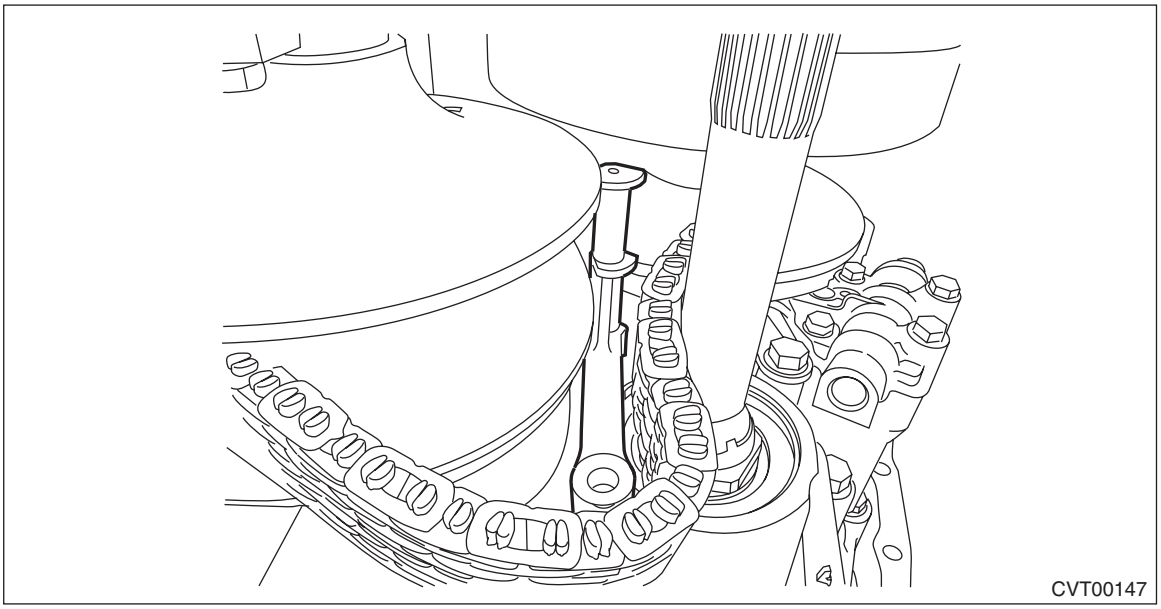
NOTE:
Apply CVTF to the bolt.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

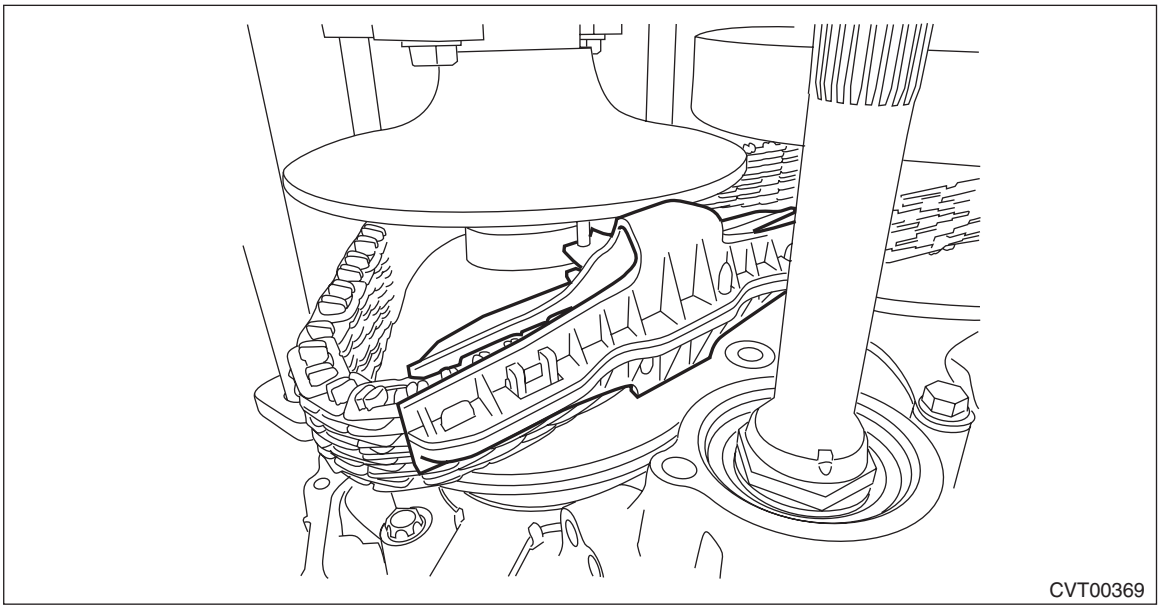


15) Install the chain guide.
(1) Place the support rod inside of the variator chain.

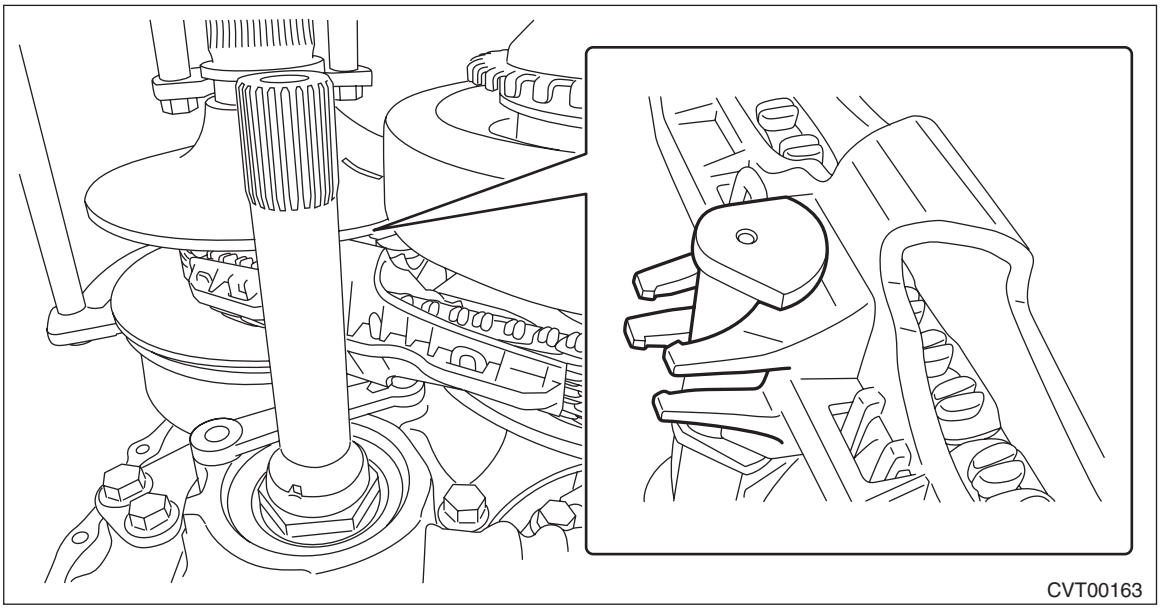
CAUTION:
Protect the both pulleys and variator chain from scratching.



(2) Install the chain guide to the variator chain.

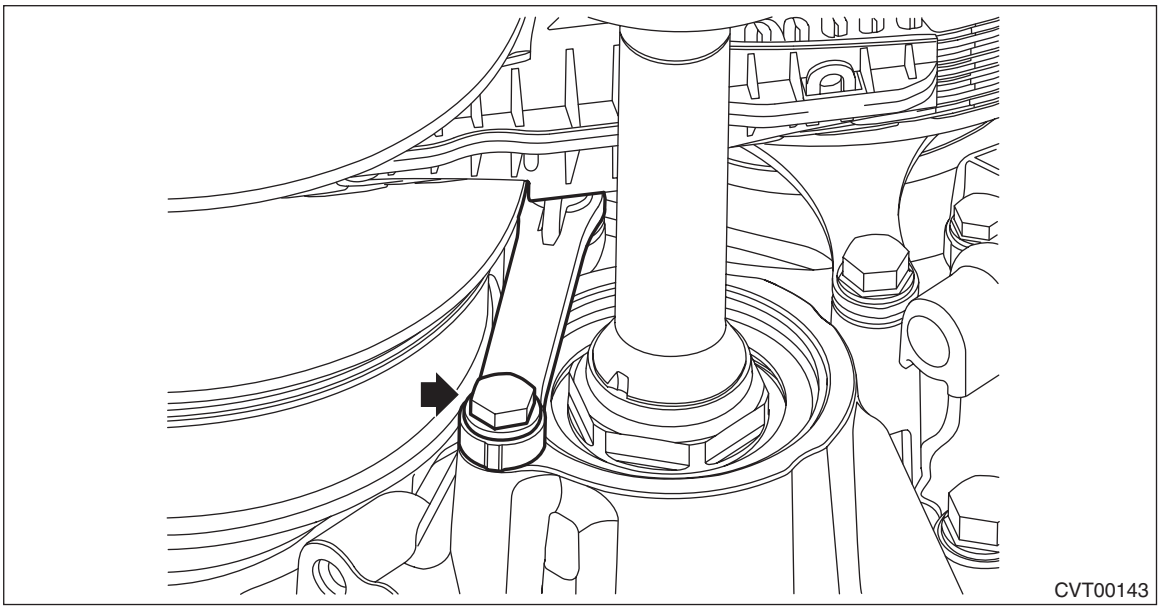


(3) Move the chain guide to the support rod side.
(4) While holding the support rod, press the chain guide so that the support rod runs through between the protrusions of chain guide and install the chain guide to the support rod.



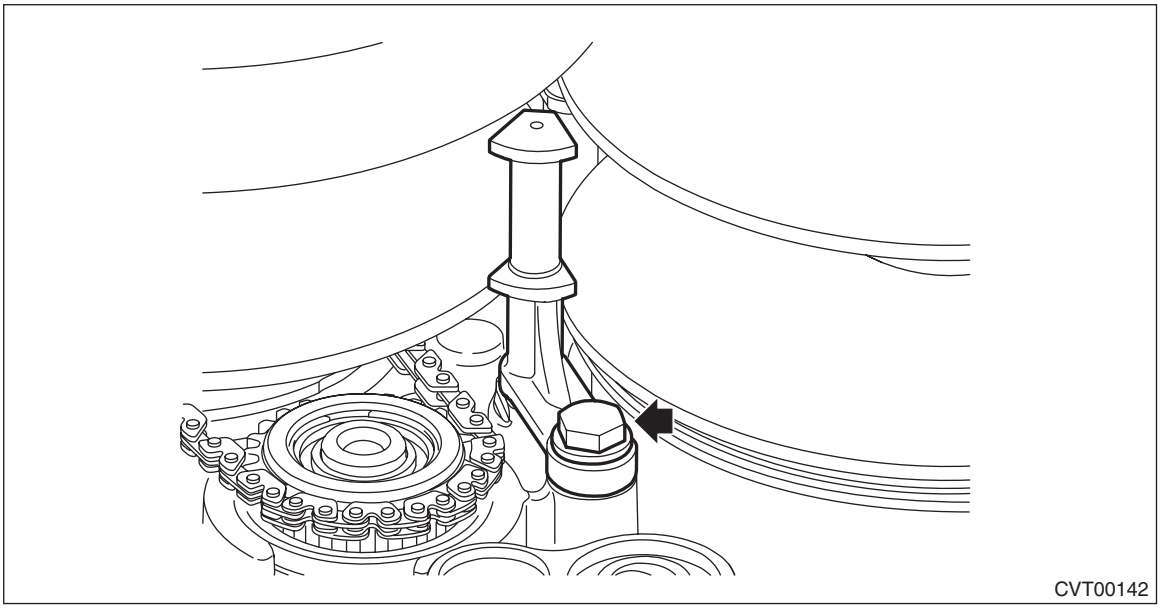
(5) Install the support rod.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

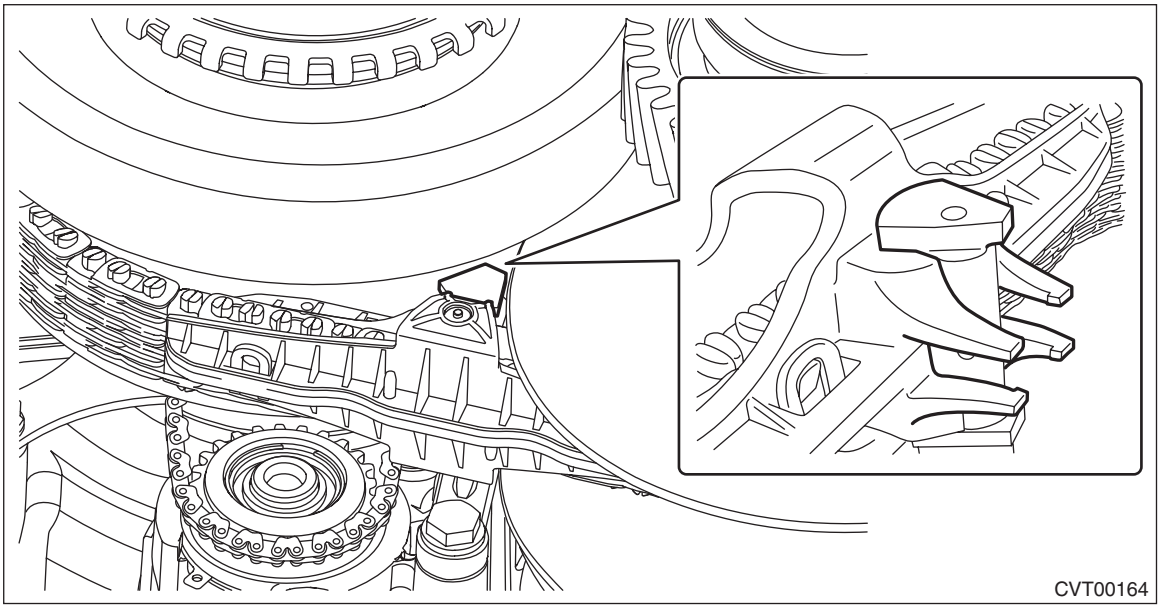


(6) Install the lubrication pipe.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



(7) Install the chain guide to the variator chain.
(8) Install the chain guide so that the lubrication pipe runs through between the protrusions of each chain guide. Then remove the ST (PULLEY EXPANDER).

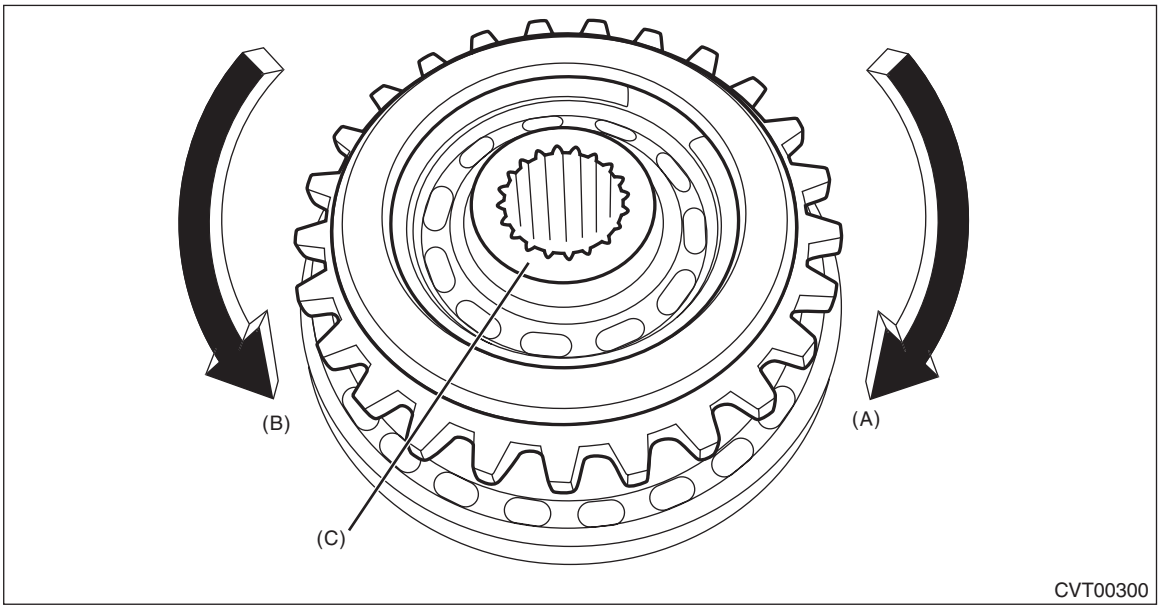


16) Install the reduction drive gear. <Ref. to CVT(TH58A)-264, INSTALLATION, Reduction Drive Gear.>
17) Install the transmission case. <Ref. to CVT(TH58A)-253, INSTALLATION, Transmission Case.>
18) Install the output clutch assembly. <Ref. to CVT(TH58A)-234, INSTALLATION, Output Clutch Assembly.>
19) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
20) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
21) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
22) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
23) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
24) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
25) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
26) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
27) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
28) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
29) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
30) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
31) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
32) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
33) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
34) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

- Check the surface of primary and secondary pulley cones for damage or wear.
- Check the primary and secondary pulley for damage.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the rear oil pump chain for damage.
- Check the one-way clutch of the oil pump sprocket (rear).

Secure the inner race, and check that the sprocket rotates clockwise and locks counterclockwise.

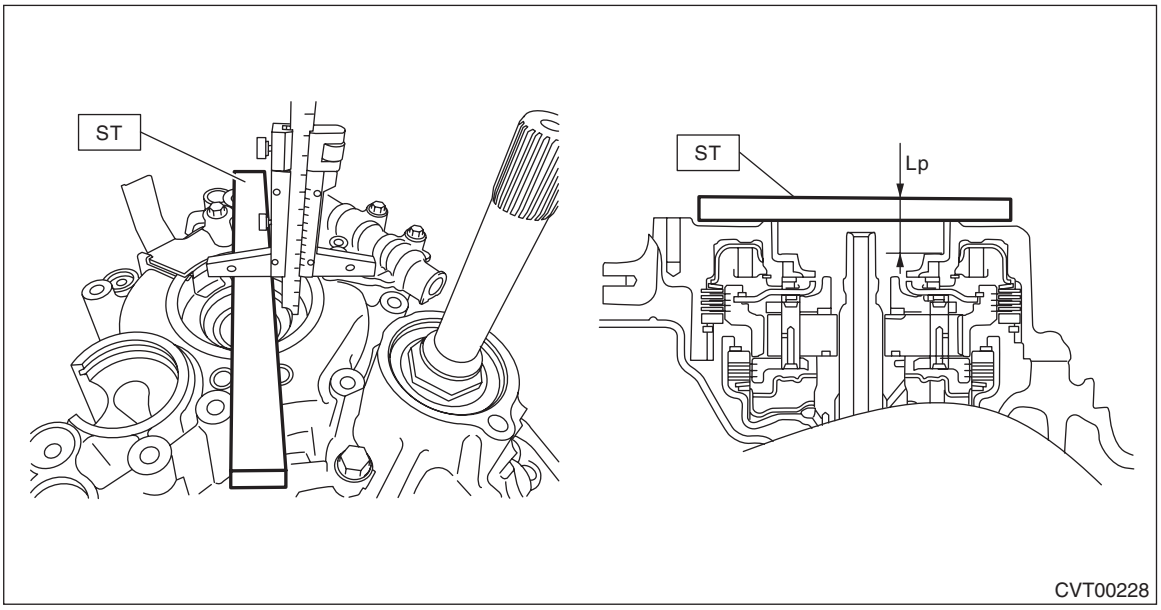


(A) Rotates freely
(B) Locked
(C) Inner race

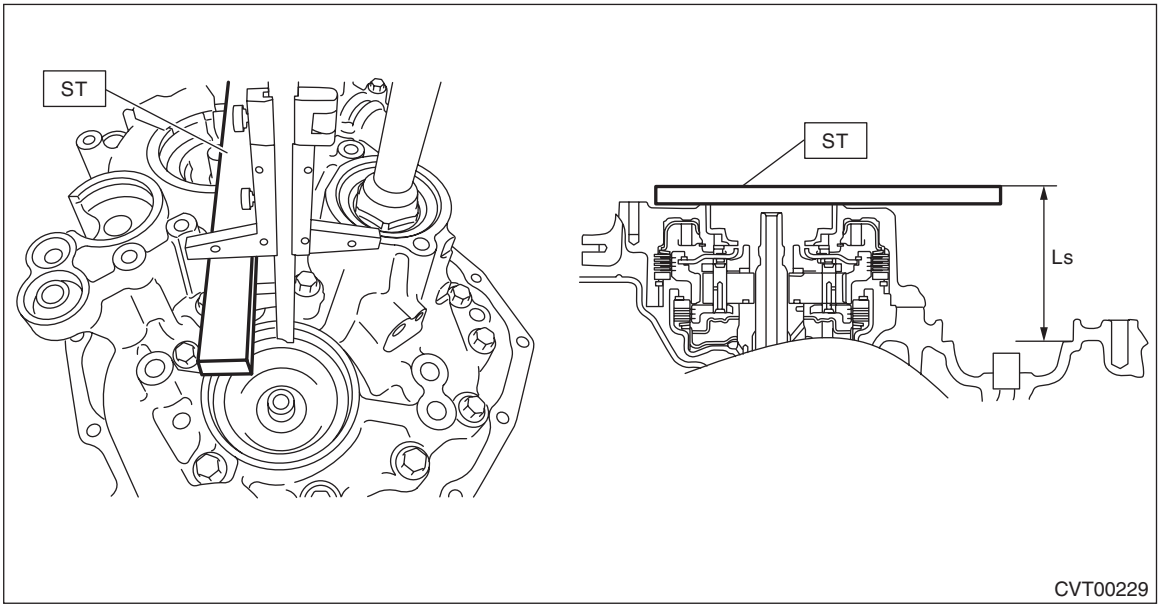
D: ADJUSTMENT

1. PROCEDURE IN REPLACEMENT OF PRIMARY AND SECONDARY PULLEY, OR IN REPLACEMENT OF PRIMARY PULLEY, SECONDARY PULLEY AND VARIATOR CHAIN

1) Measure depth “Lp” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



2) Measure the depth “Ls” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



3) Calculate the following formula.
Calculation formula:
T (mm) = B – A + Lp – Ls – 28.602
[T (in) = B – A + Lp – Ls – 1.126]
T: Pulley alignment
A: Specified primary pulley dimension
B: Specified secondary pulley dimension
Lp: Depth from the ST upper face to the primary pulley bearing catch surface
Ls: Depth from the ST upper face to the secondary pulley bearing catch surface
28.602 mm (1.126 in): Constant

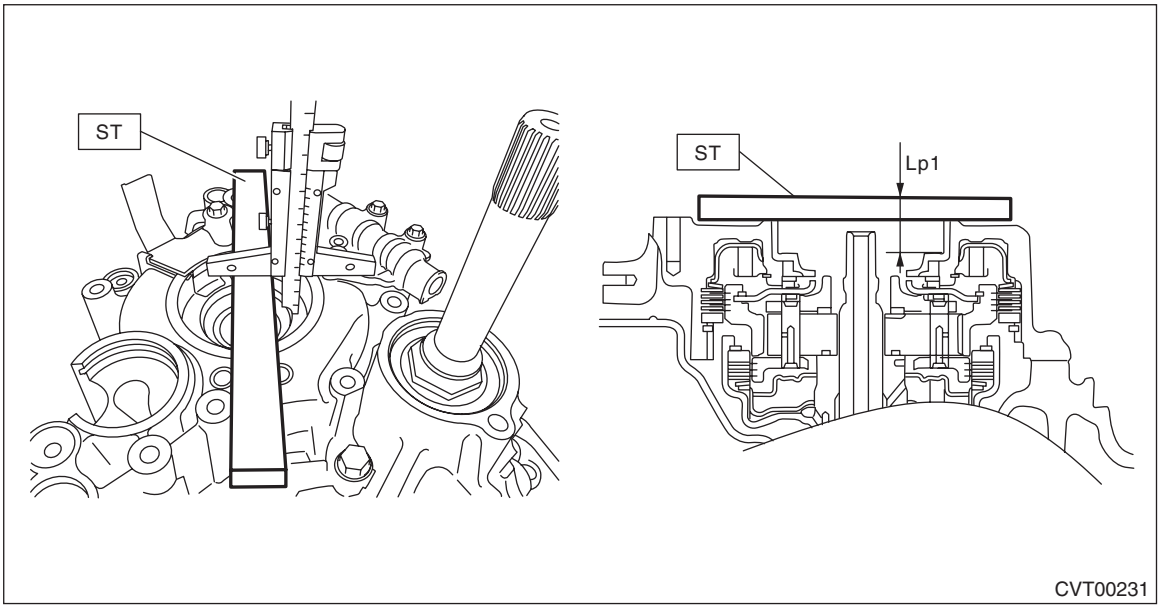
Pulley alignment T mm (in)	Thickness of shim mm (in)
–0.05 — 0.049 (–0.002 — 0.002)	No shims
0.050 — 0.149(0.002 — 0.006)	0.1 (0.004)
0.150 — 0.249(0.006 — 0.010)	0.2 (0.008)
0.250 — 0.349(0.010 — 0.014)	0.3 (0.012)
0.350 — 0.449(0.014 — 0.018)	0.4 (0.016)
0.450 — 0.549(0.018 — 0.022)	0.5 (0.020)
0.550 — 0.649(0.022 — 0.026)	0.6 (0.024)
0.650 — 0.749(0.026 — 0.029)	0.7 (0.028)
0.750 — 0.849(0.029 — 0.033)	0.8 (0.031)
0.850 — 0.949(0.033 — 0.037)	0.9 (0.035)
0.950 — 1.049(0.037 — 0.041)	1.0 (0.039)
1.050 — 1.149(0.041 — 0.045)	1.1 (0.043)

4) Select one to two shims so that the total thickness meets the value obtained from step 3).

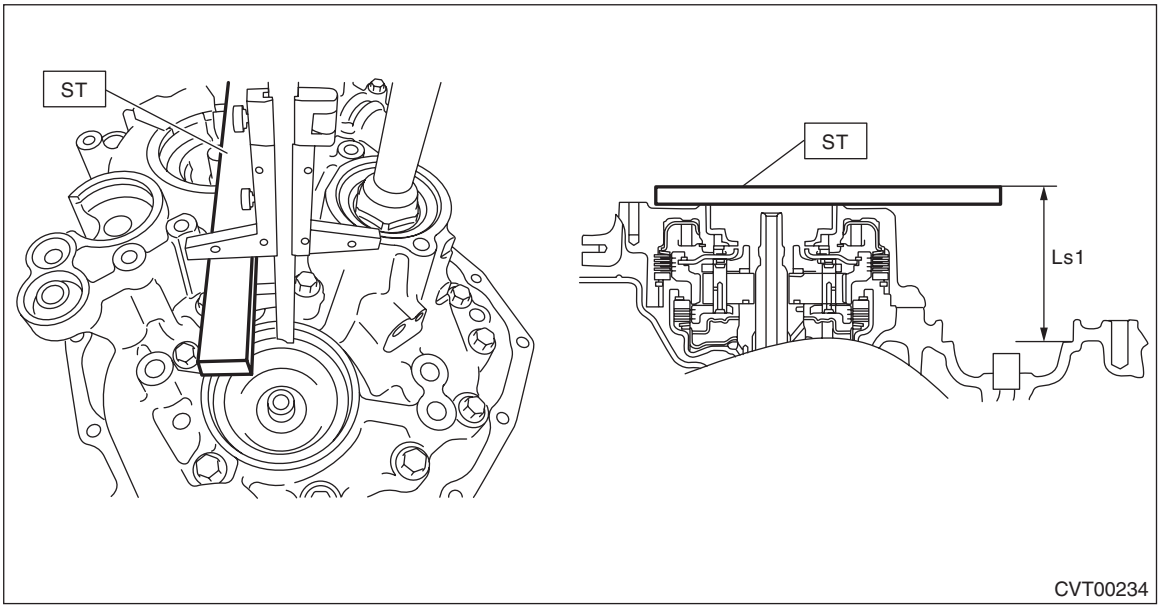
Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

2. PROCEDURE WHEN REPLACING ONLY DRIVE PINION RETAINER OR REVERSE BRAKE HOUSING

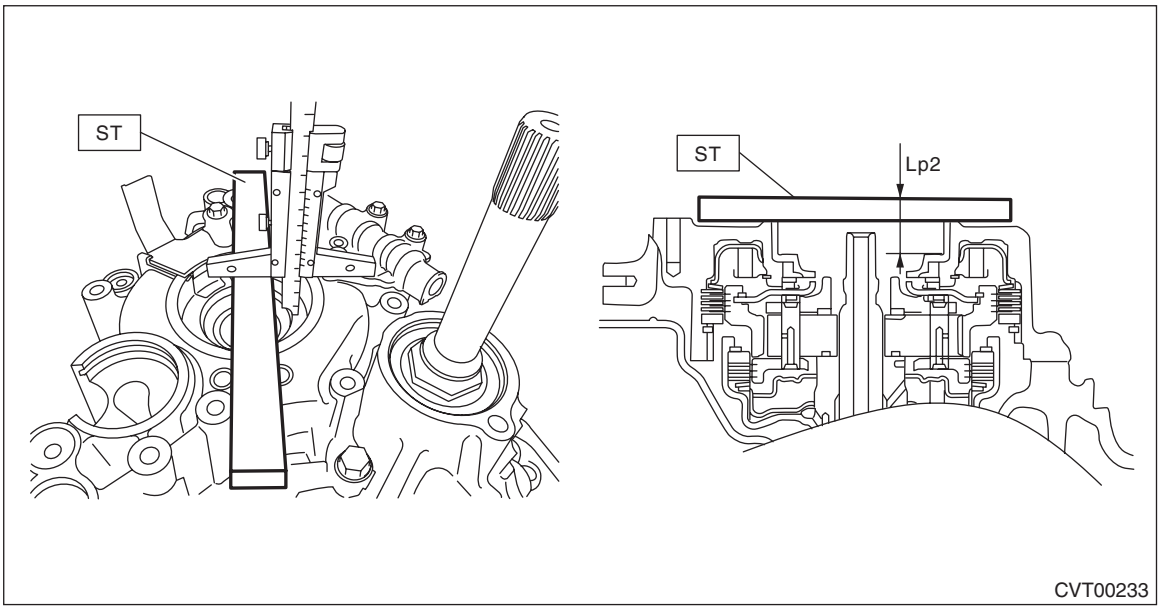
1) Clean the mating surface of current drive pinion retainer and converter case.
2) Measure and record the shim thickness that is attached on the current reverse brake housing.
3) Using the current drive pinion retainer, measure depth “Lp1” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



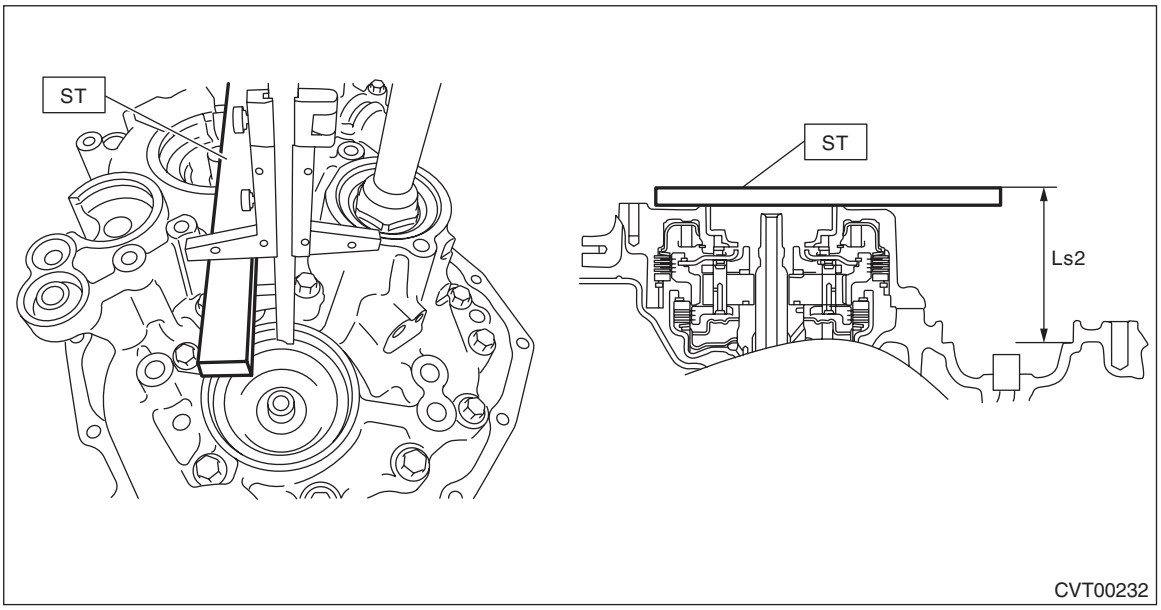
4) Using the current drive pinion retainer or current reverse brake housing, measure the depth “Ls1” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



5) Calculate the “LD1” using the following formula and record it.
Calculation formula:
LD1 mm (in) = Ls1 – Lp1
LD1: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface
Lp1: Depth from the ST upper face to the primary pulley bearing catch surface
Ls1: Depth from the ST upper face to the secondary pulley bearing catch surface
6) Using the new drive pinion retainer or new reverse brake housing, measure the depth “Lp2” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



7) Using the new drive pinion retainer or new reverse brake housing, measure depth “Ls2” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



8) Calculate the “LD2” using the following formula and record it.
Calculation formula:
LD2 mm (in) = Ls2 – Lp2
LD2: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface
Lp2: Depth from the ST upper face to the primary pulley bearing catch surface
Ls2: Depth from the ST upper face to the secondary pulley bearing catch surface

9) Calculate the recorded values of “LD1” and “LD2” to obtain the positive number to select the shims.
Calculation formula: T1 mm (in) = LD1 – LD2 or T2 mm (in) = LD2 – LD1
T1, T2: Difference between new drive pinion retainer or new reverse brake housing and current drive pinion retainer or current reverse brake housing
LD1: Calculated value of current drive pinion retainer or current reverse brake housing
LD2: Calculated value of new drive pinion retainer or new reverse brake housing

Difference of the case (T1) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.

Difference of the case (T2) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.

Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

44.Variator Chain

A: REMOVAL

For removal of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TH58A)-268, REMOVAL, Primary Pulley and Secondary Pulley.>

B: INSTALLATION

For installation of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TH58A)-276, INSTALLATION, Primary Pulley and Secondary Pulley.>

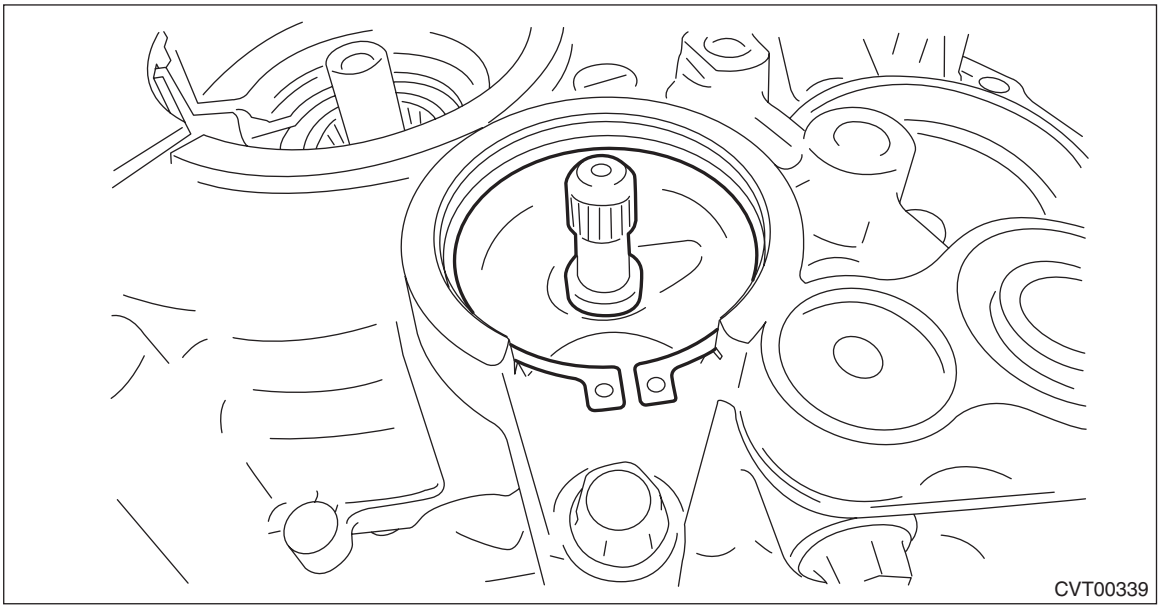
C: INSPECTION

Check the variator chain for damage and wear.

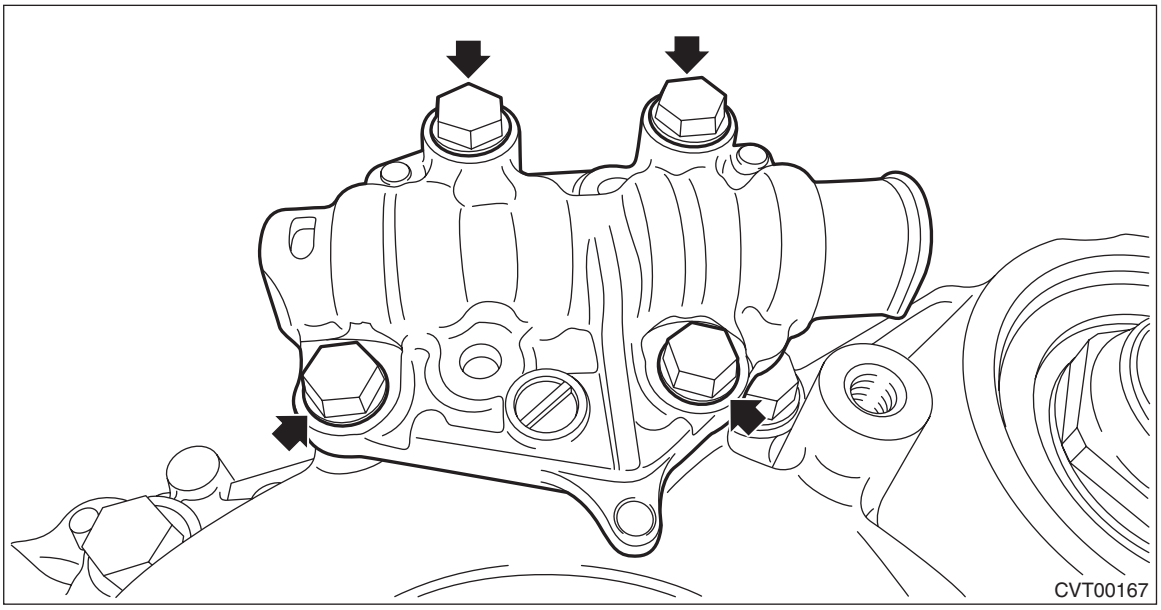
45.Reverse Brake Assembly

A: REMOVAL

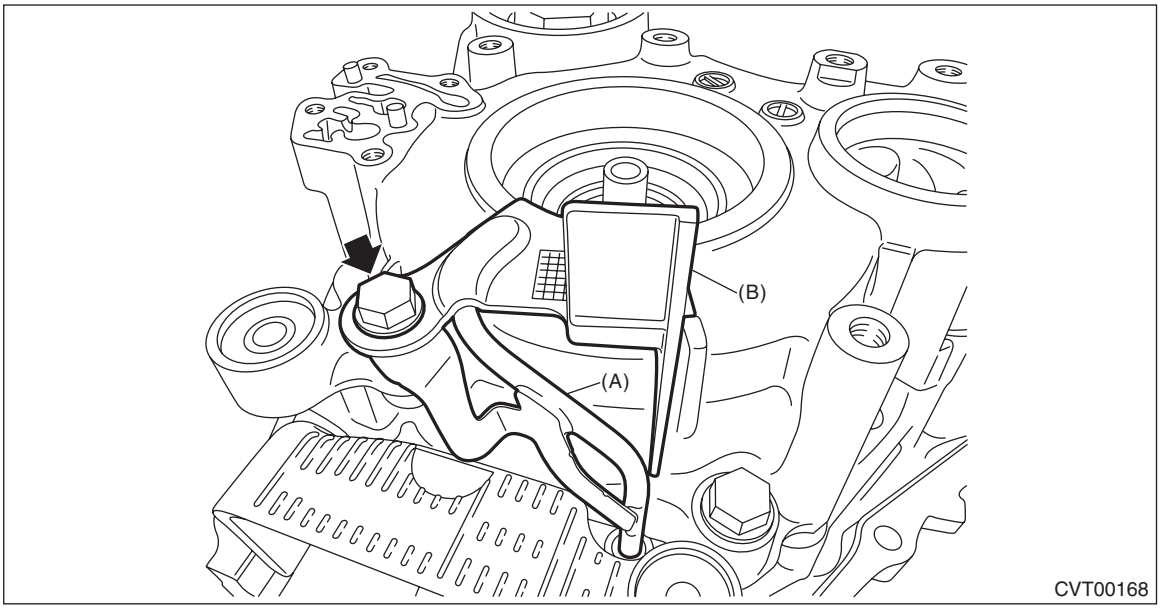
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-219, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-233, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-250, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-263, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-268, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the oil pump shaft and the snap ring.



22) Remove the manual valve assembly.

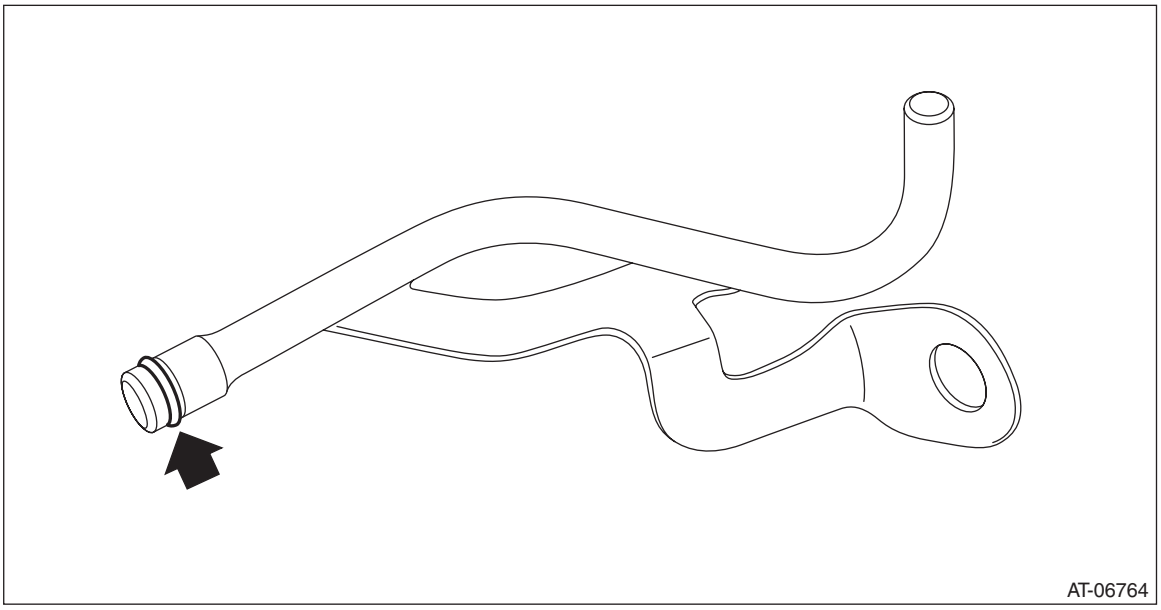


23) Remove the oil guide and lubrication pipe.

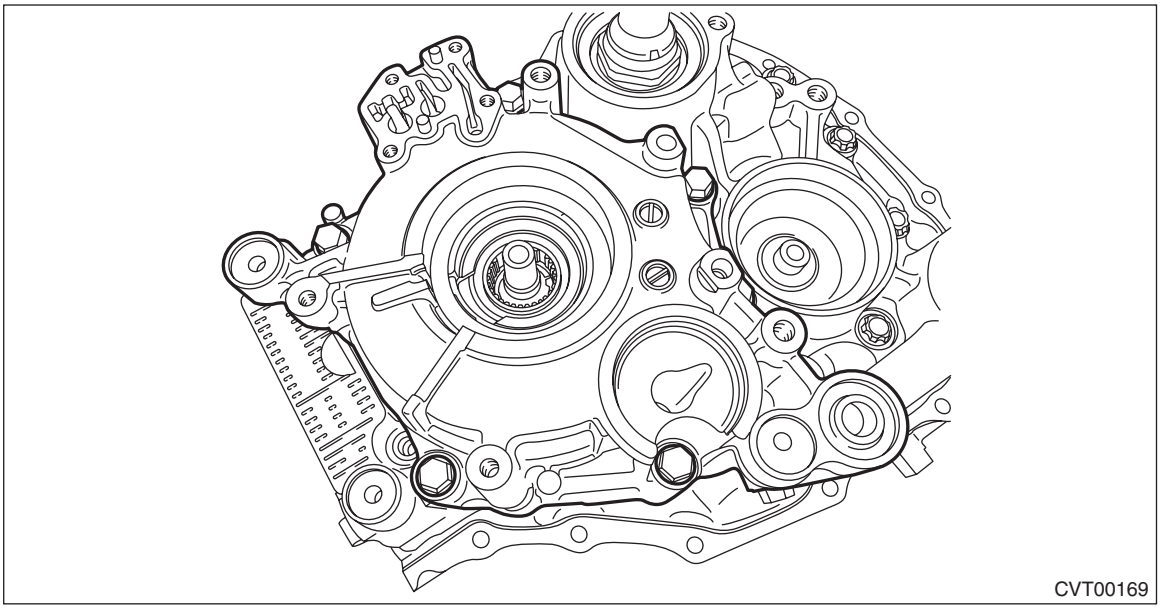


(A) Lubrication pipe
(B) Oil guide

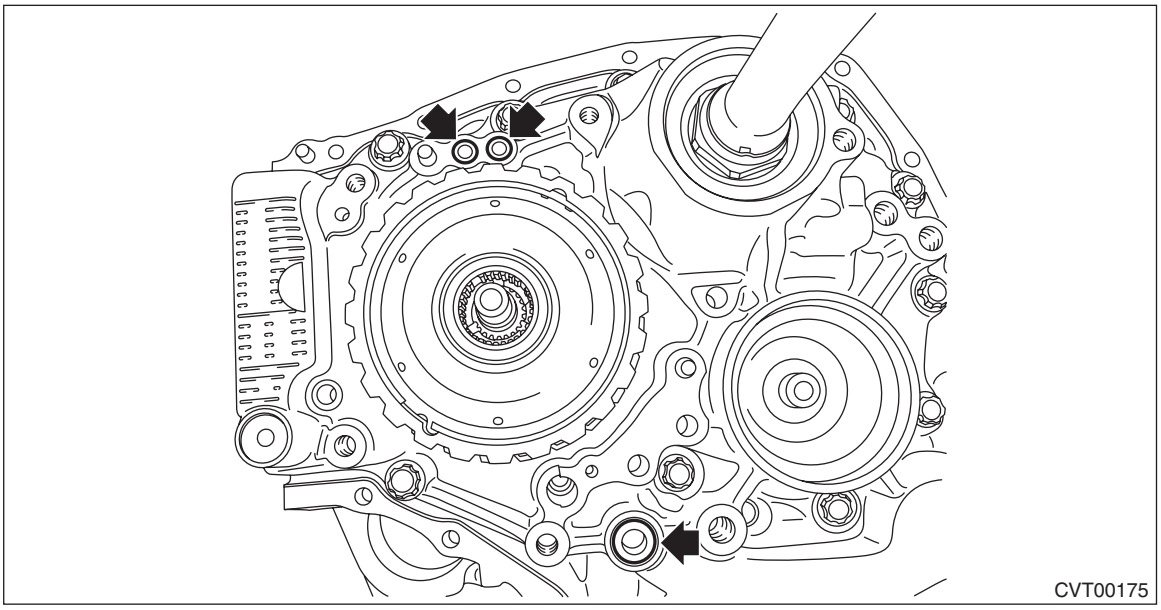
24) Remove the O-ring from lubrication pipe.



25) Remove the reverse brake assembly.

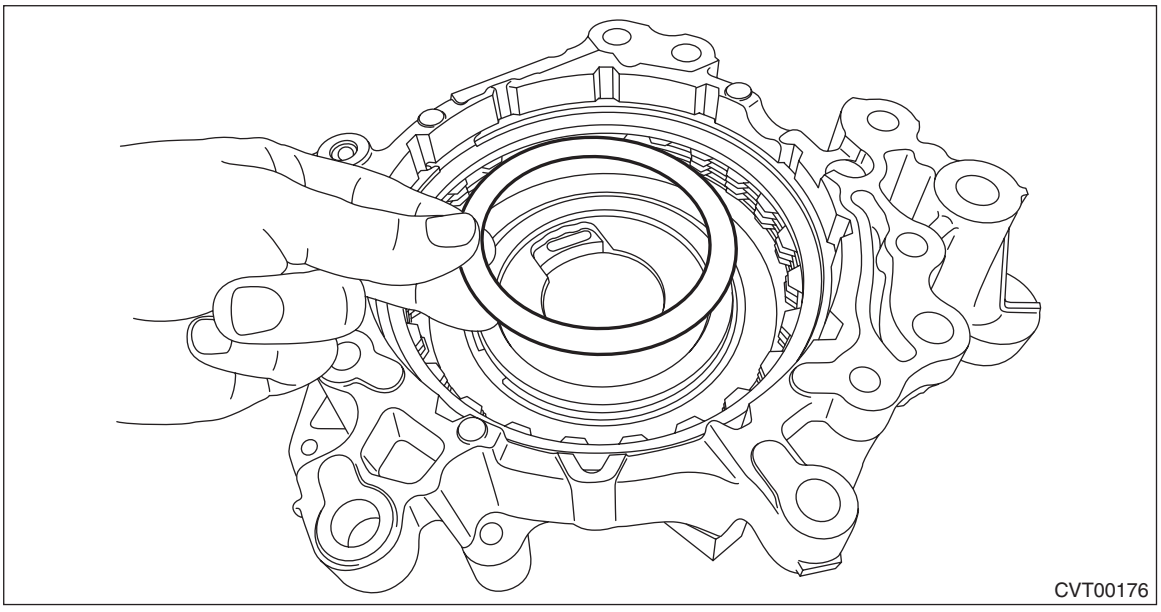


26) Remove the O-ring.



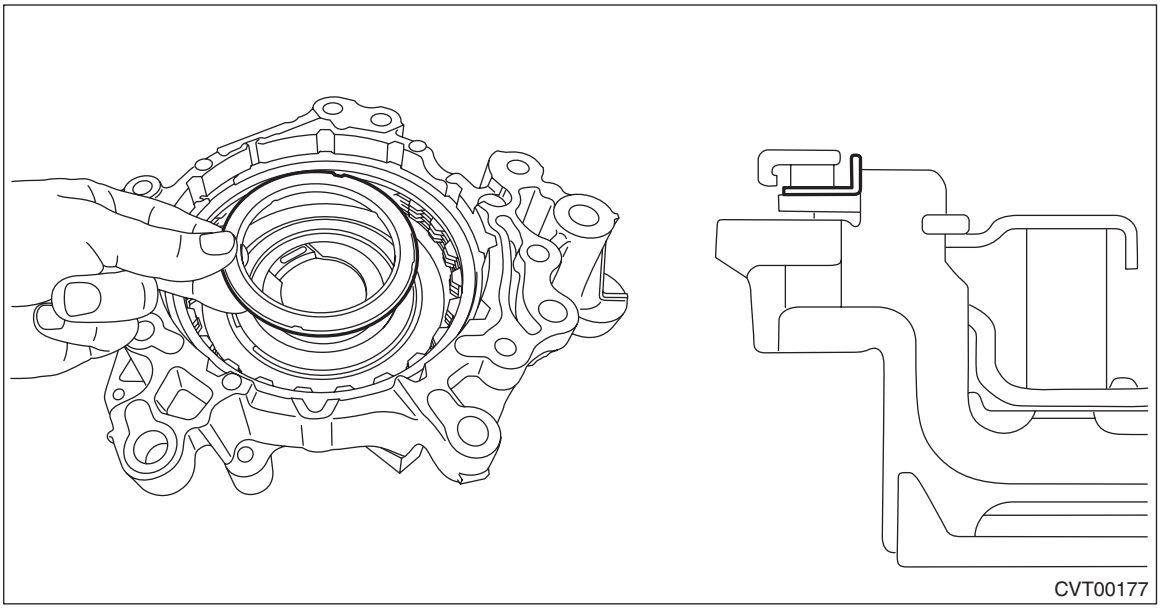
B: INSTALLATION

1) Select a washer. <Ref. to CVT(TH58A)-326, ADJUSTMENT, Forward Clutch Assembly.>
2) When replacing the reverse brake housing and the snap ring which secures the oil pump sprocket rear, select the oil pump shaft. <Ref. to CVT(TH58A)-391, ADJUSTMENT, Oil Pump.>
3) Install the selected washer to the reverse brake housing.

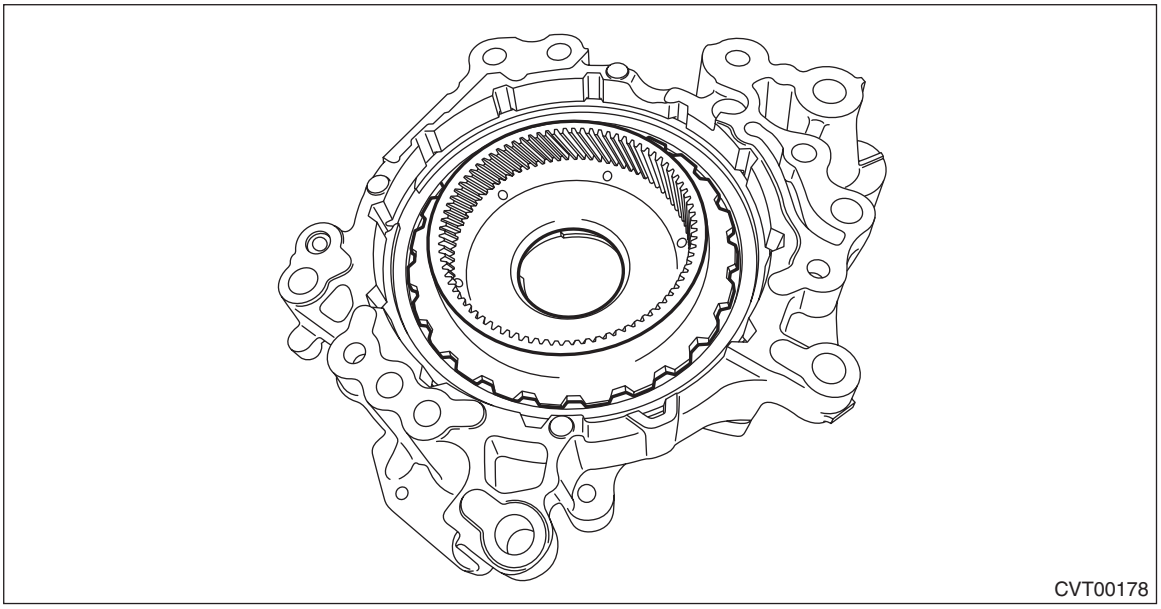


4) Install the thrust bearing to the reverse brake housing.

NOTE:
Face the temper color surface to the reverse brake side.

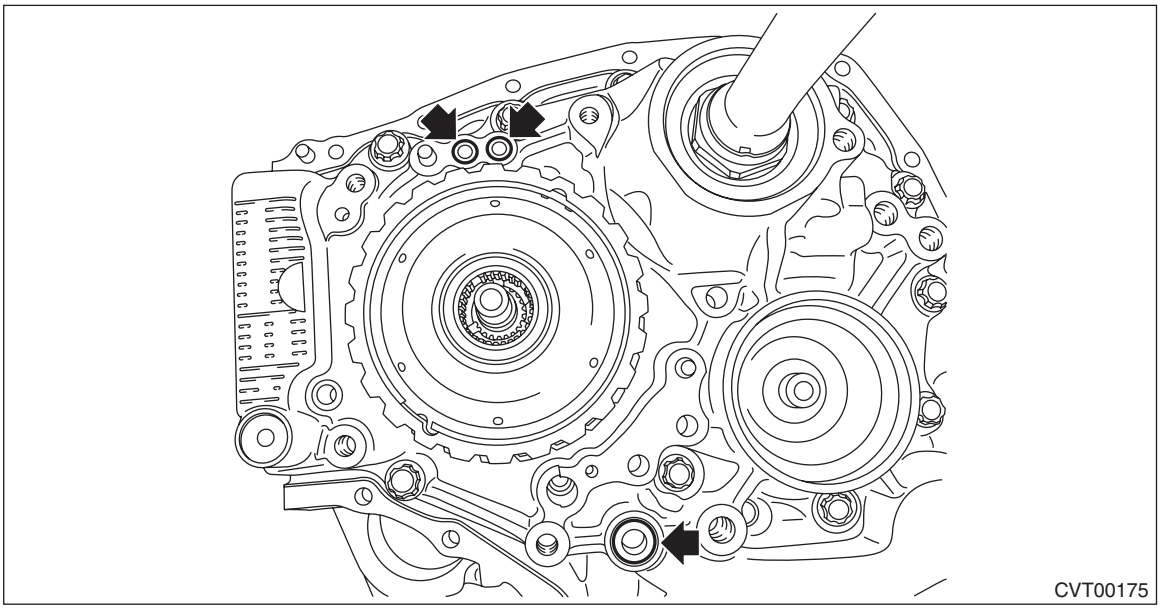


5) Remove the internal gear from the forward clutch assembly, and install it to the reverse brake housing.



6) Install the O-ring.

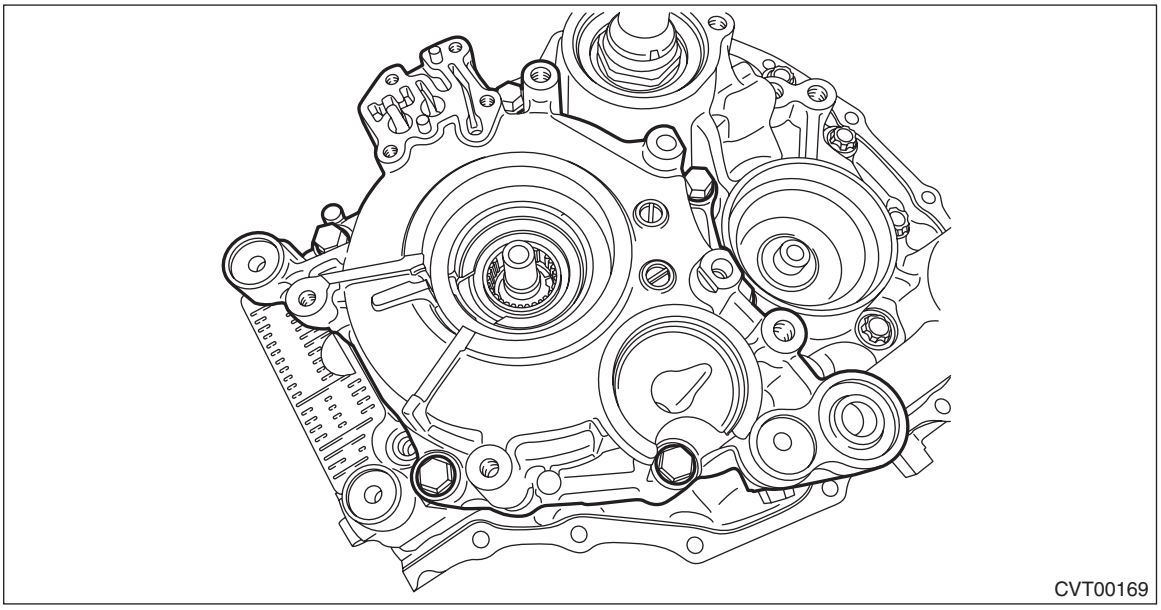
NOTE:
- Install a new O-ring.
- Apply CVTF to the O-ring.


CVT00175

7) Install the reverse brake assembly and internal gear as a unit to the drive pinion retainer.

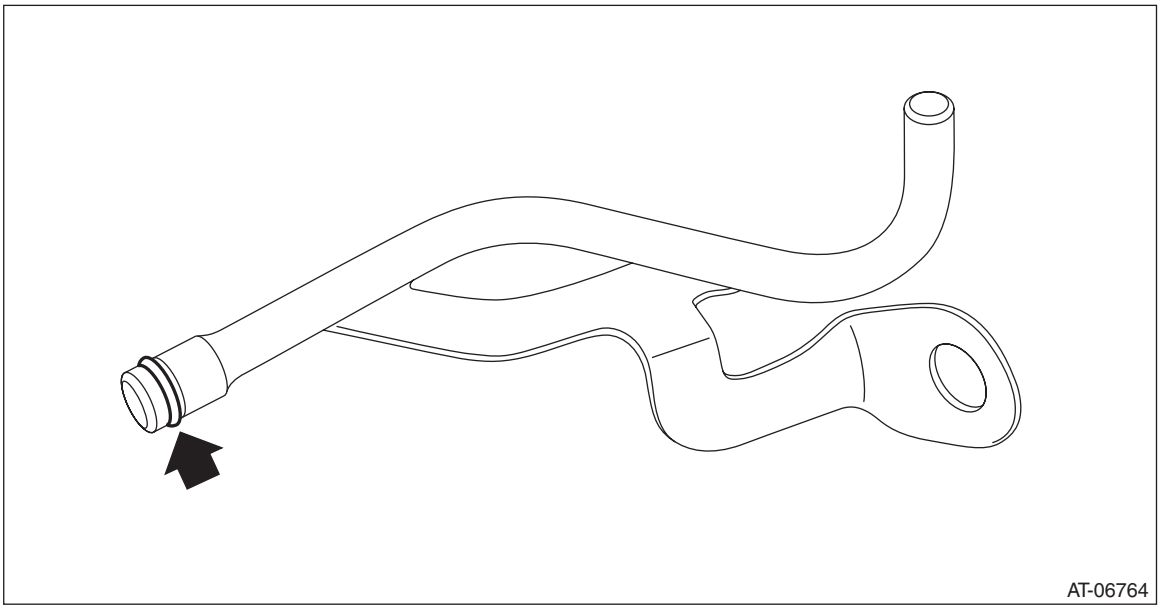
NOTE:
Slowly rotate the input shaft by hand to engage the internal gear and pinion gear of planetary carrier.

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)


CVT00169

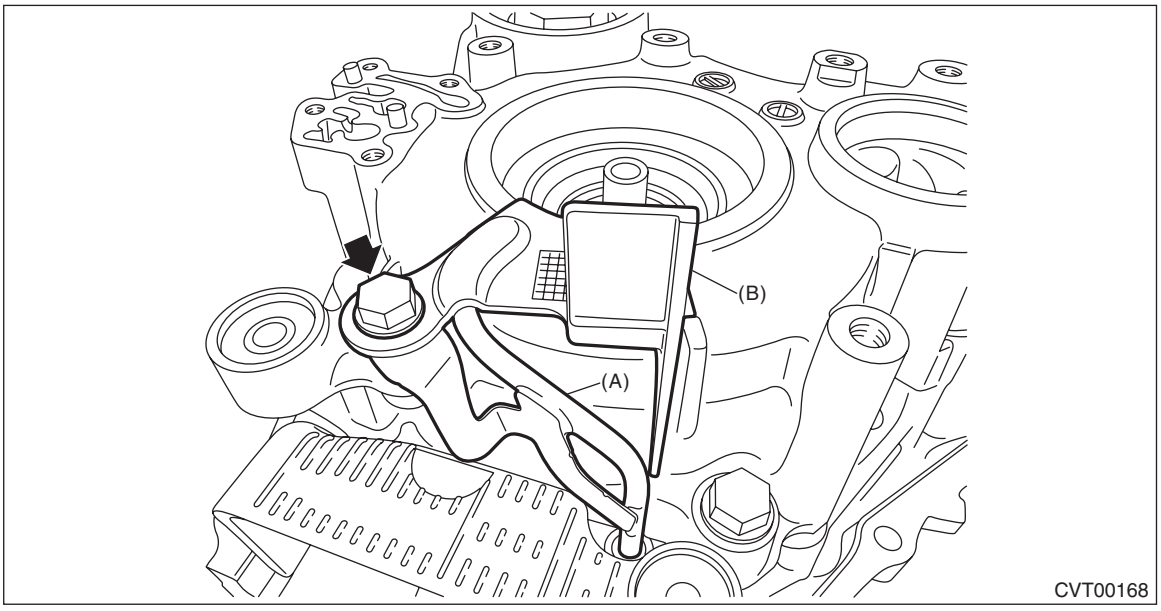
8) Install the O-ring to the lubrication pipe.

NOTE:
- Install a new O-ring.
- Apply CVTF to the O-ring.



9) Install the lubrication pipe and oil guide.

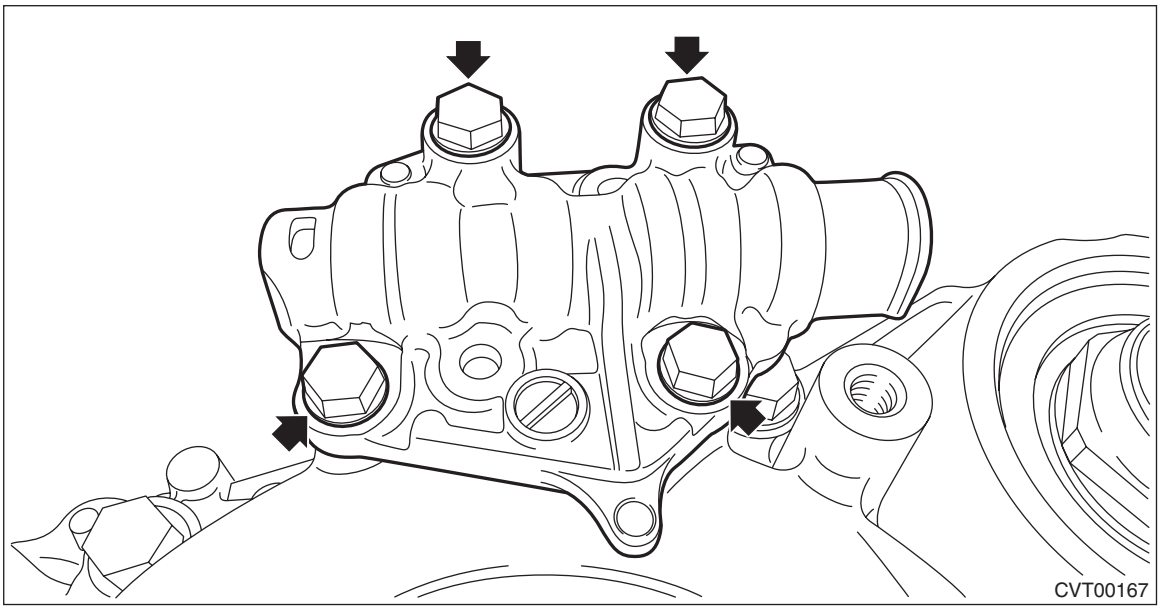
Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) Lubrication pipe
(B) Oil guide

10) Install the manual valve assembly and separator plate.

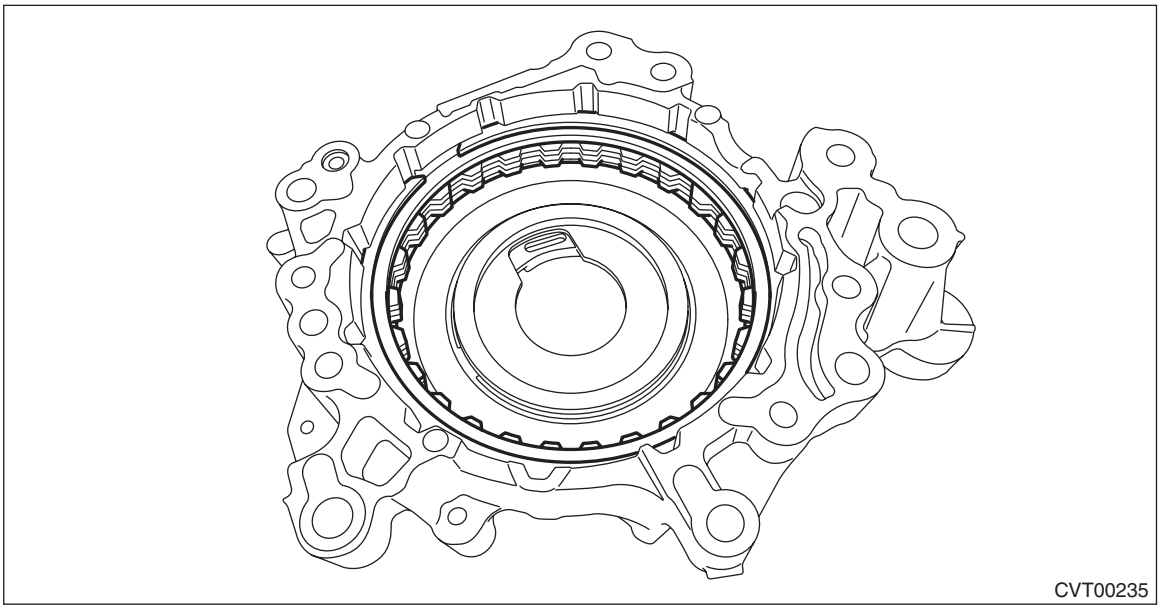
Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



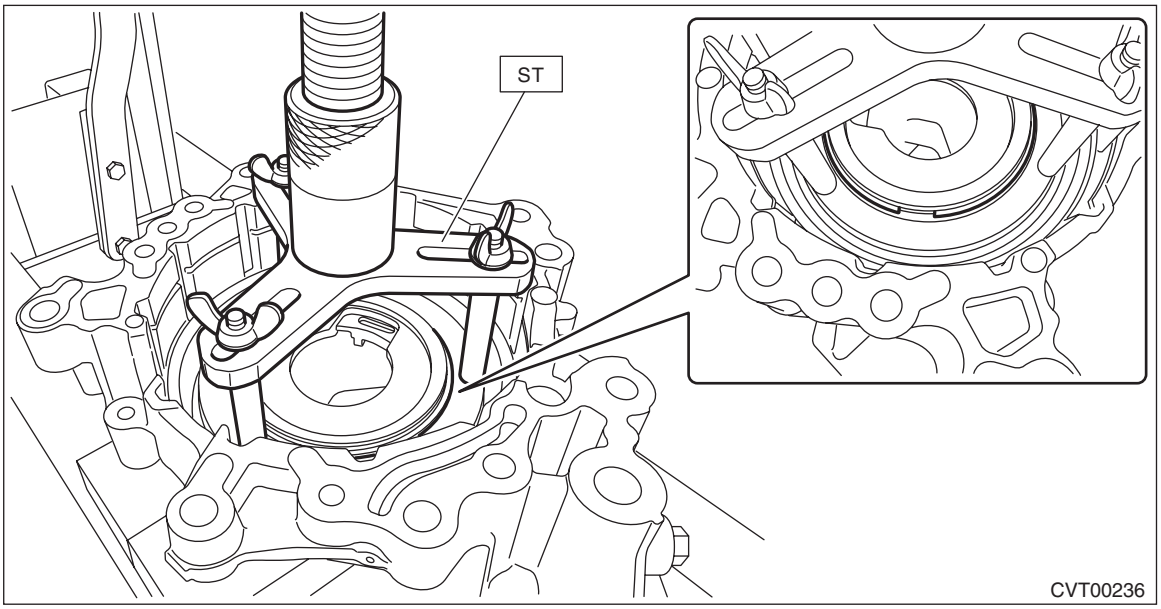
11) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-276, INSTALLATION, Primary Pulley and Secondary Pulley.>
12) Install the reduction drive gear. <Ref. to CVT(TH58A)-264, INSTALLATION, Reduction Drive Gear.>
13) Install the transmission case. <Ref. to CVT(TH58A)-253, INSTALLATION, Transmission Case.>
14) Install the output clutch assembly. <Ref. to CVT(TH58A)-234, INSTALLATION, Output Clutch Assembly.>
15) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
16) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
17) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
18) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
19) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
20) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
21) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
22) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
23) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
24) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
25) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
26) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
27) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
28) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
29) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
30) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

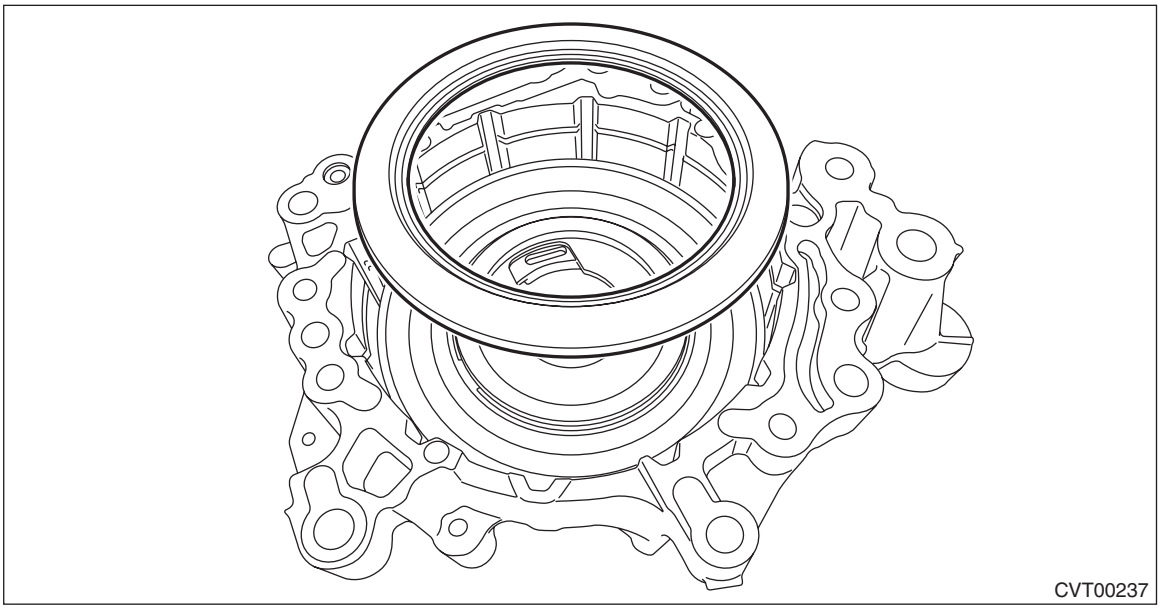
1) Remove the snap ring, retaining plate, drive plate, driven plate and dish plate.



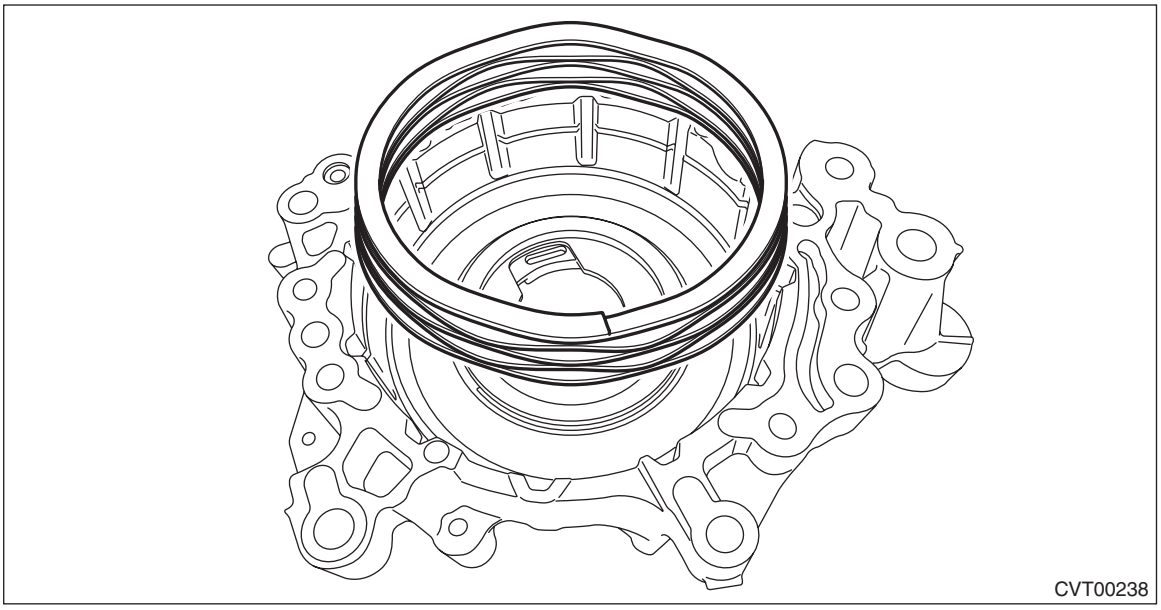
2) Compress the return spring using the ST to remove the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



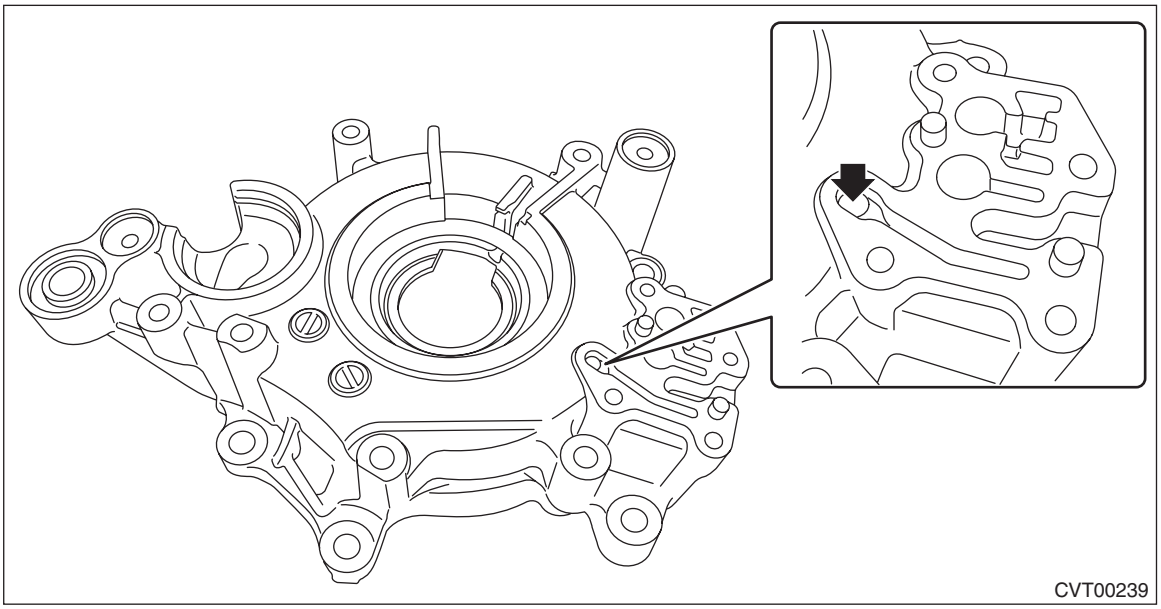
3) Using the ST, remove the snap ring and spring retainer.


CVT00237

4) Remove the return spring.


CVT00238

5) Remove the reverse brake piston by blowing compressed air intermittently from the reverse brake housing hole.



6) Remove the plug.

D: ASSEMBLY

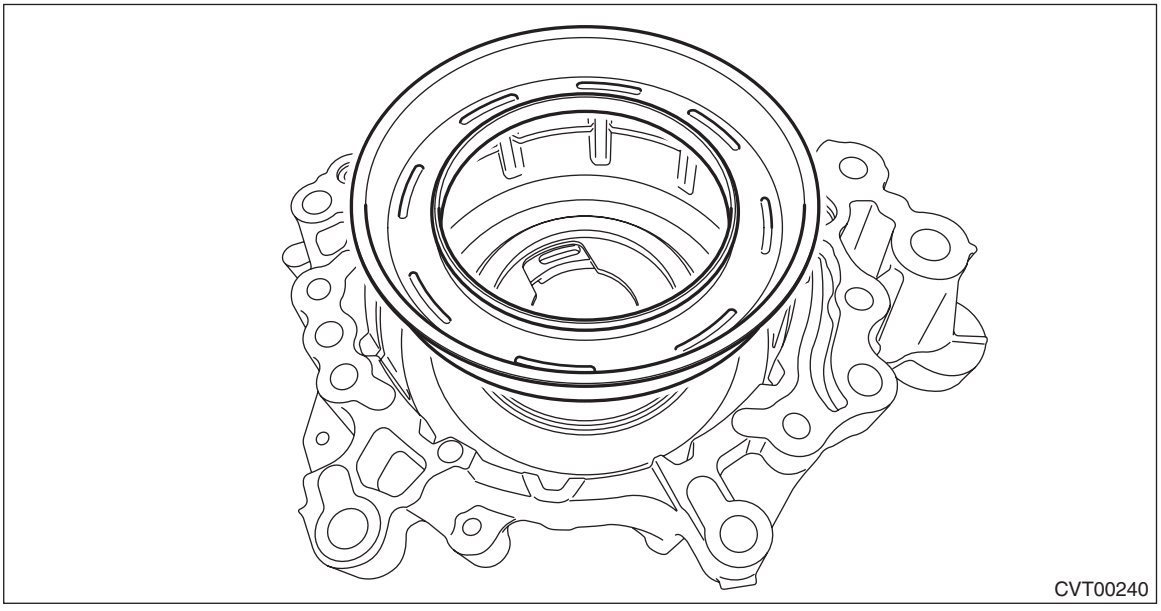
1) Install the plugs.

NOTE:
Use new O-rings.

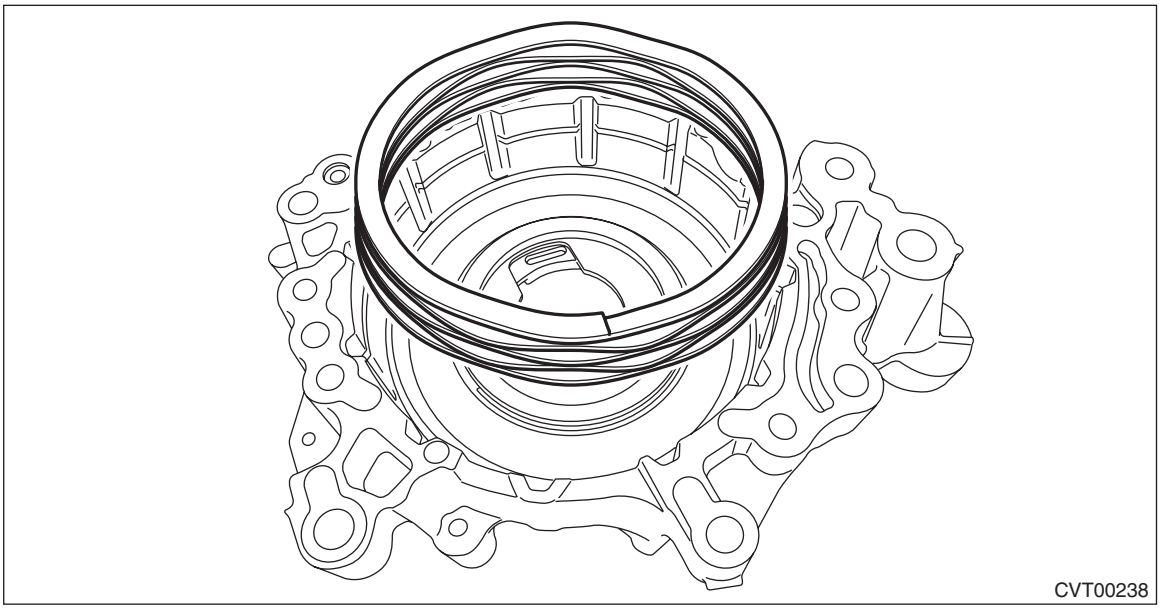
Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)

2) Install the reverse brake piston.

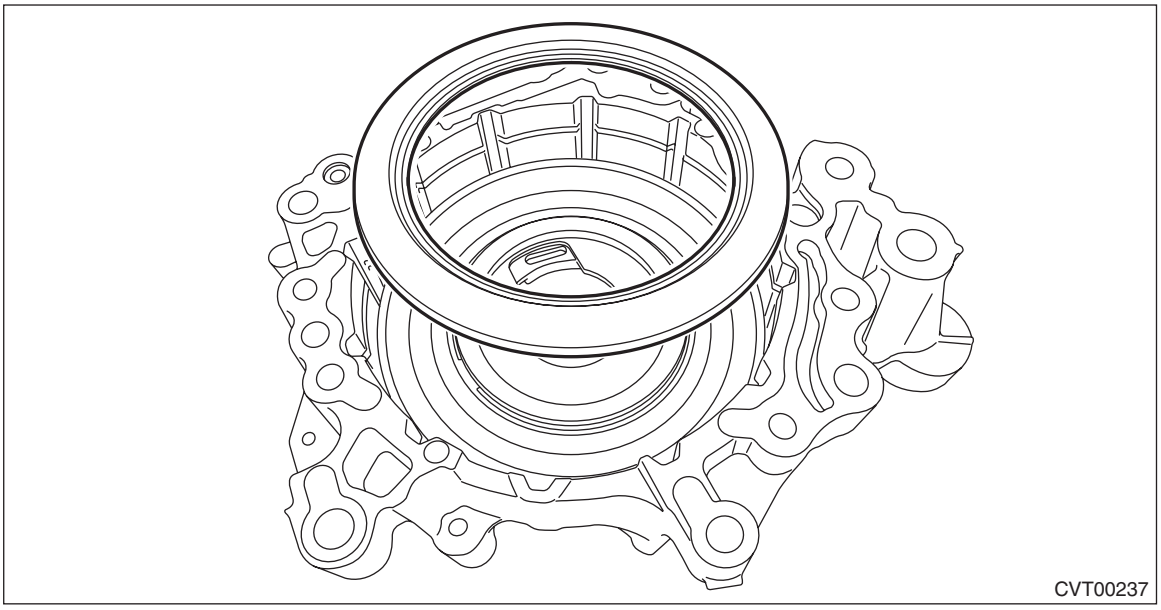
NOTE:
Apply CVTF to the sealing area of reverse brake piston.



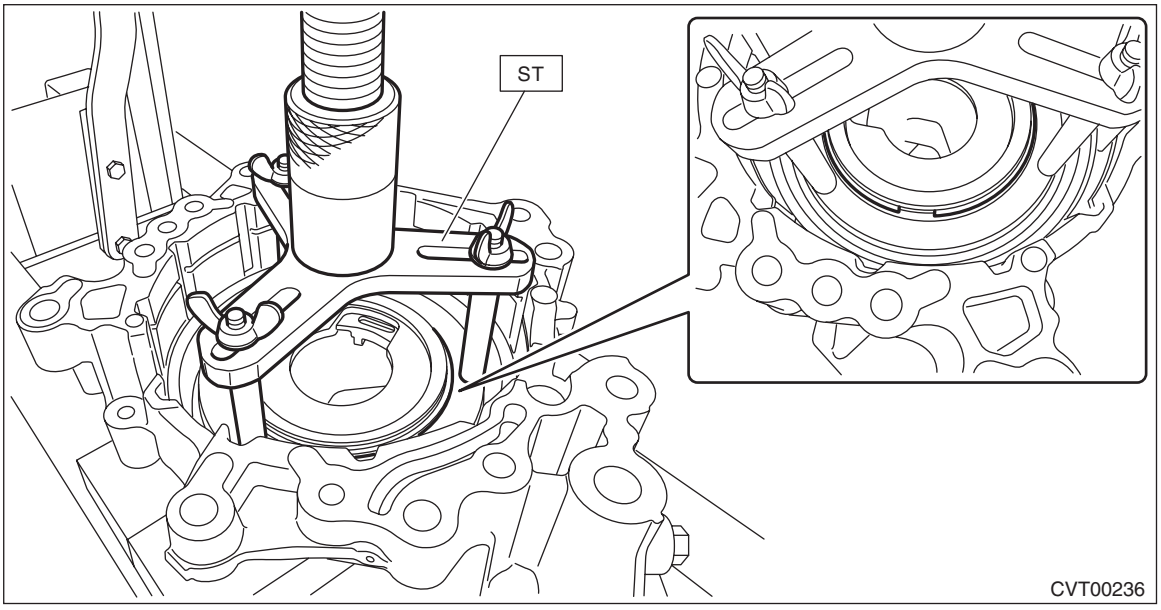
3) Install the return spring.


CVT00238

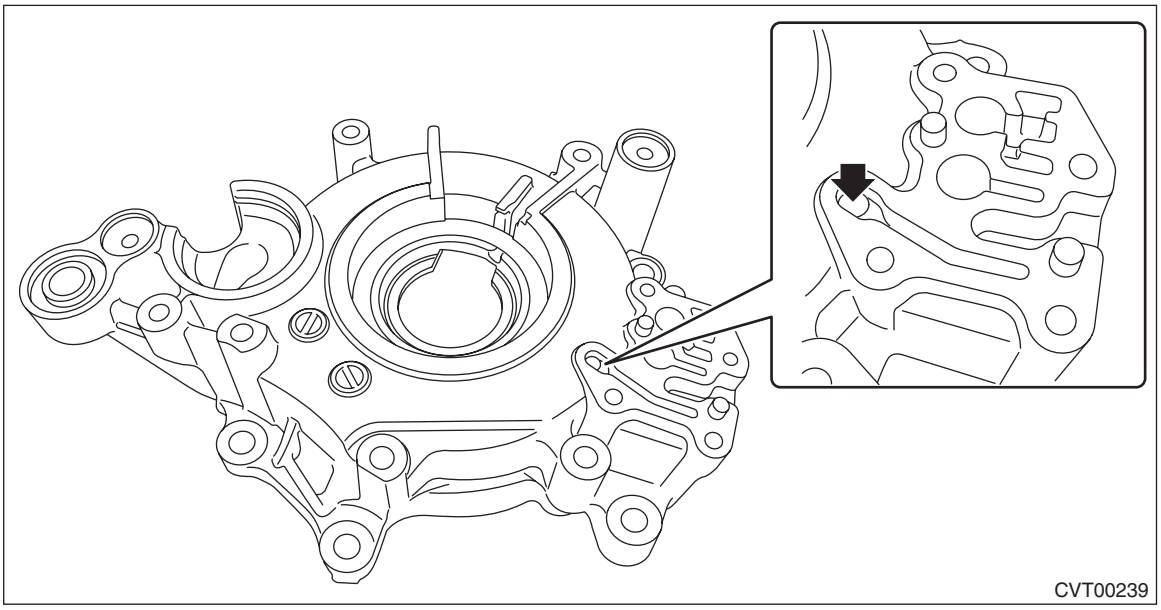
4) Install the spring retainer.


CVT00237

5) Compress the return spring using the ST to install the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



6) Check the operation of reverse brake piston by blowing compressed air intermittently from the reverse brake housing hole.

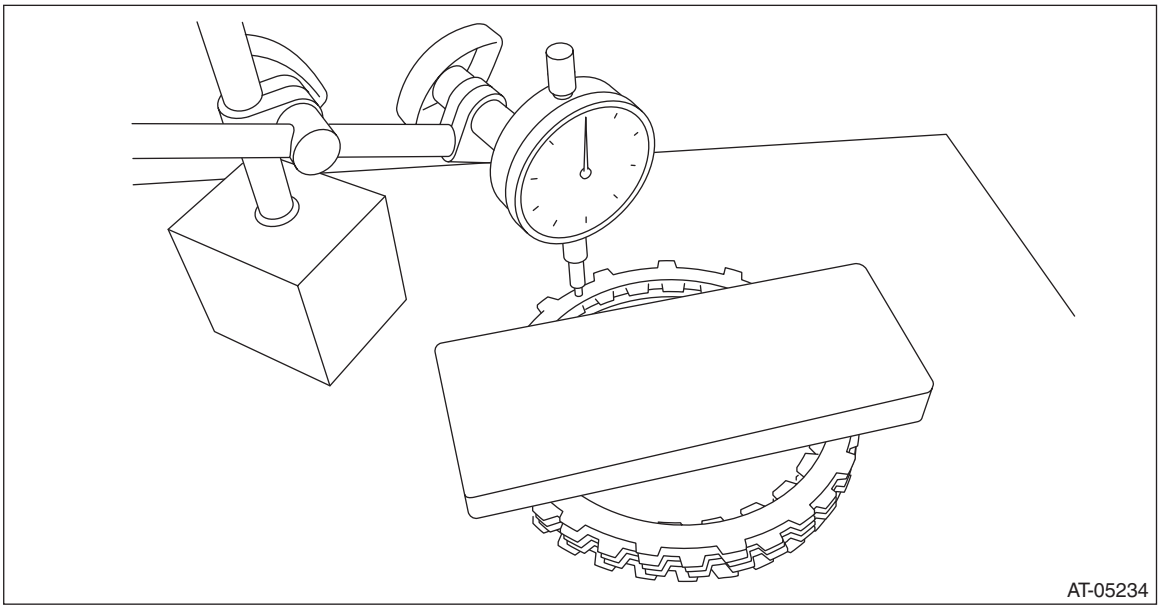


7) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
8) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.
9) Scale and record the weight "Z" of a flat board which will be put on retaining plate.

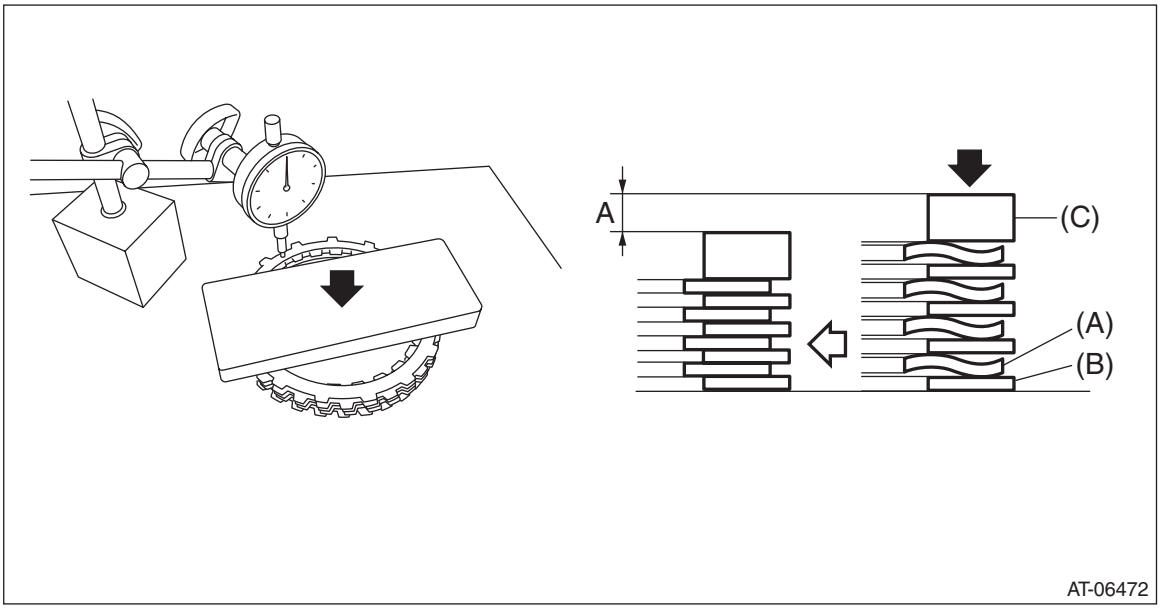
NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 29 N (3.0 kgf, 6.5 lb).

10) Put the flat board on retaining plate.



11) Using the following formula, read the push/pull gauge, and calculate “N”.
N = 29 N (3.0 kgf, 6.5 lb) – Z
29 N (3.0 kgf, 6.5 lb) : Load applied to clutch plate
Z: Flat board weight
12) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

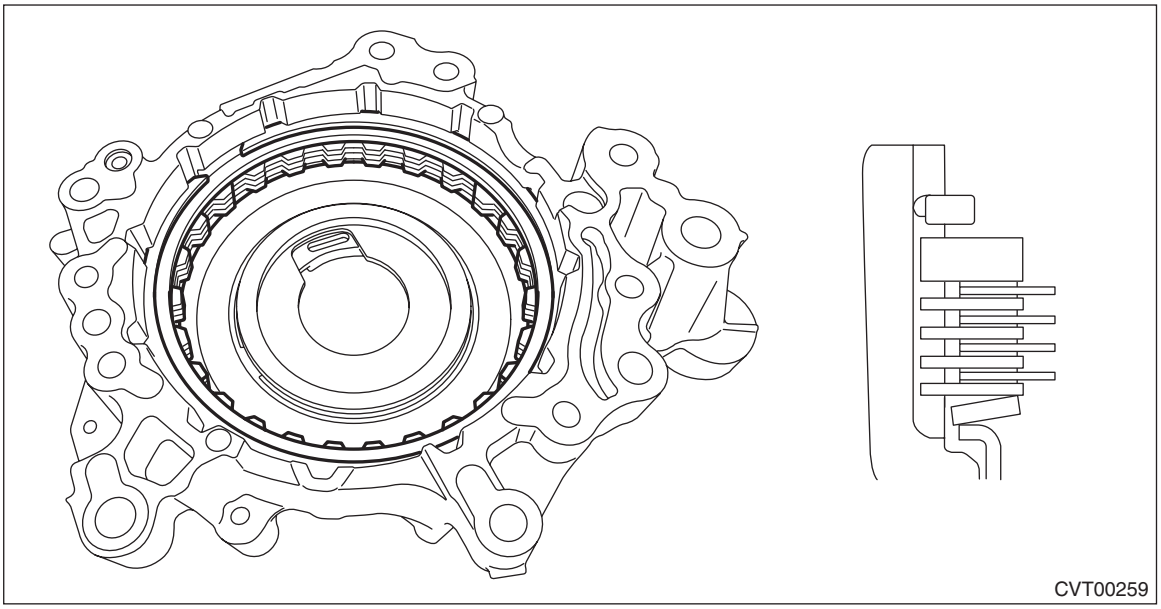
NOTE:
Measure at four points with a 90° interval and calculate the average.



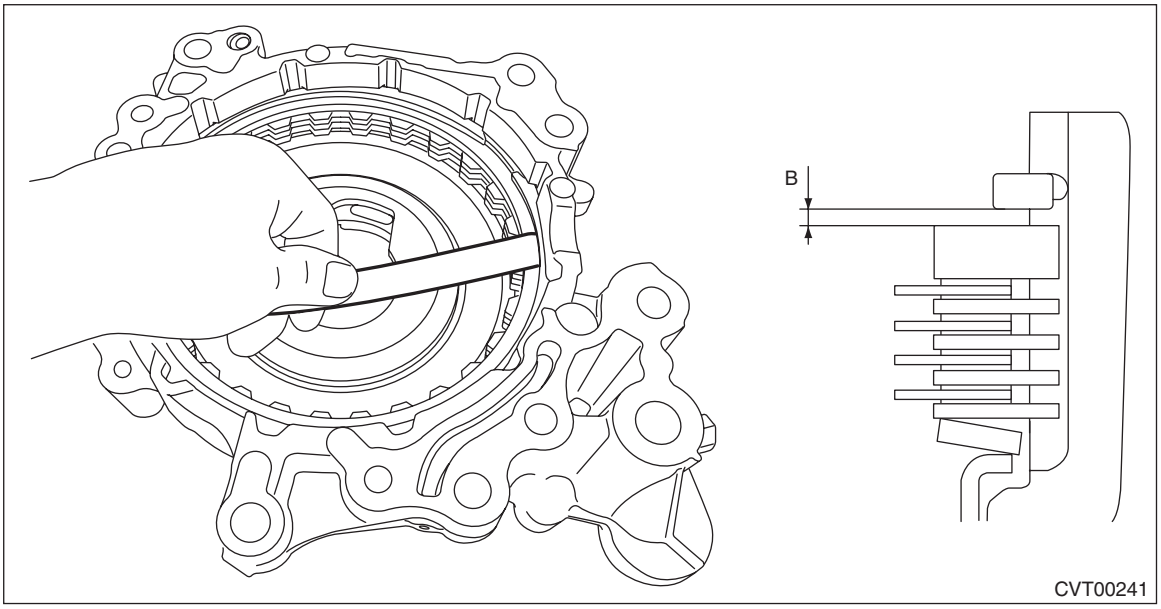
(A) Drive plate
(B) Driven plate
(C) Retaining plate

13) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the reverse brake housing.

NOTE:
Install the dish plate in the correct direction.



14) Measure and record the clearance “B” between the retaining plate and snap ring.



15) Piston stroke calculation
Calculate with A and B dimensions recorded before. If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.
S mm (in) = A + B
S: Piston stroke
A: Compression amount of drive plate and dish plate
B: Clearance between retaining plate and snap ring

Initial standard:
2.3 — 2.7 mm (0.091 — 0.106 in)

Limit thickness:
2.9 mm (0.114 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB750	4.2 (0.165)
31567AB800	4.4 (0.173)
31567AB810	4.6 (0.181)
31567AB820	4.8 (0.189)

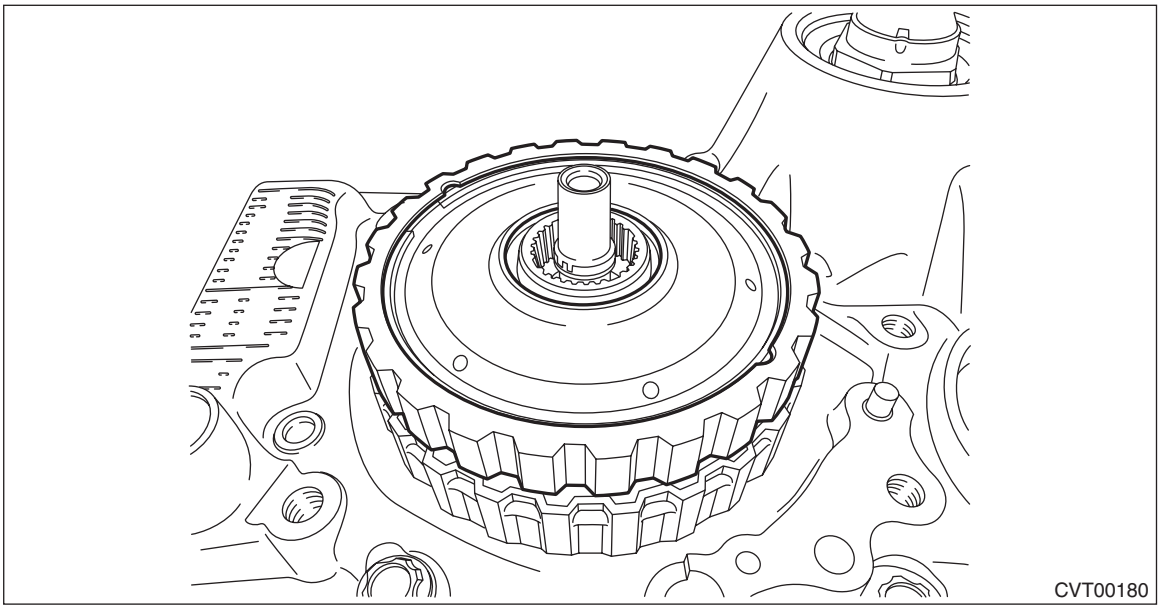
E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and snap ring of reverse brake is within the limit. If it exceeds the limit, replace with a new drive plate and select and adjust the retaining plate within the initial standard value. <Ref. to CVT(TH58A)-302, ASSEMBLY, Reverse Brake Assembly.>
- Check the oil pump shaft for damage.

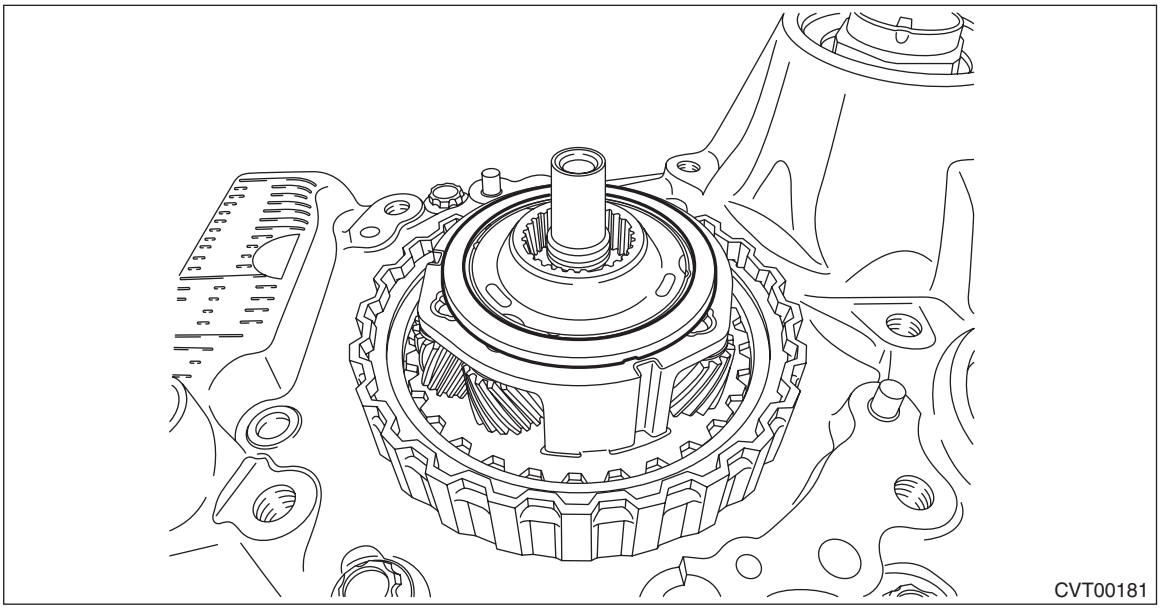
46.Forward Clutch Assembly

A: REMOVAL

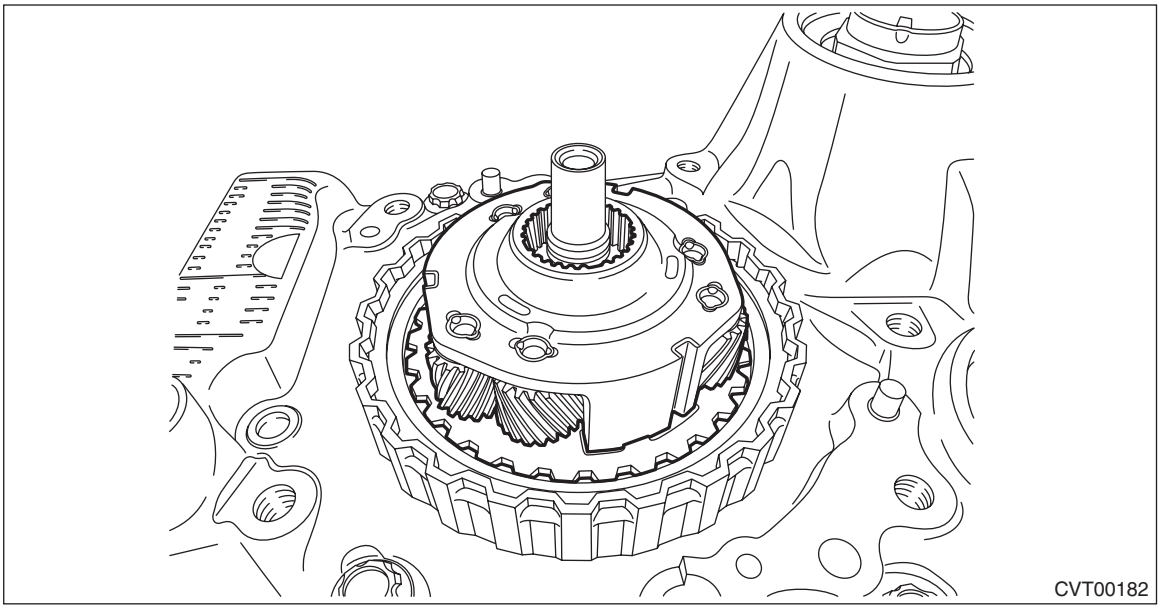
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-219, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-233, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-250, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-263, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-268, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-292, REMOVAL, Reverse Brake Assembly.>
22) Remove the internal gear.



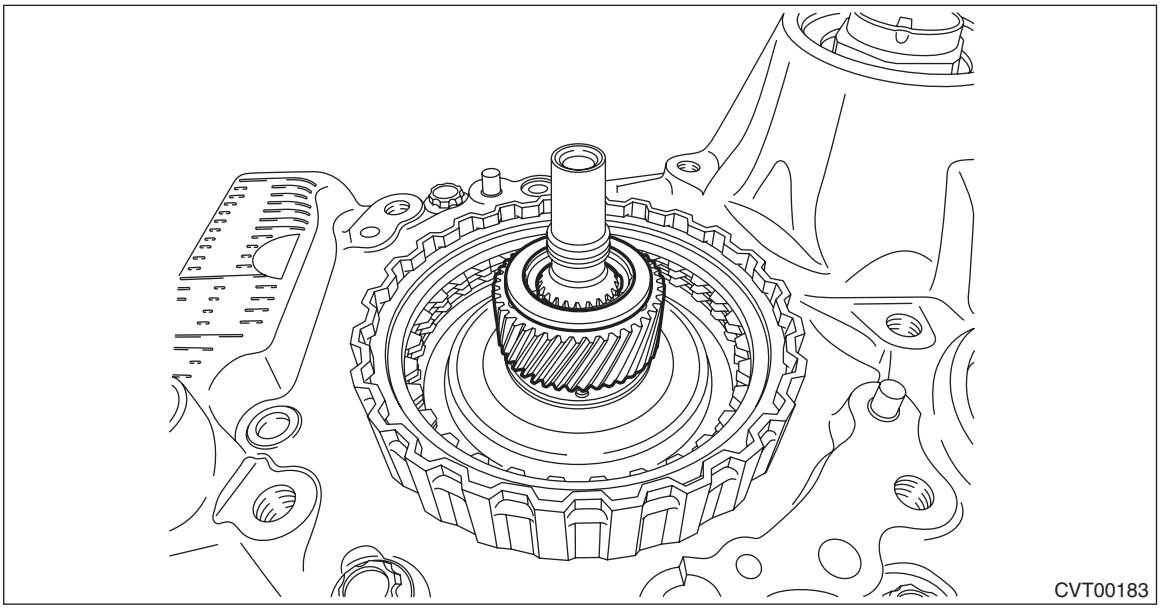
23) Remove the thrust bearing.



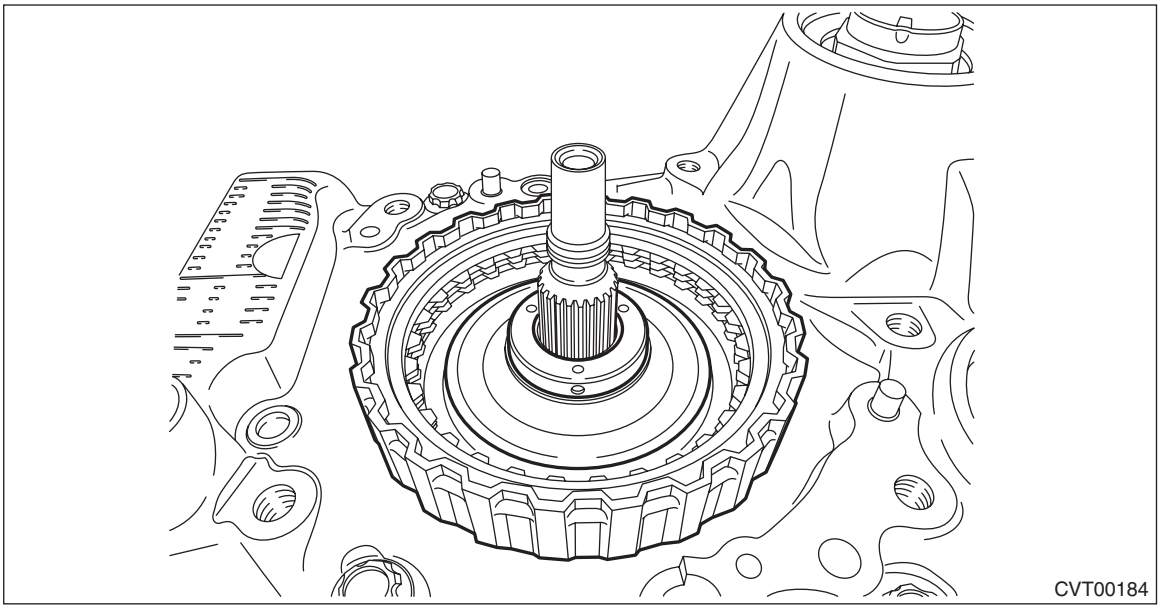
24) Remove the planetary carrier.



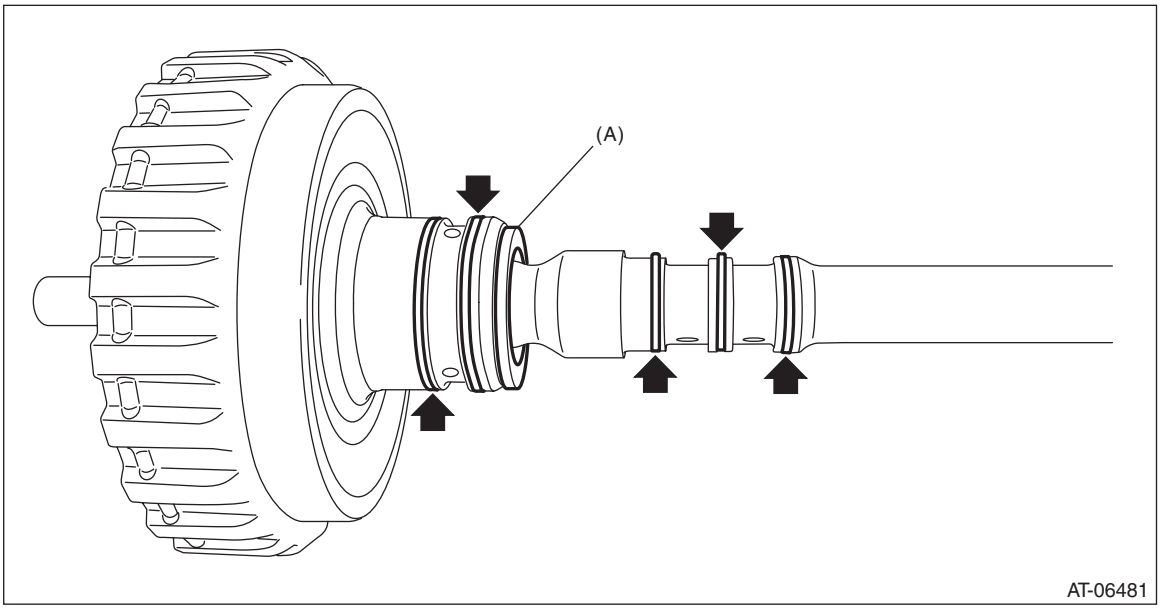
25) Remove the thrust bearing and sun gear.



26) Remove the forward clutch assembly.



27) Remove the thrust bearing and seal ring.

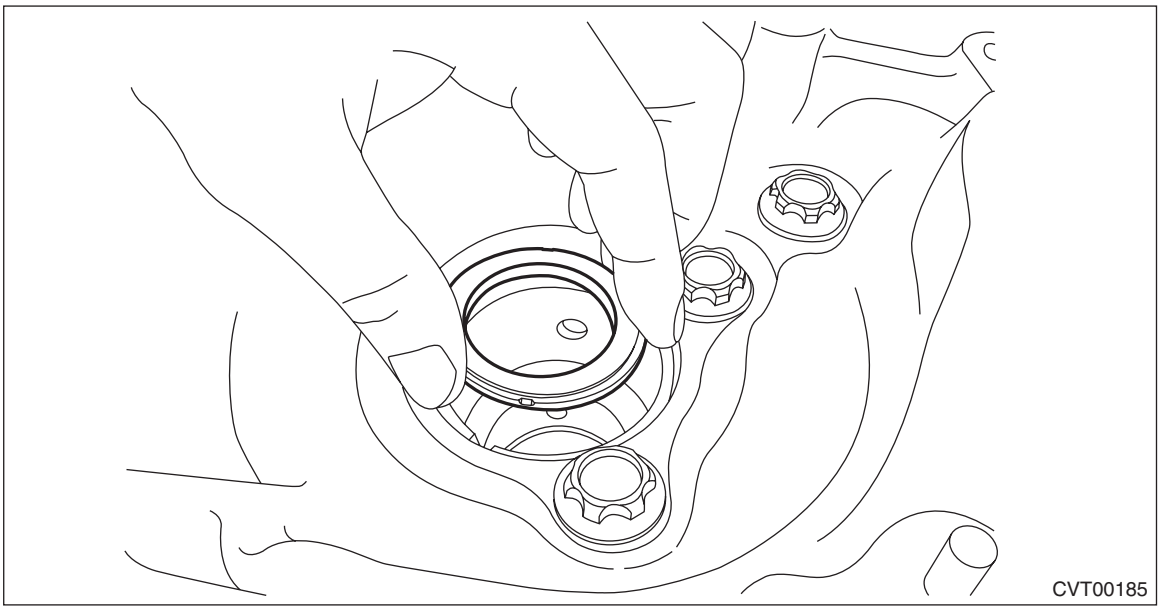


(A) Thrust bearing

B: INSTALLATION

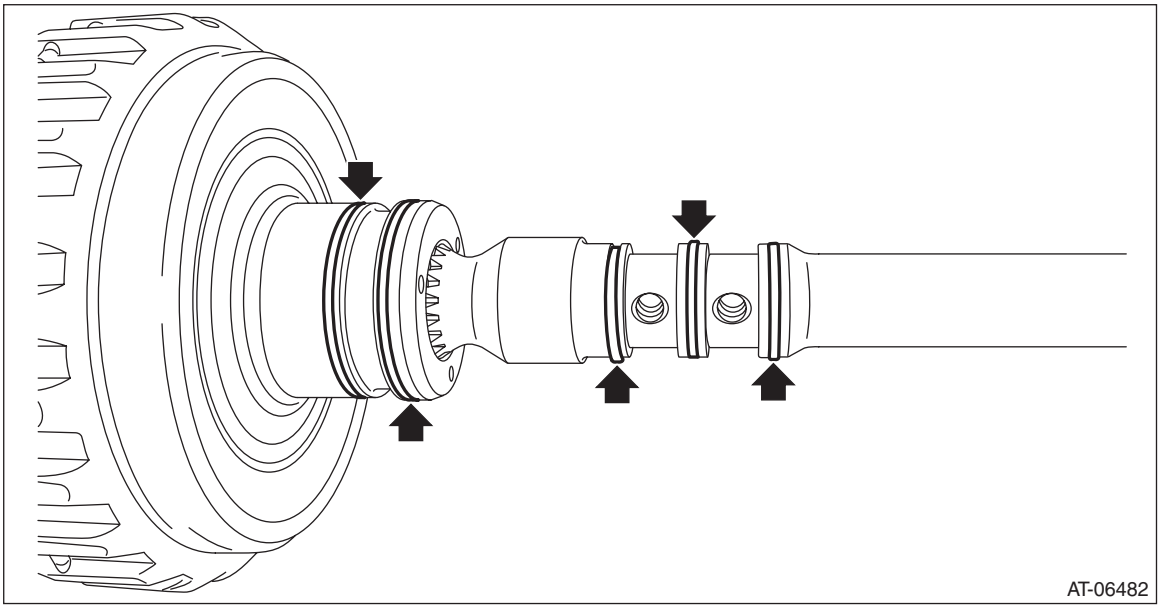
1) Install the thrust bearing to the converter case.

NOTE:
Face the temper color surface to the converter case side.

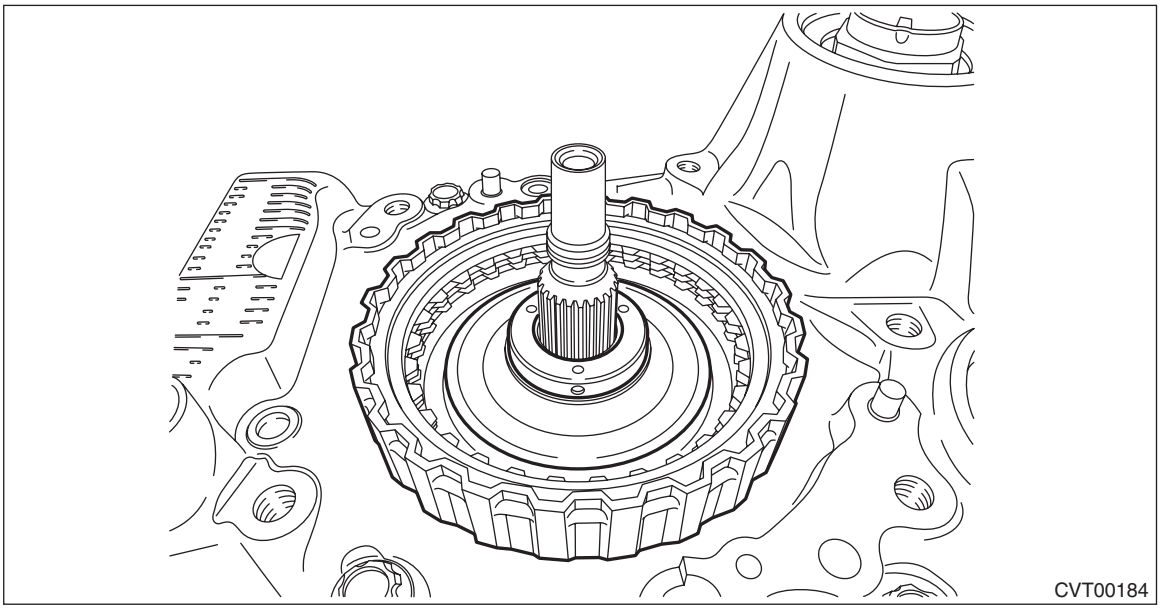


2) Install the seal ring to the input shaft.

NOTE:
- Use new seal rings.
- When installing the seal rings, do not expand the seal rings too much.
- Apply CVTF to the seal rings.

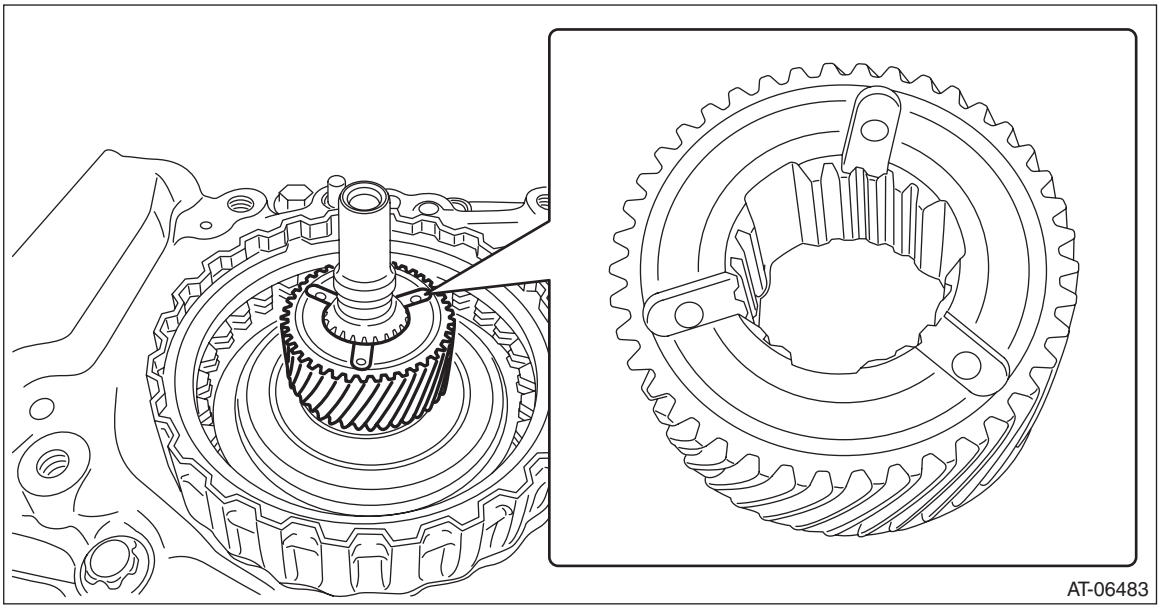


3) Install the forward clutch assembly to the converter case.



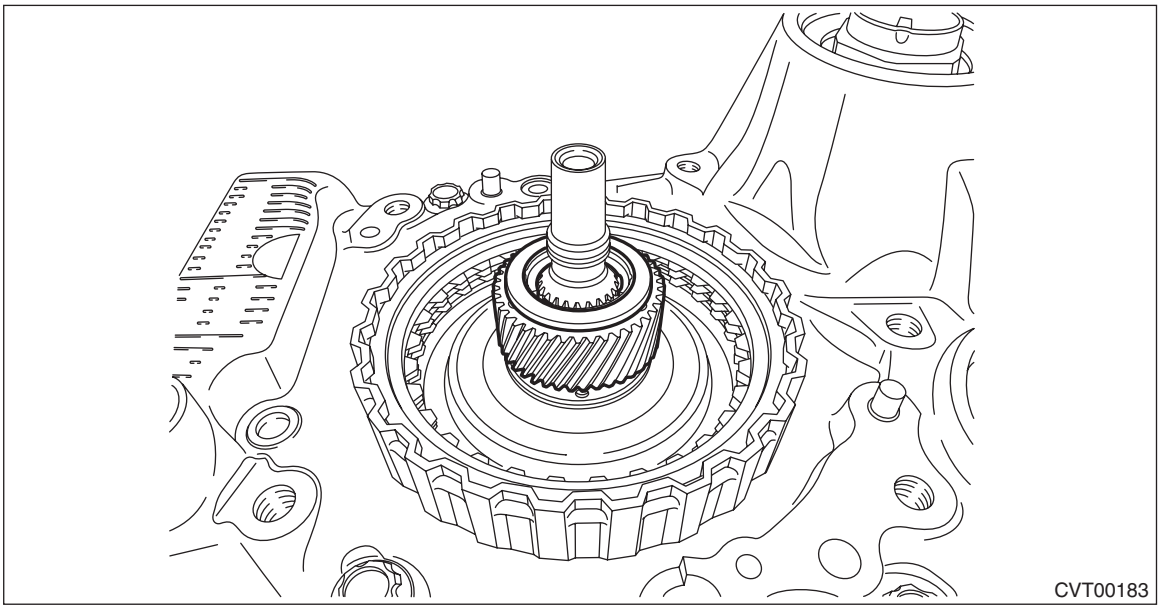
4) Install the sun gear.

NOTE:
Face the end face of the sun gear to the reverse brake side as shown in the figure.

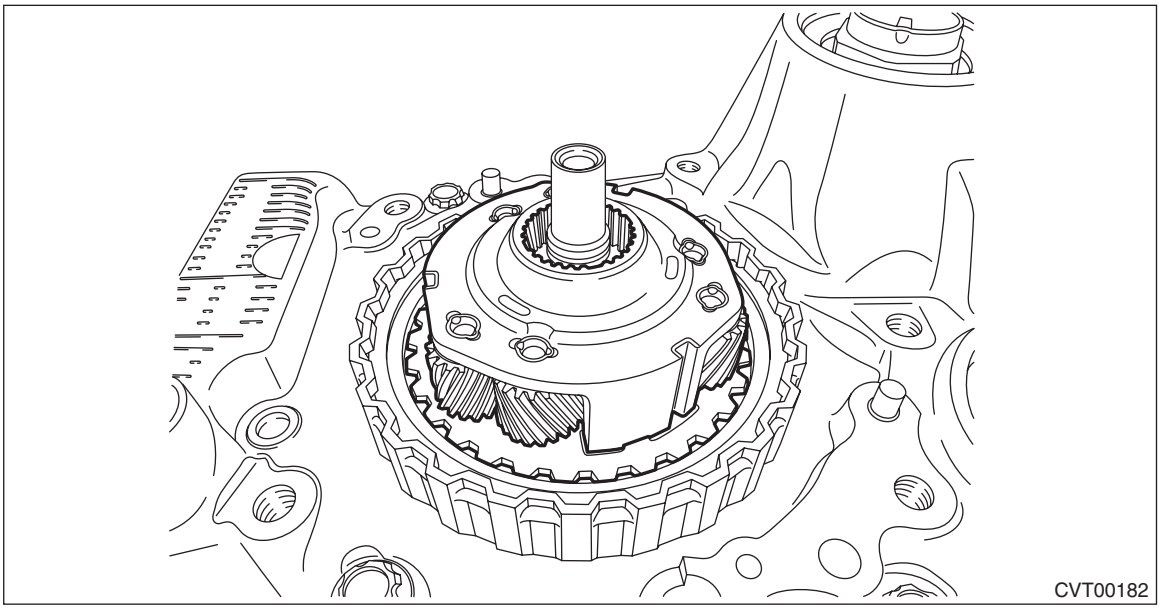


5) Install the thrust bearing to the sun gear.

NOTE:
Face the temper color surface to the reverse brake side.

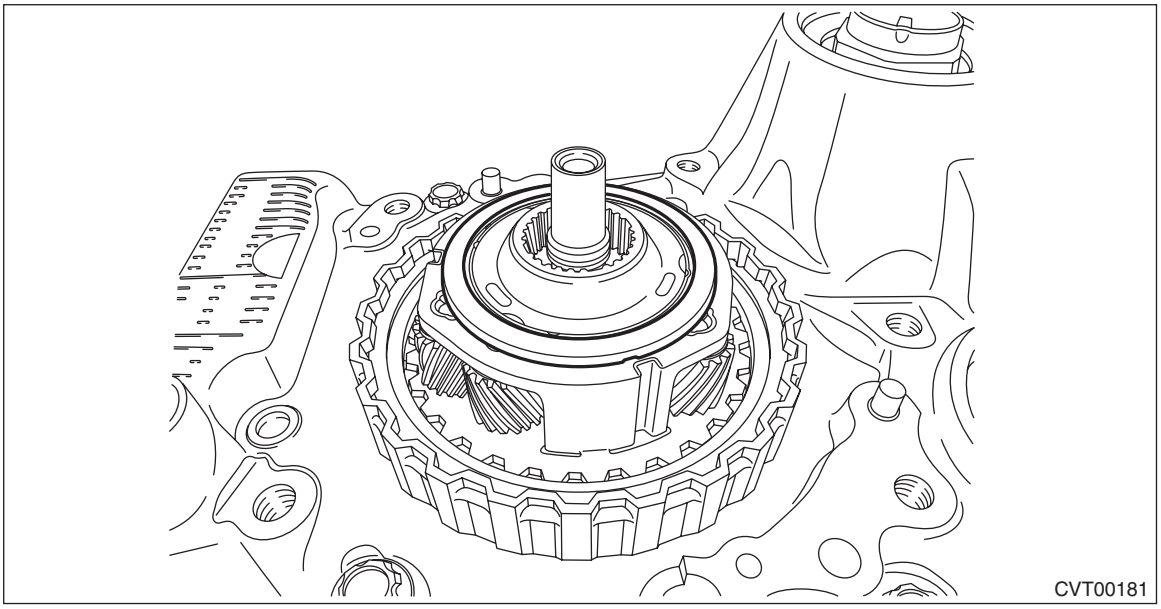


6) Install the planetary carrier.

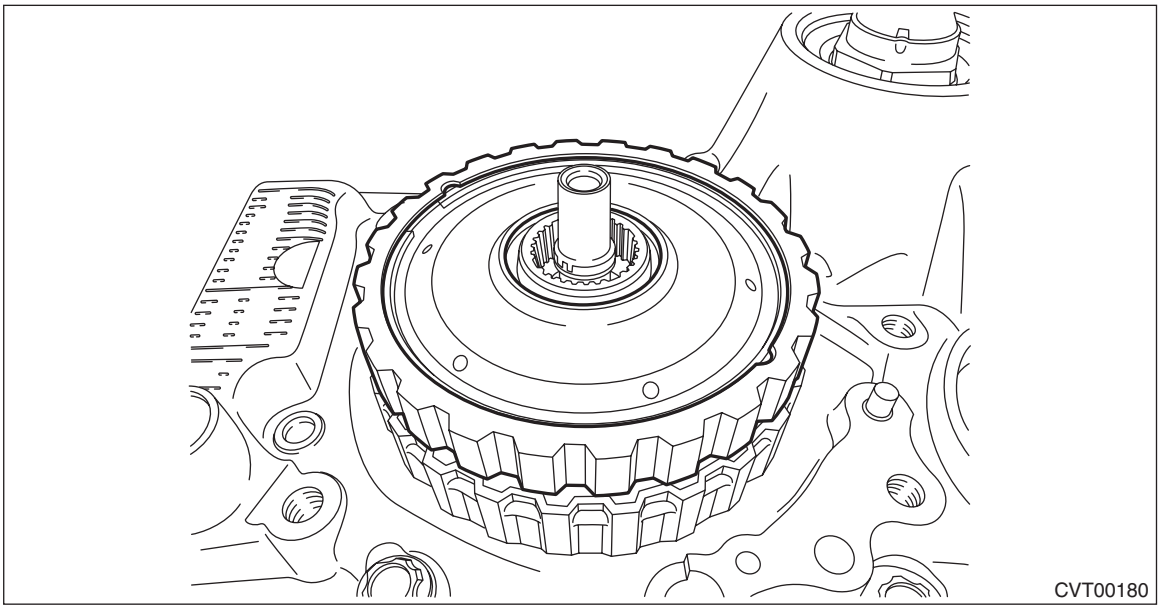


7) Install the thrust bearing.

NOTE:
Face the temper color surface to the reverse brake side.

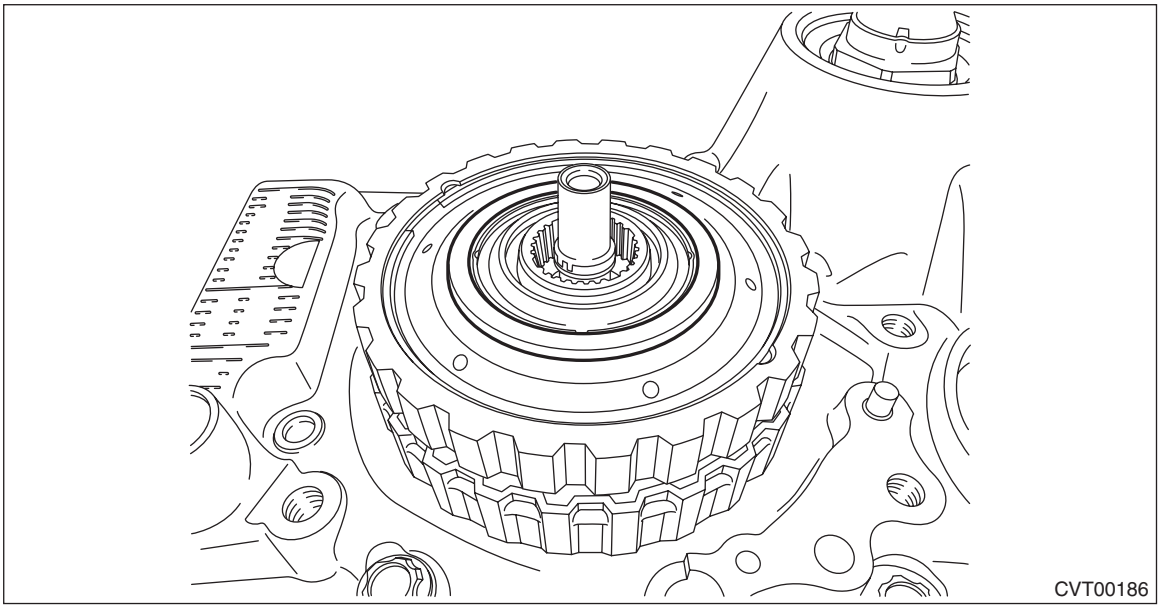


8) Install the internal gear.



9) Install the thrust bearing to the internal gear.

NOTE:
Face the temper color surface to the reverse brake side.



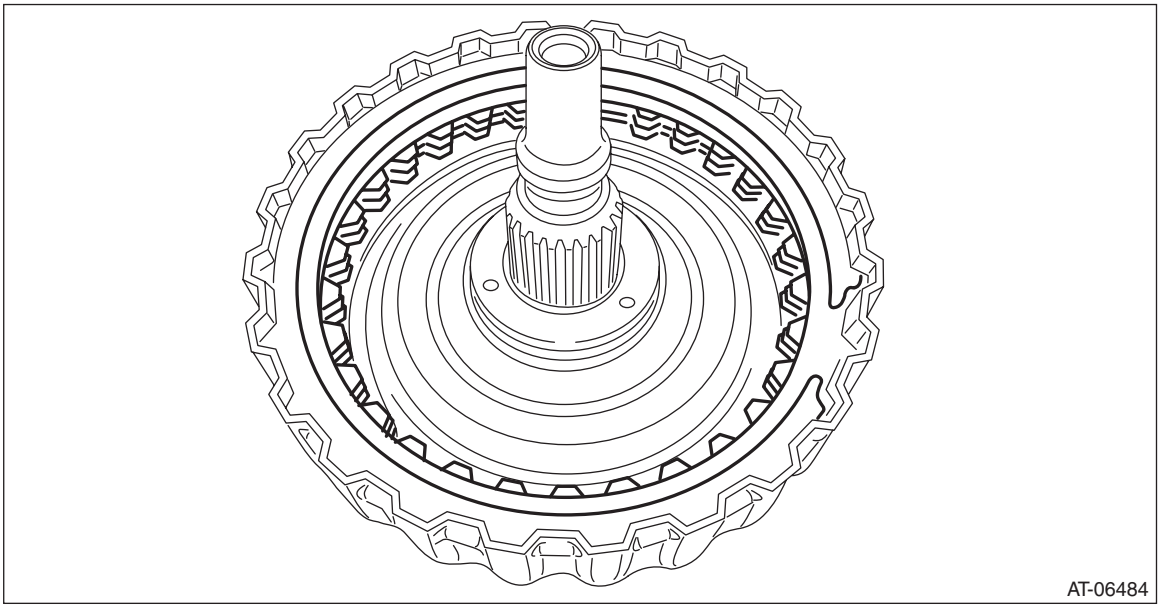
10) Select a washer. <Ref. to CVT(TH58A)-326, ADJUSTMENT, Forward Clutch Assembly.>
11) Install the reverse brake assembly. <Ref. to CVT(TH58A)-295, INSTALLATION, Reverse Brake Assembly.>
12) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-276, INSTALLATION, Primary Pulley and Secondary Pulley.>
13) Install the reduction drive gear. <Ref. to CVT(TH58A)-264, INSTALLATION, Reduction Drive Gear.>
14) Install the transmission case. <Ref. to CVT(TH58A)-253, INSTALLATION, Transmission Case.>
15) Install the output clutch assembly. <Ref. to CVT(TH58A)-234, INSTALLATION, Output Clutch Assembly.>
16) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
17) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
18) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
19) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>

20) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
21) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
22) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
23) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
24) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
25) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
26) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
27) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
28) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
29) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
30) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
31) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

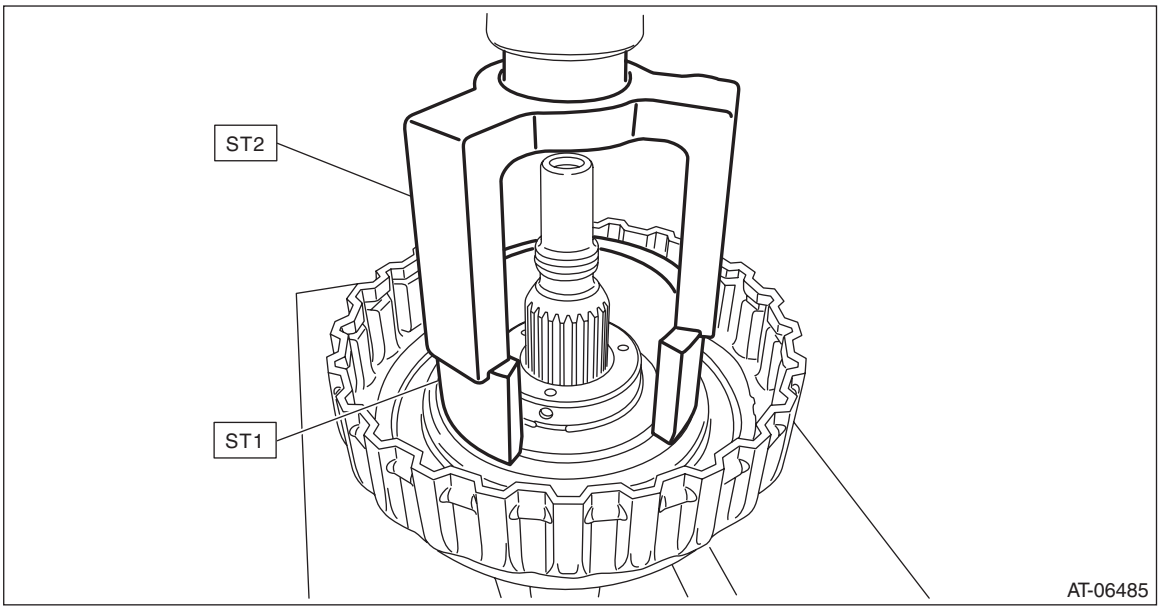
C: DISASSEMBLY

1. FORWARD CLUTCH ASSEMBLY

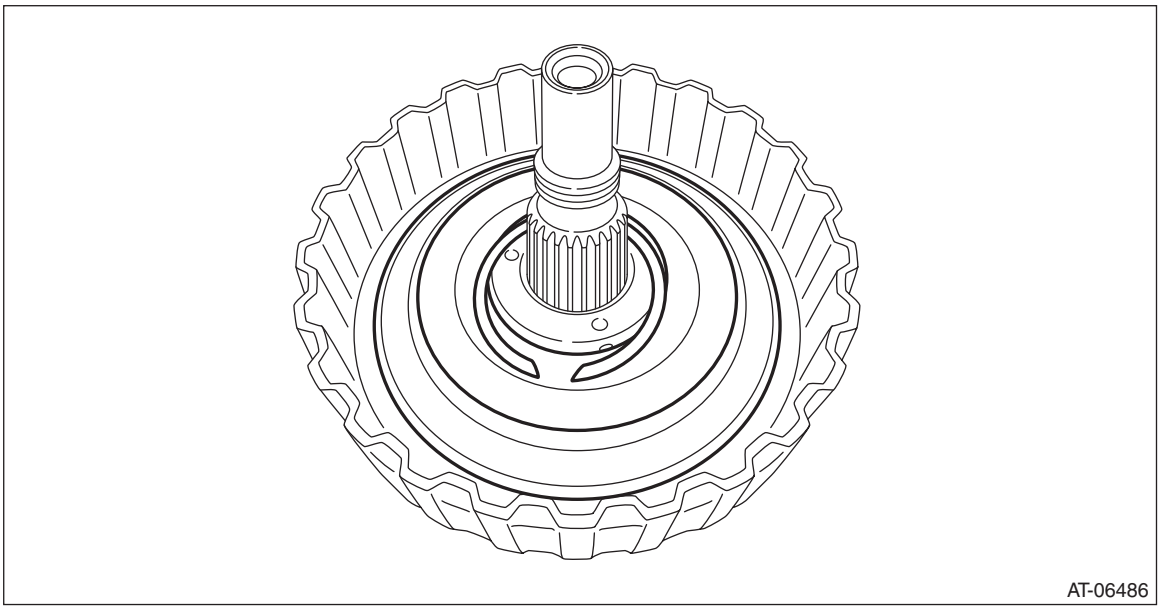
1) Remove the snap ring, retaining plate, drive plate, driven plate and dish plate.



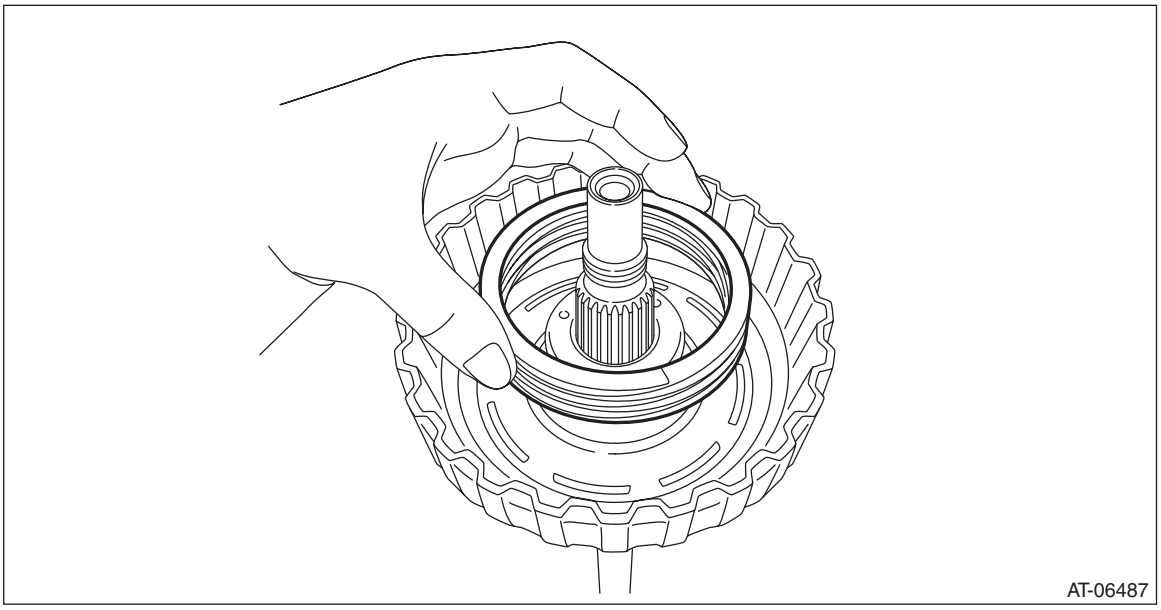
2) Compress the return spring using the ST to remove the snap ring.
ST1 18762AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



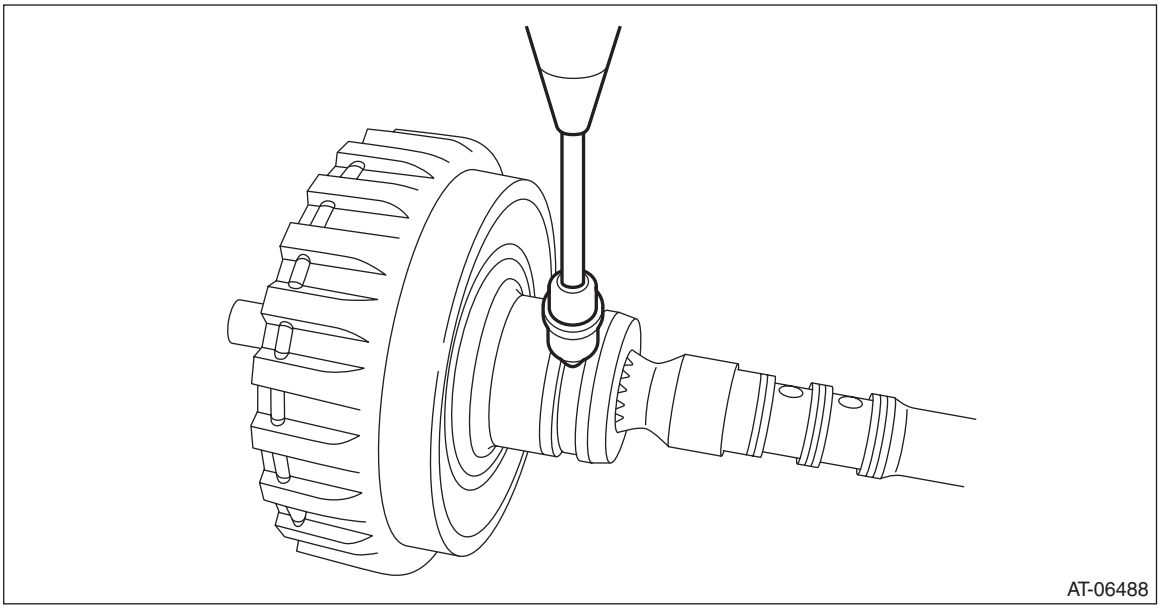
3) Remove the chamber COMPL and snap ring.



4) Remove the return spring.

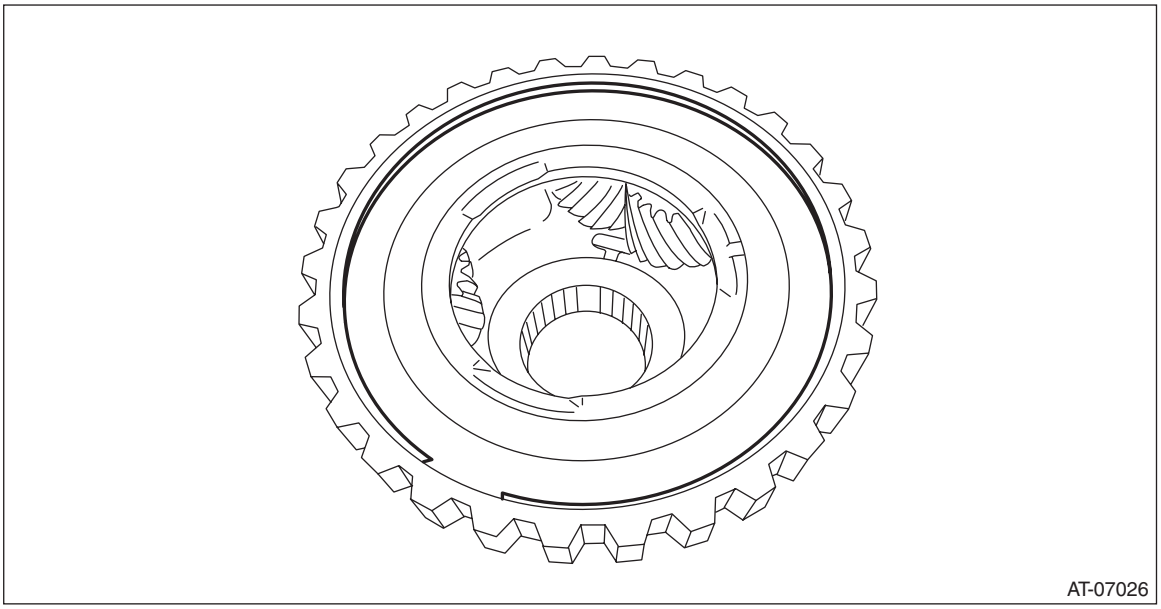


5) Remove the forward clutch piston by blowing compressed air intermittently from the forward clutch carrier hole.



2. PLANETARY CARRIER ASSEMBLY

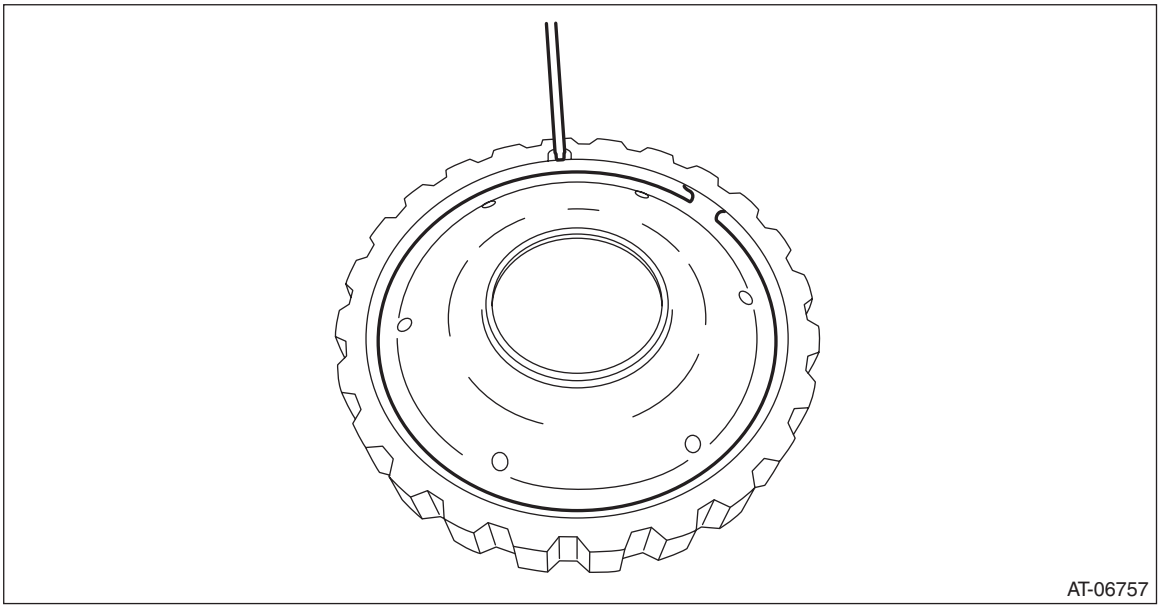
NOTE:
Disassemble the balance oil guide only.
1) Remove the snap ring.


AT-07026

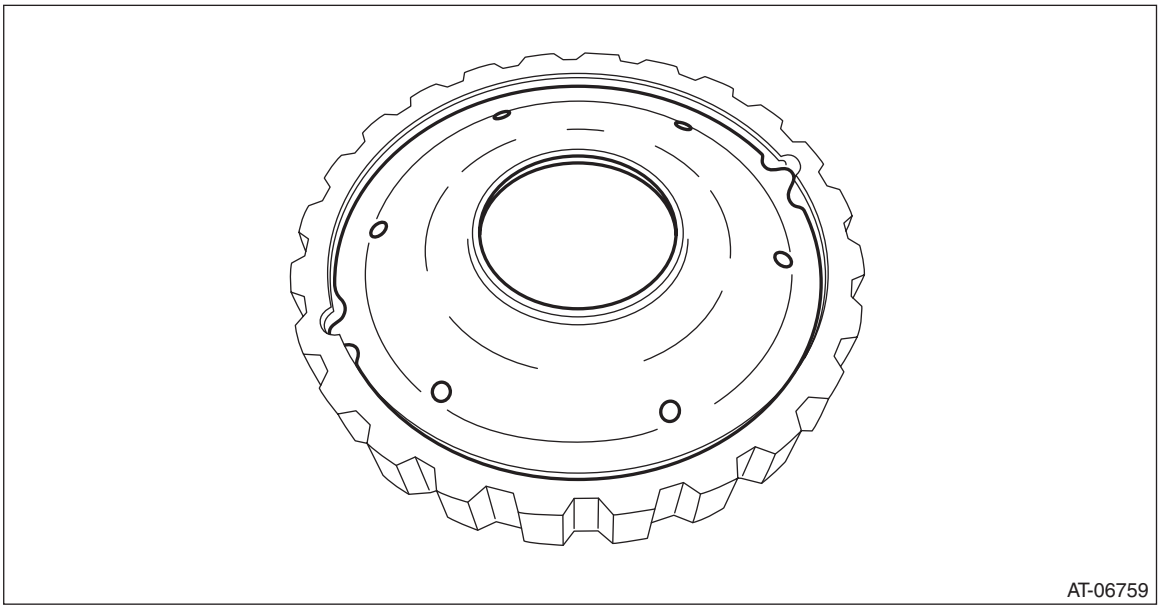
2) Remove the balance oil guide.

3. INTERNAL GEAR

1) Remove the snap ring.


AT-06757

2) Remove the thrust gear plate.

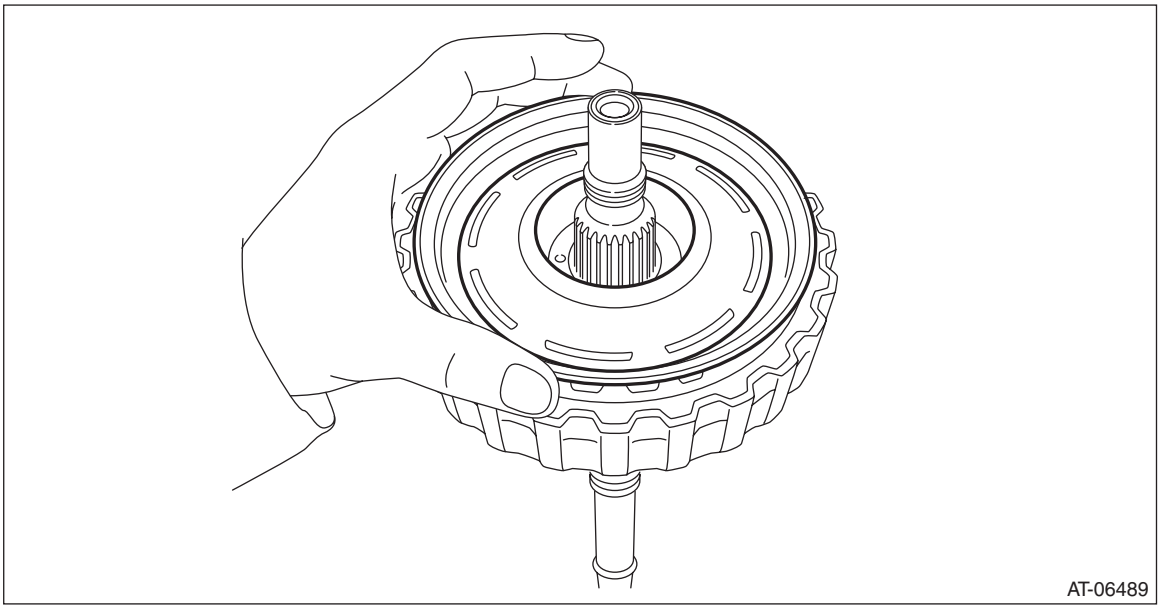

AT-06759

D: ASSEMBLY

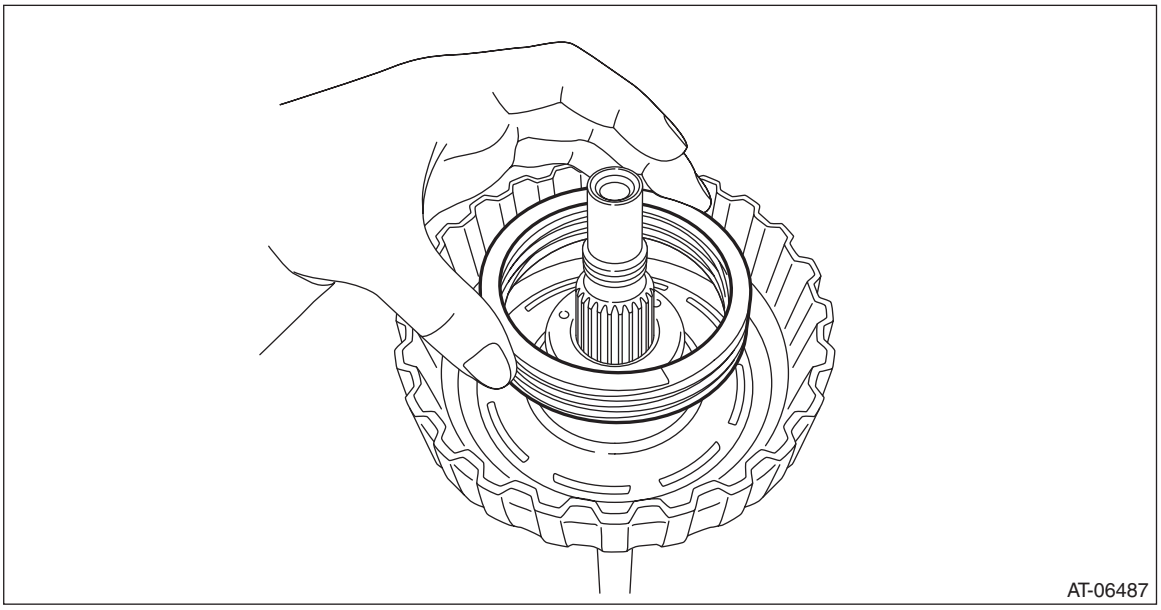
1. FORWARD CLUTCH ASSEMBLY

1) Install the forward clutch piston to forward clutch drum.

NOTE:
- Apply CVTF to the seal of forward clutch piston.
- Insert it all the way to the end.

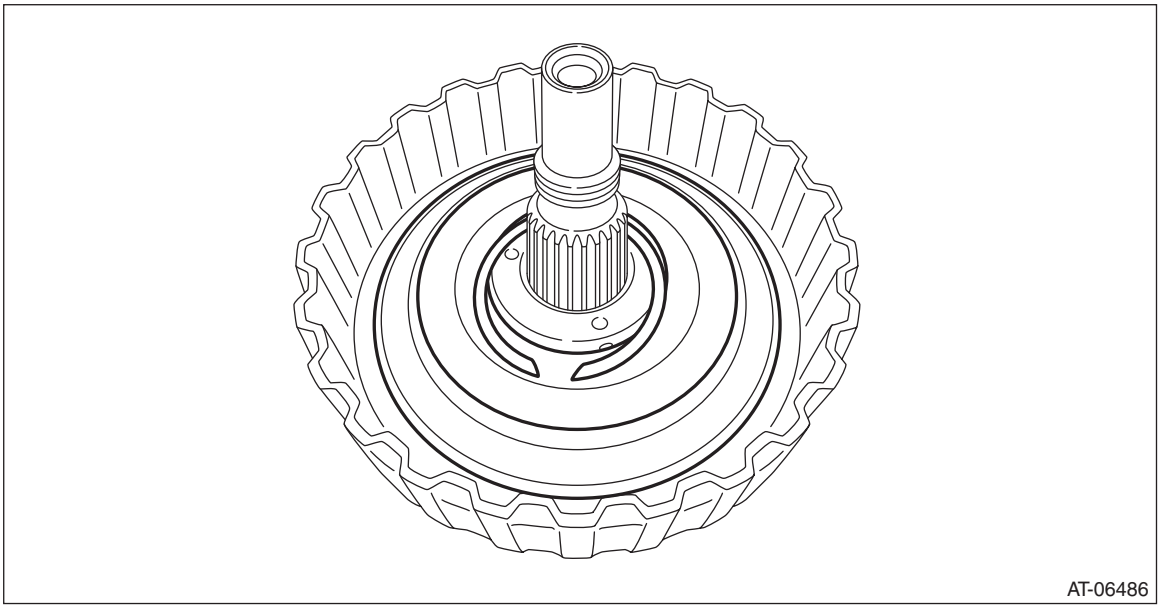

AT-06489

2) Install the return spring.

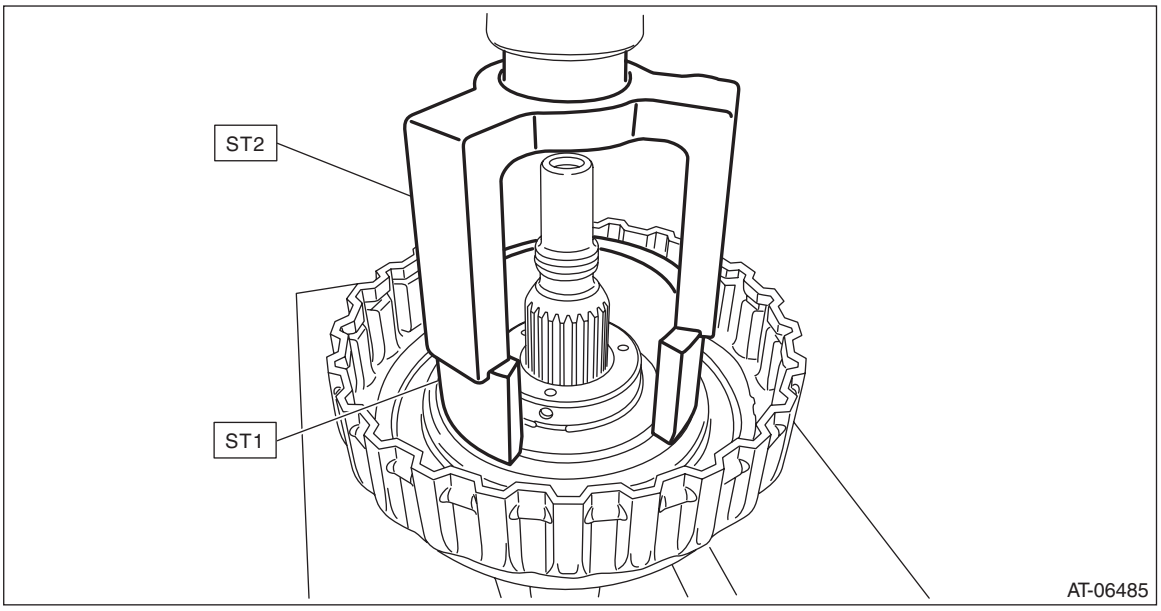


3) Install the chamber COMPL.

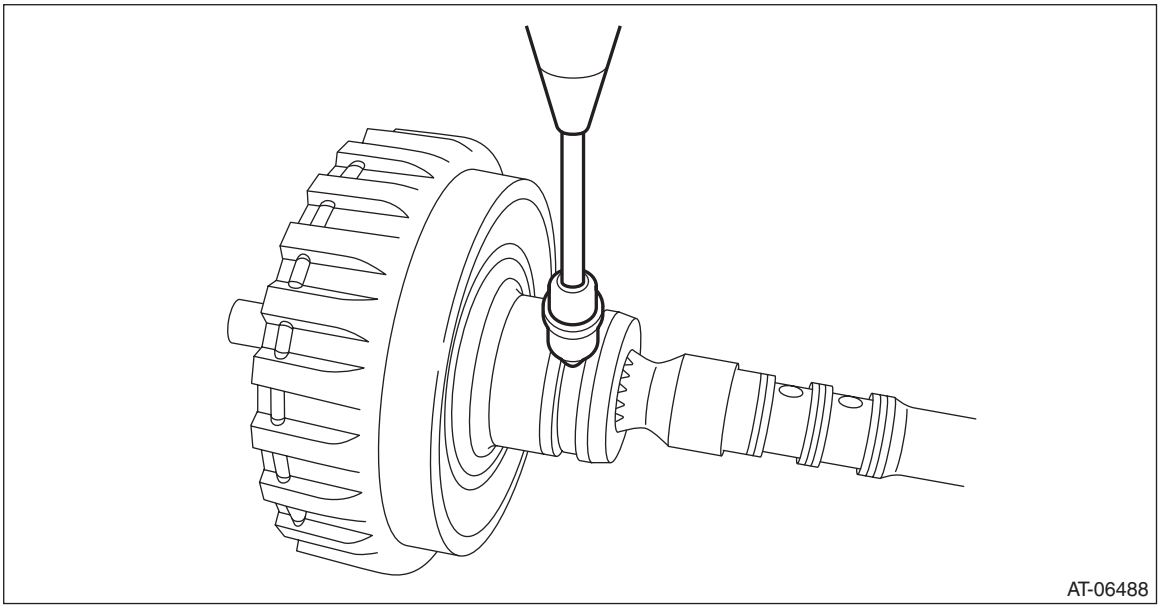
NOTE:
Apply CVTF to the sealing area of chamber COMPL.



4) Compress the return spring using the ST to install the snap ring.
ST1 18762AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



5) Check the operation of forward clutch piston by blowing compressed air intermittently from the forward clutch carrier hole.

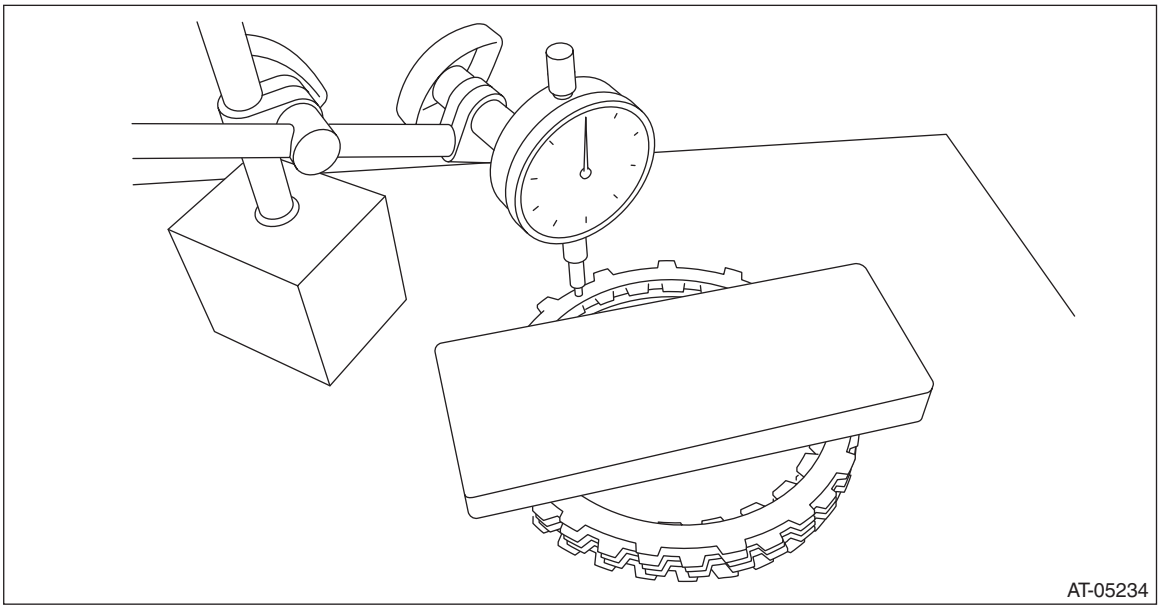


6) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
7) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.
8) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

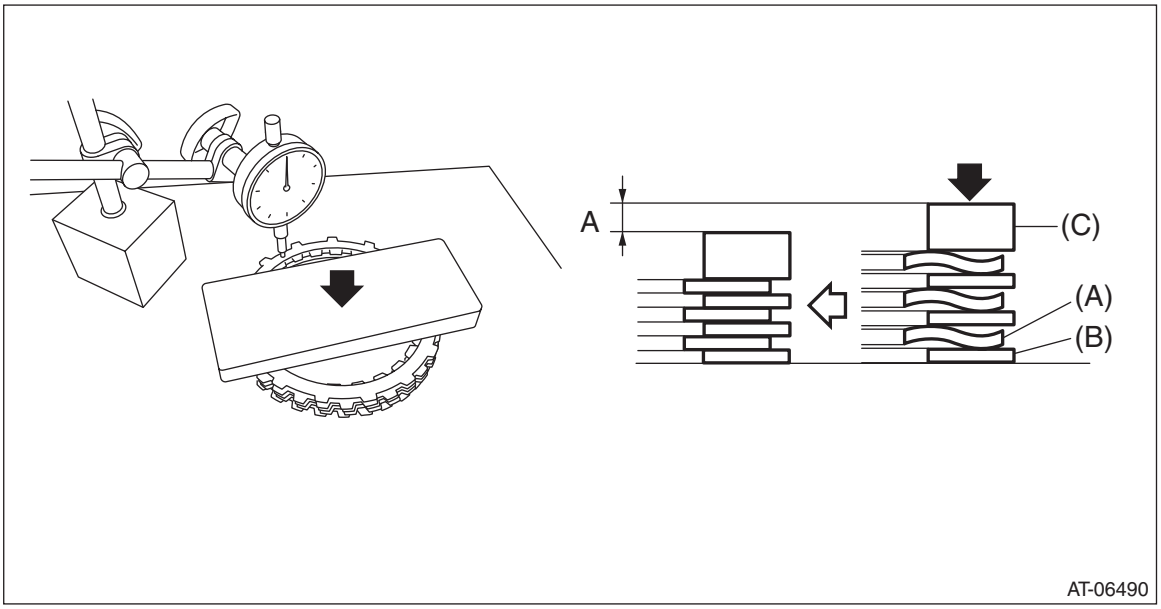
NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 52 N (5.3 kgf, 11.7 lb).

9) Put the flat board on retaining plate.



10) Using the following formula, read the push/pull gauge, and calculate “N”.
N = 52 N (5.3 kgf, 11.7 lb) – Z
52 N (5.3 kgf, 11.7 lb) : Load applied to clutch plate
Z: Flat board weight
11) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

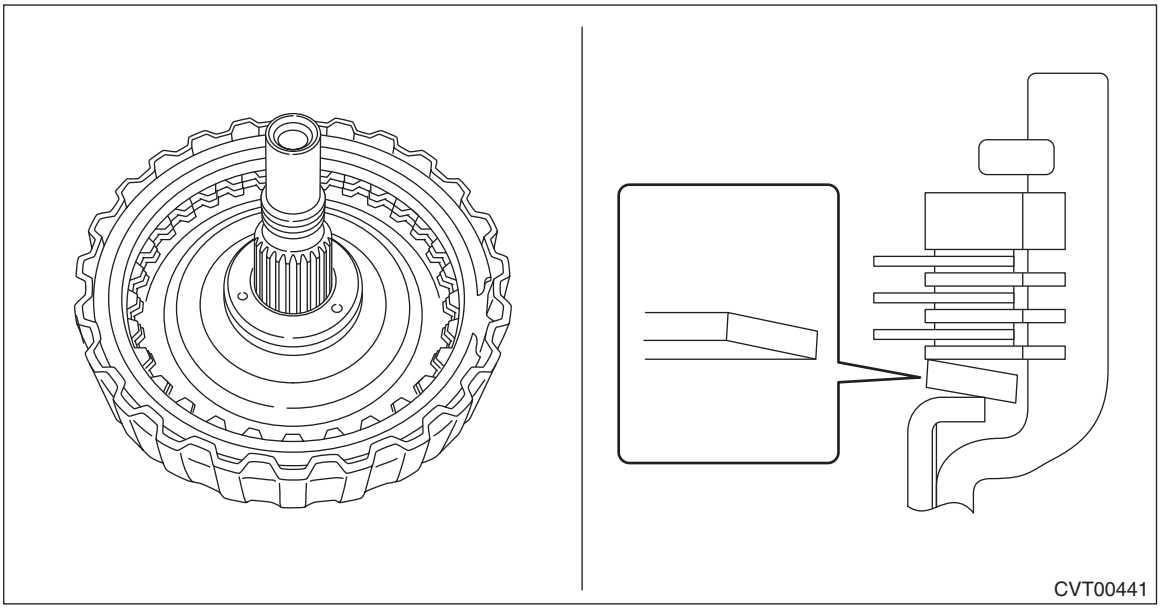
NOTE:
Measure at four points with a 90° interval and calculate the average.



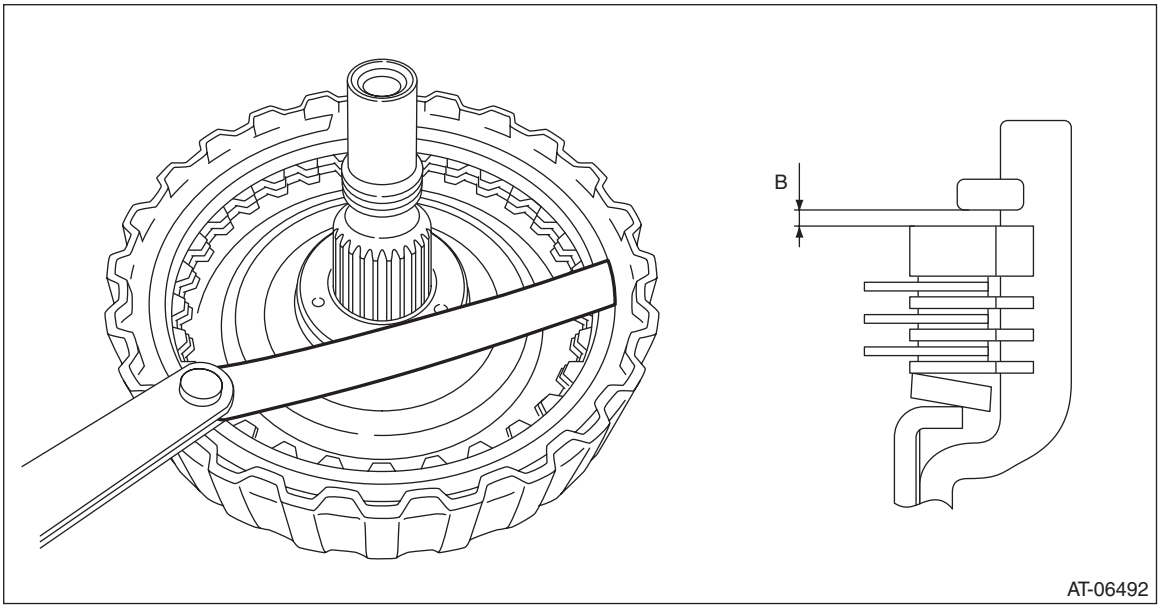
(A) Driven plate
(B) Drive plate
(C) Retaining plate

12) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the forward clutch carrier.

NOTE:
Install the dish plate in the correct direction.



13) Measure and record the clearance “B” between the retaining plate and snap ring.



14) Piston stroke calculation
Calculate with A and B dimensions recorded before.
If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.
S mm (in) = A + B
S: Piston stroke
A: Compression amount of drive plate and dish plate
B: Clearance between retaining plate and snap ring

Initial standard:
1.0 — 1.4 mm (0.040 — 0.055 in)

Limit thickness:
1.6 mm (0.063 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB760	4.2 (0.165)
31567AB770	4.4 (0.173)
31567AB780	4.6 (0.181)
31567AB790	4.8 (0.189)
31567AB830	5.0 (0.197)

2. PLANETARY CARRIER ASSEMBLY

NOTE:
Assemble in the reverse order of disassembly.

3. INTERNAL GEAR

NOTE:
Assemble in the reverse order of disassembly.

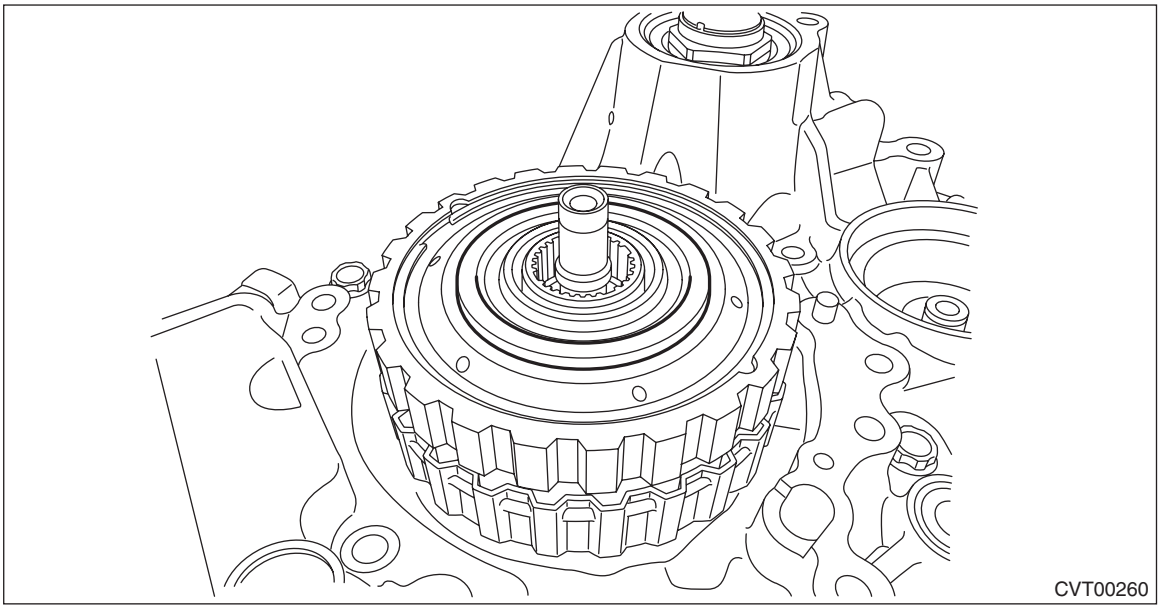
E: INSPECTION

- Check the forward clutch drum, internal gear, sun gear and forward clutch piston lip for wear or damage.
- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and internal gear of forward clutch is within the limit. If it exceeds the standard, replace the forward clutch. <Ref. to CVT(TH58A)-320, ASSEMBLY, Forward Clutch Assembly.>

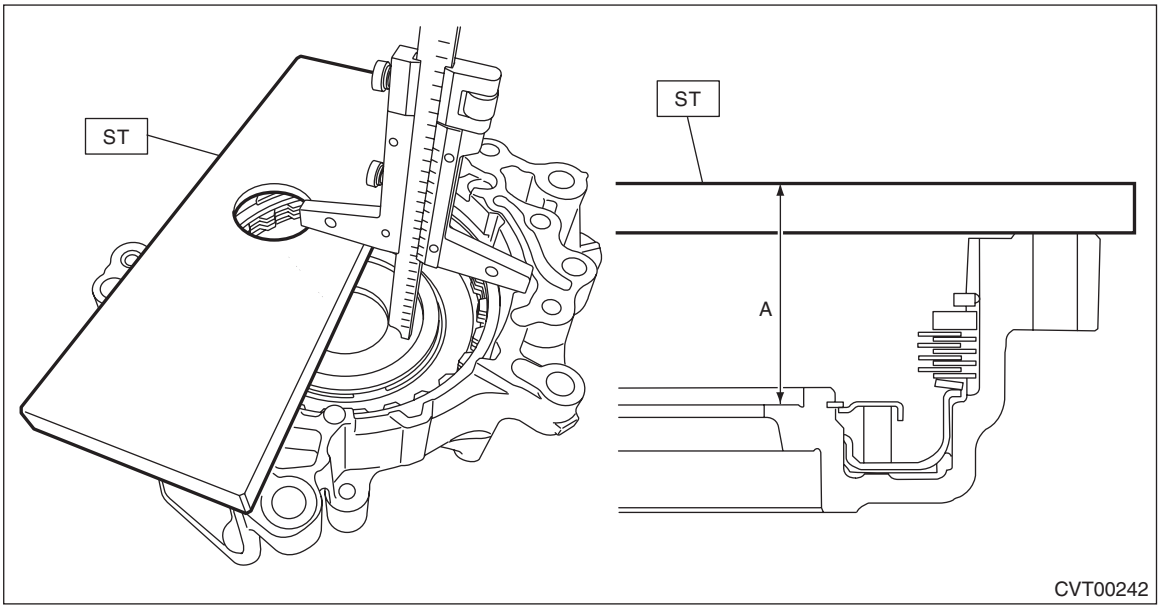
F: ADJUSTMENT

1) Install the thrust bearing to the internal gear.

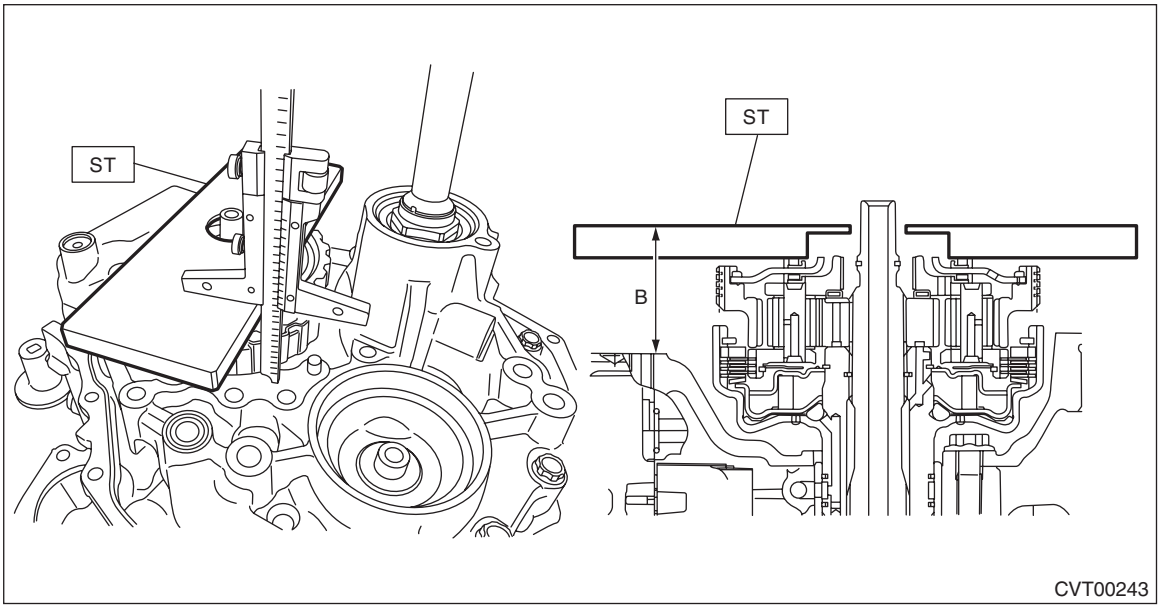
NOTE:
Face the temper color surface to the reverse brake side.



2) Measure depth “A” from the ST upper face to the washer mounting surface.
ST 499575600 GAUGE



3) Measure the height “B” from the ST upper face to the mating surface of the drive pinion retainer.
ST 499575600 GAUGE



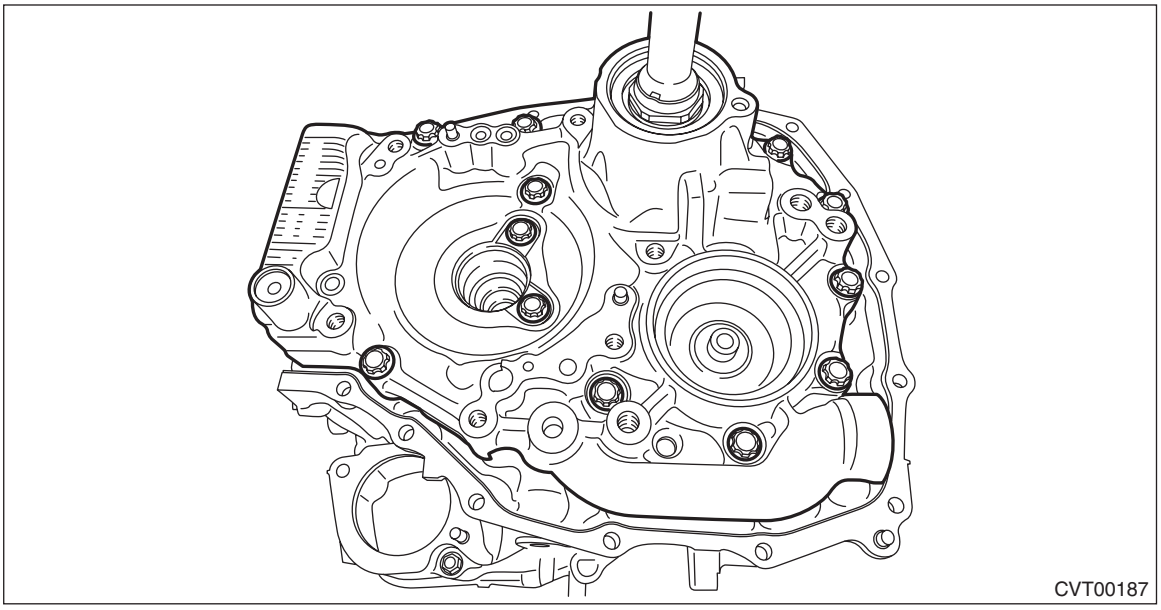
4) Obtain the thickness of washer using the following formula to select the washer.
T (mm) = A – B – (0.35 — 0.70)
[T (in) = A – B – (0.014 — 0.028)]
T: Shim thickness
A: Depth from the ST upper face to the washer mounting surface
B: Height from ST upper face to the drive pinion retainer mating surface
0.35 — 0.70 mm (0.014 — 0.028 in): Clearance

Washer	
Part No.	Thickness mm (in)
803064020	1.3 (0.051)
803064021	1.55 (0.061)
803064022	1.8 (0.071)
803064023	2.05 (0.081)
803064024	2.3 (0.091)
803064025	2.55 (0.100)

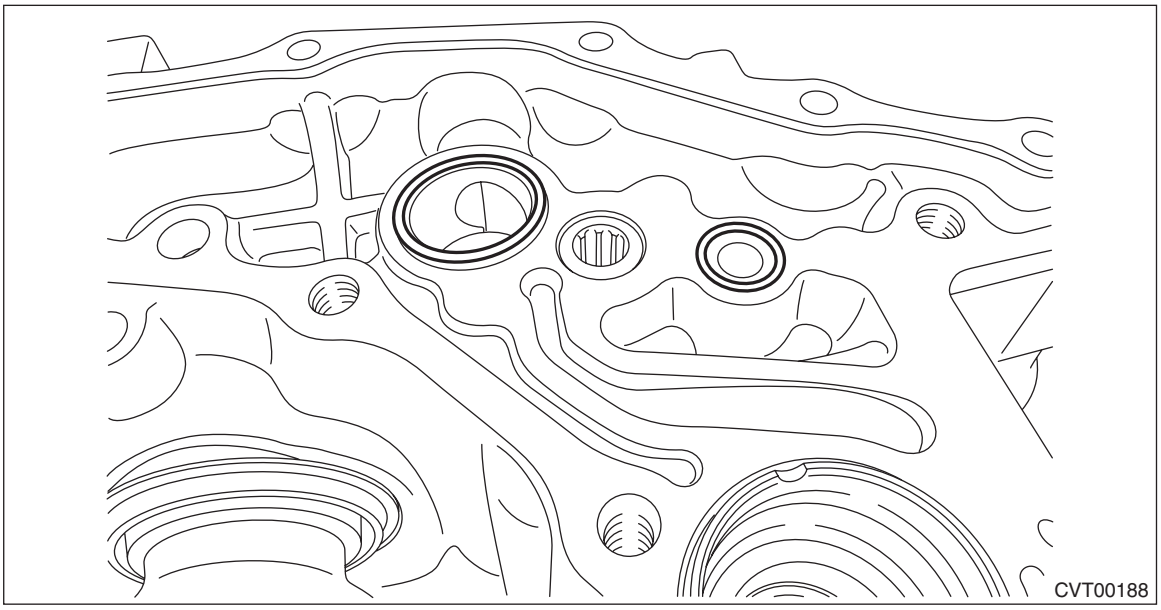
47.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-219, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-233, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-250, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-263, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-268, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-292, REMOVAL, Reverse Brake Assembly.>
22) Remove the forward clutch assembly. <Ref. to CVT(TH58A)-308, REMOVAL, Forward Clutch Assembly.>
23) Using the ST, remove the drive pinion retainer.
ST 18270KA020 SOCKET (E20)


CVT00187

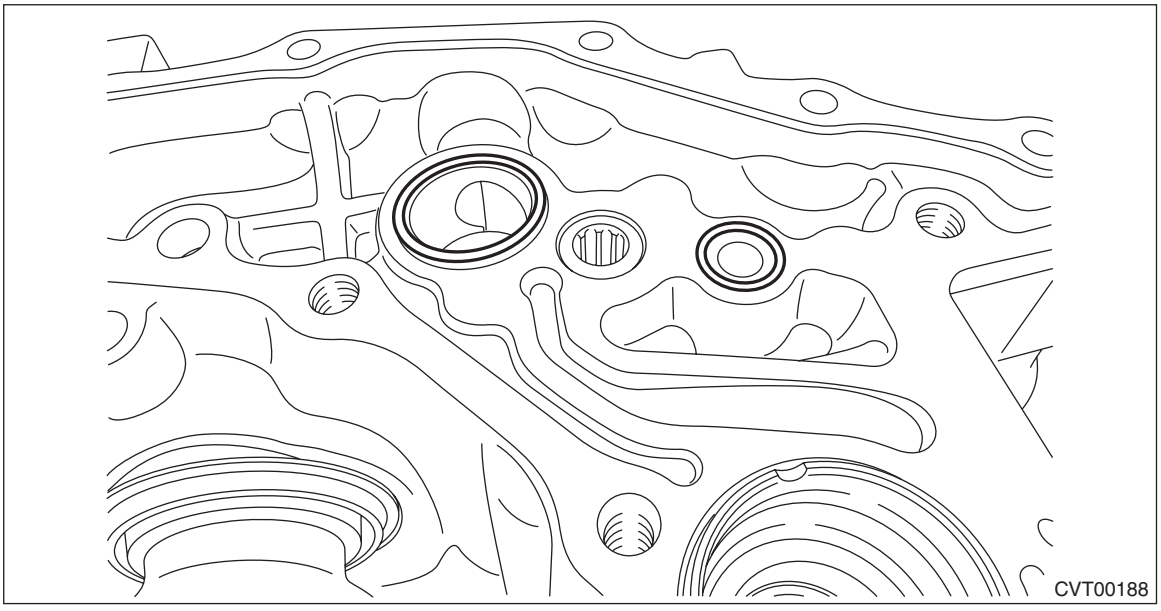
24) Remove the O-ring.



B: INSTALLATION

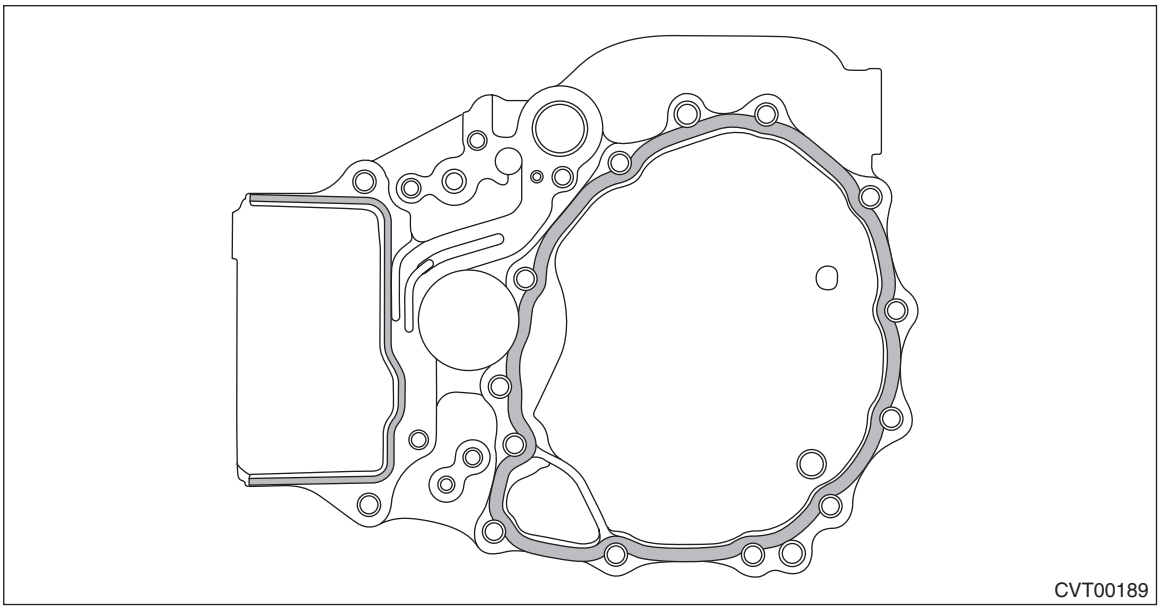
1) Clean the mating surface of drive pinion retainer and converter case.
2) Adjust the backlash and tooth contact between drive pinion shaft assembly and the front differential side gear. <Ref. to CVT(TH58A)-349, ADJUSTMENT, Drive Pinion Shaft Assembly.>
3) Install O-rings in two locations to the converter case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



4) Apply liquid gasket seamlessly to the mating surface of drive pinion retainer.

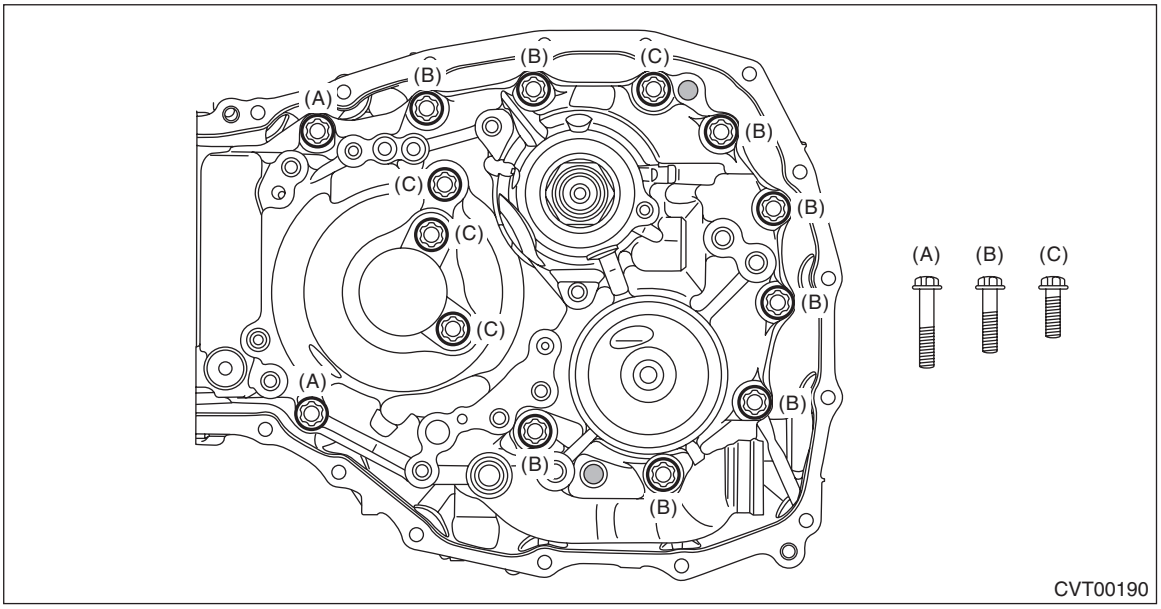
Liquid gasket:
THREE BOND 1215B or equivalent



5) Install the drive pinion retainer to converter case, and tighten the bolt using the ST.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



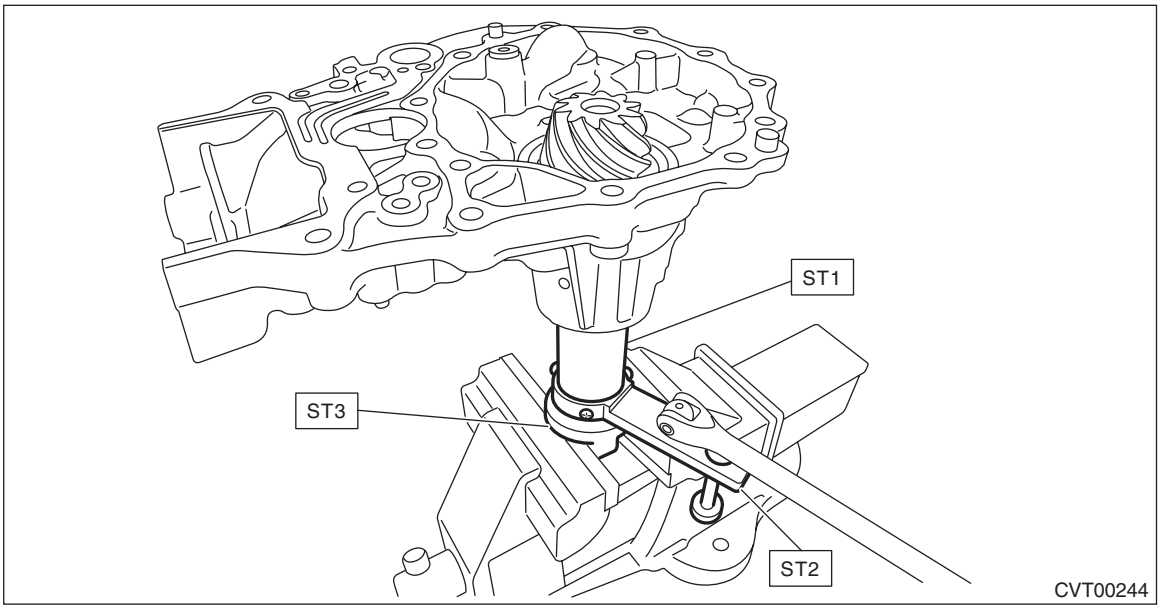
6) When replacing the drive pinion retainer, select the oil pump shaft. <Ref. to CVT(TH58A)-391, ADJUSTMENT, Oil Pump.>
7) Install the forward clutch assembly. <Ref. to CVT(TH58A)-311, INSTALLATION, Forward Clutch Assembly.>
8) Install the reverse brake assembly. <Ref. to CVT(TH58A)-295, INSTALLATION, Reverse Brake Assembly.>
9) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-276, INSTALLATION, Primary Pulley and Secondary Pulley.>

10) Install the reduction drive gear. <Ref. to CVT(TH58A)-264, INSTALLATION, Reduction Drive Gear.>
11) Install the transmission case. <Ref. to CVT(TH58A)-253, INSTALLATION, Transmission Case.>
12) Install the output clutch assembly. <Ref. to CVT(TH58A)-234, INSTALLATION, Output Clutch Assembly.>
13) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
14) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
15) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
16) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
17) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
18) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
19) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
20) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
21) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
22) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
23) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
24) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
25) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
26) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
27) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
28) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

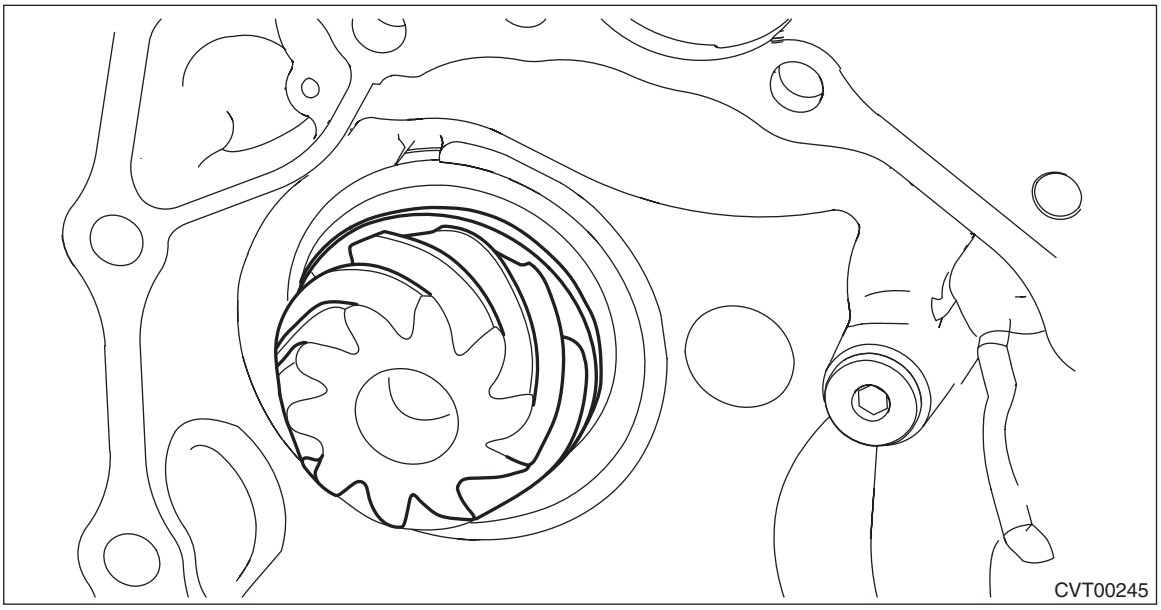
C: DISASSEMBLY

1) Flatten the tab of the lock nut.
2) Using ST1, ST2 and ST3, fix at the spline portion of drive pinion shaft to remove the lock nut.

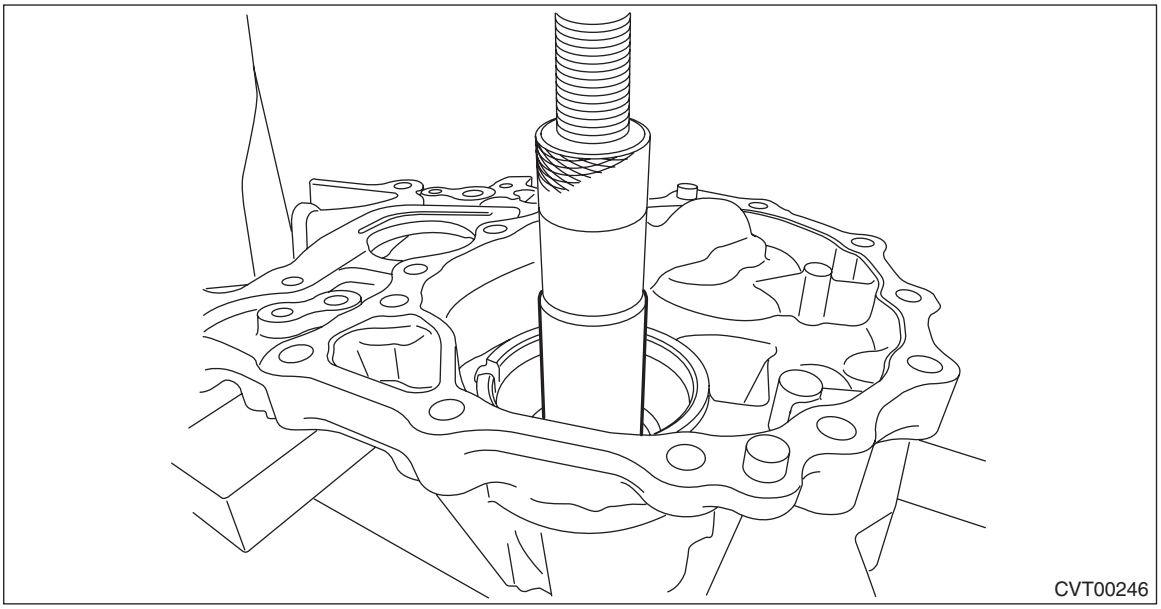
ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER



3) Remove the drive pinion shaft from the drive pinion retainer.

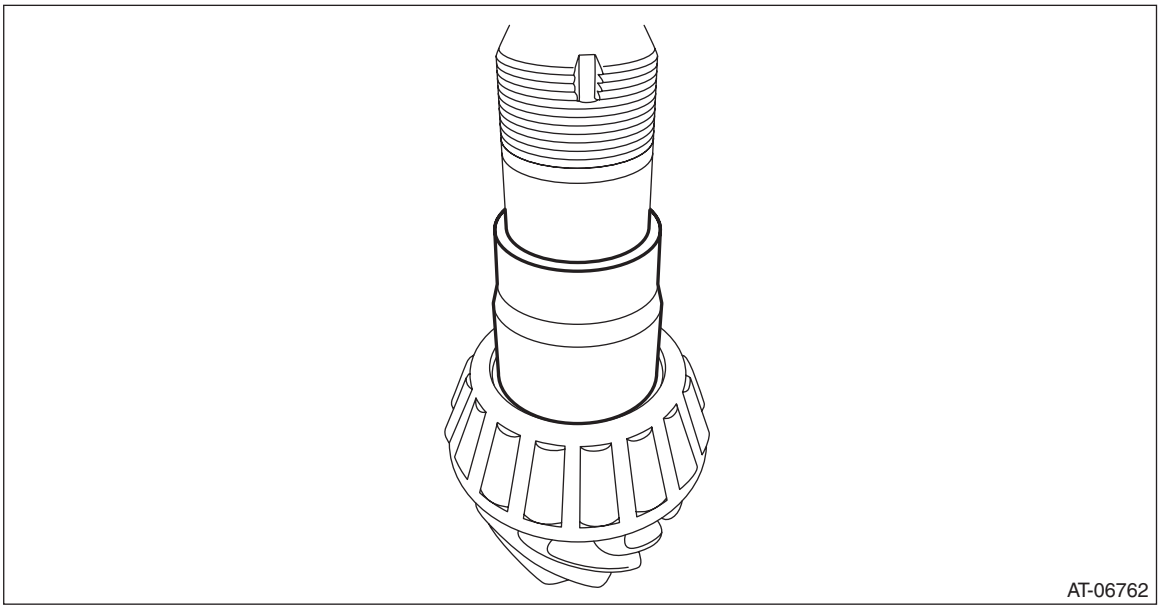


4) Using the round bar with diameter of 36 mm (1.42 in) or 37 mm (1.46 in), remove the bearing inner race and plug.

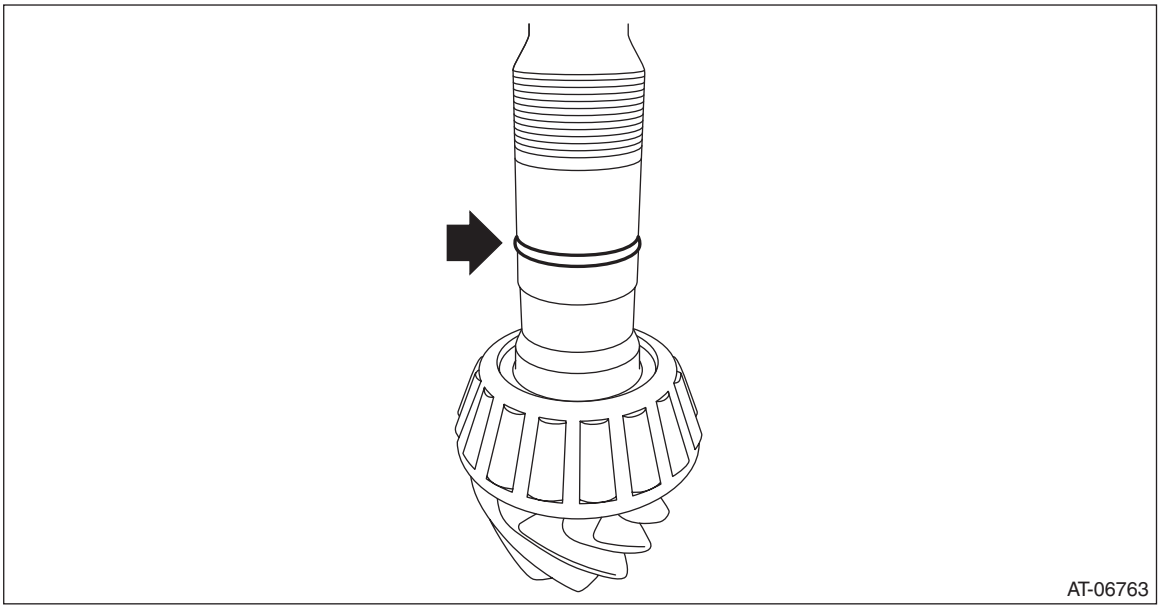


5) Remove the drive pinion washer.

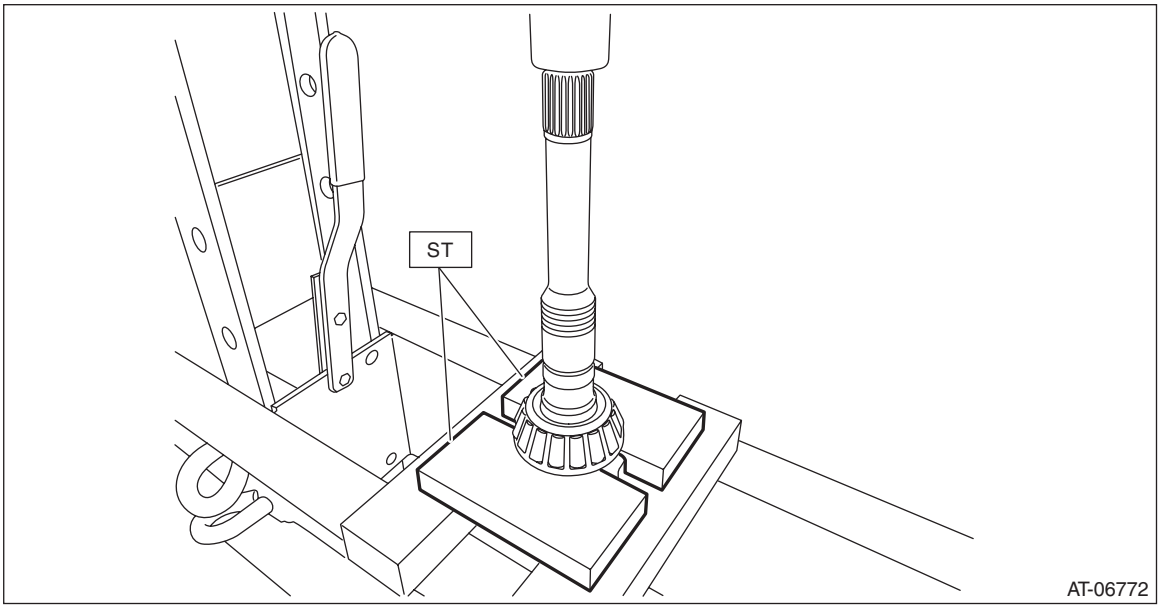
6) Remove the drive pinion spacer.



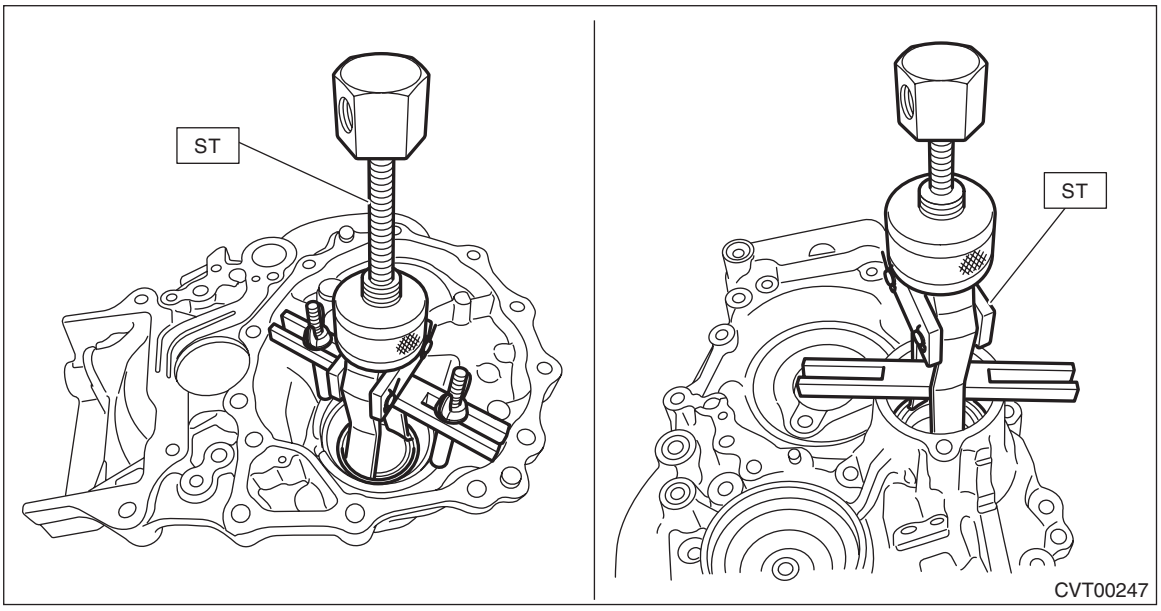
7) Remove the O-ring.



8) Remove the inner race and drive pinion shim from drive pinion shaft using ST.
ST 498515500 REMOVER

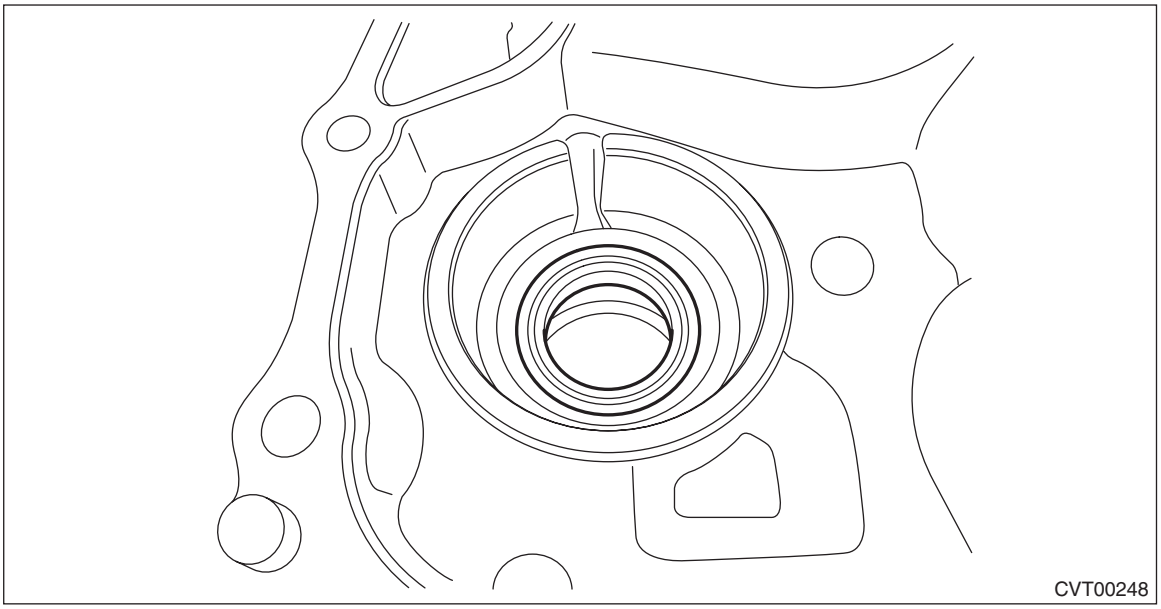


9) Using the ST, remove the outer race.
ST 398527700 PULLER ASSY

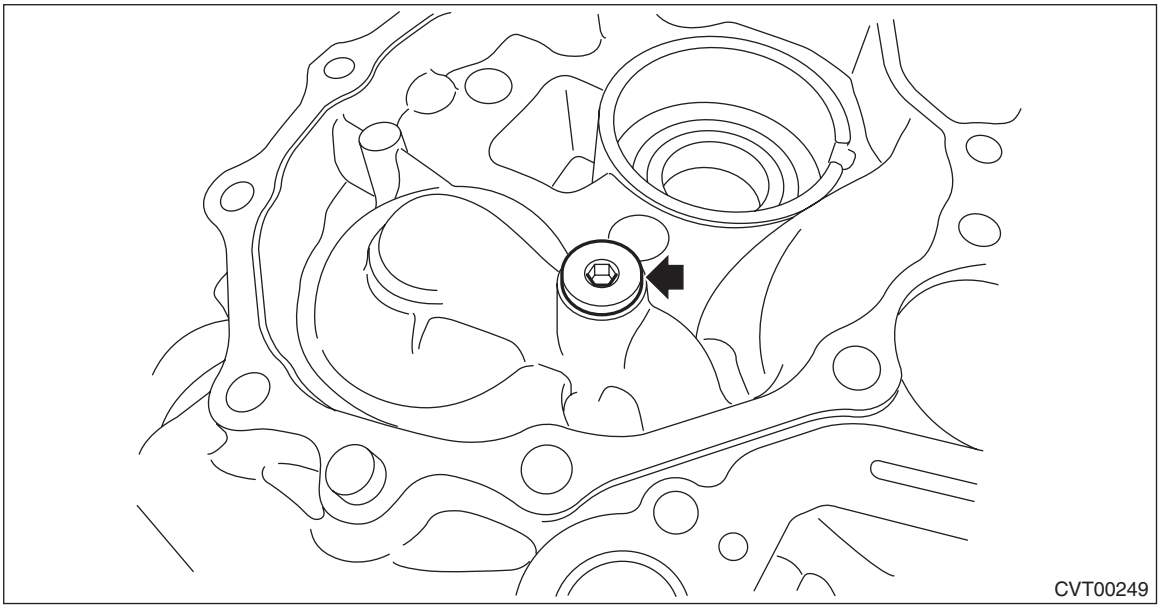


10) Remove the two oil seals using a screwdriver wrapped with cloth, etc.

CAUTION:
Do not damage the fitting surface of oil seal.



11) Remove the plug from drive pinion retainer.

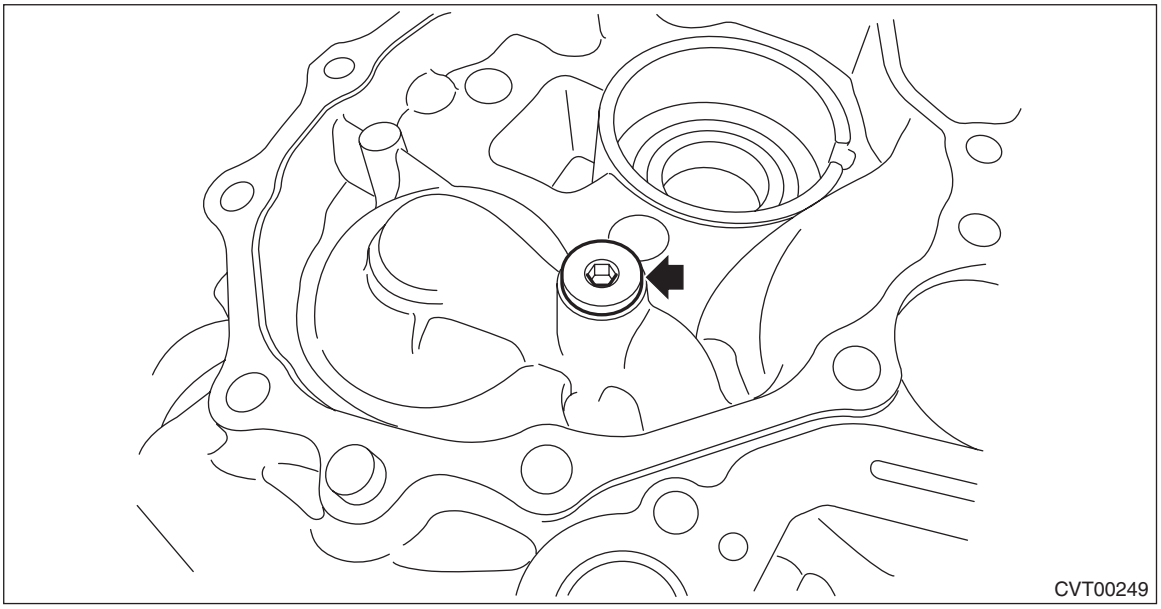


D: ASSEMBLY

1) Install the plug to drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.

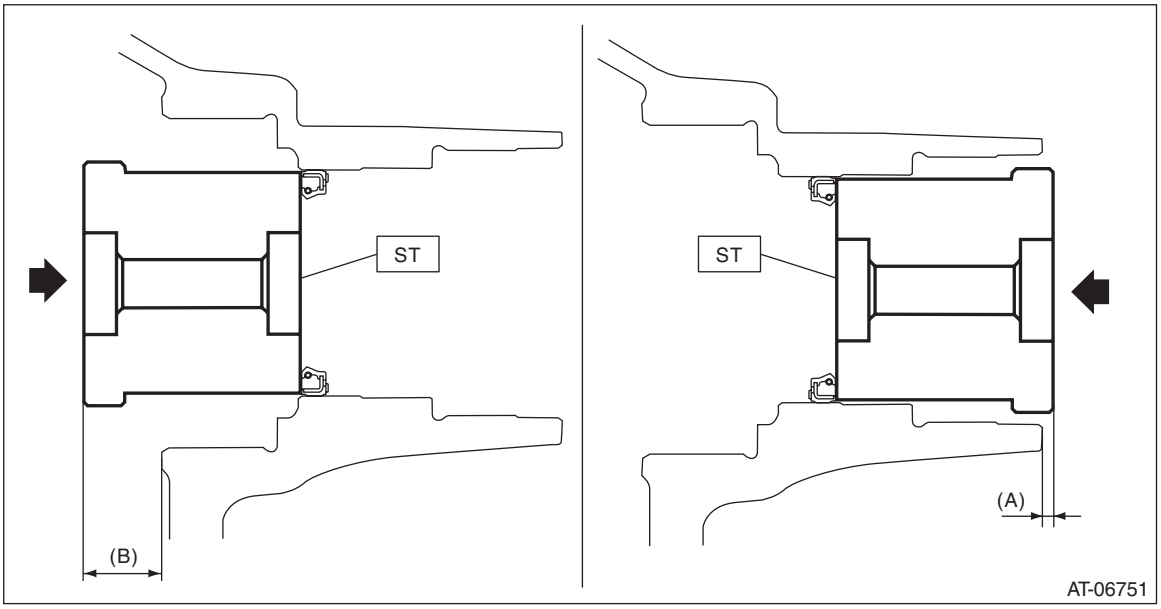
Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)



2) Using the ST, install the oil seal to drive pinion retainer.

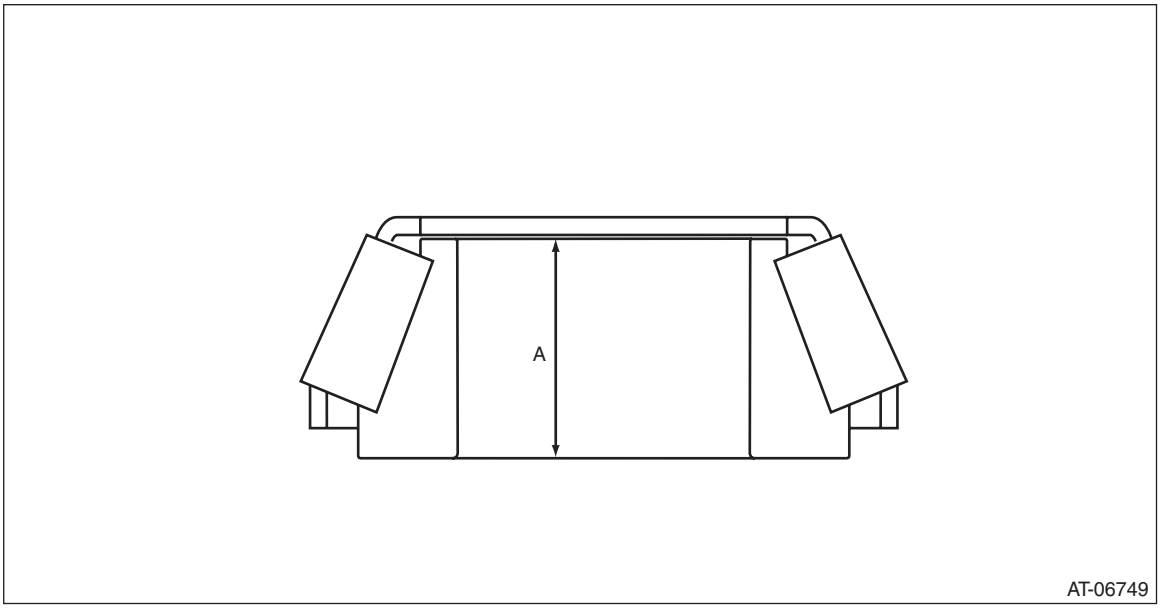
NOTE:
- Apply CVTF to the oil seal press-fitting surface and lip.
- Install the oil seal in the correct direction.

ST 927720000 HOUSING BUSHING INSTALLER AND REMOVER

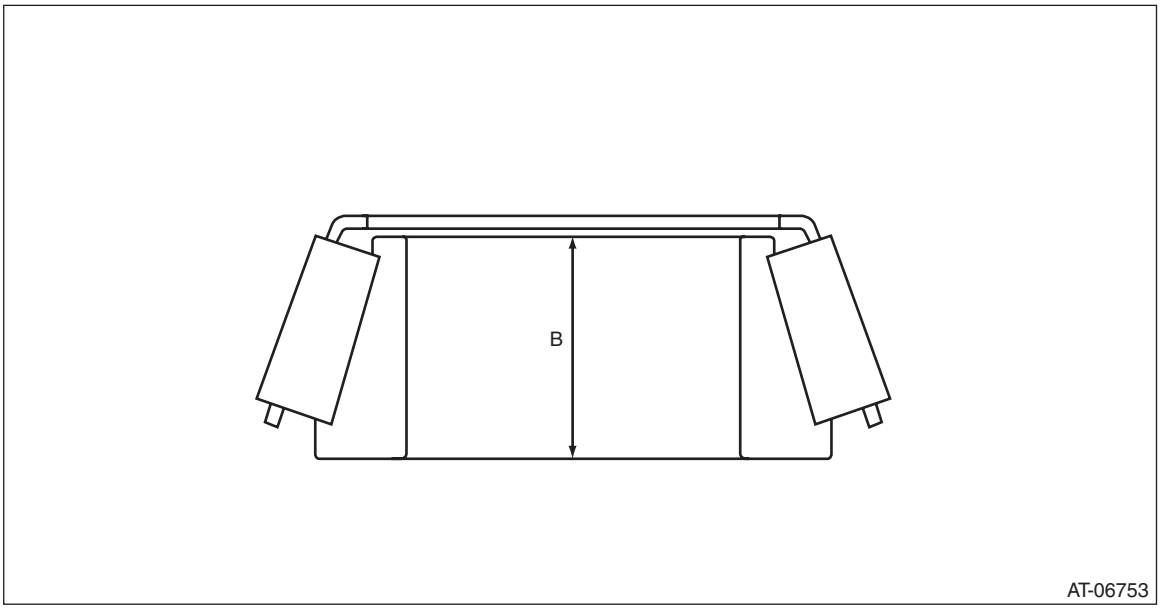


(A) 2.8 mm (0.11 in)
(B) 18.7 mm (0.74 in)

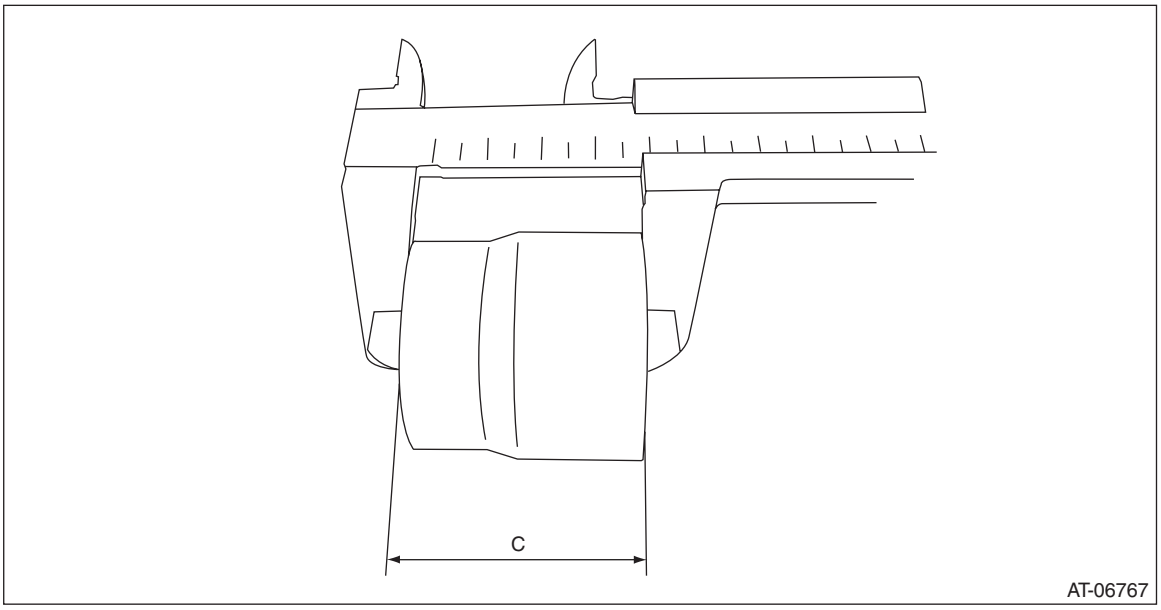
3) Select the drive pinion washer.
(1) Measure the roller bearing inner race width “A” on the front side.



(2) Measure the roller bearing inner race width “B” on the rear side.

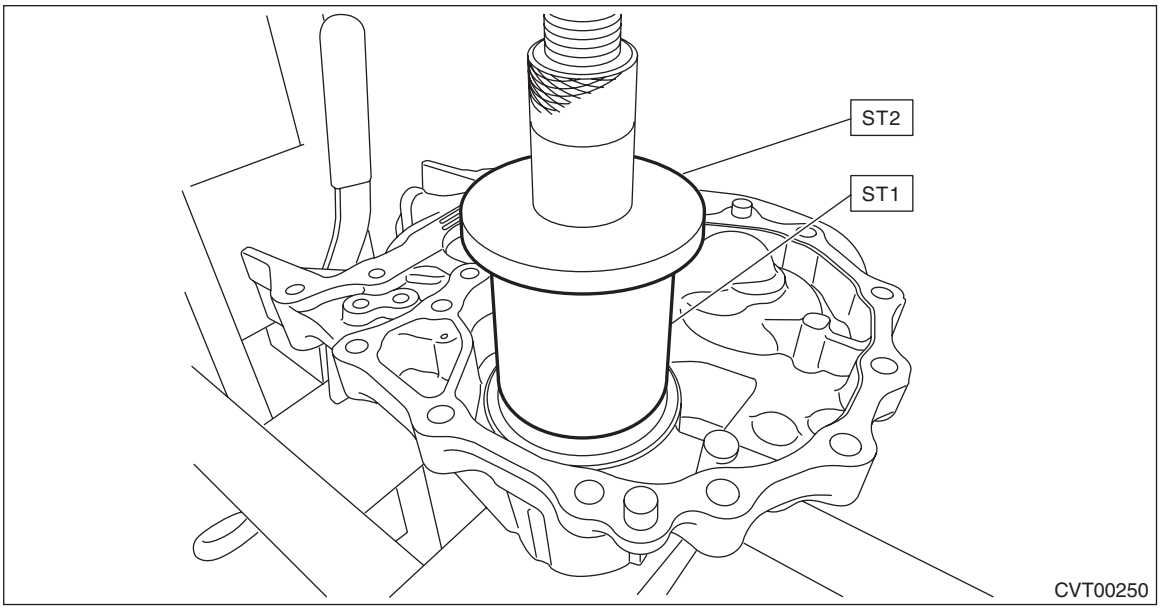


(3) Measure the spacer width “C”.



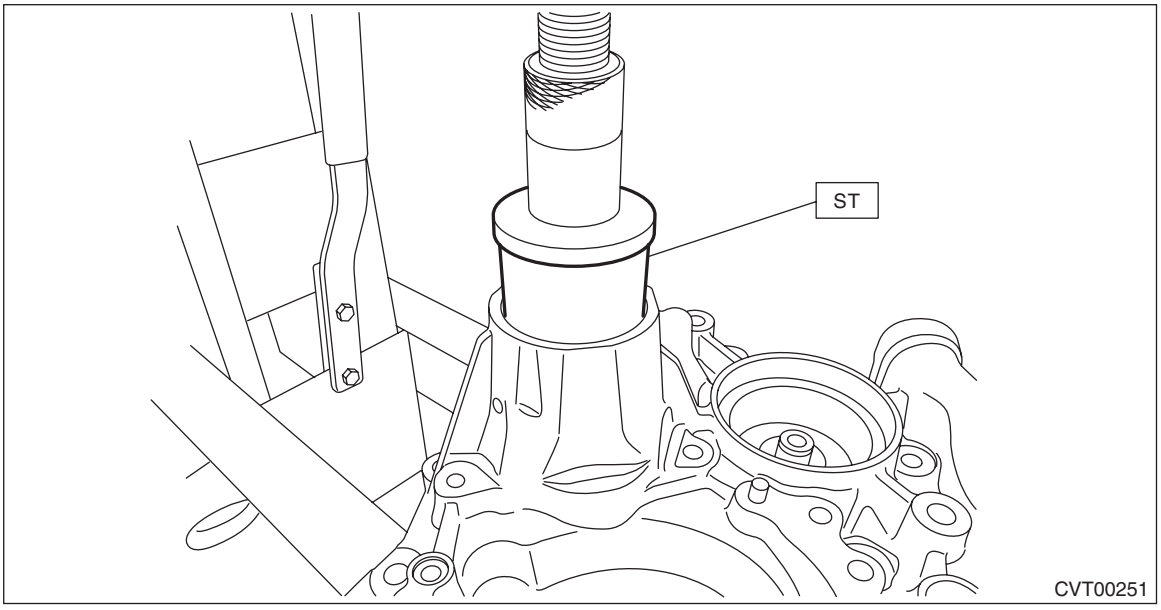
(4) Using the ST, install the front roller bearing outer race to the drive pinion retainer.

ST1 28499TC010 INSTALLER
ST2 398177700 INSTALLER



(5) Using the ST, install the rear roller bearing outer race to the drive pinion retainer.

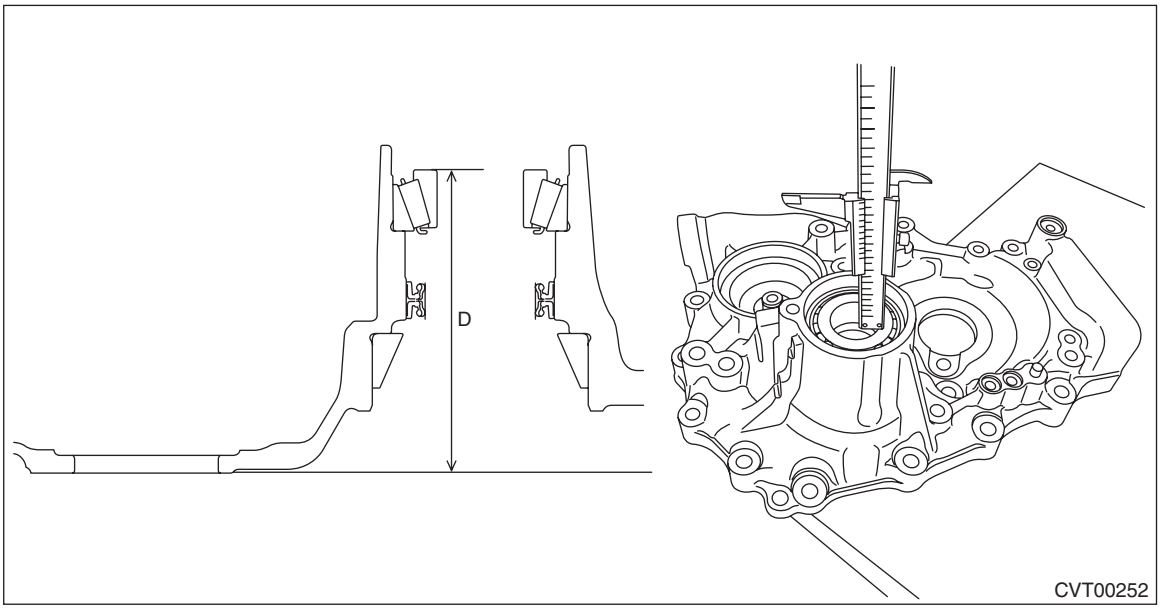
ST 20099AE020 INSTALLER



(6) Place the drive pinion retainer on the surface plate, and install the inner race to the rear roller bearing outer race.

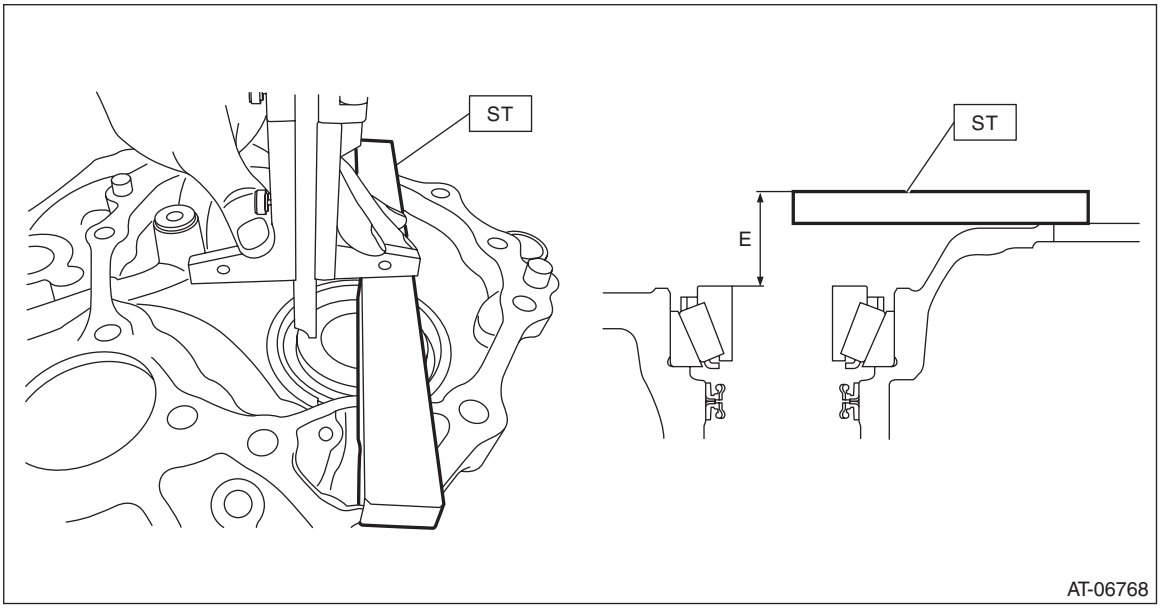
NOTE:
Place the drive pinion retainer so that the mating surface of the drive pinion retainer (mating surface with the converter case) contacts the surface plate.

(7) Measure the height “D” from the end face of the rear roller bearing inner race to the surface plate.



(8) Install the inner race to the front roller bearing outer race.

(9) Measure the depth “E” from the end face of the front roller bearing inner race to the end face of the ST.
ST 499575400 GAUGE

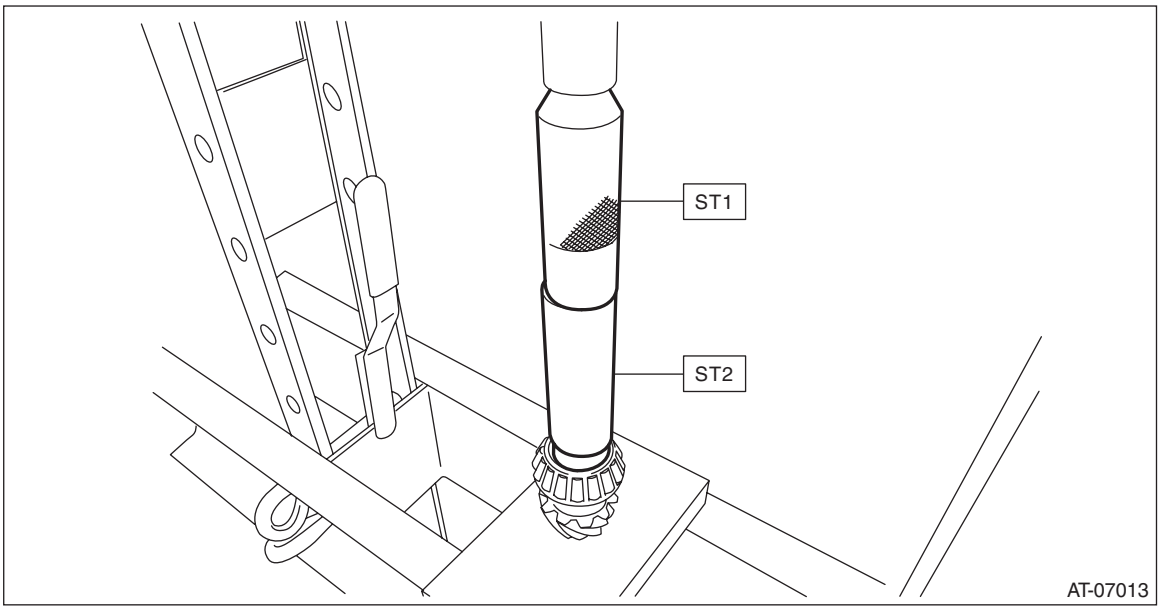


(10) Using following formula, select one to three drive pinion washers.
T (mm) = D – (A + B + C + E – 15) – (0±0.0125)
[T (in) = D – (A + B + C + E – 0.591) – (0±0.0005)]
A: Front roller bearing width
B: Rear roller bearing width
C: Spacer width
D: Height from end face of rear roller bearing inner race to surface plate
E: Depth from end face of front roller bearing inner race to end face of ST
15 mm (0.591 in): Thickness of ST
T: Drive pinion washer thickness
0±0.0125 mm (0±0.0005 in): Clearance

Drive pinion washer	
Part No.	Thickness mm (in)
38336AA750	0.150 (0.0059)
38336AA760	0.175 (0.0069)
38336AA770	0.200 (0.0079)
38336AA780	0.225 (0.0089)
38336AA790	0.250 (0.0098)
38336AA800	0.275 (0.0108)
38336AA810	0.300 (0.0118)
38336AA820	0.400 (0.0157)

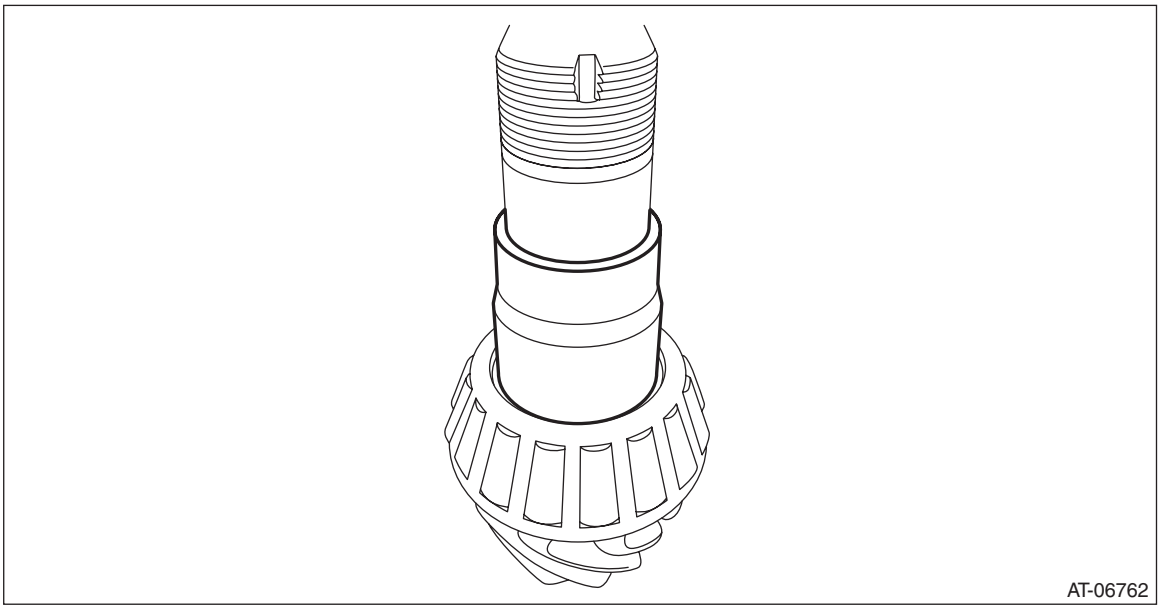
4) Measure and record the drive pinion shim thickness to be reused.
5) Install the drive pinion shim that is reused for the drive pinion shaft.

6) Using the ST1 and ST2, press-fit the inner race to the drive pinion shaft.
ST1 899580100 INSTALLER
ST2 927130000 EXTENSION DRIVE SHAFT

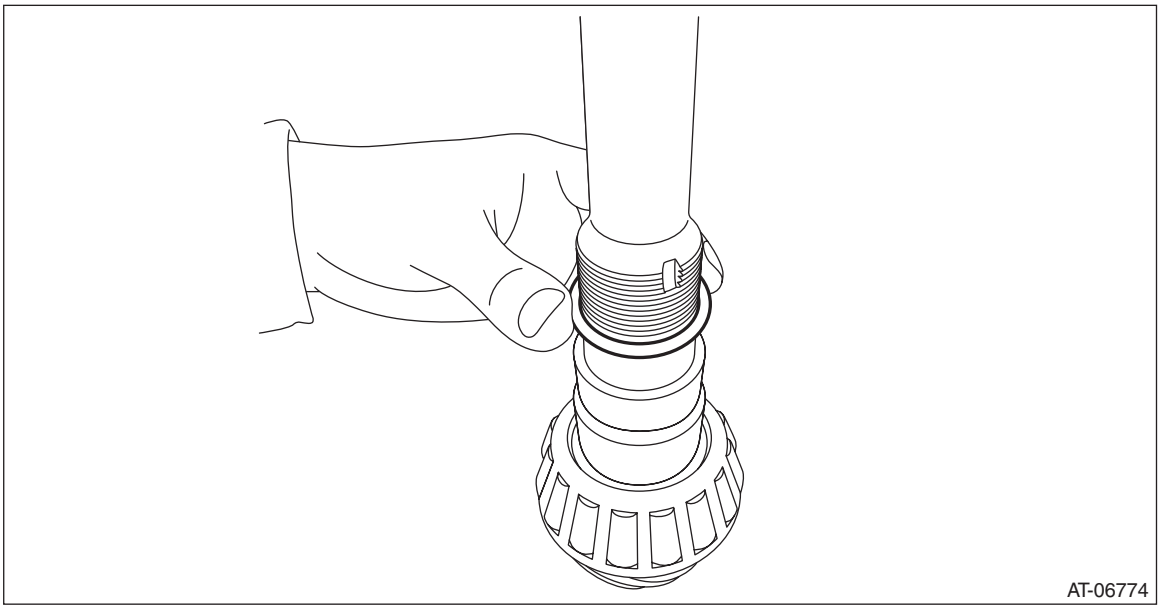


7) Install the drive pinion spacer.

NOTE:
Replace the O-ring with a new part after tooth contact inspection.



8) Install the selected drive pinion washer.

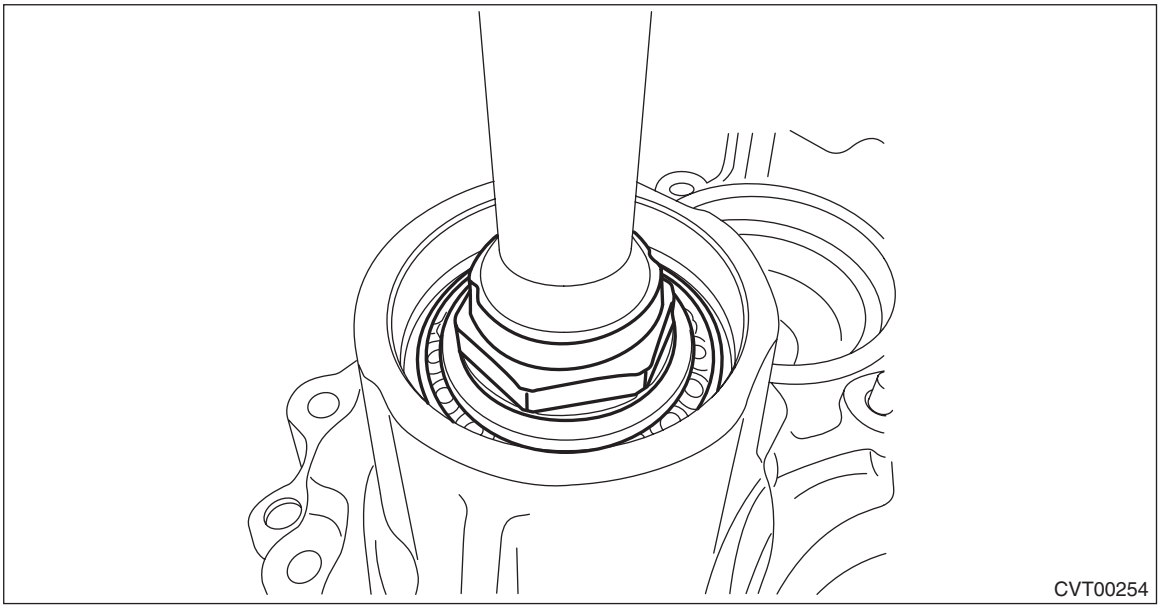


9) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.

10) Install the inner bearing and lock nut.

NOTE:
Use a new lock nut.



11) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

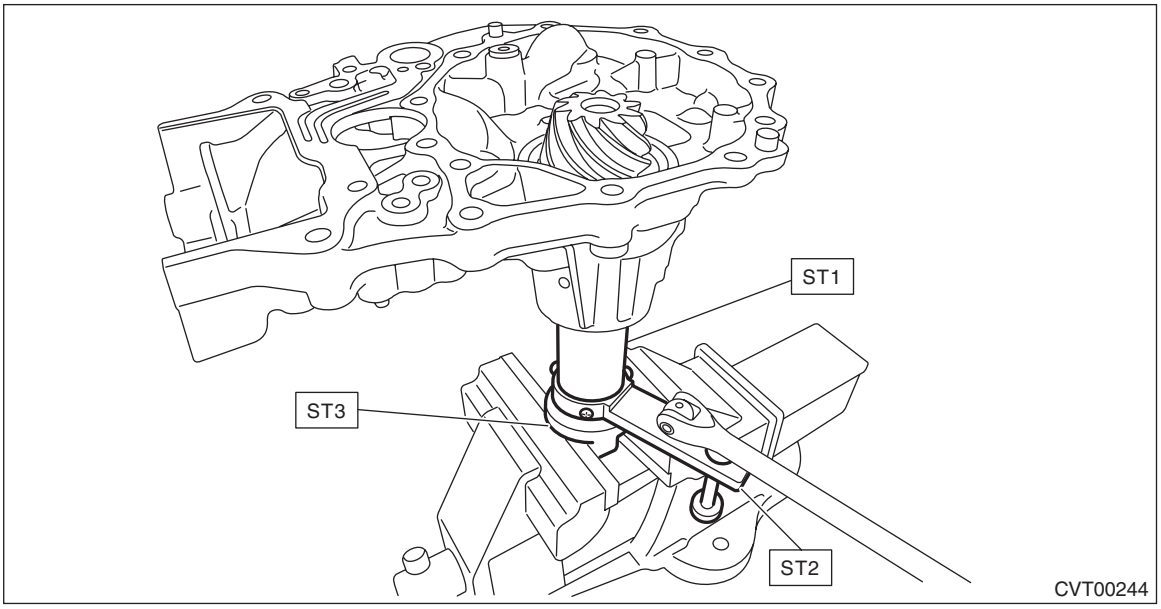
NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

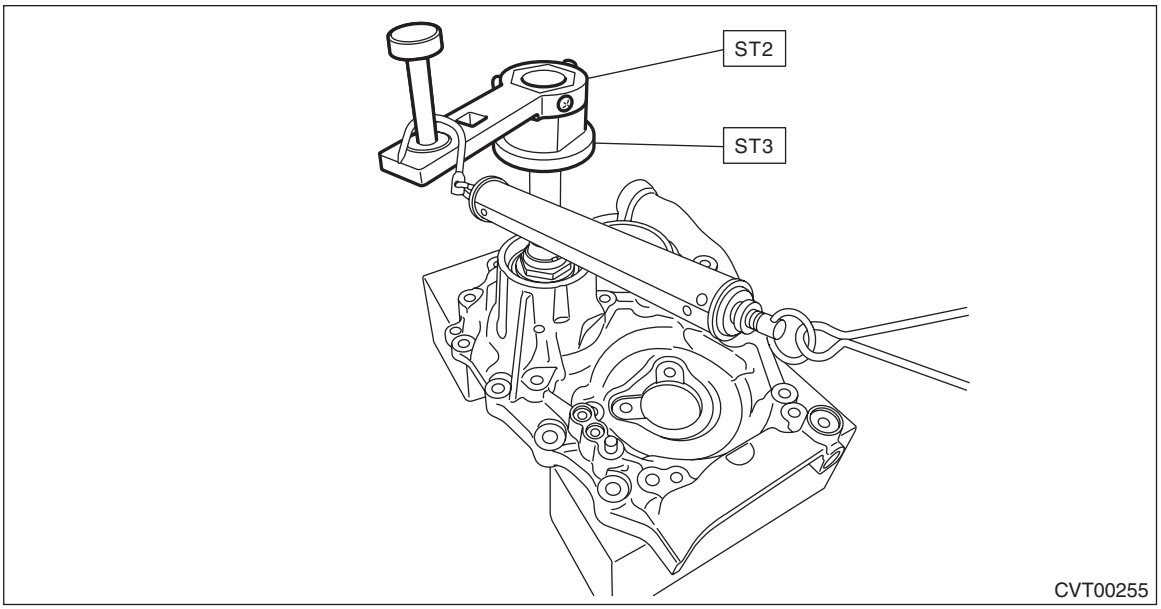
Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.
$T2 = L2/(L1 + L2) \times T1$
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

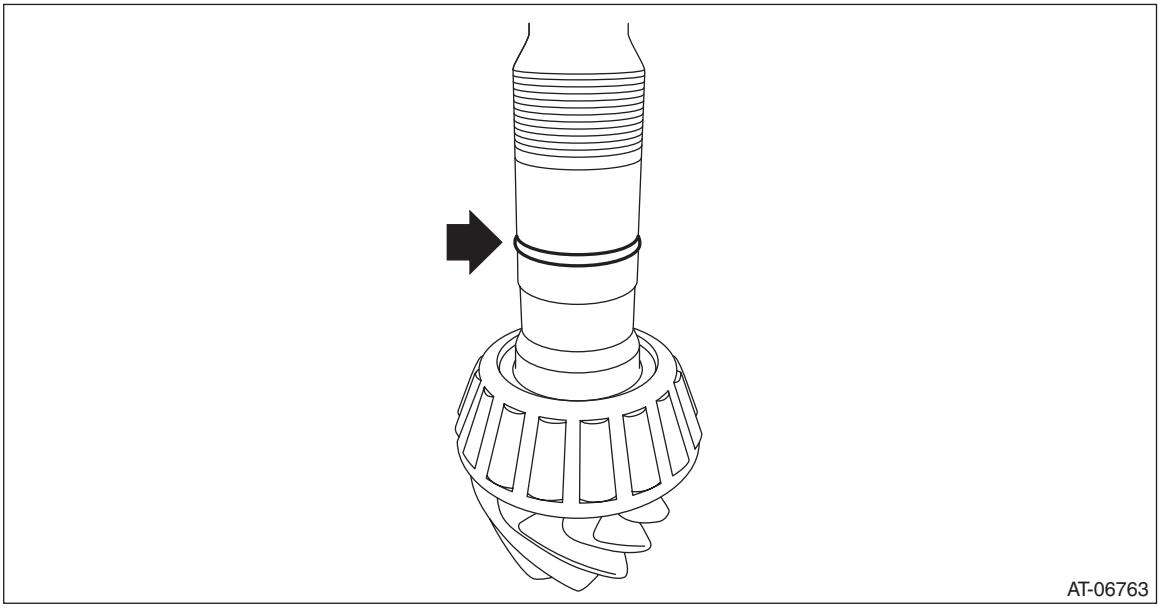
Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)



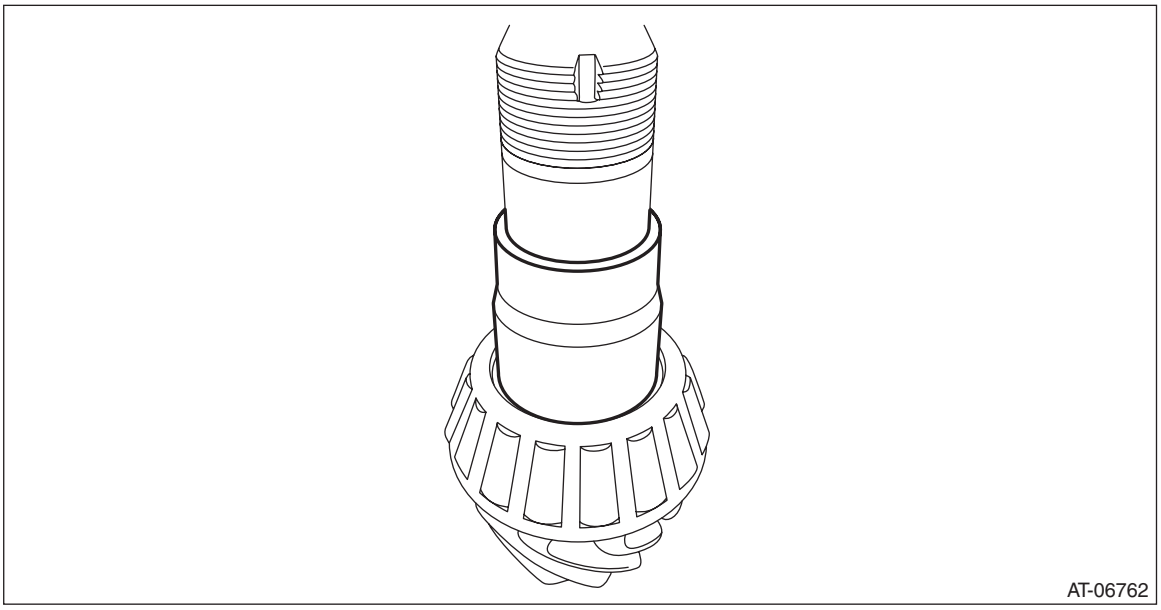


12) Install the drive pinion retainer to the converter case, and check the backlash and tooth contact. <Ref. to CVT(TH58A)-349, ADJUSTMENT, Drive Pinion Shaft Assembly.> <Ref. to CVT(TH58A)-372, ADJUSTMENT, Front Differential Assembly.>
13) Remove the drive pinion retainer from converter case. <Ref. to CVT(TH58A)-328, REMOVAL, Drive Pinion Shaft Assembly.>
14) Remove the drive pinion spacer from the drive pinion shaft. <Ref. to CVT(TH58A)-331, DISASSEMBLY, Drive Pinion Shaft Assembly.>
15) Install the O-ring to the drive pinion shaft.

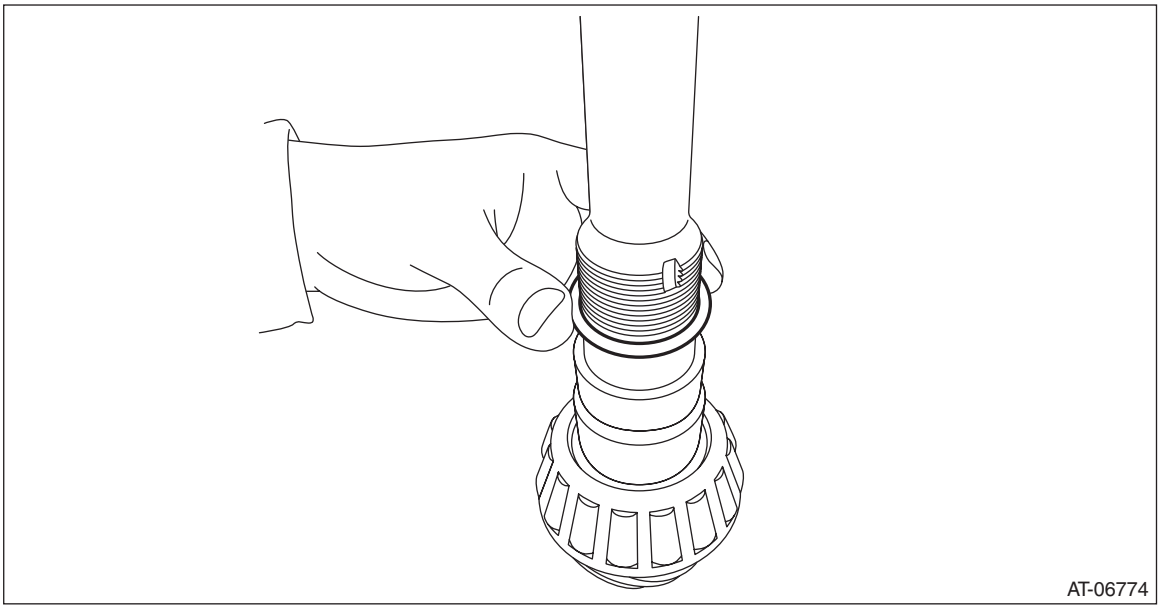
NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.



16) Install the drive pinion spacer to the drive pinion shaft.

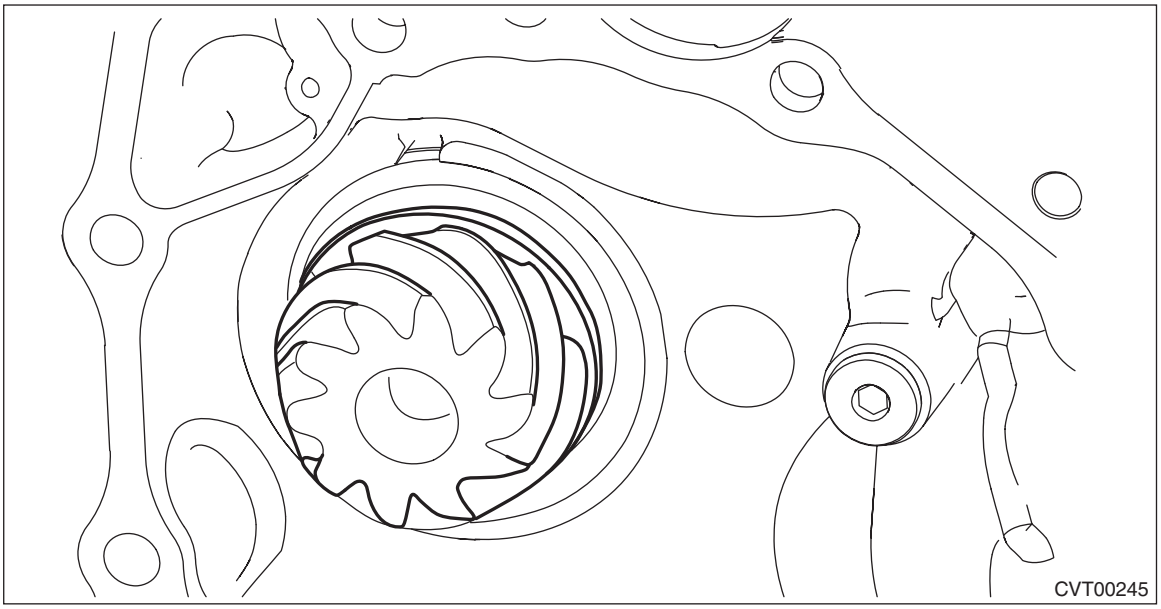


17) Install the drive pinion washer.

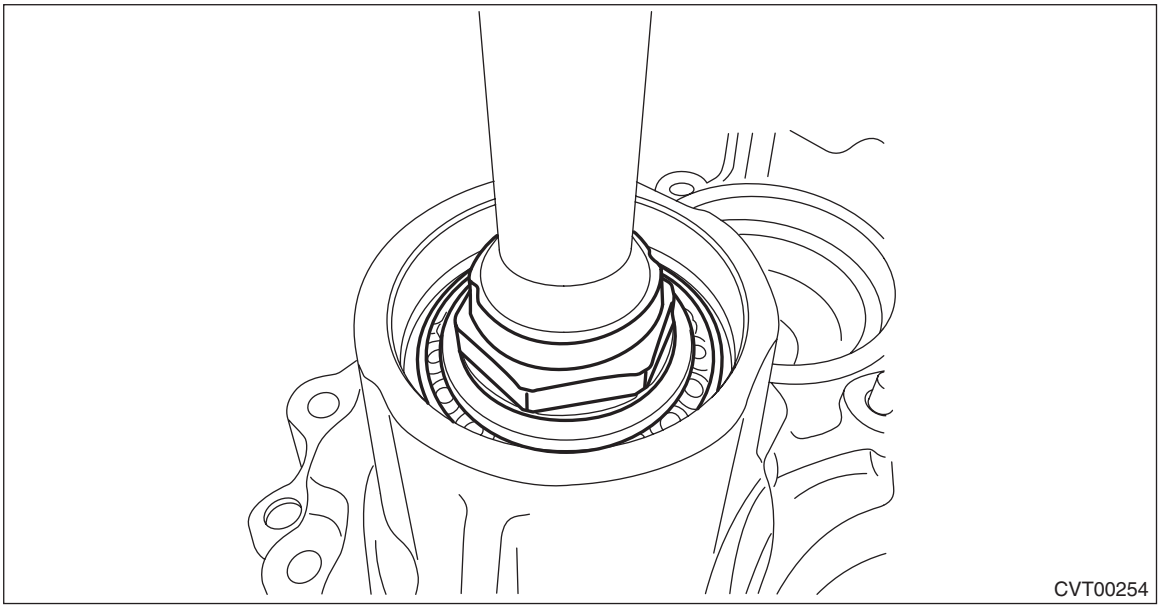


18) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.



19) Install the inner bearing and lock nut.



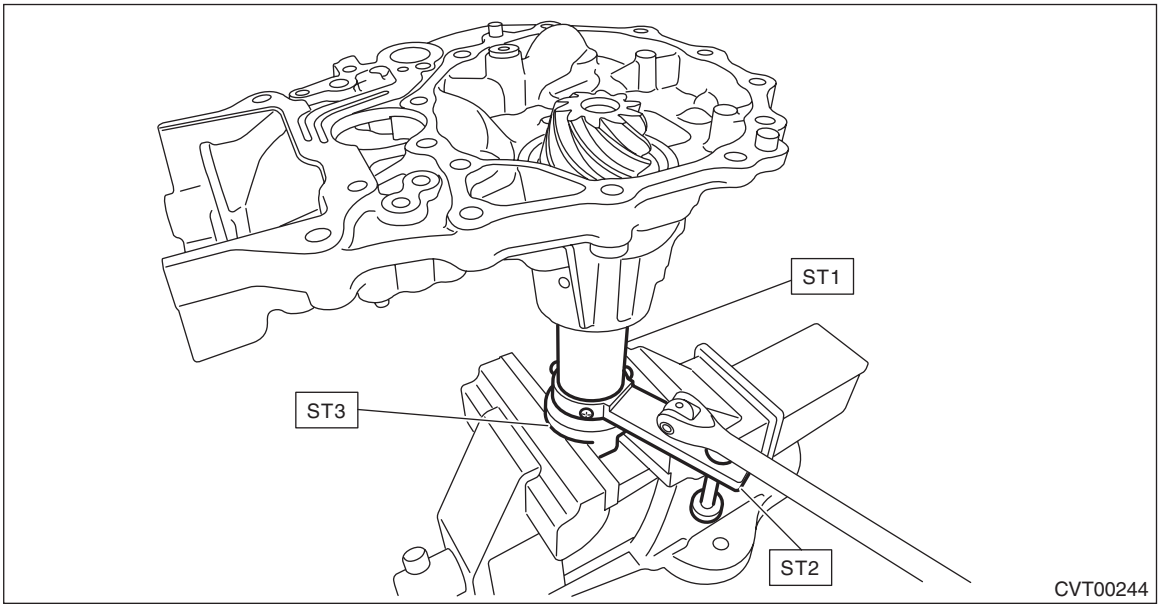
20) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

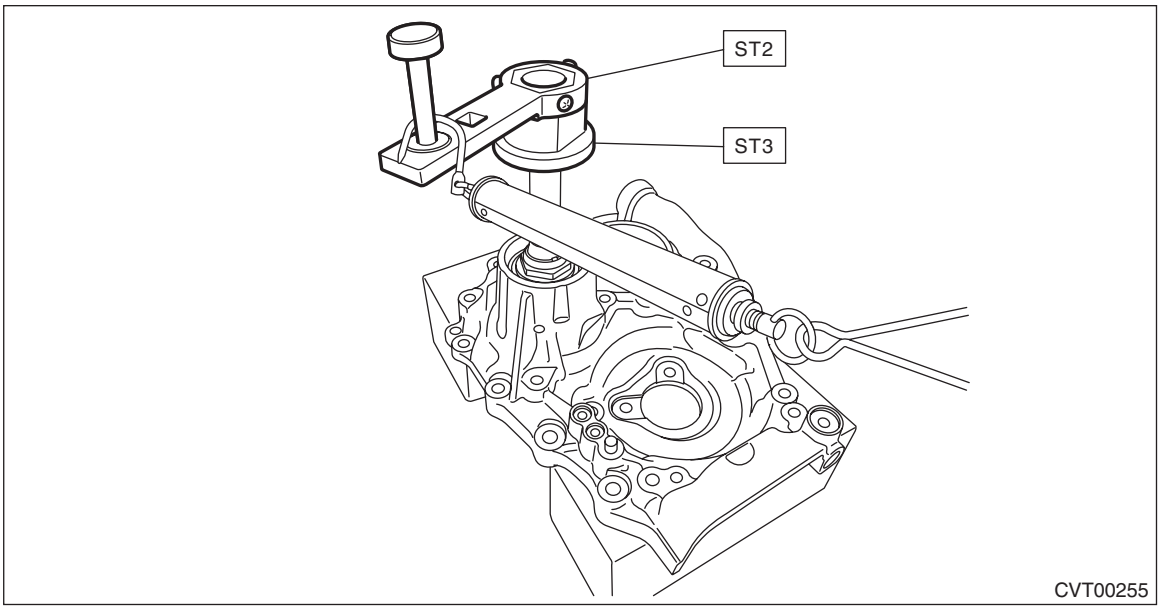
CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

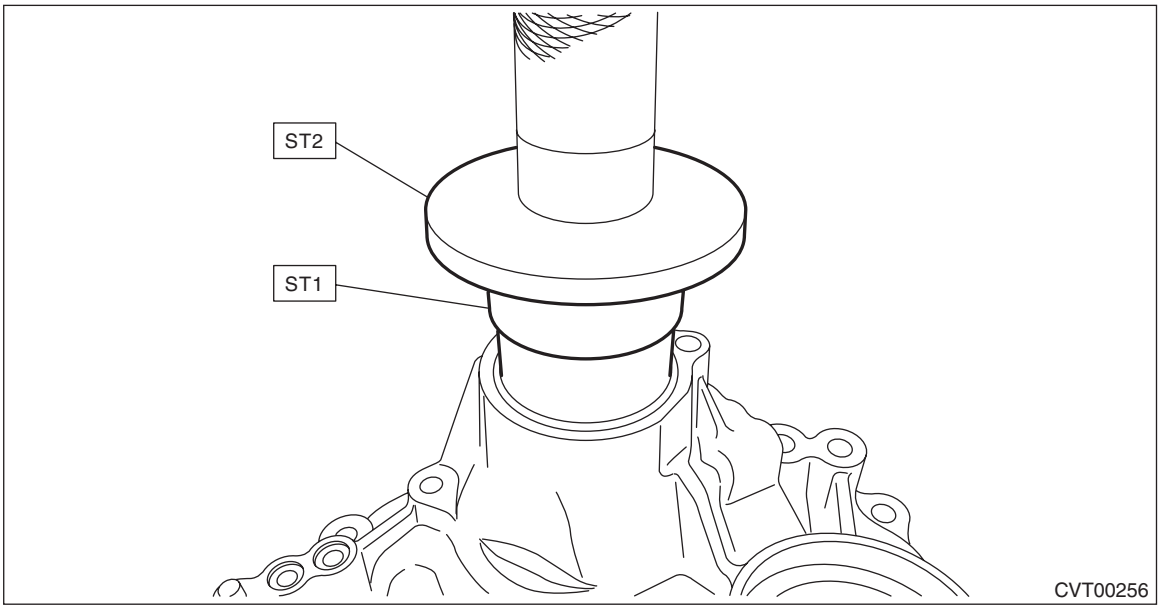
Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)
ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER
Using the following formula, calculate the tightening torque for a torque wrench.
T2 = L2/(L1 + L2) × T1
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)





21) Crimp the lock nut in 2 locations.
22) Using the ST, install the plug.
ST1 499755602 PRESS SNAP RING
ST2 398177700 INSTALLER

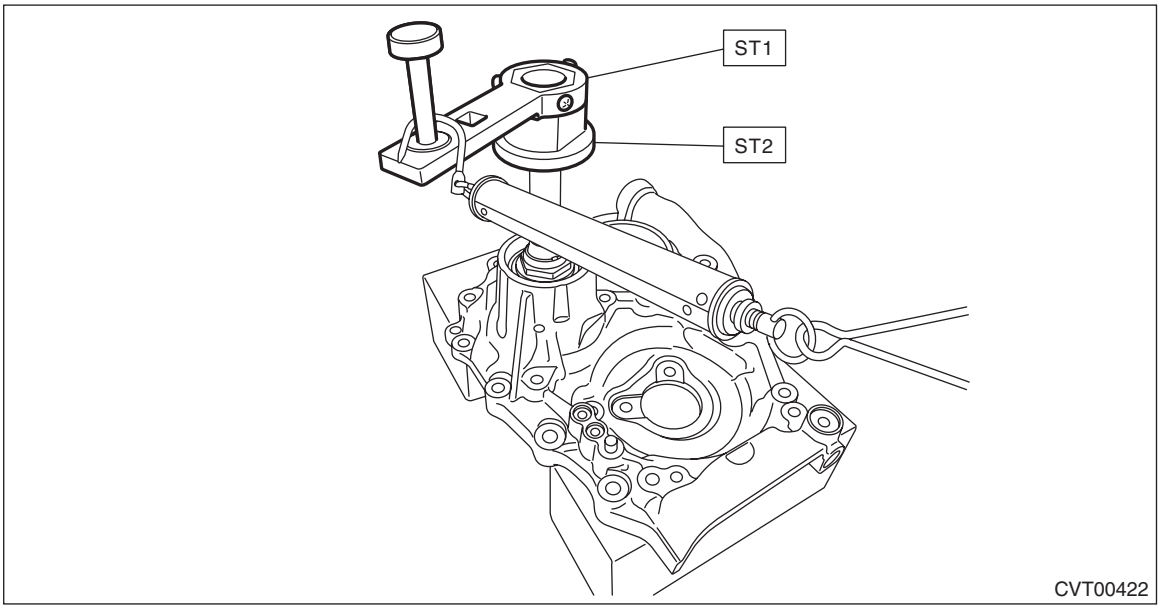


E: INSPECTION

- Make sure that all component parts are free of scratches, holes and other faults.
- Check the tooth contact. <Ref. to CVT(TH58A)-349, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the starting torque of drive pinion shaft.

CAUTION:
Before measuring, apply differential gear oil to roller of bearing and rotate the bearing several times.
ST1 499787700 WRENCH
ST2 498937110 HOLDER

Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

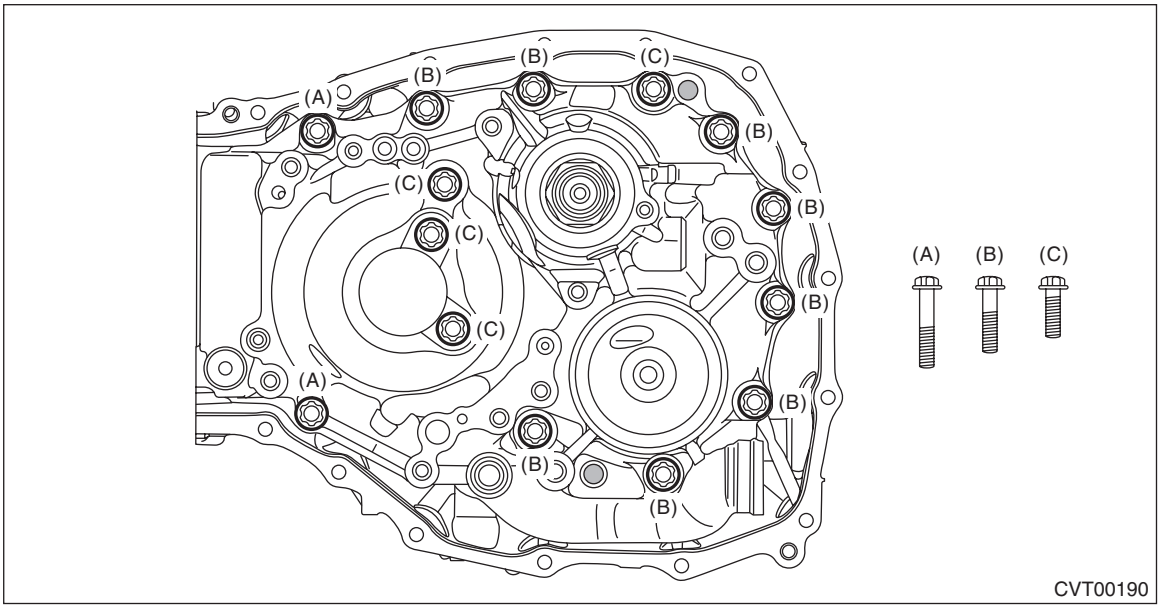


F: ADJUSTMENT

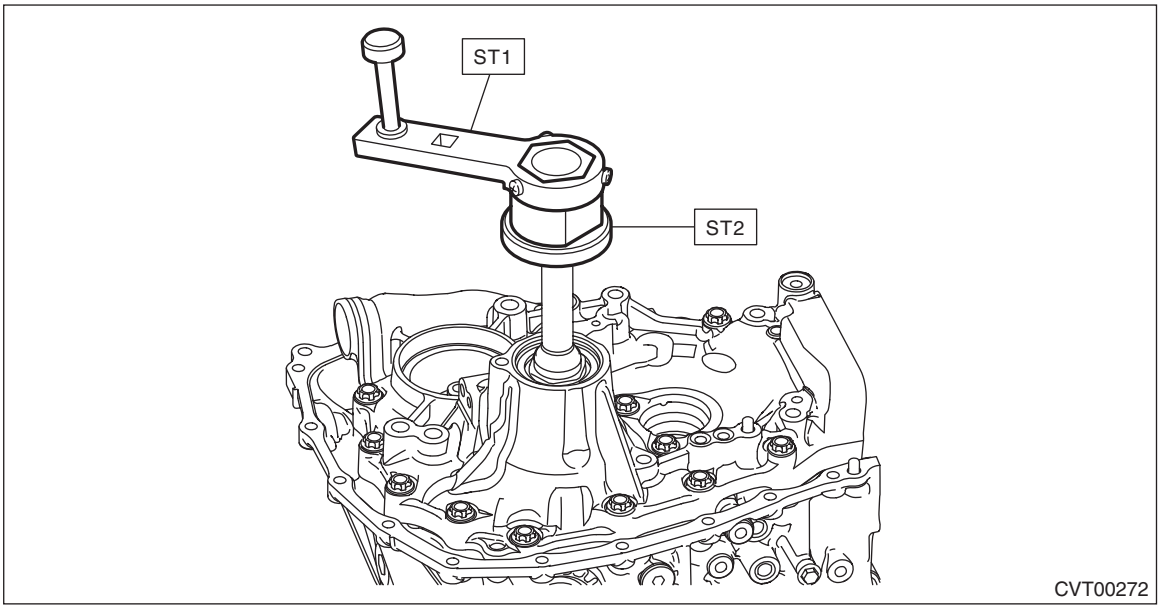
1) Remove the liquid gasket from the mating surface completely.
2) Using the ST, install the drive pinion retainer to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



3) Rotate the drive pinion several times using ST1 and ST2.
ST1 499787700 WRENCH
ST2 498937110 HOLDER



4) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to CVT(TH58A)-372, ADJUSTMENT, Front Differential Assembly.>
5) Using the ST, remove the drive pinion retainer from converter case.
ST 18270KA020 SOCKET (E20)

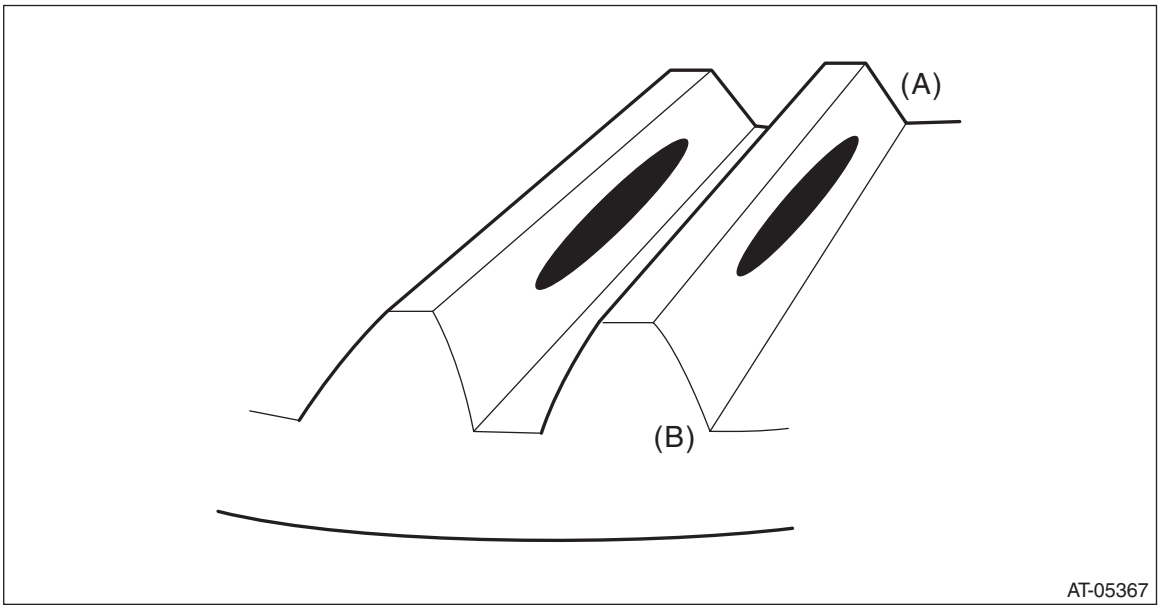
6) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Then install the drive pinion retainer and rotate the drive pinion in both directions several times. Remove the drive pinion retainer and check the tooth contact pattern.
If the tooth contact is inappropriate, readjust the backlash and shim thickness (select 1 — 3 shims) until the correct tooth contact is obtained.

NOTE:
After correction, wipe off the lead-free red dye.

Drive pinion shim	
Part No.	Thickness mm (in)
31451AA320	0.150 (0.0059)
31451AA330	0.175 (0.0069)
31451AA340	0.200 (0.0079)
31451AA350	0.225 (0.0089)
31451AA360	0.250 (0.0098)
31451AA370	0.275 (0.0108)

- Correct tooth contact

Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)

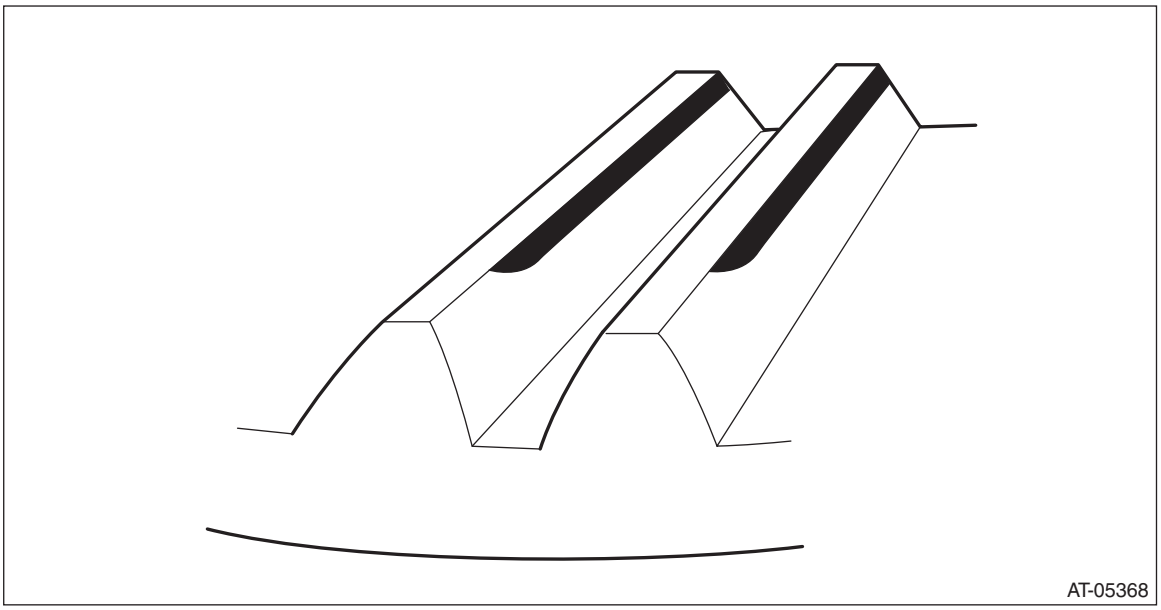


(A) Toe side
(B) Heel side

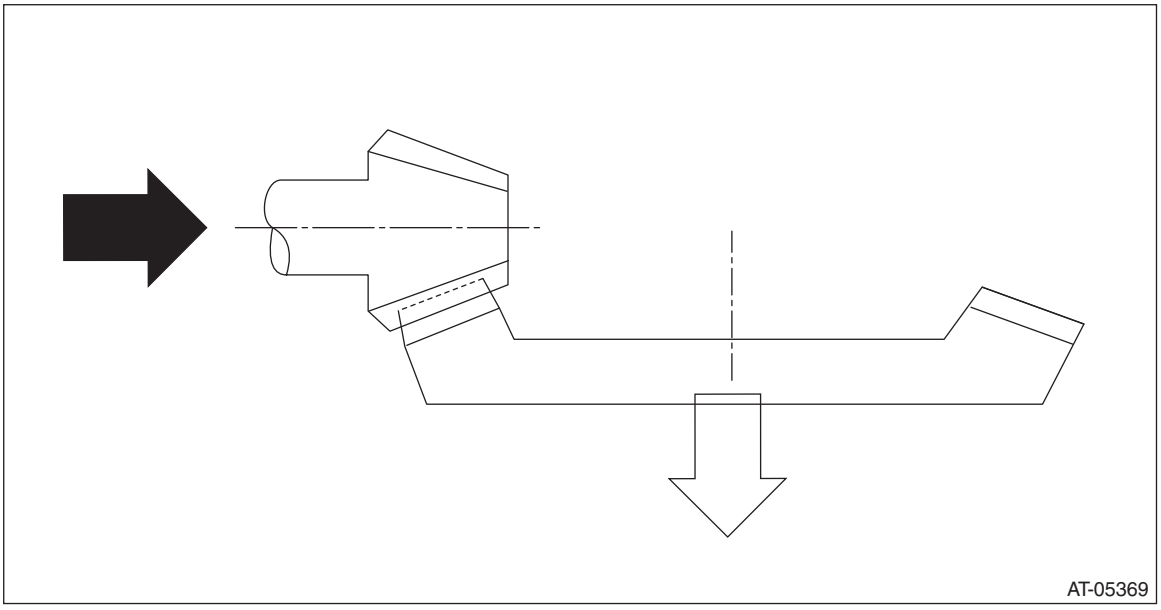
- Face contact

Check item: Backlash is too large.

Contact pattern



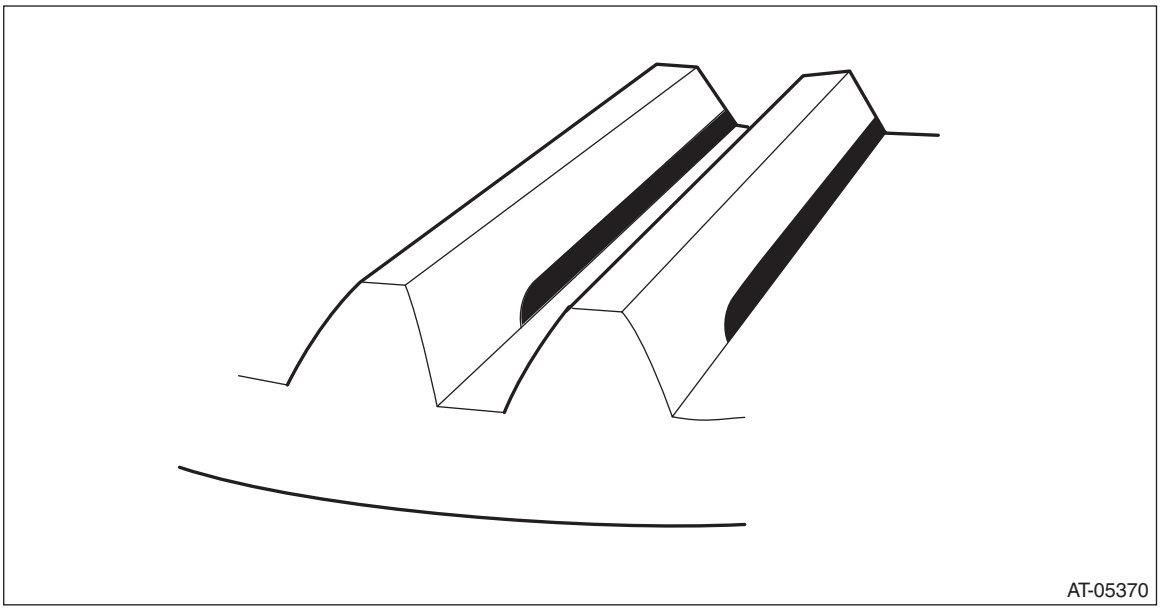
Corrective action: Increase thickness of drive pinion shim according to the procedures for moving the drive pinion close to hypoid driven gear.



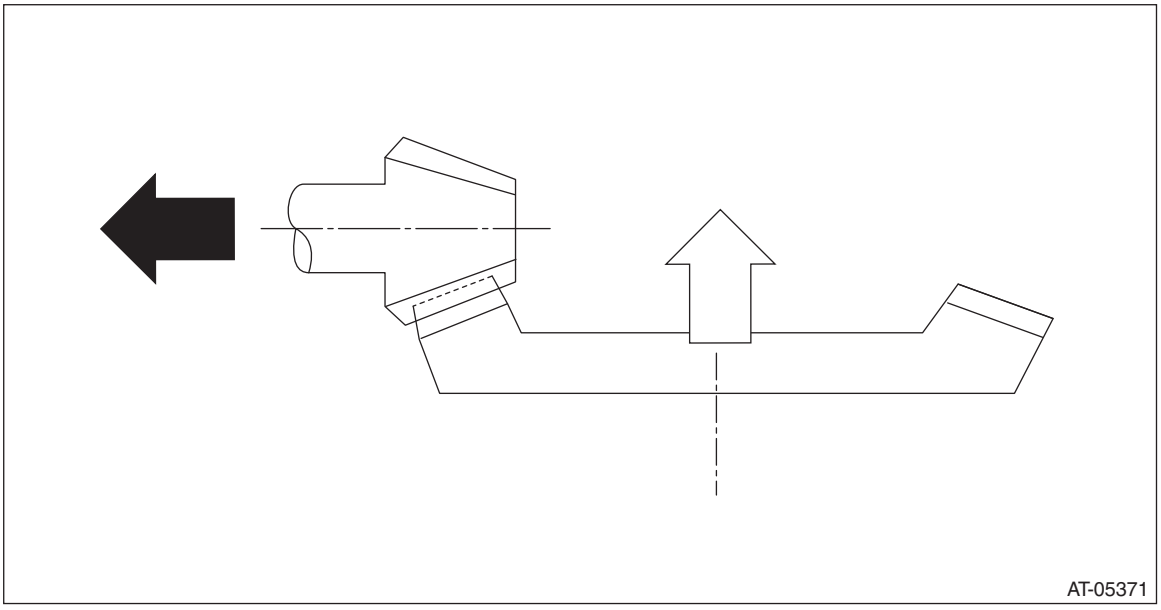
- Flank contact

Check item: Backlash is too small.

Contact pattern



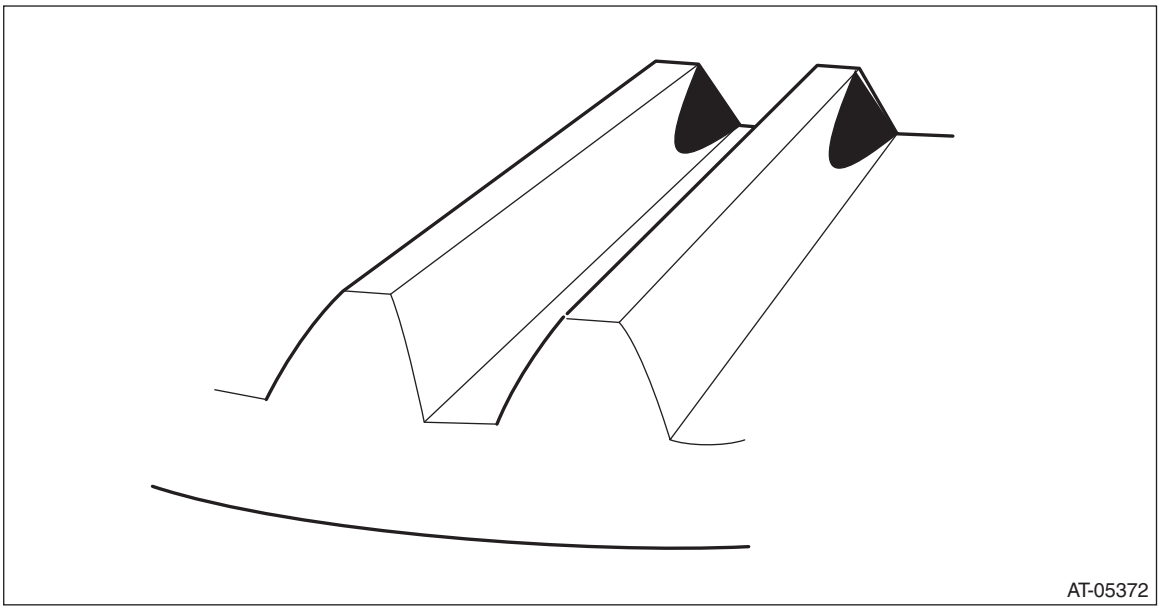
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear.



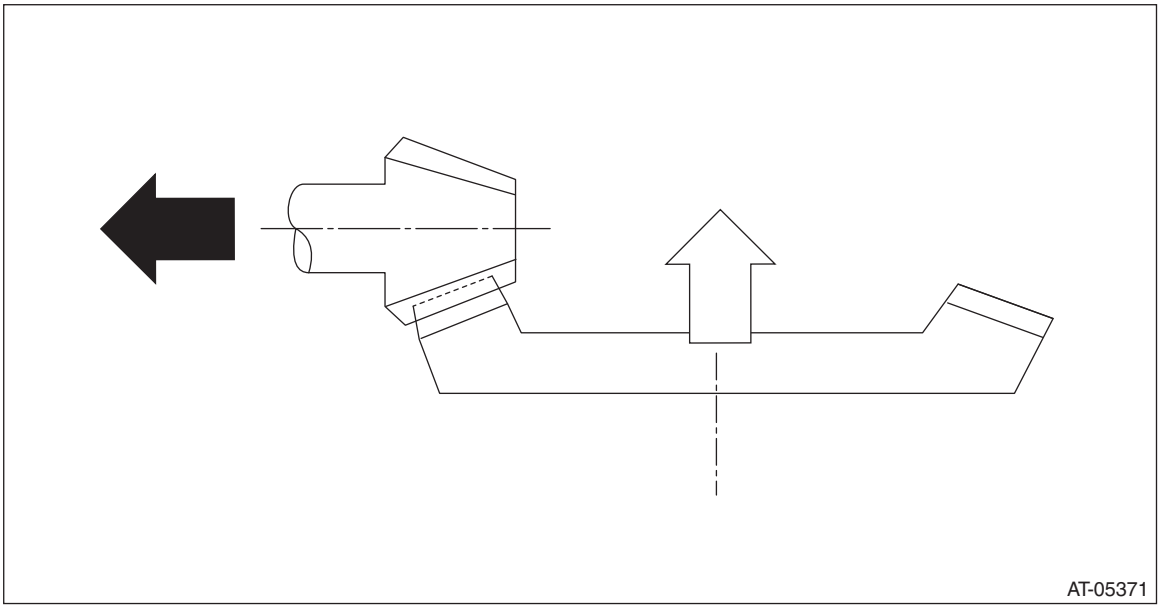
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



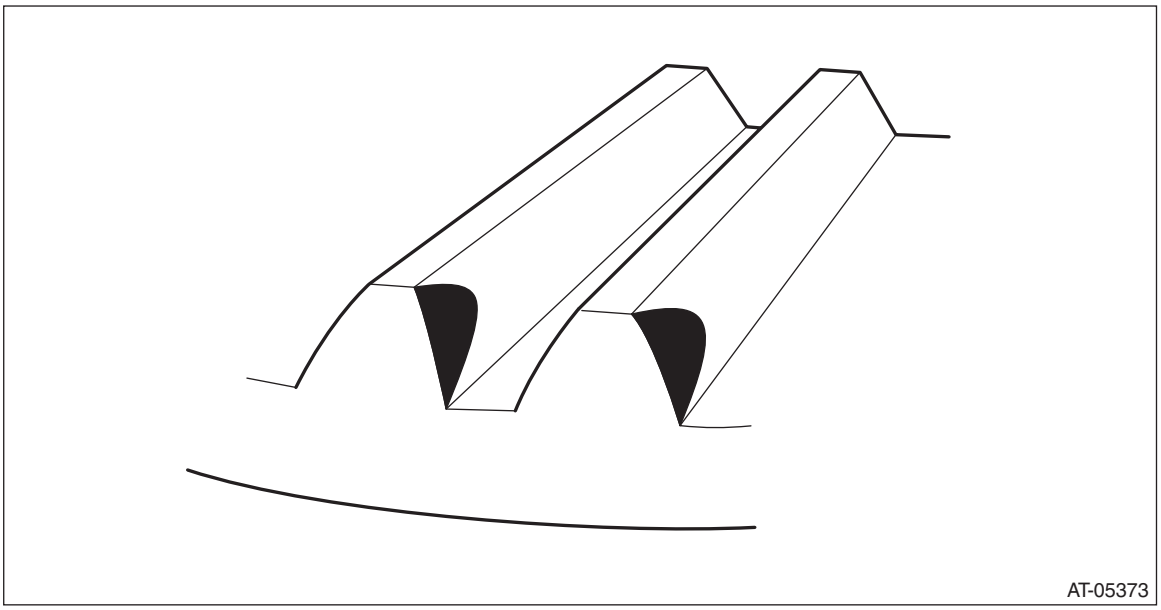
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear side.



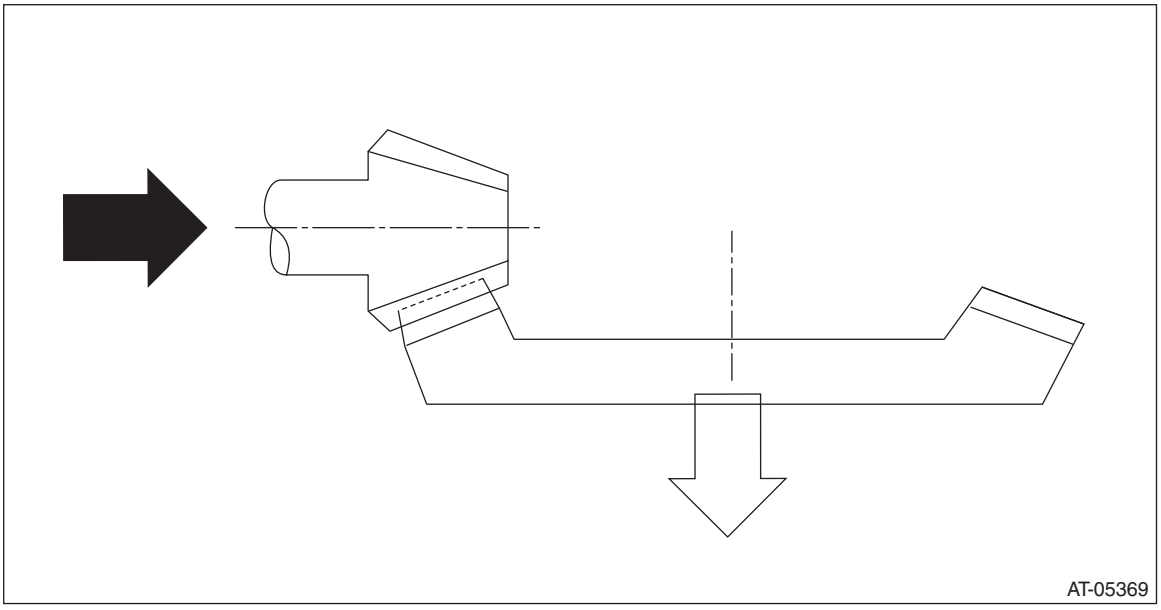
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Increase the thickness of the drive pinion shim according to the procedures for moving the drive pinion closer to the hypoid driven gear.



7) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER

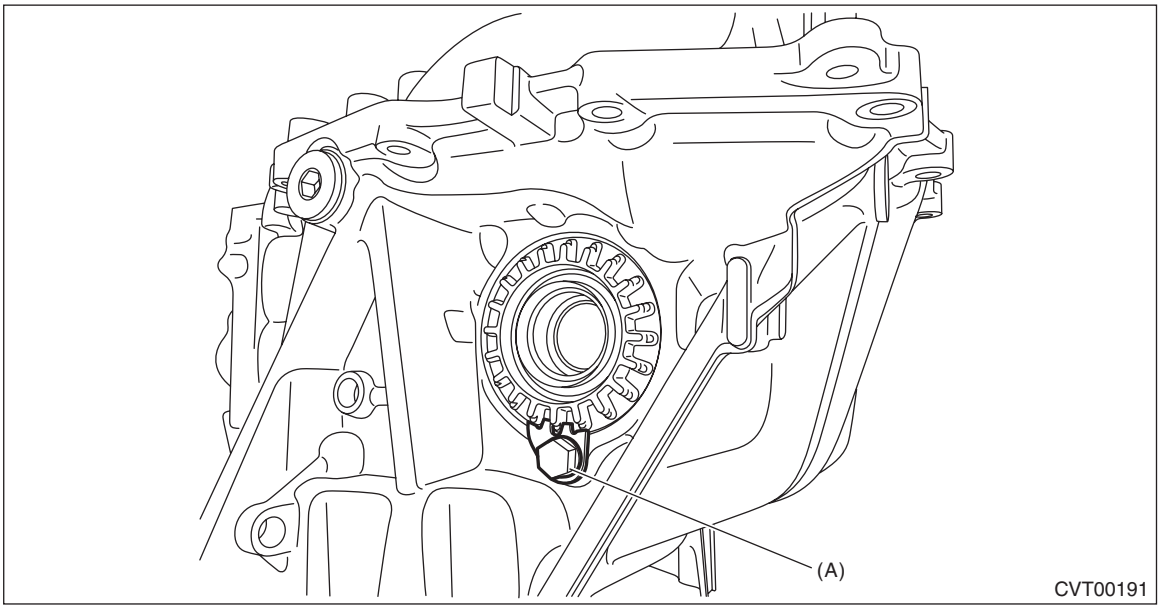
8) Using the ST, tighten the retainer to the position before it is loosened.

ST 18658AA020 WRENCH COMPL RETAINER

9) Replace the differential side retainer oil seal with a new part. <Ref. to CVT(TH58A)-92, Differential Side Retainer Oil Seal.>

10) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

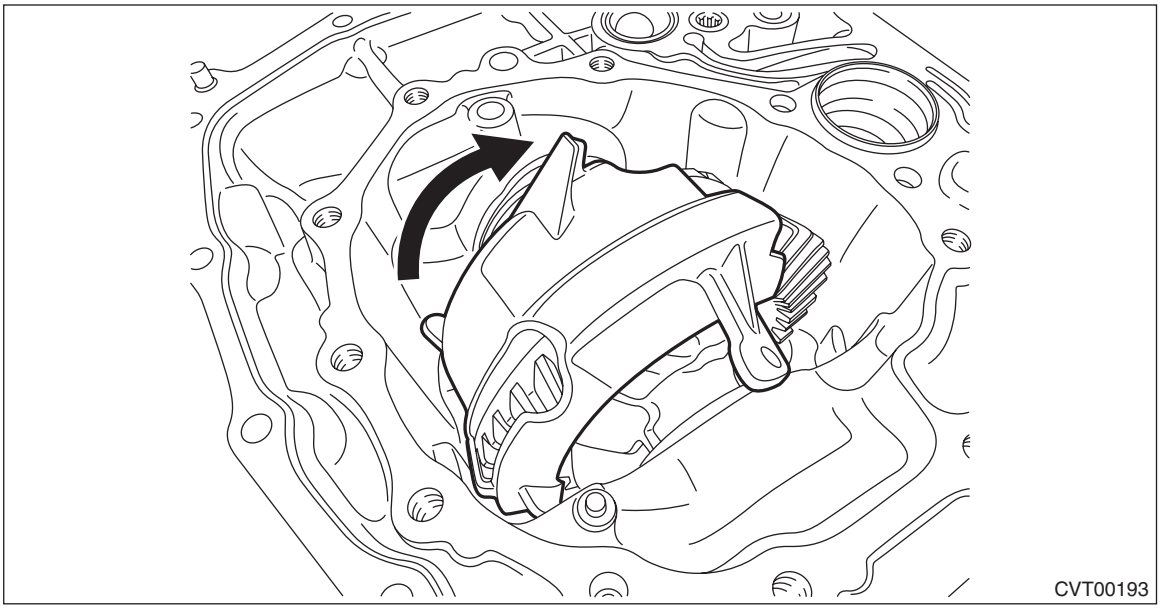


(A) Lock plate

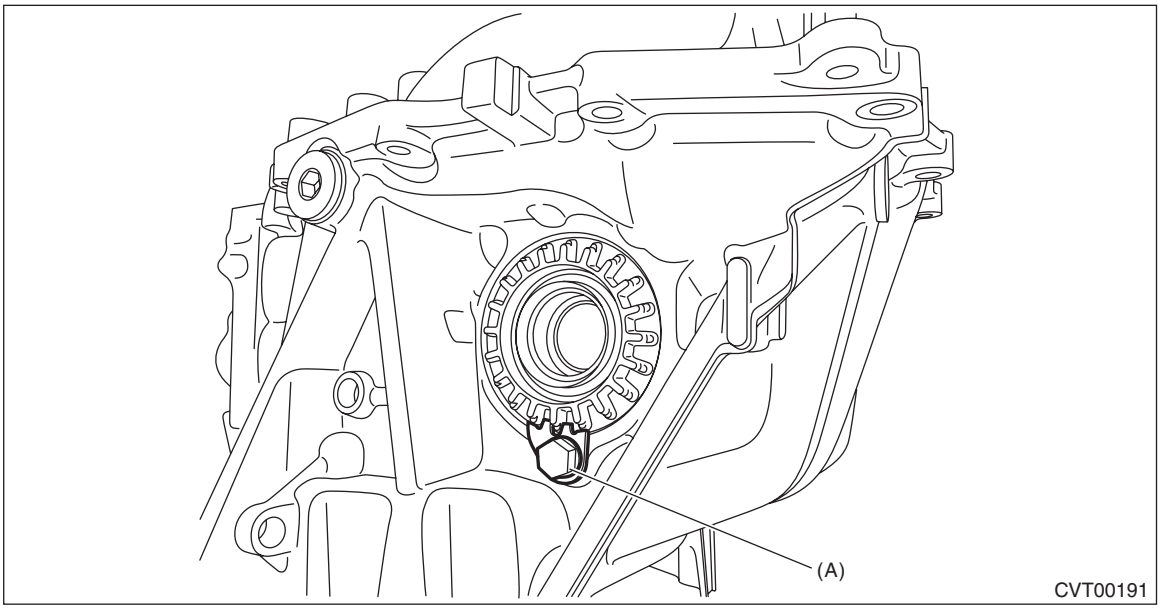
48.Front Differential Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-219, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-233, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-250, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-263, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-268, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-292, REMOVAL, Reverse Brake Assembly.>
22) Remove the forward clutch assembly. <Ref. to CVT(TH58A)-308, REMOVAL, Forward Clutch Assembly.>
23) Remove the drive pinion shaft assembly. <Ref. to CVT(TH58A)-328, REMOVAL, Drive Pinion Shaft Assembly.>
24) Remove the oil baffle.



25) Remove the lock plates on both sides.

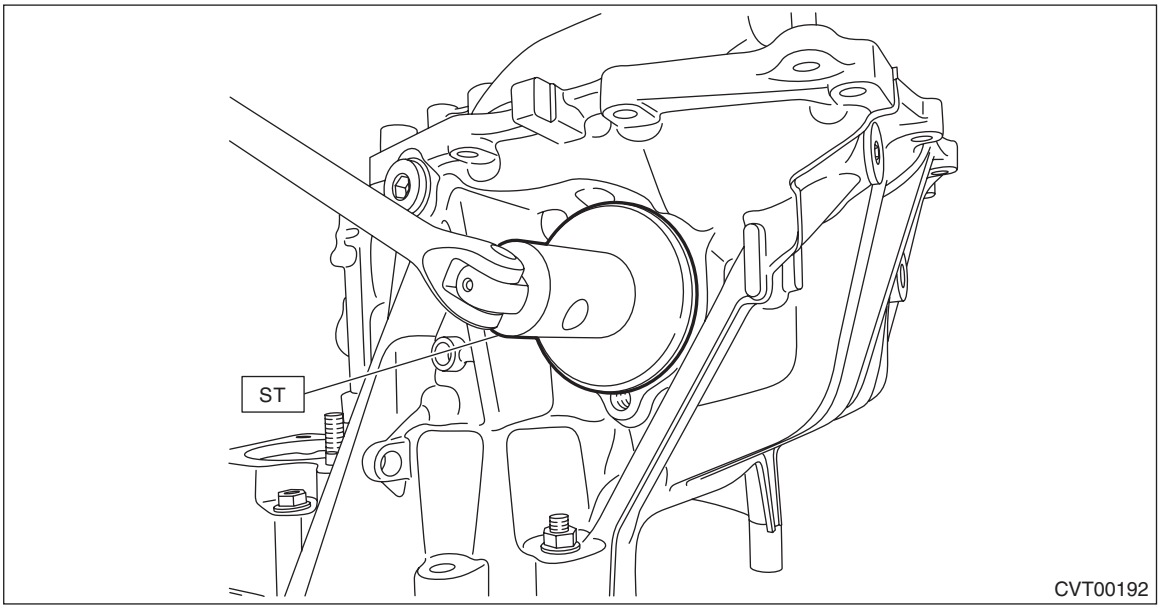


(A) Lock plate

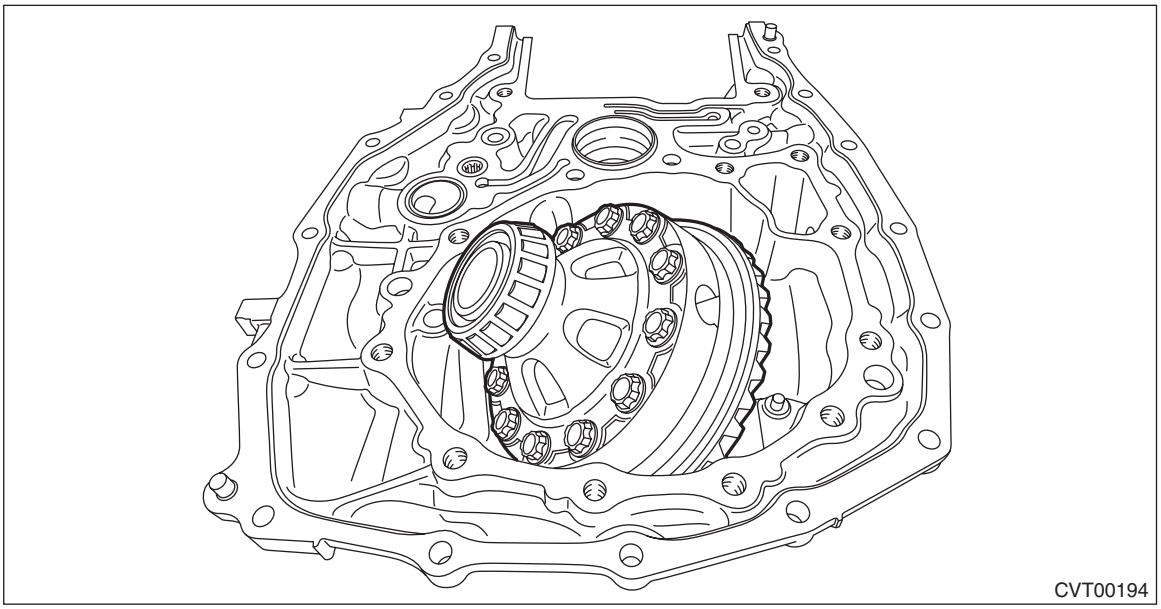
26) Remove the differential side retainers using ST.

NOTE:
• When the wrench COMPL retainer interferes with the converter case, align the cutout portion with the interference part.
• Support the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.
• Keep the left and right differential side retainers and left and right bearing outer races by attaching tags or in similar ways to make it possible to identify RH and LH sides.

ST 18658AA020 WRENCH COMPL RETAINER



27) Remove the front differential assembly while being careful not to damage the attachment part of the retainer.

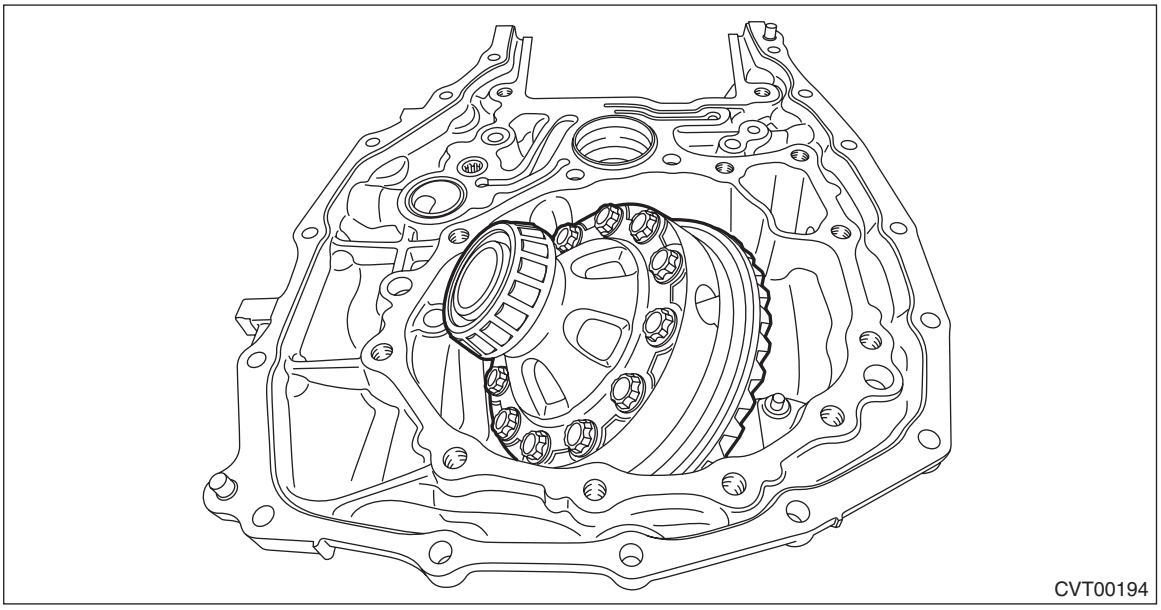


28) Remove the oil seals and O-rings from both differential side retainers. <Ref. to CVT(TH58A)-365, SIDE RETAINER, DISASSEMBLY, Front Differential Assembly.>

B: INSTALLATION

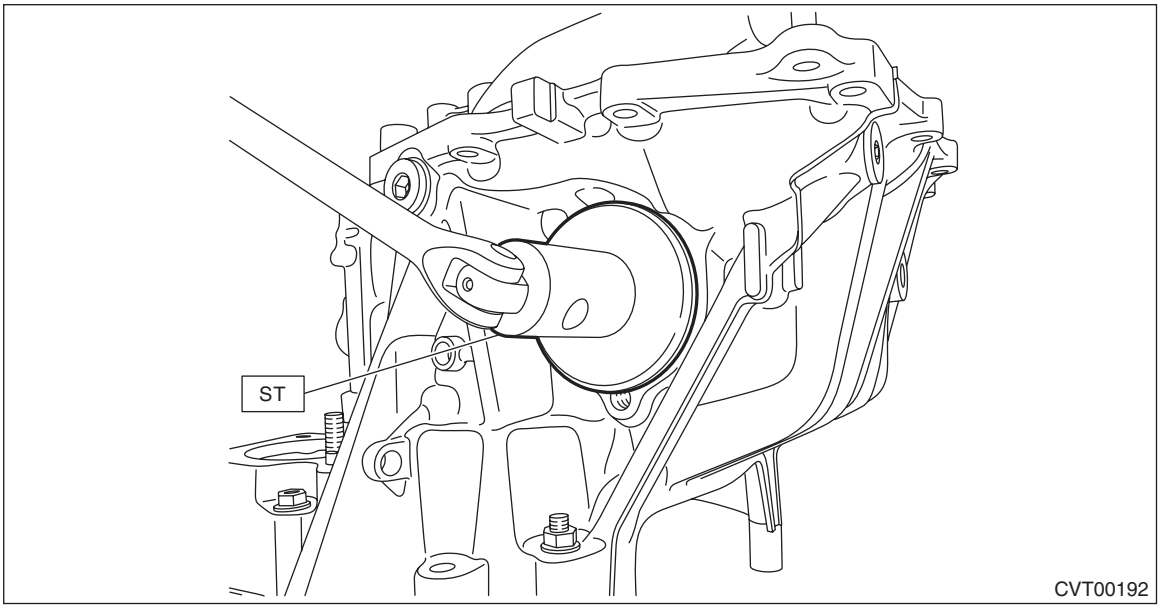
1) Install the front differential assembly to the converter case.

NOTE:
Be careful not to damage the inside of the case (especially the mounting surface of the differential side retainers).



2) Install the bearing outer race.

3) Temporarily install the differential side retainers using ST.
ST 18658AA020 WRENCH COMPL RETAINER



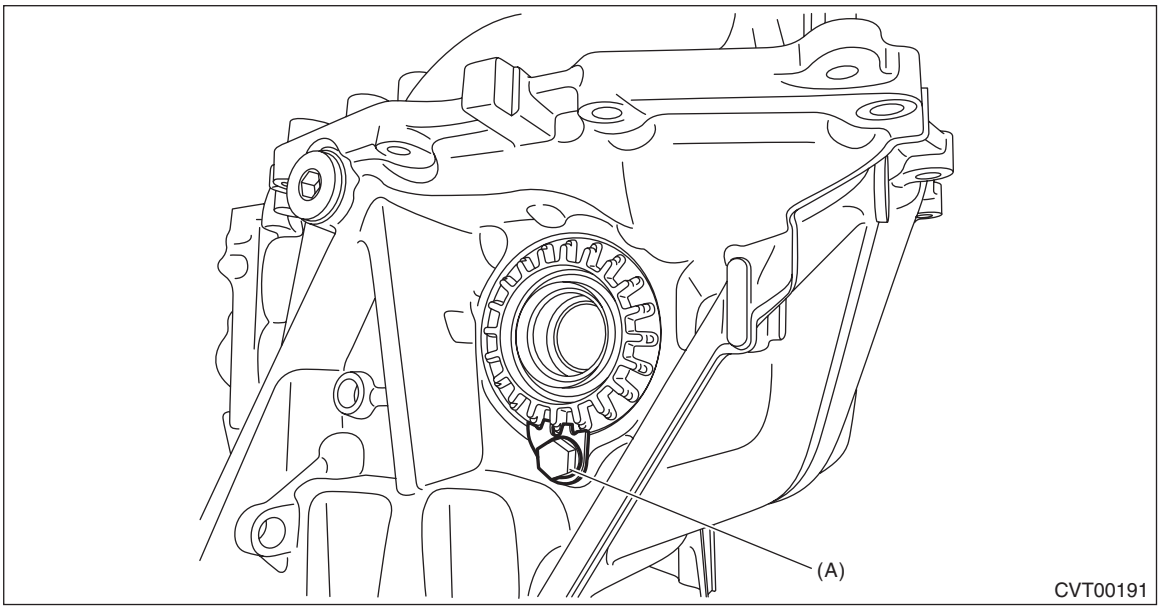
4) Adjust the backlash of the front differential. <Ref. to CVT(TH58A)-372, ADJUSTMENT, Front Differential Assembly.>
5) Inspect and adjust the tooth contact. <Ref. to CVT(TH58A)-349, ADJUSTMENT, Drive Pinion Shaft Assembly.>
6) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER
7) Using the ST, tighten the retainer to the position before it is loosened.
ST 18658AA020 WRENCH COMPL RETAINER
8) Install the oil seal to the differential side retainer. <Ref. to CVT(TH58A)-92, Differential Side Retainer Oil Seal.>

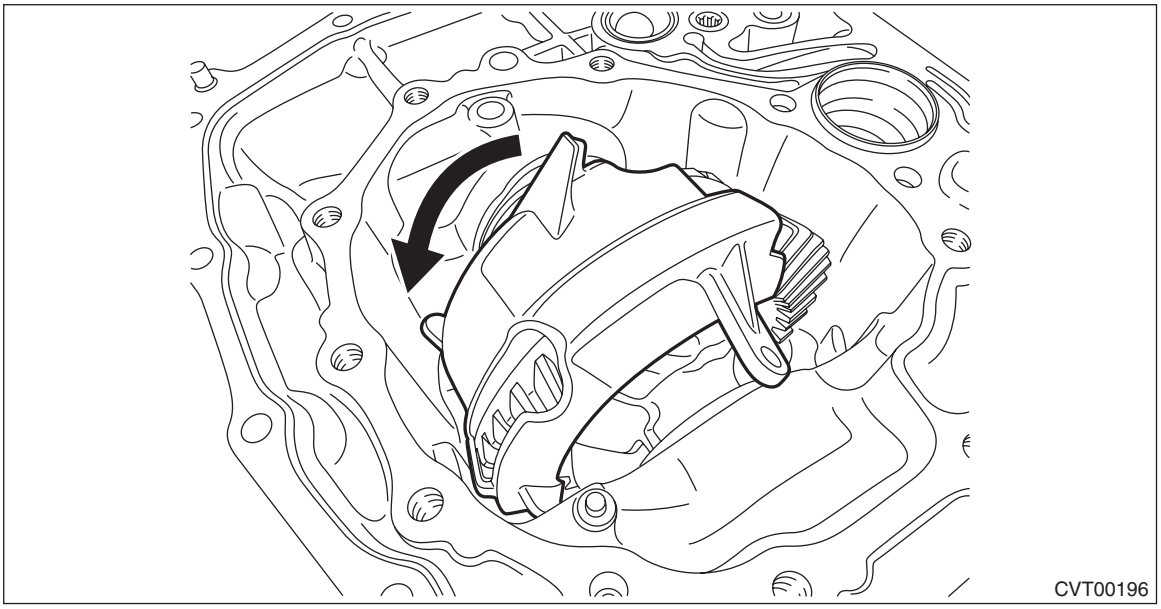
9) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Lock plate

10) Install the oil baffle.



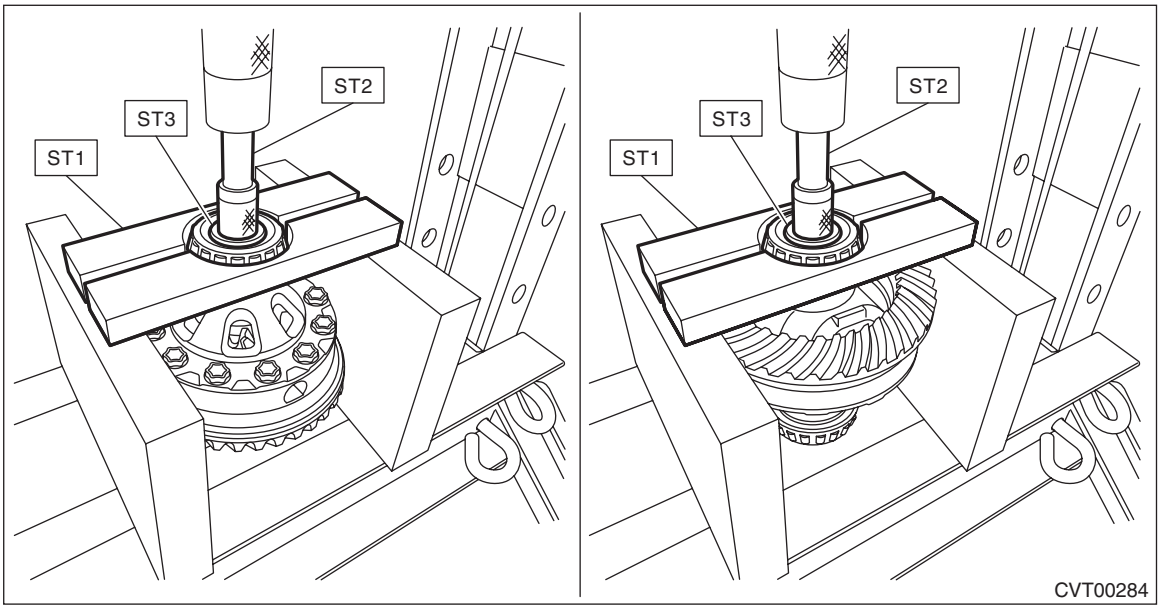
11) Install the drive pinion shaft assembly. <Ref. to CVT(TH58A)-329, INSTALLATION, Drive Pinion Shaft Assembly.>
12) Install the forward clutch assembly. <Ref. to CVT(TH58A)-311, INSTALLATION, Forward Clutch Assembly.>
13) Install the reverse brake assembly. <Ref. to CVT(TH58A)-295, INSTALLATION, Reverse Brake Assembly.>
14) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-276, INSTALLATION, Primary Pulley and Secondary Pulley.>
15) Install the reduction drive gear. <Ref. to CVT(TH58A)-264, INSTALLATION, Reduction Drive Gear.>
16) Install the transmission case. <Ref. to CVT(TH58A)-253, INSTALLATION, Transmission Case.>

17) Install the output clutch assembly. <Ref. to CVT(TH58A)-234, INSTALLATION, Output Clutch Assembly.>
18) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
19) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
20) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
21) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
22) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
23) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
24) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
25) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
26) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
27) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
28) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
29) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
30) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
31) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
32) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
33) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

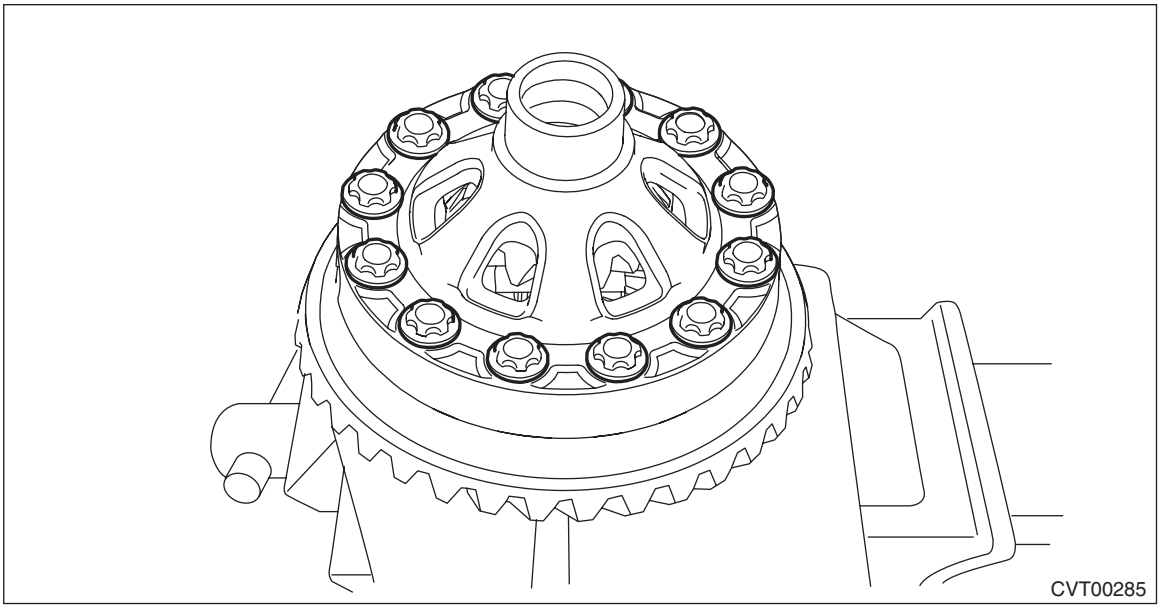
C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

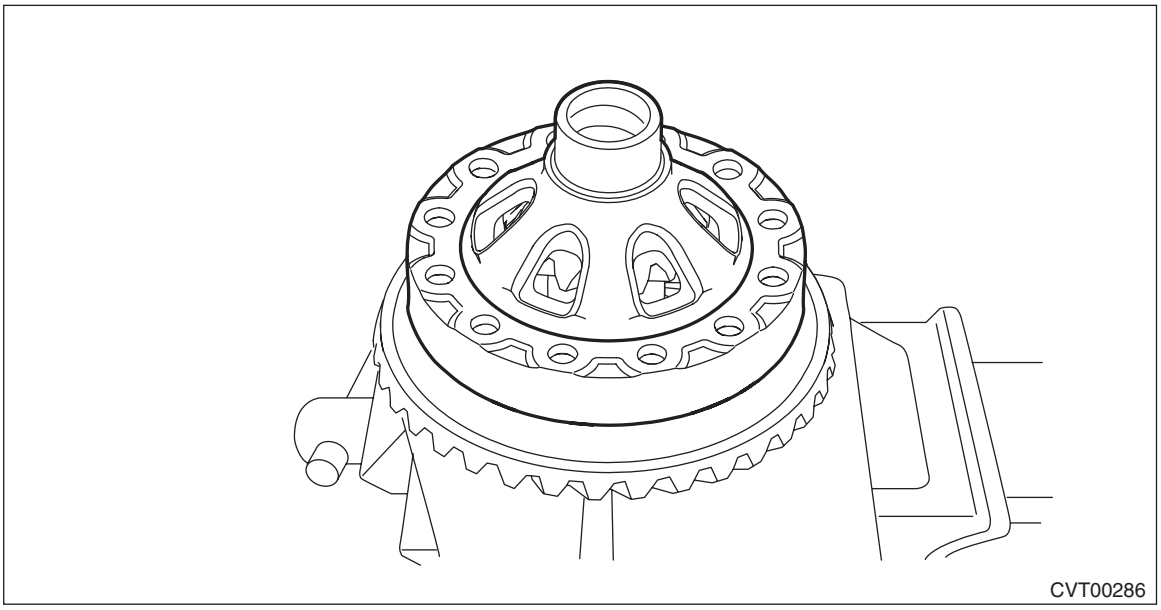
1) Remove the taper roller bearing using the ST.
ST1 498077000 REMOVER
ST2 899864100 REMOVER
ST3 398497701 SEAT



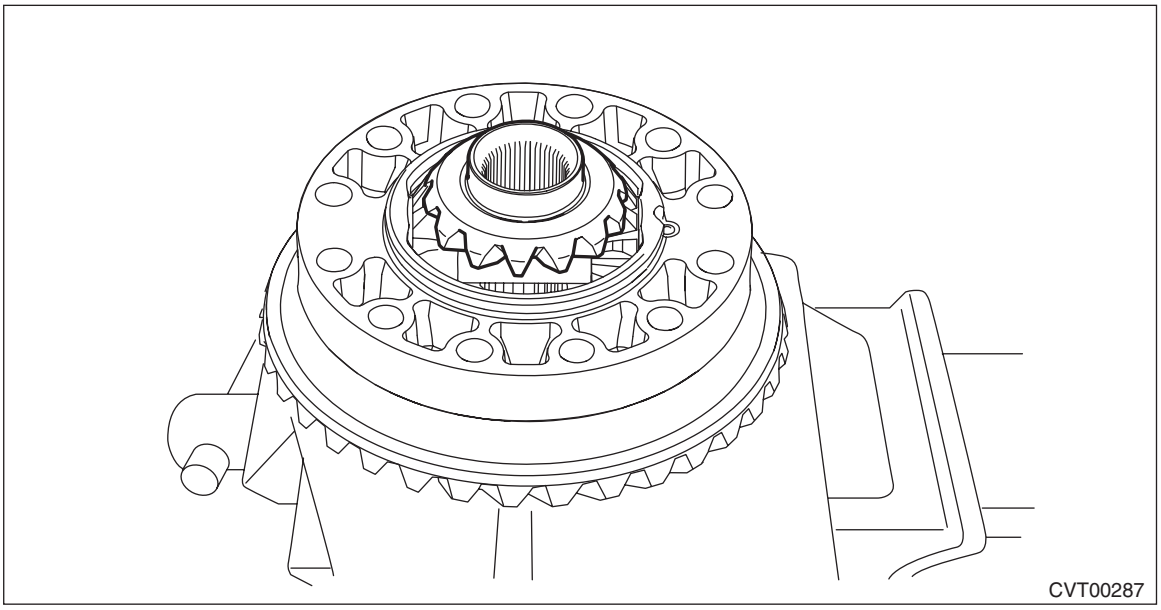
2) Remove the hypoid driven gear mounting bolt using the ST.
ST 18270KA020 SOCKET (E20)



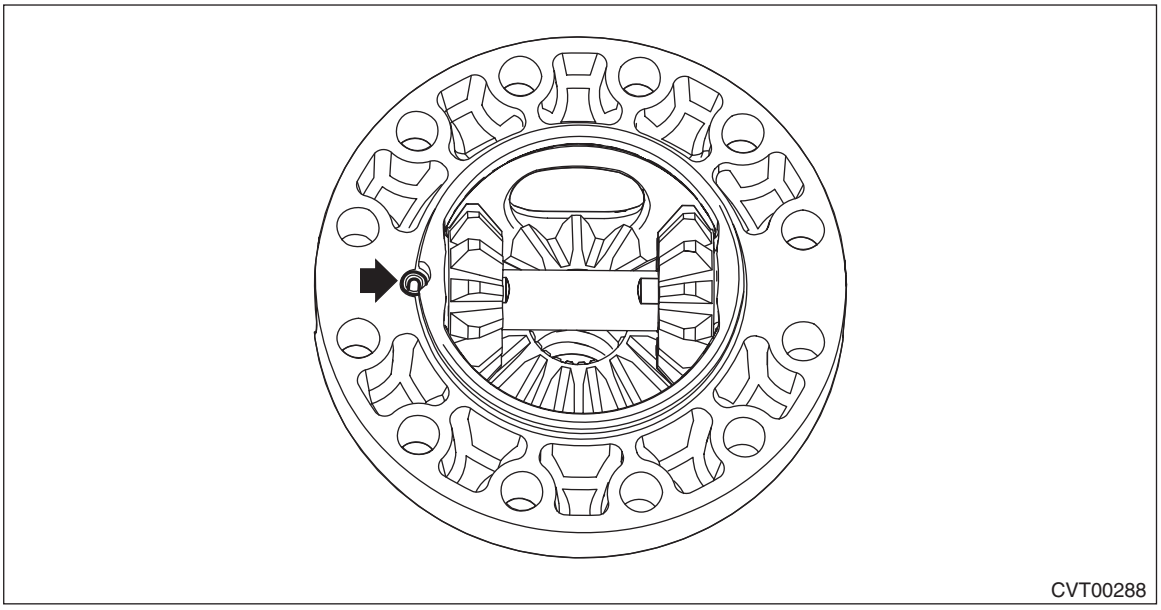
3) Remove the differential case (LH).



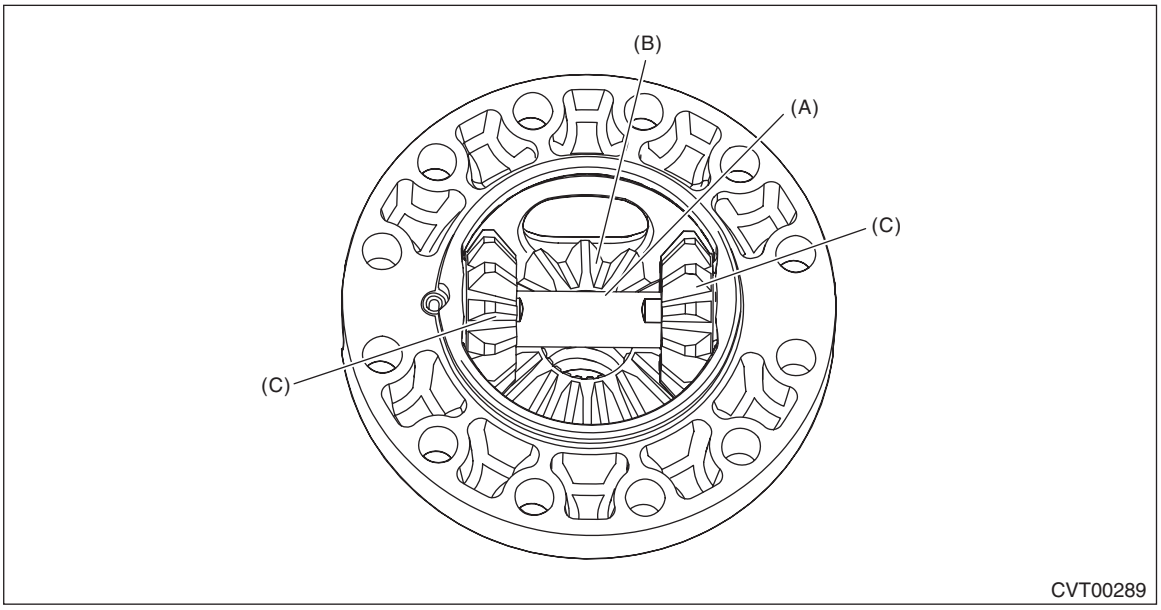
4) Remove the differential bevel gear and washer from differential case.


CVT00287

5) Remove the straight pin.


CVT00288

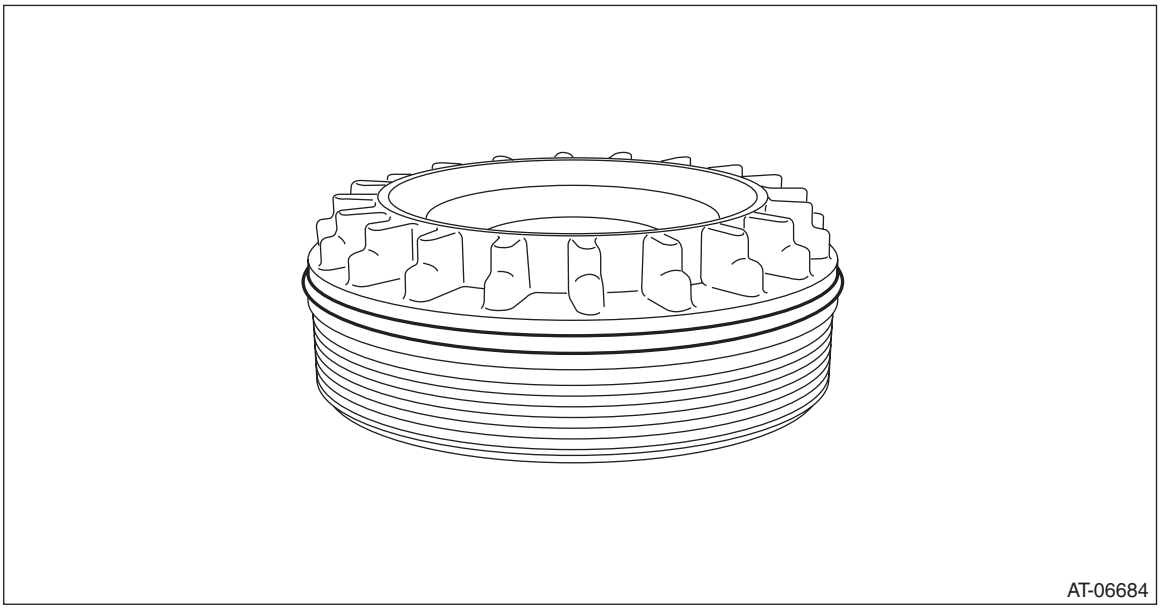
6) Remove the pinion shaft, then remove the differential bevel gear, washer and differential bevel pinion.



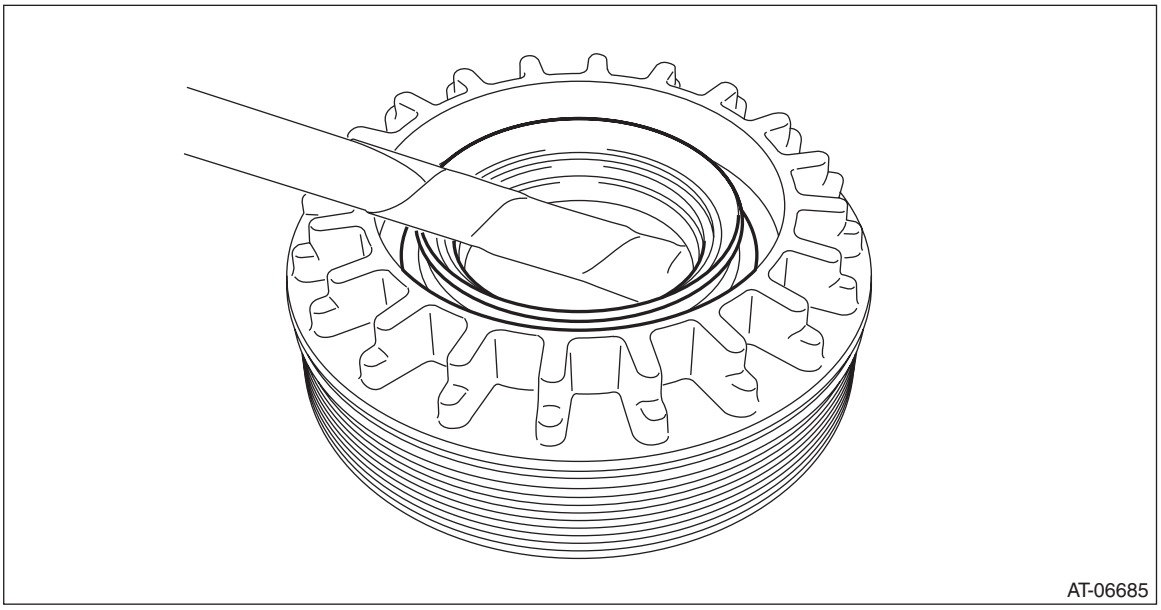
(A) Pinion shaft
(B) Differential bevel gear
(C) Differential bevel pinion

2. SIDE RETAINER

NOTE:
After adjusting the drive pinion backlash and tooth contact, replace the oil seal and O-ring with new parts.
1) Remove the O-ring.



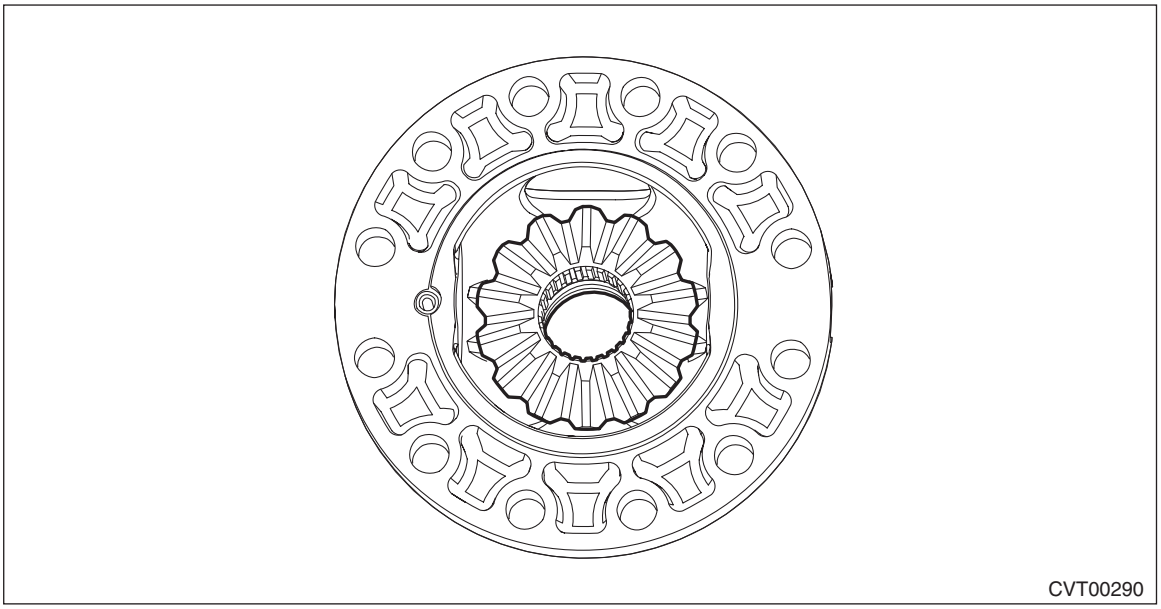
2) Remove the oil seal.



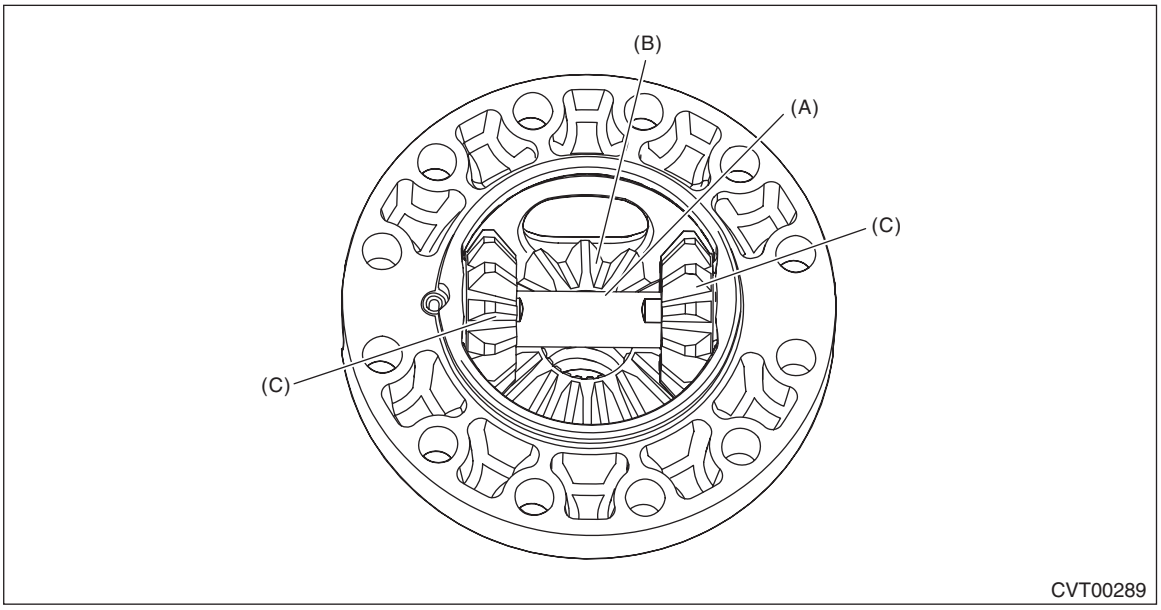
D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the washer and differential bevel gear into the differential case (RH).

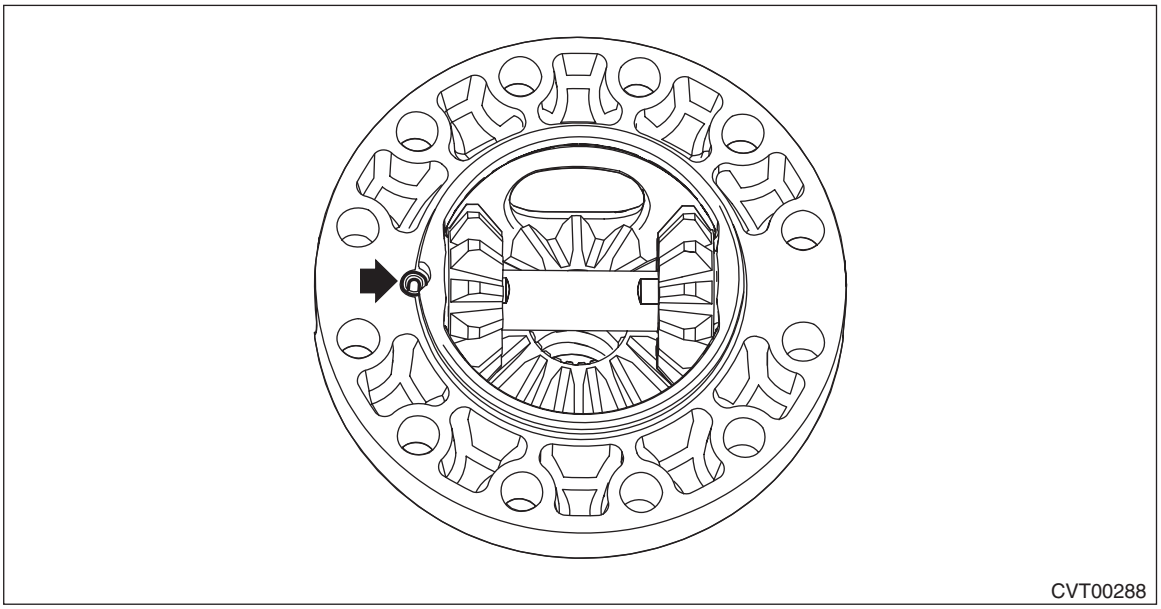


2) Install the differential bevel pinions into differential case (RH) and install the pinion shaft.

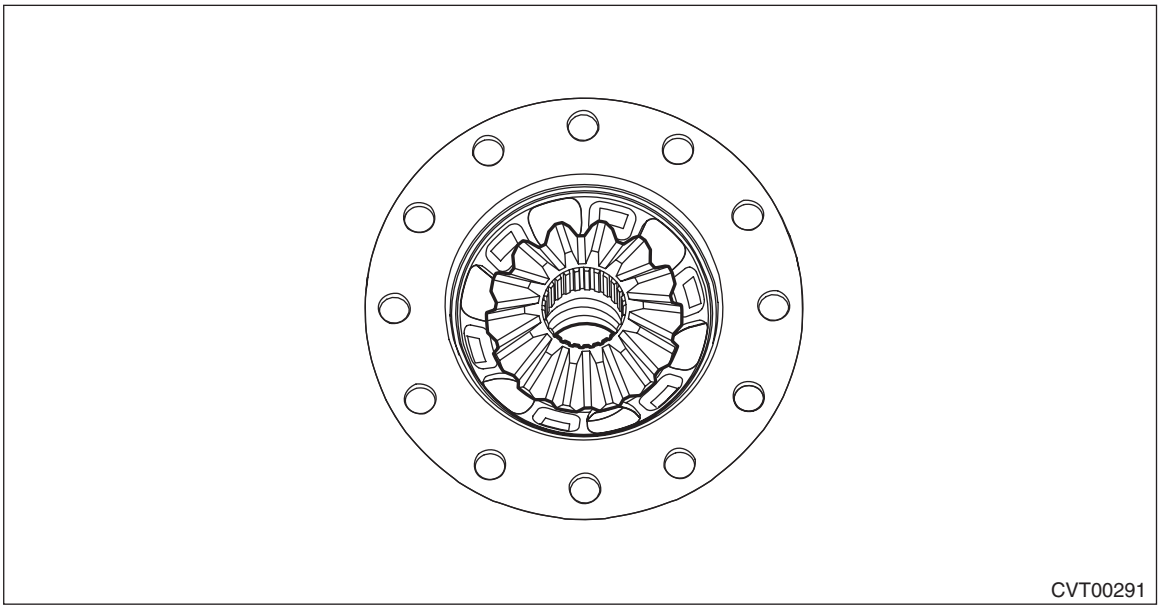


(A) Pinion shaft
(B) Differential bevel gear
(C) Differential bevel pinion

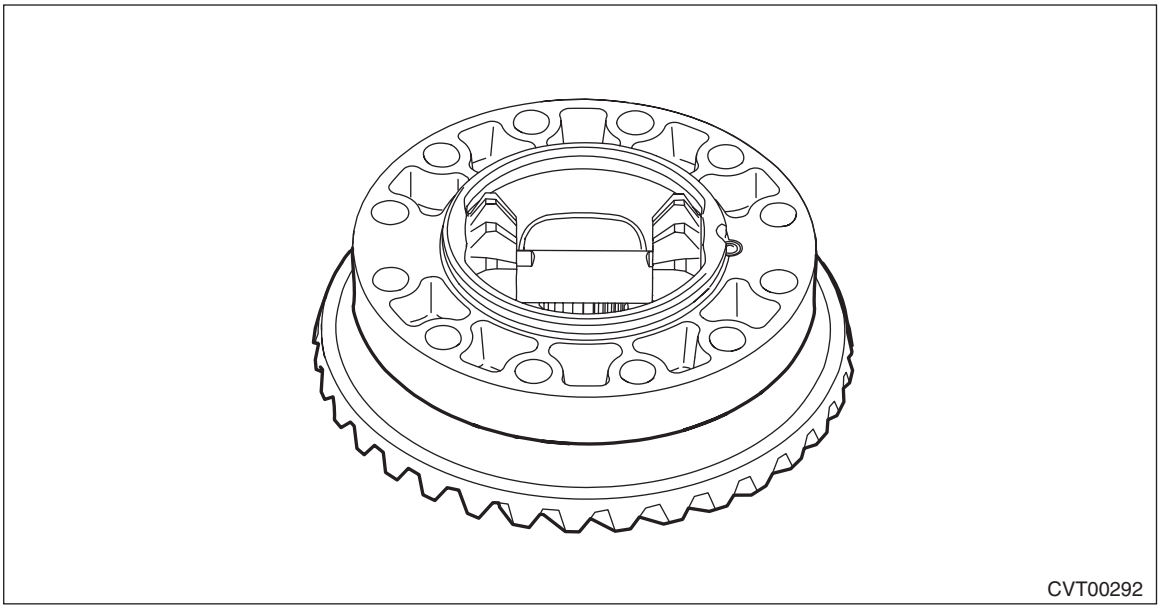
3) Install the straight pin.



4) Install the washer and differential bevel gear to the differential case (LH).

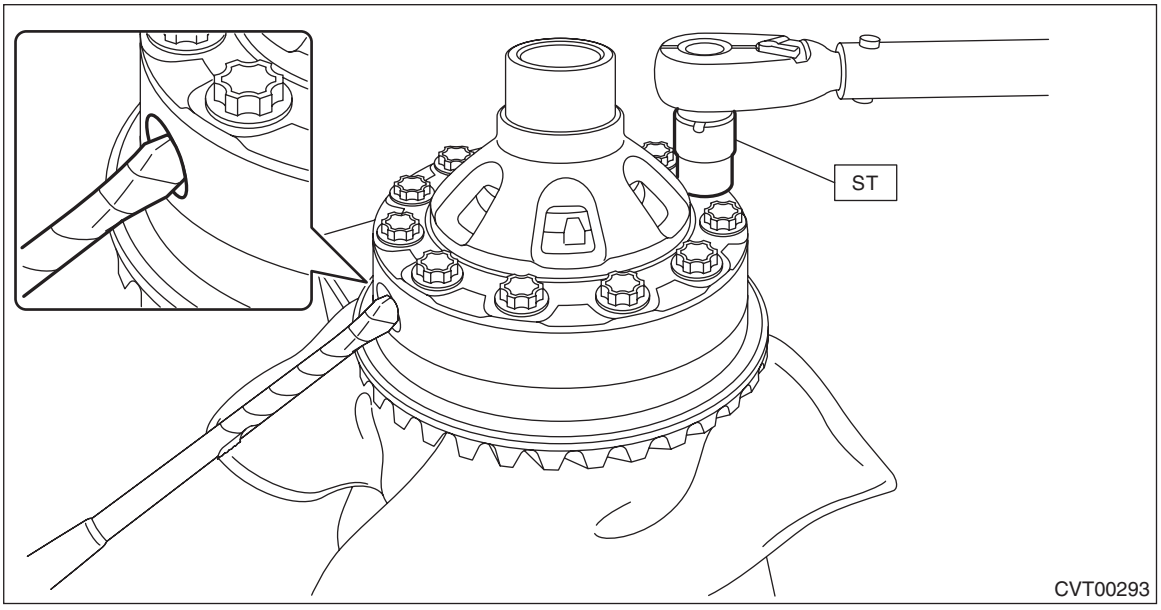

CVT00291

5) Install the differential case (RH) to the hypoid driven gear.


CVT00292

6) Install the differential case (LH) to the differential case (RH).
7) Using the ST, install the hypoid driven gear by tightening the installation bolt.
ST 18270KA020 SOCKET (E20)

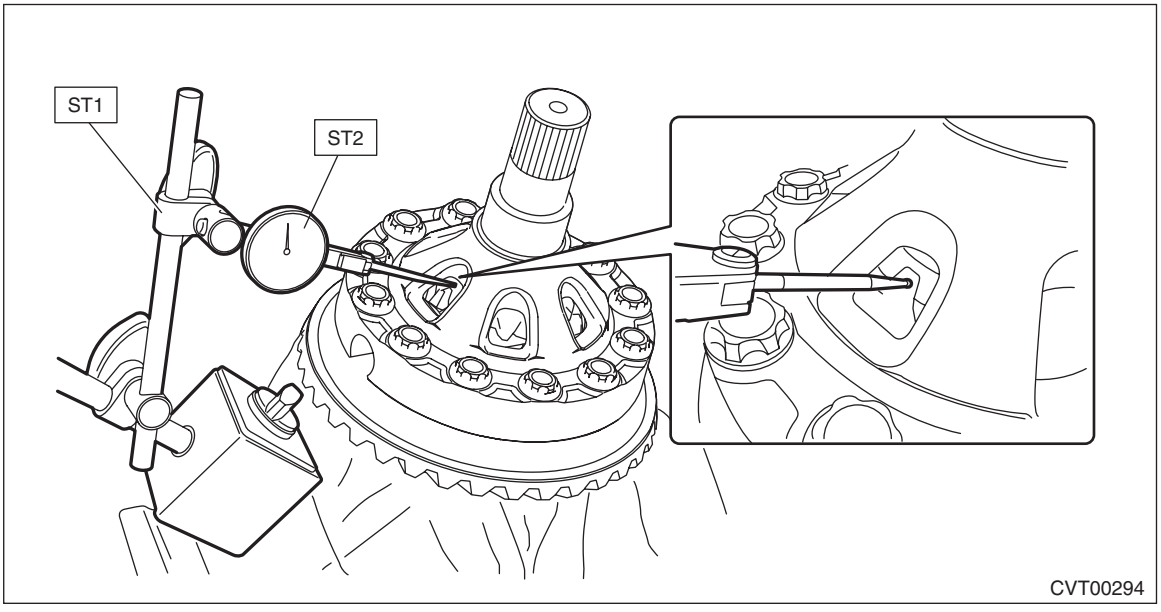
Tightening torque:
64 N·m (6.5 kgf-m, 47.2 ft-lb)



8) Measure the backlash, and select the washer.
(1) Install the SUBARU genuine axle shaft to differential case.
Part No. 38415AA070 Axle shaft
(2) Using ST1 and ST2, insert the ST2 through the window of differential case. Measure the backlash of the gear.

NOTE:
• Measure the backlash by applying a differential bevel pinion tooth between two differential bevel gear teeth.
• When measuring, fix the differential bevel pinion gear in place with a screwdriver covered with cloth, or a similar tool.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

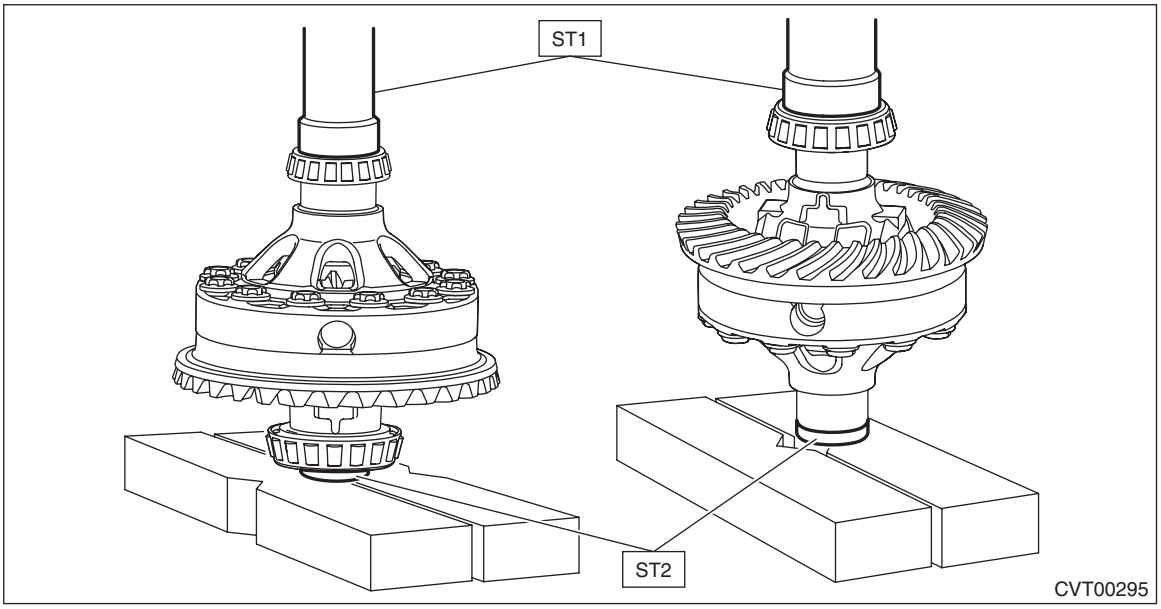
Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



(3) If the backlash is not within specification, select a washer from the table below and replace.

Washer	
Part No.	Thickness mm (in)
803038021	0.95 (0.037)
803038022	1.00 (0.039)
803038023	1.05 (0.041)

9) Using the ST, install the left and right taper roller bearings.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 SEAT

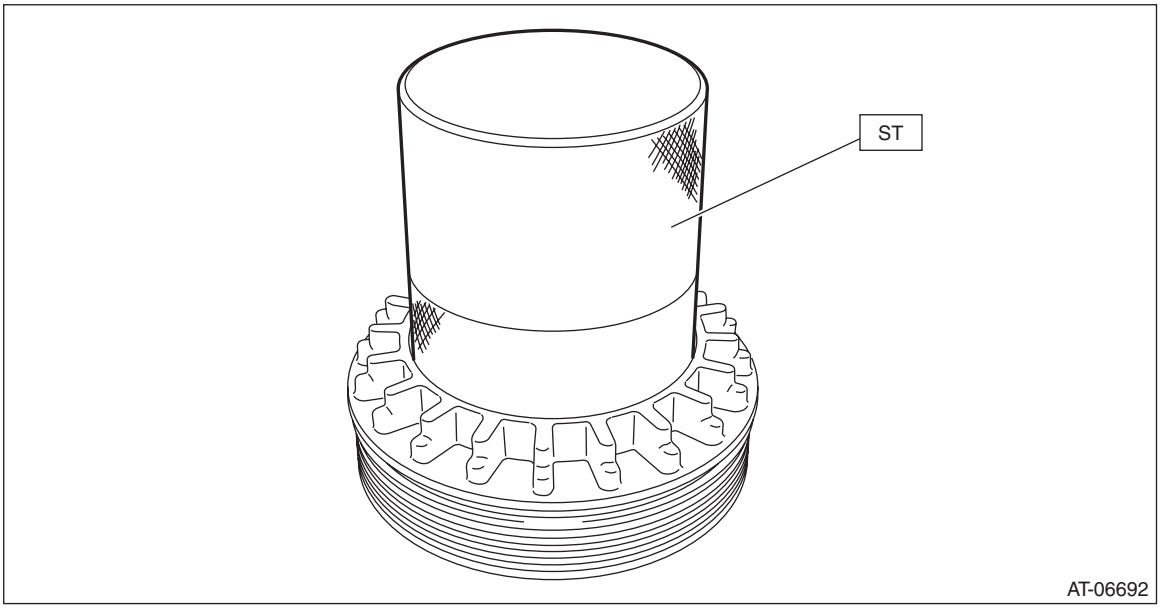


2. SIDE RETAINER

NOTE:
After adjusting the backlash and tooth contact, replace the oil seal and O-ring of side retainer with new parts.
1) Using the ST, install the oil seal.

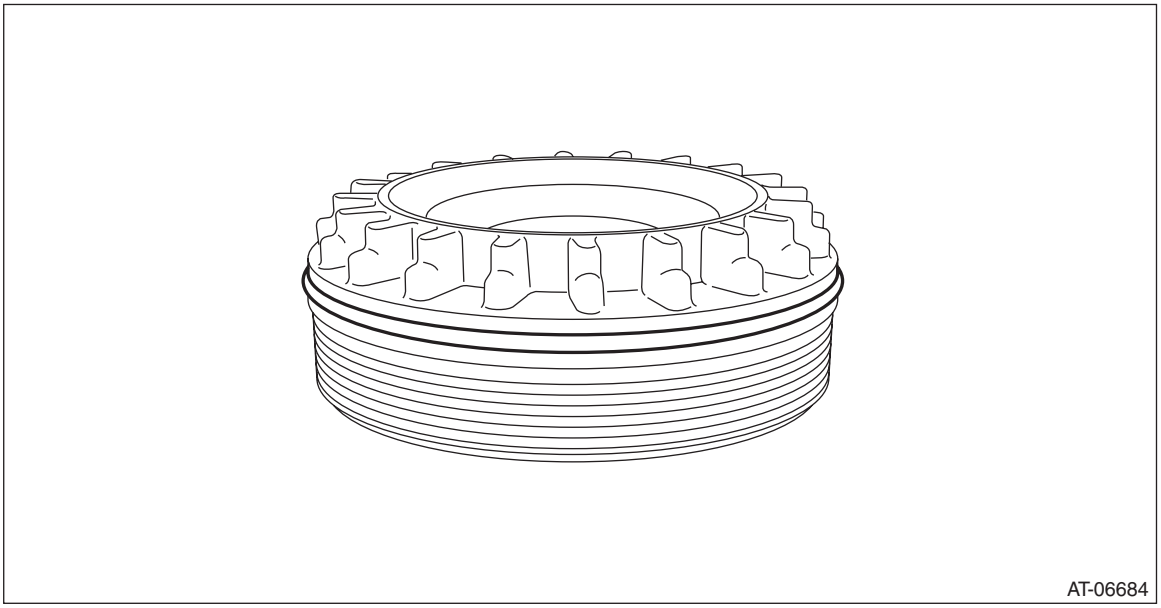
NOTE:
- Use a new oil seal.
- Apply differential gear oil to the oil seal lip and press-fitting surface.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



2) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply the differential gear oil to O-ring.

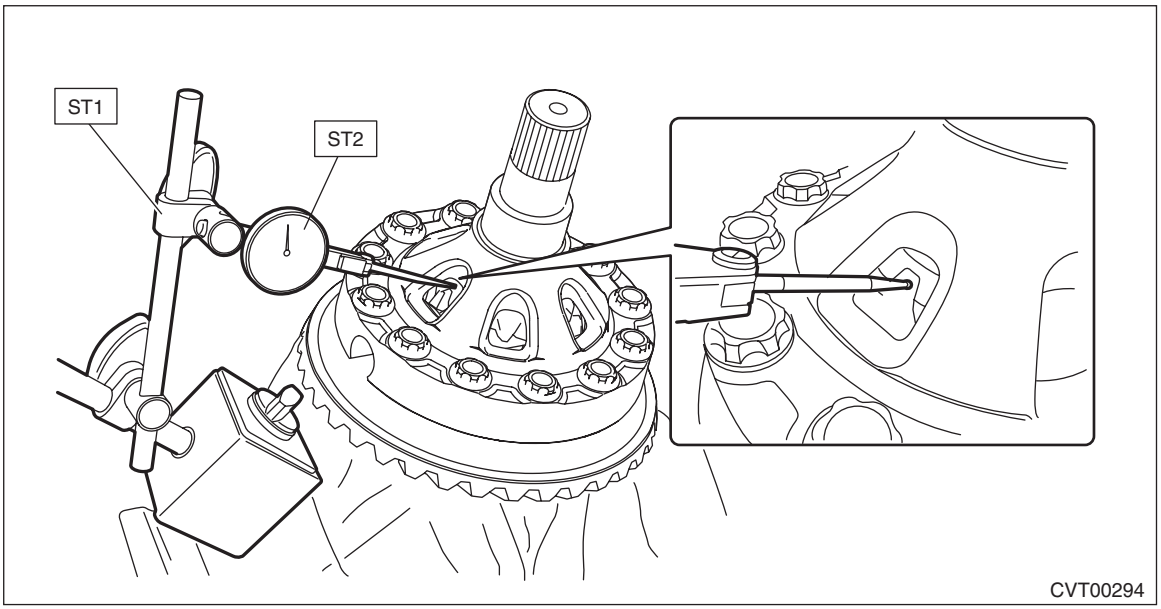


E: INSPECTION

- Check each component for scratches, damage or other faults.
- Using the ST, check the backlash of pinion gear.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)

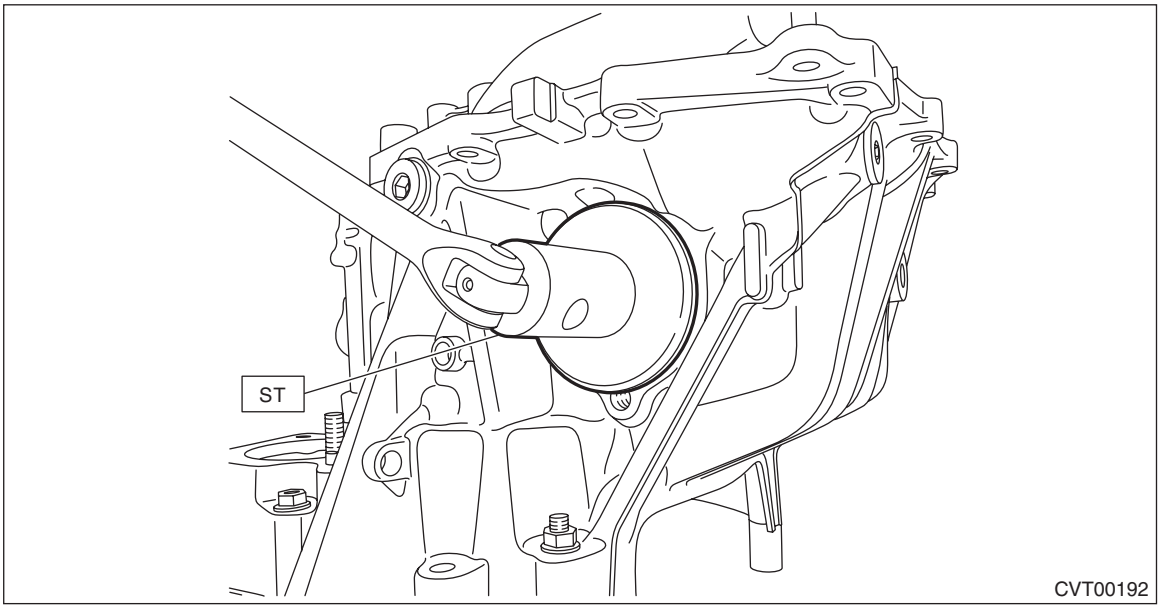


- Measure the hypoid gear backlash, and then adjust it to be within specification. <Ref. to CVT(TH58A)-372, ADJUSTMENT, Front Differential Assembly.>

F: ADJUSTMENT

1) Using the ST, screw-in the retainer until resistance is felt.

NOTE:
RH side should be screwed-in more than LH side.
ST 18658AA020 WRENCH COMPL RETAINER

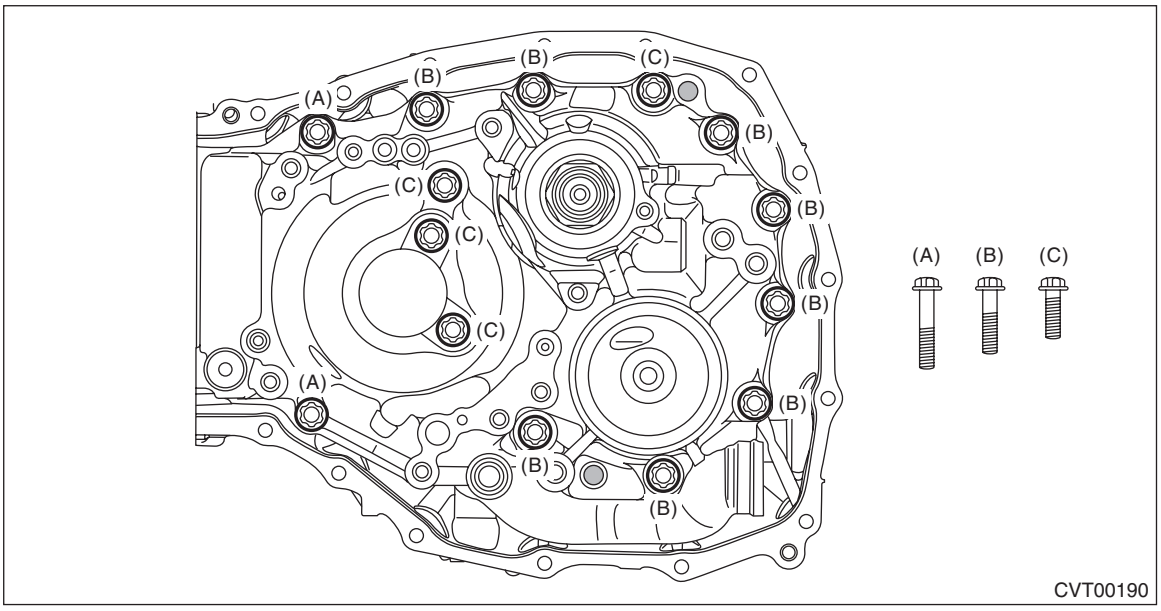


2) Remove the remaining liquid gasket from the mating surface completely.

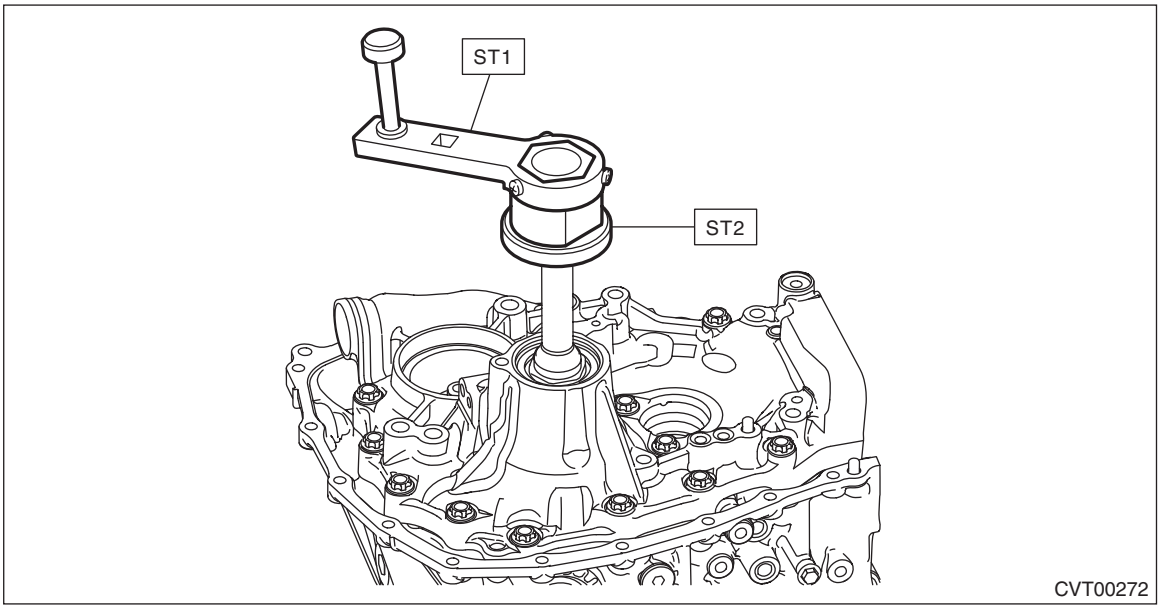
3) Using the ST, install the drive pinion assembly to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)

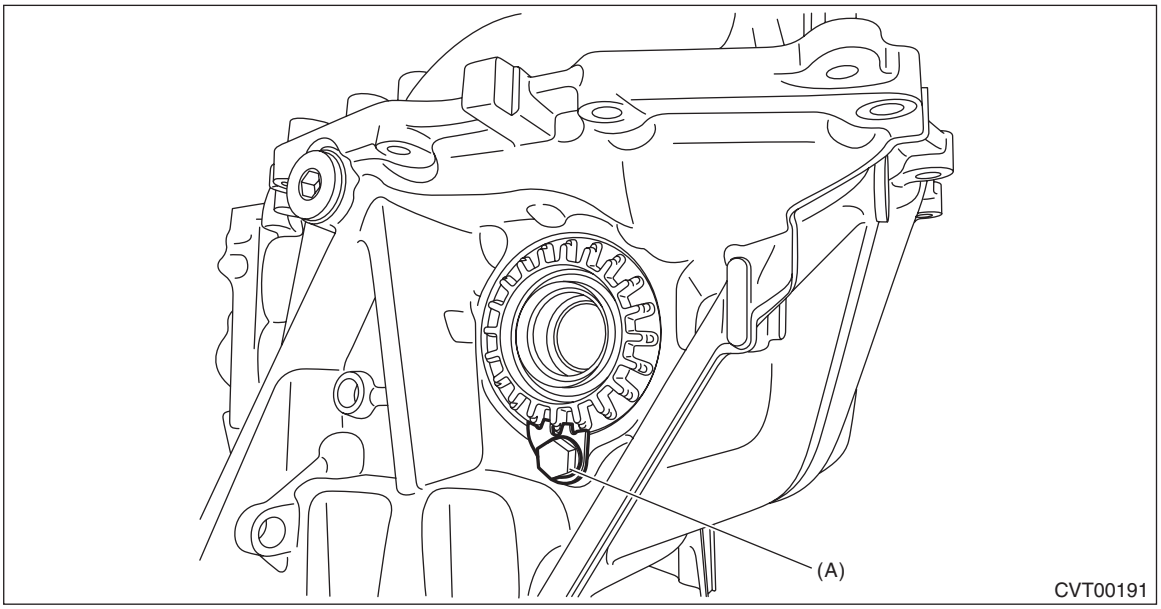


4) Rotate the drive pinion shaft ten times or more using ST1 and ST2.
ST1 499787700 WRENCH
ST2 498937110 HOLDER



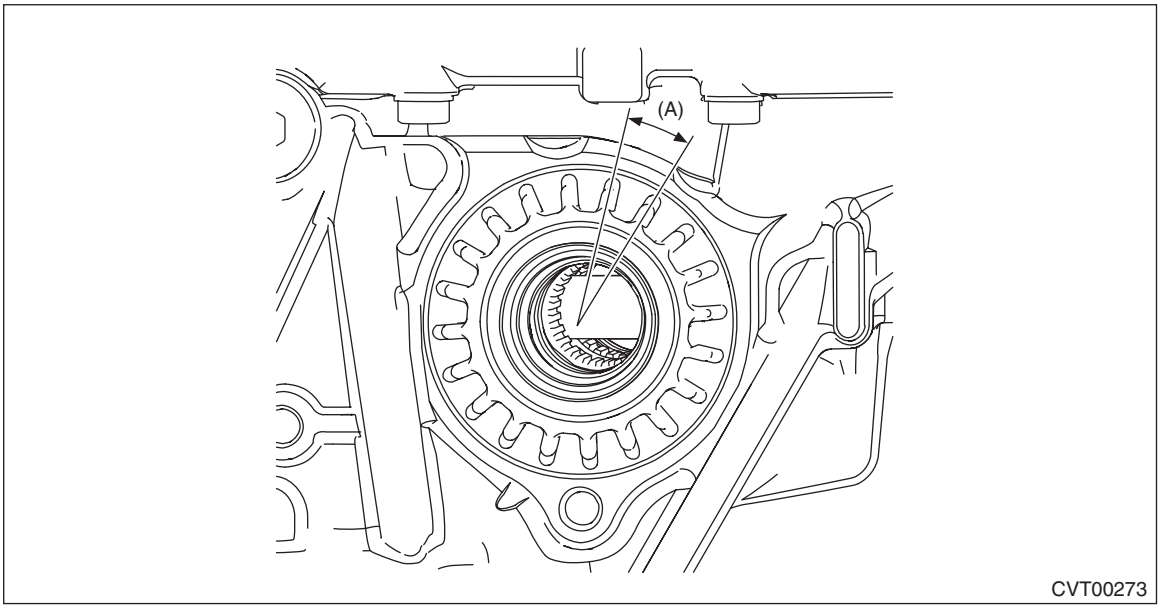
5) While rotating the pinion shaft, tighten the retainer LH and loosen the retainer RH until the shaft can't be turned anymore. The backlash is “zero” when the pinion shaft comes to the point where it doesn't rotate.

6) After the “zero” state is established, loosen the retainer LH by 3 notches and secure it with the lock plate. Retighten the retainer RH until it stops. Rotate the drive pinion 2 or 3 times. Tighten the retainer RH further 1-3/4 notches. This sets the preload. Finally, secure the retainer with its lock plate.



(A) Lock plate

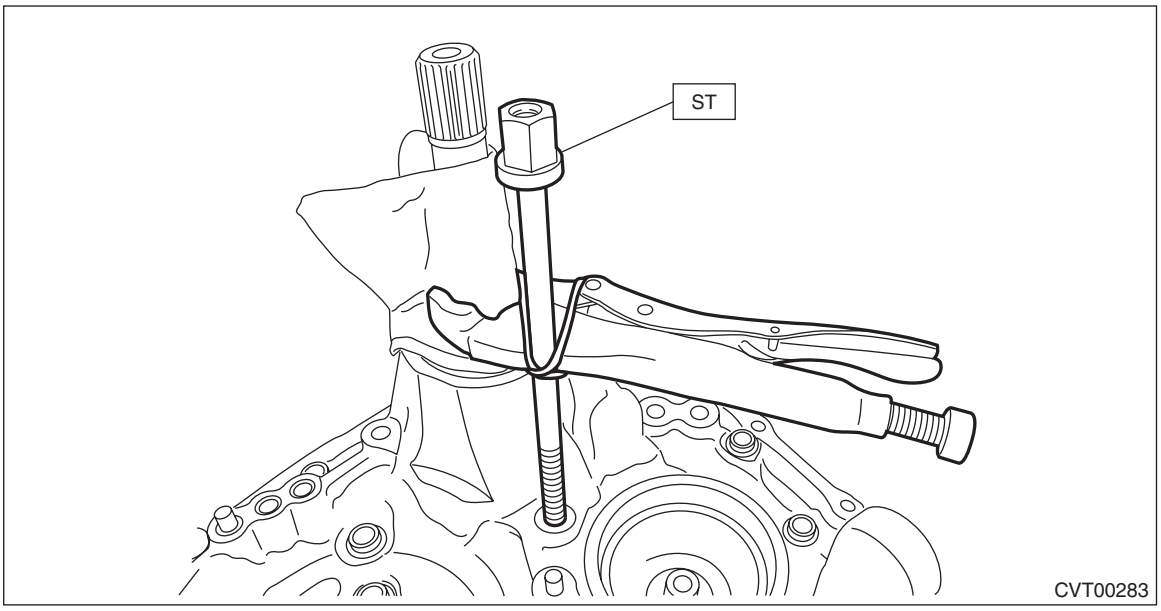
NOTE:
Turning the retainer by every one tooth changes the backlash approx. 0.05 mm (0.0020 in).



(A) 1 tooth

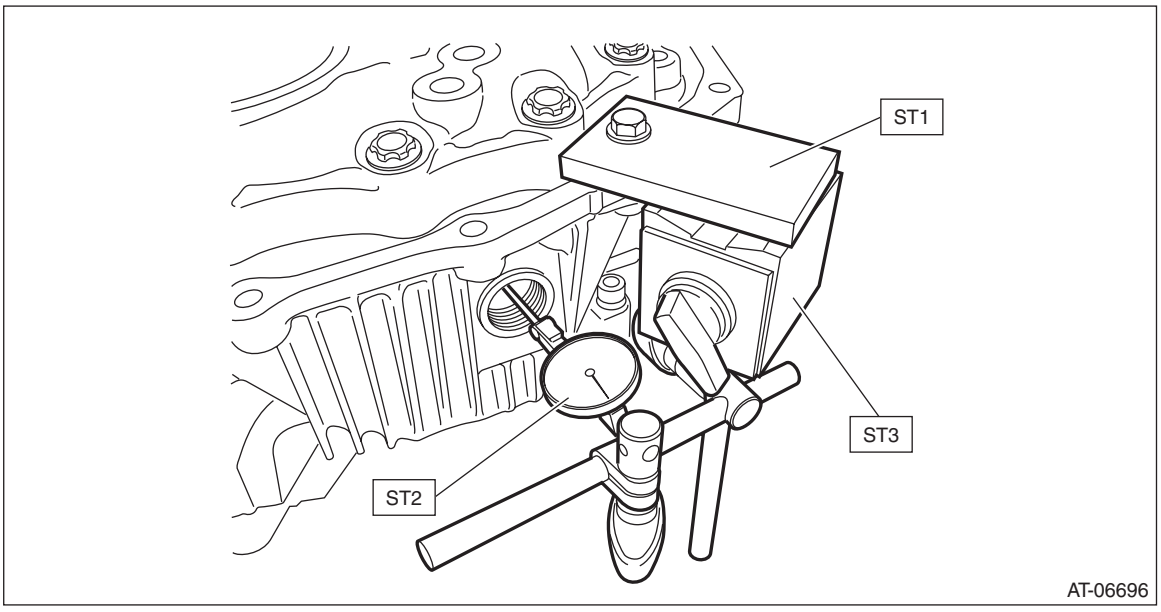
7) Insert the two SUBARU genuine axle shafts into differential case.
Part No. 38415AA070 Axle shaft

8) Install the ST to the drive pinion retainer, and wrap the drive pinion shaft with cloth and pinch with vise pliers. Using a tie-wrap or a wire, fix the vise pliers to the ST.
Make sure the drive pinion shaft does not move.
ST 18763AA000 COMPRESSOR SHAFT



9) Check the backlash is within specification using ST1, ST2 and ST3.
ST1 498255400 PLATE
ST2 498247100 DIAL GAUGE
ST3 498247001 MAGNET BASE

Backlash:
0.13 — 0.18 mm (0.005 — 0.007 in)



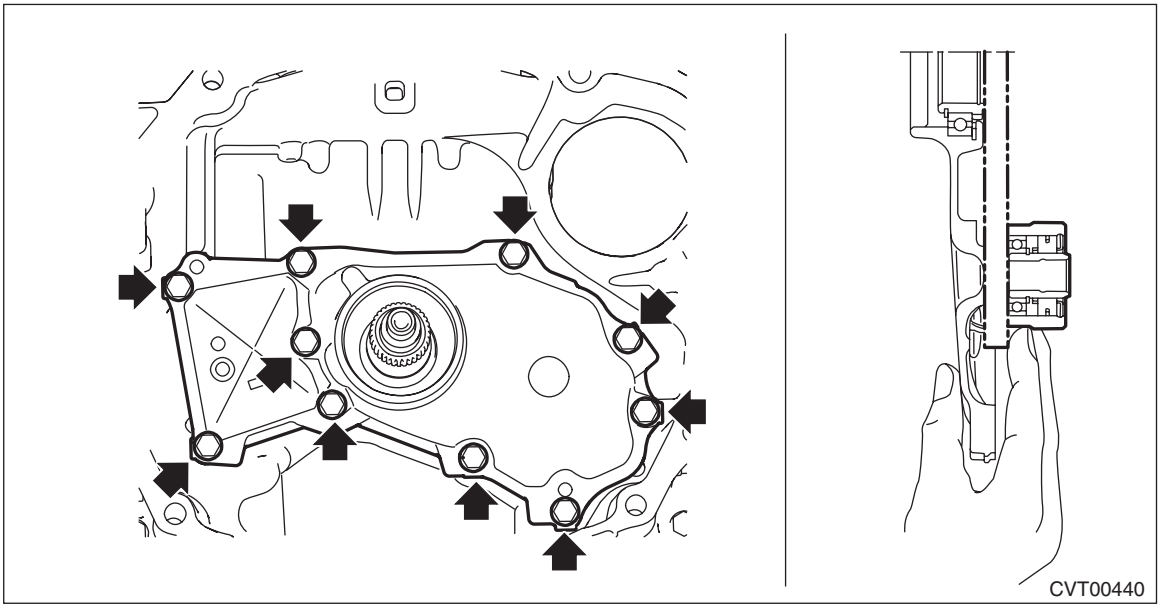
10) Adjust the teeth contact of the front differential and drive shaft. <Ref. to CVT(TH58A)-349, ADJUSTMENT, Drive Pinion Shaft Assembly.>

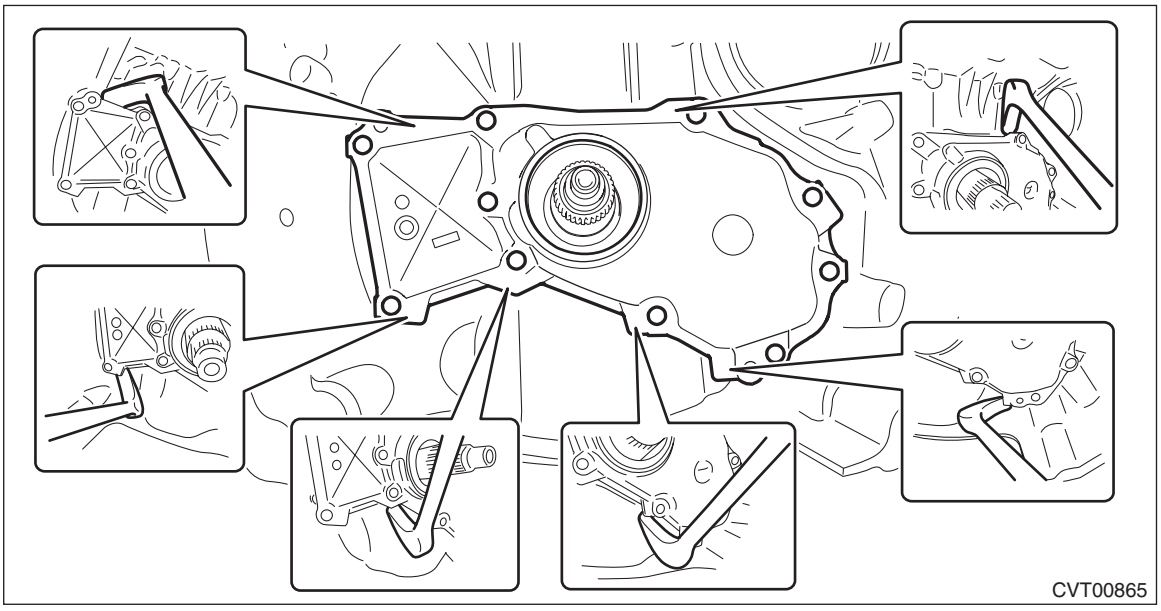
49.Oil Pump Chain

A: REMOVAL

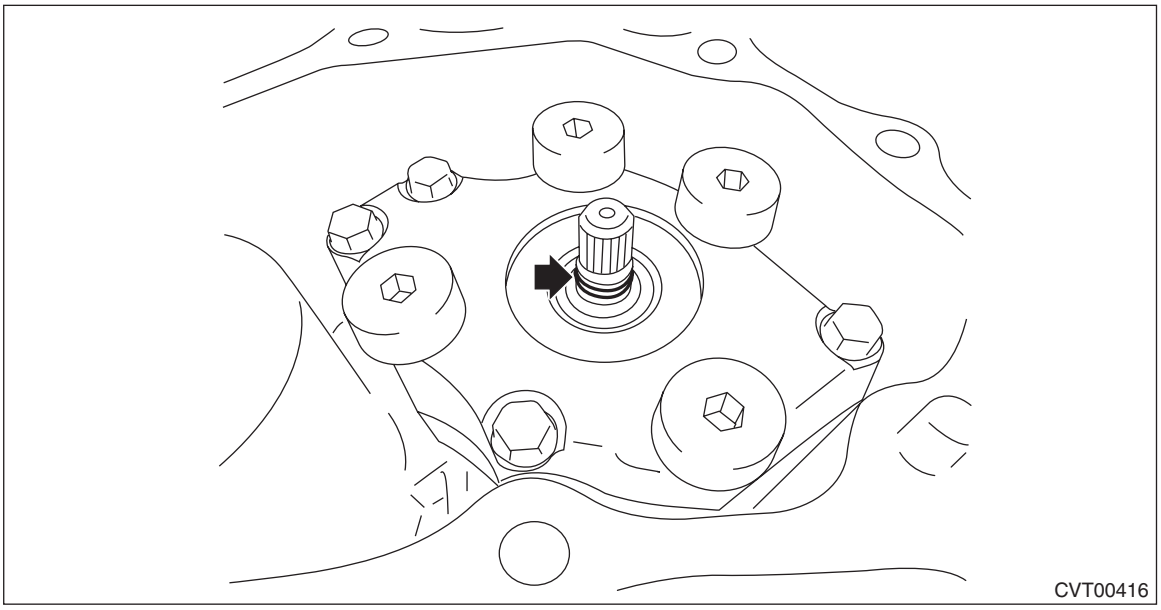
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to CVT(TH58A)-178, REMOVAL, Torque Converter Assembly.>
3) Remove the oil pump chain cover, oil pump sprocket (front) and front oil pump chain.

NOTE:
Oil pump chain cover may be hard to remove because the oil pump sprocket (front) is installed to the shaft side of the oil pump. Do not remove forcibly. Support the oil pump sprocket (front) by hand to remove.

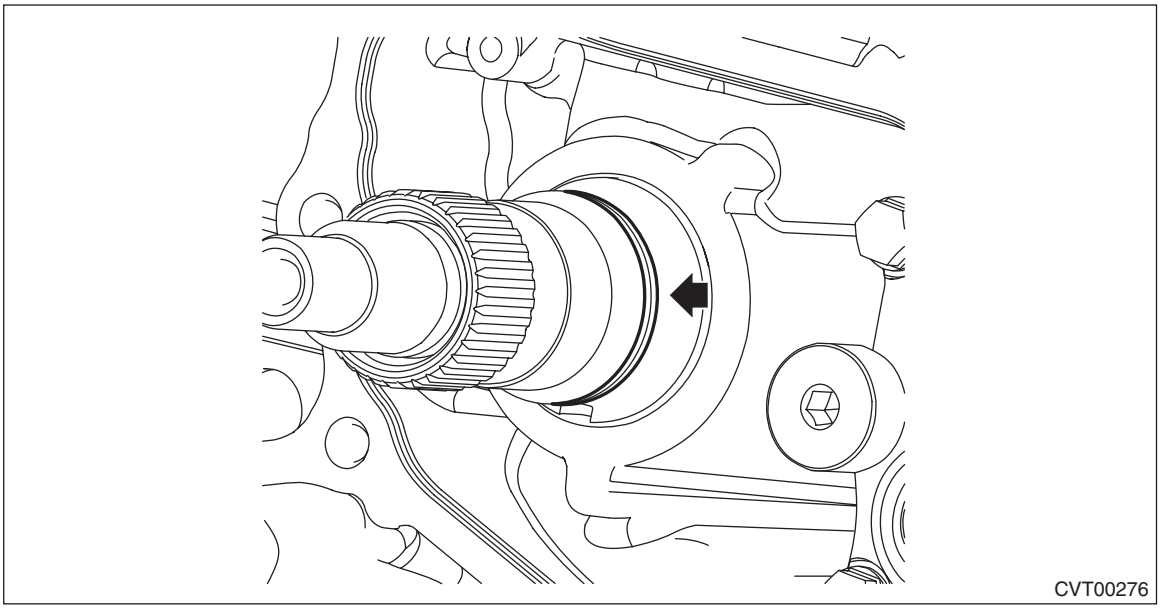

CVT00440


CVT00865

4) Remove the O-ring from the oil pump shaft.

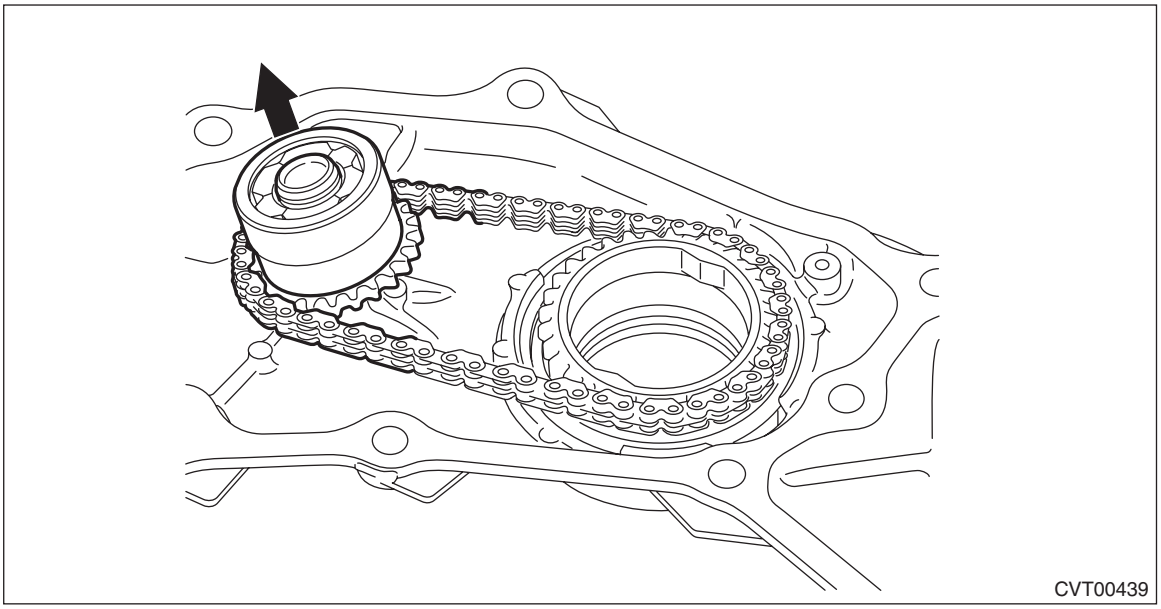


5) Remove the seal ring.

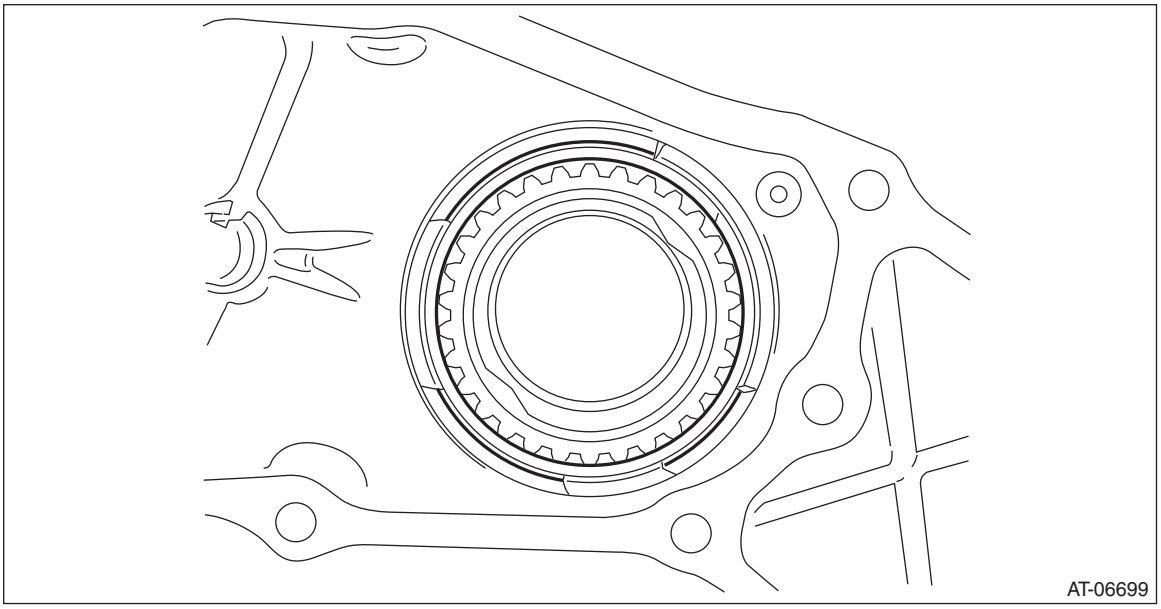


6) Remove the front oil pump chain and the oil pump sprocket (front) from the oil pump chain cover.

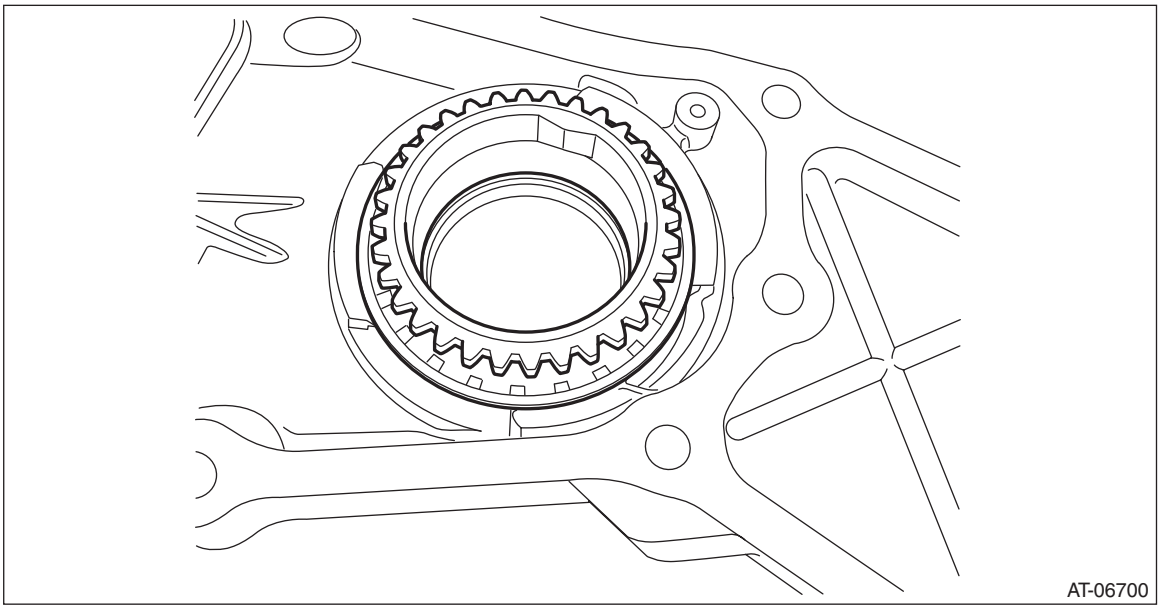
NOTE:
The oil pump sprocket (front) is replaced as an assembly only, because it is a non-disassembly part.



7) Remove the snap ring.

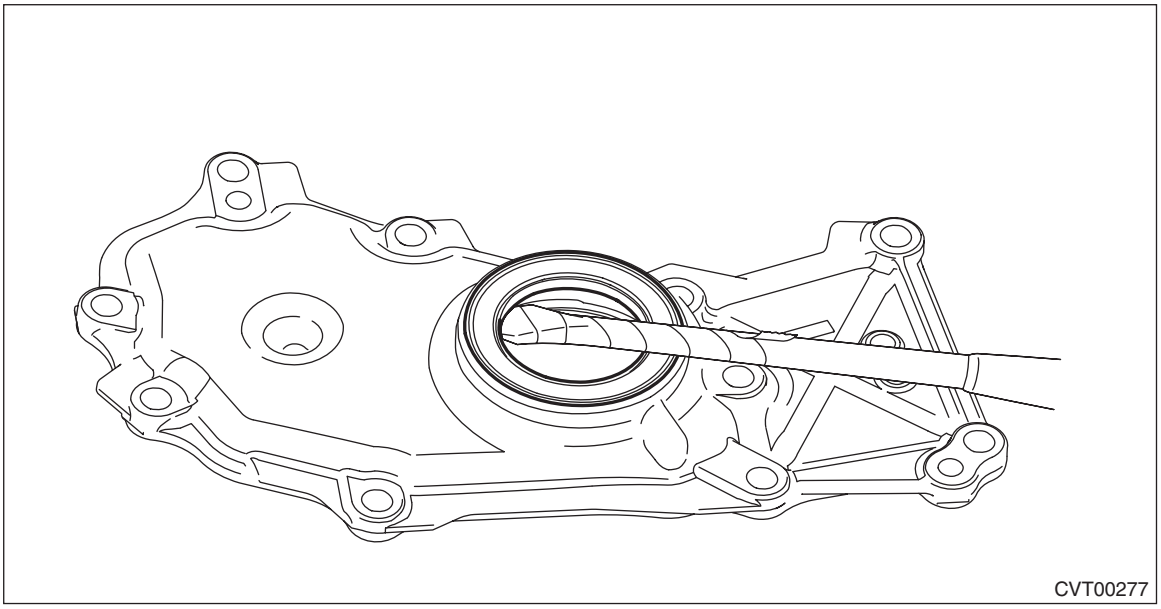


8) Remove the drive sprocket.



9) Remove the oil seal from the oil pump chain cover by using a screwdriver wrapped with vinyl tape, etc.

CAUTION:
Be careful not to damage the oil seal press-fitting surface.

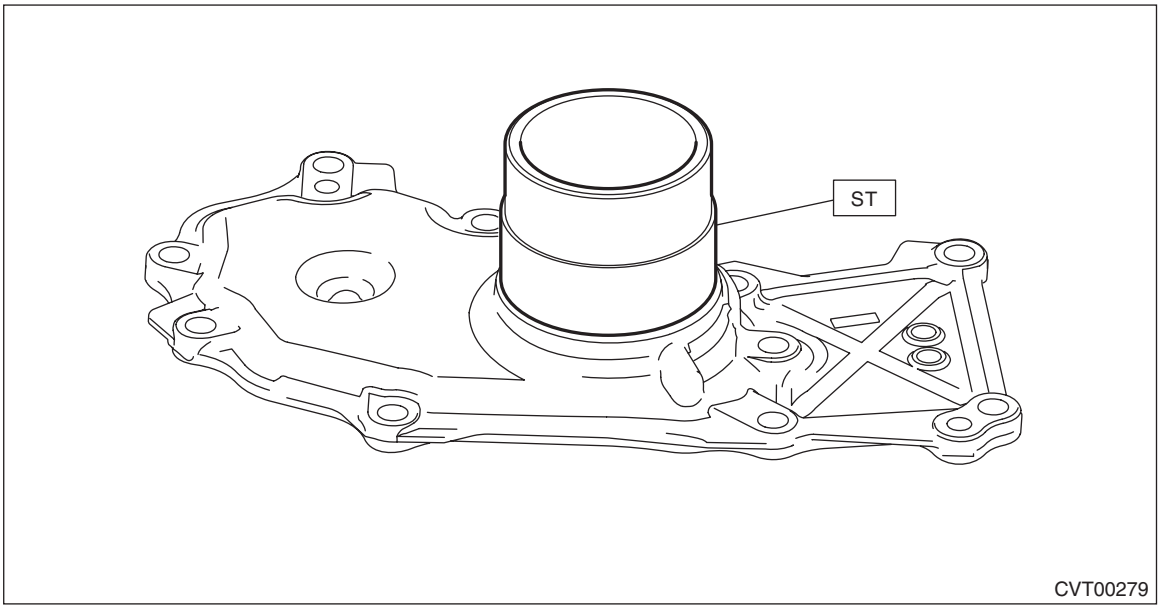


B: INSTALLATION

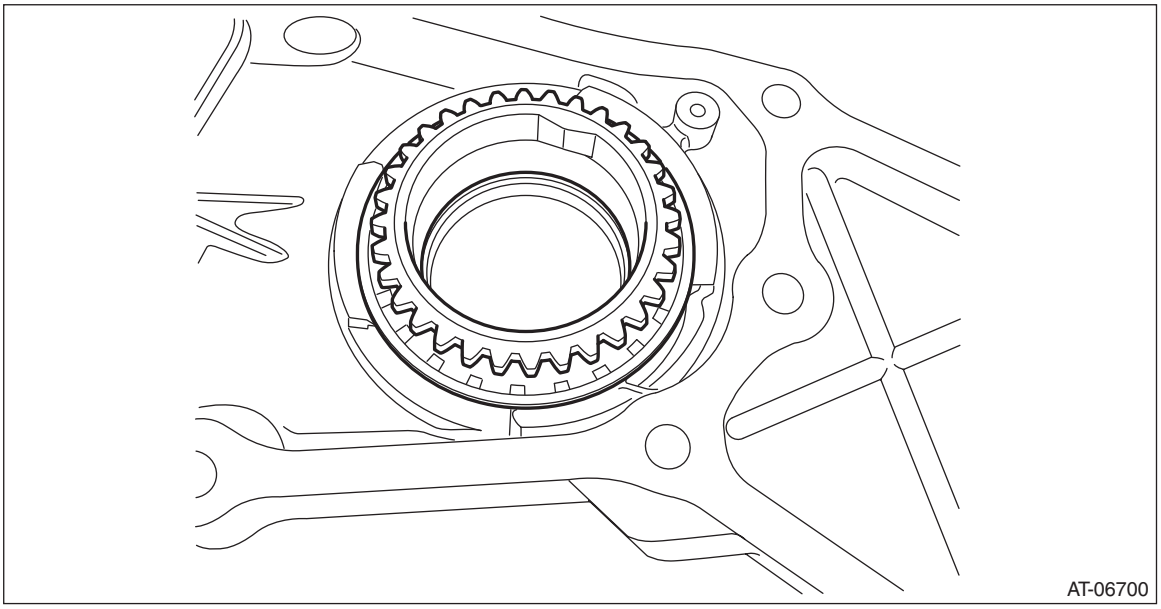
1) Clean the mating surface of oil pump chain cover and converter case.
2) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

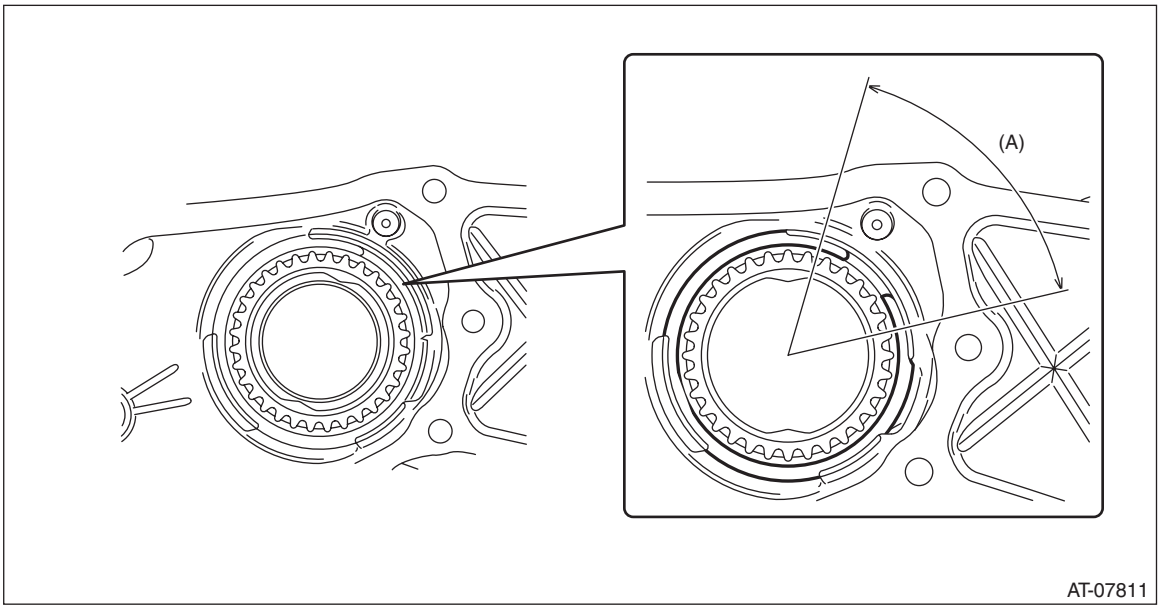
ST 499755602 PRESS SNAP RING



3) Install the drive sprocket.

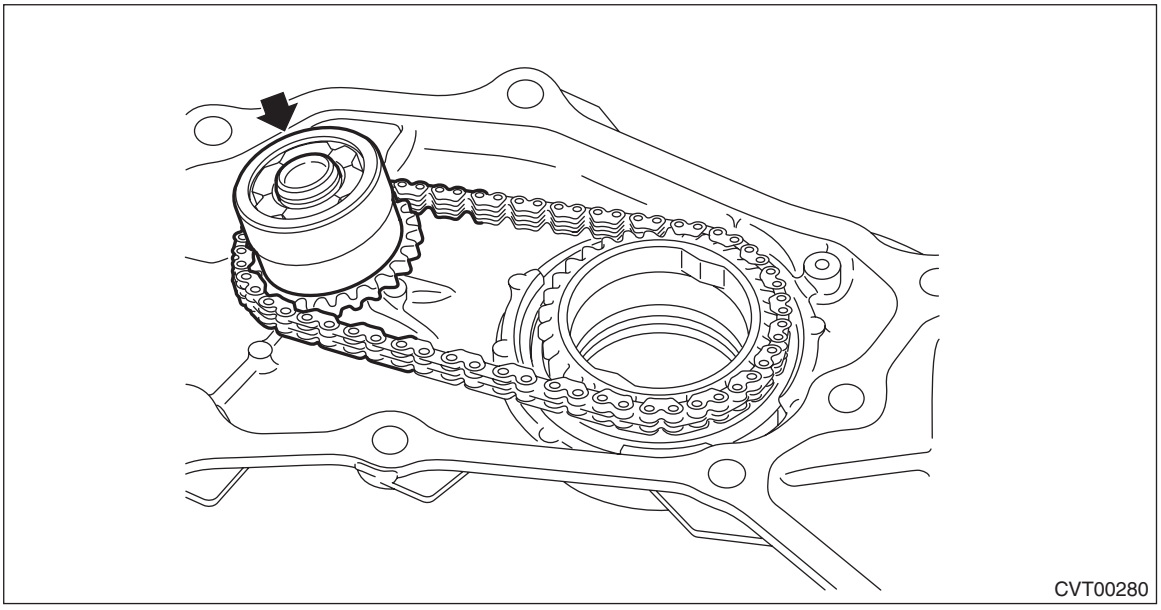


4) Install the snap ring so that its cutout portion is securely fitted into the snap ring groove of the oil pump chain cover.



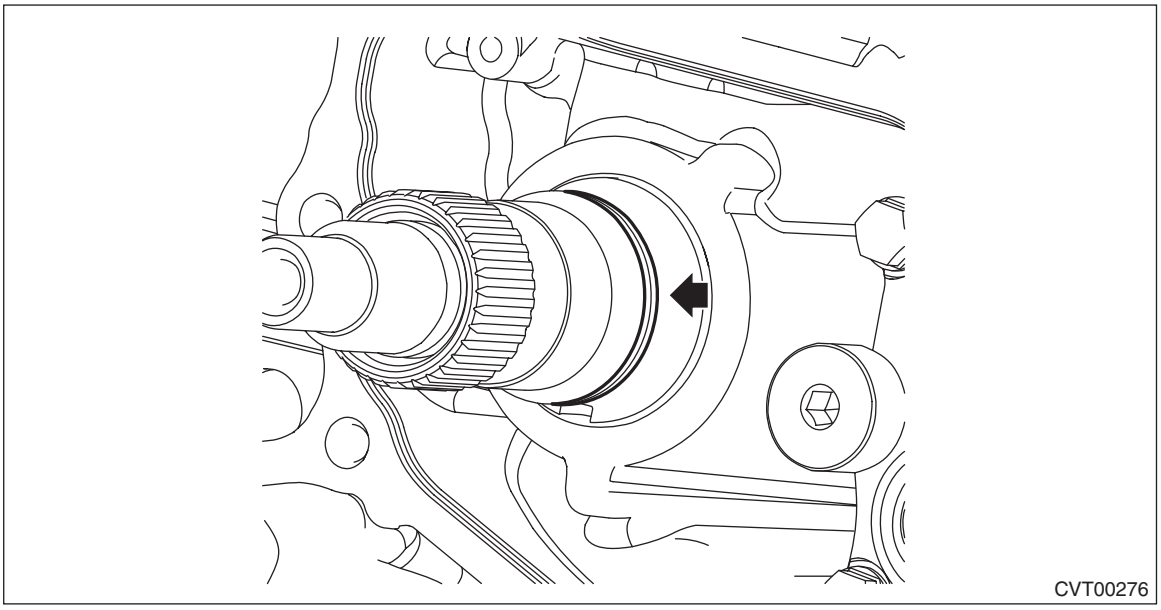
(A) Installation range of cutout portion for snap ring

5) Place the oil pump chain on drive sprocket.
6) Place the front oil pump chain on the oil pump sprocket (front) and install the oil pump sprocket (front) to oil pump chain cover.



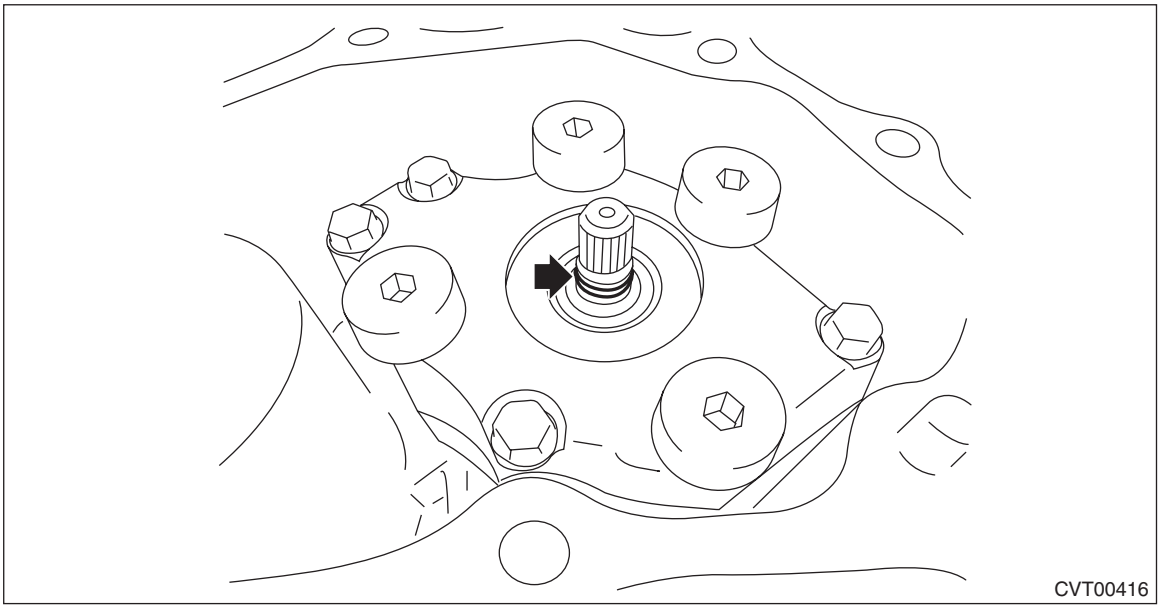
7) When replacing the oil pump sprocket (front) and the oil pump chain cover, select the oil pump shaft. <Ref. to CVT(TH58A)-391, ADJUSTMENT, Oil Pump.>
8) Install the seal ring.

NOTE:
- Use a new seal ring.
- Apply CVTF to the seal rings.
- When installing the seal ring, do not expand the seal ring too much.


CVT00276

9) Install the O-ring to the oil pump shaft.

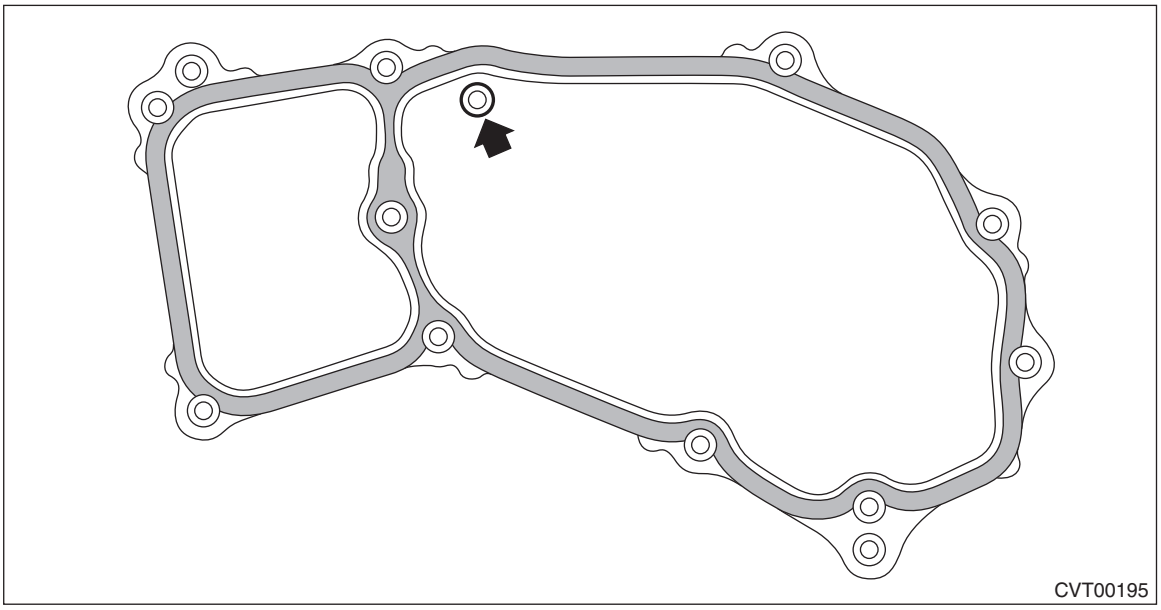
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.


CVT00416

10) Apply liquid gasket seamlessly to the mating surface of oil pump chain cover.

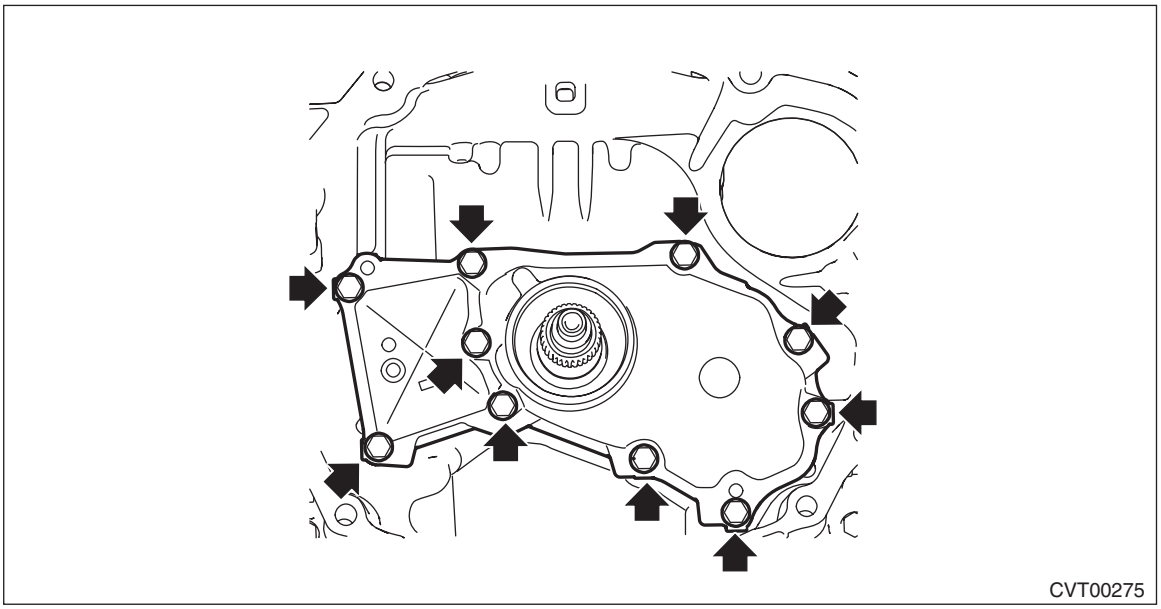
CAUTION:
Do not apply liquid gasket at the arrowed hole.

Liquid gasket:
THREE BOND 1215B or equivalent



11) Install the oil pump chain cover.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

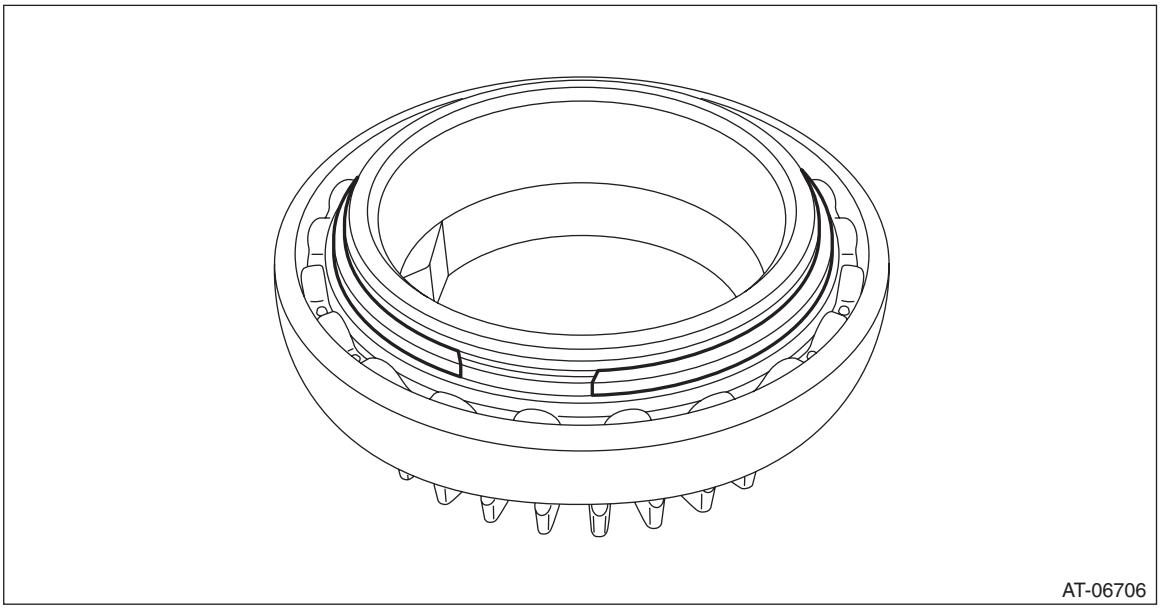


12) Install the torque converter assembly. <Ref. to CVT(TH58A)-179, INSTALLATION, Torque Converter Assembly.>
13) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

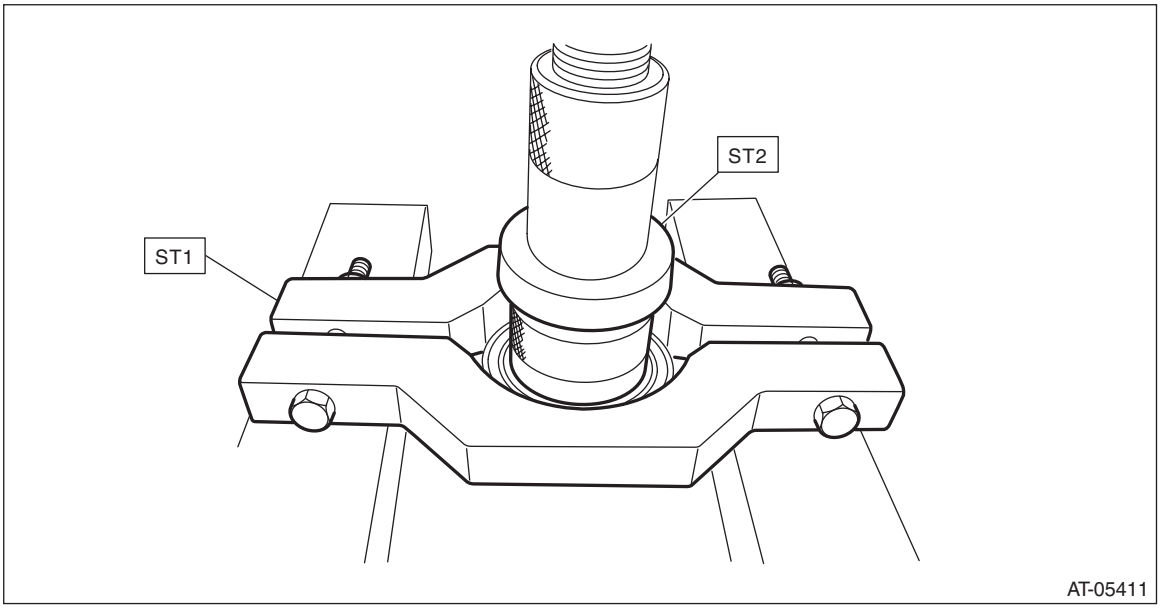
C: DISASSEMBLY

1. DRIVE SPROCKET

1) Remove the snap ring.



2) Remove the ball bearing using ST.
ST1 498077600 REMOVER
ST2 399513600 INSTALLER

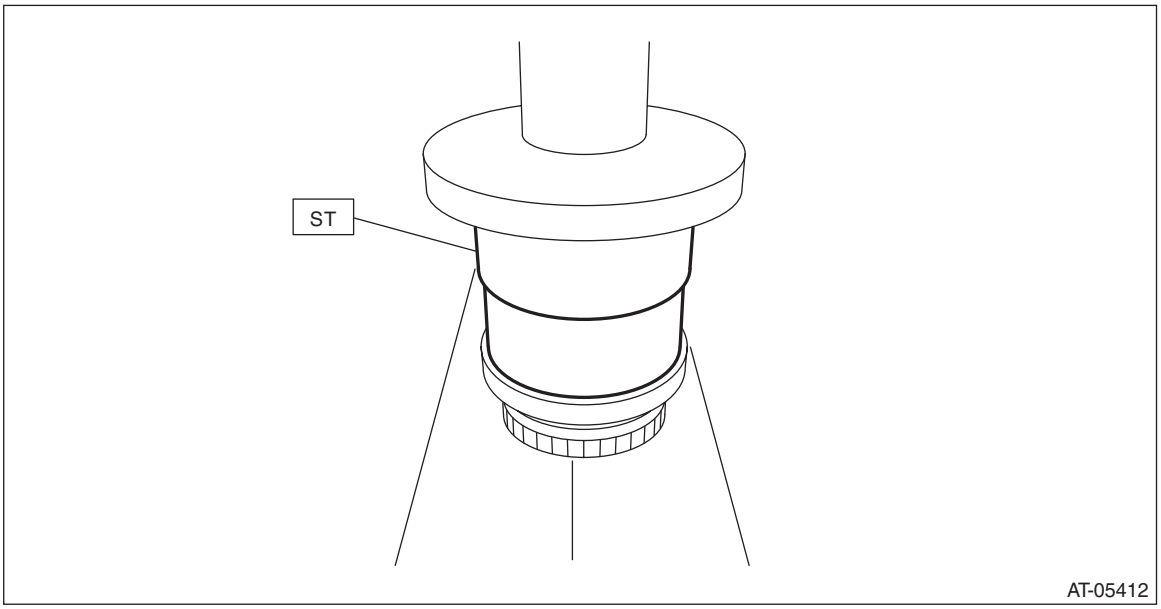


D: ASSEMBLY

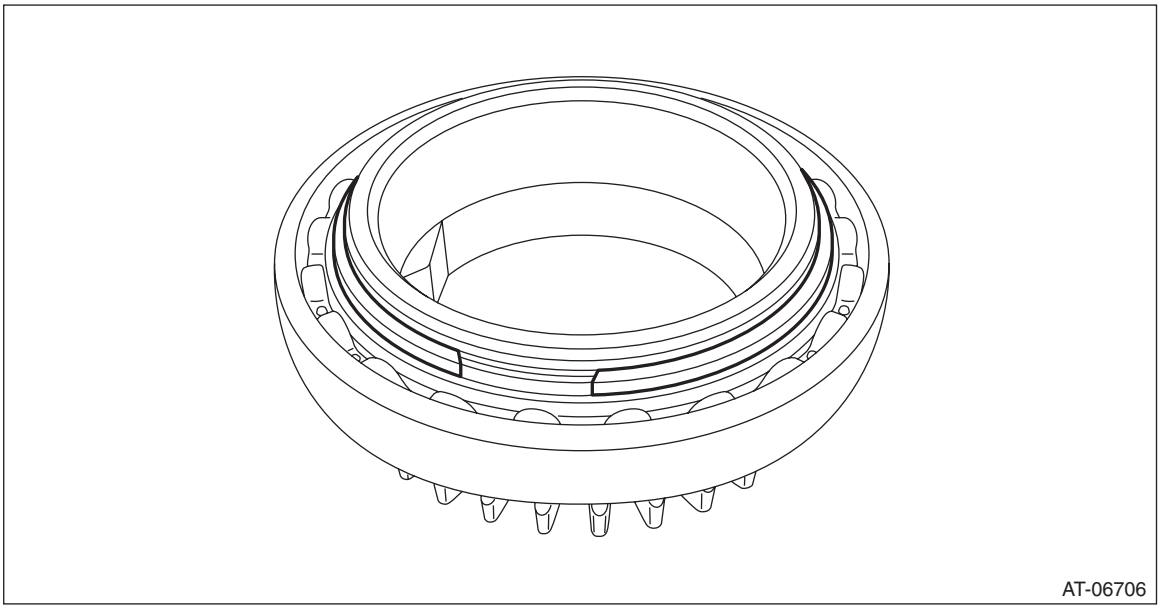
1. DRIVE SPROCKET

1) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST 499755502 PRESS SNAP RING



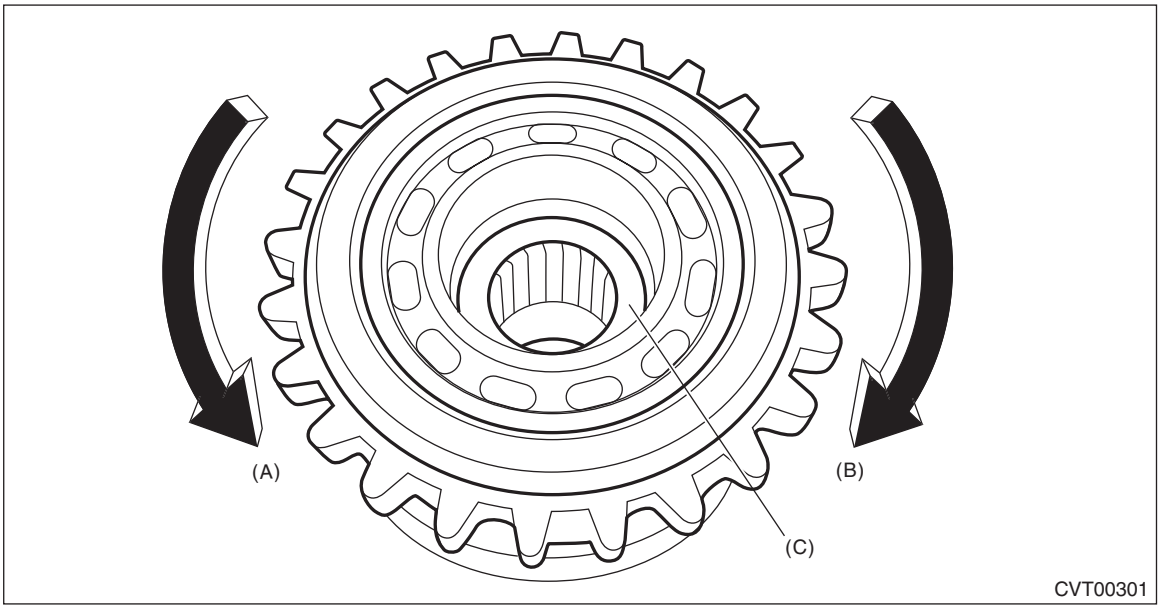
2) Install the snap ring.



E: INSPECTION

- Check the front oil pump chain for damage.
- Replace if gear teeth are broken, damaged, sharpen or excessively worn.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the oil pump chain cover for damage.
- Check for leakage of CVTF from the mating surface of oil pump chain cover.
- Check the oil seal for damage.
- Check the one-way clutch of the oil pump sprocket (front).

Secure the inner race, and check that the sprocket locks clockwise and rotates counterclockwise.

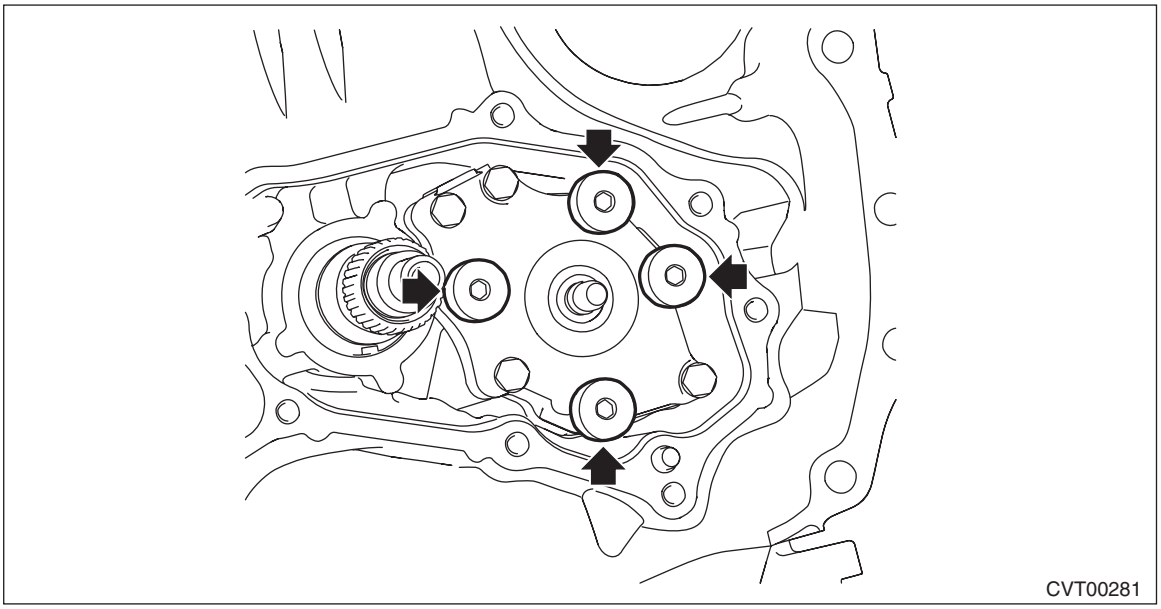


(A) Rotates freely
(B) Locked
(C) Inner race

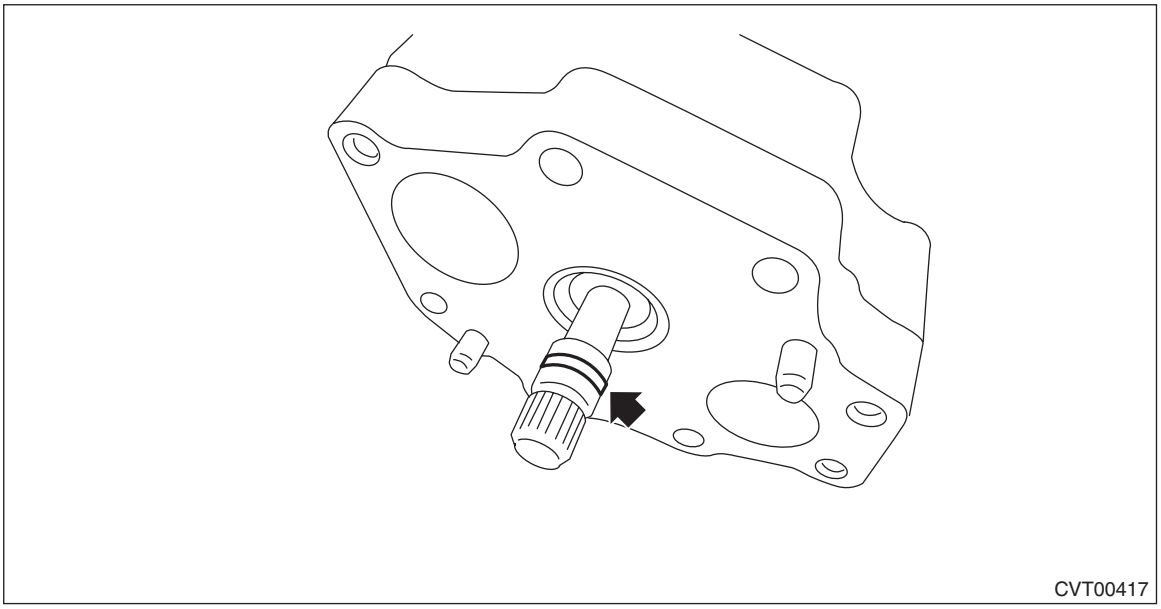
50.Oil Pump

A: REMOVAL

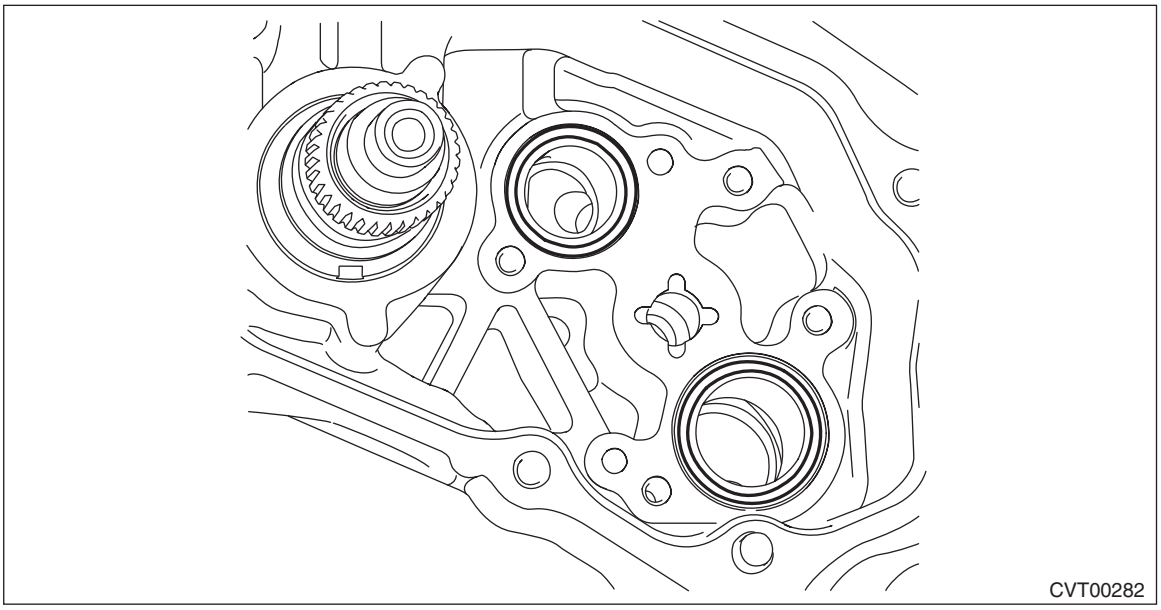
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to CVT(TH58A)-178, REMOVAL, Torque Converter Assembly.>
3) Remove the oil pump chain cover. <Ref. to CVT(TH58A)-376, REMOVAL, Oil Pump Chain.>
4) Remove the oil pump and the plate.


CVT00281

5) Remove the O-ring from the oil pump shaft.


CVT00417

6) Remove the O-ring.

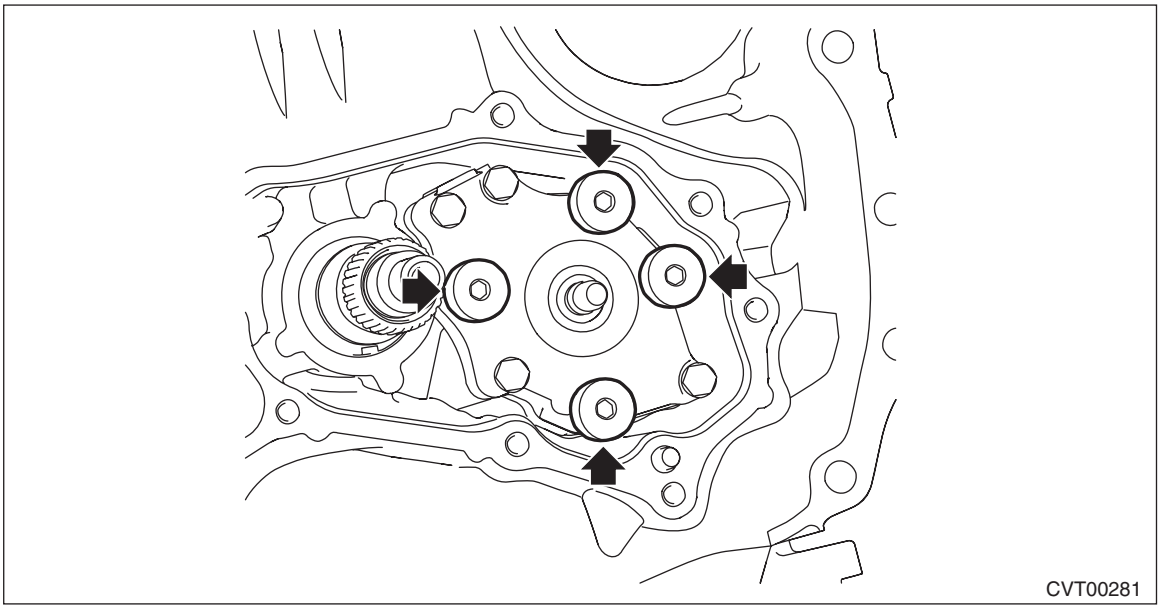


B: INSTALLATION

1) Install the plate and the oil pump.

NOTE:
Apply CVTF to the bolt.

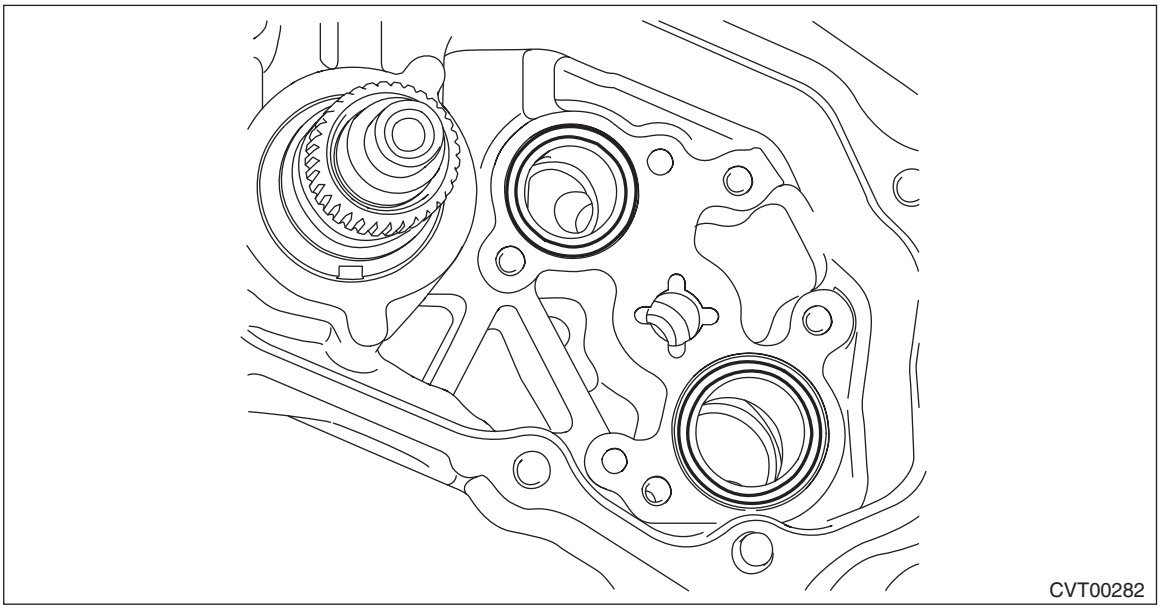
Tightening torque:
8.5 N·m (0.9 kgf-m, 6.3 ft-lb)



2) Select the oil pump shaft. <Ref. to CVT(TH58A)-391, ADJUSTMENT, Oil Pump.>
3) Remove the oil pump.

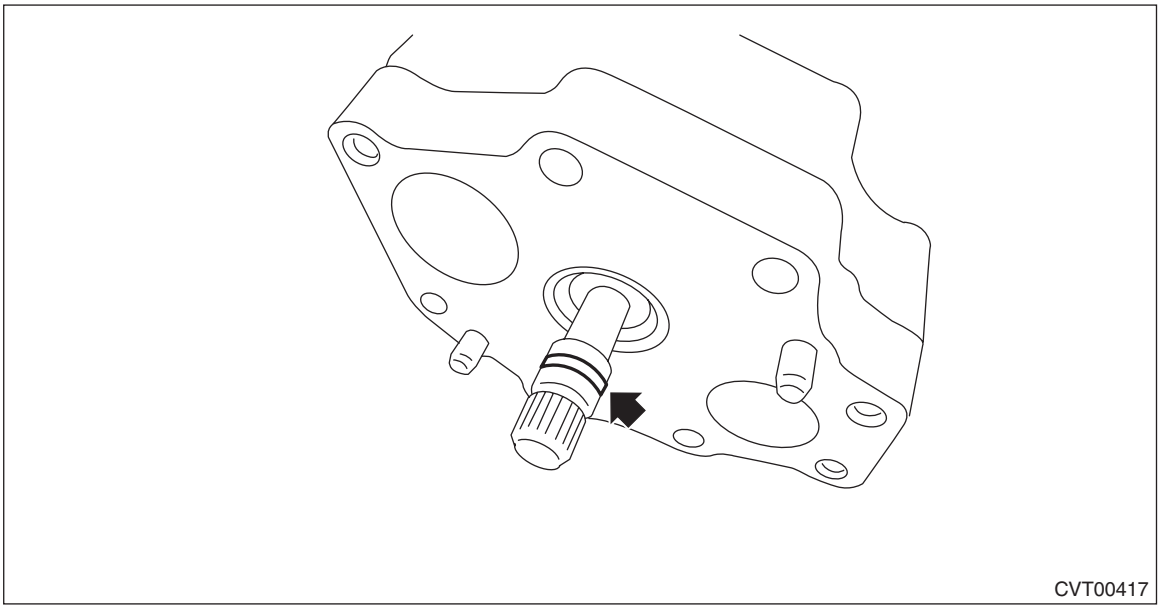
4) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.


CVT00282

5) Install the O-ring to the oil pump shaft.

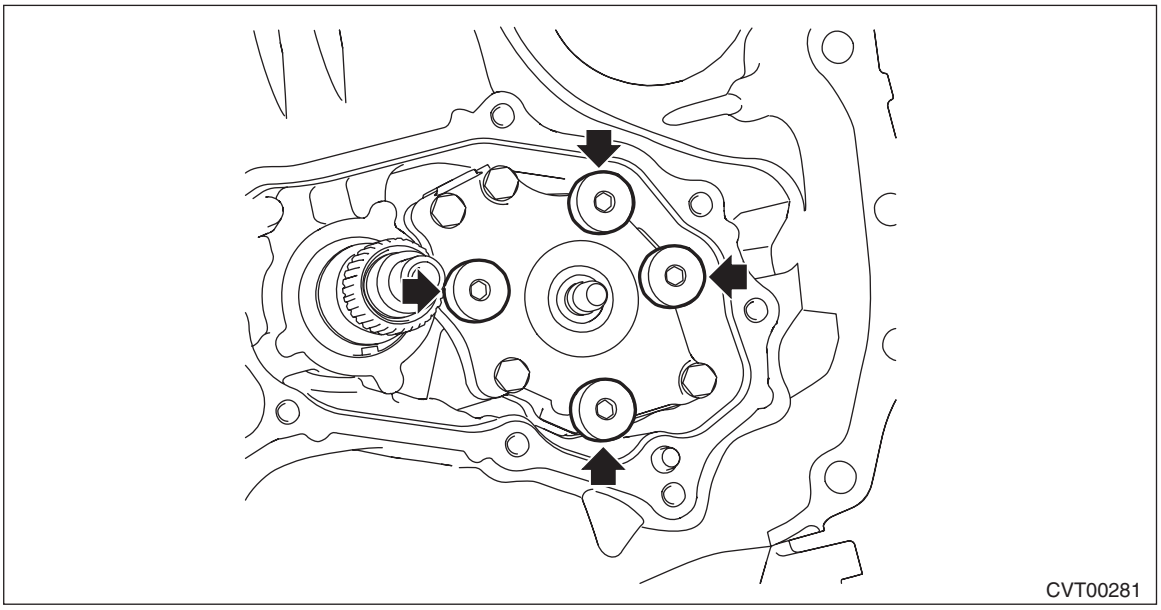
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.


CVT00417

6) Install the plate and the oil pump.

NOTE:
Apply CVTF to the bolt.

Tightening torque:
8.5 N·m (0.9 kgf-m, 6.3 ft-lb)



7) Install the oil pump chain cover. <Ref. to CVT(TH58A)-380, INSTALLATION, Oil Pump Chain.>
8) Install the selected oil pump shaft, and assemble the transmission assembly. <Ref. to CVT(TH58A)-295, INSTALLATION, Reverse Brake Assembly.>
9) Install the torque converter assembly. <Ref. to CVT(TH58A)-179, INSTALLATION, Torque Converter Assembly.>
10) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

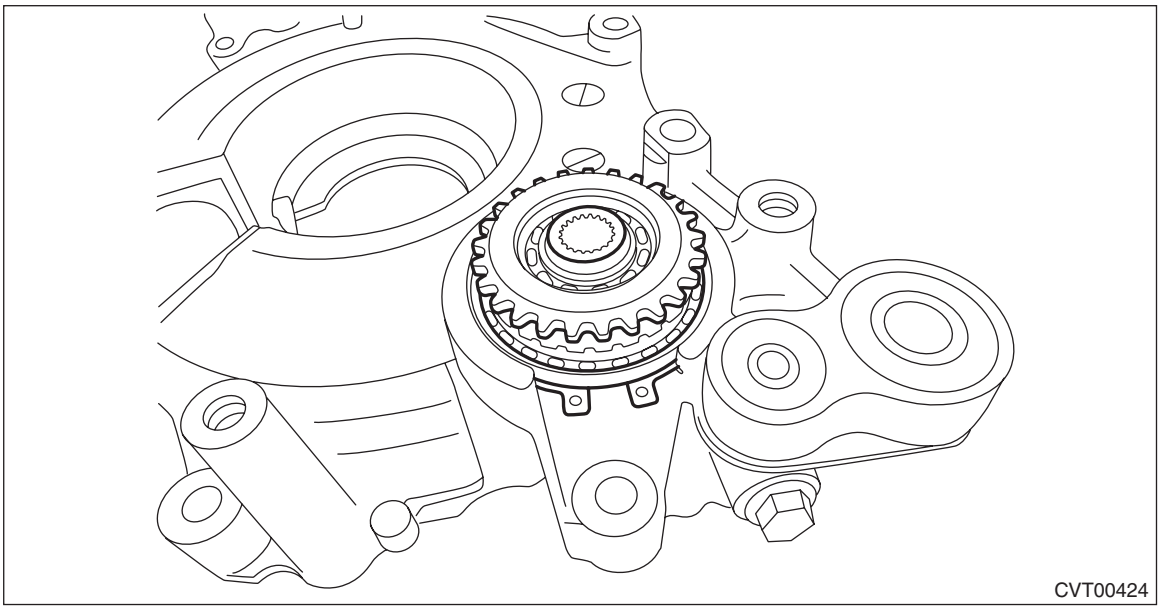
C: INSPECTION

Check the following items.
- Check the oil pump for damage and wear.
- Rotate the oil pump by hand, and check that it rotates smoothly.

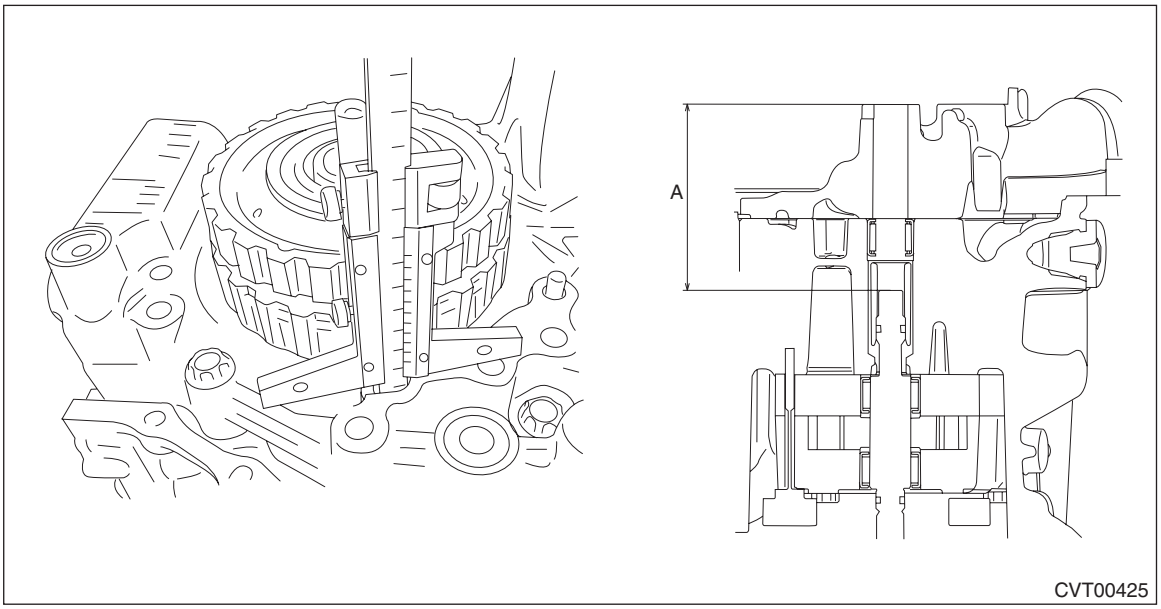
1) Measure the secondary pressure. <Ref. to CVT(TH58A)-55, INSPECTION, Secondary Pressure (Line Pressure) Test.>
2) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
3) Check oil strainer for clogging.
When oil strainer has no clogging, replace the oil pump.

D: ADJUSTMENT

1) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-292, REMOVAL, Reverse Brake Assembly.>
2) Install the oil pump sprocket rear to the reverse brake housing.

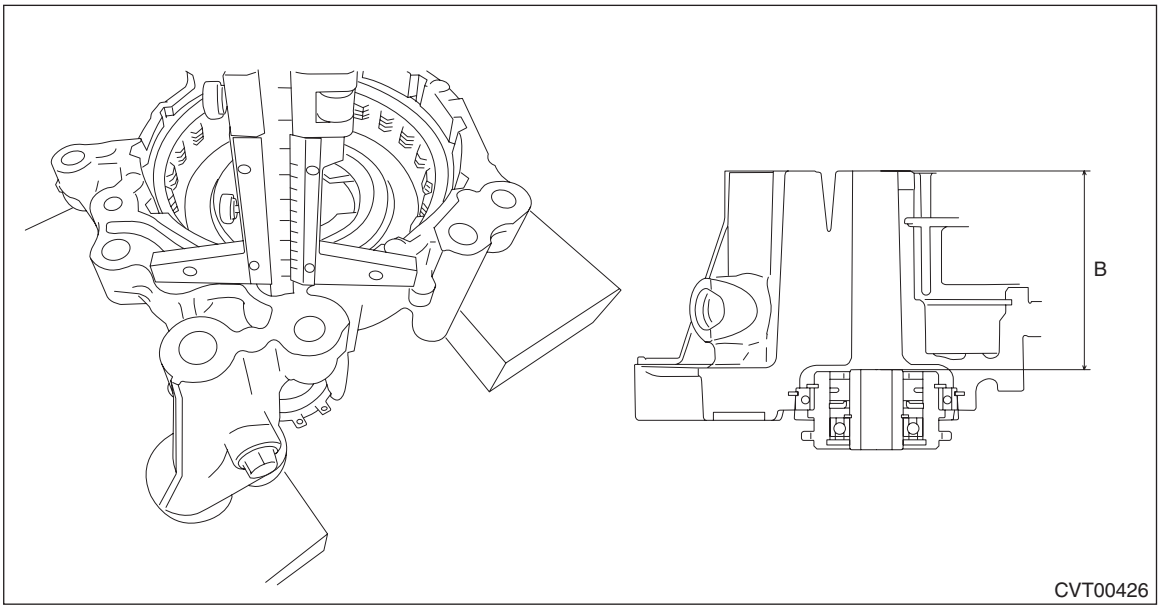

CVT00424

3) Measure the height “A” from the drive pinion retainer to the oil pump.



CVT00425

4) Measure the depth “B” from the mating surface of the reverse brake housing and the drive pinion retainer to the oil pump sprocket rear inner race.



5) Calculate the following formula and select the oil pump shaft.
T mm = A + B
[T in = A + B]
T: Distance from oil pump to oil pump sprocket rear inner race
A: Height from reverse brake housing mating surface to oil pump
B: Depth from drive pinion retainer mating surface to oil pump sprocket rear inner race

T mm (in)	Part No.
141.6 — 141.8(5.575 — 5.583)	31359AA220
141.8 — 142.0(5.583 — 5.591)	31359AA230
142.0 — 142.2(5.591 — 5.598)	31359AA240
142.2 — 142.4(5.598 — 5.606)	31359AA250
142.4 — 142.6(5.606 — 5.614)	31359AA260
142.6 — 142.8(5.614 — 5.622)	31359AA270
142.8 — 143.0(5.622 — 5.630)	31359AA280
143.0 — 143.2(5.630 — 5.638)	31359AA290

51.Converter Case

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-183, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-187, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-209, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-212, REMOVAL, Transmission Control Device.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-233, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-250, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-263, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-268, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-292, REMOVAL, Reverse Brake Assembly.>
22) Remove the forward clutch assembly. <Ref. to CVT(TH58A)-308, REMOVAL, Forward Clutch Assembly.>
23) Remove the drive pinion shaft assembly. <Ref. to CVT(TH58A)-328, REMOVAL, Drive Pinion Shaft Assembly.>
24) Remove the front differential assembly. <Ref. to CVT(TH58A)-357, REMOVAL, Front Differential Assembly.>
25) Remove the oil pump chain cover. <Ref. to CVT(TH58A)-376, REMOVAL, Oil Pump Chain.>
26) Remove the oil pump. <Ref. to CVT(TH58A)-387, REMOVAL, Oil Pump.>

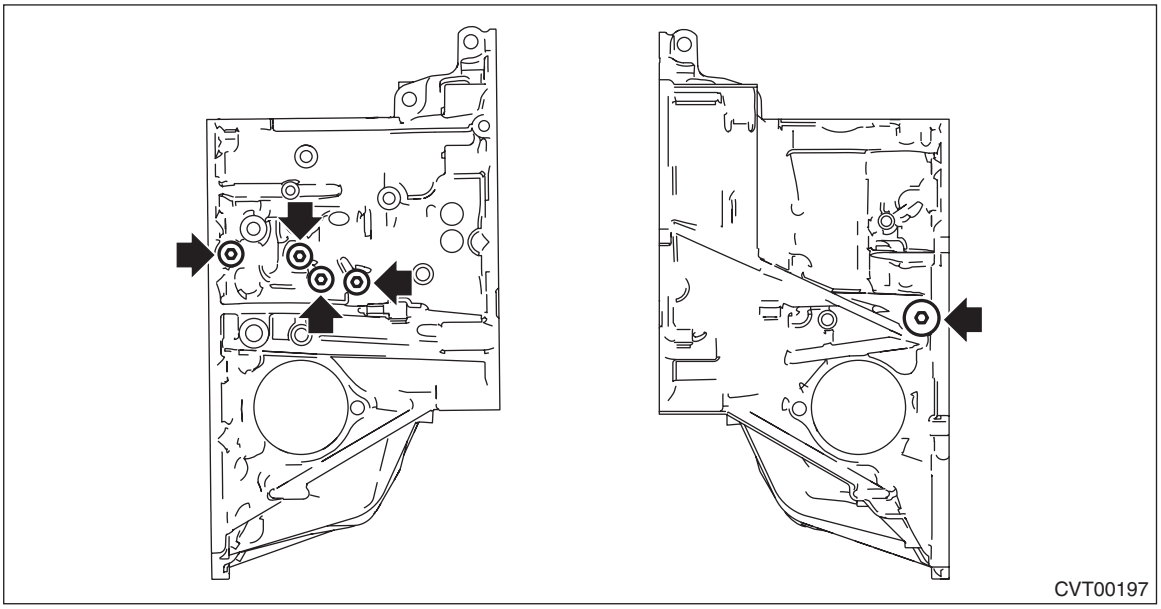
B: INSTALLATION

1) Install the oil pump. <Ref. to CVT(TH58A)-388, INSTALLATION, Oil Pump.>
2) Install the oil pump chain cover. <Ref. to CVT(TH58A)-380, INSTALLATION, Oil Pump Chain.>
3) Install the front differential assembly. <Ref. to CVT(TH58A)-359, INSTALLATION, Front Differential Assembly.>
4) Install the drive pinion shaft assembly. <Ref. to CVT(TH58A)-329, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Select the oil pump shaft. <Ref. to CVT(TH58A)-391, ADJUSTMENT, Oil Pump.>
6) Install the forward clutch assembly. <Ref. to CVT(TH58A)-311, INSTALLATION, Forward Clutch Assembly.>
7) Install the reverse brake assembly. <Ref. to CVT(TH58A)-295, INSTALLATION, Reverse Brake Assembly.>
8) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-276, INSTALLATION, Primary Pulley and Secondary Pulley.>
9) Install the transmission case. <Ref. to CVT(TH58A)-253, INSTALLATION, Transmission Case.>

10) Install the output clutch. <Ref. to CVT(TH58A)-234, INSTALLATION, Output Clutch Assembly.>
11) Install the drive motor assembly. <Ref. to CVT(TH58A)-223, INSTALLATION, Drive Motor Assembly.>
12) Install the transmission control device. <Ref. to CVT(TH58A)-215, INSTALLATION, Transmission Control Device.>
13) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
14) Install the parking pawl. <Ref. to CVT(TH58A)-210, INSTALLATION, Parking Pawl.>
15) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
16) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-202, INSTALLATION, Transfer Driven Gear.>
17) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-189, INSTALLATION, Transfer Clutch.>
18) Install the extension case. <Ref. to CVT(TH58A)-184, INSTALLATION, Extension Case.>
19) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
20) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
21) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
22) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
23) Install the control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
24) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
25) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
26) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the pitching stopper bracket and transmission radio ground cord, if mounted.
2) Remove the filler plug, oil drain plug and overflow drain plug. <Ref. to CVT(TH58A)-47, REPLACEMENT, Differential Gear Oil.>
3) Remove all plugs.



4) Remove the rubber cap.

D: ASSEMBLY

1) Install the rubber cap.
2) Install the oil drain plug.

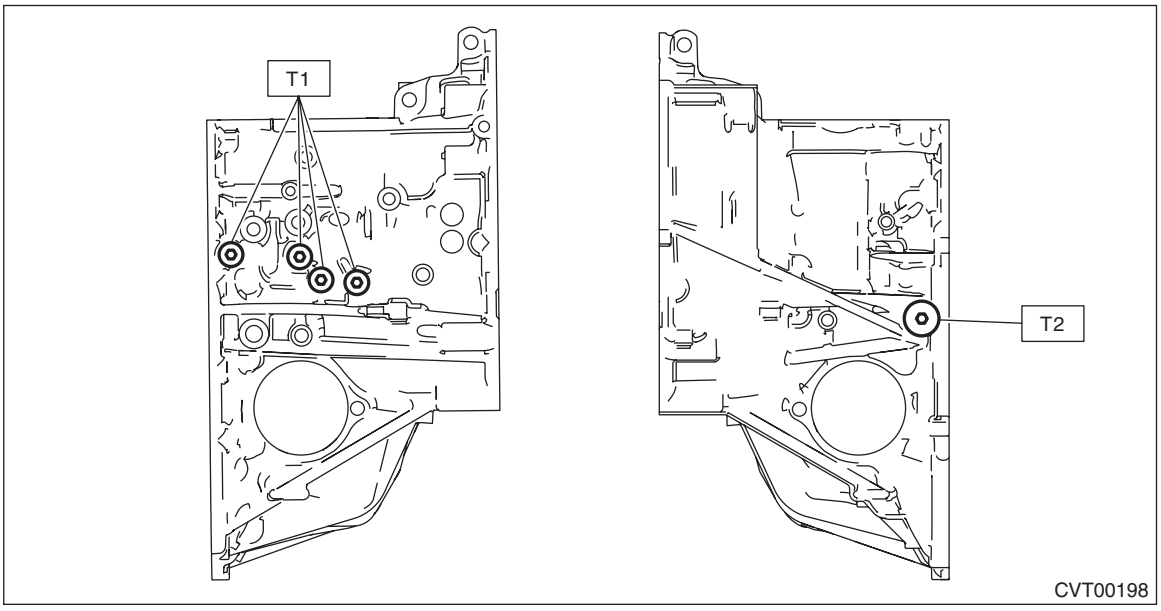
NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)
3) Install the overflow drain plug.

NOTE:
Overflow plug of differential gear oil is temporarily attached.
4) Install all plugs.

NOTE:
Use new O-rings.

Tightening torque:
T1: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
T2: 22.5 N·m (2.3 kgf-m, 16.6 ft-lb)



5) Install the pitching stopper bracket and transmission radio ground cord.

CAUTION:
Be careful not to deform or damage the terminal of transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

E: INSPECTION

- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check there is no damage or cracks on the converter case.

52.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
Stall speed is low after warming-up, with select lever in “D” or “R” range.	Engine control system
Vehicle does not move despite engine speed rising up, with select lever in “D” or “R” range.	• Engine control system • Select cable • CVTF • Secondary pressure circuit • Pulley, gear and variator chain • Forward/reverse changeover section • Output clutch • Torque converter assembly • TCM • Control valve body • Inhibitor switch
Vehicle does not move by engine stall, with select lever in “D” or “R” range.	• Parking mechanism • Select cable • Bearing • Forward/reverse changeover section • Output clutch
Excessive shock occurs at starting, with select lever in “D” or “R” range.	• Secondary pressure circuit • Control valve body • Pulley, gear and variator chain • Output clutch
Acceleration speed from standstill is insufficient, with select lever in “D” or “R” range.	• Control valve body • Forward/reverse changeover section • Output clutch • Torque converter assembly • Drive motor
Engine speed suddenly rises up during driving, with select lever in “D” or “R” range.	• Control valve body • Secondary pressure circuit • Primary pressure circuit
Vibration occurs during driving, with select lever in “D” or “R” range.	• Secondary pressure circuit • Primary pressure circuit • Forward/reverse changeover section • Pulley and variator chain • Torque converter assembly • Hydraulic pressure circuit to torque converter • Control valve body • Drive motor • Output clutch
Sudden braking occurs during driving, with select lever in “D” or “R” range.	• Secondary pressure circuit • Primary pressure circuit • Control valve body • Drive motor
During deceleration, lockup clutch does not disengage until just before halting, with select lever in “D” or “R” range.	• Control valve body • Torque converter assembly • CVTF
Engine stalls with vehicle at a standstill, with select lever in “D” or “R” range, except for Auto Start Stop.	• Engine control system • Control valve body • Torque converter assembly
Excessive lockup shock occurs during driving, with select lever in “D” range.	Control valve body
Slipping occurs at lockup, or lockup does not occur during driving, with select lever in “D” range.	• Control valve body • Lockup hydraulic line • Torque converter assembly

Symptoms	Faulty parts
Excessive shift shock occurs when shifting the select lever from “N” range to “D” range, or from “N” range to “R” range.	• Inhibitor switch • Control valve body • Forward/reverse changeover section
Vehicle does not keep at standstill with select lever in “P” range, or parking cannot be released when shifting from “P” range to another range.	• Select cable • Parking mechanism
Select lever does not shift smoothly.	• Select cable • Inhibitor switch • Detent spring • Manual plate
Clutch engagement shock occurs when engine is restarted from the Auto Start Stop condition and driving with motor.	• Electric oil pump • Relief valve • Electric oil pump hydraulic circuit • Forward clutch • CVTF
Large clutch engagement shock occurs with vehicle at a standstill.	• Output clutch • Forward clutch • CVTF • Torque converter assembly • Output clutch control valve body

CONTINUOUSLY VARIABLE TRANSMISSION (DIAGNOSTICS)

CVT(HEV)(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to CVT(HEV)(diag)-4, Check List for Interview.> 2) Before performing diagnostics, check the following items which might affect CVT problems. • General inspection <Ref. to CVT(HEV)(diag)-5, INSPECTION, General Description.> • Disconnection of harness connector • Visual check for harness damage • Oil leakage • Stall test <Ref. to CVT(TH58A)-52, Stall Test.> • Secondary pressure test <Ref. to CVT(TH58A)-55, Secondary Pressure (Line Pressure) Test.> • Output clutch pressure test <Ref. to CVT(TH58A)-58, Output Clutch Pressure Test.> • Transfer clutch pressure test <Ref. to CVT(TH58A)-60, Transfer Clutch Pressure Test.> • Time lag test <Ref. to CVT(TH58A)-54, Time Lag Test.> • Road test <Ref. to CVT(TH58A)-50, Road Test.> • Inhibitor switch <Ref. to CVT(TH58A)-97, Inhibitor Switch.> • Electric oil pump inspection mode <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is the item that is thought to influence the CVT problem working properly?	Go to step **2**.	Repair the items which may be affecting the CVT trouble.
2	**CHECK AT OIL TEMP LIGHT.** Turn the ignition switch to ON and wait for at least 2 seconds.	Does the AT OIL TEMP light illuminate?	Go to step **3**.	Check the AT OIL TEMP light.
3	**CHECK AT OIL TEMP LIGHT.** Start the engine and wait for 2 seconds or more.	Does the AT OIL TEMP light blink?	Go to step **4**.	Go to step **5**.
4	**CHECK DTC DISPLAY.** Read the DTC. NOTE: If the communication function of Subaru Select Monitor cannot be executed normally, check the communication circuit. <Ref. to CVT(HEV)(diag)-33, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.>	Is DTC displayed on Subaru Select Monitor?	Record the DTC, time stamp and freeze frame data. Go to step **6**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Go to step **5**.

	Step	Check	Yes	No
5	**PERFORM GENERAL DIAGNOSTICS.** 1) Inspect using “Diagnostic Procedure without Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-213, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Inspect using “Diagnostics with Phenomenon”. <Ref. to CVT(HEV)(diag)-214, Diagnostics with Phenomenon.> 3) Perform the Inspection Mode. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.> 4) Read the DTC.	Is DTC displayed on Subaru Select Monitor?	Go to step **6**.	Finish the diagnosis.
6	**PERFORM DIAGNOSIS.** 1) Inspect by referring to “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-42, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For the DTC table, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-35, List of Diagnostic Trouble Code (DTC).> 2) Repair the trouble cause. 3) Perform the Clear Memory Mode. 4) Perform the Inspection Mode. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.> 5) Read the DTC.	Is DTC displayed on Subaru Select Monitor?	Inspect by referring to “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-42, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Check the following items when a problem has occurred.

NOTE:
Use copies of this page for interviewing customers.

Customer's name			
Date of purchase			
Date of repair			
Transmission model	Transmission	V.I.N.	
Odometer reading	km (miles)		
Frequency	❑ Continuous ❑ Intermittent (times/day)		
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Other ( )		
Place	❑ Highland ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Downhill ❑ Rough road ❑ Other ( )		
Ambient air temperature	❑ Hot ❑ Warm ❑ Cool ❑ Cold		
Vehicle speed	km/h (MPH)		
AT OIL TEMP light	❑ Blinks continuously	❑ Does not blink	
Select lever position	❑ P ❑ R ❑ N ❑ D ❑ Manual mode		
Driving condition	❑ Not affected ❑ At racing ❑ While decelerating ❑ While EV traveling	❑ At starting ❑ While accelerating ❑ While turning (❑ RH/❑ LH)	❑ While idling ❑ When cruising (Vehicle speed km/h) ❑ Immediately after starting the engine
Manual mode	❑ ON ❑ OFF		
Symptoms	❑ Vehicle does not move (❑ Any position ❑ Particular position)		
	❑ Vehicle does not move (no load racing condition as in N range)		
	❑ Vehicle does not move (engine speed does not increase, felt as stall condition)		
	❑ Noise or vibration (Describe concretely:)		
	❑ Shock felt at N → D selection (seconds after shifting, when engine cold or after warm-up)		
	❑ Shock felt at N → R selection (seconds after shifting, when engine cold or after warm-up)		
	❑ Shifting is wrong (Describe concretely:)		
	❑ Shock or judder during driving		
	❑ Fails to accelerate.		
	❑ Engine speed increases abruptly during driving		
	❑ Shock or judder during standing start		
	❑ Select lever does not move		
	❑ Other ( )		

3. General Description

A: CAUTION

1. SRS AIRBAG SYSTEM

The airbag system wiring harness is routed near the TCM.

CAUTION:
• All the airbag system wiring harnesses and connectors are colored yellow. Do not use an electric test equipment to check these circuits.
• Be careful not to damage the airbag system wiring harness when performing diagnostics or servicing the TCM.

2. HYBRID SYSTEM

Refer to “CAUTION (HYBRID SYSTEM)” in “PRECAUTION section”. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

3. MEASUREMENT

When measuring the voltage and resistance of the ECM, TCM or each sensor, use a tapered pin with a diameter of less than 0.64 mm (0.025 in) in order to avoid poor contact. Do not insert a pin of more than 0.65 mm (0.026 in) diameter.

B: INSPECTION

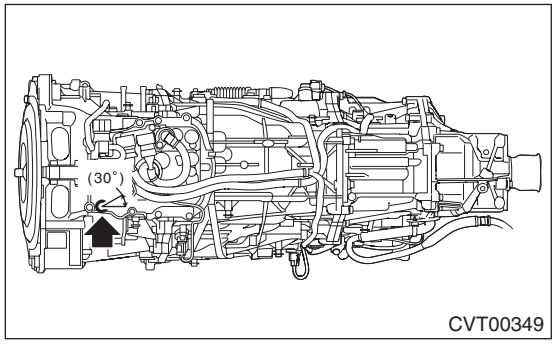
1. 12 VOLT AUXILIARY BATTERY

Check the battery. <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

Tightening torque:
14 N·m (1.4 kgf-m, 10.3 ft-lb)



3. OPERATION OF SELECT LEVER

Make sure there is no noise, dragging or contact pattern in each select lever range.

WARNING:
Stop the engine while checking operation of the select lever.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

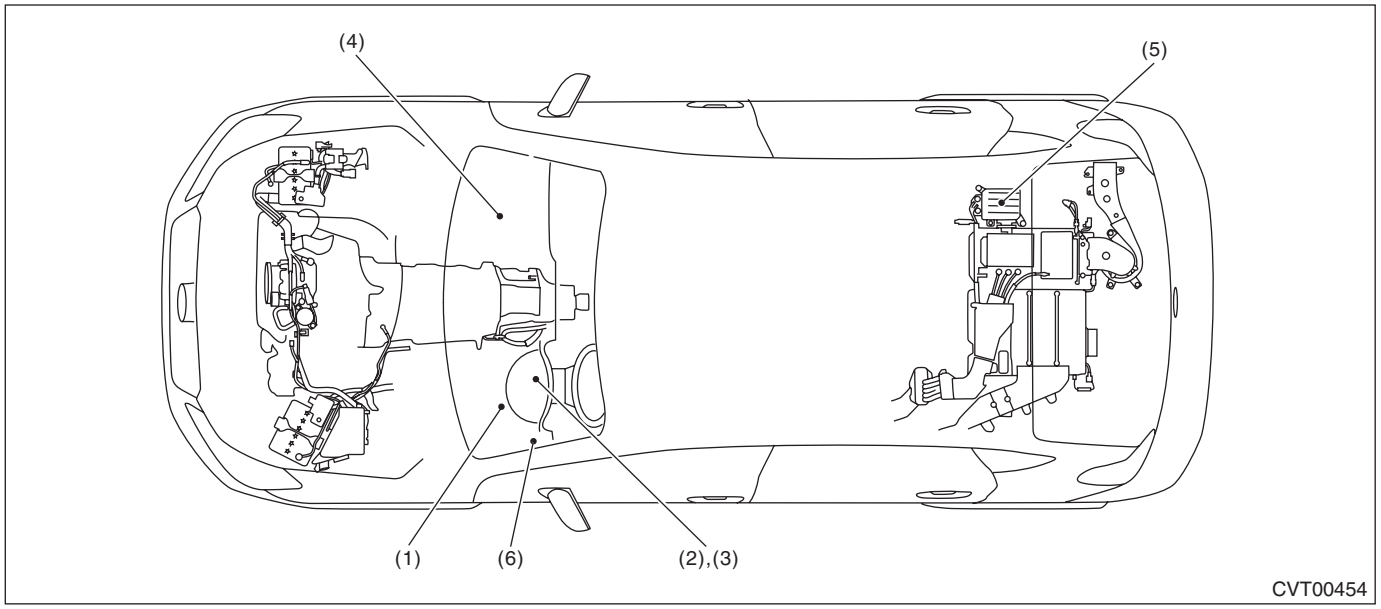
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.
DST-i	Used together with Subaru Select Monitor 4.

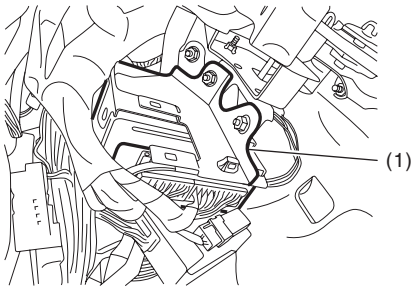
4. Electrical Component Location

A: LOCATION

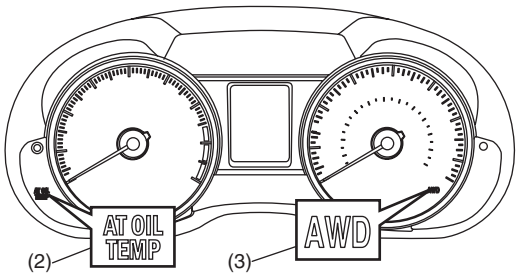
1. CONTROL MODULE



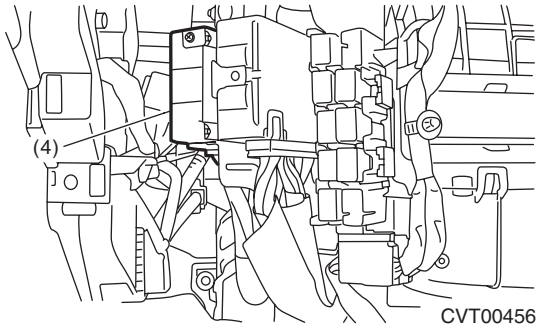
(1) Transmission control module (TCM)
(2) AT OIL TEMP light
(3) AWD light
(4) Hybrid powertrain control module (HPCM)
(5) Electric oil pump inverter
(6) Data link connector



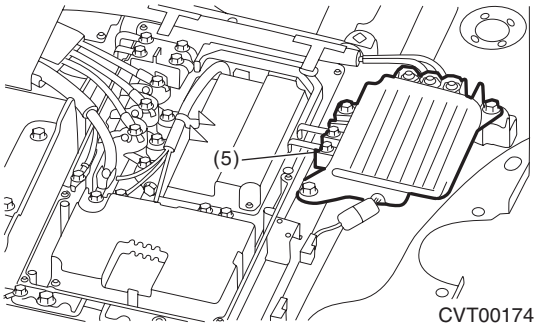
CVT00455



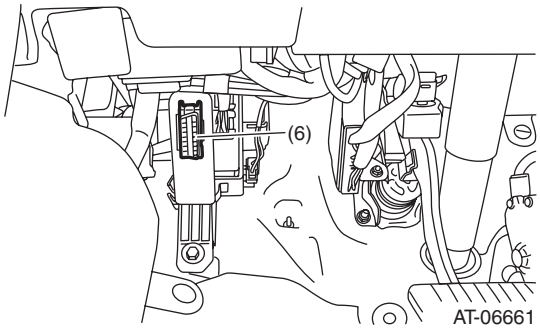
CVT00202



CVT00456

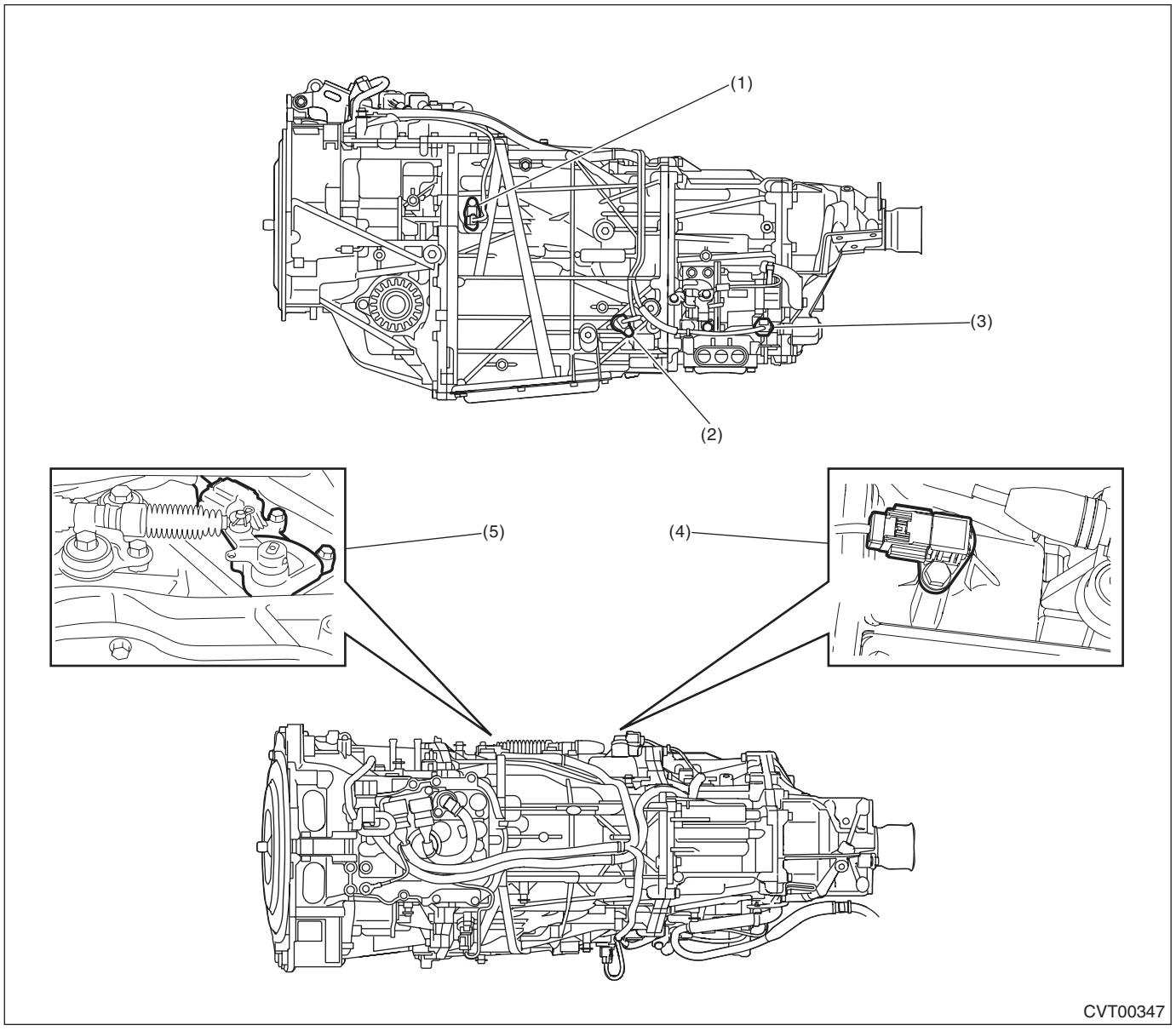


CVT00174



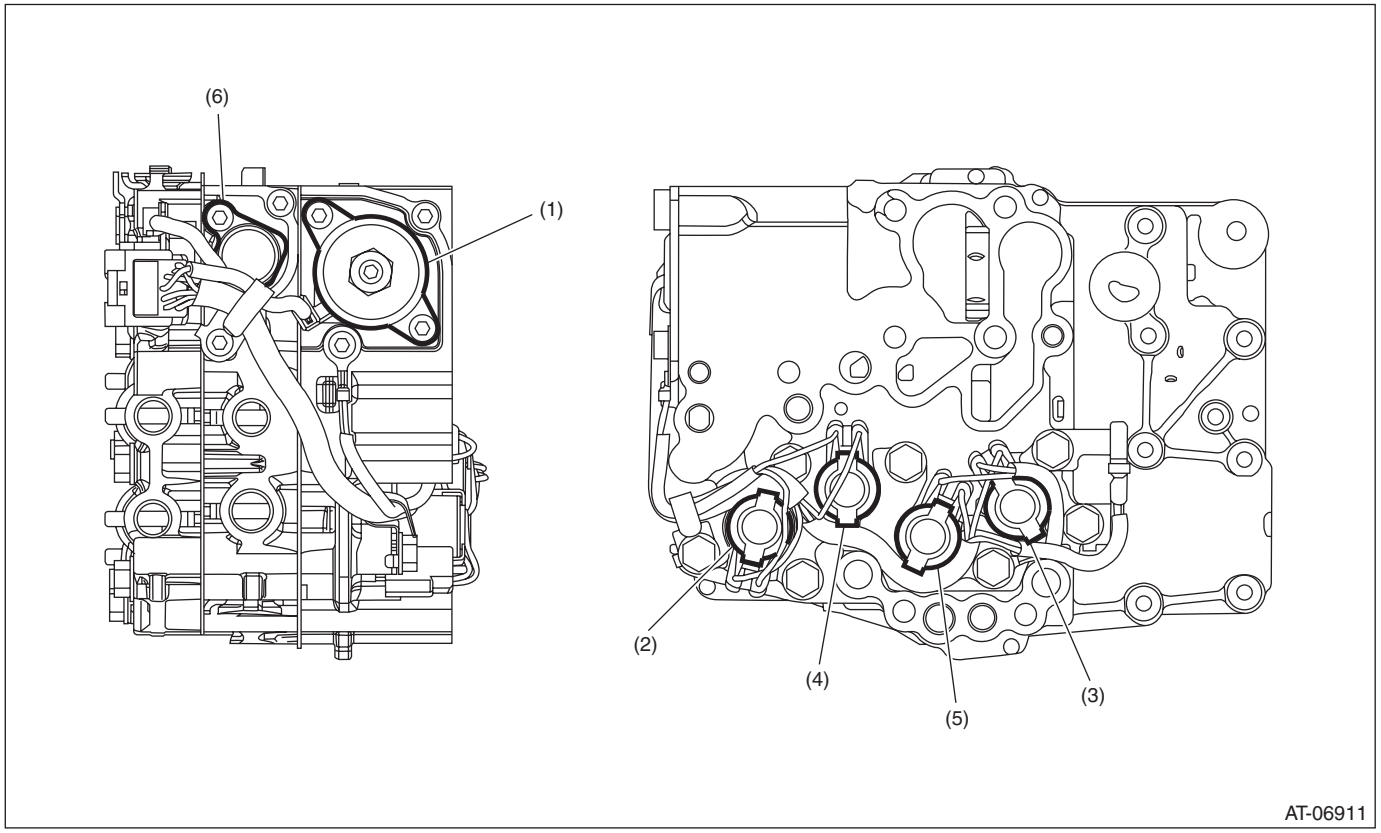
AT-06661

2. SENSOR

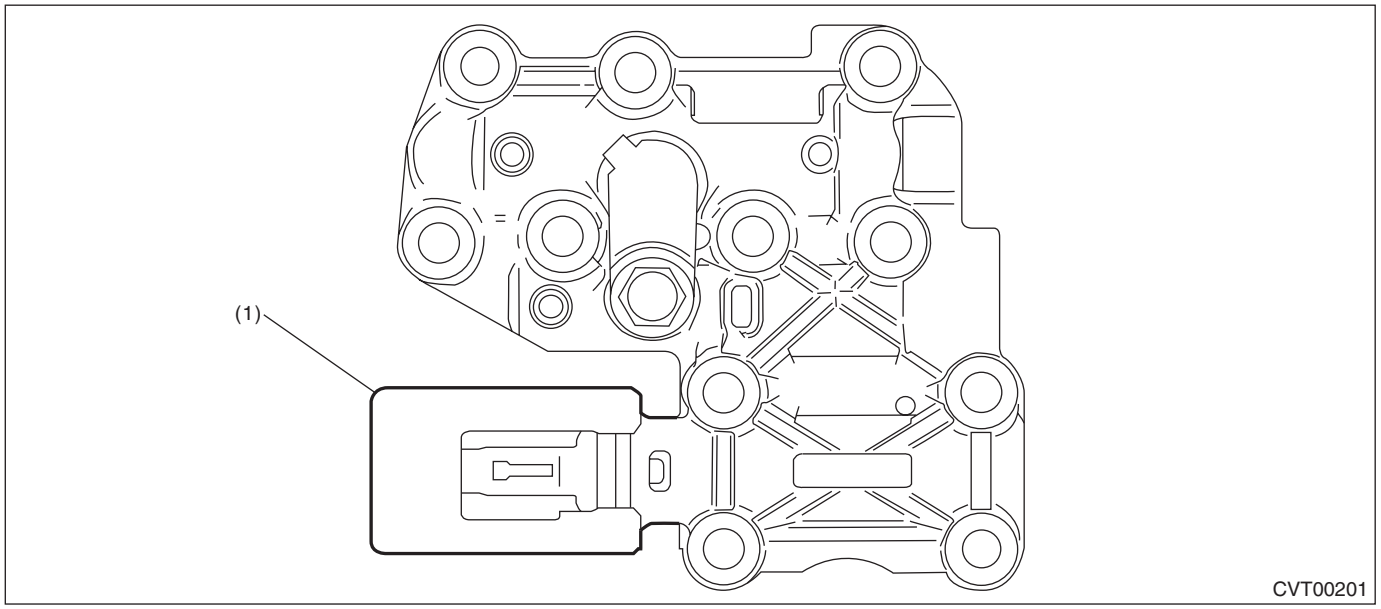


(1) Turbine speed sensor
(2) Secondary speed sensor
(3) Secondary pressure sensor
(4) Front wheel speed sensor
(5) Inhibitor switch

3. SOLENOID



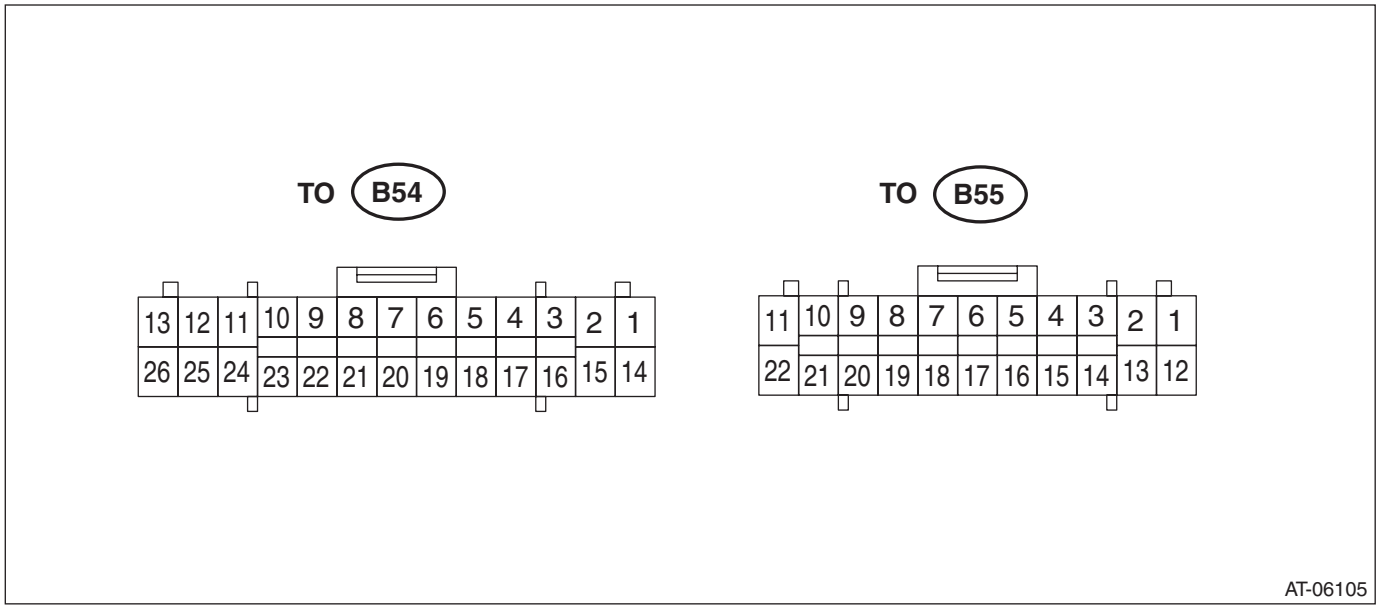
(1) Secondary solenoid
(2) AWD solenoid
(3) Lock-up duty solenoid
(4) Primary DOWN solenoid
(5) Primary UP solenoid
(6) F&R solenoid



(1) Output clutch solenoid

5. Transmission Control Module (TCM) I/O Signal

A: ELECTRICAL SPECIFICATION



NOTE:
Measure after warming up.

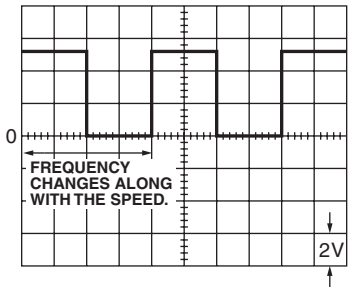
Item	Connector No.	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
Backup power supply	B55	1	—	10 — 13 V	—	
Ignition power supply	B55	21	—	10 — 13 V	—	
Main power supply	B55	11	—	10 — 13 V	—	
Main power supply	B55	2	—	10 — 13 V	—	
Main power supply	B55	22	—	10 — 13 V	—	
Manual mode switch	B55	4	Manual mode switch ON	Less than 1 V	—	
			Manual mode switch OFF	8 V or more	—	
Manual mode UP switch	B55	5	Manual mode UP switch ON	Less than 1 V	—	
			Manual mode UP switch OFF	8 V or more	—	
Manual mode DOWN switch	B55	16	Manual mode DOWN switch ON	Less than 1 V	—	
			Manual mode DOWN switch OFF	8 V or more	—	
Stop light switch	B55	13	Stop light switch ON	8 V or more	—	
			Stop light switch OFF	Less than 1 V	—	
P range switch	B54	5	P range	Less than 1 V	—	
			Except for P range	8 V or more	—	
R range switch	B54	18	R range	Less than 1 V	—	
			Except for R range	8 V or more	—	
R range switch 2	B54	21	R range	Less than 1 V	—	
			Except for R range	8 V or more	—	
P N range switch	B55	15	At P, N range	Less than 1 V	—	
			Except for P, N range	8 V or more	—	

Item	Connector No.	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
N range switch	B54	9	N range	Less than 1 V	—	
			Except for N range	8 V or more	—	
D range switch	B54	22	D range	Less than 1 V	—	
			Except for D range	8 V or more	—	
ATF temperature sensor	B54	3	ATF temperature at 20°C (68°F)	Approx. 2.5 V	Approx. 2.5 kΩ	
			ATF temperature at 80°C (176°F)	Approx. 0.7 V	Approx. 330 Ω	
ATF temperature sensor GND	B54	16	Always	Approx. 0 V	—	
Secondary pressure sensor power supply	B54	2	Ignition switch ON	5 V	—	
Secondary pressure sensor	B54	17	Ignition switch ON, engine OFF	Approx. 0.5 V (0 MPa)	—	Value increases with increase of engine load. (0.5 — 4.5 V)
			Ignition switch ON, engine ON	Approx. 1.0 V (1.0 MPa)	—	
Secondary pressure sensor GND	B54	15	Always	Approx. 0 V	—	
Secondary speed sensor	B54	7	While driving	0 or 5 V	—	Refer to the waveform (sensor)
Turbine speed sensor	B54	20	Engine ON, “P” or “N” range	0 or 5 V	—	Refer to the waveform (sensor)
Front wheel speed sensor	B54	19	While driving	0 or 5 V	—	Refer to the waveform (sensor)
Self shut relay output	B55	20	For three seconds after ignition switch ON and OFF	Less than 1 V	—	
			Ignition switch OFF	8 V or more		
F&R solenoid	B54	11	Engine ON	Refer to the waveform (solenoid (1))	Approx. 4 — 6 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Secondary solenoid	B54	12	Engine ON	Refer to the waveform (solenoid (2))	Approx. 5 — 7 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Primary UP solenoid	B54	24	Engine ON, while UP shifting	Refer to the waveform (solenoid (3))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Primary DOWN solenoid	B54	25	Engine ON, while DOWN shifting	Refer to the waveform (solenoid (4))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Lock-up duty solenoid	B54	26	Lock-up ON	Refer to the waveform (solenoid (5))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.

Item	Connector No.	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
AWD solenoid	B54	13	Engine ON, “P” or “N” range	Refer to the waveform (solenoid (6))	Approx. 2 — 4.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
			Engine ON, “D” range, brake ON	Refer to the waveform (solenoid (7))		
Output clutch solenoid	B54	10	Engine ON, “P” or “N” range	Refer to the waveform (solenoid (8))	Approx. 4 — 6 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
CAN communication line (+)	B55	18	—	—	—	
CAN communication line (–)	B55	17	—	—	—	
CAN communication line 2 (+)	B55	10	—	—	—	
CAN communication line 2 (–)	B55	9	—	—	—	
GND	B54	1	Always	Approx. 0 V	—	
GND	B54	14	Always	Approx. 0 V	—	

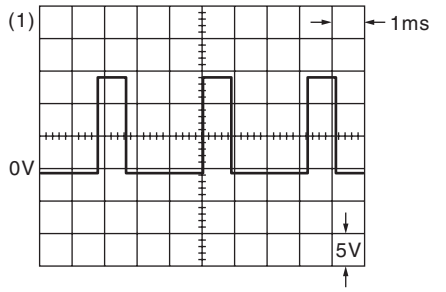
B: WAVEFORM

1. SENSOR

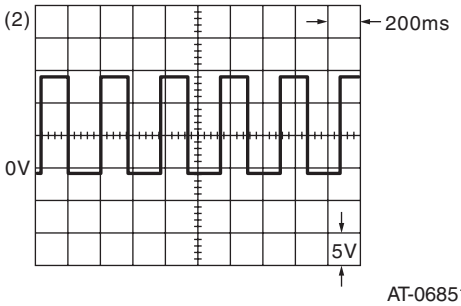


AT-04690

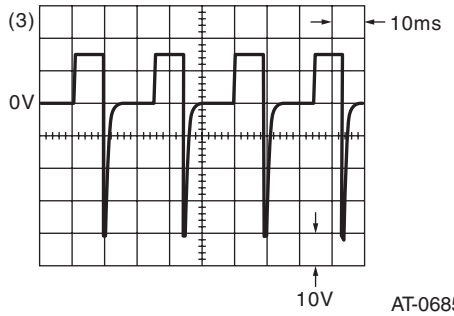
2. SOLENOID



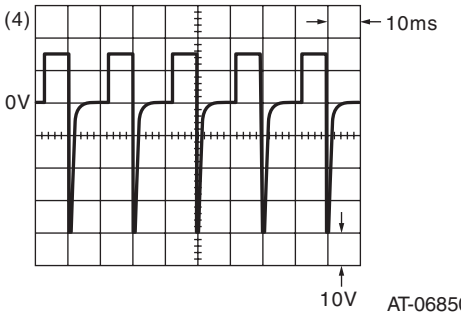
AT-06855



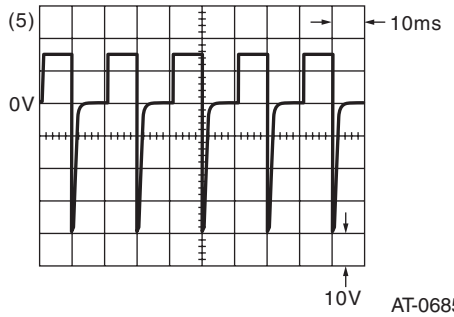
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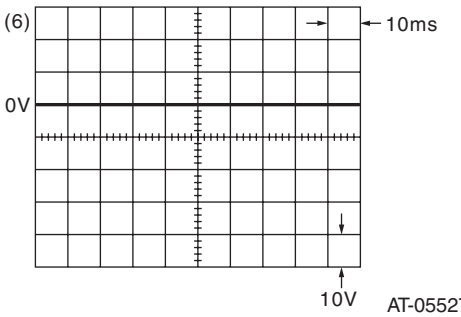
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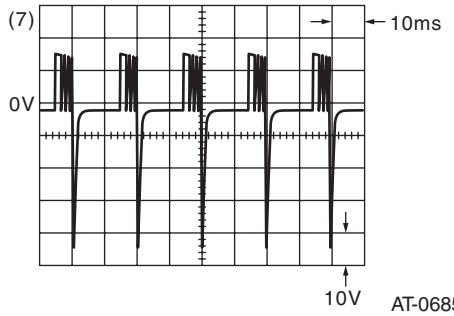
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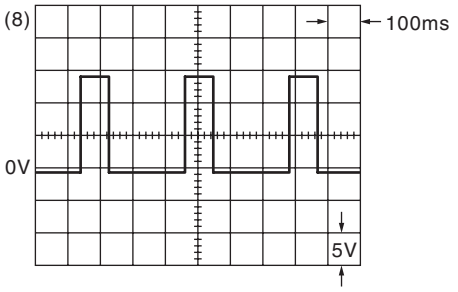
AT-06853



AT-05527



AT-06854



CVT00431

6. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

For detailed operation procedures, refer to “Application help”.

2. READ CURRENT DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «Data Monitor».

Display	Contents	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Revolution Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the output clutch output axis rotation speed.	km/h or MPH
ATF Temperature	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Front Wheel Speed	Front wheel rotation speed calculated from the output clutch output axis rotation speed.	rpm
Stop Light Switch	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
Commanded Forward & Reverse Linear Solenoid Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA
Actual Forward & Reverse Linear Solenoid Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF

Display	Contents	Unit of measure
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Emphasized idle stop request	Permission status of EV traveling and Auto Start Stop are displayed as TCM requirement.	ON or OFF
secondary pressure sensor voltage.	Voltage value after an analog/digital conversion is done inside the TCM using the signal input from the secondary pressure sensor. TCM input value.	V
ATF Temp sensor voltage.	Sensor voltage value input from the ATF temperature sensor to the TCM. TCM input value.	V
Diagnosis Lamp	Transmission failure detection status. Set to ON when a failure is detected. AT oil temperature warning light blinks at 2 Hz. TCM output value.	ON or OFF
ATF Temperature Lamp	ATF high temperature detection status. Set to ON when high temperature is detected. AT oil temperature warning light illuminates. TCM output value.	ON or OFF
AT learning	AT initial learning completion status. AT oil temperature warning light blinks at 4 Hz when the learning is not completed. TCM output value.	Complete or Not Completed
Ignition SW ON Count	Number of times the ignition switch is turned ON since the vehicle was manufactured.	times
Count	Shows whether the elapsed time counter after turning ON the ignition switch is synchronized with the integrated unit (master unit) or an original counter. “Common” means the integrated unit, and “Originally” means that the original counter is used.	—
Time Count	Shows the elapsed time after turning ON the ignition switch.	ms
Actual secondary pressure	Pressure value applied to the secondary pulley cylinder (line pressure) detected by the secondary pressure sensor.	MPa
N/P Range Signal	Inhibitor SW signal. Set to ON when the select lever is in P range or in N range. TCM input value.	ON or OFF
R Range Signal2	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
System Voltage	Power supply voltage supplied to the backup power supply (≈ battery voltage).	V
Electric Fluid Pump Target RPM	Rotation speed indication to the electric oil pump inverter calculated by the TCM. TCM output value.	rpm
Electric Fluid Pump Actual RPM	Actual rotation speed transmitted from the electric oil pump inverter. TCM input value.	rpm
Electric Fluid Pump Actual Current	Actual current value transmitted from the electric oil pump inverter. TCM input value.	A
Output Clutch Linear Solenoid Set Current	Value of the indicator current calculated by the TCM for controlling the output clutch linear solenoid.	mA
Output Clutch Linear Solenoid Actual Current	Actual current value of the output clutch linear solenoid. TCM output value.	mA
Primary Rev Speed	Rotation speed signal of the primary axis resolver transmitted from the drive motor. TCM input value.	rpm

NOTE:
For detailed operation procedures, refer to “Application help”.

3. READ FREEZE FRAME DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

Display	Contents	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Revolution Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the output clutch output axis rotation speed.	km/h or MPH
ATF Temperature	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Front Wheel Speed	Front wheel rotation speed calculated from the output clutch output axis rotation speed.	rpm
Stop Light Switch	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
Commanded Forward & Reverse Linear Solenoid Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA
Actual Forward & Reverse Linear Solenoid Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF

Display	Contents	Unit of measure
Emphasized idle stop request	Permission status of EV traveling and Auto Start Stop are displayed as TCM requirement.	ON or OFF
secondary pressure sensor voltage.	Voltage value after an analog/digital conversion is done inside the TCM using the signal input from the secondary pressure sensor. TCM input value.	V
ATF Temp sensor voltage.	Sensor voltage value input from the ATF temperature sensor to the TCM. TCM input value.	V
Diagnosis Lamp	Transmission failure detection status. Set to ON when a failure is detected. AT oil temperature warning light blinks at 2 Hz. TCM output value.	ON or OFF
ATF Temperature Lamp	ATF high temperature detection status. Set to ON when high temperature is detected. AT oil temperature warning light illuminates. TCM output value.	ON or OFF
Ignition SW ON Count	Number of times the ignition switch is turned ON since the vehicle was manufactured.	times
Count	Shows whether the elapsed time counter after turning ON the ignition switch is synchronized with the integrated unit (master unit) or an original counter. “Common” means the integrated unit, and “Originally” means that the original counter is used.	—
Time Count	Shows the elapsed time after turning ON the ignition switch.	ms
Actual secondary pressure	Pressure value applied to the secondary pulley cylinder (line pressure) detected by the secondary pressure sensor.	MPa
N/P Range Signal	Inhibitor SW signal. Set to ON when the select lever is in P range or in N range. TCM input value.	ON or OFF
R Range Signal2	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
System Voltage	Power supply voltage supplied to the backup power supply (≈ battery voltage).	V
Electric Fluid Pump Target RPM	Rotation speed indication to the electric oil pump inverter calculated by the TCM. TCM output value.	rpm
Electric Fluid Pump Actual RPM	Actual rotation speed transmitted from the electric oil pump inverter. TCM input value.	rpm
Electric Fluid Pump Actual Current	Actual current value transmitted from the electric oil pump inverter. TCM input value.	A
Output Clutch Linear Solenoid Set Current	Value of the indicator current calculated by the TCM for controlling the output clutch linear solenoid.	mA
Output Clutch Linear Solenoid Actual Current	Actual current value of the output clutch linear solenoid. TCM output value.	mA
Primary Rev Speed	Rotation speed signal of the primary axis resolver transmitted from the drive motor. TCM input value.	rpm

NOTE:
For detailed operation procedures, refer to “Application help”.

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «DTC».

NOTE:
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-35, List of Diagnostic Trouble Code (DTC).>
- For detailed operation procedures, refer to “Application help”.

8. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

9. Inspection Mode

A: PROCEDURE

<Ref. to CVT(TH58A)-50, Road Test.>

10.Drive Cycle

A: PROCEDURE

It is possible to complete diagnosis of the DTC by performing the indicated drive cycle. After the repair for the DTC, perform a necessary drive cycle and make sure the function recovers and the DTC is recorded.

1. PREPARATION FOR DRIVE CYCLE

1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) After performing the diagnostics and Clear Memory Mode, check that no DTC remains. <Ref. to CVT(w/o HEV)(diag)-19, Clear Memory Mode.>

NOTE:
Perform the drive cycle after warming up the engine except when the ATF temperature at engine start is specified.

2. DRIVE CYCLE A

DTC	Item	Condition
P0560	SYSTEM VOLTAGE	—
P0601	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR	Perform the drive cycle A twice.
P0603	INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR	—
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	Perform the drive cycle A twice.
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	Perform the drive cycle A twice.
P0705	TRANSMISSION RANGE SENSOR "A" CIRCUIT (PRNDL INPUT)	—
P0712	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW	—
P0842	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT LOW	—
P0843	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT HIGH	—
P0890	TCM POWER RELAY SENSE CIRCUIT LOW	—
P0962	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW	—
P0963	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH	—
P0966	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT LOW	—
P0967	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT HIGH	—
P0B0A	AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW	—
P0B0B	AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH	—
P0B0D	AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE	—
P0C1D	AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE INTERNAL TEMPERATURE SENSOR RANGE/PERFORMANCE	—
P0C21	AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW	—
P0C22	AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH	—
P0C24	AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT LOW	—
P0C25	AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT HIGH	—
P0C27	AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT LOW	—
P0C28	AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT HIGH	—
P160A	RANDOM ACCESS MEMORY (RAM) ERROR	Perform the drive cycle A twice.
P172A	AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION	—
P2530	IGNITION SWITCH RUN POSITION CIRCUIT	—
P2720	PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT LOW	—
P2721	PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT HIGH	—
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH	Perform the drive cycle A, then perform the drive cycle C.

Diagnostic procedure:
1) Start the engine.
2) Depress the brake pedal and move the select lever to each range at an interval of five seconds.

NOTE:
Move the select lever in the following order: “P” → “R” → “N” → “D” → “N” → “R” → “P”.

3. DRIVE CYCLE B

DTC	Item	Condition
P0711	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	Perform drive cycle B twice or more.

Diagnostic procedure:
1) Start the engine under condition that ATF temperature is at 20°C (68°F) or below.
2) Drive in any driving pattern for 20 minutes. (Include driving at a constant legal speed (for 20 seconds) at least once.)

4. DRIVE CYCLE C

DTC	Item	Condition
P0716	INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—
P0717	INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL	—
P0719	BRAKE SWITCH "B" CIRCUIT LOW	Perform drive cycle C twelve times.
P0720	OUTPUT SHAFT SPEED SENSOR CIRCUIT	—
P0721	OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE	—
P0724	BRAKE SWITCH "B" CIRCUIT HIGH	Perform drive cycle C twelve times.
P0970	PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT LOW	—
P0971	PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT HIGH	—
P0973	SHIFT SOLENOID "A" CONTROL CIRCUIT LOW	—
P0974	SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH	—
P0976	SHIFT SOLENOID "B" CONTROL CIRCUIT LOW	—
P0977	SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH	—
P2750	INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT RANGE/PERFORMANCE	—
P2751	INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL	—
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH	Perform the drive cycle A, then perform the drive cycle C.
P2764	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW	—

Diagnostic procedure:
1) Start the engine.
2) Accelerate slowly to a legal speed, and then decelerate slowly to a stop.

5. DRIVE CYCLE D

DTC	Item	Condition
P0713	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH	—
P0730	INCORRECT GEAR RATIO	—
P0746	PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P0747	PRESSURE CONTROL SOLENOID "A" STUCK ON	Perform the drive cycle D twice.
P0751	SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P0752	SHIFT SOLENOID "A" STUCK ON	Perform the drive cycle D twice.
P0756	SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P0757	SHIFT SOLENOID "B" STUCK ON	Perform the drive cycle D twice.
P0776	PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P0841	TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/ PERFORMANCE	—
P0882	PVIGN POWER SUPPLY (LOW)	—
P0961	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFOR-MANCE	—
P0965	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT RANGE/PERFOR-MANCE	—
P2714	PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF	—
P2719	PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT RANGE/PERFOR-MANCE	—
P2757	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF	Perform the drive cycle D twice.
P2758	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON	Perform the drive cycle D twice.

Diagnostic procedure:
1) Start the engine.
2) Drive in any driving pattern for 20 minutes. (Include driving at a constant legal speed (for 20 seconds) at least once.)

6. DRIVE CYCLE E

DTC	Item	Condition
P0801	REVERSE INHIBIT CONTROL CIRCUIT/OPEN	—
U0073	CONTROL MODULE COMMUNICATION BUS OFF	—
U0075	CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF	—
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	—
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	—
U0101	LOST COMMUNICATION WITH TCM	—
U0110	LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"	—
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	—
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	—
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	—
U0287	LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE	—
U0293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE	—
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	—
U0402	INVALID DATA RECEIVED FROM TCM	—
U0411	INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"	—
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	—
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	—
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	—
U0588	INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE	—
U0594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE	—
U1100	LOST COMMUNICATION WITH ECM/PCM PU-CAN	—
U1293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN	—
U1401	INVALID DATA RECEIVED FROM ECM/PCM PU-CAN	—
U1594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN	—

Diagnostic procedure:
1) Start the engine.

7. DRIVE CYCLE F

DTC	Item	Condition
P0708	TRANSMISSION RANGE SENSOR "A" CIRCUIT HIGH	—
P0812	REVERSE INPUT CIRCUIT	—
P0851	PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW	—
P086C	REVERSE INPUT CIRCUIT 2	—

Diagnostic procedure:
1) Start the engine.
2) Shift the select lever at intervals of 15 seconds for each range, while depressing the brake pedal.

NOTE:
Move the select lever in the following order: “P” → “R” → “N” → “D” → “N” → “R” → “P”.

8. DRIVE CYCLE G

DTC	Item	Condition
P0777	PRESSURE CONTROL SOLENOID "B" STUCK ON	Perform the drive cycle G three times.
P0C29	AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE	Perform the drive cycle G three times.
P0C2A	AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED	Perform the drive cycle G three times.
P2797	ELECTRIC/AUXILIARY TRANSMISSION FLUID PUMP "A" PERFORMANCE/ STUCK OFF	Perform the drive cycle G three times.

Diagnostic procedure:
1) Warm up the engine enough to drive in EV mode.
2) While driving at a legal speed, decelerate using EV coasting to a halt, and then stay in Auto Start Stop state for 10 seconds.
3) During EV creep driving, gently depress the accelerator pedal to enter motor drive mode.

9. DRIVE CYCLE H

DTC	Item	Condition
P0951	AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/PERFORMANCE	—

Diagnostic procedure:
1) Start the engine.
2) Operate the manual mode SW, and check the SW status using the Subaru Select Monitor. Or measure the terminal voltage.

10.DRIVE CYCLE I

DTC	Item	Condition
P2715	PRESSURE CONTROL SOLENOID "D" STUCK ON	—

Diagnostic procedure:
1) Start the engine.
2) Place the select lever in “P” range, and deplete the high voltage battery SOC at idling.
3) Enters the charge mode in “D” range at standstill. Wait for 10 seconds, and start the vehicle with the brake OFF.

11.DRIVE CYCLE J

DTC	Item	Condition
P0500	VEHICLE SPEED SENSOR "A" CIRCUIT	—

Diagnostic procedure:
1) Drive at 10 km/h (6 MPH) or more.
2) Stop the vehicle and idle for ten minutes.

11.Learning Control

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- When the following work is performed, perform learning work for the transmission.

Replacement of TCM/Replacement or disassembly of transmission assembly/Replacement of control valve body/Clearing AT leaning value is executed.

B: PROCEDURE

1. PREPARATION FOR LEARNING

1) Warm up or cool down until the ATF temperature displayed on the Subaru Select Monitor is 40 — 65°C (104 — 149°F).
2) After stopping the vehicle, shift the select lever to “P” range.
3) Fully apply the parking brake.
4) Lift up the vehicle.

CAUTION:
While working, be sure to keep the lower edge of the tires 30 cm or more above the ground as vehicle will vibrate.

5) Connect the Subaru Select Monitor to data link connector.
6) Turn the ignition switch to ON.
7) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger, etc.

2. SIMPLE LEARNING

NOTE:
Simple learning is performed with the vehicle lifted, without actually running the vehicle.

CAUTION:
Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «Work Support».
6) On «Work Support» display, select «AT learning mode».
7) Follow the messages displayed on the screen when working.

NOTE:
During AT learning in progress, AT OIL TEMP light in the combination meter starts flashing at 2 Hz and the learning operation starts. The following message is displayed on the screen when the AT OIL TEMP light which was flashing at 2 Hz turns off.

8) When «AT learning normally ended.» is displayed, simple AT learning is completed.

NOTE:
• If communication error occurs during learning, retry the “AT learning mode” from the beginning.
• If the message «Execute AT learning again after fixing troubles of the vehicle» appears during learning, select [OK] and display the DTC list. After repairing the locations indicated by the DTC, start the “AT learning mode” over from the beginning.
• When communication error occurs during learning, select lever does not shift occasionally. If select lever does not shift, turn the ignition switch to OFF before operating the select lever.
• If the message «AT learning ended abnormally. Try again from the beginning.» is displayed, start the “AT learning mode” over from the beginning.

Display	Main causes for abnormal termination
AT learning ended abnormally. Try again from the beginning.	• Fault is detected during AT learning. • The accelerator pedal is depressed during AT learning. • An unspecified operation was performed during AT learning • ATF temperature becomes out of specification during AT learning. • Battery voltage is low. • Malfunction indicator light illuminates. • Hybrid fail lamp illuminates. • Parking brake not applied strongly enough. • Brake pedal is not fully depressed. • Abnormal idle speed increase, etc.

• For detailed operation procedures, refer to “Application help”.

12.AT OIL TEMP Warning Light Display

A: OPERATION

The AT OIL TEMP light illuminates or blinks, when the ATF temperature is high and malfunction occurs in CVT.

- At normal condition

AT OIL TEMP light always illuminates when the ignition switch is ON (engine OFF). Light goes off after two seconds from engine ON.

- When ATF temperature is high

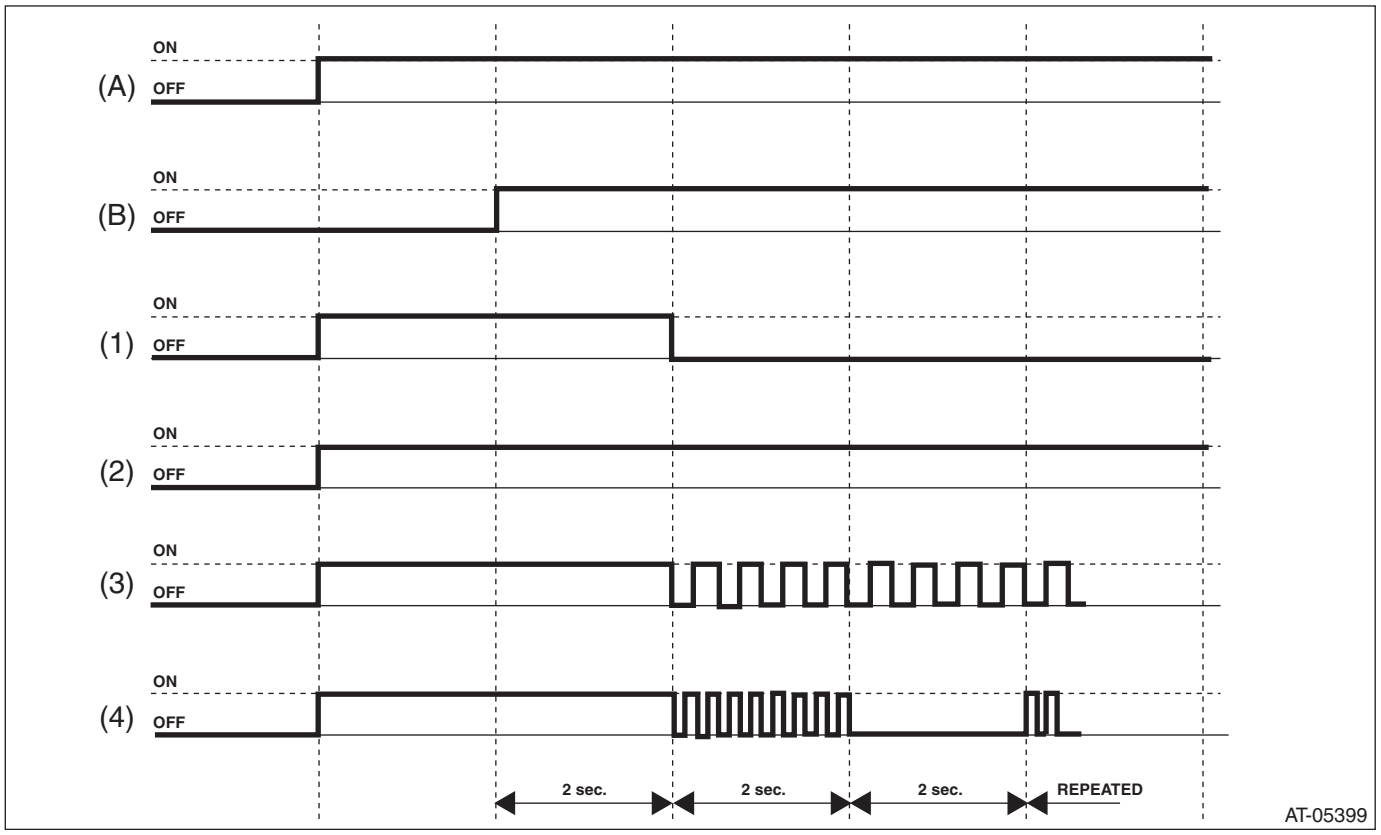
AT OIL TEMP light illuminates when the ATF temperature is abnormally high with engine ON.

- When malfunction is detected

AT OIL TEMP light blinks at 2 Hz when the TCM detects the malfunction of CVT with engine ON. In this case, inspect using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-42, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

- When AT learning is not finished

AT OIL TEMP light repeats “Blinking at 4 Hz → Turning OFF” every two seconds, when the AT learning is not finished with engine ON. In this case, perform the “Learning”. (During AT learning, the light blinks at 2 Hz or illuminates.) <Ref. to CVT(HEV)(diag)-27, Learning Control.>



(A) Ignition switch condition
(B) Engine condition
(1) At normal condition
(2) When ATF temperature is high
(3) When malfunction is detected
(4) When AT learning is not finished

If the AT OIL TEMP light does not illuminate, or illumination patterns are not as above, check the AT OIL TEMP light circuit. <Ref. to CVT(HEV)(diag)-30, INSPECTION, AT OIL TEMP Warning Light Display.>

B: INSPECTION

DIAGNOSIS:

- AT OIL TEMP light circuit is open or shorted.
- Combination meter malfunction
- TCM is in special control mode.
- AT learning is not finished.

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON, the AT OIL TEMP light does not illuminate.
- AT OIL TEMP light remains lit after engine start.

	Step	Check	Yes	No
1	**CHECK AT OIL TEMP LIGHT.** Turn the ignition switch to ON.	Does the AT OIL TEMP light illuminate?	Go to step **2**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
2	**CHECK AT OIL TEMP LIGHT.** Start the engine.	Does AT OIL TEMP light go off after two seconds from engine start?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **3**.
3	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK TCM.** Read the data of «ATF Temperature Lamp» using the Subaru Select Monitor.	Is “ON” displayed?	Go to step **5**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
5	**CHECK TCM.** Read the data of «ATF Temp.» using the Subaru Select Monitor.	Is the display 125°C or more?	Go to step **6**.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>
6	**CHECK ATF TEMPERATURE.** Check the real fluid temperature from the transmission case surface temperature.	Does it clearly differ from the «ATF Temp.» displayed on Subaru Select Monitor?	Perform the diagnosis according to DTC P0711, P0712, P0713.	When ATF temperature can be judged as actually high, perform the diagnosis again after the ATF temperature lowers.

13.AWD Warning Light Display

A: OPERATION

AWD light illuminates or blinks, when the AWD is in special control condition and AWD has malfunction.

- At normal condition

AWD light always illuminates when the ignition switch is ON (engine OFF). Light goes off after two seconds from engine ON.

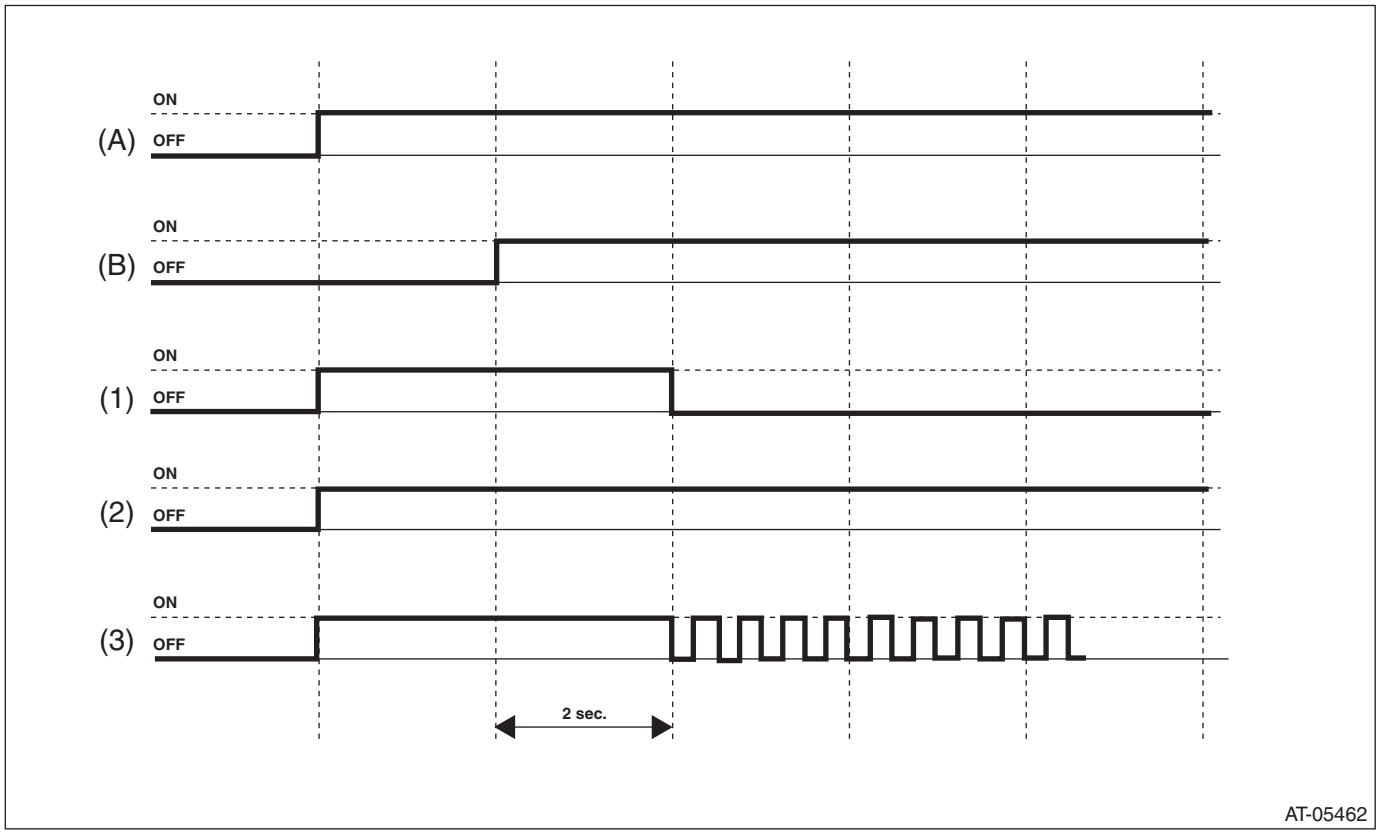
- When FF mode is selected

AWD light illuminates, when the AWD ON/OFF switching function is “FF mode” with engine ON.

- When malfunction is detected

AWD light blinks at 2 Hz when any of following malfunctions are detected.

1. When tire with different diameter is installed, or air pressure of any of four wheels is excessively low
2. When “Rear differential inspection mode” is judged as NG <Ref. to DI-67, Rear Differential Inspection Mode.>



(A) Ignition switch condition (B) Engine condition

(1) At normal condition (2) When FF mode is selected (3) When malfunction is detected

If the AWD light does not illuminate, or illumination patterns are not as above, check the AWD light circuit. <Ref. to CVT(HEV)(diag)-32, INSPECTION, AWD Warning Light Display.>

B: INSPECTION

DIAGNOSIS:
- AWD light circuit is open or shorted.
- Combination meter malfunction
- TCM is in AWD special control mode.

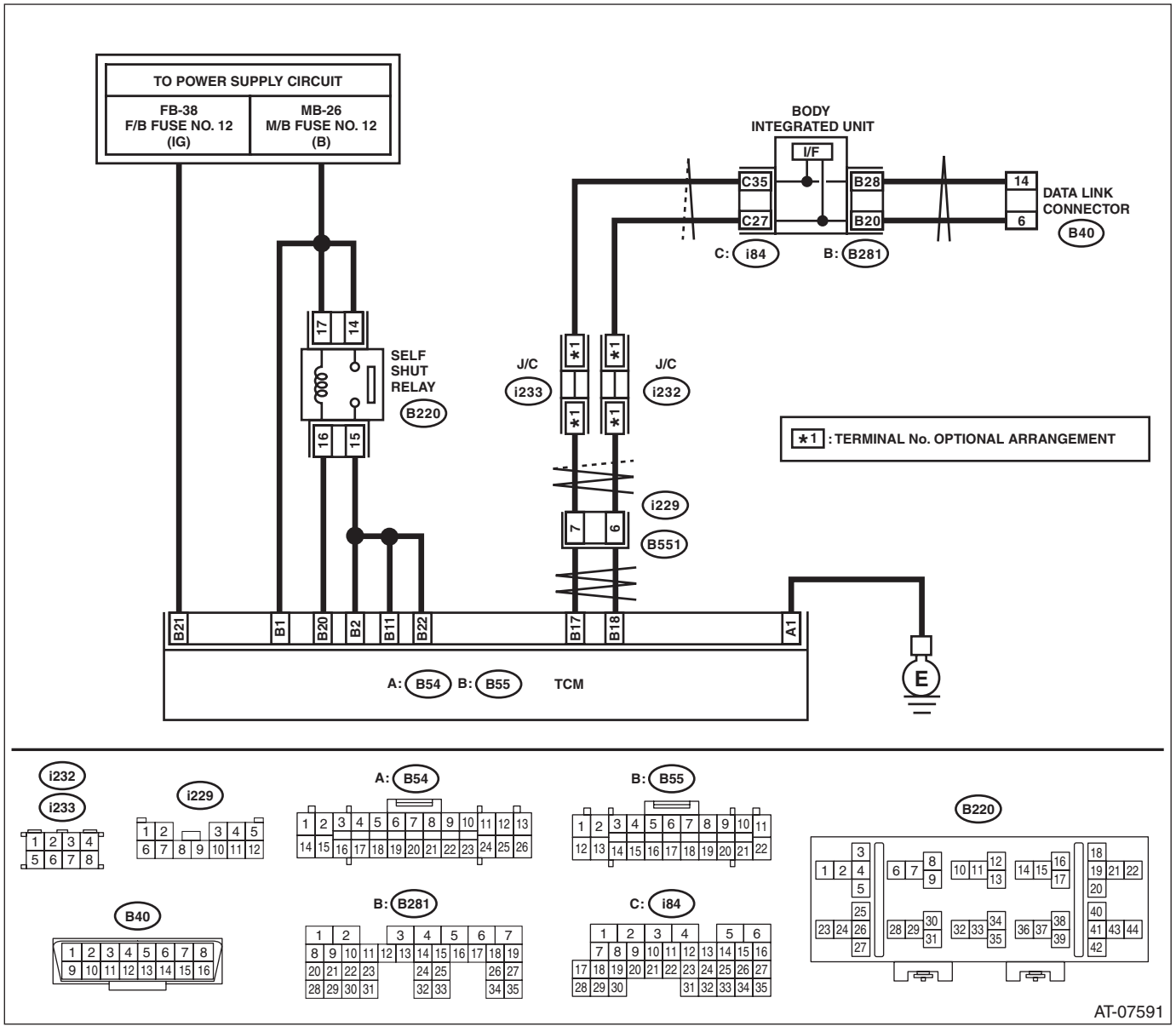
TROUBLE SYMPTOM:
- When the ignition switch is turned to ON, the AWD light does not illuminate.
- AWD light remains lit after engine start.
- AWD light is blinking immediately after engine start.

	Step	Check	Yes	No
1	**CHECK AWD LIGHT.** Turn the ignition switch to ON.	Does the AWD light illuminate?	Go to step **2**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
2	**CHECK AWD LIGHT.** Start the engine.	Does AWD light go off after two seconds from engine start?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **3**.
3	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK AWD LIGHT.** Check the display of AWD light after engine start.	Is AWD light illuminating?	Go to step **6**.	Go to step **5**.
5	**CHECK AWD LIGHT.** Check the display of AWD light after engine start.	Is AWD light blinking at 2 Hz?	Go to step **7**.	Go to step **8**.
6	**CHECK AWD ON/OFF SWITCHING FUNCTION.** Using the Subaru Select Monitor, select the «AWD ON/OFF switching mode» in «Work Support» display, and check the current mode. <Ref. to CVT(TH58A)-49, AWD ON/OFF Switching Mode.>	Is the message «At present, the vehicle is in AWD. Switch to FF?» displayed?	Go to step **8**.	If the message «At present, the vehicle is in FF. Switch to AWD?» is displayed, select “OK”, and switch to AWD mode.
7	**CHECK REAR DIFFERENTIAL.** Using the Subaru Select Monitor, select and check «Rear differential inspection mode» in «Work Support» display. <Ref. to DI-67, Rear Differential Inspection Mode.>	Does AWD light go off after inspection is finished normally?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **8**.
8	**CHECK COMBINATION METER.** Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is there any trouble with the combination meter?	Repair the combination meter.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

14.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Defective harness connector
TROUBLE SYMPTOM:
Subaru Select Monitor communication failure
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select the transmission using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.**	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.
4	**CHECK INSTALLATION OF TCM CONNECTOR.** Turn the ignition switch to OFF.	Is the TCM connector inserted into the TCM until the clamp locks?	Go to step **5**.	Insert the TCM connector to TCM.
5	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **6**.
6	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Check whether communication to transmission system can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Check DTC of TCM. <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Go to step **7**.
7	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. (Engine OFF) 2) Measure the ignition power supply voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 1 (+) — Chassis ground (–):*** ***(B55) No. 2 (+) — Chassis ground (–):*** ***(B55) No. 11 (+) — Chassis ground (–):*** ***(B55) No. 21 (+) — Chassis ground (–):*** ***(B55) No. 22 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **8**.	Repair the open circuit of harness between TCM and battery.
8	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **9**.	Repair the open circuit of the TCM ground circuit and poor contact of connector.
9	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of control module power supply, ground circuit and data link connector?	Repair the connector.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

15.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
P0500	VEHICLE SPEED SENSOR "A" CIRCUIT	Data received from VDCCM&H/U is abnormal.	<Ref. to CVT(HEV)(diag)-42, DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0560	SYSTEM VOLTAGE	Back-up voltage circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-43, DTC P0560 SYSTEM VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0601	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR	TCM ROM is faulty.	<Ref. to CVT(HEV)(diag)-45, DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0603	INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR	TCM backup RAM is faulty.	<Ref. to CVT(HEV)(diag)-46, DTC P0603 INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	TCM RAM is faulty.	<Ref. to CVT(HEV)(diag)-47, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	TCM EEPROM is faulty.	<Ref. to CVT(HEV)(diag)-48, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0705	TRANSMISSION RANGE SENSOR "A" CIRCUIT (PRNDL INPUT)	Inhibitor switch malfunction or short circuit	<Ref. to CVT(HEV)(diag)-50, DTC P0705 TRANSMISSION RANGE SENSOR "A" CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0708	TRANSMISSION RANGE SENSOR "A" CIRCUIT HIGH	Inhibitor switch malfunction or open circuit	<Ref. to CVT(HEV)(diag)-52, DTC P0708 TRANSMISSION RANGE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0711	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	ATF temperature sensor is faulty or input signal circuit is faulty.	<Ref. to CVT(HEV)(diag)-55, DTC P0711 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0712	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW	ATF temperature sensor is faulty or input signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-57, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0713	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH	ATF temperature sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-59, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0716	INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT RANGE/PERFORMANCE	Turbine speed sensor characteristics is abnormal.	<Ref. to CVT(HEV)(diag)-62, DTC P0716 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0717	INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL	Turbine speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-63, DTC P0717 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0719	BRAKE SWITCH "B" CIRCUIT LOW	Brake switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-67, DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0720	OUTPUT SHAFT SPEED SENSOR CIRCUIT	Front wheel speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-69, DTC P0720 OUTPUT SHAFT SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0721	OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/ PERFORMANCE	Front wheel speed sensor characteristics is abnormal.	<Ref. to CVT(HEV)(diag)-73, DTC P0721 OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0724	BRAKE SWITCH "B" CIRCUIT HIGH	Brake switch is faulty or input signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-74, DTC P0724 BRAKE SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0730	INCORRECT GEAR RATIO	Secondary speed sensor etc. is faulty, control valve is faulty, or chain is faulty.	<Ref. to CVT(HEV)(diag)-76, DTC P0730 INCORRECT GEAR RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0746	PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF	Secondary solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(HEV)(diag)-78, DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0747	PRESSURE CONTROL SOLENOID "A" STUCK ON	Secondary solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-81, DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0751	SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF	Primary UP solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(HEV)(diag)-84, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0752	SHIFT SOLENOID "A" STUCK ON	Primary UP solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-87, DTC P0752 SHIFT SOLENOID "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0756	SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF	Primary DOWN solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(HEV)(diag)-90, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0757	SHIFT SOLENOID "B" STUCK ON	Primary DOWN solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-93, DTC P0757 SHIFT SOLENOID "B" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0776	PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF	F&R solenoid, forward clutch or control valve is faulty.	<Ref. to CVT(HEV)(diag)-96, DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0777	PRESSURE CONTROL SOLENOID "B" STUCK ON	F&R solenoid is faulty, and hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-98, DTC P0777 PRESSURE CONTROL SOLENOID "B" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0801	REVERSE INHIBIT CONTROL CIRCUIT/OPEN	Shift lock solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-101, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0812	REVERSE INPUT CIRCUIT	Inhibitor switch is faulty, or R range switch input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-102, DTC P0812 REVERSE INPUT CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0841	TRANSMISSION FLUID PRESSURE SENSOR/ SWITCH "A" CIRCUIT RANGE/PERFORMANCE	Secondary pressure sensor or control valve is faulty	<Ref. to CVT(HEV)(diag)-104, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0842	TRANSMISSION FLUID PRESSURE SENSOR/ SWITCH "A" CIRCUIT LOW	Secondary pressure sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-108, DTC P0842 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0843	TRANSMISSION FLUID PRESSURE SENSOR/ SWITCH "A" CIRCUIT HIGH	Secondary pressure sensor is faulty or input signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-110, DTC P0843 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW	Inhibitor switch is faulty or P, N range switch input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-112, DTC P0851 PARK/ NEUTRAL SWITCH INPUT CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P086C	REVERSE INPUT CIRCUIT 2	Inhibitor switch is faulty or R range switch 2 input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-115, DTC P086C REVERSE INPUT CIRCUIT 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0882	PVIGN POWER SUPPLY (LOW)	TCM power supply voltage is low	<Ref. to CVT(HEV)(diag)-117, DTC P0882 PVIGN POWER SUPPLY (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0890	TCM POWER RELAY SENSE CIRCUIT LOW	Self-shut relay is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-118, DTC P0890 TCM POWER RELAY SENSE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0951	AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/ PERFORMANCE	Manual mode switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-120, DTC P0951 AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/ PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0961	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE	Characteristics of secondary solenoid current is abnormal.	<Ref. to CVT(HEV)(diag)-122, DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0962	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW	Secondary solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-124, DTC P0962 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0963	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH	Secondary solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-126, DTC P0963 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0965	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT RANGE/PERFORMANCE	Characteristics of F&R solenoid current is abnormal.	<Ref. to CVT(HEV)(diag)-128, DTC P0965 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0966	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT LOW	F&R solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-130, DTC P0966 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0967	PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT HIGH	F&R solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-132, DTC P0967 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0970	PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT LOW	AWD solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-134, DTC P0970 PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0971	PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT HIGH	AWD solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-136, DTC P0971 PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0973	SHIFT SOLENOID "A" CONTROL CIRCUIT LOW	Primary UP solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-138, DTC P0973 SHIFT SOLENOID "A" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0974	SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH	Primary UP solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-140, DTC P0974 SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0976	SHIFT SOLENOID "B" CONTROL CIRCUIT LOW	Primary DOWN solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-142, DTC P0976 SHIFT SOLENOID "B" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0977	SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH	Primary DOWN solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-144, DTC P0977 SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B0A	AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW	100 V power supply for electric oil pump inverter has malfunction.	<Ref. to CVT(HEV)(diag)-146, DTC P0B0A AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B0B	AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH	100 V power supply for electric oil pump inverter has malfunction.	<Ref. to CVT(HEV)(diag)-147, DTC P0B0B AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B0D	AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE	Electric oil pump inverter is faulty.	<Ref. to CVT(HEV)(diag)-148, DTC P0B0D AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C1D	AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE INTERNAL TEMPERATURE SENSOR RANGE/PERFORMANCE	Electric oil pump inverter circuit board is faulty.	<Ref. to CVT(HEV)(diag)-149, DTC P0C1D AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE INTERNAL TEMPERATURE SENSOR RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C21	AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW	Electric oil pump is faulty, electric oil pump inverter is faulty, or 3-phase circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-150, DTC P0C21 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C22	AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH	Electric oil pump is faulty, electric oil pump inverter is faulty, or 3-phase circuit is shorted.	<Ref. to CVT(HEV)(diag)-153, DTC P0C22 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C24	AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT LOW	12V power supply for electric oil pump inverter has malfunction.	<Ref. to CVT(HEV)(diag)-156, DTC P0C24 AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C25	AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT HIGH	12V power supply for electric oil pump inverter has malfunction.	<Ref. to CVT(HEV)(diag)-158, DTC P0C25 AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C27	AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT LOW	Electric oil pump inverter is faulty.	<Ref. to CVT(HEV)(diag)-160, DTC P0C27 AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C28	AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT HIGH	Electric oil pump inverter is faulty.	<Ref. to CVT(HEV)(diag)-161, DTC P0C28 AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C29	AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE	There is an overcurrent to electric oil pump inverter, or too much load is applied to electric oil pump motor.	<Ref. to CVT(HEV)(diag)-163, DTC P0C29 AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0C2A	AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED	Electric oil pump inverter control is abnormal.	<Ref. to CVT(HEV)(diag)-166, DTC P0C2A AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P160A	RANDOM ACCESS MEMORY (RAM) ERROR	TCM RAM is faulty.	<Ref. to CVT(HEV)(diag)-168, DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P172A	AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION	Electric oil pump inverter control is abnormal.	<Ref. to CVT(HEV)(diag)-169, DTC P172A AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2530	IGNITION SWITCH RUN POSITION CIRCUIT	Ignition SW circuit is faulty.	<Ref. to CVT(HEV)(diag)-171, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2714	PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF	Output clutch solenoid is faulty, output clutch is faulty, or output clutch valve is malfunctioning.	<Ref. to CVT(HEV)(diag)-173, DTC P2714 PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2715	PRESSURE CONTROL SOLENOID "D" STUCK ON	Output clutch solenoid is faulty, and hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-175, DTC P2715 PRESSURE CONTROL SOLENOID "D" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2719	PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT RANGE/PERFORMANCE	Characteristics of output clutch solenoid current is abnormal.	<Ref. to CVT(HEV)(diag)-176, DTC P2719 PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2720	PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT LOW	Output clutch solenoid is faulty, or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-178, DTC P2720 PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2721	PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT HIGH	Output clutch solenoid is faulty, or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-180, DTC P2721 PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2750	INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT RANGE/PERFORMANCE	Secondary speed sensor characteristics is abnormal.	<Ref. to CVT(HEV)(diag)-183, DTC P2750 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2751	INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL	Secondary speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-185, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2757	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF	Lock-up duty solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(HEV)(diag)-189, DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2758	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON	Lock-up duty solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-192, DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH	Lock-up duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-195, DTC P2763 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2764	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW	Lock-up duty solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-197, DTC P2764 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2797	ELECTRIC/AUXILIARY TRANSMISSION FLUID PUMP "A" PERFORMANCE/ STUCK OFF	Air entering, contamination clogging, or oil passage abnormality in the electric oil pump	<Ref. to CVT(HEV)(diag)-199, DTC P2797 ELECTRIC/AUXILIARY TRANSMISSION FLUID PUMP "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	CAN bus is shorted or communication error.	<Ref. to CVT(HEV)(diag)-201, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0075	CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF	PU-CAN bus is shorted or communication system is faulty.	<Ref. to CVT(HEV)(diag)-201, DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	HEV-CAN bus is shorted or communication system is faulty.	<Ref. to CVT(HEV)(diag)-202, DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	Detected that the engine data has not yet arrived.	<Ref. to CVT(HEV)(diag)-202, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	Detected that the transmission data has not yet arrived.	<Ref. to CVT(HEV)(diag)-203, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0110	LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"	Detected that the motor control module data has not yet arrived.	<Ref. to CVT(HEV)(diag)-203, DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Detected that the VDC data has not yet arrived.	<Ref. to CVT(HEV)(diag)-204, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Detected that the body integrated unit data has not yet arrived.	<Ref. to CVT(HEV)(diag)-204, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	Detected that the meter data has not yet arrived.	<Ref. to CVT(HEV)(diag)-205, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0287	LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE	Detected that the electric oil pump data has not yet arrived.	<Ref. to CVT(HEV)(diag)-205, DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE	Detected that the hybrid data has not yet arrived.	<Ref. to CVT(HEV)(diag)-206, DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	Detected abnormality of the engine data.	<Ref. to CVT(HEV)(diag)-206, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	Detected abnormality of the transmission data.	<Ref. to CVT(HEV)(diag)-207, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0411	INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"	Detected abnormality of the motor control module data.	<Ref. to CVT(HEV)(diag)-207, DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	Detected abnormality of the VDC data.	<Ref. to CVT(HEV)(diag)-208, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	Detected abnormality of the body integrated unit data.	<Ref. to CVT(HEV)(diag)-208, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	Detected abnormality of the meter data.	<Ref. to CVT(HEV)(diag)-209, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0588	INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE	Detected abnormality of the electric oil pump data.	<Ref. to CVT(HEV)(diag)-209, DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE	Detected abnormality of the hybrid data.	<Ref. to CVT(HEV)(diag)-210, DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1100	LOST COMMUNICATION WITH ECM/PCM PU-CAN	Detected that the engine PU-CAN data has not yet arrived.	<Ref. to CVT(HEV)(diag)-210, DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN	Detected that the hybrid powertrain control module PU-CAN data has not yet arrived.	<Ref. to CVT(HEV)(diag)-211, DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1401	INVALID DATA RECEIVED FROM ECM/PCM PU-CAN	Detected abnormality of the engine·PU-CAN data.	<Ref. to CVT(HEV)(diag)-211, DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN	Detected abnormality of the hybrid powertrain control module PU-CAN data.	<Ref. to CVT(HEV)(diag)-212, DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

16.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition

NOTE:
Refer to “ENGINE (DIAGNOSTICS)” for diagnostic procedure. <Ref. to EN(H4DO HEV)(diag)-354, DTC P0500 VEHICLE SPEED SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of VDC wheel speed sensor.
- Judge as NG when the VDC wheel speed sensor value is a specified value or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

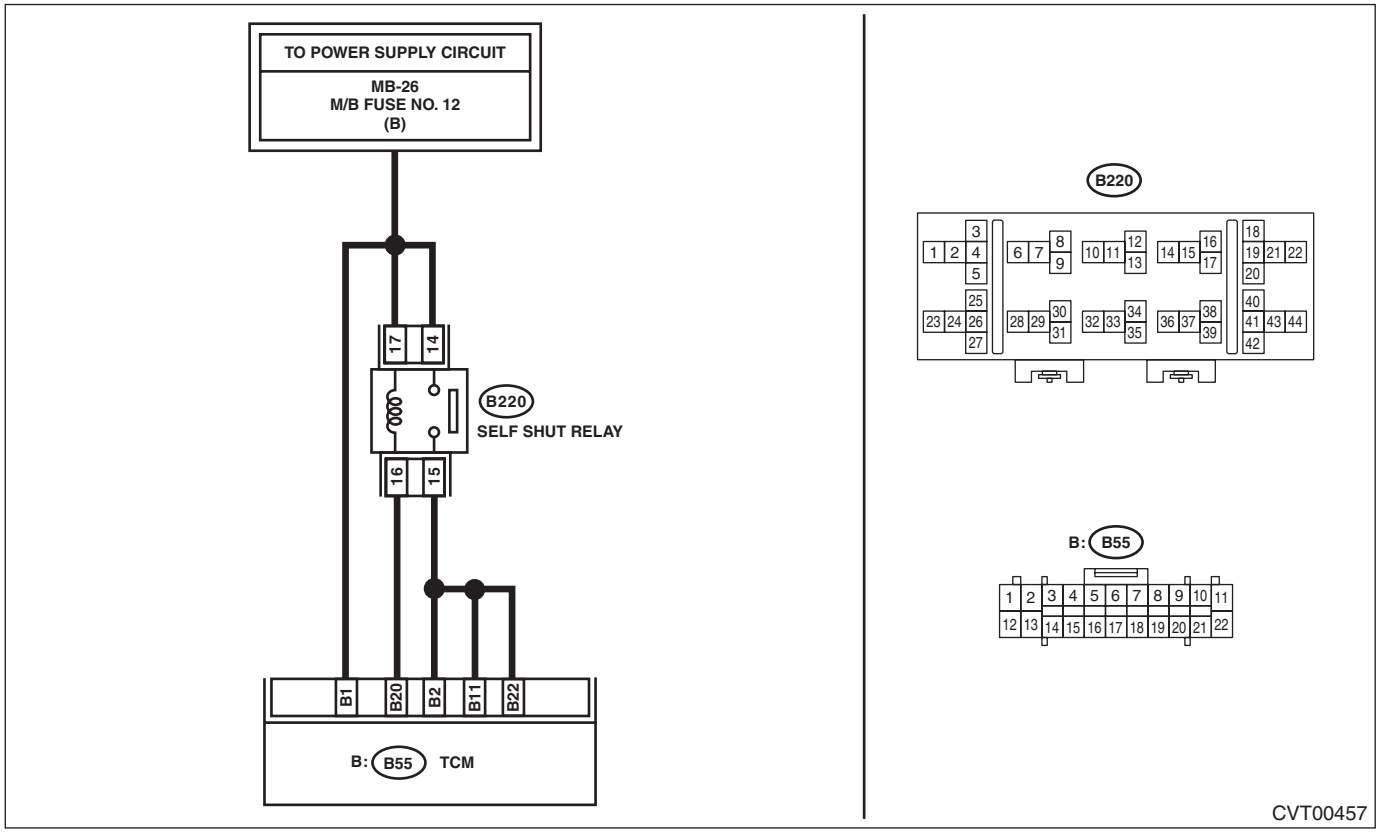
Judgment Value

Malfunction Criteria	Threshold Value
Vehicle speed (from Vehicle Dynamics Control Module) NOTE: The VDC controller detects malfunction if one of the speed sensors does not output a signal and the other vehicle speed sensor output signal is above 7.46 MPH.	≥ 186.4 MPH

Time Needed for Diagnosis: 2.5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

B: DTC P0560 SYSTEM VOLTAGE

DTC DETECTING CONDITION:
Immediately at fault recognition
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Remove the fuse (M/B No. 12).	Is the fuse blown out?	Replace the fuse. If the replaced fuse has blown out easily, repair short circuit of harness between fuse and TCM.	Go to step **2**.
2	**CHECK BACKUP POWER SUPPLY.** Read the data of «System Voltage» using the Subaru Select Monitor.	Is the voltage 10 — 13 V?	Current condition is normal.	Go to step **3**.
3	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance of harness between TCM and fuse (M/B No. 12). ***Connector & terminal*** ***(B55) No. 1 — fuse (M/B No. 12):***	Is the resistance less than 1 Ω?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Repair the open circuit of harness.

1. OUTLINE OF DIAGNOSIS

- Detect the abnormality of back-up power supply voltage.
- Judge as NG when the back-up power supply voltage is a specified value or less even though the battery voltage is normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage (Ignition state = Run or crank)	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of back-up power (TCM input voltage)	< 5 V

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

C: DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
TCM ROM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0601 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction in ROM area of the TCM.
- Judge as NG when the consistency in the ROM area is lost.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

D: DTC P0603 INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
TCM back-up RAM malfunction

Step		Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0603 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction in the back-up RAM area of the TCM.
- Judge as NG when the consistency in the back-up RAM area is lost.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (KAM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

E: DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
TCM RAM malfunction

Step		Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0604 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction in RAM area of the TCM.
- Judge as NG if an attempt to write to RAM area failed.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (RAM) NOTE: This check is carried out about the RAM only used for CAN communication.	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

F: DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- AT learning is not finished.
- Shock occurs when selecting N → D, N → R.
- Shock occurs when the vehicle starts to move after power generation at stand still.

	Step	Check	Yes	No
1	**CHECK TCM CONNECTOR.**	Is there improper connection of TCM connector?	Connect the TCM connector.	Go to step **2**.
2	**CHECK SELF SHUT RELAY.** Turn the ignition switch to ON.	Does the relay operates simultaneously?	Go to step **3**.	Perform the diagnosis according to DTC P0890. <Ref. to CVT(HEV)(diag)-118, DTC P0890 TCM POWER RELAY SENSE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
3	**CHECK SELF SHUT RELAY.** Turn the ignition switch to OFF.	Does the relay operate after two or three seconds delay?	Go to step **4**.	Perform the diagnosis according to DTC P0890. <Ref. to CVT(HEV)(diag)-118, DTC P0890 TCM POWER RELAY SENSE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	**PERFORM AT LEARNING.** 1) Perform «Clear AT learning value». 2) Perform the AT learning. <Ref. to CVT(HEV)(diag)-27, Learning Control.> 3) Start the engine.	Does the AT OIL TEMP light blink after AT learning is finished correctly?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK DTC DISPLAY.** 1) Perform the Clear Memory Mode. 2) Turn the ignition switch to OFF. 3) Start the engine after 10 seconds. 4) Repeat steps 2) and 3).	Does the AT OIL TEMP light blink and is DTC P062F detected?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for poor contact of TCM connector or harness.

1. OUTLINE OF DIAGNOSIS

- Detect TCM EEPROM malfunction.
- Judge as NG when the SUM check result of EEPROM writing value is abnormal and the contents of EEPROM can not be read.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

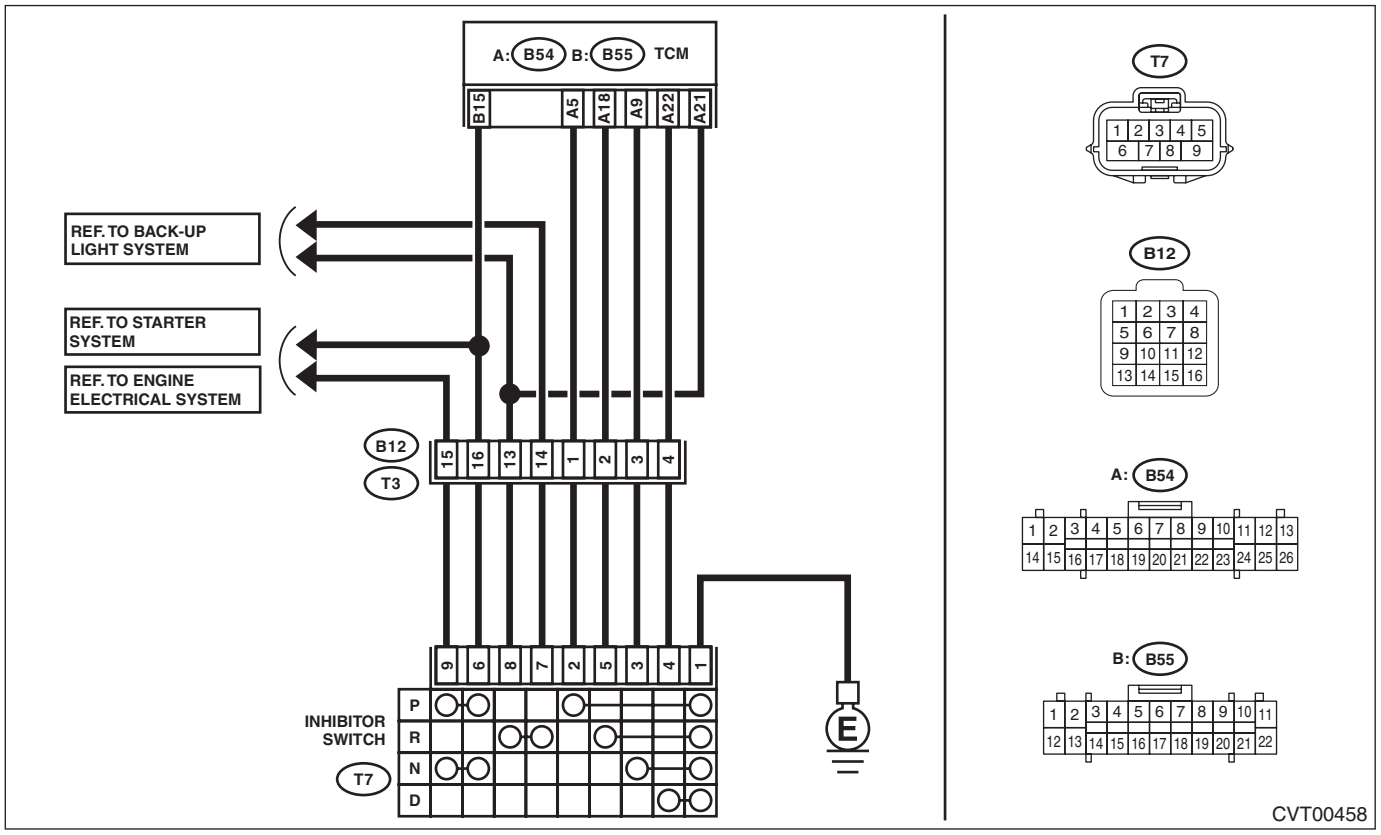
Malfunction Criteria	Threshold Value
Diagnosis 1	
Writing-check (EEPROM)	Error
Diagnosis 2	
Checksum (EEPROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

G: DTC P0705 TRANSMISSION RANGE SENSOR "A" CIRCUIT (PRNDL INPUT)

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range», «R Range», «N Range», «D Range», «N/P Range Signal», «R Range Signal2» using the Subaru Select Monitor.	Is display “OFF” for the range other than corresponding range?	Go to step **5**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 18 — Chassis ground:*** ***(B54) No. 9 — Chassis ground:*** ***(B54) No. 21 — Chassis ground:*** ***(B55) No. 15 — Chassis ground:*** ***(B54) No. 22 — Chassis ground:***	Is each resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of body harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 1 — Chassis ground:*** ***(T3) No. 2 — Chassis ground:*** ***(T3) No. 3 — Chassis ground:*** ***(T3) No. 4 — Chassis ground:*** ***(T3) No. 13 — Chassis ground:*** ***(T3) No. 16 — Chassis ground:***	Is each resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of transmission harness.
4	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 5 — No. 1:*** ***No. 3 — No. 1:*** ***No. 4 — No. 1:*** ***No. 6 — No. 1:*** ***No. 8 — No. 1:***	Is the resistance other than corresponding range 1 MΩ or more?	Go to step **5**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
5	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of Range Switch.
- Judge as NG if more than one input of Range Switch are detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

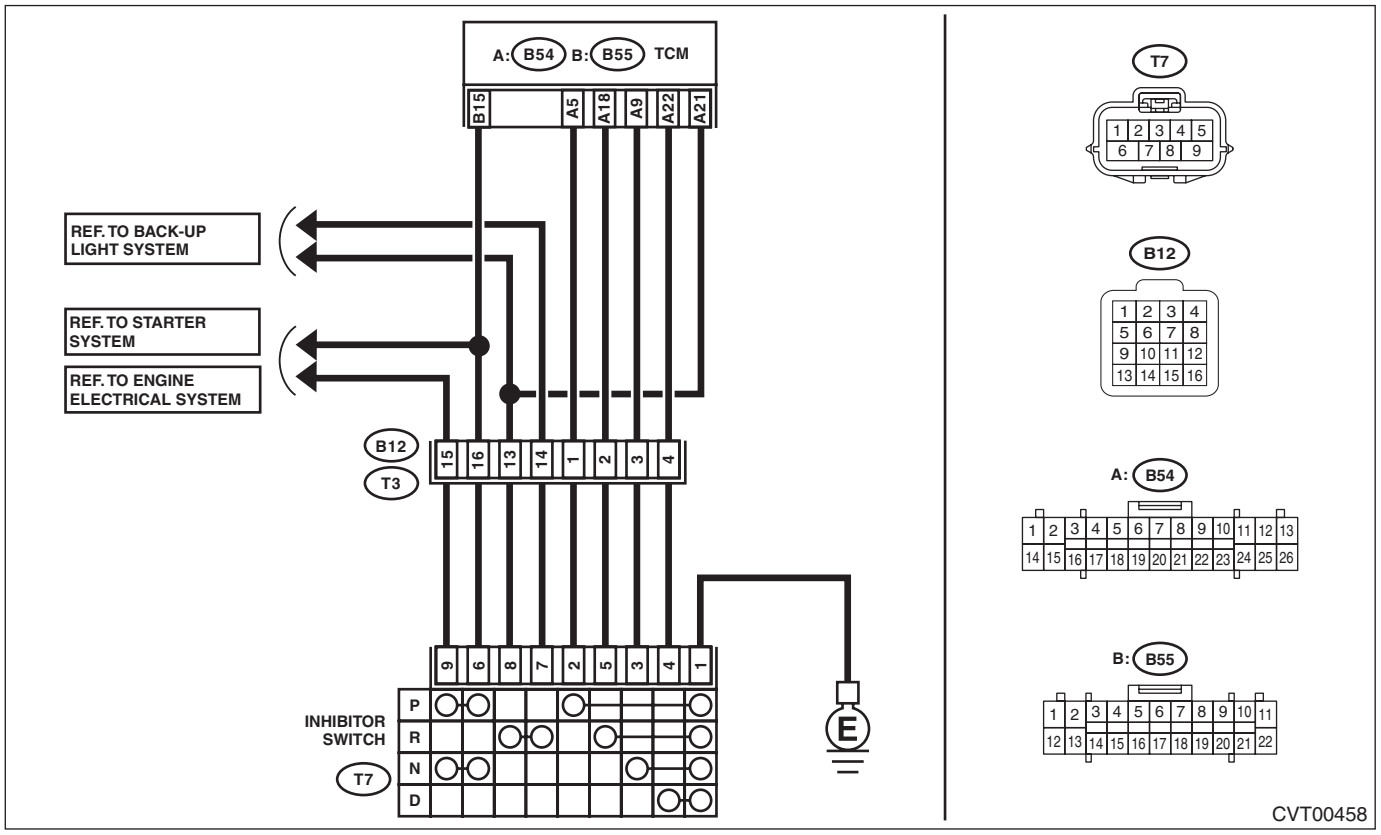
Malfunction Criteria	Threshold Value
Two or more transmission range switches ON NOTE: “Transmission range switch ON” is defined as transmission range switch input voltage < 2.9 V.	True

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

H: DTC P0708 TRANSMISSION RANGE SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range», «R Range», «N Range», «D Range», «N/P Range Signal», «R Range Signal2» using the Subaru Select Monitor.	Is the display of the corresponding range "ON"?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 5 — (B12) No. 1:*** ***(B54) No. 18 — (B12) No. 2:*** ***(B54) No. 9 — (B12) No. 3:*** ***(B54) No. 22 — (B12) No. 4:*** ***(B54) No. 21 — (B12) No. 13:*** ***(B55) No. 15 — (B12) No. 16:***	Is each resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 1 — (T7) No. 2:*** ***(T3) No. 2 — (T7) No. 5:*** ***(T3) No. 3 — (T7) No. 3:*** ***(T3) No. 4 — (T7) No. 4:*** ***(T3) No. 13 — (T7) No. 8:*** ***(T3) No. 16 — (T7) No. 6:***	Is each resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 5 — No. 1:*** ***No. 3 — No. 1:*** ***No. 4 — No. 1:*** ***No. 8 — No. 1:*** ***No. 6 — No. 1:***	Is the resistance of the corresponding range less than 1 MΩ?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 1 (+) — Chassis ground (–):*** ***(B12) No. 2 (+) — Chassis ground (–):*** ***(B12) No. 3 (+) — Chassis ground (–):*** ***(B12) No. 4 (+) — Chassis ground (–):*** ***(B12) No. 13 (+) — Chassis ground (–):*** ***(B12) No. 16 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 2 (+) — Chassis ground (–):*** ***(T7) No. 5 (+) — Chassis ground (–):*** ***(T7) No. 3 (+) — Chassis ground (–):*** ***(T7) No. 4 (+) — Chassis ground (–):*** ***(T7) No. 8 (+) — Chassis ground (–):*** ***(T7) No. 6 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of Range Switch.
- Judge as NG if there is no input from all Range Switches.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Brake switch B OFF	True
NOTE: "Brake switch B OFF" is defined as Brake switch B input voltage ≥ 4.1 V.	

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

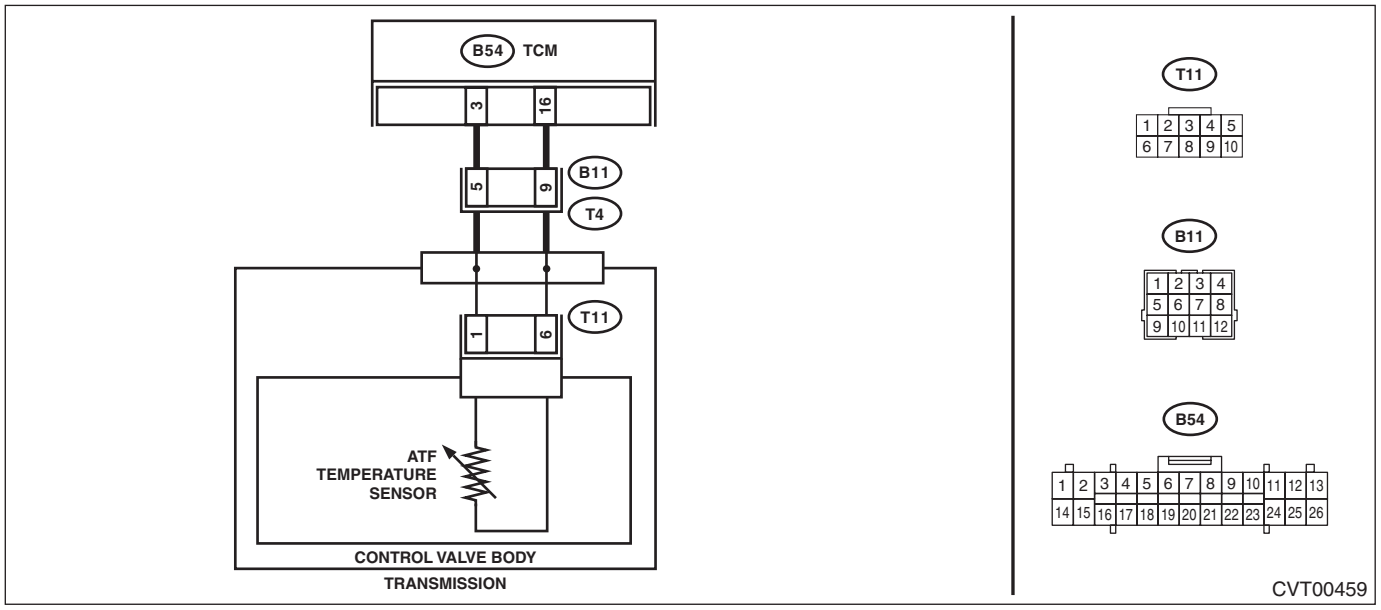
Malfunction Criteria	Threshold Value
All transmission range switches OFF	True
NOTE: "Transmission range switch OFF" is defined as transmission range switch input voltage ≥ 4.1 V.	

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

I: DTC P0711 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Excessive shift shock

CAUTION:
After diagnosis, perform Clear Memory Mode for each system.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC using Subaru Select Monitor.	Is DTC P0712 or P0713 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **3**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
3	**CHECK INPUT SIGNAL FOR TCM.** Check «ATF Temp.» using the Subaru Select Monitor.	Is «ATF Temp.» less than 20°C (68°F)?	Go to step **4**.	Reconfirm after the ATF temperature drops below 20°C (68°F).
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Apply the electronic parking brake. 3) Start the engine. 4) Set the select lever to “D” range. 5) Warm up the engine until the ATF temperature reaches 20°C (68°F). 6) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does «ATF Temp.» increase by 1°C (1.8°F) within 10 minutes?	Current condition is normal.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 3 — (B11) No. 5:*** ***(B54) No. 16 — (B11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **6**.	Check for poor contact of the ATF temperature sensor and transmission connector harness, and repair the defective part.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connector to TCM. (with the transmission connector disconnected) 2) Turn the ignition switch to ON. 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Is –50°C (–58°F) displayed in «ATF Temp.»?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the malfunction of transmission oil temperature sensor.
- Transmission oil temperature sensor is below the specified value (20°C (68°F))
- Judge as characteristics malfunction (transmission oil temperature sensor signal stuck) when a condition where the voltage change detected by transmission oil temperature sensor is 0.049 V or less is detected, even after driving for 10 minutes.

Diagnosis 2
- Judge the malfunction of transmission oil temperature sensor characteristics (stuck to high temperature side).
- Judge as malfunction when the difference of engine coolant temperature and CVT oil temperature at starting is a predetermined value or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Engine speed (The timer is held when the following conditions are not satisfied.)	> 600 rpm
Transmission range	Drive
Vehicle speed (from output shaft speed sensor)	≥ 21.9 MPH
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Engine coolant temperature at the end of the previous drive cycle – Engine coolant temperature at engine start	≥ 40 degC

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.
Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute change of measured Transmission fluid temperature sensor input voltage	≤ 0.049 V
Transmission fluid temperature	< 20°C
Diagnosis 2	
Transmission fluid temperature – Engine coolant temperature at engine start	> 46 degC

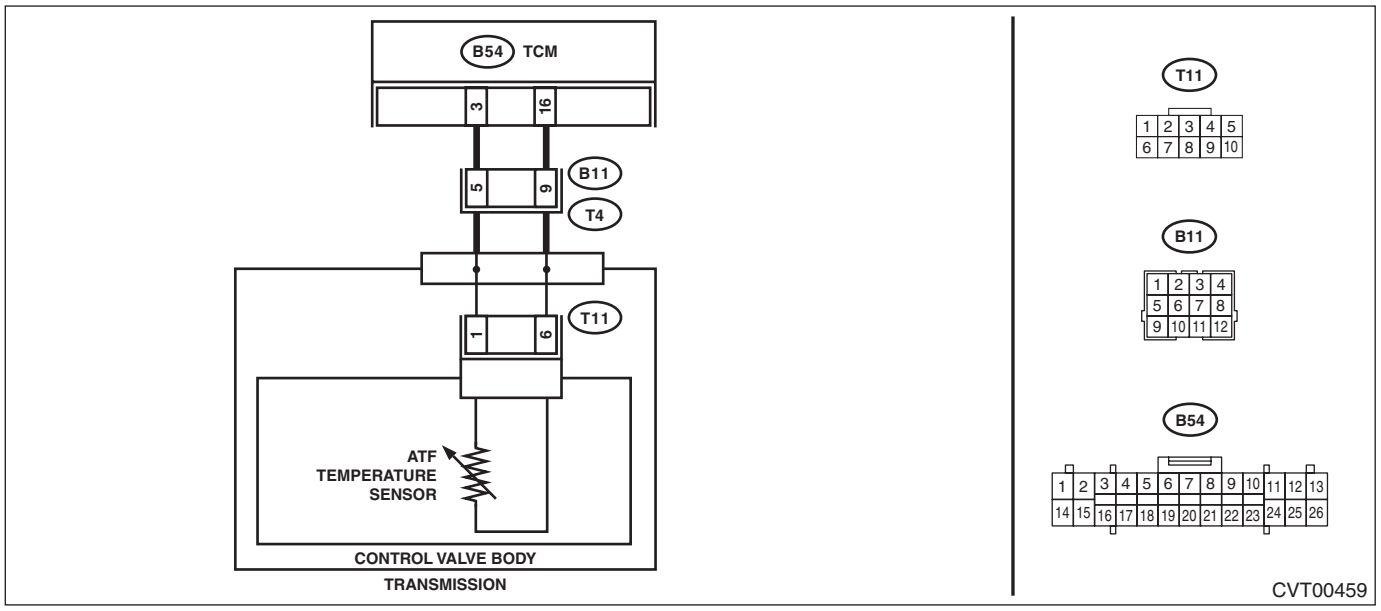
Time Needed for Diagnosis:
- **Diagnosis 1:** 600 s
- **Diagnosis 2:** 300 s

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

J: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Excessive shift shock
- Shift characteristics malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 3 — Chassis ground:*** ***(B54) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the transmission connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 5 — Transmission body:*** ***(T4) No. 9 — Transmission body:***	Is the resistance 1 MΩ or more?	Repair the short circuit of body harness.	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T11) No. 1 — No. 6:*** NOTE: Perform the measurements using multiple oil temperatures.	Is resistance as follows? Fluid temperature 0°C → Approx. 6.0 kΩ Fluid temperature 20°C → Approx. 2.5 kΩ Fluid temperature 80°C → Approx. 330 Ω	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>

1. OUTLINE OF DIAGNOSIS

- Detect the ground short circuit of transmission oil temperature sensor.
- Judge as NG if the voltage detected by the transmission oil temperature sensor is lower than 0.117 V.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

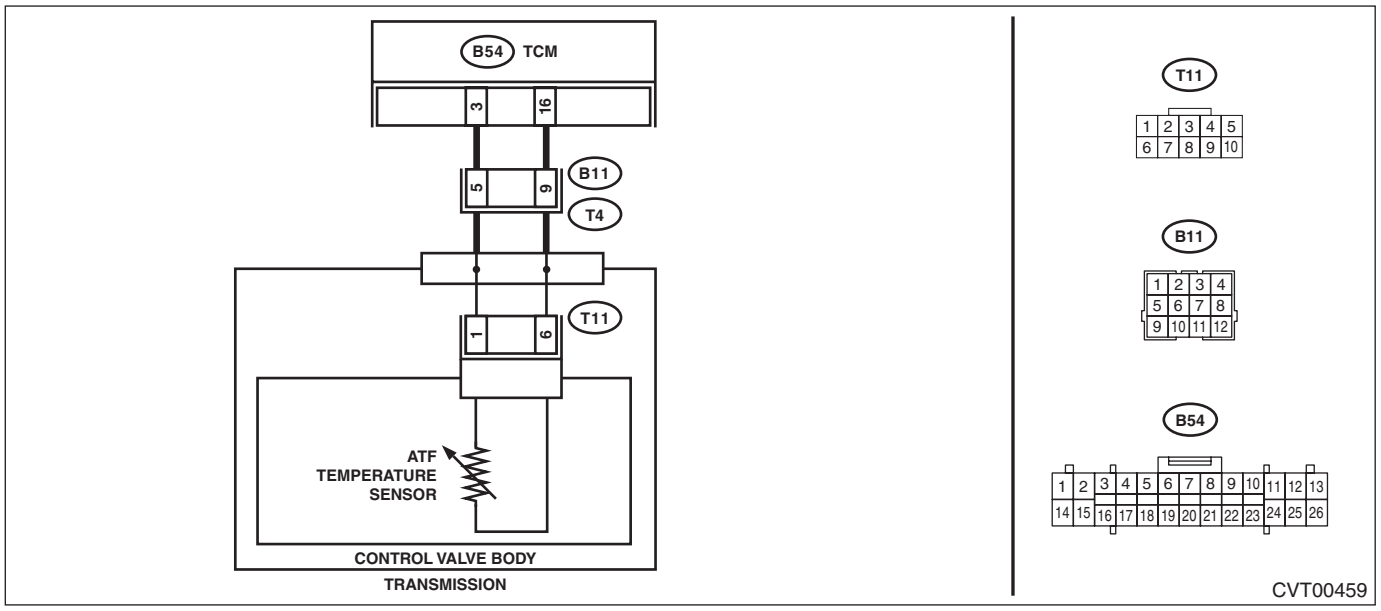
Malfunction Criteria	Threshold Value
Measured Transmission fluid temperature sensor input voltage (Transmission fluid temperature)	< 0.117 V (> 146°C (294.8°F))

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

K: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Excessive shift shock
- Shift characteristics malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 3 (+) — (B54) No. 16 (–):***	Is the voltage 5 V or more?	Repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 3 — (B11) No. 5:*** ***(B54) No. 16 — (B11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Go to step **5**.

	Step	Check	Yes	No
4	**CHECK HARNESS.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 5 — (T11) No. 1:*** ***(T4) No. 9 — (T11) No. 6:***	Is the resistance less than 1 Ω?	Repair the open circuit of transmission harness on the control valve side.	Repair the open circuit of transmission harness on the outside of the transmission.
5	**CHECK ATF TEMPERATURE SENSOR.** 1) Connect the connectors to TCM and transmission. 2) Start the engine. 3) Warm up until the ATF temperature exceeds 50°C (122°F). 4) Turn the ignition switch to OFF. 5) Disconnect the transmission connector. 6) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Is the resistance 650 — 990 Ω?	Go to step **6**.	Go to step **8**.
6	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Does the resistance value increase gradually while the ATF temperature decreases?	Go to step **7**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the transmission connector. 2) Turn the ignition switch to ON. (Do not start engine.) 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Check for poor contact of the ATF temperature sensor and transmission connector harness, and repair the defective part.	Go to step **8**.
8	**CHECK FOR POOR CONTACT.**	Is there poor contact of ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or power supply-output short circuit of the transmission oil temperature sensor 5 V system.
- Judge as NG if the voltage detected by the transmission oil temperature sensor is higher than 4.507 V.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Vehicle speed (from Output shaft speed sensor)	≥ 6.3 MPH
Above condition satisfied for	≥ 50 s

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Transmission fluid temperature sensor input voltage	> 4.507 V
(Transmission fluid temperature)	(< –52°C (–61.6°F))

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

L: DTC P0716 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT RANGE/ PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shock occurs when selecting shift position.
- Shift characteristics malfunction

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0716, is DTC U0100 or U0401 displayed?	Perform the diagnosis according to DTCs other than P0716.	Perform the diagnosis according to DTC P0717. <Ref. to CVT(HEV)(diag)-63, DTC P0717 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of turbine speed sensor characteristics.
- Judge as NG when the deviation between engine speed and turbine speed becomes equal to or larger than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured turbine shaft speed	< Table 1 rpm

Table 1

Engine speed (rpm)	3700	3727	3755	3782	3856	4019	4213	4456
Measured turbine shaft speed (rpm)	0	500	1000	1500	2000	2500	3000	3500

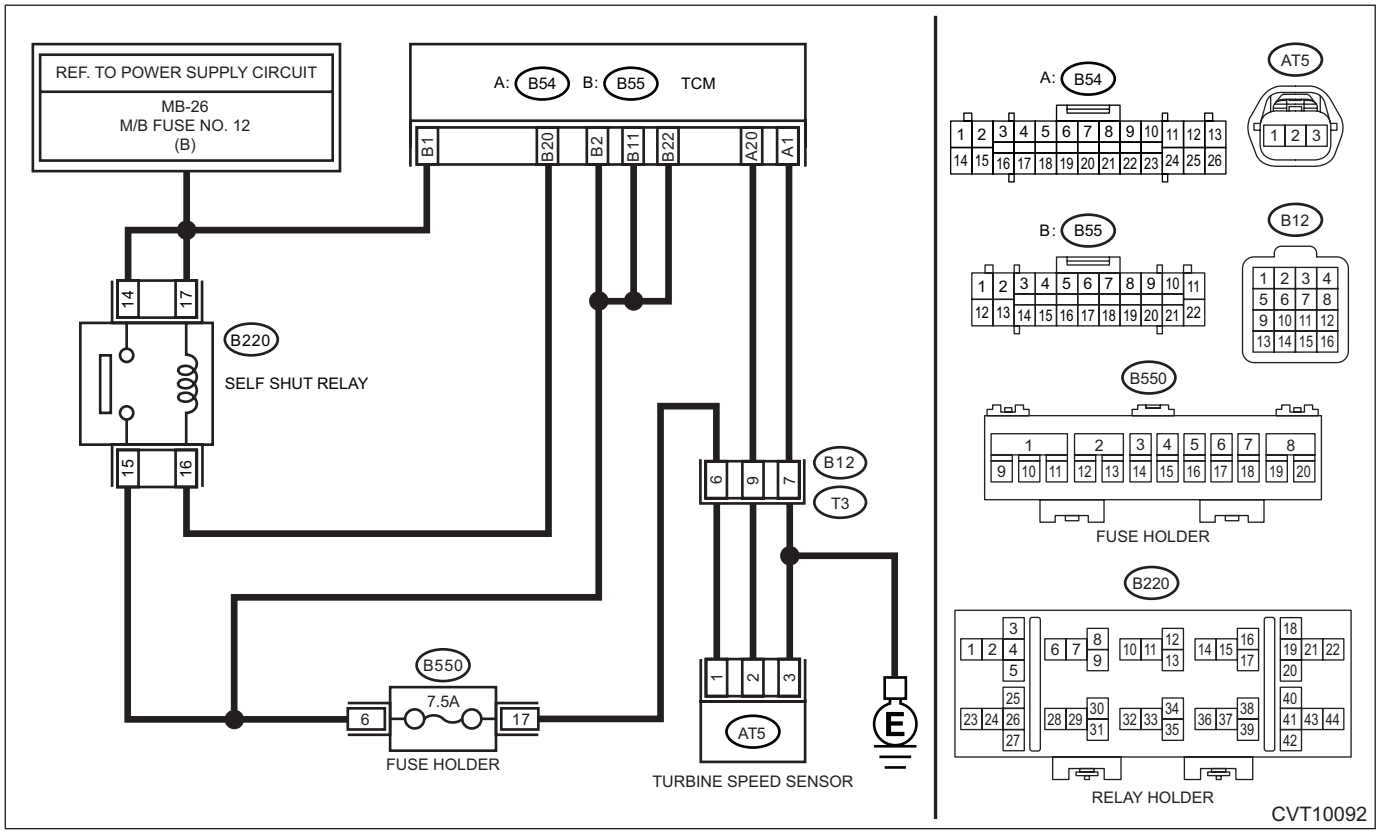
Engine speed (rpm)	4786	5213	5651	6101	6569	7044	7520
Measured turbine shaft speed (rpm)	4000	4500	5000	5500	6000	6500	7000

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

M: DTC P0717 INPUT/TURBINE SHAFT SPEED SENSOR "A" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Standing start problems
- Shock occurs when engaging the lockup clutch.
- Shock occurs when selecting shift position.
- Shock occurs when engine starts from EV traveling.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse blown out?	Replace the fuse. If the replaced fuse blows out easily, repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B55) No. 20 — (B220) No. 16:*** ***(B55) No. 2 — (B220) No. 15:*** ***(B55) No. 11 — (B220) No. 15:*** ***(B55) No. 22 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 20 — Chassis ground:*** ***(B55) No. 2 — Chassis ground:*** ***(B55) No. 11 — Chassis ground:*** ***(B55) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Set the select lever to “D” range. 4) While the vehicle is at a standstill, read the data of «Turbine Revolution Speed» and «Primary Pulley Speed» using Subaru Select Monitor.	Is the value of «Turbine Revolution Speed» and «Primary Pulley Speed» 0 rpm?	Go to step **9**.	Check the turbine speed sensor circuit.
9	**CHECK INPUT SIGNAL FOR TCM.** Read the data of «Turbine Revolution Speed» and «Primary Pulley Speed» using Subaru Select Monitor.	Does the value of «Turbine Revolution Speed» and «Primary Pulley Speed» change according to the engine speed?	Current condition is normal.	Go to step **10**.
10	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 1 — (B12) No. 7:*** ***(B54) No. 20 — (B12) No. 9:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness.
11	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **12**.	Repair the short circuit of harness.

	Step	Check	Yes	No
12	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **13**.	Repair the open circuit of harness.
13	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **14**.	Repair the open circuit of harness or poor contact of connector.
14	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Lift up the vehicle. 4) Disconnect the turbine speed sensor connector. 5) Measure the resistance between transmission connector and turbine speed sensor connector. ***Connector & terminal*** ***(T3) No. 6 — (AT5) No. 1:*** ***(T3) No. 7 — (AT5) No. 3:*** ***(T3) No. 9 — (AT5) No. 2:***	Is the resistance less than 1 Ω?	Go to step **15**.	Replace the transmission harness.
15	**CHECK TURBINE SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 6 — Chassis ground:*** ***(T3) No. 9 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **16**.	Repair the short circuit of harness.
16	**CHECK TURBINE SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the turbine speed sensor. <Ref. to CVT(TH58A)-104, Turbine Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0717 displayed?	Go to step **17**.	The original turbine speed sensor is defective.
17	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0717 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	The original self shut relay is defective.

1. OUTLINE OF DIAGNOSIS

- Detect the no input signal from the turbine speed sensor.
- Judge as NG when the turbine speed is not input while the primary speed on the same axis has been input with the forward/reverse clutch engaged in “D”, “R” range.
- Judge as NG when the turbine speed is not input while the engine speed sensor signal on the same axis has been input with the forward/reverse clutch released in “P”, “N” range.
- Judge as NG when no speed sensor inputs are received from TCM connector during driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Condition 1	
12 V battery system voltage	≥ 10 V
Engine speed	≥ 400 rpm
Actual primary pulley shaft speed	≥ 500 rpm
Transmission range	Drive or Reverse
Condition 2	
12 V battery system voltage	≥ 10 V
Engine speed	≥ 400 rpm
Transmission range	Park or Neutral
Condition 3	
12 V battery system voltage	≥ 10 V
Measured secondary pulley shaft speed	0 rpm
Measured output shaft speed	0 rpm
Actual primary pulley shaft speed	≥ 500 rpm
Transmission range	Drive or Reverse
Vehicle speed (from vehicle dynamics control module)	≥ 6.3 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured turbine shaft speed	0 rpm

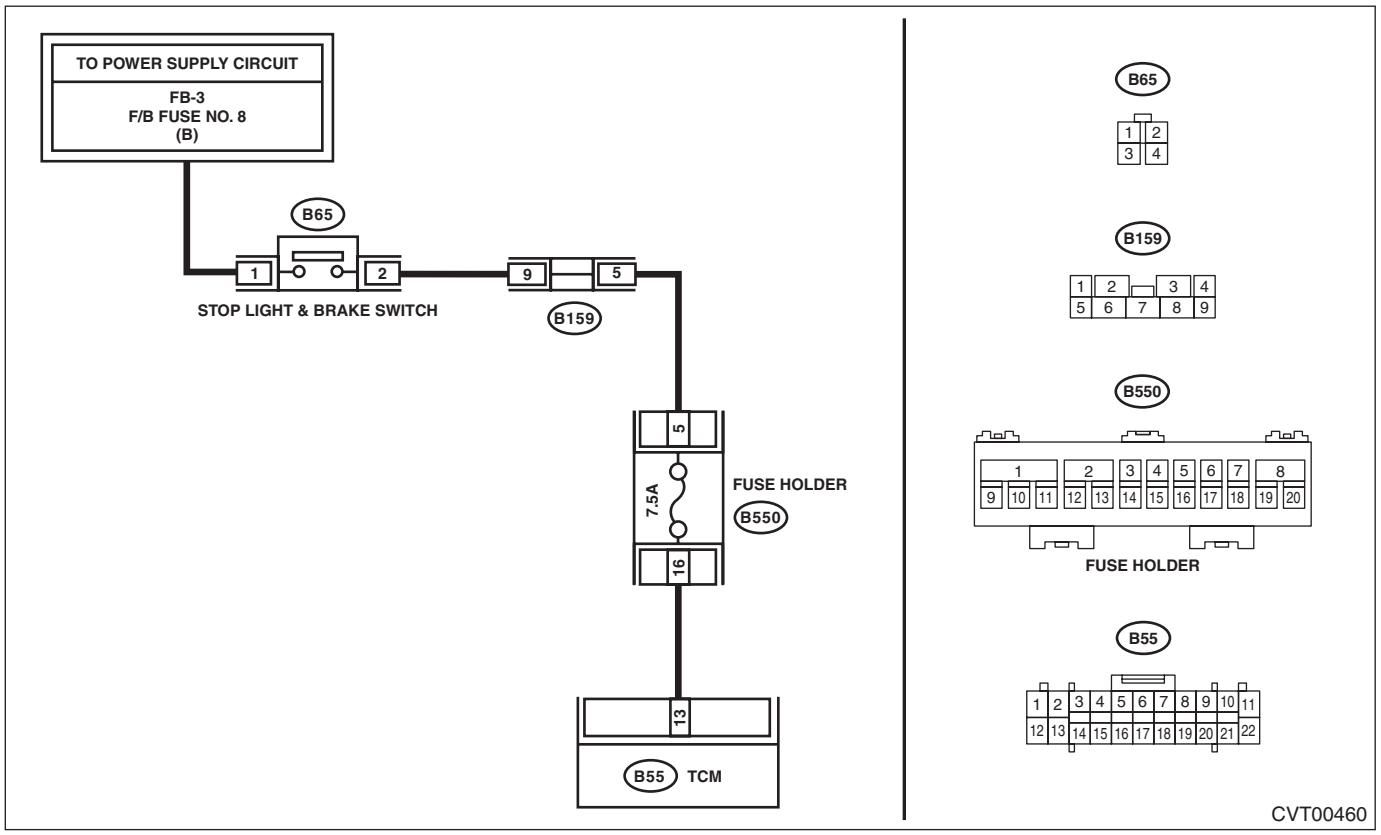
Time Needed for Diagnosis:

- **Condition 1:** 1 s
- **Condition 2:** 3 s
- **Condition 3:** 0.6 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

N: DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Symptoms such as shift-down not operating may occur.
WIRING DIAGRAM:
Stop light system <Ref. to WI(HEV)-191, Stop Light System.>



	Step	Check	Yes	No
1	**CHECK FUSE (NO. 8).** 1) Turn the ignition switch to OFF. 2) Remove the fuse (No. 8).	Is the fuse (No. 8) blown out?	Replace the fuse (No. 8). If the new fuse (No. 8) has blown out easily, repair the short circuit of harness between fuse (No. 8) and stop light switch.	Go to step **2**.
2	**CHECK FUSE.** Remove the fuse (7.5 A) from the fuse holder.	Is the fuse (7.5 A) blown out?	Replace the fuse (7.5 A). If the replaced fuse (7.5 A) blows out easily, repair the short circuit of harness between fuse (7.5 A) and TCM.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and stop light switch connector. 3) Measure the resistance between TCM connector and stop light switch connector. ***Connector & terminal*** ***(B55) No. 13 — (B65) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** Measure the resistance between the stop light switch connector and fuse (No. 8). ***Connector & terminal*** ***(B65) No. 1 — fuse (No. 8):***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness.
5	**CHECK INPUT SIGNAL FOR TCM.** 1) Install the fuse (No. 8). 2) Connect the TCM and stop light switch connector. 3) Depress the brake pedal. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Replace the stop light switch. <Ref. to BR-75, Stop Light Switch.>
6	**CHECK INPUT SIGNAL FOR TCM.** With brake pedal depressed, read the data of «Stop Light Switch» using Subaru Select Monitor.	Is "ON" displayed?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **7**.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of brake SW signal Low.
- Judge as NG when detecting the condition ten times where the vehicle speed is from more than 18.8 MPH to less than 0.6 MPH with brake SW signal OFF.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

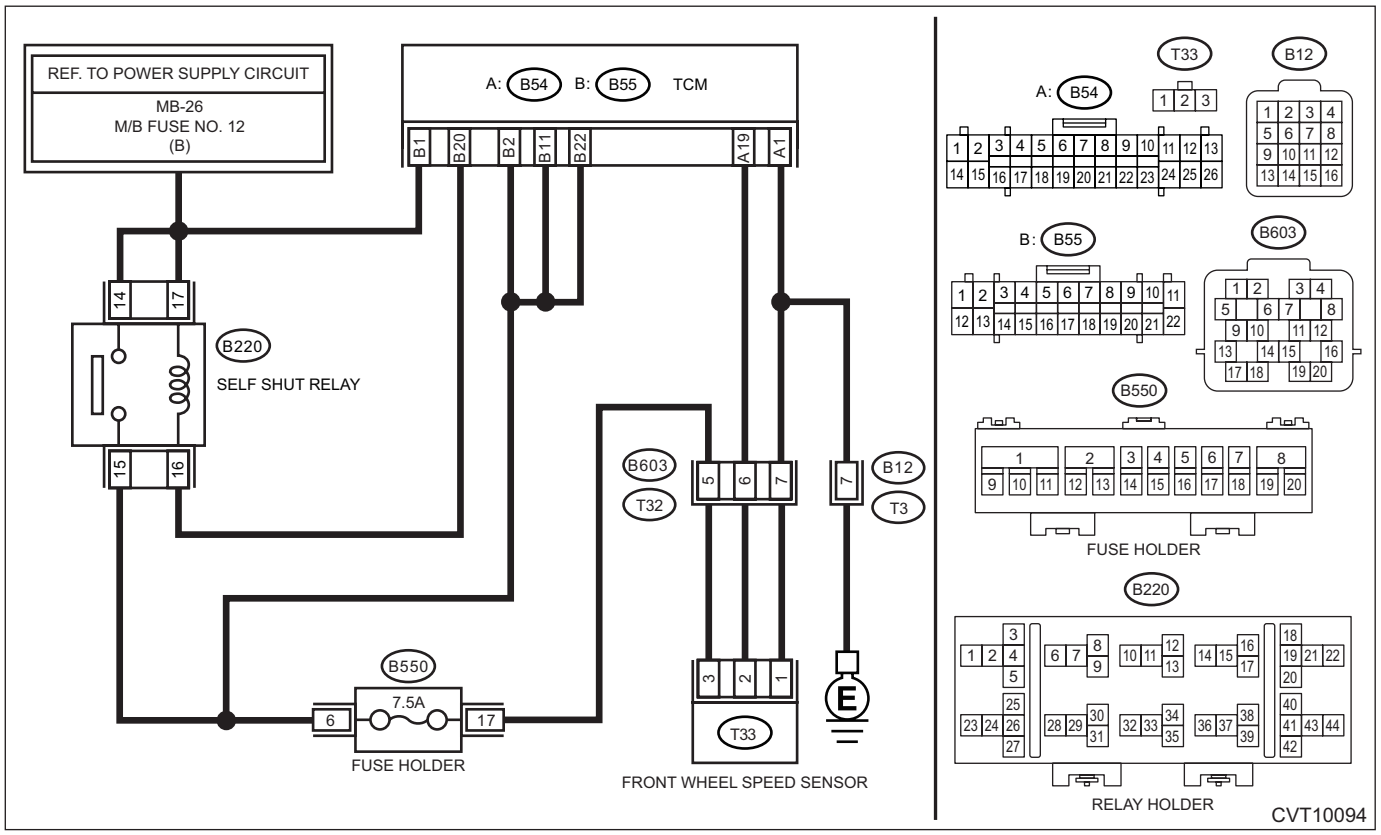
Judgment Value

Malfunction Criteria	Threshold Value
The brake switch B is continuously OFF while the vehicle speed changed from "X" to "Y". Vehicle speed "X" Vehicle speed "Y" NOTE: "Brake switch B OFF" is defined as Brake switch B input voltage ≤ 2.9 V.	 ≥ 18.8 MPH < 0.6 MPH

Time Needed for Diagnosis: 10 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

O: DTC P0720 OUTPUT SHAFT SPEED SENSOR CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Symptoms such as vehicle-vibration may occur.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse blown out?	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B55) No. 20 — (B220) No. 16:*** ***(B55) No. 2 — (B220) No. 15:*** ***(B55) No. 11 — (B220) No. 15:*** ***(B55) No. 22 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 20 — Chassis ground:*** ***(B55) No. 2 — Chassis ground:*** ***(B55) No. 11 — Chassis ground:*** ***(B55) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Slowly increase the speed to 30 km/h (18 MPH). 4) Read the data of «Front Wheel Speed» using Subaru Select Monitor.	Does the value of «Front Wheel Speed» change according to the engine speed?	Current condition is normal.	Go to step **9**.
9	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 1 — (B12) No. 7:*** ***(B54) No. 1 — (B603) No. 7:*** ***(B54) No. 19 — (B603) No. 6:*** ***(B550) No. 17 — (B603) No. 5:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair the open circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 19 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Repair the short circuit of harness.
11	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **12**.	Repair the open circuit of harness.
12	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector. ***Connector & terminal*** ***(B603) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **13**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Lift up the vehicle. 4) Disconnect the front wheel speed sensor connector. 5) Measure the resistance between transmission connector and front wheel speed sensor connector. ***Connector & terminal*** ***(T32) No. 5 — (T33) No. 3:*** ***(T32) No. 6 — (T33) No. 2:*** ***(T32) No. 7 — (T33) No. 1:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK FRONT WHEEL SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T32) No. 5 — Chassis ground:*** ***(T32) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK FRONT WHEEL SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the front wheel speed sensor. <Ref. to CVT(TH58A)-108, Front Wheel Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0720 displayed?	Go to step **16**.	The original front wheel speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0720 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	The original self shut relay is defective.

1. OUTLINE OF DIAGNOSIS

- Detect no input signal from the front wheel speed sensor.
- Judge as NG if the front wheel speed is not input while vehicle speed is detected by VDC wheel speed sensor when driving in “D”, “R” range.
- Judge as NG if the front wheel speed sensor has no input signals while the secondary speed sensor on the same axle has input signals when driving in “D” or “R” range.
- Judge as NG when no speed sensor inputs are received from TCM connector during driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Condition 1	
12 V battery system voltage	≥ 10 V
Vehicle speed (from vehicle dynamics control module)	≥ 3.1 MPH
Transmission range	Drive or Reverse
MIL is illuminated for DTCs.	P0500, U0073, U0122, U0416
Condition 2	
12 V battery system voltage	≥ 10 V
Secondary pulley shaft speed	≥ 800 rpm
Transmission range	Drive or Reverse
Condition 3	
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	0 rpm
Measured secondary pulley shaft speed	0 rpm
Actual primary pulley shaft speed	≥ 500 rpm
Transmission range	Drive or Reverse
Vehicle speed (from vehicle dynamics control module)	≥ 6.3 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured output shaft speed	0 rpm

Time Needed for Diagnosis:

- **Condition 1:** 1 s
- **Condition 2:** 1 s
- **Condition 3:** 0.6 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

P: DTC P0721 OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- No lock-up occurs.
- The engine stalls when the vehicle is stopped.
- Shift control malfunction

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0721, is any of the DTC P0500, U0122 or U0416 displayed?	Perform the diagnosis according to DTCs other than P0721.	Perform the diagnosis according to DTC P0720. <Ref. to CVT(HEV)(diag)-69, DTC P0720 OUTPUT SHAFT SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of front wheel speed sensor characteristics.
- Judge as NG when the deviation between vehicle speeds from VDC and from front wheel speed sensor becomes 10 MPH or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Vehicle speed (calculated from Wheel speed sensor)	≥ 12 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

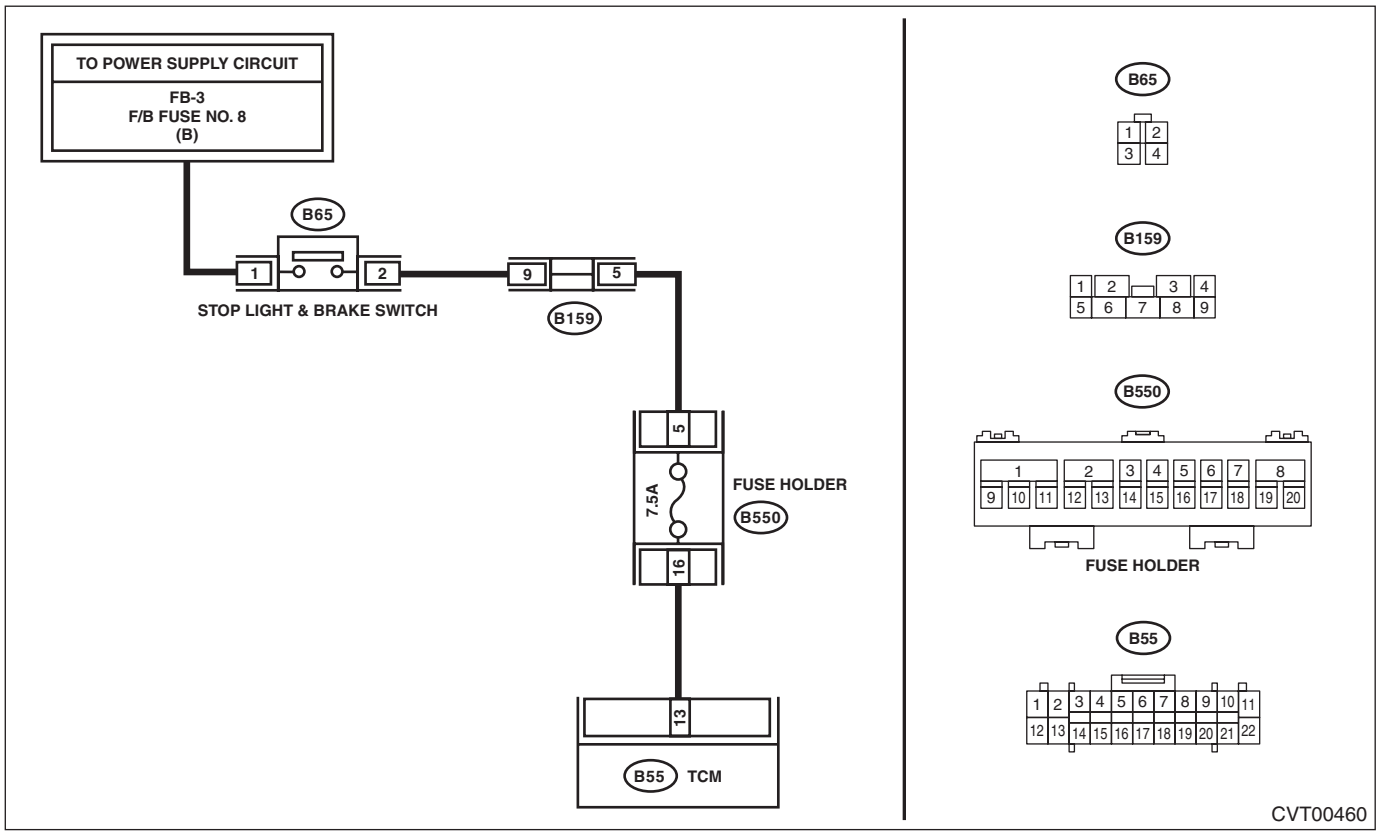
Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Vehicle speed (calculated from output shaft speed) – Vehicle speed (calculated from Wheel speed sensor))	> 10 MPH

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Q: DTC P0724 BRAKE SWITCH "B" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Symptoms such as shift-down not operating may occur.
WIRING DIAGRAM:
Stop light system <Ref. to WI(HEV)-191, Stop Light System.>



Step		Check	Yes	No
1	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light switch connector. 3) Measure the resistance between stop light switch. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Replace the stop light switch. <Ref. to BR-75, Stop Light Switch.>
2	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit of harness.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the TCM and stop light switch connector. 2) Turn the ignition switch to ON. 3) Read the data of «Stop Light Switch» using Subaru Select Monitor.	Is "OFF" displayed?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **4**.

Step	Check	Yes	No
4 CHECK FOR POOR CONTACT.	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of brake SW signal High.
- Judge as NG when detecting the condition ten times where the vehicle speed is from less than 0.6 MPH to more than 18.8 MPH with brake SW signal ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
The brake switch B is continuously ON while the vehicle speed changed from “Y” to “X”.	
Vehicle speed “Y”	< 0.6 MPH
Vehicle speed “X”	≥ 18.8 MPH
NOTE: “Brake switch B ON” is defined as Brake switch B input voltage ≥ 4.1 V.	

Time Needed for Diagnosis: 10 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

R: DTC P0730 INCORRECT GEAR RATIO

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

	Step	Check	Yes	No
1	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **2**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
2	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **3**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **4**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-104, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **5**.	Go to step **6**.
5	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Slowly increase the speed to 40 km/h (24 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **6**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
6	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0730 detected?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

- Detect the abnormality in transmission gear ratio control function.
- Judge as NG when the difference between the transmission target gear ratio that is an internal data and the actual gear ratio is larger than the predetermined value (compare the "Target gear ratio × Secondary pulley speed ≈ Target primary speed equivalent value" with the primary pulley speed).

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Transmission fluid pump speed (MTFP or ETFP)	≥ 500 rpm
Measured secondary pulley shaft speed	> 150 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

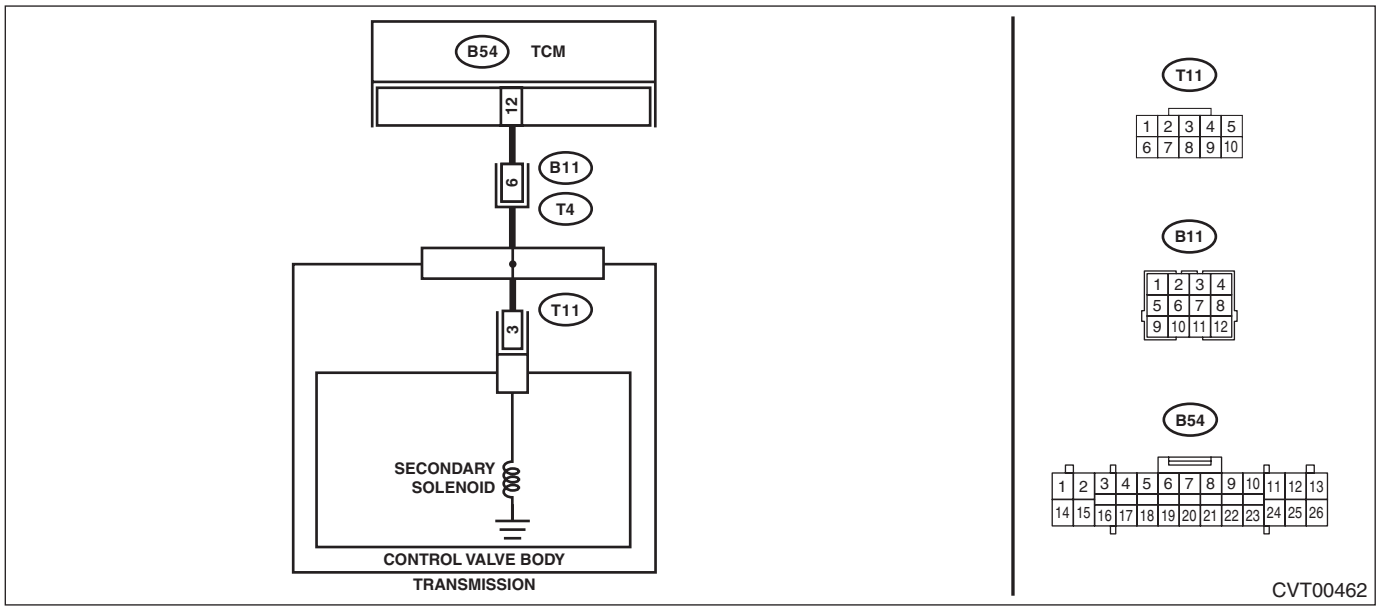
Malfunction Criteria	Threshold Value
Absolute value (Target primary pulley shaft speed – Actual primary pulley shaft speed)	≥ 800 rpm
(Commanded duty of shift up pressure control solenoid or Commanded duty of shift down pressure control solenoid)	≥ 100%

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

S: DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Shift control malfunction
- CVT chain slippage

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0746, is any of the DTCs P0842, P0843, P0962 and P0963 displayed?	Perform the diagnosis according to DTCs other than P0746.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Keep the engine speed at 3,000 rpm. 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» higher than step 6 value? Does the value change according to the engine speed?	Go to step **8**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
8	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Apply the parking brake. 2) Set the select lever to "D" range. 3) Depress the brake pedal firmly. 4) Slowly open the accelerator fully, and stabilize the engine speed. 5) Read the data of «Actual secondary pressure» using Subaru Select Monitor. **CAUTION:** **Do not perform a stall test for over 5 seconds at a time.**	Is the «Actual secondary pressure» higher than step 7 value? Does the value change according to the engine speed?	Go to step **9**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0746 displayed?	Perform the secondary pressure test. <Ref. to CVT(TH58A)-55, Secondary Pressure (Line Pressure) Test.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of transmission line pressure solenoid and hydraulic circuit (stuck to low pressure side).
• Judge as NG when the actual line pressure is smaller than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm
or	
Actual primary pulley shaft speed	
Measured line pressure control solenoid valve current	≤ 0.78 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	< Map 1 kPa

Map 1

		Engine speed (rpm)						
		0	500	1000	1500	2000	2500	3000
Transmission fluid temperature (degC)	– 40	0	0	377	421	462	514	570
	– 20	0	0	299	336	384	436	499
	0	0	0	277	323	359	414	474
	20	0	0	278	323	367	412	464
	40	0	0	280	335	371	420	475
	60	0	0	260	316	353	403	457
	80	0	0	245	304	353	394	440
	100	0	0	227	286	323	369	412
	120	0	0	211	260	300	340	385
	140	0	0	184	230	273	310	357

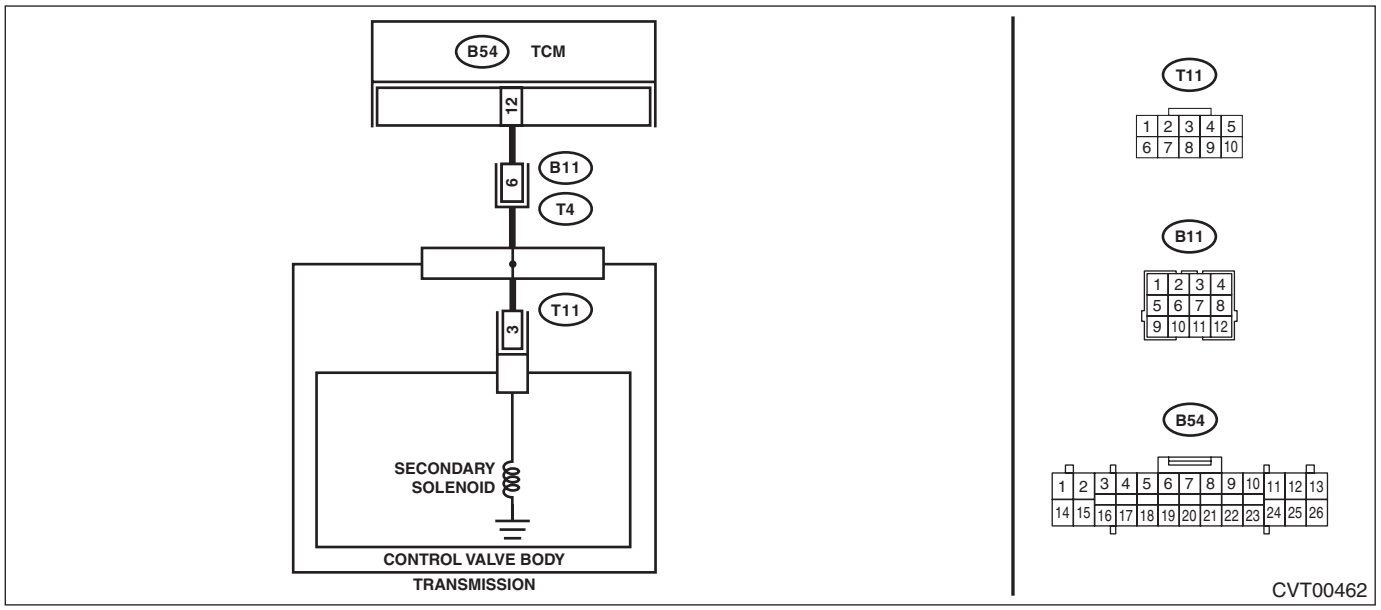
		Engine speed (rpm)						
		3500	4000	4500	5000	5500	6000	6500
Transmission fluid temperature (degC)	– 40	648	722	810	904	1010	1105	1175
	– 20	555	633	711	808	923	1038	1130
	0	544	615	682	767	873	1001	1111
	20	527	590	668	761	854	980	1110
	40	533	591	666	742	836	937	1071
	60	515	573	641	713	800	897	1024
	80	493	548	607	675	749	839	916
	100	468	521	576	632	697	756	824
	120	440	484	536	589	638	691	737
	140	397	449	728	533	564	595	623

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

T: DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0747, is any of the DTCs P0842, P0843, P0962 and P0963 displayed?	Perform the diagnosis according to DTCs other than P0747.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Keep the engine speed at 3,000 rpm. 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» higher than step 6 value? Does the value change according to the engine speed?	Go to step **8**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
8	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Apply the parking brake. 2) Set the select lever to "D" range. 3) Depress the brake pedal firmly. 4) Slowly open the accelerator fully, and stabilize the engine speed. 5) Read the data of «Actual secondary pressure» using Subaru Select Monitor. **CAUTION:** **Do not perform a stall test for over 5 seconds at a time.**	Is the «Actual secondary pressure» higher than step 7 value? Does the value change according to the engine speed?	Go to step **9**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0747 displayed?	Perform the secondary pressure test. <Ref. to CVT(TH58A)-55, Secondary Pressure (Line Pressure) Test.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission line pressure solenoid and hydraulic circuit (stuck to high pressure side).
- Judge as NG when the actual line pressure is larger than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm
or	
Actual primary pulley shaft speed	
Measured line pressure control solenoid valve current	≥ 0.5 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	> Map 1 kPa

Map 1

		Engine speed (rpm)						
		0	500	1000	1500	2000	2500	3000
Transmission fluid temperature (degC)	– 40	25600	25600	5590	5769	5915	5970	6000
	– 20	25600	25600	5925	6012	6064	6083	6115
	0	25600	25600	5887	5971	6015	6023	6035
	20	25600	25600	5451	5491	5568	5598	5610
	40	25600	25600	4564	5429	5461	5542	5576
	60	25600	25600	2598	4527	5412	5455	5514
	80	25600	25600	1798	3735	5271	5368	5402
	100	25600	25600	993	2867	4341	5282	5353
	120	25600	25600	742	2556	3969	5200	5254
	140	25600	25600	438	1902	3293	4531	5114

		Engine speed (rpm)						
		3500	4000	4500	5000	5500	6000	6500
Transmission fluid temperature (degC)	– 40	5988	5988	6040	6100	6100	6110	6200
	– 20	6130	6170	6190	6240	6250	6250	6250
	0	6056	6078	6145	6176	6201	6212	6256
	20	5637	5675	5693	5740	5752	5752	5797
	40	5626	5640	5676	5700	5711	5751	5787
	60	5546	5576	5612	5636	5658	5658	5715
	80	5502	5525	5545	5597	5602	5602	5684
	100	5422	5460	5504	5538	5574	5574	5624
	120	5326	5391	5429	5457	5472	5472	5533
	140	5185	5280	5337	5365	5377	5377	5440

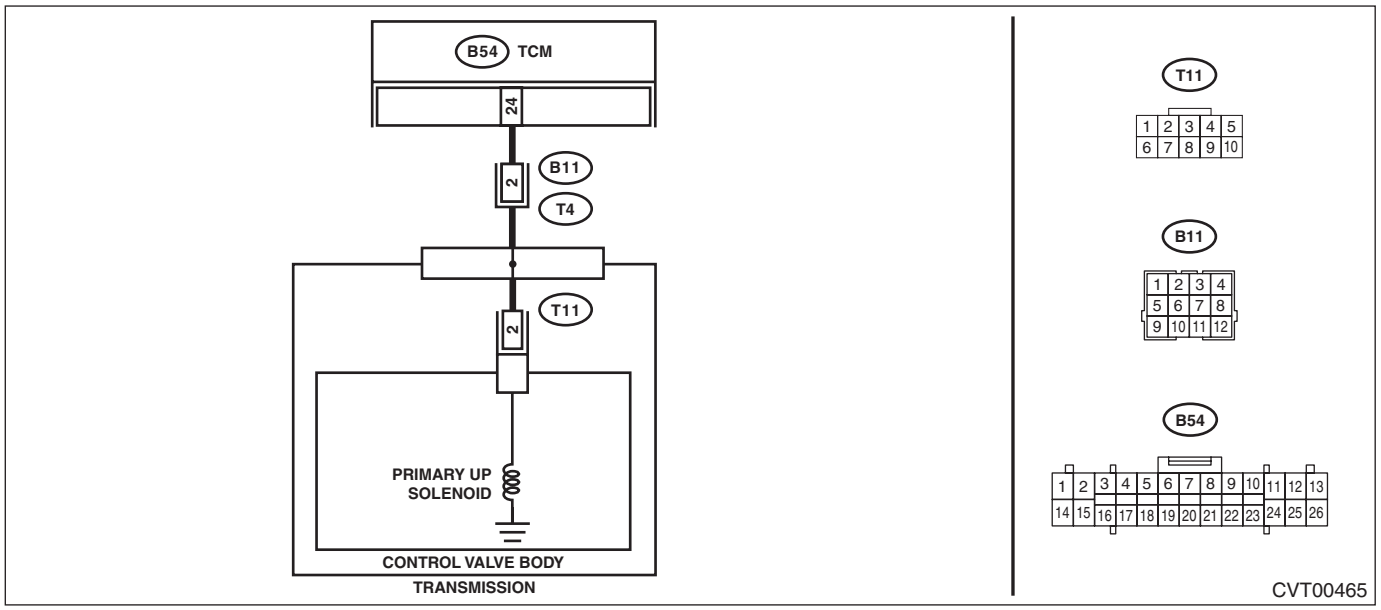
Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

U: DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.

TROUBLE SYMPTOM:
- Shift control malfunction
- Engine speed increases abruptly.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0751, is any of the DTC P0973, P0974, P0976, P0977, P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0751.	Go to step **2**.
2	**CHECK PRIMARY UP SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0751 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-up fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG when the gear ratio is more than 1.5 and less than 2.549 and the variation amount of the gear ratio per second is –0.12 or more even though up-shift command is issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
or	
Actual primary pulley shaft speed	≥ 1000 rpm
Commanded duty of shift down pressure control solenoid	0%
Actual pulley ratio*	> 1.5
	and
	< 2.549

* Actual pulley ratio: Actual primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

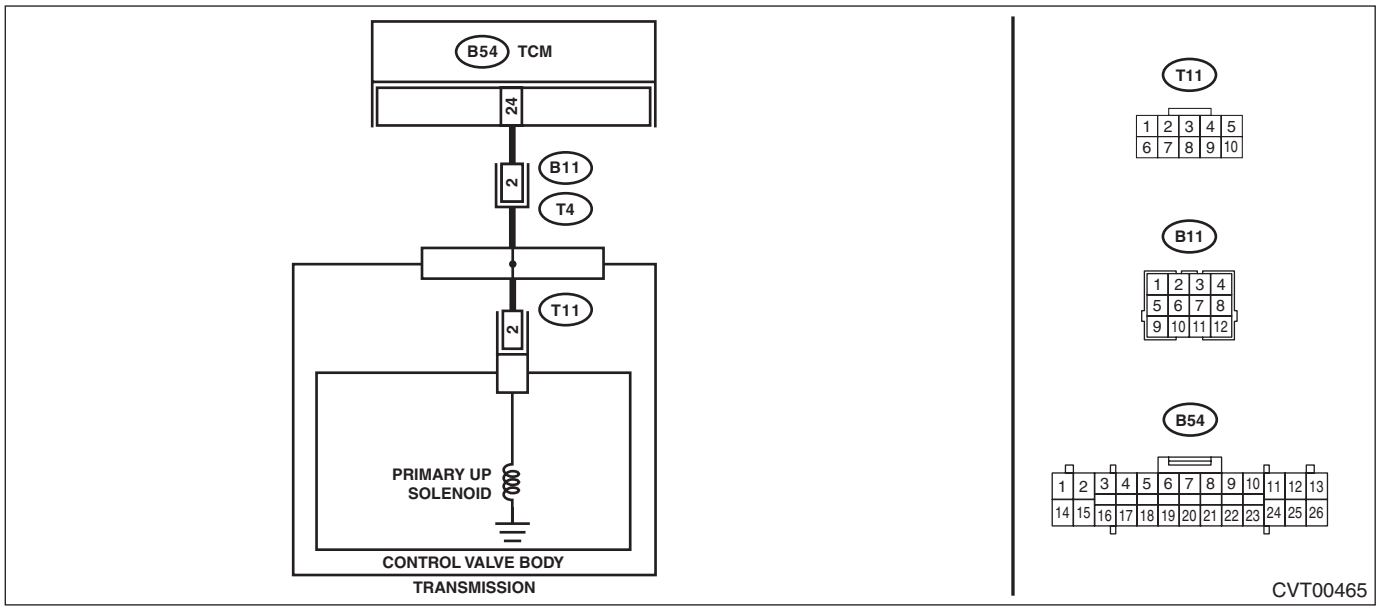
Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.12
Commanded duty of shift up pressure control solenoid	≥ 90%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

V: DTC P0752 SHIFT SOLENOID "A" STUCK ON

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0752, is any of the DTC P0973, P0974, P0976, P0977, P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0752.	Go to step **2**.
2	**CHECK PRIMARY UP SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0752 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-up fluid pressure control solenoid and hydraulic circuit characteristics (stuck to high pressure side).
• Judge as NG when the gear ratio is less than 0.5 and the variation amount of the gear ratio per second is between –0.12 and 0.12 even though down-shift command is issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
or	
Actual primary pulley shaft speed	≥ 1000 rpm
Commanded duty of shift up pressure control solenoid	0%
Actual pulley ratio*	< 0.5

* Actual pulley ratio: Actual primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

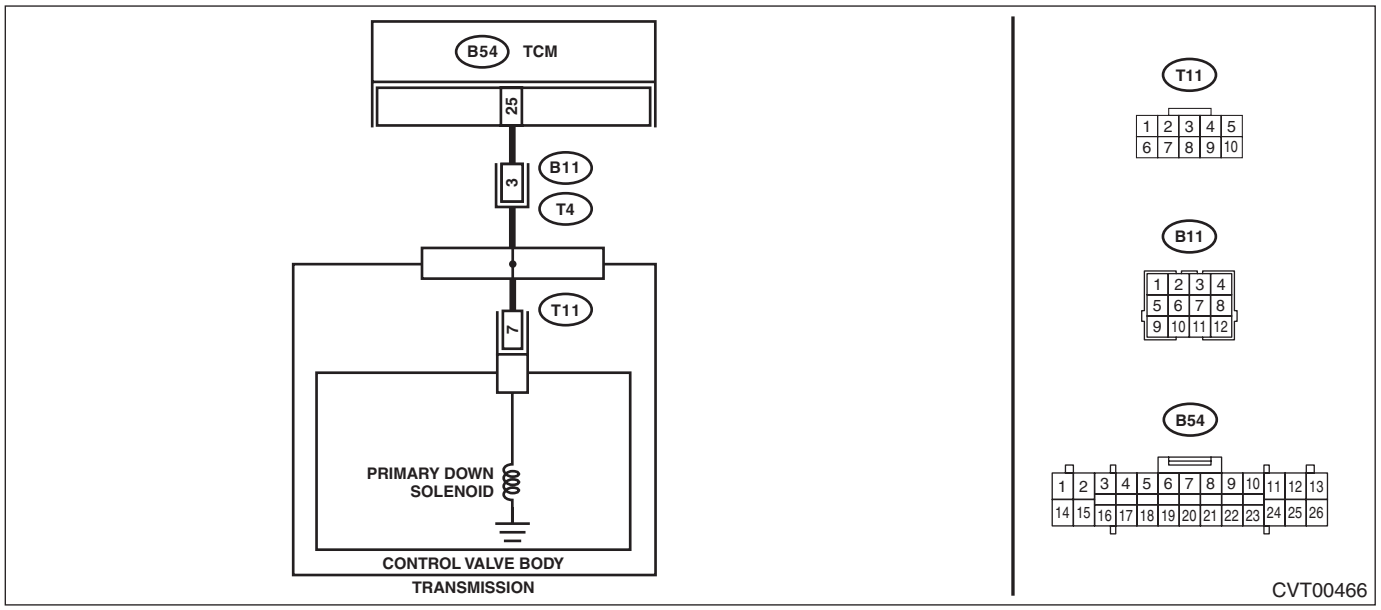
Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.12 and < 0.12
Commanded duty of shift down pressure control solenoid	> 80%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

W: DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0756, is any of the DTC P0973, P0974, P0976, P0977, P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0756.	Go to step **2**.
2	**CHECK PRIMARY DOWN SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0756 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-down fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG if the variation amount of gear rate per second is between –0.12 and 0.12 even though the down-shift command is issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
or	
Actual primary pulley shaft speed	≥ 1000 rpm
Commanded duty of shift up pressure control solenoid	0%
Actual pulley ratio*	≥ 0.406
	and
	≤ 2.549

* Actual pulley ratio: Actual primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

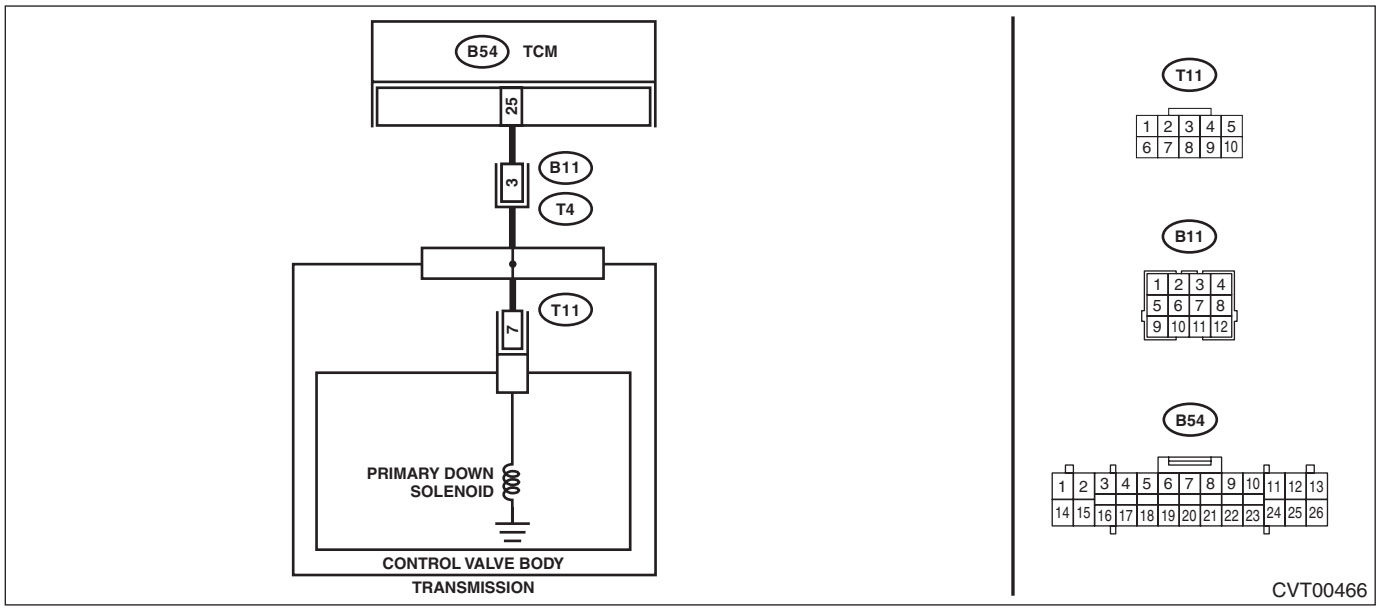
Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.12
	and
	< 0.12
Commanded duty of shift down pressure control solenoid	> 80%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

X: DTC P0757 SHIFT SOLENOID "B" STUCK ON

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Vibration occurs at shift change.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0757, is any of the DTC P0973, P0974, P0976, P0977, P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0757.	Go to step **2**.
2	**CHECK PRIMARY DOWN SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0757 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-down fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to high pressure side).
• Judge as NG if the variation amount of gear ratio per second is 0.04 or more even though the up-shift command is issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
or	
Actual primary pulley shaft speed	≥ 1000 rpm
Commanded duty of shift down pressure control solenoid	0%
Actual pulley ratio*	≥ 0.406
	and
	≤ 2.549

* Actual pulley ratio: Actual primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> 0.04
Commanded duty of shift up pressure control solenoid	> 50%

Time Needed for Diagnosis: 1 s × 10 times
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Y: DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0776, is any of the DTC P0717, P0966, P0967, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0776.	Go to step **2**.
2	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **3**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
3	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **4**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **5**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-104, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
5	**STALL TEST.** Perform the stall test. <Ref. to CVT(TH58A)-52, Stall Test.>	Is the stall test normal?	Go to step **6**.	Replace the transmission assembly if the stall speed is higher than the standard value of the stall test. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
6	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0776 detected?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the transmission forward/reverse clutch control function at OFF side.
- Judge as NG if the deviation between the turbine speed and primary pulley speed becomes the predetermined value or more, even though the forward/reverse clutch should be engaged in the current control status.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Actual primary pulley shaft speed	≥ 100 rpm
Measured turbine shaft speed	≥ 100 rpm
Commanded forward & reverse clutch pressure control solenoid current	< 0.8 A
Engine speed	≥ 500 rpm
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Actual primary pulley shaft speed	< 100 rpm
Commanded forward & reverse clutch pressure control solenoid current	< 0.8 A
Accelerator pedal position (from ECM)	> 6%
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed)	> Table 1 rpm
Diagnosis 2	
Measured turbine shaft speed	> 2000 rpm

Table 1

Vehicle speed (MPH)	0	13	25	38	50	63	75
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed) (rpm)	150	100	100	100	100	100	100

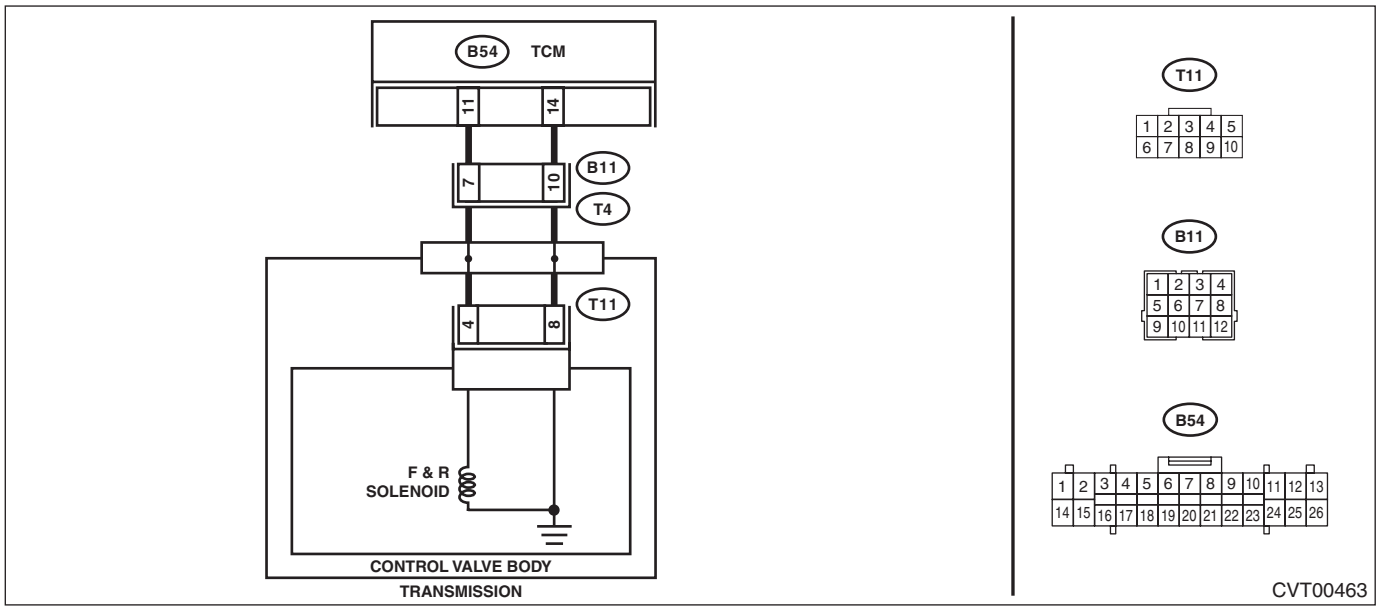
Vehicle speed (MPH)	88	100	113	125	138	150	159
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed) (rpm)	100	100	100	100	100	100	100

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Z: DTC P0777 PRESSURE CONTROL SOLENOID "B" STUCK ON

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Excessive shift shock.
- Decelerating speed in EV mode is higher than normal.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0777, is any of the DTC P0717, P0966, P0967, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0777.	Go to step **2**.
2	**CHECK F&R SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**TEST DRIVE TO CHECK F&R CLUTCH CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 60°C. 5) Place the vehicle on the ground. 6) While driving at a legal speed, gently depress the brake pedal to enter EV traveling mode. 7) After entering EV traveling mode, release the brake pedal and the accelerator pedal, and keep the coast driving until the vehicle speed drops to 10 km/h (6 MPH). 8) When the speed becomes 10 km/h (6 MPH) or less, stop the vehicle and place the select lever to "P" range. 9) Turn the ignition switch to OFF. 10) Start the engine. 11) Perform the procedure in step 6) again. 12) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P0777 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Go to step **7**.
7	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0777 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the transmission forward/reverse clutch control function.
- Judge as NG if the deviation between the turbine speed and primary pulley speed becomes less than the predetermined value, even though the EV traveling should be performed without the forward/reverse clutch engagement.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Transmission range	Drive (EV mode)
Engine speed	> 1000 rpm
or	
Actual primary pulley shaft speed	
Commanded forward & reverse clutch	≥ 900 mA
Vehicle speed (calculated from wheel speed sensor)	≥ 10 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed) (rpm)	< Table 1 rpm

Table 1

Actual primary pulley shaft speed (rpm)	0	500	1000	1500	2000	2500	3000	3500	4000
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed) (rpm)	0	0	150	150	150	150	150	150	150

Actual primary pulley shaft speed (rpm)	4500	5000	5500	6000	6500	7000	7500	8000
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed) (rpm)	150	150	150	150	150	150	150	150

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

AA:DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT/OPEN

DTC DETECTING CONDITION:
Immediately at fault recognition

NOTE:
For diagnostic procedures, refer to “BODY CONTROL SYSTEM (DIAGNOSTICS)”. <Ref. to BC(diag)-38, DTC B1016 SHIFT LOCK CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of shift lock solenoid or circuit.
- Judge as NG if abnormal signal from the integrated unit is received, when bus off is not detected and there is no trouble in CAN between the integrated unit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Malfunctions listed on the right column are not detected:	U0073 U0140, U0422

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

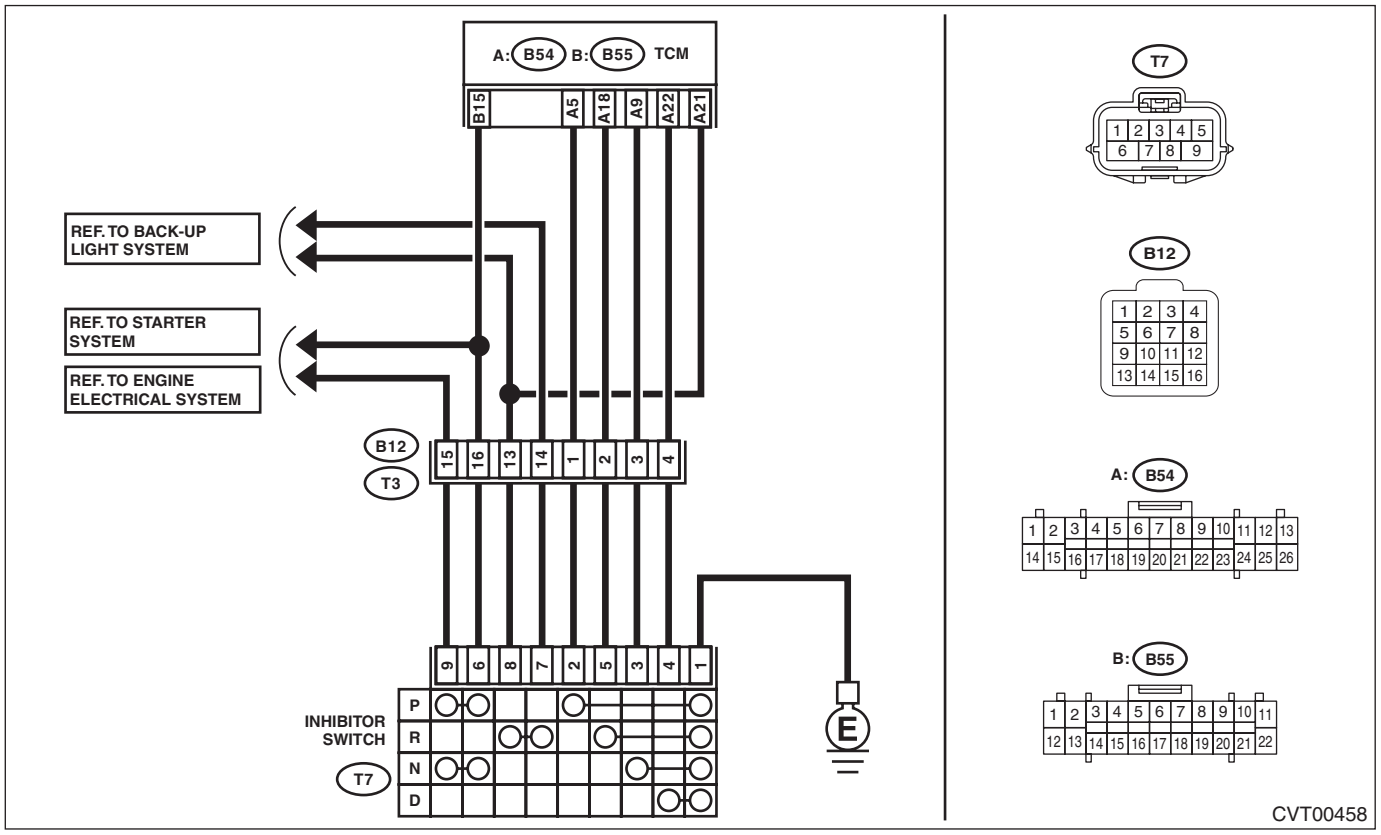
Malfunction Criteria	Threshold Value
Shift lock solenoid circuit malfunction (received from body integrated unit)	ON

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Does not illuminate.

AB:DTC P0812 REVERSE INPUT CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to "R" range, and read the data of «R Range» using the Subaru Select Monitor.	Is "ON" displayed?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 18 — (B12) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 2 — (T7) No. 5:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to "R" range, and measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 5 — No. 1:***	Is the resistance less than 1 Ω?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 2 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 5 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

Detects the open circuit or the short circuit to the power supply in the inhibitor switch R range.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Brake Switch	OFF

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

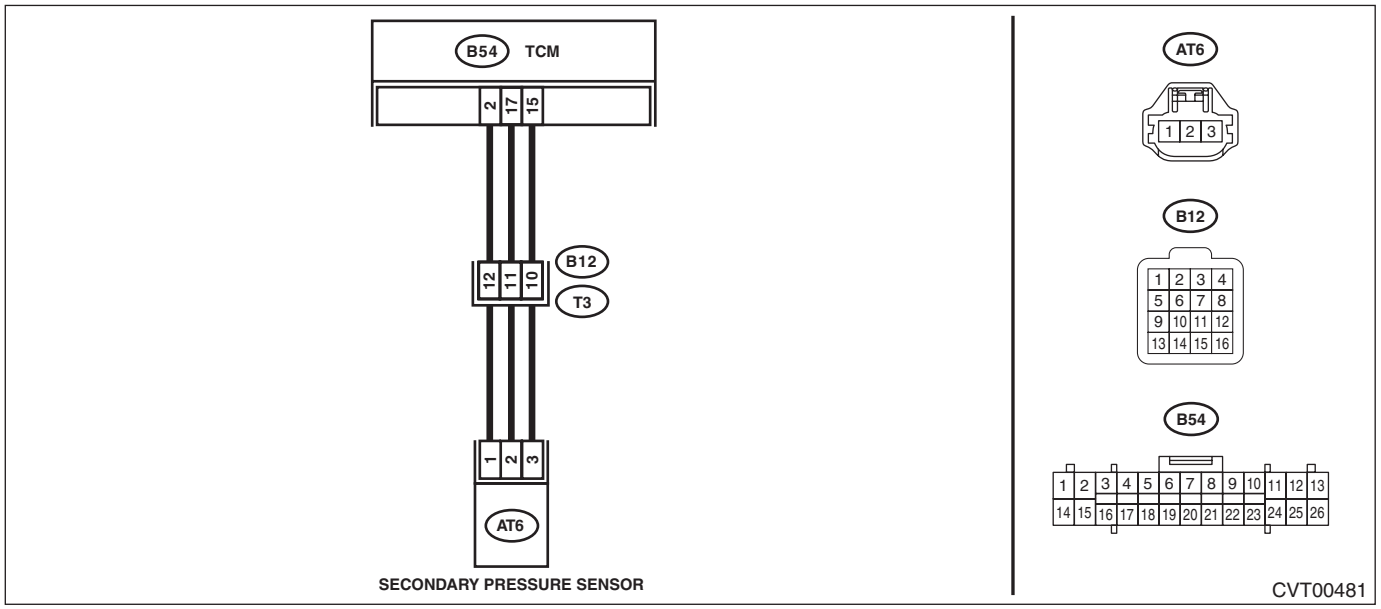
Malfunction Criteria	Threshold Value
R range SW OFF and R2 range SW ON	Completed

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

AC:DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

CAUTION:
Before performing diagnosis, record the freeze frame data.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



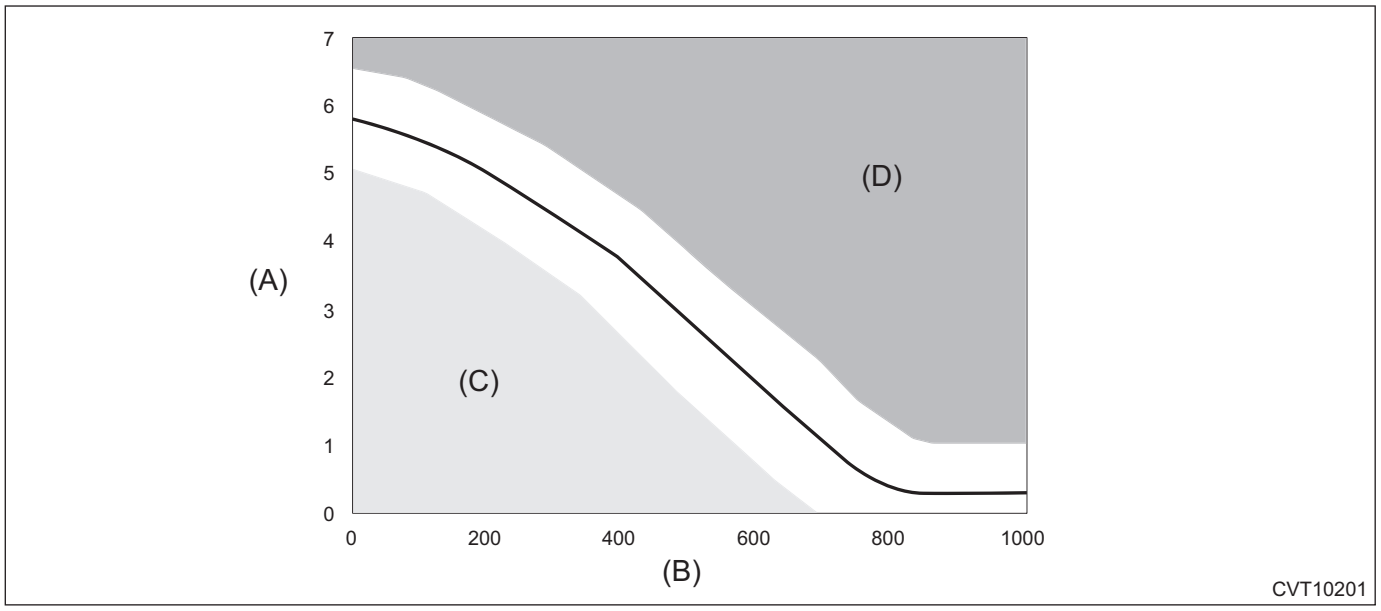
Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Are DTCs other than P0841 displayed?	Perform the diagnosis according to DTC. After the diagnosis, start the engine, and drive for 20 minutes in any driving pattern. (Include driving at a constant legal speed (for 20 seconds) at least once.) Read the DTC, and if P0841 alone is detected, Go to step **2**.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Read the data of «secondary pressure sensor voltage» using Subaru Select Monitor. (While shaking the secondary pressure sensor harness)	Is the value of «secondary pressure sensor voltage» 0.39 — 0.61 V?	Go to step **10**.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of TCM and secondary pressure sensor. 3) Measure the resistance between TCM connector and secondary pressure sensor connector. ***Connector & terminal*** ***(B54) No. 2 — (AT6) No. 1:*** ***(B54) No. 15 — (AT6) No. 3:*** ***(B54) No. 17 — (AT6) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** Measure the resistance between TCM connectors. ***Connector & terminal*** ***(B54) No. 2 — (B54) No. 17:*** ***(B54) No. 15 — (B54) No. 2:*** ***(B54) No. 17 — (B54) No. 15:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit of harness.
5	**CHECK HARNESS.** Measure the resistance between TCM connector and transmission body. ***Connector & terminal*** ***(B54) No. 2 — Transmission body:*** ***(B54) No. 15 — Transmission body:*** ***(B54) No. 17 — Transmission body:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Connect the TCM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 2 (+) — (B54) No. 15 (–):***	Is the voltage 4.6 — 5.4 V?	Go to step **7**.	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>
7	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Connect the secondary pressure sensor connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 2 (+) — (B54) No. 15 (–):***	Is the voltage 4.6 — 5.4 V?	Go to step **8**.	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.>
8	**CHECK SECONDARY PRESSURE SENSOR OUTPUT.** Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 17 (+) — (B54) No. 15 (–):***	Is the voltage 0.39 — 0.61 V?	Check for poor contact of connector, and if no fault is found, replace the TCM.<Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **9**.
9	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of TCM and secondary pressure sensor. 3) Check the TCM connector (B54) and the secondary pressure sensor connector (AT6).	Is there any fault in the TCM connector or the secondary pressure connector?	Repair the connector, or replace harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK TRANSMISSION FLUID.** 1) Connect all connectors. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **11**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.> Go to step **11**.
11	**CHECK INPUT SIGNAL FOR TCM.** 1) Perform the Clear Memory Mode. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal and move the select lever to each range at an interval of five seconds. NOTE: Move the select lever in the following order: “P” → “R” → “N” → “D” → “N” → “R” → “P”. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **12**.	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.>
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift the select lever to “P” range. 2) Keep the engine speed at 3,000 rpm. 3) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 1.5 — 2.5 MPa? And is the difference of the actual oil pressure 0.2 MPa or more compared with the value measured in step 11?	Go to step **13**.	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.>
13	**CHECK FREEZE FRAME DATA.** 1) Turn the ignition switch to OFF. 2) Check the recorded freeze frame data.	Was the detected symptom low-voltage malfunction? <Ref. to CVT(HEV)(diag)-107, CLASSIFICATION OF SYMPTOM USING FREEZE FRAME DATA, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Go to step **14**.
14	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Lift up the vehicle. 2) Start the engine. 3) Apply the parking brake. 4) Set the select lever to “D” range. 5) Depress the brake pedal firmly. 6) Slowly open the accelerator fully, and stabilize the engine speed. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 4.5 — 6.0 MPa?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Go to step **15**.
15	**CHECK TCM INPUT SIGNAL (STALL TEST).** Check the «Actual Secondary Pressure» in step 14.	Is the «Actual secondary pressure» 4.5 MPa or less?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>

1. CLASSIFICATION OF SYMPTOM USING FREEZE FRAME DATA

Apply the values of «Actual Secondary Pressure» and «Secondary Actual Current» recorded in the freeze frame data onto the graph shown in the following figure, and judge if either low-voltage malfunction or high-voltage malfunction occurs.



(A) Actual secondary pressure (MPa) (C) Low-voltage malfunction (D) High-voltage malfunction
(B) Secondary actual current (mA)

NOTE:
Symptom that the DTC P0841 illuminates can be classified into 2 patterns.
- Low-voltage malfunction: detected due to insufficient oil pressure
- High-voltage malfunction: detected due to excessive oil pressure

2. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission fluid pressure control function.
- Judge as NG when the difference becomes equal to or larger than 0.5 MPa by comparing the target secondary oil pressure (an internal data) with the secondary oil pressure sensor detected value.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Transmission fluid pump speed (MTFP or ETFP)	≥ Table 1 rpm

Table 1

Target line pressure (MPa)	0	500	1000	1500	2000	3000	4000	5000	6000
Transmission fluid pump speed* (rpm)	665	1144	1463	1702	1822	2128	2500	2793	3059

* MTFP or ETFP

4. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

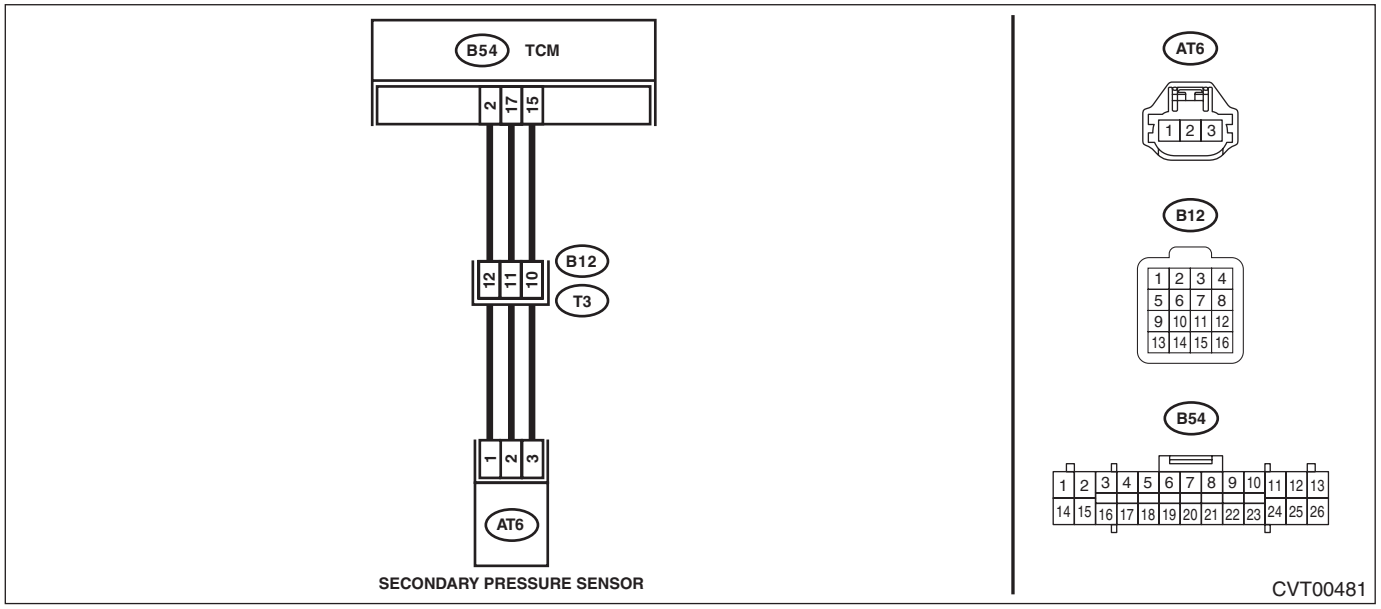
Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Target line pressure – Measured line pressure)	≥ 500 kPa
Absolute value (Correction value of line pressure control solenoid valve feedback control)	≥ 0.2 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AD:DTC P0842 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Shift characteristics malfunction
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 2 — (B12) No. 12:*** ***(B54) No. 15 — (B12) No. 10:*** ***(B54) No. 17 — (B12) No. 11:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 2 — Chassis ground:*** ***(B54) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK TRANSMISSION HARNESS.** 1) Disconnect the secondary pressure sensor connector. 2) Measure the resistance between transmission connector and secondary pressure sensor connector. ***Connector & terminal*** ***(T3) No. 10 — (AT6) No. 3:*** ***(T3) No. 11 — (AT6) No. 2:*** ***(T3) No. 12 — (AT6) No. 1:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness.
5	**CHECK TRANSMISSION HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 11 — Chassis ground:*** ***(T3) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Connect the connectors of TCM and transmission. 2) Turn the ignition switch to ON. 3) Measure the voltage between secondary pressure sensor connector terminals. ***Connector & terminal*** ***(AT6) No. 1 (+) — (AT6) No. 3 (–):***	Is the voltage 4.5 V or more?	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.> If the replacement of the sensor do not eliminate the malfunction, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the ground short circuit of the transmission line pressure sensor.
- Judge as NG if the voltage detected by the transmission line pressure sensor is lower than 0.195 V.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

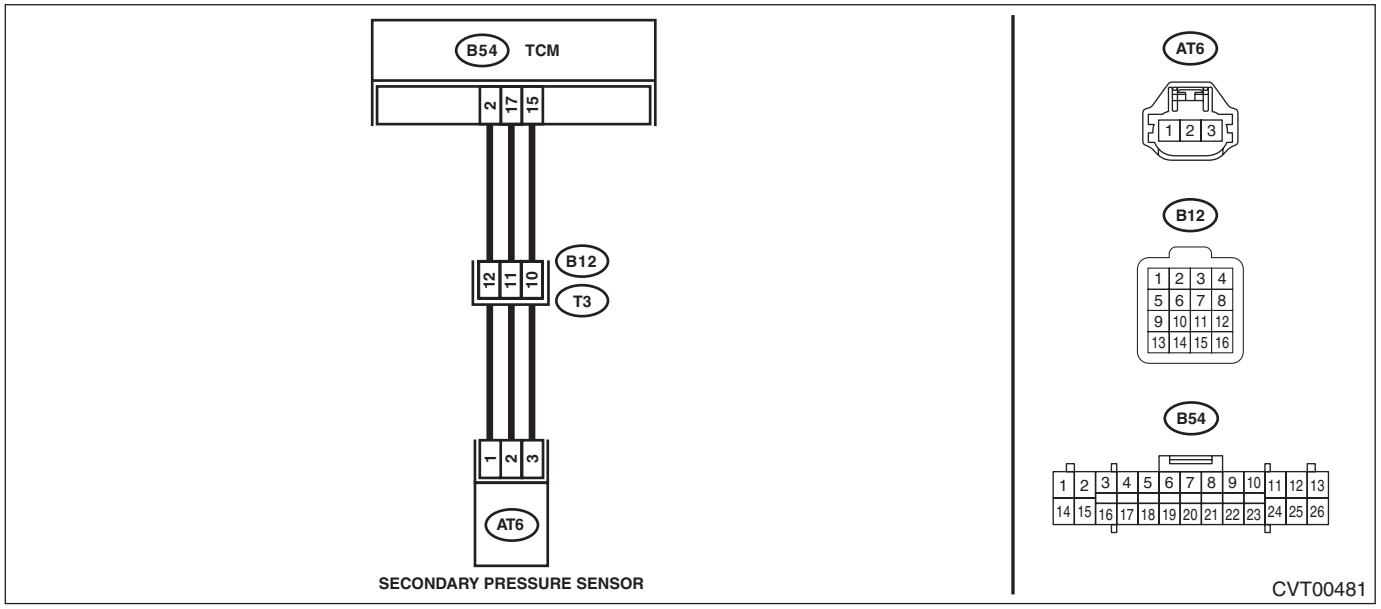
Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure sensor input voltage (Line pressure)	< 0.195 V (< – 574 kPa)

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AE:DTC P0843 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Shift characteristics malfunction
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Turn the ignition switch to ON. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 2 (+) — Chassis ground (–):*** ***(B54) No. 17 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 2 — (B54) No. 17:***	Is the resistance less than 1 Ω?	Repair the short circuit of harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK TRANSMISSION HARNESS.** 1) Disconnect the secondary pressure sensor connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 11 (+) — Chassis ground (–):*** ***(T3) No. 12 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **5**.	Repair the short circuit of harness.
5	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T3) No. 11 — (T3) No. 12:***	Is the resistance less than 1 Ω?	Repair the short circuit of harness.	Go to step **6**.
6	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Connect the connectors of TCM and transmission. 2) Turn the ignition switch to ON. 3) Measure the voltage between secondary pressure sensor connector terminals. ***Connector & terminal*** ***(AT6) No. 1 (+) — (AT6) No. 3 (–):***	Is the voltage 4.5 V or more?	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.> If the replacement of the sensor do not eliminate the malfunction, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

• Detect open circuit or power supply-output short circuit of the transmission line pressure sensor 5 V system.
• Judge as NG if the voltage detected by the transmission line pressure sensor is higher than 4.883 V.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

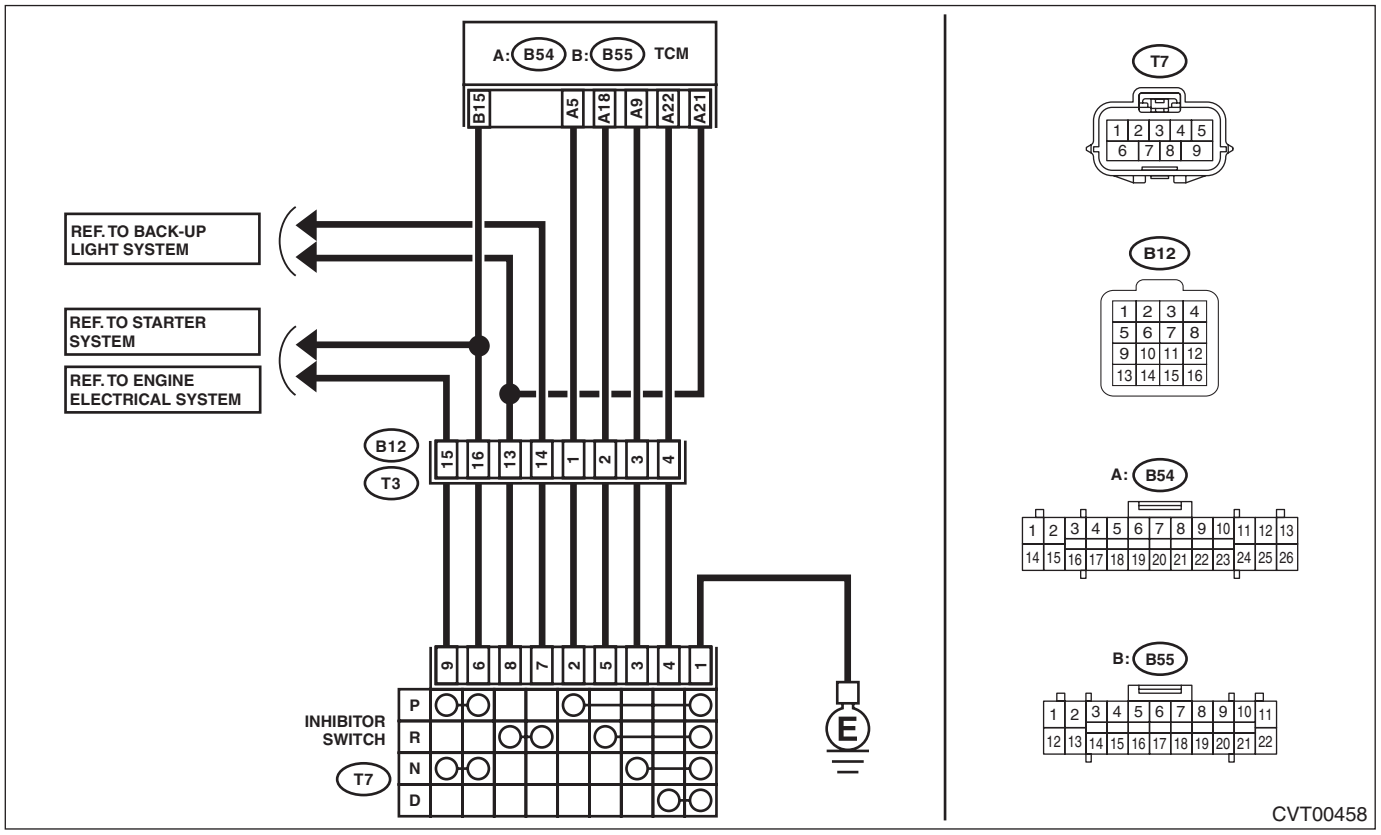
Malfunction Criteria	Threshold Value
Measured line pressure sensor input voltage (Line pressure)	> 4.883 V (> 8200 kPa)

Time Needed for Diagnosis: 1.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AF:DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range» and «N/P Range Signal» at P range, and the data of «N Range» and «N/P Range Signal» at N range using the Subaru Select Monitor.	Is the display of the corresponding range "ON"?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 5 — (B12) No. 1:*** ***(B54) No. 9 — (B12) No. 3:*** ***(B55) No. 15 — (B12) No. 16:***	Is each resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 1 — (T7) No. 2:*** ***(T3) No. 3 — (T7) No. 3:*** ***(T3) No. 16 — (T7) No. 6:***	Is each resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 3 — No. 1:*** ***No. 6 — No. 1:***	Is the resistance of the corresponding range less than 1 MΩ?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 1 (+) — Chassis ground (–):*** ***(B12) No. 3 (+) — Chassis ground (–):*** ***(B12) No. 16 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 2 (+) — Chassis ground (–):*** ***(T7) No. 3 (+) — Chassis ground (–):*** ***(T7) No. 6 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

Detects the open circuit or the short circuit to the power supply in the inhibitor switch P, PN and N ranges.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
Battery voltage	≥ 13 V
Brake Switch	OFF
Diagnosis 2	
Battery voltage	≥ 13 V
Brake Switch	OFF
Diagnosis 3	
Brake Switch	OFF

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

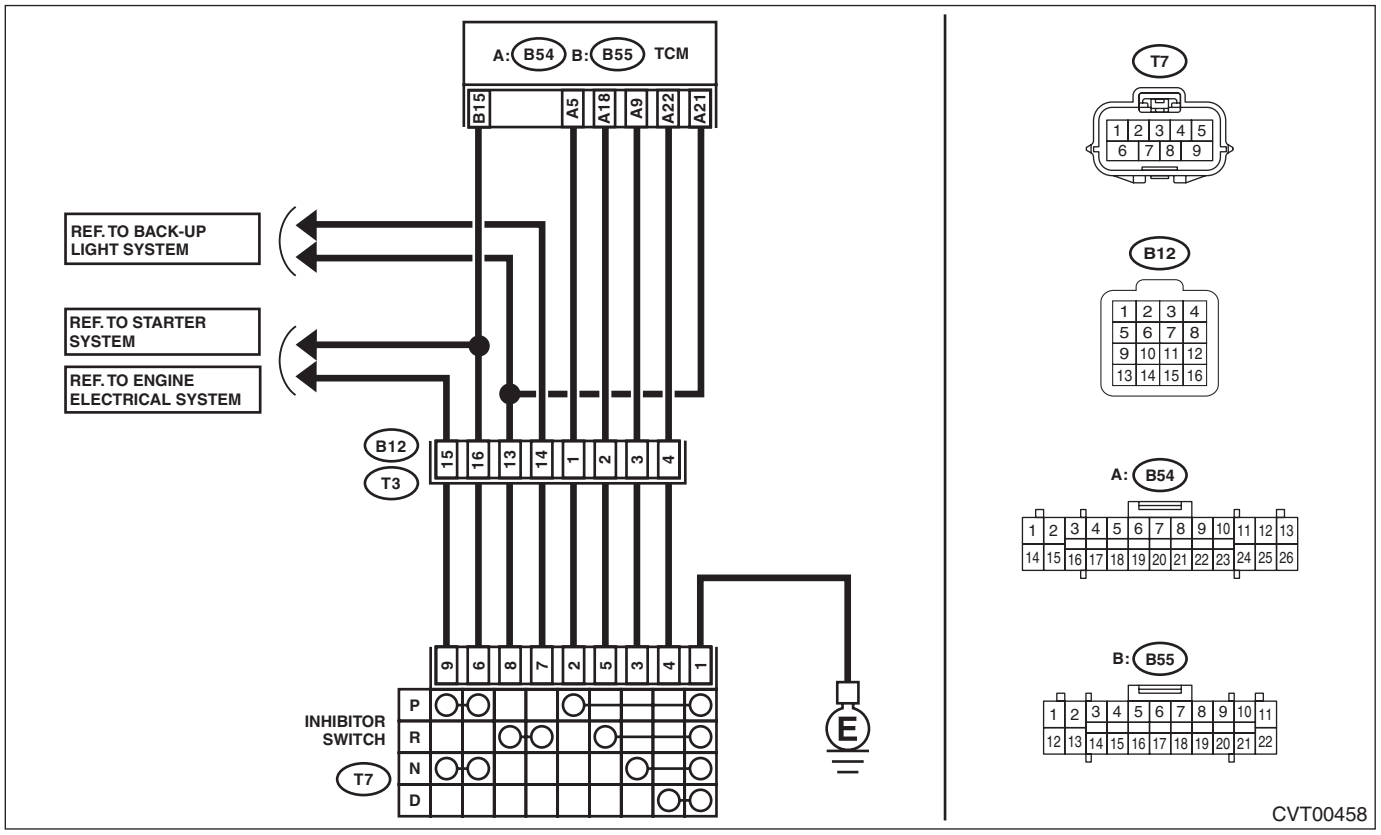
Malfunction Criteria	Threshold Value
Diagnosis 1	
PN range SW OFF and P range SW ON	Completed
Diagnosis 2	
PN range SW OFF and N range SW ON	Completed
Diagnosis 3	
P range SW OFF and N range SW OFF and PN range SW ON	Completed

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

AG:DTC P086C REVERSE INPUT CIRCUIT 2

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to "R" range, and read the data of «R Range Signal2» using the Subaru Select Monitor.	Is "ON" displayed?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 21 — (B12) No. 13:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 13 — (T7) No. 8:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to "R" range, and measure the resistance between inhibitor switch terminals. ***Terminals*** ***No. 8 — No. 1:***	Is the resistance less than 1 Ω?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 13 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 8 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

Detects the open circuit or the short circuit to the power supply in the inhibitor switch R2 range.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Brake Switch	OFF

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
R2 range SW OFF and R range SW ON	Completed

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

AH:DTC P0882 PVIGN POWER SUPPLY (LOW)

Detected when two consecutive driving cycles with fault occur.

NOTE:
For the diagnostic procedure, refer to “DTC P0890 TCM POWER RELAY SENSE CIRCUIT LOW”. <Ref. to CVT(HEV)(diag)-118, DTC P0890 TCM POWER RELAY SENSE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

- Detects the voltage drop in the main power supply.
- Judge as NG when the battery voltage drops while the ignition switch signal has been input.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition switch signal	ON
Transmission range	D range or R range

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

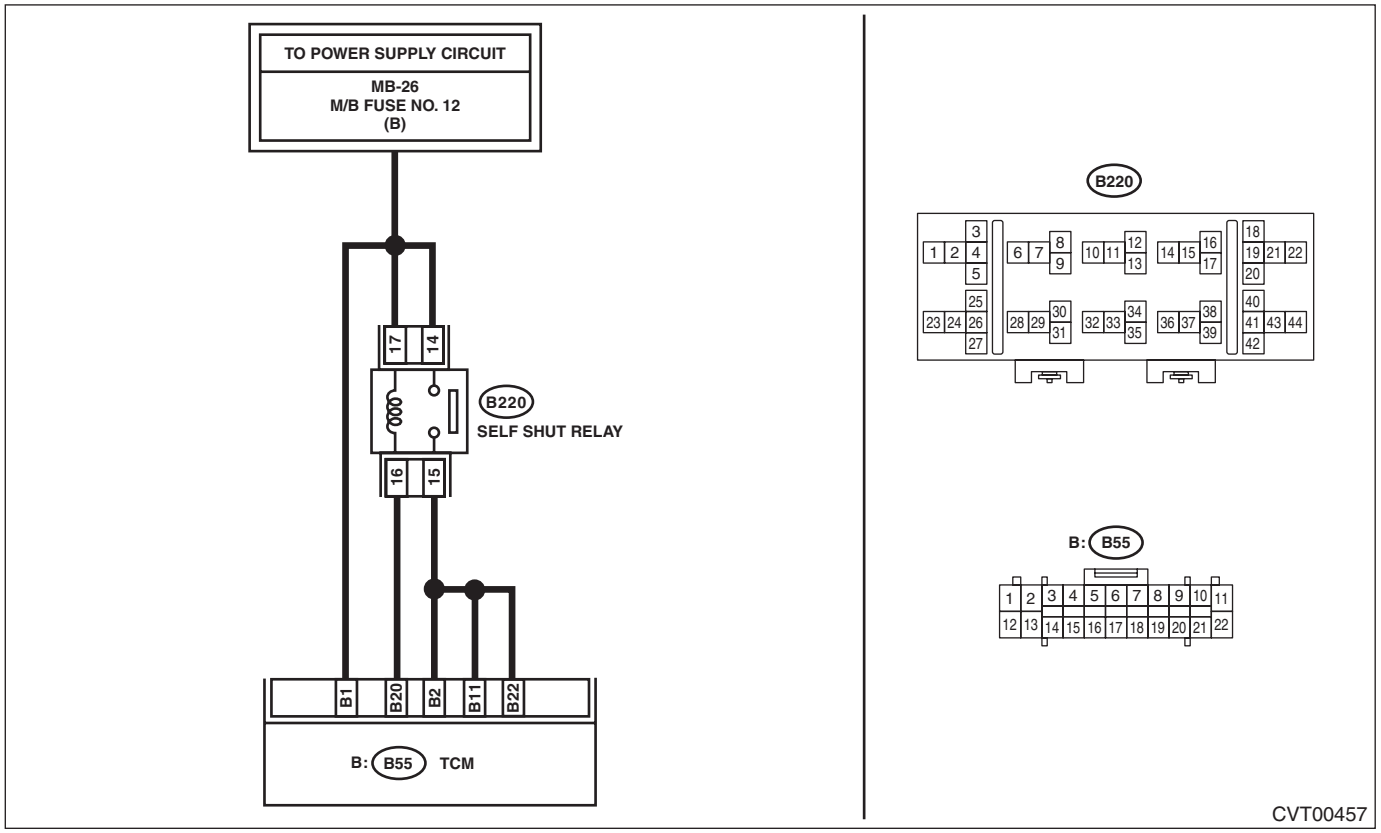
Malfunction Criteria	Threshold Value
Battery voltage	< 9.98 V

Time Needed for Diagnosis: 30 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

AI: DTC P0890 TCM POWER RELAY SENSE CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed.

CAUTION:
After diagnosis, perform Clear Memory Mode for ECM. <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B55) No. 20 — (B220) No. 16:*** ***(B55) No. 2 — (B220) No. 15:*** ***(B55) No. 11 — (B220) No. 15:*** ***(B55) No. 22 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 20 — Chassis ground:*** ***(B55) No. 2 — Chassis ground:*** ***(B55) No. 11 — Chassis ground:*** ***(B55) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.

	Step	Check	Yes	No
3	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the open or short circuit of harness.
4	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Connector & terminal*** ***(B220) No. 16 — (B220) No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **5**.	Replace the self shut relay.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Connector & terminal*** ***(B220) No. 14 — (B220) No. 15:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the self shut relay.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **7**.
7	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0890 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	The original self shut relay is defective.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission fluid pressure solenoid drive power supply relay circuit.
- Judge as NG if the transmission fluid pressure solenoid drive power supply voltage is lower than 2 V.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
TCM Power Relay output command	ON
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

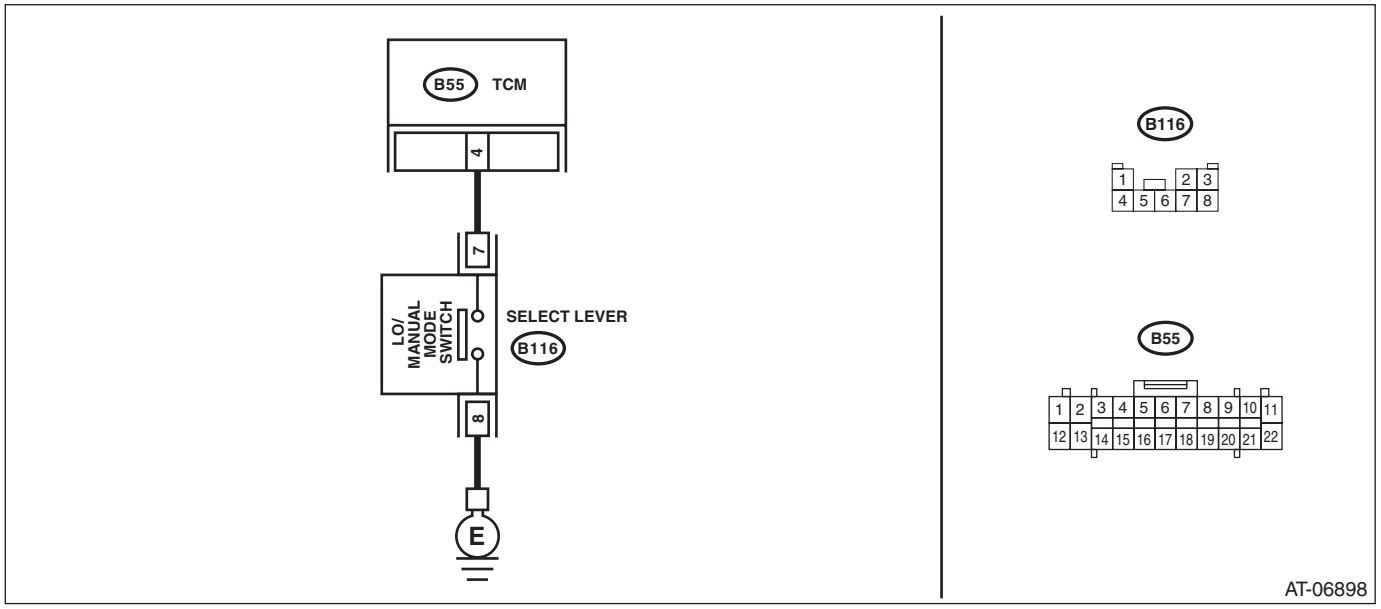
Judgment Value

Malfunction Criteria	Threshold Value
Measured TCM input voltage which is supplied from 12 V battery system through the TCM Power Relay	< 2 V

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AJ:DTC P0951 AUTO SHIFT MANUAL CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Manual mode can not be set.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the manual mode switch connector. 3) Measure the resistance between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 8 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK MANUAL MODE SWITCH.** Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***No. 7 — No. 8:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Replace the select lever assembly. <Ref. to CS-25, Select Lever.>
3	**CHECK MANUAL MODE SWITCH.** 1) Shift the select lever to manual mode. 2) Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***No. 7 — No. 8:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the select lever assembly. <Ref. to CS-25, Select Lever.>
4	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance between TCM connector and manual mode switch connector. ***Connector & terminal*** ***(B55) No. 4 — (B116) No. 7:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
5	**CHECK HARNESS.** Measure the resistance between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the TCM and manual mode switch connector. 2) Turn the ignition switch to ON. 3) Set the select lever to “D” range. 4) Read the data of «Tiptronic Mode Switch» using Subaru Select Monitor.	Does the value of «Tiptronic Mode Switch» change to “ON” with select lever in manual mode, and “OFF” with select lever in other than manual mode?	Current condition is normal.	Go to step **7**.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact of the manual mode switch circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detects the short circuit to ground in the manual SW circuit.
- Judge as NG if the manual mode switch is ON in “P”, “R” or “N” range.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Malfunctions listed on the right column are not detected:	P0705, P0708

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Manual SW status in other than D range	ON

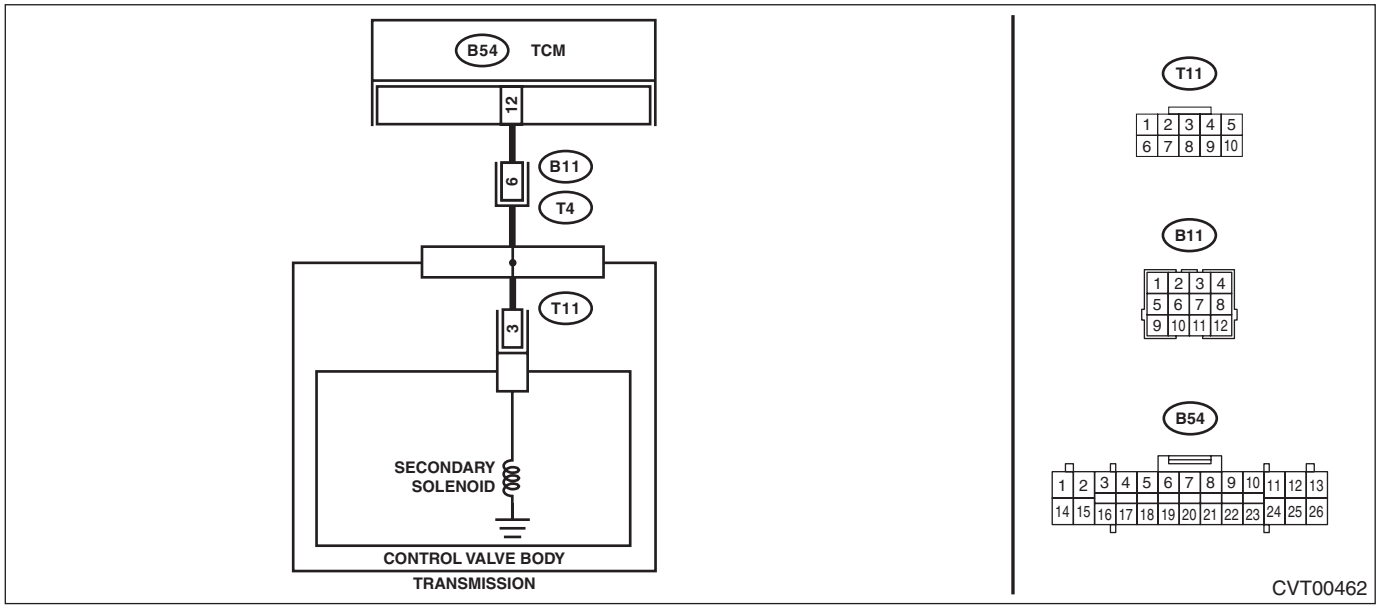
Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

AK:DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition

TROUBLE SYMPTOM:
- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.
- Excessive shift shock.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0961, is DTC P0962 or P0963 displayed?	Perform the diagnosis according to DTCs other than P0961.	Go to step **2**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and secondary solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Go to step **3**.
3	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission line pressure solenoid drive circuit.
- Judge as NG when the deviation between target current and actual current of the transmission line pressure solenoid becomes equal to or larger than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Target line pressure control solenoid valve current – Measured line pressure control solenoid valve current)	> 0.2 A

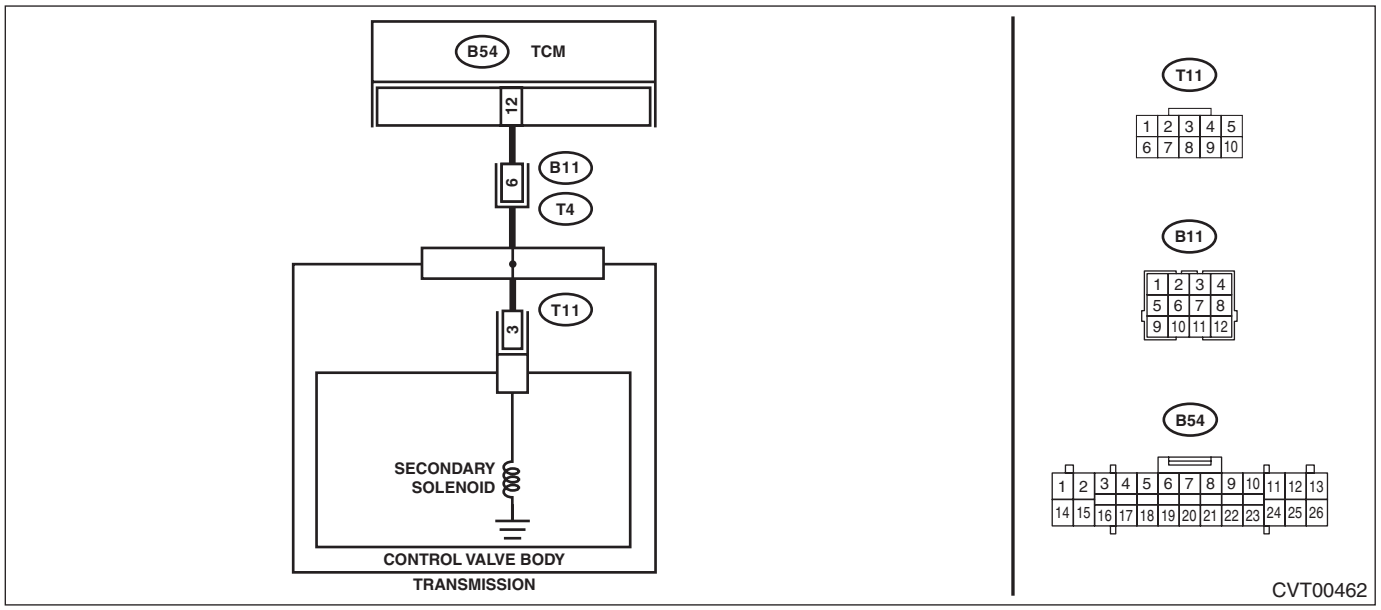
Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AL:DTC P0962 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition

TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not start.
- Engine speed increases abruptly during driving.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "N" range. 2) Read the data of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» using Subaru Select Monitor.	Does the value of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK SECONDARY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the ground short of the transmission line pressure solenoid drive circuit.
- Judge as NG if the transmission line pressure solenoid drive current is higher than 1.1 A.

Diagnosis 2
- Detect the ground short of the transmission line pressure solenoid drive circuit.
- Judge as NG if the solenoid current of the transmission line pressure solenoid drive circuit is more than 1.2 A.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Commanded line pressure control solenoid current	≥ 0.1 A
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

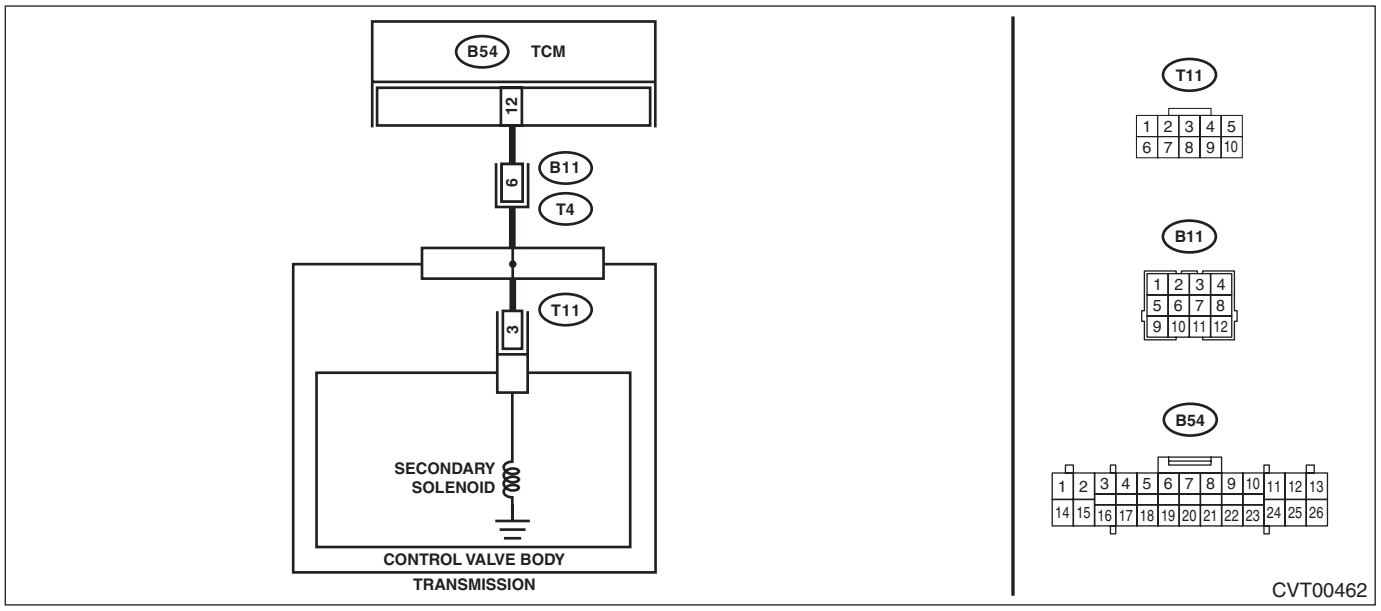
Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured line pressure control solenoid current	≥ 1.1 A
Diagnosis 2	
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured line pressure control solenoid current	≥ 1.2 A

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AM:DTC P0963 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not start.
- Engine speed increases abruptly during driving.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "N" range. 2) Read the data of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» using Subaru Select Monitor.	Does the value of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 12 — (B11) No. 6:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 12 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK SECONDARY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **6**.
6	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the transmission line pressure solenoid drive circuit.
- Judge as NG if the transmission line pressure solenoid drive current is lower than 0.1 A.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded line pressure control solenoid valve current	≥ 0.2 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

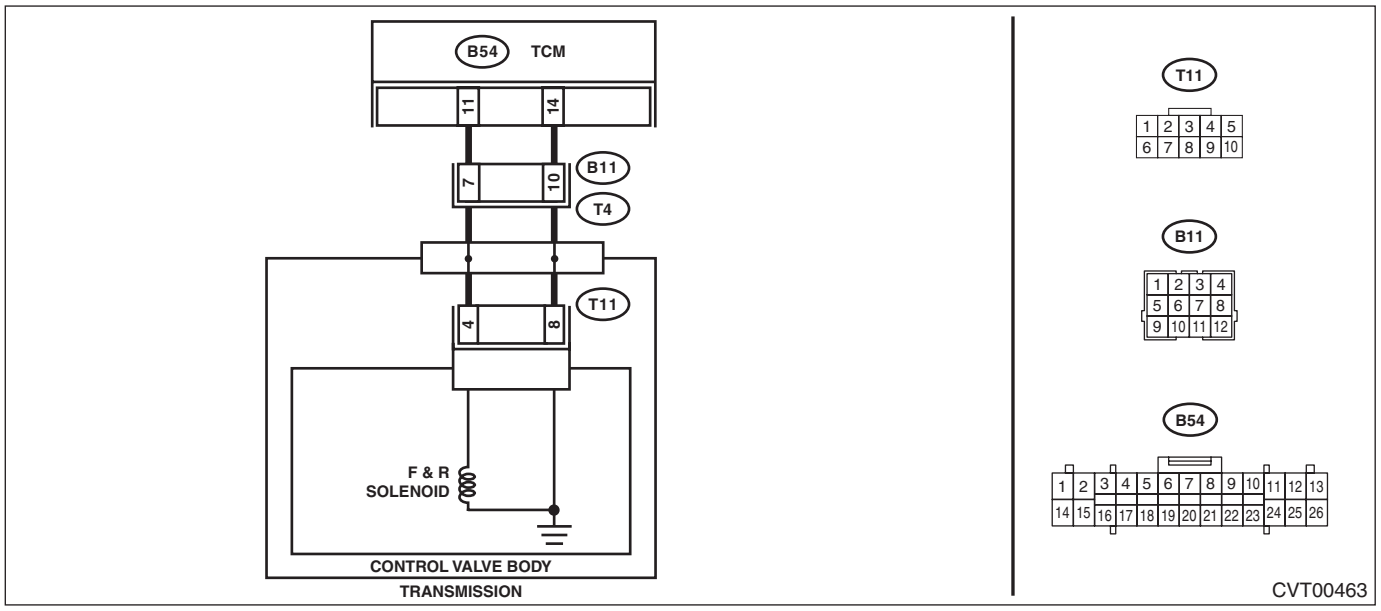
Malfunction Criteria	Threshold Value
Measured line pressure control solenoid valve current	< 0.1 A

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AN:DTC P0965 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0965, is DTC P0966 or P0967 displayed?	Perform the diagnosis according to DTCs other than P0965.	Go to step **2**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and F&R solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Go to step **3**.
3	**CHECK F&R SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
• Detect the malfunction of transmission forward/reverse clutch pressure solenoid drive circuit characteristics.
• Judge as NG when the deviation between set current and actual current of the transmission forward/reverse clutch pressure solenoid drive circuit becomes equal to or larger than the predetermined value (0.2 A).
Diagnosis 2
• Detect the malfunction of transmission forward/reverse clutch pressure solenoid drive circuit characteristics.
• Judge as NG when the transmission forward/reverse clutch pressure solenoid drive current is within the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

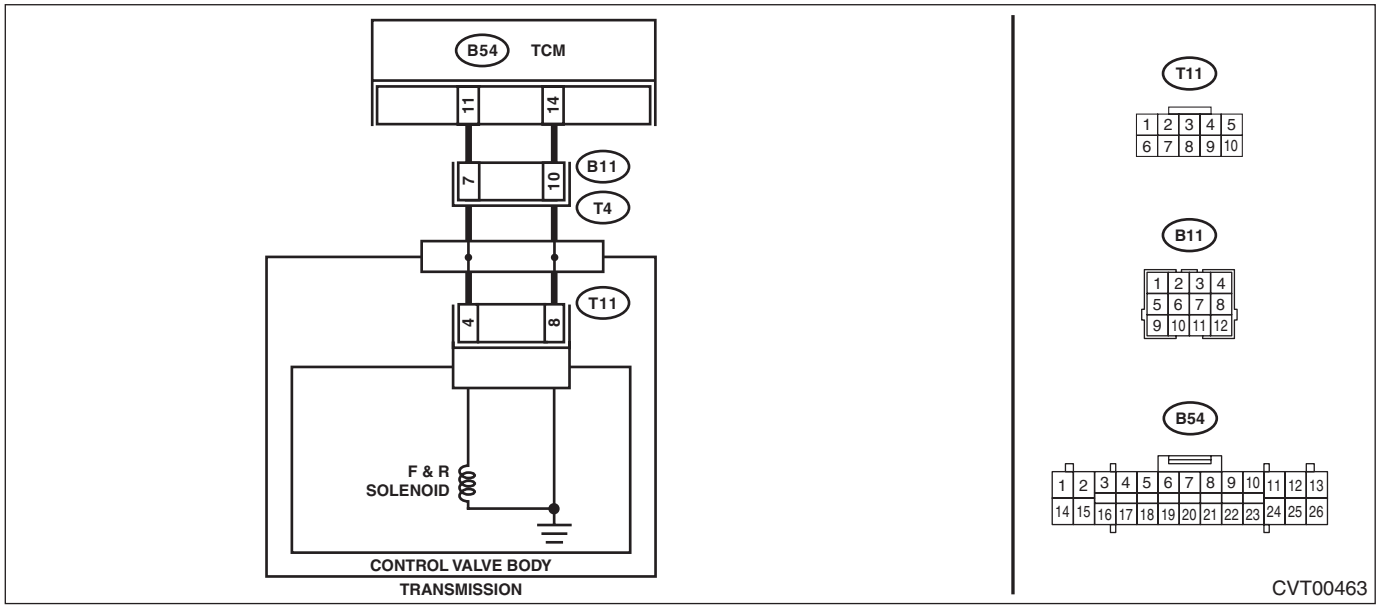
Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute value (Target forward & reverse clutch pressure control solenoid current – Measured forward & reverse clutch pressure control solenoid circuit)	> 0.2 A
Diagnosis 2	
Measured forward & reverse clutch pressure control solenoid current	> 1.08 A and ≤ 1.9 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AO:DTC P0966 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Excessive shift shock
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 11 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK F&R SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect the GND-output short in transmission forward/reverse clutch pressure solenoid circuit.
• Judge as NG when the transmission forward/reverse clutch pressure solenoid drive current is 1.9 A or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

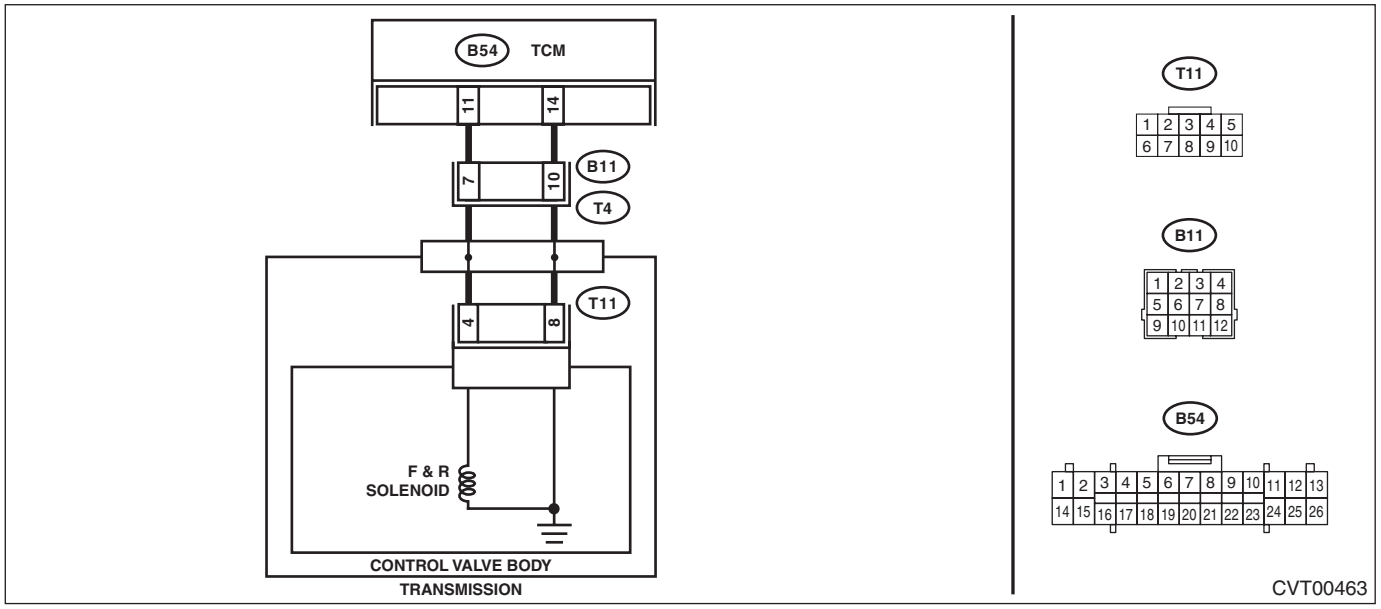
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured line pressure control solenoid current ≥ 1.9 A	ON

Time Needed for Diagnosis: 0.02 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AP:DTC P0967 PRESSURE CONTROL SOLENOID "B" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Engine speed increases abruptly, and can not start.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 11 — (B11) No. 7:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 11 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK F&R SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **6**.
6	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect open circuit or power supply-output short circuit in the transmission forward/reverse clutch pressure solenoid circuit.
• Judge as NG if the transmission forward/reverse clutch pressure solenoid drive current is lower than 0.15 A.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded forward & reverse clutch pressure control solenoid current	≥ 0.3 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

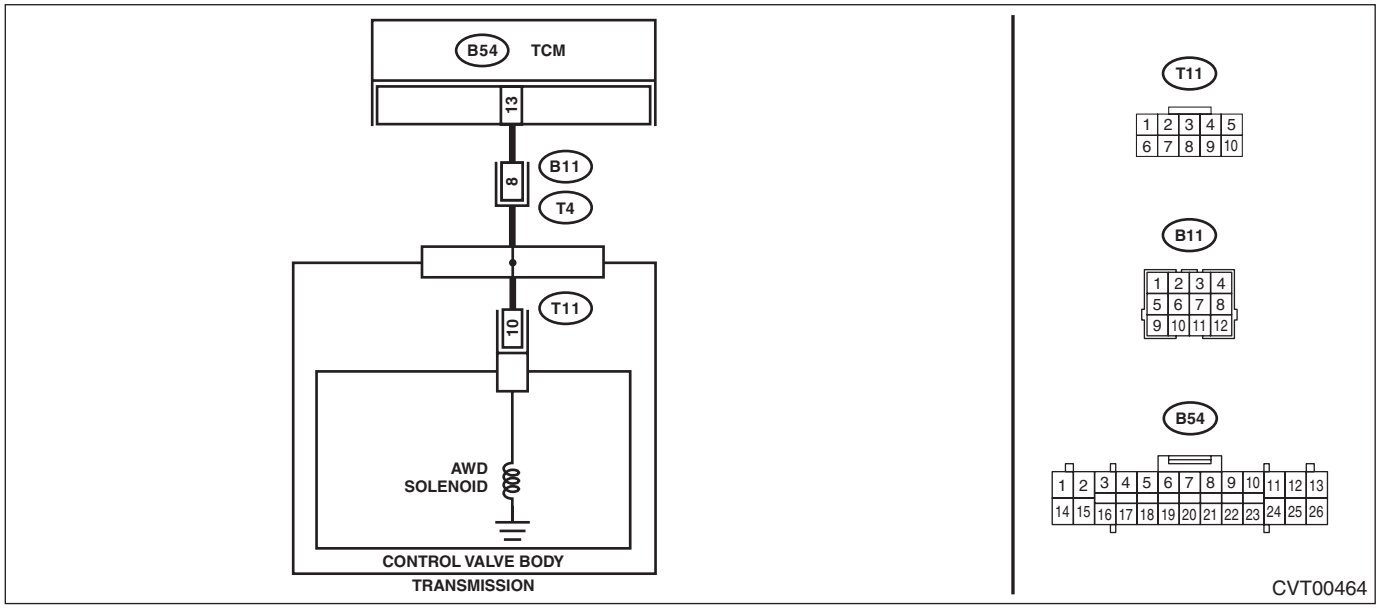
Judgment Value

Malfunction Criteria	Threshold Value
Measured forward & reverse clutch pressure control solenoid current	< 0.15 A

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AQ:DTC P0970 PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Drivability getting worse.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 13 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK AWD SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance approx. 2 — 4.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short in AWD solenoid circuit.
- Judge as NG when the number of GND-output short detection in AWD solenoid drive circuit exceeds 10 times.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Target duty cycle	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

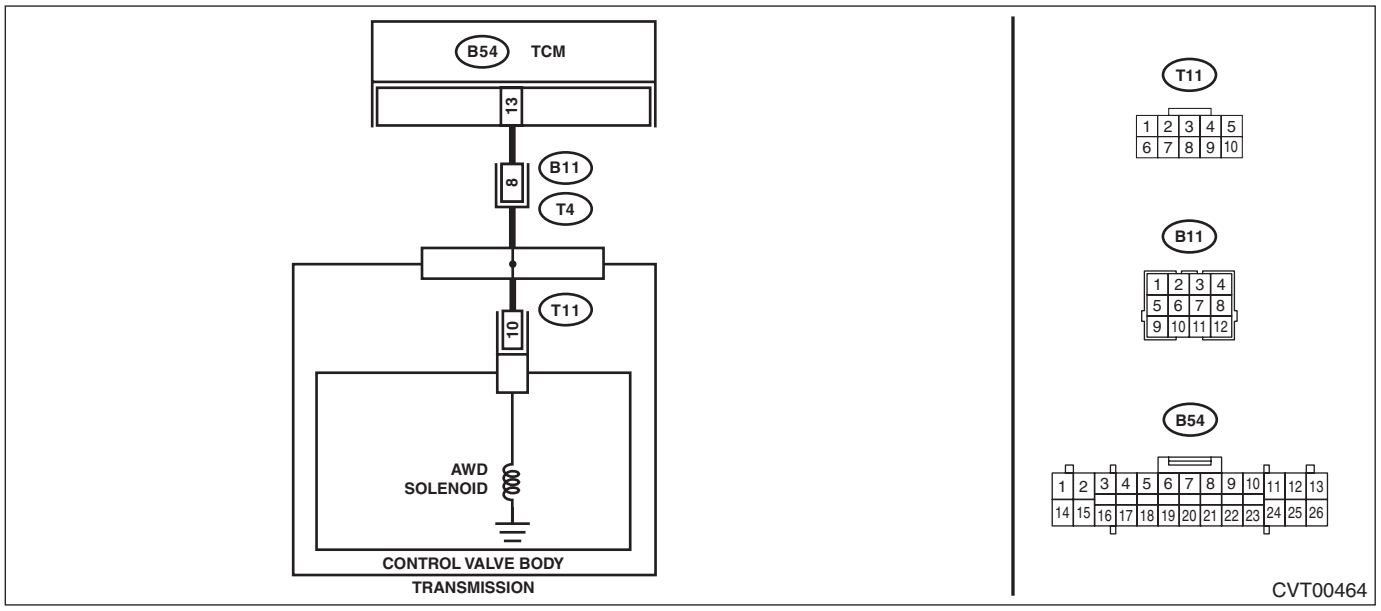
Malfunction Criteria	Threshold Value
Fault signal from solenoid driver IC	≥ 10 times

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Does not illuminate.

AR:DTC P0971 PRESSURE CONTROL SOLENOID "C" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Tight corner braking phenomenon occurs.
- Drivability getting worse.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 13 — (B11) No. 8:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 13 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK AWD SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance approx. 2 — 4.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or power supply-output short circuit in the AWD solenoid circuit.
- Judge as NG when the number of open circuit or power-supply short circuit detection in AWD solenoid drive circuit exceeds 10 times.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Target duty cycle	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

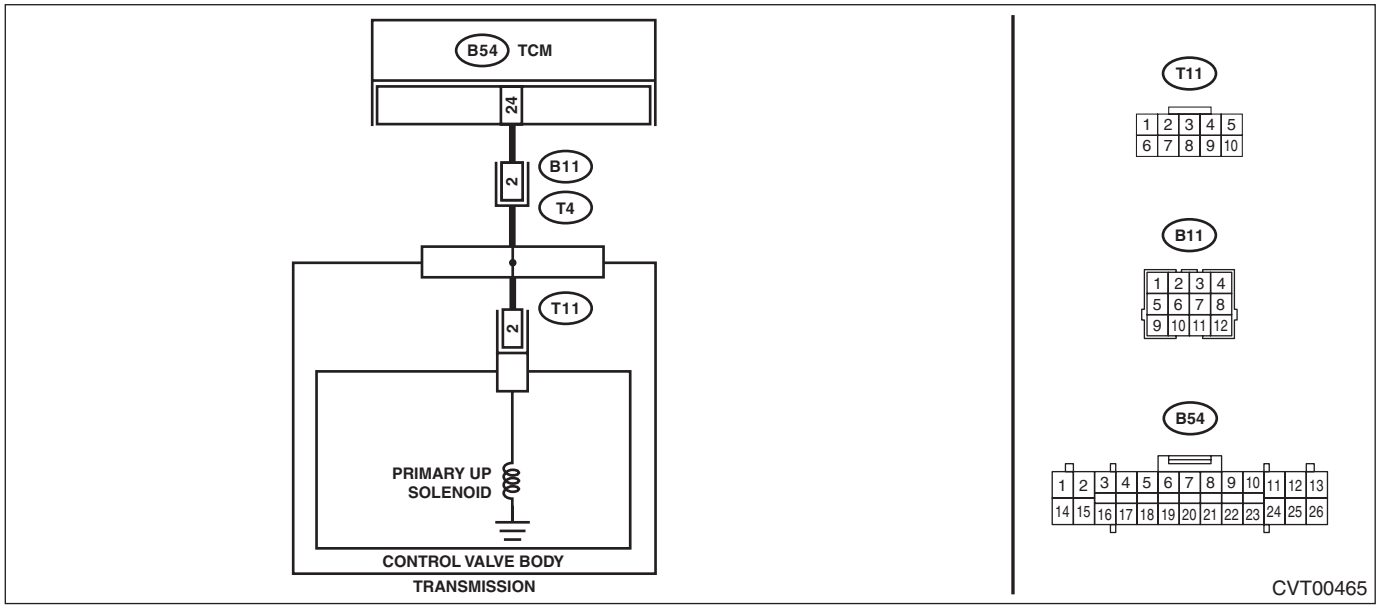
Judgment Value

Malfunction Criteria	Threshold Value
Fault signal from solenoid driver IC	≥ 10 times

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Does not illuminate.

AS:DTC P0973 SHIFT SOLENOID "A" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed. (No up-shift)
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 24 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK PRIMARY UP SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the shift-up fluid pressure control solenoid drive circuit.
- Judge as NG when the shift-up hydraulic control solenoid drive voltage is 0.8 V or less.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of shift up pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

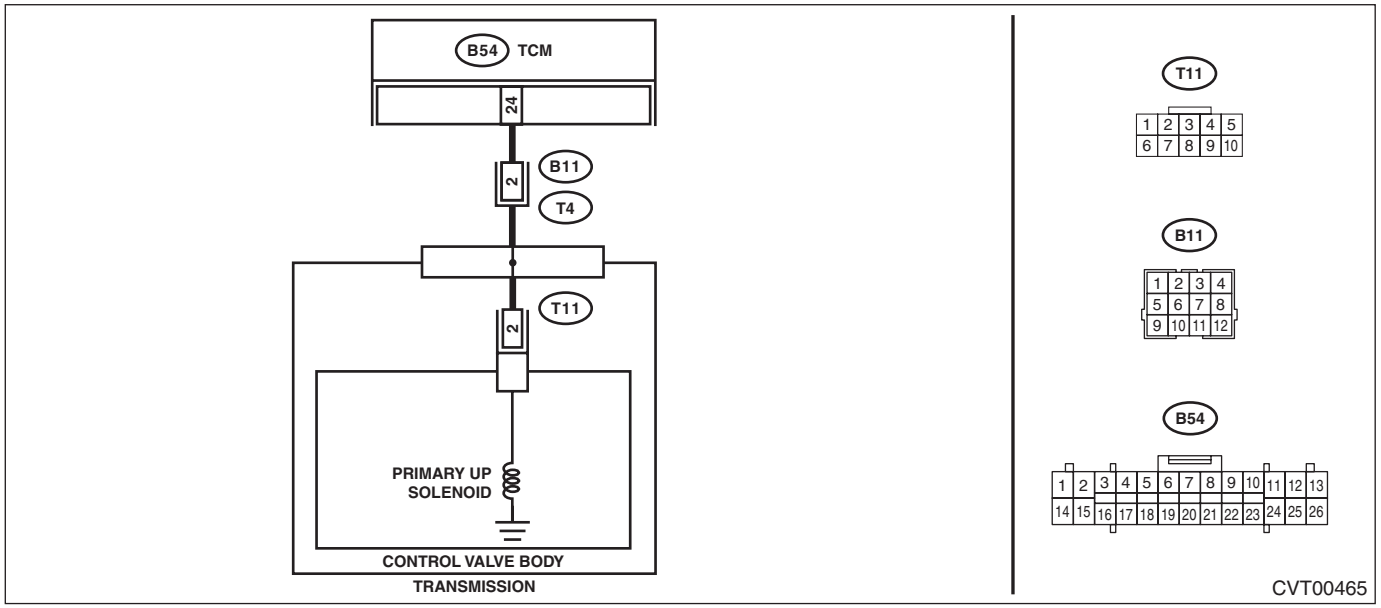
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift up pressure control solenoid voltage ≤ 0.8 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AT:DTC P0974 SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed. (No up-shift)
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 24 — (B11) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 24 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK PRIMARY UP SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the shift-up fluid pressure control solenoid drive circuit.
• Judge as NG when the shift-up hydraulic control solenoid drive voltage is 2.5 V or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of shift up pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

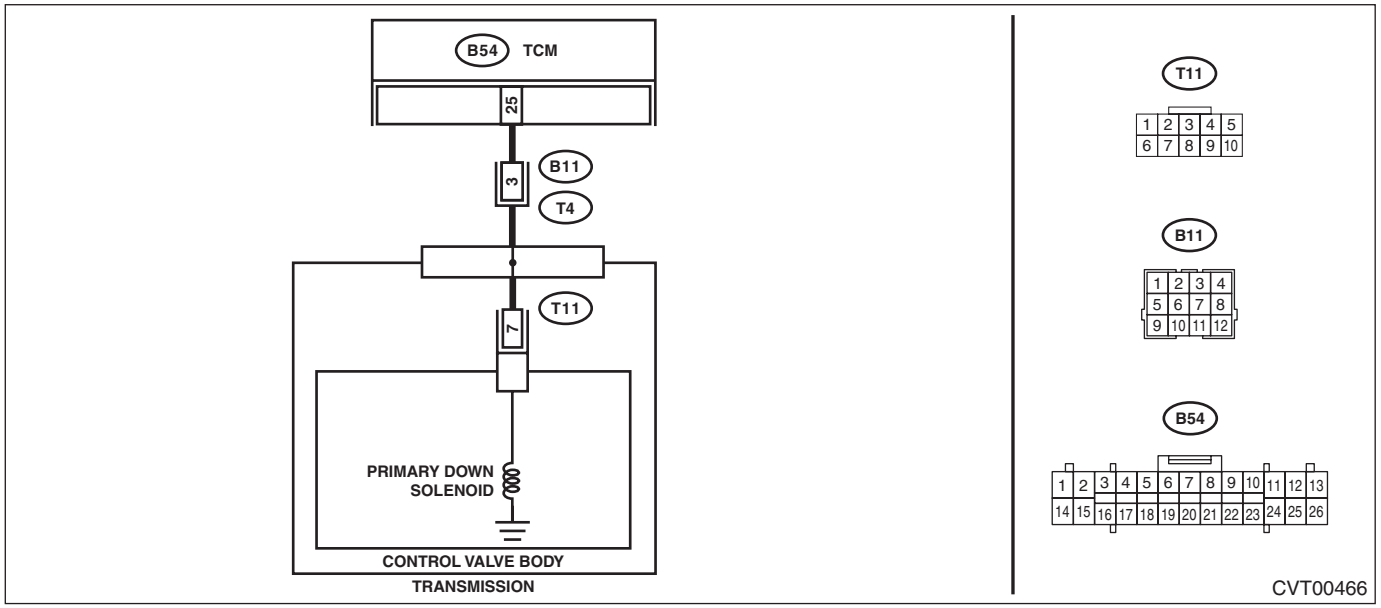
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift up pressure control solenoid voltage ≥ 2.5 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AU:DTC P0976 SHIFT SOLENOID "B" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed. (No down-shift)
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK PRIMARY DOWN SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the shift-down fluid pressure control solenoid drive circuit.
- Judge as NG when the shift-down hydraulic control solenoid drive voltage is 0.8 V or less.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of shift down pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

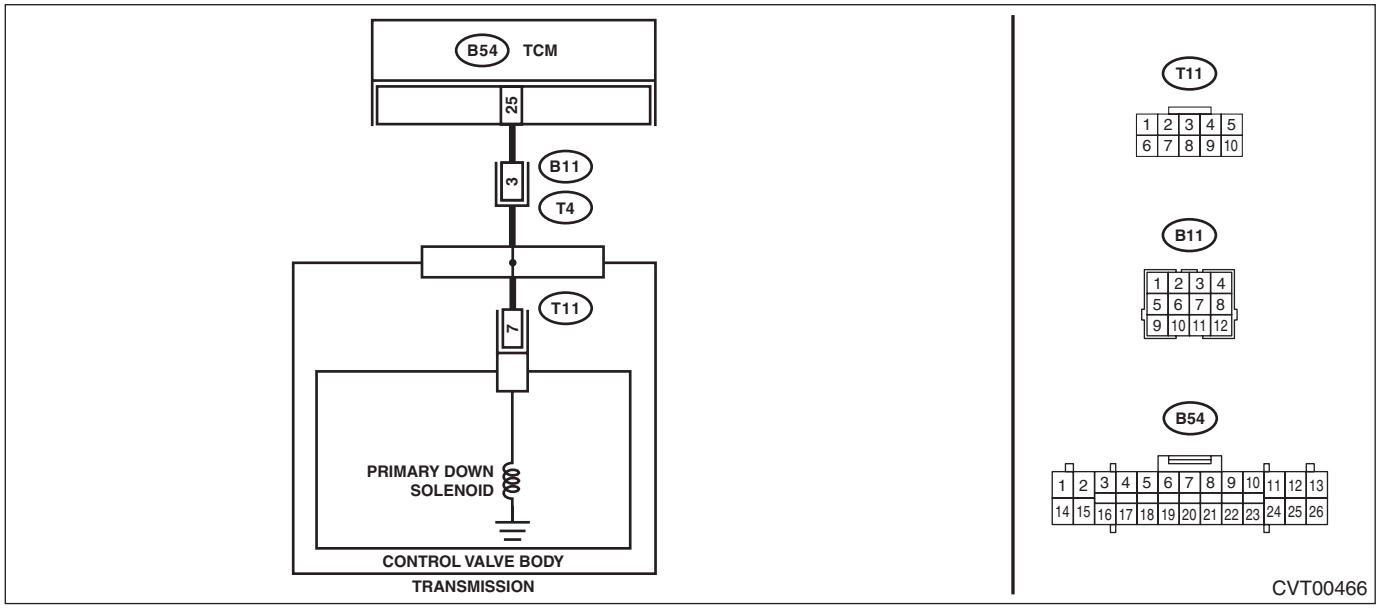
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift down pressure control solenoid voltage ≤ 0.8 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AV:DTC P0977 SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Gear is not changed. (No down-shift)
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 25 — (B11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK PRIMARY DOWN SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the shift-down fluid pressure control solenoid drive circuit.
• Judge as NG when the shift-down hydraulic control solenoid drive voltage is 2.5 V or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of shift down pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift down pressure control solenoid voltage ≥ 2.5 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AW:DTC P0B0A AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC relating the HPCM, BECM using the Subaru Select Monitor.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK BUS BAR.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the bus bar.	Is there any bend or looseness?	Reinstall or replace the bus bar.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>

1. OUTLINE OF DIAGNOSIS

- Detect the short to 100 V system GND of electric oil pump 100 V power supply.
- Judge as NG when a status where 100 V power supply voltage is less than 66 V is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: ETFP control module input voltage < 66 V	ON

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AX:DTC P0B0B AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK DTC.** Check the DTC relating the HPCM, BECM using the Subaru Select Monitor.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK DTC.** Check the displayed DTC using Subaru Select Monitor. (While the vehicle is stopped and idling)	Is the DTC P0B0B a current malfunction?	Go to step **4**.	Go to step **3**.
3	**CHECK DTC.** Check other DTC using the Subaru Select Monitor.	Is a past malfunction DTC detected? (TCM, HPCM, BECM, DMCM)	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DRIVE MOTOR.** Check the drive motor. <Ref. to CVT(TH58A)-229, INSPECTION WHILE DTC P172A AND P0B0B LIGHTS ARE ON, INSPECTION, Drive Motor Assembly.>	Is the voltage between the three-phase lines in the drive motor 0.5 V or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of electric oil pump 100 V power supply HIGH side.
- Judge as NG when the 100 V power supply voltage is 210 V or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: ETFP control module input voltage ≥ 210 V	ON

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AY:DTC P0B0D AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK DTC.** Check the DTC using Subaru Select Monitor.	Is the DTC a current malfunction?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **2**.
2	**CHECK DTC.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Start the engine. 3) Check the DTC using Subaru Select Monitor.	Is DTC P0B0D detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Perform the Inspection Mode, and if there is no problem, finish the diagnosis. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>

1. OUTLINE OF DIAGNOSIS

- Detect ROM/RAM malfunction of the electric oil pump.
- Judge as NG through a ROM/RAM diagnosis executed at the electric oil pump inverter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: Writing-check (RAM) or Checksum (ROM)	ON Error

Time Needed for Diagnosis: 1 count
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AZ:DTC P0C1D AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE INTERNAL TEMPERATURE SENSOR RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK DTC.** Check the DTC using Subaru Select Monitor.	Is the DTC a current malfunction?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **2**.
2	**CHECK DTC.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Start the engine. 3) Warm up the engine until the ATF temperature reaches 40°C (104°F) or more. 4) Check the DTC using Subaru Select Monitor.	Is DTC P0C1D detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Perform the Inspection Mode, and if there is no problem, finish the diagnosis. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>

1. OUTLINE OF DIAGNOSIS

Detects a high temperature malfunction in the electric oil pump inverter circuit board.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10 V
Malfunctions listed on the right column are not detected:	U0101, U0402, U0075
ATF temperature	> 22°C

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

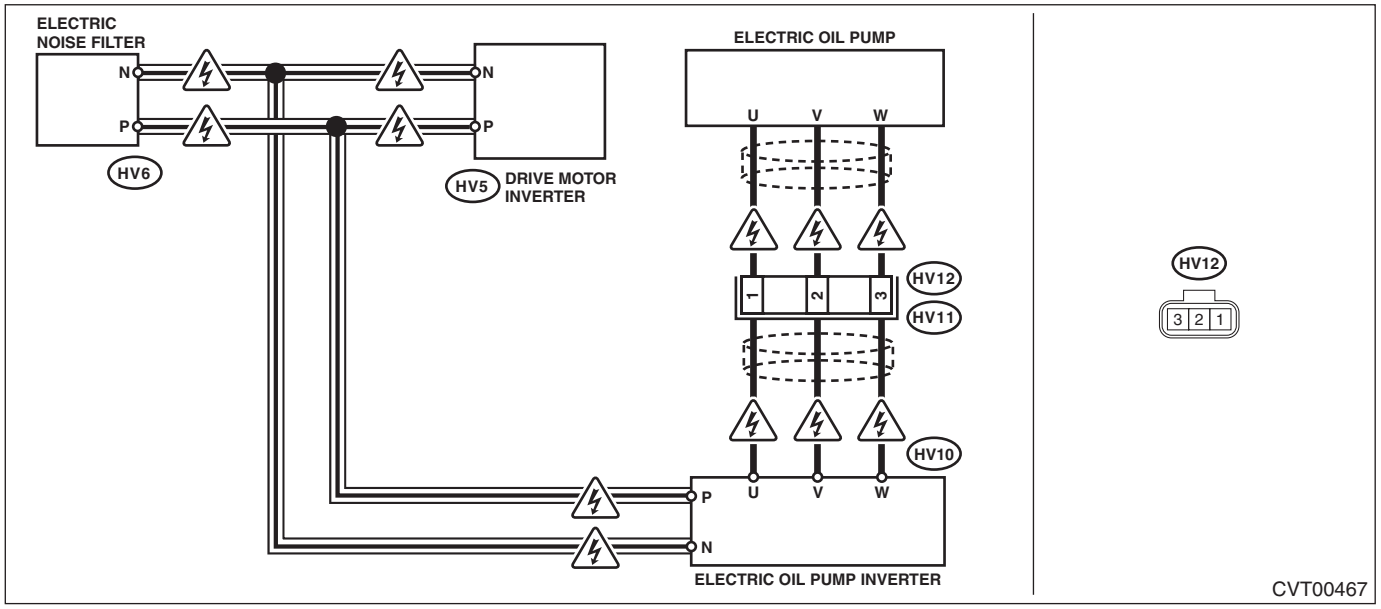
Malfunction Criteria	Threshold Value
Judgment of the malfunction in the electric oil pump inverter circuit board temperature sensor by the electric oil pump	ON

Time Needed for Diagnosis: 0.6 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BA:DTC P0C21 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-122, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK POWER CABLE.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. 4) Wait for 10 minutes. 5) Check the power cables of the electric oil pump and the electric oil pump inverter.	Is there any fault in the power cable? (looseness or rust)	Repair the power cable.	Go to step **2**.
2	**CHECK POWER CABLE.** 1) Disconnect the coupling connector of the electric oil pump and electric oil pump inverter. (HV11•HV12) 2) Disconnect the power cable from electric oil pump inverter. 3) Measure the resistance of power cable. ***Connector & terminal*** ***(HV10) U — (HV11) No. 1:*** ***(HV10) V — (HV11) No. 2:*** ***(HV10) W — (HV11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Replace the power cable. <Ref. to HEV-51, Power Cable.>

	Step	Check	Yes	No
3	**CHECK ELECTRIC OIL PUMP INVERTER.** Measure the resistance between the electric oil pump inverter terminals. ***Connector & terminal*** ***Electric oil pump inverter U terminal —*** ***Electric oil pump inverter N terminal:*** ***Electric oil pump inverter V terminal —*** ***Electric oil pump inverter N terminal:*** ***Electric oil pump inverter W terminal —*** ***Electric oil pump inverter N terminal:***	Is the resistance 1 kΩ or more?	Go to step **4**.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>
4	**CHECK ELECTRIC OIL PUMP SIDE POWER CABLE.** Measure the resistance of electric oil pump side power cable. ***Connector & terminal*** ***(HV12) No. 1 — (HV12) No. 2:*** ***(HV12) No. 1 — (HV12) No. 3:*** ***(HV12) No. 2 — (HV12) No. 3:***	Is the resistance 0.3 Ω or more?	Go to step **5**.	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>
5	**CHECK ELECTRIC OIL PUMP.** 1) Restore the vehicle to its original state. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C21 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **6**.
6	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C21 detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the open or ground short circuit of electric oil pump U/V/W line.
- Judge as NG when a status where the total current value of three phase line is 50 A or more and then any of voltage sensor values of U/V/W lines is less than 2.7 V.

Diagnosis 2
- Detect the open or ground short circuit of electric oil pump U/V/W line.
- Judge as NG when IGBT of V line is ON and any of voltage sensor values of U/V/W lines is 58 V or less.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

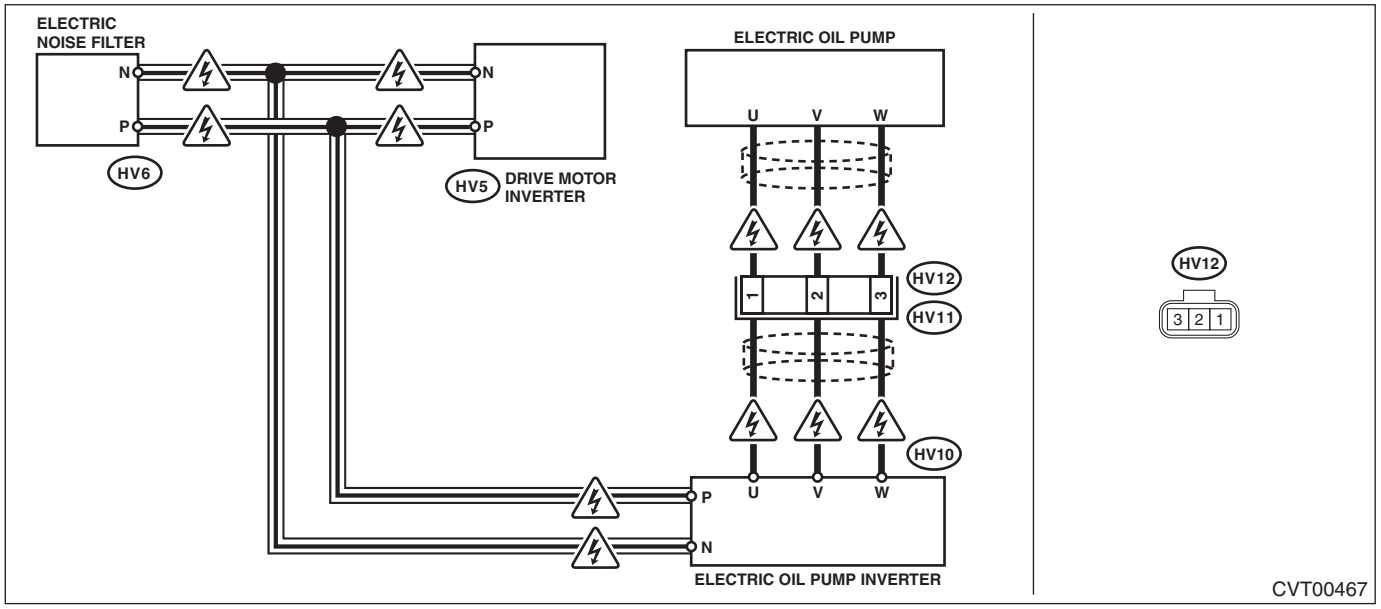
Malfunction Criteria	Threshold Value
Diagnosis 1	
Signal of malfunction from ETFP control module	ON
As defined by: Inverter phase U voltage < 2.7 V or Inverter phase V voltage < 2.7 V or Inverter phase W voltage < 2.7 V Actual current of ETFP inverter ≥ 50 A	
Diagnosis 2	
Signal of malfunction from ETFP control module	ON
As defined by: Inverter phase U voltage when the V phase high side IGBT is ON ≤ 58 V or Inverter phase V voltage when the V phase high side IGBT is ON ≤ 58 V or Inverter phase W voltage when the V phase high side IGBT is ON ≤ 58 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BB:DTC P0C22 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-122, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK POWER CABLE.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. 4) Wait for 10 minutes. 5) Check the power cables of the electric oil pump and the electric oil pump inverter.	Is there any fault in the power cable? (looseness or rust)	Repair the power cable.	Go to step **2**.
2	**CHECK POWER CABLE.** 1) Disconnect the coupling connector of the electric oil pump and electric oil pump inverter. (HV11•HV12) 2) Disconnect the power cable from electric oil pump inverter. 3) Measure the resistance of power cable. ***Connector & terminal*** ***(HV10) U — (HV11) No. 1:*** ***(HV10) V — (HV11) No. 2:*** ***(HV10) W — (HV11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Replace the power cable. <Ref. to HEV-51, Power Cable.>

	Step	Check	Yes	No
3	**CHECK ELECTRIC OIL PUMP INVERTER.** Measure the resistance between the electric oil pump inverter terminals. ***Connector & terminal*** ***Electric oil pump inverter U terminal —*** ***Electric oil pump inverter P terminal:*** ***Electric oil pump inverter V terminal —*** ***Electric oil pump inverter P terminal:*** ***Electric oil pump inverter W terminal —*** ***Electric oil pump inverter P terminal:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>
4	**CHECK ELECTRIC OIL PUMP SIDE POWER CABLE.** Measure the resistance of electric oil pump side power cable. ***Connector & terminal*** ***(HV12) No. 1 — (HV12) No. 2:*** ***(HV12) No. 1 — (HV12) No. 3:*** ***(HV12) No. 2 — (HV12) No. 3:***	Is the resistance 0.3 Ω or more?	Go to step **5**.	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>
5	**CHECK ELECTRIC OIL PUMP.** 1) Restore the vehicle to its original state. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C22 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **6**.
6	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C22 detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

1. OUTLINE OF DIAGNOSIS

- Detect the short circuit to 100 V power supply system of electric oil pump U/V/W line.
- Judge as NG when a status where the total current value of three phase line is 50 A or more and then any of voltage sensor values of U/V/W lines is more than 58 V.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

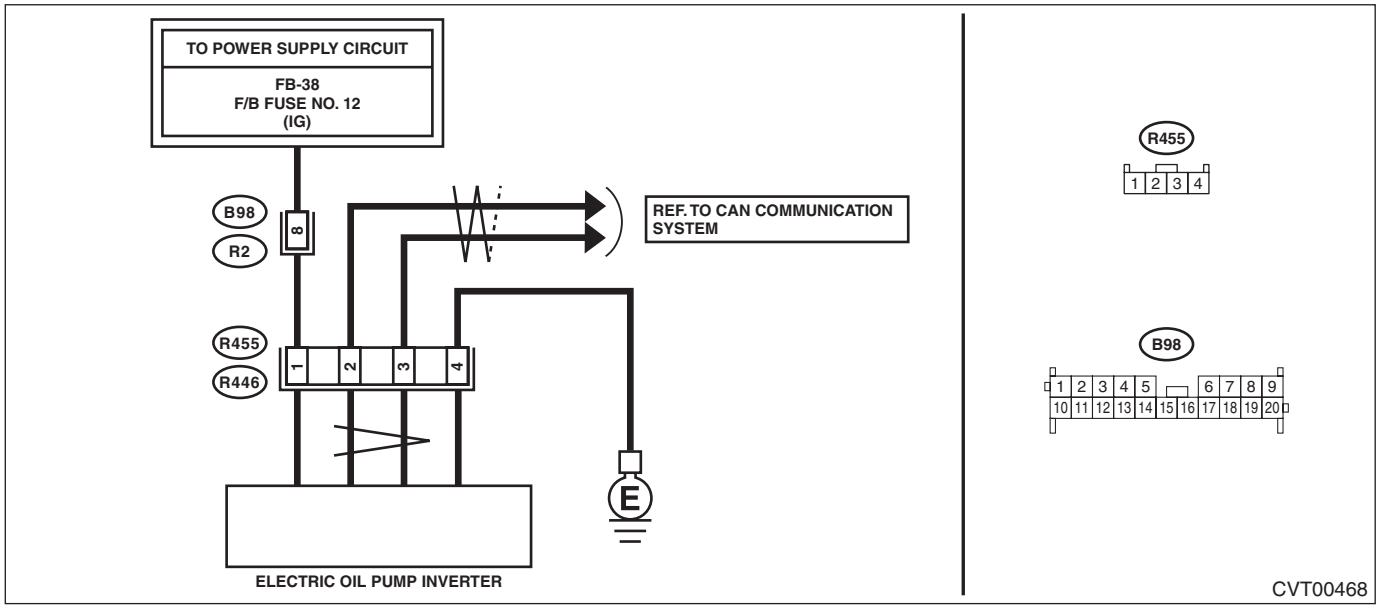
Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: Inverter phase U voltage > 58 V or Inverter phase V voltage > 58 V or Inverter phase W voltage > 58 V Actual current of ETFP control module ≥ 50 A	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BC:DTC P0C24 AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT LOW

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-122, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, confirm all DTCs.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR TCM.** Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control Module Voltage» 10 V or more?	Go to step **3**.	Check the battery and TCM power supply circuit.
3	**CHECK HARNESS.** 1) Disconnect the connector from electric oil pump inverter. 2) Measure the voltage between the electric oil pump inverter connector and the ground bolt of inverter frame body. (ignition ON) ***Connector & terminal*** ***(R455) No. 1 (+) — Ground bolt of inverter frame body:***	Is the voltage 10 V or more?	Go to step **4**.	Check the power supply circuit between the fuse and the electric oil pump inverter connector (R455).
4	**CHECK HARNESS.** Measure the resistance between the electric oil pump inverter connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R455) No. 4 — Ground bolt of inverter frame body:***	Is the resistance less than 1 Ω?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Repair the ground circuit.

1. OUTLINE OF DIAGNOSIS

Detects a low voltage in the 12 V power supply of the electric oil pump inverter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10 V
Malfunctions listed on the right column are not detected:	U0101, U0402, U0075
ATF temperature	> 22°C

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

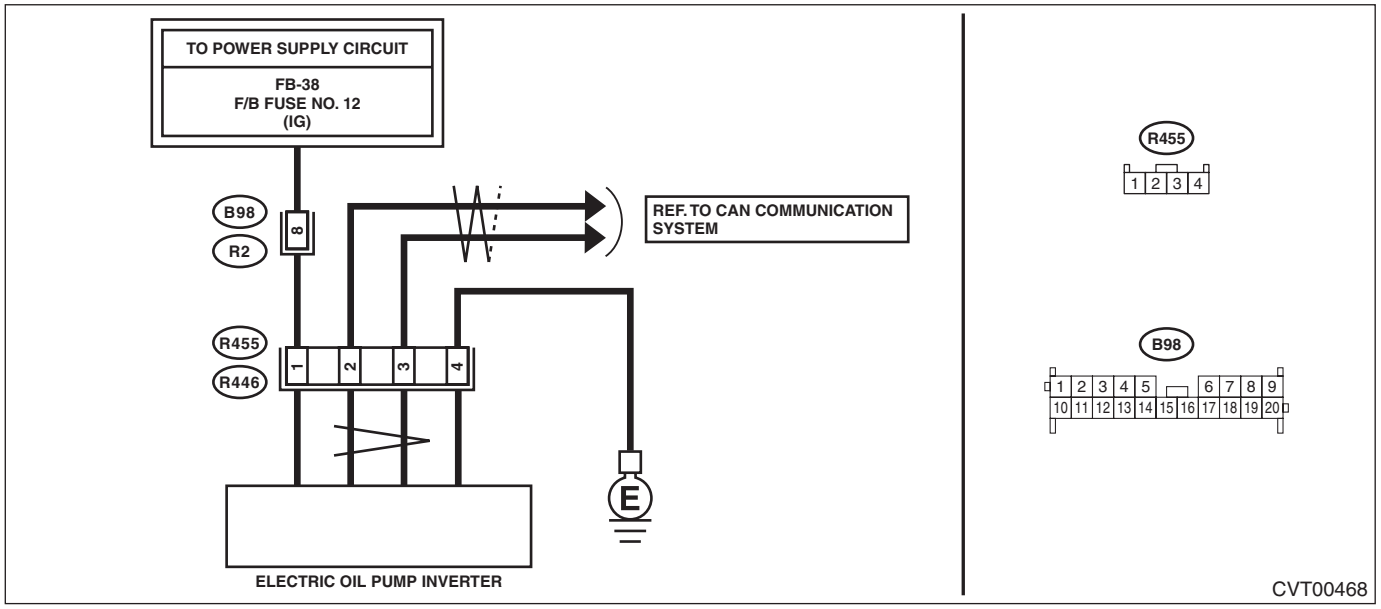
Malfunction Criteria	Threshold Value
Judgment of the low voltage malfunction in the 12 V power supply by the electric oil pump	ON

Time Needed for Diagnosis: 0.6 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BD:DTC P0C25 AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-122, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, confirm all DTCs.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR TCM.** Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control Module Voltage» 16 V or more?	Go to step **3**.	Check the battery and TCM power supply circuit.
3	**CHECK HARNESS.** 1) Disconnect the connector from electric oil pump inverter. 2) Measure the voltage between the electric oil pump inverter connector terminals. (ignition ON) ***Connector & terminal*** ***(R455) No. 1 (+) — (B455) No. 4 (–):***	Is the voltage 16 V or more?	Check the power supply circuit between the fuse and the electric oil pump inverter connector (R455).	Go to step **4**.
4	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C25 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

1. OUTLINE OF DIAGNOSIS

Detects a high voltage in the 12 V power supply of the electric oil pump inverter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Battery voltage	≥ 10 V
Malfunctions listed on the right column are not detected:	U0101, U0402, U0075
ATF temperature	> 22°C

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Judgment of the high voltage malfunction in the 12 V power supply by the electric oil pump	ON

Time Needed for Diagnosis: 0.6 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BE:DTC P0C27 AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

	Step	Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, confirm all DTCs.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C27 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **3**.
3	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C27 detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

1. OUTLINE OF DIAGNOSIS

Detects the short circuit to ground in the current sensor of the electric oil pump inverter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Target speed of electric oil pump	≥ 800 rpm
|Target speed of electric oil pump – Actual speed of electric oil pump|	< 270 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual current of electric oil pump	< 0.5000 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BF:DTC P0C28 AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, confirm all DTCs.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C28 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **3**.
3	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C28 detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

1. OUTLINE OF DIAGNOSIS

Detects the open circuit or the short circuit to power supply in the current sensor of the electric oil pump inverter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Target speed of electric oil pump	≥ 800 rpm
|Target speed of electric oil pump – Actual speed of electric oil pump|	< 270 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual current of electric oil pump	≥ Table 1 A

Table 1

		ATF temperature (°C)						
		0	10	20	30	40	50	60
High voltage battery power supply voltage (V)	60	9.0000	9.0000	9.0000	9.0000	9.0000	9.2500	9.7500
	70	8.3125	8.3125	8.3125	8.3125	8.3125	8.5625	9.0000
	85	7.3125	7.3125	7.3125	7.3125	7.3125	7.5625	7.8750
	100	6.3125	6.3125	6.3125	6.3125	6.3125	6.5000	6.8125
	125	5.0000	5.0000	5.0000	5.0000	5.0000	5.1250	5.3750
	150	4.1875	4.1875	4.1875	4.1875	4.1875	4.1875	4.4375
	160	3.8750	3.8750	3.8750	3.8750	3.8750	3.8750	4.0625

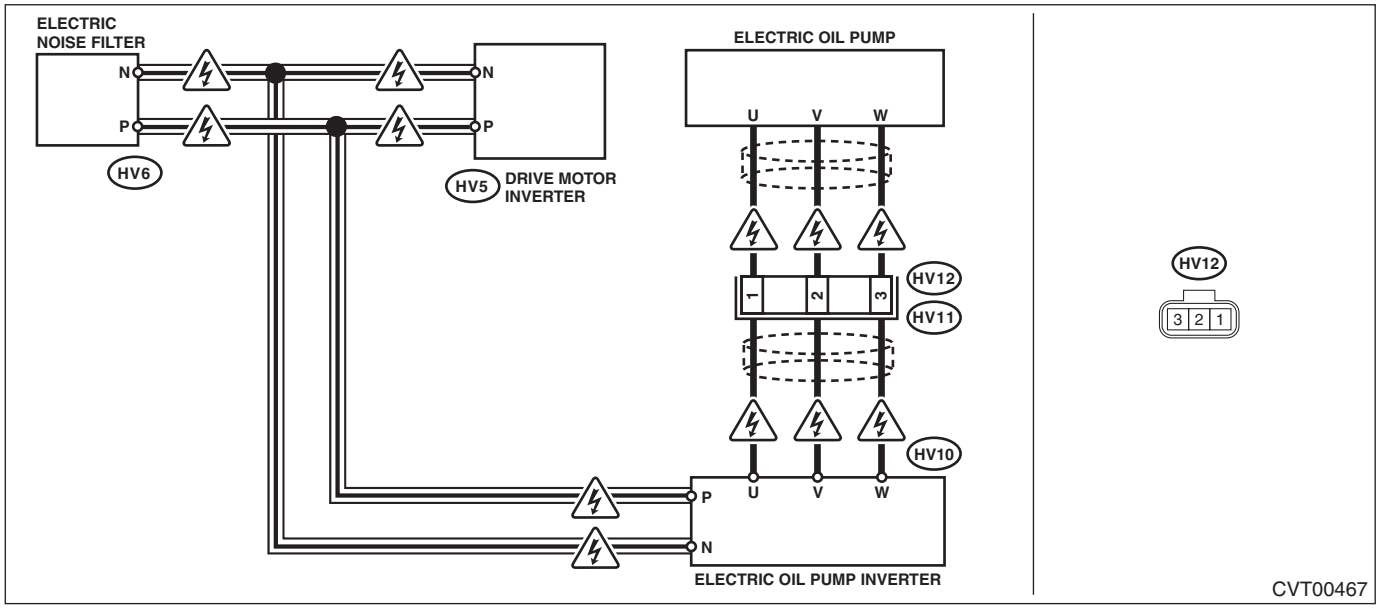
		ATF temperature (°C)					
		70	80	90	100	110	120
High voltage battery power supply voltage (V)	60	10.2500	10.8125	11.9375	13.0625	14.1875	14.3125
	70	9.5000	10.0625	11.0625	12.0625	13.1250	13.2500
	85	8.3750	8.8750	9.7500	10.6250	11.5000	11.6875
	100	7.2500	7.6250	8.4375	9.1875	9.9375	10.0625
	125	5.6875	6.0625	6.6250	7.2500	7.8125	7.9375
	150	4.7500	5.0625	5.5625	6.0625	6.5000	6.5625
	160	4.3750	4.6875	5.1250	5.5625	6.0000	6.0000

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BG:DTC P0C29 AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-122, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C29 detected?	Go to step **2**.	Current condition is normal.
2	**CHECK POWER CABLE.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. 4) Wait for 10 minutes. 5) Remove the power cable from electric oil pump inverter. 6) Measure the resistance of power cable. ***Connector & terminal*** ***(HV10) U — (HV10) V:*** ***(HV10) U — (HV10) W:*** ***(HV10) V — (HV10) W:***	Is the resistance 0.3 Ω or more?	Go to step **3**.	Go to step **4**.

	Step	Check	Yes	No
3	**CHECK POWER CABLE.** 1) Disconnect the coupling connector of the electric oil pump and electric oil pump inverter. (HV11•HV12) 2) Measure the resistance of power cable. ***Connector & terminal*** ***(HV12) No. 1 — (HV12) No. 2:*** ***(HV12) No. 1 — (HV12) No. 3:*** ***(HV12) No. 2 — (HV12) No. 3:***	Is the resistance 0.3 Ω or more?	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>	Replace the power cable. <Ref. to HEV-51, Power Cable.>
4	**CHECK ELECTRIC OIL PUMP INVERTER.** Measure the resistance between the electric oil pump inverter terminals. ***Terminals*** ***Electric oil pump inverter U terminal — Electric oil pump inverter V terminal:*** ***Electric oil pump inverter U terminal — Electric oil pump inverter W terminal:*** ***Electric oil pump inverter V terminal — Electric oil pump inverter W terminal:***	Is the resistance 1 kΩ or more?	Go to step **5**.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>
5	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the power cable and the battery. 2) Turn the ignition switch to ON. 3) Read the data of «Electric Fluid Pump Actual Current» using Subaru Select Monitor.	Is the «Electric Fluid Pump Actual Current» 0 A?	Go to step **6**.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>
6	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Perform the «Electric Fluid Pump inspection mode».	Is P0C29 detected?	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>	Current condition is normal.

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the overcurrent of electric oil pump U/V/W line.
- Judge as NG when a status where the total current value of three phase line is 14 A or more lasts 3 seconds or more.

Diagnosis 2
- Detect the overcurrent of electric oil pump U/V/W line.
- Judge as NG when a status where the total current value of three phase line is 50 A or more is detected two times or more in one driving cycle.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Signal of malfunction from ETFP control module	ON
As defined by:	
Actual current of ETFP control module ≥ 14 A	
Diagnosis 2	
Signal of malfunction from ETFP control module	ON
As defined by:	
Actual current of ETFP control module ≥ 50 A	

Time Needed for Diagnosis:
- **Diagnosis 1:** 3 s
- **Diagnosis 2:** 2 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BH:DTC P0C2A AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK ELECTRIC OIL PUMP.** 1) Turn the ignition switch to ON. 2) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 3) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C2A detected?	Go to step **3**.	Go to step **2**.
2	**CHECK ELECTRIC OIL PUMP NOISE.** Perform the «Electric Fluid Pump inspection mode».	Does the electric oil pump emit noise while performing the «Electric Fluid Pump inspection mode»?	Go to step **3**.	Current condition is normal.
3	**CHECK SECONDARY PRESSURE.** 1) Perform the «Electric Fluid Pump inspection mode». 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 1.53 MPa or more? Or 0.3 MPa or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Go to step **4**.
4	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Perform the «Electric Fluid Pump inspection mode».	Is P0C2A detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **5**.
5	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C2A detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

1. OUTLINE OF DIAGNOSIS

- Detect low speed revolution malfunction of electric oil pump.
- Judge as NG if the Set speed – Actual speed of electric oil pump is more than the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Commanded ETFP speed	≥ 800 rpm
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: Commanded ETFP speed – Actual ETFP speed > 270 rpm	ON

Time Needed for Diagnosis: 3 sec × 2 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BI: DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
TCM RAM malfunction

Step		Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Read the DTC.	Is DTC P160A displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction in RAM area of the TCM.
- Judge as NG if an attempt to write to RAM area has failed.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (RAM) NOTE: This check is carried out about the RAM used except for CAN communication.	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BJ:DTC P172A AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC relating the HPCM, BECM using the Subaru Select Monitor.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is DTC P172A detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **3**.
3	**STALL TEST.** Perform the stall test. <Ref. to CVT(TH58A)-52, Stall Test.>	Is DTC P172A detected?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Go to step **4**.
4	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is DTC P172A detected?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Go to step **5**.
5	**CHECK DRIVE MOTOR.** Check the drive motor. <Ref. to CVT(TH58A)-229, INSPECTION WHILE DTC P172A AND P0B0B LIGHTS ARE ON, INSPECTION, Drive Motor Assembly.>	Is the voltage between the three-phase lines in the drive motor 0.5 V or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Current condition is normal.

1. OUTLINE OF DIAGNOSIS

- Detect high speed revolution malfunction of electric oil pump.
- Judge as NG when a status where 100 V power supply voltage is more than 225 V is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Commanded ETFP speed	0 rpm
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

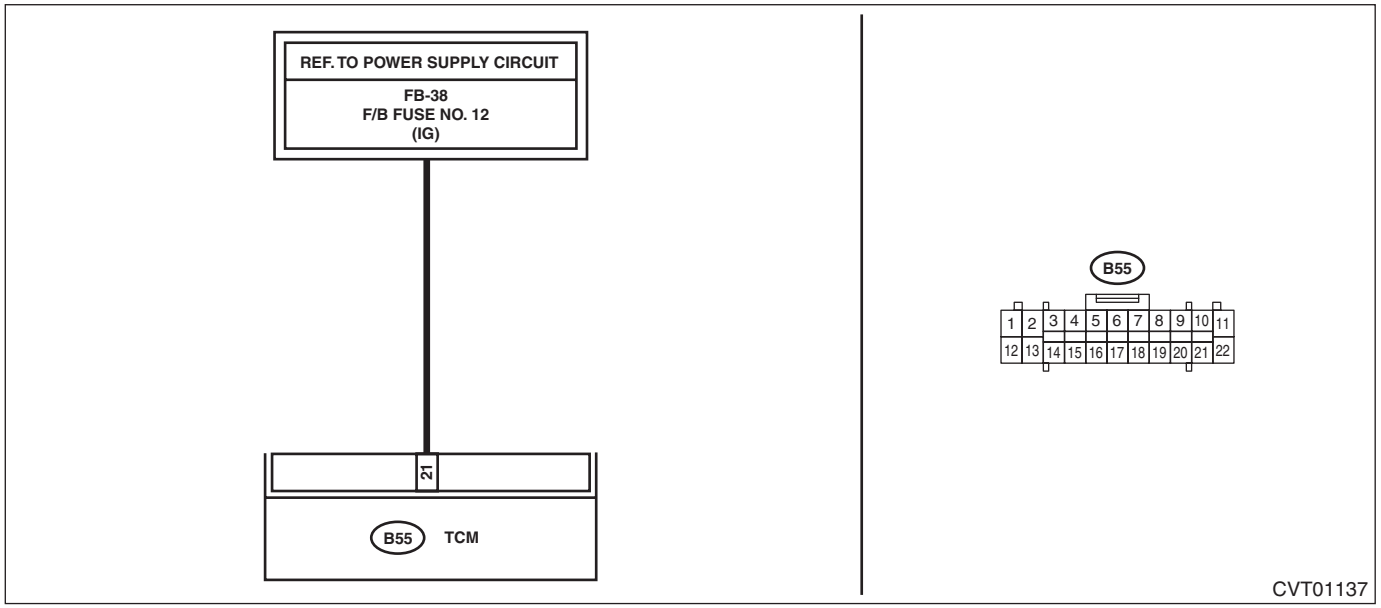
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: ETFP control module input voltage ≥ 225 V	ON

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BK:DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Faulty TCM operation
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK CONNECTOR.** Check the installing condition of TCM connector.	Is the TCM connector installed properly?	Go to step **2**.	Install the TCM connector.

Step		Check	Yes	No
2	**CHECK INPUT VOLTAGE OF TCM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. (While wiggling the harness) ***Connector & terminal*** ***(B55) No. 21 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, the following items may be the cause of fault. • Open circuit or short circuit to ground of harness between TCM connector and ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch (IG relay 1 for model with push button start)	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground of harness between TCM connector and ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch (IG relay 1 for model with push button start)

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of ignition SW circuit.
- Judge as NG if the ignition SW signals are lost 5 times or more even though the engine is ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V
Engine speed	≥ 500 rpm
or	
Vehicle speed	≥ 1.2 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Count of temporarily discontinuous input of ignition switch	≥ 5 count

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BL:DTC P2714 PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2714, is any of the DTC P2751, P0720, P2720 or P2721 displayed?	Perform the diagnosis according to DTCs other than P2714.	Go to step **2**.
2	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **3**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
3	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **4**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to "D" range. 4) Shift the select lever to "P" range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **5**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-104, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
5	**STALL TEST.** Perform the stall test. <Ref. to CVT(TH58A)-52, Stall Test.>	Is the stall test normal?	Go to step **6**.	Replace the transmission assembly if the stall speed is higher than the standard value of the stall test. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>

Step		Check	Yes	No
6	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P2714 detected?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the transmission output clutch control function.
- Judge as NG when the deviation between values of the output clutch output speed and the output clutch input speed calculated from the secondary speed becomes equal to or larger than the predetermined value (180 rpm), even though the output clutch should be engaged in the current control status.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Transmission fluid pump speed (MTFP or ETFP)	≥ 700 rpm
Transmission range	Drive or Reverse
Commanded output clutch control solenoid current	≤ 0.8 A
Measured secondary pulley shaft speed	≥ 100 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Input speed of output clutch* –Measured output shaft speed)	≥ 100 rpm

* Input speed of output clutch: Measured secondary pulley shaft speed / 1.342**
**1.342: Secondary reduction gear ratio

Time Needed for Diagnosis: 5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BM:DTC P2715 PRESSURE CONTROL SOLENOID "D" STUCK ON

DTC DETECTING CONDITION:
Immediately at fault recognition

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

NOTE:
Replace the output clutch assembly and the sub control valve body when this DTC is detected. <Ref. to CVT(TH58A)-233, Output Clutch Assembly.> <Ref. to CVT(TH58A)-115, Control Valve Body.>

1. OUTLINE OF DIAGNOSIS

Detects the output clutch stuck to ON.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Power generation mode at standstill	ON
Output clutch release mode	ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

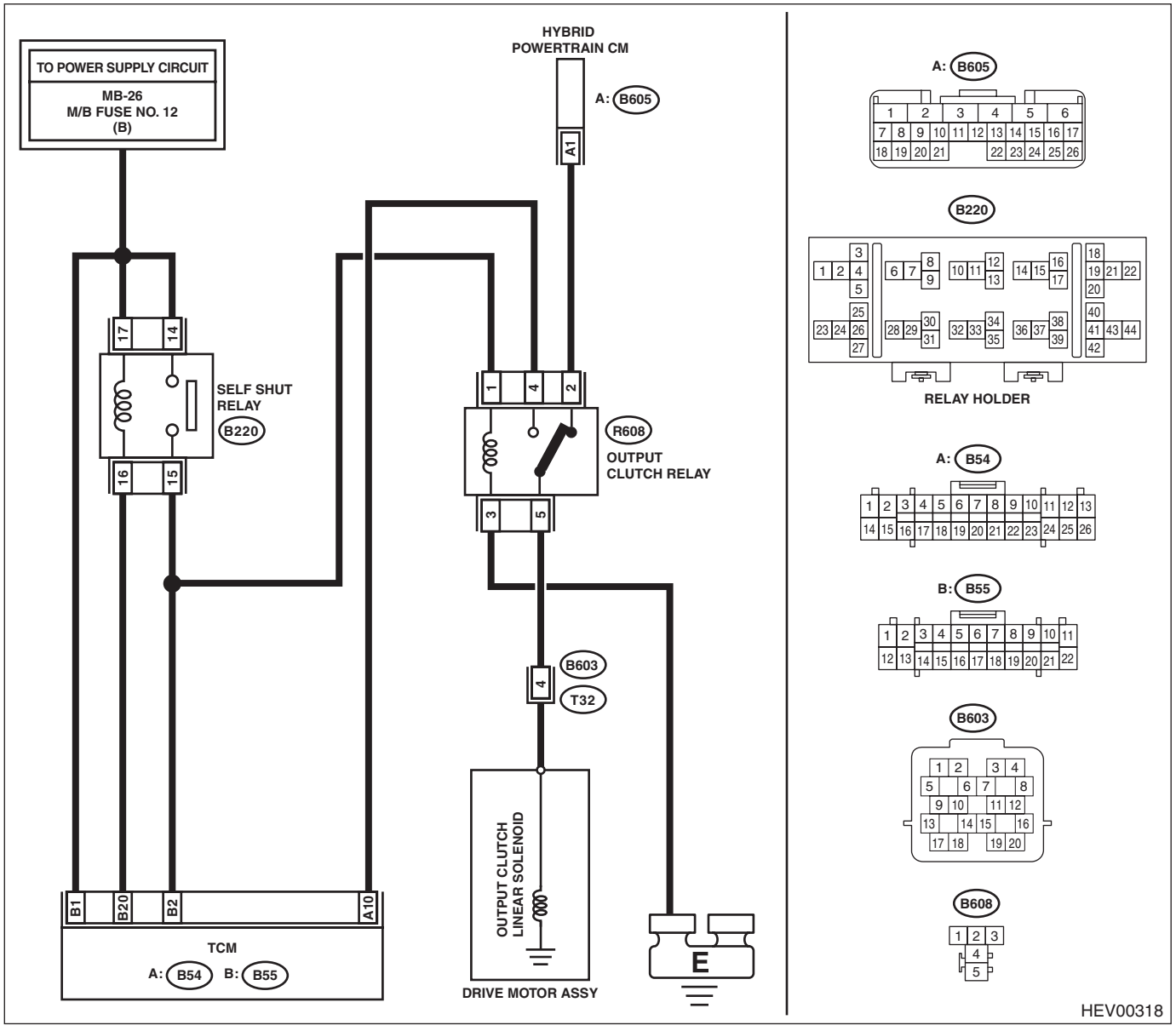
Malfunction Criteria	Threshold Value
Engine speed ÷ Turbine speed × 100	< 30.078%

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

BN:DTC P2719 PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-122, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2719, is DTC P2720 or P2721 displayed?	Perform the diagnosis according to DTCs other than P2719.	Go to step **2**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and output clutch linear solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Go to step **3**.
3	**CHECK OUTPUT CLUTCH LINEAR SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the drive motor assembly connector. 3) Measure the resistance between drive motor assembly connector and transmission body. ***Connector & terminal*** ***(T32) No. 4 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Replace the output clutch control valve body. <Ref. to CVT(TH58A)-121, OUTPUT CLUTCH CONTROL VALVE BODY, REMOVAL, Control Valve Body.>

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the characteristic malfunction of the transmission output clutch linear solenoid drive circuit.
- Judge as NG when the deviation between set current and actual current of the transmission output clutch linear solenoid drive circuit becomes equal to or larger than the predetermined value (0.2 A).

Diagnosis 2
- Detect the characteristic malfunction of the transmission output clutch linear solenoid drive circuit.
- Judge as NG when the transmission output clutch linear solenoid drive current is within the predetermined value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

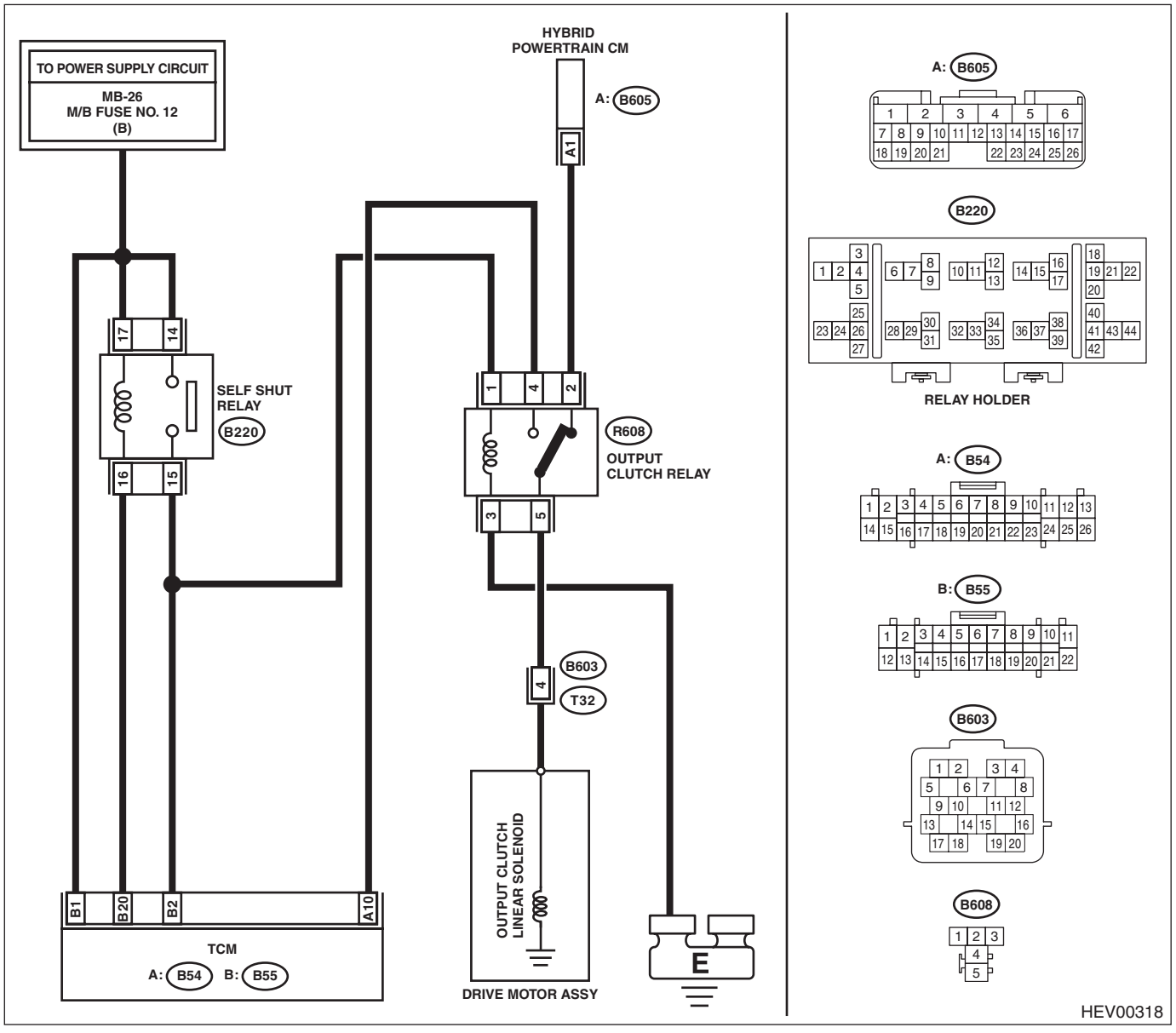
Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute value (Target output clutch pressure control solenoid current – Measured output clutch pressure control solenoid current)	> 0.2 A
Diagnosis 2	
Measured output clutch pressure control solenoid current	> 1.08 A and < 1.9 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BO:DTC P2720 PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Unexpected vibration occurs.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-122, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «Output Clutch Linear Solenoid Set Current» and «Output Clutch Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «Output Clutch Linear Solenoid Set Current» and «Output Clutch Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Remove the output clutch relay. 4) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 10 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between output clutch relay and chassis ground. ***Connector & terminal*** ***(B608) No. 5 — Transmission body:***	Is the resistance approximately 6 Ω?	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK RELAY.** Check the output clutch relay. <Ref. to CVT(TH58A)-161, INSPECTION, Relay and Fuse.>	Is the output clutch relay OK?	Go to step **5**.	Replace the output clutch relay.
5	**CHECK HARNESS.** 1) Disconnect connector (B603) of the drive motor assembly. 2) Measure the resistance of drive motor assembly harness. ***Connector & terminal*** ***(B603) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short in transmission output clutch pressure solenoid circuit.
- Judge as NG when the transmission output clutch pressure solenoid drive current is 1.9 A or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

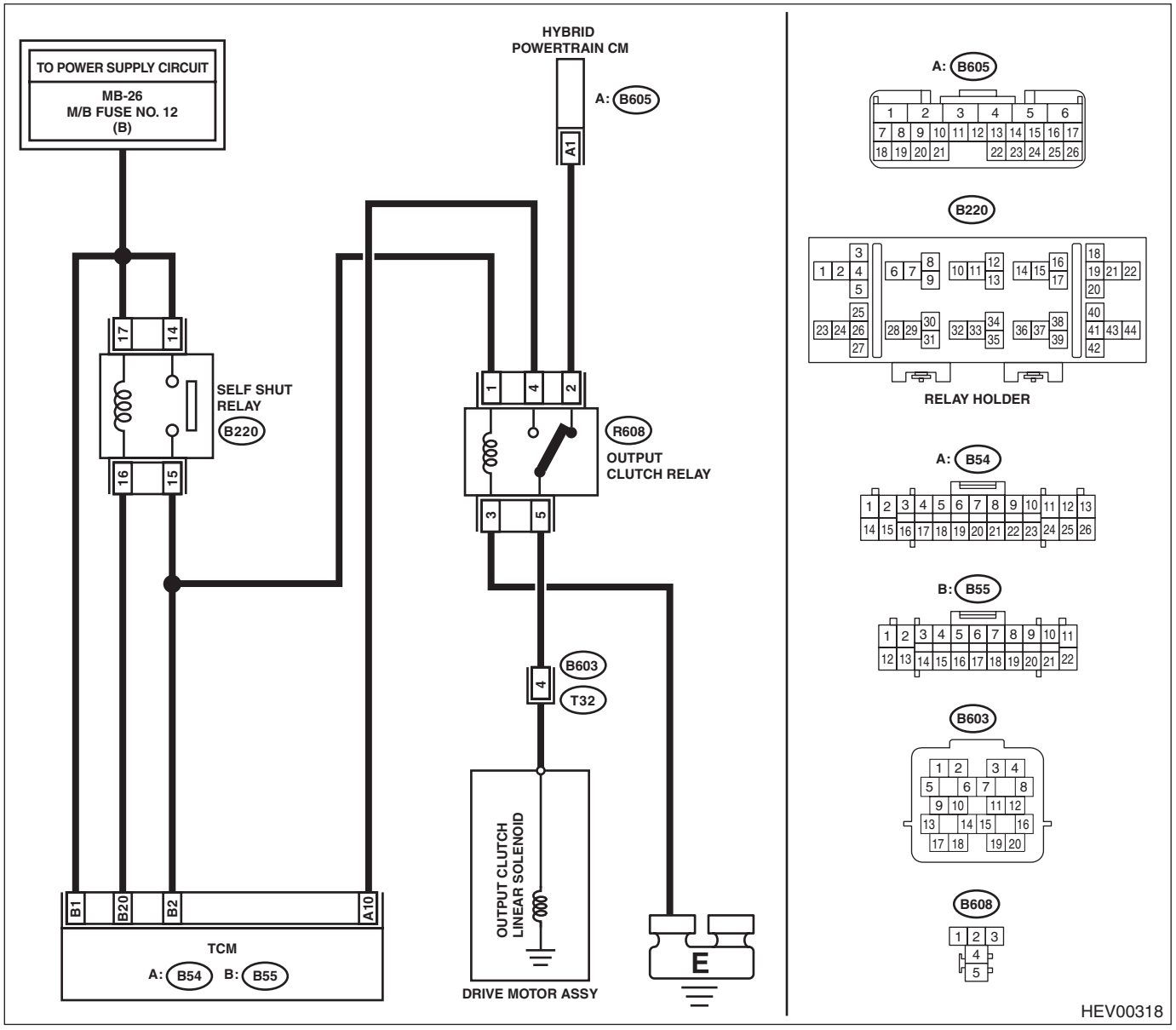
Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured output clutch pressure control solenoid current ≥ 1.9 A	ON

Time Needed for Diagnosis: 0.02 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BP:DTC P2721 PRESSURE CONTROL SOLENOID "D" CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Engine speed increases abruptly, and can not start.
- Unexpected vibration occurs.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-122, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «Output Clutch Linear Solenoid Set Current» and «Output Clutch Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «Output Clutch Linear Solenoid Set Current» and «Output Clutch Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Measure the resistance between TCM connector and output clutch relay connector. ***Connector & terminal*** ***(B54) No. 10 — (B608) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 10 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between output clutch relay and chassis ground. ***Connector & terminal*** ***(B608) No. 5 — Chassis ground:***	Is the resistance approximately 6 Ω?	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK RELAY.** Check the output clutch relay. <Ref. to CVT(TH58A)-161, INSPECTION, Relay and Fuse.>	Is the output clutch relay OK?	Go to step **6**.	Replace the output clutch relay.
6	**CHECK HARNESS.** 1) Disconnect connector (B603) of the drive motor assembly. 2) Turn the ignition switch to ON. 3) Measure the voltage between drive motor assembly harness and transmission body. ***Connector & terminal*** ***(B603) No. 4 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or short circuit to power supply in the transmission output clutch pressure solenoid circuit.
- Judge as NG if the transmission output clutch pressure solenoid drive current is less than 0.15 A.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded output clutch control solenoid current	≥ 0.3 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured output clutch pressure control solenoid current	< 0.15 A

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BQ:DTC P2750 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT RANGE/ PERFORMANCE

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- Shift control malfunction
- Shock felt when lock-up is engaged

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2750, is any of the DTC P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P2750.	Perform the diagnosis according to DTC P2751. <Ref. to CVT(HEV)(diag)-185, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the malfunction of secondary speed sensor signal characteristics.
- Judge as NG if the secondary speed, compared with the primary speed, is outside the possible range considering the hardware capabilities.

Diagnosis 2
- Detect the malfunction of secondary speed sensor signal characteristics.
- Judge as NG when the secondary speed exceeds 13500 rpm.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
(Actual primary pulley shaft speed / Measured front output shaft speed)	≥ 0.36 and ≤ 2.34
Diagnosis 2	
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
(Actual primary pulley shaft speed / Measured front output shaft speed)	≥ 0.36 and ≤ 2.34

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
(Measured primary pulley shaft speed / Measured secondary pulley shaft speed)	< 0.33 or > 2.58
Diagnosis 2	
Measured secondary pulley shaft speed	> 13500 rpm

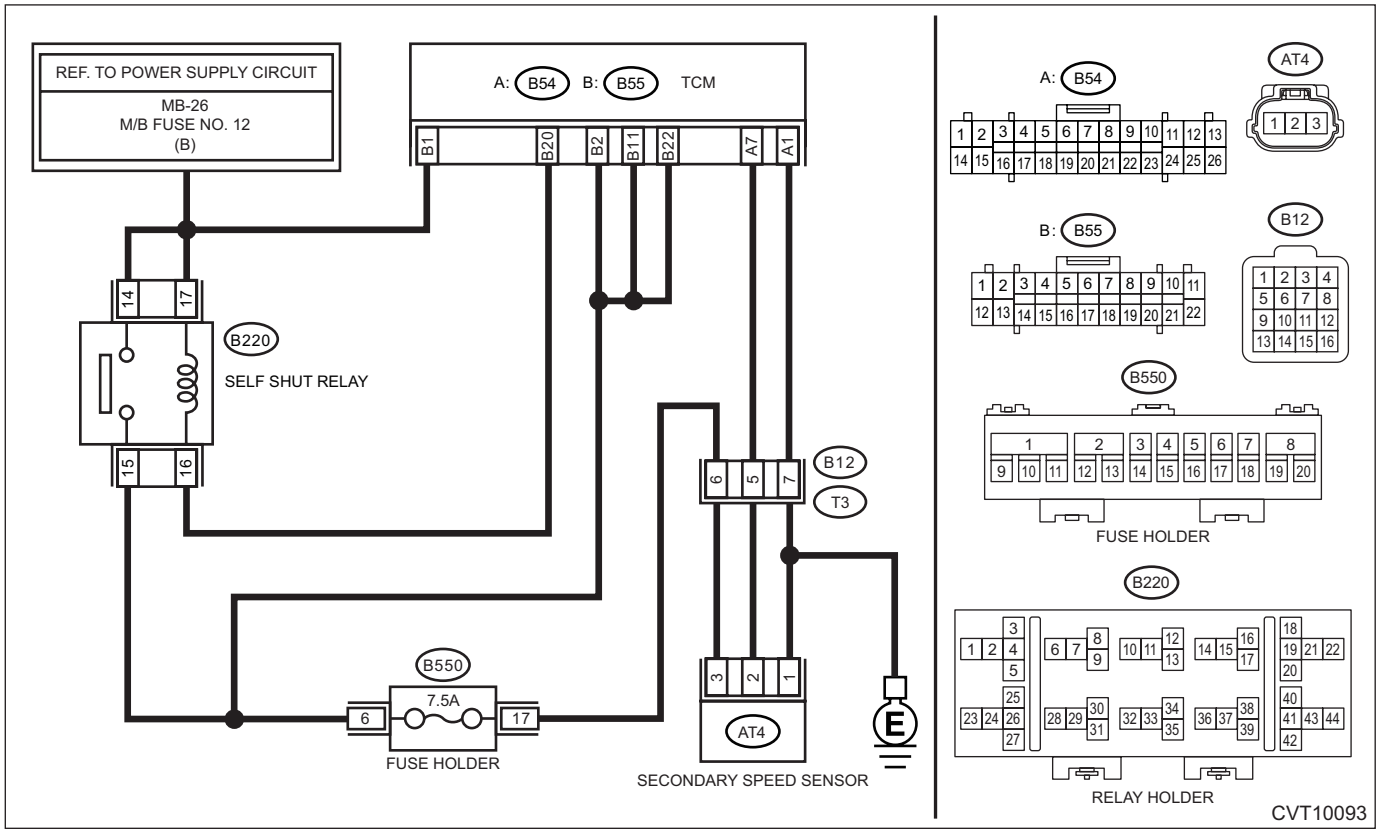
Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BR:DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:
Immediately at fault recognition

TROUBLE SYMPTOM:
- Shifting shock is felt.
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse blown out?	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B55) No. 20 — (B220) No. 16:*** ***(B55) No. 2 — (B220) No. 15:*** ***(B55) No. 11 — (B220) No. 15:*** ***(B55) No. 22 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 20 — Chassis ground:*** ***(B55) No. 2 — Chassis ground:*** ***(B55) No. 11 — Chassis ground:*** ***(B55) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Set the select lever to “D” range. 4) Read the data of «Secondary Pulley Speed» and «Front Wheel Speed» using Subaru Select Monitor.	Does the value of «Secondary Pulley Speed» change according to those of «Front Wheel Speed»?	Current condition is normal.	Go to step **9**.
9	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 1 — (B12) No. 7:*** ***(B54) No. 7 — (B12) No. 5:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair the open circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Repair the short circuit of harness.
11	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **12**.	Repair the open circuit of harness.

	Step	Check	Yes	No
12	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **13**.	Repair the open circuit of harness or poor contact of connector.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Disconnect the secondary speed sensor connector. 4) Measure the resistance between transmission connector and secondary speed sensor connector. ***Connector & terminal*** ***(T3) No. 5 — (AT4) No. 2:*** ***(T3) No. 6 — (AT4) No. 3:*** ***(T3) No. 7 — (AT4) No. 1:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK SECONDARY SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 5 — Chassis ground:*** ***(T3) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK SECONDARY SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the secondary speed sensor. <Ref. to CVT(TH58A)-106, Secondary Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2751 displayed?	Go to step **16**.	The original secondary speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2751 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	The original self shut relay is defective.

1. OUTLINE OF DIAGNOSIS

- Detect the no input signal from the secondary speed sensor.
- Judge as NG when there is no input to the secondary speed sensor while the primary speed is input.
- Judge as NG when no speed sensor inputs are received from TCM connector during driving.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Condition 1	
12 V battery system voltage	≥ 10 V
Transmission range	Drive or Reverse
Actual primary pulley shaft speed	≥ 1000 rpm
Condition 2	
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	0 rpm
Measured output shaft speed	0 rpm
Actual primary pulley shaft speed	≥ 500 rpm
Transmission range	Drive or Reverse
Vehicle speed (from vehicle dynamics control module)	≥ 6.3 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured secondary pulley shaft speed	0 rpm

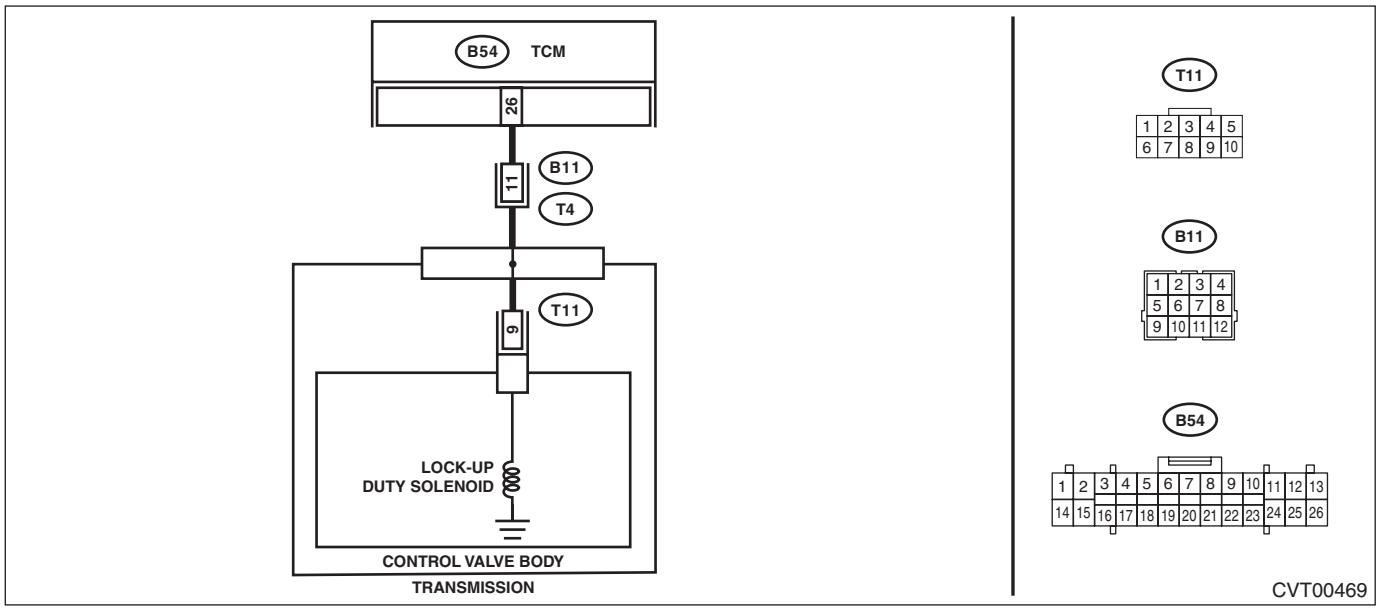
Time Needed for Diagnosis:

- **Condition 1:** 0.5 s
- **Condition 2:** 0.6 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BS:DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
Lock-up malfunction
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Is a DTC other than DTC P2757 displayed?	Perform the diagnosis according to DTCs other than P2757.	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **3**.
3	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 26 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** Measure the resistance between TCM connector and transmission body. ***Connector & terminal*** ***(B54) No. 26 — Transmission body:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit of harness.

Step		Check	Yes	No
5	**CHECK HARNESS.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Disconnect the control valve body connector. 3) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 11 — (T11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the open circuit of harness.
6	**CHECK HARNESS.** Measure the resistance between transmission connector and control valve body. ***Connector & terminal*** ***(T11) No. 9 — Control valve body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Repair the short circuit of harness.
7	**CHECK TRANSMISSION FLUID.** 1) Connect all connectors. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the check result OK?	Go to step **8**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
8	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the check result OK?	Go to step **9**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual Secondary Pressure» using Subaru Select Monitor.	Is the «Actual Secondary Pressure» 0.5 — 1.5 MPa?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.> Go to step **10**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-104, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

	Step	Check	Yes	No
10	**DRIVING CHECK FOR LOCK-UP CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 50°C. 5) Drive the vehicle for one minute or more while keeping such constant speed that «Lock Up Duty Ratio» is 70% or more, and «Front Wheel Speed» is 40 km/h (25 MPH) or more, which are displayed on the Subaru Select Monitor. 6) Turn the ignition switch to OFF. 7) Start the engine. 8) Perform the procedure in step 5) again. 9) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P2757 displayed?	Replace the torque converter assembly. <Ref. to CVT(TH58A)-178, Torque Converter Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of lock-up clutch pressure control function.
- Judge as NG when the deviation between the engine speed and the turbine speed is the predetermined value or more, even though the lock-up hydraulic pressure control solenoid is issuing an engagement command.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Commanded Torque converter clutch pressure	≥ 700 kPa

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

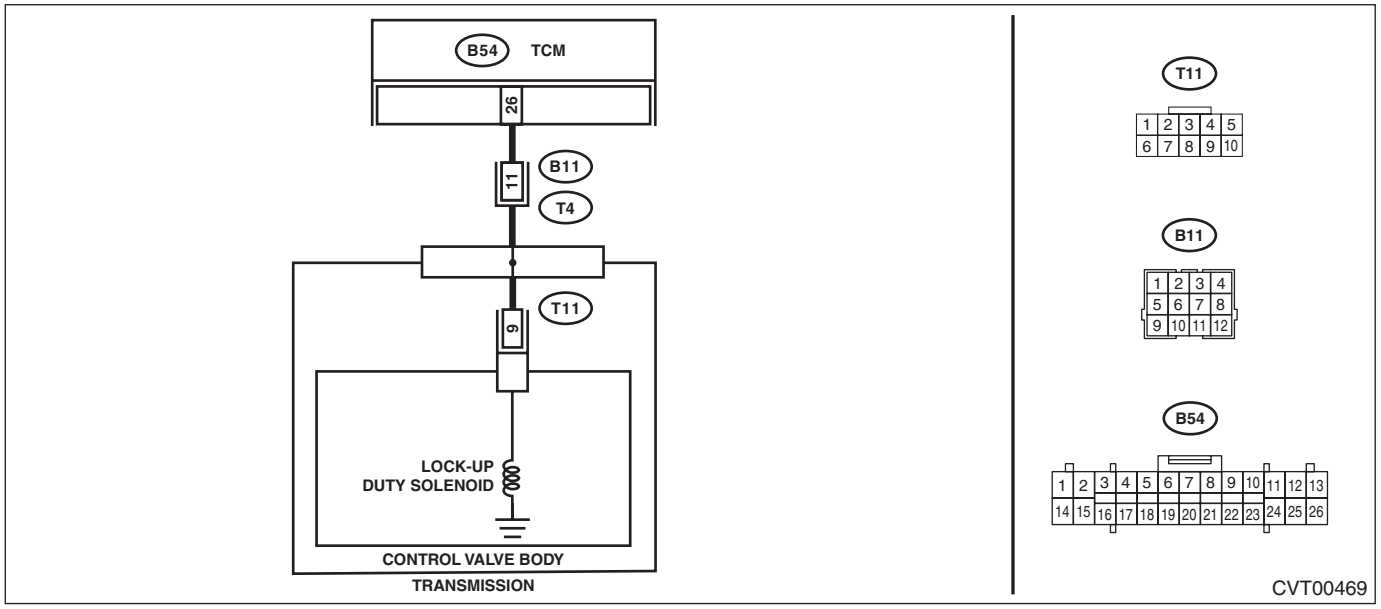
Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Engine speed – Measured turbine shaft speed)	≥ 40 + Vehicle speed / 1.25 rpm (Vehicle speed: MPH)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BT:DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON

DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
The engine stalls when the vehicle is stopped.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Is a DTC other than DTC P2758 displayed?	Perform the diagnosis according to DTCs other than P2758.	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Go to step **3**.
3	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 26 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** Measure the resistance between TCM connector and transmission body. ***Connector & terminal*** ***(B54) No. 26 — Transmission body:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit of harness.

	Step	Check	Yes	No
5	**CHECK HARNESS.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Disconnect the control valve body connector. 3) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 11 — (T11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the open circuit of harness.
6	**CHECK HARNESS.** Measure the resistance between transmission connector and control valve body. ***Connector & terminal*** ***(T11) No. 9 — Control valve body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Repair the short circuit of harness.
7	**CHECK TRANSMISSION FLUID.** 1) Connect all connectors. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the check result OK?	Go to step **8**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>s
8	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the check result OK?	Go to step **9**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual Secondary Pressure» using Subaru Select Monitor.	Is the «Actual Secondary Pressure» 0.5 — 1.5 MPa?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.> Go to step **10**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-104, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Step		Check	Yes	No
10	**DRIVING CHECK FOR LOCK-UP CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 50°C. 5) Drive the vehicle for one minute or more while keeping such constant speed that «Lock Up Duty Ratio» is 0%, and «Front Wheel Speed» is 5 km/h (3 MPH) or less, which are displayed on the Subaru Select Monitor. 6) Turn the ignition switch to OFF. 7) Start the engine. 8) Perform the procedure in step 5) again. 9) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P2758 displayed? Or does the engine stall?	Replace the torque converter assembly. <Ref. to CVT(TH58A)-178, Torque Converter Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of lock-up fluid pressure control solenoid, and hydraulic circuit, or drive circuit characteristics (stuck to high pressure side).
• Judge as NG if the deviation between engine speed and turbine speed is the predetermined value or less, even though the lock-up open request has been issued.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Transmission range	Drive
Engine torque	> Table 1 N·m
Commanded duty of torque converter clutch pressure control solenoid	≤ 0%

Table 1

Vehicle speed (rpm)	0	13	25	38	50	63	75	88	100	113
Engine torque (N·m)	60	73	92	118	154	170	205	244	286	332

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Engine speed – Measured turbine shaft speed)	< Table 2 rpm

Table 2

Engine speed (rpm)	0	500	1000	1500	2000	2500	3000	3500
Absolute value (Engine speed – Measured turbine shaft speed) (rpm)	0	0	50	50	50	50	50	50

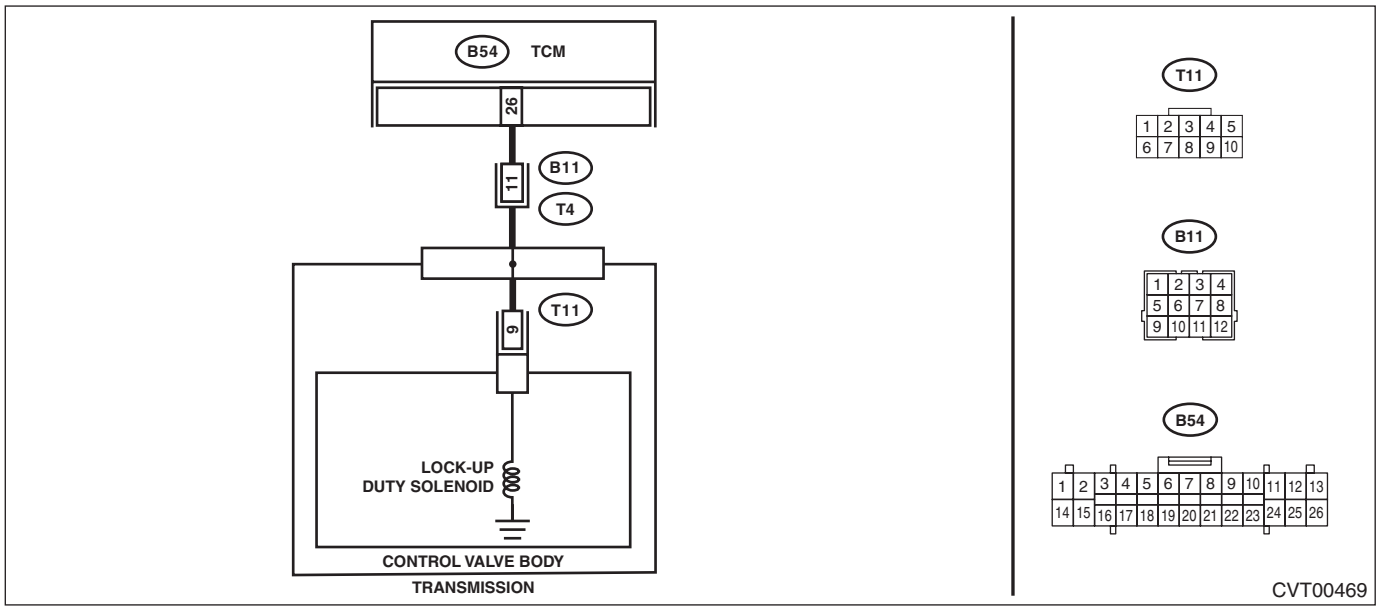
Engine speed (rpm)	4000	4500	5000	5500	6000	6500	7000
Absolute value (Engine speed – Measured turbine shaft speed) (rpm)	50	50	50	50	50	50	50

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BU:DTC P2763 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
- No lock-up occurs.
- Engine stalls.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 26 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 26 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK LOCK-UP DUTY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the lock-up clutch pressure control solenoid drive circuit.
• Judge as NG when the lock-up clutch pressure control solenoid drive voltage is 0.8 V or less.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of torque converter clutch pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

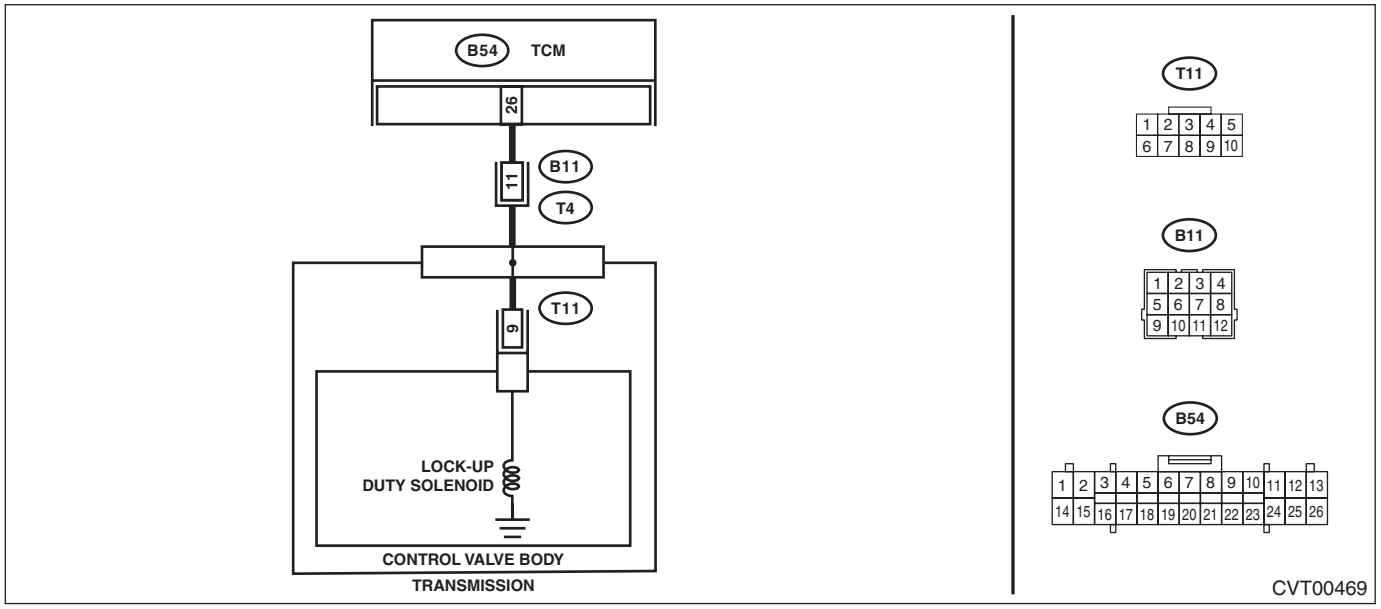
Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured torque converter clutch pressure control solenoid voltage ≤ 0.8 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BV:DTC P2764 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
No lock-up occurs.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-82, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 26 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK LOCK-UP DUTY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the lock-up clutch pressure control solenoid drive circuit.
- Judge as NG when the lock-up clutch pressure control solenoid drive voltage is 2.5 V or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 9 V
Commanded duty of torque converter clutch pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured torque converter clutch pressure control solenoid voltage ≥ 2.5 V	≥ 2.5 V

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BW:DTC P2797 ELECTRIC/AUXILIARY TRANSMISSION FLUID PUMP "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:
Immediately at fault recognition
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **2**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
2	**CHECK DTC.** Check the DTC relating the TCM using the Subaru Select Monitor.	Is P0841 detected?	Perform the diagnosis according to DTC. <Ref. to CVT(HEV)(diag)-104, DTC P0841 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is a DTC other than DTC P2797 displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK ELECTRIC OIL PUMP.** 1) Perform the «Electric Fluid Pump inspection mode». 2) Read the data of «Electric Fluid Pump Target RPM» and «Electric Fluid Pump Actual RPM» using Subaru Select Monitor.	Is the difference between «Electric Fluid Pump Target RPM» and «Electric Fluid Pump Actual RPM» 200 rpm or more?	Go to step **6**.	Go to step **5**.
5	**CHECK ELECTRIC OIL PUMP.** 1) Perform the «Electric Fluid Pump inspection mode». 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.3 MPa or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Current condition is normal.
6	**CHECK DTC HISTORY WHEN RECEIVING THE VEHICLE.**	Was DTC P0C21 recorded when receiving the vehicle?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the electric oil pump.
- Judge as NG if the secondary pressure is less than 0.2 MPa while the electric oil pump is driven.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V
Commanded ETFP speed	≥ 800 rpm
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	< 200 kPa

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BX:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure has occurred.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BY:DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure has occurred.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BZ:DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure has occurred.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

CA:DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the ECM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CB:DTC U0101 LOST COMMUNICATION WITH TCM

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the TCM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

CC:DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with drive motor CM is not possible.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Drive Motor Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CD:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with VDCCM is not possible.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CE:DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the body integrated unit.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from body integrated unit	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

CF:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the combination meter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from meter	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

CG:DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with electric oil pump inverter is not possible.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ETFP Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CH:DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with hybrid powertrain CM is not possible.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CI: DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from ECM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CJ:DTC U0402 INVALID DATA RECEIVED FROM TCM

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the TCM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

CK:DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from drive motor CM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from Drive Motor Control Module	Did not change
Diagnosis 2	
CAN data from Drive Motor Control Module	Check sum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 2 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CL:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the VDCCM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CM:DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the body integrated unit is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from body integrated unit	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Does not illuminate.

CN:DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the combination meter is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from meter	Did not change

Time Needed for Diagnosis: 2 seconds

CO:DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from electric oil pump inverter is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ETFP Control Module	Did not change
Diagnosis 2	
CAN data from ETFP Control Module	Check sum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 2 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CP:DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from hybrid powertrain CM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CQ:DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the ECM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CR:DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with hybrid powertrain CM is not possible.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CS:DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from ECM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	Did not change
Diagnosis 2	
CAN data from ECM	Check sum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 2 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

CT:DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from hybrid powertrain CM is not normal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from HPCM	Did not change
Diagnosis 2	
CAN data from HPCM	Check sum error

Time Needed for Diagnosis:

- **Diagnosis 1:** 2 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

17.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK SHIFT INDICATOR

DIAGNOSIS:

- Output signal circuit of shift indicator is open or shorted.
- Combination meter malfunction

TROUBLE SYMPTOM:

- Shift indicator does not display or remains displayed.
- Shift indicator display does not change.

	Step	Check	Yes	No
1	**CHECK TCM.** Check the DTC relating the TCM using the Subaru Select Monitor.	Is DTC U0155 or U0423 detected?	Perform the self-diagnosis of combination meter.	Go to step **2**.
2	**CHECK TCM.** Check the DTC relating the TCM using the Subaru Select Monitor.	Are DTCs other than U0155 and U0423 detected?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** Check the DTC of combination meter.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK TCM.** 1) Operate the + side of the paddle shift switch. 2) Read the data of «Up Switch» using the Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Go to step **5**.	Check for poor contact between TCM and paddle shift UP switch, and repair the defective part.
5	**CHECK TCM.** 1) Operate the – side of the paddle shift switch. 2) Read the data of «Down Switch» using the Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Go to step **6**.	Check for poor contact between TCM and paddle shift down switch, and repair the defective part.
6	**CHECK TCM.** 1) Turn the ignition switch OFF, then turn it ON again. 2) Shift the select lever to manual mode. 3) Read the data of «Tiptronic Mode Switch» using Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Current condition is normal.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

18.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
The vehicle can not move unless the engine is started after ignition switch was turned off, when driving in “D” or “R” range, or selecting “N” → “D”, “N” → “R”.	• Control valve • Engine control system
While driving in “D” range, the vibration occurs immediately before the stopping. Or the vehicle can not move unless the engine is started after ignition switch was turned off.	• Control valve • Torque converter
Vehicle cannot shift while driving in “D” range.	• Control valve • TCM • Shift mechanism • Power supply system • HPCM
Excessive shock when selecting “N” → “D”, and “N” → “R”.	• Control valve • TCM • F&R clutch pack • ATF deterioration or lack
Excessive shock at standing start in “D” range.	• Control valve • TCM • F&R clutch pack • ATF deterioration or lack
Engine speed increases abruptly during driving in “D” or “R” range.	• Control valve • Secondary pressure sensor • F&R clutch pack • Output clutch pack • ATF deterioration or lack
Vehicle can not start when depressing the accelerator pedal in “D” or “R” range, or acceleration is very poor. (without abrupt engine increase)	• Control valve • F&R clutch pack • Output clutch pack • Shift mechanism • Parking mechanism • Engine control system • Power supply system • HPCM
Shift indicator in combination meter displays the position which differs from select lever position.	• Inhibitor switch • Select cable related • Combination meter
Manual mode enters even though the select lever and paddle shift switch is not operated.	• Manual mode switch • Paddle shift switch • Select lever • TCM • HPCM
Engine speed increases abruptly in “D” or “R” range, vehicle can not start.	• F&R clutch pack • Output clutch pack • Select cable related
Manual mode can not be set	• Select lever • TCM • HPCM

MANUAL TRANSMISSION AND DIFFERENTIAL

5MT

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1. General Description

A: SPECIFICATION

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Model			Except for Crosstrek model	Crosstrek model
Type			5-forward speeds and 1-reverse (all stage with synchromesh)	
Transmission gear ratio		1st	3.454	3.545
		2nd	1.888	
		3rd	1.296	
		4th	0.972	
		5th	0.738	0.780
		Rev.	3.333	
Front reduction gear	Final	Type of gear	Hypoid	
		Gear ratio	4.111	4.444
Rear reduction gear	Transfer	Type of gear	Helical	
		Gear ratio	1.000	
Front differential	Type and number of gear		Straight bevel gear (bevel pinion: 2, bevel gear: 2)	
Center differential	Type and number of gear		Straight bevel gear (bevel pinion: 2, bevel gear: 2 and viscous coupling)	
Transmission gear oil			SUBARU GEAR OIL EXTRA MT or equivalent	
Transmission gear oil capacity			3.5 L (3.7 US qt, 3.1 Imp qt)	

2. TRANSMISSION GEAR OIL

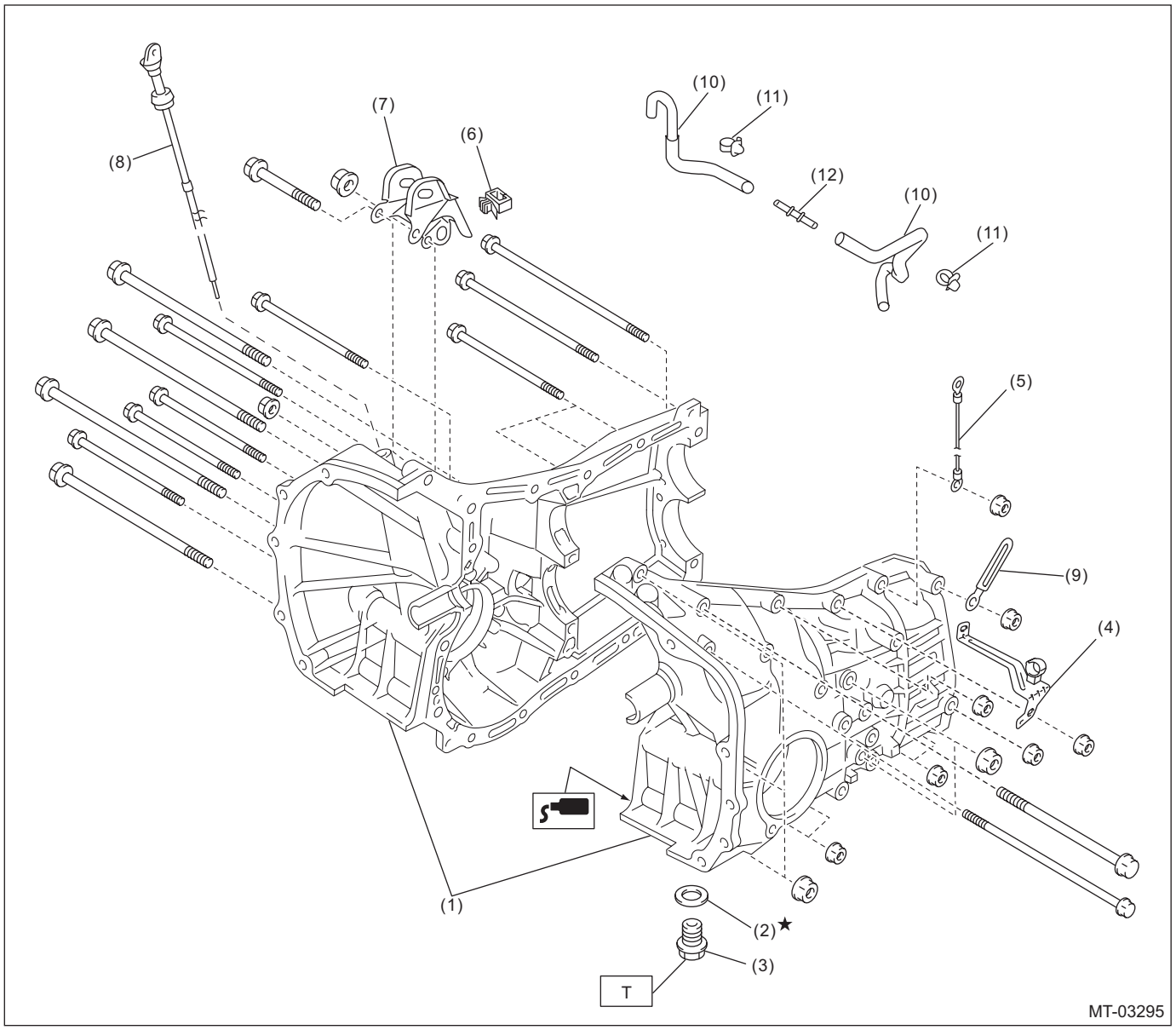
CAUTION:
If an alternative gear oil is used, you may not have expected functionality and performance.

Recommended oil:
SUBARU GEAR OIL EXTRA MT

Alternative:
GL-5 (75W-90)

B: COMPONENT

1. TRANSMISSION CASE

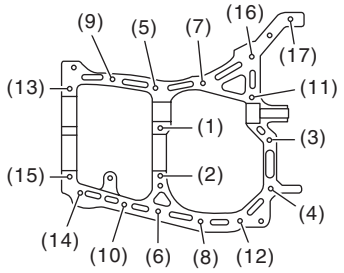


(1)	Transmission case ASSY	(7)	Pitching stopper bracket
(2)	Gasket	(8)	Oil level gauge
(3)	Drain plug	(9)	Harness clip
(4)	Harness bracket	(10)	Air breather hose
(5)	Transmission radio ground cord	(11)	Clip
(6)	Clamp	(12)	Hose connector

Tightening torque: N·m (kgf-m, ft-lb)

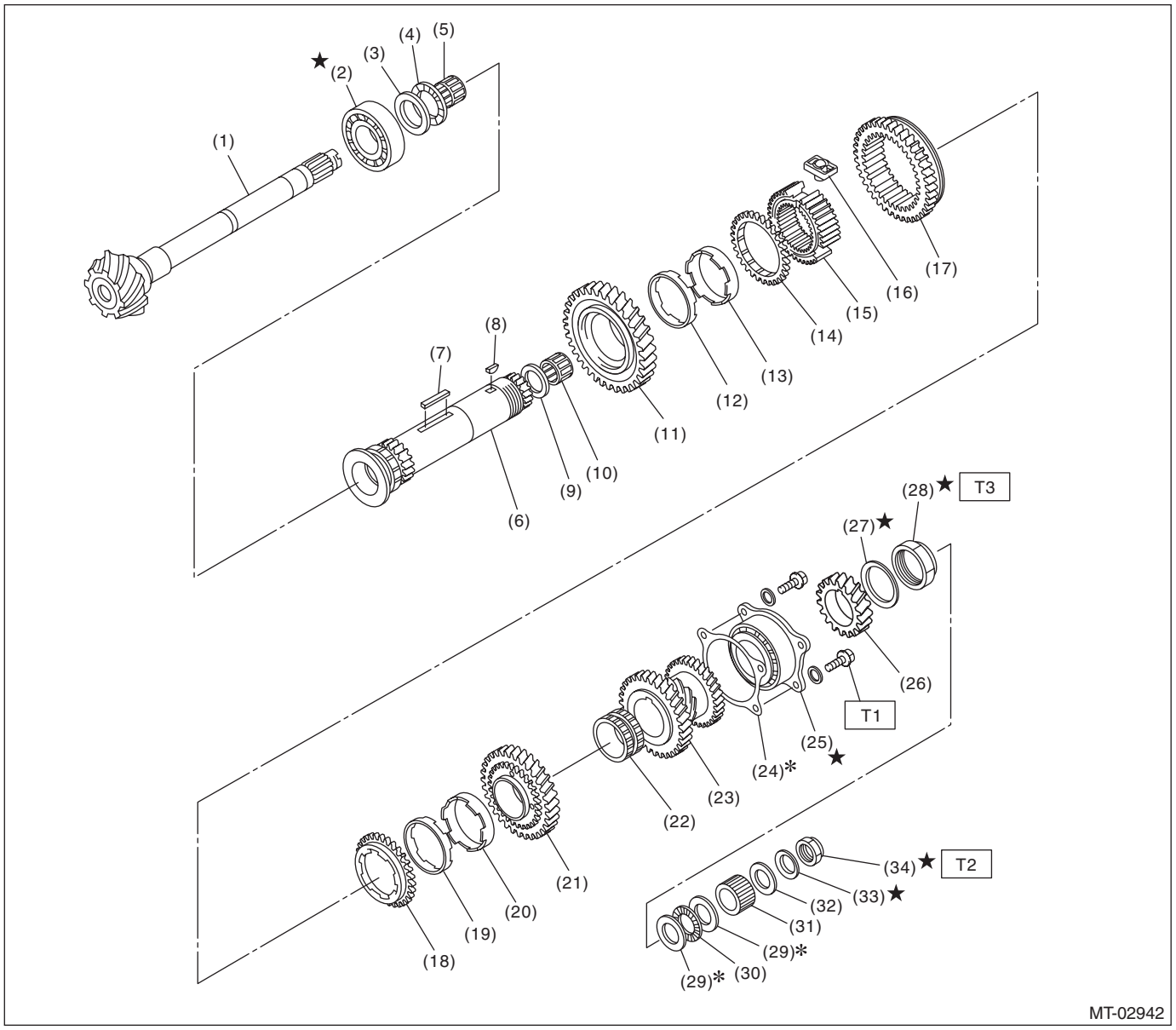
T: 44 (4.5, 32.5) (aluminum gasket, silver)
70 (7.1, 51.6) (copper gasket, brown)
70 (7.1, 51.6) (metal gasket, black)

Transmission case tightening torque



Bolt No.	Bolt size mm	Tightening torque: N·m (kgf-m, ft-lb)
(5) — (15)	8	25 (2.5, 18.4)
(1) — (4) (16), (17)	10	39 (4.0, 28.8)

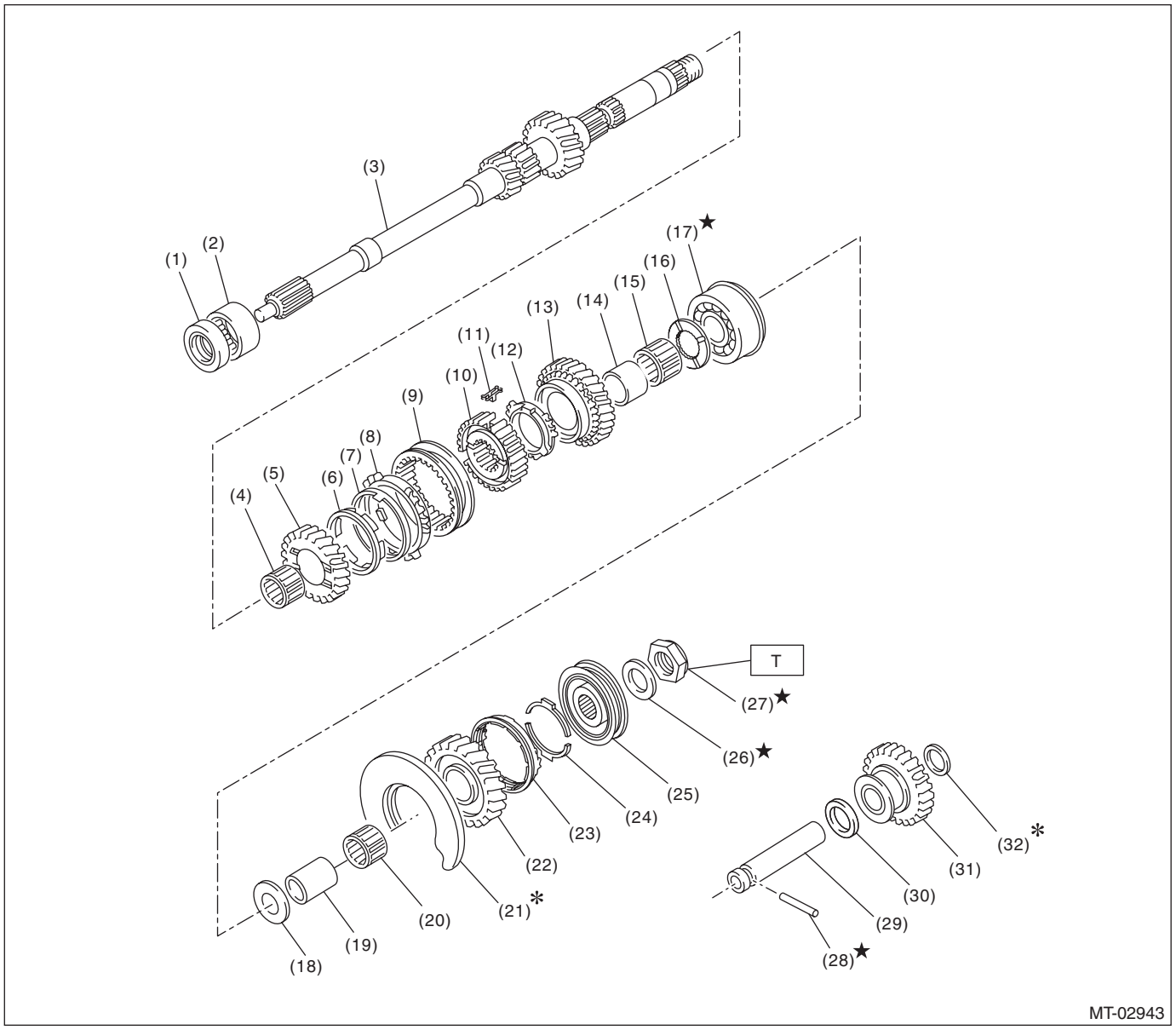
2. DRIVE PINION SHAFT ASSEMBLY



(1) Drive pinion shaft
(2) Roller bearing
(3) Washer
(4) Thrust bearing
(5) Needle bearing
(6) Driven shaft
(7) Key
(8) Woodruff key
(9) Drive pinion collar
(10) Needle bearing
(11) 1st driven gear
(12) Inner baulk ring
(13) Synchro cone
(14) Outer baulk ring
(15) 1st-2nd synchronizer hub
(16) 1st-2nd shifting insert
(17) Reverse driven gear
(18) Outer baulk ring
(19) Synchro cone
(20) Inner baulk ring
(21) 2nd driven gear
(22) 2nd driven gear bushing
(23) 3rd-4th driven gear
(24) Drive pinion shim
(25) Double taper roller bearing
(26) 5th driven gear
(27) Lock washer
(28) Lock nut
(29) Adjusting washer
(30) Thrust bearing
(31) Differential bevel gear sleeve
(32) Washer
(33) Lock washer
(34) Lock nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 30 (3.1, 22.1)
T2: 120 (12.2, 88.5)
T3: 260 (26.5, 191.8)

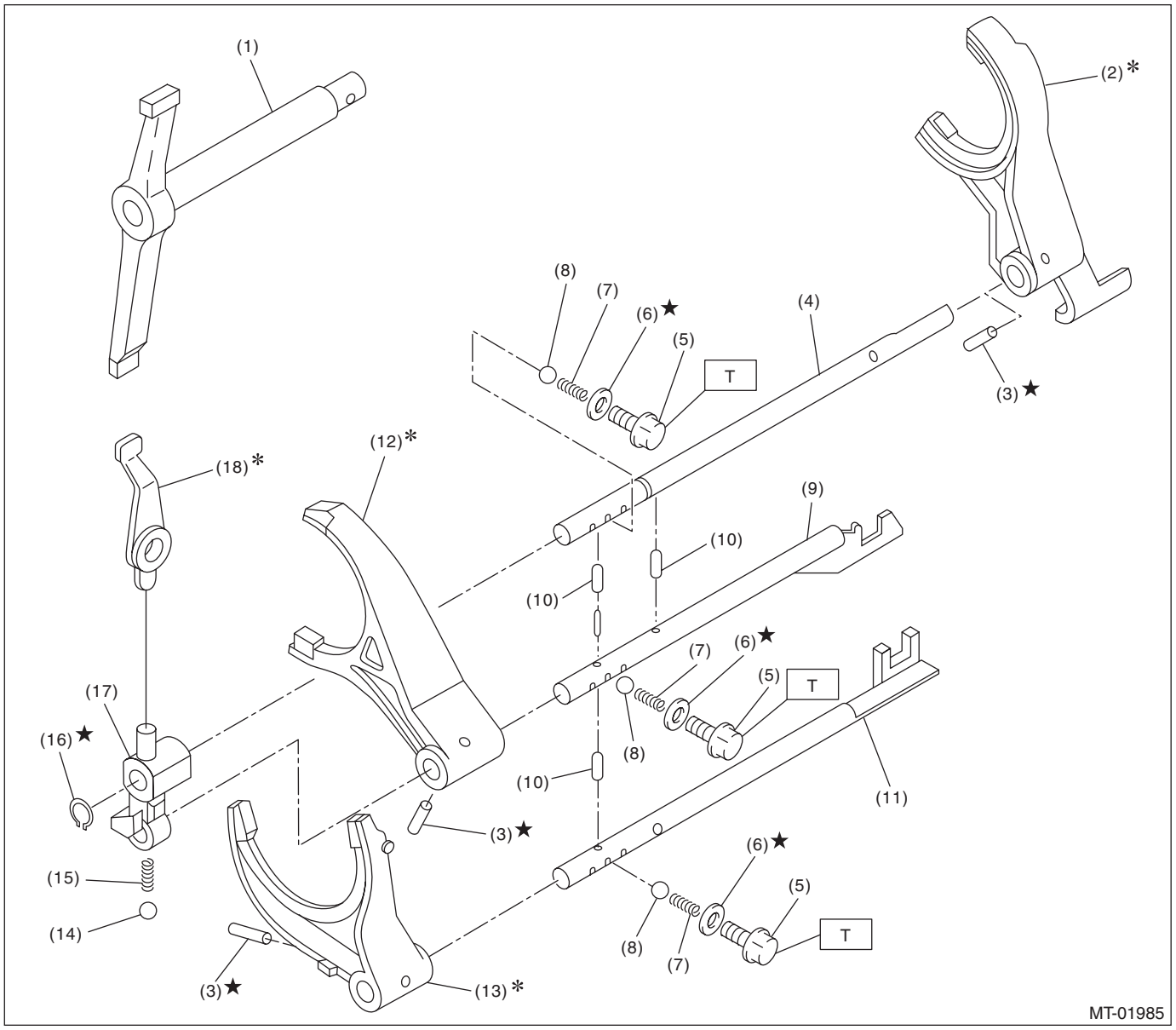
3. MAIN SHAFT ASSY



(1) Oil seal
(2) Needle bearing
(3) Main shaft
(4) 3rd needle bearing
(5) 3rd drive gear
(6) Inner baulk ring
(7) 3rd synchro cone
(8) Outer baulk ring
(9) 3rd-4th coupling sleeve
(10) 3rd-4th synchronizer hub
(11) 3rd-4th shifting insert
(12) 4th baulk ring
(13) 4th drive gear
(14) 4th needle bearing race
(15) 4th needle bearing
(16) 4th gear thrust washer
(17) Double ball bearing
(18) 5th gear thrust washer
(19) 5th needle bearing race
(20) 5th needle bearing
(21) Main shaft rear plate
(22) 5th drive gear
(23) 5th baulk ring
(24) Baulk lever
(25) 5th hub & sleeve No. 2
(26) Lock washer
(27) Lock nut
(28) Straight pin
(29) Reverse idler gear shaft
(30) Reverse idler gear washer
(31) Reverse idler gear
(32) Adjusting washer

Tightening torque: N·m (kgf-m, ft-lb)
T: 120 (12.2, 88.5)

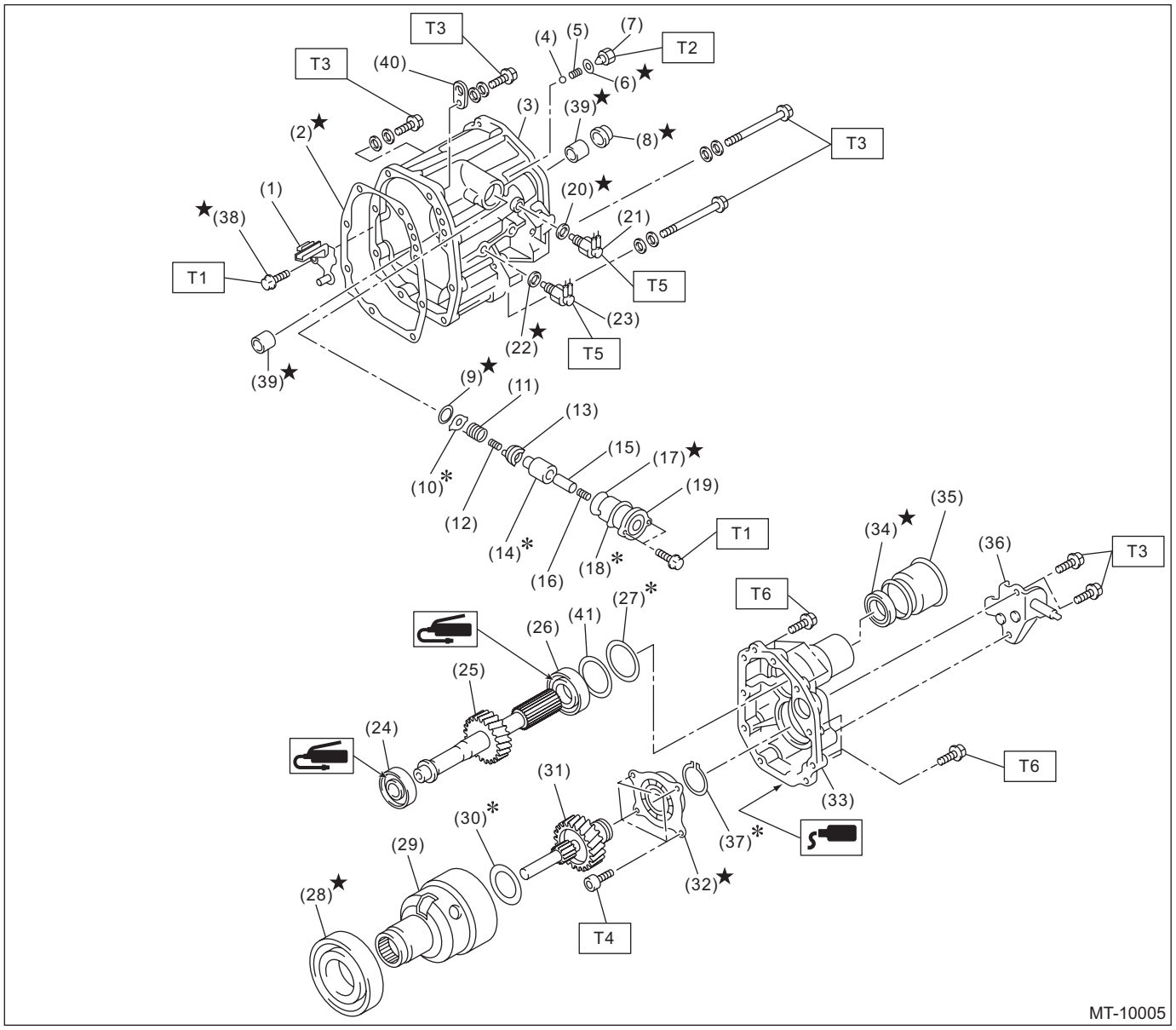
4. SHIFTER FORK AND SHIFTER ROD



(1) Shifter arm
(2) 5th shifter fork
(3) Straight pin
(4) Reverse fork rod
(5) Checking ball plug
(6) Gasket
(7) Checking ball spring
(8) Check ball
(9) 3rd-4th fork rod
(10) Interlock plunger
(11) 1st-2nd fork rod
(12) 3rd-4th shifter fork
(13) 1st-2nd shifter fork
(14) Check ball
(15) Checking ball spring
(16) Snap ring (outer)
(17) Reverse fork rod arm
(18) Reverse shifter lever

Tightening torque: N·m (kgf-m, ft-lb)
T: 20 (2.0, 14.8)

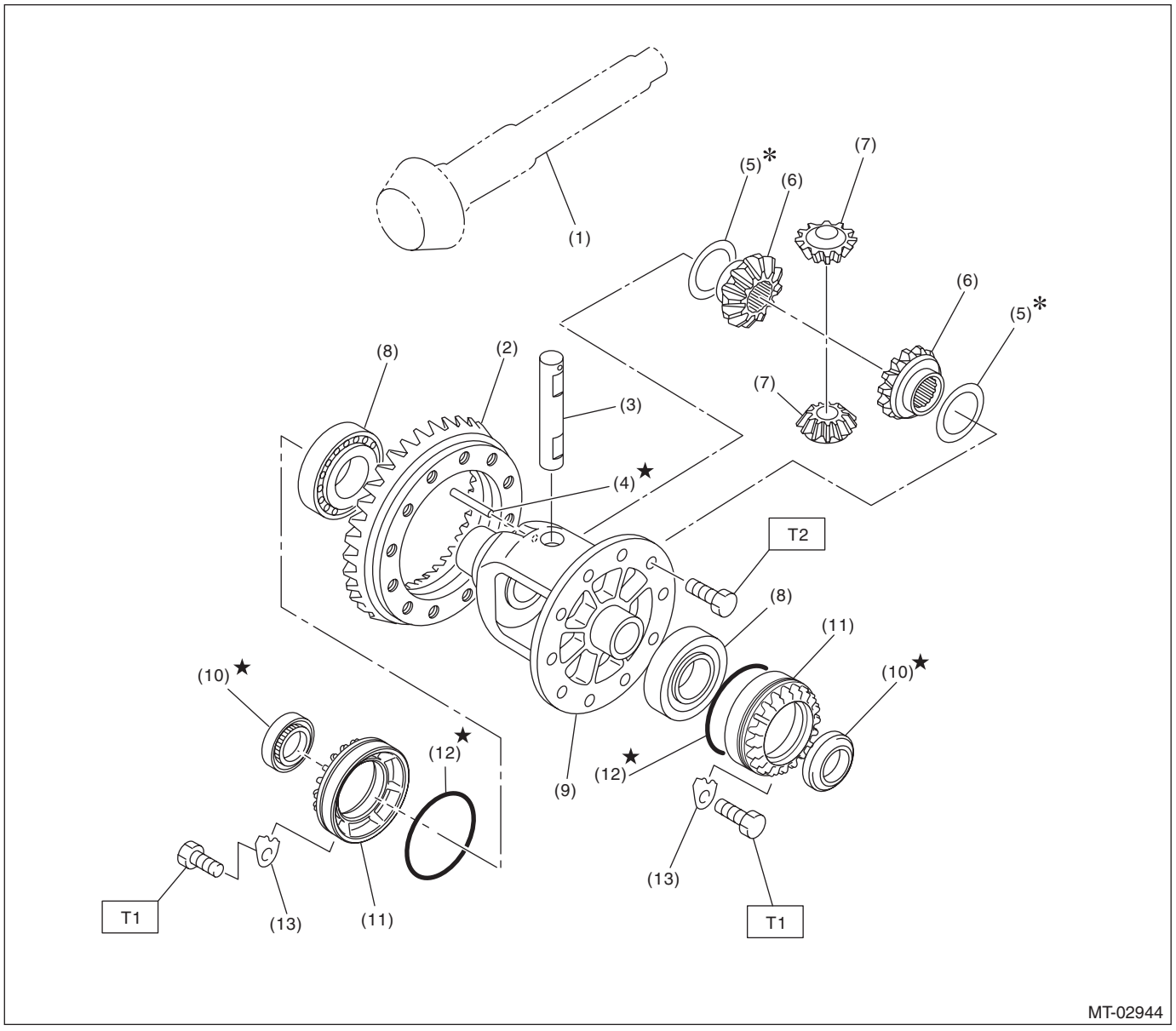
5. TRANSFER CASE AND EXTENSION



(1) Oil guide
(2) Gasket
(3) Transfer case
(4) Ball
(5) Reverse accent spring
(6) Gasket
(7) Plug
(8) Oil seal
(9) Snap ring (inner)
(10) Reverse check plate
(11) Reverse check spring
(12) Reverse return spring
(13) Reverse check cam
(14) Reverse accent shaft
(15) Return spring cap
(16) Return spring
(17) O-ring
(18) Adjusting select shim
(19) Reverse check sleeve
(20) Gasket
(21) Neutral position switch
(22) Gasket
(23) Back-up light switch
(24) Taper roller bearing (transfer case side)
(25) Transfer driven gear
(26) Taper roller bearing (extension case side)
(27) Adjusting washer
(28) Ball bearing
(29) Center differential
(30) Adjusting washer
(31) Transfer drive gear
(32) Ball bearing
(33) Extension case
(34) Oil seal
(35) Dust cover
(36) Shift bracket
(37) Snap ring
(38) Precoat bolt
(39) Roller bearing
(40) Transmission hanger
(41) Dish plate

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.7, 4.7)
T2: 9.75 (1.0, 7.2)
T3: 24.5 (2.5, 18.1)
T4: 26 (2.7, 19.2)
T5: 32.3 (3.3, 23.8)
T6: 40 (4.1, 29.5)

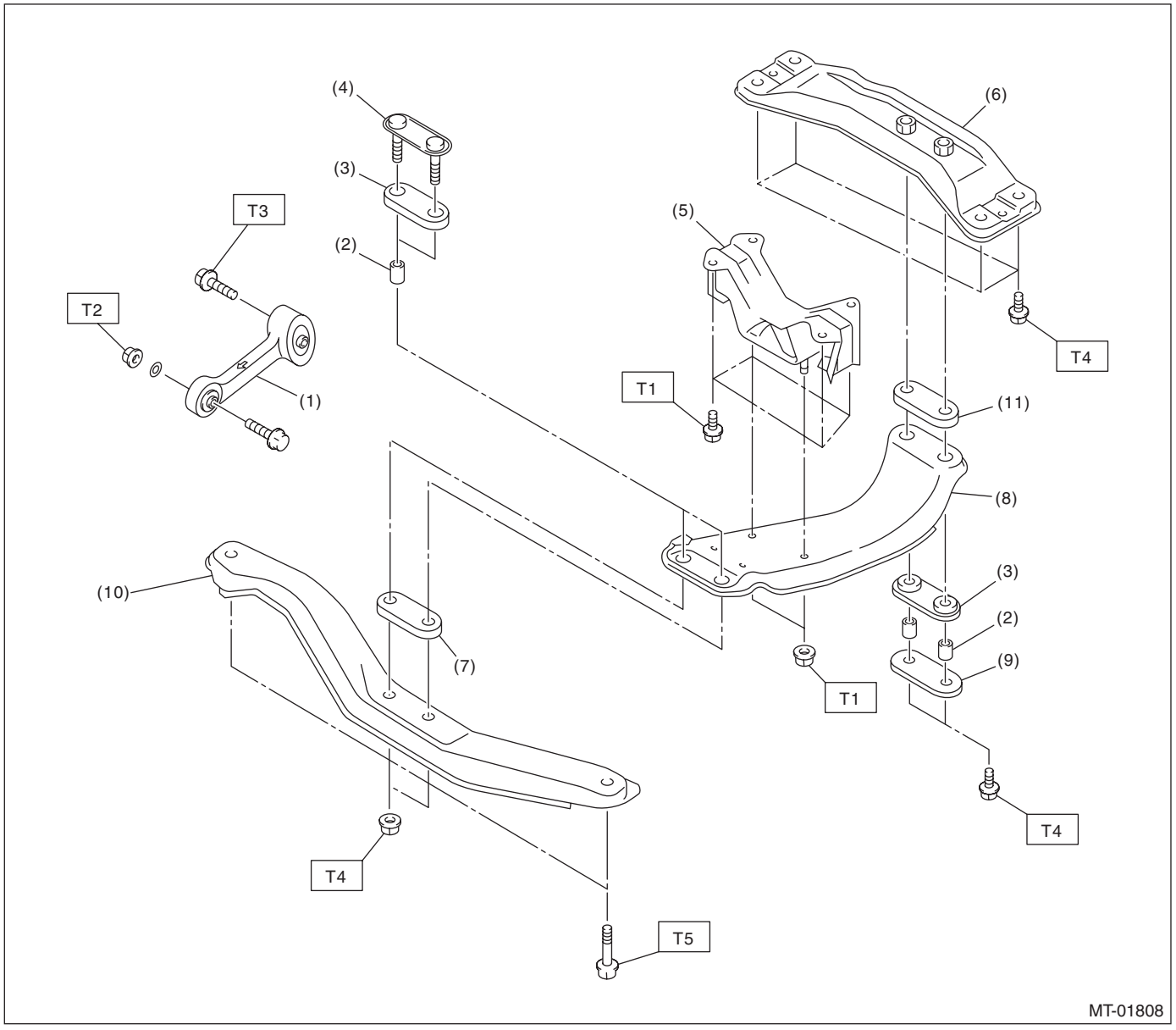
6. FRONT DIFFERENTIAL



(1) Drive pinion shaft
(2) Hypoid driven gear
(3) Pinion shaft
(4) Straight pin
(5) Adjusting washer
(6) Differential bevel gear
(7) Differential bevel pinion
(8) Taper roller bearing
(9) Differential case
(10) Oil seal
(11) Differential side retainer
(12) O-ring
(13) Retainer lock plate

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.4)
T2: 62 (6.3, 45.7)

7. TRANSMISSION MOUNTING



(1)	Pitching stopper	(7)	Upper cushion rubber
(2)	Spacer	(8)	Center crossmember
(3)	Lower cushion rubber	(9)	Rear plate
(4)	Front plate	(10)	Front crossmember
(5)	Transmission cushion rubber	(11)	Rear cushion rubber
(6)	Rear crossmember		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 50 (5.1, 36.9)
T3: 58 (5.9, 42.8)
T4: 70 (7.1, 51.6)
T5: 140 (14.3, 103.3)

C: CAUTION

- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, disassemble by using a plastic hammer. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease or equivalent. Do not mix gear oil, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolving surfaces before installation.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of gear oil to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove and clean the old liquid gasket.
- Be careful of handling the oil seal, O-ring and gasket. If the contact surface of them is damaged, oil leakage may occur.
- When pressing-in the oil seal, make sure that the oil seal lip portion and outer surface are not damaged or tilted.
- When replacing the taper roller bearing, replace the outer race and inner race as a set.
- When replacing the hypoid gear, replace the hypoid driven gear and drive pinion shaft as a set.
- Replace the bolts if the seating surface or the thread surface is excessively rusted.

D: PREPARATION TOOL

1. SPECIAL TOOL

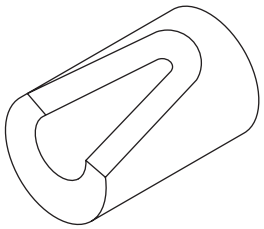
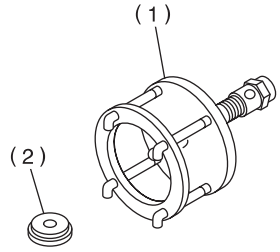
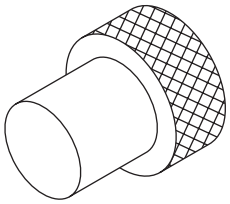
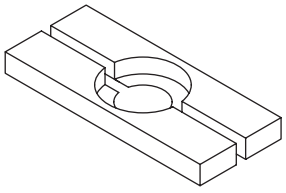
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399411700	399411700	ACCENT BALL INSTALLER	Used for installing reverse fork rod arm.
 ST-899524100	899524100	PULLER SET	Used for removing the front differential taper roller bearing. (1) Puller (2) Cap
 ST-399780104	399780104	WEIGHT	Used for adjusting preload on the front differential taper roller bearing.
 ST-498077000	498077000	REMOVER	• Used for removing the roller bearing of the drive pinion shaft assembly. • Used for removing the taper roller bearing of transfer driven gear.

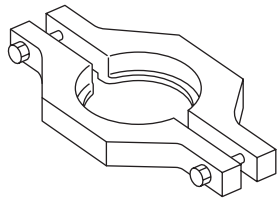
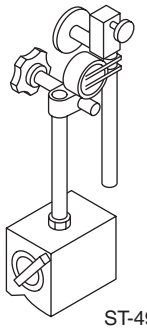
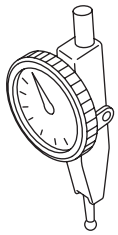
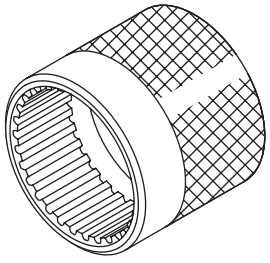
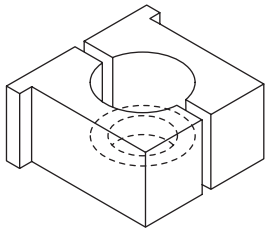
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077300	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential ball bearing.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring the backlash of differential bevel pinion gear and hypoid driven gear. • Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring the backlash of differential bevel pinion gear and hypoid driven gear. • Used together with MAGNET BASE (498247001).
 ST-498427100	498427100	STOPPER	• Used for removing and installing the drive pinion shaft assembly lock nut. • Used for measuring the backlash of hypoid driven gear. • Used for adjusting preload on the front differential taper roller bearing.
 ST-498937000	498937000	TRANSMISSION HOLDER	Used for removing and installing the main shaft assembly lock nut.

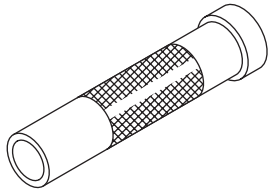
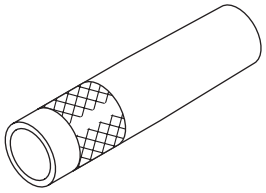
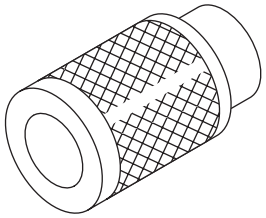
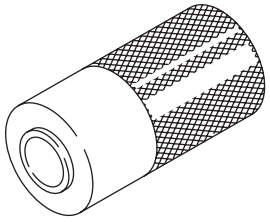
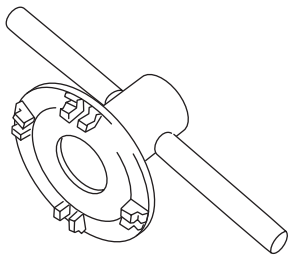
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	• Used for installing the drive pinion shaft assembly washer. • Used for installing the front differential taper roller bearing inner race.
 ST-499277200	499277200	INSTALLER	• Used for installing the drive pinion shaft assembly washer. • Used for installing the 2nd driven gear bushing, 3rd-4th driven gear, double taper roller bearing and 5th driven gear.
 ST-499757002	499757002	INSTALLER	Used for removing the double taper roller bearing and driven gear of the drive pinion shaft assembly.
 ST-927640000	927640000	INSTALLER	Used for installing the taper roller bearing (transfer case side) of transfer driven gear.
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	• Used for removing and installing the differential side retainer. • Used for adjusting preload on the front differential taper roller bearing. • Used for adjusting the backlash of hypoid driven gear. • WRENCH ASSY (499787000) can also be used.

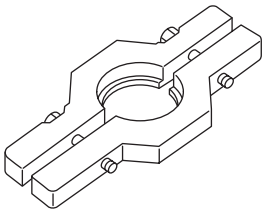
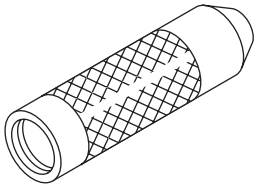
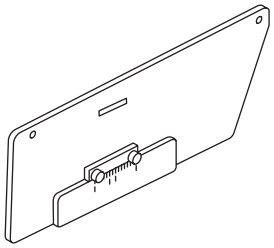
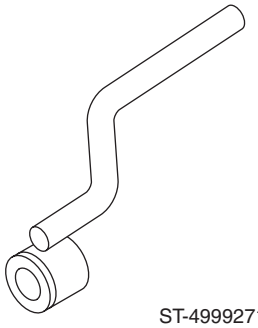
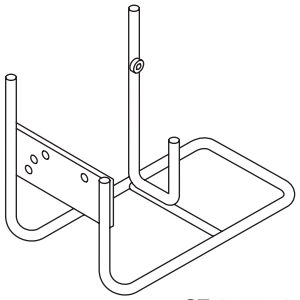
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499857000	499857000	5TH DRIVEN GEAR REMOVER	Used for removing the 5th driven gear.
 ST-499877000	499877000	RACE 4-5 INSTALLER	• Used for installing the 4th needle bearing race. • Used together with REMOVER (899714110). • Used for installing the double ball bearing of the main shaft assembly. • Used for installing the 5th gear thrust washer.
 ST-499917500	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting the drive pinion shaft assembly shim.
 ST-499927100	499927100	HANDLE	Used for backlash adjustment of the front differential hypoid driven gear and preload adjustment of the taper roller bearing.
 ST-499937100	499937100	TRANSMISSION STAND	Used for disassembling and assembling the transmission.

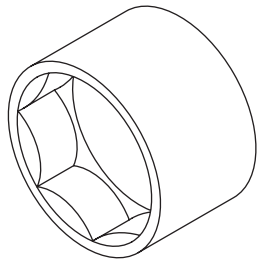
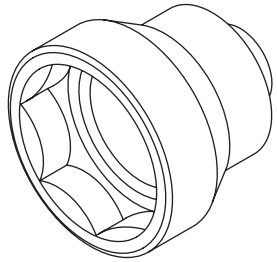
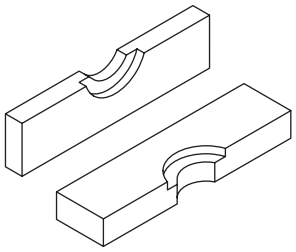
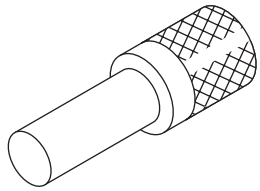
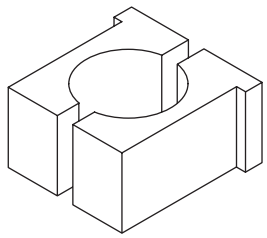
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing the main shaft assembly lock nut.
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing the driven shaft lock nut.
 ST-899714110	899714110	REMOVER	Used for removing and installing the parts of main shaft assembly and driven shaft.
 ST-899864100	899864100	REMOVER	• Used for removing the parts of the main shaft assembly. • Used for installing the transfer case roller bearing. • Used for removing the transfer driven gear taper roller bearing (transfer case side). • Used for installing the transfer driven gear taper roller bearing (extension case side).
 ST-899884100	899884100	HOLDER	• Used for removing and installing the drive pinion shaft assembly lock nut. • Used for removing and installing the driven shaft lock nut. • Used for measuring the starting torque of the drive pinion shaft assembly.

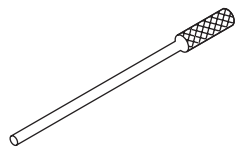
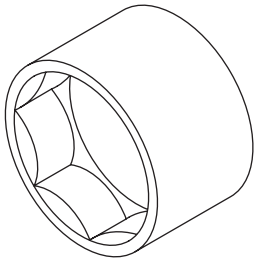
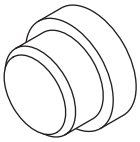
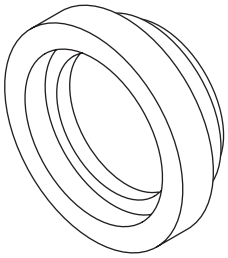
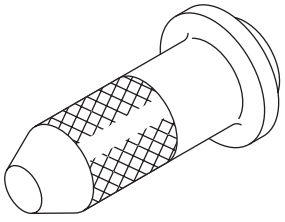
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899904100	899904100	STRAIGHT PIN REMOVER	Used for removing and installing the straight pin.
 ST-899988608	899988608	SOCKET WRENCH (27)	• Used for removing and installing the drive pinion shaft assembly lock nut. • Used for measuring the starting torque of the drive pinion shaft assembly.
 ST-398497701	398497701	SEAT	• Used for installing the front differential taper roller bearing. • Used together with BUSHING 1-2 INSTALLER (499277100).
 ST-499587000	499587000	INSTALLER	Used for installing the driven shaft parts.
 ST-498057300	498057300	INSTALLER	Used for installing the oil seal of extension case.

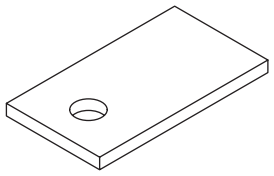
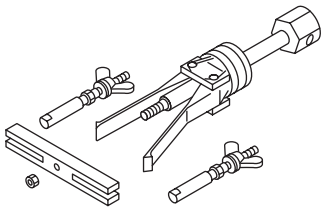
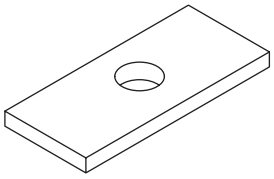
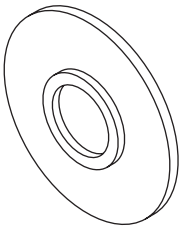
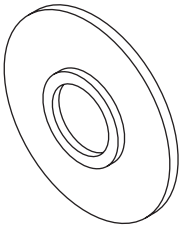
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498255400	498255400	PLATE	Used for measuring the hypoid driven gear backlash.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the oil seal of extension case. • Used for removing the taper roller bearing outer race of front differential. • Used for removing the oil seal of differential side retainer.
 ST-398643600	398643600	GAUGE	Used for adjusting the extension end play.
 ST-398177700	398177700	INSTALLER	Used for installing the ball bearing of the transfer drive gear.
 ST-498175500	498175500	INSTALLER	Used for installing the taper roller bearing of transfer driven gear (extension case side).

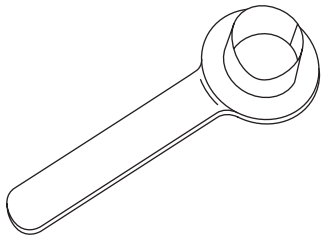
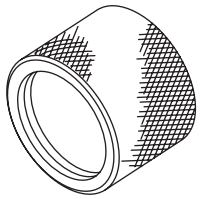
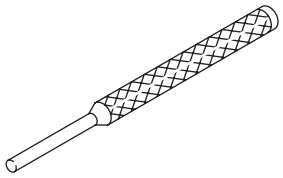
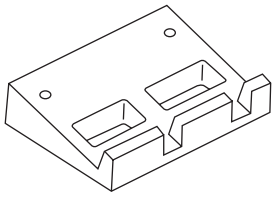
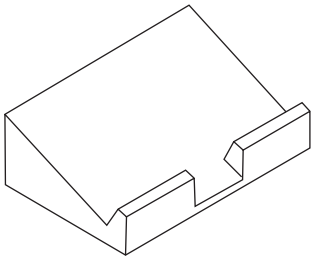
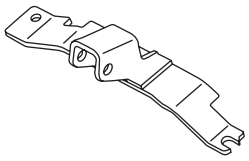
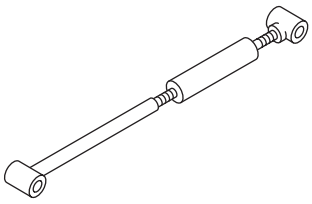
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting the oil seal from damage when inserting the front drive shaft.
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST-398791700	398791700	REMOVER	Used for removing and installing the straight pin.
 ST-498267200	498267200	CYLINDER HEAD TABLE	Used for removing and installing the roller bearing of the transfer case.
 ST-498267300	498267300	CYLINDER HEAD TABLE	Used for removing and installing the roller bearing of the transfer case.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41099AA012	41099AA012	ENGINE SUPPORT BRACKET	• Used for supporting engine. • Used together with ENGINE SUPPORT (41099AA020). • ENGINE SUPPORT BRACKET (41099AA010 or 41099AA011) can also be used.
 ST41099AA020	41099AA020	ENGINE SUPPORT	• Used for supporting engine. • Used together with ENGINE SUPPORT BRACKET (41099AA012).

2. GENERAL TOOL

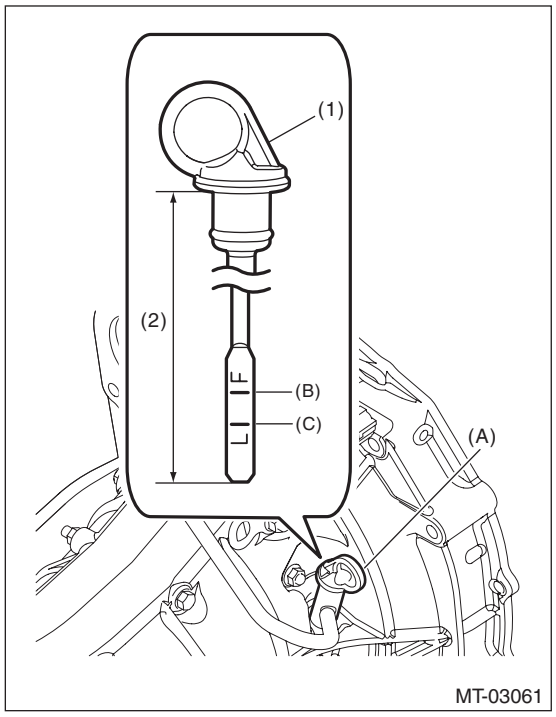
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
TORX® bit T70	Used for removing and installing the drain plug.

2. Transmission Gear Oil

A: INSPECTION

1) Park the vehicle on a level surface.
2) Turn the ignition switch to OFF, and wait until the engine cools.
3) Remove the oil level gauge and wipe it clean.
4) Reinsert the oil level gauge all the way. Be sure that the oil level gauge is correctly inserted in the proper direction.
5) Pull out the oil level gauge again, and check the oil level. If it is below the lower level, check for oil leakage and add oil through the oil level gauge hole to bring the level up to the upper level.

CAUTION:
The length of the oil level gauge varies depending on models and destinations. Make sure to use the appropriate oil level gauge.



(A) Oil level gauge
(B) Upper level
(C) Lower level

(1) Gray
(2) 195.9 mm (7.71 in)

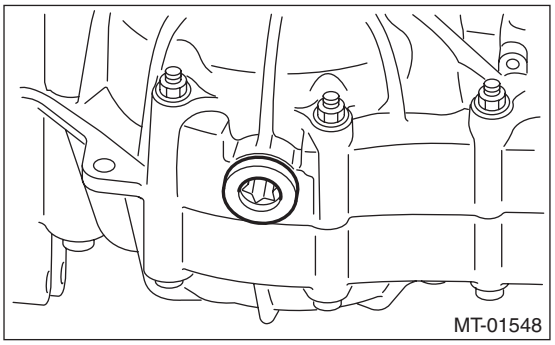
B: REPLACEMENT

1) Pull out the oil level gauge.
2) Lift up the vehicle.
3) Using the TORX® bit T70, remove the drain plug, and drain the gear oil completely.

CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the gear oil will be hot. Be careful not to receive burns.
• Be careful not to spill the gear oil on the exhaust pipe, to prevent emission of smoke or causing a fire. If gear oil is spilled, wipe it off completely.
4) Attach the drain plug using TORX® bit T70.

NOTE:
- Install the drain plug after draining gear oil.
- Use a new gasket.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (copper gasket, brown)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (metal gasket, black)



5) Lower the vehicle.
6) Pour gear oil through the oil level gauge hole.

CAUTION:
If an alternative gear oil is used, you may not have expected functionality and performance.

Recommended gear oil:
SUBARU GEAR OIL EXTRA MT

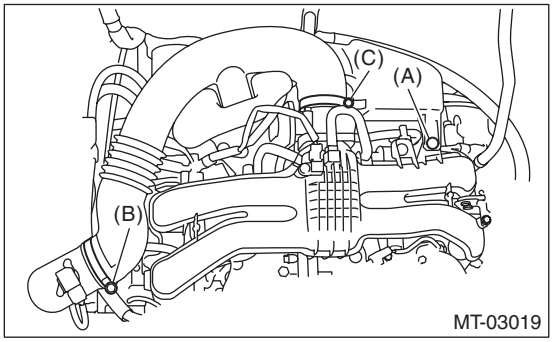
Alternative:
GL-5 (75W-90)

Gear oil capacity:
3.5 L (3.7 US qt, 3.1 Imp qt)
7) Check the gear oil amount, and confirm that it is within the specification.

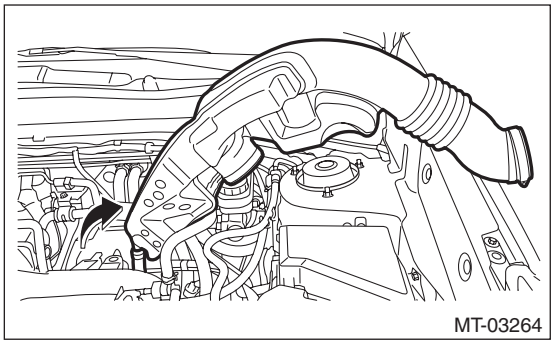
3. Manual Transmission Assembly

A: REMOVAL

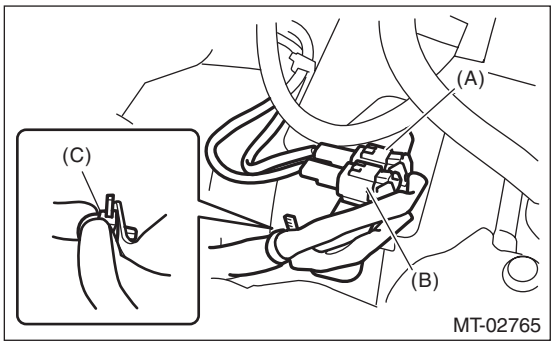
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

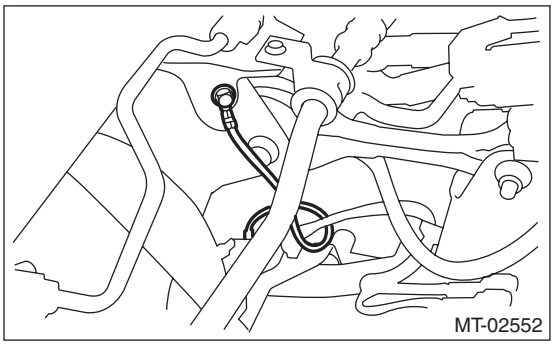


6) Disconnect the following connectors and remove the clip.

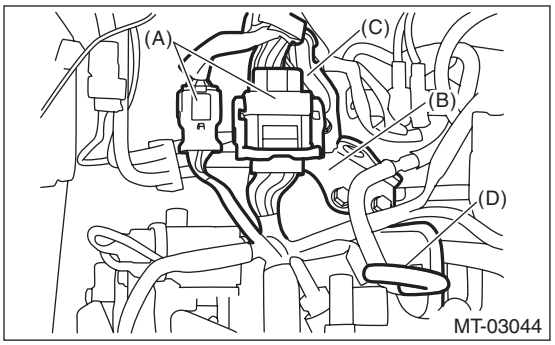


(A) Neutral position switch connector (brown)
(B) Back-up light switch connector (gray)
(C) Clip

7) Disconnect the transmission radio ground cord terminal.

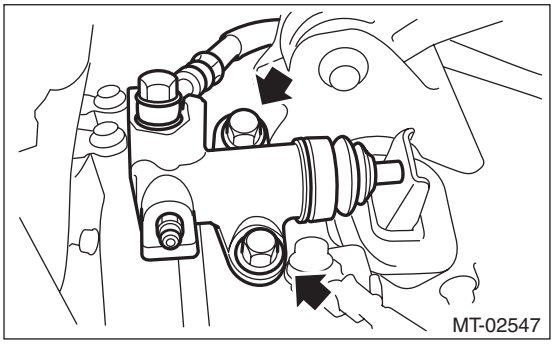


8) Remove the harness bracket, disconnect the engine harness connectors, remove the air breather hose, and then remove the engine hanger rear.

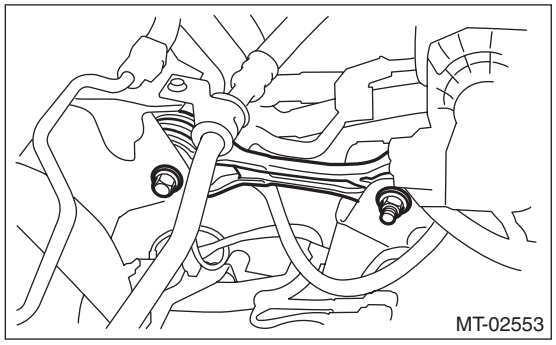


(A) Engine harness connectors
(B) Engine hanger rear
(C) Harness bracket
(D) Air breather hose

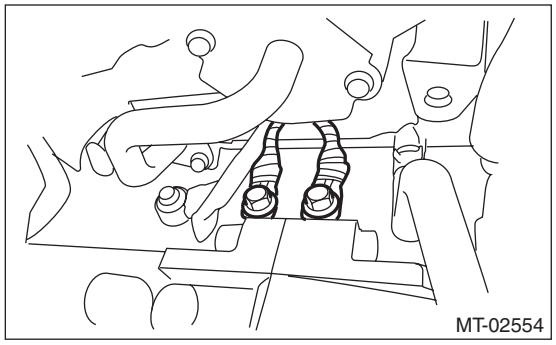
9) Remove the starter. <Ref. to SC(H4DO(w/o HEV))-8, REMOVAL, Starter.>
10) Remove the operating cylinder and suspend on a wire.



11) Remove the pitching stopper.

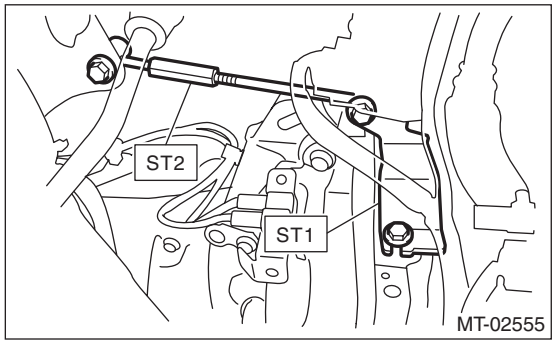


12) Disconnect two ground cables from rear end of the engine.

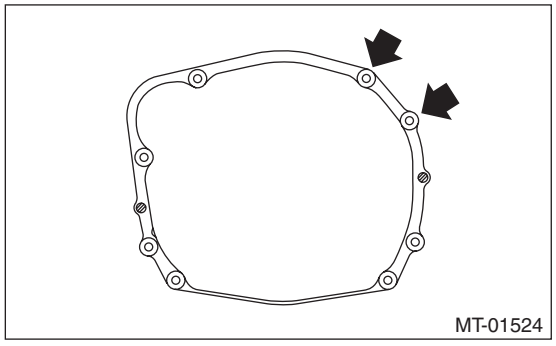


13) Set the ST.

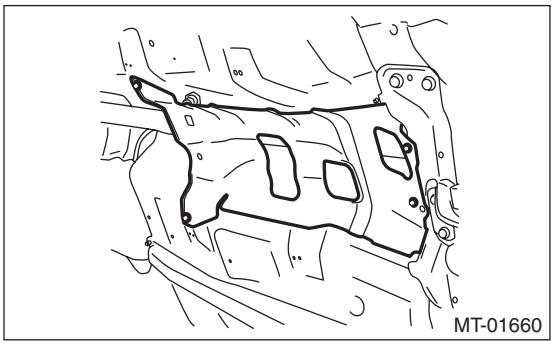
ST1	41099AA012	ENGINE SUPPORT BRACKET
ST2	41099AA020	ENGINE SUPPORT



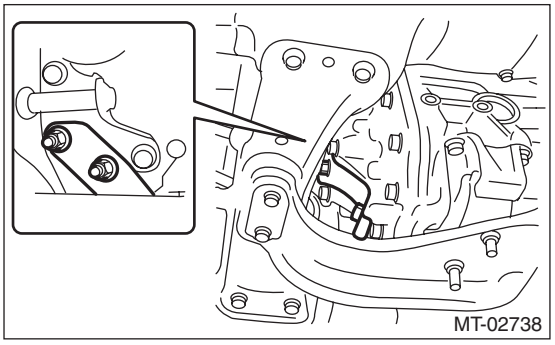
14) Remove the bolts which hold upper side of transmission to engine.



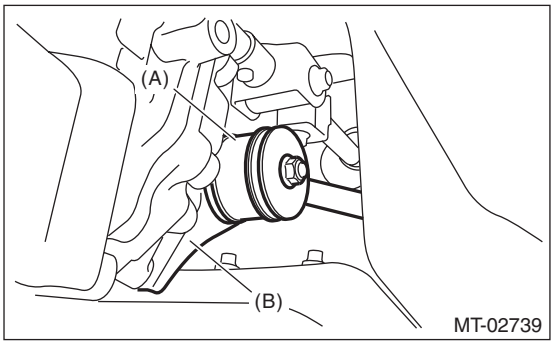
15) Remove the front tires.
16) Lift up the vehicle.
17) Remove the front under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
18) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
19) Drain transmission gear oil completely. <Ref. to 5MT-22, REPLACEMENT, Transmission Gear Oil.>
20) Remove the center exhaust cover.



21) Remove the hanger bracket.

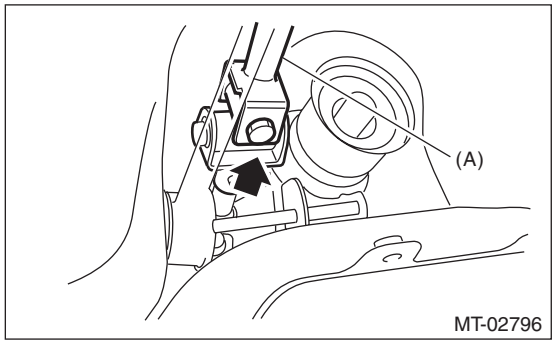


22) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
23) Remove the gear shift rod and stay.
(1) Remove the stay.



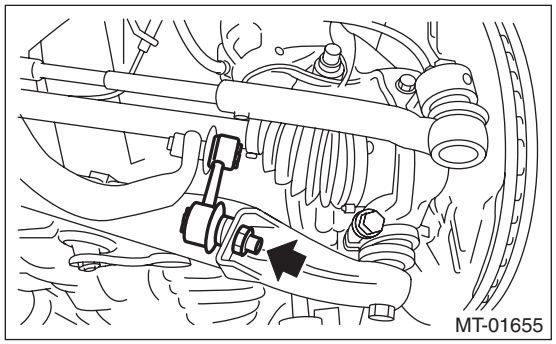
(A) Stay
(B) Shift bracket

(2) Remove the gear shift rod.

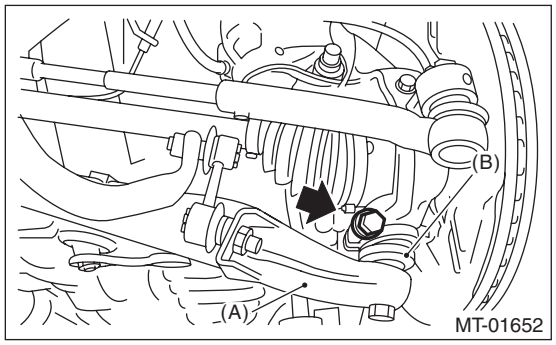


(A) Gear shift rod

24) Disconnect the stabilizer link.

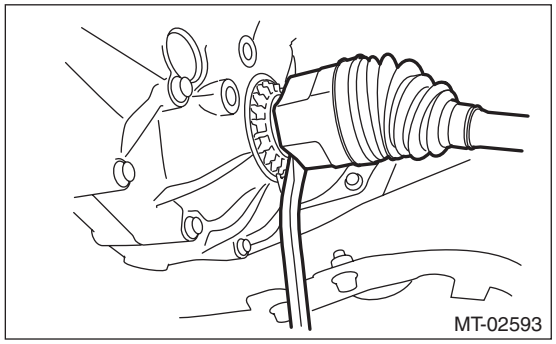


25) Remove the bolt securing the ball joint of the front arm to the housing, then separate the front arms and the housing.

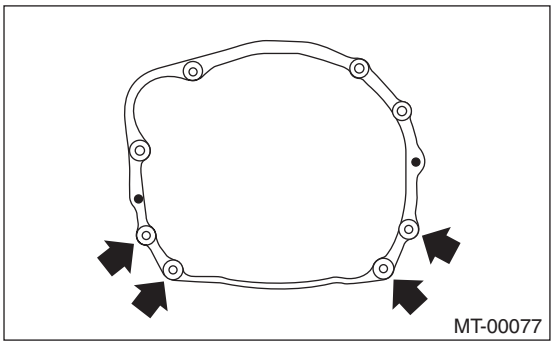


(A) Front arm
(B) Ball joint

26) Using a crowbar, separate the left and right front drive shafts.

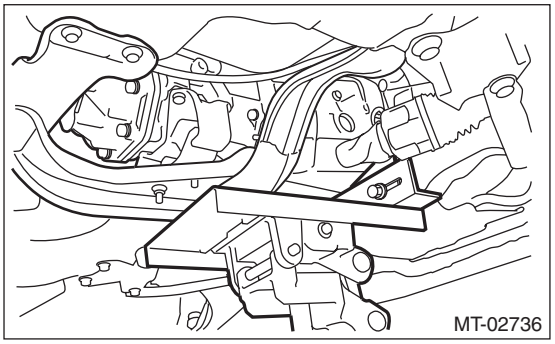


27) Remove the bolts and nuts which hold lower side of transmission to engine.

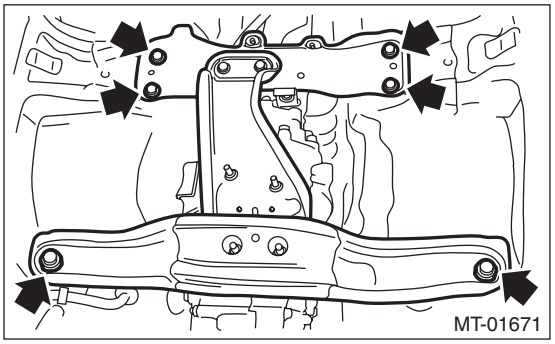


28) Place the transmission jack under the transmission.

CAUTION:
Always support the transmission case with a transmission jack.



29) Remove the front crossmember and the rear crossmember.



30) While lowering the transmission jack, tighten the turnbuckle of the ST, and incline the engine unit rearward.
31) Remove the transmission assembly.

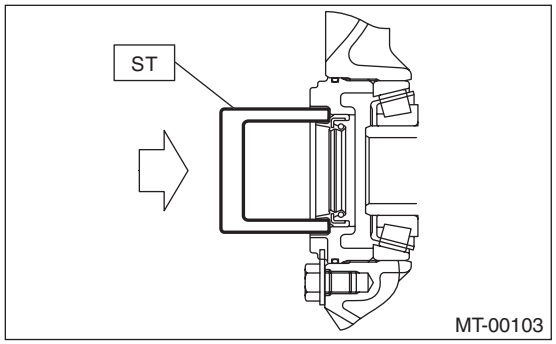
NOTE:
Move the transmission jack towards the rear until the main shaft is withdrawn from the clutch disc.
32) Remove the transmission cushion rubber.

B: INSTALLATION

1) Replace the differential side retainer oil seal. <Ref. to 5MT-34, REPLACEMENT, Differential Side Retainer Oil Seal.>

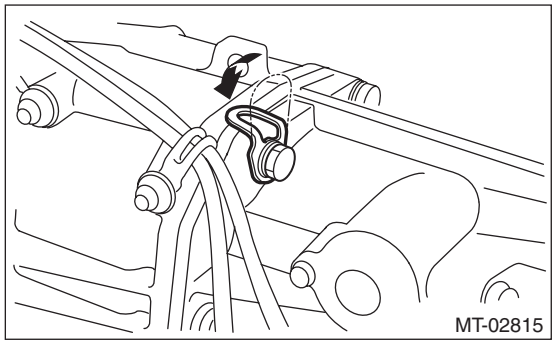
NOTE:
• Be sure to replace the oil seal after removing the front drive shaft.
• When a new oil seal has been installed, replacement is not required.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



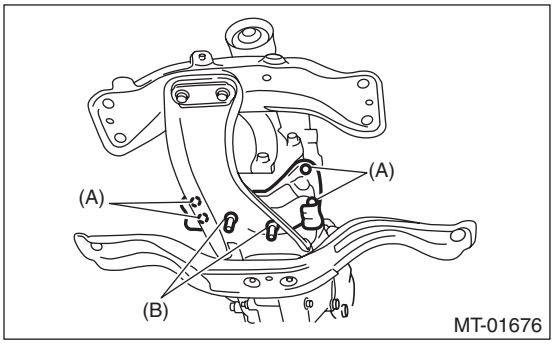
2) Strike and bend the transmission hanger of transmission rear with a rubber hammer etc. so that it gets in contact with the transmission case.

CAUTION:
Do not apply excessive load or impact to the transmission case.



3) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).
4) Install the transmission cushion rubber to the center crossmember, and temporarily tighten the nut (B).

Tightening torque:
Bolt (A)
35 N·m (3.6 kgf-m, 25.8 ft-lb)

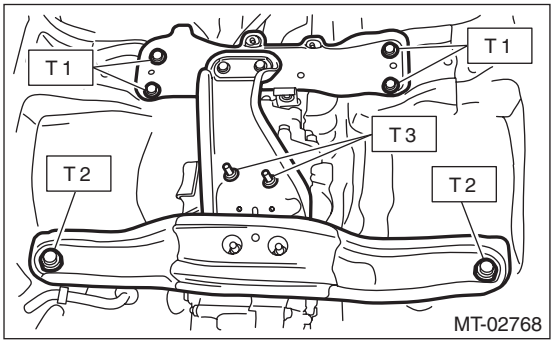


5) Install the transmission assembly onto the engine.
(1) Lift up the transmission gradually using a transmission jack.
(2) Engage at the spline section.

NOTE:
Be careful not to hit the main shaft against the clutch cover.

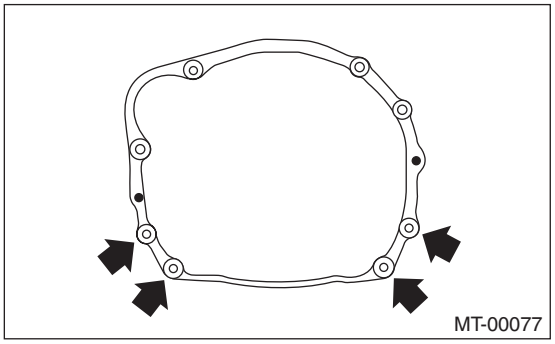
6) While raising the transmission jack, loosen the turnbuckle of the ST, and set the engine unit to the original position.
7) Install the front crossmember and rear crossmember.
8) Tighten the transmission cushion rubber mounting nut.

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103.3 ft-lb)
T3: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



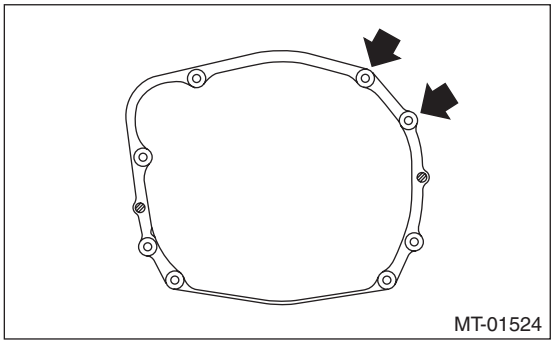
9) Take out the transmission jack.
10) Tighten the bolts and nuts which hold the lower side of transmission to the engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

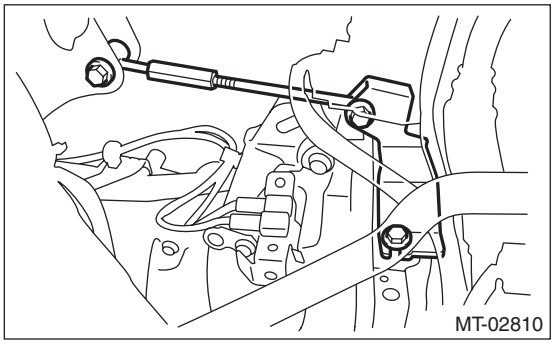


11) Lower the vehicle.
12) Install the starter. <Ref. to SC(H4DO(w/o HEV))-10, INSTALLATION, Starter.>
13) Tighten the bolts which hold the upper side of the transmission to the engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

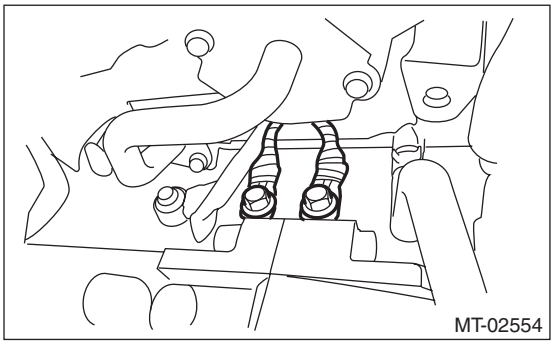


14) Remove the ST.



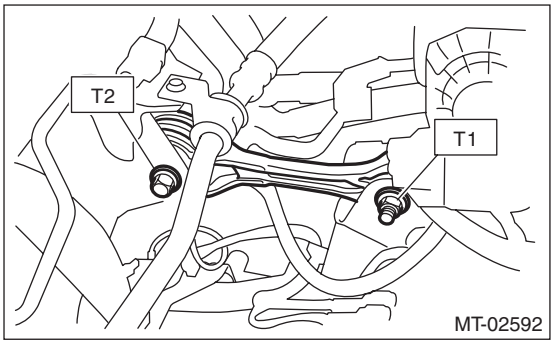
15) Install the ground cable.

Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)

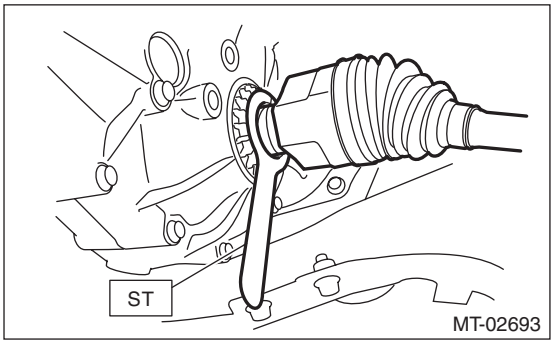


16) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)

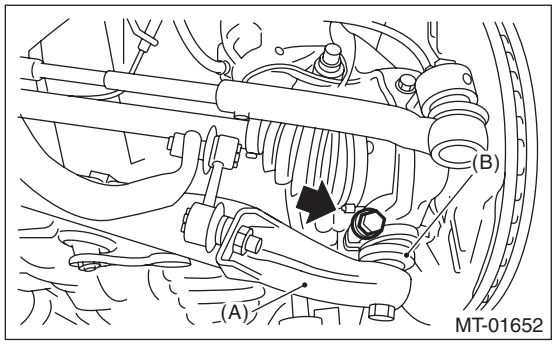


17) Lift up the vehicle.
18) Install the ST to the transmission, and then install the front drive shaft.
ST 28399SA010 OIL SEAL PROTECTOR



19) Insert the front arm ball joint and tighten the mounting bolt.

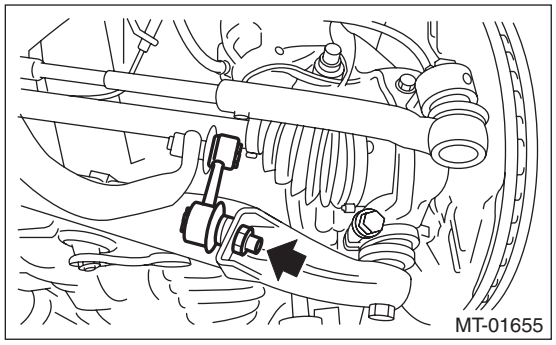
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



(A) Front arm
(B) Ball joint

20) Install the stabilizer link.

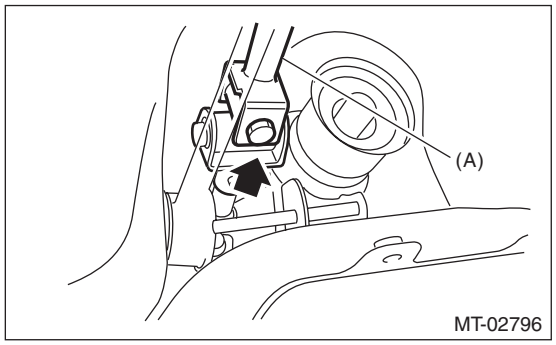
Tightening torque:
Except for Crosstrek model
38 N·m (3.9 kgf-m, 28.0 ft-lb)
Crosstrek model
60 N·m (6.1 kgf-m, 44.3 ft-lb)



21) Attach the gear shift rod and stay.
(1) Install the gear shift rod.

NOTE:
Use a new self-locking nut.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)

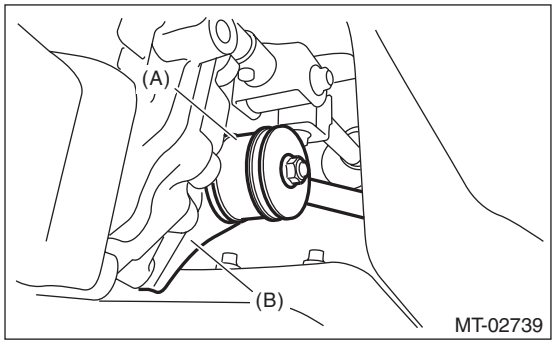


(A) Gear shift rod

(2) Install the stay.

NOTE:
Use a new self-locking nut.

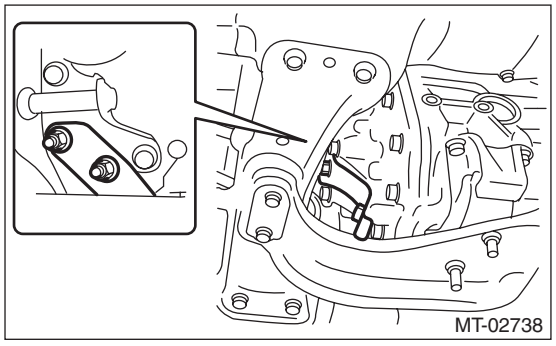
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



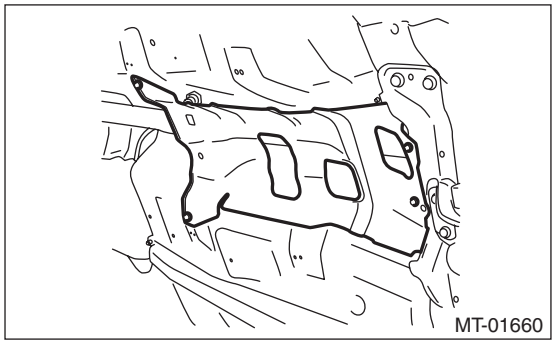
(A) Stay
(B) Shift bracket

22) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
23) Install the hanger bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



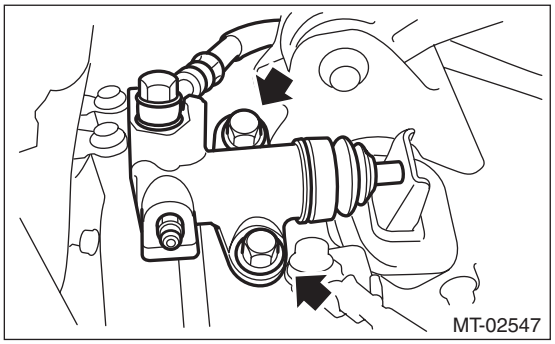
24) Install the center exhaust cover.
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



25) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
26) Install the front under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
27) Lower the vehicle.

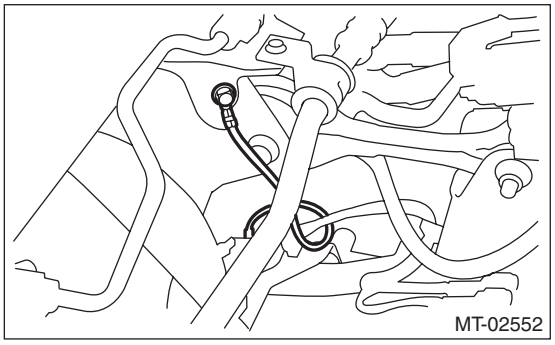
28) Install the operating cylinder.

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)



29) Install the transmission radio ground cord terminal.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)

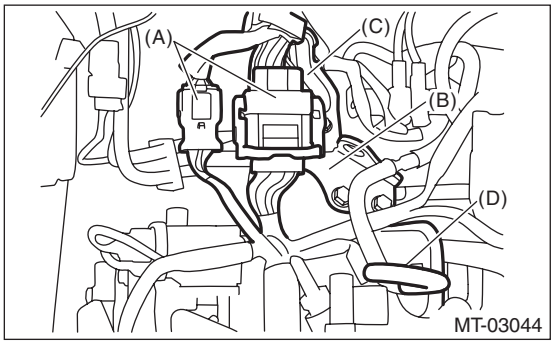


30) Install the engine hanger rear.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

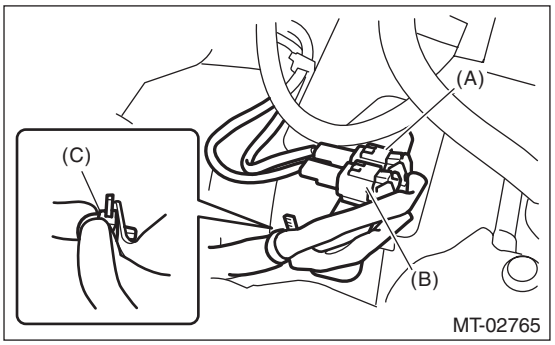
31) Install the air breather hose.
32) Connect the engine harness connector, then attach the harness bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



(A) Engine harness connectors
(B) Engine hanger rear
(C) Harness bracket
(D) Air breather hose

33) Connect the following connectors and secure the clip.



(A) Neutral position switch connector (brown)
(B) Back-up light switch connector (gray)
(C) Clip

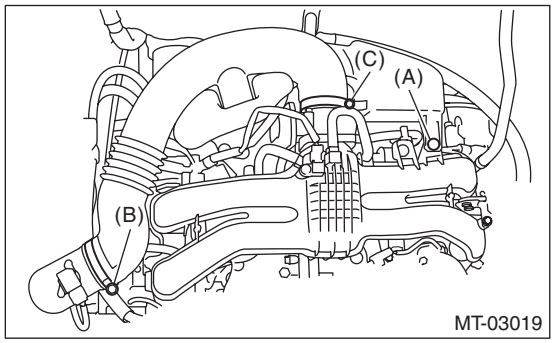
34) Pour in transmission gear oil and check the oil level. <Ref. to 5MT-22, Transmission Gear Oil.>
35) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
36) Install the front tires.
37) Connect the battery ground terminal.

4. Transmission Mounting System

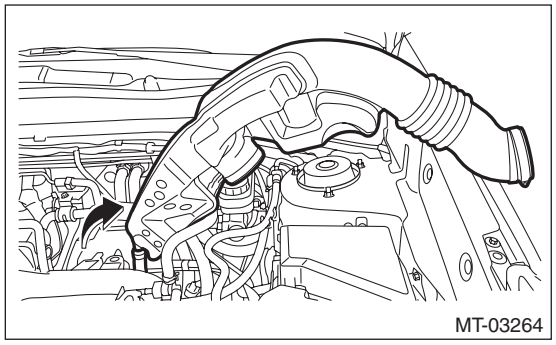
A: REMOVAL

1. PITCHING STOPPER

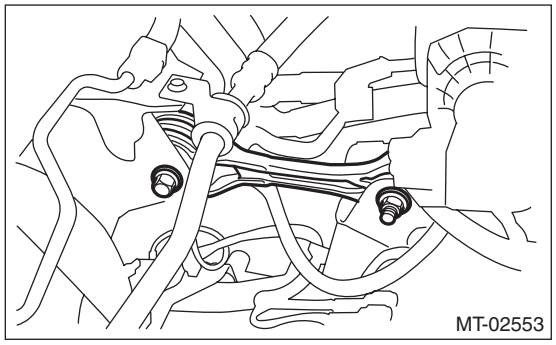
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

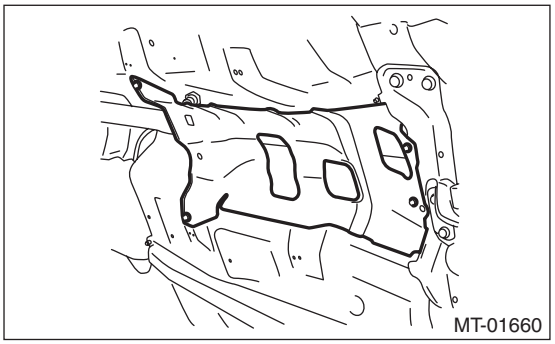


6) Remove the pitching stopper.



2. CROSSMEMBER AND CUSHION RUBBER

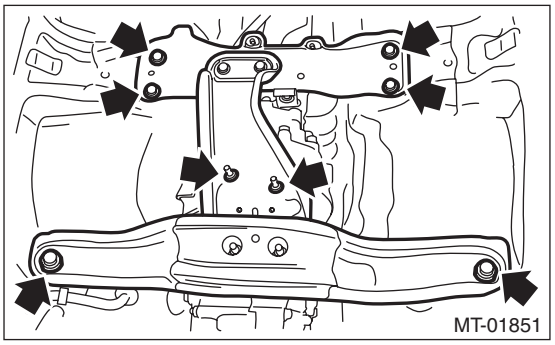
1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Remove the center exhaust cover.



5) Set the transmission jack.

CAUTION:
Always support the transmission case with a transmission jack.

6) Remove the front crossmember and the rear crossmember.



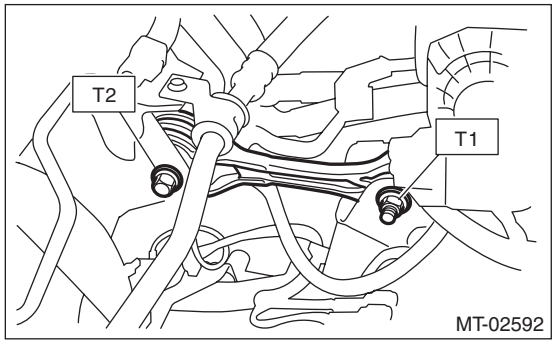
7) Remove the transmission cushion rubber.

B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)

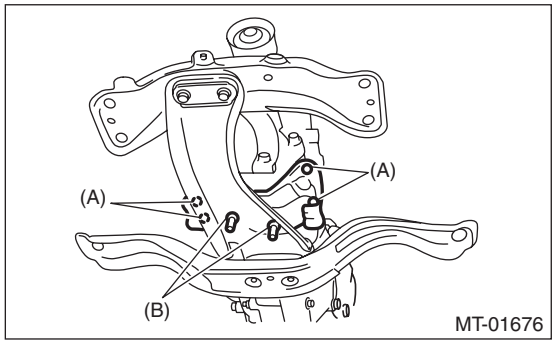


2) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
3) Connect the battery ground terminal.

2. CROSSMEMBER AND CUSHION RUBBER

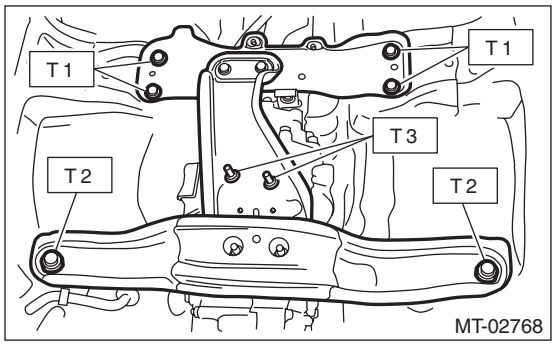
1) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).
2) Install the transmission cushion rubber to the center crossmember, and temporarily tighten the nut (B).

Tightening torque:
Bolt (A)
35 N·m (3.6 kgf-m, 25.8 ft-lb)



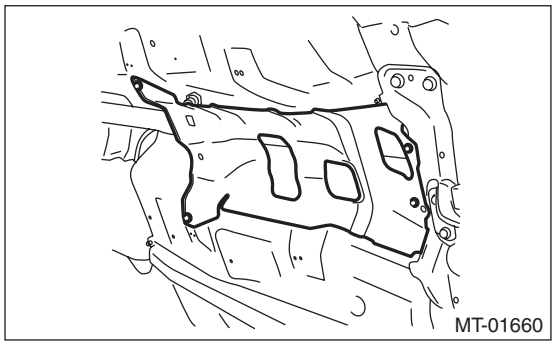
3) Install the front crossmember and rear crossmember.
4) Tighten the transmission cushion rubber mounting nut.

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103.3 ft-lb)
T3: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



5) Remove the transmission jack.
6) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



7) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
8) Lower the vehicle.
9) Connect the battery ground terminal.

C: INSPECTION

Check the following; repair or replace the faulty parts.

1. PITCHING STOPPER

Check the pitching stopper for bends or damage. Check that the rubber is not stiff, cracked or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER

Check the crossmember for bending or damage. Check that the cushion rubber does not have hardening, cracks or other damages.

5. Oil Seal

A: INSPECTION

Check for leakage of transmission gear oil from the oil seal. If there is oil leakage, replace the oil seal with the new part and check the propeller shaft.

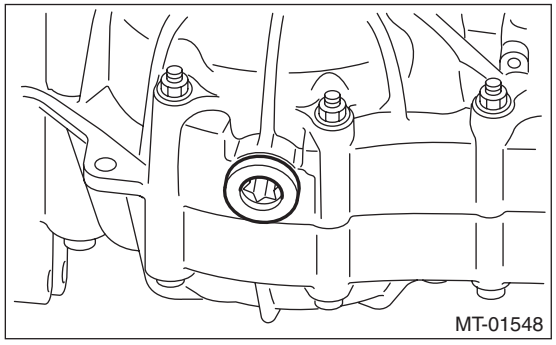
B: REPLACEMENT

1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Clean the transmission exterior.
4) Using the TORX® bit T70, remove the drain plug, and drain the transmission gear oil completely.

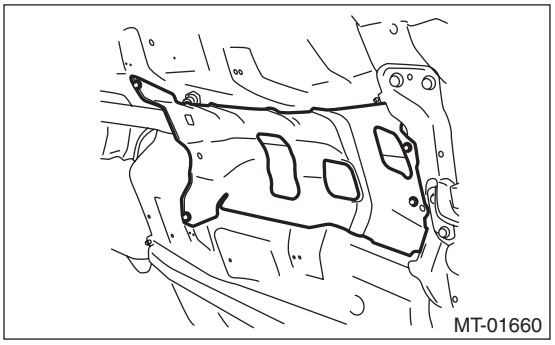
CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the gear oil will be hot. Be careful not to receive burns.
• Be careful not to spill the gear oil on the exhaust pipe, to prevent emission of smoke or causing a fire. If gear oil is spilled, wipe it off completely.
5) Attach the drain plug using TORX® bit T70.

NOTE:
Use a new gasket.

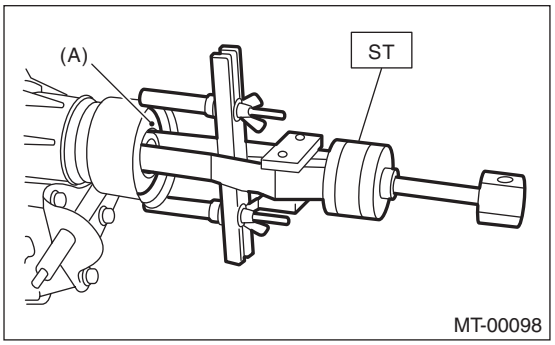
Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (copper gasket, brown)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (metal gasket, black)



6) Remove the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
7) Remove the center exhaust cover.



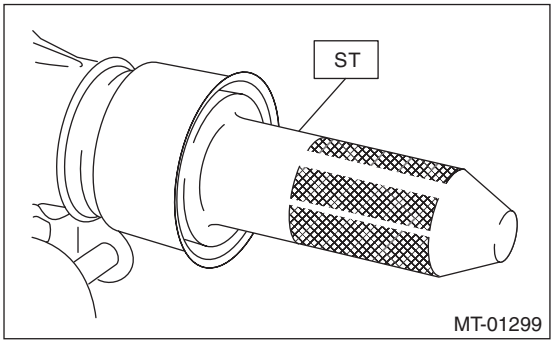
8) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
9) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY



(A) Oil seal

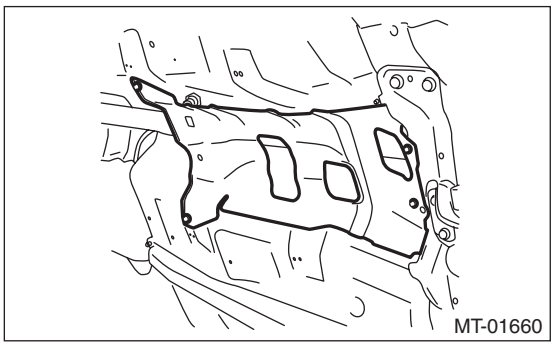
10) Using the ST, install the oil seal.

NOTE:
• When grease is not applied to the oil seal lips, apply the transmission gear oil to the oil seal lips.
• Use a new oil seal.
ST 498057300 INSTALLER



11) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
12) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



13) Install the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.>
14) Lower the vehicle.
15) Pour in transmission gear oil and check the oil level. <Ref. to 5MT-22, Transmission Gear Oil.>
16) Connect the battery ground terminal.

6. Differential Side Retainer Oil Seal

A: INSPECTION

Check for transmission gear oil leaks at differential side retainer oil seal area. If there is oil leakage, replace the oil seal with the new part and check the drive shaft.

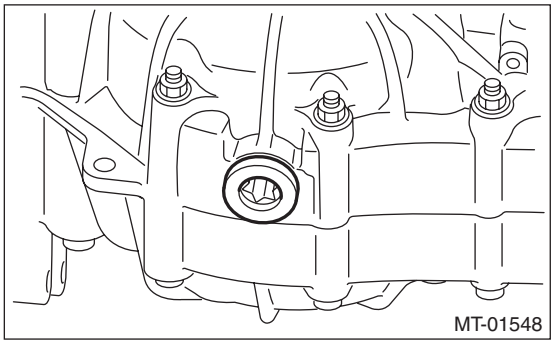
B: REPLACEMENT

1) Disconnect the ground cable from battery.
2) Remove the front tires.
3) Lift up the vehicle.
4) Using the TORX® bit T70, remove the drain plug, and drain the transmission gear oil completely.

CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the gear oil will be hot. Be careful not to receive burns.
• Be careful not to spill the gear oil on the exhaust pipe, to prevent emission of smoke or causing a fire. If gear oil is spilled, wipe it off completely.
5) Attach the drain plug using TORX® bit T70.

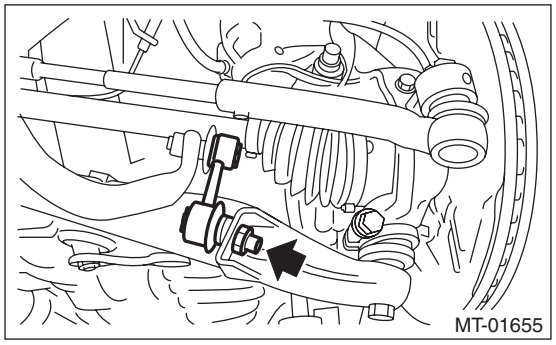
NOTE:
Use a new gasket.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (copper gasket, brown)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (metal gasket, black)

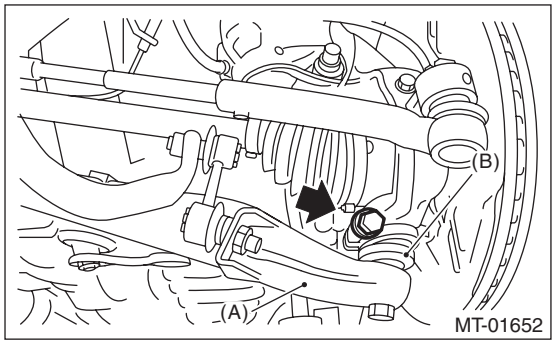

MT-01548

6) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>

7) Disconnect the stabilizer link.


MT-01655

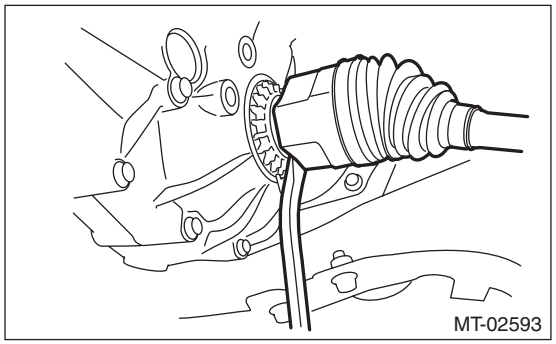
8) Remove the bolt securing the ball joint of the front arm to the housing, then separate the front arms and the housing.



MT-01652

(A) Front arm
(B) Ball joint

9) Using a crowbar, separate the left and right front drive shafts.


MT-02593

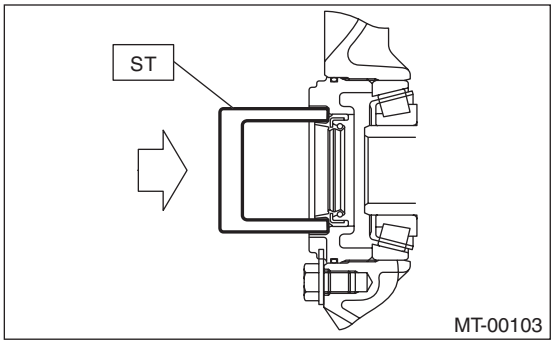
10) Remove the differential side retainer oil seal.

NOTE:
• Be sure to replace the oil seal after removing the front drive shaft from the transmission.
• Use the ST 398527700 PULLER ASSY to remove the oil seal. If removing the oil seal with a flat tip screwdriver, be careful not to scratch the differential side retainer.

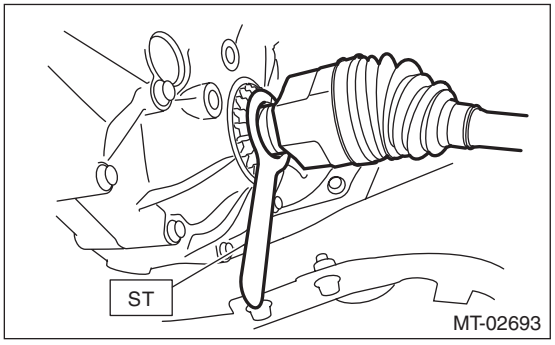
11) Using the ST, install the differential side retainer oil seal by lightly tapping with a plastic hammer.

CAUTION:
• Apply transmission gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.
• Check the identification marks (R, L) during the installation so as not to mix up the oil seal RH and LH.

NOTE:
Use a new oil seal.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

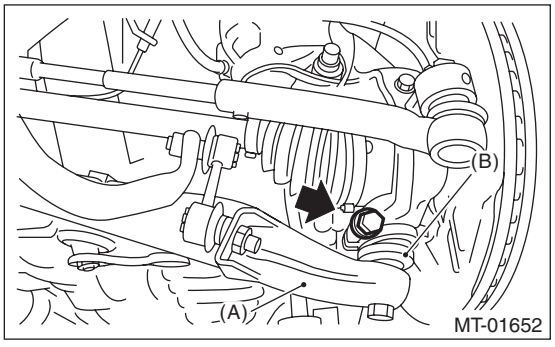


12) Install the ST to the transmission, and then install the front drive shaft.
ST 28399SA010 OIL SEAL PROTECTOR



13) Insert the front arm ball joint and tighten the mounting bolt.

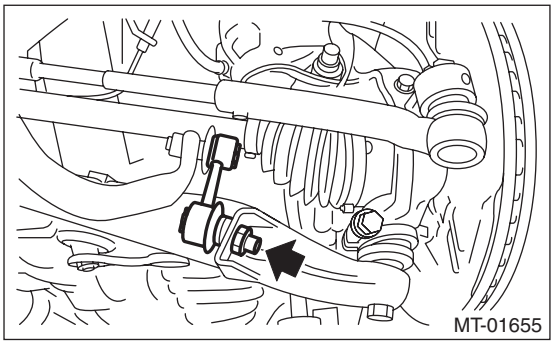
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



(A) Front arm
(B) Ball joint

14) Install the stabilizer link.

Tightening torque:
Except for Crosstrek model
38 N·m (3.9 kgf-m, 28.0 ft-lb)
Crosstrek model
60 N·m (6.1 kgf-m, 44.3 ft-lb)



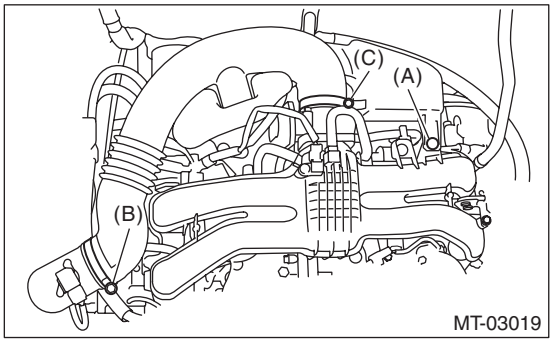
15) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
16) Lower the vehicle.
17) Pour in transmission gear oil and check the oil level. <Ref. to 5MT-22, REPLACEMENT, Transmission Gear Oil.>
18) Install the front tires.
19) Connect the battery ground terminal.

7. Switches and Harness

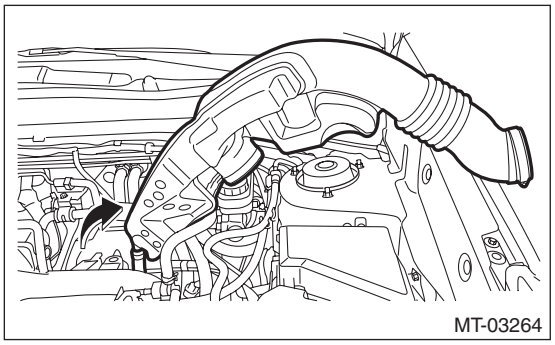
A: REMOVAL

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

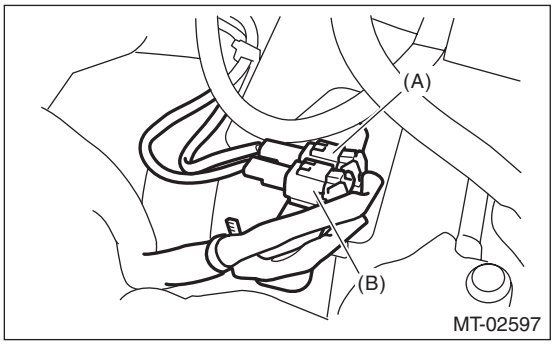
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

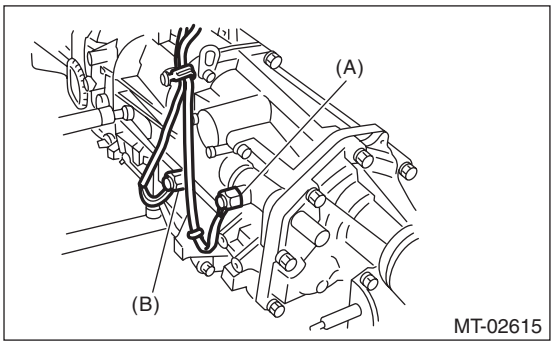


6) Disconnect the connector back-up light switch & neutral position switch.



(A) Neutral position switch connector (brown)
(B) Back-up light switch connector (gray)

7) Remove the harness connector from bracket.
8) Lift up the vehicle.
9) Remove the harness from each clip.
10) Remove the back-up light switch & neutral position switch with the harness.



(A) Neutral position switch
(B) Back-up light switch

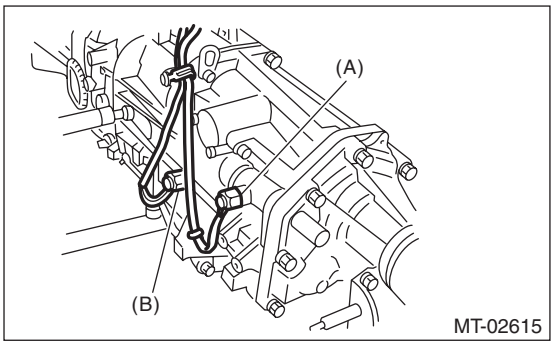
B: INSTALLATION

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

1) Install the back-up light switch & neutral position switch with the harness.

NOTE:
Use a new gasket.

Tightening torque:
32.3 N·m (3.3 kgf-m, 23.8 ft-lb)



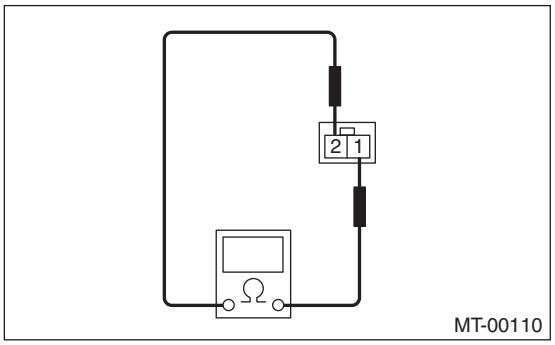
(A) Neutral position switch
(B) Back-up light switch

2) Secure the harness on each clip.
3) Lower the vehicle.
4) Connect the connectors for back-up light switch and neutral position switch, and secure the connector to the bracket.
5) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
6) Connect the battery ground terminal.

C: INSPECTION

1. BACK-UP LIGHT SWITCH

1) Turn the ignition switch to OFF.
2) Disconnect the back light switch connector.
3) Measure the resistance between the back-up light switch terminals.

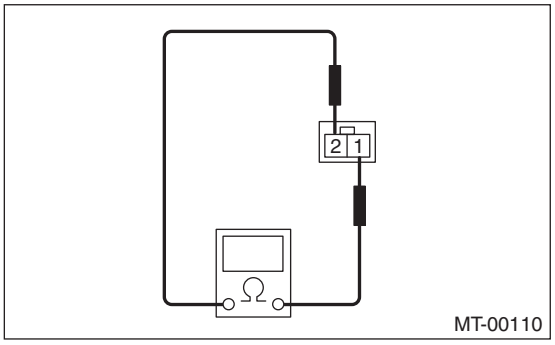


Gear shift position	Terminal No.	Specified resistance
Reverse position	1 and 2	Less than 1 Ω
Other positions		1 MΩ or more

4) Replace faulty parts.

2. NEUTRAL POSITION SWITCH

1) Turn the ignition switch to OFF.
2) Disconnect the connector of neutral position switch.
3) Measure the resistance between neutral position switch terminals.



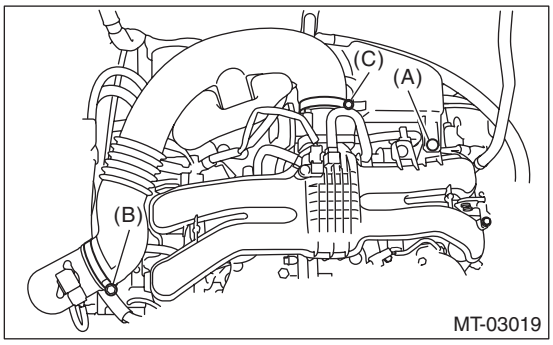
Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 2	Less than 1 Ω
Other positions		1 MΩ or more

4) Replace faulty parts.

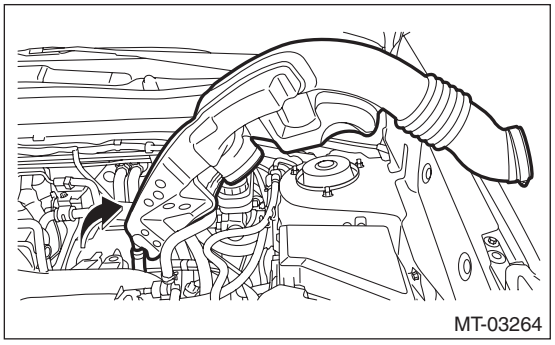
8. Air Breather Hose

A: REMOVAL

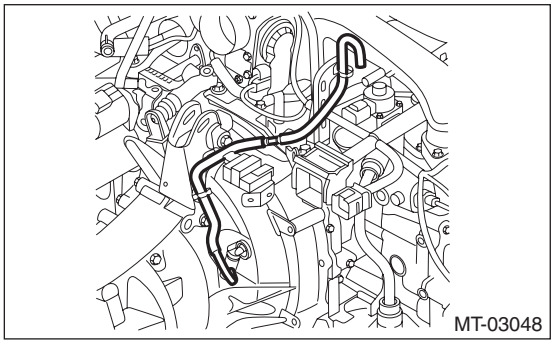
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



6) Remove the air breather hose.



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
Air intake boot
3 N·m (0.3 kgf-m, 2.2 ft-lb)

C: INSPECTION

Check the hose for peeling, crack or clogging.

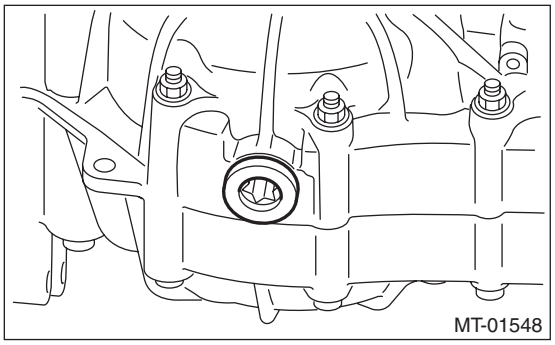
9. Preparation for Overhaul

A: PROCEDURE

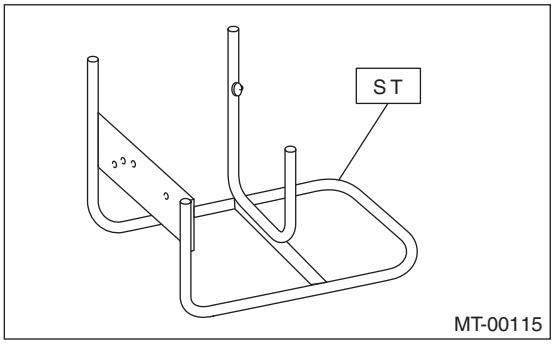
1) Clean oil, grease, dirt and dust from the transmission.
2) When transmission gear oil remains in the transmission, using the TORX® bit T70, remove the drain plug, and drain the gear oil completely.
3) Attach the drain plug using TORX® bit T70.

NOTE:
Use a new gasket.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (copper gasket, brown)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (metal gasket, black)



4) Attach the transmission to the ST.
ST 499937100 TRANSMISSION STAND

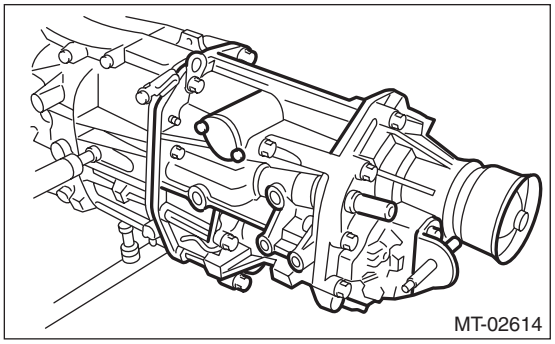


5) Apply transmission gear oil to rotating parts before assembly.
6) All disassembled parts, if to be reused, should be reinstalled in the original positions.
7) Gaskets, lock washers and lock nuts must be replaced with new ones.
8) Apply liquid gasket to the specified areas to prevent leakage.

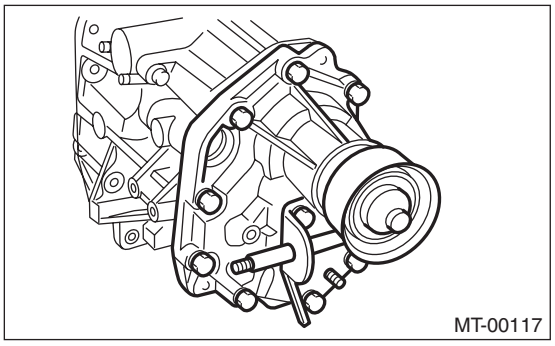
10. Transfer Case and Extension Case Assembly

A: REMOVAL

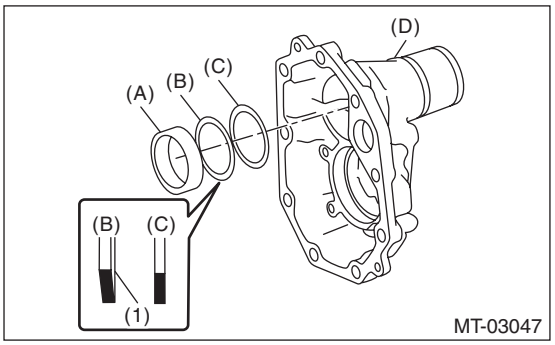
1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-36, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly.


MT-02614

4) Remove the gasket.
5) Remove the shifter arm.
6) Remove the extension case assembly.


MT-00117

7) Remove the transfer driven gear.
8) Remove the taper roller bearing (extension case side) outer race, dish plate and adjusting washer.



MT-03047

(A) Taper roller bearing (extension case side) outer race
(B) Dish plate
(C) Adjusting washer
(D) Extension case

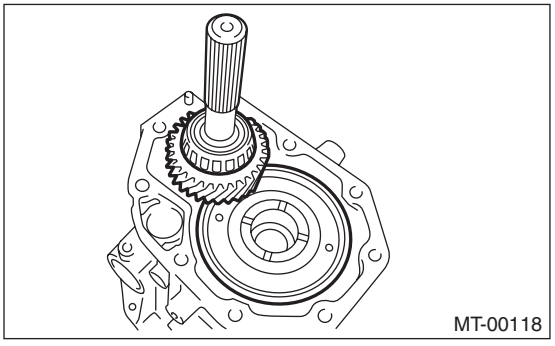
(1) Paint side

B: INSTALLATION

1) Clean the mating surfaces of the transmission case, transfer case and extension case.
2) Apply a coat of grease to the taper roller bearing (transfer case side) of transfer driven gear and the roller rolling surface of the taper roller bearing (extension case side).

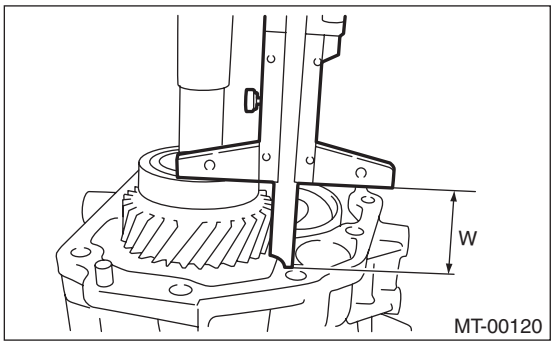
Grease:
NICHIMOLY N-130 or equivalent

3) Install the center differential and the transfer driven gear.


MT-00118

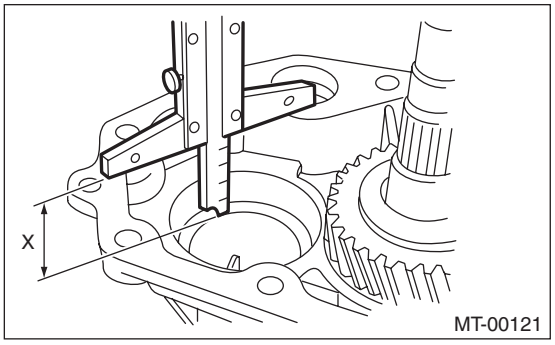
4) Install the taper roller bearing (extension case side) outer race to the transfer driven gear.
5) While pressing the taper roller bearing (extension case side) outer race horizontally, rotate the transfer driven gear for ten turns.

6) Measure the height “W” between transfer case and taper roller bearing (transfer case side) on the transfer driven gear.



7) Measure the depth “X” of taper roller bearing insertion part of the extension case.

NOTE:
Measure while the taper roller bearing (extension case side) outer race, dish plate and adjusting washer are removed.



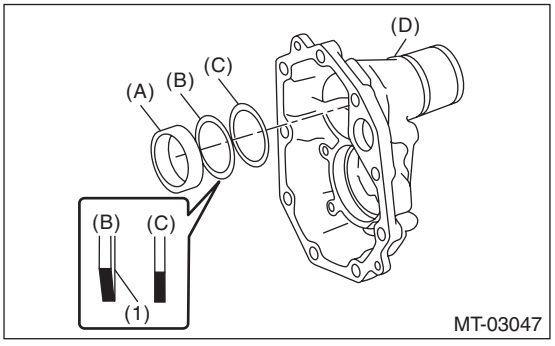
8) Calculate the adjusting washer thickness “t” using the following calculation.
t = X – W – (1.715 — 1.765 mm (0.686 — 0.706 in))
X: Depth of taper roller bearing insertion part of extension case
W: Height between transfer case and taper roller bearing (transfer case side) on transfer driven gear

9) Select the adjusting washer with the nearest value in the following table.

Adjusting washer (61 × 50 × t)	
Part No.	Thickness mm (in)
803050060	0.50 (0.0197)
803050061	0.55 (0.0217)
803050062	0.60 (0.0236)
803050063	0.65 (0.0256)
803050064	0.70 (0.0276)
803050065	0.75 (0.0295)
803050066	0.80 (0.0315)
803050067	0.85 (0.0335)
803050068	0.90 (0.0354)
803050069	0.95 (0.0374)
803050070	1.00 (0.0394)
803050071	1.05 (0.0413)
803050072	1.10 (0.0433)
803050073	1.15 (0.0453)
803050074	1.20 (0.0472)
803050075	1.25 (0.0492)
803050076	1.30 (0.0512)
803050077	1.35 (0.0531)
803050078	1.40 (0.0551)
803050079	1.45 (0.0571)

10) Install the selected adjusting washer, dish plate and taper roller bearing (extension case side) outer race.

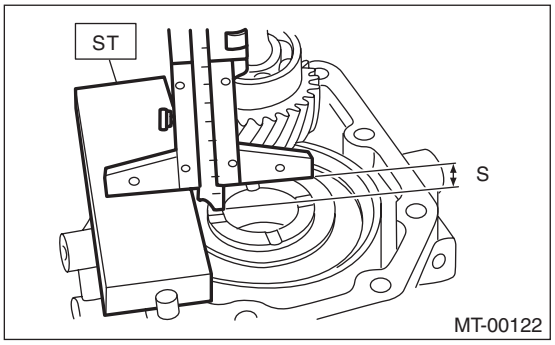
NOTE:
Make sure the dish plate is installed in the proper direction.



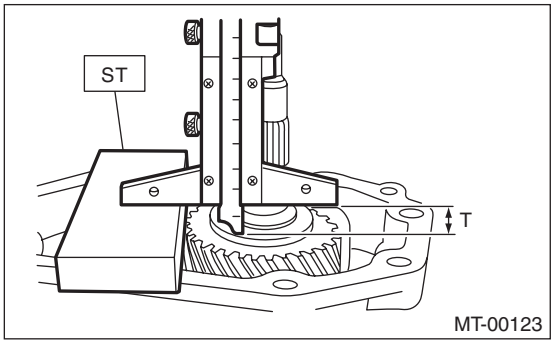
(A) Taper roller bearing (extension case side) outer race
(B) Dish plate
(C) Adjusting washer
(D) Extension case

(1) Paint side

11) Measure the depth “S” between the transfer case + ST and the center differential.
ST 398643600 GAUGE



12) Measure the height “T” between the extension case + ST and the transfer drive gear.
ST 398643600 GAUGE



13) Calculate the adjusting washer thickness “U” using the following calculation.
U = S + T – 30 mm (1.18 in) – (0.15 — 0.35 mm (0.0059 — 0.0138 in))
S: Depth between the transfer case + ST and the center differential
T: Height between the extension case + ST and the transfer drive gear
30 mm (1.18 in): Thickness of ST (× 2 pieces)
0.15 — 0.35 mm (0.0059 — 0.0138 in): Clearance

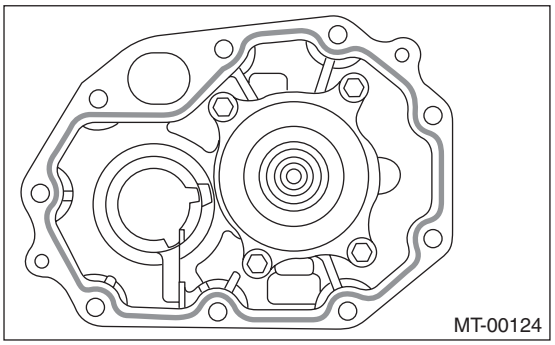
14) Select a suitable adjusting washer in the following table.

Clearance:
0.15 — 0.35 mm (0.0059 — 0.0138 in)

Adjusting washer	
Part No.	Thickness mm (in)
803036050	0.9 (0.035)
803036054	1.0 (0.039)
803036051	1.1 (0.043)
803036055	1.2 (0.047)
803036052	1.3 (0.051)
803036056	1.4 (0.055)
803036053	1.5 (0.059)
803036057	1.6 (0.063)
803036058	1.7 (0.067)
803036080	1.8 (0.071)
803036081	1.9 (0.075)

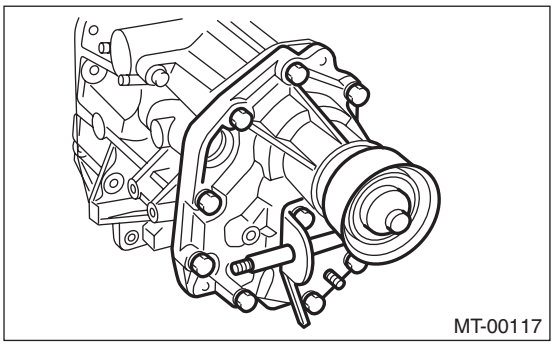
15) Install the adjusting washer to center differential.
16) Apply an appropriate amount of liquid gasket.

Liquid gasket:
THREE BOND 1215B or equivalent



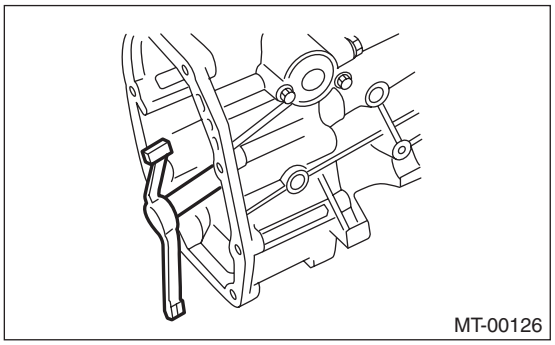
17) Install the extension case assembly.

Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)



18) Install the shifter arm.

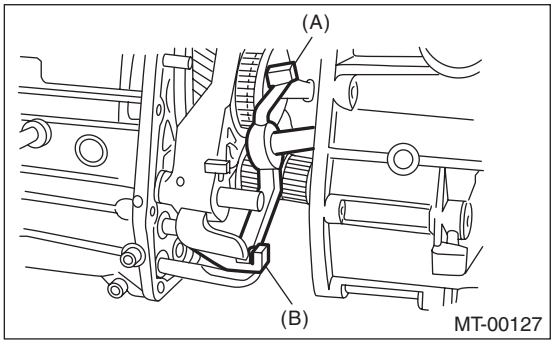
NOTE:
Apply transmission gear oil to the oil seal lips.


MT-00126

19) Attach the gasket.

NOTE:
Use a new gasket.

20) Hang the shifter arm on 3rd-4th fork rod.

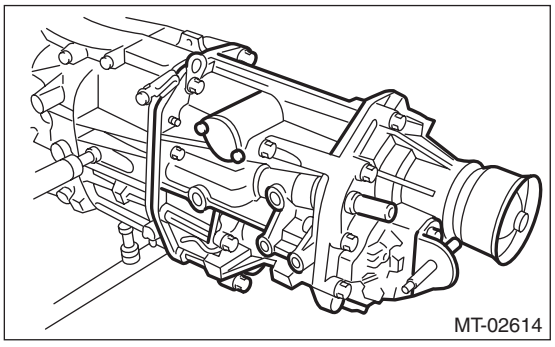


MT-00127

(A) Shifter arm
(B) 3rd-4th fork rod

21) Install the transfer case together with the extension case assembly.

Tightening torque:
24.5 N·m (2.5 kgf-m, 18.1 ft-lb)


MT-02614

22) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>

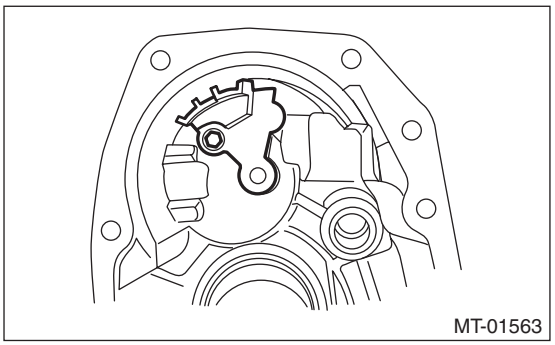
23) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1. TRANSFER CASE

1) Remove the reverse check sleeve assembly. <Ref. to 5MT-52, REMOVAL, Reverse Check Sleeve.>

2) Remove the oil guide.

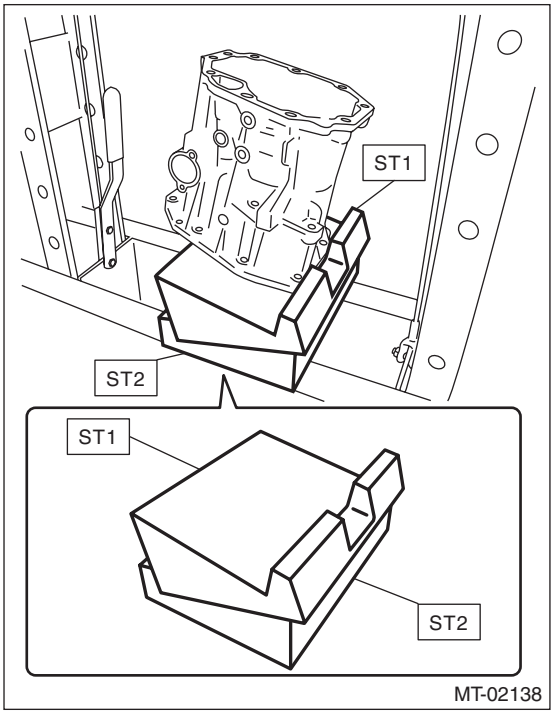

MT-01563

3) Remove the oil seal.

4) Set ST1, ST2 and transfer case to a press.

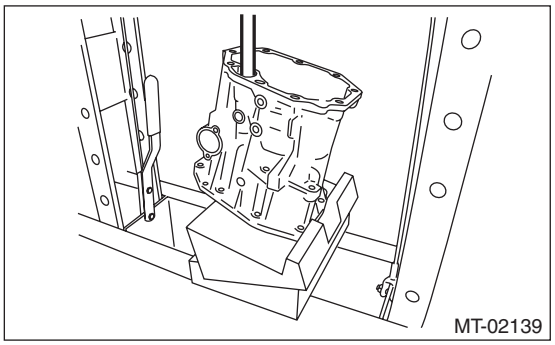
NOTE:
- Set the ST2 under ST1.
- Set the transfer case so that the hole for shifter arm is positioned vertically.

ST1 498267300 CYLINDER HEAD TABLE
ST2 498267200 CYLINDER HEAD TABLE



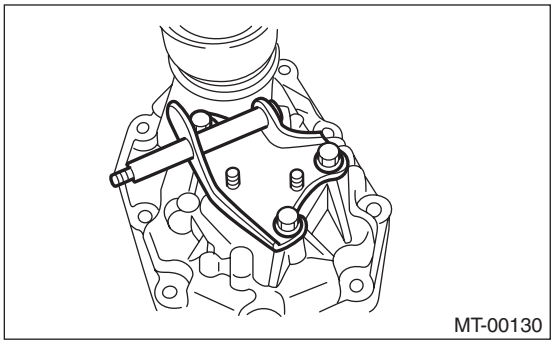
MT-02138

5) Using the round bar with diameter of 22 mm (0.87 in) or 23 mm (0.91 in), remove the roller bearing.



2. EXTENSION CASE

1) Remove the transfer drive gear assembly. <Ref. to 5MT-47, REMOVAL, Transfer Drive Gear.>
2) Remove the shift bracket.



3) Remove the oil seal from the extension case. <Ref. to 5MT-32, Oil Seal.>
4) Remove the dust cover.

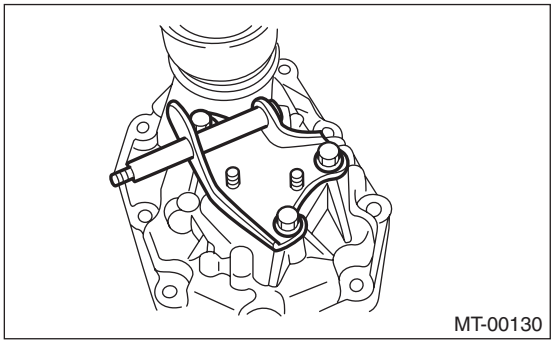
D: ASSEMBLY

1. EXTENSION CASE

1) Using the ST, install the oil seal to the extension case. <Ref. to 5MT-32, Oil Seal.>

NOTE:
Use a new oil seal.
2) Install the dust cover.
3) Install the shift bracket.

Tightening torque:
24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



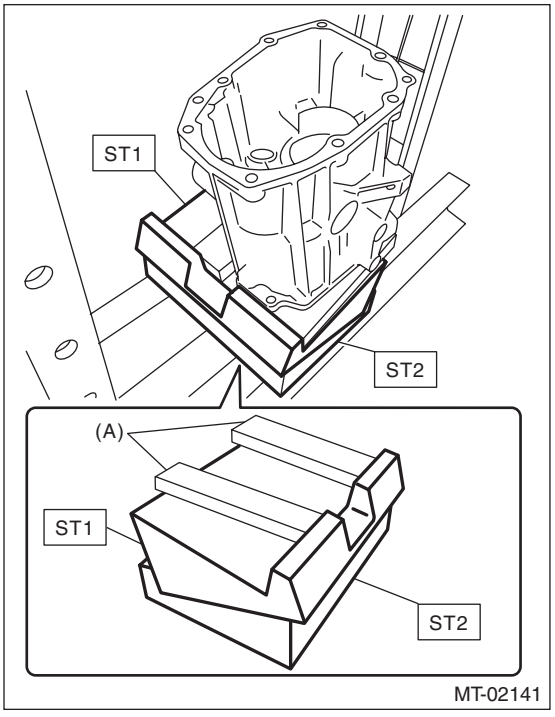
4) Install the transfer drive gear to the extension case. <Ref. to 5MT-47, INSTALLATION, Transfer Drive Gear.>

2. TRANSFER CASE

1) Set the ST1, ST2, iron plate and the transfer case to the press.

NOTE:
- Set the ST2 under ST1.
- Set the transfer case so that the hole for shifter arm is positioned vertically.
- Insert the iron plate which is thicker than the exposed length of the transfer case knock pin between the ST and transfer case.
- Set the iron plate so that the transfer case knock pin does not ride on the iron plate.

ST1 498267300 CYLINDER HEAD TABLE
ST2 498267200 CYLINDER HEAD TABLE

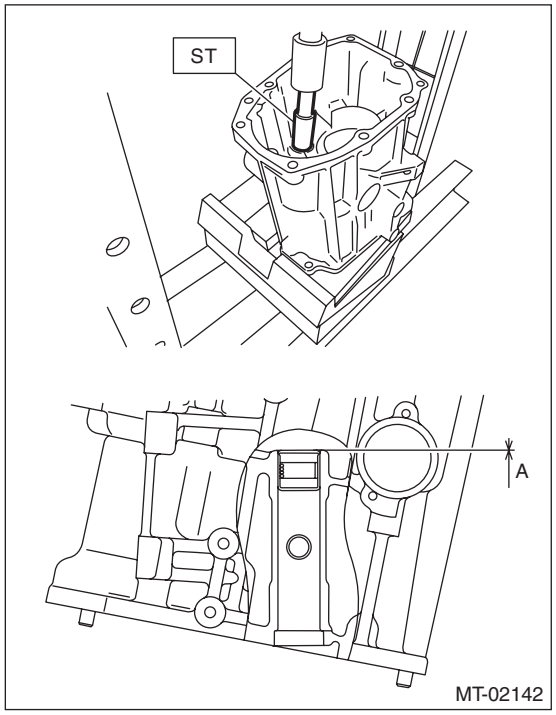


(A) Iron plate

2) Press-fit the roller bearing using the ST.

Press-fit depth of roller bearing:
A: 0±0.2 mm (0±0.01 in) from the end of transfer case

ST 899864100 REMOVER



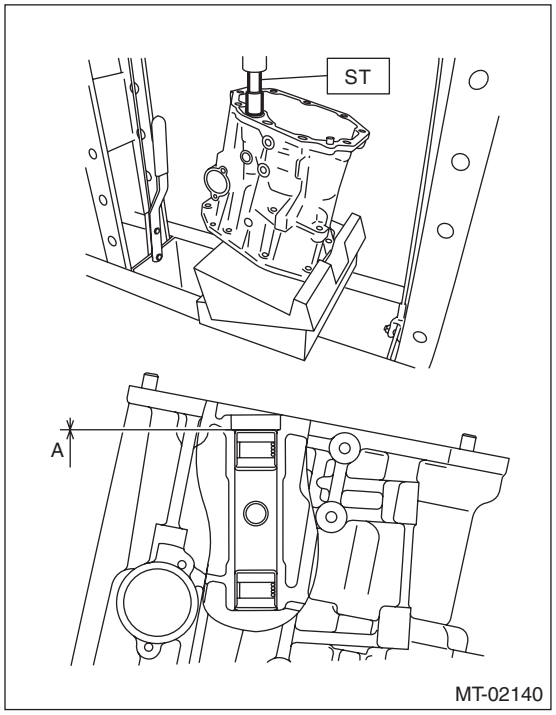
3) Remove the iron plate, and turn over the transfer case.

NOTE:
Set the transfer case so that the hole for shifter arm is positioned vertically.

4) Press-fit the roller bearing using the ST.

Press-fit depth of roller bearing:
A: 0±0.2 mm (0±0.01 in) from the end of transfer case

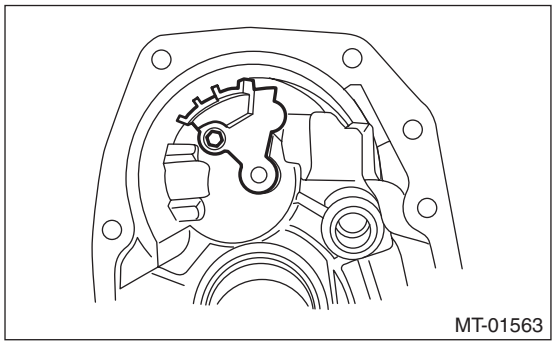
ST 899864100 REMOVER



5) Install the shifter arm to the transfer case, and make sure that the shift arm moves smoothly.
6) Install the oil guide.

NOTE:
Use a new installing bolt.

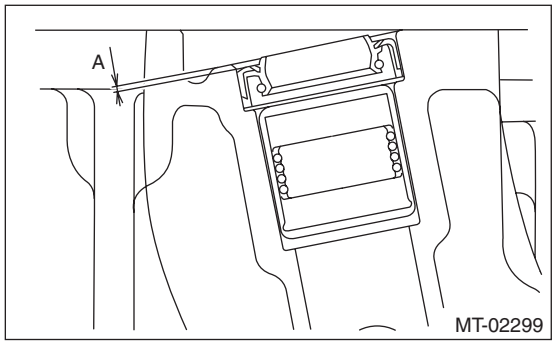
Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



7) Install the reverse check sleeve assembly to the transfer case. <Ref. to 5MT-52, INSTALLATION, Reverse Check Sleeve.>
8) Install the oil seal.

NOTE:
Use a new oil seal.

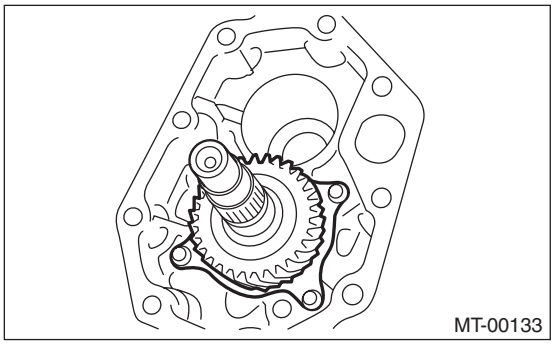
Press-fit depth of oil seal:
A: 1±0.2 mm (0.04±0.01 in) from the end of transfer case



11.Transfer Drive Gear

A: REMOVAL

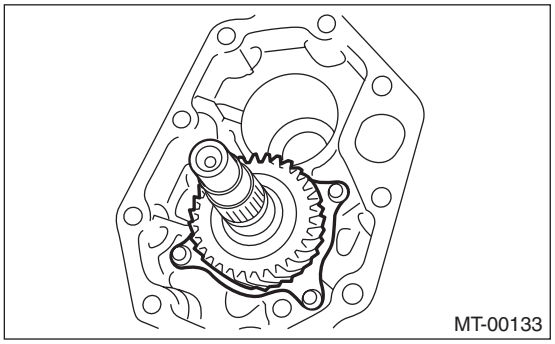
1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-36, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.
6) Remove the transfer drive gear.


MT-00133

B: INSTALLATION

1) Install the transfer drive gear.

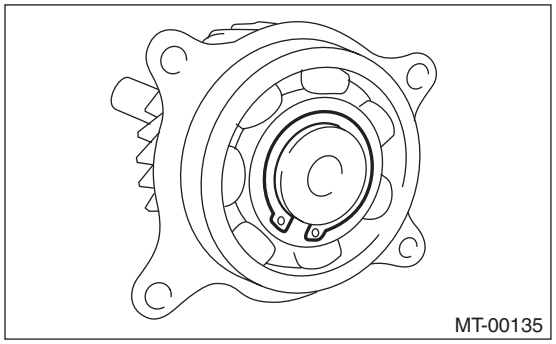
Tightening torque:
26 N·m (2.7 kgf-m, 19.2 ft-lb)


MT-00133

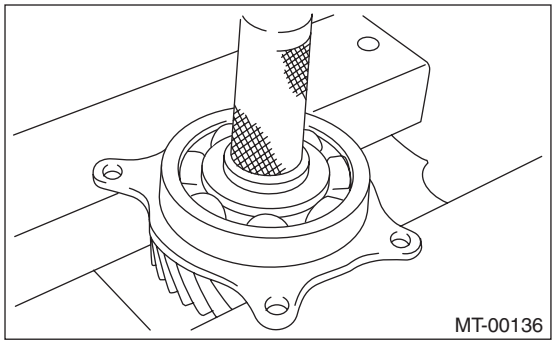
2) Select the adjusting washer. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
3) Install the transfer driven gear.
4) Install the transfer case and the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Remove the snap ring.


MT-00135

2) Remove the ball bearing.

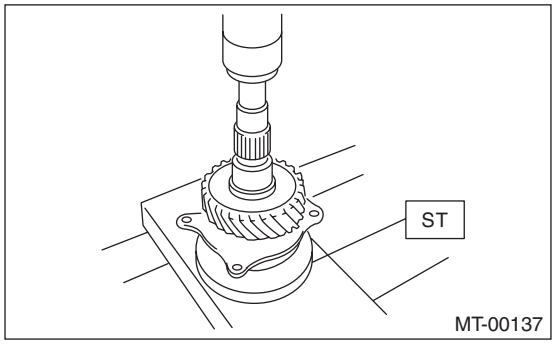

MT-00136

D: ASSEMBLY

1) Set the ST against the inner race of the ball bearing, and install the transfer drive gear.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Use a new ball bearing.
ST 398177700 INSTALLER



MT-00137

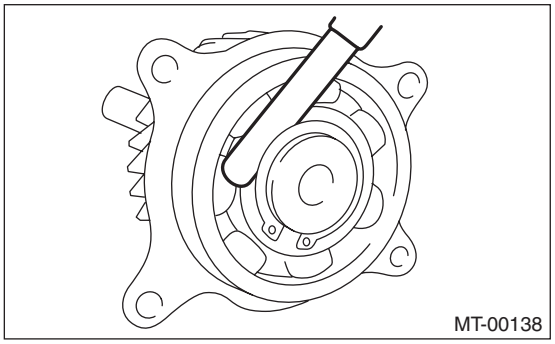
2) Install the snap ring on the transfer drive gear.
3) Inspect the clearance between the snap ring and the ball bearing. <Ref. to 5MT-48, INSPECTION, Transfer Drive Gear.>

E: INSPECTION

1) Ball bearing
Replace the bearings in the following cases.
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil lubrication.

2) Transfer drive gear
If the drive gear tooth surface and shaft are excessively broken or damaged, replace the drive gear.
3) Measure the clearance between snap ring and inner race of ball bearing with a thickness gauge.

Clearance:
0.01 — 0.15 mm (0.0004 — 0.0059 in)



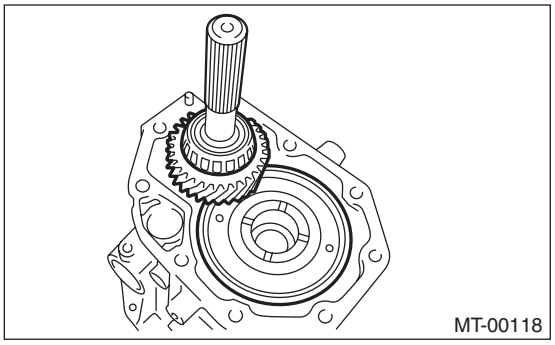
If the measurement is not within specification, select a suitable snap ring and replace it.

Snap ring (outer-30)	
Part No.	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

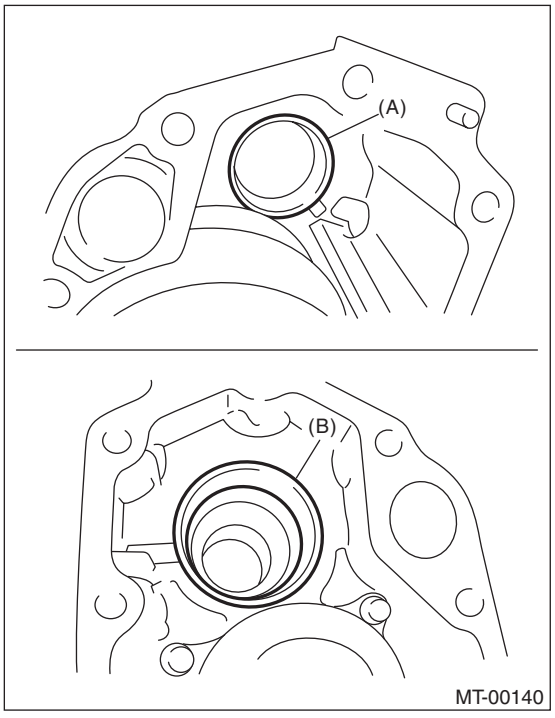
12.Transfer Driven Gear

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-36, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.


MT-00118

6) Remove the taper roller bearing outer race.

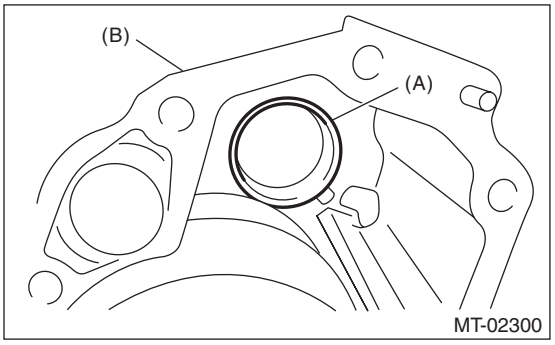


MT-00140

(A) Taper roller bearing (transfer case side) outer race
(B) Taper roller bearing (extension case side) outer race

B: INSTALLATION

1) Install the taper roller bearing (transfer case side) outer race.



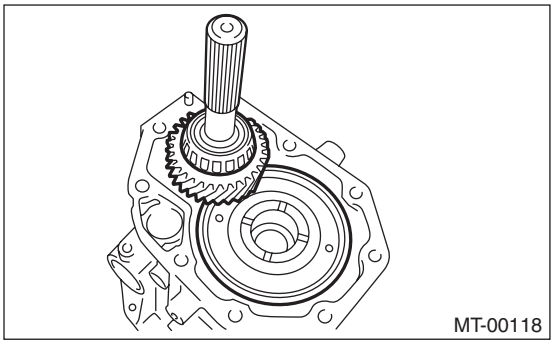
MT-02300

(A) Taper roller bearing (transfer case side) outer race
(B) Transfer case

2) Apply a coat of grease to the taper roller bearing (transfer case side) of transfer driven gear and the roller rolling surface of the taper roller bearing (extension case side).

Grease:
NICHIMOLY N-130 or equivalent

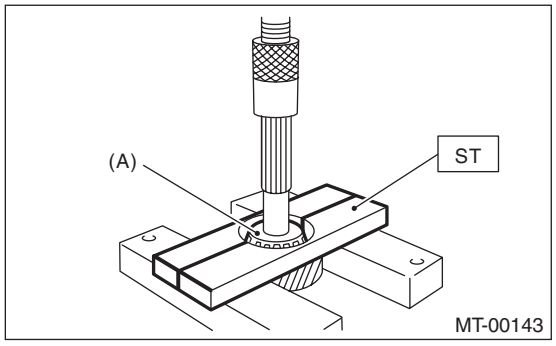
3) Install the transfer driven gear.


MT-00118

4) Select the adjusting washer. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the transfer case and the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
6) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
7) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

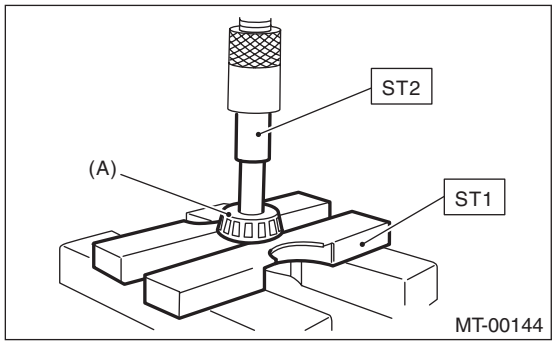
C: DISASSEMBLY

1) Using the ST, remove the taper roller bearing (extension case side).
ST 498077000 REMOVER



(A) Taper roller bearing (extension case side)

2) Using ST1 and ST2, remove the taper roller bearing (transfer case side).
ST1 498077000 REMOVER
ST2 899864100 REMOVER



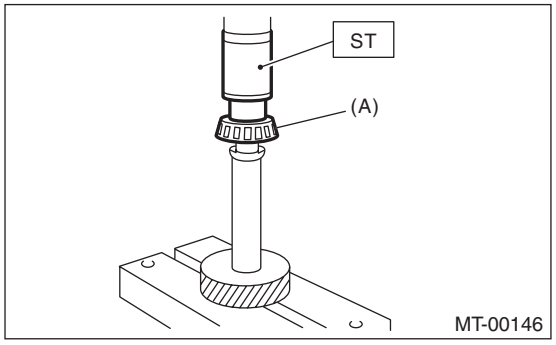
(A) Taper roller bearing (transfer case side)

D: ASSEMBLY

1) Using the ST, install the taper roller bearing (transfer case side).

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Be careful when handling, because the outer race and inner race of the taper roller bearing are used as a set.
ST 927640000 INSTALLER

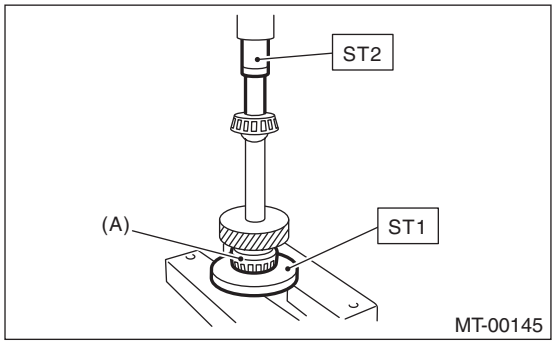


(A) Taper roller bearing (transfer case side)

2) Using the ST, install the taper roller bearing (extension case side).

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Be careful when handling, because the outer race and inner race of the taper roller bearing are used as a set.
ST1 498175500 INSTALLER
ST2 899864100 REMOVER



(A) Taper roller bearing (extension case side)

E: INSPECTION

1) Taper roller bearing
Replace the bearings in the following cases.
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil lubrication.

2) Transfer driven gear
If the tooth face of driven gear and the shaft are excessively broken or damaged, replace the driven gear.

13.Center Differential

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-36, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear. <Ref. to 5MT-49, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential.

B: INSTALLATION

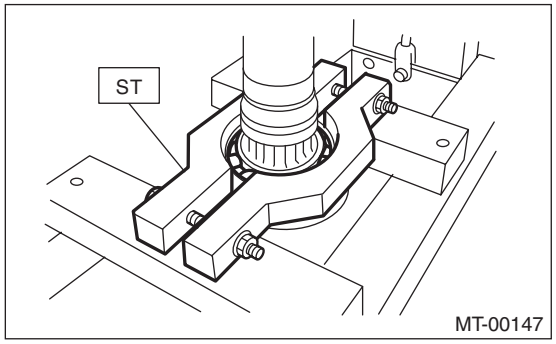
1) Attach the center differential to transfer case.
2) Install the transfer driven gear. <Ref. to 5MT-49, INSTALLATION, Transfer Driven Gear.>
3) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
5) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

Remove the ball bearing using ST.

NOTE:
Center differential is a non-disassembled part which should not be disassembled.

ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER

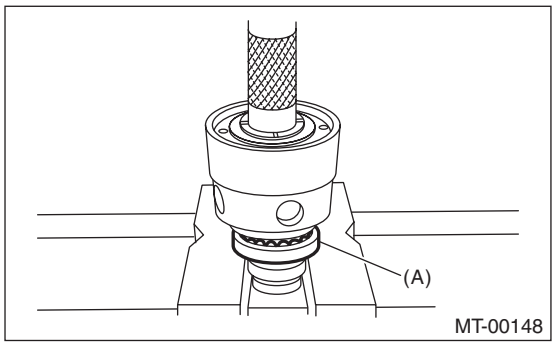


D: ASSEMBLY

Install the ball bearings.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Use a new ball bearing.



(A) Ball bearing

E: INSPECTION

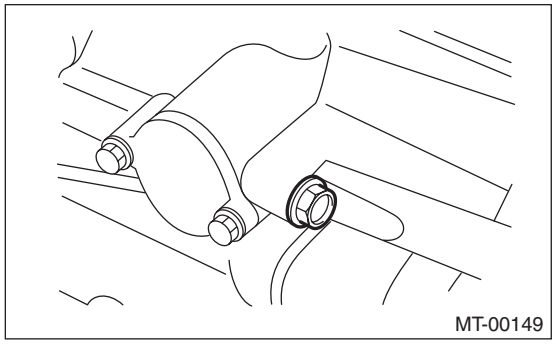
1) Ball bearing
Replace the bearings in the following cases.
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil has been applied.
- When bearing has other defects.

2) Center differential
If there is wear or damage, replace the center differential assembly.

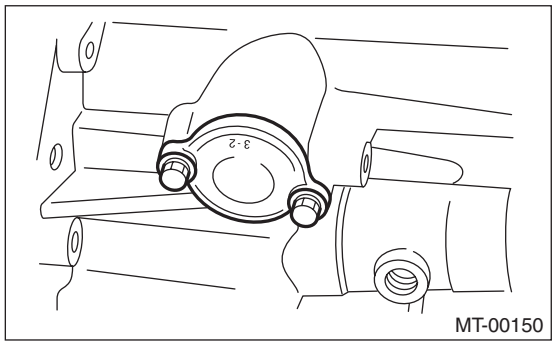
14.Reverse Check Sleeve

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the shifter arm.
4) Remove the plug, gasket, reverse accent spring, and reverse check ball.


MT-00149

5) Remove the reverse check sleeve.

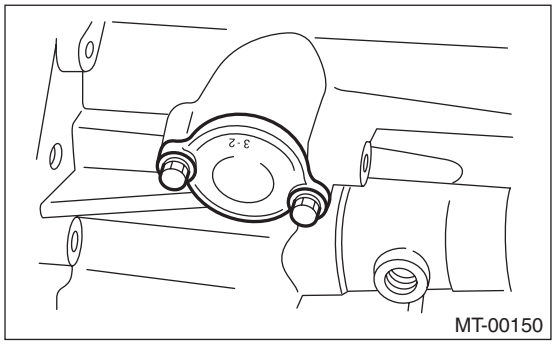


MT-00150

B: INSTALLATION

1) Install the reverse check sleeve.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

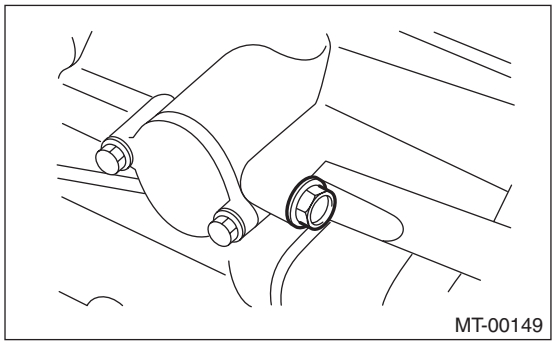


MT-00150

2) Install the reverse check ball, reverse accent spring, gasket and plug.

NOTE:
Use a new gasket.

Tightening torque:
9.75 N·m (1.0 kgf-m, 7.2 ft-lb)

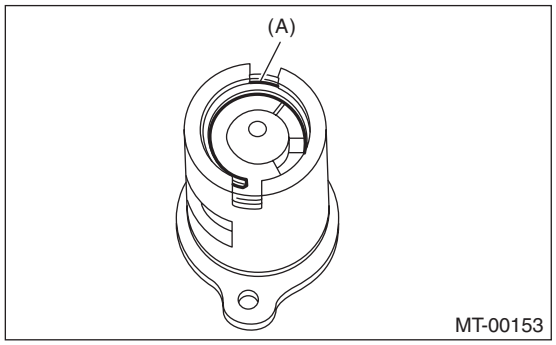

MT-00149

3) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

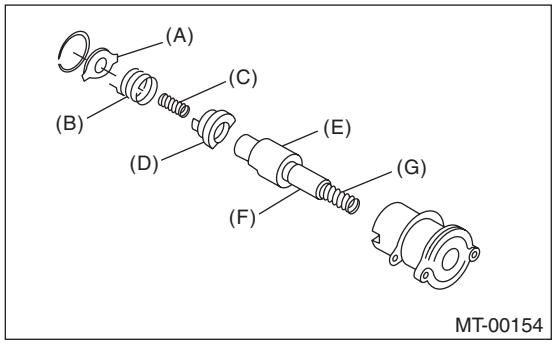
1) Cover the reverse check sleeve with cloth, and remove the snap ring by using screwdriver.

NOTE:
If the snap ring is deformed or the spring repulsive force is not enough, replace with a new snap ring.



(A) Snap ring

2) Remove the reverse check plate, reverse check spring, reverse check cam, return spring (5th-Reverse), reverse accent shaft, return spring cap, and return spring (1st-2nd).



(A) Reverse check plate
(B) Reverse check spring
(C) Return spring (5th-Reverse)
(D) Reverse check cam
(E) Reverse accent shaft
(F) Return spring cap
(G) Return spring (1st-2nd)

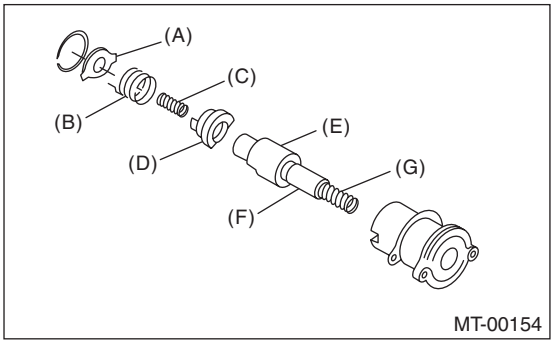
3) Remove the O-ring.

NOTE:
Be careful not to damage the adjusting shim between reverse check sleeve assembly and case.

D: ASSEMBLY

1) Install the return spring (1st-2nd), return spring cap, reverse accent shaft, reverse check cam, return spring (5th-Reverse) and reverse check spring.

NOTE:
Be sure to insert the curved part of reverse check spring into the check cam groove.



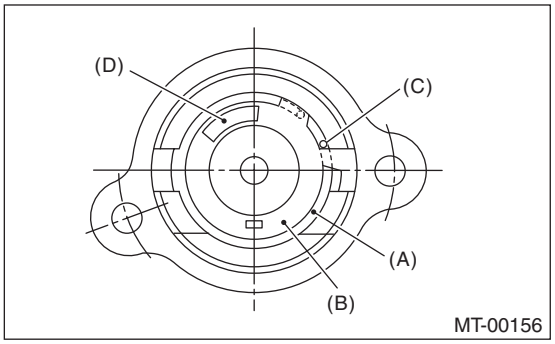
(A) Reverse check plate
(B) Reverse check spring
(C) Return spring (5th-Reverse)
(D) Reverse check cam
(E) Reverse accent shaft
(F) Return spring cap
(G) Return spring (1st-2nd)

2) Hook the curved part of reverse check spring onto the reverse check plate.
3) Rotate the cam so that the protrusion on the reverse check cam is located at the plate opening.
4) While fixing the cam to that position, attach the reverse check plate to the reverse check sleeve, and secure with snap ring.
5) Insert the O-ring into the sleeve groove.

NOTE:
Use new O-rings.

E: INSPECTION

• Make sure the cutout of the reverse accent shaft is aligned with the opening in the reverse check sleeve.
• Turn the cam by hand to check for smooth rotation.
• Move the cam and shaft all the way toward the plate, and make sure it releases.
If the cam does not return properly, replace the reverse check spring. If the shaft does not return, check for scratches on the inner surface of sleeve. If the sleeve is in good order, replace the spring.



(A) Snap ring
(B) Reverse check plate
(C) Reverse check spring
(D) Reverse check cam

• Select a suitable reverse accent shaft and reverse check plate. <Ref. to 5MT-54, ADJUSTMENT, Reverse Check Sleeve.>

F: ADJUSTMENT

1. NEUTRAL POSITION ADJUSTMENT

1) Shift the gear into 3rd gear position.
2) Because of the return spring, until the arm contacts the stopper the shifter arm will feel lighter moving towards 1st/2nd gear and heavier towards the reverse gear.
3) Make adjustment so that the heavy stroke (reverse side) is a little heavier than the lighter stroke (1st/2nd side).
4) To adjust, remove the bolts holding the reverse check sleeve assembly to the case, and move the sleeve assembly outward, then place an adjustment shim between the sleeve assembly and the case to adjust the clearance.

CAUTION:
Be careful not to damage the O-ring when placing shims.

NOTE:
• When the shim is removed, the neutral position will move closer to reverse; when the shim is added, the neutral position will move closer to 1st gear.
• If it is not possible to adjust the clearance with only shims, replace the reverse accent shaft and re-adjust.

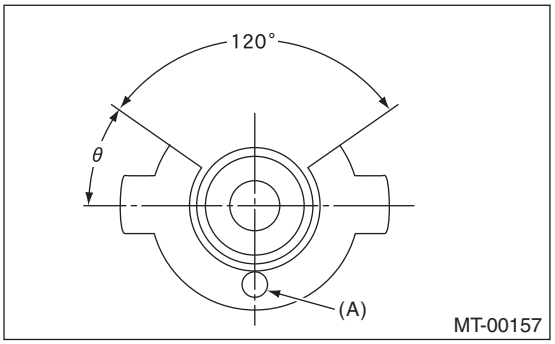
Adjusting shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA130	S	Neutral position is closer to 1st gear.
32188AA140	T	Standard
32188AA150	U	Neutral position is closer to reverse gear.

2. REVERSE CHECK PLATE ADJUSTMENT

1) Shift the shifter arm to “5th” and then to reverse to see if the reverse check mechanism operates properly.
2) Also check to see if the arm returns to neutral when released from the reverse position. If the arm does not return properly, replace the reverse check plate.

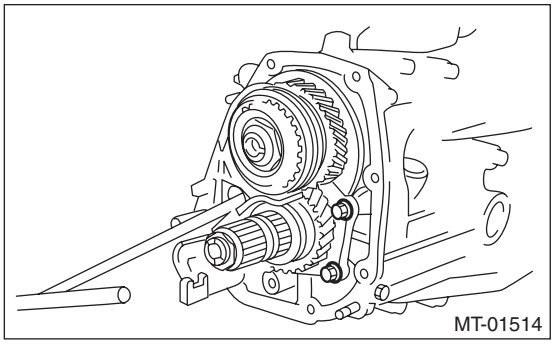
Reverse check plate			
Part No.	(A): No.	Angleθ	Content
32189AA001	0	28°	Arm stops closer to 5th gear.
32189AA011	1	31°	Arm stops closer to 5th gear.
32189AA021	2	34°	Arm stops in the center.
32189AA031	3	37°	Arm stops closer to reverse gear.
32189AA041	4	40°	Arm stops closer to reverse gear.



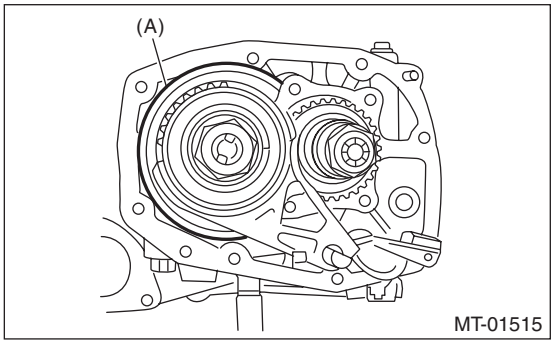
15.Transmission Case

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the clutch release lever and the release bearing. <Ref. to CL-15, REMOVAL, Release Bearing and Lever.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the bearing mounting bolt.


MT-01514

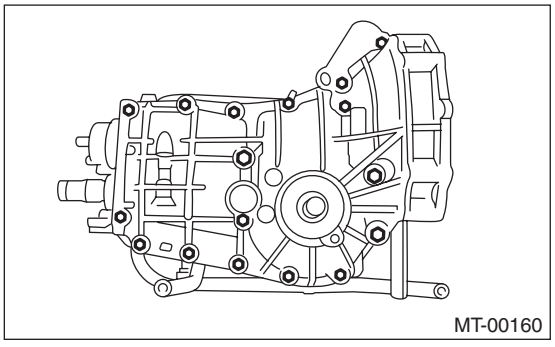
5) Remove the main shaft rear plate.



MT-01515

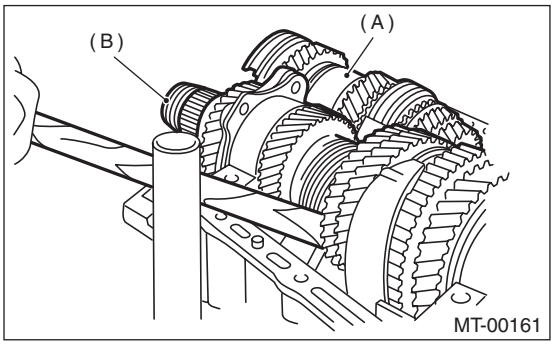
(A) Main shaft rear plate

6) Remove the bolts and nuts, and separate the transmission case into the right and left cases.


MT-00160

7) Remove the drive pinion shaft assembly.

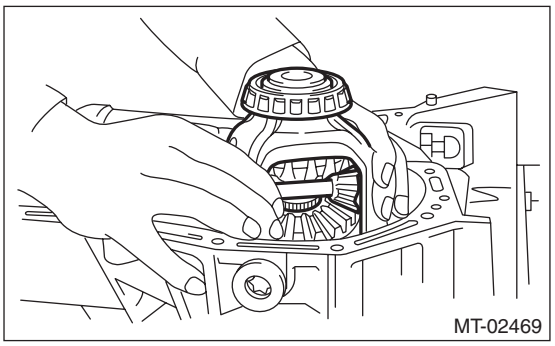
NOTE:
Use a hammer handle, etc. to remove if too tight.



MT-00161

(A) Main shaft ASSY
(B) Drive pinion shaft assembly

8) Remove the main shaft assembly.
9) Remove the front differential assembly.


MT-02469

10) Remove the differential side retainers and taper roller bearing outer races on the left and right sides. <Ref. to 5MT-74, REMOVAL, Front Differential Assembly.>

NOTE:
Do not confuse the right and left taper roller bearing outer races.
11) Remove the reverse idler gear. <Ref. to 5MT-81, REMOVAL, Reverse Idler Gear.>
12) Remove the shifter fork and rod. <Ref. to 5MT-83, REMOVAL, Shifter Fork and Rod.>

B: INSTALLATION

1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with cleaning solvent.
2) Install the reverse idler gear. <Ref. to 5MT-81, INSTALLATION, Reverse Idler Gear.>
3) Install the shifter fork and rod. <Ref. to 5MT-83, INSTALLATION, Shifter Fork and Rod.>
4) Select the drive pinion shim. <Ref. to 5MT-64, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install the taper roller bearing outer race to the transmission case LH side, and install the differential side retainer with the O-ring removed.
6) Install the front differential assembly.

7) Install the main shaft assembly.

NOTE:
Align the needle bearing knock pin hole to the transmission case knock pin.

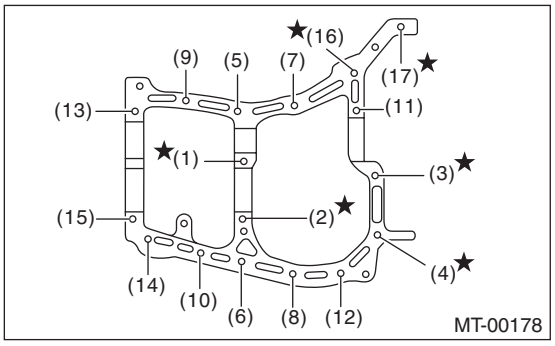
8) Install the selected drive pinion shims and drive pinion shaft assembly.

NOTE:
Align the roller bearing knock pin hole to the transmission case knock pin.

9) Tighten the left and right side of the transmission case with the 17 mounting bolts.

NOTE:
• Insert bolts (11) and (16) from the LH side of the transmission case.
• Match the cases together so that the drive pinion shims are not caught between the cases.

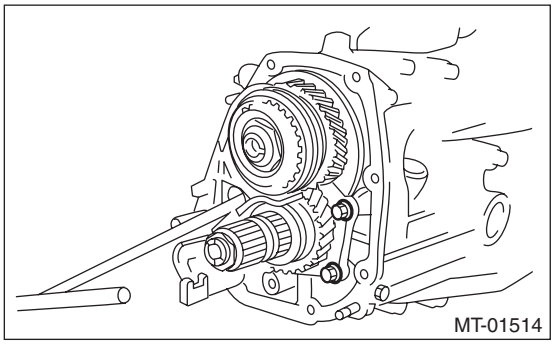
Tightening torque:
8 mm bolt
25 N·m (2.5 kgf-m, 18.4 ft-lb)
★ ***10 mm bolt***
39 N·m (4.0 kgf-m, 28.8 ft-lb)



10) Install the taper roller bearing outer race to the RH side of the transmission case.

11) Tighten the bearing mounting bolts.

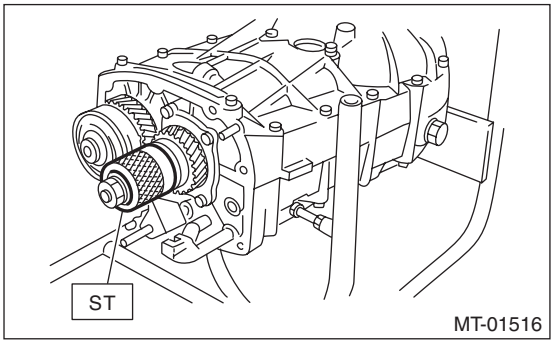
Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)



12) Adjust the backlash of the hypoid driven gear and the preload of the taper roller bearing.

(1) Attach the ST on drive pinion shaft assembly.

ST 498427100 STOPPER

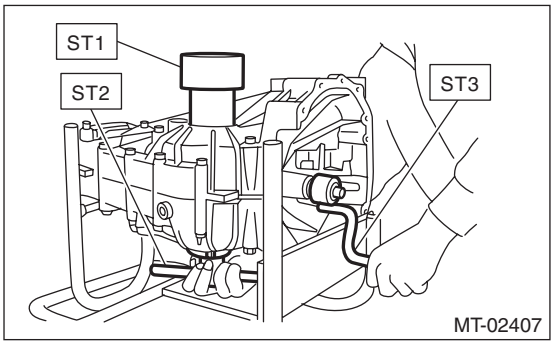


(2) Place the transmission case with the LH side facing downward, and put ST1 on the taper roller bearing outer race.

(3) Screw in the differential side retainer from the bottom into LH side case using ST2. Fit the ST3 on the main shaft. Shift the gear into 4th or 5th, and turn the shaft several times. Screw in the side retainer while rotating the ST3 until a slight resistance is felt on ST2.

This is the contact point of the hypoid driven gear and the drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

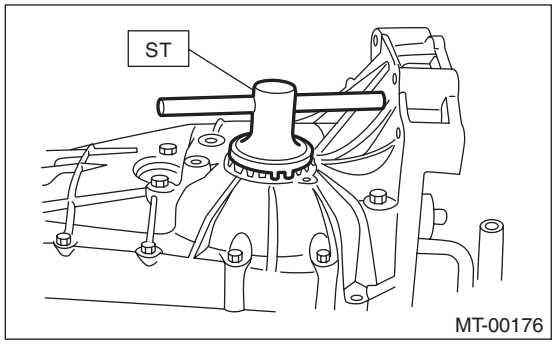
ST1	399780104	WEIGHT
ST2	18630AA010	WRENCH COMPL RETAINER
ST3	499927100	HANDLE



(4) Remove the WEIGHT, and screw in the differential side retainer without the O-ring into the RH side of the transmission case, and stop at the point where a slight resistance is felt.

NOTE:
In this condition, the backlash between hypoid driven gear and drive pinion shaft is zero.

ST 18630AA010 WRENCH COMPL RETAINER



(5) Loosen the differential side retainer on the LH side of the transmission case by 3 notches, and turn the side retainer on the RH side of the transmission case by 3 notches in order to apply backlash.

(6) Screw in the differential side retainer of the RH side of the transmission case additionally by 1 notch in order to apply preload on taper roller bearing.

(7) Tighten temporarily both the retainer lock plates LH and RH, and put marks on both the differential side retainer and lock plate for later readjustment.

NOTE:
If it is hard to install the lock plates, reverse the sides and install them.

(8) Turn the main shaft several times while tapping around the differential side retainer lightly with a plastic hammer.

13) Inspect and adjust backlash and tooth contact of the hypoid driven gear. <Ref. to 5MT-77, INSPECTION, Front Differential Assembly.>

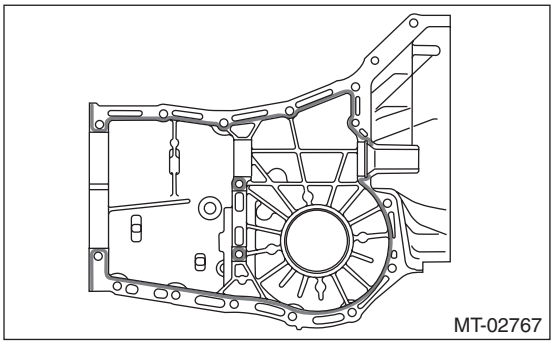
14) Separate the transmission case into left and right parts. <Ref. to 5MT-55, REMOVAL, Transmission Case.>

15) Check each shifter fork. <Ref. to 5MT-84, INSPECTION, Shifter Fork and Rod.>

16) Select a main shaft rear plate. <Ref. to 5MT-63, ADJUSTMENT, Main Shaft Assembly.>

17) Apply liquid gasket, then join the right side and left side of the case together.

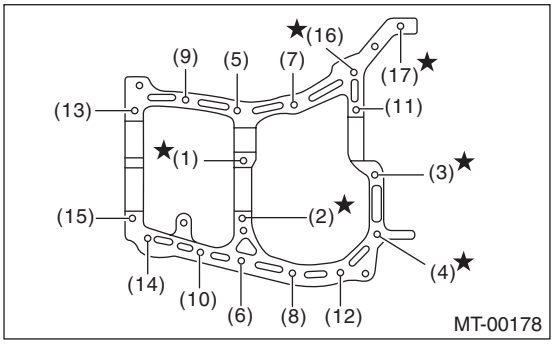
Liquid gasket:
THREE BOND 1215B or equivalent



18) Tighten 17 bolts with brackets and clips as shown in the figure.

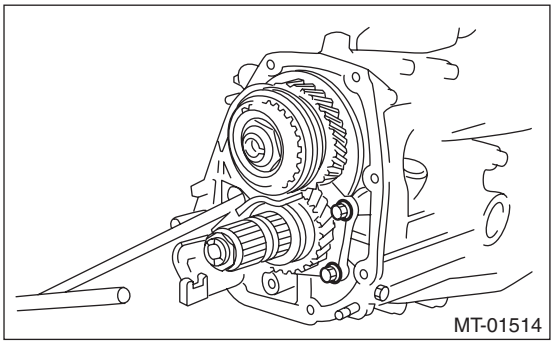
NOTE:
- Insert bolts (11) and (16) from the LH side of the transmission case.
- Match the cases together so that the drive pinion shims are not caught between the cases.

Tightening torque:
8 mm bolt
25 N·m (2.5 kgf-m, 18.4 ft-lb)
★ ***10 mm bolt***
39 N·m (4.0 kgf-m, 28.8 ft-lb)



19) Tighten the bearing mounting bolts.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)

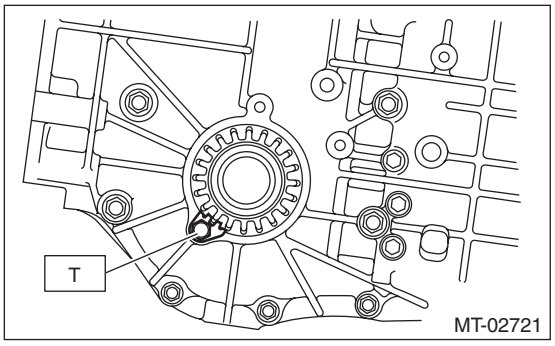


20) Remove the retainer lock plate, and loosen the differential side retainer until the groove of the O-ring appears. Fit the O-ring into the groove and tighten the side retainer into the position where it was not loosened.

NOTE:
• When loosening the side retainer, record the number of the turns made.
• Perform this for both left and right side retainers.
• Use new O-rings.
• Apply transmission gear oil to O-ring.

21) Install the retainer lock plate.

Tightening torque:
T: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



22) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
23) Install the clutch release lever and release bearing. <Ref. to CL-15, INSTALLATION, Release Bearing and Lever.>
24) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

Check the transmission case for cracks, damage, or oil leaks.

16.Main Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-64, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly.

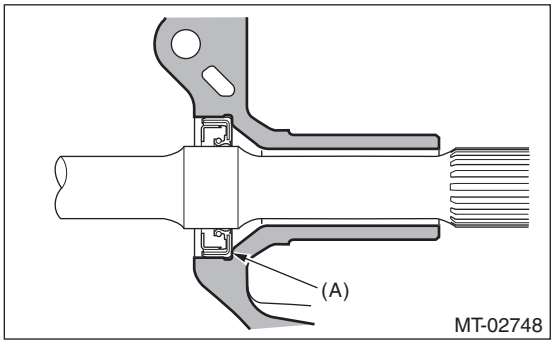
B: INSTALLATION

1) Attach the needle bearing and oil seal to the front of the main shaft assembly.

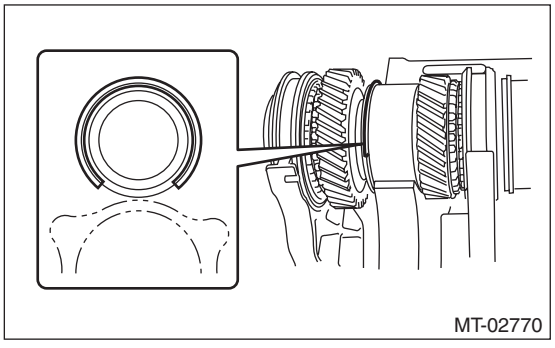
NOTE:
• Wrap the clutch splined section with vinyl tape to prevent damage to the oil seal.
• Apply NICHIMOLY N-130 or the equivalent to the sealing lip of the oil seal.
• Use a new oil seal.

2) Fit the knock pin hole of the needle bearing outer race to the transmission case knock pin, and install the main shaft assembly.

NOTE:
• Align the end face of the seal with surface (A) when installing the oil seal.



• Face the cutout portion of the snap ring for the ball bearing to the drive pinion shaft assembly.



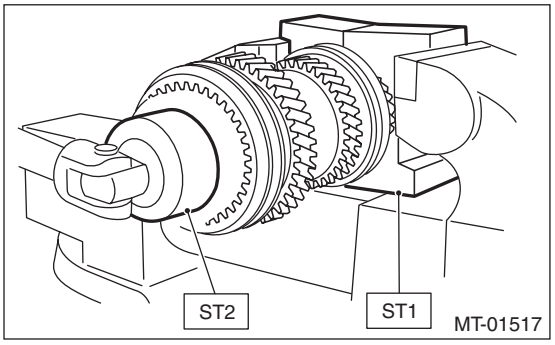
3) Install the drive pinion shaft assembly. <Ref. to 5MT-64, INSTALLATION, Drive Pinion Shaft Assembly.>
4) Check each shifter fork. <Ref. to 5MT-84, INSPECTION, Shifter Fork and Rod.>
5) Select a main shaft rear plate. <Ref. to 5MT-63, ADJUSTMENT, Main Shaft Assembly.>
6) Install the transmission case. <Ref. to 5MT-55, INSTALLATION, Transmission Case.>
7) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
8) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

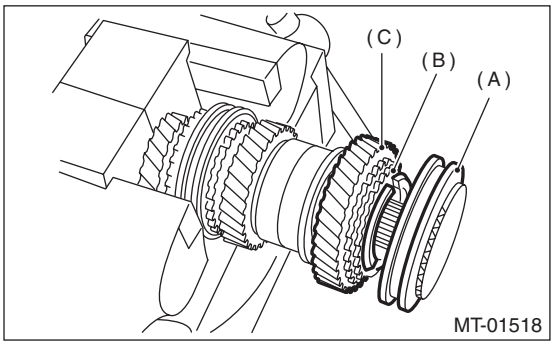
1) Put vinyl tape around main shaft spline to protect the oil seal from damage. Then pull out the oil seal and needle bearing by hand.
2) Remove the lock nut and lock washer.

NOTE:
Flatten the lock nut tab before removing the lock nut.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)



3) Remove the 5th hub & sleeve No. 2, baulk lever, 5th baulk ring, and 5th drive gear & needle bearing.

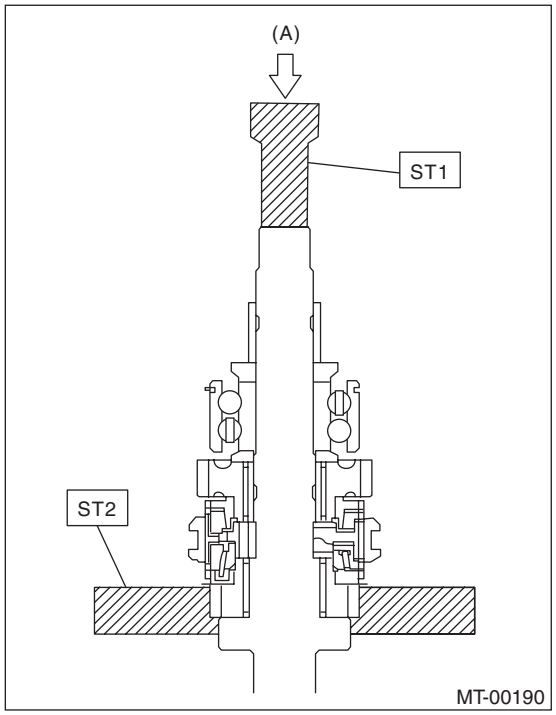


(A) 5th hub & sleeve No. 2
(B) 5th baulk ring
(C) 5th drive gear

4) Using ST1 and ST2, remove the rest of the parts.

NOTE:
• When replacing the sleeve & hub, replace them as a set.
• Do not disassemble the sleeve & hub; the engaging point is pre-determined.
• If it is necessary to disassemble, mark the engaging points on the splines beforehand.

ST1 899864100 REMOVER
ST2 899714110 REMOVER

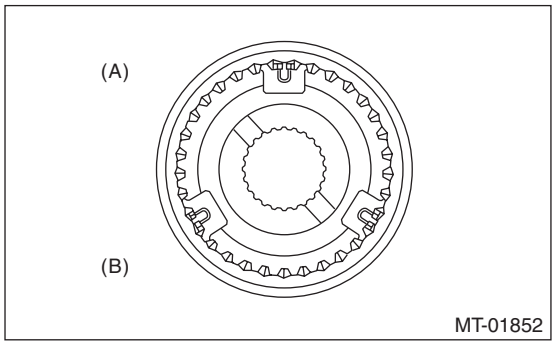


(A) Press

D: ASSEMBLY

1) When the sleeve & hub assemblies have been disassembled, reassemble by aligning the alignment marks.

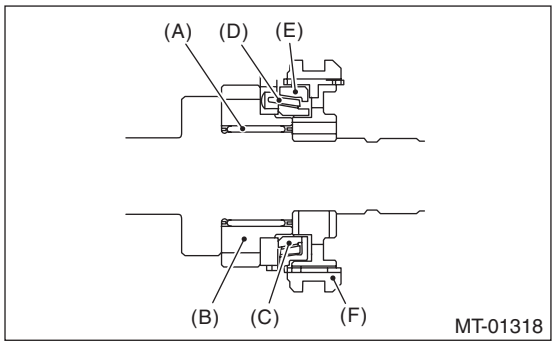
NOTE:
Position the open ends of the spring 120° apart.



(A) 3rd-4th coupling sleeve & synchronizer hub ASSY
(B) 3rd gear side

2) Install the 3rd drive gear, outer baulk ring, 3rd synchro cone, inner baulk ring, 3rd needle bearing, and sleeve & hub assembly.

NOTE:
Align the groove of the baulk ring with the 3rd-4th shifting insert.

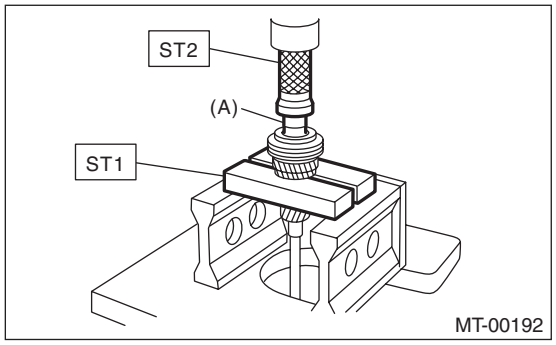


(A) 3rd needle bearing
(B) 3rd drive gear
(C) Inner baulk ring
(D) 3rd synchro cone
(E) Outer baulk ring
(F) Sleeve & hub ASSY

3) Install the 4th needle bearing race using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

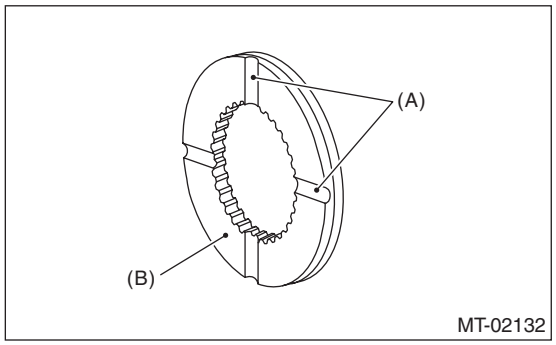
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(A) 4th needle bearing race

4) Install the 4th baulk ring, 4th needle bearing, 4th drive gear, and 4th gear thrust washer to the main shaft.

NOTE:
- Align the 4th baulk ring and hub & sleeve assembly with the key groove.
- Make sure the thrust washer is facing the correct direction.



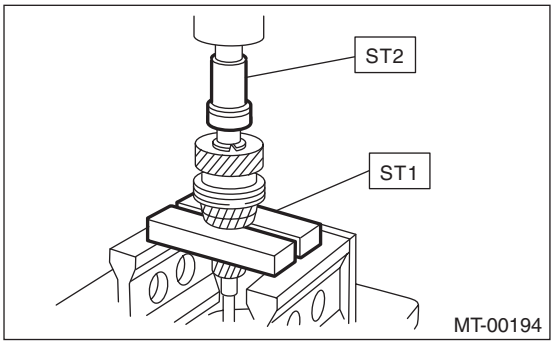
(A) Groove
(B) Face this surface to the 4th gear side.

5) Press-fit the double ball bearing with ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
- Install the snap ring side of the double ball bearing facing the 5th drive gear side.
- Use a new double ball bearing.

ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER

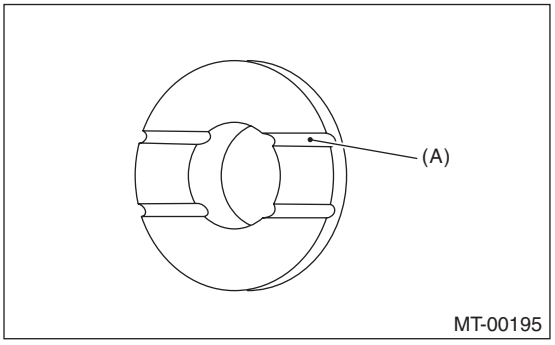


6) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of the main shaft.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Make sure the thrust washer is facing the correct direction.

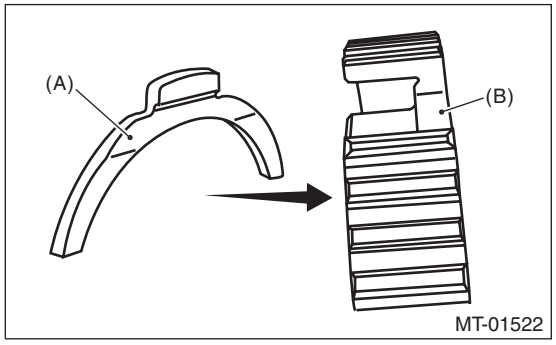
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(A) Face this surface to the 5th gear side.

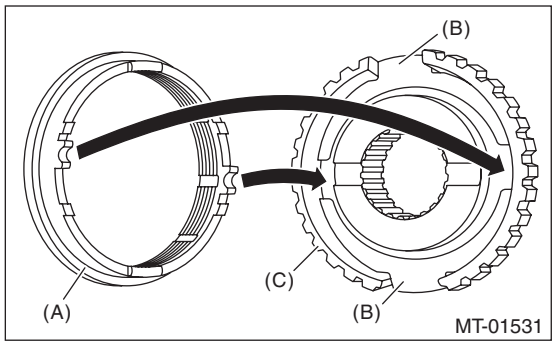
7) Install the rest of the parts to the rear section of the main shaft.

CAUTION:
• Install the baulk lever so that the concave side faces toward the 5th hub.



(A) Baulk lever
(B) 5th hub

• Align the protruded section of the 5th baulk ring between the baulk levers.

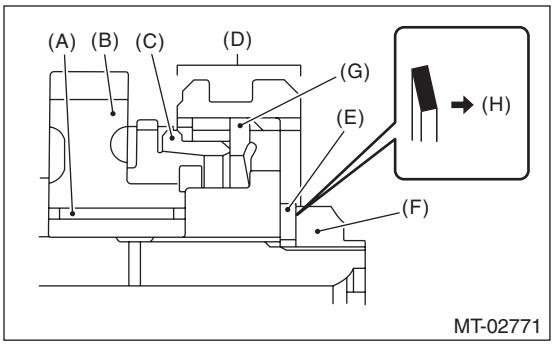


(A) 5th baulk ring
(B) Baulk lever
(C) 5th hub

8) Tighten the lock nuts to the specified torque using ST1 and ST2.

NOTE:
• Use new lock nuts and lock washers.
• Make sure the lock washer is installed in the proper direction.

Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)
ST1 499987003 SOCKET WRENCH (35)
ST2 498937000 TRANSMISSION HOLDER



(A) 5th needle bearing
(B) 5th drive gear
(C) 5th baulk ring
(D) 5th hub & sleeve No. 2
(E) Lock washer
(F) Lock nut
(G) Baulk lever
(H) Nut side

9) Crimp lock nuts in two locations after tightening.

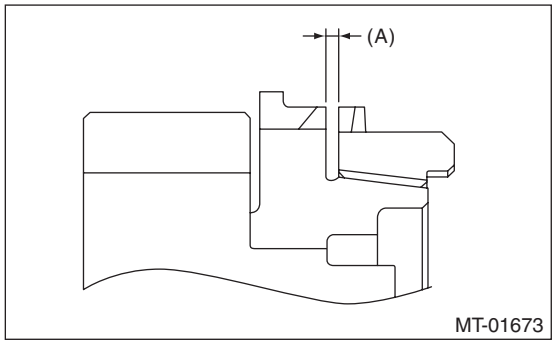
CAUTION:
When crimping the lock nut, be careful not to crack it.

E: INSPECTION

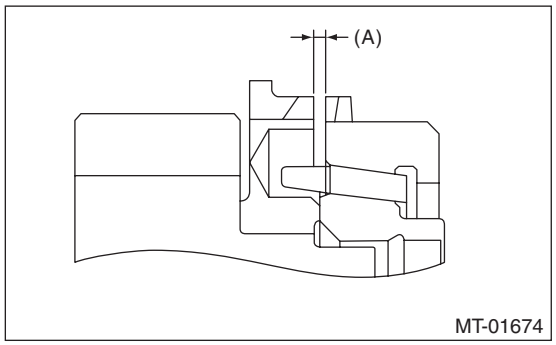
Disassembled parts should be washed with cleaning solvent first, then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
• When the bearing balls, outer races and inner races are broken or rusty.
• When the bearing is worn.
• When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil has been applied.
• When bearing has other defects.
2) Bushing (each gear)
Replace the bushing in following cases.
• When the sliding surface is damaged or abnormally worn.
• When the inner wall is abnormally worn.

3) Gear
Replace gears in the following cases.
• Replace the gear with new part if its tooth surfaces are broken, damaged or excessively worn.
• Correct or replace if the cone that contacts the baulk ring is rough or damaged.
• Correct or replace if the inner surface or end face is damaged.
4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following cases.
• When the inner surface and end face are damaged.
• When the baulk ring inner surface is abnormally or partially worn down.
• When the contact surface of the baulk ring insert section is cracked or abnormally worn.
• If the gap between the end faces of the baulk ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

Clearance (A):
0.5 mm (0.020 in) or more
Single cone



Double cone



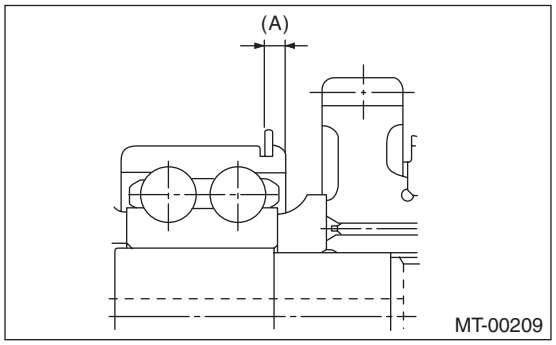
• Apply transmission gear oil to the cone of the gear and while press-fitting the baulk ring, check there is no rotation in the circumferential direction.
5) Shifting insert
Replace the shifting insert if deformed, excessively worn or defective in any way.
6) Coupling sleeve and synchronizer hub
• Check the slipping condition of the coupling sleeve.
• Check the splines on the coupling sleeve and synchronizer hub for wear.
7) Oil seal
Replace the oil seal if the lip is deformed, hardened, worn or defective in any way.
8) Gearshift mechanism
Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.

F: ADJUSTMENT

Selection of main shaft rear plate:
Measure the protrusion amount (A) of ball bearing from transmission main case surface, and select a suitable plate in the following table.

NOTE:
Before measuring, tap the end of main shaft with a plastic hammer lightly in order to make the clearance zero between the main case surface and moving flange of bearing.

Dimension (A) mm (in)	Part No.	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 4.00 (0.1524 — 0.1575)	32294AA051	2

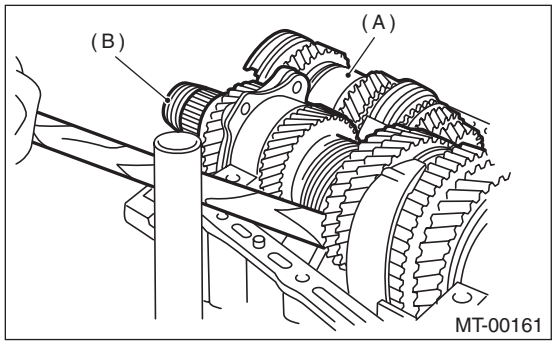


17.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly.

NOTE:
Use a hammer handle, etc. to remove if too tight.

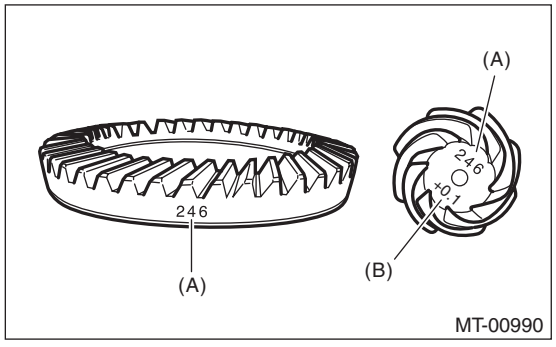


(A) Main shaft ASSY
(B) Drive pinion shaft assembly

5) Remove the main shaft assembly. <Ref. to 5MT-59, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

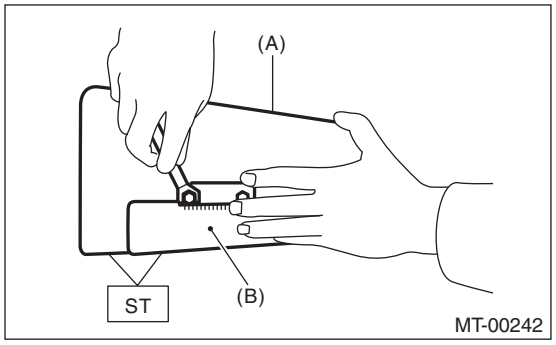
1) Remove the front differential assembly.
2) Hypoid gear set match mark/No.: The number (A) on top of the drive pinion, and the number on the hypoid driven gear are set numbers for the two gears. Use a pair having the same numbers.
The figure (B) below shows a number for shim adjustment. If no number is shown, the value is zero.



(A) Set number
(B) Number for shim adjustment

3) Place the drive pinion shaft assembly on transmission main case RH without shim and tighten the bearing mounting bolts.
4) Perform the adjustment of ST.
(1) Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.

ST 499917500 DRIVE PINION GAUGE ASSY



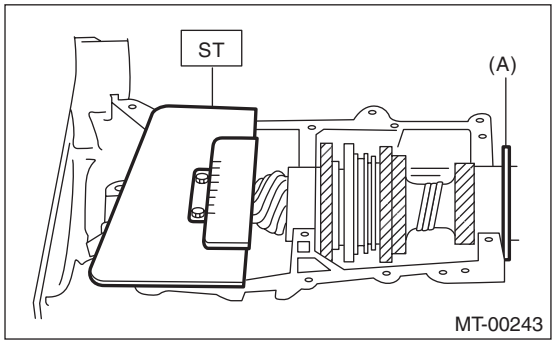
(A) Plate
(B) Scale

(2) Tighten the two bolts.
5) Position the ST by inserting the knock pin of ST into the knock hole of transmission case.

ST 499917500 DRIVE PINION GAUGE ASSY

6) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.

ST 499917500 DRIVE PINION GAUGE ASSY



(A) Adjust the clearance to zero without drive pinion shims.

7) The thickness of drive pinion shims shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the number on drive pinion is prefixed by +, and subtract if the number is prefixed by –.)

ST 499917500 DRIVE PINION GAUGE ASSY

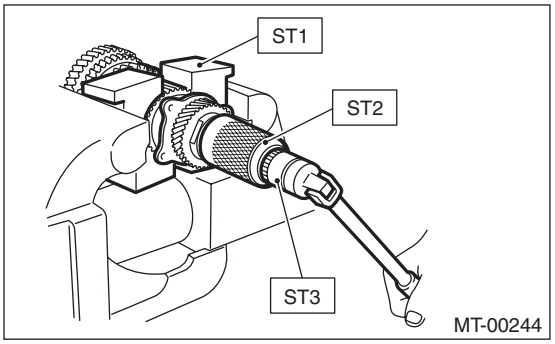
8) Select one to three drive pinion shim(s) from the following table for the value determined as described above, and take the shim(s) whose thickness is closest to the said value.

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA031	0.150 (0.0059)
32295AA041	0.175 (0.0069)
32295AA051	0.200 (0.0079)
32295AA061	0.225 (0.0089)
32295AA071	0.250 (0.0098)
32295AA081	0.275 (0.0108)
32295AA091	0.300 (0.0118)
32295AA101	0.500 (0.0197)

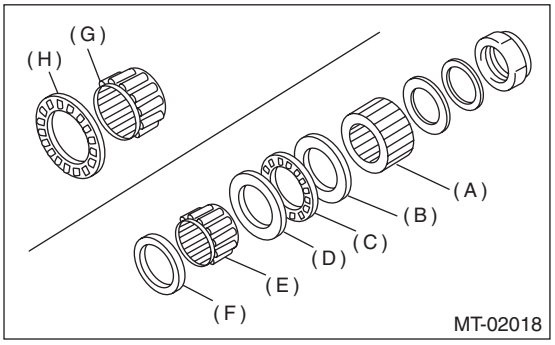
9) Install the front differential assembly. <Ref. to 5MT-74, INSTALLATION, Front Differential Assembly.>
10) Fit the transmission case knock pin to the knock pin hole of the roller bearing and install the drive pinion shaft assembly.
11) Install the main shaft assembly. <Ref. to 5MT-59, INSTALLATION, Main Shaft Assembly.>
12) Check each shifter fork. <Ref. to 5MT-84, INSPECTION, Shifter Fork and Rod.>
13) Install the transmission case. <Ref. to 5MT-55, INSTALLATION, Transmission Case.>
14) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
15) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:
Attach a cloth to the end of driven shaft (on the frictional side of the thrust needle bearing) to prevent damage during disassembly or reassembly.
1) Flatten the tab of the lock nut. Remove the lock nut with ST1, ST2 and ST3.
ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)

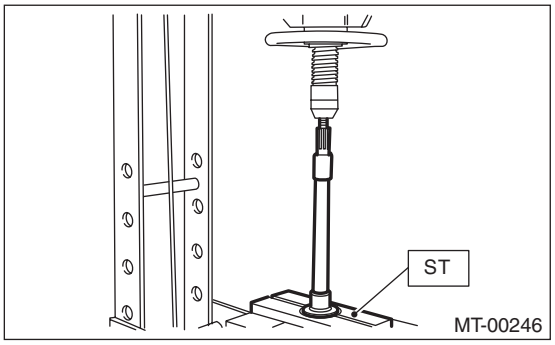


2) Remove the lock washer, washer, differential bevel gear sleeve, adjusting washers No. 1, No. 2 and thrust bearing.
3) Pull out the drive pinion shaft, and remove the needle bearing and drive pinion collar from driven shaft.
4) Remove the needle bearing and thrust bearing from drive pinion shaft.

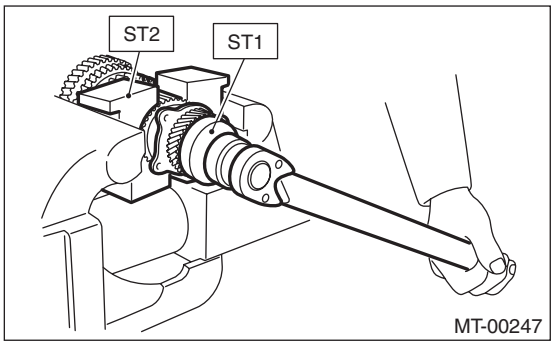


(A) Differential bevel gear sleeve
(B) Adjusting washer No. 1 (25 × 37.5 × t)
(C) Thrust bearing (25 × 37.5 × 3)
(D) Adjusting washer No. 2 (25 × 37.5 × t)
(E) Needle bearing (25 × 30 × 20)
(F) Drive pinion collar
(G) Needle bearing (30 × 37 × 23)
(H) Thrust bearing (33 × 50 × 3)

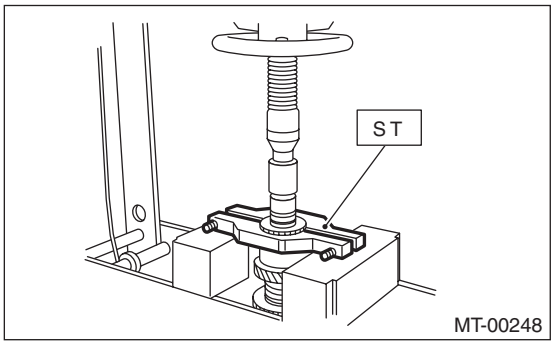
5) Remove the roller bearing and washer using ST and a press.
ST 498077000 REMOVER



6) Flatten the tab of the lock nut. Remove the lock nut and lock washer using ST1 and ST2.
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER

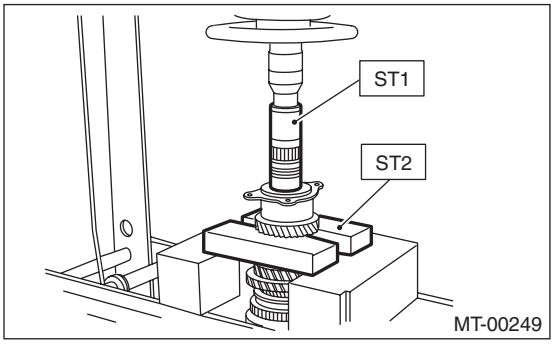


7) Remove the 5th driven gear using ST.
ST 499857000 5TH DRIVEN GEAR REMOVER

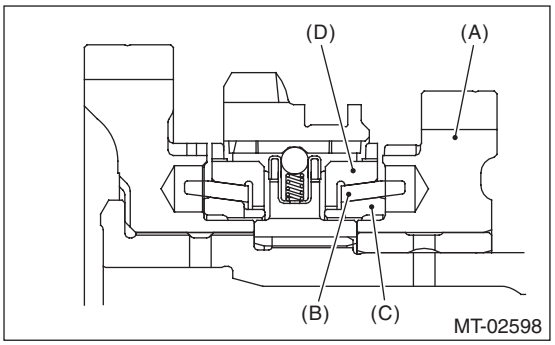


8) Remove the woodruff key.

9) Remove the double taper roller bearing and 3rd-4th driven gear using ST1 and ST2.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER

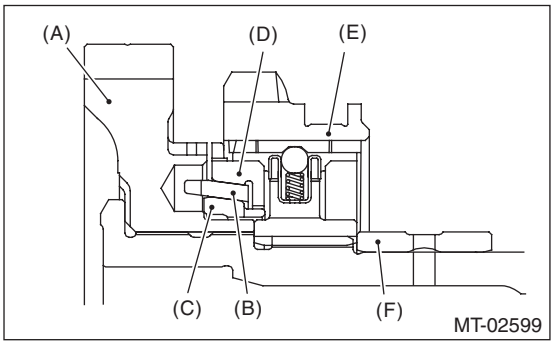


10) Remove the key.
11) Remove the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.



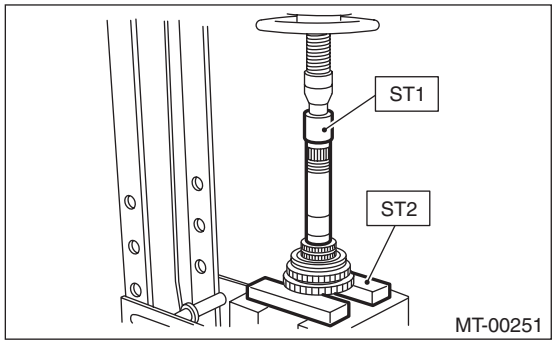
(A) 2nd driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring

12) Remove the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, 2nd driven gear bushing, and gear & hub assembly using ST1 and ST2.



(A) 1st driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring
(E) Gear & hub
(F) 2nd driven gear bushing

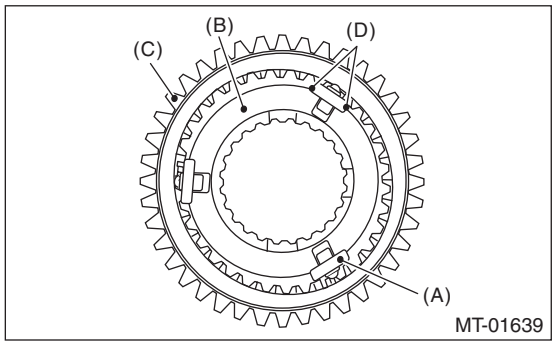
NOTE:
If necessary, use a new gear and hub assembly as a set, when replacing the gear or hub. Because these must engage at the specified point, avoid disassembly as much as possible. If it must be disassembled, mark the engaging point on the spline beforehand.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER



D: ASSEMBLY

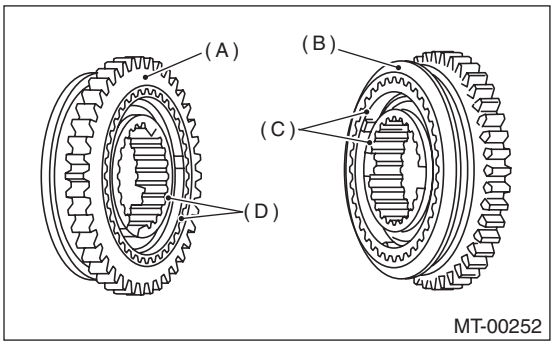
1) Install the sleeve and the gear and hub assembly by matching the alignment marks.

NOTE:
• Make sure that there is no large clearance at both sides of the 1st-2nd shifting insert after assembly.



(A) 1st-2nd shifting insert
(B) 1st-2nd synchronizer hub
(C) Reverse driven gear
(D) There is no large clearance at this part.

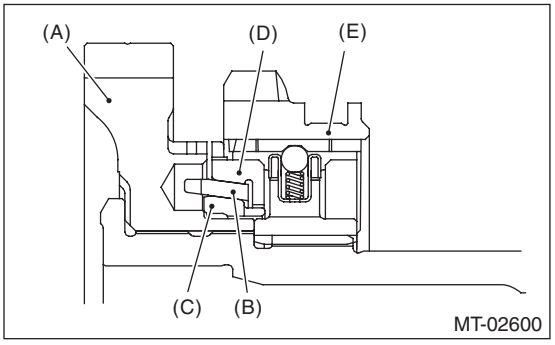
• Use the new gear & hub assembly, if replacing the gear or hub.



(A) 1st gear side
(B) 2nd gear side
(C) Flush surface
(D) Stepped surface

2) Install the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, and gear & hub assembly.

NOTE:
• Install the gear & hub assembly in the proper position while paying attention to the installing direction.
• Align the baulk ring and gear & hub assembly with the key groove.

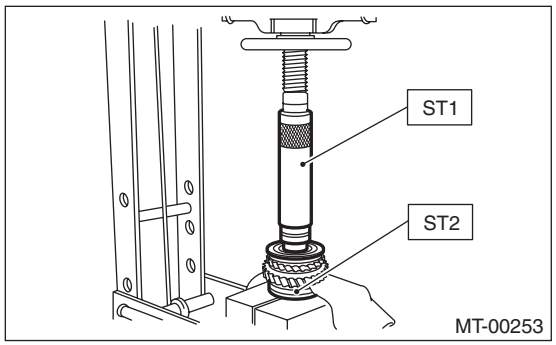


(A) 1st driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring
(E) Gear & hub

3) Install the 2nd driven gear bushing using ST1, ST2 and a press.

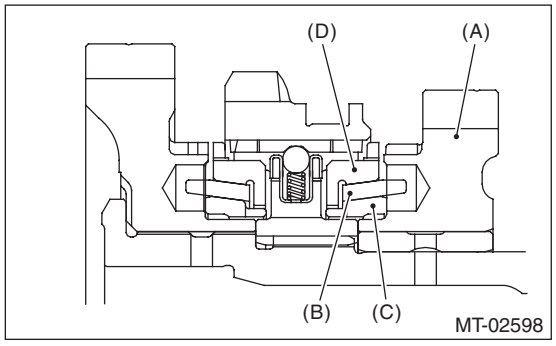
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
• Attach a cloth to the end of the driven shaft to prevent damage.
• When press fitting, align the oil holes of the shaft and bushing.
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



4) Attach and insert the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.

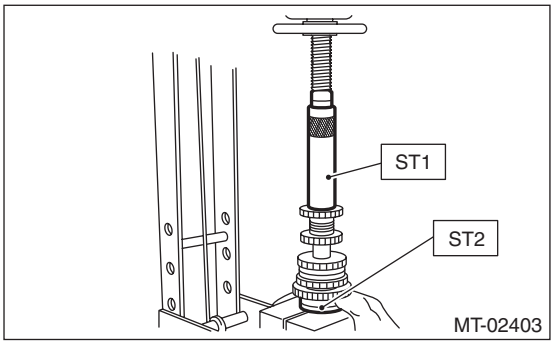
NOTE:
Align the groove of the baulk ring with the 1st-2nd shifting insert.



(A) 2nd driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring

5) After installing key onto the driven shaft, install the 3rd-4th driven gear using ST1, ST2 and a press.

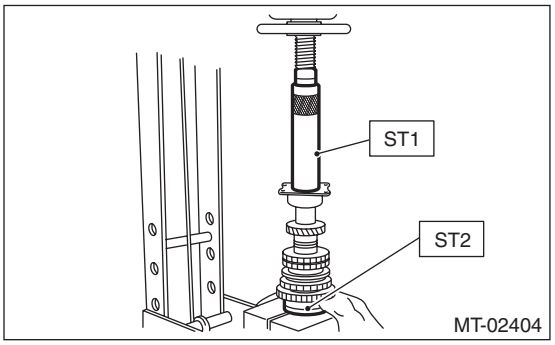
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



6) Install the set of double taper roller bearing using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

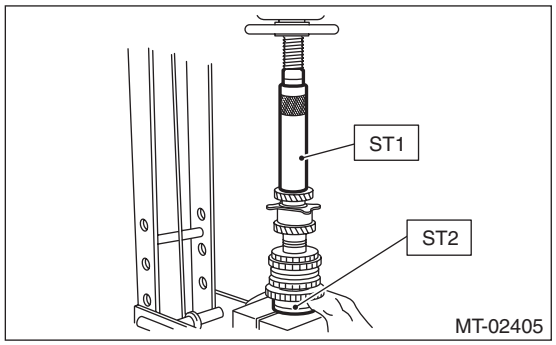
NOTE:
Use a new double taper roller bearing.
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



7) Position the woodruff key in groove of the rear of driven shaft. Install the 5th driven gear using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

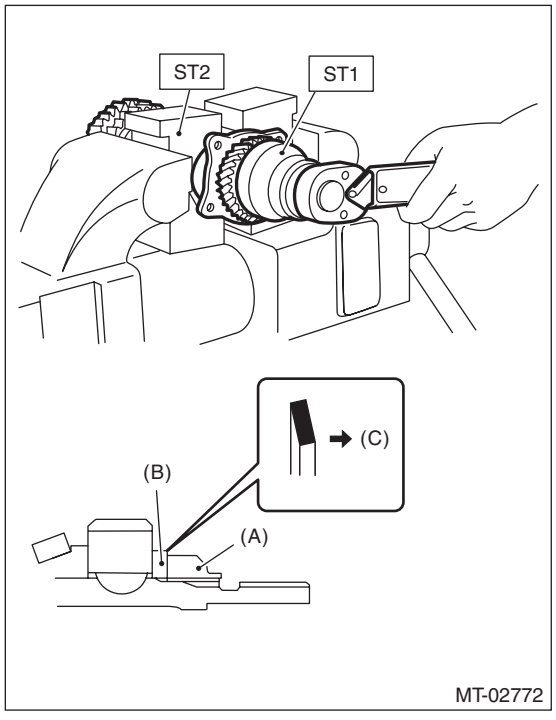
NOTE:
Face the groove for identification of the 5th driven gear toward the nut.
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



8) Install the lock washer. Tighten the lock nuts to the specified torque using ST1 and ST2.

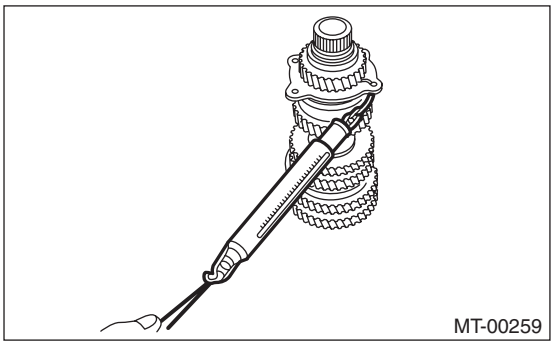
NOTE:
- Use new lock nuts and lock washers.
- Make sure the lock washer is installed in the proper direction.

Tightening torque:
260 N·m (26.5 kgf-m, 191.8 ft-lb)
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER



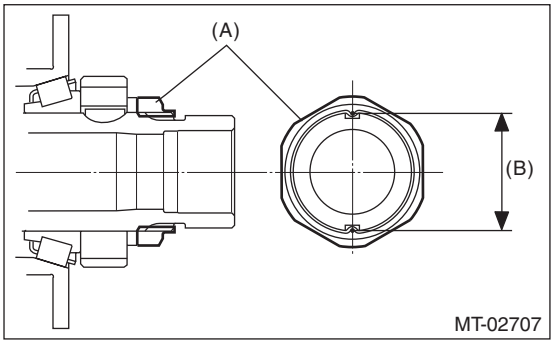
(A) Lock nut
(B) Lock washer
(C) Nut side

9) Using a spring scale, check that starting torque of the double taper roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.34 lbf).



10) Crimp the lock nut at two locations so that the dimension (B) becomes 41.1 mm (1.62 in) or less.

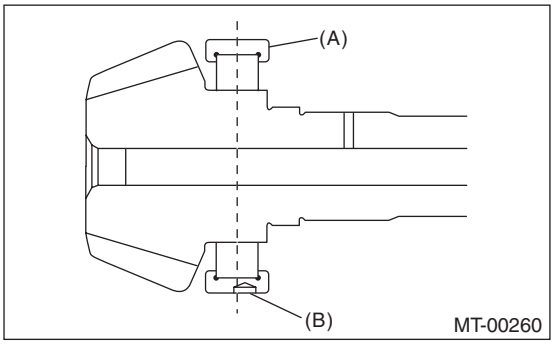
CAUTION:
When crimping the lock nut, be careful not to crack it.



(A) Lock nut
(B) Outer dimension after crimping

11) Install the roller bearing.

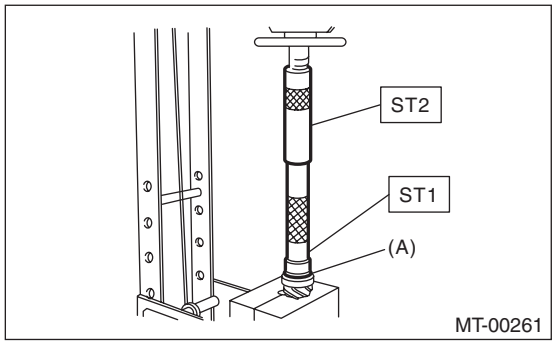
NOTE:
- Use a new roller bearing.
- Install with the knock pin hole of the roller bearing outer race facing the rear side.



(A) Roller bearing
(B) Knock pin hole

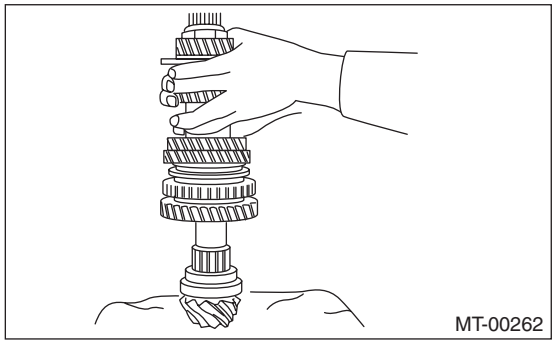
12) Install the washer using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 499277200 INSTALLER

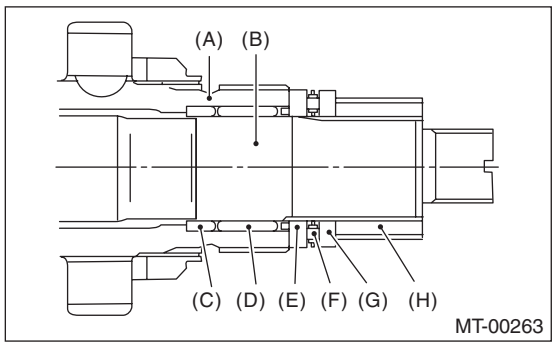


(A) Washer

13) Install the thrust bearing and needle bearing and install the driven shaft assembly.



14) Install the drive pinion collar, needle bearing, adjusting washer No. 2, thrust bearing, adjusting washer No. 1 and differential bevel gear sleeve in this order.

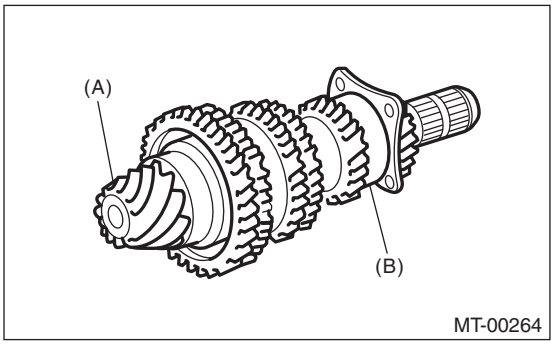


(A) Driven shaft
(B) Drive pinion shaft
(C) Drive pinion collar
(D) Needle bearing (25 × 30 × 20)
(E) Adjusting washer No. 2 (25 × 36 × t)
(F) Thrust bearing (25 × 37.5 × 3)
(G) Adjusting washer No. 1 (25 × 36 × t)
(H) Differential bevel gear sleeve

15) Adjust the thrust bearing preload. <Ref. to 5MT-71, THRUST BEARING PRELOAD, ADJUSTMENT, Drive Pinion Shaft Assembly.>

E: INSPECTION

Disassembled parts should be washed with cleaning solvent first, then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
• When the bearing balls, outer races and inner races are broken or rusty.
• When the bearing is worn.
• When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil has been applied.
• The double taper roller bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion shaft assembly is disassembled. In this case, because a preload is working on the bearing, its rotation feels like it is slightly dragging unlike other bearings.

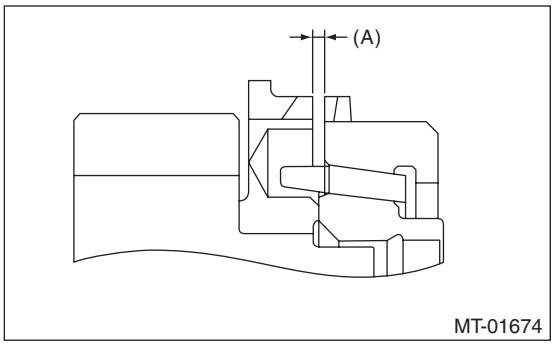


(A) Drive pinion shaft
(B) Double taper roller bearing

• When bearing has other defects.
2) Bushing (each gear)
Replace the bushing in following cases.
• When the sliding surface is damaged or abnormally worn.
• When the inner wall is abnormally worn.
3) Gear
Replace gears in the following cases.
• Replace the gear with new part if its tooth surfaces are broken, damaged or excessively worn.
• Correct or replace if the cone that contacts the baulk ring is rough or damaged.
• Correct or replace if the inner surface or end face is damaged.

4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following cases.
• When the inner surface and end face are damaged.
• When the baulk ring inner surface is abnormally or partially worn down.
• When the contact surface of the baulk ring insert section is cracked or abnormally worn.
• If the gap between the end faces of the baulk ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

Clearance (A):
0.5 mm (0.020 in) or more

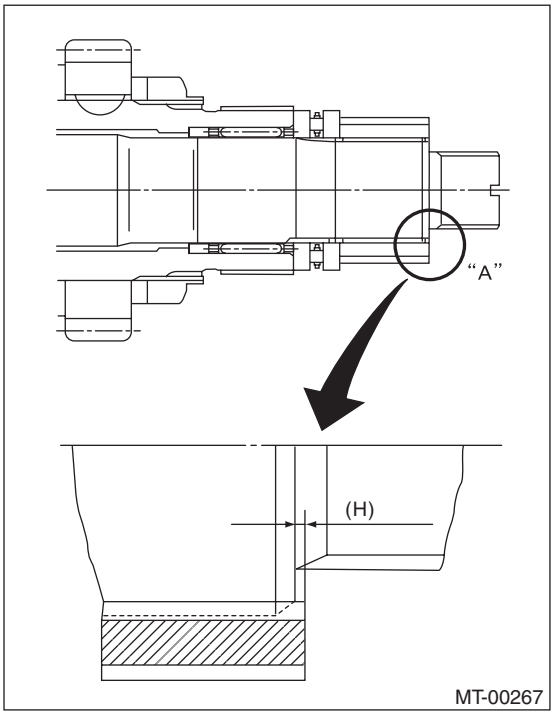


• Apply transmission gear oil to the cone of the gear and while press-fitting the baulk ring, check there is no rotation in the circumferential direction.
5) Coupling sleeve and synchronizer hub
• Check the slipping condition of the coupling sleeve.
• Check the splines on the coupling sleeve and synchronizer hub for wear.
6) Shifting insert
Replace the shifting insert if deformed, excessively worn or defective in any way.

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

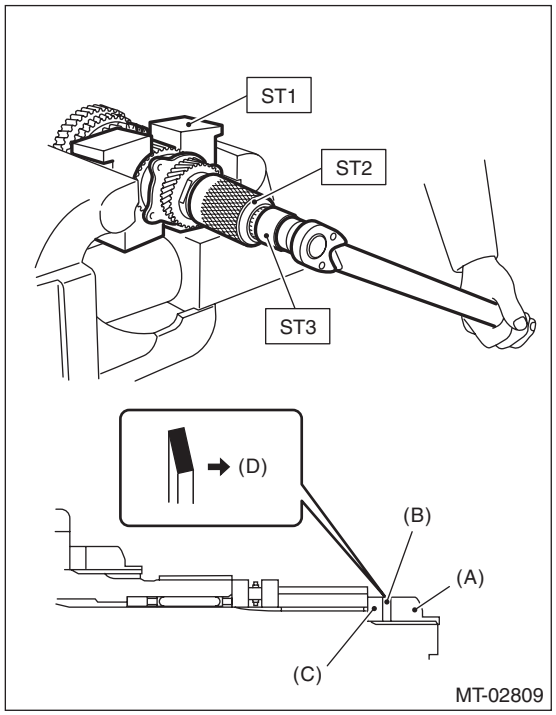
1) Select a suitable adjusting washer No. 1 so that dimension (H) will be zero in a visual check. Position the washer (18.3 × 30 × t) and lock washer (18 × 30 × 2) and attach the lock nut.



2) Using the ST1, ST2 and ST3, tighten the lock nut to the specified torque.

NOTE:
- Use new lock nuts and lock washers.
- Make sure the lock washer is installed in the proper direction.

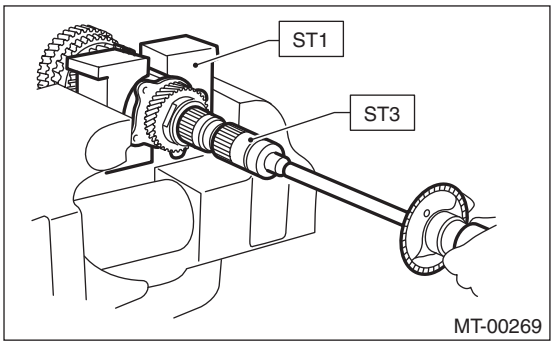
Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)
ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)



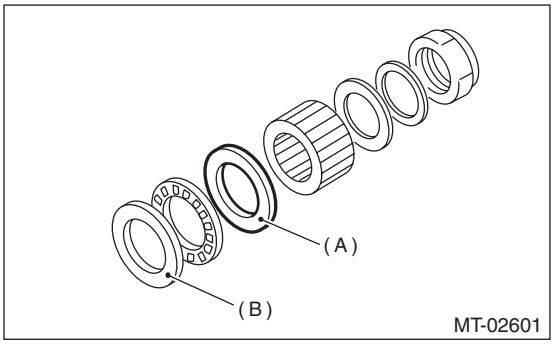
(A) Lock nut
(B) Lock washer
(C) Washer
(D) Nut side

3) After removing the ST2, measure the starting torque using torque driver.

Starting torque:
0.3 — 0.8 N·m (0.03 — 0.08 kgf-m, 0.22 — 0.59 ft-lb)
ST1 899884100 HOLDER
ST3 899988608 SOCKET WRENCH (27)



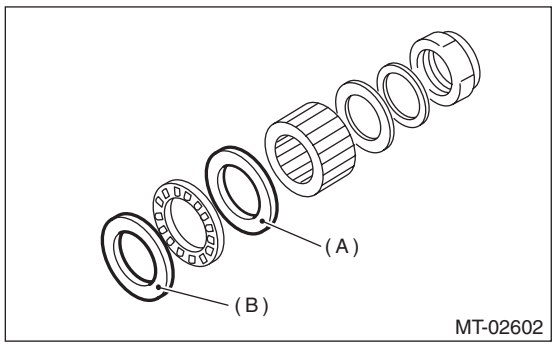
4) If the starting torque is not within the specified limit, select new adjusting washer No. 1 and re-check starting torque.



(A) Adjusting washer No. 1
(B) Adjusting washer No. 2

Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025051	3.925 (0.1545)
803025052	3.950 (0.1555)
803025053	3.975 (0.1565)
803025054	4.000 (0.1575)
803025055	4.025 (0.1585)
803025056	4.050 (0.1594)
803025057	4.075 (0.1604)

5) If the specified starting torque cannot be obtained by the selection of adjusting washer No. 1, select adjusting washer No. 2 from the list below. Repeat steps 1) through 4) to adjust starting torque.



(A) Adjusting washer No. 1
(B) Adjusting washer No. 2

Starting torque	Dimension H	Adjusting washer No. 2
Low	Small	Select thicker one.
High	Large	Select thinner one.

Adjusting washer No. 2	
Part No.	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)

6) Recheck that the starting torque is within the specified range, then crimp the lock nut at four positions.

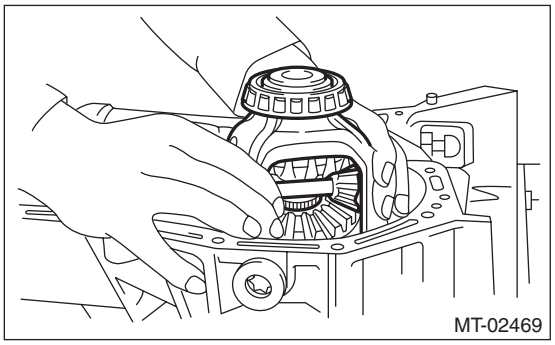
CAUTION:
When crimping the lock nut, be careful not to crack it.

18.Front Differential Assembly

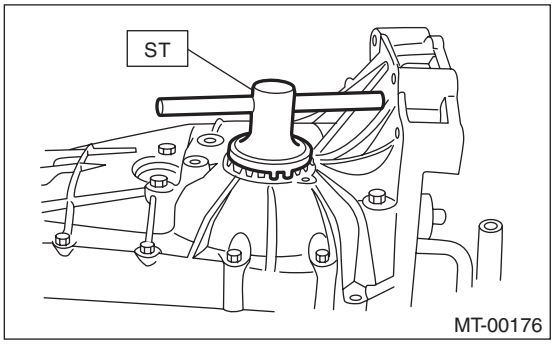
A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-64, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly. <Ref. to 5MT-59, REMOVAL, Main Shaft Assembly.>
6) Remove the front differential assembly.

NOTE:
• Do not confuse the right and left taper roller bearing outer races.
• Be careful not to damage the oil seal of differential side retainer.


MT-02469

7) Remove the differential side retainers using ST.
ST 18630AA010 WRENCH COMPL RETAINER



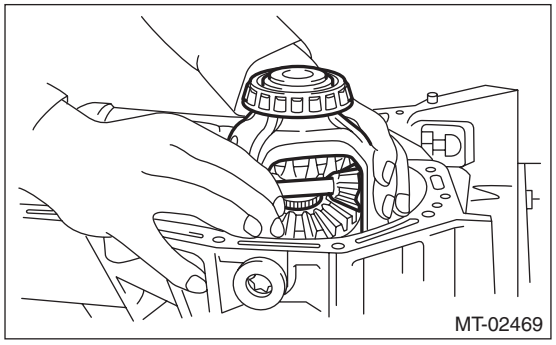
MT-00176

8) Remove the taper roller bearing outer race from the transmission case.
ST 398527700 PULLER ASSY

B: INSTALLATION

1) Install the differential side retainers using ST.
ST 18630AA010 WRENCH COMPL RETAINER
2) Install the taper roller bearing outer race to the transmission case.
3) Install the front differential assembly.

NOTE:
Be careful not to bend the seal lips of oil seal.

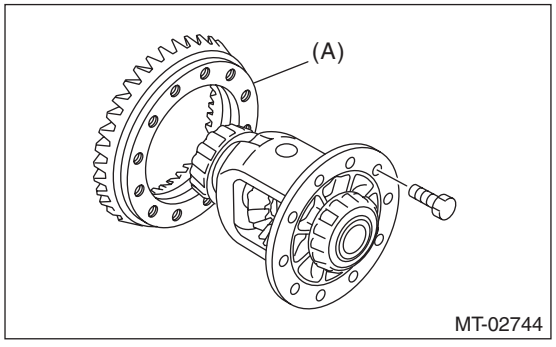

MT-02469

4) Install the main shaft assembly. <Ref. to 5MT-59, INSTALLATION, Main Shaft Assembly.>
5) Install the drive pinion shaft assembly. <Ref. to 5MT-64, INSTALLATION, Drive Pinion Shaft Assembly.>
6) Install the transmission case. <Ref. to 5MT-55, INSTALLATION, Transmission Case.>
7) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
8) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

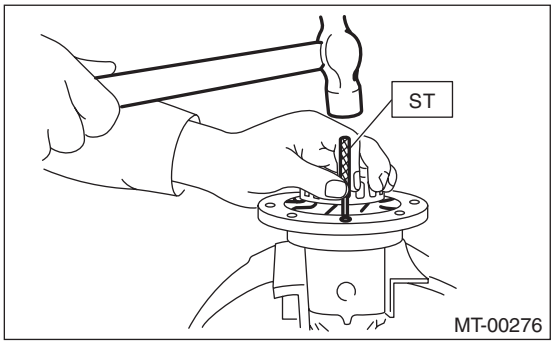
1) Remove the twelve bolts and remove hypoid driven gear.



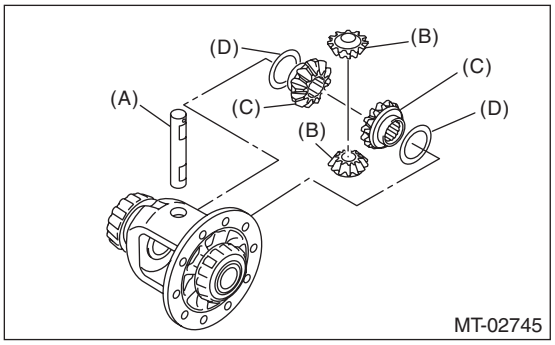
MT-02744

(A) Hypoid driven gear

2) Drive out the straight pin from differential assembly toward hypoid driven gear side.
ST 899904100 STRAIGHT PIN REMOVER

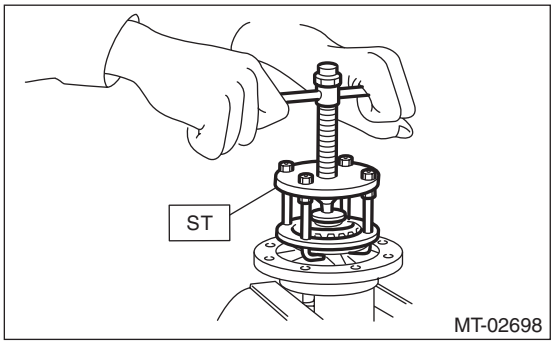


3) Pull out the pinion shaft, and remove the differential bevel pinion, differential bevel gear and adjusting washer.



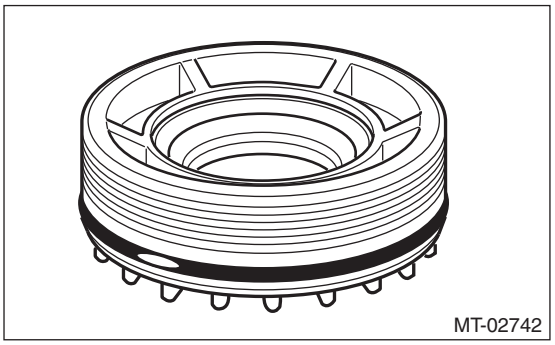
(A) Pinion shaft
(B) Differential bevel pinion
(C) Differential bevel gear
(D) Adjusting washer

4) Using the ST, remove the taper roller bearing.
ST 899524100 PULLER SET



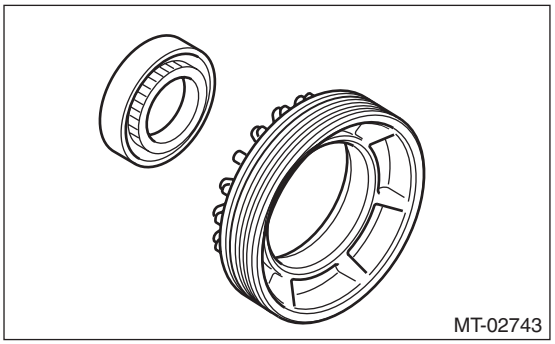
2. DIFFERENTIAL SIDE RETAINER

1) Remove the O-ring.



2) Remove the oil seal.

NOTE:
Remove it using a flat tip screwdriver wrapped with cloth or tape, etc.

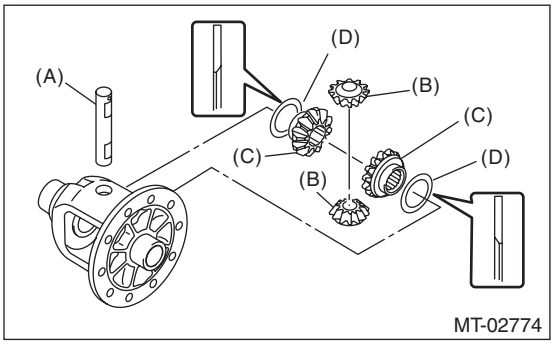


D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the differential bevel gear and differential bevel pinion together with adjusting washer, and insert the pinion shaft.

NOTE:
Face the chamfered side of adjusting washer toward bevel gear.

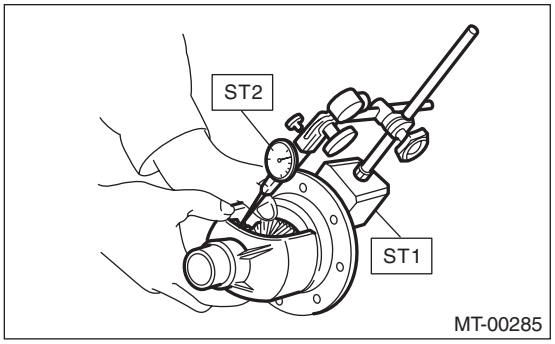


(A) Pinion shaft
(B) Differential bevel pinion
(C) Differential bevel gear
(D) Adjusting washer

2) Measure the backlash between the differential bevel gear and differential bevel pinion. Adjust the backlash if not within specified limit. <Ref. to 5MT-79, DIFFERENTIAL BEVEL PINION GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

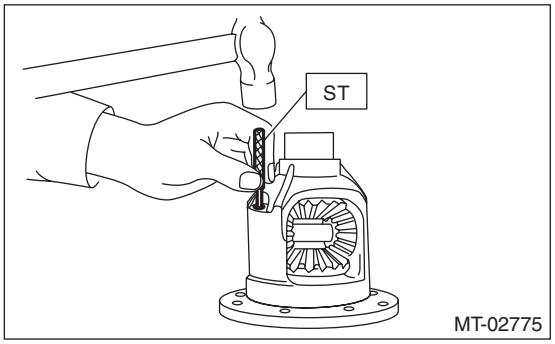
NOTE:
Be sure the bevel pinion gear teeth contact adjacent gear teeth during measurement.

Standard backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE



3) Align the pinion shaft and differential case with each hole, and drive the straight pin into the holes from the hypoid driven gear side using the ST.

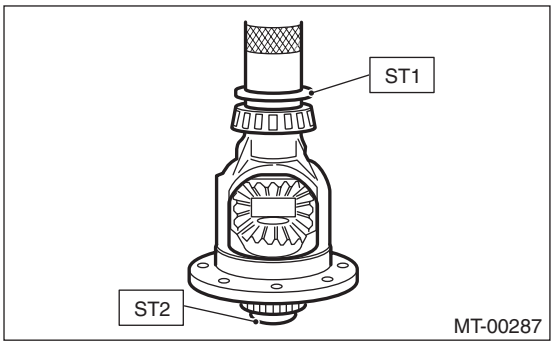
NOTE:
Use a new straight pin. After driving, crimp the area around the hole, and make sure that the straight pin will not come out.
ST 899904100 STRAIGHT PIN REMOVER



4) Install the taper roller bearing.

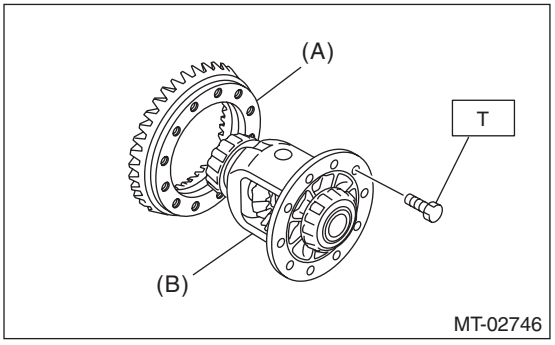
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Be careful when handling because the taper roller bearing and the outer race are used as a set.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 SEAT



5) Install the hypoid driven gear using twelve bolts.

Tightening torque:
T: 62 N·m (6.3 kgf-m, 45.7 ft-lb)



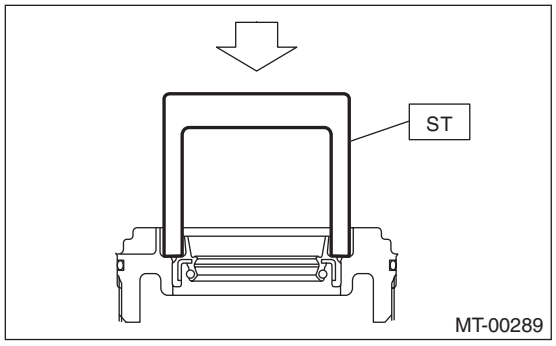
(A) Hypoid driven gear
(B) Differential case

2. DIFFERENTIAL SIDE RETAINER

1) Using the ST, install the oil seal by lightly tapping with a plastic hammer.

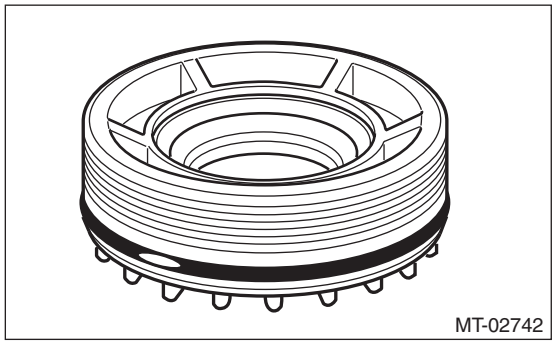
NOTE:
- Use a new oil seal.
- Apply transmission gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.
- Check the identification marks (R, L), and attach the oil seal RH and LH.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



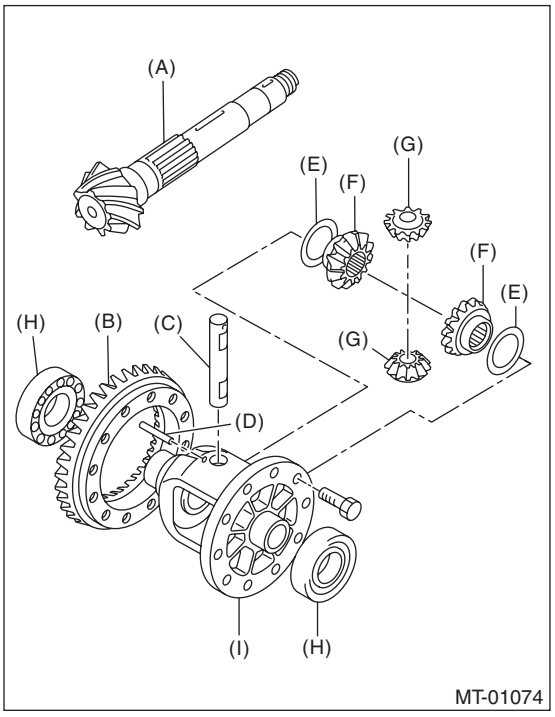
2) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply transmission gear oil to O-ring.
- Do not stretch or damage the O-ring.
- Install the O-ring after adjusting the backlash of the hypoid driven gear and the preload of the taper roller bearing.



E: INSPECTION

Repair or replace the differential gear in the following cases:
- When the hypoid driven gear and drive pinion shaft tooth surfaces are damaged, excessively worn, or seized.
- When the roller bearing on the drive pinion shaft has a worn or damaged roller path.
- When there is damage, wear or seizure of the differential bevel pinion, differential bevel gear, adjusting washer, pinion shaft or straight pin.
- When the differential case sliding surfaces are worn or damaged.



(A) Drive pinion shaft
(B) Hypoid driven gear
(C) Pinion shaft
(D) Straight pin
(E) Adjusting washer
(F) Differential bevel gear
(G) Differential bevel pinion
(H) Taper roller bearing
(I) Differential case

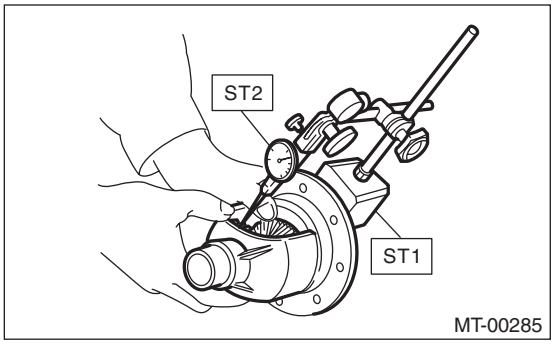
1. DIFFERENTIAL BEVEL PINION GEAR BACKLASH

Measure the backlash between the differential bevel gear and differential bevel pinion. Adjust the backlash if not within specified limit. <Ref. to 5MT-79, ADJUSTMENT, Front Differential Assembly.>

NOTE:
Be sure the bevel pinion gear teeth contact adjacent gear teeth during measurement.

Standard backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)

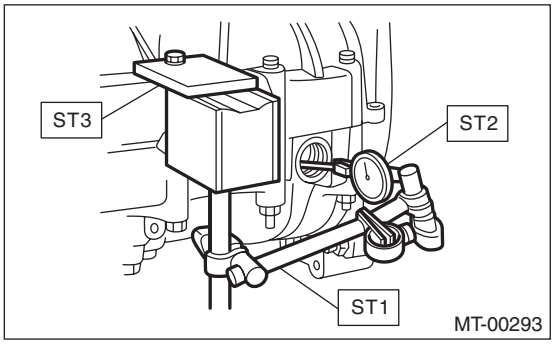
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE



2. HYPOID DRIVEN GEAR BACKLASH

1) Set the ST1, ST2 and ST3. Insert the needle through drain plug hole so that the needle comes in contact with the tooth surface on the right corner, and check the backlash.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE
ST3 498255400 PLATE



2) Install SUBARU genuine axle shafts to both sides, rotate in the inversion direction so that the gauge contacts the tooth surface, and read the dial gauge.

NOTE:
If the backlash is outside the specified range, adjust it by turning the differential side retainer in the right side case.

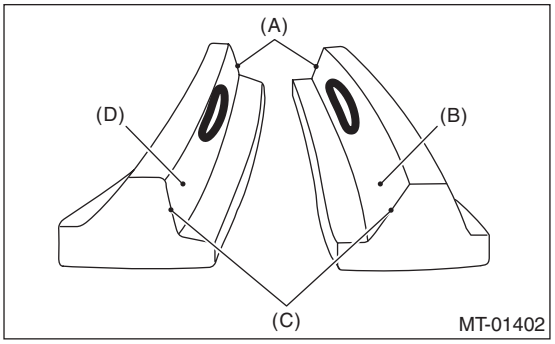
Backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)

Part No. 38415AA100 Axle shaft

3. TOOTH CONTACT OF HYPOID DRIVEN GEAR

Check tooth contact of hypoid driven gear as follows: Apply a thin uniform coat of red lead on both teeth surfaces of three to four teeth of the driven gear. Move the driven gear back and forth by turning the main shaft until a definite contact pattern is developed on the driven gear, and judge whether face contact is correct. When the contact pattern is not correct, adjust. <Ref. to 5MT-79, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



(A) Toe
(B) Coast side
(C) Heel
(D) Drive side

F: ADJUSTMENT

1. DIFFERENTIAL BEVEL PINION GEAR BACKLASH

1) Disassemble the front differential assembly. <Ref. to 5MT-74, DISASSEMBLY, Front Differential Assembly.>
2) Select the adjusting washer from the table and install.

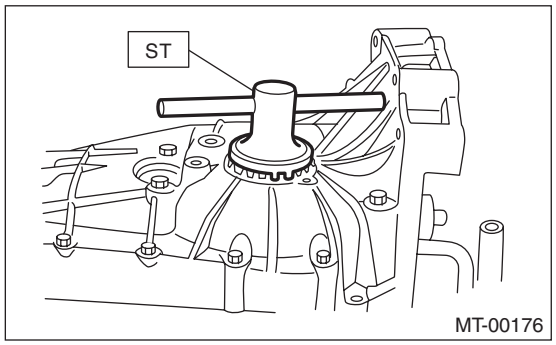
Adjusting washer	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

3) Adjust until the standard value is obtained.

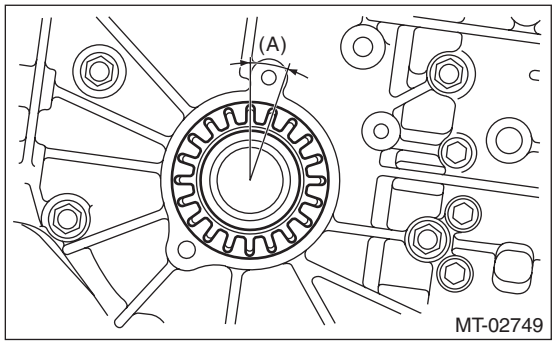
Backlash:
Standard
0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID DRIVEN GEAR BACKLASH

Adjust the backlash by rotating the differential side retainer in the RH side case.
ST 18630AA010 WRENCH COMPL RETAINER

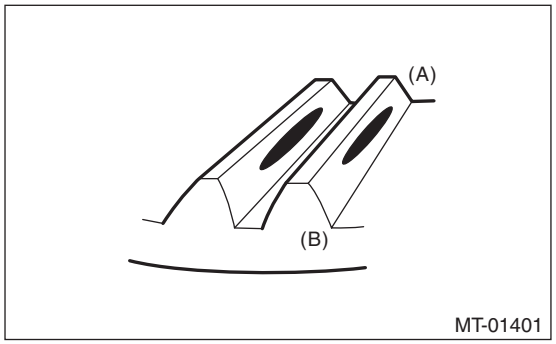


NOTE:
Each time the side retainer rotates by one notch (A), the backlash changes by 0.05 mm (0.020 in).



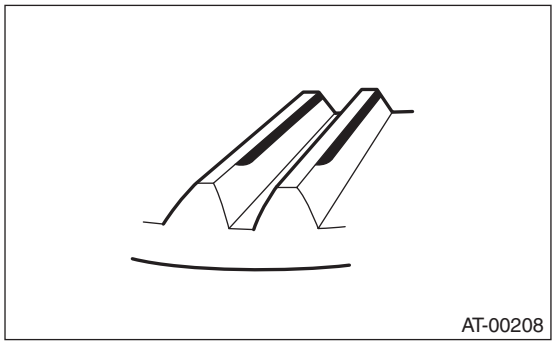
3. TOOTH CONTACT OF HYPOID DRIVEN GEAR

1) Adjust until correct teeth contact is obtained.
2) Check tooth contact, and perform the adjustment as follows.
• Correct tooth contact
Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)

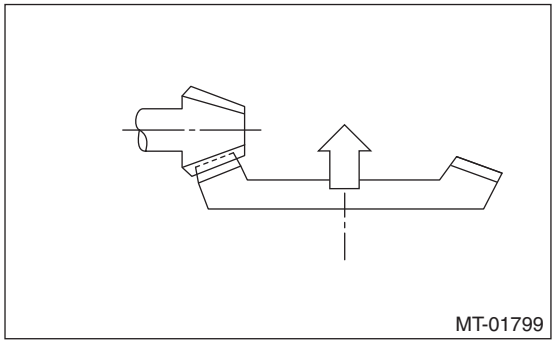


(A) Toe side
(B) Heel side

• Face contact
Check item: Backlash is too large.
Contact pattern



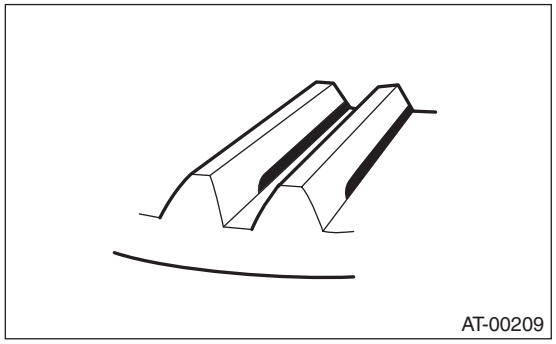
Corrective action: Tighten the differential side retainer to move the driven gear closer to the drive pinion shaft.



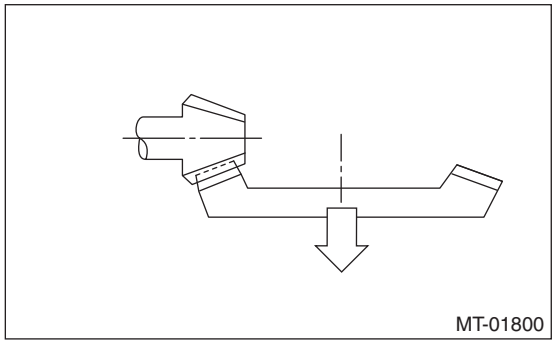
• Flank contact

Check item: Backlash is too small.

Contact pattern



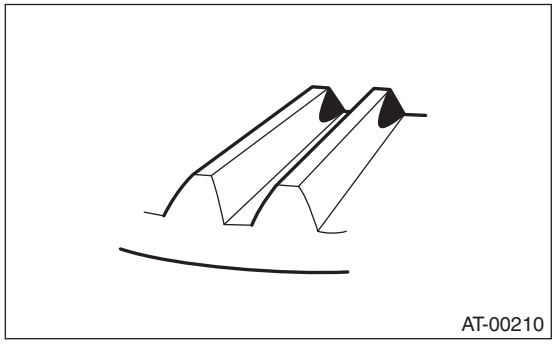
Corrective action: Loosen the differential side retainer to move the driven gear away from the drive pinion shaft.



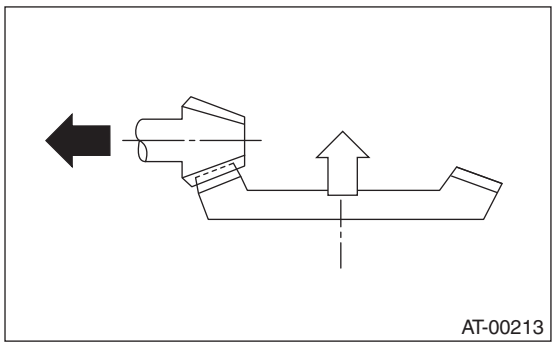
• Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



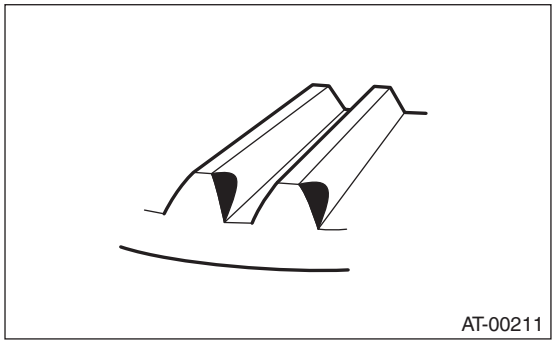
Corrective action: Increase the thickness of drive pinion shim and tighten the differential side retainer to move the driven gear closer to the drive pinion shaft according to the procedure for bringing drive pinion shaft away from driven gear.



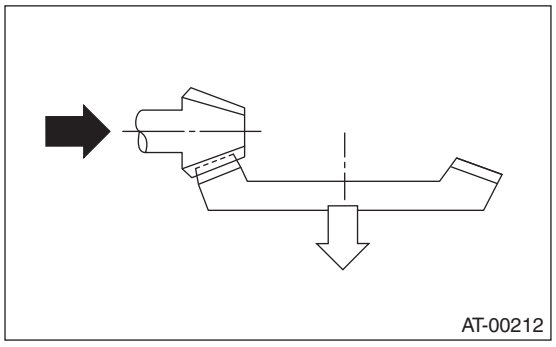
• Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



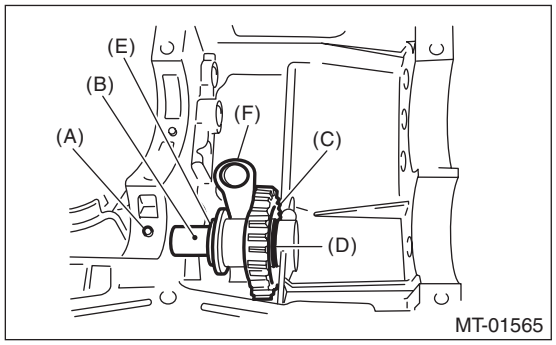
Corrective action: Reduce thickness of the drive pinion shim according to the procedures for moving the drive pinion shaft closer to driven gear. Also loosen the differential side retainer to move the driven gear away from the drive pinion shaft.



19.Reverse Idler Gear

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-36, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-64, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly. <Ref. to 5MT-59, REMOVAL, Main Shaft Assembly.>
7) Remove the front differential assembly. <Ref. to 5MT-74, REMOVAL, Front Differential Assembly.>
8) Remove the shifter forks and rods. <Ref. to 5MT-83, REMOVAL, Shifter Fork and Rod.>
9) Pull out the straight pin, and remove the reverse idler gear shaft, adjusting washer, reverse idler gear and washer.



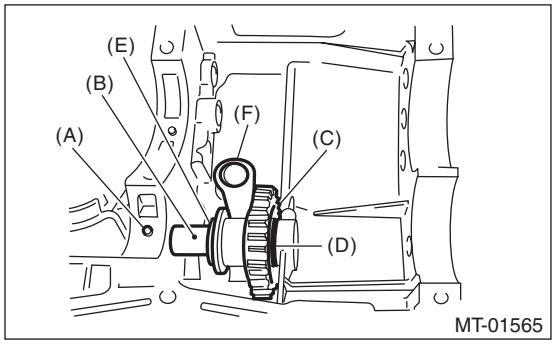
(A) Straight pin
(B) Reverse idler gear shaft
(C) Reverse idler gear
(D) Adjusting washer
(E) Reverse idler gear washer
(F) Reverse shifter lever

10) Remove the reverse shifter lever.

B: INSTALLATION

1) Install the reverse shifter lever, adjusting washer, reverse idler gear, reverse idler gear shaft and washer, and secure them with the straight pin.

NOTE:
• Be sure to install the reverse idler gear shaft from rear side.
• Use a new straight pin.



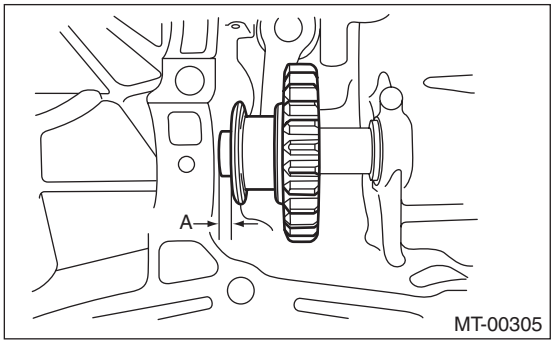
(A) Straight pin
(B) Reverse idler gear shaft
(C) Reverse idler gear
(D) Adjusting washer
(E) Reverse idler gear washer
(F) Reverse shifter lever

2) Check and adjust clearance between the reverse idler gear and the timing case wall surface. <Ref. to 5MT-81, INSTALLATION, Reverse Idler Gear.> <Ref. to 5MT-82, ADJUSTMENT, Reverse Idler Gear.>
3) Install the shifter forks and rods. <Ref. to 5MT-83, INSTALLATION, Shifter Fork and Rod.>
4) Install the front differential assembly. <Ref. to 5MT-74, INSTALLATION, Front Differential Assembly.>
5) Install the main shaft assembly. <Ref. to 5MT-59, INSTALLATION, Main Shaft Assembly.>
6) Install the drive pinion shaft assembly. <Ref. to 5MT-64, INSTALLATION, Drive Pinion Shaft Assembly.>
7) Install the transmission case. <Ref. to 5MT-55, INSTALLATION, Transmission Case.>
8) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
9) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
10) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

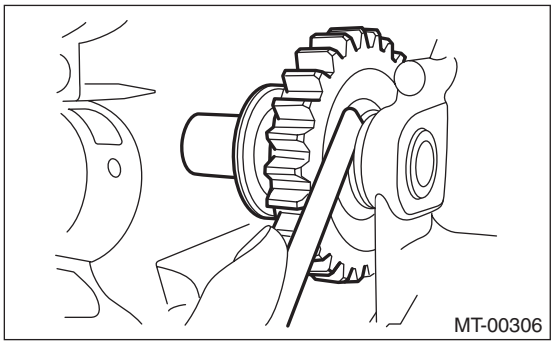
1) Move the reverse shifter rod toward the reverse side. Check the clearance between the reverse idler gear and the transmission case wall surface.
If the value is out of specification, select the appropriate reverse shifter lever and adjust. <Ref. to 5MT-82, ADJUSTMENT, Reverse Idler Gear.>

Clearance A:
6.0 — 7.5 mm (0.236 — 0.295 in)



2) After installing a suitable reverse shifter lever, shift into neutral. Check the clearance between the reverse idler gear and the transmission case wall surfaces.
If the value is out of specification, select the appropriate adjusting washer and adjust. <Ref. to 5MT-82, ADJUSTMENT, Reverse Idler Gear.>

Clearance:
0 — 0.5 mm (0 — 0.020 in)

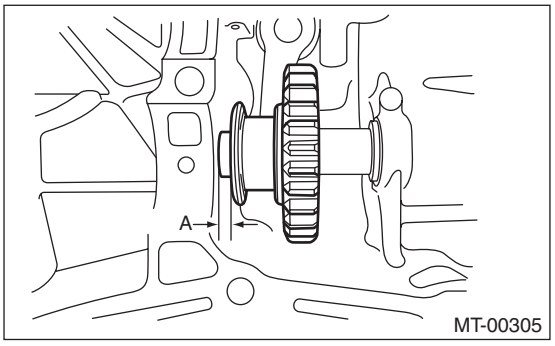


3) Check the reverse idler gear and shaft for damage. Replace if it is damaged.

D: ADJUSTMENT

1) Select the appropriate reverse shifter lever from the table below, and adjust until the clearance between the reverse idler gear and transmission case wall is within specification.

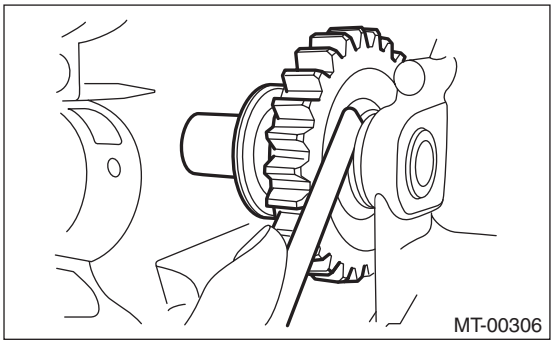
Clearance A:
6.0 — 7.5 mm (0.236 — 0.295 in)



Reverse shifter lever		
Part No.	Mark	Contents
32820AA070	7	Far from case wall
32820AA080	8	Standard
32820AA090	9	Closer to case wall

2) Select the appropriate adjusting washer from the table below, and adjust until the clearance between the reverse idler gear and transmission case wall is within specification.

Clearance:
0 — 0.5 mm (0 — 0.020 in)

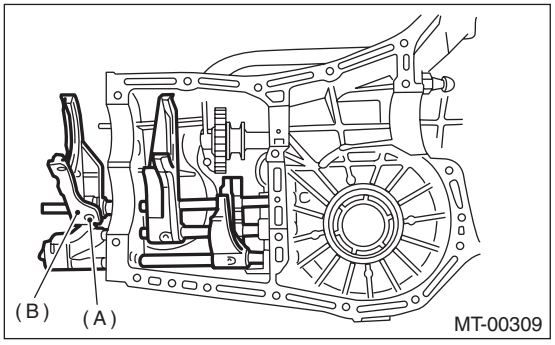


Adjusting washer	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

20.Shifter Fork and Rod

A: REMOVAL

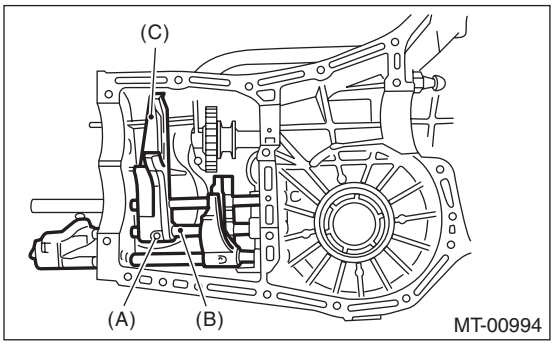
1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-36, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-64, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly. <Ref. to 5MT-59, REMOVAL, Main Shaft Assembly.>
7) Remove the front differential assembly. <Ref. to 5MT-74, REMOVAL, Front Differential Assembly.>
8) Drive out the straight pin by tapping it with the ST, and remove the 5th shifter fork.
ST 398791700 REMOVER



(A) Straight pin
(B) 5th shifter fork

9) Remove the check ball plugs, check ball springs and check balls.
10) Drive out the straight pin by tapping with the ST, and remove the 3rd-4th fork rod and 3rd-4th shifter fork.

NOTE:
When removing the 3rd-4th fork rod, keep other fork rods in neutral. When driving out the straight pin, remove it toward the inside of case so that it does not hit against the case.
ST 398791700 REMOVER



(A) Straight pin
(B) 3rd-4th fork rod
(C) 3rd-4th shifter fork

11) Drive out the straight pin by tapping with the ST, and pull out the 1st-2nd fork rod and 1st-2nd shifter fork.
ST 398791700 REMOVER
12) Remove the snap ring (outer), and pull out the reverse fork rod from the reverse fork rod arm. Then take out the check ball, check ball spring, and interlock plunger from the reverse fork rod arm. And then remove the reverse fork rod.

NOTE:
When pulling out the reverse fork rod arm, be careful not to let the ball pop out of arm.
13) Remove the reverse shifter lever.

B: INSTALLATION

1) Install the check ball spring and check ball to the reverse fork rod arm, and press in the ST.
ST 399411700 ACCENT BALL INSTALLER
2) Install the reverse fork rod through the hole on the rear of the transmission case. Press out the ST using the reverse fork rod, and fix with outer snap ring.
3) Install the interlock plunger to reverse fork rod arm.

NOTE:
Apply grease to plunger to prevent it from falling.
4) Position the check ball, check ball spring and gasket in the reverse fork rod hole on the left side of transmission case, and tighten the check ball plug.

NOTE:
Use a new gasket.

Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)

5) Install the 1st-2nd fork rod to the 1st-2nd shifter fork through the hole on the rear of the transmission case.

NOTE:
• Set the reverse fork rod to neutral.
• Check that the positions of interlock plunger is correct.

6) Align the holes in the 1st-2nd fork rod and the 1st-2nd shifter fork, and drive a new straight pin into these holes using the ST.
ST 398791700 REMOVER

7) Install the interlock plunger (thin) onto the 3rd-4th fork rod.

NOTE:
Apply grease to plunger to prevent it from falling.

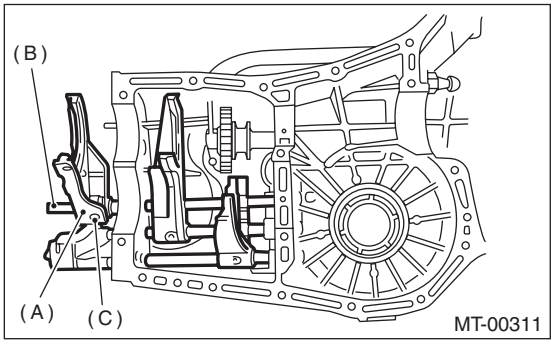
8) Install the 3rd-4th fork rod to the 3rd-4th shifter fork and reverse fork rod arm through the hole on the rear of the transmission case.

9) Align the holes in the 3rd-4th fork rod and the 3rd-4th shifter fork, and drive a new straight pin into these holes.

NOTE:
• Set the reverse fork rod and the 1st-2nd fork rod to neutral.
• Check that the positions of interlock plunger is correct.

ST 398791700 REMOVER

10) Install the 5th shifter fork onto the rear of reverse fork rod. Align the holes in the two parts and drive new straight pin into the specified place.
ST 398791700 REMOVER

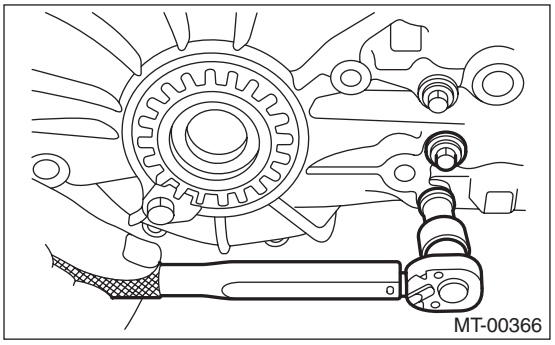


(A) 5th shifter fork
(B) Reverse fork rod
(C) Straight pin

11) Position the check balls, check ball springs and gaskets to the 3rd-4th fork rod and 1st-2nd fork rod holes, and install the check ball plugs.

NOTE:
Use a new gasket.

Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)

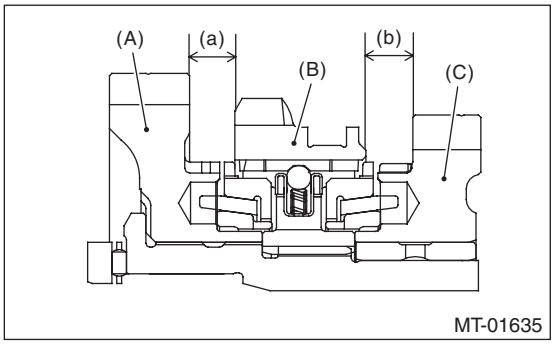


12) Install the front differential assembly. <Ref. to 5MT-74, INSTALLATION, Front Differential Assembly.>
13) Install the main shaft assembly. <Ref. to 5MT-59, INSTALLATION, Main Shaft Assembly.>
14) Install the drive pinion shaft assembly. <Ref. to 5MT-64, INSTALLATION, Drive Pinion Shaft Assembly.>
15) Install the transmission case. <Ref. to 5MT-55, INSTALLATION, Transmission Case.>
16) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
17) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
18) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1) Check the shifter fork and fork rod for damage. Replace if it is damaged.
2) Gearshift mechanism
Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.
3) Inspect the clearance between 1st, 2nd driven gear and reverse driven gear. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a) and (b):
9.5 mm (0.374 in)

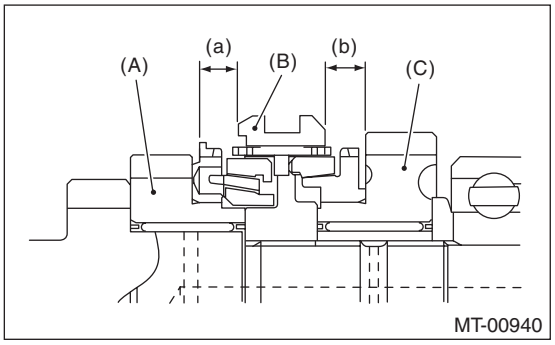


(A) 1st driven gear
(B) Reverse driven gear
(C) 2nd driven gear

1st-2nd shifter fork		
Part No.	Mark	Remarks
32804AA060	1	Approaches 1st gear by 0.2 mm (0.008 in).
32804AA070	No mark	Standard
32804AA080	3	Approaches 2nd gear by 0.2 mm (0.008 in).

4) Inspect the clearance between the 3rd, 4th drive gear and the coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a) and (b):
9.3 mm (0.366 in)

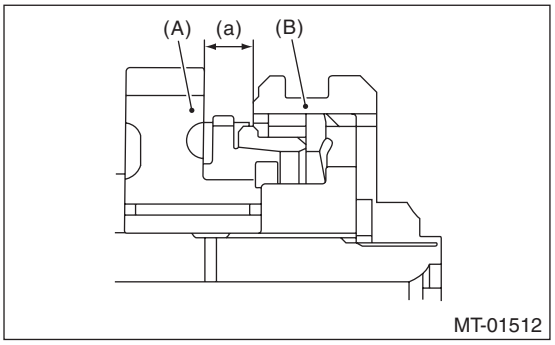


(A) 3rd drive gear
(B) Coupling sleeve
(C) 4th drive gear

3rd-4th shifter fork		
Part No.	Mark	Remarks
32810AA061	1	Approaches 4th gear by 0.2 mm (0.008 in).
32810AA071	No mark	Standard
32810AA101	3	Approaches 3rd gear by 0.2 mm (0.008 in).

5) Inspect the clearance between 5th drive gear and coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a):
9.3 mm (0.366 in)



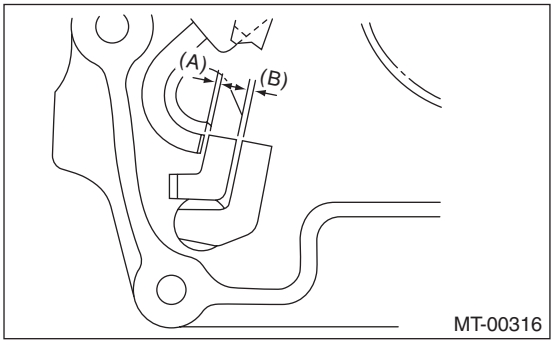
(A) 5th drive gear
(B) Coupling sleeve

5th shifter fork		
Part No.	Mark	Remarks
32812AA201	7	Approaches 5th gear by 0.2 mm (0.008 in).
32812AA211	No mark	Standard
32812AA221	9	Moves away from 5th gear by 0.2 mm (0.008 in).

6) Inspect the rod end clearances (A) and (B). If any clearance is not within specifications, replace the fork rod or shifter fork as required.

Clearance (A):
3rd-4th — 5th
0.5 — 1.3 mm (0.020 — 0.051 in)

Clearance (B):
1st-2nd — 3rd-4th
0.4 — 1.4 mm (0.016 — 0.055 in)



21.General Diagnostic Table

A: INSPECTION

1. MANUAL TRANSMISSION

Symptoms	Possible cause	Corrective action
1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two types: One is a defective gear shift system and the other is defective transmission. However, if the operation is heavy and engagement of the gears is difficult, a defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	(a) Worn, damaged or burred chamfer at internal spline of the sleeve and reverse driven gear	Replace.
	(b) Worn, damaged or burred chamfer of gear spline	Replace.
	(c) Worn or scratched bushings	Replace.
	(d) Incorrect contact or wear between baulk ring and gear cone	Repair or replace.
2. Gear slip-out • Gear slips out when coasting on rough road. • Gear slips out during acceleration.	(a) Defective pitching stopper adjustment	Replace.
	(b) Loose engine mounting bolts	Tighten.
	(c) Worn shifter fork or broken shifter check ball spring	Replace.
	(d) Worn or damaged ball bearing	Replace.
	(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
	(f) Synchronizer hub tooth step wear	Replace.
	(g) Worn 1st driven gear and driven shaft	Replace.
	(h) Worn 2nd driven gear and bushing	Replace.
	(i) Worn 3rd drive gear and needle bearing	Replace.
	(j) Worn 4th drive gear and needle bearing	Replace.
	(k) Worn 5th drive gear and needle bearing	Replace.
	(l) Worn reverse idler gear and bushing	Replace.
3. Noise emitted from transmission	(a) Insufficient or improper lubrication	Lubricate with specified oil or replace.
NOTE: If a noise is heard when the vehicle is parked with its engine idling and if a noise ceases when the clutch is disengaged, it may be considered that the noise is coming from the transmission.	(b) Worn or damaged gears and bearings NOTE: If the trouble is only wear of the gear teeth surfaces, only a high whirring noise will occur at high speeds, but if any part is broken, rhythmical clicking sounds will be heard even at low speeds.	Replace.

2. DIFFERENTIAL

Symptoms	Possible cause	Corrective action
1. Broken differential (case, gear, bearing, etc.) NOTE: Noise will occur, and eventually the differential will not be able to operate due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble the differential and replace broken components. At the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of the clutch	Readjust the preload and backlash of the bearing, and the contact surface of gear.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of the drive pinion and the hypoid driven gear	Adjust.
	(e) Excessive backlash of a vehicle under severe operating conditions due to worn differential side gear, adjusting washer or differential pinion	Add recommended oil to the specified level. Do not use vehicle under severe operating conditions.
	(f) Loose hypoid driven gear clamping bolts	Tighten.
2. Differential and hypoid gear noises Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of trouble. However, noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as the vehicle speed increases, it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to misadjusted bearings and incorrect shim adjustment • Bearing noise when driving or coasting: Cracked, broken or damaged bearings • Noise mainly when turning: Noise from differential side gear, differential pinion or differential pinion shaft, etc.	(a) Insufficient oil	Replenish or replace with the specified amount of recommended oil.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check the tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust the bearing preload.
	(d) Loose roller bearing	Readjust the backlash of the hypoid driven gear to drive pinion, and check the tooth contact.
	(e) Distorted hypoid driven gear or differential case	Replace.
	(f) Worn adjusting washer and differential pinion shaft	Replace.

CLUTCH SYSTEM

CL

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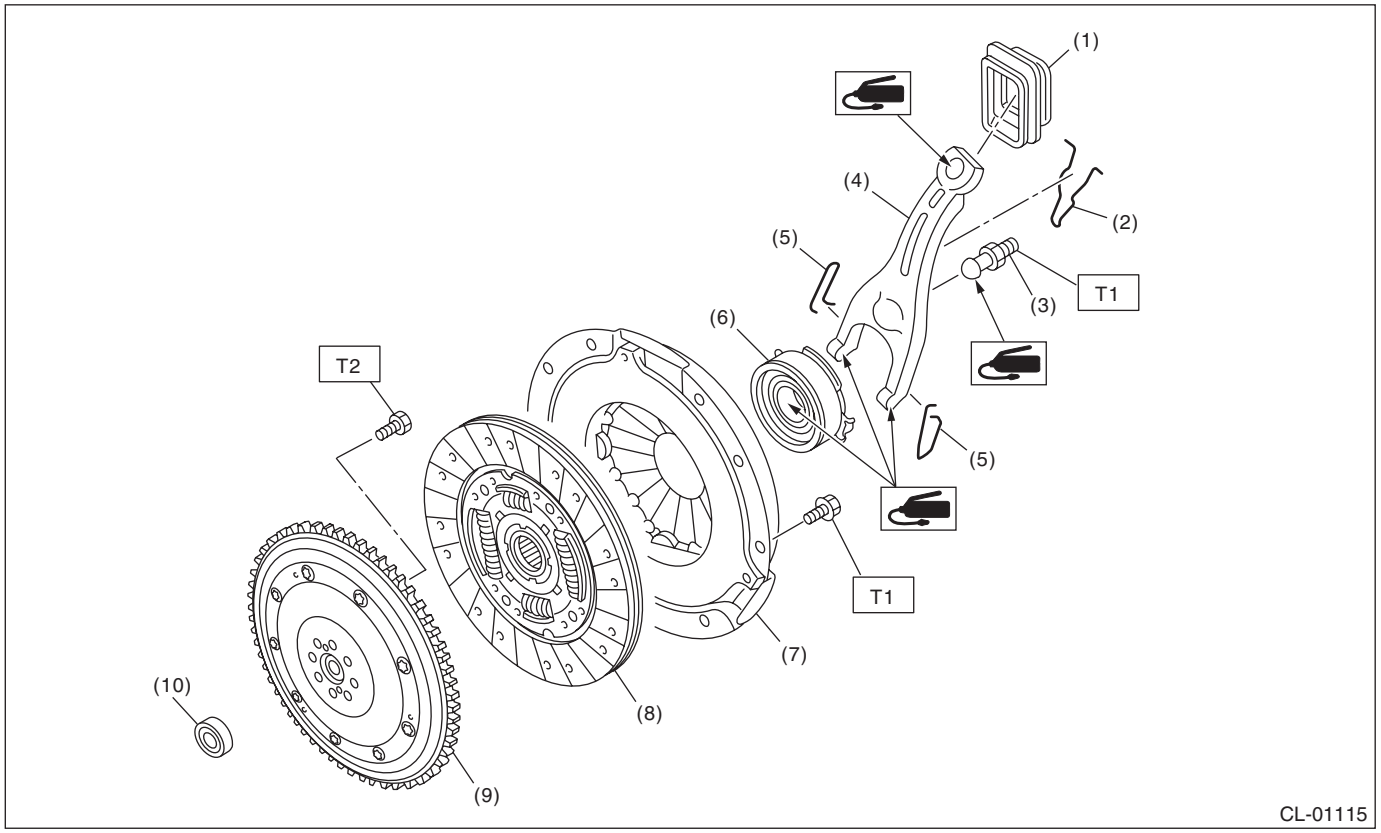
1. General Description

A: SPECIFICATION

Model			2.0 L
Transmission type			5MT
Clutch cover	Type		Push type
	Diaphragm set load	N (kgf, lbf)	5,688 (580, 1,279)
Clutch disc	Facing material		Woven (non-asbestos)
	O.D. × I.D. × Thickness mm (in)	Flywheel side	225 × 150 × 3.2 (8.86 × 5.9 × 0.126)
		Clutch cover side	225 × 150 × 3.5 (8.86 × 5.9 × 0.138)
	Spline outer diameter	mm (in)	25.2 (0.992), (number of teeth: 24)
	Depth of rivet head mm (in)	Flywheel side	1.35 — 1.95 (0.053 — 0.077)
		Clutch cover side	1.65 — 2.25 (0.065 — 0.089)
		Limit of sinking	0.8 (0.031)
	Deflection limit	mm (in)	0.7 (0.028) at R = 110 (4.33)
Clutch release lever ratio			1.6
Release bearing			Grease-packed self-aligning
Clutch pedal	Full stroke	mm (in)	130 — 135 (5.12 — 5.31)
	Free play	mm (in)	4 — 11 (0.16 — 0.43)
Flywheel	Type		Flexible

B: COMPONENT

1. CLUTCH ASSEMBLY



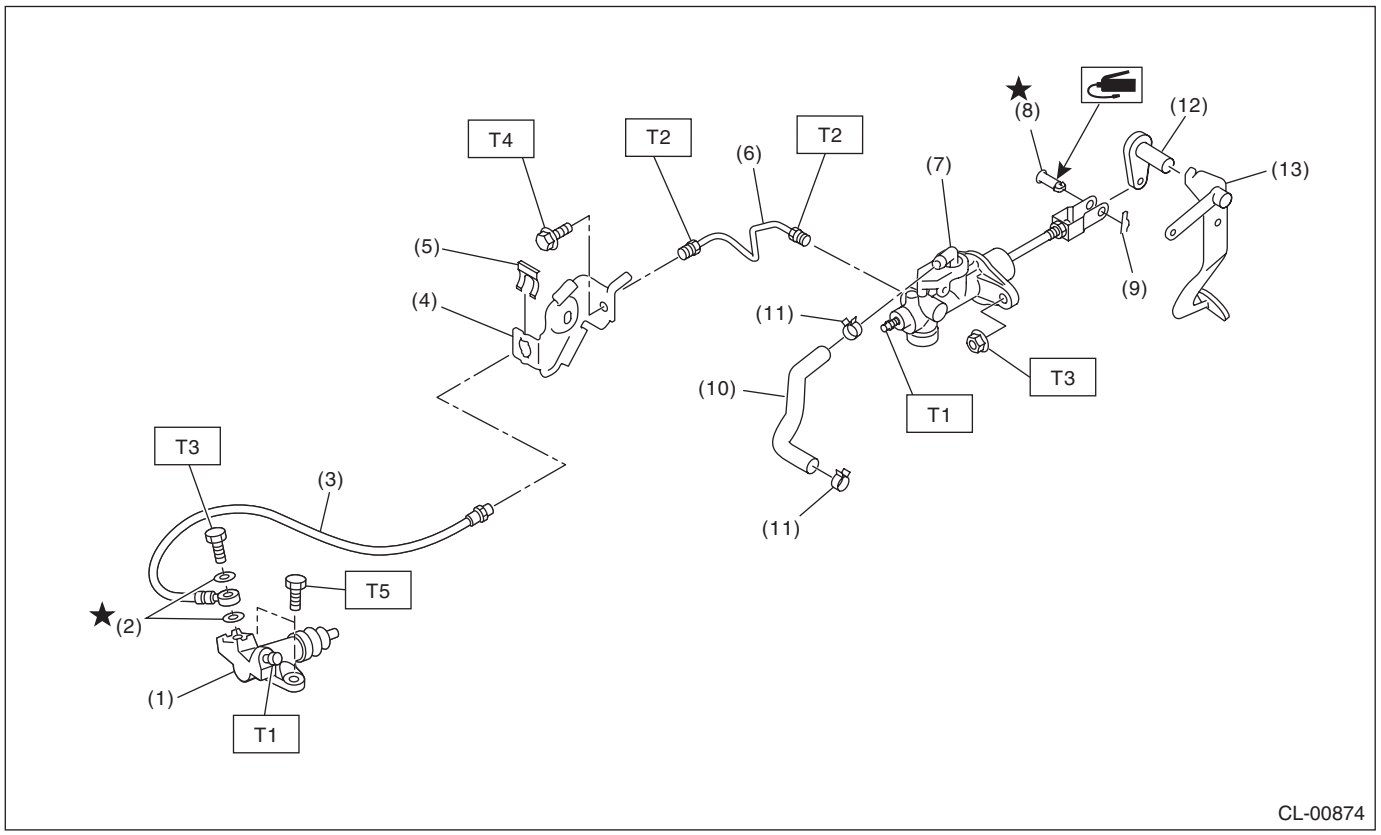
(1)	Dust cover	(6)	Release bearing
(2)	Lever spring	(7)	Clutch cover
(3)	Pivot	(8)	Clutch disc
(4)	Release lever	(9)	Flexible flywheel
(5)	Clip	(10)	Pilot bearing

Tightening torque: N·m (kgf-m, ft-lb)

T1: 16 (1.6, 11.8)

T2: <Ref. to CL-13, INSTALLATION, Flywheel.>

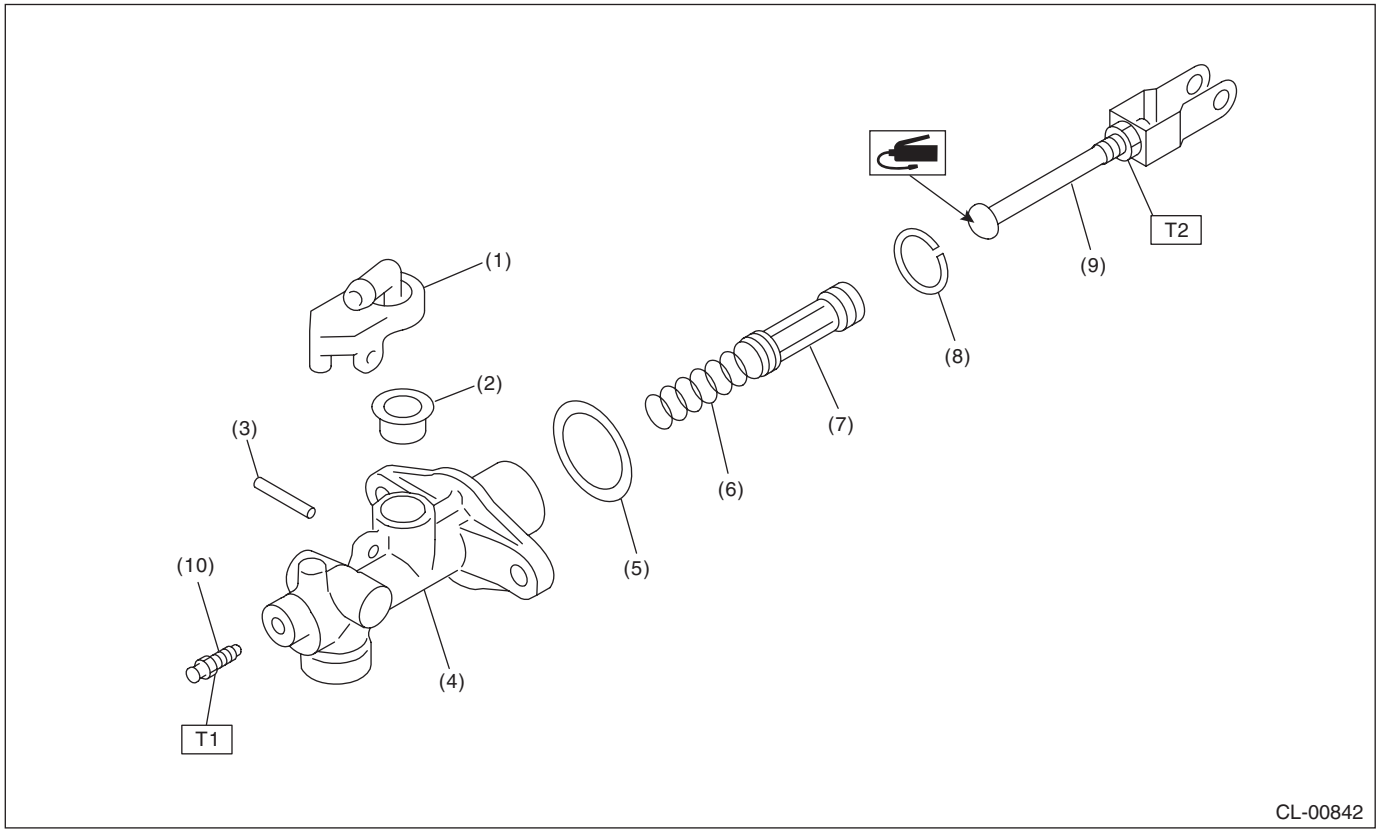
2. CLUTCH PIPE AND HOSE



(1)	Operating cylinder	(8)	Clevis pin
(2)	Gasket	(9)	Snap pin
(3)	Clutch hose	(10)	Tank hose
(4)	Clutch hose bracket	(11)	Clamp
(5)	Clamp	(12)	Lever
(6)	Clutch pipe	(13)	Pedal
(7)	Master cylinder ASSY		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.8 (0.8, 5.8)
T2: 15 (1.5, 11.1)
T3: 18 (1.8, 13.3)
T4: 25 (2.5, 18.4)
T5: 37 (3.8, 27.3)

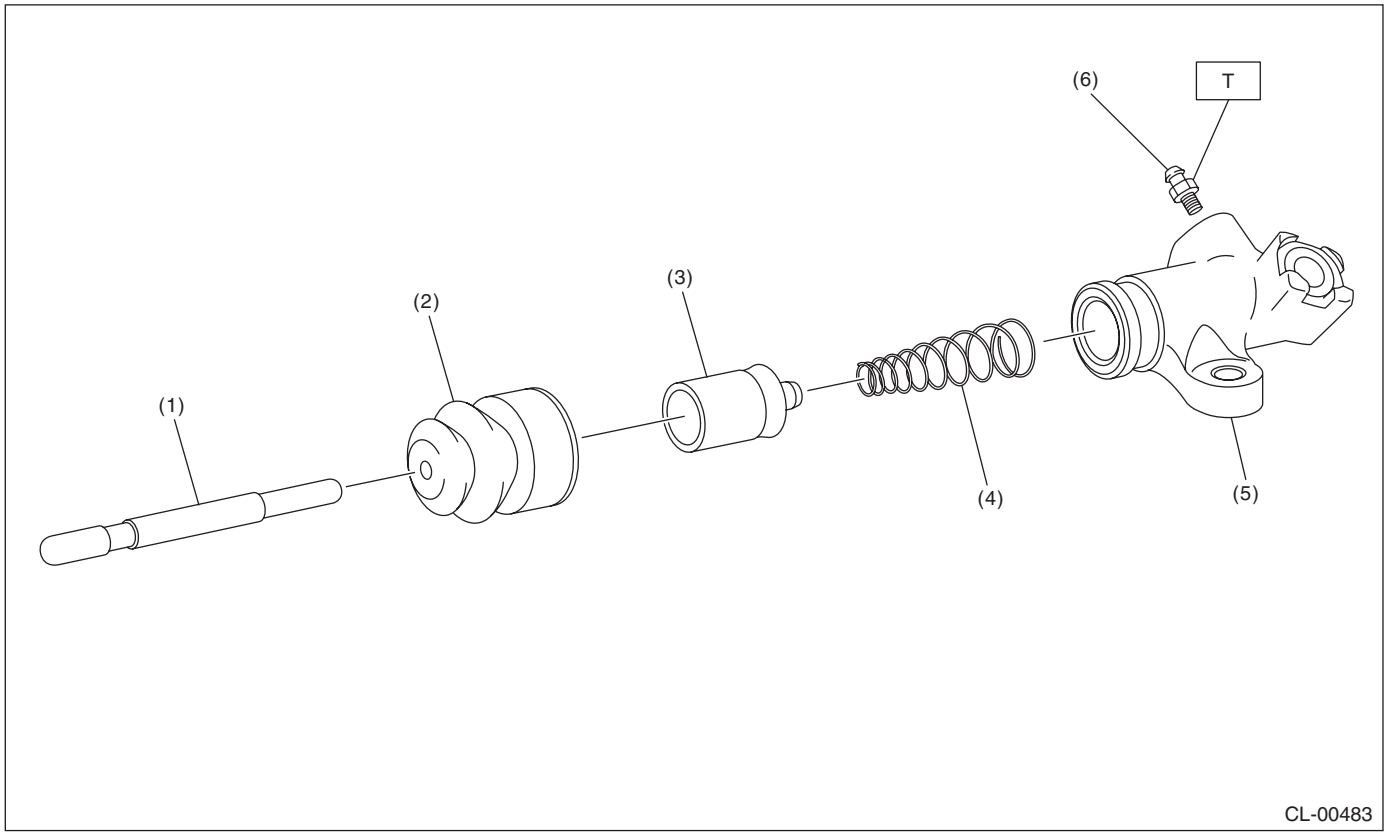
3. MASTER CYLINDER



(1)	Nipple	(6)	Return spring
(2)	Oil seal	(7)	Piston
(3)	Straight pin	(8)	Piston stop ring
(4)	Master cylinder	(9)	Push rod ASSY
(5)	Seat	(10)	Bleeder screw

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.8 (0.8, 5.8)
T2: 10 (1.0, 7.4)

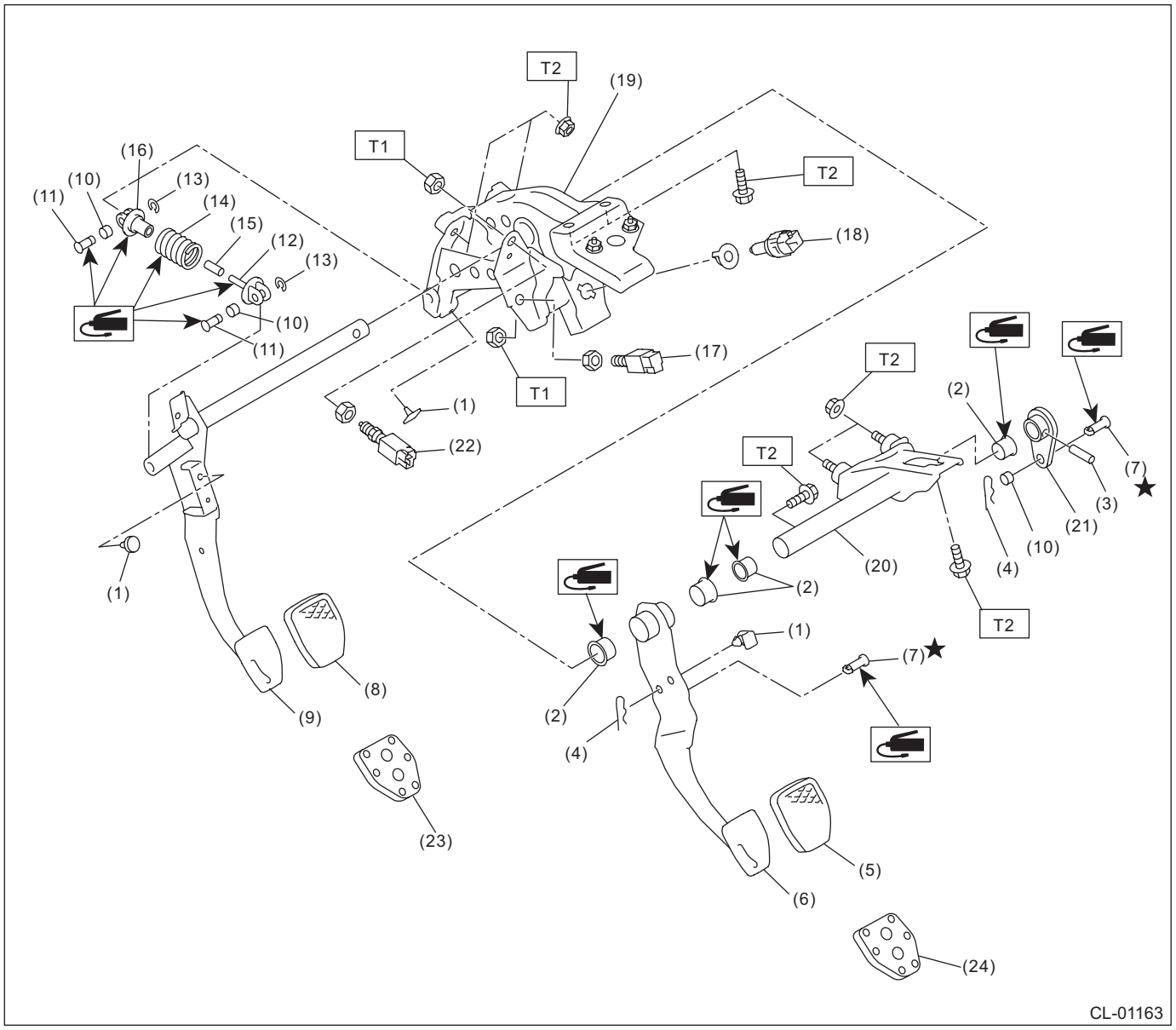
4. OPERATING CYLINDER



(1) Push rod
(2) Boot
(3) Piston
(4) Piston spring
(5) Operating cylinder
(6) Bleeder screw

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.8 (0.8, 5.8)

5. CLUTCH PEDAL



(1) Stopper
(2) Bushing
(3) Spring pin
(4) Snap pin
(5) Brake pedal pad (normal type)
(6) Brake pedal
(7) Clevis pin
(8) Clutch pedal pad (normal type)
(9) Clutch pedal
(10) Bushing C
(11) Clutch clevis pin
(12) Assist rod A
(13) Clip
(14) Assist spring
(15) Assist bushing
(16) Assist rod B
(17) Clutch switch
(18) Stop light switch
(19) Pedal bracket
(20) Clutch master cylinder bracket
(21) Lever
(22) Clutch start switch
(23) Clutch pedal pad (sport type)
(24) Brake pedal pad (sport type)

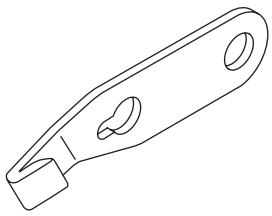
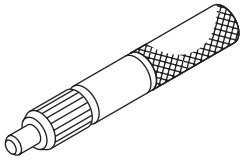
Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.9)
T2: 18 (1.8, 13.3)

C: CAUTION

- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine fluid, grease etc. or equivalent. Do not mix fluid, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part in a vise, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vise.
- Keep fluid away from the vehicle body. If any fluid contacts the vehicle body, immediately flush the area with water.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498497100	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of the flywheel.
 ST-499747100	499747100	CLUTCH DISC GUIDE	Used for installing the clutch disc to the flywheel.
SSM 4 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

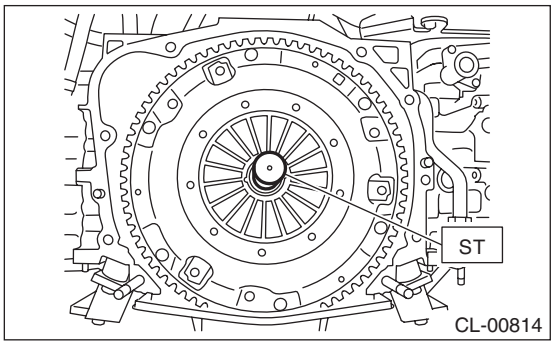
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Dial gauge	Used for measuring clutch disc run-out.
Depth gauge	Used for measuring clutch disc wear.
Angle gauge	Used for tightening the flywheel.
DST-i	Used together with Subaru Select Monitor 4.

2. Clutch Disc and Cover

A: REMOVAL

1) Remove the transmission assembly from the vehicle.
<Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Attach the ST on the flywheel.
ST 499747100 CLUTCH DISC GUIDE



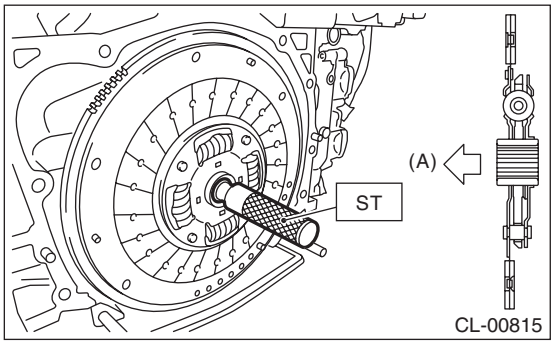
3) Remove the clutch cover and clutch disc.

NOTE:
• Take care not to allow oil to touch the clutch disc face.
• Do not disassemble the clutch cover or clutch disc.

B: INSTALLATION

1) Insert the ST into the clutch disc and the ST end into pilot bearing to install the clutch disc.

NOTE:
When installing the clutch disc, be careful to attach in the correct direction.
ST 499747100 CLUTCH DISC GUIDE

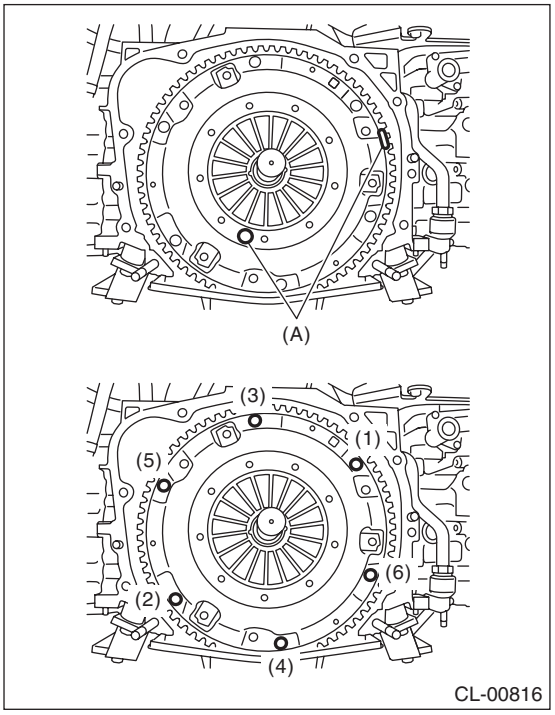


(A) Flywheel side

2) Install the clutch cover and tighten the bolts to the specified torque.

NOTE:
• When installing the clutch cover, position the clutch cover so that the spacing between the unbalance marks (paint mark) on the flywheel and clutch cover is 120° or more apart. (The unbalance mark indicates the direction of residual unbalance.)
• Temporarily tighten the bolts by hand. Each bolt should be tightened to the specified torque in a crisscross order.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) Unbalance mark (paint)

3) Remove the ST.
ST 499747100 CLUTCH DISC GUIDE
4) Install the transmission assembly. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

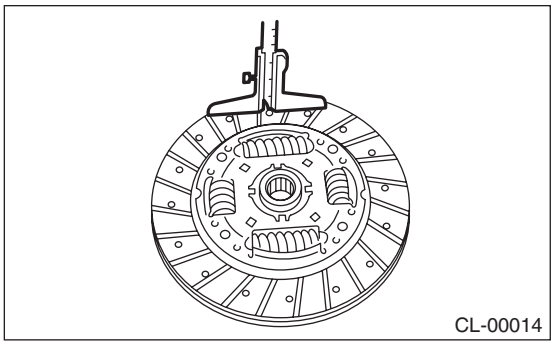
C: INSPECTION

1. CLUTCH DISC

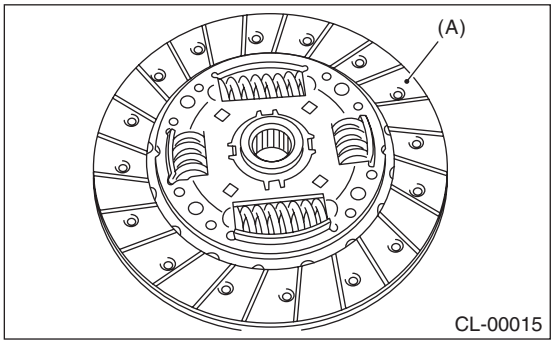
1) Facing wear
Measure the depth from the facing surface to the rivet head. Replace if the face is worn locally or worn down to less than the specified value.

Depth to rivet head:
Limit of sinking
0.8 mm (0.031 in)

NOTE:
Do not wash the clutch disc with any type of cleaning fluid.



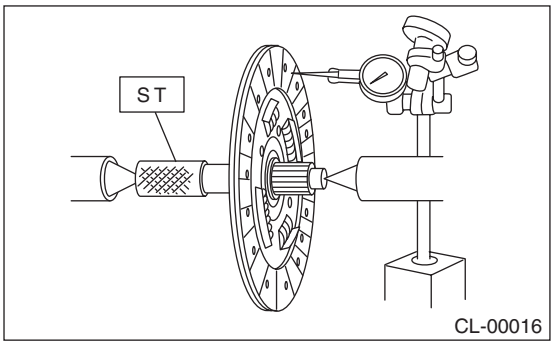
2) Hardened facing
Replace the clutch disc.
3) Oil soakage on facing
Replace the clutch disc and inspect the transmission front oil seal, transmission case mating surface, engine rear oil seal and other locations for oil leakage.



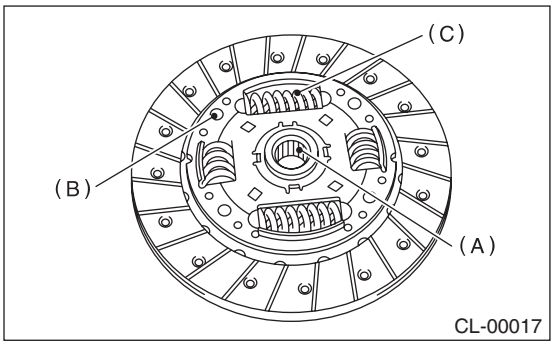
(A) Clutch facing

4) Deflection on facing
If deflection exceeds the specified value at the outer circumference of the facing, replace the clutch disc.
ST 499747100 CLUTCH DISC GUIDE

Limit for deflection:
0.7 mm (0.028 in) at R = 110 mm (4.33 in)



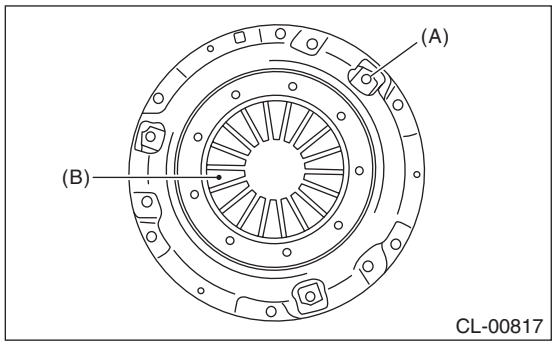
5) If there is spline wear, loose rivets, failed damper springs, etc., replace the clutch disc.



(A) Spline
(B) Rivet
(C) Damper spring

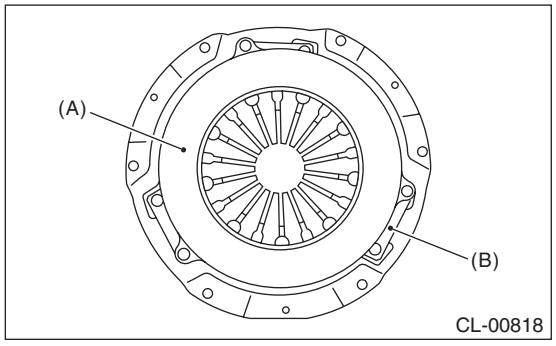
2. CLUTCH COVER

NOTE:
Visually check the following items without disassembling, and replace or repair if defective.
1) Loose thrust rivet
2) Damaged or worn bearing contact area at the center of diaphragm spring



(A) Thrust rivet
(B) Diaphragm spring

3) Damaged or worn disc contact surface of the pressure plate
4) Loose strap plate installation area
5) Worn diaphragm sliding area

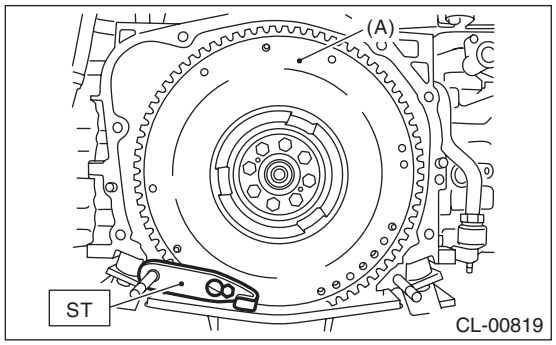


(A) Pressure plate
(B) Strap plate

3. Flywheel

A: REMOVAL

1) Remove the transmission assembly. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the clutch cover and clutch disc. <Ref. to CL-10, REMOVAL, Clutch Disc and Cover.>
3) Attach the ST.
ST 498497100 CRANKSHAFT STOPPER



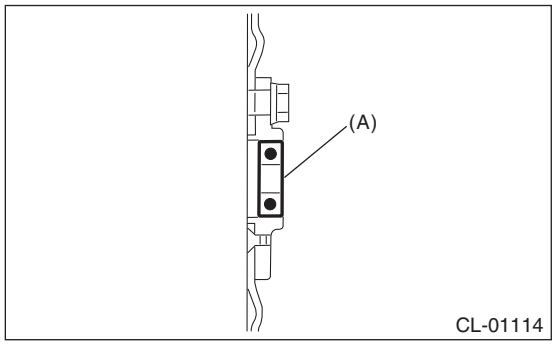
(A) Flywheel

4) Remove the flywheel and crankshaft position sensor plate.
5) Drive out the pilot bearing from flywheel.

B: INSTALLATION

1) Press in a new pilot bearing to the position where it is flush with the flywheel surface or up to 0.4 mm (0.016 in) deeper than that.

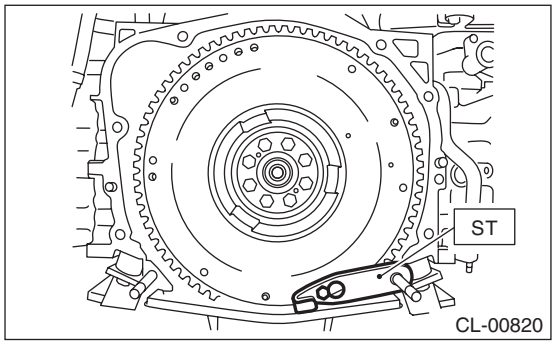
CAUTION:
Do not press the bearing inner ring.



(A) Pilot bearing

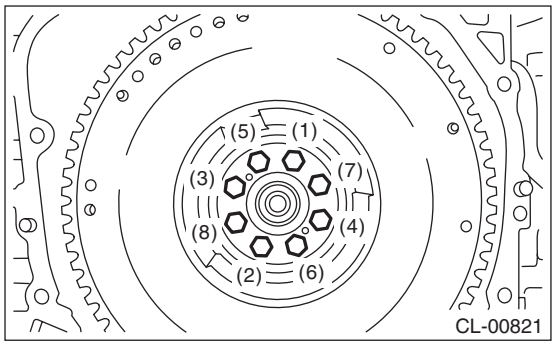
2) Temporarily tighten the crankshaft position sensor plate and flywheel.

NOTE:
Align the knock pin hole of the crankshaft position sensor plate to the knock pin of the crankshaft to secure the knock pin.
3) Attach the ST.
ST 498497100 CRANKSHAFT STOPPER



4) Tighten the flywheel mounting bolts in two stages.
(1) Tighten the flywheel attachment bolts.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)



(2) While checking the tightening angle with the angle gauge, further tighten the flywheel mounting bolts.

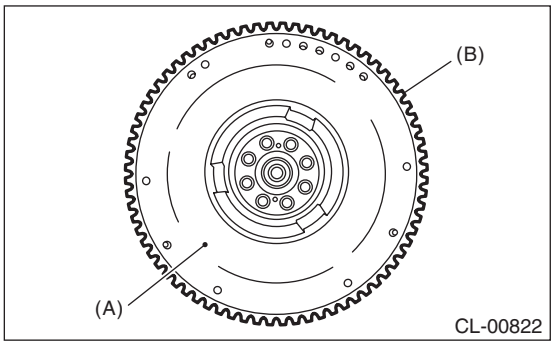
Tightening angle:
30° — 35°

5) Install the clutch disc and clutch cover. <Ref. to CL-10, INSTALLATION, Clutch Disc and Cover.>
6) Install the transmission assembly. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

CAUTION:
Because the center pilot bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or solvents.

1) If there is damage or defectiveness in the facing sliding surface or ring gear, replace the flywheel.



(A) Flywheel
(B) Ring gear

2) Smoothness of rotation
Rotate the ball bearing while applying pressure in the thrust direction.

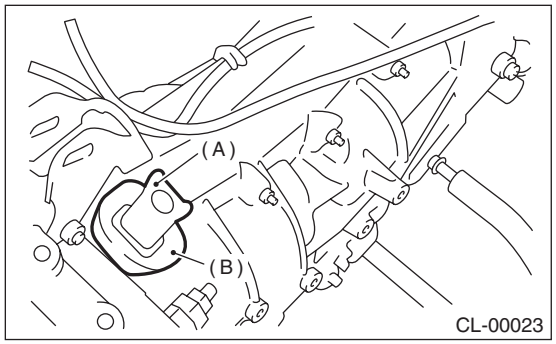
3) If noise or excessive play is noted, replace the pilot bearing.

4. Release Bearing and Lever

A: REMOVAL

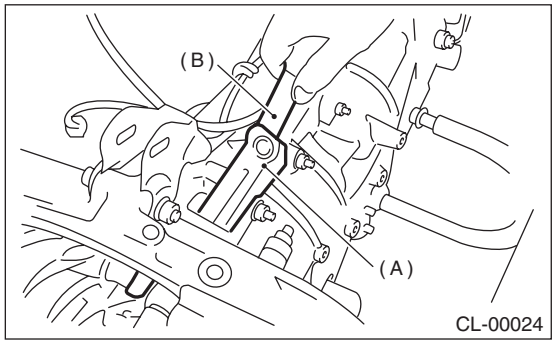
1) Remove the transmission assembly from the vehicle.
<Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
2) Remove the two clips from the release lever and remove the release bearing.

CAUTION:
Be careful not to deform the clips.
3) Remove the dust cover.



(A) Release lever
(B) Dust cover

4) Remove the attachment point of lever spring by inserting a screwdriver through the clutch housing release lever hole. Then remove the release lever.



(A) Release lever
(B) Screwdriver

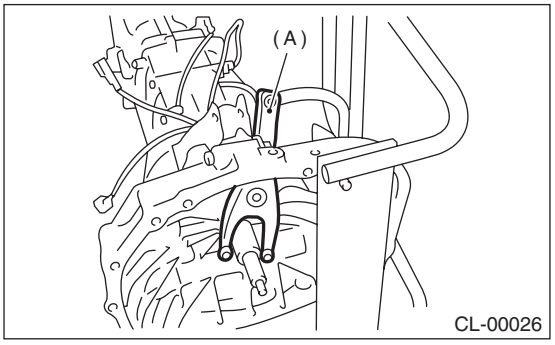
B: INSTALLATION

NOTE:
Apply the specified grease to lubricate to the following points before installation.
- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline
- Contact surface of release bearing and transmission case

Grease
NICHIMOLY N-130 or equivalent

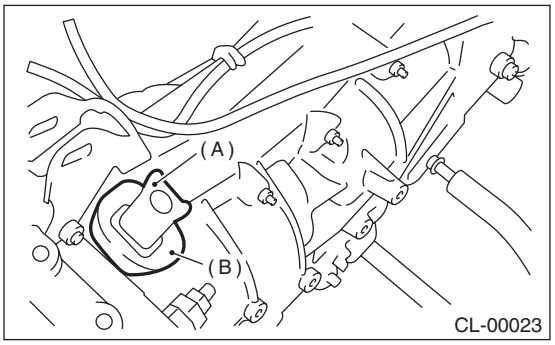
1) While pushing the release lever to the pivot and twisting it to both sides, fit the lever spring onto the raised portion of the pivot.

NOTE:
Observing from the main case hole, check that the lever spring is installed securely.



(A) Release lever

2) Install the release bearing and fasten it with two clips.
3) Install the dust cover.



(A) Release lever
(B) Dust cover

4) Operate the release lever and check if the release bearing moves smoothly.
5) Apply grease to the contact point of the release lever and operating cylinder.

Grease
NICHIMOLY N-130 or equivalent
6) Install the transmission assembly. <Ref. to 5MT-26, INSTALLATION, Manual Transmission Assembly.>

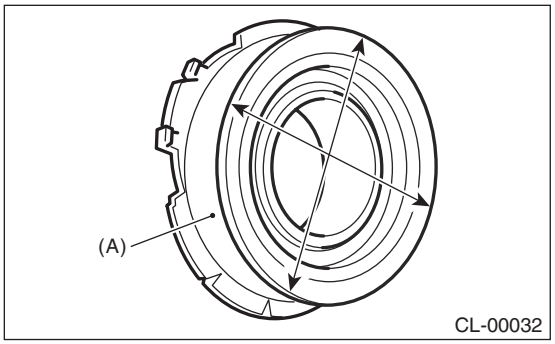
C: INSPECTION

1. RELEASE BEARING

CAUTION:
Since this bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or any other solvent when servicing the clutch.

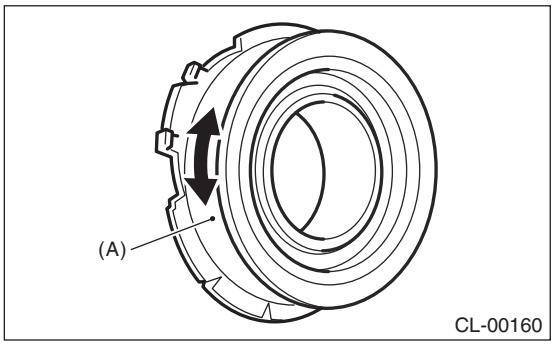
1) Check the bearing for smooth movement by applying force to the bearing in the radial direction.

Radial direction stroke:
1.6 mm (0.063 in)



(A) Bearing case

2) While applying force to the bearing in the rotational direction, check the bearing for smooth rotation.

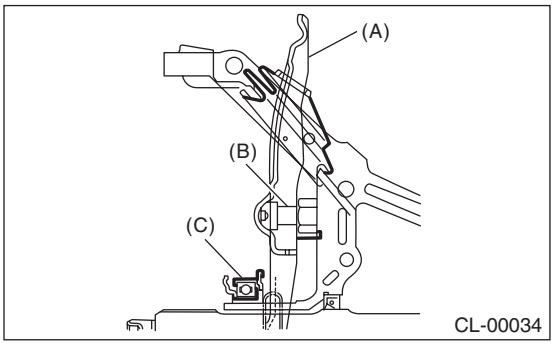


(A) Bearing case

3) Check for wear and damage at the bearing case surface in contact with the lever.

2. RELEASE LEVER

Check the pivot portion of the lever and the contact area with the release bearing case for wear.



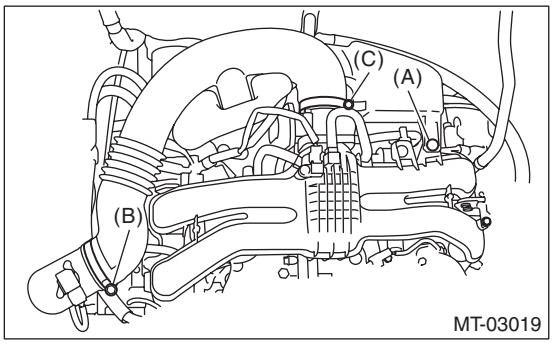
(A) Release lever
(B) Pivot
(C) Release bearing

5. Operating Cylinder

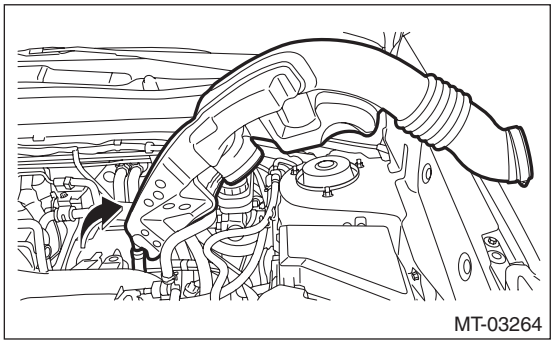
A: REMOVAL

CAUTION:
Brake fluid spilled on the vehicle body will harm the paint surface; therefore, wash it off with water and wipe clean quickly if spilled.

1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.

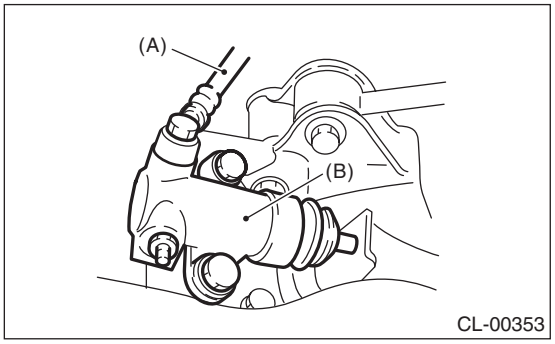


5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



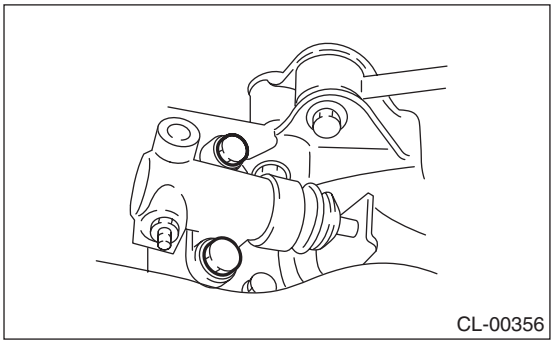
6) Disconnect the clutch hose.

CAUTION:
Cover the hose joint to prevent the brake fluid from flowing out.



(A) Clutch hose
(B) Operating cylinder

7) Remove the operating cylinder.



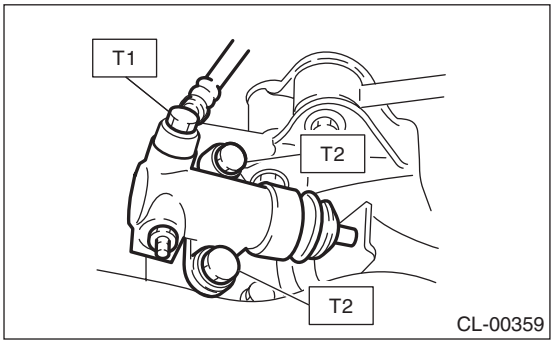
B: INSTALLATION

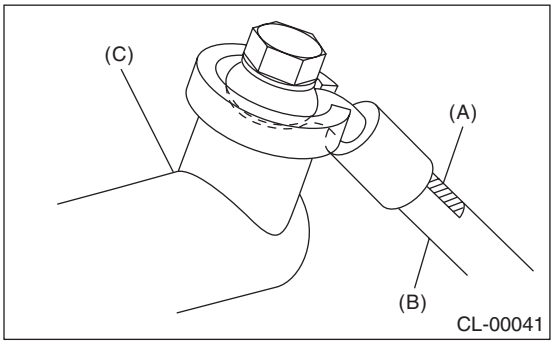
1) Install in the reverse order of removal.

NOTE:
• Before installing the operating cylinder, apply grease to the contact point of the release lever and operating cylinder.

Grease:
NICHIMOLY N-130 or equivalent
• Be sure to install the clutch hose with the mark side facing upward.
• Be careful not to twist the clutch hose during installation.
• Use a new gasket.

Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T2: 37 N·m (3.8 kgf-m, 27.3 ft-lb)





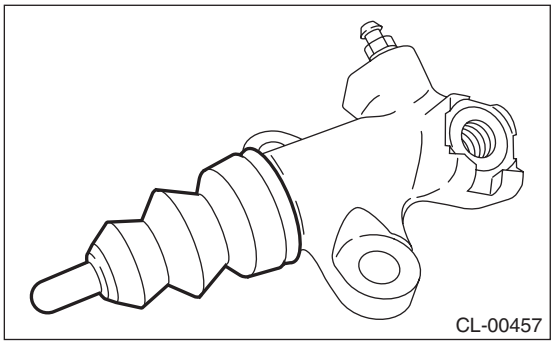
(A) Mark
(B) Clutch hose
(C) Operating cylinder

Tightening torque:
Air intake boot
3 N·m (0.3 kgf-m, 2.2 ft-lb)

2) After bleeding air from the operating cylinder, ensure that the clutch operates properly. <Ref. to CL-25, Clutch Fluid Air Bleeding.>

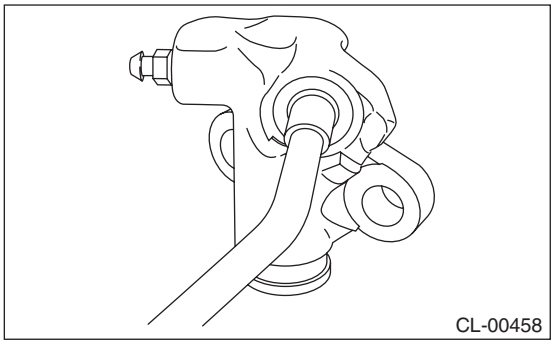
C: DISASSEMBLY

1) Remove the boot and push rod.

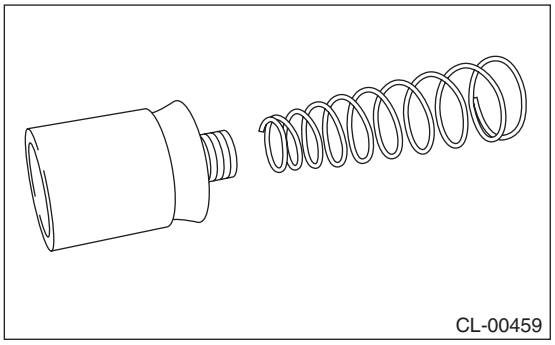

CL-00457

2) Apply compressed air through clutch hose attachment hole.

NOTE:
Face the piston hole down and place a piece of wood underneath to prevent the piston from popping out.


CL-00458

3) Separate the piston and piston spring.

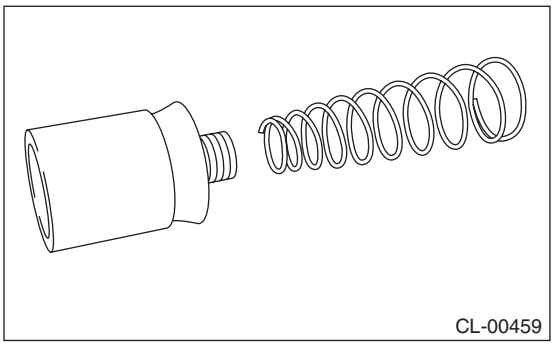

CL-00459

D: ASSEMBLY

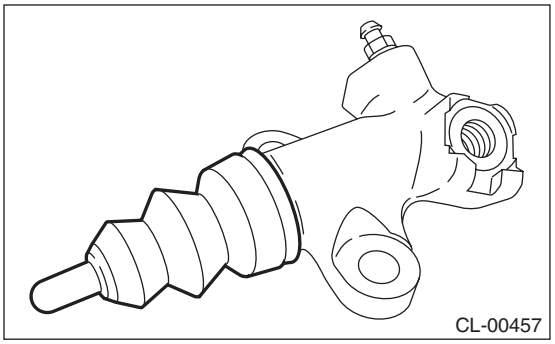
NOTE:
During assembly, apply hydraulic oil to all parts.

Recommended brake fluid:
New FMVSS No. 116 DOT3 or DOT4

1) Install the piston spring.


CL-00459

2) Insert piston into the operating cylinder.
3) Install push rod to the boot.
4) Install the boot and push rod.


CL-00457

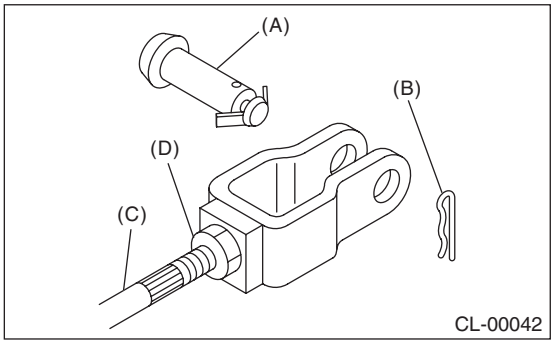
E: INSPECTION

1) Check that the operating cylinder is not damaged. Replace the operating cylinder if it is damaged.
2) Check the brake fluid leakage on the operating cylinder or the boot for damage. Replace the operating cylinder if brake fluid leaks or boot damages are noted.

6. Master Cylinder

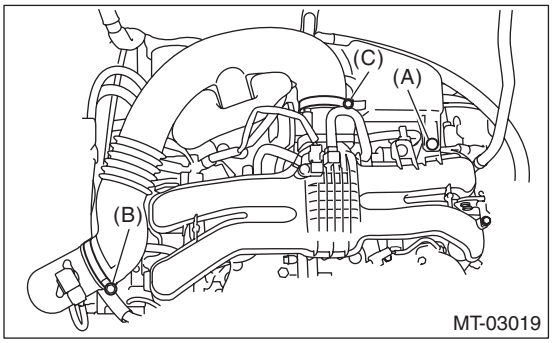
A: REMOVAL

CAUTION:
• Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>
3) Drain the brake fluid. <Ref. to CL-24, Clutch Fluid.>
4) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
5) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
6) Remove the snap pin and clevis pin, and then separate the push rod of the master cylinder.

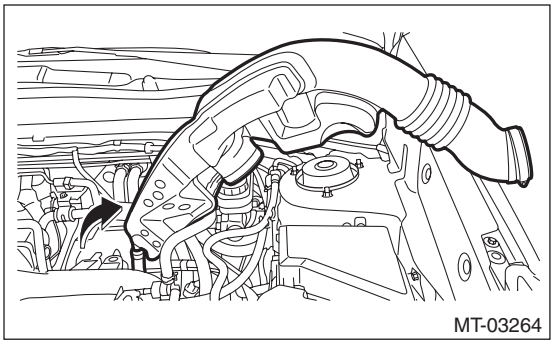


(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

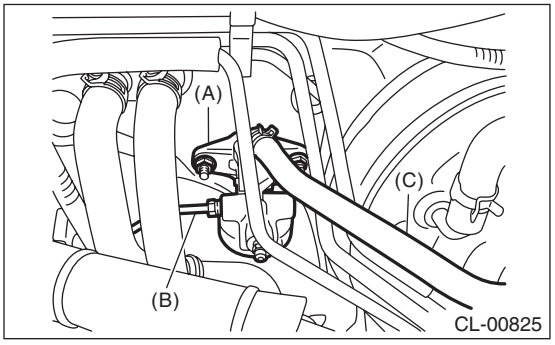
7) Remove the clip (A) from the air intake boot.
8) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
9) Loosen the clamp (C) which connects the air intake boot and throttle body.



10) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



11) Disconnect the clutch pipe and tank hose from the master cylinder.
12) Remove the master cylinder.

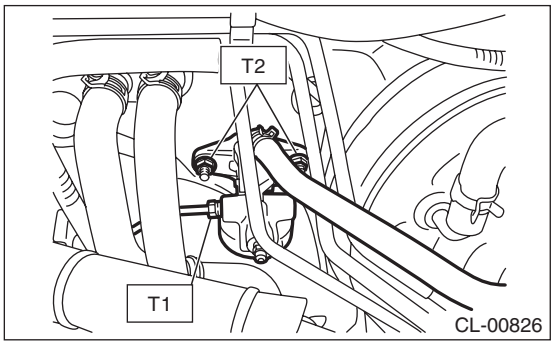


(A) Master cylinder
(B) Clutch pipe
(C) Tank hose

B: INSTALLATION

1) Install the master cylinder to the body, and connect the clutch pipe and the tank hose.

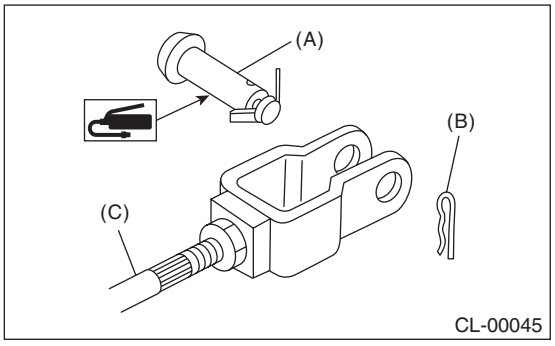
Tightening torque:
T1: 15 N·m (1.5 kgf-m, 11.1 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)



2) Connect the push rod of the master cylinder, and install the clevis pin and snap pin.

CAUTION:
Always use a new clevis pin.

NOTE:
Apply grease to the clevis pin.

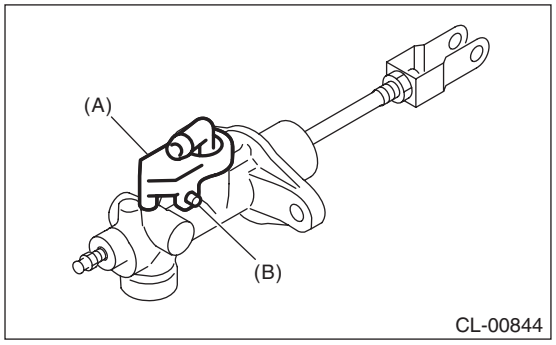


(A) Clevis pin
(B) Snap pin
(C) Push rod

3) Install the knee airbag module. <Ref. to AB-41, INSTALLATION, Knee Airbag Module.>
4) Fill the recommended brake fluid. <Ref. to CL-24, Clutch Fluid.>
5) After bleeding air from the clutch system, ensure that the clutch operates properly. <Ref. to CL-25, Clutch Fluid Air Bleeding.>
6) Install the cover assembly - instrument panel LWR driver. <Ref. to EI-73, INSTALLATION, Instrument Panel Lower Cover.>
7) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
8) Connect the battery ground terminal.

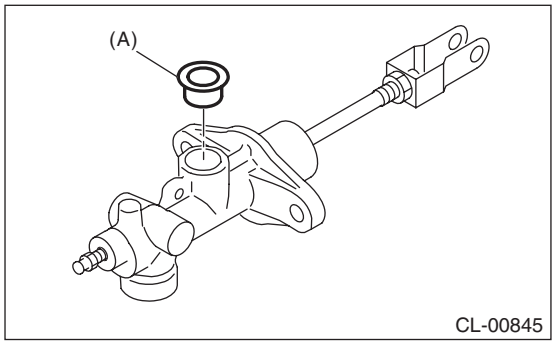
C: DISASSEMBLY

1) Remove the straight pin and nipple.



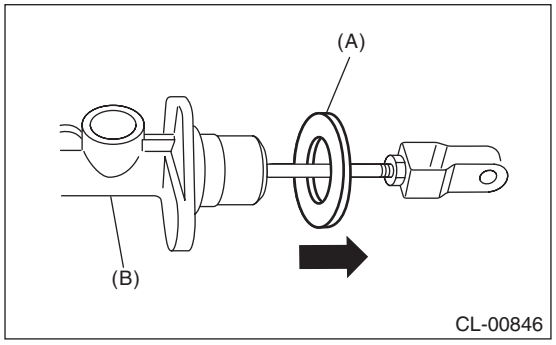
(A) Nipple
(B) Straight pin

2) Remove the oil seal.



(A) Oil seal

3) Move the seat towards the rear.



(A) Seat
(B) Master cylinder

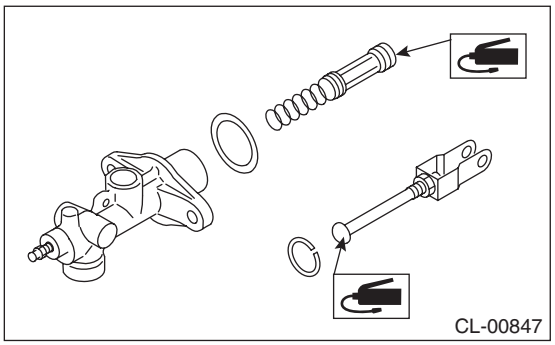
4) Remove the piston stop ring.

CAUTION:
When removing the piston stop ring, be careful to prevent the rod, washer, piston and return spring from popping out.

D: ASSEMBLY

1) Apply a coat of grease to the contact surfaces of the push rod and piston before installation.

Grease:
SILICONE GREASE G-40M or equivalent

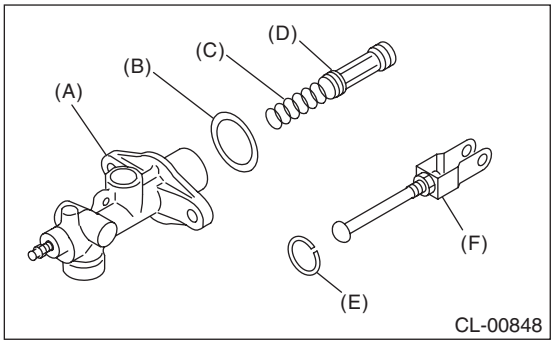


2) Assemble in the reverse order of disassembly.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

E: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, nipple, return spring, bleeder screw, seat or hose, replace the faulty part.

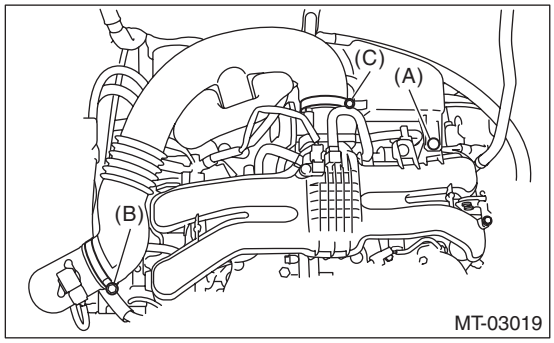


(A) Master cylinder body
(B) Seat
(C) Return spring
(D) Piston
(E) Piston stop ring
(F) Push rod ASSY

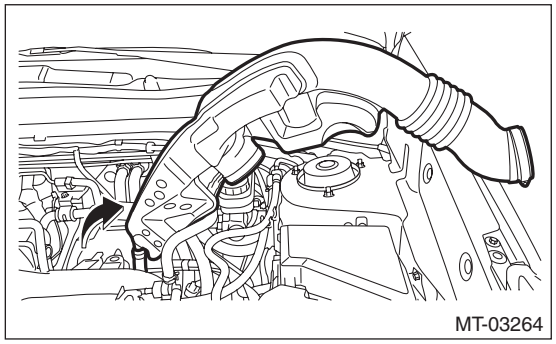
7. Clutch Pipe and Hose

A: REMOVAL

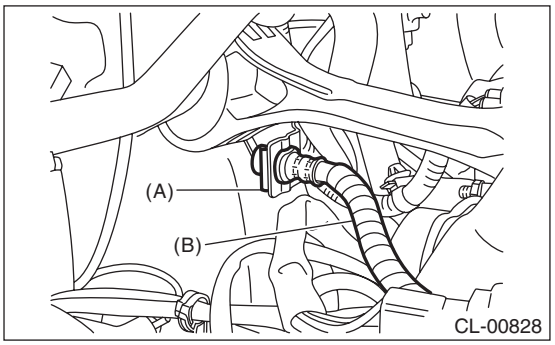
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

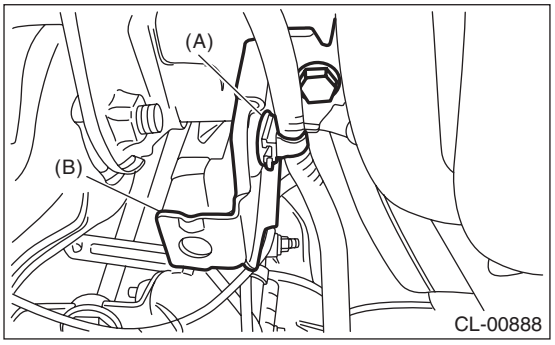


6) Drain the brake fluid. <Ref. to CL-24, Clutch Fluid.>
7) Disconnect the clutch pipe from the clutch hose and master cylinder.
8) Remove the clamp, and then remove the clutch hose.



(A) Clamp
(B) Clutch hose

9) Disconnect the clutch hose from operating cylinder.
10) Remove the harness clip.



(A) Harness clip
(B) Clutch hose bracket

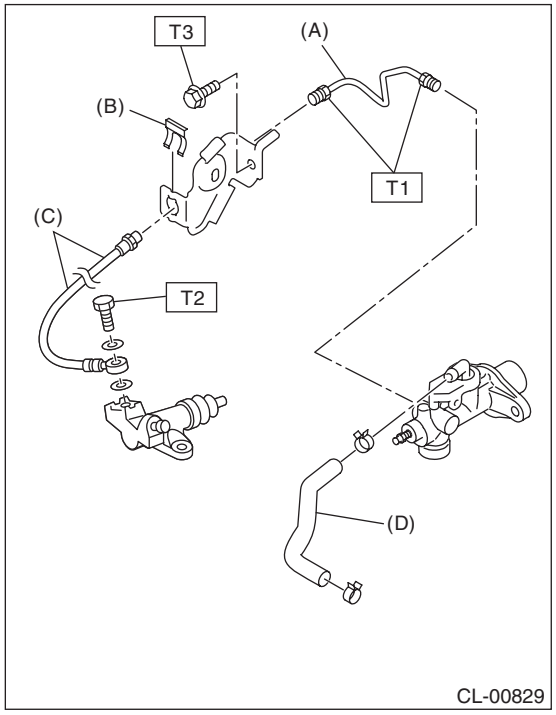
11) Remove the clutch hose bracket.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Bleed air from brake fluid. <Ref. to CL-25, Clutch Fluid Air Bleeding.>

Tightening torque:
T1: 15 N·m (1.5 kgf-m, 11.1 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T3: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Clutch pipe
(B) Clamp
(C) Clutch hose
(D) Tank hose

Tightening torque:
Air intake boot
3 N·m (0.3 kgf-m, 2.2 ft-lb)

C: INSPECTION

Check the pipes and hoses for breaks and damage. Check the joint for brake fluid leakage. If crack, breakage or damage is found, repair or replace the faulty pipe or hose.

8. Clutch Fluid

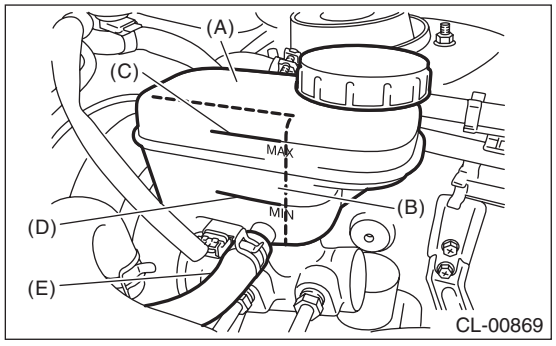
A: INSPECTION

CAUTION:
Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

1) Park the vehicle on a level surface.
2) Check the brake fluid level using the scale on the outside of the reservoir tank. If the level is below “MIN”, add fluid to bring it up to “MAX”, and also inspect for leakage.

CAUTION:
This reservoir tank has the brake fluid chamber and the clutch fluid chamber. When checking the fluid level, always check the fluid from the clutch fluid chamber side where the tank hose is connected.

Recommended brake fluid:
New FMVSS No. 116 DOT3 or DOT4



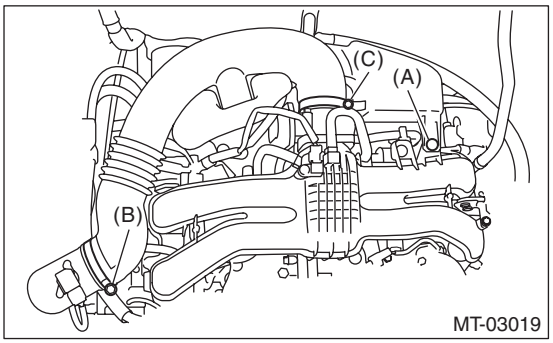
(A) Reservoir tank
(B) Clutch fluid chamber
(C) MAX. level
(D) MIN. level
(E) Tank hose

B: REPLACEMENT

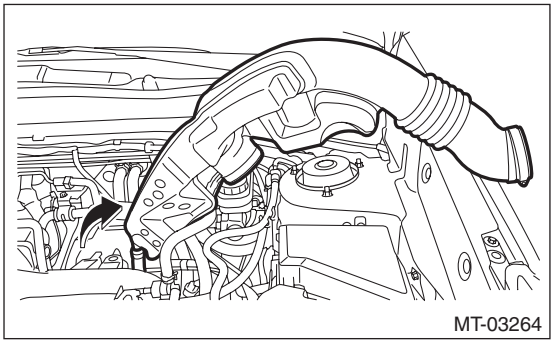
CAUTION:
• Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.
• Use new FMVSS No. 116 DOT3 or DOT4.
• Cover the air bleeder with cloth to prevent brake fluid from being splashed on surrounding parts when loosening the bleeder.
• Avoid mixing brake fluid of different brands to prevent fluid performance from degrading.
• Be careful not to allow dirt or dust to enter the reservoir tank.

NOTE:
• During the bleeding operation, keep the reservoir tank filled with brake fluid to prevent entry of air.
• Clutch pedal must be operated very slowly.
• Bleed air from the oil line with help of a co-worker.
• The required amount of brake fluid is approximately 150 mL (5.1 US fl oz, 5.3 Imp fl oz) for total clutch system.

1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



5) Drain the brake fluid from the air bleeder of the operating cylinder.
6) Refill the reservoir tank with recommended brake fluid.

Recommended brake fluid:
New FMVSS No. 116 DOT3 or DOT4

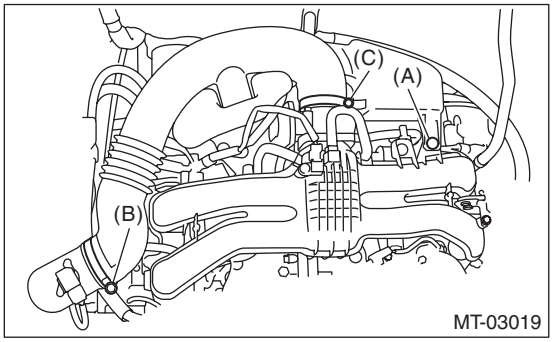
7) Bleed air from brake fluid. <Ref. to CL-25, Clutch Fluid Air Bleeding.>
8) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>

9. Clutch Fluid Air Bleeding

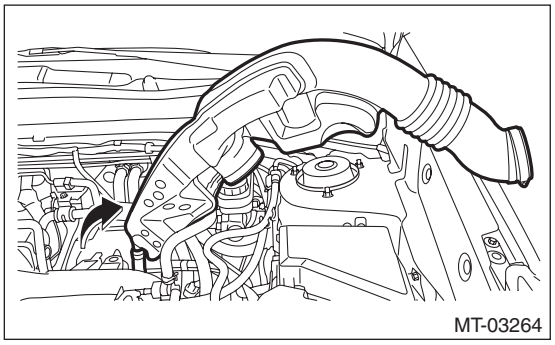
A: PROCEDURE

CAUTION:
Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

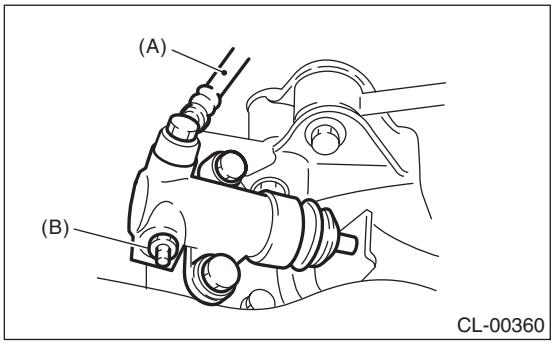
NOTE:
Bleed air from the oil line with help of a co-worker.
1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



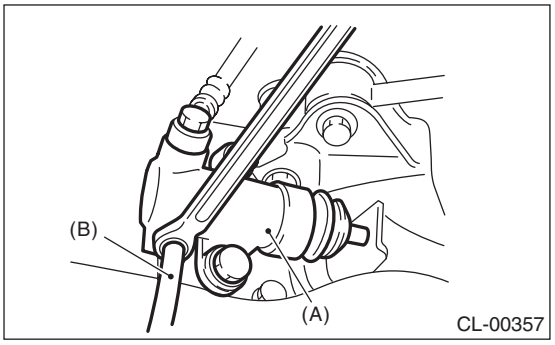
5) Fit one end of a vinyl tube into the air bleeder of the operating cylinder, and put the other end into a container.



(A) Clutch hose
(B) Air bleeder

6) Slowly depress the clutch pedal and keep it depressed. Then open the air bleeder to discharge air together with the brake fluid.
Release the air bleeder for 1 or 2 seconds. Next, close the air bleeder, and slowly release the clutch pedal.

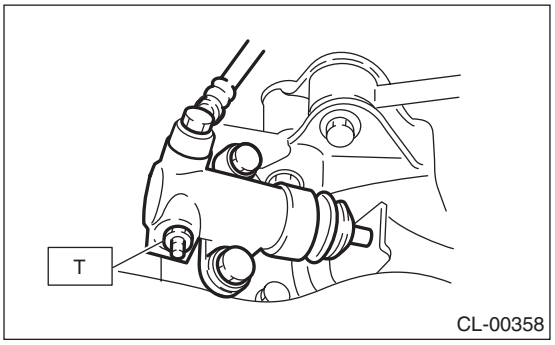
CAUTION:
Cover the air bleeder with cloth to prevent brake fluid from being splashed on surrounding parts when loosening the bleeder.



(A) Operating cylinder
(B) Vinyl tube

7) Repeat procedure 6), until there are no more air bubbles appearing from the air bleeder.
8) Tighten the air bleeder.

Tightening torque:
T: 7.8 N·m (0.8 kgf-m, 5.8 ft-lb)



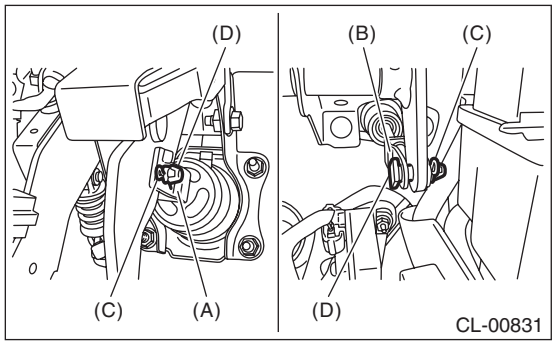
9) After stepping on the clutch pedal, make sure that there are no leaks evident in the entire clutch system.
10) After bleeding the air from clutch system, ensure that the clutch operates properly.
11) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>

10.Clutch Pedal

A: REMOVAL

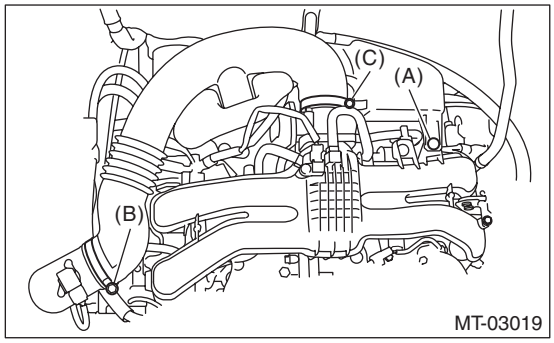
CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>
3) Remove the steering column. <Ref. to PS-21, REMOVAL, Steering Column.>
4) Disconnect the connector from the stop light switch and clutch switch.
5) Remove the snap pins from clevis pins which secure the lever to the push rod and operating rod.
6) Pull out the clevis pins which secures the lever to the push rod and operating rod.

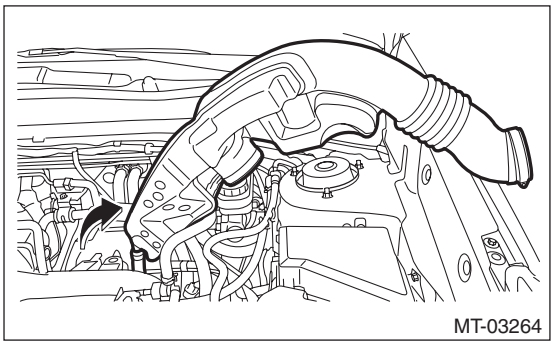


(A) Operating rod
(B) Push rod
(C) Snap pin
(D) Clevis pin

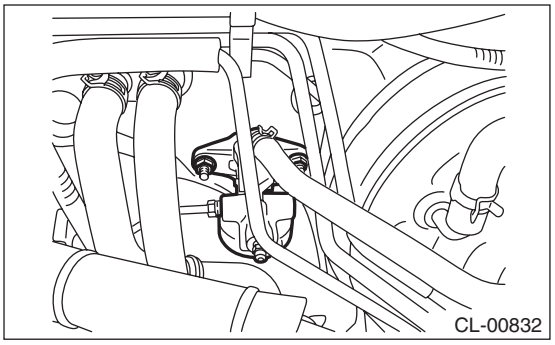
7) Remove the clip (A) from the air intake boot.
8) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
9) Loosen the clamp (C) which connects the air intake boot and throttle body.



10) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



11) Remove the nut which secures the clutch master cylinder.



12) Remove the bolts and nuts which secure the brake pedal and clutch pedal, and remove the pedal assembly.

NOTE:
Hold the clutch master cylinder with a wire or a string onto the vehicle body to avoid the clutch pipe from bending.

B: INSTALLATION

1) Install in the reverse order of removal.

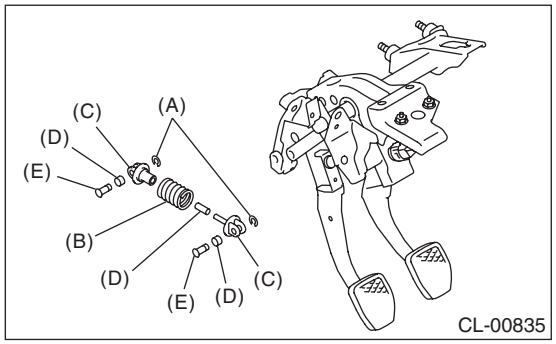
CAUTION:
Always use a new clevis pin.

Tightening torque:
Clutch pedal
18 N·m (1.8 kgf-m, 13.3 ft-lb)
Knee airbag module
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
Air intake boot
3 N·m (0.3 kgf-m, 2.2 ft-lb)

2) Adjust the clutch pedal after installation. <Ref. to CL-28, ADJUSTMENT, Clutch Pedal.>

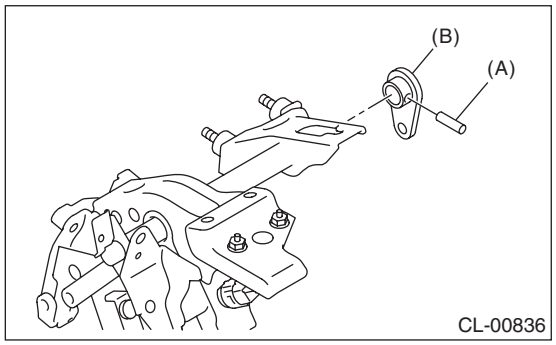
C: DISASSEMBLY

1) Remove the clutch switches.
2) Remove the clip, assist spring, rod and bushing.



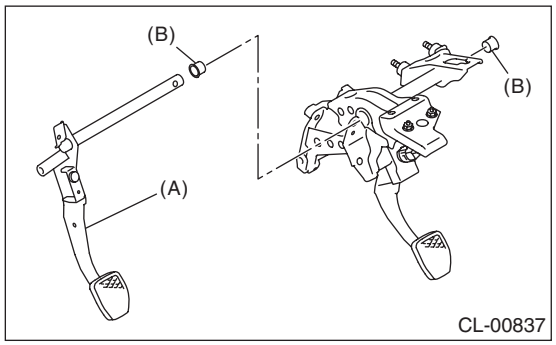
(A) Clip
(B) Assist spring
(C) Assist rod
(D) Bushing
(E) Clevis pin

3) Remove the spring pin and lever.



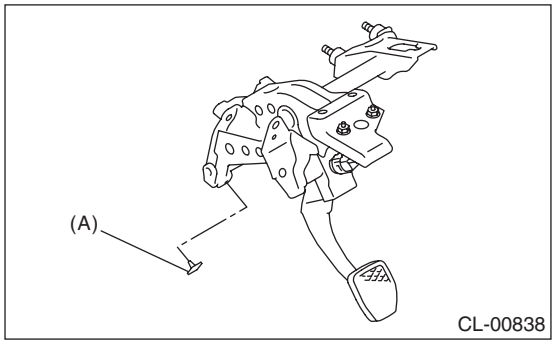
(A) Spring pin
(B) Lever

4) Remove the clutch pedal and bushings.



(A) Clutch pedal
(B) Bushing

5) Remove the stopper.



(A) Stopper

6) Remove the clutch pedal pad.

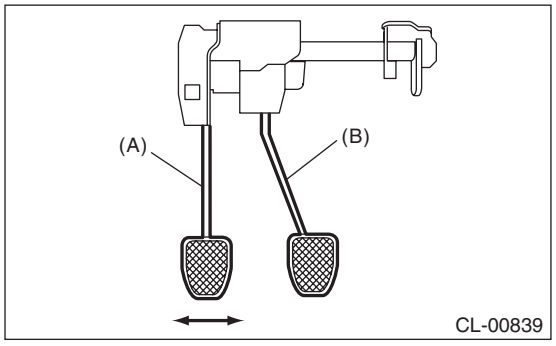
D: ASSEMBLY

1) Install the stopper and pedal pad to the clutch pedal.
2) Install the clutch switch to the pedal bracket.
3) Clean the pedal bushing holes of the clutch pedal and the brake pedal, apply grease, and install the pedal bushings.
4) Install the clutch pedal, brake pedal and lever to the pedal bracket, and fix with a spring pin.
5) Install the assist rod A, assist rod B, assist bushing and assist spring to the clutch pedal and pedal bracket.

E: INSPECTION

Move the clutch pedal pads in the lateral direction with a force of approximately 10 N (1 kgf, 2 lbf) to check that the clutch pedal deflection is within the service limit. If it exceeds the service limit, replace with new bushings.

Deflection of the clutch pedal:
Service limit
4.0 mm (0.157 in) or less



(A) Clutch pedal
(B) Brake pedal

F: ADJUSTMENT

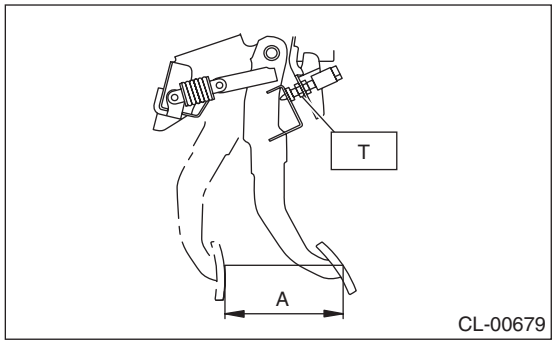
1) Turn the lock nut until the full stroke of clutch pedal becomes within the specification.

CAUTION:
When adjusting the full stroke of clutch pedal, do not turn the clutch switch.

NOTE:
If the lock nut cannot adjust the full stroke of clutch pedal to the specified value, adjust it by turning the master cylinder push rod.

Clutch pedal full stroke A:
130 — 135 mm (5.12 — 5.31 in)

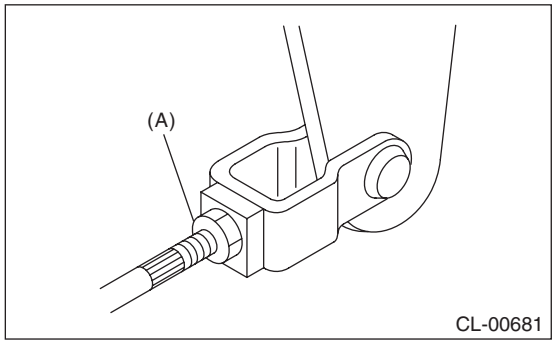
Tightening torque (clutch switch lock nut):
T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)



2) If the full stroke is not within the specified value, loosen the clutch switch lock nut to adjust.

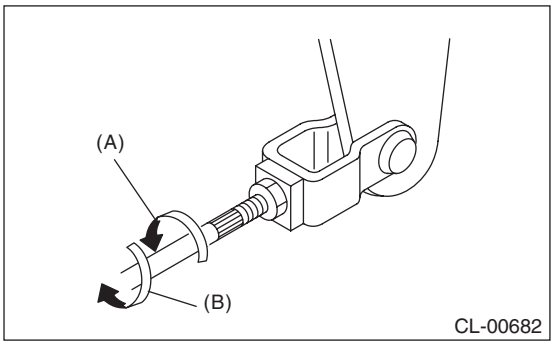
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

3) Loosen the push rod lock nuts.



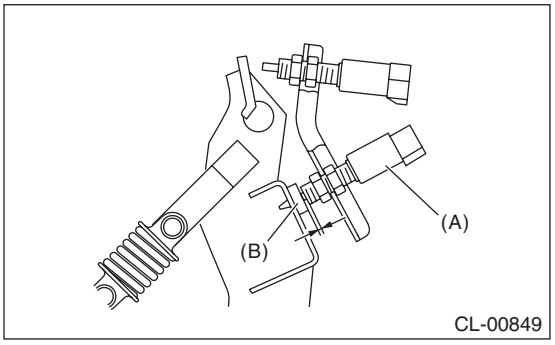
(A) Push rod lock nut

4) Make sure that the clutch pedal contacts the clutch pedal bracket stopper when the clutch pedal is at the maximum stroke position.



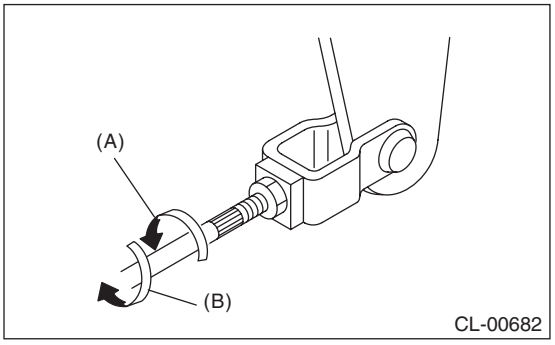
(A) In the longer direction
(B) In the shorter direction

5) Make sure that the clutch pedal contacts the clutch switch side when the pedal is released.
6) Turn the push rod to shorten until a clearance is gained on the clutch switch side.



(A) Clutch switch
(B) Stopper

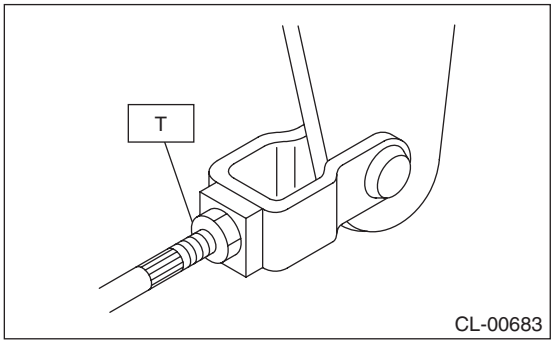
7) Turn the push rod to lengthen until clutch pedal contacts the clutch switch.
8) Turn further in the direction that will shorten the push rod by 270°.



(A) In the longer direction
(B) In the shorter direction

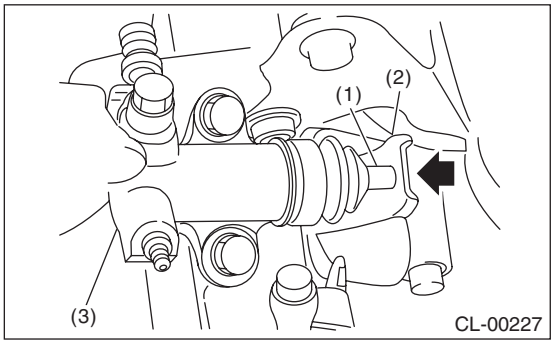
9) Check that the clevis pin moves smoothly by moving it in the left and right directions.
10) Tighten the push rod lock nut.

Tightening torque (push rod lock nut):
T: 10 N·m (1.0 kgf-m, 7.4 ft-lb)



11) Depress and release the clutch pedal two or three times to ensure that the clutch pedal and release lever operate smoothly. If the clutch pedal and release lever do not operate smoothly, bleed air from the clutch hydraulic system. <Ref. to CL-25, Clutch Fluid Air Bleeding.>
12) Measure the clutch pedal full stroke length again to ensure that it is within specifications. If it is not within specifications, repeat adjustment procedures again from the beginning.

Clutch pedal full stroke:
130 — 135 mm (5.12 — 5.31 in)
13) Push the release lever until the operating cylinder push rod retracts. Check that the brake fluid level in the reservoir tank increases.



(1) Push rod
(2) Release lever
(3) Operating cylinder

14) If the brake fluid level increases, hydraulic clutch play is correct.
15) If the brake fluid level does not increase or push rod does not retract, readjust the clutch pedal.
16) Check the brake fluid level using the scale on the reservoir tank. <Ref. to CL-24, INSPECTION, Clutch Fluid.>

11.Clutch Switch

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>
3) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
4) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
5) Disconnect the connectors of the clutch switch and clutch start switch.
6) Remove the clutch switch and clutch start switch.

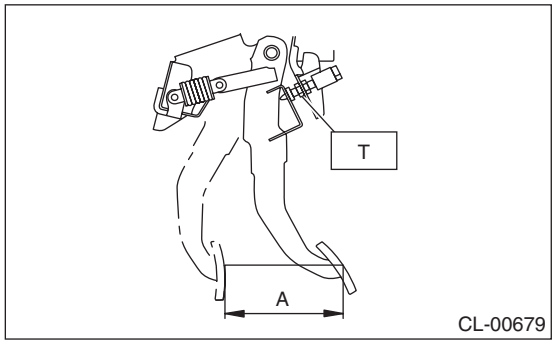
B: INSTALLATION

1. CLUTCH SWITCH

1) Install the clutch switch.
2) Move the clevis pin of push rod to left and right, retain it at the position where it moves smoothly, and measure the clutch pedal stroke.

Clutch pedal full stroke A:
130 — 135 mm (5.12 — 5.31 in)

Tightening torque:
T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)

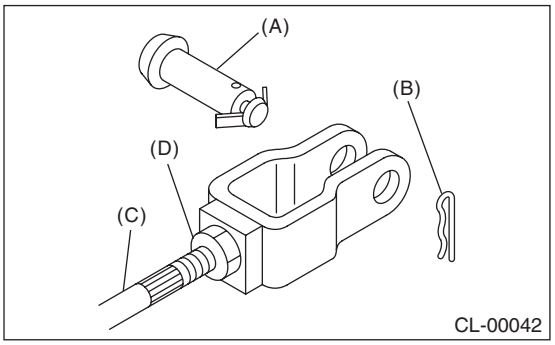


3) If the clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-28, ADJUSTMENT, Clutch Pedal.>
4) Connect the clutch switch connector.
5) Thereafter, install in the reverse order of removal.

Tightening torque:
Knee airbag module
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

2. CLUTCH START SWITCH

1) Remove the snap pin and clevis pin connecting the clutch pedal and operating rod.

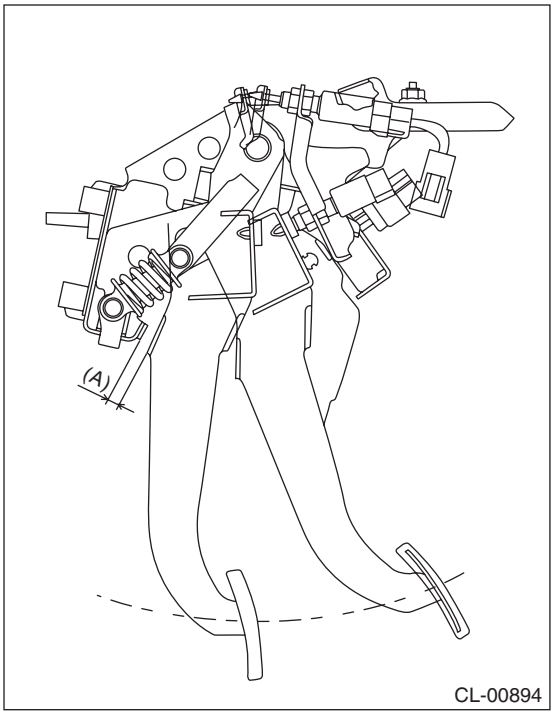


(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

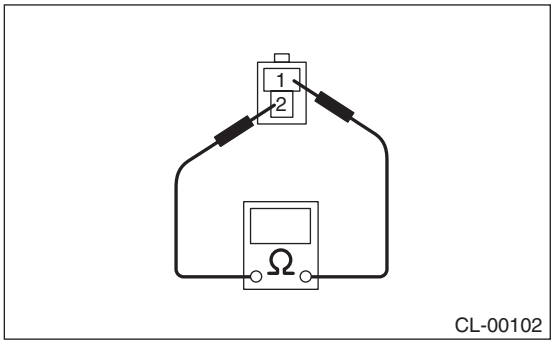
2) Install the clutch start switch so that the clutch switch turns on when the clearance between clutch pedal stopper and clutch pedal is within the specification described below.

Clearance A:
6.3 — 8.6 mm (0.25 — 0.34 in)

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

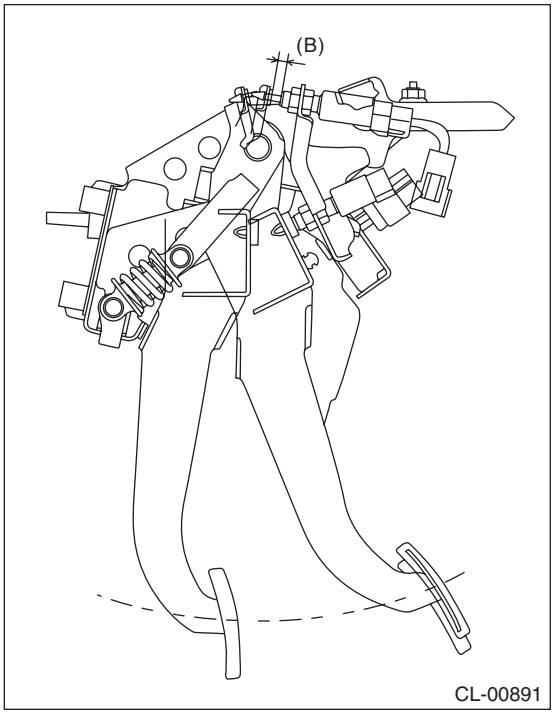


NOTE:
• Using a plate of the same thickness for the clearance facilitates the adjustment operation.
• Using the Subaru Select Monitor or a tester, check the position where the switch turns on.
Check the following figure for the terminal layout of the harness connector.



• When performing adjustment by the clearance between clutch start switch and clutch pedal plate, perform installation according to the following gap.

Clearance B:
8.6 — 9.0 mm (0.34 — 0.35 in)



3) Connect the clutch start switch connector.
4) Make sure that engine does not start with clutch pedal not depressed.
5) Make sure that engine starts with clutch pedal depressed.
6) Thereafter, install in the reverse order of removal.

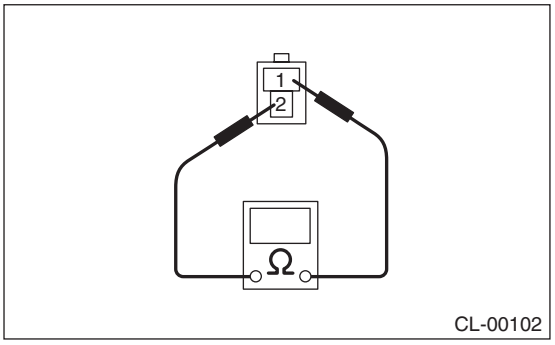
Tightening torque:
Knee airbag module
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

1. CLUTCH START SWITCH

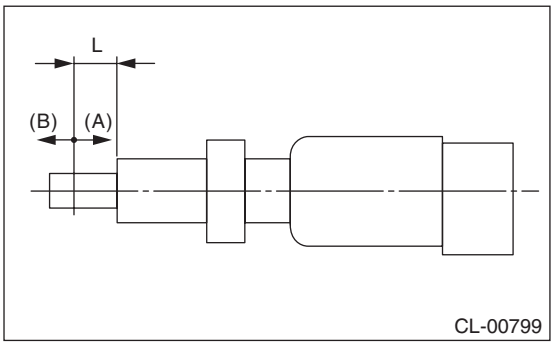
1) Perform the following inspections. If the clutch start switch does not operate normally, adjust the switch, and check it again. <Ref. to CL-32, ADJUSTMENT, Clutch Switch.>
• Make sure that engine does not start with clutch pedal not depressed.
• Make sure that engine starts with clutch pedal fully depressed.
2) When the clutch start switch does not operate normally even if it is adjusted, check the clutch start switch for continuity.
(1) Remove the clutch start switch. <Ref. to CL-30, REMOVAL, Clutch Switch.>
(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not at the standard value, replace the switch.

Condition	Terminal No.	Specified resistance
ON	No. 1 — No. 2	Less than 1 Ω
OFF	No. 1 — No. 2	1 MΩ or more



(3) Check that the switch is turned on and off in dimension L.

Dimension L:
9 — 10 mm (0.35 — 0.39 in)



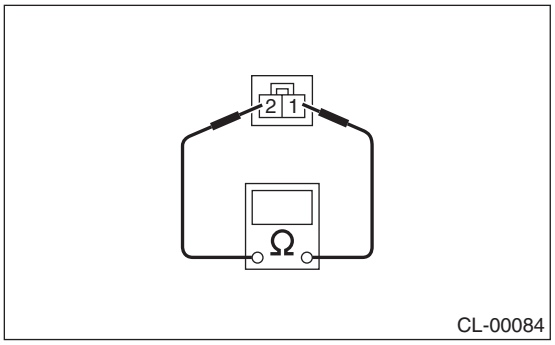
(A) ON
(B) OFF

(4) Install the clutch start switch. <Ref. to CL-30, CLUTCH START SWITCH, INSTALLATION, Clutch Switch.>

2. CLUTCH SWITCH

1) Check the clutch switch for continuity.
(1) Disconnect the connector of clutch switch.
(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not within the specification, check the clutch stroke and installation condition, and check the clutch switch again.

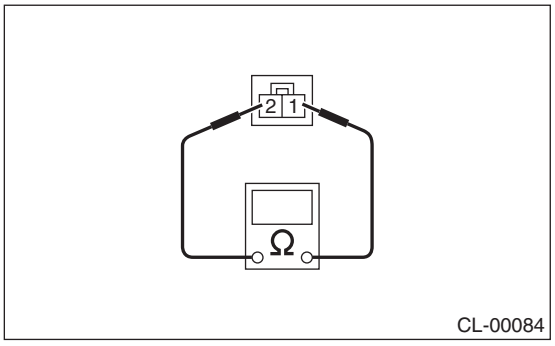
Condition	Terminal No.	Specified resistance
When clutch pedal is depressed	No. 1 — No. 2	1 MΩ or more
When the clutch pedal is not depressed	No. 1 — No. 2	Less than 1 Ω



CL-00084

2) When the clutch switch does not operate normally even if the clutch stroke and installation condition are normal, check the clutch switch for continuity.
(1) Remove the clutch switches. <Ref. to CL-30, REMOVAL, Clutch Switch.>
(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not at the standard value, replace the switch.

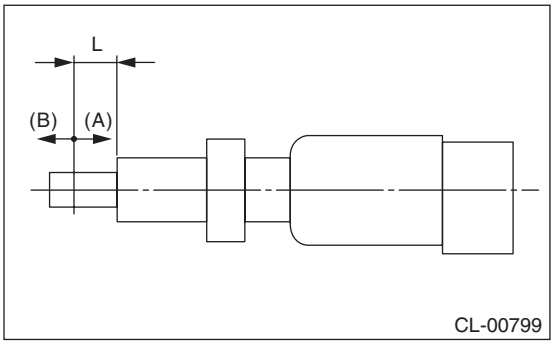
Condition	Terminal No.	Specified resistance
ON	No. 1 — No. 2	Less than 1 Ω
OFF	No. 1 — No. 2	1 MΩ or more



CL-00084

(3) Check that the switch is turned on and off in dimension L.

Dimension L:
5 — 6.5 mm (0.2 — 0.26 in)



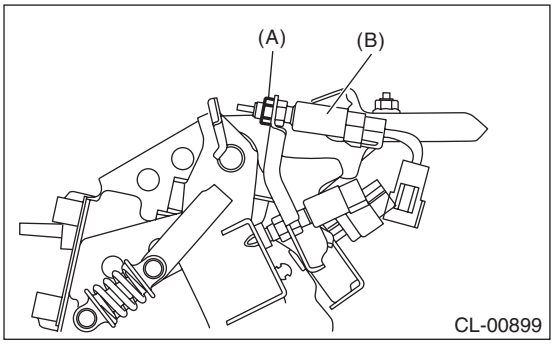
CL-00799

(A) ON
(B) OFF

(4) Install the clutch switch. <Ref. to CL-30, CLUTCH SWITCH, INSTALLATION, Clutch Switch.>

D: ADJUSTMENT

1) Loosen the lock nut of the clutch start switch.

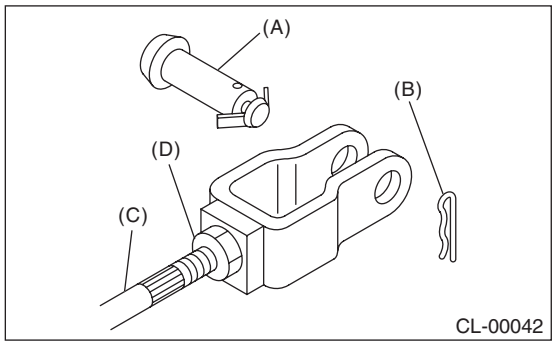


CL-00899

(A) Lock nut
(B) Clutch start switch

2) Disconnect the harness connector of the clutch start switch.

3) Remove the snap pin and clevis pin connecting the clutch pedal and operating rod.

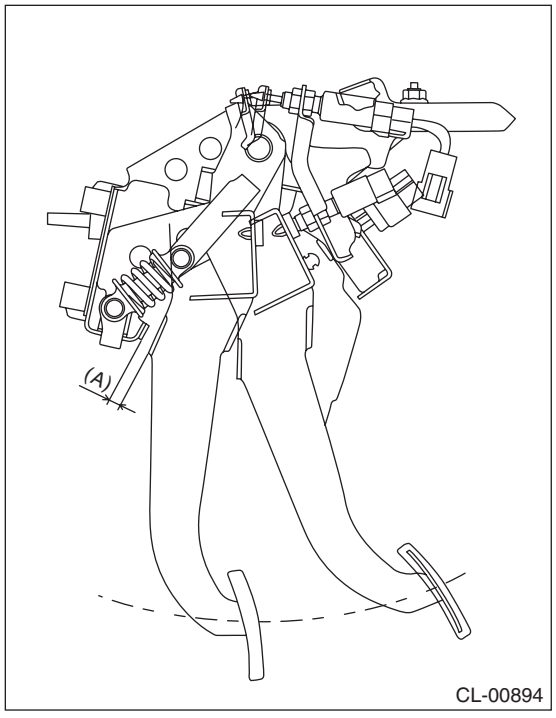


(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

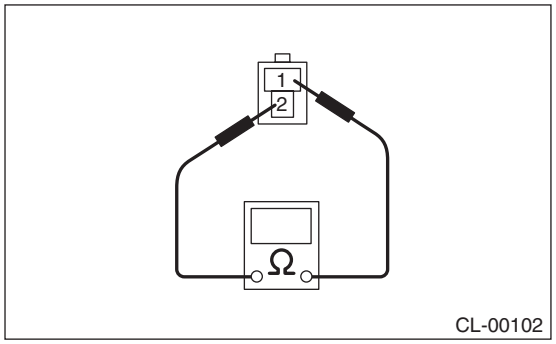
4) Adjust the clutch start switch so that the switch turns on when the clearance between clutch pedal stopper and clutch pedal is within the specification described below, and then tighten the lock nut.

Clearance A:
6.3 — 8.6 mm (0.25 — 0.34 in)

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

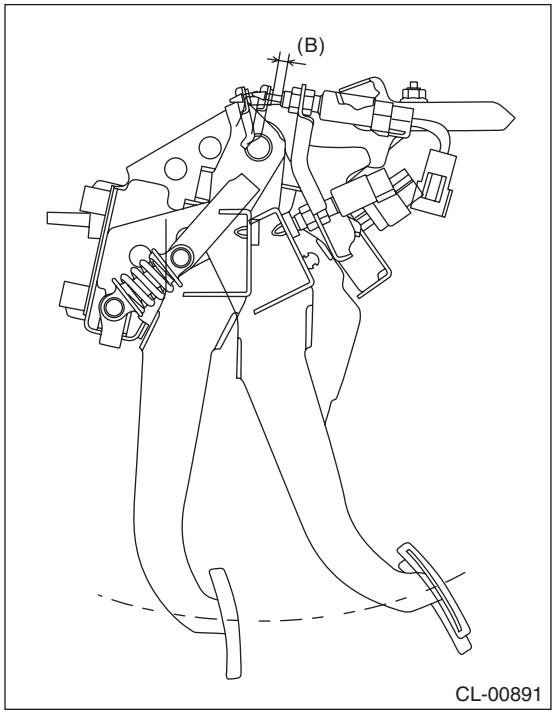


NOTE:
• Using a plate of the same thickness for the clearance facilitates the adjustment operation.
• Using the Subaru Select Monitor or a tester, check the position where the switch turns on.
Check the following figure for the terminal layout of the harness connector.



• When performing adjustment by the clearance between clutch start switch and clutch pedal plate, perform installation according to the following gap.

Clearance B:
8.6 — 9.0 mm (0.34 — 0.35 in)



5) Connect the clutch start switch connector.

12.General Diagnostic Table

A: INSPECTION

1. CLUTCH

Symptoms	Possible cause	Corrective action
1. Clutch slippage It is hard to perceive clutch slippage in the early stage, but pay attention to the following symptoms. • Engine temporarily speeds up when the accelerator ON immediately after shifting. • High-speed driving is not possible; especially rapid acceleration is not possible and vehicle speed does not increase in proportion to the increase in engine speed. • Power drops particularly when ascending a slope, and there is a burning smell of the clutch plate. • Method of testing: Park the vehicle and fully apply the parking brake. Disengage the clutch and shift the transmission gear into the 1st. Gradually increase the engine speed while gradually allowing the clutch to engage. The clutch function is satisfactory if the engine stalls. However, the clutch is slipping if the vehicle does not move forward and the engine does not stall.	(a) Oil on the clutch face	Replace.
	(b) Worn clutch face	Replace.
	(c) Deteriorated diaphragm spring	Replace.
	(d) Warped pressure plate or flywheel	Repair or replace.
	(e) Defective release bearing holder	Repair or replace.
2. Clutch drags. As a symptom of this trouble, a harsh scratching noise occurs and control becomes difficult when shifting gears. The symptom becomes more apparent when shifting into the 1st gear. However, because most trouble of this sort is due to a defective synchronization mechanism, perform the following tests. • Method of testing: <Ref. to CL-35, DIAGNOSTIC DIAGRAM OF CLUTCH DRAG, INSPECTION, General Diagnostic Table.> The problem is caused by insufficient disengagement of the clutch if an abnormal noise occurs during this test.	(a) Worn or rusty clutch disc hub spline	Replace the clutch disc.
	(b) Excessive deflection of clutch disc face	Repair or replace.
	(c) Crankshaft pilot needle bearing sticking	Replace.
	(d) Cracked clutch disc face	Replace.
	(e) Stuck clutch disc (smeared by oil or water)	Replace.
3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole vehicle when the vehicle is just started with clutch partially engaged.	(a) Adhesion of oil on the clutch face	Replace the clutch disc.
	(b) Weak or broken damper spring	Replace the clutch disc.
	(c) Poor contact of the disc surface or excessively worn disc	Replace the faulty clutch disc.
	(d) Warped pressure plate or flywheel	Repair or replace.
	(e) Loose disc rivets	Replace the clutch disc.
	(f) Loose engine mounting	Retighten or replace mounting.
	(g) Loose pitching stopper	Retighten the pitching stopper. Or replace it.
4. Noisy clutch Noise occurs when the clutch is disengaged, engaged, or partially engaged.	(a) Broken, worn or insufficiently lubricated release bearing	Replace the release bearing.
	(b) Insufficient lubrication of the pilot bearing	Replace the pilot bearing.
	(c) Loose clutch disc hub	Replace the clutch disc.
	(d) Loose damper spring retainer	Replace the clutch disc.
	(e) Deteriorated or broken damper spring	Replace the clutch disc.

Symptoms	Possible cause	Corrective action
5. Clutch grabs suddenly. When starting the vehicle with the clutch partially engaged, the clutch engages suddenly and the vehicle jumps instead of making a smooth start.	(a) Grease or oil on facing	Replace the clutch disc.
	(b) Deteriorated cushioning spring	Replace the clutch disc.
	(c) Worn or rusted spline of clutch disc or main shaft	Take off rust, apply grease or replace clutch disc or main shaft.
	(d) Deteriorated or broken damper spring	Replace the clutch disc.
	(e) Loose engine mounting	Retighten or replace mounting.
	(f) Deteriorated diaphragm spring	Replace.

2. CLUTCH PEDAL

Symptoms	Corrective action
Insufficient clutch pedal free play	Adjust the free play of the pedal.
Excessively worn and damaged pedal shaft and/or bushing	Replace the bushing or shaft with a new part.

3. DIAGNOSTIC DIAGRAM OF CLUTCH DRAG

	Step	Check	Yes	No
1	**CHECK GEAR NOISE.** 1) Start the engine. 2) While idling the engine, step on the clutch pedal and quickly shift from neutral to reverse.	Is there any abnormal noise from the transmission gear?	Go to step **2**.	Clutch is normal.
2	**CHECK GEAR NOISE.** Depress the clutch pedal at idle and shift from neutral to reverse within 0.5 — 1.0 second.	Is there any abnormal noise from the transmission gear?	Go to step **3**.	Inspect defective transmission or excessive clutch drag torque, pilot bearing, clutch disc, transmission and clutch disc hub spline.
3	**CHECK GEAR NOISE.** 1) Depress the clutch pedal at idle and shift from neutral to reverse within 0.5 — 1.0 second. 2) While stepping on the clutch pedal, shift from neutral to reverse, reverse to neutral several times.	Is there any abnormal noise from the transmission gear?	Inadequate clutch disengage. Inspect the clutch disc, clutch cover, clutch release, and clutch pedal free play.	Clutch and flywheel seizure. Inspect the clutch disc and the spline of the clutch disc hub.

CHASSIS SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FRONT SUSPENSION	FS
REAR SUSPENSION	RS
WHEEL AND TIRE SYSTEM	WT
TIRE PRESSURE MONITORING SYSTEM (DIAGNOSTICS)	TPM(diag)
DIFFERENTIALS	DI
TRANSFER CASE	TC
DRIVE SHAFT SYSTEM	DS
VEHICLE DYNAMICS CONTROL (VDC)	VDC
VEHICLE DYNAMICS CONTROL (VDC) (DIAGNOSTICS)	VDC(diag)
BRAKE	BR
PARKING BRAKE	PB
POWER ASSISTED SYSTEM (POWER STEERING)	PS
POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)	PS(diag)

FRONT SUSPENSION

FS

Page

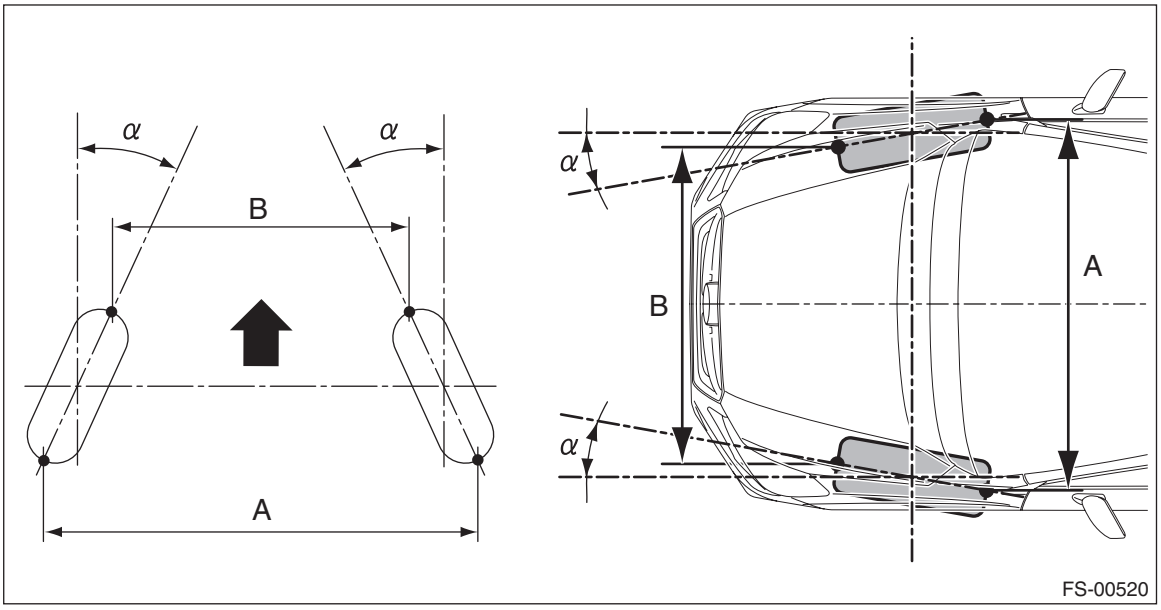
1. General Description 2
2. Wheel Alignment 7
3. Front Crossmember 18
4. Front Crossmember Support Plate 25
5. Front Stabilizer 26
6. Front Ball Joint 28
7. Front Arm 32
8. Front Strut 40
9. General Diagnostic Table 46

1. General Description

A: SPECIFICATION

			Impreza model	Crosstrek model
Tire size			P195/65R15 P205/55R16 P205/50R17	P225/55R17 225/55R17
Front	Wheel arch height (Tolerance: $^{+12\ mm}_{-24\ mm}$ ($^{+0.47\ in}_{-0.94\ in}$)) mm (in)		387 (15.24)	452 (17.8)
	Camber (tolerance: ±0°45′ Differences between RH and LH: 45′ or less)		–0°20′	0°10′
	Caster (referential value)		6°00′	5°60′
	Steering angle (tolerance: ±1.5°)	Inner wheel	38.3°	38.5°
		Outer wheel	33.7°	34.0°
	Toe-in mm (in)		0±3 (0±0.12) Toe angle (sum of both wheels): 0°±0°12′	0±3 (0±0.12) Toe angle (sum of both wheels): 0°±0°10′
	Kingpin angle (referential value)		13°50′	13°05′
Rear	Wheel arch height (Tolerance: $^{+12\ mm}_{-24\ mm}$ ($^{+0.47\ in}_{-0.94\ in}$)) mm (in)		368 (14.49)	450 (17.72)
	Camber (tolerance: $^{+0°45′}_{-0°52′}$ (Differences between RH and LH: 45′ or less))		–1°20′	–0°25′
	Toe-in mm (in)		IN 3±3 (IN 0.12±0.12) Toe angle (sum of both wheels): IN 0°12′±12′	IN 0±3 (IN 0±0.12) Toe angle (sum of both wheels): IN 0°00°±10′
	Thrust angle (tolerance: 0°00′±30′)		0°00′	

NOTE:
• Front toe-in, rear toe-in and front camber can be adjusted. Adjust if the value of toe-in or camber exceeds the tolerance range of the specification chart.
• Other items except for front toe-in, rear toe-in and front camber that are described in the specification chart cannot be adjusted. If other items exceed the tolerance range of the specification chart, check the suspension parts and connections for deformation. If defective, replace with new parts.

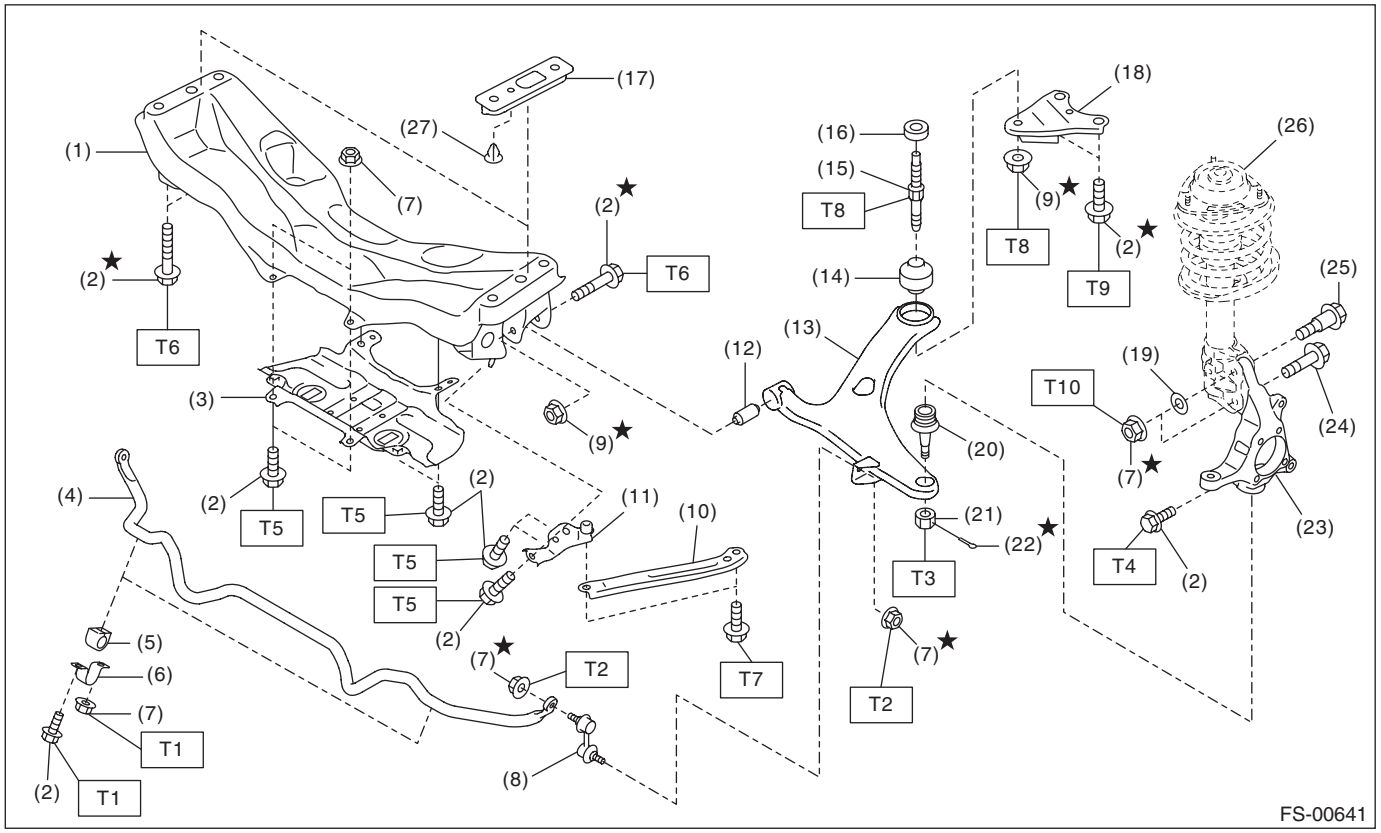


A – B = Positive: Toe-in, Negative: Toe-out

α = Individual toe angles

B: COMPONENT

1. FRONT SUSPENSION

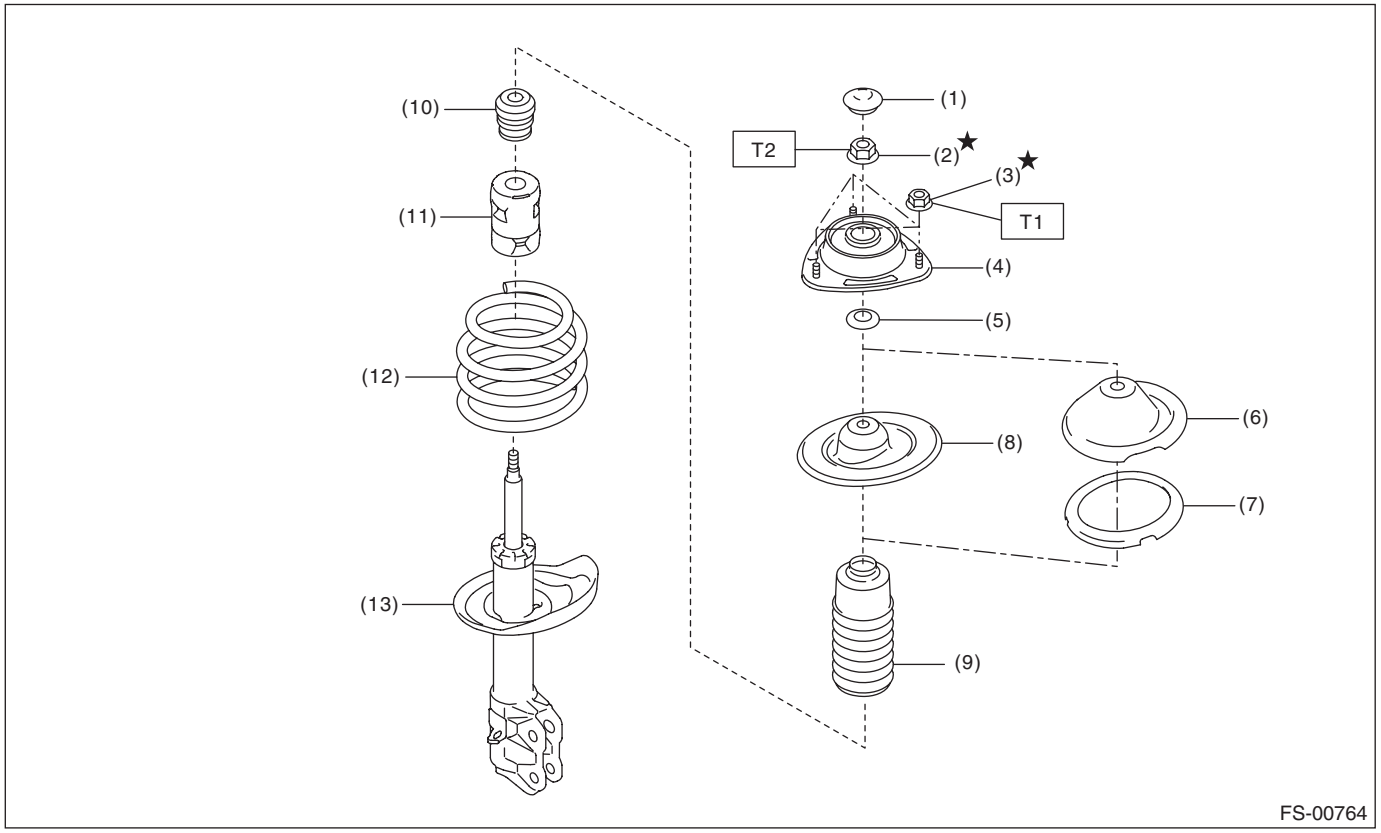


(1)	Front crossmember COMPL	(14)	Bushing rear - front arm	(27)	Clip
(2)	Flange bolt	(15)	Stud bolt		
(3)	Front crossmember support	(16)	Stopper - front arm bushing rear		
(4)	Front stabilizer	(17)	Adapter (Crosstrek model)		
(5)	Bushing - stabilizer	(18)	Front arm rear plate		
(6)	Clamp - stabilizer bushing	(19)	Adjusting washer		
(7)	Flange nut	(20)	Ball joint ASSY		
(8)	Stabilizer link ASSY	(21)	Castle nut		
(9)	Self-locking nut	(22)	Cotter pin		
(10)	Front support	(23)	Housing ASSY - front axle		
(11)	Support plate - front crossmember	(24)	Flange bolt		
(12)	Bushing front - front arm	(25)	Adjusting bolt		
(13)	Front arm ASSY	(26)	Front strut ASSY		

Tightening torque: N·m (kgf-m, ft-lb)

T1:	***25 (2.55, 18.4)***
T2:	***Impreza model: 38 (3.87, 28.0)*** ***Crosstrek model: 60 (6.12, 44.3)***
T3:	***39 (3.98, 28.8)***
T4:	***50 (5.10, 36.9)***
T5:	***60 (6.12, 44.3)***
T6:	***95 (9.69, 70.1)***
T7:	***100 (10.20, 73.8)***
T8:	***110 (11.22, 81.1)***
T9:	***150 (15.30, 110.6)***
T10:	***155 (15.81, 114.3)***

2. FRONT STRUT



(1) Dust seal - front strut
(2) Self-locking nut
(3) Flange nut
(4) Strut mount - front
(5) Spacer - front strut
(6) Spring seat - front strut UPR (Crosstrek model)
(7) Rubber seat (Crosstrek model)
(8) Spring seat - front strut UPR (Impreza model)
(9) Dust cover - front strut
(10) Helper - front strut
(11) Dust cover inner
(12) Coil spring - front
(13) Strut COMPL - front

Tightening torque: N·m (kgf-m, ft-lb)
T1: 20 (2.04, 14.8)
T2: 55 (5.61, 40.6)

C: CAUTION

• Wear appropriate work clothing, including a helmet, protective goggles and protective shoes when performing any work.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• Use SUBARU genuine grease etc. or equivalent. Do not mix grease etc. of different grades or manufacturers.
• Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or rigid racks at the specified points.
• When the suspension-related components have been replaced, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

D: PREPARATION TOOL

1. SPECIAL TOOL

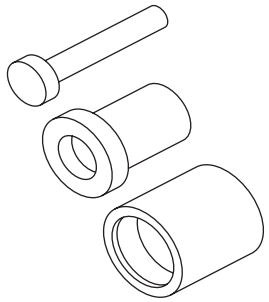
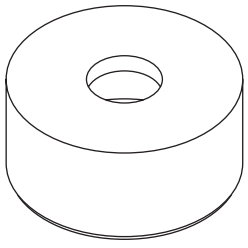
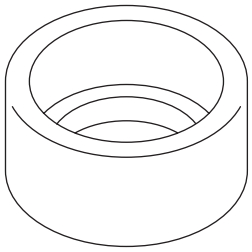
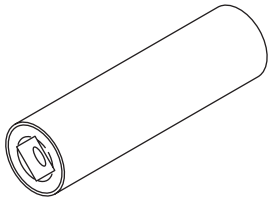
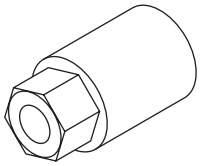
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927680000	927680000	INSTALLER & REMOVER SET	Used for replacing the bushing front - front arm of front arm assembly.
 ST20299AG000	20299AG000	REMOVER	• Used for replacing the bushing rear - front arm of front arm assembly. • Used together with BASE (20299AG010).

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST20299AG010	20299AG010	BASE	• Used for replacing the bushing rear - front arm of front arm assembly. • Used together with REMOVER (20299AG000).
 ST20299AG020	20299AG020	STUD BOLT SOCKET	Used for removing and installing the stud bolt for front arm assembly installing portion.
 ST20399AG000	20399AG000	STRUT MOUNT SOCKET	Used for disassembling and assembling strut mount.

2. GENERAL TOOL

TOOL NAME	REMARKS
Alignment gauge	Used for measuring wheel alignment.
Alignment gauge adapter	Used for measuring wheel alignment.
Turning radius gauge	Used for measuring wheel alignment.
Toe-in gauge	Used for toe-in measurement.
Tie-rod end puller	Used for disconnecting tie-rod end.
Dial gauge	Used for damper strut measurement.
Coil spring compressor	Used for strut assembly/disassembly.

2. Wheel Alignment

A: INSPECTION

Check the following items before performing the wheel alignment measurement.

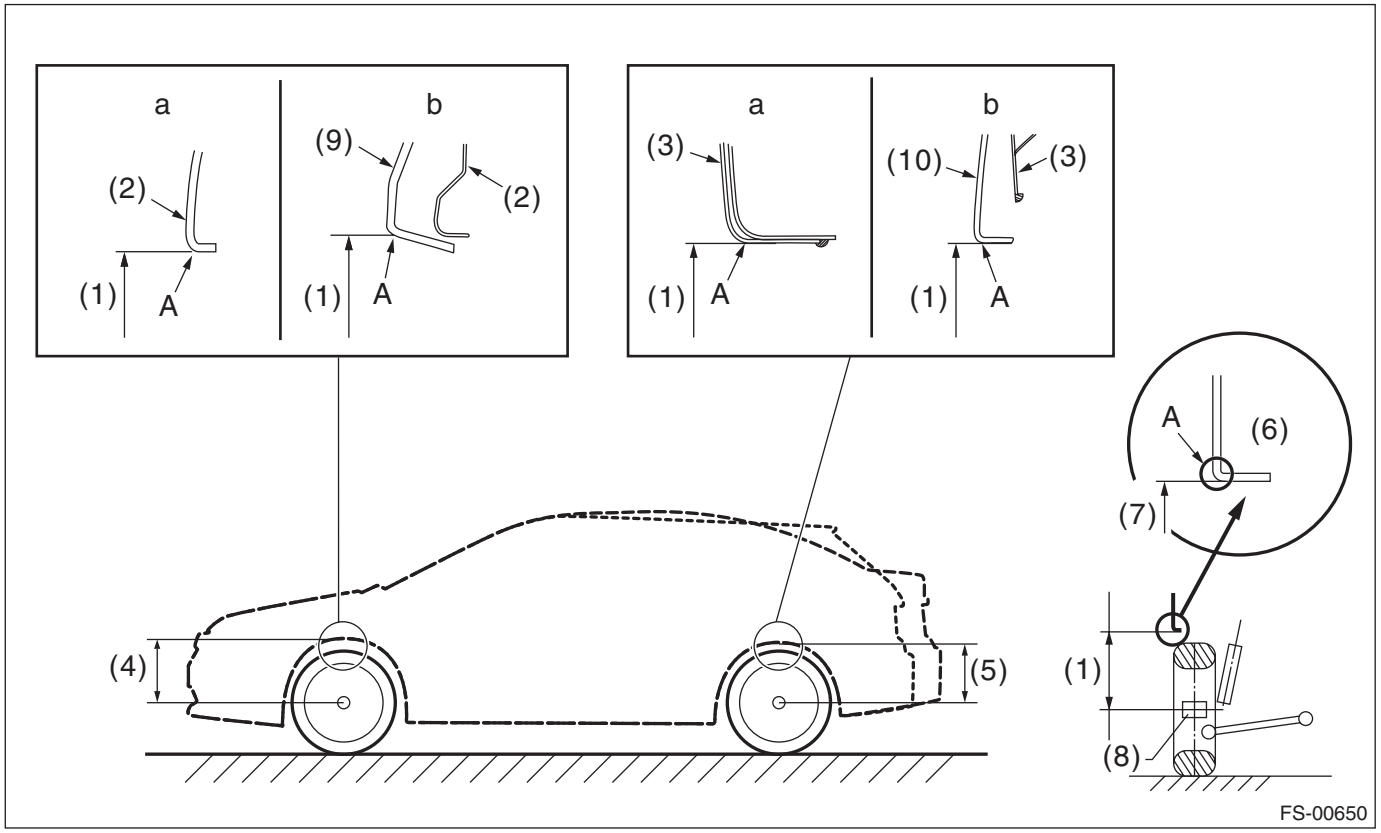
- Tire inflation pressure
- Uneven wear of RH and LH tires, or difference of sizes
- Tire runout
- Excessive play and wear of ball joint
- Excessive play and wear of tie-rod end
- Excessive play of wheel bearing
- Right and left wheel base imbalance
- Deformation and excessive play of steering link
- Deformation and excessive play of suspension parts

Check, adjust and measure the wheel alignment in accordance with the following procedures.

1	Wheel arch height (front and rear wheels)	Inspection: <Ref. to FS-10, REAR WHEEL TOE-IN, INSPECTION, Wheel Alignment.>
	↓	
2	Camber (front and rear wheels)	Inspection: <Ref. to FS-9, CAMBER, INSPECTION, Wheel Alignment.> Adjustment: <Ref. to FS-11, FRONT CAMBER, ADJUSTMENT, Wheel Alignment.>
	↓	
3	Caster (front wheel)	Inspection: <Ref. to FS-9, CASTER, INSPECTION, Wheel Alignment.>
	↓	
4	Steering angle	Inspection: <Ref. to FS-10, FRONT WHEEL TOE-IN, INSPECTION, Wheel Alignment.> Adjustment: <Ref. to FS-13, STEERING ANGLE, ADJUSTMENT, Wheel Alignment.>
	↓	
5	Front wheel toe-in	Inspection: <Ref. to FS-10, STEERING ANGLE, INSPECTION, Wheel Alignment.> Adjustment: <Ref. to FS-13, FRONT WHEEL TOE-IN, ADJUSTMENT, Wheel Alignment.>
	↓	
6	Rear wheel toe-in	Inspection: <Ref. to FS-8, WHEEL ARCH HEIGHT, INSPECTION, Wheel Alignment.> Adjustment: <Ref. to FS-14, REAR WHEEL TOE-IN, ADJUSTMENT, Wheel Alignment.>
	↓	
7	Thrust angle	Inspection: <Ref. to FS-11, THRUST ANGLE, INSPECTION, Wheel Alignment.> Adjustment: <Ref. to FS-16, THRUST ANGLE, ADJUSTMENT, Wheel Alignment.>

1. WHEEL ARCH HEIGHT

1) Park the vehicle on a level surface.
2) Empty the vehicle so that it is at “curb weight”. (Empty the luggage compartment, load the spare tire, jack and service tools, and fill up the fuel tank.)
3) Set the steering wheel in a straight-ahead position, and stabilize the suspension by moving the vehicle in a straight line for 5 m (16 ft) or more.
4) Suspend a thread from the wheel arch (point “A” in the figure below) and affix at a position directly above the center of wheel.
5) Measure the distance between the point “A” and the center of wheel.



a	Impreza model	b	Crosstrek model		
(1)	Wheel arch height	(5)	Rear wheel arch height	(9)	Garnish fender (Crosstrek model)
(2)	Front fender	(6)	Flange bend line	(10)	Garnish ASSY rear quarter (Crosstrek model)
(3)	Rear quarter	(7)	Point of measurement		
(4)	Front wheel arch height	(8)	End of spindle		

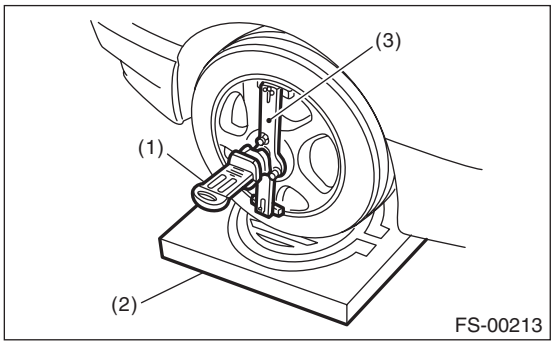
Wheel arch height specification mm (in) (tolerance: $^{+12\ mm}_{-24\ mm}$ ($^{+0.47\ in}_{-0.94\ in}$))		
Model	Impreza model	Crosstrek model
Tire size	P195/65R15 P205/55R16 P205/50R17	P225/55R17 225/55R17
Front	387 (15.24)	452 (17.8)
Rear	368 (14.49)	450 (17.72)

2. CAMBER

1) Place the front wheel on the turning radius gauge.

NOTE:
Make sure the ground contact surfaces of the front and rear wheels are at the same height.

2) Set the adapter into the center of wheel, and then set the wheel alignment gauge.



(1) Alignment gauge
(2) Turning radius gauge
(3) Adapter

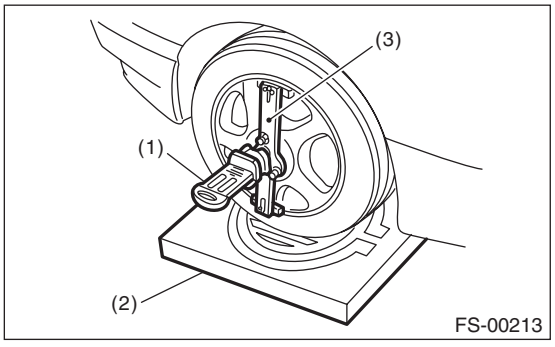
3) Measure the camber angle in accordance with the operation manual for wheel alignment gauge.

Model	Tire size	Camber (difference between RH and LH 45′ or less)
Impreza model	P195/65R15 P205/55R16 P205/50R17	–0°20′±0°45′
Crosstrek model	P225/55R17 225/55R17	0°10′±0°45′

3. CASTER

1) Place the front wheel on the turning radius gauge. Make sure the ground contact surfaces of the front and rear wheels are at the same height.

2) Set the adapter into the center of wheel, and then set the wheel alignment gauge.



(1) Alignment gauge
(2) Turning radius gauge
(3) Adapter

3) Measure the caster angle in accordance with the operation manual for wheel alignment gauge.

Model	Tire size	Caster
Impreza model	P195/65R15 P205/55R16 P205/50R17	6°00′
Crosstrek model	P225/55R17 225/55R17	5°60′

4. STEERING ANGLE

1) Place the vehicle on turning radius gauge.
2) While depressing the brake pedal, turn the steering wheel fully to the left and right.
3) With the steering wheel held at each fully turned position, measure both the inner and outer wheel steering angles.

Model	Tire size	Inner wheel	Outer wheel
Impreza model	P195/65R15 P205/55R16 P205/50R17	38.3°±1.5°	33.7°±1.5°
Crosstrek model	P225/55R17 225/55R17	38.5°±1.5°	34.0°±1.5°

5. FRONT WHEEL TOE-IN

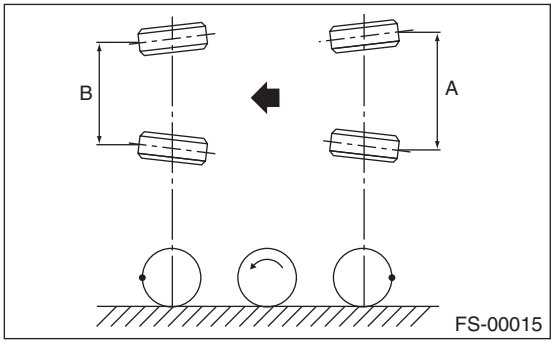
Toe-in: Inspection value
0±3 mm (0±0.12 in)

1) Set the toe-in gauge in the position at wheel axis center height behind the right and left front tires.
2) Place a mark at the center of both left and right tires, and measure distance “A” between the marks.
3) Move the vehicle forward to rotate the tires 180°.

NOTE:
Be sure to rotate the tires in the forward direction.

4) Measure the distance “B” between the left and right marks. Find toe-in using the following calculation:

A – B = Toe-in



6. REAR WHEEL TOE-IN

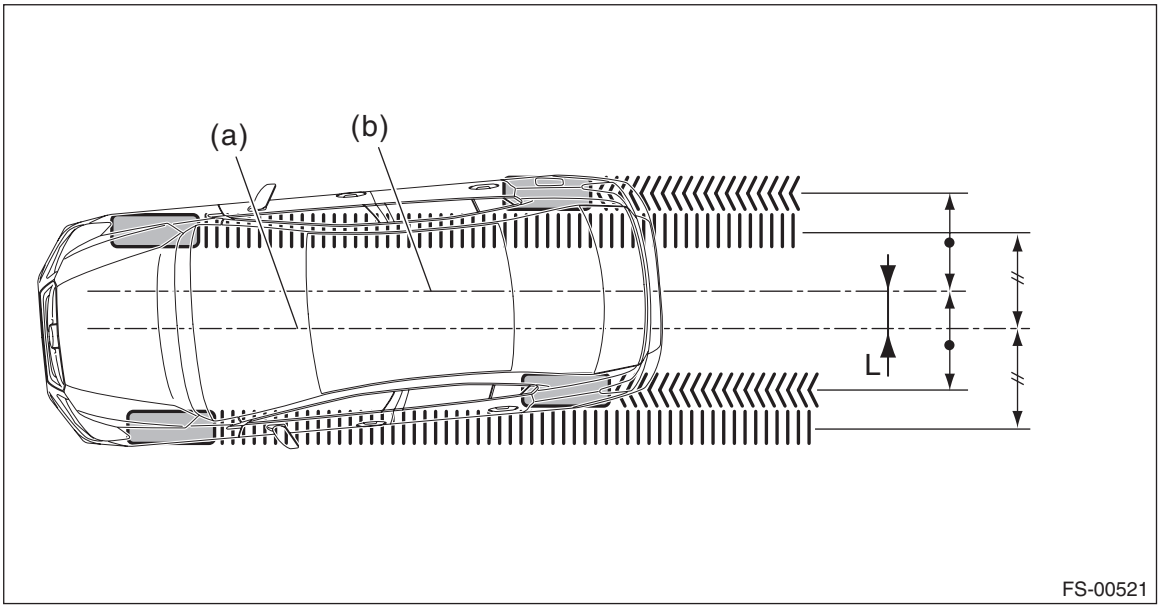
Refer to the FRONT WHEEL TOE-IN for rear toe-in inspection procedures. <Ref. to FS-10, FRONT WHEEL TOE-IN, INSPECTION, Wheel Alignment.>

Toe-in: Inspection value
Impreza model: 3±3 mm (0.12±0.12 in)
Crosstrek model: 0±3 mm (0±0.12 in)

7. THRUST ANGLE

1) Park the vehicle on a level surface.
2) Move the vehicle 3 to 4 meters (10 to 13 feet) straight forward.
3) Draw the center of loci for both the front and rear axles.
4) Measure distance “L” between the center lines of the axle loci.

Thrust angle: Inspection value
0°±30′
Less than 30′ when “L” is 23 mm (0.9 in) or less



(a) Center line of loci (front axle) (b) Center line of loci (rear axle)

B: ADJUSTMENT

CAUTION:
When the wheel alignment has been adjusted, perform the adjustment of the VDC. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

1. FRONT CAMBER

1) Adjust the camber angle to the following value.

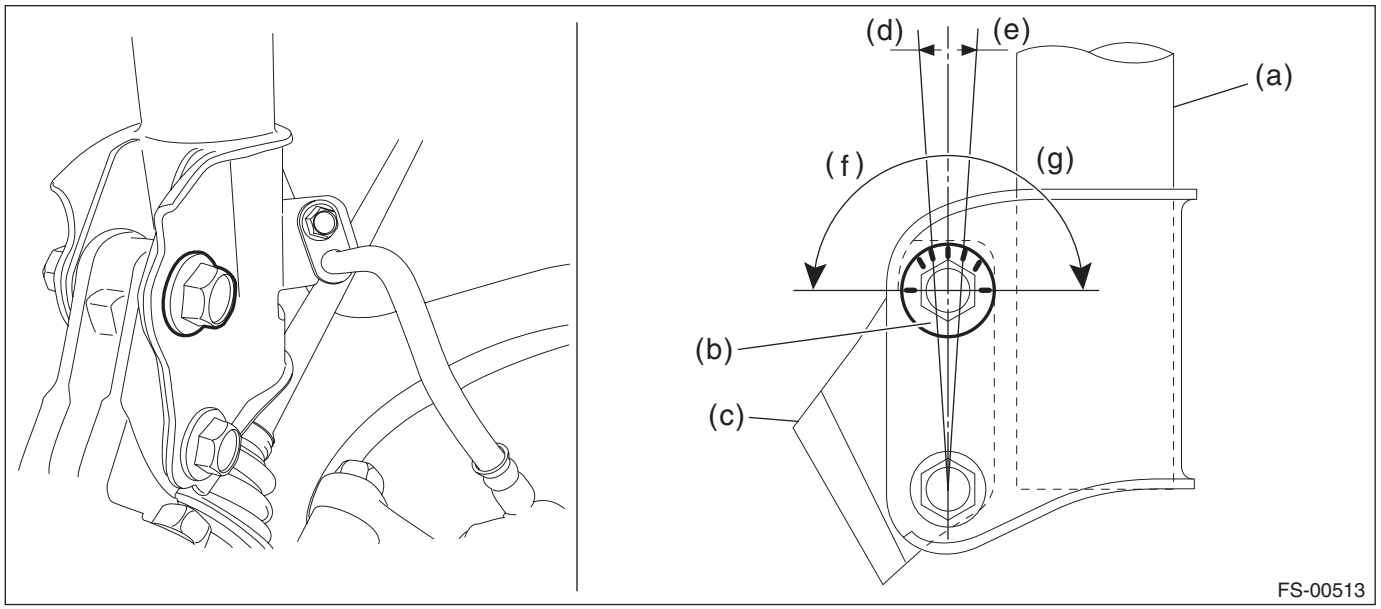
Model	Tire size	Camber (difference between RH and LH 45′ or less)
Impreza model	P195/65R15 P205/55R16 P205/50R17	–0°20′±0°30′
Crosstrek model	P225/55R17 225/55R17	0°10′±0°30′

2) Loosen the two flange nuts located at the front lower section of the strut.

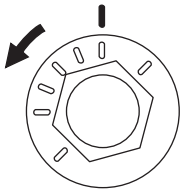
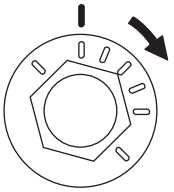
NOTE:
When the adjusting bolt needs to be loosened or tightened, hold its head with a wrench and turn the flange nut.

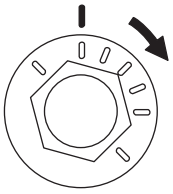
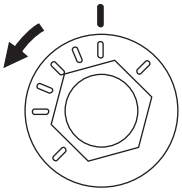
3) Turn the camber adjusting bolt so that the camber is set at specification.

NOTE:
Moving the adjusting bolt by one scale changes the camber by approximately 0°15′.



(a) Strut ASSY
(b) Adjusting bolt
(c) Housing ASSY - front axle
(d) Outer direction
(e) Inner direction
(f) Camber is increased.
(g) Camber is decreased.

To increase camber.	
Rotate the left side counterclockwise.	Rotate the right side clockwise.
 FS-00352	 FS-00353

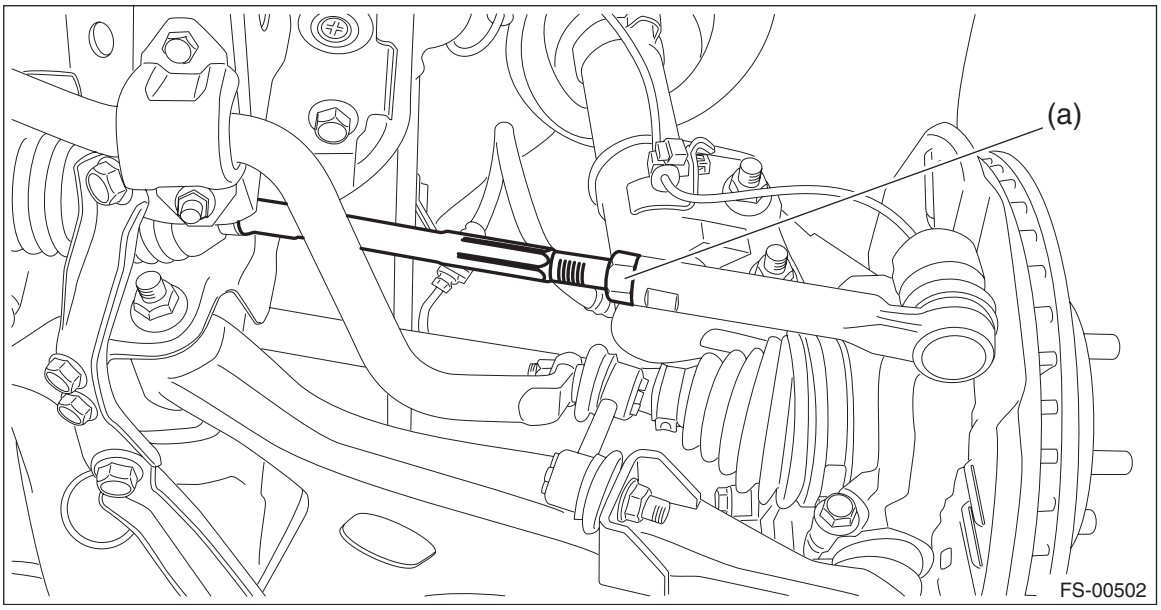
To decrease camber.	
Rotate the left side clockwise.	Rotate the right side counterclockwise.
 FS-00353	 FS-00352

4) Tighten two new flange nuts.

Tightening torque:
155 N·m (15.81 kgf-m, 114.3 ft-lb)

2. STEERING ANGLE

1) Adjust the steering angle of both inner and outer wheels.
(1) Loosen the steering tie-rod lock nut (a), and rotate the tie-rod.



(2) Turn the tie-rod to adjust the steering angle of both inner and outer wheels.
(3) Tighten the steering tie-rod lock nut (a).

Tightening torque:
85 N·m (8.67 kgf-m, 62.7 ft-lb)

NOTE:
Check and correct the tie-rod boot if twisted.
2) Check the toe-in. <Ref. to FS-10, STEERING ANGLE, INSPECTION, Wheel Alignment.>

3. FRONT WHEEL TOE-IN

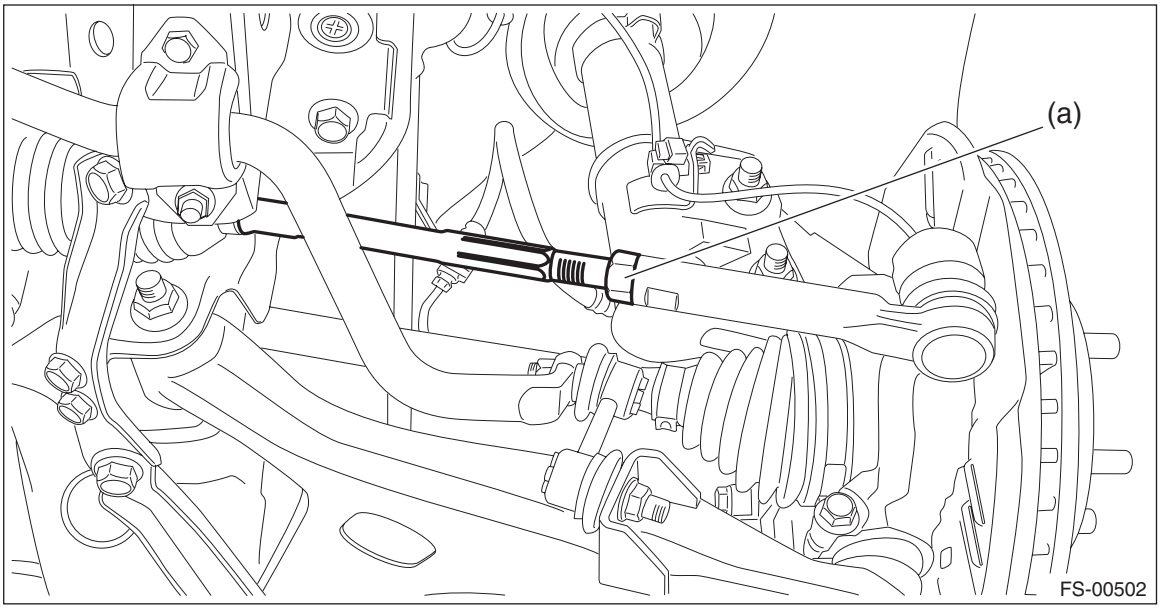
When adjusting the toe-in, adjust it to the following value. <Ref. to FS-13, STEERING ANGLE, ADJUSTMENT, Wheel Alignment.>

Toe-in: Adjustment value
0±2 mm (0±0.08 in)

1) Check that the left and right wheel steering angles are within specification.
2) Loosen the left and right side steering tie-rod lock nuts (a).
3) Turn the left and right tie-rods by equal amounts until the toe-in is at the specification.

NOTE:
Both the left and right tie-rods are right-hand threaded. To increase toe-in, turn both tie-rods clockwise by equal amount (viewing from the inside of vehicle).

4) Tighten the tie-rod lock nut (a).



Tightening torque:
85 N·m (8.67 kgf-m, 62.7 ft-lb)

5) Check and correct the tie-rod boot if twisted.

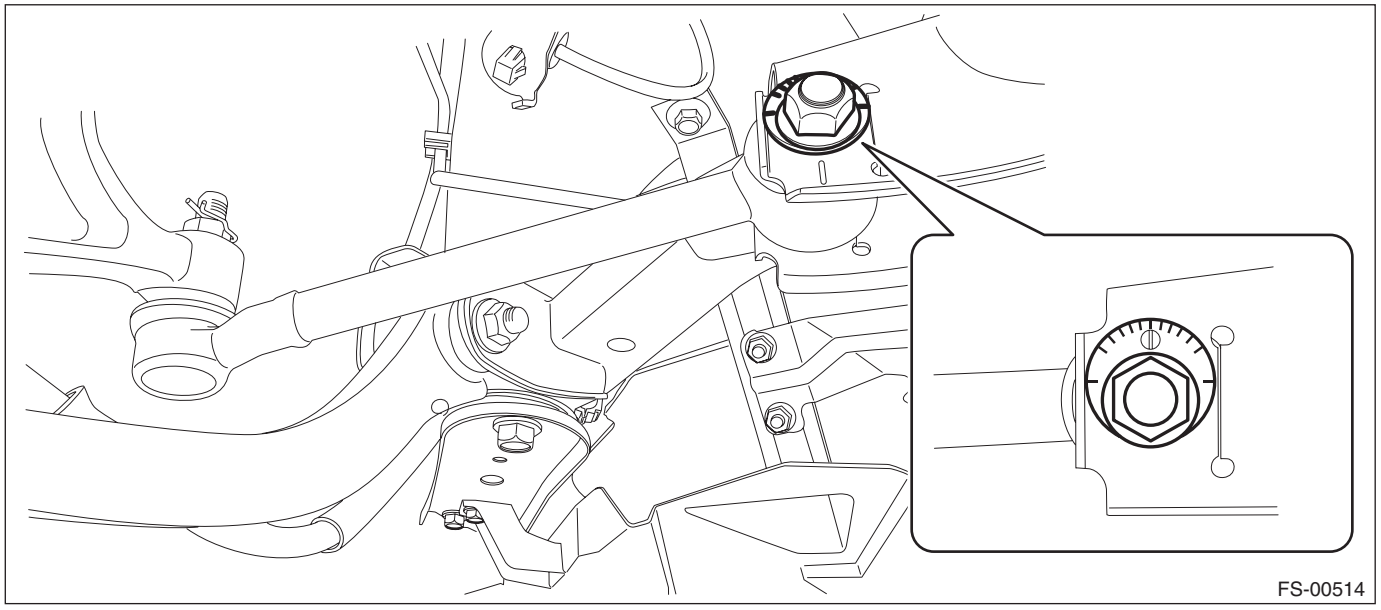
4. REAR WHEEL TOE-IN

When adjusting, adjust it to the following value.

Toe-in: Adjustment value
Impreza model: 3±2 mm (0.12±0.08 in)
Crosstrek model: 0±2 mm (0±0.08 in)

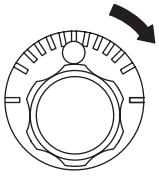
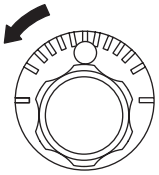
1) Loosen the self-locking nut for the lateral link assembly - front.

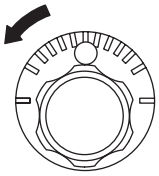
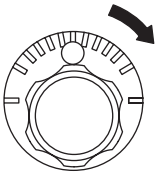
NOTE:
When loosening or tightening the adjusting bolt, hold the bolt head and turn the self-locking nut.



2) Turn the adjusting bolt until toe-in is within the specification.

NOTE:
When the left and right wheels are adjusted for toe-in at the same time, the movement of one scale graduation changes toe-in by approx. 1.3 mm (0.05 in).

To increase toe-in.	
Rotate the left side clockwise.	Rotate the right side counterclockwise.
 FS-00018	 FS-00019

To decrease toe-in.	
Rotate the left side counterclockwise.	Rotate the right side clockwise.
 FS-00019	 FS-00018

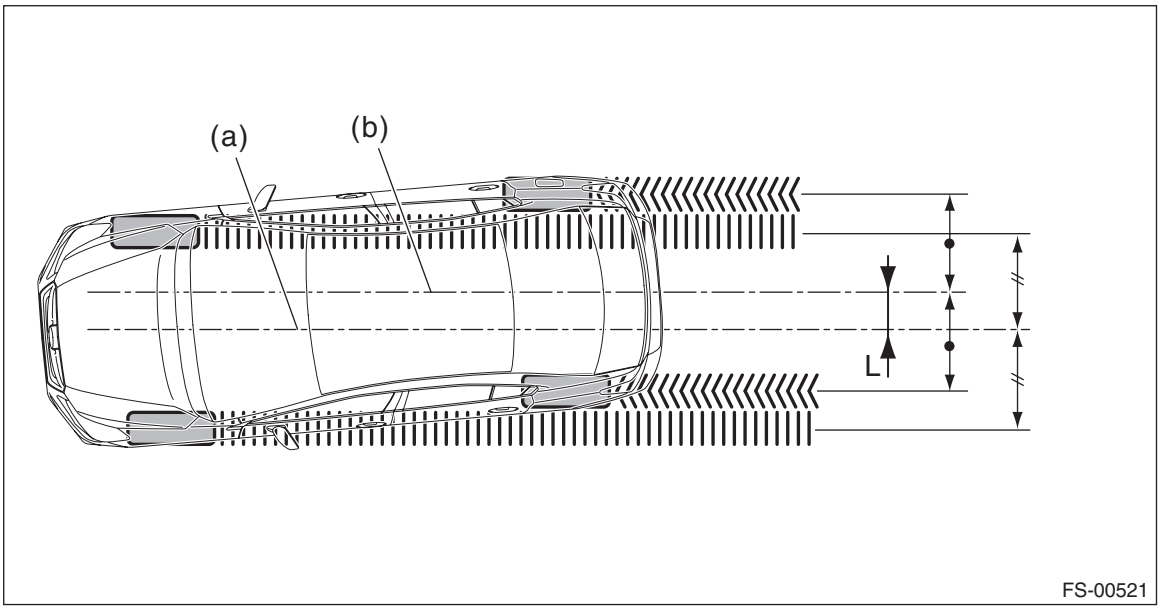
3) Attach and tighten a new self-locking nut.

Tightening torque:
100 N·m (10.20 kgf-m, 73.8 ft-lb)

5. THRUST ANGLE

When adjusting, adjust it to the following value.

Thrust angle: Adjustment value
0°±20′
Less than 20′ when "L" is 15 mm (0.6 in) or less

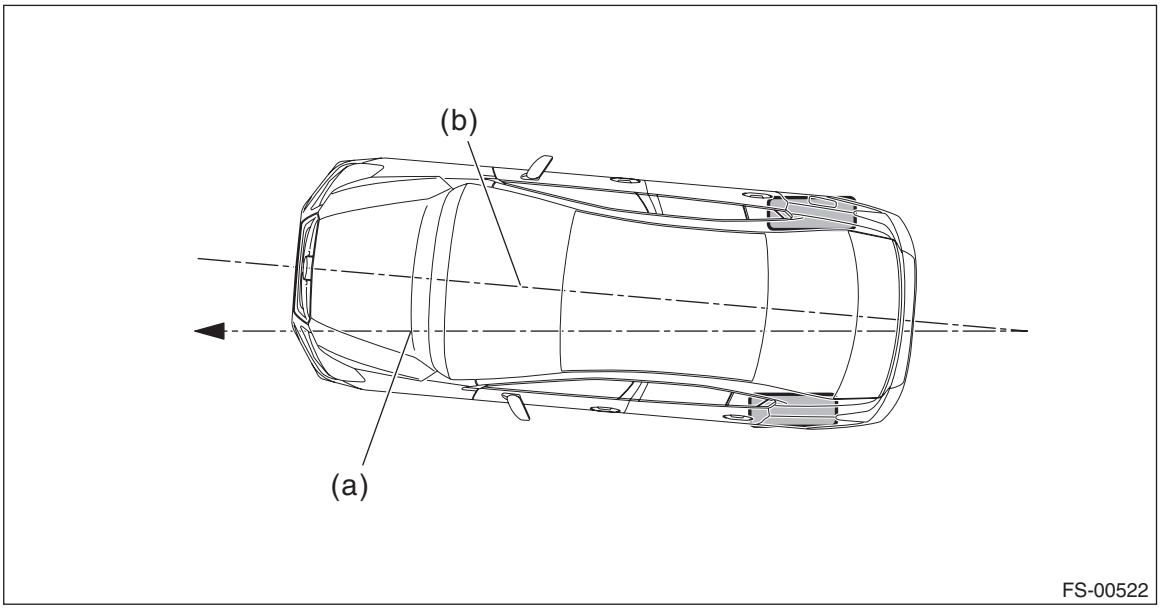


(a) Center line of loci (front axle) (b) Center line of loci (rear axle)

1) Make thrust angle adjustments by turning the toe-in adjusting bolts of the rear suspension equally in the same direction.
2) When one rear wheel is adjusted in a toe-in direction, adjust the other rear wheel equally in toe-out direction, in order to make the thrust angle adjustment.

3) When the left and right adjusting bolts are turned by one graduation, the thrust angle will change approx. 15′. (“L” is approx. 11 mm (0.43 in)).

NOTE:
Thrust angle is a mean value of left and right wheel toe angles in relation to the vehicle body center line. Vehicle is driven straight in the thrust angle direction while slanting in the oblique direction depending on the degree of the mean thrust angle.

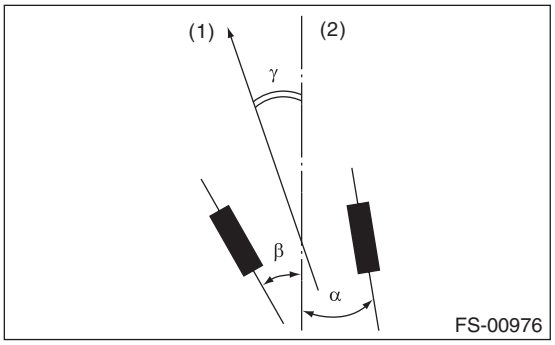


(a) Thrust angle (b) Body center line

Thrust angle:

$\gamma = (\alpha - \beta)/2$

α: Rear RH wheel toe-in angle
β: Rear LH wheel toe-in angle
Substitute only the positive toe-in values from each wheel into α and β in the calculation.



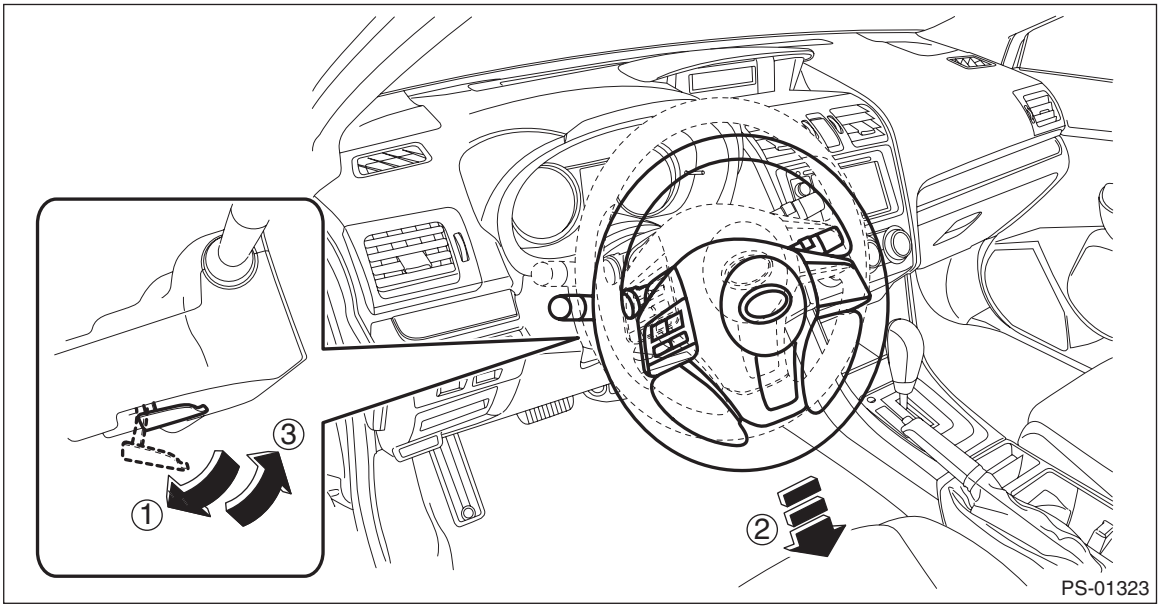
(1) Front
(2) Body center line

3. Front Crossmember

A: REMOVAL

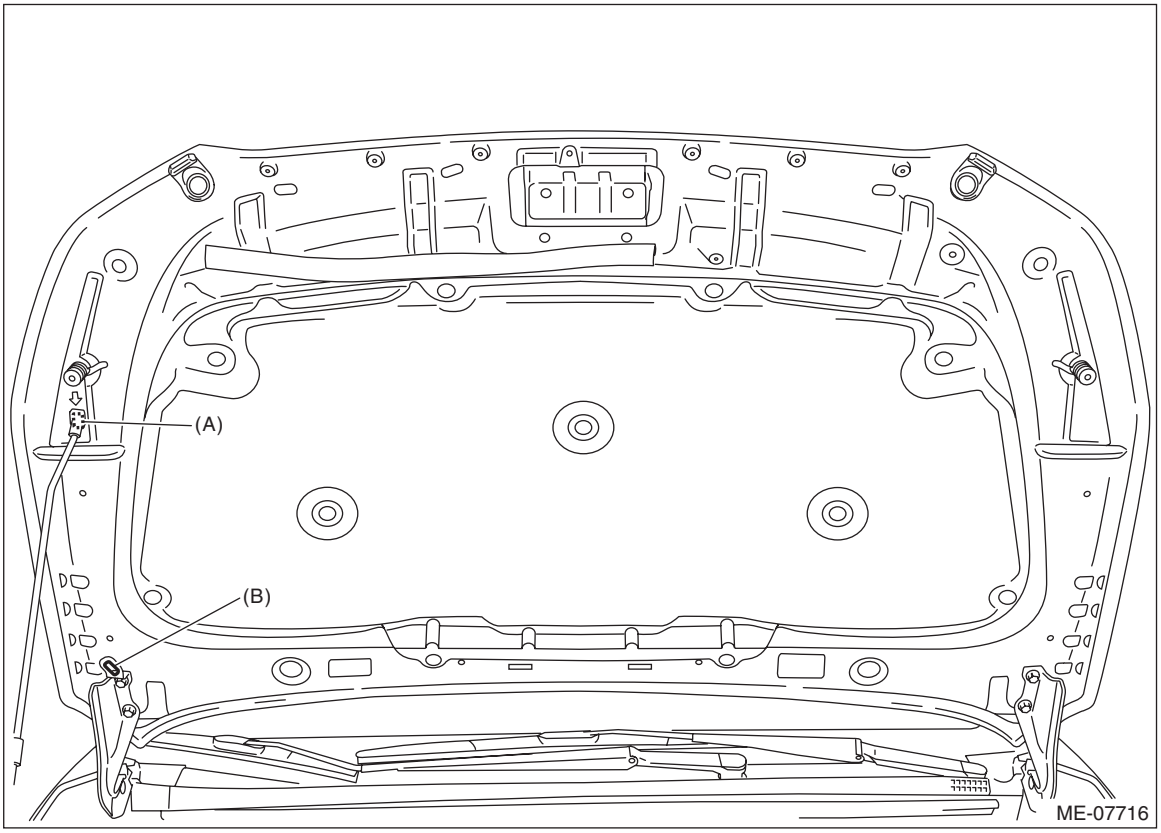
CAUTION:
• The power steering control module continues to operate after the engine stops and calculate the temperature in the control module. Therefore, before starting service of the power steering system which requires disconnection of the connector, stop the engine and allow approx. 30 minutes until the control module becomes cold.
• Before removal or installation, be sure to remove any foreign matter (dust, moisture, oil, etc.) from the power steering control module connector.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Adjust the tilt position of the steering column to the lowest position and lock the tilt lever.

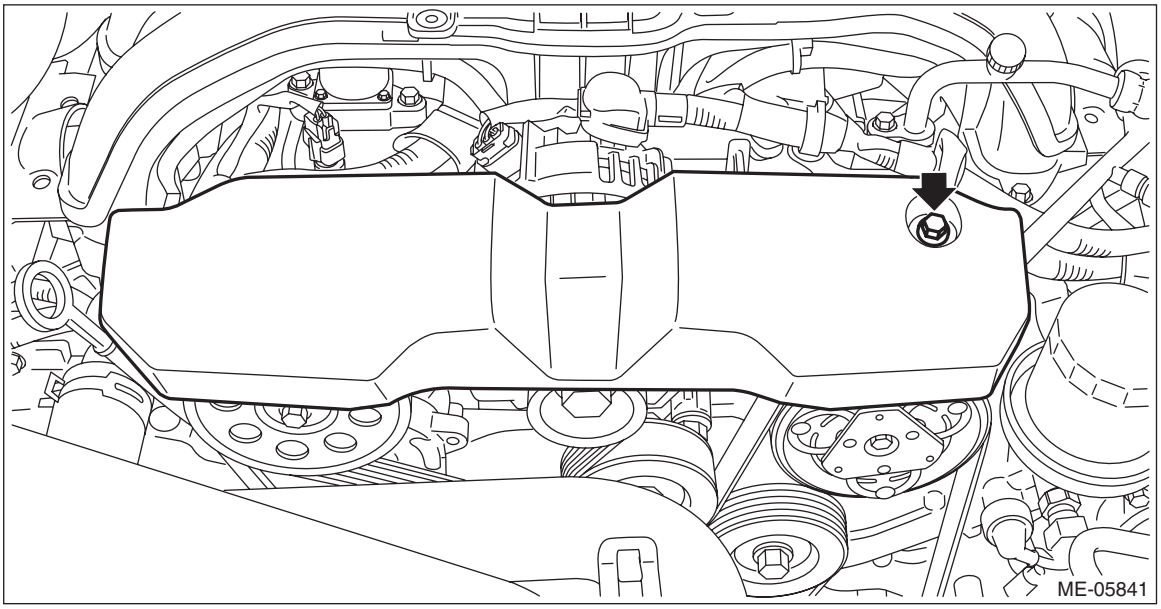


3) Lift up the vehicle, and then remove the front wheels.
4) Remove the under cover - front. <Ref. to EI-31, REMOVAL, Front Under Cover.>
5) Remove the universal joint assembly - steering. <Ref. to PS-16, REMOVAL, Universal Joint.>

6) Change the front hood stay position from (A) to (B), and completely open the front hood.

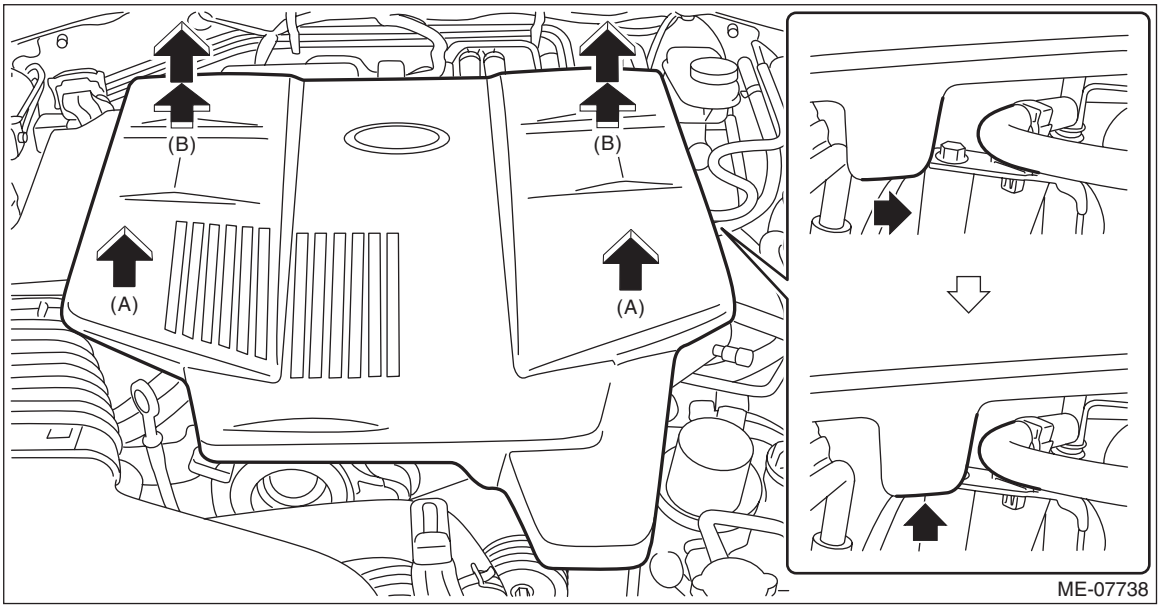


7) Remove the V-belt covers. (Gasoline engine model)



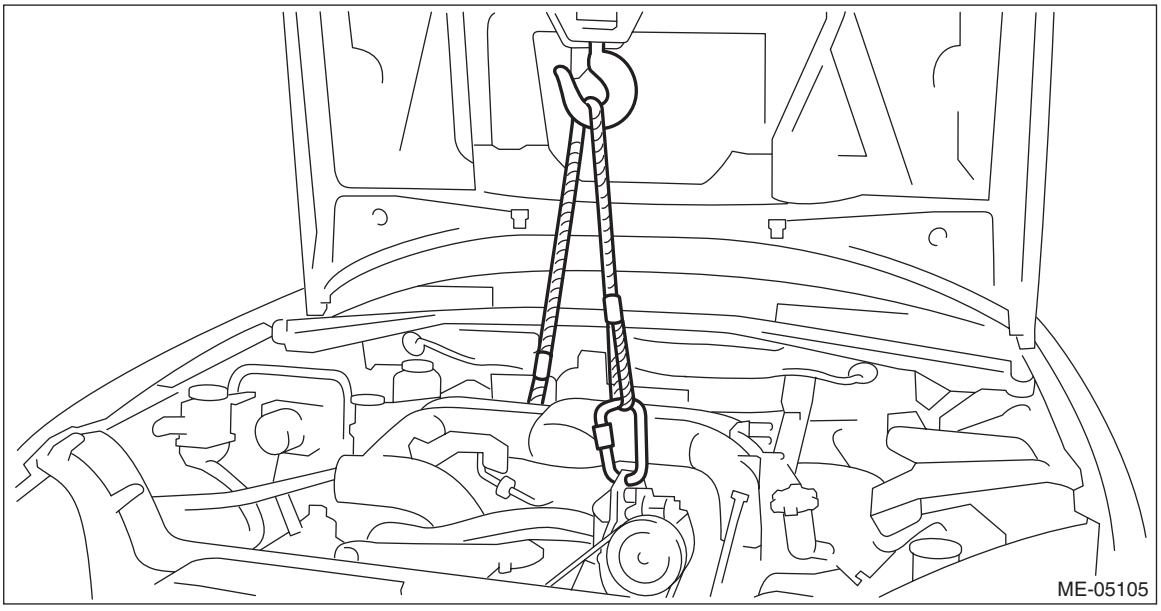
8) Remove the collector cover. (HEV model)
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

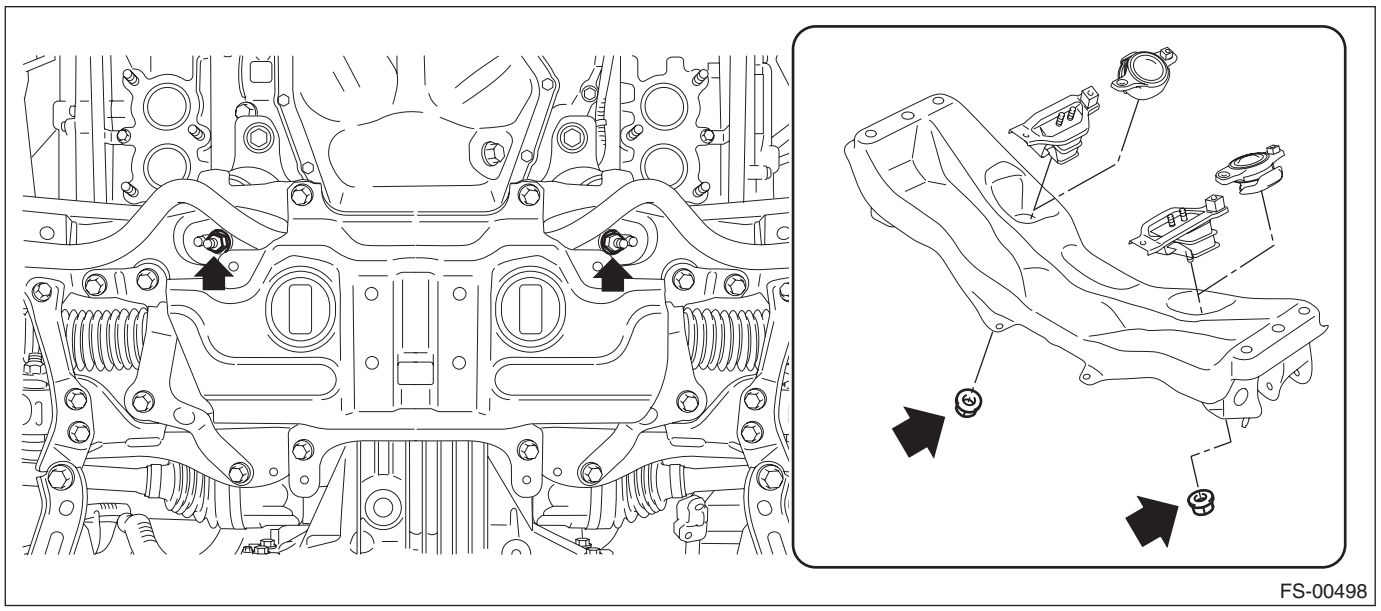


9) Disconnect the connector and harness clamp from power steering control module.
10) Support the engine with a lifting device and wire ropes.
(1) Support the engine with a lifting device and wire ropes.
(2) While lifting up the vehicle, also raise up the lifting device.

CAUTION:
When lifting up the vehicle, raise up wire ropes at the same time.

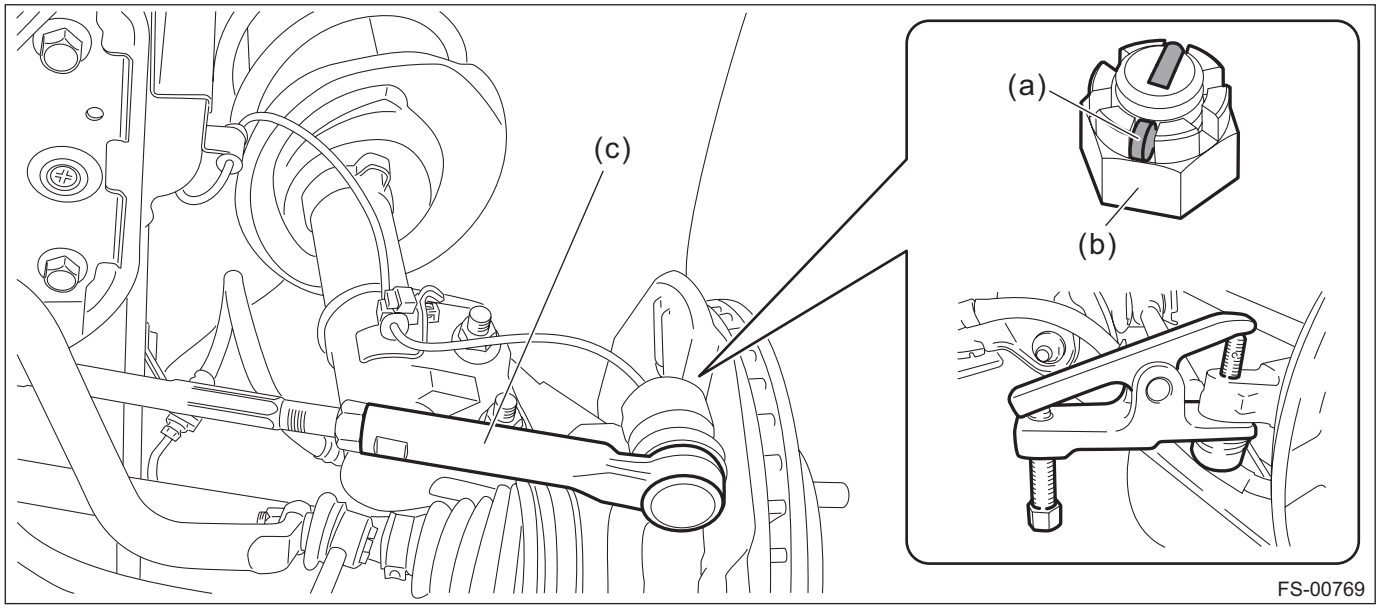


11) Remove the nuts which secure the engine mounting.
(1) Raise up the lifting device, and lift the engine by approx. 10 mm (0.39 in).
(2) Remove the nuts which secure the engine mounting to the front crossmember assembly.


FS-00498

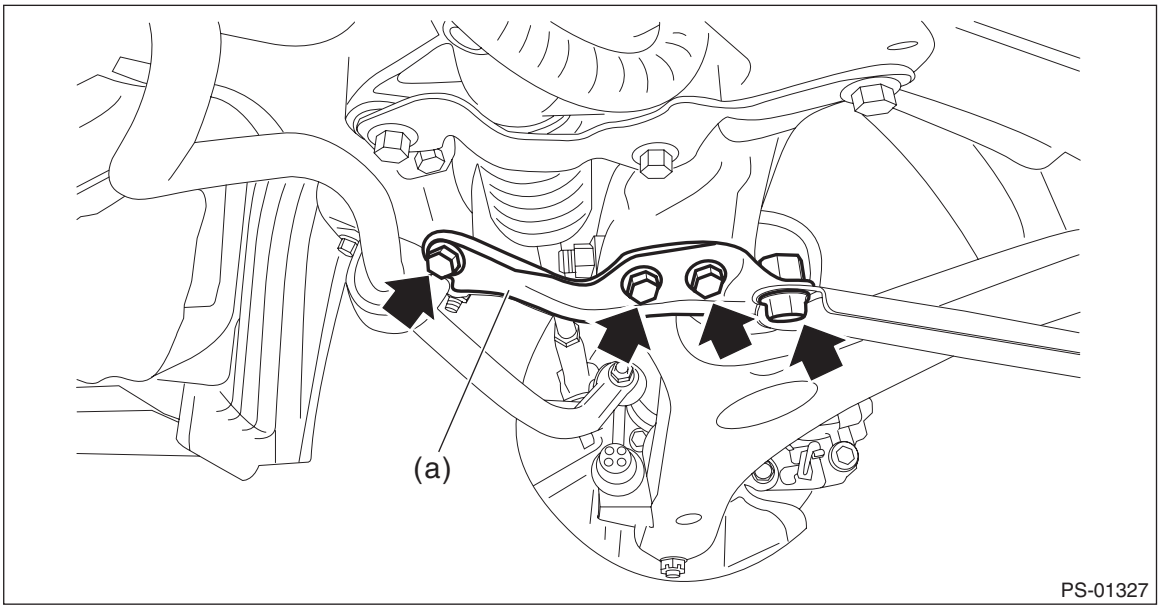
12) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
13) Remove the front crossmember support. <Ref. to FS-25, REMOVAL, Front Crossmember Support Plate.>
14) Remove the front stabilizer. <Ref. to FS-26, REMOVAL, Front Stabilizer.>
15) Disconnect the tie-rod end.
(1) Pull out the cotter pin (a).
(2) Remove the castle nut (b).
(3) Using a tie-rod ball joint puller, remove the tie-rod end (c).

Preparation tool:
Tie-rod end puller

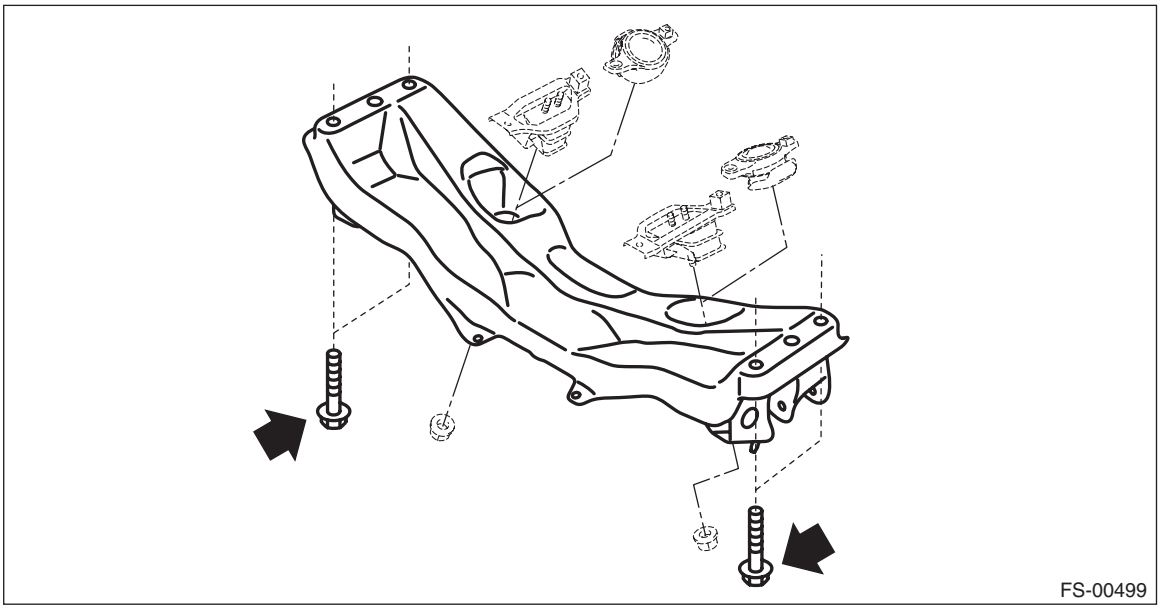


FS-00769

16) Remove the support plate - front crossmember (a).



17) Remove the front arm assembly. <Ref. to FS-32, REMOVAL, Front Arm.>
18) Support the front crossmember assembly using a jack, and remove the bolts which hold the crossmember on the body.



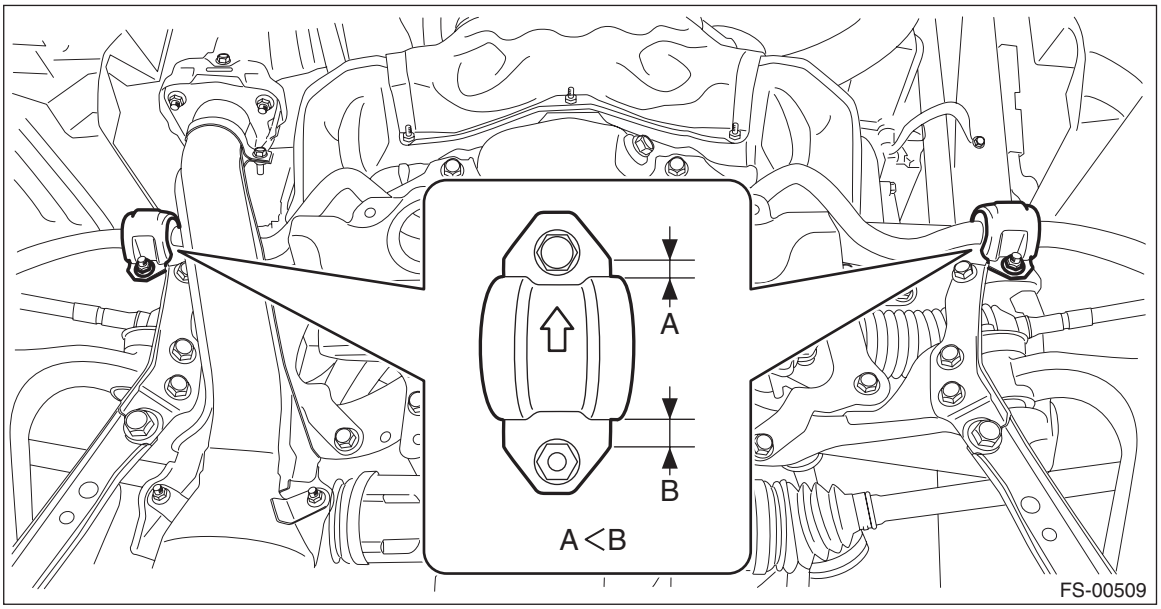
19) Slowly lower the front crossmember assembly with the steering gearbox assembly as a single unit.

CAUTION:
When removing the crossmember, make sure that the tie-rod end does not interfere with the drive shaft boot.
20) Remove the steering gearbox assembly from the front crossmember assembly.

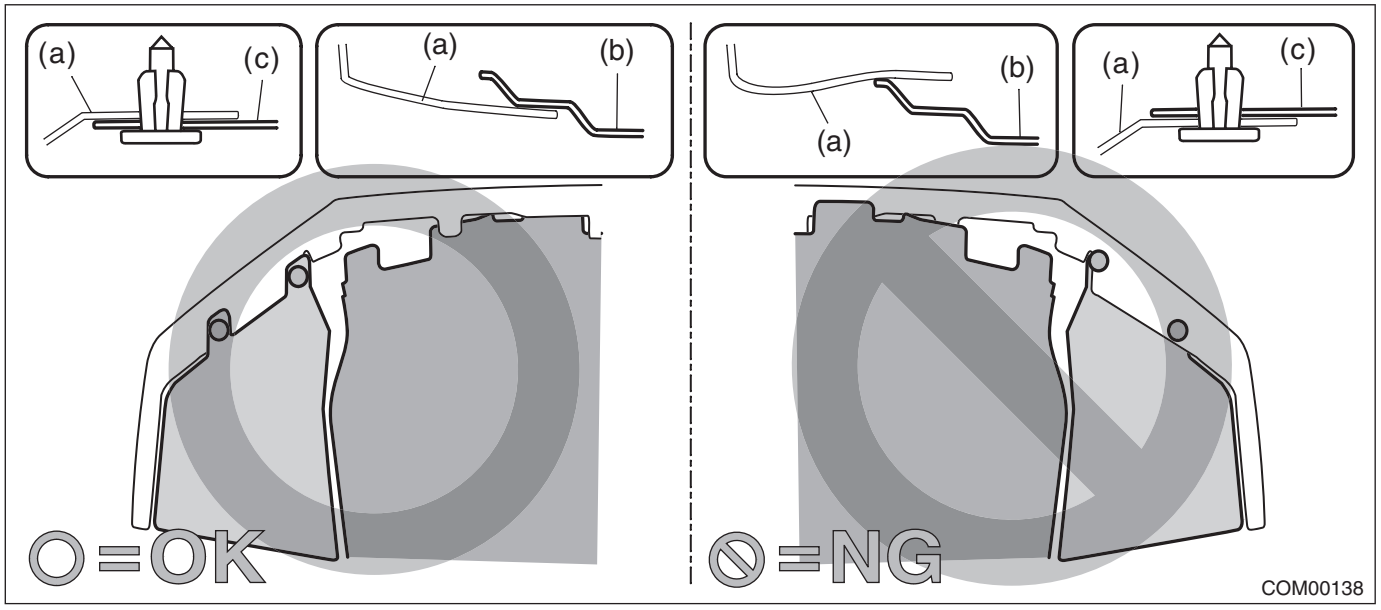
B: INSTALLATION

1) Check the crossmember for damage or cracks, and correct or replace if defective.
2) Install the universal joint assembly - steering. <Ref. to PS-17, INSTALLATION, Universal Joint.>
3) Install each part in the reverse order of removal.

CAUTION:
• Use a new bolt and self-locking nut. For parts which are not reusable, refer to "COMPONENT". <Ref. to FS-3, COMPONENT, General Description.>
• Always tighten the bushing in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.
• Install the clamp - stabilizer bushing with the arrow mark facing the front of the vehicle.



• Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



Tightening torque:
Engine mounting to Front crossmember assembly: <Ref. to ME(H4DO(w/o HEV))-19, ENGINE MOUNTING, COMPONENT, General Description.>
Universal joint assembly - steering: 24 N·m (2.45 kgf-m, 17.7 ft-lb)
V-belt cover: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
Under cover - front: 18 N·m (1.84 kgf-m, 13.3 ft-lb)
Front suspension parts: <Ref. to FS-3, FRONT SUSPENSION, COMPONENT, General Description.>

When tightening the castle nut, tighten the castle nut to the specified torque first, then tighten it further but within 60° until the hole in the ball stud is aligned with a slot in castle nut.

4) Install the front wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

5) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

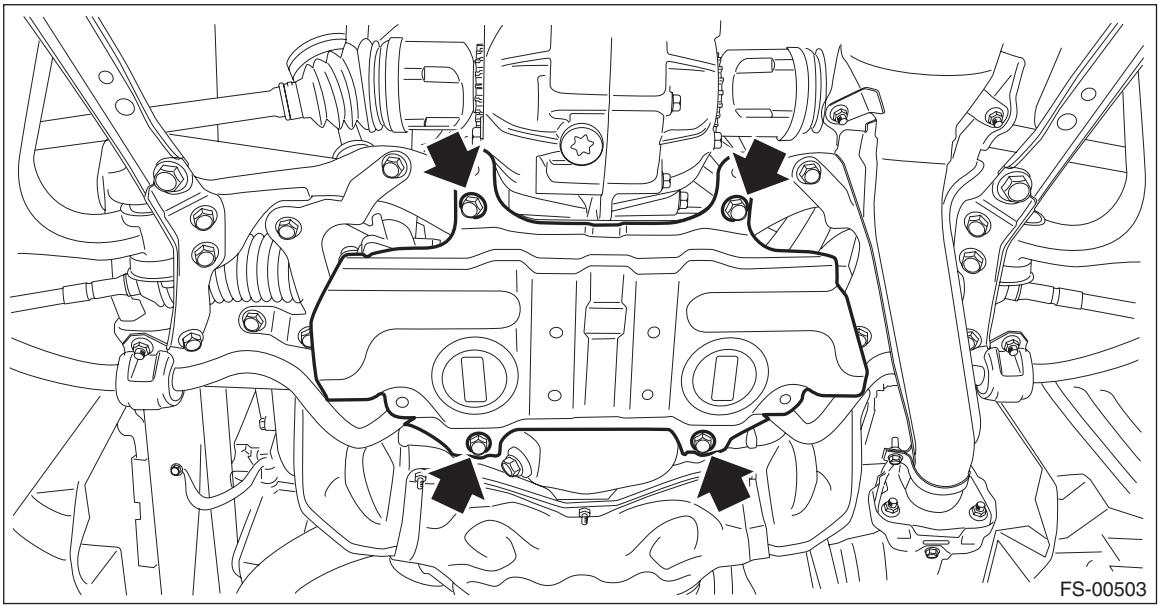
CAUTION:
If the steering wheel and steering angle sensor are removed, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDC-CM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH Eye-Sight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

6) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

4. Front Crossmember Support Plate

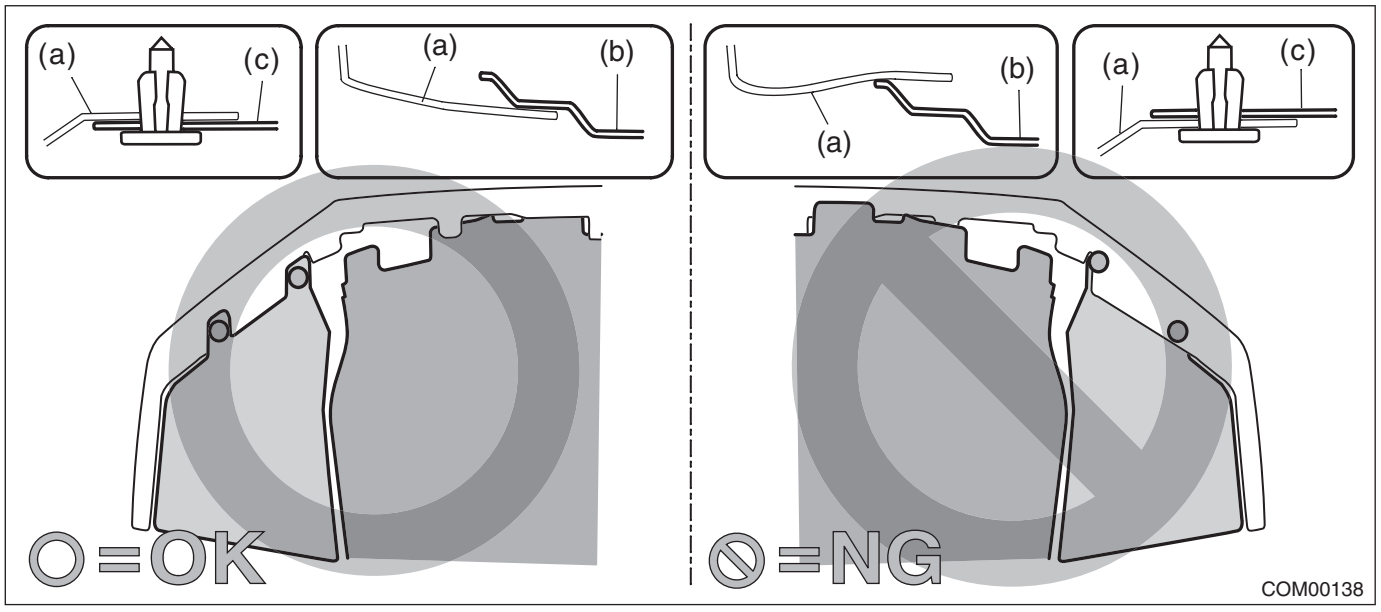
A: REMOVAL

1) Lift up the vehicle.
2) Remove the under cover - front. <Ref. to EI-31, REMOVAL, Front Under Cover.>
3) Remove the bolt, and remove the front crossmember support.



B: INSTALLATION

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



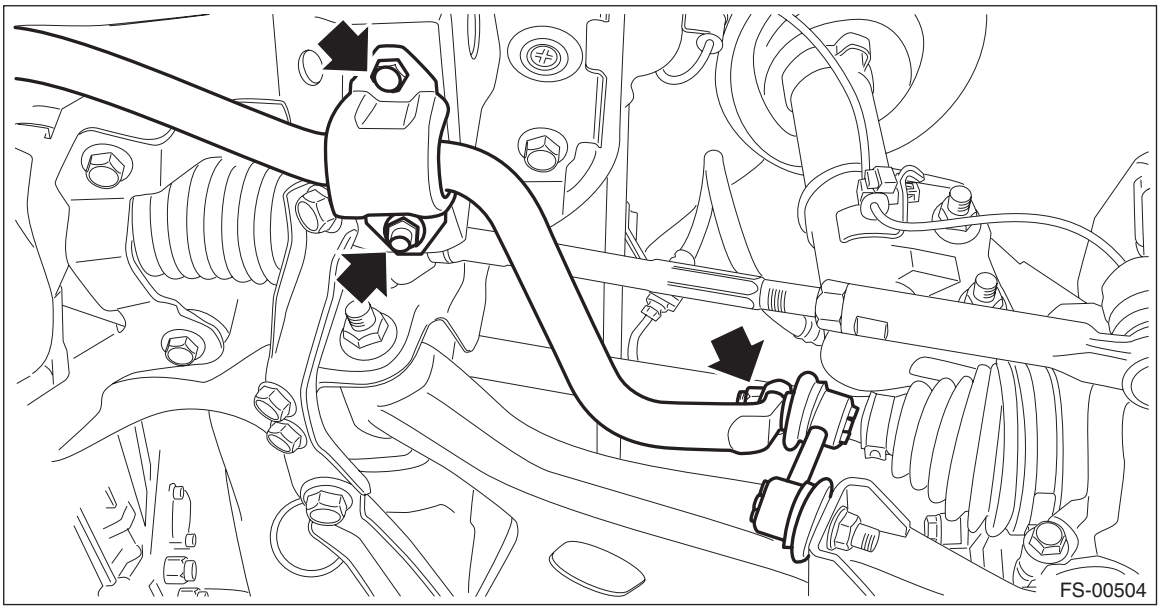
Install each part in the reverse order of removal.

Tightening torque:
Front crossmember support: 60 N·m (6.12 kgf-m, 44.3 ft-lb)
Under cover - front: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

5. Front Stabilizer

A: REMOVAL

1) Lift up the vehicle, and then remove the left and right front wheels.
2) Remove the under cover - front. <Ref. to EI-31, REMOVAL, Front Under Cover.>
3) Remove the front crossmember support. <Ref. to FS-25, REMOVAL, Front Crossmember Support Plate.>
4) Remove the front stabilizer.
   (1) Remove the left and right stabilizer links.
   (2) Remove the clamp - stabilizer bushing on the left and right sides.

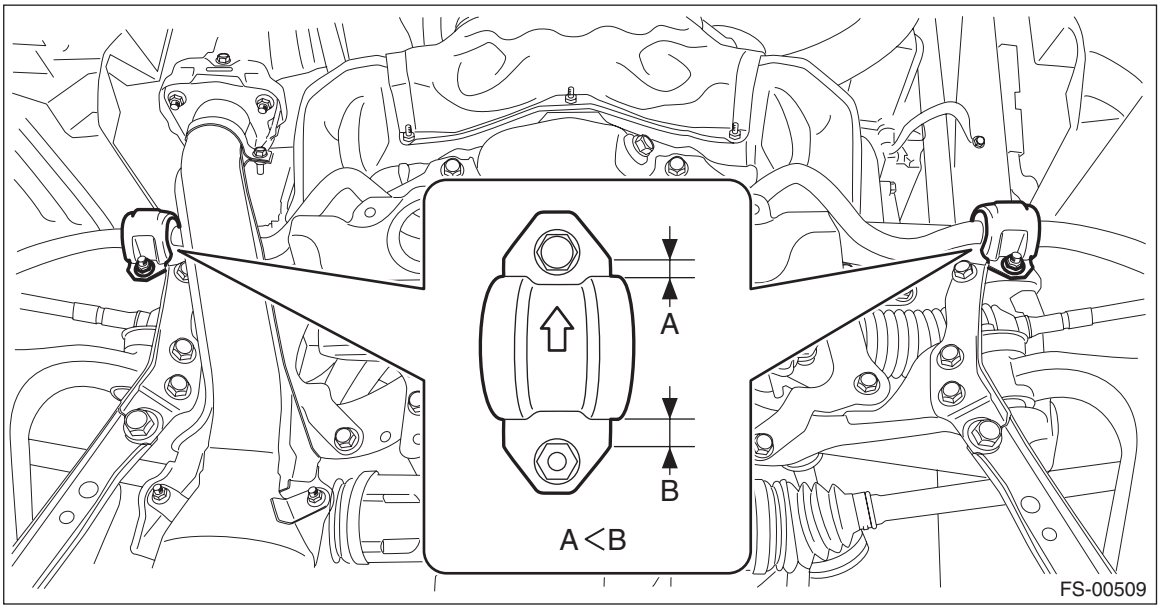


B: INSTALLATION

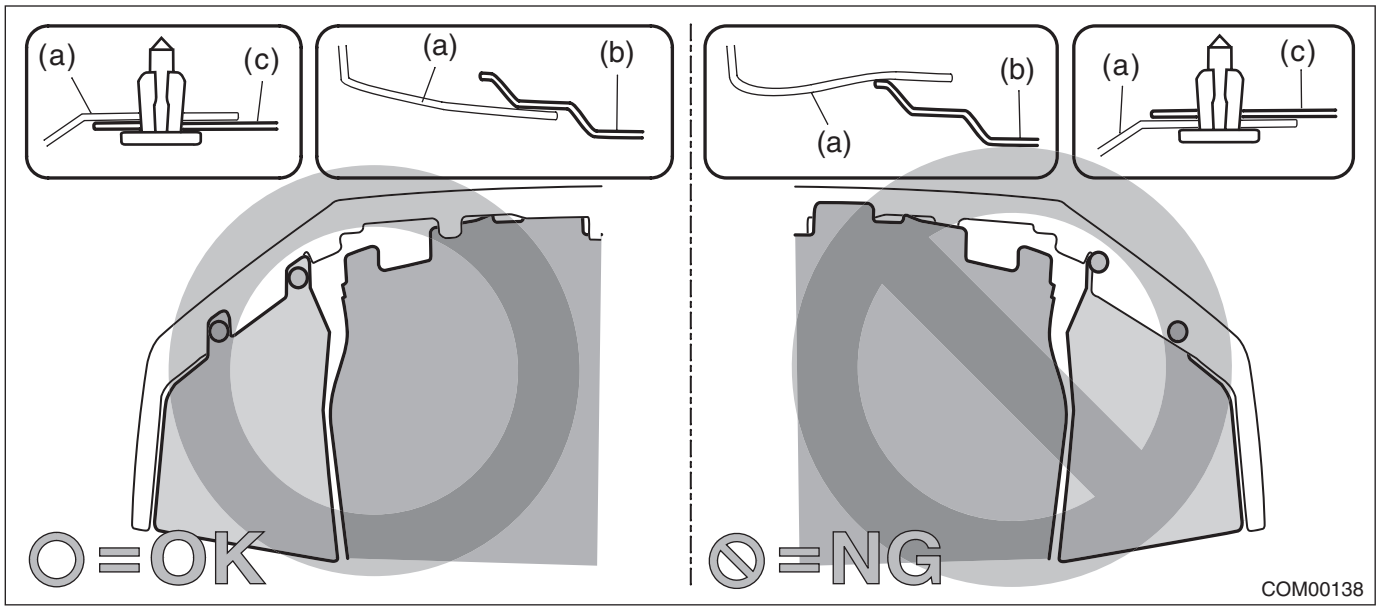
1) Before installation, inspect the following items and replace any faulty part with a new one.
- Check the bushing - stabilizer for abnormal cracks, fatigue or damage.
- Check the stabilizer link assembly for damage.

2) Install each part in the reverse order of removal.

CAUTION:
- **Install the clamp - stabilizer bushing with the arrow mark facing the front of the vehicle.**



• Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



Tightening torque:
Clamp - stabilizer: 25 N·m (2.55 kgf-m, 18.4 ft-lb)
Stabilizer link assembly: 60 N·m (6.12 kgf-m, 44.3 ft-lb)
Support plate - crossmember: 60 N·m (6.12 kgf-m, 44.3 ft-lb)
Under cover - front: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

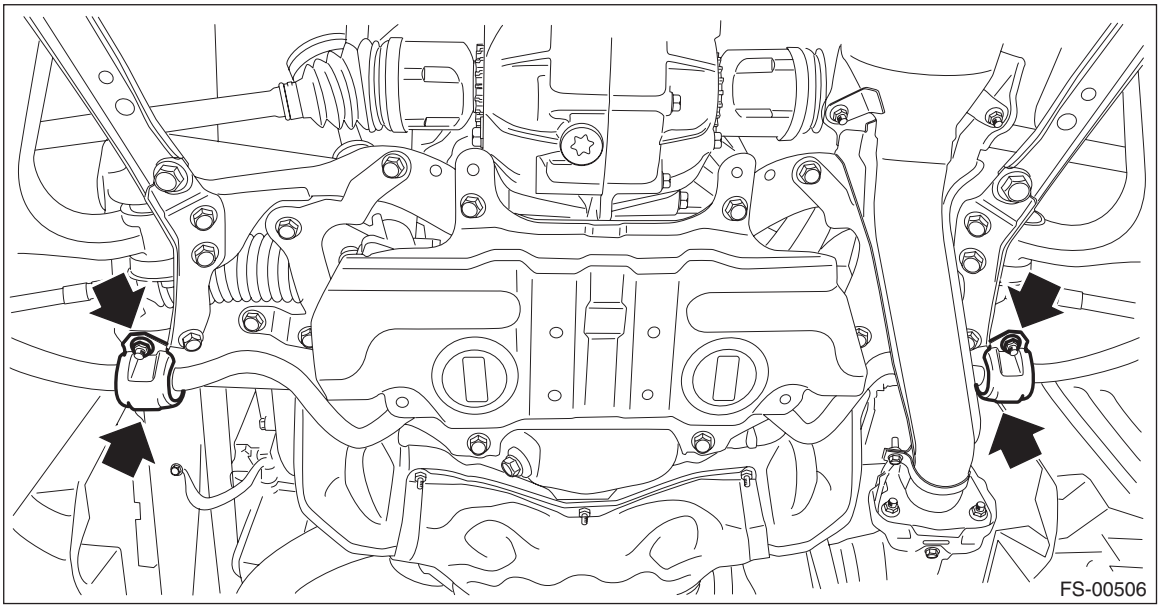
3) Install the front wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

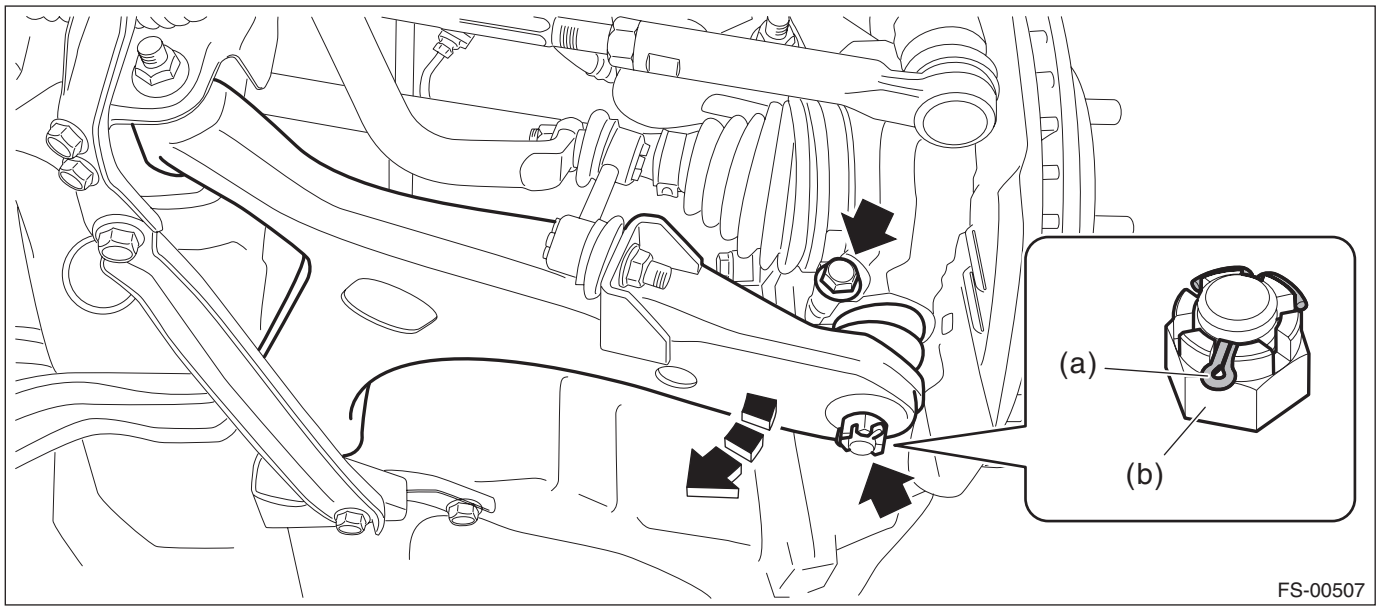
6. Front Ball Joint

A: REMOVAL

1) Lift up the vehicle, and then remove the front wheels.
2) Remove the under cover - front. <Ref. to EI-31, REMOVAL, Front Under Cover.>
3) Remove the clamp - stabilizer bushing on the left and right sides.



4) Remove the ball joint assembly.
   (1) Pull out the cotter pin (a), and remove the castle nut (b).
   (2) Lower the front arm assembly, and remove the ball stud.
   (3) Remove the bolt from the housing assembly - front axle.

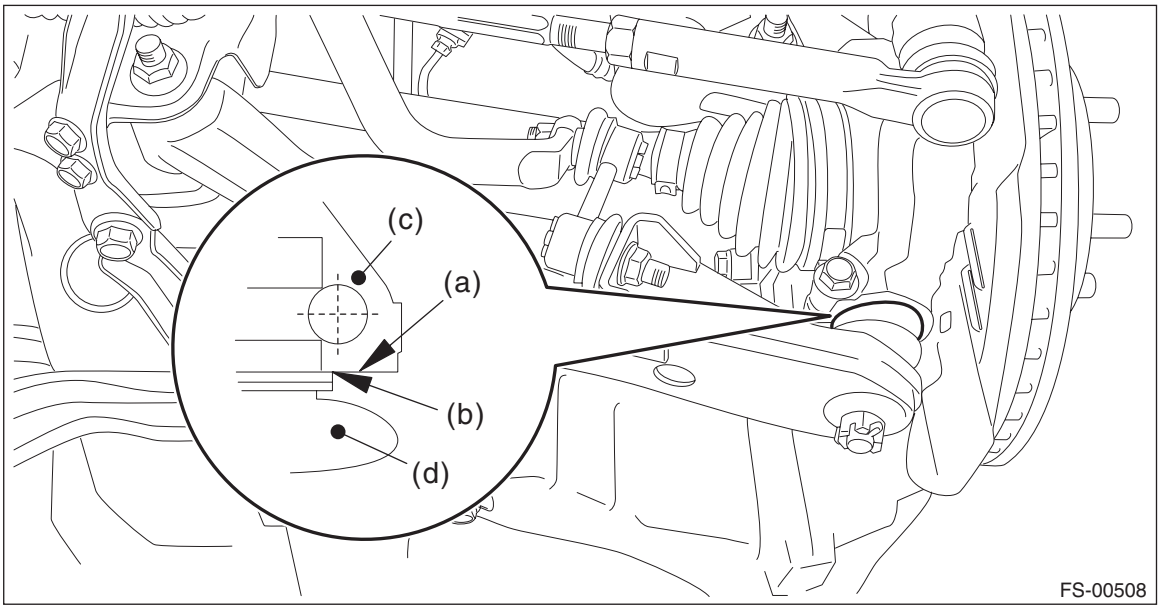


   (4) Extract the ball joint assembly from the housing assembly - front axle.

B: INSTALLATION

1) Install the ball joint assembly to the housing assembly - front axle.

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the bottom surface of the housing assembly - front axle and the stepped section of ball joint are in contact.**



(a) Bottom surface of housing ASSY - front axle
(b) Raised section of ball joint
(c) Housing ASSY - front axle
(d) Ball joint ASSY

Tightening torque:
50 N·m (5.10 kgf-m, 36.9 ft-lb)

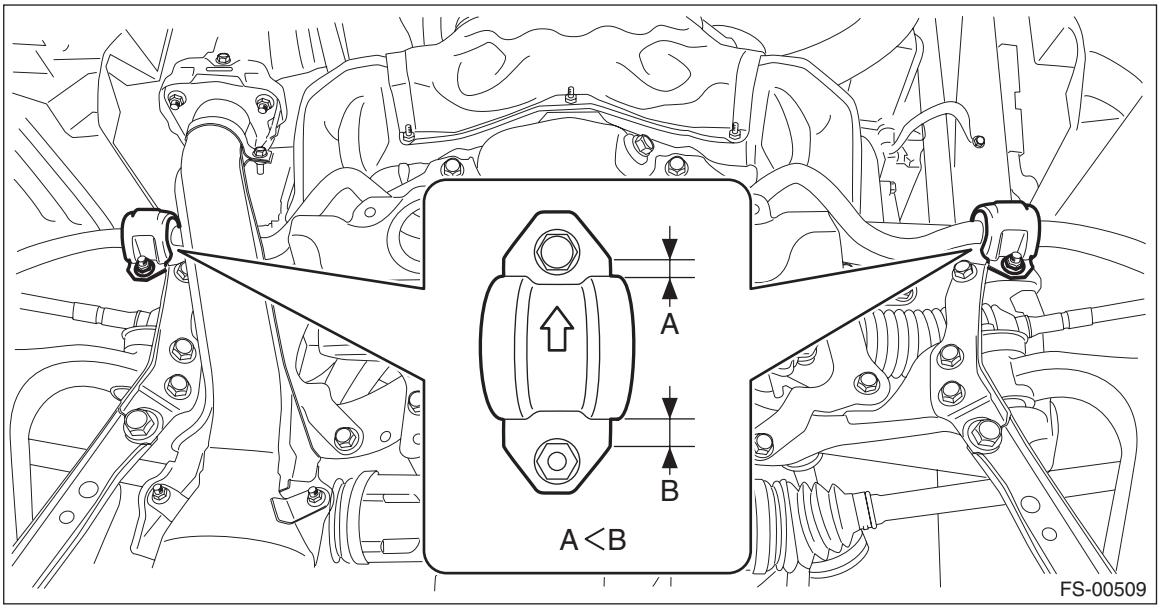
2) Install the ball joint assembly to the front arm assembly.
(1) Connect the ball joint assembly to the front arm assembly.

Tightening torque:
39 N·m (3.98 kgf-m, 28.8 ft-lb)

(2) Retighten the castle nut further up to 60° until the hole in the ball stud is aligned with a slot in castle nut.
(3) Insert a new cotter pin and bend it around the castle nut.

3) Install the clamp - stabilizer bushing.

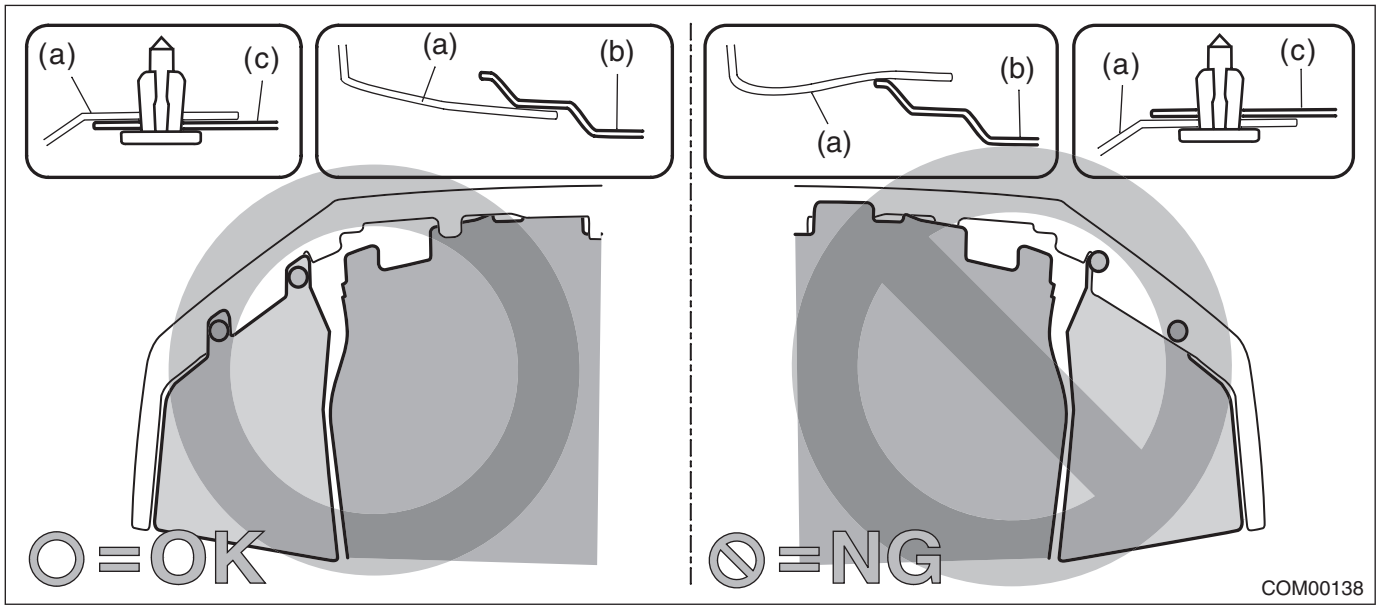
CAUTION:
Install the clamp - stabilizer bushing with the arrow mark facing the front of the vehicle.



Tightening torque:
25 N·m (2.55 kgf-m, 18.4 ft-lb)

4) Install the under cover - front.

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



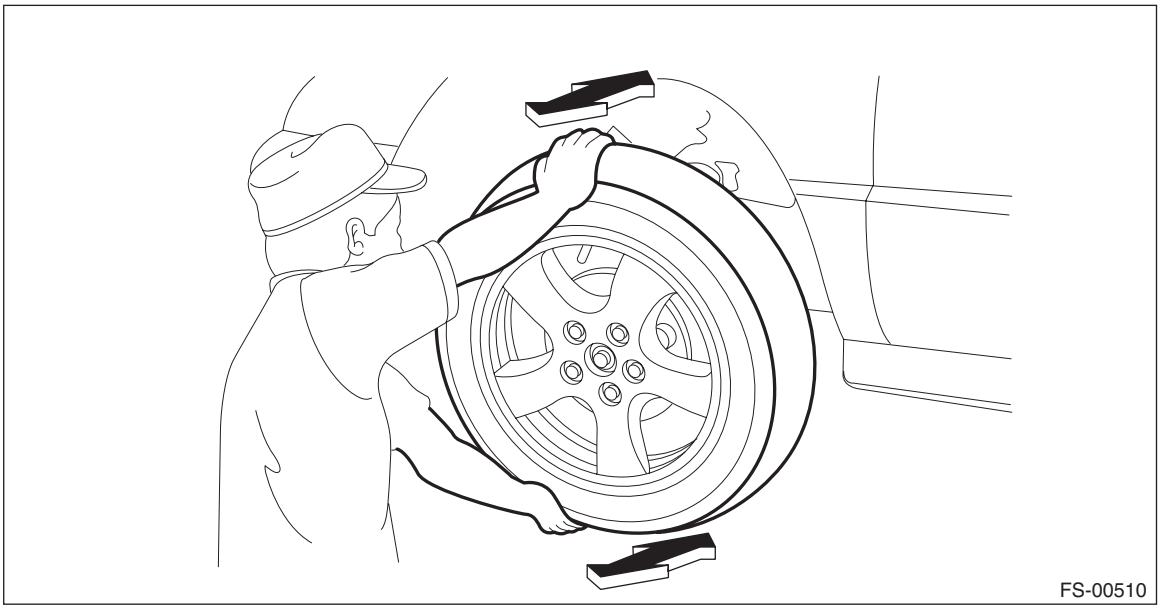
Tightening torque:
18 N·m (1.84 kgf-m, 13.3 ft-lb)

5) Install the front wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

C: INSPECTION

1) Check that there is no play by moving the upper and lower portions of front tire in an axial direction with the brake pedal depressed.



- **Play exists.** → Replace the ball joint assembly. <Ref. to FS-28, REMOVAL, Front Ball Joint.>

2) Check that there is no play by moving the upper and lower portions of front tire in an axial direction with the brake pedal released.

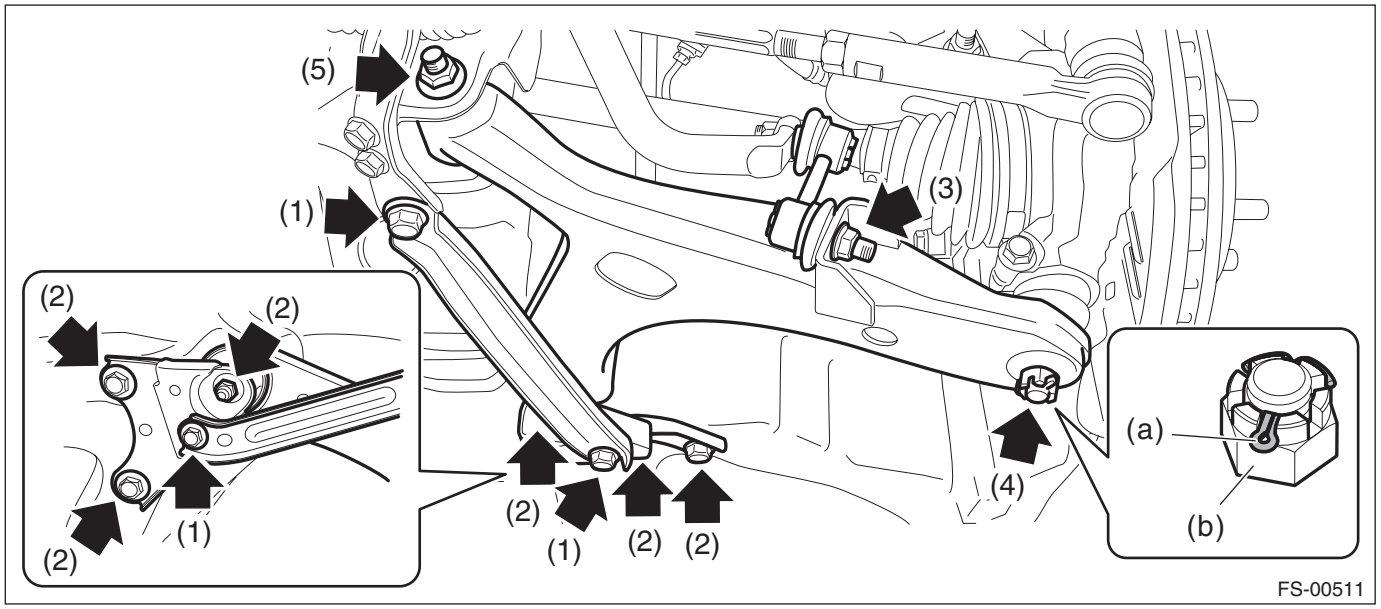
- **Play exists.** → Check the hub unit COMPL - front axle. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>

3) Replace the ball joint assembly if the dust cover is damaged when visually inspecting the dust cover.

7. Front Arm

A: REMOVAL

1) Lift up the vehicle, and then remove the front wheels.
2) Remove the under cover - front. <Ref. to EI-31, REMOVAL, Front Under Cover.>
3) Remove the front arm assembly.
   (1) Remove the bolt, and then detach the front support. (Electric power steering model only)
   (2) Remove the bolts and nuts, and then remove the front arm rear plate.
   (3) Remove the nut and disconnect the stabilizer link assembly.
   (4) Pull out the cotter pin (a), remove the castle nut (b), and remove the ball joint assembly from front arm assembly.
   (5) Remove the nuts, pull out the flange bolt, and remove the front arm assembly.

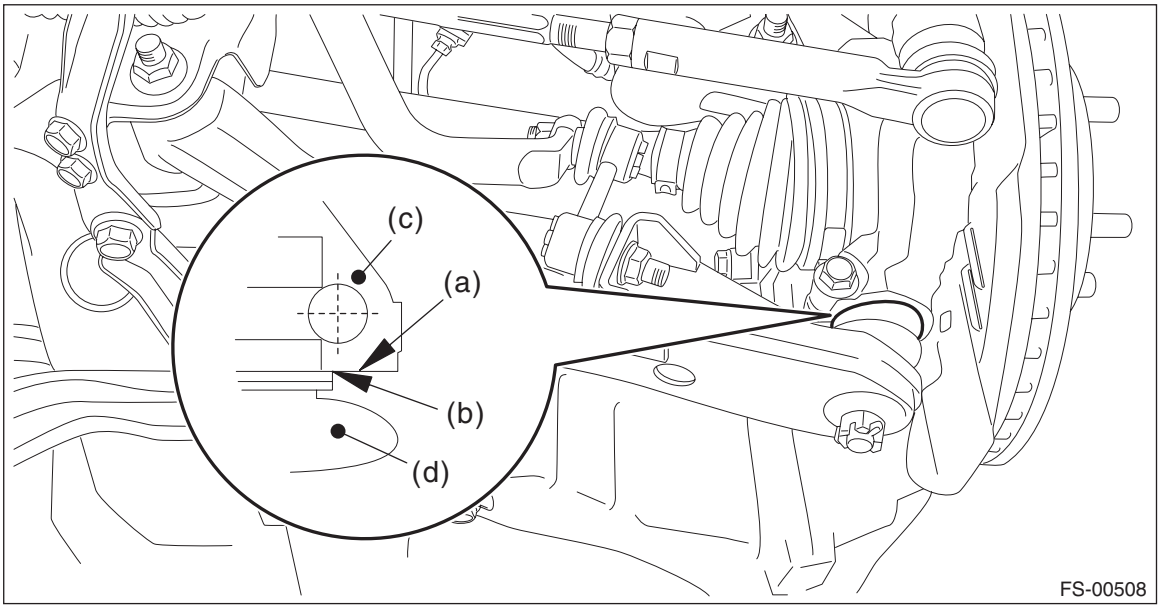


B: INSTALLATION

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Check the front arm assembly for damage or cracks, and replace if defective.
- Visually check the bushing for abnormal cracks, fatigue or damage.
- Visually check the dust cover on the ball joint assembly for damage.

2) Using new self-locking nuts and flange bolts, temporarily tighten the front arm assembly to the front cross-member assembly.
3) Install the ball joint assembly to the housing assembly - front axle.

CAUTION:
Before tightening, make sure the bottom surface of the housing assembly - front axle and the stepped section of ball joint are in contact.



(a) Bottom surface of housing ASSY - front axle
(c) Housing ASSY - front axle
(d) Ball joint ASSY
(b) Raised section of ball joint

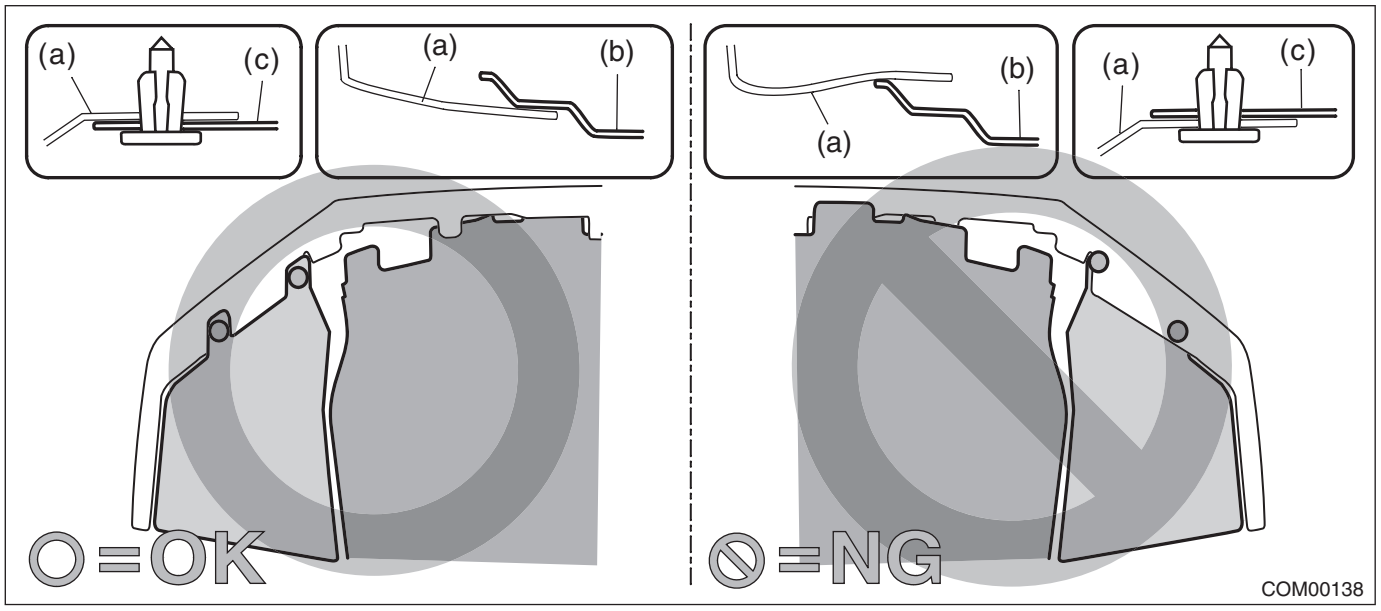
Tightening torque:
50 N·m (5.10 kgf-m, 36.9 ft-lb)

4) Install the stabilizer link assembly.

Tightening torque:
Impreza model: 38 N·m (3.87 kgf-m, 28.0 ft-lb)
Crosstrek model: 60 N·m (6.12 kgf-m, 44.3 ft-lb)

5) Install the under cover - front.

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



Tightening torque:
18 N·m (1.84 kgf-m, 13.3 ft-lb)
6) Install the front wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)
7) Unload the vehicle from the lift, and tighten the bolt which secures the front arm assembly to the front crossmember assembly while the wheels are in full contact with the ground and the vehicle is at curb weight.

Tightening torque:
Busing front - front arm: 95 N·m (9.7 kgf-m, 70.1 ft-lb)
Busing rear - front arm: 110 N·m (11.22 kgf-m, 81.1 ft-lb)
8) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

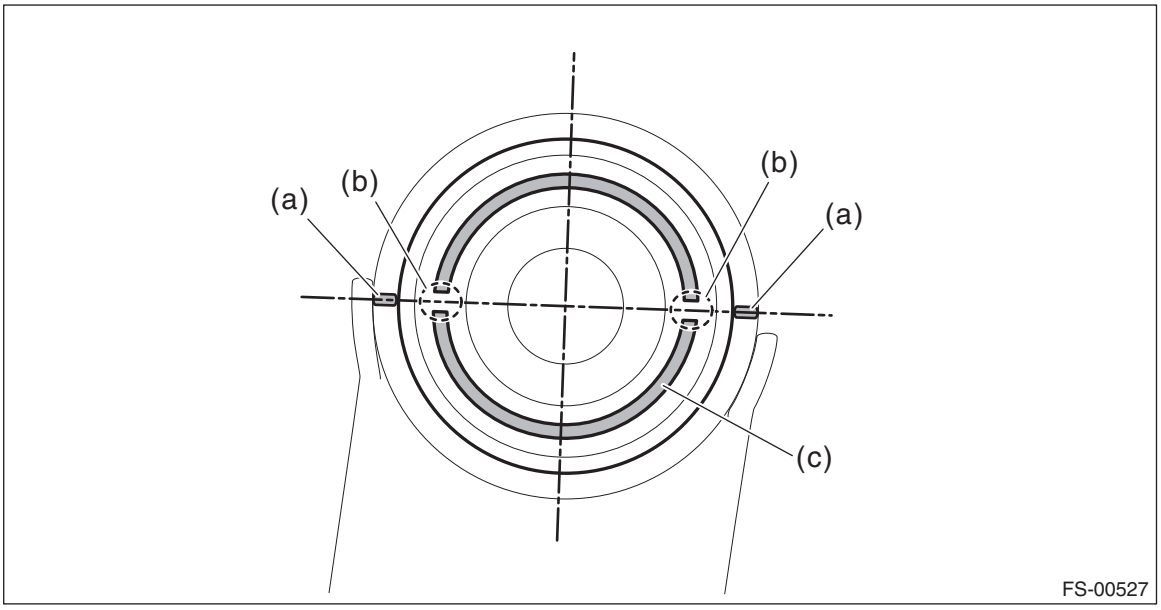
CAUTION:
When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
9) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

C: DISASSEMBLY

1. BUSHING FRONT - FRONT ARM

1) Put an alignment mark on the front arm assembly based on the split portion of the bushing intermediate plate of the busing front - front arm.

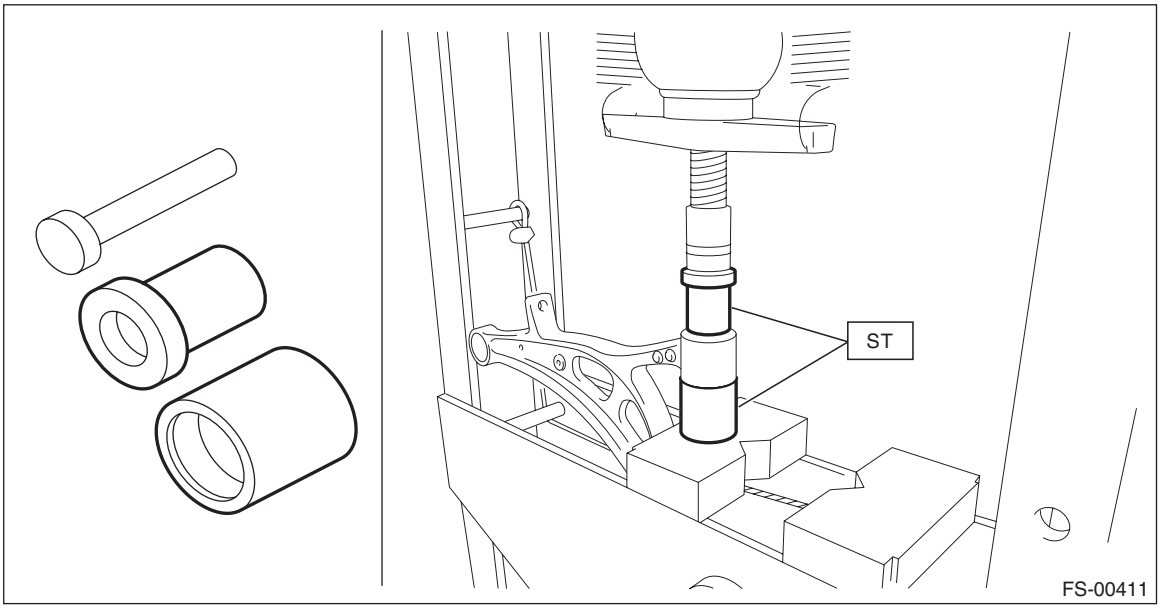
CAUTION:
Always put an alignment mark for aligning the position on bushing installation.



(a) Put an alignment mark.
(b) Split portion of bushing intermediate plate
(c) Bushing intermediate plate

2) Using the ST and a press, remove the busing front - front arm.

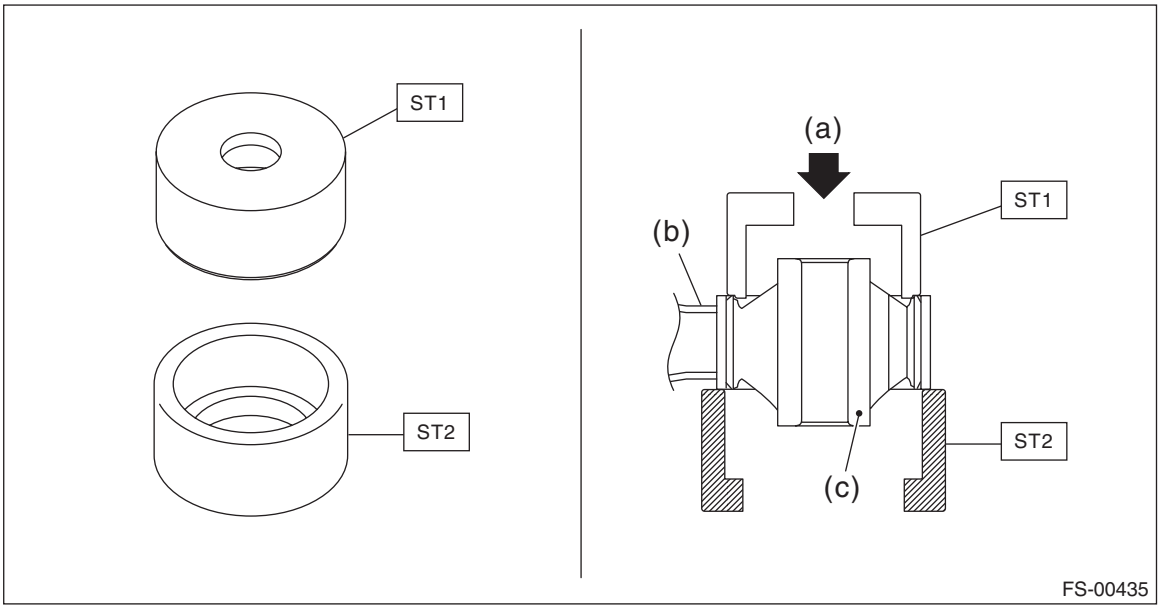
PREPARATION TOOL:
ST: INSTALLER & REMOVER SET (927680000)



2. BUSHING REAR - FRONT ARM

1) Put an alignment mark on the front arm assembly based on the center of recess portion of the busing rear - front arm.
2) Using the ST and a press, remove the busing rear - front arm.

PREPARATION TOOL:
ST1: REMOVER (20299AG000)
ST2: BASE (20299AG010)



(a) Press (b) Front arm ASSY (c) Bushing rear - front arm

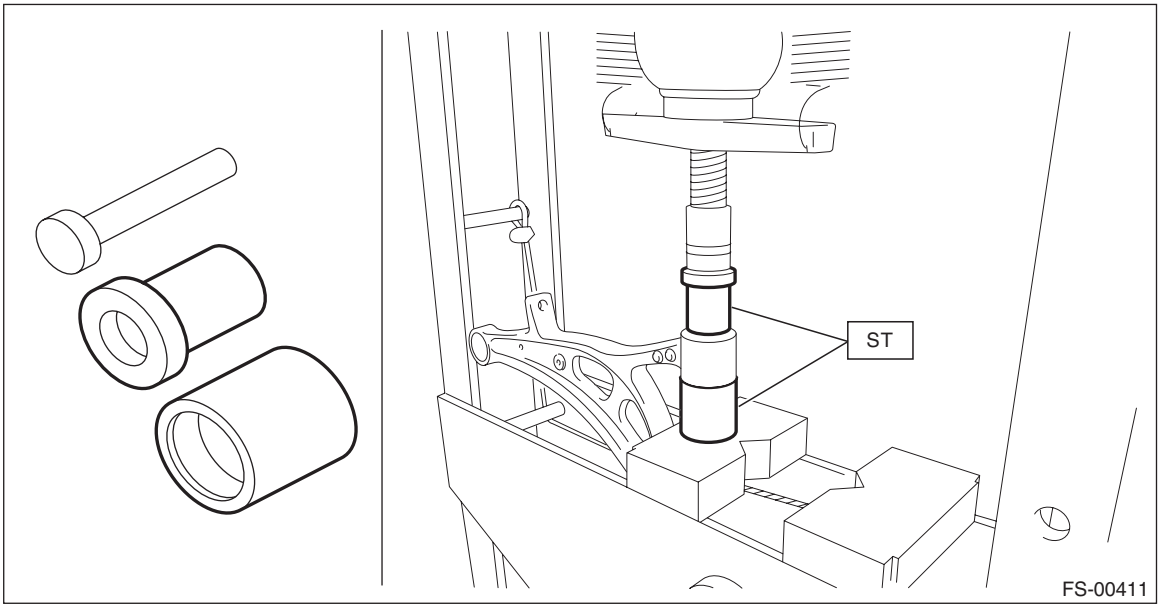
D: ASSEMBLY

1. BUSHING FRONT - FRONT ARM

1) Before assembly, inspect the following items and replace any faulty part with a new one.
- Check the front arm assembly for damage or cracks, and replace if defective.
- Visually check the bushing for abnormal cracks, fatigue or damage.
- Visually check the dust cover on the ball joint assembly for damage.

2) Align the alignment mark on the front arm assembly to the split portion of the bushing intermediate plate of the busing front - front arm.
3) Using the ST and a press, assemble the busing front - front arm.

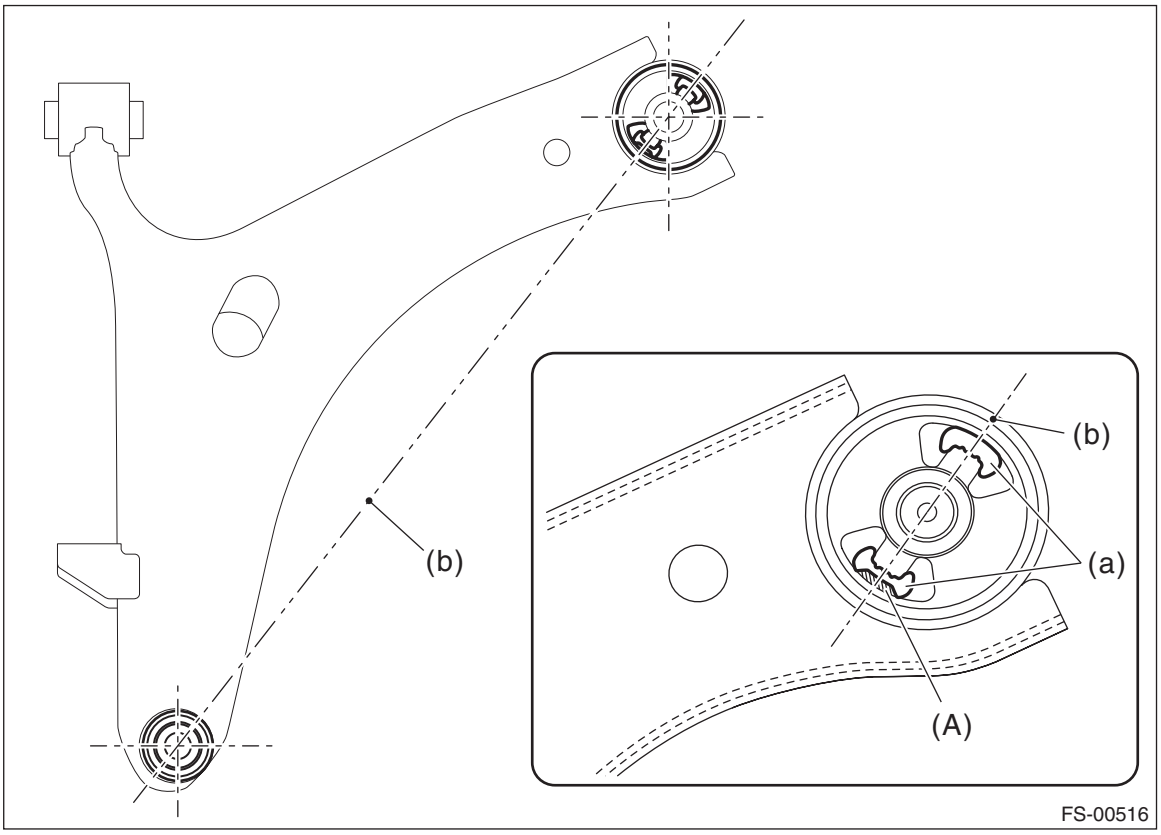
PREPARATION TOOL:
ST: INSTALLER & REMOVER SET (927680000)



2. BUSHING REAR - FRONT ARM

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Check the front arm assembly for damage or cracks, and replace if defective.
- Visually check the bushing for abnormal cracks, fatigue or damage.
- Visually check the dust cover on the ball joint assembly for damage.

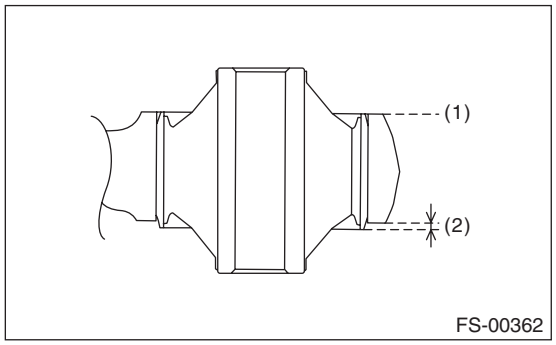
2) Align a line extending from the center of recess portion with the ball joint after placing the protrusion (A) of recess portion to the ball joint side of the front arm assembly.



(a) Recess section
(b) Center line of recess section

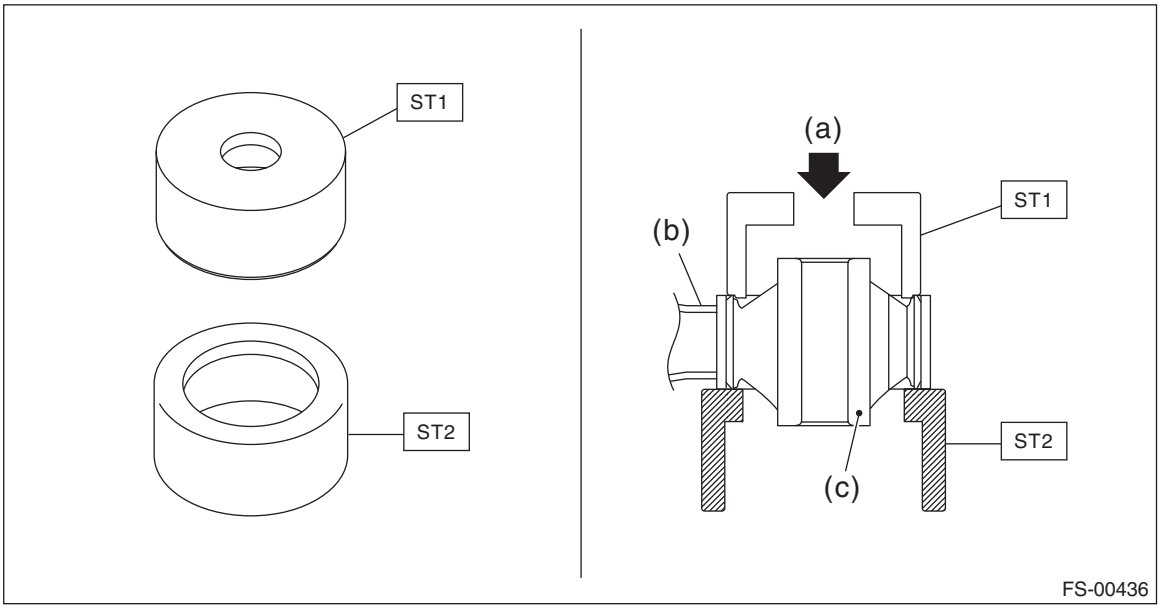
3) Using the ST and a press, install the busing rear - front arm.

CAUTION:
Align the upper face of front arm assembly and the end of bushing during installation.



(1) Aligned
(2) Not aligned

PREPARATION TOOL:
ST1: REMOVER (20299AG000)
ST2: BASE (20299AG010)



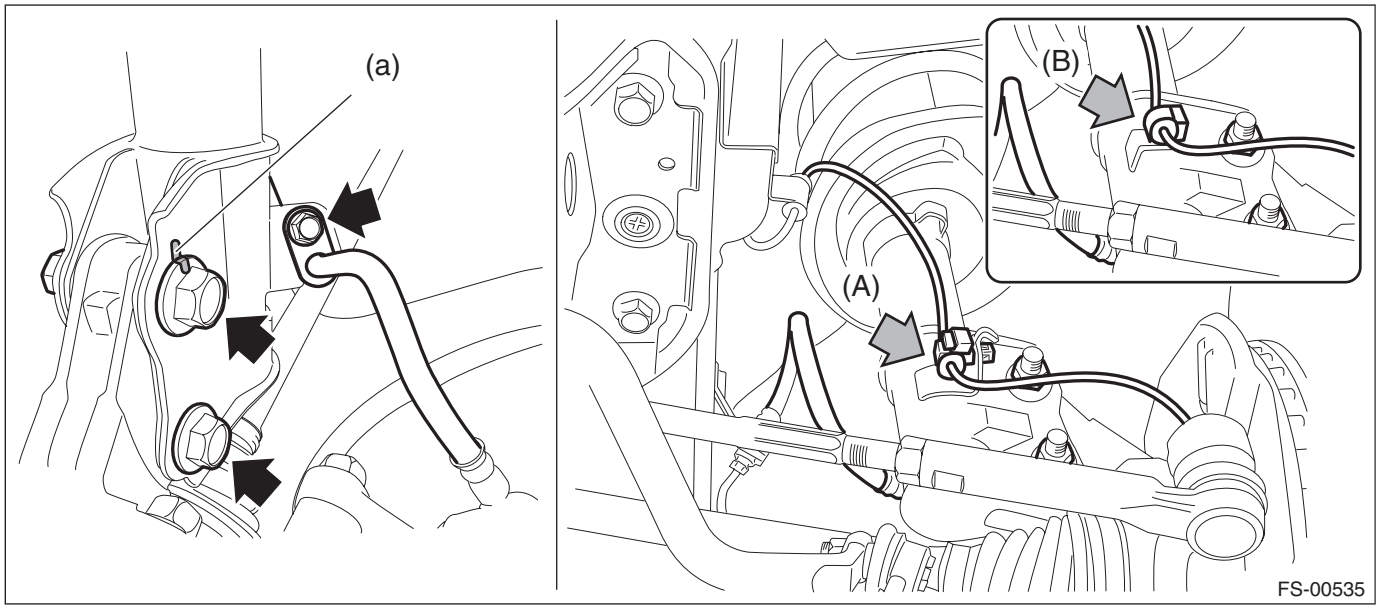
(a) Press
(b) Front arm ASSY
(c) Bushing rear - front arm

8. Front Strut

A: REMOVAL

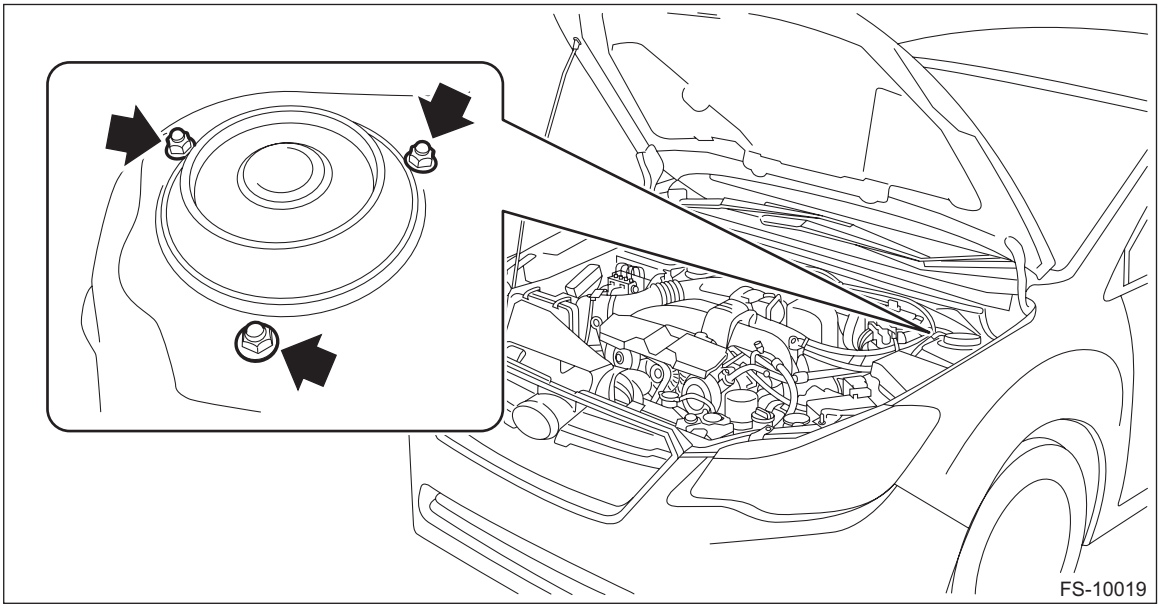
1) Lift up the vehicle, and then remove the front wheels.
2) Remove the front strut assembly.
   (1) Place an alignment mark (a) on the adjusting bolt and the strut.
   (2) Remove the brake hose bracket.
   (3) Remove the clamp of ABS wheel speed sensor harness.
   (4) Remove the adjusting bolts and flange bolts for the strut assembly.

CAUTION:
While holding the head of the adjusting bolt, loosen the flange nut.



(A) Impreza model (B) Crosstrek model

(5) Remove the three nuts securing strut mount to body.



B: INSTALLATION

1) Install the strut mount - front at the upper side of the strut to the body, and tighten it with new flange nuts.

Tightening torque:
20 N·m (2.04 kgf-m, 14.8 ft-lb)

2) Align alignment marks on the camber adjusting bolt and strut.
Using new self-locking nuts, install the strut to the housing assembly - front axle.

NOTE:
While holding the head of adjusting bolt, tighten the nut.

Tightening torque:
155 N·m (15.81 kgf-m, 114.3 ft-lb)

3) Secure the ABS wheel speed sensor harness bracket to the strut.

CAUTION:
During the installation, make sure that the marking of ABS wheel speed sensor harness does not twist.

4) Install the brake hose bracket.

Tightening torque:
33 N·m (3.36 kgf-m, 24.3 ft-lb)

5) Install the front wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

6) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

CAUTION:
When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDC-CM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH Eye-Sight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

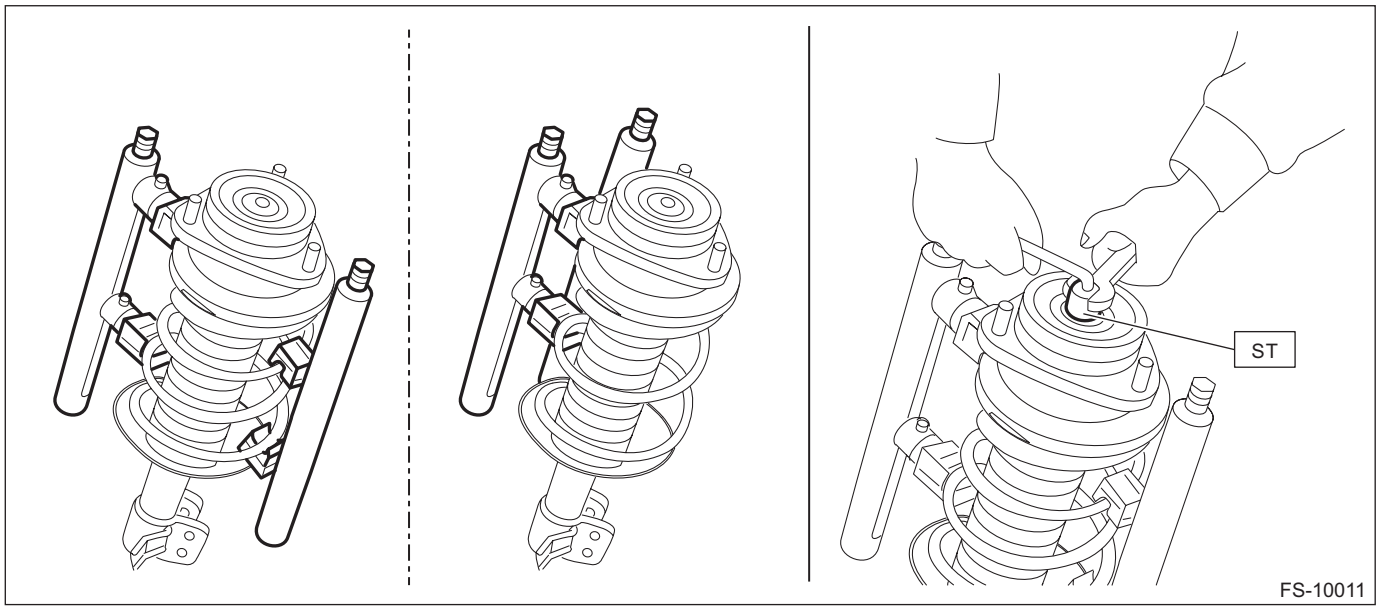
7) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

C: DISASSEMBLY

1) Using a coil spring compressor, compress the coil spring - front.
2) Using the ST, remove the self-locking nut.

Preparation tool:
ST: STRUT MOUNT SOCKET (20399AG000)

NOTE:
<Example of coil spring compressor installation>
The installing position of coil spring compressor varies depending on the coil spring shape and winding number.

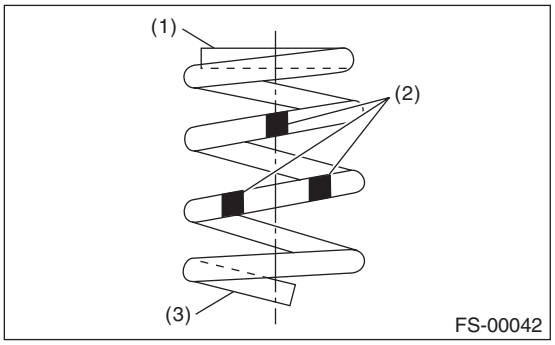


3) Remove the strut mount - front, spacer - front strut and spring seat - front strut UPR from the strut.
4) Gradually decrease the compression pressure of compressor, and remove the coil spring - front.
5) Remove the dust cover - inner and the helper - front strut.

D: ASSEMBLY

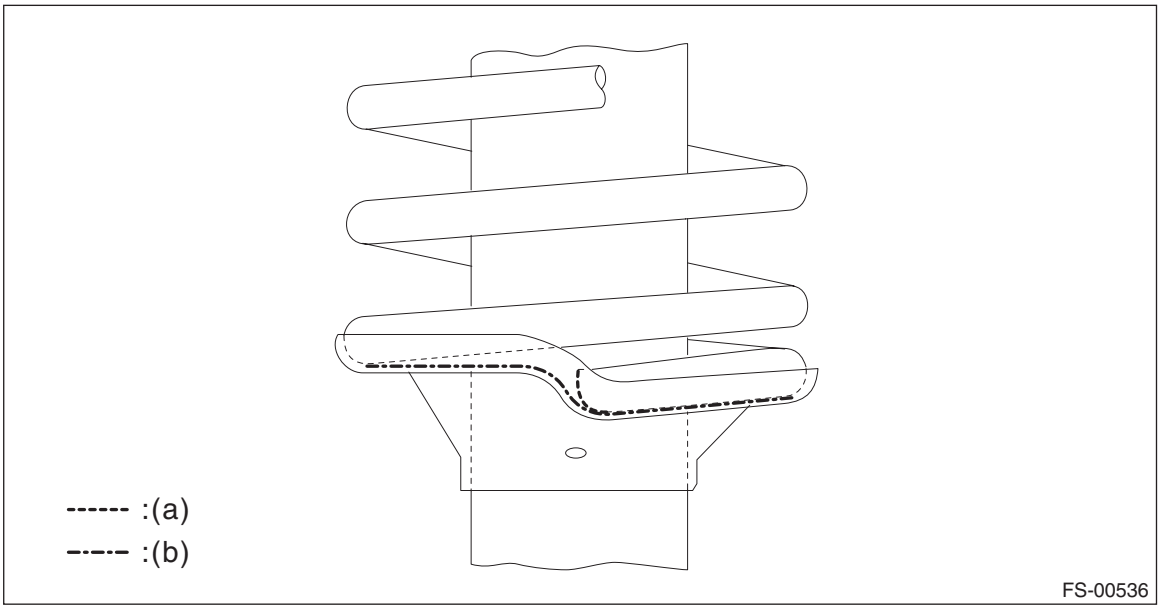
1) Before assembly, check each part. <Ref. to FS-44, INSPECTION, Front Strut.>
2) Using a coil spring compressor, compress the coil spring - front.

NOTE:
Make sure that the vertical installation direction of the coil spring - front is as shown in the figure.



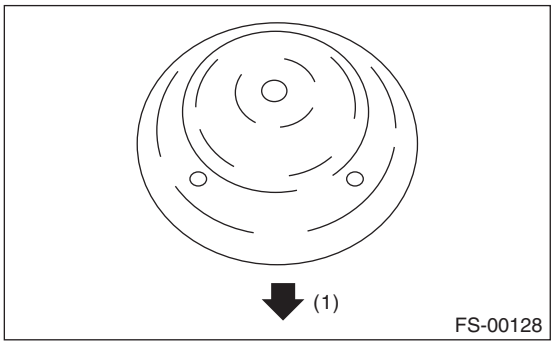
(1) Diameter is small (upper part)
(2) Identification paint
(3) Diameter is large (bottom part)

3) Set the front coil spring correctly so that its end face (a) contacts the vertical surface (b) of the spring seat - front strut UPR as shown in the figure.



4) Install the dust cover - inner and the helper - front strut to the piston rod.
5) Pull the piston rod fully upward, and install the spring seat.

NOTE:
Position the spring seat - front strut UPR as shown in the figure.

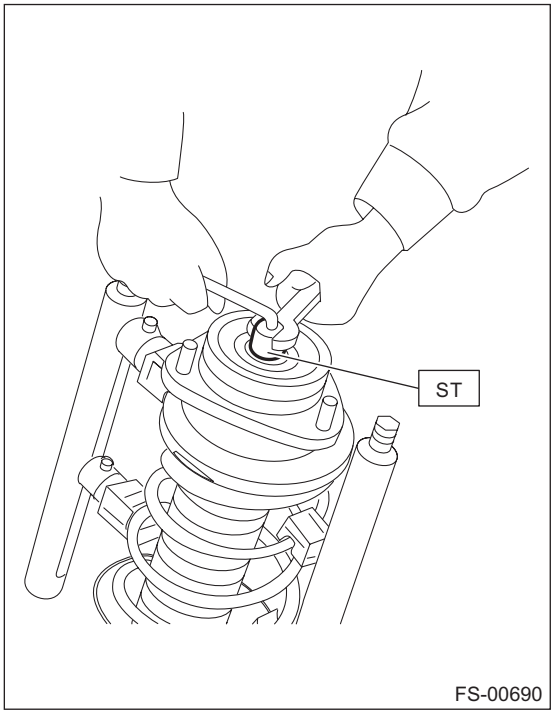


(1) Outside of body

6) Install the spacer - front strut and the strut mount - front to the piston rod, and temporarily tighten a new self-locking nut.

7) Using a hexagon wrench to prevent strut rod from turning, tighten the new self-locking nut with ST.

Preparation tool:
ST: STRUT MOUNT SOCKET (20399AG000)



Tightening torque:
55 N·m (5.61 kgf-m, 40.6 ft-lb)

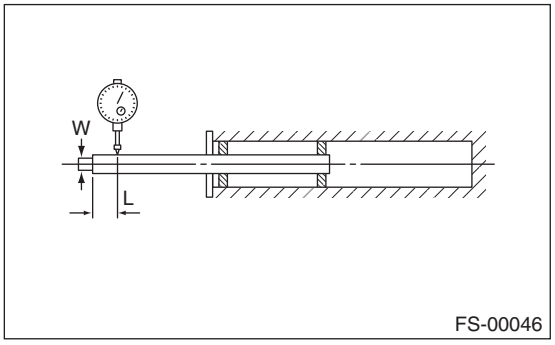
8) Loosen the coil spring compressor carefully.

E: INSPECTION

Check the removed part for wear, damage and cracks, and then repair or replace it if defective.

1. STRUT

1) Check for oil leaks.
2) Move the piston rod up and down to check that it operates smoothly without any hitch.
3) Check the piston rod for play.
   (1) Fix the outer shell in place and fully extend the rod.
   (2) Set the dial gauge on the end of the rod L [10 mm (0.39 in)].
   (3) While applying a force of W [20 N (2 kgf, 4 lbf)] to the threaded part, read the dial gauge indication P_1.
   (4) Apply a force of 20 N (2 kgf, 4 lbf) from the opposite direction of “W”, and then read the dial gauge indication P_2.



Play limit (P_1 + P_2): 0.8 mm (0.031 in)

4) Replace the strut if faulty is found in the inspection or limit value is exceeded.

2. STRUT MOUNT - FRONT

Check the rubber part for deformation, cracks or deterioration, and then replace it with a new part if defective.

3. DUST COVER - INNER

If cracks or damage are found, replace it with a new part.

4. COIL SPRING - FRONT

If a permanent strain is found, replace it with a new part.

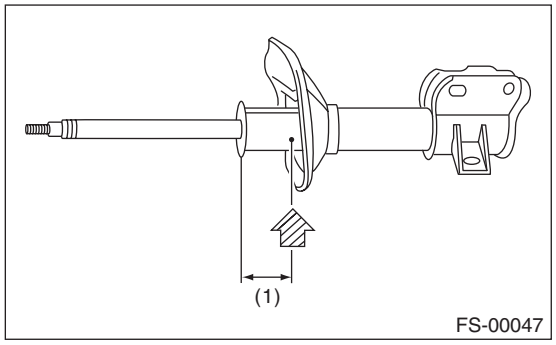
5. HELPER - FRONT STRUT

If major cracks or damage are found, replace it with a new part.

F: DISPOSAL

CAUTION:
• Before handling the strut damper and shock absorber, be sure to wear goggles to protect eyes from gas, oil and cutting powder.
• Do not disassemble the strut damper and shock absorber or place them into a fire.
• When discarding gas filled strut dampers and shock absorbers, drill holes in them to purge the gas.

1) Place the strut damper and shock absorber on a level surface with the piston rod fully expanded.
2) Make a hole into the specified position 30 mm (1.18 in) deep using a drill with 2 — 3 mm (0.08 — 0.12 in) diameter.



(1) 40 mm (1.57 in)

9. General Diagnostic Table

A: INSPECTION

1. IMPROPER VEHICLE POSTURE OR IMPROPER WHEEL ARCH HEIGHT

Possible cause	Corrective action
(1) Permanent distortion or damage of the coil spring	Replace.
(2) Rough operation of strut or shock absorber	Replace.
(3) Improper installation of strut or shock absorber	Replace with appropriate parts.
(4) Installation of the wrong coil spring	Replace with appropriate parts.

2. POOR RIDE COMFORT

1) Large rebound shock
2) Rocking of the vehicle continues too long after running over bump and hump.
3) Excessive shock in bumping

Possible cause	Corrective action
(1) Damaged coil spring	Replace.
(2) Overinflation of tires	Adjust.
(3) Improper wheel arch height	Replace the coil springs with new parts.
(4) Fault in operation of strut or shock absorber	Replace.
(5) Damage or deformation of strut mount or shock absorber mount	Replace.
(6) Unsuitable length (maximum or minimum) of strut or shock absorber	Replace with appropriate parts.
(7) Abnormal deformation or loss of bushing	Replace.
(8) Deformation or damage of helper in strut assembly or shock absorber	Replace.
(9) Oil leakage from the strut or shock absorber	Replace.

3. NOISE

Possible cause	Corrective action
(1) Wear or damage of strut or shock absorber component parts	Replace.
(2) Loosening of the suspension link installing bolt	Tighten to the specified torque.
(3) Abnormal deformation or loss of bushing	Replace.
(4) Unsuitable length (maximum or minimum) of strut or shock absorber	Replace with appropriate parts.
(5) Damaged coil spring	Replace.
(6) Wear or damage of the ball joint	Replace.
(7) Deformation of the clamp - stabilizer bushing	Replace.

REAR SUSPENSION

RS

Page

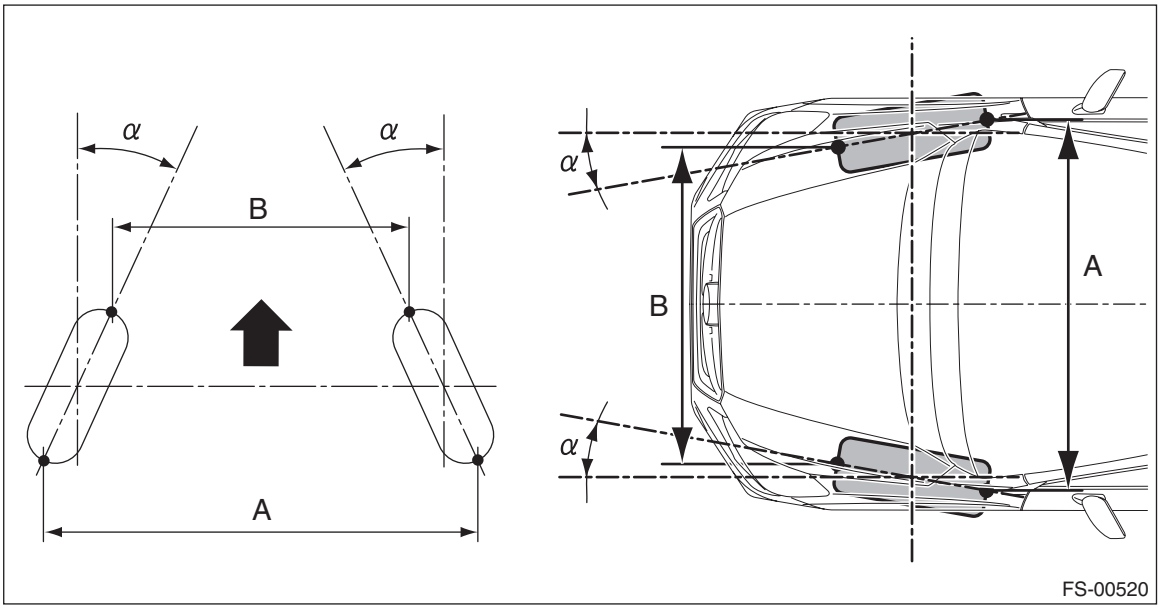
1. General Description 2
2. Wheel Alignment 9
3. Rear Sub Frame 10
4. Rear Stabilizer 18
5. Rear Trailing Link 20
6. Upper Arm 23
7. Front Lateral Link 25
8. Rear Lateral Link 28
9. Rear Shock Absorber 31
10. General Diagnostic Table 41

1. General Description

A: SPECIFICATION

Refer to “SPECIFICATIONS” in “FRONT SUSPENSION” section for rear suspension specifications. <Ref. to FS-2, SPECIFICATION, General Description.>

NOTE:
• Front toe-in, rear toe-in and front camber can be adjusted. Adjust if the value of toe-in or camber exceeds the tolerance range of the specification chart.
• Other items except for front toe-in, rear toe-in and front camber that are described in the specification chart cannot be adjusted. If other items exceed the tolerance range of the specification chart, check the suspension parts and connections for deformation. If defective, replace with new parts.

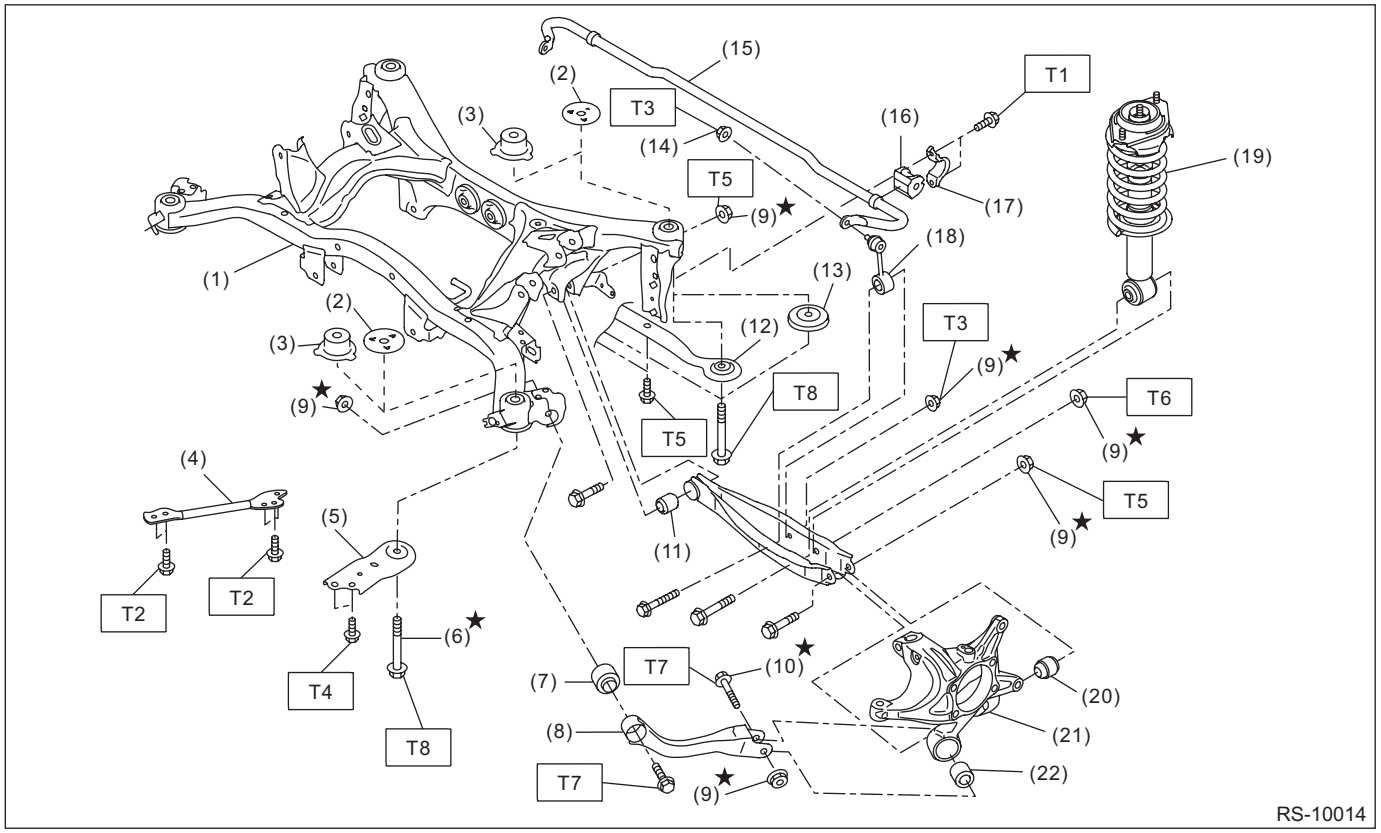


A – B = Positive: Toe-in, Negative: Toe-out

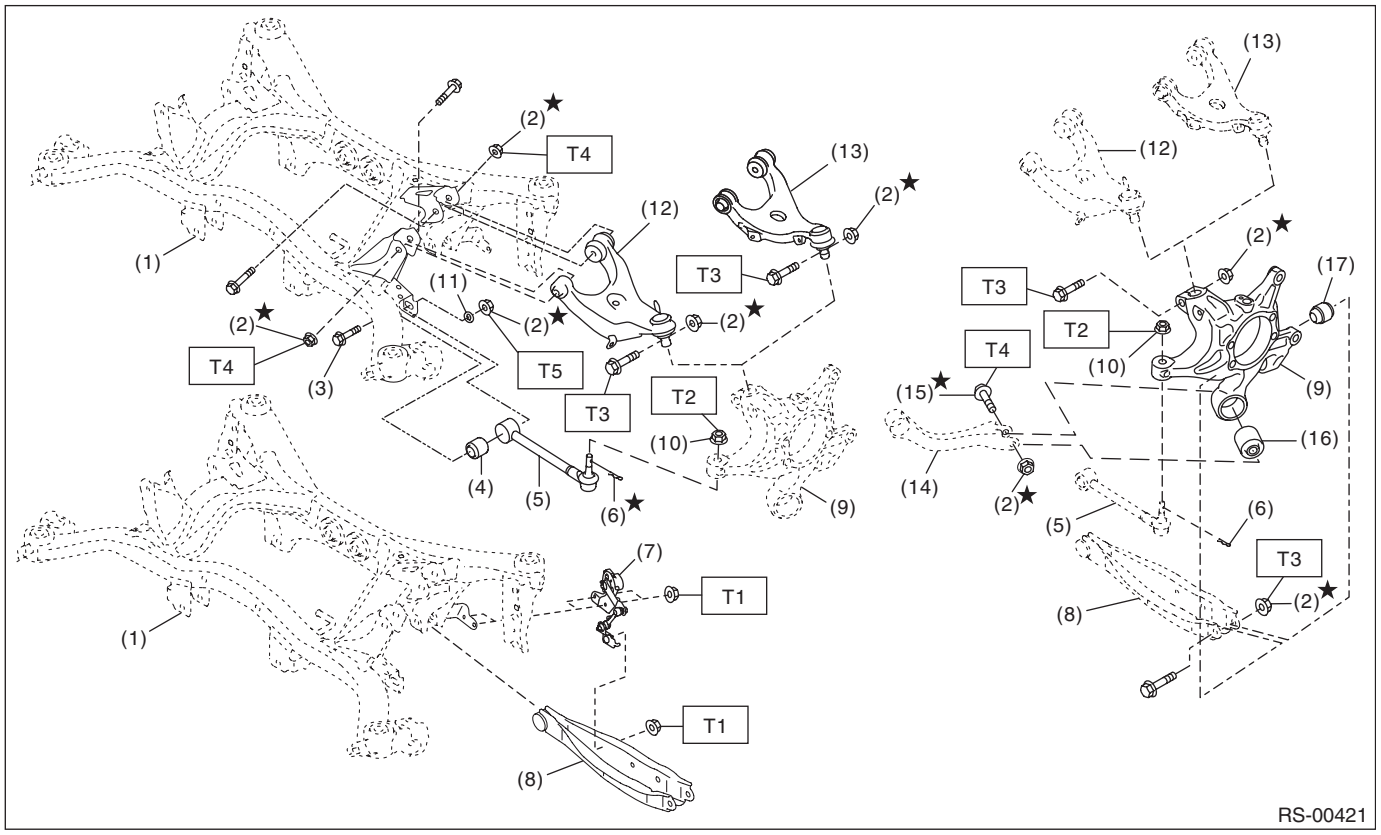
α = Individual toe angles

B: COMPONENT

1. REAR SUSPENSION

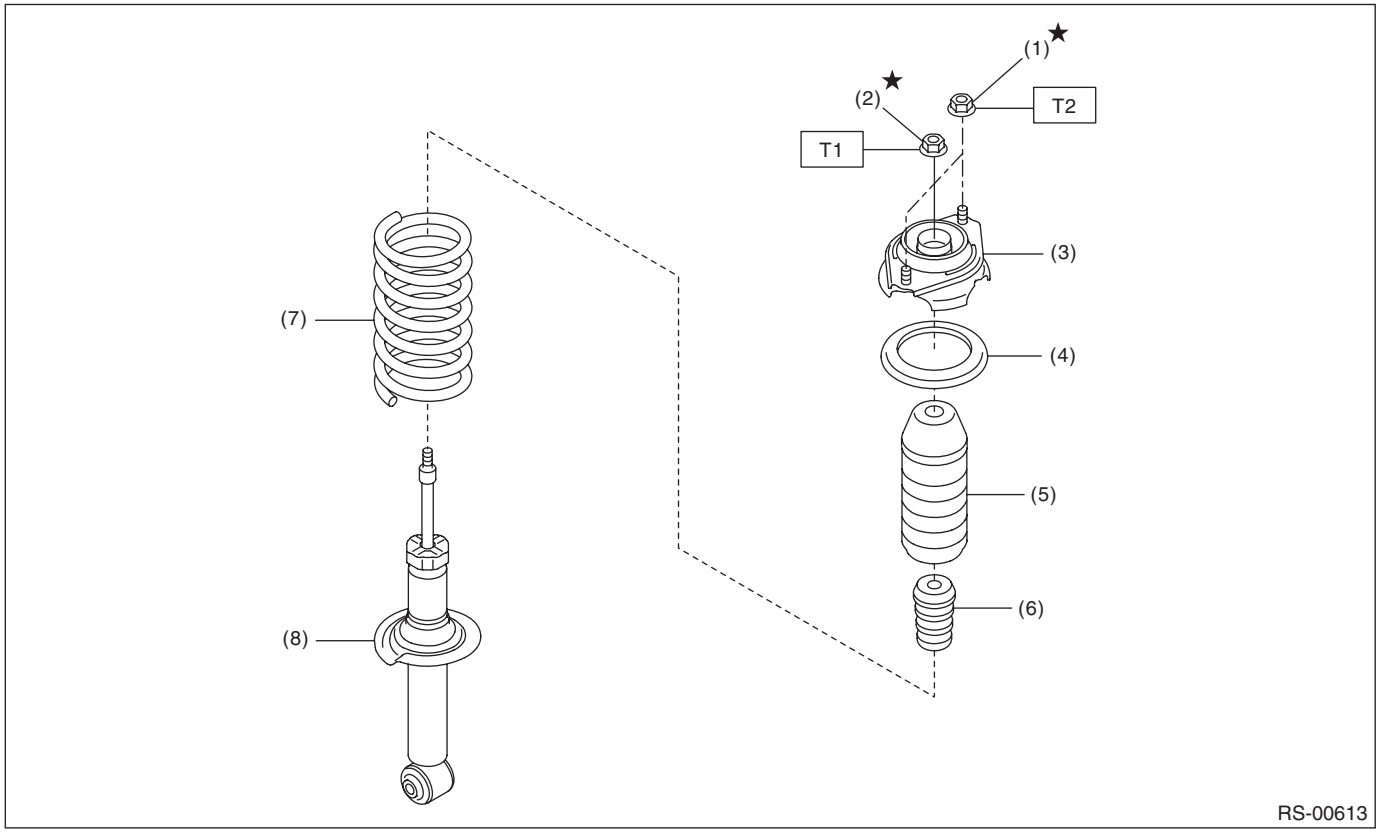


(1)	Rear sub frame ASSY	(12)	Rear support sub frame (HEV model)	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Stopper UPR (Impreza model)	(13)	Stopper LWR (gasoline engine model)	***T1: 30 (3.06, 22.1)***
(3)	Stopper UPR (Crosstrek model)	(14)	Flange nut	***T2: 33 (3.36, 24.3)***
(4)	Stay - rear frame COMPL (Crosstrek model)	(15)	Rear stabilizer	***T3: 38 (3.87, 28.0)***
(5)	Front sub frame support	(16)	Bushing - stabilizer	***T4: 70 (7.14, 51.6)***
(6)	Flange bolt A	(17)	Clamp - stabilizer bushing	***T5: 80 (8.16, 59.0)***
(7)	Bushing A - trailing link	(18)	Stabilizer link ASSY	***T6: 85 (8.67, 62.7)***
(8)	Trailing link	(19)	Rear shock absorber ASSY	***T7: 90 (9.18, 66.4)***
(9)	Self-locking nut	(20)	Bushing - pillow ball	***T8: 145 (14.79, 106.9)***
(10)	Flange bolt B	(21)	Housing ASSY - rear axle	
(11)	Bushing C - lateral link rear	(22)	Bushing B - trailing link	



(1)	Rear sub frame ASSY	(9)	Housing ASSY - rear axle	(17)	Bushing - rear axle housing
(2)	Self-locking nut	(10)	Flange nut		
(3)	Adjusting bolt	(11)	Adjusting washer	***Tightening torque: N·m (kgf-m, ft-lb)***	
(4)	Bushing B - lateral link	(12)	Rear upper arm ASSY	***T1: 7.5 (0.76, 5.5)***	
(5)	Lateral link ASSY - front	(13)	Rear upper arm ASSY (Crosstrek model)	***T2: 60 (6.12, 44.3)***	
(6)	Snap pin	(14)	Trailing link	***T3: 80 (8.16, 59)***	
(7)	Sensor ASSY - headlight beam leveler (models with auto headlight beam leveler only)	(15)	Flange bolt	***T4: 90 (9.18, 66.4)***	
(8)	Lateral link ASSY - rear	(16)	Bushing - trailing link	***T5: 100 (10.20, 73.8)***	

2. REAR SHOCK ABSORBER



(1) Flange nut
(2) Self-locking nut
(3) Shock mount - rear
(4) Rubber seat - shock UPR
(5) Dust cover - rear shock
(6) Helper - rear
(7) Coil spring - rear
(8) Shock absorber COMPL - rear

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.55, 18.4)
T2: 30 (3.06, 22.1)

C: CAUTION

Please clearly understand and adhere to the following general precautions. They must be strictly followed to avoid minor or serious injury to the person doing the work or people in the area.

1. EACH PROCEDURE

• Wear appropriate work clothing, including a helmet, protective goggles and protective shoes when performing any work.
• Before disposing of shock absorbers, be sure to bleed the gas out completely. Also, do not expose to flames or fire.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• Use SUBARU genuine grease etc. or equivalent. Do not mix grease etc. of different grades or manufacturers.
• Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or rigid racks at the specified points.
• When the suspension-related components have been replaced, perform the following VDC setting mode.
  – Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
  – Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
  – Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

2. OIL

When handling oil, adhere to the following to prevent unexpected accident.
• Prepare container and waste cloths when performing work which oil could possibly spill. If oil spills, wipe it off immediately to prevent from penetrating into floor or flowing outside, for environmental protection.
• Follow all government regulations concerning disposal of refuse when disposing.

D: PREPARATION TOOL

1. SPECIAL TOOL

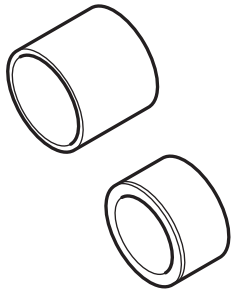
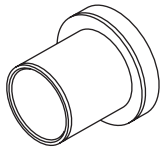
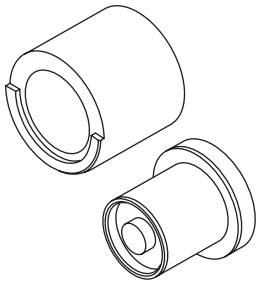
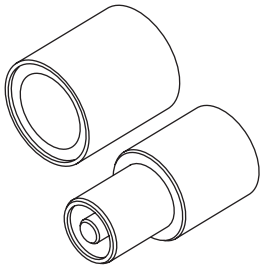
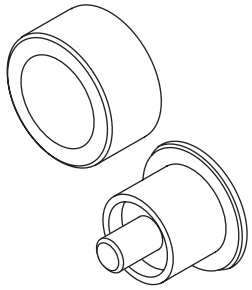
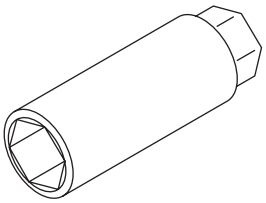
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST20099PA010	20099PA010	INSTALLER & REMOVER	• Used for replacing the bushing A - trailing link of the housing assembly - rear axle. • Used together with BUSHING REMOVER (20099FG000).
 ST20099FG000	20099FG000	BUSHING REMOVER	• Used for replacing the bushing A - trailing link of the housing assembly - rear axle. • Used together with base part of INSTALLER & REMOVER (20099PA000).
 ST20099AE000	20099AE000	INSTALLER & REMOVER	Used for replacing the bushing B - lateral link.
 ST20099AE010	20099AE010	INSTALLER & REMOVER	Used for replacing the bushing C - lateral link.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST20099AE040	20099AE040	INSTALLER & REMOVER	Used for replacing the bushing C - lateral link.
 ST20399FG000	20399FG000	STRUT MOUNT SOCKET	• Used for removing and installing strut assembly and shock absorber assembly. • Used for checking center nut torque of strut assembly and shock absorber assembly.

2. GENERAL TOOL

TOOL NAME	REMARKS
Alignment tester	Used for measuring wheel alignment.
Toe-in gauge	Used for toe-in measurement.
Jack	Used for removing and installing suspension.
Bearing puller	Used for removing bushings.
Tie-rod ball joint puller	Used for disconnecting the lateral link assembly - front.
Coil spring compressor	Used for disassembling and assembling shock absorber assembly.

2. Wheel Alignment

A: INSPECTION

NOTE:
Measure and adjust the front and rear wheel alignment at a time. Refer to “Wheel Alignment” in “FRONT SUSPENSION” section for measurement or adjustment of wheel alignment.

- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

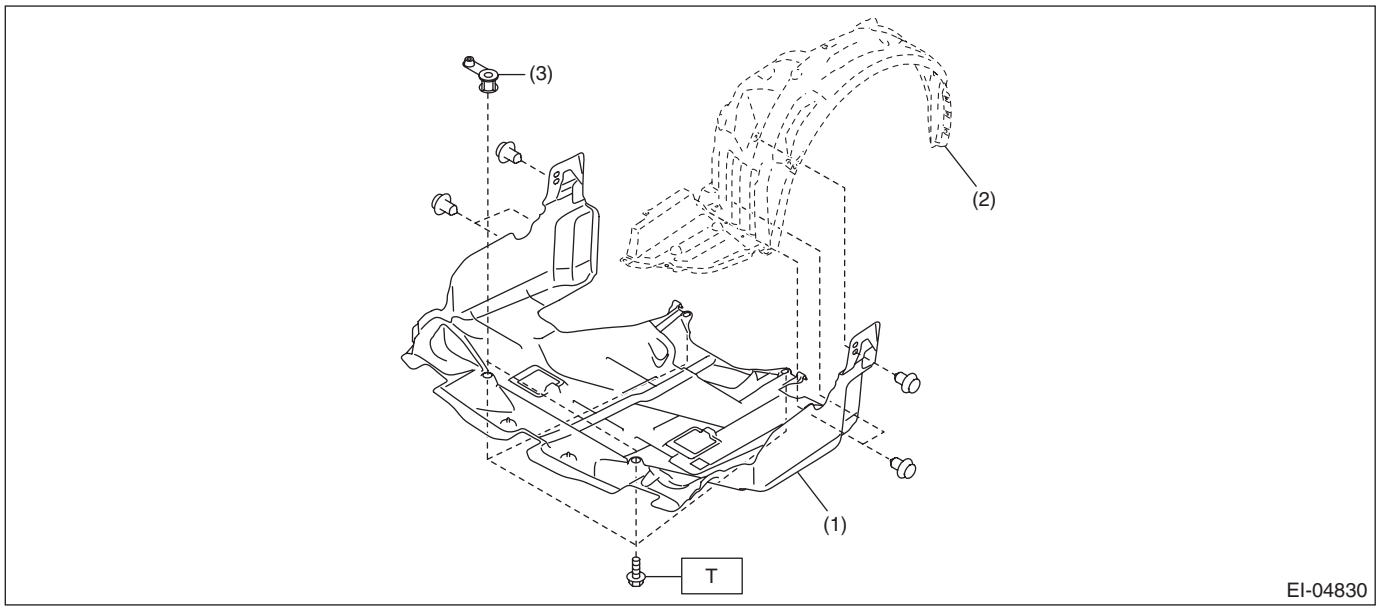
3. Rear Sub Frame

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

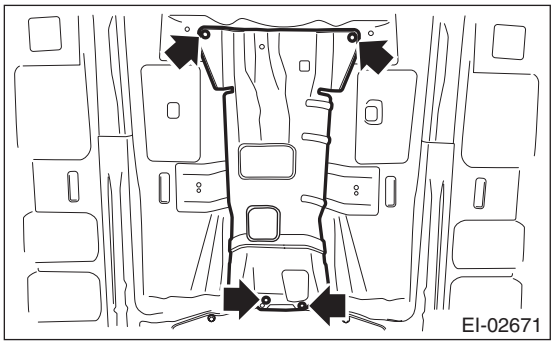
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle, and then remove the rear wheels.
3) Remove the bolts and clips, and remove the under cover - front.



(1) Under cover - front
(2) Mud guard - front
(3) Spacer - under cover (Crosstrek model)

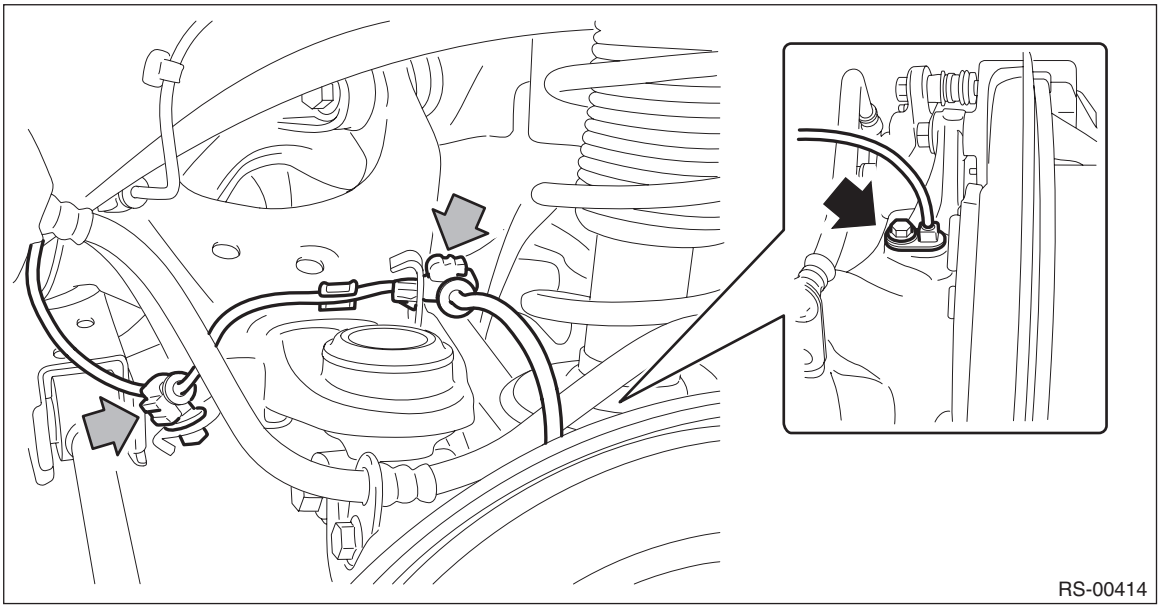
4) Remove the exhaust pipe and muffler.
• Center exhaust pipe & rear exhaust pipe: <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
• Muffler: <Ref. to EX(H4DO(w/o HEV))-22, REMOVAL, Muffler.>
5) Remove the bolts to remove the front heat shield cover.



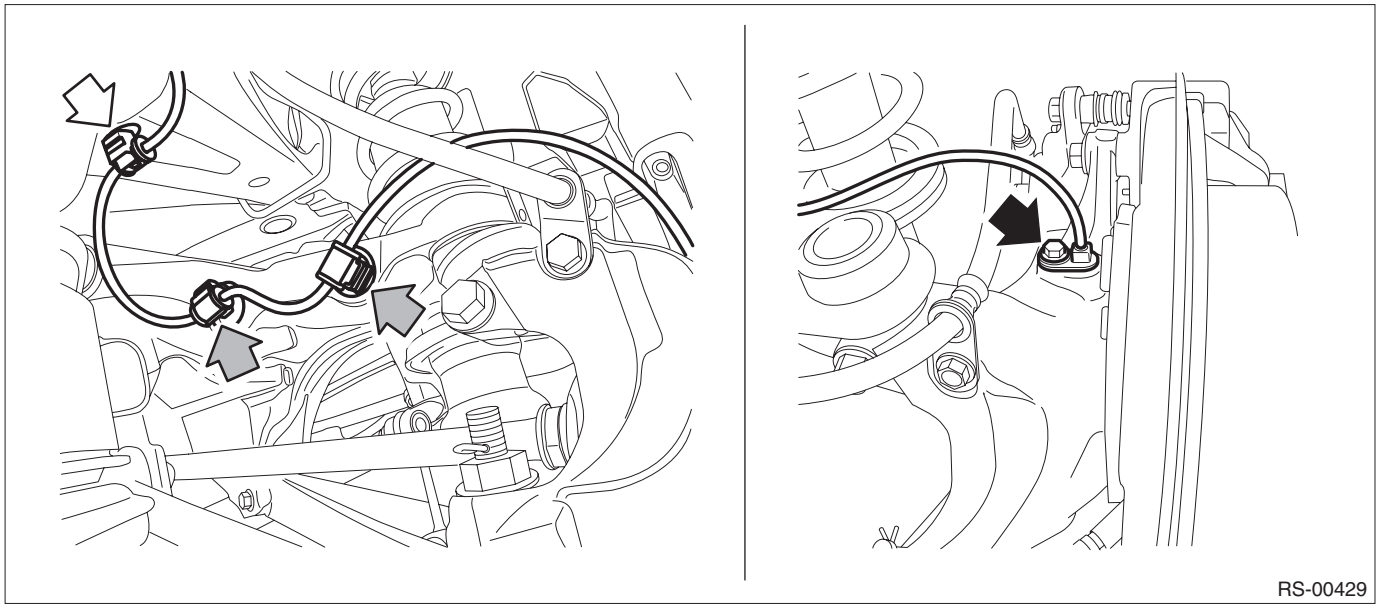
6) Remove the propeller shaft assembly. <Ref. to DS-12, REMOVAL, Propeller Shaft.>

7) Remove the rear ABS wheel speed sensor from the housing assembly - rear axle.
   (1) Remove the bolts, and remove the rear ABS wheel speed sensor.
   (2) Remove the rear ABS wheel speed sensor harness from the upper arm assembly.

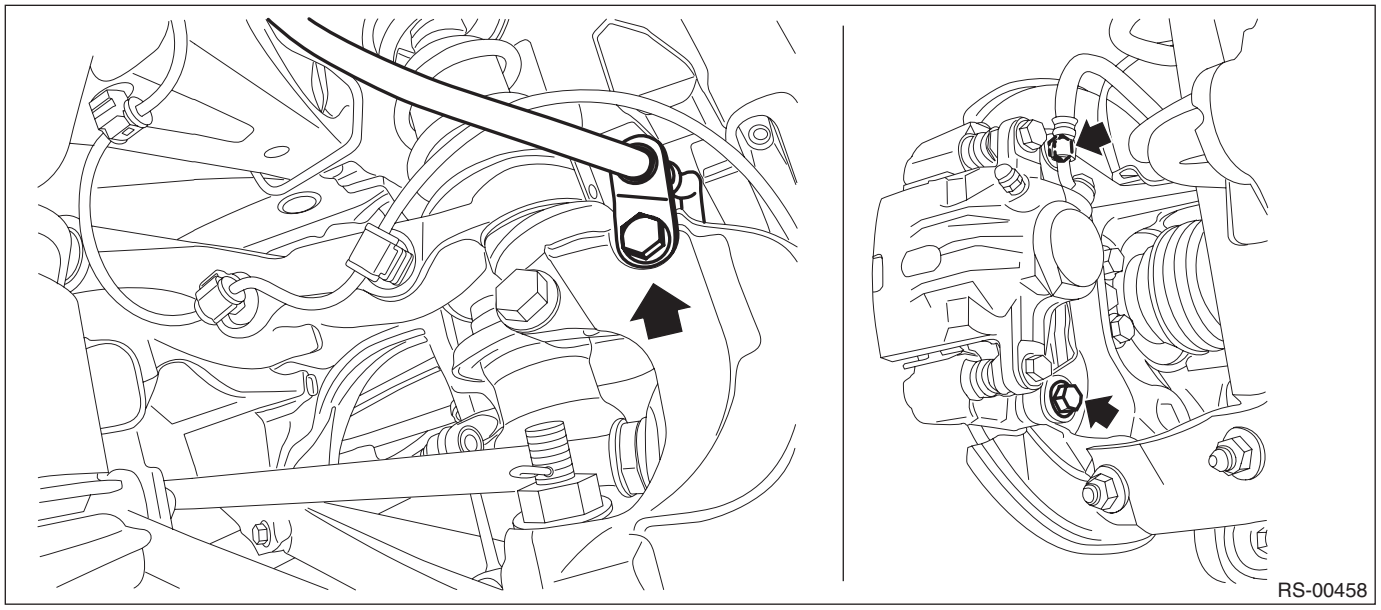
CAUTION:
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**
- **Leave the sensor harness clamp (white arrow) on the vehicle side.**
  - Impreza model



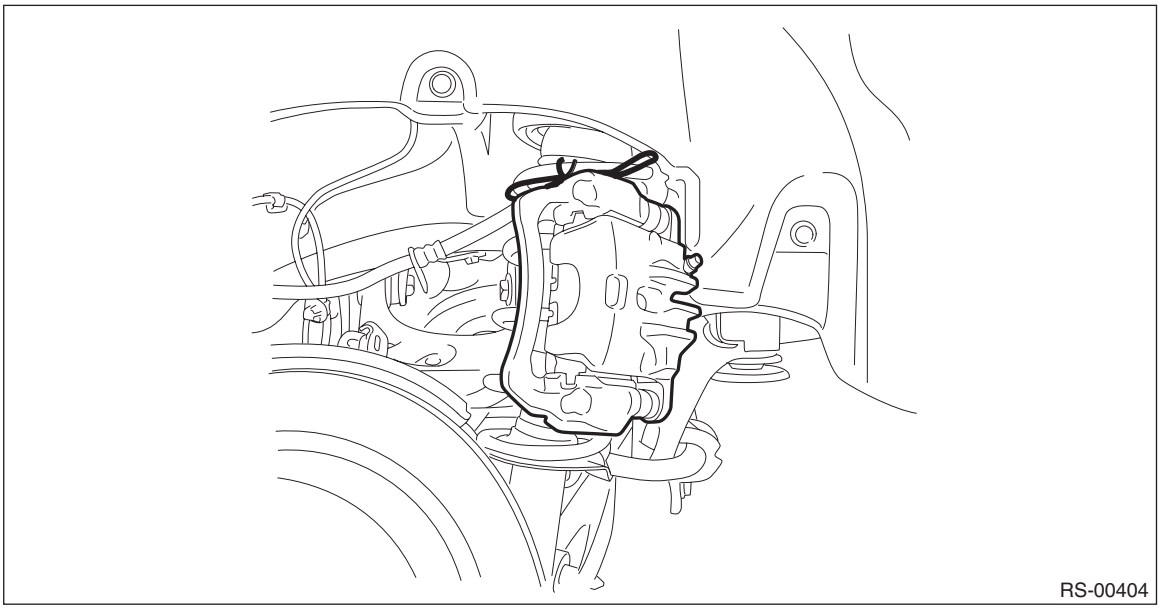
  - Crosstrek model



8) Remove the caliper body assembly from the housing assembly - rear axle.
(1) Remove the bolts and then remove the brake hose bracket and caliper body assembly.

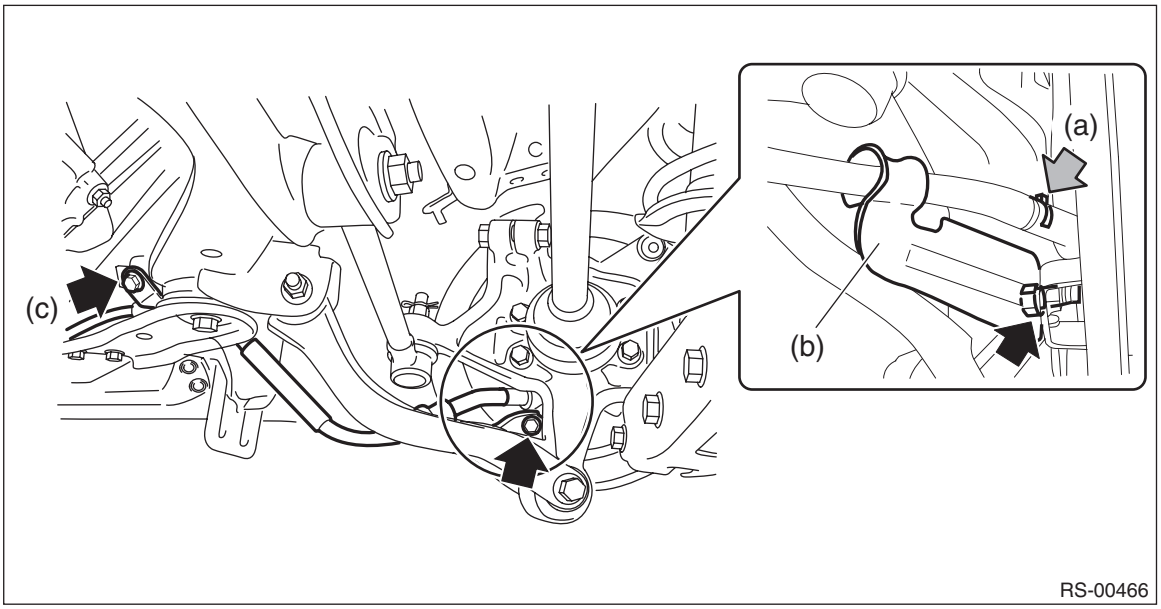


(2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the shock absorber assembly with the harnesses.

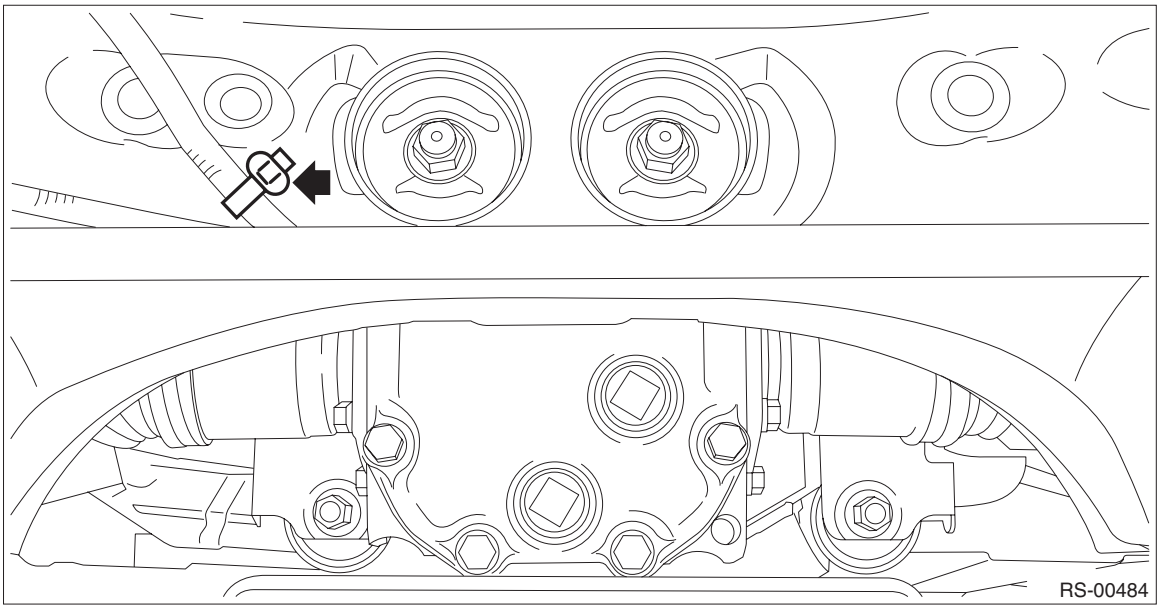


9) Remove the rear parking brake cable from the parking brake assembly. <Ref. to PB-11, REMOVAL, Parking Brake Assembly (Rear Disc Brake).>

10) Remove the rear parking brake cable from the back plate - rear brake.
(1) Remove the clamp B - hand brake cable (a) from the back plate - rear brake.
(2) Remove the cable clamp (b) from the back plate - rear brake.
(3) Remove the cable clamp (c) and pull out the cable assembly - parking brake.



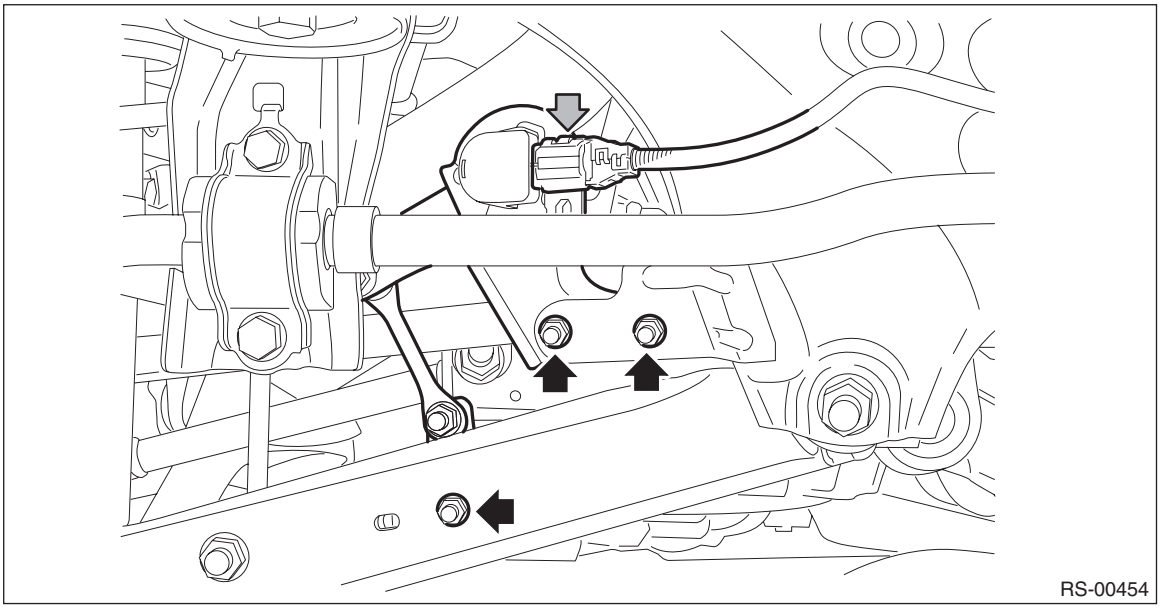
11) Remove the clamp of the sub rear harness.



12) Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler, left side only)

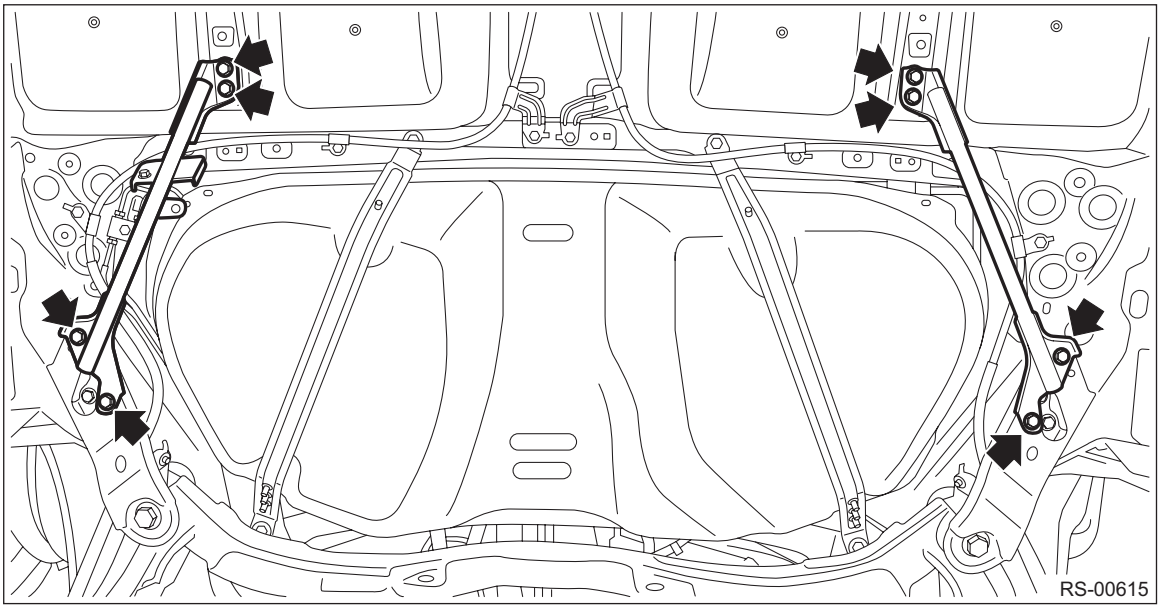
CAUTION:
Do not apply impact to the sensor assembly - headlight beam leveler or forcibly move the arm. Doing so may cause sensor damage and malfunction.

(1) Disconnect the connector of the sensor assembly - headlight beam leveler.
(2) Remove the nuts, and remove the sensor assembly - headlight beam leveler.

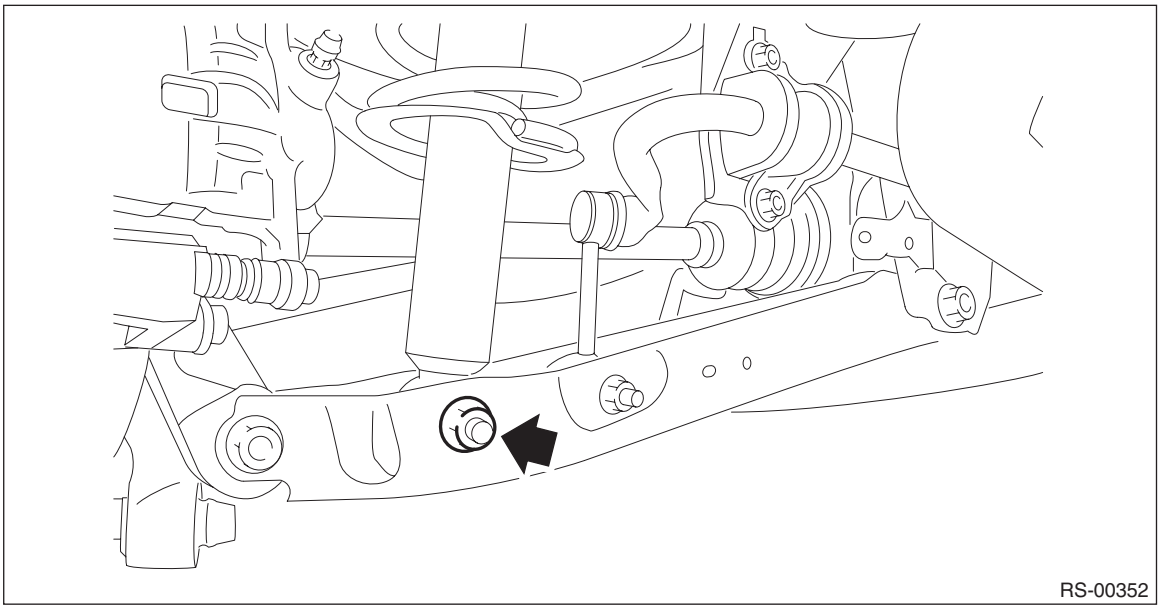

RS-00454

13) Remove the bolt and nuts and remove the fuel tank protector.
- Gasoline engine model: <Ref. to FU(H4DO(w/o HEV))-114, REMOVAL, Fuel Tank Protector.>
- HEV model: <Ref. to FU(H4DO(HEV))-105, REMOVAL, Fuel Tank Protector.>

14) Remove the rear sub frame assembly.
(1) Remove the bolts, and remove the stay - rear frame COMPL. (Crosstrek model)

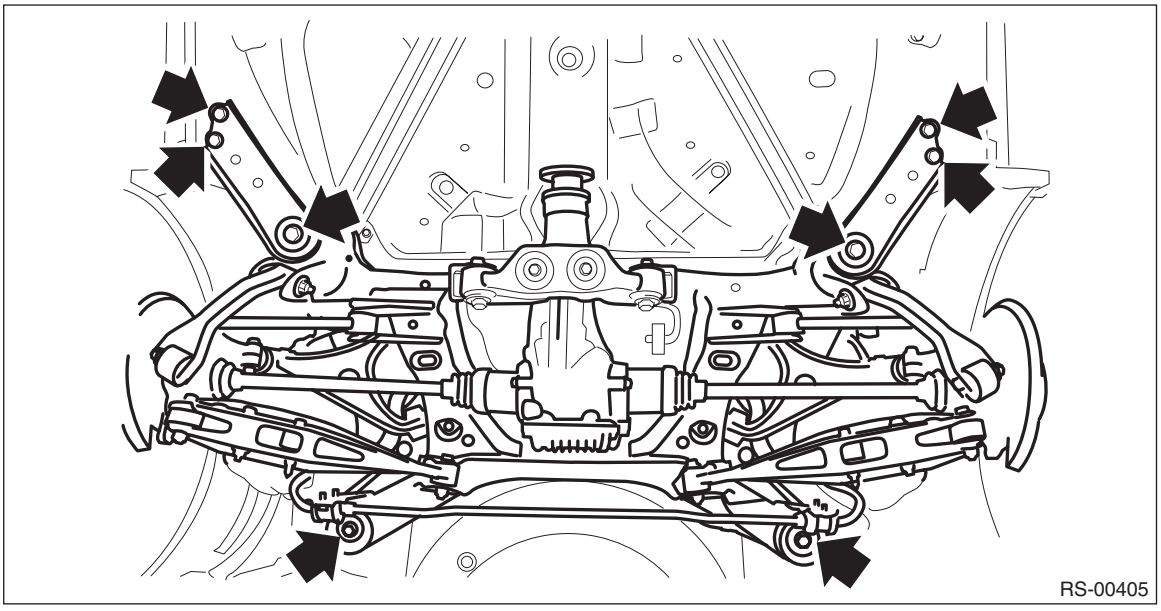

RS-00615

(2) Remove the bolts from the lower side of rear shock absorber assembly.

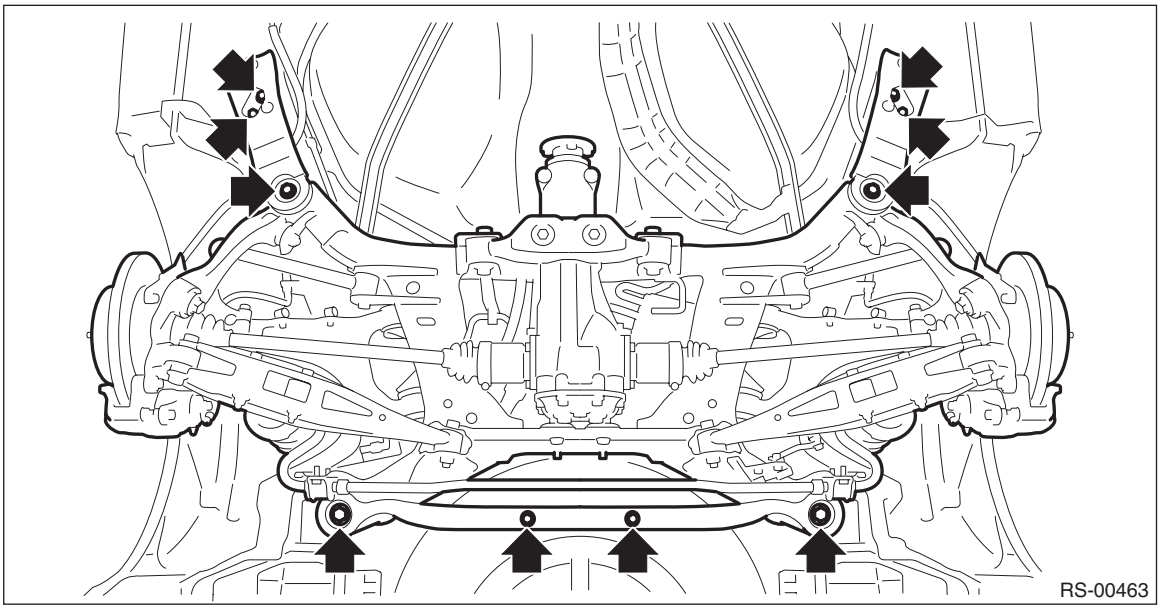


(3) Support the rear sub frame assembly using a transmission jack.
(4) Remove the bolt, and remove the left and right sub frame supports.
(5) Remove the bolts, then remove the rear sub frame assembly.

- Gasoline engine model



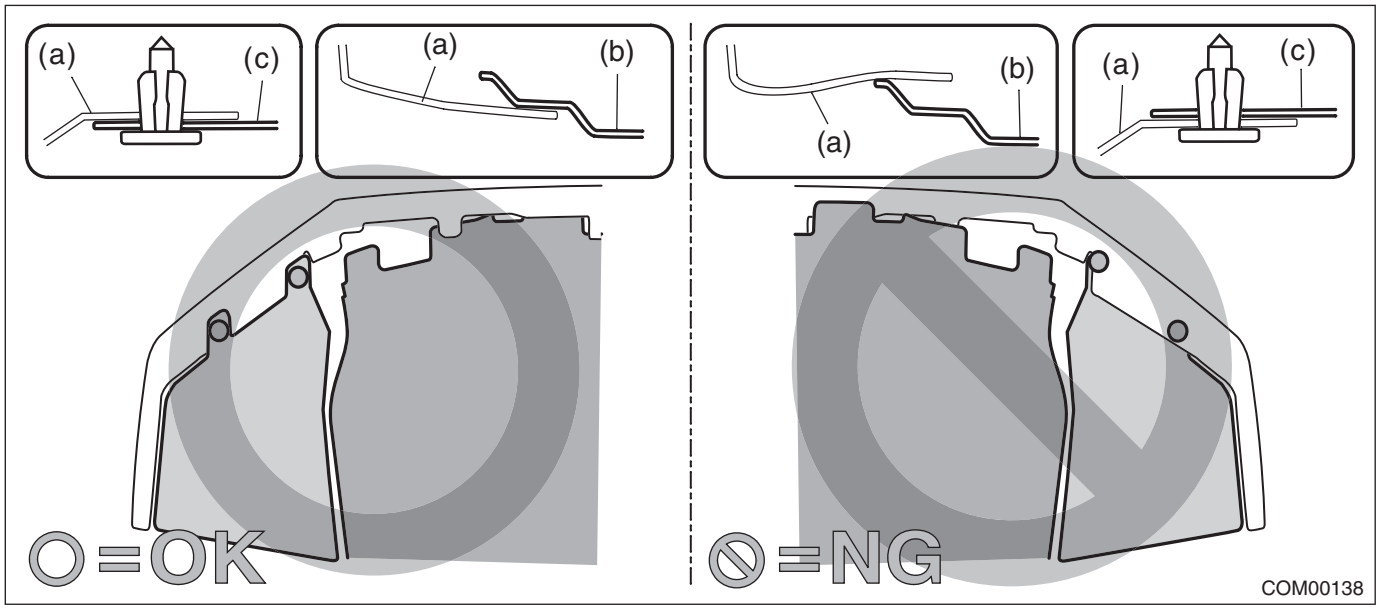
- HEV model



15) As necessary, remove each part from the rear sub frame assembly.

B: INSTALLATION

CAUTION:
- **Be sure to use a new self-locking nut.**
- **Always tighten the bushing in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.**
- **Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).**



1) Check the removed parts for wear, damage and crack, and repair or replace them if faulty.
2) Install each part in the reverse order of removal.

Tightening torque:

- ***Rear suspension parts: <Ref. to RS-3, COMPONENT, General Description.>***
- ***Fuel tank protector (gasoline engine model): <Ref. to FU(H4DO(w/o HEV))-114, REMOVAL, Fuel Tank Protector.>***
- ***Fuel tank protector (HEV model): <Ref. to FU(H4DO(HEV))-105, REMOVAL, Fuel Tank Protector.>***
- ***Rear disc brake parts: <Ref. to BR-5, REAR DISC BRAKE, COMPONENT, General Description.>***
- ***Parking brake parts: <Ref. to PB-3, PARKING BRAKE LEVER & CABLE, COMPONENT, General Description.>***
- ***Exhaust pipe parts: <Ref. to EX(H4DO(w/o HEV))-2, FRONT EXHAUST PIPE AND CENTER EXHAUST PIPE, COMPONENT, General Description.>***
- ***Propeller shaft parts: <Ref. to DS-13, INSTALLATION, Propeller Shaft.>***

3) Install the under cover - front.

Tightening torque:
18 N·m (1.84 kgf-m, 13.3 ft-lb)

4) Bleed air from brake system. <Ref. to BR-65, BRAKE LINE, PROCEDURE, Air Bleeding.>
5) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

6) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

CAUTION:
When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

7) Connect the battery ground terminal.
8) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

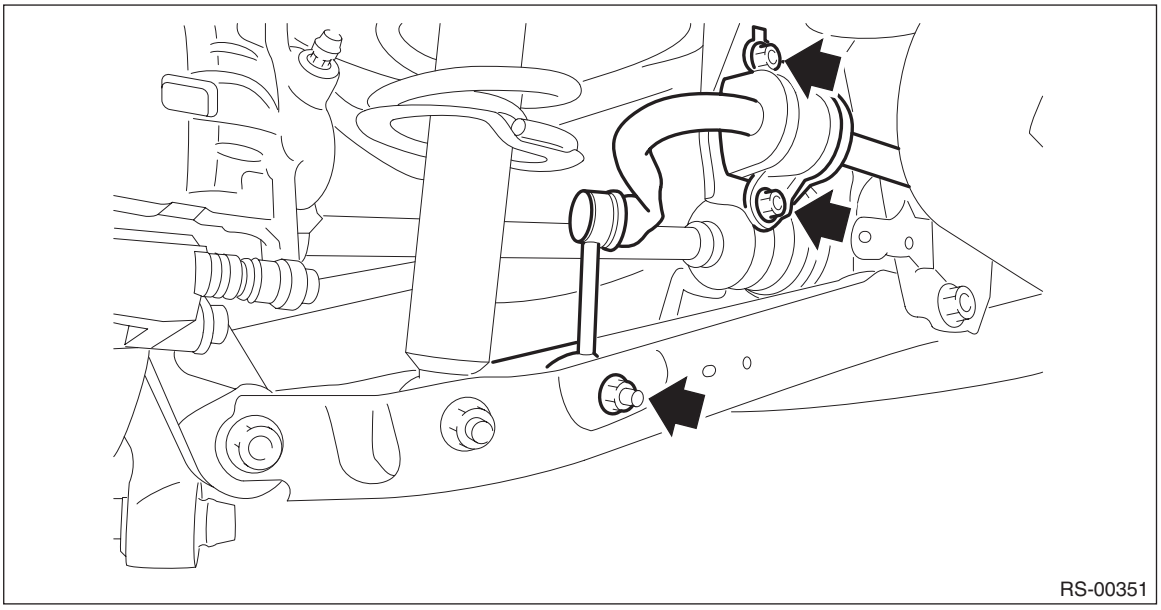
C: INSPECTION

Check the removed parts for wear, damage and crack, and repair or replace them if faulty.

4. Rear Stabilizer

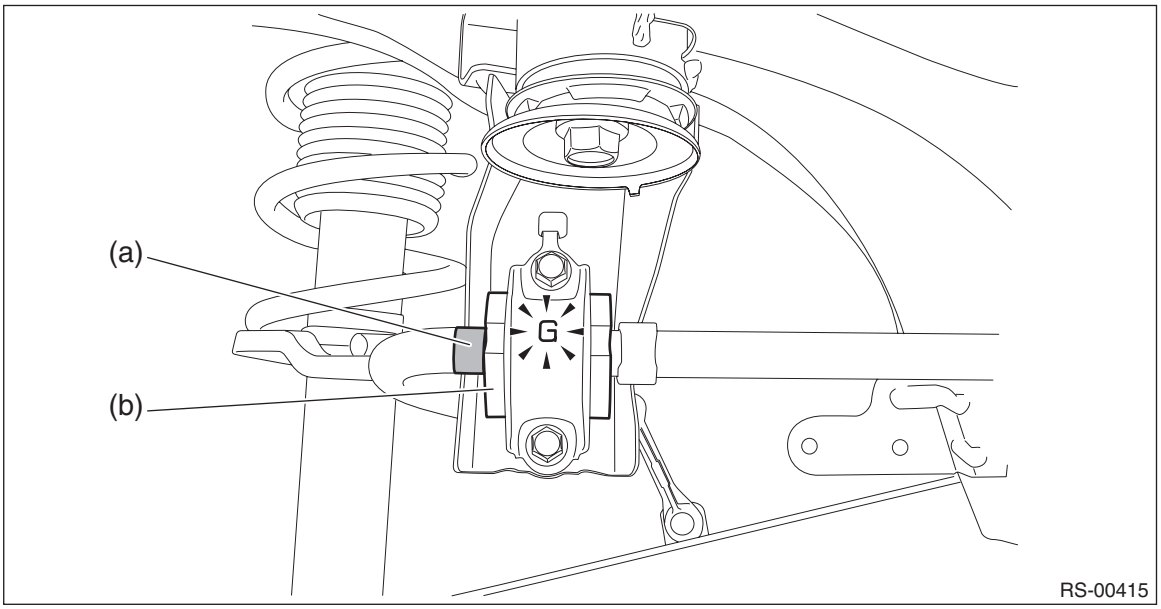
A: REMOVAL

1) Lift up the vehicle, and then remove the rear wheels.
2) Remove the rear stabilizer.
   (1) Remove the left and right stabilizer link assemblies.
   (2) Detach the clamp - stabilizer bushing and remove the rear stabilizer.



B: INSTALLATION

CAUTION:
- **Be sure to use a new flange nut and self-locking nut.**
- **Always tighten the bushing in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.**
- **Install the clamp - stabilizer bushing with the "G" character facing upward.**
- **When installing, align the edge of identification paint (a) to the end face of the bushing (b).**



1) Before installation, inspect the following items and replace any faulty part with a new one.
- Check the bushing - stabilizer for abnormal cracks, fatigue or damage.
- Check the stabilizer link assembly for damage.

2) Install each part in the reverse order of removal.

Tightening torque:
Clamp - stabilizer bushing: 30 N·m (3.06 kgf-m, 22.1 ft-lb)
Stabilizer link assembly: 38 N·m (3.87 kgf-m, 28.0 ft-lb)

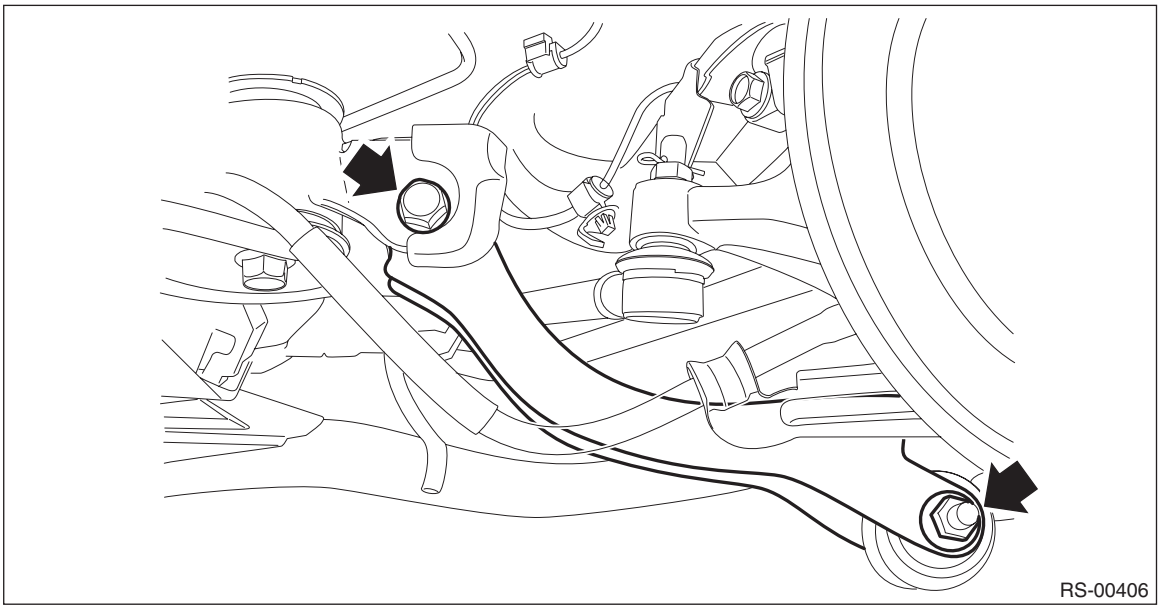
3) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

5. Rear Trailing Link

A: REMOVAL

1) Lift up the vehicle, and then remove the rear wheels.
2) Remove the bolts and nuts, and then remove the trailing link.



B: INSTALLATION

CAUTION:
- **Be sure to use a new self-locking nut.**
- **Always tighten the bushing in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.**

1) Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to RS-3, COMPONENT, General Description.>

2) Install the rear wheels.

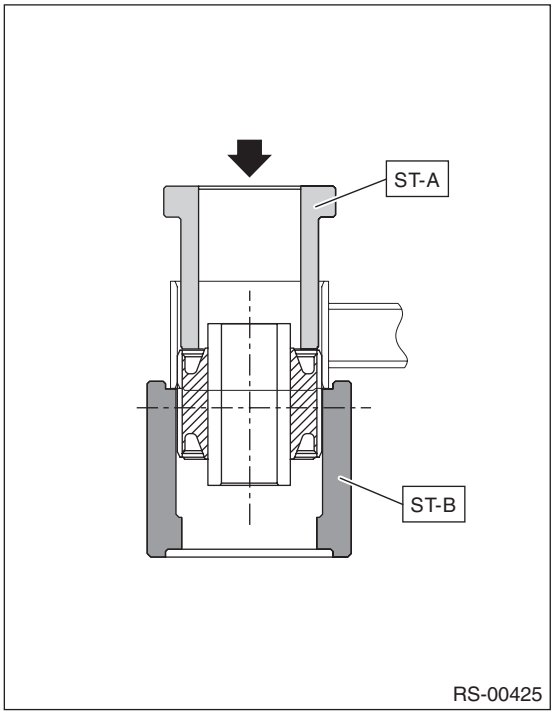
Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

C: DISASSEMBLY

1. BUSHING A - TRAILING LINK

Using the ST, push out the bushing A - trailing link.

Preparation tool:
ST-A: INSTALLER (899874100)
ST-B: INSTALLER & REMOVER (BASE) (20099PA010)



2. BUSHING - TRAILING LINK

For the removal procedure of bushing - trailing link, refer to “Rear Axle” in the “DRIVE SHAFT SYSTEM” section. <Ref. to DS-41, BUSHING - TRAILING LINK, DISASSEMBLY, Rear Axle.>

D: ASSEMBLY

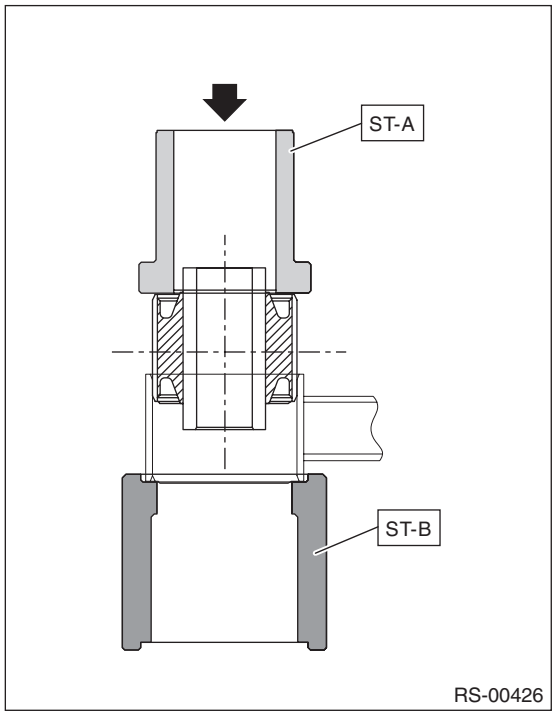
1. BUSHING A - TRAILING LINK

1) Before assembly, inspect the following items and replace any faulty part with a new one.
- Perform visual check for damage or bend on the trailing link.
- Visually check the bushing for abnormal cracks, fatigue or damage.

2) Using the ST-A and ST-B, press-fit the bushing.

CAUTION:
Make sure to press the bushing straight in.

Preparation tool:
ST-A: INSTALLER (899874100)
ST-B: INSTALLER & REMOVER (BASE) (20099PA010)



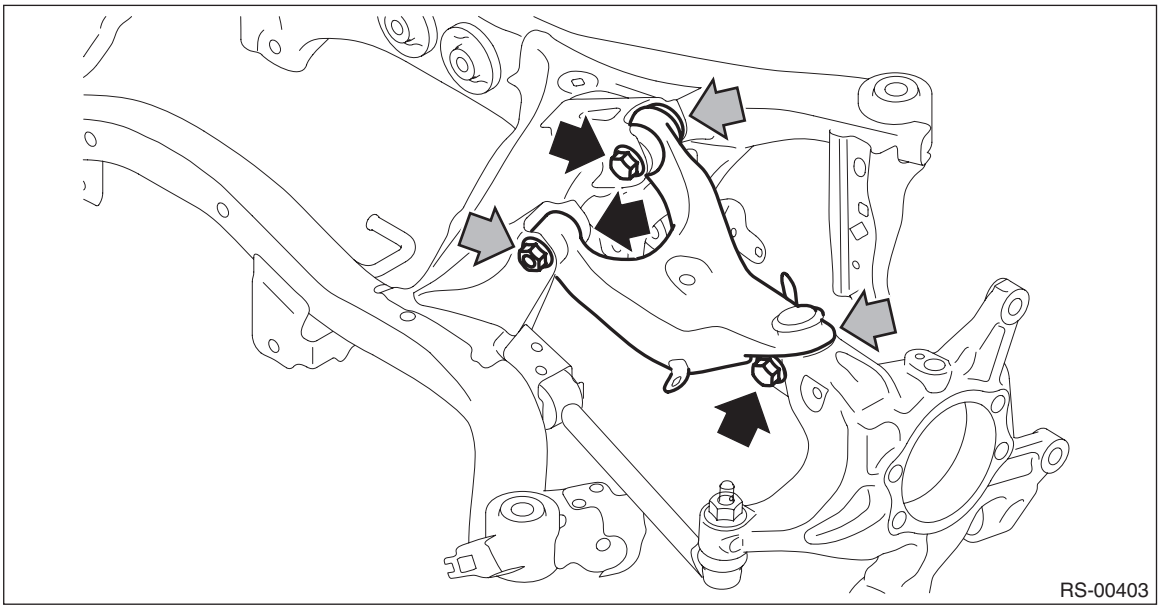
2. BUSHING - TRAILING LINK

For the installation procedure of bushing - trailing link, refer to “Rear Axle” in the “DRIVE SHAFT SYSTEM” section. <Ref. to DS-41, BUSHING - TRAILING LINK, DISASSEMBLY, Rear Axle.>

6. Upper Arm

A: REMOVAL

1) Remove the rear sub frame assembly. <Ref. to RS-10, REMOVAL, Rear Sub Frame.>
2) Remove the bolts and nuts to remove the upper arm assembly.



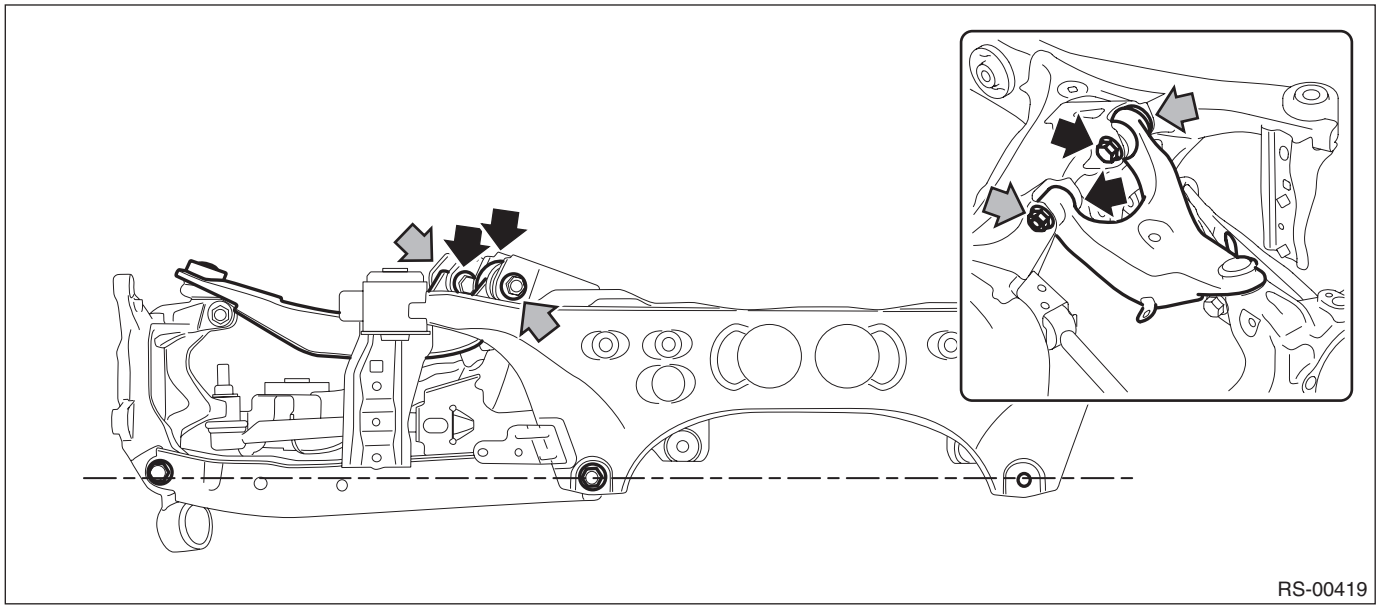
B: INSTALLATION

CAUTION:
- **Use a new self-locking nut.**
- **Always tighten the bushing when the arm is positioned in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.**

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Visually check the upper arm assembly for damage and deformation.
- Visually check the bushing for abnormal cracks, fatigue or damage.
- Visually check the dust cover on the ball joint for abnormal cracks, fatigue or damage.

2) Install the upper arm assembly to the rear sub frame assembly.
   (1) Make the installation sections of the rear lateral link assembly (the bolt on the housing assembly - rear axle side and the bolt on the rear sub frame assembly side) horizontal.

(2) Install the upper arm assembly to the rear sub frame assembly.



Tightening torque:
Upper arm assembly — rear sub frame assembly: 90 N·m (9.18 kgf-m, 66.4 ft-lb)

3) Connect the upper arm assembly and the housing assembly - rear axle.

Tightening torque:
Upper arm assembly — housing assembly - rear axle: 80 N·m (8.16 kgf-m, 59.0 ft-lb)

4) Install the rear sub frame assembly in the reverse order of removal. <Ref. to RS-16, INSTALLATION, Rear Sub Frame.>
5) Route the rear ABS wheel speed sensor cable to the upper arm assembly.
6) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

7) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

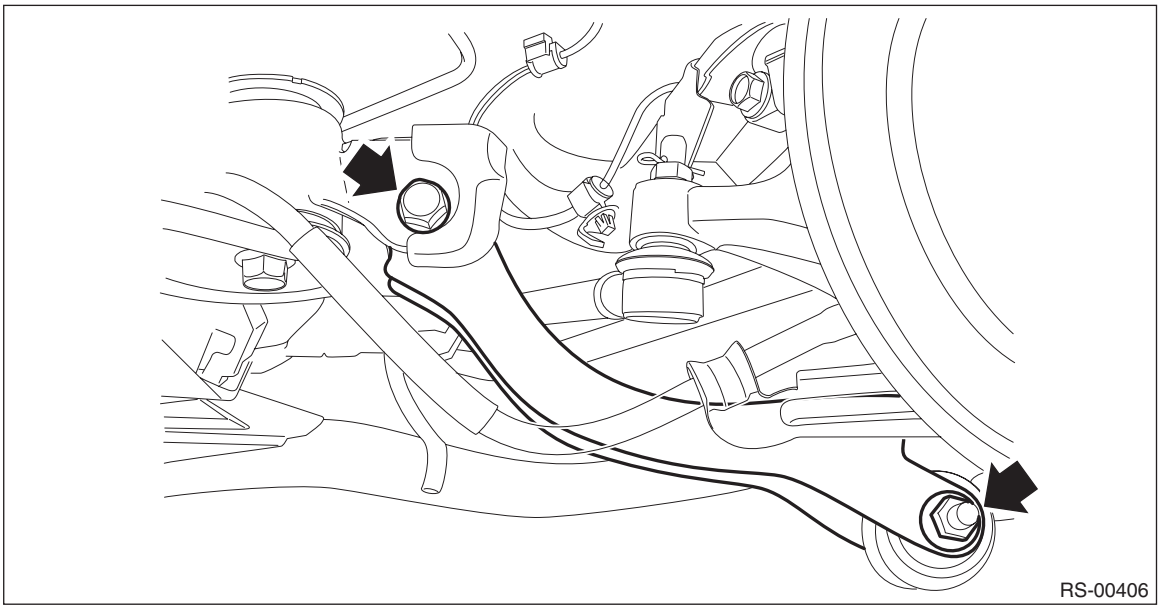
CAUTION:
When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

8) Connect the battery ground terminal.
9) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

7. Front Lateral Link

A: REMOVAL

1) Lift up the vehicle, and then remove the rear wheels.
2) Remove the bolts and nuts, and then remove the trailing link.

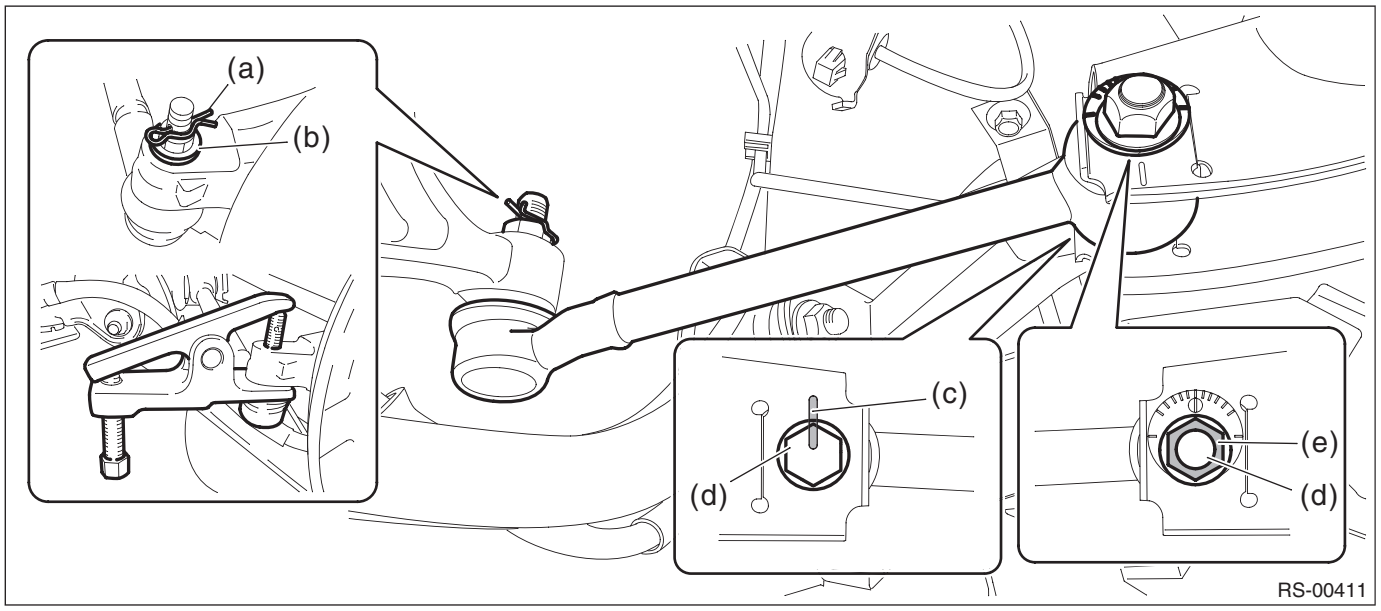


3) Remove the lateral link assembly - front.
   (1) Remove the snap pin (a) and nut (b).
   (2) Remove the ball joint from the housing assembly - rear axle.

Preparation tool:
Tie-rod ball joint puller

   (3) Scribe alignment marks (c) on the adjusting bolt for lateral link assembly - front and on the rear sub frame assembly.
   (4) Remove the adjusting bolt (d), and remove the lateral link assembly - front.

CAUTION:
When removing the adjusting bolt (d), make sure to fix the bolt head in place when loosening the nut (e).



B: INSTALLATION

CAUTION:
- **Be sure to use a new self-locking nut.**
- **Always tighten the bushing in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.**

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Visually check the lateral link assembly - front for damage and deformation.
- Visually check the bushing for abnormal cracks, fatigue or damage.
- Visually check the dust cover on the ball joint for abnormal cracks, fatigue or damage.

2) Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to RS-3, COMPONENT, General Description.>

3) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

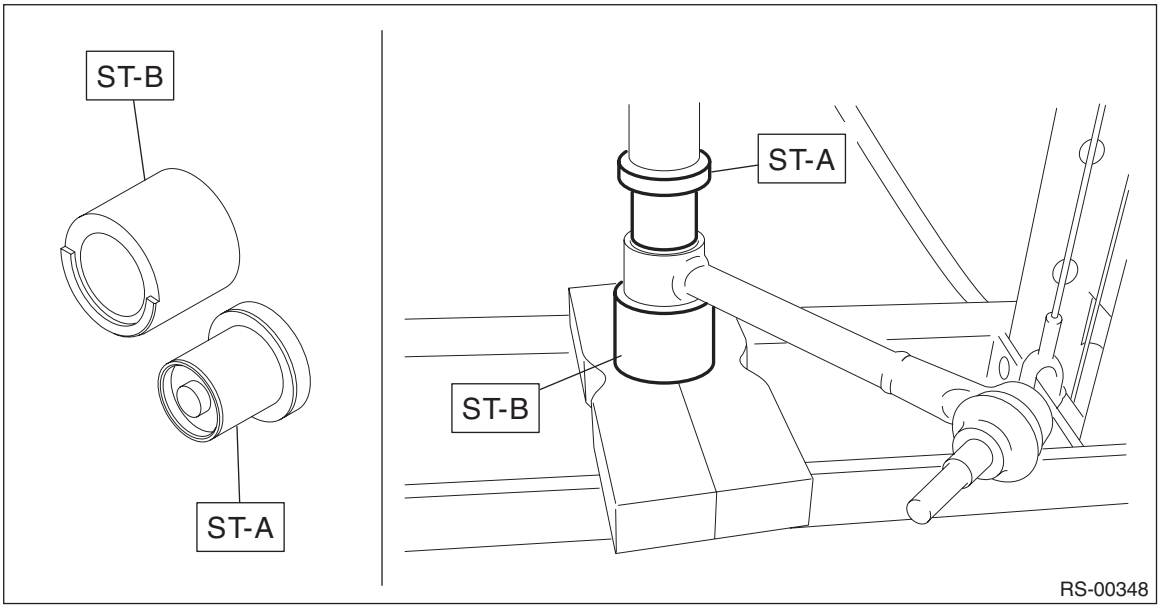
4) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

CAUTION:
When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

C: DISASSEMBLY

Using the ST, push out the bushing B - lateral link.

PREPARATION TOOL:
ST-A & ST-B: INSTALLER & REMOVER (20299AE000)



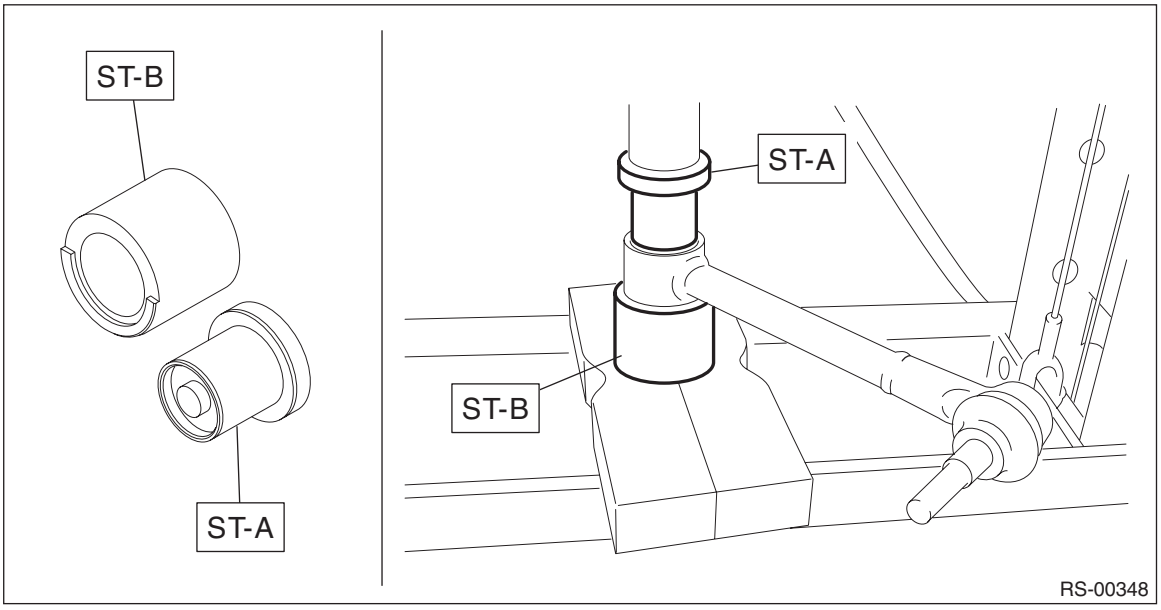
D: ASSEMBLY

1) Before assembly, inspect the following items and replace any faulty part with a new one.
- Visually check the lateral link assembly - front for damage and deformation.
- Visually check the bushing for abnormal cracks, fatigue or damage.
- Visually check the dust cover on the ball joint for damage.

2) Using the ST, press-fit the bushing B - lateral link.

CAUTION:
Make sure to press the bushing straight in.

Preparation tool:
ST-A & ST-B: INSTALLER & REMOVER (20299AE000)



8. Rear Lateral Link

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

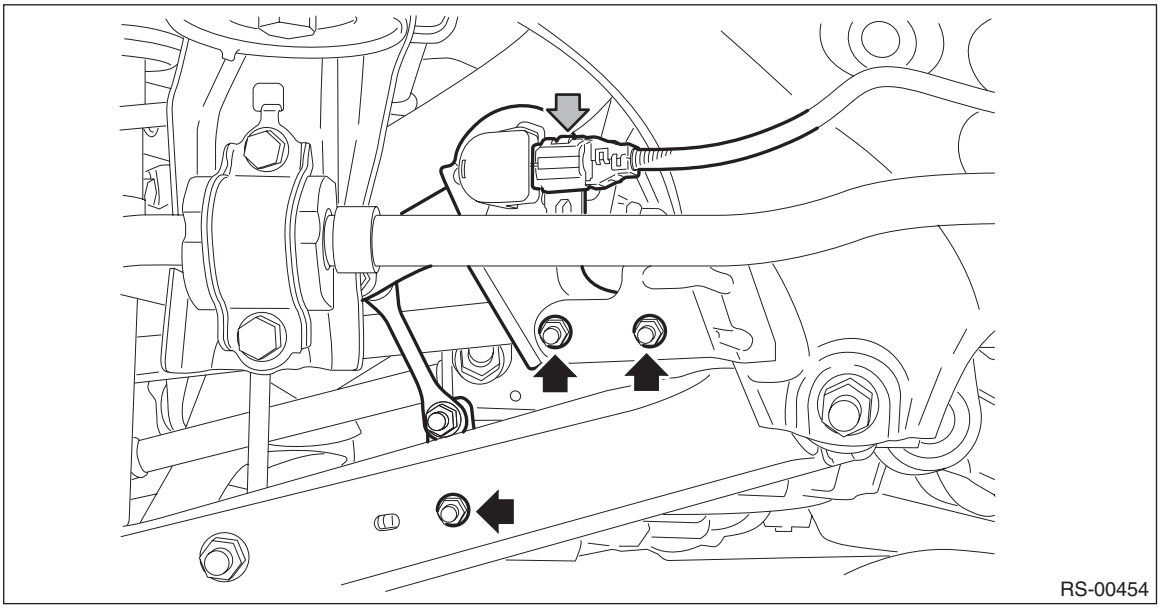
2) Lift up the vehicle, and then remove the rear wheels.

3) Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler, left side only)

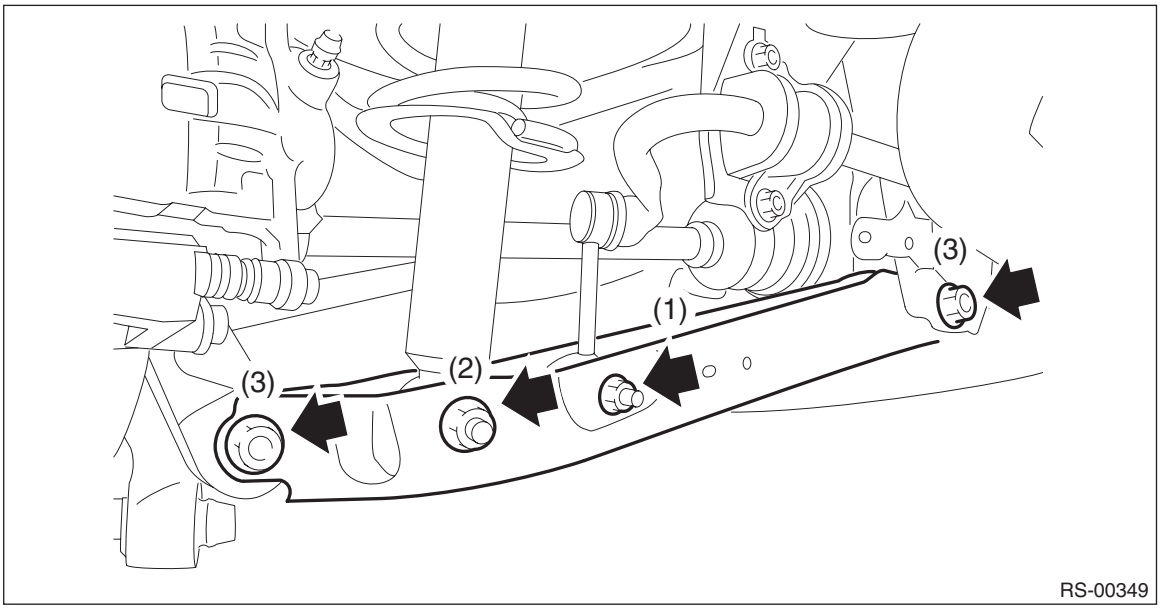
CAUTION:
Do not apply impact to the sensor assembly - headlight beam leveler or forcibly move the arm. Doing so may cause sensor damage and malfunction.

(1) Disconnect the connector of the sensor assembly - headlight beam leveler.

(2) Remove the nuts, and remove the sensor assembly - headlight beam leveler.



4) Remove the bolts and nuts, and remove the lateral link assembly - rear on the left and right sides.
   (1) Remove the nut and disconnect the rear stabilizer link assembly.
   (2) Remove the bolts from the lower side of rear shock absorber assembly.
   (3) Disconnect the lateral link assembly - rear.



B: INSTALLATION

CAUTION:
- **Be sure to use a new self-locking nut.**
- **Always tighten the bushing in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.**

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Visually check the lateral link assembly - rear for damage and deformation.
- Visually check the bushing for abnormal cracks, fatigue or damage.

2) Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to RS-3, COMPONENT, General Description.>

3) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

4) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

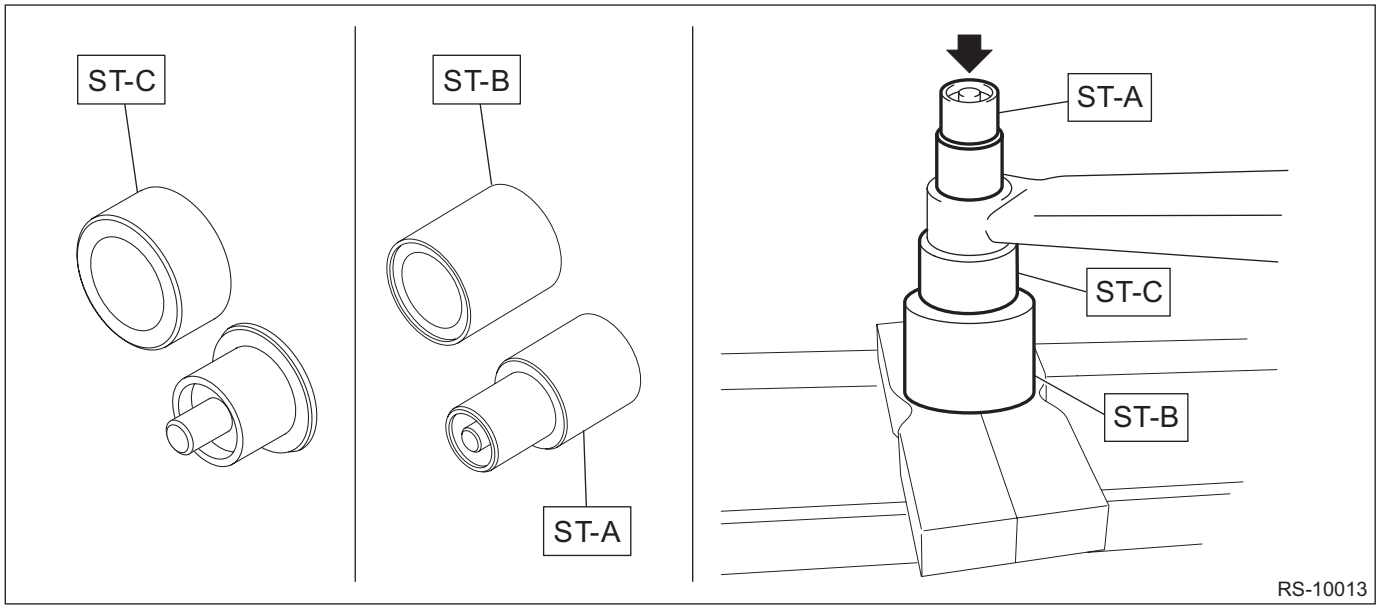
CAUTION:
When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

5) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-19, REINITIALIZATION, PROCEDURE, Auto Headlight Beam Leveler System.>

C: DISASSEMBLY

Using the ST, push out the bushing.

Preparation tool:
ST-A & ST-B: INSTALLER & REMOVER (20099AE010)
ST-C: INSTALLER & REMOVER (20099AE040)

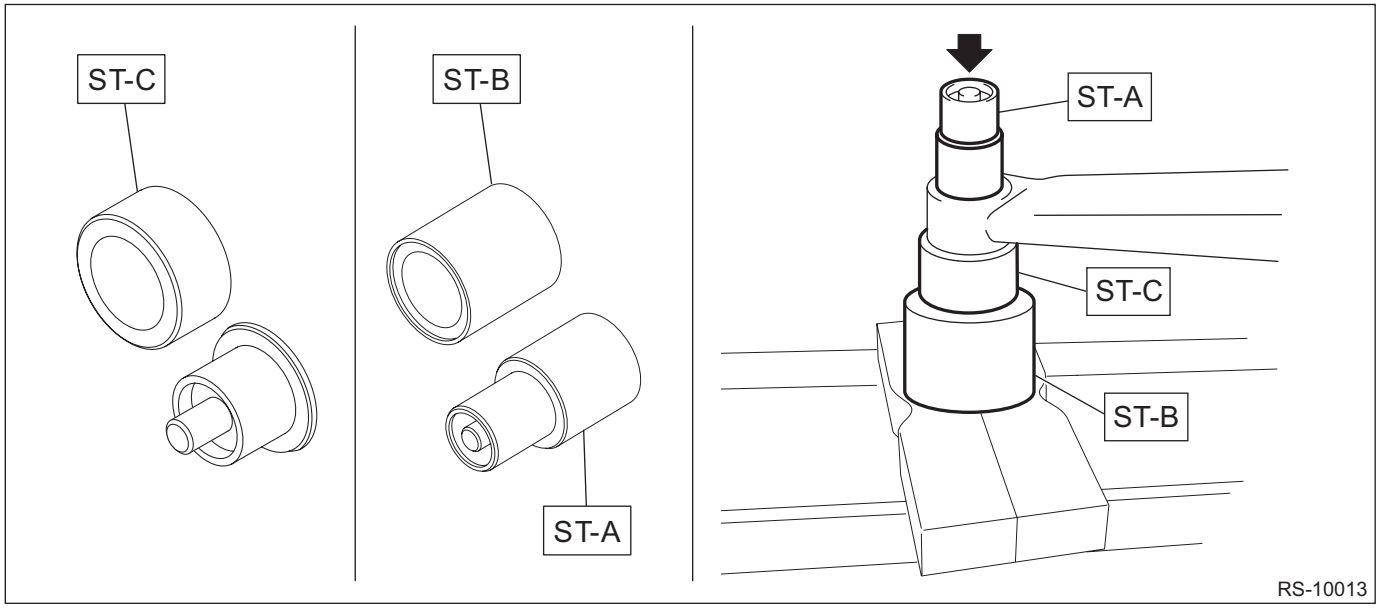


D: ASSEMBLY

1) Before assembly, inspect the following items and replace any faulty part with a new one.
- Visually check the lateral link assembly - rear for damage and deformation.
- Visually check the bushing for abnormal cracks, fatigue or damage.

2) Using the ST, press the bushing into place.

Preparation tool:
ST-A & ST-B: INSTALLER & REMOVER (20099AE010)
ST-C: INSTALLER & REMOVER (20099AE040)



9. Rear Shock Absorber

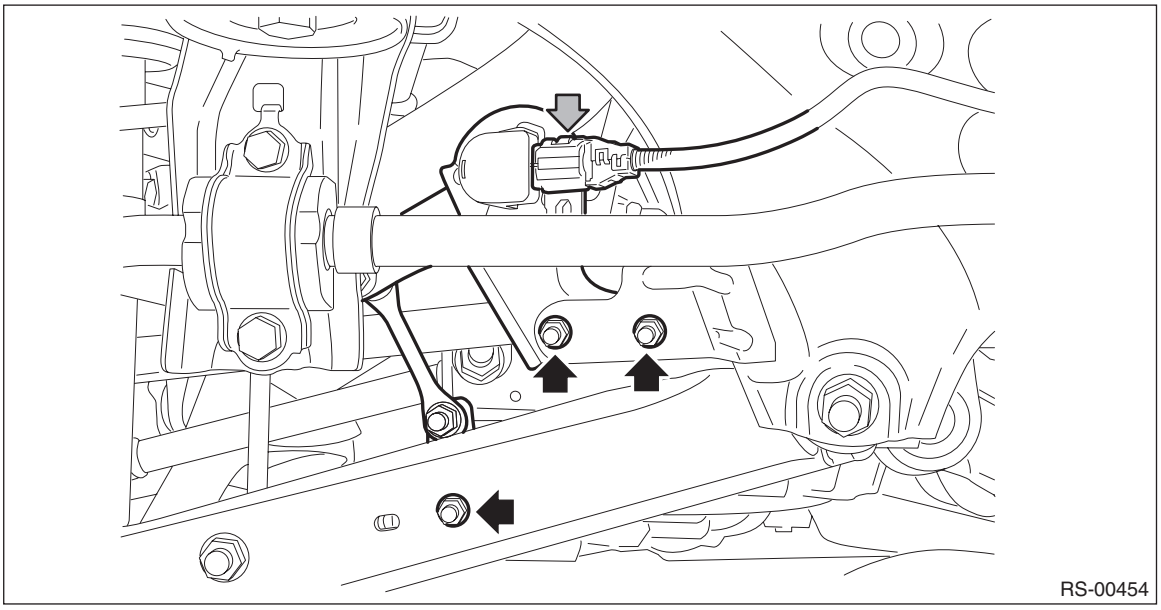
A: REMOVAL

1. 4 DOOR MODEL

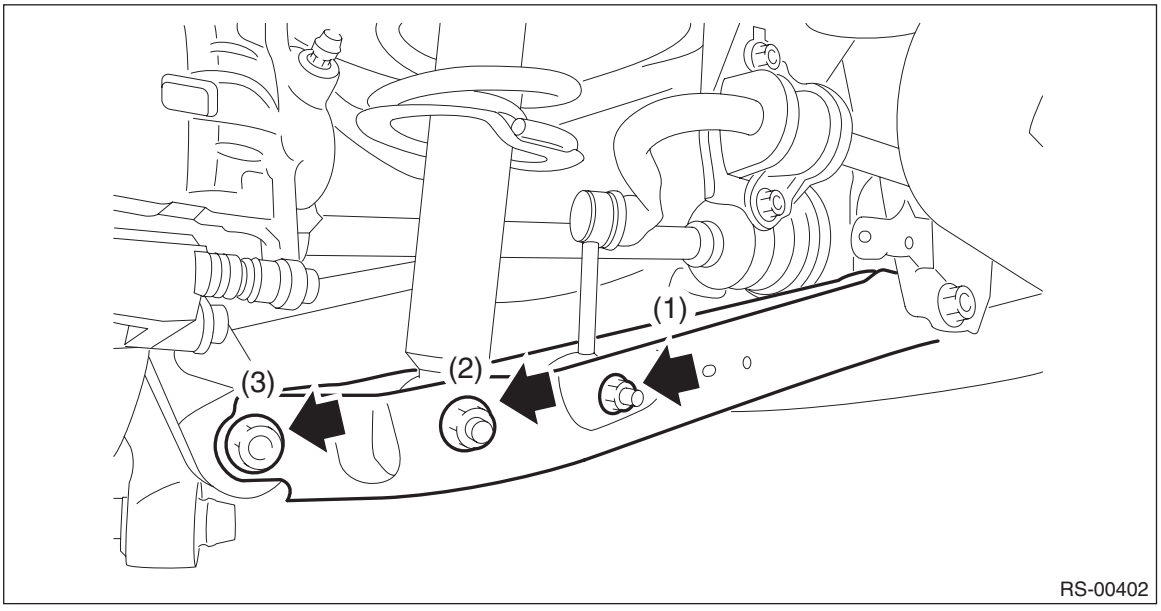
1) Disconnect the ground cable from battery.
2) Lift up the vehicle, and then remove the rear wheels.
3) Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler, left side only)

CAUTION:
Do not apply impact to the sensor assembly - headlight beam leveler or forcibly move the arm. Doing so may cause sensor damage and malfunction.

(1) Disconnect the connector of the sensor assembly - headlight beam leveler.
(2) Remove the nuts, and remove the sensor assembly - headlight beam leveler.

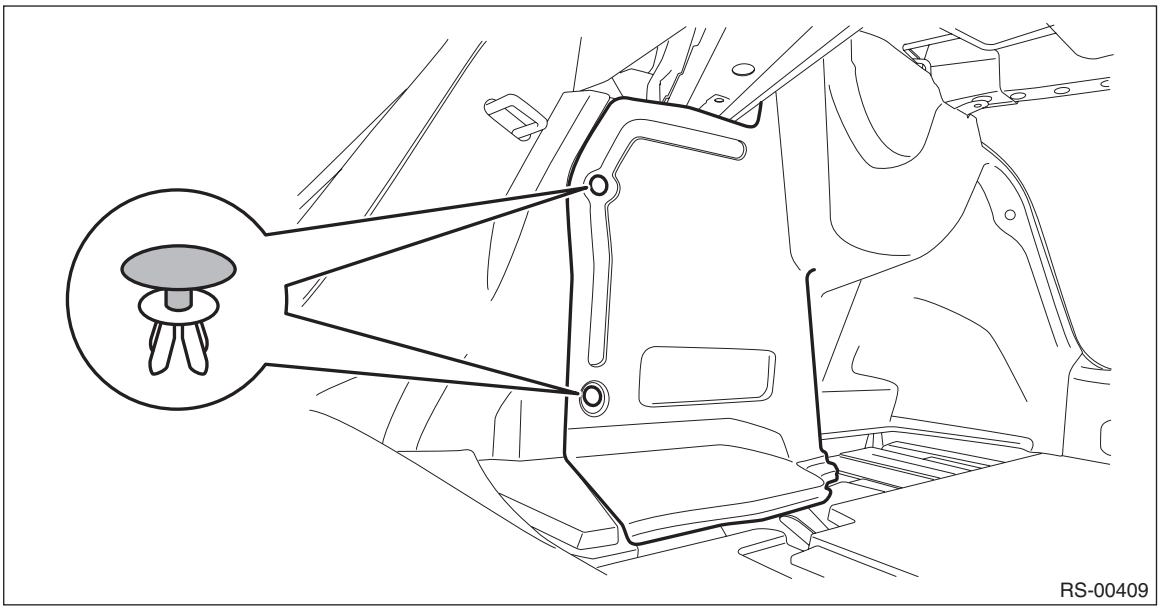

RS-00454

4) Remove the bolts and nuts, and lower the lateral link assembly - rear.
(1) Remove the nut and disconnect the rear stabilizer link assembly. (Model with rear stabilizer)
(2) Remove the bolts from the lower side of rear shock absorber assembly.
(3) Disconnect the housing assembly - rear axle from the lateral link assembly - rear.

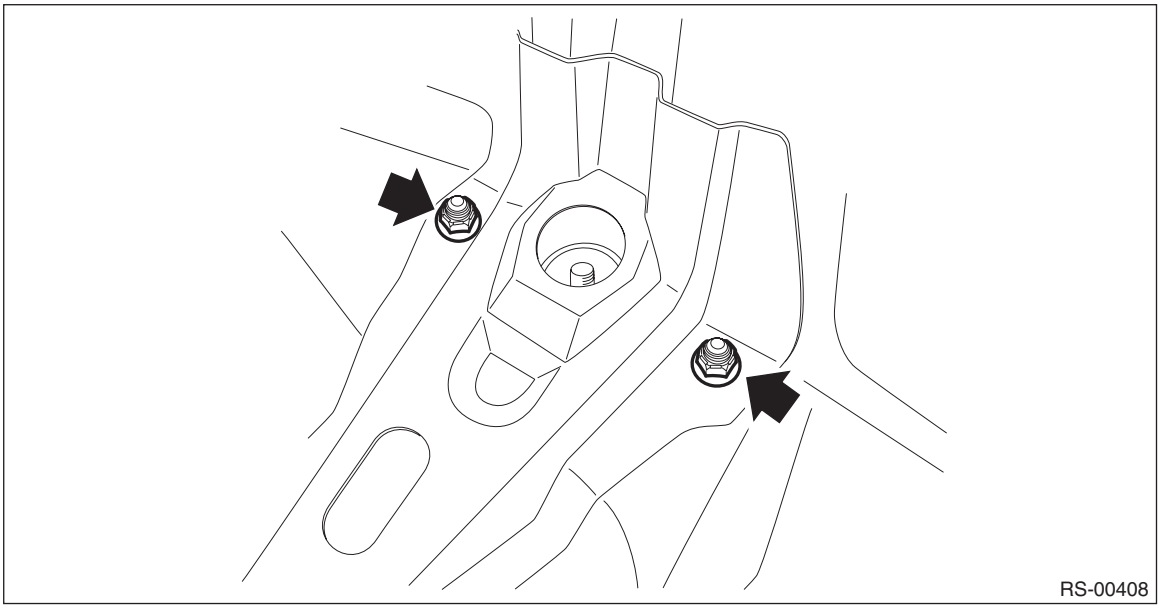


RS-00402

5) Take out the trunk mat.
6) Fold down the rear seat backrest.
7) Remove the clips, and turn over the trim panel - trunk side.



8) Remove the nuts on the upper side of rear shock absorber assembly.



9) Lower the lateral link assembly - rear, and remove the rear shock absorber assembly.

2. 5 DOOR MODEL/CROSSTREK MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

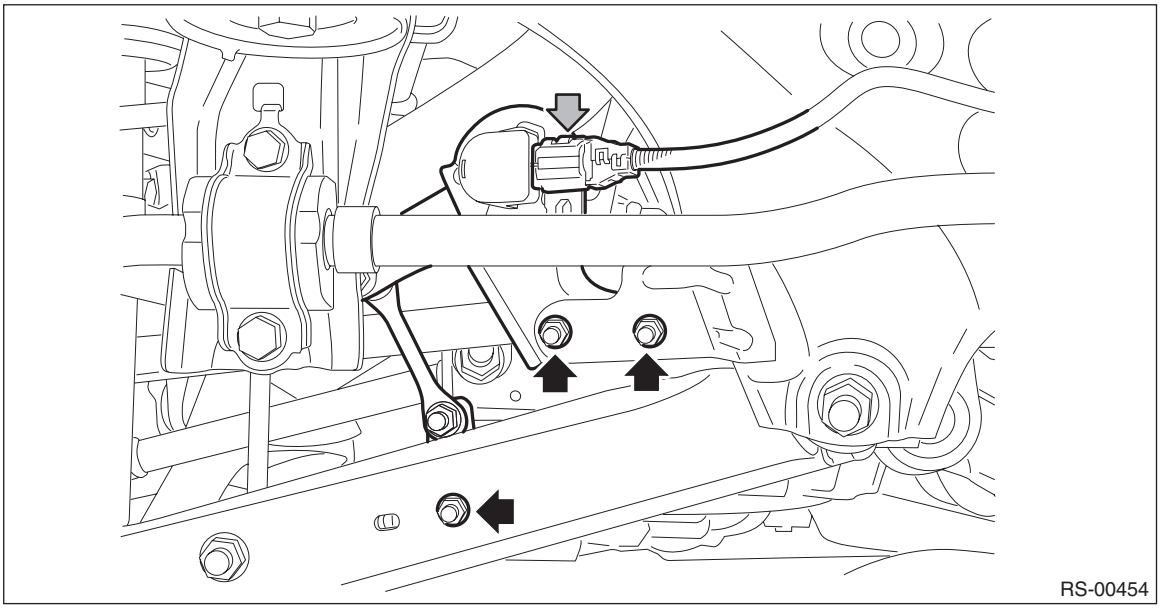
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle, and then remove the rear wheels.

3) Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler, left side only)

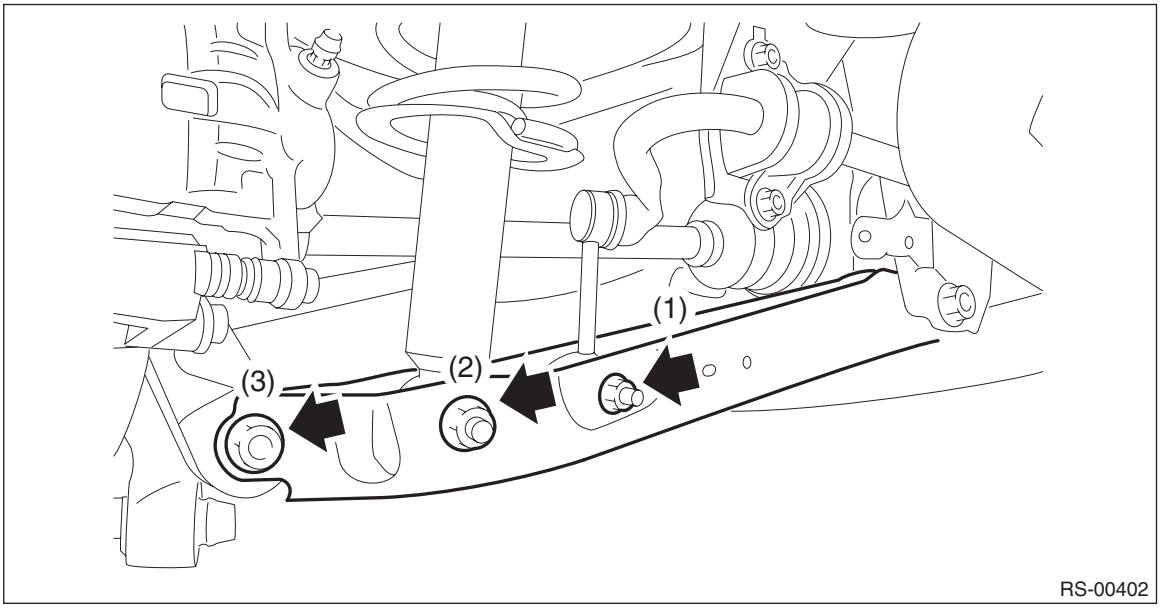
CAUTION:
Do not apply impact to the sensor assembly - headlight beam leveler or forcibly move the arm. Doing so may cause sensor damage and malfunction.

(1) Disconnect the connector of the sensor assembly - headlight beam leveler.
(2) Remove the nuts, and remove the sensor assembly - headlight beam leveler.


RS-00454

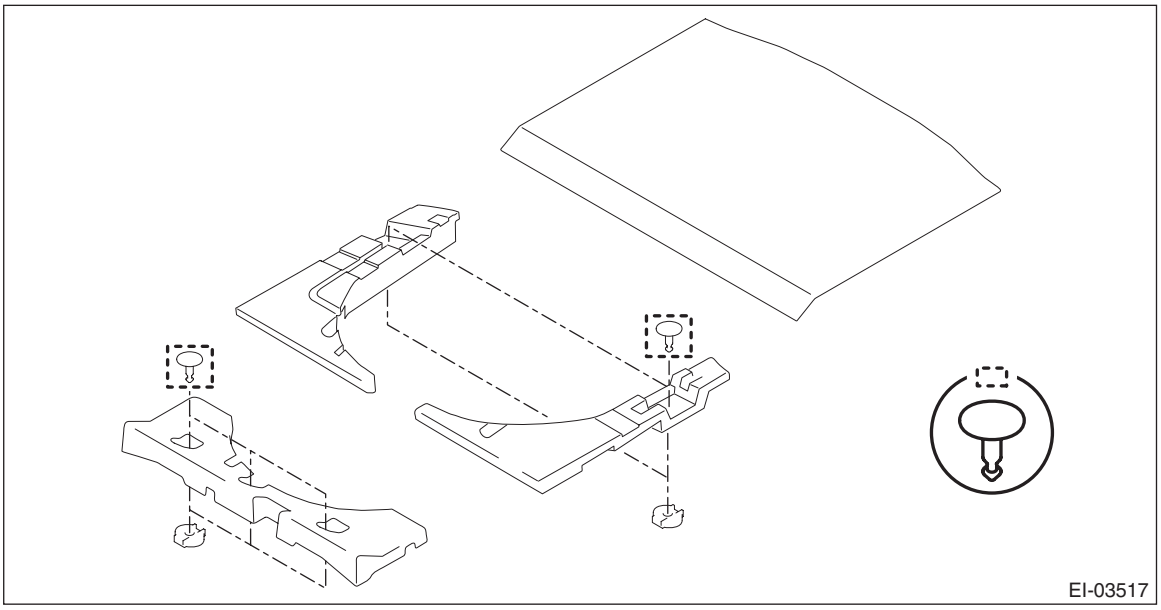
4) Remove the bolts and nuts, and lower the lateral link assembly - rear.

(1) Remove the nut and disconnect the rear stabilizer link assembly. (Model with rear stabilizer)
(2) Remove the bolts from the lower side of rear shock absorber assembly.
(3) Disconnect the housing assembly - rear axle from the lateral link assembly - rear.

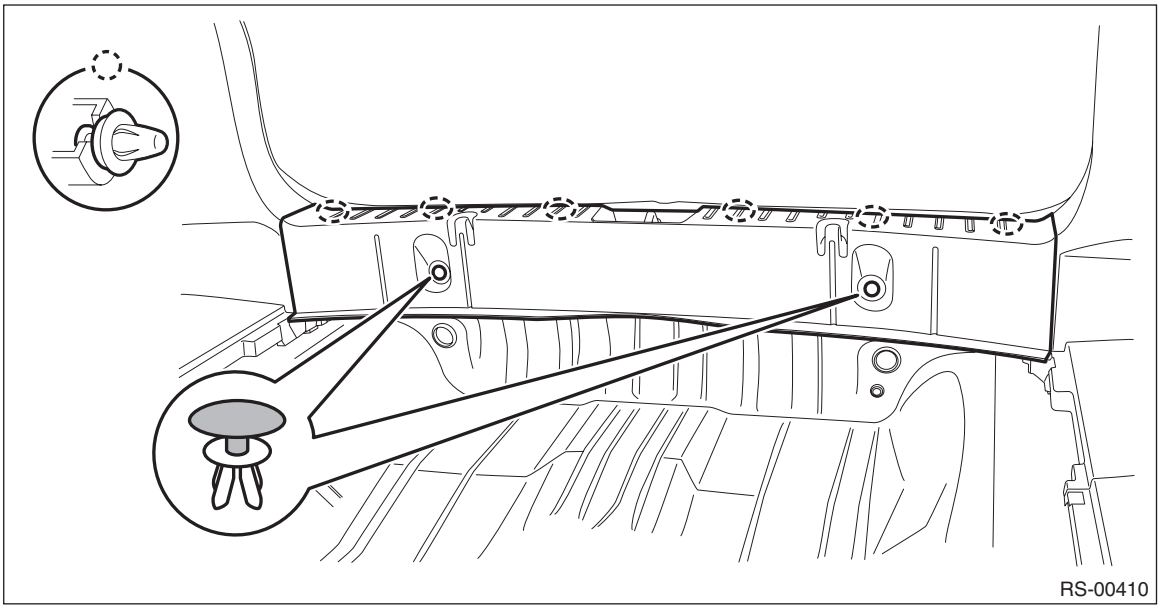


RS-00402

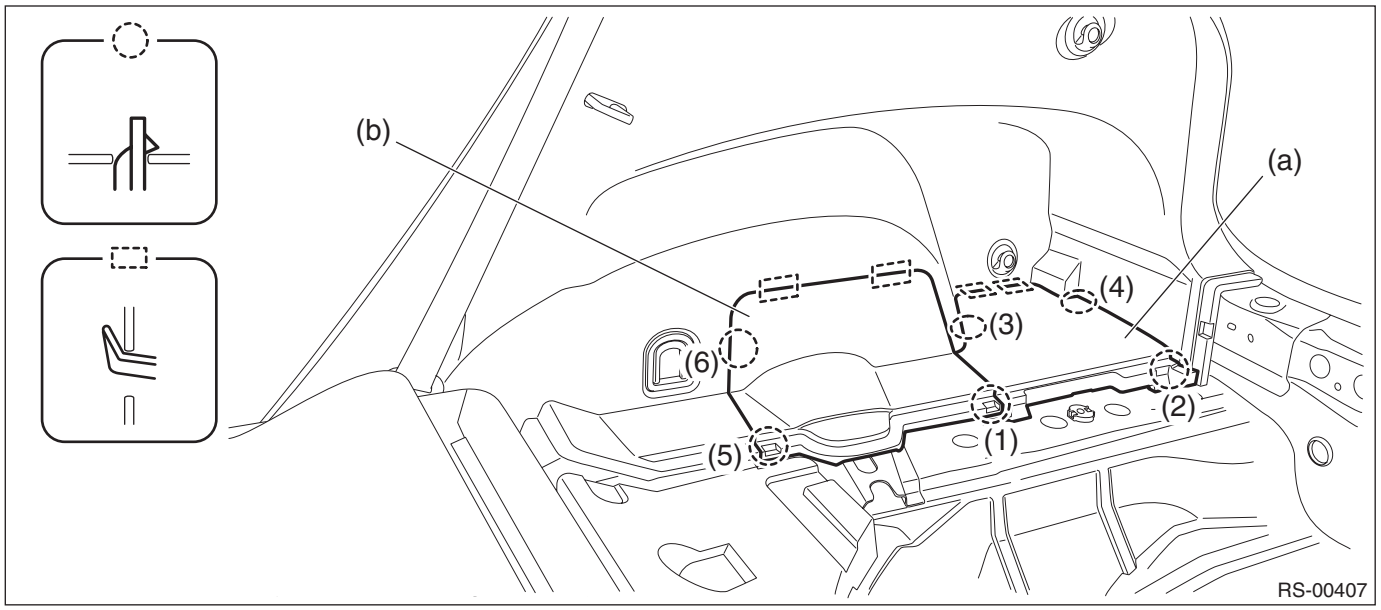
5) Remove the mat - rear floor CTR and the spacer - rear floor side. (Gasoline engine model)



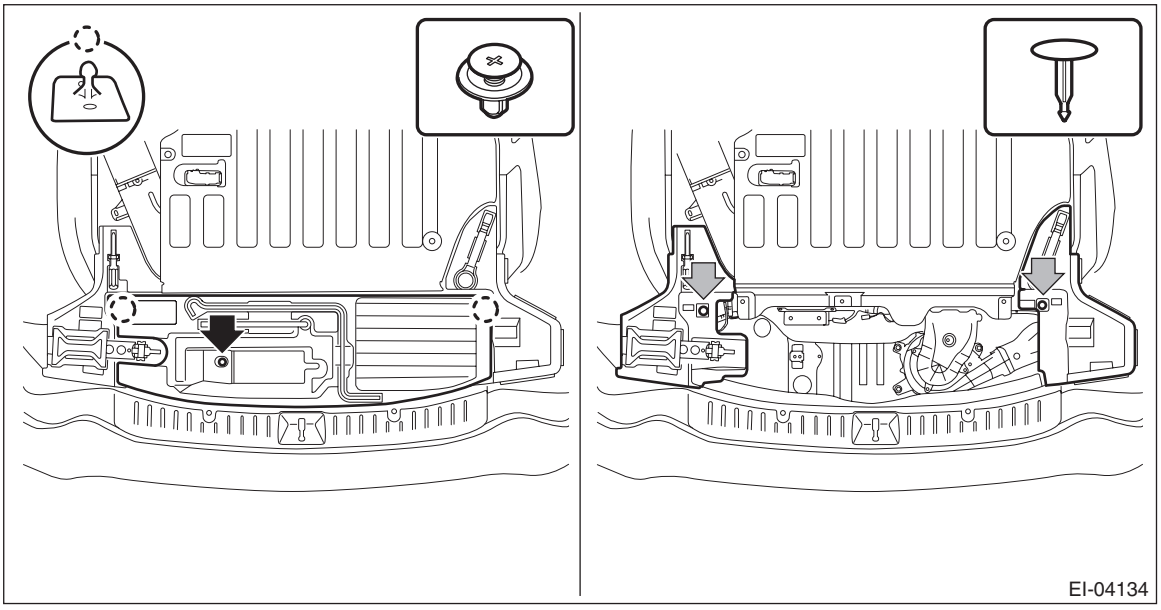
6) Remove the clips, and remove the trim panel - rear skirt. (Gasoline engine model)



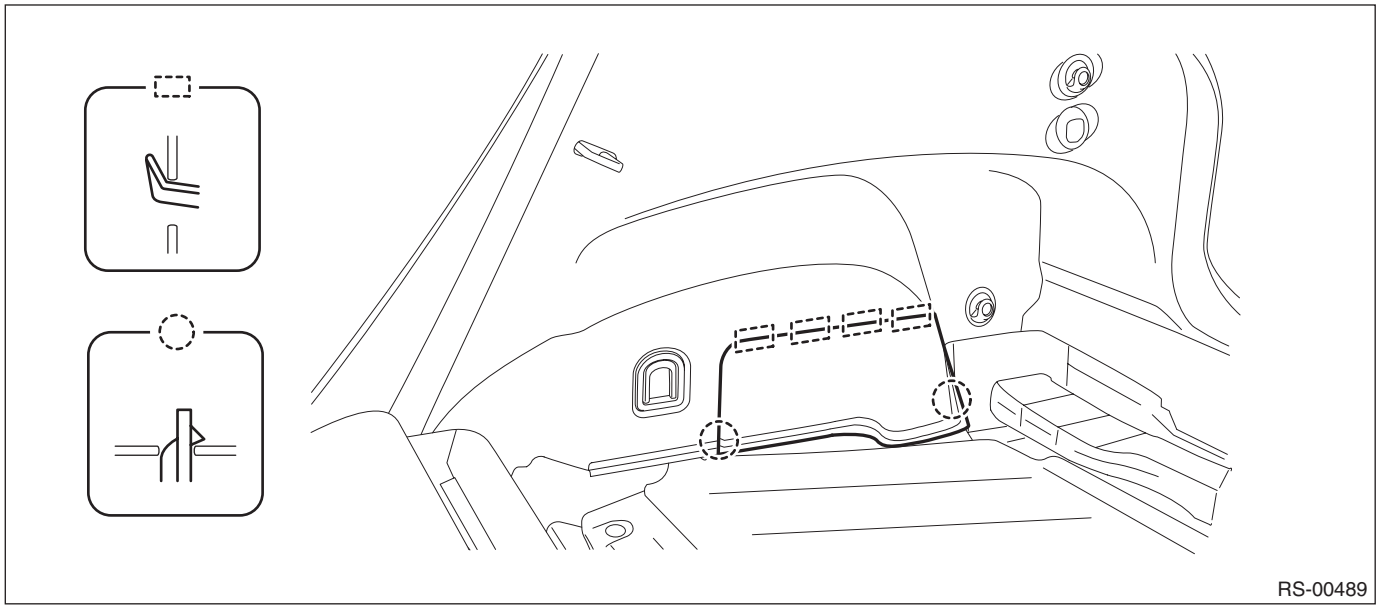
7) Remove the lid upper rear (a) and the cap - rear strut (b) in the order from (1) to (6). (Gasoline engine model)



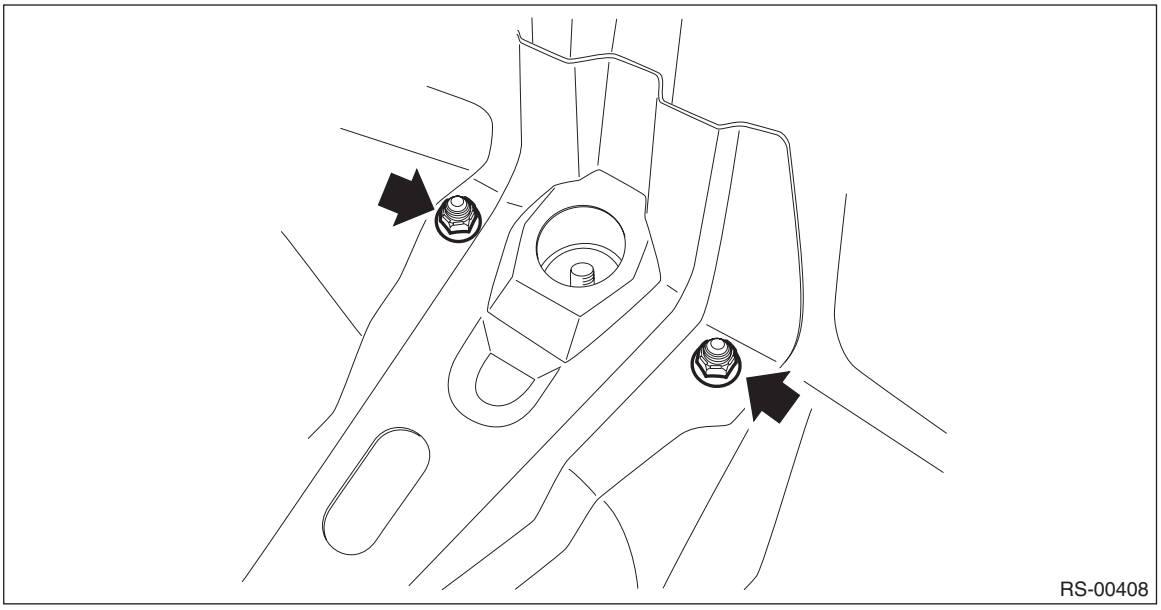
8) Remove the sub-trunk box and side spacers. (HEV model)
   (1) Release the clips and side spacers, then detach the sub-trunk box.
   (2) Remove the clips and detach the side spacers.



9) Remove the cap - rear strut. (HEV model)



10) Remove the nuts on the upper side of rear shock absorber assembly.



11) Lower the lateral link assembly - rear, and remove the rear shock absorber assembly.

B: INSTALLATION

CAUTION:
- **Use a new flange nut.**
- **Always tighten the bushing in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.**

1) Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description" for the tightening torque. <Ref. to RS-3, COMPONENT, General Description.>

2) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

3) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

CAUTION:
When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDC-CM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH Eye-Sight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
4) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-19, REINITIALIZATION, PROCEDURE, Auto Headlight Beam Leveler System.>

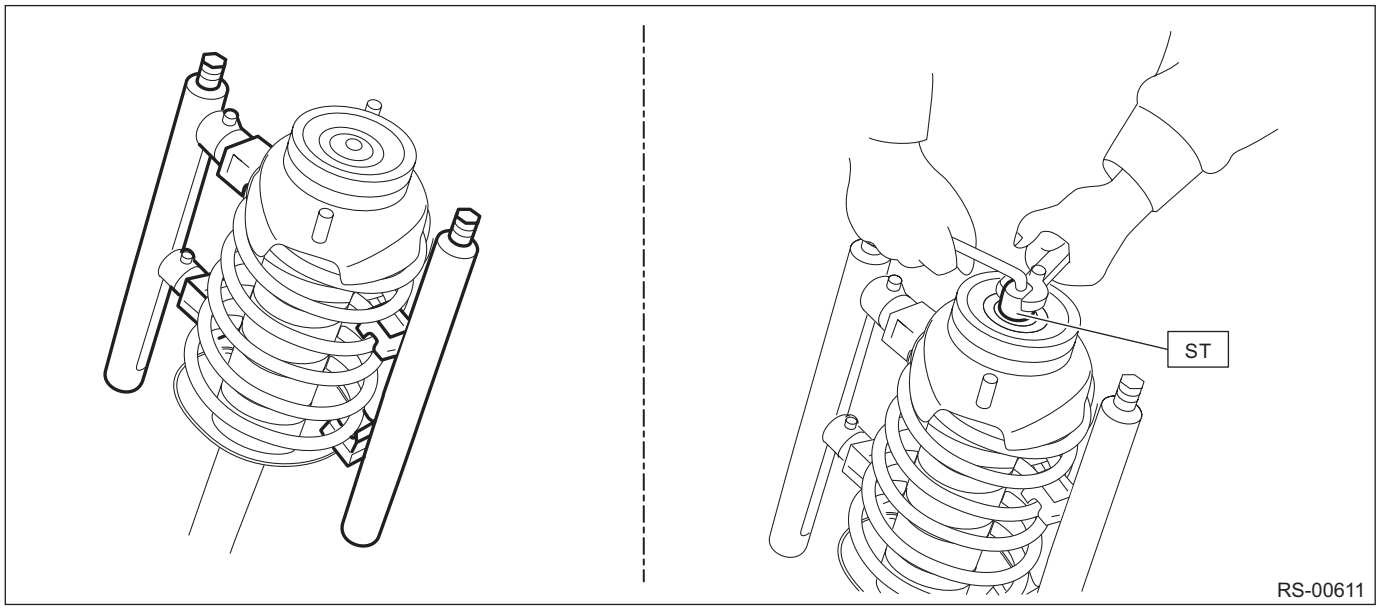
C: DISASSEMBLY

1) Using a coil spring compressor, compress the coil spring.
2) Using a hexagon wrench to prevent the shock absorber piston rod from turning, remove the self-locking nut with ST.

CAUTION:
When installing the coil spring compressor to the coil spring, follow the operation manual accompanied with the coil spring compressor during operation.

Preparation tool:
ST: STRUT MOUNT SOCKET (20399FG000)

NOTE:
<Example of coil spring compressor installation>
The installing position of coil spring compressor varies depending on the coil spring shape and winding number.

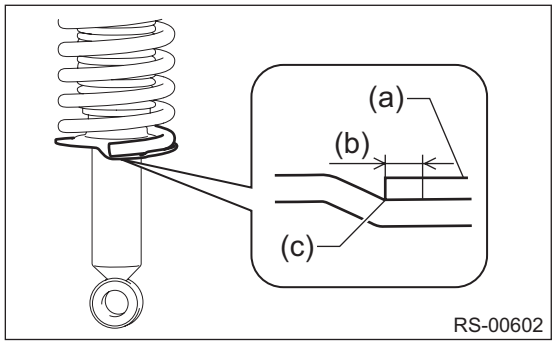


3) Remove the rubber seat - shock UPR and shock mount - rear from the shock absorber COMPL - rear.
4) Gradually decrease the compression pressure of compressor, and remove the coil spring - rear.
5) Remove the helper - rear and the dust cover - rear shock.

D: ASSEMBLY

1) Before assembly, check each part. <Ref. to RS-40, INSPECTION, Rear Shock Absorber.>
2) Using a coil spring compressor, compress the coil spring - rear.

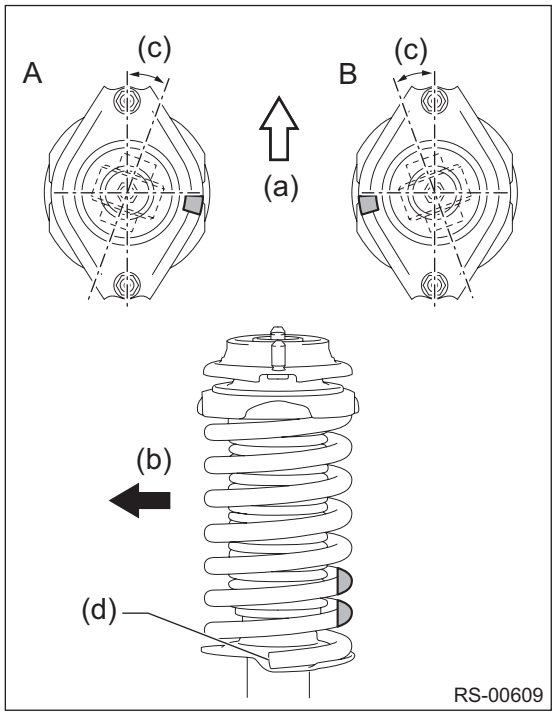
CAUTION:
When installing the coil spring compressor to the coil spring, follow the operation manual accompanied with the coil spring compressor during operation.
3) Install by aligning with the edge surface of the coil spring - rear and the stopper portion of the lower side spring seat.



(a) Coil spring - rear
(b) 0+ 10 mm (0 + 0.4 in)
(c) Spring seat stopper portion

4) Install the helper - rear and the dust cover - rear shock to the piston rod.
5) Fully pull up the piston rod in the upward direction.
6) Temporarily tighten the rubber seat - shock UPR and the shock mount - rear with new self-locking nuts.

NOTE:
Position the shock mount - rear as shown in the figure.



A LH side
B RH side

(a) Front side of vehicle
(b) Vehicle outside
(c) 0°±10°
(d) End portion of coil spring - rear

7) Using a hexagon wrench to prevent the shock absorber piston rod from turning, tighten the new self-locking nut with ST.

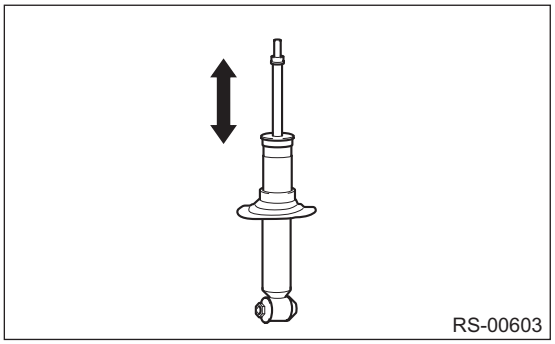
CAUTION:
Make sure that the shock mount - rear turns smoothly after tightening.

Preparation tool:
ST: STRUT MOUNT SOCKET (20399FG000)

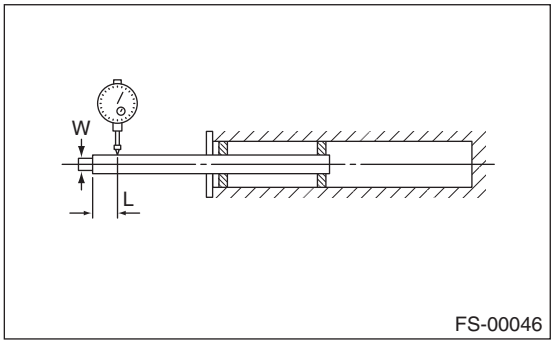
Tightening torque:
25 N·m (2.55 kgf-m, 18.4 ft-lb)
8) Loosen the coil spring compressor carefully.

E: INSPECTION

1) Check for oil leaks.
2) Move the piston rod up and down to check that it operates smoothly without any hitch.



3) Check the piston rod for play as follows:
1. Fix the outer shell in place and fully extend the rod.
2. Set the dial gauge on the end of the rod L [10 mm (0.39 in)].
3. While applying a force of W [20 N (2 kgf, 4 lbf)] to the threaded part, read the dial gauge indication P_1.
4. Apply a force of 20 N (2 kgf, 4 lbf) from the opposite direction of "W", and then read the dial gauge indication P_2.

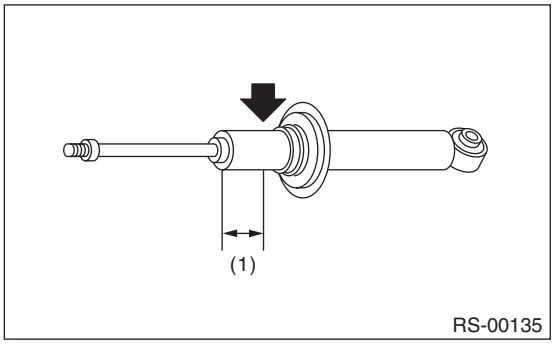


Play limit (P_1 + P_2): 0.8 mm (0.031 in)

F: DISPOSAL

CAUTION:
- **Before handling the shock absorber, be sure to wear goggles to protect eyes from gas, oil and cutting powder.**
- **Do not disassemble the shock absorber or place it into a fire.**
- **Drill a hole into shock absorbers in case of discarding shock absorbers filled with gas.**

1) Place the shock absorber on a level surface with the piston rod fully expanded.
2) Make a hole into the specified position 30 mm (1.18 in) deep using a drill with 2 — 3 mm (0.08 — 0.12 in) diameter.



(1) 40 mm (1.57 in)

10.General Diagnostic Table

A: INSPECTION

1. IMPROPER VEHICLE POSTURE OR IMPROPER WHEEL ARCH HEIGHT

Possible cause	Corrective action
(1) Permanent distortion or damaged coil spring	Replace.
(2) Rough operation of shock absorber	Replace.
(3) Installation of the wrong shock absorber	Replace with proper parts.
(4) Installation of the wrong coil spring	Replace with proper parts.

2. POOR RIDE COMFORT

1) Large rebound shock
2) Rocking of the vehicle continues too long after running over bump and hump.
3) Excessive shock in bumping

Possible cause	Corrective action
(1) Damaged coil spring	Replace.
(2) Overinflation of tires	Adjust.
(3) Improper wheel arch height	Replace the coil springs with new parts.
(4) Defective operation of shock absorber	Replace.
(5) Damage or deformation of shock absorber mount	Replace.
(6) Unsuitable length (maximum or minimum) of shock absorber	Replace with appropriate parts.
(7) Deformation or loss of bushing	Replace.
(8) Deformation or damage of helper in shock absorber	Replace.
(9) Oil leakage from the shock absorber	Replace.

3. NOISE

Possible cause	Corrective action
(1) Wear or damage of shock absorber component parts	Replace.
(2) Loosening of the suspension link or arm installing bolt	Tighten to the specified torque.
(3) Deformation or loss of bushing	Replace.
(4) Unsuitable length (maximum or minimum) of shock absorber	Replace with appropriate parts.
(5) Damaged coil spring	Replace.
(6) Wear or damage of the ball joint	Replace.
(7) Deformation of the clamp - stabilizer bushing	Replace.

WHEEL AND TIRE SYSTEM

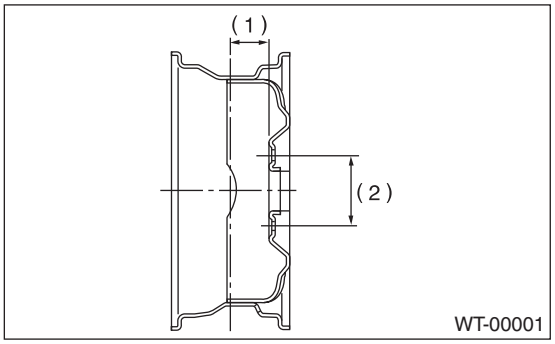
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Page

1. General Description 2
2. Tire and Wheel 5
3. Temporary Tire 8
4. Full Wheel Cap 9
5. Tire Pressure Monitoring System 10
6. Tire Repair Kit 15
7. General Diagnostic Table 17

1. General Description

A: SPECIFICATION



(1) Inset
(2) P.C.D.

- Impreza model

Tire size	Wheel size	Inset mm (in)	P.C.D. mm (in)	Tire inflation pressure kPa (kgf/cm^2, psi)	
				Front wheel	Rear wheel
P195/65R15 89H	15 × 6J	48 (1.89)	100 (3.94)	240 (2.4, 35)	230 (2.3, 33)
P205/55R16 89V	16 × 6$^1/_2$J				
P205/50R17 88V	17 × 7J			220 (2.2, 32)	210 (2.1, 30)
	17 × 7JJ				
T135/80D16 101M	16 × 4T	20 (0.79)		–	420 (4.2, 60)

- Crosstrek model

Tire size	Wheel size	Inset mm (in)	P.C.D. mm (in)	Tire inflation pressure kPa (kgf/cm^2, psi)		
				Front wheel		Rear wheel
P225/55R17 95H	17 × 7J	48 (1.89)	100 (3.94)	MT	220 (2.2, 32)	210 (2.1, 30)
225/55R17 97V				CVT	230 (2.3, 33)	220 (2.2, 32)
T145/90D16 106M	16 × 4T	20 (0.79)		–		420 (4.2, 60)
185/65R17 90M	17 × 6JJ	55 (2.17)	100 (3.94)	–		290 (3.0, 42)

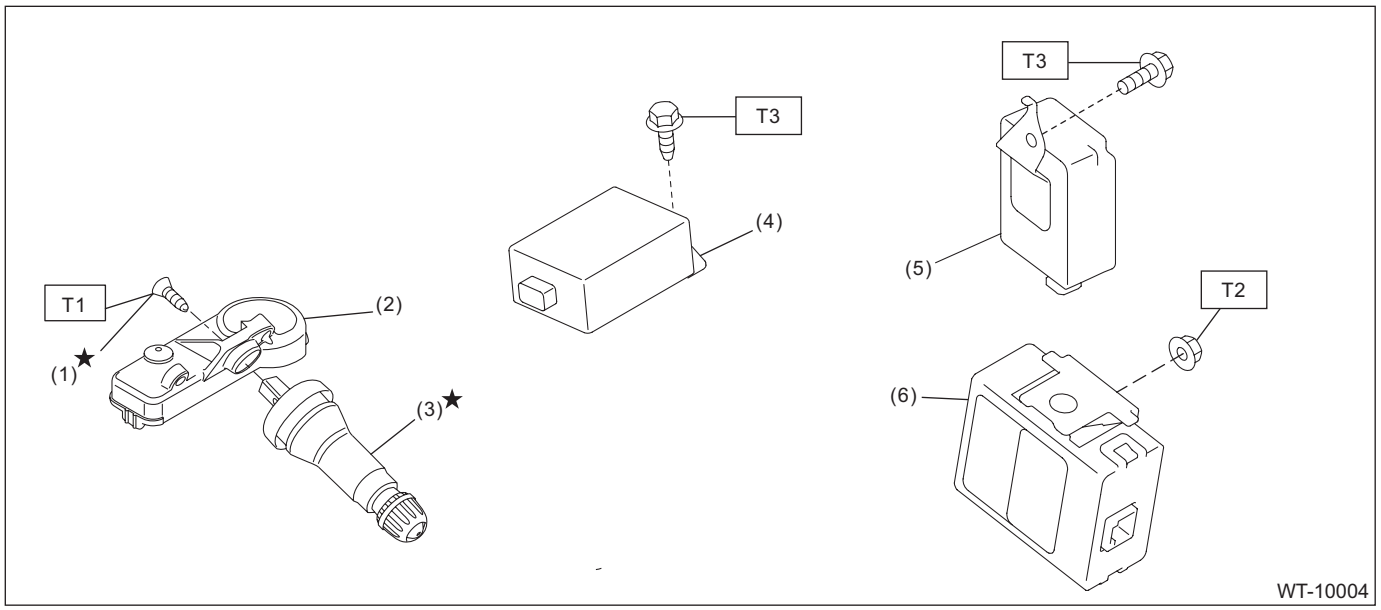
NOTE:
Size and inflation pressure of the standard equipment tire and temporary tire are described on the “Tire inflation pressure” label attached to the body side of the driver’s door.

1. SERVICE DATA

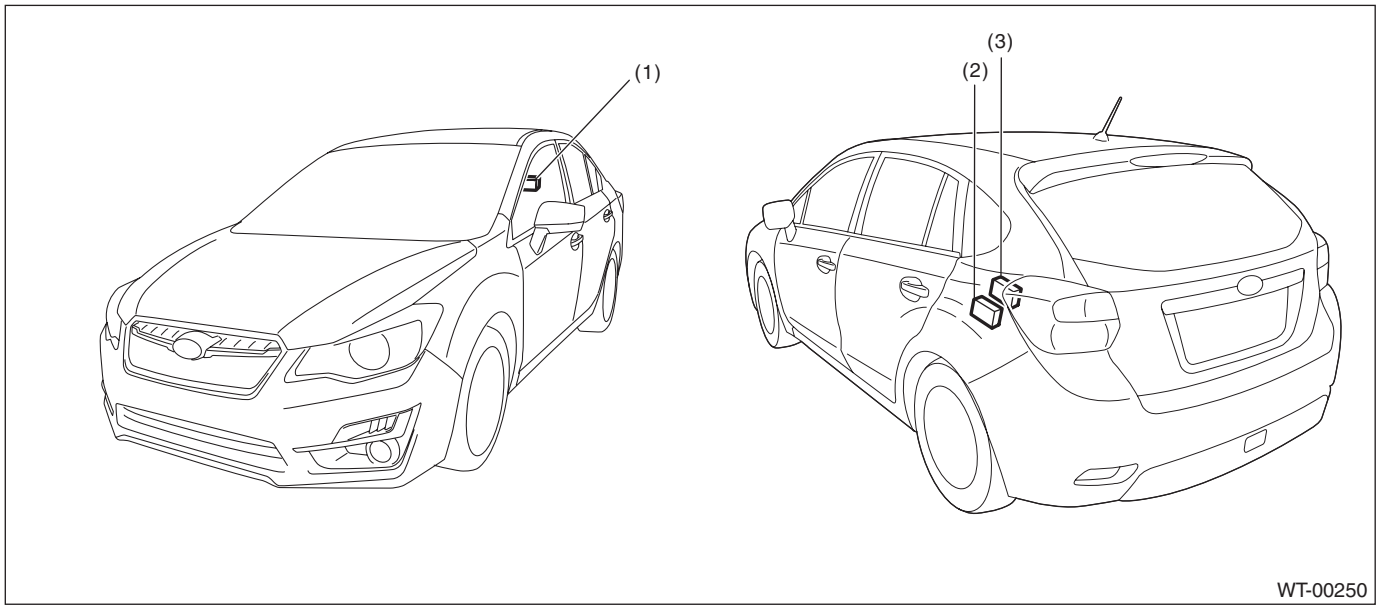
Part	Axial runout	Radial runout
Steel wheel	1.5 mm (0.059 in)	
Aluminum wheel	1.0 mm (0.039 in)	

Wheel balancing	Standard	Service limit
Dynamic unbalance	5 g (0.18 oz) or less	

B: COMPONENT



(1)	Screw	(4)	TPMS & keyless entry control module (4 door model)	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Transmitter (snap in type)	(5)	TPMS & keyless entry control module (5 door model)	***T1: 1.4 (0.14, 1.0)***
(3)	Valve	(6)	TPMS CM	***T2: 7.5 (0.76, 5.5)***
				T3: 13 (1.33, 9.6)



(1)	TPMS & keyless entry control module (4 door model)	(2)	TPMS CM	(3)	TPMS & keyless entry control module (5 door model)

C: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Air pressure gauge	Used for measuring tire air pressure.
Dial gauge	Used for measuring wheel runout.
Wheel balancer	Used for adjusting wheel balance.
Circuit tester	Used for measuring resistance, voltage and current.

2. Tire and Wheel

A: REMOVAL

1) Remove the hubcap. (model with hubcap) <Ref. to WT-9, REMOVAL, Full Wheel Cap.>
2) Lift up the vehicle.
3) Remove the wheel nut.
4) Remove the wheels.

CAUTION:
When removing the wheels, be careful not to damage the bolt - hub.

B: INSTALLATION

1) Install the wheels to vehicle.
2) Tighten the wheel nuts to the specified torque.

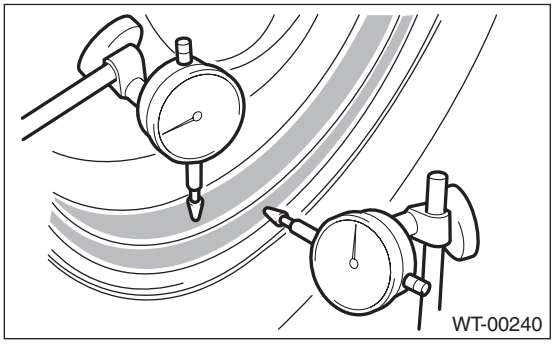
Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.2 kgf-m, 73.8 ft-lb)

C: INSPECTION

1. TIRE

CAUTION:
When replacing a tire, make sure to use tires of the same size, construction and load range as originally installed.

1) Tire size and tire inflation pressure check <Ref. to WT-2, SPECIFICATION, General Description.>
2) Cracks, damage and wear check
3) Tire runout check
   (1) Lift up the vehicle.
   (2) Slowly rotate the wheel to check rim “runout” using a dial gauge.



- Aluminum wheel

Axial runout limit	Radial runout limit
1.0 mm (0.039 in)	

- Steel wheel

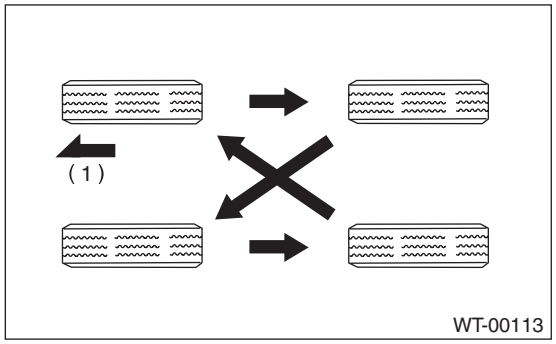
Axial runout limit	Radial runout limit
1.5 mm (0.059 in)	

   (3) If the rim runout exceeds service limit, replace the wheel.

2. TIRE ROTATION

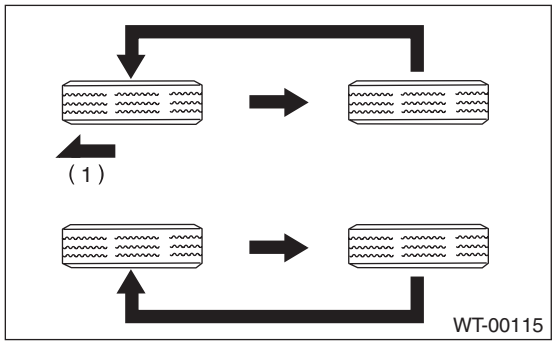
NOTE:
Rotate tires periodically (9,600 km/6,000 miles) in order to prolong life and to prevent uneven wear.
Rotate tires as shown in the figure depending on whether or not the direction of the tire rotation is specified.

- When the direction of tire rotation is not specified



(1) Front side of vehicle

- When the direction of tire rotation is specified

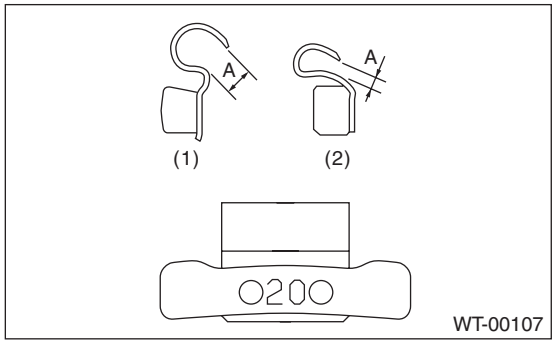


(1) Front side of vehicle

3. WHEEL BALANCING

1) Using the wheel balancer, measure wheel balance.
2) Adjust the wheel balancing.

NOTE:
- Unbalance after adjusting the wheel balancing should be 5 g (0.18 oz) or less.
- When using the adhesive type weight, degrease the surface where the adhesive type weight will be applied securely.
- After applying the adhesive type weight, apply a force to the weight and attain full adhesion.
- Using the knock-on type weight, check the size of the knock-on part.



(1) Knock-on type weight for aluminum wheel
(2) Knock-on type weight for steel wheel

Service limit A:
Knock-on type weight for steel wheel: 2.0 mm (0.079 in)
Knock-on type weight for aluminum wheel: 5.0 mm (0.197 in)

3. Temporary Tire

A: NOTE

"T-type" or "Temporary" tire for temporary use is equipped as a temporary tire.

CAUTION:
• The "T-type" or "Temporary" tire is only for temporary use. Replace with a conventional tire as soon as possible.
• Do not use tire chains for "T-type" or "Temporary" tires. Because tire size is small, tire chains can not be installed and will damage the vehicle and tires.
• Do not drive at a speed greater than 80 km/h (50 MPH).
• Drive the vehicle as slowly as possible and avoid bumps on the road.

B: REPLACEMENT

Refer to "Tire and Wheel" for removal and installation of the "T-type" or "Temporary" tire. <Ref. to WT-5, Tire and Wheel.>

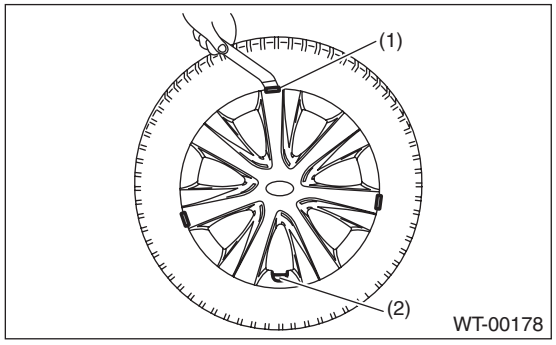
C: INSPECTION

Refer to "Tire and Wheel" for inspection of the "T-type" or "Temporary" tire. <Ref. to WT-5, TIRE, INSPECTION, Tire and Wheel.>

4. Full Wheel Cap

A: REMOVAL

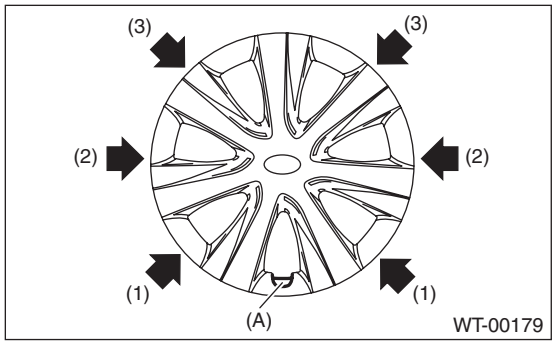
Insert a remover into the notch located diagonally to the valve, and remove the cap by prying the remover to the tire side.



(1) Cutout portion
(2) Valve hole

B: INSTALLATION

1) Align the valve with the valve hole in the hubcap.
2) Install the hubcap by tapping it in the order from (1) to (3) described in the figure.



(A) Valve hole

C: INSPECTION

Check for damage on the hubcap.

5. Tire Pressure Monitoring System

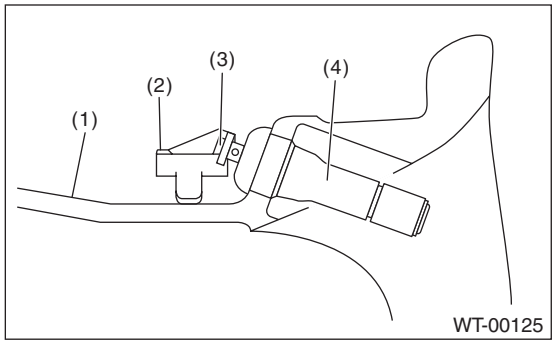
A: REMOVAL

1. TRANSMITTER (TIRE INFLATION PRESSURE SENSOR)

1) Remove the wheels from the vehicle. <Ref. to WT-5, REMOVAL, Tire and Wheel.>
2) Remove the tires from wheels.

CAUTION:
Use a tire changer when removing the tire from the wheel.
3) Loosen the screw to remove the transmitter from the valve stem.

CAUTION:
Do not reuse the valve and screw.
Replace the valve and screw with a new part even when reusing transmitter.



(1) Wheel
(2) Transmitter
(3) Screw
(4) Valve

4) Remove the valve from the wheel.

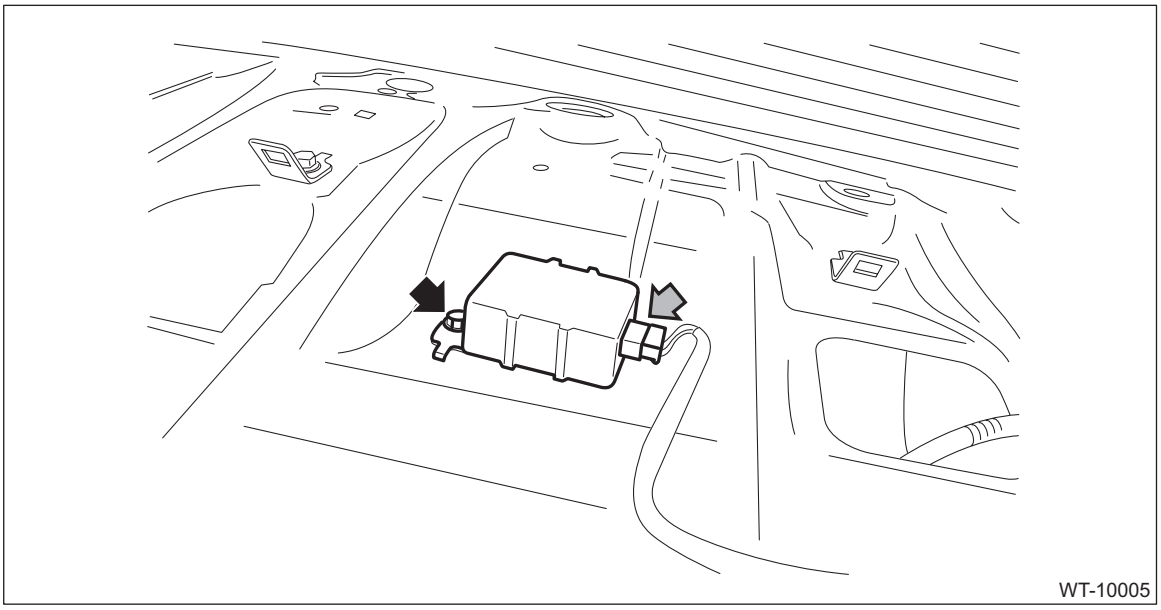
2. TPMS & KEYLESS CONTROL MODULE

NOTE:
TPMS control module is integrated with the keyless entry control module.

4 door model

1) Disconnect the ground cable from battery.
2) Remove the trim panel assembly - rear shelf. <Ref. to EI-103, REMOVAL, Rear Shelf Trim.>
3) Remove the TPMS & keyless control module.
   (1) Disconnect the connector.

(2) Remove the bolt and then remove the TPMS & keyless control module.



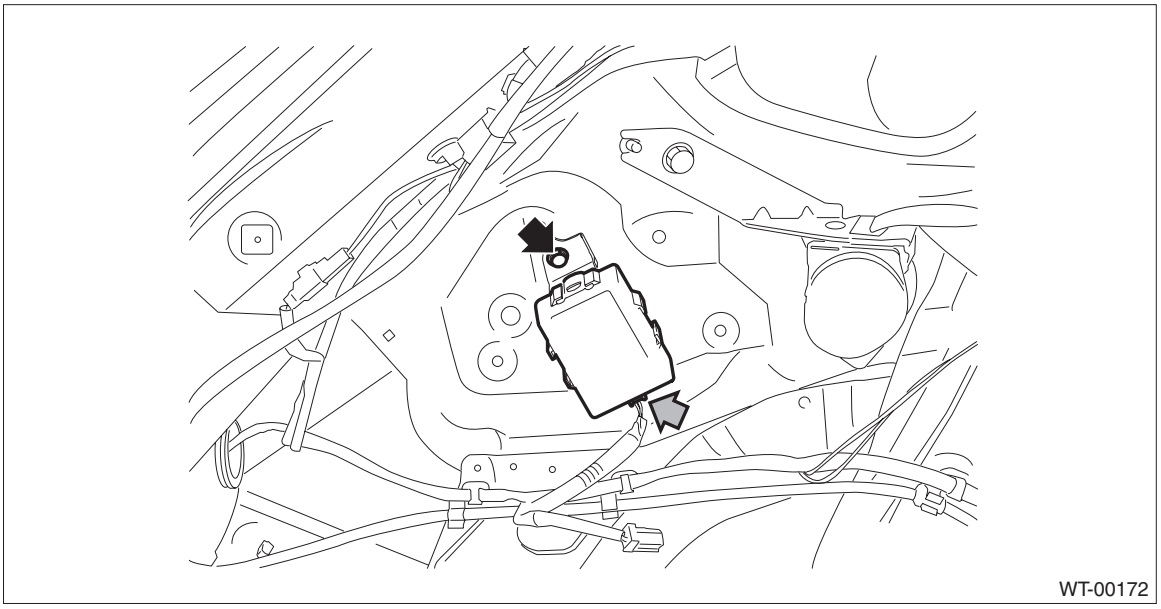
5 door model (keyless entry model)

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear apron LH. <Ref. to EI-99, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Rear Quarter Trim.>

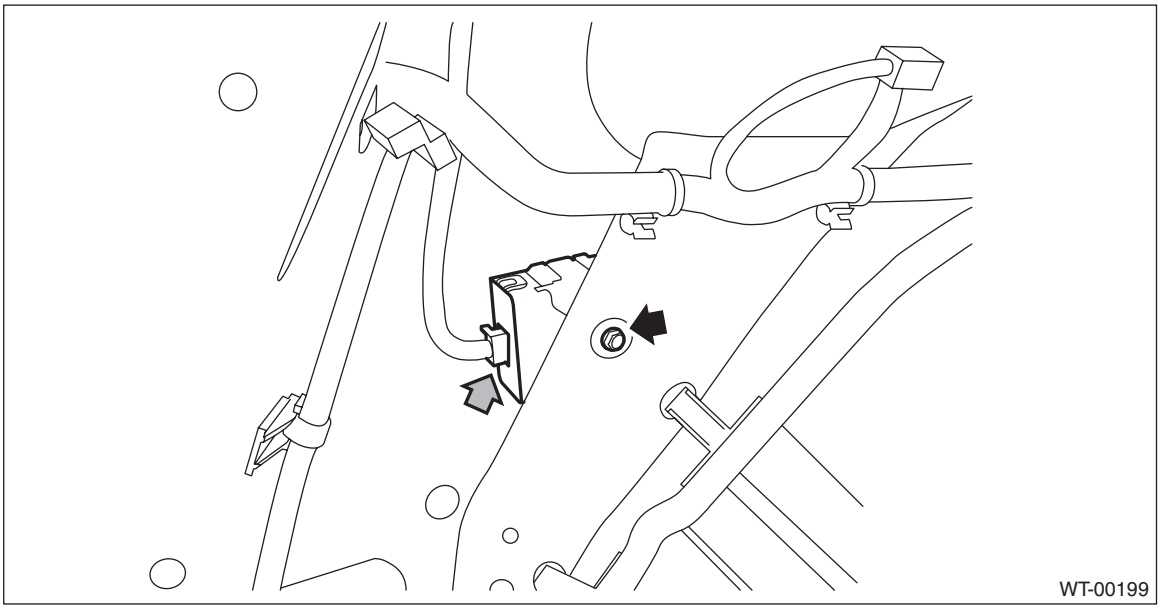
3) Remove the TPMS & keyless control module.
   (1) Disconnect the connector.
   (2) Remove the bolt and then remove the TPMS & keyless control module.



3. TPMS CM

NOTE:
TPMS control module is separate from the keyless entry control module.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - rear apron LH. <Ref. to EI-99, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Rear Quarter Trim.>
3) Remove the TPMS CM.
   (1) Disconnect the connector.
   (2) Remove the bolt and then remove the TPMS CM.

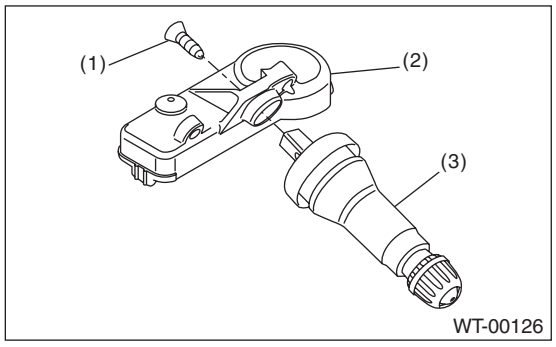


B: INSTALLATION

1. TRANSMITTER (TIRE INFLATION PRESSURE SENSOR)

CAUTION:
Use the new transmitter assembly or replace the new valve and screw, when installing.

1) Replace the valve and screw with a new part when reusing transmitter.



(1) Screw
(2) Transmitter
(3) Valve

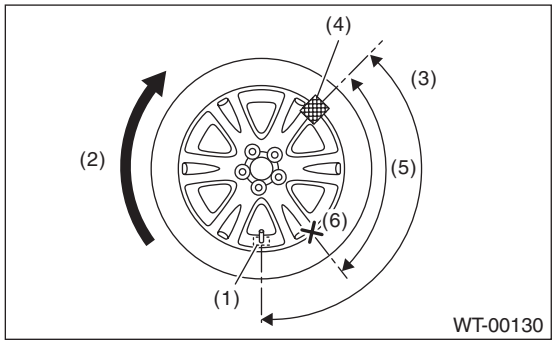
Tightening torque:
1.4 N·m (0.14 kgf-m, 1.0 ft-lb)

2) Install the transmitter to the wheel by aligning it with valve hole.

NOTE:
When using the jig that pulls the valve cap by hooking its neck part, use another short-type cap.

3) Install the tires to wheels.

CAUTION:
• Use a tire changer when installing tire to wheel.
• To prevent damaging the transmitter, set the tire changer boom in the position as shown in the figure.



(1) Transmitter
(2) Direction of turn table rotation
(3) 135°
(4) Tire changer boom
(5) 90°
(6) Starting point for fitting the bead to the rim

4) Install the wheels to vehicle. <Ref. to WT-5, INSTALLATION, Tire and Wheel.>

5) Register the transmitter ID to the TPMS & keyless control module. <Ref. to TPM(diag)-15, Register Transmitter (ID).>

2. TPMS & KEYLESS CONTROL MODULE

Install each part in the reverse order of removal.

Tightening torque:
13 N·m (1.33 kgf-m, 9.6 ft-lb)

3. TPMS CM

Install each part in the reverse order of removal.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

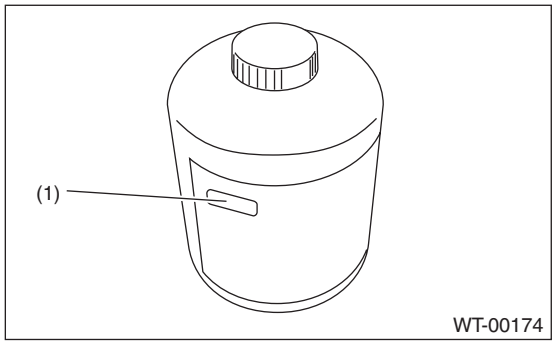
C: ADJUSTMENT

Re-register the transmitter ID when transmitter has been replaced. <Ref. to TPM(diag)-15, Register Transmitter (ID).>

6. Tire Repair Kit

A: NOTE

- Refer to the owner's manual for the tire puncture repair.
- Replace the expired sealant with a new part.
- The expiration date of a tire puncture repair sealant is shown on the label of the sealant bottle. The expired sealant is not included in the warranty.



(1) Label

B: REPLACEMENT

1. CLEARING THE TIRE PUNCTURE REPAIR SEALANT

CAUTION:
- **Do not dispose the tire filled with repair sealant.**
- **Expired sealant, recovered sealant, or empty bottles and hoses of sealant used for repair work, contains ethylene glycol that is to be treated as industrial waste. Take appropriate measures to these materials at the time of disposal.**
- **Perform this operation in a well-ventilated space.**
- **During the operation, use appropriate protection tools to prevent the sealant from adhering to eyes, skin and clothes.**
- **After work, wash hands, face etc. well to wash away the sealant completely.**
- **If the sealant enters the mouth or eyes, wash it away with plenty of water, and consult a doctor.**

1) Using a tire changer, remove the tire from the wheel.

NOTE:
Cover the tire changer and floor with cloth, and work while being careful not to spill the sealant.

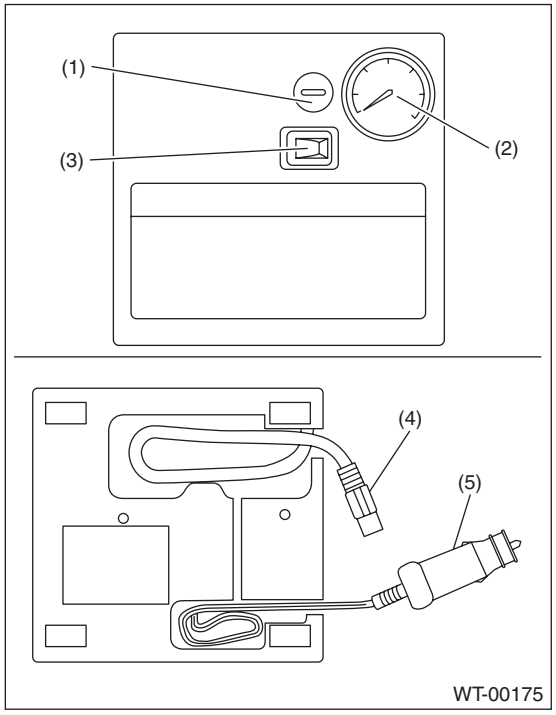
2) Clear the sealant remaining inside the tire.

3) Wipe off the sealant adhered to the wheel, inside the tire, tire changer and on the floor with cloth carefully.

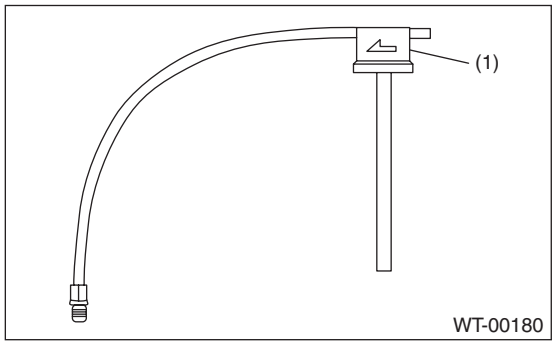
CAUTION:
- **Completely wipe off the sealant in the mating surface of wheel rim and bead.**
- **Do not use the tire repaired with the tire puncture repair kit.**
- **Wheel can be reused even after repaired by using the tire puncture repair kit. However, replace the tire valve and transmitter with new parts.**

2. REPLACEMENT OF REPAIR SEALANT AND INJECTION CAP

NOTE:
After using the repair kit for the repair work, replace the repair sealant and injection cap with new parts.



(1) Air bleeding button
(2) Pressure gauge
(3) Power switch
(4) Hose
(5) Power cord



(1) Injection cap

Place a new repair sealant bottle, injection cap and compressor back into the bag, and store the bag at the specified position of the vehicle.

7. General Diagnostic Table

A: INSPECTION

Symptoms	Possible cause	Corrective action
Wheel is out of balance.	Improperly inflated tire.	Adjust the tire pressure.
	Uneven wear	Check the tire referring to “Abnormal tire wear” in this table, carry out the procedure and replace the tire.
	Front wheel alignment	Check or adjust the front wheel alignment. • Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.> • Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>
	Rear wheel alignment	Check or adjust the rear wheel alignment. • Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.> • Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>
	Front strut	Check the front strut. <Ref. to FS-44, INSPECTION, Front Strut.>
	Rear shock absorber	Check the rear shock absorber. <Ref. to RS-40, INSPECTION, Rear Shock Absorber.>
	Housing ASSY - front axle	Check the housing assembly - front axle. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>
	Hub unit COMPL - front axle	Check the hub unit COMPL - front axle. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>
	Hub unit COMPL - rear axle	Check the hub unit COMPL - rear axle. <Ref. to DS-52, INSPECTION, Rear Hub Unit Bearing.>
Vehicle is abnormally out of balance.	Improperly inflated tire.	Adjust the tire pressure.
	Uneven wear	Check the tire referring to “Abnormal tire wear” in this table, carry out the procedure and replace the tire.
	Front stabilizer	Inspect the front stabilizer.
	Front wheel alignment	Check or adjust the front wheel alignment. • Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.> • Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>
	Rear wheel alignment	Check or adjust the rear wheel alignment. • Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.> • Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>
Abnormal wheel vibration	Improperly inflated tire.	Adjust the tire pressure.
	Uneven wear	Check the tire referring to “Abnormal tire wear” in this table, carry out the procedure and replace the tire.
	Improper wheel balancing	Check the wheel balance. <Ref. to WT-7, WHEEL BALANCING, INSPECTION, Tire and Wheel.>
	Housing ASSY - front axle	Check the housing assembly - front axle. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>
	Hub unit COMPL - front axle	Check the hub unit COMPL - front axle. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>
	Hub unit COMPL - rear axle	Check the hub unit COMPL - rear axle. <Ref. to DS-52, INSPECTION, Rear Hub Unit Bearing.>
Abnormal tire wear	Improperly inflated tire.	Adjust the tire pressure.
	Improper wheel balancing	Check the wheel balance. <Ref. to WT-7, WHEEL BALANCING, INSPECTION, Tire and Wheel.>
	Front wheel alignment	Check or adjust the front wheel alignment. • Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.> • Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>
	Rear wheel alignment	Check or adjust the rear wheel alignment. • Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.> • Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

TIRE PRESSURE MONITORING SYSTEM (DIAGNOSTICS)

TPM(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
Before removal or installation, be sure to remove any foreign matter (dust, moisture, oil, etc.) from the TPMS & keyless entry CM connector or TPMS CM connector.

NOTE:
To check harness for open or short circuits, shake the suspected trouble spot or connector.

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Check with the user regarding when the warning light lit or started blinking. 2) Before performing diagnostics, check all components which may adversely affect the tire pressure monitor system. <Ref. to TPM(diag)-4, INSPECTION, General Description.>	Is the component that might affect the tire pressure monitor system normal?	Go to step **2**.	Repair or replace each component.
2	**CHECK DIAGNOSTIC TROUBLE CODE (DTC).** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch to ON and run the Subaru Select Monitor. NOTE: If the communication function of the Subaru Select Monitor cannot be executed normally, check the communication circuit. <Ref. to TPM(diag)-9, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.> 4) Read the DTC. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Go to step **4**.	Go to step **3**.
3	**PERFORM GENERAL DIAGNOSTICS.** 1) Perform the inspection by referring to “General Diagnostic Table”. <Ref. to TPM(diag)-36, General Diagnostic Table.> 2) Perform the Clear Memory Mode. <Ref. to TPM(diag)-13, OPERATION, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to TPM(diag)-17, Inspection Mode.> 4) Read the DTC. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).> Check the DTC is not displayed.	Does the tire pressure warning light illuminates for about 2 seconds and then foes off after turning on the ignition switch, and then go out?	Finish the diagnosis.	Check the tire inflation pressure warning light. <Ref. to TPM(diag)-18, Tire Pressure Warning Light / Trouble Indicator Light Illumination Pattern.>

	Step	Check	Yes	No
4	**CHECK FOR REPRODUCTION OF MALFUNCTION.** 1) Perform the drive test. Drive the vehicle at 40 km/h (25 MPH) or faster for at least 10 minutes. 2) Read the DTC. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the DTC displayed as "Current malfunction"?	Go to step **5**.	When DTC is detected as "Past faults", the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, a temporary communication error due to radio wave environment inside and outside the vehicle may be possible.
5	**PERFORM DIAGNOSIS.** 1) Refer to "List of Diagnostic Trouble Code (DTC)". 2) Correct the cause of trouble. 3) Perform the Clear Memory Mode. <Ref. to TPM(diag)-13, OPERATION, Clear Memory Mode.> 4) Perform the drive test. Drive the vehicle at 40 km/h (25 MPH) or faster for at least 10 minutes. 5) Read the DTC. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Repeat steps 1 to 4 until DTC is not shown.	Finish the diagnosis.

2. General Description

A: CAUTION

1. SUPPLEMENTAL RESTRAINT SYSTEM "AIRBAG"

Airbag system wiring harness is routed near the TPM control module.

CAUTION:
- **Do not use electrical test equipment on any of the airbag system wiring harness circuits.**
- **Be careful not to damage the wiring harness of the airbag system when servicing the TPMS & keyless entry CM or TPMS CM.**

2. TPMS & KEYLESS ENTRY CM OR TPMS CM

- If the transmitter is replaced, ID registration for the transmitter is required. <Ref. to TPM(diag)-15, OPERATION, Register Transmitter (ID).>
- When adjusting tire pressure indoors in winter, there is a big temperature difference between the indoor facilities and outside. Once the car is outside where the temperature is lower, the air pressure in the tires will drop, causing the tire pressure warning light to illuminate, even if the pressure in the tires was adjusted to standard values indoors. To avoid this, it is necessary to adjust the tire pressure to the high side in consideration of the difference in temperature between inside and outside according to the following table.
- P195/65R15, P205/55R16, P225/55R17 (CVT)

Temperature °C (°F)	Indoor temperature	15.5 (60)		
	Ambient temperature	–1 (30)	–12 (10)	–23 (–10)
Air pressure kPa (psi)	Front	250 (36)	265 (38)	280 (40)
	Rear	240 (35)	255 (37)	270 (39)

- P205/50R17, P225/55R17 (MT)

Temperature °C (°F)	Indoor temperature	15.5 (60)		
	Ambient temperature	–1 (30)	–12 (10)	–23 (–10)
Air pressure kPa (psi)	Front	240 (35)	255 (37)	270 (39)
	Rear	230 (33)	245 (35)	255 (37)

B: INSPECTION

Before performing diagnosis, check the following item which might affect the quality of the tire pressure monitoring system.

1. TIRE

- Inspect that the tire pressure is within the specification while the tire is cool. (Refer to Tire Caution Label.)
- Check the tires for damage or the insertion of foreign matters.

2. BATTERY

Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>

C: PREPARATION TOOL

1. SPECIAL TOOL

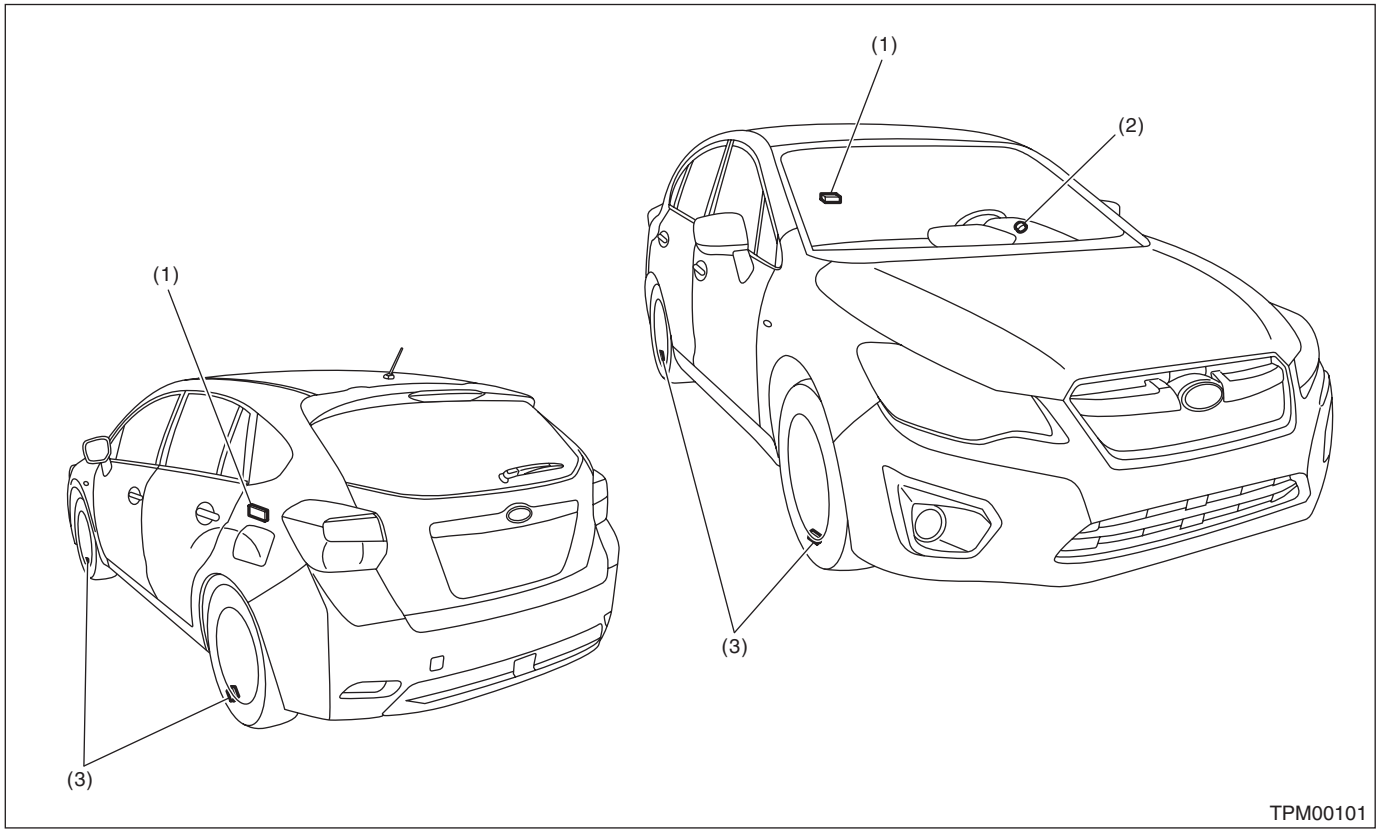
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

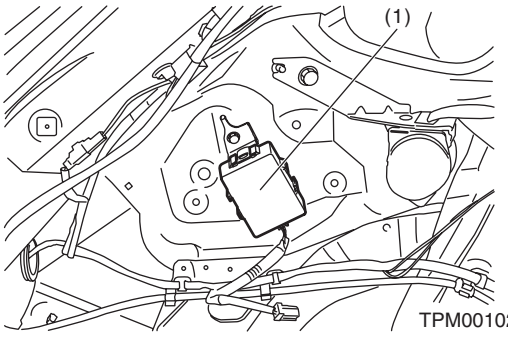
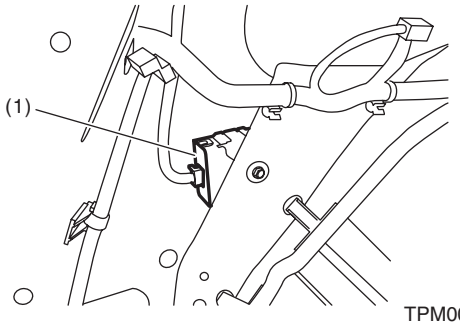
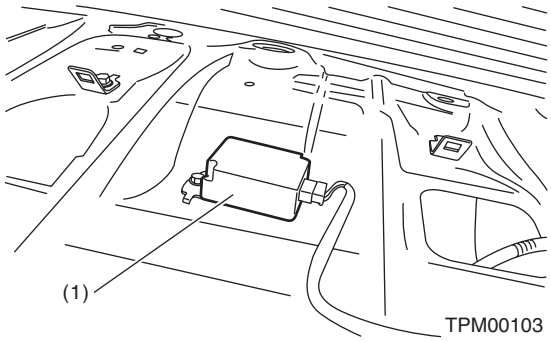
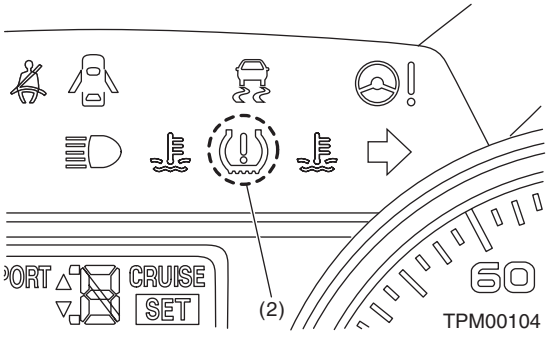
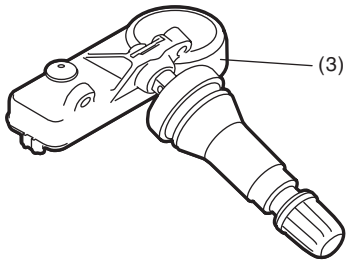
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Transmitter registration tool	Used to register the transmitter ID. Manufacturer: Kent-Moore Item number: J45295
DST-i	Used together with Subaru Select Monitor 4.

3. Electrical Component Location

A: LOCATION

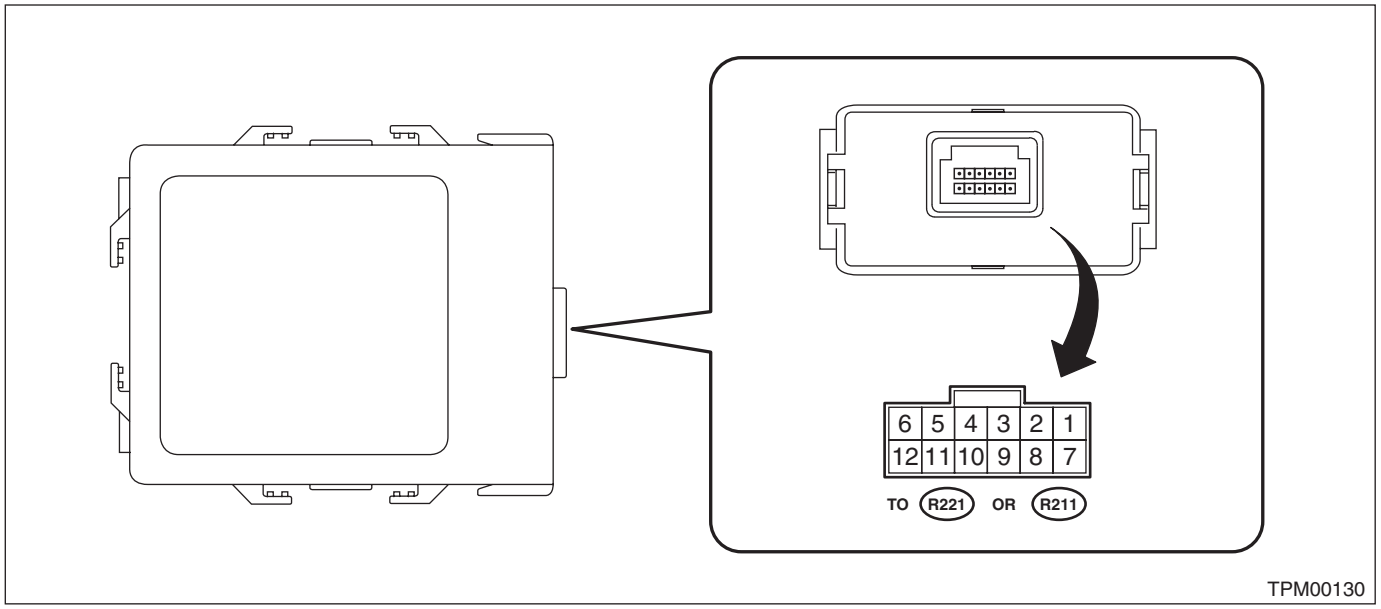


(1) TPMS & keyless entry CM or TPMS CM
(2) Tire pressure warning light
(3) Snap-in type transmitter

• 5 door model (model without keyless access with push button start)  TPM00102	• 5 door model (model with keyless access with push button start)  TPM00127
• 4 door model  TPM00103	 TPM00104
 TPM00049	

4. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION



Terminal No.	Content	Measured value and measuring conditions	Remarks
1	—	—	—
2	—	—	—
3	—	—	—
4	Ignition power supply	10 — 13 V (when the ignition switch is ON)	—
5	GND	0 V (always)	—
6	Battery power supply	10 — 13 V (always)	—
7	—	—	—
8	—	—	—
9	—	—	—
10	—	—	—
11	Body integrated unit	—	—
12	—	—	—

B: WIRING DIAGRAM

Refer to “Tire Pressure Monitoring System” in the wiring diagram. <Ref. to WI(w/o HEV)-229, WIRING DIAGRAM, Tire Pressure Monitoring System.> <Ref. to WI(HEV)-197, WIRING DIAGRAM, Tire Pressure Monitoring System.>

5. Subaru Select Monitor

A: OPERATION

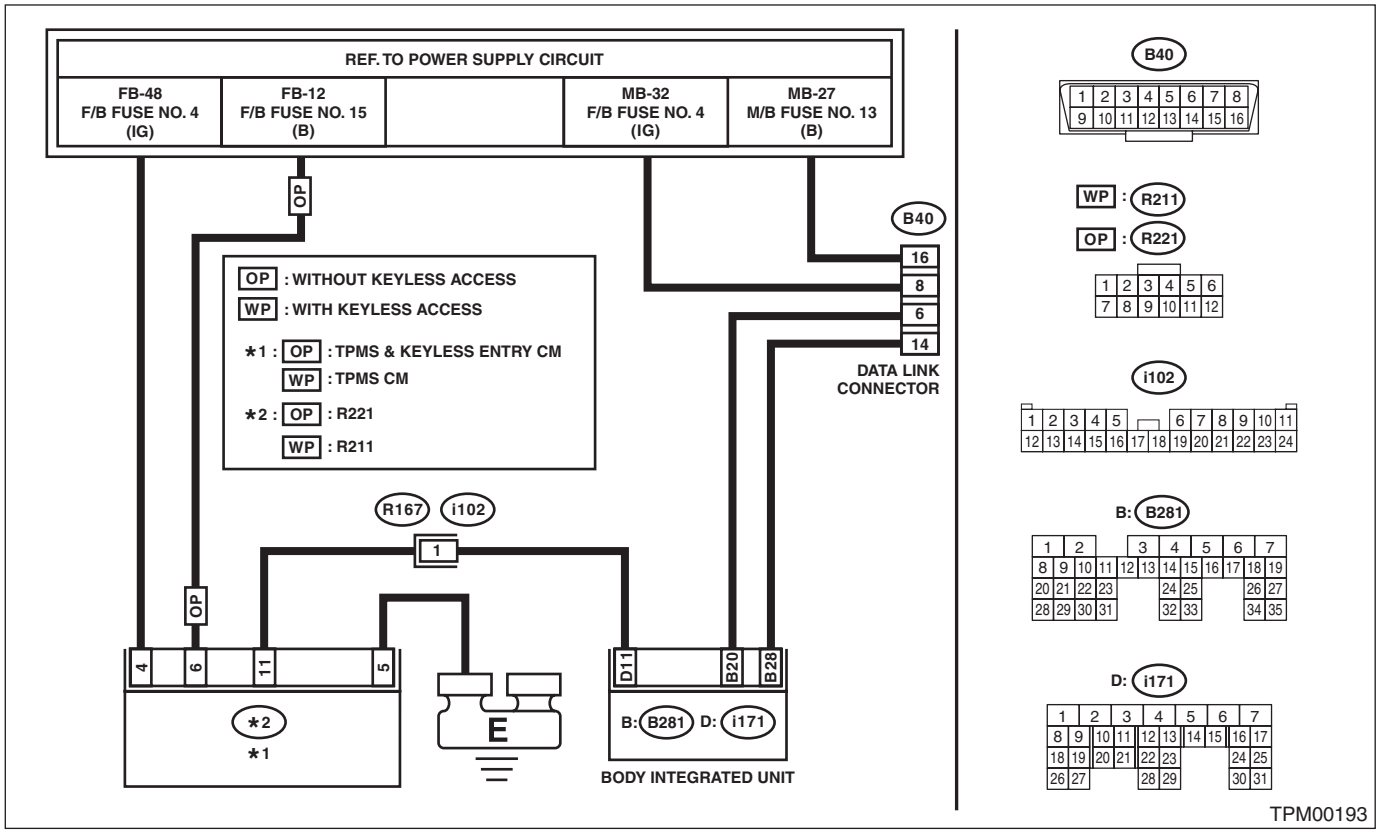
For detailed operation procedures, refer to “Application help”.

NOTE:
If TPMS & keyless entry CM or TPMS CM and Subaru Select Monitor cannot communicate, check the communication circuit. <Ref. to TPM(diag)-9, INSPECTION, Subaru Select Monitor.>

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DETECTING CONDITION:
Defective harness connector
TROUBLE SYMPTOM:
Communication is impossible between the TPMS & keyless entry CM or TPMS CM and the Subaru Select Monitor.
WIRING DIAGRAM:
Tire Pressure Monitoring System <Ref. to WI(w/o HEV)-229, WIRING DIAGRAM, Tire Pressure Monitoring System.> <Ref. to WI(HEV)-197, WIRING DIAGRAM, Tire Pressure Monitoring System.>



	Step	Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select TPM mode using Subaru Select Monitor.
2	**CHECK BATTERY.** Check the battery voltage. <Ref. to SC(H4DO(w/o HEV))-52, Battery.> NOTE: For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.** Check the battery terminal. <Ref. to SC(H4DO(w/o HEV))-52, Battery.> NOTE: For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.
4	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Go to step **8**.	Go to step **5**.
5	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to OFF. 2) Disconnect the TPMS & keyless entry CM connector or TPMS CM connector. 3) Turn the ignition switch to ON. 4) Check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Replace the TPMS & keyless entry CM or TPMS CM. <Ref. to WT-10, Tire Pressure Monitoring System.>	Go to step **6**.
6	**CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND BODY INTEGRATED UNIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of the TPMS & keyless entry CM or TPMS CM. 3) Measure the resistance between the body integrated unit and chassis ground. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair the harness and connector between each control module and body integrated unit.
7	**CHECK OUTPUT SIGNAL TO TPMS & KEYLESS ENTRY CM OR TPMS CM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TPMS & keyless entry CM or TPMS CM and chassis ground. ***Connector & terminal*** ***(B40) No. 6 (+) — Chassis ground (–):*** ***(B40) No. 14 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **8**.	Repair the harness and connector between each control module and body integrated unit.

	Step	Check	Yes	No
8	**CHECK HARNESS CONNECTOR BETWEEN TPMS & KEYLESS ENTRY CM OR TPMS CM AND BODY INTEGRATED UNIT.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between TPMS & keyless entry CM connector or TPMS CM connector and body integrated unit. ***Connector & terminal*** ***Without keyless access with push button start*** ***(R221) No. 11 — (i171) No. 11:*** ***With keyless access with push button start*** ***(R211) No. 11 — (i171) No. 11:***	Is the resistance less than 0.5 Ω?	Go to step **9**.	Repair the harness and connector between TPMS & keyless entry CM or TPMS CM and body integrated unit.
9	**CHECK TPMS & KEYLESS ENTRY CM CONNECTOR OR TPMS CM CONNECTOR.**	Is the connector inserted into the TPMS & keyless entry CM or TPMS CM until it locks?	Go to step **10**.	Insert the connector into the TPMS & keyless entry CM or TPMS CM.
10	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. 2) Measure the ignition power supply voltage between TPMS & keyless entry CM connector or TPMS CM connector and chassis ground. ***Connector & terminal*** ***Without keyless access with push button start*** ***(R221) No. 4 (+) — Chassis ground (–):*** ***With keyless access with push button start*** ***(R211) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **11**.	Repair open circuit of the harness between TPMS & keyless entry CM or TPMS CM and battery.
11	**CHECK HARNESS CONNECTOR BETWEEN TPMS & KEYLESS ENTRY CM OR TPMS CM AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the TPMS & keyless entry CM or TPMS CM. 3) Measure the resistance of harness between TPMS & keyless entry CM or TPMS CM and chassis ground. ***Connector & terminal*** ***Without keyless access with push button start*** ***(R221) No. 5 — Chassis ground:*** ***With keyless access with push button start*** ***(R211) No. 5 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **12**.	Repair open circuit of the harness of TPMS & keyless entry CM or TPMS CM.
12	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact in TPMS & keyless entry CM power supply or TPMS CM power supply, ground line and body integrated unit?	Repair the connector.	Replace the TPMS & keyless entry CM or TPMS CM. <Ref. to WT-10, Tire Pressure Monitoring System.>

6. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Tire Pressure Monitor» and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTCs, refer to List of Diagnostic Trouble Code (DTC). <Ref. to TPM(diag)-23, List of Diagnostic Trouble Code (DTC).>
- All DTCs detected will be displayed.
- If a particular DTC is not properly stored in memory (due to a voltage drop of the TPMS & keyless entry CM or TPMS CM power supply, etc.) when a problem occurs, a DTC suffixed with a question mark appears on the Subaru Select Monitor display. This shows it may be an unreliable reading.
- When DTC is not displayed, check the indicator circuit and communication circuit. <Ref. to TPM(diag)-18, Tire Pressure Warning Light / Trouble Indicator Light Illumination Pattern.>

7. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Tire Pressure Monitor» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

8. Read Current Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Tire Pressure Monitor» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

Display	Contents to be displayed	Unit of measure
Tire 1 FN code	LEARN, LOW BAT, OFF, WAKE, RE ME, NORMAL	LEARN: Transmitted transmitter ID using the transmitter registration tool LOW BAT: Transmitter battery voltage running low OFF: Transmitter function stops (no data transmission) RE ME: Tire air changes ±8.4 kPa WAKE: When data transmission is started from a stopped state. NORMAL: Conditions other than above
Tire 2 FN code		
Tire 3 FN code		
Tire 4 FN code		
Tire 1 air pressure	Value converted to tire pressure from data delivered from transmitter is displayed. (The figure may differ from the actual measured values.)	kPa, psig, mmHg, inHg
Tire 2 air pressure		kPa, psig, mmHg, inHg
Tire 3 air pressure		kPa, psig, mmHg, inHg
Tire 4 air pressure		kPa, psig, mmHg, inHg
Vehicle Speed	Vehicle speed signal which is input in control module	km/h, MPH
Pressure warning	Threshold where tire pressure warning light illuminates	kPa, psig, mmHg, inHg
Return pressure	Threshold where tire pressure warning light goes out	kPa, psig, mmHg, inHg

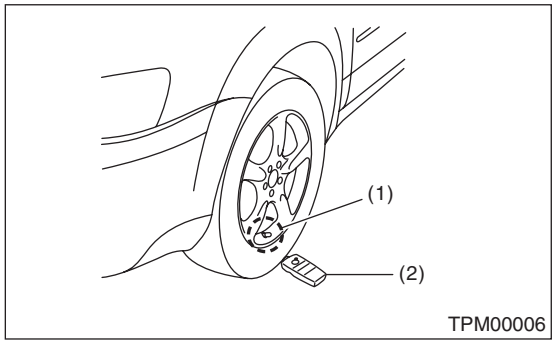
9. Register Transmitter (ID)

A: OPERATION

Perform the registration procedure of the transmitter in the following cases:
- Transmitter is replaced.
- TPMS & keyless entry CM or TPMS CM is replaced.

NOTE:
- If registration of the transmitter ID is not possible after two attempts, replace the TPMS & keyless entry CM or TPMS CM. <Ref. to WT-10, Tire Pressure Monitoring System.>
- During the registration, turn the ignition switch to OFF and end the Subaru Select Monitor. Or if the registration is not performed for 5 minutes or more, the registration mode is cancelled.
- When rotating tires, there is no affect on the performance or functions of the tire pressure monitoring control module even if the transmitter (ID) is not registered, however, the tire position displayed on the Subaru Select Monitor will be incorrect.

1) Adjust all tire pressures to the specifications.
2) Connect the Subaru Select Monitor, and select «Diagnosis» on the «Start» display.
3) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
4) On «Main Menu» display, select «Each System».
5) On «Select System» display, select «Tire Pressure Monitor» and then select «Enter».
6) On «Select Function» display, select «Work Support».
7) On «Work Support» display, select «Transmitter ID regist».
8) «ID registration mode When execute Registered ID is deleted Continue?» is displayed, select [OK].
9) Contact the transmitter registration tool to the side wall area near the air valve on the front left tire, and press the switch. The transmitter ID is sent to the TPMS & keyless entry CM or TPMS CM. (At this time, the tire pressure warning light blinks to confirm that the registration has started.)



(1) Air valve (transmitter)
(2) Transmitter registration tool

NOTE:
- The registration order of transmitter ID is not specified.
- The transmitter registration tool is used by touching the side wall area near the transmitter.
- When registration of each tire is completed, «ID registration completed» is displayed on the Select Monitor screen.
- If registration procedure stop in the halfway (turning ignition switch to OFF, wrong registration order, etc), proceed from step 5).

10) When ID registration is completed, the tire pressure warning light remains lit for approximately 2 seconds, to end the registration. Switch the screen to «Data monitor» of Subaru Select Monitor. <Ref. to TPM(diag)-14, Read Current Data.>
11) Check the transmitter ID that was registered, then perform a driving test. <Ref. to TPM(diag)-17, Inspection Mode.>

10.Display Transmitter (ID)

A: OPERATION

For detailed operation procedures, refer to Read Current Data. <Ref. to TPM(diag)-14, Read Current Data.>

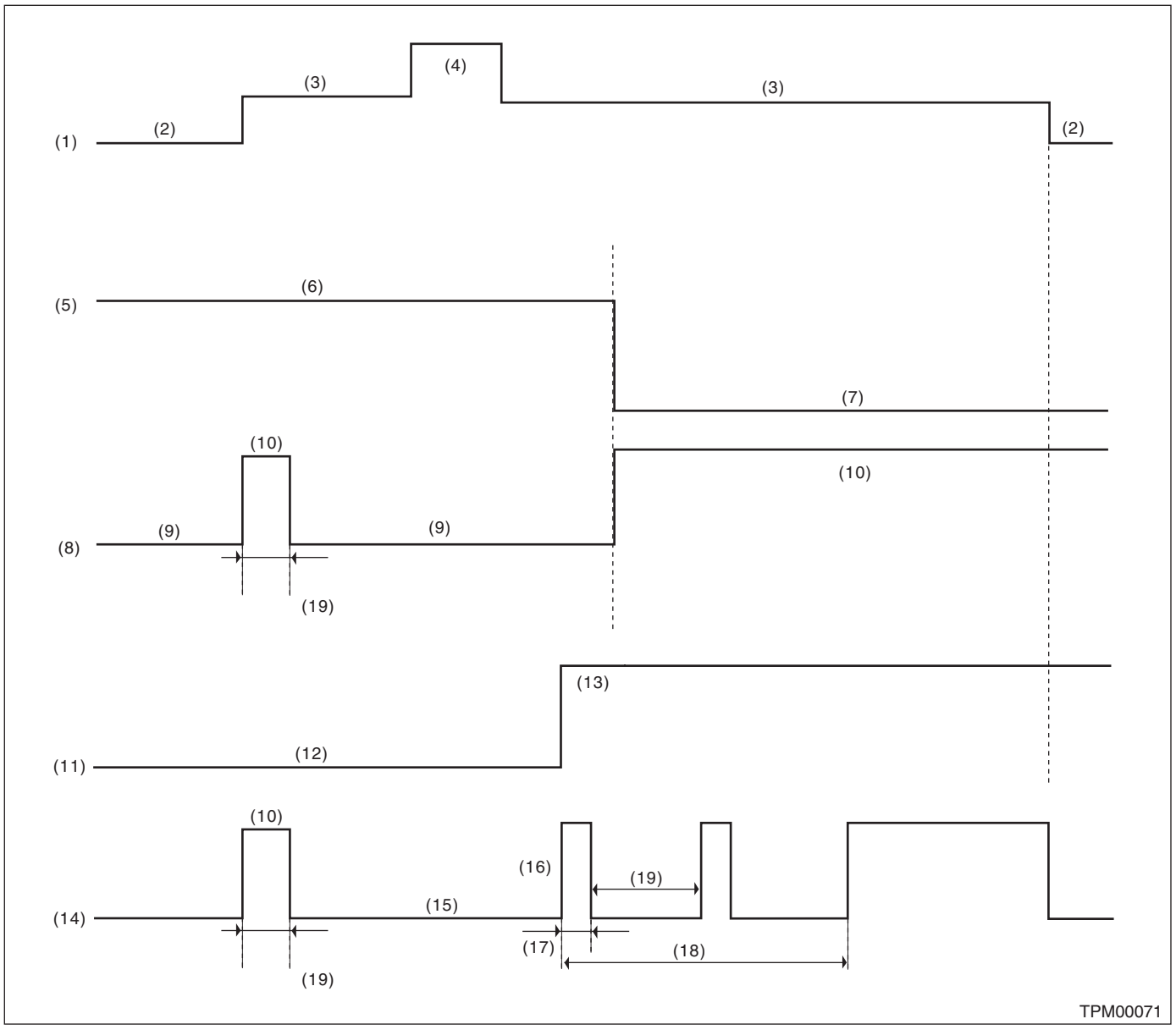
11.Inspection Mode

A: PROCEDURE

Reproduce the malfunction occurrence condition as much as possible. Drive the vehicle at 40 km/h (25 MPH) or faster for at least ten minutes.

12. Tire Pressure Warning Light / Trouble Indicator Light Illumination Pattern

A: INSPECTION



(1) Ignition switch
(2) OFF
(3) ON
(4) Start
(5) Tire inflation pressure condition
(6) Meet the specification
(7) Less than standard value (For the pressure warning level, refer to “CURRENT DATA”.) <Ref. to TPM(diag)-14, LIST, Read Current Data.>
(8) Tire inflation pressure warning light (pressure condition)
(9) Light OFF
(10) Light ON
(11) System status
(12) Normal
(13) Malfunction
(14) Tire inflation pressure warning light (system condition)
(15) Light OFF
(16) Blink
(17) 1 second
(18) Blinks 25 times
(19) 2 seconds

1) When the tire pressure warning light does not illuminate in accordance with this illumination pattern, there must be an electrical malfunction.
2) If the tire pressure warning light does not go off, check the TPMS & keyless entry CM or TPMS CM/warning light circuit and the combination meter circuit. <Ref. to TPM(diag)-20, TIRE PRESSURE WARNING LIGHT DOES NOT COME OFF, Tire Pressure Warning Light / Trouble Indicator Light Illumination Pattern.>

NOTE:
If the problem is fixed while driving at approximately 40 km/h (25 MPH) after the tire pressure warning light blinks/lights, the warning light goes out and the tire pressure monitor system operates normally. (If there is a decrease in tire pressure, or a malfunction of the system, the malfunction history is displayed.)

B: TIRE PRESSURE WARNING LIGHT DOES NOT COME ON

DETECTING CONDITION:
Defective combination meter

TROUBLE SYMPTOM:
When the ignition switch is turned to ON, the tire pressure warning light does not turn on (for approx. 2 seconds).

	Step	Check	Yes	No
1	**CHECK DIAGNOSTIC TROUBLE CODE (DTC).** Connect the Subaru Select Monitor, and read the Diagnostic Trouble Code. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is diagnostics code (DTC) displayed?	Perform the diagnosis according to the DTC. <Ref. to TPM(diag)-23, List of Diagnostic Trouble Code (DTC).>	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

C: TIRE PRESSURE WARNING LIGHT DOES NOT COME OFF

DETECTING CONDITION:

- Defective combination meter
- Tires pressure drop
- Transmitter ID not registered

TROUBLE SYMPTOM:

Tire pressure warning light remains illuminating after engine starts.

	Step	Check	Yes	No
1	**CHECK DTC.** Connect the Subaru Select Monitor, and read the Diagnostic Trouble Code. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is a DTC displayed?	Perform the diagnosis according to the DTC. <Ref. to TPM(diag)-23, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TRANSMITTER (ID).** Display the transmitter ID of the tire pressure monitor system.	Is the transmitter ID registered?	Go to step **3**.	Register the transmitter ID. <Ref. to TPM(diag)-15, OPERATION, Register Transmitter (ID).>
3	**CHECK TRANSMITTER DATA OUTPUT.** 1) Select data display of the tire pressure monitoring. 2) Start the engine and check the tire pressure warning light output.	Is the warning light output ON?	Replace the TPMS & keyless entry CM or TPMS CM. <Ref. to WT-10, Tire Pressure Monitoring System.>	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

D: TIRE PRESSURE WARNING LIGHT IS 25 TIMES BLINKING AND TURN ON

DETECTING CONDITION:

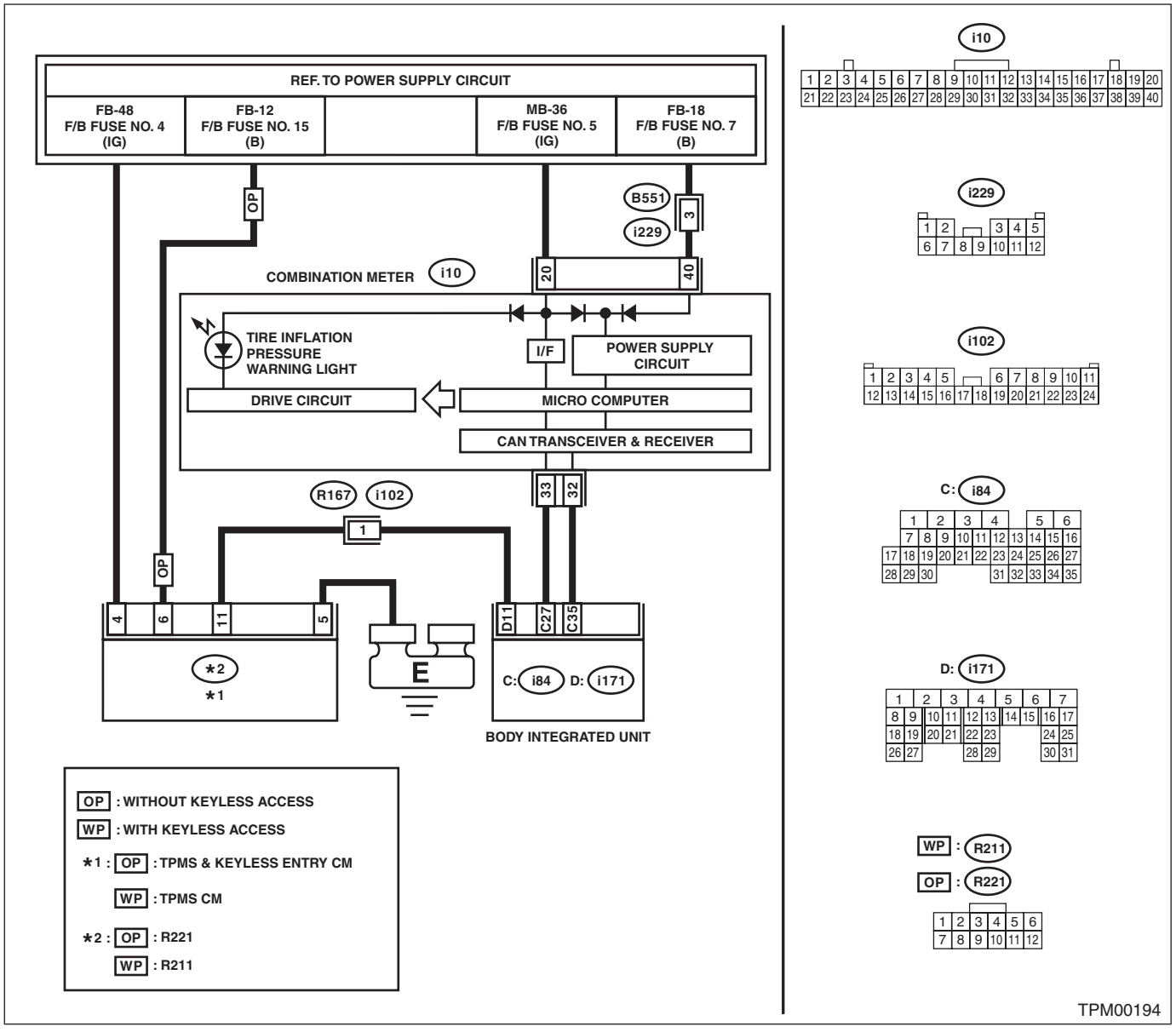
- Defective TPMS & keyless entry CM or TPMS CM
- Defective harness
- Transmitter is faulty.

TROUBLE SYMPTOM:

Every time the engine starts, tire pressure warning light blinks 25 times and then illuminates.

WIRING DIAGRAM:

Tire Pressure Monitoring System <Ref. to WI(w/o HEV)-229, WIRING DIAGRAM, Tire Pressure Monitoring System.> <Ref. to WI(HEV)-197, WIRING DIAGRAM, Tire Pressure Monitoring System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Connect the Subaru Select Monitor, and read the Diagnostic Trouble Code. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is diagnostics code (DTC) displayed?	Perform the diagnosis according to the DTC. <Ref. to TPM(diag)-23, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK LAN COMMUNICATION.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Repair it according to the diagnosis for LAN system.	Go to step **3**.
3	**CHECK HARNESS.** Measure the resistance between TPMS & keyless entry CM or TPMS CM and body integrated unit. ***Connector & terminal*** ***Without keyless access with push button start*** ***(R221) No. 11 — (i171) No. 11:*** ***With keyless access with push button start*** ***(R211) No. 11 — (i171) No. 11:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair the harness.
4	**CHECK CONNECTOR.** Check each connector.	Is there poor contact or any other faults?	Repair the connector.	Replace the TPMS & keyless entry CM or TPMS CM. <Ref. to WT-10, Tire Pressure Monitoring System.>

13.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Contents of diagnosis	Remarks
C2021	TIRE 1 AIR PRESSURE LOW (NORMAL MODE)	Tire pressure of tire 1 is reduced.	<Ref. to TPM(diag)-25, DTC C2021 TIRE 1 AIR PRESSURE LOW (NORMAL MODE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2022	TIRE 2 AIR PRESSURE LOW (NORMAL MODE)	Tire pressure of tire 2 is reduced.	<Ref. to TPM(diag)-25, DTC C2022 TIRE 2 AIR PRESSURE LOW (NORMAL MODE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2023	TIRE 3 AIR PRESSURE LOW (NORMAL MODE)	Tire pressure of tire 3 is reduced.	<Ref. to TPM(diag)-25, DTC C2023 TIRE 3 AIR PRESSURE LOW (NORMAL MODE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2024	TIRE 4 AIR PRESSURE LOW (NORMAL MODE)	Tire pressure of tire 4 is reduced.	<Ref. to TPM(diag)-26, DTC C2024 TIRE 4 AIR PRESSURE LOW (NORMAL MODE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2121	TRANSMITTER 1 NO DATA	Data cannot be received from transmitter 1.	<Ref. to TPM(diag)-26, DTC C2121 TRANSMITTER 1 NO DATA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2122	TRANSMITTER 2 NO DATA	Data cannot be received from transmitter 2.	<Ref. to TPM(diag)-26, DTC C2122 TRANSMITTER 2 NO DATA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2123	TRANSMITTER 3 NO DATA	Data cannot be received from transmitter 3.	<Ref. to TPM(diag)-26, DTC C2123 TRANSMITTER 3 NO DATA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2124	TRANSMITTER 4 NO DATA	Data cannot be received from transmitter 4.	<Ref. to TPM(diag)-27, DTC C2124 TRANSMITTER 4 NO DATA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2221	TRANSMITTER 1 PRESSURE DATA ABNORMAL	Transmitter 1 data contents are abnormal.	<Ref. to TPM(diag)-28, DTC C2221 TRANSMITTER 1 PRESSURE DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2222	TRANSMITTER 2 PRESSURE DATA ABNORMAL	Transmitter 2 data contents are abnormal.	<Ref. to TPM(diag)-28, DTC C2222 TRANSMITTER 2 PRESSURE DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2223	TRANSMITTER 3 PRESSURE DATA ABNORMAL	Transmitter 3 data contents are abnormal.	<Ref. to TPM(diag)-28, DTC C2223 TRANSMITTER 3 PRESSURE DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2224	TRANSMITTER 4 PRESSURE DATA ABNORMAL	Transmitter 4 data contents are abnormal.	<Ref. to TPM(diag)-29, DTC C2224 TRANSMITTER 4 PRESSURE DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2321	TRANSMITTER 1 FUNCTION CODE ABNORMAL	Function code has error.	<Ref. to TPM(diag)-30, DTC C2321 TRANSMITTER 1 FUNCTION CODE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2322	TRANSMITTER 2 FUNCTION CODE ABNORMAL	Function code has error.	<Ref. to TPM(diag)-30, DTC C2322 TRANSMITTER 2 FUNCTION CODE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Contents of diagnosis	Remarks
C2323	TRANSMITTER 3 FUNCTION CODE ABNORMAL	Function code has error.	<Ref. to TPM(diag)-30, DTC C2323 TRANSMITTER 3 FUNCTION CODE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2324	TRANSMITTER 4 FUNCTION CODE ABNORMAL	Function code has error.	<Ref. to TPM(diag)-31, DTC C2324 TRANSMITTER 4 FUNCTION CODE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2421	TRANSMITTER 1 BATTERY VOLTAGE LOW	Transmitter battery voltage is low.	<Ref. to TPM(diag)-32, DTC C2421 TRANSMITTER 1 BATTERY VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2422	TRANSMITTER 2 BATTERY VOLTAGE LOW	Transmitter battery voltage is low.	<Ref. to TPM(diag)-32, DTC C2422 TRANSMITTER 2 BATTERY VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2423	TRANSMITTER 3 BATTERY VOLTAGE LOW	Transmitter battery voltage is low.	<Ref. to TPM(diag)-32, DTC C2423 TRANSMITTER 3 BATTERY VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2424	TRANSMITTER 4 BATTERY VOLTAGE LOW	Transmitter battery voltage is low.	<Ref. to TPM(diag)-33, DTC C2424 TRANSMITTER 4 BATTERY VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2521	SPEED ABNORMAL	Vehicle speed signal is not input to the control module when the vehicle speed is 6 km/h (3.7 MPH) or more.	<Ref. to TPM(diag)-34, DTC C2521 SPEED ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

14.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC C2021 TIRE 1 AIR PRESSURE LOW (NORMAL MODE)

NOTE:
Refer to DTC C2024 for diagnostic procedure. <Ref. to TPM(diag)-26, DTC C2024 TIRE 4 AIR PRESSURE LOW (NORMAL MODE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

B: DTC C2022 TIRE 2 AIR PRESSURE LOW (NORMAL MODE)

NOTE:
Refer to DTC C2024 for diagnostic procedure. <Ref. to TPM(diag)-26, DTC C2024 TIRE 4 AIR PRESSURE LOW (NORMAL MODE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

C: DTC C2023 TIRE 3 AIR PRESSURE LOW (NORMAL MODE)

NOTE:
Refer to DTC C2024 for diagnostic procedure. <Ref. to TPM(diag)-26, DTC C2024 TIRE 4 AIR PRESSURE LOW (NORMAL MODE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

D: DTC C2024 TIRE 4 AIR PRESSURE LOW (NORMAL MODE)

DTC DETECTING CONDITION:
Inflation pressure of tires dropped below the specified value.

NOTE:
For the specifications, refer to “CURRENT DATA”. <Ref. to TPM(diag)-14, LIST, Read Current Data.>
TROUBLE SYMPTOM:
Tire pressure warning light illuminates.

	Step	Check	Yes	No
1	**CHECK TIRES.** Lift up the vehicle and check for damage in the tires.	Are there cracks or damage?	Replace the tire.	Go to step **2**.
2	**CHECK TIRES.** Check the tire air pressure.	Is the tire pressure in the specifications?	Go to step **3**.	Adjust the air pressure.
3	**CHECK TRANSMITTER DATA.** 1) Drive at 40 km/h (25 MPH) or more. 2) Confirm the current data «Tire 1 air pressure»«Tire 2 air pressure»«Tire 3 air pressure»«Tire 4 air pressure» of the tire pressure monitor. <Ref. to TPM(diag)-14, Read Current Data.>	Is there a transmitter with different display?	Replace the transmitter (tire pressure sensor) with different display. <Ref. to WT-10, Tire Pressure Monitoring System.>	Go to step **4**.
4	**PERFORM DRIVING TEST.** 1) Perform the Clear Memory Mode. <Ref. to TPM(diag)-13, OPERATION, Clear Memory Mode.> 2) Perform a driving test. <Ref. to TPM(diag)-17, PROCEDURE, Inspection Mode.> 3) Read the DTC of tire pressure monitoring. <Ref. to TPM(diag)-12, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the TPMS & keyless entry CM or TPMS CM. <Ref. to WT-10, Tire Pressure Monitoring System.>	Even if the DTC is displayed, the system has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.

CAUTION:
When driving vehicle to perform driving test, there should be always 2 persons (driver and checker) to check.

E: DTC C2121 TRANSMITTER 1 NO DATA

NOTE:
Refer to DTC C2124 for diagnostic procedure. <Ref. to TPM(diag)-27, DTC C2124 TRANSMITTER 4 NO DATA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

F: DTC C2122 TRANSMITTER 2 NO DATA

NOTE:
Refer to DTC C2124 for diagnostic procedure. <Ref. to TPM(diag)-27, DTC C2124 TRANSMITTER 4 NO DATA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

G: DTC C2123 TRANSMITTER 3 NO DATA

NOTE:
Refer to DTC C2124 for diagnostic procedure. <Ref. to TPM(diag)-27, DTC C2124 TRANSMITTER 4 NO DATA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

H: DTC C2124 TRANSMITTER 4 NO DATA

DTC DETECTING CONDITION:
Detected when no data is received from each transmitter for 8 minutes or more at a vehicle speed of 40 km/h (25 MPH) or more. (Timer is not cleared when the vehicle speed becomes lower than 40 km/h halfway.)
TROUBLE SYMPTOM:
Tire pressure warning light blinks 25 times and then illuminates.

	Step	Check	Yes	No
1	**REPRODUCTION OF FAILURE.** 1) Perform the drive test. Drive the vehicle at 40 km/h (25 MPH) or faster for at least 10 minutes. 2) Read the DTC of tire pressure monitoring. <Ref. to TPM(diag)-12, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed as “Present fault”?	Go to step **2**.	When DTC is displayed as “Past faults”, the system has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, there may be temporary poor communication due to radio wave environment inside/outside the vehicle.
2	**START FRONT LEFT TRANSMITTER.** 1) Connect the Subaru Select Monitor and then turn the ignition switch to ON. 2) Select «Data monitor» of the tire pressure monitor. <Ref. to TPM(diag)-14, Read Current Data.> 3) Use the transmitter registration tool and transmit the ID from the front left transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **3**.	Replace the front left transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
3	**CHECK FRONT LEFT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 1».	Are the two IDs same?	Go to step **4**.	Record «Latest reception ID» as the front left. Go to step **4**.
4	**START FRONT RIGHT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the front right transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **5**.	Replace the front right transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
5	**CHECK FRONT RIGHT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 2».	Are the two IDs same?	Go to step **6**.	Record «Latest reception ID» as the front right. Go to step **6**.
6	**START REAR RIGHT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the rear right transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **7**.	Replace the rear right transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
7	**CHECK REAR RIGHT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 3».	Are the two IDs same?	Go to step **8**.	Record «Latest reception ID» as the rear right. Go to step **8**.

	Step	Check	Yes	No
8	**START REAR LEFT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the rear left transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **9**.	Replace the rear left transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
9	**CHECK REAR LEFT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 4».	Are the two IDs same?	Go to step **10**.	Record «Latest reception ID» as the rear left. Go to step **10**.
10	**CHECK MALFUNCTION TRANSMITTER.**	Is ID recorded by this procedure?	Go to step **11**.	Go to step **2**.
11	**CHECK MALFUNCTION TRANSMITTER.** Check the registered ID of the transmitter indicated by DTC.	Is there checked ID in the record?	Replace the transmitter of the recorded position. <Ref. to WT-10, Tire Pressure Monitoring System.>	Replace the transmitter showing the latest ID that is not included in the registered IDs. <Ref. to WT-10, Tire Pressure Monitoring System.>

CAUTION:
When driving vehicle to perform driving test, there should be always 2 persons (driver and checker) to check.

I: DTC C2221 TRANSMITTER 1 PRESSURE DATA ABNORMAL

NOTE:
Refer to DTC C2224 for diagnostic procedure. <Ref. to TPM(diag)-29, DTC C2224 TRANSMITTER 4 PRESSURE DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

J: DTC C2222 TRANSMITTER 2 PRESSURE DATA ABNORMAL

NOTE:
Refer to DTC C2224 for diagnostic procedure. <Ref. to TPM(diag)-29, DTC C2224 TRANSMITTER 4 PRESSURE DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

K: DTC C2223 TRANSMITTER 3 PRESSURE DATA ABNORMAL

NOTE:
Refer to DTC C2224 for diagnostic procedure. <Ref. to TPM(diag)-29, DTC C2224 TRANSMITTER 4 PRESSURE DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

L: DTC C2224 TRANSMITTER 4 PRESSURE DATA ABNORMAL

DTC DETECTING CONDITION:
Detected when error data is received from each transmitter at a vehicle speed of 40 km/h (25 MPH) or more.
- When comparing the data from each transmitter to the previous data, the change is large.
- The pressure exceeds what the transmitter can measure. (Excessive pressure)

TROUBLE SYMPTOM:
Tire pressure warning light blinks 25 times and then illuminates.

	Step	Check	Yes	No
1	**REPRODUCTION OF FAILURE.** 1) Perform the drive test. Drive the vehicle at 40 km/h (25 MPH) or faster for at least 10 minutes. 2) Read the DTC of tire pressure monitoring. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed as “Present fault”?	Go to step **2**.	When DTC is displayed as “Past faults”, the system has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, there may be temporary poor communication due to radio wave environment inside/outside the vehicle.
2	**START FRONT LEFT TRANSMITTER.** 1) Connect the Subaru Select Monitor and then turn the ignition switch to ON. 2) Select «Data monitor» of the tire pressure monitor. <Ref. to TPM(diag)-14, Read Current Data.> 3) Use the transmitter registration tool and transmit the ID from the front left transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **3**.	Replace the front left transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
3	**CHECK FRONT LEFT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 1».	Are the two IDs same?	Go to step **4**.	Record «Latest reception ID» as the front left. Go to step **4**.
4	**START FRONT RIGHT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the front right transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **5**.	Replace the front right transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
5	**CHECK FRONT RIGHT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 2».	Are the two IDs same?	Go to step **6**.	Record «Latest reception ID» as the front right. Go to step **6**.
6	**START REAR RIGHT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the rear right transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **7**.	Replace the rear right transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
7	**CHECK REAR RIGHT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 3».	Are the two IDs same?	Go to step **8**.	Record «Latest reception ID» as the rear right. Go to step **8**.

	Step	Check	Yes	No
8	**START REAR LEFT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the rear left transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **9**.	Replace the rear left transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
9	**CHECK REAR LEFT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 4».	Are the two IDs same?	Go to step **10**.	Record «Latest reception ID» as the rear left. Go to step **10**.
10	**CHECK MALFUNCTION TRANSMITTER.**	Is ID recorded by this procedure?	Go to step **11**.	Go to step **2**.
11	**CHECK MALFUNCTION TRANSMITTER.** Check the registered ID of the transmitter indicated by DTC.	Is there checked ID in the record?	Replace the transmitter of the recorded position. <Ref. to WT-10, Tire Pressure Monitoring System.>	Replace the transmitter showing the latest ID that is not included in the registered IDs. <Ref. to WT-10, Tire Pressure Monitoring System.>

M: DTC C2321 TRANSMITTER 1 FUNCTION CODE ABNORMAL

NOTE:
Refer to DTC C2324 for diagnostic procedure. <Ref. to TPM(diag)-31, DTC C2324 TRANSMITTER 4 FUNCTION CODE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

N: DTC C2322 TRANSMITTER 2 FUNCTION CODE ABNORMAL

NOTE:
Refer to DTC C2324 for diagnostic procedure. <Ref. to TPM(diag)-31, DTC C2324 TRANSMITTER 4 FUNCTION CODE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

O: DTC C2323 TRANSMITTER 3 FUNCTION CODE ABNORMAL

NOTE:
Refer to DTC C2324 for diagnostic procedure. <Ref. to TPM(diag)-31, DTC C2324 TRANSMITTER 4 FUNCTION CODE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

P: DTC C2324 TRANSMITTER 4 FUNCTION CODE ABNORMAL

Detected when error data is received from each transmitter at a vehicle speed of 40 km/h (25 MPH) or more.
DTC DETECTING CONDITION:
Unexpected function codes received from each transmitter.
TROUBLE SYMPTOM:
Tire pressure warning light blinks 25 times and then illuminates.

Step		Check	Yes	No
1	**REPRODUCTION OF FAILURE.** 1) Perform the drive test. Drive the vehicle at 40 km/h (25 MPH) or faster for at least 10 minutes. 2) Read the DTC of tire pressure monitoring. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed as “Present fault”?	Go to step **2**.	When DTC is displayed as “Past faults”, the system has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, there may be temporary poor communication due to radio wave environment inside/outside the vehicle.
2	**START FRONT LEFT TRANSMITTER.** 1) Connect the Subaru Select Monitor and then turn the ignition switch to ON. 2) Select «Data monitor» of the tire pressure monitor. <Ref. to TPM(diag)-14, Read Current Data.> 3) Use the transmitter registration tool and transmit the ID from the front left transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **3**.	Replace the front left transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
3	**CHECK FRONT LEFT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 1».	Are the two IDs same?	Go to step **4**.	Record «Latest reception ID» as the front left. Go to step **4**.
4	**START FRONT RIGHT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the front right transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **5**.	Replace the front right transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
5	**CHECK FRONT RIGHT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 2».	Are the two IDs same?	Go to step **6**.	Record «Latest reception ID» as the front right. Go to step **6**.
6	**START REAR RIGHT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the rear right transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **7**.	Replace the rear right transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
7	**CHECK REAR RIGHT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 3».	Are the two IDs same?	Go to step **8**.	Record «Latest reception ID» as the rear right. Go to step **8**.

	Step	Check	Yes	No
8	**START REAR LEFT TRANSMITTER.** Use the transmitter registration tool and transmit the ID from the rear left transmitter to check «Latest reception ID».	Is «Latest reception ID» updated?	Go to step **9**.	Replace the rear left transmitter. <Ref. to WT-10, Tire Pressure Monitoring System.>
9	**CHECK REAR LEFT TRANSMITTER ID.** Compare the ID on the latest ID display with «Registered ID 4».	Are the two IDs same?	Go to step **10**.	Record «Latest reception ID» as the rear left. Go to step **10**.
10	**CHECK MALFUNCTION TRANSMITTER.**	Is ID recorded by this procedure?	Go to step **11**.	Replace the transmitter indicated by diagnostics trouble code (DTC). <Ref. to WT-10, Tire Pressure Monitoring System.>
11	**CHECK MALFUNCTION TRANSMITTER.** Check the registered ID of the transmitter indicated by DTC.	Is there checked ID in the record?	Replace the transmitter of the recorded position. <Ref. to WT-10, Tire Pressure Monitoring System.>	Replace the transmitter indicated by diagnostics trouble code (DTC). <Ref. to WT-10, Tire Pressure Monitoring System.>

Q: DTC C2421 TRANSMITTER 1 BATTERY VOLTAGE LOW

NOTE:
Refer to DTC C2424 for diagnostic procedure. <Ref. to TPM(diag)-33, DTC C2424 TRANSMITTER 4 BATTERY VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

R: DTC C2422 TRANSMITTER 2 BATTERY VOLTAGE LOW

NOTE:
Refer to DTC C2424 for diagnostic procedure. <Ref. to TPM(diag)-33, DTC C2424 TRANSMITTER 4 BATTERY VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

S: DTC C2423 TRANSMITTER 3 BATTERY VOLTAGE LOW

NOTE:
Refer to DTC C2424 for diagnostic procedure. <Ref. to TPM(diag)-33, DTC C2424 TRANSMITTER 4 BATTERY VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

T: DTC C2424 TRANSMITTER 4 BATTERY VOLTAGE LOW

DTC DETECTING CONDITION:
Detected when power supply voltage failure signal is received from each transmitter.
TROUBLE SYMPTOM:
Tire pressure warning light blinks 25 times and then illuminates.

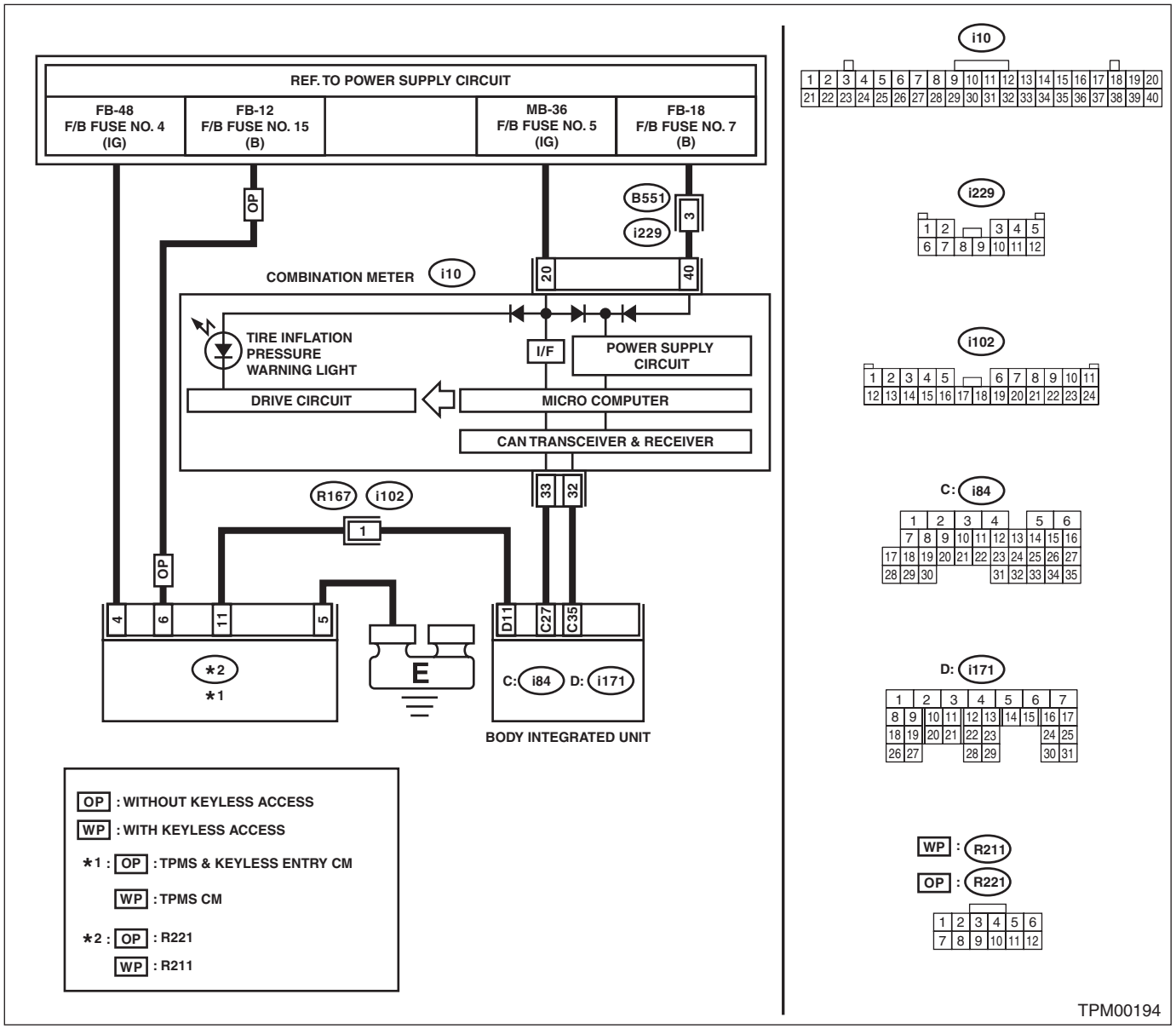
	Step	Check	Yes	No
1	**REPRODUCTION OF FAILURE.** 1) Perform the drive test. Drive the vehicle at 40 km/h (25 MPH) or faster for at least 10 minutes. 2) Read the DTC of tire pressure monitoring. <Ref. to TPM(diag)-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed as “Present fault”?	Go to step **2**.	When DTC is displayed as “Past faults”, the system has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, there may be temporary poor communication due to radio wave environment inside/outside the vehicle.
2	**CHECK TRANSMITTER.** 1) Replace all transmitters and register their IDs. <Ref. to TPM(diag)-15, OPERATION, Register Transmitter (ID).> 2) Perform the Clear Memory Mode. <Ref. to TPM(diag)-13, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to TPM(diag)-17, Inspection Mode.>	Is the fault eliminated?	Internal battery of the transmitter had worn out.	Replace the TPMS & keyless entry CM or TPMS CM. <Ref. to WT-10, Tire Pressure Monitoring System.>

U: DTC C2521 SPEED ABNORMAL

DTC DETECTING CONDITION:
Detected when transmitter normal signal is received at a vehicle speed of less than 6 km/h (4 MPH).

TROUBLE SYMPTOM:
Tire pressure warning light blinks 25 times and then illuminates.

WIRING DIAGRAM:
Tire Pressure Monitoring System <Ref. to WI(w/o HEV)-229, WIRING DIAGRAM, Tire Pressure Monitoring System.>



	Step	Check	Yes	No
1	**CHECK LAN COMMUNICATION.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Repair it according to the diagnosis for LAN system.	Go to step **2**.
2	**CHECK HARNESS (OPEN CIRCUIT).** Measure the resistance between TPMS & keyless entry CM or TPMS CM and body integrated unit. ***Connector & terminal*** ***Without keyless access with push button start*** ***(R221) No. 11 — (i171) No. 11:*** ***(R221) No. 5 — Chassis ground:*** ***With keyless access with push button start*** ***(R211) No. 11 — (i171) No. 11:*** ***(R211) No. 5 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair the harness.
3	**CHECK CONNECTOR.** Check each connector.	Is there poor contact or any other faults?	Repair the connector.	Replace the TPMS & keyless entry CM or TPMS CM. <Ref. to WT-10, Tire Pressure Monitoring System.>

15.General Diagnostic Table

A: INSPECTION

Symptoms		Faulty parts
Tire pressure warning light illuminates.	Tire pressure is reduced.	• Improper tire pressure adjustment • Punctured tire
Tire pressure warning light blinks 25 times and then illuminates.	Tire pressure monitoring system has malfunction.	• Air pressure sensor malfunction • Air pressure sensor is out of battery. • Defective TPMS & keyless entry CM or TPMS CM • Defective vehicle harness • Defective combination meter
Tire pressure is dropping but the warning light does not illuminate.	Tire pressure warning light does not illuminate.	• Air pressure sensor is faulty. • Defective TPMS & keyless entry CM or TPMS CM • Defective combination meter

DIFFERENTIALS

DI

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1. General Description

A: SPECIFICATION

1. REAR DIFFERENTIAL

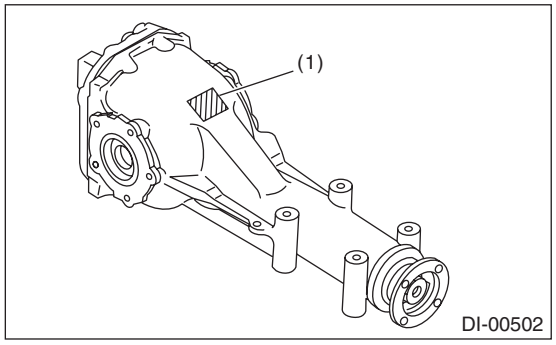
When replacing a rear differential assembly, select the correct one according to the following table.

NOTE:
• Using a different rear differential assembly will cause the drive train and tires to drag or emit abnormal noise.
• For option code, refer to “ID” section. <Ref. to ID-2, IDENTIFICATION, Identification.>

Model	2.0 L non-turbo		
	CVT	5MT	
		Except for Crosstrek model	Crosstrek model
Rear differential type	VA1-type	T-type	
Identification	XD	T2	TP
LSD type	—		
Type of gear	Hypoid gear		
Gear ratio (number of gear teeth)	3.700 (37/10)	4.111 (37/9)	4.444 (40/9)
Oil capacity	0.8 L (0.8 US qt, 0.7 Imp qt)		
Rear differential gear oil	GL–5 (75W-90)		

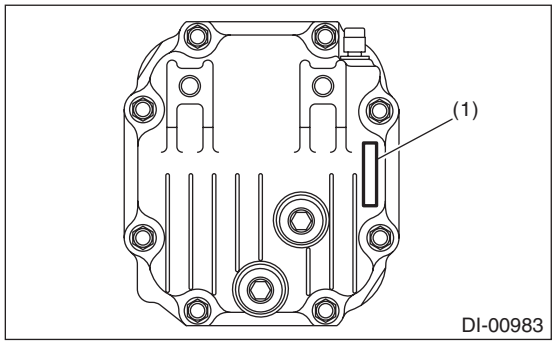
2. IDENTIFICATION

Identification positions are shown in the following figures. For details concerning identification, refer to the “ID” section.
• T-type



(1) Identification

• VA1-type

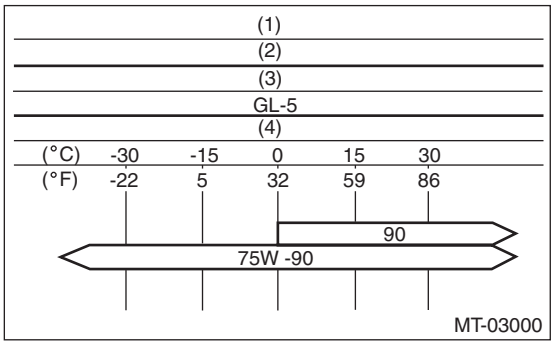


(1) Identification

3. REAR DIFFERENTIAL GEAR OIL

Recommended gear oil:
GL–5 (75W–90) or equivalent

CAUTION:
Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.



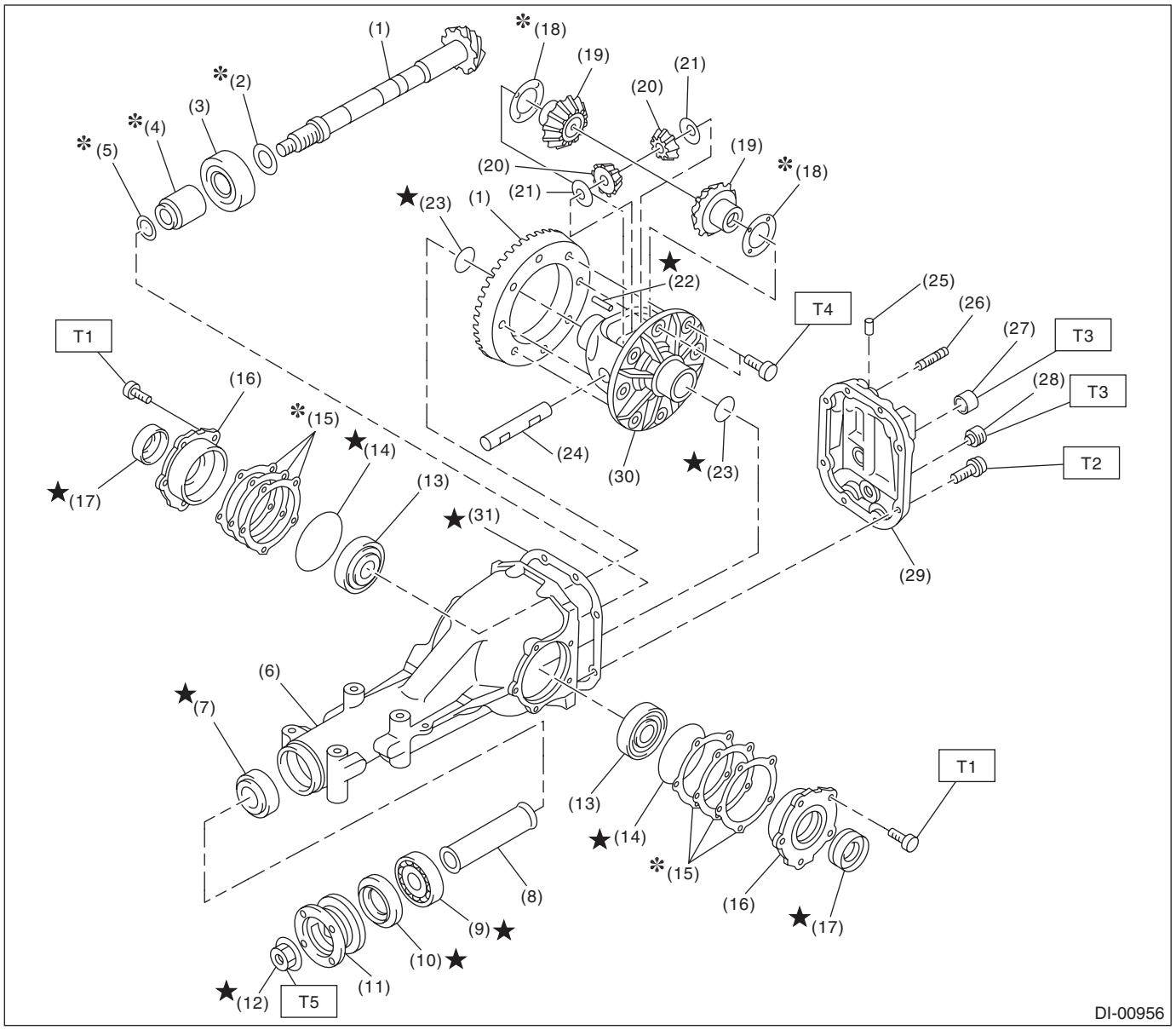
(1) Item
(2) Rear differential gear oil
(3) API classification
(4) SAE viscosity No. and applicable temperature

4. SERVICE DATA

Drive pinion bearing preload (for new bearing)	Measured with spring measurement (measured from the companion flange bolt)	N (kgf, lbf)	T-type	18.1 — 38.8 (1.8 — 4.0, 4.1 — 8.7)
			VA1-type	12.7 — 32.2 (1.3 — 3.3, 2.9 — 7.2)
	Measured with torque wrench	N·m (kgf-m, ft-lb)	T-type	0.69 — 1.47 (0.07 — 0.15, 0.51 — 1.08)
			VA1-type	0.48 — 1.22 (0.05 — 0.12, 0.35 — 0.90)
Side gear backlash		mm (in)	T-type	0.10 — 0.20 (0.004 — 0.008)
			VA1-type	0.05 — 0.15 (0.002 — 0.006)
Hypoid driven gear backlash		mm (in)	T-type	0.10 — 0.20 (0.004 — 0.008)
			VA1-type	0.10 — 0.15 (0.004 — 0.006)
Hypoid driven gear runout on its back surface		mm (in)	T-type	0.05 (0.002)
Total preload (measured from the companion flange bolt hole)		N (kgf, lbf)	T-type	20.7 — 54.4 (2.1 — 5.5, 4.7 — 12.2)
Companion flange mating surface runout		mm (in)		0.08 (0.003)
Companion flange runout on its inner side		mm (in)		0.08 (0.003)

B: COMPONENT

1. REAR DIFFERENTIAL (T-TYPE)

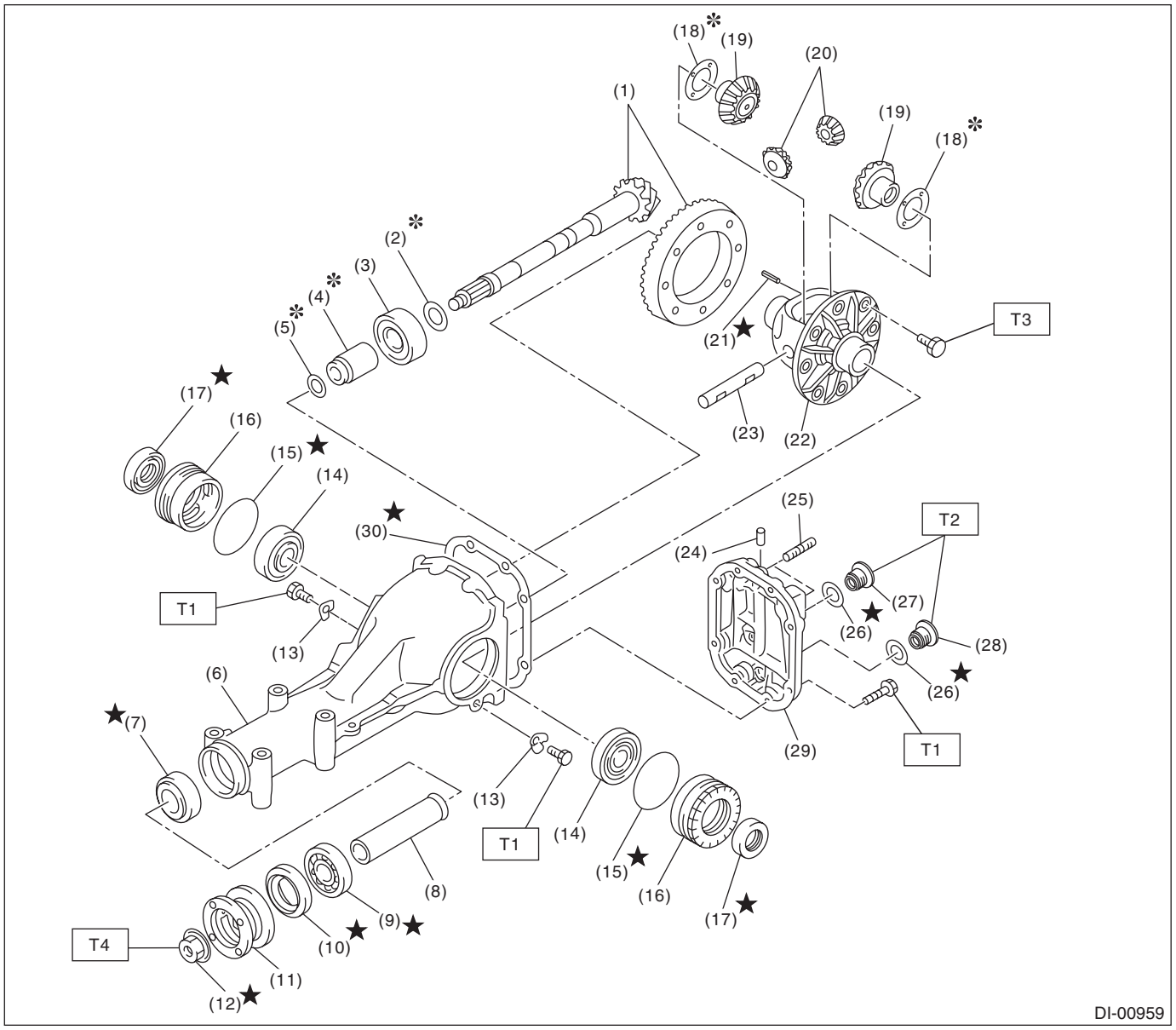


(1)	Hypoid driven gear and drive pinion set	(14)	O-ring	(27)	Filler plug
(2)	Pinion height adjusting washer	(15)	Side retainer shim	(28)	Drain plug
(3)	Rear bearing	(16)	Side retainer	(29)	Rear cover
(4)	Preload adjusting spacer	(17)	Side oil seal	(30)	Differential case
(5)	Preload adjusting washer	(18)	Side gear thrust washer	(31)	Gasket
(6)	Differential carrier	(19)	Side gear		
(7)	Front bearing	(20)	Pinion mate gear		
(8)	Spacer	(21)	Pinion mate gear washer		
(9)	Pilot bearing	(22)	Pinion shaft lock pin		
(10)	Front oil seal	(23)	Snap ring		
(11)	Companion flange	(24)	Pinion mate shaft		
(12)	Self-locking nut	(25)	Air breather cap		
(13)	Side bearing	(26)	Stud bolt		

Tightening torque: N·m (kgf-m, ft-lb)

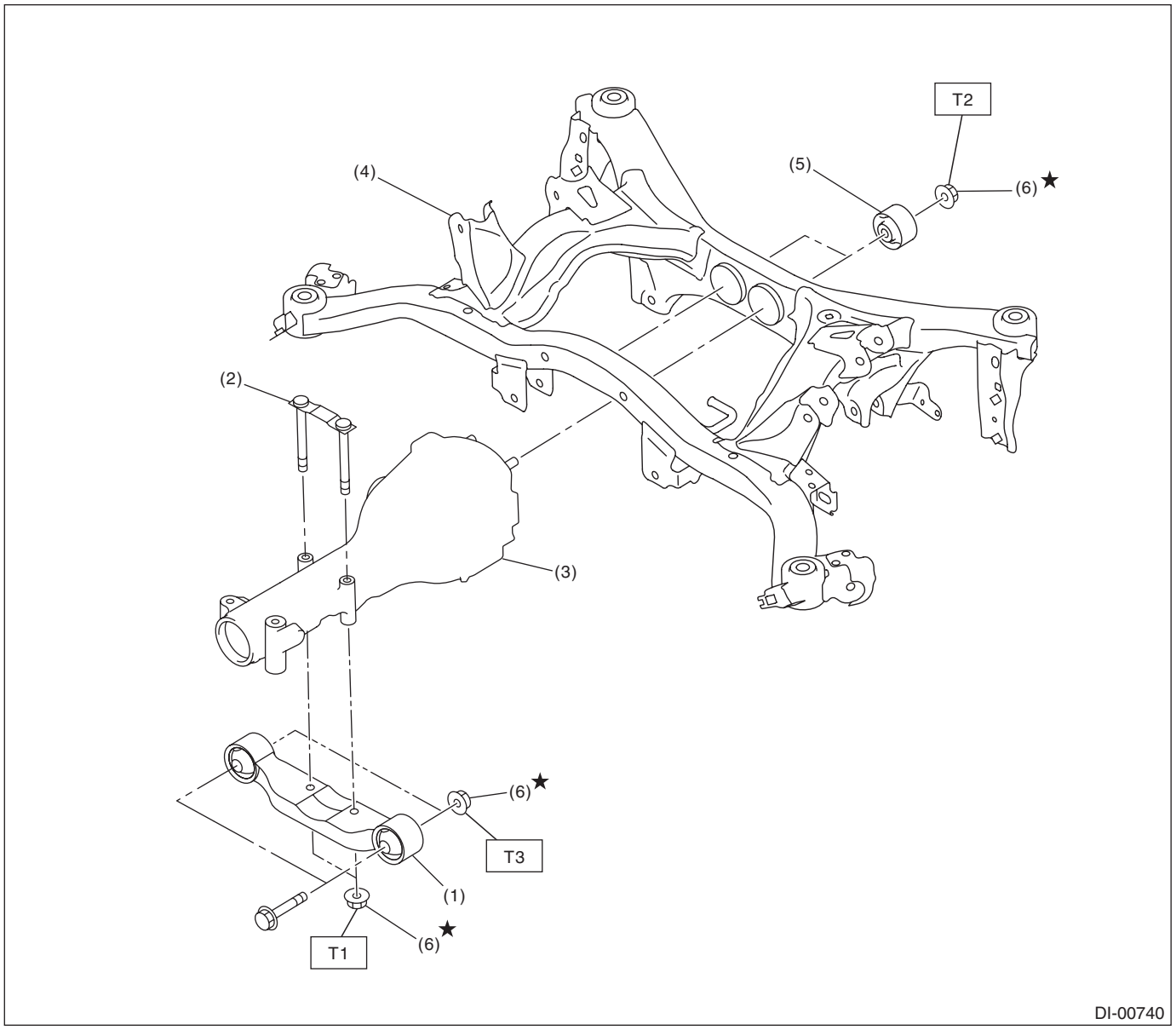
T1: 10.5 (1.1, 7.7)
T2: 29.5 (3.0, 21.8)
T3: 49 (5.0, 36.1)
T4: 103 (10.5, 76.0)
T5: 181.5 (18.5, 133.9)

2. REAR DIFFERENTIAL (VA1-TYPE)



(1)	Hypoid driven gear and drive pinion set	(13)	Lock plate	(25)	Stud bolt
(2)	Pinion height adjusting washer	(14)	Side bearing	(26)	Gasket
(3)	Rear bearing	(15)	O-ring	(27)	Filler plug
(4)	Preload adjusting spacer	(16)	Side retainer	(28)	Drain plug
(5)	Preload adjusting washer	(17)	Side oil seal	(29)	Rear cover
(6)	Differential carrier	(18)	Side gear thrust washer	(30)	Gasket
(7)	Front bearing	(19)	Side gear		
(8)	Spacer	(20)	Pinion mate gear	***Tightening torque: N·m (kgf-m, ft-lb)***	
(9)	Pilot bearing	(21)	Spring pin	***T1:***	***25 (2.5, 18.4)***
(10)	Front oil seal	(22)	Differential case	***T2:***	***50 (5.1, 36.9)***
(11)	Companion flange	(23)	Pinion mate shaft	***T3:***	***<Ref. to DI-46, ASSEMBLY, Rear Differential (VA-type).>***
(12)	Self-locking nut	(24)	Air breather cap	***T4:***	***191 (19.5, 140.9)***

3. REAR DIFFERENTIAL MOUNTING SYSTEM



(1)	Rear differential front member	(4)	Rear sub frame	
(2)	Rear differential member plate	(5)	Rear differential mount bushing	
(3)	Rear differential ASSY	(6)	Self-locking nut	

Tightening torque: N·m (kgf-m, ft-lb)
T1: 50 (5.1, 36.9)
T2: 70 (7.1, 51.6)
T3: 110 (11.2, 81.1)

C: CAUTION

- When performing any work, always wear work clothes, a work cap and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Use SUBARU genuine grease, the recommended or equivalent. Do not mix up grease etc. with that of different grades or manufacturers.
- Do not secure a part in a vise directly. Place cushioning materials such as wood pieces, blocks, aluminum plates, or waste cloth between the part and the vise.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing the O-ring or snap ring, apply a sufficient amount of gear oil to avoid damage and deformation.
- Avoid damaging the mating surface of the case.
- For parts which are not reusable, always use new parts. Other parts should be replaced with new parts as required.
- When handling oil or fuel, adhere to the following to prevent unexpected accident.
  - Be careful with fire.
  - Prepare a container to catch grease or oil, etc. If any grease or oil spills, wipe it off and clean immediately to prevent from penetrating into floor or flowing outside.
  - Follow all government and local regulations concerning disposal of refuse when disposing.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Some vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.

D: PREPARATION TOOL

1. SPECIAL TOOL

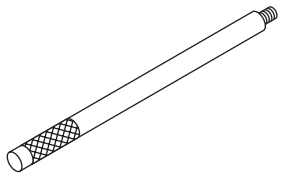
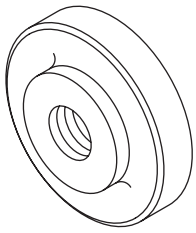
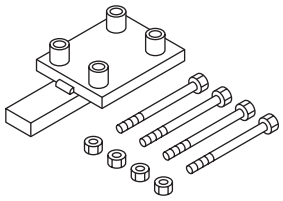
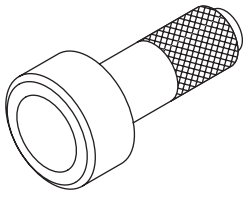
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477701	398477701	HANDLE	• Used for installing the rear bearing race. • Used for installing the front bearing race.
 ST-398477702	398477702	DRIFT	• Used for installing the front bearing race. (T-type) • Used for installing the rear bearing race. (VA1-type) • Used for installing side bearing race. (VA1-type)
 ST-398217700	398217700	ATTACHMENT SET	Stand for rear differential carrier disassembly and assembly.
 ST-498447120	498447120	INSTALLER	Used for installing the front oil seal.

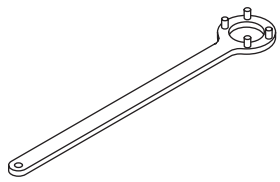
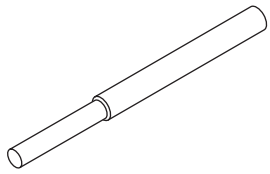
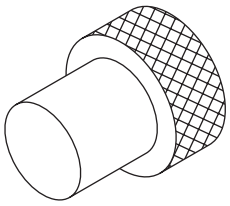
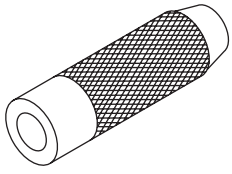
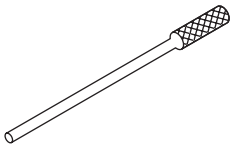
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498427200	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when removing and tightening self-lock nut.
 ST-398467700	398467700	DRIFT	Used for removing drive pinion shaft, pilot bearing and front bearing cone.
 ST-399780104	399780104	WEIGHT	• Used for installing the front bearing cone and the companion flange. • Used for installing the pilot bearing.
 ST-899580100	899580100	INSTALLER	Used for installing the front bearing cone and the pilot bearing.
 ST-899904100	899904100	STRAIGHT PIN REMOVER	• Used for removing and installing the pinion mate shaft lock pin. (T-type) • Used for removing and installing the pinion mate shaft spring pin. (VA1-type)

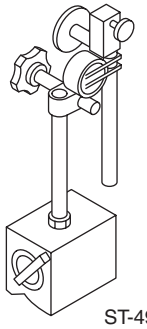
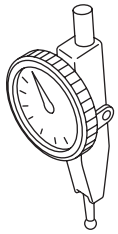
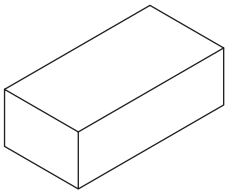
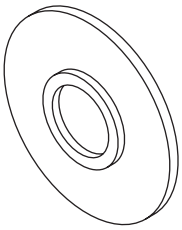
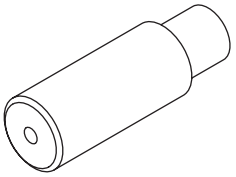
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247001	498247001	MAGNET BASE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used together with MAGNET BASE (498247001).
 ST-398507704	398507704	BLOCK	Used for adjusting pinion height and preload.
 ST-398177700	398177700	INSTALLER	Used for installing the rear bearing cone. (T-type)
 ST-398457700	398457700	ATTACHMENT	Used for removing the side retainer. (T-type)

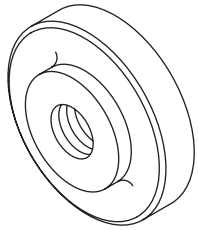
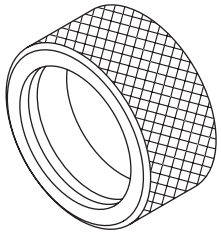
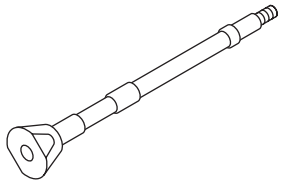
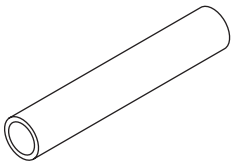
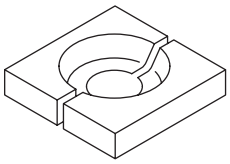
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477703	398477703	DRIFT 2	Used for installing the rear bearing race. (T-type)
 ST-398437700	398437700	DRIFT	Used for installing the side oil seal. (T-type)
 ST-398507702	398507702	DUMMY SHAFT	Used for adjusting pinion height and preload. (T-type)
 ST-398507703	398507703	DUMMY COLLAR	Used for adjusting pinion height and preload. (T-type)
 ST-398517700	398517700	REPLACER	Used for removing rear bearing cone. (T-type)

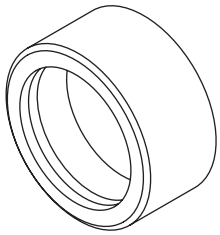
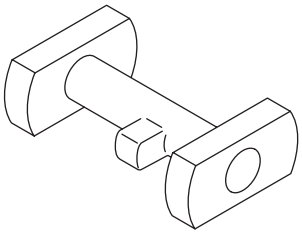
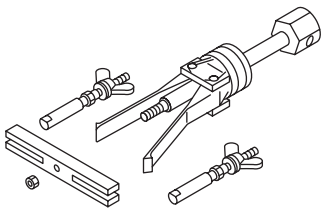
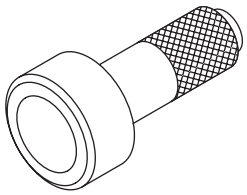
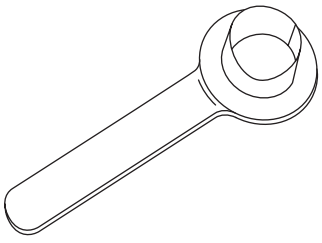
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398487700	398487700	DRIFT	Used for installing side bearing cone. (T-type)
 ST-398507701	398507701	DIFFERENTIAL CARRIER GAUGE	Used for adjusting pinion height. (T-type)
 ST-398527700	398527700	PULLER ASSY	• Used for removing front oil seal. • Used for removing the side bearing race. (T-type) • Used for removing side oil seal.
 ST-398417700	398417700	DRIFT	Used for installing side bearing race. (T-type)
 ST28099PA090	28099PA090	OIL SEAL PROTECTOR	Used for installing the rear drive shaft to the rear differential. (For oil seal protection)

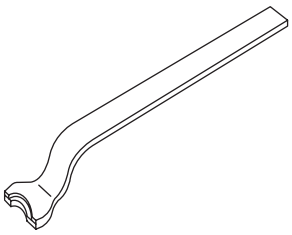
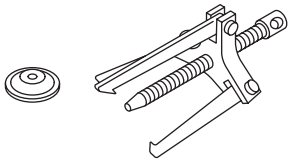
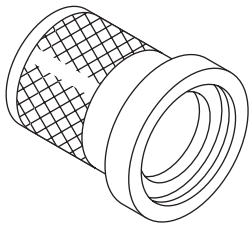
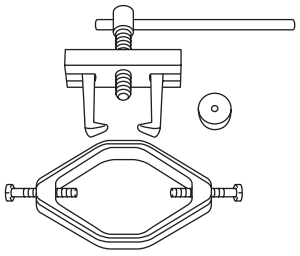
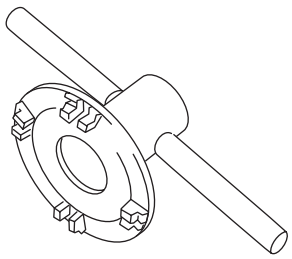
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28099PA100	28099PA100	DRIVE SHAFT REMOVER	Used for removing the rear drive shaft from rear differential. (T-type)
 ST-399703600	399703600	PULLER ASSY	Used for removing companion flange.
 ST-899874100	899874100	INSTALLER	Used for installing the companion flange.
 ST18759AA000	18759AA000	PULLER ASSY	Used for removing the side bearing cone. (T-type)
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	• Used for removing and installing the side retainer. (VA1-type) • WRENCH ASSY (499787000) can also be used.

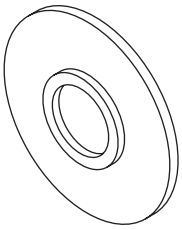
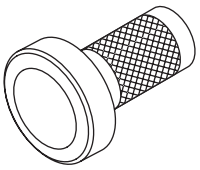
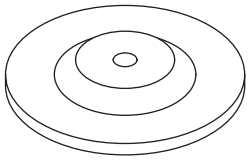
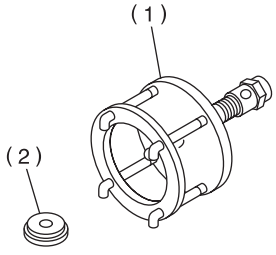
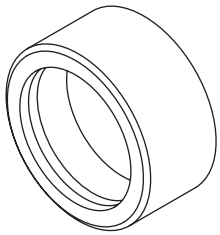
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498175500	498175500	INSTALLER	Used for installing the rear bearing cone. (VA1-type)
 ST498447100	498447100	INSTALLER	Used for installing the side oil seal. (VA1-type)
 ST-399520105	399520105	SEAT	• Used for removing the side bearing cone. (VA1-type) • Used together with PULLER SET (899524100). (VA1-type)
 ST-899524100	899524100	PULLER SET	• Used for removing the side bearing cone. (VA1-type) • Used together with SEAT (399520105). (1) Puller (2) Cap
 ST-498485400	498485400	DRIFT	Used for installing side bearing cone. (VA1-type)

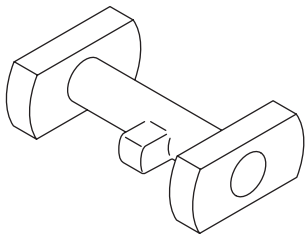
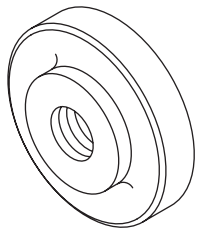
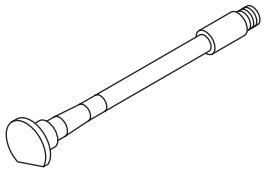
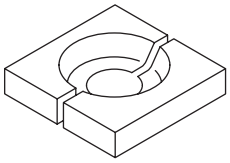
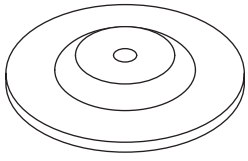
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498505501	498505501	DIFFERENTIAL CARRIER GAUGE	Used for adjusting pinion height. (VA1-type)
 ST-498447110	498447110	DRIFT	Used for installing the front bearing race. (VA1-type)
 ST-498447150	498447150	DUMMY SHAFT	Used for adjusting pinion height and preload. (VA1-type)
 ST-498515500	498515500	REPLACER	Used for removing rear bearing cone. (VA1-type)
 ST-499705404	499705404	SEAT	• Used for removing the side bearing race. (VA1-type) • Used together with PULLER ASSY (499705401).

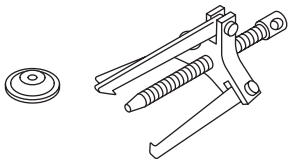
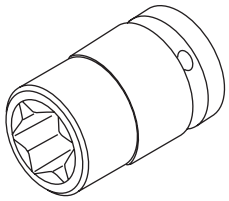
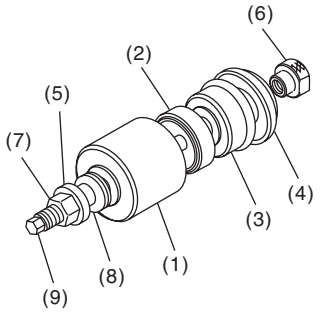
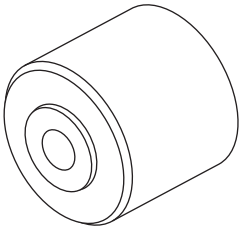
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499705401	499705401	PULLER ASSY	• Used for removing the side bearing race. (VA1-type) • Used together with SEAT (499705404).
 ST18270KA020	18270KA020	SOCKET (E20)	Used for removing and installing the hypoid driven gear. (VA1-type)
 ST41399FG001	41399FG001	SPECIAL TOOL ASSY	• Used for removing and installing the rear differential mount bushing. • Use (1), (2), (5), (6), (7), (8) and (9) for removal. • Use (3), (4), (5), (6), (7), (8) and (9) for installation. (1) SPECIAL TOOL A (41399FG010) (2) SPECIAL TOOL C (41399FG031) (3) SPECIAL TOOL B (41399FG020) (4) SPECIAL TOOL D (41399FG041) (5) SPECIAL TOOL SLEEVE (41399FG050) (6) SPECIAL TOOL RING (41399FG061) (7) SPECIAL TOOL NUT (41399FG070) (8) SPECIAL TOOL BEARING (41399FG080) (9) SPECIAL TOOL SHAFT (41399FG091)
 ST41399FG010	41399FG010	SPECIAL TOOL A	• Used for removing the rear differential mount bushing. • For combination of tools for removal, refer to “SPECIAL TOOL ASSY (41399FG001)”.

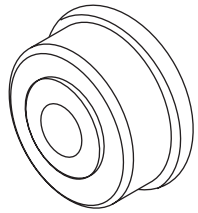
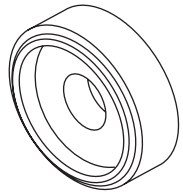
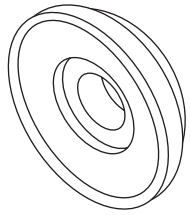
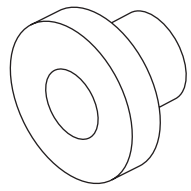
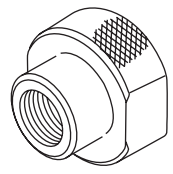
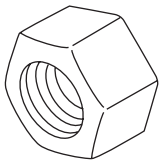
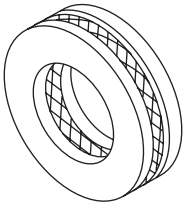
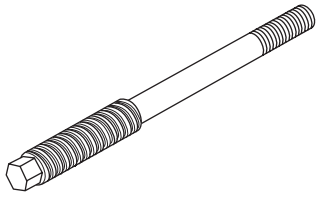
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG020	41399FG020	SPECIAL TOOL B	• Used for installing the rear differential mount bushing. • For combination of tools for installation, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 ST41399FG031	41399FG031	SPECIAL TOOL C	• Used for removing the rear differential mount bushing. • For combination of tools for removal, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 ST41399FG041	41399FG041	SPECIAL TOOL D	• Used for installing the rear differential mount bushing. • For combination of tools for installation, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 ST41399FG050	41399FG050	SPECIAL TOOL SLEEVE	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 ST41399FG061	41399FG061	SPECIAL TOOL RING	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to “SPECIAL TOOL ASSY (41399FG001)”.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG070	41399FG070	SPECIAL TOOL NUT	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 ST41399FG080	41399FG080	SPECIAL TOOL BEARING	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 ST41399FG091	41399FG091	SPECIAL TOOL SHAFT	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and troubleshooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Transmission jack	Used for removing and installing the rear differential.
Puller	Used for removing the side bearing retainer.
Thickness gauge	Used for measuring clearance.
Hexagon wrench	Used for installing and removing the filler plug and drain plug.
Tire lever	Used for removing the rear drive shaft. (VA1-type)
Angle gauge	Used for installing the hypoid driven gear. (VA1-type)
DST-i	Used together with Subaru Select Monitor 4.

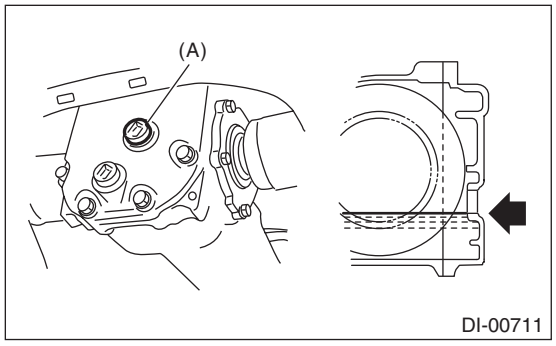
2. Differential Gear Oil

A: INSPECTION

1) Lift up the vehicle.
2) Remove the filler plug, and then check the gear oil. Replace the gear oil if it is contaminated, deteriorated or cloudy. <Ref. to DI-20, REPLACEMENT, Differential Gear Oil.>
3) Check that the gear oil level is within –5 mm (–0.2 in) from the bottom of the filler plug hole. If the level is low, make sure that there is no oil leakage and refill up to the bottom of filler plug hole.

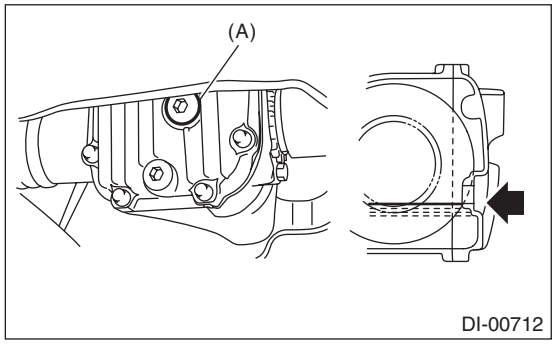
NOTE:
On VA1-types at factory settings, the oil level may be within –14 mm (–0.6 in) from the bottom of the filler plug. This is at normal level, requiring no oil refill.

- T-type



(A) Filler plug

- VA1-type



(A) Filler plug

4) Install the filler plug.

NOTE:
- For the T-type, degrease the thread portion sufficiently and apply liquid gasket to the filler plug.

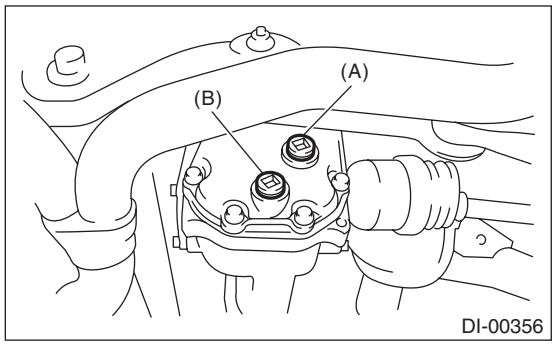
Liquid gasket:
THREE BOND 1105 (Part No. 004403010) or equivalent
- For VA-type, use a new gasket.

Tightening torque:
T-type:
49 N·m (5.0 kgf-m, 36.1 ft-lb)
VA-type:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

B: REPLACEMENT

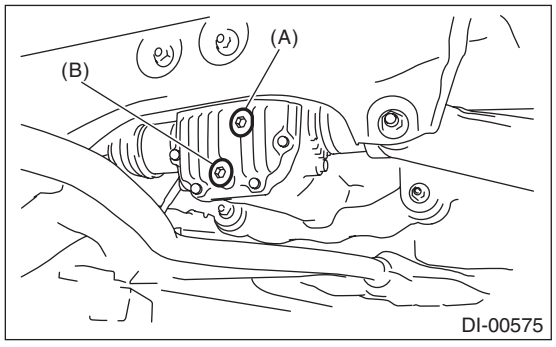
CAUTION:
- **Gear oil is extremely hot just after driving. Be wary of receiving burns.**
- **Be careful not to spill the differential gear oil on exhaust pipe. If gear oil is spilled, wipe it off completely.**

1) Lift up the vehicle.
2) Remove the drain plug and filler plug, and drain the gear oil.
- T-type



(A) Filler plug
(B) Drain plug

- VA1-type



(A) Filler plug
(B) Drain plug

3) Tighten the drain plug.

NOTE:
- For the T-type, degrease the thread portion sufficiently and apply liquid gasket to the drain plug.

Liquid gasket:
THREE BOND 1105 (Part No. 004403010) or equivalent
- For VA-type, use a new gasket.

Tightening torque:
T-type:
49 N·m (5.0 kgf-m, 36.1 ft-lb)
VA-type:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

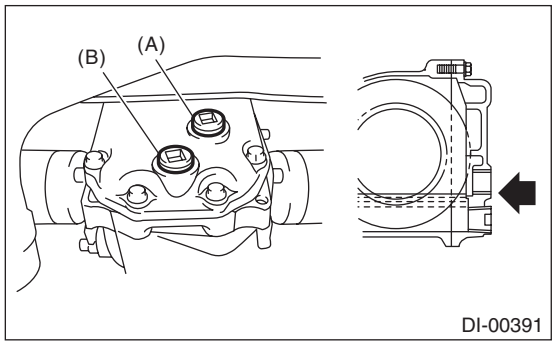
4) Fill the differential carrier with gear oil to the bottom of filler plug.

NOTE:
Carefully refill gear oil while watching the level. Excessive or insufficient oil must be avoided.

Recommended gear oil:
<Ref. to DI-2, SPECIFICATION, General Description.>

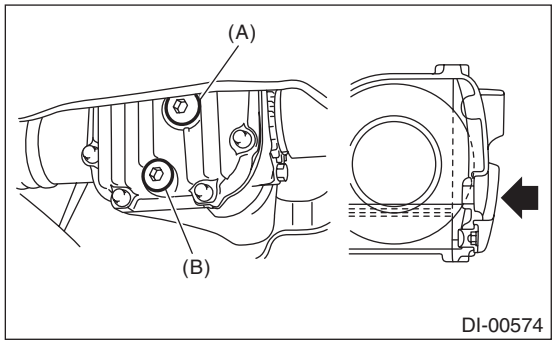
Oil capacity:
0.8 L (0.8 US qt, 0.7 Imp qt)

- T-type



(A) Filler plug
(B) Drain plug

- VA1-type



(A) Filler plug
(B) Drain plug

5) Install the filler plug.

NOTE:
- For the T-type, degrease the thread portion sufficiently and apply liquid gasket to the filler plug.

Liquid gasket:
THREE BOND 1105 (Part No. 004403010) or equivalent

- For VA-type, use a new gasket.

Tightening torque:
T-type:
49 N·m (5.0 kgf-m, 36.1 ft-lb)
VA-type:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

3. Front Differential Assembly

A: NOTE

1. CVT MODEL

For front differential for the CVT model, refer to the “CVT” section. <Ref. to CVT(TR580)-319, Front Differential Assembly.>

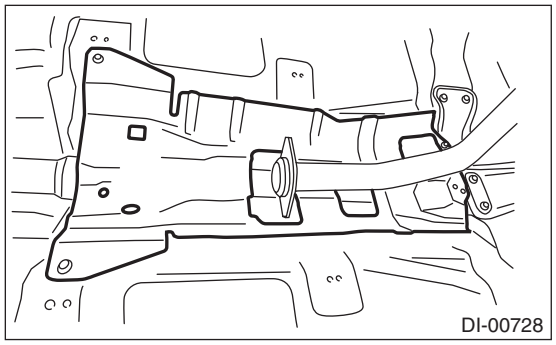
2. MT MODEL

For front differential for the 5MT model, refer to the “5MT” section. <Ref. to 5MT-74, Front Differential Assembly.>

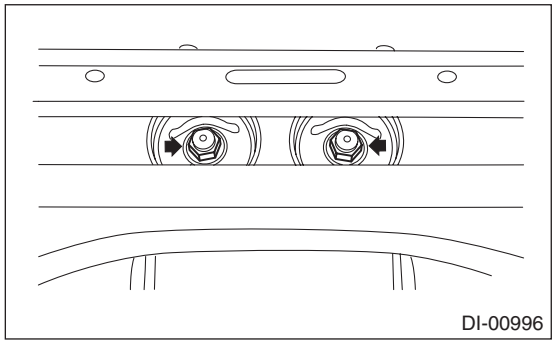
4. Rear Differential (T-type)

A: REMOVAL

1) Shift the select lever or gear shift lever to neutral.
2) Disconnect the ground cable from battery.
3) Release the parking brake.
4) Loosen the wheel nuts.
5) Lift up the vehicle.
6) Remove the rear wheels.
7) Drain differential gear oil. <Ref. to DI-20, REPLACEMENT, Differential Gear Oil.>
8) Remove the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
9) Remove the center exhaust cover.


DI-00728

10) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
11) Loosen the self-lock nuts which hold the rear differential to the rear sub frame assembly.

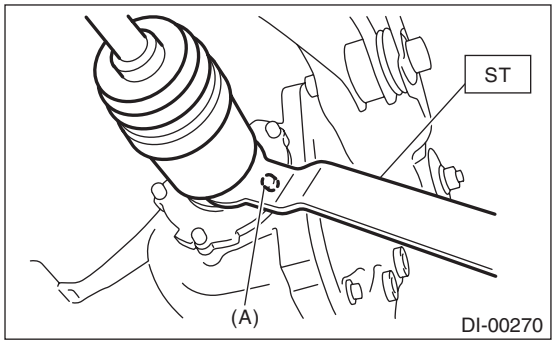

DI-00996

12) Remove the DOJ of rear drive shaft from rear differential using ST or tire lever.

NOTE:
- For the T-type, use the ST.
- For the VA-type, use the tire lever.
- When removing the DOJ from the rear differential, fit the tire lever or ST to the bolts as shown in the figure so as not to damage the side retainer.

T-type

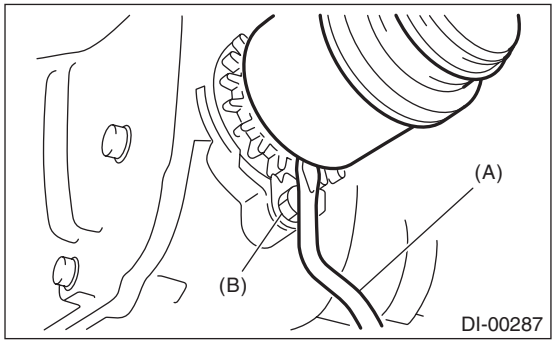
ST 28099PA100 DRIVE SHAFT REMOVER



DI-00270

(A) Bolt

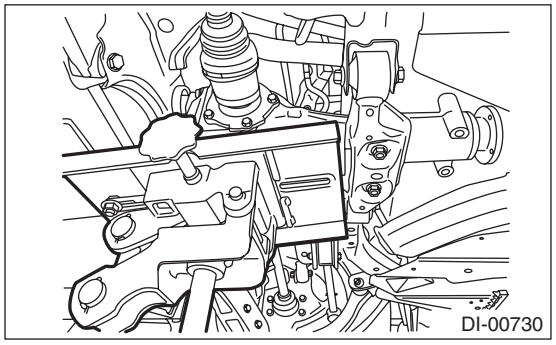
VA-type



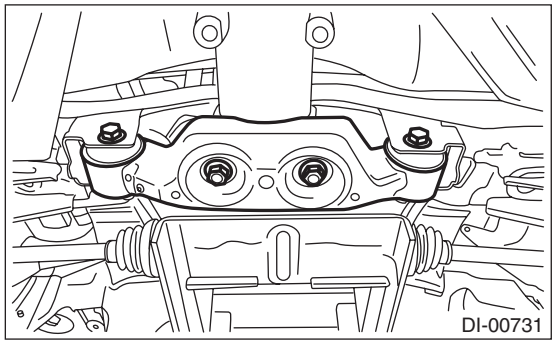
DI-00287

(A) Tire lever
(B) Bolt

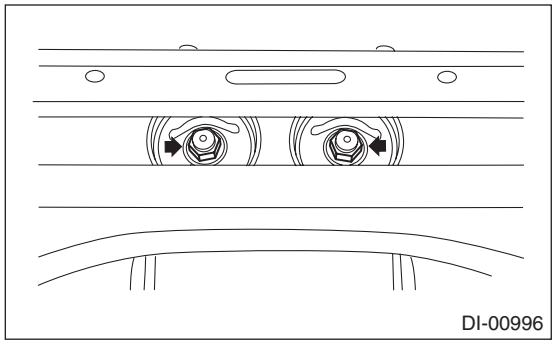
13) Set the rear differential to transmission jack.


DI-00730

14) Remove the rear differential front member.

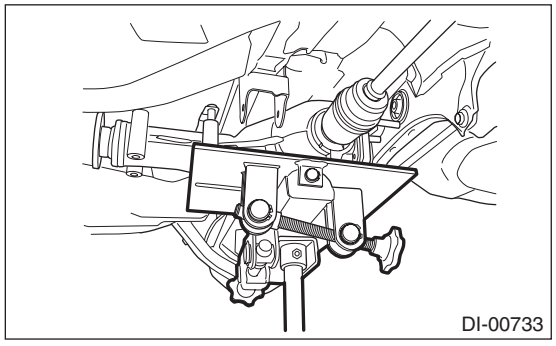


15) Remove the self-lock nuts which hold the rear differential to the rear sub frame assembly.



16) Pull out the rear differential stud bolt from rear differential mount bushing.

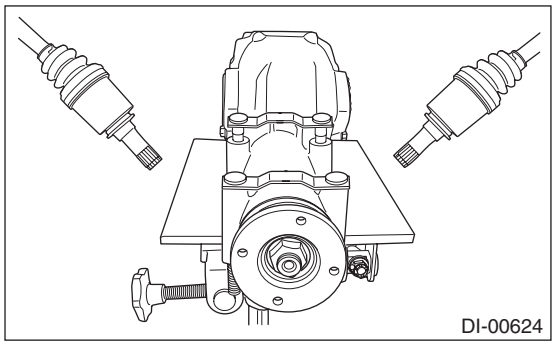
NOTE:
When removing the stud bolt from the rear differential mount bushing, carefully adjust the angle and location of transmission jack and jack stand, if necessary.



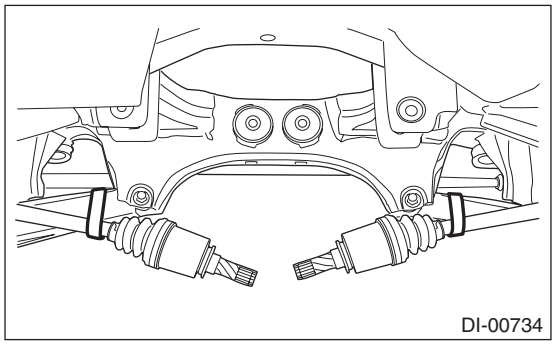
17) Lower the transmission jack.

18) Pull out the rear drive shaft from the rear differential.

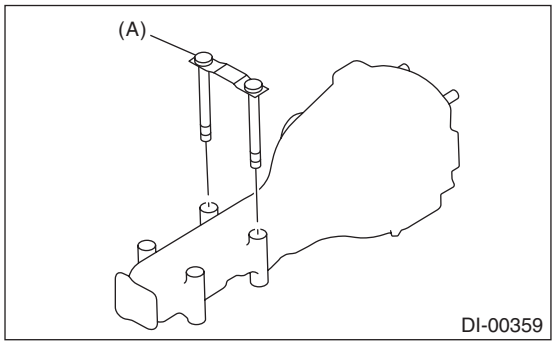
NOTE:
If it is difficult to pull out the rear drive shaft from rear differential, use the ST for T-type and the tire lever for VA-type.
ST 28099PA100 DRIVE SHAFT REMOVER



19) Lower the transmission jack.
20) Secure the rear drive shaft to rear lateral link using wire.



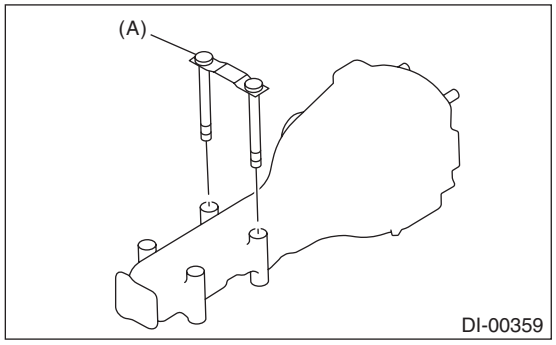
21) Remove the rear differential member plate from rear differential.



(A) Rear differential member plate

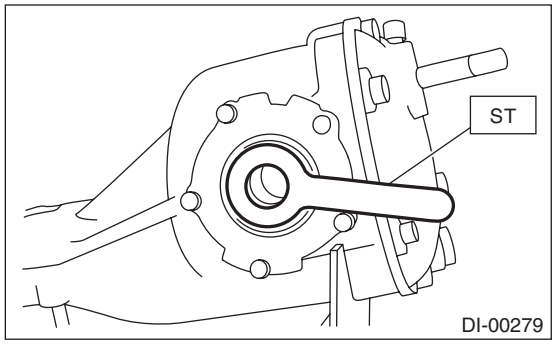
B: INSTALLATION

1) Attach the rear differential member plate to the rear differential.

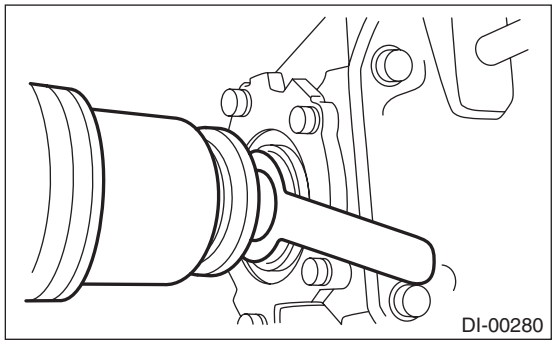


(A) Rear differential member plate

2) Set the rear differential to transmission jack.
3) Set the ST to the rear differential.
ST 28099PA090 OIL SEAL PROTECTOR

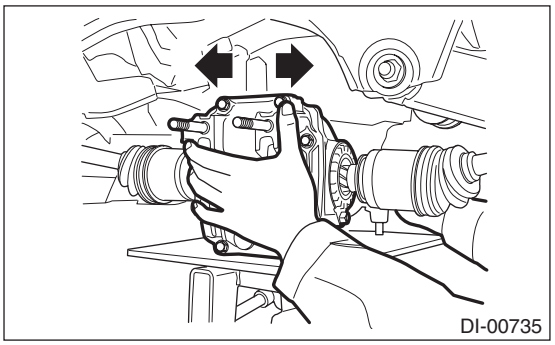


4) Insert the rear drive shaft until the spline portion of the rear drive shaft exceeds the side oil seal.

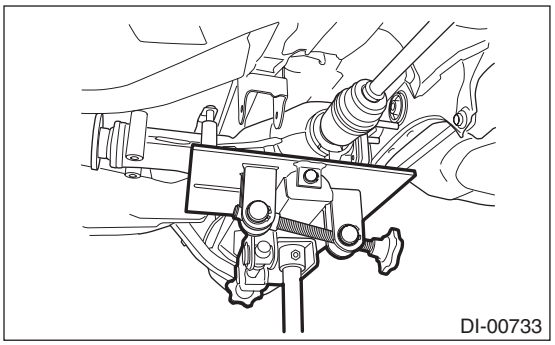


5) Remove ST from rear differential.

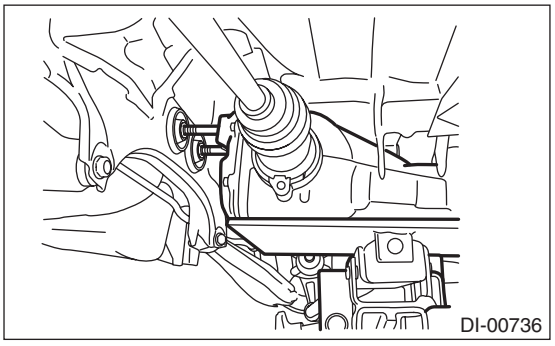
6) Push the rear differential from side to side to insert the DOJ into rear differential completely.



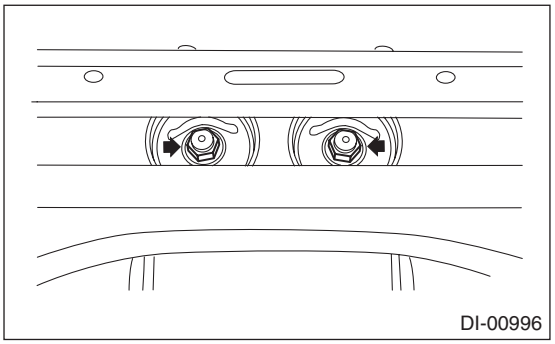
7) Adjust the transmission jack, if necessary, and insert the rear differential stud bolt into the rear differential mount bushing properly.



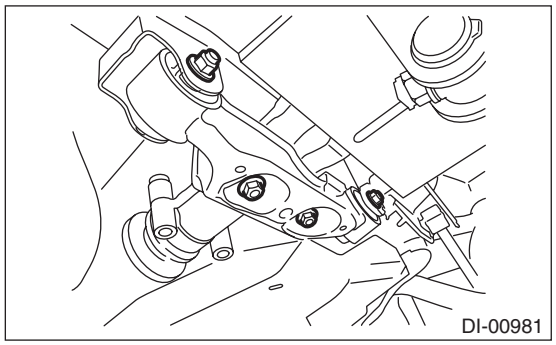
8) After inserting the rear differential stud bolt into the rear differential mount bushing, lift up the transmission jack and align the rear differential to its attachment position.



9) Tighten a new self-locking nut temporarily to the rear differential stud bolt.

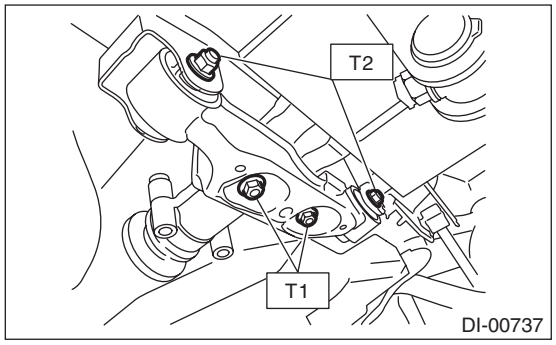


10) Install the rear differential front member, and temporarily attach and tighten a new self-locking nut.



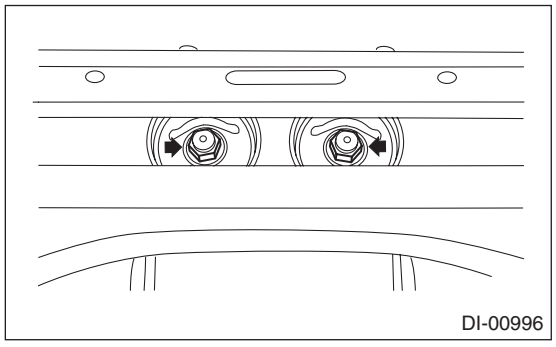
11) Remove the transmission jack.
12) Tighten the self-locking nut.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 110 N·m (11.2 kgf-m, 81.1 ft-lb)



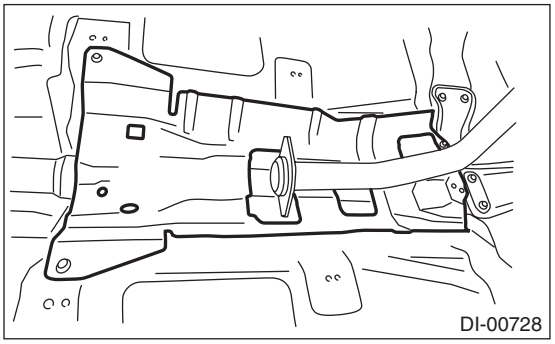
13) Tighten the self-locking nut.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



14) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
15) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

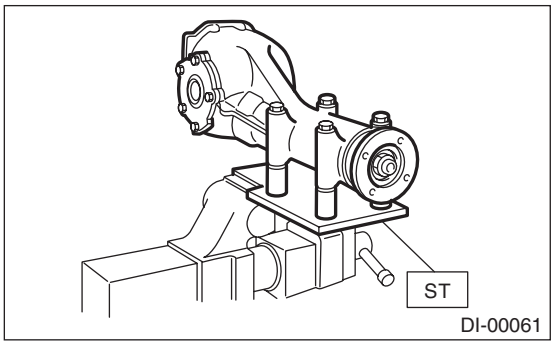


16) Install the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.>
17) Fill differential gear oil. <Ref. to DI-20, REPLACEMENT, Differential Gear Oil.>
18) Installing procedure hereafter is in the reverse order of removal.
19) Perform “Rear differential inspection mode” using the Subaru Select Monitor. (CVT model) <Ref. to DI-67, Rear Differential Inspection Mode.>

CAUTION:
Be sure to perform rear differential inspection mode when the following work has been performed.
- **Replacement of rear differential**
- **Replacement of rear differential hypoid gear set**
- **Replacement of transmission assembly**
- **Replacement of front differential hypoid gear set**

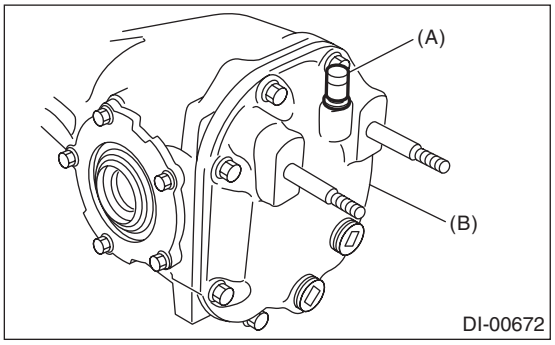
C: DISASSEMBLY

To detect the real cause of trouble, inspect the following items before disassembling.
• Tooth contact and backlash between hypoid driven gear and drive pinion
• Hypoid driven gear runout on its back surface
• Total preload of drive pinion
1) Set the ST on vise and install the differential assembly to ST.
ST 398217700 ATTACHMENT SET



2) Remove the drain plug and filler plug.
3) Remove the air breather cap.

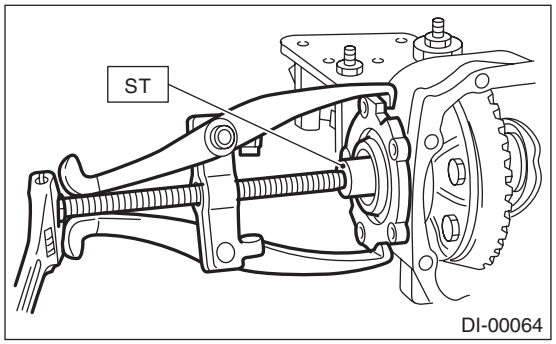
NOTE:
• Do not attempt to remove the air breather cap unless necessary.
• Whenever the air breather cap is removed, replace it with a new part.



(A) Air breather cap
(B) Rear cover

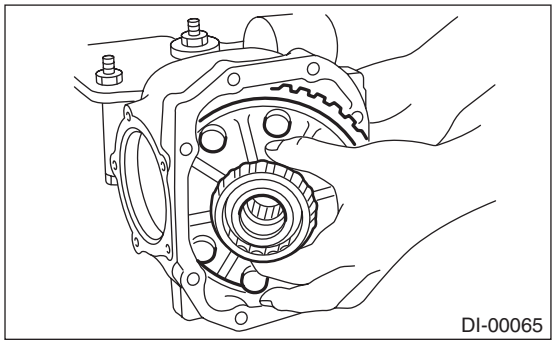
4) Remove the bolts, and then remove the rear cover.
5) Remove the stud bolts from rear cover if necessary.
6) Remove the side retainer attachment bolts, set the ST to differential case, and extract the side retainers RH and LH with a puller.

NOTE:
• Side retainer shim of each side should be kept together with its mating retainer.
• Keep the side retainers separate by attaching tags or in similar ways to make it possible to identify RH and LH sides during reassembly.
ST 398457700 ATTACHMENT

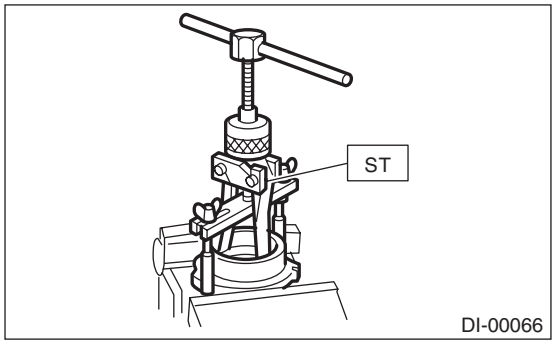


7) Pull out the differential case assembly from the differential carrier.

NOTE:
Be careful not to hit the teeth of hypoid driven gear against the differential carrier.



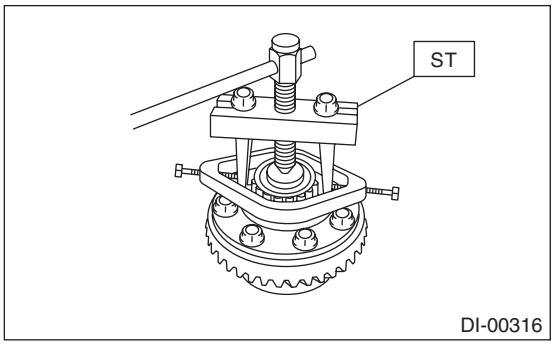
8) Remove the oil seal and O-ring from the side retainer.
9) When replacing the side bearing, remove the side bearing race from the side retainer using ST.
ST 398527700 PULLER ASSY



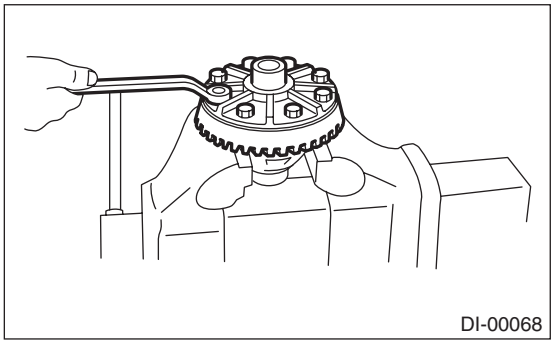
10) Using the ST, remove the side bearing cone.

NOTE:
• Do not attempt to disassemble the parts unless necessary.
• Set the ST so that its claws catch the edge of the side bearing cone.
• Never mix up the RH and LH bearing races and cones.

ST 18759AA000 PULLER ASSY

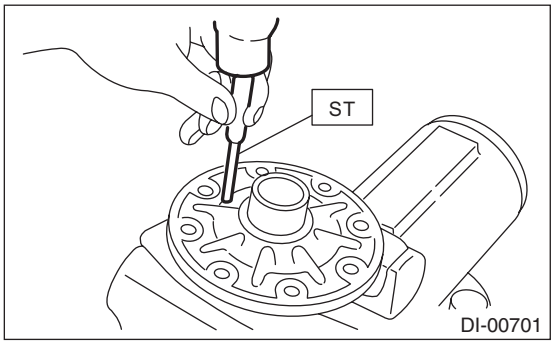


11) Remove the hypoid driven gear by loosening hypoid driven gear bolts.



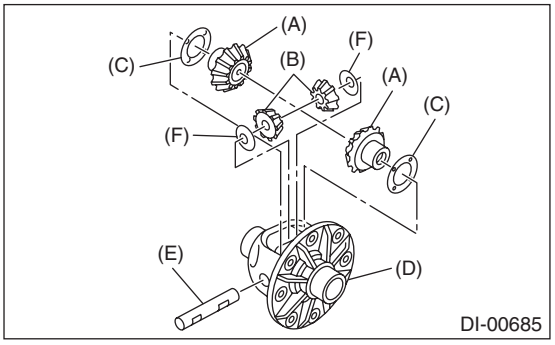
12) Remove the pinion shaft lock pin from hypoid driven gear side using ST.

ST 899904100 STRAIGHT PIN REMOVER



13) Draw out the pinion mate shaft, and remove pinion mate gears, pinion mate gear washers, side gears, and side gear thrust washers.

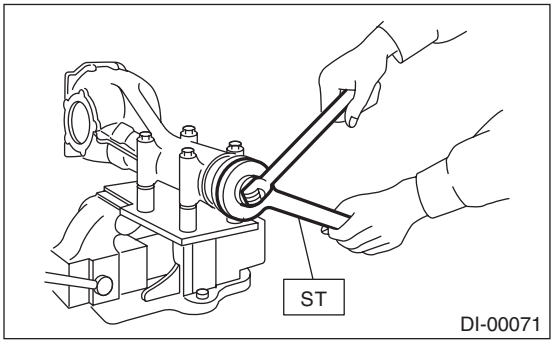
NOTE:
The gears and washers should be marked with RH or LH, front or rear, or kept separately.



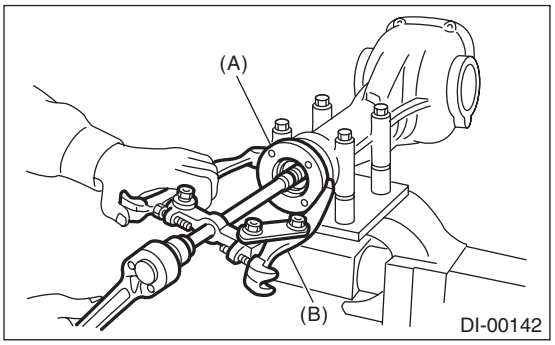
(A) Side gear
(B) Pinion mate gear
(C) Side gear thrust washer
(D) Differential case
(E) Pinion mate shaft
(F) Pinion mate gear washer

14) Remove the self-locking nut while securing the companion flange with ST.

ST 498427200 FLANGE WRENCH



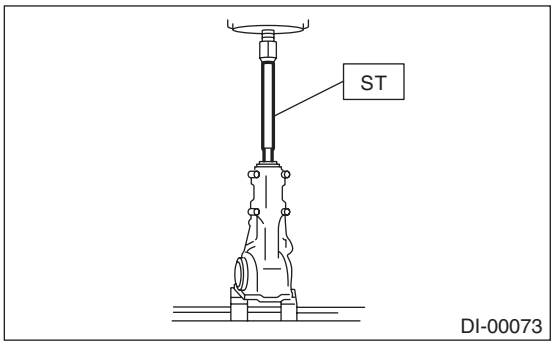
15) Extract the companion flange with a puller.



(A) Companion flange
(B) Puller

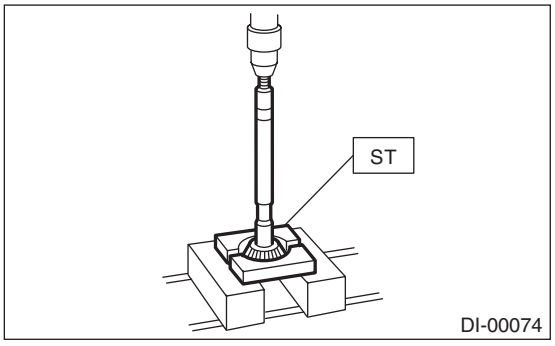
16) Press the end of drive pinion shaft using ST and remove the rear bearing cone, pinion height adjusting washer, preload adjusting spacer and washer.

NOTE:
Hold the drive pinion so as not to drop it.
ST 398467700 DRIFT

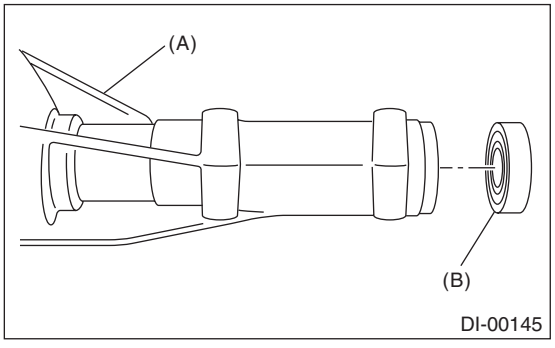


17) Remove the rear bearing cone from drive pinion by supporting the bearing cone with ST.

NOTE:
Place the replacer so that its center-recessed side faces the bearing cone.
ST 398517700 REPLACER

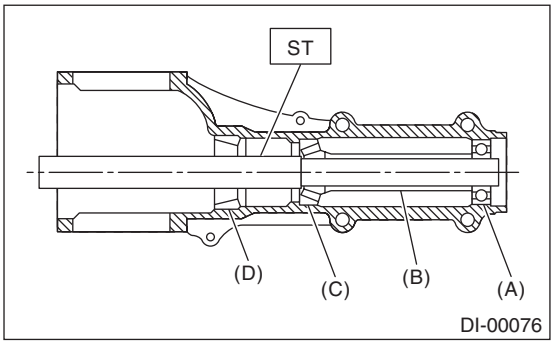


18) Remove the front oil seal from differential carrier using ST.
ST 398527700 PULLER ASSY



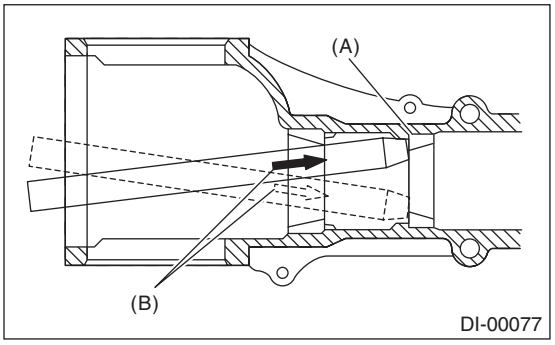
(A) Differential carrier
(B) Front oil seal

19) Remove the pilot bearing together with the front bearing cone and spacer using the ST.
ST 398467700 DRIFT



(A) Pilot bearing
(B) Spacer
(C) Front bearing
(D) Rear bearing race

20) When replacing the bearings, use a brass bar to tap out the front bearing race and rear bearing race in this order to remove them.

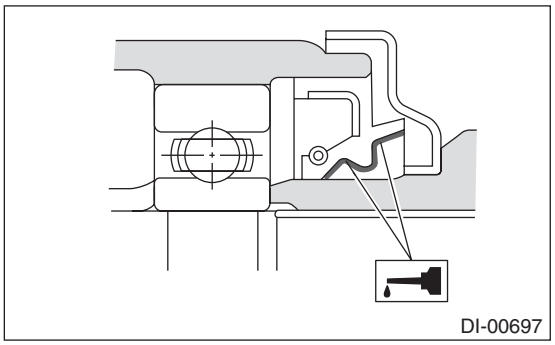


(A) 2 cutout portions along diagonal lines
(B) Tap alternately with brass bar.

D: ASSEMBLY

NOTE:
- Assemble in the reverse order of disassembly.
- Check and adjust each part during assembly.
- Keep the shims and washers in order, so that they are not improperly installed.
- Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.
- Apply differential gear oil when installing the bearings and thrust washers.
- Be careful not to mix up the RH and LH bearing races.
- Replace the gasket, oil seal and O-ring with a new part.
- Be careful not to mix up the rear differential side oil seal RH and LH.

• Apply differential gear oil to the lips when installing the oil seal.

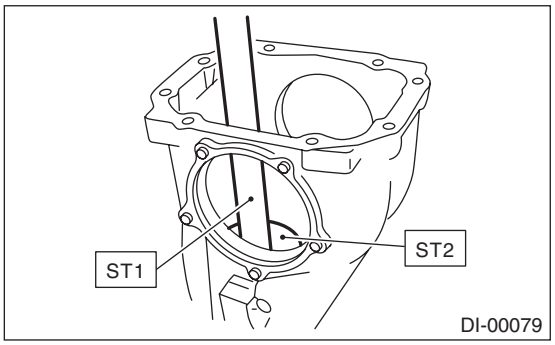


1) Adjusting preload for front and rear bearings

NOTE:
Adjust the bearing preload between front and rear bearings with preload adjusting spacer and washer. Pinion height adjusting washer is not affected by this adjustment. The adjustment must not be carried out with oil seal inserted.

(1) Install the rear bearing race into the differential carrier using ST1 and ST2.

ST1 398477701 HANDLE
ST2 398477703 DRIFT 2



(2) Install the front bearing race to the differential carrier using ST1 and ST2.

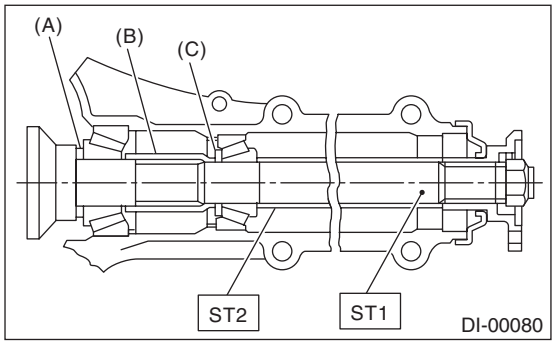
NOTE:
Use a new front bearing race.
ST1 398477701 HANDLE
ST2 398477702 DRIFT

(3) Insert ST1 into the differential carrier with the pinion height adjusting washer and rear bearing cone fitted onto it.

NOTE:
• At this time, install a provisionally selected or previously used pinion height adjusting washer. Measure and record the thickness.
• If tooth contact (drive pinion, hypoid driven gear) is normal in the inspection before disassembling, verify that the washer is not deformed, and then reuse the used washer.

(4) Install the preload adjusting spacer and washer, front bearing cone, ST2, companion flange and self-locking nut.

NOTE:
Use new front bearing cone.
ST1 398507702 DUMMY SHAFT
ST2 398507703 DUMMY COLLAR

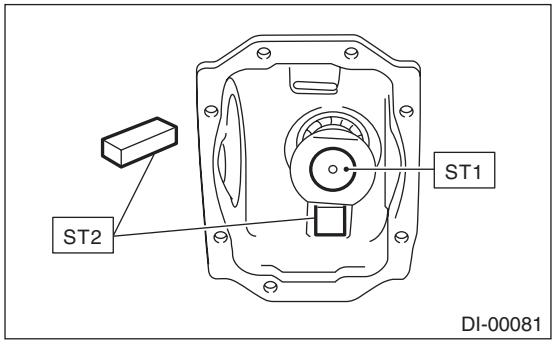


(A) Pinion height adjusting washer
(B) Preload adjusting spacer
(C) Preload adjusting washer

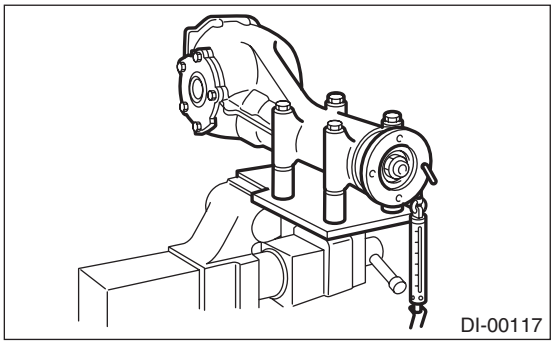
(5) Turn the ST1 by hand to smooth the bearing, and tighten the self-locking nut while measuring the initial load or initial torque with a spring scale or torque wrench. Select the preload adjusting washer and spacer so that the specified preload is obtained when nut is tightened to the specified torque.

NOTE:
• Use a new self-locking nut.
• Measure the preload in direction of tangent to the flange.
• Be careful not to give excessive preload.
• When tightening the self-locking nut, lock ST1 with ST2 as shown in the figure.
ST1 398507702 DUMMY SHAFT
ST2 398507704 BLOCK

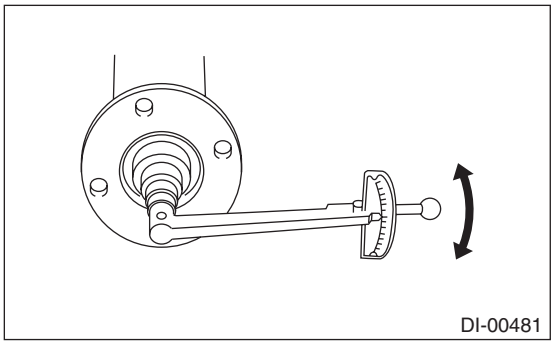
Tightening torque:
181.5 N·m (18.5 kgf-m, 133.9 ft-lb)



Initial load:
18.1 — 38.8 N (1.8 — 4.0 kgf, 4.1 — 8.7 lbf)



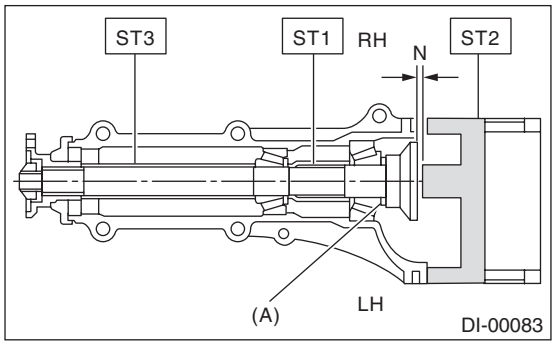
Initial torque:
0.69 — 1.47 N·m (0.07 — 0.15 kgf-m, 0.51 — 1.08 ft-lb)



Preload adjusting washer	
Part No.	Thickness mm (in)
383705200	2.59 (0.1020)
383715200	2.57 (0.1012)
383725200	2.55 (0.1004)
383735200	2.53 (0.0996)
383745200	2.51 (0.0988)
383755200	2.49 (0.0980)
383765200	2.47 (0.0972)
383775200	2.45 (0.0965)
383785200	2.43 (0.0957)
383795200	2.41 (0.0949)
383805200	2.39 (0.0941)
383815200	2.37 (0.0933)
383825200	2.35 (0.0925)
383835200	2.33 (0.0917)
383845200	2.31 (0.0909)

Preload adjusting spacer	
Part No.	Length mm (in)
383695201	56.2 (2.213)
383695202	56.4 (2.220)
383695203	56.6 (2.228)
383695204	56.8 (2.236)
383695205	57.0 (2.244)
383695206	57.2 (2.252)

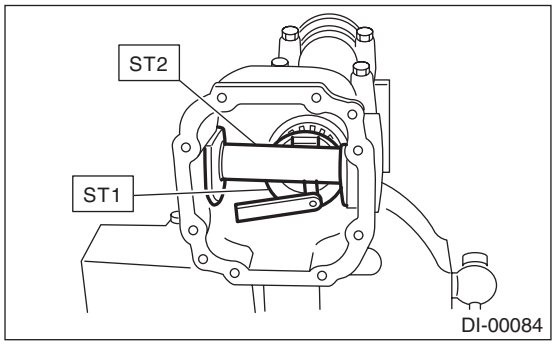
2) Adjusting drive pinion height:
Adjust the drive pinion height with pinion height adjusting washer installed between the rear bearing cone and the back of pinion gear.
(1) Attach the ST2.
ST1 398507702 DUMMY SHAFT
ST2 398507701 DIFFERENTIAL CARRIER GAUGE
ST3 398507703 DUMMY COLLAR



(A) Pinion height adjusting washer

(2) Measure the clearance “N” between the end of ST2 and the end surface of ST1 by using a thickness gauge.

NOTE:
Make sure there is no clearance between the differential carrier and ST2.
ST1 398507702 DUMMY SHAFT
ST2 398507701 DIFFERENTIAL CARRIER GAUGE



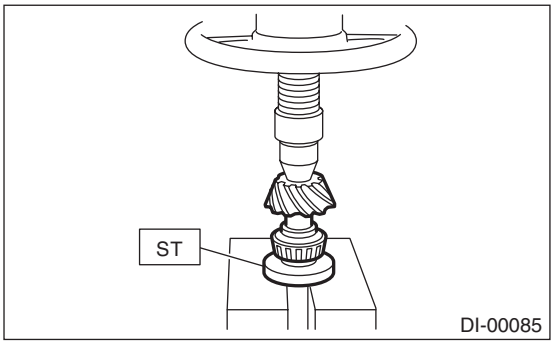
(3) Obtain the thickness of pinion height adjusting washer to be inserted from the following formula, and replace the temporarily installed washer with this one.
T = To + N – (H × 0.01) – 0.20 mm (0.0079 in)

T	Thickness of pinion height adjusting washer mm (in)	
To	Thickness of washer temporarily inserted mm (in)	
N	Clearance of thickness gauge mm (in)	
H	Figure marked on drive pinion head	
Memo:		

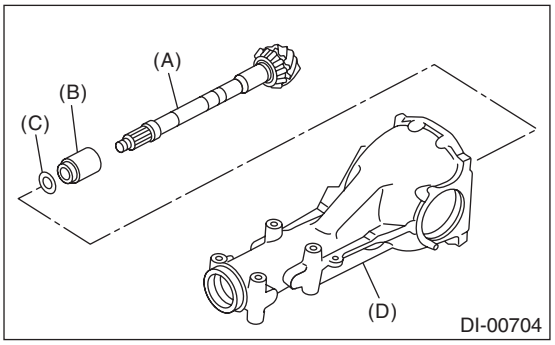
(Example of calculation)
To = 3.39 mm (0.1335 in)
N = 0.24 mm (0.0094 in)
H = + 1
T = 3.39 mm (0.1335 in) + 0.24 mm (0.0094 in) – 0.01 mm (0.0004 in) – 0.20 mm (0.0079 in) = 3.42 mm (0.1346 in)
Result: Thickness = 3.42 mm (0.1346 in)
Therefore use washer 383605200.

Pinion height adjusting washer	
Part No.	Thickness mm (in)
383495200	3.09 (0.1217)
383505200	3.12 (0.1228)
383515200	3.15 (0.1240)
383525200	3.18 (0.1252)
383535200	3.21 (0.1264)
383545200	3.24 (0.1276)
383555200	3.27 (0.1287)
383565200	3.30 (0.1299)
383575200	3.33 (0.1311)
383585200	3.36 (0.1323)
383595200	3.39 (0.1335)
383605200	3.42 (0.1346)
383615200	3.45 (0.1358)
383625200	3.48 (0.1370)
383635200	3.51 (0.1382)
383645200	3.54 (0.1394)
383655200	3.57 (0.1406)
383665200	3.60 (0.1417)
383675200	3.63 (0.1429)
383685200	3.66 (0.1441)

3) Install the selected pinion height adjusting washer on drive pinion, and press the rear bearing cone into position with ST.
ST 398177700 INSTALLER



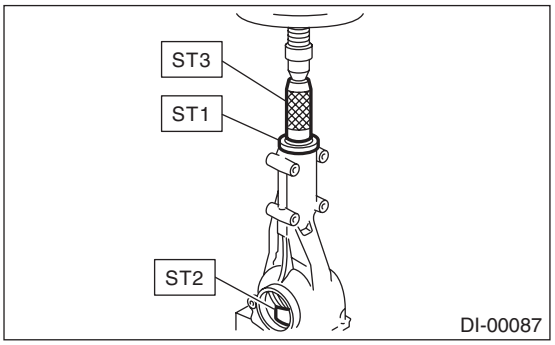
4) Insert the drive pinion into the differential carrier, and install the preselected preload adjusting spacer and washer.



(A) Drive pinion
(B) Preload adjusting spacer
(C) Preload adjusting washer
(D) Differential carrier

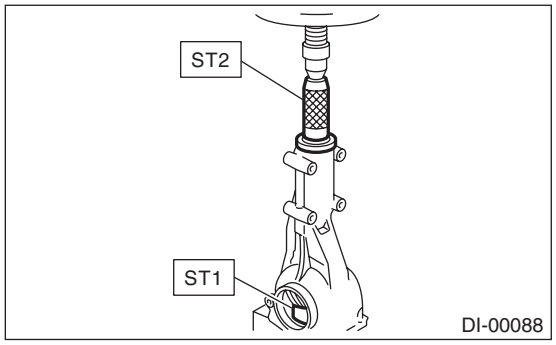
5) Press-fit the front bearing cone with ST1, ST2 and ST3.

NOTE:
Use new front bearing cone.
ST1 398507703 DUMMY COLLAR
ST2 399780104 WEIGHT
ST3 899580100 INSTALLER



6) Insert the spacer, then press-fit the pilot bearing with ST1 and ST2.

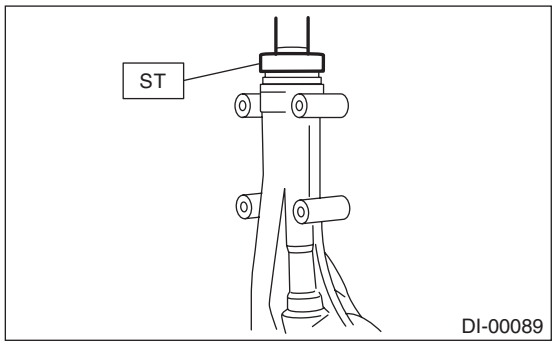
NOTE:
Use a new pilot bearing.
ST1 399780104 WEIGHT
ST2 899580100 INSTALLER



7) Using the ST, install the oil seal.

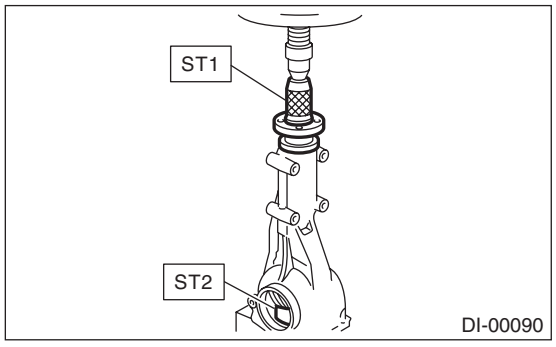
NOTE:
- Use a new oil seal.
- Press-fit until the oil seal end comes 1 mm (0.04 in) inward from end of carrier.
- Apply differential gear oil to the oil seal lips.

ST 498447120 INSTALLER



8) Press-fit the companion flange with ST1 and ST2.

NOTE:
Be careful not to damage the bearing.
ST1 899874100 INSTALLER
ST2 399780104 WEIGHT



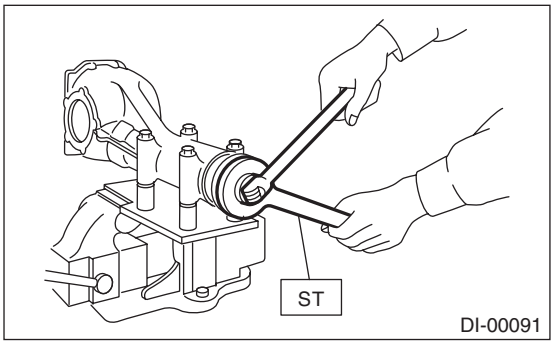
9) Apply seal material on the drive pinion shaft thread and new self-locking nut seat.

Seal material:
THREE BOND 1324 (Part No. 004403042) or equivalent

10) Attach the new self-locking nut and use the ST to fix the companion flange in place, then tighten the self-locking nut.

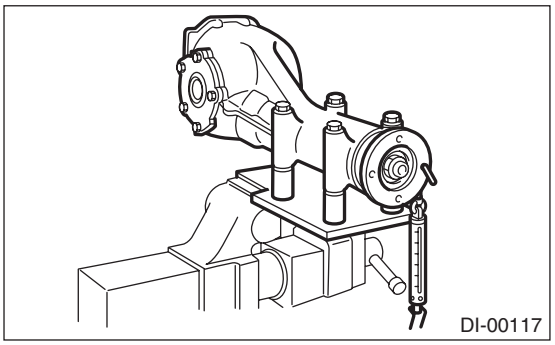
Tightening torque:
181.5 N·m (18.5 kgf-m, 133.9 ft-lb)

ST 498427200 FLANGE WRENCH

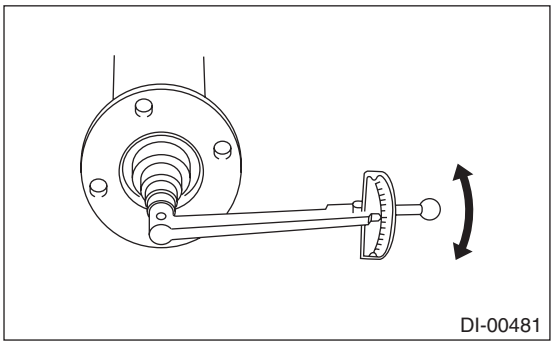


11) Check the initial torque or initial load.

Initial load:
18.1 — 38.8 N (1.8 — 4.0 kgf, 4.1 — 8.7 lbf)

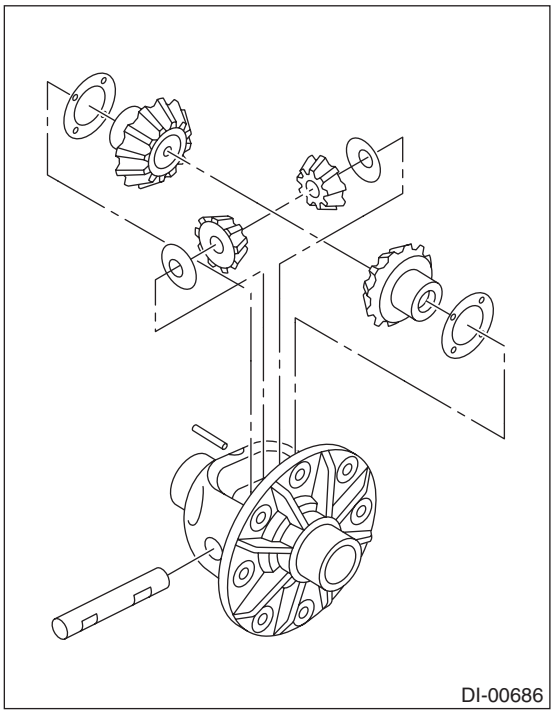


Initial torque:
0.69 — 1.47 N·m (0.07 — 0.15 kgf-m, 0.51 — 1.08 ft-lb)



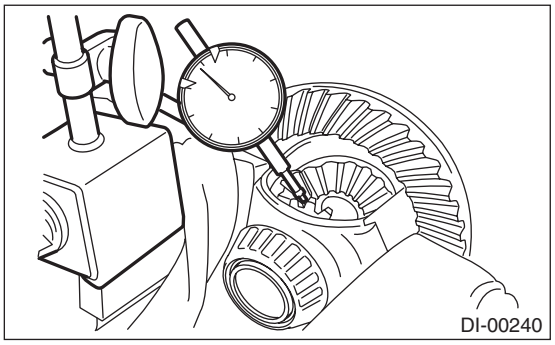
12) Assembling differential case
(1) Install the side gears and pinion mate gears, with their side gear thrust washers, pinion mate gear washer, and pinion mate shaft, into the differential case.

NOTE:
• Apply gear oil on both sides of the washer and on the pinion mate shaft before installing.
• Insert the pinion mate shaft into the differential case by aligning the pin holes.



(2) Measure the side gear backlash.

Side gear backlash:
0.10 — 0.20 mm (0.004 — 0.008 in)



(3) Adjust the backlash as specified by selecting side gear thrust washer.

Side gear thrust washer	
Part No.	Thickness mm (in)
383445201	0.75 — 0.80 (0.0295 — 0.0315)
383445202	0.80 — 0.85 (0.0315 — 0.0335)
383445203	0.85 — 0.90 (0.0335 — 0.0354)

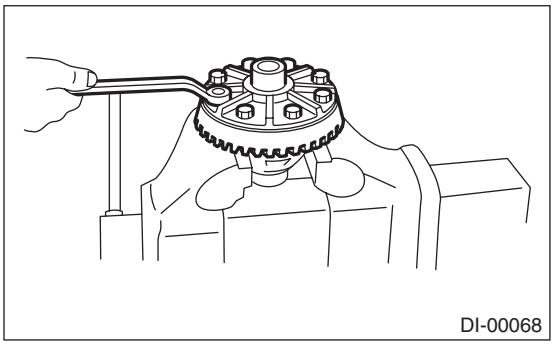
(4) Check the condition of rotation after applying oil to the gear tooth surfaces and washer surfaces.
(5) Drive the pinion shaft lock pin into the differential case.

NOTE:
Use a new pinion shaft lock pin.
ST 899904100 STRAIGHT PIN REMOVER
13) Install the driven gear to the differential case.

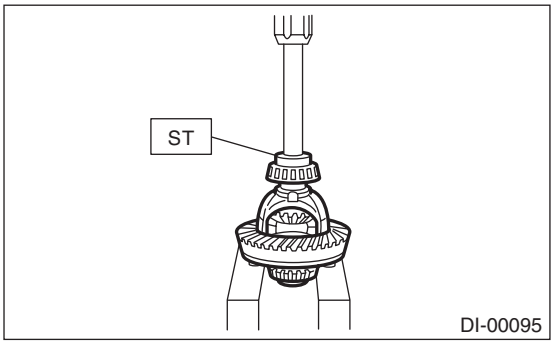
NOTE:
• Before installing bolts, apply seal material to bolt threads.

Seal material:
THREE BOND 1324 (Part No. 004403042) or equivalent
• Make sure there is no clearance between the differential case and driven gear.
• Tighten opposing bolts in order.

Tightening torque:
103 N·m (10.5 kgf-m, 76.0 ft-lb)

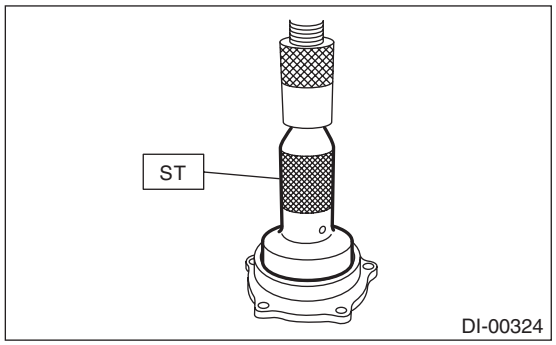


14) Using the ST, press-fit the side bearing to the differential case.
ST 398487700 DRIFT



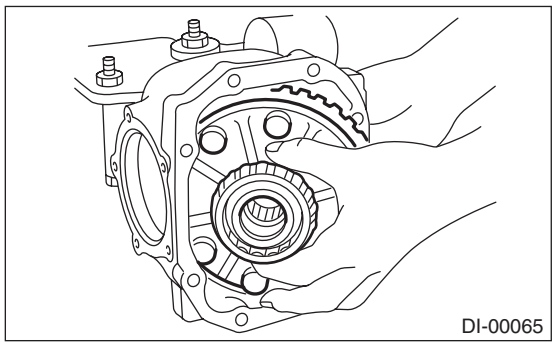
15) Using the ST, press-fit the side bearing race to the side retainer.

CAUTION:
Make sure that bearing races and cones are properly assembled.
ST 398417700 DRIFT



16) Side retainer shim adjustment
(1) The hypoid driven gear backlash and side bearing preload can be adjusted by the side retainer shim thickness.
(2) Install the differential case assembly into differential carrier in the reverse order of disassembly.

NOTE:
Be careful not to hit the teeth of hypoid driven gear against the differential carrier.



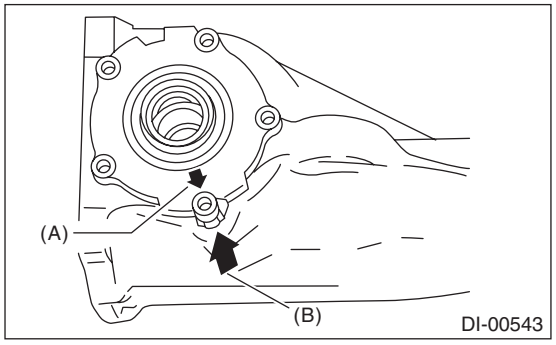
(3) Install the side retainer shim.

NOTE:
• Be careful not to mix up the side retainer shim RH and LH.
• Replace broken or corroded side retainer shims with a new part of the same thickness.

Side retainer shim	
Part No.	Thickness mm (in)
383475201	0.20 (0.0079)
383475202	0.25 (0.0098)
383475203	0.30 (0.0118)
383475204	0.40 (0.0157)
383475205	0.50 (0.0197)

(4) Align the arrow mark on the differential carrier with the arrow mark on the side retainer when installing the side retainer.

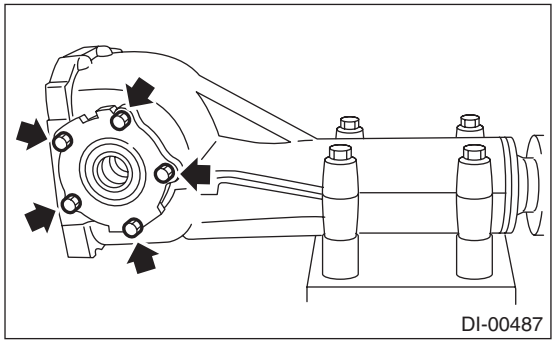
NOTE:
Be careful that side bearing race is not damaged by the bearing roller.



(A) Arrow mark (on the side retainer)
(B) Arrow mark (on the differential carrier)

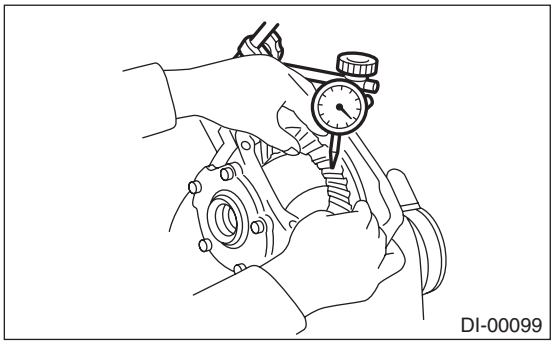
(5) Tighten the side retainer bolts.

Tightening torque:
10.5 N·m (1.1 kgf-m, 7.7 ft-lb)



(6) Measure the hypoid driven gear to drive pinion backlash. Set the magnet base on differential carrier. Align the contact point of dial gauge with tooth face of hypoid driven gear, and move hypoid driven gear while holding drive pinion still. Read the value indicated on dial gauge. If the backlash is outside the standard range, adjust the side retainer shim by the following method.
•When backlash is less than 0.1 mm (0.004 in):
Reduce the thickness of shim on the back side of the hypoid driven gear and increase the thickness of shims on the teeth side of the hypoid driven gear.
•When backlash exceeds 0.2 mm (0.008 in):
Increase the thickness of shim on the back side of the hypoid driven gear and reduce the thickness of shims on the teeth side of the hypoid driven gear.

Backlash:
0.10 — 0.20 mm (0.004 — 0.008 in)

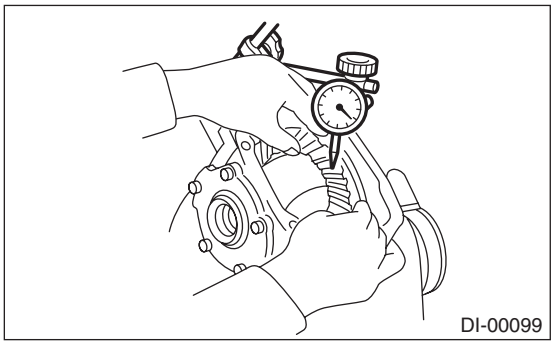


(7) Measure the total preload of the drive pinion. If the total preload is outside the specification range, adjust the thickness of side retainer shims, increasing/reducing both shims by an even amount at a time.

Total preload:
20.7 — 54.4 N (2.1 — 5.5 kgf, 4.7 — 12.2 lbf)

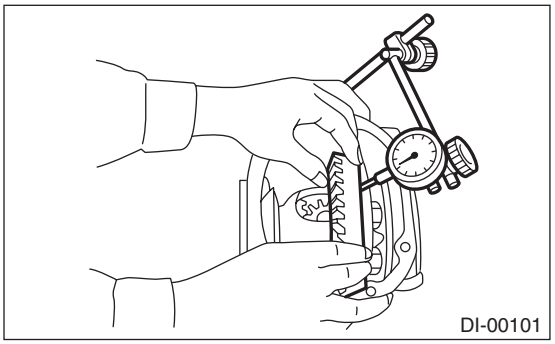
17) Recheck the hypoid driven gear to drive pinion backlash.

Backlash:
0.10 — 0.20 mm (0.004 — 0.008 in)



18) Check pinion and hypoid driven gears rotate smoothly and make sure of the hypoid driven gear runout on its back surface. If the hypoid driven gear runout on its back surface exceeds the specification, check for any foreign objects between the hypoid driven gear and differential case, and for any deformation of the differential case or hypoid driven gear.

Hypoid driven gear back surface runout:
0.05 mm (0.002 in)



19) Check and adjustment of the tooth contact of hypoid driven gear and drive pinion

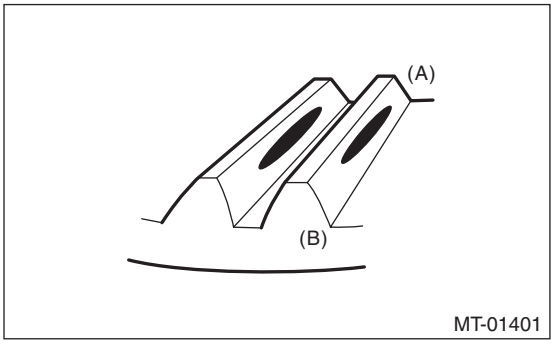
(1) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Check the contact pattern after rotating the hypoid driven gear several revolutions back and forth until a definite contact pattern appears on the hypoid driven gear.

(2) When the contact pattern is not correct, readjust.

NOTE:
Be sure to wipe off the lead-free red dye completely after the adjustment is completed.

- Correct tooth contact

Check item: Tooth contact pattern is slightly shifted toward toe side under no-load rotation. (When driving, it moves towards the heel side.)

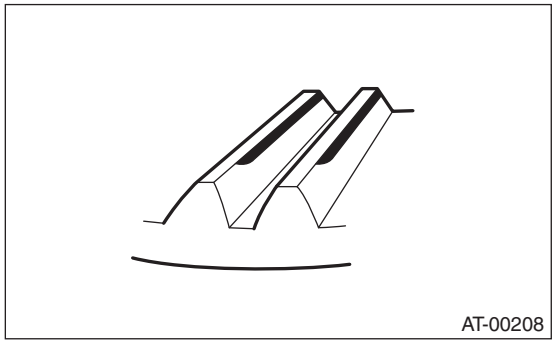


(A) Toe side
(B) Heel side

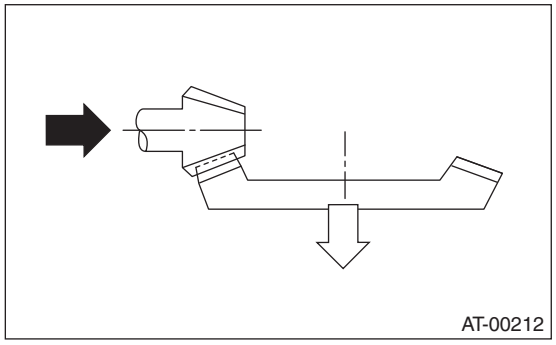
- Face contact

Check item: Backlash is too large.

Contact pattern



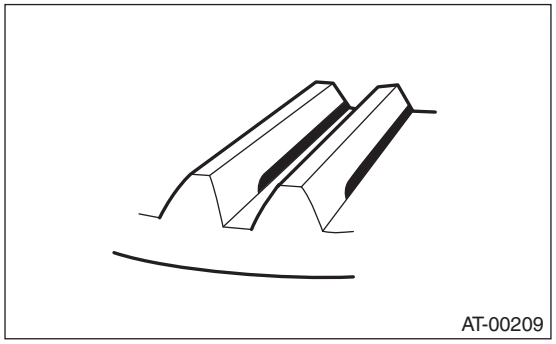
Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.



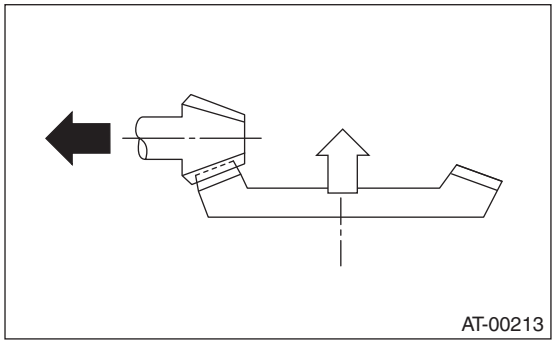
- Flank contact

Check item: Backlash is too small.

Contact pattern



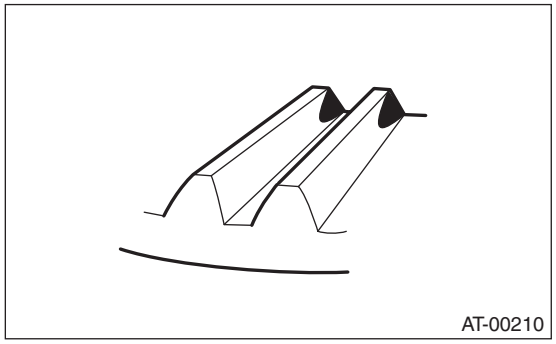
Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.



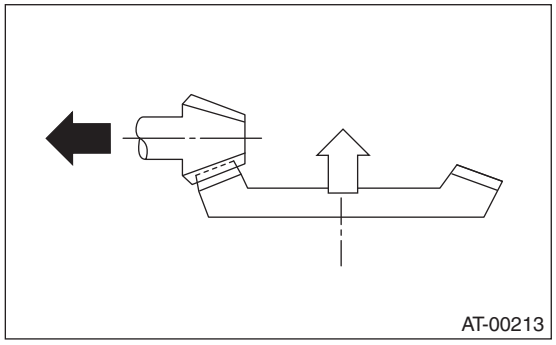
• Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



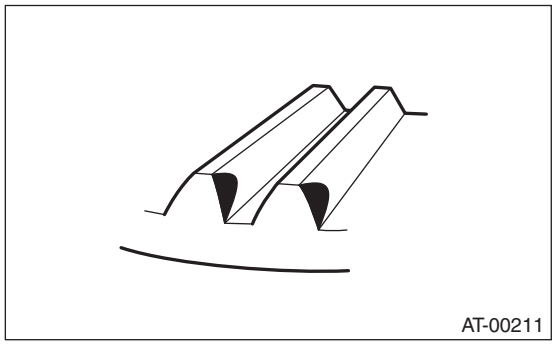
Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.



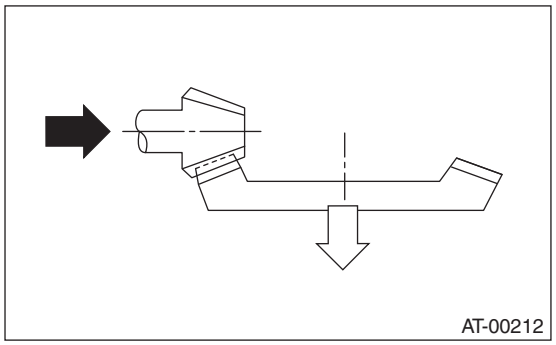
• Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.

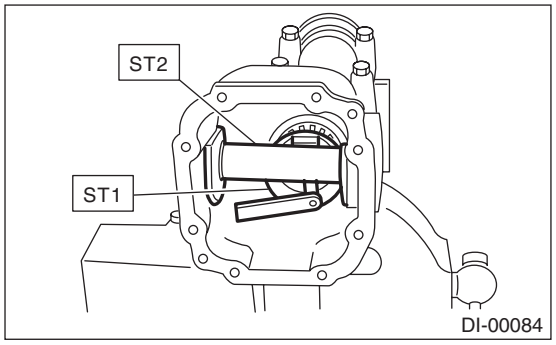


20) If proper tooth contact is not obtained, readjust the drive pinion height by changing the RH and LH side retainer shims and the hypoid gear backlash.

(1) Drive pinion height

ST1 398507702 DUMMY SHAFT

ST2 398507701 DIFFERENTIAL CARRIER GAUGE

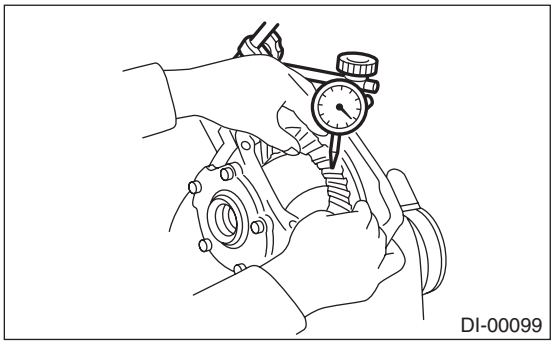


T = To + N – (H × 0.01) – 0.20 mm (0.0079 in)

T	Thickness of pinion height adjusting washer mm (in)	
To	Thickness of washer temporarily inserted mm (in)	
N	Clearance of thickness gauge mm (in)	
H	Figure marked on drive pinion head	
Memo:		

(2) Hypoid gear backlash

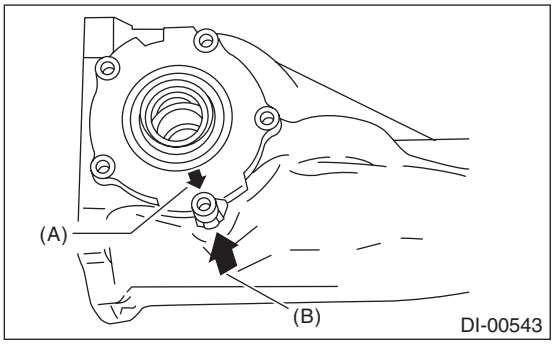
Backlash:
0.10 — 0.20 mm (0.004 — 0.008 in)



21) Remove the RH and LH side retainers.
22) Install the O-ring to left and right side retainers.

NOTE:
Use new O-rings.

23) Install the oil seal to the side retainers on both sides. <Ref. to DI-61, REPLACEMENT, Rear Differential Side Oil Seal.>
24) Align the arrow mark on the differential carrier with the arrow mark on the side retainer when installing the side retainer.

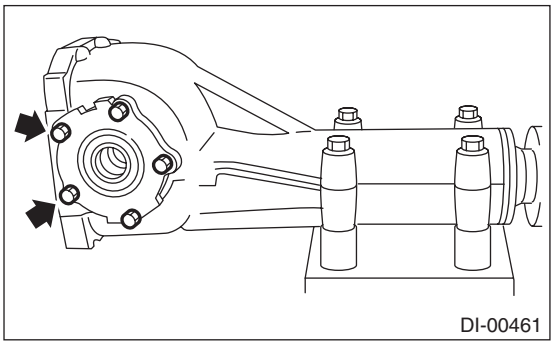


(A) Arrow mark (on the side retainer)
(B) Arrow mark (on the differential carrier)

25) Apply liquid gasket to the bolts indicated by arrows, and tighten the bolts.

Liquid gasket:
THREE BOND 1110F, THREE BOND 1110B or equivalent

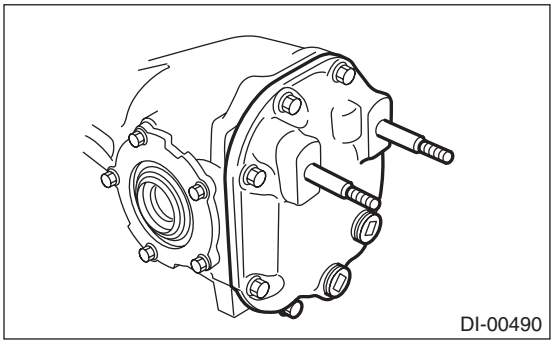
Tightening torque:
10.5 N·m (1.1 kgf-m, 7.7 ft-lb)



26) Install the gasket and rear cover, and tighten the bolts to specified torque.

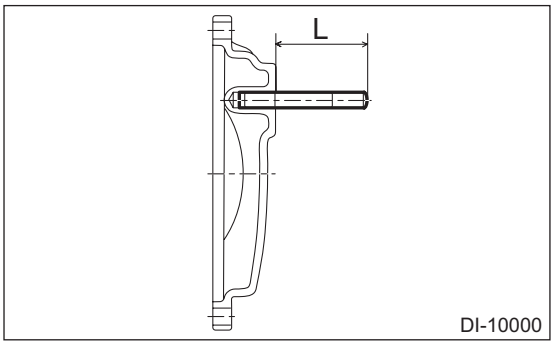
NOTE:
Use a new gasket.

Tightening torque:
29.5 N·m (3.0 kgf-m, 21.8 ft-lb)



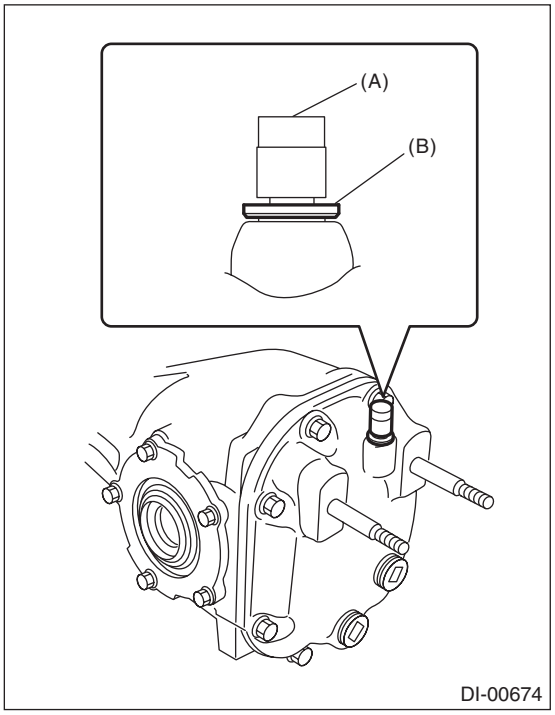
27) When the stud bolts are removed from the rear cover, install the stud bolts.
28) Measure the exposed length “L” of the stud bolt as shown in the figure, and check that the value is within the specified range.

Exposed length L of stud bolt:
59.0 — 61.0 mm (2.32 — 2.40 in)



29) Install the air breather cap.

NOTE:
When installing the air breather cap, do not tap section (A). Be sure to tap section (B) to install.



30) Install the drain plug.

NOTE:
Apply liquid gasket to the drain plug.

Liquid gasket:
THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:
49 N·m (5.0 kgf-m, 36.1 ft-lb)

31) Install the filler plug.

NOTE:
After installing the rear differential assembly to the vehicle, fill the gear oil, then apply liquid gasket, and tighten to the specified torque. <Ref. to DI-20, REPLACEMENT, Differential Gear Oil.>

E: INSPECTION

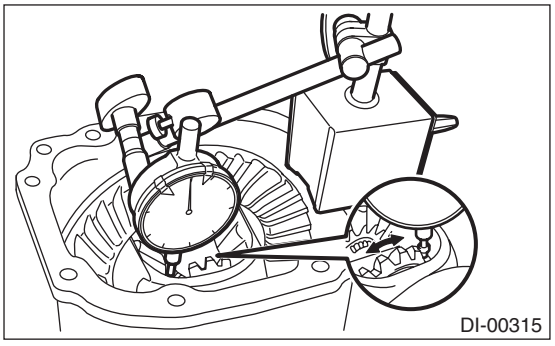
Wash all the disassembled parts clean, and examine them for wear, damage and other defects. Repair or replace the defective parts as necessary.
1) Hypoid driven gear and drive pinion
• If there is evidently an abnormal tooth contact, find out the cause and adjust until the teeth contact correctly. Replace the gear if there is an excessive worn or an incapable adjustment.
• If crack, cutout or seizure is found, replace the parts as a set. Slight damage of some teeth can be corrected by oil stone or the like.
2) Side gear and pinion mate gear
• Replace if cracks, scoring or other defects are evident on the tooth surface.
• Replace if thrust washer contact surface is worn or scored. Slight damages of the surface can be corrected by oil stones or equivalent.
3) Bearing
Replace if seizure, peeling, wear, rust, dragging during rotation, noise or other defect is evident.
4) Thrust washer of the side gear and pinion mate gear
Replace if seized, flawed, abnormally worn or having other defects.
5) Oil seal
Replace if deformed or damaged, and at every disassembling.
6) Differential carrier
Replace if the bearing bores are worn or damaged.
7) Differential case
Replace if sliding surfaces are abnormally worn, burned, or cracked.
8) Companion flange
Replace if the oil seal lip contact surface shows cracking.

1. SIDE GEAR BACKLASH

Using a dial gauge, check the backlash of side gear.

Side gear backlash:
0.10 — 0.20 mm (0.004 — 0.008 in)

If the side gear backlash is not within the specified range, select the side gear thrust washer and adjust the side gear backlash as specified.

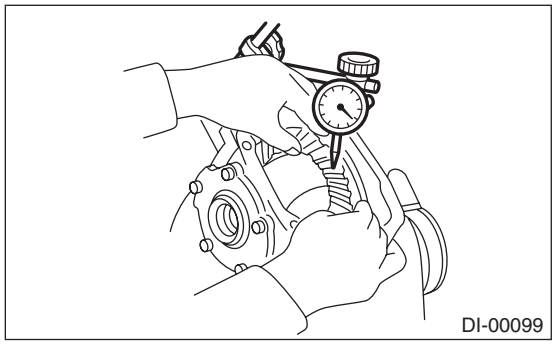


2. HYPOID DRIVEN GEAR BACKLASH

Using a dial gauge, check the backlash of hypoid driven gear.

Hypoid driven gear backlash:
0.10 — 0.20 mm (0.004 — 0.008 in)

If the hypoid driven gear backlash is outside the specification range, adjust the side bearing preload and repair if necessary.

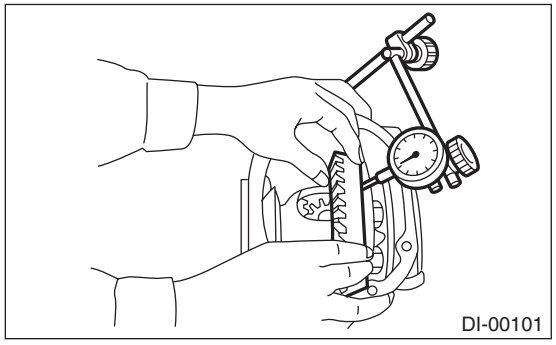

DI-00099

3. HYPOID DRIVEN GEAR RUNOUT ON ITS BACK SURFACE

Using a dial gauge, check the hypoid driven gear back surface runout.

Hypoid driven gear back surface runout:
0.05 mm (0.002 in)

If the hypoid driven gear runout on its back surface exceeds the limit, replace the hypoid driven gear.


DI-00101

4. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

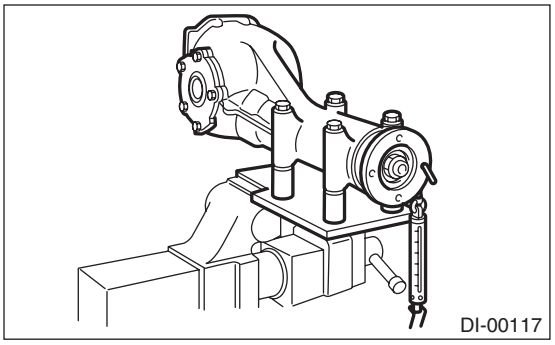
Inspect the tooth contact between the hypoid driven gear and drive pinion. <Ref. to DI-29, ASSEMBLY, Rear Differential (T-type).>

5. TOTAL PRELOAD

Using a spring scale, check the total preload.

Total preload:
20.7 — 54.4 N (2.1 — 5.5 kgf, 4.7 — 12.2 lb)

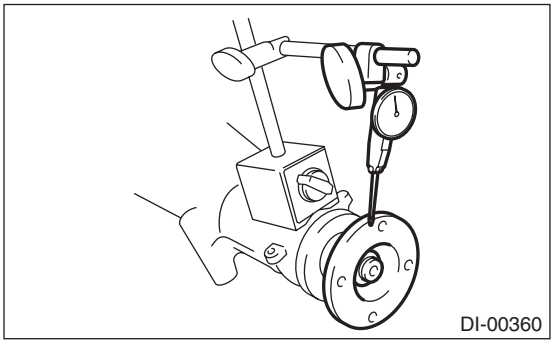
If the total preload is not within the specified range, adjust the side retainer shim.


DI-00117

6. COMPANION FLANGE

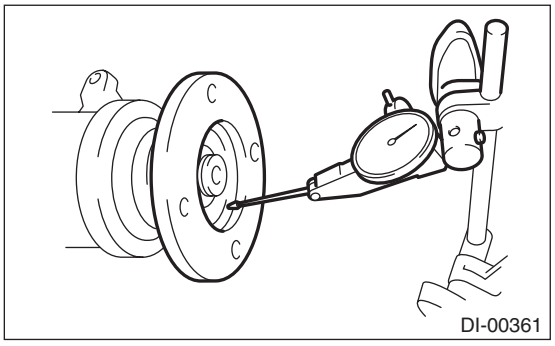
1) If rust or dirt is attached to the companion flange, remove them.
2) Set a dial gauge at a companion flange surface (mating surface of propeller shaft and companion flange), and then measure the companion flange runout.

Limit of runout:
0.08 mm (0.003 in)


DI-00360

3) Set the gauge inside of the companion flange, and measure the runout.

Limit of runout:
0.08 mm (0.003 in)



4) If either runout exceeds the limit, move the phase of companion flange and drive pinion 90° each, and find the point where the runout is within the limit.
5) If the runout exceeds the limit even after changing the phase, replace the companion flange and recheck the runout.
6) If the runout exceeds the limit after replacing the companion flange, the drive pinion may be assembled incorrectly or bearing is faulty.

F: ADJUSTMENT

1. SIDE GEAR BACKLASH

Adjust the side gear backlash. <Ref. to DI-29, ASSEMBLY, Rear Differential (T-type).>

2. HYPOID DRIVEN GEAR BACKLASH

Adjust hypoid driven gear backlash. <Ref. to DI-29, ASSEMBLY, Rear Differential (T-type).>

3. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Adjust the tooth contact between hypoid driven gear and drive pinion gear. <Ref. to DI-29, ASSEMBLY, Rear Differential (T-type).>

4. TOTAL PRELOAD

Adjust the side retainer shim. <Ref. to DI-29, ASSEMBLY, Rear Differential (T-type).>

5. Rear Differential (VA-type)

A: REMOVAL

The removal procedure for VA-type is included in “REMOVAL” for T-type. <Ref. to DI-23, REMOVAL, Rear Differential (T-type).>

B: INSTALLATION

The installation procedure for VA-type is included in “INSTALLATION” for T-type. <Ref. to DI-25, INSTALLATION, Rear Differential (T-type).>

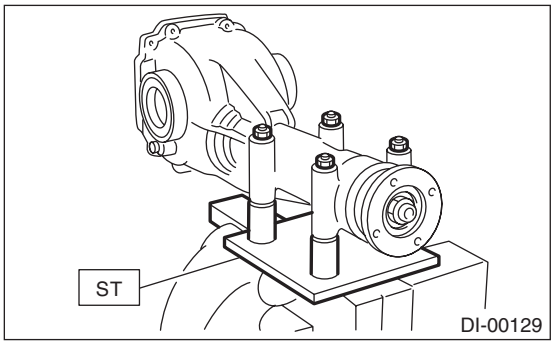
C: DISASSEMBLY

To detect the real cause of trouble, inspect the following items before disassembling.

• Tooth contact and backlash between hypoid driven gear and drive pinion

1) Set the ST on vise and install the differential assembly to ST.

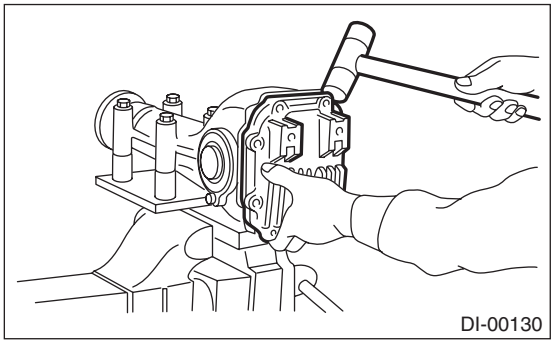
ST 398217700 ATTACHMENT SET



2) Remove the drain plug and filler plug.

3) Remove the rear cover by removing retaining bolts.

NOTE:
Remove it by tapping with a plastic hammer.



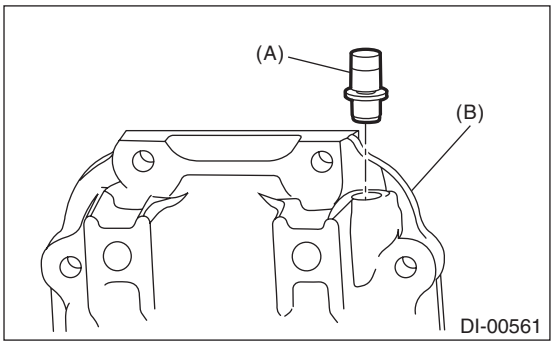
4) Remove the stud bolts from rear cover if necessary.

5) Remove the air breather cap.

NOTE:

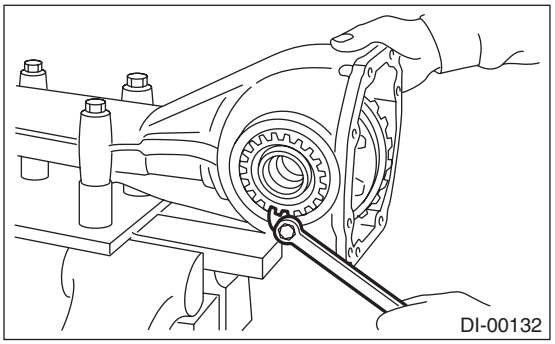
• Do not attempt to remove the air breather cap unless necessary.

• Whenever the air breather cap is removed, replace it with a new part.



(A) Air breather cap
(B) Rear cover

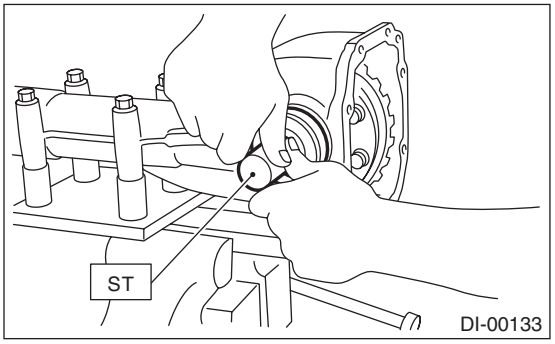
6) Remove the lock plate RH and LH.



7) Remove the side retainer RH and LH with ST.

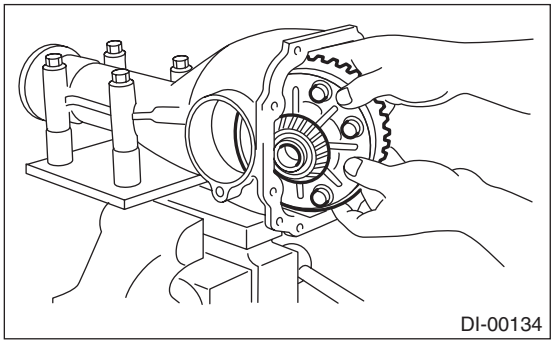
NOTE:
When keeping the retainers aside, use labels etc. to avoid confusing the left and right.

ST 18630AA010 WRENCH COMPL RETAINER

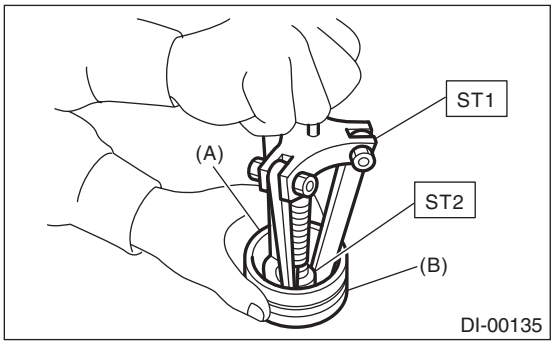


8) Pull out the differential case assembly from differential carrier.

NOTE:
Be careful not to hit the teeth of hypoid driven gear against the differential carrier.



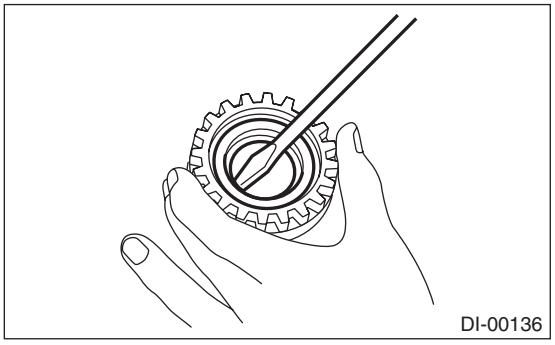
9) Remove the bearing race from side retainer RH and LH with ST1 and ST2.
ST1 499705401 PULLER ASSY
ST2 499705404 SEAT



(A) Bearing race
(B) Side retainer

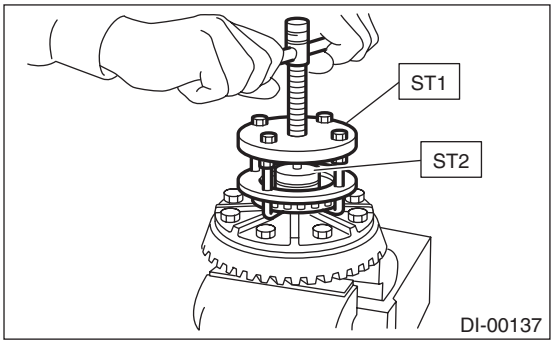
10) Remove the oil seal from RH and LH side retainers.

NOTE:
Perform this operation only when changing oil seal.

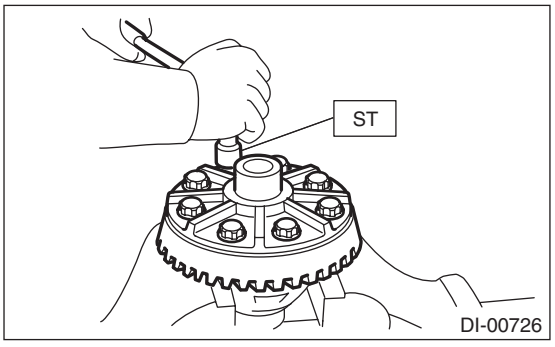


11) Remove the O-rings.
12) Extract the bearing cone with ST1 and ST2.

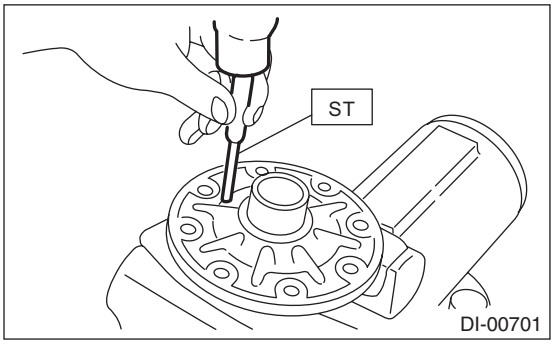
NOTE:
• Do not attempt to disassemble the parts unless necessary.
• Set the puller so that its claws catch the edge of the bearing cone.
• Store so that the right and left side bearing races and cones are not mixed together.
ST1 899524100 PULLER SET
ST2 399520105 SEAT



13) Using the ST, loosen the hypoid driven gear bolt and remove the hypoid driven gear.
ST 18270KA020 SOCKET (E20)

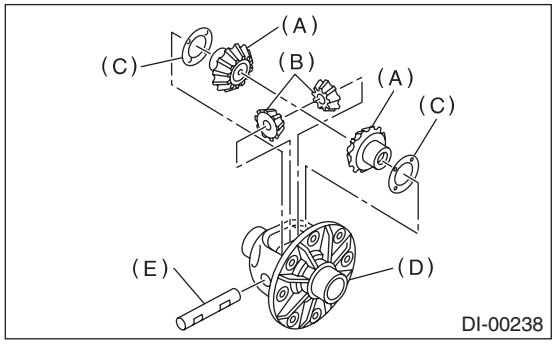


14) Remove the spring pin from hypoid driven gear side using ST.
ST 899904100 STRAIGHT PIN REMOVER



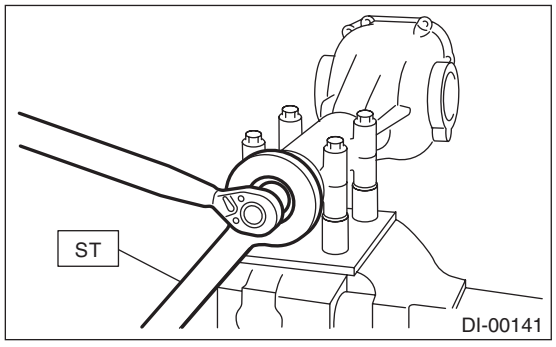
15) Draw out the pinion mate shaft and remove pinion mate gears, side gears and side gear thrust washers.

NOTE:
The gears and washers should be marked with RH or LH, front or rear, or kept separately.

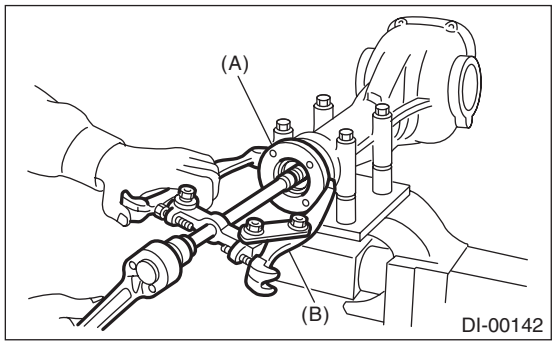


(A) Side gear
(B) Pinion mate gear
(C) Side gear thrust washer
(D) Differential case
(E) Pinion mate shaft

16) Remove the self-locking nut while securing the companion flange with ST.
ST 498427200 FLANGE WRENCH



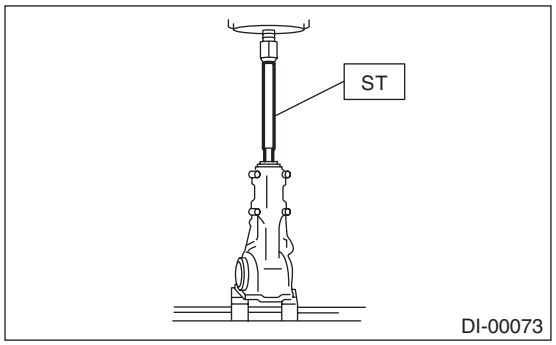
17) Extract the companion flange with a puller.



(A) Companion flange
(B) Puller

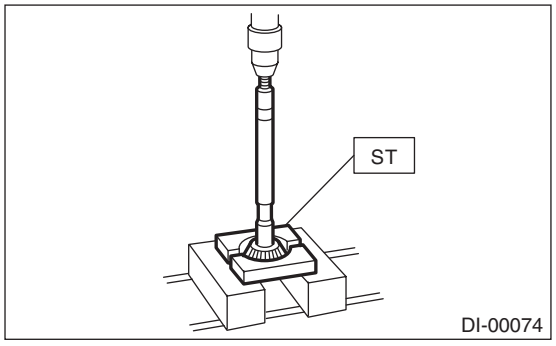
18) Press the end of drive pinion shaft using ST and remove the rear bearing cone, pinion height adjusting washer, preload adjusting spacer and washer.

NOTE:
Hold the drive pinion so as not to drop it.
ST 398467700 DRIFT

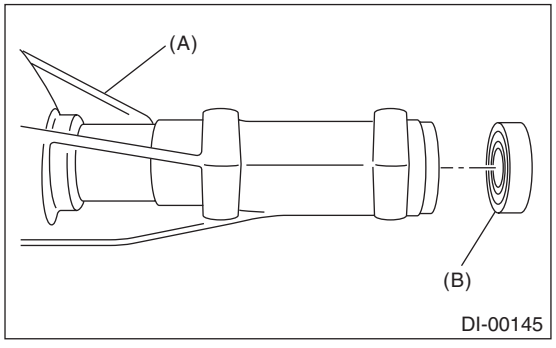


19) Remove the rear bearing cone from drive pinion by supporting the bearing cone with ST.

NOTE:
Place the replacer so that its center-recessed side faces the bearing cone.
ST 498515500 REPLACER

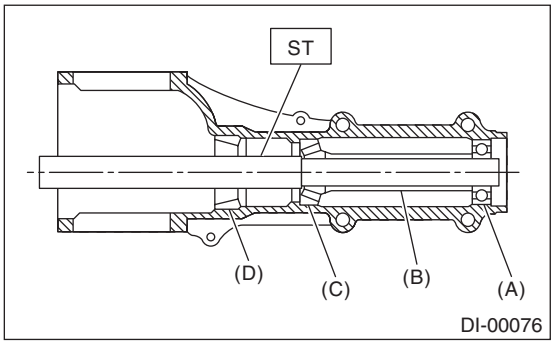


20) Remove the front oil seal from differential carrier using ST.
ST 398527700 PULLER ASSY



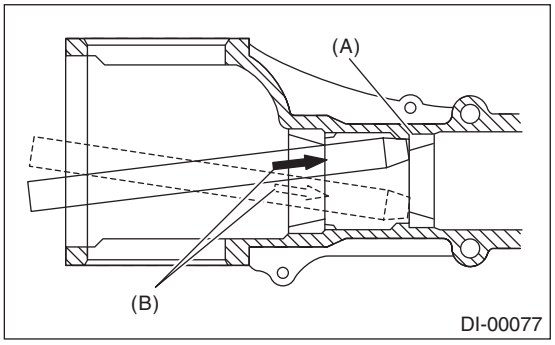
(A) Differential carrier
(B) Front oil seal

21) Remove the pilot bearing together with the front bearing cone and spacer using the ST.
ST 398467700 DRIFT



(A) Pilot bearing
(B) Spacer
(C) Front bearing
(D) Rear bearing race

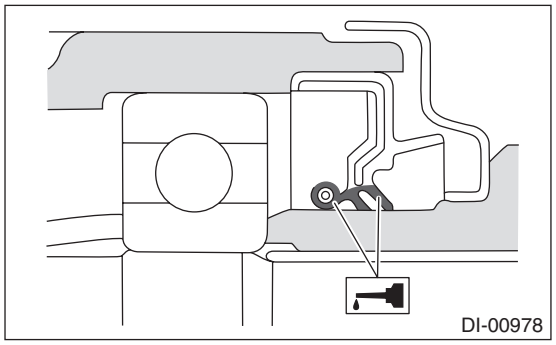
22) When replacing the bearings, tap out the front bearing race and rear bearing race in this order using a brass bar to remove them.



(A) 2 cutout portions along diagonal lines
(B) Tap alternately with brass bar.

D: ASSEMBLY

NOTE:
- Assemble in the reverse order of disassembly.
- Check and adjust each part during assembly.
- Keep the shims and washers in order, so that they are not improperly installed.
- Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.
- Apply differential gear oil when installing the bearings and thrust washers.
- Be careful not to mix up the RH and LH bearing races.
- Replace the gasket, oil seal and O-ring with a new part.
- Be careful not to mix up the rear differential side oil seal RH and LH.
- Apply differential gear oil to the lips when installing the oil seal.

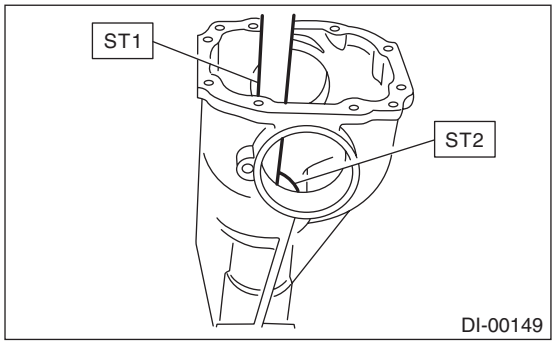


1) Adjusting preload for front and rear bearings

NOTE:
Adjust the bearing preload between front and rear bearings with preload adjusting spacer and washer. Pinion height adjusting washer is not affected by this adjustment. The adjustment must be carried out with oil seal removed.

(1) Install the rear bearing race into the differential carrier using ST1 and ST2.

ST1 398477701 HANDLE
ST2 398477702 DRIFT



(2) Install the front bearing race to the differential carrier using ST1 and ST2.

NOTE:
Use a new front bearing race.
ST1 398477701 HANDLE
ST2 498447110 DRIFT

(3) Insert the front bearing cone.

NOTE:
Use new front bearing cone.

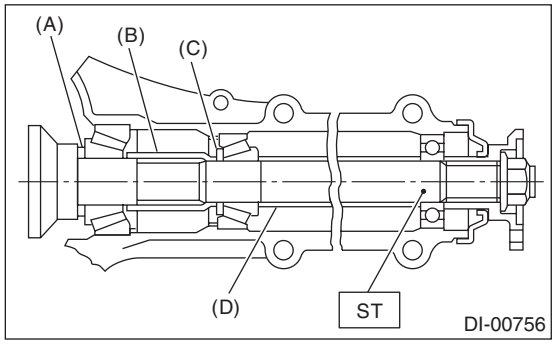
(4) Measure and record the thickness of pinion height adjusting washer.

NOTE:
• At this time, install a provisionally selected or previously used pinion height adjusting washer. Measure and record the thickness.
• If tooth contact (drive pinion and hypoid driven gear) is normal in the inspection before disassembling, verify that the washer is not deformed, and then reuse the used washer.

(5) Insert the ST (DUMMY SHAFT) into case with the pinion height adjusting washer and rear bearing cone fitted onto it.

(6) Install the preload adjusting spacer, washer, front bearing cone, spacer, pilot bearing, companion flange, and self-locking nut.

NOTE:
Use a new pilot bearing.
ST 498447150 DUMMY SHAFT
Part No. 32285AA000 Spacer

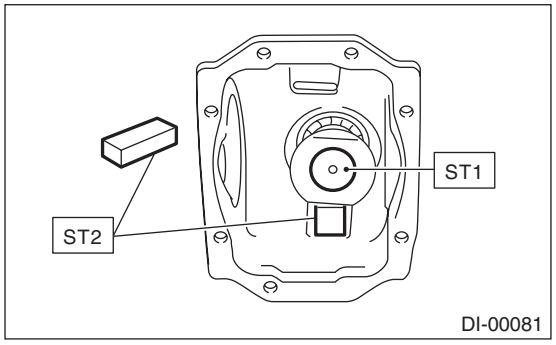


(A) Pinion height adjusting washer
(B) Preload adjusting spacer
(C) Preload adjusting washer
(D) Spacer (SUBARU genuine parts)

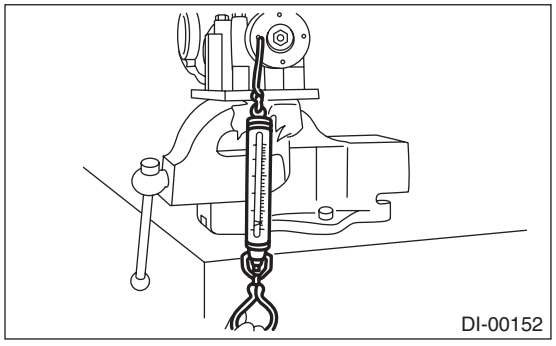
(7) Turn the ST by hand to slowly seat the bearing, and tighten the self-locking nut while measuring the initial load or initial torque with a spring scale or torque wrench. Select the preload adjusting washer and spacer so that the specified preload is obtained when nut is tightened to the specified torque.

NOTE:
• Use a new self-locking nut.
• Measure the preload in direction of tangent to the flange.
• Be careful not to give excessive preload.
• When tightening the self-locking nut, lock ST1 with ST2 as shown in the figure.
ST1 498447150 DUMMY SHAFT
ST2 398507704 BLOCK

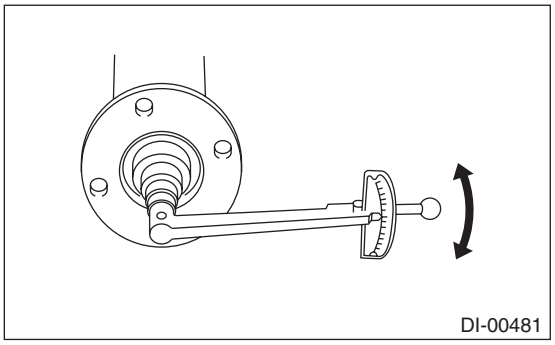
Tightening torque:
191 N·m (19.5 kgf-m, 140.9 ft-lb)



Initial load:
12.7 — 32.2 N (1.3 — 3.3 kgf, 2.9 — 7.2 lbf)



Initial torque:
0.48 — 1.22 N·m (0.05 — 0.12 kgf-m, 0.35 — 0.90 ft-lb)

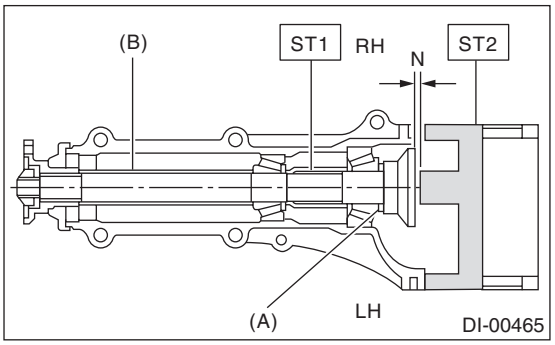


Preload adjusting washer	
Part No.	Thickness mm (in)
38336AA000	1.500 (0.0591)
38336AA120	1.513 (0.0596)
38336AA010	1.525 (0.0600)
38336AA130	1.538 (0.0606)
38336AA020	1.550 (0.0610)
38336AA140	1.563 (0.0615)
38336AA030	1.575 (0.0620)
38336AA150	1.588 (0.0625)
38336AA040	1.600 (0.0630)
38336AA160	1.613 (0.0635)
38336AA050	1.625 (0.0640)
38336AA170	1.638 (0.0645)
38336AA060	1.650 (0.0650)
38336AA180	1.663 (0.0655)
38336AA070	1.675 (0.0659)
38336AA190	1.688 (0.0665)
38336AA080	1.700 (0.0669)
38336AA200	1.713 (0.0674)
38336AA090	1.725 (0.0679)
38336AA210	1.738 (0.0684)
38336AA100	1.750 (0.0689)
38336AA220	1.763 (0.0694)
38336AA110	1.775 (0.0699)

Preload adjusting spacer	
Part No.	Length mm (in)
32288AA040	52.3 (2.059)
32288AA050	52.5 (2.067)
31454AA100	52.6 (2.071)
32288AA060	52.7 (2.075)
31454AA110	52.8 (2.079)
32288AA070	52.9 (2.083)
31454AA120	53.0 (2.087)
32288AA080	53.1 (2.091)
32288AA090	53.3 (2.098)

2) Adjusting drive pinion height:
Adjust the drive pinion height with pinion height adjusting washer installed between the rear bearing cone and the back of pinion gear.
(1) Attach the ST2.

ST1	498447150	DUMMY SHAFT
ST2	498505501	DIFFERENTIAL CARRIER GAUGE
Part No. 32285AA000		Spacer

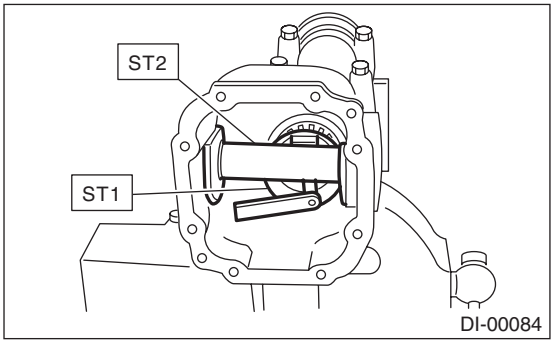


(A) Pinion height adjusting washer
(B) Spacer (SUBARU genuine parts)

(2) Measure the clearance “N” between the end of ST2 and the end surface of ST1 by using a thickness gauge.

NOTE:
Make sure there is no clearance between the differential carrier and ST2.

ST1	498447150	DUMMY SHAFT
ST2	498505501	DIFFERENTIAL CARRIER GAUGE



(3) Obtain the thickness of pinion height adjusting washer to be inserted from the following formula, and replace the temporarily installed washer with this one.

NOTE:
Adjust it using the 1 — 3 washers.

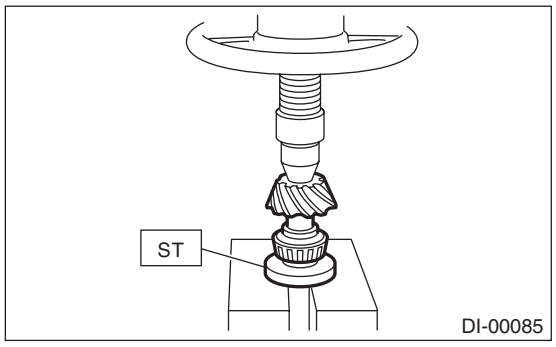
T = To + N – 0.05 mm (0.0020 in)

T	Thickness of pinion height adjusting washer mm (in)	
To	Thickness of washer temporarily inserted mm (in)	
N	Clearance of thickness gauge mm (in)	
Memo:		

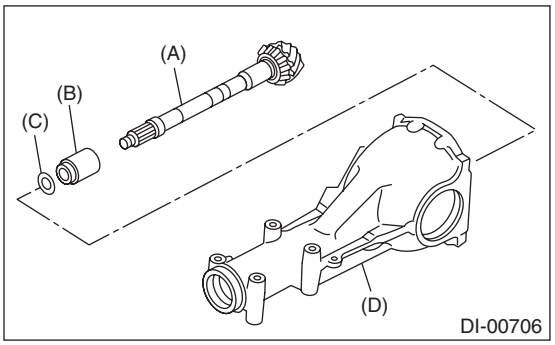
(Example of calculation)
To = 0.15 mm (0.0059 in)
N = 0.1 mm (0.0039 in)
T = 0.15 + 0.1 – 0.05 = 0.2 mm (0.0079 in)
Result: Thickness = 0.2 mm (0.0079 in)
Therefore use part number 32295AA220.

Pinion height adjusting washer	
Part No.	Thickness mm (in)
32295AA200	0.150 (0.0059)
32295AA210	0.175 (0.0069)
32295AA220	0.200 (0.0079)
32295AA230	0.225 (0.0089)
32295AA240	0.250 (0.0098)
32295AA250	0.275 (0.0108)

3) Install the selected pinion height adjusting washer on drive pinion, and press the rear bearing cone into position with ST.
ST 498175500 INSTALLER



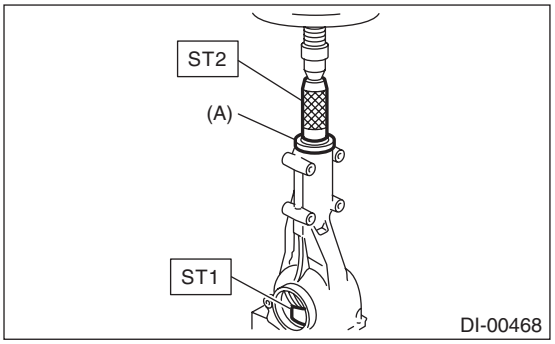
4) Insert the drive pinion into the differential carrier, and install the preselected preload adjusting spacer and washer.



(A) Drive pinion
(B) Preload adjusting spacer
(C) Preload adjusting washer
(D) Differential carrier

5) Press-fit the front bearing cone into the carrier with ST1, ST2 and the spacer.

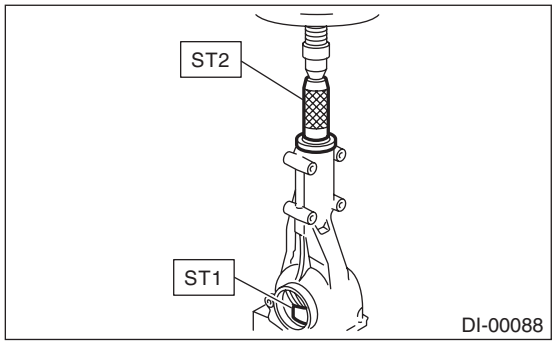
NOTE:
Use new front bearing cone.
ST1 399780104 WEIGHT
ST2 899580100 INSTALLER
Part No. 32285AA000 Spacer



(A) Spacer (SUBARU genuine parts)

6) Insert the spacer, then press-fit the pilot bearing with ST1 and ST2.

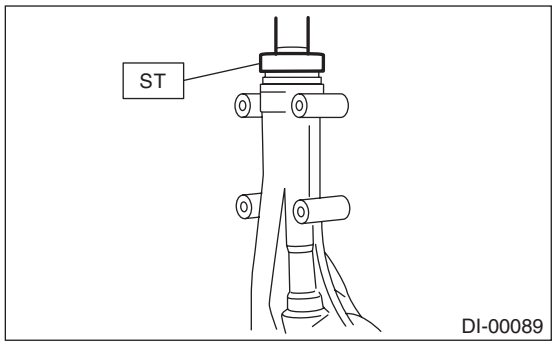
NOTE:
Use a new pilot bearing.
ST1 399780104 WEIGHT
ST2 899580100 INSTALLER



7) Using the ST, install the oil seal.

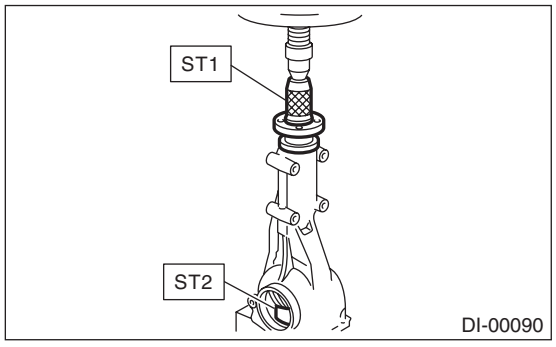
NOTE:
- Use a new oil seal.
- Press-fit until the oil seal end comes 1 mm (0.04 in) inward from end of carrier.
- Apply differential gear oil to the oil seal lips.

ST 498447120 INSTALLER



8) Press-fit the companion flange with ST1 and ST2.

NOTE:
Be careful not to damage the pilot bearing.
ST1 899874100 INSTALLER
ST2 399780104 WEIGHT



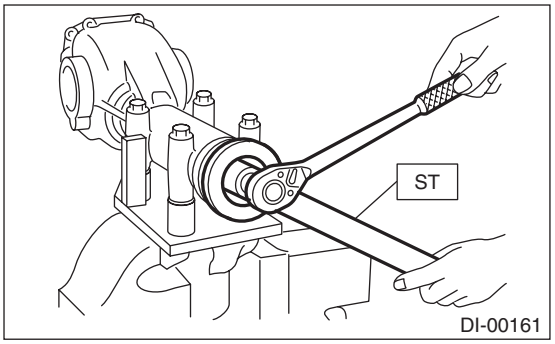
9) Attach the self-locking nut and use the ST to fix the companion flange in place, then tighten the self-locking nut.

NOTE:
- Use a new self-locking nut.
- Before installing the self-locking nut, apply the seal material to the threads of the drive pinion shaft and to the seating surface of the self-locking nut.

Seal material:
THREE BOND 1324 (Part No. 004403042) or equivalent

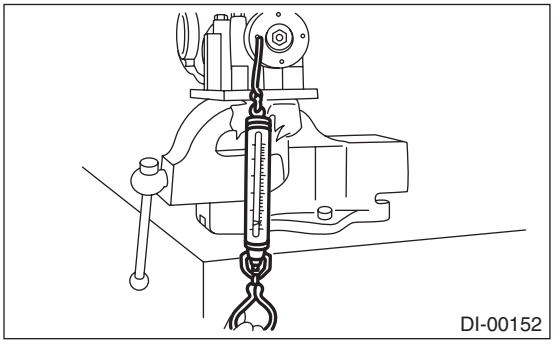
Tightening torque:
191 N·m (19.5 kgf-m, 140.9 ft-lb)

ST 498427200 FLANGE WRENCH

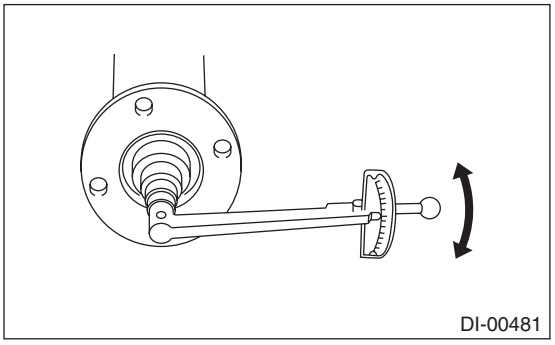


10) Check the initial torque or initial load.

Initial load:
12.7 — 32.2 N (1.3 — 3.3 kgf, 2.9 — 7.2 lbf)

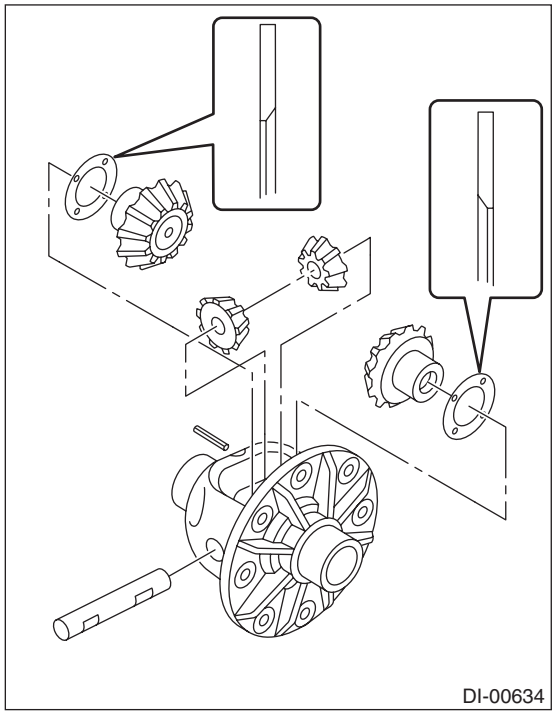


Initial torque:
0.48 — 1.22 N·m (0.05 — 0.12 kgf-m, 0.35 — 0.90 ft-lb)



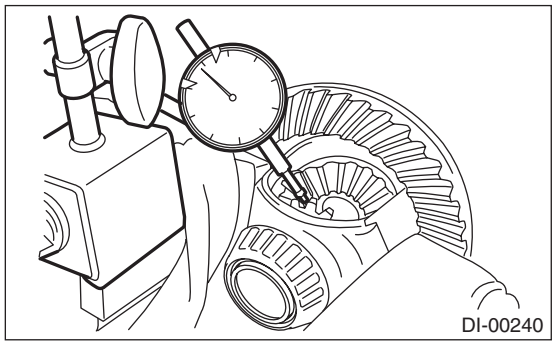
11) Assembling differential case
(1) Install the side gears and pinion mate gears, with their thrust washers and pinion mate shaft, into the differential case.

NOTE:
• Apply gear oil on both sides of the washer and on the side gear shaft before installing.
• Insert the pinion mate shaft into the differential case by aligning the pin holes.
• The side gear thrust washer inner surface has a chamfered side. Install the washer with the chamfered side facing toward the side gear.


DI-00634

(2) Measure the side gear backlash.

Side gear backlash:
0.05 — 0.15 mm (0.002 — 0.006 in)


DI-00240

(3) Adjust the side gear backlash by selecting side gear thrust washer.

Side gear thrust washer	
Part No.	Thickness mm (in)
803135011	0.925 — 0.950 (0.0364 — 0.0374)
803135012	0.950 — 0.975 (0.0374 — 0.0384)
803135013	0.975 — 1.000 (0.0384 — 0.0394)
803135014	1.000 — 1.025 (0.0394 — 0.0404)
803135015	1.025 — 1.050 (0.0404 — 0.0413)

(4) Check the condition of rotation after applying oil to the gear tooth surfaces and washer surfaces.
(5) Drive the spring pin into the differential case.

NOTE:
Use new spring pin.

12) Install the hypoid driven gear to differential case.

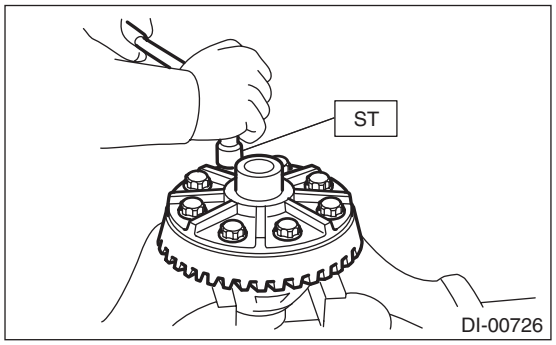
NOTE:
• Before installing bolts, apply seal material to bolt threads.

Seal material:
THREE BOND 1324 (Part No. 004403042) or equivalent

• Tighten opposing bolts in order.
(1) Tighten the hypoid driven gear mounting bolts to the specified torque using the ST.

ST 18270KA020 SOCKET (E20)

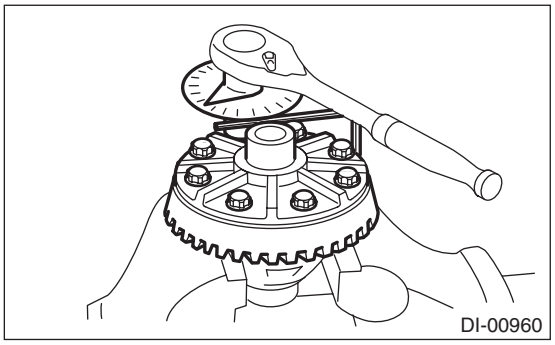
Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)



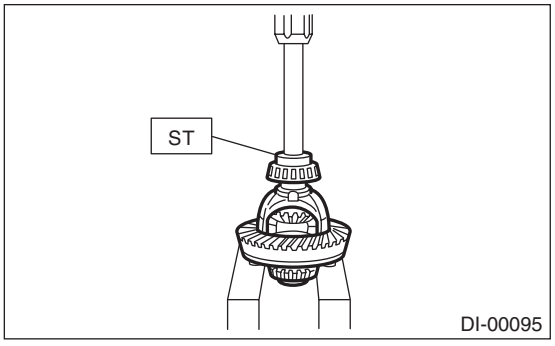
DI-00726

(2) While checking the tightening angle with the angle gauge, further tighten the hypoid driven gear mounting bolts.

Tightening angle:
35°±2°



13) Using the ST, press-fit the side bearing to the differential case.
ST 498485400 DRIFT

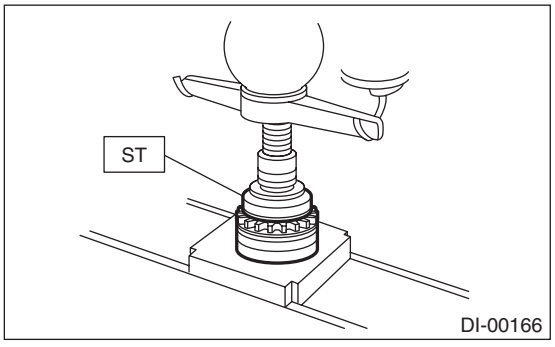


14) Assemble the side retainer.
(1) Install the oil seal into side retainer RH and LH.

CAUTION:
Pay attention to the left and right of the oil seal.

NOTE:
- Use a new oil seal.
- Apply differential gear oil to the oil seal lip.

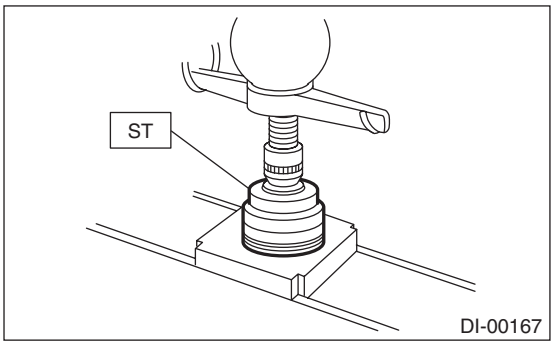
ST 498447100 INSTALLER



(2) Install the bearing race into side retainer RH and LH.

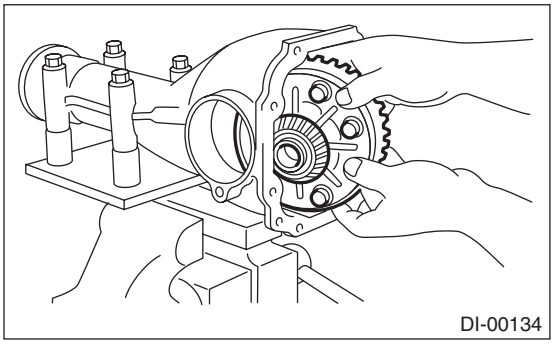
CAUTION:
Make sure that bearing races and cones are properly assembled.

ST 398477702 DRIFT



(3) Install the differential case assembly into differential carrier in the reverse order of disassembly.

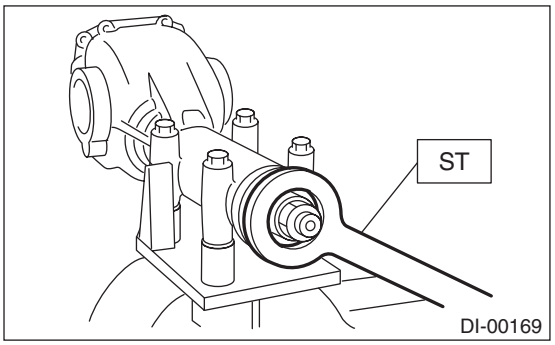
NOTE:
Be careful not to hit the teeth of hypoid driven gear against the differential carrier.



(4) Temporally tighten the side retainers RH and LH in differential carrier to install.

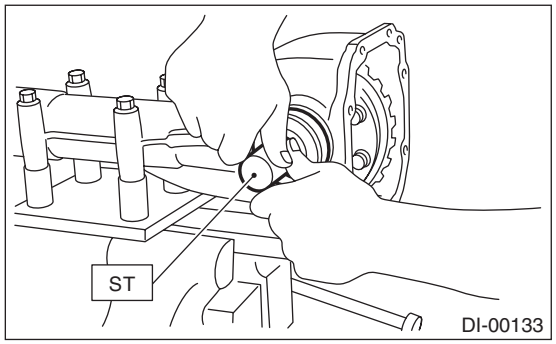
15) Perform the backlash adjustment between the hypoid driven gear and drive pinion, and preload adjustment of differential side bearing.
(1) Turn the drive pinion with ST for better fitting of differential side bearing.

ST 498427200 FLANGE WRENCH



(2) Using the ST, tighten side retainer RH, and then tighten side retainer LH until there is no backlash.

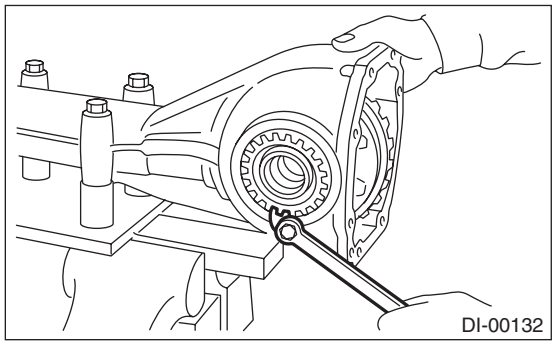
ST 18630AA010 WRENCH COMPL RETAINER



(3) Loosen the side retainer LH by approx. 1 and 1/2 teeth, and tighten the side retainer RH by approx. 2 teeth [amount that the side retainer LH is turned back (approx. 1 and 1/2 teeth) + approx. 1/2 teeth]. Difference between [amount that the side retainer LH is turned back (approx. 1 and 1/2 teeth)] and [amount that the side retainer RH is tightened (approx. 2 teeth)] gives preload.

(4) Temporarily tighten the lock plate.

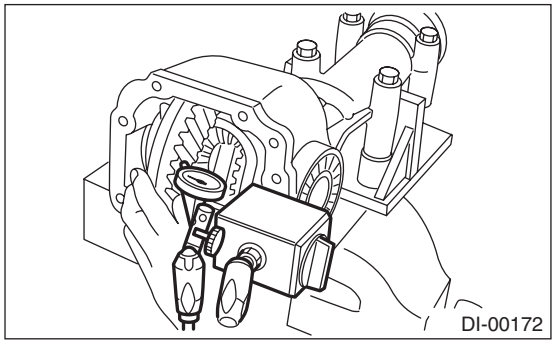
NOTE:
Turn over the lock plate to shift the holder by 1/2 teeth.



(5) Measure the hypoid driven gear-to-drive pinion backlash. Set the magnet base on differential carrier. Align the contact point of dial gauge with tooth face of hypoid driven gear, and move hypoid driven gear while holding drive pinion still. Read the value indicated on dial gauge.

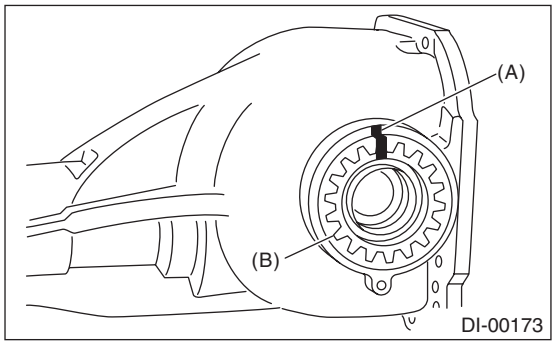
NOTE:
If measured value of backlash is not within the specified range, repeat the procedures for pinion driven gear set backlash adjustment and the differential side bearing preload adjustment.

Backlash:
0.10 — 0.15 mm (0.004 — 0.006 in)



16) Put alignment marks on both the differential carrier and side retainer. Remove the side retainers one side at a time. After installing an O-ring and applying oil to the threaded portion, restore them to the original position.

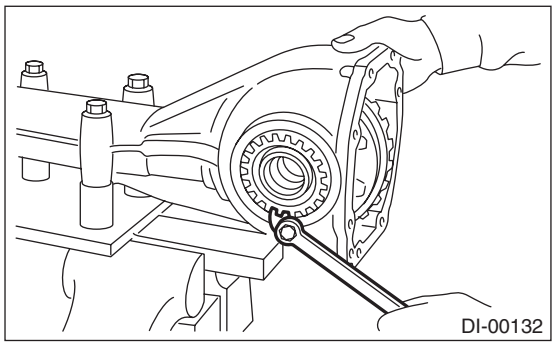
NOTE:
Use new O-rings.



(A) Alignment mark
(B) Side retainer

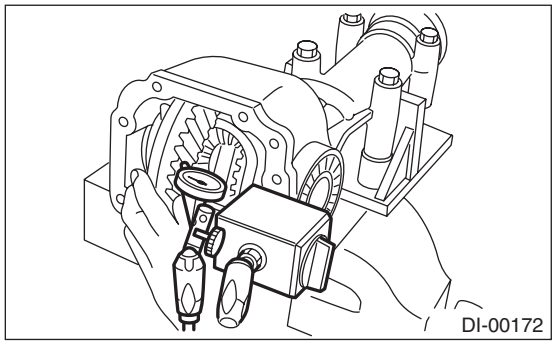
17) Install the lock plate, and tighten the bolts to the specified torque.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



18) Recheck the backlash between hypoid driven gear and drive pinion.

Backlash:
0.10 — 0.15 mm (0.004 — 0.006 in)



19) Checking and adjusting the tooth contact of hypoid driven gear

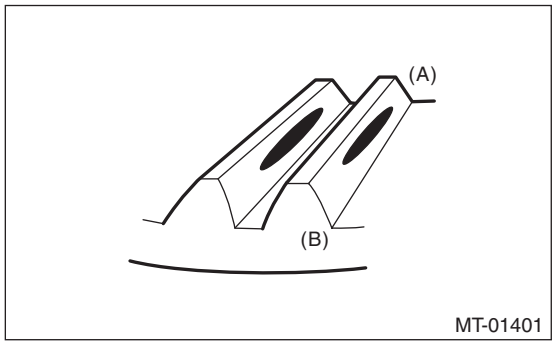
(1) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Check the contact pattern after rotating the hypoid driven gear several revolutions back and forth until a definite contact pattern appears on the hypoid driven gear.

(2) When the contact pattern is not correct, re-adjust.

NOTE:
Be sure to wipe off the lead-free red dye completely after the adjustment is completed.

- Correct tooth contact

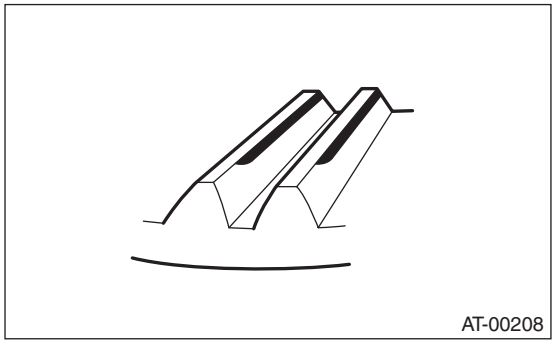
Check item: Tooth contact pattern is slightly shifted toward toe side under no-load rotation. (When driving, it moves towards the heel side.)



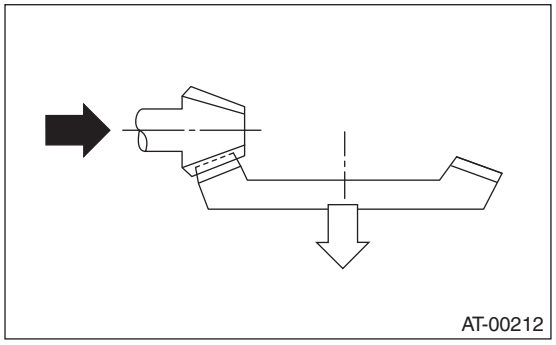
(A) Toe side
(B) Heel side

- Face contact

Check item: Backlash is too large.
Contact pattern



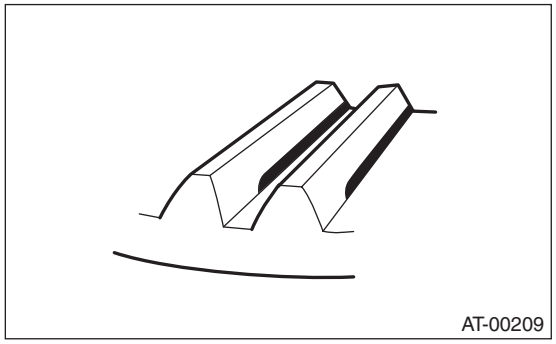
Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.



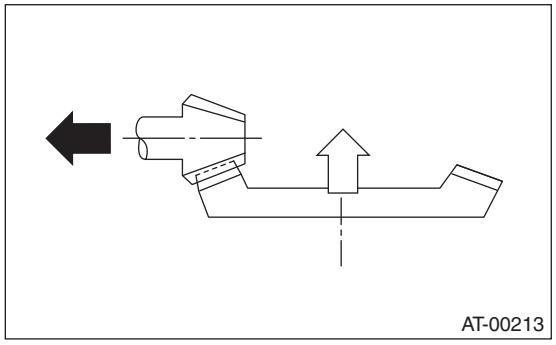
• Flank contact

Check item: Backlash is too small.

Contact pattern



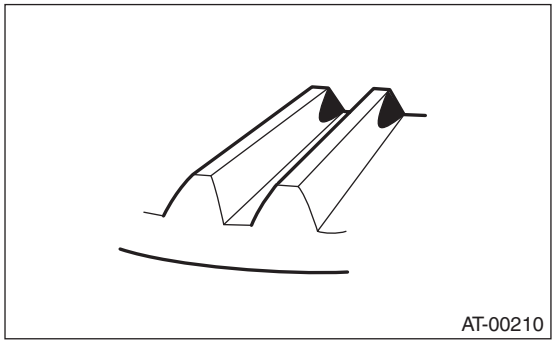
Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.



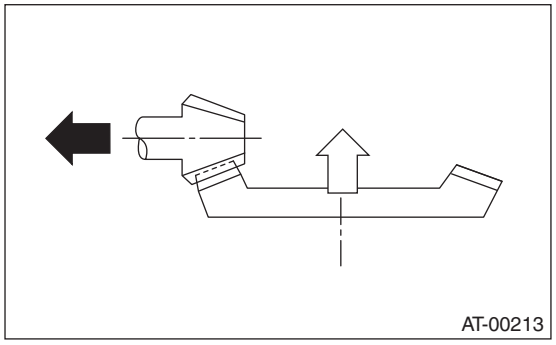
• Toe contact (inside contact)

Check item: Teeth contact area is too small.

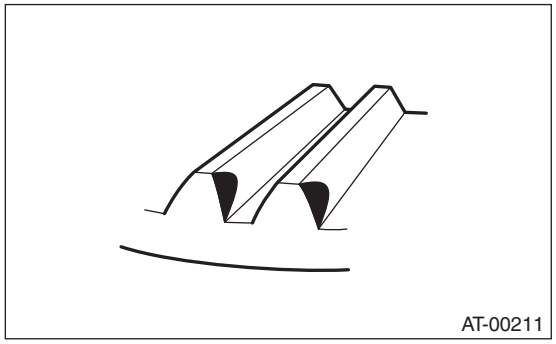
Contact pattern



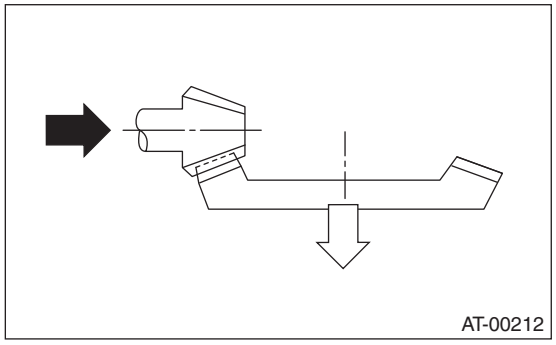
Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear side.



• Heel contact (outside end contact)
Check item: Teeth contact area is too small.
Contact pattern



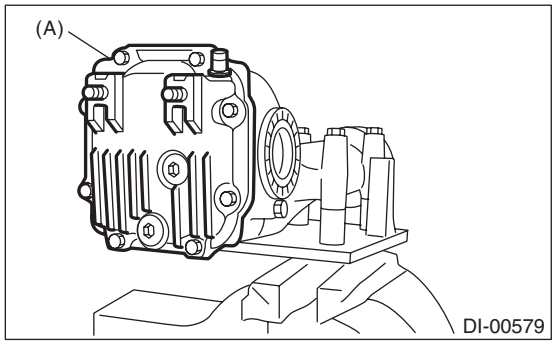
Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.



20) If correct tooth contact is not obtained, readjust the drive pinion height and the differential side bearing preload (already mentioned) and the hypoid gear backlash.
21) Install the gasket and rear cover to the differential carrier, and tighten the bolts to specified torque.

NOTE:
Use a new gasket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

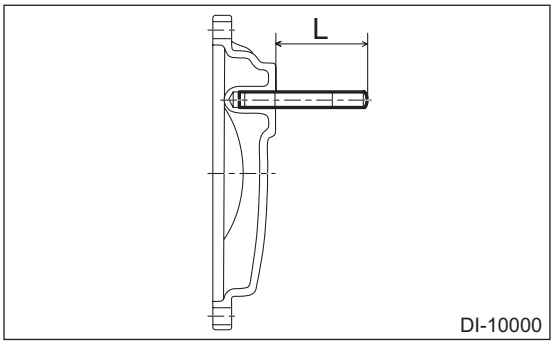


(A) Rear cover

22) When the stud bolts are removed from the rear cover, install the stud bolts.

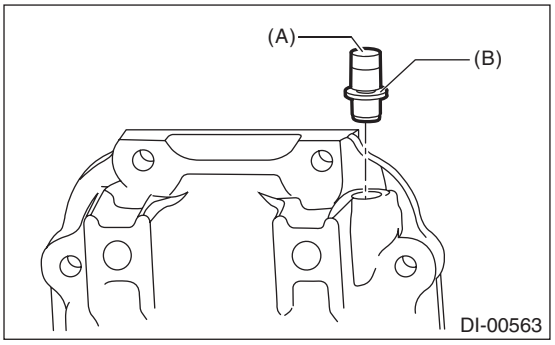
23) Measure the exposed length “L” of the stud bolt as shown in the figure, and check that the value is within the specified range.

Exposed length L of stud bolt:
59.0 — 61.0 mm (2.32 — 2.40 in)



24) Install the air breather cap.

NOTE:
When installing the air breather cap, do not tap section (A). Be sure to tap section (B) to install.



25) Install the drain plug.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kg-m, 36.9 ft-lb)
26) Install the filler plug.

NOTE:
After installing the rear differential assembly to the vehicle, fill the gear oil, then use a new gasket, and tighten to the specified torque. <Ref. to DI-20, REPLACEMENT, Differential Gear Oil.>

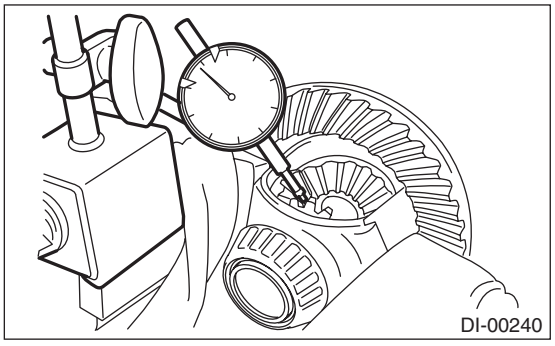
E: INSPECTION

Wash all the disassembled parts clean, and examine them for wear, damage or other defects. Repair or replace the defective parts as necessary.
1) Hypoid driven gear and drive pinion
• If there is evidently an abnormal tooth contact, find out the cause and adjust until the teeth contact correctly. Replace the gear if there is an excessive worn or an incapable adjustment.
• If crack, cutout or seizure is found, replace the parts as a set. Slight damage of some teeth can be corrected by oil stone or the like.
2) Side gear and pinion mate gear
• Replace if cracks, scoring or other defects are evident on the tooth surface.
• Replace if thrust washer contact surface is worn or seized. Slight damages of the surface can be corrected by oil stones or equivalent.
3) Bearing
Replace if seizure, peeling, wear, rust, dragging during rotation, noise or other defect is evident.
4) Thrust washer of the side gear and pinion mate gear:
Replace if seized, flawed, abnormally worn or having other defects.
5) Oil seal
Replace if deformed or damaged, and at every disassembling.
6) Differential carrier
Replace if the bearing bores are worn or damaged.
7) Differential case
Replace if its sliding surfaces are abnormally worn, burned, or cracked.
8) Companion flange
Replace if the oil seal lip contact surface shows cracking.

1. SIDE GEAR BACKLASH

Using a dial gauge, check the backlash of side gear.

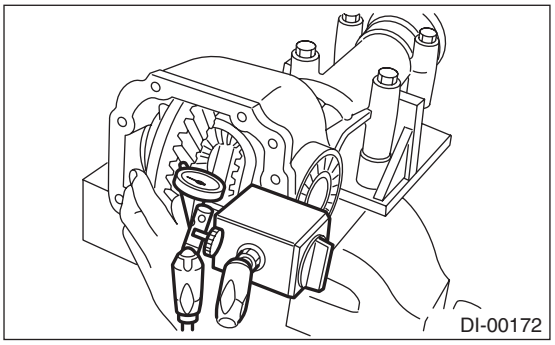
Side gear backlash:
0.05 — 0.15 mm (0.002 — 0.006 in)
If the side gear backlash is outside the specification range, select the side gear thrust washer and adjust the side gear backlash as specified.


DI-00240

2. HYPOID DRIVEN GEAR BACKLASH

Using a dial gauge, check the backlash of hypoid driven gear.

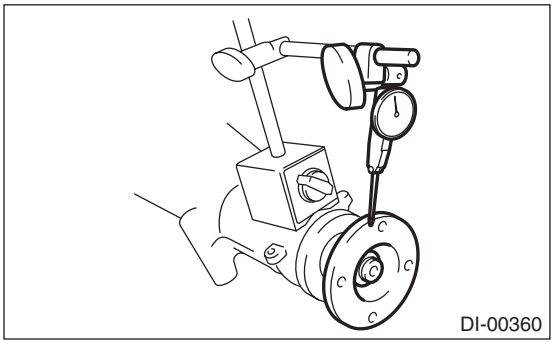
Hypoid driven gear backlash:
0.10 — 0.15 mm (0.004 — 0.006 in)
If the hypoid driven gear backlash is outside the specification range, adjust the side bearing preload and repair if necessary.


DI-00172

3. COMPANION FLANGE

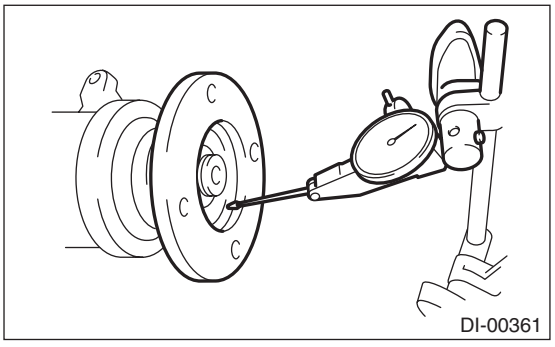
1) If rust or dirt is attached to the companion flange, remove them.
2) Set a dial gauge at a companion flange surface (mating surface of propeller shaft and companion flange), and then measure the companion flange runout.

Limit of runout:
0.08 mm (0.003 in)


DI-00360

3) Set the gauge inside of the companion flange, and measure the runout.

Limit of runout:
0.08 mm (0.003 in)


DI-00361

4) If either runout exceeds the limit, move the phase of companion flange and drive pinion 90° each, and find the point where the runout is within the limit.
5) If the runout exceeds the limit even after changing the phase, replace the companion flange and recheck the runout.
6) If the runout exceeds the limit after replacing the companion flange, the drive pinion may be assembled incorrectly or bearing is faulty.

4. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Inspect the tooth contact between the hypoid driven gear and drive pinion. <Ref. to DI-46, ASSEMBLY, Rear Differential (VA-type).>

F: ADJUSTMENT

1. SIDE GEAR BACKLASH

Adjust the side gear backlash. <Ref. to DI-46, ASSEMBLY, Rear Differential (VA-type).>

2. HYPOID DRIVEN GEAR BACKLASH

Adjust hypoid driven gear backlash. <Ref. to DI-46, ASSEMBLY, Rear Differential (VA-type).>

3. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Adjust the tooth contact between hypoid driven gear and drive pinion gear. <Ref. to DI-46, ASSEMBLY, Rear Differential (VA-type).>

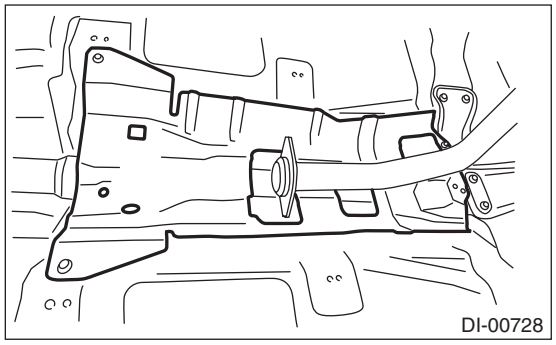
6. Rear Differential Front Oil Seal

A: INSPECTION

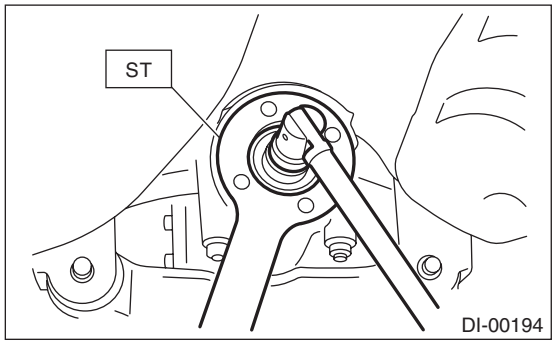
Make sure that there is no leakage from front oil seal portion. If there is any leakage, replace the oil seal and inspect the propeller shaft.

B: REPLACEMENT

1) Shift the select lever or gear shift lever to neutral.
2) Release the parking brake.
3) Lift up the vehicle.
4) Drain differential gear oil. <Ref. to DI-20, REPLACEMENT, Differential Gear Oil.>
5) Remove the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
6) Remove the center exhaust cover.

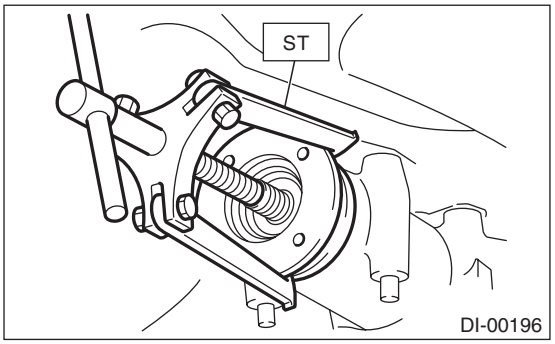

DI-00728

7) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
8) Check the initial torque and write it down.
9) Remove the self-locking nut while holding the companion flange with ST.
ST 498427200 FLANGE WRENCH



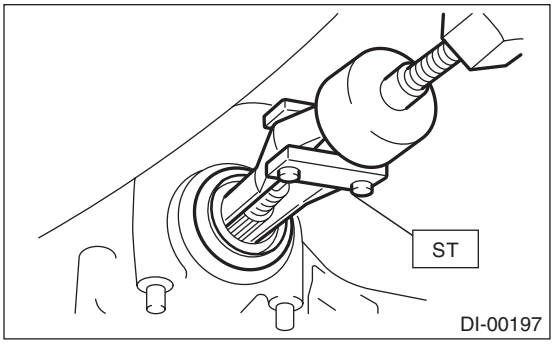
DI-00194

10) Extract the companion flange using the ST.
ST 399703600 PULLER ASSY



DI-00196

11) Remove the oil seal using ST or screwdriver.
ST 398527700 PULLER ASSY

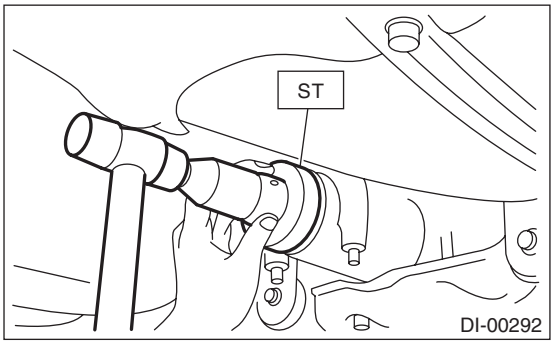


DI-00197

12) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply differential gear oil to the oil seal lips.

ST 498447120 INSTALLER



DI-00292

13) Install the companion flange.

NOTE:
Use a plastic hammer to install companion flange.

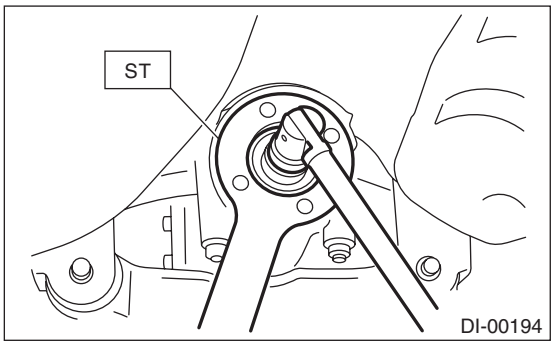
14) Tighten the self-locking nut to the specified torque so that the initial torque of companion flange becomes the same as that of before oil seal replacement.

NOTE:
- Use a new self-locking nut.
- Before installing the self-locking nut, apply the seal material to the threads of the drive pinion shaft and to the seating surface of the self-locking nut.

Seal material:
THREE BOND 1324 (Part No. 004403042) or equivalent

Tightening torque:
T-type
167 — 196 N·m (17.0 — 20.0 kgf-m, 123.2 — 144.6 ft-lb)
VA-type
162 — 220 N·m (16.5 — 22.5 kgf-m, 119.5 — 162.3 ft-lb)

ST 498427200 FLANGE WRENCH



15) Hereafter, perform assembly in the reverse order of disassembly.

16) Fill differential gear oil. <Ref. to DI-20, REPLACEMENT, Differential Gear Oil.>

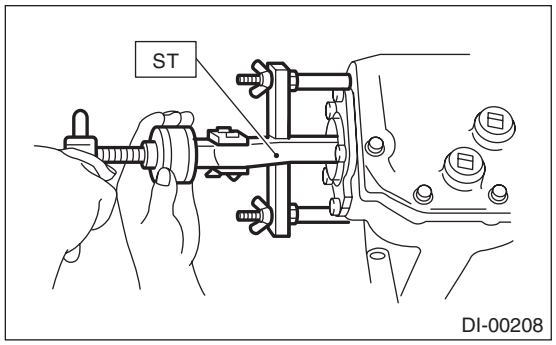
7. Rear Differential Side Oil Seal

A: INSPECTION

Make sure that there is no leakage from side oil seal. If there is any leakage, replace the oil seal.

B: REPLACEMENT

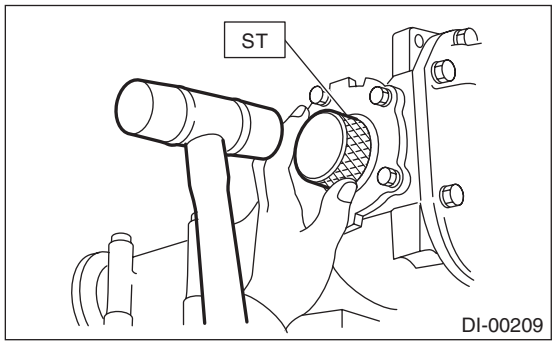
1) Remove the rear differential. <Ref. to DI-23, REMOVAL, Rear Differential (T-type).> <Ref. to DI-43, REMOVAL, Rear Differential (VA-type).>
2) Remove the rear differential side oil seal using a ST or screwdriver wrapped with vinyl tape to prevent the side retainer from scratching.
ST 398527700 PULLER ASSY



3) Using the ST, install the oil seal.

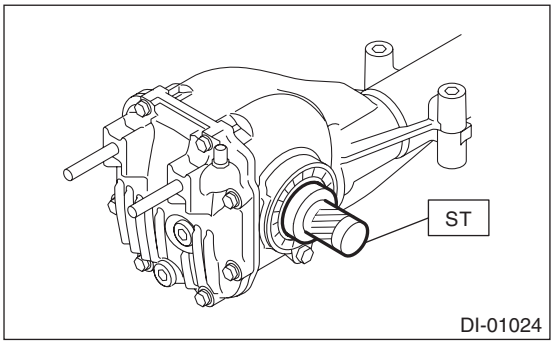
NOTE:
- Use a new oil seal.
- Apply differential gear oil to the oil seal lips.
- T-type

ST 398437700 DRIFT



- VA1-type

ST 498447100 INSTALLER

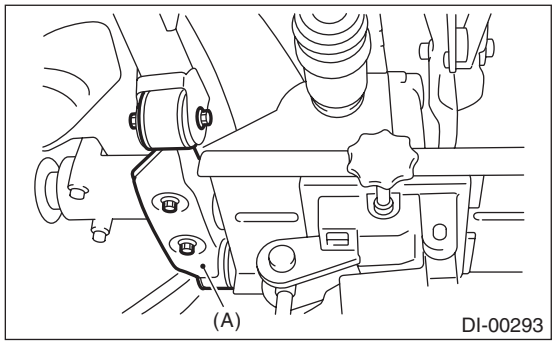


4) Install the rear differential. <Ref. to DI-25, INSTALLATION, Rear Differential (T-type).> <Ref. to DI-43, INSTALLATION, Rear Differential (VA-type).>

8. Rear Differential Front Member

A: REMOVAL

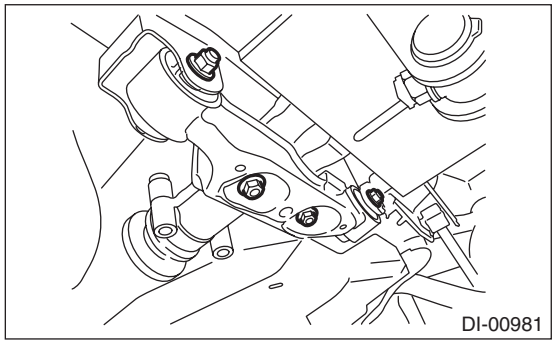
1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Support the rear differential using transmission jack, and then remove the rear differential front member.



(A) Rear differential front member

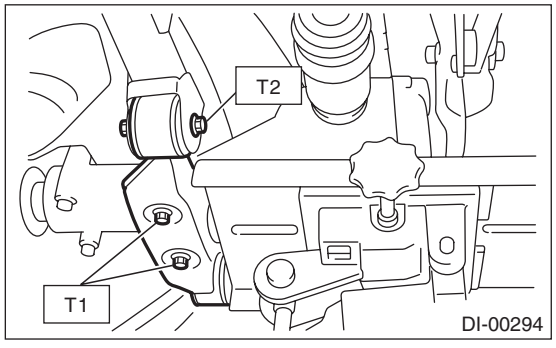
B: INSTALLATION

1) Install the rear differential front member, and temporarily attach and tighten a new self-locking nut.



2) Remove the transmission jack.
3) Tighten the self-locking nut.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 110 N·m (11.2 kgf-m, 81.1 ft-lb)



C: INSPECTION

1) Check the rear differential front member for damage, bend and corrosion.
If damage, bend or corrosion is excessive, replace the rear differential front member.
2) Check the bushings of rear differential member for cracking, hardening and damage. If cracking, hardening or damage is excessive, replace rear differential front member.

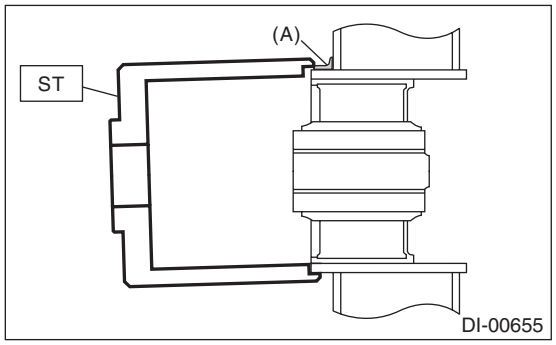
9. Rear Differential Mount Bushing

A: INSPECTION

Check the rear differential mount bushing for cracks, hardening or damage. If cracking, hardening or damage is excessive, replace rear differential mount bushing.

B: REPLACEMENT

CAUTION:
• If there was so much rust in the rear differential mount bushing, remove the rust before starting work.
• Apply the molybdenum grease on the square thread of the ST (shaft and nut) before use.
1) Remove the rear differential. <Ref. to DI-23, REMOVAL, Rear Differential (T-type).> <Ref. to DI-43, REMOVAL, Rear Differential (VA-type).>
2) Fit the ST to the periphery of the sub frame cylinder, and make sure that the ST does not contact with welded spots or spatters.
ST 41399FG010 SPECIAL TOOL A

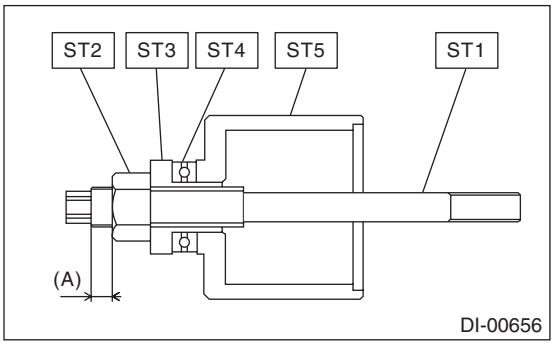


(A) Welded spot

3) If the ST contacts with welded spots or spatters, remove the excessive welds or spatters with sander or the equivalent so that the ST contacts the cylinder peripheral part.

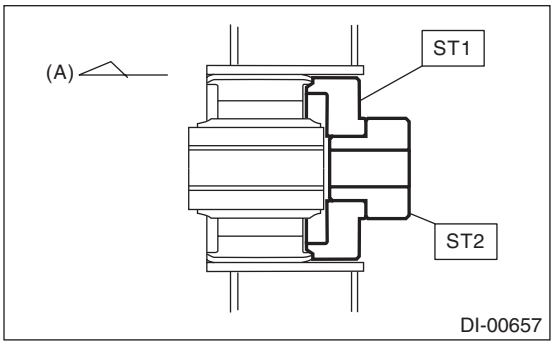
CAUTION:
Performing the operation with the ST contacting with welded spots or spatters may break the ST. Be sure to remove excessive welds or spatters before the operation.

4) Set ST1, ST2, ST3, ST4 and ST5 as shown in the figure.
ST1 41399FG091 SPECIAL TOOL SHAFT
ST2 41399FG070 SPECIAL TOOL NUT
ST3 41399FG050 SPECIAL TOOL SLEEVE
ST4 41399FG080 SPECIAL TOOL BEARING
ST5 41399FG010 SPECIAL TOOL A



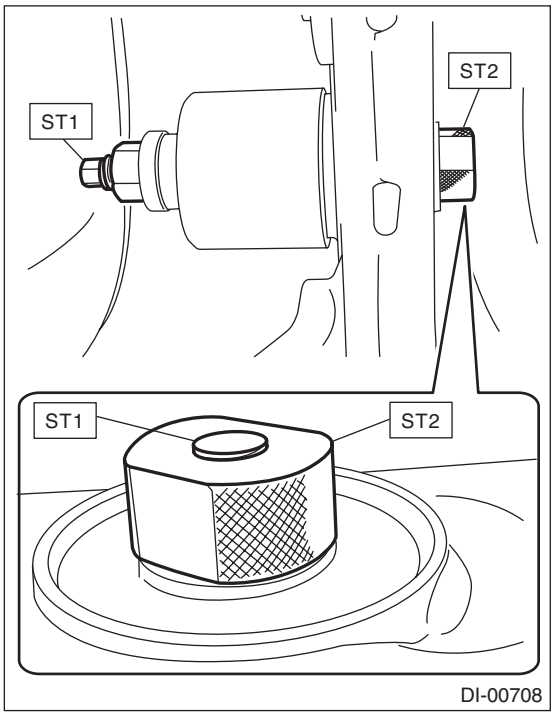
(A) 5 mm (0.2 in) or less

5) Fit and hold the ST1 and ST2 to the rear differential mount bushing from the rear side of vehicle.
ST1 41399FG031 SPECIAL TOOL C
ST2 41399FG061 SPECIAL TOOL RING



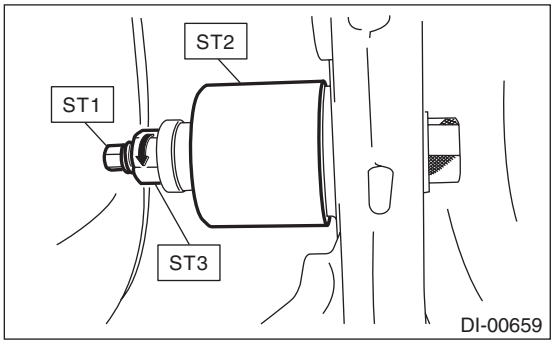
(A) Front side of vehicle

6) Insert the ST set in the step 4) through the rear differential mount bushing hole from the front side of vehicle, and screw in the ST1 by hand till the front end of ST1 comes out slightly from the rear end of ST2.
ST1 41399FG091 SPECIAL TOOL SHAFT
ST2 41399FG061 SPECIAL TOOL RING



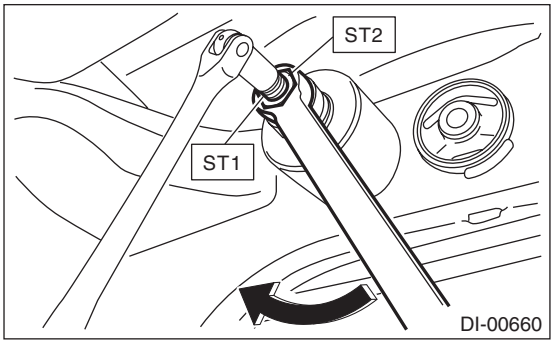
7) Hold the ST1 to prevent it from rotating, and screw in the ST3 by hand till there is no loose fit on the ST2.

CAUTION:
When setting the ST to the vehicle, always make sure that the ST2 fits the periphery of the sub frame cylinder and is not tilted.
ST1 41399FG091 SPECIAL TOOL SHAFT
ST2 41399FG010 SPECIAL TOOL A
ST3 41399FG070 SPECIAL TOOL NUT



8) Hold the ST1 with a tool to prevent it from rotating, and screw in the ST2 to remove the rear differential mount bushing.

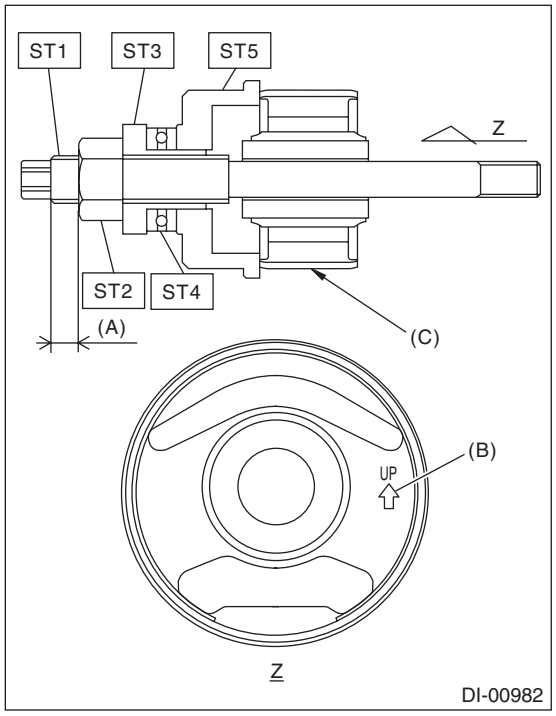
CAUTION:
• Rotation of ST1 will damage the screw at the rear end of rear differential mount bushing. Never rotate the ST1.
• If the ST starts to tilt while removing the rear differential mount bushing, stop the work and set the ST again.
ST1 41399FG091 SPECIAL TOOL SHAFT
ST2 41399FG070 SPECIAL TOOL NUT



9) Set ST1, ST2, ST3, ST4, ST5 and rear differential mount bushing as shown in the figure.

NOTE:
- Set the ST2 nut near to the end of ST1 screw.
- Hold the rear differential mount bushing with the arrow marked side facing toward the rear of the vehicle, and set the rear differential mount bushing to the ST so that the arrow mark faces upward.
- Mark the bottom end of rear differential mount bushing to identify the installing direction.

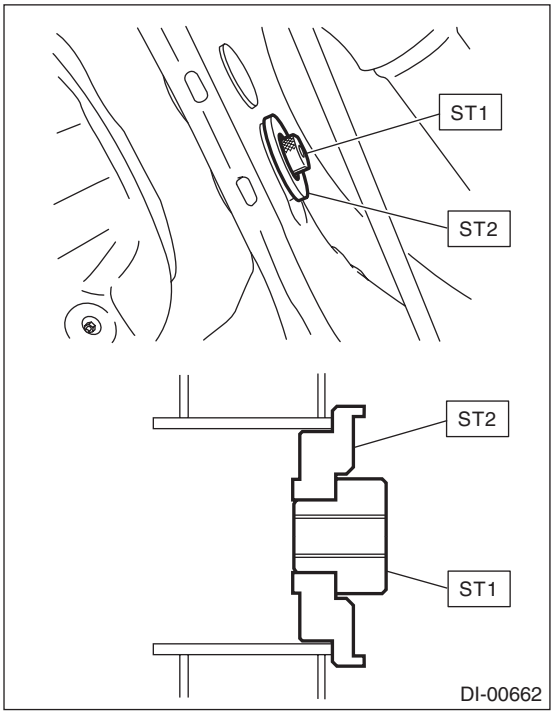
ST1 41399FG091 SPECIAL TOOL SHAFT
ST2 41399FG070 SPECIAL TOOL NUT
ST3 41399FG050 SPECIAL TOOL SLEEVE
ST4 41399FG080 SPECIAL TOOL BEARING
ST5 41399FG020 SPECIAL TOOL B



(A) 8 mm (0.31 in) or more
(B) Arrow mark
(C) Marked position

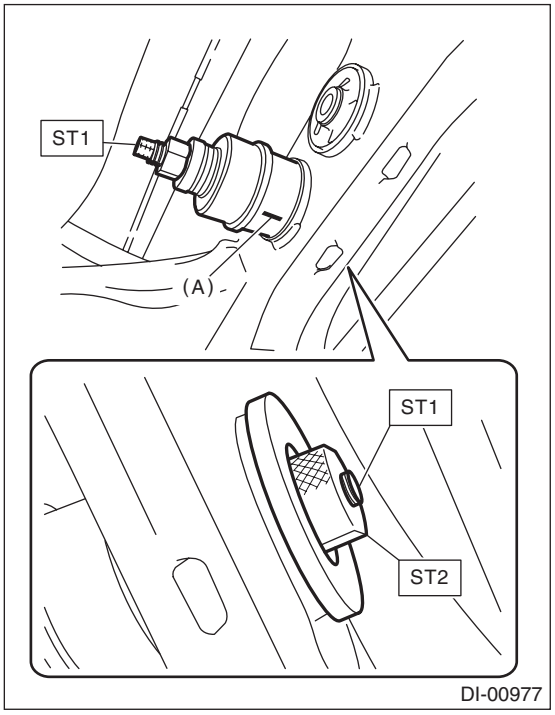
10) Attach ST1 to the ST2, and fit and hold the STs as a unit to the sub frame from the rear side of vehicle.

ST1 41399FG061 SPECIAL TOOL RING
ST2 41399FG041 SPECIAL TOOL D



11) Insert the ST and rear differential mount bushing set in the step 9) through the sub frame from the front side of vehicle, and screw in the ST1 by hand till the front end of ST1 comes out slightly from the rear end of ST2.

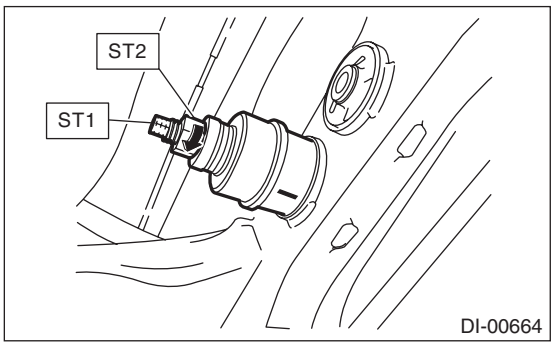
CAUTION:
Set the rear differential mount bushing with its mark facing the bottom end direction.
ST1 41399FG091 SPECIAL TOOL SHAFT
ST2 41399FG061 SPECIAL TOOL RING



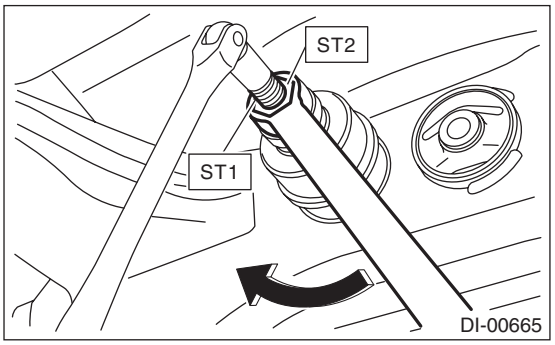
(A) Mark

12) Hold the ST1 to prevent it from rotating, and screw in the ST2 by hand till there is no loose fit on the ST and the rear differential mount bushing.

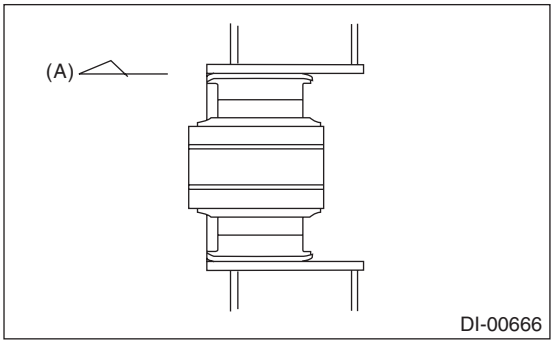
CAUTION:
Make sure that the ST and rear differential mount bushing are not tilted.
ST1 41399FG091 SPECIAL TOOL SHAFT
ST2 41399FG070 SPECIAL TOOL NUT



13) Screw in the ST2 while holding the ST1 with a tool to prevent it from rotating, and press-fit the rear differential mount bushing to the front end of sub frame cylinder.
ST1 41399FG091 SPECIAL TOOL SHAFT
ST2 41399FG070 SPECIAL TOOL NUT



14) Make sure that the rear differential mount bushing is inserted to the front end of sub frame cylinder.



(A) Front side of vehicle

15) Install the rear differential. <Ref. to DI-25, INSTALLATION, Rear Differential (T-type).> <Ref. to DI-43, INSTALLATION, Rear Differential (VA-type).>

10.Rear Differential Inspection Mode

A: GENERAL DESCRIPTION

CAUTION:
Be sure to perform rear differential inspection mode.
- Follow the messages displayed on the Subaru Select Monitor when working.
- “Rear differential inspection mode” using the Subaru Select Monitor is available only for the CVT model.
- Perform rear differential inspection mode when the following work has been performed.

Transmission assembly replacement/Replacement of rear differential/Replacement of front differential hypoid gear set/Replacement of rear differential hypoid gear set

B: PROCEDURE

CAUTION:
Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
1) Shift the select lever to “P” range.
2) Apply the parking brake.
3) Lift up the vehicle.

WARNING:
Lift up the vehicle until the tire bottom is 30 cm or more above the ground.
4) Connect the Subaru Select Monitor to data link connector.
5) Turn the ignition switch to ON.
6) Select «Diagnosis» in the «Start» screen of Subaru Select Monitor.
7) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
8) On «Main Menu» display, select «Each System».
9) On «Select System» display, select «Transmission Control System».
10) On «Select Function» display, select «Work Support».
11) On «Work Support» display, select «Rear differential inspection mode».
12) Follow the messages displayed on the Subaru Select Monitor screen when working.
13) The results of the rear differential inspection mode are displayed on the Subaru Select Monitor screen.
- When ended normally: “The rear differential has been replaced normally.”
- When ended abnormally: “A rear differential abnormality has been detected. Reinspect the items at the time of rear differential installation.”
- When interrupted: “Inspection is stopped. Restart this inspection mode from the beginning.”

14) After the message “Inspection has been completed. Set the ignition switch to OFF.” appears, the rear differential inspection mode completes.

NOTE:
• When the rear differential inspection mode is completed properly, the following warning lights may illuminate. But this is not a malfunction. If warning light illuminates, clear the memory.
VDC/ABS, engine, power steering
• For detailed operation procedures, refer to “Application help”.
• If the rear differential inspection mode does not end normally, repeat the mode until it ends normally.
• When the inspection mode does not end normally, the AWD warning light will start blinking at 2 Hz.
• When the rear differential inspection mode ends abnormally, the front differential and rear differential may be different from the specifications for the vehicle.
• When the rear differential inspection mode is interrupted, the following reasons are possible.

Message	Main reasons for abnormal termination
• “Inspection is stopped.” • “Inspection is stopped. Restart this inspection mode from the beginning.”	• TCM has detected a failure. • VDC has a failure. • Brake is applied after start during automatic running. • Too delayed operation to the instructions displayed on the Subaru Select Monitor.
“TCM incompatible. Rear differential inspection mode is stopped.”	The model does not support the rear differential inspection mode.
The TCM has detected a fault. Inspect following the manual.	TCM has detected a failure.

15) Perform “Function Check Sequence” for VDC. <Ref. to VDC(diag)-17, READ FREEZE FRAME DATA, OPERATION, Subaru Select Monitor.> <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

11.General Diagnostic Table

A: INSPECTION

Symptom or trouble	Possible cause	Remedy
1. Oil leakage	(1) Worn, scratched, or incorrectly seated front or side oil seal. Scored, battered or excessively worn sliding surface of companion flange.	Repair or replace.
	(2) Clogged or damaged air breather cap.	Clean, repair or replace.
	(3) Loose bolts on the side retainer, or incorrectly fitted O-ring.	Tighten the bolts to specified torque. Replace the O-ring.
	(4) Loose rear cover attachment bolts or damaged gasket.	Replace the gasket, and tighten the bolts to specified torque.
	(5) Loose filler plug or drain plug.	• Apply liquid gasket, and tighten to the specified torque. (T-type) • Replace the gasket, and tighten to the specified torque. (VA-type)
	(6) Wear, damage or incorrect fitting of drive shaft, side retainer or oil seal.	Repair or replace.
2. Seizure NOTE: Seized or damaged parts should be replaced, and also other parts should be thoroughly checked for any defect and should be repaired or replaced as required.	(1) Insufficient backlash for hypoid gear.	Readjust or replace.
	(2) Excessive preload for side, rear or front bearing.	Readjust or replace.
	(3) Insufficient or improper oil used.	Add recommended oil to the specified level.
3. Damage NOTE: Damaged parts should be replaced, and also other parts should be thoroughly checked for any defect and should be repaired or replaced as required.	(1) Improper backlash for hypoid gear.	Readjust or replace.
	(2) Insufficient or excessive preload for side, rear or front bearing.	Readjust or replace.
	(3) Excessive backlash for differential gear.	Replace gear or thrust washer.
	(4) Loose bolts and nuts such as hypoid driven gear bolt.	Retighten.
	(5) Damage due to overloading.	Replace.
4. Noises when starting or shifting gears NOTE: Noises may be caused by differential assembly, universal joint, wheel bearing, etc. Find out what is actually making noise before disassembling.	(1) Improper tooth contact of hypoid driven gear and drive pinion	Readjust. (drive pinion adjustment and backlash adjustment)
	(2) Excessive backlash for hypoid driven gear	Replace the gear or the pinion height adjusting washer.
	(3) Excessive backlash for side gear.	Replace gear or thrust washer.
	(4) Insufficient preload for front or rear bearing.	Readjust.
	(5) Loose drive pinion nut.	Tighten to the specified torque.
	(6) Loose bolts and nuts such as side retainer attachment bolt.	Tighten to the specified torque.
5. Noises when cornering	(1) Damaged differential gear.	Replace.
	(2) Excessive wear or damage of thrust washer.	Replace.
	(3) Broken pinion mate shaft.	Replace.
	(4) Stuck or damaged side bearing	Replace.

Symptom or trouble	Possible cause	Remedy
6. Gear Noise NOTE: Since noises from engine, muffler, transmission, propeller shaft, wheel bearings, tires, and body are sometimes mistaken for noises from differential assembly, be careful in checking them. Inspection methods to locate noises include coasting, accelerating, cruising, and lifting-up all four wheels. Perform these inspections according to the condition of trouble. When listening to noises, shift the gear into four-wheel drive and fourth speed position, trying to pick up only differential noise.	(1) Improper tooth contact of hypoid driven gear and drive pinion	Readjust or replace the hypoid gear set.
	(2) Improper backlash of the hypoid driven gear	Readjust.
	(3) Scored or chipped teeth of hypoid gear.	Replace hypoid gear set.
	(4) Scuffed hypoid gear	Replace hypoid gear set.
	(5) Improper preload for front or rear bearings.	Readjust.
	(6) Stuck, scored or chipped teeth of front or rear bearing	Replace.
	(7) Stuck, scored or chipped teeth of side bearing	Replace.
	(8) Vibrating differential gear.	Replace the differential gear.

TRANSFER CASE

TC

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1. General Description

A: NOTE

For general description, refer to “CVT” or “5MT” section.
CVT model:
<Ref. to CVT(TR580)-3, General Description.> <Ref. to CVT(TH58A)-3, General Description.>
5MT model:
<Ref. to 5MT-2, General Description.>

2. Transfer Case and Extension Case Assembly

A: NOTE

For removal, installation and inspection, refer to “5MT” section. <Ref. to 5MT-40, Transfer Case and Extension Case Assembly.>

3. Transfer Clutch

A: NOTE

For removal, installation and inspection, refer to “CVT” section. <Ref. to CVT(TR580)-177, Transfer Clutch.> <Ref. to CVT(TH58A)-187, Transfer Clutch.>

4. Extension Case

A: NOTE

For removal, installation and inspection, refer to “CVT” section. <Ref. to CVT(TR580)-173, Extension Case.> <Ref. to CVT(TH58A)-183, Extension Case.>

5. Oil Seal

A: NOTE

For removal, installation and inspection, refer to “CVT” or “5MT” section.
CVT model:
<Ref. to CVT(TR580)-92, Extension Case Oil Seal.> <Ref. to CVT(TH58A)-91, Extension Case Oil Seal.>
5MT model:
<Ref. to 5MT-32, Oil Seal.>

6. Transfer Drive Gear

A: NOTE

For removal, installation and inspection, refer to “CVT” or “5MT” section.
CVT model:
<Ref. to CVT(TH58A)-204, Transfer Drive Gear.>
5MT model:
<Ref. to 5MT-47, Transfer Drive Gear.>

7. Transfer Driven Gear

A: NOTE

For removal, installation and inspection, refer to “CVT” or “5MT” section.
CVT model:
<Ref. to CVT(TR580)-192, Transfer Driven Gear.> <Ref. to CVT(TH58A)-201, Transfer Driven Gear.>
5MT model:
<Ref. to 5MT-49, Transfer Driven Gear.>

8. Reduction Drive Gear

A: NOTE

For removal, installation and inspection, refer to “CVT” section. <Ref. to CVT(TR580)-229, Reduction Drive Gear.> <Ref. to CVT(TH58A)-263, Reduction Drive Gear.>

9. Reduction Driven Gear

A: NOTE

For removal, installation and inspection, refer to “CVT” section. <Ref. to CVT(TR580)-197, Reduction Driven Gear.>

10.Center Differential

A: NOTE

For removal, installation and inspection, refer to “5MT” section. <Ref. to 5MT-51, Center Differential.>

11.Transfer Clutch Pressure Test

A: NOTE

For inspection, refer to the “CVT” section. <Ref. to CVT(TR580)-55, Transfer Clutch Pressure Test.> <Ref. to CVT(TH58A)-60, Transfer Clutch Pressure Test.>

DRIVE SHAFT SYSTEM

DS

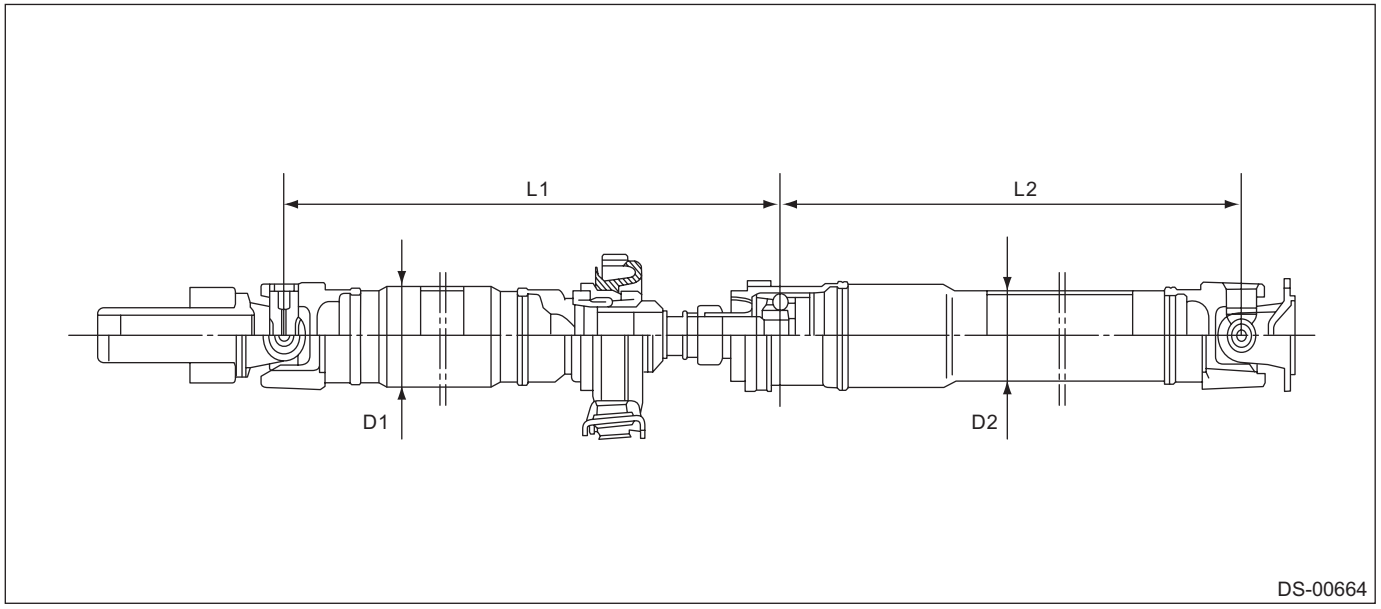
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4.	Front Hub Unit Bearing	24
5.	Rear Axle	33
6.	Rear Hub Unit Bearing	43
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1. General Description

A: SPECIFICATION

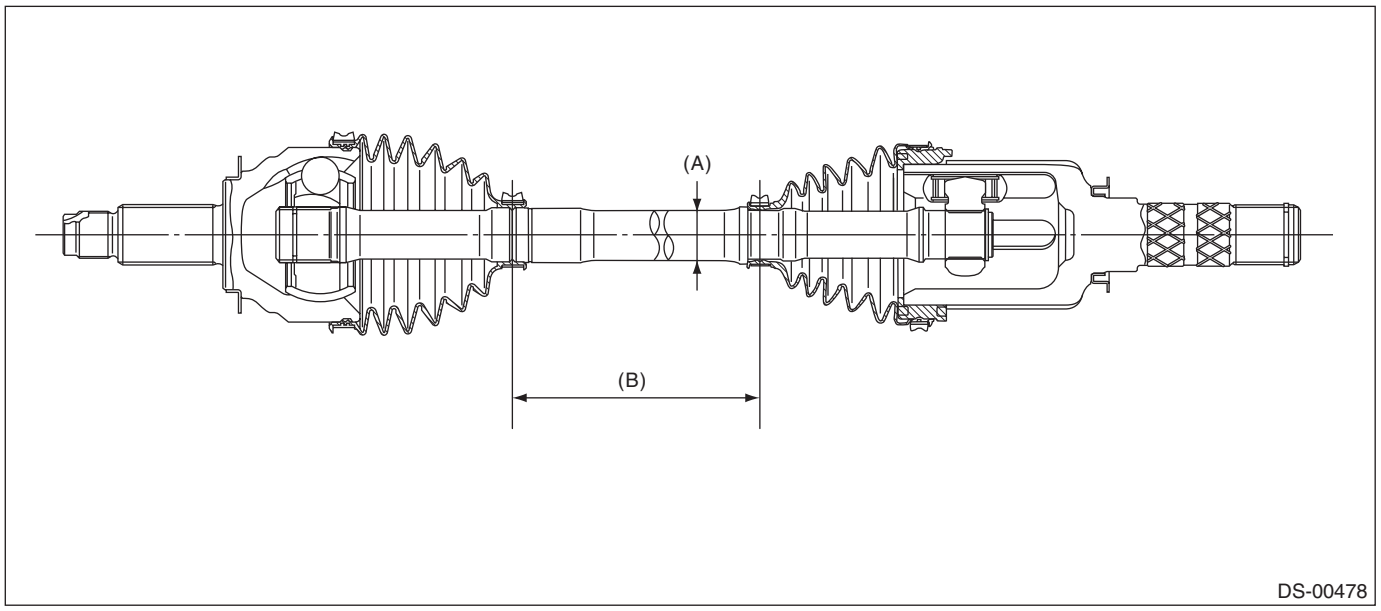
1. PROPELLER SHAFT

Model		Except for Crosstrek model	Crosstrek model	
			Gasoline engine model	HEV model
Propeller shaft type		EDJ		
Front propeller shaft joint-to-joint length: L_1	CVT	675.5 mm (26.59 in)		562 mm (22.13 in)
	MT	735.5 mm (28.96 in)		—
Rear propeller shaft joint-to-joint length: L_2		723 mm (28.46 in)		
Outer diameter of tube:	D_1	63.5 mm (2.50 in)		
	D_2	65.0 mm (2.56 in)	57.5 mm (2.26 in)	



2. FRONT DRIVE SHAFT ASSEMBLY

Model	Type of drive shaft	Axle diameter ϕ mm (in)	Axle length mm (in)
Except for Crosstrek model	AC + AAR	22 (0.87)	347.5 (13.68)
Crosstrek model	EBJ + PTJ	22 (0.87)	356.4 (14.03)



(A) Axle diameter (B) Axle length

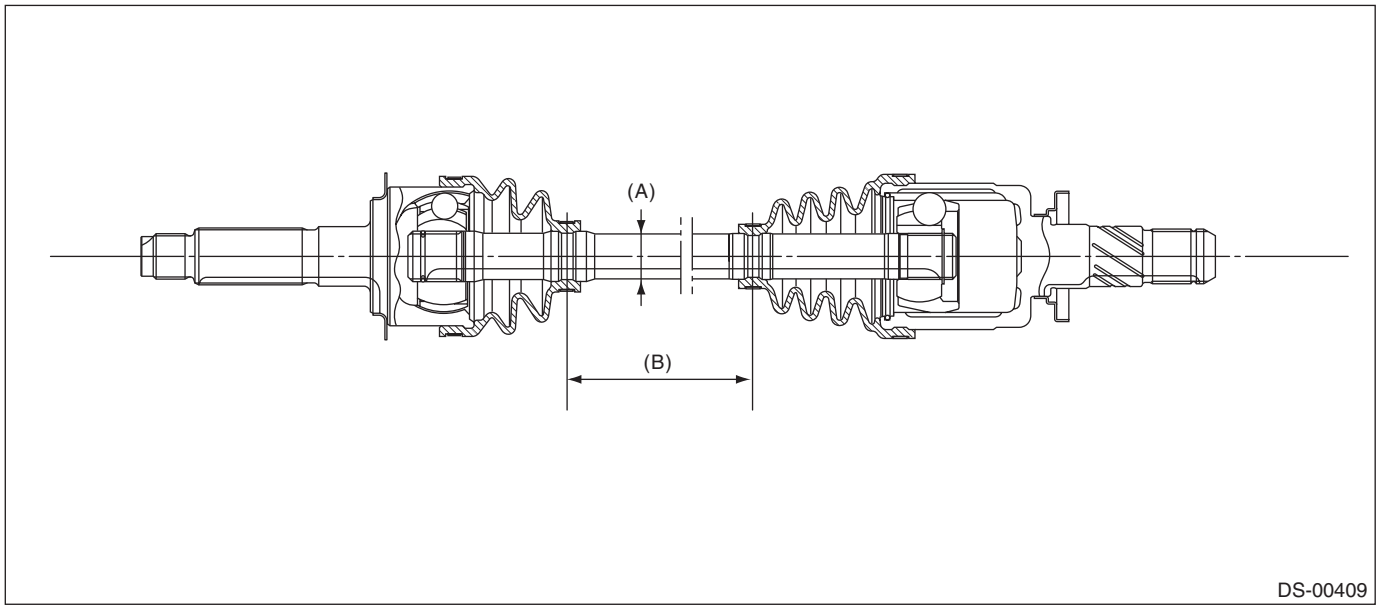
3. REAR DRIVE SHAFT ASSEMBLY

- Except for Crosstrek model

Model	Type of drive shaft	Axle diameter ϕ mm (in)	Axle length mm (in)
CVT model	BJ + DOJ	22 (0.87)	357.45 (14.07)
MT model	EBJ + DOJ	22 (0.87)	372.5 (14.67)

- Crosstrek model

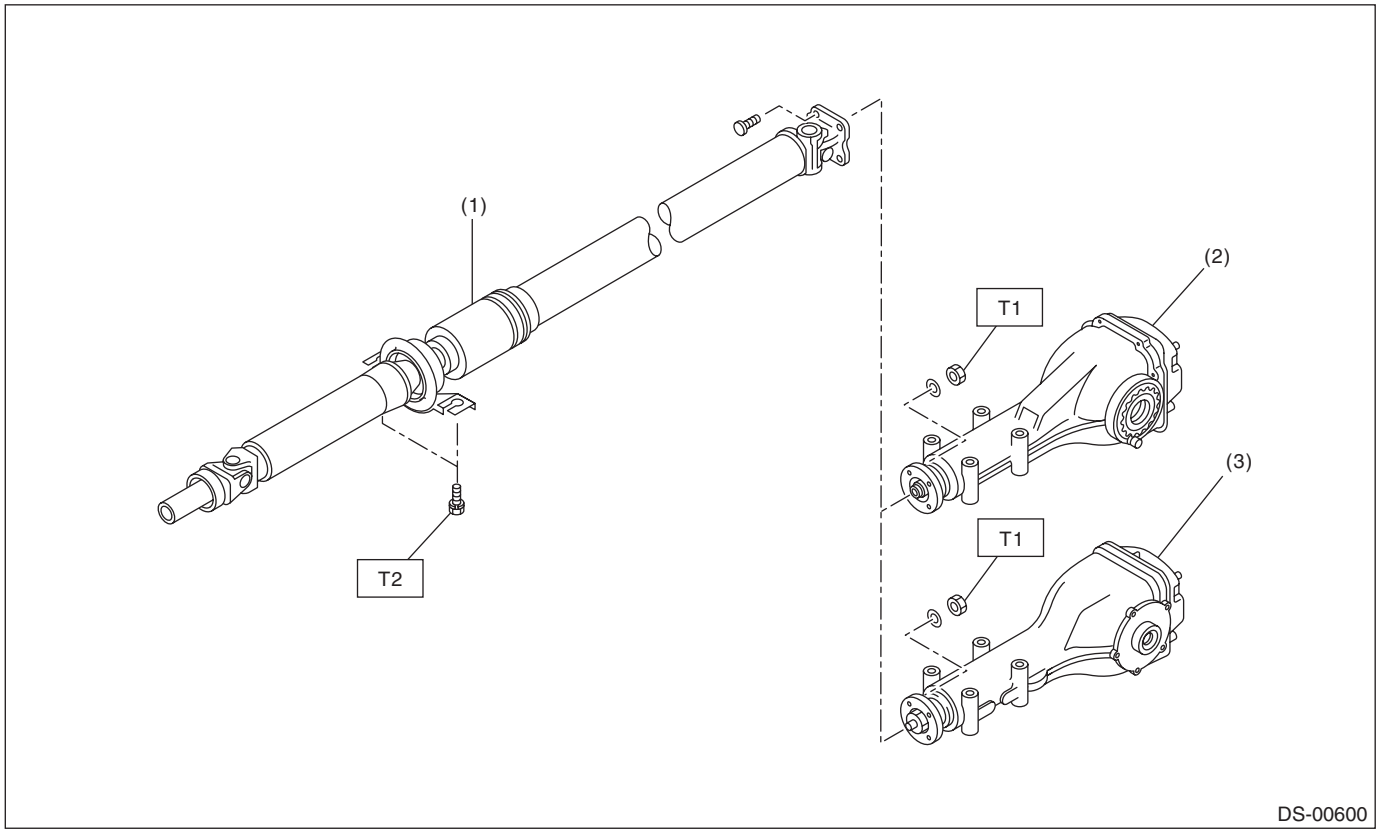
Model	Type of drive shaft	Axle diameter ϕ mm (in)	Axle length mm (in)
CVT model	BJ + DOJ	22 (0.87)	394.2 (15.52)
MT model	EBJ + DOJ	22 (0.87)	388.5 (15.30)



(A) Axle diameter (B) Axle length

B: COMPONENT

1. PROPELLER SHAFT

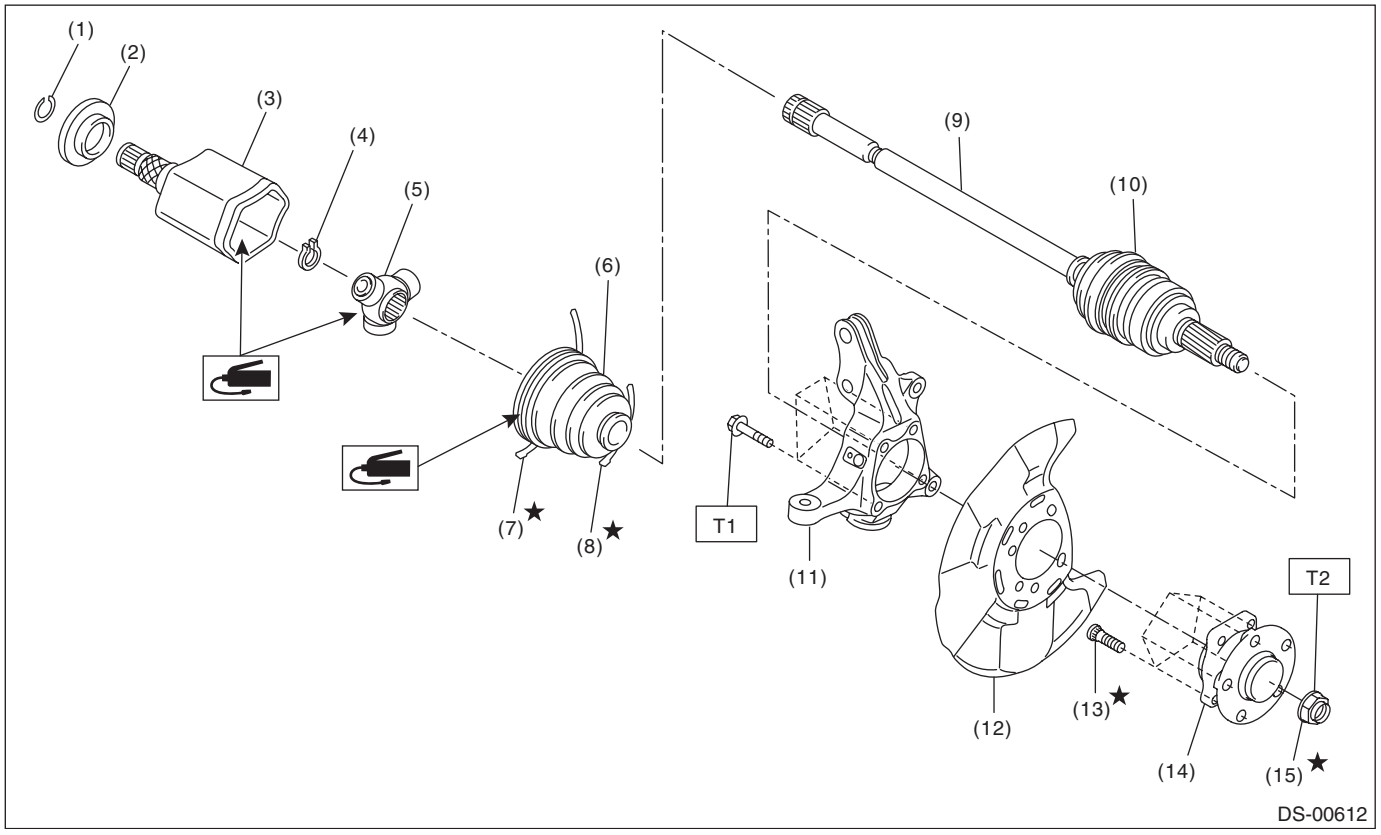


(1) Propeller shaft
(2) Rear differential (VA1-type)
(3) Rear differential (T-type)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 31 (3.2, 22.9)
T2: 52 (5.3, 38.4)

2. FRONT AXLE

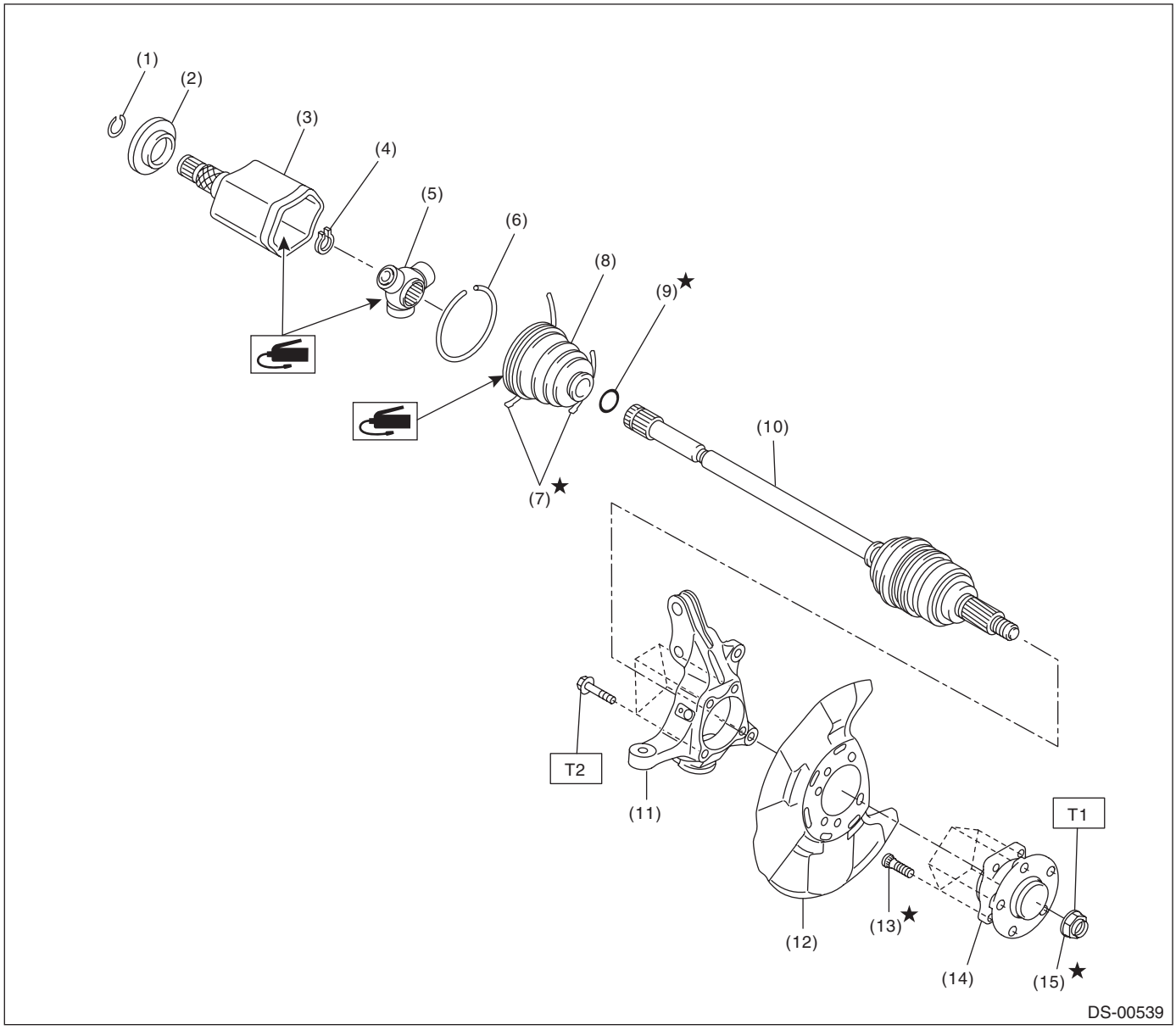
- AC + AAR type



(1) Circlip
(2) Baffle plate
(3) Outer race (AAR)
(4) Snap ring
(5) Trunnion
(6) Boot (AAR)
(7) Band - drive shaft A
(8) Band - drive shaft D
(9) Drive shaft ASSY
(10) Boot (AC)
(11) Housing ASSY - front axle
(12) Back plate - front brake
(13) Bolt - hub
(14) Hub unit COMPL - front axle
(15) Nut - axle

Tightening torque: N·m (kgf-m, ft-lb)
T1: 65 (6.6, 47.9)
T2: 220 (22.4, 162.3)

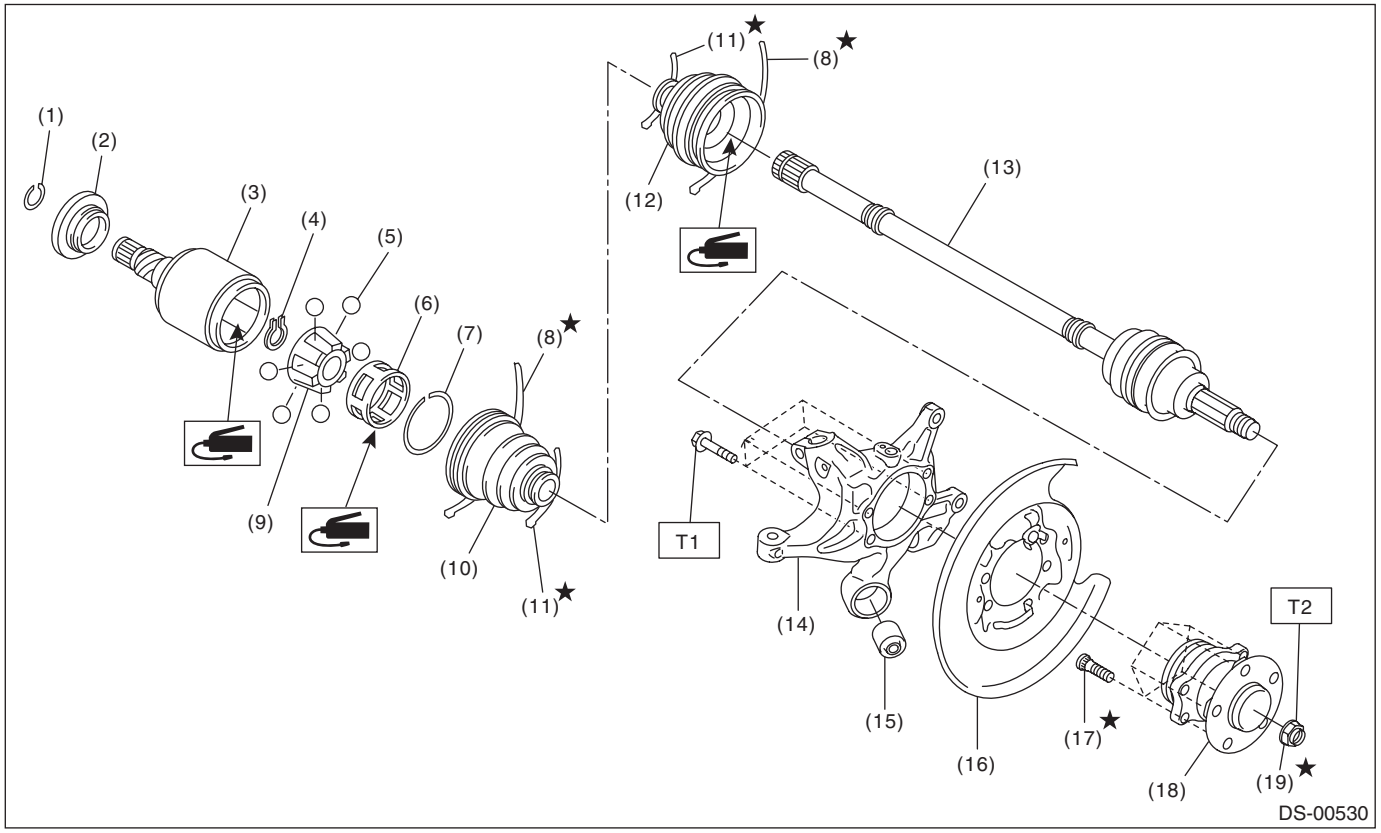
- EBJ + PTJ type



(1) Circlip
(2) Baffle plate
(3) Outer race (PTJ)
(4) Snap ring
(5) Trunnion
(6) Snap ring
(7) Boot band
(8) Boot (PTJ)
(9) O-ring
(10) EBJ shaft ASSY
(11) Housing ASSY - front axle
(12) Back plate - front brake
(13) Bolt - hub
(14) Hub unit COMPL - front axle
(15) Nut - axle

Tightening torque: N·m (kgf-m, ft-lb)
T1: 220 (22.4, 162.3)
T2: 65 (6.6, 47.9)

3. REAR AXLE



(1) Circlip A
(2) Baffle plate
(3) Outer race (DOJ)
(4) Snap ring
(5) Ball
(6) Cage
(7) Circlip B
(8) Band - drive shaft A
(9) Inner race
(10) Boot - drive shaft (DOJ)
(11) Band - drive shaft B
(12) Boot - drive shaft (BJ)
Boot - drive shaft (EBJ)
(13) Shaft ASSY (EBJ) (CVT model)
Shaft ASSY (EBJ) (MT model)
(14) Housing ASSY - rear axle
(15) Bushing - trailing link
(16) Back plate - rear brake
(17) Bolt - hub
(18) Hub unit COMPL - rear axle
(19) Nut - axle

Tightening torque: N·m (kgf-m, ft-lb)

T1: 65 (6.6, 47.9)
T2: 190 (19.4, 140.1)

C: CAUTION

• When performing any work, always wear work clothes, a work cap and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
• Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
• When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
• Some vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
• Use SUBARU genuine grease, the recommended or equivalent. Do not mix grease etc. of different grades or manufacturers.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
• Apply grease onto sliding or revolving surfaces before installation.
• Be sure that the surface of brake disc, brake pad or brake shoe is free from grease or oil.
• Do not secure a part in a vise directly. Place cushioning materials such as wood blocks, aluminum plates, or waste cloth between the part and the vise.
• When the suspension-related components have been removed or replaced, perform “VDC sensor mid-point setting mode” of the VDC. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

D: PREPARATION TOOL

1. SPECIAL TOOL

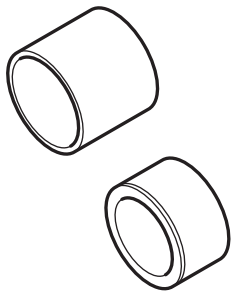
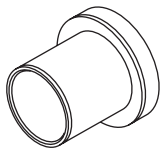
ILLUSTRATION	Part No.	DESCRIPTION	REMARKS
 ST20099PA010	20099PA010	INSTALLER & REMOVER	• Used for replacing the bushing - trailing link of the housing assembly - rear axle. • Used together with BUSHING REMOVER (20099FG000).
 ST20099FG000	20099FG000	BUSHING REMOVER	• Used for replacing the bushing - trailing link of the housing assembly - rear axle. • Used together with base part of INSTALLER & REMOVER (20099PA010).

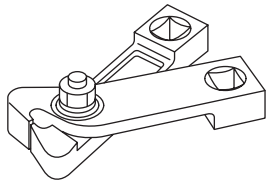
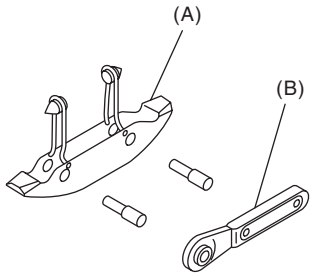
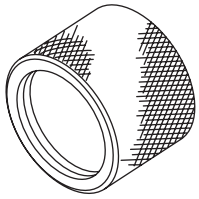
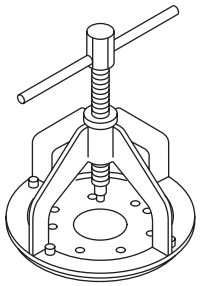
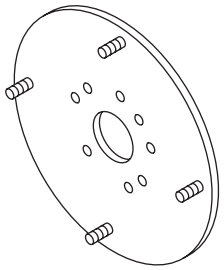
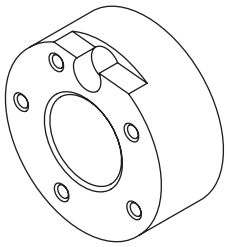
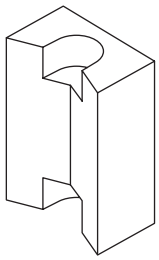
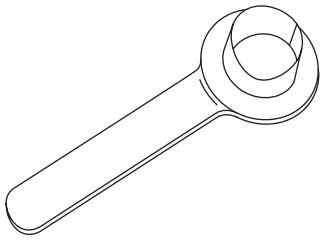
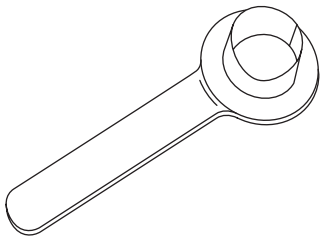
ILLUSTRATION	Part No.	DESCRIPTION	REMARKS
 ST28099AC000	28099AC000	BOOT BAND PLIERS	Used for tightening the band - boot. (For front drive shaft)
 ST-925091000	925091000	BAND TIGHTENING TOOL	Used for tightening the band - boot. (A) Jig for the band (B) Ratchet wrench
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST-926470000	926470000	AXLE SHAFT PULLER	• Used for removing the drive shaft. • Used together with AXLE SHAFT PULLER PLATE (28099PA110).
 ST28099PA110	28099PA110	AXLE SHAFT PULLER PLATE	Exchange with the plate of the AXLE SHAFT PULLER (926470000) to use.

ILLUSTRATION	Part No.	DESCRIPTION	REMARKS
 ST-927080000	927080000	HUB STAND	Used for assembling the bolt - hub of the hub.
 ST28399AG000	28399AG000	HUB STAND	Used for extracting the bolt - hub.
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	• Used for installing front drive shaft into front differential. • For protecting the oil seal.
 ST28099PA090	28099PA090	OIL SEAL PROTECTOR	• Used for installing the rear drive shaft to the rear differential. • For protecting the oil seal.

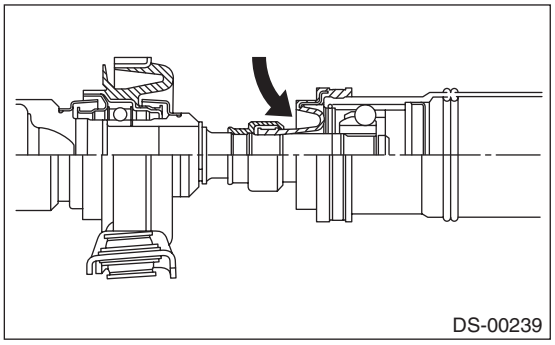
2. GENERAL TOOL

TOOL NAME	REMARKS
Tie-rod ball joint puller	Used for disconnecting joints.
Dial gauge	Used for inspecting the propeller shaft run-out.
Extension cap	Used for preventing leakage of gear oil or CVTF.
Crowbar	Used for extracting drive shaft.
Needle nose pliers	Used for tightening the band - boot of the rear drive shaft. • Snap-on 96BCP Or equivalent.

2. Propeller Shaft

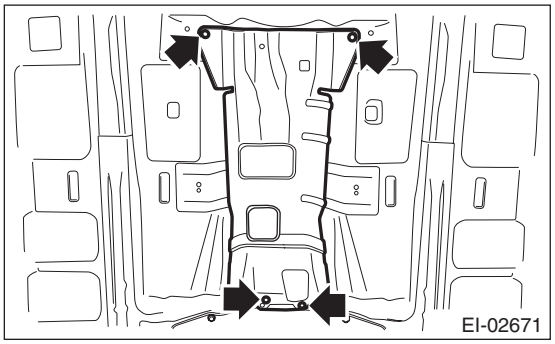
A: REMOVAL

CAUTION:
- **Before removing propeller shaft, wrap metal parts with a cloth or rubber material.**
- **Do not disassemble the center EDJ of the propeller shaft.**
- **Before removing propeller shaft, wrap the metal parts attached to the rubber boot of center EDJ with a cloth or rubber material, as shown in the figure. The rubber boot may be damaged due to interference with adjacent metal parts while bending the EDJ during removal.**


DS-00239

1) Shift the select lever or gear shift lever to neutral.
2) Release the parking brake.
3) Lift up the vehicle.
4) Remove the center exhaust pipe, rear exhaust pipe, and muffler.
- Center exhaust pipe & rear exhaust pipe: <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
- Muffler: <Ref. to EX(H4DO(w/o HEV))-22, REMOVAL, Muffler.>

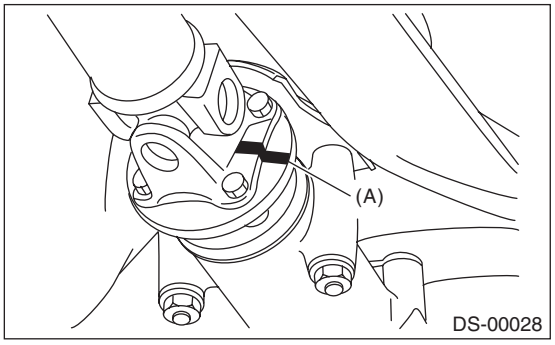
5) Remove the bolts to remove the front heat shield cover.


EI-02671

6) Remove the propeller shaft assembly.

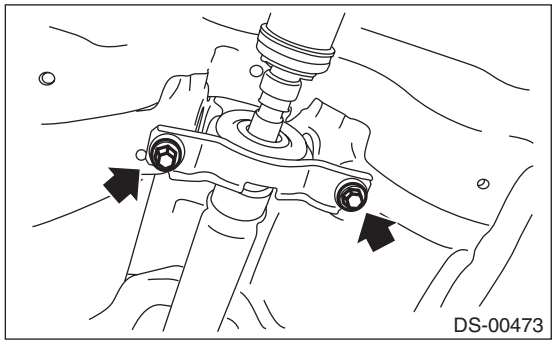
CAUTION:
Do not disassemble the propeller shaft.

(1) Place alignment marks (A) on the flange yoke and rear differential.
(2) Remove four bolts holding the propeller shaft to the rear differential.



DS-00028

(3) Remove the center bearing.



(4) Remove the propeller shaft from transmission.

CAUTION:
Be careful not to damage oil seals and contact surface of the sleeve yoke.

NOTE:
- Use a container to catch CVTF or oil flowing from propeller shaft.
- To prevent CVTF from leaking, install extension cap etc. to the transmission.

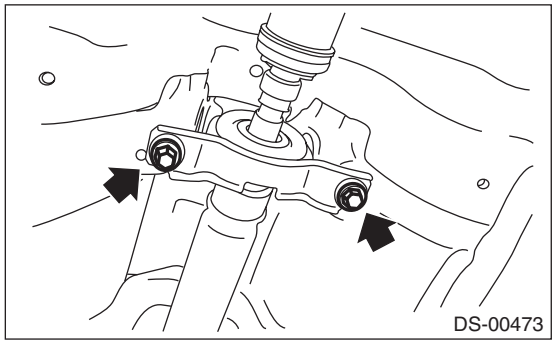
B: INSTALLATION

1) Before installation, check the following items, and replace the propeller shaft assembly as necessary.
- Dents or cracks on the tube surface
- Splines for deformation or abnormal wear
- Unsmooth joint operation or abnormal noise
- Center bearing for free play, noise or non-smooth operation.
- Oil seals for abnormal wear or damage
- Damaged center bearing

2) Apply fluid or gear oil to the oil seal lip and the propeller shaft.
- CVT model: SUBARU CVT OIL FOR LINEARTRONIC
- MT model: GL-5

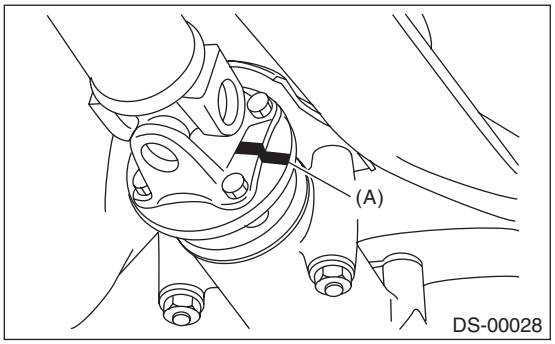
3) Insert the sleeve yoke into the transmission and attach center bearing to body.

Tightening torque:
52 N·m (5.3 kgf-m, 38.4 ft-lb)



4) Align the alignment marks (A), and connect the yoke flange and rear differential.

Tightening torque:
31 N·m (3.2 kgf-m, 22.9 ft-lb)

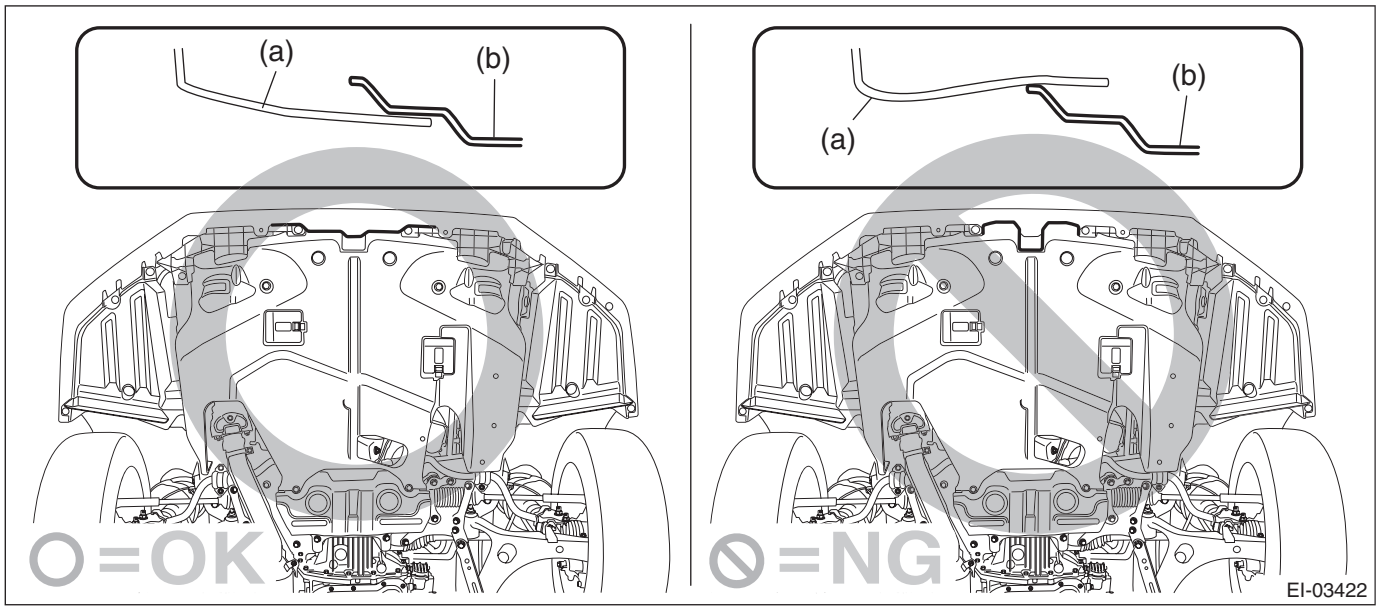


5) Check the propeller shaft with the propeller shaft installed to the vehicle. <Ref. to DS-15, INSPECTION, Propeller Shaft.>
6) Install the heat shield cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
7) Install the center exhaust pipe, rear exhaust pipe and the muffler.
8) Install the under cover - front.

CAUTION:
Install the under cover so that the under cover front end (b) comes inside of the bumper face - front (a).

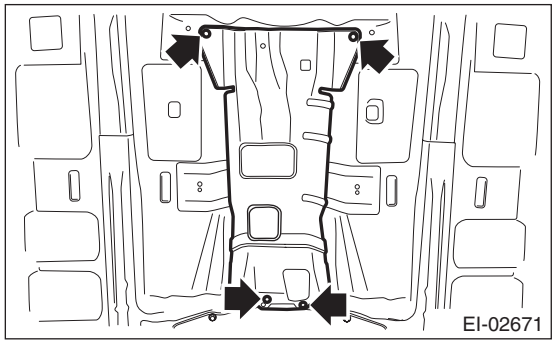
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



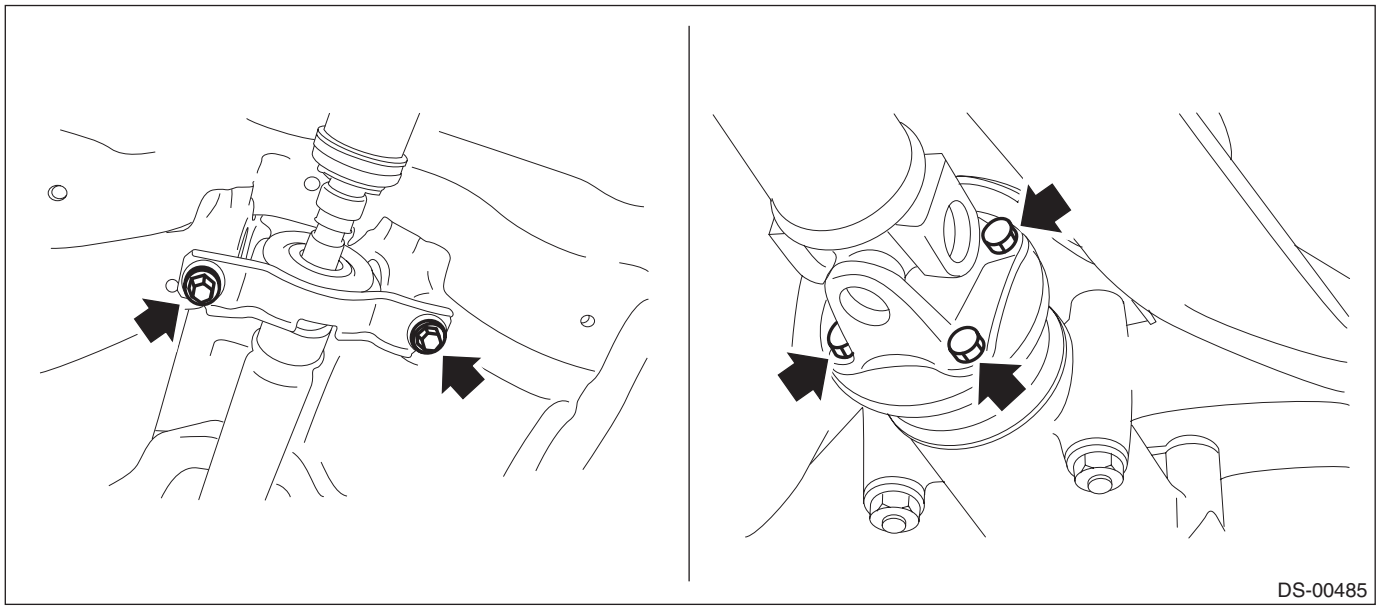
9) Lower the vehicle.

C: INSPECTION

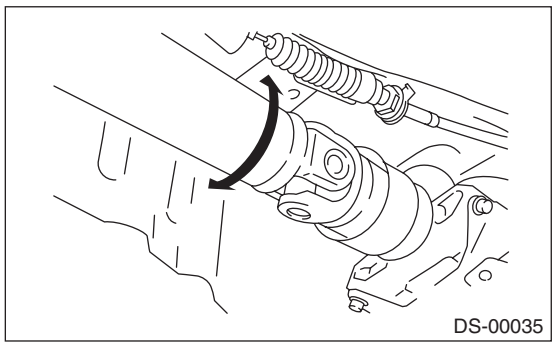
Check the propeller shaft with the propeller shaft installed to the vehicle.
1) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
2) Remove the center exhaust pipe, rear exhaust pipe, and muffler.
• Center exhaust pipe & rear exhaust pipe: <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
• Muffler: <Ref. to EX(H4DO(w/o HEV))-22, REMOVAL, Muffler.>
3) Remove the bolts to remove the front heat shield cover.



4) Check the propeller shaft mounting bolt for looseness.
(1) Yoke flange mounting bolts which connect to the rear differential
(2) Center bearing bracket mounting bolts

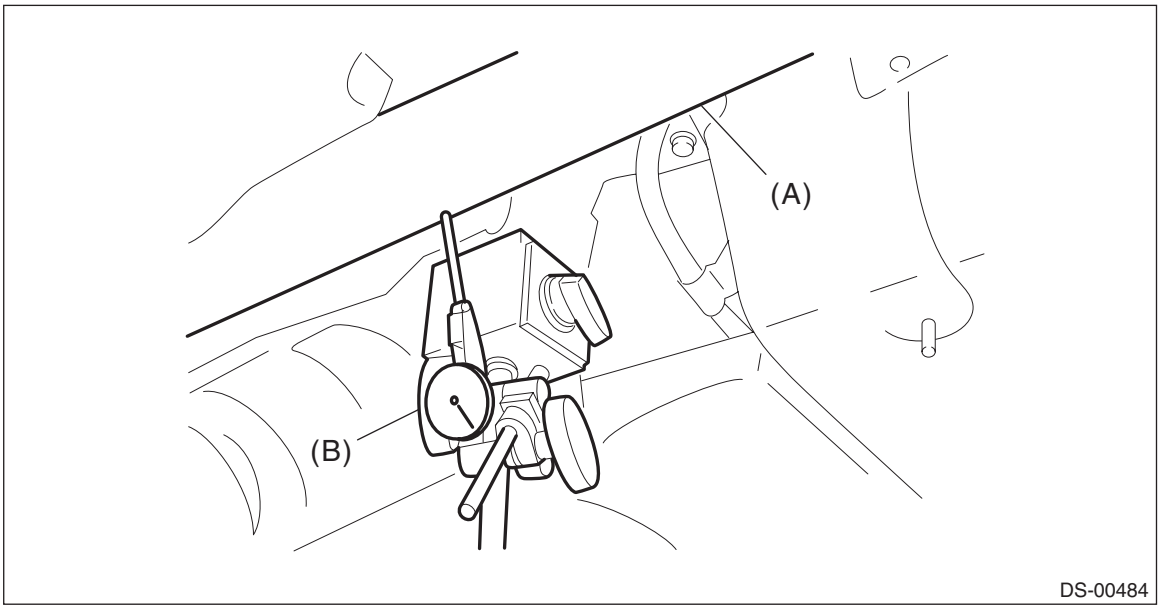


5) Check the spline and bearing for the propeller shaft.
(1) Turn the propeller shaft by hand to check if abnormal free play exists at splines.
(2) Also move yokes to check if abnormal free play exists at spiders and bearings.

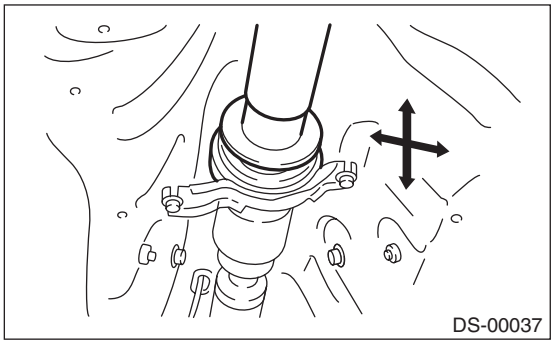


6) Measure the deflection of the propeller shaft.
(1) Set the dial gauge (B) with its indicator stem at the center of the propeller shaft (A).
(2) Turn the propeller shaft (A) slowly by hands to check for runout of the propeller shaft.

Runout:
Limit: 0.6 mm (0.024 in)



7) Check the center bearing for free play.
Move the propeller shaft near the center bearing up, down, left, right by hand, to check for any abnormal free play of the bearings.



8) Replace the propeller shaft assembly if faulty is found in the inspection.

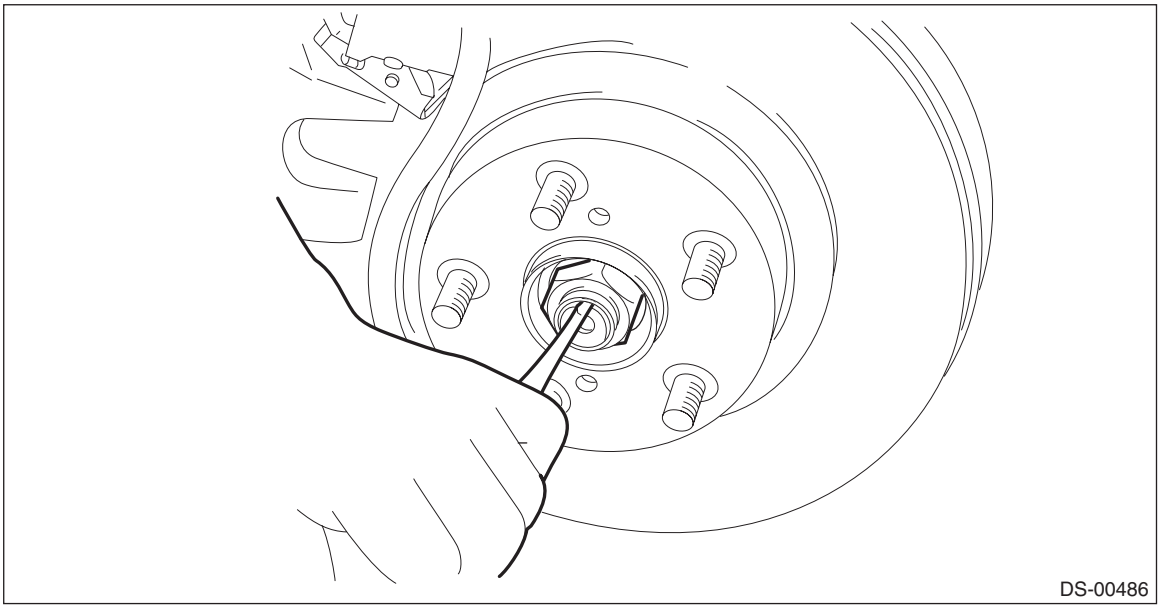
3. Front Axle

A: REMOVAL

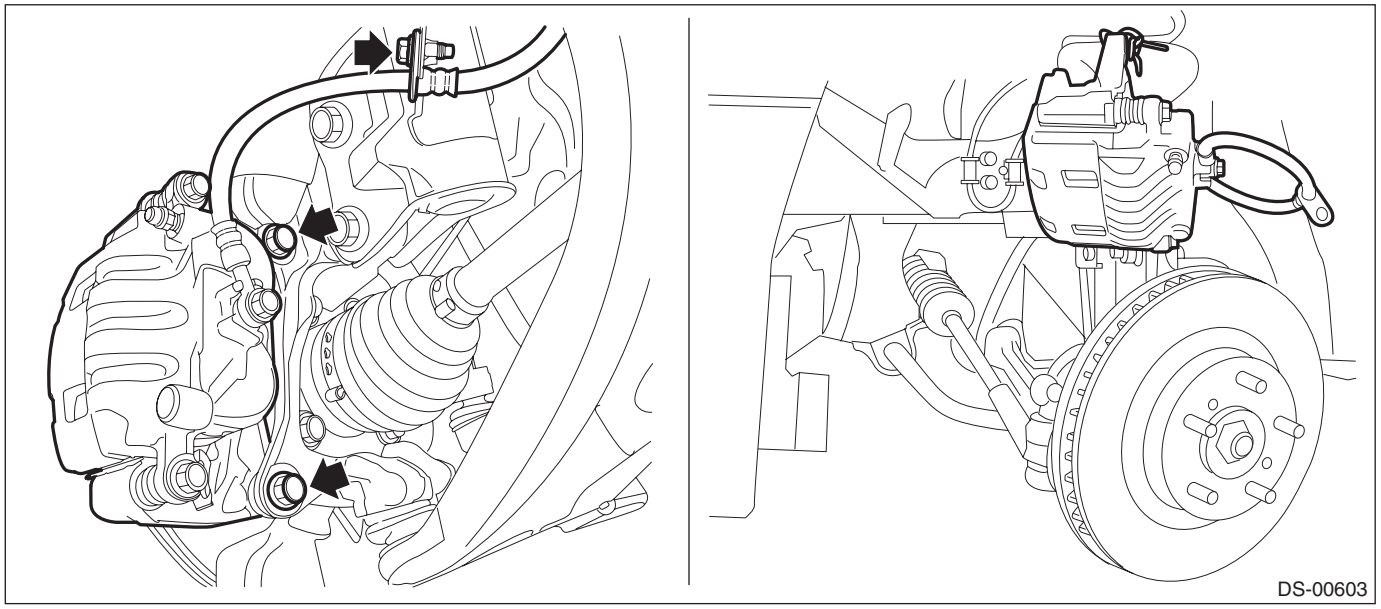
1) Lift up the vehicle, and then remove the front wheels.
2) Remove the nut - axle.

CAUTION:
Do not loosen the nut - axle while the front axle is loaded. Doing so may damage the hub unit COMPL.

(1) Lift the crimped section of the nut - axle.
(2) Remove the nut - axle using a socket wrench while depressing the brake pedal.

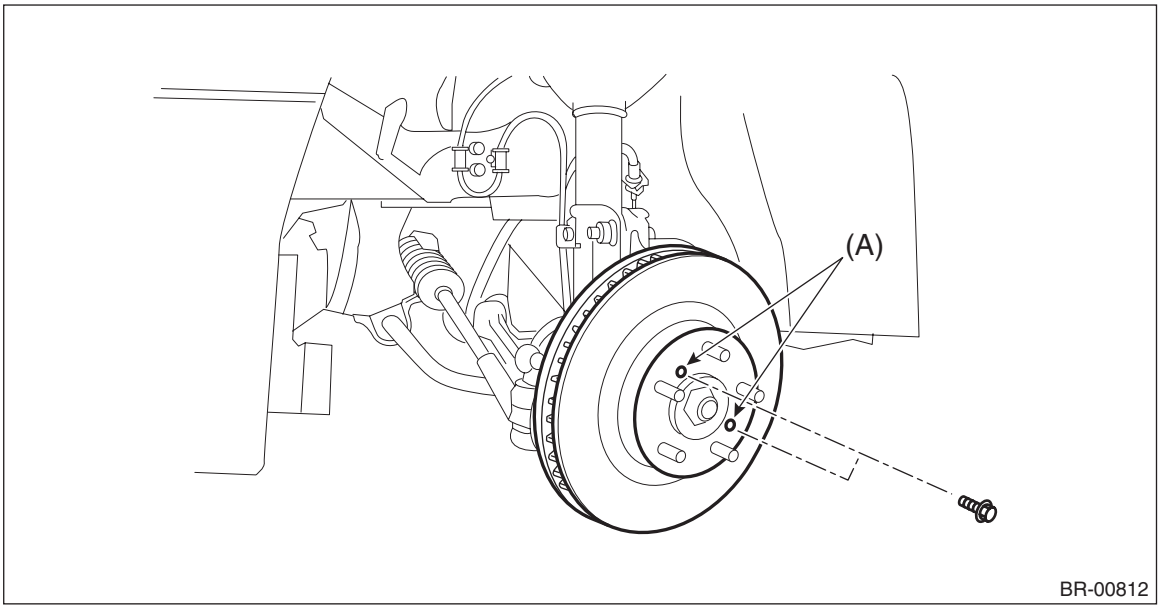


3) Remove the caliper body assembly from the housing assembly - front axle.
(1) Remove the mounting bolts and the brake hose bracket, and remove the caliper body assembly.
(2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.

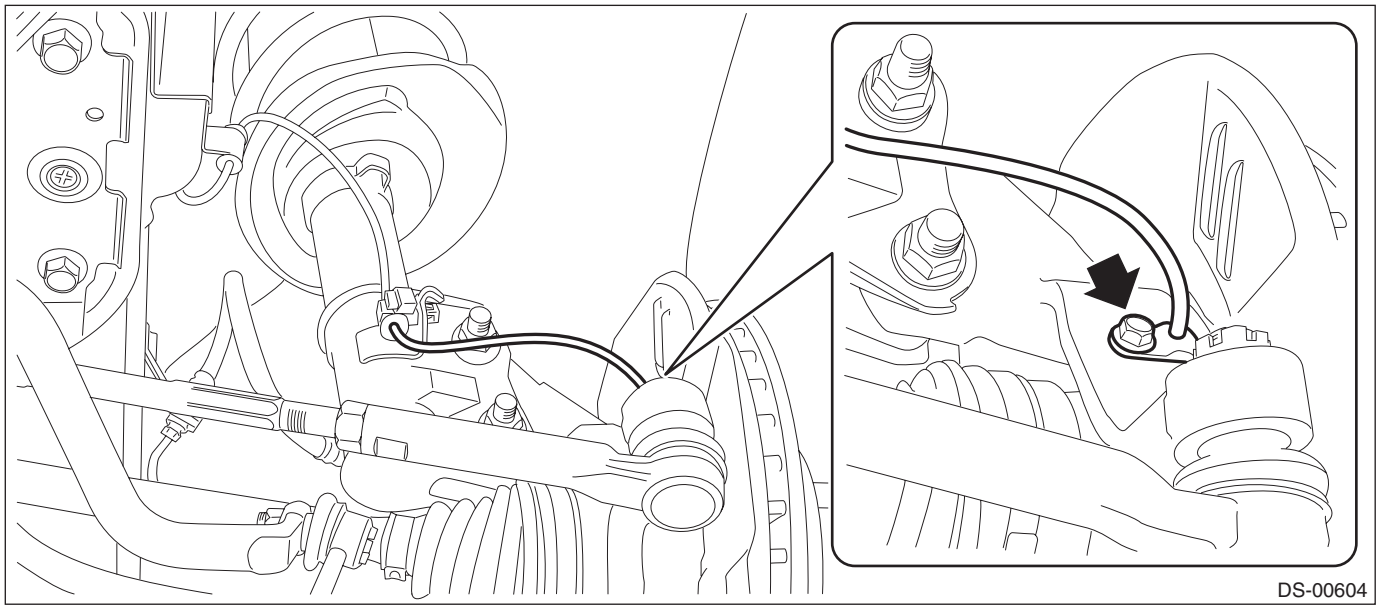


4) Remove the disc rotor.

NOTE:
When the disc rotor is difficult to be removed from the hub unit COMPL - front axle, screw in 8 mm (0.31 in) bolt to the threaded part of the disc rotor (A), and remove the disc rotor.



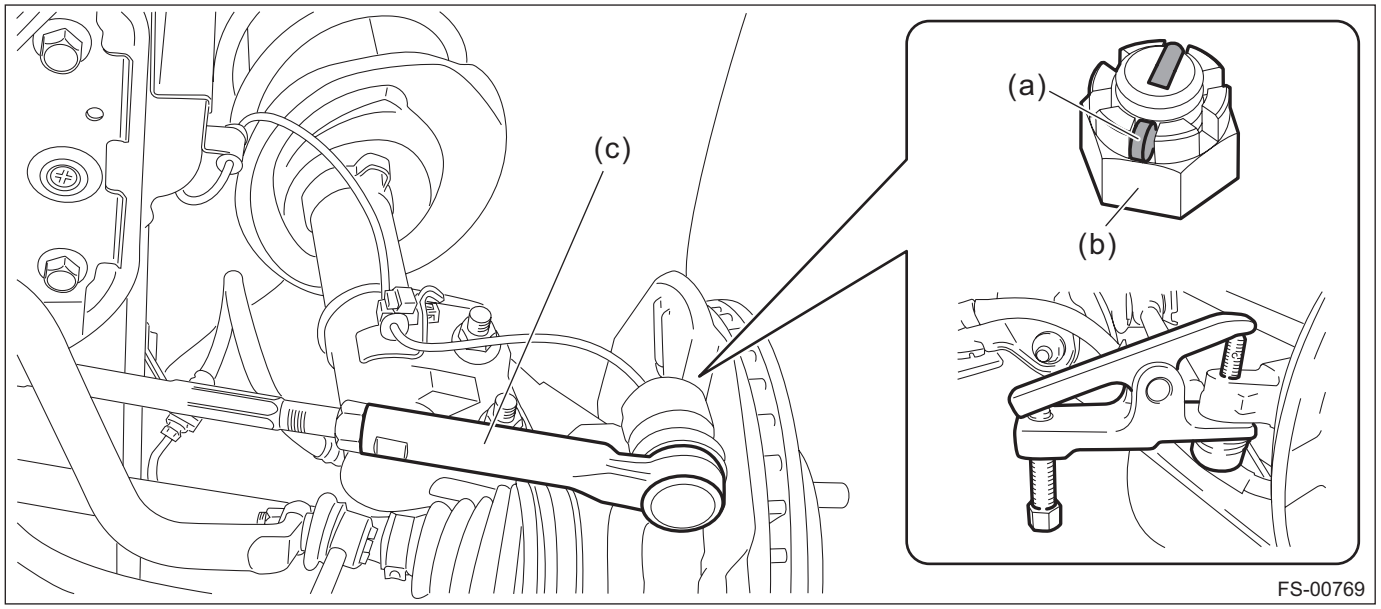
5) Remove the bolts, and remove the front ABS wheel speed sensor.



6) Disconnect the tie-rod end.
   (1) Pull out the cotter pin (a).
   (2) Remove the castle nut (b).
   (3) Using a tie-rod ball joint puller, remove the tie-rod end (c).

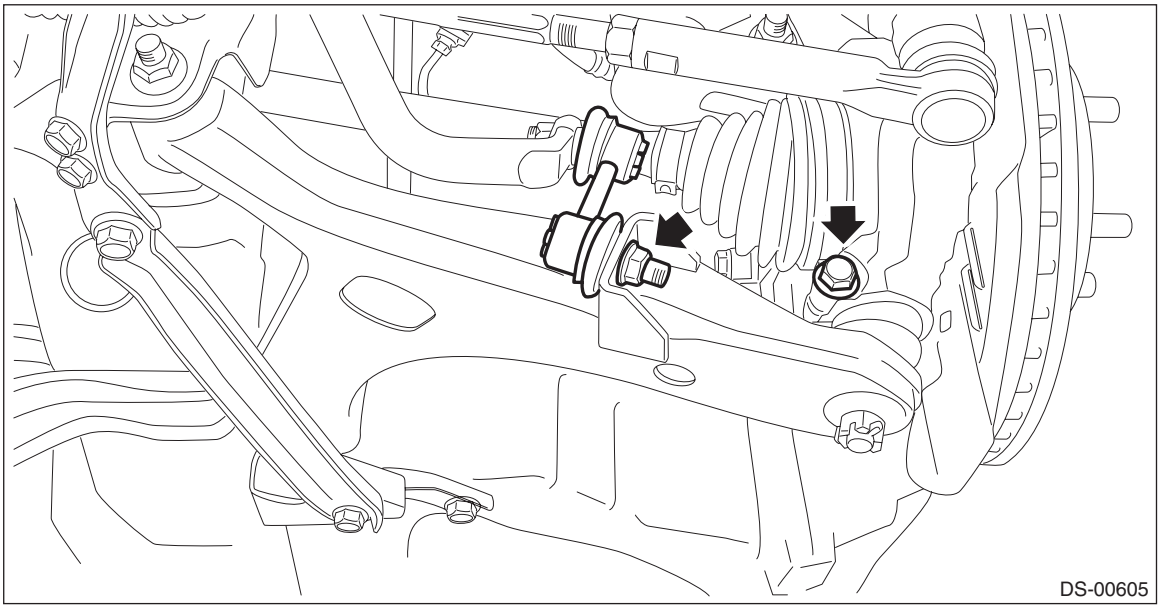
CAUTION:
Be careful not to damage the boot of the joint.

Preparation tool:
Tie-rod ball joint puller



7) Remove the stabilizer link and ball joint.

CAUTION:
Be careful not to damage the boot of the joint.



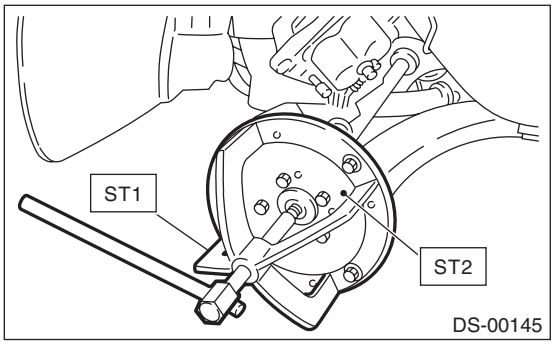
8) Using a bar, remove the front drive shaft from transmission.

CAUTION:
Be careful not to allow the bar to damage holder area.

9) Remove the front drive shaft assembly from the hub unit COMPL - front axle.

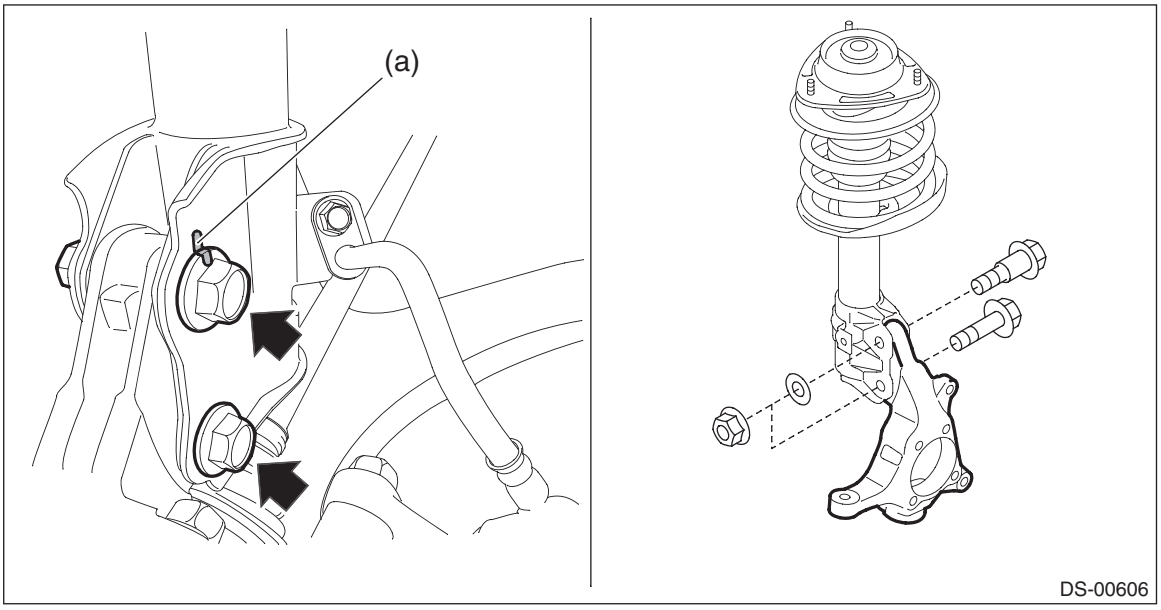
NOTE:
If it is hard to remove, use the ST.

Preparation tool:
ST1: AXLE SHAFT PULLER (926470000)
ST2: AXLE SHAFT PULLER PLATE (28099PA110)



10) Remove the housing assembly - front axle.
(1) Place an alignment mark (a) on the adjusting bolt and the strut.
(2) Remove the adjusting bolts and flange bolts for the strut assembly, and then remove the housing assembly - front axle.

CAUTION:
- **While holding the head of the adjusting bolt, loosen the flange nut.**
- **Be careful of the weight of the housing assembly - front axle.**
- **Be careful not to damage the spline portion of the drive shaft.**



11) For removal of the hub unit COMPL - front axle, refer to “Front Hub Unit Bearing”. <Ref. to DS-24, REMOVAL, Front Hub Unit Bearing.>

B: INSTALLATION

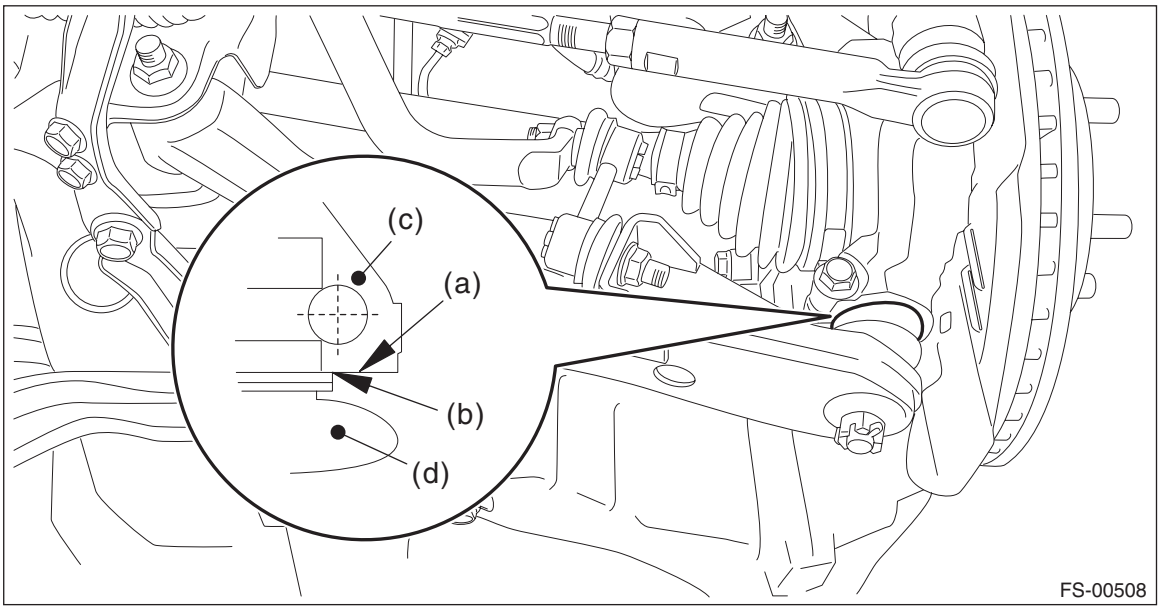
1) Install the front drive shaft assembly.

CAUTION:
- **Do not hammer the drive shaft assembly when installing.**
- **Use new nut - axle.**
  (1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.
  (2) Temporarily tighten the nut - axle.

2) Install the ball joint assembly to the housing assembly - front axle.

CAUTION:
- **Before tightening, make sure the bottom surface of the housing assembly - front axle and the stepped section of ball joint are in contact.**
- **Be careful not to damage the boot of the joint.**

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



(a) Bottom surface of housing ASSY - front axle
(b) Raised section of ball joint
(c) Housing ASSY - front axle
(d) Ball joint ASSY

3) Install the front ABS wheel speed sensor.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

4) Install the disc rotor.
5) Install the caliper body assembly.

Tightening torque:
80 N·m (8.2 kgf-m, 59.0 ft-lb)

6) Install the brake hose bracket.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)

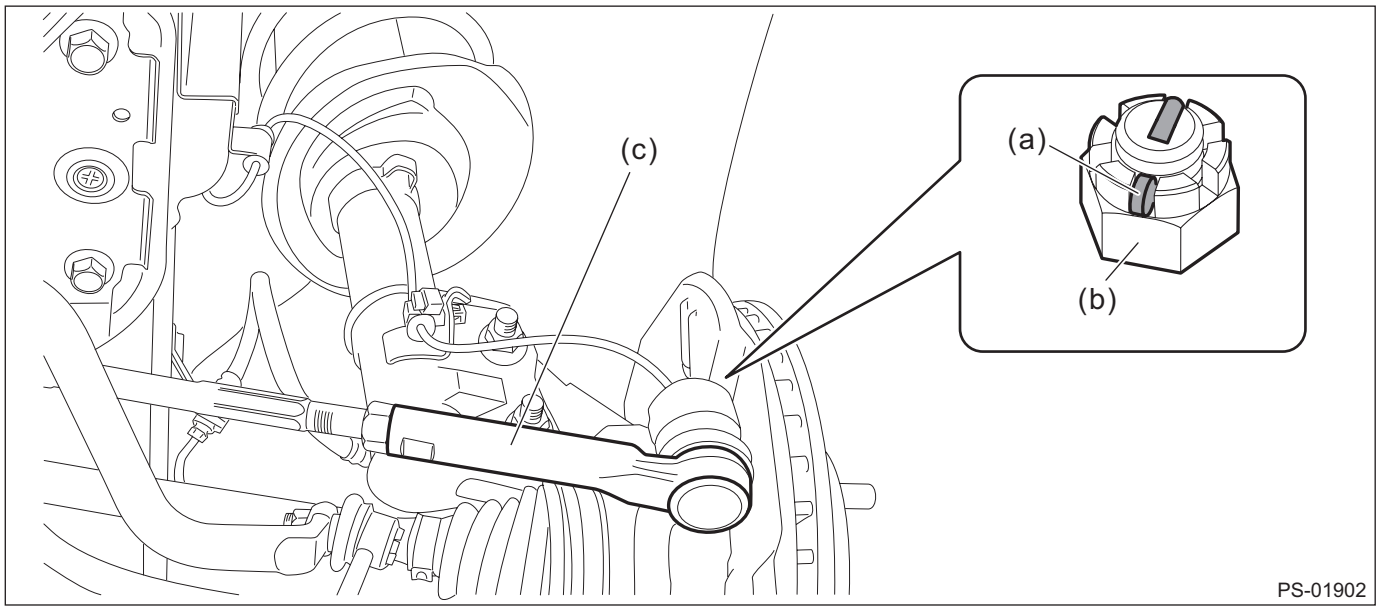
7) Install the stabilizer link assembly.
- Except for Crosstrek model

Tightening torque:
38 N·m (3.9 kgf-m, 28.0 ft-lb)
- Crosstrek model

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)
8) Connect the tie-rod ends.
(1) Connect the tie-rod ends to the housing assembly - front axle.
(2) Tighten the castle nuts to the specified torque.

CAUTION:
When connecting the tie-rod, do not hit the cap at bottom of tie-rod end with a hammer.

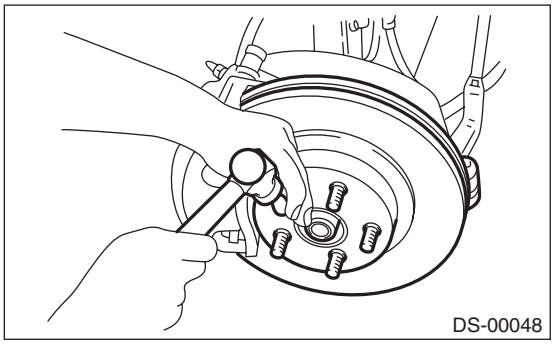
Tightening torque:
27 N·m (2.8 kgf-m, 19.9 ft-lb)
(3) Tighten the castle nut within the range of 60° so that the cotter pin hole and cutout portion of the castle nut are aligned.
(4) Insert the cotter pin, and bend the tip of the pin to fix it.



9) While depressing the brake pedal, tighten a new nut - axle to the specified torque and lock it securely.

CAUTION:
Do not load the front axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

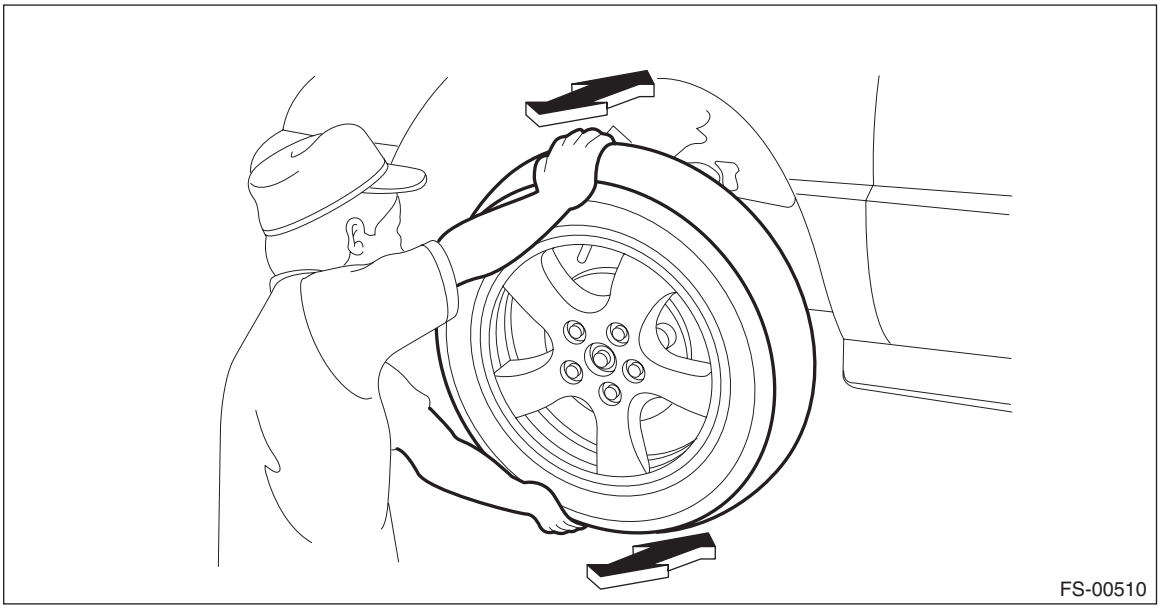
Tightening torque:
220 N·m (22.4 kgf-m, 162.3 ft-lb)
10) After tightening the nut - axle, lock it securely.



11) Install the front wheels, and perform the following inspections.

Tightening torque:
Except for C4 model: 120 N·m (12.2 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.2 kgf-m, 73.8 ft-lb)

1. Check the wheels for smooth rotation.
2. Check that there is no play by moving the upper and lower portions of front tire in an axial direction with the brake pedal released.
   - **Play exists** → Check the hub unit COMPL - front axle. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>



3. Check that there is no play by moving the upper and lower portions of front tire in an axial direction with the brake pedal depressed.
   - **Play exists** → Replace the ball joint assembly. <Ref. to FS-28, REMOVAL, Front Ball Joint.>

12) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

CAUTION:
When the wheel alignment has been adjusted, perform "VDC sensor midpoint setting mode". <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

13) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

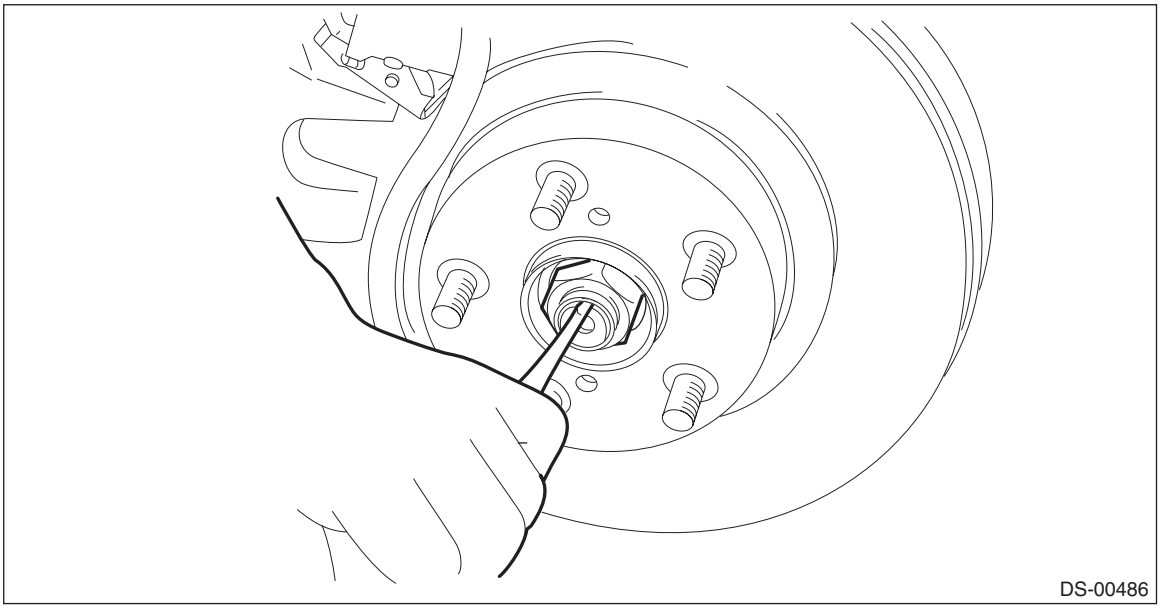
4. Front Hub Unit Bearing

A: REMOVAL

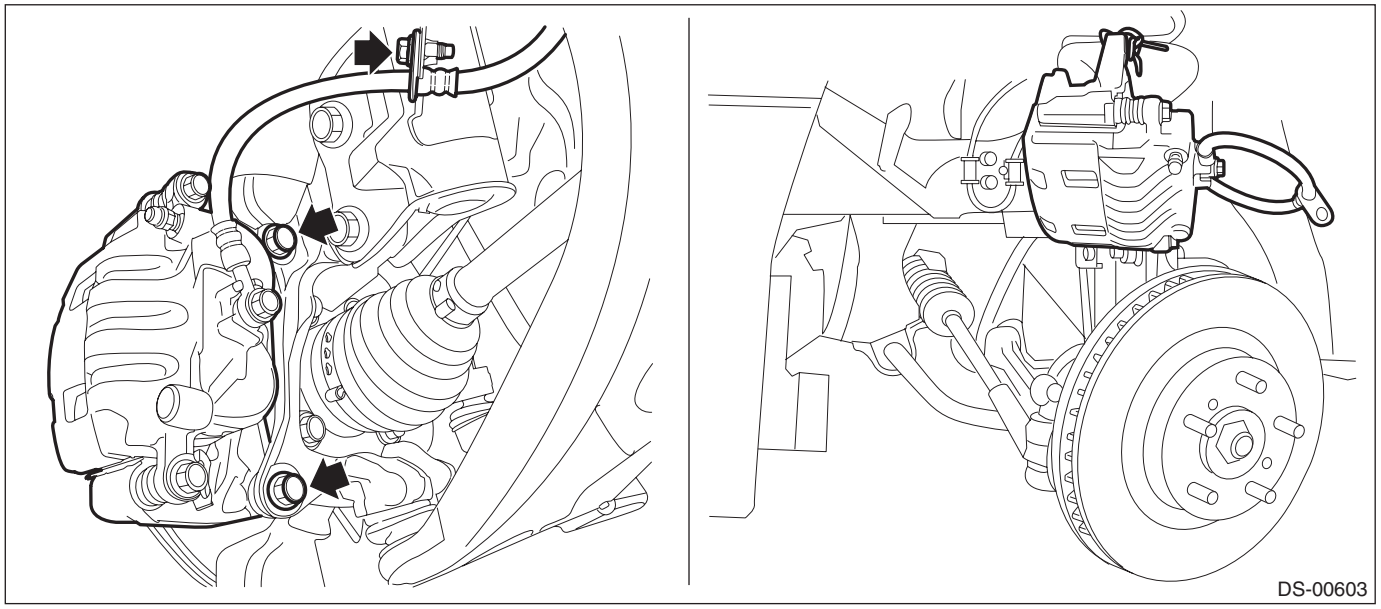
1) Lift up the vehicle, and then remove the front wheels.
2) Remove the nut - axle.

CAUTION:
Do not loosen the nut - axle while the front axle is loaded. Doing so may damage the hub unit COMPL.

(1) Lift the crimped section of the nut - axle.
(2) Remove the nut - axle using a socket wrench while depressing the brake pedal.

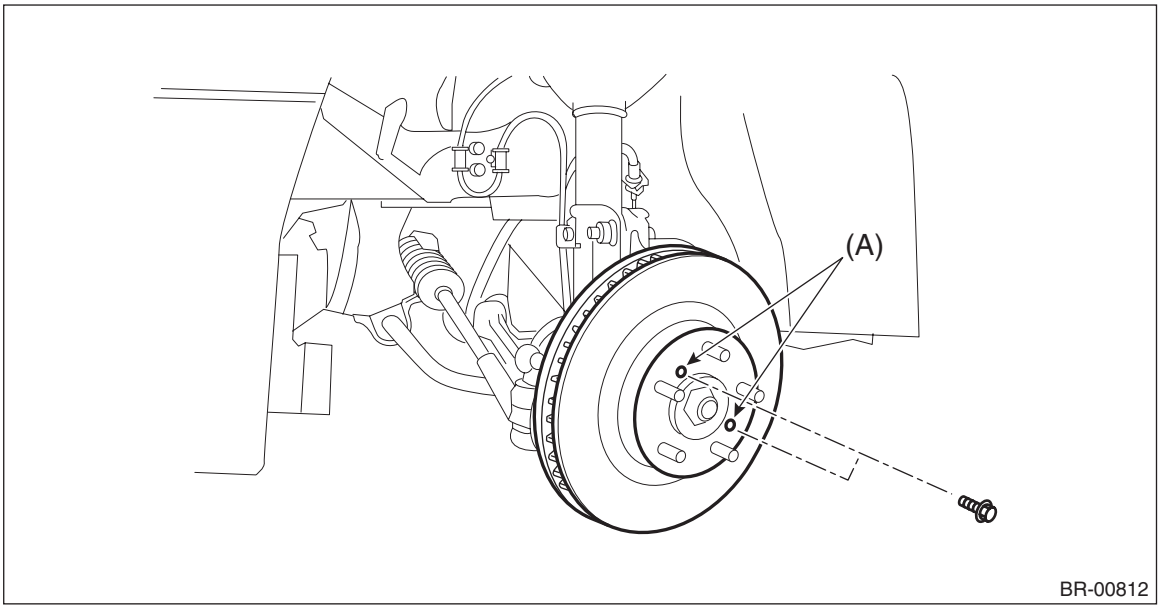


3) Remove the caliper body assembly from the housing assembly - front axle.
(1) Remove the mounting bolts and the brake hose bracket, and remove the caliper body assembly.
(2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.

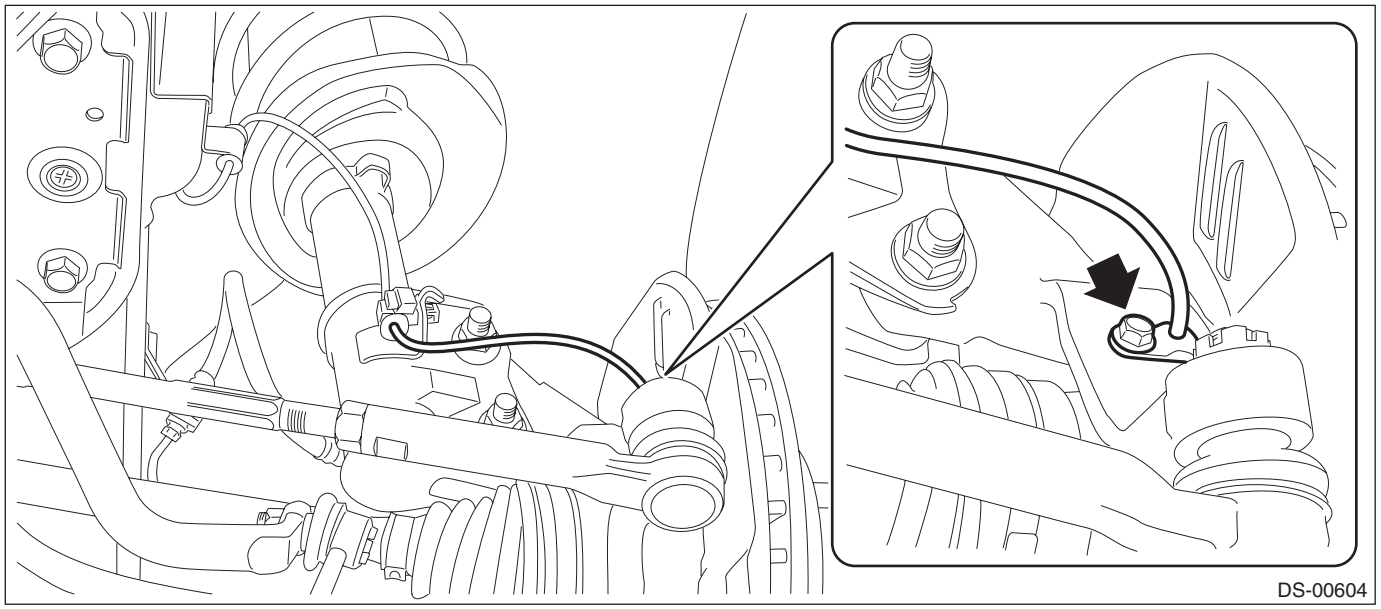


4) Remove the disc rotor.

NOTE:
When the disc rotor is difficult to be removed from the hub unit COMPL - front axle, screw in 8 mm (0.31 in) bolt to the threaded part of the disc rotor (A), and remove the disc rotor.

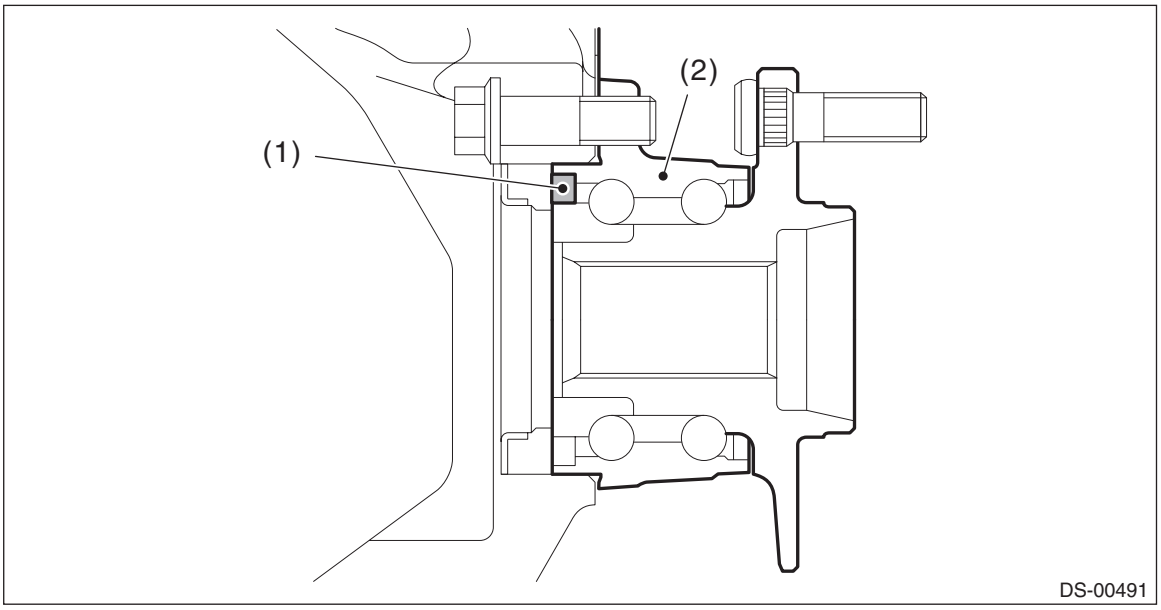


5) Remove the bolts, and remove the front ABS wheel speed sensor.

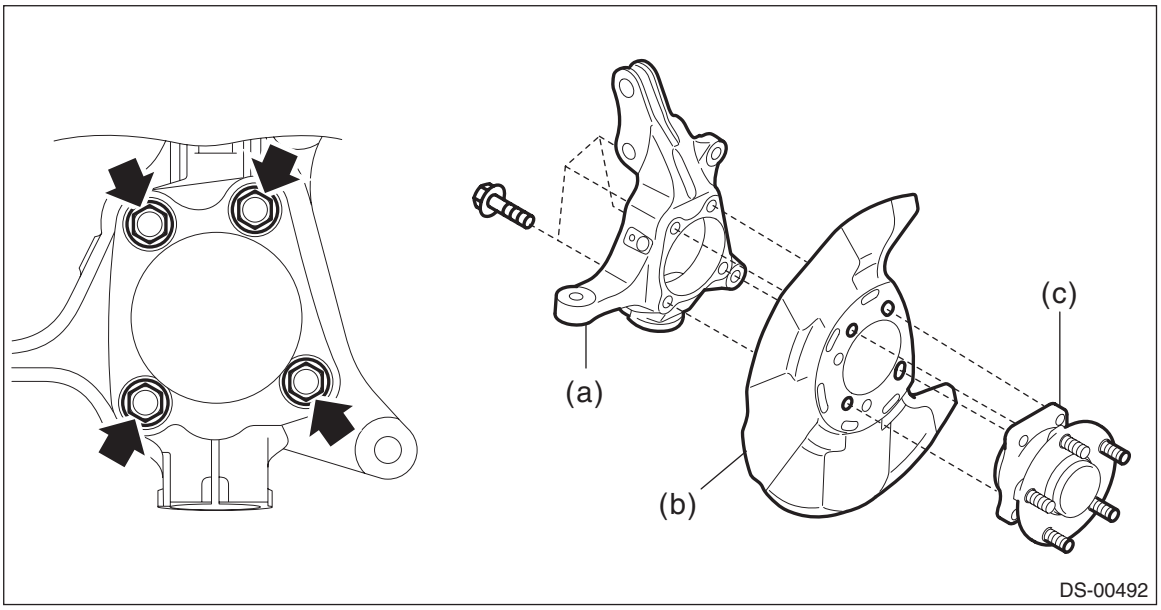


6) Remove the bolts from the housing assembly - front axle, and then remove the hub unit COMPL - front axle.

CAUTION:
- **Do not get closer the tool which charged magnetism to magnetic encoder.**
- **Be careful not to damage the magnetic encoder.**



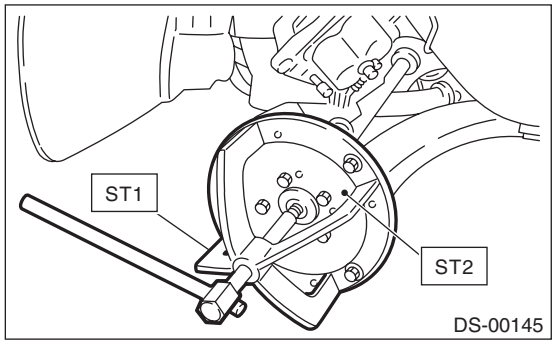
(1) Magnetic encoder (2) Hub unit COMPL - front axle



(a) Housing ASSY - front axle (b) Back plate - front brake (c) Hub unit COMPL - front axle

NOTE:
If it is hard to remove, use the ST.

Preparation tool:
ST1: AXLE SHAFT PULLER (926470000)
ST2: AXLE SHAFT PULLER PLATE (28099PA110)

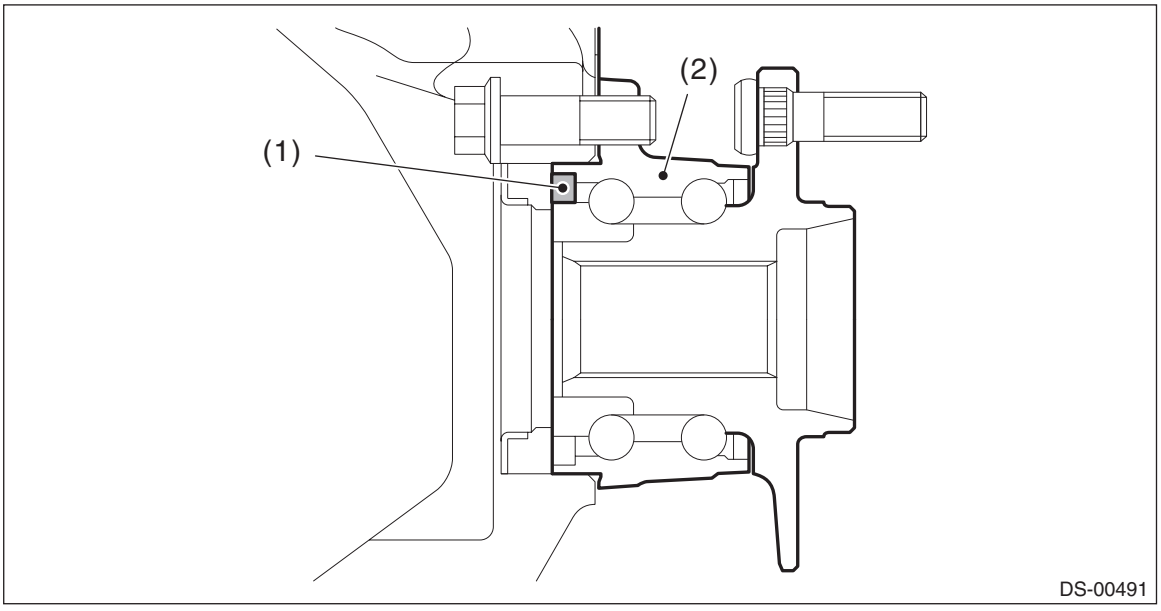


B: INSTALLATION

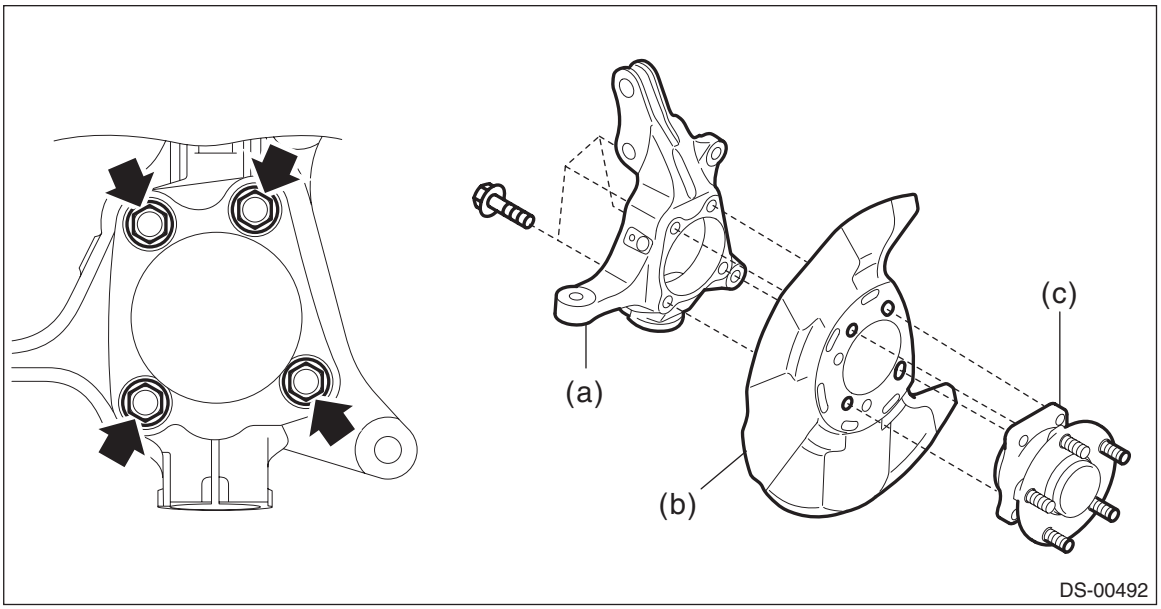
1) Place the back plate - front brake between the housing assembly - front axle and the hub unit COMPL - front axle, and tighten the bolt.

CAUTION:
- **Do not get closer the tool which charged magnetism to magnetic encoder.**
- **Be careful not to damage the magnetic encoder.**

Tightening torque:
65 N·m (6.6 kgf-m, 47.9 ft-lb)



(1) Magnetic encoder
(2) Hub unit COMPL - front axle



(a) Housing ASSY - front axle (b) Back plate - front brake (c) Hub unit COMPL - front axle

Tightening torque:
65 N·m (6.6 kgf-m, 47.9 ft-lb)

2) Install the front drive shaft assembly.

CAUTION:
- **Do not hammer the drive shaft assembly when installing.**
- **Use new nut - axle.**

(1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.
(2) Temporarily tighten the nut - axle.

3) Install the disc rotor to the hub unit COMPL - front axle.
4) Install the caliper body assembly to the housing assembly - front axle.

Tightening torque:
80 N·m (8.2 kgf-m, 59.0 ft-lb)

5) Install the brake hose bracket.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)

6) Install the front ABS wheel speed sensor.

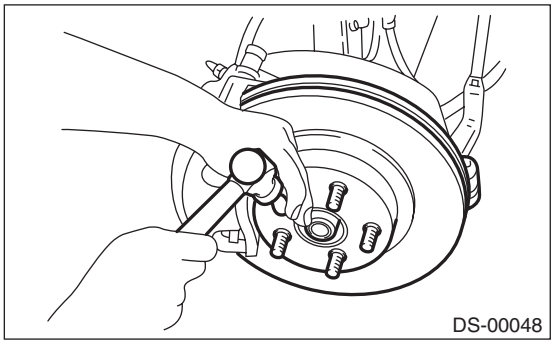
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

7) While depressing the brake pedal, tighten new nuts - axle to the specified torque.

CAUTION:
Do not load the front axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:
220 N·m (22.4 kgf-m, 162.3 ft-lb)

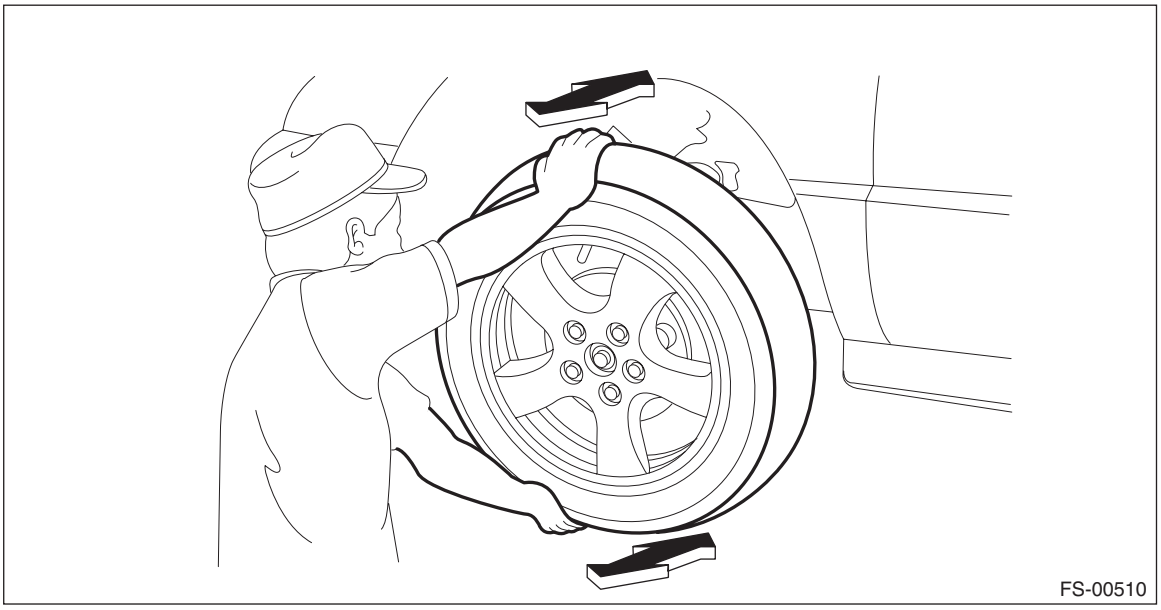
8) After tightening the nut - axle, lock it securely.



9) Install the front wheels, and perform the following inspections.

Tightening torque:
Except for C4 model: 120 N·m (12.2 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.2 kgf-m, 73.8 ft-lb)

1. Check the wheels for smooth rotation.
2. Check that there is no play by moving the upper and lower portions of front tire in an axial direction with the brake pedal released.
   - **Play exists** → Check the hub unit COMPL - front axle. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>



3. Check that there is no play by moving the upper and lower portions of front tire in an axial direction with the brake pedal depressed.
   - **Play exists** → Replace the ball joint assembly. <Ref. to FS-28, REMOVAL, Front Ball Joint.>

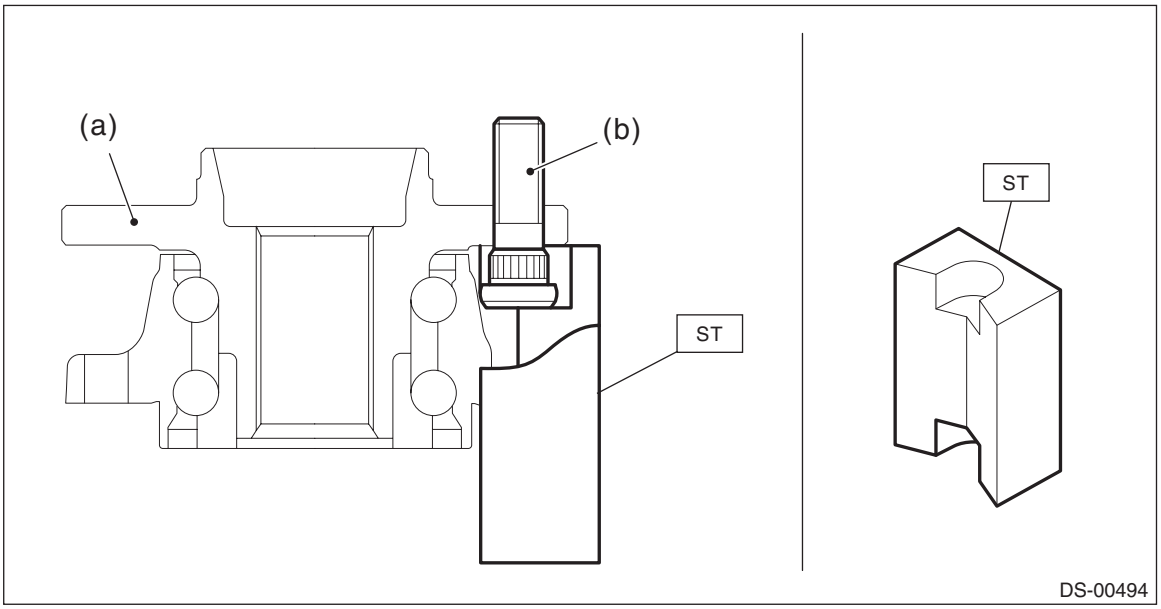
C: DISASSEMBLY

Using the ST or a hydraulic press, push out the bolt - hub (b) from the hub unit COMPL - front axle (a).

CAUTION:
- **Be careful not to hammer the bolts - hub. This may deform the hub unit COMPL.**
- **Do not reuse the bolt - hub.**

NOTE:
Since the hub unit COMPL can not be disassembled, only bolts - hub can be removed.

Preparation tool:
ST: HUB STAND (28399AG000)



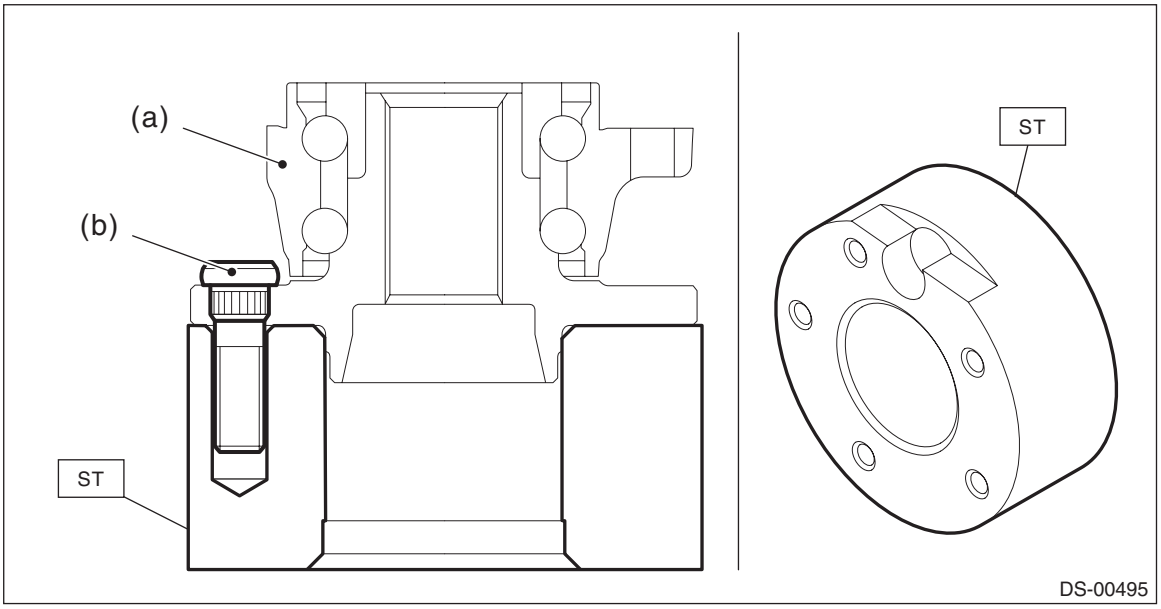
D: ASSEMBLY

1) Install the hub unit COMPL to the ST securely.

Preparation tool:
ST: HUB STAND (927080000)

2) Using a press, press new bolts - hub (b) until their seating surfaces contact the hub unit COMPL (a).

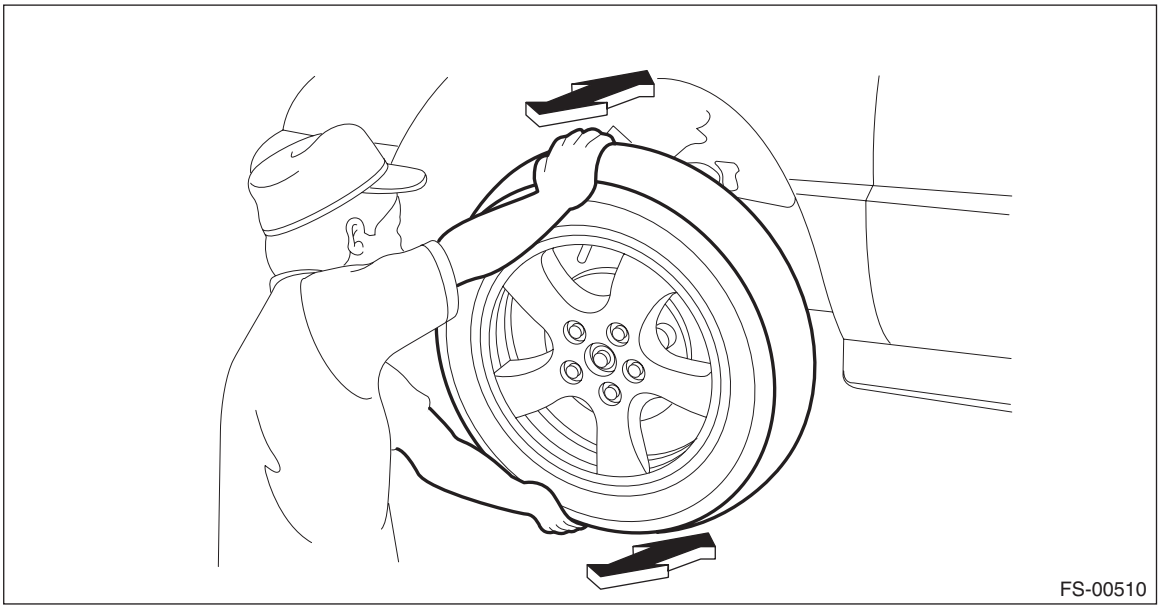
NOTE:
Use the 12 mm (0.47 in) dia. holes in the HUB STAND to prevent bolts from tilting.



E: INSPECTION

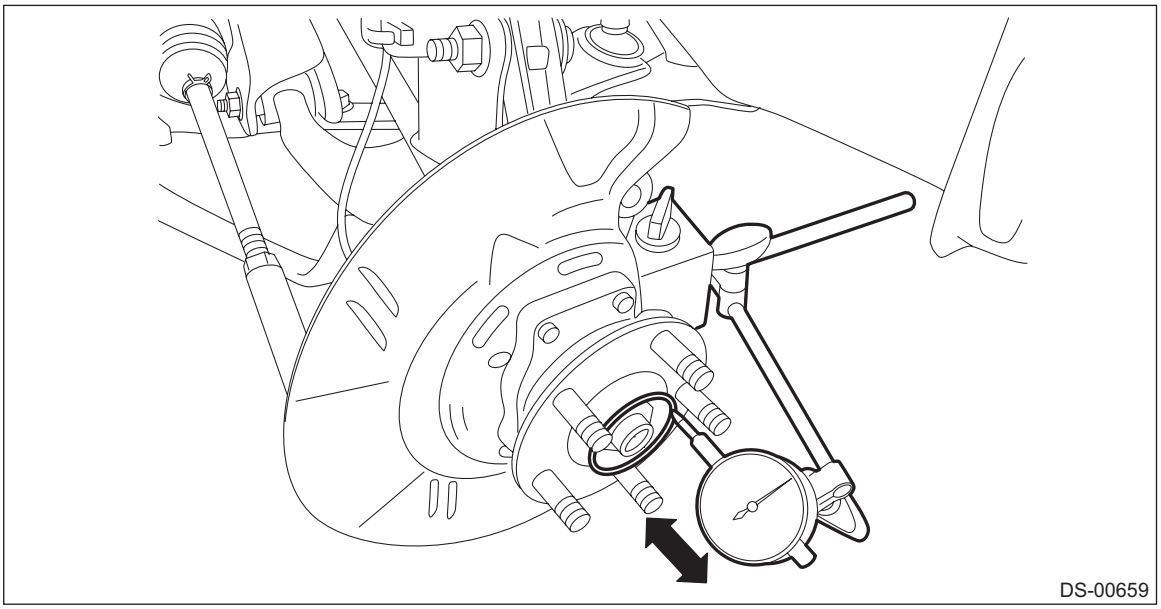
1) Moving the front tire up and down by hand, check there is no play in bearing, and check the wheel rotates smoothly.

CAUTION:
If there is any fault in the bearing, replace the hub unit COMPL.



2) Inspect axial play of the hub unit bearing.
1. Remove the tire and disc rotor.
2. Inspect the lean of axis direction using a dial gauge. Replace the hub unit COMPL if the play exceeds the limit.

Service limit:
Maximum: 0.05 mm (0.0020 in)



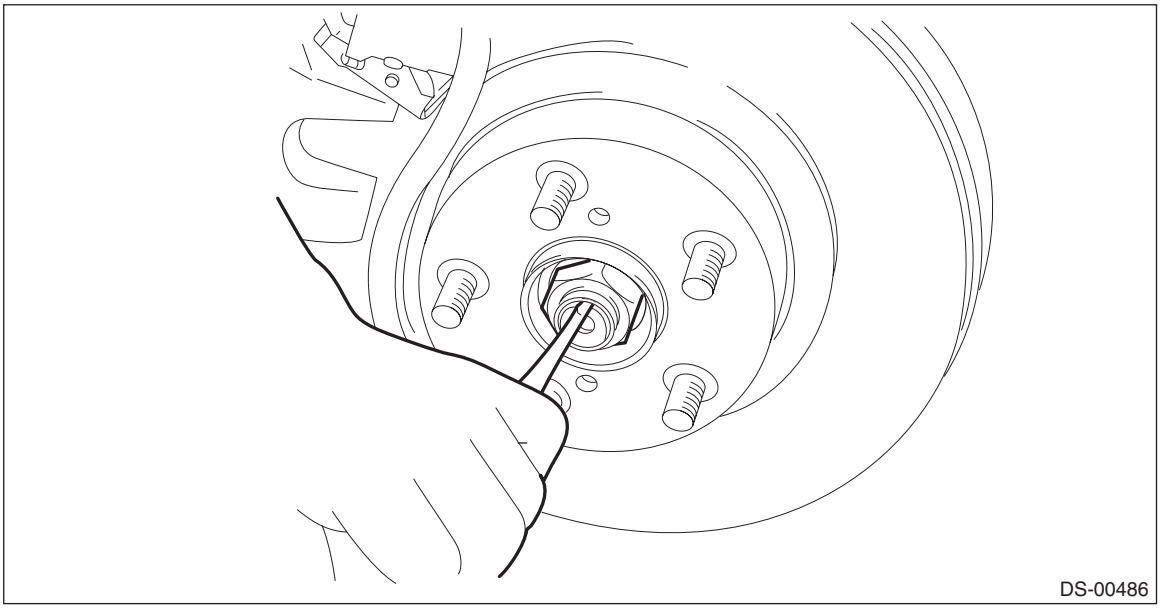
5. Rear Axle

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle, and then remove the rear wheels.
3) Remove the nut - axle.

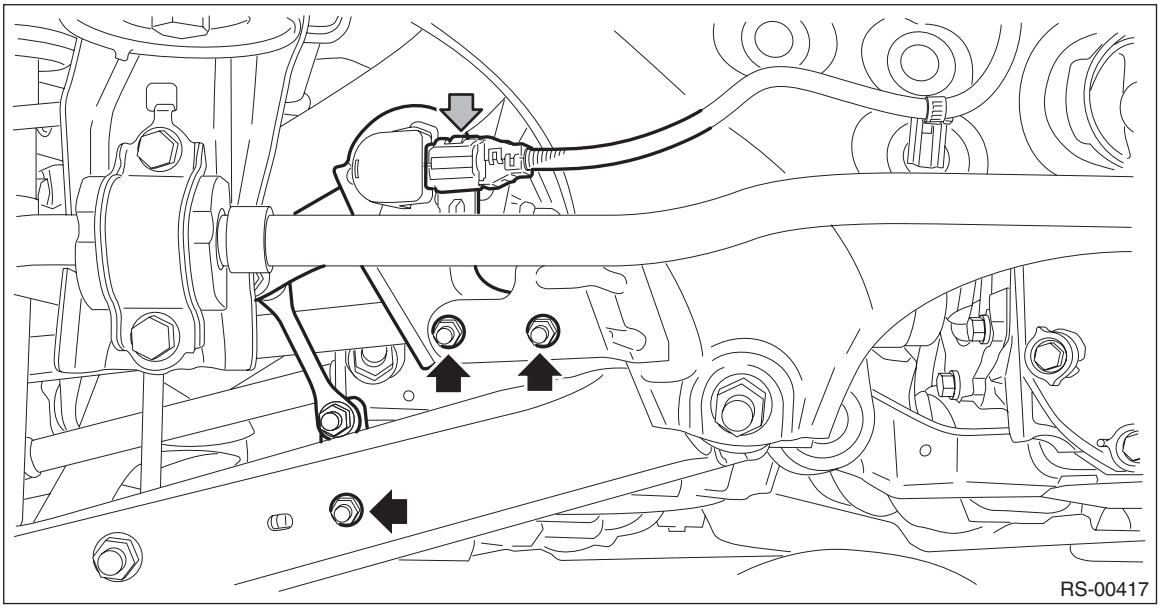
CAUTION:
Do not loosen the nut - axle while the rear axle is loaded. Doing so may damage the hub unit COMPL.
(1) Lift the crimped section of the nut - axle.
(2) Remove the nut - axle using a socket wrench while depressing the brake pedal.



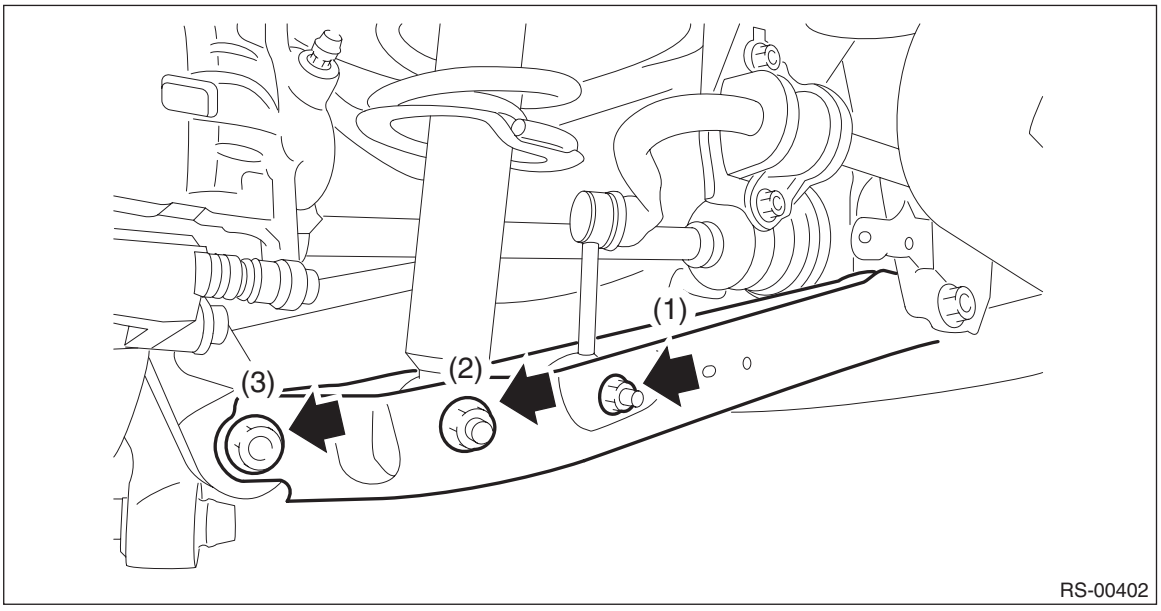
4) Disconnect the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler)

CAUTION:
Do not apply impact to the sensor assembly - headlight beam leveler or forcibly move the arm. Doing so may cause sensor damage and malfunction.

(1) Disconnect the connector of the sensor assembly - headlight beam leveler.
(2) Remove the bolts and nuts, and remove the sensor assembly - headlight beam leveler.

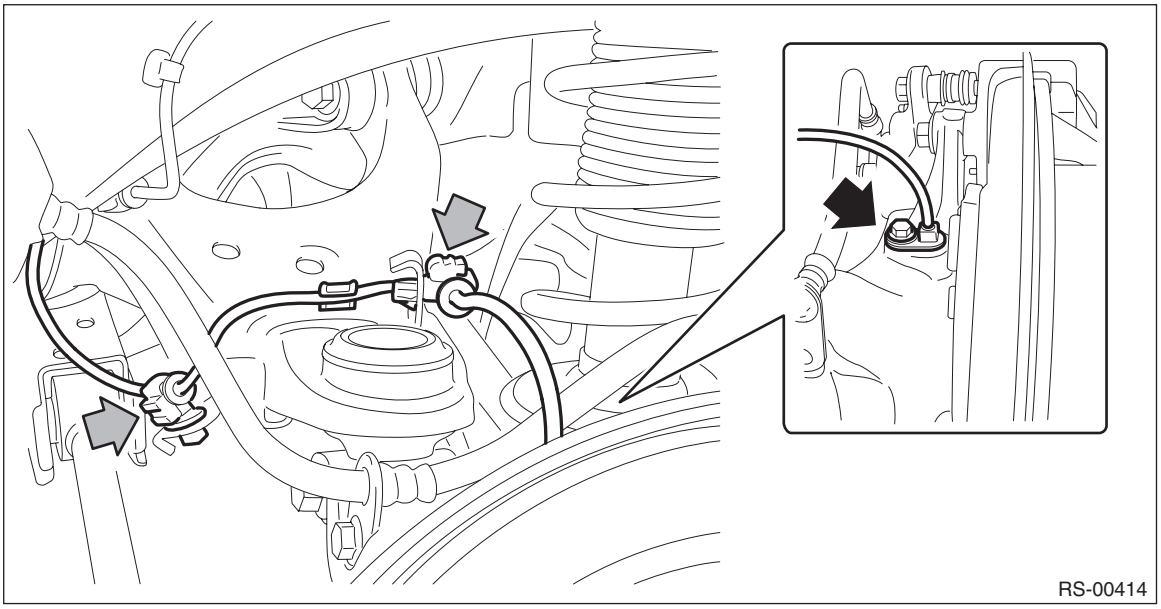


5) Remove the bolts and nuts, and lower the lateral link assembly - rear.
(1) Remove the nut and disconnect the rear stabilizer link assembly. (Model with rear stabilizer)
(2) Remove the bolts at the bottom of rear strut assembly.
(3) Disconnect the housing assembly - rear axle from the lateral link assembly - rear.

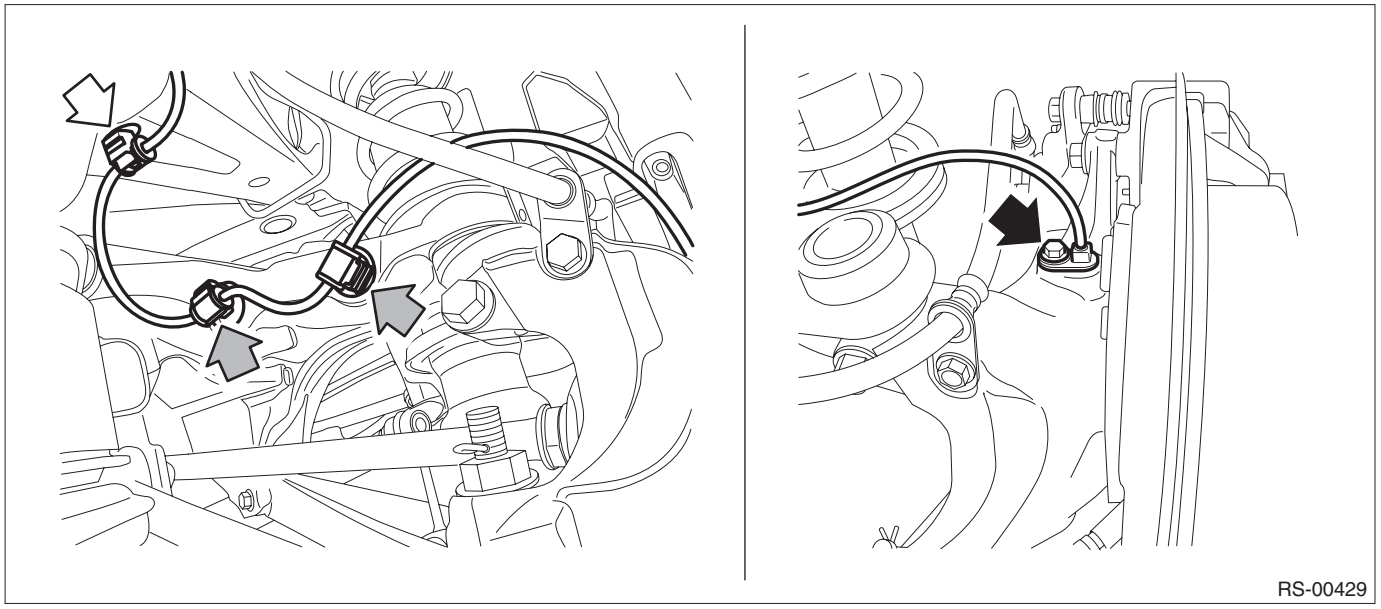


6) Remove the rear ABS wheel speed sensor from the housing assembly - rear axle.
   (1) Remove the bolts, and remove the ABS wheel speed sensor.
   (2) Remove the rear ABS wheel speed sensor harness from the upper arm.

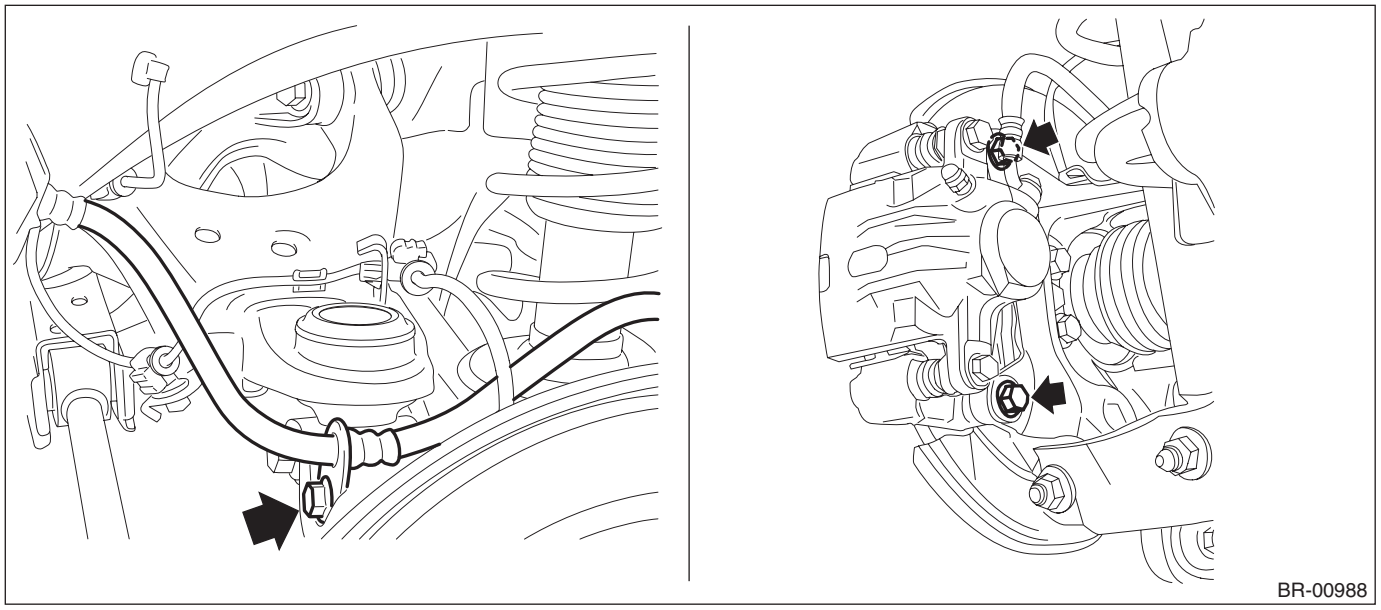
CAUTION:
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**
- **Leave the sensor harness clamp (white arrow) on the vehicle side.**
  - Except for Crosstrek model



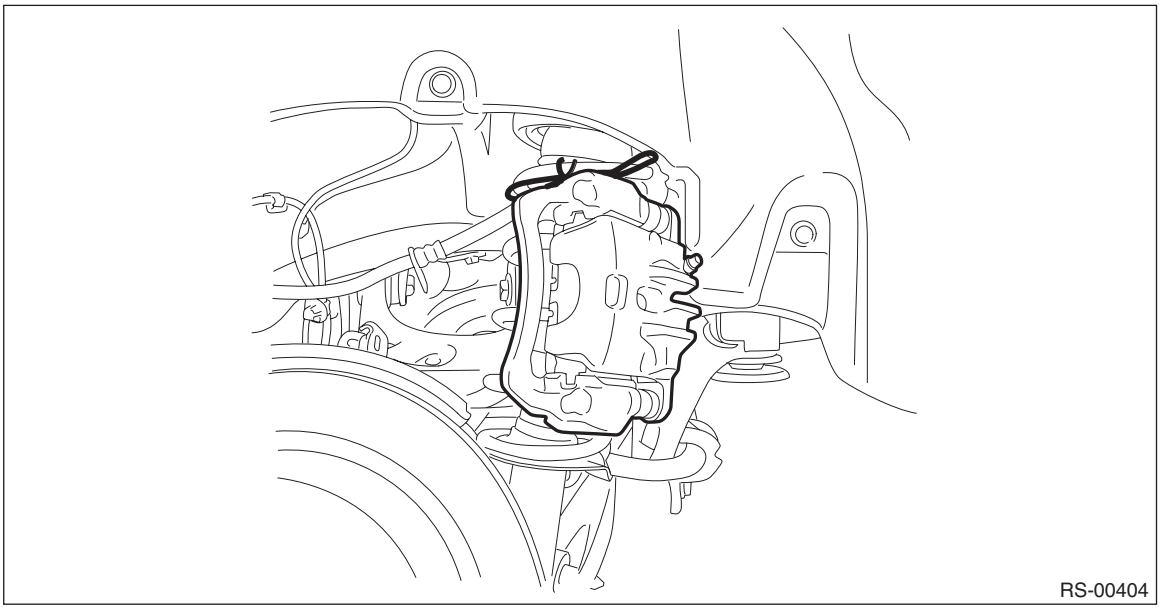
  - Crosstrek model



7) Remove the caliper body assembly from the housing assembly - rear axle.
(1) Remove the bolts and then remove the brake hose bracket and caliper body assembly.

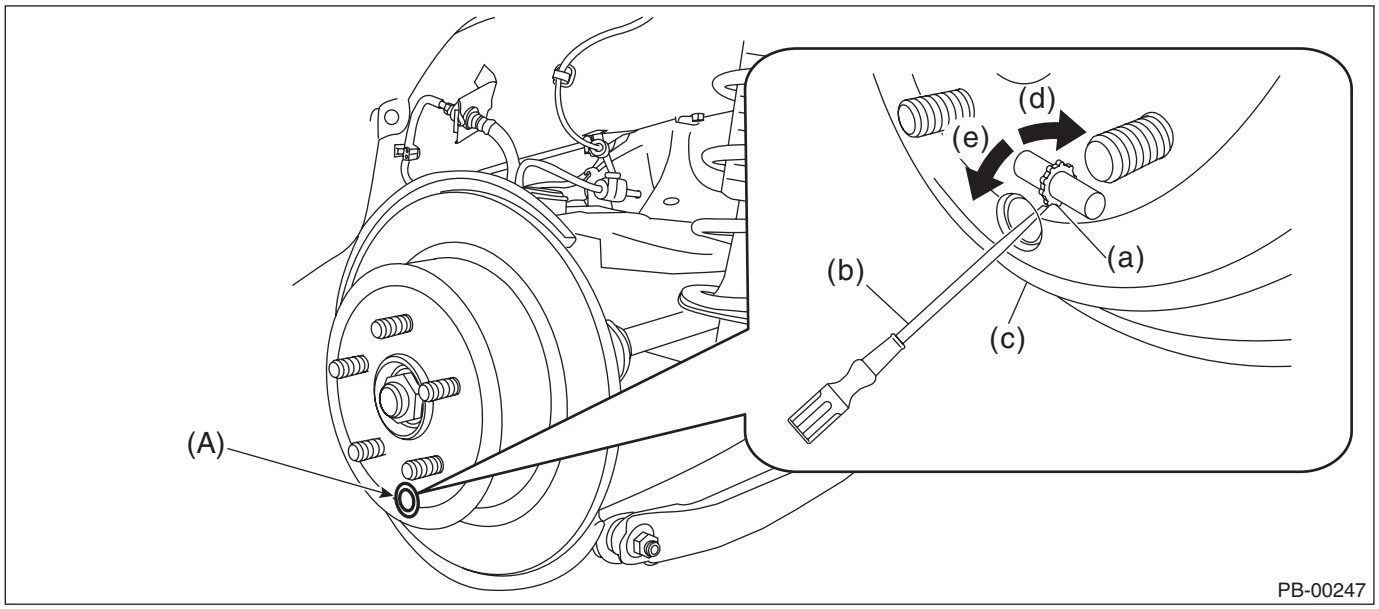


(2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.



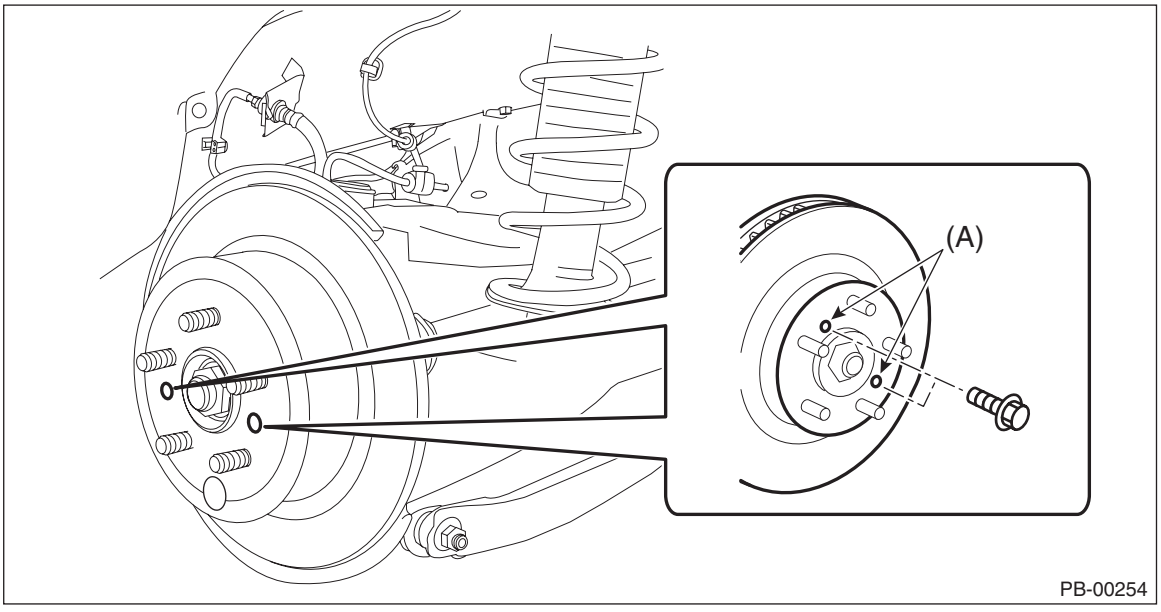
8) Remove the rear disc rotor.

NOTE:
If it is difficult to remove the rear disc rotor, perform the following two methods in order.
1. Remove the adjusting hole cover (A), insert the flat tip screwdriver, and rotate the adjuster assembly - rear brake until the brake shoe moves far enough to remove the disc rotor.



(a) Adjuster ASSY - rear brake
(b) Flat tip screwdriver
(c) Disc rotor
(d) Extend the adjuster ASSY - rear brake
(e) Shorten the adjuster ASSY - rear brake

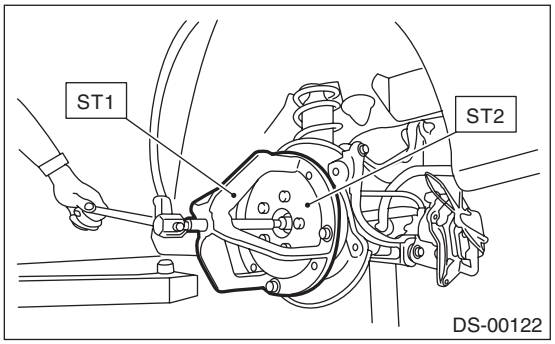
2. If the disc rotor is not removed after performing above step, screw in an 8 mm (0.31 in) bolt to the threaded part (A) of the disc rotor, and remove the disc rotor.



9) Remove the rear drive shaft assembly from the hub unit COMPL - rear axle.

NOTE:
If it is hard to remove, use the ST.

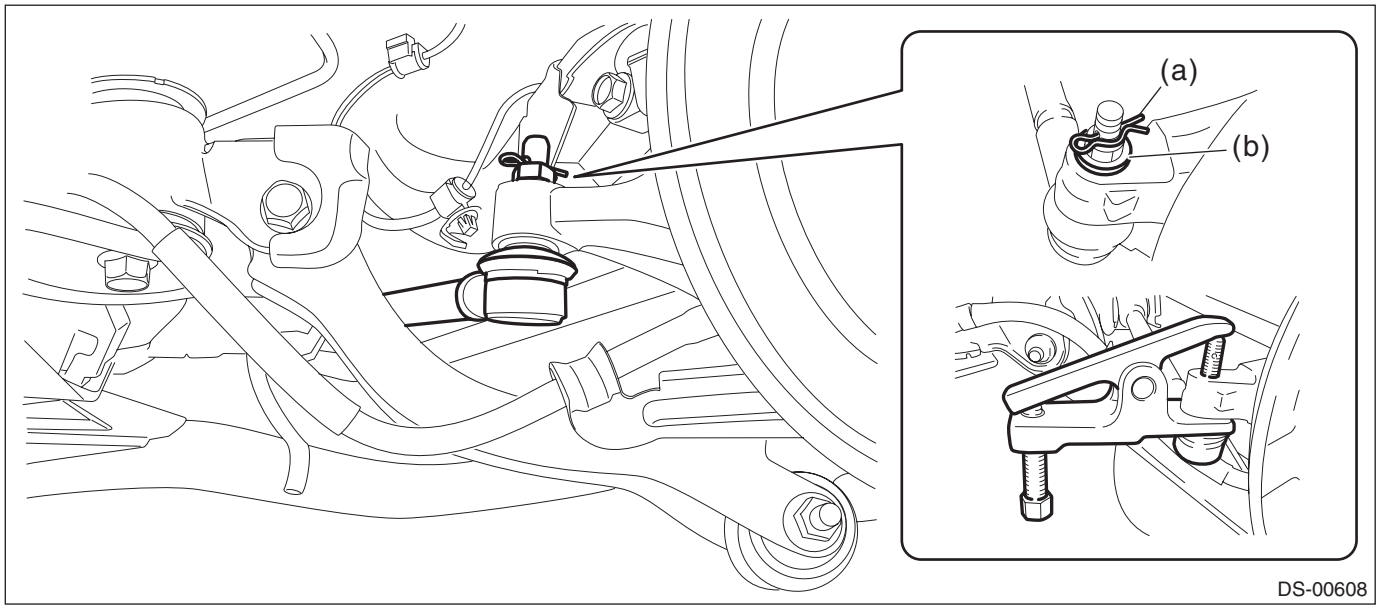
Preparation tool:
ST1: AXLE SHAFT PULLER (926470000)
ST2: AXLE SHAFT PULLER PLATE (28099PA110)



10) Remove the lateral link assembly - front.
(1) Remove the snap pin (a) and nut (b).
(2) Remove the ball joint from the housing assembly - rear axle.

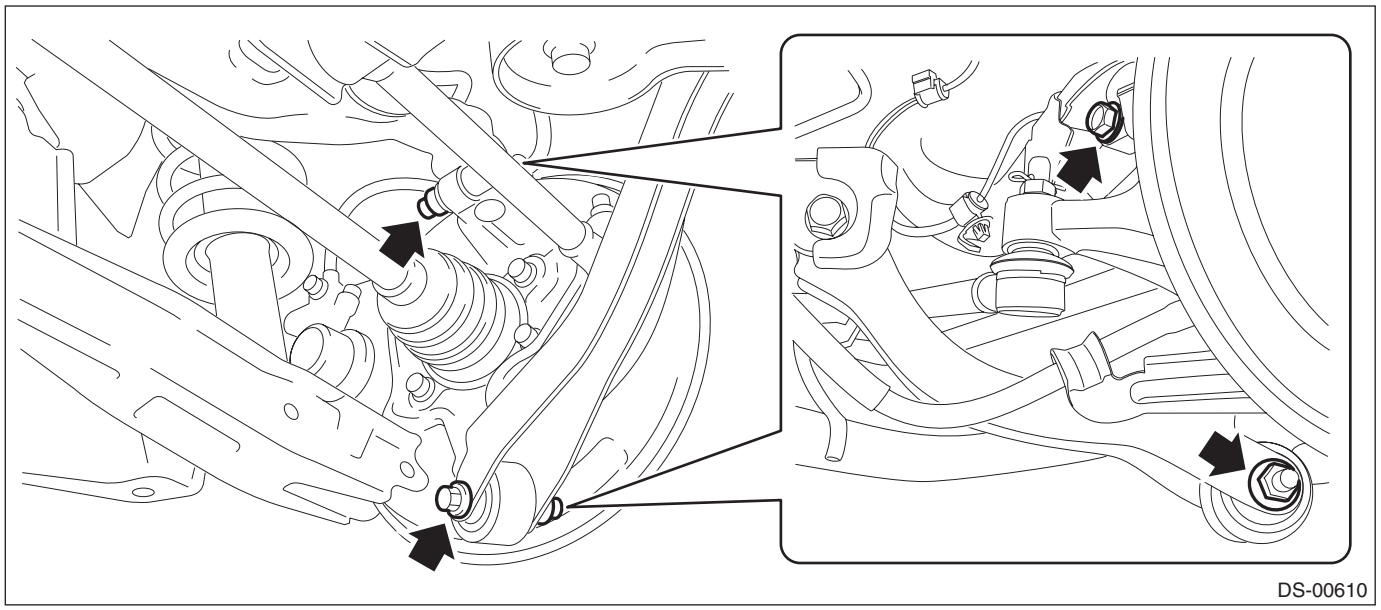
CAUTION:
Be careful not to damage the boot of the joint.

Preparation tool:
Tie-rod ball joint puller



11) Remove the housing assembly - rear axle.
(1) Remove the bolts for the upper arm, the trailing link, and the lateral link assembly - rear, and then separate the housing assembly - rear axle.

CAUTION:
Be careful not to damage the boot of the joint.



(2) Remove the housing assembly - rear axle.

CAUTION:
- **Be careful of the weight of the housing assembly - rear axle.**
- **Be careful not to damage the spline portion of the drive shaft.**

12) Refer to “Rear Hub Unit Bearing” for removal of the hub unit COMPL - rear axle. <Ref. to DS-43, REMOVAL, Rear Hub Unit Bearing.>

B: INSTALLATION

1) Temporarily tighten the housing assembly - rear axle to the upper arm assembly.
2) Install the rear drive shaft assembly.

CAUTION:
- **Do not hammer the drive shaft assembly when installing.**
- **Use new nut - axle.**

(1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.
(2) Temporarily tighten the nut - axle.

3) Tighten the rear strut assembly, rear stabilizer link assembly and other links to the specified torque.

Tightening torque:
Rear suspension: <Ref. to RS-3, REAR SUSPENSION, COMPONENT, General Description.>
Rear strut: <Ref. to RS-5, REAR SHOCK ABSORBER, COMPONENT, General Description.>

4) Install the rear disc rotor.
5) Install the caliper body assembly.

Tightening torque:
66 N·m (6.7 kgf-m, 48.7 ft-lb)

6) Install the brake hose bracket and rear ABS wheel speed sensor.

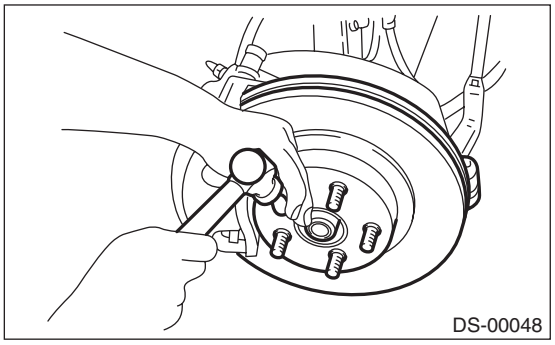
Tightening torque:
Brake hose bracket: 33 N·m (3.4 kgf-m, 24.3 ft-lb)
Rear ABS wheel speed sensor: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

7) Install the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler)

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
8) While depressing the brake pedal, tighten new nuts - axle to the specified torque.

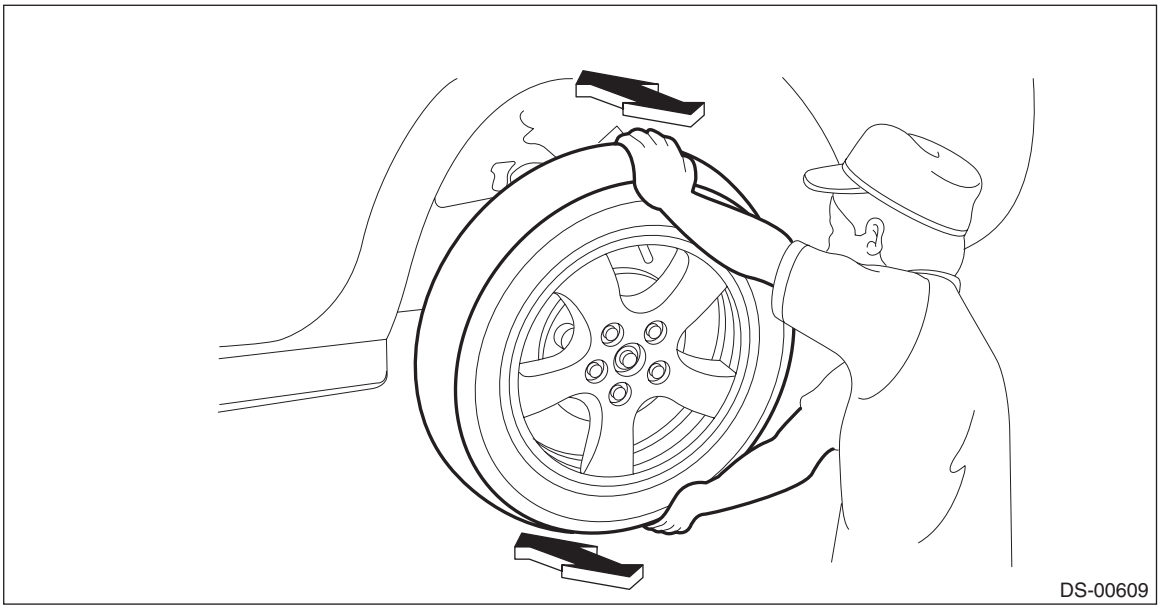
CAUTION:
Do not load the rear axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:
190 N·m (19.4 kgf-m, 140.1 ft-lb)
9) After tightening the nut - axle, lock it securely.


DS-00048

10) Install the rear wheels, and perform the following inspections.

Tightening torque:
Except for C4 model: 120 N·m (12.2 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.2 kgf-m, 73.8 ft-lb)
1. Check the wheels for smooth rotation.
2. Check that there is no play by moving the upper and lower portions of rear tire in an axial direction with the brake pedal released.
   - **Play exists** → Check the hub unit COMPL - rear axle. <Ref. to DS-52, INSPECTION, Rear Hub Unit Bearing.>


DS-00609

11) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

12) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

C: DISASSEMBLY

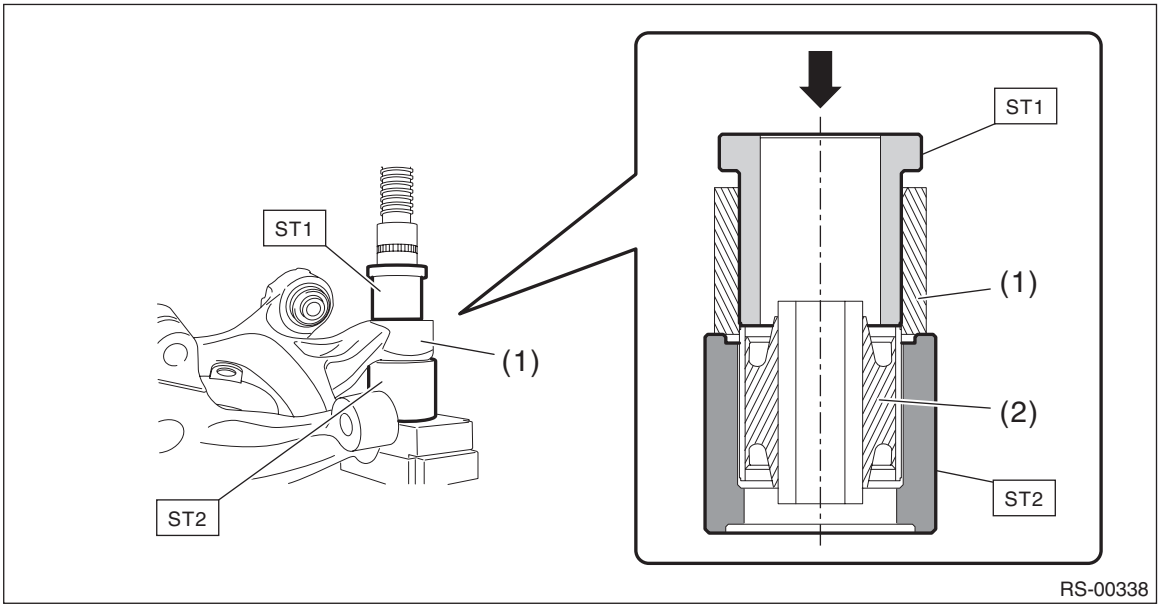
1. BUSHING - REAR AXLE HOUSING

Do not remove the housing assembly - rear axle because the bushing - rear axle housing cannot be replaced. If it is removed, replace the housing assembly - rear axle.

2. BUSHING - TRAILING LINK

1) Remove the housing assembly - rear axle. <Ref. to DS-33, REMOVAL, Rear Axle.>
2) Using the ST and a hydraulic press, push out the bushing.

Preparation tool:
ST1: BUSHING REMOVER (20099FG000)
ST2: INSTALLER & REMOVER (BASE) (20099PA010)



(1) Housing ASSY - rear axle
(2) Bushing - trailing link

D: ASSEMBLY

1. BUSHING - REAR AXLE HOUSING

Do not remove the housing assembly - rear axle because the bushing - rear axle housing cannot be replaced. If it is removed, replace the housing assembly - rear axle.

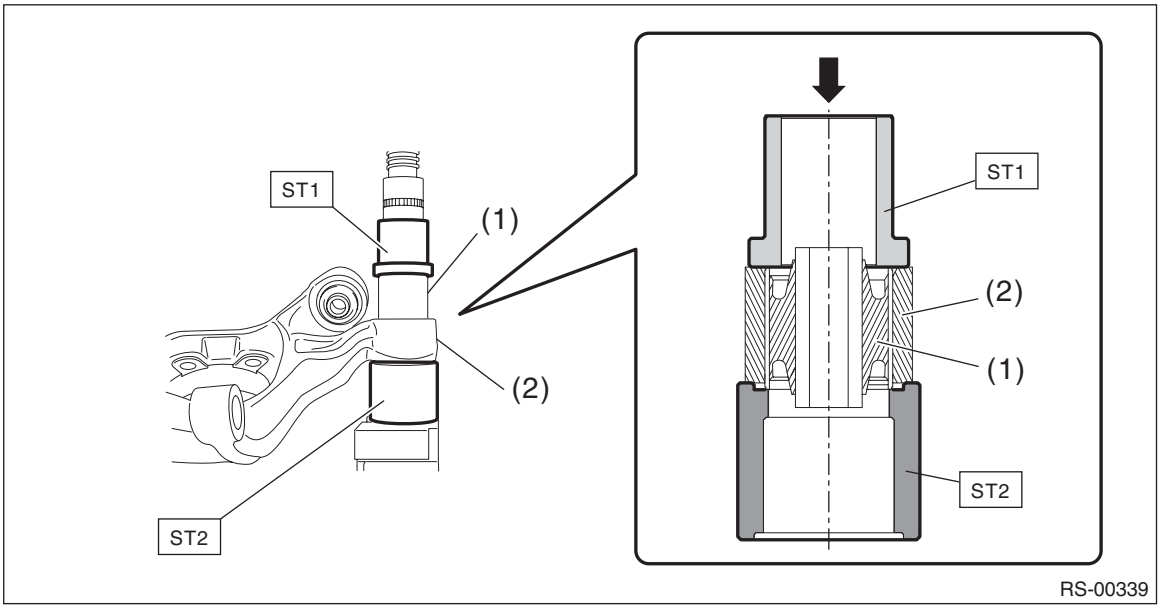
2. BUSHING - TRAILING LINK

1) Before assembly, inspect the following items and replace any faulty part with a new one.
- Perform visual check for damage or bend on the trailing link.
- Visually check the bushing for abnormal cracks, fatigue or damage.

2) Press-fit the bushing using ST and the hydraulic press.

CAUTION:
Make sure to press the bushing straight in.

Preparation tool:
ST1: BUSHING REMOVER (20099FG000)
ST2: INSTALLER & REMOVER (BASE) (20099PA010)



(1) Bushing (2) Housing ASSY - rear axle

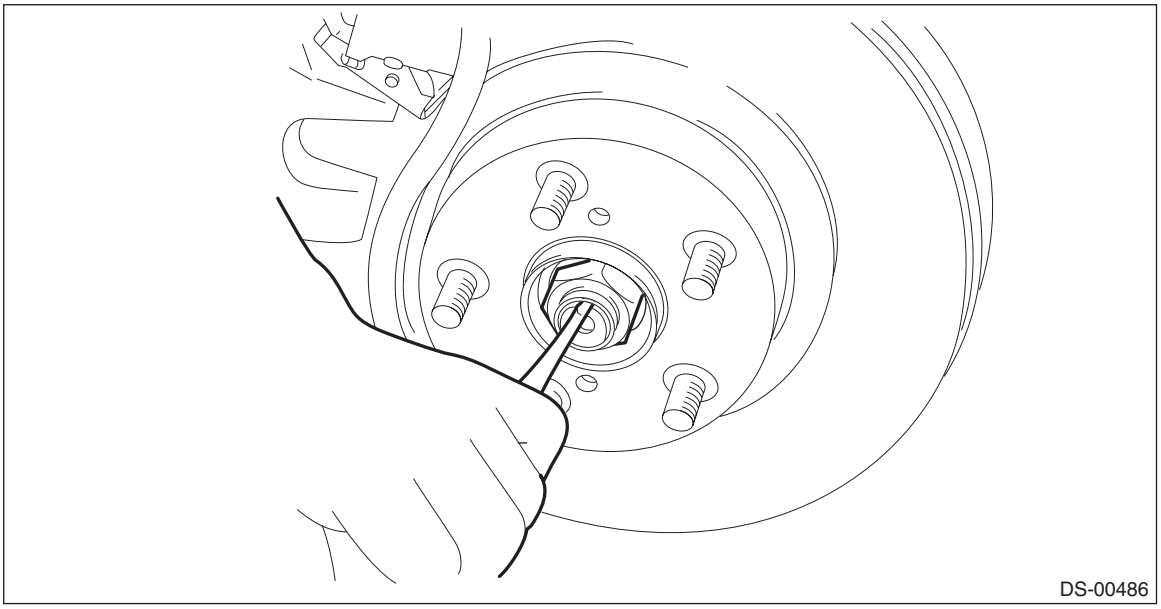
6. Rear Hub Unit Bearing

A: REMOVAL

1) Lift up the vehicle, and then remove the rear wheels.
2) Remove the nut - axle.

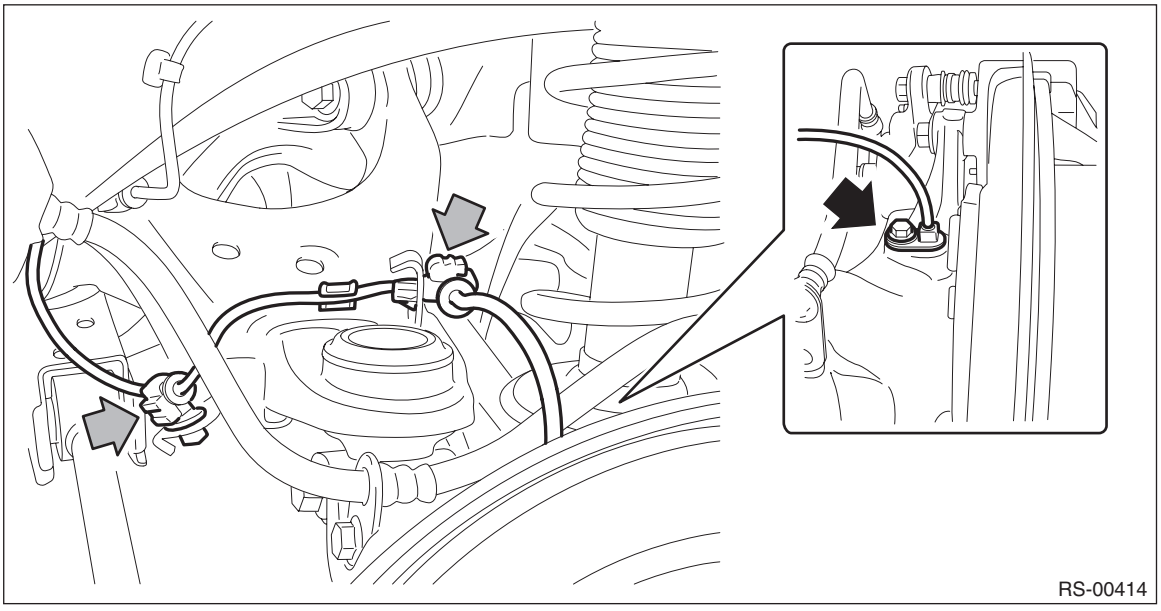
CAUTION:
Do not loosen the nut - axle while the rear axle is loaded. Doing so may damage the hub unit COMPL.

(1) Lift the crimped section of the nut - axle.
(2) Remove the nut - axle using a socket wrench while depressing the brake pedal.

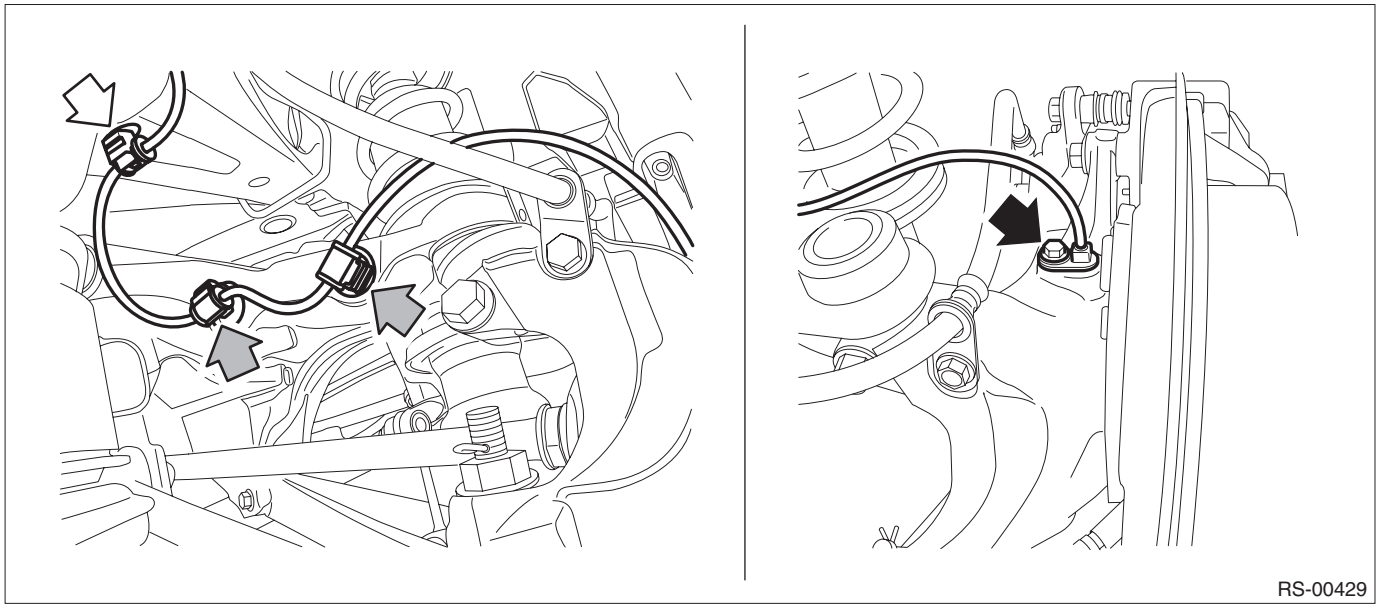


3) Remove the rear ABS wheel speed sensor from the rear axle housing.
(1) Remove the bolts, and remove the rear ABS wheel speed sensor.
(2) Remove the rear ABS wheel speed sensor harness from the upper arm.

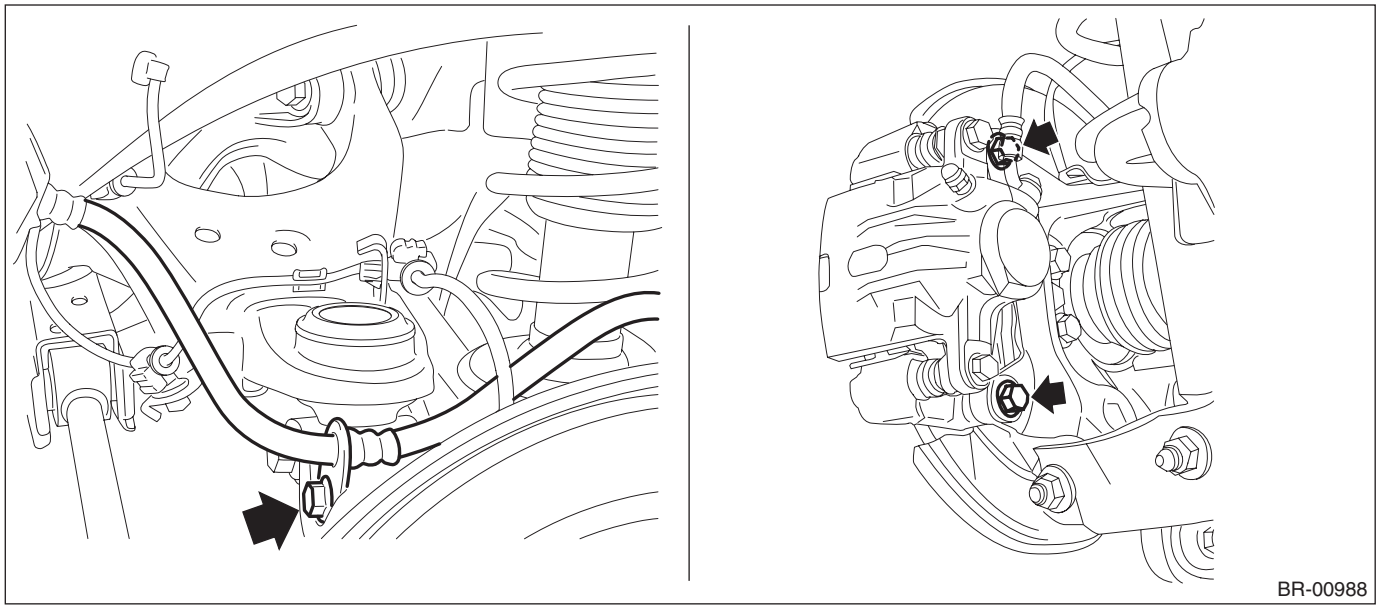
CAUTION:
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**
- **Leave the sensor harness clamp (white arrow) on the vehicle side.**
  - Except for Crosstrek model



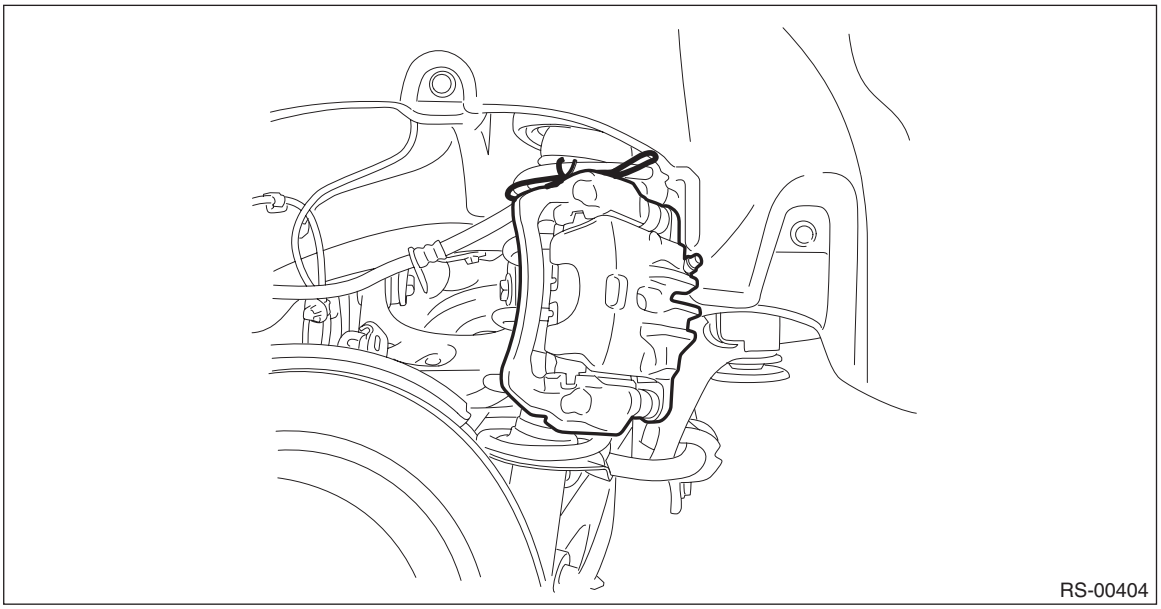
- Crosstrek model



4) Remove the caliper body assembly from the housing assembly - rear axle.
(1) Remove the bolts and then remove the brake hose bracket and caliper body assembly.

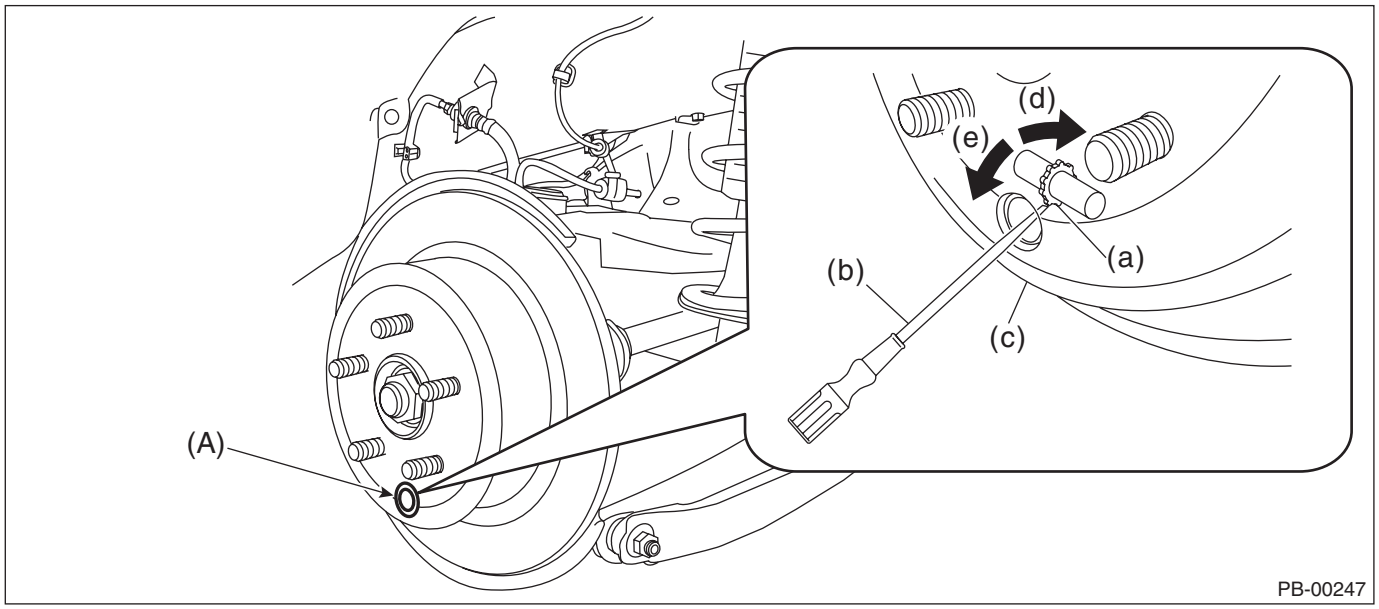


(2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.



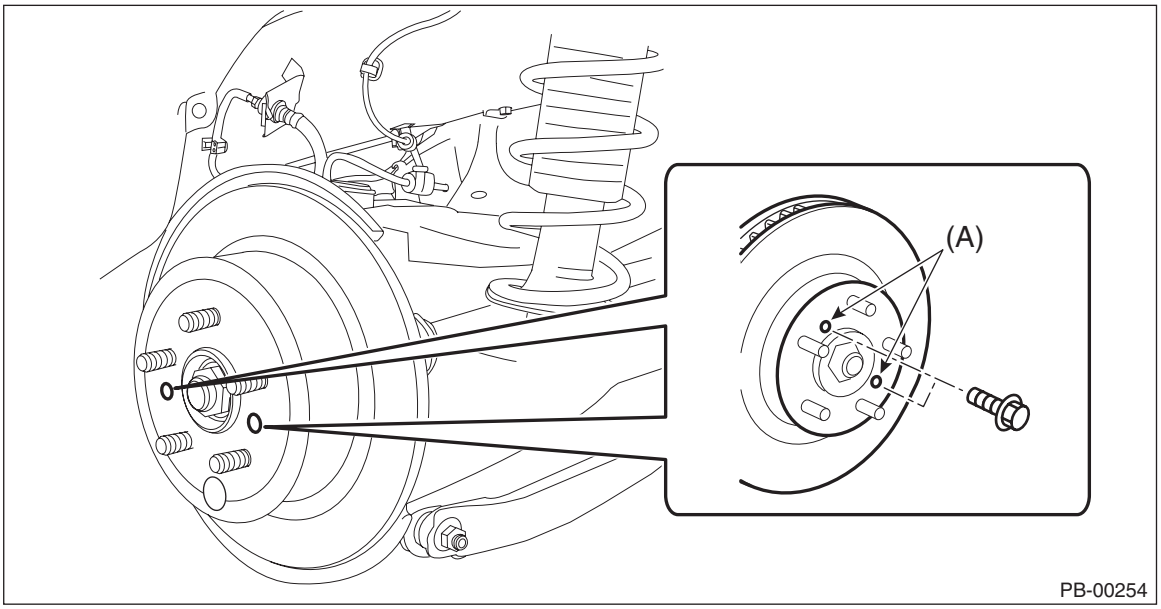
5) Remove the rear disc rotor.

NOTE:
If it is difficult to remove the rear disc rotor, perform the following two methods in order.
1. Remove the adjusting hole cover (A), insert the flat tip screwdriver, and rotate the adjuster assembly - rear brake until the brake shoe moves far enough to remove the disc rotor.



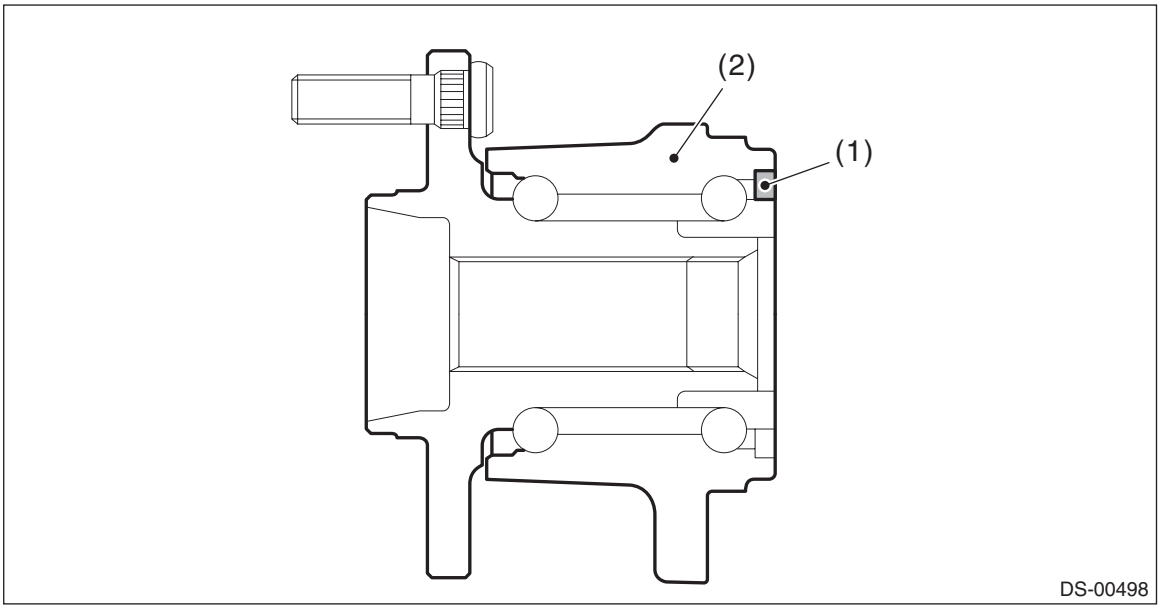
(a) Adjuster ASSY - rear brake
(b) Flat tip screwdriver
(c) Disc rotor
(d) Extend the adjuster ASSY - rear brake
(e) Shorten the adjuster ASSY - rear brake

2. If the disc rotor is not removed after performing above step, screw in an 8 mm (0.31 in) bolt to the threaded part (A) of the disc rotor, and remove the disc rotor.

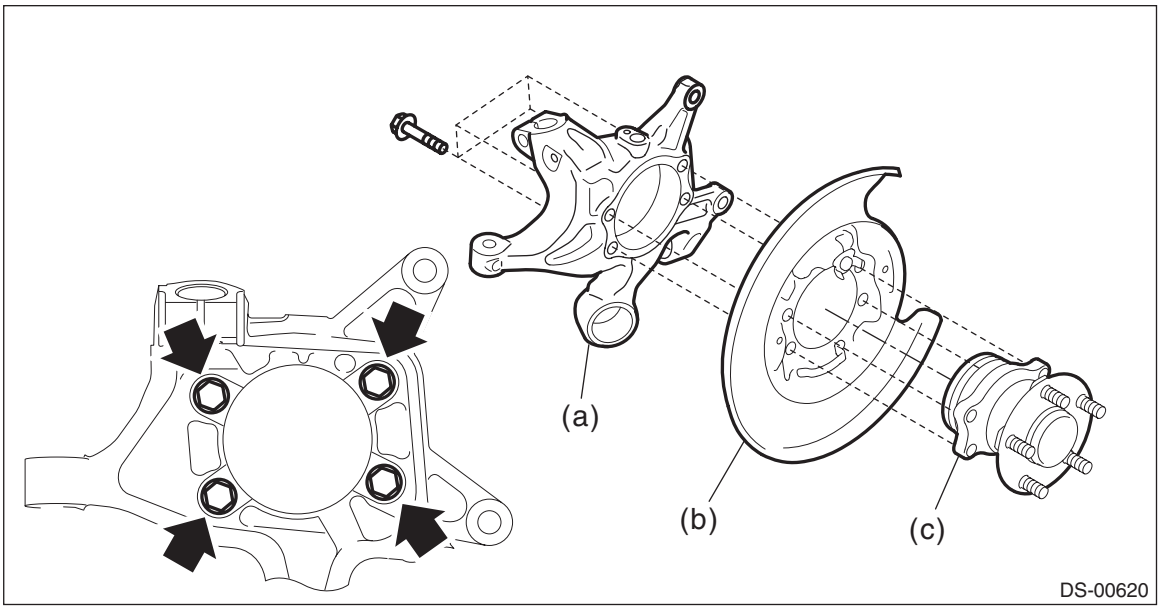


6) Remove the bolts from the housing assembly - rear axle, and then remove the hub unit COMPL - rear axle.

CAUTION:
- **Be careful not to damage the magnetic encoder.**
- **Do not get closer the tool which charged magnetism to magnetic encoder.**



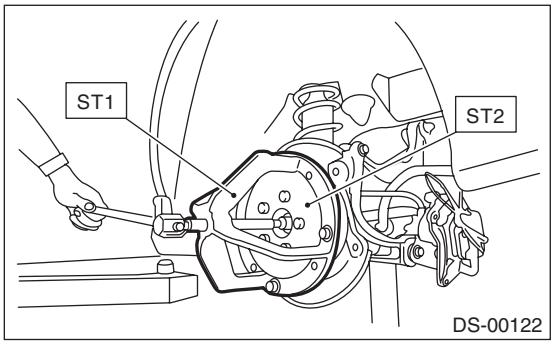
(1) Magnetic encoder
(2) Hub unit COMPL - rear axle



(a) Housing ASSY - rear axle (b) Back plate - rear brake (c) Hub unit COMPL - rear axle

NOTE:
If it is hard to remove, use the ST.

Preparation tool:
ST1: AXLE SHAFT PULLER (926470000)
ST2: AXLE SHAFT PULLER PLATE (28099PA110)

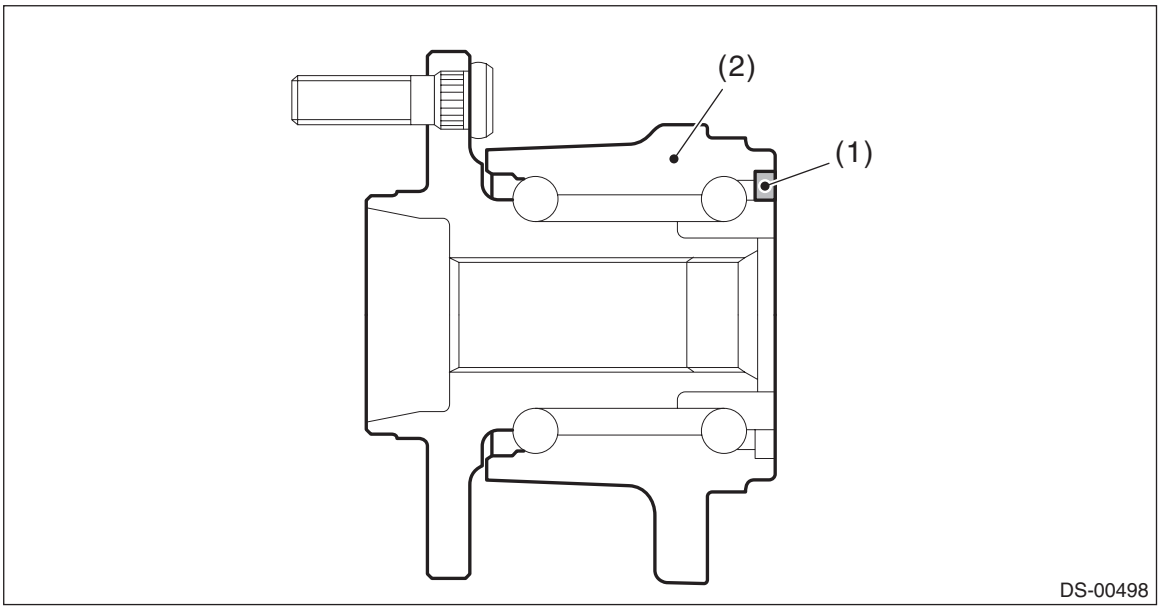


B: INSTALLATION

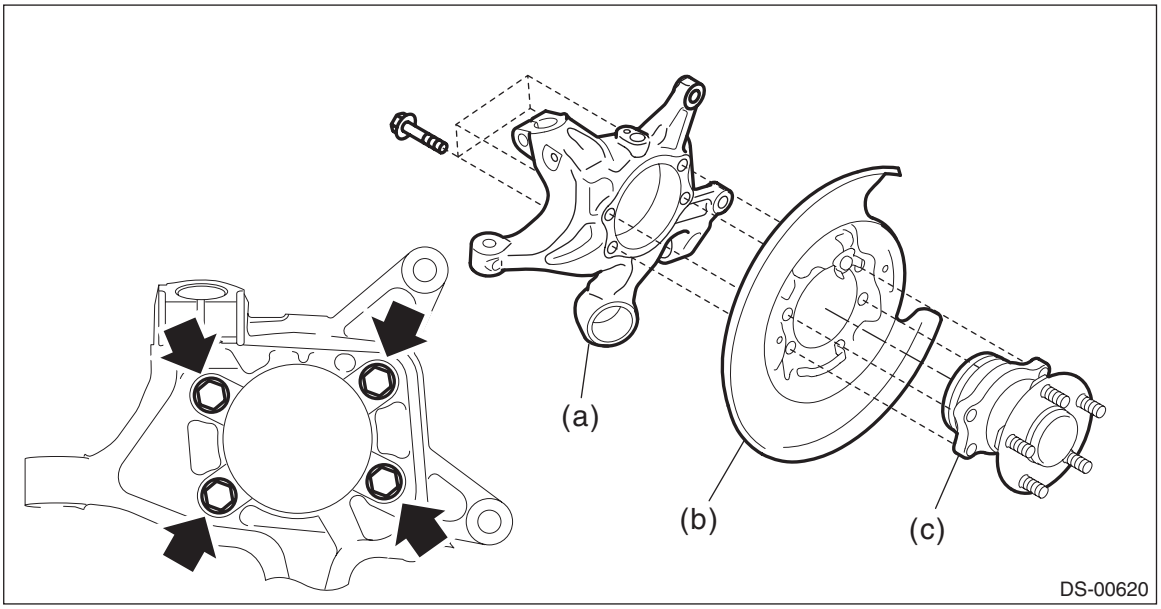
1) Place the back plate - rear brake between the housing assembly - rear axle and the hub unit COMPL - rear axle, and tighten the bolt.

CAUTION:
- **Be careful not to damage the magnetic encoder.**
- **Do not get closer the tool which charged magnetism to magnetic encoder.**

Tightening torque:
65 N·m (6.6 kgf-m, 47.9 ft-lb)



(1) Magnetic encoder (2) Hub unit COMPL - rear axle



(a) Housing ASSY - rear axle (b) Back plate - rear brake (c) Hub unit COMPL - rear axle

2) Install the rear drive shaft assembly.

CAUTION:
- **Do not hammer the drive shaft assembly when installing.**
- **Use new nut - axle.**
  (1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.
  (2) Temporarily tighten the nut - axle.

3) Install the disc rotor to the hub unit COMPL - rear axle.
4) Install the caliper body assembly to the housing assembly - rear axle.

Tightening torque:
66 N·m (6.7 kgf-m, 48.7 ft-lb)

5) Install the brake hose bracket.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)

6) Install the rear ABS wheel speed sensor.

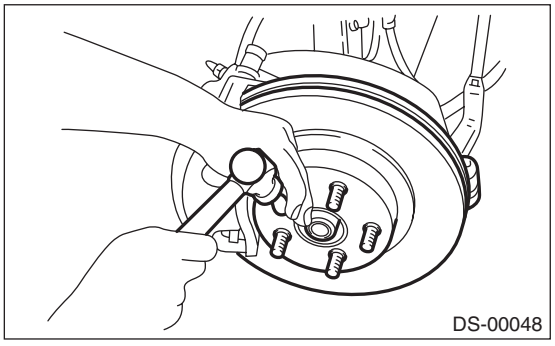
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

7) While depressing the brake pedal, tighten new nuts - axle to the specified torque.

CAUTION:
Do not load the rear axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:
190 N·m (19.4 kgf-m, 140.1 ft-lb)

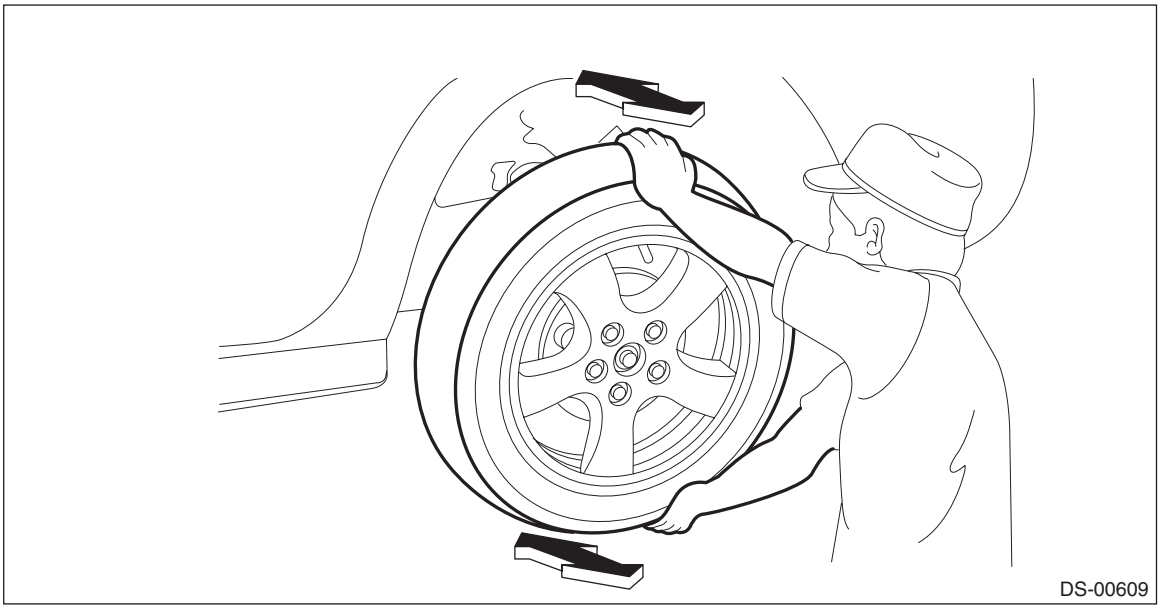
8) After tightening the nut - axle, lock it securely.



9) Install the rear wheels, and perform the following inspections.

Tightening torque:
Except for C4 model: 120 N·m (12.2 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.2 kgf-m, 73.8 ft-lb)

1. Check the wheels for smooth rotation.
2. Check that there is no play by moving the upper and lower portions of rear tire in an axial direction with the brake pedal released.
   - **Play exists** → Check the hub unit COMPL - rear axle. <Ref. to DS-52, INSPECTION, Rear Hub Unit Bearing.>



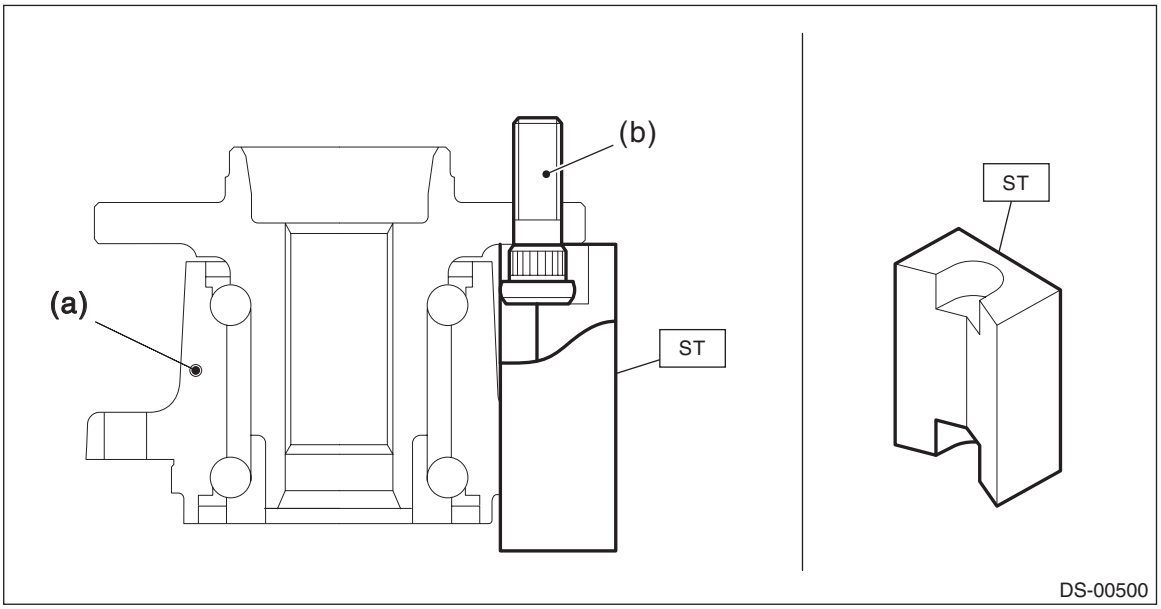
C: DISASSEMBLY

Using the ST or a hydraulic press, push out the bolt - hub (b) from the hub unit COMPL - rear axle (a).

CAUTION:
- **Be careful not to hammer the bolts - hub. This may deform the hub unit COMPL.**
- **Do not reuse the bolt - hub.**

NOTE:
Since the hub unit COMPL - rear axle cannot be disassembled, only bolts - hub can be removed.

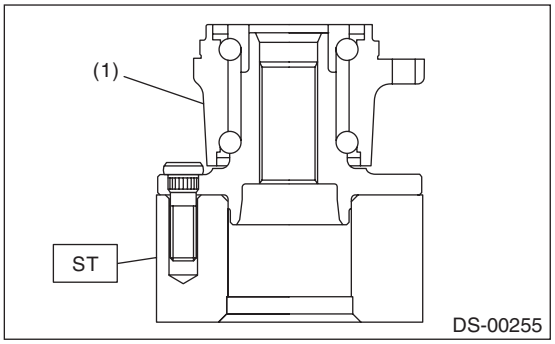
Preparation tool:
ST: HUB STAND (28399AG000)



D: ASSEMBLY

1) Install the hub unit COMPL - rear axle to the ST securely.

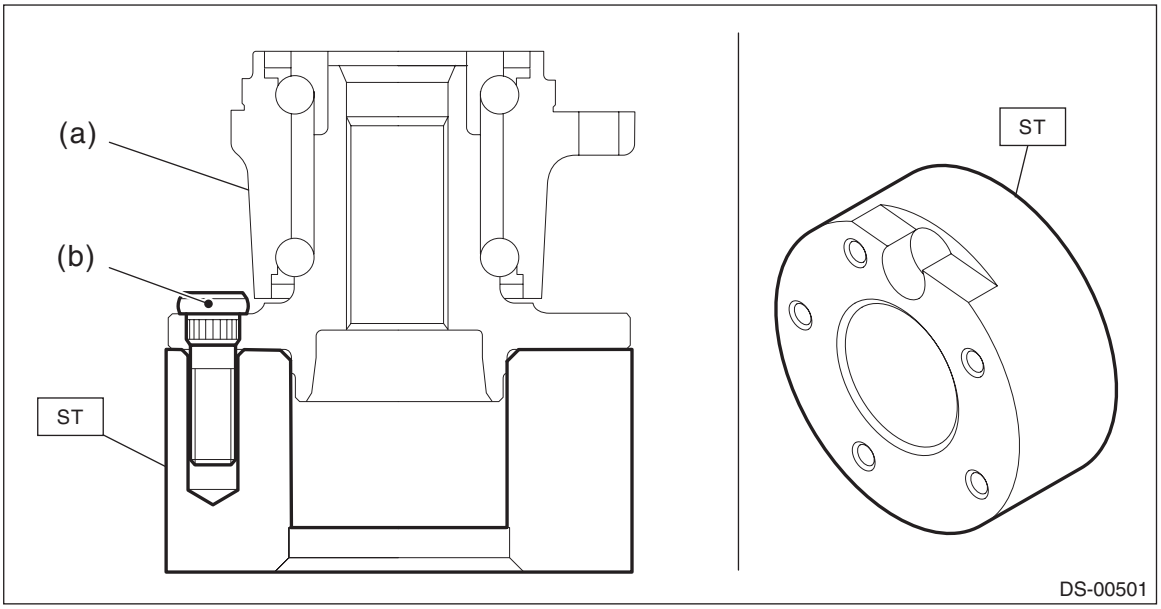
Preparation tool:
ST: HUB STAND (927080000)



(1) Hub unit COMPL - rear axle

2) Using a press, press new bolts - hub (b) until their seating surfaces contact the hub unit COMPL - rear axle (a).

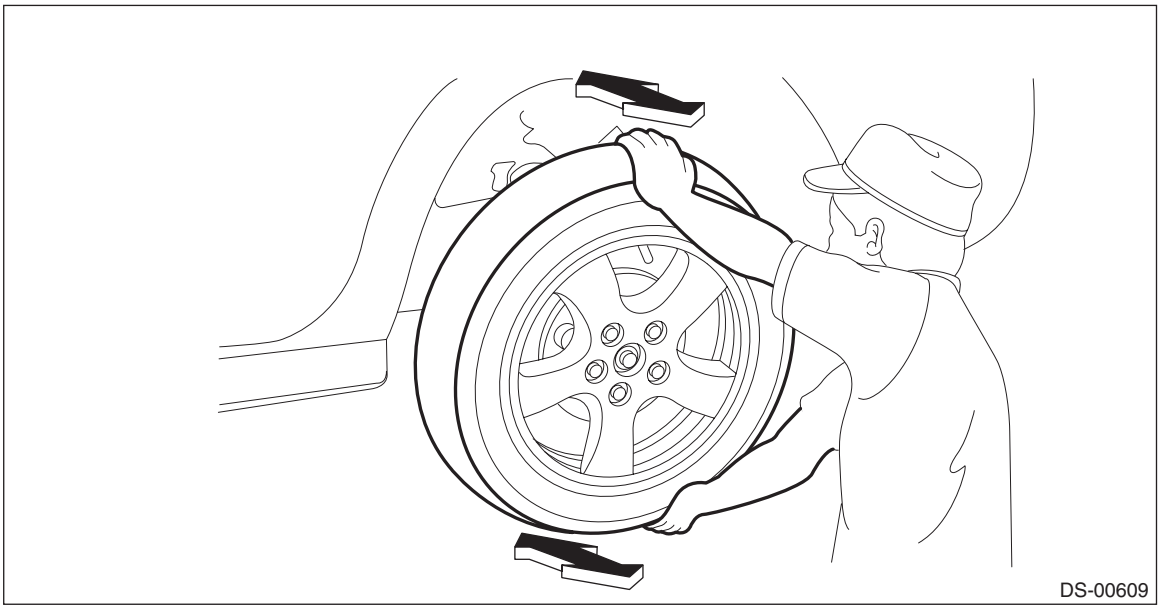
NOTE:
Use the 12 mm (0.47 in) dia. holes in the HUB STAND to prevent bolts from tilting.



E: INSPECTION

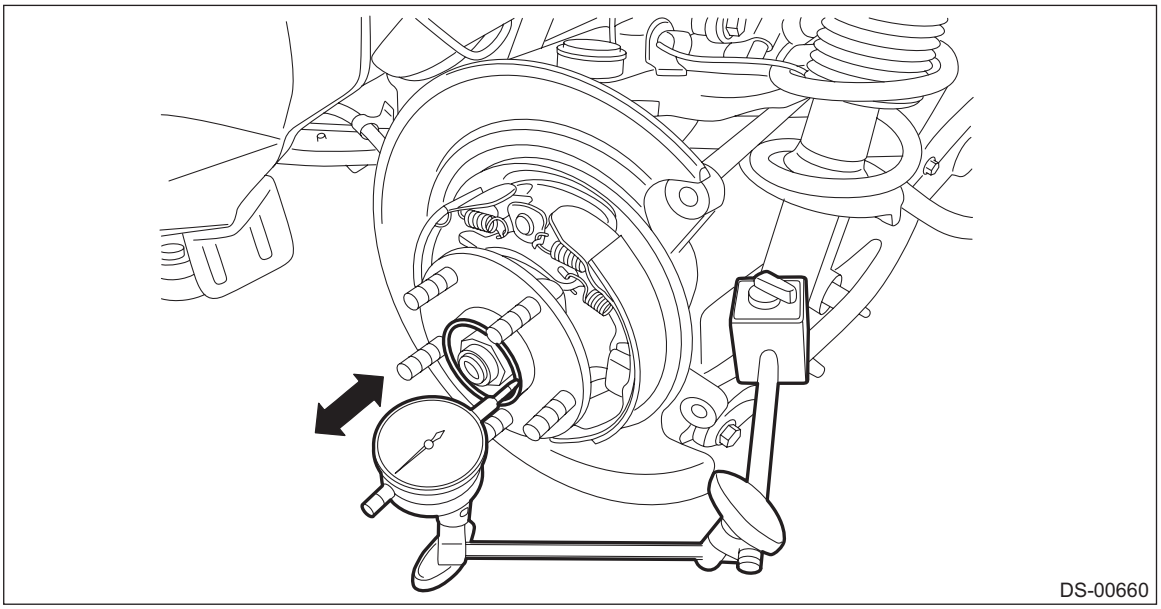
1) Moving the rear tire up and down by hand, check there is no backlash in bearing, and check the wheel rotates smoothly.

CAUTION:
If there is any fault in the bearing, replace the hub unit COMPL - rear axle.



2) Inspect axial play of the hub unit bearing.
1. Remove the tire and disc rotor.
2. Inspect the lean of axis direction using a dial gauge. Replace the hub unit COMPL if the play exceeds the limit.

Service limit:
Maximum: 0.05 mm (0.0020 in)



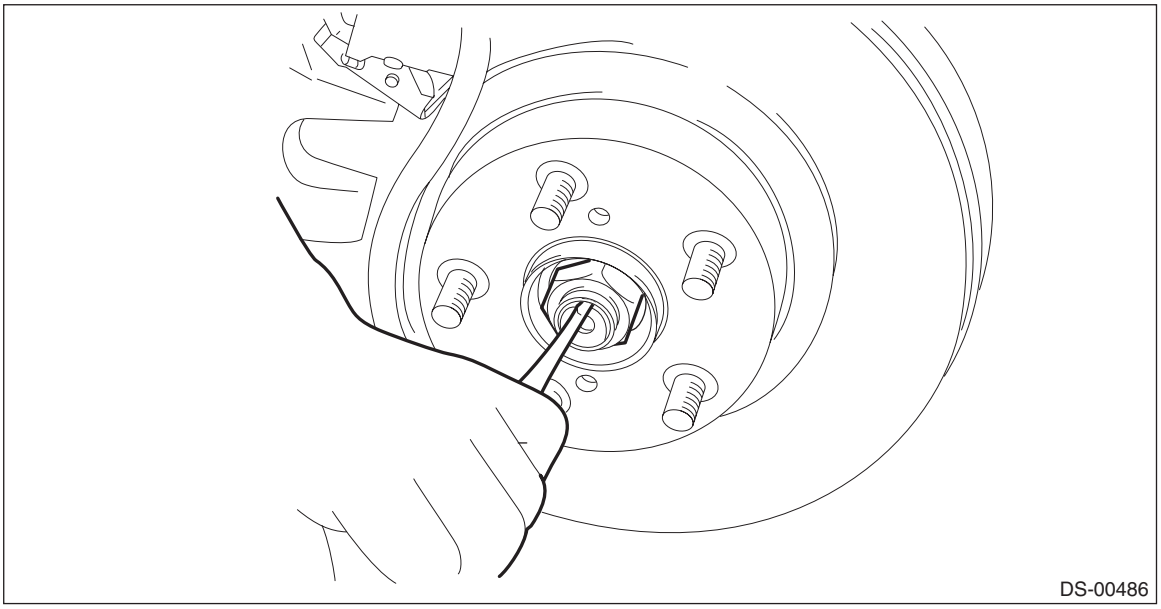
7. Front Drive Shaft

A: REMOVAL

1) Lift up the vehicle, and then remove the front wheels.
2) Remove the nut - axle.

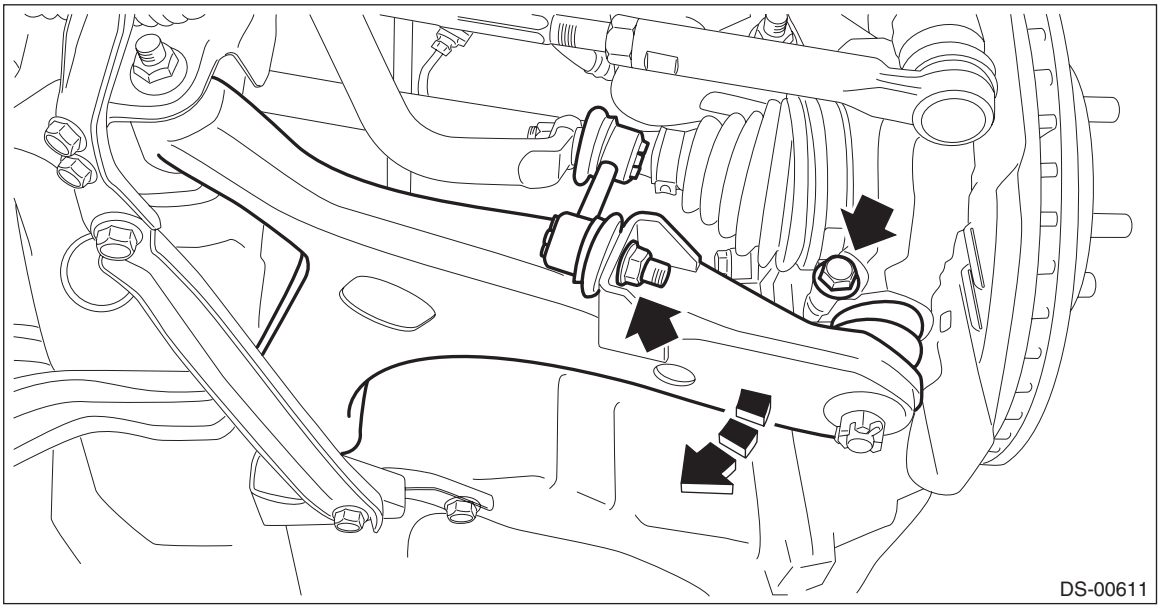
CAUTION:
Do not loosen the nut - axle while the front axle is loaded. Doing so may damage the hub unit COMPL.

(1) Lift the crimped section of the nut - axle.
(2) Remove the nut - axle using a socket wrench while depressing the brake pedal.



3) Drain the transmission gear oil. (MT model)
4) Drain differential gear oil. (CVT model)
5) Disconnect the ball joint assembly.

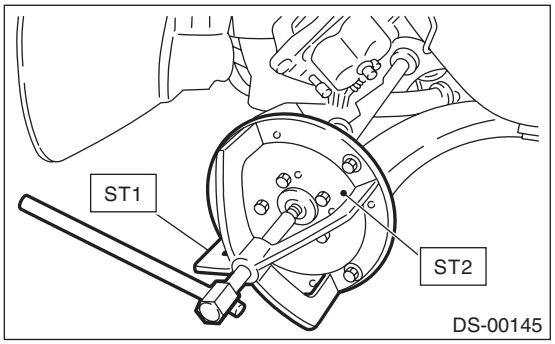
(1) Remove the nut and disconnect the front stabilizer link.
(2) Remove the bolts, disconnect the front arm ball joint, and lower the front arm assembly.



6) Remove the front drive shaft assembly from the housing assembly - front axle.

NOTE:
If it is hard to remove, use the ST.

Preparation tool:
ST1: AXLE SHAFT PULLER (926470000)
ST2: AXLE SHAFT PULLER PLATE (28099PA110)



7) Using a bar, remove the front drive shaft assembly from transmission.

CAUTION:
Be careful not to allow the bar to damage holder area.

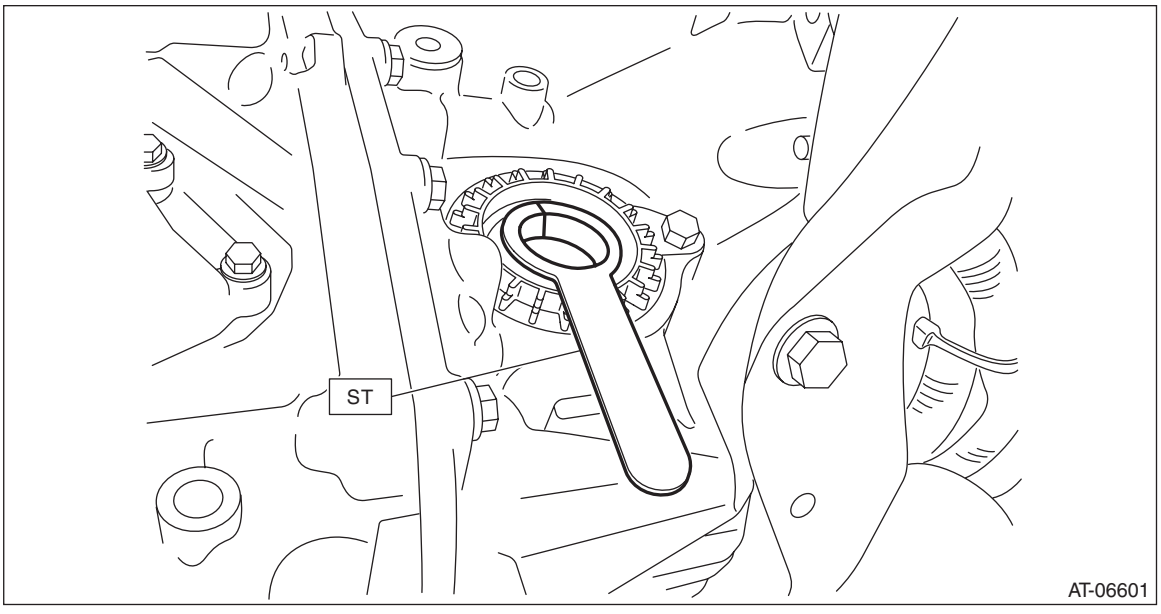
B: INSTALLATION

1) Before installation, check the drive shaft assembly. <Ref. to DS-69, INSPECTION, Front Drive Shaft.>
2) Replace the differential side retainer oil seal with a new part.
- MT model: <Ref. to 5MT-34, REPLACEMENT, Differential Side Retainer Oil Seal.>
- CVT model: <Ref. to CVT(TR580)-94, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:
After pulling out the drive shaft assembly, be sure to replace with a new oil seal.
3) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.

CAUTION:
Do not hammer the drive shaft assembly when installing.
4) Temporarily tighten the nut - axle.
5) Using the ST, install the front drive shaft assembly to the transmission.

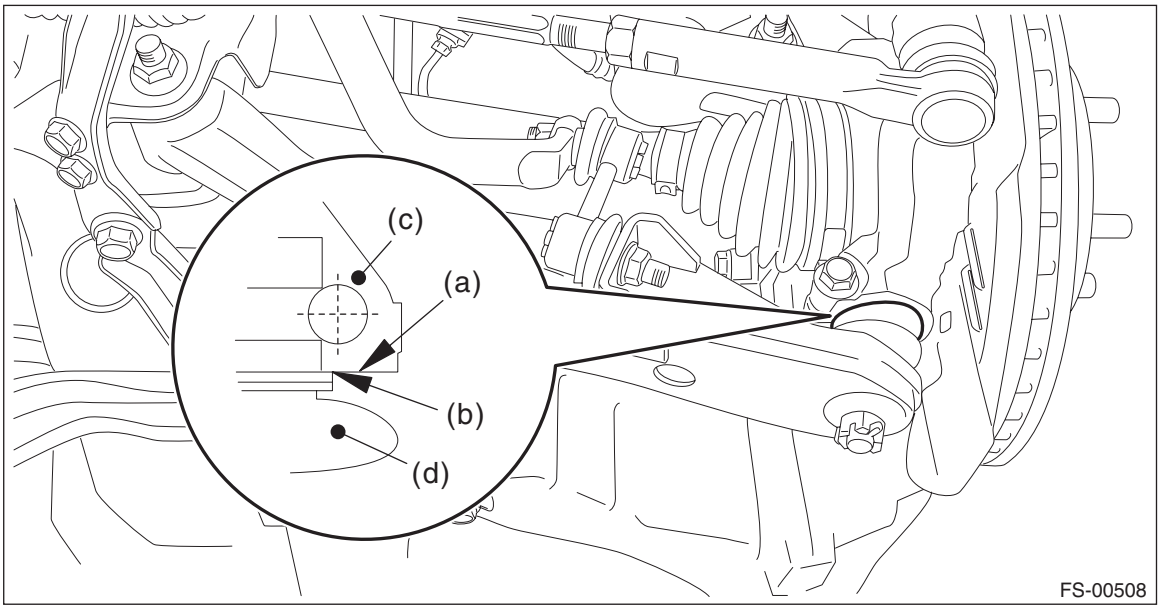
Preparation tool:
ST: OIL SEAL PROTECTOR (28399SA010)



6) Install the ball joint assembly to the housing assembly - front axle.

CAUTION:
Before tightening, make sure the bottom surface of the housing assembly - front axle and the stepped section of ball joint are in contact.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



(a) Bottom surface of housing ASSY - front axle
(b) Raised section of ball joint
(c) Housing ASSY - front axle
(d) Ball joint

7) Install the stabilizer link.
- Except for Crosstrek model

Tightening torque:
38 N·m (3.9 kgf-m, 28.0 ft-lb)
- Crosstrek model

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)
8) While depressing the brake pedal, tighten new nuts - axle to the specified torque.

CAUTION:
Do not load the front axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:
220 N·m (22.4 kgf-m, 162.3 ft-lb)
9) After tightening the nut - axle, lock it securely.
10) Fill transmission gear oil. (MT model)
11) Fill differential gear oil. (CVT model)
12) Install the front wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.2 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.2 kgf-m, 73.8 ft-lb)

13) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

CAUTION:
When the wheel alignment has been adjusted, perform "VDC sensor midpoint setting mode". <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
14) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

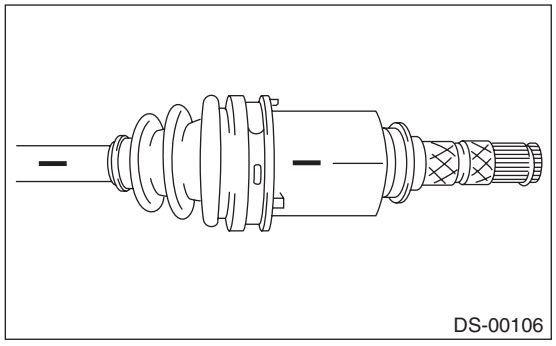
C: DISASSEMBLY

1. AC + AAR TYPE

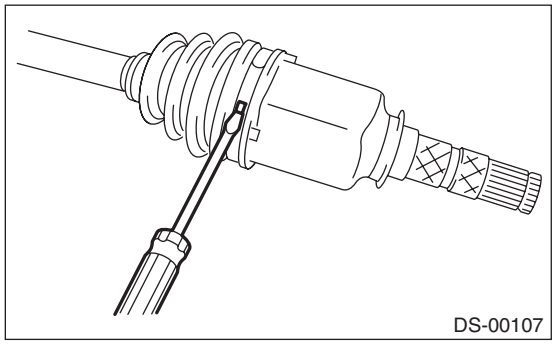
1) Remove the AAR outer race from shaft assembly.

CAUTION:
Be careful not to damage the boot.

(1) Place alignment marks on the shaft and outer race.

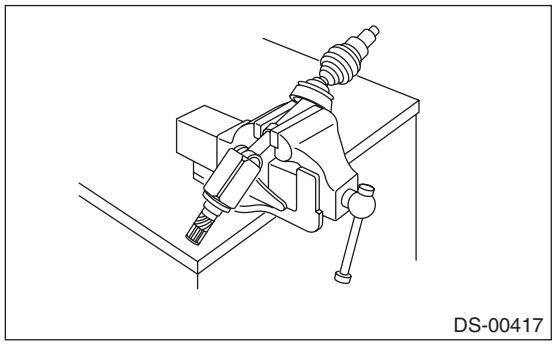

DS-00106

(2) Remove the AAR boot band and boot.


DS-00107

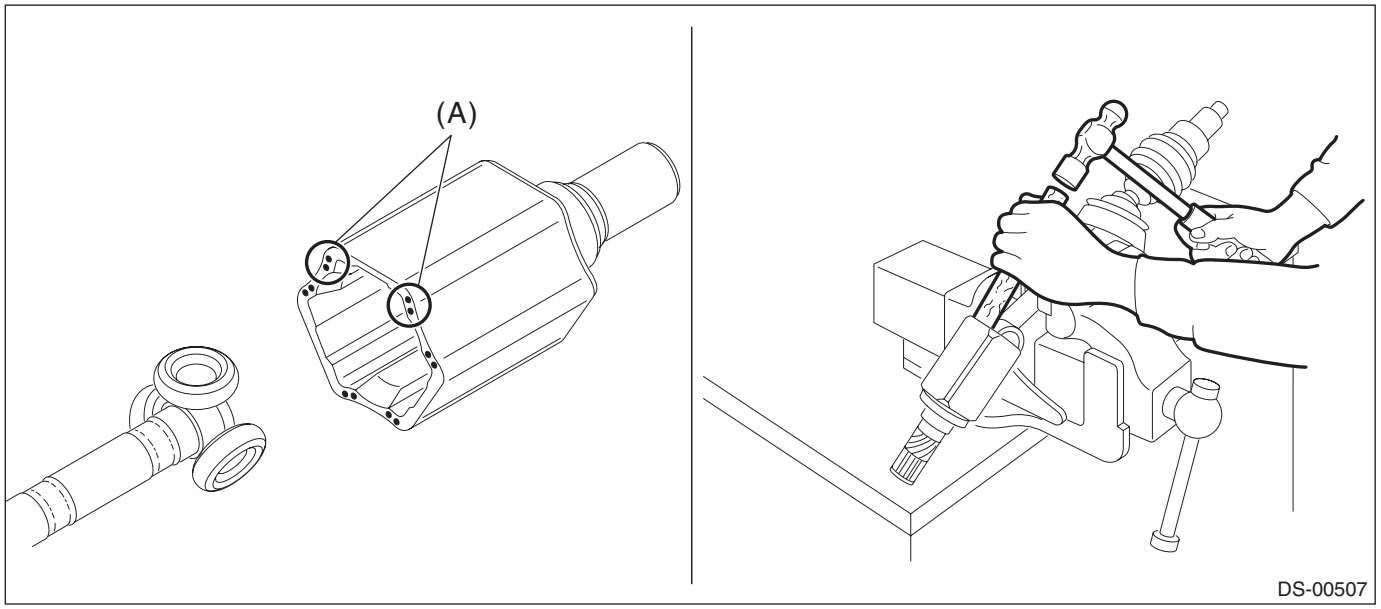
(3) Place the drive shaft between wooden blocks and fix it on a vise.

CAUTION:
Do not set the drive shaft directly on a vise.



(4) Tap the staking are of the outer race alternately with a plastic or wooden bar, and remove one roller at a time.

CAUTION:
- **Tap the staking area (A) of the outer race.**
- **Do not use a metal bar as the outer race may deform.**
- **Be careful not to damage the roller parts.**



(5) Remove the outer race from shaft assembly.

CAUTION:
Make sure to have your associate hold the outer race when removing the third roller to prevent the outer race from falling.

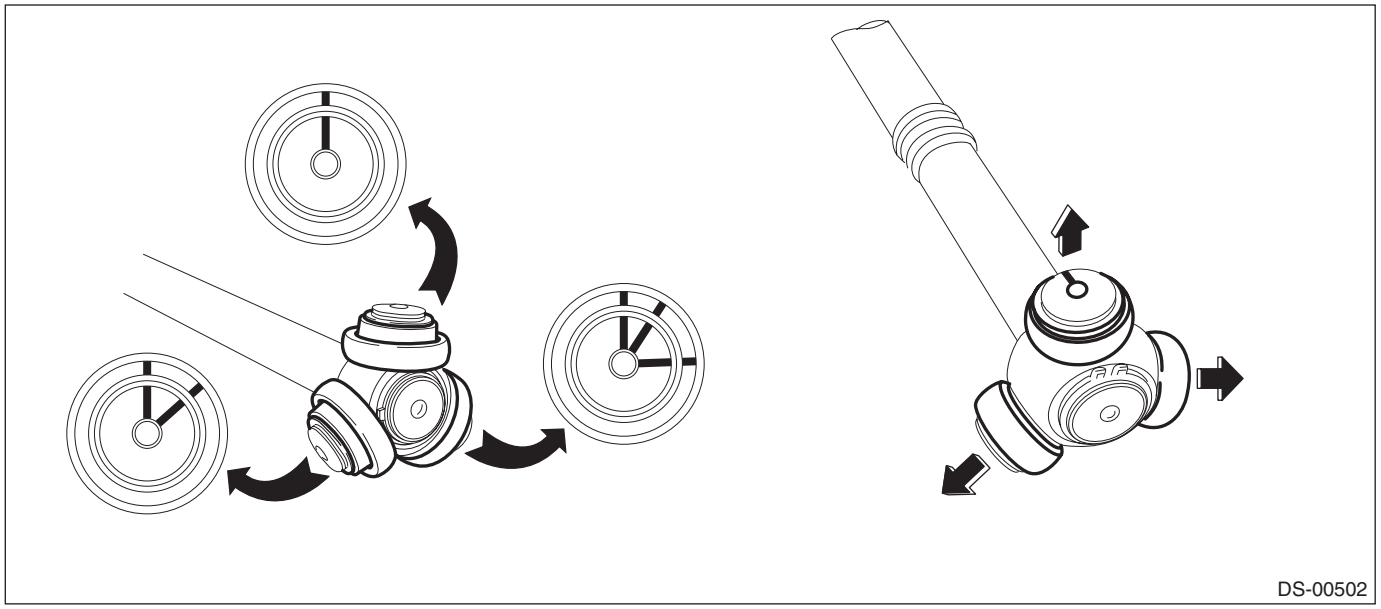
(6) Wipe off grease.

CAUTION:
The grease is a special type of grease. Do not mix with other grease.

2) Remove the roller kit from trunnion.

CAUTION:
Be careful with the roller kit position.

(1) Place alignment marks on the roller kit and trunnion.



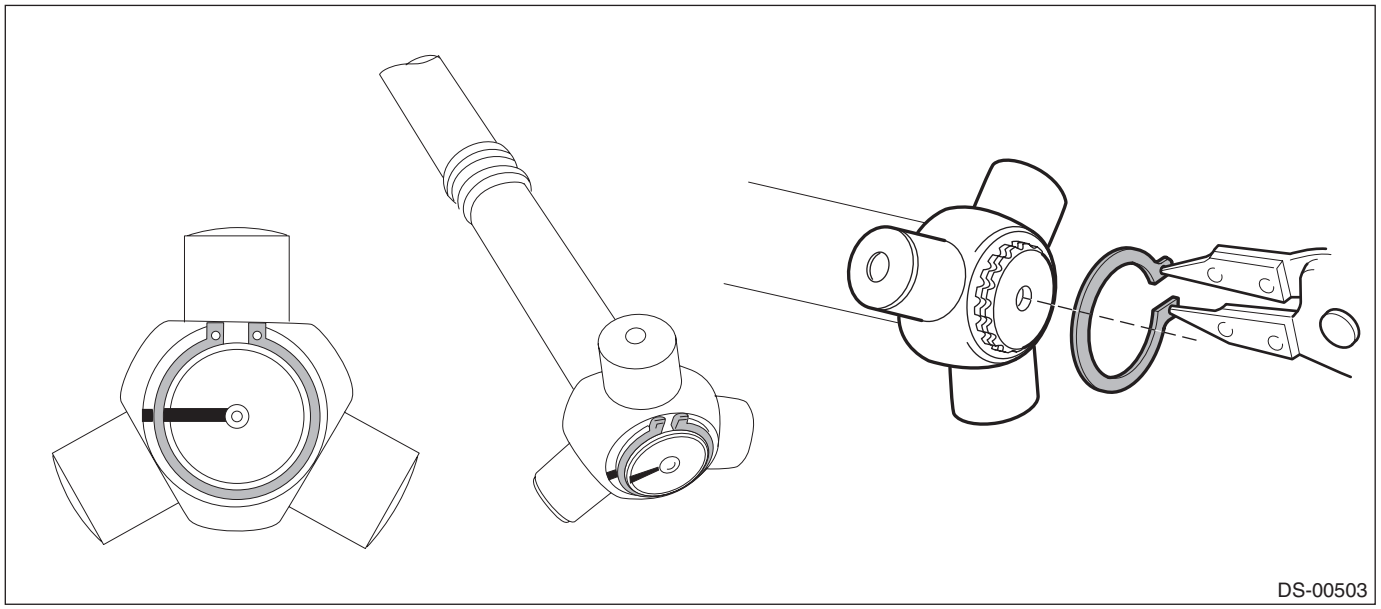
(2) Remove the roller kit from trunnion.

3) Remove the trunnion from the shaft.

(1) Place alignment marks on the trunnion and shaft.

(2) Remove the snap ring and trunnion.

CAUTION:
Be sure to wrap shaft splines with vinyl tape to protect the boot from scratches.

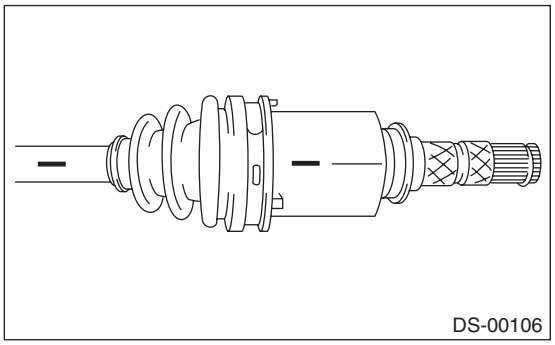


4) Remove the AAR boot.

NOTE:
The AC is a non-disassembly part, so the drive shaft disassembly stops here.

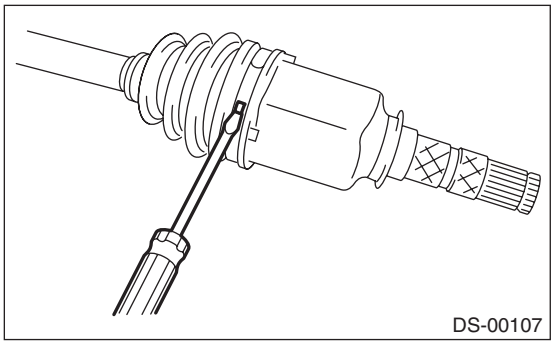
2. EBJ + PTJ TYPE

1) Place alignment marks on the shaft and outer race.

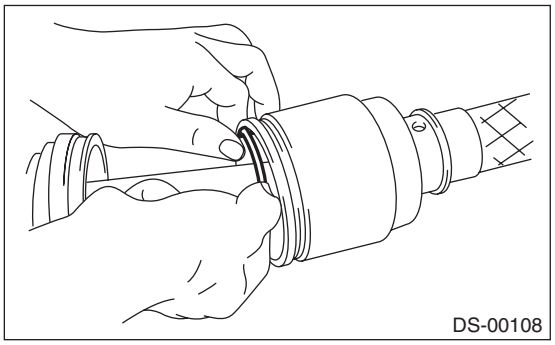


2) Remove the PTJ boot band and boot.

CAUTION:
Be careful not to damage the boot.



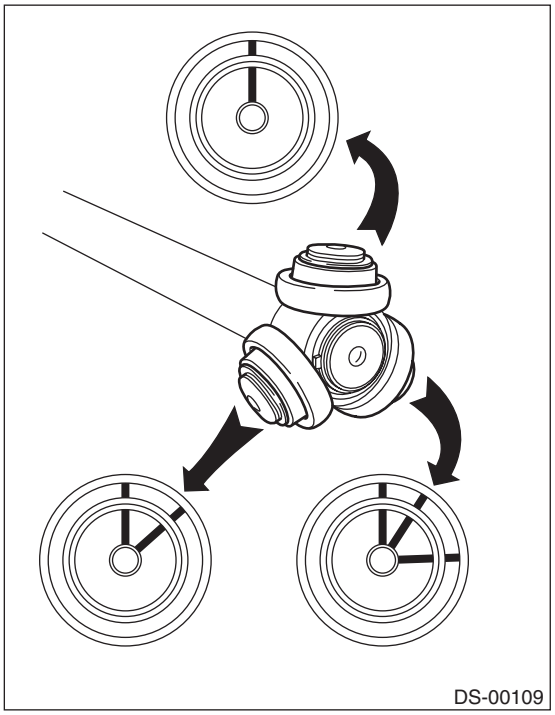
3) Remove the snap ring from PTJ outer race.



4) Remove the PTJ outer race from shaft assembly.
5) Wipe off grease.

CAUTION:
The grease is a special type of grease. Do not mix with other grease.

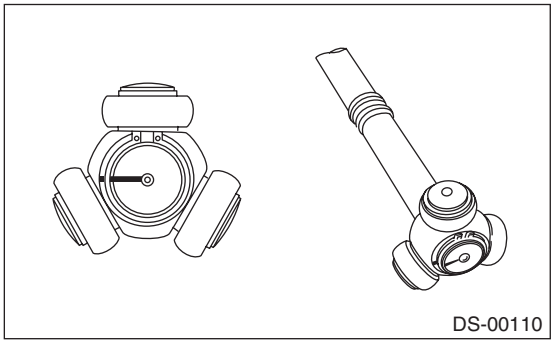
6) Place alignment marks on the roller kit and trunnion.



7) Remove the roller kit from trunnion.

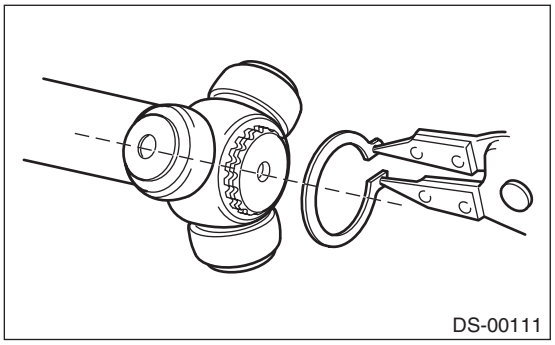
CAUTION:
Be careful with the roller kit position.

8) Place alignment marks on the trunnion and shaft.



9) Remove the snap ring and trunnion.

CAUTION:
Be sure to wrap shaft splines with vinyl tape to protect the boot from scratches.



10) Remove the PTJ boot.

11) Remove the O-ring from the groove of the shaft.

NOTE:
The EBJ is a non-disassembly part, so the axle disassembly stops here.

D: ASSEMBLY

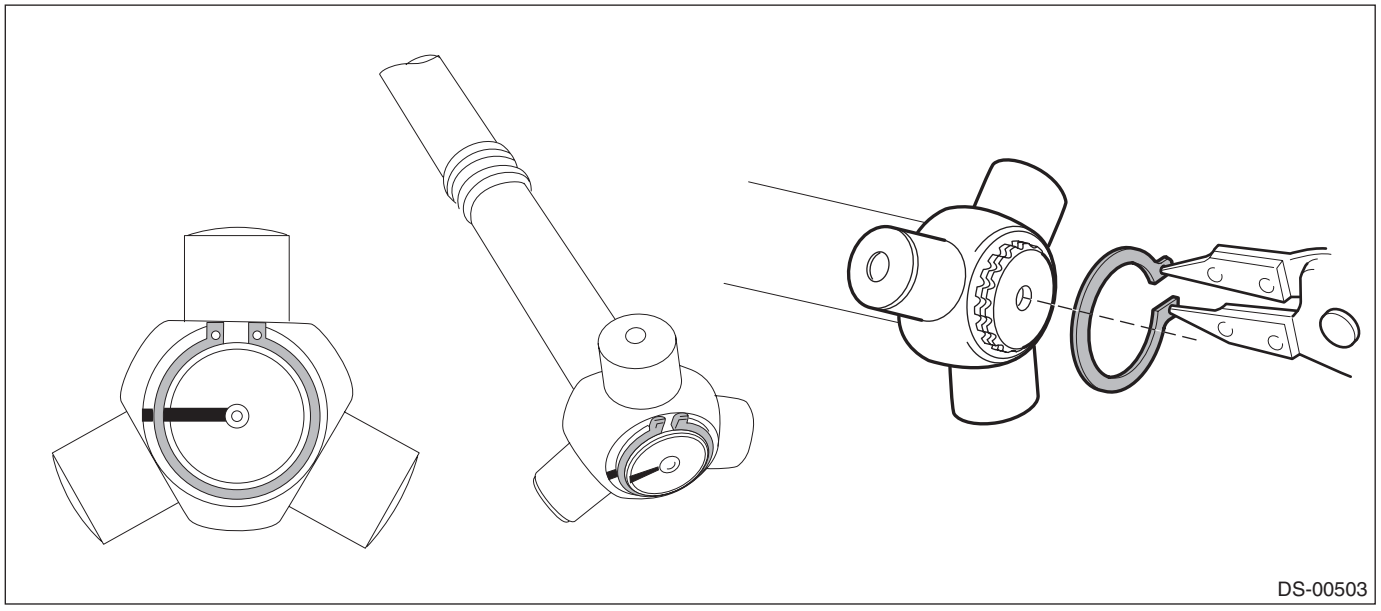
1. AC + AAR TYPE

NOTE:
Use specified grease.

AAR side:
One-Luber C

1) Pass the AAR boot through the shaft.
2) Install the trunnion to the shaft.
   (1) Match the alignment marks, and attach the trunnion onto the shaft.
   (2) Attach the snap ring to the shaft.

CAUTION:
Confirm that the snap ring is completely fitted in the shaft groove.



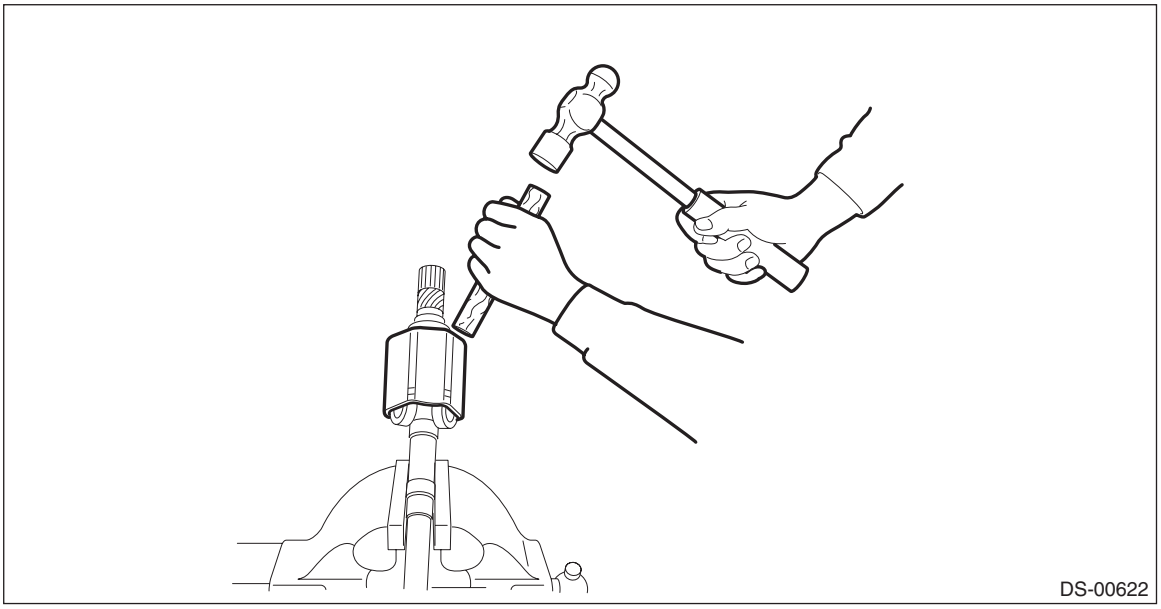
3) Fill 50 to 60 g (1.76 to 2.12 oz) of specified grease into the interior of AAR outer race.
4) Install the trunnion to the roller kit.
   (1) Apply a thin coat of specified grease to the roller kit and trunnion.
   (2) Place the drive shaft between wooden blocks and fix it on a vise.

CAUTION:
Do not set the drive shaft directly on a vise.

5) Align the alignment marks on the shaft and outer race.

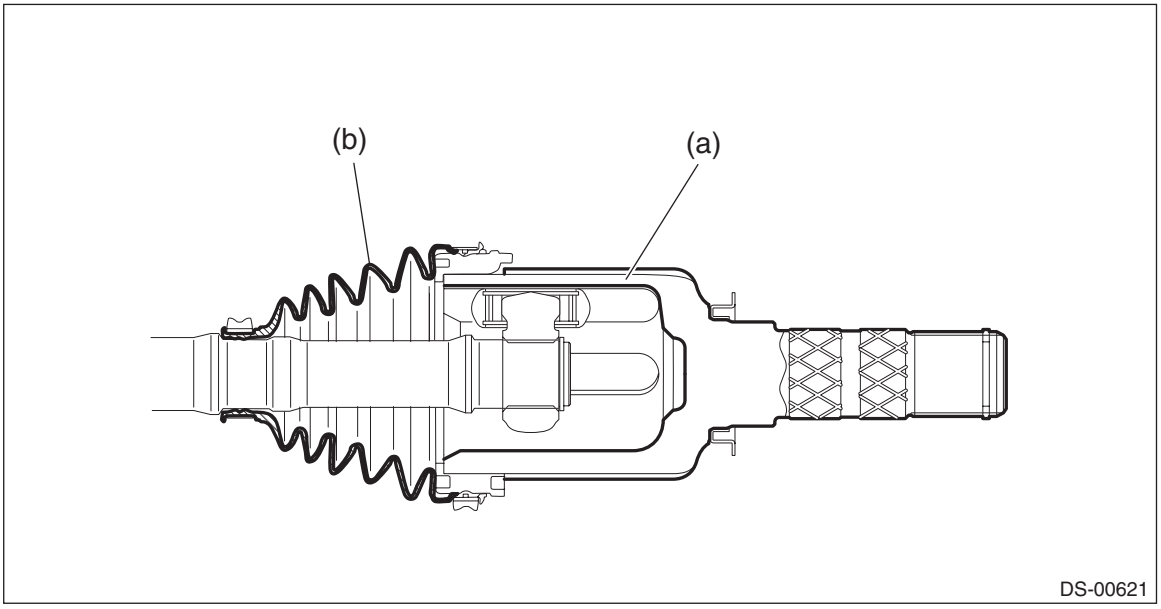
6) Tap the insertion upper part of the outer race alternately using a plastic or wood bar shown in the figure, and then insert the roller one by one.

CAUTION:
- **Do not use a metal bar as the outer race may deform.**
- **Do not tap on the end of outer race (shaft part).**
- **Be careful not to deform the baffle plate.**



7) Apply an even coat of the specified grease 30 to 40 g (1.06 to 1.41 oz) to the entire inner surface of boot.
8) Install the AAR boot taking care not to twist it.

CAUTION:
Do not let grease get on groove of the outer race side.



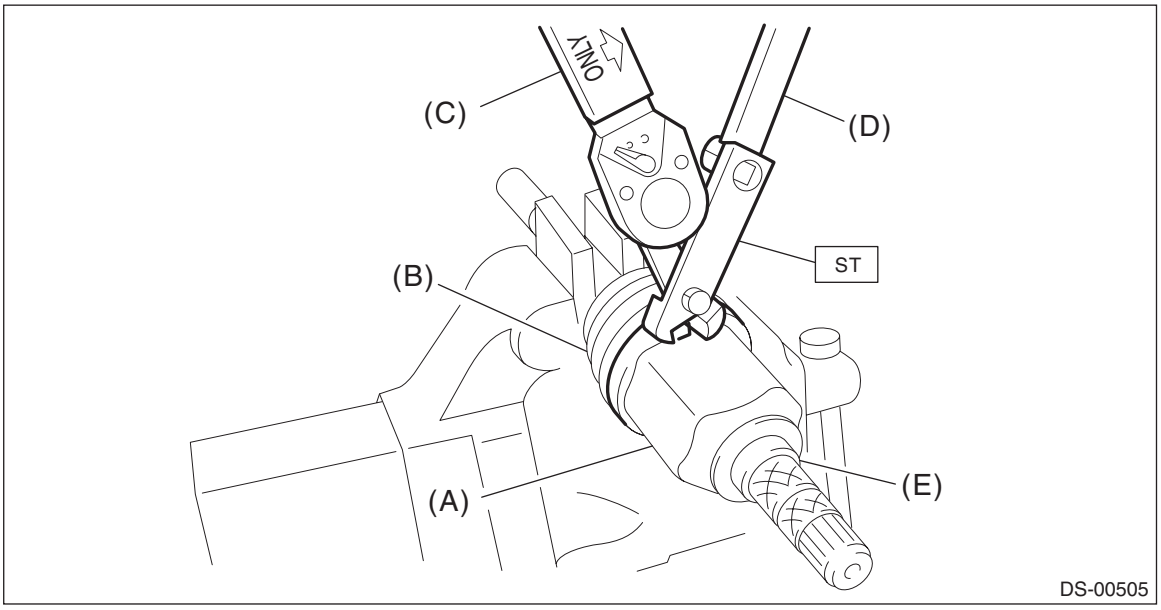
(a) Outer race
(b) Boot

9) Insert a flat tip screwdriver, etc. between outer race and boot to make pressure inside of boot as high as barometric pressure.
10) Tighten the boot band.
(1) Install the new large boot band and small boot band at the required positions.
(2) Connect the torque wrench and socket flex handle to the ST.

Preparation tool:
ST: BOOT BAND PLIERS (28099AC000)
Torque wrench
Socket flex handle
(3) Use a prepared tool, tighten the boot band.

Clearance at the crimped section of the boot band:
Large boot band: 1 mm (0.04 in) or less
Small boot band: 1 mm (0.04 in) or less

Tightening torque:
Large boot band: 178 N·m (18.2 kgf-m, 131.3 ft-lb)
Small boot band: 145 N·m (14.8 kgf-m, 106.9 ft-lb)



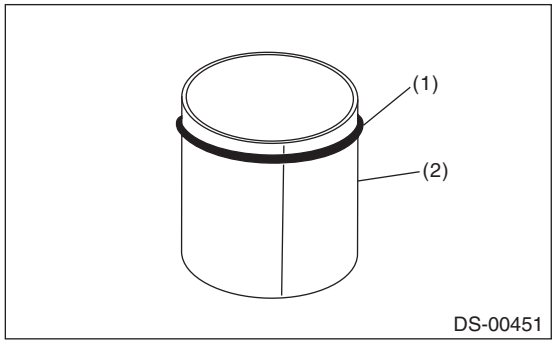
(A) Large boot band
(B) Boot
(C) Torque wrench
(D) Socket flex handle
(E) Outer race

11) Extend and retract the AAR repeatedly to provide an equal coating of grease.

2. EBJ + PTJ TYPE

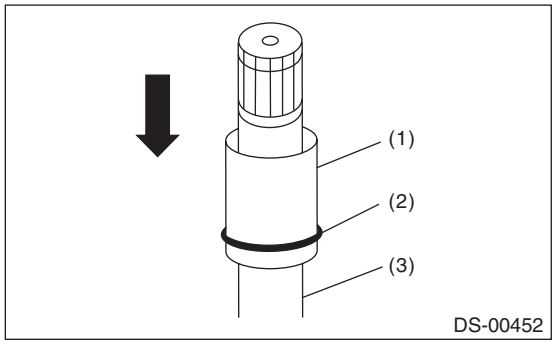
1) Roll up a thick piece of paper to a size where the shaft can pass through, and affix with tape to form a cylinder.
2) Attach a new O-ring on this cylinder.

CAUTION:
- **Always use a new O-ring.**
- **Be careful that the O-ring does not become scratched and that there are no foreign objects attached to it.**
- **Make sure to install the O-ring so that it does not twist as much as possible.**
- **Do not stretch the O-ring to 30 mm (1.18 in) inner diameter or more.**



(1) O-ring
(2) Cylinder made with thick paper, etc.

3) Pass the cylinder material onto the shaft, and slide in the direction of the shaft axis.

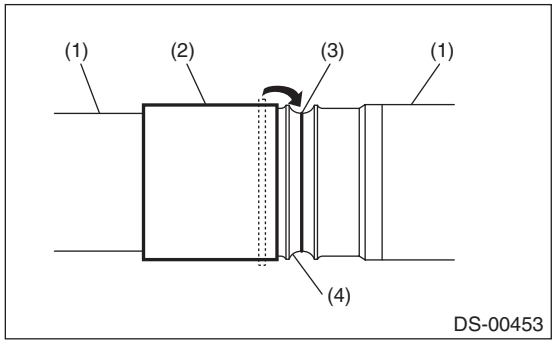


(1) Cylinder material
(2) O-ring
(3) Shaft

4) Clean the shaft boot groove, and wipe off the grease.

5) Slide the cylinder material near the shaft boot groove, and move the O-ring from the cylinder material onto the shaft boot groove.

CAUTION:
- **Attach the O-ring to the shaft boot groove center.**
- **Be careful that the O-ring does not become scratched and that there are no foreign objects attached to it.**
- **Make sure to install the O-ring so that it does not twist as much as possible.**
- **With the O-ring attached, do not wash with kerosene, gasoline, etc.**

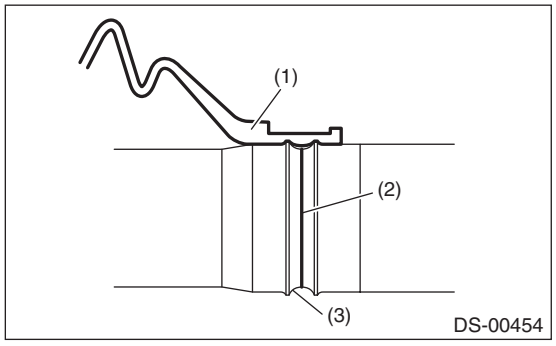


(1) Shaft
(2) Cylinder material
(3) O-ring
(4) Boot groove

6) Pass the PTJ small diameter boot band through the shaft.
7) Wrap vinyl tape around the splines of the shaft.

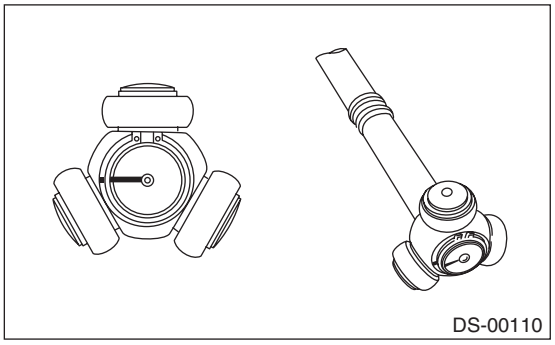
CAUTION:
To prevent damage to the boots, make sure to always wrap with vinyl tape for protection.
8) Install a new PTJ boot.

CAUTION:
Make sure to fit securely on the boot groove of the shaft.



(1) PTJ boot
(2) O-ring
(3) Boot groove

9) Match the alignment marks, and attach the trunnion onto the shaft.



10) Attach the snap ring to the shaft.

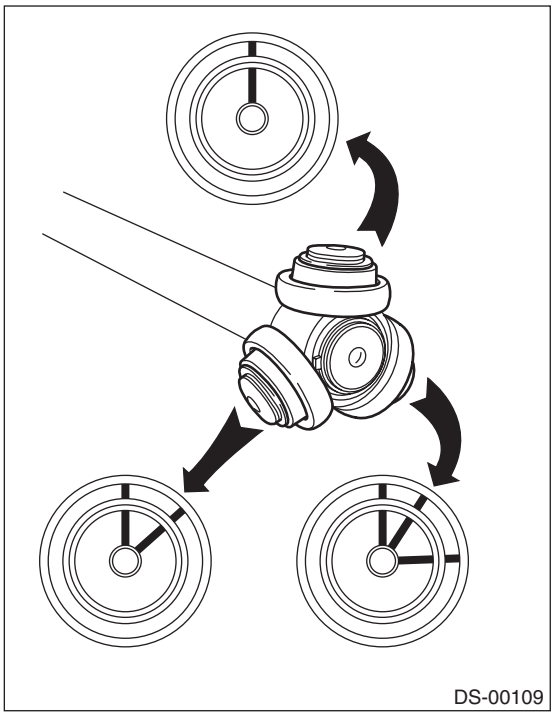
CAUTION:
Confirm that the snap ring is completely fitted in the shaft groove.

11) Fill 100 to 110 g (3.53 to 3.88 oz) of specified grease into the interior of the PTJ outer race.

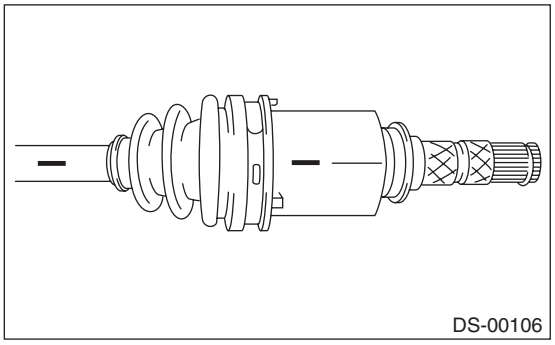
Grease:
NKG302

12) Apply a thin coat of specified grease to the roller kit and trunnion.
13) Match the alignment marks of the roller kit and trunnion, and attach the roller kit.

CAUTION:
Be careful with the roller kit position.



14) Match the alignment marks of the shaft and outer race, and attach the outer race.



15) Install the snap ring in the groove of the PTJ outer race.

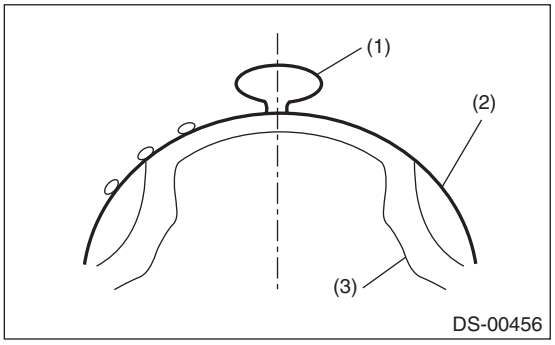
CAUTION:
Pull the shaft lightly and make sure that the snap ring is completely fitted in the groove.

16) Apply an even coat of the specified grease 30 to 40 g (1.06 to 1.41 oz) to the entire inner surface of boot.
17) Attach the PTJ boot taking care not to twist it.

CAUTION:
• Clean the large end of PTJ boot and the boot groove well, and remove the grease and other substances.
• When installing the PTJ boot, position the outer race of the PTJ at center of the stroke.

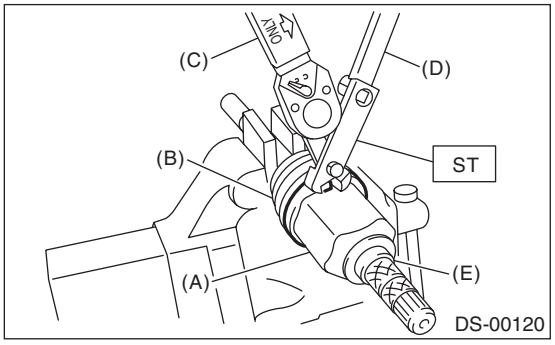
18) Set the new boot band at the specified position.
19) Tighten the boot bands using ST, torque wrench and socket flex handle.

CAUTION:
The large boot band is to be tightened so that the omega shaped part is at the position indicated in the figure below.



(1) Omega shaped part
(2) Boot band
(3) Outer race

Tightening torque:
Large boot band
178 N·m (18.2 kgf-m, 131.3 ft-lb)
Small boot band
145 N·m (14.8 kgf-m, 106.9 ft-lb)
ST 28099AC000 BOOT BAND PLIERS



(A) Large boot band
(B) Boot
(C) Torque wrench
(D) Socket flex handle
(E) Outer race

20) Extend and retract the PTJ repeatedly so that grease is spread evenly.

E: INSPECTION

Check the removed parts for damage, wear, corrosion etc. If faulty, repair or replace.
- **AAR and AC:**

Check for seizure, corrosion, damage, wear and excessive play.
- **PTJ (Pillow Tripod Joint):**

Check for seizure, corrosion, damage, wear and excessive play.
- **EBJ (High-Efficiency Compact Ball fixed Joint):**

Check for seizure, corrosion, damage and excessive play.
- **Shaft:**

Check for excessive bending, twisting, damage and wear.
- **Boot:**

Check for wear, warping, breakage and scratches.
- **Grease:**

Check for discoloration and fluidity.

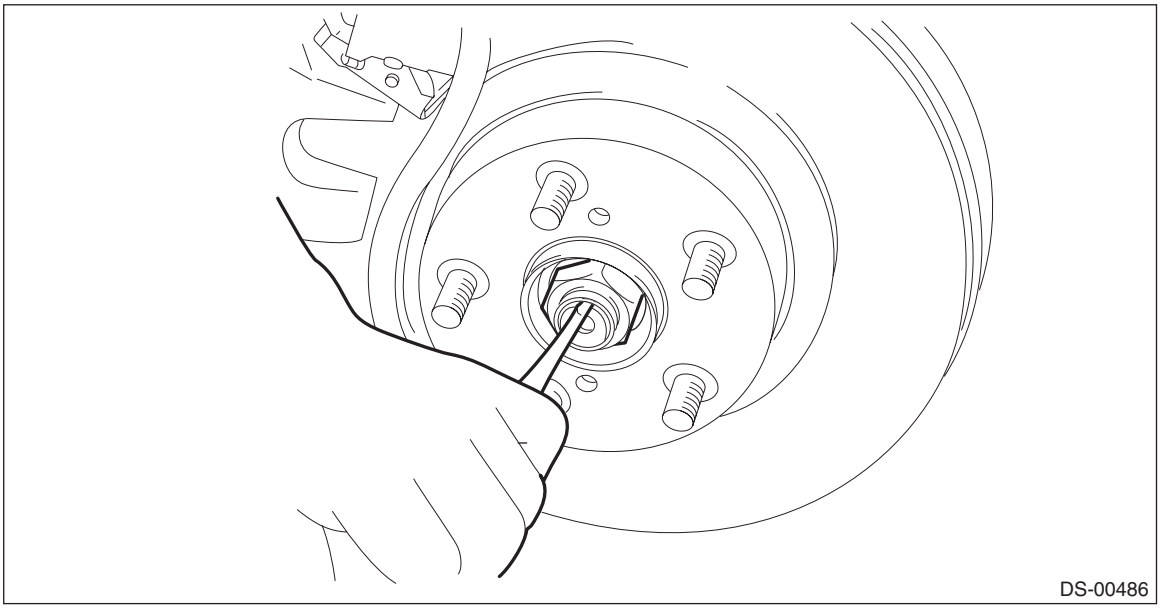
8. Rear Drive Shaft

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle, and then remove the rear wheels.
3) Remove the nut - axle.

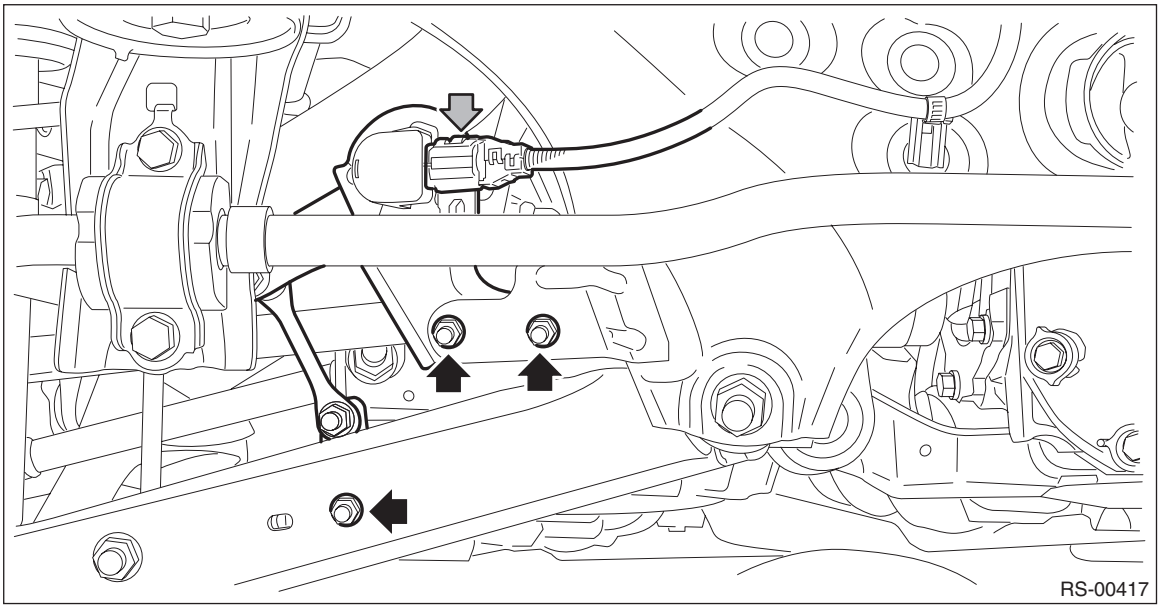
CAUTION:
Do not loosen the nut - axle while the rear axle is loaded. Doing so may damage the hub unit COMPL.
(1) Lift the crimped section of the nut - axle.
(2) Remove the nut - axle using a socket wrench while depressing the brake pedal.



4) Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler)

CAUTION:
Do not apply impact to the sensor assembly - headlight beam leveler or forcibly move the arm. Doing so may cause sensor damage and malfunction.

(1) Disconnect the connector of the sensor assembly - headlight beam leveler.
(2) Remove the nuts, and remove the sensor assembly - headlight beam leveler.

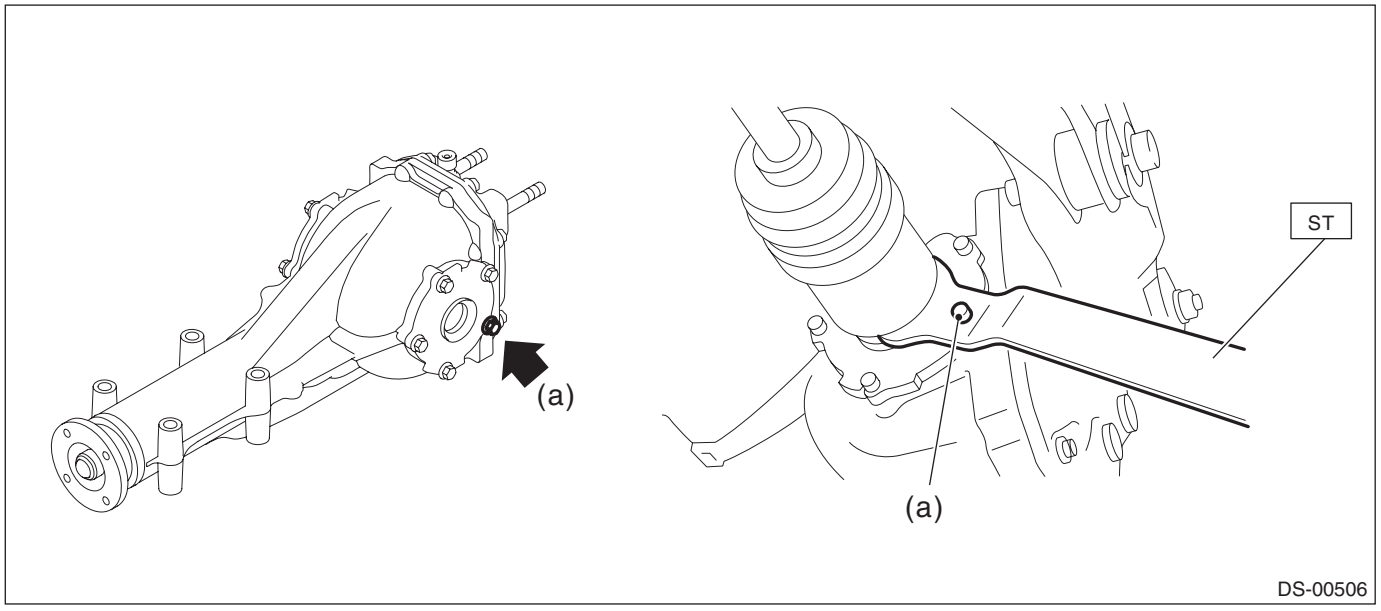


5) Drain differential gear oil.
6) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
7) Loosen the joint of rear differential assembly and rear drive shaft assembly.

- T type: Pull out the rear drive shaft assembly by fitting the ST to the bolt (a) as shown in the figure.

CAUTION:
Fit the ST to the bolts as shown in the figure to prevent damage of the side bearing retainer.

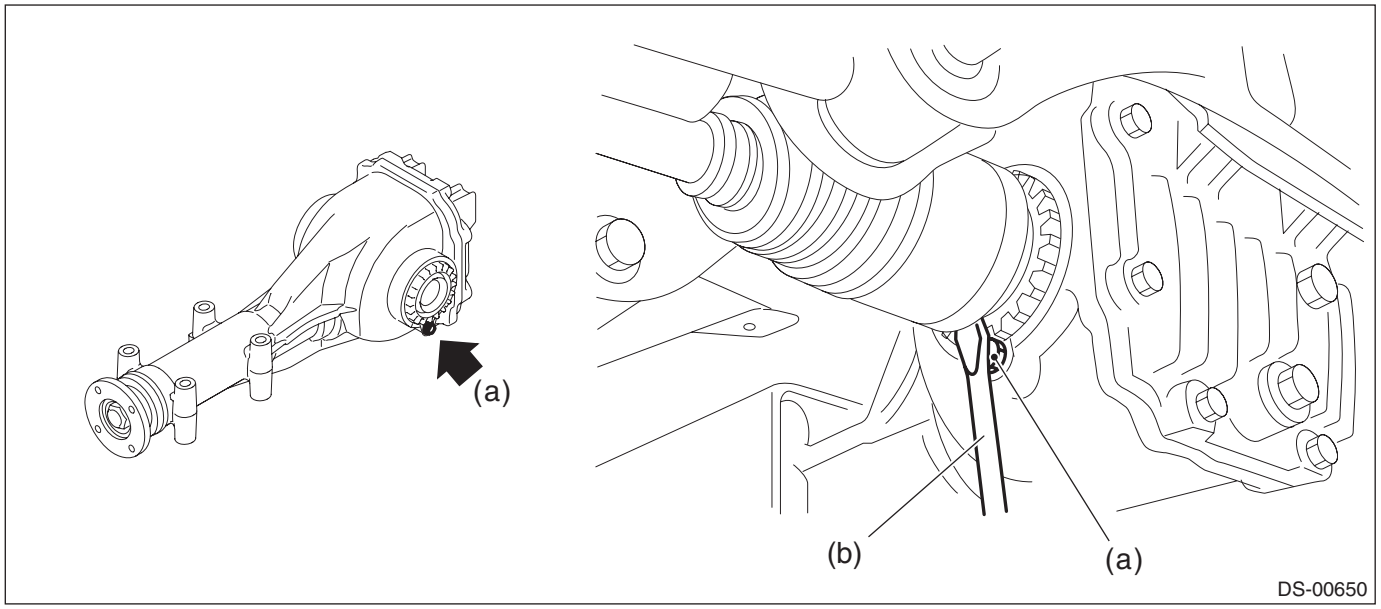
Preparation tool:
ST: DRIVE SHAFT REMOVER (28099PA100)



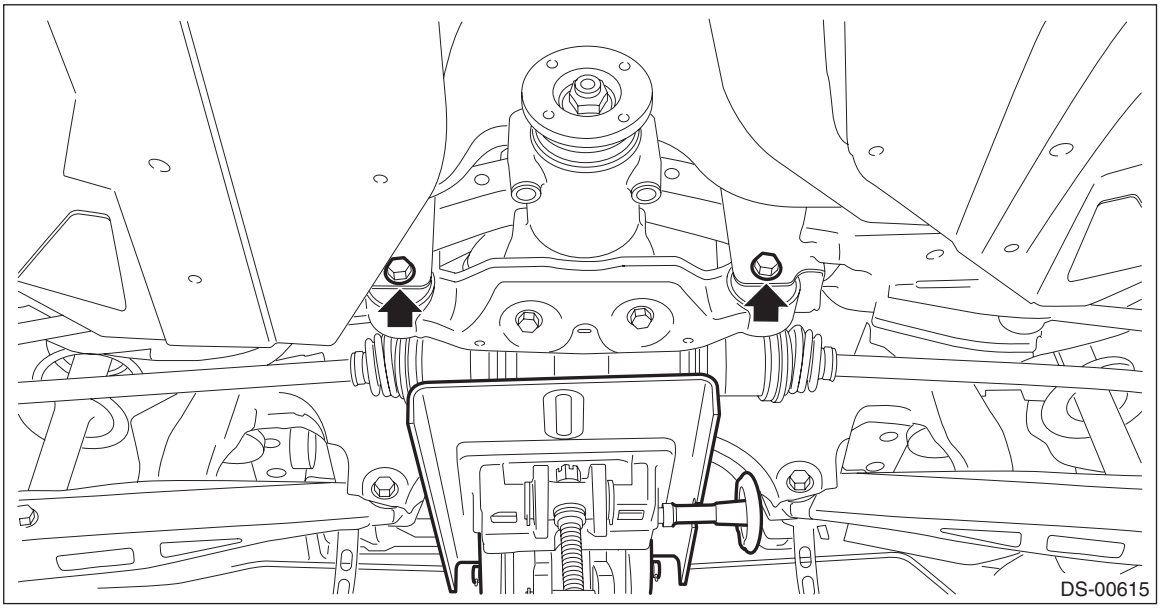
• VA type: Pull out the rear drive shaft assembly by fitting the tire lever (b) to the bolt (a) as shown in the figure.

CAUTION:
To prevent damage to the side bearing retainer, use by placing the tire lever against the bolt as shown in the figure.

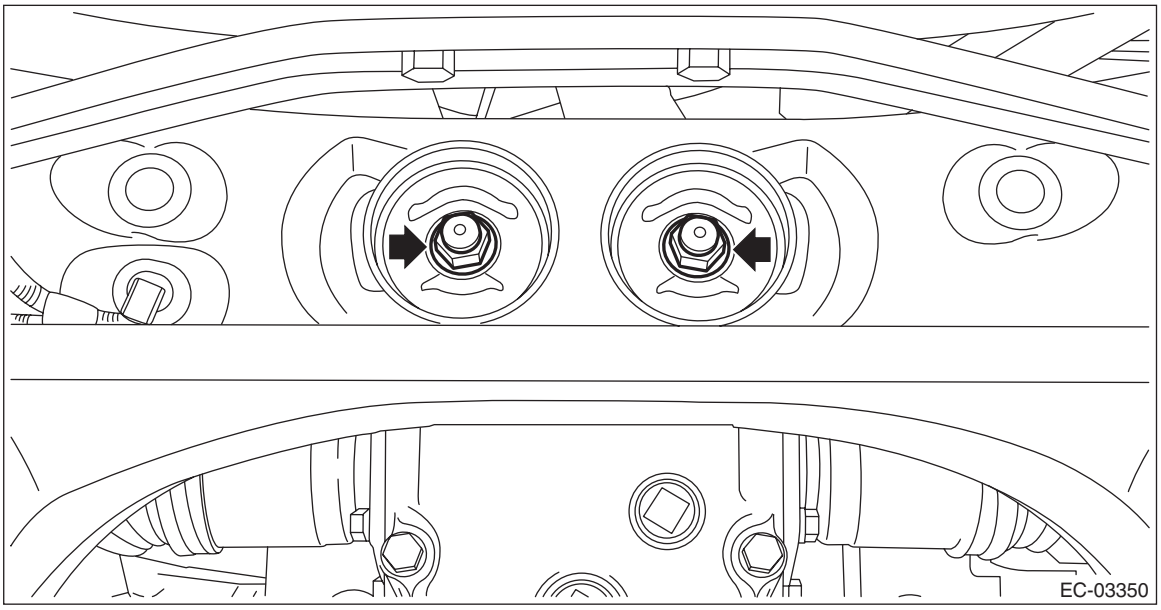
Preparation tool:
Tire lever



8) Remove the installation section of rear differential assembly.
(1) Support the rear differential assembly with a transmission jack.
(2) Remove the bolts which hold the rear differential front crossmember from the rear sub frame assembly.

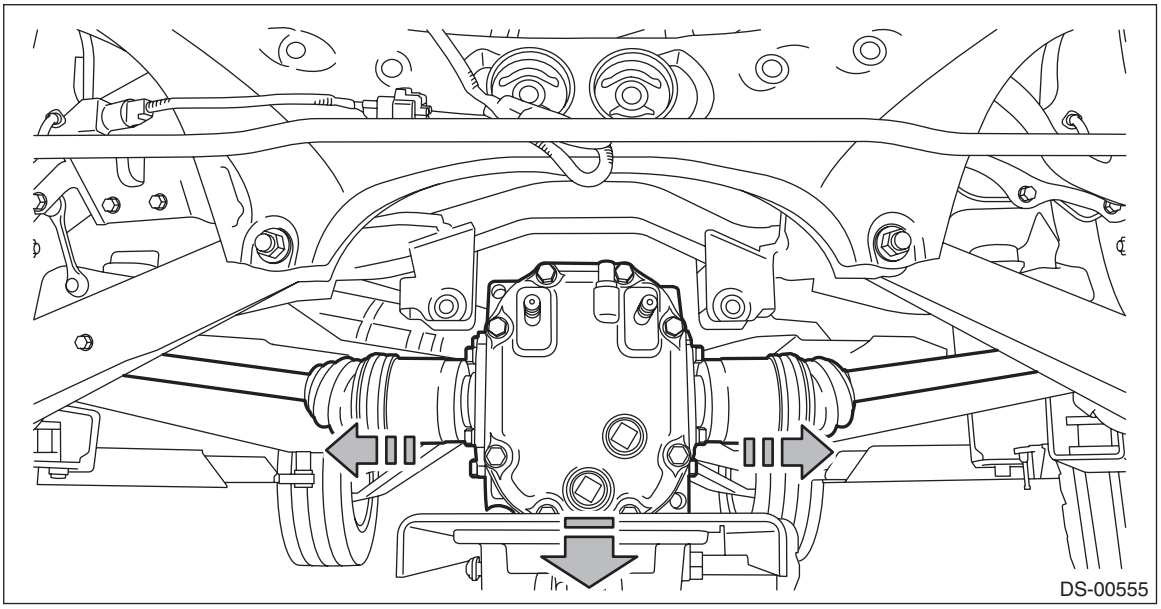


(3) Remove the self-locking nuts which hold the rear differential to the rear sub frame assembly.



9) Completely pull out the rear drive shaft assembly while lowering the rear differential.

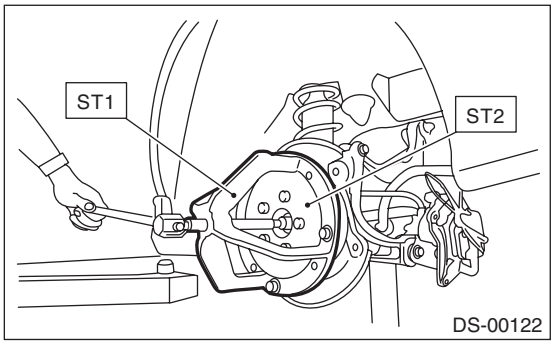
CAUTION:
Pay attention to avoid damaging the boot of drive shaft.



10) Remove the rear drive shaft assembly from the housing assembly - rear axle.

NOTE:
If it is hard to remove, use the ST.

Preparation tool:
ST1: AXLE SHAFT PULLER (926470000)
ST2: AXLE SHAFT PULLER PLATE (28099PA110)

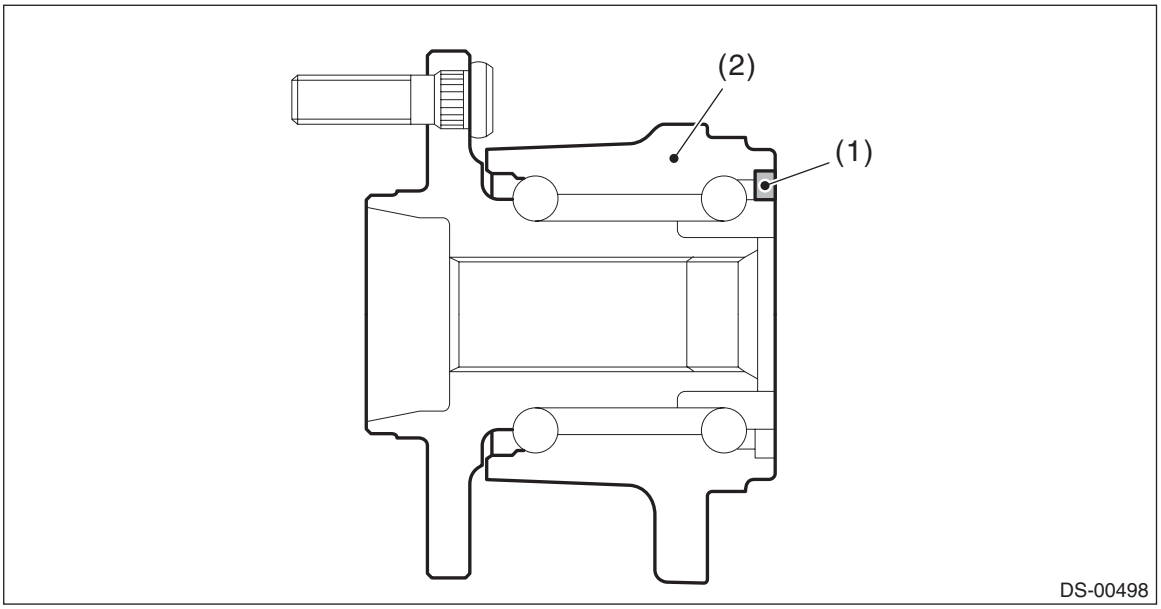


B: INSTALLATION

1) Replace the rear differential side oil seal. <Ref. to DI-61, REPLACEMENT, Rear Differential Side Oil Seal.>

NOTE:
After pulling out the drive shaft assembly, be sure to replace with a new oil seal.
2) Insert the drive shaft assembly into the rear hub spline, and pull it into the specified position.

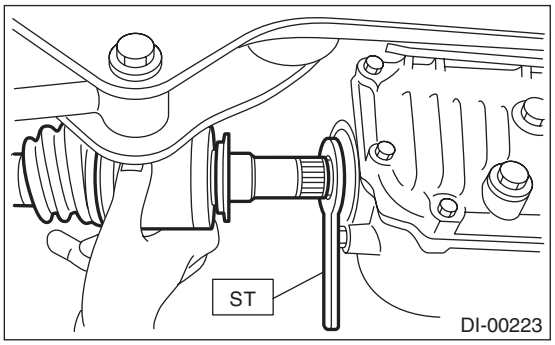
CAUTION:
- **Be careful not to damage the magnetic encoder.**
- **Do not get closer the tool which charged magnetism to magnetic encoder.**
- **Do not hammer the drive shaft assembly when installing.**



(1) Magnetic encoder
(2) Hub unit COMPL - rear axle

3) Temporarily tighten the nut - axle.
4) Using the ST, install the rear drive shaft assembly to the rear differential.

Preparation tool:
ST: OIL SEAL PROTECTOR (28099PA090)



5) Install the rear differential assembly to the rear sub frame assembly.

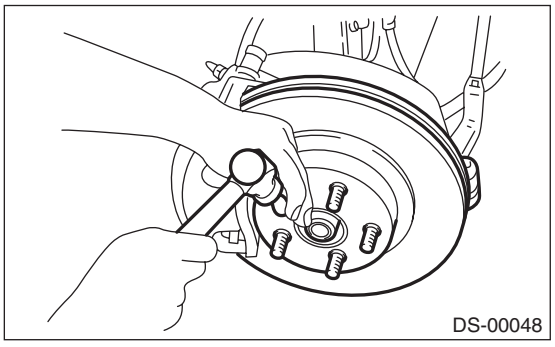
CAUTION:
Be sure to use a new self-locking nut.

Tightening torque:
Differential assembly — bushing - differential: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
Differential assembly — rear sub frame assembly: 110 N·m (11.2 kgf-m, 81.1 ft-lb)
6) Install the sensor assembly - headlight beam leveler.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
7) While pressing the brake pedal, tighten the new axle nuts to the specified torque.

CAUTION:
Do not load the rear axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:
190 N·m (19.4 kgf-m, 140.1 ft-lb)
8) Lock the nut - axle securely.



9) Fill differential gear oil.
10) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.2 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.2 kgf-m, 73.8 ft-lb)
11) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

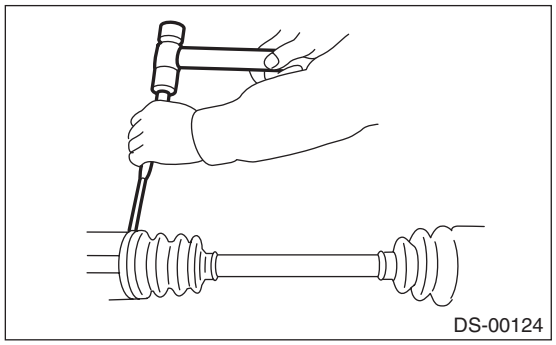
C: DISASSEMBLY

1) Take out the DOJ outer race from the shaft assembly.

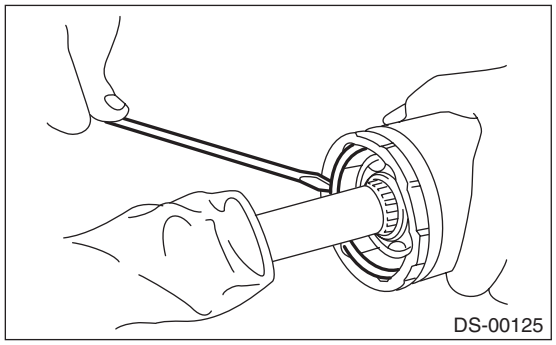
CAUTION:
Be careful not to damage the boot.

(1) Using a flat tip screwdriver or pliers, loosen the boot band on the large end of DOJ boot.

CAUTION:
Be careful not to damage the boot.



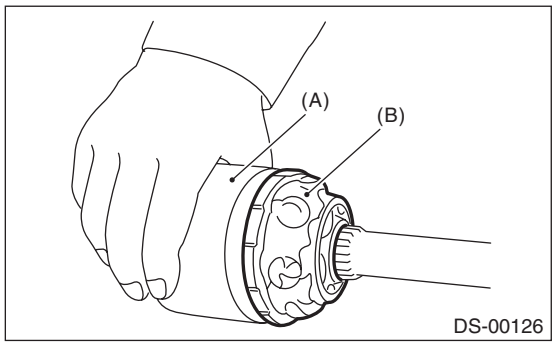
(2) Remove the boot band on the small end of DOJ boot in the same manner.
(3) Remove the large end of DOJ boot from DOJ outer race.
(4) Remove the round snap ring at the neck of DOJ outer race with a flat tip screwdriver.



(5) Take out the DOJ outer race from the shaft assembly.
(6) Wipe off the grease and take out the ball bearings.

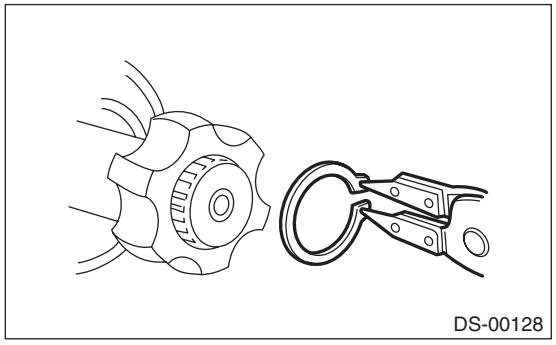
CAUTION:
The grease is a special grease (grease for constant velocity joints). Do not mix with other greases.

NOTE:
Disassemble the parts taking care not to lose balls.



(A) Outer race
(B) Grease

2) Remove the cage from the inner race.
(1) Turn the cage by a half pitch to the track groove of inner race and shift the cage.
(2) Using pliers, remove the snap ring fixing the inner race to the shaft.



(3) Take out the DOJ inner race.
(4) Take off the DOJ cage from shaft and remove the DOJ boot.

CAUTION:
Wrap shaft splines with vinyl tape to protect the boot from scratches.

3) Remove the BJ boot or EBJ boot in the same procedure as the DOJ boot.

NOTE:
The BJ is a non-disassembly part, so the drive shaft disassembly stops here.

D: ASSEMBLY

1. MT MODEL EXCEPT FOR CROSSTREK MODEL AND CROSSTREK MODEL

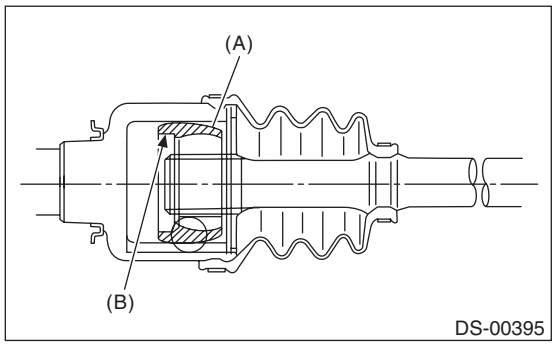
CAUTION:
Wrap shaft splines with vinyl tape to protect the boot from scratches.

NOTE:
Use specified grease.

Grease:
BJ, EBJ side: NKG814
DOJ side: NKG814

1) Install the DOJ inner race to the shaft.
(1) Install the BJ or EBJ boot to the specified position, and fill it with 50 to 60 g (1.76 to 2.12 oz) of specified grease.
(2) Place the DOJ boot at the center of shaft.
(3) Insert the DOJ cage onto shaft.

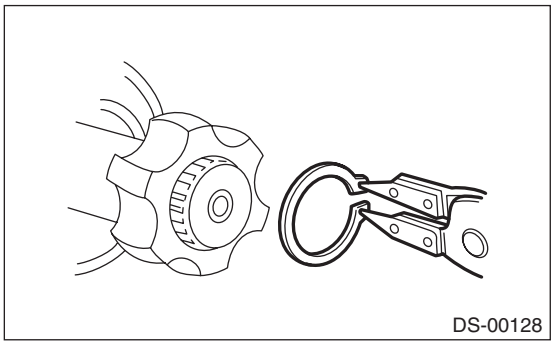
NOTE:
Insert the cage with the cutout portion facing the shaft end, since the cage has an orientation.



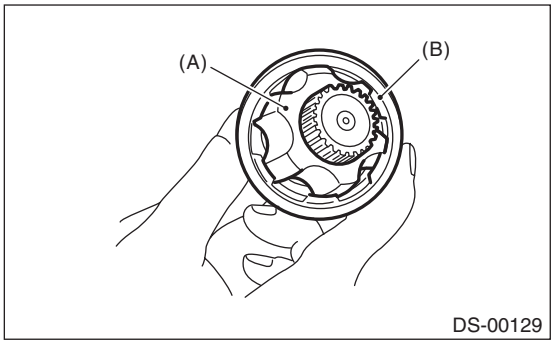
(A) Cage
(B) Cutout portion

(4) Install the DOJ inner race on shaft and fix the snap ring in place with pliers.

NOTE:
Confirm that the snap ring is completely fitted in the shaft groove.


DS-00128

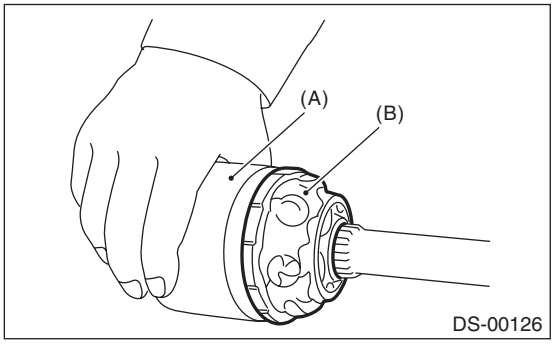
2) Install the cage to the inner race.
(1) Install the cage (B) with the protruding section aligned with the track on the inner race (A), and turn by a half pitch.



DS-00129

(2) Fill 80 to 90 g (2.82 to 3.17 oz) of specified grease into the inner side of the DOJ outer race.
(3) Apply a thin coat of specified grease to the cage pocket and ball.
(4) Insert the ball bearings into the cage pocket.

3) Connect the shaft assembly to the outer race.
(1) Align the outer race track and ball positions, and place the shaft, inner race, cage and ball bearings in the original positions, and then fix outer race in place.



DS-00126

(A) Outer race
(B) Grease

(2) Install the snap ring in the groove on the DOJ outer race.

CAUTION:
Be careful of the following items during installation:
- **Make sure that the balls, cage and inner race are completely fitted in the outer race of DOJ.**
- **Use care not to place the matched position of snap ring in the ball groove of outer race.**
- **Pull the shaft lightly and assure that the circlip is completely fitted in the groove.**

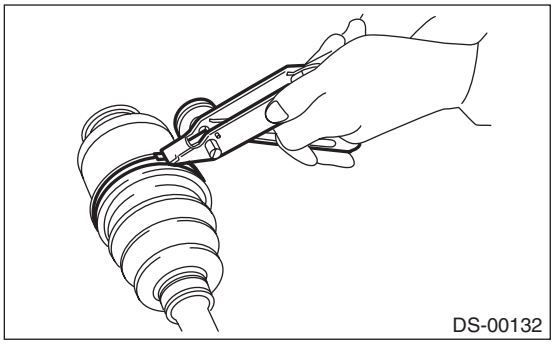
(3) Apply an even coat of the specified grease [20 to 30 g (0.71 to 1.06 oz)] to the entire inner surface of boot. Also apply grease to the shaft.
(4) Install the DOJ boot taking care not to twist it.

NOTE:
• The inside of the large end of DOJ boot and the boot groove shall be cleaned so as to be free from grease and other substances.
• When installing the DOJ boot, position the outer race of DOJ at center of the stroke.
(5) Put a new band through the clip and wind twice in the band groove of the boot.
(6) Pinch the end of band with pliers. Hold the clip and tighten securely.

NOTE:
When tightening boot, use care so that the air within the boot is appropriate.
(7) Tighten the band using the ST.

NOTE:
Tighten the band until it cannot be moved by hand.

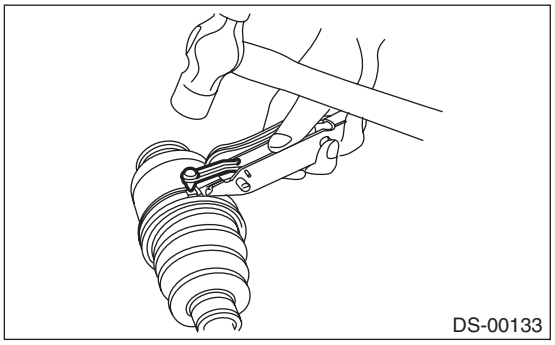
Preparation tool:
ST: BAND TIGHTENING TOOL (925091000)



(8) Tap the clip with the punch provided at the end of the ST.

NOTE:
Tap to an extent that the boot underneath is not damaged.

Preparation tool:
ST: BAND TIGHTENING TOOL (925091000)



(9) Cut off the band with an allowance of about 10 mm (0.39 in) left from the clip and bend this allowance over the clip.

CAUTION:
Make sure that the end of the band is in close contact with clip.
4) Extend and retract the DOJ repeatedly to provide an equal coating of grease.

2. CVT MODEL EXCEPT FOR CROSSTREK MODEL

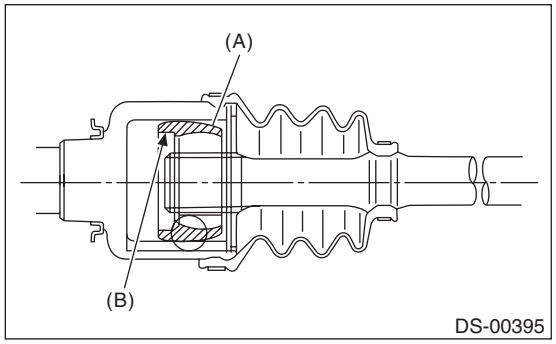
CAUTION:
Wrap shaft splines with vinyl tape to protect the boot from scratches.

NOTE:
Use specified grease.

Grease:
BJ side: Raremax LF-G
DOJ side: Raremax LF-G

1) Install the DOJ inner race to the shaft.
   (1) Install the BJ boot to the specified position, and fill it with 50 to 60 g (1.76 to 2.12 oz) of specified grease.
   (2) Place the DOJ boot at the center of shaft.
   (3) Insert the DOJ cage onto shaft.

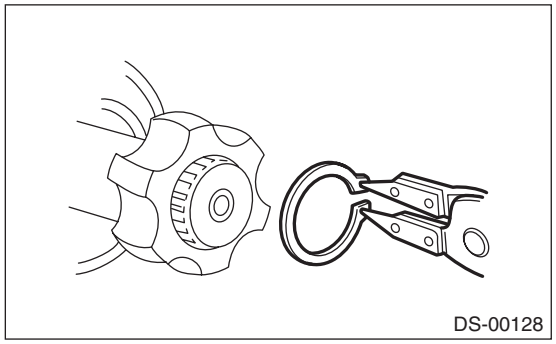
NOTE:
Insert the cage with the cutout portion facing the shaft end, since the cage has an orientation.



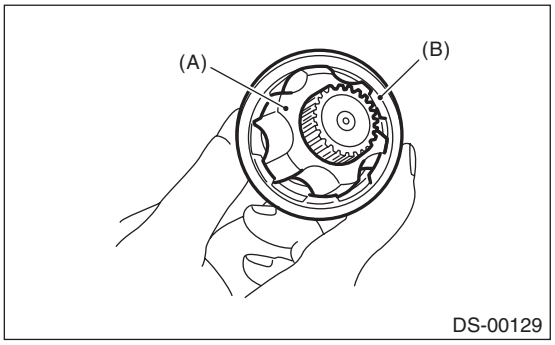
(A) Cage
(B) Cutout portion

   (4) Install the DOJ inner race on shaft and fix the snap ring in place with pliers.

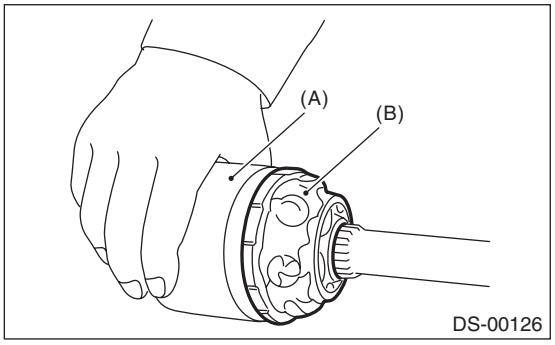
NOTE:
Confirm that the snap ring is completely fitted in the shaft groove.



2) Install the cage to the inner race.
(1) Install the cage (B) with the protruding section aligned with the track on the inner race (A), and turn by a half pitch.



(2) Fill 80 to 90 g (2.82 to 3.17 oz) of specified grease into the inner side of the DOJ outer race.
(3) Apply a thin coat of specified grease to the cage pocket and ball.
(4) Insert the ball bearings into the cage pocket.
3) Connect the shaft assembly to the outer race.
(1) Align the outer race track and ball positions, and place the shaft, inner race, cage and ball bearings in the original positions, and then fix outer race in place.



(A) Outer race
(B) Grease

(2) Install the snap ring in the groove on the DOJ outer race.

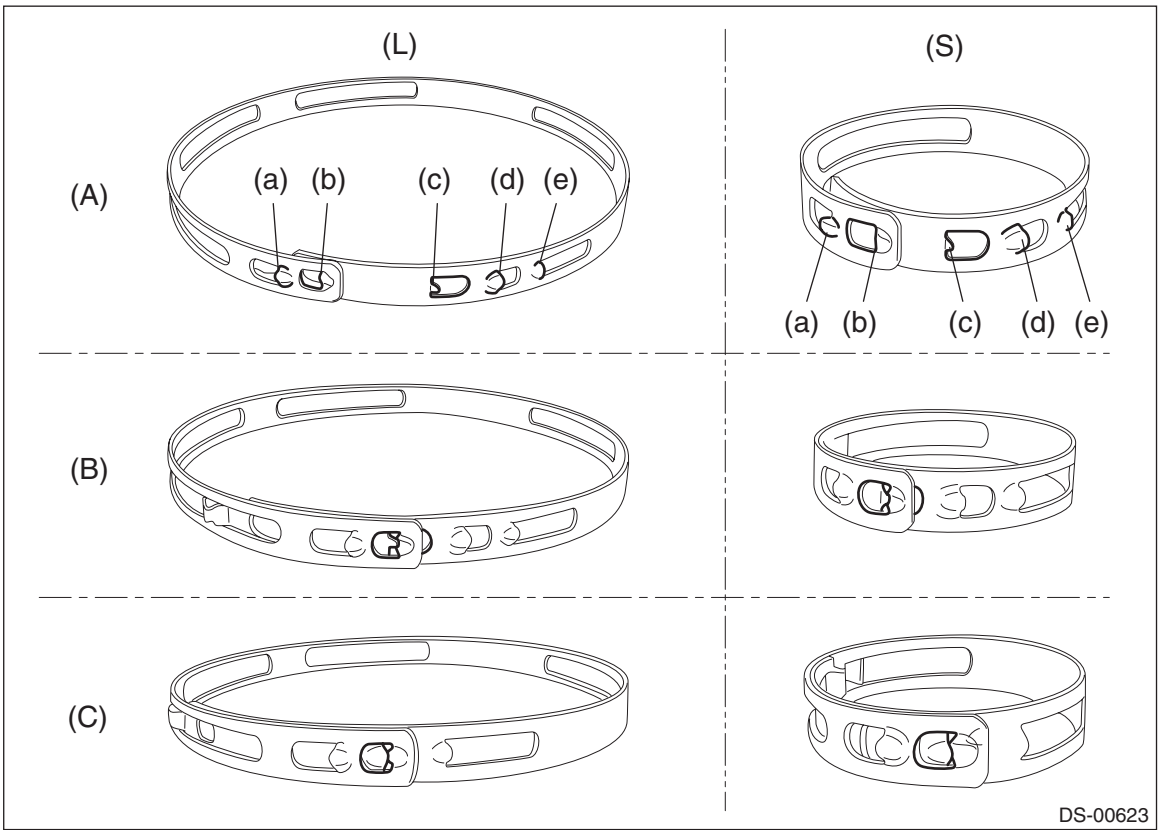
CAUTION:
Be careful of the following items during installation:
- **Make sure that the balls, cage and inner race are completely fitted in the outer race of DOJ.**
- **Use care not to place the matched position of snap ring in the ball groove of outer race.**
- **Pull the shaft lightly and assure that the circlip is completely fitted in the groove.**

(3) Apply an even coat of the specified grease [20 to 30 g (0.71 to 1.06 oz)] to the entire inner surface of boot. Also apply grease to the shaft.
(4) Install the DOJ boot and BJ boot taking care not to twist it.

NOTE:
- The inside of the large end of DOJ boot and the boot groove shall be cleaned so as to be free from grease and other substances.
- When installing the DOJ boot, position the outer race of DOJ at center of the stroke.

(5) Prepare a new band, pinch (a) and (e) of the band with needle nose pliers, and align it with the groove of the boot.

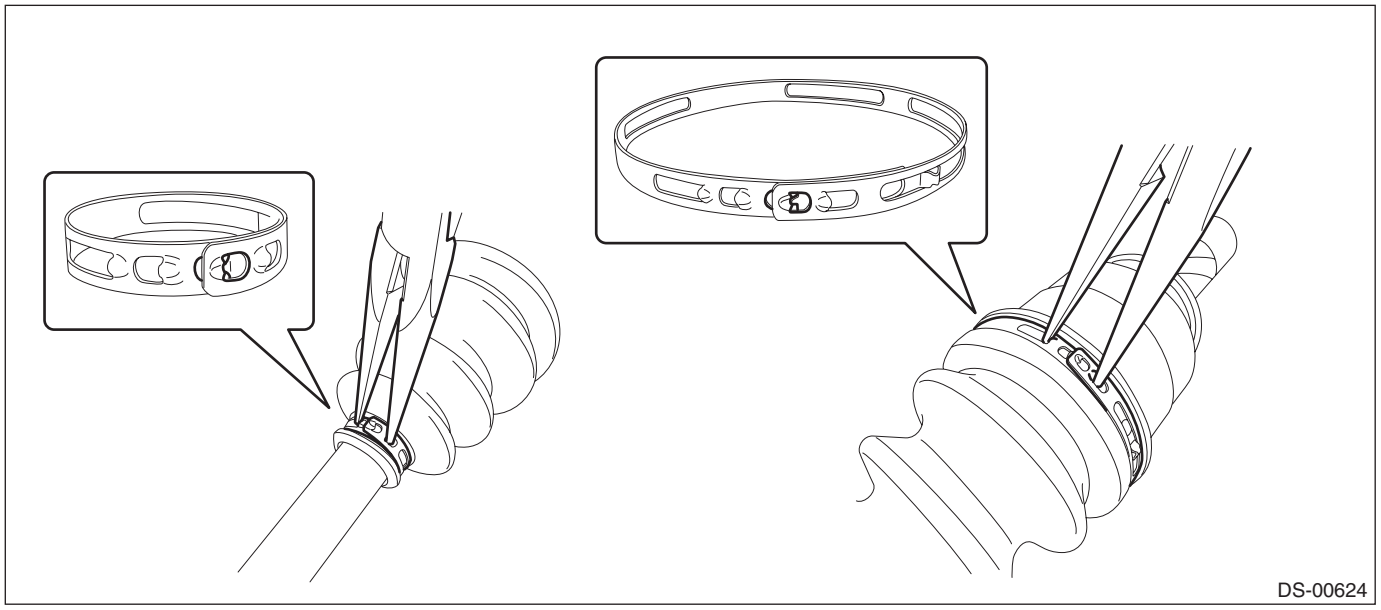
CAUTION:
- **Be careful not to damage the boot.**
- **When tightening boot, use care so that the air within the boot is appropriate.**



(L)	Band for large diameter	(S)	Band for small diameter		
(A)	Free position	(B)	Temporarily tightening position	(C)	Fully tightening position
(a)	Holding portion using pliers	(c)	Convex claw for temporarily tightening position	(e)	Holding portion using pliers
(b)	Concave claw	(d)	Convex claw		

(6) Pinch (a) and (e) of the band with needle nose pliers, and align the concave claw (b) with the convex claw (c) for temporarily tightening position.

Preparation tool:
Needle nose pliers



(7) Check the positions of the boot and band, align the concave claw (b) with the convex claw (d), and tighten the band.

4) Extend and retract the DOJ repeatedly to provide an equal coating of grease.

E: INSPECTION

Check the removed parts for damage, wear, corrosion etc. Repair or replace if defective.

- **DOJ (Double Offset Joint):**

Check for seizure, corrosion, damage, wear and excessive play.

- **BJ (Bell Joint):**

Check for seizure, corrosion, damage and excessive play.

- **EBJ (High-Efficiency Compact Ball Fixed Joint):**

Check for seizure, corrosion, damage and excessive play.

- **Shaft:**

Check for excessive bending, twisting, damage and wear.

- **Boot:**

Check for wear, warping, breakage and scratches.

- **Grease:**

Check for discoloration and fluidity.

9. General Diagnostic Table

A: INSPECTION

NOTE:
Vibration while cruising may be caused by an unbalanced tire, improper tire inflation pressure, improper wheel alignment, etc.

Symptoms	Possible cause	Corrective action
Noise or vibration from propeller shaft	• Center bearing • Runout of propeller shaft • Loose or gap at connections	Inspect the propeller shaft. <Ref. to DS-15, INSPECTION, Propeller Shaft.>
Abnormal wheel vibration	Wheel is out of balance.	Check the wheel balance. <Ref. to WT-7, WHEEL BALANCING, INSPECTION, Tire and Wheel.>
	Front wheel alignment	Check the front wheel alignment. <Ref. to FS-7, INSPECTION, Wheel Alignment.>
	Rear wheel alignment	Check the rear wheel alignment. <Ref. to RS-9, INSPECTION, Wheel Alignment.>
	Front strut	Check the front strut. <Ref. to FS-44, INSPECTION, Front Strut.>
	Rear shock absorber	Check the rear shock absorber. <Ref. to RS-40, INSPECTION, Rear Shock Absorber.>
	Front drive shaft	Check the front drive shaft. <Ref. to DS-69, INSPECTION, Front Drive Shaft.>
	Rear drive shaft	Check the rear drive shaft. <Ref. to DS-83, INSPECTION, Rear Drive Shaft.>
	Hub unit COMPL - front axle	Check the hub unit COMPL - front axle. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>
	Hub unit COMPL - rear axle	Check the hub unit COMPL - rear axle. <Ref. to DS-52, INSPECTION, Rear Hub Unit Bearing.>
Noise from the underbody	Wheel is out of balance.	Check the wheel balance. <Ref. to WT-7, WHEEL BALANCING, INSPECTION, Tire and Wheel.>
	Front wheel alignment	Check the front wheel alignment. <Ref. to FS-7, INSPECTION, Wheel Alignment.>
	Rear wheel alignment	Check the rear wheel alignment. <Ref. to RS-9, INSPECTION, Wheel Alignment.>
	Front strut	Check the front strut. <Ref. to FS-44, INSPECTION, Front Strut.>
	Rear shock absorber	Check the rear shock absorber. <Ref. to RS-40, INSPECTION, Rear Shock Absorber.>

VEHICLE DYNAMICS CONTROL (VDC)

VDC

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13.	VDC OFF Switch	51

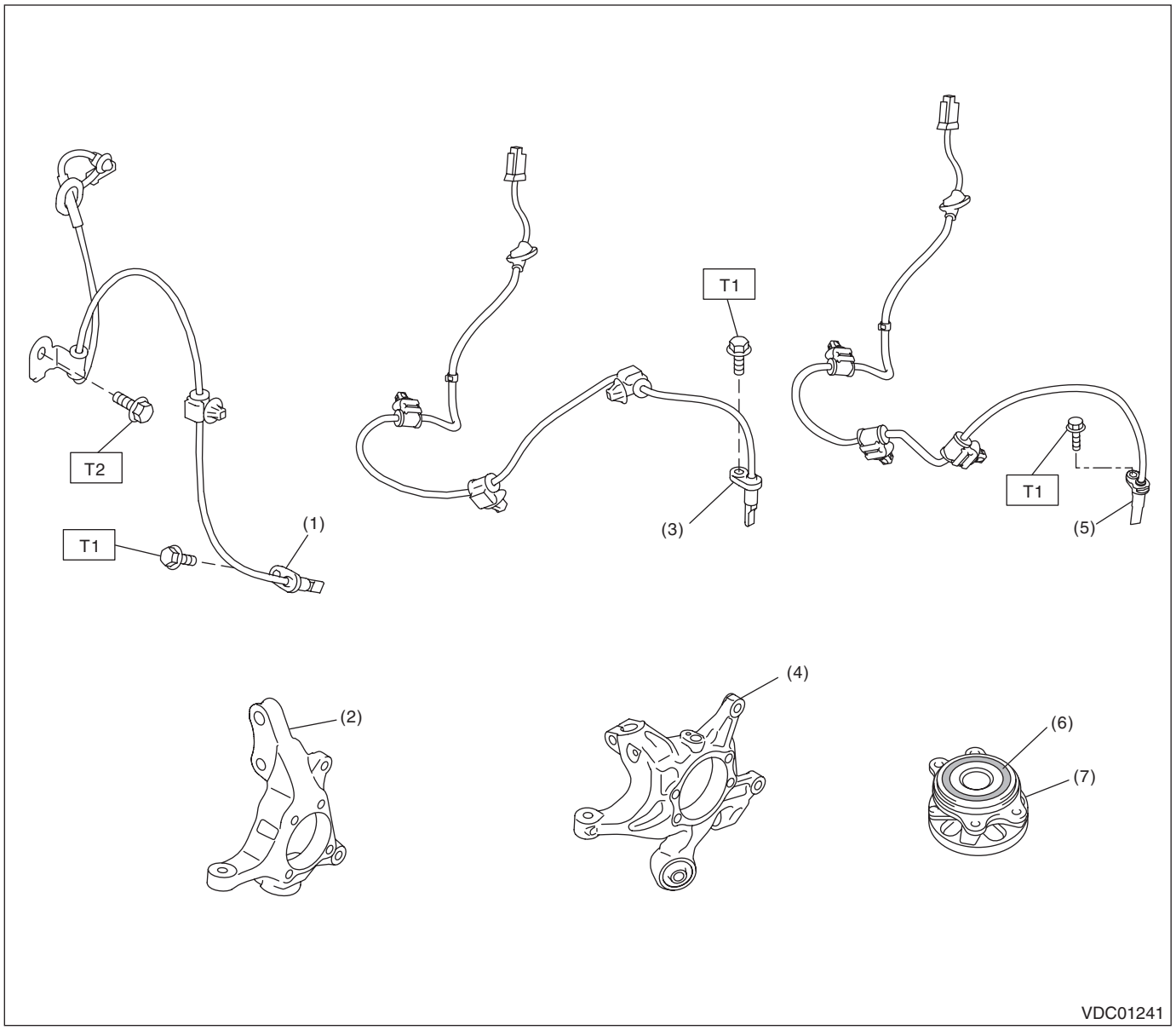
1. General Description

A: SPECIFICATION

Item				Specification or identification
ABS wheel speed sensor	ABS wheel speed sensor gap (for reference)	Front		0.77 — 1.43 mm (0.030 — 0.056 in)
		Rear		0.44 — 1.76 mm (0.017 — 0.069 in)
	Identifications of harness (symbol)	Front	RH	Z1
			LH	Z2
		Rear	RH (Impreza model)	Z3
			RH (Crosstrek model)	Z5
			LH (Impreza model)	Z4
			LH (Crosstrek model)	Z6
VDCCM&H/U identification		Models without EyeSight	Gasoline engine model	XQ
			HEV model	CY
		Models with EyeSight		CZ

B: COMPONENT

1. ABS WHEEL SPEED SENSOR

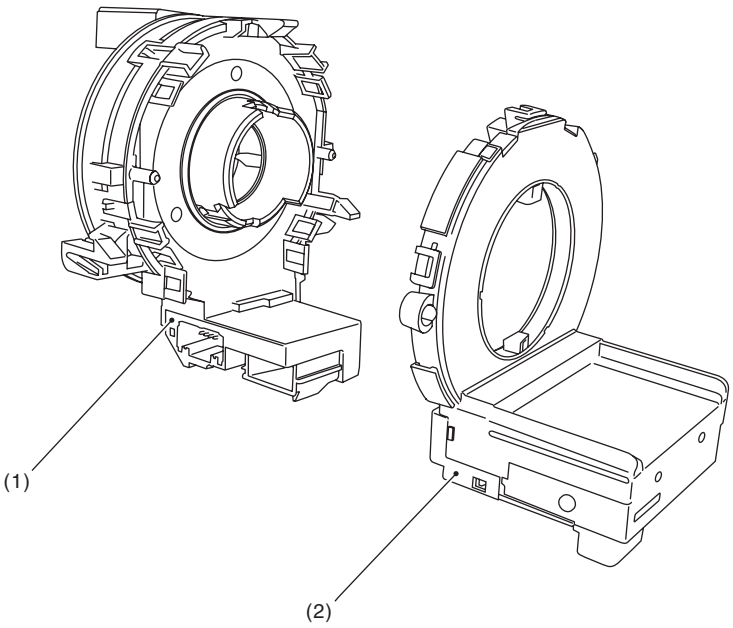


(1) Front ABS wheel speed sensor
(2) Housing ASSY - front axle
(3) Rear ABS wheel speed sensor (Impreza model)
(4) Housing ASSY - rear axle
(5) Rear ABS wheel speed sensor (Crosstrek model)
(6) Magnetic encoder
(7) Hub unit COMPL

Tightening torque: N·m (kgf-m, ft-lb)

T1: 7.5 (0.8, 5.5)
T2: 33 (3.4, 24.3)

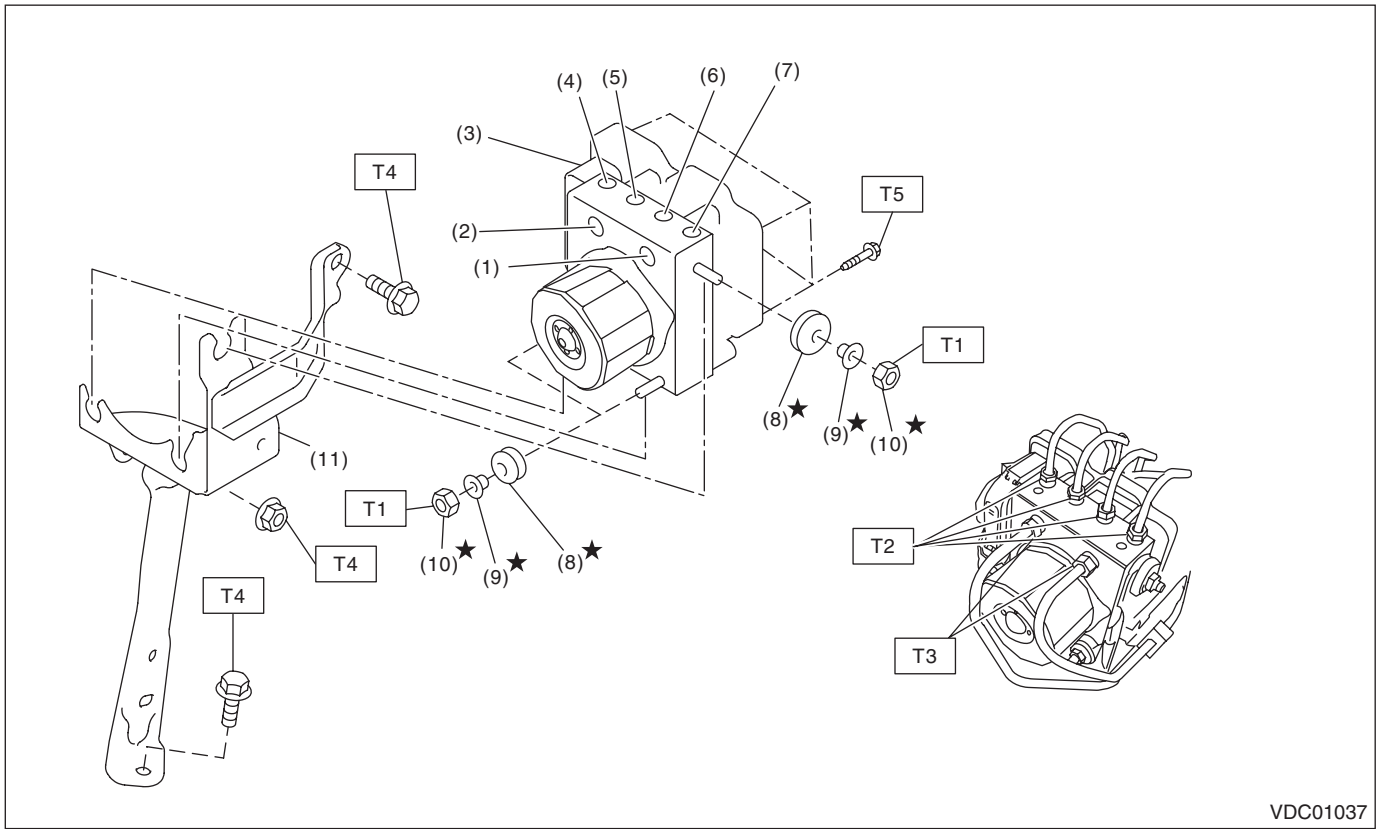
2. STEERING ANGLE SENSOR



(1) Steering roll connector
(2) Steering angle sensor

3. VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U)

- Models without EyeSight



(1)	Primary inlet	(7)	Rear LH outlet
(2)	Secondary inlet	(8)	Damper - hydraulic unit
(3)	VDC control module and hydraulic control unit (VDCCM&H/U)	(9)	Spacer
(4)	Rear RH outlet	(10)	Nut
(5)	Front LH outlet	(11)	Bracket - hydraulic unit
(6)	Front RH outlet		

Tightening torque: N·m (kgf-m, ft-lb)

T1: 7.5 (0.8, 5.5)

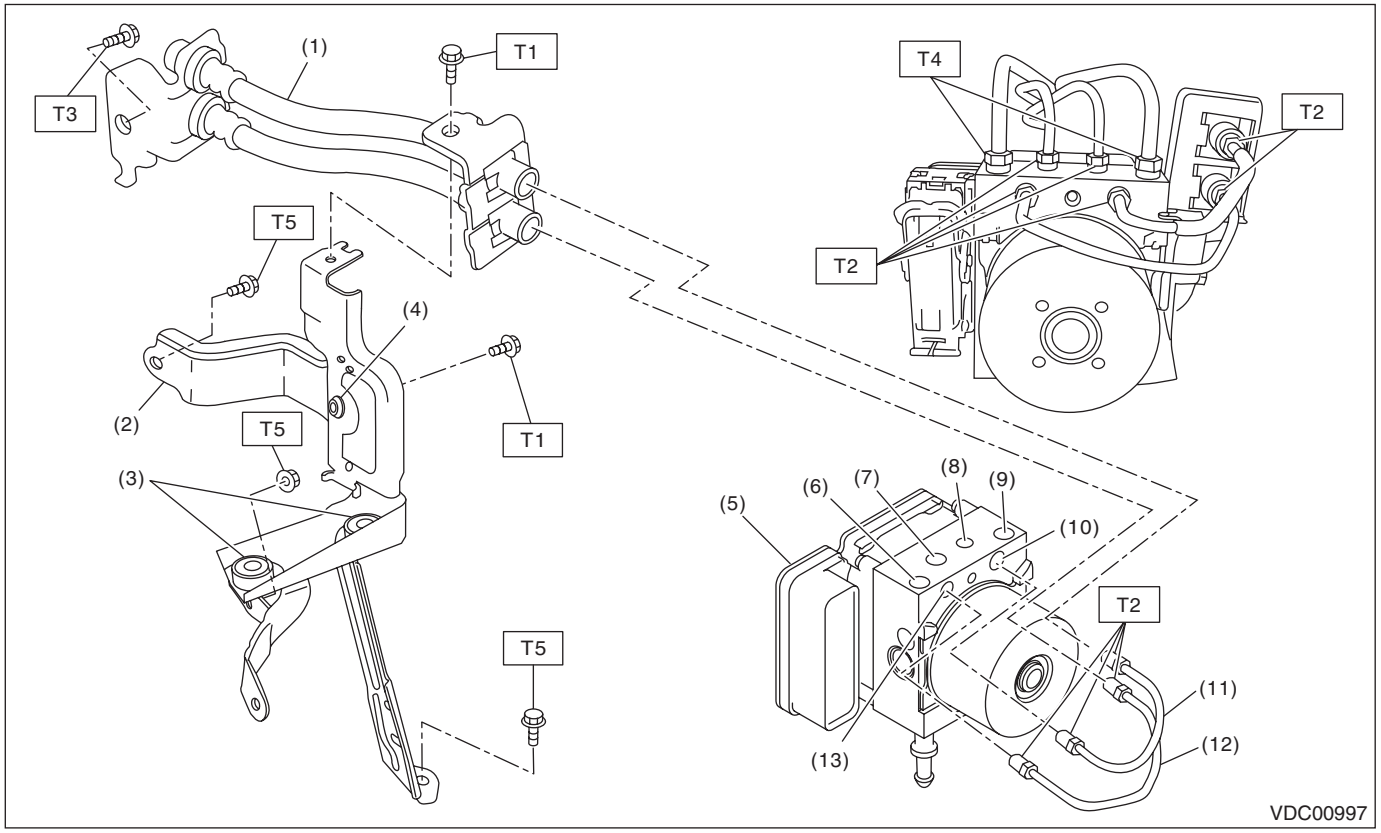
T2: 15 (1.5, 11.1)

T3: 19 (1.9, 14.0)

T4: 33 (3.4, 24.3)

T5: <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

- Models with EyeSight



(1)	Hose ASSY	(8)	Front RH outlet	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Bracket - hydraulic unit	(9)	Primary inlet	***T1: 7.5 (0.8, 5.5)***
(3)	Damper - hydraulic unit	(10)	Rear LH outlet	***T2: 15 (1.5, 11.1)***
(4)	Spacer	(11)	Pipe A	***T3: 18 (1.8, 13.3)***
(5)	VDC control module and hydraulic control unit (VDCCM&H/U)	(12)	Pipe B	***T4: 19 (1.9, 14.0)***
(6)	Secondary inlet	(13)	Rear RH outlet	***T5: 33 (3.4, 24.3)***
(7)	Front LH outlet			

C: CAUTION

• Wear appropriate work clothing, including a helmet, protective goggles and protective shoes when performing any work.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust and dirt.
• Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or rigid racks at the specified points.
• When removing, installing or replacing the VDCCM&H/U, VDCCM&H/U bracket, steering wheel or steering angle sensor, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

D: PREPARATION TOOL

1. SPECIAL TOOL

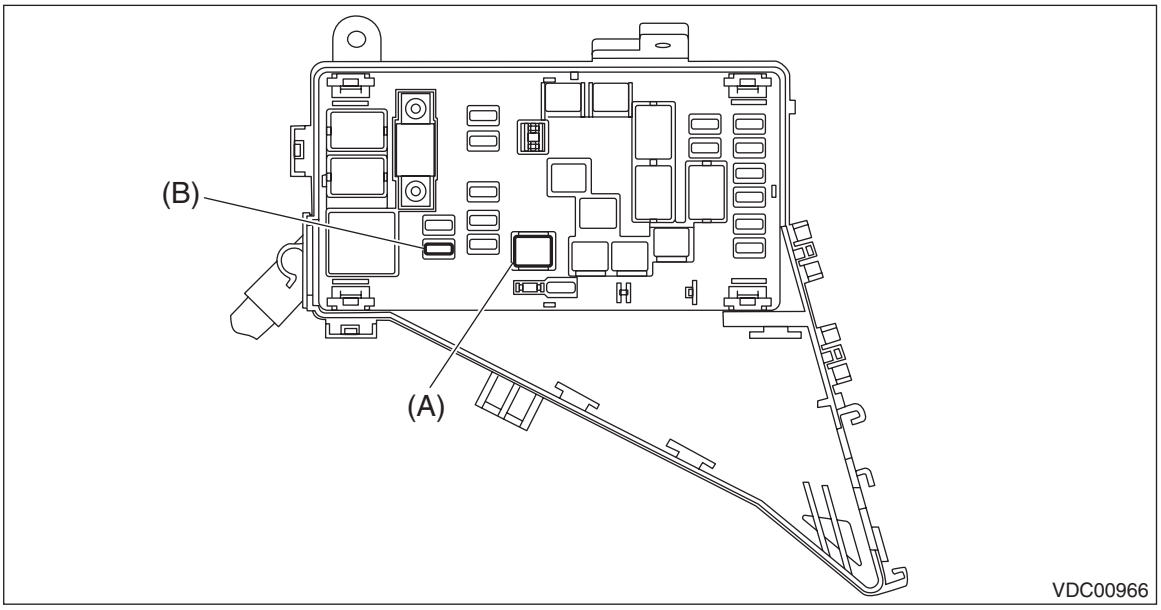
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and troubleshooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.
Pressure gauge	Used for measuring oil pressure.
Oscilloscope	Used for measuring the sensor.
Steering wheel puller	Used for removing the steering wheel.

2. Relay and Fuse

A: LOCATION



Main fuse box	Fuse 50A (VDC CM&H/U)	(A)
	Fuse 30A (VDC CM&H/U)	(B)

NOTE:
For other related fuses, refer to the wiring diagram. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>

B: INSPECTION

1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

3. Vehicle Dynamics Control System

A: WIRING DIAGRAM

Refer to “Vehicle Dynamics Control System” in the wiring diagram.

- Gasoline engine model <Ref. to WI(w/o HEV)-233, WIRING DIAGRAM, Vehicle Dynamics Control System.>
- HEV model <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>

B: ELECTRICAL SPECIFICATION

Refer to the Control Module I/O Signal of the “Vehicle Dynamics Control System (VDC) (DIAGNOSTICS)”. <Ref. to VDC(diag)-12, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

Refer to the “Vehicle Dynamics Control System (VDC) (DIAGNOSTICS)”. <Ref. to VDC(diag)-151, INSPECTION, General Diagnostic Table.>

D: NOTE

For operation procedures of each component of the vehicle dynamics control system, refer to the respective section.

- VDC control module & hydraulic control unit (VDCCM&H/U): <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
- Yaw rate & G sensor: <Ref. to VDC-33, Yaw Rate and G Sensor.>
- Steering angle sensor: <Ref. to VDC-34, Steering Angle Sensor.>
- Front ABS wheel speed sensor: <Ref. to VDC-37, Front ABS Wheel Speed Sensor.>
- Rear ABS wheel speed sensor: <Ref. to VDC-40, Rear ABS Wheel Speed Sensor.>
- Front magnetic encoder: <Ref. to VDC-49, Front Magnetic Encoder.>
- Rear magnetic encoder: <Ref. to VDC-50, Rear Magnetic Encoder.>
- VDC OFF switch: <Ref. to VDC-51, VDC OFF Switch.>

4. VDC Control Module and Hydraulic Control Unit (VDCCM&H/U)

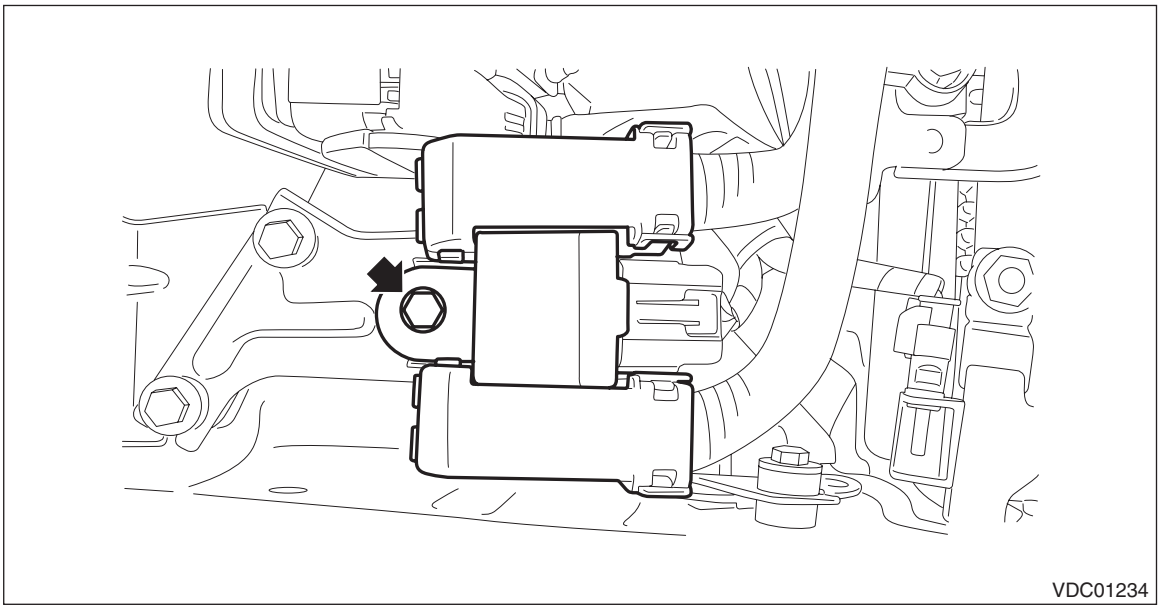
A: REMOVAL

1. MODELS WITHOUT EyeSight

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

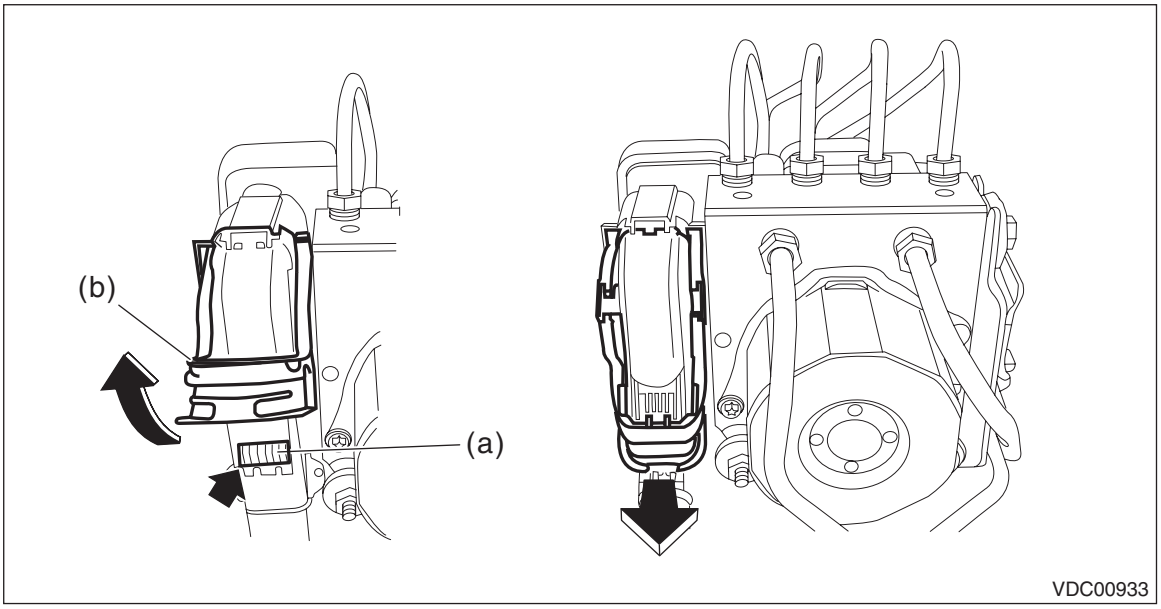
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, REMOVAL, Air Intake Boot.>
3) Remove the air intake duct. (HEV model) <Ref. to IN(H4DO(HEV))-16, REMOVAL, Intake Duct.>

CAUTION:
Move aside the intake boot to perform the operation without disconnecting the PCV hose.
4) Remove the bolts which secure the 12V battery relay, and move the 12V battery relay. (HEV model)



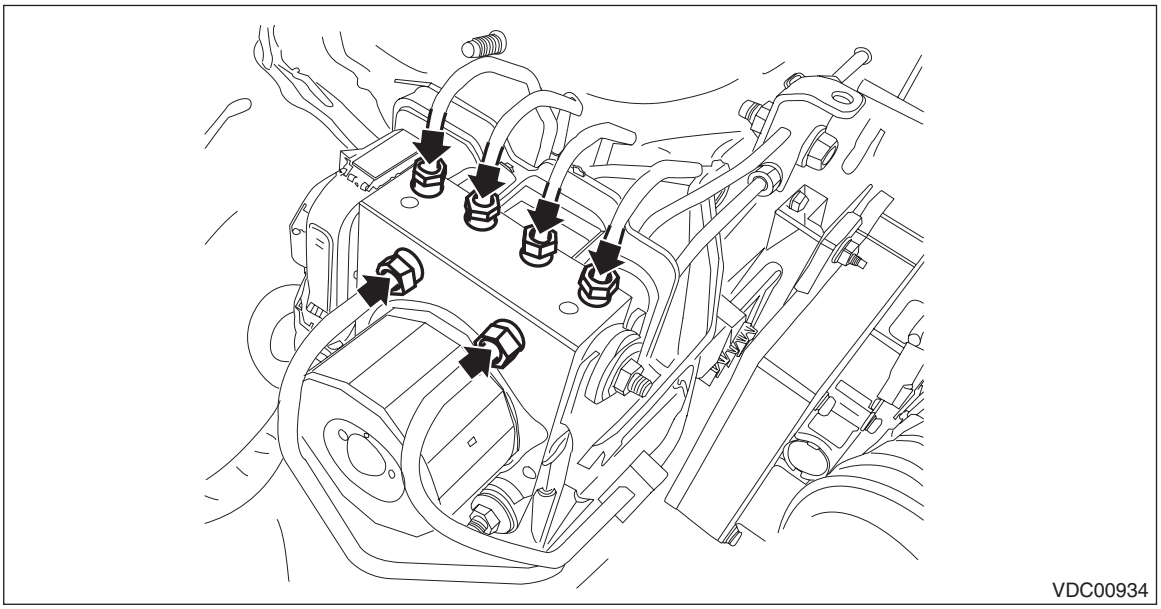
5) Remove the VDC control module & hydraulic control unit (VDCCM&H/U).
(1) Remove any dirt from around the VDCCM&H/U.
(2) Pull up the lock lever (b) while pressing the lock button (a) and disconnect the VDCCM&H/U connector.

CAUTION:
Do not pull on the harness when disconnecting the connector.



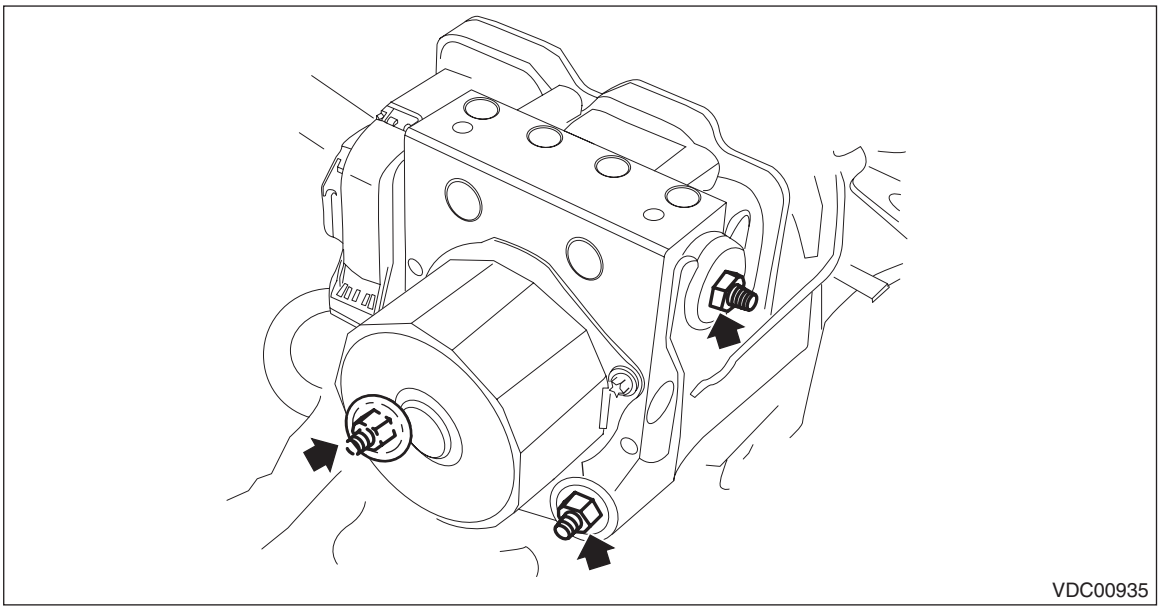
(3) Using a flare nut wrench, disconnect each brake pipe from VDCCM&H/U.

CAUTION:
• Wrap the brake pipe with a vinyl bag so as not to spill the brake fluid on the painted surface of the vehicle body.
• If brake fluid is spilled on the painted surface of the vehicle body, wash it off immediately with water and wipe clean.



(4) Remove the nuts and remove the VDCCM&H/U from the bracket - hydraulic unit.

CAUTION:
- **Do not drop or bump the VDCCM&H/U.**
- **Do not turn the VDCCM&H/U upside down or place it sideways for storage.**
- **Be careful not to let foreign matter enter the VDCCM&H/U.**
- **Be careful that no water and fluid enter the connectors.**



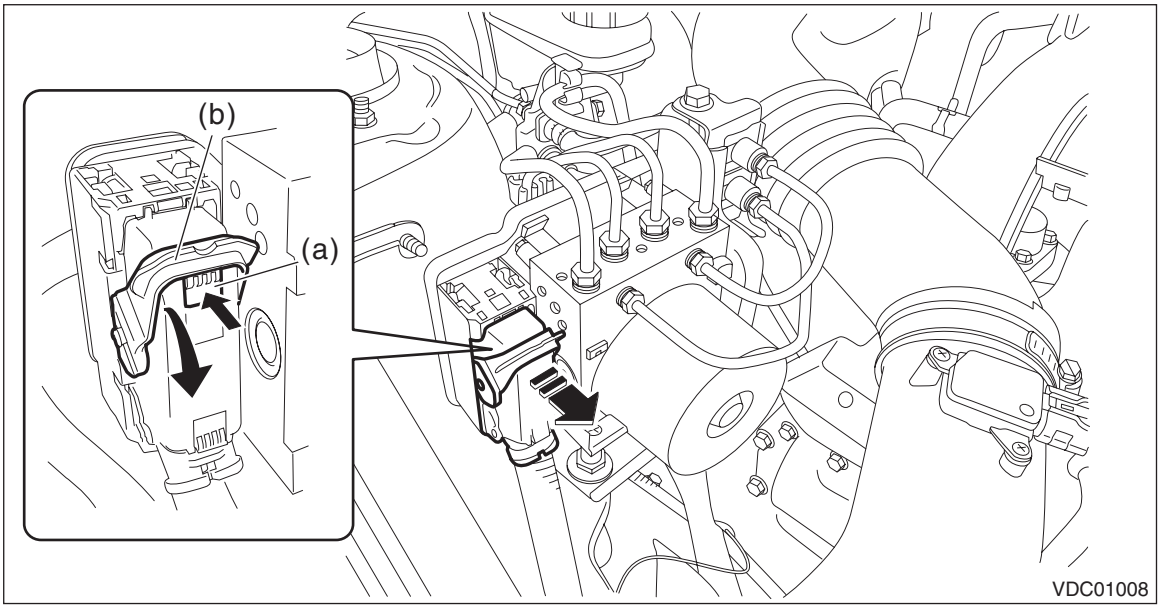
2. MODELS WITH EyeSight

CAUTION:
- **Avoid unnecessary removal of parts in order to prevent fluid leakage.**
- **When the VDCCM&H/U components are removed, be sure to perform the installation according to the installation procedures. <Ref. to VDC-15, MODELS WITH EyeSight, INSTALLATION, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>**

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, REMOVAL, Air Intake Boot.>

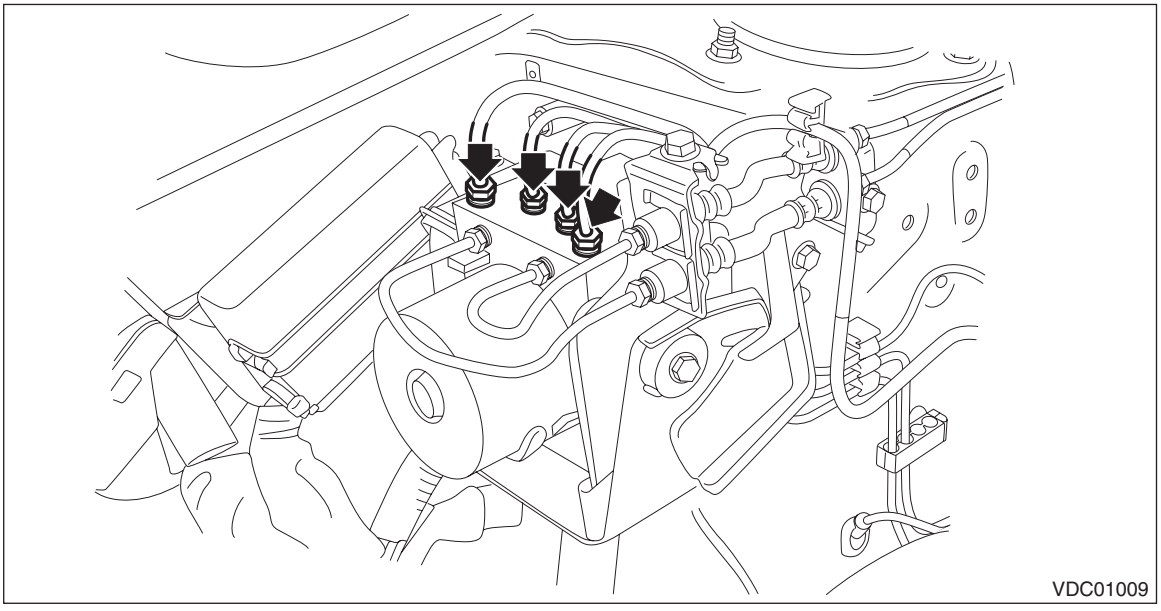
3) Remove the VDC control module & hydraulic control unit (VDCCM&H/U).
(1) Remove any dirt from around the VDCCM&H/U.
(2) Push the lock button (a), pull down the lock lever (b) and disconnect the VDCCM&H/U connector.

CAUTION:
Do not pull on the harness when disconnecting the connector.



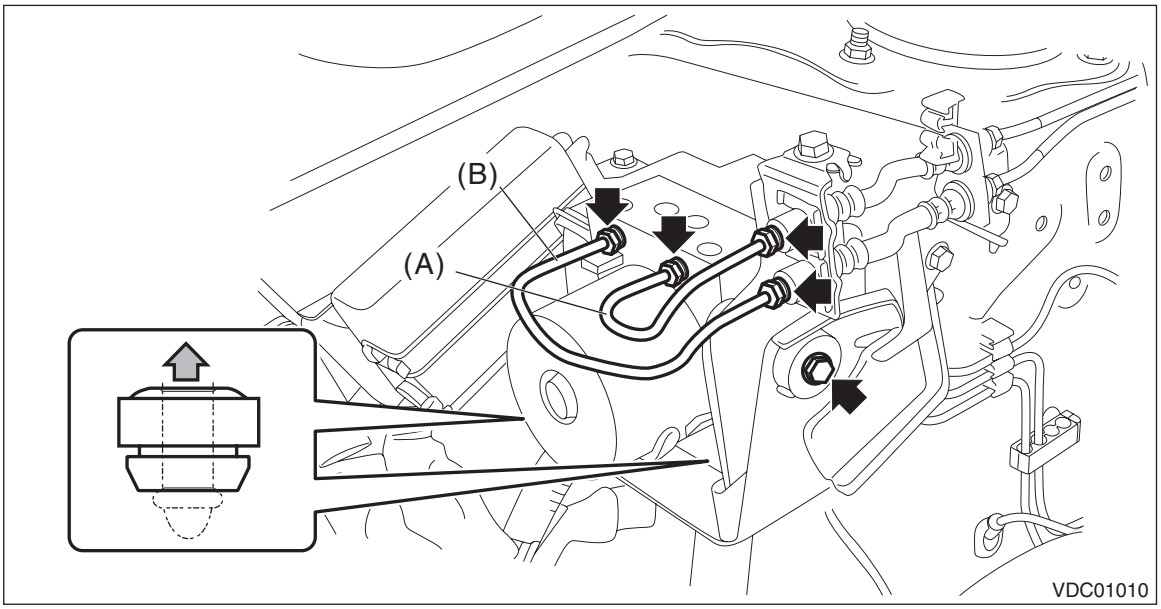
(3) Using a flare nut wrench, disconnect each brake pipe from VDCCM&H/U.

CAUTION:
• Wrap the brake pipe with a vinyl bag so as not to spill the brake fluid on the painted surface of the vehicle body.
• If brake fluid is spilled on the painted surface of the vehicle body, wash it off immediately with water and wipe clean.



(4) Using a flare nut wrench, disconnect pipes (A) and (B) from VDCCM&H/U.
(5) Remove the bolt, and remove the VDCCM&H/U from the bracket - hydraulic unit.

CAUTION:
- **Do not drop or bump the VDCCM&H/U.**
- **Do not turn the VDCCM&H/U upside down or place it sideways for storage.**
- **Be careful not to let foreign matter enter the VDCCM&H/U.**
- **Be careful that no water and fluid enter the connectors.**



B: INSTALLATION

1. MODELS WITHOUT EyeSight

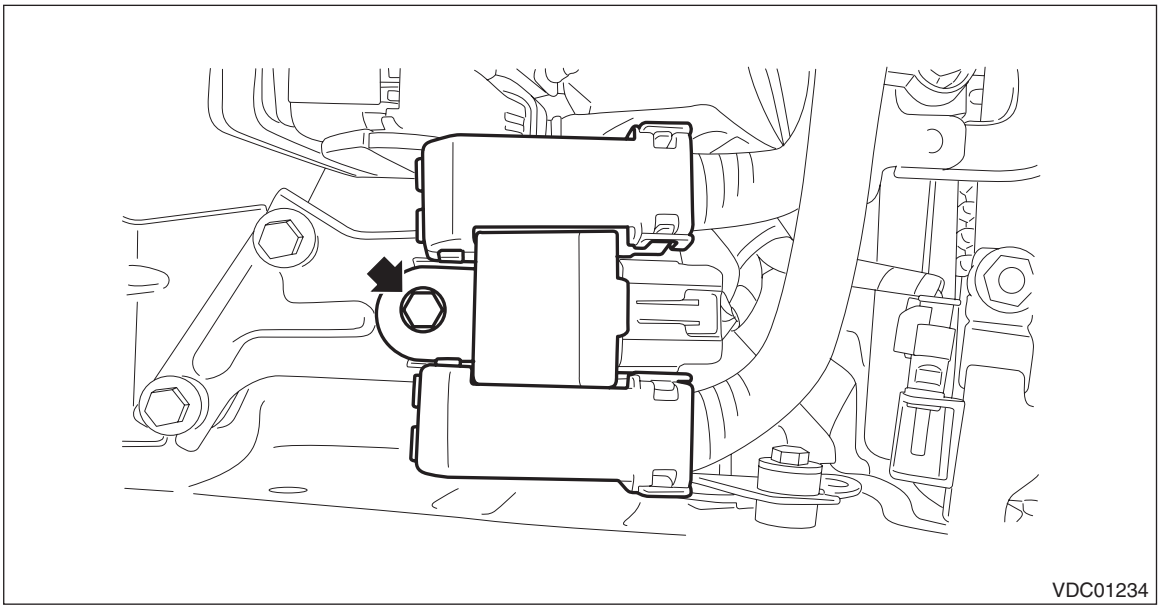
CAUTION:
- **When installing the VDCCM&H/U to the bracket - hydraulic unit, make sure that there is no oil adhered to the bolts and the threads of VDCCM&H/U. If the oil is adhered, degrease it carefully before tightening.**
- **Connect the VDCCM&H/U connector securely.**
- **When installing the VDCCM&H/U, replace the damper - hydraulic unit, spacer and nut with new parts.**

1) Install the VDC control module & hydraulic control unit (VDCCM&H/U) in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to VDC-5, VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U), COMPONENT, General Description.>

2) Install the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
3) Install the air intake duct. (HEV model) <Ref. to IN(H4DO(HEV))-17, INSTALLATION, Intake Duct.>

4) Install the 12V battery relay. (HEV model)



Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

5) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
6) Bleed air from the brake system. <Ref. to BR-63, Air Bleeding.>
7) Perform parameter confirmation, selection, and registration.

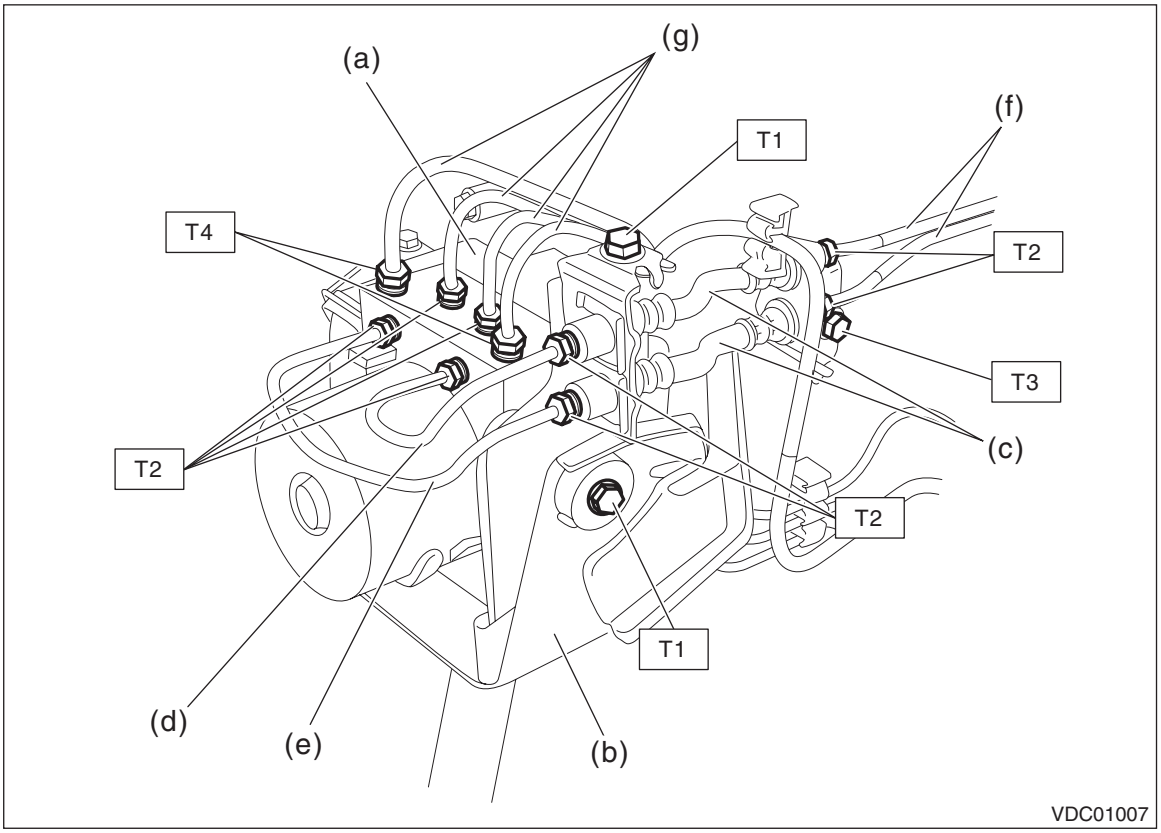
NOTE:
• When the VDCCM&H/U is replaced with a new part, be sure to perform the selection · registration operation.
• When the registration has not been performed, the DTC code “Parameter selection error” is detected together with the ABS/EBD/VDC warning light illumination.
(1) Check that the applied model and grade of the relevant vehicle are included. <Ref. to VDC(diag)-19, PARAMETER CHECK, OPERATION, Subaru Select Monitor.>
(2) If the applied model and grade of the target vehicle are not included, perform parameter selection and registration. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>
8) Perform “VDC sensor midpoint setting mode”. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

2. MODELS WITH EyeSight

CAUTION:
• When the VDCCM&H/U components are removed, be sure to perform the installation according to the following procedures to prevent fluid leakage.
• When installing the VDCCM&H/U to the bracket - hydraulic unit, make sure that there is no oil adhered to the bolts and the threads of VDCCM&H/U. If the oil is adhered, degrease it carefully before tightening.
• Be careful not to deform the bracket - hydraulic unit for hose assembly.
• Connect the VDCCM&H/U connector securely.
1) Install the VDCCM&H/U.

NOTE:
Refer to the following figure for tightening torque.
(1) Set the VDCCM&H/U (a) to the bracket - hydraulic unit (b).
(2) Set the hose assembly (c) to the bracket - hydraulic unit (b).
(3) Set pipe A (d) and pipe B (e), and temporarily tighten the flare nuts.
(4) Tighten the VDCCM&H/U (a) and the bracket - hydraulic unit (b).
(5) Tighten the hose assembly (c) and the bracket - hydraulic unit (b).

(6) Tighten pipe A (d) and pipe B (e).
(7) Set the center pipes (f) to hose assembly (c), and temporarily tighten the flare nuts.
(8) Install the hose assembly (c) to the vehicle body.
(9) Tighten the flare nuts of the center pipes (f).
(10) Install the brake pipes (g).



Tightening torque:
T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
T2: 15 N·m (1.5 kgf-m, 11.1 ft-lb)
T3: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T4: 19 N·m (1.9 kgf-m, 14.0 ft-lb)

2) Connect the VDCCM&H/U connector.
3) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
4) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
5) Bleed air from the brake system. <Ref. to BR-63, Air Bleeding.>
6) Perform parameter confirmation, selection, and registration.

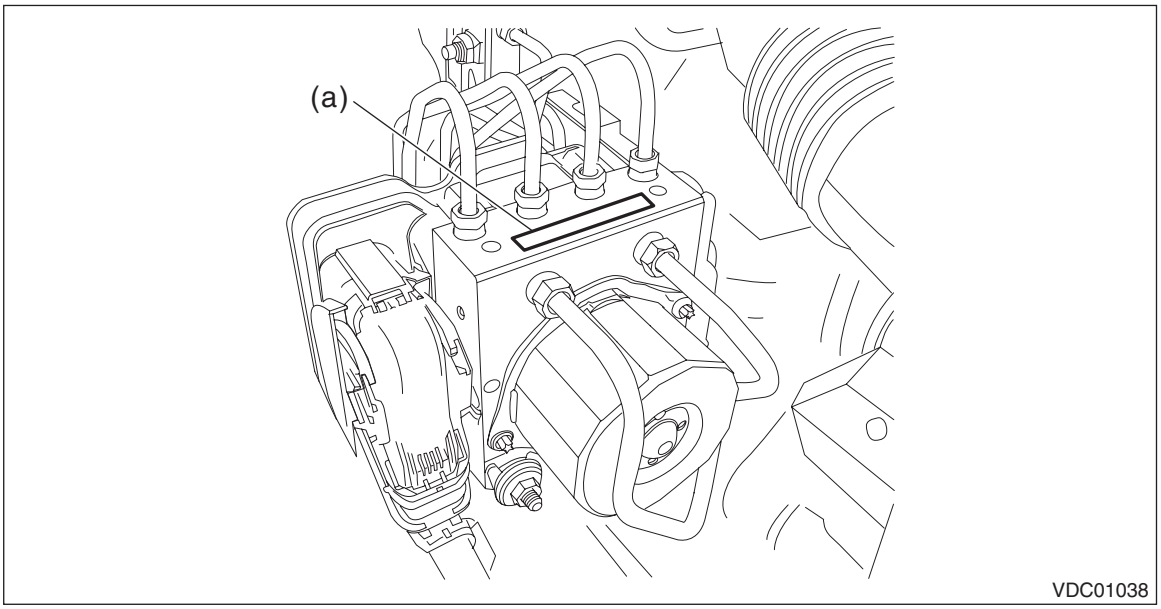
NOTE:
• When the VDCCM&H/U is replaced with a new part, be sure to perform the selection · registration operation.
• When the registration has not been performed, the DTC code “Parameter selection error” is detected together with the ABS/EBD/VDC warning light illumination.
(1) Check that the applied model and grade of the relevant vehicle are included. <Ref. to VDC(diag)-19, PARAMETER CHECK, OPERATION, Subaru Select Monitor.>
(2) If the applied model and grade of the target vehicle are not included, perform parameter selection and registration. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>

7) Perform the following VDC setting mode.
• Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

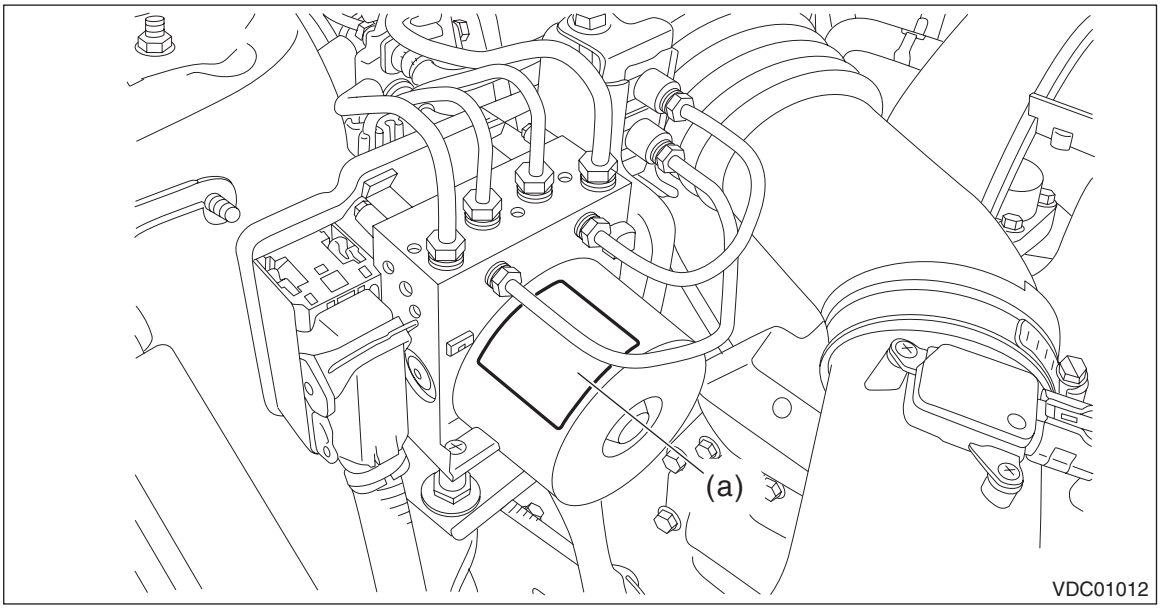
C: INSPECTION

1) Check the identification (a) of the VDC control module & hydraulic control unit (VDCCM&H/U).

NOTE:
For the identification, refer to “SPECIFICATION” in “General Description”. <Ref. to VDC-2, SPECIFICATION, General Description.>
• Models without EyeSight



• Models with EyeSight



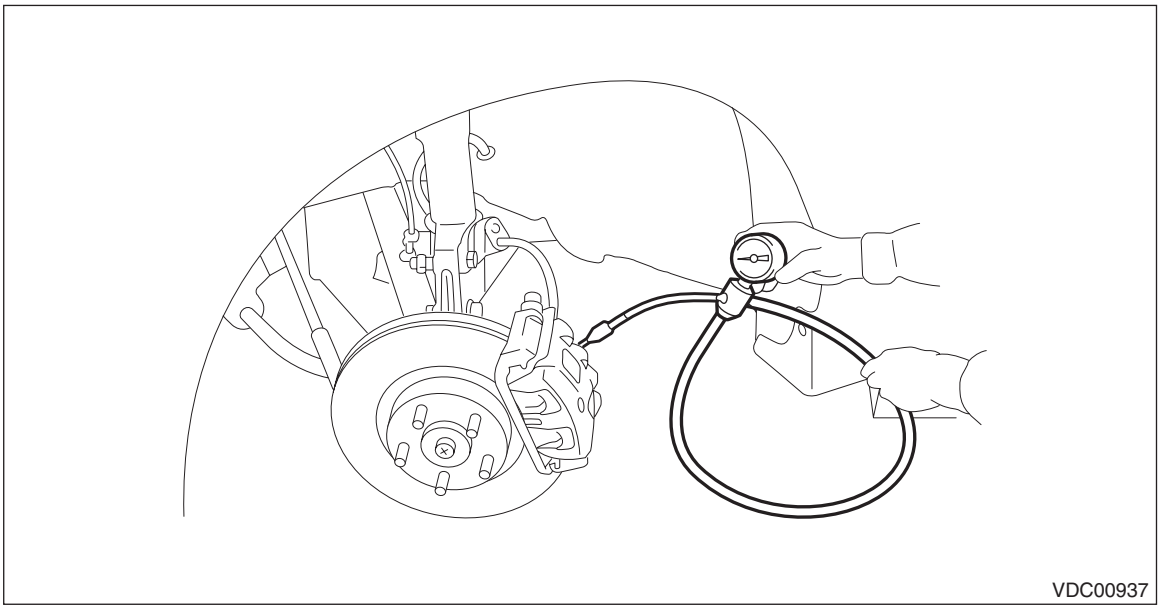
2) Check the condition of connection and settlement of connector, and correct or replace if defective.

1. CHECKING THE HYDRAULIC UNIT ABS OPERATION BY PRESSURE GAUGE

1) Lift up the vehicle, and then remove the wheel.
2) Remove the bleeder - screws from the FL and FR caliper bodies.
3) Connect two pressure gauges to FL and FR caliper bodies.

CAUTION:
- **Use a pressure gauge used exclusively for brake fluid measurement.**
- **Do not use the pressure gauge used for the measurement of transmission oil. Doing so will cause the piston seal to expand and deform.**

NOTE:
Wrap sealing tape around the pressure gauge.



4) Bleed air from the pressure gauges and the FL and FR caliper bodies.
5) Perform ABS sequence control. <Ref. to VDC-27, ABS Sequence Control.>

NOTE:
When the hydraulic unit begins to work, first the FL side performs decompression, hold and compression, and then the FR side performs decompression, hold and compression.
6) Read values indicated on the pressure gauge and check if the fluctuation of the values between decompression and compression meets the standard values. Depress the brake pedal and check that the kick-back is normal, and tightness is normal.

Inspection conditions	Front wheel	Rear wheel
Initial value	3,500 kPa (36 kgf/cm^2, 511 psi)	3,500 kPa (36 kgf/cm^2, 511 psi)
When depressurized	500 kPa (5 kgf/cm^2, 73 psi) or less	500 kPa (5 kgf/cm^2, 73 psi) or less
When pressurized	3,500 kPa (36 kgf/cm^2, 511 psi) or more	3,500 kPa (36 kgf/cm^2, 511 psi) or more

7) Disconnect the pressure gauges from FL and FR caliper bodies.
8) Install the bleeder - screws of the FL and FR caliper bodies.
9) Remove the bleeder - screws from the RL and RR caliper bodies.
10) Connect two pressure gauges to RL and RR caliper bodies.
11) Bleed air from RL and RR caliper bodies, and pressure gauge.

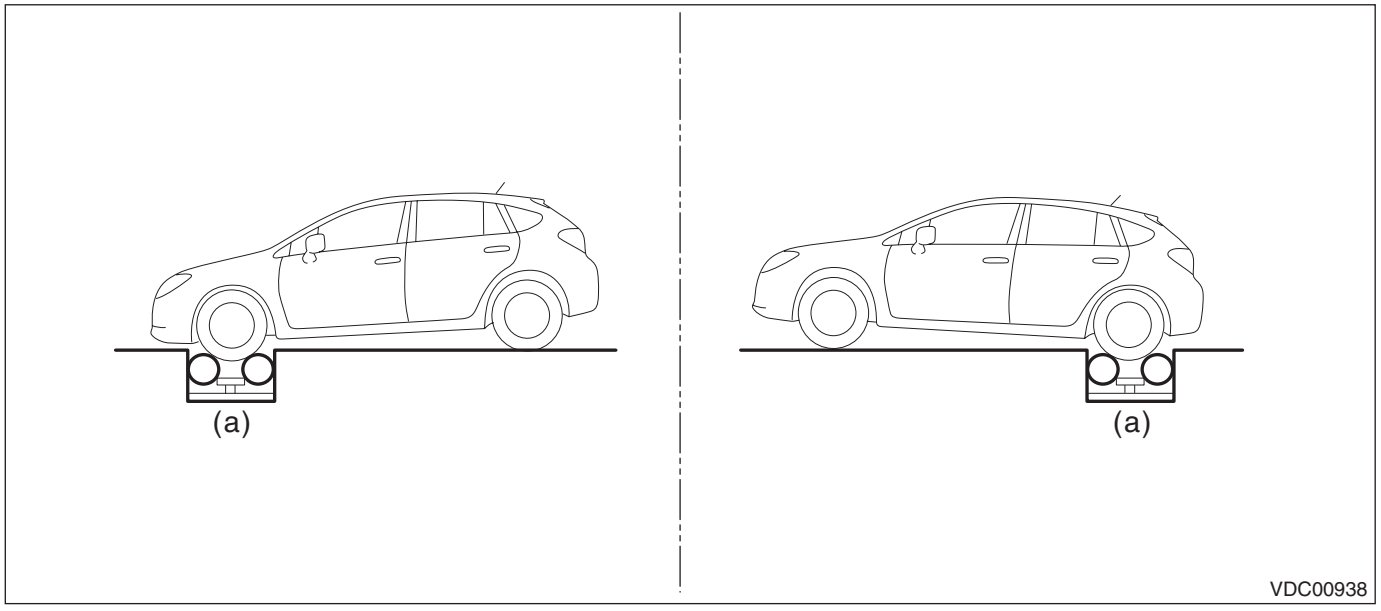
12) Perform ABS sequence control. <Ref. to VDC-27, ABS Sequence Control.>

NOTE:
When the hydraulic unit begins to work, first the RR side performs decompression, hold and compression, and then the RL side performs decompression, hold and compression.

13) Read values indicated on the pressure gauge and check if the fluctuation of the values between decompression and compression meets specification. Depress the brake pedal and check that the kick-back is normal, and tightness is normal.
14) Disconnect the pressure gauge from the RL and RR caliper bodies.
15) Install the bleeder - screws of the RL and RR caliper bodies.
16) Bleed air from the brake system. <Ref. to BR-63, Air Bleeding.>

2. CHECKING THE HYDRAULIC UNIT ABS OPERATION WITH THE BRAKE TESTER

1) Set wheels other than the one to measure on free rollers.
2) Prepare for the ABS sequence control operation. <Ref. to VDC-27, ABS Sequence Control.>
3) Set the front wheels or rear wheels on the brake tester (a) and set the gear to neutral.



4) Operate the brake tester.
5) Perform ABS sequence control. <Ref. to VDC-27, ABS Sequence Control.>
6) When the hydraulic unit begins to work, check the following work sequence.
   (1) The FL wheel performs decompression, hold and compression in sequence, and subsequently the FR wheel repeats the cycle.
   (2) The RR wheel performs decompression, hold and compression in sequence, and subsequently the RL wheel repeats the cycle.
7) Read values indicated on the brake tester and check if the fluctuation of the values between decompression and compression meets specification.

Inspection conditions	Front wheel	Rear wheel
Initial value	1,000 N (102 kgf, 225 lb)	1,000 N (102 kgf, 225 lb)
When depressurized	500 N (51 kgf, 112 lb) or less	500 N (51 kgf, 112 lb) or less
When pressurized	1,000 N (102 kgf, 225 lb) or more	1,000 N (102 kgf, 225 lb) or more

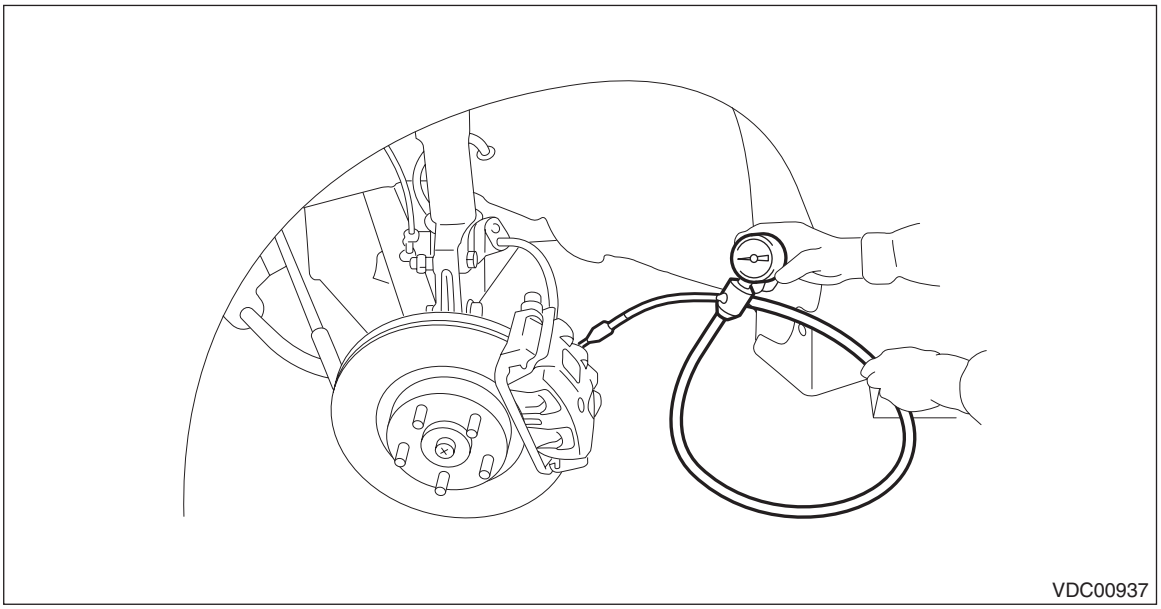
8) After the inspection, depress the brake pedal and check that it is not abnormally hard, and tightness is normal.

3. CHECKING THE HYDRAULIC UNIT VDC OPERATION USING A PRESSURE GAUGE

1) Lift up the vehicle, and then remove the wheel.
2) Remove the bleeder - screws from FL and FR caliper bodies.
3) Connect two pressure gauges to FL and FR caliper bodies.

CAUTION:
- **Use a pressure gauge used exclusively for brake fluid measurement.**
- **Do not use a pressure gauge used for the measuring transmission oil pressure, as the piston seal may expand and deform.**

NOTE:
Wrap sealing tape around the pressure gauge.



4) Bleed air from the pressure gauge.
5) Perform VDC sequence control. <Ref. to VDC-30, VDC Sequence Control.>

NOTE:
When the hydraulic unit begins to work, first the FL side performs compression, hold, and decompression, and then the FR side performs compression, hold, and decompression.
6) Read values indicated on the pressure gauge and check if the fluctuation of the values between decompression and compression meets specification. Depress the brake pedal and check that it is not abnormally hard, and tightness is normal.

Inspection conditions	Front wheel	Rear wheel
When pressurized	3,000 kPa (31 kgf/cm^2, 441 psi) or more	3,000 kPa (31 kgf/cm^2, 441 psi) or more
When depressurized	500 kPa (5 kgf/cm^2, 73 psi) or less	500 kPa (5 kgf/cm^2, 73 psi) or less

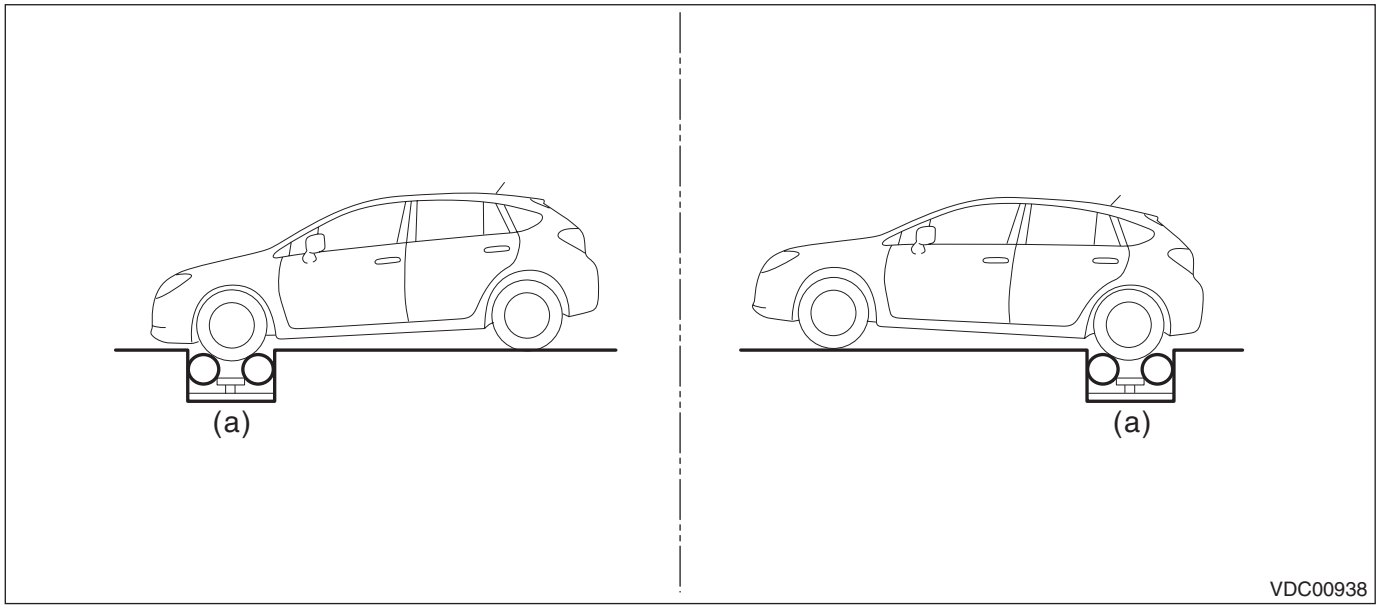
7) Disconnect the pressure gauges from FL and FR caliper bodies.
8) Install the bleeder - screws of FL and FR caliper bodies.
9) Remove the bleeder - screws from RL and RR caliper bodies.
10) Connect two pressure gauges to RL and RR caliper bodies.
11) Bleed air from RL and RR caliper bodies, and pressure gauge.
12) Perform VDC sequence control. <Ref. to VDC-30, VDC Sequence Control.>

NOTE:
When the hydraulic unit begins to work, first the RR side performs compression, hold, and decompression, and then the RL side performs compression, hold, and decompression.

13) Read the values indicated on the pressure gauges and check if it is within specification. Depress the brake pedal and check that it is not abnormally hard, and tightness is normal.
14) Disconnect the pressure gauge from the RL and RR caliper bodies.
15) Install the bleeder - screws of RL and RR caliper bodies.
16) Bleed air from the brake system. <Ref. to BR-63, Air Bleeding.>

4. CHECK HYDRAULIC UNIT VDC OPERATION WITH BRAKE TESTER

1) Set wheels other than the one to measure on free rollers.
2) Prepare to operate the VDC sequence control. <Ref. to VDC-30, VDC Sequence Control.>
3) Set the front wheels or rear wheels on the brake tester (a) and set the gear to neutral.



4) Operate the brake tester.
5) Perform VDC sequence control. <Ref. to VDC-30, VDC Sequence Control.>
6) When the hydraulic unit begins to work, check the following work sequence.
   (1) The FL wheel performs compression, hold and decompression in sequence, and subsequently the FR wheel repeats the cycle.
   (2) The RR wheel performs compression, hold and decompression in sequence, and subsequently the RL wheel repeats the cycle.
7) Read values indicated on the brake tester and check if the fluctuation of the values between decompression and compression meets specification.

Inspection conditions	Front wheel	Rear wheel
When pressurized	2,000 N (204 kgf, 450 lbf) or more	2,000 N (204 kgf, 450 lbf) or more
When depressurized	500 N (51 kgf, 112 lbf) or less	500 N (51 kgf, 112 lbf) or less

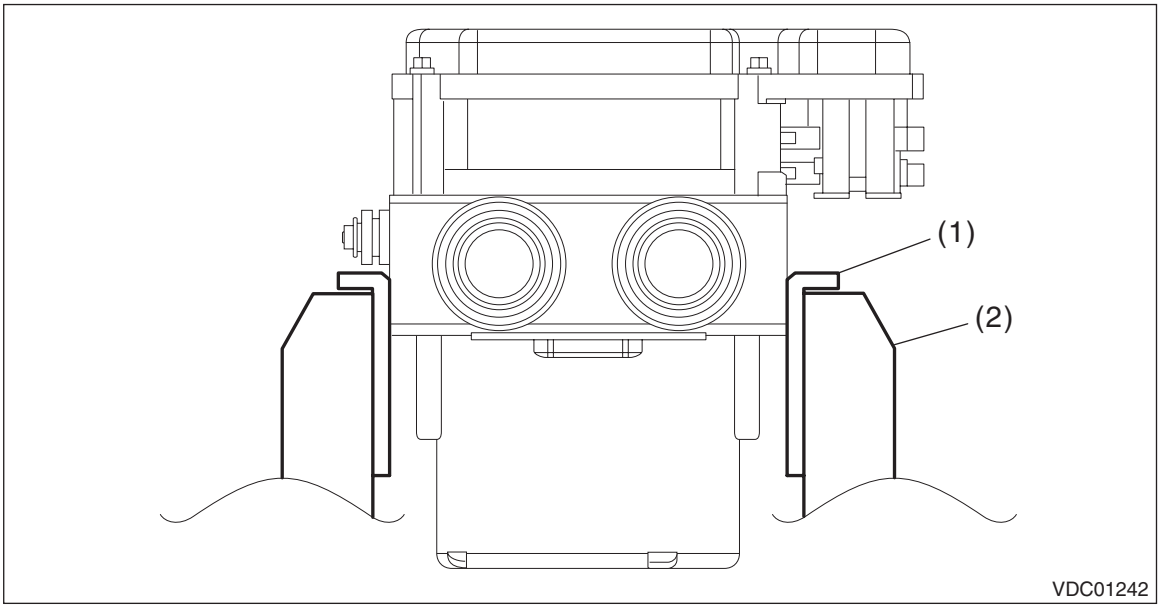
8) After the inspection, depress the brake pedal and check that it is not abnormally hard, and tightness is normal.

D: REPLACEMENT

1. ONLY FOR MODELS WITHOUT EyeSight

CAUTION:
• Because the pressure sensor built into the H/U is easily damaged by static electricity, start the operation after performing static electricity measures.
• Be careful not to touch the sensors in the H/U to prevent damage.
• Because the seal of the VDCCM cannot be replaced, do not pull or peel it by lifting it up.
• Because the screw of the H/U will become slightly worn in every replacement procedure, 5 times is the maximum number for H/U re-use. If a problem is found such as not being able to torque the screw to specifications even before 5 replacement operations are performed, replace the H/U body.
• When installing the VDCCM, always use new screws.
• When the sealing surface of the VDCCM or H/U is dirty or damaged and it cannot be cleaned or repaired, replace with a new part.
1) Remove the VDCCM&H/U. <Ref. to VDC-10, MODELS WITHOUT EyeSight, REMOVAL, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
2) To prevent entry of foreign objects and brake fluid leakage, plug the oil pressure port of the VDCCM&H/U using a screw plug, etc.
3) Set the pump motor section of the removed VDCCM&H/U face down on a vise.

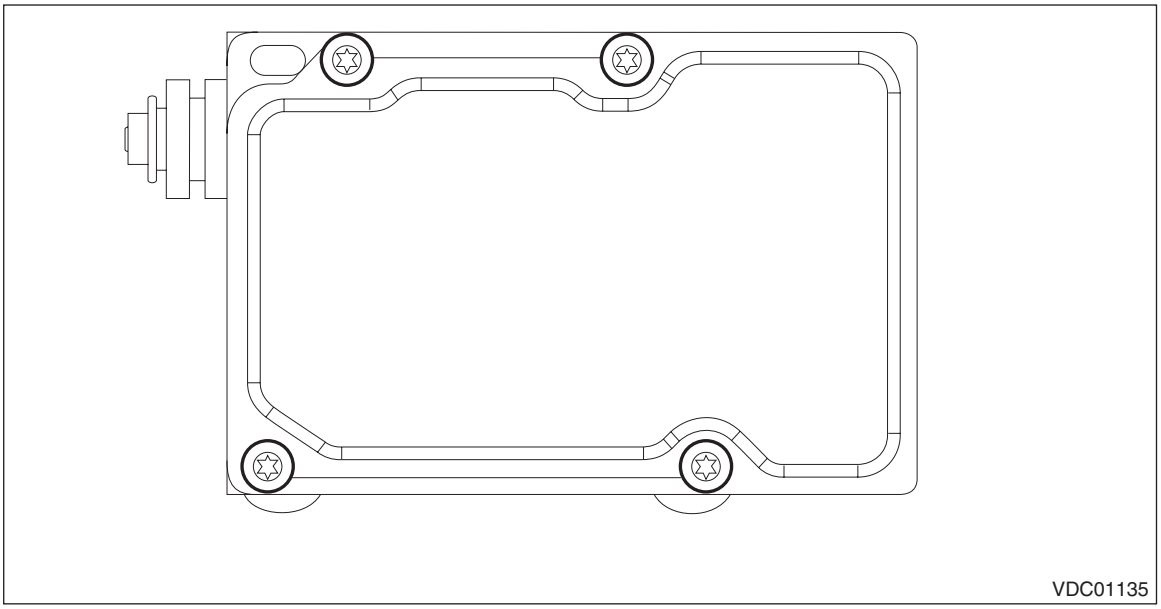
NOTE:
Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.



(1) Aluminum plate, etc. (2) Vise

4) Using TORX® bit E5, remove the four screws of VDCCM.

CAUTION:
Do not re-use the screws.



5) Slowly pull out the VDCCM upward from the H/U.

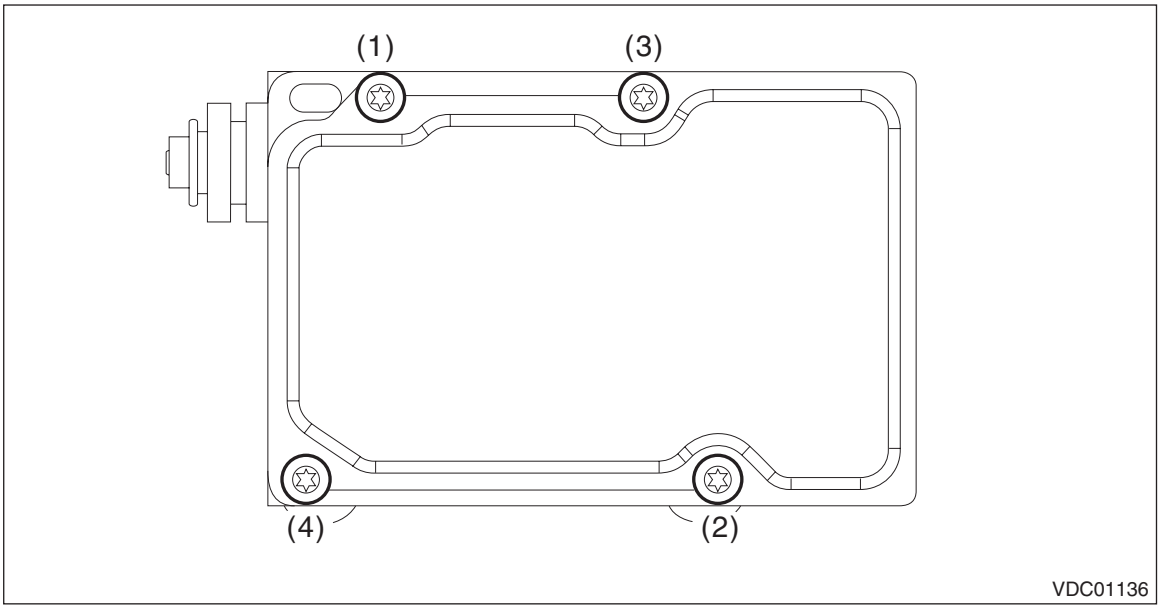
NOTE:
To prevent damaging of coil section, remove the VDCCM straight up from H/U without twisting.
6) Make sure there is no dirt or damage on the sealing surface of the H/U.

CAUTION:
- **Do not clean the VDCCM&H/U by applying compressed air.**
- **Even if damage is found on the H/U seal, do not attempt repair by filing or with a metal scraper. To remove the seal residue, always use a plastic scraper. Do not use chemical such as paint thinner, etc., to clean.**

7) Position the coil of the new VDCCM to align with the H/U valve.
8) To prevent deformation of the VDCCM housing cover, hold the corner of VDCCM and install it to the H/U without tilting.

9) Using a TORX® bit E5, attach/tighten new screws in the order of (1) through (4).

CAUTION:
Always use new screws.



Tightening torque:
1.5 N·m (0.2 kgf-m, 1.1 ft-lb)

10) Check that there is no foreign matter in mating surface between the VDCCM&H/U.
11) Using a TORX® bit E5, tighten the screws in the order of (1) through (4) again.

Tightening torque:
3.0 N·m (0.3 kgf-m, 2.2 ft-lb)

12) Check that there is no gap in the mating surface between VDCCM&H/U.
13) Install the VDCCM&H/U to the vehicle.

CAUTION:
When installing the VDCCM&H/U, replace the damper - hydraulic unit, spacer and nut with new parts.

14) Bleed air from the brake system. <Ref. to BR-63, PROCEDURE, Air Bleeding.>
15) Perform the selection and registration operation of parameter. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>

NOTE:
- After replacing the VDCCM, be sure to perform the selection · registration operation of parameter.
- When the registration has not been performed, the DTC code “Parameter selection error” is detected together with the ABS/EBD/VDC warning light illumination.

16) Check the parameter to confirm that the applied models and grades of the relevant vehicle are included. <Ref. to VDC(diag)-19, PARAMETER CHECK, OPERATION, Subaru Select Monitor.>
17) If the applied model and grade of the target vehicle are not included, perform parameter selection and registration. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>
18) Execute Clear Memory after parameter selection and registration operations because the DTC for “Parameter selection error” is memorized.
19) Perform “VDC sensor midpoint setting mode”. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

E: ADJUSTMENT

1. VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight)

After installing, replacing or adjusting the following parts, perform the VDC sensor midpoint setting mode.
- Steering angle sensor
- Steering wheel
- Suspension parts
- Wheel alignment
- VDCCM&H/U
- VDCCM&H/U bracket

1) Park the vehicle on a level surface, and set the steering wheel to the neutral position.
2) Perform the VDC sensor 0 point setting mode.
   (1) Connect the Subaru Select Monitor.

NOTE:
For detailed operation procedures, refer to “Application help”.
   (2) Turn the ignition switch to ON.
   (3) On «Start» display, select «Diagnosis».
   (4) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
   (5) On «Main Menu» display, select «Each System».
   (6) On «Select System» display, select «Brake Control System» and select «Enter».
   (7) On «Select Function» display, select «Data Monitor».
   (8) From the data monitor item list, select «Steering Angle Sensor», «Longitudinal G Sensor» and «Lateral G sensor Output».
   (9) Check that the steering angle sensor output value is between –10 and 10 deg.

NOTE:
If the output value is not at the standard value, check the steering wheel.
   (10) Check that output values for the longitudinal G sensor and lateral G sensor are –2 — 2 m/s^2.

NOTE:
If the output value is not at the standard value, check the installation conditions of VDCCM&H/U and VDCCM&H/U bracket.
   (11) On «Select Function» display, select «Work Support».
   (12) From the work support item list, select «VSC(VDC) Centering Mode», and perform the setting according to the procedure displayed on the Subaru Select Monitor screen.

3) Drive the vehicle for 10 minutes, and check that there is no system malfunction or the warning light illumination while driving.
4) Make sure that the DTC is not stored.

2. NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight)

After installing, replacing, or adjusting the following part, perform the Set up mode for Neutral of Steering Angle Sensor & Lateral G Sensor 0 point.
- Steering angle sensor
- Steering wheel
- Suspension parts
- Wheel alignment
- VDCCM&H/U
- VDCCM&H/U bracket

1) Set the steering wheel to the neutral position.
2) Perform the VDC sensor 0 point setting mode.
   (1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to “Application help”.

(2) Turn the ignition switch to ON.
(3) On «Start» display, select «Diagnosis».
(4) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
(5) On «Main Menu» display, select «Each System».
(6) On «Select System» display, select «Brake Control System» and select «Enter».
(7) On «Select Function» display, select «Data Monitor».
(8) On «Data monitor» display, select «Steering Angle Sensor».
(9) Check that the steering angle sensor output value is within the range of following values.
- Gasoline engine model: –2 — 2 deg
- HEV model: –10 — 10 deg

(10) On «Select Function» display, select «Work Support».
(11) From «Work Support», select «Set mode Str.A.Sen.N&Lat.GSen.0p», and perform the setting according to the procedure displayed on the Subaru Select Monitor Screen.

3) Drive the vehicle for 10 minutes, and check that there is no system malfunction or the warning light illumination while driving.
4) Make sure that the DTC is not stored.

3. LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight)

After installing or replacing the following part, perform the longitudinal G sensor & lateral G sensor 0 point setting mode.
- Suspension parts
- VDCCM&H/U
- VDCCM&H/U bracket

1) Park the vehicle on a level surface with all wheels aligned straight.
2) Perform the VDC sensor 0 point setting mode.
(1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to “Application help”.
(2) Turn the ignition switch to ON.
(3) On «Start» display, select «Diagnosis».
(4) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
(5) On «Main Menu» display, select «Each System».
(6) On «Select System» display, select «Brake Control System» and select «Enter».
(7) On «Select Function» display, select «Data Monitor».
(8) From the «Data monitor» display, select «Longitudinal G Sensor» and «Lateral G sensor Output».
(9) Check that output values for the longitudinal G sensor and lateral G sensor are –2 — 2 m/s^2.
(10) On «Select Function» display, select «Work Support».
(11) From «Work Support», select «Longitudinal G sensor & lateral G sensor 0 point setting mode», and perform the setting according to the procedure displayed on the Subaru Select Monitor Screen.

3) Drive the vehicle for 10 minutes, and check that there is no system malfunction or the warning light illumination while driving.
4) Make sure that the DTC is not stored.

5. ABS Sequence Control

A: OPERATION

1) While the ABS sequence control is being performed, the operation of the hydraulic unit can be checked using the brake tester or pressure gauge after the hydraulic unit solenoid valve operation.
2) ABS sequence control can be started by the Subaru Select Monitor.

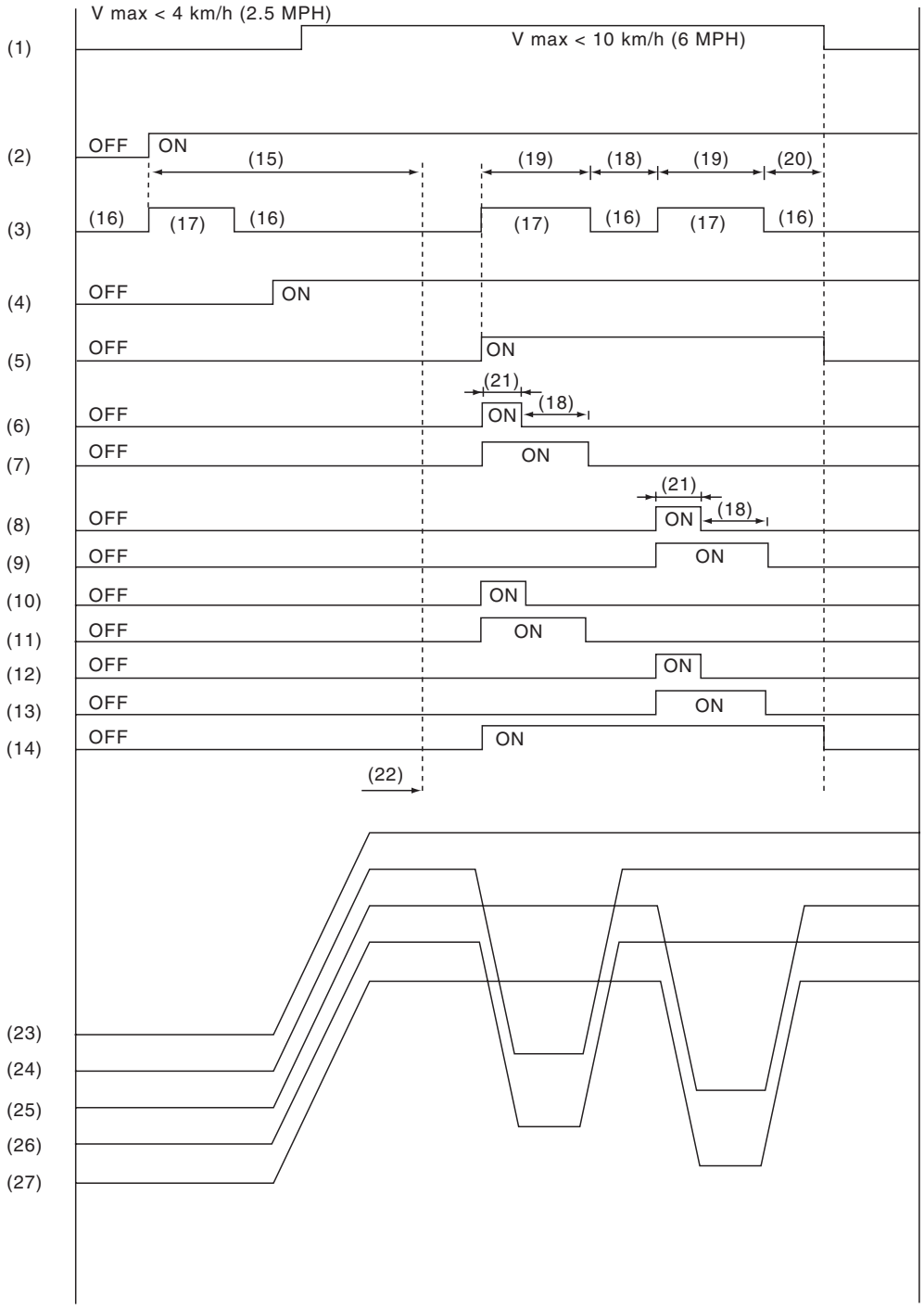
1. ABS SEQUENCE CONTROL WITH SUBARU SELECT MONITOR

NOTE:
In the event of any trouble, the ABS sequence control will not operate.
1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to “Application help”.
(1) Turn the ignition switch to ON.
(2) On «Start» display, select «Diagnosis».
(3) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
(4) On «Main Menu» display, select «Each System».
(5) On «Select System» display, select «Brake Control System» and select «Enter».
(6) On «Select Function» display, select «Work Support».
(7) On «Work Support» display, select «ABS Sequence Control Mode».
2) Follow the procedures displayed in the Subaru Select Monitor to execute the following.
(1) When using a brake tester, depress the brake pedal with a force of 100 N (10.2 kgf, 22.5 lbf).
(2) When using a pressure gauge, press the brake pedal so that the pressure gauge indicates 3,500 kPa (36 kgf/cm^2, 511 psi).
3) The brake system being operated is displayed on the Subaru Select Monitor.

2. CONDITIONS FOR ABS SEQUENCE CONTROL

NOTE:
The control operation starts at point A.



VDC00988

(1) All wheel speed
(2) Ignition key
(3) ABS warning light
(4) Switch - stop light
(5) Valve relay
(6) FL decompression valve
(7) FL compression valve
(8) FR decompression valve
(9) FR compression valve
(10) RR decompression valve
(11) RR compression valve
(12) RL decompression valve
(13) RL compression valve
(14) Pump motor
(15) A few seconds
(16) Light OFF
(17) Light ON
(18) 1.0 second
(19) 1.4 seconds
(20) 0.6 seconds
(21) 0.4 seconds
(22) Point A
(23) Master cylinder pressure
(24) FL wheel cylinder pressure
(25) FR wheel cylinder pressure
(26) RR wheel cylinder pressure
(27) RL wheel cylinder pressure

B: SPECIFICATION

1. CONDITIONS FOR COMPLETION OF ABS SEQUENCE CONTROL

When the following conditions develop, the ABS sequence control stops and ABS operation is returned to the normal control mode.

- When the speed of at least one wheel reaches 10 km/h (6 MPH).
- When the brake pedal is released during ABS sequence control and the switch - stop light becomes OFF.
- After completion of ABS sequence control.
- When a malfunction is detected.

6. VDC Sequence Control

A: OPERATION

1) While the VDC sequence control is performed, the operation of the hydraulic unit can be checked using the brake tester or pressure gauge after the hydraulic unit solenoid valve is operated.
2) VDC sequence control can be started by Subaru Select Monitor.

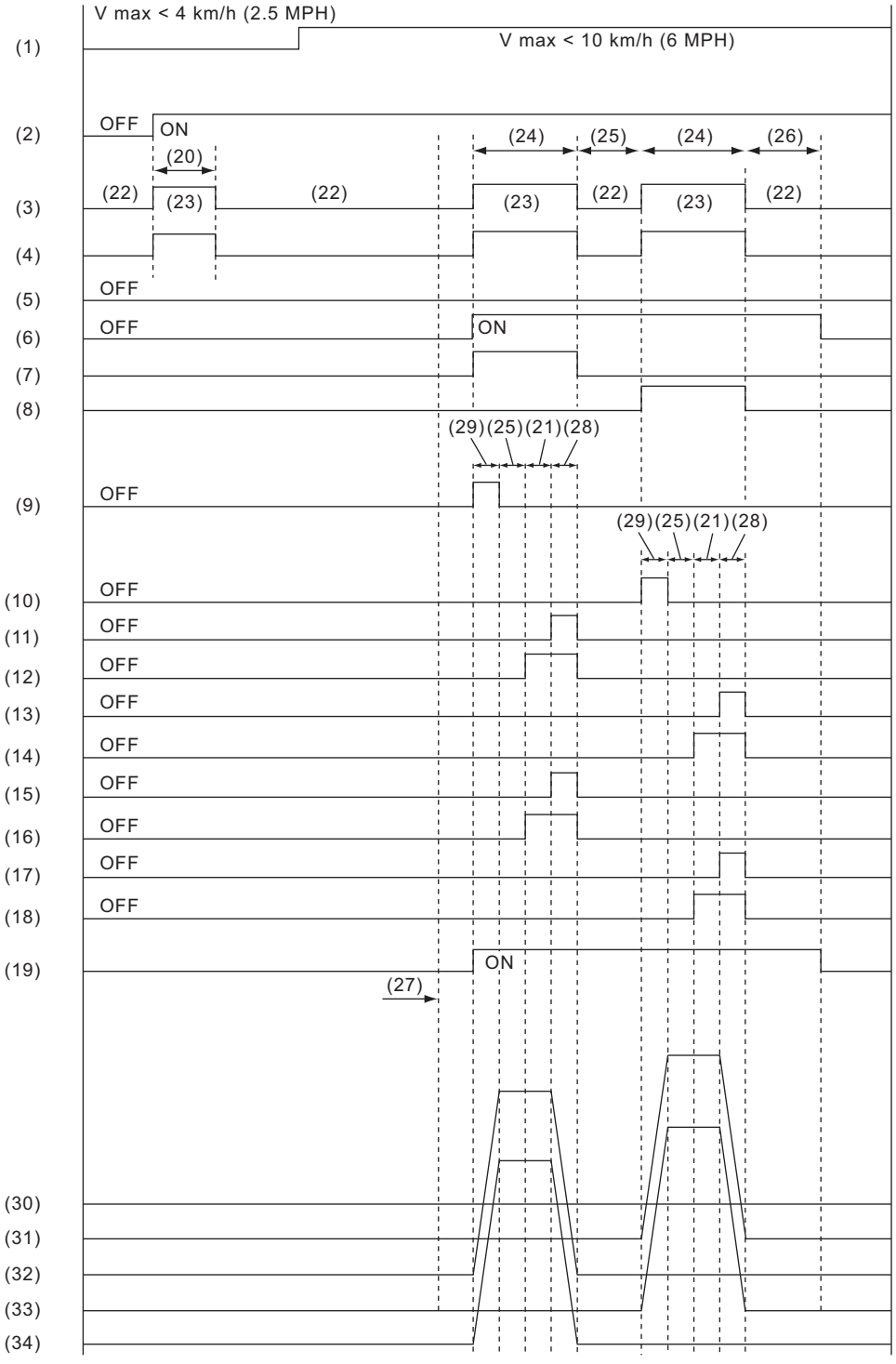
1. VDC SEQUENCE CONTROL WITH SUBARU SELECT MONITOR

NOTE:
In the event of any trouble, sequence control will not operate.
1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to “Application help”.
(1) Turn the ignition switch to ON.
(2) On «Start» display, select «Diagnosis».
(3) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
(4) On «Main Menu» display, select «Each System».
(5) On «Select System» display, select «Brake Control System» and select «Enter».
(6) On «Select Function» display, select «Work Support».
(7) On «Work Support» display, select «VDC Function Check Mode».
2) Operate according to the procedures displayed in the Subaru Select Monitor.
3) The brake system being operated is displayed on the Subaru Select Monitor.

2. CONDITIONS FOR VDC SEQUENCE CONTROL

NOTE:
The control operation starts at point A.



VDC10059

(1) All wheel speed
(2) Ignition key
(3) ABS warning light
(4) VDC warning light
(5) Switch - stop light
(6) Valve relay
(7) VDC switching valve 1 FL
(8) VDC switching valve 1 FR
(9) VDC switching valve 2 FL
(10) VDC switching valve 2 FR
(11) FL decompression valve
(12) FL compression valve
(13) FR decompression valve
(14) FR compression valve
(15) RR decompression valve
(16) RR compression valve
(17) RL decompression valve
(18) RL compression valve
(19) Pump motor
(20) A few seconds
(21) 1.2 seconds
(22) Light OFF
(23) Light ON
(24) 3.4 seconds
(25) 1 second
(26) 1.6 seconds
(27) Point A
(28) 0.4 seconds
(29) 0.8 seconds
(30) Master cylinder pressure
(31) FR wheel cylinder pressure
(32) FL wheel cylinder pressure
(33) RL wheel cylinder pressure
(34) RR wheel cylinder pressure

B: SPECIFICATION

1. CONDITIONS FOR COMPLETION OF VDC SEQUENCE CONTROL

When the following conditions develop, the VDC sequence control stops and VDC operation is returned to the normal control mode.

- When the speed of at least one wheel reaches 10 km/h (6 MPH).
- After completion of VDC sequence control.
- When a malfunction is detected.

7. Yaw Rate and G Sensor

A: NOTE

Yaw rate & longitudinal G and lateral G sensor are integrated with the VDC control module & hydraulic control module (VDCCM&H/U).

B: INSPECTION

1. YAW RATE & LONGITUDINAL G AND LATERAL G SENSOR SIGNAL

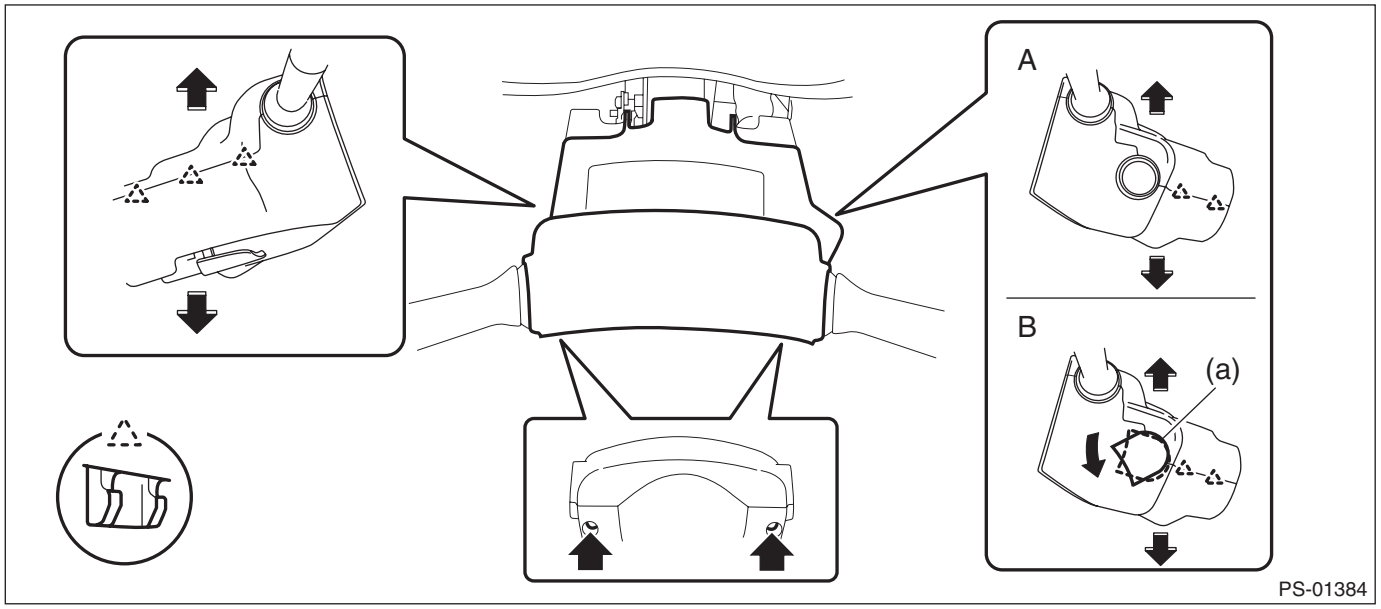
	Step	Check	Yes	No
1	**CHECK YAW RATE & G SENSOR.** 1) Check the installation condition of the VDC control module & hydraulic control module (VDCCM&H/U). 2) Using the Subaru Select Monitor, display «Data monitor». 3) Read the output of «Yaw Rate Sensor», «Longitudinal G Sensor» and «Lateral G Sensor».	When the vehicle is placed horizontally, are the displayed values –1.5 — 1.5 m/s^2 for longitudinal G and lateral G sensor, and –4 — 4 deg/s for yaw rate sensor?	Go to step **2**.	Replace the VDC control module & hydraulic control unit (VDCCM&H/U).
2	**PERFORM DRIVING TEST.** Drive for approximately 10 minutes, and check that there is no system malfunction or the warning light illumination while driving.	Is there any abnormal movement or the warning light illumination while driving?	Perform the diagnosis according to DTCs for the VDC system. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	G sensor is normal.

8. Steering Angle Sensor

A: REPLACEMENT

CAUTION:
• If the steering wheel and steering angle sensor are removed, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Set up mode for Neutral of Steering Angle Sensor & Lateral G Sensor 0 point <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting mode <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Always use the steering wheel puller for removal to avoid deforming the steering wheel.
• If the steering wheel has been removed, make sure that the steering roll connector is not turned from the original position.
1) Set the tire to the straight-ahead position.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
4) Remove the steering wheel. <Ref. to PS-9, REMOVAL, Steering Wheel.>
5) Remove the cover assembly - column.
(1) Release the screws and claws.
(2) Remove the cap - key cylinder (a).
(3) Remove the cover assembly - column UPR and the cover assembly - column LWR.

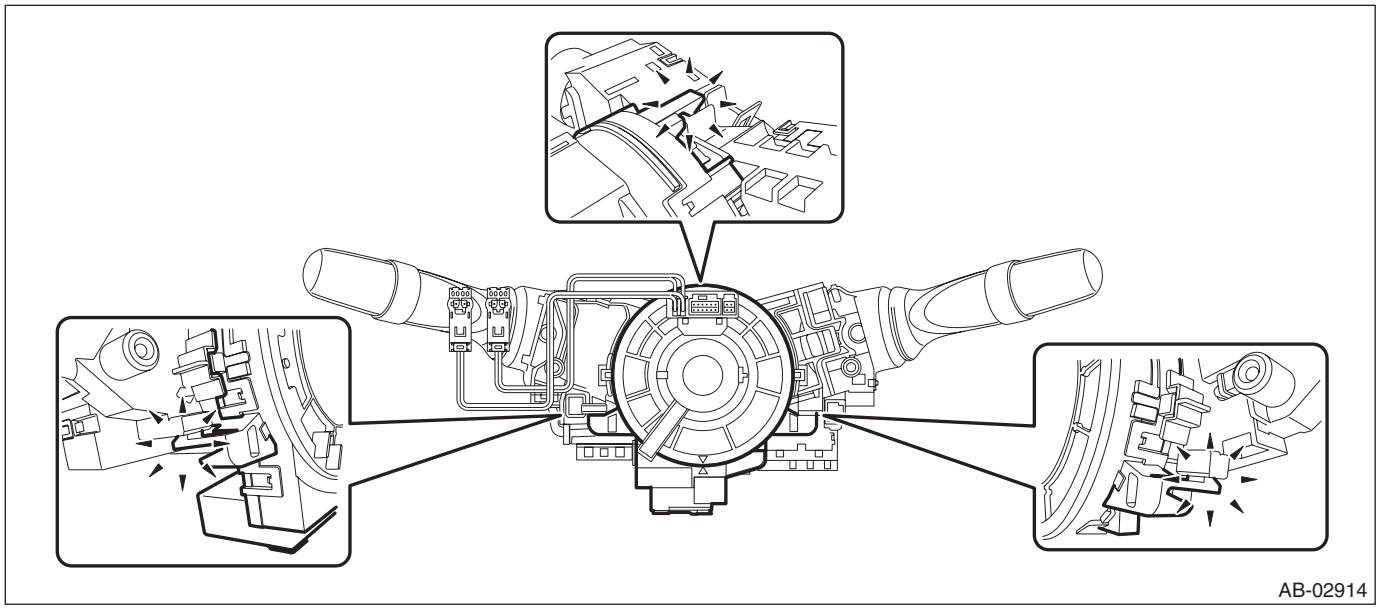


A Model without keyless access with push button start
B Model with keyless access with push button start

6) Remove the steering roll connector.

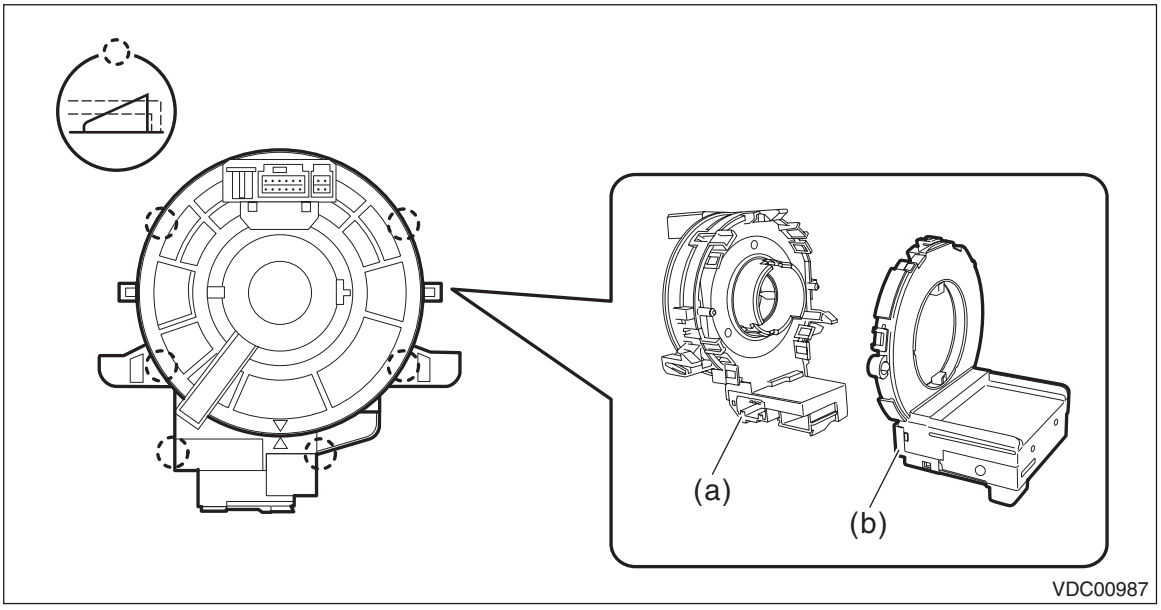
CAUTION:
Make sure that the steering roll connector is not turned from the original position.

(1) Disconnect the connector under the steering roll connector.
(2) Release the claws and remove the steering roll connector.



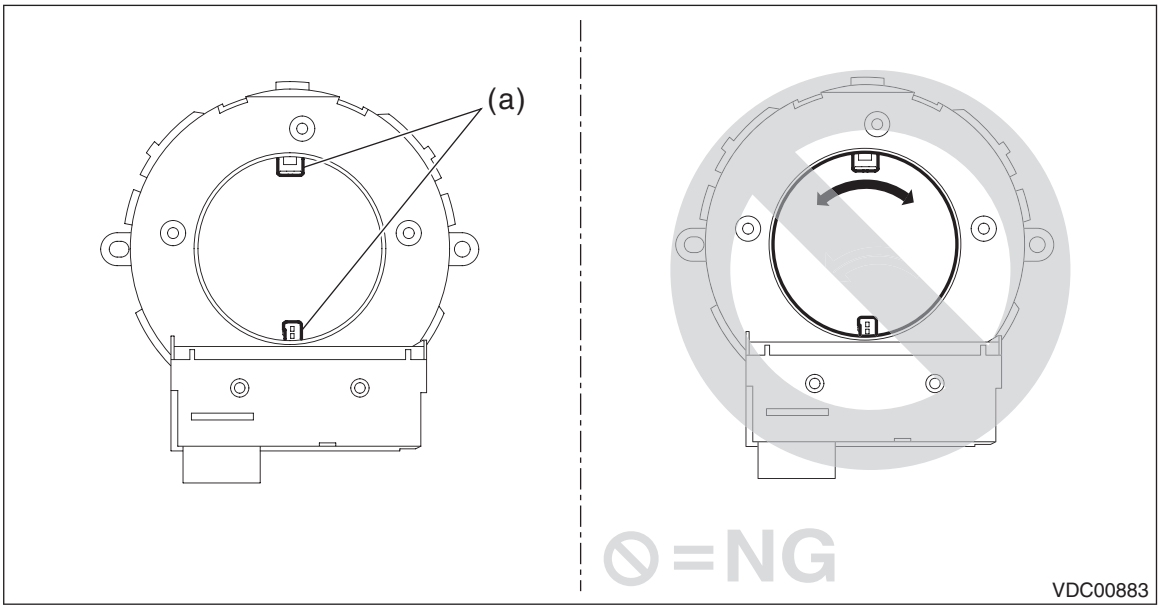
7) Remove the steering angle sensor.

(1) Release the claws and remove the steering angle sensor (b) from the steering roll connector (a).



8) Install the steering angle sensor.
(1) Apply grease to the protrusion (a) of the new steering angle sensor.

CAUTION:
Do not rotate the steering angle sensor protrusion.



(2) Align the center of steering roll connector. <Ref. to AB-70, INSTALLATION, Roll Connector.>
(3) Align the position of the protrusion and install the steering angle sensor to the steering roll connector.
9) Install each part in the reverse order of removal.

Tightening torque:
Steering wheel: 39 N·m (4.0 kgf-m, 28.8 ft-lb)

Clearance:
Between cover assembly - column and steering wheel: 4 — 6 mm (0.16 — 0.24 in)
10) Adjust the steering angle sensor. (Models without EyeSight) <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
11) Adjust the steering angle sensor. (Models with EyeSight)
• Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

9. Front ABS Wheel Speed Sensor

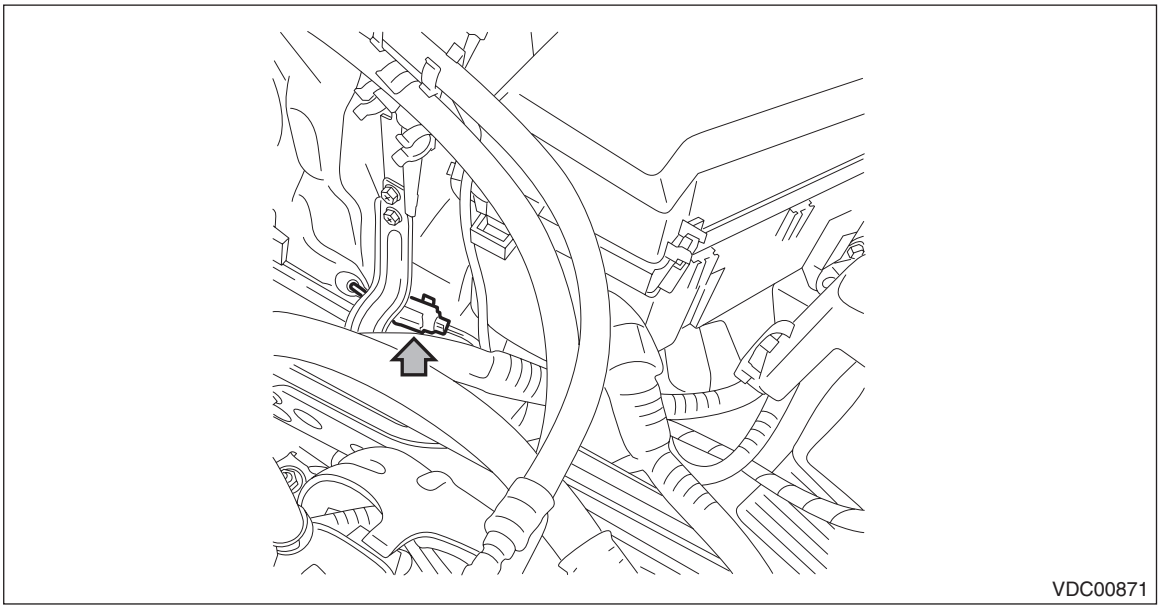
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

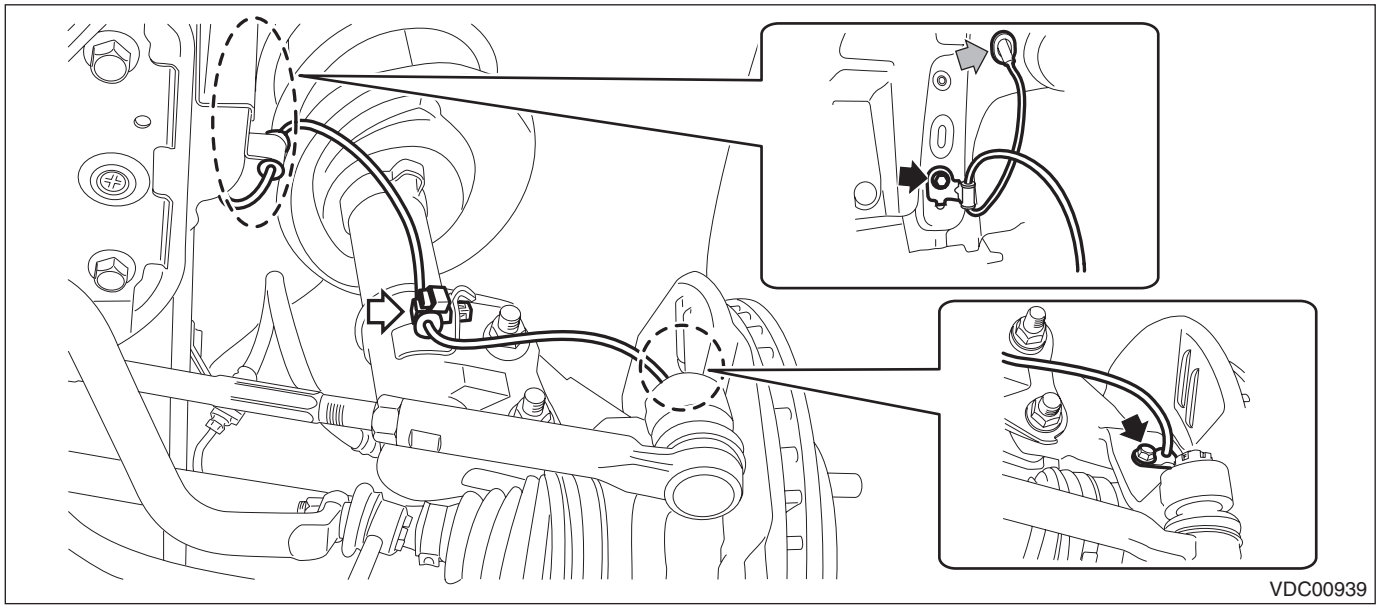
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle, and then remove the front wheels.
3) Remove the front ABS wheel speed sensor.

CAUTION:
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**
- **Leave the sensor harness clamp (white arrow) on the vehicle side.**

(1) Disconnect the connector of the front ABS wheel speed sensor in the engine compartment.



(2) Remove each harness clip and grommet.
(3) Remove the bolts, and remove the front ABS wheel speed sensor from the housing assembly - front axle.



B: INSTALLATION

CAUTION:
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**

Install each part in the reverse order of removal.

NOTE:
- Check the identification (mark) on the harness to make sure there is no warpage. <Ref. to VDC-2, SPECIFICATION, General Description.>
- Check if the harness is not pulled and does not come in contact with the suspension or body while operating the steering.

Tightening torque:
Front ABS wheel speed sensor: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
Front ABS wheel speed sensor bracket: 33 N·m (3.4 kgf-m, 24.3 ft-lb)
Front wheel: Except for C4 model
120 N·m (12.2 kgf-m, 88.5 ft-lb)
Front wheel: C4 model
100 N·m (10.2 kgf-m, 73.8 ft-lb)

C: INSPECTION

1. CHECK WITH SUBARU SELECT MONITOR

1) Connect the Subaru Select Monitor to data link connector.

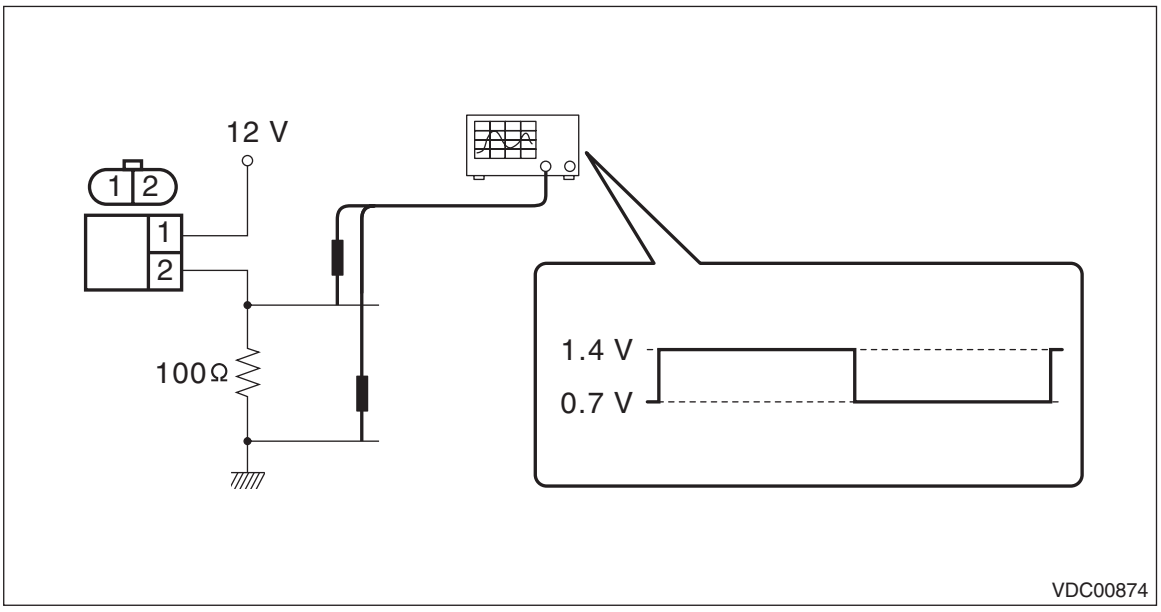
NOTE:
For detailed operation procedures, refer to “Application help”.
(1) On «Start» display, select «Diagnosis».
(2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
(3) On «Main Menu» display, select «Each System».
(4) On «Select System» display, select «Brake Control System» and select «Enter».
(5) On «Select Function» display, select «Data Monitor».
(6) From «Data monitor», select «FR Wheel Speed» and «FL Wheel Speed».

2) Check if the speed indicated on the display changes in the same manner as the speedometer reading during acceleration/deceleration when the steering wheel is in the straight-ahead position.
3) If the speed indicated on the display does not change in the inspection, check the ABS wheel speed sensor. <Ref. to VDC-39, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Front ABS Wheel Speed Sensor.>

2. CHECK ABS WHEEL SPEED SENSOR UNIT

1) Visually check the tip of the ABS wheel speed sensor for foreign particles or damage. If necessary, clean the tip or replace the ABS wheel speed sensor.
2) Disconnect the ABS wheel speed sensor connector.
3) Check the ABS wheel speed sensor cable for discontinuity. If defective, replace the ABS wheel speed sensor.
4) Connect a 12 V power supply to No. 1 terminal of ABS wheel speed sensor connector, then attach resistance to the No. 2 terminal. Rotate the wheel at about 2.75 km/h (2 MPH), and measure the voltage using an oscilloscope.

Standard value of output voltage:
0.7 — 1.4 V



5) Replace the ABS wheel speed sensor if the inspection result is not within the standard value.

10.Rear ABS Wheel Speed Sensor

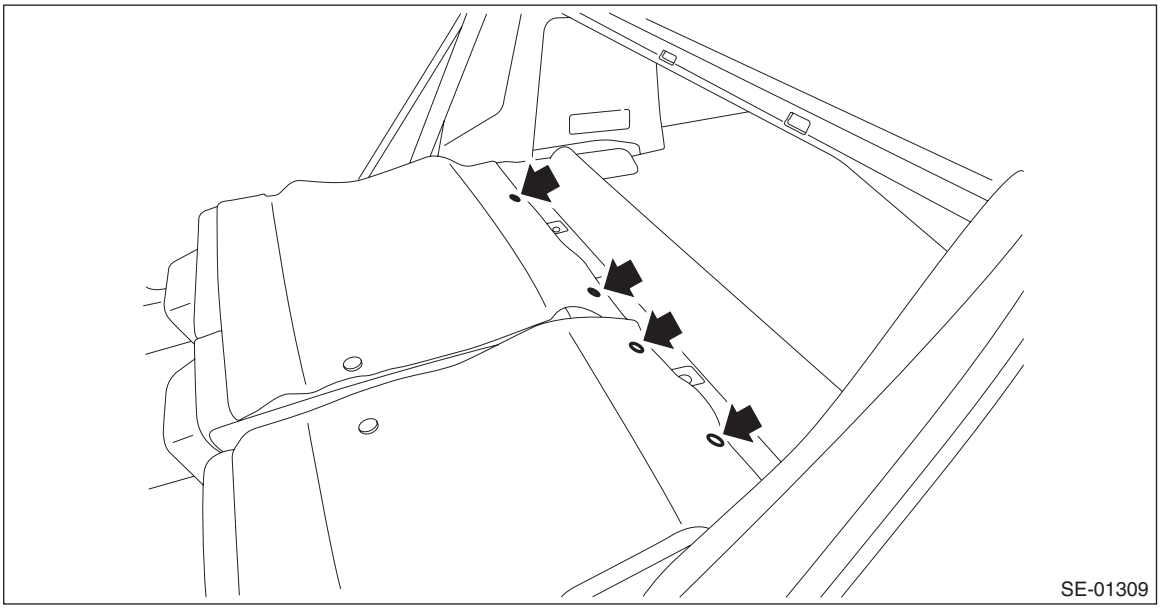
A: REMOVAL

1. 4 DOOR MODEL

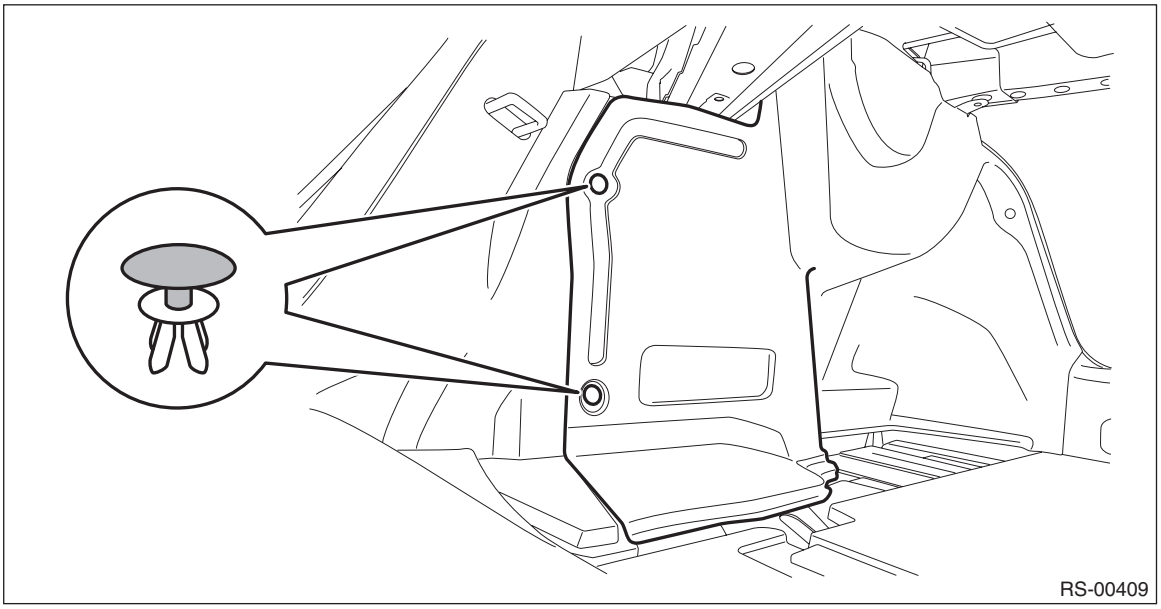
1) Disconnect the ground cable from battery.
2) Lift up the vehicle, and then remove the rear wheels.
3) Remove the rear ABS wheel speed sensor.

CAUTION:
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**
- **Leave the sensor harness clamp (white arrow) on the vehicle side.**

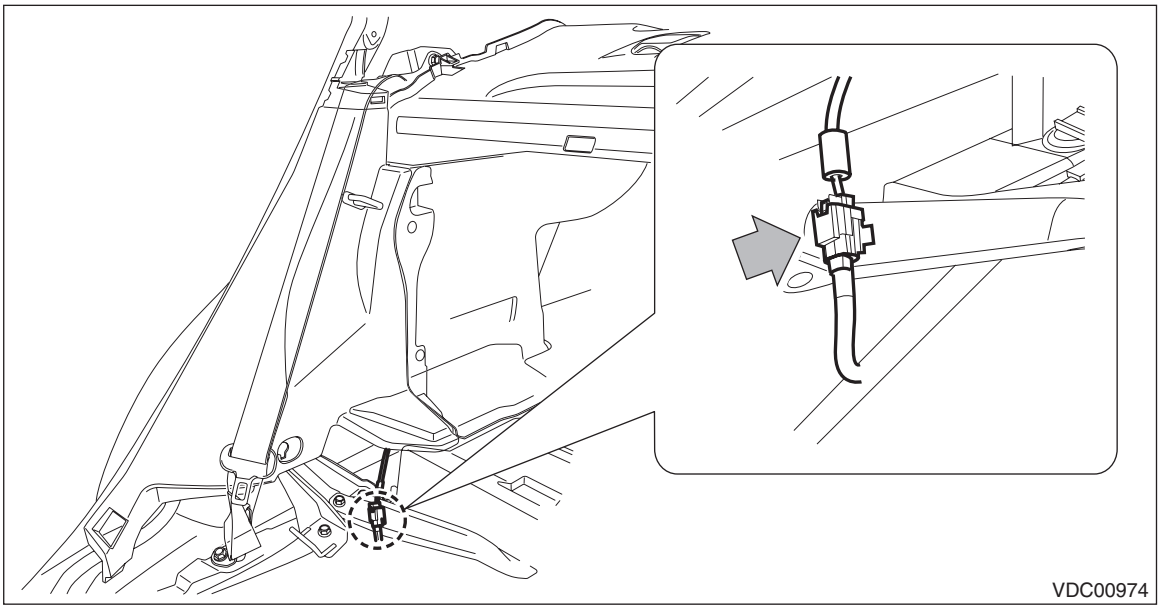
(1) Take out the trunk mat.
(2) Tilt the backrest assembly of the rear seat forward.
(3) Remove the clips located at the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.



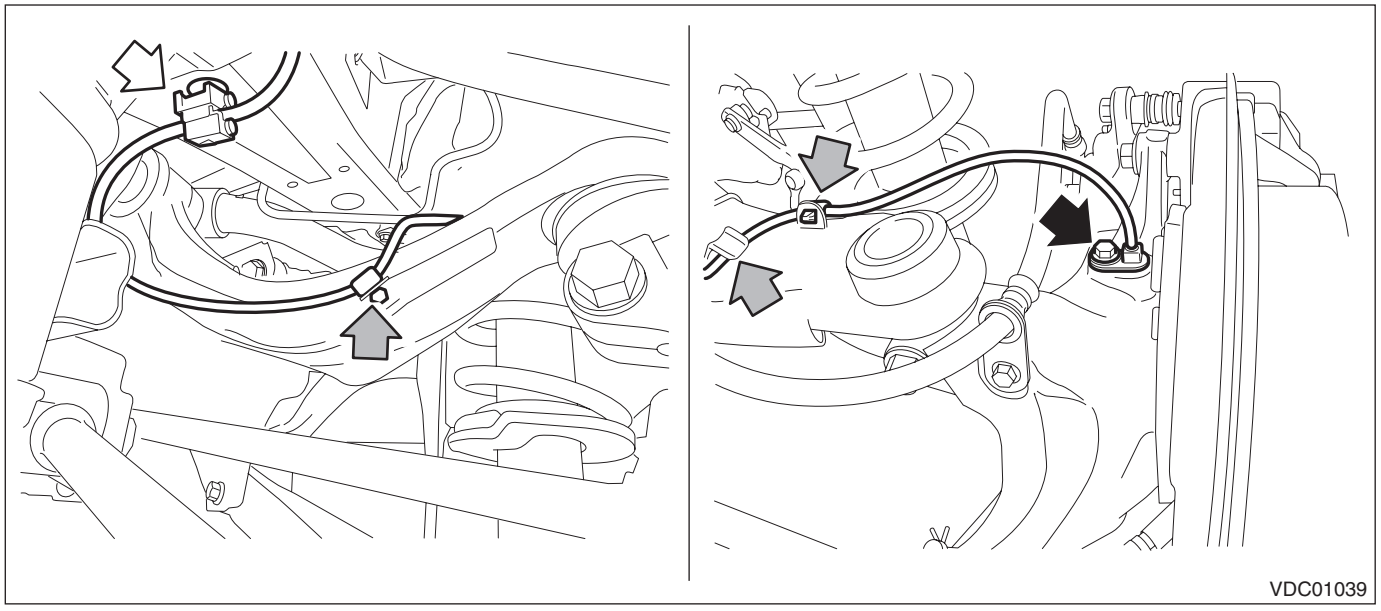
(4) Remove the clips, and turn over the trim panel - trunk side.



(5) Disconnect the connector of the rear ABS wheel speed sensor.



(6) Remove the grommet from the rear wheel housing, and pull out the connector of the rear ABS wheel speed sensor.
(7) Remove the harness clip and bolt, and remove the rear ABS wheel speed sensor.

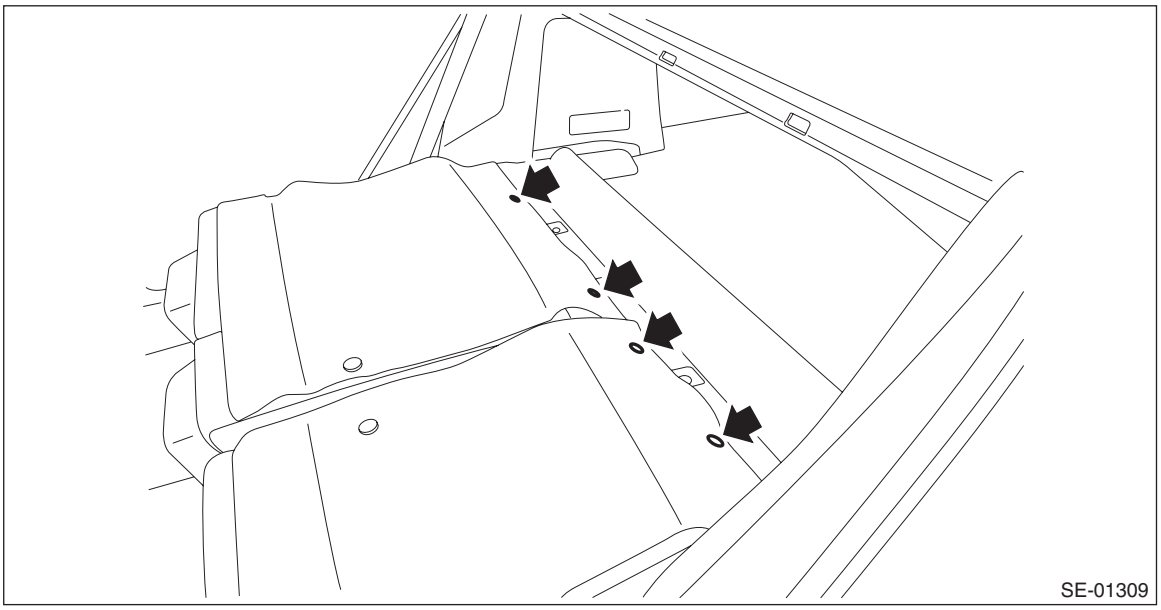


2. 5 DOOR MODEL (GASOLINE ENGINE MODEL)

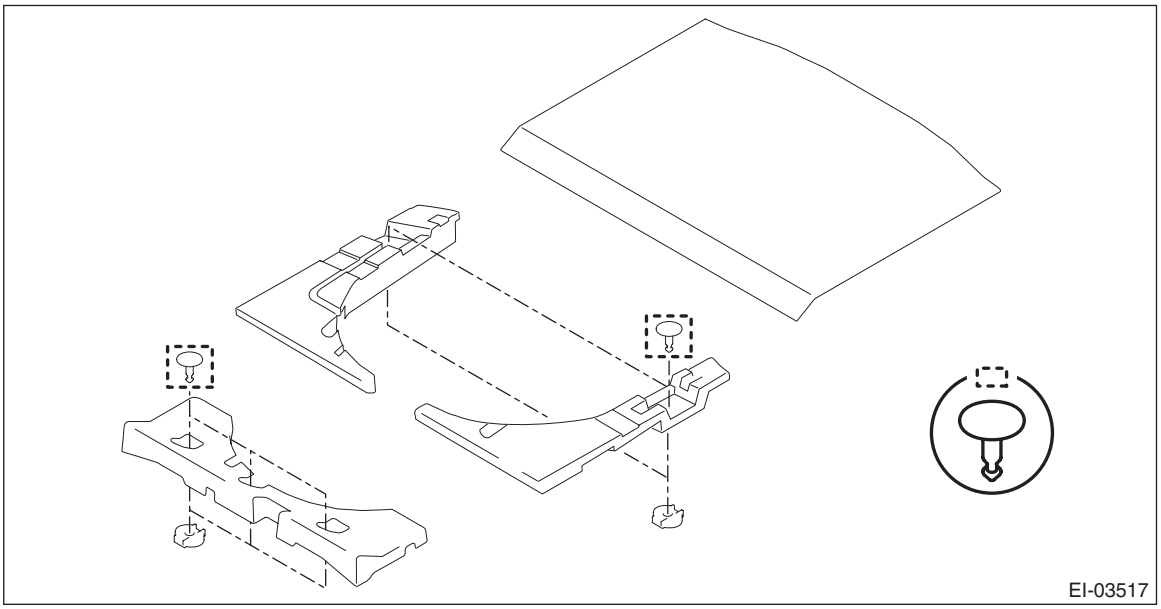
NOTE:
For removal relating to HEV model, refer to “HEV model”. <Ref. to VDC-45, HEV MODEL, REMOVAL, Rear ABS Wheel Speed Sensor.>
1) Disconnect the ground cable from battery.
2) Lift up the vehicle, and then remove the rear wheels.
3) Remove the rear ABS wheel speed sensor.

CAUTION:
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**
- **Leave the sensor harness clamp (white arrow) on the vehicle side.**

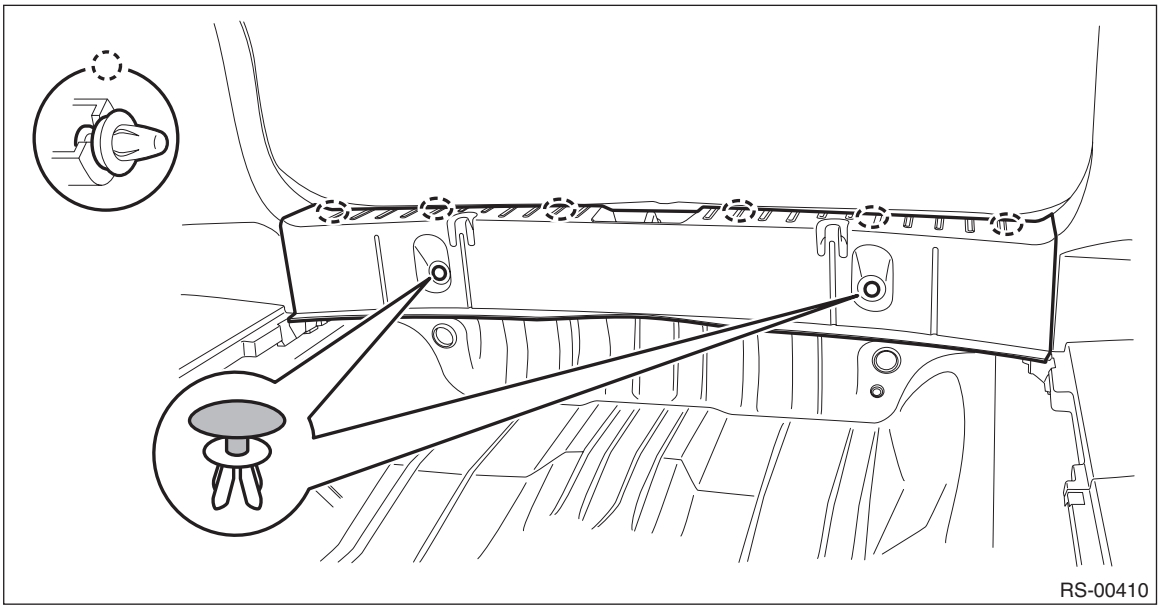
(1) Tilt the backrest assembly of the rear seat forward.
(2) Remove the clips located at the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.


SE-01309

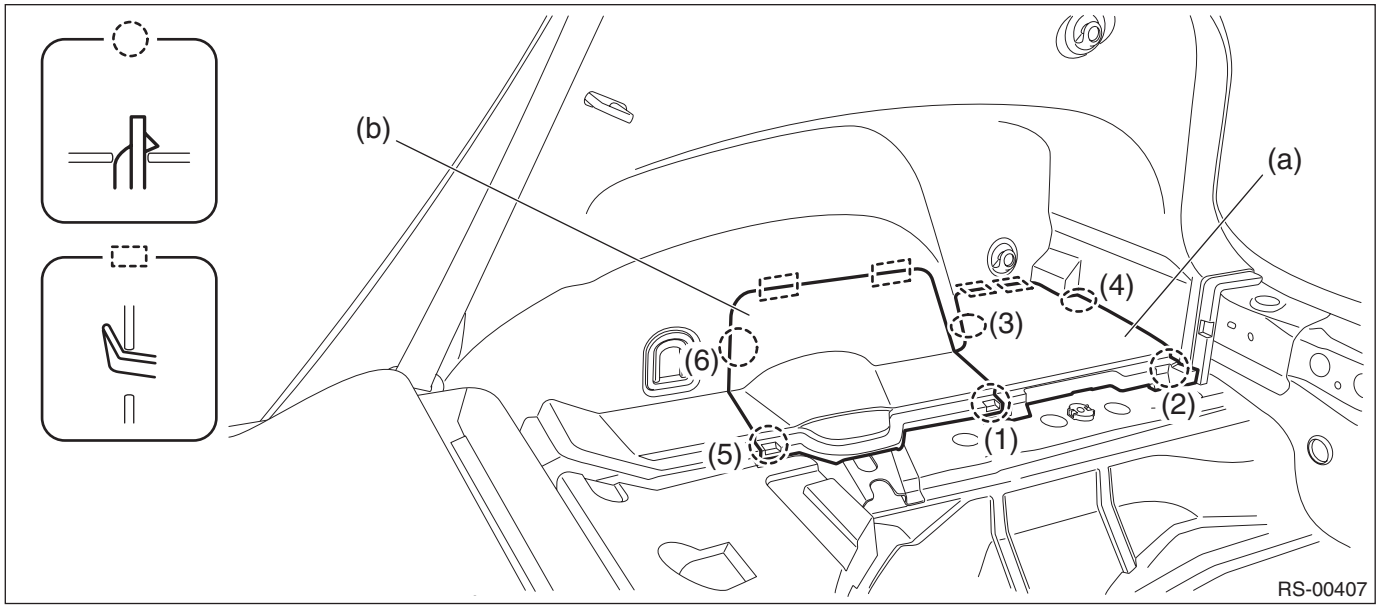
(3) Remove the mat - rear floor CTR and the spacer - rear floor side.


EI-03517

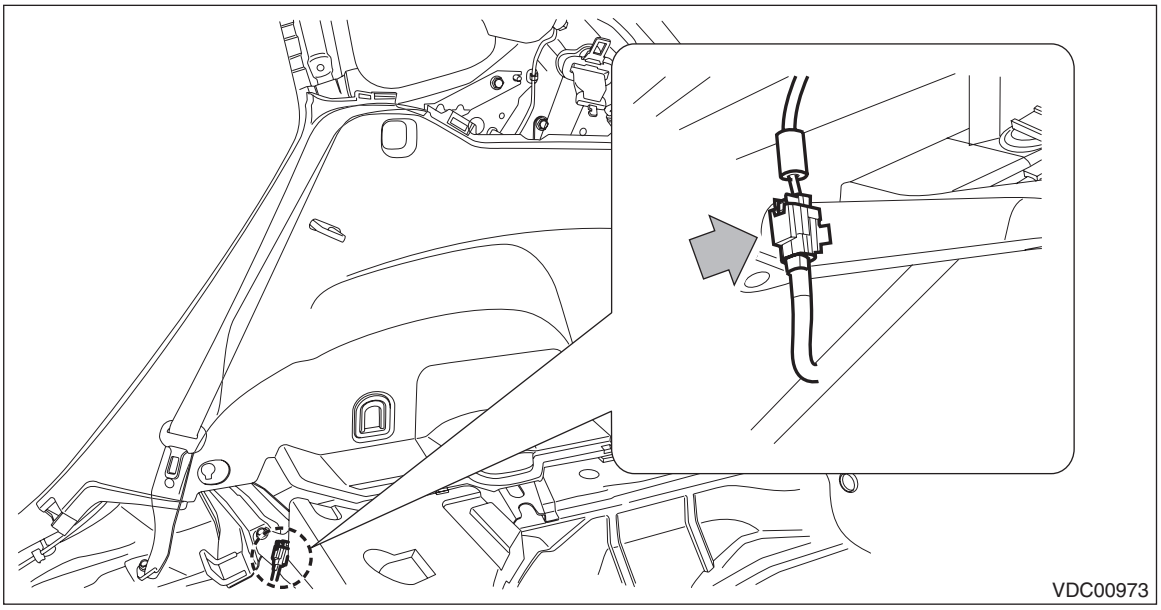
(4) Remove the clips, and remove the trim panel - rear skirt.



(5) Remove the lid upper rear (a) and the cap - rear strut (b) in the order from (1) to (6).

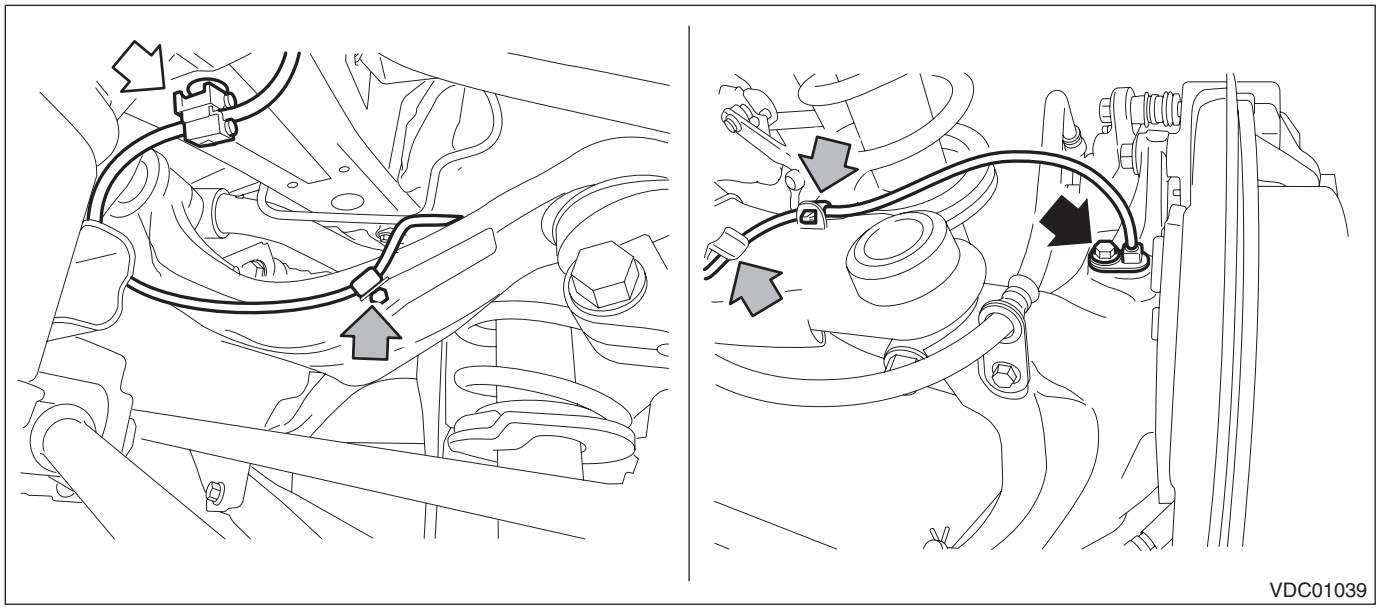


(6) Disconnect the connector of the rear ABS wheel speed sensor.

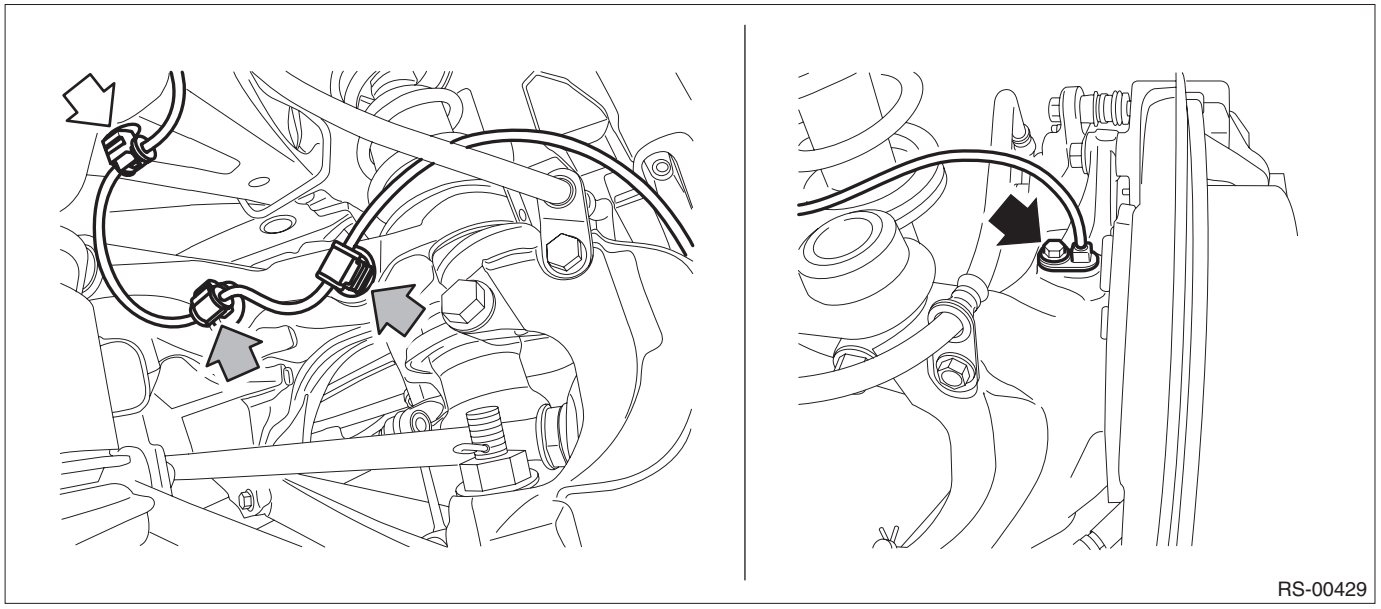


(7) Remove the grommet from the rear wheel housing, and pull out the connector of the rear ABS wheel speed sensor.
(8) Remove the harness clip and bolt, and remove the rear ABS wheel speed sensor.

- Impreza model



- Crosstrek model



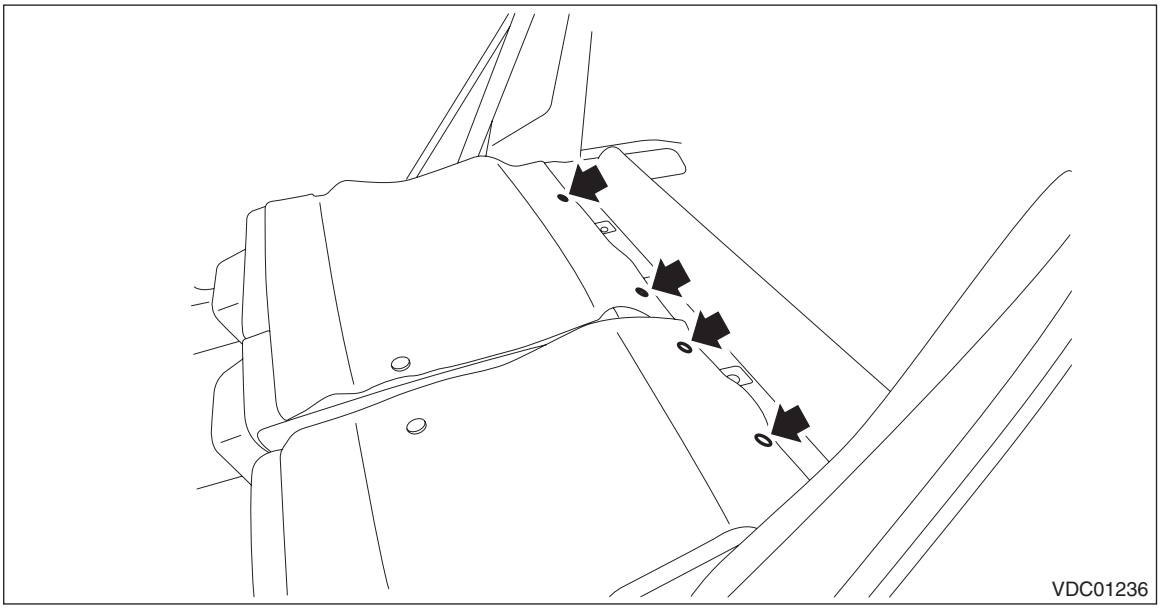
3. HEV MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle, and then remove the rear wheels.
3) Remove the rear ABS wheel speed sensor.

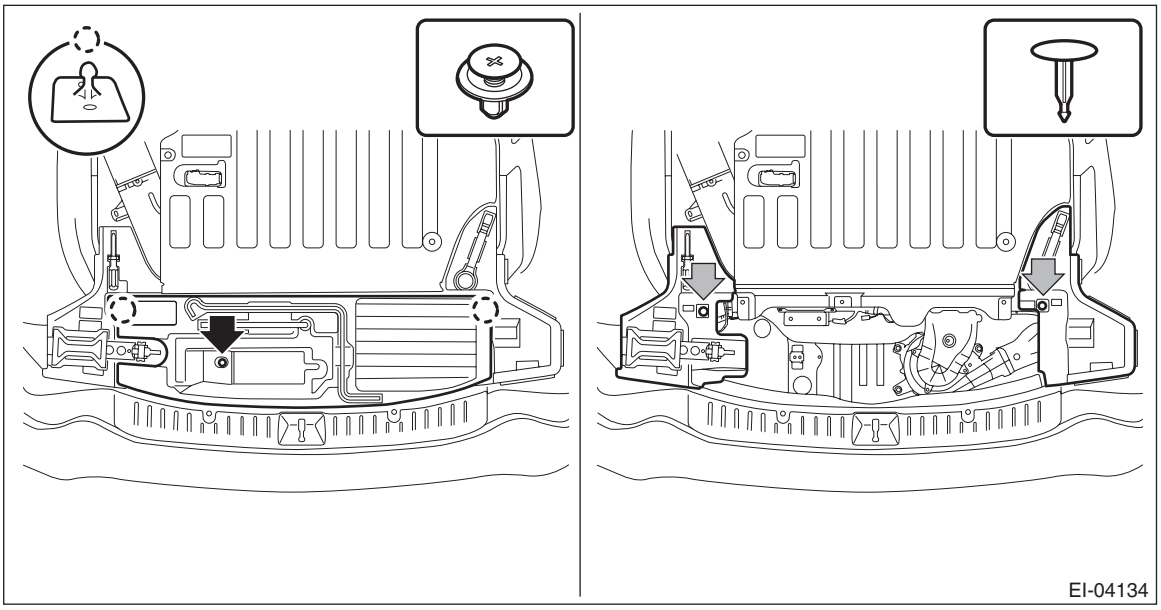
CAUTION:
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**
- **Leave the sensor harness clamp (white arrow) on the vehicle side.**

(1) Tilt the backrest assembly of the rear seat forward.
(2) Remove the clips located at the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.

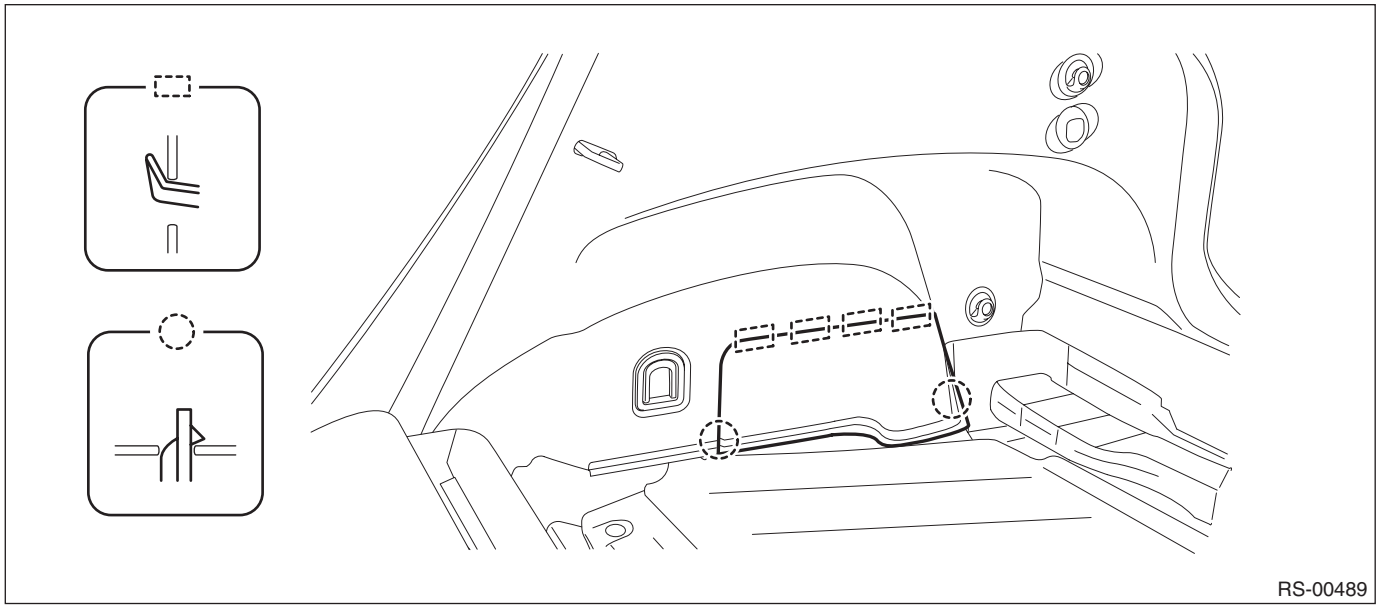


(3) Remove the mat - rear floor CTR.
(4) Release the clips and side spacers, then detach the sub-trunk box.

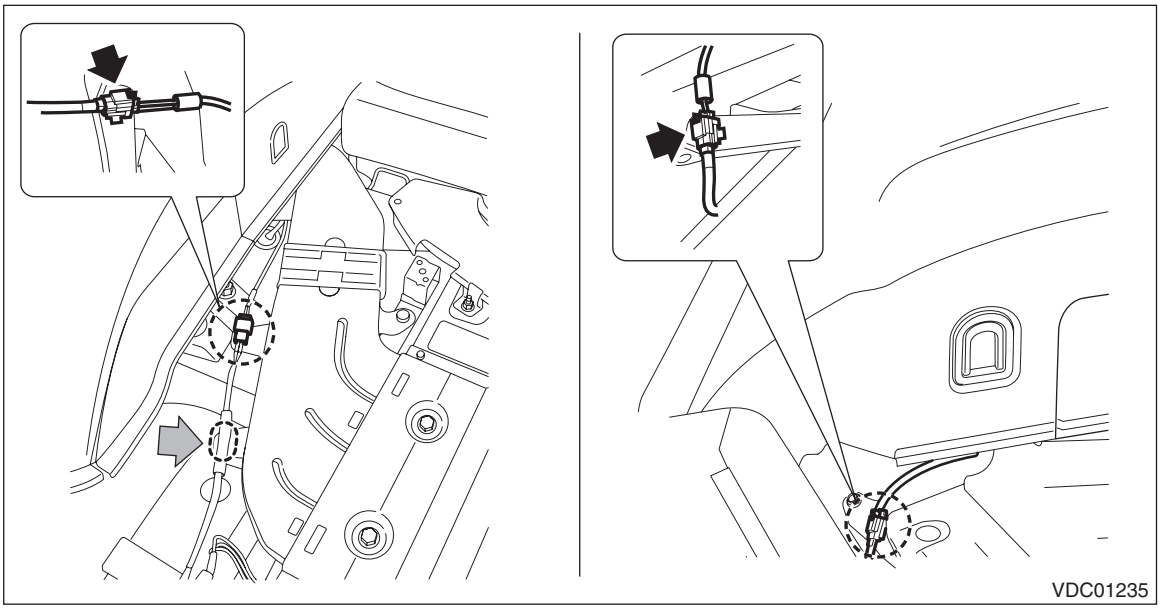
(5) Remove the clips and detach the side spacers.



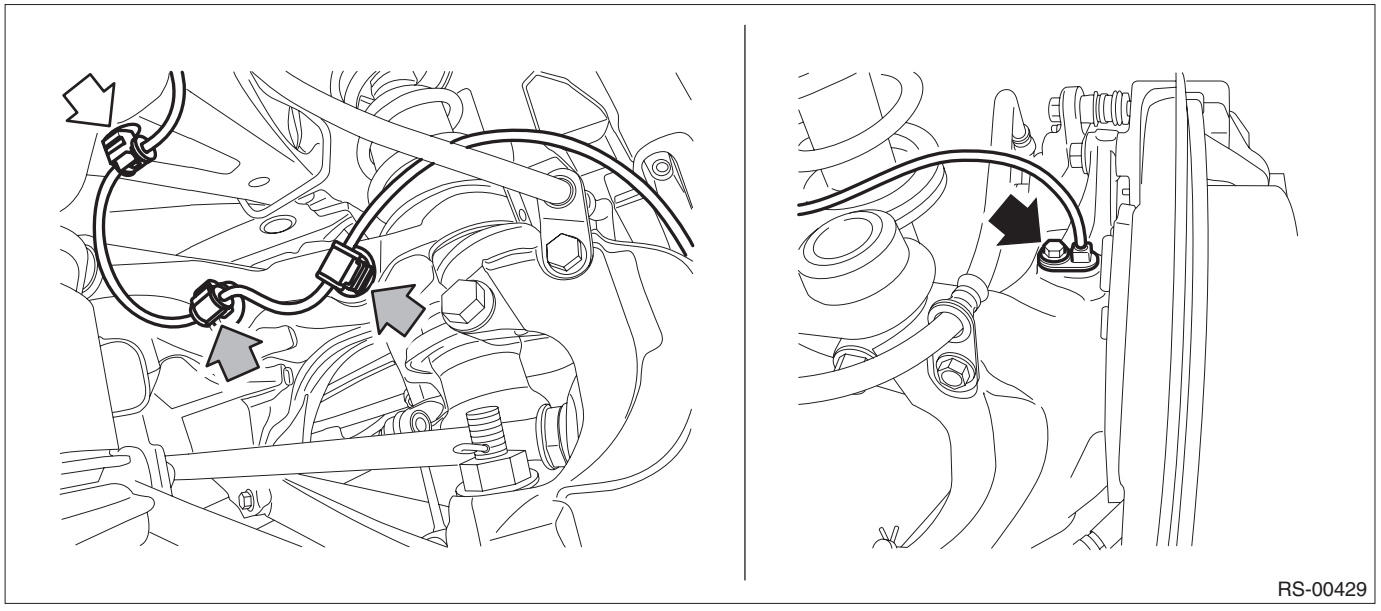
(6) Remove the cap - rear strut.



(7) Remove the clips, and disconnect the rear ABS wheel speed sensor connector.



(8) Remove the grommet from the rear wheel housing, and pull out the connector of the rear ABS wheel speed sensor.
(9) Remove the harness clip and bolt, and remove the rear ABS wheel speed sensor.



B: INSTALLATION

CAUTION:
Be careful not to damage the sensor.
1) Install each part in the reverse order of removal.
2) Route the rear ABS wheel speed sensor cable to the upper arm assembly.

NOTE:
Check the identification (mark) on the harness to make sure there is no warpage. <Ref. to VDC-2, SPECIFICATION, General Description.>

Tightening torque:
Rear ABS wheel speed sensor: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
Rear wheel (except for C4 model): 120 N·m (12.2 kgf-m, 88.5 ft-lb)
Rear wheel (C4 model): 100 N·m (10.2 kgf-m, 73.8 ft-lb)

C: INSPECTION

1. CHECK WITH SUBARU SELECT MONITOR

1) Connect the Subaru Select Monitor to data link connector.

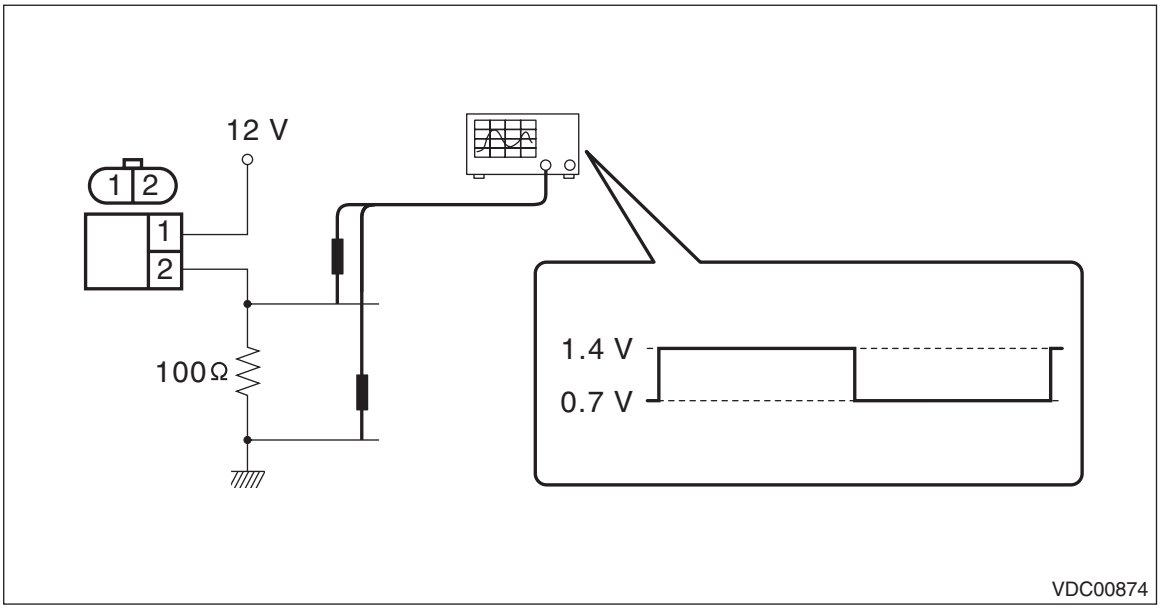
NOTE:
For detailed operation procedures, refer to “Application help”.
(1) On «Start» display, select «Diagnosis».
(2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
(3) On «Main Menu» display, select «Each System».
(4) On «Select System» display, select «Brake Control System» and select «Enter».
(5) On «Select Function» display, select «Data Monitor».
(6) From «Data monitor», select «RR Wheel Speed» and «RL Wheel Speed».

2) Check if the speed indicated on the display changes in the same manner as the speedometer reading during acceleration/deceleration when the steering wheel is in the straight-ahead position.
3) If the speed indicated on the display does not change in the inspection, check the ABS wheel speed sensor. <Ref. to VDC-39, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Front ABS Wheel Speed Sensor.>

2. CHECK ABS WHEEL SPEED SENSOR UNIT

1) Visually check the tip of the ABS wheel speed sensor for foreign particles or damage. If necessary, clean the tip or replace the ABS wheel speed sensor.
2) Disconnect the ABS wheel speed sensor connector.
3) Check the ABS wheel speed sensor cable for discontinuity. If defective, replace the ABS wheel speed sensor.
4) Connect a 12 V power supply to No. 1 terminal of ABS wheel speed sensor connector, then attach resistance to the No. 2 terminal. Rotate the wheel at about 2.75 km/h (2 MPH), and measure the voltage using an oscilloscope.

Standard value of output voltage:
0.7 — 1.4 V



5) Replace the ABS wheel speed sensor if the inspection result is not within the standard value.

11.Front Magnetic Encoder

A: REMOVAL

Refer to “Front Hub Unit Bearing” for removal, because the front magnetic encoder is integrated with the hub unit COMPL - front axle. <Ref. to DS-24, REMOVAL, Front Hub Unit Bearing.>

B: INSTALLATION

Refer to “Front Hub Unit Bearing” for installation, because the front magnetic encoder is integrated with the hub unit COMPL - front axle. <Ref. to DS-27, INSTALLATION, Front Hub Unit Bearing.>

C: INSPECTION

Visually check the magnetic encoder for any damage. If necessary, replace with a new hub unit COMPL - front axle.

NOTE:
Because the magnetic encoder is integrated with hub unit COMPL, replace the hub unit COMPL with a new part if there is any defect found on the magnetic encoder.

12.Rear Magnetic Encoder

A: REMOVAL

Refer to “Rear Hub Unit Bearing” for removal, because the rear magnetic encoder is integrated with the hub unit COMPL - rear axle. <Ref. to DS-43, REMOVAL, Rear Hub Unit Bearing.>

B: INSTALLATION

Refer to “Rear Hub Unit Bearing” for installation, because the rear magnetic encoder is integrated with the hub unit COMPL - rear axle. <Ref. to DS-48, INSTALLATION, Rear Hub Unit Bearing.>

C: INSPECTION

Visually check the magnetic encoder parts for any damage. If necessary, replace with a new hub unit COMPL - rear axle.

NOTE:
Because the magnetic encoder is integrated with hub unit COMPL, replace the hub unit COMPL with a new part if there is any defect found on the magnetic encoder.

13.VDC OFF Switch

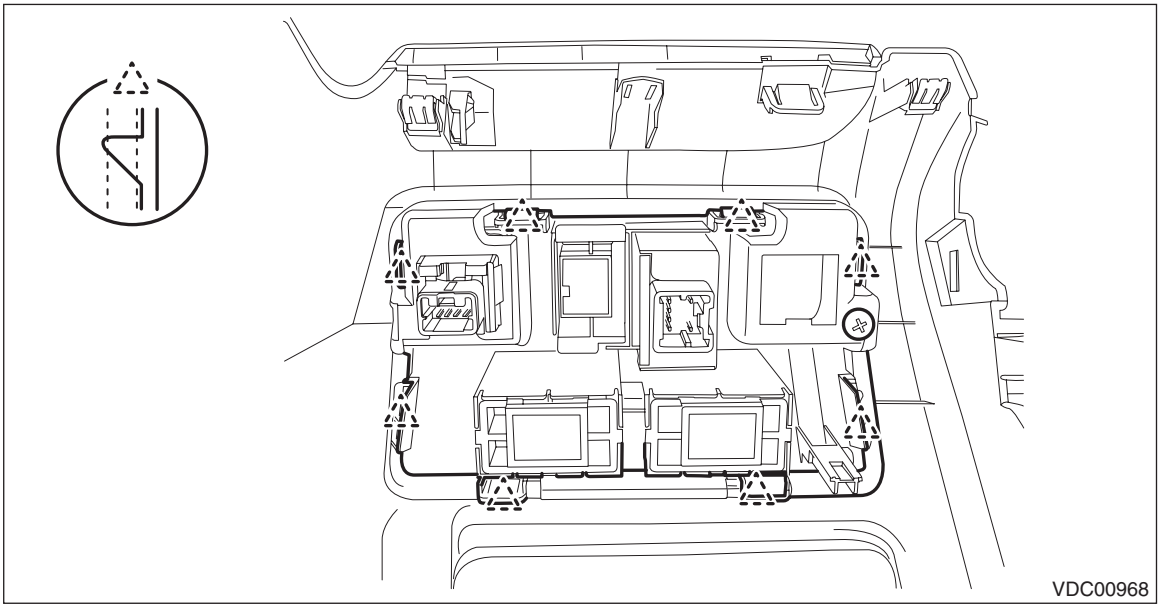
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

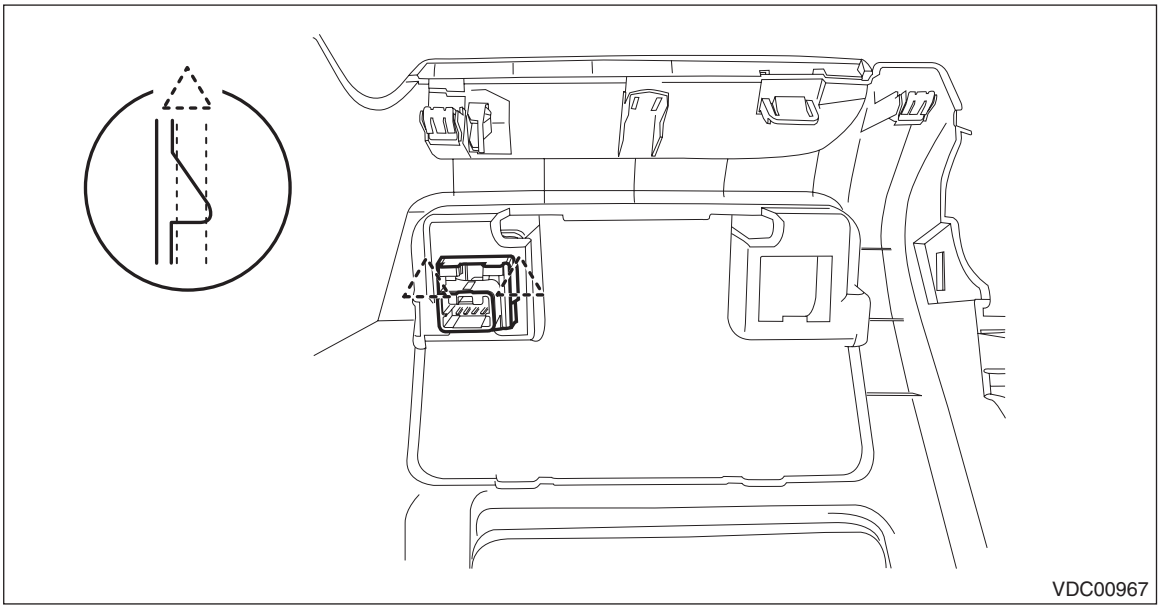
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the cover assembly - instrument panel LWR driver OUT. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>

3) Remove the screws and release the claws, then detach the cover.



4) Release the claws and remove the VDC OFF switch.



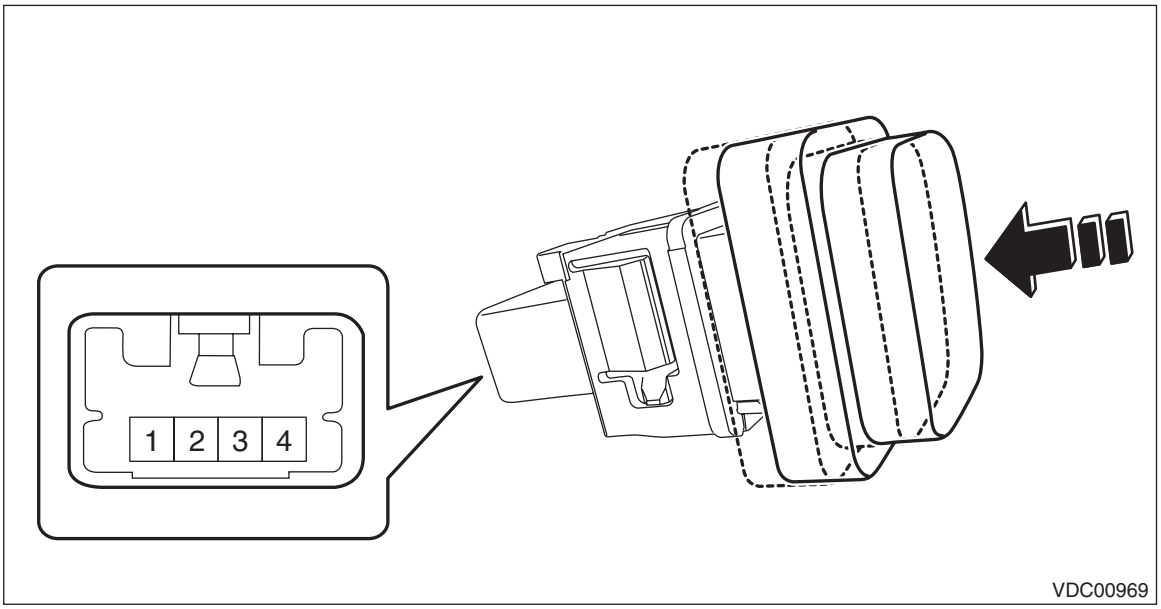
B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Disconnect the VDC OFF switch connector.
2) Check the resistance between the VDC OFF switch terminals.

PREPARATION TOOL:
Circuit tester



Terminal No.	Inspection conditions	Standard
2 — 3	Switch OFF	1 MΩ or more
	Switch ON	Less than 1 Ω

3) Replace the VDC OFF switch if the inspection result is not within the standard value.

VEHICLE DYNAMICS CONTROL (VDC) (DIAGNOSTICS)

VDC(diag)

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7.	Read Diagnostic Trouble Code (DTC)	24
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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
Remove foreign matter (dust, water, oil etc.) from the VDCCM&H/U connector during removal and installation.

NOTE:
- To check the harness for open or short circuits, shake problem spot or connector.
- Refer to “Check List for Interview”. <Ref. to VDC(diag)-4, Check List for Interview.>

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to VDC(diag)-4, Check List for Interview.> 2) Before performing diagnostics, check the component which might affect VDC problems. <Ref. to VDC(diag)-8, INSPECTION, General Description.>	Is the component that might influence the VDC problem normal?	Go to step **2**.	Repair or replace each component.
2	**CHECK INDICATION OF DTC.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch to ON and run the Subaru Select Monitor. 4) Read the DTC using the Subaru Select Monitor. <Ref. to VDC(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to VDC(diag)-20, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>	Is DTC displayed on Subaru Select Monitor?	Record the DTC, time stamp and freeze frame data. Go to step **4**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Go to step **3**.

	Step	Check	Yes	No
3	**PERFORM GENERAL DIAGNOSTICS.** 1) Perform the inspection by referring to "General Diagnostic Table". <Ref. to VDC(diag)-151, INSPECTION, General Diagnostic Table.> 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, OPERATION, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, PROCEDURE, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).> 5) Check the DTC is not displayed.	Do the VDC warning light & VDC indicator light, VDC OFF indicator light and ABS warning light go off after starting the engine?	Finish the diagnosis.	Check the combination meter circuit. <Ref. to VDC(diag)-32, ABS WARNING LIGHT DOES NOT GO OFF, Warning Light Illumination Pattern.> <Ref. to VDC(diag)-33, VDC WARNING LIGHT AND VDC INDICATOR LIGHT DO NOT GO OFF, Warning Light Illumination Pattern.> <Ref. to VDC(diag)-34, VDC OFF INDICATOR LIGHT DOES NOT GO OFF, Warning Light Illumination Pattern.>
4	**PERFORM DIAGNOSIS.** 1) Refer to "List of Diagnostic Trouble Code (DTC)". NOTE: For the DTC list, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to VDC(diag)-41, LIST, List of Diagnostic Trouble Code (DTC).> 2) Correct the cause of trouble. 3) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, OPERATION, Clear Memory Mode.> 4) Perform the Inspection Mode. <Ref. to VDC(diag)-25, PROCEDURE, Inspection Mode.> 5) Read the DTC. <Ref. to VDC(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Repeat step 4 until DTC is not shown.	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Check the following item about the vehicle's state.

1. STATE OF ABS WARNING LIGHT

ABS warning light illuminates.	❑ Always ❑ Sometimes ❑ Only once ❑ Does not illuminate • When/How long does it illuminate?		
Ignition key position	❑ LOCK ❑ ACC ❑ ON (before starting engine) ❑ START ❑ ON (after starting engine, engine is running) ❑ ON (after starting engine, engine is at a standstill)		
Timing	❑ Immediately after turning the ignition switch to ON ❑ Immediately after turning the ignition switch to START		
	❑ While accelerating	—	km/h
		—	MPH
	❑ While driving at a constant speed	km/h	MPH
	❑ While decelerating	—	km/h
		—	MPH
	❑ When turning to the right	Steering angle:	deg
		Steering time:	Sec.
	❑ When turning to the left	Steering angle:	deg
		Steering time:	Sec.
	❑ When other electrical parts are operating		
	• Part name: • Operating condition:		

2. STATE OF VDC WARNING LIGHT & VDC INDICATOR LIGHT

VDC warning light & VDC indicator light illuminates.	❑ Always ❑ Sometimes ❑ Only once ❑ Does not illuminate • When/How long does it illuminate?		
Ignition key position	❑ LOCK ❑ ACC ❑ ON (before starting engine) ❑ START ❑ ON (after starting engine, engine is running) ❑ ON (after starting engine, engine is at a standstill)		
Timing	❑ Immediately after turning the ignition switch to ON ❑ Immediately after turning the ignition switch to START		
	❑ While accelerating	—	km/h
		—	MPH
	❑ While driving at a constant speed	km/h	MPH
	❑ While decelerating	—	km/h
		—	MPH
	❑ When turning to the right	Steering angle:	deg
		Steering time:	Sec.
	❑ When turning to the left	Steering angle:	deg
		Steering time:	Sec.
	❑ When other electrical parts are operating		
	• Part name: • Operating condition:		

3. STATE OF VDC OFF INDICATOR LIGHT

VDC OFF indicator light illuminates.	❑ Always ❑ Sometimes ❑ Only once ❑ Does not illuminate • When/How long does it illuminate?		
Ignition key position	❑ LOCK ❑ ACC ❑ ON (before starting engine) ❑ START ❑ ON (after starting engine, engine is running) ❑ ON (after starting engine, engine is at a standstill)		
Timing	❑ Immediately after turning the ignition switch to ON ❑ Immediately after turning the ignition switch to START		
	❑ While accelerating	—	km/h
		—	MPH
	❑ While driving at a constant speed	km/h	MPH
	❑ While decelerating	—	km/h
		—	MPH
	❑ When turning to the right	Steering angle:	deg
		Steering time:	Sec.
	❑ When turning to the left	Steering angle:	deg
		Steering time:	Sec.
	❑ When other electrical parts are operating		
	• Part name: • Operating condition:		

4. CONDITIONS UNDER WHICH TROUBLE OCCURS

Environment	a) Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Others:
	b) Ambient temperature	°C (°F)
	c) Road	❑ Inner city ❑ Suburbs ❑ Highway ❑ Local street ❑ Uphill ❑ Downhill ❑ Paved road ❑ Gravel road ❑ Muddy road ❑ Sandy place ❑ Straight road ❑ Sharp curve ❑ Gentle curve ❑ S-curve ❑ Road with a slope on both sides ❑ Others:
	d) Road surface	❑ Dry ❑ Wet ❑ Covered with fresh snow ❑ Covered with hardened snow ❑ Frozen slope ❑ Others:

Condition	a) Brakes	Deceleration:	G
		❑ continuous / ❑ intermittent	
	b) Accelerator	Acceleration:	G
		❑ continuous / ❑ intermittent	
	c) Vehicle speed	km/h	MPH
		❑ Advancing ❑ While accelerating ❑ While decelerating ❑ At low speed ❑ When turning ❑ Others:	
	d) Tire inflation pressure	Front RH tire:	kPa
		Front LH tire:	kPa
		Rear RH tire:	kPa
		Rear LH tire:	kPa
	e) Degree of wear	Front RH tire:	mm (in)
		Front LH tire:	mm (in)
		Rear RH tire:	mm (in)
		Rear LH tire:	mm (in)
	f) Steering wheel	❑ Sharp turning ❑ Gentle turning ❑ Straight forward motion ❑ Gentle return ❑ Sharp return	
	g) Tire/Wheel size	❑ Specified size ❑ Except specification ( )	
	h) Tire variation	❑ Summer tire ❑ Studless tire (Brand:)	
	i) Tire chain is attached: ❑ Yes / ❑ No		
	j) Using T-type tires: ❑ Yes / ❑ No		
	k) Condition of suspension alignment:		
	l) Load condition:		
	m) Repaired parts are used: ❑ Yes / ❑ No		
	• Content:		
	n) Others:		

3. General Description

A: CAUTION

1. SUPPLEMENTAL RESTRAINT SYSTEM "AIRBAG"

Airbag system wiring harness is routed near the ABS wheel speed sensor and VDCCM&H/U.

CAUTION:
• Do not use electrical test equipment on wiring harness and connector circuits of the airbag system.
• Be careful not to damage the airbag system wiring harness when servicing the ABS wheel speed sensor and VDCCM&H/U.

B: INSPECTION

Before performing diagnosis, check the following items which might affect VDC problems.

1. BATTERY

Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>

2. GROUND

Check the tightening torque of the ground bolt for VDC.

3. BRAKE FLUID

1) Check the brake fluid level.
2) Check the brake fluid for leaks.

4. HYDRAULIC UNIT

Check the hydraulic unit.
• When using the brake tester <Ref. to VDC-19, CHECKING THE HYDRAULIC UNIT ABS OPERATION WITH THE BRAKE TESTER, INSPECTION, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• When not using the brake tester <Ref. to VDC-18, CHECKING THE HYDRAULIC UNIT ABS OPERATION BY PRESSURE GAUGE, INSPECTION, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

5. BRAKE DRAG

Check for brake drag.

6. BRAKE PAD AND ROTOR

Check the brake pad and rotor.
• Front <Ref. to BR-20, INSPECTION, Front Brake Pad.> <Ref. to BR-22, INSPECTION, Front Disc Rotor.>
• Rear <Ref. to BR-34, INSPECTION, Rear Brake Pad.> <Ref. to BR-38, INSPECTION, Rear Disc Rotor.>

7. TIRES

Check the tire specifications, tire wear and air pressure. <Ref. to WT-2, SPECIFICATION, General Description.>

C: PREPARATION TOOL

1. SPECIAL TOOL

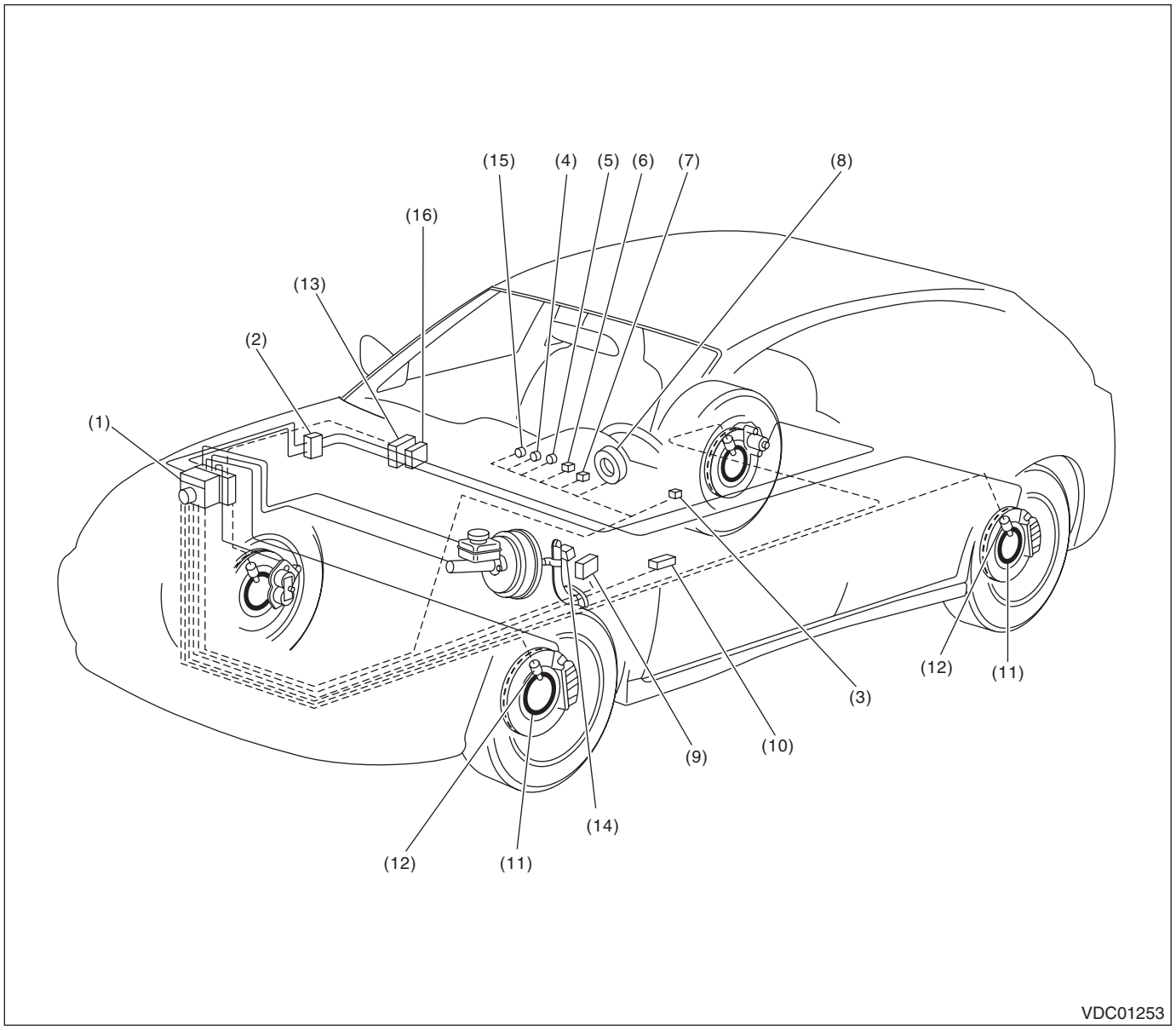
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.
DST-i	Used together with Subaru Select Monitor 4.

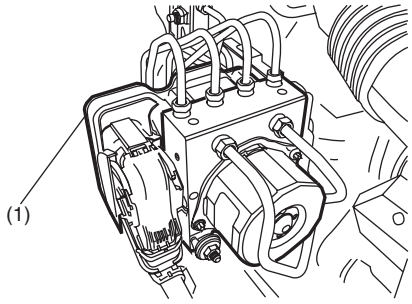
4. Electrical Component Location

A: LOCATION



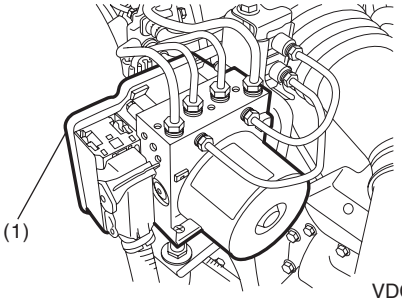
(1) VDC control module and hydraulic control unit (VDCCM&H/U)
(2) Connector
(3) VDC OFF switch
(4) ABS warning light
(5) Brake warning light (EBD warning light)
(6) VDC warning light & VDC indicator light
(7) VDC OFF indicator light
(8) Steering angle sensor
(9) Transmission control module (TCM)
(10) Data link connector
(11) Magnetic encoder
(12) ABS wheel speed sensor
(13) Engine control module (ECM)
(14) Stop light switch
(15) Hill start assist OFF indicator light / Hill start assist warning light
(16) Hybrid powertrain control module (HPCM)

- Models without EyeSight



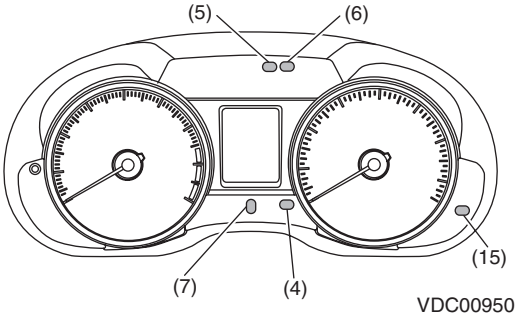
VDC00948

- Models with EyeSight



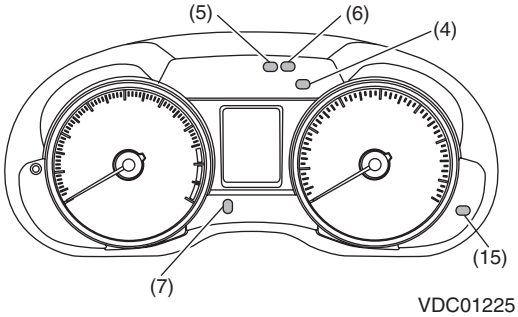
VDC01040

- Gasoline engine model

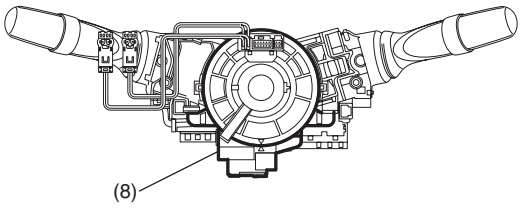


VDC00950

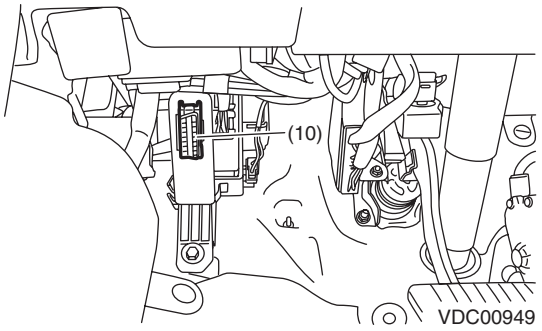
- HEV model



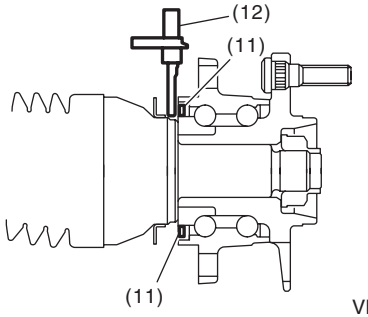
VDC01225



VDC00952



VDC00949

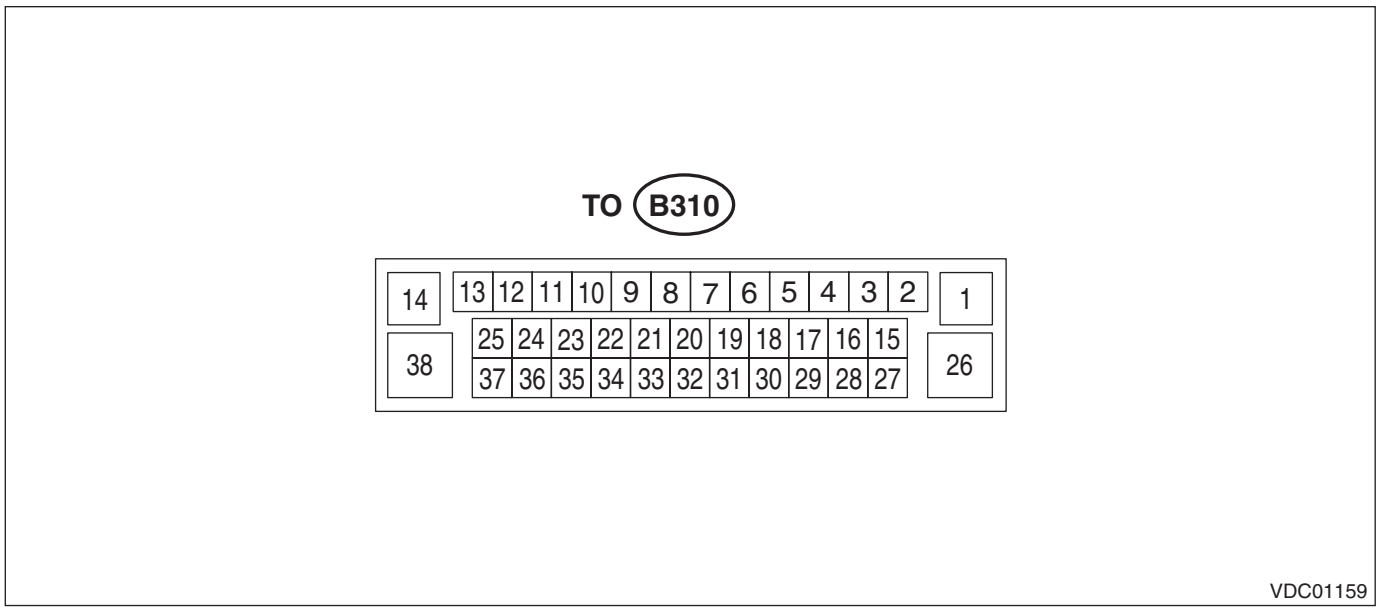


VDC00741

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

- Models without EyeSight



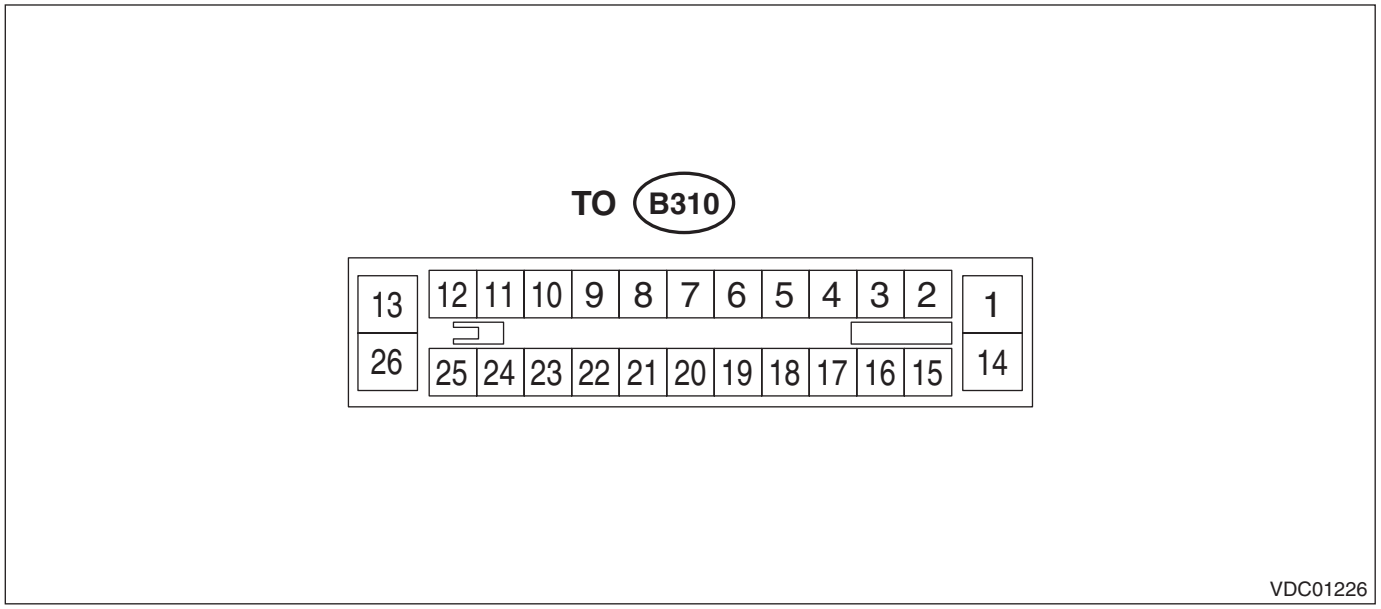
NOTE:

- Terminal numbers in VDCCM&H/U connector (on the control module side) are shown in the figure.
- When the connector is removed from the VDCCM&H/U, the brake warning light (EBD warning light), ABS warning light, VDC warning light & VDC indicator light, VDC OFF indicator light, and the hill start assist warning light illuminate.

Content			Terminal No. (+) — (–)	Input/Output signal Measured value and measuring conditions
Power supply			4 — 14	10 — 15 V when the ignition switch is ON.
ABS wheel speed sensor	Front LH wheel	Power supply	20 — 14	0 — 18 V when the ignition switch is ON.
		Signal	33 (*1)	7 — 14 mA: Rectangle waveform
		Signal	8 (*2)	7 — 14 mA: Rectangle waveform
	Front RH wheel	Power supply	17 — 14	0 — 18 V when the ignition switch is ON.
		Signal	29	7 — 14 mA: Rectangle waveform
	Rear LH wheel	Power supply	7 — 14	0 — 18 V when the ignition switch is ON.
		Signal	19	7 — 14 mA: Rectangle waveform
	Rear RH wheel	Power supply	18 — 14	0 — 18 V when the ignition switch is ON.
		Signal	5	7 — 14 mA: Rectangle waveform
CAN communication line (H)			2 — 14	2.75 — 4.5 V pulse signal when the ignition switch is ON.
CAN communication line (L)			15 — 14	0.5 — 2.25 V pulse signal when the ignition switch is ON.
Valve relay power supply			1 — 14	10 — 15 V
Motor relay power supply			26 — 38	10 — 15 V
Stop light switch			6 — 14	1.5 V or less when the stop light is OFF; otherwise, 10 — 15 V when the stop light is ON.
Vehicle speed output signal			27 — 14	0 ←→ 12 V pulse
VDC OFF switch			37 — 14	1 Ω or less when the OFF switch is “ON”; 1 MΩ or more when the switch is “OFF”.
Ground			14	—
Ground			38	—

*1: Gasoline engine model
*2: HEV model

- Models with EyeSight



NOTE:
- Terminal numbers in VDCCM&H/U connector (on the control module side) are shown in the figure.
- When the connector is removed from the VDCCM&H/U, the brake warning light (EBD warning light), ABS warning light, VDC warning light & VDC indicator light, VDC OFF indicator light, and the hill start assist warning light illuminate.

Content			Terminal No. (+) — (–)	Input/Output signal Measured value and measuring conditions
Power supply			7 — 13	10 — 15 V when the ignition switch is ON.
ABS wheel speed sensor	Front LH wheel	Power supply	22 — 13	0 — 18 V when the ignition switch is ON.
		Signal	21	7 — 14 mA: Rectangle waveform
	Front RH wheel	Power supply	18 — 13	0 — 18 V when the ignition switch is ON.
		Signal	19	7 — 14 mA: Rectangle waveform
	Rear LH wheel	Power supply	16 — 13	0 — 18 V when the ignition switch is ON.
		Signal	15	7 — 14 mA: Rectangle waveform
	Rear RH wheel	Power supply	24 — 13	0 — 18 V when the ignition switch is ON.
		Signal	25	7 — 14 mA: Rectangle waveform
CAN communication line (L)			8 — 13	0.5 — 2.25 V pulse signal when the ignition switch is ON.
CAN communication line (H)			10 — 13	2.75 — 4.5 V pulse signal when the ignition switch is ON.
Valve relay power supply			14 — 13	10 — 15 V
Motor relay power supply			1 — 13	10 — 15 V
Stop light switch			3 — 13	1.5 V or less when the stop light is OFF; otherwise, 10 — 15 V when the stop light is ON.
Subaru Select Monitor			5 — 13	0 ←→ 12 V pulse (during the communication)
Vehicle speed output signal			11 — 13	0 ←→ 12 V pulse
VDC OFF switch			9 — 13	0.5 Ω or less when the OFF switch is ON; 1 MΩ or more when the switch is OFF.
Ground			13	—

B: WIRING DIAGRAM

Refer to “Vehicle Dynamics Control System” in the wiring diagram. <Ref. to WI(w/o HEV)-233, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, Vehicle Dynamics Control System.>

6. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

For detailed operation procedures, refer to “Application help”.

2. READ CURRENT DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Brake Control System».
5) On «Select Function» display, select «Data Monitor».

- Models without EyeSight

Display	Contents to be displayed	Unit of measure
FR Wheel Speed	Wheel speed detected by front ABS wheel speed sensor RH is displayed.	km/h or MPH
FL Wheel Speed	Wheel speed detected by front ABS wheel speed sensor LH is displayed.	km/h or MPH
RR Wheel Speed	Wheel speed detected by rear ABS wheel speed sensor RH is displayed.	km/h or MPH
RL Wheel Speed	Wheel speed detected by rear ABS wheel speed sensor LH is displayed.	km/h or MPH
Steering Angle Sensor	Steering angle detected by steering angle sensor is displayed.	deg
Yaw Rate Sensor	Vehicle angular speed detected by yaw rate sensor is displayed.	deg/s
Pressure Sensor	Brake fluid pressure detected by pressure sensor is displayed.	bar
Longitudinal G Sensor	Vehicle longitudinal acceleration detected by longitudinal G sensor is displayed.	m/s^2
Lateral G Sensor	Vehicle lateral acceleration detected by lateral G sensor is displayed.	m/s^2
Voltage of IGN	Voltage supplied to VDCCM&H/U is displayed.	V
M. Relay monitor Voltage	Voltage applied to the motor relay is displayed.	V
Motor Relay Signal	Motor relay driving signal is displayed.	ON or OFF
Valve Relay Signal	Valve relay driving signal is displayed.	ON or OFF
EBD Warning Light	ON operation of the EBD warning light is displayed.	ON or OFF
ABS Warning Lamp	ON operation of the ABS warning light is displayed.	ON or OFF
VDC Warning Lamp	ON operation of the VDC warning light is displayed.	ON or OFF
EBD Control Flag	EBD operation condition is displayed.	ON or OFF
ABS Control Flag	ABS operation condition is displayed.	ON or OFF
TCS Control Flag	TCS operation condition is displayed.	ON or OFF
VDC Control Flag	VDC operation condition is displayed.	ON or OFF
E/G Control Stop Flag	Engine control command signal is displayed.	1 or 0
E/G torques up Control Stop Flag	Engine control command signal is displayed. (HEV model)	1 or 0
HPCM Control Stop Flag	Command signal of hybrid powertrain control module is displayed. (HEV model)	1 or 0
HPCM torques up Control Stop Flag	Command signal of hybrid powertrain control module is displayed. (HEV model)	1 or 0
VDC-OFF Light	ON/OFF condition of VDC OFF indicator light is displayed.	ON or OFF
OFF SW Signal	Operation condition of VDC OFF switch is displayed.	ON or OFF
Brake Light Switch	Brake ON/OFF is displayed.	ON or OFF
Clutch switch	Clutch ON/OFF is displayed. (For MT model only. For AT model: OFF fixed)	ON or OFF
Reverse Signal	Reverse gear ON/OFF is displayed. (For MT model only. For AT model: OFF fixed)	ON or OFF

- Models with EyeSight

Display	Contents to be displayed	Unit of measure
FR Wheel Speed	Wheel speed detected by front ABS wheel speed sensor RH is displayed.	km/h or MPH
FL Wheel Speed	Wheel speed detected by front ABS wheel speed sensor LH is displayed.	km/h or MPH
RR Wheel Speed	Wheel speed detected by rear ABS wheel speed sensor RH is displayed.	km/h or MPH
RL Wheel Speed	Wheel speed detected by rear ABS wheel speed sensor LH is displayed.	km/h or MPH
Steering Angle Sensor Signal	Steering angle detected by steering angle sensor is displayed.	deg
Yaw Rate Sensor Output	Vehicle angular speed detected by yaw rate sensor is displayed.	deg/s
Master Cylinder Pressure Sensor	Master cylinder brake fluid pressure detected by pressure sensor is displayed.	bar
FL Wheel Cylinder Pressure Sensor	FL wheel cylinder brake fluid pressure detected by pressure sensor is displayed.	bar
FR Wheel Cylinder Pressure Sensor	FR wheel cylinder brake fluid pressure detected by pressure sensor is displayed.	bar
Fr Rr G sensor Output	Vehicle longitudinal acceleration detected by longitudinal G sensor is displayed.	m/s^2
Lateral G sensor Output	Vehicle lateral acceleration detected by lateral G sensor is displayed.	m/s^2
Ignition Power Supply Voltage	Voltage supplied to VDCCM&H/U is displayed.	V
M. Relay monitor Voltage	Voltage applied to the motor relay is displayed.	V
Motor Relay Signal	Motor relay driving signal is displayed.	ON or OFF
Valve Relay Signal	Valve relay driving signal is displayed.	ON or OFF
EBD Warning Light	ON operation of the EBD warning light is displayed.	ON or OFF
ABS Warning Light	ON operation of the ABS warning light is displayed.	ON or OFF
VDC Warning Light	ON operation of the VDC warning light is displayed.	ON or OFF
EBD Control Flag	EBD operation condition is displayed.	ON or OFF
ABS Control Flag	ABS operation condition is displayed.	ON or OFF
TCS Control Flag	TCS operation condition is displayed.	ON or OFF
VDC Control Flag	VDC operation condition is displayed.	ON or OFF
E/G Control Stop Flag	Engine control command signal is displayed.	1 or 0
OFF Lamp	ON/OFF condition of VDC OFF indicator light is displayed.	ON or OFF
OFF SW Signal	Operation condition of VDC OFF switch is displayed.	ON or OFF
Brake Switch	Brake ON/OFF is displayed.	ON or OFF

NOTE:
For detailed operation procedures, refer to “Application help”.

3. FUNCTION CHECK

• Models without EyeSight

Display	Contents of display	Index No.
ABS Sequence Control Mode	Operate the valve and pump motor continuously to perform the ABS sequence control.	<Ref. to VDC-27, ABS Sequence Control.>
VDC Check Mode	Operate the valve and pump motor continuously to perform the VDC sequence control.	<Ref. to VDC-30, VDC Sequence Control.>
VSC(VDC) Centering Mode	Set the steering angle sensor neutral position, and the lateral G sensor and longitudinal G sensor "0" point.	<Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

• Models with EyeSight

Display	Contents of display	Index No.
ABS Sequence Control Mode	Operate the valve and pump motor continuously to perform the ABS sequence control.	<Ref. to VDC-27, ABS Sequence Control.>
VDC Check Mode	Operate the valve and pump motor continuously to perform the VDC sequence control.	<Ref. to VDC-30, VDC Sequence Control.>
Set mode Str.A.Sen.N&Lat.GSen.0p	Set the steering angle sensor neutral position and the lateral G sensor "0" point.	<Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
Longitudinal G sensor and lateral G sensor 0 point setting mode	Set "0" point of the longitudinal G sensor and the lateral G sensor.	<Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

4. READ FREEZE FRAME DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Brake Control System».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

• Models without EyeSight

Display	Contents to be displayed	Unit of measure
FR Wheel Speed	Wheel speed detected by front ABS wheel speed sensor RH is displayed.	km/h or MPH
FL Wheel Speed	Wheel speed detected by front ABS wheel speed sensor LH is displayed.	km/h or MPH
RR Wheel Speed	Wheel speed detected by rear ABS wheel speed sensor RH is displayed.	km/h or MPH
RL Wheel Speed	Wheel speed detected by rear ABS wheel speed sensor LH is displayed.	km/h or MPH
Vehicle Speed	Vehicle speed calculated by VDC control module is displayed.	km/h or MPH
Steering Angle Sensor	Steering angle detected by steering angle sensor is displayed.	deg
Yaw Rate Sensor	Vehicle angular speed detected by yaw rate sensor is displayed.	deg/s
Pressure Sensor	Brake fluid pressure detected by pressure sensor is displayed.	bar
Longitudinal G Sensor	Vehicle longitudinal acceleration detected by longitudinal G sensor is displayed.	m/s^2
Lateral G Sensor	Vehicle lateral acceleration detected by lateral G sensor is displayed.	m/s^2
Voltage of IGN	Voltage supplied to VDCCM&H/U is displayed.	V
Acceleration Pedal Position	Accelerator pedal opening angle is displayed.	%
Engine Speed	Engine speed on malfunction occurrence is displayed.	rpm
Steering angle flag	Whether the absolute angle of the steering angle sensor was determined is displayed.	Recognized or No recognition

Display	Contents to be displayed	Unit of measure
EBD Control Flag	EBD operation condition is displayed.	ON or OFF
ABS Control Flag	ABS operation condition is displayed.	ON or OFF
TCS Control Flag	TCS operation condition is displayed.	ON or OFF
VDC Control Flag	VDC operation condition is displayed.	ON or OFF
E/G Control Stop Flag	Engine control command signal is displayed.	1 or 0
E/G torques up Control Stop Flag	Engine control command signal is displayed. (HEV model)	1 or 0
HPCM Control Stop Flag	Command signal of hybrid powertrain control module is displayed. (HEV model)	1 or 0
HPCM torques up Control Stop Flag	Command signal of hybrid powertrain control module is displayed. (HEV model)	1 or 0
OFF Switch Detection	ON/OFF condition of the VDC operated by the driver is displayed.	ON or OFF
Brake Light Switch	Brake ON/OFF is displayed.	ON or OFF
Clutch switch	Clutch ON/OFF is displayed. (For MT model only. For AT model: OFF fixed)	ON or OFF
Reverse Signal	Reverse gear ON/OFF is displayed. (For MT model only. For AT model: OFF fixed)	ON or OFF

- Models with EyeSight

Display	Contents to be displayed	Unit of measure
FR Wheel Speed	Wheel speed detected by front ABS wheel speed sensor RH is displayed.	km/h or MPH
FL Wheel Speed	Wheel speed detected by front ABS wheel speed sensor LH is displayed.	km/h or MPH
RR Wheel Speed	Wheel speed detected by rear ABS wheel speed sensor RH is displayed.	km/h or MPH
RL Wheel Speed	Wheel speed detected by rear ABS wheel speed sensor LH is displayed.	km/h or MPH
Vehicle Speed	Vehicle speed calculated by VDC control module is displayed.	km/h or MPH
Steering Angle Sensor Signal	Steering angle detected by steering angle sensor is displayed.	deg
Yaw Rate Sensor Output	Vehicle angular speed detected by yaw rate sensor is displayed.	deg/s
Master Cylinder Pressure Sensor	Master cylinder brake fluid pressure detected by pressure sensor is displayed.	bar
FL Wheel Cylinder Pressure Sensor	FL wheel cylinder brake fluid pressure detected by pressure sensor is displayed.	bar
FR Wheel Cylinder Pressure Sensor	FR wheel cylinder brake fluid pressure detected by pressure sensor is displayed.	bar
Fr Rr G sensor Output	Vehicle longitudinal acceleration detected by longitudinal G sensor is displayed.	m/s^2
Lateral G sensor Output	Vehicle lateral acceleration detected by lateral G sensor is displayed.	m/s^2
Ignition Power Supply Voltage	Voltage supplied to VDCCM&H/U is displayed.	V
Accel opening angle	Acceleration opening is displayed.	%
Engine Speed	Engine speed on malfunction occurrence is displayed.	rpm
Steering angle flag	Whether the absolute angle of the steering angle sensor was determined is displayed.	Recognized or No recognition
EBD Control Flag	EBD operation condition is displayed.	ON or OFF
ABS Control Flag	ABS operation condition is displayed.	ON or OFF
TCS Control Flag	TCS operation condition is displayed.	ON or OFF
VDC Control Flag	VDC operation condition is displayed.	ON or OFF
E/G Control Stop Flag	Engine control command signal is displayed.	1 or 0
OFF Switch Detection	ON/OFF condition of the VDC operated by the driver is displayed.	ON or OFF
Brake Switch	Brake ON/OFF is displayed.	ON or OFF

NOTE:
- Data stored at the time of trouble occurrence is shown on display.
- Each time a trouble occurs, the latest information is stored in the freeze frame data in memory.
- For detailed operation procedures, refer to “Application help”.

5. PARAMETER SELECTION

CAUTION:
- **Subaru Select Monitor is required for parameter selection.**
- **This function can be used for the replacement part of VDCCM&H/U.**

NOTE:
- When the VDCCM&H/U is replaced with a replacement part, be sure to perform the parameter selection/registration to the VDCCM&H/U using this function.
- To check the applied model, refer to the “Model number plate” attached to the vehicle. <Ref. to ID-2, IDENTIFICATION, Identification.>
- If you entered a wrong applied model, you can re-write it.
- When the registration has not been performed, the DTC code “Parameter” is detected together with the ABS/EBD/VDC warning light illumination.

1) Connect the Subaru Select Monitor.
2) On «Start» display, select «Diagnosis».
3) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
4) On «Main Menu» display, select «Each System».
5) On «Select System» display, select «Brake Control System».
6) On «Select Function» display, select «Work Support».
7) On «Work Support» display, select «Selection of Parameter».
8) Check the applied model and option code indicated on the “Model number plate”. <Ref. to ID-2, IDENTIFICATION, Identification.>
9) Enter the applied model of 7-digit alphanumeric characters and press the [Enter] key.
10) When the option code input screen appears after entering the applied model, enter the option code consisting of 4-digit alphanumeric characters, and press the [Enter] key. When the option code is 3 digits, add “0” (zero) in front and enter the code as 4 digits.
11) When the confirmation screen indicating the vehicle information appears, check that the correct applied model and grade are displayed and click the [OK] button.

NOTE:
When the displayed applied model and grade are different from those of the vehicle, perform registration operations again after clicking the [OK] button.

12) Execute the Clear Memory Mode after parameter selection and registration operations because the DTC for “Parameter selection error” is memorized. <Ref. to VDC(diag)-26, Clear Memory Mode.>

6. PARAMETER CHECK

NOTE:
The parameter data registered in the VDCCM is shown on the display.

1) Connect the Subaru Select Monitor.
2) On «Start» display, select «Diagnosis».
3) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
4) On «Main Menu» display, select «Each System».
5) On «Select System» display, select «Brake Control System».
6) On «Select Function» display, select «Work Support».
7) On «Work Support» display, select «Confirm on parameter».
8) On the «Confirm on parameter» display screen, check that the applied model and grade of the target vehicle are included, and click the [OK] button.
9) If the applied model and grade of the target vehicle are not included on the «Confirm on parameter» display screen, perform “parameter selection and registration”. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>

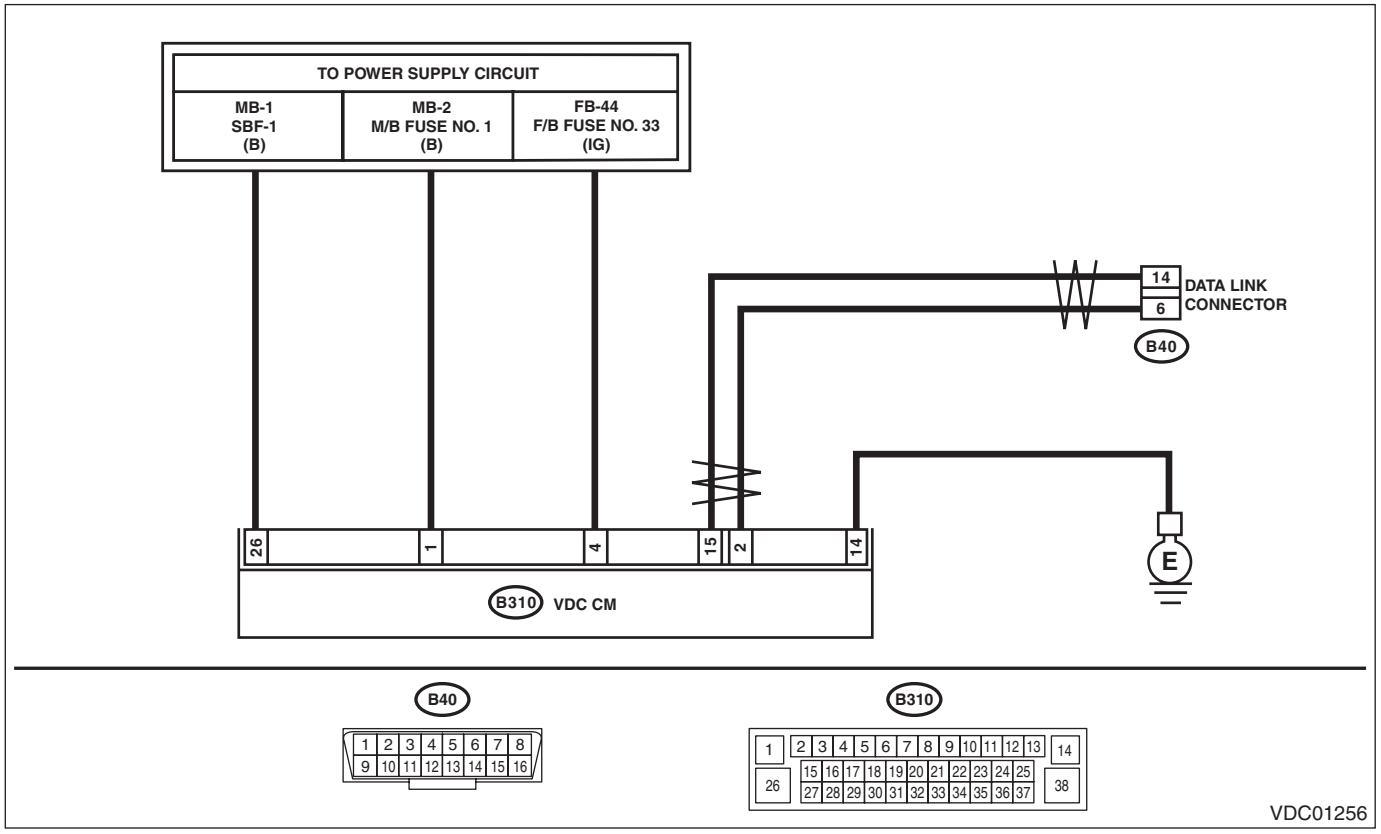
B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DETECTING CONDITION:
Defective harness connector
TROUBLE SYMPTOM:
Communication is impossible between VDC and Subaru Select Monitor.
WIRING DIAGRAM:

Models without EyeSight

Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>

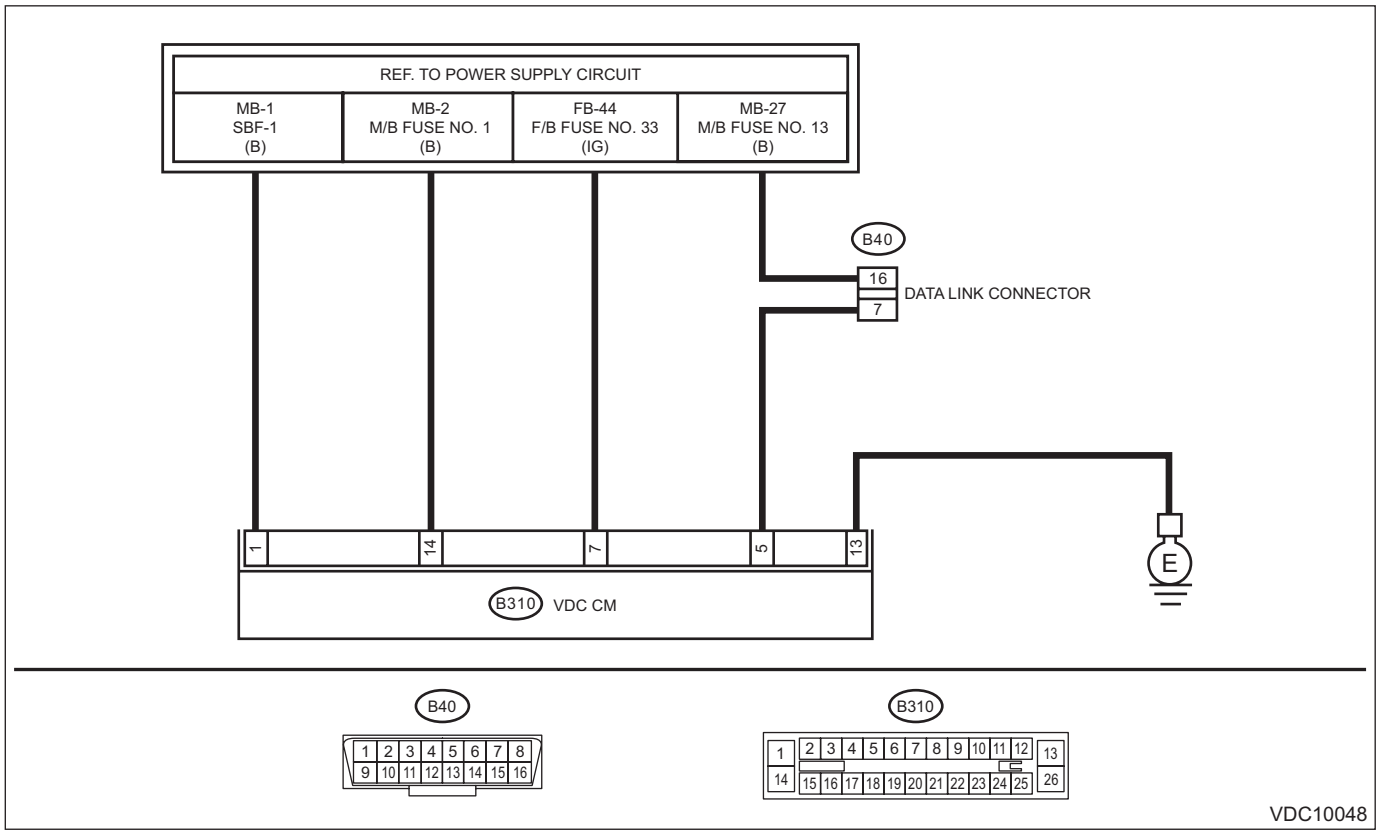


Step		Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select VDC using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.**	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.
4	**CHECK INSTALLATION OF VDCCM&H/U CONNECTOR.** Turn the ignition switch to OFF.	Is the VDCCM&H/U connector inserted into VDCCM&H/U until the clamp locks onto it?	Go to step **5**.	Insert VDCCM&H/U connector into VDCCM&H/U.

	Step	Check	Yes	No
5	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **6**.
6	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Check whether communication to VDC system can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Check the DTC in VDC system. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Go to step **7**.
7	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. (Engine OFF) 2) Measure the ignition power supply voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 4 (+) — Chassis ground (–):*** ***(B310) No. 1 (+) — Chassis ground (–):*** ***(B310) No. 26 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **8**.	Repair open circuit in harness between VDCCM&H/U and battery.
8	**CHECK HARNESS CONNECTOR BETWEEN VDCCM&H/U AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Measure the resistance of harness between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 14 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **9**.	Repair the open circuit of VDCCM&H/U ground circuit and poor contact of connector.
9	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of control module power supply, ground circuit and data link connector?	Repair the connector.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

Models with EyeSight

Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



	Step	Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select VDC using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.**	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.
4	**CHECK INSTALLATION OF VDCCM&H/U CONNECTOR.** Turn the ignition switch to OFF.	Is the VDCCM&H/U connector inserted into VDCCM&H/U until the clamp locks onto it?	Go to step **5**.	Insert VDCCM&H/U connector into VDCCM&H/U.
5	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Go to step **9**.	Go to step **6**.
6	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to OFF. 2) Disconnect the VDCCM&H/U connector. 3) Turn the ignition switch to ON. 4) Check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **7**.

	Step	Check	Yes	No
7	**CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM, TCM, power steering CM, airbag CM and impact sensor. **CAUTION:** **When disconnecting the connector from airbag CM, always follow the precautions on AB section. <Ref. to AB-11, CAUTION, General Description.>** 3) Measure the resistance between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **8**.	Repair the harness and connector between each control module and data link connector.
8	**CHECK HARNESS CONNECTOR BETWEEN VDCCM&H/U AND DATA LINK CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 7 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **9**.	Repair the harness and connector between each control module and data link connector.
9	**CHECK HARNESS CONNECTOR BETWEEN VDCCM&H/U AND DATA LINK CONNECTOR.** Measure the resistance between VDCCM&H/U connector and data link connector. ***Connector & terminal*** ***(B310) No. 5 — (B40) No. 7:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair harness and connector between VDCCM&H/U and data link connector.
10	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. (Engine OFF) 2) Measure the ignition power supply voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 7 (+) — Chassis ground (–):*** ***(B310) No. 14 (+) — Chassis ground (–):*** ***(B310) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **11**.	Repair open circuit in harness between VDCCM&H/U and battery.
11	**CHECK HARNESS CONNECTOR BETWEEN VDCCM&H/U AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Measure the resistance of harness between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 13 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **12**.	Repair the open circuit of VDCCM&H/U ground harness and poor contact of connector.
12	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of control module power supply, ground circuit and data link connector?	Repair the connector.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Brake Control System».
5) On «Select Function» display, select «DTC».

NOTE:
- For details concerning DTCs, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>
- For detailed operation procedures, refer to “Application help”.

8. Inspection Mode

A: PROCEDURE

Reproduce the malfunction occurrence condition as much as possible.
Drive the vehicle at least ten minutes.

NOTE:
Make sure the vehicle is not dragged to one side under usual driving condition.

9. Clear Memory Mode

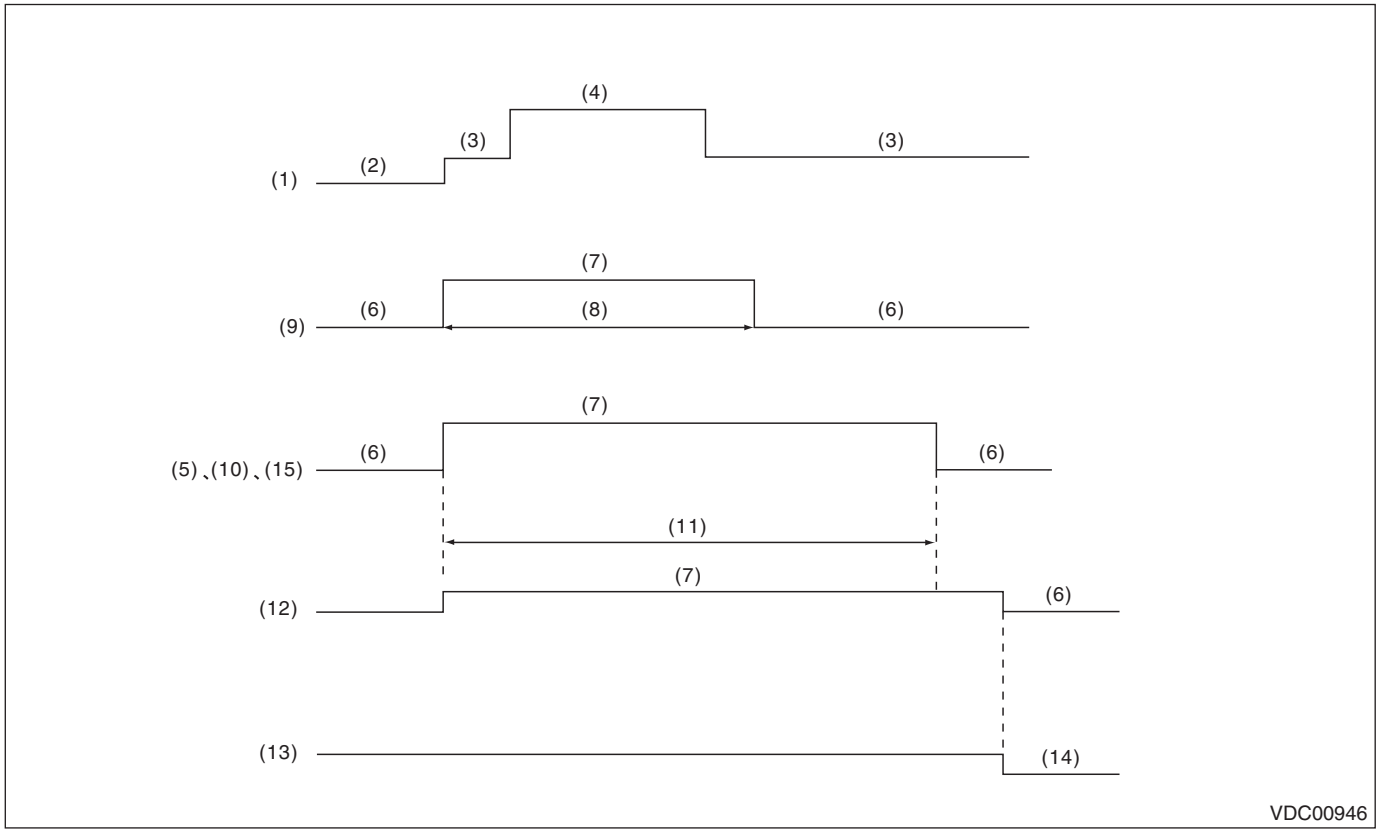
A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Brake Control System».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

10.Warning Light Illumination Pattern

A: INSPECTION



(1)	Ignition switch	(6)	Light OFF	(11)	2 seconds or more
(2)	OFF	(7)	Light ON	(12)	Brake warning light (EBD warning light)
(3)	ON	(8)	2 seconds	(13)	Parking brake
(4)	Engine start	(9)	VDC OFF indicator light	(14)	Released
(5)	ABS warning light	(10)	VDC warning light & VDC indicator light	(15)	Hill start assist warning light

NOTE:
Hill start assist warning light always illuminates when the hill start assist is in the OFF mode.

Warning Light Illumination Pattern

1) When warning lights or indicator lights do not illuminate in accordance with this illumination pattern, there must be an electrical malfunction.
2) When the warning lights or indicator lights remain constantly OFF, check the combination meter circuit. <Ref. to VDC(diag)-29, EBD WARNING LIGHT, ABS WARNING, VDC OFF INDICATOR LIGHT, VDC WARNING LIGHT AND VDC INDICATOR LIGHT DO NOT COME ON, Warning Light Illumination Pattern.> <Ref. to VDC(diag)-31, HILL START ASSIST WARNING LIGHT DOES NOT COME ON, Warning Light Illumination Pattern.>
3) When the ABS warning light, VDC OFF indicator light, VDC warning light & VDC indicator light, and hill start assist warning light do not go off, check the combination meter circuit or CAN communication circuit. <Ref. to VDC(diag)-32, ABS WARNING LIGHT DOES NOT GO OFF, Warning Light Illumination Pattern.> <Ref. to VDC(diag)-34, VDC OFF INDICATOR LIGHT DOES NOT GO OFF, Warning Light Illumination Pattern.> <Ref. to VDC(diag)-33, VDC WARNING LIGHT AND VDC INDICATOR LIGHT DO NOT GO OFF, Warning Light Illumination Pattern.> <Ref. to VDC(diag)-36, HILL START ASSIST WARNING LIGHT DOES NOT GO OFF, Warning Light Illumination Pattern.>

NOTE:
- Even though the ABS warning light, and the VDC warning light & VDC indicator light do not go off in 2 seconds after illuminating, the ABS and VDC functions are normal if the warning lights go off while the vehicle is driven at the specified speed (model without EyeSight: approximately 38 km/h, model with EyeSight: approximately 12 km/h). However, while these lights are on, the functions with their warning lights illuminated do not operate.
- Even when the ABS and VDC function check is displayed on the multi-function display, the ABS and VDC functions are normal if the indicator light on the combination meter goes off. However, the functions with their indicator lights illuminated on the combination meter do not operate.
- It may take several minutes before the VDC warning light & VDC indicator light goes off, if the vehicle is parked under low temperature for a specified time. This is not defective because it is resulted from low engine coolant temperature. Perform the Clear Memory Mode because DTC may be recorded at this time. <Ref. to VDC(diag)-26, Clear Memory Mode.>
- With the vehicle jack-up/lift-up or set on free rollers, when the wheels lock or spin after starting the engine, ABS warning light, and VDC warning light & VDC indicator light may illuminate because VDCCM&H/U detects the abnormal conditions from ABS wheel speed sensor or longitudinal G sensor. In this case, this is not a malfunction. Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.>

B: EBD WARNING LIGHT, ABS WARNING, VDC OFF INDICATOR LIGHT, VDC WARNING LIGHT AND VDC INDICATOR LIGHT DO NOT COME ON

DETECTING CONDITION:
Defective combination meter

TROUBLE SYMPTOM:
When the ignition switch is turned to ON (engine OFF), EBD warning light, ABS warning light, VDC OFF indicator light, and VDC warning light & VDC indicator light do not illuminate.

NOTE:
When pressing the VDC OFF switch for 10 seconds or more, the VDC OFF indicator light goes off and cannot operate any more. When turning the ignition switch from OFF to ON, the OFF operation enabled status is restored.

	Step	Check	Yes	No
1	**CHECK OTHER INDICATOR LIGHT.** Turn the ignition switch to ON.	Does other indicator light illuminate soon after “ON”?	Go to step **2**.	Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
2	**CHECK VDCCM.** When the engine does not start, display the current data of VDCCM using Subaru Select Monitor.	Immediately after the ignition switch is turned to ON, is the «EBD Warning Light» ON?	Go to step **3**.	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
3	**CHECK VDCCM.** When the engine does not start, display the current data of VDCCM using Subaru Select Monitor.	Immediately after the ignition switch is turned to ON, is the «ABS Warning Lamp» ON?	Go to step **4**.	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

Step		Check	Yes	No
4	**CHECK VDCCM.** When the engine does not start, display the current data of VDCCM using Subaru Select Monitor.	Immediately after the ignition switch is turned to ON, is the «VDC Warning Lamp» ON?	Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

C: HILL START ASSIST WARNING LIGHT DOES NOT COME ON

DETECTING CONDITION:
Defective combination meter

TROUBLE SYMPTOM:
When the ignition switch is turned to ON (engine OFF), hill start assist warning light does not illuminate.

	Step	Check	Yes	No
1	**CHECK OTHER INDICATOR LIGHT.** Turn the ignition switch to ON. (engine OFF)	Do other indicator lights illuminate?	Go to step **2**.	Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
2	**READ DTC.** Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **4**.
4	**CHECK COMBINATION METER.** Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is combination meter OK?	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

D: ABS WARNING LIGHT DOES NOT GO OFF

DETECTING CONDITION:

- Defective combination meter
- Defective CAN communication

TROUBLE SYMPTOM:

When starting the engine, the ABS warning light is kept on.

	Step	Check	Yes	No
1	**READ DTC.** Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK VDCCM.** Display the current data of VDCCM using Subaru Select Monitor.	Is the «ABS Warning Lamp» ON?	Go to step **3**.	Go to step **4**.
3	**READ DTC.** Read the DTC after driving the vehicle at 40 km/h (25 MPH) or more.	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **4**.
4	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **5**.
5	**CHECK COMBINATION METER.** Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is combination meter OK?	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

E: VDC WARNING LIGHT AND VDC INDICATOR LIGHT DO NOT GO OFF

DETECTING CONDITION:

- Defective combination meter
- Defective engine
- Defective CAN communication

TROUBLE SYMPTOM:

When starting the engine, the VDC warning light & VDC indicator light remains lit.

	Step	Check	Yes	No
1	**READ DTC.** Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK VDCCM.** Display the current data of VDCCM using Subaru Select Monitor.	Is the «VDC Warning Lamp» ON?	Go to step **3**.	Go to step **4**.
3	**READ DTC.** Read the DTC after driving the vehicle at 40 km/h (25 MPH) or more.	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **4**.
4	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **5**.
5	**CHECK COMBINATION METER.** Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is combination meter OK?	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

F: VDC OFF INDICATOR LIGHT DOES NOT GO OFF

DETECTING CONDITION:

- Defective combination meter
- Defective CAN communication
- VDC OFF switch is shorted.

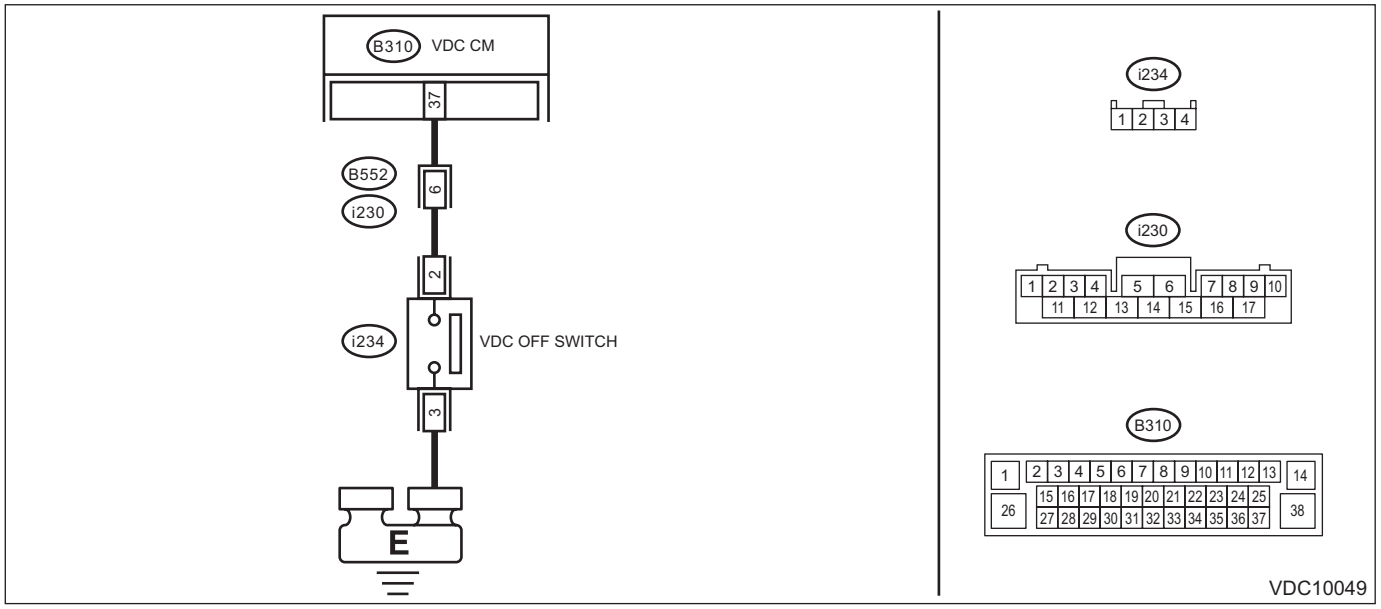
TROUBLE SYMPTOM:

When starting the engine, VDC OFF indicator light is kept ON.

WIRING DIAGRAM:

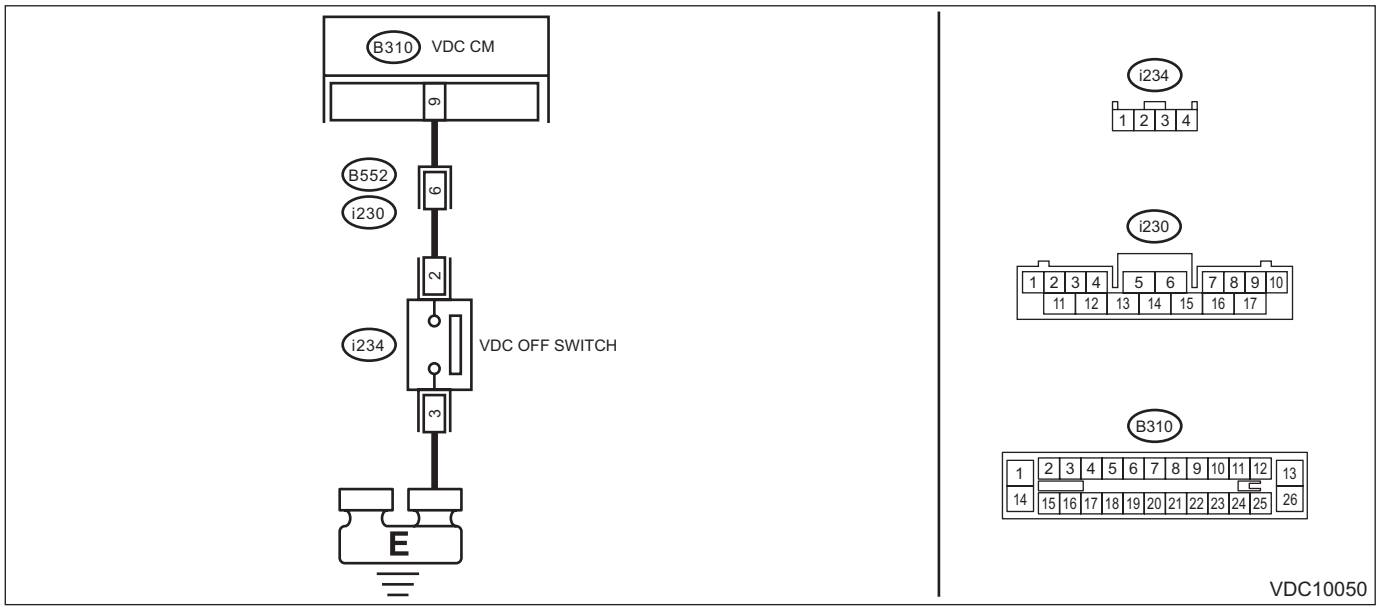
- Models without EyeSight

Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



- Models with EyeSight

Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



	Step	Check	Yes	No
1	**READ DTC.** Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK VDC OFF SWITCH.** Remove and check VDC OFF switch. <Ref. to VDC-51, VDC OFF Switch.>	Is the VDC OFF switch normal?	Go to step **3**.	Replace the VDC OFF switch.
3	**CHECK VDC OFF SWITCH CIRCUIT.** 1) Disconnect the connector from the VDCCM&H/U. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***Models without EyeSight*** ***(B310) No. 37 — Chassis ground:*** ***Models with EyeSight*** ***(B310) No. 9 — Chassis ground:***	Is the resistance less than 10 Ω?	Check the VDC OFF switch circuit.	Go to step **4**.
4	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **5**.
5	**CHECK COMBINATION METER.** Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is combination meter OK?	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

G: HILL START ASSIST WARNING LIGHT DOES NOT GO OFF

DETECTING CONDITION:

- Defective combination meter
- Defective CAN communication

TROUBLE SYMPTOM:

When starting the engine, the hill start assist warning light continues to illuminate.

	Step	Check	Yes	No
1	**READ DTC.** Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK COMBINATION METER.** Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is combination meter OK?	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

H: BRAKE WARNING LIGHT DOES NOT GO OFF

DETECTING CONDITION:

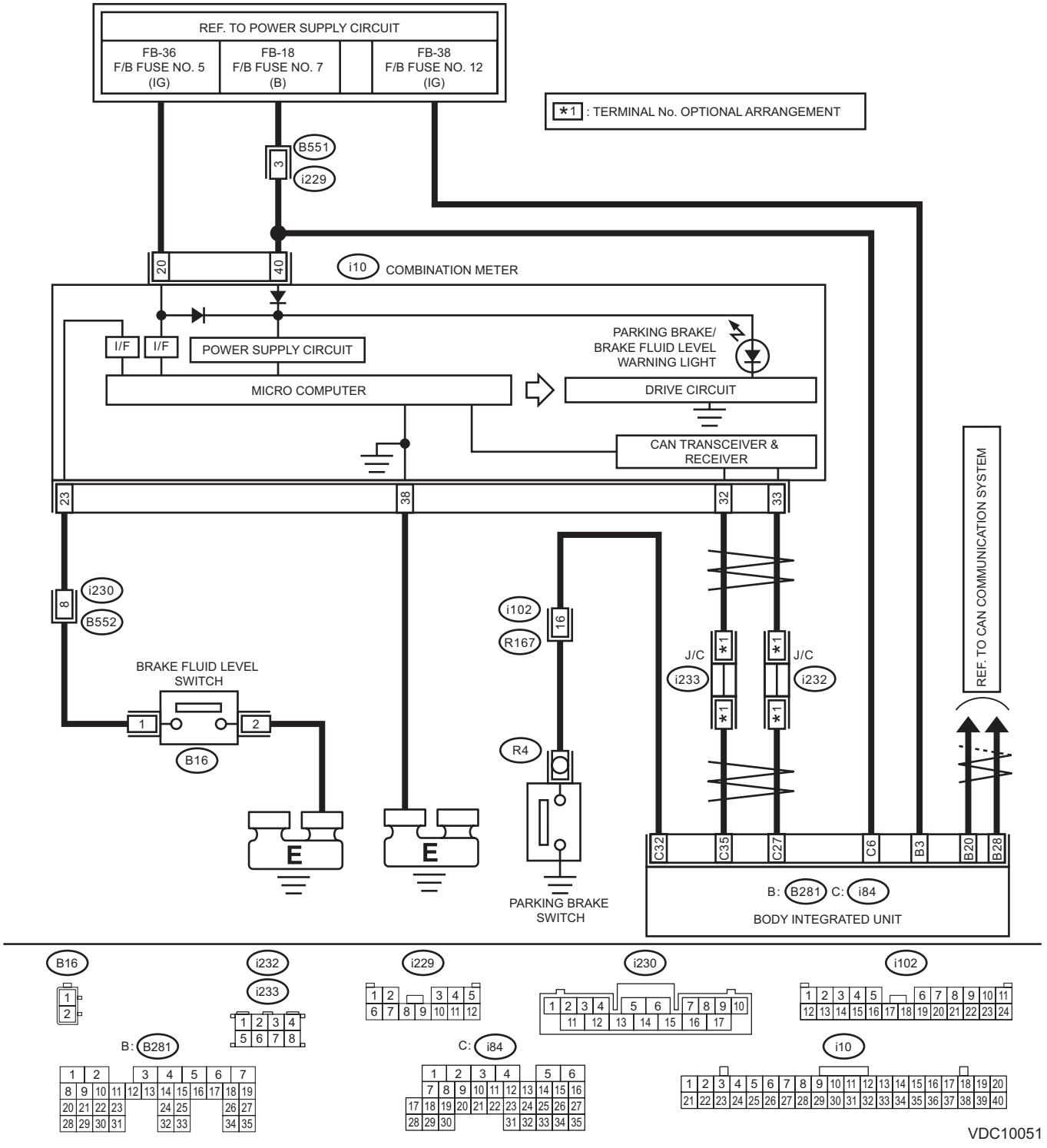
- Brake warning light circuit is shorted.
- Defective sensor/connector
- Defective CAN communication

TROUBLE SYMPTOM:

After starting the engine, the brake warning light remains lit though the parking lever is released.

WIRING DIAGRAM:

Parking brake / brake fluid level warning light system <Ref. to WI(w/o HEV)-181, WIRING DIAGRAM, Parking Brake / Brake Fluid Level Warning Light System.> <Ref. to WI(HEV)-160, WIRING DIAGRAM, Parking Brake / Brake Fluid Level Warning Light System.>



	Step	Check	Yes	No
1	**CHECK INSTALLATION OF VDCCM&H/U CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Check that the VDCCM&H/U connector is inserted until it is locked by clamp.	Is the connector firmly inserted?	Go to step **2**.	Insert the VDCCM&H/U connector until it is locked by clamp.
2	**READ DTC.** Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK BRAKE FLUID AMOUNT.** Check the amount of brake fluid in the reservoir tank of master cylinder.	Does the level of the brake fluid amount fall between the lines of "MAX" and "MIN"?	Go to step **4**.	Replenish brake fluid to the specified value.
4	**CHECK BRAKE FLUID LEVEL SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the level switch connector (B16) from master cylinder. 3) Measure the resistance between master cylinder terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Replace the master cylinder. <Ref. to BR-47, Master Cylinder.>
5	**CHECK GROUND SHORT OF HARNESS.** 1) Disconnect the connector (i10) from combination meter. 2) Measure the resistance between combination meter connector and chassis ground. ***Connector & terminal*** ***(i10) No. 23 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the harness between combination meter and brake fluid level switch.
6	**CHECK PARKING BRAKE SWITCH.** 1) Disconnect the connector (R4) from parking brake switch. 2) Release the parking brake. 3) Measure the resistance between parking brake switch terminal and chassis ground.	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the parking brake switch.
7	**CHECK GROUND SHORT OF HARNESS.** 1) Disconnect the connector (i84) from body integrated unit. 2) Measure the resistance between body integrated unit connector and chassis ground. ***Connector & terminal*** ***(i84) No. 32 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **8**.	Repair the harness between body integrated unit and parking brake switch.
8	**CHECK POOR CONTACT OF CONNECTOR.** Check for poor contact of all connectors.	Is there poor contact?	Repair the connector.	Go to step **9**.
9	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **10**.

Step		Check	Yes	No
10	**CHECK COMBINATION METER.** Check the combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is combination meter OK?	• Models without EyeSight Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> • Models with EyeSight Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

11.List of Diagnostic Trouble Code (DTC)

A: LIST

- Models without EyeSight

DTC	Item	Content of diagnosis	Reference
C1211	FRONT RIGHT ABS SENSOR CIRCUIT	Open/high input of front ABS wheel speed sensor RH	<Ref. to VDC(diag)-49, DTC C1211 FRONT RIGHT ABS SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1212	FRONT RIGHT ABS SENSOR SIGNAL	Front ABS wheel speed sensor RH signal malfunction	<Ref. to VDC(diag)-54, DTC C1212 FRONT RIGHT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1221	FRONT LEFT ABS SENSOR CIRCUIT	Open/high input of front ABS wheel speed sensor LH	<Ref. to VDC(diag)-49, DTC C1221 FRONT LEFT ABS SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1222	FRONT LEFT ABS SENSOR SIGNAL	Front ABS wheel speed sensor LH signal malfunction	<Ref. to VDC(diag)-54, DTC C1222 FRONT LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1231	REAR RIGHT ABS SENSOR CIRCUIT	Open/high input of rear ABS wheel speed sensor RH	<Ref. to VDC(diag)-49, DTC C1231 REAR RIGHT ABS SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1232	REAR RIGHT ABS SENSOR SIGNAL	Rear ABS wheel speed sensor RH signal malfunction	<Ref. to VDC(diag)-54, DTC C1232 REAR RIGHT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1241	REAR LEFT ABS SENSOR CIRCUIT	Open/high input of rear ABS wheel speed sensor LH	<Ref. to VDC(diag)-50, DTC C1241 REAR LEFT ABS SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1242	REAR LEFT ABS SENSOR SIGNAL	Rear ABS wheel speed sensor LH signal malfunction	<Ref. to VDC(diag)-55, DTC C1242 REAR LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1251	WHEEL SPEED SENSOR SYSTEM	Wheel speed sensor malfunction	<Ref. to VDC(diag)-57, DTC C1251 WHEEL SPEED SENSOR SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1252	WHEEL SPEED SENSOR SIGNAL OF ONE OF THE WHEELS	ABS wheel speed sensor signal malfunction in one of four wheels	<Ref. to VDC(diag)-58, DTC C1252 WHEEL SPEED SENSOR SIGNAL OF ONE OF THE WHEELS, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1311	FR HOLD VALVE	Front inlet solenoid valve RH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-59, DTC C1311 FR HOLD VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1312	FR PRESSURE REDUCING VALVE	Front outlet solenoid valve RH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-59, DTC C1312 FR PRESSURE REDUCING VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1321	FL HOLD VALVE	Front inlet solenoid valve LH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-59, DTC C1321 FL HOLD VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1322	FL PRESSURE REDUCING VALVE	Front outlet solenoid valve LH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-59, DTC C1322 FL PRESSURE REDUCING VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1331	RR HOLD VALVE	Rear inlet solenoid valve RH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-59, DTC C1331 RR HOLD VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1332	RR PRESSURE REDUCING VALVE	Rear outlet solenoid valve RH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-59, DTC C1332 RR PRESSURE REDUCING VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1341	RL HOLD VALVE	Rear inlet solenoid valve LH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-60, DTC C1341 RL HOLD VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
C1342	RL PRESSURE REDUCING VALVE	Rear outlet solenoid valve LH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-60, DTC C1342 RL PRESSURE REDUCING VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1351	NORMAL OPENING VALVE 1	Secondary cut valve malfunction in VDCCM&H/U	<Ref. to VDC(diag)-60, DTC C1351 NORMAL OPENING VALVE 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1352	NORMAL OPENING VALVE 2	Primary cut valve malfunction in VDCCM&H/U	<Ref. to VDC(diag)-60, DTC C1352 NORMAL OPENING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1361	NORMAL CLOSING VALVE 1	Secondary suction valve malfunction in VDCCM&H/U	<Ref. to VDC(diag)-60, DTC C1361 NORMAL CLOSING VALVE 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1362	NORMAL CLOSING VALVE 2	Primary suction valve malfunction in VDCCM&H/U	<Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1411	ELECTRICAL CONTROL MODULE	VDC control module malfunction	<Ref. to VDC(diag)-63, DTC C1411 ELECTRICAL CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1412	SELECTED PARAMETER	VDC control module parameter failure	<Ref. to VDC(diag)-65, DTC C1412 SELECTED PARAMETER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1413	POWER SUPPLY VOLTAGE	Power voltage malfunction	<Ref. to VDC(diag)-66, DTC C1413 POWER SUPPLY VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1421	ECM CONTROL SYSTEM	Prohibition of coordinate control for engine control module	<Ref. to VDC(diag)-68, DTC C1421 ECM CONTROL SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1422	VDC INTERRUPTION FOR ENGINE CONVENIENCE	VDC interrupted due to reasons derived from the engine	<Ref. to VDC(diag)-69, DTC C1422 VDC INTERRUPTION FOR ENGINE CONVENIENCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1423	DIFFERENT ECU SPECIFICATIONS	Different VDC control module specification	<Ref. to VDC(diag)-70, DTC C1423 DIFFERENT ECU SPECIFICATIONS, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1424	ECM	Engine control module is faulty	<Ref. to VDC(diag)-72, DTC C1424 ECM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1431	AT	Transmission control module is faulty	<Ref. to VDC(diag)-73, DTC C1431 AT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1432	DIFFERENT ECU SPECIFICATIONS	Different VDC control module specification	<Ref. to VDC(diag)-73, DTC C1432 DIFFERENT ECU SPECIFICATIONS, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1451	HPCM CONTROL SYSTEM	Prohibition of coordinate control for hybrid powertrain control module	<Ref. to VDC(diag)-74, DTC C1451 HPCM CONTROL SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1452	HPCM INTERRUPTED DUE TO EGI REASON	VDC interrupted due to reasons derived from the hybrid powertrain control module	<Ref. to VDC(diag)-75, DTC C1452 HPCM INTERRUPTED DUE TO EGI REASON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1511	VALVE RELAY	Defective valve relay	<Ref. to VDC(diag)-76, DTC C1511 VALVE RELAY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1512	VALVE SYSTEM	Defective valve system	<Ref. to VDC(diag)-77, DTC C1512 VALVE SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1521	MOTOR RELAY	Motor relay malfunction	<Ref. to VDC(diag)-78, DTC C1521 MOTOR RELAY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1531	BLS OFF STUCK	Stop light switch malfunction	<Ref. to VDC(diag)-80, DTC C1531 BLS OFF STUCK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
C1532	BLS ON STUCK	Stop light switch malfunction	<Ref. to VDC(diag)-83, DTC C1532 BLS ON STUCK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1541	CLUTCH SWITCH OFF MALFUNCTION	Clutch signal malfunction	<Ref. to VDC(diag)-85, DTC C1541 CLUTCH SWITCH OFF MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1542	CLUTCH SWITCH ON MALFUNCTION	Clutch signal malfunction	<Ref. to VDC(diag)-86, DTC C1542 CLUTCH SWITCH ON MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1561	REVERSE OFF FAULT	Reverse signal malfunction	<Ref. to VDC(diag)-87, DTC C1561 REVERSE OFF FAULT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1562	REVERSE ON FAULT	Reverse signal malfunction	<Ref. to VDC(diag)-88, DTC C1562 REVERSE ON FAULT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1711	STEERING ANGLE SENSOR	Steering angle sensor malfunction	<Ref. to VDC(diag)-90, DTC C1711 STEERING ANGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1721	YAW RATE SENSOR	Defective yaw rate sensor	<Ref. to VDC(diag)-93, DTC C1721 YAW RATE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1731	G SENSOR ABNORMAL	Defective G sensor	<Ref. to VDC(diag)-94, DTC C1731 G SENSOR ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1732	LATERAL G SENSOR	Defective lateral G sensor	<Ref. to VDC(diag)-95, DTC C1732 LATERAL G SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1733	LONGITUDINAL G SENSOR	Defective longitudinal G sensor	<Ref. to VDC(diag)-96, DTC C1733 LONGITUDINAL G SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1741	PRESSURE SENSOR	Defective pressure sensor	<Ref. to VDC(diag)-97, DTC C1741 PRESSURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1811	SYSTEM	System malfunction	<Ref. to VDC(diag)-98, DTC C1811 SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0126	LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0126 LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
U0401	INVALID DATA RECEIVED FROM ECM/ PCM “A”	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	Defective CAN communication	<Ref. to VDC(diag)-101, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0428	INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE	Defective CAN communication	<Ref. to VDC(diag)-101, DTC U0428 INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE	Defective CAN communication	<Ref. to VDC(diag)-101, DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1120	LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE	Defective CAN communication	<Ref. to VDC(diag)-101, DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1469	INVALID DATA RECEIVED FROM AUTOSTART STOP CONTROL MODULE	Defective CAN communication	<Ref. to VDC(diag)-101, DTC U1469 INVALID DATA RECEIVED FROM AUTOSTART STOP CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

- Models with EyeSight

DTC	Detailed code	Item	Content of diagnosis	Reference
C0021	5045	FRONT RIGHT ABS SENSOR CIRCUIT OPEN OR SHORT	Open/high input of front ABS wheel speed sensor RH	<Ref. to VDC(diag)-101, DTC C0021 FRONT RIGHT ABS SENSOR CIRCUIT OPEN OR SHORT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0022	5049 5053 5057 5061 5065	FRONT RIGHT ABS SENSOR SIGNAL	Front ABS wheel speed sensor RH signal malfunction	<Ref. to VDC(diag)-105, DTC C0022 FRONT RIGHT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0023	5044	FRONT LEFT ABS SENSOR CIRCUIT OPEN OR SHORT	Open/high input of front ABS wheel speed sensor LH	<Ref. to VDC(diag)-101, DTC C0023 FRONT LEFT ABS SENSOR CIRCUIT OPEN OR SHORT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0024	5048 5052 5056 5060 5064	FRONT LEFT ABS SENSOR SIGNAL	Front ABS wheel speed sensor LH signal malfunction	<Ref. to VDC(diag)-105, DTC C0024 FRONT LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0025	5047	REAR RIGHT ABS SENSOR CIRCUIT OPEN OR SHORT	Open/high input of rear ABS wheel speed sensor RH	<Ref. to VDC(diag)-101, DTC C0025 REAR RIGHT ABS SENSOR CIRCUIT OPEN OR SHORT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0026	5051 5055 5059 5063 5067	REAR RIGHT ABS SENSOR SIGNAL	Rear ABS wheel speed sensor RH signal malfunction	<Ref. to VDC(diag)-105, DTC C0026 REAR RIGHT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0027	5046	REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT	Open/high input of rear ABS wheel speed sensor LH	<Ref. to VDC(diag)-102, DTC C0027 REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0028	5050 5054 5058 5062 5066	REAR LEFT ABS SENSOR SIGNAL	Rear ABS wheel speed sensor LH signal malfunction	<Ref. to VDC(diag)-106, DTC C0028 REAR LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0031	5019	FR HOLD VALVE MALFUNCTION	Front inlet solenoid valve RH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-108, DTC C0031 FR HOLD VALVE MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0032	5023	FR PRESSURE REDUCING VALVE MALFUNCTION	Front outlet solenoid valve RH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-108, DTC C0032 FR PRESSURE REDUCING VALVE MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0033	5018	FL HOLD VALVE MALFUNCTION	Front inlet solenoid valve LH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-108, DTC C0033 FL HOLD VALVE MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0034	5022	FL PRESSURE REDUCING VALVE MALFUNCTION	Front outlet solenoid valve LH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-108, DTC C0034 FL PRESSURE REDUCING VALVE MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0035	5021	RR HOLD VALVE MALFUNCTION	Rear inlet solenoid valve RH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-108, DTC C0035 RR HOLD VALVE MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0036	5025	RR PRESSURE REDUCING VALVE MALFUNCTION	Rear outlet solenoid valve RH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-109, DTC C0036 RR PRESSURE REDUCING VALVE MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0037	5020	RL HOLD VALVE MALFUNCTION	Rear inlet solenoid valve LH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-109, DTC C0037 RL HOLD VALVE MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Detailed code	Item	Content of diagnosis	Reference
C0038	5024	RL PRESSURE REDUCING VALVE MALFUNCTION	Rear outlet solenoid valve LH malfunction in VDCCM&H/U	<Ref. to VDC(diag)-109, DTC C0038 RL PRESSURE REDUCING VALVE MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0041	5002 5003 5004 5005 5006 5007 5008 5009 5010 5011 5012 5013 5014 5015 5037 5038 5040 5041 5068 5069 5134	ECM	VDC control module malfunction	<Ref. to VDC(diag)-112, DTC C0041 ECM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	5148 5149	PARAMETER SELECTION ERROR	VDC control module parameter selection failure	<Ref. to VDC(diag)-114, DTC C0041 PARAMETER SELECTION ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0042	5000 5001	POWER SUPPLY VOLTAGE FAILURE	Power voltage malfunction	<Ref. to VDC(diag)-115, DTC C0042 POWER SUPPLY VOLTAGE FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0044	5137 5140 5142	TCM COMMUNICATION CIRCUIT	CAN communication failure of transmission control module	<Ref. to VDC(diag)-117, DTC C0044 TCM COMMUNICATION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0045	5144	TCM MALFUNCTION	Malfunction of transmission control module	<Ref. to VDC(diag)-118, DTC C0045 TCM MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	5146	INCORRECT VDC CONTROL MODULE SPECIFICATIONS	Different VDC control module specification	<Ref. to VDC(diag)-119, DTC C0045 INCORRECT VDC CONTROL MODULE SPECIFICATIONS, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0046	5155 5162	BODY INTEGRATED MODULE COMMUNICATION CIRCUIT	Body integrated module communication circuit	<Ref. to VDC(diag)-121, DTC C0046 BODY INTEGRATED MODULE COMMUNICATION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0047	5135	CAN COMMUNICATION	Improper CAN communication	<Ref. to VDC(diag)-122, DTC C0047 CAN COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0049	5151 5152	CRUISE CONTROLLER ABNORMAL	CRUISE controller communication error	<Ref. to VDC(diag)-123, DTC C0049 CRUISE CONTROLLER ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0051	5016 5017 5034 5036	VALVE RELAY	Valve Relay	<Ref. to VDC(diag)-124, DTC C0051 VALVE RELAY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0052	5039 5042 5043 5154	MOTOR MALFUNCTION	Motor	<Ref. to VDC(diag)-126, DTC C0052 MOTOR MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Detailed code	Item	Content of diagnosis	Reference
C0054	5133	BLS OFF MALFUNCTION	BLS OFF Malfunction	<Ref. to VDC(diag)-128, DTC C0054 BLS OFF MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	5153	BLS ON MALFUNCTION	BLS ON malfunction	<Ref. to VDC(diag)-130, DTC C0054 BLS ON MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0056	5102 5108	G SENSOR ABNORMAL	G sensor failure	<Ref. to VDC(diag)-131, DTC C0056 G SENSOR ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	5103 5104 5105 5106 5107 5109	G SENSOR SIGNAL	G sensor signal	<Ref. to VDC(diag)-132, DTC C0056 G SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0057	5136 5139 5141	ECM COMMUNICATION CIRCUIT	CAN communication failure of engine control module	<Ref. to VDC(diag)-134, DTC C0057 ECM COMMUNICATION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	5143	ECM CONTROL SYSTEM	Prohibition of coordinate control for engine control module	<Ref. to VDC(diag)-135, DTC C0057 ECM CONTROL SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	5145	VDC INTERRUPTED DUE TO EGI REASON	VDC interrupted due to EGI reason	<Ref. to VDC(diag)-136, DTC C0057 VDC INTERRUPTED DUE TO EGI REASON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0061	5027	NORMAL OPENING VALVE 1 MALFUNCTION	Secondary cut valve malfunction in VDCCM&H/U	<Ref. to VDC(diag)-109, DTC C0061 NORMAL OPENING VALVE 1 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0062	5026	NORMAL OPENING VALVE 2 MALFUNCTION	Primary cut valve malfunction in VDCCM&H/U	<Ref. to VDC(diag)-109, DTC C0062 NORMAL OPENING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0063	5029	NORMAL CLOSING VALVE 1 MALFUNCTION	Secondary suction valve malfunction in VDCCM&H/U	<Ref. to VDC(diag)-109, DTC C0063 NORMAL CLOSING VALVE 1 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0064	5028	NORMAL CLOSING VALVE 2 MALFUNCTION	Primary suction valve malfunction in VDCCM&H/U	<Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0071	5121 5122 5123 5138	NO SIGNAL FROM STEERING ANGLE SENSOR	Steering angle sensor communication	<Ref. to VDC(diag)-137, DTC C0071 NO SIGNAL FROM STEERING ANGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	5124 5125 5126 5127 5128 5129 5132	STEER ANGLE SENSOR OP	Steering angle sensor output	<Ref. to VDC(diag)-139, DTC C0071 STEER ANGLE SENSOR OP, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0072	5116 5117 5118 5119 5120 5131	ABNORMAL YAW RATE SENSOR OUTPUT	Yaw rate sensor output	<Ref. to VDC(diag)-142, DTC C0072 ABNORMAL YAW RATE SENSOR OUTPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Detailed code	Item	Content of diagnosis	Reference
C0073	5110 5114	LATERAL G SENSOR POWER/OUTPUT	Lateral G sensor power supply/output	<Ref. to VDC(diag)-143, DTC C0073 LATERAL G SENSOR POWER/OUTPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	5111 5112 5113 5115 5130	ABNORMAL LATERAL G SENSOR OUTPUT	Lateral G sensor output	<Ref. to VDC(diag)-144, DTC C0073 ABNORMAL LATERAL G SENSOR OUTPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0074	5070 5071 5072 5073 5074 5075 5076 5077 5078 5079	MASTER CYLINDER PRESSURE SENSOR OUTPUT	Master cylinder pressure sensor output	<Ref. to VDC(diag)-146, DTC C0074 MASTER CYLINDER PRESSURE SENSOR OUTPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0075	5080 5081 5082 5083 5084 5086 5087 5088 5089 5090 5091 5092 5093 5094 5095 5097 5098 5099 5100 5101	WHEEL CYLINDER PRESSURE SENSOR OUTPUT	Wheel cylinder pressure sensor output	<Ref. to VDC(diag)-147, DTC C0075 WHEEL CYLINDER PRESSURE SENSOR OUTPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C0081	5147	SYSTEM FAILURE	System malfunction	<Ref. to VDC(diag)-148, DTC C0081 SYSTEM FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C1424	5160	ECM	Engine control module is faulty	<Ref. to VDC(diag)-72, DTC C1424 ECM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	5167	INVALID DATA RECEIVED FROM ECM/PCM “A”	Defective CAN communication	<Ref. to VDC(diag)-100, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	5163	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	Defective CAN communication	<Ref. to VDC(diag)-101, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

12.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC C1211 FRONT RIGHT ABS SENSOR CIRCUIT

NOTE:
For the diagnostic procedure, refer to “DTC C1241 REAR LEFT ABS SENSOR CIRCUIT”. <Ref. to VDC(diag)-50, DTC C1241 REAR LEFT ABS SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

B: DTC C1221 FRONT LEFT ABS SENSOR CIRCUIT

NOTE:
For the diagnostic procedure, refer to “DTC C1241 REAR LEFT ABS SENSOR CIRCUIT”. <Ref. to VDC(diag)-50, DTC C1241 REAR LEFT ABS SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

C: DTC C1231 REAR RIGHT ABS SENSOR CIRCUIT

NOTE:
For the diagnostic procedure, refer to “DTC C1241 REAR LEFT ABS SENSOR CIRCUIT”. <Ref. to VDC(diag)-50, DTC C1241 REAR LEFT ABS SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

D: DTC C1241 REAR LEFT ABS SENSOR CIRCUIT

DTC DETECTING CONDITION:

- Defective ABS wheel speed sensor (broken wire, input voltage too high)
- Defective harness connector

TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

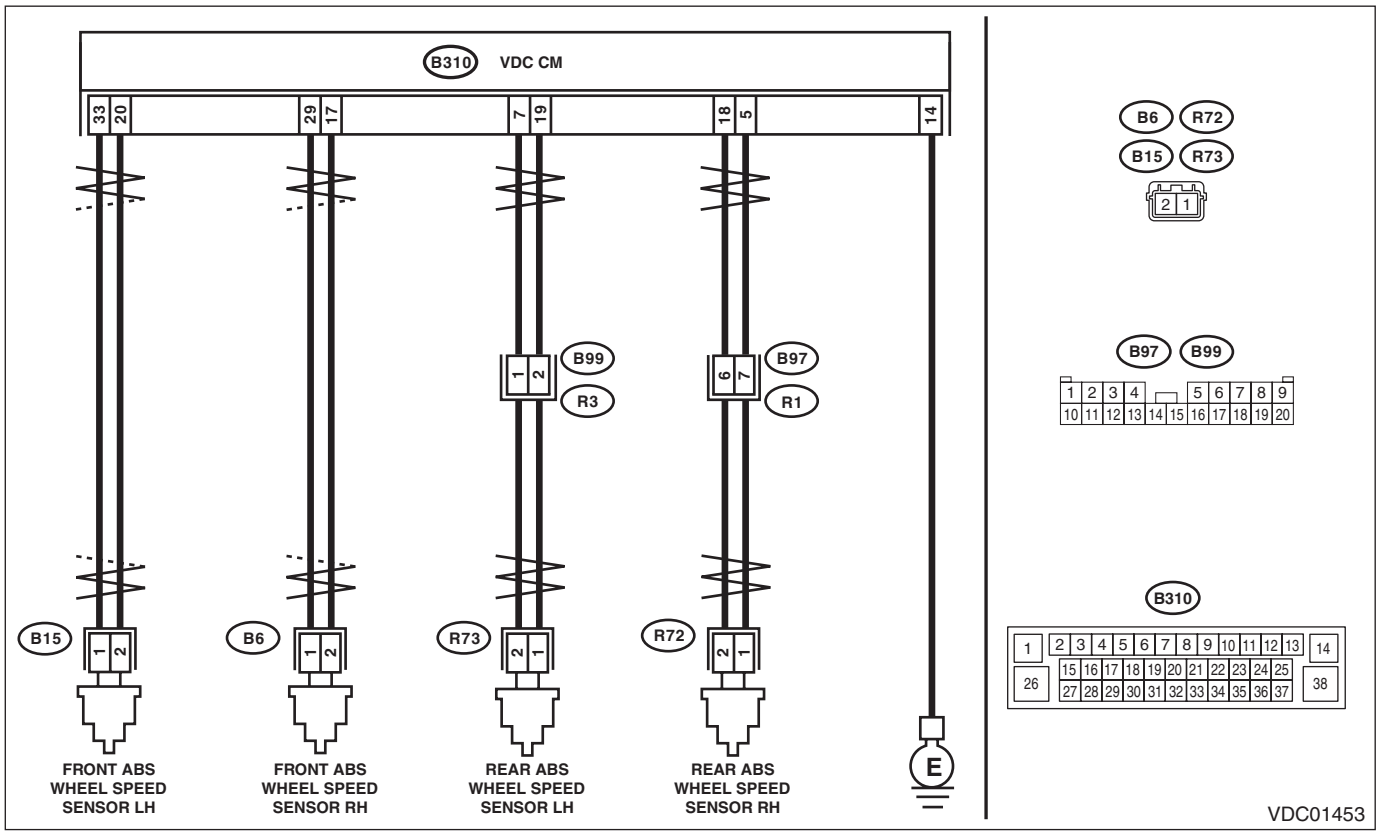
CAUTION:

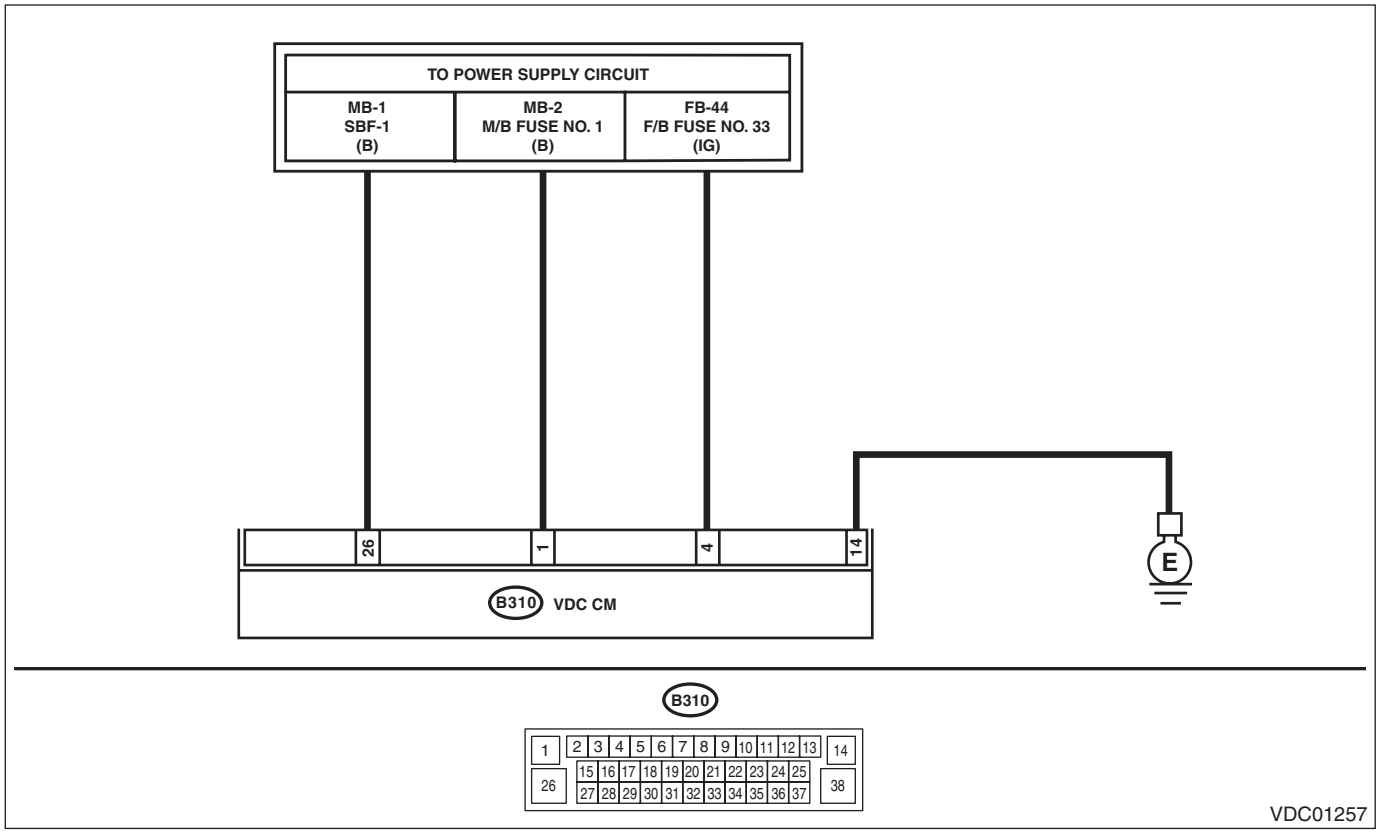
For HEV model, perform Clear Memory Mode for VDC system after diagnosis, turn the ignition switch to OFF, and wait for 30 seconds. Next, perform Clear Memory Mode for hybrid system, turn the ignition switch to OFF, and wait for 30 seconds. <Ref. to VDC(diag)-26, Clear Memory Mode.> <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.>

WIRING DIAGRAM:

- Gasoline engine model

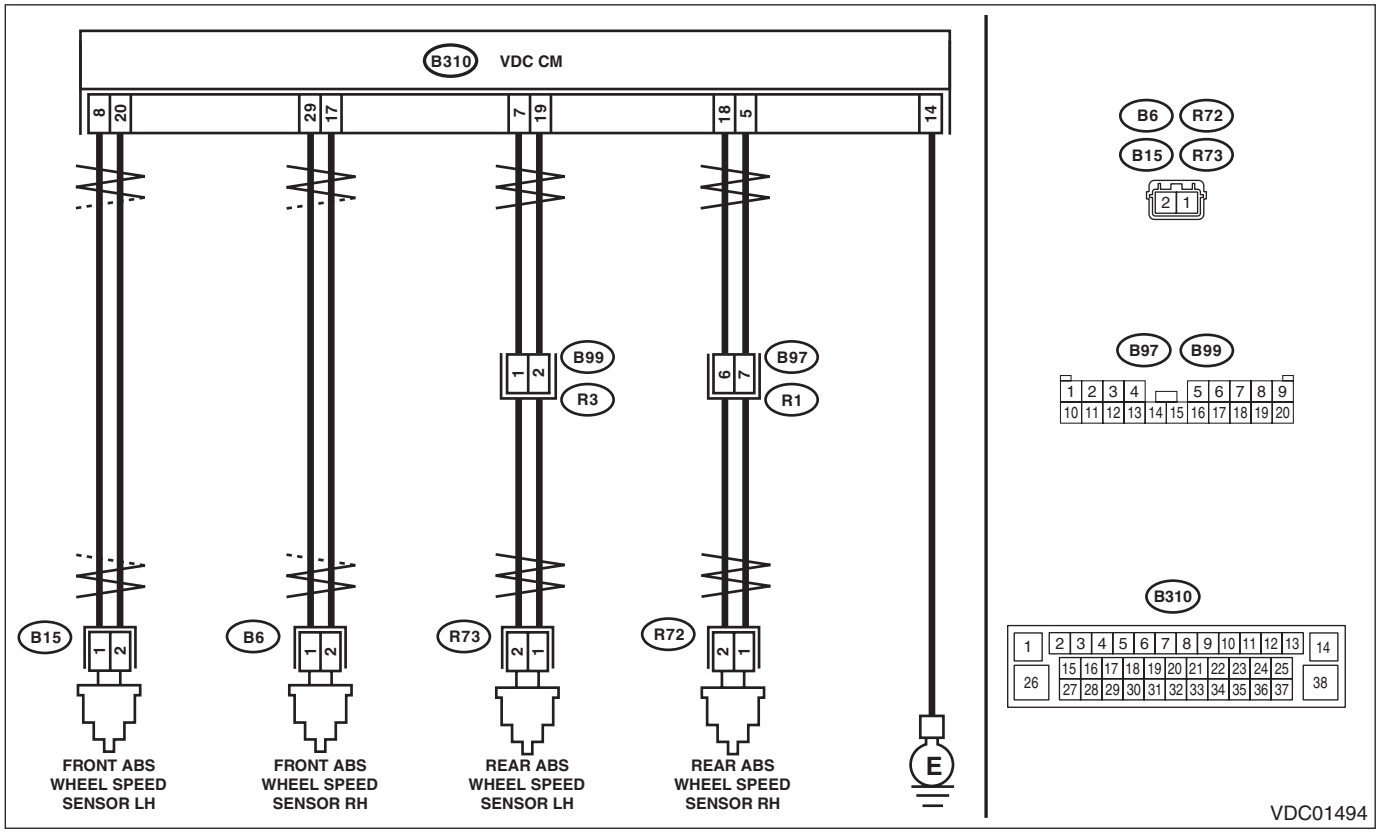
Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>

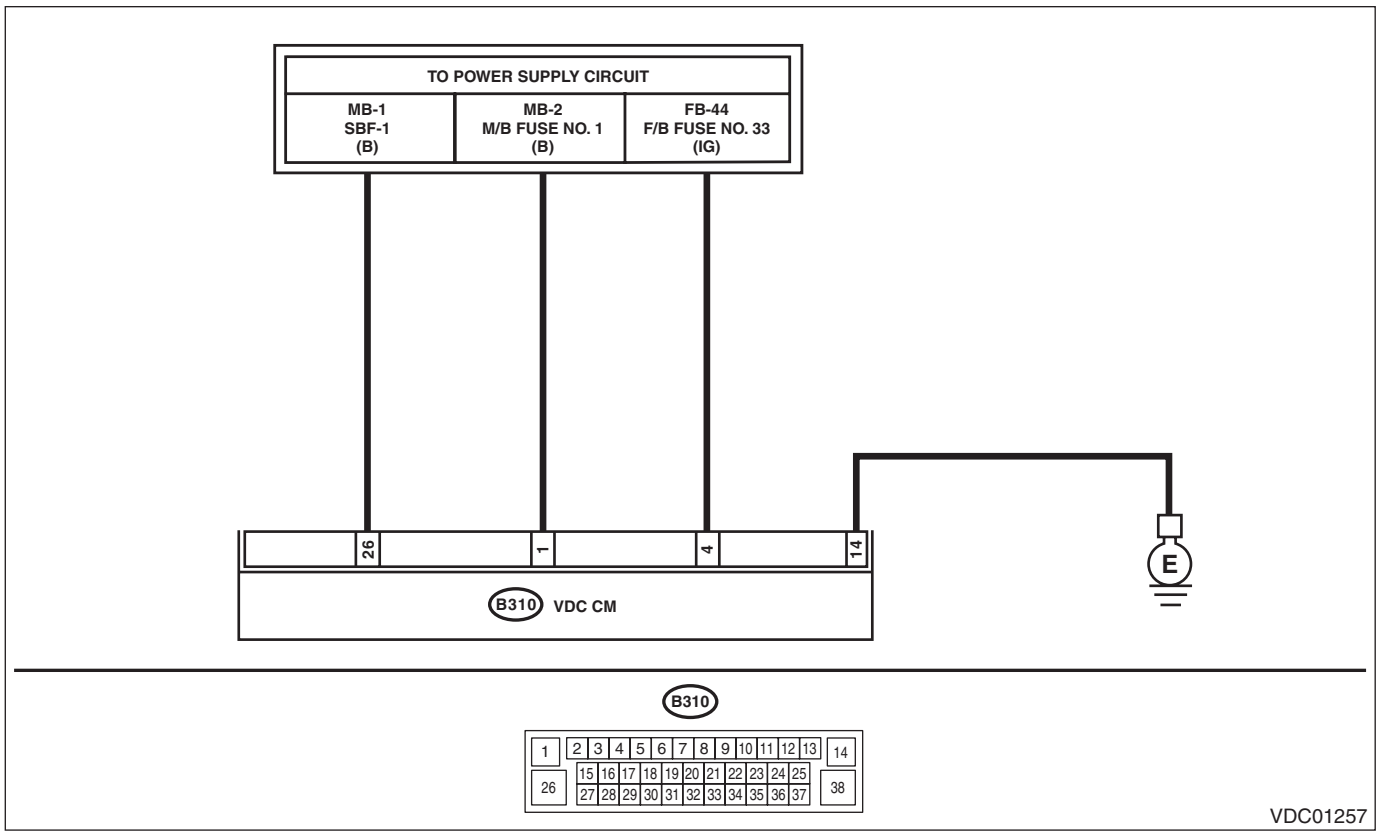




- HEV model

Vehicle dynamics control system <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>





	Step	Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTOR.** Check if there is poor contact between VDCCM&H/U and ABS wheel speed sensor.	Is there poor contact?	Repair the connector.	Go to step **2**.
2	**CHECK HARNESS CONNECTOR BETWEEN VDCCM&H/U AND ABS WHEEL SPEED SENSOR (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (B310) from the VDCCM&H/U. 3) Disconnect the connector from ABS wheel speed sensor. 4) Measure the resistance between VDCCM&H/U connector and ABS wheel speed sensor connector. ***Connector & terminal*** ***DTC C1211*** ***(B310) No. 29 — (B6) No. 1:*** ***(B310) No. 17 — (B6) No. 2:*** ***DTC C1221*** ***(B310) No. 33 — (B15) No. 1: (gasoline engine model)*** ***(B310) No. 8 — (B15) No. 1: (HEV model)*** ***(B310) No. 20 — (B15) No. 2:*** ***DTC C1231*** ***(B310) No. 5 — (R72) No. 1:*** ***(B310) No. 18 — (R72) No. 2:*** ***DTC C1241*** ***(B310) No. 19 — (R73) No. 1:*** ***(B310) No. 7 — (R73) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness connector between VDCCM&H/U and ABS wheel speed sensor.
3	**CHECK GROUND SHORT OF HARNESS.** Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***DTC C1211*** ***(B310) No. 29 — Chassis ground:*** ***DTC C1221*** ***(B310) No. 33 — Chassis ground: (gasoline engine model)*** ***(B310) No. 8 — Chassis ground: (HEV model)*** ***DTC C1231*** ***(B310) No. 5 — Chassis ground:*** ***DTC C1241*** ***(B310) No. 19 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the harness connector between VDCCM&H/U and ABS wheel speed sensor.
4	**CHECK ABS WHEEL SPEED SENSOR POWER SUPPLY CIRCUIT.** 1) Connect the VDCCM&H/U connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between ABS wheel speed sensor connector and chassis ground. ***Connector & terminal*** ***DTC C1211*** ***(B6) No. 2 (+) — Chassis ground (–):*** ***DTC C1221*** ***(B15) No. 2 (+) — Chassis ground (–):*** ***DTC C1231*** ***(R72) No. 2 (+) — Chassis ground (–):*** ***DTC C1241*** ***(R73) No. 2 (+) — Chassis ground (–):***	Is the voltage 5 — 16 V?	Go to step **6**.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK VDCCM&H/U POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the VDCCM&H/U connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between VDCCM&H/U connector terminals. ***Connector & terminal*** ***(B310) No. 4 (+) — (B310) No. 14 (–):*** ***(B310) No. 1 (+) — (B310) No. 14 (–):*** ***(B310) No. 26 (+) — (B310) No. 14 (–):***	Is the voltage 10 — 15 V?	Go to step **6**.	Check the generator, battery and VDCCM&H/U power supply circuit.
6	**CHECK ABS WHEEL SPEED SENSOR SIGNAL.** 1) Prepare an oscilloscope. 2) Check the ABS wheel speed sensor. <Ref. to VDC-39, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Front ABS Wheel Speed Sensor.> <Ref. to VDC-48, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Rear ABS Wheel Speed Sensor.>	Is the pattern the same waveform as shown in the figure?	Go to step **7**.	Replace the ABS wheel speed sensor. <Ref. to VDC-37, Front ABS Wheel Speed Sensor.> <Ref. to VDC-40, Rear ABS Wheel Speed Sensor.>
7	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **8**.
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

E: DTC C1212 FRONT RIGHT ABS SENSOR SIGNAL

NOTE:
For the diagnostic procedure, refer to “DTC C1242 REAR LEFT ABS SENSOR SIGNAL”. <Ref. to VDC(diag)-55, DTC C1242 REAR LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

F: DTC C1222 FRONT LEFT ABS SENSOR SIGNAL

NOTE:
For the diagnostic procedure, refer to “DTC C1242 REAR LEFT ABS SENSOR SIGNAL”. <Ref. to VDC(diag)-55, DTC C1242 REAR LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

G: DTC C1232 REAR RIGHT ABS SENSOR SIGNAL

NOTE:
For the diagnostic procedure, refer to “DTC C1242 REAR LEFT ABS SENSOR SIGNAL”. <Ref. to VDC(diag)-55, DTC C1242 REAR LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

H: DTC C1242 REAR LEFT ABS SENSOR SIGNAL

DTC DETECTING CONDITION:

- Defective ABS wheel speed sensor signal (noise, irregular signal, etc.)
- Defective harness connector

TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

CAUTION:

For HEV model, perform Clear Memory Mode for VDC system after diagnosis, turn the ignition switch to OFF, and wait for 30 seconds. Next, perform Clear Memory Mode for hybrid system, turn the ignition switch to OFF, and wait for 30 seconds. <Ref. to VDC(diag)-26, Clear Memory Mode.> <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.>

	Step	Check	Yes	No
1	**CHECK ABS WHEEL SPEED SENSOR AND FREEZE FRAME DATA USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, check the freeze frame data when DTC is detected. <Ref. to VDC(diag)-17, READ FREEZE FRAME DATA, OPERATION, Subaru Select Monitor.> 2) Compare «FR Wheel Speed», «FL Wheel Speed», «RR Wheel Speed» and «RL Wheel Speed» to determine a sensor that is not indicating the same value. 3) Check the current data of the wheel speed sensor that is not indicating the same value. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>	Does the speed indicated on the data monitor change in response to the speedometer reading during acceleration/deceleration when the steering wheel is in the straight-ahead position? In addition, are the wheel speeds of the freeze frame data for 4 wheels almost the same?	Go to step **2**.	Go to step **7**.
2	**CHECK POOR CONTACT OF CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Check for poor contact of the connector between VDCCM&H/U and ABS wheel speed sensor.	Is there poor contact of connectors between VDCCM&H/U and ABS wheel speed sensor?	Repair the connector.	Go to step **3**.
3	**CHECK CAUSE OF SIGNAL NOISE.** Make sure the radio wave devices and electronic components are installed correctly.	Are the radio wave devices and electronic components installed correctly?	Go to step **4**.	Install the radio wave devices and electronic components properly.
4	**CHECK CAUSE OF SIGNAL NOISE.** Check if the noise sources (such as an antenna) are installed near the sensor harness.	Are noise sources installed?	Install the noise sources apart from sensor harness.	Go to step **5**.
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

Step		Check	Yes	No
7	**CHECK INSTALLATION OF ABS WHEEL SPEED SENSOR.**	Is the ABS wheel speed sensor installation bolt tightened to 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)?	Go to step **8**.	Tighten the ABS wheel speed sensor installation bolts.
8	**CHECK ABS WHEEL SPEED SENSOR SIGNAL.** 1) Prepare an oscilloscope. 2) Check the ABS wheel speed sensor. <Ref. to VDC-39, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Front ABS Wheel Speed Sensor.> <Ref. to VDC-48, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Rear ABS Wheel Speed Sensor.>	Does the oscilloscope indicate the waveform pattern like shown in the figure when the tire is slowly turned? Does the oscilloscope indication repeat the waveform pattern like shown in the figure when the tire is slowly turned in equal speed for one rotation or more?	Go to step **10**.	Go to step **9**.
9	**CHECK ABS WHEEL SPEED SENSOR OR MAGNETIC ENCODER.**	Are there foreign matter, breakage or damage at the tip of ABS wheel speed sensor or magnetic encoder?	Remove dirt thoroughly. Also replace the ABS wheel speed sensor or magnetic encoder as a unit with hub unit bearing if it is broken or damaged.	Go to step **10**.
10	**CHECK CAUSE OF SIGNAL NOISE.** Make sure the radio wave devices and electronic components are installed correctly.	Are the radio wave devices and electronic components installed correctly?	Go to step **11**.	Install the radio wave devices and electronic components properly.
11	**CHECK CAUSE OF SIGNAL NOISE.** Check if the noise sources (such as an antenna) are installed near the sensor harness.	Are noise sources installed?	Install the noise sources apart from sensor harness.	Go to step **12**.
12	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Go to step **13**.	Go to step **14**.
13	**CHECK FREEZE FRAME DATA OF ABS WHEEL SPEED SENSOR USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select “Freeze frame data”. <Ref. to VDC(diag)-17, READ FREEZE FRAME DATA, OPERATION, Subaru Select Monitor.> 2) Read the ABS wheel speed sensor output.	Is the ABS wheel speed sensor output different compared with other wheels?	Replace the ABS wheel speed sensor which has a difference. <Ref. to VDC-37, Front ABS Wheel Speed Sensor.> <Ref. to VDC-40, Rear ABS Wheel Speed Sensor.>	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

	Step	Check	Yes	No
14	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference. NOTE: Though the ABS warning light may remain on at this time, this is normal. Drive the vehicle at 60 km/h (37 MPH) or more in order to turn ABS warning light off. Be sure to drive the vehicle and check that the warning light goes off.

I: DTC C1251 WHEEL SPEED SENSOR SYSTEM

NOTE:
For the diagnostic procedure, refer to “DTC C1241 REAR LEFT ABS SENSOR CIRCUIT”. <Ref. to VDC(diag)-50, DTC C1241 REAR LEFT ABS SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

J: DTC C1252 WHEEL SPEED SENSOR SIGNAL OF ONE OF THE WHEELS

DTC DETECTING CONDITION:

- Defective ABS wheel speed sensor signal (noise, irregular signal, etc.)
- Defective magnetic encoder
- When a wheel is turned freely for a long time

TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- EBD may not operate.
- Hill start assist does not operate.

CAUTION:

For HEV model, perform Clear Memory Mode for VDC system after diagnosis, turn the ignition switch to OFF, and wait for 30 seconds. Next, perform Clear Memory Mode for hybrid system, turn the ignition switch to OFF, and wait for 30 seconds. <Ref. to VDC(diag)-26, Clear Memory Mode.> <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.>

NOTE:
Brake warning light comes on as well as ABS warning light when EBD does not operate.

	Step	Check	Yes	No
1	**WHETHER A WHEEL TURNED FREELY OR NOT.** Check if the wheels have been turned freely for one minute or more, such as when the vehicle is jacked-up, under full-lock cornering or when the wheels are not in contact with road surface.	Did the wheels turn freely?	VDC is normal. Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> NOTE: This diagnostic trouble code may sometimes occur if the wheels turn freely for a long time, for example when the vehicle is towed or jacked-up, or when steering wheel is continuously turned all the way.	Go to step **2**.
2	**CHECK TIRE SPECIFICATIONS.** Turn the ignition switch to OFF.	Are the tire specifications correct?	Go to step **3**.	Replace the tire.
3	**CHECK WEAR OF TIRE.**	Is the tire worn excessively?	Replace the tire.	Go to step **4**.
4	**CHECK TIRE INFLATION PRESSURE.**	Is the tire pressure correct?	Go to step **5**.	Adjust the tire pressure.
5	**CHECK INSTALLATION OF ABS WHEEL SPEED SENSOR.**	Are the ABS wheel speed sensor installation bolts tightened to 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)? (For four wheels)	Go to step **6**.	Tighten the ABS wheel speed sensor installation bolts.
6	**CHECK ABS WHEEL SPEED SENSOR SIGNAL.** 1) Prepare an oscilloscope. 2) Check the ABS wheel speed sensor. <Ref. to VDC-39, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Front ABS Wheel Speed Sensor.> <Ref. to VDC-48, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Rear ABS Wheel Speed Sensor.>	Does the oscilloscope indicate the waveform pattern like shown in the figure when the tire is slowly turned? Does the oscilloscope indication repeat the waveform pattern like shown in the figure when the tire is slowly turned in equal speed for one rotation or more? (For all four wheels)	Go to step **8**.	Go to step **7**.

	Step	Check	Yes	No
7	**CHECK ABS WHEEL SPEED SENSOR OR MAGNETIC ENCODER.**	Are there foreign matter, breakage or damage at the tip of ABS wheel speed sensor or magnetic encoder? (For all four wheels)	Remove dirt thoroughly. Also replace the ABS wheel speed sensor or magnetic encoder as a unit with hub unit bearing if it is broken or damaged.	Go to step **8**.
8	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **9**.
9	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

K: DTC C1311 FR HOLD VALVE

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

L: DTC C1312 FR PRESSURE REDUCING VALVE

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

M: DTC C1321 FL HOLD VALVE

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

N: DTC C1322 FL PRESSURE REDUCING VALVE

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

O: DTC C1331 RR HOLD VALVE

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

P: DTC C1332 RR PRESSURE REDUCING VALVE

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Q: DTC C1341 RL HOLD VALVE

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

R: DTC C1342 RL PRESSURE REDUCING VALVE

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

S: DTC C1351 NORMAL OPENING VALVE 1

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

T: DTC C1352 NORMAL OPENING VALVE 2

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

U: DTC C1361 NORMAL CLOSING VALVE 1

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

V: DTC C1362 NORMAL CLOSING VALVE 2

DTC DETECTING CONDITION:

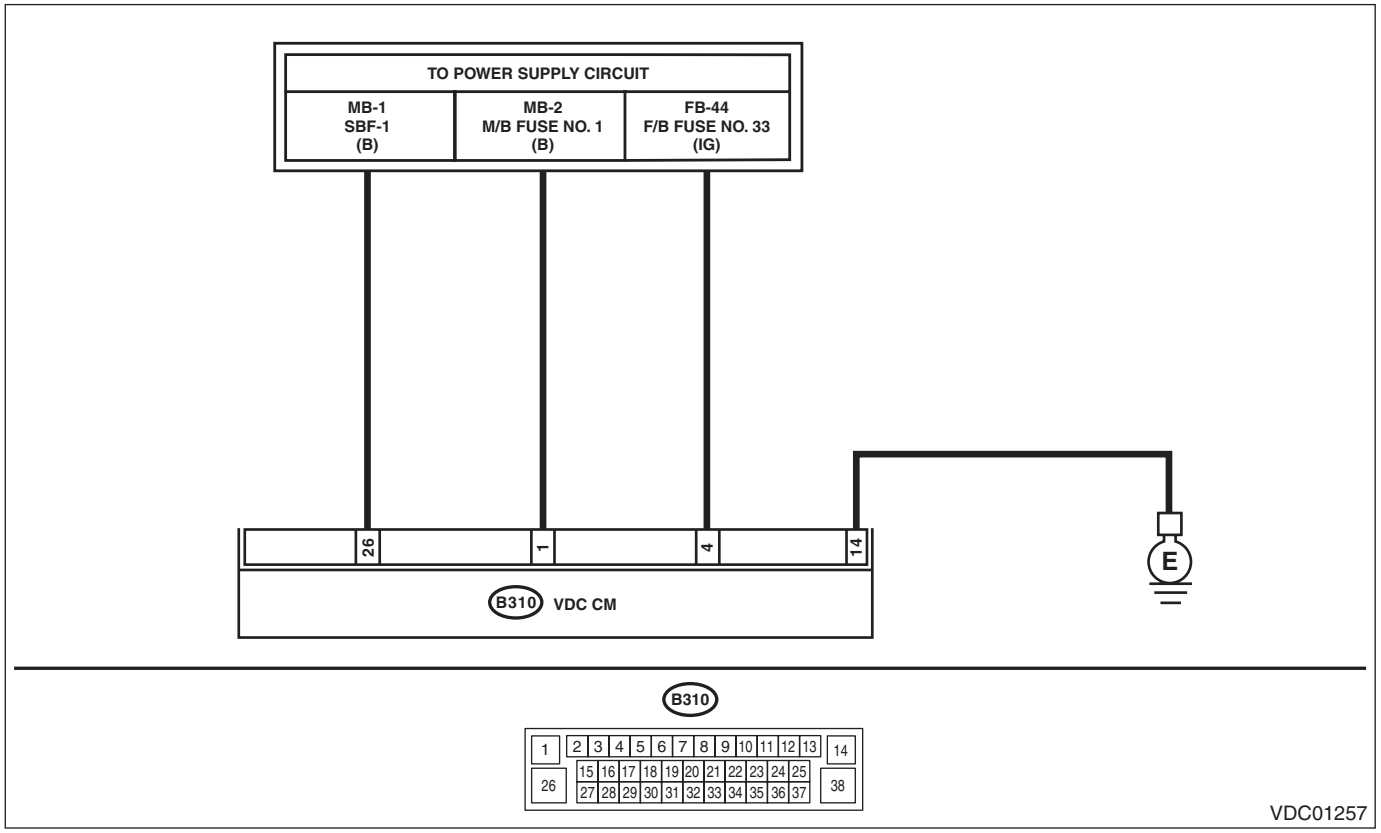
- Defective harness connector
- Defective VDCH/U solenoid valve

TROUBLE SYMPTOM:

- ABS does not operate.
- EBD does not operate.
- VDC does not operate.
- Hill start assist does not operate.

WIRING DIAGRAM:

Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK VDCCM&H/U INPUT VOLTAGE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Run the engine at idle. 4) Measure the voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 4 (+) — Chassis ground (–):*** ***(B310) No. 1 (+) — Chassis ground (–):*** ***(B310) No. 26 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the power supply circuit including the battery.

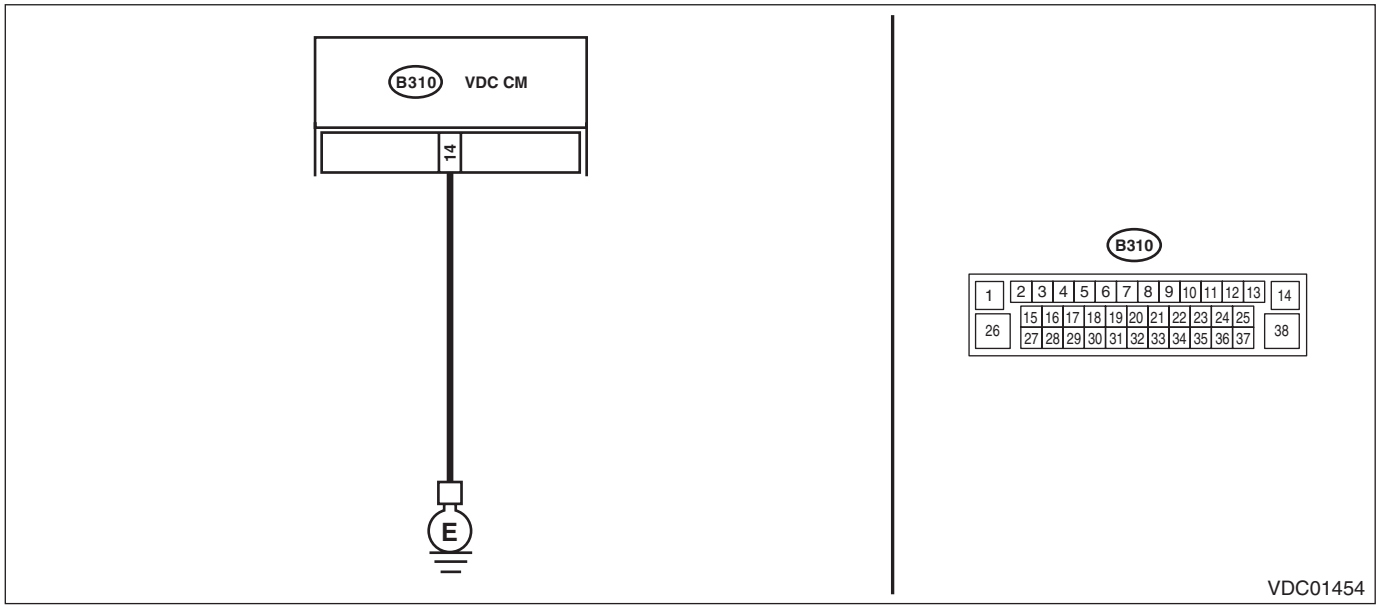
	Step	Check	Yes	No
2	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 14 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair the VDCCM&H/U ground harness.
3	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of connector between generator, battery and VDCCM&H/U?	Repair the connector.	Go to step **4**.
4	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

W: DTC C1411 ELECTRICAL CONTROL MODULE

DTC DETECTING CONDITION:
Defective VDCCM

TROUBLE SYMPTOM:
- ABS does not operate.
- EBD does not operate.
- VDC does not operate.
- Hill start assist does not operate.

WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Measure the resistance between VDCCM&H/U and chassis ground. ***Connector & terminal*** ***(B310) No. 14 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **2**.	Repair the VDCCM&H/U ground harness.
2	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of the connector between the battery, ignition switch and VDCCM&H/U?	Repair the connector.	Go to step **3**.
3	**CHECK CAUSE OF SIGNAL NOISE.**	Are the radio wave devices and electronic components installed correctly?	Go to step **4**.	Install the radio wave devices and electronic components properly.
4	**CHECK CAUSE OF SIGNAL NOISE.**	Is there a noise source (such as an antenna) installed near the sensor harness and VDCCM?	Install the noise sources apart from sensor harness and VDCCM.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

X: DTC C1412 SELECTED PARAMETER

DTC DETECTING CONDITION:
VDCCM parameter selection error
TROUBLE SYMPTOM:
- ABS does not operate.
- EBD does not operate.
- VDC does not operate.
- Hill start assist does not operate.

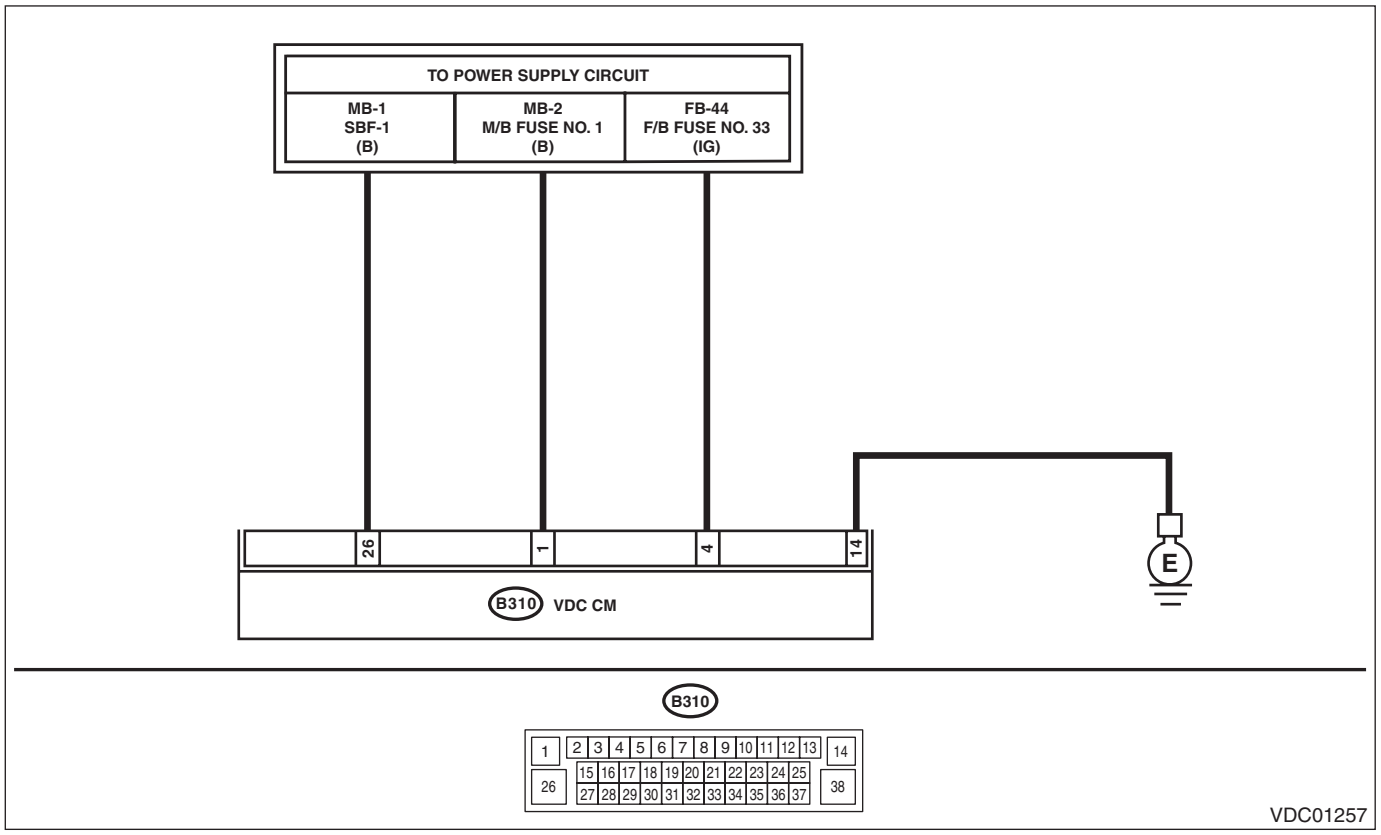
NOTE:
When the VDCCM or VDCCM&H/U is replaced, this DTC may be stored.

	Step	Check	Yes	No
1	**CHECK VDCCM&H/U IDENTIFICATION SYMBOL.** Check the identification symbol attached on the H/U. <Ref. to VDC-2, SPECIFICATION, General Description.>	Is the identification symbol correct?	Go to step **2**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
2	**CHECK PARAMETER SELECTED IN VDCCM.** <Ref. to VDC(diag)-19, PARAMETER CHECK, OPERATION, Subaru Select Monitor.>	Does the parameter registered in the VDCCM match the relevant vehicle?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Select and register the correct parameter. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>

Y: DTC C1413 POWER SUPPLY VOLTAGE

DTC DETECTING CONDITION:
Improper VDCCM&H/U power supply voltage
TROUBLE SYMPTOM:
- ABS does not operate.
- EBD may not operate.
- VDC does not operate.
- Hill start assist does not operate.

NOTE:
Warning lights go off if voltage returns.
WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK GENERATOR.** 1) Start the engine. 2) Run the engine at idle after warming up. 3) Measure the voltage between generator terminal B and chassis ground. ***Terminals*** ***Generator terminal B (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the generator.
2	**CHECK BATTERY TERMINAL.** Turn the ignition switch to OFF.	Are the positive and negative battery terminals clamped tightly?	Go to step **3**.	Install the battery terminal correctly.

	Step	Check	Yes	No
3	**CHECK VDCCM&H/U INPUT VOLTAGE.** 1) Disconnect the connector from the VDCCM&H/U. 2) Run the engine at idle. 3) Operate devices such as headlights, air conditioner, rear defogger, etc. which produce an electrical load. 4) Measure the voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 4 (+) — Chassis ground (–):*** ***(B310) No. 1 (+) — Chassis ground (–):*** ***(B310) No. 26 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 14 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair the VDCCM&H/U ground harness.
5	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of connector between generator, battery and VDCCM&H/U?	Repair the connector.	Go to step **6**.
6	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **7**.
7	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

Z: DTC C1421 ECM CONTROL SYSTEM

DTC DETECTING CONDITION:
ECM malfunctioning
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

	Step	Check	Yes	No
1	**CHECK COOPERATION CONTROL FEASIBILITY OF ECM USING SUBARU SELECT MONITOR.** 1) Start the engine, and run the engine at idle approximately 5 minutes. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Check the «E/G Control Stop Flag» displayed on screen.	Is the «E/G Control Stop Flag» "1"?	Go to step **4**.	Go to step **2**.
2	**CHECK WARNING LIGHT.** Check whether the VDC warning light illuminates after driving for 1 minute or more at a speed of 10 km/h (6 MPH) or more.	Does the VDC warning light illuminate?	Go to step **3**.	VDC is normal. Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> NOTE: DTC may be recorded if cranking is performed during driving.
3	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of ECM connector?	Repair the connector.	Go to step **4**.
4	**CHECK ENGINE SYSTEM.** Refer to the basic diagnostic procedure of ENGINE (DIAGNOSTICS).	Is the engine system normal?	Go to step **5**.	Check the engine system.
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AA:DTC C1422 VDC INTERRUPTION FOR ENGINE CONVENIENCE

DTC DETECTING CONDITION:
ECM prohibits the cooperation control.
TROUBLE SYMPTOM:
VDC does not operate.

NOTE:
- For the diagnostic procedure, refer to “DTC C1421 ECM CONTROL SYSTEM”. <Ref. to VDC(diag)-68, DTC C1421 ECM CONTROL SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- Warning lights go off if the cooperation control of ECM returns.

AB:DTC C1423 DIFFERENT ECU SPECIFICATIONS

DTC DETECTING CONDITION:
Different control module specification
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

NOTE:
When parameter selection for VDCCM is improper, this DTC may be memorized.

	Step	Check	Yes	No
1	**CHECK VDCCM&H/U IDENTIFICATION SYMBOL.** Check the identification symbol attached on the H/U. <Ref. to VDC-2, SPECIFICATION, General Description.>	Is the identification symbol correct?	Go to step **2**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
2	**CHECK PARAMETER SELECTED IN VDCCM.** <Ref. to VDC(diag)-19, PARAMETER CHECK, OPERATION, Subaru Select Monitor.>	Does the parameter registered in the VDCCM match the relevant vehicle?	CVT model: Go to step **3**. MT model: Go to step **5**.	Select and register the correct parameter. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>
3	**CHECK TCM SPECIFICATION.** Check the TCM specification.	Is the specification of TCM same as vehicle specification?	Go to step **4**.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).> <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>
4	**CHECK CVT SYSTEM.** 1) Start the engine. 2) Check the DTC in CVT system. <Ref. to CVT(w/o HEV)(diag)-18, Read Diagnostic Trouble Code (DTC).> <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Is DTC of CVT system displayed?	Perform the diagnosis according to DTC. <Ref. to CVT(w/o HEV)(diag)-36, List of Diagnostic Trouble Code (DTC).> <Ref. to CVT(HEV)(diag)-35, List of Diagnostic Trouble Code (DTC).>	Go to step **5**.
5	**CHECK ECM SPECIFICATION.** Check the ECM specification.	Is the specification of ECM same as vehicle specification?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>

	Step	Check	Yes	No
6	**CHECK ENGINE SYSTEM.** 1) Start the engine. 2) Check DTCs of engine system. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is engine system DTC displayed?	Perform the diagnosis according to DTC. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **7**.
7	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **8**.
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AC:DTC C1424 ECM

DTC DETECTING CONDITION:
ECM malfunctioning
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

	Step	Check	Yes	No
1	**CHECK ECM.** 1) Start the engine. 2) Check DTC of ECM. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO HEV)(diag)-92, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **3**.
3	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AD:DTC C1431 AT

DTC DETECTING CONDITION:
Defective TCM
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

Step		Check	Yes	No
1	**CHECK TCM.** 1) Start the engine. 2) Check DTC of TCM. <Ref. to CVT(w/o HEV)(diag)-18, Read Diagnostic Trouble Code (DTC).> <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to CVT(w/o HEV)(diag)-36, List of Diagnostic Trouble Code (DTC).> <Ref. to CVT(HEV)(diag)-35, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK VDCCM&H/U.** 1) Turn the ignition switch to OFF. 2) After turning the ignition switch to ON for approx. 10 seconds, turn it to OFF. 3) Turn the ignition switch to ON again. 4) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 6) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **3**.
3	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AE:DTC C1432 DIFFERENT ECU SPECIFICATIONS

NOTE:
For the diagnostic procedure, refer to “DTC C1423 DIFFERENT ECU SPECIFICATIONS”. <Ref. to VDC(diag)-70, DTC C1423 DIFFERENT ECU SPECIFICATIONS, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AF:DTC C1451 HPCM CONTROL SYSTEM

DTC DETECTING CONDITION:
Defective HPCM
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

	Step	Check	Yes	No
1	**CHECK COOPERATION CONTROL FEASIBILITY OF HPCM USING SUBARU SELECT MONITOR.** 1) Start the engine, and run the engine at idle approximately 5 minutes. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Check the «HPCM Control Stop Flag» displayed on screen.	Is the «HPCM Control Stop Flag» "1"?	Go to step **4**.	Go to step **2**.
2	**CHECK WARNING LIGHT.** Check whether the VDC warning light illuminates after driving for 1 minute or more at a speed of 10 km/h (6 MPH) or more.	Does the VDC warning light illuminate?	Go to step **3**.	VDC is normal. Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> NOTE: DTC may be recorded if cranking is performed during driving.
3	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of HPCM connector?	Repair the connector.	Go to step **4**.
4	**CHECK HYBRID SYSTEM.** Refer to the basic diagnostic procedure for HYBRID ELECTRIC VEHICLE (DIAGNOSTICS).	Does the hybrid system operate normally?	Go to step **5**.	Check the hybrid system.
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AG:DTC C1452 HPCM INTERRUPTED DUE TO EGI REASON

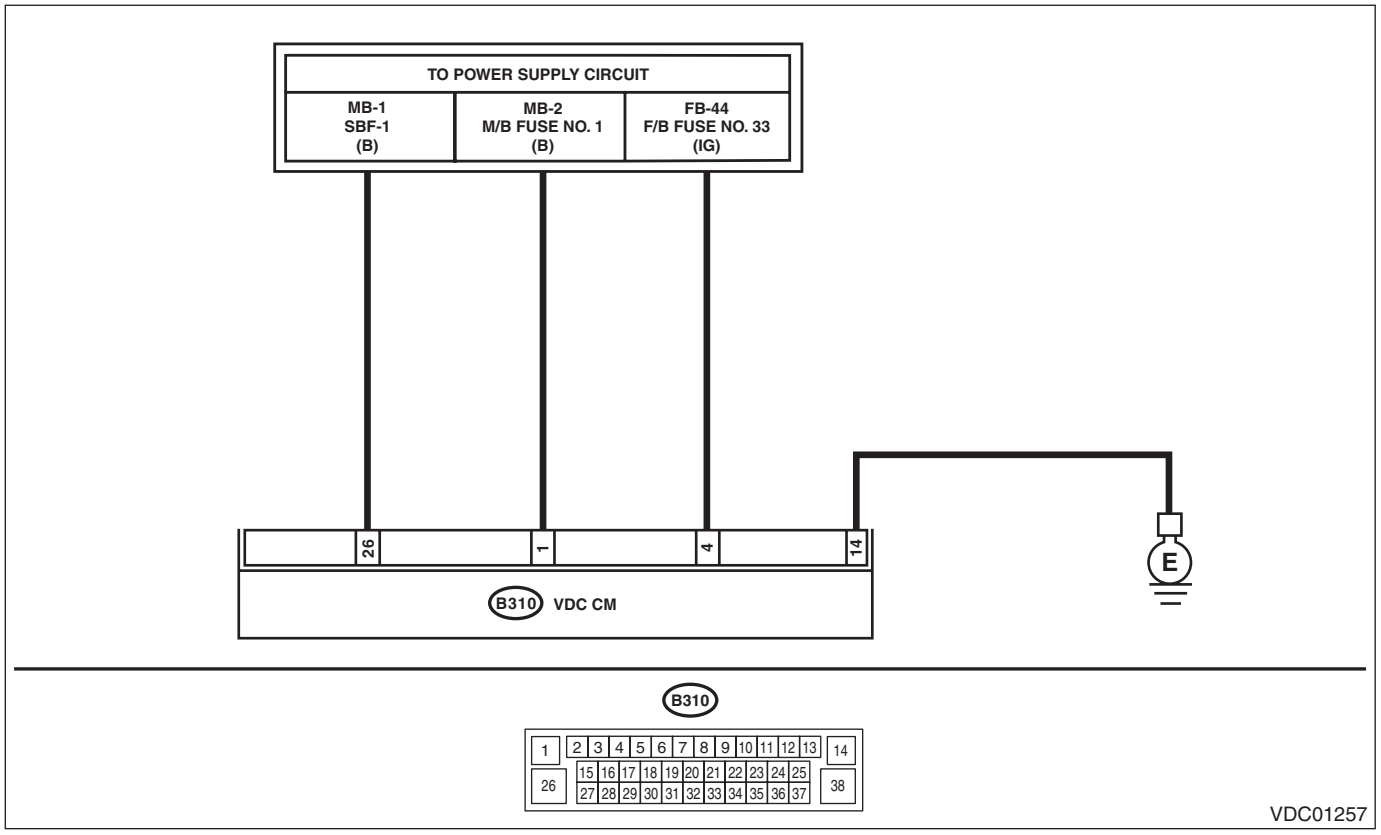
DTC DETECTING CONDITION:
HPCM prohibits the cooperation control.
TROUBLE SYMPTOM:
VDC does not operate.

NOTE:
- For the diagnostic procedure, refer to “DTC C1451 HPCM CONTROL SYSTEM”. <Ref. to VDC(diag)-74, DTC C1451 HPCM CONTROL SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- Warning lights go off if the cooperation control of HPCM returns.

AH:DTC C1511 VALVE RELAY

DTC DETECTING CONDITION:
Defective valve relay
TROUBLE SYMPTOM:
- ABS does not operate.
- EBD does not operate.
- VDC does not operate.
- Hill start assist does not operate.

WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK VDCCM&H/U INPUT VOLTAGE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Run the engine at idle. 4) Measure the voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 1 (+) — Chassis ground (–):*** ***(B310) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the power supply circuit.
2	**CHECK VDCCM&H/U INPUT VOLTAGE.** Calculate the voltage difference measured in step 1. A: (B310) No. 1 (+) — Chassis ground (–): B: (B310) No. 4 (+) — Chassis ground (–):	Is the voltage difference between A and B 2 V or more?	Repair the power supply circuit.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 14 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair the VDCCM&H/U ground harness.
4	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of connector between generator, battery and VDCCM&H/U?	Repair the connector.	Go to step **5**.
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AI: DTC C1512 VALVE SYSTEM

NOTE:
For the diagnostic procedure, refer to “DTC C1362 NORMAL CLOSING VALVE 2”. <Ref. to VDC(diag)-61, DTC C1362 NORMAL CLOSING VALVE 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AJ:DTC C1521 MOTOR RELAY

DTC DETECTING CONDITION:

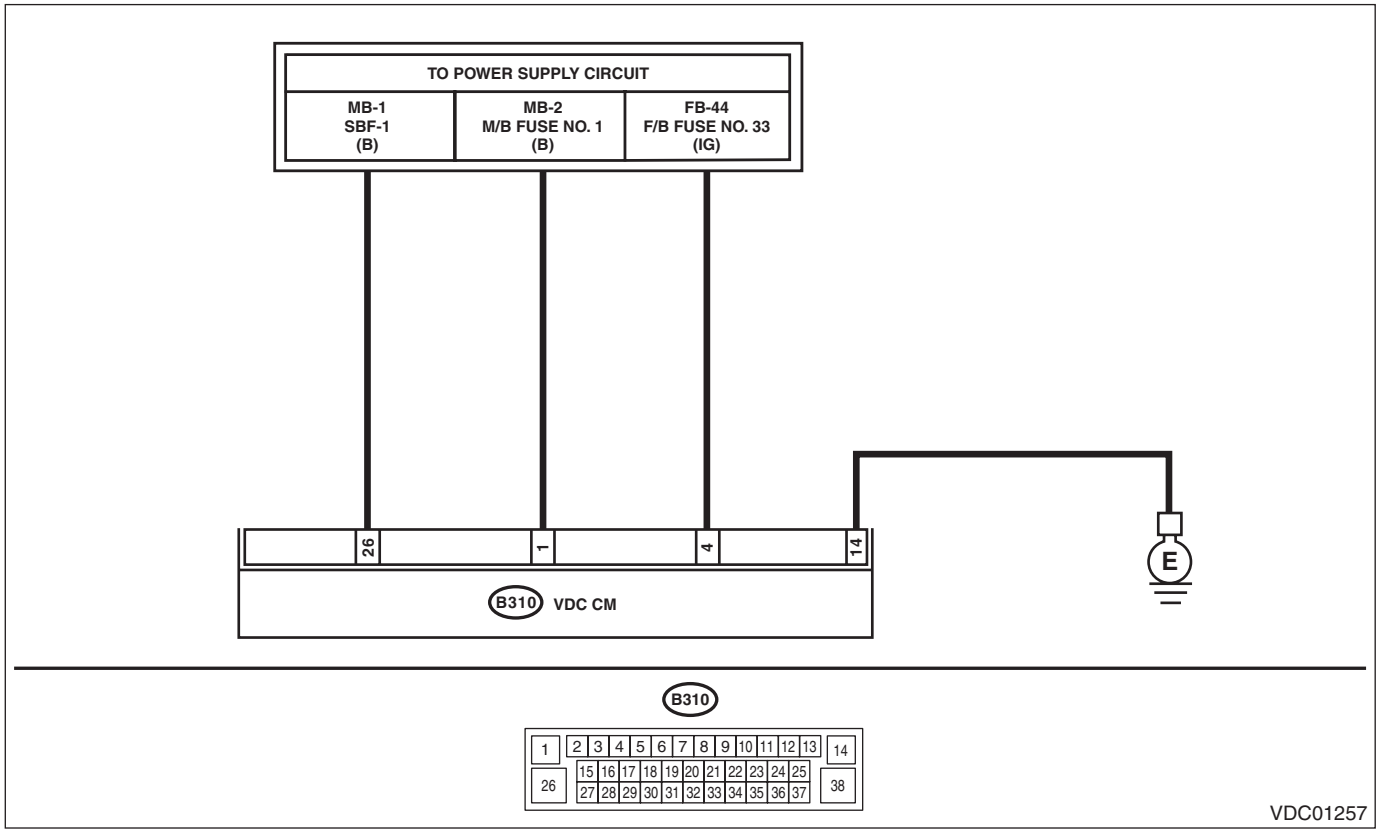
- Defective motor and motor relay
- Defective harness connector

TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- EBD may not operate.
- Hill start assist does not operate.

WIRING DIAGRAM:

Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK VDCCM&H/U INPUT VOLTAGE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Turn the ignition switch to ON. 4) Measure the voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 4 (+) — Chassis ground (–):*** ***(B310) No. 26 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the VDCCM&H/U power supply circuit.
2	**CHECK VDCCM&H/U INPUT VOLTAGE.** Calculate the voltage difference measured in step 1. A: (B310) No. 4 (+) — Chassis ground (–): B: (B310) No. 26 (+) — Chassis ground (–):	Is the voltage difference between A and B 2 V or more?	Repair the power supply circuit.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK INSTALLATION OF VDCCM&H/U GROUND.**	Is the VDCCM&H/U ground terminal installation bolt (ground bolt fixing onto the side frame upper face) installed correctly?	Go to step **4**.	Install the VDCCM&H/U ground terminal installation bolt correctly.
4	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 14 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair the VDCCM&H/U ground harness.
5	**CHECK VDCCM&H/U MOTOR RELAY.** Measure the resistance between VDCCM&H/U terminals. ***Terminals*** ***No. 26 — No. 38:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6	**CHECK POOR CONTACT OF CONNECTORS.** Turn the ignition switch to OFF.	Is there poor contact of connector between generator, battery and VDCCM&H/U?	Repair the connector.	Go to step **7**.
7	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **8**.
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AK:DTC C1531 BLS OFF STUCK

DTC DETECTING CONDITION:

Defective stop light switch

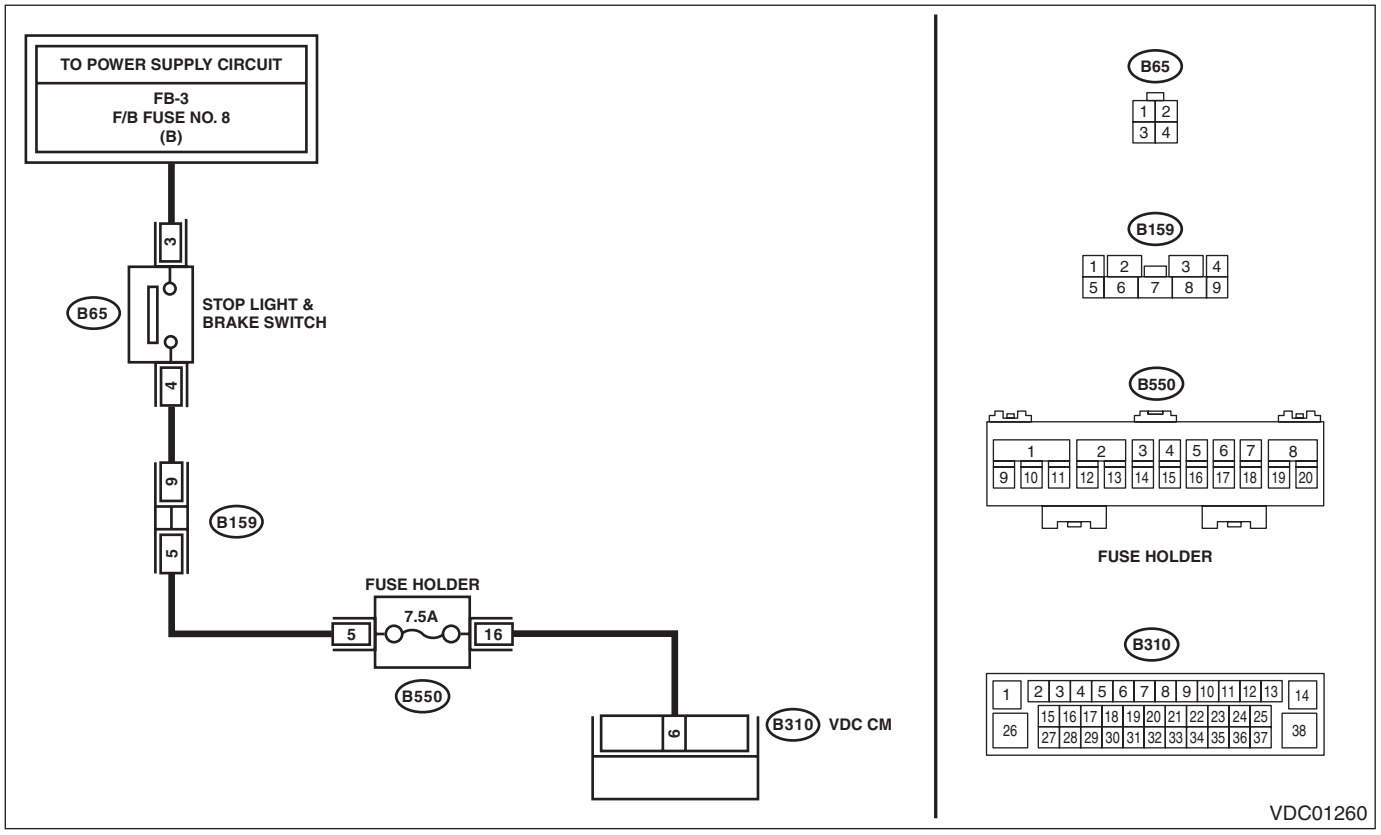
TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

WIRING DIAGRAM:

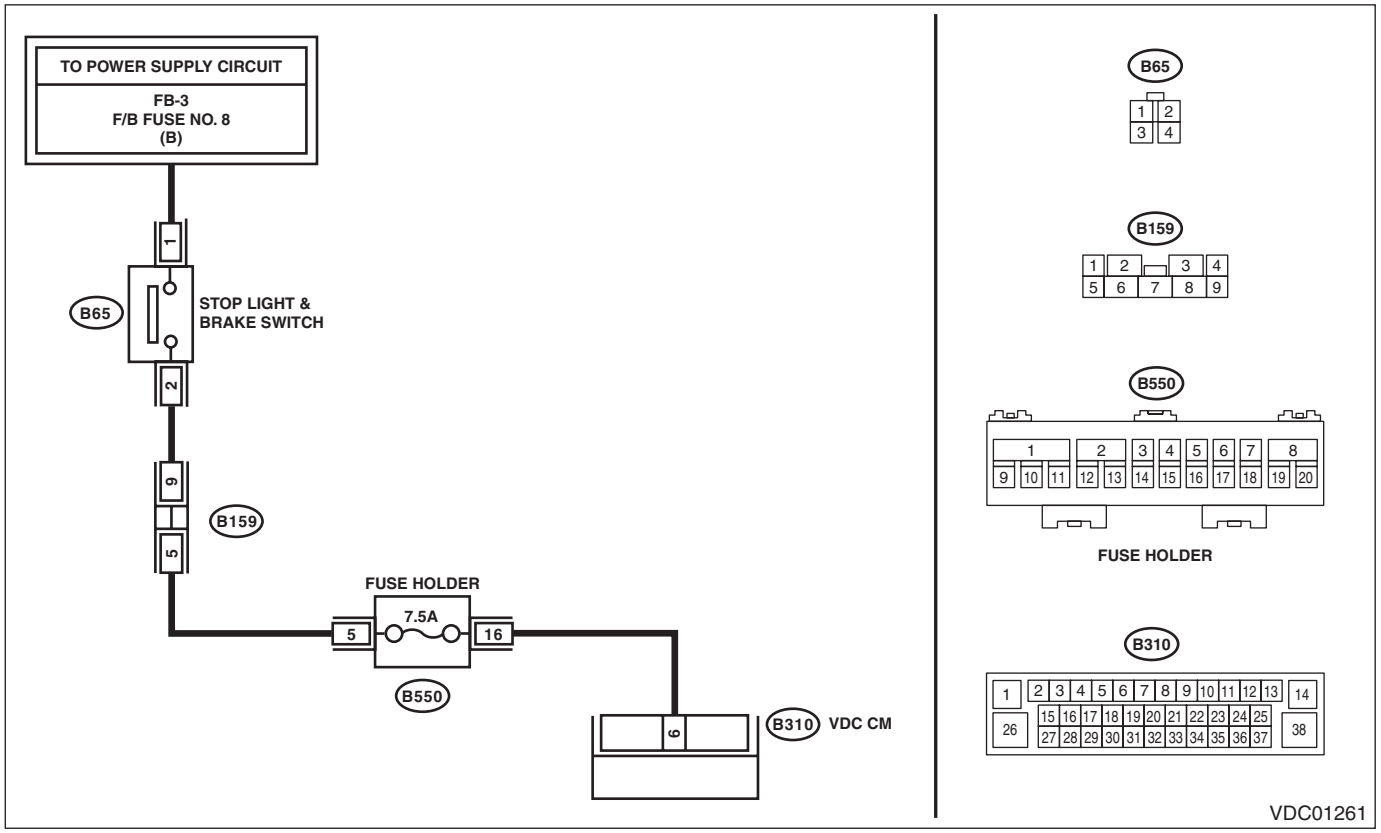
- Gasoline engine model

Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



• HEV model

Vehicle dynamics control system <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



	Step	Check	Yes	No
1	**CHECK STOP LIGHT SWITCH.** Check the stop light switch. <Ref. to BR-75, INSTALLATION, Stop Light Switch.>	Is the installation position of the stop light switch correct?	Go to step **2**.	Adjust the installation position of the stop light switch. <Ref. to BR-75, INSTALLATION, Stop Light Switch.>
2	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light switch connector. 3) Measure the resistance of stop light switch terminals. ***Terminals*** ***Gasoline engine model*** ***No. 3 — No. 4:*** ***HEV model*** ***No. 1 — No. 2:***	Is the resistance 1 Ω or less when the switch is ON (when pedal is depressed)?	Go to step **3**.	Replace the stop light switch. <Ref. to BR-75, Stop Light Switch.>
3	**CHECK STOP LIGHT POWER SUPPLY.** Measure the voltage between stop light switch terminal and chassis ground. ***Connector & terminal*** ***Gasoline engine model*** ***(B65) No. 3 (+) — Chassis ground (–):*** ***HEV model*** ***(B65) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **4**.	Repair the stop light power supply circuit.

	Step	Check	Yes	No
4	**CHECK STOP LIGHT SWITCH HARNESS (CHECK FOR OPEN CIRCUIT).** 1) Disconnect the connector from the VDCCM&H/U. 2) Measure the resistance between VDCCM&H/U and stop light switch. ***Connector & terminal*** ***Gasoline engine model*** ***(B65) No. 4 — (B310) No. 6:*** ***HEV model*** ***(B65) No. 2 — (B310) No. 6:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the stop light switch circuit.
5	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of connector between stop light switch and VDCCM&H/U?	Repair the connector.	Go to step **6**.
6	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **7**.
7	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AL:DTC C1532 BLS ON STUCK

DTC DETECTING CONDITION:

Defective stop light switch

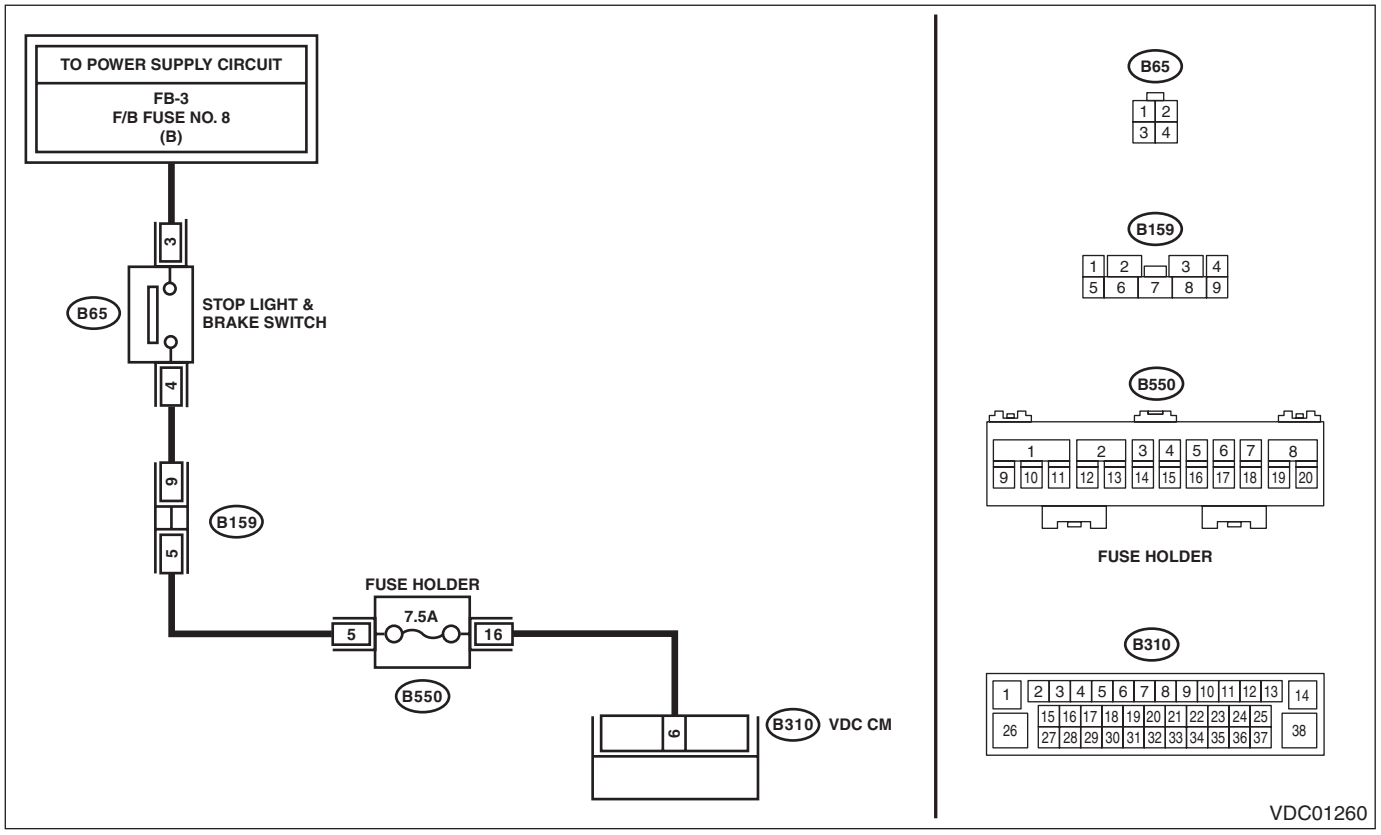
TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

WIRING DIAGRAM:

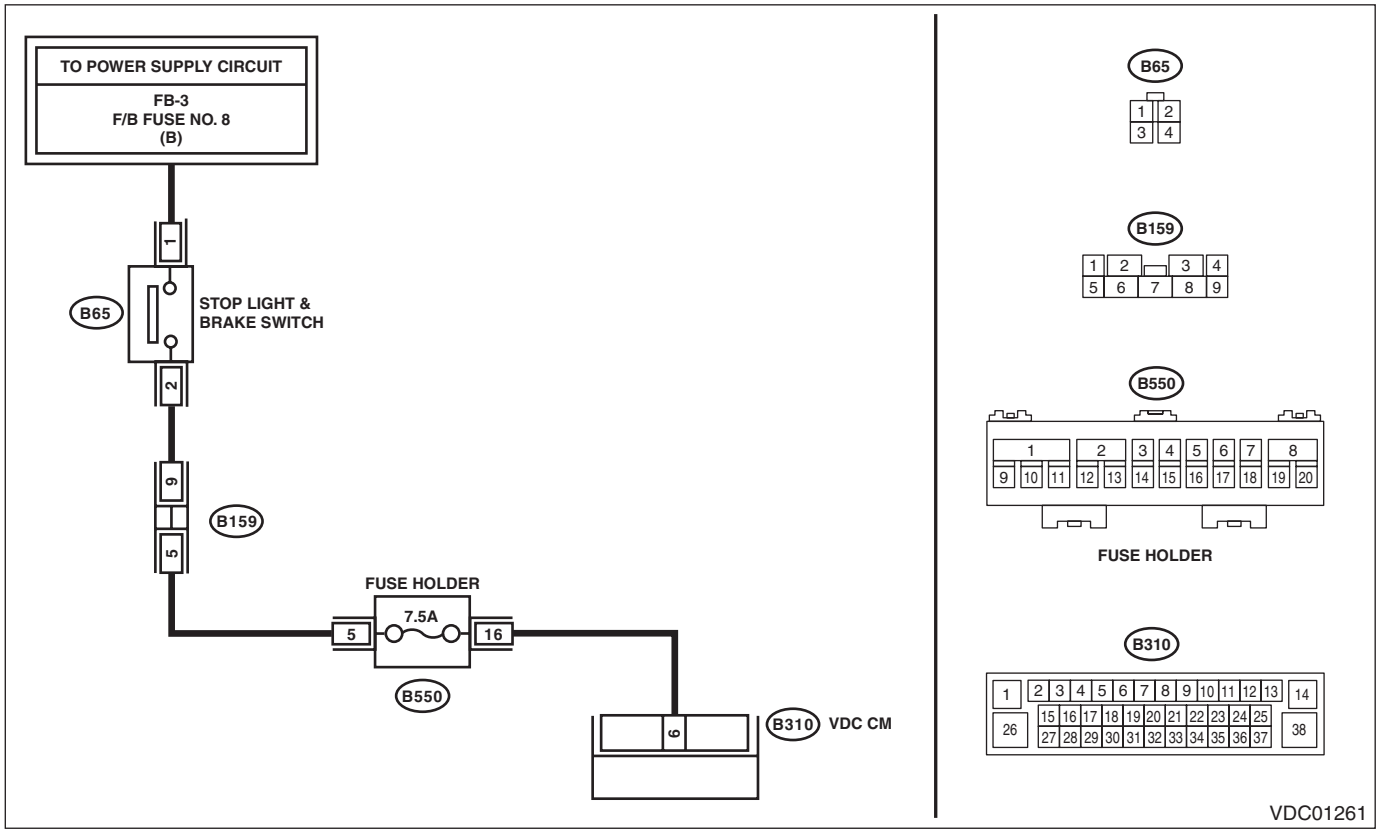
- Gasoline engine model

Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



- HEV model

Vehicle dynamics control system <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light switch connector. 3) Measure the resistance of stop light switch terminals. ***Terminals*** ***Gasoline engine model*** ***No. 3 — No. 4:*** ***HEV model*** ***No. 1 — No. 2:***	Is the resistance 1 MΩ or more when switch is OFF (when pedal is not depressed)?	Go to step **2**.	Replace the stop light switch. <Ref. to BR-75, Stop Light Switch.>
2	**CHECK STOP LIGHT SWITCH HARNESS.** 1) Disconnect the connector from the VDCCM&H/U. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 6 — Chassis ground:***	Is the resistance less than 1 MΩ?	Go to step **3**.	Repair the stop light switch circuit.
3	**INTERVIEW CUSTOMERS.** Make sure that the operation was performed in which accelerator pedal and brake pedal were depressed simultaneously (with depressing brake pedal with left foot).	Were the acceleration pedal and brake pedal depressed simultaneously?	System is normal. (DTC may be recorded if the brake pedal is always depressed while driving.)	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

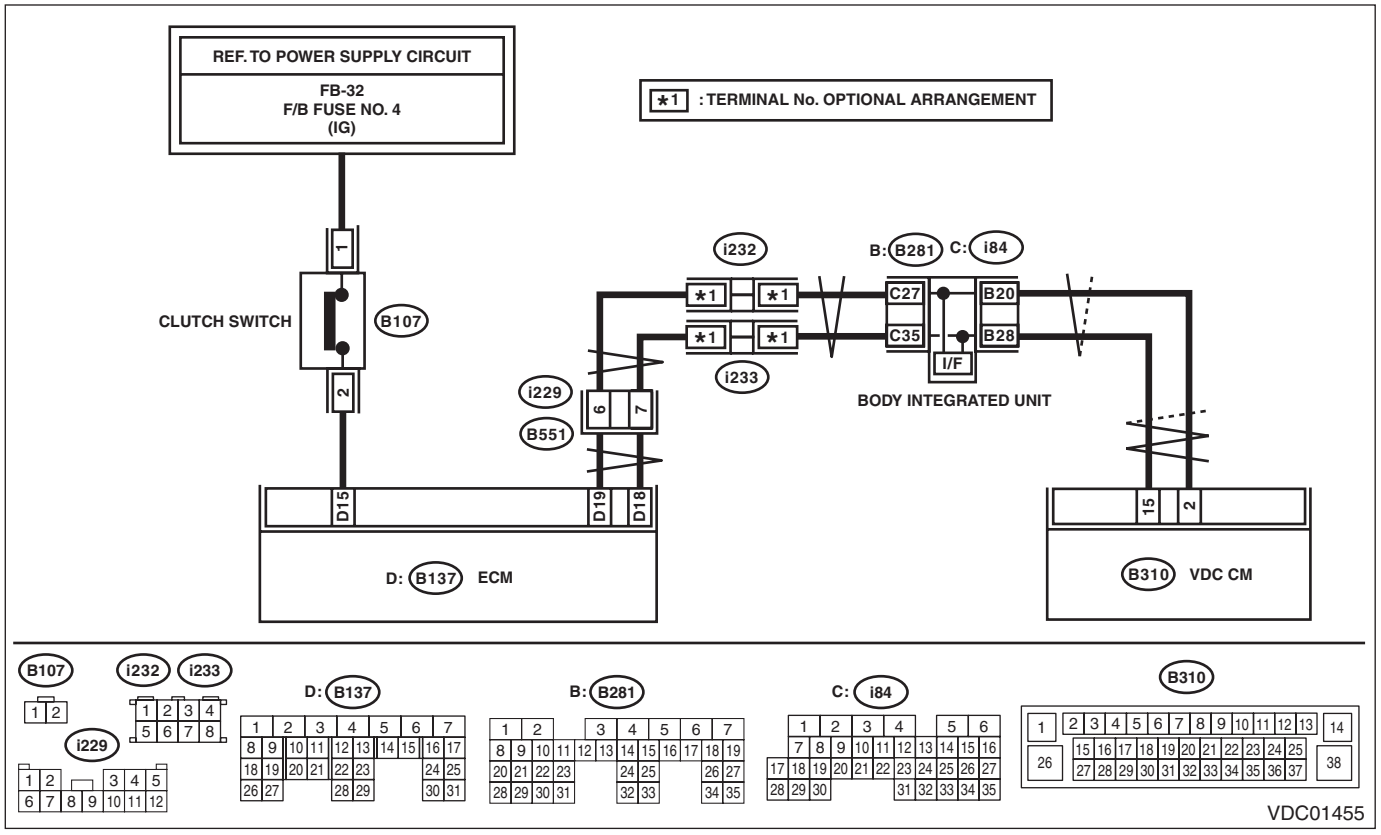
AM:DTC C1541 CLUTCH SWITCH OFF MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “DTC C1542 CLUTCH SWITCH ON MALFUNCTION”. <Ref. to VDC(diag)-86, DTC C1542 CLUTCH SWITCH ON MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AN:DTC C1542 CLUTCH SWITCH ON MALFUNCTION

DTC DETECTING CONDITION:
Abnormal clutch signal
TROUBLE SYMPTOM:
Hill start assist does not operate.

NOTE:
Depending on the user clutch operation patterns, the hill start assist warning light may illuminate for a while, and then go off.
Illumination condition:
While the vehicle speed is 10 km/h (6 MPH) or above, and the clutch switch signal ON (depressed) condition continues five minutes or more, if the vehicle speed lowers to 10 km/h (6 MPH) or below, the module judges as abnormal (clutch switch stuck ON), and then turns on the warning light.
Turning off condition:
If the clutch switch signal OFF (foot released) condition continues for 2 seconds, the module turns off the warning light.
The hill start assist function does not operate, while the warning light illuminates.
WIRING DIAGRAM:
Engine electrical system <Ref. to WI(w/o HEV)-102, WITHOUT PUSH BUTTON START, WIRING DIAGRAM, Engine Electrical System.>
CAN communication system <Ref. to WI(w/o HEV)-69, CAN Communication System.>



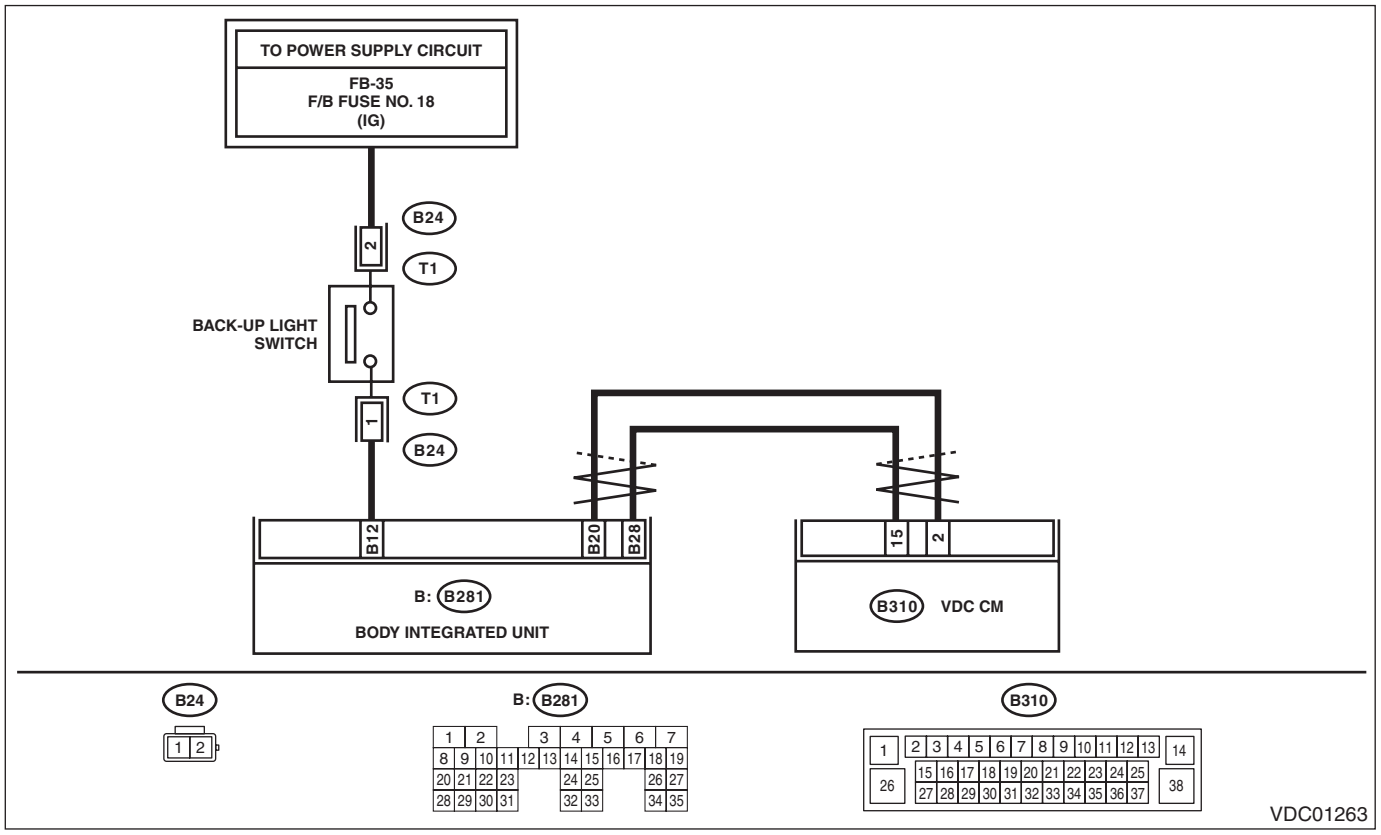
	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK CLUTCH SIGNAL USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the «Clutch Switch» displayed on display.	Is "OFF" displayed when the clutch pedal is not depressed, and is "ON" displayed when depressed?	Go to step **5**.	Go to step **3**.
3	**CHECK CLUTCH SIGNAL OF ECM USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Data monitor" in ECM. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the «Clutch Switch» displayed on display.	Is "OFF" displayed when the clutch pedal is not depressed, and is "ON" displayed when depressed?	Go to step **5**.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND CLUTCH SWITCH (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and clutch switch. 3) Measure the resistance of harness between ECM and clutch switch connector. ***Connector & terminal*** ***(B137) No. 15 — (B107) No. 2:***	Is the resistance less than 1 Ω?	Repair the power supply circuit of clutch switch. Or replace the clutch switch. <Ref. to CL-30, Clutch Switch.>	Repair the harness between ECM and clutch switch connector.
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AO:DTC C1561 REVERSE OFF FAULT

NOTE:
For the diagnostic procedure, refer to "DTC C1562 REVERSE ON FAULT". <Ref. to VDC(diag)-88, DTC C1562 REVERSE ON FAULT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AP:DTC C1562 REVERSE ON FAULT

DTC DETECTING CONDITION:
Abnormal reverse signal
TROUBLE SYMPTOM:
Hill start assist does not operate.
WIRING DIAGRAM:
Back-up light system <Ref. to WI(w/o HEV)-65, Back-up Light System.>
CAN communication system <Ref. to WI(w/o HEV)-69, CAN Communication System.>



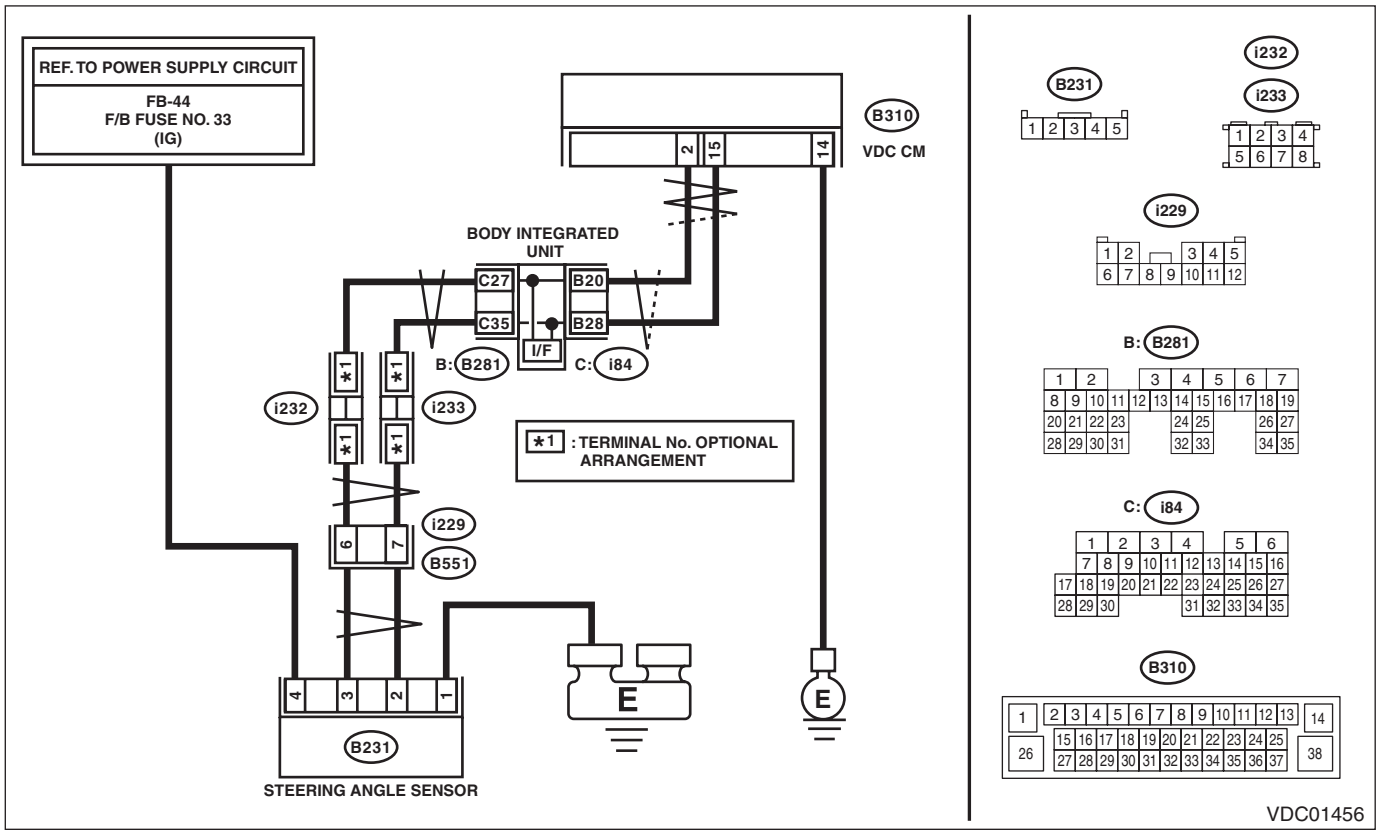
	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK REVERSE SIGNAL USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the «Reverse Signal» displayed on display.	Is “OFF” displayed when the shift lever is placed in any position other than reverse, and is “ON” displayed in reverse position?	Go to step **5**.	Go to step **3**.
3	**CHECK BACK-UP LIGHT ILLUMINATION.** 1) Turn the ignition switch to ON. 2) Place the shift lever in reverse position.	Does the back-up light illuminate?	Go to step **4**.	Repair the back-up light circuit.

	Step	Check	Yes	No
4	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND BACK-UP LIGHT SWITCH (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from body integrated unit and back-up light switch. 3) Measure the resistance of harness between body integrated unit and back-up light switch connector. ***Connector & terminal*** ***(B281) No. 12 — (B24) No. 1:***	Is the resistance less than 1 Ω?	Replace the back-up light switch. <Ref. to 5MT-36, Switches and Harness.>	Repair the harness between body integrated unit and back-up light switch connector.
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AQ:DTC C1711 STEERING ANGLE SENSOR

DTC DETECTING CONDITION:
Defective steering angle sensor
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-233, WITHOUT EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.> <Ref. to WI(HEV)-203, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK POWER SUPPLY FOR STEERING ANGLE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from steering angle sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the steering angle sensor power supply circuit including the fuse.
2	**CHECK GROUND CIRCUIT OF STEERING ANGLE SENSOR (CHECK FOR OPEN CIRCUIT).** Measure the resistance between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair ground circuit in the steering angle sensor.

	Step	Check	Yes	No
3	**CHECK STEERING ANGLE SENSOR HARNESS (CHECK FOR OPEN CIRCUIT).** 1) Disconnect the connector from the VDCCM&H/U. 2) Measure the resistance between VDCCM&H/U and steering angel sensor. ***Connector & terminal*** ***(B231) No. 2 — (B310) No. 15:*** ***(B231) No. 3 — (B310) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness between the steering angle sensor and VDCCM&H/U.
4	**CHECK GROUND SHORT CIRCUIT OF STEERING ANGLE SENSOR HARNESS.** Measure the resistance between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 2 — Chassis ground:*** ***(B231) No. 3 — Chassis ground:***	Is the resistance 10 Ω or more?	Go to step **5**.	Repair the harness between the steering angle sensor and VDCCM&H/U.
5	**CHECK STEERING WHEEL.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Check the steering wheel for deviation from center.	Is the deviation from the center of steering wheel less than 5°?	Go to step **6**.	Perform the centering adjustment of steering wheel, and perform the VDC sensor midpoint setting mode. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6	**CHECK OUTPUT OF STEERING ANGLE SENSOR USING SUBARU SELECT MONITOR.** 1) Adjust steering wheel to the center position. 2) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Steering Angle Sensor» displayed on display.	Is the reading of «Steering Angle Sensor» –10° — 10°?	Perform the VDC sensor midpoint setting mode. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> Go to step **7**.	Check the installation of the steering wheel and steering angle sensor.
7	**CHECK VDCCM&H/U.** 1) Turn the ignition switch to OFF. 2) Connect all connectors. 3) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 4) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 5) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	Go to step **8**.

Step		Check	Yes	No
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AR:DTC C1721 YAW RATE SENSOR

DTC DETECTING CONDITION:
Defective yaw rate & G sensor
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

	Step	Check	Yes	No
1	**INTERVIEW CUSTOMERS.** Check if the vehicle ran the road with banks or sandy surface (which does not mean a dirt road).	Did the vehicle run the road with banks or sandy surface (which does not mean a dirt road)?	VDCCM&H/U may record DTC when the vehicle ran the road with banks or sandy surface (which does not mean a dirt road).	Go to step **2**.
2	**CHECK INSTALLATION OF VDCCM&H/U.**	Is VDCCM&H/U installed properly without being tilted? Is the bracket deformation-free? Are the VDCCM&H/U installation bolts installed without missing or getting loose?	Go to step **3**.	Repair the defective part. • Install VDCCM&H/U properly. • Replace the bracket if faulty. • Tighten the VDCCM&H/U installation bolt. <Ref. to VDC-5, VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U), COMPONENT, General Description.> Go to step **3**.
3	**CHECK OUTPUT OF YAW RATE & G SENSOR WITH SUBARU SELECT MONITOR.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the «Yaw Rate Sensor» displayed on display.	Is the reading of «Yaw Rate Sensor» –4 deg/s — 4 deg/s?	Go to step **4**.	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
4	**CHECK OUTPUT OF STEERING ANGLE SENSOR WITH SUBARU SELECT MONITOR.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the «Steering Angle Sensor» displayed on display.	Is the reading of «Steering Angle Sensor» –10° — 10°?	Go to step **5**.	Perform the centering adjustment of steering wheel.

	Step	Check	Yes	No
5	**CHECK VDCCM&H/U.** 1) Turn the ignition switch to OFF. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AS:DTC C1731 G SENSOR ABNORMAL

NOTE:
For the diagnostic procedure, refer to “DTC C1732 LATERAL G SENSOR”. <Ref. to VDC(diag)-95, DTC C1732 LATERAL G SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AT:DTC C1732 LATERAL G SENSOR

DTC DETECTING CONDITION:
Defective lateral G sensor
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

	Step	Check	Yes	No
1	**CHECK INSTALLATION OF VDCCM&H/U.**	Is VDCCM&H/U installed properly without being tilted? Is the bracket deformation-free? Are the VDCCM&H/U installation bolts installed without missing or getting loose?	Go to step **2**.	Repair the defective part. • Install VDCCM&H/U properly. • Replace the bracket if faulty. • Tighten the VDCCM&H/U installation bolt. <Ref. to VDC-5, VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U), COMPONENT, General Description.> Go to step **2**.
2	**CHECK OUTPUT OF STEERING ANGLE SENSOR USING SUBARU SELECT MONITOR.** 1) Park the vehicle straight on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Steering Angle Sensor» displayed on display.	Is the reading of «Steering Angle Sensor» –10° — 10°?	Go to step **3**.	Check the installation of steering angle sensor.
3	**CHECK OUTPUT OF LATERAL G SENSOR AND LONGITUDINAL G SENSOR WITH SUBARU SELECT MONITOR.** 1) Park the vehicle straight on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Lateral G Sensor» «Longitudinal G Sensor» displayed on display.	Are the values of «Lateral G Sensor» «Longitudinal G Sensor» –2 — 2 m/s^2?	Go to step **4**.	Recheck from step 1, and if the problem is not solved, go to next. Go to step **7**.
4	**SET 0 POINT OF LATERAL G SENSOR AND LONGITUDINAL G SENSOR WITH SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Work Support". 2) Perform the VDC sensor midpoint setting mode. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Is the 0 point setting successful?	Go to step **5**.	Recheck from step 1, and when the 0 point setting is not possible, replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

	Step	Check	Yes	No
5	**PERFORM DRIVING TEST.** Drive approximately 10 minutes, and check if the warning lights illuminate or improperly operate during driving. In a safe place, drive the vehicle while alternating acceleration and deceleration as much as possible.	Did the ABS warning light or VDC warning light remain off? Does ABS or VDC operate without malfunction?	Go to step **6**.	Recheck from step 1, and when the warning lights illuminate or improperly operate, replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6	**CHECK OUTPUT OF LATERAL G SENSOR AND LONGITUDINAL G SENSOR WITH SUBARU SELECT MONITOR.** 1) Park the vehicle on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Lateral G Sensor» «Longitudinal G Sensor» displayed on display.	Are the values of «Lateral G Sensor» «Longitudinal G Sensor» –1.5 m/s^2 — 1.5 m/s^2?	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.	Recheck from step 1, and if the problem is not solved, replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
7	**CHECK OUTPUT OF LATERAL G SENSOR AND LONGITUDINAL G SENSOR WITH SUBARU SELECT MONITOR.** 1) Remove the VDCCM&H/U installation bolt and bracket. 2) Keep VDCCM&H/U in a horizontal position. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the «Lateral G Sensor» «Longitudinal G Sensor» displayed on display.	When the VDCCM&H/U is in a horizontal position, are the values of «Lateral G Sensor» «Longitudinal G Sensor» –1.5 m/s^2 — 1.5 m/s^2?	Check the bracket and brake pipe, and install VDCCM&H/U in a horizontal position to the vehicle.	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

AU:DTC C1733 LONGITUDINAL G SENSOR

DTC DETECTING CONDITION:
Defective longitudinal G sensor
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

NOTE:
For the diagnostic procedure, refer to "DTC C1732 LATERAL G SENSOR". <Ref. to VDC(diag)-95, DTC C1732 LATERAL G SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AV:DTC C1741 PRESSURE SENSOR

DTC DETECTING CONDITION:
Defective pressure sensor
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- Hill start assist does not operate.

	Step	Check	Yes	No
1	**CHECK STOP LIGHT SWITCH CIRCUIT AND INSTALLATION CONDITION.** Check the stop light switch circuit for open circuit and the installation condition.	Are the stop light switch circuit and the installation condition normal?	Go to step **2**.	Repair the stop light switch circuit or correct the installation condition. NOTE: If there is malfunction in the stop light circuit, DTC may be recorded in the memory.
2	**CHECK OUTPUT OF PRESSURE SENSOR WITH SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the «Master Cylinder Pressure Sensor» displayed on display.	With the brake pedal released, does the value for «Master Cylinder Pressure Sensor» fall within 0 — 11 bar?	Go to step **3**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
3	**CHECK OUTPUT OF PRESSURE SENSOR WITH SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the «Master Cylinder Pressure Sensor» displayed on display.	When the brake pedal is operated, does the value of «Master Cylinder Pressure Sensor» change in accordance with the brake pedal?	Go to step **4**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
4	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

AW:DTC C1811 SYSTEM

DTC DETECTING CONDITION:
ABS and VDC long time sequential control
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- EBD may not operate.
- Hill start assist does not operate.

	Step	Check	Yes	No
1	**CHECK INSTALLATION OF VDCCM&H/U.**	Is VDCCM&H/U installed properly without being tilted? Is the bracket deformation-free? Are the VDCCM&H/U installation bolts installed without missing or getting loose?	Go to step **2**.	Repair the defective part. • Install VDCCM&H/U properly. • Replace the bracket if faulty. • Tighten the VDCCM&H/U installation bolt. <Ref. to VDC-5, VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U), COMPONENT, General Description.> Go to step **2**.
2	**CHECK STEERING WHEEL.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Check the steering wheel for deviation from center.	Is the deviation from the center of steering wheel less than 5°?	Go to step **3**.	Perform the centering adjustment of steering wheel, and perform the VDC sensor midpoint setting mode. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> Go to step **3**.
3	**CHECK OUTPUT OF STEERING ANGLE SENSOR USING SUBARU SELECT MONITOR.** 1) Adjust steering wheel to the center position. 2) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Steering Angle Sensor» displayed on display.	Is the reading of «Steering Angle Sensor» –10° — 10°?	Go to step **4**.	Check the installation of the steering wheel and steering angle sensor, and correct the installation if it is improper. If the installation condition is correct, replace the sensor.

	Step	Check	Yes	No
4	**CHECK OUTPUT OF SENSORS USING SUBARU SELECT MONITOR.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read «Lateral G Sensor», «Longitudinal G Sensor», and «Yaw Rate Sensor» displayed on display.	Is the reading of each sensor following value? «Lateral G Sensor» : –2 — 2 m/s^2 «Longitudinal G Sensor» : –2 — 2 m/s^2 «Yaw Rate Sensor» : –4 deg/s — 4 deg/s	Go to step **5**.	Recheck from step 1, and if the problem is not solved, go to next. Go to step **8**.
5	**SET 0 POINT FOR LONGITUDINAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Work Support". 2) Perform the VDC sensor midpoint setting mode. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Is the 0 point setting successful?	Go to step **6**.	Recheck from step 1, and when the 0 point setting is not possible, replace the VDCCM and the steering angle sensor. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> <Ref. to VDC-34, Steering Angle Sensor.>
6	**PERFORM DRIVING TEST.** Drive approximately 10 minutes, and check if the warning lights illuminate or improperly operate during driving.	Did the ABS warning light or VDC warning light remain off? Does ABS or VDC operate without malfunction?	Go to step **7**.	Recheck from step 1, and when the warning lights illuminate or improperly operate, replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
7	**CHECK OUTPUT OF SENSORS USING SUBARU SELECT MONITOR.** 1) Park the vehicle on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read «Lateral G Sensor», «Longitudinal G Sensor», and «Yaw Rate Sensor» displayed on display.	Is the reading of each sensor following value? «Lateral G Sensor» : –2 — 2 m/s^2 «Longitudinal G Sensor» : –2 — 2 m/s^2 «Yaw Rate Sensor» : –4 deg/s — 4 deg/s	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

	Step	Check	Yes	No
8	**CHECK OUTPUT OF SENSORS USING SUBARU SELECT MONITOR.** 1) Remove the VDCCM&H/U installation bolt and bracket. 2) Keep VDCCM&H/U in a horizontal position. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read «Lateral G Sensor», «Longitudinal G Sensor», and «Yaw Rate Sensor» displayed on display.	When VDCCM&H/U is in a horizontal position, is the reading of each sensor following value? «Lateral G Sensor» : –1.5 m/s^2 — 1.5 m/s^2 «Longitudinal G Sensor» : –1.5 m/s^2 — 1.5 m/s^2 «Yaw Rate Sensor» : –4 deg/s — 4 deg/s	Check the bracket and brake pipe, and install VDCCM&H/U in a horizontal position to the vehicle.	Replace the VDCCM only. <Ref. to VDC-22, REPLACEMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

AX:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
Refer to "LAN SYSTEM" for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

AY:DTC U0100 LOST COMMUNICATION WITH ECM/PCM "A"

NOTE:
Refer to "LAN SYSTEM" for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

AZ:DTC U0101 LOST COMMUNICATION WITH TCM

NOTE:
Refer to "LAN SYSTEM" for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BA:DTC U0126 LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE

NOTE:
Refer to "LAN SYSTEM" for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BB:DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

NOTE:
Refer to "LAN SYSTEM" for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BC:DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE

NOTE:
Refer to "LAN SYSTEM" for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BD:DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM "A"

NOTE:
Refer to "LAN SYSTEM" for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BE:DTC U0402 INVALID DATA RECEIVED FROM TCM

NOTE:
Refer to "LAN SYSTEM" for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BF:DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BG:DTC U0428 INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BH:DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BI: DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BJ:DTC U1469 INVALID DATA RECEIVED FROM AUTOSTART STOP CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BK:DTC C0021 FRONT RIGHT ABS SENSOR CIRCUIT OPEN OR SHORT

NOTE:
For the diagnostic procedure, refer to “DTC C0027 REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT”. <Ref. to VDC(diag)-102, DTC C0027 REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BL:DTC C0023 FRONT LEFT ABS SENSOR CIRCUIT OPEN OR SHORT

NOTE:
For the diagnostic procedure, refer to “DTC C0027 REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT”. <Ref. to VDC(diag)-102, DTC C0027 REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BM:DTC C0025 REAR RIGHT ABS SENSOR CIRCUIT OPEN OR SHORT

NOTE:
For the diagnostic procedure, refer to “DTC C0027 REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT”. <Ref. to VDC(diag)-102, DTC C0027 REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BN:DTC C0027 REAR LEFT ABS SENSOR CIRCUIT OPEN OR SHORT

DTC DETECTING CONDITION:

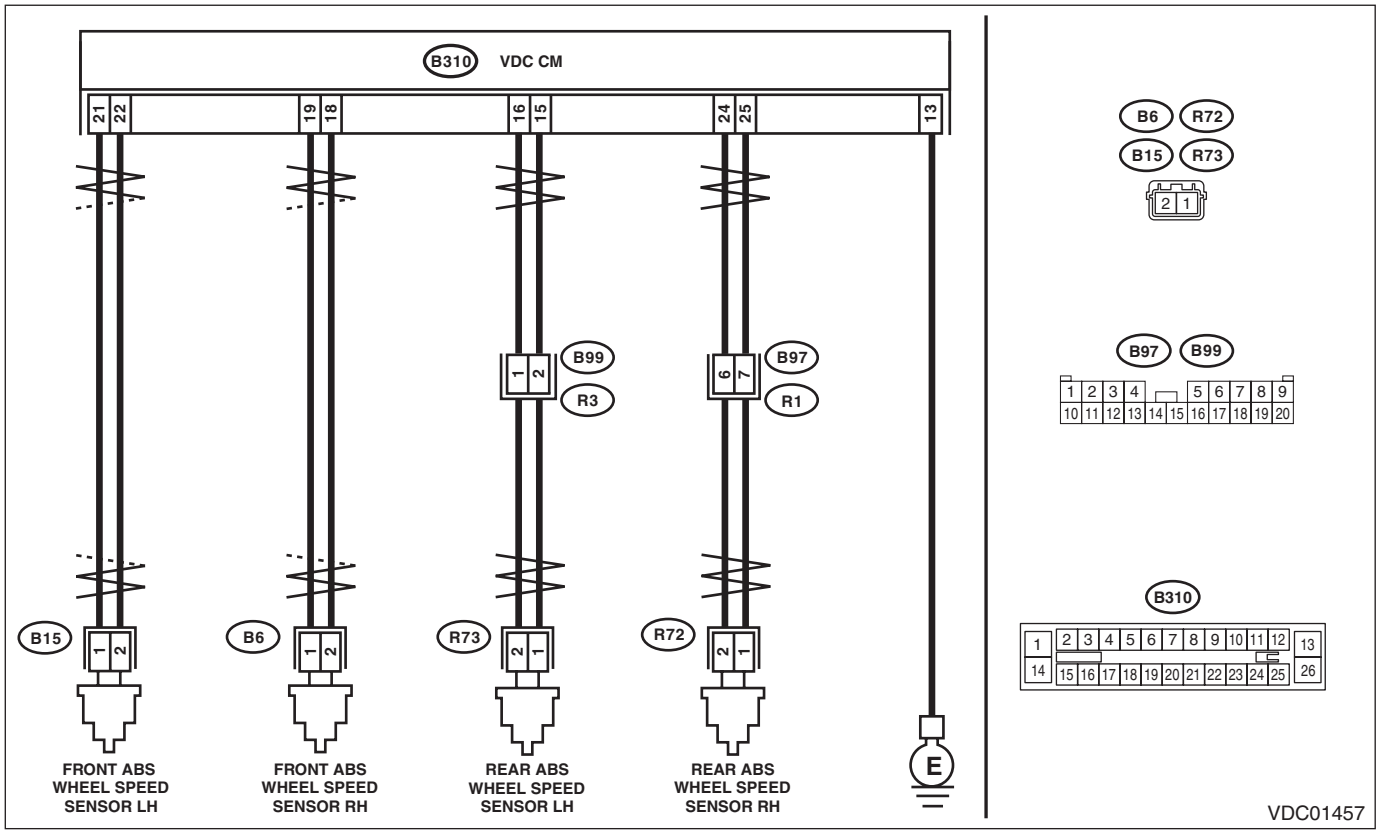
- Defective ABS wheel speed sensor (broken wire, input voltage too high)
- Defective harness connector

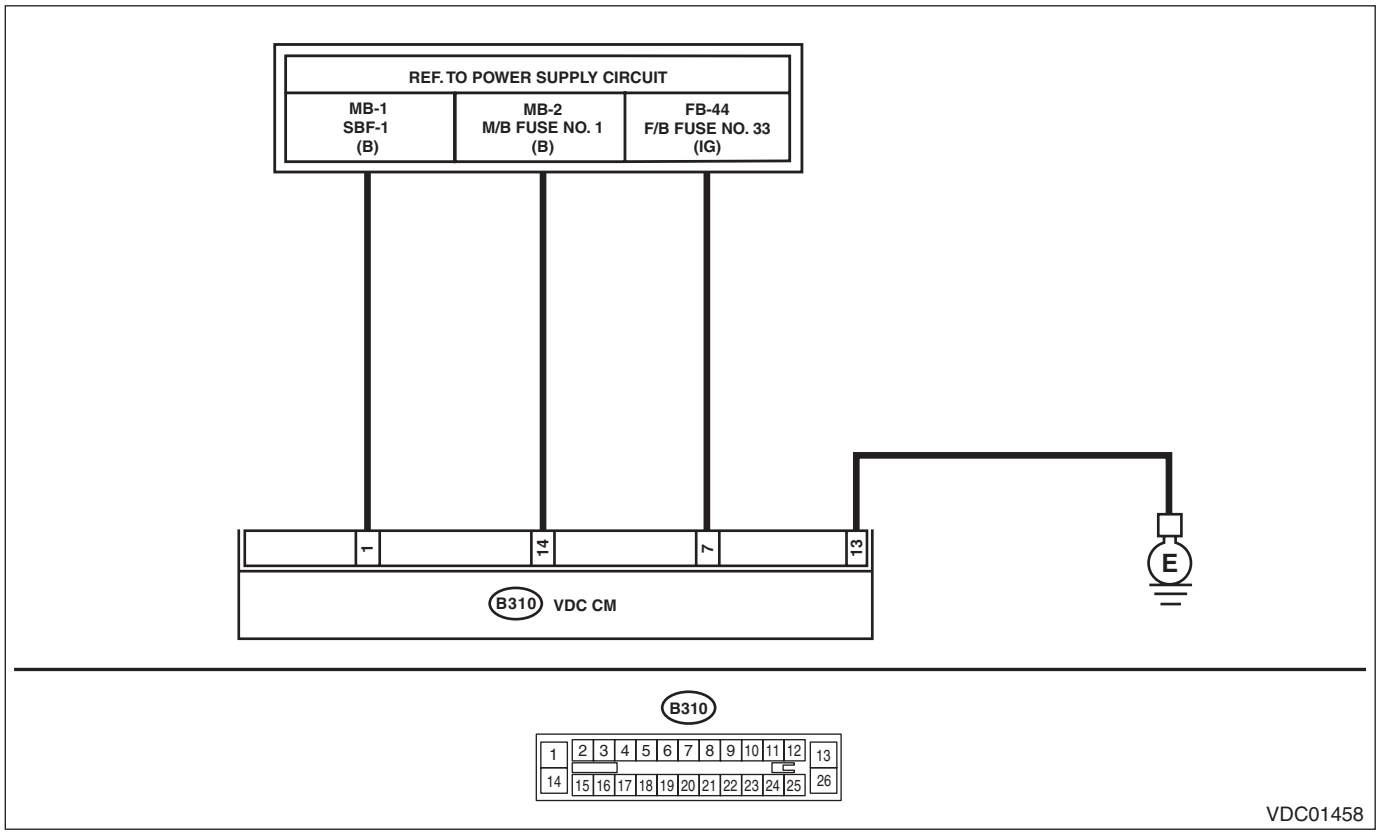
TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

WIRING DIAGRAM:

Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>





	Step	Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTOR.** Check if there is poor contact between VDCCM&H/U and ABS wheel speed sensor.	Is there poor contact?	Repair the connector.	Go to step **2**.
2	**CHECK HARNESS CONNECTOR BETWEEN VDCCM&H/U AND ABS WHEEL SPEED SENSOR (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (B310) from the VDCCM&H/U. 3) Disconnect the connector from ABS wheel speed sensor. 4) Measure the resistance between VDCCM&H/U connector and ABS wheel speed sensor connector. ***Connector & terminal*** ***DTC C0021*** ***(B310) No. 19 — (B6) No. 1:*** ***(B310) No. 18 — (B6) No. 2:*** ***DTC C0023*** ***(B310) No. 21 — (B15) No. 1:*** ***(B310) No. 22 — (B15) No. 2:*** ***DTC C0025*** ***(B310) No. 25 — (R72) No. 1:*** ***(B310) No. 24 — (R72) No. 2:*** ***DTC C0027*** ***(B310) No. 15 — (R73) No. 1:*** ***(B310) No. 16 — (R73) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the harness connector between VDCCM&H/U and ABS wheel speed sensor.

	Step	Check	Yes	No
3	**CHECK GROUND SHORT OF HARNESS.** Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***DTC C0021*** ***(B310) No. 19 — Chassis ground:*** ***DTC C0023*** ***(B310) No. 21 — Chassis ground:*** ***DTC C0025*** ***(B310) No. 25 — Chassis ground:*** ***DTC C0027*** ***(B310) No. 15 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the harness connector between VDCCM&H/U and ABS wheel speed sensor.
4	**CHECK ABS WHEEL SPEED SENSOR POWER SUPPLY CIRCUIT.** 1) Connect the VDCCM&H/U connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between ABS wheel speed sensor connector and chassis ground. ***Connector & terminal*** ***DTC C0021*** ***(B6) No. 2 (+) — Chassis ground (–):*** ***DTC C0023*** ***(B15) No. 2 (+) — Chassis ground (–):*** ***DTC C0025*** ***(R72) No. 2 (+) — Chassis ground (–):*** ***DTC C0027*** ***(R73) No. 2 (+) — Chassis ground (–):***	Is the voltage 5 — 16 V?	Go to step **6**.	Go to step **5**.
5	**CHECK VDCCM&H/U POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the VDCCM&H/U connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between VDCCM&H/U connector terminals. ***Connector & terminal*** ***(B310) No. 7 (+) — (B310) No. 13 (–):*** ***(B310) No. 14 (+) — (B310) No. 13 (–):*** ***(B310) No. 1 (+) — (B310) No. 13 (–):***	Is the voltage 10 — 15 V?	Go to step **6**.	Check the generator, battery and VDCCM&H/U power supply circuit.
6	**CHECK ABS WHEEL SPEED SENSOR SIGNAL.** 1) Prepare an oscilloscope. 2) Check the ABS wheel speed sensor. <Ref. to VDC-39, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Front ABS Wheel Speed Sensor.> <Ref. to VDC-48, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Rear ABS Wheel Speed Sensor.>	Does the oscilloscope indicate the waveform pattern as shown in the figure?	Go to step **7**.	Replace the ABS wheel speed sensor. <Ref. to VDC-37, Front ABS Wheel Speed Sensor.> <Ref. to VDC-40, Rear ABS Wheel Speed Sensor.>
7	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

BO:DTC C0022 FRONT RIGHT ABS SENSOR SIGNAL

NOTE:
For the diagnostic procedure, refer to “DTC C0028 REAR LEFT ABS SENSOR SIGNAL”. <Ref. to VDC(diag)-106, DTC C0028 REAR LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BP:DTC C0024 FRONT LEFT ABS SENSOR SIGNAL

NOTE:
For the diagnostic procedure, refer to “DTC C0028 REAR LEFT ABS SENSOR SIGNAL”. <Ref. to VDC(diag)-106, DTC C0028 REAR LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BQ:DTC C0026 REAR RIGHT ABS SENSOR SIGNAL

NOTE:
For the diagnostic procedure, refer to “DTC C0028 REAR LEFT ABS SENSOR SIGNAL”. <Ref. to VDC(diag)-106, DTC C0028 REAR LEFT ABS SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BR:DTC C0028 REAR LEFT ABS SENSOR SIGNAL

DTC DETECTING CONDITION:

- Defective ABS wheel speed sensor signal (noise, irregular signal, etc.)
- Defective harness connector

TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK ABS WHEEL SPEED SENSOR AND FREEZE FRAME DATA USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, check the freeze frame data when DTC is detected. <Ref. to VDC(diag)-17, READ FREEZE FRAME DATA, OPERATION, Subaru Select Monitor.> 2) Compare «FR Wheel Speed», «FL Wheel Speed», «RR Wheel Speed» and «RL Wheel Speed» to determine a sensor that is not indicating the same value. 3) Check the current data of the wheel speed sensor that is not indicating the same value. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>	Does the speed indicated on the data monitor change in response to the speedometer reading during acceleration/deceleration when the steering wheel is in the straight-ahead position? In addition, are the wheel speeds of the freeze frame data for 4 wheels almost the same?	Go to step **2**.	Go to step **7**.
2	**CHECK POOR CONTACT OF CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Check for poor contact of the connector between VDCCM&H/U and ABS wheel speed sensor.	Is there poor contact of connectors between VDCCM&H/U and ABS wheel speed sensor?	Repair the connector.	Go to step **3**.
3	**CHECK CAUSE OF SIGNAL NOISE.** Make sure the radio wave devices and electronic components are installed correctly.	Are the radio wave devices and electronic components installed correctly?	Go to step **4**.	Install the radio wave devices and electronic components properly.
4	**CHECK CAUSE OF SIGNAL NOISE.** Check if the noise sources (such as an antenna) are installed near the sensor harness.	Are noise sources installed?	Install the noise sources apart from sensor harness.	Go to step **5**.
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.
7	**CHECK INSTALLATION OF ABS WHEEL SPEED SENSOR.**	Is the ABS wheel speed sensor installation bolt tightened to 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)?	Go to step **8**.	Tighten the ABS wheel speed sensor installation bolts.

	Step	Check	Yes	No
8	**CHECK ABS WHEEL SPEED SENSOR SIGNAL.** 1) Prepare an oscilloscope. 2) Check the ABS wheel speed sensor. <Ref. to VDC-39, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Front ABS Wheel Speed Sensor.> <Ref. to VDC-48, CHECK ABS WHEEL SPEED SENSOR UNIT, INSPECTION, Rear ABS Wheel Speed Sensor.>	Does the oscilloscope indicate the waveform pattern like shown in the figure when the tire is slowly turned? Does the oscilloscope indication repeat the waveform pattern like shown in the figure when the tire is slowly turned in equal speed for one rotation or more?	Go to step **10**.	Go to step **9**.
9	**CHECK ABS WHEEL SPEED SENSOR OR MAGNETIC ENCODER.**	Are there foreign matter, breakage or damage at the tip of ABS wheel speed sensor or magnetic encoder?	Remove dirt thoroughly. Also replace the ABS wheel speed sensor or magnetic encoder as a unit with hub unit bearing if it is broken or damaged.	Go to step **10**.
10	**CHECK CAUSE OF SIGNAL NOISE.** Make sure the radio wave devices and electronic components are installed correctly.	Are the radio wave devices and electronic components installed correctly?	Go to step **11**.	Install the radio wave devices and electronic components properly.
11	**CHECK CAUSE OF SIGNAL NOISE.** Check if the noise sources (such as an antenna) are installed near the sensor harness.	Are noise sources installed?	Install the noise sources apart from sensor harness.	Go to step **12**.
12	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Go to step **13**.	Go to step **14**.
13	**CHECK FREEZE FRAME DATA OF ABS WHEEL SPEED SENSOR USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select “Freeze frame data”. <Ref. to VDC(diag)-17, READ FREEZE FRAME DATA, OPERATION, Subaru Select Monitor.> 2) Read the ABS wheel speed sensor output.	Is the ABS wheel speed sensor output different compared with other wheels?	Replace the ABS wheel speed sensor which has a difference. <Ref. to VDC-37, Front ABS Wheel Speed Sensor.> <Ref. to VDC-40, Rear ABS Wheel Speed Sensor.>	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

	Step	Check	Yes	No
14	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference. NOTE: Though the ABS warning light, and the VDC warning light & VDC indicator light remain lit at this point, this is normal. Drive the vehicle at 12 km/h (7 MPH) or more in order to turn off the ABS warning light, and the VDC warning light & VDC indicator light. Be sure to drive the vehicle and check that the warning light goes off.

BS:DTC C0031 FR HOLD VALVE MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BT:DTC C0032 FR PRESSURE REDUCING VALVE MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BU:DTC C0033 FL HOLD VALVE MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BV:DTC C0034 FL PRESSURE REDUCING VALVE MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BW:DTC C0035 RR HOLD VALVE MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BX:DTC C0036 RR PRESSURE REDUCING VALVE MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BY:DTC C0037 RL HOLD VALVE MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BZ:DTC C0038 RL PRESSURE REDUCING VALVE MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CA:DTC C0061 NORMAL OPENING VALVE 1 MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CB:DTC C0062 NORMAL OPENING VALVE 2 MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CC:DTC C0063 NORMAL CLOSING VALVE 1 MALFUNCTION

NOTE:
For the diagnostic procedure, refer to “C0064 NORMAL CLOSING VALVE 2 MALFUNCTION”. <Ref. to VDC(diag)-110, DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CD:DTC C0064 NORMAL CLOSING VALVE 2 MALFUNCTION

DTC DETECTING CONDITION:

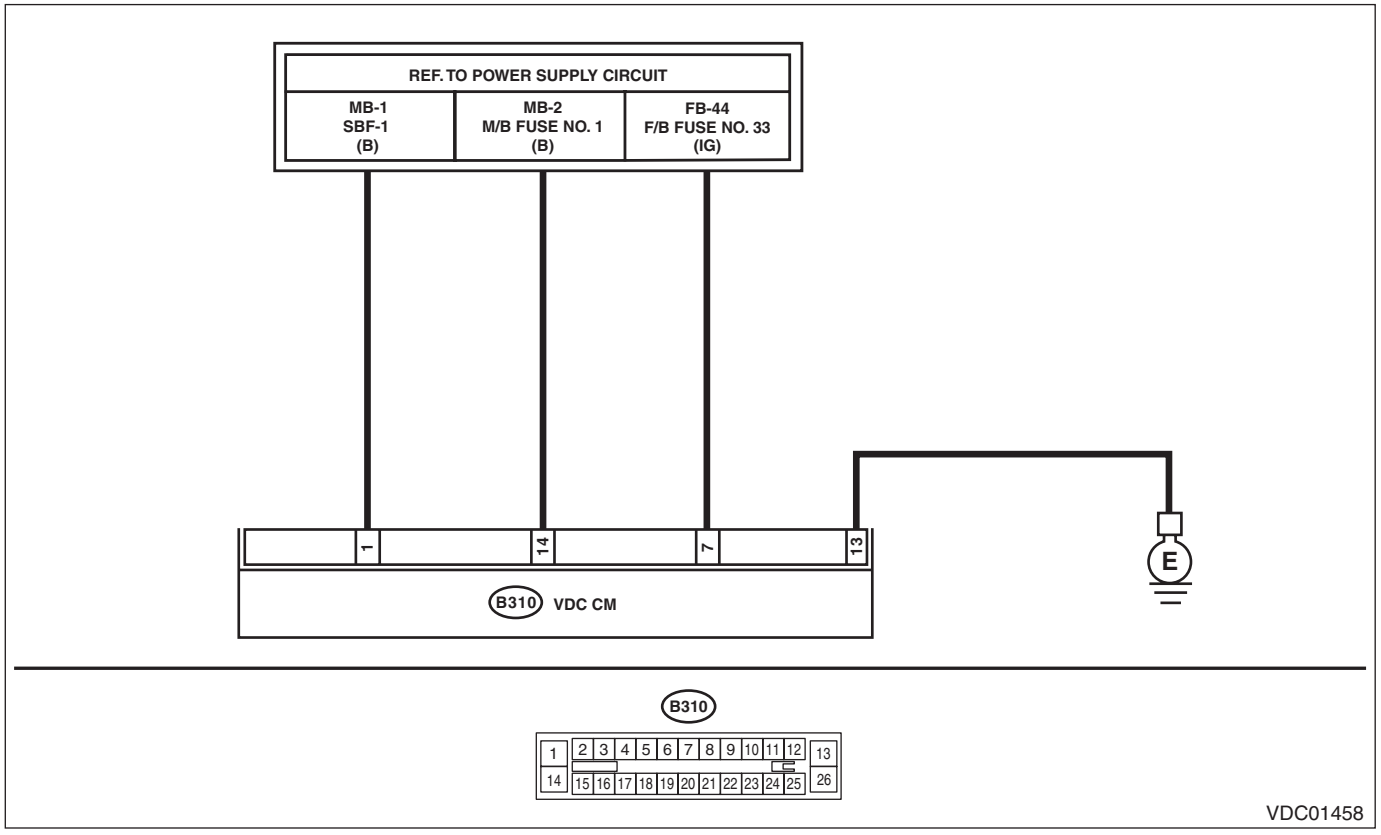
- Defective harness connector
- Defective VDCH/U solenoid valve

TROUBLE SYMPTOM:

- ABS does not operate.
- EBD does not operate.
- VDC does not operate.
- EyeSight does not operate.

WIRING DIAGRAM:

Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK VDCCM&H/U INPUT VOLTAGE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Run the engine at idle. 4) Measure the voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 7 (+) — Chassis ground (–):*** ***(B310) No. 14 (+) — Chassis ground (–):*** ***(B310) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the power supply circuit including the battery.
2	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 13 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair the VDCCM&H/U ground harness.

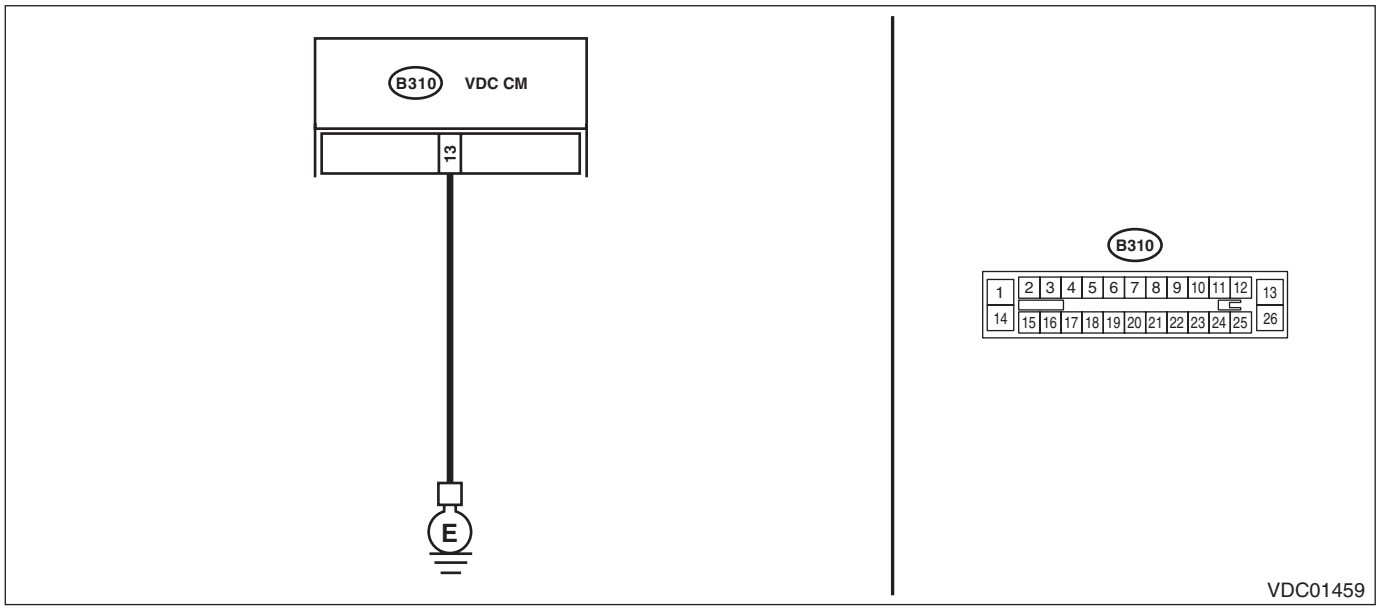
	Step	Check	Yes	No
3	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of connector between generator, battery and VDCCM&H/U?	Repair the connector.	Go to step **4**.
4	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CE:DTC C0041 ECM

DTC DETECTING CONDITION:
Defective VDCCM&H/U

TROUBLE SYMPTOM:
- ABS does not operate.
- EBD does not operate.
- VDC does not operate.
- EyeSight does not operate.

WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



	Step	Check	Yes	No
1	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Measure the resistance between VDCCM&H/U and chassis ground. ***Connector & terminal*** ***(B310) No. 13 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **2**.	Repair the VDCCM&H/U ground harness.
2	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of the connector between the battery, ignition switch and VDCCM&H/U?	Repair the connector.	Go to step **3**.
3	**CHECK CAUSE OF SIGNAL NOISE.**	Are the radio wave devices and electronic components installed correctly?	Go to step **4**.	Install the radio wave devices and electronic components properly.
4	**CHECK CAUSE OF SIGNAL NOISE.**	Is there a noise source (such as an antenna) installed near the sensor harness and VDCCM?	Install the noise sources apart from sensor harness and VDCCM.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CF:DTC C0041 PARAMETER SELECTION ERROR

DTC DETECTING CONDITION:
VDCCM parameter selection error
TROUBLE SYMPTOM:
- ABS does not operate.
- EBD does not operate.
- VDC does not operate.
- EyeSight does not operate.

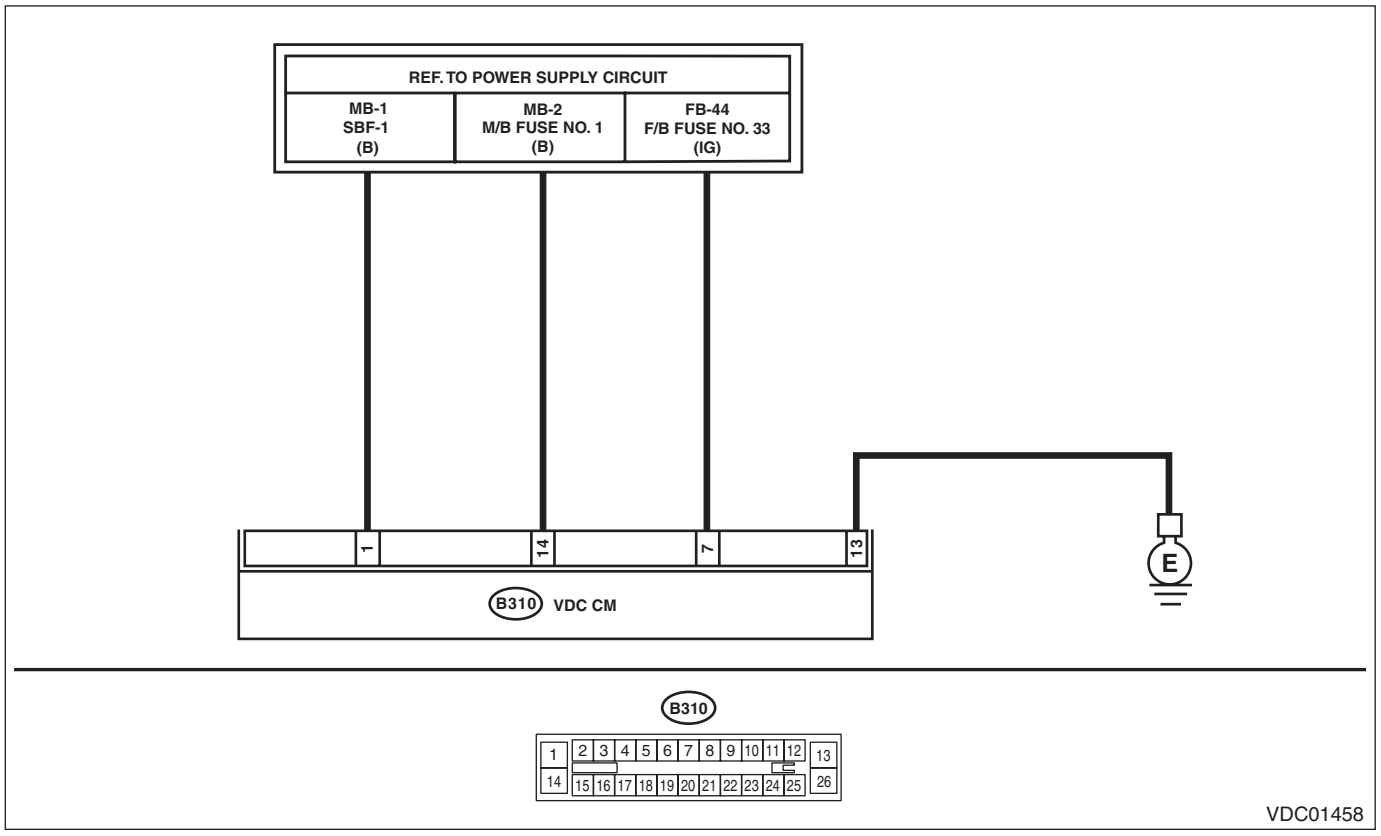
NOTE:
When the VDCCM&H/U is replaced, this DTC may be stored.

	Step	Check	Yes	No
1	**CHECK VDCCM&H/U IDENTIFICATION SYMBOL.** Check the identification symbol attached on the H/U. <Ref. to VDC-2, SPECIFICATION, General Description.>	Is the identification symbol correct?	Go to step **2**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
2	**CHECK PARAMETER SELECTED IN VDCCM.** <Ref. to VDC(diag)-19, PARAMETER CHECK, OPERATION, Subaru Select Monitor.>	Does the parameter registered in the VDCCM match the relevant vehicle?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Select and register the correct parameter. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>

CG:DTC C0042 POWER SUPPLY VOLTAGE FAILURE

DTC DETECTING CONDITION:
Improper VDCCM&H/U power supply voltage
TROUBLE SYMPTOM:
- ABS does not operate.
- EBD may not operate.
- VDC does not operate.
- EyeSight does not operate.

NOTE:
Warning lights go off if voltage returns.
WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK GENERATOR.** 1) Start the engine. 2) Run the engine at idle after warming up. 3) Measure the voltage between generator terminal B and chassis ground. ***Terminals*** ***Generator terminal B (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the generator.
2	**CHECK BATTERY TERMINAL.** Turn the ignition switch to OFF.	Are the positive and negative battery terminals clamped tightly?	Go to step **3**.	Install the battery terminal correctly.

	Step	Check	Yes	No
3	**CHECK VDCCM&H/U INPUT VOLTAGE.** 1) Disconnect the connector from the VDCCM&H/U. 2) Run the engine at idle. 3) Operate devices such as headlights, air conditioner, defogger, etc. which produce an electrical load. 4) Measure the voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 7 (+) — Chassis ground (–):*** ***(B310) No. 14 (+) — Chassis ground (–):*** ***(B310) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **4**.	Repair the power supply circuit.
4	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 13 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair the VDCCM&H/U ground harness.
5	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of connector between generator, battery and VDCCM&H/U?	Repair the connector.	Go to step **6**.
6	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **7**.
7	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CH:DTC C0044 TCM COMMUNICATION CIRCUIT

DTC DETECTING CONDITION:
No CAN signal from TCM.
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of TCM connector?	Repair the connector.	Go to step **3**.
3	**CHECK TCM.** Refer to the basic diagnostic procedure for Transmission (diagnostics).	Is the TCM normal?	Go to step **4**.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>
4	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CI: DTC C0045 TCM MALFUNCTION

DTC DETECTING CONDITION:
Defective TCM
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK CVT SYSTEM.** 1) Start the engine. 2) Check the DTC in CVT system. <Ref. to CVT(w/o HEV)(diag)-18, Read Diagnostic Trouble Code (DTC).>	Is DTC of CVT system displayed?	Repair the CVT system. <Ref. to CVT(w/o HEV)(diag)-36, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **3**.
3	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CJ:DTC C0045 INCORRECT VDC CONTROL MODULE SPECIFICATIONS

DTC DETECTING CONDITION:
Different control module specification
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

NOTE:
When parameter selection for VDCCM is improper, this DTC may be memorized.

	Step	Check	Yes	No
1	**CHECK VDCCM&H/U IDENTIFICATION SYMBOL.** Check the identification symbol attached on the H/U. <Ref. to VDC-2, SPECIFICATION, General Description.>	Is the identification symbol correct?	Go to step **2**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
2	**CHECK PARAMETER SELECTED IN VDCCM.** <Ref. to VDC(diag)-19, PARAMETER CHECK, OPERATION, Subaru Select Monitor.>	Does the parameter registered in the VDCCM match the relevant vehicle?	Go to step **3**.	Select and register the correct parameter. <Ref. to VDC(diag)-19, PARAMETER SELECTION, OPERATION, Subaru Select Monitor.>
3	**CHECK TCM SPECIFICATION.** Check the TCM specification.	Is the specification of TCM same as vehicle specification?	Go to step **4**.	Replace the TCM. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>
4	**CHECK CVT SYSTEM.** 1) Start the engine. 2) Check the DTC in CVT system. <Ref. to CVT(w/o HEV)(diag)-18, Read Diagnostic Trouble Code (DTC).>	Is DTC of CVT system displayed?	Perform the diagnosis according to DTC. <Ref. to CVT(w/o HEV)(diag)-36, List of Diagnostic Trouble Code (DTC).>	Go to step **5**.
5	**CHECK ECM SPECIFICATION.** Check the ECM specification.	Is the specification of ECM same as vehicle specification?	Go to step **6**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
6	**CHECK ENGINE SYSTEM.** 1) Start the engine. 2) Check DTCs of engine system. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).>	Is engine system DTC displayed?	Perform the diagnosis according to DTC. <Ref. to EN(H4DO w/o HEV)(diag)-97, List of Diagnostic Trouble Code (DTC).>	Go to step **7**.

	Step	Check	Yes	No
7	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **8**.
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CK:DTC C0046 BODY INTEGRATED MODULE COMMUNICATION CIRCUIT

DTC DETECTING CONDITION:

No CAN signal received from body integrated unit.

TROUBLE SYMPTOM:

- VDC may not operate.
- Hill start assist does not operate.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of body integrated unit connector?	Repair the connector.	Go to step **3**.
3	**CHECK BODY INTEGRATED UNIT.** Perform the diagnosis for body integrated unit. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>	Is the body integrated unit normal?	Go to step **4**.	Check body integrated unit according to DTC. <Ref. to BC(diag)-25, List of Diagnostic Trouble Code (DTC).>
4	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CL:DTC C0047 CAN COMMUNICATION

DTC DETECTING CONDITION:
CAN communication line circuit is open or shorted.
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of VDCCM&H/U connector?	Repair the connector.	Go to step **3**.
3	**CHECK OUTPUT OF STEERING ANGLE SENSOR WITH SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Check the «Steer Angle Sensor Op».	Does «Steer Angle Sensor Op» change?	Go to step **4**.	Check output of the steering angle sensor. <Ref. to VDC(diag)-139, DTC C0071 STEER ANGLE SENSOR OP, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CM:DTC C0049 CRUISE CONTROLLER ABNORMAL

DTC DETECTING CONDITION:

Faulty signal is received from the stereo camera.

TROUBLE SYMPTOM:

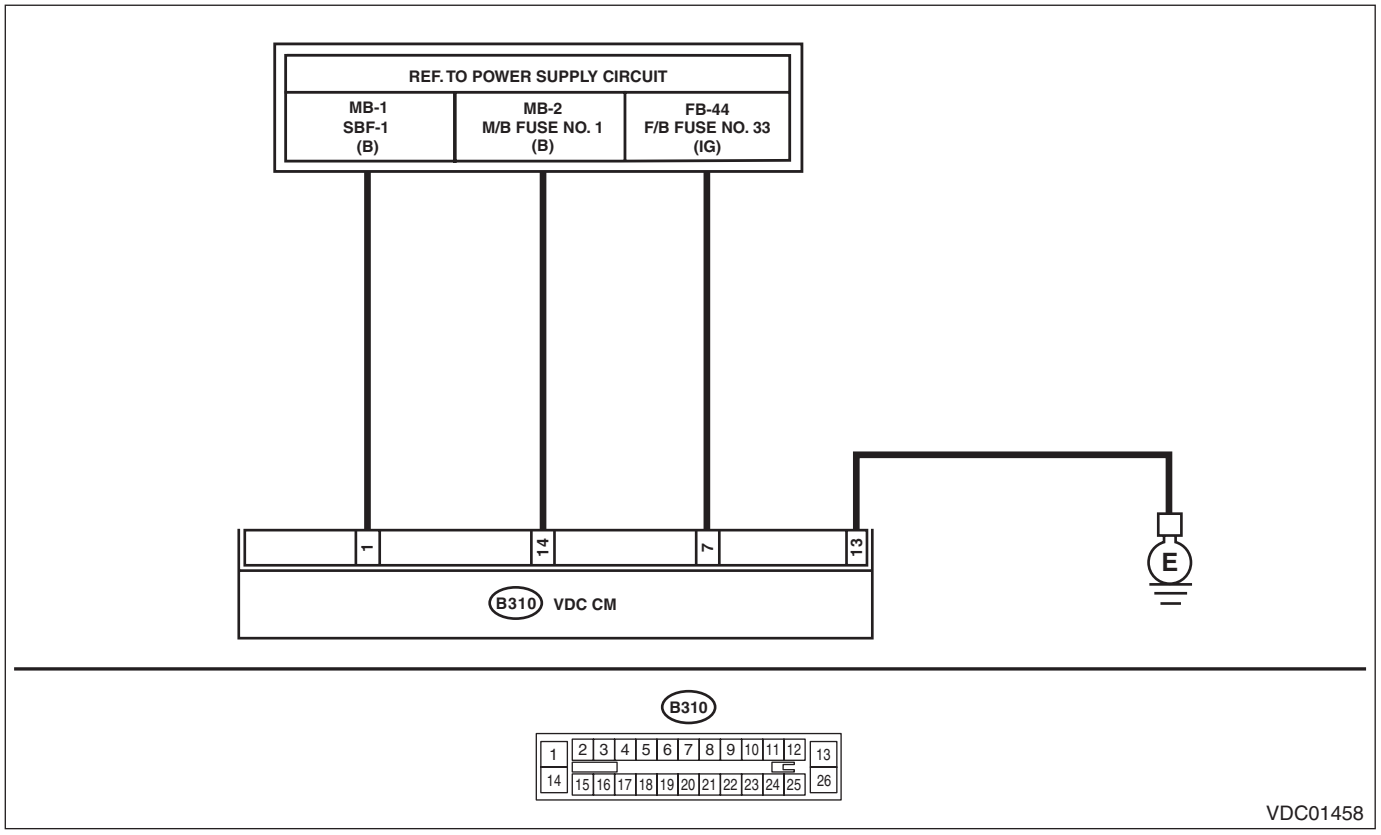
- VDC may not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of the stereo camera connector?	Repair the connector.	Go to step **3**.
3	**CHECK STEREO CAMERA.** Perform the diagnosis for the EyeSight system. <Ref. to ES(diag)-2, Basic Diagnostic Procedure.>	Is the stereo camera normal?	Go to step **4**.	Perform the diagnosis according to DTC of the stereo camera. <Ref. to ES(diag)-75, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CN:DTC C0051 VALVE RELAY

DTC DETECTING CONDITION:
Defective valve relay
TROUBLE SYMPTOM:
- ABS does not operate.
- EBD does not operate.
- VDC does not operate.
- EyeSight does not operate.

WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK VDCCM&H/U INPUT VOLTAGE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Run the engine at idle. 4) Measure the voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 7 (+) — Chassis ground (–):*** ***(B310) No. 14 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the power supply circuit.
2	**CHECK VDCCM&H/U INPUT VOLTAGE.** Calculate the voltage difference measured in step 1. A: (B310) No. 7 (+) — Chassis ground (–): B: (B310) No. 14 (+) — Chassis ground (–):	Is the voltage difference between A and B 2 V or more?	Repair the power supply circuit.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK INSTALLATION OF VDCCM&H/U GROUND.**	Is the VDCCM&H/U ground terminal installation bolt (ground bolt fixing onto the side frame upper face) installed correctly?	Go to step **4**.	Install the VDCCM&H/U ground terminal installation bolt correctly.
4	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 13 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair the VDCCM&H/U ground harness.
5	**CHECK VDCCM&H/U VALVE RELAY.** Measure the resistance between VDCCM&H/U terminals. ***Connector & terminal*** ***No. 14 — No. 13:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of connector between generator, battery and VDCCM&H/U?	Repair the connector.	Go to step **7**.
7	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **8**.
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CO:DTC C0052 MOTOR MALFUNCTION

DTC DETECTING CONDITION:

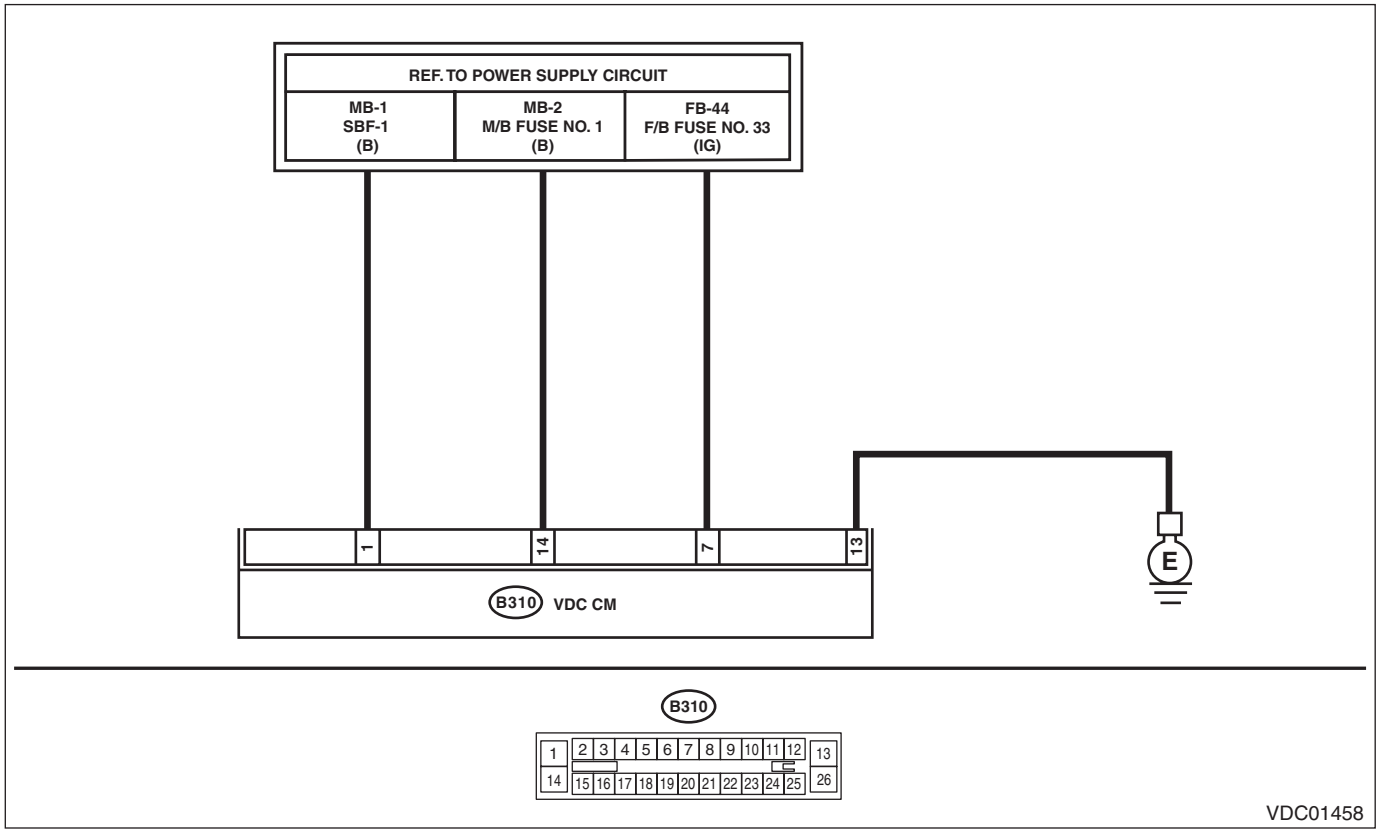
- Defective motor and motor relay
- Defective harness connector

TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- EBD may not operate.
- EyeSight does not operate.

WIRING DIAGRAM:

Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



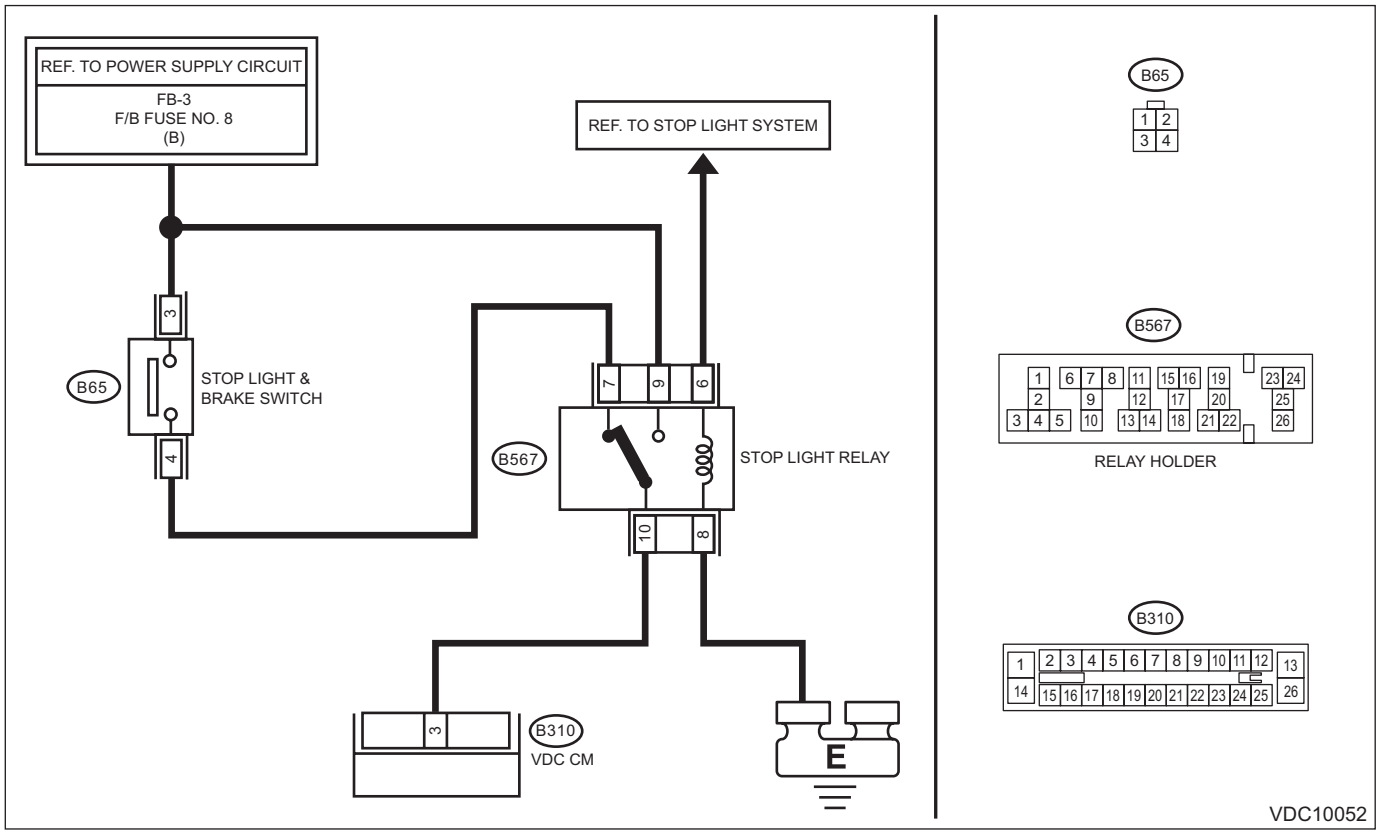
Step		Check	Yes	No
1	**CHECK VDCCM&H/U INPUT VOLTAGE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the VDCCM&H/U. 3) Turn the ignition switch to ON. 4) Measure the voltage between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 1 (+) — Chassis ground (–):*** ***(B310) No. 7 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the VDCCM&H/U power supply circuit.
2	**CHECK VDCCM&H/U INPUT VOLTAGE.** Calculate the voltage difference measured in step 1. A: (B310) No. 1 (+) — Chassis ground (–): B: (B310) No. 7 (+) — Chassis ground (–):	Is the voltage difference between A and B 2 V or more?	Repair the power supply circuit.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK INSTALLATION OF VDCCM&H/U GROUND.**	Is the VDCCM&H/U ground terminal installation bolt (ground bolt fixing onto the side frame upper face) installed correctly?	Go to step **4**.	Install the VDCCM&H/U ground terminal installation bolt correctly.
4	**CHECK VDCCM&H/U GROUND CIRCUIT (CHECK FOR OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between VDCCM&H/U connector and chassis ground. ***Connector & terminal*** ***(B310) No. 13 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair the VDCCM&H/U ground harness.
5	**CHECK VDCCM&H/U MOTOR RELAY.** Measure the resistance between VDCCM&H/U terminals. ***Connector & terminal*** ***No. 1 — No. 13:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6	**CHECK POOR CONTACT OF CONNECTORS.** Turn the ignition switch to OFF.	Is there poor contact of connector between generator, battery and VDCCM&H/U?	Repair the connector.	Go to step **7**.
7	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **8**.
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CP:DTC C0054 BLS OFF MALFUNCTION

DTC DETECTING CONDITION:
Defective stop light switch
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



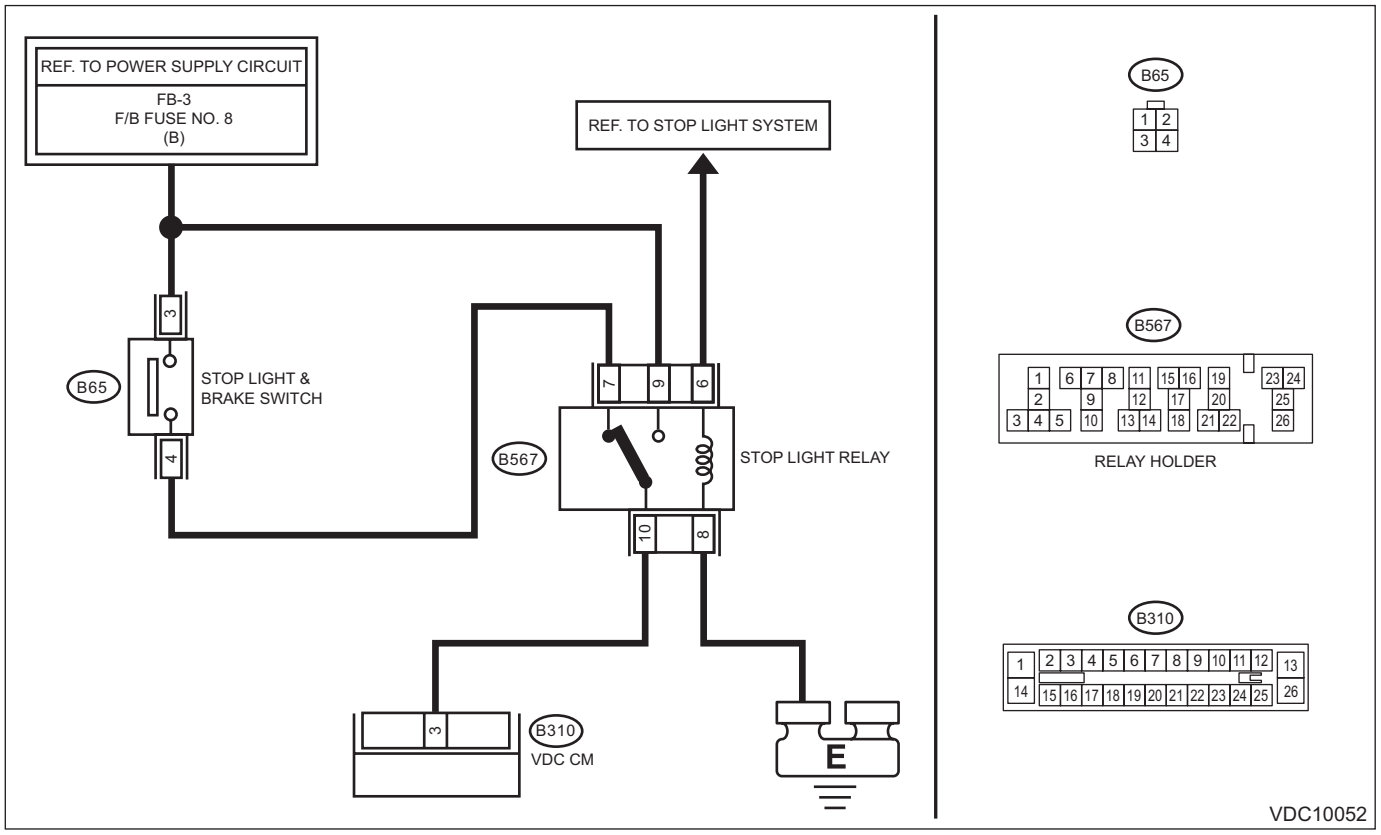
Step		Check	Yes	No
1	**CHECK STOP LIGHT SWITCH.** Check the stop light switch. <Ref. to BR-75, INSTALLATION, Stop Light Switch.>	Is the installation position of the stop light switch correct?	Go to step **2**.	Adjust the installation position of the stop light switch. <Ref. to BR-75, INSTALLATION, Stop Light Switch.>
2	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light switch connector. 3) Measure the resistance of stop light switch terminals. ***Terminals*** ***No. 3 — No. 4:***	Is the resistance less than 1 Ω when the stop light switch is ON (when pedal is depressed)?	Go to step **3**.	Replace the stop light switch. <Ref. to BR-75, Stop Light Switch.>
3	**CHECK STOP LIGHT RELAY.** Measure the resistance of stop light relay terminals. ***Terminals*** ***No. 7 — No. 10:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the stop light relay.

	Step	Check	Yes	No
4	**CHECK VDCCM&H/U CONNECTOR.** Disconnect the connector from the VDCCM&H/U.	Is there poor contact or damage of the VDCCM&H/U connector?	Repair the VDCCM&H/U connector.	Go to step **5**.
5	**CHECK STOP LIGHT SWITCH CIRCUIT.** Measure the resistance of stop light switch circuit. ***Connector & terminal*** ***(B310) No. 3 — (B567) No. 10:*** ***(B65) No. 4 — (B567) No. 7:*** ***(B65) No. 3 — (F/B fuse) No. 8:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the stop light switch circuit.
6	**CHECK STOP LIGHT SWITCH CIRCUIT.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between stop light relay and chassis ground. ***Connector & terminal*** ***(B567) No. 10 (+) — Chassis ground (–):***	Is the voltage 10 V or more when the stop light switch is ON (when pedal is depressed)?	Go to step **7**.	Repair the stop light switch circuit.
7	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **8**.
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CQ:DTC C0054 BLS ON MALFUNCTION

DTC DETECTING CONDITION:
Defective stop light switch
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**INTERVIEW CUSTOMERS.** Make sure that the operation was performed in which accelerator pedal and brake pedal were depressed simultaneously (with depressing brake pedal with left foot).	Were the acceleration pedal and brake pedal depressed simultaneously?	System is normal. (DTC may be recorded if the brake pedal is always depressed while driving.)	Go to step **2**.
2	**CHECK STOP LIGHT RELAY.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of stop light relay terminals. ***Terminals*** ***No. 9 — No. 10:***	Is the resistance less than 1 Ω?	Replace the stop light relay.	Go to step **3**.
3	**CHECK VDCCM&H/U CONNECTOR.** Disconnect the connector from the VDCCM&H/U.	Is there poor contact or damage of the VDCCM&H/U connector?	Repair the VDCCM&H/U connector.	Go to step **4**.
4	**CHECK STOP LIGHT SWITCH CIRCUIT.** 1) Turn the ignition switch to ON. 2) Measure the voltage between stop light switch and chassis ground. ***Connector & terminal*** ***(B567) No. 10 (+) — Chassis ground (–):***	Is the voltage 10 V or more when the stop light switch is OFF (when pedal is not depressed)?	Repair the stop light switch circuit.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CR:DTC C0056 G SENSOR ABNORMAL

DTC DETECTING CONDITION:

Longitudinal G sensor signal failure

TROUBLE SYMPTOM:

- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

NOTE:

For the diagnostic procedure, refer to “DTC C0056 G SENSOR SIGNAL”. <Ref. to VDC(diag)-132, DTC C0056 G SENSOR SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CS:DTC C0056 G SENSOR SIGNAL

DTC DETECTING CONDITION:
Longitudinal G sensor signal failure
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK INSTALLATION OF VDCCM&H/U.**	Is VDCCM&H/U installed properly without being tilted? Is the bracket deformation-free? Are the VDCCM&H/U installation bolts installed without missing or getting loose?	Go to step **2**.	Repair the defective part. • Install VDCCM&H/U properly. • Replace the bracket if faulty. • Tighten the VDCCM&H/U installation bolt. <Ref. to VDC-5, VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U), COMPONENT, General Description.> Go to step **2**.
2	**CHECK OUTPUT OF LONGITUDINAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Park the vehicle on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Fr Rr G sensor Output» displayed on display.	Is the value of «Fr Rr G sensor Output» –2 — 2 m/s^2?	Go to step **3**.	Recheck from step 1, and if the problem is not solved, go to next. Go to step **6**.
3	**SET 0 POINT FOR LONGITUDINAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Work Support". 2) Perform the "Longitudinal G sensor & lateral G sensor 0 point setting mode". <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Is the 0 point setting successful?	Go to step **4**.	Recheck from step 1, and when the 0 point setting is not possible, replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

	Step	Check	Yes	No
4	**PERFORM DRIVING TEST.** Drive approximately 10 minutes, and check if the warning lights illuminate or improperly operate during driving. In a safe place, drive the vehicle while alternating acceleration and deceleration as much as possible.	Did the ABS warning light or VDC warning light remain off? Does ABS or VDC operate without malfunction?	Go to step **5**.	Recheck from step 1, and when the warning lights illuminate or improperly operate, replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
5	**CHECK OUTPUT OF LONGITUDINAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Park the vehicle on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Fr Rr G sensor Output» displayed on display.	Is the value of «Fr Rr G sensor Output» –1.5 — 1.5 m/s^2?	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.	Recheck from step 1, and if the problem is not solved, replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6	**CHECK OUTPUT OF LONGITUDINAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Remove the VDCCM&H/U installation bolt and bracket. 2) Keep VDCCM&H/U in a horizontal position. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the «Fr Rr G sensor Output» displayed on display.	When the VDCCM&H/U is in a horizontal position, is the value of «Fr Rr G sensor Output» –1.5 — 1.5 m/s^2?	Check the bracket and brake pipe, and install VDCCM&H/U in a horizontal position to the vehicle.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

CT:DTC C0057 ECM COMMUNICATION CIRCUIT

DTC DETECTING CONDITION:
No CAN signal from ECM.
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of ECM connector?	Repair the connector.	Go to step **3**.
3	**CHECK ECM.** Refer to the basic diagnostic procedure of ENGINE (DIAGNOSTICS).	Is ECM normal?	Go to step **4**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
4	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CU:DTC C0057 ECM CONTROL SYSTEM

DTC DETECTING CONDITION:
ECM malfunctioning
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK COOPERATION CONTROL FEASIBILITY OF ECM USING SUBARU SELECT MONITOR.** 1) Start the engine, and run the engine at idle approximately 5 minutes. 2) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Check the «E/G Control Stop Flag» displayed on screen.	Is the «E/G Control Stop Flag» “1”?	Go to step **4**.	Go to step **2**.
2	**CHECK WARNING LIGHT.** Check whether the VDC warning light illuminates after driving for 1 minute or more at a speed of 10 km/h or more.	Does the VDC warning light illuminate?	Go to step **3**.	VDC is normal. Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> NOTE: DTC may be recorded if cranking is performed during driving.
3	**CHECK POOR CONTACT OF CONNECTORS.**	Is there poor contact of ECM connector?	Repair the connector.	Go to step **4**.
4	**CHECK ENGINE SYSTEM.** Refer to the basic diagnostic procedure of ENGINE (DIAGNOSTICS).	Is the engine system normal?	Go to step **5**.	Check the engine system.
5	**CHECK VDCCM&H/U.** 1) Connect all connectors. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CV:DTC C0057 VDC INTERRUPTED DUE TO EGI REASON

DTC DETECTING CONDITION:
Cooperation control prohibition of ECM
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

NOTE:
- For the diagnostic procedure, refer to “DTC C0057 ECM CONTROL SYSTEM”. <Ref. to VDC(diag)-135, DTC C0057 ECM CONTROL SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- Warning lights go off if the cooperation control of ECM returns.

CW:DTC C0071 NO SIGNAL FROM STEERING ANGLE SENSOR

DTC DETECTING CONDITION:

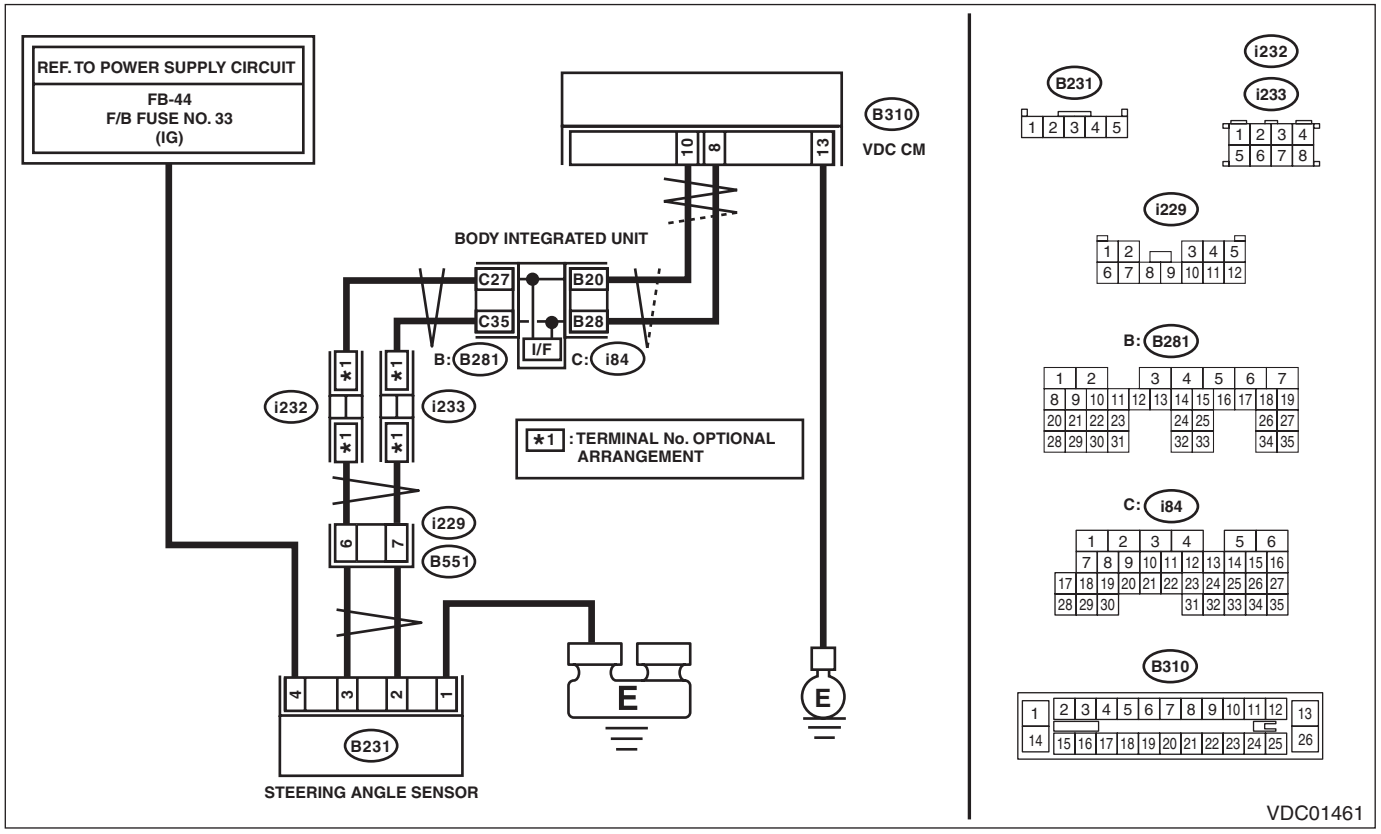
Communication from steering angle sensor is faulty.

TROUBLE SYMPTOM:

- VDC does not operate.
- EyeSight does not operate.

WIRING DIAGRAM:

Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



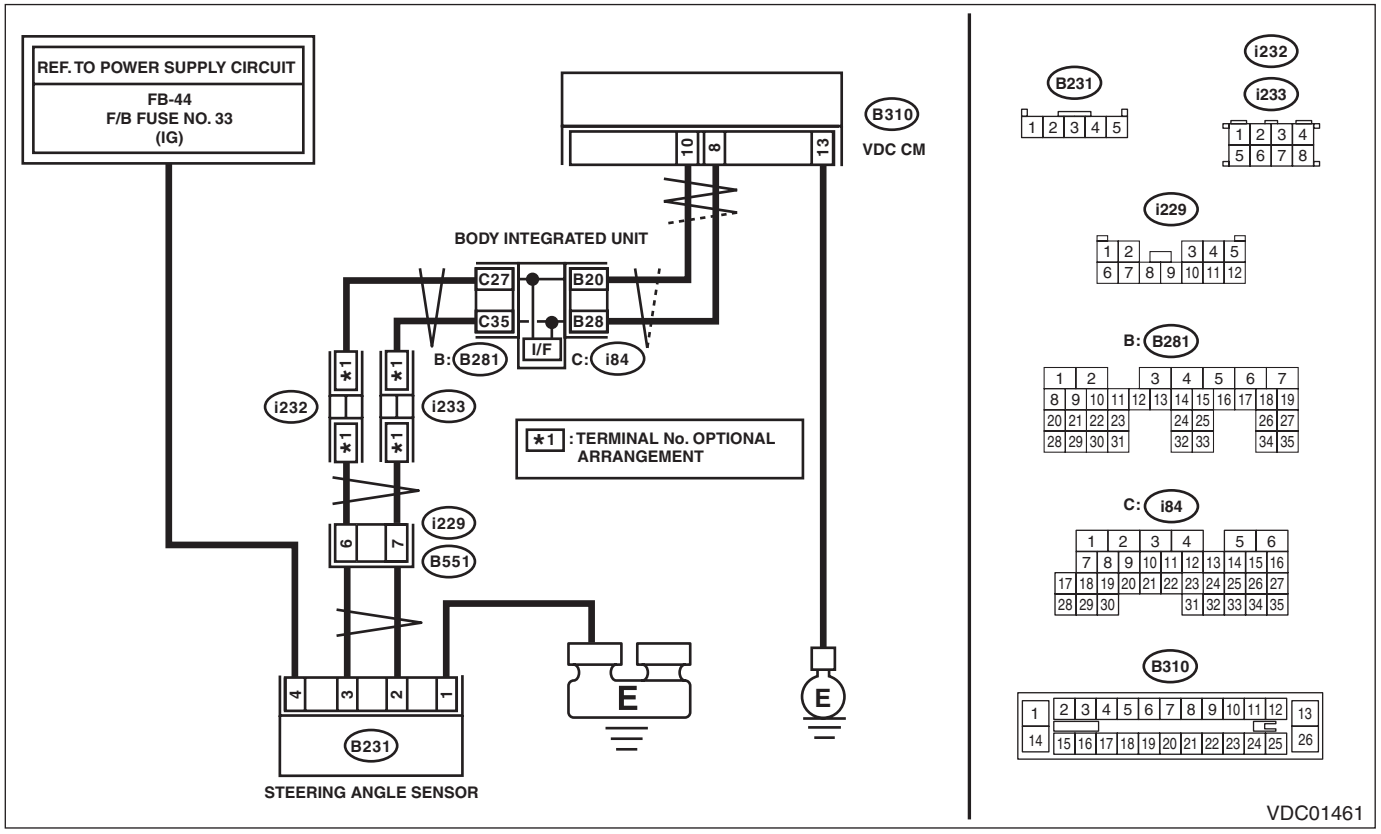
Step		Check	Yes	No
1	**CHECK POWER SUPPLY FOR STEERING ANGLE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from steering angle sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the steering angle sensor power supply circuit.
2	**CHECK GROUND CIRCUIT OF STEERING ANGLE SENSOR (CHECK FOR OPEN CIRCUIT).** Measure the resistance between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair ground circuit in the steering angle sensor.

	Step	Check	Yes	No
3	**CHECK VDCCM&H/U.** 1) Turn the ignition switch to OFF. 2) Connect all connectors. 3) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 4) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 5) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Go to step **4**.	Go to step **5**.
4	**CHECK VDCCM&H/U.** 1) Turn the ignition switch to OFF. 2) Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.> 3) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 4) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 5) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Original steering angle sensor malfunction

CX:DTC C0071 STEER ANGLE SENSOR OP

DTC DETECTING CONDITION:
Steering angle sensor output is faulty.
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

WIRING DIAGRAM:
Vehicle dynamics control system <Ref. to WI(w/o HEV)-238, WITH EyeSight, WIRING DIAGRAM, Vehicle Dynamics Control System.>



Step		Check	Yes	No
1	**CHECK POWER SUPPLY FOR STEERING ANGLE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from steering angle sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **2**.	Repair the steering angle sensor power supply circuit including the fuse.
2	**CHECK GROUND CIRCUIT OF STEERING ANGLE SENSOR (CHECK FOR OPEN CIRCUIT).** Measure the resistance between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair ground circuit in the steering angle sensor.

	Step	Check	Yes	No
3	**CHECK STEERING ANGLE SENSOR HARNESS (CHECK FOR OPEN CIRCUIT).** 1) Disconnect the connector from the VDCCM&H/U. 2) Measure the resistance between VDCCM&H/U and steering angel sensor. ***Connector & terminal*** ***(B231) No. 2 — (B310) No. 8:*** ***(B231) No. 3 — (B310) No. 10:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness between the steering angle sensor and VDCCM&H/U.
4	**CHECK GROUND SHORT CIRCUIT OF STEERING ANGLE SENSOR HARNESS.** Measure the resistance between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 2 — Chassis ground:*** ***(B231) No. 3 — Chassis ground:***	Is the resistance 10 Ω or more?	Go to step **5**.	Repair the harness between the steering angle sensor and VDCCM&H/U.
5	**CHECK STEERING WHEEL.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Check the steering wheel for deviation from center.	Is the deviation from the center of steering wheel less than 5°?	Go to step **6**.	Perform the centering adjustment of steering wheel, and perform Set up mode for Neutral of Steering Angle Sensor & Lateral G Sensor 0 point. <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6	**CHECK OUTPUT OF STEERING ANGLE SENSOR USING SUBARU SELECT MONITOR.** 1) Adjust steering wheel to the center position. 2) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Steer Angle Sensor Op» displayed on display.	Is the reading of «Steer Angle Sensor Op» –10° — 10°?	Perform Set up mode for Neutral of Steering Angle Sensor & Lateral G Sensor 0 point. <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> Go to step **7**.	Check the installation of the steering wheel and steering angle sensor.

	Step	Check	Yes	No
7	**CHECK VDCCM&H/U.** 1) Turn the ignition switch to OFF. 2) Connect all connectors. 3) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 4) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 5) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	Go to step **8**.
8	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CY:DTC C0072 ABNORMAL YAW RATE SENSOR OUTPUT

DTC DETECTING CONDITION:
Defective yaw rate sensor
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**INTERVIEW CUSTOMERS.** Check if the vehicle ran the road with banks or sandy surface (which does not mean a dirt road).	Did the vehicle run the road with banks or sandy surface (which does not mean a dirt road)?	VDCCM&H/U may record DTC when the vehicle ran the road with banks or sandy surface (which does not mean a dirt road).	Go to step **2**.
2	**CHECK INSTALLATION OF VDCCM&H/U.**	Is VDCCM&H/U installed properly without being tilted? Is the bracket deformation-free? Are the VDCCM&H/U installation bolts installed without missing or getting loose?	Go to step **3**.	Repair the defective part. • Install VDCCM&H/U properly. • Replace the bracket if faulty. • Tighten the VDCCM&H/U installation bolt. <Ref. to VDC-5, VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U), COMPONENT, General Description.> Go to step **3**.
3	**CHECK OUTPUT OF YAW RATE & G SENSOR WITH SUBARU SELECT MONITOR.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the «Yaw Rate Sensor Output» displayed on display.	Is the reading of «Yaw Rate Sensor Output» –4 — 4 deg/s?	Go to step **4**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
4	**CHECK OUTPUT OF STEERING ANGLE SENSOR WITH SUBARU SELECT MONITOR.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the «Steer Angle Sensor Op» displayed on display.	Is the reading of «Steer Angle Sensor Op» –5 — 5°?	Go to step **5**.	Perform the centering adjustment of steering wheel.

	Step	Check	Yes	No
5	**CHECK VDCCM&H/U.** 1) Turn the ignition switch to OFF. 2) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 4) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

CZ:DTC C0073 LATERAL G SENSOR POWER/OUTPUT

NOTE:
For the diagnostic procedure, refer to “DTC C0073 ABNORMAL LATERAL G SENSOR OUTPUT”. <Ref. to VDC(diag)-144, DTC C0073 ABNORMAL LATERAL G SENSOR OUTPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DA:DTC C0073 ABNORMAL LATERAL G SENSOR OUTPUT

DTC DETECTING CONDITION:
Defective lateral G sensor
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK INSTALLATION OF VDCCM&H/U.**	Is VDCCM&H/U installed properly without being tilted? Is the bracket deformation-free? Are the VDCCM&H/U installation bolts installed without missing or getting loose?	Go to step **2**.	Repair the defective part. • Install VDCCM&H/U properly. • Replace the bracket if faulty. • Tighten the VDCCM&H/U installation bolt. <Ref. to VDC-5, VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U), COMPONENT, General Description.> Go to step **2**.
2	**CHECK OUTPUT OF STEERING ANGLE SENSOR USING SUBARU SELECT MONITOR.** 1) Park the vehicle straight on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Steer Angle Sensor Op» displayed on display.	Is the reading of «Steer Angle Sensor Op» –10 — 10°?	Go to step **3**.	Check the installation of steering angle sensor.
3	**CHECK OUTPUT OF LATERAL G SENSOR WITH SUBARU SELECT MONITOR.** 1) Park the vehicle straight on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Lateral G sensor Output» displayed on display.	Is the reading of «Abnormal Lateral G Sensor output» –2 — 2 m/s^2?	Go to step **4**.	Recheck from step 1, and if the problem is not solved, go to next. Go to step **7**.
4	**SET 0 POINT FOR LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Work Support". 2) Perform Set up mode for Neutral of Steering Angle Sensor & Lateral G Sensor 0 point. <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Is the 0 point setting successful?	Go to step **5**.	Recheck from step 1, and when the 0 point setting is not possible, replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

	Step	Check	Yes	No
5	**PERFORM DRIVING TEST.** Drive approximately 10 minutes, and check if the warning lights illuminate or improperly operate during driving. In a safe place, drive the vehicle while alternating acceleration and deceleration as much as possible.	Did the ABS warning light or VDC warning light remain off? Does ABS or VDC operate without malfunction?	Go to step **6**.	Recheck from step 1, and when the warning lights illuminate or improperly operate, replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6	**CHECK OUTPUT OF LATERAL G SENSOR WITH SUBARU SELECT MONITOR.** 1) Park the vehicle on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Lateral G sensor Output» displayed on display.	Is the reading of «Abnormal Lateral G Sensor output» –1.5 — 1.5 m/s^2?	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.	Recheck from step 1, and if the problem is not solved, replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
7	**CHECK OUTPUT OF LATERAL G SENSOR WITH SUBARU SELECT MONITOR.** 1) Remove the VDCCM&H/U installation bolt and bracket. 2) Keep VDCCM&H/U in a horizontal position. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the «Lateral G sensor Output» displayed on display.	When the VDCCM&H/U is in a horizontal position, is the value of «Abnormal Lateral G Sensor output» –1.5 — 1.5 m/s^2?	Check the bracket and brake pipe, and install VDCCM&H/U in a horizontal position to the vehicle.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

DB:DTC C0074 MASTER CYLINDER PRESSURE SENSOR OUTPUT

DTC DETECTING CONDITION:
Defective pressure sensor
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK STOP LIGHT SWITCH CIRCUIT.** Check stop light switch open circuit.	Is the stop light switch circuit OK?	Go to step **2**.	Repair the stop light switch circuit. NOTE: If there is malfunction in the stop light circuit, DTC may be recorded in the memory.
2	**CHECK OUTPUT OF PRESSURE SENSOR WITH SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the «Master Cylinder Pressure Sensor» displayed on display.	With the brake pedal released, does the value for «Master Cylinder Pressure Sensor» fall within 0 — 11 bar?	Go to step **3**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
3	**CHECK OUTPUT OF PRESSURE SENSOR WITH SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the «Master Cylinder Pressure Sensor» displayed on display.	When the brake pedal is operated, does the value of «Master Cylinder Pressure Sensor» change in accordance with the brake pedal?	Go to step **4**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
4	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

DC:DTC C0075 WHEEL CYLINDER PRESSURE SENSOR OUTPUT

DTC DETECTING CONDITION:
Defective pressure sensor
TROUBLE SYMPTOM:
EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK STOP LIGHT SWITCH CIRCUIT.** Check stop light switch open circuit.	Is the stop light switch circuit OK?	Go to step **2**.	Repair the stop light switch circuit. NOTE: If there is malfunction in the stop light circuit, DTC may be recorded in the memory.
2	**CHECK OUTPUT OF PRESSURE SENSOR WITH SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the values of «FL Wheel Cylinder Pressure Sensor» and «FR Wheel Cylinder Pressure Sensor» displayed on the screen.	With the brake pedal released, do the values for «FL Wheel Cylinder Pressure Sensor» and «FR Wheel Cylinder Pressure Sensor» fall within 0 — 11 bar?	Go to step **3**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
3	**CHECK OUTPUT OF PRESSURE SENSOR WITH SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 2) Read the values of «FL Wheel Cylinder Pressure Sensor» and «FR Wheel Cylinder Pressure Sensor» displayed on the screen.	When the brake pedal is operated, do the values of «FL Wheel Cylinder Pressure Sensor» and «FR Wheel Cylinder Pressure Sensor» change in accordance with the brake pedal? Also, is the difference between «FL Wheel Cylinder Pressure Sensor» and «FR Wheel Cylinder Pressure Sensor» less than 10 bar?	Go to step **4**.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
4	**CHECK VDCCM&H/U.** 1) Perform the Clear Memory Mode. <Ref. to VDC(diag)-26, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to VDC(diag)-25, Inspection Mode.> 3) Read the DTC. <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is the same DTC displayed?	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **5**.
5	**CHECK DETECTION OF OTHER DTCS FOR VDC.** <Ref. to VDC(diag)-24, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.

DD:DTC C0081 SYSTEM FAILURE

DTC DETECTING CONDITION:
VDC long time sequential control
TROUBLE SYMPTOM:
- VDC does not operate.
- EyeSight does not operate.

	Step	Check	Yes	No
1	**CHECK INSTALLATION OF VDCCM&H/U.**	Is VDCCM&H/U installed properly without being tilted? Is the bracket deformation-free? Are the VDCCM&H/U installation bolts installed without missing or getting loose?	Go to step **2**.	Repair the defective part. • Install VDCCM&H/U properly. • Replace the bracket if faulty. • Tighten the VDCCM&H/U installation bolt. <Ref. to VDC-5, VDC CONTROL MODULE & HYDRAULIC CONTROL UNIT (VDCCM&H/U), COMPONENT, General Description.> Go to step **2**.
2	**CHECK STEERING WHEEL.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Check the steering wheel for deviation from center.	Is the deviation from the center of steering wheel less than 5°?	Go to step **3**.	Perform the centering adjustment of steering wheel, and perform Set up mode for Neutral of Steering Angle Sensor & Lateral G Sensor 0 point. <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> Go to step **3**.
3	**CHECK OUTPUT OF STEERING ANGLE SENSOR USING SUBARU SELECT MONITOR.** 1) Adjust steering wheel to the center position. 2) Using the Subaru Select Monitor, select “Data monitor”. <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the «Steer Angle Sensor Op» displayed on display.	Is the reading of «Steer Angle Sensor Op» –10° — 10°?	Go to step **4**.	Check the installation of the steering wheel and steering angle sensor, and correct the installation if it is improper. If the installation condition is correct, replace the sensor.

	Step	Check	Yes	No
4	**CHECK OUTPUT OF SENSORS USING SUBARU SELECT MONITOR.** 1) Drive the vehicle on a flat road. 2) Park the vehicle straight. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the values of «Abnormal Lateral G Sensor output», «Fr Rr G sensor Output», and «Yaw Rate Sensor Output» displayed on the screen.	Is the reading of each sensor following value? «Abnormal Lateral G Sensor output»: –2 — 2 m/s^2 «Fr Rr G sensor Output»: –2 — 2 m/s^2 «Yaw Rate Sensor Output»: –4 — 4 deg/s	Go to step **5**.	Recheck from step 1, and if the problem is not solved, go to next. Go to step **8**.
5	**SET 0 POINT FOR LONGITUDINAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Using the Subaru Select Monitor, select "Work Support". 2) Perform the "Longitudinal G sensor & lateral G sensor 0 point setting mode". <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Is the 0 point setting successful?	Go to step **6**.	Recheck from step 1, and when the 0 point setting is not possible, replace the VDCCM&H/U and steering angle sensor. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).> <Ref. to VDC-34, Steering Angle Sensor.>
6	**PERFORM DRIVING TEST.** Drive approximately 10 minutes, and check if the warning lights illuminate or improperly operate during driving.	Did the ABS warning light or VDC warning light remain off? Does ABS or VDC operate without malfunction?	Go to step **7**.	Recheck from step 1, and when the warning lights illuminate or improperly operate, replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
7	**CHECK OUTPUT OF SENSORS USING SUBARU SELECT MONITOR.** 1) Park the vehicle on a level surface. 2) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 3) Read the values of «Abnormal Lateral G Sensor output», «Fr Rr G sensor Output», and «Yaw Rate Sensor Output» displayed on the screen.	Is the reading of each sensor following value? «Abnormal Lateral G Sensor output»: –1.5 — 1.5 m/s^2 «Fr Rr G sensor Output»: –1.5 — 1.5 m/s^2 «Yaw Rate Sensor Output»: –4 — 4 deg/s	Currently, it is normal. There may have been a temporary poor contact in the harness and connector or a temporary noise interference.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

	Step	Check	Yes	No
8	**CHECK OUTPUT OF SENSORS USING SUBARU SELECT MONITOR.** 1) Remove the VDCCM&H/U installation bolt and bracket. 2) Keep VDCCM&H/U in a horizontal position. 3) Using the Subaru Select Monitor, select "Data monitor". <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 4) Read the values of «Abnormal Lateral G Sensor output», «Fr Rr G sensor Output», and «Yaw Rate Sensor Output» displayed on the screen.	When VDCCM&H/U is in a horizontal position, is the reading of each sensor following value? «Abnormal Lateral G Sensor output»: –1.5 — 1.5 m/s^2 «Fr Rr G sensor Output»: –1.5 — 1.5 m/s^2 «Yaw Rate Sensor Output»: –4 — 4 deg/s	Check the bracket and brake pipe, and install VDCCM&H/U in a horizontal position to the vehicle.	Replace the VDCCM&H/U. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

13.General Diagnostic Table

A: INSPECTION

Symptoms		Main probable cause	Other probable cause
Poor brake performance	Long braking/ stopping distance	• VDCCM&H/U • Brake pad • Aeration to brake line • Tire specifications, tire wear and air pressures • Incorrect wiring or piping connections	• Defective ABS wheel speed sensor or sensor gap • Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Master cylinder • Brake caliper • Disc rotor • Brake pipe • Brake booster
	Wheel lock	• VDCCM&H/U • Defective ABS wheel speed sensor or sensor gap • Incorrect wiring or piping connections	• Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Brake caliper • Brake pipe
	Brake drag	• VDCCM&H/U • Defective ABS wheel speed sensor or sensor gap • Master cylinder • Brake caliper • Parking brake • Axle and wheels • Brake pedal play	• Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Brake pad • Brake pipe
	Long brake pedal stroke	• Aeration to brake line • Brake pedal play	• VDCCM&H/U • Master cylinder • Brake caliper • Brake pad • Brake pipe • Brake booster
	Vehicle vertical pitching	• VDCCM&H/U • Road surface (uneven) • Suspension play or fatigue (reduced damping) • Incorrect wiring or piping connections	• Defective ABS wheel speed sensor or sensor gap • Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U.
Poor brake performance	Unstable or uneven braking	• VDCCM&H/U • Defective ABS wheel speed sensor or sensor gap • Brake caliper • Brake pad • Road surface (uneven) • Tire specifications, tire wear and air pressures • Incorrect wiring or piping connections	• Defective ABS wheel speed sensor or sensor gap • Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Master cylinder • Disc rotor • Brake pipe • Axle and wheels • Road with crowns or banks • Suspension play or fatigue (reduced damping)

Symptoms		Main probable cause	Other probable cause
Vibration or noise • When braking suddenly • When accelerating suddenly • While driving on a slippery road	Excessive brake pedal vibration	• Road surface (uneven) • Incorrect wiring or piping connections	• VDCCM&H/U • Brake booster • Suspension play or fatigue (reduced damping)
	Noise from VDCCM&H/U	• VDCCM&H/U (mount bushing) • Defective ABS wheel speed sensor or sensor gap • Brake pipe	• VDCCM&H/U • Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U.
	Noise from the front side of vehicle	• VDCCM&H/U (mount bushing) • Defective ABS wheel speed sensor or sensor gap • Master cylinder • Brake caliper • Brake pad • Disc rotor • Brake pipe • Brake booster • Suspension play or fatigue (reduced damping)	• Axle and wheels • Tire specifications, tire wear and air pressures
	Noise from the rear side of vehicle	• Defective ABS wheel speed sensor or sensor gap • Brake caliper • Brake pad • Disc rotor • Parking brake • Brake pipe • Suspension play or fatigue (reduced damping)	• Axle and wheels • Tire specifications, tire wear and air pressures
Engine does not accelerate or goes into a stall when accelerating suddenly or driving on a slippery surface.		• VDCCM&H/U • Defective ABS wheel speed sensor or sensor gap • Master cylinder • Brake caliper • Parking brake • Incorrect wiring or piping	• Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Brake pad • Brake pipe
Poor change-direction-operation stability of TCS	Deviation to right or left direction	• VDCCM&H/U • Defective ABS wheel speed sensor or sensor gap • Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Brake caliper • Brake pad • Wheel alignment • Road surface (uneven) • Road with crowns or banks • Tire specifications, tire wear and air pressures • Incorrect wiring or piping connections	• Disc rotor • Brake pipe • Axle and wheels • Suspension play or fatigue (reduced damping)
	Vehicle spin	• VDCCM&H/U • Defective ABS wheel speed sensor or sensor gap • Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Brake pad • Tire specifications, tire wear and air pressures • Incorrect wiring or piping connections	• Brake caliper • Brake pipe

Symptoms	Main probable cause	Other probable cause
Steering wheel drag while driving	• VDCCM&H/U • Defective ABS wheel speed sensor or sensor gap • Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Incorrect wiring or piping connections • Power steering system	• Brake caliper • Brake pad • Disc rotor • Wheel alignment • Road surface (uneven) • Road with crowns or banks • Suspension play or fatigue (reduced damping) • Tire specifications, tire wear and air pressures
VDC operates while driving normally.	• VDCCM&H/U • Defective ABS wheel speed sensor or sensor gap • Defective steering angle sensor or improper neutral position • Defective yaw rate & G sensor or improper installation of VDCCM&H/U. • Wheel alignment • Road surface (uneven) • Road with crowns or banks • Suspension play or fatigue (reduced damping) • Tire specifications, tire wear and air pressures • Incorrect wiring or piping connections • Power steering system	
VDC OFF indicator light does not illuminate when the VDC OFF switch is depressed. NOTE: When pressing VDC OFF switch for 10 seconds or more, VDC OFF indicator light goes off and cannot operate any more. When turning the ignition switch from OFF to ON, the previous status is restored.	• Harness • Combination meter • VDC OFF switch	

BRAKE

BR

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1. General Description

A: SPECIFICATION

Front disc brake	Size		15-inch type	16-inch type
	Type		Disc (floating type, ventilated)	
	Effective disc diameter	mm (in)	228 (8.98)	244 (9.61)
	Disc thickness × Diameter	mm (in)	24 × 277 (0.94 × 10.91)	24 × 294 (0.94 × 11.57)
	Effective cylinder diameter	mm (in)	42.8 (1.685) × 2	42.8 (1.685) × 2
	Pad dimensions (Length × Width × Thickness)	mm (in)	117.8 × 50.5 × 11.0 (4.638 × 1.988 × 0.433)	117.8 × 50.5 × 11.0 *4 (4.638 × 1.988 × 0.433)
	Clearance adjustment		Automatic adjustment	
Rear disc brake	Size		15-inch type	
	Type		Disc (floating type, solid)	
	Effective disc diameter	mm (in)	238 (9.37)	
	Disc thickness × Diameter	mm (in)	10 × 274 (0.39 × 10.79)	
	Effective cylinder diameter	mm (in)	38.1 (1.500)	
	Pad dimensions (Length × Width × Thickness)	mm (in)	92.0 × 33.0 × 9.0 (3.622 × 1.299 × 0.354)	
	Clearance adjustment		Automatic adjustment	
Master cylinder	Type		Tandem	
	Effective diameter	mm (in)	23.8 (15/16)	
	Reservoir type		Sealed type	
	Brake fluid reservoir capacity	cm^3 (cu in)	240 (14.64)	
Brake booster	Type		Vacuum suspended	
	Effective diameter	mm (in)	208 + 229 (8.19 + 9.02)	
Brake line			Dual circuit system	
Brake fluid			FMVSS No. 116, DOT3, or DOT4 **CAUTION:** **• Do not let brake fluid come into contact with the painted surface of the vehicle body. Wash away with water immediately and wipe off if it is spilled by accident.** **• Avoid mixing brake fluid of different brands or different grades even from the same brand to prevent fluid performance from degrading.** **• When refilling brake fluid, do not allow dirt or dust to get into the reservoir tank.** **• Always use new SUBARU genuine brake fluid when replacing or refilling the fluid. Do not reuse drained brake fluid.**	

NOTE:
Refer to “PARKING BRAKE” for parking brake specifications. <Ref. to PB-2, SPECIFICATION, General Description.>

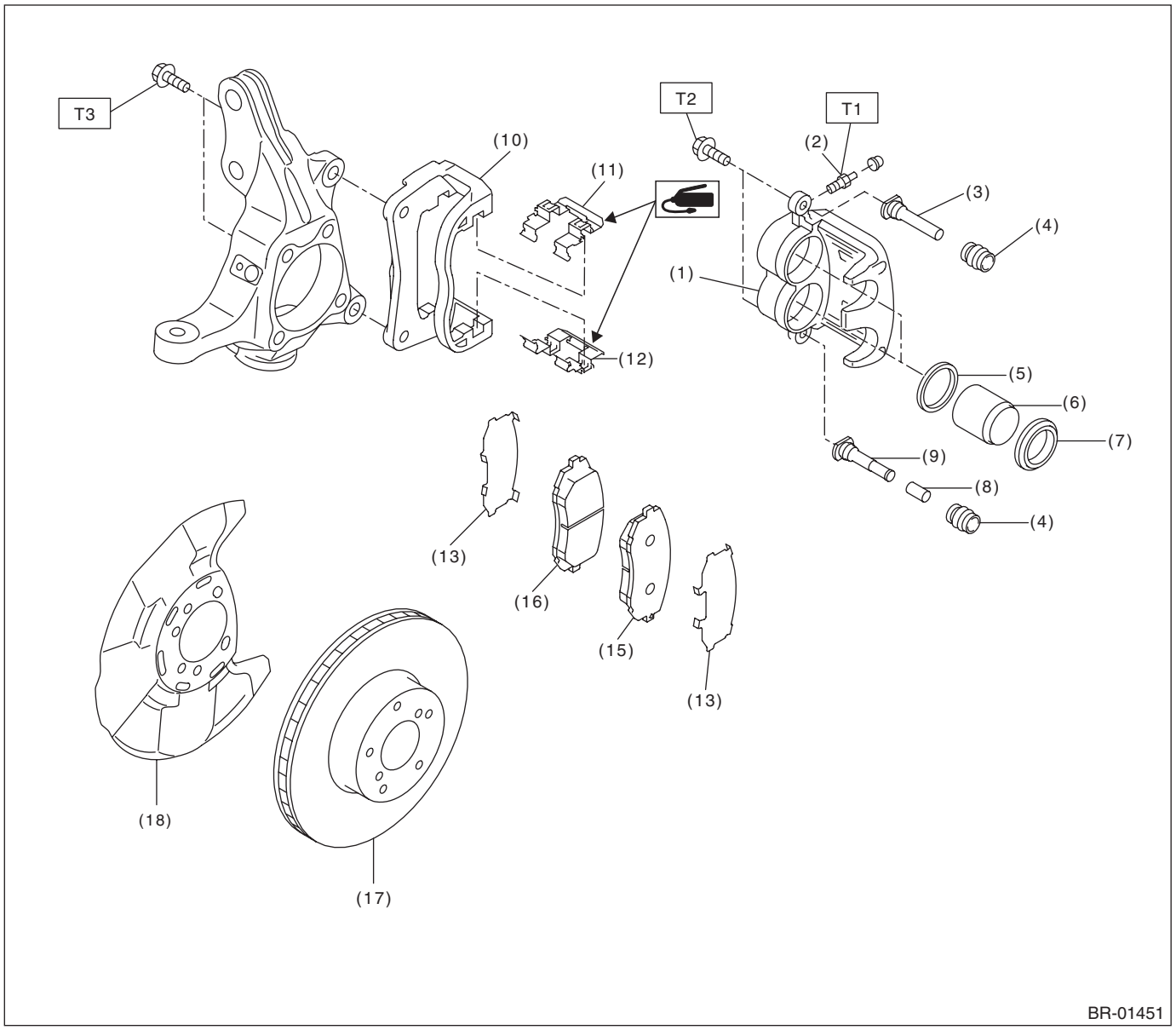
Item			Standard	Limit
Front brake	Pad thickness	All models mm (in)	11 (0.43)	1.5 (0.059)
	Disc thickness	All models mm (in)	24 (0.94)	22 (0.87)
	Disc runout	mm (in)	—	0.05 (0.0020)
Rear brake (disc type)	Pad thickness mm (in)	Solid disc	9.0 (0.354)	1.5 (0.059)
	Disc thickness mm (in)	Solid disc	10 (0.39)	8.5 (0.335)
	Disc runout	mm (in)	—	0.05 (0.0020)
Parking brake	Inside diameter	mm (in)	170 (6.69)	171 (6.73)
	Lining thickness	mm (in)	3.5 (0.14)	1.5 (0.059)

		Brake pedal force N (kgf, lbf)	Fluid pressure kPa (kgf/cm^2, psi)
Brake booster	Brake fluid pressure with engine stopped	147 (15, 33)	533 (5, 77)
		294 (30, 66)	1,551 (16, 225)
	Brake fluid pressure with engine running and vacuum pressure at 66.7 kPa (500 mmHg, 19.69 inHg)	147 (15, 33)	6,177 (63, 896)
		294 (30, 66)	11,273 (115, 1,635)

Brake pedal	Free play mm (in)	0.5 — 2.7 (0.02 — 0.11) [When pulling the brake pedal upward with a force of less than 10 N (1 kgf, 2 lbf)]

B: COMPONENT

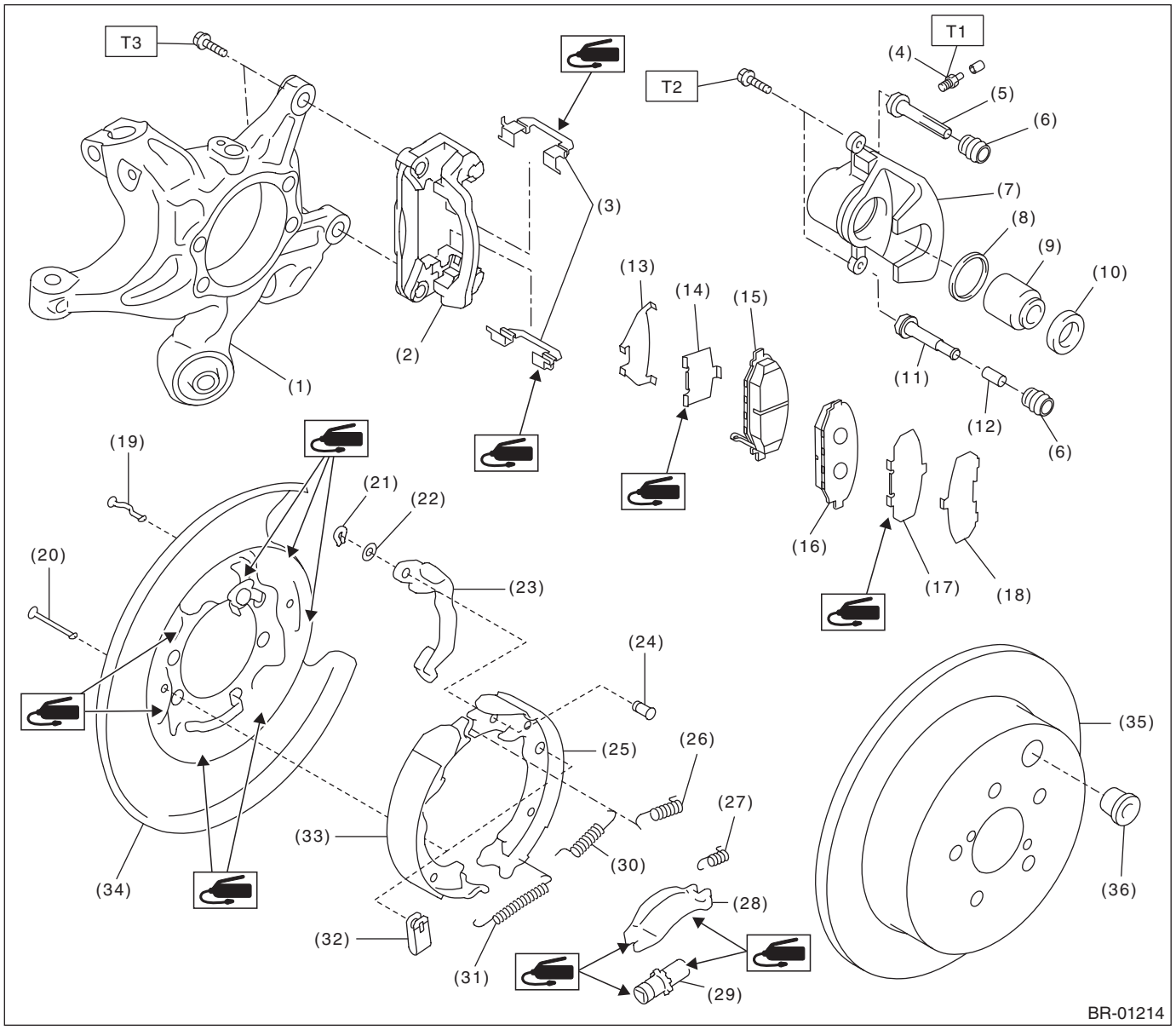
1. FRONT DISC BRAKE



(1) Caliper body
(2) Bleeder - screw
(3) Guide pin - front brake (black)
(4) Pin boot
(5) Piston seal
(6) Piston - disc brake
(7) Piston boot
(8) Lock pin - sleeve
(9) Lock pin - front brake (silver)
(10) Support - front disc brake
(11) Pad clip - upper
(12) Pad clip - lower
(13) Shim - disc brake front
(14) Pad - disc brake front outer
(15) Pad - disc brake front inner
(16) Disc rotor
(17) Back plate - front brake

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.82, 5.9)
T2: 27 (2.75, 19.9)
T3: 80 (8.16, 59)

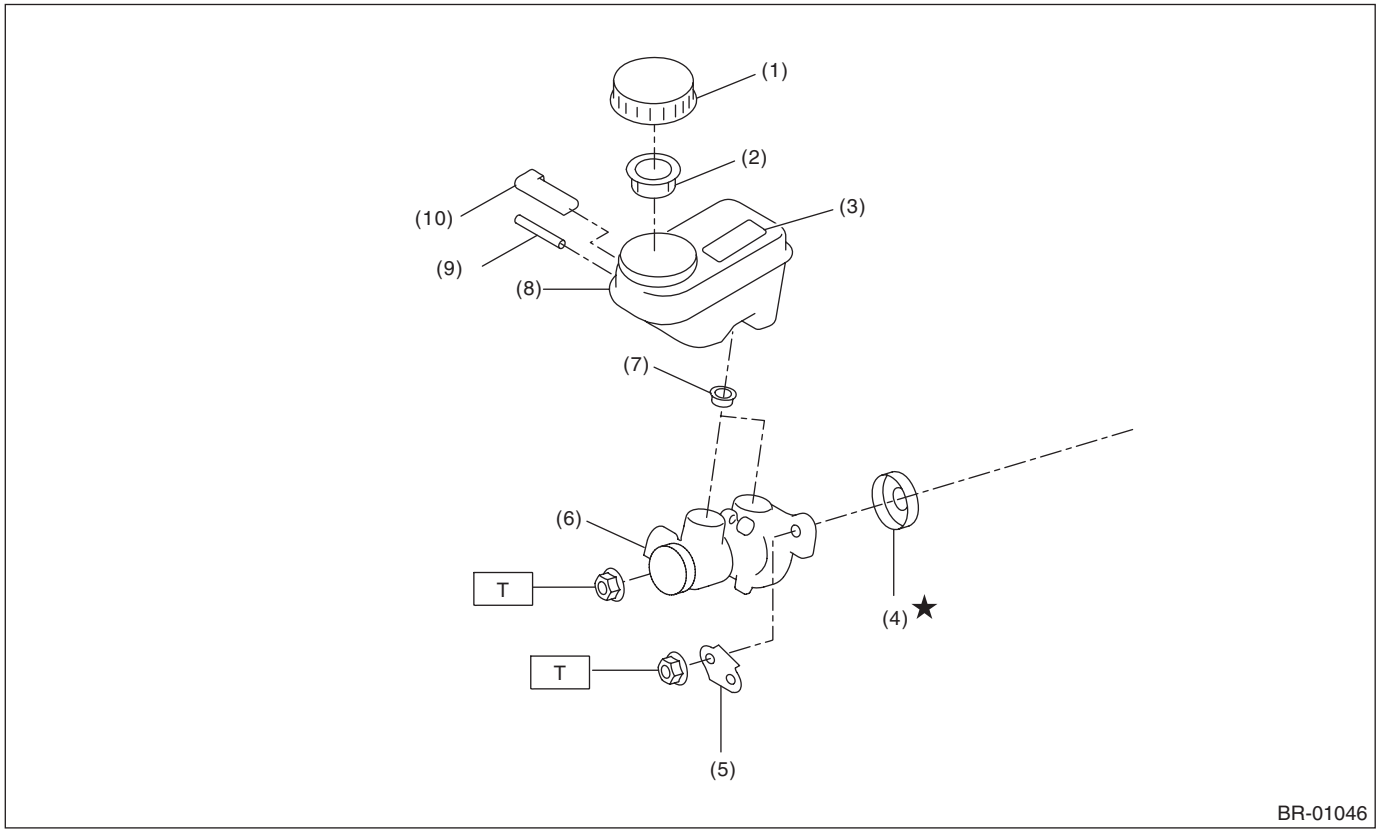
2. REAR DISC BRAKE



(1) Housing ASSY - rear axle
(2) Support - rear disc brake
(3) Pad clip - rear brake
(4) Bleeder - screw
(5) Guide pin - rear brake (black)
(6) Pin boot
(7) Caliper body
(8) Piston seal
(9) Piston - disc brake
(10) Piston boot
(11) Lock pin - rear brake (silver)
(12) Lock pin - sleeve
(13) Shim - disc brake rear outer
(14) Shim - disc brake rear inner
(15) Pad - disc brake rear inner
(16) Pad - disc brake rear outer
(17) Shim - disc brake rear inner
(18) Shim - disc brake rear outer
(19) Pin - secondary shoe hold-down
(20) Pin - primary shoe hold-down
(21) Retainer - rear brake
(22) Spring washer - rear brake
(23) Parking lever - rear
(24) Pin - parking lever
(25) Parking brake shoe (secondary)
(26) Spring - secondary shoe return
(27) Spring - strut
(28) Strut - brake
(29) Adjuster ASSY - rear brake
(30) Spring - primary shoe return
(31) Spring - adjuster
(32) Cup - shoe hold-down
(33) Parking brake shoe (primary)
(34) Back plate - rear brake
(35) Disc rotor (solid type)
(36) Adjusting hole cover

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.82, 5.9)
T2: 27 (2.75, 19.9)
T3: 66 (6.73, 48.7)

3. MASTER CYLINDER

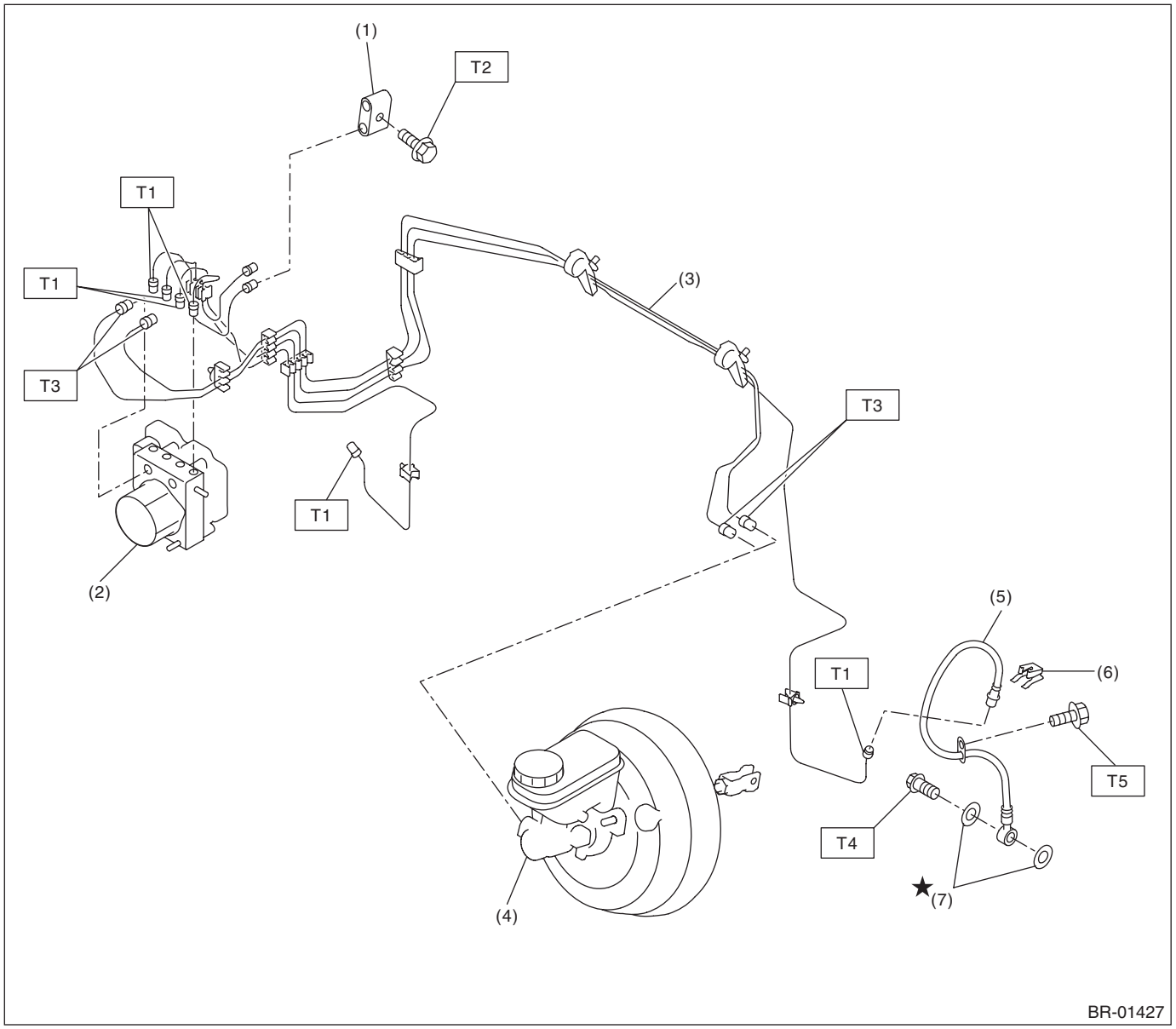


(1)	Cap - reservoir tank	(6)	Cylinder body ASSY
(2)	Filter - master cylinder	(7)	Seal
(3)	Caution label (model with caution label)	(8)	Reservoir tank
(4)	Seal sub ASSY	(9)	Pin
(5)	Bracket - master cylinder	(10)	Level - indicator

Tightening torque: N·m (kgf-m, ft-lb)
T: 13 (1.33, 9.6)

4. FRONT BRAKE PIPES AND HOSES

- Models without EyeSight



(1)	Connector - two-way	(5)	Front brake hose RH/LH
(2)	VDC control module and hydraulic control unit (VDCCM&H/U)	(6)	Clamp
(3)	Front brake pipe ASSY	(7)	Gasket
(4)	Master cylinder ASSY		

Tightening torque: N·m (kgf-m, ft-lb)

T1: 15 (1.53, 11.1)

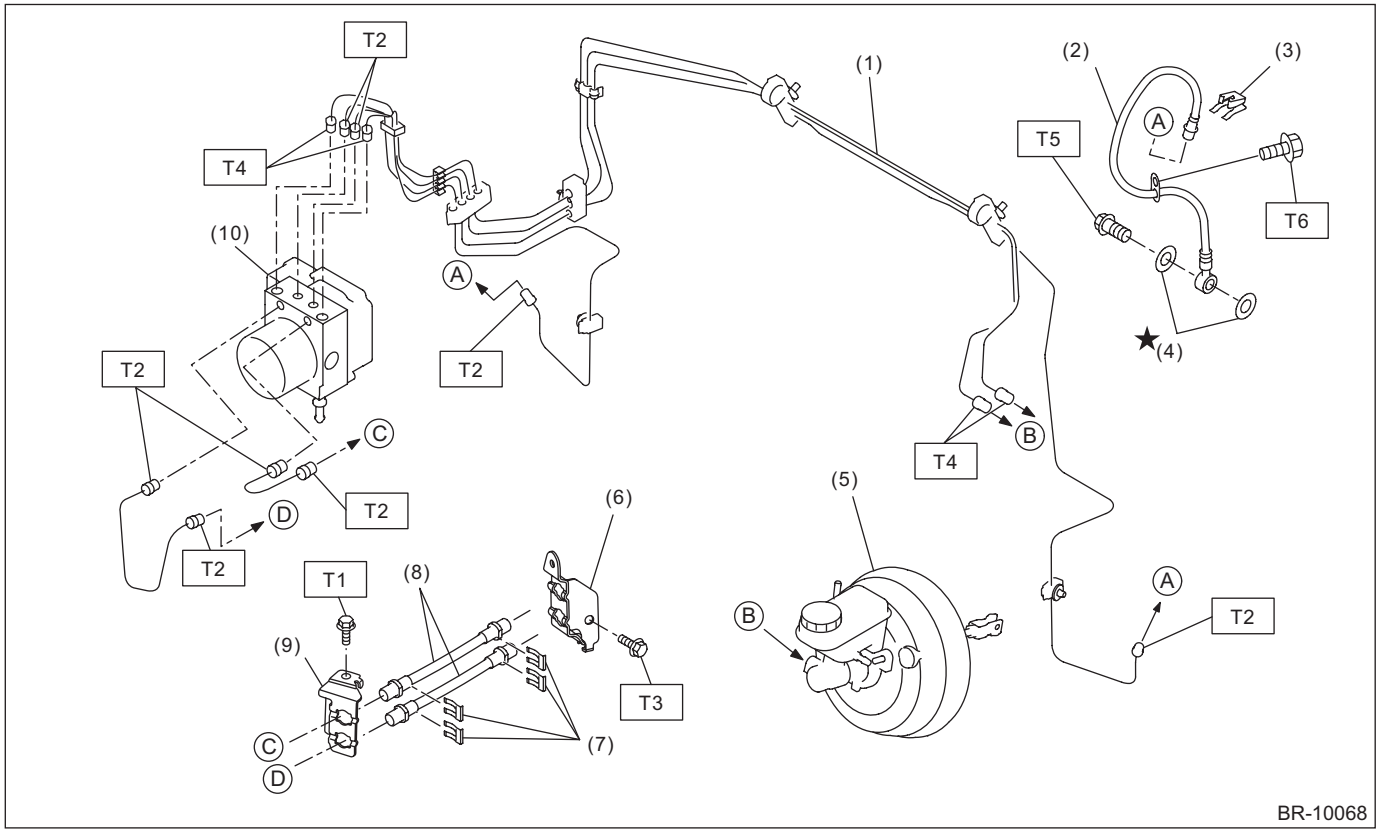
T2: 18 (1.84, 13.3)

T3: 19 (1.94, 14.0)

T4: 26 (2.65, 19.2)

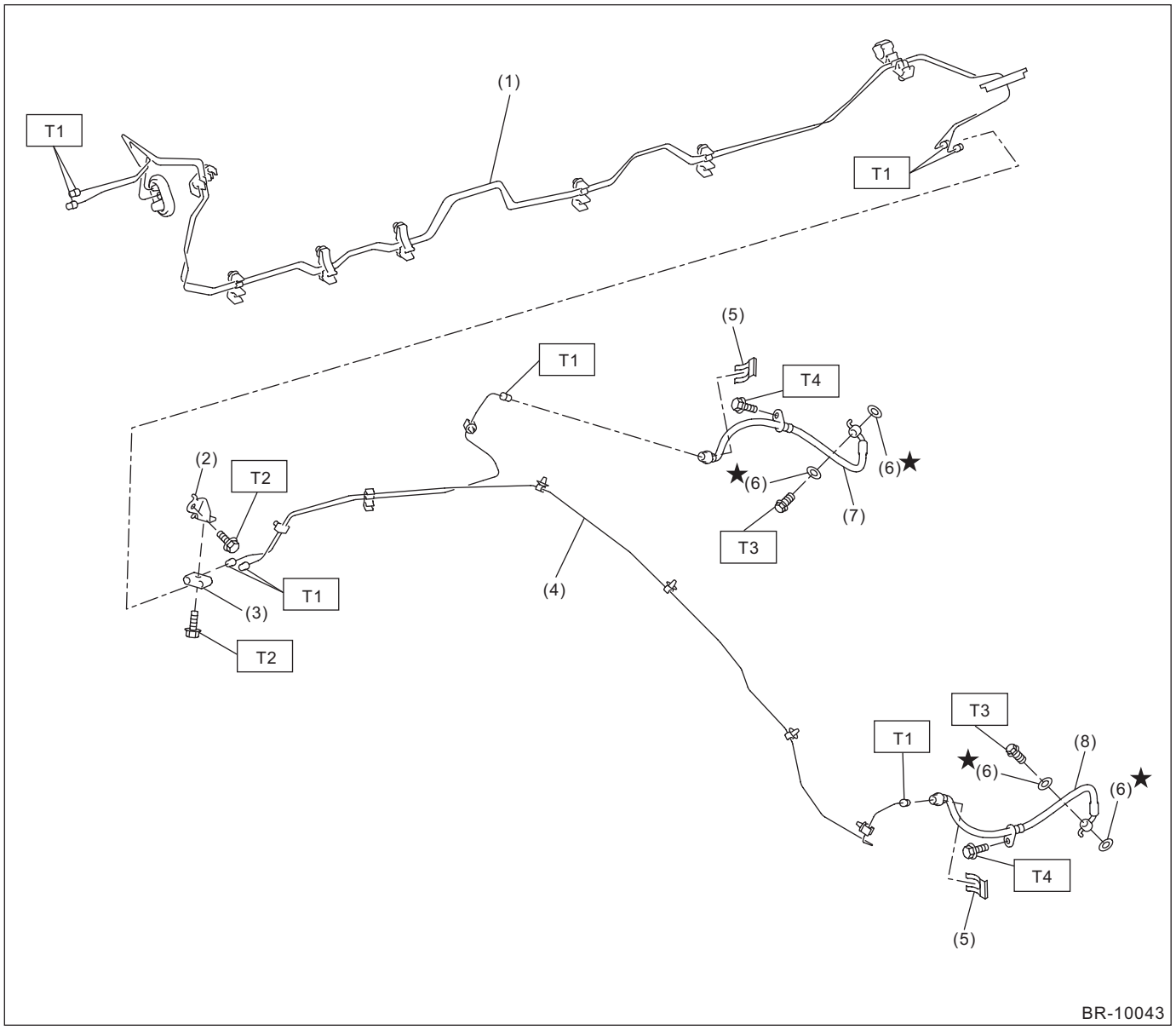
T5: 33 (3.36, 24.3)

- Models with EyeSight



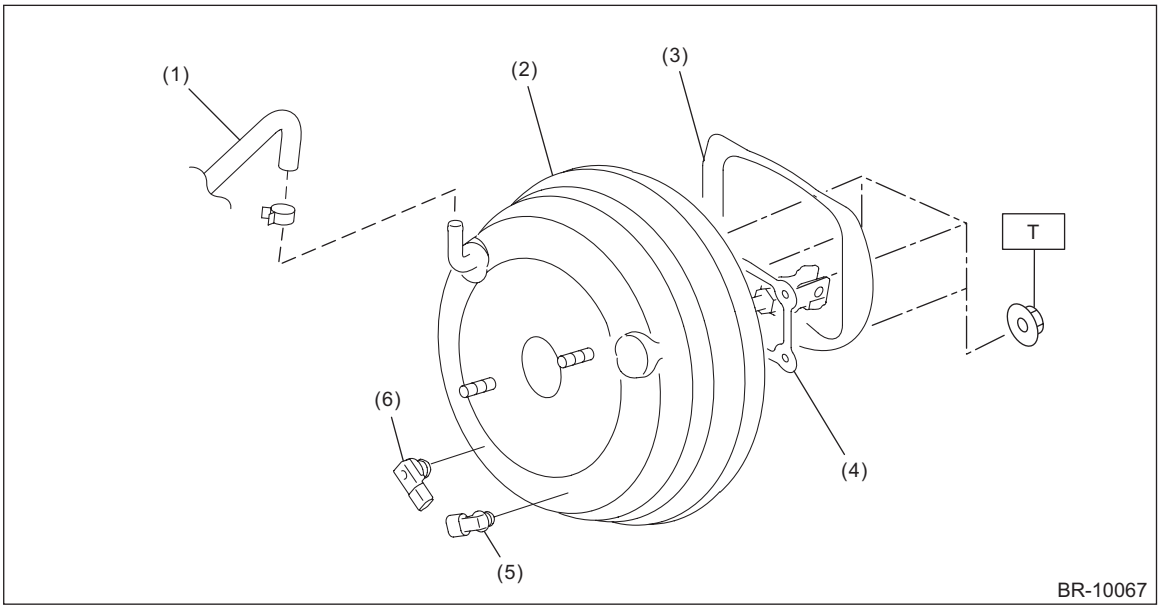
(1)	Front brake pipe ASSY	(7)	Clamp	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Front brake hose RH/LH	(8)	Brake hose ASSY	***T1: 7.5 (0.76, 5.5)***
(3)	Clamp	(9)	Bracket	***T2: 15 (1.53, 11.1)***
(4)	Gasket	(10)	VDC control module and hydraulic control unit (VDCCM&H/U)	***T3: 18 (1.84, 13.3)***
(5)	Master cylinder ASSY			***T4: 19 (1.94, 14.0)***
(6)	Bracket			***T5: 26 (2.65, 19.2)***
				T6: 33 (3.36, 24.3)

5. CENTER AND REAR BRAKE PIPES AND HOSES



(1)	Center brake pipe ASSY	(5)	Clamp	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Bracket	(6)	Gasket	***T1: 15 (1.53, 11.1)***
(3)	Connector	(7)	Rear brake hose RH	***T2: 18 (1.84, 13.3)***
(4)	Rear brake pipe ASSY	(8)	Rear brake hose LH	***T3: 26 (2.65, 19.2)***
				T4: 33 (3.4, 24.3)

6. BRAKE BOOSTER

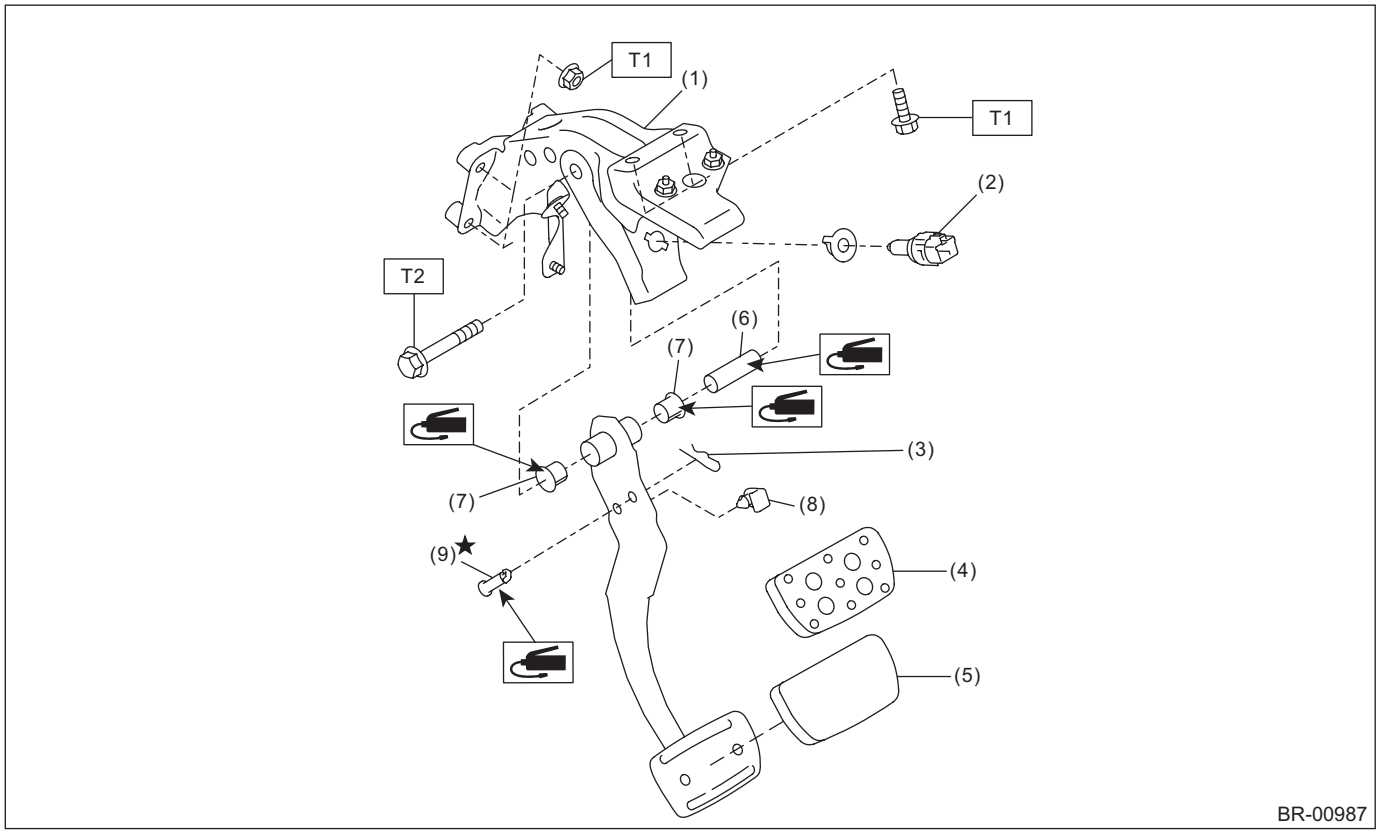


(1) Vacuum hose
(2) Vacuum booster ASSY
(3) Damping seat (model with EyeSight)
(4) Gasket
(5) Vacuum sensor
(6) Vacuum sensor (HEV model)

Tightening torque: N·m (kgf-m, ft-lb)
T: 18 (1.84, 13.3)

7. BRAKE PEDAL

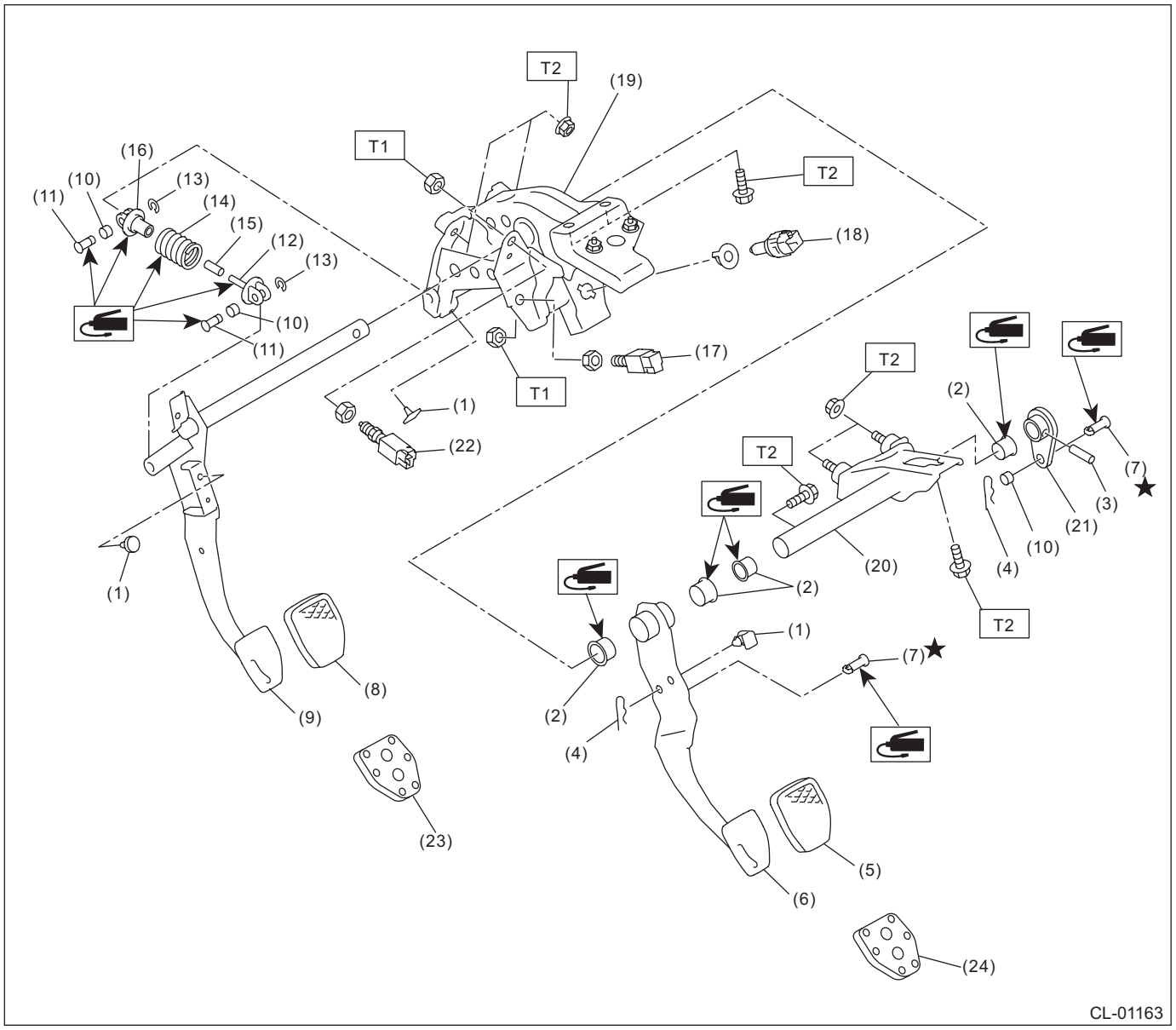
- CVT model



(1) Brake pedal ASSY
(2) Stop light switch
(3) Snap pin
(4) Pad - brake pedal (sport type)
(5) Pad - brake pedal (normal type)
(6) Spacer - pedal
(7) Bushing - pedal
(8) Stopper - pedal
(9) Clevis pin

Tightening torque: N·m (kgf-m, ft-lb)
T1: 18 (1.84, 13.3)
T2: 30 (3.06, 22.1)

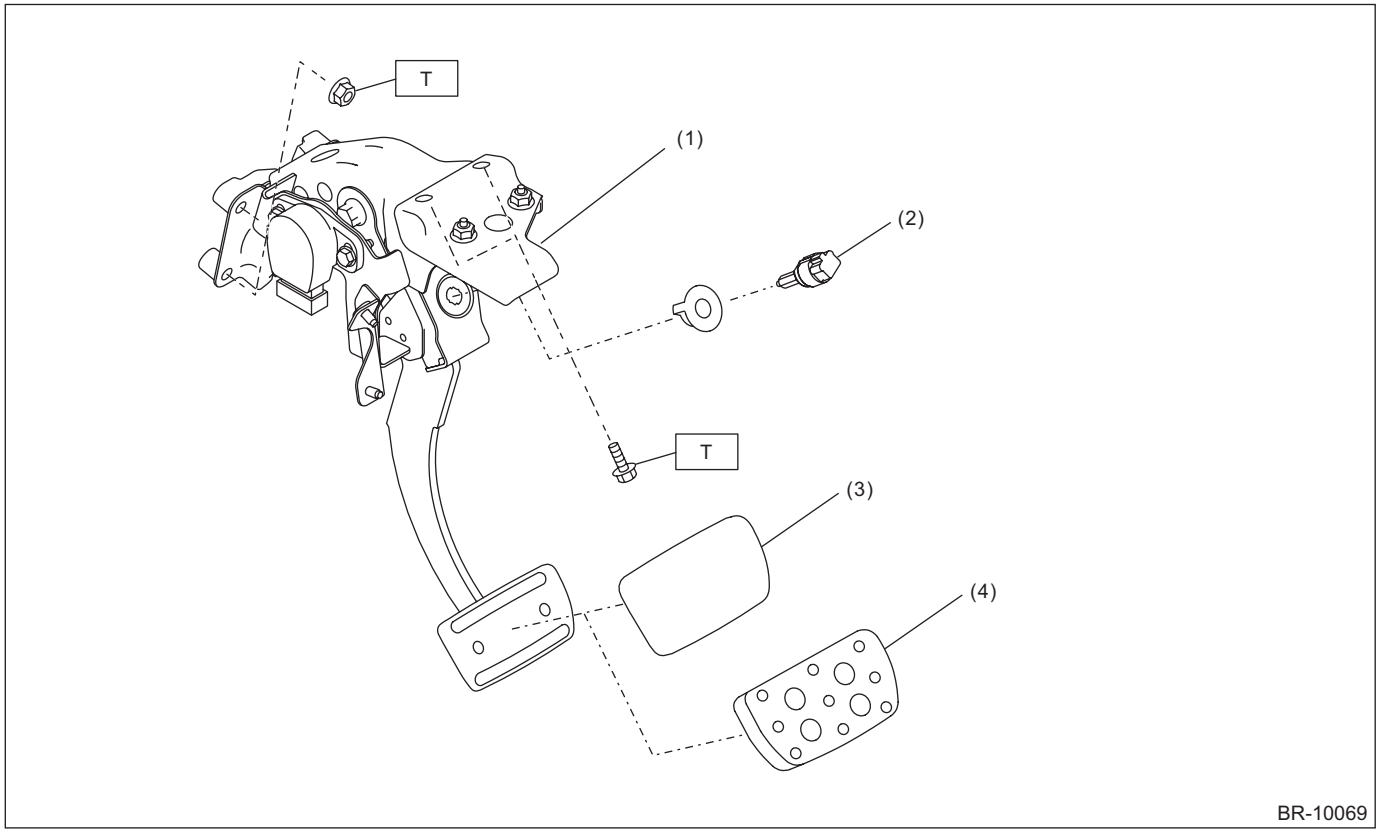
- MT model



(1) Stopper
(2) Bushing
(3) Spring pin
(4) Snap pin
(5) Pad - brake pedal (normal type)
(6) Brake pedal
(7) Clevis pin
(8) Pad - clutch pedal (normal type)
(9) Clutch pedal
(10) Bushing C
(11) Clutch clevis pin
(12) Assist rod A
(13) Clip
(14) Assist spring
(15) Assist bushing
(16) Assist rod B
(17) Clutch switch
(18) Stop light switch
(19) Pedal bracket
(20) Clutch master cylinder bracket
(21) Lever
(22) Clutch start switch
(23) Pad - clutch pedal (sport type)
(24) Pad - brake pedal (sport type)

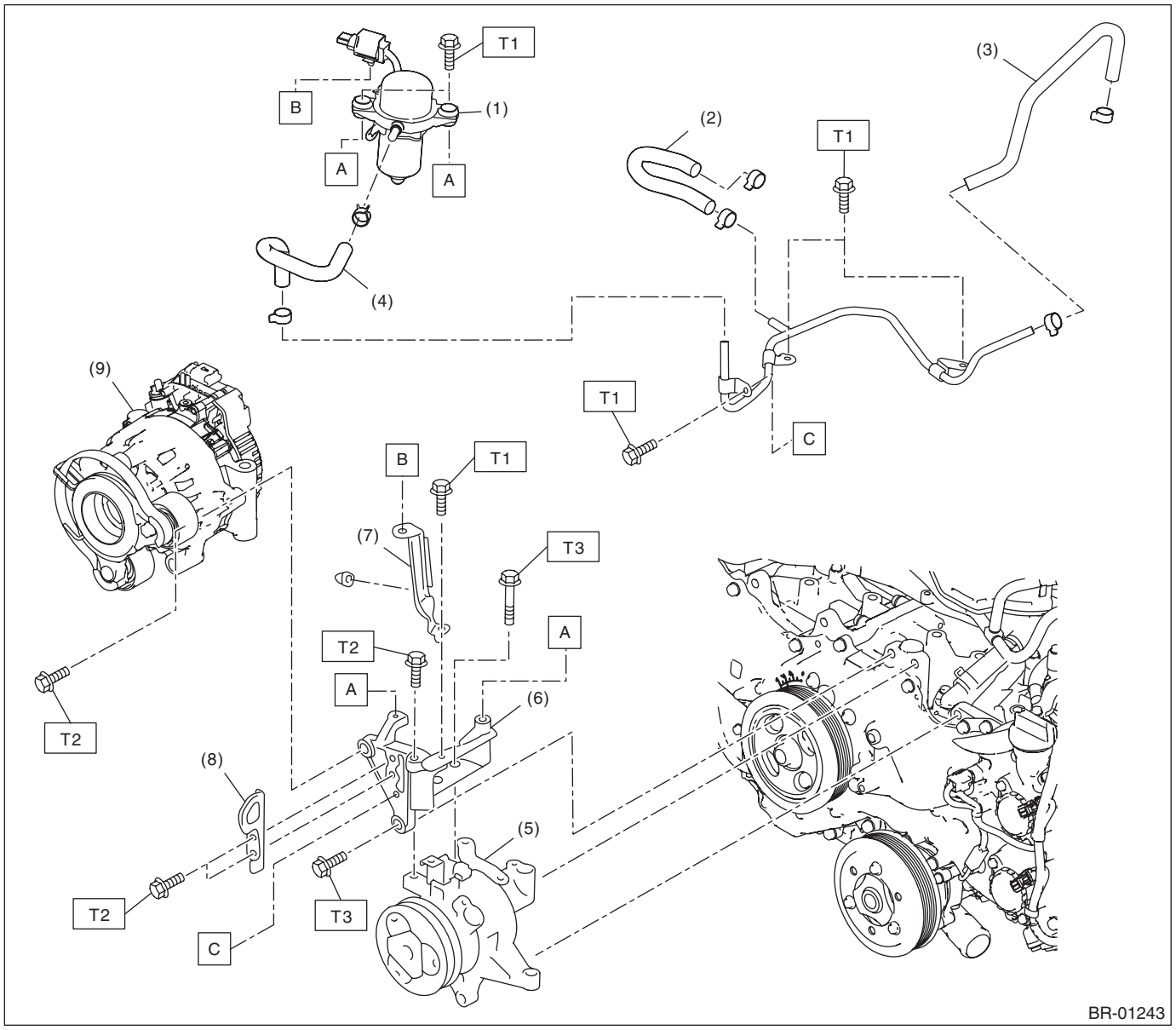
Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.9)
T2: 18 (1.8, 13.3)

- HEV model



(1)	Brake pedal ASSY	(3)	Pad - brake pedal (normal type)	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Stop light switch	(4)	Pad - brake pedal (sport type)	***T: 18 (1.84, 13.3)***

8. BRAKE VACUUM PUMP



(1) Vacuum pump ASSY
(2) Vacuum hose - COMPL A
(3) Vacuum hose - COMPL B
(4) Vacuum hose - COMPL C
(5) Compressor ASSY
(6) Bracket COMPL - vacuum pump
(7) Bracket - vacuum pump connector
(8) Hanger - engine front
(9) Integrated starter generator

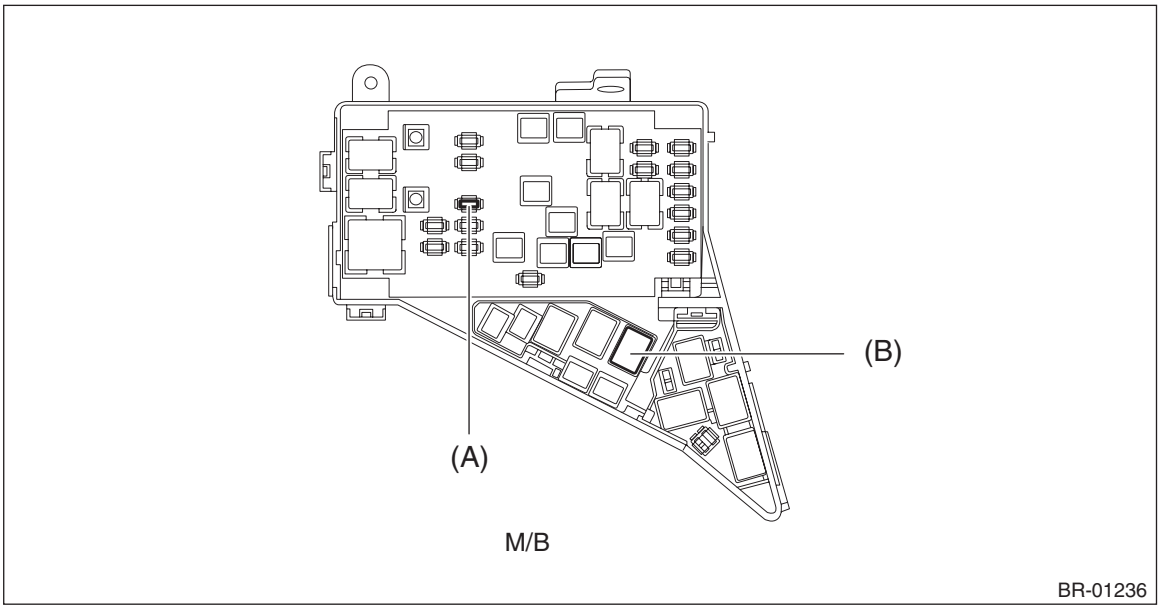
Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 18 (1.84, 13.3)
T3: 36 (3.67, 26.6)

C: CAUTION

- Wear appropriate work clothing, including a helmet, protective goggles and protective shoes when performing any work.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Use SUBARU genuine grease etc. or equivalent. Do not mix grease etc. of different grades or manufacturers.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.

2. Relay and Fuse

A: LOCATION



Main fuse box	Fuse 15 A (vacuum pump - relay)	(A)
	Fuse 30 A (vacuum pump - relay)	(B)

NOTE:
For other related fuses, refer to the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model: <Ref. to WI(HEV)-21, Power Supply Circuit.>

B: INSPECTION

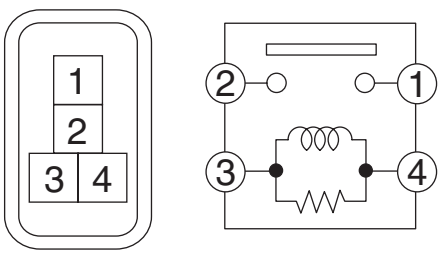
1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

2. CHECK RELAY

1) Check the resistance between relay terminals.

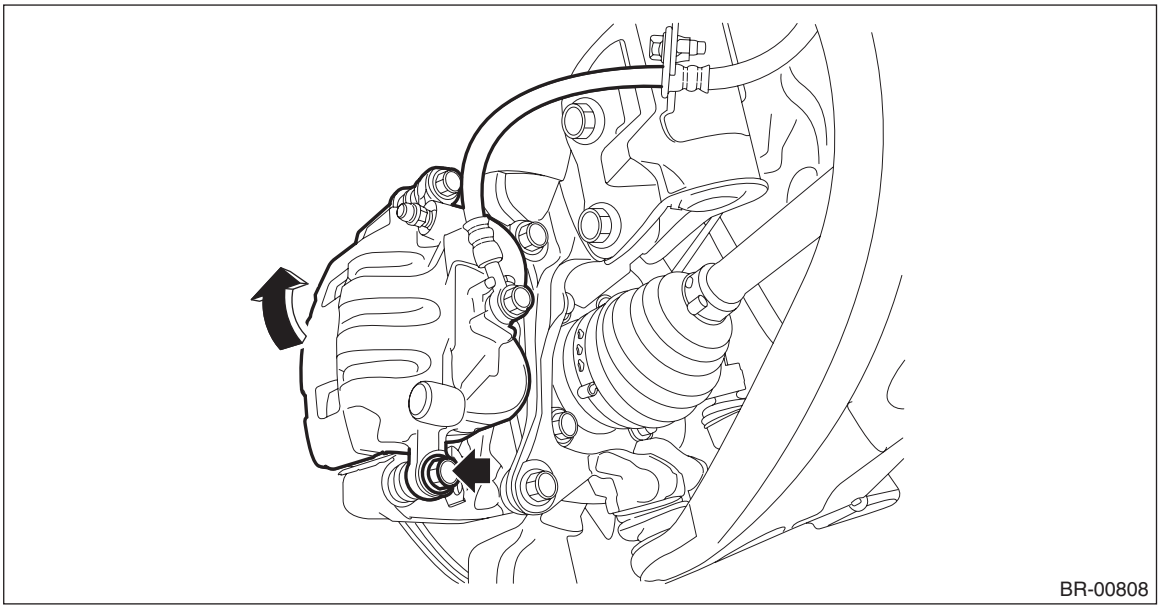
Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	
1 — 2	Apply battery voltage between terminals 4 and 3.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard value.

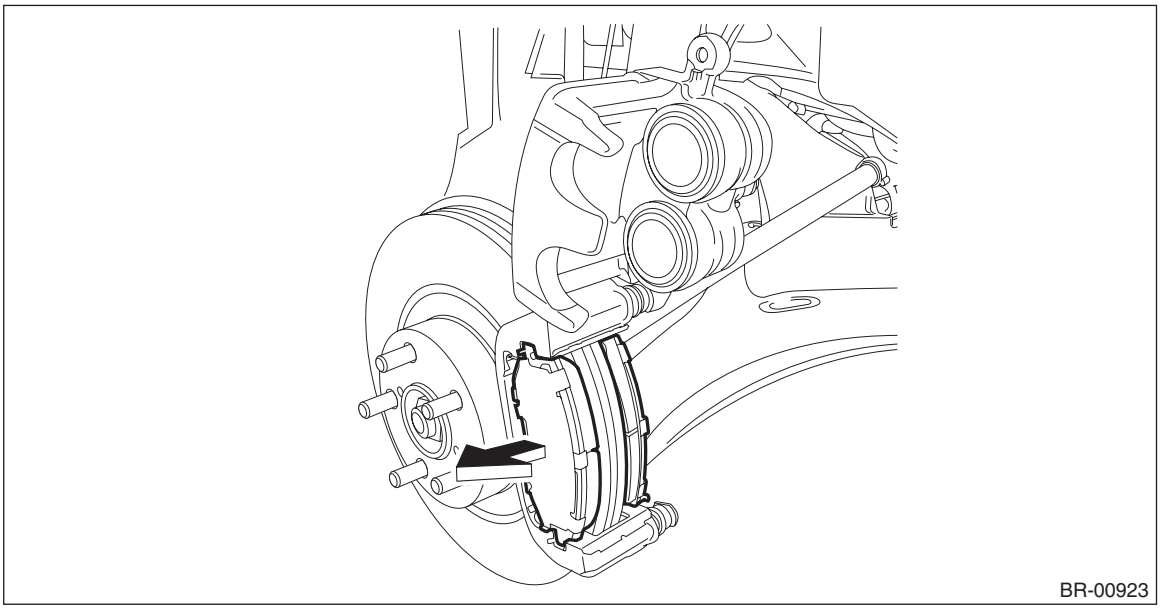
3. Front Brake Pad

A: REMOVAL

1) Lift up the vehicle, and then remove the front wheels.
2) Remove the front brake pad.
   (1) Remove the caliper bolt on the lower side.
   (2) Raise the caliper body assembly and support it.



NOTE:
Do not disconnect the brake hose from the caliper body assembly.
   (3) Remove the brake pad from support - front disc brake.

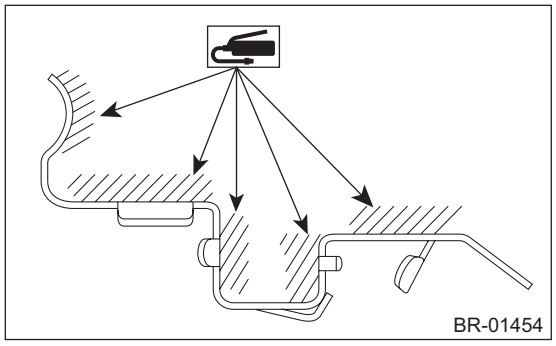


B: INSTALLATION

NOTE:
Before installation, remove mud and foreign matter from the caliper body assembly and support - front disc brake.
1) Check the brake pad. <Ref. to BR-20, INSPECTION, Front Brake Pad.>
2) Apply a thin coat of grease to the pad clip. (A)

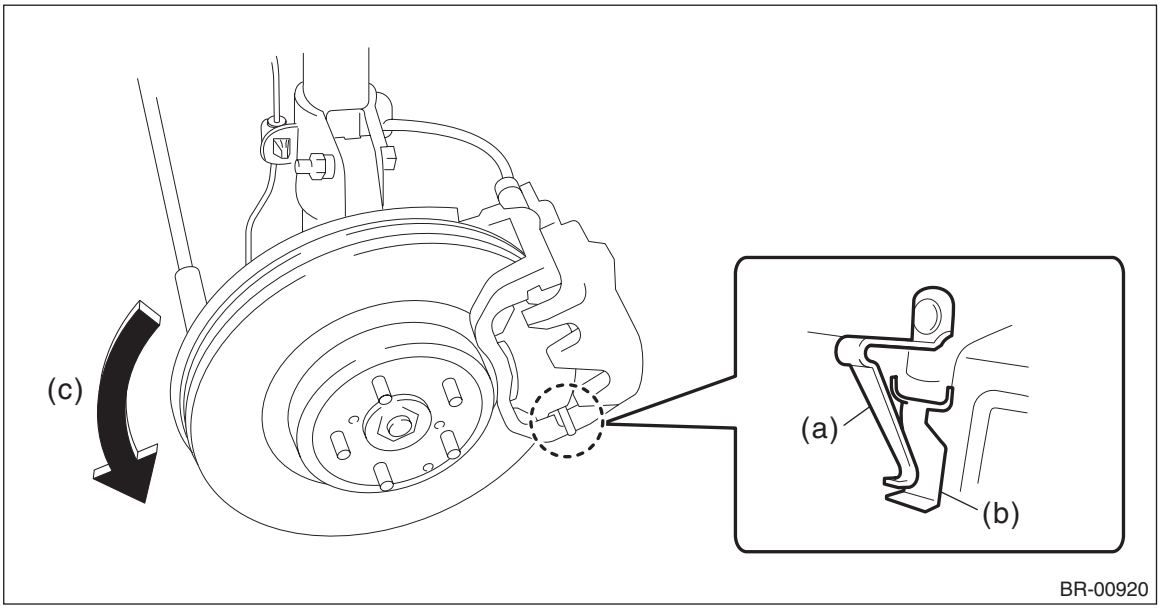
Grease:
Grease contained in the pad kit or equivalent
3) Apply a thin coat of grease to the pad and both sides of the shim - disc brake front inner (a). (B)

Grease:
Molykote AS880N or an item contained in the pad kit



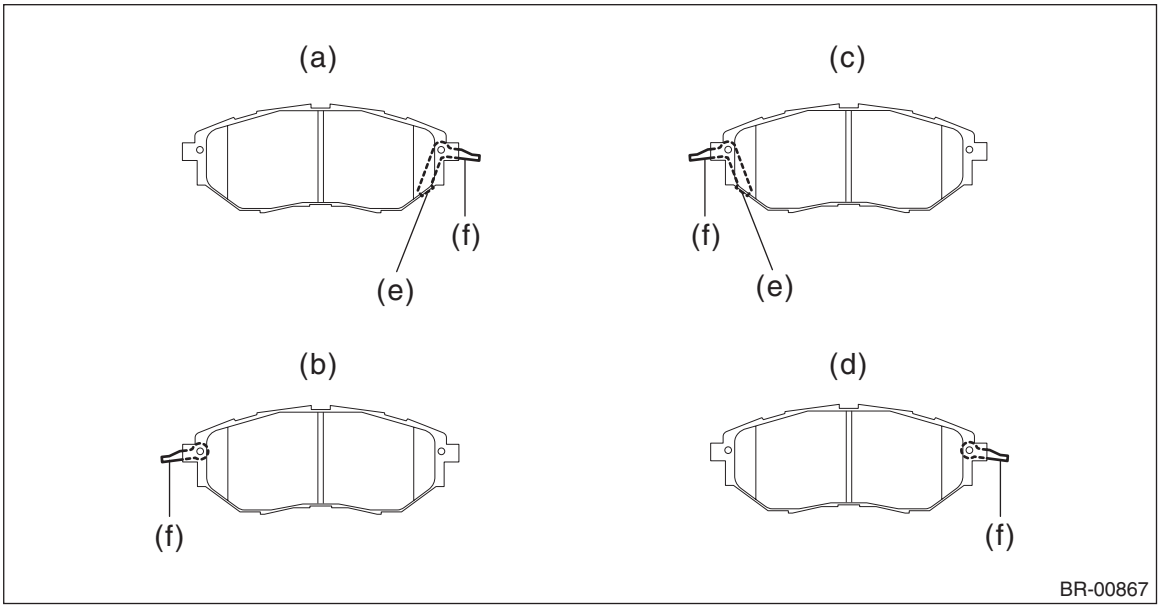
4) Install the brake pad to the support - front disc brake.

CAUTION:
• Be sure to install so that the pad return spring faces the input side of the direction of brake rotor rotation, as shown in the figure.
• Correctly install the pad return spring to the supporting surface of the pad clip as shown in the figure.
• If the pad return spring is deformed or damaged, replace the brake pad with a new part.



(a) Pad return spring (b) Supporting surface of pad clip (c) Direction of brake rotor rotation

NOTE:
Install the brake pad indicator in proper direction.



(a) LH — IN
(b) LH — OUT
(c) RH — IN
(d) RH — OUT
(e) Pad indicator
(f) Pad return spring

5) Install the caliper body assembly to the support - front disc brake.

Tightening torque:
Caliper bolt: 27 N·m (2.75 kgf-m, 19.9 ft-lb)

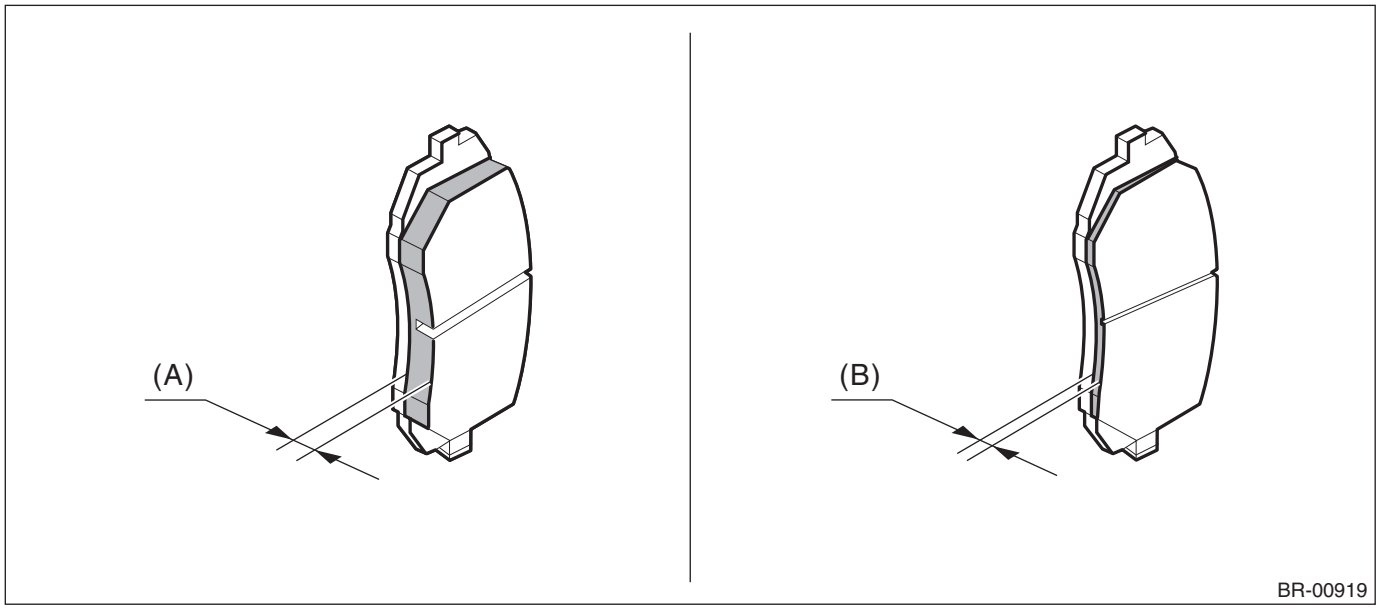
6) Install the front wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

C: INSPECTION

1) Check the pad thickness (A).

NOTE:
- Always replace the pads of both wheels and both sides as a set.
- Replace pad clips if they are twisted or worn.
- Replace the pad if there is oil or grease on it.



	Standard (A)	Wear limit (B)
Pad thickness	11 mm (0.43 in)	1.5 mm (0.059 in)

NOTE:
- Always replace the pads of both wheels and both sides as a set.
- Replace pad clips if they are twisted or worn.
- Wear indicators are installed on the inner and outer disc brake pads.

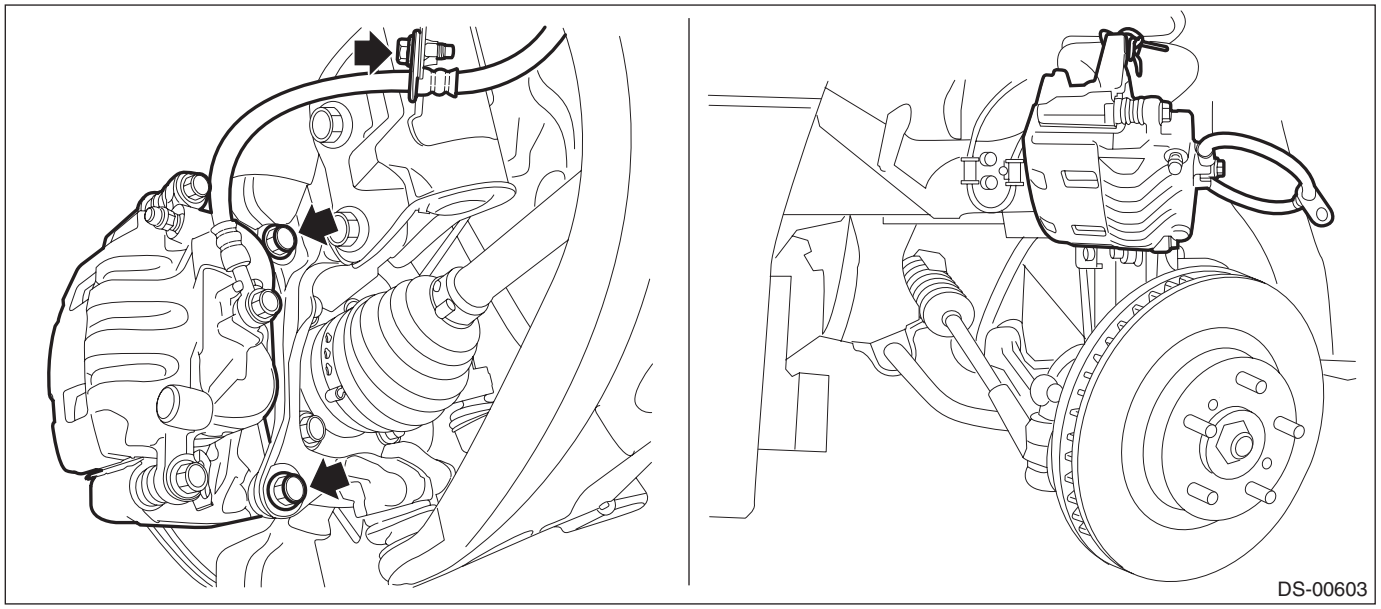
If the pad is worn to the limit, the end of wear indicator contacts disc rotor, and a squeaking sound is heard as the wheel rotates. If the sound is heard, replace the pad.
- Replace the pad if there is oil or grease on it.

2) If the wear limit is exceeded in the inspection, replace the brake pad.

4. Front Disc Rotor

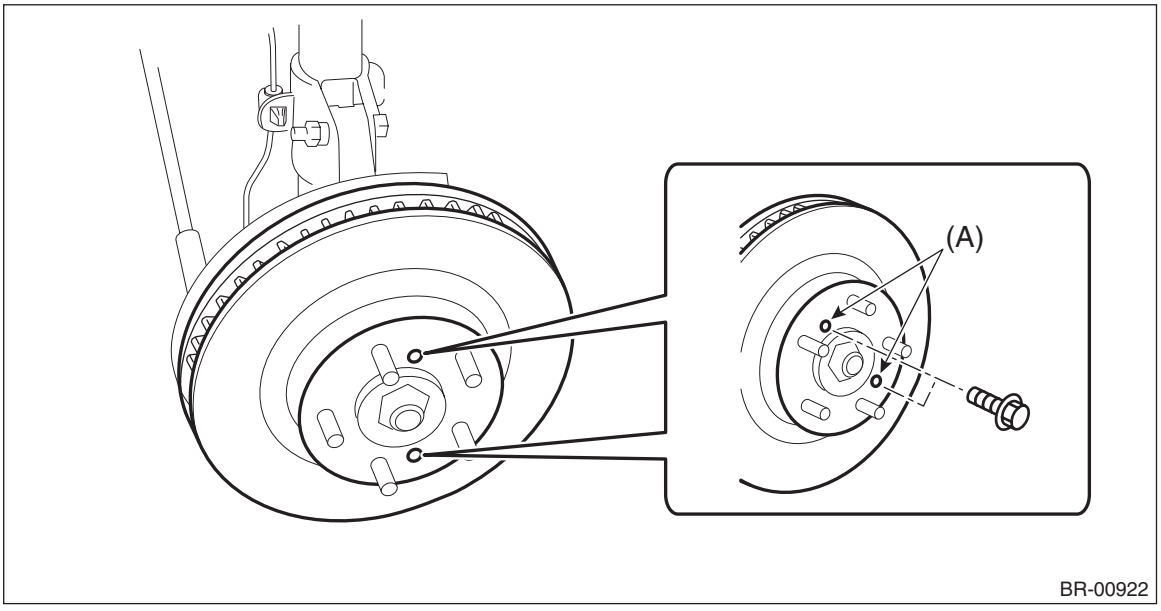
A: REMOVAL

1) Lift up the vehicle, and then remove the front wheels.
2) Remove the caliper body assembly from the housing assembly - front axle.
   (1) Remove the bolt from the brake hose bracket.
   (2) Remove the mounting bolt, and remove the caliper body assembly.
   (3) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the front strut assembly with the harnesses.



3) Remove the front disc rotor.

NOTE:
When the disc rotor is difficult to be removed from the hub unit COMPL - front axle, screw in 8 mm (0.31 in) bolt to the threaded part of the disc rotor (A), and remove the disc rotor.



B: INSTALLATION

NOTE:
Before installation, remove mud and foreign matter from the caliper body assembly.
1) Before installation, check the front disc rotor. <Ref. to BR-22, INSPECTION, Front Disc Rotor.>
2) Install each part in the reverse order of removal.

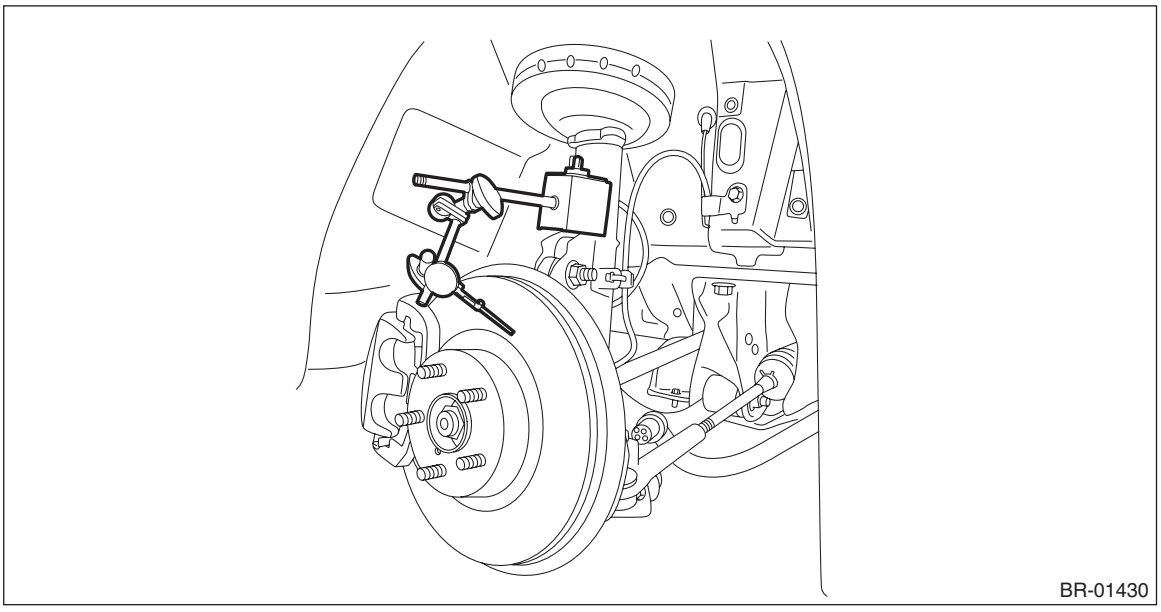
Tightening torque:
Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)
Mounting bolt: 80 N·m (8.16 kgf-m, 59.0 ft-lb)
Front wheel: Except for C4 model
120 N·m (12.24 kgf-m, 88.5 ft-lb)
Front wheel: C4 model
100 N·m (10.20 kgf-m, 73.8 ft-lb)

C: INSPECTION

1. DISC ROTOR RUNOUT CHECK

1) Check the hub unit COMPL - front axle for free play and runout before the inspection of disc rotor runout limit. <Ref. to DS-31, INSPECTION, Front Hub Unit Bearing.>
2) Tighten the wheel nuts to secure disc rotor.
3) Set a dial gauge 10 mm (0.39 in) inward from the disc rotor outer circumference, and check the disc rotor runout while rotating the disc rotor.

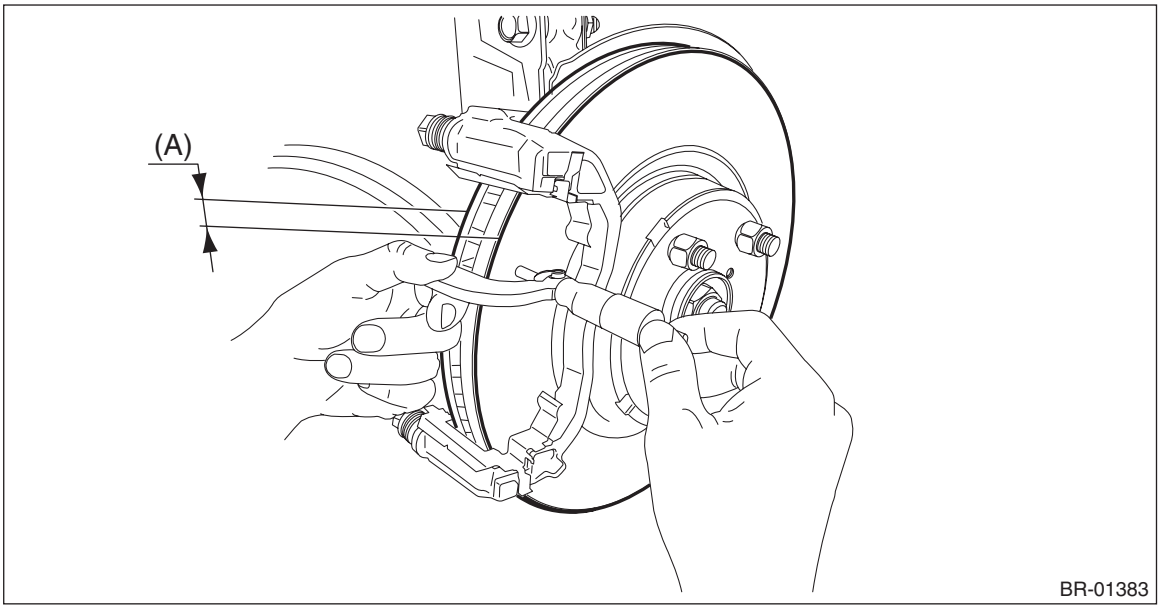
Disc rotor runout limit: 0.05 mm (0.0020 in)



4) If the disc rotor runout exceeds service limit, resurface the disc rotor.
5) Check the disc rotor thickness after resurfacing. <Ref. to BR-23, DISC ROTOR THICKNESS CHECK, INSPECTION, Front Disc Rotor.>

2. DISC ROTOR THICKNESS CHECK

1) Set a micrometer 10 mm (0.39 in) inward from the disc rotor outer perimeter, and then measure the disc rotor thickness (A).



	Size	Standard	Wear limit	Disc rotor outer diameter
Disc rotor thickness (A)	15-inch	24 mm (0.94 in)	22 mm (0.87 in)	277 mm (10.91 in)
	16-inch			294 mm (11.57 in)

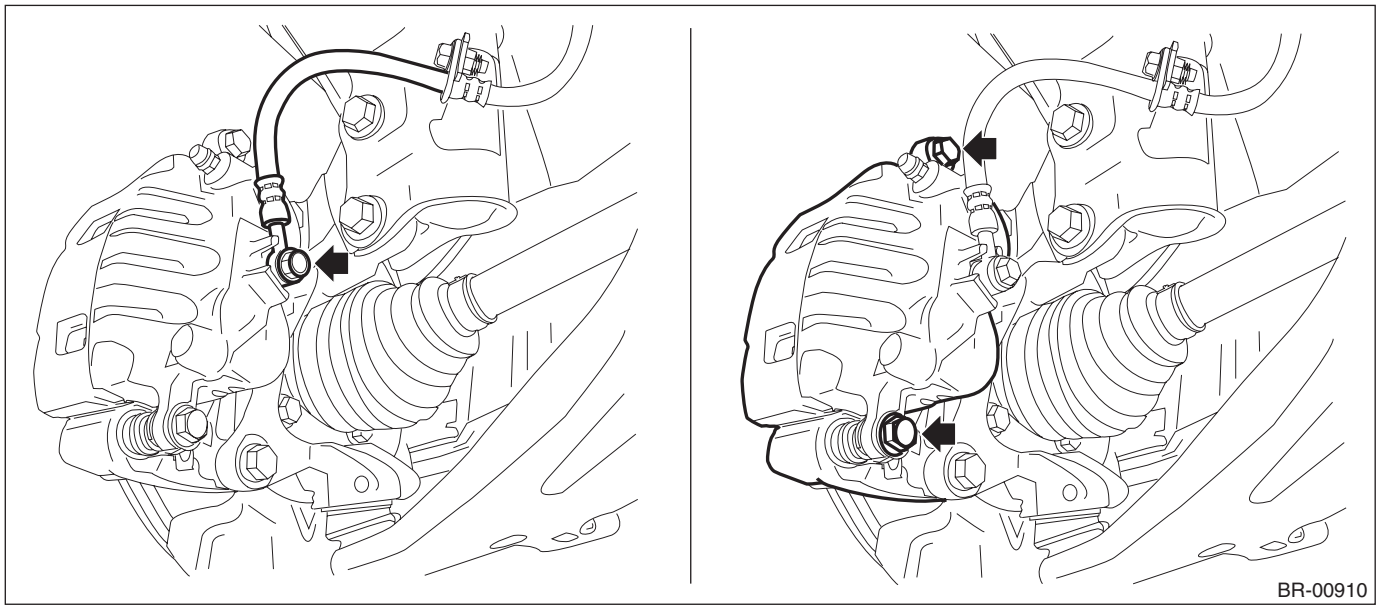
2) If the wear limit is exceeded in the inspection, replace the disc rotor.

5. Front Disc Brake Assembly

A: REMOVAL

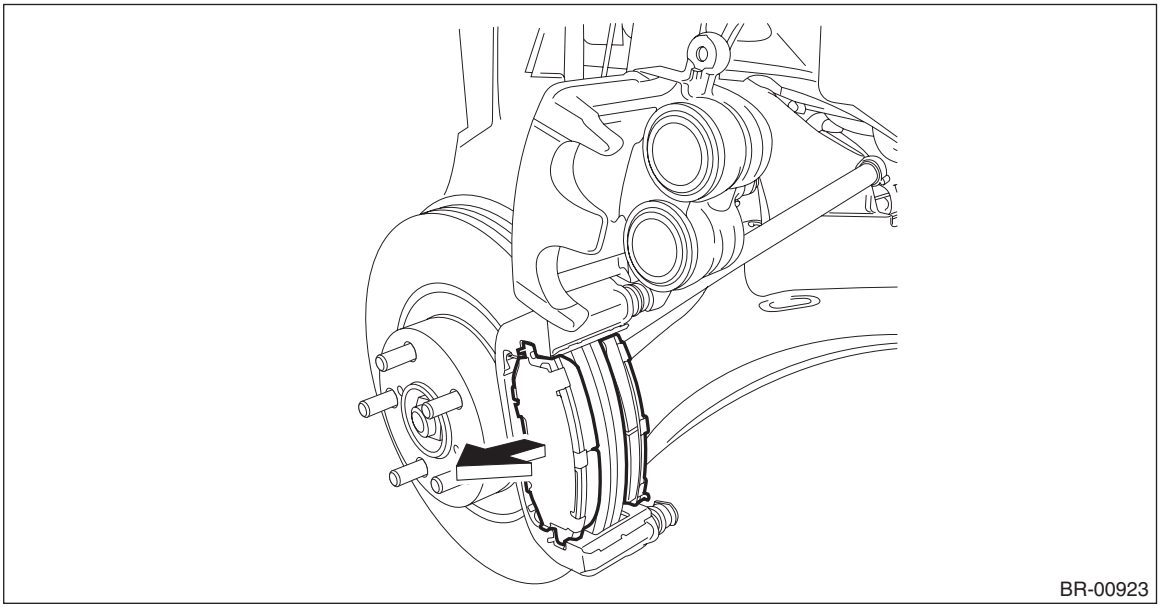
CAUTION:
Do not allow brake fluid to come in contact with the painted surface of the vehicle body. If it does, wash off with water and wipe away completely.

1) Lift up the vehicle, and then remove the front wheels.
2) Remove the caliper body assembly.
   (1) Remove the union bolt and caliper bolt, and remove the caliper body assembly from the support - front disc brake.

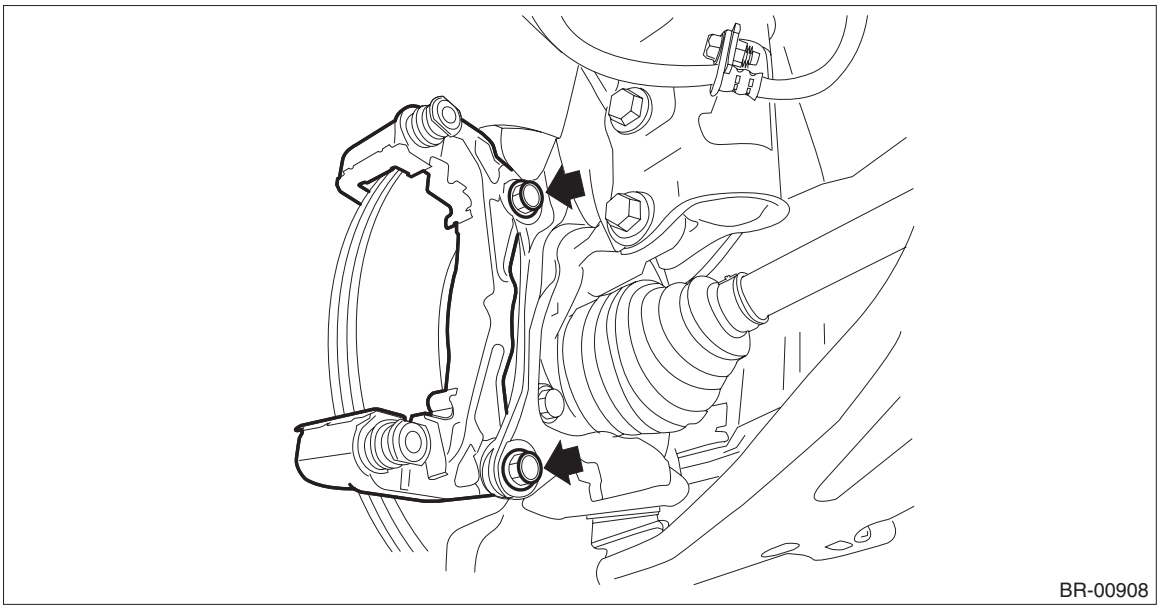


3) Remove the support - front disc brake.

NOTE:
Remove the support - front disc brake only when replacing the disc rotor or the support - front disc brake. It is not necessary to remove it when servicing the caliper body assembly.
   (1) Remove the brake pad from support - front disc brake.



(2) Remove the mounting bolts, and then remove the support - front disc brake from the housing assembly - front axle.

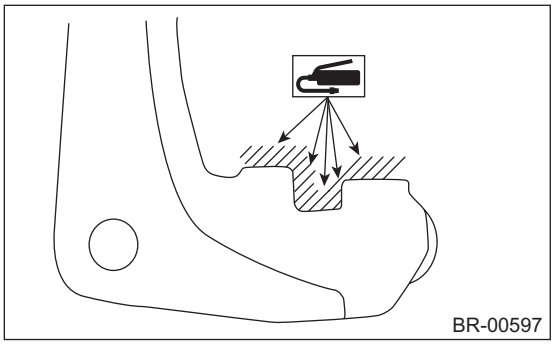


B: INSTALLATION

NOTE:
Before installation, remove mud and foreign matter from the caliper body assembly and support - front disc brake.

1) Check each part. <Ref. to BR-31, INSPECTION, Front Disc Brake Assembly.>
2) Apply a thin coat of grease to the support - front disc brake.

Grease:
Grease contained in the pad kit or equivalent



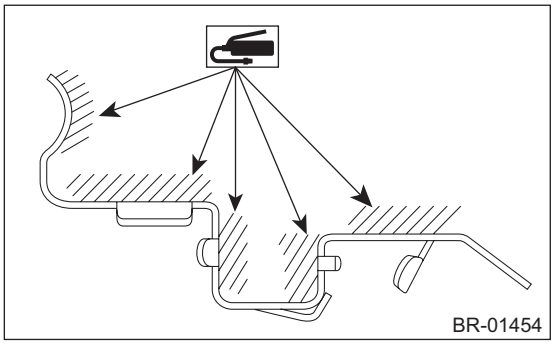
3) Install the support - front disc brake to the housing assembly - front axle.

Tightening torque:
Mounting bolt: 80 N·m (8.16 kgf-m, 59.0 ft-lb)
4) Apply a thin coat of grease to the pad clip. (A)

Grease:
Grease contained in the pad kit or equivalent

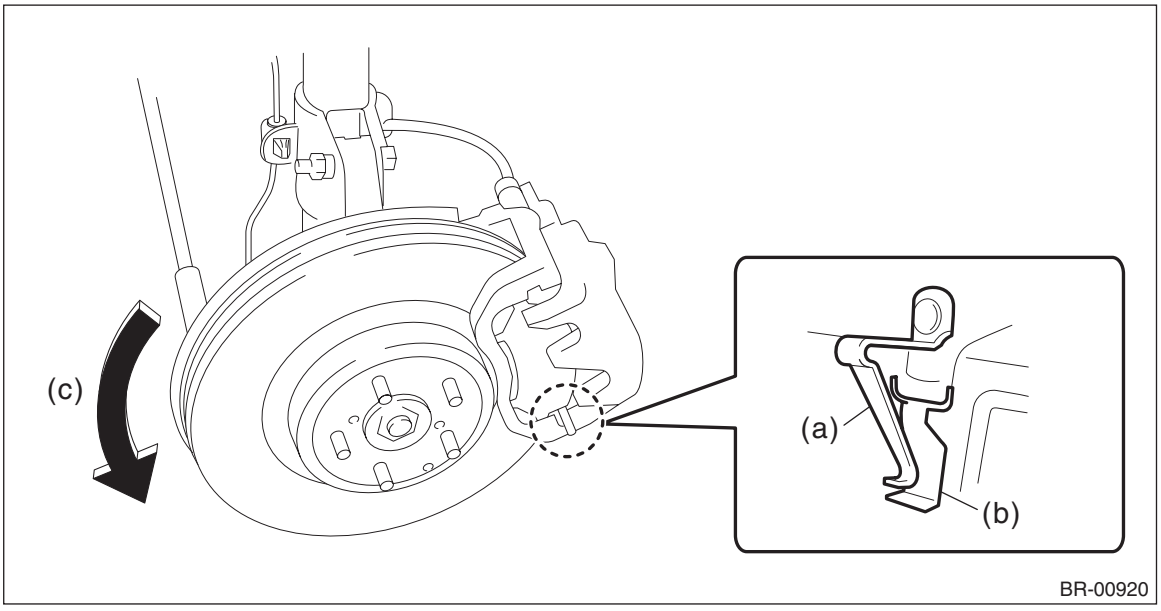
5) Apply a thin coat of grease to the pad and both sides of the shim - disc brake front inner (a). (B)

Grease:
Molykote AS880N or an item contained in the pad kit



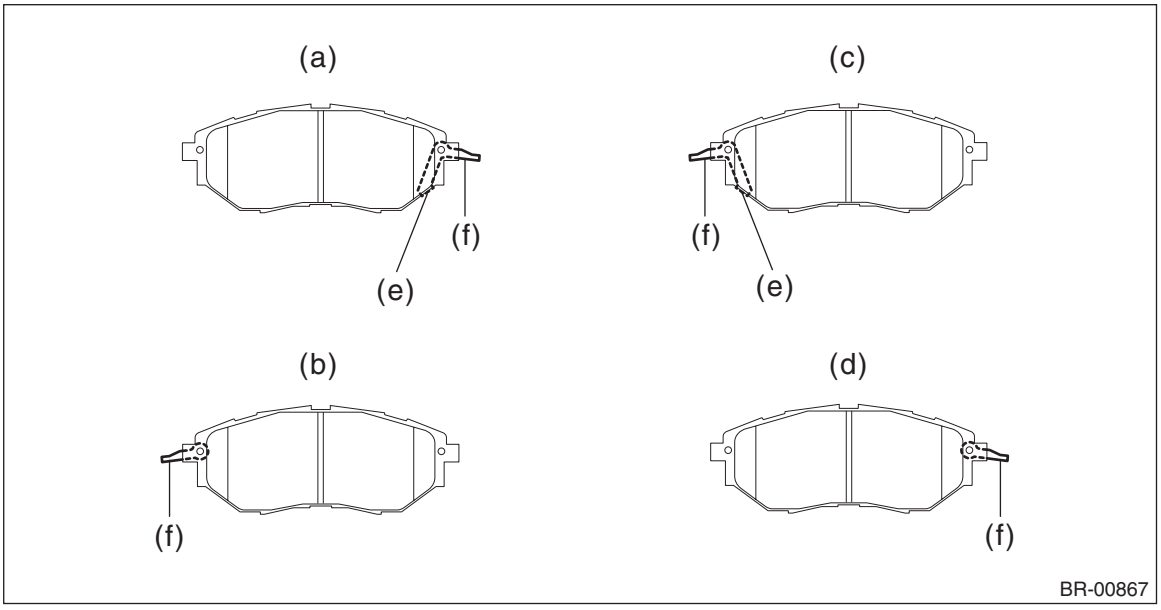
6) Install the brake pad to the support - front disc brake.

CAUTION:
• Be sure to install so that the pad return spring faces the input side of the direction of brake rotor rotation, as shown in the figure.
• Correctly install the pad return spring to the supporting surface of the pad clip as shown in the figure.
• If the pad return spring is deformed or damaged, replace the brake pad with a new part.



(a) Pad return spring (b) Supporting surface of pad clip (c) Direction of brake rotor rotation

NOTE:
Install the brake pad indicator in proper direction.



(a) LH — IN
(b) LH — OUT
(c) RH — IN
(d) RH — OUT
(e) Pad indicator
(f) Pad return spring

7) Install the caliper body assembly to the support - front disc brake.

Tightening torque:
Caliper bolt: 27 N·m (2.75 kgf-m, 19.9 ft-lb)

8) Connect the brake hose using a new brake hose gasket.

Tightening torque:
Union bolt: 26 N·m (2.65 kgf-m, 19.2 ft-lb)

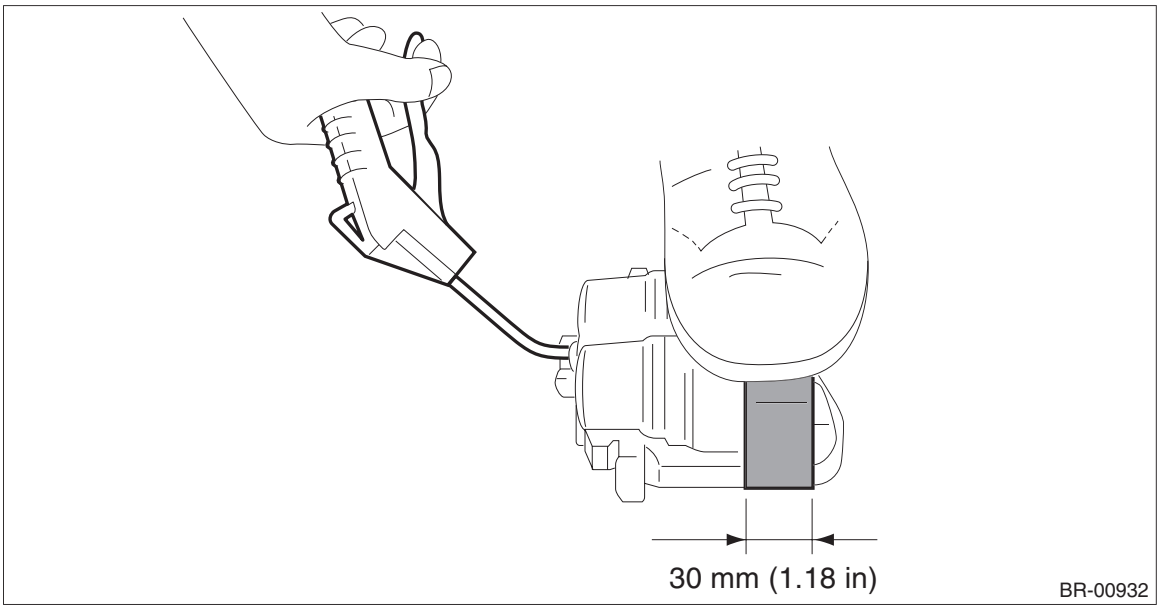
9) Bleed air from the brake system. <Ref. to BR-65, BRAKE LINE, PROCEDURE, Air Bleeding.>
10) Install the front wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

C: DISASSEMBLY

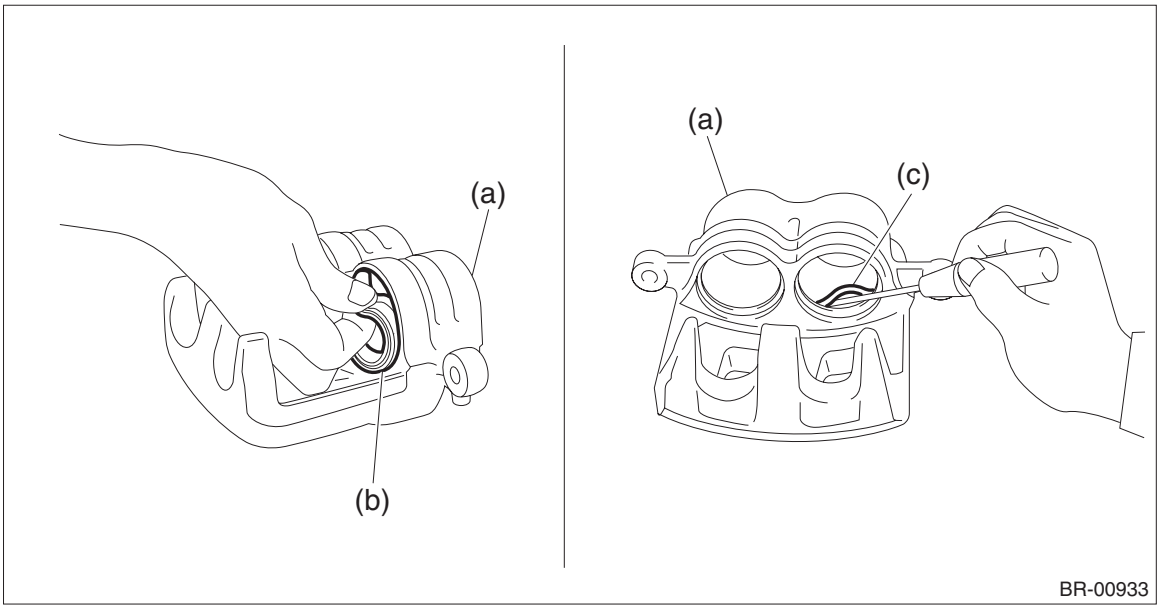
CAUTION:
Be careful not to allow foreign matter to enter the brake hose connector.

1) Remove mud and foreign matter from the caliper body.
2) Remove the piston - disc brake.
   (1) Place a wooden block in the caliper body as shown in the figure to prevent the piston - disc brake from jumping out and being damaged.
   (2) Using an air gun, gradually apply compressed air via the brake hose installation hole to push out the piston - disc brake.

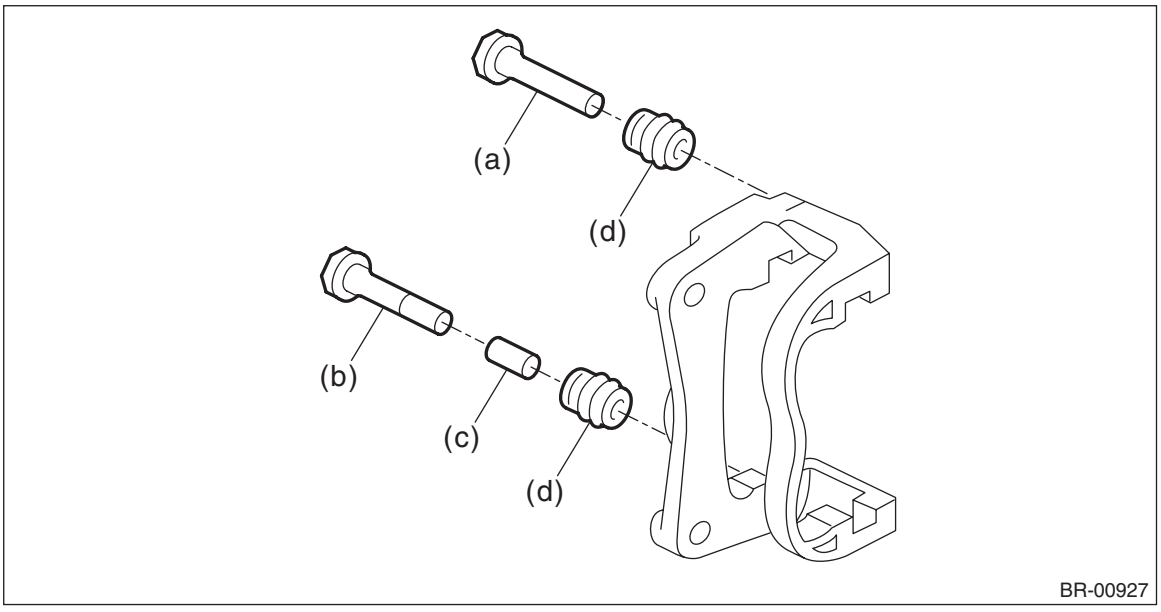


3) Remove the piston boot (b) and piston seal (c) from the caliper body cylinder (a).

CAUTION:
Do not damage the cylinder and piston seal groove.



4) Remove the guide pin - front brake, lock pin - front brake, lock pin - sleeve, and pin boot from the support - front disc brake.

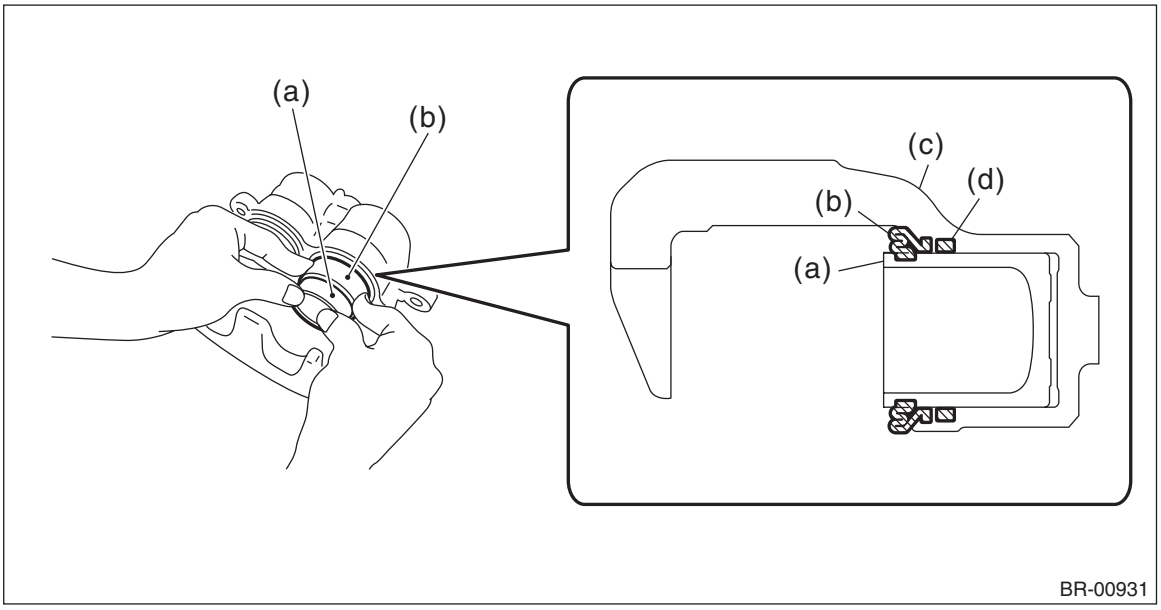


(a) Guide pin - front brake (black)
(b) Lock pin - front brake (silver)
(c) Lock pin - sleeve
(d) Pin boot

D: ASSEMBLY

1) Before assembly, check each part. <Ref. to BR-31, INSPECTION, Front Disc Brake Assembly.>
2) Clean the inside of the caliper body cylinder using brake fluid.
3) Apply a coat of brake fluid to piston seal and install the piston seal to the caliper body cylinder groove.
4) Apply a coat of brake fluid to the inner surface of caliper body cylinder and the entire outer surface of the piston - disc brake.
5) Apply grease contained in the piston seal kit to the piston boot, and install it to the groove at the end of the cylinder.
6) Insert the piston - disc brake into the caliper body cylinder.
7) Position the piston boot in the grooves on the piston - disc brake and the caliper body cylinder.

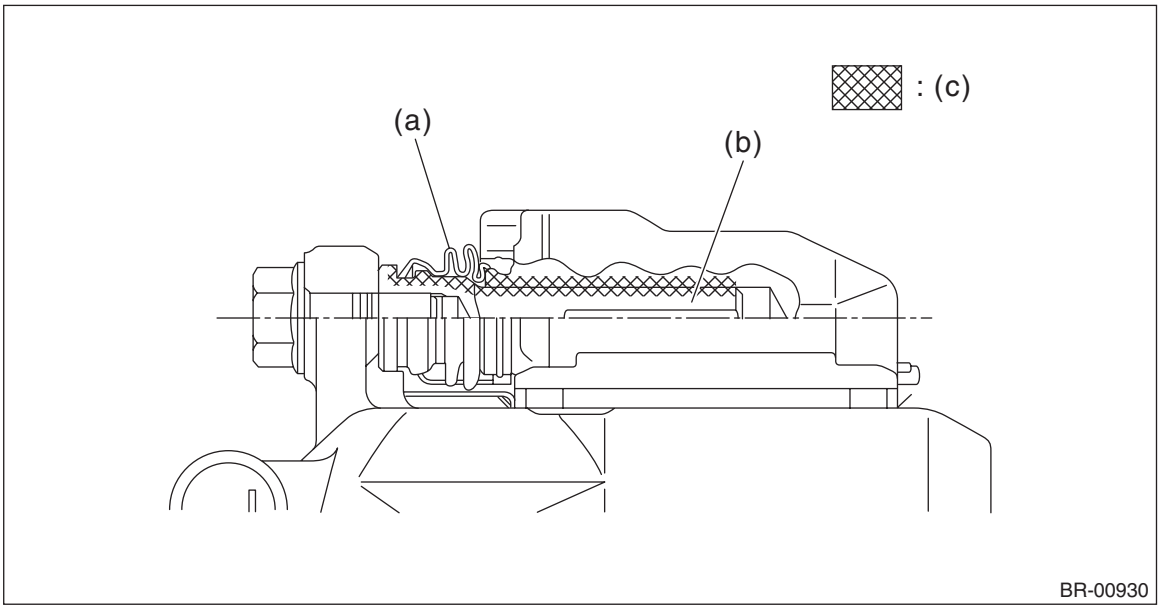
CAUTION:
Do not force the piston - disc brake into the caliper body cylinder.



(a) Piston - disc brake
(b) Piston boot
(c) Caliper body assembly
(d) Piston seal

8) Apply grease contained in the piston seal kit to the lock pin - front brake, the outer surface of guide pin - front brake, the inner surface of support cylinder, and the grooves of pin boot.
9) Install the pin boot to the lock pin - front brake and guide pin - front brake, and insert them into the support cylinder.

CAUTION:
Insert the lock pin - front brake and guide pin - front brake into specified position, and make sure that they slide and seat properly.



(a) Pin boot
(b) Lock pin - front brake or guide pin - front brake
(c) Grease applied area

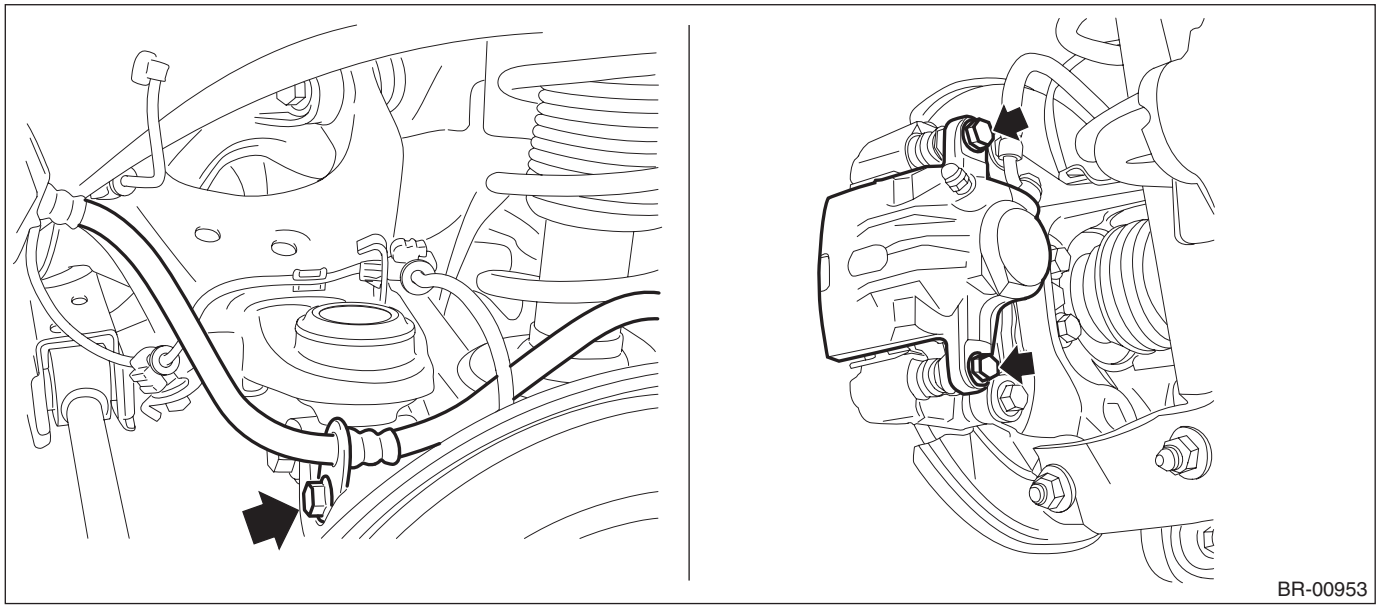
E: INSPECTION

1) Check the caliper body cylinder and piston for uneven wear, damage or rust.
2) Check the rubber parts for damage or deterioration.
3) If faulty is found in the inspection, replace the relevant part.

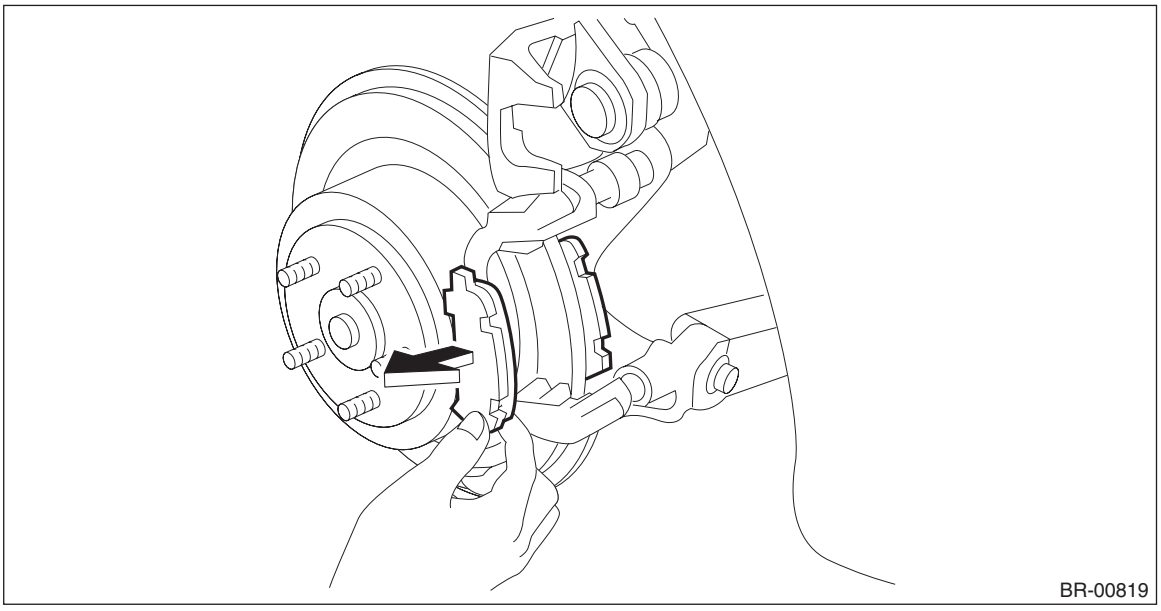
6. Rear Brake Pad

A: REMOVAL

1) Lift up the vehicle, and then remove the rear wheels.
2) Remove the rear brake pad.
   (1) Remove the bolts and remove the brake hose bracket.
   (2) Remove the caliper bolt, and raise and hold the caliper body assembly.



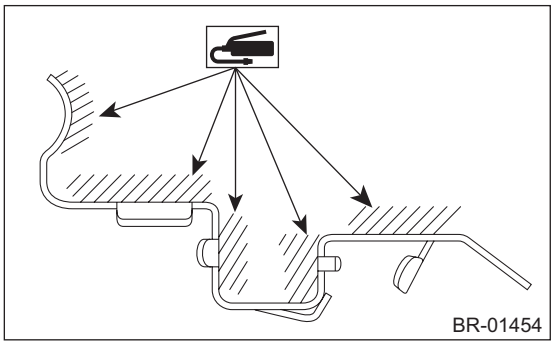
NOTE:
Do not disconnect the brake hose from the caliper body assembly.
   (3) Remove the brake pad from support - rear disc brake.



B: INSTALLATION

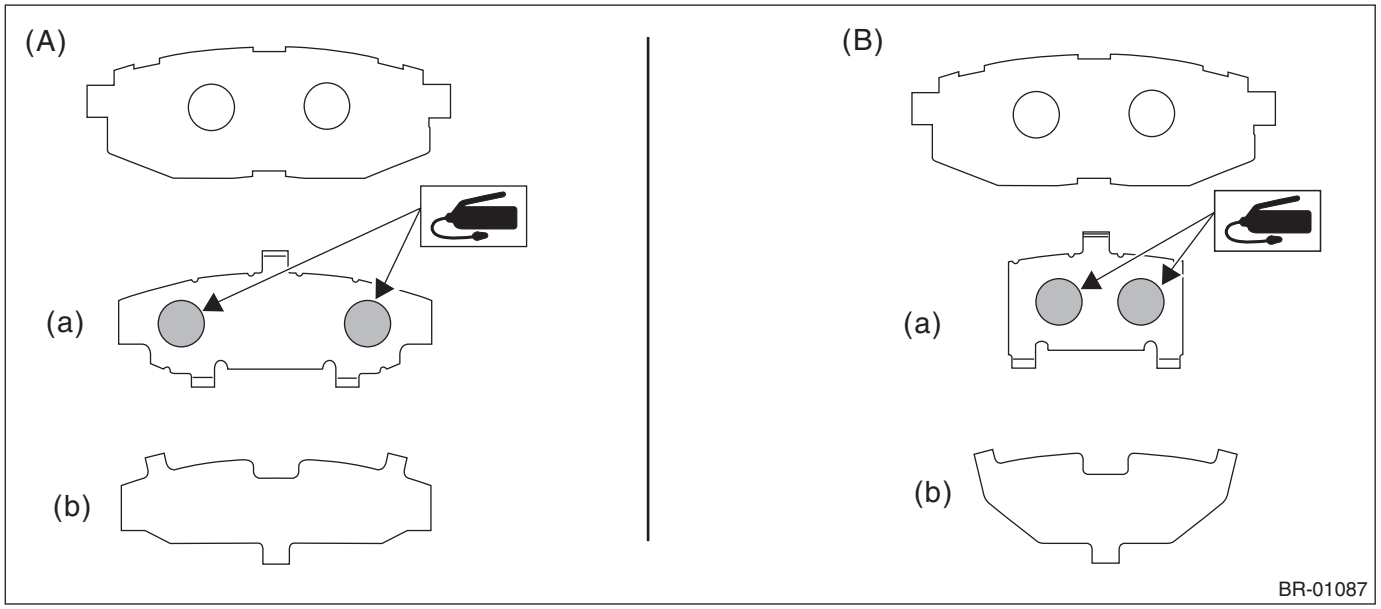
NOTE:
Before installation, remove mud and foreign matter from the caliper body assembly and support - rear disc brake.
1) Before installation, check the brake pad. <Ref. to BR-34, INSPECTION, Rear Brake Pad.>
2) Apply a thin coat of grease to the pad clip.

Grease:
Grease contained in the pad kit or equivalent



3) Apply a thin coat of grease to the shim - disc brake rear inner (a) and the shim - disc brake rear outer (b).

Grease:
Grease contained in the pad kit or WAKO grease V160



(A) Pad - disc brake rear outer (B) Pad - disc brake rear inner

4) Install the brake pad to the support - rear disc brake.
5) Install the caliper body assembly to the support - rear disc brake.

Tightening torque:
Caliper bolt: 27 N·m (2.75 kgf-m, 19.9 ft-lb)

6) Install the brake hose bracket.

Tightening torque:
Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

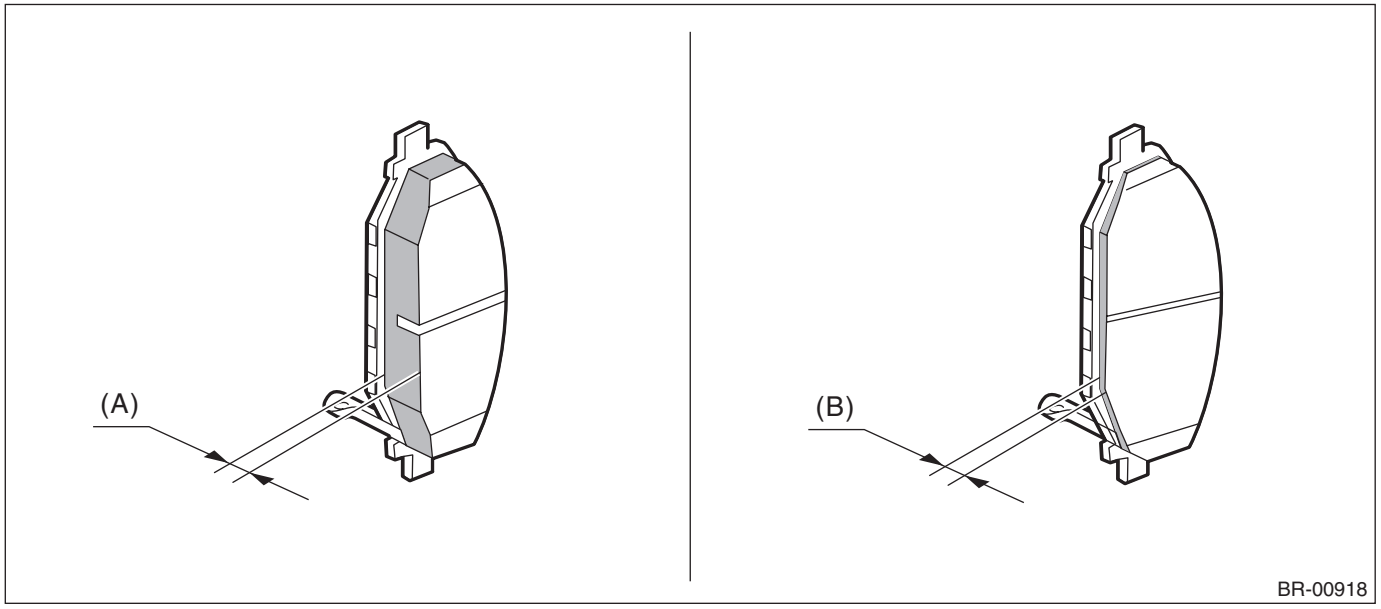
7) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

C: INSPECTION

1) Check the pad thickness.

NOTE:
- Always replace the pads of both wheels and both sides as a set.
- Replace pad clips if they are twisted or worn.
- Replace the pad if there is oil or grease on it.
- A wear indicator is installed on the pad - disc brake rear inner. If the pad is worn to the limit, the end of wear indicator contacts disc rotor, and a squeaking sound is heard as the wheel rotates. If the sound is heard, replace the pad.



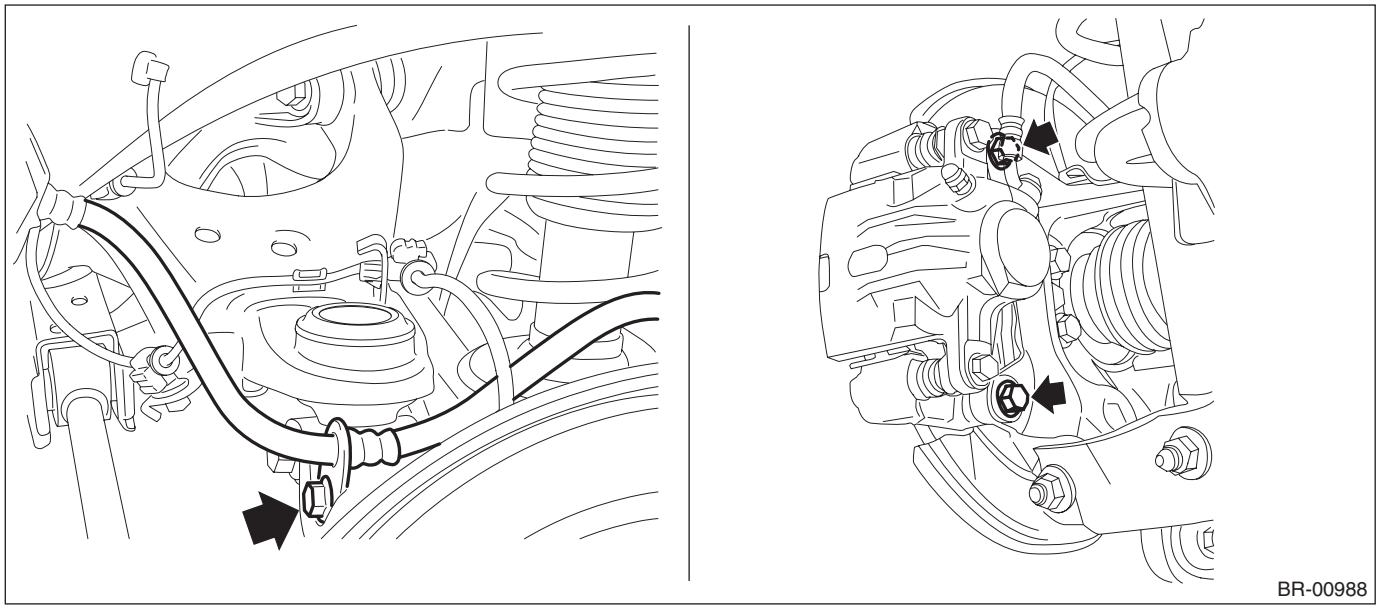
	Disc rotor type	Standard (A)	Wear limit (B)
Pad thickness	Solid	9 mm (0.35 in)	1.5 mm (0.059 in)

2) If the wear limit is exceeded in the inspection, replace the brake pad.

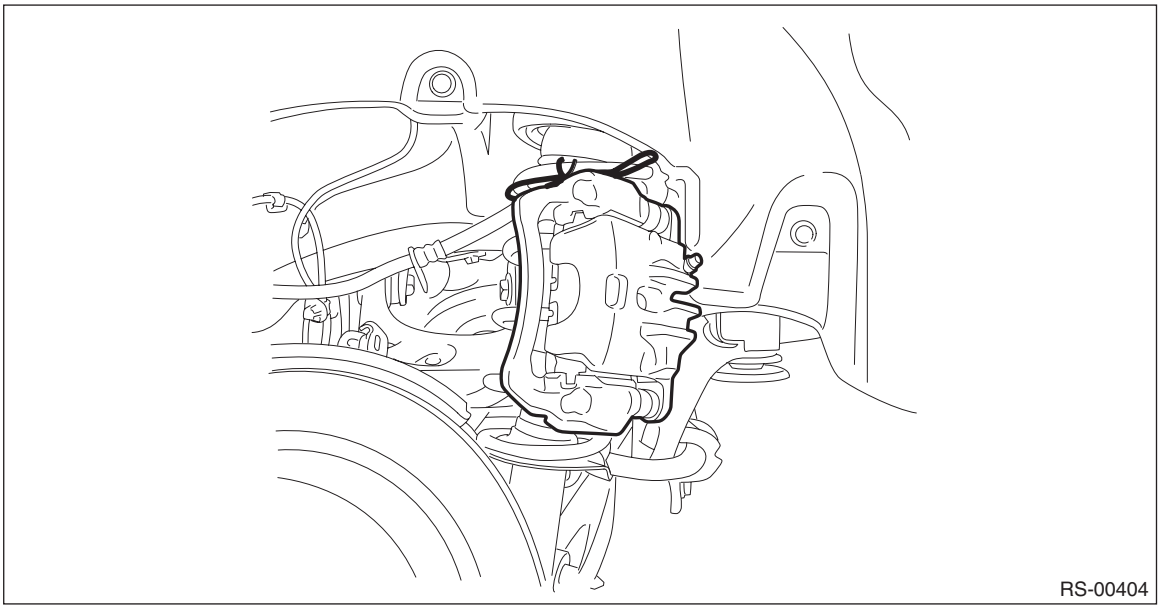
7. Rear Disc Rotor

A: REMOVAL

1) Lift up the vehicle, and then remove the rear wheels.
2) Release the lever assembly - hand brake.
3) Remove the caliper body assembly from the housing assembly - rear axle.
   (1) Remove the bolt from the brake hose bracket.
   (2) Remove the mounting bolt, and remove the caliper body assembly.

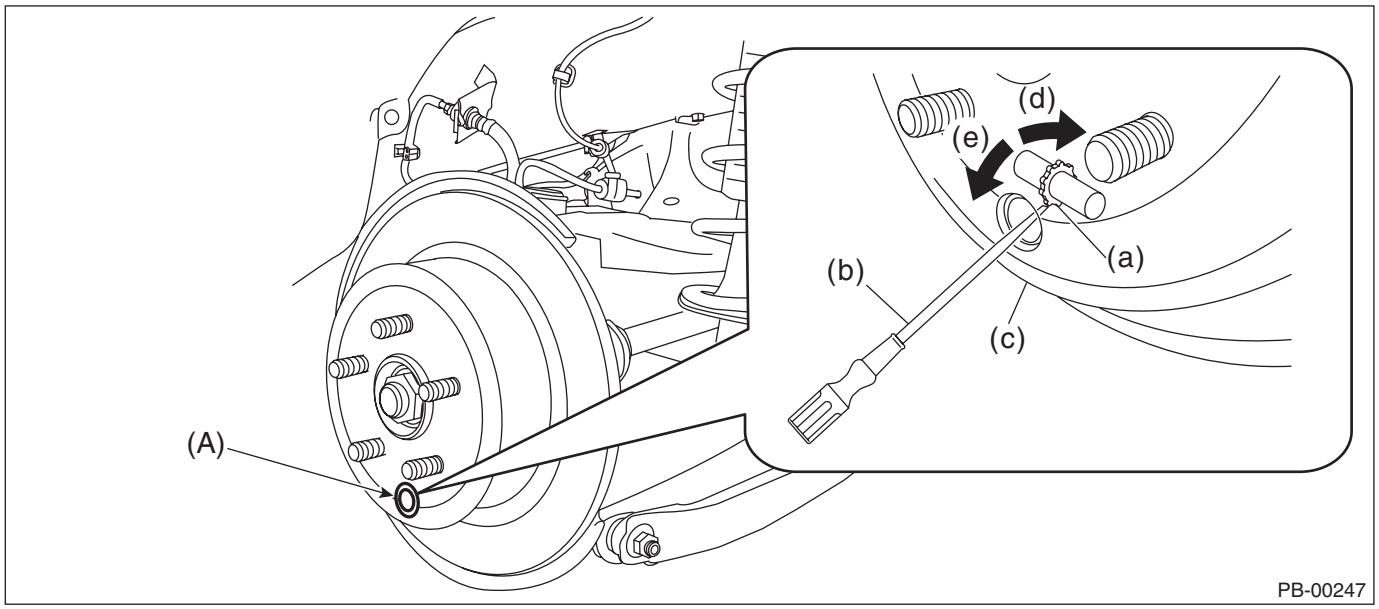


   (3) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the shock absorber assembly - rear with the harnesses.



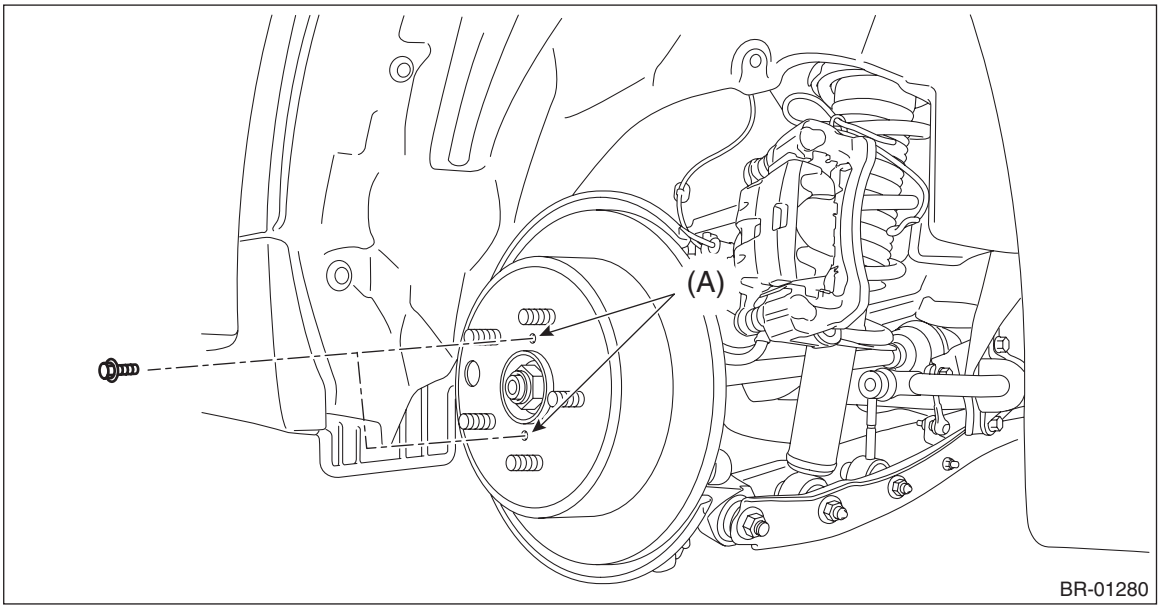
4) Remove the rear disc rotor.

NOTE:
If it is difficult to remove the disc rotor, perform the following two methods in order.
1. Remove the adjusting hole cover (A), and loosen the adjuster assembly - rear brake by inserting a flat tip screwdriver.



(a)	Adjuster ASSY - rear brake	(c)	Disc rotor	(e)	Shorten the adjuster ASSY - rear brake
(b)	Flat tip screwdriver	(d)	Extend the adjuster ASSY - rear brake		

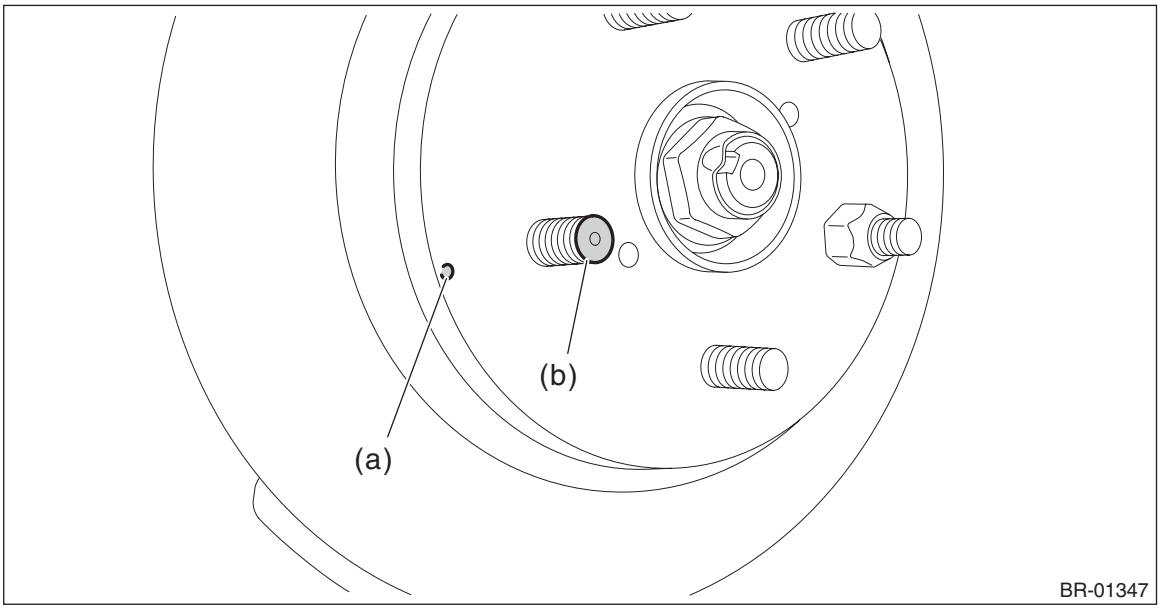
2. When the disc rotor is difficult to be removed from the hub unit COMPL - rear axle, screw in 8 mm (0.31 in) bolt to the threaded part of the disc rotor (A), and remove the disc rotor.



B: INSTALLATION

NOTE:
Before installation, remove mud and foreign matter from the caliper body assembly.
1) Before installation, check the rear disc rotor. <Ref. to BR-38, INSPECTION, Rear Disc Rotor.>
2) Install each part in the reverse order of removal.

NOTE:
When installing the rear disc rotor, match the alignment mark (a) of the rear disc rotor and the alignment mark (b) of the bolt - hub.



3) Adjust the parking brake. <Ref. to PB-16, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

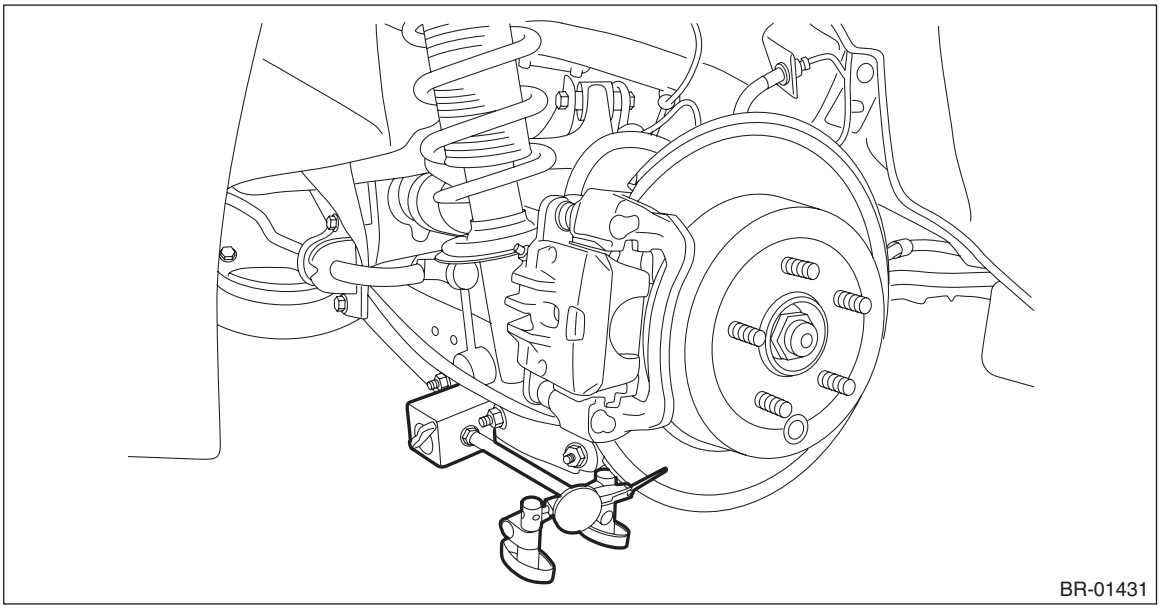
Tightening torque:
Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)
Mounting bolt: 66 N·m (6.73 kgf-m, 48.7 ft-lb)
Rear wheel: Except for C4 model
120 N·m (12.24 kgf-m, 88.5 ft-lb)
Rear wheel: C4 model
100 N·m (10.20 kgf-m, 73.8 ft-lb)

C: INSPECTION

1. DISC ROTOR RUNOUT CHECK

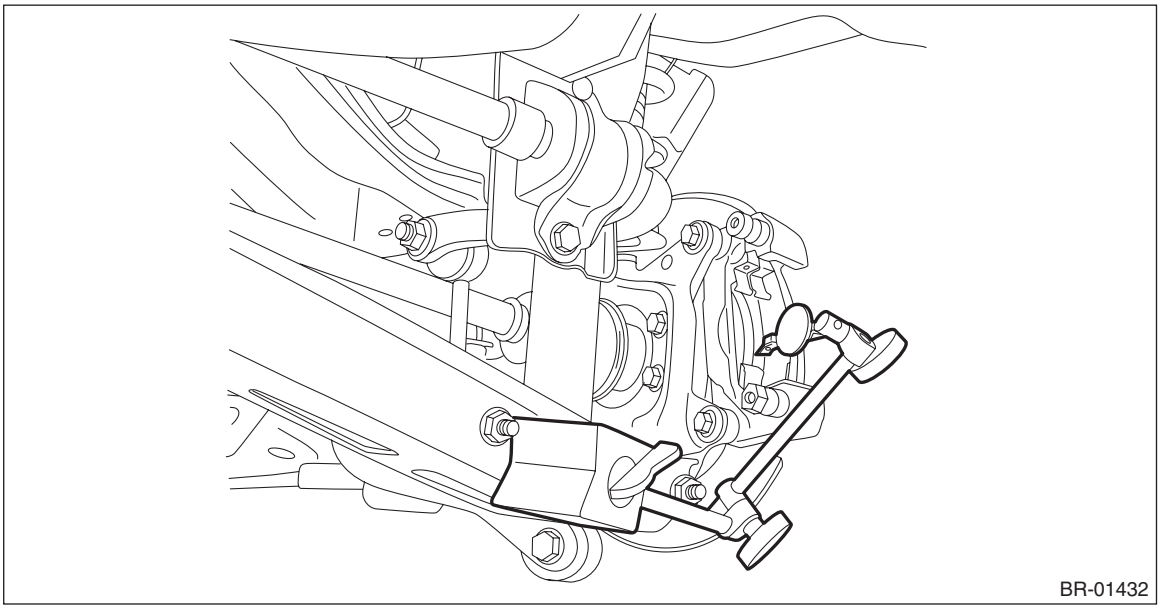
1) Check the hub unit COMPL - rear axle for free play and runout before the inspection of disc rotor runout limit. <Ref. to DS-52, INSPECTION, Rear Hub Unit Bearing.>
2) Check the disc rotor runout.
   (1) Remove the caliper body assembly. <Ref. to BR-40, REMOVAL, Rear Disc Brake Assembly.>
   (2) Secure the disc rotor by tightening the five wheel nuts.
   (3) Set a dial gauge 10 mm (0.39 in) inward from the disc rotor outer circumference, and check the outer disc rotor runout while rotating the disc rotor.

Disc rotor runout limit:
0.05 mm (0.0020 in)


BR-01431

(4) Set a dial gauge 10 mm (0.39 in) inward from the disc rotor outer circumference, and check the inner disc rotor runout while rotating the disc rotor.

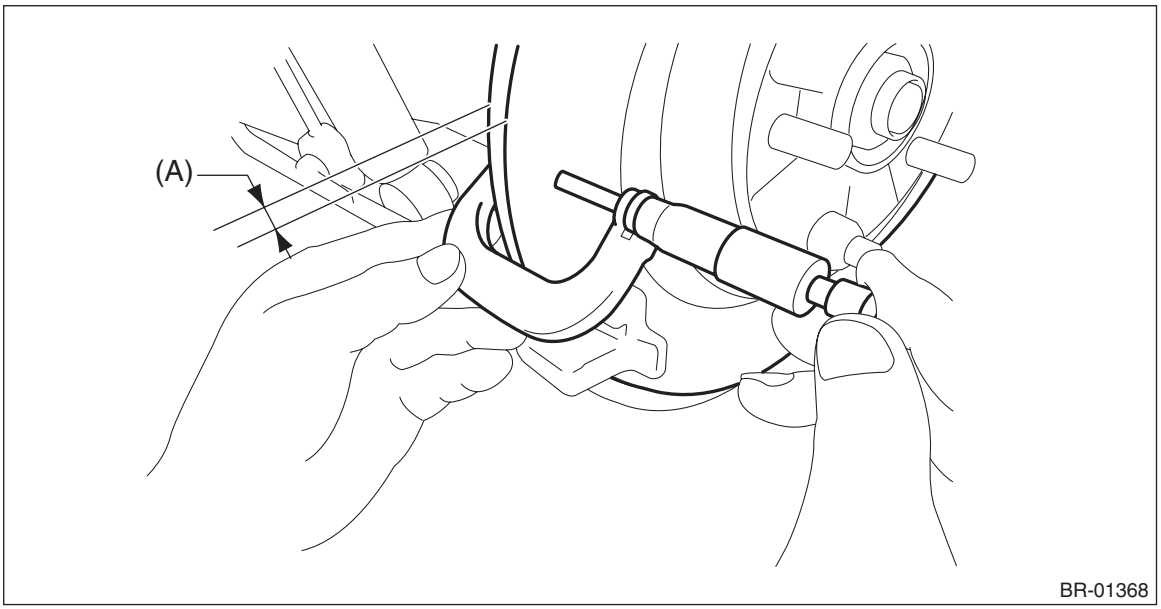
Disc rotor runout limit:
0.05 mm (0.0020 in)


BR-01432

3) If the disc rotor runout exceeds service limit, resurface the disc rotor.
4) Check the disc rotor thickness after resurfacing. <Ref. to BR-39, DISC ROTOR THICKNESS CHECK, INSPECTION, Rear Disc Rotor.>

2. DISC ROTOR THICKNESS CHECK

1) Set a micrometer 10 mm (0.39 in) inward from the disc rotor outer perimeter, and then measure the disc rotor thickness (A).



	Type of disc rotor	Standard	Wear limit	Disc rotor outer diameter
Disc rotor thickness (A)	Solid disc	10 mm (0.39 in)	8.5 mm (0.33 in)	274 mm (10.79 in)

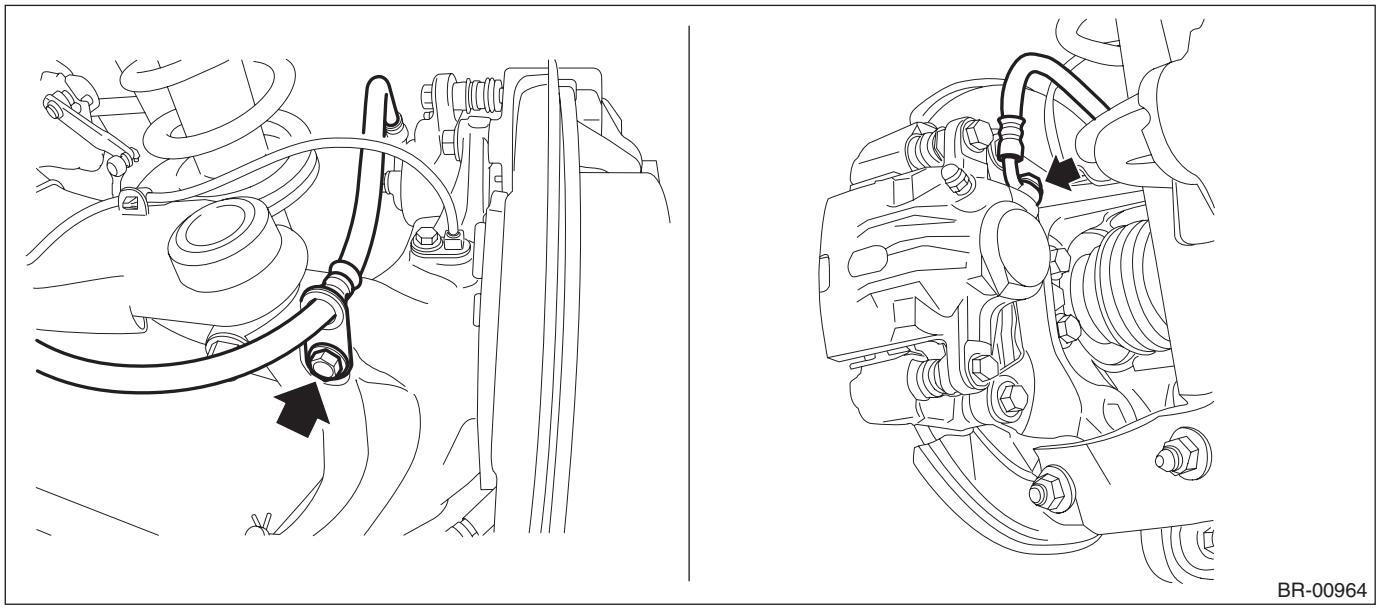
2) If the wear limit is exceeded in the inspection, replace the disc rotor.

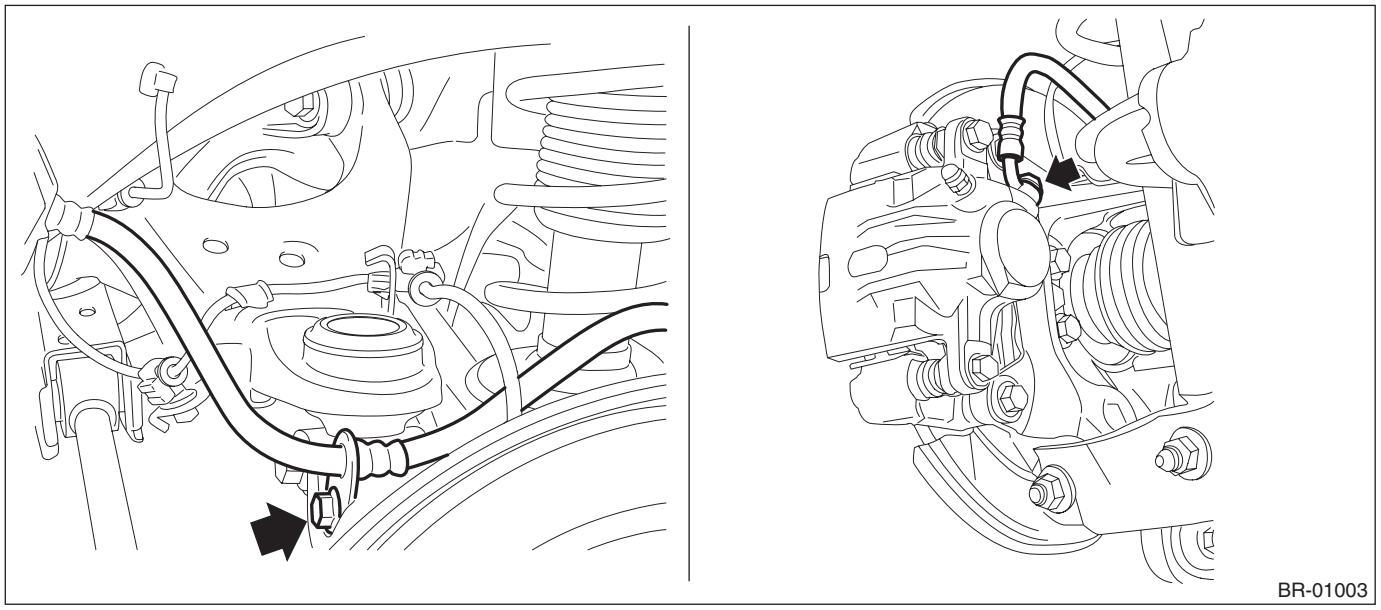
8. Rear Disc Brake Assembly

A: REMOVAL

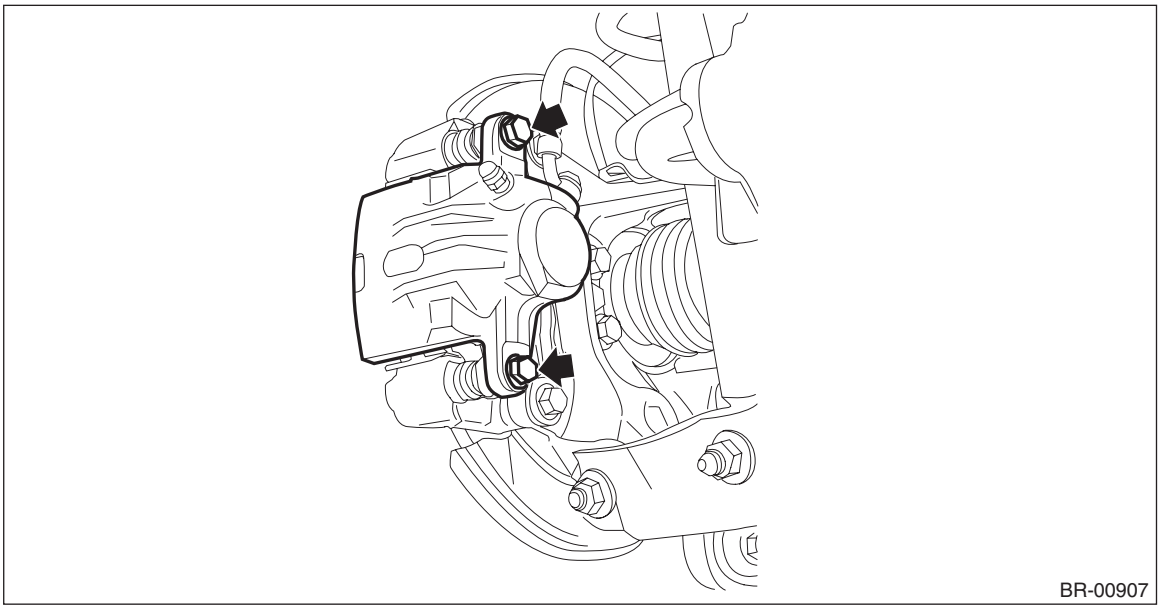
CAUTION:
Do not allow brake fluid to come in contact with the painted surface of the vehicle body. If it does, wash off with water and wipe away completely.

1) Lift up the vehicle, and then remove the rear wheels.
2) Remove the caliper body assembly from the support - rear disc brake.
   (1) Remove the brake hose bracket and union bolt.


BR-00964


BR-01003

(2) Remove the caliper bolt, and remove the caliper body assembly.



3) Remove the support - rear disc brake.

NOTE:
Remove the support - rear disc brake only when replacing the disc rotor or the support - rear disc brake. It is not necessary to remove it when servicing the caliper body assembly.

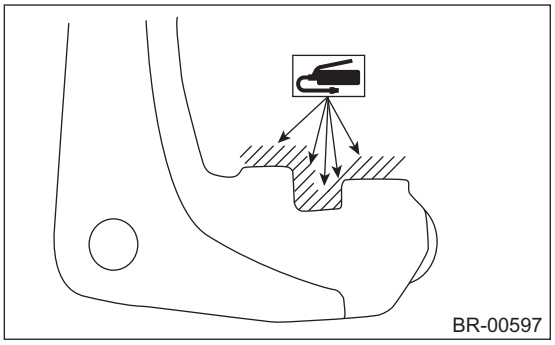
(1) Remove the brake pad from support - rear disc brake.
(2) Remove the mounting bolts, and then remove the support - rear disc brake from the housing assembly - rear axle.

B: INSTALLATION

NOTE:
Before installation, remove mud and foreign matter from the caliper body assembly and support - rear disc brake.

1) Before installation, check each part. <Ref. to BR-46, INSPECTION, Rear Disc Brake Assembly.>
2) Apply a thin coat of grease contained in the pad kit to the support - rear disc brake.

Grease:
Grease contained in the pad kit or equivalent

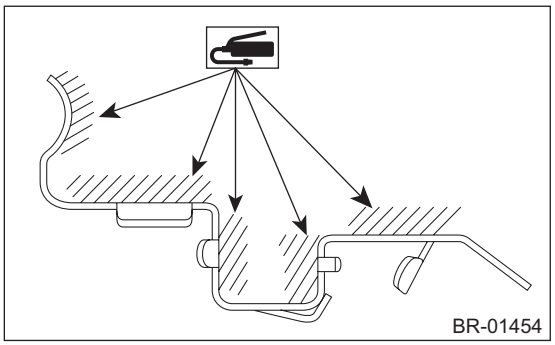


3) Install the support - rear disc brake to the housing assembly - rear axle.

Tightening torque:
Mounting bolt: 66 N·m (6.73 kgf-m, 48.7 ft-lb)

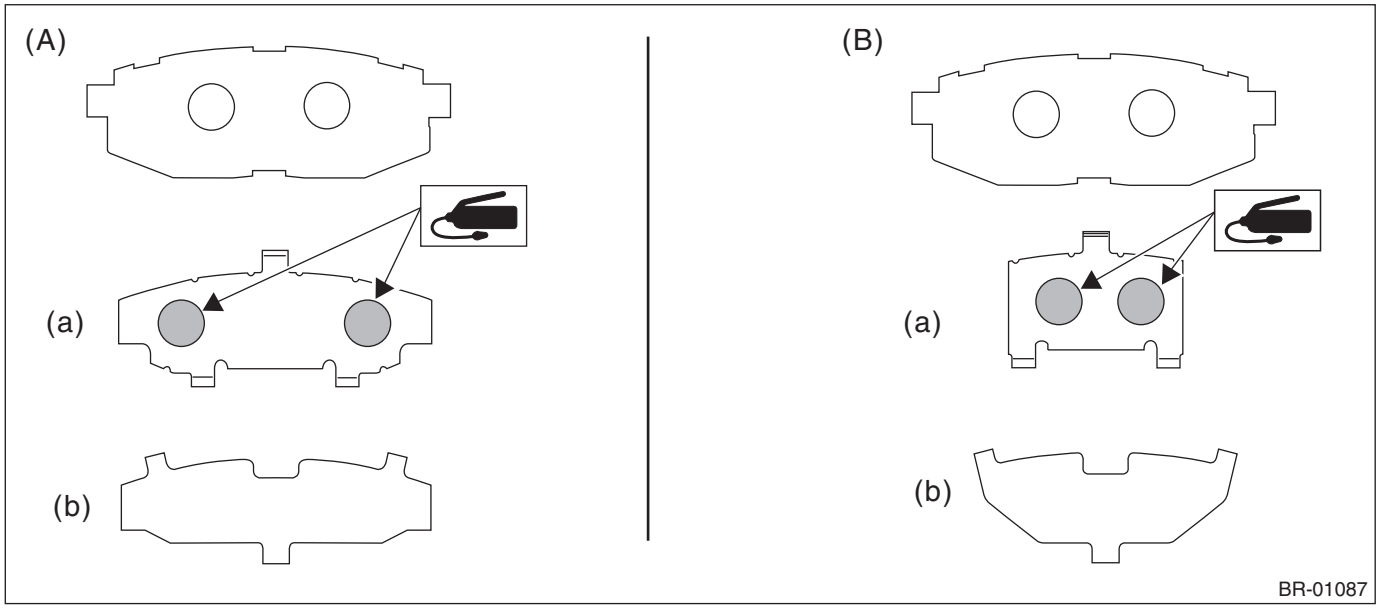
4) Apply a thin coat of grease to the pad clip.

Grease:
Grease contained in the pad kit or equivalent



5) Apply a thin coat of grease to the shim - disc brake rear inner (a) and the shim - disc brake rear outer (b).

Grease:
Grease contained in the pad kit or WAKO grease V160



(A) Pad - disc brake rear outer (B) Pad - disc brake rear inner

6) Install the brake pad to the support - rear disc brake.
7) Install the caliper body assembly to the support - rear disc brake.

Tightening torque:
Caliper bolt: 27 N·m (2.75 kgf-m, 19.9 ft-lb)
8) Install the brake hose bracket.

Tightening torque:
Brake hose bracket: 33 N·m (3.36 kgf-m, 14.3 ft-lb)
9) Connect the brake hose using a new brake hose gasket.

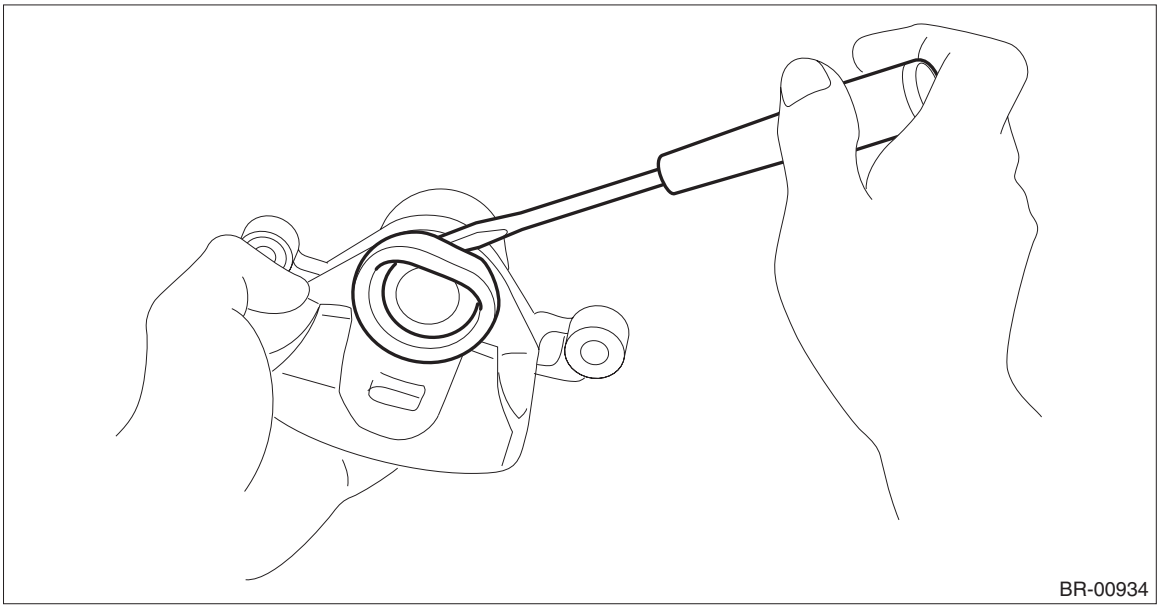
Tightening torque:
Union bolt: 26 N·m (2.65 kgf-m, 19.2 ft-lb)
10) Bleed air from the brake system. <Ref. to BR-65, BRAKE LINE, PROCEDURE, Air Bleeding.>
11) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

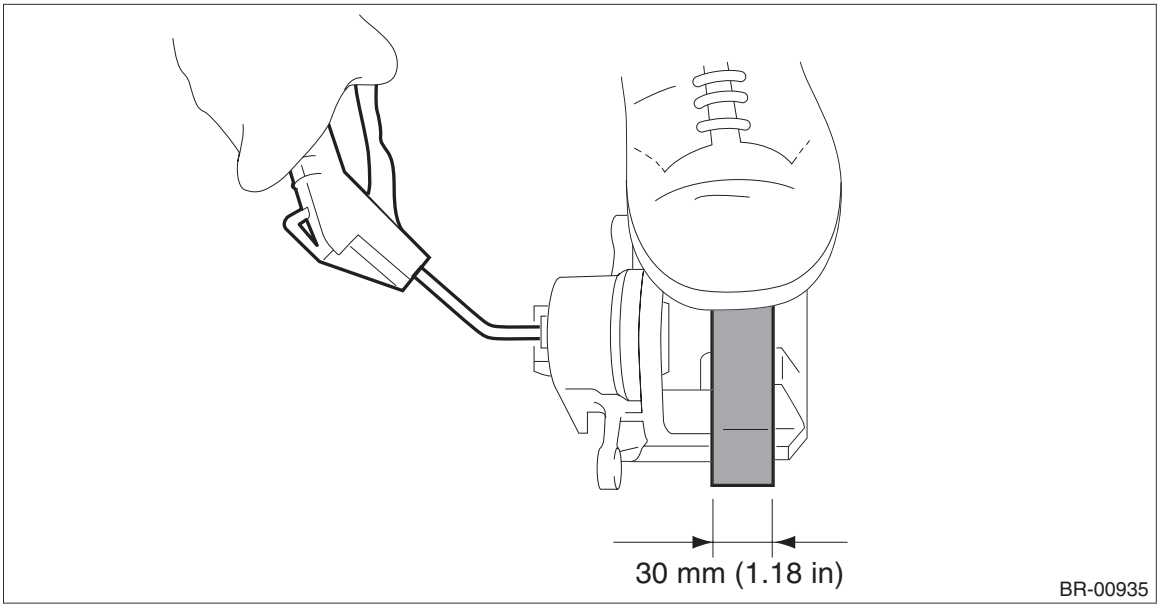
C: DISASSEMBLY

CAUTION:
Be careful not to allow foreign matter to enter the brake hose connector.

1) Remove mud and foreign matter from the caliper body assembly.
2) Remove the piston boot from caliper body cylinder.

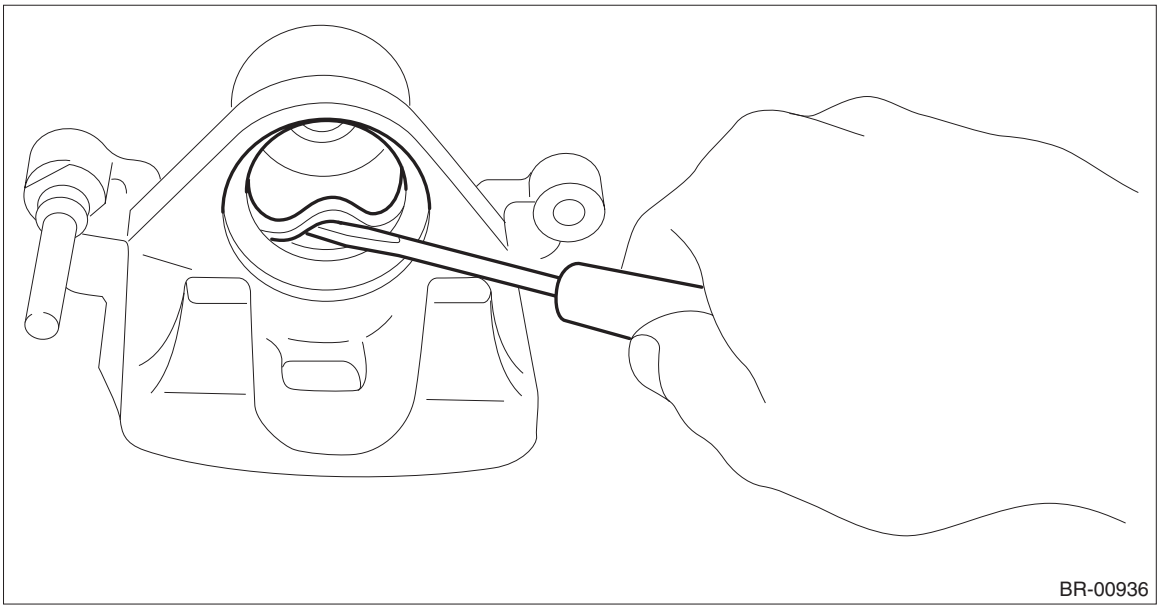


3) Remove the piston - disc brake.
   (1) Place a wooden block in the caliper body assembly as shown in the figure to prevent the piston - disc brake from jumping out and being damaged.
   (2) Using an air gun, gradually apply compressed air via the brake hose installation hole to push out the piston - disc brake.

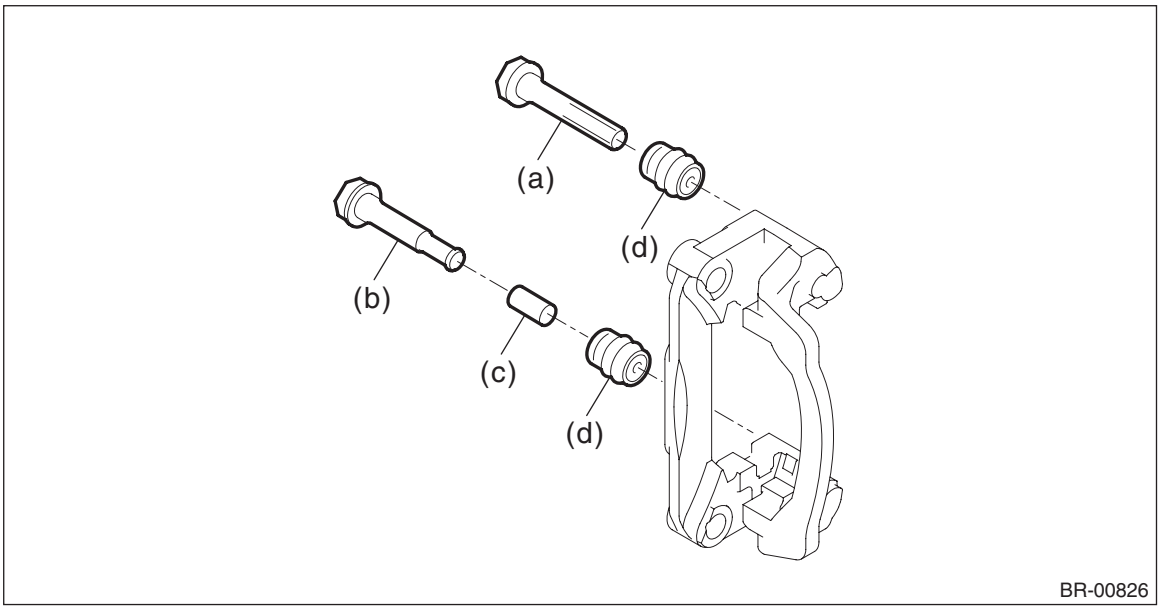


4) Remove the piston seal from caliper body cylinder.

CAUTION:
Do not damage the cylinder and piston seal groove.



5) Remove the guide pin - rear brake, lock pin - rear brake, lock pin - sleeve, and pin boot from the support - rear disc brake.

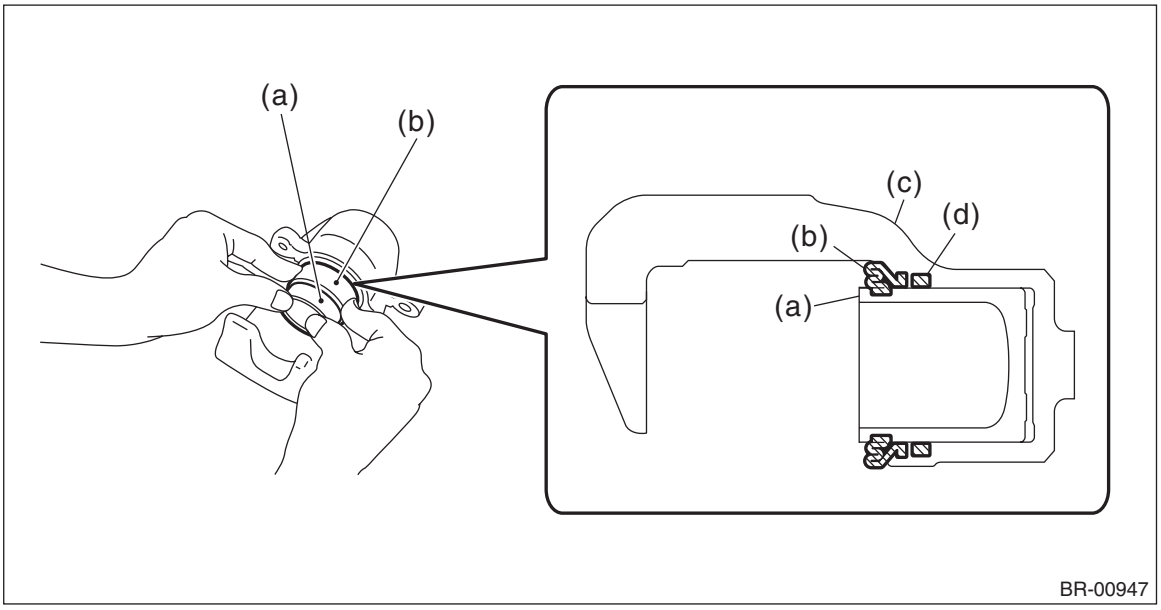


(a) Guide pin - rear brake (black)
(b) Lock pin - rear brake (silver)
(c) Lock pin - sleeve
(d) Pin boot

D: ASSEMBLY

1) Before installation, check each part. <Ref. to BR-46, INSPECTION, Rear Disc Brake Assembly.>
2) Clean the inside of the caliper body cylinder using brake fluid.
3) Apply a coat of brake fluid to piston seal and install the piston seal to the caliper body cylinder groove.
4) Apply a coat of brake fluid to the inner surface of caliper body cylinder and the entire outer surface of the piston - disc brake.
5) Apply grease contained in the piston seal kit to the piston boot, and install it to the groove at the end of the cylinder.
6) Insert the piston - disc brake into the caliper body cylinder.

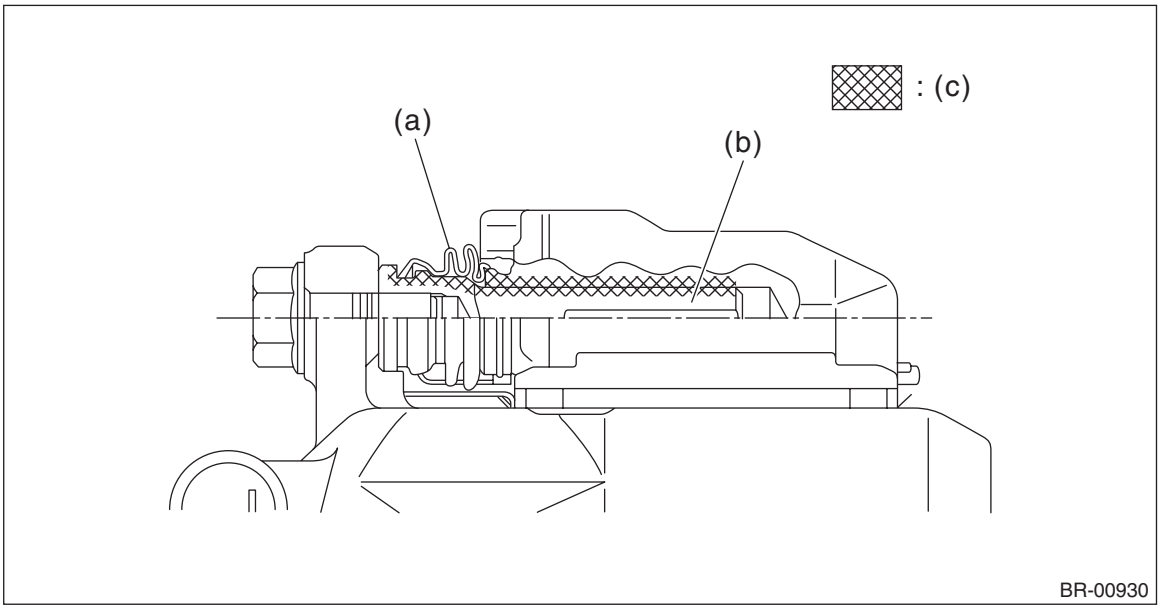
CAUTION:
Do not force the piston - disc brake into the caliper body cylinder.
7) Position the piston boot in the grooves on the piston - disc brake and the caliper body cylinder.



(a) Piston - disc brake
(b) Piston boot
(c) Caliper body
(d) Piston seal

8) Apply grease contained in the piston seal kit to the lock pin - rear brake, the outer surface of guide pin - rear brake, the inner surface of support cylinder, and the grooves of pin boot.
9) Install the pin boot to the lock pin - rear brake and guide pin - rear brake, and insert them into the support cylinder.

CAUTION:
Insert the lock pin - rear brake and guide pin - rear brake into specified position, and make sure that they slide and seat properly.



(a) Pin boot
(b) Lock pin - rear brake or guide pin - rear brake
(c) Grease applied area

E: INSPECTION

1) Check the caliper body cylinder and piston - disc brake for uneven wear, damage or rust.
2) Check the rubber parts for damage or deterioration.
3) If faulty is found in the inspection, replace the relevant part.

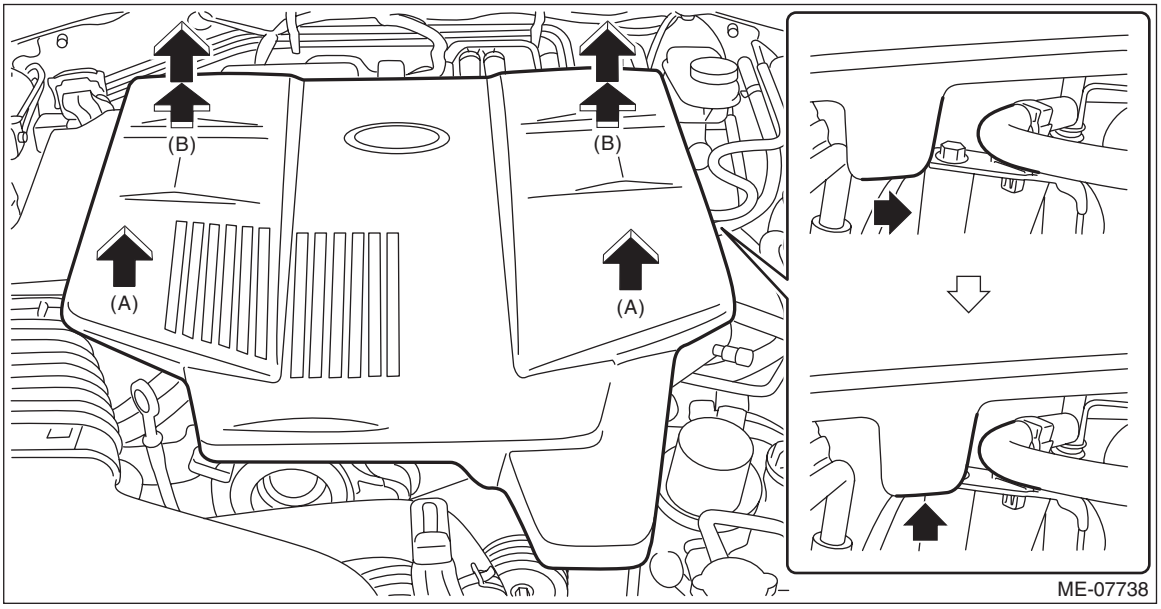
9. Master Cylinder

A: REMOVAL

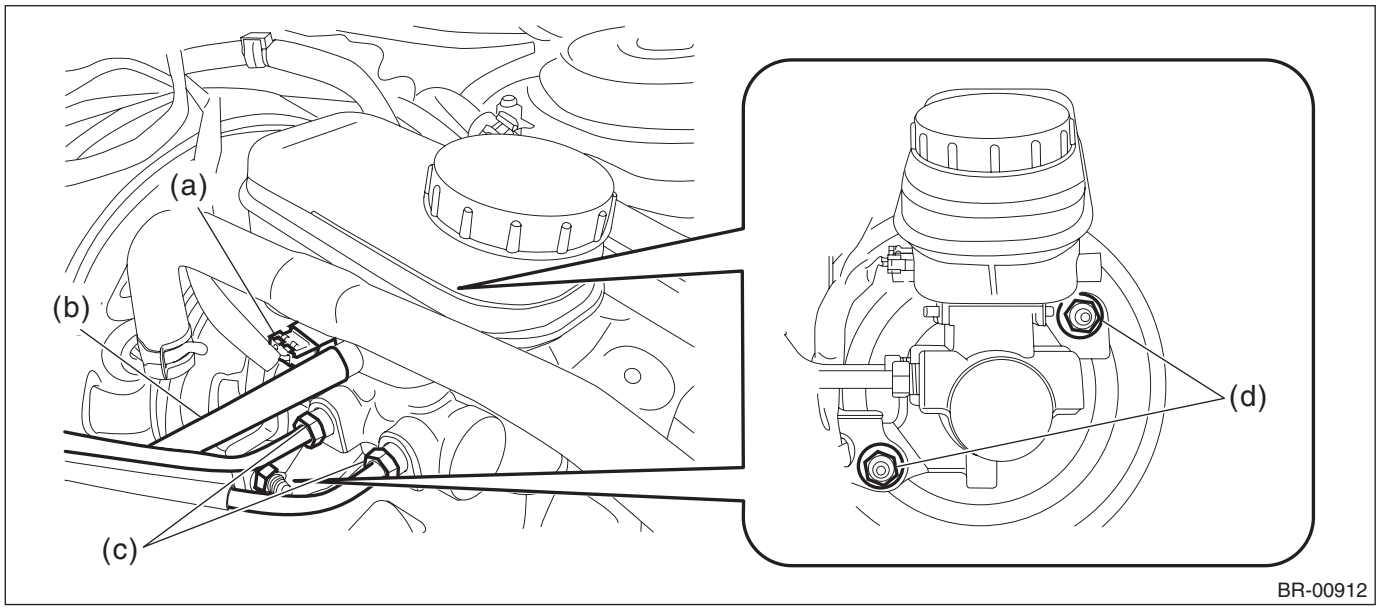
CAUTION:
Do not allow brake fluid to come in contact with the painted surface of the vehicle body. If it does, wash off with water and wipe away completely.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the collector cover. (HEV model)
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



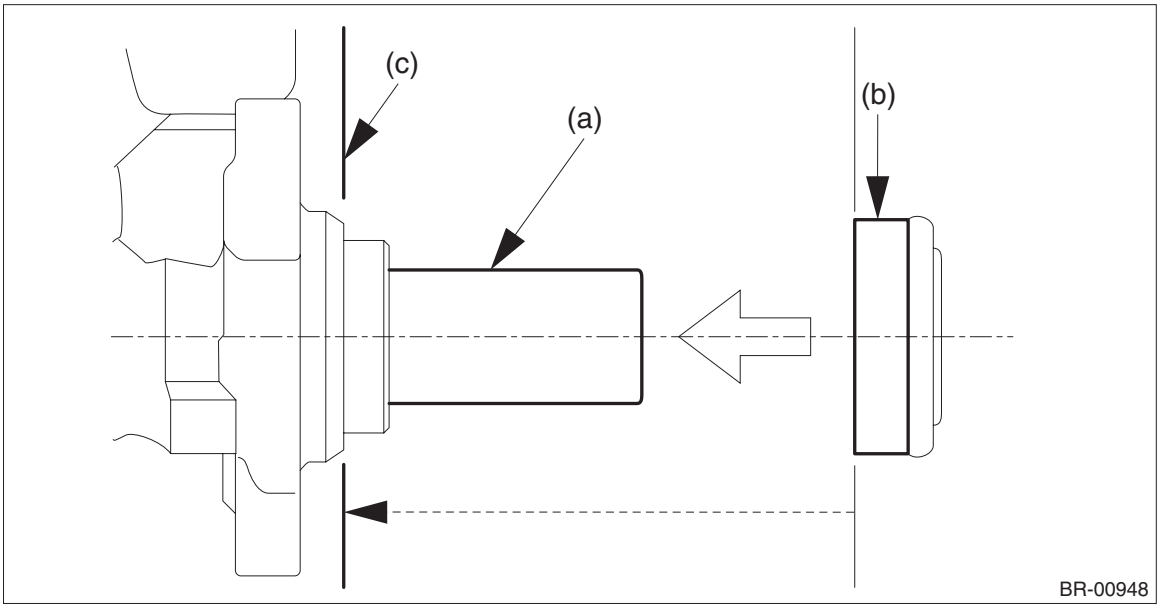
3) Drain brake fluid from the reservoir tank completely.
4) Remove the master cylinder assembly.
   (1) Disconnect the fluid level gauge connector (a).
   (2) Disconnect the clutch hose (b). (MT model)
   (3) Disconnect the brake pipe (c).
   (4) Remove the nut (d), and slowly remove the master cylinder assembly from the vacuum booster assembly.



B: INSTALLATION

1) Replace the seal sub assembly for the master cylinder assembly with a new part.

CAUTION:
Be careful not to install the seal sub assembly in the wrong location.



(a) Primary piston
(b) Seal sub ASSY
(c) Install the seal sub assembly to this surface.

2) Install each part in the reverse order of removal.

Tightening torque:
Master cylinder assembly: 13 N·m (1.33 kgf-m, 9.6 ft-lb)
Brake pipe flare nut: 19 N·m (1.94 kgf-m, 14.0 ft-lb)

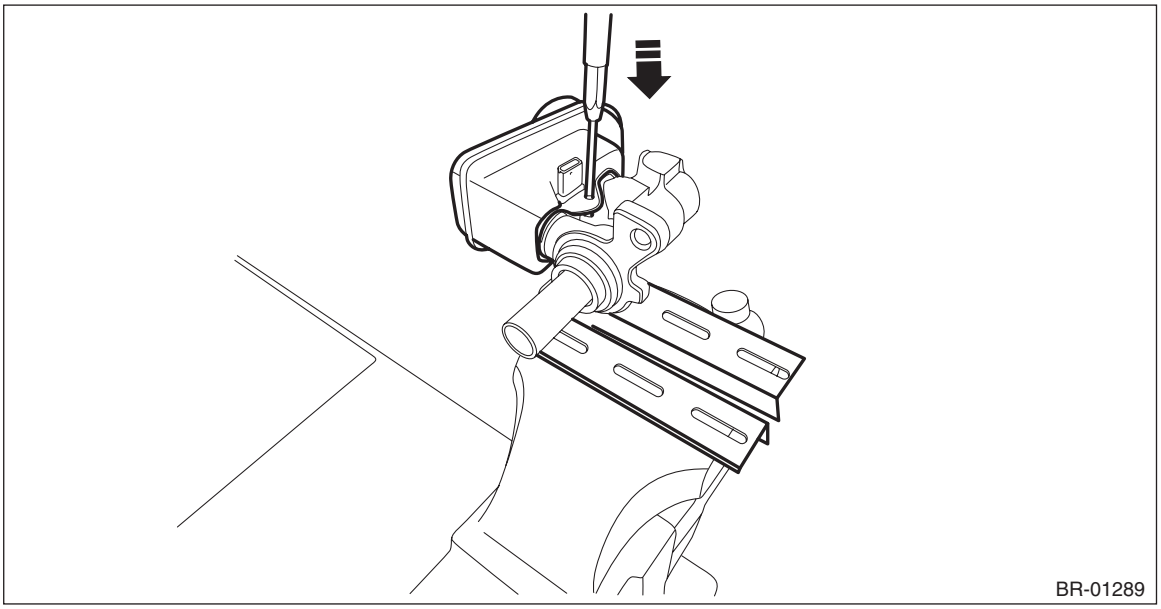
3) Bleed air from the brake system. <Ref. to BR-63, PROCEDURE, Air Bleeding.>

C: DISASSEMBLY

1) Remove the reservoir tank.

CAUTION:
Be careful not to tighten a vise excessively.

(1) Place the master cylinder assembly between aluminum plates and fix it on a vise.
(2) Drive out the pin using a punch and a hammer to remove the reservoir tank.

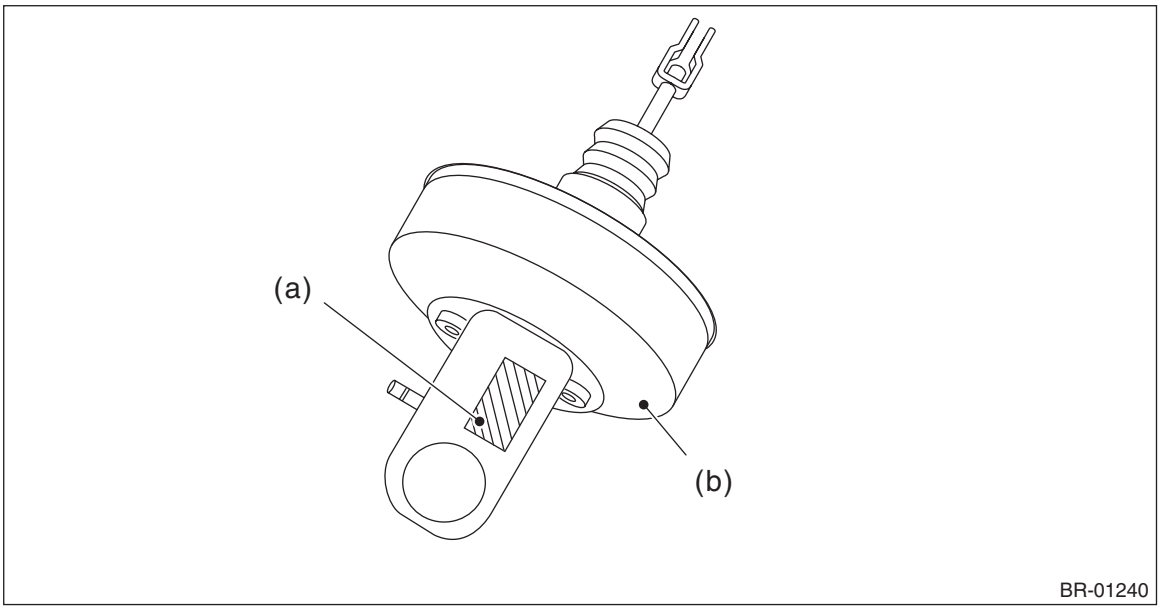


2) Remove the seal from the cylinder body assembly.

D: ASSEMBLY

CAUTION:
When replacing the reservoir tank, adhere the label to the position shown in the figure. (C0 model)

Label:
C5 model
Part No. 25080GA010



(a) Label (b) Brake booster

1) Install the seal to the cylinder body assembly.
2) Install the reservoir tank.

CAUTION:
Be careful not to tighten a vise excessively.
(1) Place the master cylinder assembly between aluminum plates and fix it on a vise.
(2) Drive the pin using a punch and a hammer to install the reservoir tank.

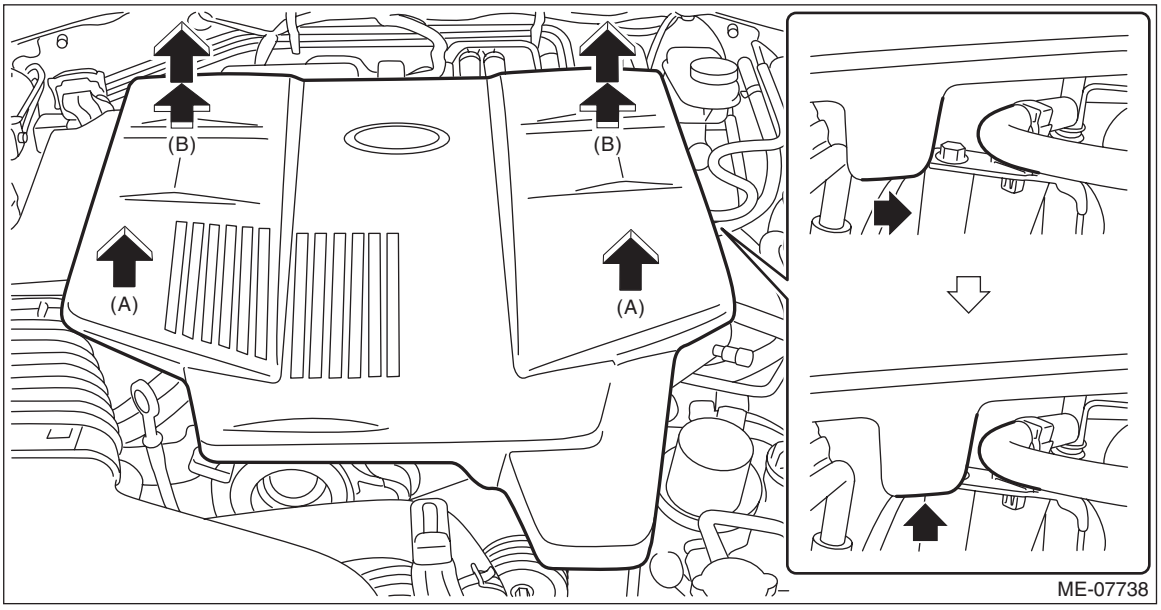
10.Brake Booster

A: REMOVAL

CAUTION:
• Do not allow brake fluid to come in contact with the painted surface of the vehicle body. If it does, wash off with water and wipe away completely.
• Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

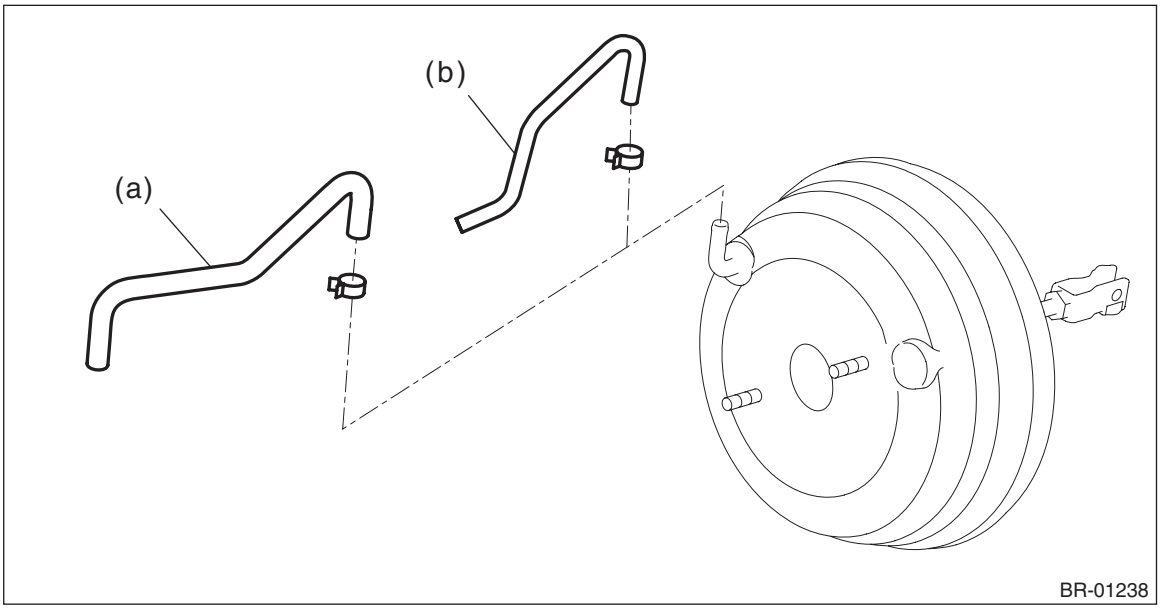
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the collector cover. (HEV model)
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



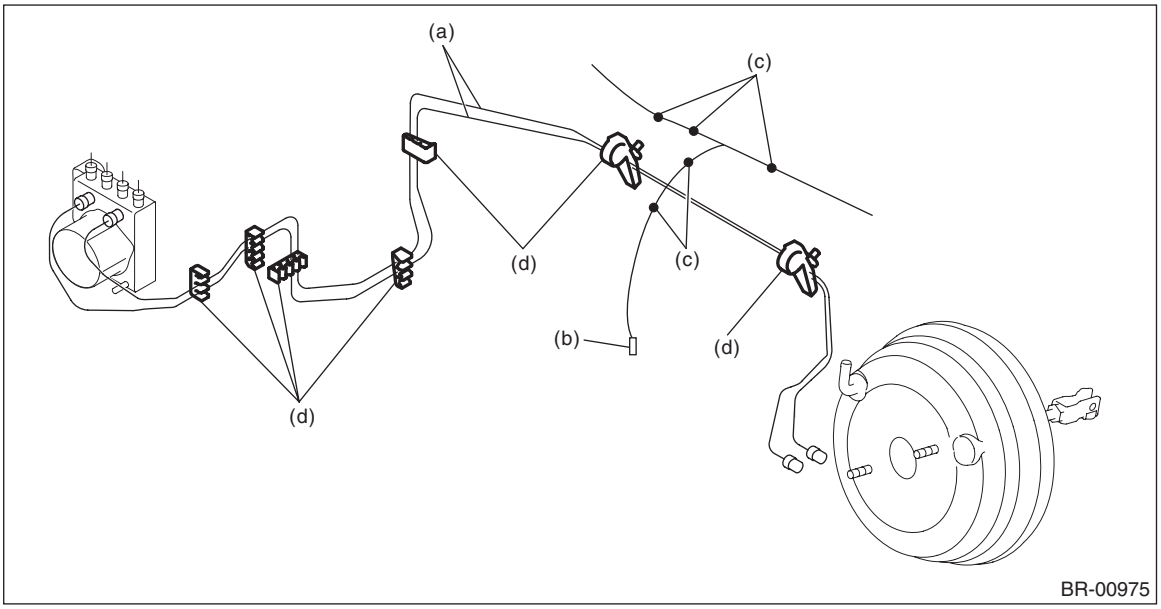
3) Remove the air cleaner case. (HEV model) <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Remove the column assembly - steering. <Ref. to PS-21, REMOVAL, Steering Column.>
5) Drain brake fluid from the reservoir tank completely.
6) Disconnect the air conditioner pipe. <Ref. to AC-66, REMOVAL, Hose and Pipe.>
7) Remove the power steering control module. <Ref. to PS-40, REMOVAL, Power Steering Control Module.>
8) Remove the master cylinder assembly. <Ref. to BR-47, REMOVAL, Master Cylinder.>

9) Remove the clamp and remove the vacuum hose.



(a) Gasoline engine model (b) HEV model

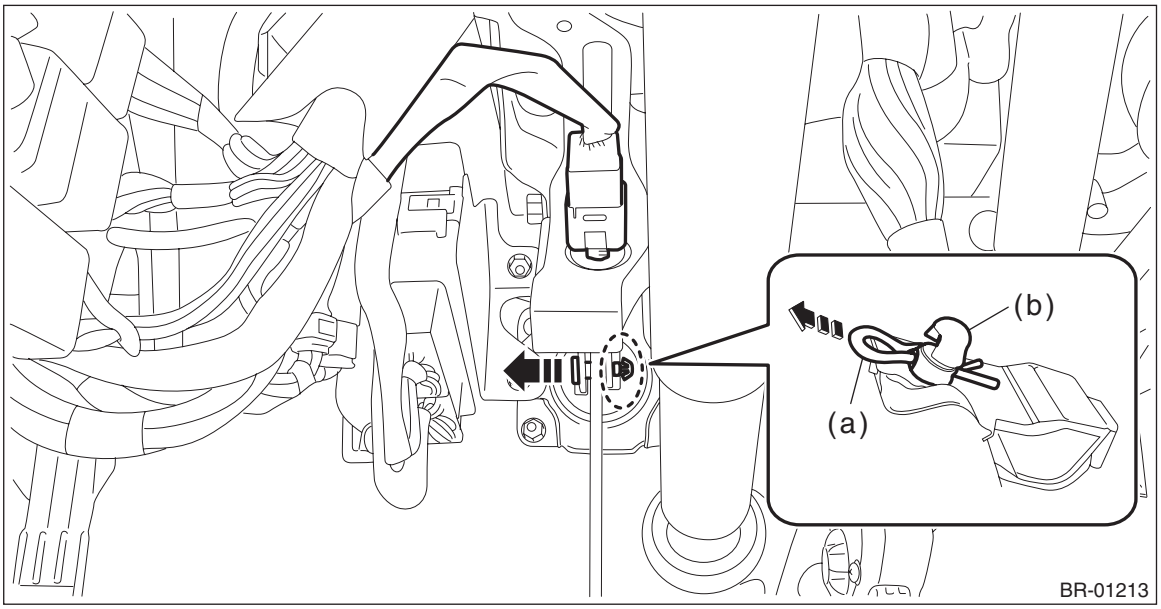
10) Remove the brake pipe assembly (a).
(1) Disconnect the starter connector (b) and harness clip (c).
(2) Remove the brake pipe assembly (a) from the pipe clip (d).



11) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
12) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
13) Remove the column assembly - steering. <Ref. to PS-21, REMOVAL, Steering Column.>

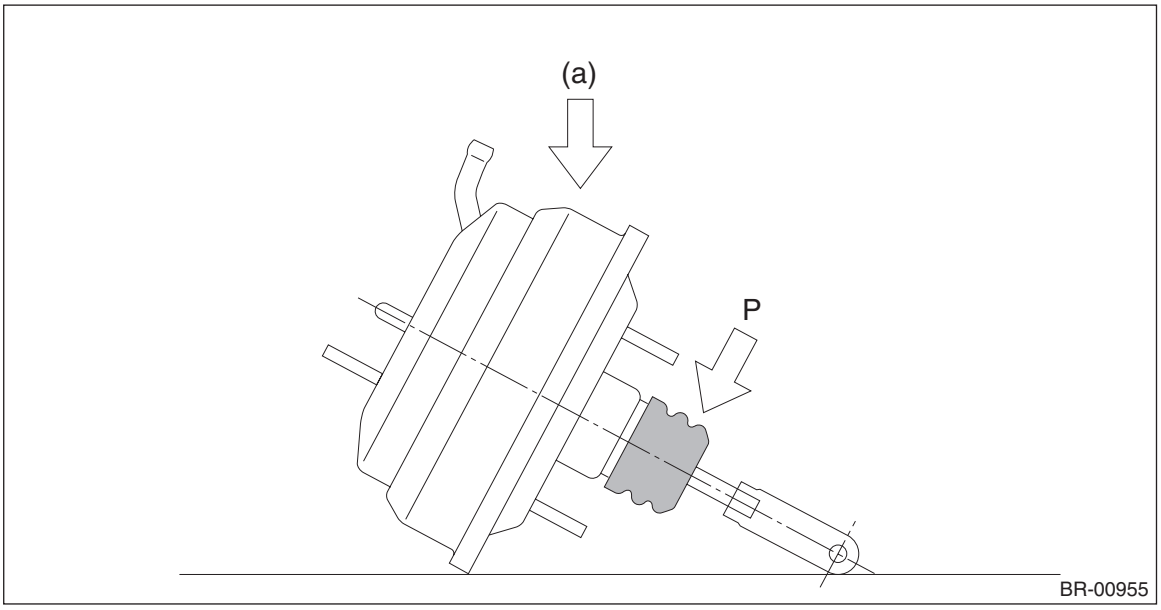
14) Remove the snap pin (a) and clevis pin (b), and remove the operating rod from the brake pedal.

CAUTION:
• Be careful not to apply excessive force to the operating rod when handling the operating rod. The angle may change by ±3°, and it may result in damage to power piston cylinder.
• Do not change the push rod length.

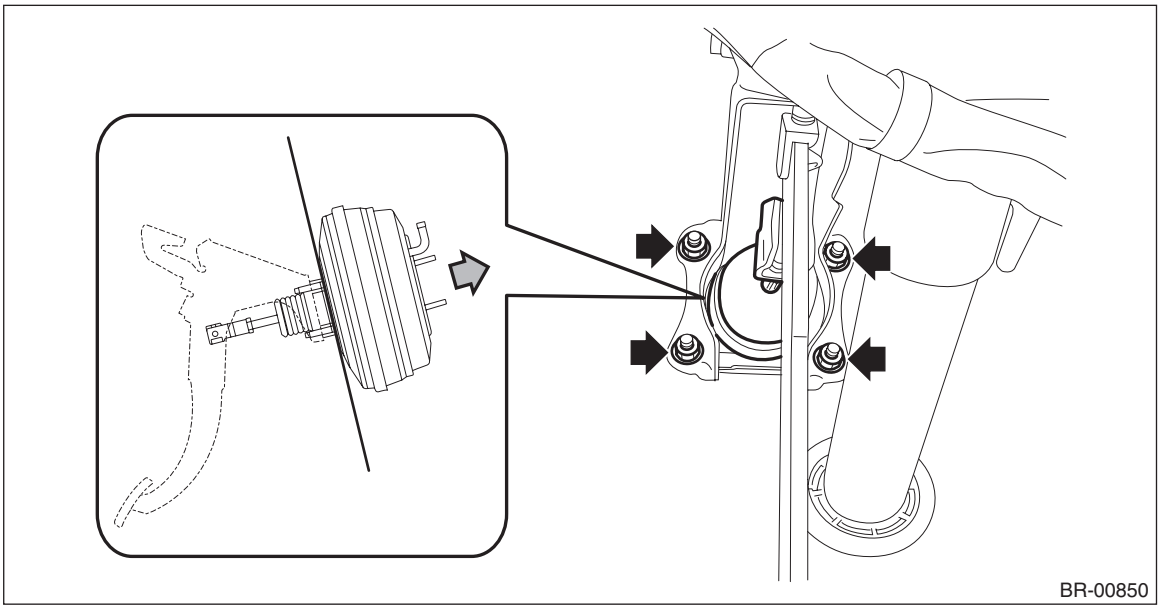


15) Remove the vacuum booster assembly.

CAUTION:
• Do not disassemble the vacuum booster assembly.
• Make sure that the booster shell and vacuum pipe are not subject to strong impacts.
• Be careful not to drop the vacuum booster assembly. If the vacuum booster assembly is dropped accidentally, replace it.
• Be careful when placing the vacuum booster assembly on floor.
• If external force (a) is applied from above when the vacuum booster assembly is placed in this position, the resin portion as indicated by "P" may become damaged.



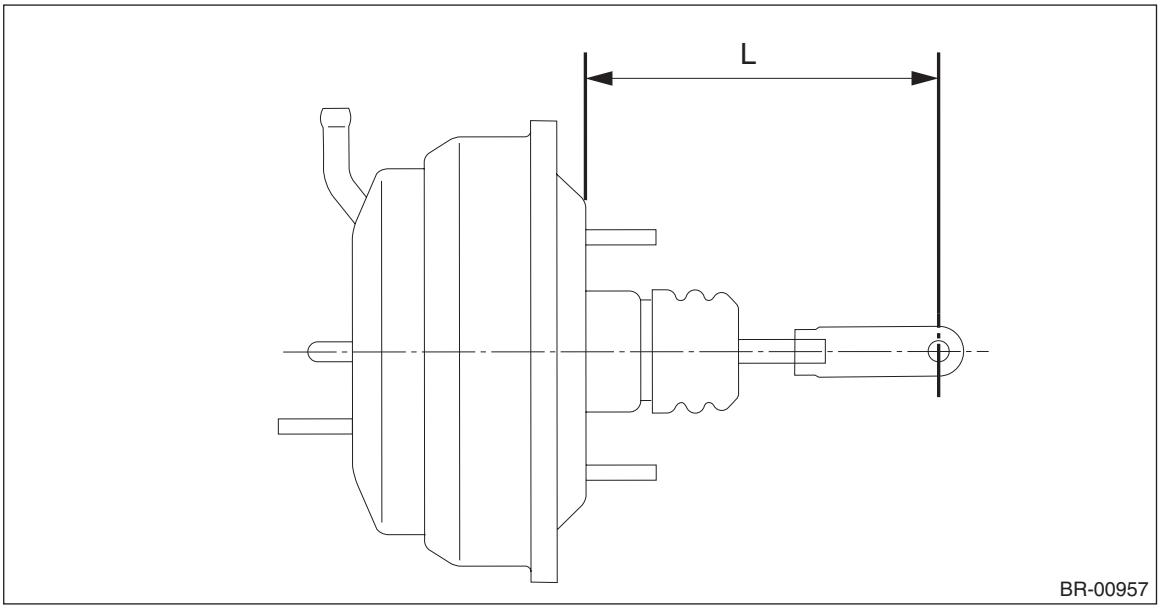
(1) Remove the nuts, and then remove the vacuum booster assembly.



B: INSTALLATION

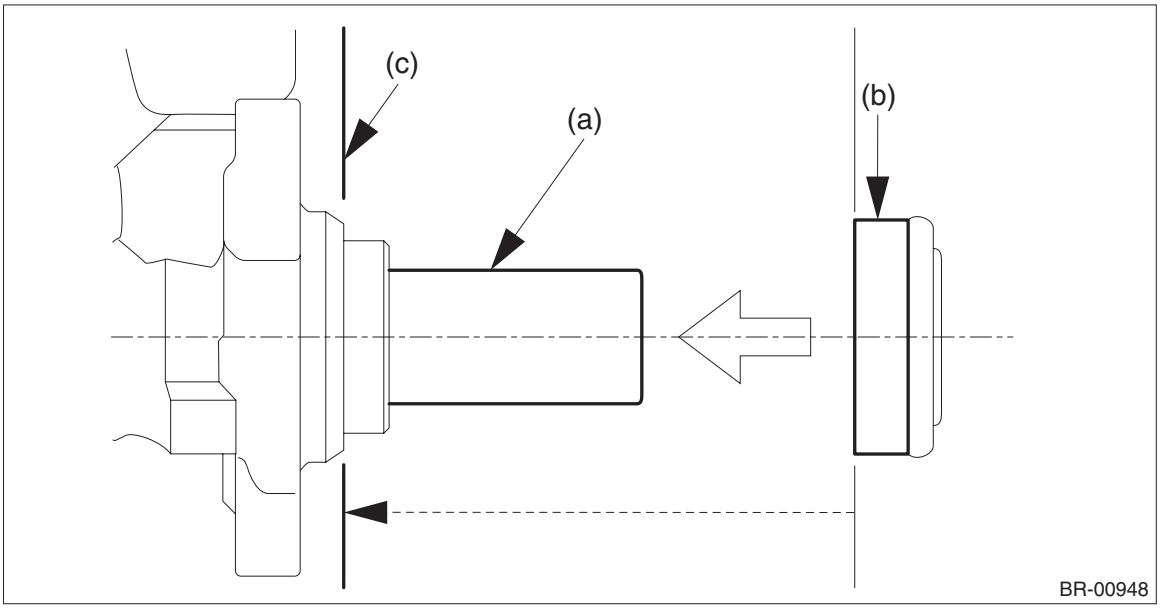
1) Check and adjust the operating rod of the vacuum booster assembly.
   (1) Measure the length between the vacuum booster assembly mounting surface and clevis pin hole.
   (2) If it is not within the specification, loosen the lock nut, rotate the vacuum booster assembly operating rod to adjust the rod length.

Specification L:
136.3 mm (5.37 in)



2) Install each part in the reverse order of removal.

CAUTION:
• Apply grease to the snap pin to prevent the operating rod from wear.
• Replace the clevis pin with new parts, and apply thin coat of NIGTIGHT LYW No. 2 grease to the clevis pin.
• When installing the master cylinder assembly, replace the seal sub assembly with a new part, and install it to the vacuum booster assembly.



(a) Primary piston
(b) Seal sub ASSY
(c) Install the seal sub ASSY to this surface.

Tightening torque:
Vacuum booster assembly: 18 N·m (1.84 kgf-m, 13.3 ft-lb)
Master cylinder assembly: 13 N·m (1.33 kgf-m, 9.6 ft-lb)
Brake pipe flare nut: 19 N·m (1.94 kgf-m, 14.0 ft-lb)
Operating lock nut: 22 N·m (2.24 kgf-m, 16.2 ft-lb)
Knee airbag module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

3) Install the air conditioner pipe. <Ref. to AC-11, AIR CONDITIONING UNIT, COMPONENT, General Description.>
4) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>
5) Bleed air from the brake system. <Ref. to BR-63, PROCEDURE, Air Bleeding.>
6) Perform a road test to make sure the brakes do not drag.

C: INSPECTION

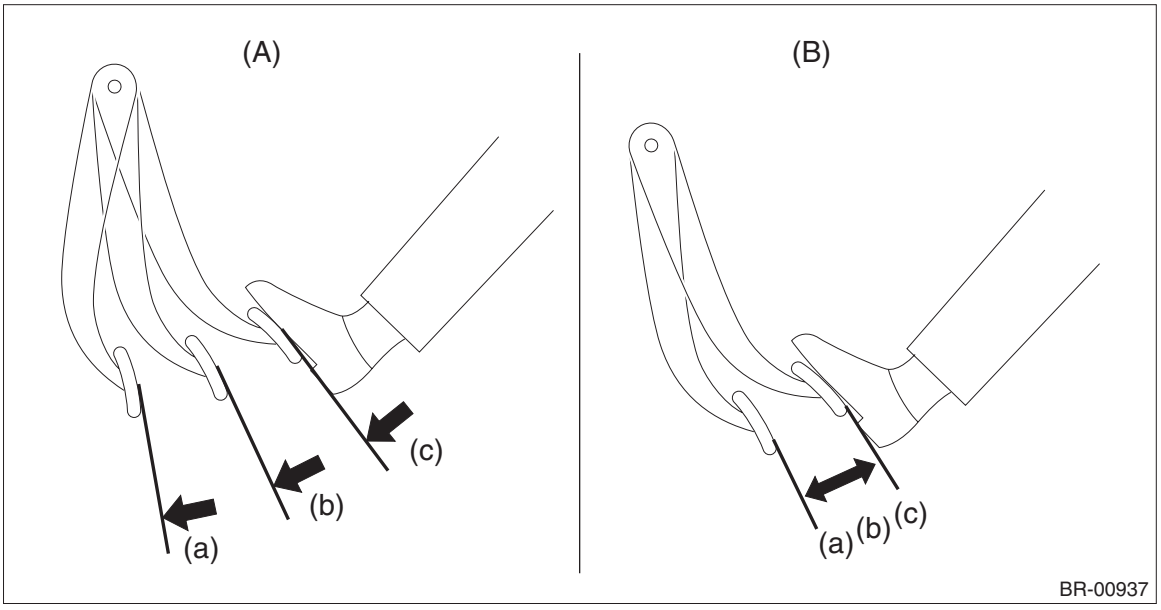
1. OPERATION CHECK WHEN NOT USING MEASURING DEVICES

CAUTION:
When checking operation, be sure to apply the parking brake securely.
When an operation check is performed with no measuring devices, a faulty part cannot be identified correctly. But it is possible to identify the outline of the defect by performing the check according to the following procedures.

- **Air tightness check**

1) Start the engine, and idle it for 1 to 2 minutes, then turn it OFF.
2) Depress the brake pedal several times applying the normal pedal force.

NOTE:
The pedal stroke should be the longest at the 1st depression, and it should become shorter at each successive depression.
3) If no change occurs in the pedal height when pressed, the vacuum booster assembly is faulty.



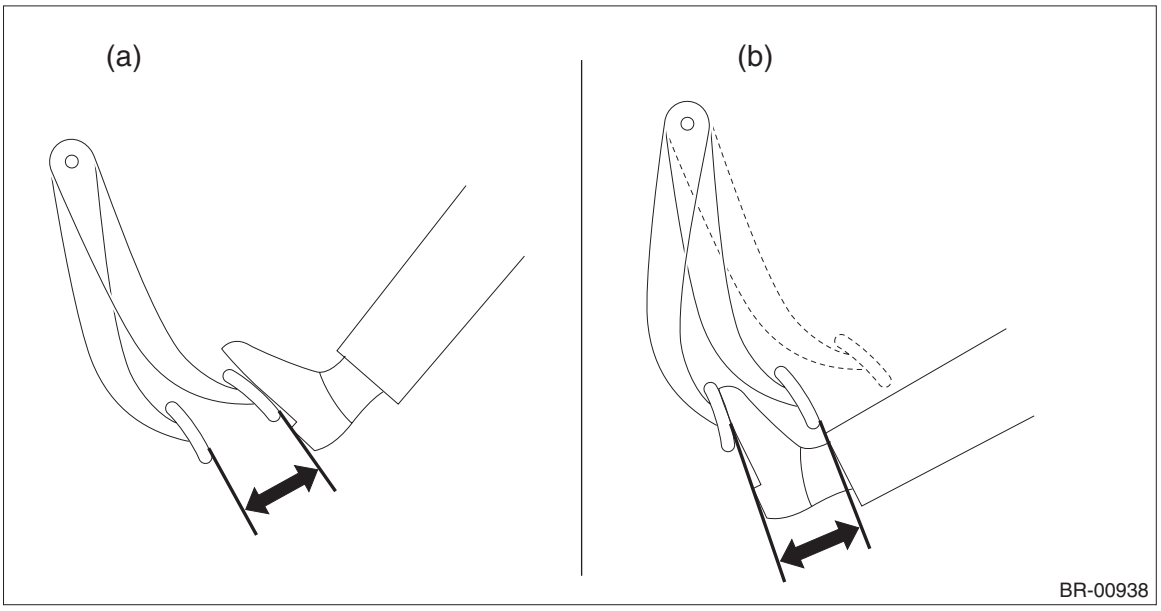
(A) Normal (B) Not OK

(a) 1st (b) 2nd (c) 3rd

NOTE:
- In case of defective operation, inspect the condition of the check valve and vacuum hose as well.
- Replace them if faulty, and perform the test again.
- If no improvement is observed, check precisely with gauges.

- **Check operation**

1) While the engine is OFF, depress the brake pedal several times applying the same pedal force, to check for a change in pedal height.



(a) When engine is stopped (b) When engine is started

2) With the brake pedal depressed, start the engine.
3) As the engine starts, the brake pedal should move slowly toward the floor. If the pedal height does not change, the vacuum booster assembly is faulty.

NOTE:
If a faulty part is detected after inspection, check precisely with measuring devices.

- **Loaded air tightness check**

Depress the brake pedal while the engine is running, and turn the engine to OFF while the pedal is depressed.
Keep the pedal depressed for 30 seconds. If the pedal height does not change, the function of vacuum booster assembly is normal. If the pedal height increases, it is faulty.

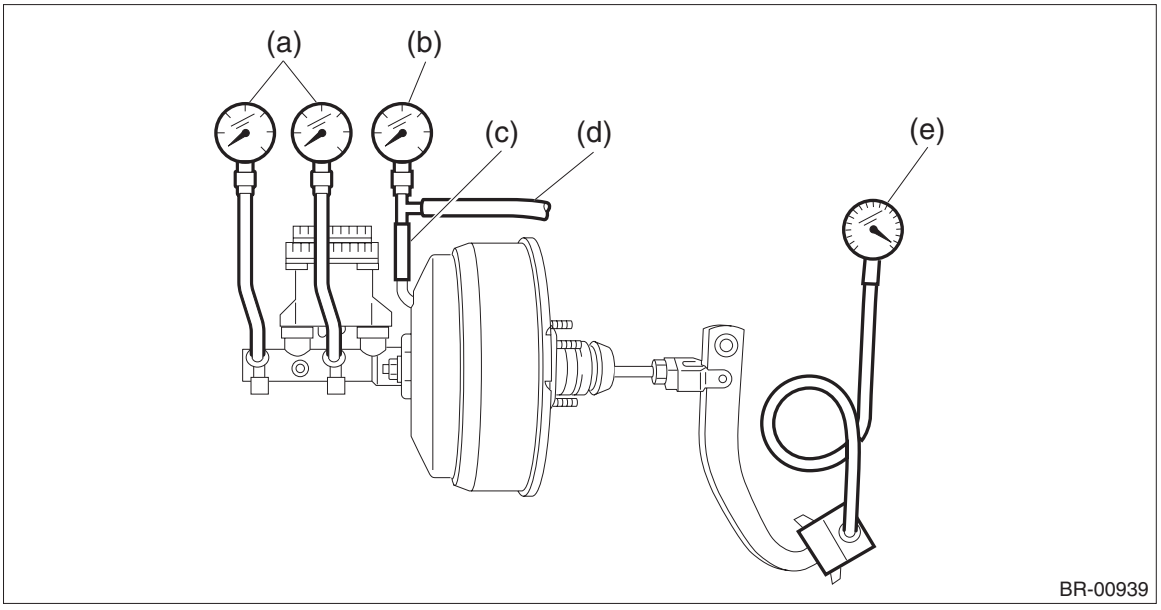
NOTE:
If a faulty part is detected after inspection, check precisely with measuring devices.

2. OPERATION CHECK WHEN USING MEASURING DEVICES

CAUTION:
When checking operation, be sure to apply the parking brake securely.

- **Check with measuring devices**

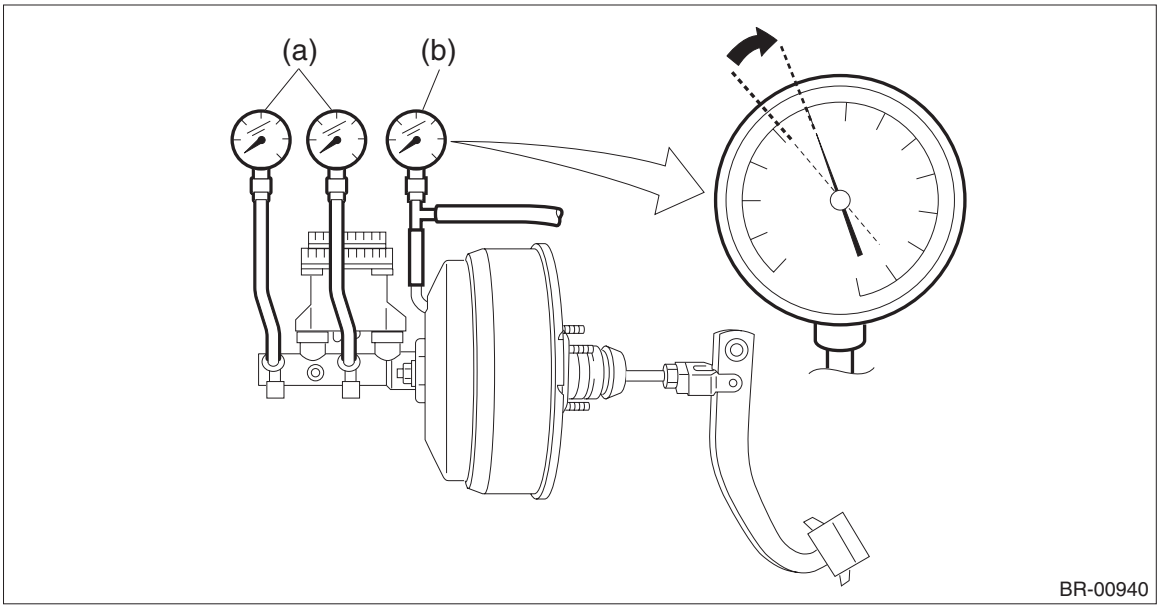
Connect a measuring device as shown in the figure. After bleeding air from the pressure gauge, perform each check.



(a) Pressure gauge
(b) Vacuum gauge
(c) Adapter hose
(d) Vacuum hose
(e) Pedal force gauge

- **Air tightness check**

1) Start the engine and keep it running at idle until vacuum pressure indicates 66.7 kPa (500 mmHg, 19.69 inHg) while the brake pedal is not depressed.



(a) Pressure gauge
(b) Vacuum gauge

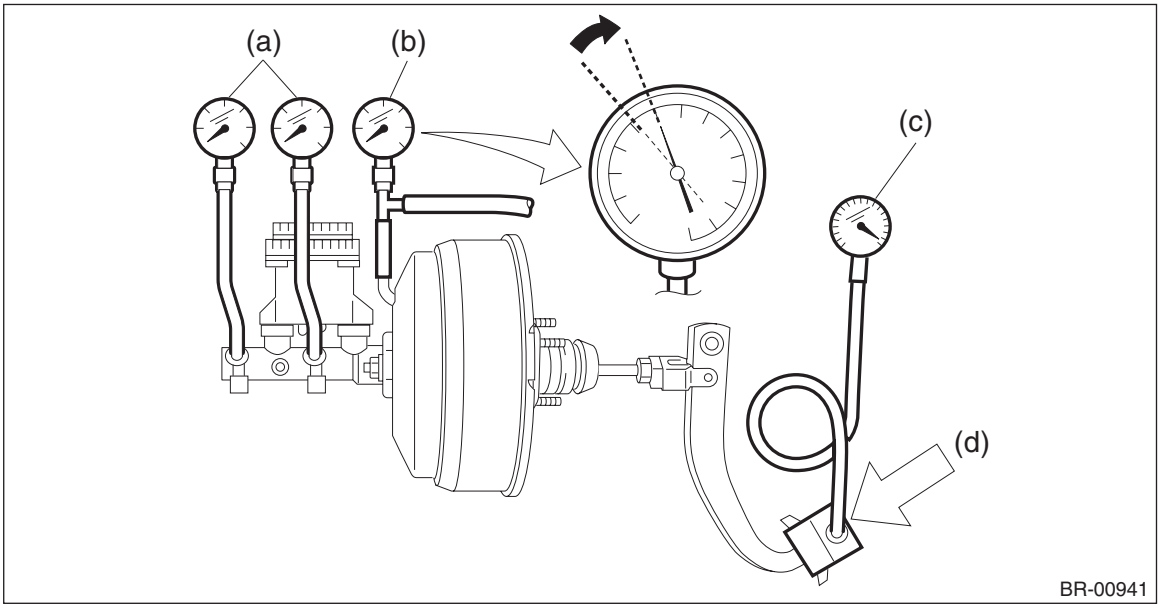
2) Stop the engine and check the vacuum pressure.
If the value matches the following standard, the vacuum booster assembly function is normal.

Vacuum pressure: standard
The range of vacuum pressure drop within 15 seconds after stopping the engine is 3.3 kPa (25 mmHg, 0.98 inHg) or less.

If a faulty part is detected after inspection, it may results from one of the following causes.
- Check valve malfunction
- Leak from vacuum hose
- Leak from shell joint section or stud bolt welded section
- Damaged diaphragm
- Leak from valve body seal and bearing section
- Leak from plate and seal assembly section
- Leak from poppet valve assembly section

• Loaded air tightness check

1) Start the engine and depress the brake pedal with a pedal force of 196 N (20 kgf, 44 lbf).
2) Keep the engine running at idle and the pedal depressed until vacuum pressure of the vacuum gauge indicates 66.7 kPa (500 mmHg, 19.69 inHg).



(a) Pressure gauge
(b) Vacuum gauge
(c) Pedal force gauge
(d) Depressed

3) Stop the engine and check the vacuum gauge.
If the value matches the following standard, the vacuum booster function is normal.

Vacuum pressure: standard
The range of vacuum pressure drop within 15 seconds after stopping the engine is 3.3 kPa (25 mmHg, 0.98 inHg) or less.

If a faulty part is detected after inspection, refer to “AIR TIGHTNESS CHECK”.
<Ref. to BR-56, INSPECTION, Brake Booster.>
4) If the vacuum booster assembly is faulty, replace it with a new part.

• Lack of boost action check

1) Turn the engine OFF, and set the value of the vacuum gauge to “0”.
2) Check the fluid pressure when the brake pedal is depressed. The pressure must be greater than the specification listed.

Brake pedal force: N (kgf, lbf)	147 (15, 33)	294 (30, 66)
Fluid pressure: kPa (kgf/cm^2, psi)	533 (5, 77)	1,551 (16, 225)

• Boosting action check

1) Set the vacuum gauge reading to 66.7 kPa (500 mmHg, 19.69 inHg) with the engine running.
2) Check the fluid pressure when the brake pedal is depressed. The pressure must be greater than the specification listed.

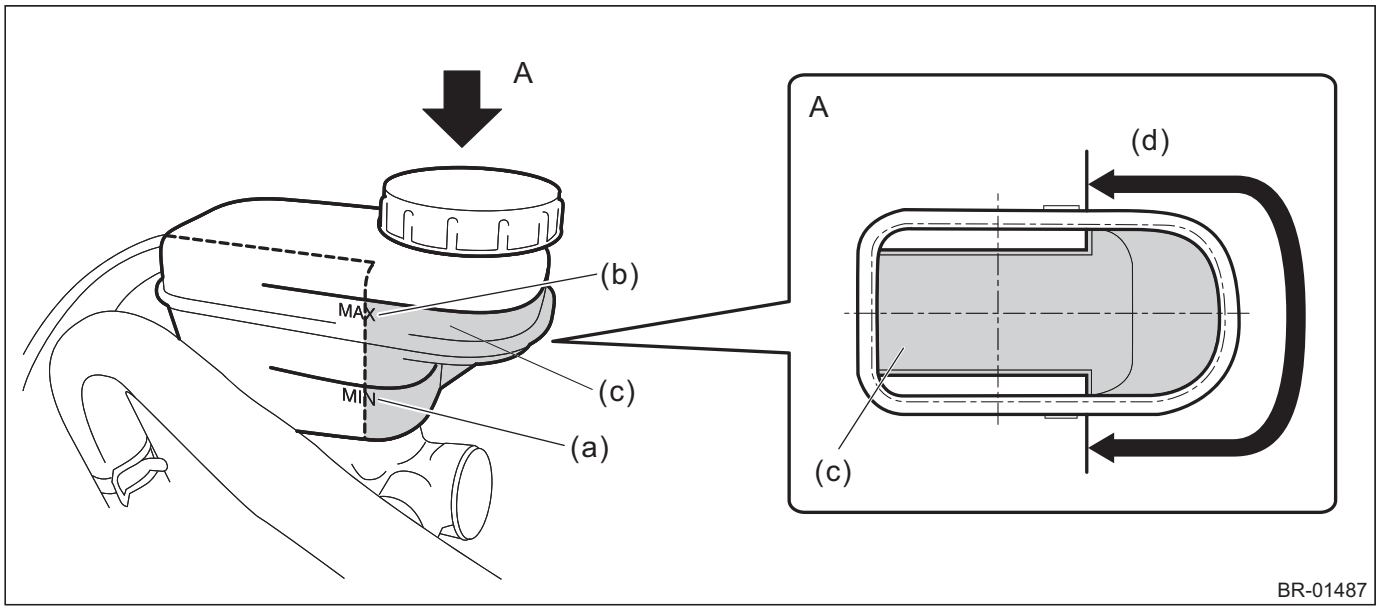
Brake pedal force: N (kgf, lbf)	147 (15, 33)	294 (30, 66)
Fluid pressure: kPa (kgf/cm^2, psi)	6,177 (63, 896)	11,273 (115, 1,635)

11.Brake Fluid

A: INSPECTION

CAUTION:
• Do not let brake fluid come into contact with the painted surface of the vehicle body. Wash away with water immediately and wipe off if it is spilled by accident.
• Do not reuse drained brake fluid. When refilling brake fluid, always refill new brake fluid.
• Avoid mixing brake fluid of different brands or different grades even from the same brand to prevent fluid performance from degrading.
• Do not allow dirt or dust to get into the reservoir tank.
1) Check the fluid for discoloration.
2) Check that the amount of brake fluid is between the lines of “MIN” (a) and “MAX” (b) from a straight view or within 90° to the right and left forward.

CAUTION:
Always check the level using the specified direction because there is a partition in the reservoir tank.



(A) View from upper face

(a) MIN. level
(b) MAX. level
(c) Brake fluid
(d) Brake fluid level check range

3) If the brake fluid level is close to “MIN”, check the brake pipe or brake hose for any leak first. Then, check that the brake fluid level is reduced due to brake pad wear.
4) If the fluid is extremely discolored or the fluid level is less than the specified value after inspection, replenish or replace with the new fluid.

B: REPLACEMENT

CAUTION:
• Do not let brake fluid come into contact with the painted surface of the vehicle body. Wash away with water immediately and wipe off if it is spilled by accident.
• Do not reuse drained brake fluid. When refilling brake fluid, always refill new brake fluid.
• Avoid mixing brake fluid of different brands or different grades even from the same brand to prevent fluid performance from degrading.
• Do not allow dirt or dust to get into the reservoir tank.

NOTE:
• During the operation, keep the reservoir tank filled with brake fluid to prevent entry of air.
• Operate the brake pedal slowly and depress it fully.
• For convenience and safety, perform the work with 2 people.
• The required amount of brake fluid is approximately 500 mL (16.9 US fl oz, 17.6 Imp fl oz) for the entire brake system.
1) Lift up the vehicle.
2) Remove both the front and rear wheels.
3) Drain brake fluid from the reservoir tank.
4) Replenish the reservoir tank with the recommended brake fluid, and perform the same procedure as for bleeding the brake line on each brake caliper. <Ref. to BR-63, PROCEDURE, Air Bleeding.>

Recommended brake fluid:
FMVSS No. 116, DOT3, or DOT4

NOTE:
Repeat the full stroke depressing operation of the brake pedal 20 times slowly on each brake caliper, until new brake fluid comes out from transparent vinyl tube.

12.Air Bleeding

A: PROCEDURE

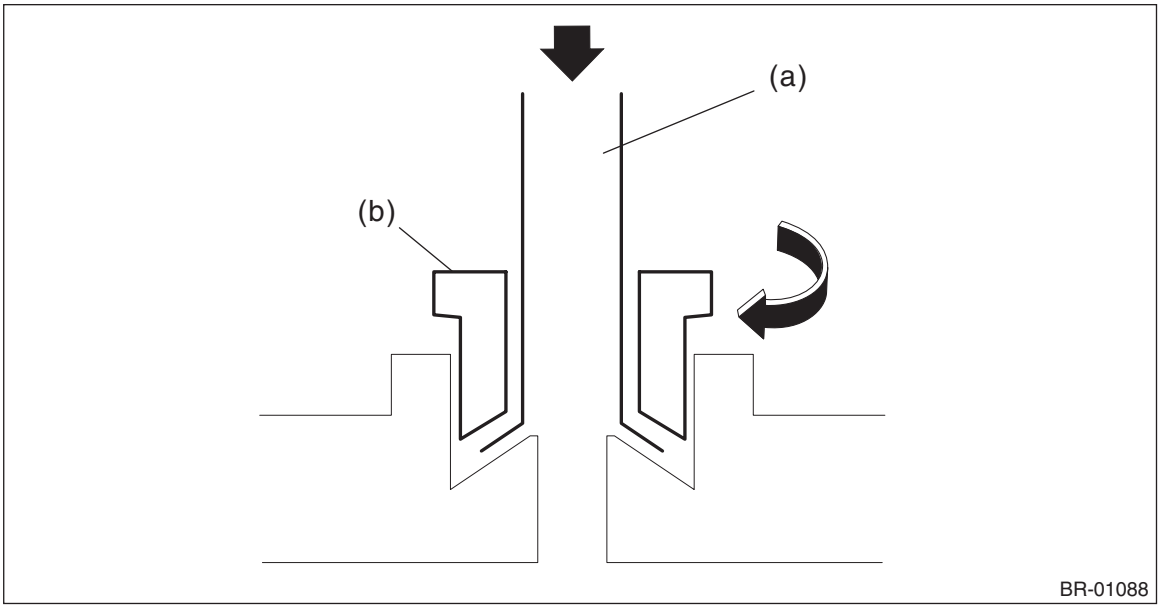
CAUTION:
• Do not let brake fluid come into contact with the painted surface of the vehicle body. Wash away with water immediately and wipe off if it is spilled by accident.
• Avoid mixing brake fluid of different brands or different grades even from the same brand to prevent fluid performance from degrading.
• Do not reuse drained brake fluid. When refilling brake fluid, always refill new brake fluid.
• Do not allow dirt or dust to get into the reservoir tank.
• Do not mix two different kinds or makes of fluid to prevent fluid performance from degrading.
• For convenience and safety, perform the work with 2 people.
• During the operation, keep the reservoir tank filled with brake fluid at MIN level or higher to prevent entry of air.
For air bleed procedure of each part, refer to the following.
- Master cylinder: <Ref. to BR-63, MASTER CYLINDER, PROCEDURE, Air Bleeding.>
- Brake line: <Ref. to BR-65, BRAKE LINE, PROCEDURE, Air Bleeding.>
- Hydraulic control unit: <Ref. to BR-66, HYDRAULIC CONTROL UNIT, PROCEDURE, Air Bleeding.>
- Caliper: <Ref. to BR-66, CALIPER, PROCEDURE, Air Bleeding.>

1. MASTER CYLINDER

NOTE:
• When the master cylinder assembly is replaced or the reservoir tank is empty, bleed the brake master cylinder and the clutch master cylinder (MT model).
For air bleed procedure of the clutch fluid, refer to “CLUTCH SYSTEM” section. <Ref. to CL-25, PROCEDURE, Clutch Fluid Air Bleeding.>
• If bleeding of the master cylinder assembly is not necessary, omit the following procedures, and perform bleeding of the brake line. <Ref. to BR-65, BRAKE LINE, PROCEDURE, Air Bleeding.>
1) Install the brake pipe to the master cylinder assembly.
(1) Screw and tighten the flare nut (b) so that the end of the nut contacts the back side of the brake pipe flare, while pressing the brake pipe (a) toward the master cylinder assembly side.

CAUTION:
Be careful not to make scratches or other damage to the inside surface of the brake pipe flare.

Tightening torque:
Brake pipe flare nut: 19 N·m (1.94 kgf-m, 14.0 ft-lb)



2) Fill the reservoir tank of the master cylinder assembly with brake fluid.

NOTE:
- Replenish brake fluid to the MAX level.
- During the operation, keep the reservoir tank filled with brake fluid at MIN level or higher to prevent entry of air.

3) Attach a transparent vinyl tube to the bleeder - screw of the right front caliper body assembly that is the closest from the VDC control module & hydraulic control unit, and the other end of the vinyl tube to a collection container.
4) Loosen the bleeder - screw, depress the brake pedal slowly and hold it.
5) Tighten the bleeder - screw, and release the brake pedal quickly.
6) Repeat steps 4) and 5) until there are no more air bubbles in the brake fluid in the vinyl tube.

NOTE:
Air bubbles are removed after repeating the procedures six to seven times.

7) Attach a transparent vinyl tube to the bleeder - screw of the left front caliper body assembly, and the other end of the vinyl tube to a brake fluid collection container.
8) Repeat steps 4) and 5) until there are no more air bubbles in the brake fluid in the vinyl tube.

NOTE:
- Air bubbles are removed after repeating the procedures seven to eight times.
- With the procedures so far, bleed is completed for the air that entered in the master cylinder, front brake piping hose passages and front caliper.

Next, perform the following procedures to bleed air that entered in the rear brake piping hose passages and rear caliper from the hydraulic unit.
9) Attach a transparent vinyl tube to the bleeder - screw of the left rear caliper body assembly, and the other end of the vinyl tube to a brake fluid collection container.
10) Loosen the bleeder - screw, and repeat the full stroke depressing operation of the brake pedal slowly, until the brake fluid in the transparent vinyl tube has no more air bubbles, then tighten the bleeder - screw.

NOTE:
By repeating the procedures 15 times or more, air that entered in the rear brake pipe passages from the VDC control module & hydraulic control unit reaches the bleeder - screw of the left rear caliper body assembly and is discharged.

11) Attach a transparent vinyl tube to the bleeder - screw of the right rear caliper body assembly, and the other end of the vinyl tube to a brake fluid collection container.
12) Perform step 10).

NOTE:
- By repeating the procedures 10 times or more, air that entered in the rear brake pipe passages from the VDC control module & hydraulic control unit reaches the bleeder - screw of the right rear caliper body assembly and is discharged.
- With the procedures so far, bleed is completed for the air that entered in the rear brake piping hose passages and rear caliper from the hydraulic unit.

Lastly, perform the following procedures to bleed air that may remain in areas where the brake fluid flow stands.
13) Attach a transparent vinyl tube to the bleeder - screw of the right front caliper body assembly, and the other end of the vinyl tube to a brake fluid collection container.
14) After repeating firmly depressing of the brake pedal quickly five or six times, depress and hold the pedal.
15) Loosen the bleeder - screw to drain brake fluid. When the brake pedal reaches the full stroke position, tighten the bleeder - screw quickly, and release the brake pedal.
16) Repeat steps 14) and 15) until there are no more air bubbles in the transparent vinyl tube.

NOTE:
Repeat the procedures approximately four to five times.

17) Repeat steps 14) to 16) above for each brake caliper.

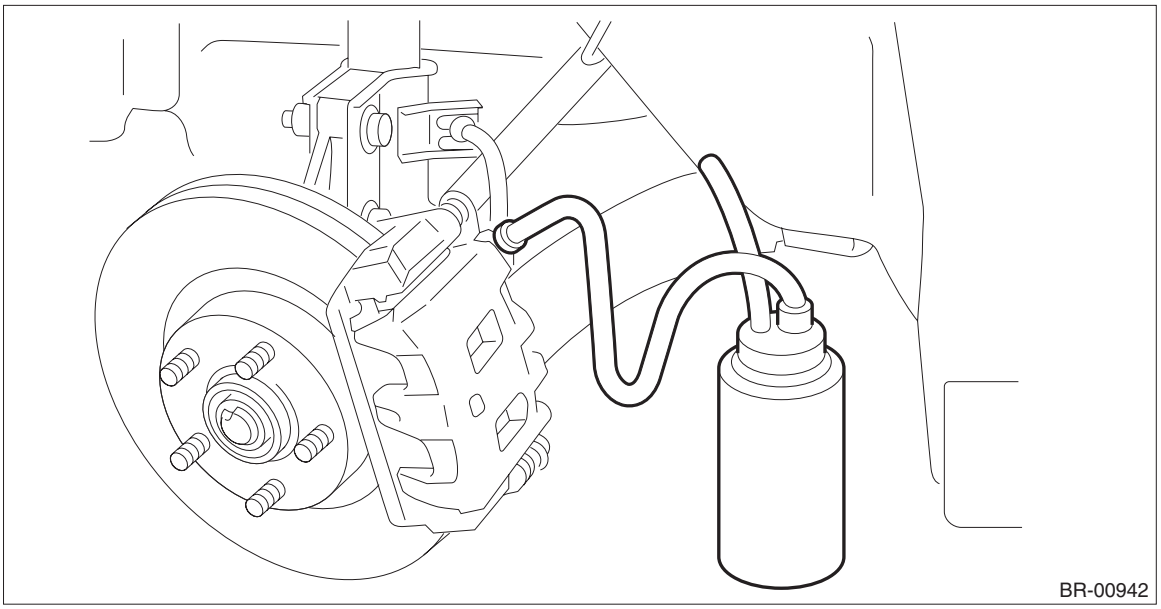
NOTE:
Bleed air in the order starting from the front RH → front LH → rear LH → rear RH.
18) Tighten the bleeder - screw to the specified torque.

Tightening torque:
Bleeder - screw: 8 N·m (0.82 kgf-m, 5.9 ft-lb)

2. BRAKE LINE

1) When the master cylinder assembly is replaced or the reservoir tank is empty, bleed the master cylinder assembly before bleeding the brake line. <Ref. to BR-63, MASTER CYLINDER, PROCEDURE, Air Bleeding.>
2) Fill the reservoir tank of the master cylinder assembly with brake fluid.

NOTE:
While bleeding air, keep the reservoir tank filled with brake fluid to prevent entry of air.
3) Attach one end of a transparent vinyl tube to the bleeder - screw, and the other end to a brake fluid collection container.



4) Loosen the bleeder - screw, and then repeat the full stroke depressing operation of the brake pedal, until brake fluid in the transparent vinyl tube has no more air bubbles.

NOTE:
Air bubbles are removed after repeating the depressing operation 15 times or more for the front caliper, and 20 times or more for the rear caliper.
5) Perform the steps 2) to 4) above on each brake caliper.

NOTE:
Perform in the order starting from the front RH → front LH → rear LH → rear RH.
6) Tighten the loosened bleeder - screw, repeat firmly depressing of the brake pedal 5 to 6 times, and then depress and hold the brake pedal.
7) Loosen the bleeder - screw to drain the brake fluid. When the brake pedal reaches the full stroke position, immediately tighten the bleeder - screw and return the brake pedal.
8) Repeat steps 6) and 7) until there are no more air bubbles in the transparent vinyl tube.
9) Perform the steps 6) to 8) above on each brake caliper.

NOTE:
Perform in the order starting from the front RH → front LH → rear LH → rear RH.

10) Operate the hydraulic control unit in the sequence control mode for both ABS and VDC systems.

CAUTION:
• If there is a possibility that air enters the pressure control section in the hydraulic control unit, perform steps 11) to 16).
• For normal air bleeding operation, do not operate the sequence control for the hydraulic control unit. (Operating the sequence control may let air in the normal air bleeding passages move to the pressure control section.)

NOTE:
• Normal air bleeding operation does not help bleed air that enters the pressure control section in the hydraulic control unit.
• If there is a possibility that air enters the pressure control section in the hydraulic control unit (if VDC or ABS operates with air contained in the normal air bleeding passage), perform the sequence control mode for both of the ABS and VDC systems.
11) Perform the ABS sequence control mode. <Ref. to VDC-27, ABS Sequence Control.>

CAUTION:
Be sure to perform the ABS sequence control mode first.
12) Perform the air bleeding operation of steps 3) and 4) for the bleeder - screw on each caliper.

NOTE:
• Perform in the order starting from the front RH → front LH → rear LH → rear RH.
• As a reference, the number of the full stroke depressing operation is six times.
13) Perform the VDC sequence control mode. <Ref. to VDC-30, VDC Sequence Control.>
14) Perform the air bleeding operation of steps 3) and 4) for the bleeder - screw on each caliper.
15) Repeat from steps 11) to 14) for three cycles.
16) In case air still remains at step 15), repeat steps 11) to 14) again until all air is removed.
17) Fill the reservoir tank with brake fluid up to the “MAX” level.
18) Tighten the bleeder - screw to the specified torque.

Tightening torque:
Bleeder - screw: 8 N·m (0.82 kgf-m, 5.9 ft-lb)
19) Check that there are no brake fluid leaks at the flare nut portion or in the entire brake system.
20) Perform a road test and ensure that the brakes operate normally.

3. HYDRAULIC CONTROL UNIT

1) Bleed air from the brake line. <Ref. to BR-65, BRAKE LINE, PROCEDURE, Air Bleeding.>

NOTE:
If there is a possibility that air enters the pressure control section in the hydraulic control unit, perform the sequence control mode for both of the ABS and VDC systems. (Refer to steps 10) to 16) for brake lining.)

4. CALIPER

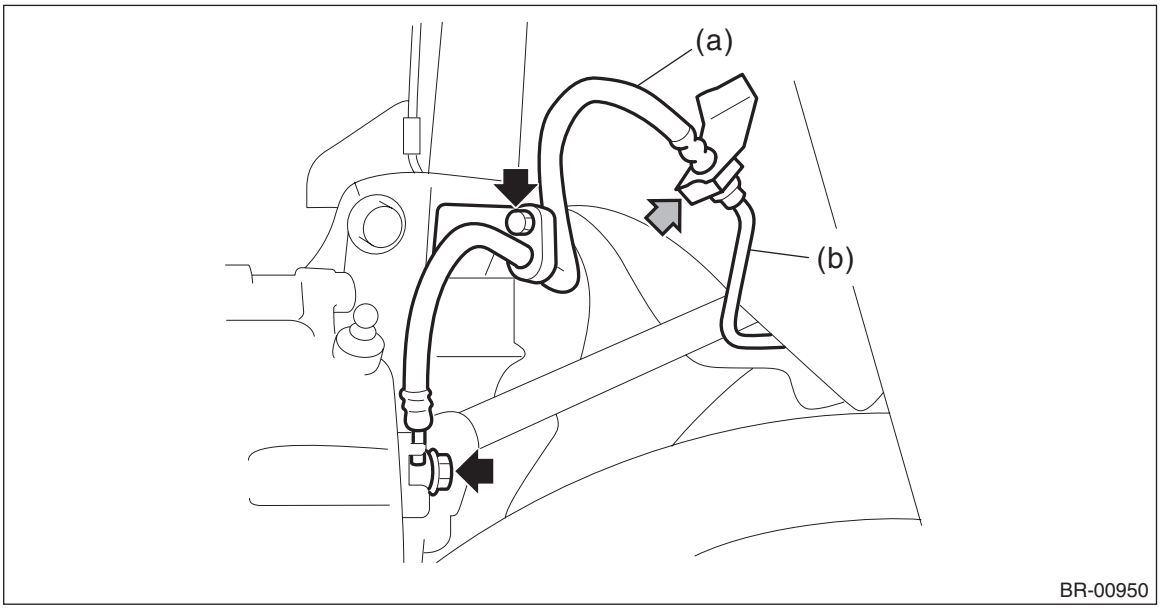
1) Bleed air from the brake line. <Ref. to BR-65, BRAKE LINE, PROCEDURE, Air Bleeding.>

13.Brake Hose

A: REMOVAL

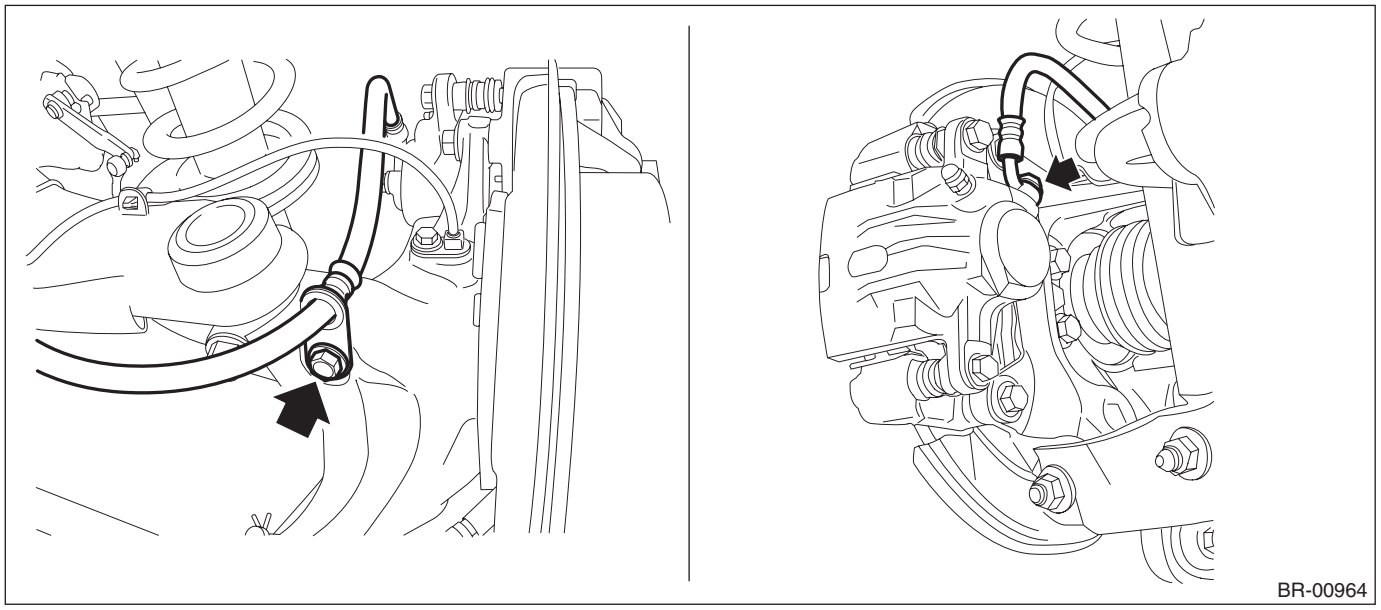
1. FRONT BRAKE HOSE

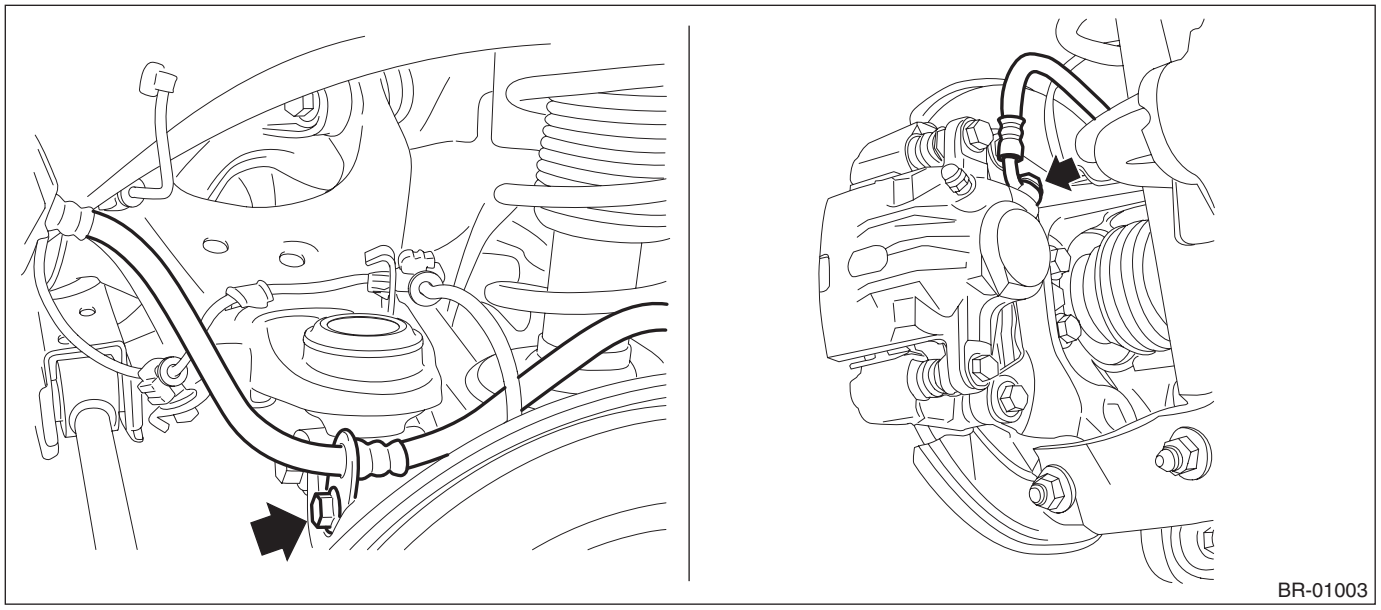
1) Separate the brake pipe (b) from brake hose (a) using a flare nut wrench.
2) Remove the clamp, strut mounting bolt and union bolt, and remove the front brake hose.



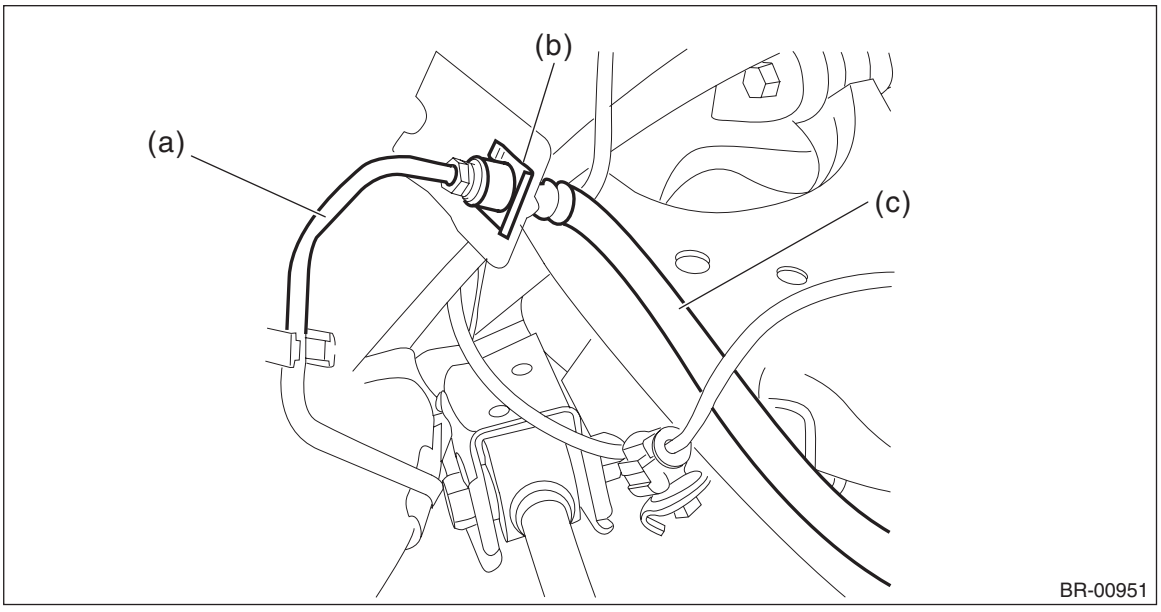
2. REAR BRAKE HOSE

1) Remove the brake hose bracket bolt and union bolt.





2) Separate the brake pipe (a) using a flare nut wrench.
3) Remove the brake hose clamp (b), and remove the rear brake hose (c).



B: INSTALLATION

1. FRONT BRAKE HOSE

1) Secure the brake hose to strut mount.

Tightening torque:
Brake hose: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

2) Connect the brake hose to the front caliper body assembly using a new gasket.

Tightening torque:
Union bolt: 26 N·m (2.65 kgf-m, 19.2 ft-lb)

3) Position the disc in straight position and route the brake hose through the hole in the bracket on the wheel apron side.

CAUTION:
Do not twist the brake hose.

4) Temporarily tighten the flare nut which connects brake pipe and hose.
5) Secure the brake hose to wheel apron bracket with clamp.
6) Tighten the flare nut to the specified torque.

Tightening torque:
Brake pipe flare nut: 15 N·m (1.53 kgf-m, 11.1 ft-lb)

7) Bleed air from the brake system. <Ref. to BR-63, PROCEDURE, Air Bleeding.>

2. REAR BRAKE HOSE

1) Route the brake hose through the hole of bracket, and lightly tighten the flare nut to connect brake pipe.
2) Insert the clamp to secure brake hose.

Tightening torque:
Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

3) Install the brake hose to rear caliper body using a new gasket.

Tightening torque:
Union bolt: 26 N·m (2.65 kgf-m, 19.2 ft-lb)

4) Tighten the flare nut to the specified torque.

Tightening torque:
Brake pipe flare nut: 15 N·m (1.53 kgf-m, 11.1 ft-lb)

5) Bleed air from the brake system. <Ref. to BR-63, PROCEDURE, Air Bleeding.>

C: INSPECTION

Check the hose for crack, interference with other parts, damage, and fluid leakage on connecting sections. If any faulty is found, repair or replace the relevant part.

14.Brake Pipe

A: REMOVAL

CAUTION:
- **Be careful of the following items. Failure to do so may cause the airbag system malfunction.**
  – Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. When using a tester on these circuits, follow the cautions of "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
  – Be careful not to damage the airbag system wiring harness when servicing the electrical parts around the steering column.
- **Be careful not to damage the airbag system wiring harness when servicing the center brake pipe.**
- **When removing the brake pipe, do not bend.**

NOTE:
The airbag system wiring harness is routed near the center brake pipe.

B: INSTALLATION

CAUTION:
- **Be careful of the following items. Failure to do so may cause the airbag system malfunction.**
  – Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. When using a tester on these circuits, follow the cautions of "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
  – Be careful not to damage the airbag system wiring harness when servicing the electrical parts around the steering column.
- **Be careful not to damage the airbag system wiring harness when servicing the center brake pipe.**
- **When removing the brake pipe, do not bend.**
- **After installing the brake pipe and hose, perform air bleed.**
- **After installing the brake hoses, make sure that they do not contact the tires or suspension assembly, etc.**

NOTE:
The airbag system wiring harness is routed near the center brake pipe.

Tightening torque:
Front brake pipes & hoses: <Ref. to BR-7, FRONT BRAKE PIPES AND HOSES, COMPONENT, General Description.>
Center & rear brake pipes and hoses: <Ref. to BR-9, CENTER AND REAR BRAKE PIPES AND HOSES, COMPONENT, General Description.>

C: INSPECTION

Check the pipe for crack and damage, and also check the connection for fluid leakage. If any faulty is found, repair or replace the relevant part.

NOTE:
Use a mirror when inspecting back sides and other locations which are hard to see.

15.Brake Pedal

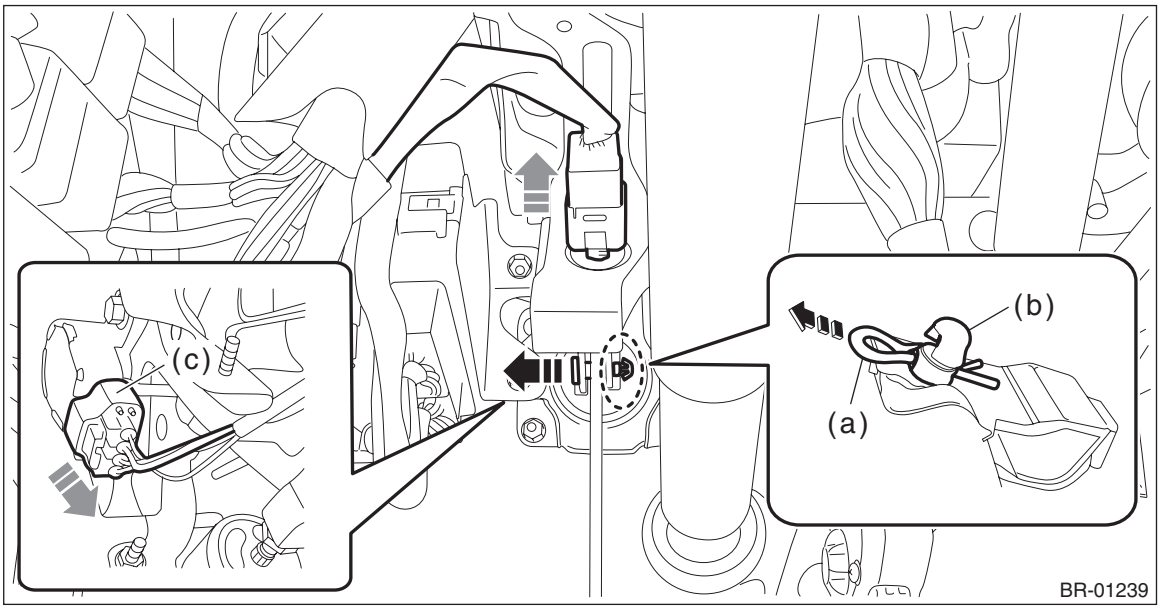
A: REMOVAL

1. CVT MODEL

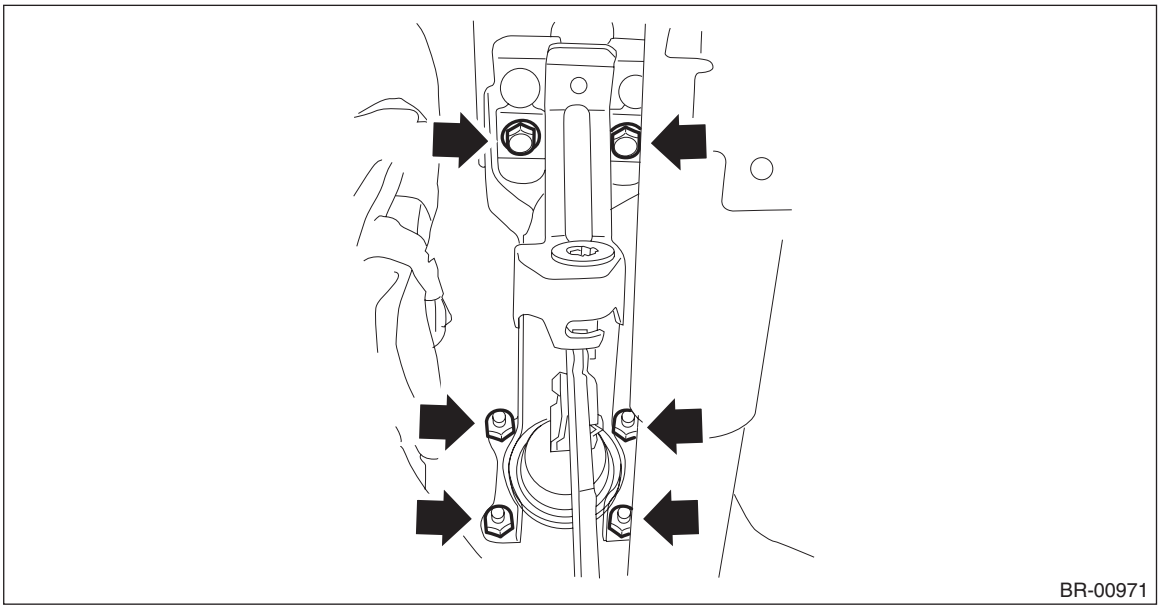
CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the column assembly - steering. <Ref. to PS-21, REMOVAL, Steering Column.>
5) Remove the brake pedal assembly.
   (1) Disconnect the stop light switch connector.
   (2) Disconnect the brake stroke sensor connector (c). (HEV model)
   (3) Remove the snap pin (a) and clevis pin (b), and remove the operating rod from the brake pedal.

CAUTION:
- **Be careful not to apply excessive force to the operating rod when handling the operating rod. The angle may change by ±3°, and it may result in damage to power piston cylinder.**
- **Do not change the push rod length.**



(4) Remove the bolt and nut, and then detach the brake pedal assembly.



2. MT MODEL

NOTE:
Brake pedal is integrated with the clutch pedal.
For removal procedures of the brake pedal, refer to Clutch section. <Ref. to CL-26, REMOVAL, Clutch Pedal.>

B: INSTALLATION

CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Install each part in the reverse order of removal.

CAUTION:
- **Apply grease to the snap pin to prevent the operating rod from wear.**
- **Replace the clevis pin with new parts, and apply thin coat of NIGTIGHT LYW No. 2 grease to the clevis pin.**

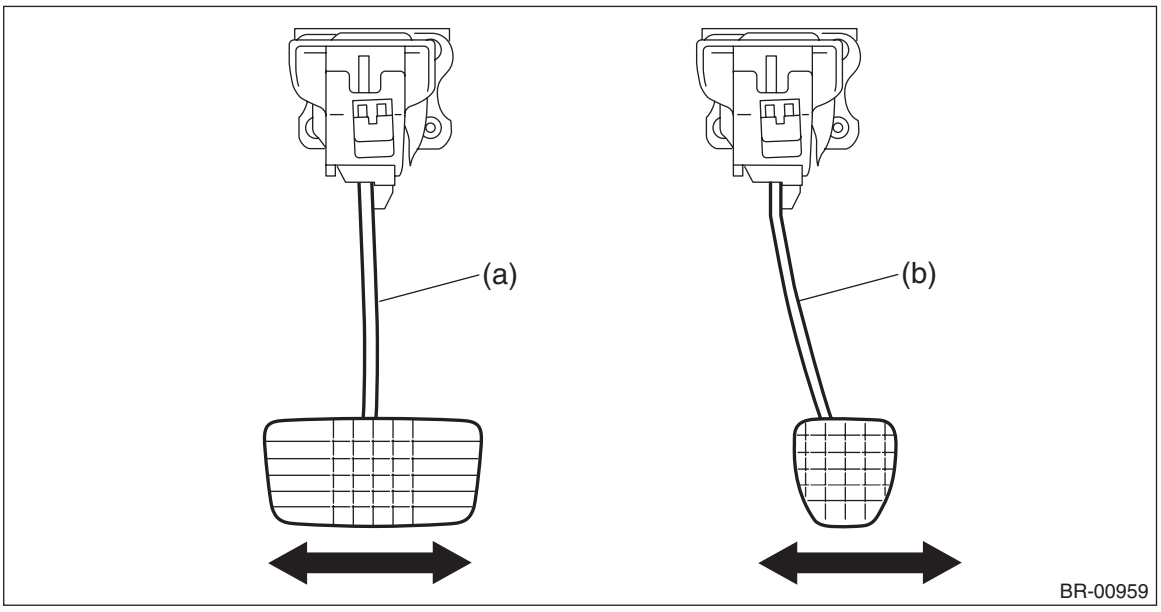
Tightening torque:
Brake pedal: 18 N·m (1.84 kgf-m, 13.3 ft-lb)
Knee airbag module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
2) Check that the brake light operate properly.
3) Check the brake pedal after installation. <Ref. to BR-73, INSPECTION, Brake Pedal.>

C: INSPECTION

1) Move the pad - brake pedal in a horizontal direction with a force of approx. 10 N (1 kgf, 2 lbf), and check that the pedal deflection is in the range of specifications.

CAUTION:
If excessive deflection is noted, replace with a new bushing.

Deflection of brake pedal:
Wear limit: 5.0 mm (0.197 in) or less

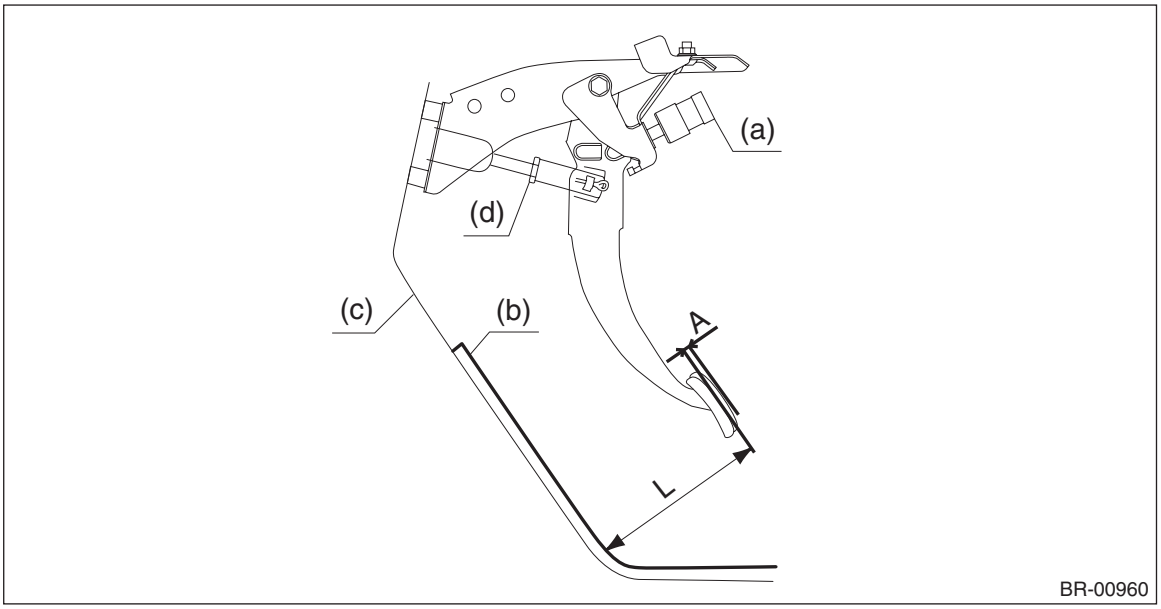


(a) Brake pedal (except for MT model) (b) Brake pedal (MT model)

2) Check the position of the pedal pad.

Pedal height L:
140 — 150 mm (5.51 — 5.91 in)

Brake pedal free play A:
0.5 — 2.7 mm (0.02 — 0.11 in) [When pulling the brake pedal upward with a force of less than 10 N (1 kgf, 2 lbf).]



(a) Stop light switch
(b) Mat
(c) Toe board
(d) Brake booster operating rod

3) If it is not within the specification, loosen the lock nuts of vacuum booster operating rod, and rotate the rod to adjust the pedal height L within the specification.
4) Tighten the lock nut.

Tightening torque:
Operating lock nut: 22 N·m (2.24 kgf-m, 16.2 ft-lb)

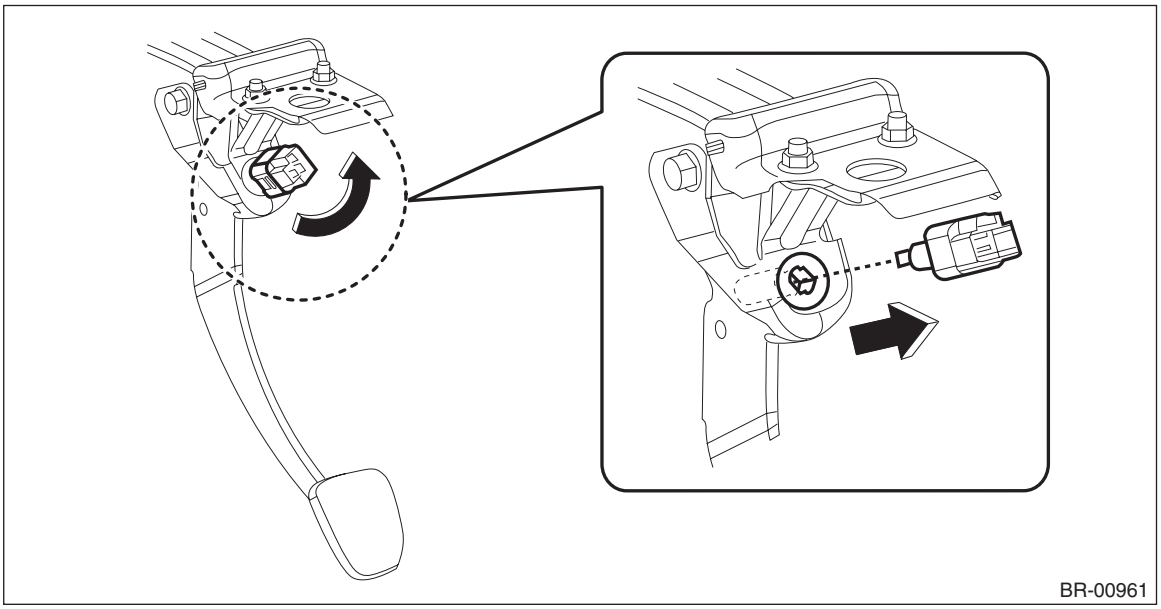
NOTE:
Check the brake pedal height. When adjusting, also adjust the stop light switch.

16.Stop Light Switch

A: REMOVAL

CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the stop light switch.
   (1) Disconnect the stop light switch connector.
   (2) Remove the stop light switch by turning it counterclockwise.



B: INSTALLATION

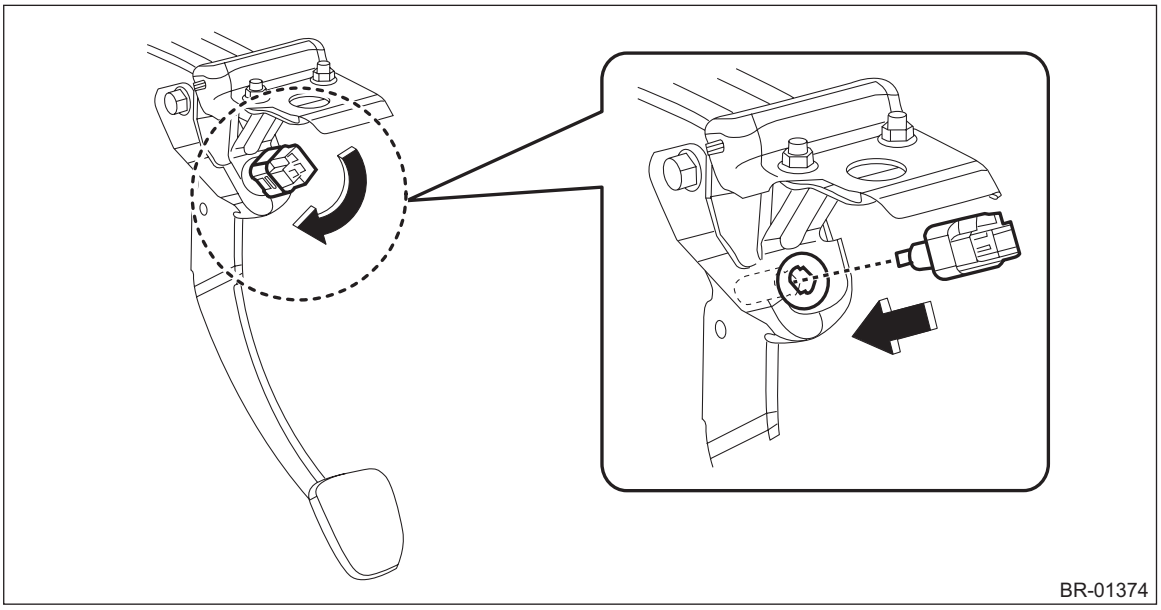
1. BULB TYPE

1) Install the stop light switch.

CAUTION:
- **Turn the stop light switch clockwise when installing so that it can return backward by approximately 1 mm (0.04 in) and clearance is automatically adjusted.**
- **If it is hard to turn the switch, reduce the switch pushing force and turn it again.**

   (1) While pulling up the brake pedal toward you, contact the stop light switch to the stopper and temporarily install it by rotating it clockwise.
   (2) Adjust the stop light switch position, and install it. <Ref. to BR-79, ADJUSTMENT, Stop Light Switch.>

(3) Install the stop light switch connector.



2) Install the cover assembly - instrument panel LWR driver.
3) Connect the battery ground terminal.
4) Check that the brake light operate properly.
5) Check the stop light switch operation.
(1) Turn the ignition switch to OFF and connect the Subaru Select Monitor.
(2) Start the engine and warm it up to a sufficient temperature.

NOTE:
Perform the following operations with the engine running.
(3) Display the data of «Brake Switch» and «Pressure Sensor Output» by following the Subaru Select Monitor display screen.
(4) Check that the stop light switch is ON with the brake pedal not depressed.
(5) Quickly depress the brake pedal 5 times.
(6) Slowly release the brake pedal depressed at the fifth time and check that the master cylinder pressure is within the standard value when the stop light switch changes from ON to OFF.

Specification:
Less than 1 Mpa (10 bar)

2. LED TYPE

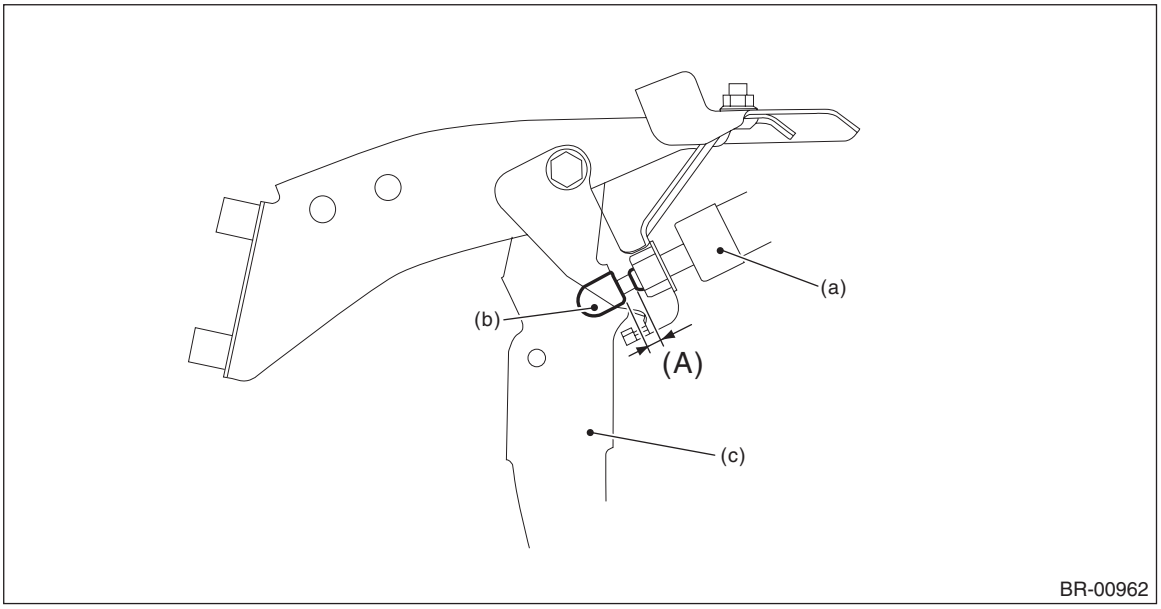
1) Adjust the stop light switch position, and then secure the stop light switch by turning it clockwise. <Ref. to BR-79, ADJUSTMENT, Stop Light Switch.>
2) Install each part in the reverse order of removal.
3) Check the stop light switch operation.

C: INSPECTION

1. CLEARANCE CHECK

NOTE:
Check for clearance is applied only to LED model.
1) Measure the clearance between the end of the stop light switch and the stopper.

Specification:
Clearance (A) of the stop light switch: 1 mm — 2 mm (0.04 in — 0.08 in)



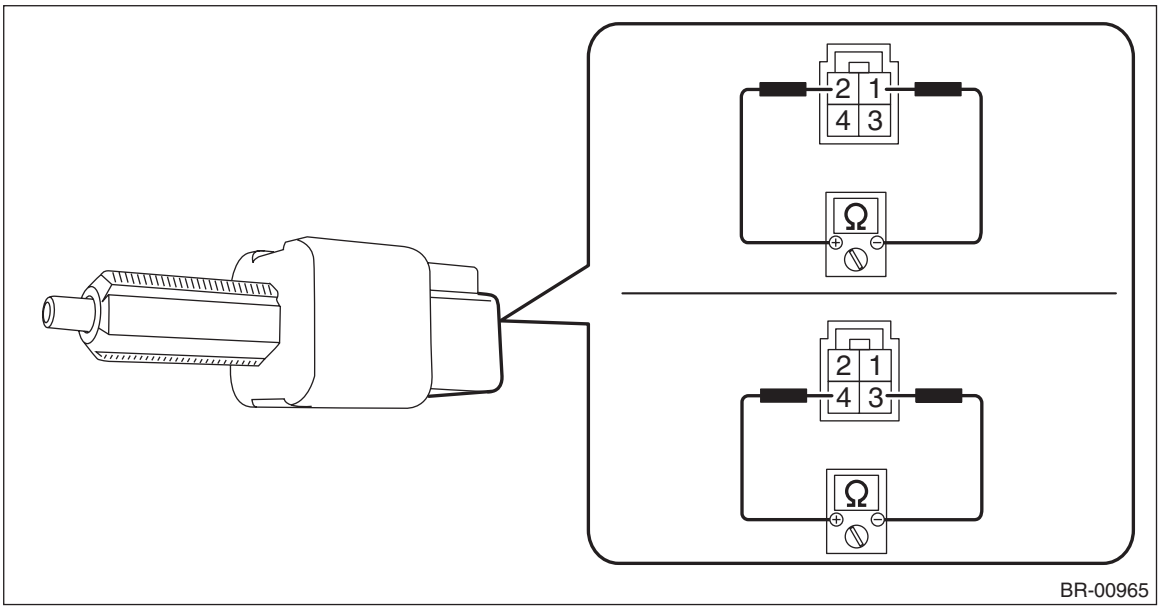
(a) Stop light switch (b) Stopper (c) Brake pedal

2) Adjust the position of the stop light switch if the inspection result is not within the standard value. <Ref. to BR-79, ADJUSTMENT, Stop Light Switch.>

2. CHECK RESISTANCE

1) Disconnect the stop light switch connector.
2) Measure the resistance between stop light switch terminals.

Preparation tool:
Circuit tester



- Bulb type

Terminal No.	Inspection conditions	Standard
1 — 2	When brake pedal is depressed	1 MΩ or more
	When brake pedal is released	Less than 1 Ω
3 — 4	When brake pedal is depressed	Less than 1 Ω
	When brake pedal is released	1 MΩ or more

- LED type

Terminal No.	Inspection conditions	Standard
1 — 2	When brake pedal is depressed	Less than 1 Ω
	When brake pedal is released	1 MΩ or more
3 — 4	When brake pedal is depressed	1 MΩ or more
	When brake pedal is released	Less than 1 Ω

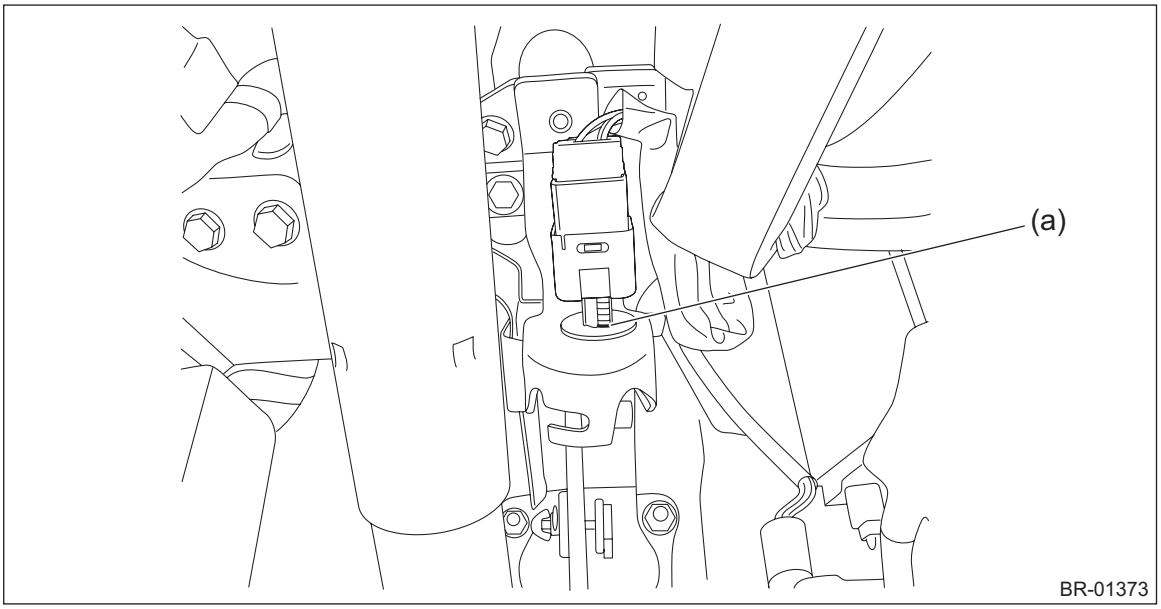
3) Replace the stop light switch if the inspection result is not within the standard value.

D: ADJUSTMENT

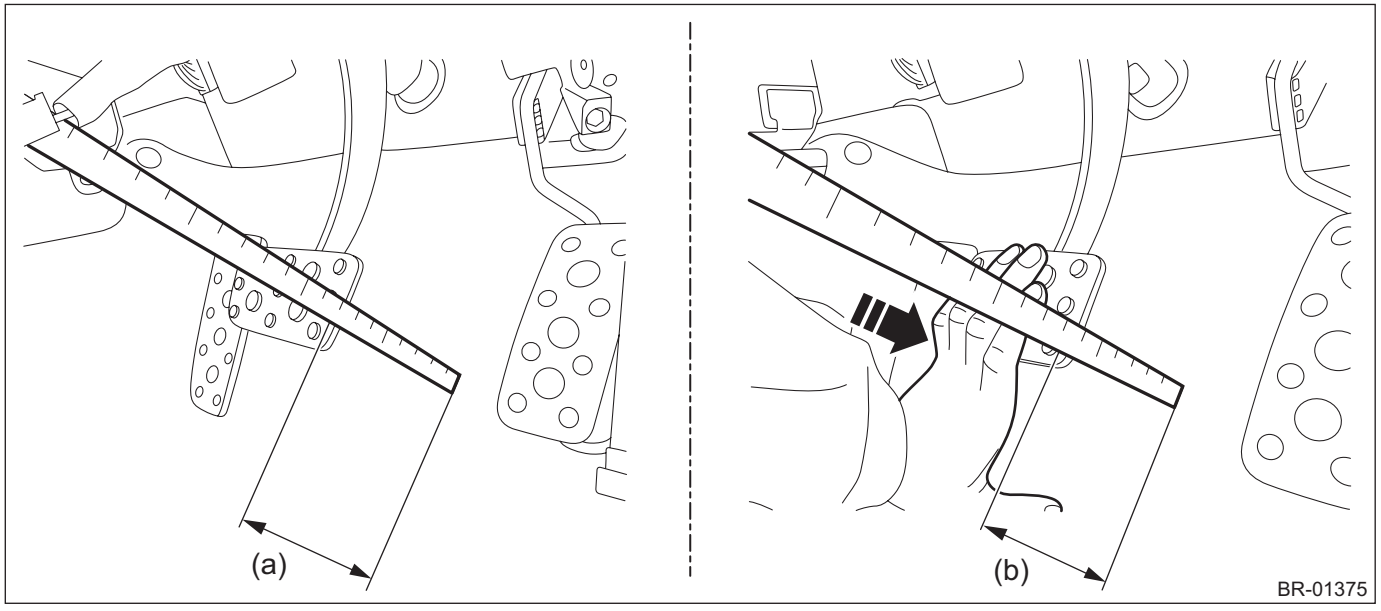
1. BULB TYPE

CAUTION:
• Turn the stop light switch clockwise when installing so that it can return backward by approximately 1 mm (0.04 in) and clearance is automatically adjusted.
• If it is hard to turn the switch, reduce the switch pushing force and turn it again.
• After adjustment, if the pedal stroke is less than 3 mm (0.12 in), it may lead to an incorrect light illumination by vibrations etc.

1) Mark the threaded portion of the stop light switch (a).



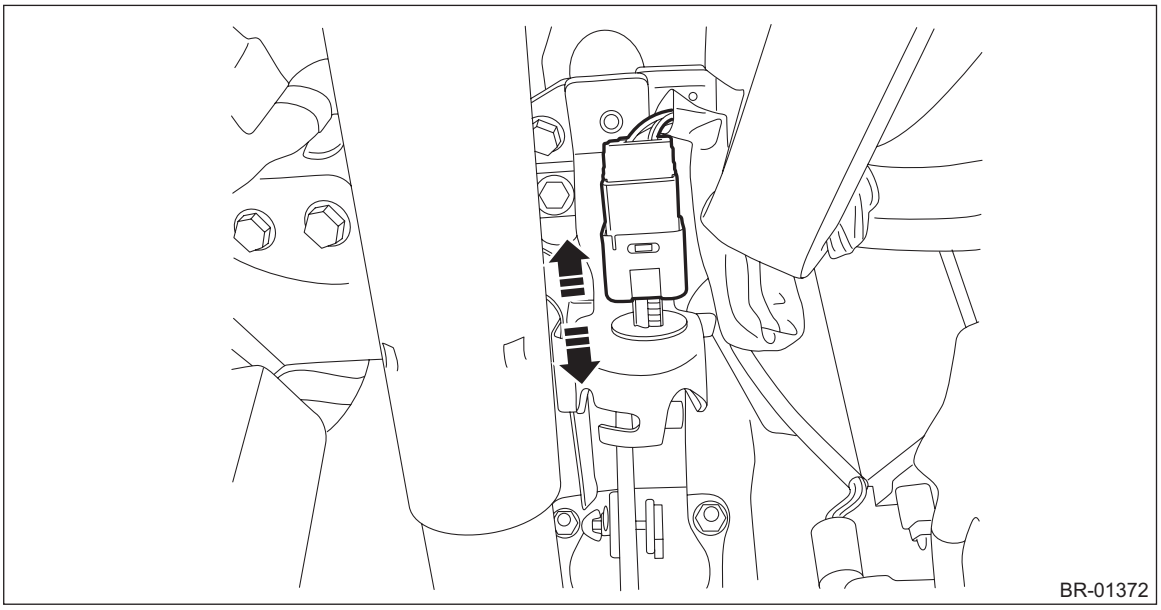
2) Measure the brake pedal stroke which turns on the stop light switch.
   (1) Measure the distance (a) from the floor mat to the end of brake pedal pad.
   (2) Hold the pedal to a position that the stop light illuminates, and measure the distance (b) from the floor mat to the end of brake pedal pad.
   (3) Calculate the difference (stroke value) between the values (a) and (b) measured as above.



3) Adjust so that the calculated difference of stroke value fit within the specified value, and install the stop light switch.

Specification:
3 mm (0.12 in) or more, less than 8 mm (0.31 in)

NOTE:
Pedal stroke volume per a pitch becomes approx. 5 mm (0.2 in).

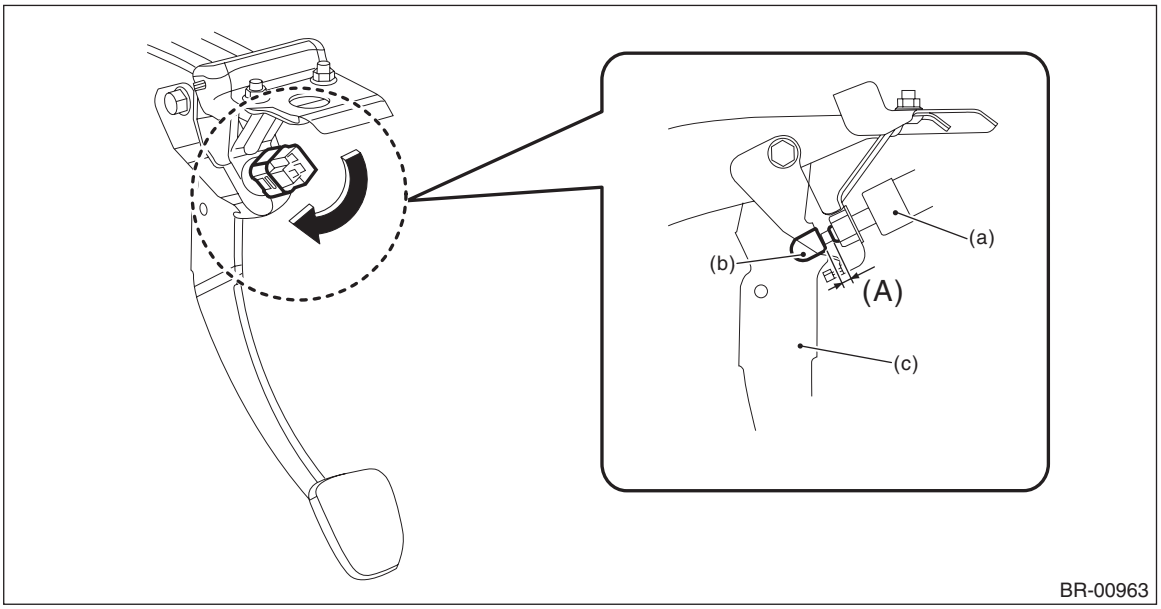


4) After adjustment, make sure that the stop light switch illuminates normally.

2. LED TYPE

1) While pulling up the brake pedal (c) toward you, insert the switch - stop light (a) until it reaches the stopper (b).
2) Install the switch - stop light by turning it clockwise.

CAUTION:
Turn the stop light switch clockwise when installing so that it can return backward by approximately 1 mm (0.04 in) and clearance is automatically adjusted.
Insert until it contacts the stopper, and make sure that clearance (A) of the end of stop light switch and the stopper is 1 mm — 2 mm (0.04 in — 0.08 in).



(a) Stop light switch (b) Stopper (c) Brake pedal

3) After adjustment, make sure that the stop light switch illuminates normally.

17.Brake Vacuum Pump

A: REMOVAL

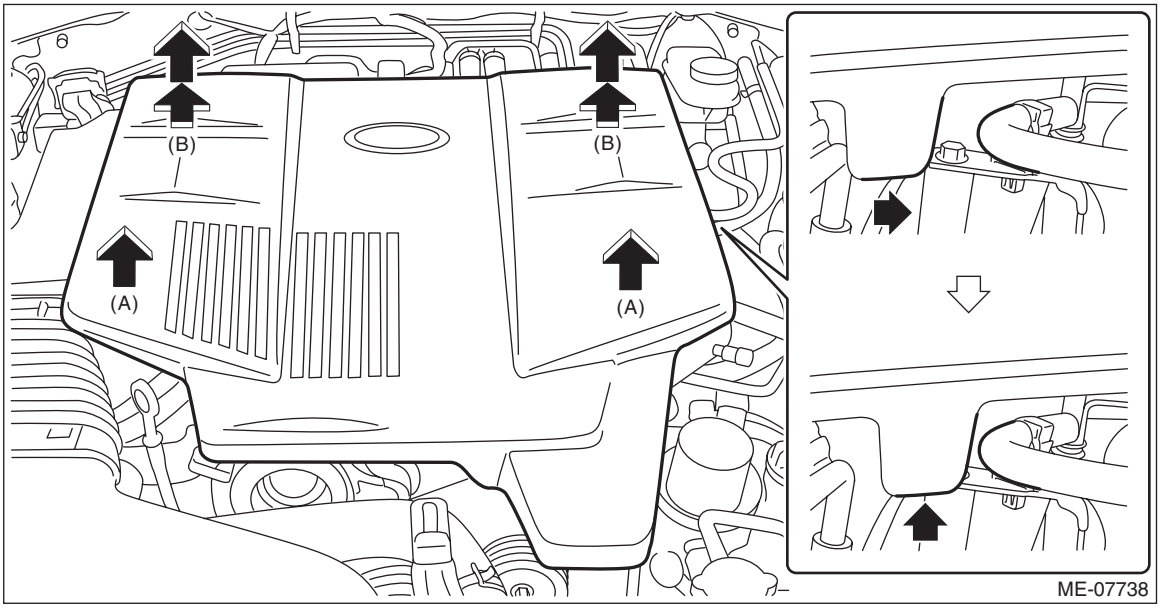
1. BRAKE VACUUM PUMP

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

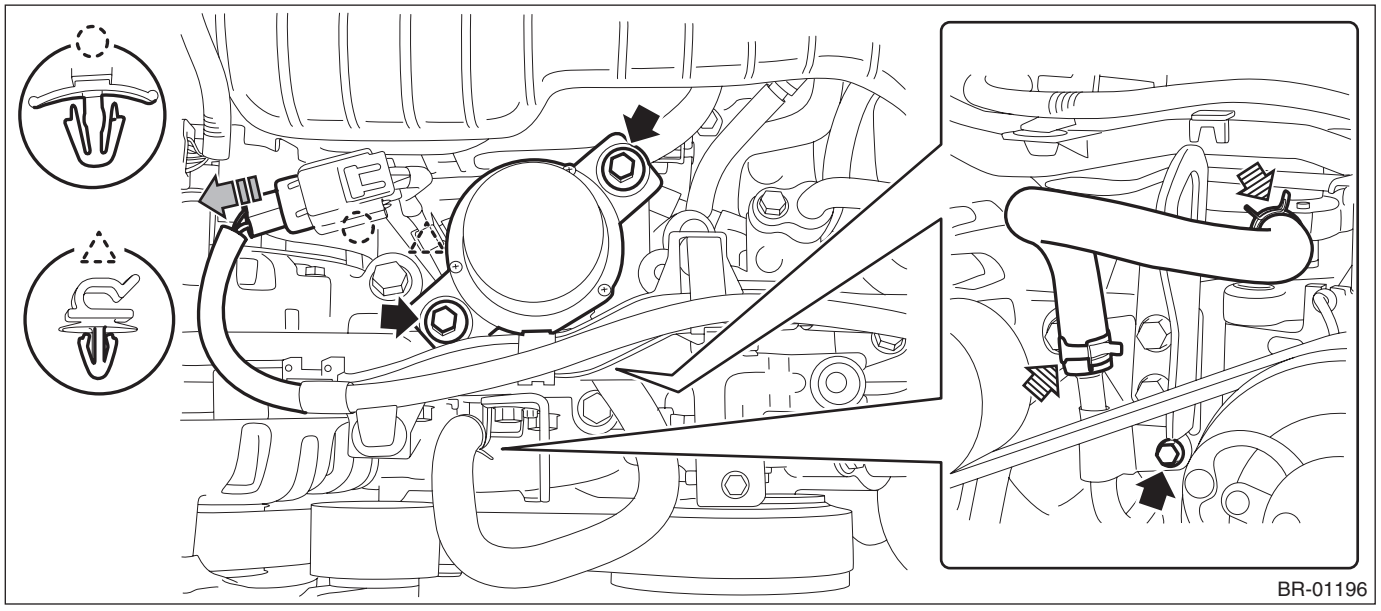
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

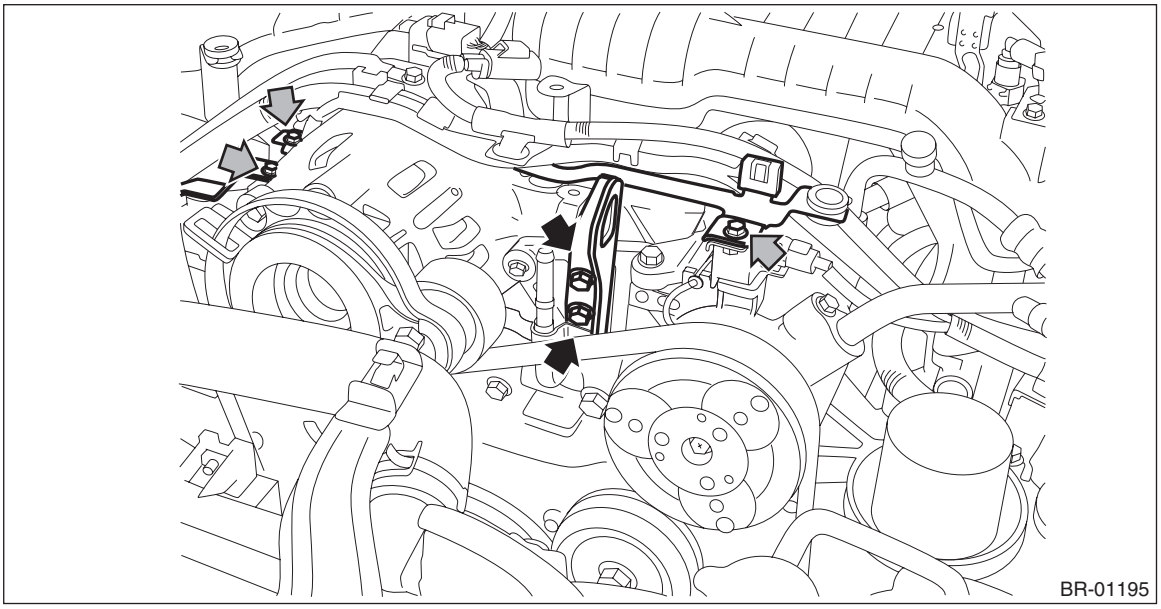
NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



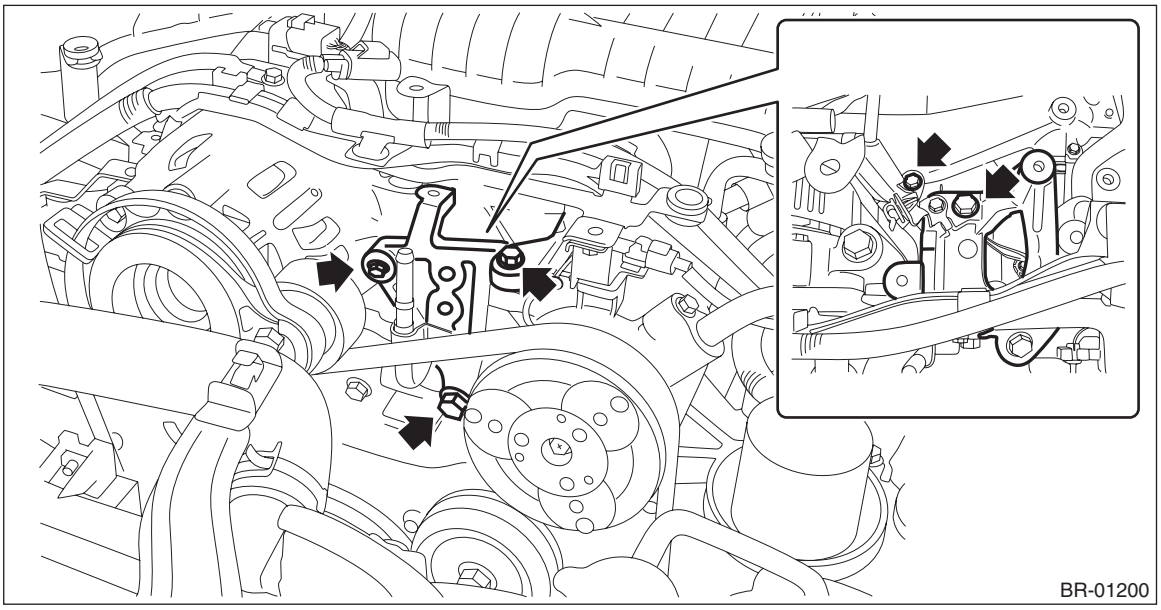
3) Remove the brake vacuum pump.
   (1) Remove the clamp and remove the vacuum hose.
   (2) Remove the connector and the connector clip, and then remove the harness from the harness clip.
   (3) Remove the brake vacuum pipe bracket bolts which are installed to the engine hanger.
   (4) Remove the bolt, and remove the brake vacuum pump.



4) Remove the bolts, and remove the engine hanger.
5) Remove the bolts, and make a clearance between the harness bracket and the brake vacuum pump bracket.



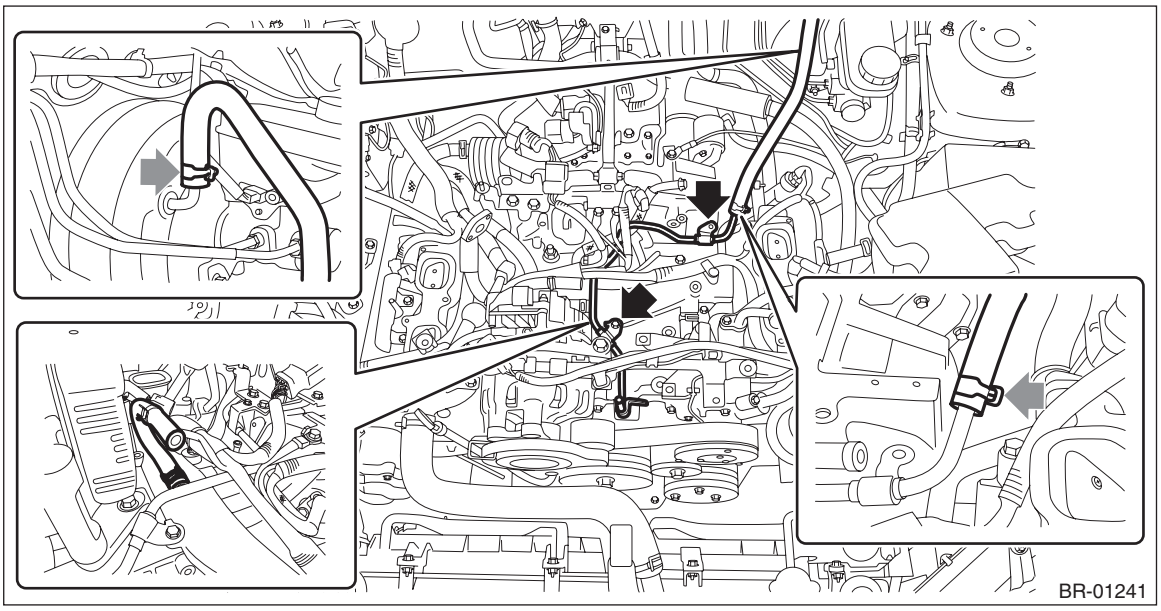
6) Remove the bolt, and remove the brake vacuum pump bracket.



2. BRAKE VACUUM PIPE AND HOSE

1) Remove the brake vacuum pump. <Ref. to BR-82, BRAKE VACUUM PUMP, REMOVAL, Brake Vacuum Pump.>
2) Remove the intake manifold. <Ref. to FU(H4DO(HEV))-20, REMOVAL, Intake Manifold.>
3) Remove the brake vacuum pipe.

CAUTION:
Be careful not to damage the engine harness.
(1) Remove the clamp, and then remove the brake vacuum hose.
(2) Remove the bolt, and remove the brake vacuum pipe.



B: INSTALLATION

1. BRAKE VACUUM PUMP

CAUTION:
If the brake vacuum pump is reused, clean the vacuum hose mounting section of the pump before installation. If it is not cleaned, a malfunction of pump or disconnection of hose may result.
Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to BR-14, BRAKE VACUUM PUMP, COMPONENT, General Description.>

2. BRAKE VACUUM PIPE AND HOSE

Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to BR-14, BRAKE VACUUM PUMP, COMPONENT, General Description.>

C: INSPECTION

1. BRAKE VACUUM PUMP

Refer to "Read Diagnostic Trouble Code (DTC)" of "BRAKE VACUUM CONTROL". <Ref. to HEV(diag)-23, OPERATION, Read Diagnostic Trouble Code (DTC).>

2. BRAKE VACUUM PIPE AND HOSE

- Check the pipe for cracks or damage. Replace the brake vacuum pipe if it is found defective.
- Check to see that air only flows in one direction, when air is blown into or sucked from the hose. Replace the brake vacuum hose if it is found defective.
- Make sure that there is no foreign matter inside the pipe and hose.

18.General Diagnostic Table

A: INSPECTION

	Trouble and possible cause	Corrective action
1. Insufficient braking	(1) Fluid leakage from the hydraulic mechanism	Repair or replace. (cup, piston seal, piston boot, master cylinder piston kit, pipe or hose)
	(2) Entry of air into the hydraulic mechanism	Bleed air.
	(3) Wear, deteriorated surface material, water or fluid on lining	Replace, grind or clean.
	(4) Improper operation of master cylinder assembly, disc caliper, vacuum booster assembly or check valve	Repair or replace.
2. Unstable or uneven braking	(1) Fluid on lining or rotor	Correct the cause of fluid leakage, and clean or replace.
	(2) Rotor defective	Repair or replace the rotor.
	(3) Improper lining contact, deteriorated surface, deteriorated or worn lining material	Repair by grinding, or replace.
	(4) Deformed back plate	Repair or replace.
	(5) Overinflation of tires	Adjust the air pressure.
	(6) Defective wheel alignment	Adjust alignment.
	(7) Loose back plate or support installation bolt	Tighten to the specified torque.
	(8) Defective hub unit COMPL	Replace.
	(9) Defective hydraulic system	Replace the cylinder, brake pipe or hose.
	(10) Unstable performance of the parking brake	Check, adjust or replace the rear brake and cable system.
	(11) Defective brake stroke sensor (HEV model)	Replace the brake pedal assembly.
3. Excessive pedal stroke	(1) Entry of air into the hydraulic mechanism	Bleed air.
	(2) Excessive play in the master cylinder push rod	Adjust.
	(3) Fluid leakage from the hydraulic mechanism	Repair or replace. (cup, piston seal, piston boot, master cylinder piston kit, pipe or hose)
	(4) Improper lining contact or worn lining	Repair or replace.
4. Brake dragging or improper brake return	(1) Insufficient pedal play	Adjust play.
	(2) Improper master cylinder return	Clean or replace the cylinder.
	(3) Clogged hydraulic system	Replace.
	(4) Improper return or adjustment of parking brake	Repair or adjust.
	(5) Weakened spring tension or breakage of shoe return spring	Replace the spring.
	(6) Improper disc caliper operation	Repair or replace.
	(7) Faulty wheel bearing	Replace.
	(8) Defective brake stroke sensor (HEV model)	Replace the brake pedal assembly.
5. Brake noise (1) (creaking sound)	(1) Hardened or deteriorated brake pad	Replace the pad.
	(2) Worn brake pad	Replace the pad.
	(3) Loose back plate or support installation bolt	Tighten to the specified torque.
	(4) Loose hub unit COMPL	Tighten to the specified torque.
	(5) Dirty rotor	Clean the rotor, or clean and replace brake assembly.
6. Brake noise (2) (hissing sound)	(1) Worn brake pad	Replace the pad.
	(2) Improperly installed pad	Correct or replace the pad.
	(3) Loose or bent rotor	Retighten or replace.
7. Brake noise (3) (click sound)	Excessively worn pad or support	Replace the pad or the support.

PARKING BRAKE

PB

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2. Parking Brake Lever 4
3. Parking Brake Cable 8
4. Parking Brake Assembly (Rear Disc Brake) 11
5. General Diagnostic Table 18

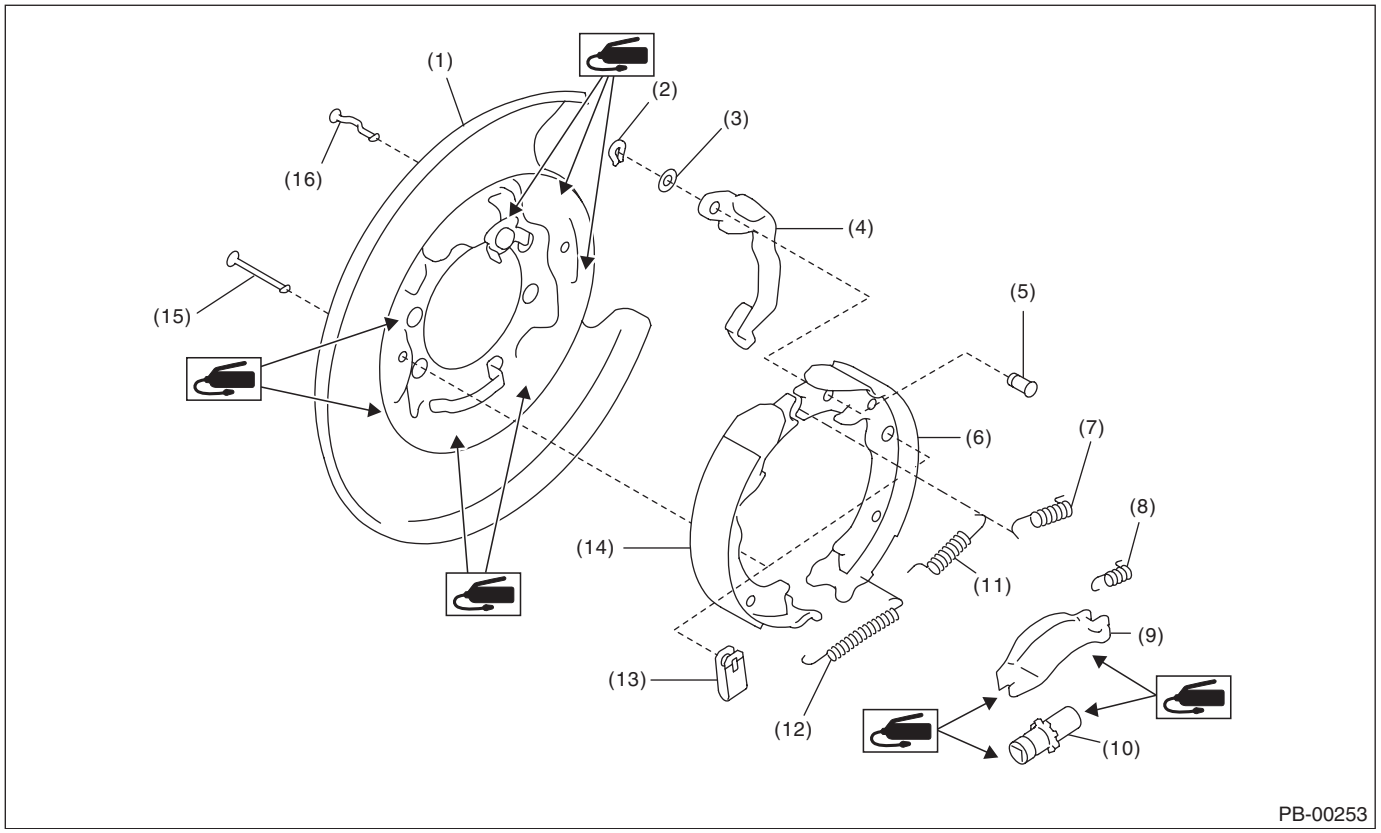
1. General Description

A: SPECIFICATION

Model		Rear disc brake
Type		Mechanical, drum in disc rear brakes
Effective drum diameter	mm (in)	170 (6.69)
Lining dimensions (Length × Width × Thickness)	mm (in)	147.7 × 30.0 × 3.5 (5.81 × 1.181 × 0.14)
Clearance adjustment		Manual adjustment
Lever stroke	Notches/N (kgf, lbf)	7 — 8/200 (20.4, 45)

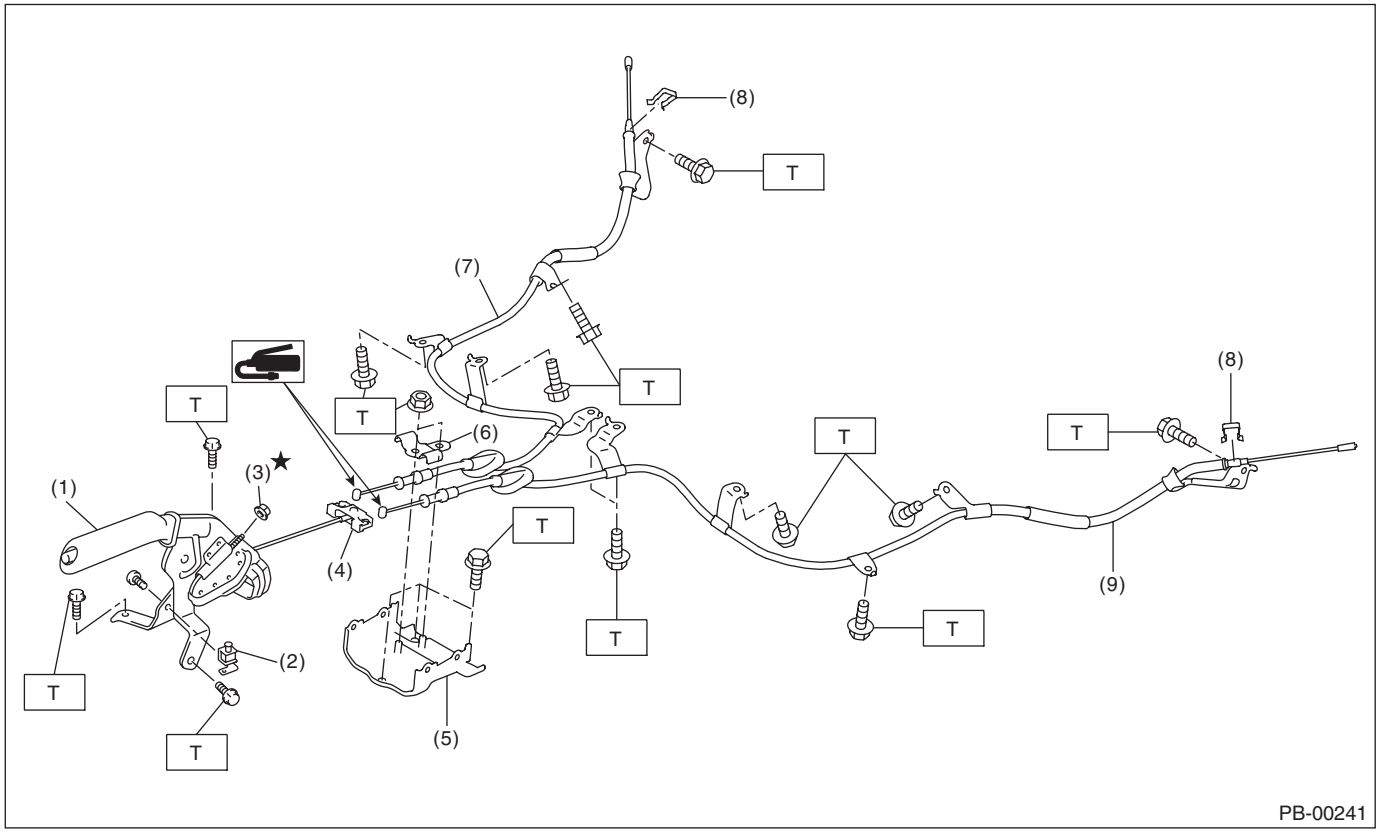
B: COMPONENT

1. PARKING BRAKE (REAR DISC BRAKE)



(1) Back plate - rear brake
(2) Retainer - rear brake
(3) Spring washer - rear brake
(4) Parking lever - rear
(5) Pin - parking lever
(6) Parking brake shoe (secondary)
(7) Spring - secondary shoe return
(8) Spring - strut
(9) Strut - brake
(10) Adjuster ASSY - rear brake
(11) Spring - primary shoe return
(12) Spring - adjuster
(13) Cup - shoe hold-down
(14) Parking brake shoe (primary)
(15) Pin - primary shoe hold-down
(16) Pin - secondary shoe hold-down

2. PARKING BRAKE LEVER & CABLE



(1) Lever assembly - hand brake
(2) Switch ASSY - hand brake
(3) Adjusting nut (self-locking nut)
(4) Equalizer
(5) Bracket
(6) Clamp A - hand brake cable
(7) Cable ASSY - parking brake RH
(8) Clamp B - hand brake cable
(9) Cable ASSY - parking brake LH

Tightening torque: N·m (kgf-m, ft-lb)
T: 18 (1.84, 13.3)

C: CAUTION

- Wear appropriate work clothing, including a helmet, protective goggles and protective shoes when performing any work.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine grease etc. or equivalent. Do not mix grease etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Make sure grease does not come into contact with the parking shoes.

D: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.

2. Parking Brake Lever

A: REMOVAL

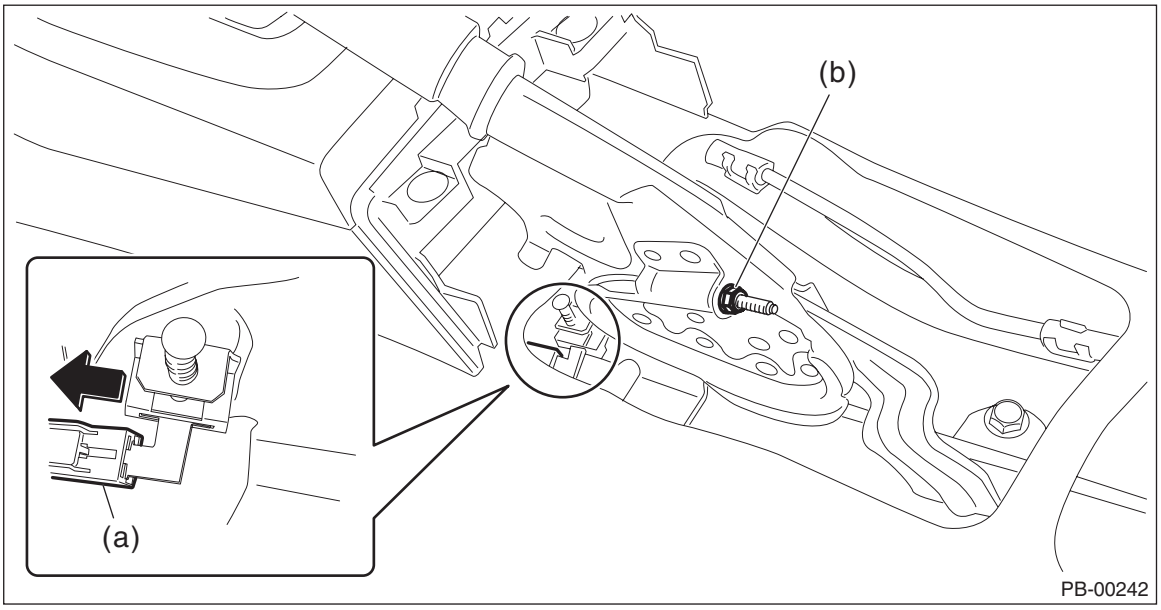
CAUTION:
Refer to "CAUTION" of "General Description" before handling the airbag system components. <Ref. to AB-11, CAUTION, General Description.>

1) Set the wheel stoppers to tires.
2) Remove the headrest assembly - front.
3) Move the passenger's seat towards the front.
4) Remove the driver's seat. <Ref. to SE-8, REMOVAL, Front Seat.>
5) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

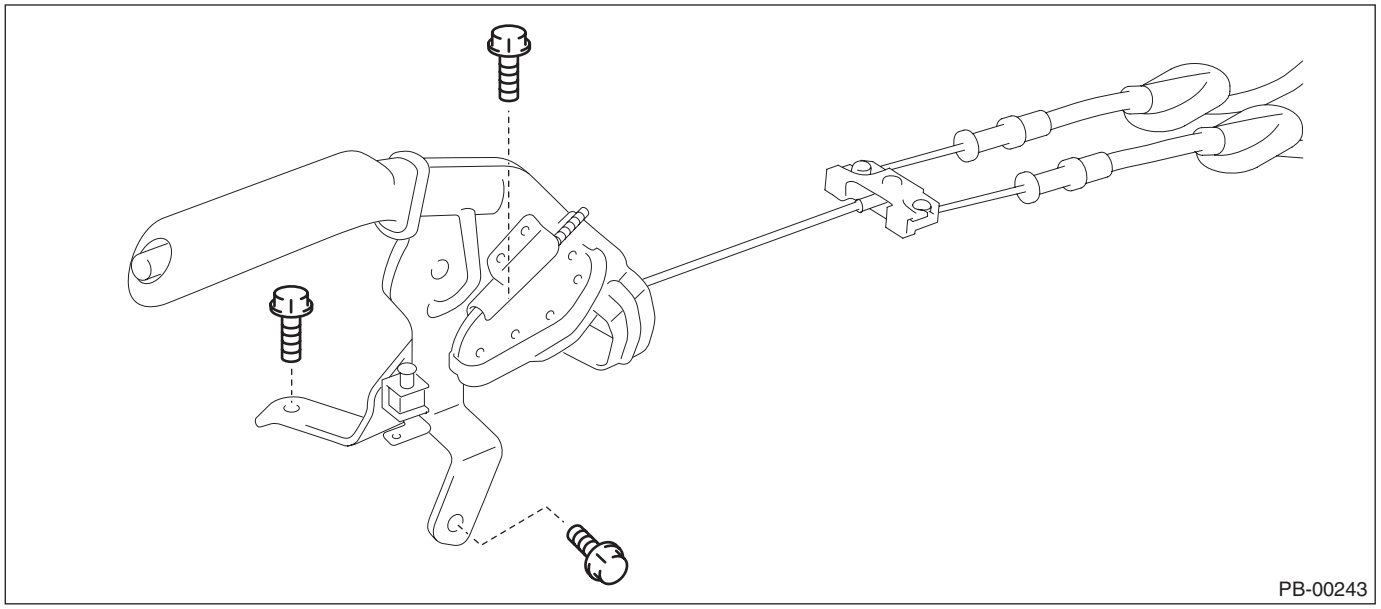
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

6) Remove the console box assembly. <Ref. to EI-77, REMOVAL, Console Box.>
7) Remove the lever assembly - hand brake.
   (1) Disconnect the connector (a) of the switch assembly - hand brake.
   (2) Remove the adjusting nut (b).

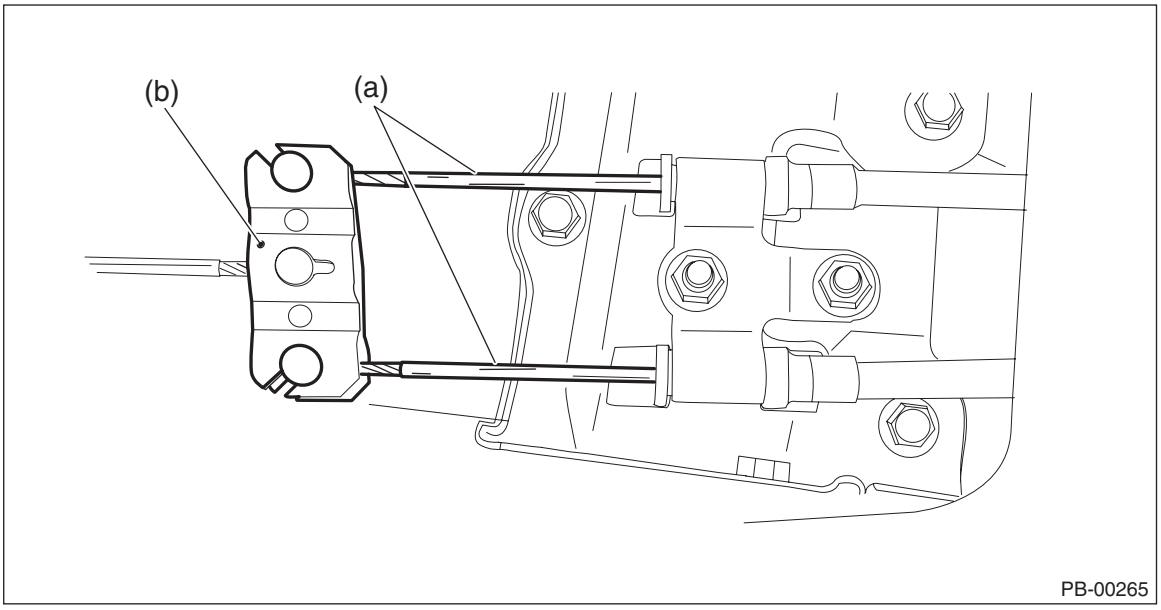
CAUTION:
A self-locking nut is used for the adjusting nut of parking cable. Therefore, replace the self-locking nut with a new one when disassembling.



(3) Remove the bolt, and then remove the lever assembly - hand brake.



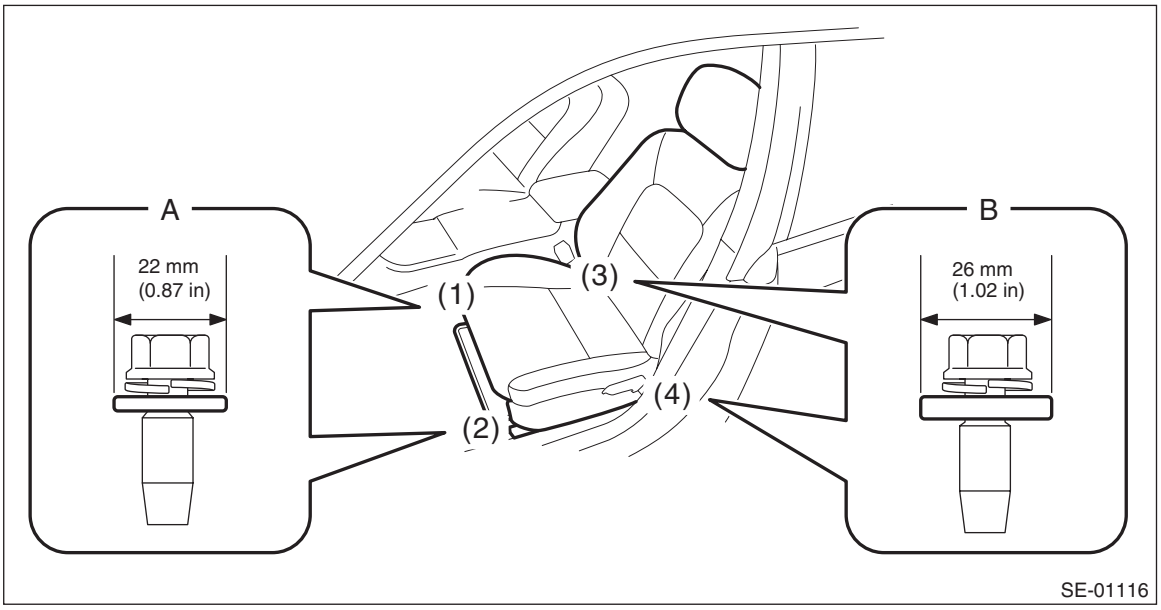
8) Remove the inner cable end (a) from the equalizer (b).



B: INSTALLATION

1) Install each part in the reverse order of removal.

CAUTION:
• The front seat mounting bolts differ between the front mounting points and the rear mounting points. When installing the front seat, make sure that you are using correct bolts at correct positions.
• Tighten the slide rail assembly installing bolts in the order as shown in the figure, in several steps by gradually increasing the torque until they reach the specified torque.



- **Front (bolt A): Washer diameter 22 mm (0.87 in)**
- **Rear (bolt B): Washer diameter 26 mm (1.02 in)**

Tightening torque:
Front seat assembly: 53 N·m (5.40 kgf-m, 39.1 ft-lb)

Tightening torque:
Lever assembly - hand brake: 18 N·m (1.84 kgf-m, 13.3 ft-lb)
Console box assembly: 6.5 N·m (0.66 kgf-m, 4.8 ft-lb)

2) Install a new adjusting nut (self-locking nut).
3) Be sure to adjust the lever stroke. <Ref. to PB-7, ADJUSTMENT, Parking Brake Lever.>

C: INSPECTION

1. LEVER ASSY

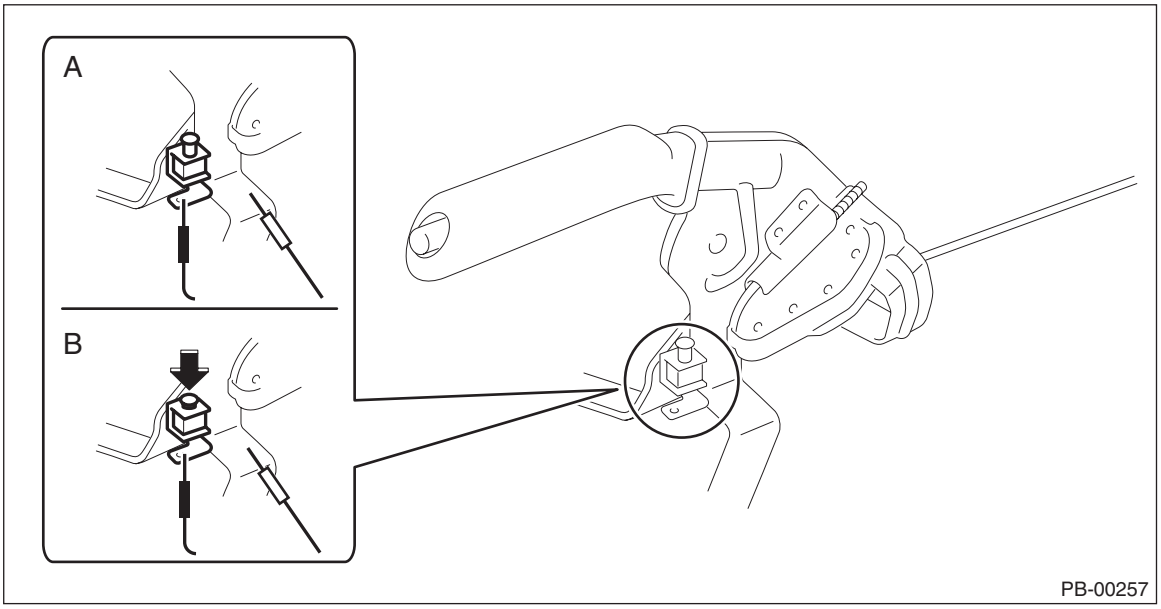
1) Operate the lever assembly - hand brake 3 to 4 times and fully return the lever assembly - hand brake.
2) While slowly pulling up the lever assembly - hand brake, count the notches.

Lever stroke:
7 to 8 notches when pulled with a force of 200 N (20.4 kgf, 45 lbf)
If it is not within the specified value, adjust the parking brake. <Ref. to PB-16, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

2. SWITCH ASSEMBLY

1) Measure the resistance between the switch assembly - hand brake and chassis ground.

Preparation tool:
Circuit tester



	Switch position	Standard
A	When shaft is free (ON)	Less than 1 Ω
B	When shaft is pressed in (OFF)	10 kΩ or more

If it is not within the specified value, replace the switch assembly - hand brake.

D: ADJUSTMENT

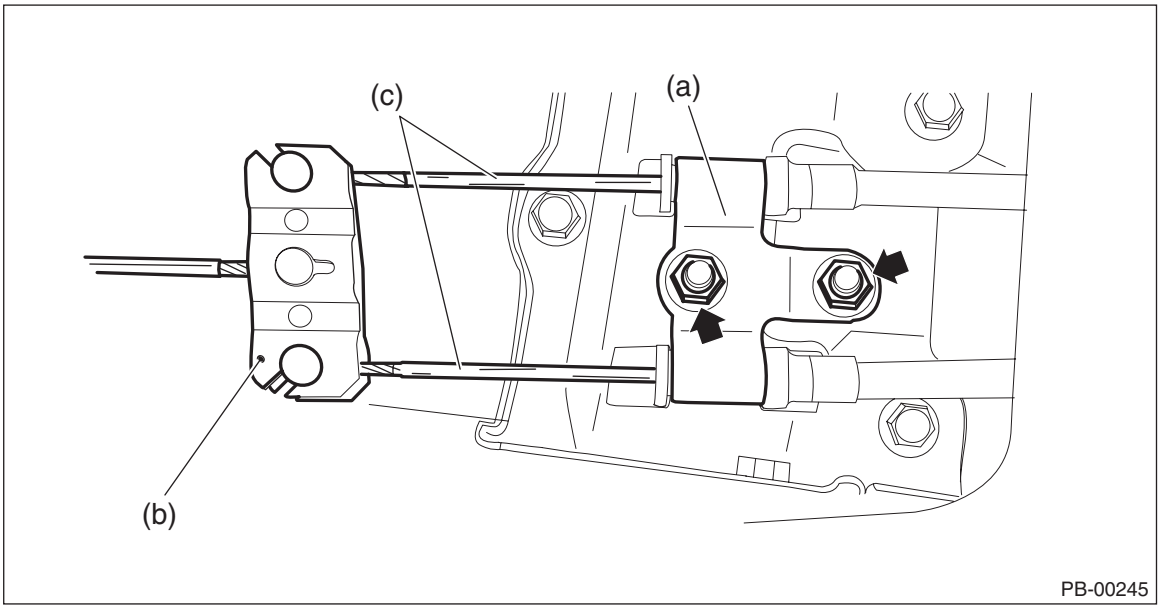
Adjust the parking lever stroke. <Ref. to PB-17, LEVER STROKE, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

3. Parking Brake Cable

A: REMOVAL

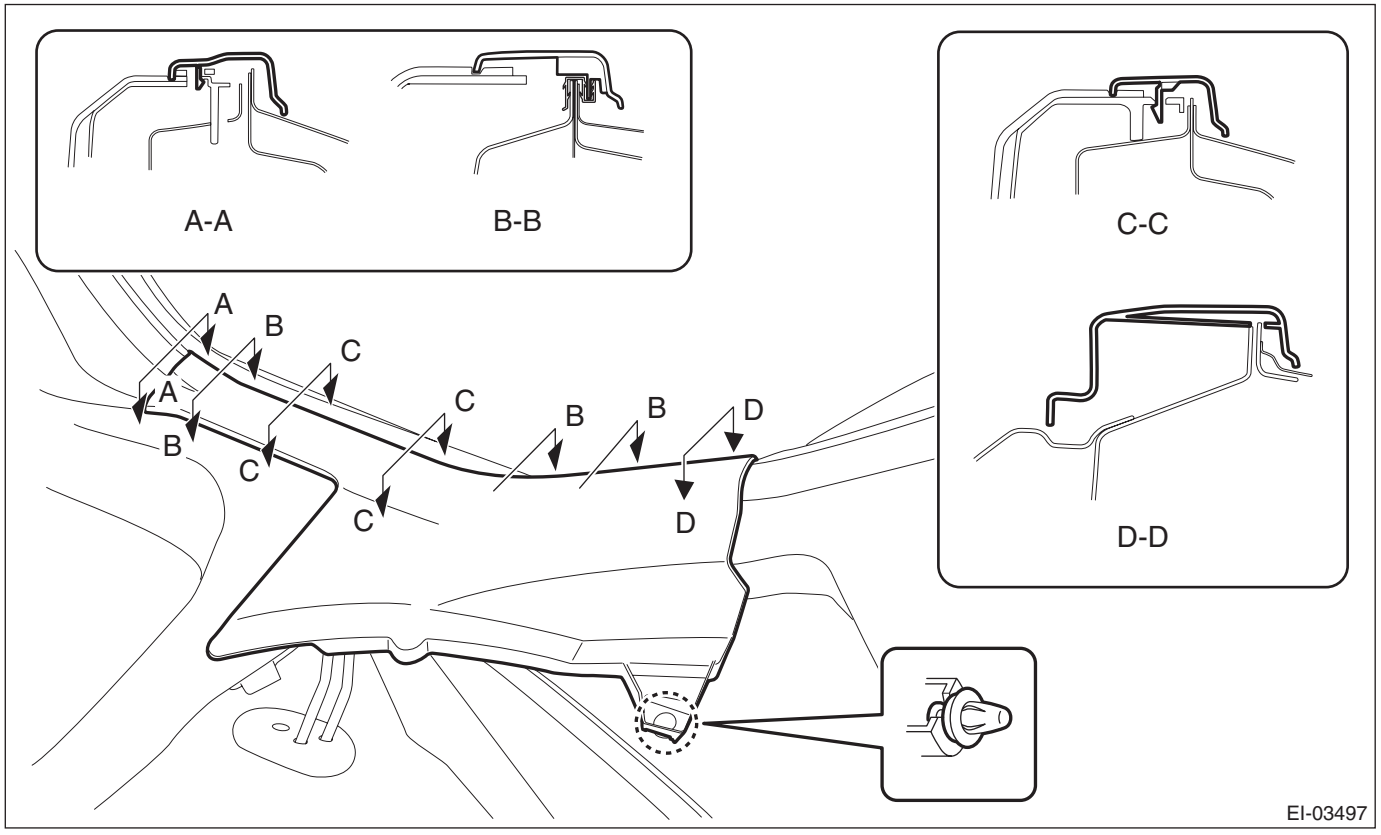
CAUTION:
• Refer to "CAUTION" of "General Description" before handling the airbag system components. <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.

1) Remove the lever assembly - hand brake. <Ref. to PB-4, REMOVAL, Parking Brake Lever.>
2) Remove the nut and remove the clamp A - hand brake cable (a).
3) Remove the inner cable end (c) from the equalizer (b).

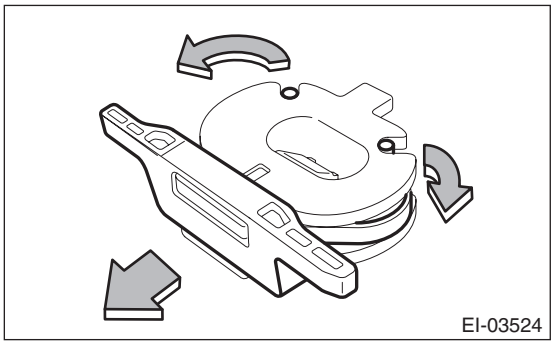


4) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Release the clips and claws, and remove the side sill covers - rear INN on the left and right sides.

CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the side sill cover - rear INN.



6) Remove the clips and knobs of the hook - seat cushion rear.

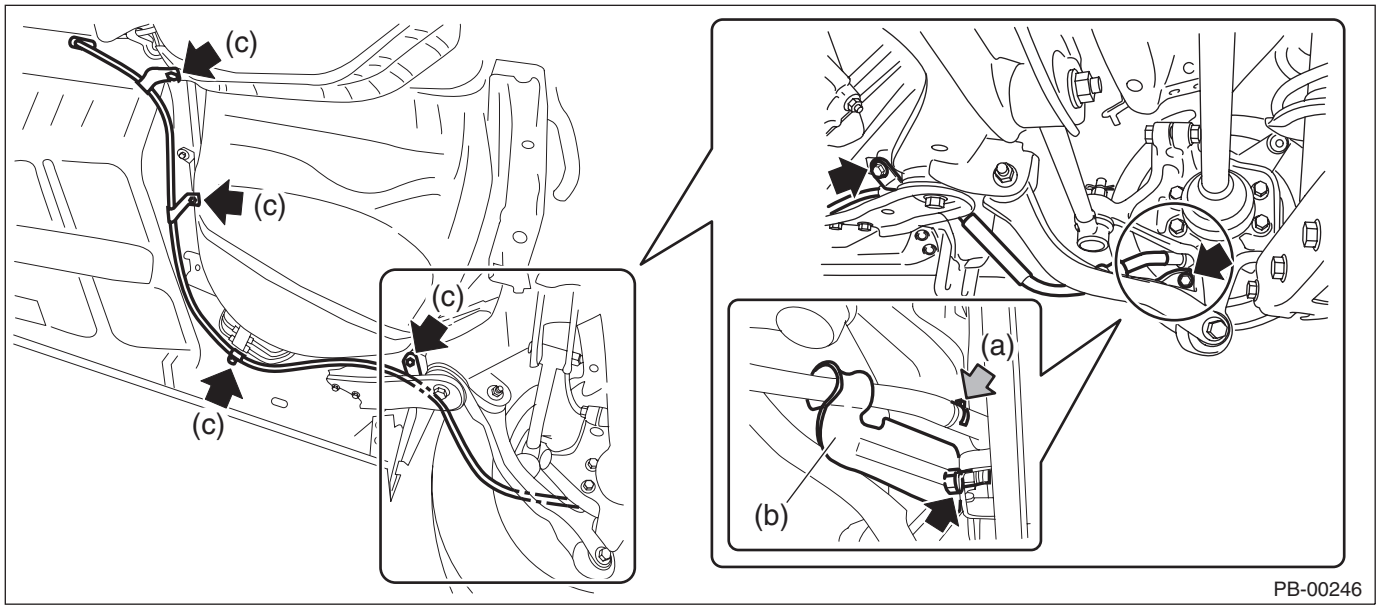


7) Turn over the floor carpet and remove the grommet of the cable assembly - parking brake from the rear floor.
8) Lift up the vehicle, and then remove the rear wheels.
9) Remove the fuel tank protector.
- Gasoline engine model <Ref. to FU(H4DO(w/o HEV))-114, REMOVAL, Fuel Tank Protector.>
- HEV model <Ref. to FU(H4DO(HEV))-105, REMOVAL, Fuel Tank Protector.>

10) Remove the exhaust pipe and muffler.
- Center exhaust pipe & rear exhaust pipe: <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
- Muffler: <Ref. to EX(H4DO(w/o HEV))-22, REMOVAL, Muffler.>

11) Remove the propeller shaft assembly. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
12) Remove the cable assembly - parking brake from the lever section of parking brake shoe. <Ref. to PB-11, REMOVAL, Parking Brake Assembly (Rear Disc Brake).>
13) Remove the clamp B - hand brake cable (a) from the rear brake.

14) Remove the cable clamp (b) from the back plate - rear brake.
15) Remove the cable clamp (c) from the rear floor, and remove the cable assembly - parking brake.



B: INSTALLATION

1) Install each part in the reverse order of removal.

Tightening torque:
Cable clamp: 18 N·m (1.84 kgf-m, 13.3 ft-lb)
Rear wheel: Except for C4 model
120 N·m (12.24 kgf-m, 88.5 ft-lb)
Rear wheel: C4 model
100 N·m (10.20 kgf-m, 73.8 ft-lb)

NOTE:
- Apply grease to the cable guide inside the tunnel, and pass the cable through.
- After installing the backrest assembly, make sure that each seat belt operates normally.
- Make sure that they are properly secured on each hook on the vehicle side.

2) Be sure to adjust the lever stroke. <Ref. to PB-7, ADJUSTMENT, Parking Brake Lever.>

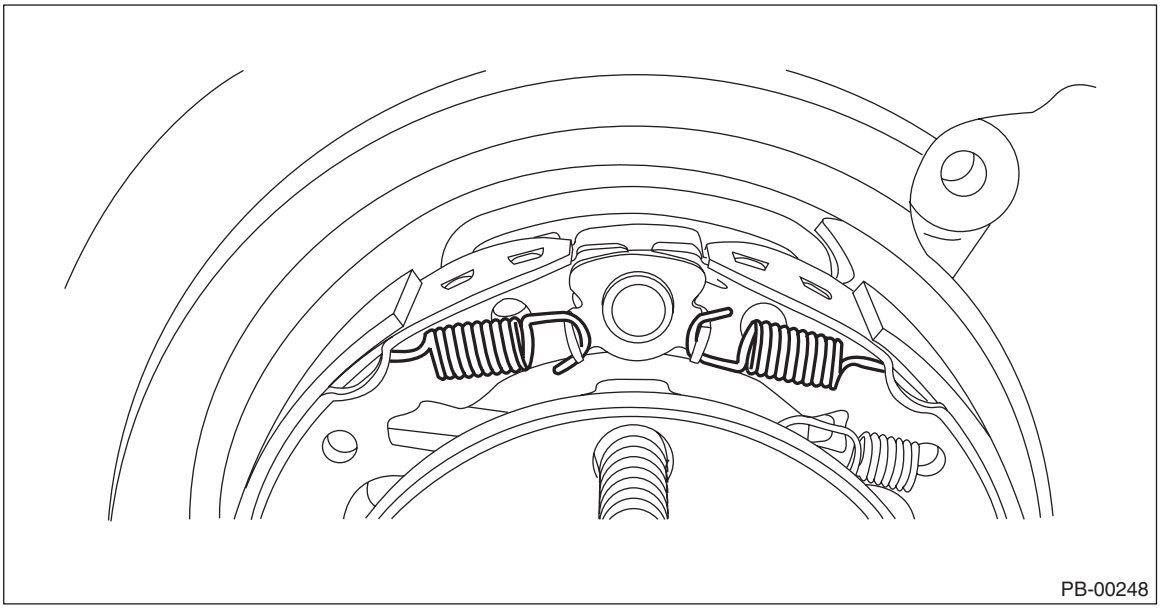
C: INSPECTION

Check the removed cable and replace if damaged, rusty or malfunctioning.
1) Check the cable for smooth operation.
2) Check the inner cable for damage and rust.
3) Check the outer cable for damage, bends and cracks.

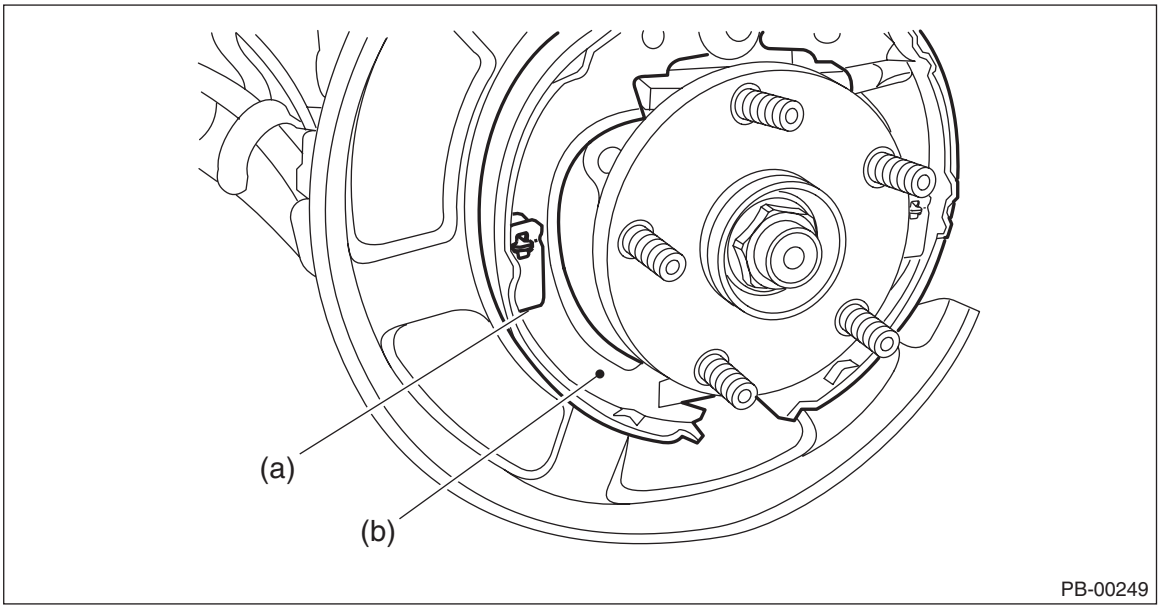
4. Parking Brake Assembly (Rear Disc Brake)

A: REMOVAL

1) Release the parking brake.
2) Lift up the vehicle, and then remove the rear wheels.
3) Remove the rear disc rotor. <Ref. to BR-35, REMOVAL, Rear Disc Rotor.>
4) Remove the spring - primary shoe return and the spring - secondary shoe return.


PB-00248

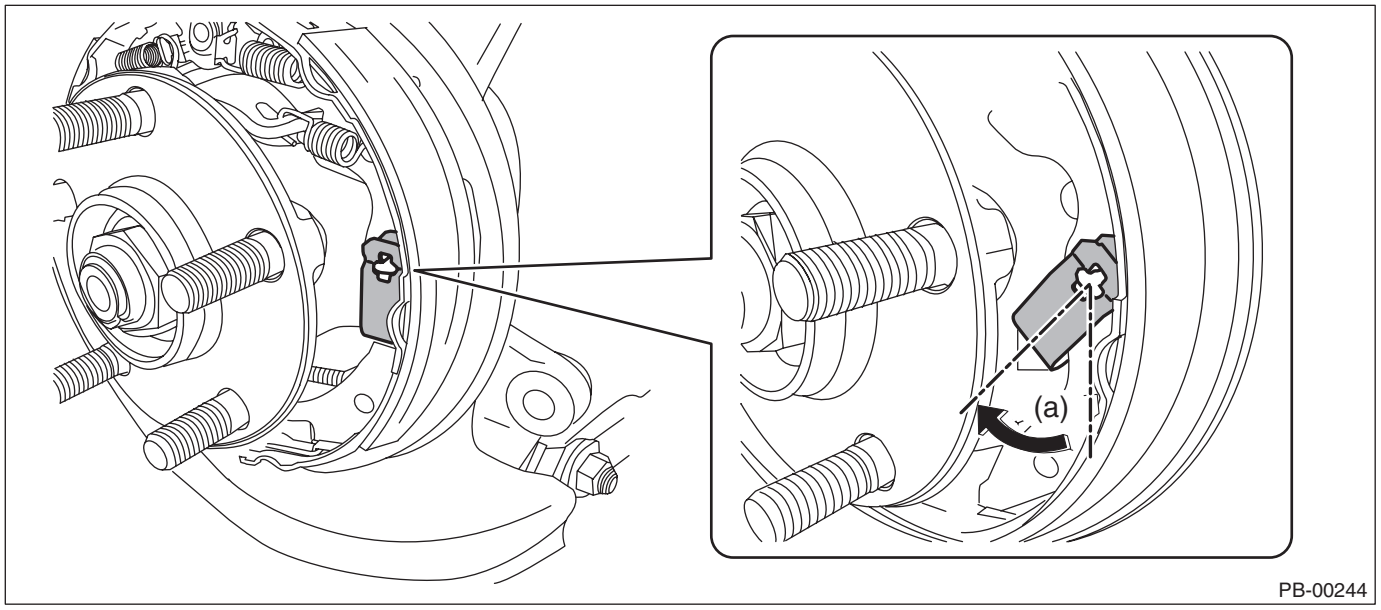
5) Remove the parking brake shoe on the primary side.
   (1) Remove the cup - shoe hold-down (a) and the spring - adjuster, and remove the parking brake shoe (b).



PB-00249

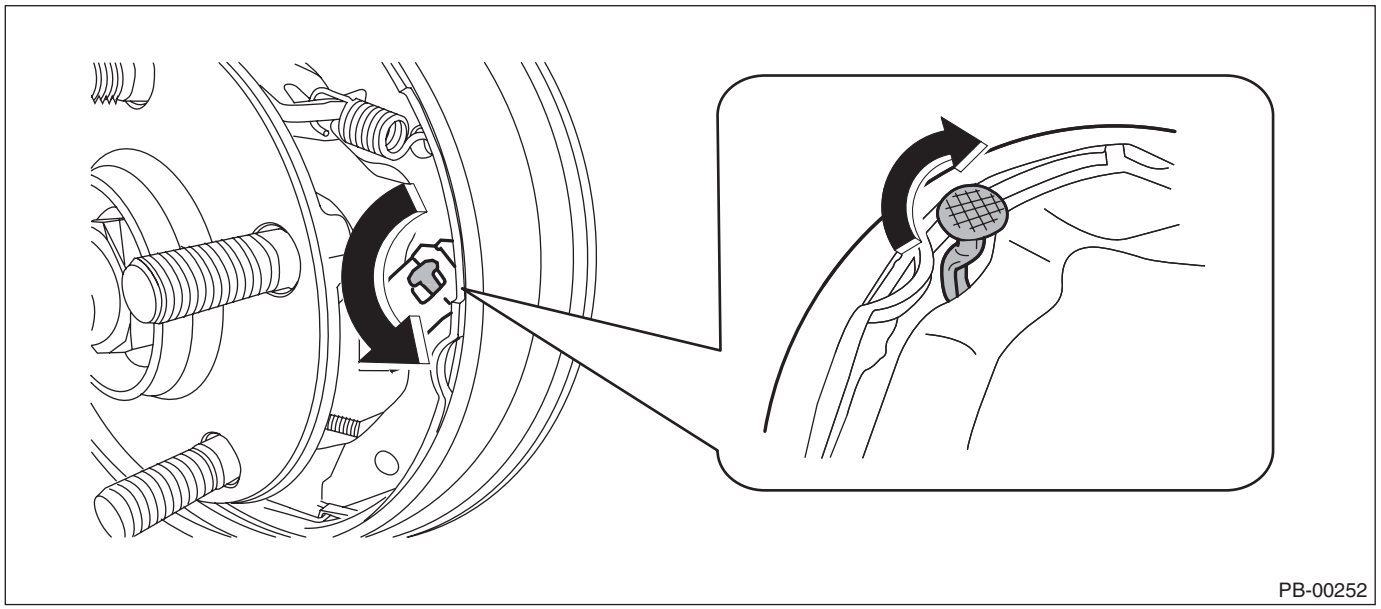
   (2) Remove the strut - brake and the spring - strut.
   (3) Remove the adjuster assembly - rear brake.

6) Remove the parking brake shoe on the secondary side.
(1) Rotate the cup - shoe hold-down in the direction of the front side of the vehicle.

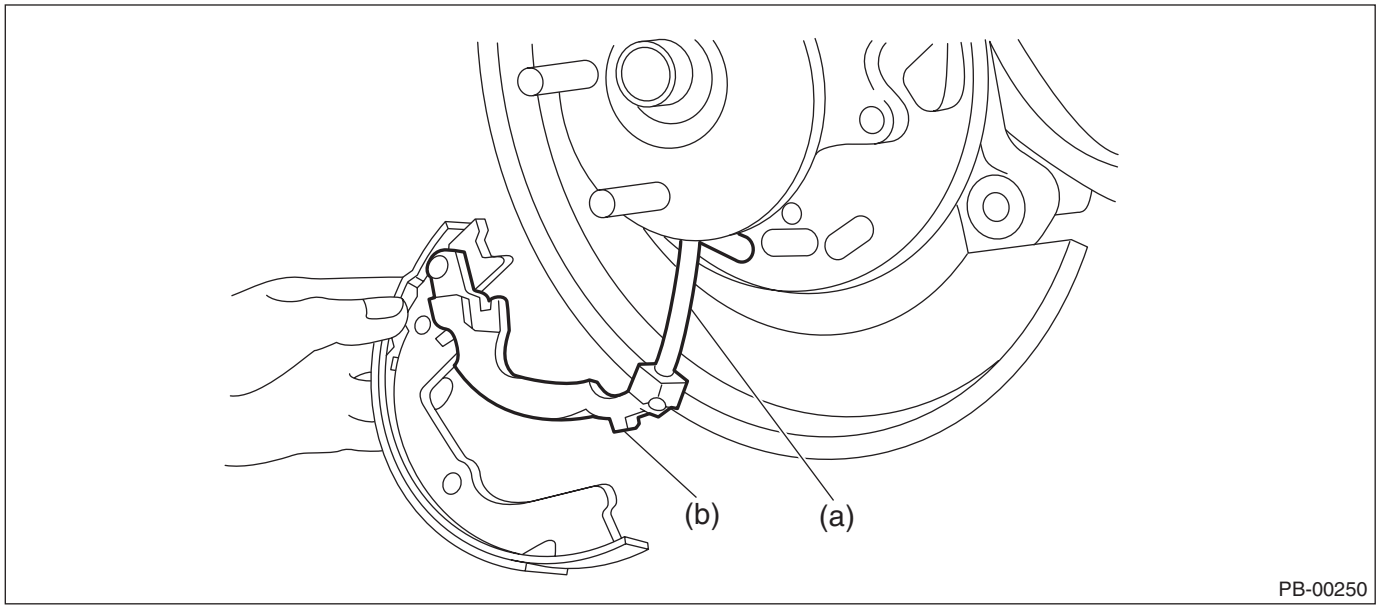


(a) Approx. 45°

(2) Press and shorten the cup - shoe hold-down.
(3) Rotate the pin - secondary shoe hold-down in the opposite direction, and pull out the pin - shoe hold-down.



7) Remove the cable assembly - hand brake cable (a) from the parking lever - rear (b).



8) Remove the retainer - rear brake from the secondary side parking brake shoe. Remove the parking lever - rear from the brake shoe.

B: INSTALLATION

CAUTION:
Be sure the lining surface is free from brake fluid and grease.

1) Apply brake grease to the following locations.

Brake grease:
Molykote 44MA or equivalent

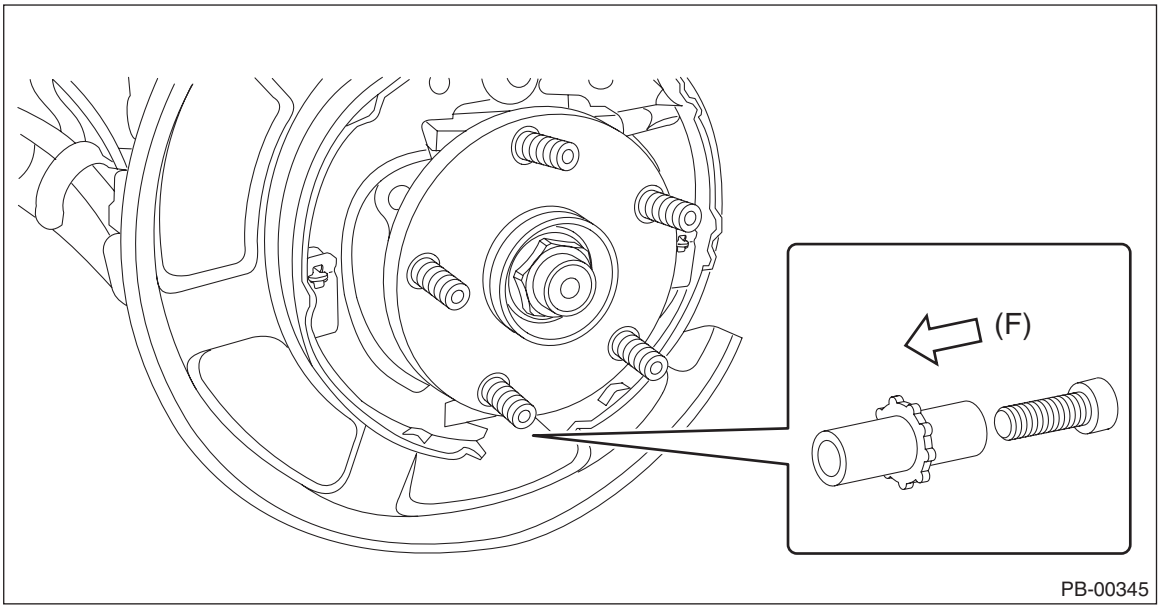
- Six contact surfaces of the parking brake shoe rim and back plate - rear brake
- Contact surface of the parking brake shoe and the anchor pin
- Contact surface of the parking lever assembly - rear and the strut - brake
- Contact surface of the parking brake shoe and the adjuster assembly - rear brake
- Contact surface of the parking brake shoe and the strut - brake
- Contact surface of the parking lever - rear and the parking brake shoe

2) Install the spring washer - rear brake and the lever to the secondary side parking brake shoe pin, and lock the retainer - rear brake securely.

3) Install the cable assembly - parking brake to the lever.

4) Attach the adjuster assembly - rear brake and the spring - adjuster to the parking brake shoe.

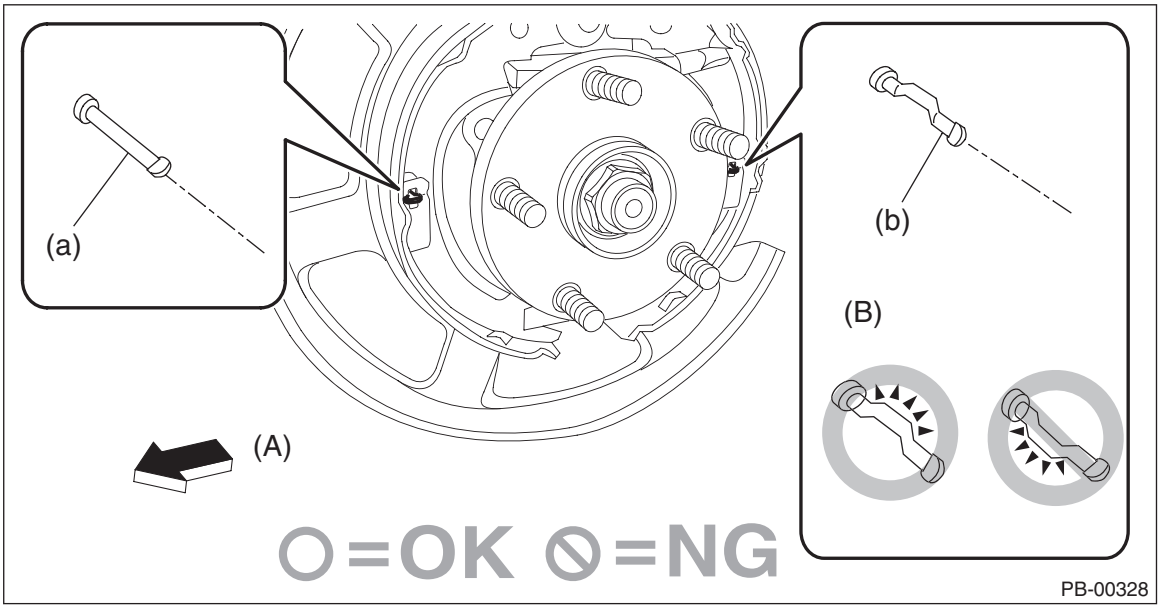
NOTE:
Install the adjuster assembly - rear brake with the screw section facing to the direction shown in the figure below.



(F) Left wheel: front side of vehicle,
right wheel: rear side of vehicle

5) Check that the cable assembly - parking brake does not fall from the cable guide.
6) Install the parking brake shoes to the back plate - rear brake with the pins - shoe hold-down and the cups - shoe hold-down.

NOTE:
- Do not reversely install the pin - primary shoe hold-down (a) and the pin - secondary shoe hold-down (b).
- When installing the pin - secondary shoe hold-down (b), face the convex portion to the rear of the vehicle not to contact with the parking lever - rear.



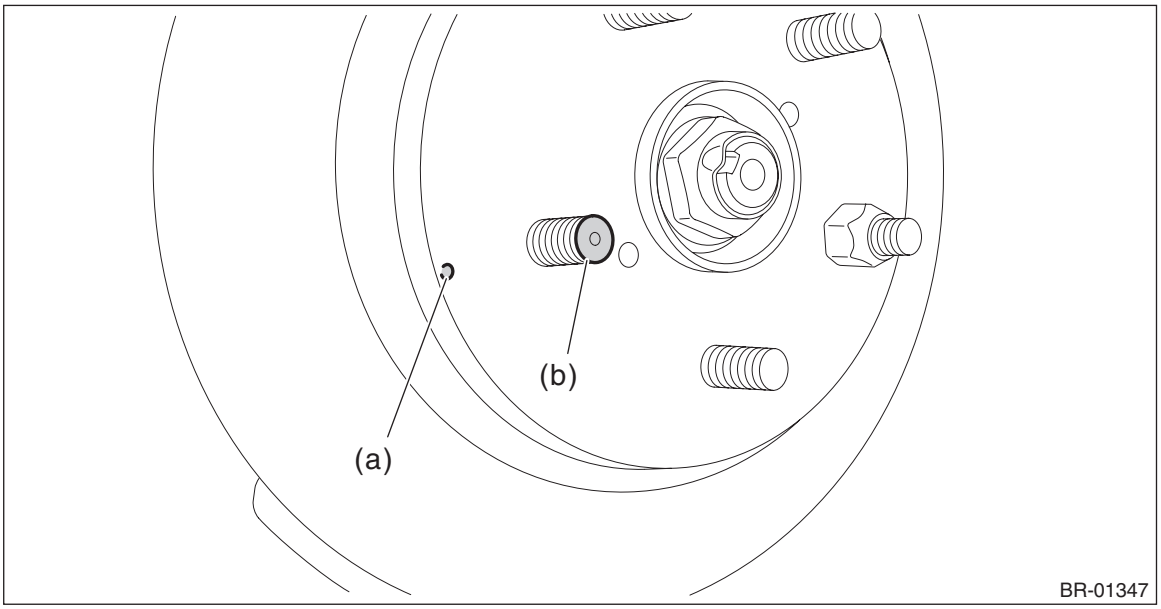
(A) Front side of vehicle

(B) Orientation of pin - shoe hold-down relative to the front of the vehicle

7) Install the strut - brake and the spring - strut to the parking brake shoes.

NOTE:
Install the spring - strut so that it comes towards the front side of the vehicle.
8) Install the return springs on the primary side first, and then the secondary side.
9) Install the brake disc rotor and the brake caliper assembly.

NOTE:
When installing the rear disc rotor, match the alignment mark (a) of the rear disc rotor and the alignment mark (b) of the bolt - hub.



10) Install the brake hose bracket.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to BR-4, COMPONENT, General Description.>
11) Adjust the parking brake. <Ref. to PB-16, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>
12) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)
13) If new parking brake shoes are replaced, drive the vehicle to break-in the parking brake lining.
(1) Drive the vehicle at approximately 35 km/h (22 MPH) or more.
(2) While pressing the button of lever assembly - hand brake, pull the lever assembly - hand brake with a force of 150 N (15.3 kgf, 33.7 lbf).
(3) Drive the vehicle for about 200 m (0.12 mile) in this condition.
(4) Wait 5 to 10 minutes for the parking brake to cool down. Repeat steps (1) through (3) again.
(5) After breaking-in, re-adjust the parking brakes.

C: INSPECTION

1) Measure the inner diameter of the rear disc rotor. If scoring or worn is found on the disc, replace the rear disc rotor.

Disc rotor inner diameter:
Specification: 170 mm (6.69 in)
Service limit: 171 mm (6.73 in)

2) Measure the lining thickness. If it exceeds the limit, replace the brake shoe.

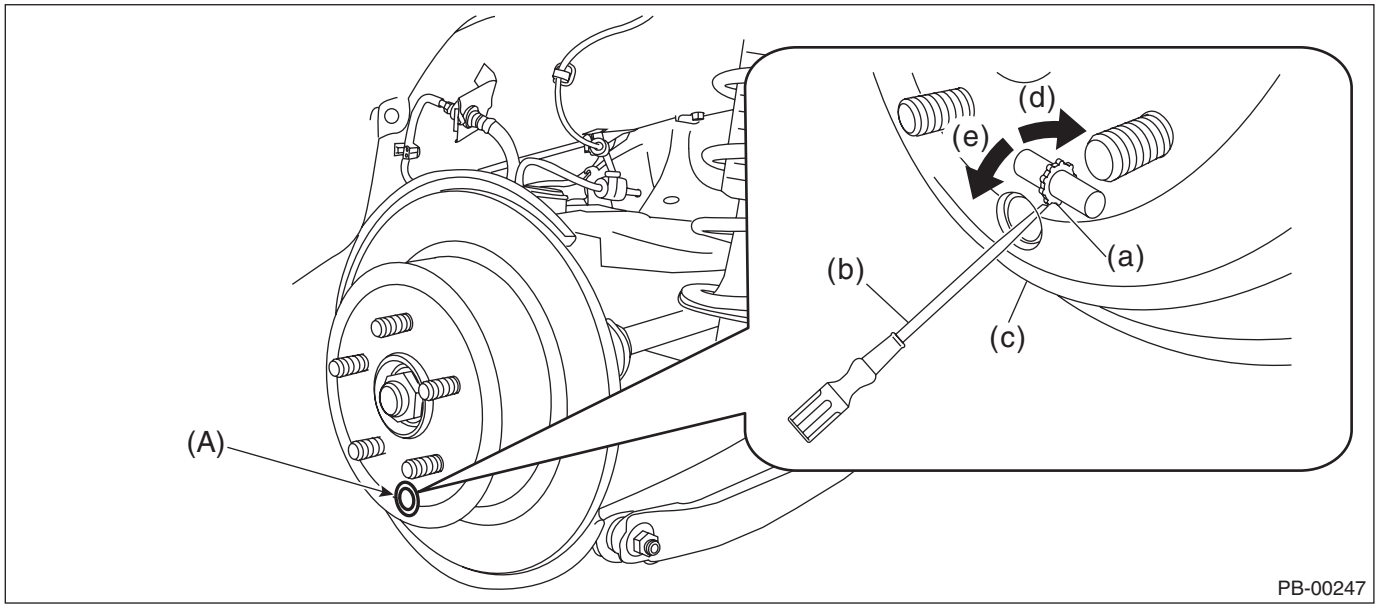
Lining thickness:
Specification: 3.5 mm (0.14 in)
Service limit: 1.5 mm (0.059 in)

NOTE:
Replace the right and left parking brake shoe as a set.

D: ADJUSTMENT

1. SHOE CLEARANCE

1) Return the lever assembly - hand brake completely.
2) Loosen the adjusting nut, and make the cable free.
3) Remove the adjusting hole cover (A) from the rear disc rotor.
4) Insert a flat tip screwdriver (b) into the adjustment hole, and rotate the adjuster assembly - rear brake (a) until the disc rotor cannot be turned by hand.



(a)	Adjuster ASSY - rear brake	(c)	Disc rotor	(e)	Shorten the adjuster ASSY - rear brake
(b)	Flat tip screwdriver	(d)	Extend the adjuster ASSY - rear brake		

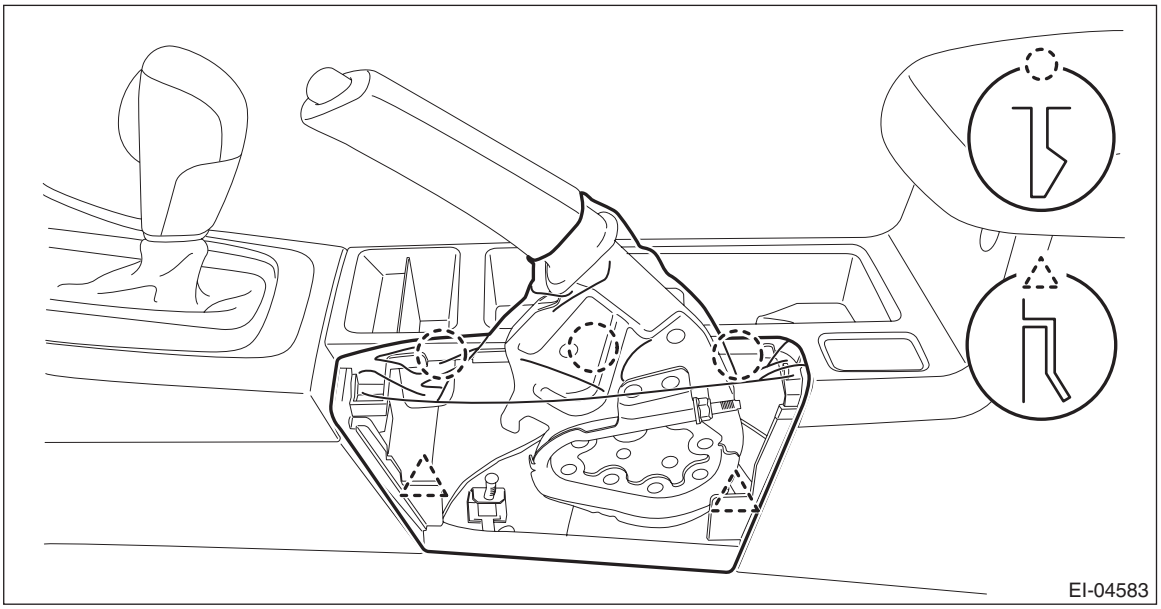
5) Loosen the adjuster assembly - rear brake by 10 notches in the direction of the arrow (e).

CAUTION:
- **Check there is no brake drag.**
- **Make sure that the adjuster assembly - rear brake is loosened by 10 notches. If it is not loosened sufficiently, dragging may occur.**

6) Install the adjusting hole cover to the disc rotor.
7) Adjust the parking lever stroke. <Ref. to PB-17, LEVER STROKE, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

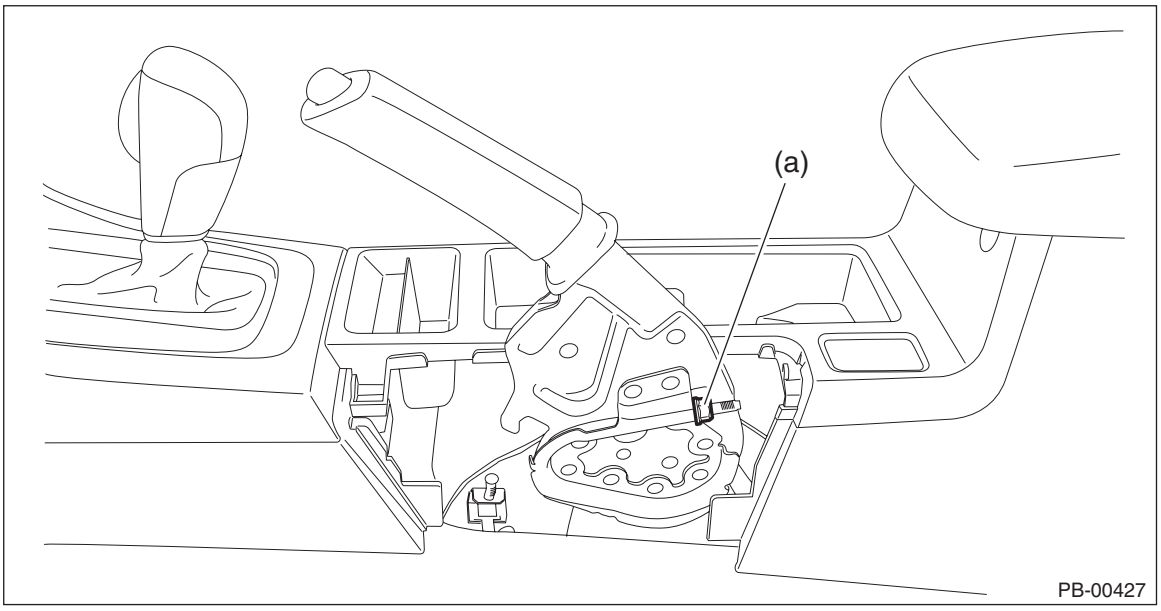
2. LEVER STROKE

1) Adjust the shoe clearance before adjusting lever stroke. <Ref. to PB-16, SHOE CLEARANCE, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>
2) Release the claws, and then remove the boot - parking brake.



3) Pull the lever assembly - hand brake hard 3 to 5 times.
4) Turn the adjusting nut (a) until the lever stroke is at the specified value.

Lever stroke:
7 to 8 notches when pulled with a force of 200 N (20.4 kgf, 45 lbf)



5) Check there is no brake drag.
6) Check that the brake warning light illuminates when the lever assembly - hand brake is operated.

NOTE:
The light must illuminate when the first notch is reached after pulling the lever.
7) Install the boot - parking brake.

5. General Diagnostic Table

A: INSPECTION

Symptoms	Possible cause	Corrective action
Brake dragging	Lever assembly - hand brake is maladjusted.	Adjust.
	Parking brake cable does not move.	Repair or replace.
	Parking brake shoe clearance is maladjusted.	Adjust.
	Spring - shoe return is faulty.	Replace.
Noise from brake	Spring - shoe return is faulty.	Replace.
	Cup - shoe hold-down is faulty.	Replace.

POWER ASSISTED SYSTEM (POWER STEERING)

PS

		Page
1.	General Description	2
2.	Power Steering System	8
3.	Steering Wheel	9
4.	Universal Joint	16
5.	Steering Column	21
6.	Electric Power Steering Gearbox	25
7.	Power Steering Control Module	40
8.	General Diagnostic Table	41

1. General Description

A: SPECIFICATION

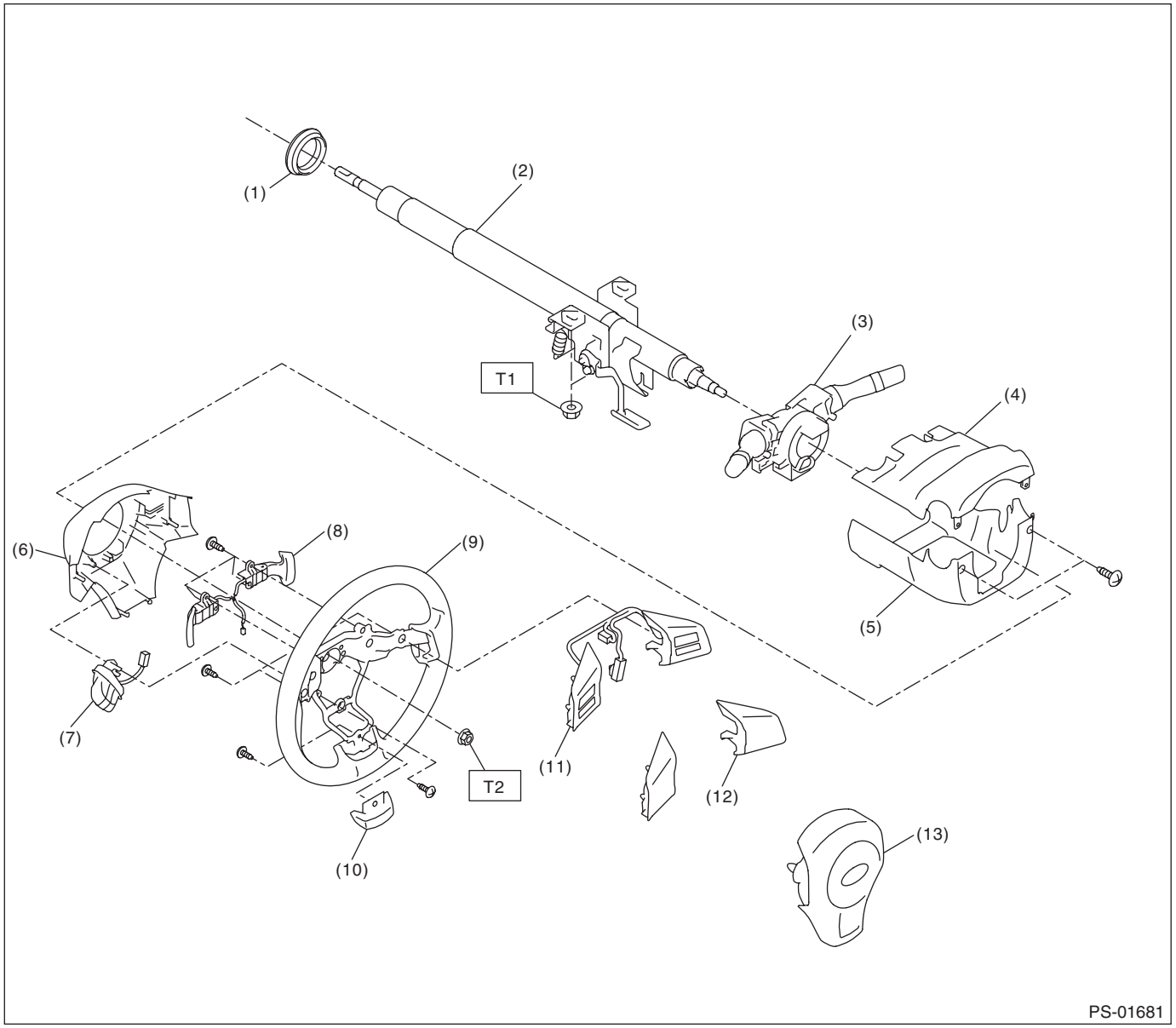
Model			Impreza model	Crosstrek model	
				Gasoline engine model	HEV model
Whole system	Minimum turning radius m (ft)		5.3 (17.39)		
	Steering angle	Inner wheel	38.3°±1.5°	38.2°±1.5°	
		Outer wheel	33.7°±1.5°	33.6°±1.5°	
	Steering wheel diameter mm (in)		375 (14.76)		
	Lock-to-lock revolution number		2.9	2.8	
Gearbox	Type		Rack & pinion type		
	Backlash		0 (automatic adjusting)		
Motor (Temperature 20°C (68°F))	Rated voltage V		12		
	Rated torque N·m (kgf-m, ft-lb)		4.5 (0.46, 3.31)		
	Rated revolution speed r/min		1,140		
	Rated current A		85		
	Rated output W		561		

Model			Impreza model	Crosstrek model	
				Gasoline engine model	HEV model
Steering wheel	Free play mm (in)		17 (0.67) or less		
Steering shaft	Clearance between the steering wheel and column cover mm (in)		4 — 6 (0.16 — 0.24)		
Steering gearbox (Power steering system)	Sliding resistance N (kgf, lbf)		320 (33, 72) or less Difference between right and left sliding resistance: 20% or less	303 (31, 68) or less Difference between right and left sliding resistance: 20% or less	
	Rack shaft play in the radial direction	Right-turn steering mm (in)	Horizontal play: 0.6 (0.024) or less Vertical play: 0.4 (0.016) or less		
		Left-turn steering mm (in)	0.4 (0.016) or less		
	Input shaft play	In radial direction mm (in)	0.18 (0.0071) or less		
		In axial direction mm (in)	0.27 (0.0106) or less		
	Rotational resistance N (kgf, lbf)		Maximum allowable value: 18.3 (1.9, 4.1) or less Difference between right and left sliding resistance: 20% or less	Maximum allowable value: 18.0 (1.8, 4.0) or less Difference between right and left sliding resistance: 20% or less	
Steering wheel effort (Power steering system)	At standstill with engine idling on paved road N (kgf, lbf)		29.4 (3.0, 6.6) or less		
	At standstill with engine stalled on paved road N (kgf, lbf)		294.2 (30, 66.2) or less		

B: COMPONENT

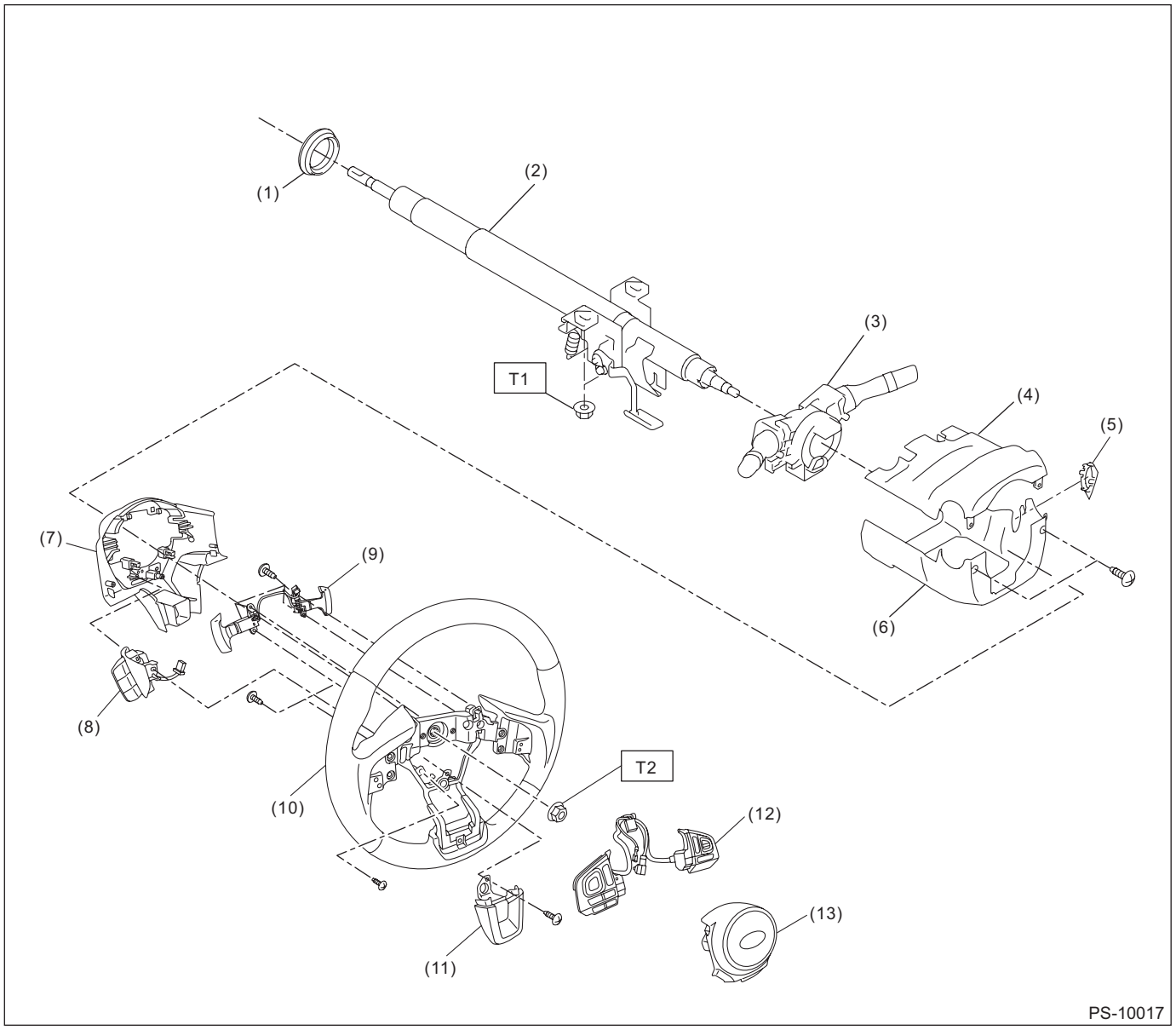
1. STEERING WHEEL AND COLUMN

- Impreza model



(1)	Bushing	(7)	MID switch	(13)	Airbag module
(2)	Column ASSY - steering	(8)	Paddle shift		
(3)	Switch ASSY - combination	(9)	Steering wheel	***Tightening torque: N·m (kgf-m, ft-lb)***	
(4)	Cover ASSY - column UPR	(10)	Cover - spoke	***T1: 20 (2.04, 14.8)***	
(5)	Cover ASSY - column LWR	(11)	Satellite switch	***T2: 39 (3.98, 28.8)***	
(6)	Cover - steering wheel LWR	(12)	Cover - switch		

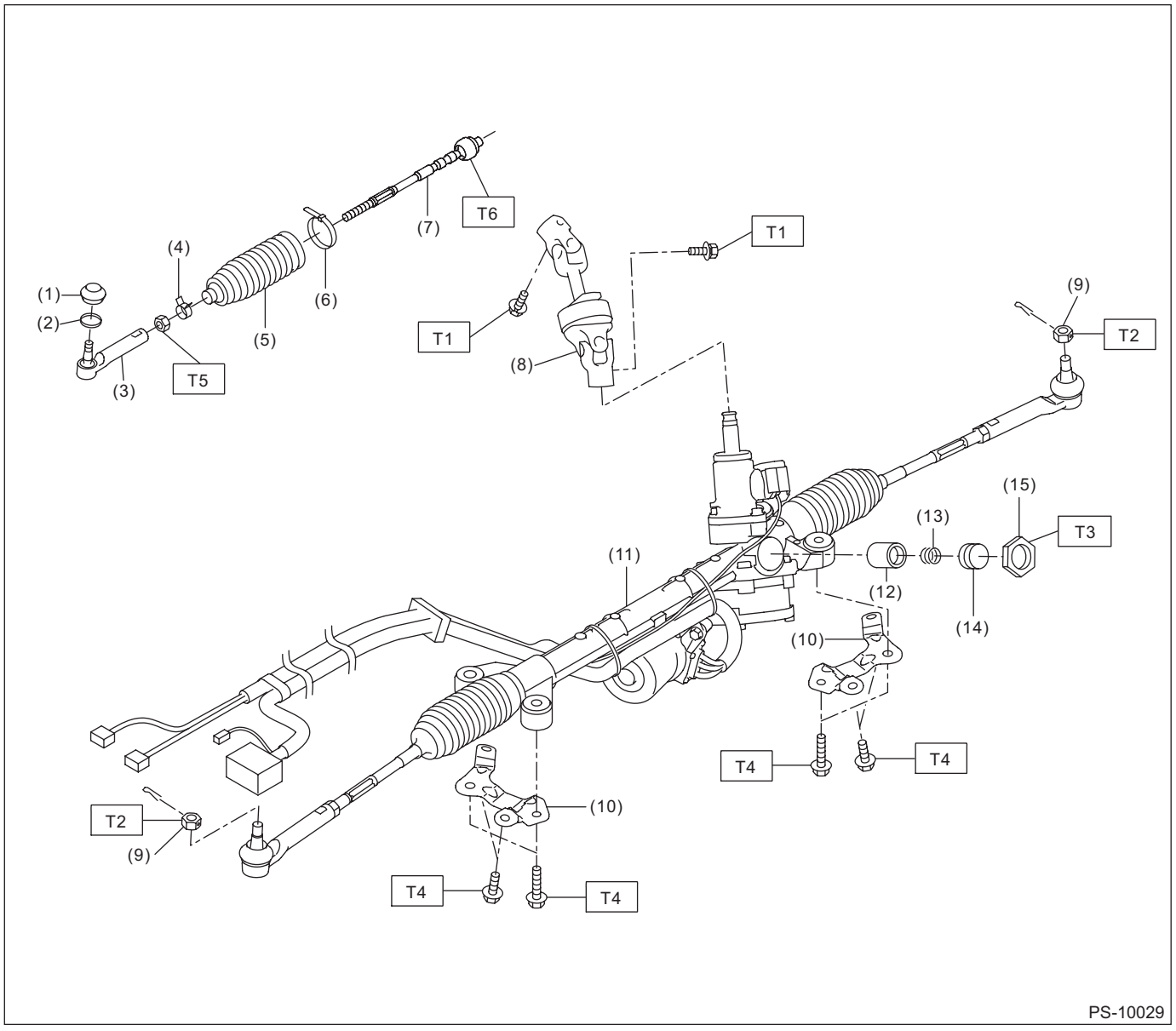
- Crosstrek model



(1) Bushing
(2) Column ASSY - steering
(3) Switch ASSY - combination
(4) Cover ASSY - column UPR
(5) Cap - key cylinder (model with keyless access with push button start)
(6) Cover ASSY - column LWR
(7) Cover - steering wheel LWR
(8) MID switch
(9) Paddle shift
(10) Steering wheel
(11) Cover - spoke
(12) Satellite switch
(13) Airbag module

Tightening torque: N·m (kgf-m, ft-lb)
T1: 20 (2.04, 14.8)
T2: 39 (3.98, 28.8)

2. STEERING GEARBOX

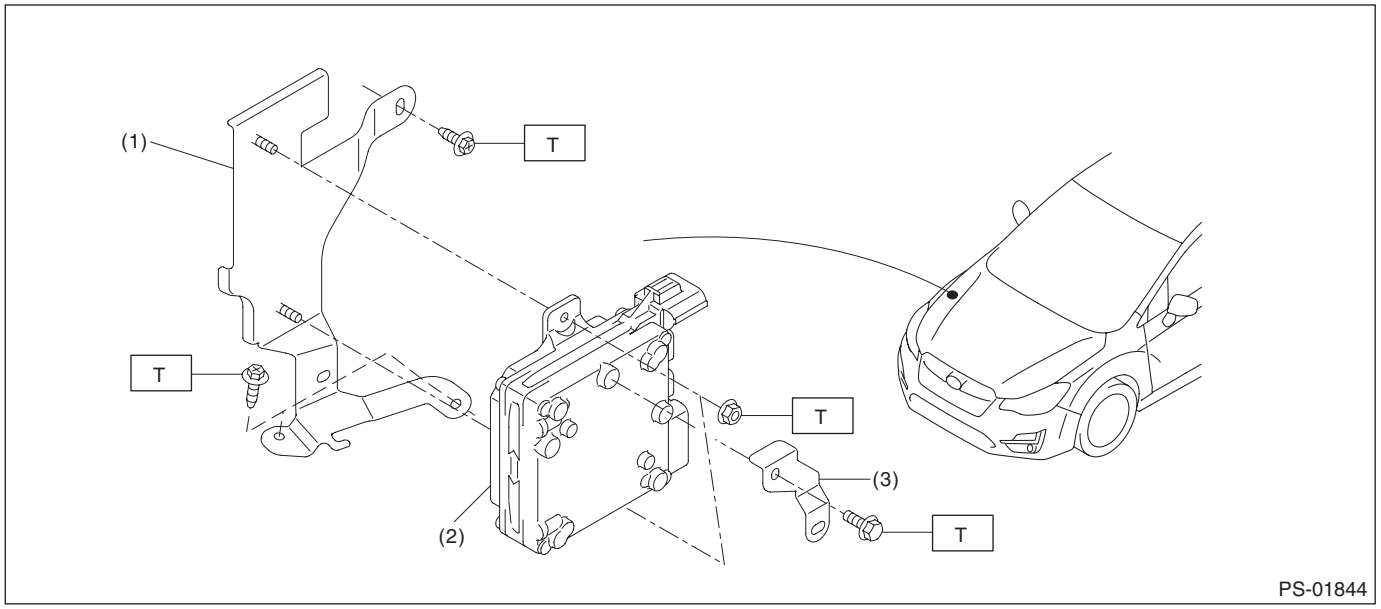


(1)	Dust seal	(9)	Castle nut
(2)	Clip - boot tie-rod end B	(10)	Stiffener
(3)	Tie-rod end	(11)	Steering gearbox ASSY
(4)	Clip - boot tie-rod end A	(12)	Pad - pressure
(5)	Boot - steering gearbox	(13)	Spring - gearbox
(6)	Band - boot	(14)	Adjusting screw
(7)	Tie-rod	(15)	Lock nut
(8)	Universal joint ASSY - steering		

Tightening torque: N·m (kgf-m, ft-lb)

T1: 24 (2.45, 17.7)
T2: 27 (2.75, 19.9)
T3: 49.4 (5.04, 36.4)
T4: 60 (6.12, 44.3)
T5: 85 (8.67, 62.7)
T6: 90 (9.18, 66.4)

3. ELECTRIC POWER STEERING CONTROL MODULE



(1) Bracket - control module
(2) Power steering control module
(3) Harness bracket

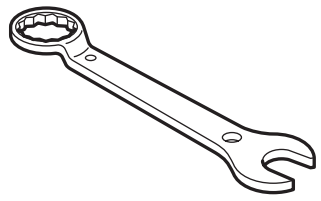
Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

C: CAUTION

• Wear appropriate work clothing, including a helmet, protective goggles and protective shoes when performing any work.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
• Use grease and oil of Subaru genuine or the equivalent products. Do not mix them of different grades or manufacturers.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or rigid racks at the specified points.
• Before securing a part on a vise, place cushioning material such as wooden blocks, aluminum plate or cloth between the part and the vise.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST34099PA100	34099PA100	SPANNER	Used when measuring the rotating resistance of gearbox assembly.

2. GENERAL TOOL

TOOL NAME	REMARKS
Steering wheel puller	Used for removing the steering wheel.

2. Power Steering System

A: WIRING DIAGRAM

Refer to “Electric Power Steering System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-101, WIRING DIAGRAM, Electric Power Steering System.>
- HEV model: <Ref. to WI(HEV)-94, WIRING DIAGRAM, Electric Power Steering System.>

B: ELECTRICAL SPECIFICATION

Refer to Control Module I/O Signal of “POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)”. <Ref. to PS(diag)-10, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

Refer to “POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)”. <Ref. to PS(diag)-2, Basic Diagnostic Procedure.>

D: NOTE

For procedure of each component in the power steering system, refer to the respective section.
- Steering wheel: <Ref. to PS-9, Steering Wheel.>
- Universal joint assembly - steering: <Ref. to PS-16, Universal Joint.>
- Steering column: <Ref. to PS-21, Steering Column.>
- Electric power steering gearbox: <Ref. to PS-25, Electric Power Steering Gearbox.>
- Power steering control module: <Ref. to PS-40, Power Steering Control Module.>

3. Steering Wheel

A: REMOVAL

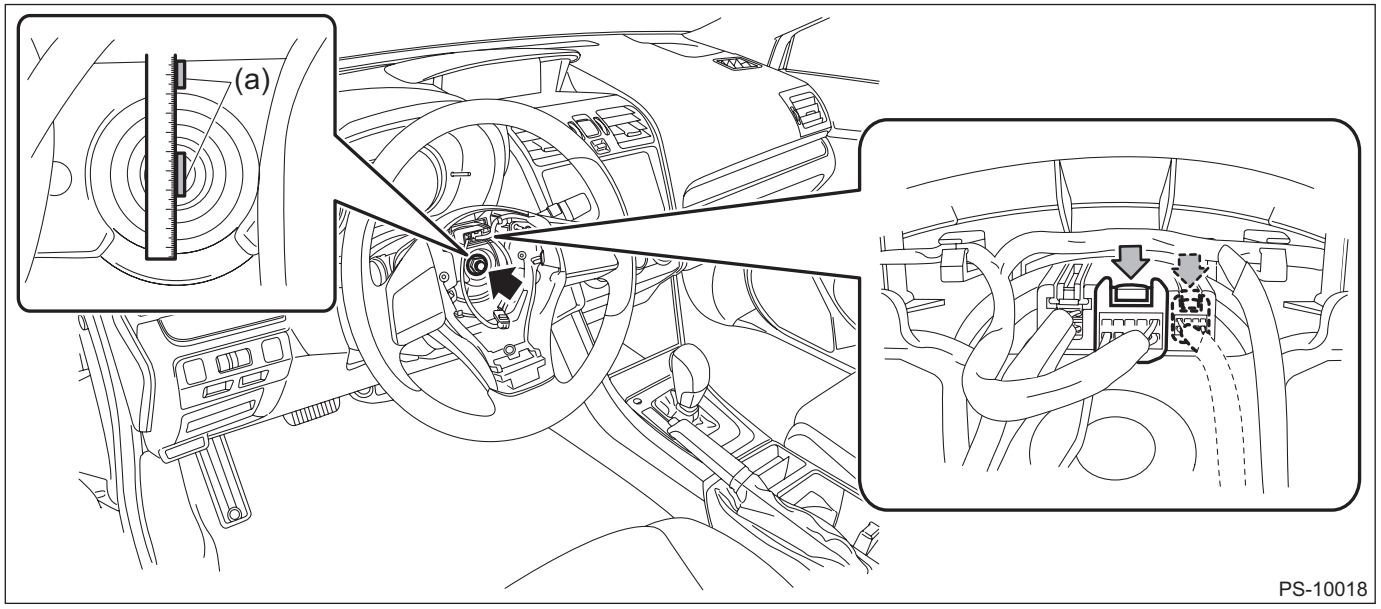
CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Set the tire to the straight-ahead position.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
4) Remove the steering wheel.

CAUTION:
- **Always use the steering wheel puller for removal to avoid deforming the steering wheel.**
- **If the steering wheel has been removed, make sure that the steering roll connector is not turned from the original position.**

(1) Disconnect the connector and remove the nut.
(2) Put an alignment mark (a) using a ruler as shown in the figure, and remove the steering wheel.

Preparation tool:
Steering wheel puller



B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• If the steering wheel and steering angle sensor are removed, perform the following VDC setting mode. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
1) Align the center position of the roll connector. <Ref. to AB-72, ADJUSTMENT, Roll Connector.>
2) Install each part in the reverse order of removal.

NOTE:
Align the alignment marks on the steering wheel and the column assembly - steering.

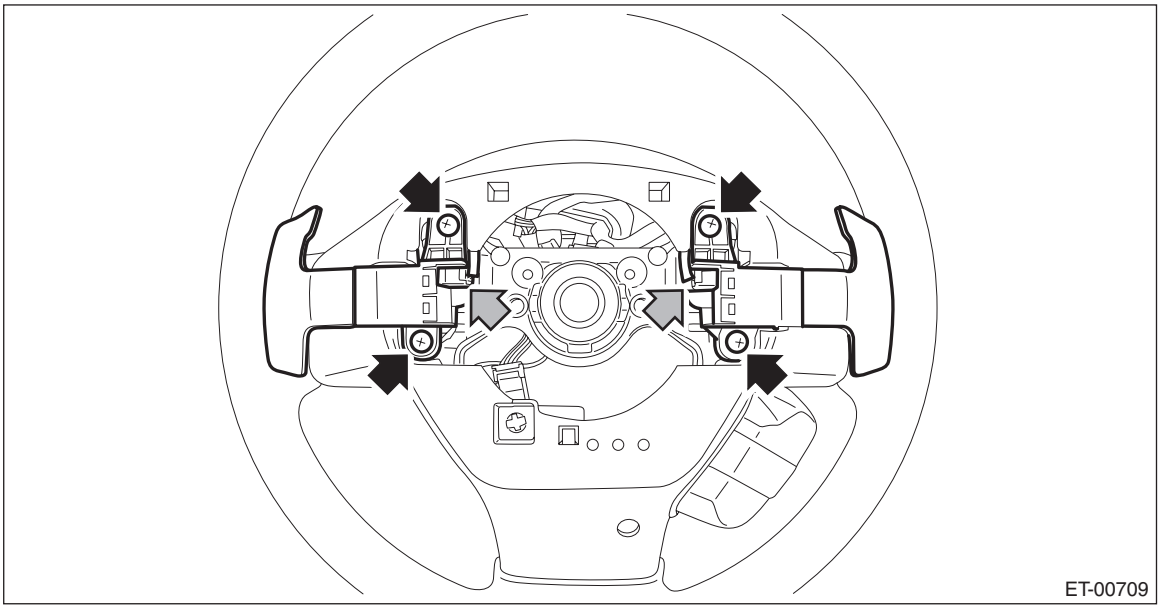
Tightening torque:
Steering wheel: 39 N·m (3.98 kgf-m, 28.8 ft-lb)

Clearance:
Between cover assembly - column and steering wheel: 4 — 6 mm (0.16 — 0.24 in)

C: DISASSEMBLY

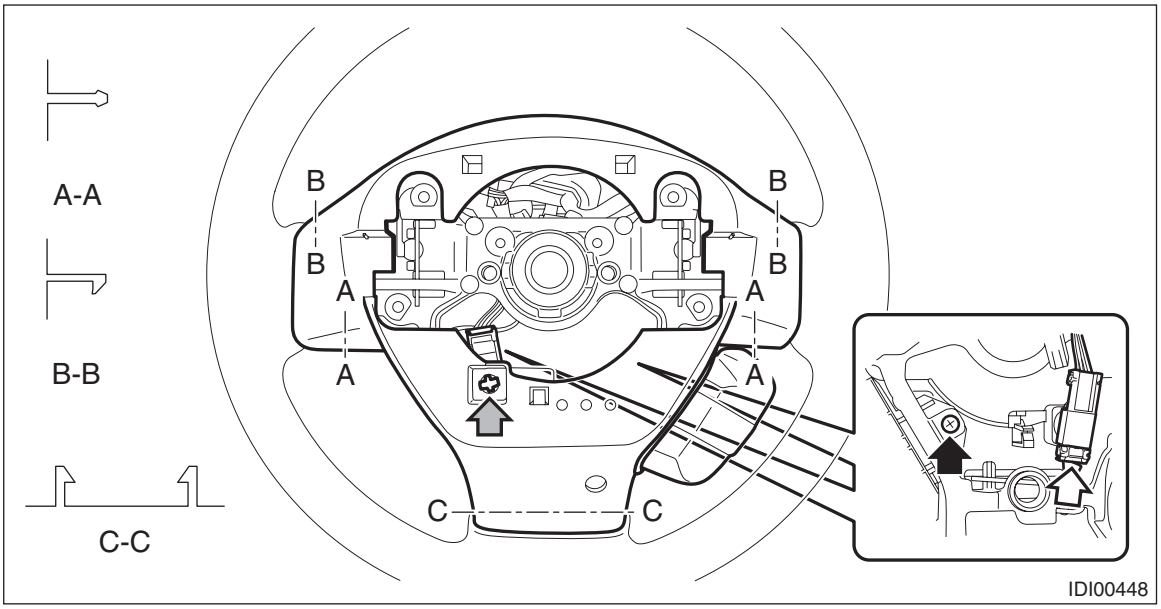
1. IMPREZA MODEL

1) Remove the screw, disconnect the connector and remove the paddle shift switch. (Model with paddle shift)

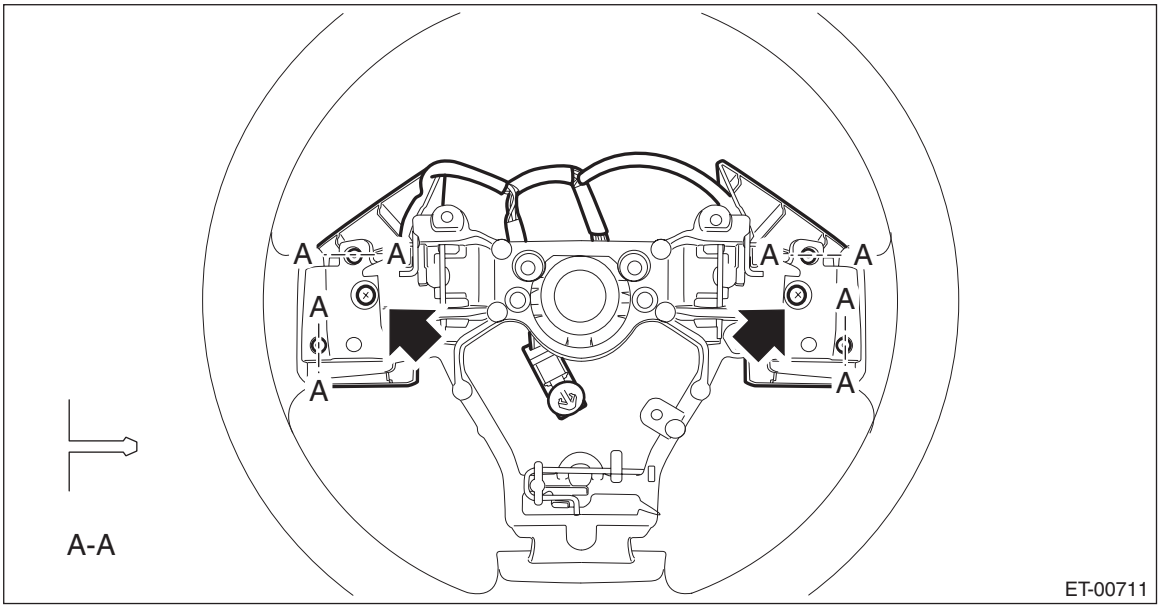


2) Release the claws and clips, detach the cover - steering wheel LWR.

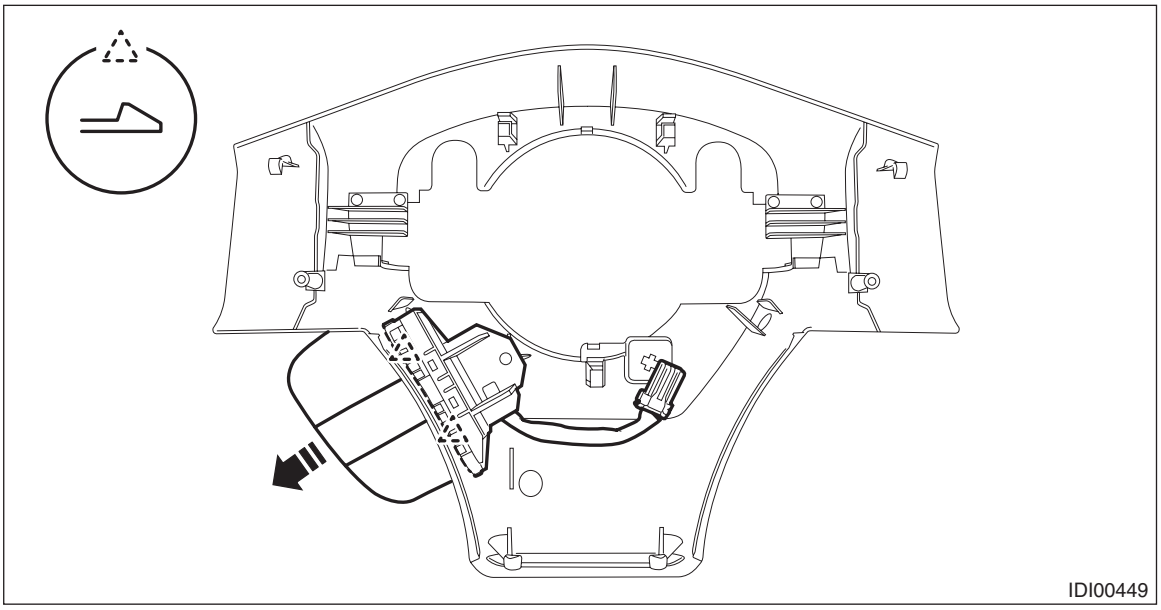
NOTE:
For model with MID switch, remove the connector and screw.



3) Remove the screws and then remove the satellite switch assembly.

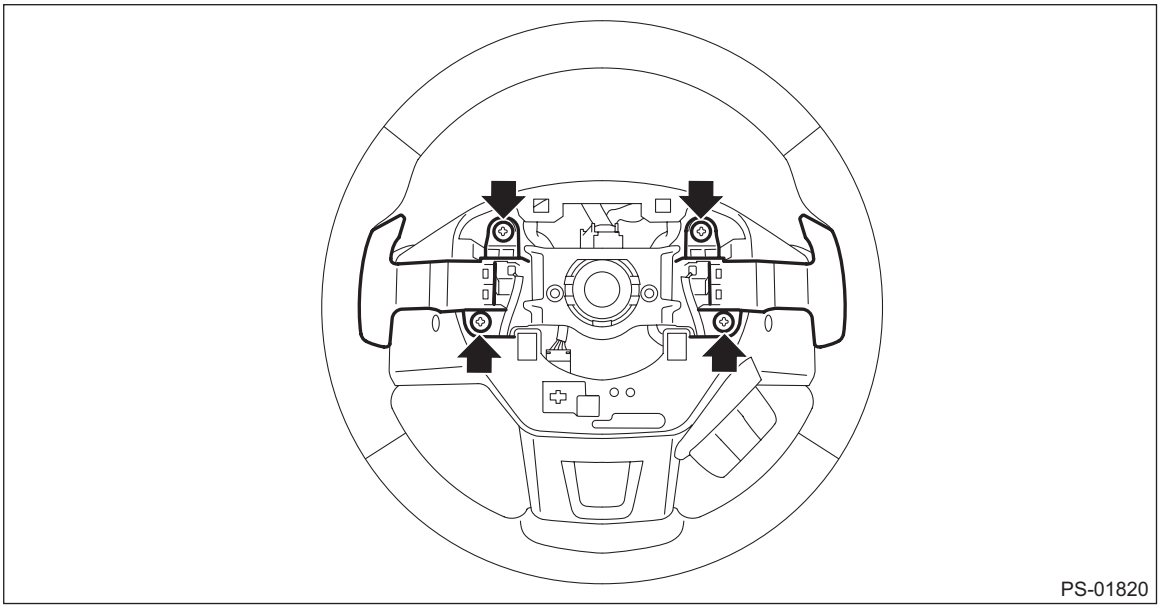


4) Remove the MID switch.

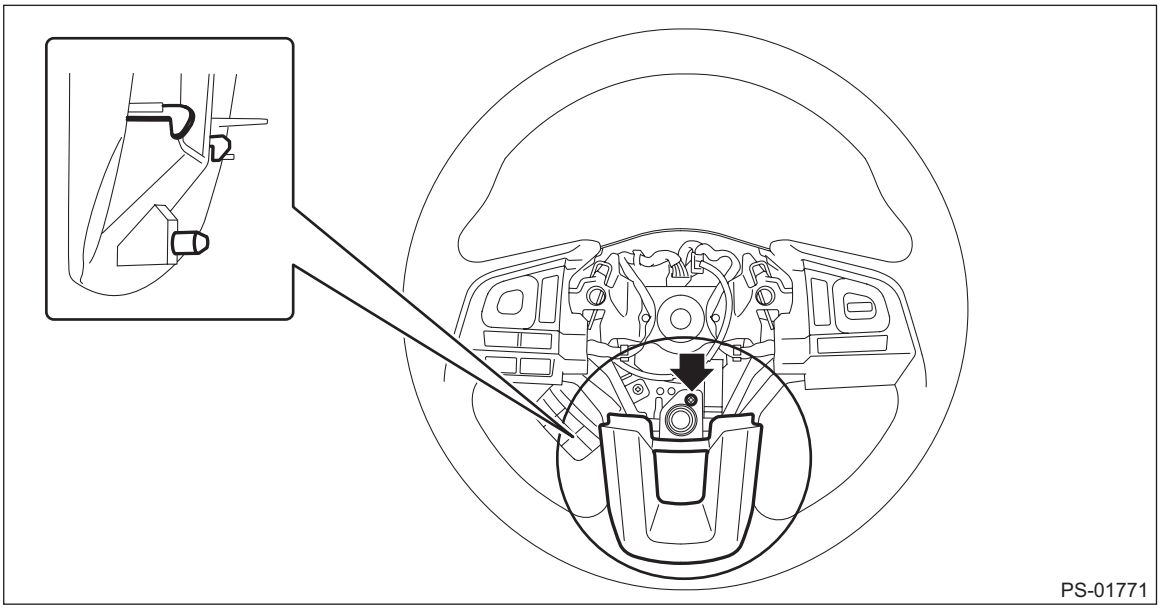


2. CROSSTREK MODEL

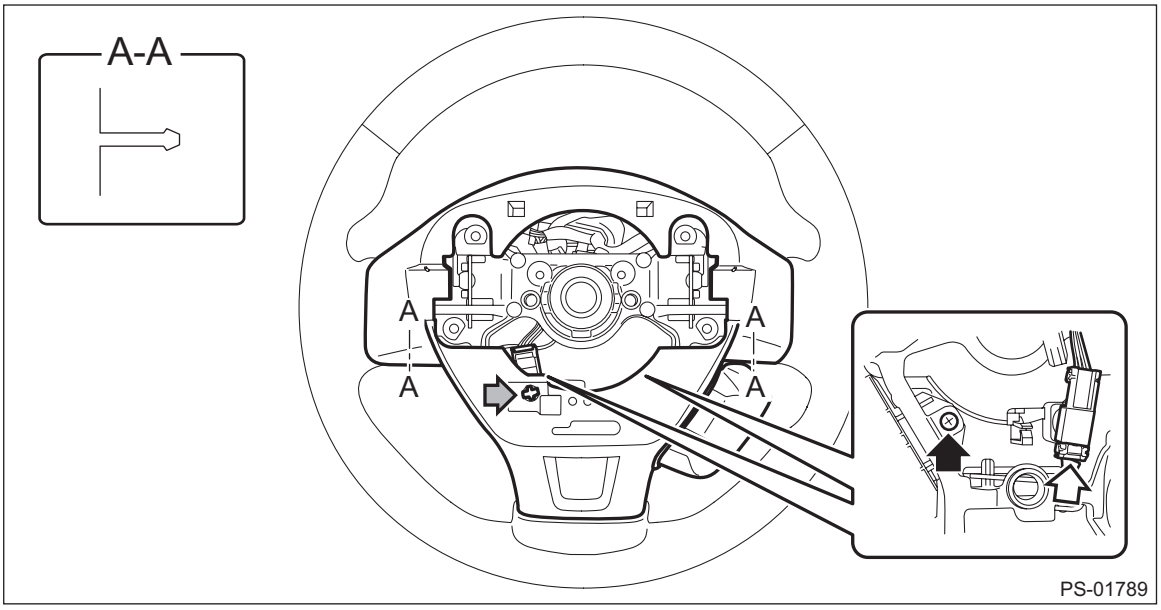
1) Remove the screw, disconnect the connector and remove the paddle shift switch. (Model with paddle shift)



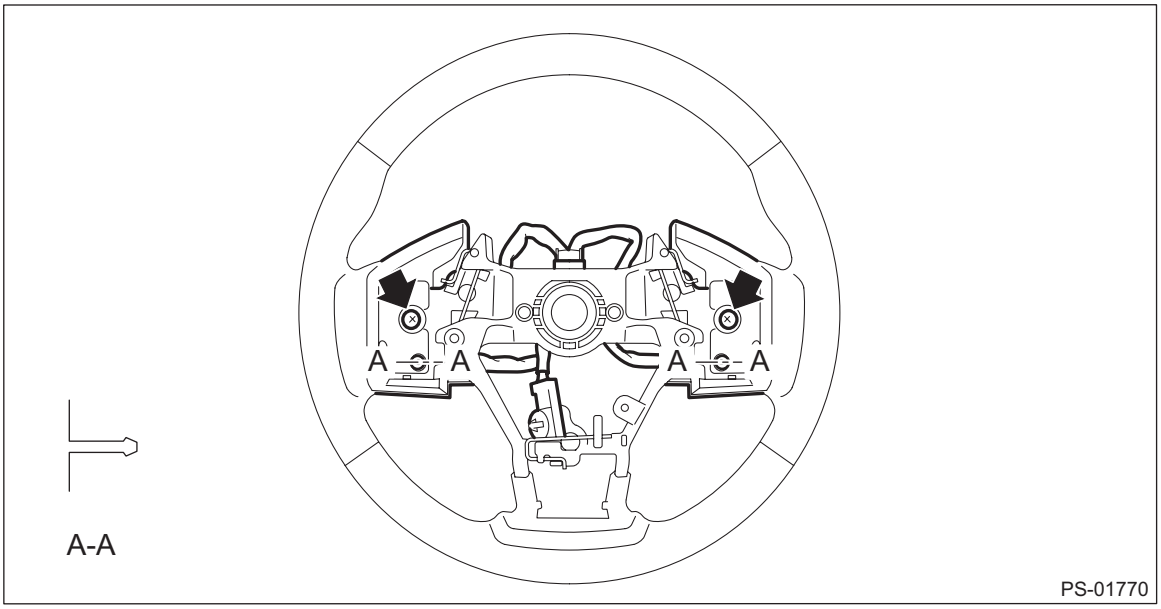
2) Release the claws and remove the screws, then detach the cover - spoke.



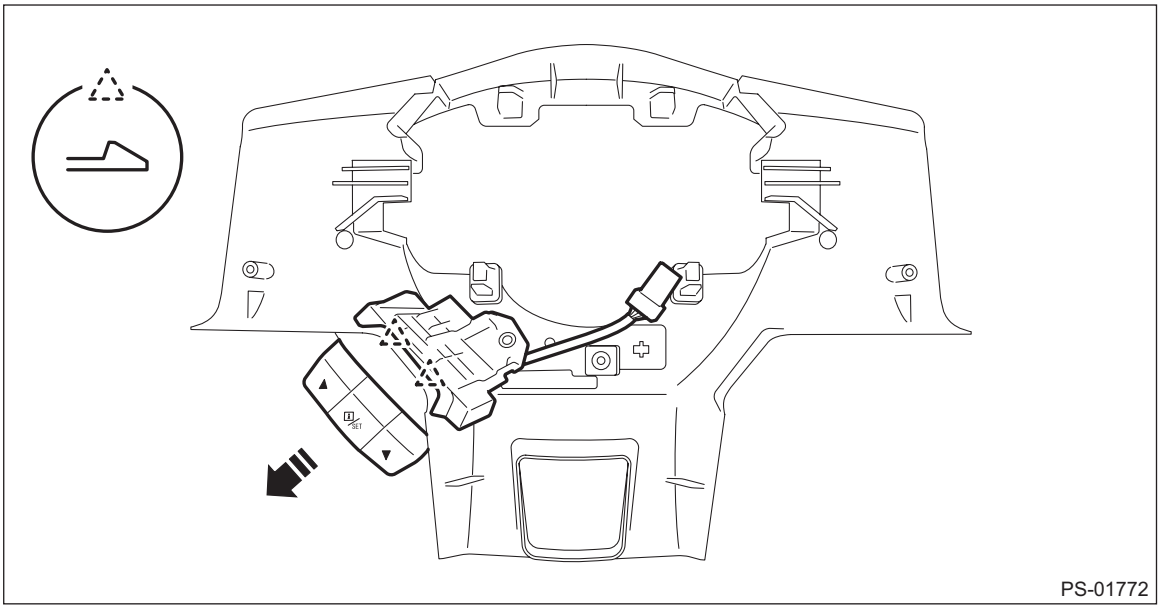
3) Remove connector and screw, and remove the cover - steering wheel LWR.



4) Release the claws and remove the screws, then detach the satellite switch.



5) Release the claws, and then remove the MID switch.



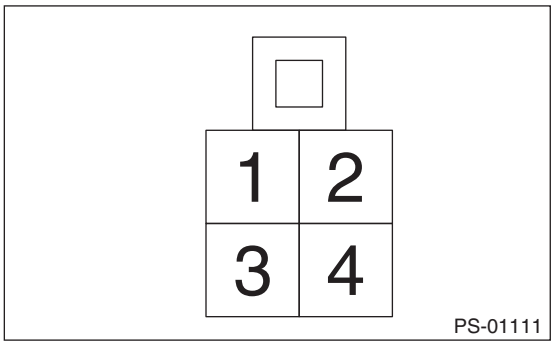
D: ASSEMBLY

Assemble each part in the reverse order of disassembly.

E: INSPECTION

1. PADDLE SHIFT SWITCH

Check the resistance of paddle switch.



Step		Check	Yes	No
1	**SHIFT-UP SWITCH CONTINUITY CHECK.** 1) Operate the + side of paddle shift assembly and hold it. 2) Measure the resistance between terminals of the paddle shift assembly connector. ***Terminals*** ***No. 4 — No. 3:***	Is the resistance less than 10 Ω?	Go to step **2**.	Replace the paddle shift assembly.
2	**SHIFT-DOWN SWITCH CONTINUITY CHECK.** 1) Operate the – side of paddle shift assembly and hold it. 2) Measure the resistance between terminals of the paddle shift assembly connector. ***Terminals*** ***No. 1 — No. 4:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the paddle shift assembly.
3	**CHECK SHIFT SWITCH INSULATION.** 1) Do not operate the paddle shift assembly. 2) Measure the resistance between terminals of the paddle shift assembly connector. ***Terminals*** ***No. 4 — No. 3:*** ***No. 1 — No. 4:***	Is the resistance 1 MΩ or more?	Paddle shift assembly is normal.	Replace the paddle shift assembly.

Replace the paddle switch if the inspection result is not within the standard value.

2. SATELLITE SWITCH ASSEMBLY

• Audio (navigation) switch: <Ref. to ET-39, SATELLITE SWITCH ASSEMBLY, INSPECTION, Switches and Harness.>
• EyeSight steering switch <Ref. to ES-34, EyeSight STEERING SWITCH, INSPECTION, Switches and Harness.>
• Cruise control command switch: <Ref. to CC-7, INSPECTION, Cruise Control Command Switch.>

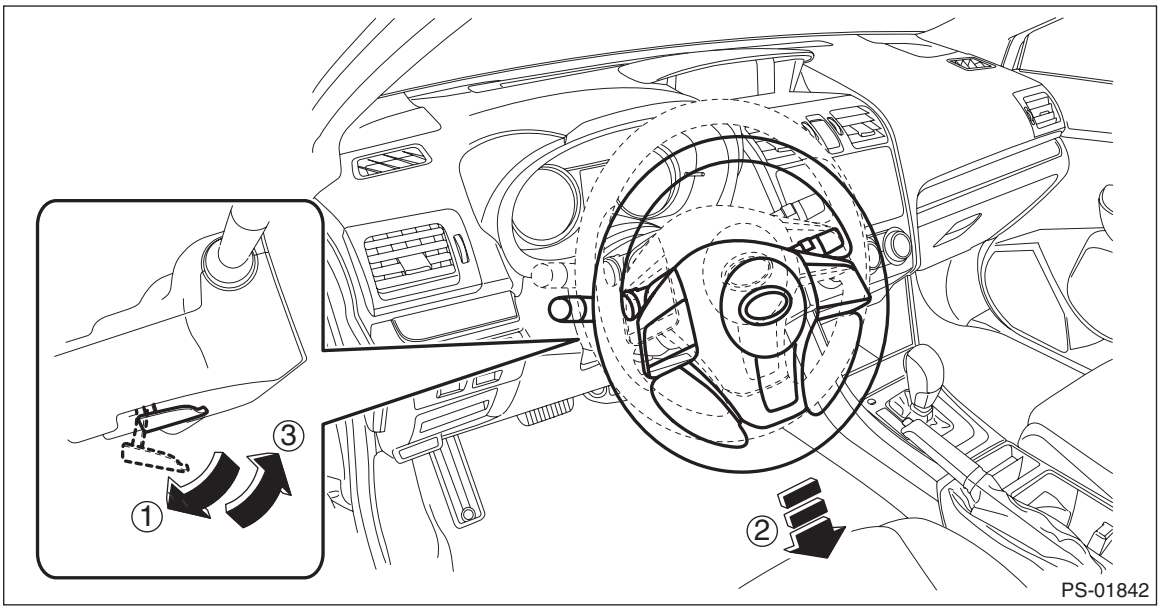
3. MID SWITCH

Refer to “Steering Switch” of “INSTRUMENTATION/DRIVER INFO” section. <Ref. to IDI-31, INSPECTION, Steering Switch.>

4. Universal Joint

A: REMOVAL

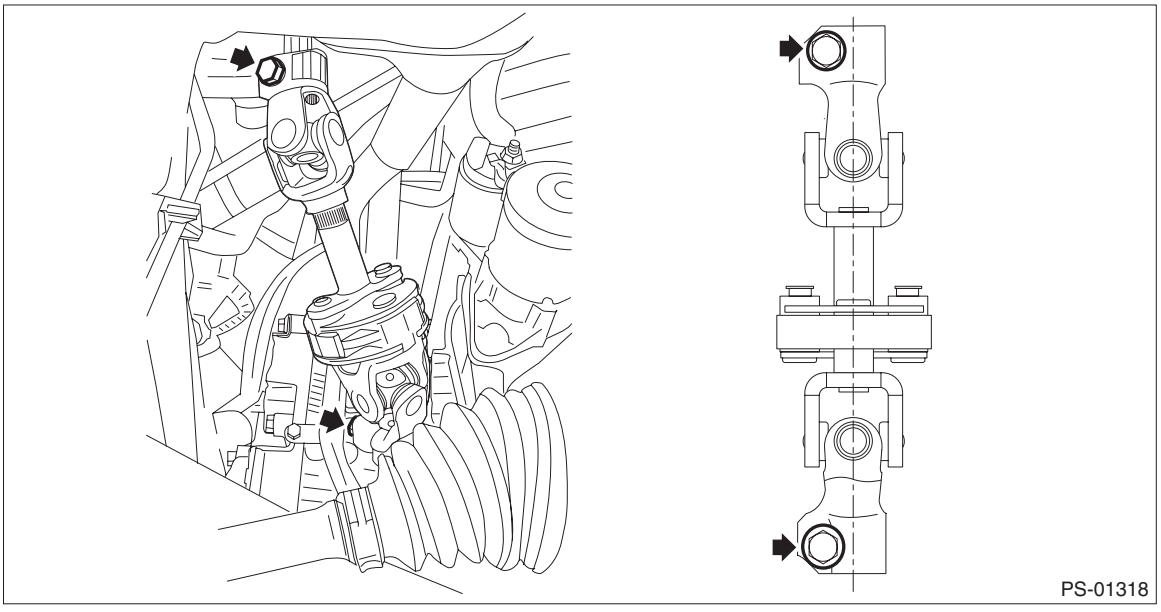
1) Adjust the tilt position of the column assembly - steering to the lowest position and lock the tilt lever.



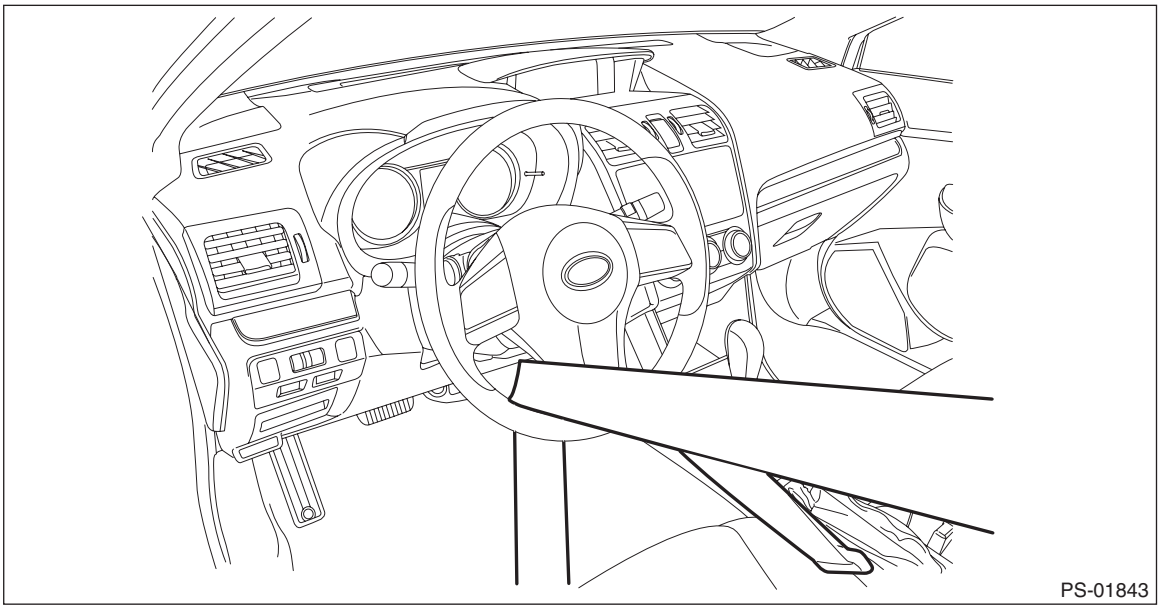
2) Remove the universal joint assembly - steering.
   (1) Place alignment marks on the universal joint assembly - steering.

NOTE:
Place alignment marks on the following positions.
- Between the column assembly - steering and the universal joint assembly - steering
- Between the steering gearbox assembly and the universal joint assembly - steering

   (2) Remove the bolt, and remove the universal joint assembly - steering.

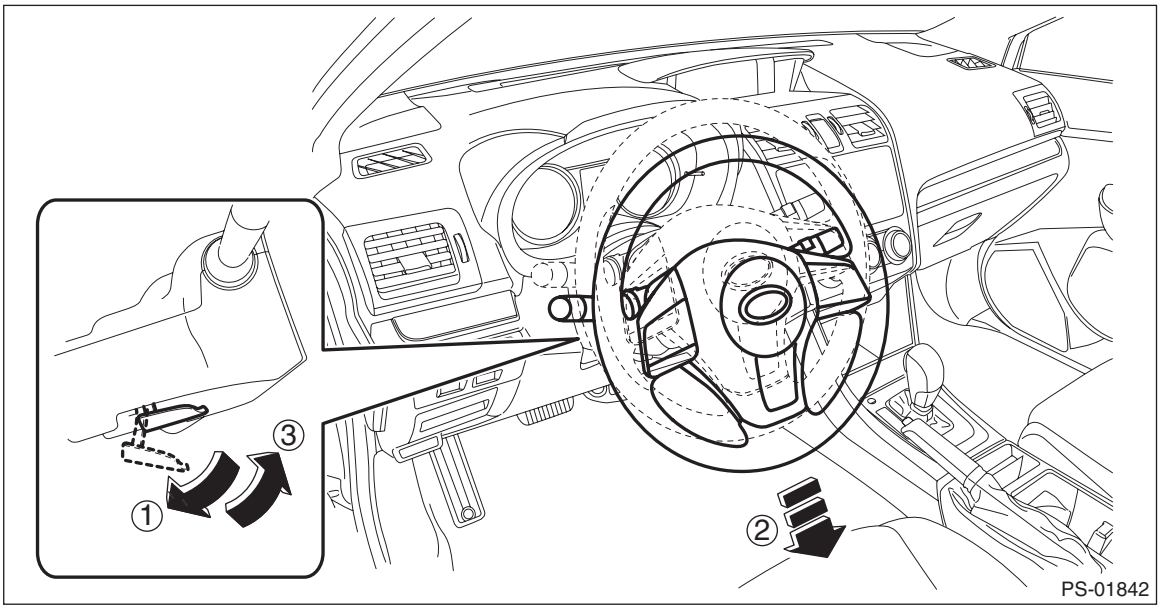


3) Prevent the steering wheel from turning using the seat belt.



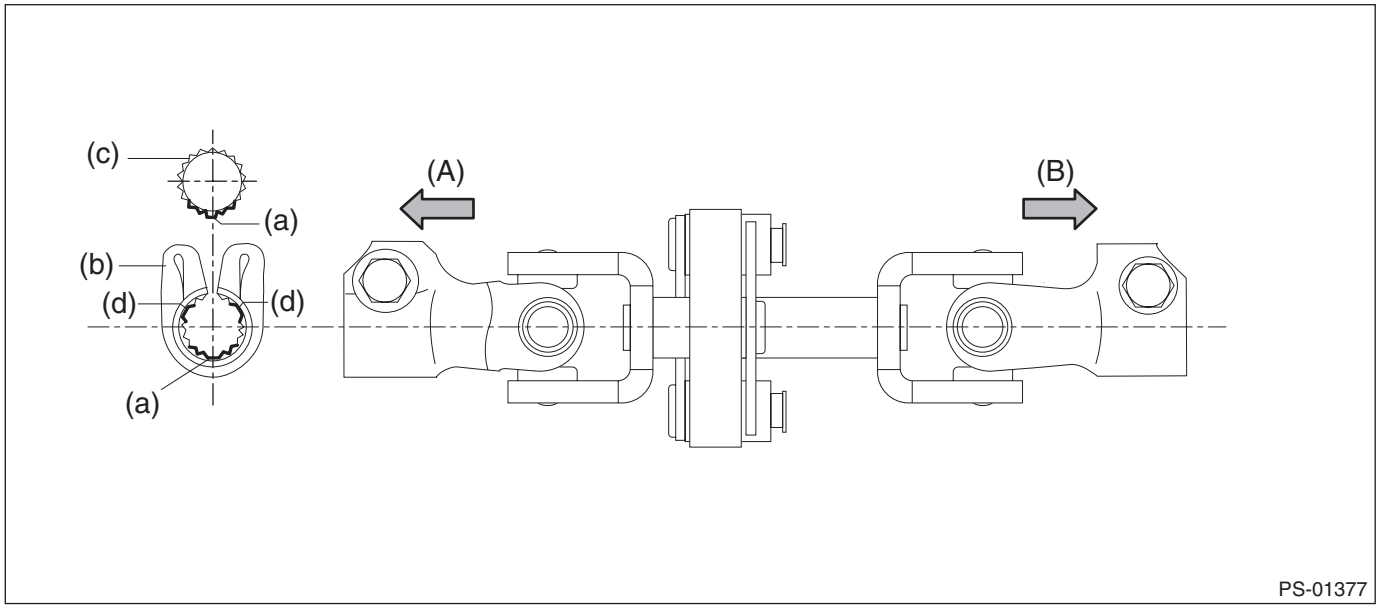
B: INSTALLATION

1) Before installation, check the universal joint assembly - steering. <Ref. to PS-19, INSPECTION, Universal Joint.>
2) Adjust the tilt position of the column assembly - steering to the neutral position and lock the tilt lever.



3) Align the cutout portion (a) at serrated section of the column shaft (c) and yoke (b), then install the universal joint assembly - steering into column shaft.

CAUTION:
Be sure to align the protrusion section (a) of the column shaft side with the cutout (a) of the serration. If another cutout portions (d) are used for alignment, the bolt of the universal joint assembly - steering cannot be assembled.



(A) Column shaft side (B) Gearbox side

4) Install the universal joint assembly - steering to the serrations of the gearbox assembly by matching the alignment marks.
5) Tighten the bolts on the gearbox side first, and then the column shaft side.

CAUTION:
Be sure to follow the tightening order and tightening torque of the universal joint assembly - steering to avoid the steering effort from becoming heavy.

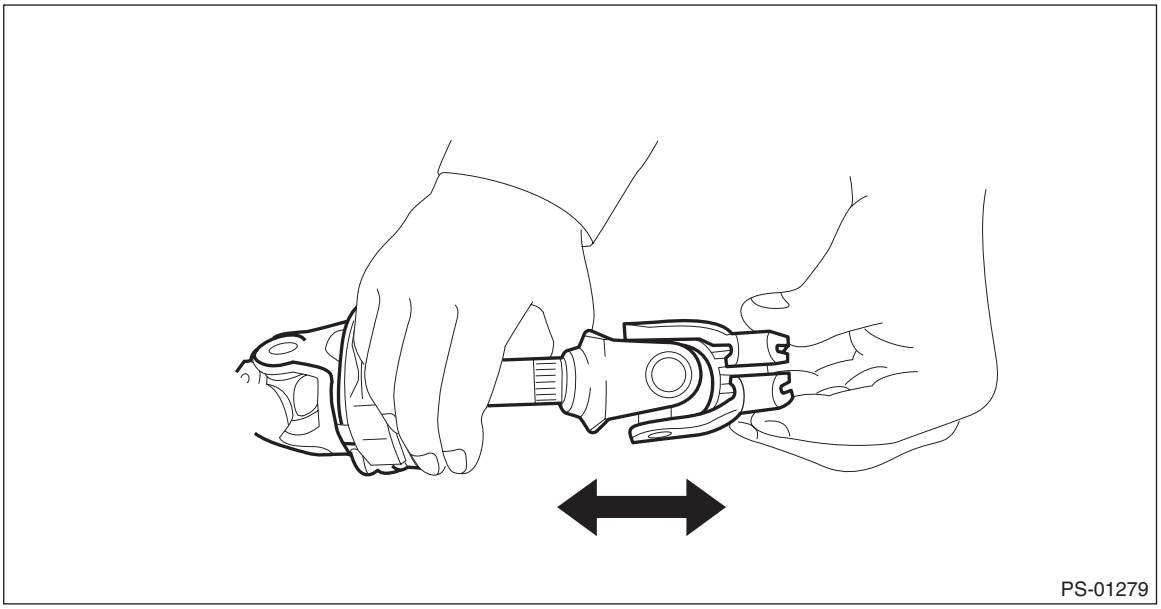
Tightening torque:
24 N·m (2.45 kgf-m, 17.7 ft-lb)

Clearance:
Universal joint assembly - steering coupling to adjacent parts: 15 mm (0.59 in) or more

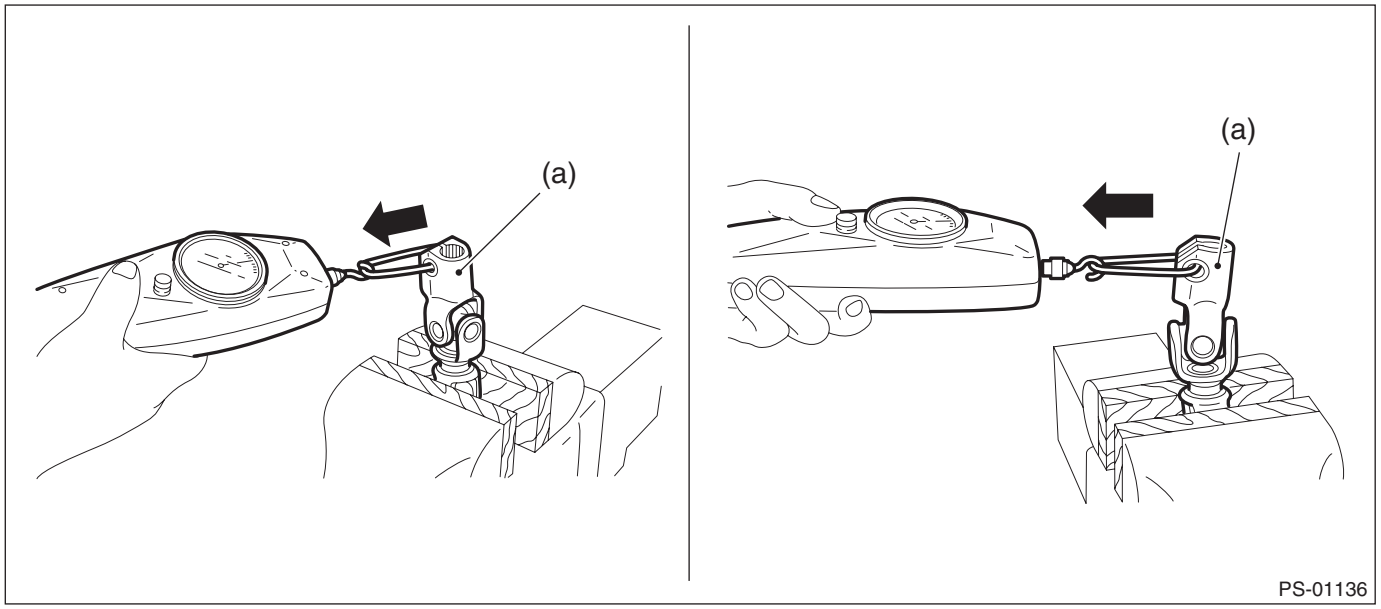
C: INSPECTION

Check for wear, damage or any other faults.
1) Check the universal joint assembly - steering for excessive looseness.

Service limit:
Play of the universal joint assembly - steering: 0 mm (0 in)

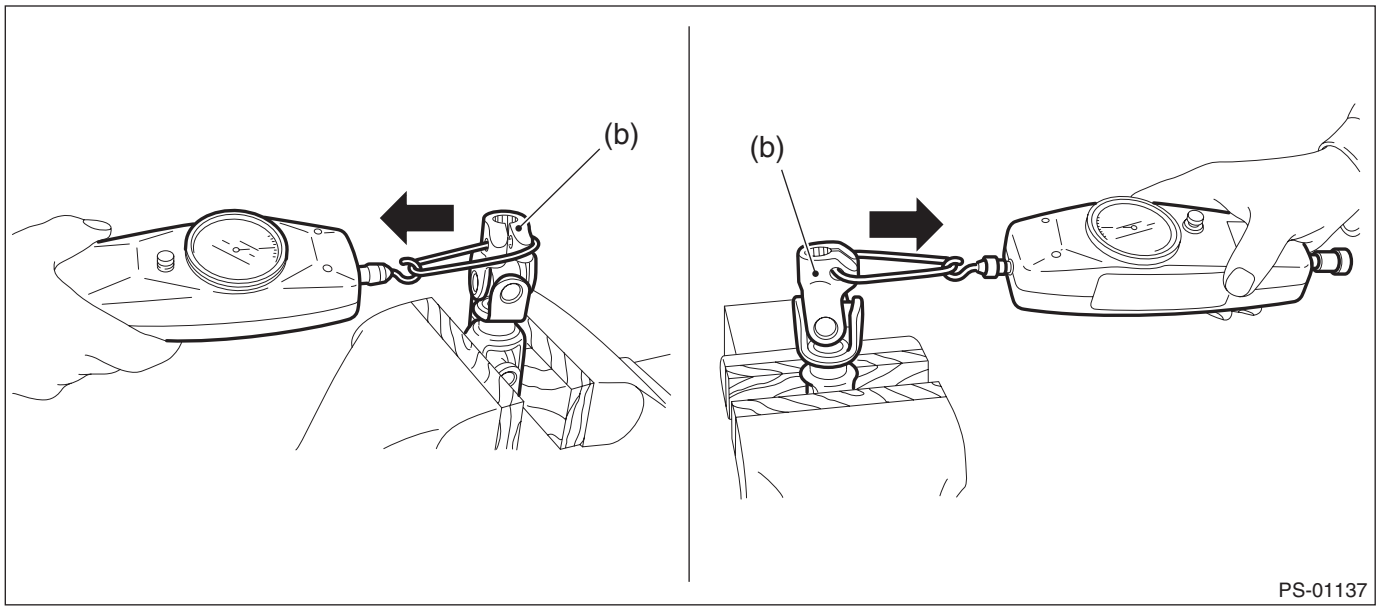


2) Measure the swing torque of the universal joint assembly - steering.
(1) Place the universal joint assembly - steering between wooden blocks and fix it on a vise.
(2) With the yoke (a) of gearbox side facing up, measure the swing torque in two directions.



Service limit:
Maximum load: 3.8 N (0.39 kgf, 0.86 lbf) or less

(3) With the yoke (b) of column assembly - steering side facing up, measure the swing torque in two directions.



Service limit:
Maximum load: 7.3 N (0.74 kgf, 1.64 lbf) or less

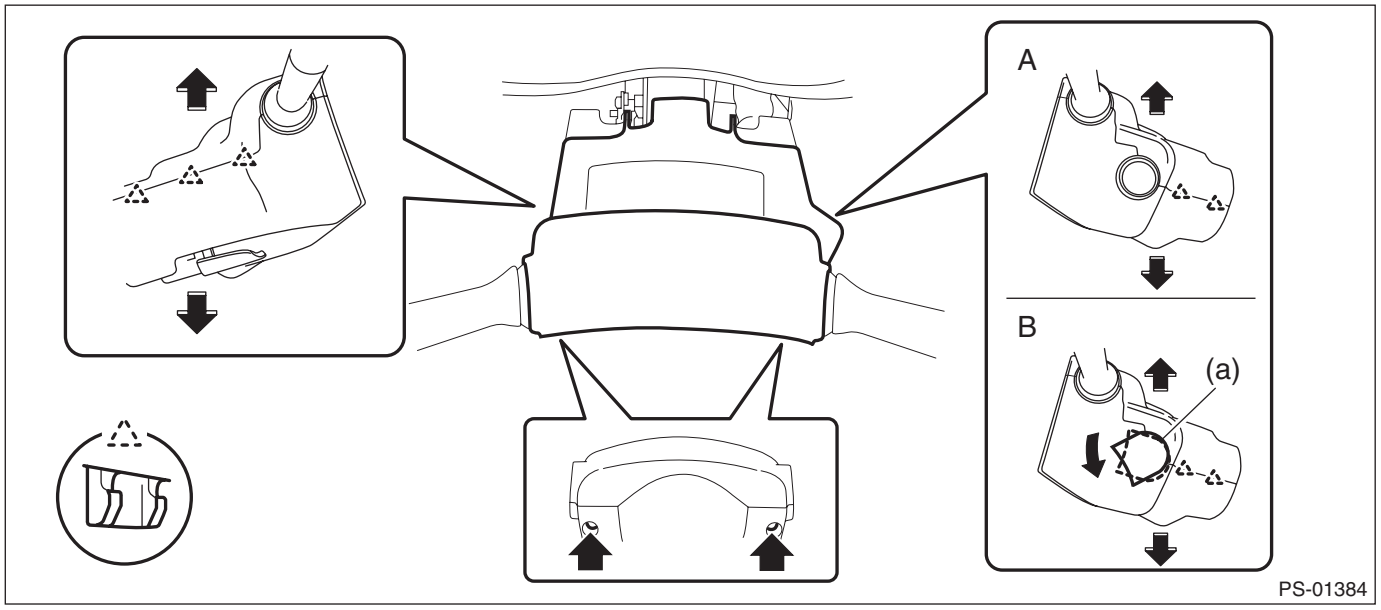
(4) Replace as necessary, if it is found defective.

5. Steering Column

A: REMOVAL

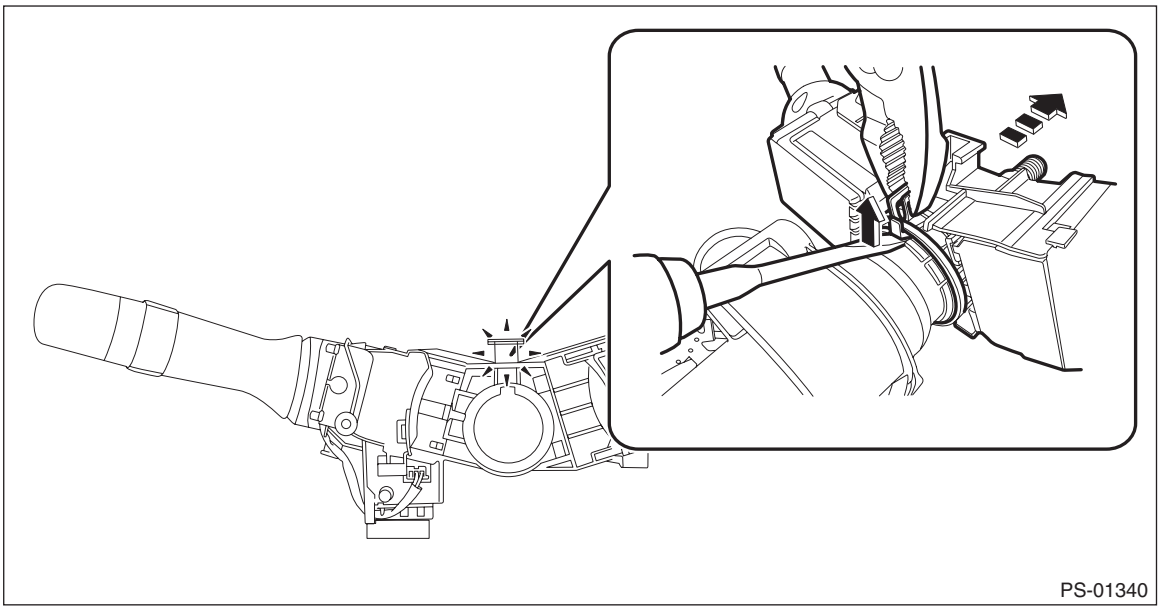
CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
3) Remove the steering wheel. <Ref. to PS-9, REMOVAL, Steering Wheel.>
4) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
5) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
6) Remove the cover assembly - column.
   (1) Release the screws and claws.
   (2) Remove the cap - key cylinder (a). (Model with keyless access with push button start)
   (3) Remove the cover assembly - column UPR and the cover assembly - column LWR.



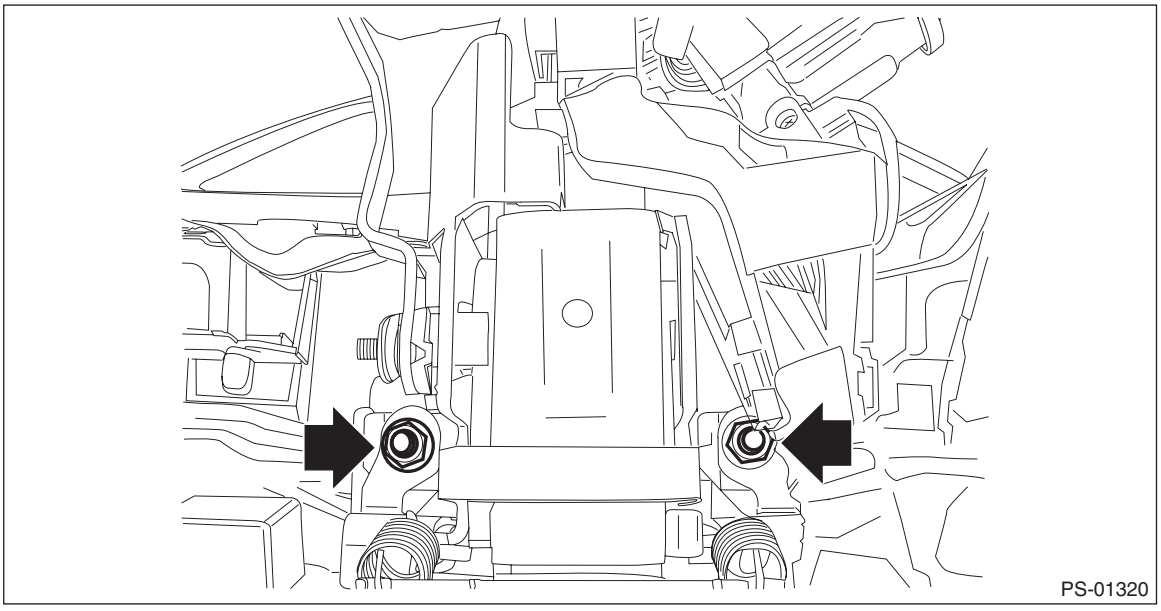
A Model without keyless access with push button start
B Model with keyless access with push button start

7) Remove the switch assembly - combination.
(1) Disconnect the connector, and loosen the clamp to release the claws.
(2) Pull out the switch assembly - combination from the column assembly - steering.



8) Remove all connectors from the column assembly - steering.
9) Remove the universal joint assembly - steering. <Ref. to PS-16, REMOVAL, Universal Joint.>

CAUTION:
To prevent damage to the universal joint assembly - steering and improper steering effort, make sure to remove the universal joint assembly - steering.
10) Remove the two nuts under the beam COMPL - steering securing the column assembly - steering.

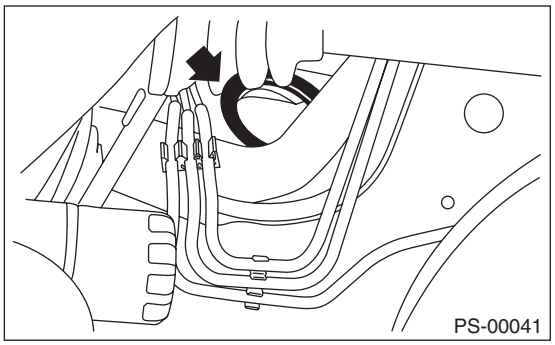


11) Pull out the column assembly - steering from the hole on toe board.

CAUTION:
Do not loosen the tilt lever when the column assembly - steering is not secured to the vehicle.
12) Remove the ignition key lock from the column assembly - steering. <Ref. to SL-65, REPLACEMENT, Ignition Key Lock.>

B: INSTALLATION

CAUTION:
If the steering wheel and steering angle sensor are removed, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
1) Install the grommet to the toe board.



2) Insert the end of the column assembly - steering into the toe board grommet.
3) Tighten the column assembly - steering installation bolt located under the beam COMPL - steering with the tilt lever fixed.

Tightening torque:
20 N·m (2.04 kgf-m, 14.8 ft-lb)
4) Connect all connectors located under the beam COMPL - steering.
5) Install the airbag module. <Ref. to AB-40, INSTALLATION, Driver's Airbag Module.>
6) Install the knee airbag module. <Ref. to AB-41, INSTALLATION, Knee Airbag Module.>
7) Install the cover assembly - instrument panel LWR driver INN and OUT.
8) Install the universal joint assembly - steering. <Ref. to PS-17, INSTALLATION, Universal Joint.>

CAUTION:
• Always install the universal joint assembly - steering after installing the steering column to avoid damage to the universal joint assembly - steering.
• Be sure to follow the tightening order and tightening torque of the universal joint assembly - steering to avoid the steering effort from becoming heavy.
9) Align the center position of the steering roll connector. <Ref. to AB-72, ADJUSTMENT, Roll Connector.>
10) Install the steering wheel. <Ref. to PS-10, INSTALLATION, Steering Wheel.>

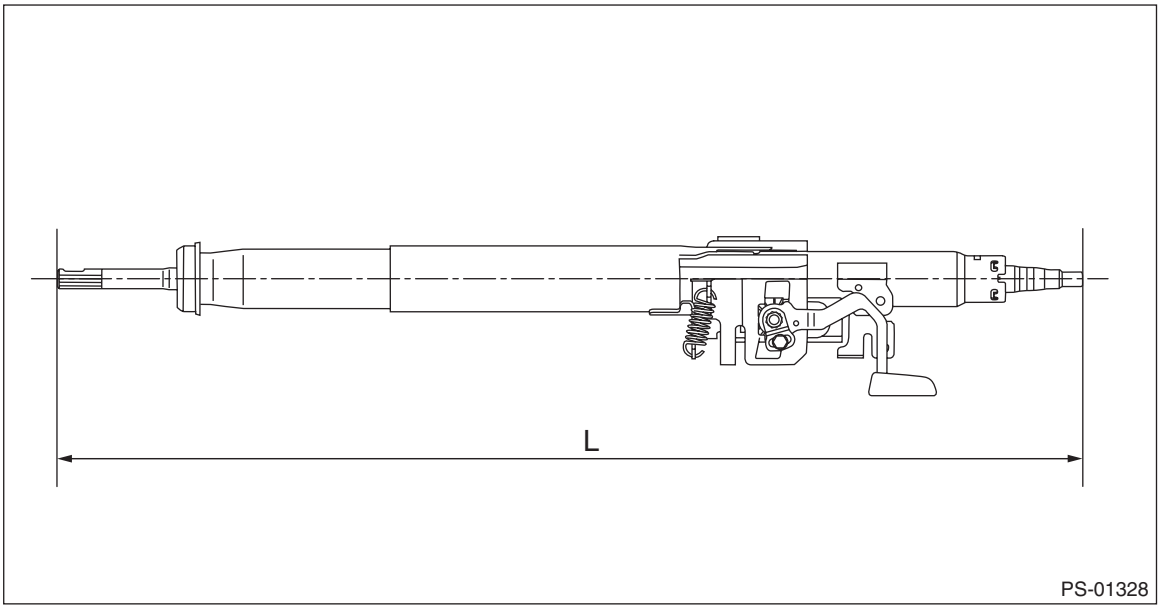
C: INSPECTION

1. UNIT INSPECTION

Check the following items, and if there is anything out of standard value, it is considered to be damaged. If so, replace it with a new part.

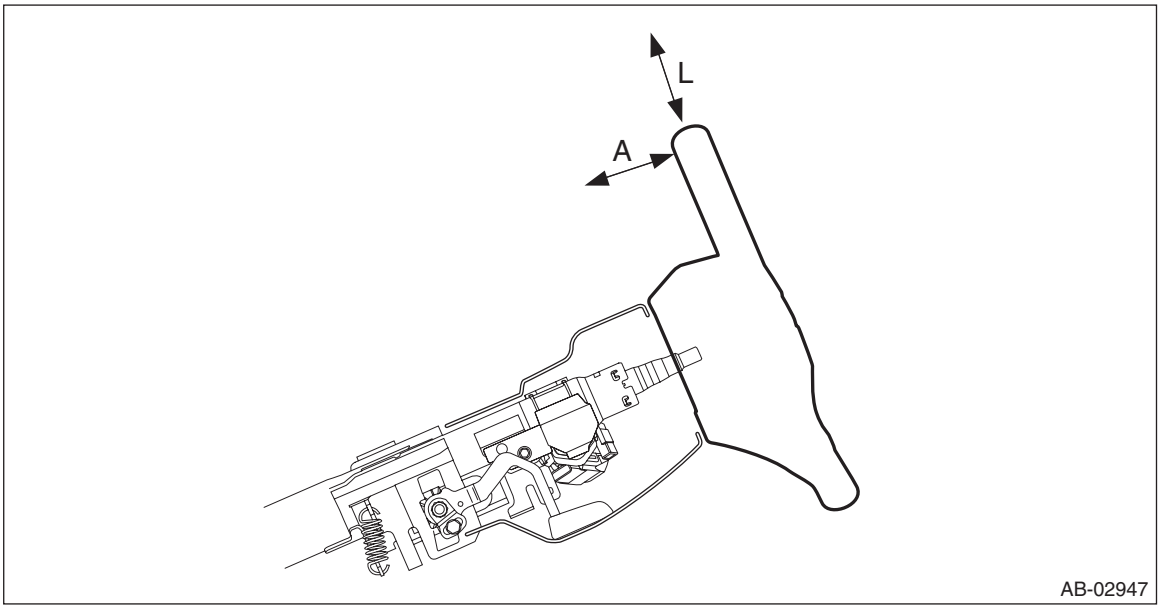
- Measure the whole length of the column assembly - steering.

Standard: Overall length L
Tilt and telescopic column (measure while minimized)
$819.7^{+1.5}_{-1.5}$ mm ($32.27^{+0.059}_{-0.059}$ in)



- Check the steering wheel deflection in axial and vertical directions.

Specification:
Axial deflection A (deflection of steering wheel)
Less than 6 mm (0.24 in)
Vertical deflection L (runout of steering wheel)
Less than 17 mm (0.68 in)



2. INSPECTION OF AIRBAG SYSTEM

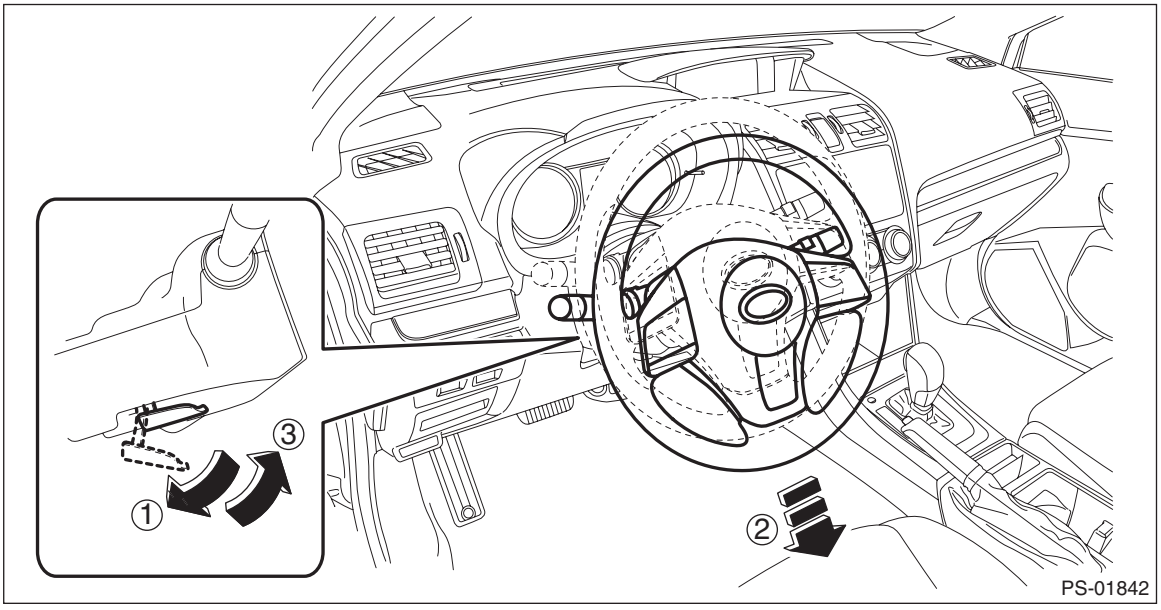
Refer to “Airbag System” for airbag inspection procedure. <Ref. to AB-40, INSTALLATION, Driver’s Airbag Module.>

6. Electric Power Steering Gearbox

A: REMOVAL

CAUTION:
• The power steering control module continues to operate after the engine stops and calculate the temperature in the control module. Therefore, before starting service of the power steering system which requires disconnection of the connector, stop the engine and allow approx. 30 minutes until the control module becomes cold.
• Before removal or installation, be sure to remove any foreign matter (dust, moisture, oil, etc.) from the power steering control module connector.
1) Lift up the vehicle, and then remove the front wheels.
2) Remove the under cover - front. <Ref. to EI-31, REMOVAL, Front Under Cover.>
3) Remove the universal joint assembly - steering. <Ref. to PS-16, REMOVAL, Universal Joint.>
4) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

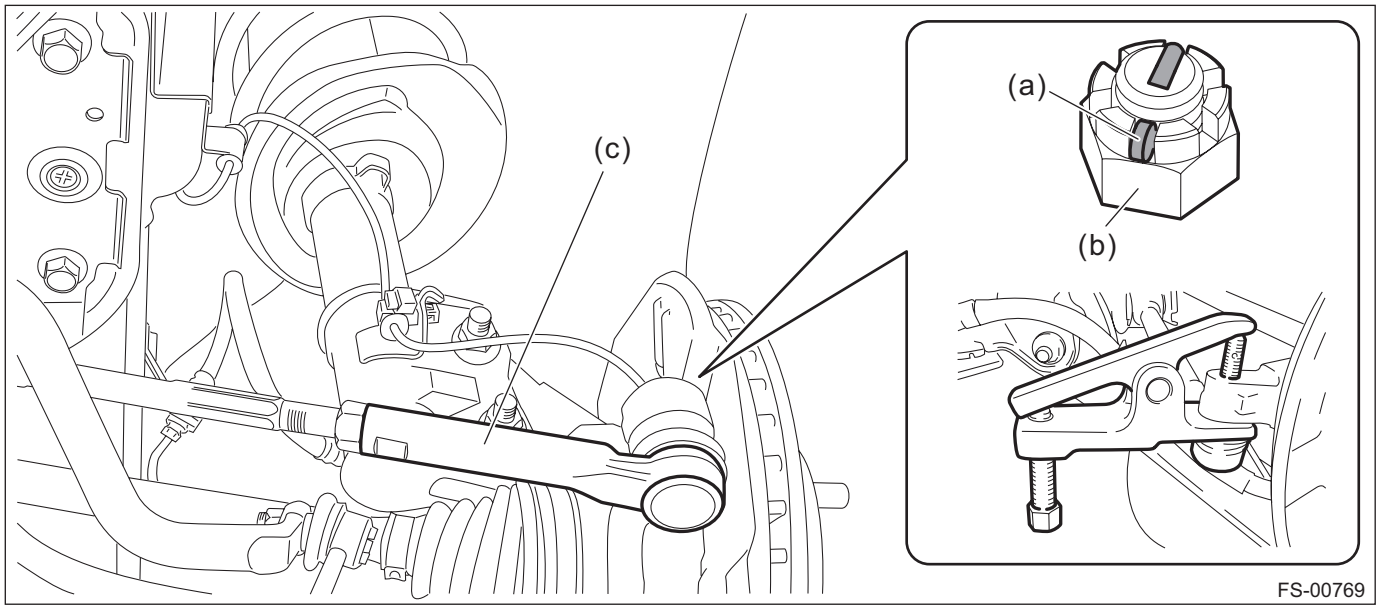
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
5) Adjust the tilt position of the column assembly - steering to the lowest position and lock the tilt lever.



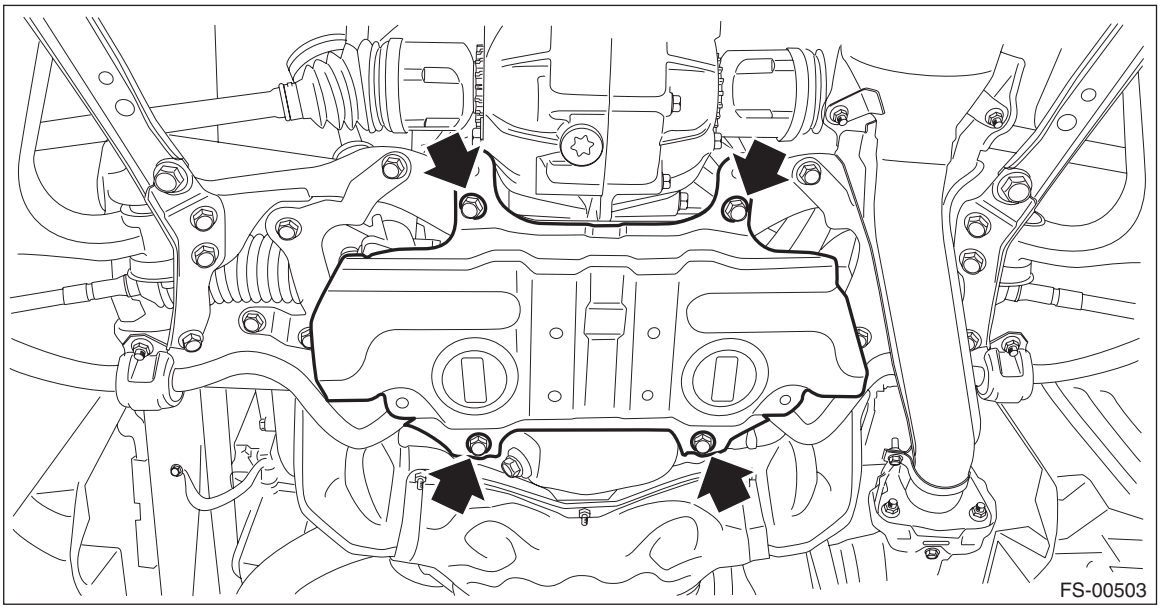
6) Remove the universal joint assembly - steering. <Ref. to PS-16, REMOVAL, Universal Joint.>
7) Disconnect the connector and harness clamp from power steering control module.

8) Disconnect the tie-rod end.
   (1) Pull out the cotter pin (a).
   (2) Remove the castle nut (b).
   (3) Using a tie-rod ball joint puller, remove the tie-rod end (c).

Preparation tool:
Tie-rod ball joint puller

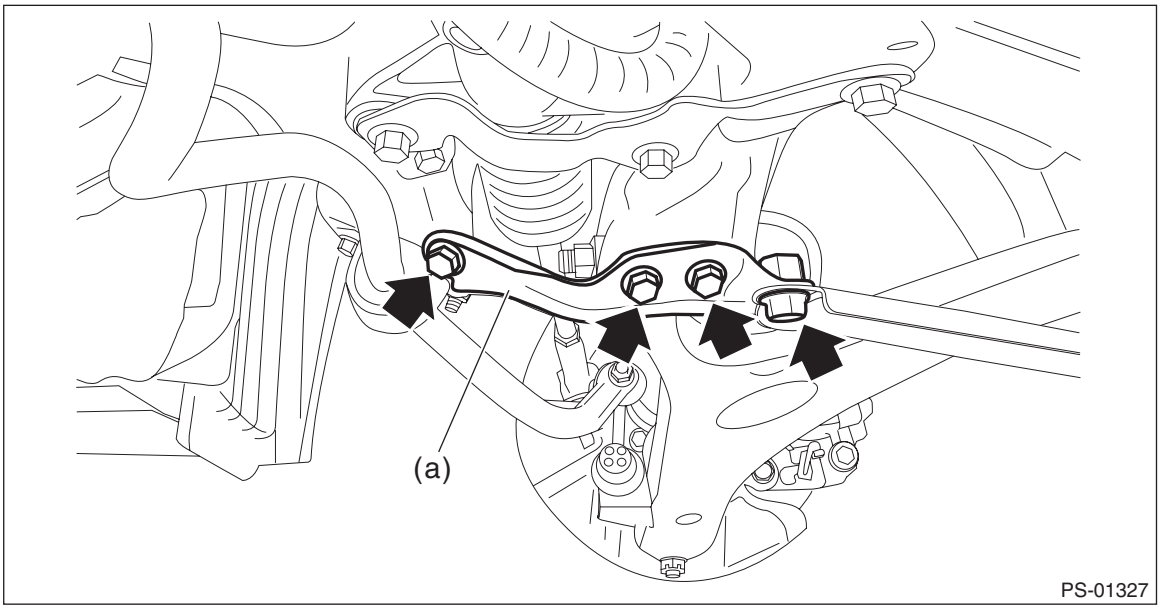


9) Remove the front crossmember support.

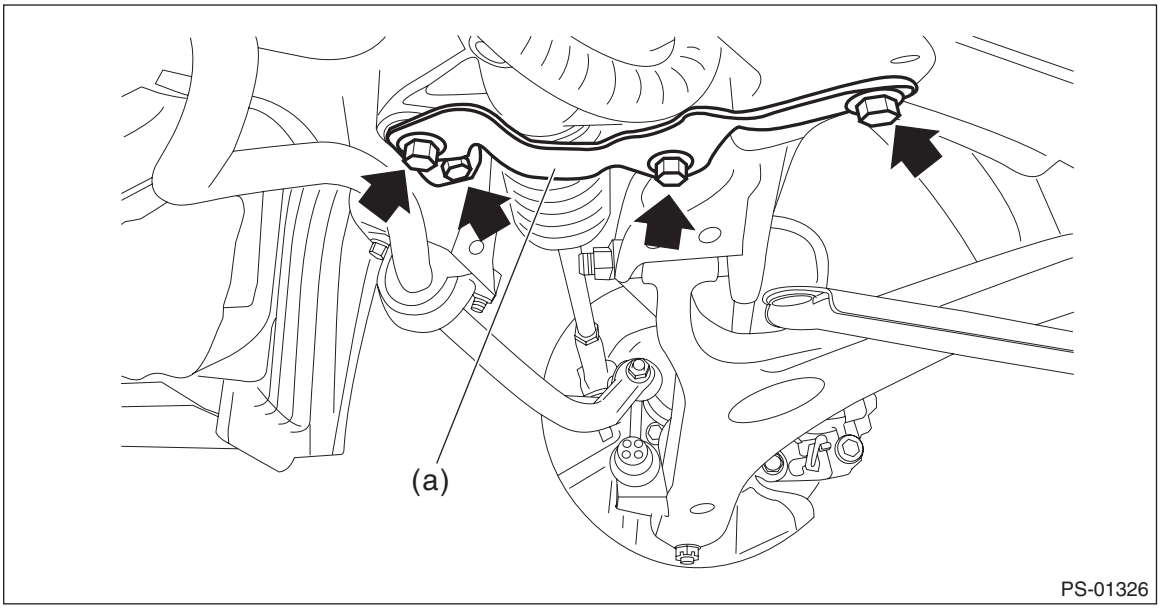


10) Remove the front exhaust pipe assembly. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>

11) Remove the support plate - front crossmember (a).



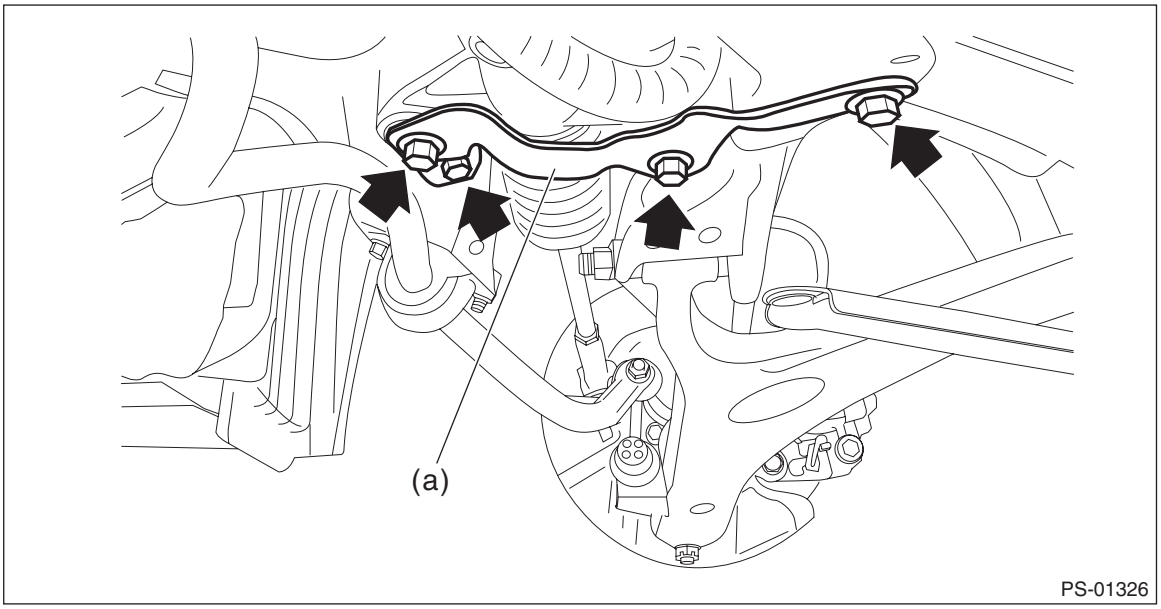
12) Remove the bolts securing the steering gearbox assembly, and remove the stiffener (a) and steering gearbox assembly.



B: INSTALLATION

1) Insert the steering gearbox assembly into crossmember, being careful not to damage the boot of the steering gearbox assembly.
2) Install the steering gearbox assembly to the crossmember by tightening the bolts through the stiffener (a) to the specified torque.

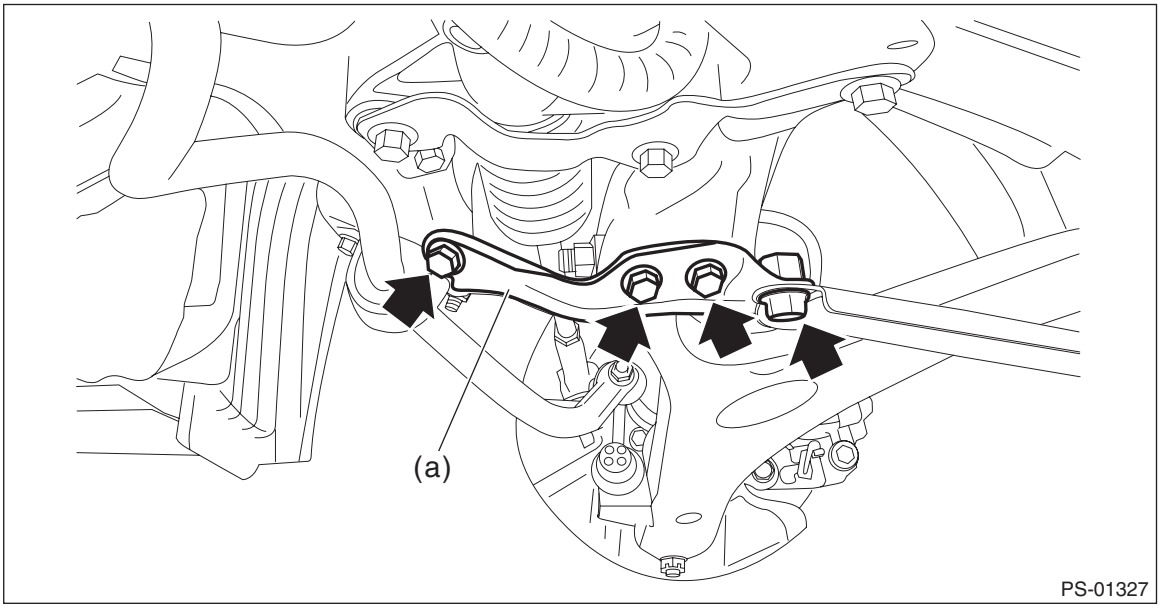
Tightening torque:
60 N·m (6.12 kgf-m, 44.3 ft-lb)



3) Install the universal joint assembly - steering. <Ref. to PS-17, INSTALLATION, Universal Joint.>

CAUTION:
Tighten the bolts of the universal joint assembly - steering in the order of steering gearbox side and column shaft side.
4) Install the support plate - front crossmember (a).

Tightening torque:
Support plate - front crossmember: 60 N·m (6.12 kgf-m, 44.3 ft-lb)
Front support: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

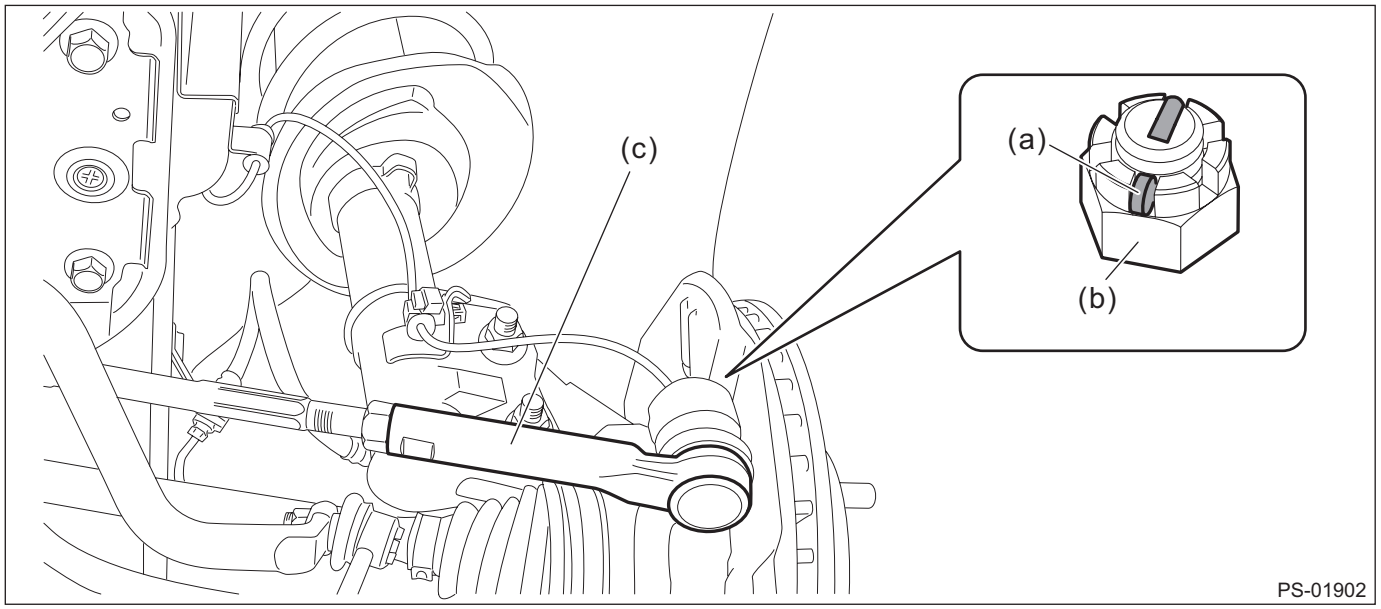


5) Connect the tie-rod ends and knuckle arm.
(1) Connect the tie-rod end (a) to the housing assembly - front axle.
(2) Tighten the castle nuts (b) to the specified torque.

CAUTION:
During connection, do not hit the cap at bottom of tie-rod end with a hammer.

Castle nut tightening torque:
27 N·m (2.75 kgf-m, 19.9 ft-lb)

(3) Tighten within the range of 60° so that the cotter pin hole and cutout portion of the castle nut (b) are aligned.
(4) Insert the cotter pin (c), and bend the tip of the pin to fix it.



6) Install the front crossmember - support.

Tightening torque:
60 N·m (6.12 kgf-m, 44.3 ft-lb)

7) Install the front exhaust pipe assembly. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
8) Install the under cover - front. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
9) Install the front wheels.
10) Lower the vehicle.
11) Tighten the wheel nuts to the specified torque.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

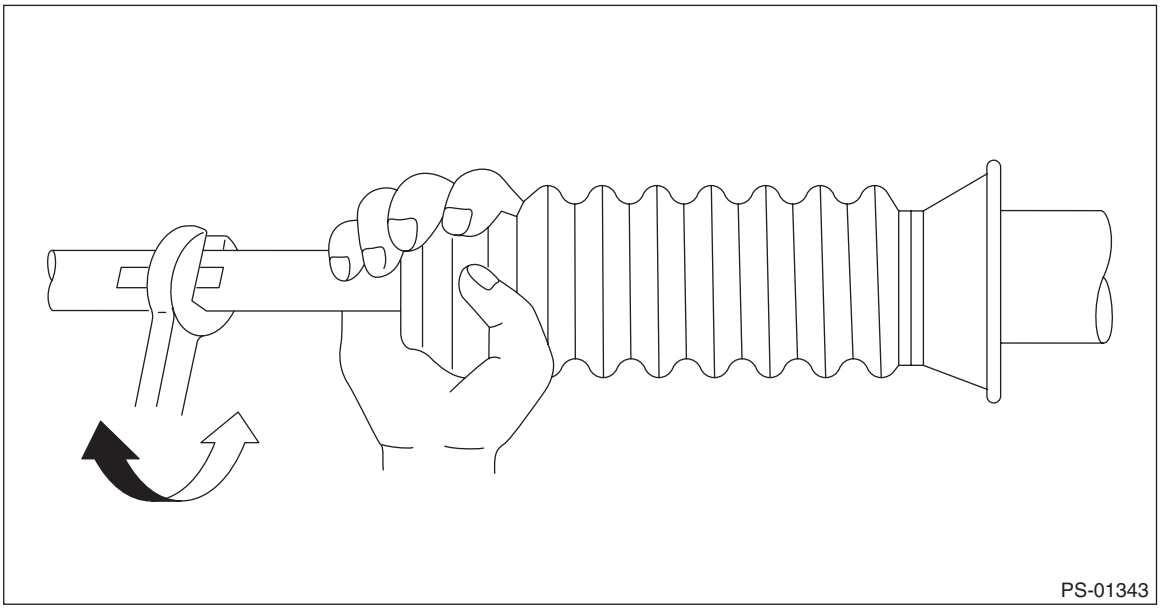
12) Connect the power steering control module harness connector.
13) Connect the battery ground terminal.

CAUTION:
When the wheel alignment has been adjusted, perform the adjustment of the steering angle sensor.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

14) After adjusting toe-in and steering angle, tighten the lock nut on tie-rod end.

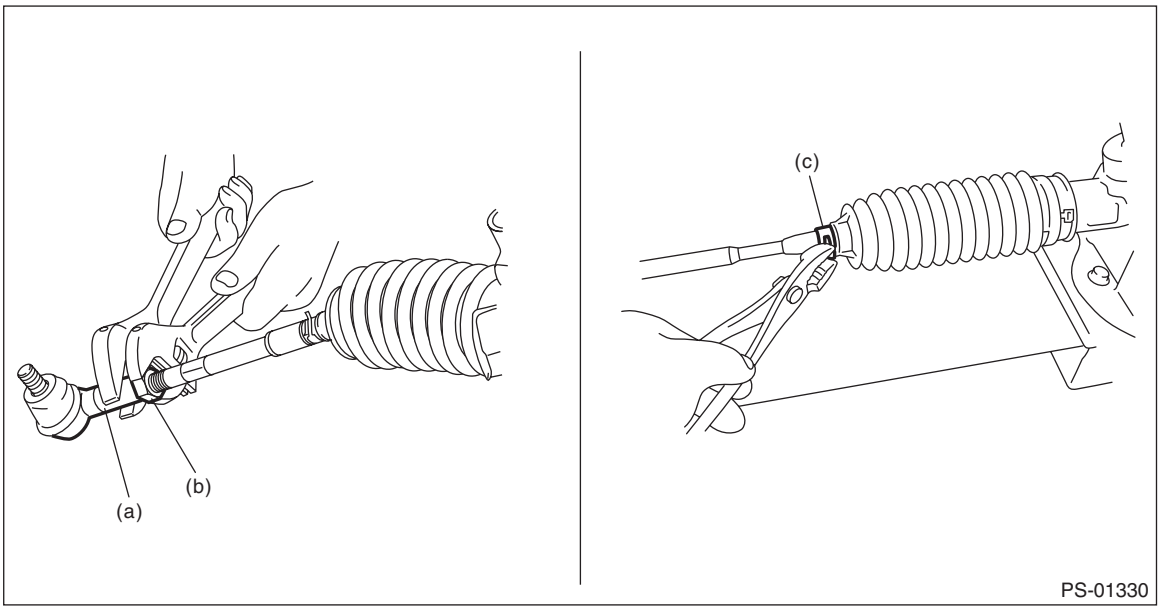
Tightening torque:
85 N·m (8.67 kgf-m, 62.7 ft-lb)

NOTE:
When adjusting toe-in, hold the boot - steering gearbox as shown to prevent it from being rotated or twisted. If it becomes twisted, straighten it.



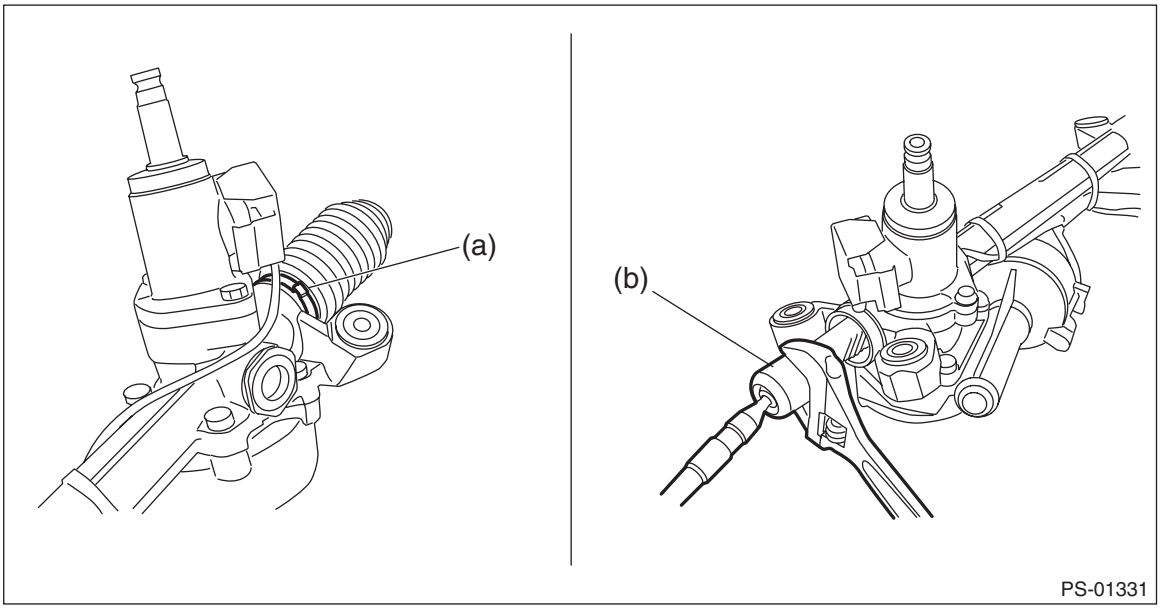
C: DISASSEMBLY

CAUTION:
• Nut for fixing the rack is on the driver's side only. When removing the tie-rod on the passenger's side, turn over the boot - steering gearbox on the driver's side, and fix the rack during operation.
• When fixing the steering gearbox assembly in a vise, apply a wooden piece on the flange portion.
1) Remove the tie-rod end (a) and lock nut (b) from the steering gearbox assembly.
2) Remove the clip - boot tie-rod (c) located outside the boot - steering gearbox using the pliers, and then slide the boot - steering gearbox to the tie-rod end side.



3) Remove the tie-rod (b) from the gearbox assembly.
(1) Using a flat tip screwdriver, remove the band - boot (a) from the boot - steering gearbox.

NOTE:
Replace the boot - steering gearbox or the band - boot (a) if there is damage, cracks or deterioration.
(2) Remove the tie-rod (b).



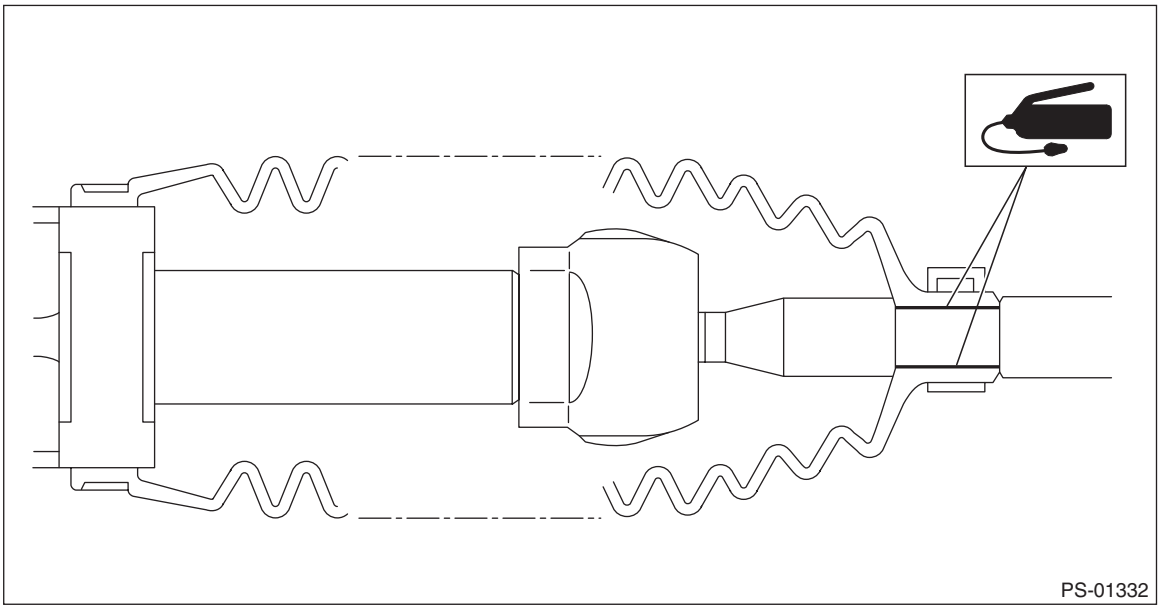
D: ASSEMBLY

1) Install the tie-rod into rack.

Tightening torque:
90 N·m (9.18 kgf-m, 66.4 ft-lb)

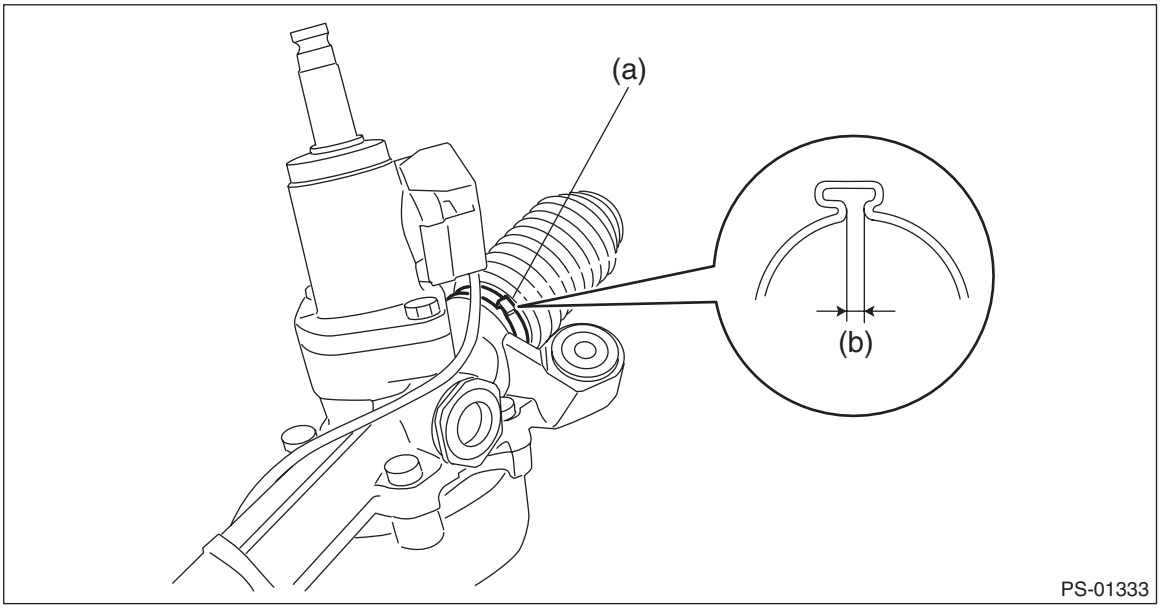
NOTE:
Check the mating face of rack and tie-rod for foreign matter such as dust etc.
2) Apply a coat of grease to the tie-rod groove, and then install the boot - steering gearbox to the housing.

NOTE:
Make sure that the boot - steering gearbox is installed without unusual inflation or deflation.


PS-01332

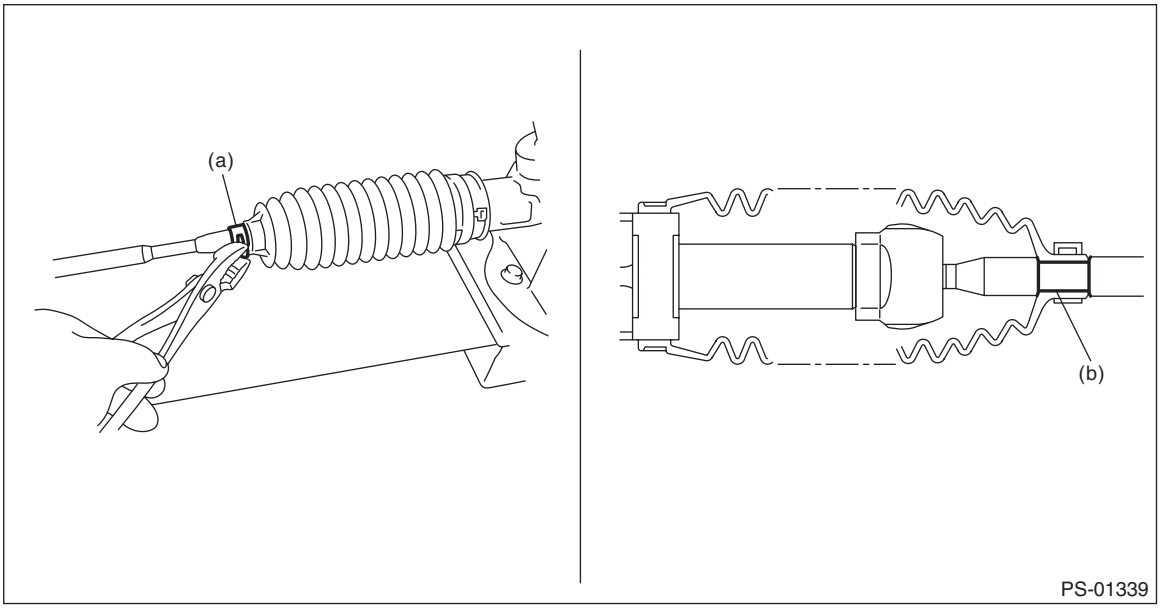
3) Using the boot clamp pliers, crimp the boot so that the clearance (b) of the band - boot (a) crimp portion becomes 2 mm (0.08 in) or less.

NOTE:
Use a new band - boot.



PS-01333

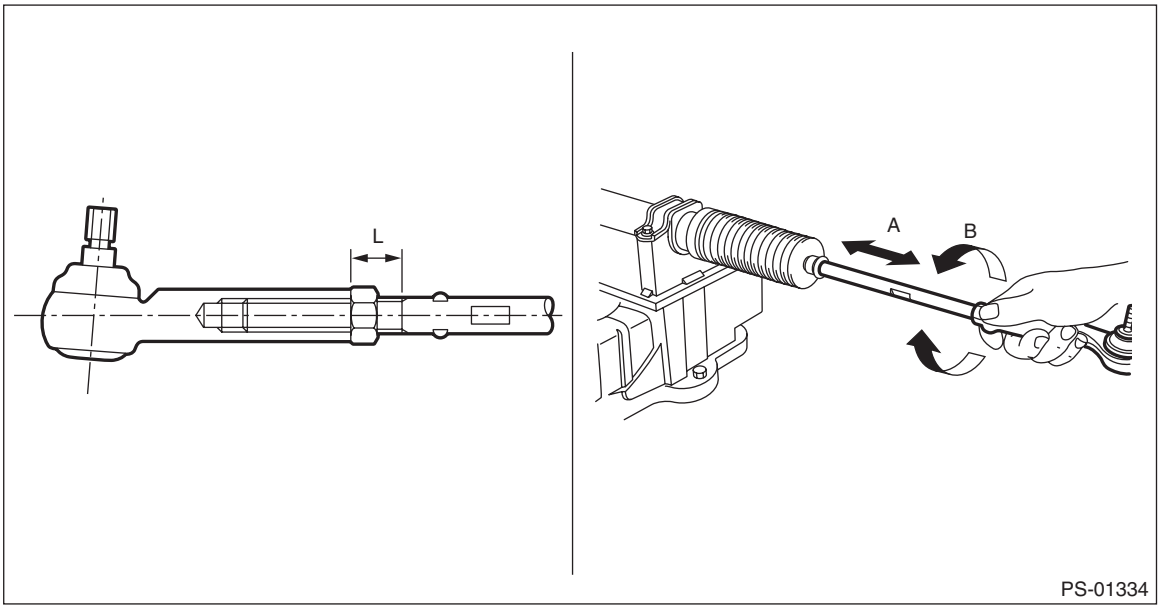
4) Fix the end of the boot - steering gearbox with clip - boot tie-rod (a).
5) After installation, check that the end of the boot - steering gearbox is installed to the groove (b) of the tie-rod.



6) If the tie-rod end has been removed, screw in lock nut and tie-rod end to the screwed portion of tie-rod, and tighten the lock nut temporarily in a position as shown in the figure.

Installed tie-rod length L:
33 mm (1.3 in)

7) Inspect the steering gearbox assembly as follows:
1. "A" Holding the tie-rod end, repeat lock to lock several times as quickly as possible.
2. "B" Holding the tie-rod end, turn it slowly at a radius several times as large as possible.
3. Finally, make sure that the boot - steering gearbox is installed in the specified position without inflating.



8) Remove the steering gearbox assembly from ST.

E: INSPECTION

1. UNIT INSPECTION

Check components for wear, damage or other faults. Adjust or replace if necessary.

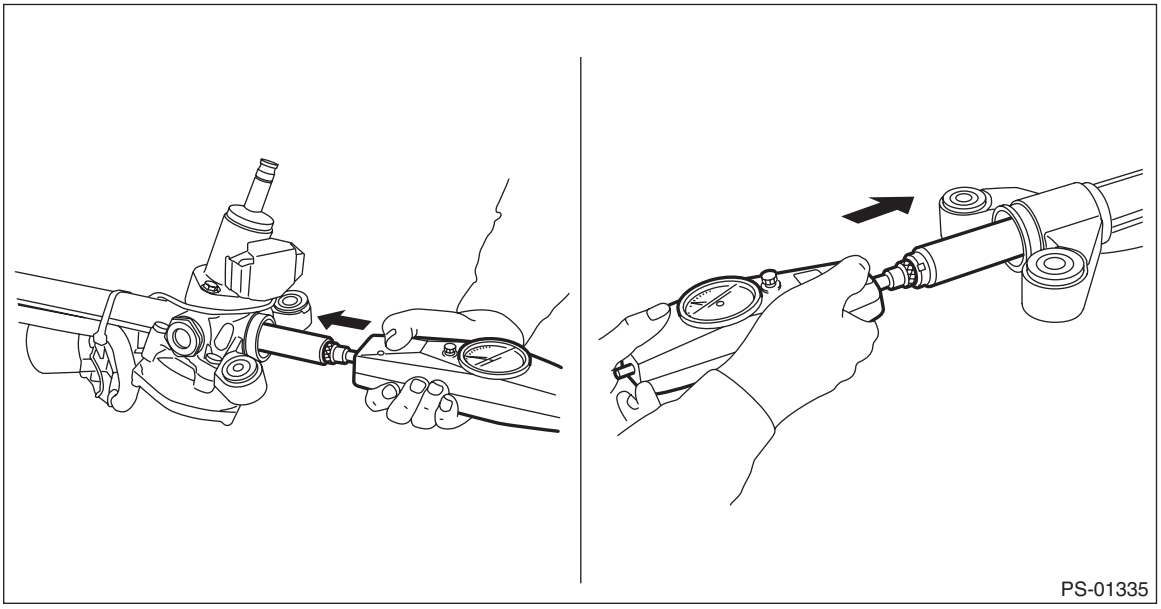
2. LIMIT

Make a measurements as follows. If it exceeds the specified service limits, adjust or replace.

NOTE:
When fixing the steering gearbox assembly in a vise, apply a wooden piece on the flange portion.

Rack shaft sliding resistance (Impreza model):
Limit: 320 N (33 kgf, 72 lbf) or less
Left/right differential of sliding resistance: 20% or less

Rack shaft sliding resistance (Crosstrek model):
Limit: 303 N (31 kgf, 68 lbf) or less
Left/right differential of sliding resistance: 20% or less

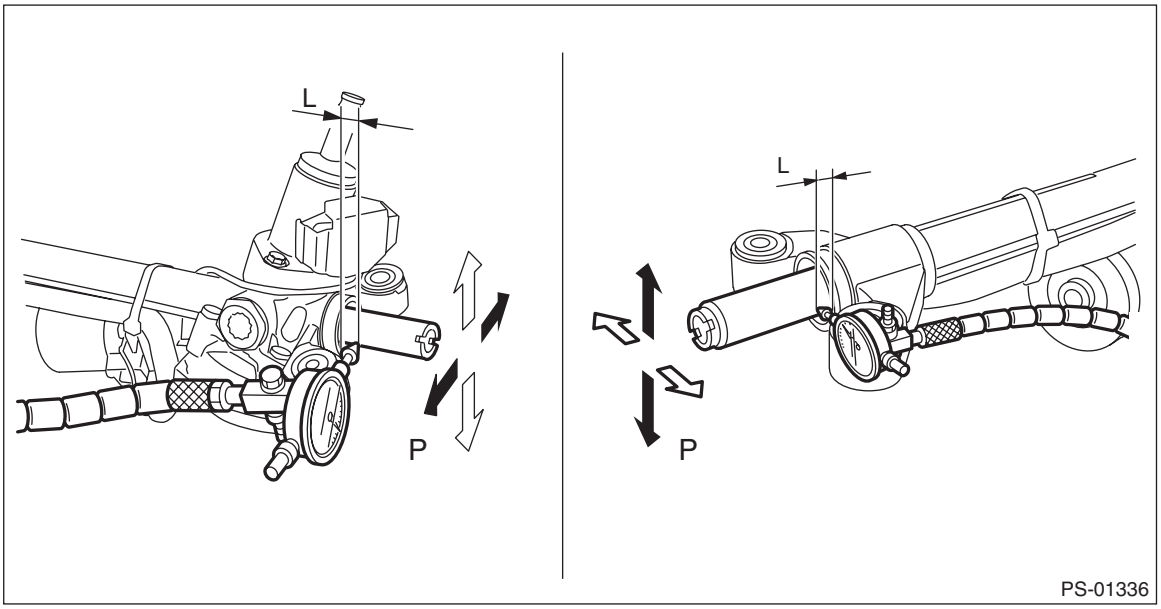


3. RACK SHAFT PLAY IN THE RADIAL DIRECTION

Right-turn steering:
Service limit:
Direction ⬅ ➡: 0.4 mm (0.016 in) or less
Direction ⇦ ⇨: 0.6 mm (0.024 in) or less

Left-turn steering:
Service limit:
Direction ⇦ ⇨ ⬅ ➡: 0.4 mm (0.016 in) or less

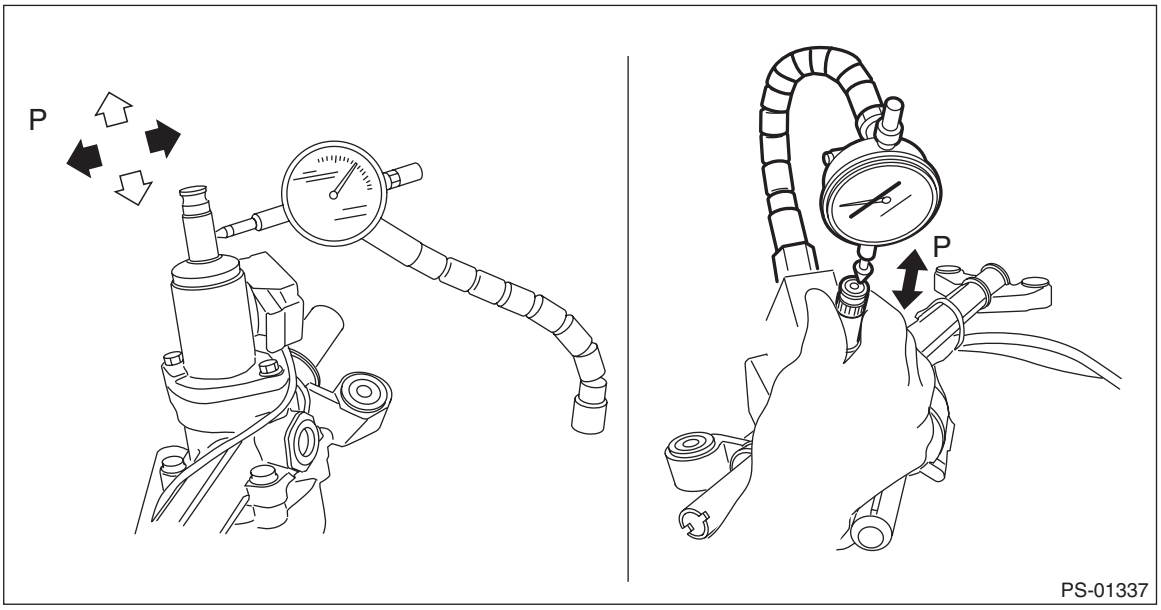
Condition:
L: 5 mm (0.20 in)
P: 98 N (10 kgf, 22 lbf)



4. INPUT SHAFT PLAY

In radial direction:
Wear limit: 0.18 mm (0.0071 in) or less
Condition: P = 98 N (10 kgf, 22 lbf)

In axial direction:
Service limit: 0.27 mm (0.0106 in) or less
Condition: P = 20 — 49 N (2 — 5 kgf, 4 — 11 lbf)



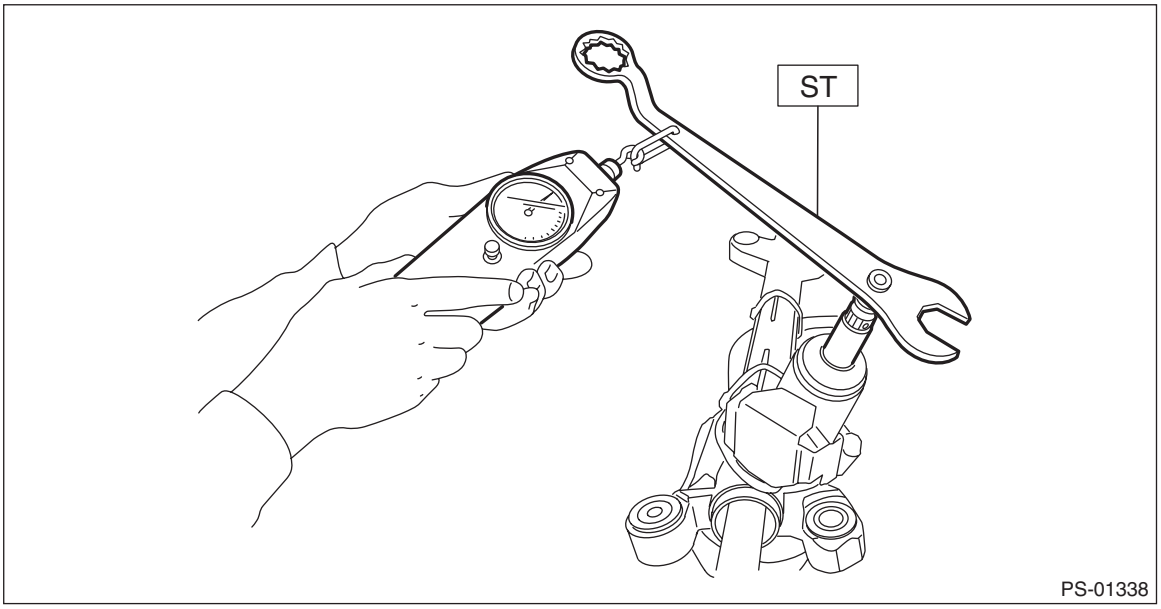
5. TURNING RESISTANCE OF GEARBOX

1) Using the ST, measure the rotational resistance of the steering gearbox assembly.

Preparation tool:
ST: SPANNER (34099PA100)

Service limit (Impreza model):
Maximum allowable resistance: 18.3 N (1.9 kgf, 4.1 lbf) or less
Difference between right and left rotational resistance: 20% or less

Service limit (Crosstrek model):
Maximum allowable resistance: 18.0 N (1.8 kgf, 4.0 lbf) or less
Difference between right and left rotational resistance: 20% or less



F: ADJUSTMENT

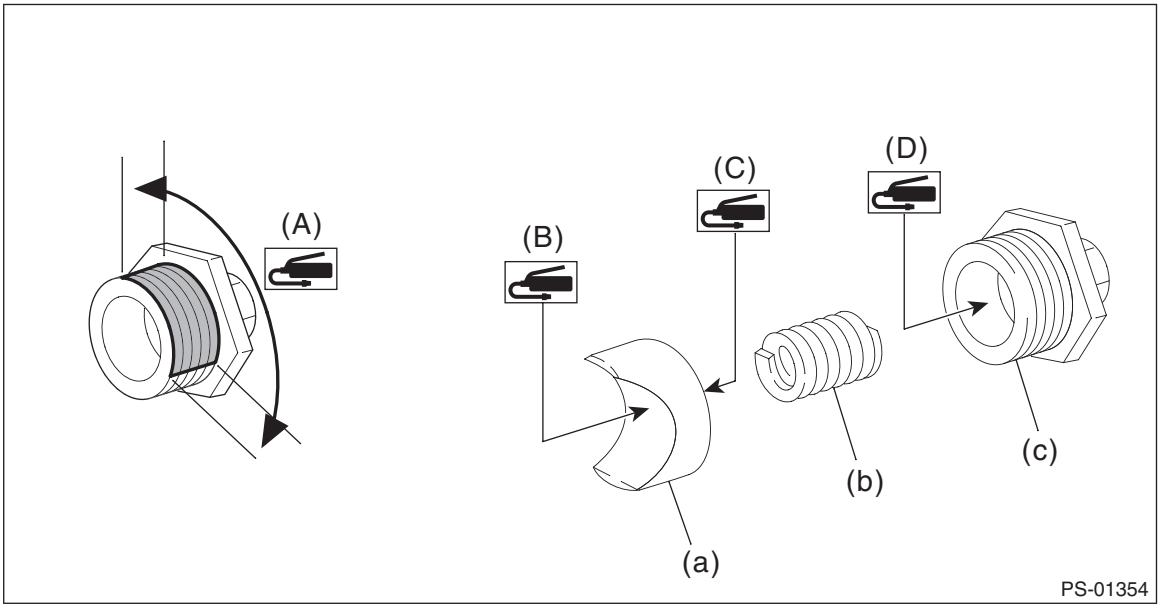
1. GEARBOX BACKLASH ADJUSTMENT

1) Remove the steering gearbox assembly. <Ref. to PS-25, REMOVAL, Electric Power Steering Gearbox.>
2) Loosen the lock nut and adjusting screw.
3) Apply a coat of grease to the sliding surface (B) of the pad - pressure (a) and seating surface (C) of spring - gearbox (b), and then insert the pad - pressure (a) into steering body.
4) Charge the adjusting screw (c) with grease (D), and then insert the spring - gearbox (b) into adjusting screw. Then install on the steering body.

Grease:
Multemp AC-P

5) Apply liquid gasket to 1/3 or more (A) of entire perimeter of adjusting screw thread (c).

Liquid gasket:
THREE BOND TB-1111B



6) Tighten the adjusting screw to 9.8 N·m (1.0 kgf-m, 7.2 ft-lb), then loosen it.
7) Tighten the adjusting screw to 6 N·m (0.6 kgf-m, 4.4 ft-lb).
8) Loosen the adjusting screw by 20°.
9) While fixing the adjusting screw, tighten the lock nuts.

Tightening torque:
49.4 N·m (5.04 kgf-m, 36.4 ft-lb)

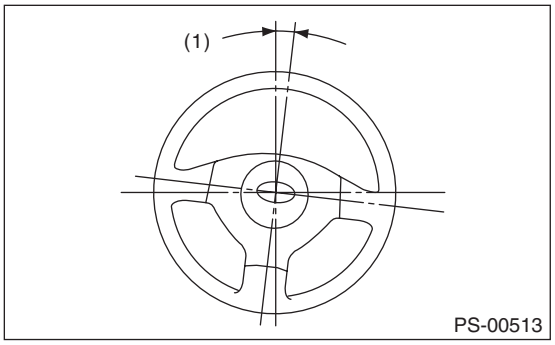
2. FRONT WHEEL ALIGNMENT ADJUSTMENT

1) Adjust the front toe. <Ref. to FS-13, FRONT WHEEL TOE-IN, ADJUSTMENT, Wheel Alignment.>
2) Check the steering angle of the wheels.

Standard of steering angle:

Model	*Impreza model*	*Crosstrek model*
Inner wheel	*38.3°±1.5°*	*38.2°±1.5°*
Outer wheel	*33.7°±1.5°*	*33.6°±1.5°*

3) When the steering wheel is in the following condition, perform the steering wheel installation over again.
- When wheels are set in the straight ahead position, the steering wheel spokes are not horizontal.
- Error is more than 5° on the periphery of the steering wheel.



(1) 5° or less

4) If the steering wheel spokes are not horizontal with vehicle set in the straight ahead position after this adjustment, correct it by turning the right and left tie-rods in the opposite direction from each other by the same angle. Also check that there are no abnormal steering effort, failure of the steering wheel to return or other faults.
5) Adjust the steering angle sensor. (Models without EyeSight) <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
6) Adjust the steering angle sensor. (Models with EyeSight)
- Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
- Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

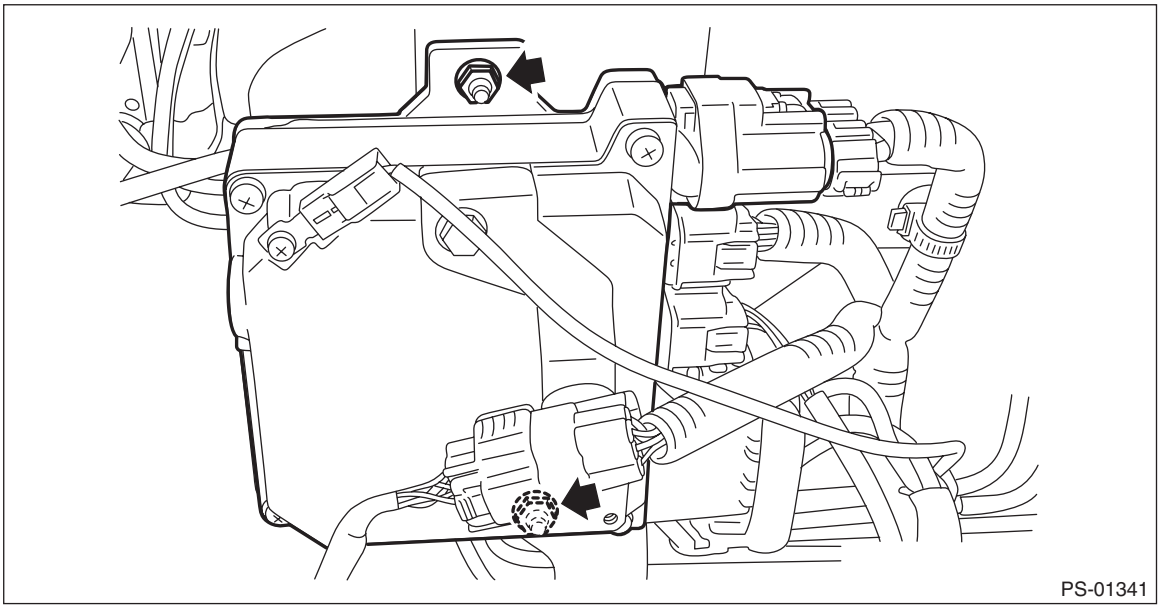
7. Power Steering Control Module

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the power steering control module.
   (1) Disconnect the connector of the power steering control module.
   (2) Remove the nuts, and remove the power steering control module.



B: INSTALLATION

1) Install each part in the reverse order of removal.

CAUTION:
Make sure that the connector is securely locked.

Tightening torque:
Power steering control module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

8. General Diagnostic Table

A: INSPECTION

Trouble	Possible cause	Corrective action
• Steering effort is heavy in all ranges. • Steering effort is heavy at stand still. • Steering wheel vibrates when turning.	1. Tire and wheel • Improper tire out of specifications • Improper wheel out of specification • Tires not properly inflated	Replace or reinflate.
	2. Measure the steering wheel effort. <Ref. to PS-37, TURNING RESISTANCE OF GEARBOX, INSPECTION, Electric Power Steering Gearbox.>	Adjust or replace.
• Vehicle leads to one side or the other. • Returning force of steering wheel to center is poor. • Steering wheel vibrates when turning.	1. Tire and wheel • Flat tire • Mixed use of different tires • Mixed use of different wheels • Abnormal wear of tire • Unequal tread remaining • Unequal pressure of tire	Adjust, fix or replace.
	2. Front wheel alignment • Improper or unequal caster • Improper or unequal toe-in • Loose suspension connections	Adjust or retighten.
	3. Measure the steering wheel effort. <Ref. to PS-37, TURNING RESISTANCE OF GEARBOX, INSPECTION, Electric Power Steering Gearbox.>	Adjust or replace.

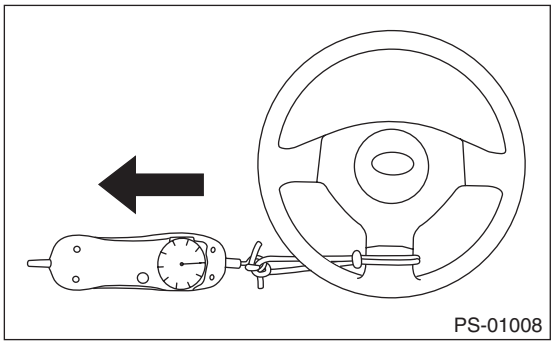
NOTE:
When performing repeated steering operation with the vehicle at standstill, the steering effort may be temporarily heavy because the heat generated in the system activates the power steering protection control. This is not a malfunction caused by the steering system. After a while, it will return to normal steering effort. (In this case, the steering warning light will not come on and there will be no DTC.)

1. NOISE AND VIBRATION

NOTE:
• When turning the steering wheel with the brake applied when the vehicle is parked, a screeching noise may be generated by the brake disc and pads. This is not a fault in the steering system.
• There may be a small vibration around the steering devices when turning the steering wheel at standstill, even though the component parts are operating properly.

Trouble	Possible cause	Corrective action
Rattling noise (intermittent) While engine is running.	Interference with adjacent parts	Check the clearance. Correct if necessary.
	Looseness of linkage, play of steering, improper tightening (looseness) of suspension joint or column assembly - steering	Retighten or replace.
	Noise emitted from inside of the gearbox	Replace the gearbox assembly.
Knocking When turning steering wheel in both directions with small angle repeatedly at engine ON or OFF.	Excessive backlash Loosened lock nut for adjusting backlash	Adjust the backlash. When the noise remains after adjustment, replace the gearbox assembly.
	Insufficient tightening or play in the tie-rod or tie-rod end	Retighten or replace.
Grinding noise (intermittent) While engine is running. (While operating the steering.)	Fault inside of gearbox	Replace the gearbox assembly.
	Faulty bearing of the column assembly - steering	Apply grease or replace.
	Occurs when turning the steering wheel with brakes (service or parking) applied.	If the noise goes off when brake is released, it is normal.
Vibration While engine is running. (with/without steering turned)	Excessive play in steering, looseness of suspension parts	Retighten.

2. MEASUREMENT OF STEERING EFFORT

	Step	Check	Yes	No
1	**CHECK STEERING WARNING LIGHT.**	Does the STEERING warning light illuminate?	Read the DTC, and inspect according to it.	Go to step **2**.
2	**CHECK STEERING WARNING LIGHT.** 1) Connect the Subaru Select Monitor, and turn the steering wheel. (One lock to lock) 2) Check the “EPS operation flag” in the current data.	Is the EPS operation flag normal without displaying any DTC code?	Go to step **3**.	If the EPS operation flag is “Assist limitation”, stop the engine for approx. 10 minutes and perform the procedures from step 1 again.
3	**CHECK STEERING EFFORT.** 1) Stop the vehicle on paved road. 2) Set the tire air pressure to the specification. 3) Start the engine. 4) Run the engine at idle. 5) Install a spring scale on the steering wheel. 6) Pull the spring scale at a right angle to the steering wheel, and measure both right and left steering wheel efforts.  PS-01008	Is the steering effort less than 29.4 N (3.0 kgf, 6.6 lbf)?	Go to step **4**.	Go to step **8**.
4	**CHECK STEERING EFFORT.** 1) Stop the engine. 2) Pull the spring scale at a right angle to the steering wheel, and measure both right and left steering wheel efforts.	Is the steering effort less than 294.2 N (30 kgf, 66.2 lbf)?	Go to step **5**.	Perform the inspection or adjustment around the suspension part.
5	**CHECK TORQUE SENSOR OUTPUT VALUE.** 1) Connect the Subaru Select Monitor. 2) Read the output of torque sensor voltage. NOTE: When measuring, place the steering wheel at the center position.	Is the voltage 2.425 — 2.575 V?	Go to step **6**.	Replace the gearbox assembly. <Ref. to PS-25, Electric Power Steering Gearbox.>
6	**CHECK TORQUE SENSOR OUTPUT VALUE.** 1) Remove the universal joint assembly - steering. 2) Connect the Subaru Select Monitor. 3) Read the output of torque sensor voltage.	Is the voltage 2.425 — 2.575 V?	Go to step **7**.	Replace the gearbox assembly. <Ref. to PS-25, Electric Power Steering Gearbox.>

Step		Check	Yes	No
7	**CHECK TORQUE SENSOR OUTPUT VALUE.** 1) Remove the universal joint assembly - steering. NOTE: Check that the universal joint assembly - steering moves up and down smoothly without installing the bolt. Then tighten the bolts first on the gearbox side and then on the column shaft side. 2) Connect the Subaru Select Monitor. 3) Read the output of torque sensor voltage.	Is the voltage 2.425 — 2.575 V?	Go to step **8**.	Check the universal joint assembly - steering. <Ref. to PS-25, Electric Power Steering Gearbox.>
8	**CHECK STEERING WHEEL EFFORT.** 1) Remove the universal joint assembly - steering. 2) Measure the steering wheel effort.	Is the steering effort less than 2.26 N (0.23 kgf, 0.51 lbf)?	Go to step **9**.	Replace the column assembly - steering. <Ref. to PS-25, Electric Power Steering Gearbox.>
9	**CHECK STEERING WHEEL EFFORT.** Measure the steering wheel effort.	Is the difference of steering effort between right and left less than 20%?	Go to step **10**.	Replace the column assembly - steering. <Ref. to PS-21, Steering Column.>
10	**CHECK UNIVERSAL JOINT ASSEMBLY - STEERING.** Measure the swing torque of joint. (Yoke of column assembly - steering side) <Ref. to PS-19, INSPECTION, Universal Joint.>	Is the swing torque of the universal joint assembly - steering less than 7.3 N (0.74 kgf, 1.64 lbf)?	Go to step **11**.	Replace the universal joint assembly - steering with a new part. <Ref. to PS-16, Universal Joint.>
11	**CHECK UNIVERSAL JOINT ASSEMBLY - STEERING.** Measure the swing torque of joint. (Yoke of gearbox side) <Ref. to PS-19, INSPECTION, Universal Joint.>	Is the swing torque of the universal joint assembly - steering less than 3.8 N (0.39 kgf, 0.86 lbf)?	Go to step **12**.	Replace the universal joint assembly - steering with a new part. <Ref. to PS-16, Universal Joint.>
12	**CHECK FRONT WHEEL.** Check the front wheels.	Does the front wheels have unsteady revolution or rattling, or does the brake drag?	Inspect, readjust and replace if necessary.	Go to step **13**.
13	**CHECK TIE-ROD ENDS.** Remove the tie-rod ends.	Does the tie-rod ends of suspension have unsteady revolution or rattling?	Inspect and replace if necessary.	Go to step **14**.
14	**CHECK BALL JOINT.** Remove the ball joint.	Does the ball joints of suspension have unsteady revolution or rattling?	Inspect and replace if necessary.	Go to step **15**.
15	**CHECK GEARBOX.** Measure the rotating of gearbox. <Ref. to PS-34, LIMIT, INSPECTION, Electric Power Steering Gearbox.>	Impreza model: Is the turn resistance of the steering gearbox less than 18.3 N (1.9 kgf, 4.1 lbf)? Is the difference between the right and left rotational resistances less than 20%? Crosstrek model: Is the turn resistance of the steering gearbox less than 18.0 N (1.8 kgf, 4.0 lbf)? Is the difference between the right and left rotational resistances less than 20%?	Go to step **16**.	Replace the gearbox assembly. <Ref. to PS-25, Electric Power Steering Gearbox.>

Step		Check	Yes	No
16	**CHECK GEARBOX.** Measure the sliding of gearbox.	Impreza model: Is the sliding resistance of the steering gearbox less than 320 N (33 kgf, 72 lbf)? Is the difference between the right and left sliding resistances less than 20%? Crosstrek model: Is the sliding resistance of the steering gearbox less than 303 N (31 kgf, 68 lbf)? Is the difference between the right and left sliding resistance less than 20%?	Steering effort is normal.	Replace the gearbox assembly. <Ref. to PS-25, Electric Power Steering Gearbox.>

POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)

PS(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
• The power steering control module continues to operate after the engine stops and calculate the temperature in the control module. Therefore, before starting service of the power steering system which requires disconnection of the connector, stop the engine and allow approx. 10 minutes until the control module becomes cold.
• Before removal or installation, be sure to remove any foreign matter (dust, moisture, oil, etc.) from the power steering control module connector.

NOTE:
• Shake the connector at the suspected trouble location to check for open or short circuits of the harness.
• Refer to “Check List for Interview”. <Ref. to PS(diag)-4, Check List for Interview.>

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to PS(diag)-4, Check List for Interview.> 2) Check the illumination status of the STEERING warning light while the engine is running. 3) Before performing diagnostics, check components which might affect power steering problems. <Ref. to PS(diag)-7, INSPECTION, General Description.> 4) Save the data of «Overheating protection intervention history», «IGN count from overheating protection (most recent)», «IGN count from overheating protection (previous)», «IGN count from overheating protection (before previous)», and «Assist limit history (low voltage, high voltage)» using Subaru Select Monitor. <Ref. to PS(diag)-12, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>	Are components that might influence the power steering problem operating properly?	Go to step **2**.	Repair or replace each component.
2	**CHECK INDICATION OF DTC.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch to ON and run the Subaru Select Monitor. 4) Read the DTC using the Subaru Select Monitor. <Ref. to PS(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to PS(diag)-14, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>	Is DTC displayed?	Record the DTC. Go to step **4**.	Go to step **3**.

	Step	Check	Yes	No
3	**PERFORM GENERAL DIAGNOSTICS.** 1) If the STEERING warning light is illuminated while the engine is running, perform the Clear Memory Mode. <Ref. to PS(diag)-21, OPERATION, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to PS(diag)-20, Inspection Mode.> 3) Read the DTC. <Ref. to PS(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).> Check that the DTC is not displayed.	Does the STEERING warning light illuminate at ignition switch ON, and turn off two seconds after the engine is started?	Finish the diagnosis.	<Ref. to PS(diag)-18, WITHOUT DTC, INSPECTION, Subaru Select Monitor.>
4	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, check the freeze frame data for the power steering control module.	Are freeze frame data recorded?	Record the freeze frame data. Go to step **5**.	Go to step **5**.
5	**PERFORM DIAGNOSIS.** 1) Refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to PS(diag)-25, LIST, List of Diagnostic Trouble Code (DTC).> 2) Correct the cause of trouble. 3) Check the illumination status of the STEERING warning light while the engine is running, and if the warning light is lit, perform Clear Memory Mode. <Ref. to PS(diag)-21, OPERATION, Clear Memory Mode.> 4) Perform the Inspection Mode. <Ref. to PS(diag)-20, Inspection Mode.> 5) Read the DTC. <Ref. to PS(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Repeat step 5 until DTC is not shown.	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Check the following items regarding condition of the vehicle.

1. TROUBLE STATUS

Phenomenon of the vehicle	❑ Steering is heavy ❑ Steering is not smooth ❑ Steering is unstable (wondering) ❑ Steering does not return to center ❑ Steering is not straight
	❑ Steering force required is not the same for right and left turn ❑ Steering force required is not even ❑ Steering is too light
	❑ Noise ❑ Vibration ❑ STEERING warning light illuminates ❑ Other
Frequency	❑ Always ❑ Sometimes ❑ Immediately after starting the engine ❑ Only once ❑ Other
	❑ Recovers after leaving it for minutes
Steering wheel operation	❑ Dry steering ❑ When turning ❑ Quick steering ❑ Slow steering ❑ Returning the steering wheel
	❑ Releasing the steering wheel ❑ Only supporting the steering wheel by hand ❑ Repetitive dry steering
Steering wheel status / direction	❑ Around center position ❑ Near end of lock to lock
	❑ When turning the steering to right ❑ When turning the steering to left ❑ Both to right and to left ❑ (1) Steering angle: degrees ❑ (2) Maneuvering time: minutes
	❑ Slow steering ❑ Quick steering ❑ While holding the steering ❑ When repeating the dry wheel operation
Vehicle speed	❑ Stall 0 km/h (0 MPH) ❑ Very low speed — 20 km/h (— 12 MPH) ❑ Low speed — 40 km/h (— 25 MPH) ❑ Medium speed — 80 km/h (— 50 MPH) ❑ High speed — 80 km/h or more (— 50 MPH or more)
	❑ At starting ❑ While accelerating ❑ While decelerating ❑ When accelerating rapidly ❑ When decelerating rapidly
	❑ Other
Engine speed	❑ Idling ❑ (1) Around rpm ❑ (2) rpm — rpm ❑ (3) rpm or more / or less

2. STATE OF STEERING WARNING LIGHT

STEERING warning light illuminates	❑ Always ❑ Sometimes ❑ Only once ❑ Does not illuminate ❑ Other
Ignition key position	❑ LOCK ❑ ACC ❑ ON (when starting engine) ❑ START ❑ ON (when starting engine, while engine is running) ❑ ON (when starting engine, when engine is at a standstill)
Timing	❑ Immediately after turning the ignition ON ❑ Immediately after turning the ignition to START
	❑ Idling ❑ While accelerating ❑ While decelerating ❑ When cruising at — km/h (MPH)
	❑ When other electrical parts are operating (parts name: operating condition:)

3. ENVIRONMENT

a) Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Others:
b) Outside temperature	❑ °C (°F)
c) Road	❑ Inner city ❑ Suburbs ❑ Highway ❑ Local street ❑ Alley way ❑ Private road ❑ Parking lot ❑ Mountain road ❑ Paved road ❑ Unpaved road ❑ Gravel road ❑ Sandy place ❑ Muddy road ❑ Concrete road ❑ Stone pavement ❑ Racetrack ❑ Others:
d) Road surface	❑ Dry ❑ Wet ❑ Covered with fresh snow ❑ Covered with hardened snow ❑ Others:
e) Tire	❑ Tire chain ❑ Studless tire ❑ T-type tire (front RH, front LH, rear RH, rear LH)
f) Tire inflation pressure	Front RH: kPa Front LH: kPa Rear RH: kPa Rear LH: kPa
g) Degree of wear	Front RH: mm (in) Front LH: mm (in) Rear RH: mm (in) Rear LH: mm (in)
h) Genuine part	❑ Yes ❑ No Record after-market parts if any. (Steering wheel, audio, tires, and similar parts)
i) Condition of suspension alignment	
j) Electrical load conditions	❑ Audio ❑ Air conditioner ❑ Other
k) Loaded state	Condition:
l) Repair parts	❑ None ❑ Provided Contents:
m) Others	

3. General Description

A: CAUTION

1. SRS AIRBAG SYSTEM

The airbag system wiring harness is routed near the power steering control module.

CAUTION:
• Do not use the electrical test equipment on the airbag system wiring harnesses or connector circuits.
• Be careful not to damage the airbag system wiring harness during maintenance of the power steering control module.

B: INSPECTION

Before performing diagnosis, check the following items which might be affecting the power steering problem.

1. BATTERY

Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>

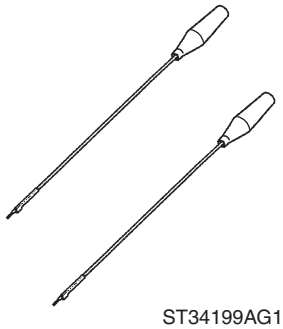
NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>

2. TIRES

Check the tire specifications, tire wear and air pressure. <Ref. to WT-2, SPECIFICATION, General Description.>

C: PREPARATION TOOL

1. SPECIAL TOOL

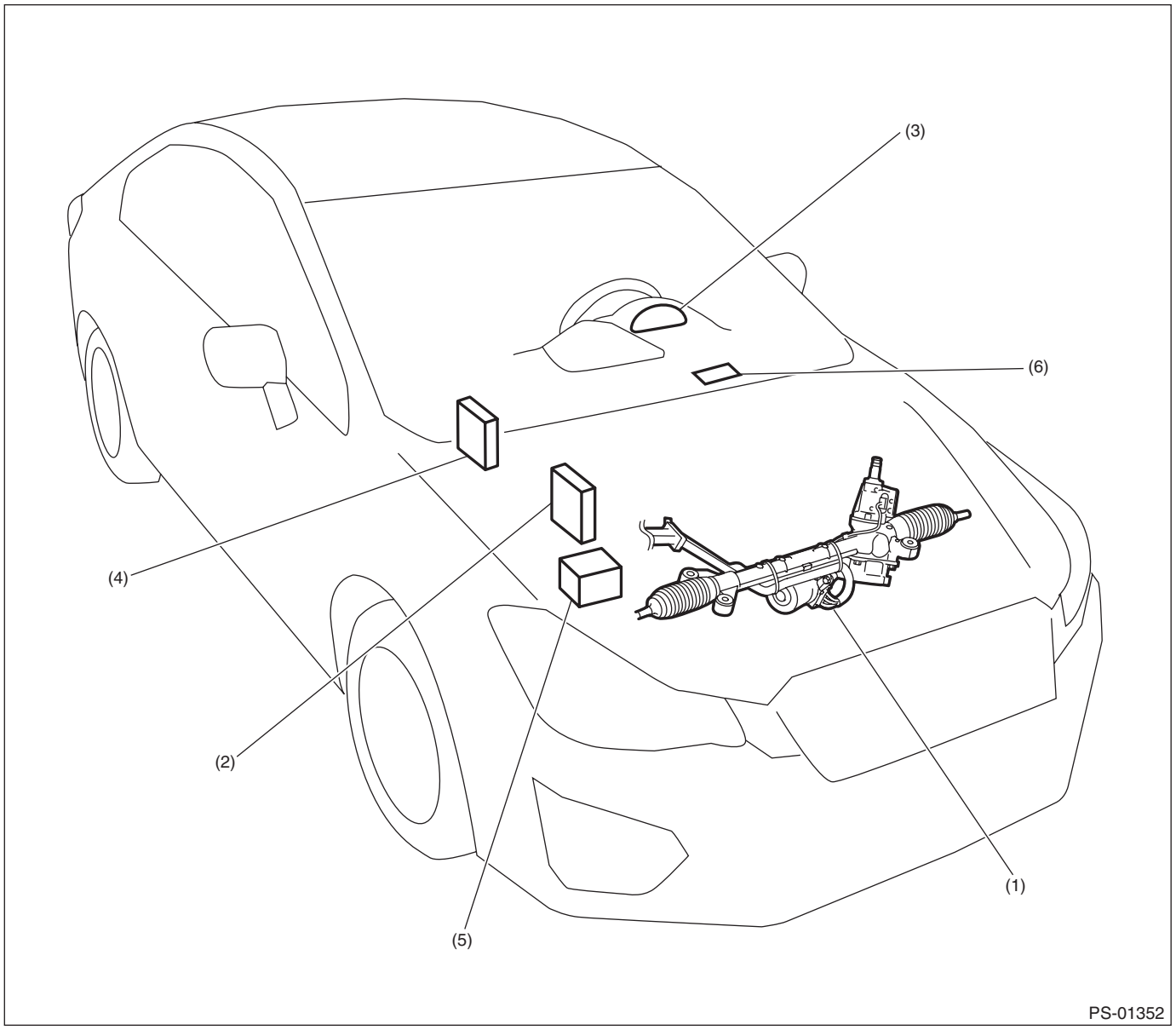
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and troubleshooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.
 ST34199AG100	34199AG100	SPECIAL TOOL HARNESS	Used for troubleshooting the electrical system.

2. GENERAL TOOL

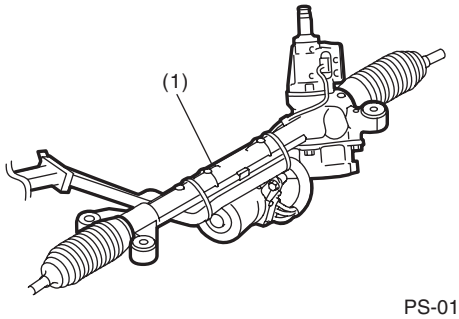
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

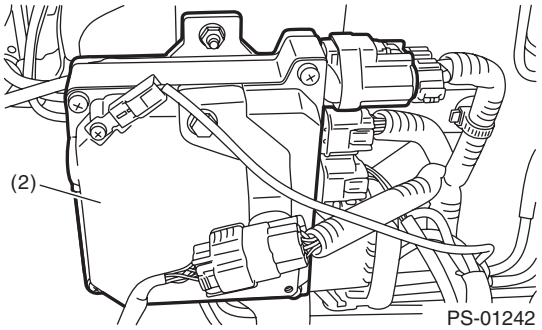
A: LOCATION



(1) Steering gearbox
(2) Power steering control module
(3) STEERING warning light
(4) Engine control module (ECM)
(5) VDCCM&H/U
(6) Data link connector (for Subaru Select Monitor)

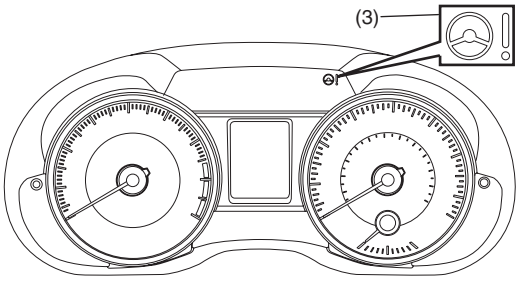


PS-01290



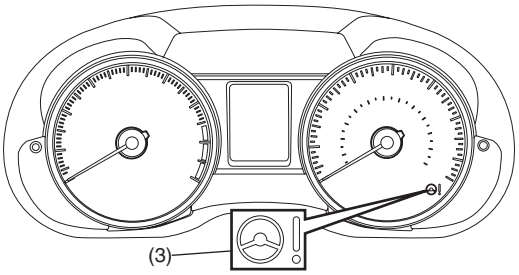
PS-01242

- Gasoline engine model (U5, U6 model)



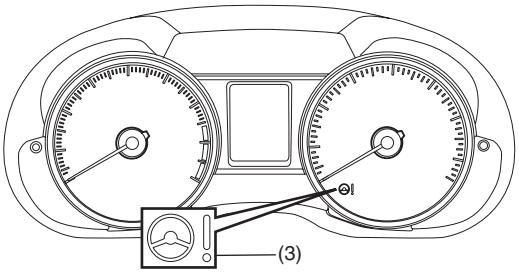
PS-01296

- Gasoline engine model (C0 model)

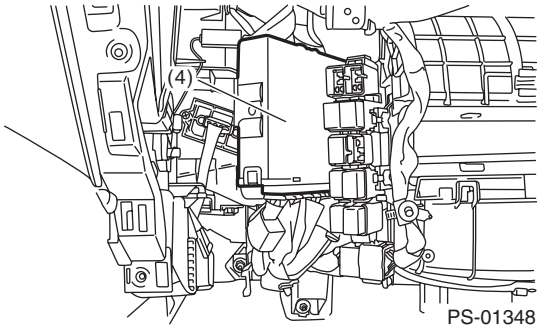


PS-01347

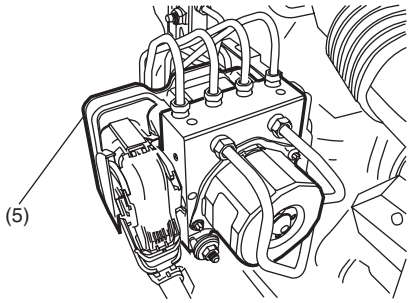
- HEV model



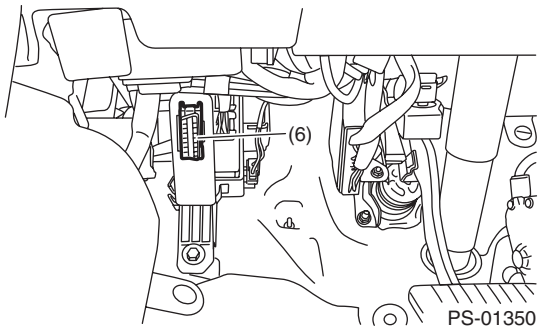
PS-01663



PS-01348



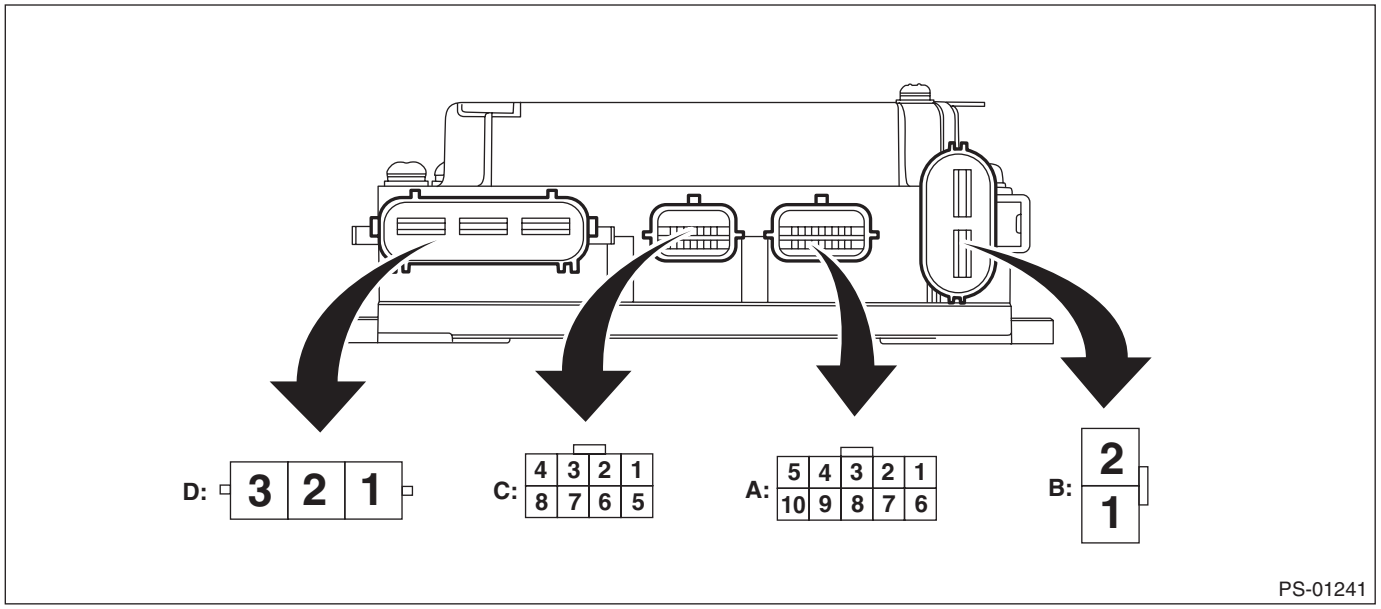
PS-01349



PS-01350

5. Control Module I/O Signal

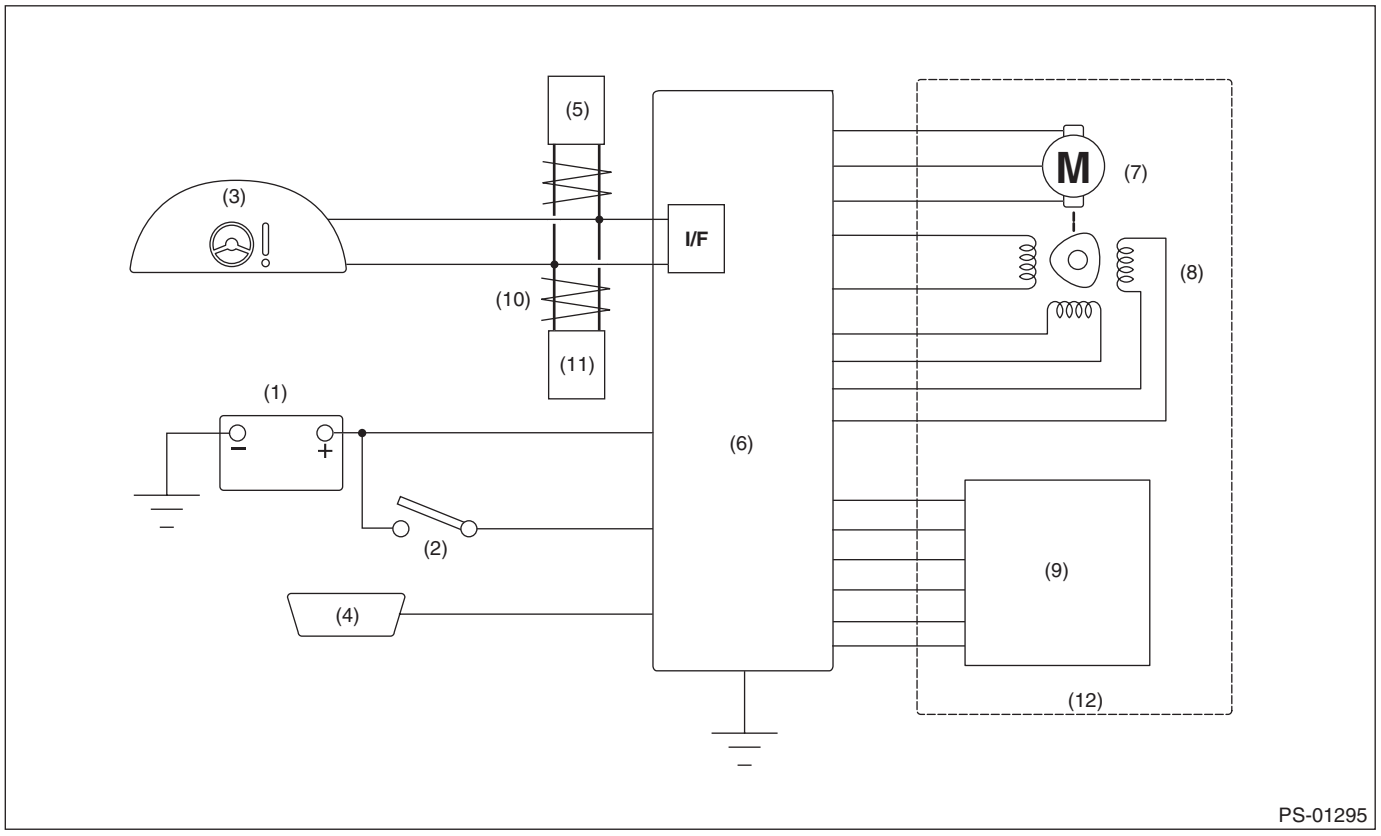
A: ELECTRICAL SPECIFICATION



NOTE:
The terminal numbers of the power steering control module connectors are as indicated in the figure.

Contents	Terminal No.	Input/output signal Measured value and measuring conditions
Power supply (IG SW)	A1	Battery voltage is detected with the ignition switch ON when measuring between A1 — B1.
Subaru Select Monitor communication line	A2	Digital signal; can not be measured
Shield GND	A3	0 V is constantly detected.
Main torque sensor	A4	The voltage changes when the steering is operated to the right or left with the ignition switch ON.
Sub torque sensor	A5	The voltage changes when the steering is operated to the right or left with the ignition switch ON.
CAN communication	A6	Digital signal; can not be measured
CAN communication	A7	Digital signal; can not be measured
Torque sensor operating power supply	A8	Approximately 8 V is detected with ignition switch ON.
Torque sensor ground	A9	0 V is constantly detected.
Torque sensor standard power supply	A10	Approximately 3 V is detected with ignition switch ON.
Ground	B1	Battery voltage is constantly detected when measuring between B1 — B2.
Power supply	B2	
Resolver S1	C1	Varies depending on the operational status of the motor.
Resolver S3	C2	
Resolver S2	C3	
Resolver S4	C4	
Excitation power supply for resolver	C5	
Common output	C6	
Motor U phase	D1	Varies depending on the motor output.
Motor V phase	D2	
Motor W phase	D3	

B: WIRING DIAGRAM



(1) Battery
(2) Ignition switch
(3) STEERING warning light (combination meter)
(4) Data link connector (for Subaru Select Monitor)
(5) Engine control module (ECM)
(6) Power steering control module
(7) Motor
(8) Resolver sensor
(9) Torque sensor (main & sub)
(10) CAN communication
(11) VDC CM
(12) Steering gearbox

6. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

For detailed operation procedures, refer to “Application help”.

2. READ CURRENT DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Power Steering».
5) On «Select Function» display, select «Data Monitor».

Display	Contents to be displayed	Range	Unit
Torque sensor main output	Main torque sensor output voltage is displayed.	0 — 5	V
Torque sensor sub output	Sub torque sensor output voltage is displayed.	0 — 5	V
Torque sensor reference voltage	Torque sensor standard voltage is displayed.	0 — 5	V
Power current	The current flowing to CM is displayed.	–128 — 127	A
Vehicle Speed	Vehicle speed is displayed. (CAN communication data)	0 — 255	km/h
Engine Speed	Engine speed is displayed. (CAN communication data)	0 — 12750	rpm
Detection current at ECM	The current flowing to the motor relay is displayed.	–128 — 127	A
3-phase motor current (U-phase)	The U phase actual current value as calculated by the microcomputer from the torque sensor input is displayed.	–128 — 127	A
3-phase motor current (V-phase)	The V phase actual current value as calculated by the microcomputer from the torque sensor input is displayed.	–128 — 127	A
Motor angular speed	Data from the resolver sensor is displayed.	–4096 — 4064	rpm
CU Temperature	The thermistor temperature of the steering control module is displayed.	–50 — 205	°C
Power supply voltage	Battery voltage is displayed.	0 — 25.5	V
Torque sensor power supply voltage	The power supply voltage output to the torque sensor is displayed.	0 — 10.2	V
IG Voltage	The power supply voltage supplied to the ECM is displayed.	0 — 25.5	V
CAN Bus Status	Either Active/Passive/Bus Off is displayed.	—	—
EPS operating condition	Either Normal/Assist Stop/Assist Limitation is displayed.	—	—
Target Current at ECM	The motor target current value required for assist is displayed.	–128 — 127	A
Steering angle	Steering angle of steering wheel is displayed.	–640 — 635	deg
Reading assist MAP	Either MAP1/MAP2/MAP3 is displayed.	—	—
Overheating protection intervention history	Number of interventions to the overheat protection control (assist limitation for protecting the power steering from overheating)*1	0 — 250	times
IG Count after ECU Overheat Protection(latest)	Number of times the ignition switch is ON from the intervention to overheat protection control (most recent) until now*2	0 — 65000	times
IGN count from overheating protection (previous)	Number of times the ignition switch is ON from the intervention to overheat protection control (previous) until now*2	0 — 65000	times
IGN count from overheating protection (before previous)	Number of times the ignition switch is ON from the intervention to overheat protection control (before previous) until now*2	0 — 65000	times
Assist limit history (low voltage, high voltage)	Number of intervention to assist limit when the power supply voltage is low or high*1	0 — 250	times
IG OFF Number while Driving	Number of times the ignition switch is turned OFF during driving*1	0 — 250	times

NOTE:
- *1 When the value exceeds the maximum of 250 times, 250 is displayed.
- *2 When there is no intervention of the overheating protection control, “65535” is displayed. If an error such as control unit memory error, etc. occurs, “65534” is displayed.
- For detailed operation procedures, refer to “Application help”.

3. READ FREEZE FRAME DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Power Steering».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

Display	Contents to be displayed	Range	Unit
Torque sensor main output	Main torque sensor output voltage is displayed.	0 — 5	V
Torque sensor sub output	Sub torque sensor output voltage is displayed.	0 — 5	V
Torque sensor reference voltage	Torque sensor standard voltage is displayed.	0 — 5	V
Power current	The current flowing to CM is displayed.	–128 — 127	A
Vehicle Speed	Vehicle speed is displayed. (CAN communication data)	0 — 255	km/h
Engine Speed	Engine speed is displayed. (CAN communication data)	0 — 12750	rpm
Detection current at ECM	The current flowing to the motor relay is displayed.	–128 — 127	A
3-phase motor current (U-phase)	The U phase actual current value as calculated by the microcomputer from the torque sensor input is displayed.	–128 — 127	A
3-phase motor current (V-phase)	The V phase actual current value as calculated by the microcomputer from the torque sensor input is displayed.	–128 — 127	A
Motor angular speed	Data from the resolver sensor is displayed.	–4096 — 4064	rpm
CU Temperature	The thermistor temperature of the steering control module is displayed.	–50 — 205	°C
Power supply voltage	Battery voltage is displayed.	0 — 25.5	V
Torque sensor power supply voltage	The power supply voltage output to the torque sensor is displayed.	0 — 10.2	V
IG Voltage	The power supply voltage supplied to the ECM is displayed.	0 — 25.5	V
CAN Bus Status	Either Active/Passive/Bus Off is displayed.	—	—
EPS operating condition	Either Normal/Assist Stop/Assist Limitation is displayed.	—	—
Target Current at ECM	The motor target current value required for assist is displayed.	–128 — 127	A
Steering angle	Steering angle of steering wheel is displayed.	–640 — 635	deg
Reading assist MAP	Either MAP1/MAP2/MAP3 is displayed.	—	—
Overheating protection intervention history	Number of interventions to the overheat protection control (assist limitation for protecting the power steering from overheating)*1	0 — 250	times
IG Count after ECU Overheat Protection(latest)	Number of times the ignition switch is ON from the intervention to overheat protection control (most recent) until now*2	0 — 65000	times
IGN count from overheating protection (previous)	Number of times the ignition switch is ON from the intervention to overheat protection control (previous) until now*2	0 — 65000	times
IGN count from overheating protection (before previous)	Number of times the ignition switch is ON from the intervention to overheat protection control (before previous) until now*2	0 — 65000	times
Assist limit history (low voltage, high voltage)	Number of intervention to assist limit when the power supply voltage is low or high*1	0 — 250	times
IG OFF Number while Driving	Number of times the ignition switch is turned OFF during driving*1	0 — 250	times

NOTE:
- Freeze frame data stored at the time of trouble occurrence is shown on the display.
- Each time a trouble occurs, the latest information is stored in the freeze frame data in memory.
- One freeze frame data is stored.
- For detailed operation procedures, refer to “Application help”.

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DETECTING CONDITION:

- Defective harness connector
- Defective power steering control module

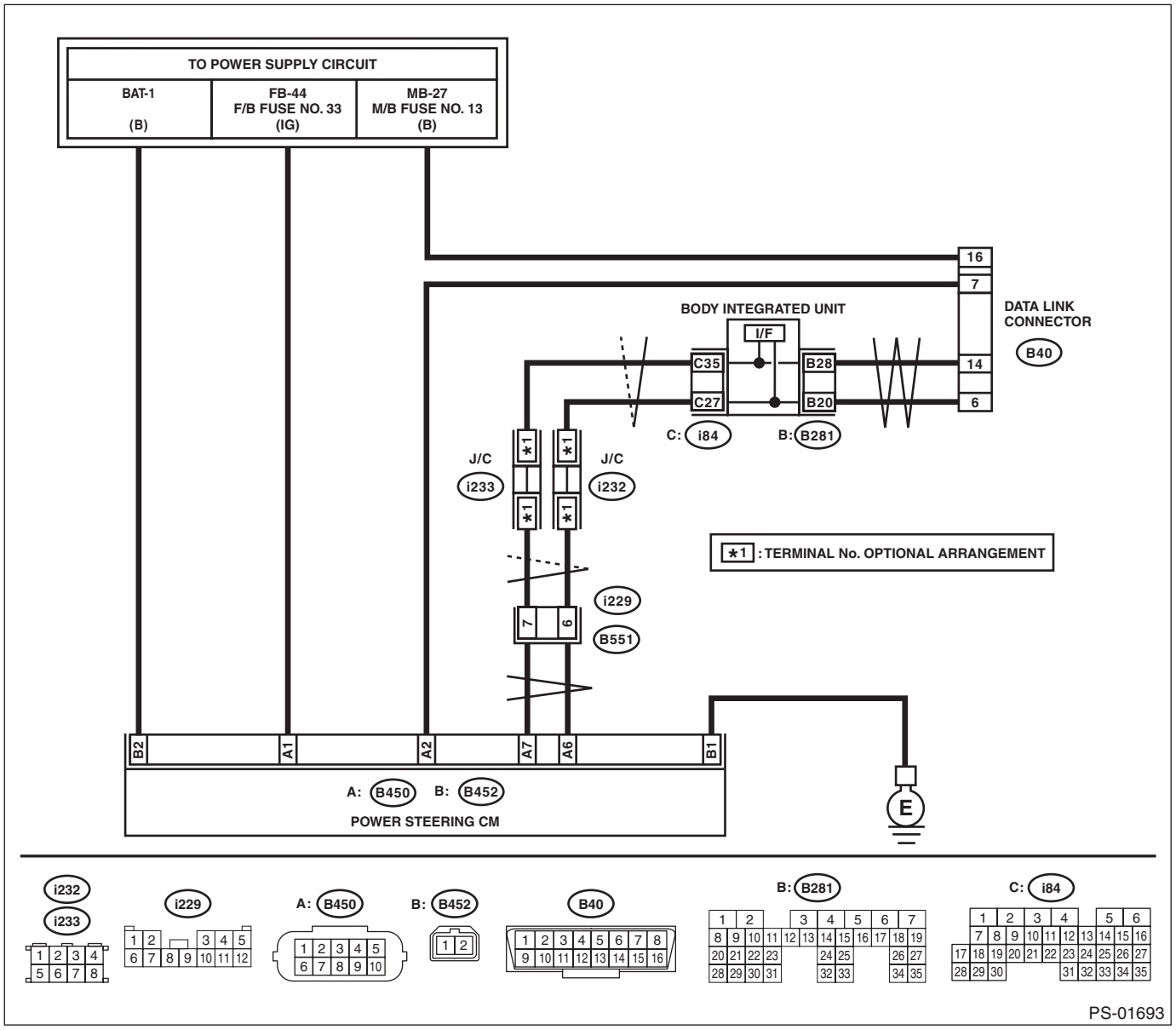
TROUBLE SYMPTOM:

- Communication is impossible between the power steering control module and Subaru Select Monitor.
- After starting the engine, the STEERING warning light does not illuminate but steering effort is heavy.

WIRING DIAGRAM:

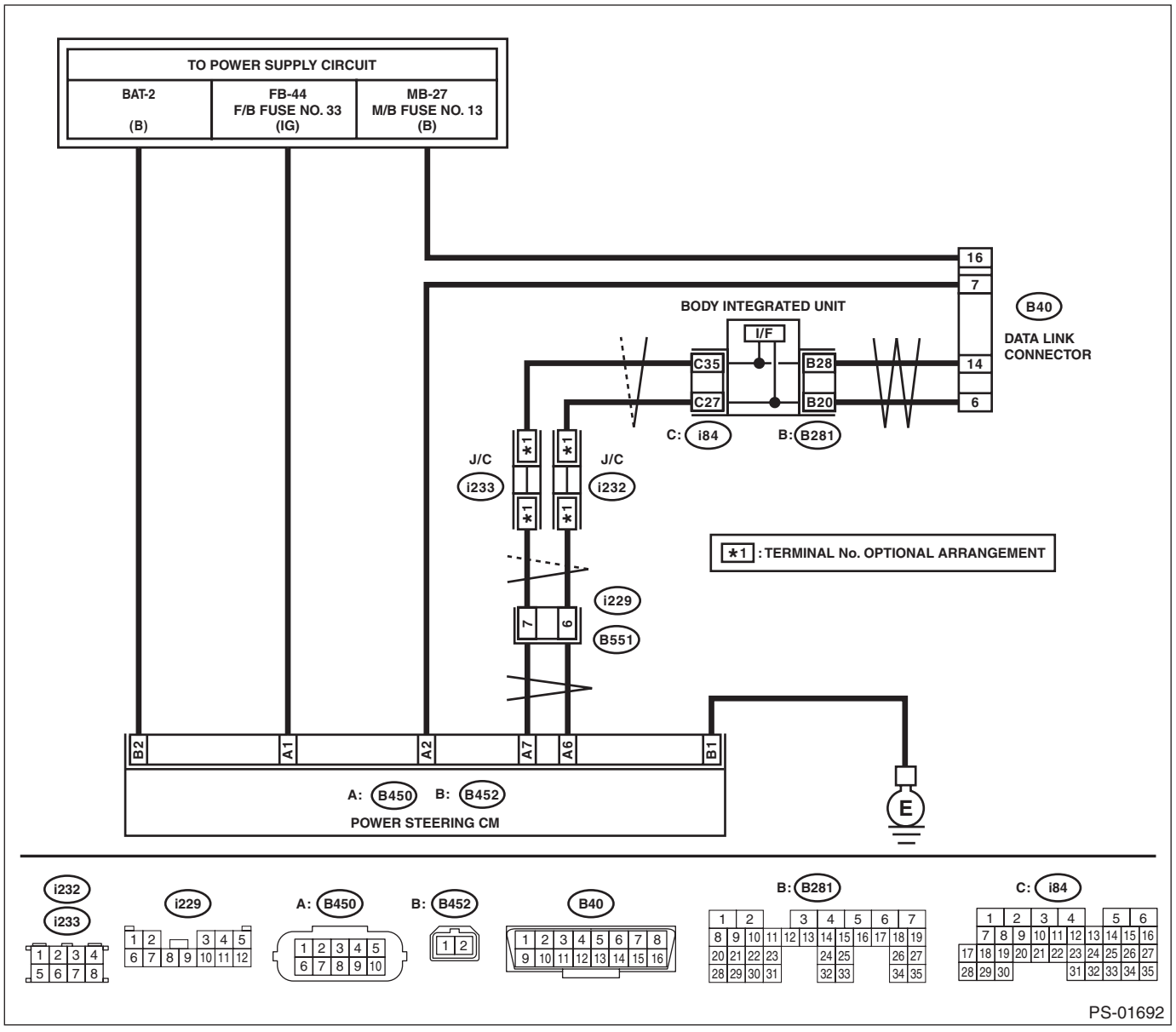
- Gasoline engine model

Electric power steering system <Ref. to WI(w/o HEV)-101, Electric Power Steering System.>



- HEV model

Electric power steering system <Ref. to WI(HEV)-94, Electric Power Steering System.>



Step		Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select the power steering mode using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 12 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.**	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Go to step **8**.	Go to step **5**.
5	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to OFF. 2) Disconnect the power steering control module connector. 3) Turn the ignition switch to ON. 4) Check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>	Go to step **6**.
6	**CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM, VDC CM, airbag CM and body integrated unit. **CAUTION:** **When disconnecting the connector from airbag CM, always follow the precautions on AB section. <Ref. to AB-11, CAUTION, General Description.>** 3) Measure the resistance between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair the short circuit to ground in harness and connector between each control module and data link connector.
7	**CHECK HARNESS CONNECTOR BETWEEN POWER STEERING CONTROL MODULE AND DATA LINK CONNECTOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between the power steering control module and chassis ground. ***Connector & terminal*** ***(B40) No. 7 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **8**.	Repair the short circuit to power supply in harness and connector between each control module and data link connector.
8	**CHECK HARNESS CONNECTOR BETWEEN POWER STEERING CONTROL MODULE AND DATA LINK CONNECTOR.** Measure the resistance between the power steering control module connector and the data link connector. ***Connector & terminal*** ***(B450) No. 2 — (B40) No. 7:***	Is the resistance less than 0.5 Ω?	Go to step **9**.	Repair the open circuit or poor contact of harness and connectors between the power steering control module and data link connector.
9	**CHECK POWER STEERING CONTROL MODULE CONNECTOR INSTALLATION.** Turn the ignition switch to OFF.	Is the power steering control module connector inserted into the power steering control module until the clamp locks?	Go to step **10**.	Insert the power steering control module connector into the power steering control module.

	Step	Check	Yes	No
10	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the power steering control module connector (B452). 3) Turn the ignition switch to ON. (engine OFF) 4) Measure the ignition power supply voltage between the power steering control module connector and chassis ground. ***Connector & terminal*** ***(B450) No. 1 (+) — Chassis ground (–):*** ***(B452) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 — 15 V?	Go to step **11**.	Repair the open circuit of harness or the poor contact of connector between the power steering control module and the battery.
11	**CHECK HARNESS CONNECTOR BETWEEN POWER STEERING CONTROL MODULE AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the power steering control module. 3) Measure the resistance in the harness between the power steering control module and chassis ground. ***Connector & terminal*** ***(B452) No. 1 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **12**.	Repair the open circuit or poor contact of the harness between the power steering control module and chassis ground.
12	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of the power steering control module power supply, ground circuit line and data link connector?	Repair the connector.	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>

2. WITHOUT DTC

DETECTING CONDITION:

- Defective combination meter
- Open circuit of harness

TROUBLE SYMPTOM:

- The STEERING warning light will not turn off.
- «No Diagnostic Code Present» will be displayed on Subaru Select Monitor.

NOTE:
When the STEERING warning light is OFF and «No Diagnostic Code Present» is displayed on Subaru Select Monitor when all DTCs are read, the system is operating properly.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is DTC U0131 detected?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK COMBINATION METER.** Check the STEERING warning light when the ignition switch is turned from OFF to ON.	Does the STEERING warning light illuminate at ignition switch ON, and turn off two seconds after the engine is started?	Finish the diagnosis.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Power Steering».
5) On «Select Function» display, select «DTC».

NOTE:
- For details concerning the DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to PS(diag)-25, List of Diagnostic Trouble Code (DTC).>
- For detailed operation procedures, refer to “Application help”.

8. Inspection Mode

A: PROCEDURE

Reproduce the malfunction occurrence condition as much as possible.

9. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Power Steering».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:

- Before performing memory clear, check the current data, and if there are any data of DTC, trouble status information, overheating protection intervention history, IGN count from overheating protection and assist limit history, save them.
- For detailed operation procedures, refer to “Application help”.

10.STEERING Warning Light

A: STEERING WARNING LIGHT DOES NOT COME ON

1. POWER STEERING ASSIST ENABLED

DETECTING CONDITION:

- Defective combination meter
- Defective harness

TROUBLE SYMPTOM:

When the ignition switch is turned to ON (engine OFF), the STEERING warning light does not illuminate.

NOTE:
It is operating normally if the warning light illuminates when the ignition switch is turned to ON (engine OFF), and turns off approximately two seconds after engine start.

	Step	Check	Yes	No
1	**CHECK ILLUMINATION OF OTHER LIGHTS.** Turn the ignition switch to ON. (engine OFF)	Do other warning lights illuminate?	Go to step **2**.	Check the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is a DTC of the CAN communication displayed?	Perform the diagnosis according to DTC. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK COMBINATION METER.** Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is the self diagnosis normal?	The combination meter is normal.	Check the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>

2. POWER STEERING ASSIST DISABLED

DETECTING CONDITION:

CAN communication error (engine rpm signal not received)

TROUBLE SYMPTOM:

- There is no assist due to power supply voltage failure.
- The STEERING warning light is normal but there is no power steering assist (steering feels heavy).

	Step	Check	Yes	No
1	**CHECK BATTERY.** Check the battery and fuse.	Is the voltage 12 V or more? Is the specific gravity 1.260 or more? Is the battery terminal installed properly? Is the fuse OK?	Go to step **2**.	Repair the defective part.
2	**CHECK DTC.** Using the Subaru Select Monitor, read all DTCs.	Is DTC related to VDC system or ignition power supply system displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK CURRENT DATA.** 1) Start the engine. 2) Display the current data «Engine Speed» of the power steering control module using the Subaru Select Monitor.	Is «Engine Speed» the same as that in the combination meter?	Go to step **4**.	Check the CAN communication. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
4	**CHECK CURRENT DATA.** Display the current data «EPS Status» of the power steering control module using the Subaru Select Monitor.	Is «Assist limitation» displayed?	It is possible that temporary assist limitation has occurred due to overheat protection. Stop the engine for approx. 10 minutes, and check again.	Go to step **5**.
5	**CHECK CURRENT DATA.** 1) Display the current data «Torque sensor main output» and «Torque sensor sub output» of the power steering control module using the Subaru Select Monitor. 2) Move the steering wheel to the left and right.	Do the values of «Torque sensor main output» and «Torque sensor sub output» change according to the operations?	Go to step **6**.	Check the installation status of torque sensor, and check again.
6	**CHECK CURRENT DATA.** Display the current data «IG Voltage» of the power steering control module using the Subaru Select Monitor.	Is the value of «IG Voltage» steady? (While shaking the harness)	Go to step **7**.	Check the ignition switch and IG voltage harness, and repair the defective part.
7	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (B450).	Are there any damages to terminal or other parts either on the power steering control module side or on the connector side?	Repair the terminal.	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>

NOTE:
• During driving, the assist system will not be activated when the ignition voltage drops.
• Power steering assist is not started unless both of the ignition switch ON signal and the engine speed signal are input.
• In any of the following cases, the power steering assist is limited and steering wheel operation may become heavy.
If the steering wheel is held to an end for a long time, or the steering wheel turning to right and left at slow speed is repeated during parking, the assist limitation (overheat protection control) may operate to prevent failures by overheat.
In this case, by stopping the engine for approx. 10 minutes for cooling, the assist will start operating. While assist limitation (overheat protection control) is in active, «Assist limitation» is displayed in the «EPS operating condition» in the Subaru Select Monitor "Data monitor".
• History can be confirmed on «Overheating protection intervention history» or «IGN count from overheating protection» of "Data monitor".
• The overheat protection control system is normal operation, therefore, the STEERING warning light will not come on and there will be no DTC displayed.
• If the power steering system connector is disconnected while cooling under the overheat protection control, different DTC may be recorded. If there is no DTC and assist limitation is in active, stop the engine for approx. 10 minutes for cooling.

B: STEERING WARNING LIGHT DOES NOT GO OFF

DETECTING CONDITION:
• Defective combination meter
• Open circuit of harness

TROUBLE SYMPTOM:
When starting the engine, the STEERING warning light continues to illuminate.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the power steering control module using the Subaru Select Monitor. <Ref. to PS(diag)-19, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to PS(diag)-25, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is a DTC of the CAN communication detected?	Perform the diagnosis according to DTC. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Check the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>

11.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Note
None	Without DTC	Normal	<Ref. to PS(diag)-18, WITHOUT DTC, INSPECTION, Subaru Select Monitor.>
	“Assist limitation” is displayed in the current data «EPS operating condition».	Assist limitation is performed due to overheat protection control.	<Ref. to PS(diag)-23, POWER STEERING ASSIST DISABLED, STEERING WARNING LIGHT DOES NOT COME ON, STEERING Warning Light.>
	«Overheating protection intervention history» in current data display shows 1 or more.	There are previous records of intervention to overheat protection control.	<Ref. to PS(diag)-23, POWER STEERING ASSIST DISABLED, STEERING WARNING LIGHT DOES NOT COME ON, STEERING Warning Light.>
C2511	TORQUE SENSOR MAIN	• Poor connector contact • Forgot to connect connector • Faulty torque sensor section circuit • Faulty torque sensor coil	<Ref. to PS(diag)-27, DTC C2511 TORQUE SENSOR MAIN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2512	TORQUE SENSOR SUB		<Ref. to PS(diag)-28, DTC C2512 TORQUE SENSOR SUB, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2513	TORQUE SENSOR MUCH TOLERANCE		<Ref. to PS(diag)-28, DTC C2513 TORQUE SENSOR MUCH TOLERANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2514	TORQUE SENSOR POWER SUPPLY		<Ref. to PS(diag)-29, DTC C2514 TORQUE SENSOR POWER SUPPLY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2521	MOTOR MALFUNCTION	• Poor connector contact • Forgot to connect connector • Harness open/short circuit • Motor open circuit • Power transistor shorted/open • Terminal power supply or ground short	<Ref. to PS(diag)-30, DTC C2521 MOTOR MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2522	RESOLVER SENSOR		<Ref. to PS(diag)-31, DTC C2522 RESOLVER SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2531	CONTROL MODULE CPU	Faulty main unit of power steering control module	<Ref. to PS(diag)-31, DTC C2531 CONTROL MODULE CPU, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2532	CONTROL MODULE PERIPHERAL CIRCUIT	Faulty main unit of power steering control module	<Ref. to PS(diag)-32, DTC C2532 CONTROL MODULE PERIPHERAL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2533	CONTROL MODULE BOARD TEMPERATURE SENSOR	Faulty main unit of power steering control module	<Ref. to PS(diag)-33, DTC C2533 CONTROL MODULE BOARD TEMPERATURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2541	VEHICLE DYNAMICS CONTROL MODULE VEHICLE SPEED SENSOR	• Poor connector contact • Forgot to connect connector • Harness open/short circuit	<Ref. to PS(diag)-34, DTC C2541 VEHICLE DYNAMICS CONTROL MODULE VEHICLE SPEED SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2543	ERROR PASSIVE	Defective CAN communication	<Ref. to PS(diag)-35, DTC C2543 ERROR PASSIVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2551	POWER SUPPLY RELAY	• Power supply voltage malfunction • Faulty relay contact	<Ref. to PS(diag)-36, DTC C2551 POWER SUPPLY RELAY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
C2552	MOTOR RELAY	Faulty relay	<Ref. to PS(diag)-38, DTC C2552 MOTOR RELAY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	Defective CAN communication	<Ref. to PS(diag)-38, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Note
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Defective CAN communication	<Ref. to PS(diag)-38, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	Defective CAN communication	<Ref. to PS(diag)-38, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1120	LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE	Defective CAN communication	<Ref. to PS(diag)-38, DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

12.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

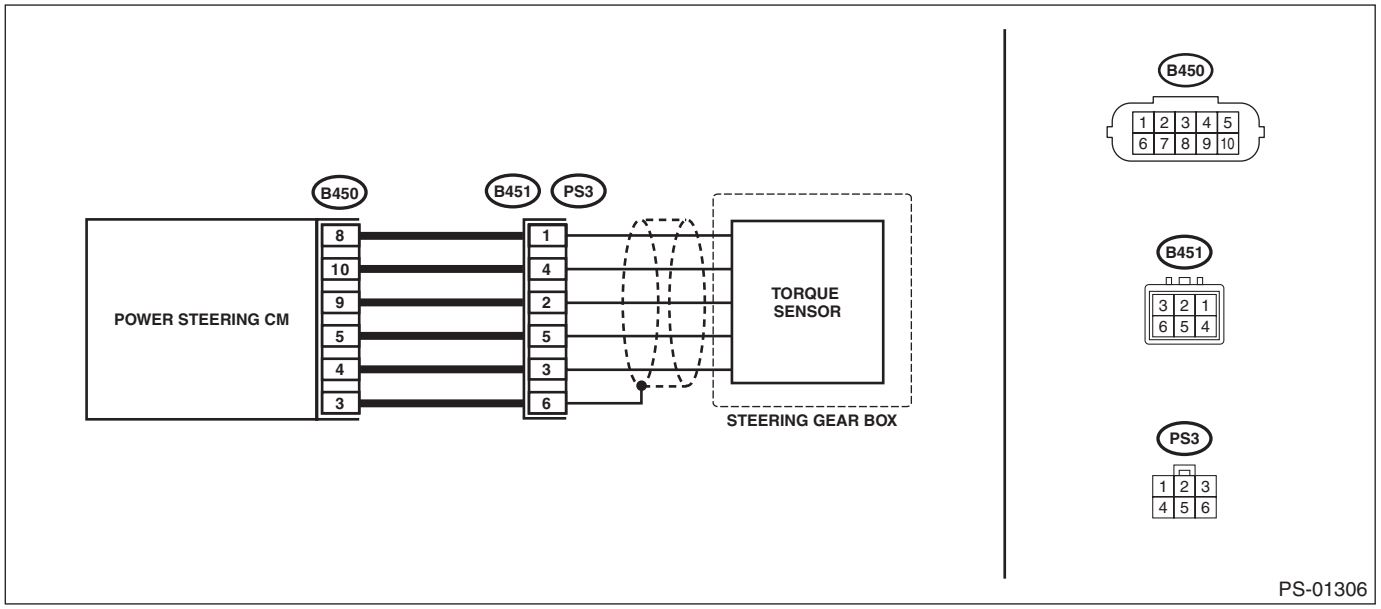
A: DTC C2511 TORQUE SENSOR MAIN

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI(w/o HEV)-101, Electric Power Steering System.> <Ref. to WI(HEV)-94, Electric Power Steering System.>



Step		Check	Yes	No
1	**CHECK TORQUE SENSOR SIGNAL.** 1) Display the current data of the power steering control module using the Subaru Select Monitor. 2) Check the voltage of «Torque sensor main output», «Torque sensor sub output», «Torque sensor reference voltage» and «Torque sensor power supply voltage».	Are the voltage of «Torque sensor main output» and «Torque sensor sub output» 2.5±0.1 V? Is the voltage of «Torque sensor reference voltage» 3±0.1 V? Is the voltage of «Torque sensor power supply voltage» 8±0.4 V?	Check for poor contact of the connector, and check the conditions again. If the condition recur, go to the next step. Go to step **2**. If it does not recur, complete the inspection.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors (B450, B451). 3) Using a tester and test harness, check the internal resistance of the harness terminals. ***Connector & terminal*** ***(B450) No. 4 — (B451) No. 3:*** ***(B450) No. 5 — (B451) No. 5:*** ***(B450) No. 8 — (B451) No. 1:*** ***(B450) No. 9 — (B451) No. 2:*** ***(B450) No. 10 — (B451) No. 4:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair or replace the harness.

	Step	Check	Yes	No
3	**CHECK POWER STEERING CONTROL MODULE.** 1) Connect the connector (B450) to the power steering control module. 2) Turn the ignition switch to ON. 3) Short the circuit between connector (B451) terminals. ***Terminals*** ***No. 4 — No. 3:*** ***No. 4 — No. 5:*** 4) Using the Subaru Select Monitor, check the voltages of «Torque sensor main output» and «Torque sensor sub output».	Are the voltages of «Torque sensor main output» and «Torque sensor sub output» before you short the circuit 0±0.1 V? Are the voltages of «Torque sensor main output» and «Torque sensor sub output» after you short the circuit 3±0.1 V?	Replace the steering gearbox. <Ref. to PS-25, Electric Power Steering Gearbox.>	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>

B: DTC C2512 TORQUE SENSOR SUB

NOTE:
Refer to “DTC C2511 TORQUE SENSOR MAIN” for diagnostic procedure. <Ref. to PS(diag)-27, DTC C2511 TORQUE SENSOR MAIN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

C: DTC C2513 TORQUE SENSOR MUCH TOLERANCE

NOTE:
Refer to “DTC C2511 TORQUE SENSOR MAIN” for diagnostic procedure. <Ref. to PS(diag)-27, DTC C2511 TORQUE SENSOR MAIN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

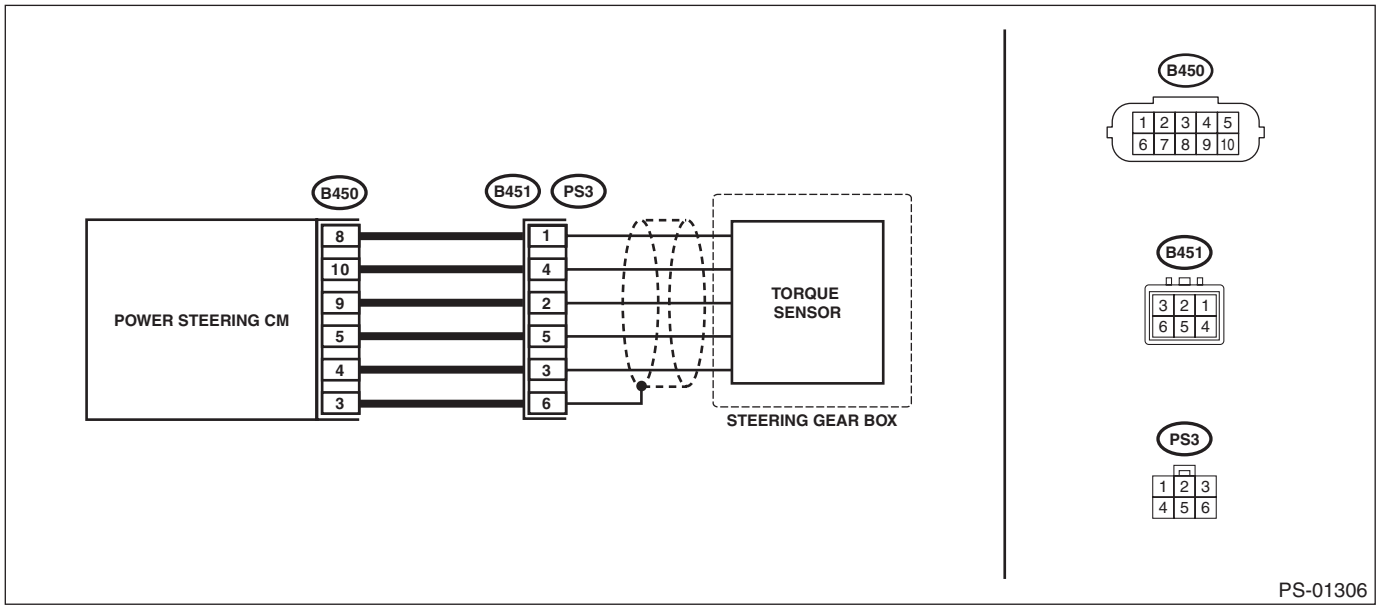
D: DTC C2514 TORQUE SENSOR POWER SUPPLY

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI(w/o HEV)-101, Electric Power Steering System.> <Ref. to WI(HEV)-94, Electric Power Steering System.>



Step		Check	Yes	No
1	**CHECK TORQUE SENSOR SIGNAL.** 1) Display the current data of the power steering control module using the Subaru Select Monitor. 2) Check the voltage of «Torque sensor main output», «Torque sensor sub output», «Torque sensor reference voltage» and «Torque sensor power supply voltage».	Are the voltage of «Torque sensor main output» and «Torque sensor sub output» 2.5±0.1 V? Is the voltage of «Torque sensor reference voltage» 3±0.1 V? Is the voltage of «Torque sensor power supply voltage» 8±0.4 V?	Check for poor contact of the connector, and check the conditions again. If the condition recur, go to the next step. Go to step **2**. If it does not recur, complete the inspection.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (B451). 3) Using a tester and test harness, check the internal resistance of the harness terminals. ***Connector & terminal*** ***(B450) No. 4 — (B451) No. 3:*** ***(B450) No. 5 — (B451) No. 5:*** ***(B450) No. 8 — (B451) No. 1:*** ***(B450) No. 9 — (B451) No. 2:*** ***(B450) No. 10 — (B451) No. 4:***	Is the resistance less than 10 Ω?	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>	Repair or replace the harness.

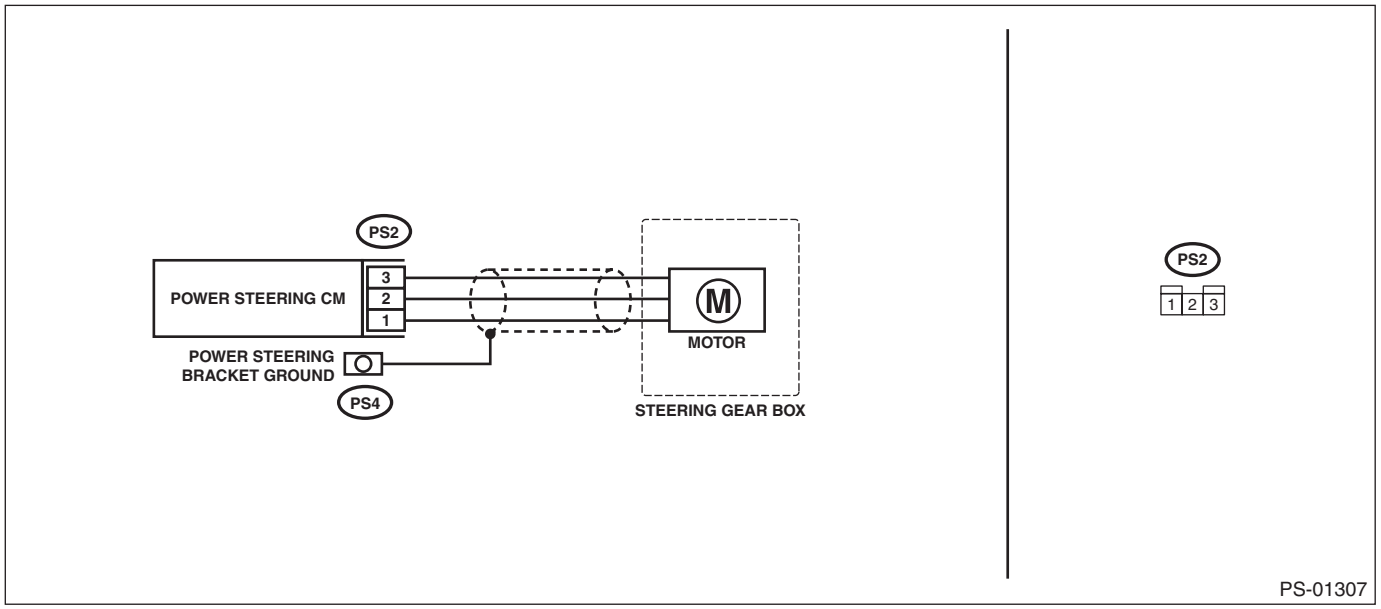
E: DTC C2521 MOTOR MALFUNCTION

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI(w/o HEV)-101, Electric Power Steering System.> <Ref. to WI(HEV)-94, Electric Power Steering System.>



Step		Check	Yes	No
1	**CHECK MOTOR UNIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (PS2) from the power steering control module. 3) Use a tester to check for continuity in the motor. ***Connector & terminal*** ***(PS2) No. 1 — No. 2:*** ***(PS2) No. 1 — No. 3:*** ***(PS2) No. 2 — No. 3:***	Is there continuity?	Go to step **2**.	Replace the steering gearbox. <Ref. to PS-25, Electric Power Steering Gearbox.>
2	**CHECK MOTOR INSULATION.** Use a tester to check for short circuits in the motor. ***Connector & terminal*** ***(PS2) No. 1 — Steering gearbox body:*** ***(PS2) No. 2 — Steering gearbox body:*** ***(PS2) No. 3 — Steering gearbox body:***	Is the resistance 1 MΩ or more?	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>	Replace the steering gearbox. <Ref. to PS-25, Electric Power Steering Gearbox.>

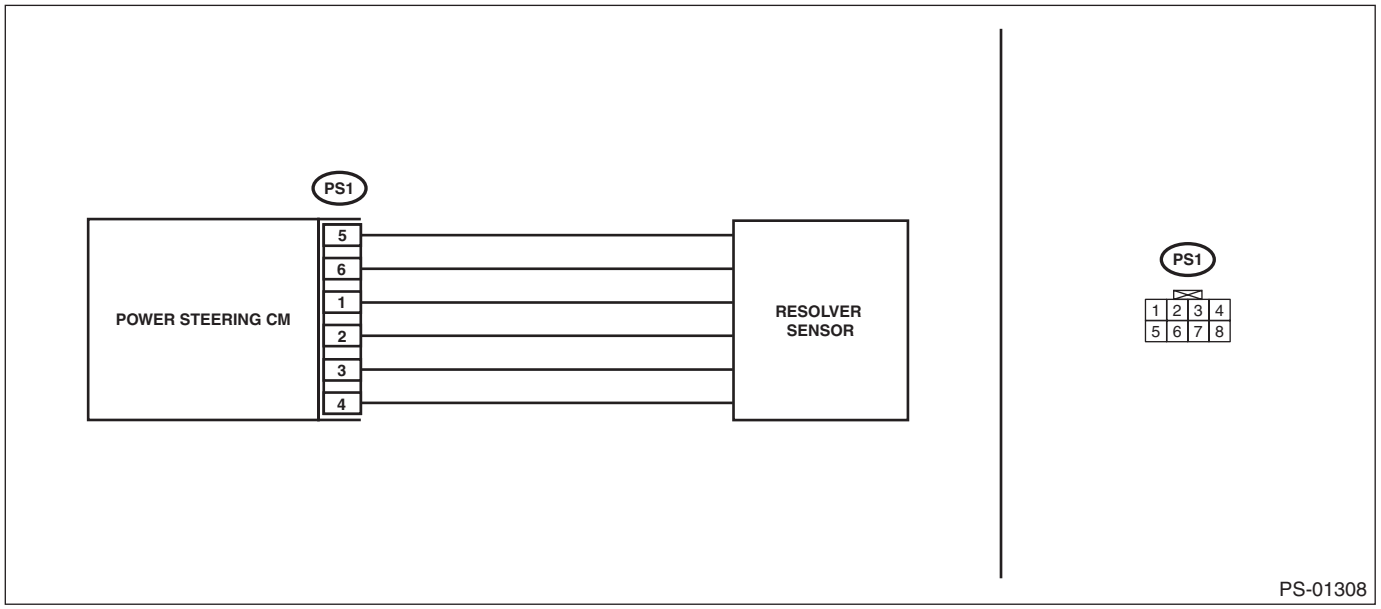
F: DTC C2522 RESOLVER SENSOR

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI(w/o HEV)-101, Electric Power Steering System.> <Ref. to WI(HEV)-94, Electric Power Steering System.>



Step		Check	Yes	No
1	**PERFORM UNIT CHECK OF RESOLVER SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (PS1) from the power steering control module. 3) Use a tester to check for continuity in the resolver sensor. ***Connector & terminal*** ***(PS1) No. 1 — No. 2 :*** ***(PS1) No. 3 — No. 4 :*** ***(PS1) No. 5 — No. 6 :***	Is there continuity?	Go to step **2**.	Replace the steering gearbox. <Ref. to PS-25, Electric Power Steering Gearbox.>
2	**CHECK RESOLVER SENSOR INSULATION.** Using a tester, check for short circuits in the resolver sensor. ***Connector & terminal*** ***(PS1) No. 1 — Steering gearbox body:*** ***(PS1) No. 2 — Steering gearbox body:*** ***(PS1) No. 3 — Steering gearbox body:*** ***(PS1) No. 4 — Steering gearbox body:*** ***(PS1) No. 5 — Steering gearbox body:*** ***(PS1) No. 6 — Steering gearbox body:***	Is the resistance 1 MΩ or more?	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>	Replace the steering gearbox. <Ref. to PS-25, Electric Power Steering Gearbox.>

G: DTC C2531 CONTROL MODULE CPU

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

NOTE:
When this code is displayed, replace the power steering control module with new parts. <Ref. to PS-40, Power Steering Control Module.>

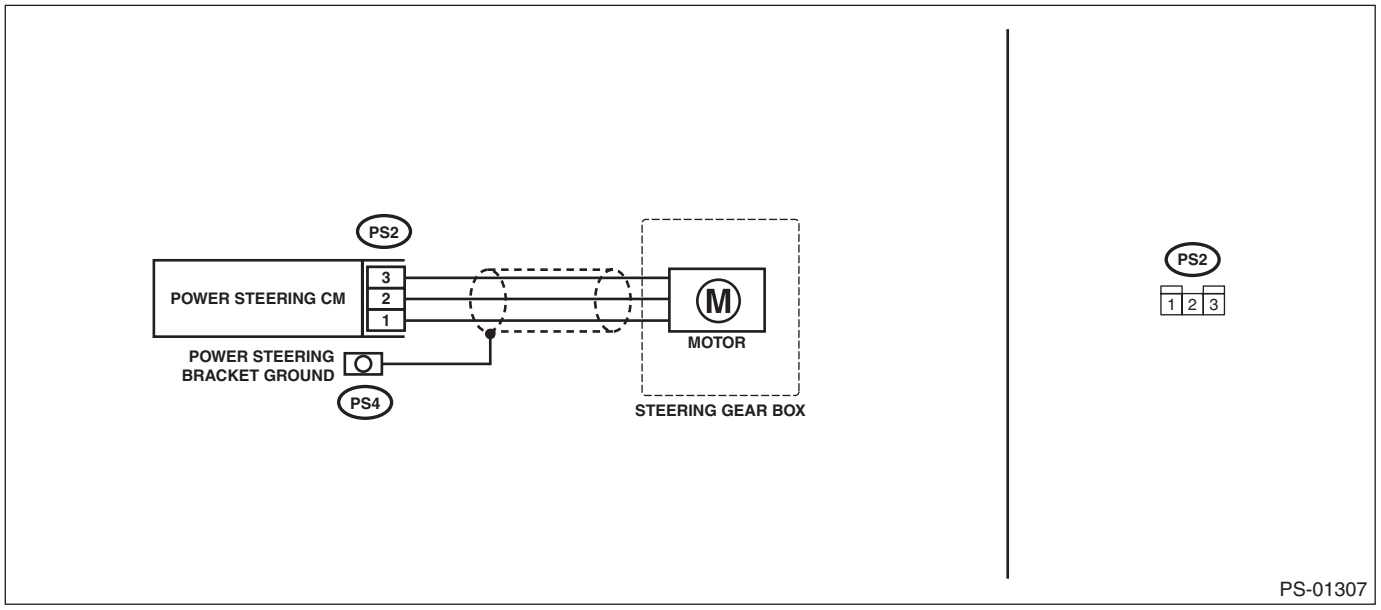
H: DTC C2532 CONTROL MODULE PERIPHERAL CIRCUIT

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI(w/o HEV)-101, Electric Power Steering System.>



	Step	Check	Yes	No
1	**CHECK CONNECTOR.** Check the connection status of the power steering control module and motor harness (PS2).	Is the connector firmly installed?	Go to step **2**.	Install the connector, and check again.
2	**CHECK CONNECTOR.** Check the appearance at connection of the power steering control module and motor harness (PS2).	Is the motor harness grommet coming out from the connector?	Replace the steering gearbox. <Ref. to PS-25, Electric Power Steering Gearbox.>	Go to step **3**.
3	**CHECK MOTOR UNIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (PS2) from the power steering control module. 3) Use a tester to check for continuity in the motor. ***Connector & terminal*** ***(PS2) No. 1 — No. 2:*** ***(PS2) No. 1 — No. 3:*** ***(PS2) No. 2 — No. 3:***	Is there continuity? (While shaking the harness)	Go to step **4**.	Replace the steering gearbox. <Ref. to PS-25, Electric Power Steering Gearbox.>
4	**CHECK MOTOR INSULATION.** Use a tester to check for short circuits in the motor. ***Connector & terminal*** ***(PS2) No. 1 — Steering gearbox body:*** ***(PS2) No. 2 — Steering gearbox body:*** ***(PS2) No. 3 — Steering gearbox body:***	Is the resistance 1 MΩ or more? (While shaking the harness)	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>	Replace the steering gearbox. <Ref. to PS-25, Electric Power Steering Gearbox.>

I: DTC C2533 CONTROL MODULE BOARD TEMPERATURE SENSOR

TROUBLE SYMPTOM:
The steering wheel operation feels heavy.

NOTE:
When this code is displayed, replace the power steering control module with new parts. <Ref. to PS-40, Power Steering Control Module.>

J: DTC C2541 VEHICLE DYNAMICS CONTROL MODULE VEHICLE SPEED SENSOR

TROUBLE SYMPTOM:
The steering wheel operation feels heavy.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the VDC system using the Subaru Select Monitor.	Is a DTC related to VDC CM or vehicle speed signal detected?	Perform the diagnosis according to the DTC.	Go to step **2**.
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is a DTC related to CAN communication detected?	Perform the diagnosis according to the DTC. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK VEHICLE SPEED SIGNAL.** 1) Display the current data «Vehicle Speed» of the power steering control module using the Subaru Select Monitor. 2) Lift up the vehicle (so that the wheels turn freely), start the engine, and raise engine speed in gear. **CAUTION:** **Be careful that no one is near the spinning tires and nothing gets caught in them.** 3) Check for whether the data changes according to vehicle speed.	Is the data in sync with the vehicle speed?	It is possible that temporary poor communication occurs. Perform the Clear Memory Mode. <Ref. to PS(diag)-21, Clear Memory Mode.>	Replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>

K: DTC C2543 ERROR PASSIVE

TROUBLE SYMPTOM:
The steering wheel operation feels heavy.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is a DTC related to CAN communication detected?	Perform the diagnosis according to the DTC. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>	Check for poor contact of the connector, and check the conditions again. If the condition recurs, perform the diagnosis according to the DTC. <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).> If it does not recur, complete the inspection.

L: DTC C2551 POWER SUPPLY RELAY

TROUBLE SYMPTOM:

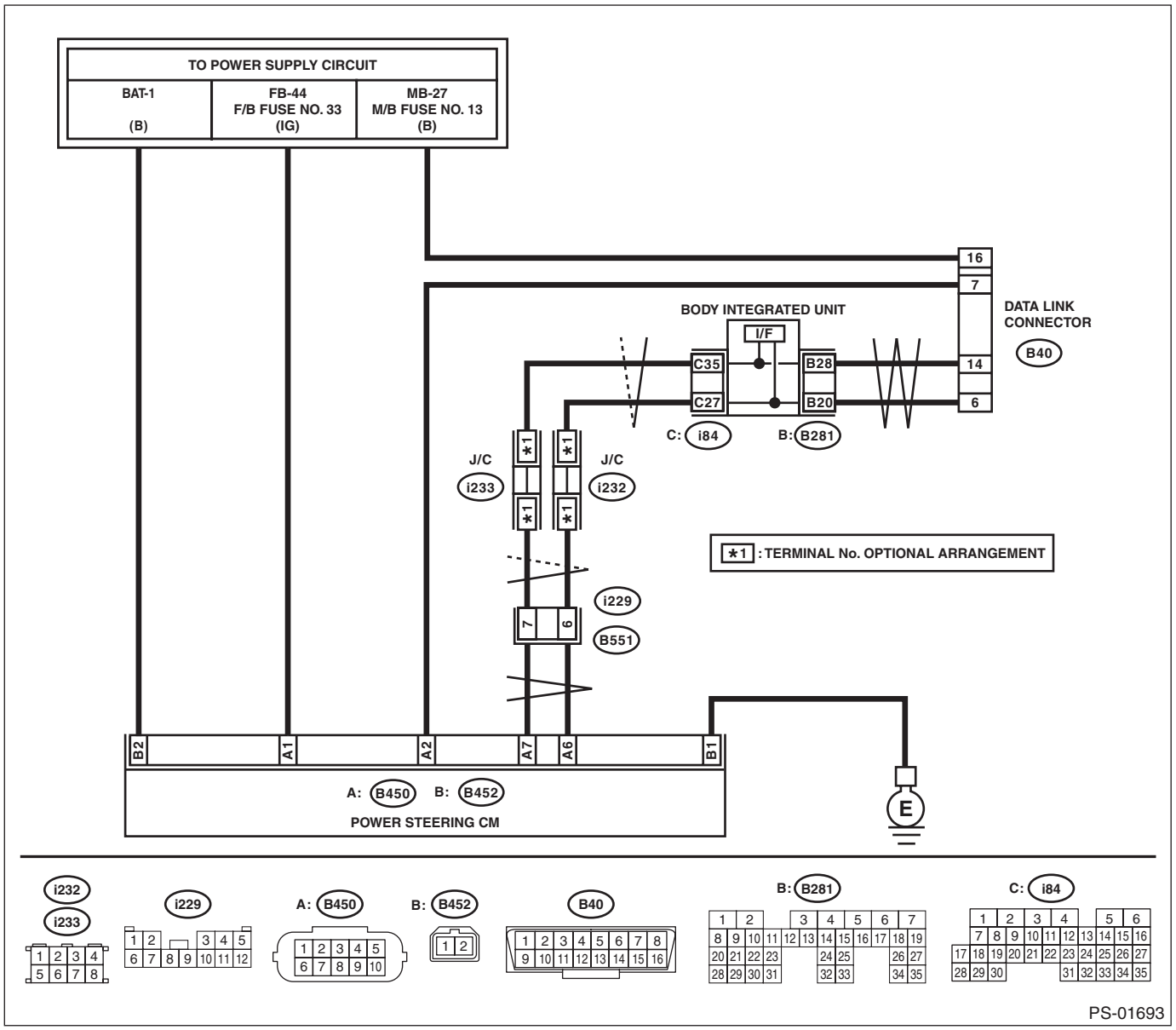
- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

NOTE:
If power supply voltage failure exists at the vehicle side, the warning light goes off if the normal voltage returns.

WIRING DIAGRAM:

- Gasoline engine model

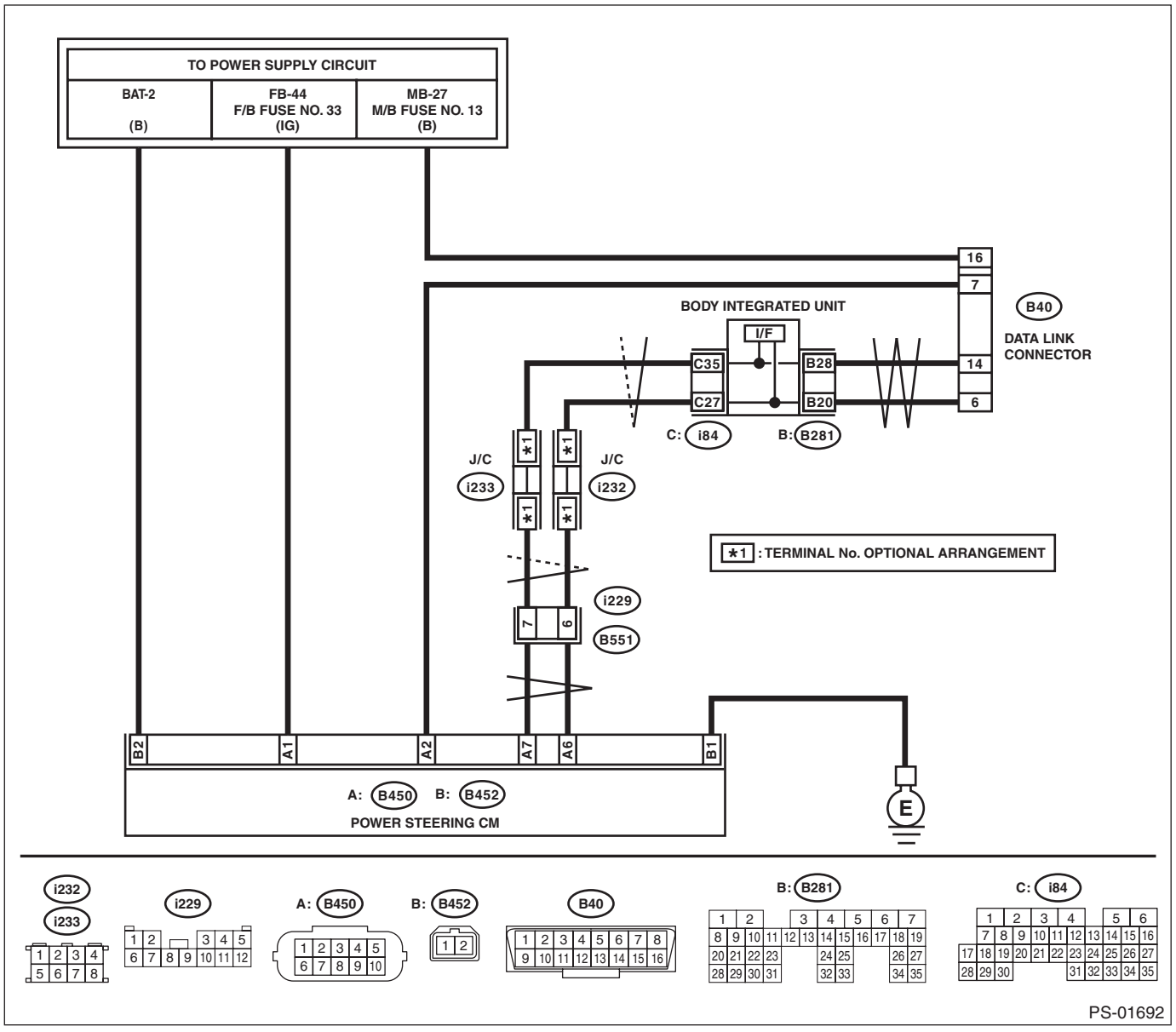
Electric power steering system <Ref. to WI(w/o HEV)-101, Electric Power Steering System.>



PS-01693

- HEV model

Electric power steering system <Ref. to WI(HEV)-94, Electric Power Steering System.>



Step		Check	Yes	No
1	**CHECK BATTERY.** Check the battery and fuse.	Is the voltage 12 V or more? Is the specific gravity 1.260 or more? Is the battery terminal installed properly? Is the fuse OK?	Go to step **2**.	Repair or replace faulty parts.
2	**CHECK WIRING HARNESS.** 1) Disconnect the connector of the power steering control module. 2) Turn the ignition switch to ON. 3) Using a tester and test harness, check the voltage between terminals. ***Connector & terminal*** ***(B452) No. 2 (+) — Chassis ground (–):***	Is the voltage 12 V or more?	Go to step **3**.	Repair the open circuit of harness or the poor contact of connector between the power steering control module and the battery.

Step		Check	Yes	No
3	**CHECK GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Using a tester and test harness, check the resistance between terminals. ***Connector & terminal*** ***(B452) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Check for poor contact of terminals in the power steering control module, and if there are no malfunctions, replace the power steering control module. <Ref. to PS-40, Power Steering Control Module.>	Repair the open circuit or poor contact of the harness between the power steering control module and chassis ground.

M: DTC C2552 MOTOR RELAY

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

NOTE:
When this code is displayed, replace the power steering control module with new parts. <Ref. to PS-40, Power Steering Control Module.>

N: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

O: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

P: DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

Q: DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BODY 1 SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)	AC
HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)	AC(diag)
AIRBAG SYSTEM	AB
AIRBAG SYSTEM (DIAGNOSTICS)	AB(diag)
OCCUPANT DETECTION SYSTEM (DIAGNOSTICS)	OD(diag)
SEAT BELT SYSTEM	SB
LIGHTING SYSTEM	LI
AUTO HEADLIGHT BEAM LEVELER SYSTEM (DIAGNOSTICS)	AL(diag)
STEERING RESPONSIVE FOG LIGHTS (DIAGNOSTICS)	SRF(diag)
WIPER AND WASHER SYSTEMS	WW
ENTERTAINMENT	ET
COMMUNICATION SYSTEM	COM
GLASS/WINDOWS/MIRRORS	GW
BODY STRUCTURE	BS
INSTRUMENTATION/DRIVER INFO	IDI
INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS)	IDI(diag)
SEATS	SE

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

AC

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1. General Description

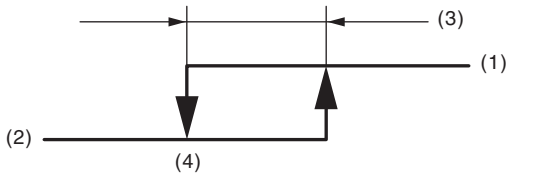
A: SPECIFICATION

1. HEATER SYSTEM

Item		Specifications	Condition
Heating capacity		5.0 kW (4,299 kcal/h, 17,059 BTU/h) or more	• Air flow control dial or switch: FOOT • Temperature control dial: HI (MAX HOT) • Temperature difference between hot water and inlet air: 65°C (149°F) • Hot water flow rate: 360 L (95.1 US gal, 79.2 Imp gal)/h
Air flow rate		290 m^3 (10,243 cu ft)/h	FOOT mode (FRESH), MAX HOT at 12.5 V
Max air flow rate		480 m^3 (16,954 cu ft)/h	• Temperature control dial: LO (MAX COOL) • Fan dial: HI (MAX) Auto A/C model: 7th position Manual A/C model: 4th position • FRESH/RECIRC switch: RECIRC
Heater core	Dimensions (W × H × T)	257.5 × 118.5 × 27 mm (10.1 × 4.67 × 1.06 in)	—
Blower motor	Type	Magnet motor 300 W or less	12 V
	Fan type and size (diameter × width)	Sirocco fan type 150 × 75 mm (5.91 × 2.95 in)	—

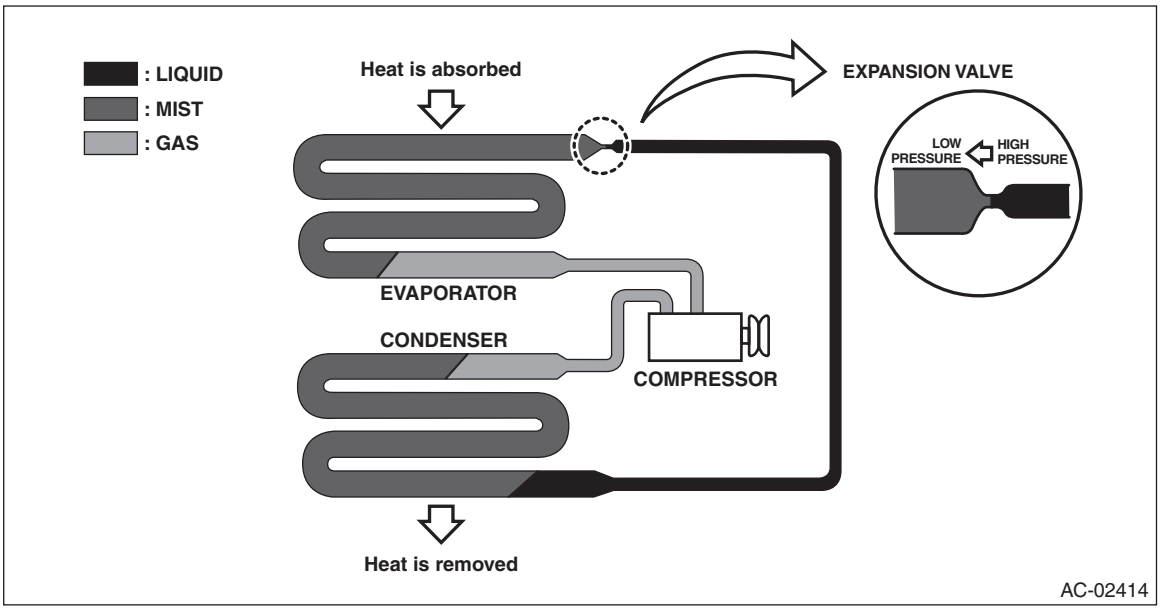
2. A/C SYSTEM

Item		Specifications
Type of air conditioner		Reheat air-mix type
Cooling capacity		5.0 kW (4,299 kcal/h, 17,059 BTU/h)
Refrigerant		HFC-134a (CH_2FCF_3) [0.475±0.025 kg (1.05±0.06 lb)]
Compressor	Type	Rotary fixed capacity (DKV-10Z)
	Discharge	105 cc (6.41 cu in)/rev
	Max. permissible speed	7,700 r/min
Magnet clutch	Type	Dry, single-disc type
	Power consumption	45 W
	Type of belt	Gasoline engine model: V-belt 6 PK HEV model: V-belt 7 PK
	Pulley dia. (effective dia.)	110 mm (4.33 in)
	Pulley ratio	1.3
Condenser	Type	Sub cool type
	Core face area	0.188 m^2 (2.002 sq ft)
	Core thickness	16 mm (0.63 in)
	Radiation area	4.5 m^2 (48.44 sq ft)
Expansion valve	Type	Block
Evaporator	Type	Dual-tank
	Dimensions (W × H × T)	290.1 × 172 × 39 mm (11.42 × 6.77 × 1.54 in)
Blower fan	Fan type	Sirocco fan
	Outer diameter × Width	150 × 75 mm (5.91 × 2.95 in)
	Power consumption	280 W
Condenser fan (sub fan)	Motor type	Magnet
	Power consumption	120 W
	Fan outer diameter	320 mm (12.6 in)

Item			Specifications
Radiator fan (main fan)		Motor type	Magnet
		Power consumption	120 W
		Fan outer diameter	320 mm (12.6 in)
Idle speed		No load	650±100 r/min
		A/C ON	800 — 900±50 r/min
Triple switch (Pressure switch)	Low-pressure switch operating pressure	ON → OFF	196±25 kPa (2.00±0.25 kgf/cm^2, 28.4±3.6 psi)
		OFF → ON	225±30 kPa (2.29±0.31 kgf/cm^2, 32.6±4.3 psi)
	High-pressure switch operating pressure	ON → OFF	2,940±200 kPa (29.98±2.04 kgf/cm^2, 426.3±29 psi)
		OFF → ON	2,350±200 kPa (24.00±2.04 kgf/cm^2, 340.7±29.0 psi)
	Middle-pressure switch operating pressure	ON → OFF	1,470±120 kPa (14.99±1.22 kgf/cm^2, 213.15±17.4 psi)
		OFF → ON	1,770±100 kPa (18.05±1.02 kgf/cm^2, 256.65±14.5 psi)
Thermo-control amplifier working temperature			 AC-00601 (1) ON (2) OFF (3) 1.5±0.3°C (34.7±0.5°F) (4) 1.0±0.5°C (33.8±0.9°F)

3. BASIC OPERATION

The cooling system cools down the compartment by using the pipes connecting parts and cycling the evaporable liquid (refrigerant) within the sealed system in a repeated process of “vaporization — liquefaction — re-vaporization”.



Item	Operation
Compressor	Sucks and pressurizes the low temperature, low pressure refrigerant gas that was vaporized at the evaporator by absorbing heat from the compartment, and sends the high temperature, high pressure refrigerant gas to the condenser.
Condenser	Cools the high temperature, high pressure refrigerant gas sent from the compressor for condense and liquefaction.
Expansion valve	• Sprays the high temperature, high pressure liquid refrigerant from the small hole in order to let the refrigerant expand rapidly to turn it into low temperature, low pressure mist. • The refrigerant amount is adjusted according to the refrigerant vaporization condition in the evaporator.
Evaporator	The evaporator turns into a low temperature condition when the mist refrigerant that was turned into a low temperature, low pressure condition at the expansion valve is vaporized in large quantity in the evaporator. Passing air flow through the low temperature evaporator emits cold air.

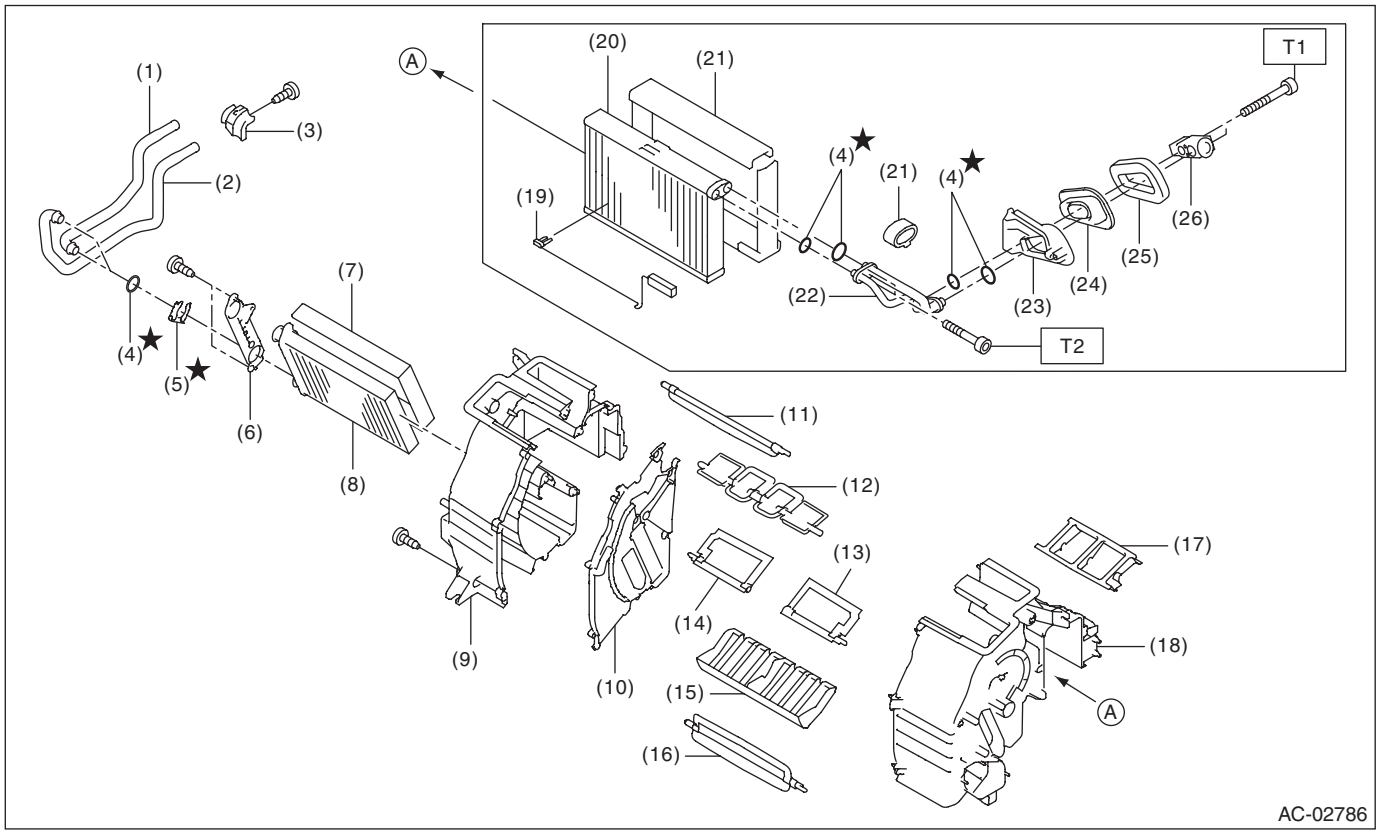
B: LOCATION

Refer to “LOCATION” for “HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)” section. <Ref. to AC(diag)-4, LOCATION, Electrical Component Location.>

C: COMPONENT

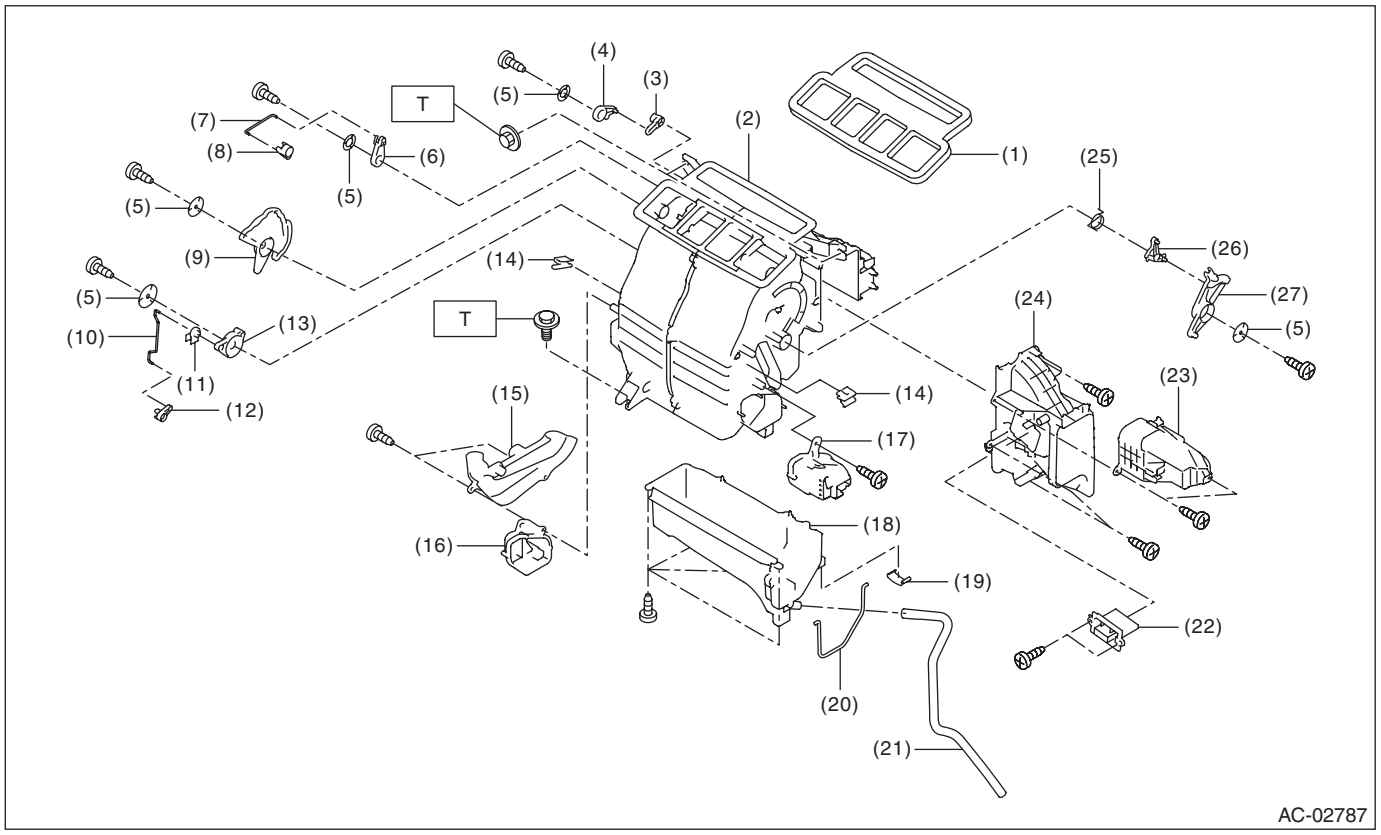
1. HEATER AND COOLING UNIT

- Manual A/C model



(1) Pipe - inlet
(2) Pipe - outlet
(3) Clamp - pipe
(4) Seal O-ring
(5) Clamp
(6) Plate - heater core
(7) Packing - heater core
(8) Heater core
(9) Case - heater unit UPR LH
(10) Plate CTR
(11) Shutter - defroster
(12) Shutter - vent
(13) Shutter - air mix RH
(14) Shutter - air mix LH
(15) Guide - heater unit
(16) Shutter - foot
(17) Case - vent duct
(18) Case - heater unit UPR RH
(19) Thermostat - cooling
(20) Evaporator ASSY - cooling
(21) Packing - evaporator core
(22) Pipe - evaporator core
(23) Case - expansion valve
(24) Seal - cooling
(25) Packing - heater unit
(26) Expansion valve - cooling

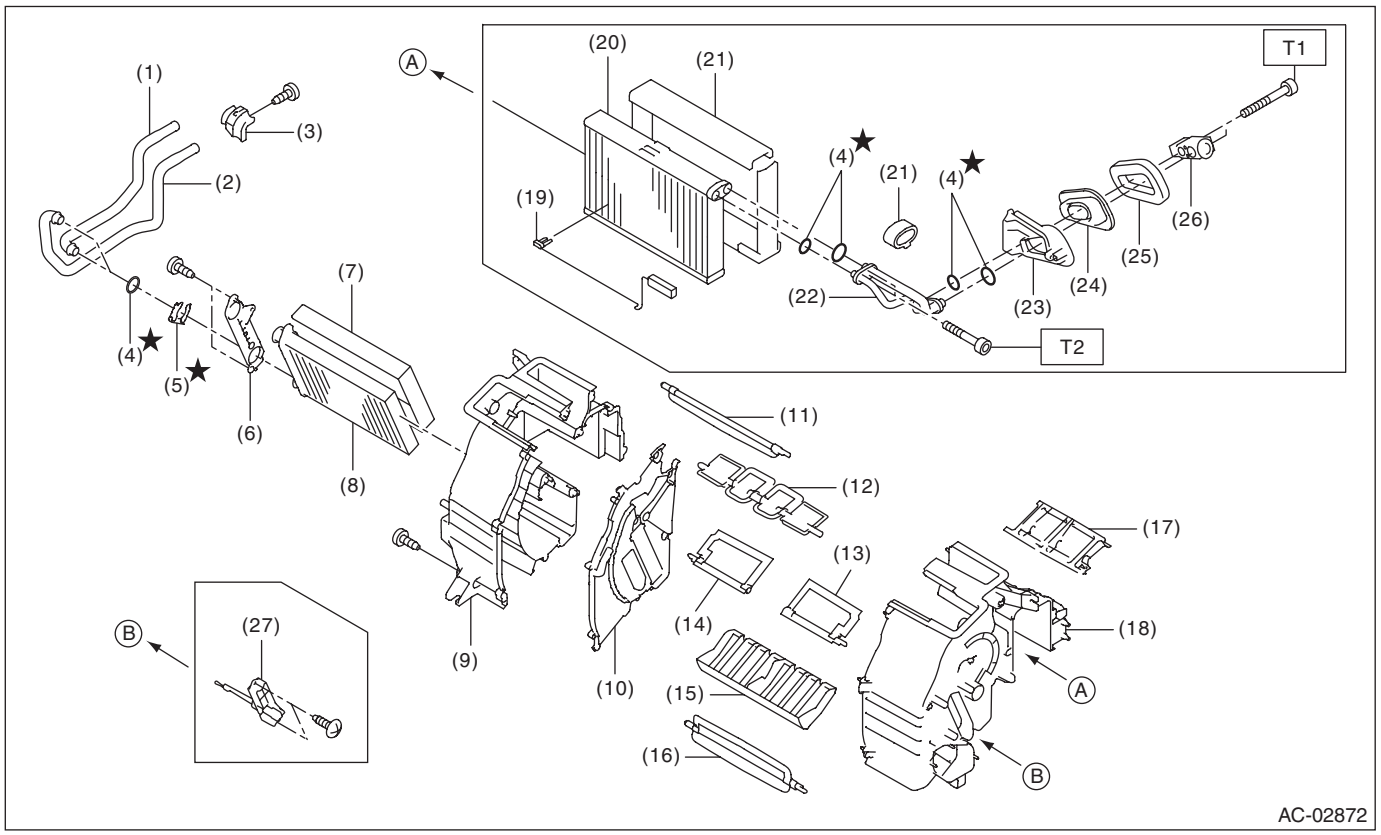
Tightening torque: N·m (kgf-m, ft-lb)
T1: 5.0 (0.51, 3.7)
T2: 6.7 (0.68, 4.9)



(1) Packing - heater unit
(2) Case - heater unit
(3) Lever - defroster
(4) Lever - defroster sub
(5) Washer - heater
(6) Lever - ventilator sub
(7) Rod - ventilator
(8) Lever - ventilator door
(9) Lever - mode
(10) Rod - foot
(11) Clip
(12) Lever - foot
(13) Lever - foot sub
(14) Clamp - cable
(15) Cover - heater pipe
(16) Duct - foot LH
(17) Duct - foot RH
(18) Case - heater LWR
(19) Clip - case
(20) Packing - evaporator cover
(21) Hose - drain
(22) Resistor
(23) Cover
(24) Cover - heater unit
(25) Spring - heater unit
(26) Lever A
(27) Lever B

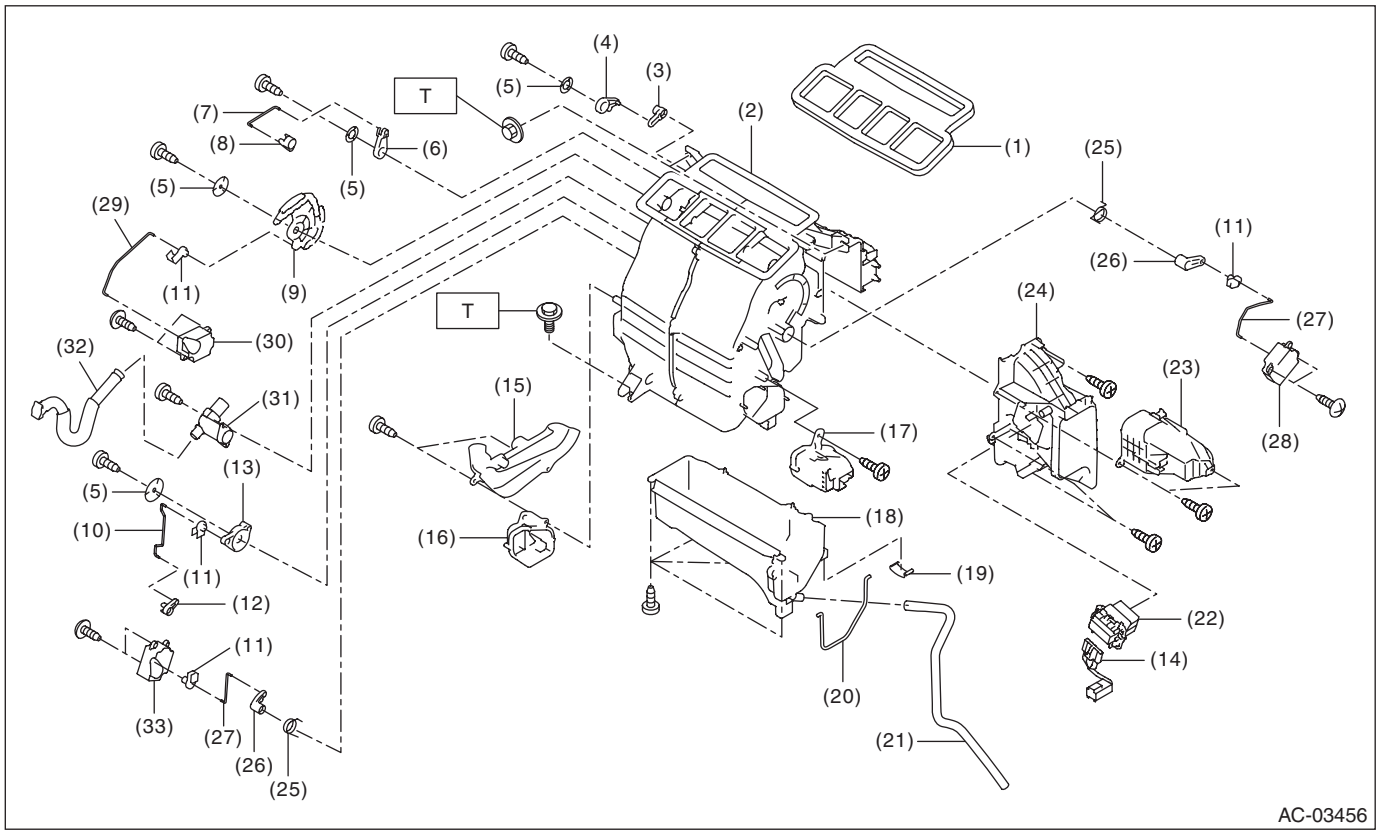
Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

- Auto A/C model



(1) Pipe - inlet
(2) Pipe - outlet
(3) Clamp - pipe
(4) Seal O-ring
(5) Clamp
(6) Plate - heater core
(7) Packing - heater core
(8) Heater core
(9) Case - heater unit UPR LH
(10) Plate CTR
(11) Shutter - defroster
(12) Shutter - vent
(13) Shutter - air mix RH
(14) Shutter - air mix LH
(15) Guide - heater unit
(16) Shutter - foot
(17) Case - vent duct
(18) Case - heater unit UPR RH
(19) Thermostat - cooling
(20) Evaporator ASSY - cooling
(21) Packing - evaporator core
(22) Pipe - evaporator core
(23) Case - expansion valve
(24) Seal - cooling
(25) Packing - heater unit
(26) Expansion valve - cooling
(27) Heater core sensor (HEV model)

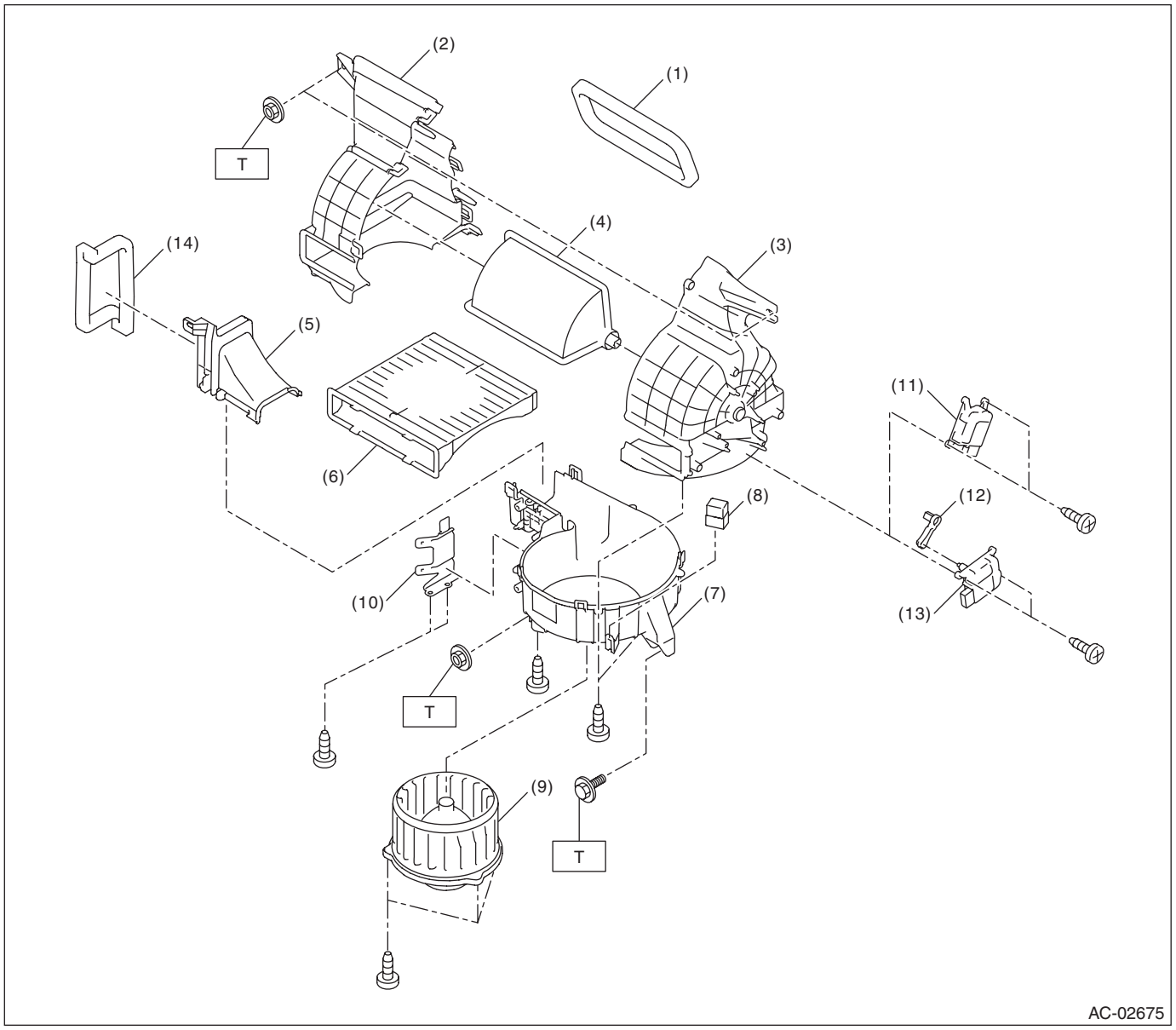
Tightening torque: N·m (kgf-m, ft-lb)
T1: 5.0 (0.51, 3.7)
T2: 6.7 (0.68, 4.9)



(1) Packing - heater unit
(2) Case - heater unit
(3) Lever - defroster
(4) Lever - defroster sub
(5) Washer - heater
(6) Lever - ventilator sub
(7) Rod - ventilator
(8) Lever - ventilator door
(9) Lever - mode
(10) Rod - foot
(11) Clip
(12) Lever - foot
(13) Lever - foot sub
(14) Harness - heater unit
(15) Cover - heater pipe
(16) Duct - foot LH
(17) Duct - foot RH
(18) Case - heater LWR
(19) Clip - case
(20) Packing - evaporator cover
(21) Hose - drain
(22) Power transistor
(23) Cover
(24) Cover - heater unit
(25) Spring - heater unit
(26) Lever - air mix
(27) Rod - air mix
(28) Motor - actuator mix RH
(29) Rod - mode
(30) Motor - actuator mode
(31) Aspirator - heater unit
(32) Aspirator hose
(33) Motor - actuator mix LH (dual A/C model)

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

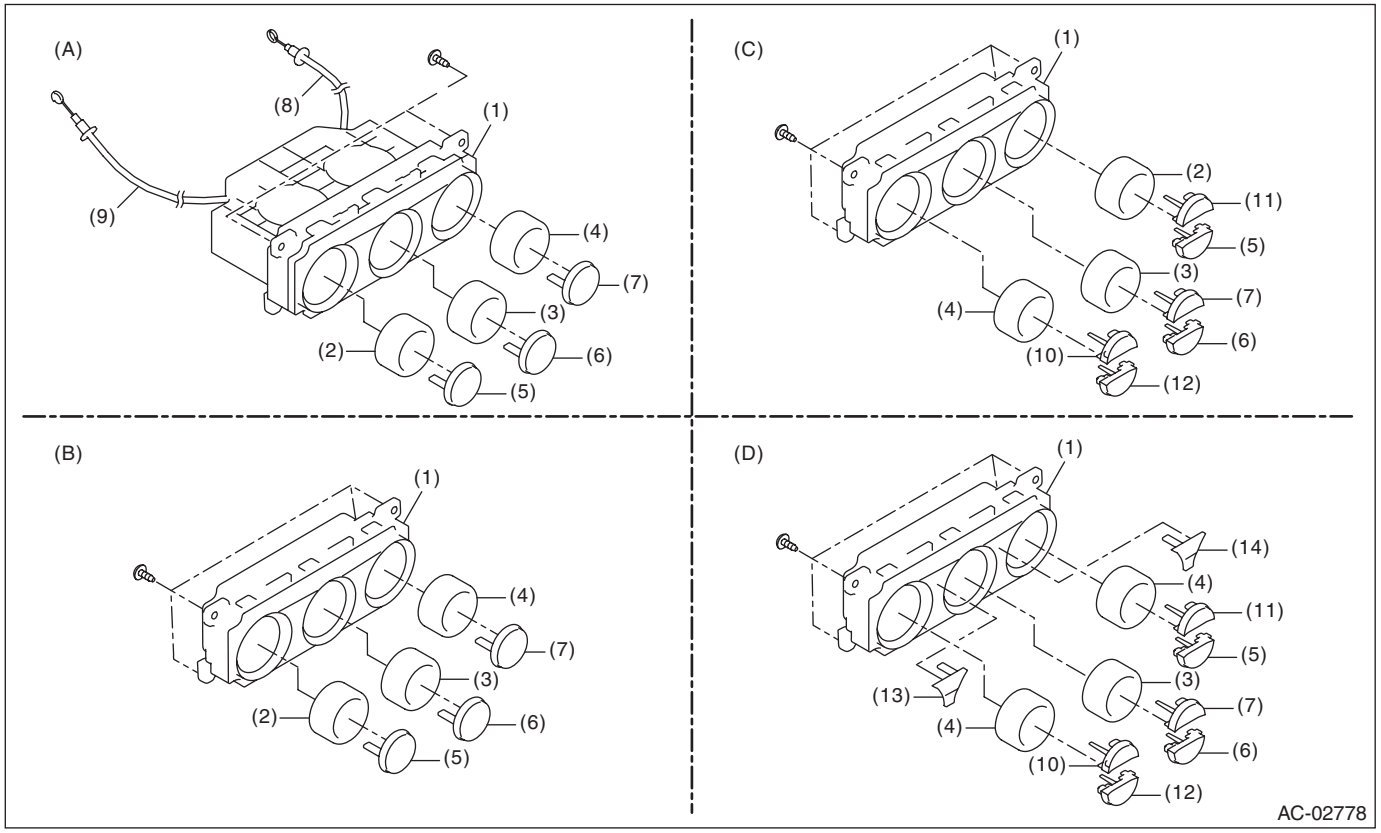
2. BLOWER MOTOR UNIT



(1) Packing - blower
(2) Case - blower intake LH
(3) Case - blower intake RH
(4) Shutter - blower
(5) Case upper - blower
(6) Filter kit
(7) Case lower - blower
(8) Blower motor relay
(9) Blower - motor
(10) Bracket
(11) Motor - actuator blower (auto A/C model)
(12) Lever
(13) Motor - actuator blower (manual A/C model)
(14) Packing

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

3. CONTROL PANEL



(A) Manual A/C model

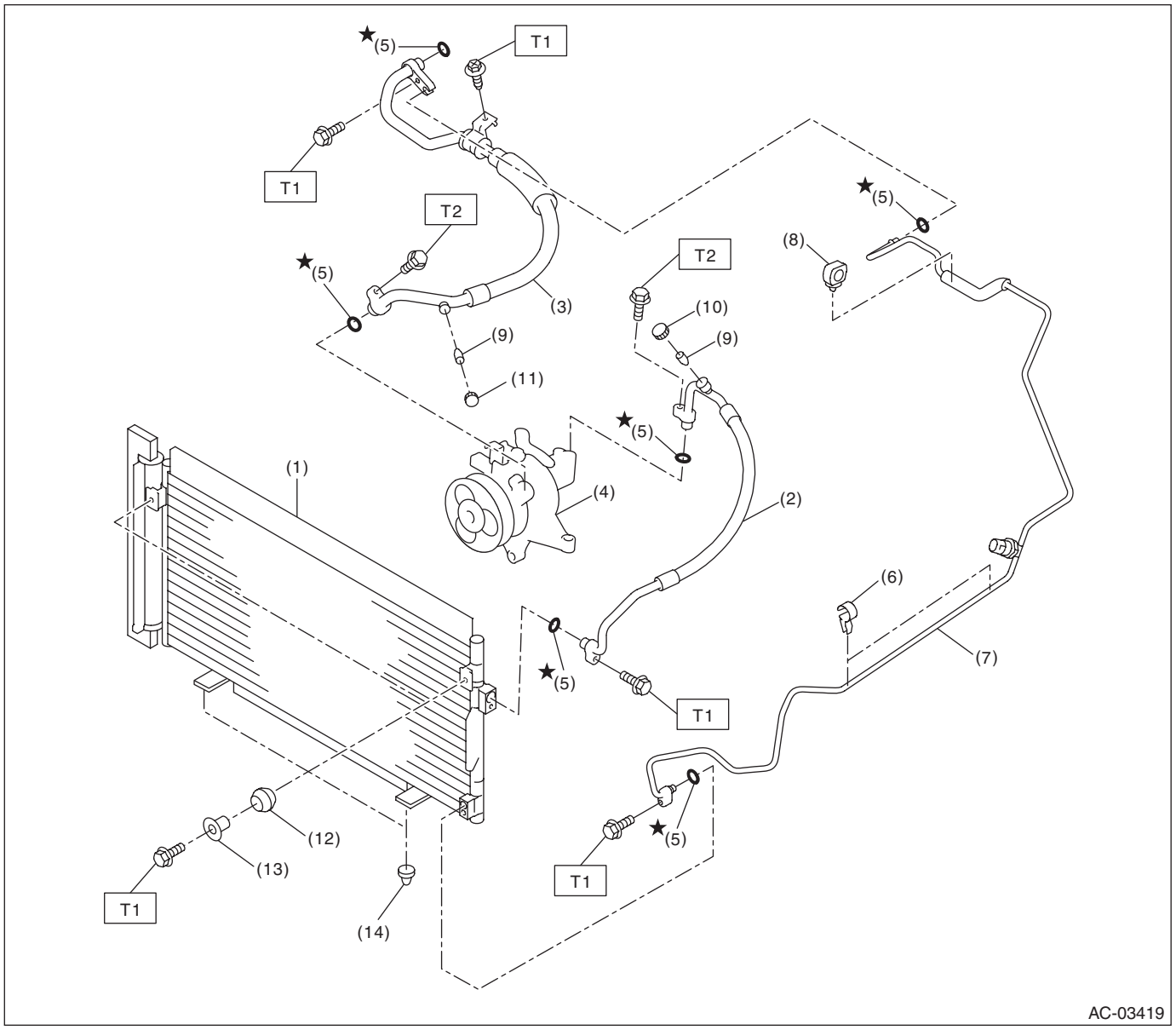
(B) Single auto A/C model (with standard MFD)

(C) Single auto A/C model (with high grade MFD)

(D) Dual auto A/C model

(1) Control case
(2) Air flow control dial
(3) Fan dial
(4) Temperature adjustment dial
(5) Rear window defogger switch
(6) FRESH/RECIRC switch
(7) A/C switch
(8) Temperature control cable
(9) Air flow control cable
(10) AUTO switch
(11) Defroster switch
(12) OFF switch
(13) Air flow control switch
(14) Dual switch

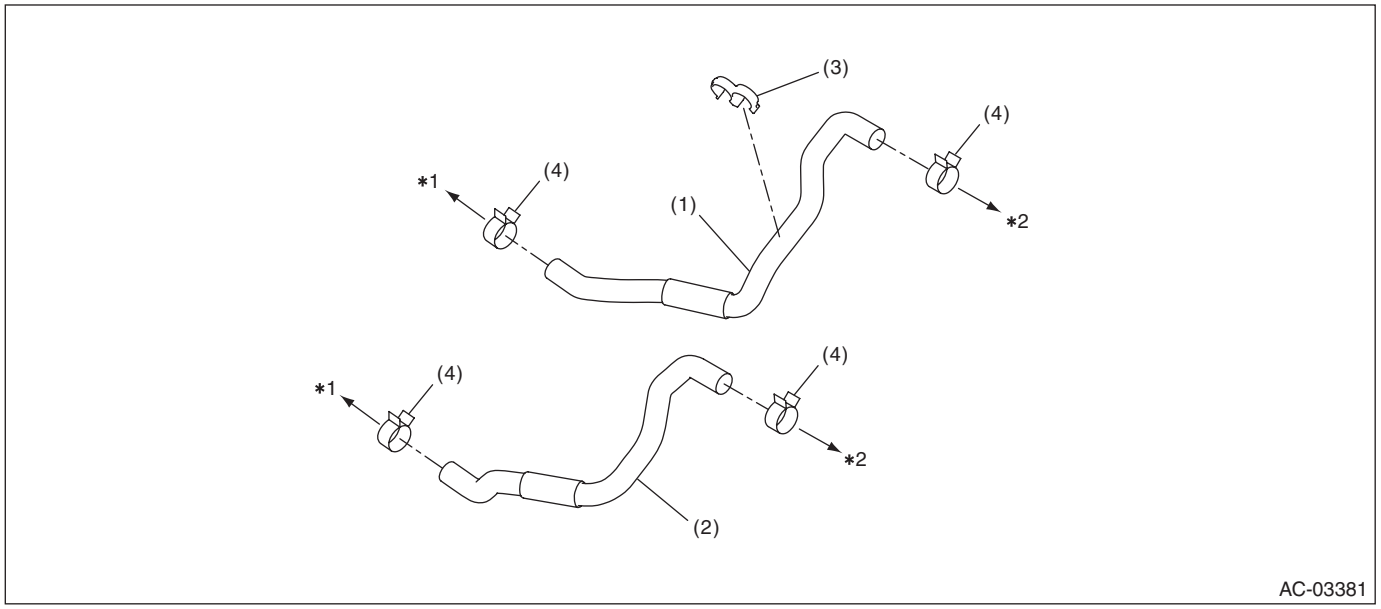
4. AIR CONDITIONING UNIT



(1) Condenser ASSY - air conditioner
(2) Hose - pressure discharge
(3) Hose - pressure suction
(4) Compressor ASSY
(5) Seal O-ring
(6) Clip - pipe
(7) Pipe - evaporator cooling
(8) Clip
(9) Valve - hose pressure
(10) Cap - hose pressure discharge
(11) Cap - hose pressure suction
(12) Grommet
(13) Spacer
(14) Bushing - condenser

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 10 (1.02, 7.4)

5. HEATER HOSE

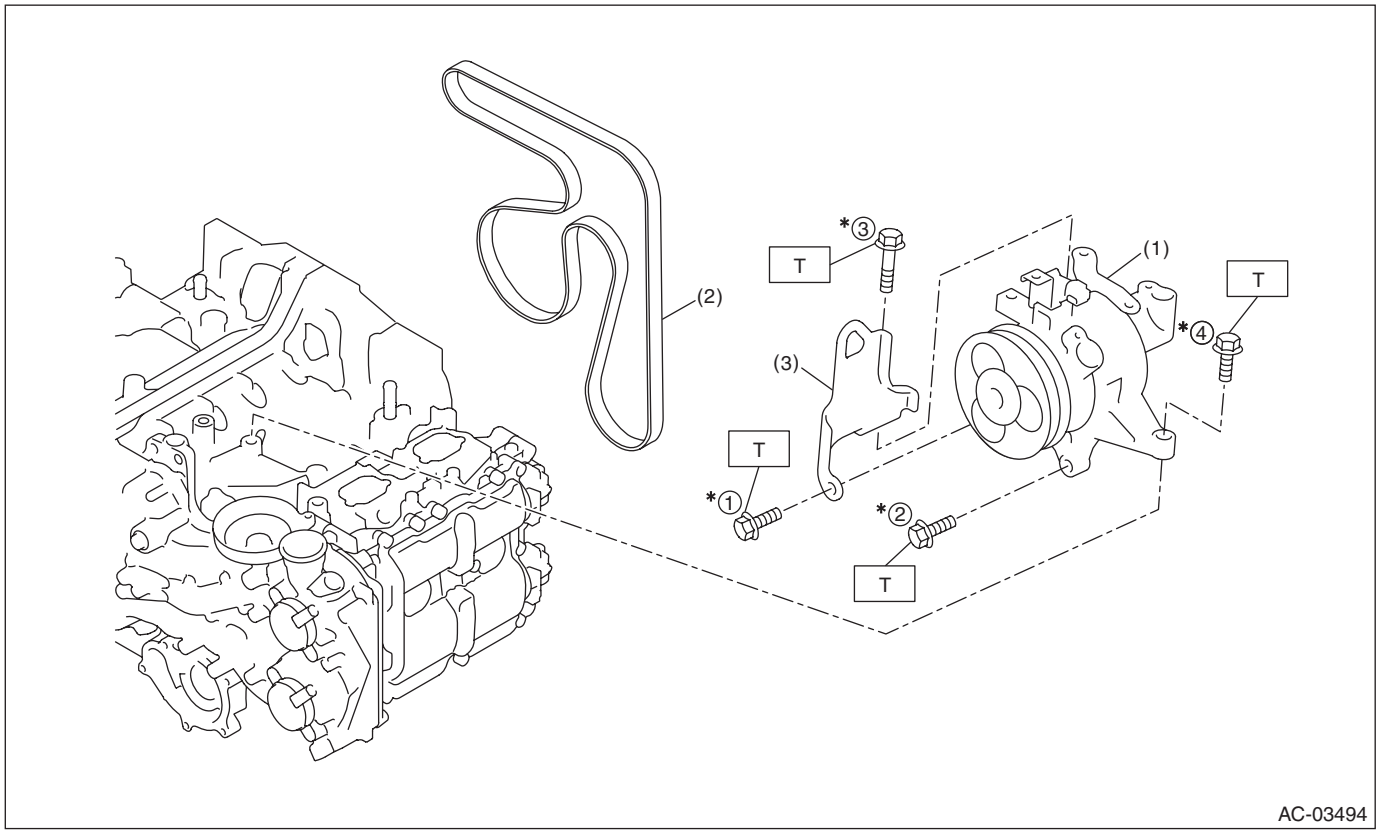


(1) Hose - heater outlet
(2) Hose - heater inlet
(3) Clip
(4) Clamp

*1: Engine side
*2: Heater core side

6. COMPRESSOR

- Gasoline engine model

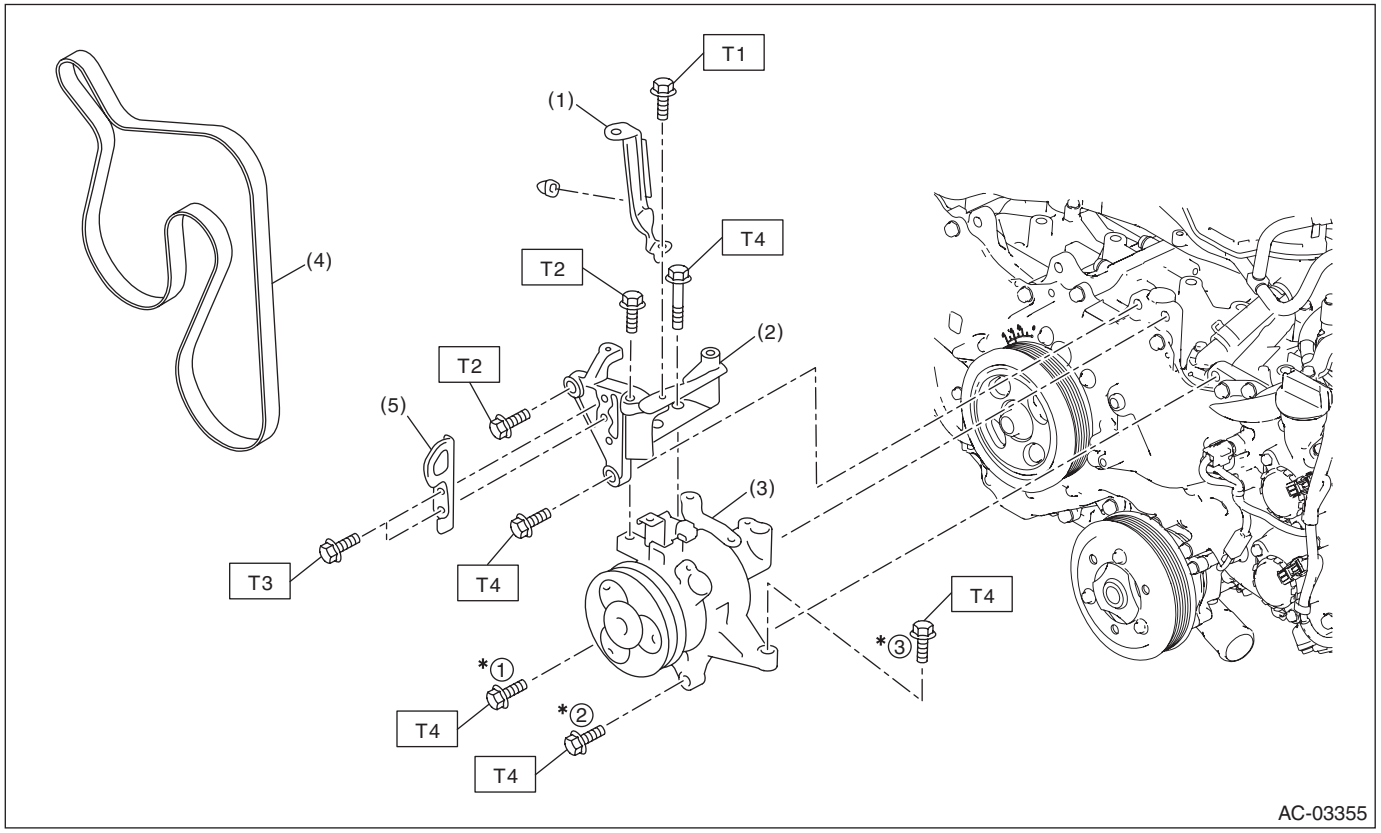


(1) Compressor ASSY
(2) V-belt (6 PK)
(3) Hanger - engine front

Tightening torque: N·m (kgf-m, ft-lb)
T: 36 (3.67, 26.6)

*: Tighten the compressor in the numerical order as shown in the figure.

- HEV model

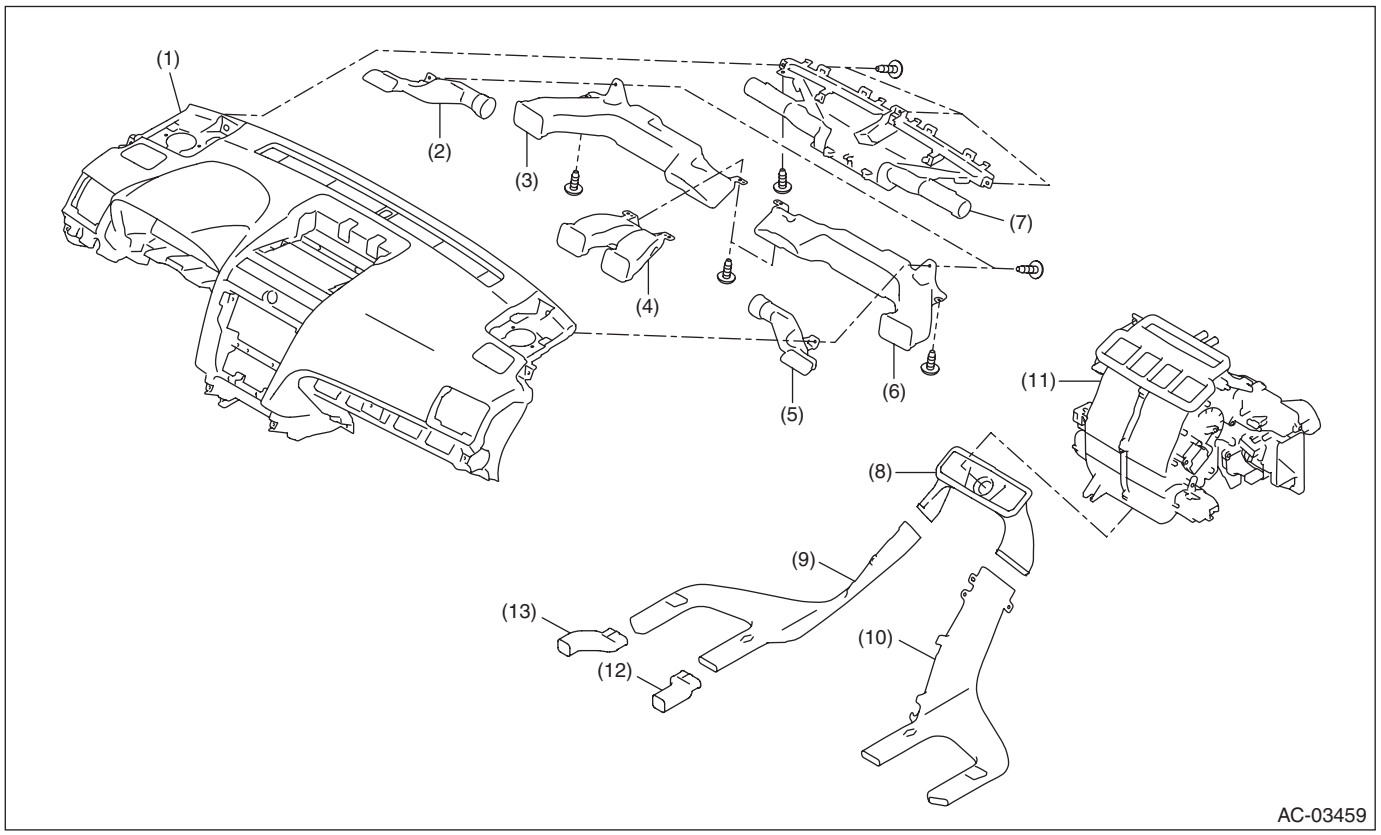


(1) Bracket - vacuum pump connector
(2) Bracket COMPL - vacuum pump
(3) Compressor ASSY
(4) V-belt (7 PK)
(5) Hanger - engine front

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 18 (1.84, 13.3)
T3: 19 (1.94, 14)
T4: 36 (3.67, 26.6)

*: Tighten the compressor in the numerical order as shown in the figure.

7. HEATER DUCT



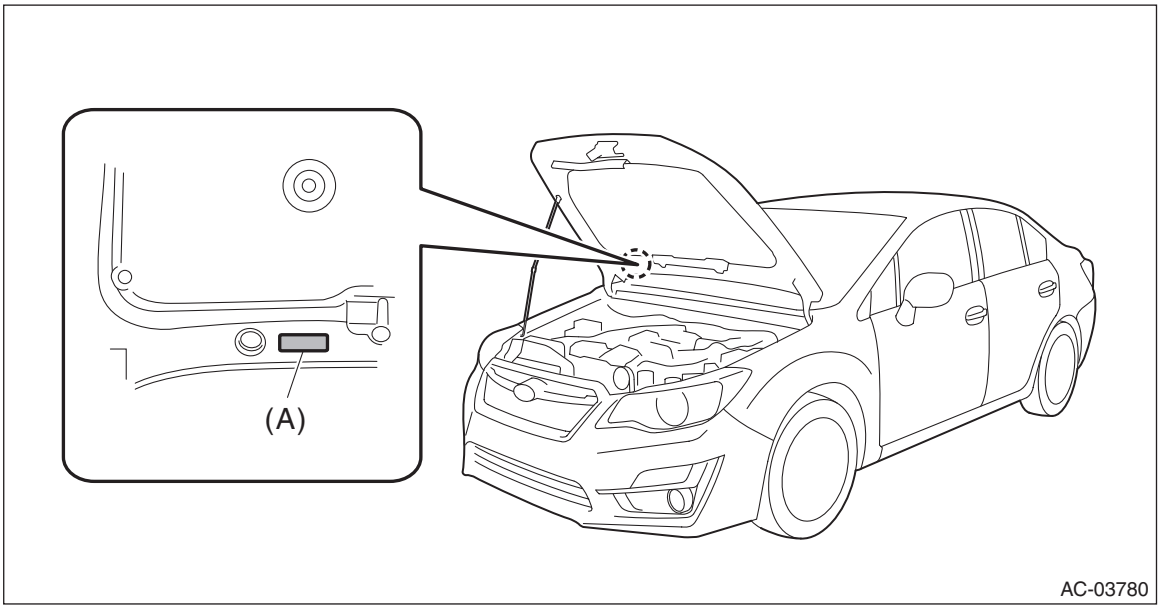
(1) Panel COMPL - instrument
(2) Duct - side defroster LH
(3) Duct - side ventilation LH
(4) Duct - center vent
(5) Duct - side defroster RH
(6) Duct - side ventilation RH
(7) Nozzle - front defroster
(8) Duct - rear heater CTR
(9) Duct - rear heater LH
(10) Duct - rear heater RH
(11) Heater and cooling unit ASSY
(12) Duct - extension LH (HEV model)
(13) Duct - extension RH (HEV model)

D: CAUTION

• Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the radio, control module, and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that each component operates normally.

1. HFC-134A A/C SYSTEM

• The cooling system components for the HFC-134a system using such as the refrigerant and compressor oil are different from the conventional CFC-12 system components and they are incompatible with each other.
• Vehicles with the HFC-134a system can be identified by the label (A) attached to the vehicle.
Before maintenance, check A/C system which is installed to the vehicle.



2. COMPRESSOR OIL

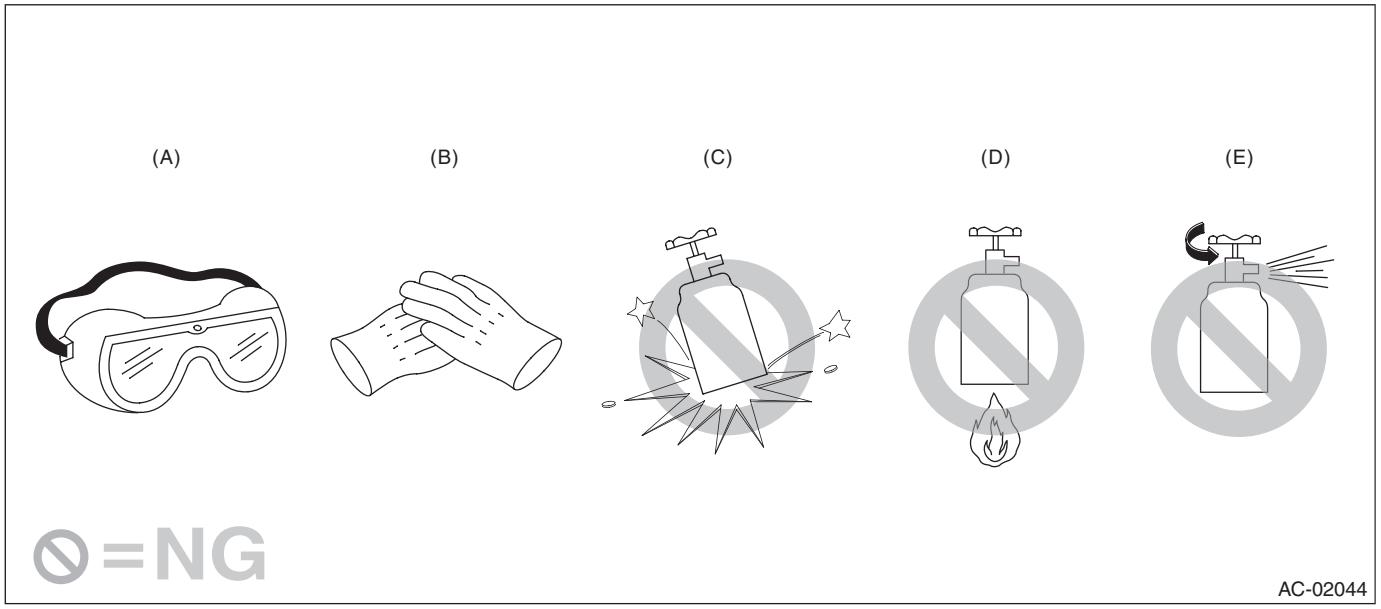
• HFC-134a compressor oil has no compatibility with that of CFC-12 system.
• Use only the manufacturer-authorized compressor oil for the HFC-134a system; only use DH-PR (ZXL200PG).
• Do not mix multiple compressor oils.
If CFC-12 compressor oil is used in the HFC-134a A/C system, the compressor may become stuck due to poor lubrication, or the refrigerant may leak due to swelling of rubber parts.
On the other hand, if HFC-134a compressor oil is used in a CFC-12 A/C system, the durability of the A/C system will be lowered.
• HFC-134a compressor oil is very hygroscopic. When replacing or installing/removing A/C parts, immediately isolate the oil from atmosphere using a plug or tape. In order to avoid moisture, store the oil in a container with its cap tightly closed.

3. REFRIGERANT

• CFC-12 refrigerant cannot be used in a HFC-134a A/C system. HFC-134a refrigerant, also cannot be used in a CFC-12 A/C system.
• If an incorrect or no refrigerant is used, it will result in poor lubrication and the compressor itself may be damaged.

4. HANDLING OF REFRIGERANT

• The refrigerant boils at approx. –30°C (–22°F). When handling it, be sure to wear protective goggles and protective gloves. Direct contact of the refrigerant with skin may cause frostbite.
If the refrigerant gets into your eye, avoid rubbing your eyes with your hands. Wash your eye with plenty of water, and receive medical treatment from an eye doctor.
• Do not heat a service can. If a service can is directly heated, or put into boiling water, the inside pressure will become extremely high. This may cause the can to explode. If a service can must be warmed up, use warm water of 40°C (104°F) or less.
• Do not drop or impact a service can. (Observe the precautions and operation procedure described on the refrigerant can.)
• When the engine is running, do not open the high-pressure valve of manifold gauge. The high-pressure gas will back-flow resulting in an explosion of the can.
• Provide good ventilation and do not work in a closed area.
• In order to prevent global warming, avoid releasing HFC-134a into the atmosphere. Using a refrigerant recovery system, discharge and recycle the gas.

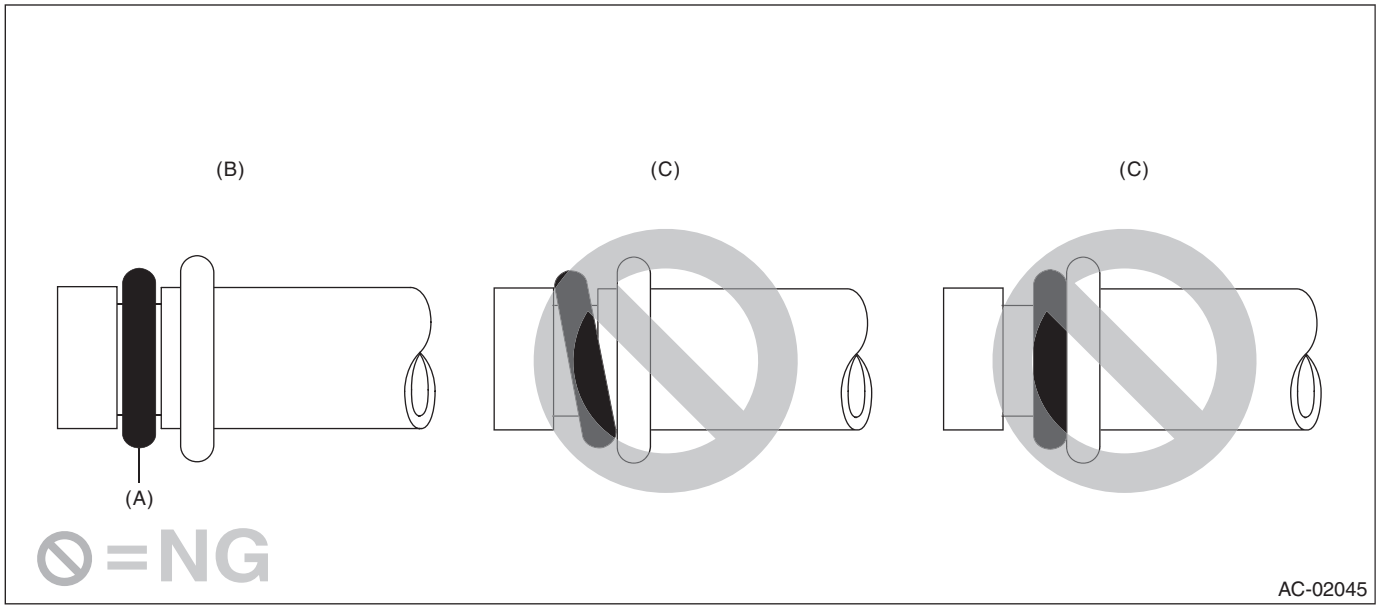


(A) Goggles
(B) Gloves
(C) Do not apply impact.
(D) No direct heat on container
(E) Do not discharge

5. O-RING CONNECTIONS

• Always use a new O-ring.
• In order to keep the O-rings free of lint which will cause a refrigerant gas leak, perform work without using gloves or waste cloths.
• Apply compressor oil to O-rings to avoid sticking, before installation.
• Use a torque wrench to tighten the O-ring fittings. Over-tightening will result in damage of the O-ring and deformation of the pipe end.
• If the work is interrupted before completing pipe connections, recap the pipes, components and fittings with a plug or tape to prevent foreign matter from entering.
• Visually check the surfaces and mating surfaces of O-rings, threads and connecting points. If a failure is found, replace the applicable parts.

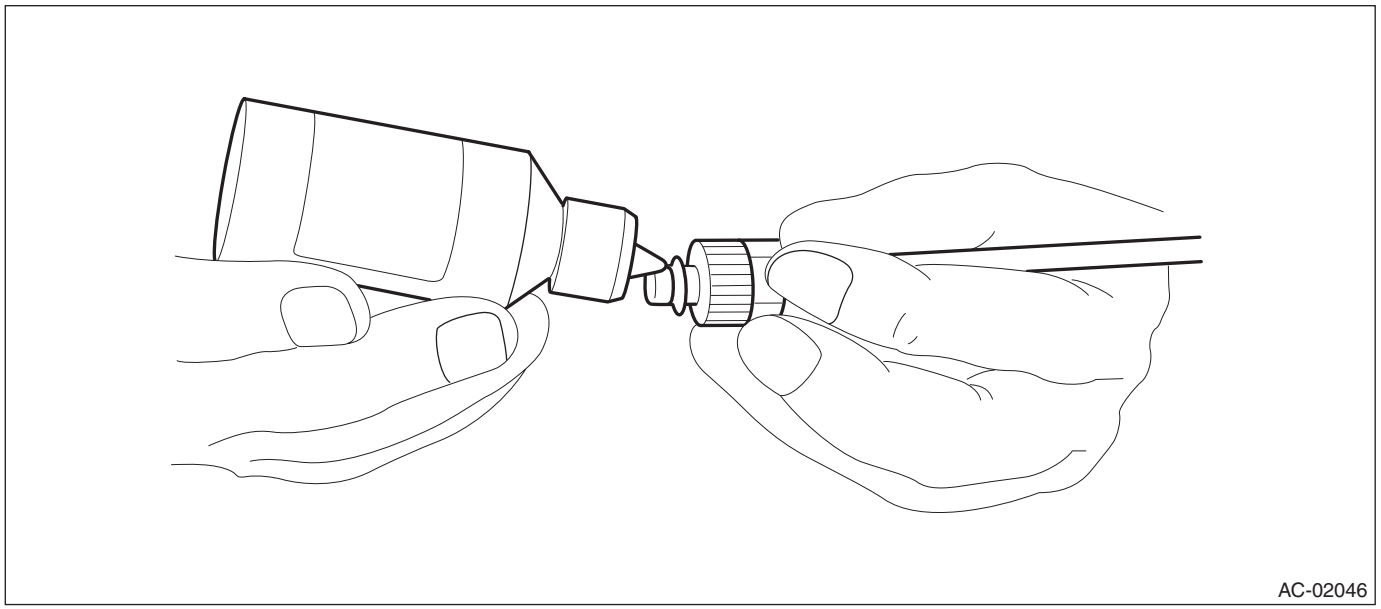
- Install the O-rings straight against the pipe groove.



(A) O-ring (B) OK (C) NG

- Use compressor oil specified in the service manual to lubricate the O-rings.

Apply oil to the top and sides of O-rings before installation.
Apply compressor oil to the pipe grooves.



- After tightening, use a clean cloth to remove excess compressor oil from the connections and any oil which may have run on the vehicle body or other parts.
- If any leakage is suspected after tightening, do not tighten the connections further, but disconnect the connections, remove the O-rings, and check the O-rings, threads, and connections.

E: PREPARATION TOOL

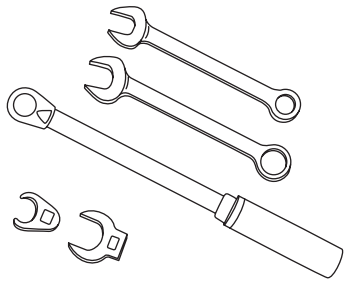
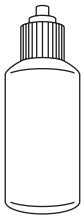
1. SPECIAL TOOL

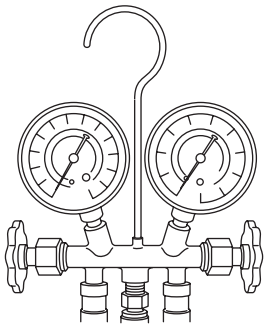
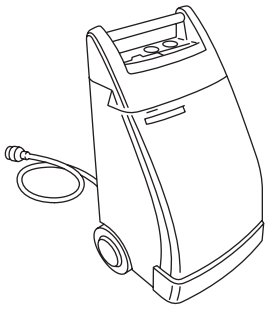
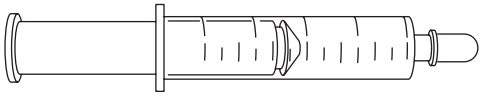
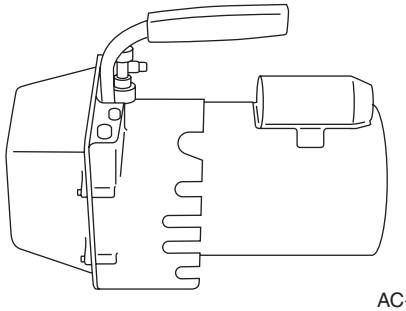
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

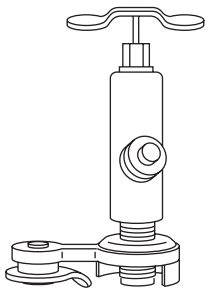
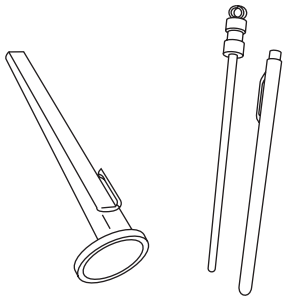
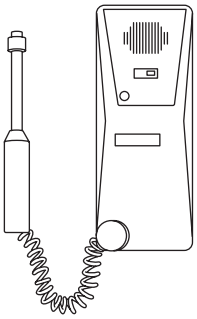
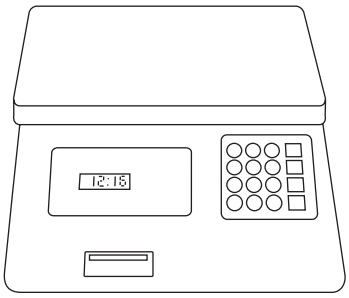
2. GENERAL TOOL

CAUTION:
When working on vehicles with a HFC-134a system, only use HFC-134a specified tools and parts. Do not mix CFC-12 tools and parts. If HFC-134a and CFC-12 compressor oil is mixed, it will result in poor lubrication and the compressor itself may be damaged.
In order to prevent the mixture of HFC-134a and CFC-12 parts and liquid, the type of tool and screw, and the replacement valves used are different. The gas leak detectors for the HFC-134a and CFC-12 systems must also not be interchanged.

	HFC-134a	CFC-12
Tool and screw type	Millimeter size	Inch size
Valve type	Quick joint type	Screw-in type

TOOL NAME/ILLUSTRATION	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.
Wrench  AC-00213	Various **WRENCHES** will be required to service any A/C system.7 — 40 N·m (0.7 to 4.1 kgf-m, 5 to 30 ft-lb) torque wrench and various crow-foot wrenches will be needed. Open end or flare nut wrenches will be needed to affix the pipe and hose fittings.
Applicator bottle  AC-00012	A small **APPLICATOR BOTTLE** is recommended to apply compressor oil to the various parts. It can be available at a hardware store.

TOOL NAME/ILLUSTRATION	REMARKS
Manifold gauge set  AC-00013	A **MANIFOLD GAUGE SET** (with hoses) is available at either a refrigerant supplier or an automotive equipment supplier.
Refrigerant recovery system  AC-00014	A **REFRIGERANT RECOVERY SYSTEM** is used for the recovery and recycling of A/C system refrigerant after contaminants and moisture have been removed from the refrigerant.
Syringe  AC-00015	A graduated plastic **SYRINGE** will be needed to add oil into the system again. A syringe can be available at a pharmacy or drug store.
Vacuum pump  AC-00016	A **VACUUM PUMP** is necessary (for a good working condition), and may be available at either a refrigerant supplier or an automotive equipment supplier.

TOOL NAME/ILLUSTRATION	REMARKS
Can tap  AC-00017	A **CAN TAP** for the 397 g (14 oz) can is available at an automotive equipment supplier.
Thermometer/hygrometer  AC-00018	A Pocket **THERMOMETER/HYGROMETER** is available at either a industrial hardware store or a refrigerant supplier.
Electronic leak detector  AC-00019	An **ELECTRONIC LEAK DETECTOR** can be available at either a specialty tool supplier or an A/C equipment supplier.
Weight scale  AC-00020	A **WEIGHT SCALE** such as an electronic charging scale or a bathroom scale with digital display will be needed, if a 13.6 kg (30 lb) refrigerant container is used.

2. Air Conditioning System

A: WIRING DIAGRAM

Refer to “Air Conditioning System” in the wiring diagram.

- Gasoline engine model
  – Manual A/C model: <Ref. to WI(w/o HEV)-45, MANUAL A/C MODEL, WIRING DIAGRAM, Air Conditioning System.>
  – Auto A/C model: <Ref. to WI(w/o HEV)-47, AUTO A/C MODEL, WIRING DIAGRAM, Air Conditioning System.>
- HEV model: <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

B: ELECTRICAL SPECIFICATION

Refer to “Auto A/C Control Module I/O Signal” of “HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)” section. <Ref. to AC(diag)-6, ELECTRICAL SPECIFICATION, Auto A/C Control Module I/O Signal.>

C: INSPECTION

Refer to “Basic Diagnostic Procedure” for “HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)” section. <Ref. to AC(diag)-2, Basic Diagnostic Procedure.>

D: NOTE

For procedure of each component in the air conditioning system, refer to the respective section.

- Blower motor unit assembly: <Ref. to AC-38, Blower Motor Unit Assembly.>
- Blower motor: <Ref. to AC-40, Blower Motor.>
- Power transistor (auto A/C model): <Ref. to AC-42, Power Transistor (Auto A/C Model).>
- Blower resistor (manual A/C model): <Ref. to AC-43, Blower Resistor (Manual A/C Model).>
- Control panel: <Ref. to AC-47, Control Panel.>
- Compressor: <Ref. to AC-50, Compressor.>
- Condenser: <Ref. to AC-54, Condenser.>
- Heater and cooling unit: <Ref. to AC-57, Heater and Cooling Unit.>
- Evaporator: <Ref. to AC-60, Evaporator.>
- Expansion valve: <Ref. to AC-64, Expansion Valve.>
- Hose & pipe: <Ref. to AC-66, Hose and Pipe.>
- Ambient sensor: <Ref. to AC-72, Ambient Sensor.>
- Sunload sensor (auto A/C model): <Ref. to AC-76, Sunload Sensor (Auto A/C Model).>
- In-vehicle sensor (auto A/C model) (gasoline engine model): <Ref. to AC-78, In-Vehicle Sensor (Auto A/C Model).>
- Evaporator sensor: <Ref. to AC-85, Evaporator Sensor.>
- Intake door actuator: <Ref. to AC-93, FRESH/RECIRC Door Actuator.>
- Mode door actuator: <Ref. to AC-96, Mode Door Actuator.>
- Air mix door actuator: <Ref. to AC-98, Air Mix Door Actuator.>
- Temperature and humidity sensor (HEV model): <Ref. to AC-82, Temperature and Humidity Sensor.>

3. Refrigerant Pressure with Manifold Gauge Set

A: PROCEDURE

1. REFRIGERANT GAS PRESSURE INSPECTION

1) Prepare the vehicle.

NOTE:
Check that the ambient temperature is 25 — 40°C (77 — 104°F) and that the humidity is 30% — 80%.
- Place the vehicle in the shade and windless condition, and open the front hood.
- Open the front windows and close all doors.

2) Check the refrigerant pressure.

Preparation tool:
Manifold gauge set

(1) Connect the manifold gauge set, and start the engine.
(2) Set the vehicle to the following conditions.

Item	Condition
Engine	Warmed up (Engine coolant temperature indicator light: OFF)
Air vent grille	Shutter is fully open.
A/C switch	ON
Temperature adjustment dial	LO (MAX COOL)
FRESH/RECIRC switch	RECIRC
Air flow control dial or switch	VENT
Fan dial	Auto A/C model: 5/7 level
	Manual A/C model: 3/4 level

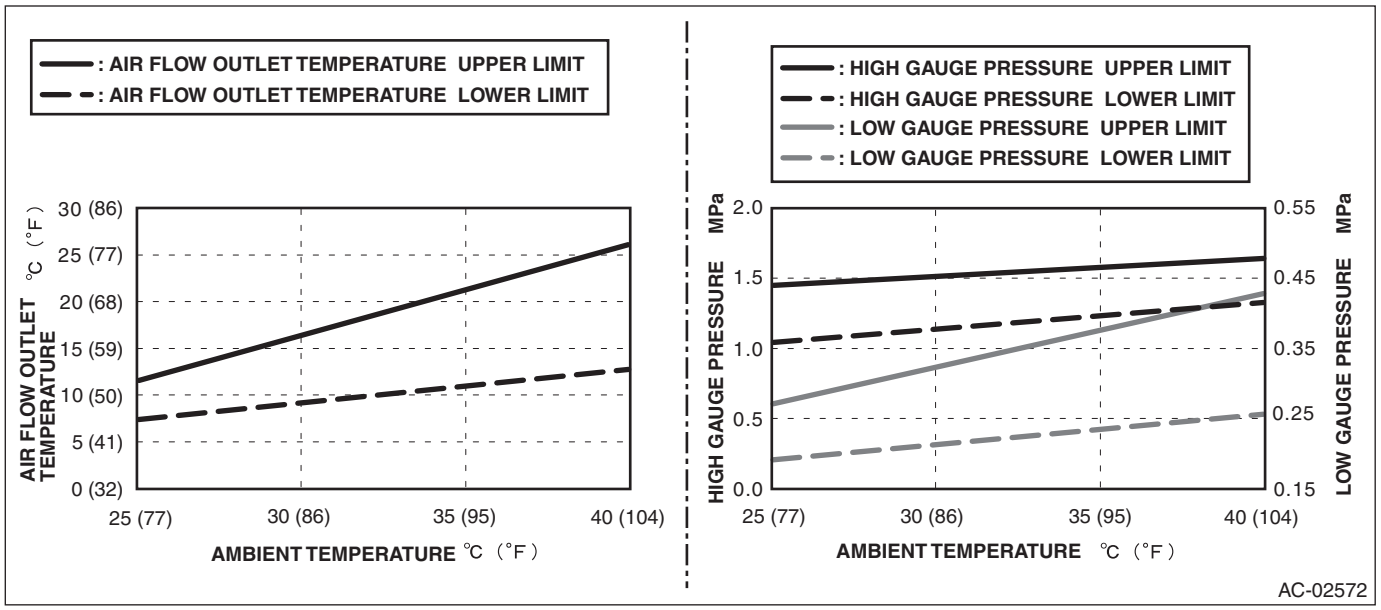
(3) In the condition of step (2), idle the engine for 30 minutes.
(4) Read the gauge values on both high pressure side and low pressure side for manifold gauge.

3) Measure the air vent grille outlet opening temperature, ambient temperature and humidity.

Preparation tool:
Thermometer and hygrometer

NOTE:
For outlet opening temperature, measure the average temperature of center grille assembly and side grille assembly.

4) Check that the high and low pressures and outlet opening temperature for ambient temperature and humidity is within the standard value described in the chart below.



5) Refer to “DIAGNOSIS WITH SYMPTOM” if the inspection result is not within the standard value. <Ref. to AC-25, INSPECTION WITH PRESSURE SYMPTOMS, INSPECTION, Refrigerant Pressure with Manifold Gauge Set.>

B: INSPECTION

1. INSPECTION WITH PRESSURE SYMPTOMS

Symptoms	Reference
Both high and low pressure sides are low.	<Ref. to AC-25, BOTH HIGH AND LOW PRESSURE SIDES ARE LOW, INSPECTION, Refrigerant Pressure with Manifold Gauge Set.>
Both high and low pressure sides are high.	<Ref. to AC-25, BOTH HIGH AND LOW PRESSURE SIDES ARE HIGH, INSPECTION, Refrigerant Pressure with Manifold Gauge Set.>
Both high and low pressure sides are equal, or high-pressure side is low.	<Ref. to AC-26, BOTH HIGH AND LOW PRESSURE SIDES ARE EQUAL, OR HIGH-PRESSURE SIDE IS LOW, INSPECTION, Refrigerant Pressure with Manifold Gauge Set.>
High-pressure side is high.	<Ref. to AC-26, HIGH-PRESSURE SIDE IS HIGH, INSPECTION, Refrigerant Pressure with Manifold Gauge Set.>
Low-pressure side is low.	<Ref. to AC-27, LOW-PRESSURE SIDE IS LOW, INSPECTION, Refrigerant Pressure with Manifold Gauge Set.>
Low-pressure side is high.	<Ref. to AC-27, LOW-PRESSURE SIDE IS HIGH, INSPECTION, Refrigerant Pressure with Manifold Gauge Set.>

2. BOTH HIGH AND LOW PRESSURE SIDES ARE LOW

	Step	Check	Yes	No
1	**CHECK REFRIGERANT LEAKAGE.** Check the refrigerant for leakage. <Ref. to AC-33, INSPECTION, Refrigerant Leak Check.> NOTE: When the pressure on the high-pressure side is less than 0.69 Mpa: Go to Step 2.	Are there any refrigerant leakage?	Repair the refrigerant leakage.	Go to step **2**.
2	**FILL PROPER AMOUNT OF REFRIGERANT.** Drain the refrigerant completely, and then refill the proper amount of refrigerant. • Recovery: <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.> • Refill: <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>	Is the refrigerant pressure within the specified range?	Refrigerant pressure is normal.	Perform appropriate inspection with pressure symptoms.

3. BOTH HIGH AND LOW PRESSURE SIDES ARE HIGH

	Step	Check	Yes	No
1	**FILL PROPER AMOUNT OF REFRIGERANT.** Drain the refrigerant completely, and then refill the proper amount of refrigerant. • Recovery: <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.> • Refill: <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>	Is the refrigerant pressure within the specified range?	Refrigerant pressure is normal.	Perform appropriate inspection with pressure symptoms.

4. BOTH HIGH AND LOW PRESSURE SIDES ARE EQUAL, OR HIGH-PRESSURE SIDE IS LOW

	Step	Check	Yes	No
1	**CHECK REFRIGERANT LEAKAGE.** Check the refrigerant for leakage. <Ref. to AC-33, INSPECTION, Refrigerant Leak Check.> NOTE: When the pressure on the high-pressure side is less than 0.69 Mpa: Go to Step 2.	Are there any refrigerant leakage?	Repair the refrigerant leakage.	Go to step **2**.
2	**FILL PROPER AMOUNT OF REFRIGERANT.** Drain the refrigerant completely, and then refill the proper amount of refrigerant. • Recovery: <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.> • Refill: <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>	Is the refrigerant pressure within the specified range?	Refrigerant pressure is normal.	Inspect the compressor. <Ref. to AC(diag)-26, COOL AIR DOES NOT COME OUT WHEN PRESSING THE A/C SWITCH. FOG CANNOT BE CLEARED. (COMPRESSOR DOES NOT OPERATE.), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

5. HIGH-PRESSURE SIDE IS HIGH

	Step	Check	Yes	No
1	**CHECK CONDENSER.** Check the condenser. <Ref. to AC-56, INSPECTION, Condenser.>	Is condenser normal?	Go to step **2**.	Clean or replace the condenser.
2	**CHECK RADIATOR FAN.** Check the radiator fan system. <Ref. to CO(H4DO(w/o HEV))-10, Radiator Fan System.>	Is radiator fan system normal?	Go to step **3**.	Repair or replace the faulty parts of the radiator fan system.
3	**FILL PROPER AMOUNT OF REFRIGERANT.** Drain the refrigerant completely, and then refill the proper amount of refrigerant. • Recovery: <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.> • Refill: <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>	Is the refrigerant pressure within the specified range?	Refrigerant pressure is normal.	Check the high-pressure hose and condenser for deformation or clogging, and replace if defective.

6. LOW-PRESSURE SIDE IS LOW

	Step	Check	Yes	No
1	**CHECK REFRIGERANT LEAKAGE.** Check the refrigerant for leakage. <Ref. to AC-33, INSPECTION, Refrigerant Leak Check.> NOTE: When the pressure on the high-pressure side is less than 0.69 Mpa: Go to Step 2.	Are there any refrigerant leakage?	Repair the refrigerant leakage.	Go to step **2**.
2	**FILL PROPER AMOUNT OF REFRIGERANT.** Drain the refrigerant completely, and then refill the proper amount of refrigerant. • Recovery: <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.> • Refill: <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>	Is the refrigerant pressure within the specified range?	Refrigerant pressure is normal.	Go to step **3**.
3	**REPLACE EXPANSION VALVE.** Replace the expansion valve. <Ref. to AC-64, REMOVAL, Expansion Valve.>	Is the refrigerant pressure within the specified range?	Refrigerant pressure is normal.	Inspect the compressor. <Ref. to AC(diag)-26, COOL AIR DOES NOT COME OUT WHEN PRESSING THE A/C SWITCH. FOG CANNOT BE CLEARED. (COMPRESSOR DOES NOT OPERATE.), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

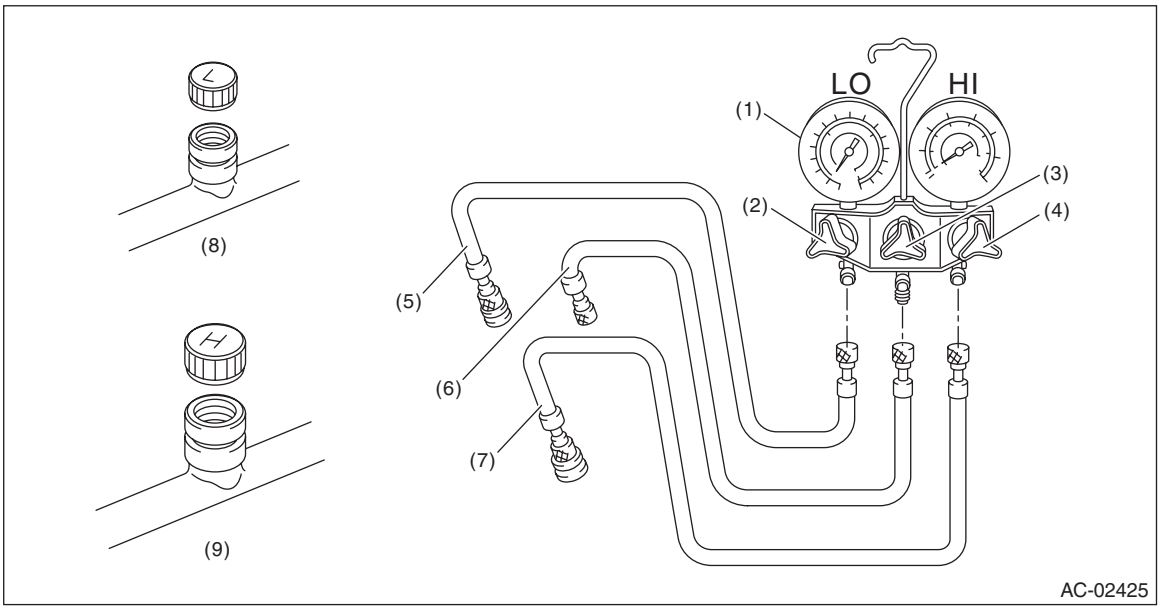
7. LOW-PRESSURE SIDE IS HIGH

	Step	Check	Yes	No
1	**FILL PROPER AMOUNT OF REFRIGERANT.** Drain the refrigerant completely, and then refill the proper amount of refrigerant. • Recovery: <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.> • Refill: <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>	Is the refrigerant pressure within the specified range?	Refrigerant pressure is normal.	Go to step **2**.
2	**REPLACE EXPANSION VALVE.** Replace the expansion valve. <Ref. to AC-64, REMOVAL, Expansion Valve.>	Is the refrigerant pressure within the specified range?	Refrigerant pressure is normal.	Replace the evaporator. <Ref. to AC-60, REMOVAL, Evaporator.>

4. Refrigerant Recovery Procedure

A: PROCEDURE

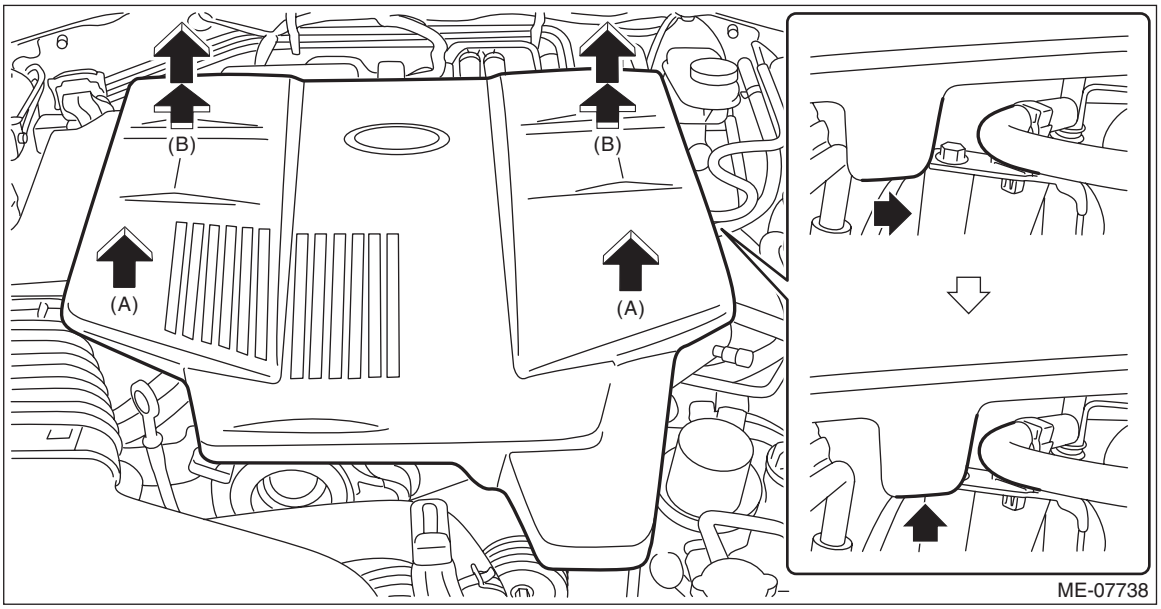
CAUTION:
• During operation, be sure to wear protective goggles and protective gloves.
• Connect the refrigerant recovery system with the manifold gauge set to discharge the refrigerant from the A/C system and recycle the gas.
• When recycling the discharged refrigerant, keep service cans on hand. Because the recovery rate with the recovery system is approx. 90%, service cans are necessary to charge the refrigerant.
• Follow the detailed operation procedure described in the operation manual attached to the refrigerant recovery system.



(1) Manifold gauge
(2) Low pressure valve
(3) Center valve
(4) High pressure valve
(5) Low-pressure hose
(6) Center manifold hose (vacuum pump and charge)
(7) High-pressure hose
(8) Low-pressure side service port
(9) High-pressure side service port

1) Perform compressor oil return operation. <Ref. to AC-37, PROCEDURE, Compressor Oil.>
2) Turn the ignition switch to OFF.
3) Remove the collector cover. (HEV model)
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



4) Attach the manifold gauge set.

Preparation tool:
Manifold gauge set
(1) Check that all valves are fully closed.
(2) Install the low/high pressure hoses to the service ports on the low/high pressure sides of the vehicle respectively.

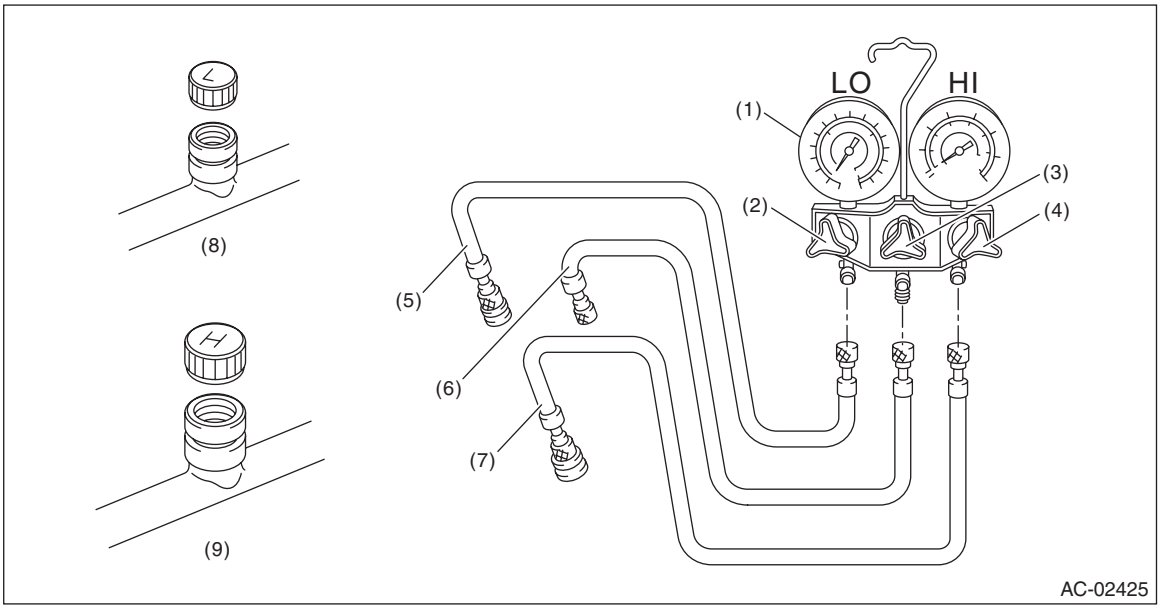
CAUTION:
Confirm that the connections are secure.
(3) Connect the center hose to the refrigerant recovery system.

Preparation tool:
Refrigerant recovery system
5) Follow the operation manual attached to the refrigerant recovery system to collect the refrigerant.

5. Refrigerant Charging Procedure

A: PROCEDURE

CAUTION:
- **While working, be sure to wear protective goggles and protective gloves.**
- **Air in the cycle can cause insufficient air conditioning, and water in the cycle can cause clogging in the cycle (icing) and rust. To remove this air and water content, use a vacuum pump to perform evacuation before filling with refrigerant. By making the inside of the cycle a vacuum, the water content will evaporate even at normal temperatures, and can be removed.**



(1)	Manifold gauge	(4)	High pressure valve	(7)	High-pressure hose
(2)	Low pressure valve	(5)	Low-pressure hose	(8)	Low-pressure side service port
(3)	Center valve	(6)	Center manifold hose (vacuum pump and charge)	(9)	High-pressure side service port

1) Attach the manifold gauge set.

Preparation tool:
Manifold gauge set
(1) Check that all valves are fully closed.
(2) Install the low/high pressure hoses to the service ports on the low/high pressure sides of the vehicle respectively.

CAUTION:
Confirm that the connections are secure.
(3) Connect the center manifold hose of the manifold gauge to the vacuum pump.

Preparation tool:
Vacuum pump
2) Perform evacuation.

CAUTION:
Make sure to perform evacuation using a vacuum pump.
(1) Open the low-pressure valve, high-pressure valve and center valve.
(2) Operate the vacuum pump.
(3) Perform evacuation for 5 minutes or more, and when the low pressure gauge needle reaches -0.1 MPa (-1.0 kgf/cm^2, –14 psi), close the center manifold hose valve, and stop the vacuum pump.

(4) Leave alone for 5 to 10 minutes after closing the low pressure side and high pressure side valves, and check whether there is any change in the low pressure gauge needle indication.
If the needle position changes, this indicates a leak. Check the pipe and hose connections, and repair the location with the problem.
After repair, retry charging the refrigerant from the step 1).
(5) If there is no leakage, continue evacuation for additional 20 — 30 minutes, close all valves and then stop the vacuum pump.

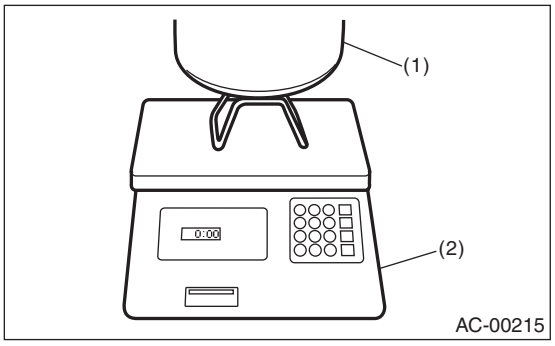
3) Charge refrigerant.
(1) Follow the can tap operation manual to attach it to the refrigerant can.

Preparation tool:
Can tap

(2) Disconnect the center manifold hose from the vacuum pump, and connect the hose to the tap valve.

Preparation tool:
Weight scale

NOTE:
When 13.6 kg (30 lb) refrigerant container (1) is used, measure the amount of refrigerant with a refrigerant charging scale (2), and connect with the center manifold hose.



(3) Open the tap valve of HFC-134a supply container (refrigerant can or refrigerant container).
(4) Loosen the center manifold hose connection on the manifold gauge for a few seconds (if there is a purge valve on the manifold gauge, push this instead) to allow the air in the center manifold hose to be bled by the refrigerant pressure.
(5) Open the low-pressure side and high-pressure side valves of the manifold gauge to fill with refrigerant.

NOTE:
If the HFC-134a supply container is empty, close all manifold gauge valves and the tap valve of HFC-134a supply container, and replace the empty supply container with a new one. After replacing with a new HFC-134a supply container, perform air purge, and resume the filling operation.

(6) If the low pressure gauge indicates approximately 0.2 MPa (2.0 kgf/cm^2, 29 psi) or refrigerant filling efficiency drops, close the low-pressure side valve and high-pressure side valve.
(7) Check that the low-pressure side valve and high-pressure side valve are closed, turn off the A/C switch and start the engine.

CAUTION:
When filling with the engine running, do not open the high pressure side valve. Always fill from the low pressure side.

(8) To prevent damage to the compressor, push the A/C switch ON-OFF quickly a few times.
(9) Set the vehicle to the following conditions.

Item	Condition
Engine speed	1,500 r/min
A/C switch	ON
Temperature adjustment dial	LO (MAX COOL)
Fan dial	HI (MAX)
FRESH/RECIRC switch	RECIRC
Air flow control dial or switch	VENT
Window	OPEN

(10) Open the low-pressure side valve, check the refrigerant pressure with a manifold gauge and fill with refrigerant up to the specified amount. <Ref. to AC-25, INSPECTION WITH PRESSURE SYMPTOMS, INSPECTION, Refrigerant Pressure with Manifold Gauge Set.>

4) Using an electronic leak detector (leak tester), check for refrigerant leaks in the system. <Ref. to AC-33, INSPECTION, Refrigerant Leak Check.>
5) After filling with refrigerant, close all valves and remove the manifold gauge set.
6) Attach cap to the service port of the low-pressure side and high-pressure side.

6. Refrigerant Leak Check

A: INSPECTION

1) Attach the manifold gauge set.

Preparation tool:

Manifold gauge set

(1) Check that all valves are fully closed.

(2) Install the low/high pressure hoses to the service ports on the low/high pressure sides of the vehicle respectively.

CAUTION:

Confirm that the connections are secure.

(3) Start the engine, operate the A/C system for approx. 10 minutes, and check that the high-pressure side indicates 0.69 MPa (7.0 kgf/cm^2, 100 psi) or more.

2) Turn the ignition switch to OFF to start the leak test.

Preparation tool:

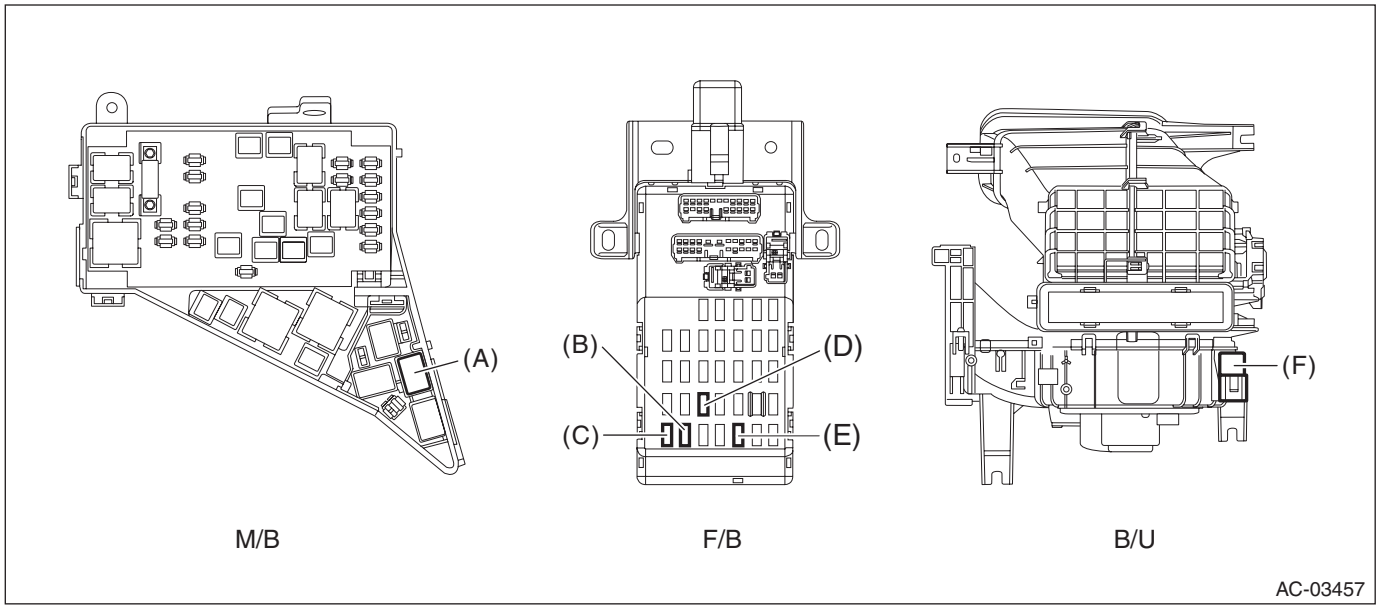
Electronic leak detector (leak tester)

Items	Condition	Corrective action
Pipe	Check the connections of pipe and expansion valve.	Check the O-ring at connection and tightening torque. If necessary, replace each part.
	Check the connection between pressure switch or pressure sensor and high-pressure pipe.	Replace the pressure switch or pressure sensor.
	Check the connection between pipe and condenser.	Check the O-ring at connection and tightening torque. If necessary, replace each part.
Condenser	Check the welded part of condenser and core.	Replace the condenser.
Hose (high-pressure)	Check the connection between hose (high-pressure) and compressor.	Check the O-ring at connection and tightening torque. If necessary, replace each part.
	Check the connection between hose (high-pressure) and condenser.	Check the O-ring at connection and tightening torque. If necessary, replace each part.
	Check the rubber part of the flexible hose and pipe seam. **CAUTION:** **Carefully check the external surface of flexible hoses and pipes at approx. 25 mm (0.98 in) per second.**	Replace the hose (high pressure).
	Check the valve and cap in the service port.	Check the rubber seal of the valve and cap. If necessary, replace valve or cap.
Compressor	Check the compressor pulley and vicinity of shaft seal. **CAUTION:** **Some shaft seals will show a slight amount of leakage, about 3 g (0.1 oz) per year. This is not a problem.**	Replace the compressor.
Hose (low-pressure)	Check the connection between hose (low pressure) and expansion valve.	Check the O-ring at connection and tightening torque. If necessary, replace each part.
	Check the connection between hose (low pressure) and compressor.	Check the O-ring at connection and tightening torque. If necessary, replace each part.
	Check the rubber part of the flexible hose and pipe seam. **CAUTION:** **Carefully check the external surface of flexible hoses and pipes at approx. 25 mm (0.98 in) per second.**	Replace the hose (low pressure).
	Check the valve and cap in the service port.	Check the rubber seal of the valve and cap. If necessary, replace valve or cap.

Items	Condition	Corrective action
Evaporator	Remove the drain hose from the heater case, and check the end part for 10 seconds or more.	Replace the evaporator.
	Check the air vent grille. NOTE: Turn the ignition switch to ON, and run the blower at high speed for approx. 1 minute. Stop the blower to check the air vent grille on the instrument panel. While moving the tester closer to the grille, run the blower for 1 or 2 seconds, then stop it. Check the grille at that position for at least 10 seconds.	Replace the evaporator.

7. Relay and Fuse

A: LOCATION



Main fuse box	A/C relay	(A)
Relay & fuse box	Fuse 15 A (blower motor relay)	(B)
	Fuse 15 A (blower motor relay)	(C)
	Fuse 7.5 A (A/C control panel, A/C relay, sub fan relay, pressure switch and blower motor relay)	(D)
	Fuse 7.5 A (A/C control panel)	(E)
Blower motor unit	Blower motor relay	(F)

NOTE:
For other related fuses, refer to the wiring diagram. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- Gasoline engine model: <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model: <Ref. to WI(HEV)-21, Power Supply Circuit.>

B: INSPECTION

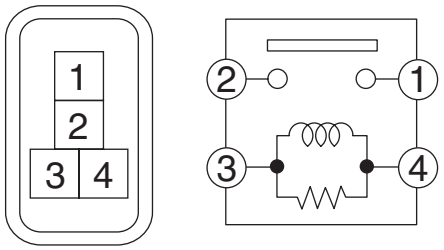
1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

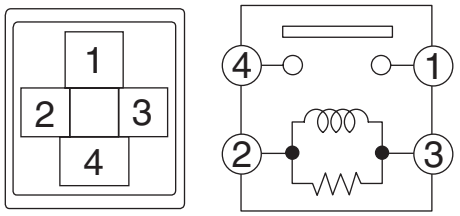
NOTE:
If the fuse is blown again, check the system wiring harness.

2. CHECK RELAY

1) Check the resistance between relay terminals.
- A/C relay

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01273
1 — 2	Apply battery voltage between terminals 4 and 3.	Less than 1 Ω	

- Blower motor relay

Terminal No.	Inspection conditions	Standard	Circuit
1 — 4	Always	1 MΩ or more	 AC-02796
1 — 4	Apply battery voltage between terminals 2 and 3.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard.

8. Compressor Oil

A: PROCEDURE

NOTE:
Before making repairs, perform the oil return operation to return the compressor oil in circulation with the refrigerant to the compressor assembly.
1) Increase the engine speed to 1,500 r/min.
2) Turn the A/C switch to ON.
3) Turn the temperature control dial to LO (MAX COOL).
4) Turn the FRESH/RECIRC switch to RECIRC position.
5) Turn the fan dial to HI (MAX).
6) Leave in this condition for 10 minutes.

B: ADJUSTMENT

- If a component has been replaced, add an appropriate amount of compressor oil (same as the amount of remaining oil in removed component).
- When replacing the compressor assembly, the new compressor assembly will already have the specified amount of oil in it. Adjust the oil amount (so that the amount remains the same as that of the removed compressor assembly) and install the new compressor assembly.

NOTE:
Since the hygroscopicity of compressor oil is high, perform this series of works quickly.

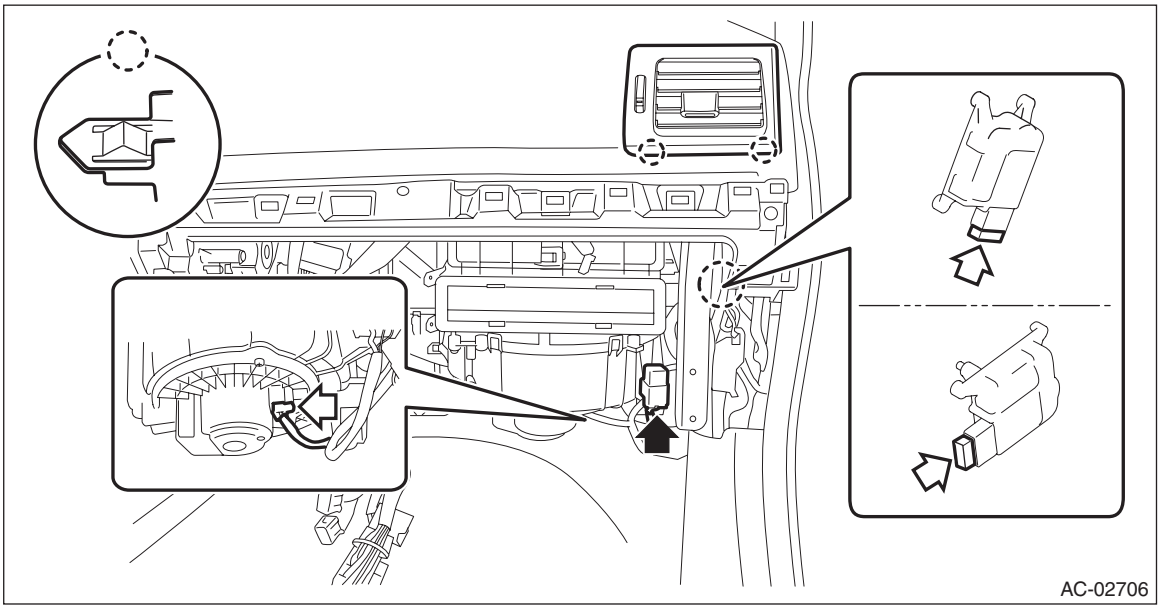
9. Blower Motor Unit Assembly

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

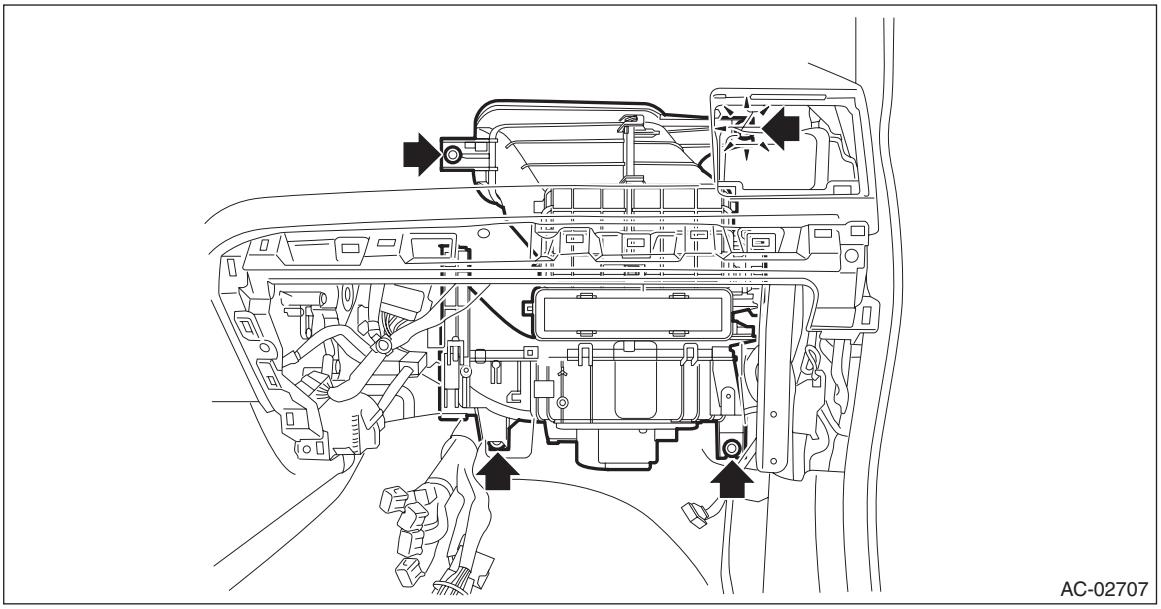
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the engine control module (ECM).
- Gasoline engine model: <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).>
- HEV model: <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).>

4) Remove the blower motor unit assembly.
   (1) Release the claws, and then remove the grille assembly - ventilation RH.
   (2) Disconnect the blower motor relay and each connector.



(3) Remove the bolts and nuts to remove blower motor unit assembly.

NOTE:
Remove the RH upper nut from the mounting portion of the grille assembly - ventilation RH.



B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• After installing the grille assembly - ventilation RH, check that the air vent grille of the grille assembly - ventilation RH is inserted correctly into the air vent duct.
Install each part in the reverse order of removal.

Tightening torque:
Blower motor unit: <Ref. to AC-9, BLOWER MOTOR UNIT, COMPONENT, General Description.>

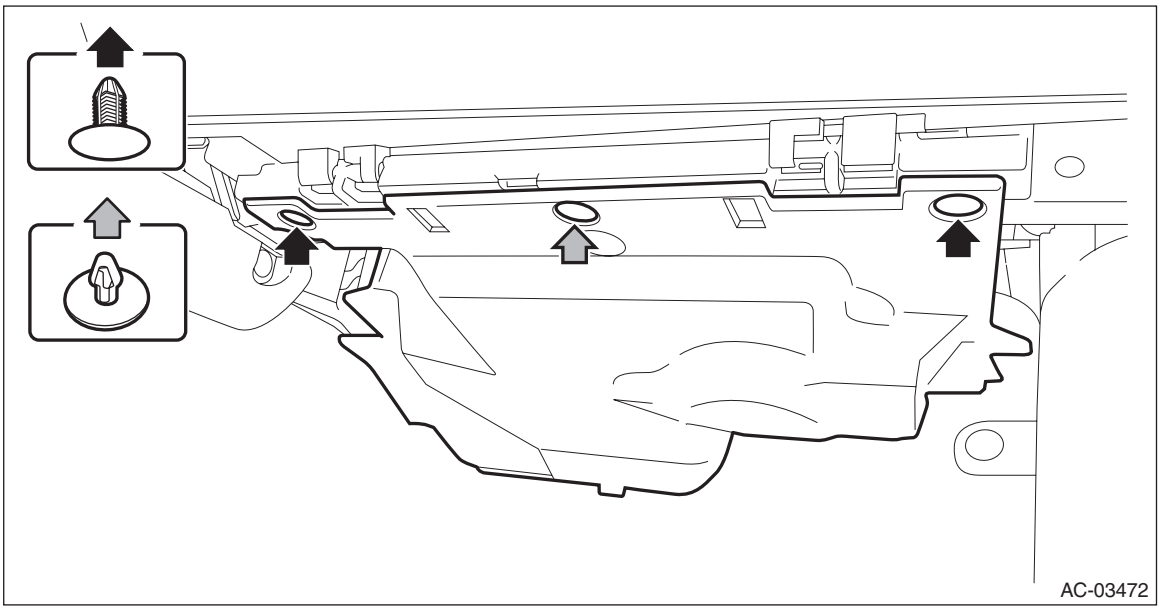
10.Blower Motor

A: REMOVAL

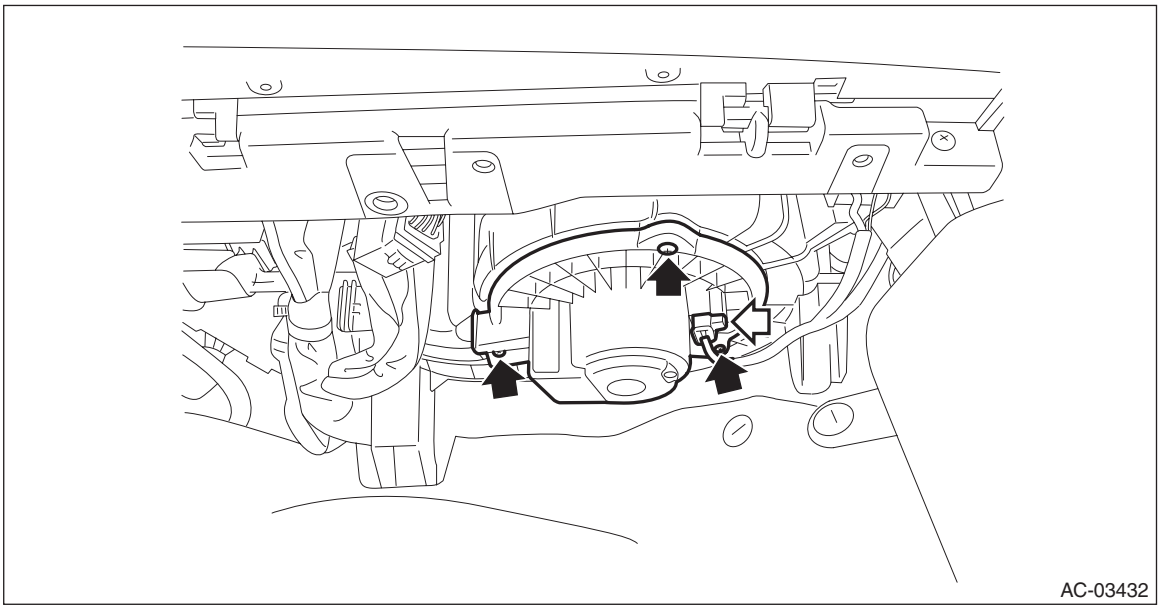
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Release the clips, and remove the under cover assembly - passenger.



3) Remove the blower - motor.
   (1) Disconnect the connector.
   (2) Remove the screws and detach the blower - motor.

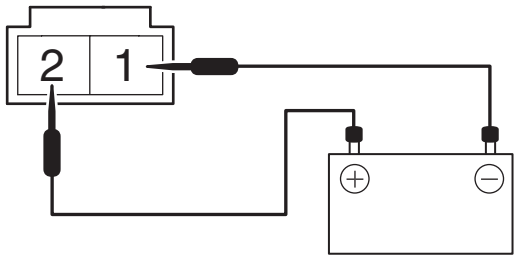


B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Check the motor operation when battery voltage is applied between the terminals of motor.

Terminal No.	Inspection conditions	Specification	Connection diagram
2 (+) — 1 (–)	Connect battery to the terminals	Rotation	 AC-02797

2) If it does not operate normally, replace the blower - motor.

11.Power Transistor (Auto A/C Model)

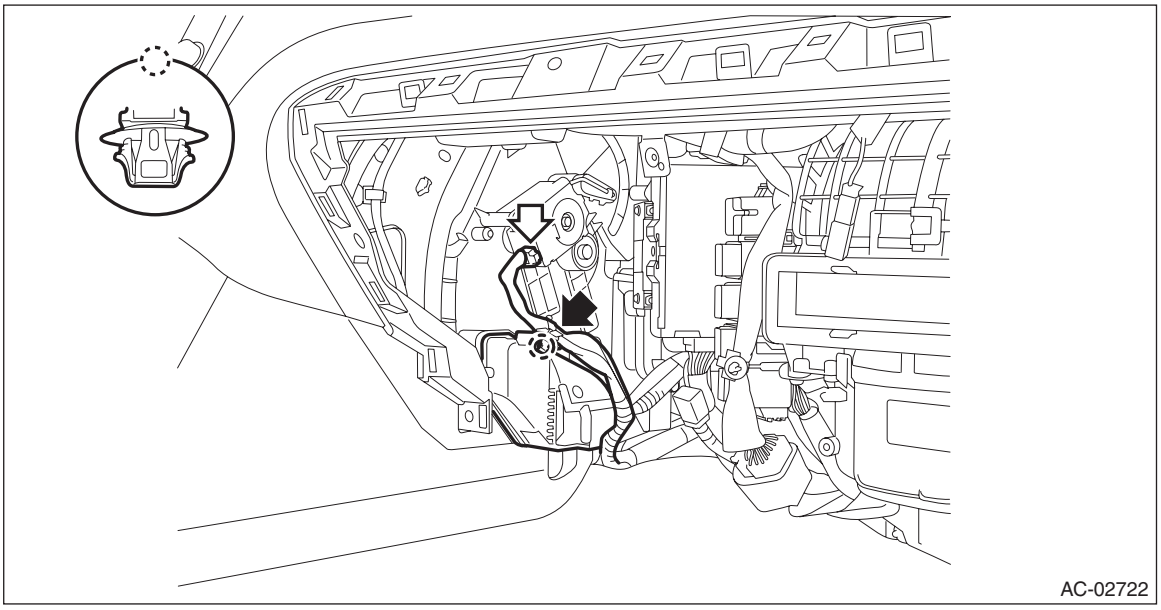
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

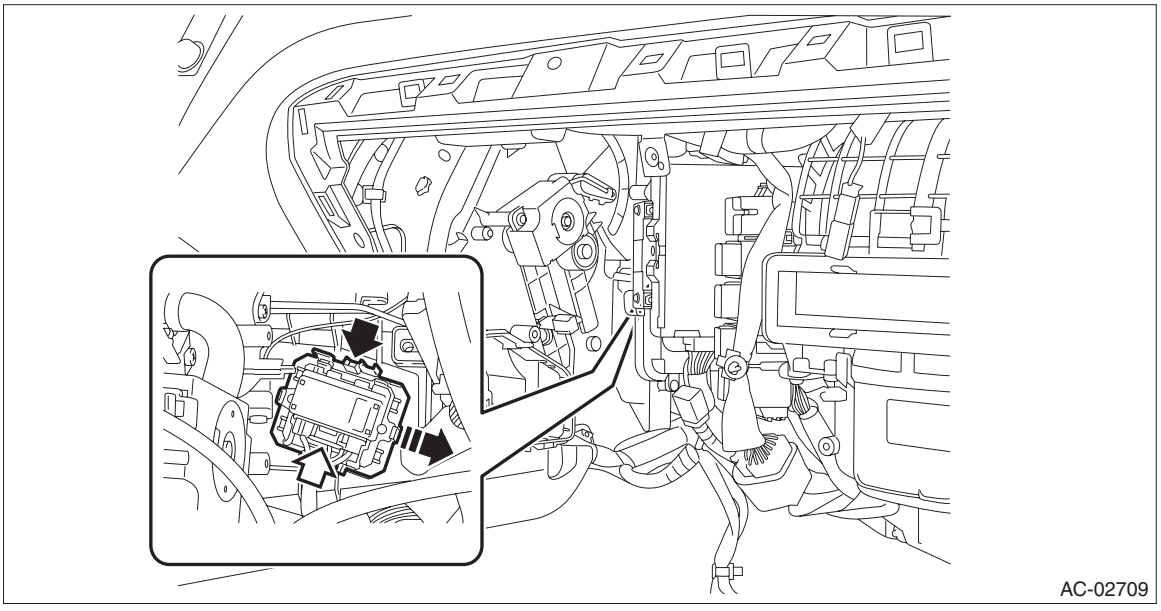
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the screws and remove the duct - foot RH.

NOTE:
Remove the connector and harness clip of the motor - actuator mix RH, and move the harness aside.



4) Remove the power transistor.
   (1) Disconnect the connector.
   (2) Remove the power transistor while pressing the power transistor claw part and sliding it.



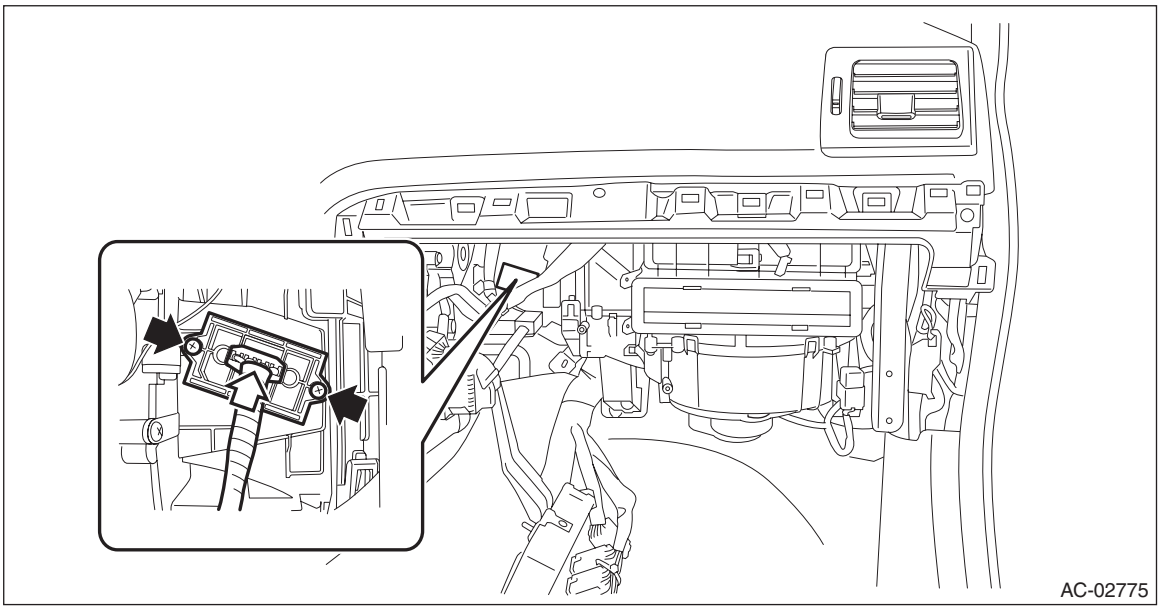
B: INSTALLATION

Install each part in the reverse order of removal.

12.Blower Resistor (Manual A/C Model)

A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the engine control module (ECM). <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).>
4) Remove the resistor.
   (1) Disconnect the connector.
   (2) Remove the screw and remove the resistor.



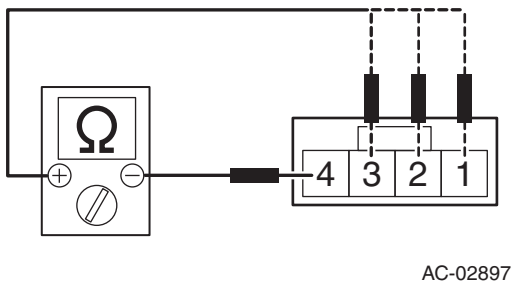
B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Check the resistance between resistor terminals.

Preparation tool:
Circuit tester

Terminal No.	Standard	Connection diagram
4 — 3	Approx. 0.43 Ω	
4 — 2	Approx. 1.03 Ω	
4 — 1	Approx. 3 Ω	

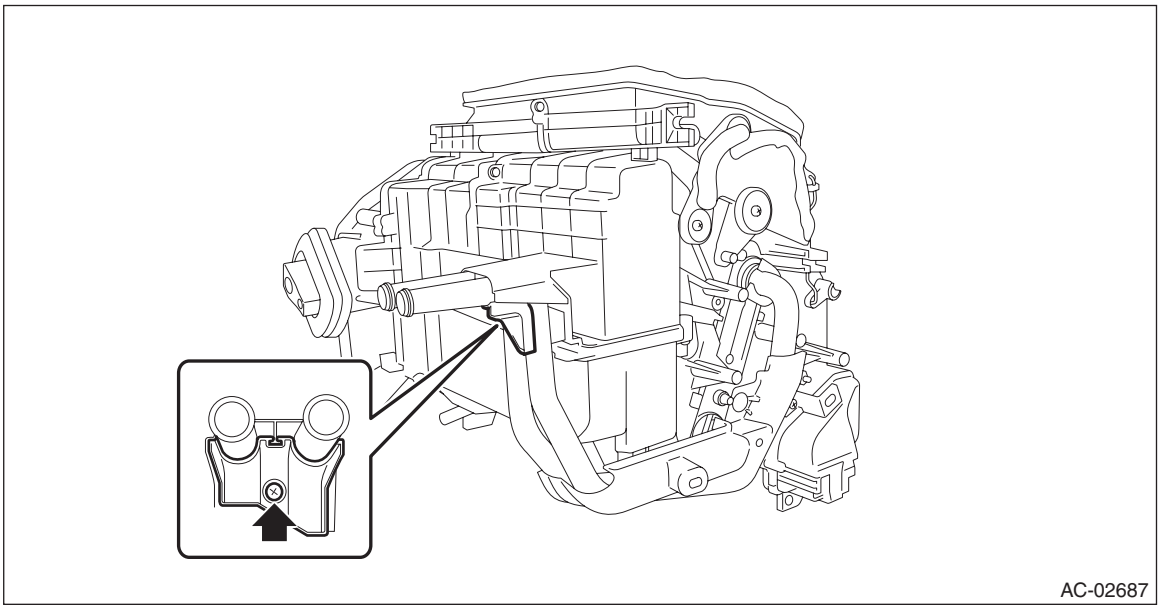
2) Replace the resistor if the inspection result is not within the standard.

13.Heater Core

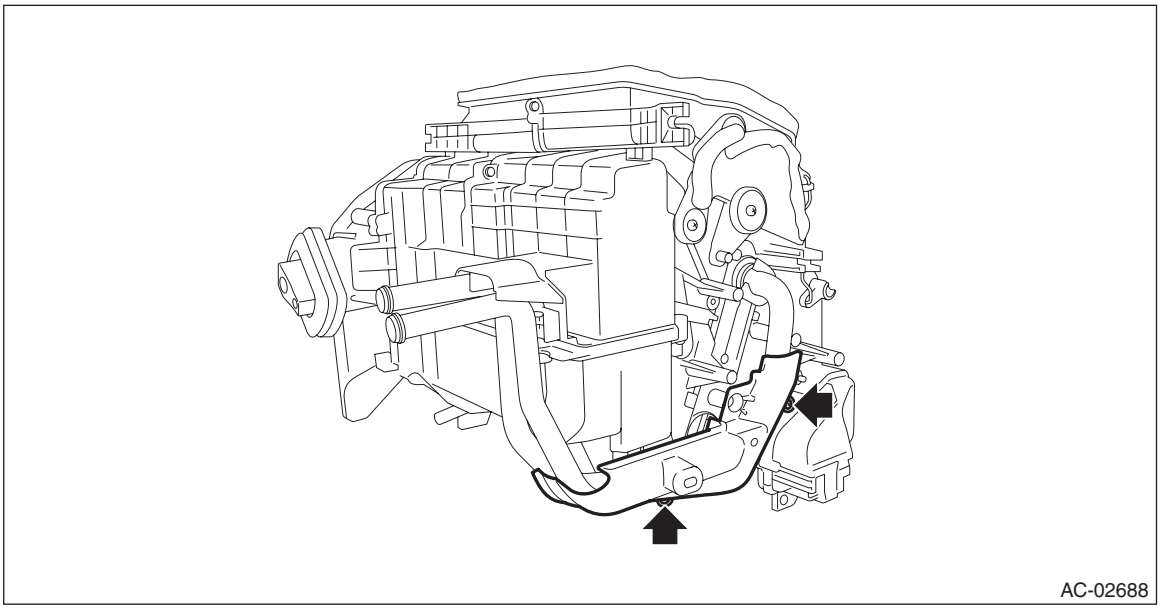
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

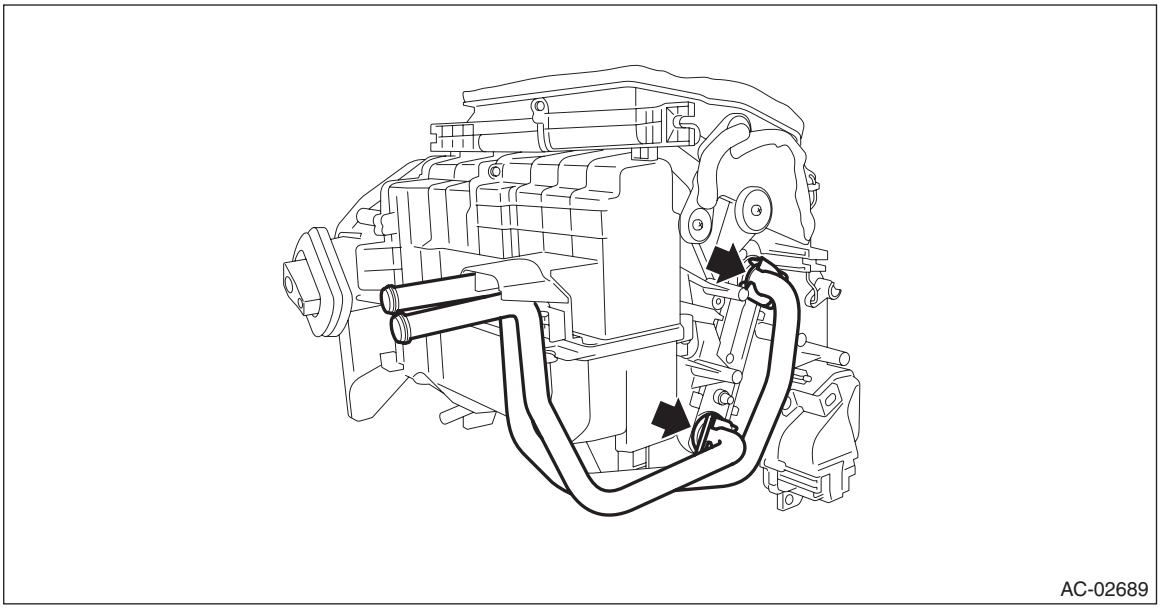
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Drain the coolant from the radiator. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
4) Remove the heater and cooling unit assembly. <Ref. to AC-57, REMOVAL, Heater and Cooling Unit.>
5) Remove the heater core.
(1) Remove the screw and detach the clamp - pipe.


AC-02687

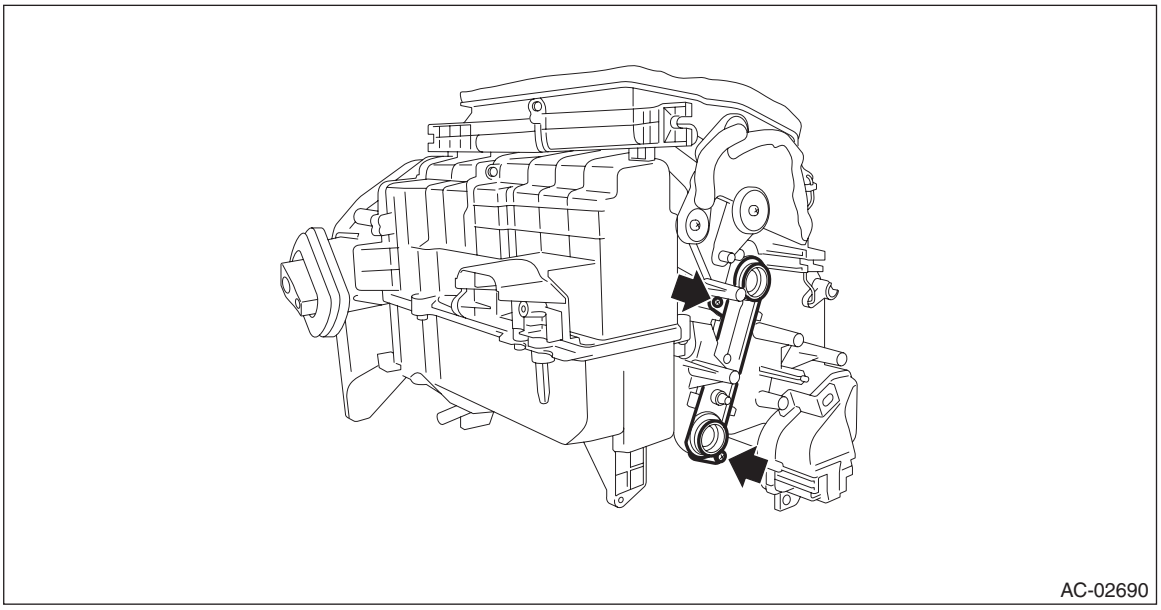
(2) Remove the screws and detach the cover - heater pipe.



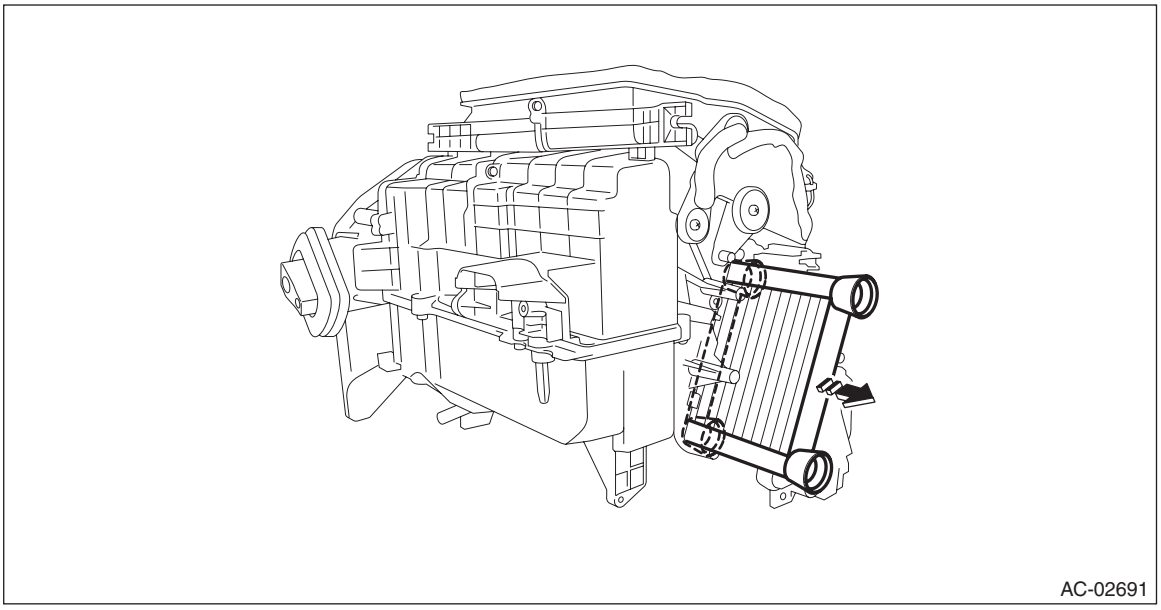
(3) Remove the clamp, and remove the pipe - inlet and outlet.



(4) Remove the screws and detach the plate - heater core.


AC-02690

(5) Pull out the heater core from the case - heater unit.


AC-02691

B: INSTALLATION

CAUTION:
- **Replace O-rings and clamps with new parts and install securely.**
- **Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>**

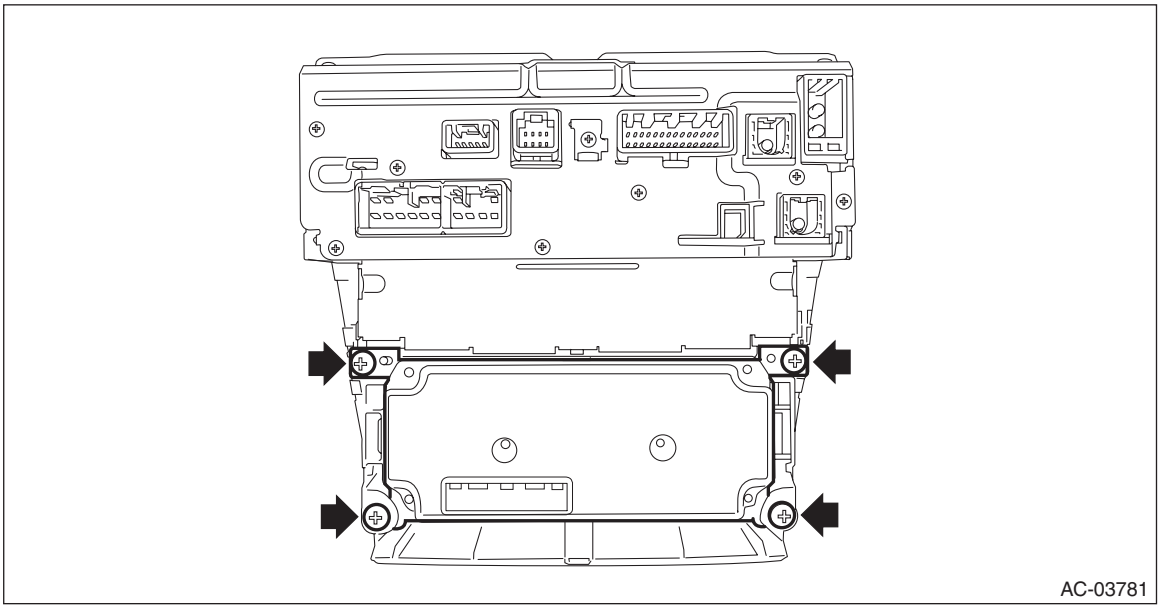
1) Install each part in the reverse order of removal.
2) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
3) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>

14.Control Panel

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
5) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
6) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
7) Remove the screws to remove the heater control assembly.



NOTE:
For manual A/C model, refer to the instructions above to remove.

B: INSTALLATION

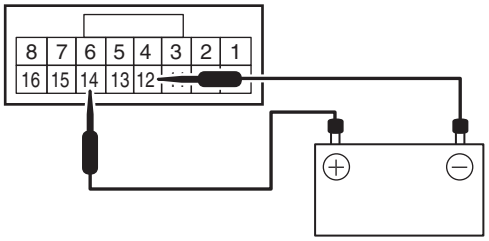
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
Install each part in the reverse order of removal.

C: INSPECTION

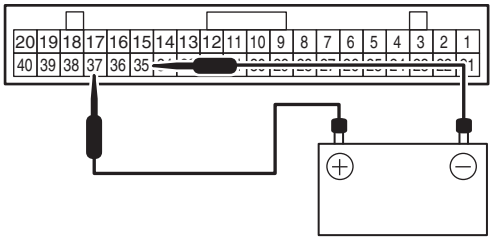
1. CHECK ILLUMINATION

1) Check the illumination operation when battery voltage is applied between the terminals of control panel.

- Manual A/C model

Terminal No.	Inspection conditions	Specification	Connection diagram
14 (+) — 12 (–)	Connect battery to the terminals	Light ON	 AC-02733

- Auto A/C model

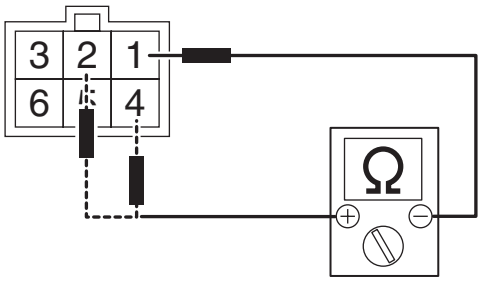
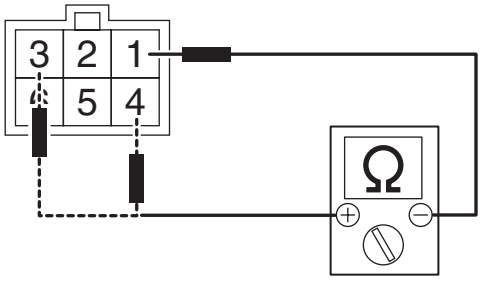
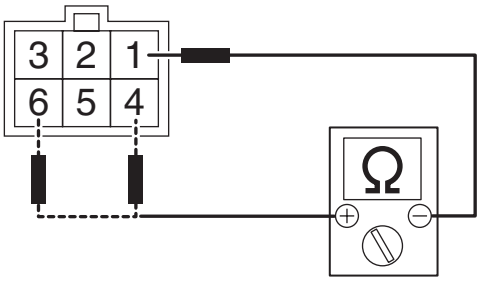
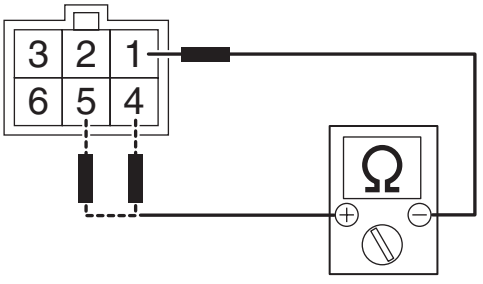
Terminal No.	Inspection conditions	Specification	Connection diagram
37 (+) — 35 (–)	Connect battery to the terminals	Light ON	 AC-02734

2) If it does not operate normally, replace the heater control assembly.

2. BLOWER SWITCH (MANUAL A/C MODEL)

1) Measure the resistance between the control panel terminals.

Preparation tool:
Circuit tester

Terminal No.	Inspection conditions	Standard	Connection diagram
—	OFF	—	—
1 — 2, 4	1 (LO)	Less than 1 Ω	 AC-02798
1 — 3, 4	2 (M1)	Less than 1 Ω	 AC-02799
1 — 4, 6	3 (M2)	Less than 1 Ω	 AC-02800
1 — 4, 5	4 (HI)	Less than 1 Ω	 AC-02801

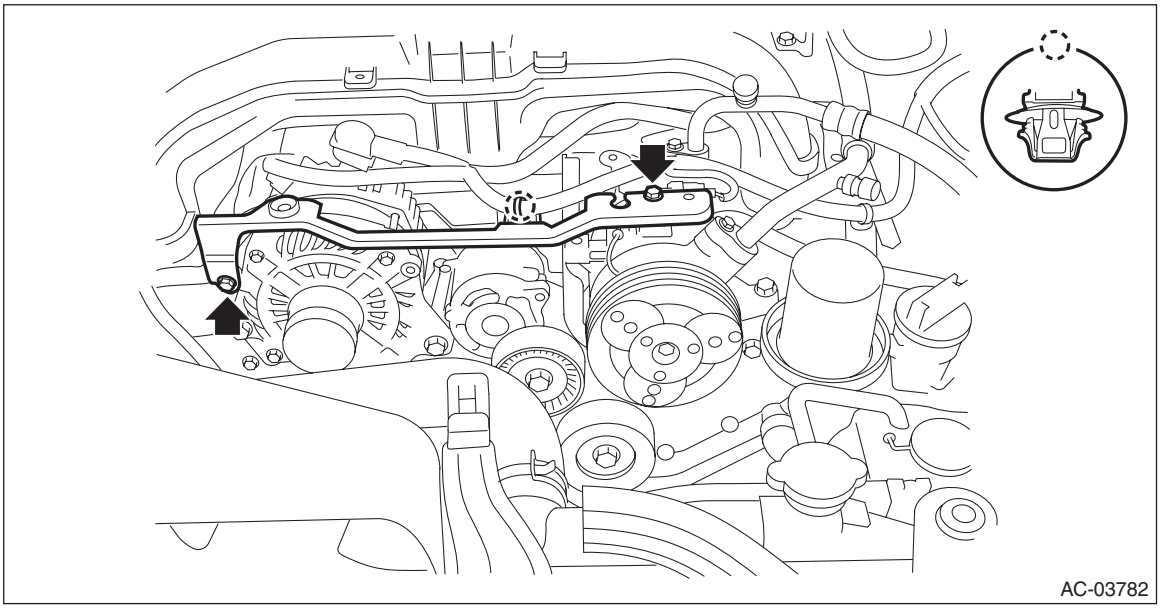
2) Replace the heater control assembly if the inspection result is not within the standard.

15.Compressor

A: REMOVAL

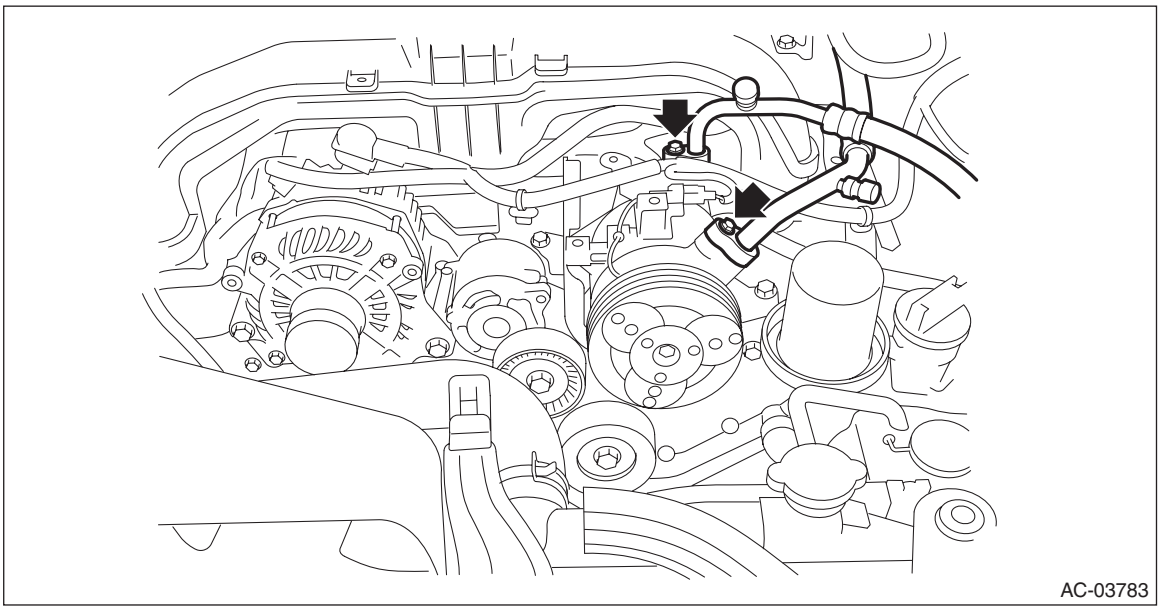
1. GASOLINE ENGINE MODEL

1) Perform compressor oil return operation. <Ref. to AC-37, PROCEDURE, Compressor Oil.>
2) Turn the A/C switch to OFF, and turn the ignition switch to OFF.
3) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
4) Disconnect the ground cable from battery.
5) Remove the V-belts. <Ref. to ME(H4DO(w/o HEV))-124, REMOVAL, V-belt.>
6) Remove the harness clips and bolts and remove the V-belt cover bracket.


AC-03782

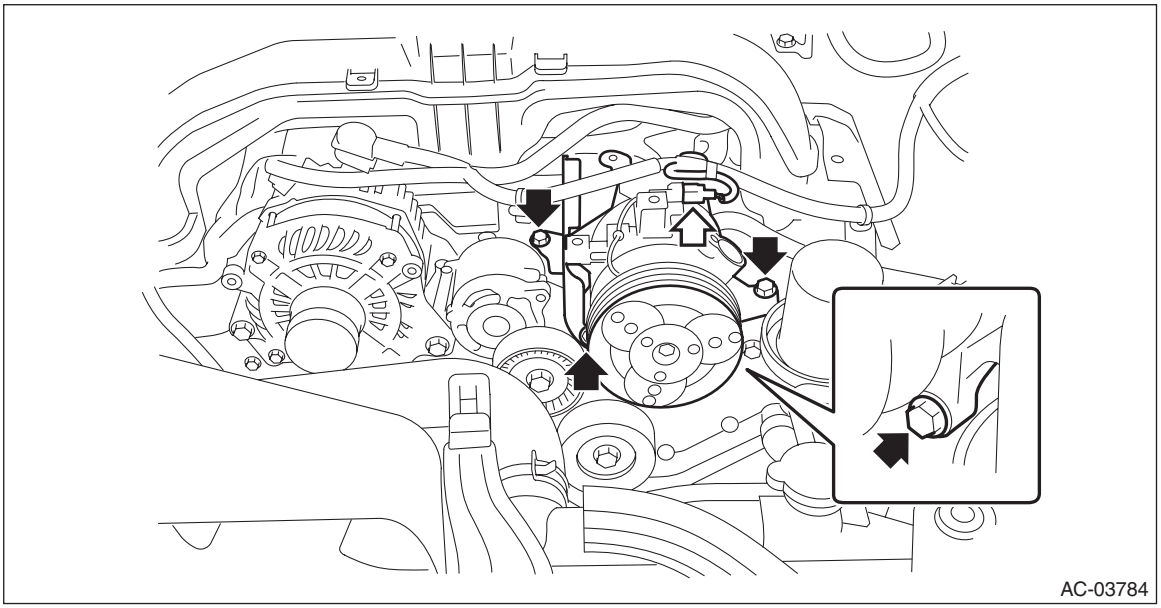
7) Remove the bolt, and detach the hose - pressure suction and the hose - pressure discharge.

CAUTION:
Seal the disconnected hose and engaging part of compressor with a plug or vinyl tape to prevent foreign matter from entering.


AC-03783

8) Remove the compressor assembly.
(1) Disconnect the connector.
(2) Remove the bolts and remove the compressor assembly.

NOTE:
Tighten the engine hanger together with the compressor assembly.



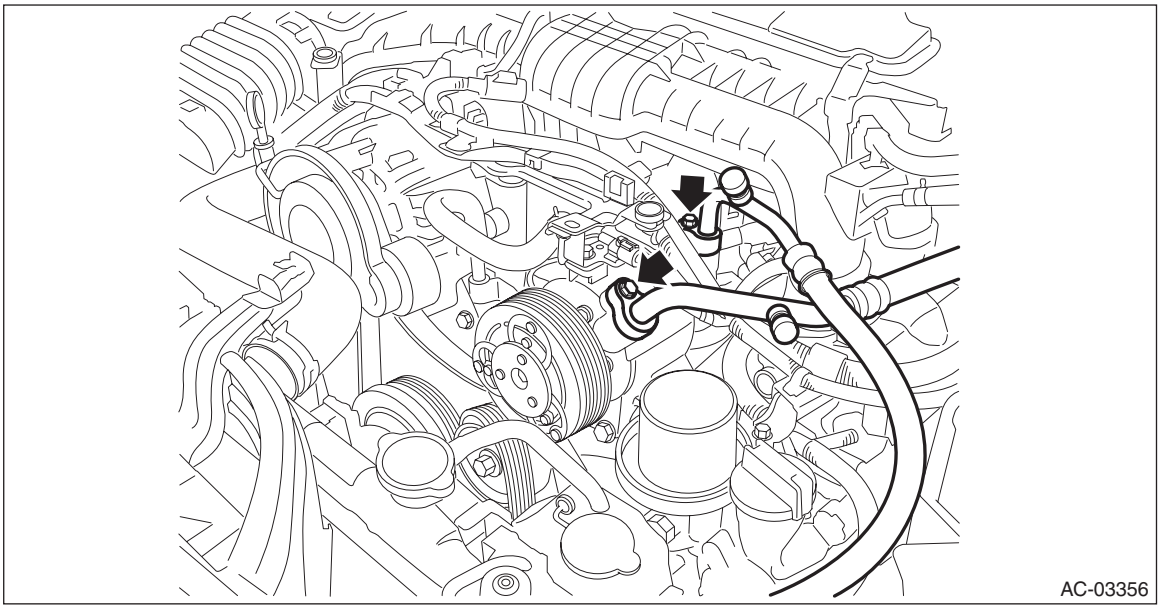
2. HEV MODEL

1) Perform compressor oil return operation. <Ref. to AC-37, PROCEDURE, Compressor Oil.>
2) Turn the A/C switch to OFF, and turn the ignition switch to OFF.
3) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
4) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

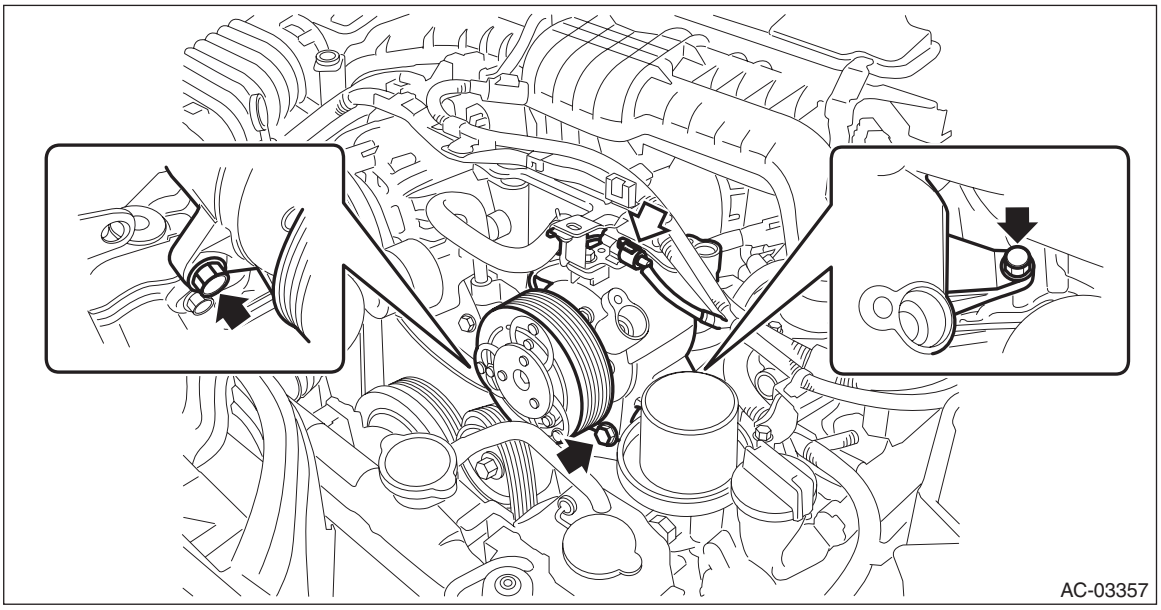
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
5) Remove the brake vacuum pump and bracket. <Ref. to BR-82, REMOVAL, Brake Vacuum Pump.>
6) Loosen the V-belt, and remove the V-belt from the compressor pulley. <Ref. to ME(H4DO(w/o HEV))-126, HEV MODEL, REMOVAL, V-belt.>

7) Remove the bolt, and detach the hose - pressure suction and the hose - pressure discharge.

CAUTION:
Seal the disconnected hose and engaging part of compressor assembly with a plug or vinyl tape to prevent foreign matter from entering.



8) Remove the compressor assembly.
(1) Disconnect the connector.
(2) Remove the bolts and remove the compressor assembly.



B: INSTALLATION

CAUTION:
• Replace the O-rings on the hose - pressure suction and discharge with new parts, and then apply compressor oil.
• After replacing the compressor assembly, adjust the amount of the compressor oil. <Ref. to AC-37, ADJUSTMENT, Compressor Oil.>
1) Install each part in the reverse order of removal.

Tightening torque:
Air conditioning unit: <Ref. to AC-11, AIR CONDITIONING UNIT, COMPONENT, General Description.>
Compressor: <Ref. to AC-13, COMPRESSOR, COMPONENT, General Description.>
V-belt cover bracket and generator bracket: <Ref. to SC(H4DO(w/o HEV))-5, GENERATOR BRACKET, COMPONENT, General Description.>
2) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>

C: INSPECTION

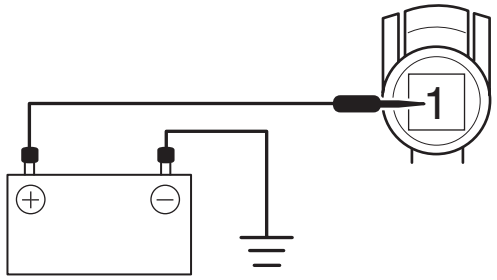
1. MAGNET CLUTCH CLEARANCE INSPECTION

1) Check the clearance of entire circumference around the drive plate and pulley.

Specification:
0.3 — 0.6 mm (0.0118 — 0.0236 in)
2) Replace the compressor assembly if the inspection result is not within the standard.

2. MAGNET CLUTCH OPERATION INSPECTION

1) Check the magnet clutch operation when battery voltage is applied to the compressor terminal.

Terminal No.	Inspection conditions	Specification	Connection diagram
1 (+) — Chassis ground (–)	Battery connection between compressor terminal and chassis ground	Engaged	 AC-02772

2) If it does not operate normally, replace the compressor assembly.

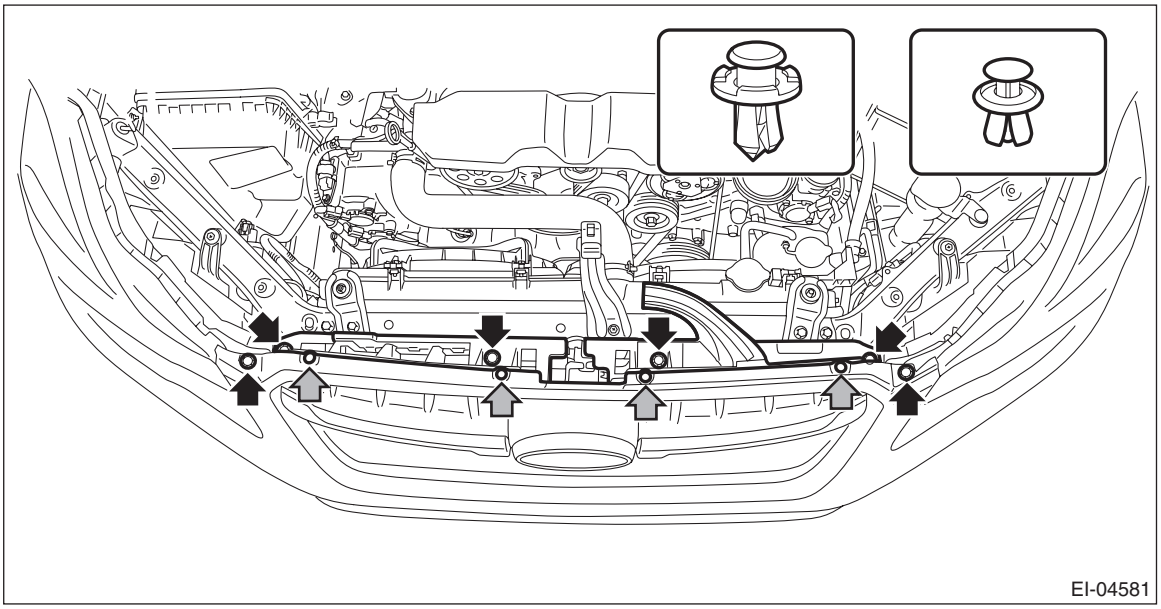
16.Condenser

A: REMOVAL

1) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
2) Remove the air intake duct.
- Gasoline engine model: <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
- HEV model: <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>

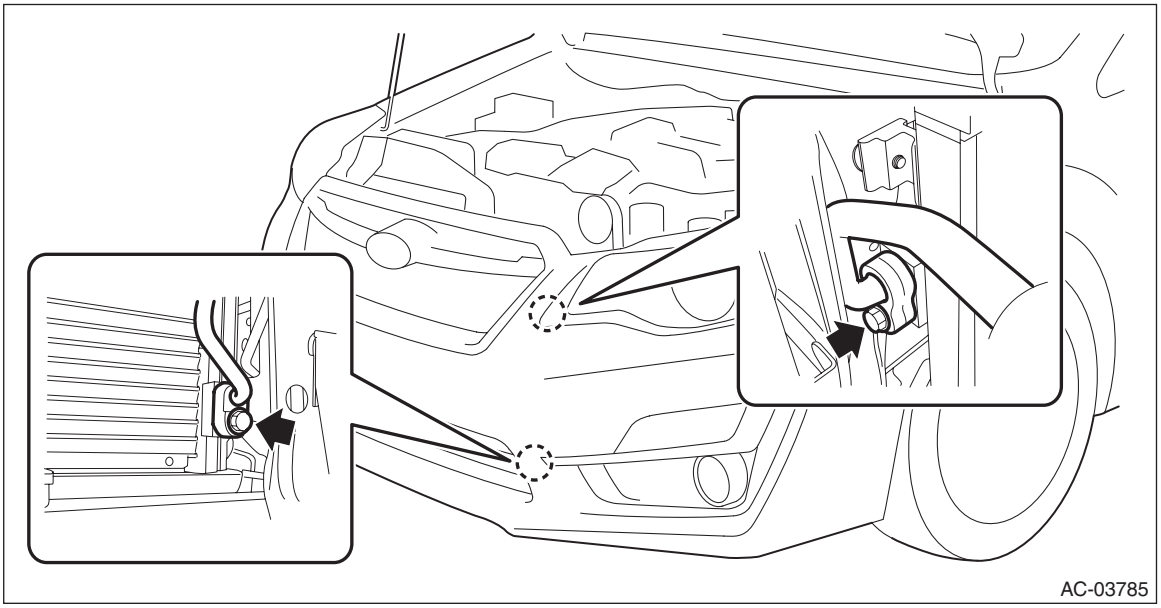
3) Remove the clip, and remove the bracket - grille.

NOTE:
To prevent damage to the bracket - grille, make sure to remove all clips.

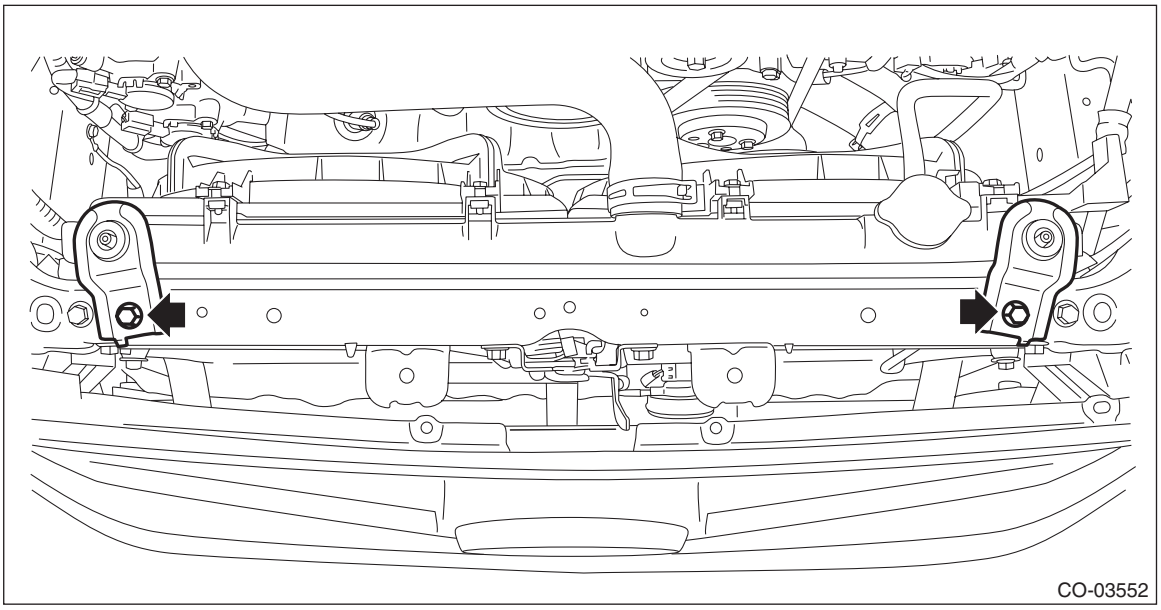

EI-04581

4) Remove the bolt, and disconnect the hose - pressure discharge and the pipe - evaporator cooling from the condenser assembly - air conditioner.

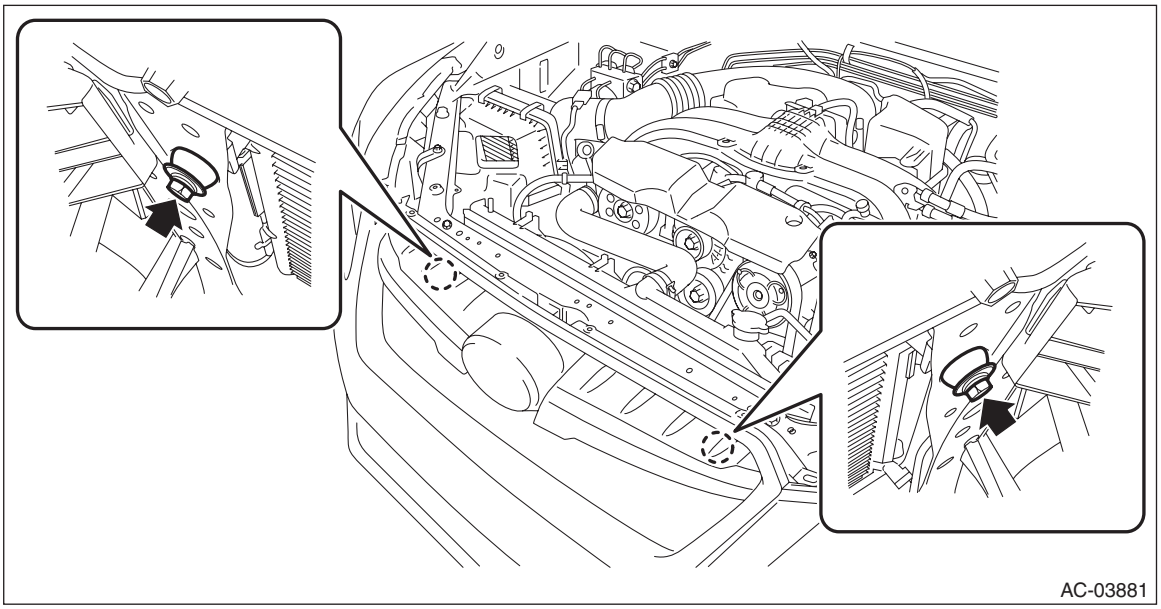
CAUTION:
Seal the disconnected hose, pipe and engaging part of condenser assembly with a plug or vinyl tape to prevent foreign matter from entering.


AC-03785

5) Remove the bolts and remove the radiator upper bracket.

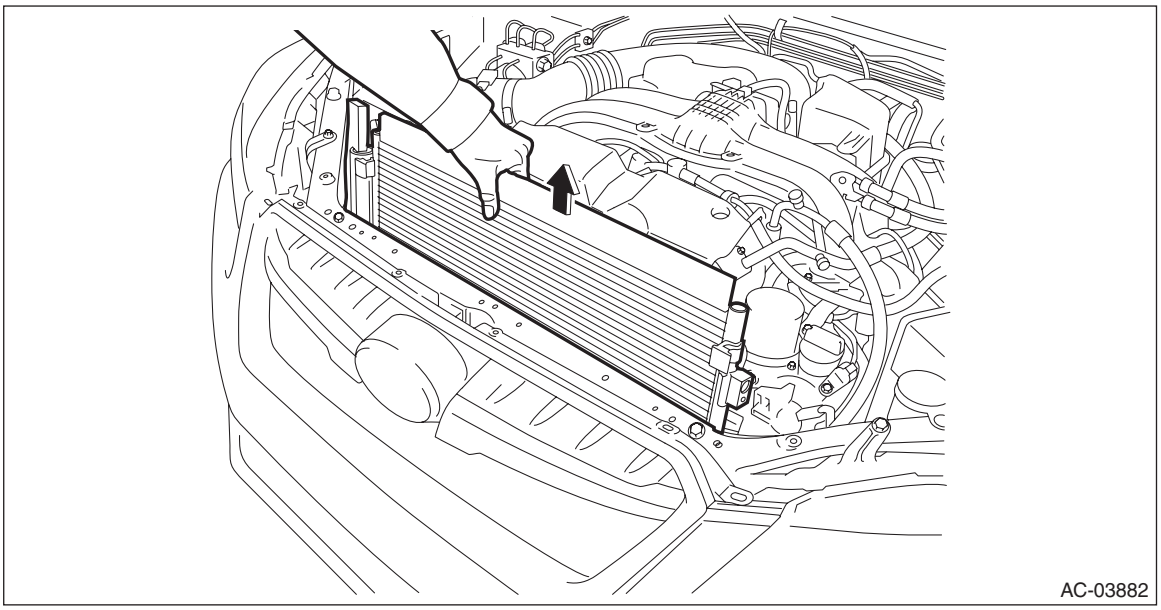


6) Remove the condenser assembly - air conditioner.
(1) Remove the bolt.



(2) By lifting the condenser assembly - air conditioner, pull it out through the space between the radiator and the radiator panel.

CAUTION:
Be careful not to damage the condenser and radiator fin. If a damaged fin is found, repair it using a thin screwdriver.



B: INSTALLATION

CAUTION:
• If the condenser assembly - air conditioner has been replaced, add an appropriate amount of compressor oil. <Ref. to AC-37, ADJUSTMENT, Compressor Oil.>
• Replace the O-rings with new parts, and then apply compressor oil.
• Confirm that the lower guide of condenser assembly - air conditioner fits into the holes on radiator panel.

1) Install each part in the reverse order of removal.

Tightening torque:
Air conditioning unit: <Ref. to AC-11, AIR CONDITIONING UNIT, COMPONENT, General Description.>
Radiator upper bracket: <Ref. to CO(H4DO(w/o HEV))-7, RADIATOR & RADIATOR FAN, COMPONENT, General Description.>

2) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>

C: INSPECTION

1) Check to see that the condenser fins are not clogged with debris or insects. Blow with compressed air or flush fins with water as needed.
2) If any oil leak is found, replace the condenser assembly - air conditioner.

17.Heater and Cooling Unit

A: REMOVAL

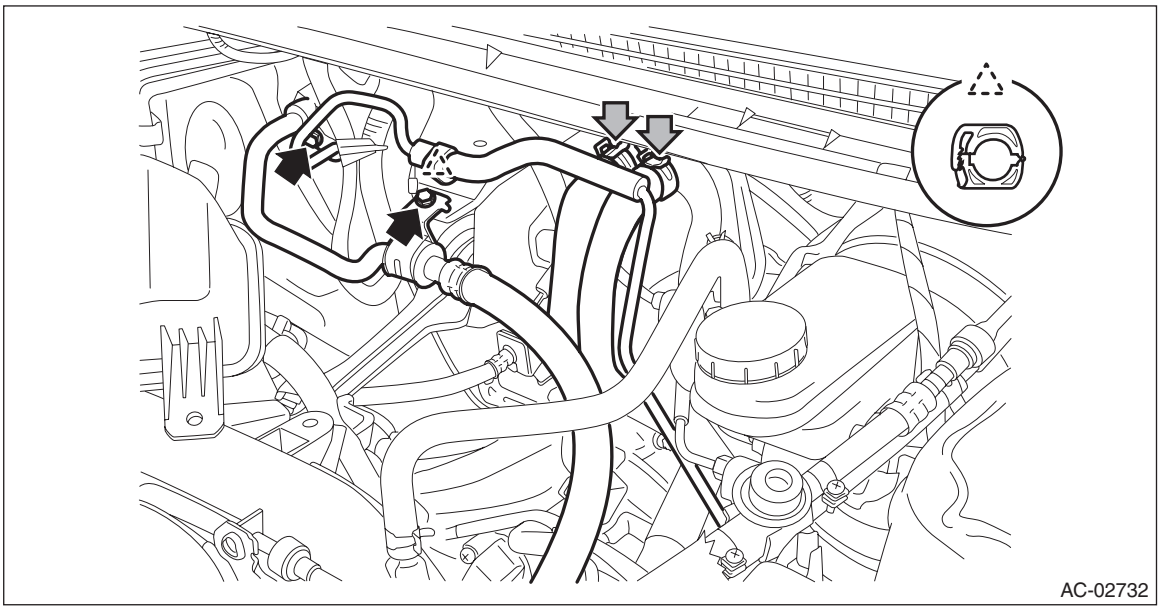
CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
3) Drain the coolant from the radiator. <Ref. to CO(H4DO(w/o HEV))-16, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
4) Remove the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, REMOVAL, Air Intake Boot.>

CAUTION:
Move aside the air intake boot to perform the operation without disconnecting the PCV hose.
5) Remove the air cleaner case. (HEV model) <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
6) Remove the clips and bolts, and remove the hose - pressure suction and the pipe - evaporator cooling from the expansion valve - cooling.

CAUTION:
Seal the disconnected hose, pipe and engaging part of expansion valve with a plug or vinyl tape to prevent foreign matter from entering.
7) Loosen the heater hose clamps and detach the hoses.

NOTE:
Put alignment marks to hoses, clamps, etc.

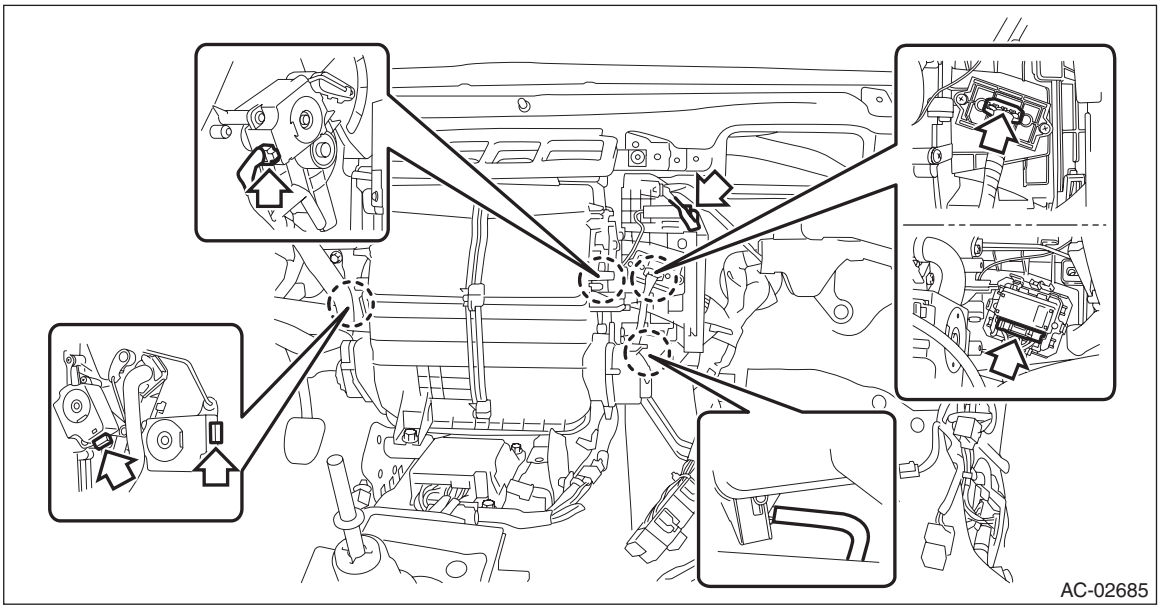


8) Remove the instrument panel assembly. <Ref. to EI-79, REMOVAL, Instrument Panel Assembly.>
9) Remove the engine control module (ECM).
- Gasoline engine model: <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).>
- HEV model: <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).>

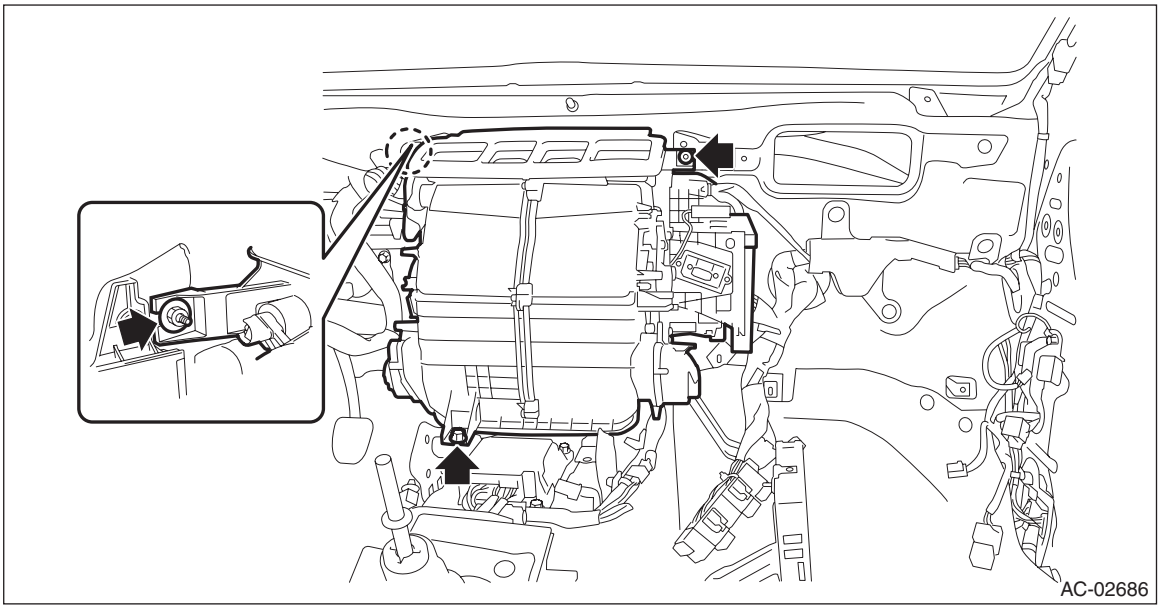
10) Remove the blower motor unit assembly. <Ref. to AC-38, REMOVAL, Blower Motor Unit Assembly.>

11) Remove the heater and cooling unit assembly.
(1) Disconnect each connector and the hose - drain.

NOTE:
For HEV model, disconnect the heater core sensor connector.



(2) Remove the bolt and nuts, and remove the heater & cooling unit assembly.



B: INSTALLATION

CAUTION:
- **Replace O-rings with new parts and install securely.**
- **Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>**

1) Install each part in the reverse order of removal.

Tightening torque:
Heater and cooling unit: <Ref. to AC-5, HEATER AND COOLING UNIT, COMPONENT, General Description.>
Air conditioning unit: <Ref. to AC-11, AIR CONDITIONING UNIT, COMPONENT, General Description.>

2) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
3) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>

18.Evaporator

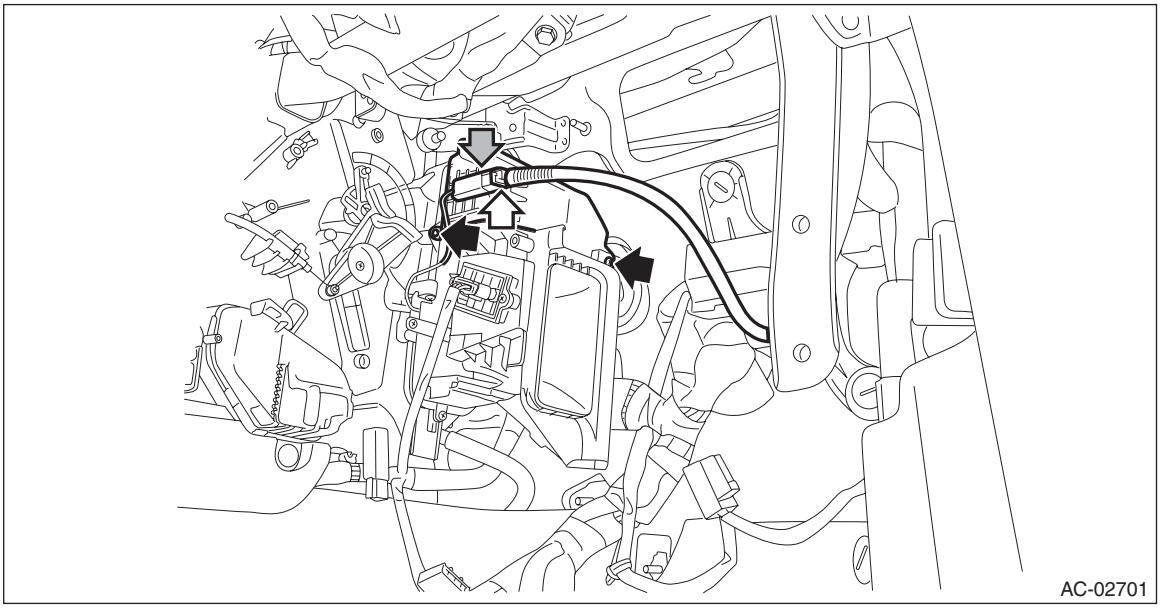
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

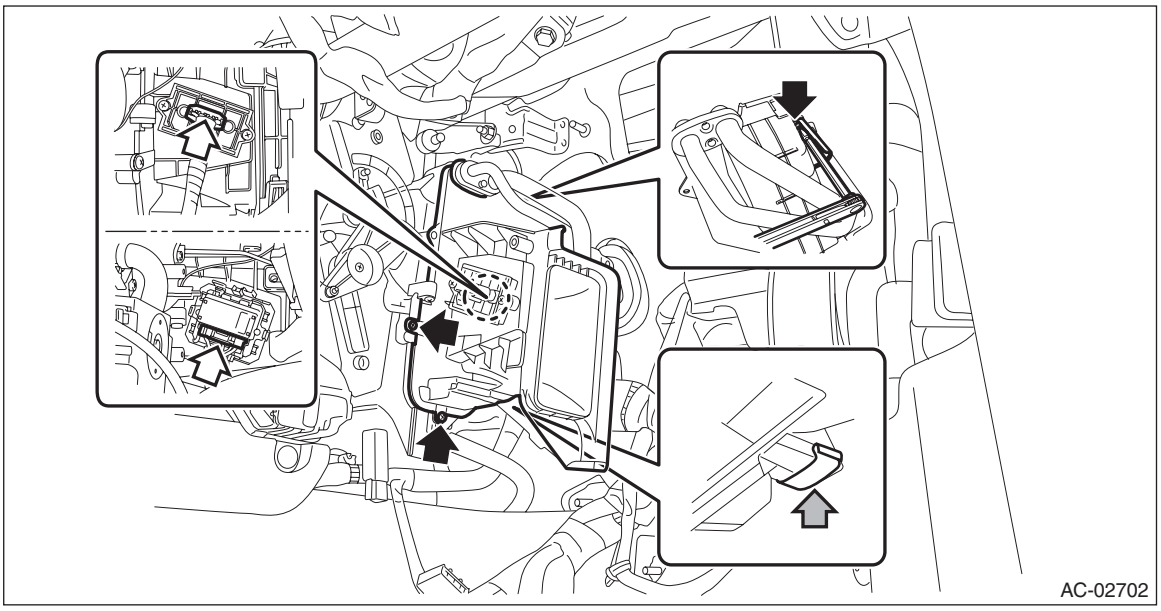
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
3) Remove the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, REMOVAL, Air Intake Boot.>

CAUTION:
Move aside the air intake boot to perform the operation without disconnecting the PCV hose.
4) Remove the air cleaner case. (HEV model) <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
5) Remove the expansion valve - cooling. <Ref. to AC-64, REMOVAL, Expansion Valve.>
6) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
7) Remove the engine control module (ECM).
- Gasoline engine model: <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).>
- HEV model: <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).>

8) Remove the blower motor unit assembly. <Ref. to AC-38, REMOVAL, Blower Motor Unit Assembly.>
9) Remove the evaporator assembly - cooling.
   (1) Disconnect the connector and lock of the thermostat - cooling.
   (2) Remove the screws and detach the cover.



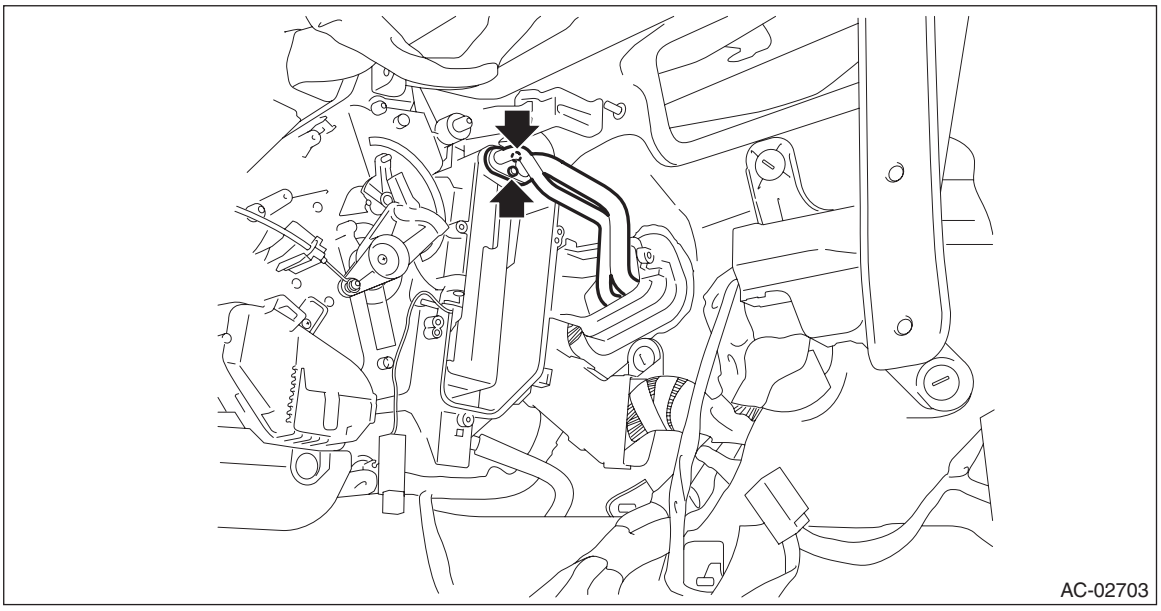
(3) Remove the cover - heater unit.
1. Disconnect the connector for the power transistor or resistor.
2. Remove the screws and clips to remove the cover - heater unit.



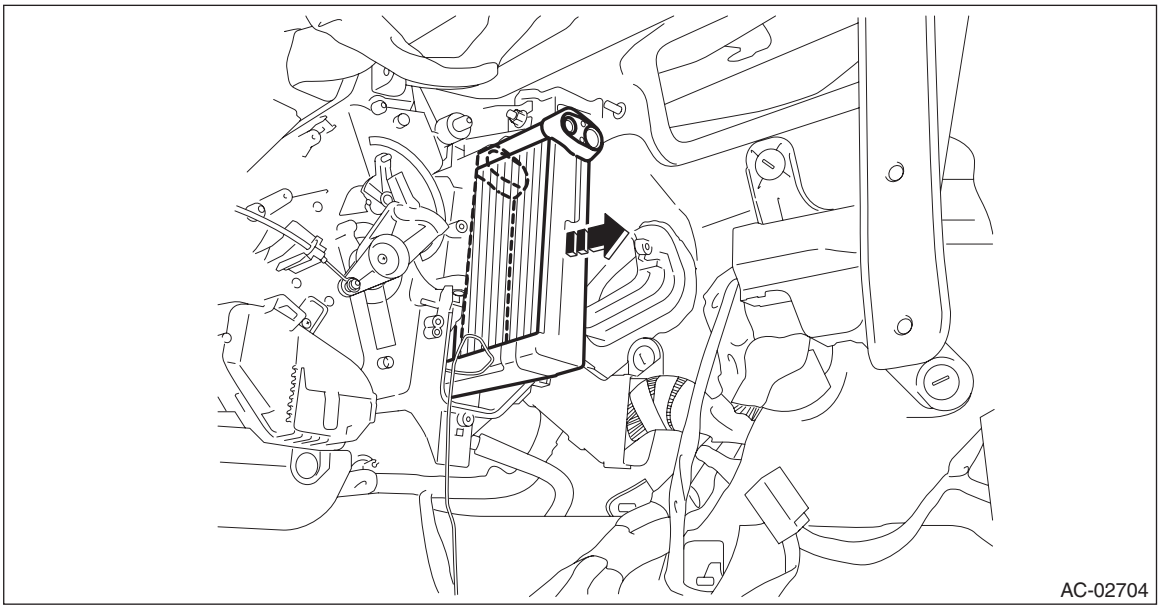
(4) Remove the bolt, and detach the pipe - evaporator core.

CAUTION:
Seal the disconnected pipe and engaging part of evaporator assembly with a plug or vinyl tape to prevent foreign matter from entering.

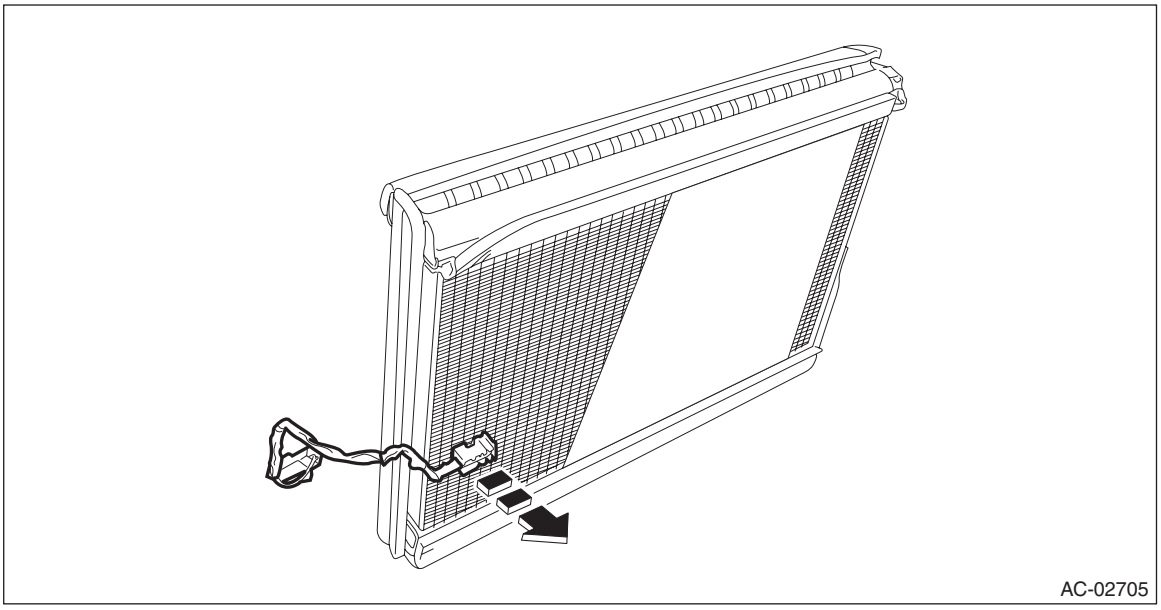
Preparation tool:
Hexagon wrench: 4 mm (0.16 in)



(5) Pull out the evaporator assembly - cooling from the case - heater unit.



(6) Remove the thermostat - cooling from the evaporator assembly - cooling.



B: INSTALLATION

CAUTION:
• If the evaporator assembly - cooling has been replaced, add an appropriate amount of compressor oil. <Ref. to AC-37, ADJUSTMENT, Compressor Oil.>
• When the evaporator assembly - cooling has been replaced, replace the packing of the expansion valve - cooling with a new one, and then apply compressor oil.
• Make sure that the water seal packing on the cover attachment area is securely attached.
• Replace the O-rings with new parts, and then apply compressor oil.
• After installing the grille assembly - ventilation RH, check that the air vent grille of the grille assembly - ventilation RH is inserted correctly into the air vent duct.
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Install the thermostat - cooling to the specified position. <Ref. to AC-86, INSTALLATION, Evaporator Sensor.>
2) Install each part in the reverse order of removal.

Tightening torque:
Heater and cooling unit: <Ref. to AC-5, HEATER AND COOLING UNIT, COMPONENT, General Description.>
3) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>

C: INSPECTION

1) Check the evaporator fin for dust. Blow with compressed air or flush fins with water as needed.
2) If any oil leak is found, replace the evaporator assembly - cooling.

19.Expansion Valve

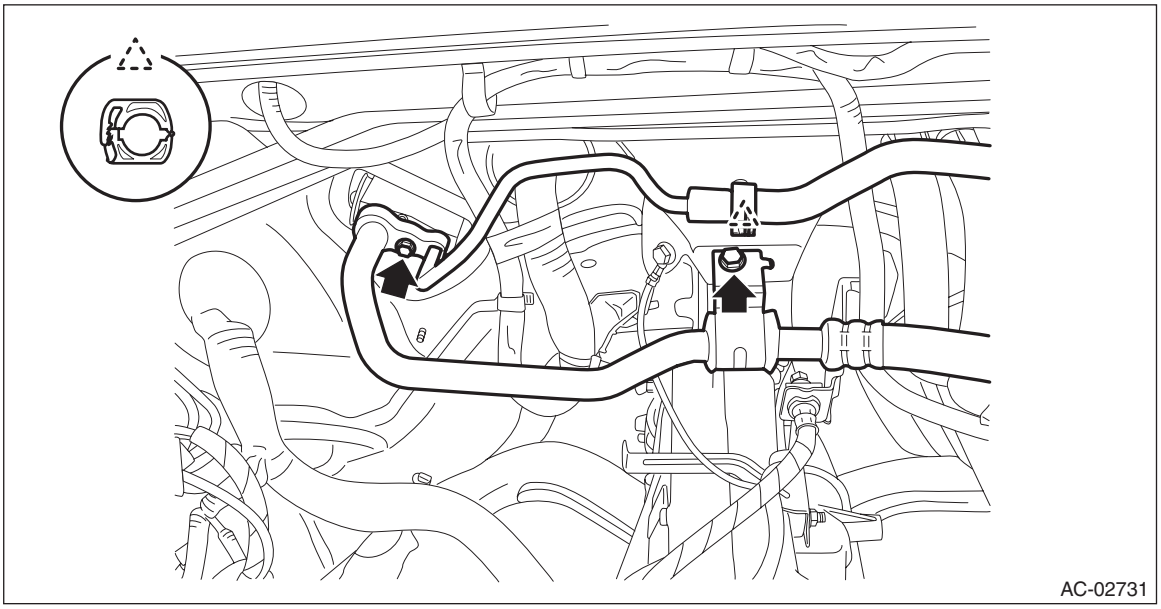
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
3) Remove the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, REMOVAL, Air Intake Boot.>

CAUTION:
Move aside the air intake boot to perform the operation without disconnecting the PCV hose.
4) Remove the air cleaner case. (HEV model) <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
5) Remove the expansion valve - cooling.
(1) Remove the clips and bolts, and detach the hose - pressure suction and the pipe - evaporator cooling.

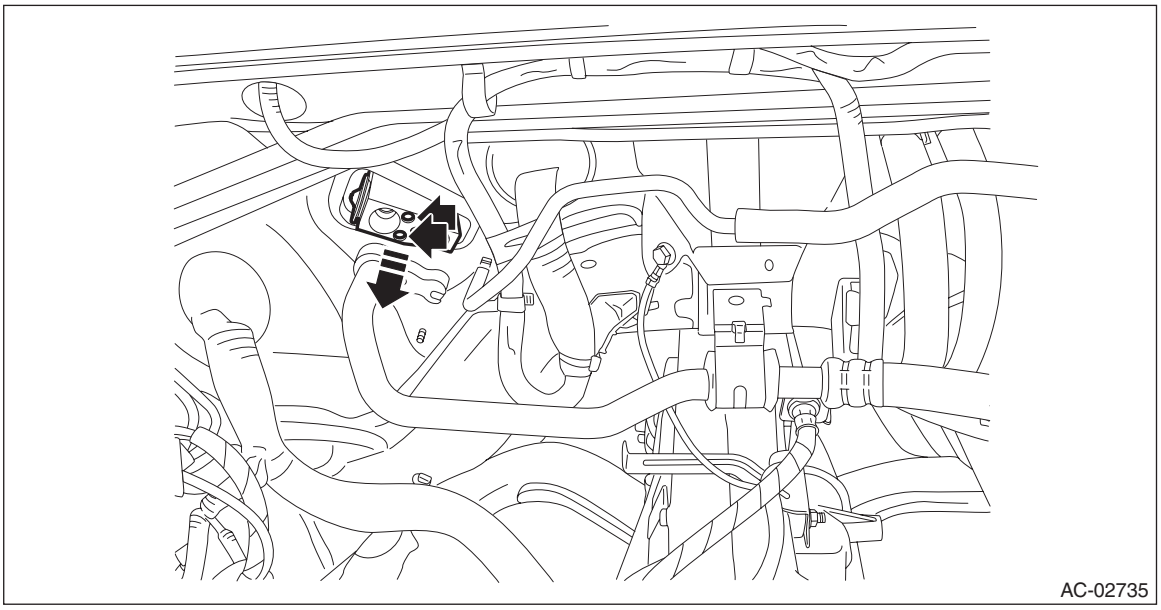
CAUTION:
Seal the disconnected hose, pipe and engaging part of expansion valve with a plug or vinyl tape to prevent foreign matter from entering.



(2) Remove the bolt, and remove the expansion valve - cooling.

CAUTION:
Seal the pipe and engaging part of expansion valve with a plug or vinyl tape to prevent foreign matter from entering.

Preparation tool:
Hexagon wrench: 4 mm (0.16 in)



B: INSTALLATION

CAUTION:
Replace the O-rings with new parts, and then apply compressor oil.
1) Install each part in the reverse order of removal.

Tightening torque:
Heater and cooling unit: <Ref. to AC-5, HEATER AND COOLING UNIT, COMPONENT, General Description.>
Air conditioning unit: <Ref. to AC-11, AIR CONDITIONING UNIT, COMPONENT, General Description.>
2) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>

20.Hose and Pipe

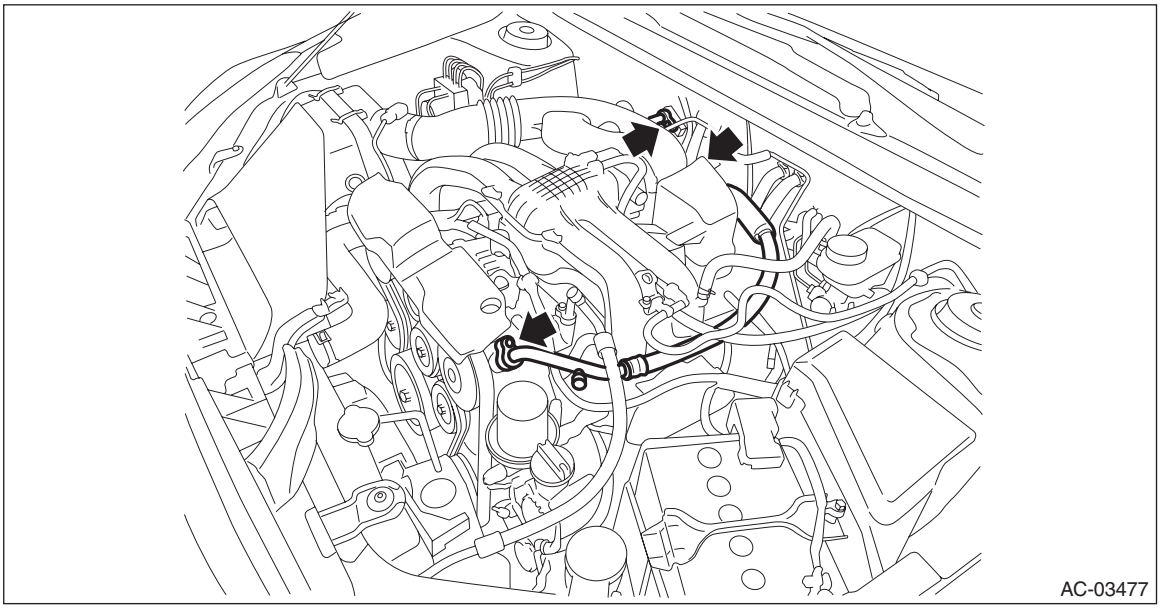
A: REMOVAL

1. LOW-PRESSURE HOSE

1) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
2) Remove the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, REMOVAL, Air Intake Boot.>

CAUTION:
Move aside the air intake boot to perform the operation without disconnecting the PCV hose.
3) Remove the air cleaner case. (HEV model) <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Remove the bolts and remove the hose - pressure suction.

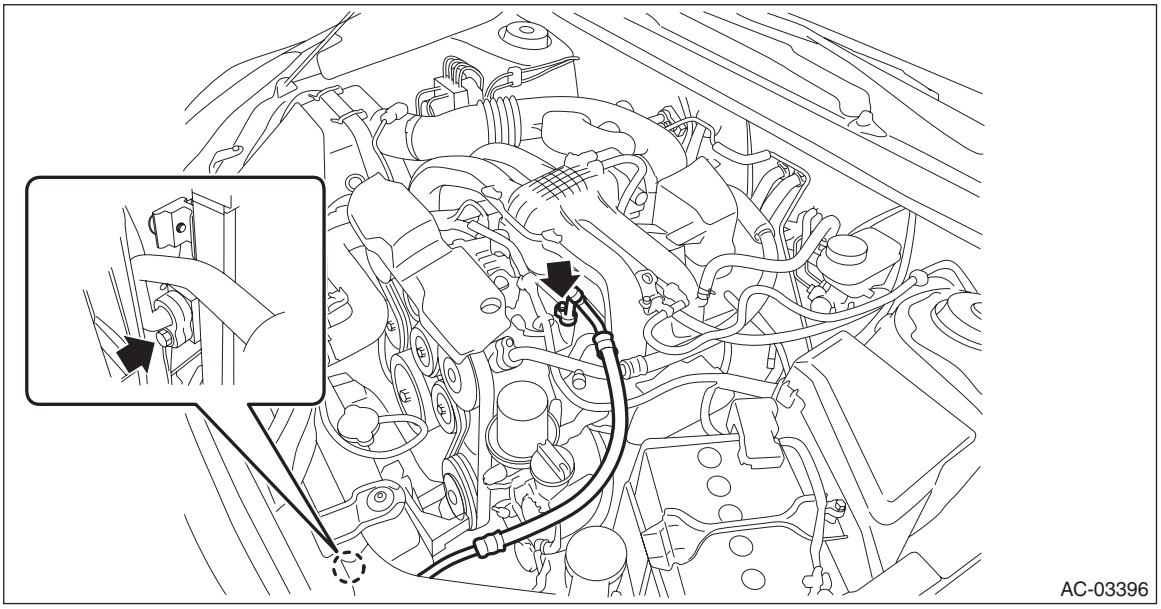
CAUTION:
- **Do not apply excessive force to the hose.**
- **Seal the disconnected hose, compressor and engaging part of expansion valve with a plug or vinyl tape to prevent foreign matter from entering.**



2. HIGH-PRESSURE HOSE

1) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
2) Remove the reservoir tank. <Ref. to CO(H4DO(w/o HEV))-96, REMOVAL, Reservoir Tank.>
3) Remove the bolts and remove the hose - pressure discharge.

CAUTION:
• Do not apply excessive force to the hose.
• Seal the disconnected hose, compressor and engaging part of compressor with a plug or vinyl tape to prevent foreign matter from entering.

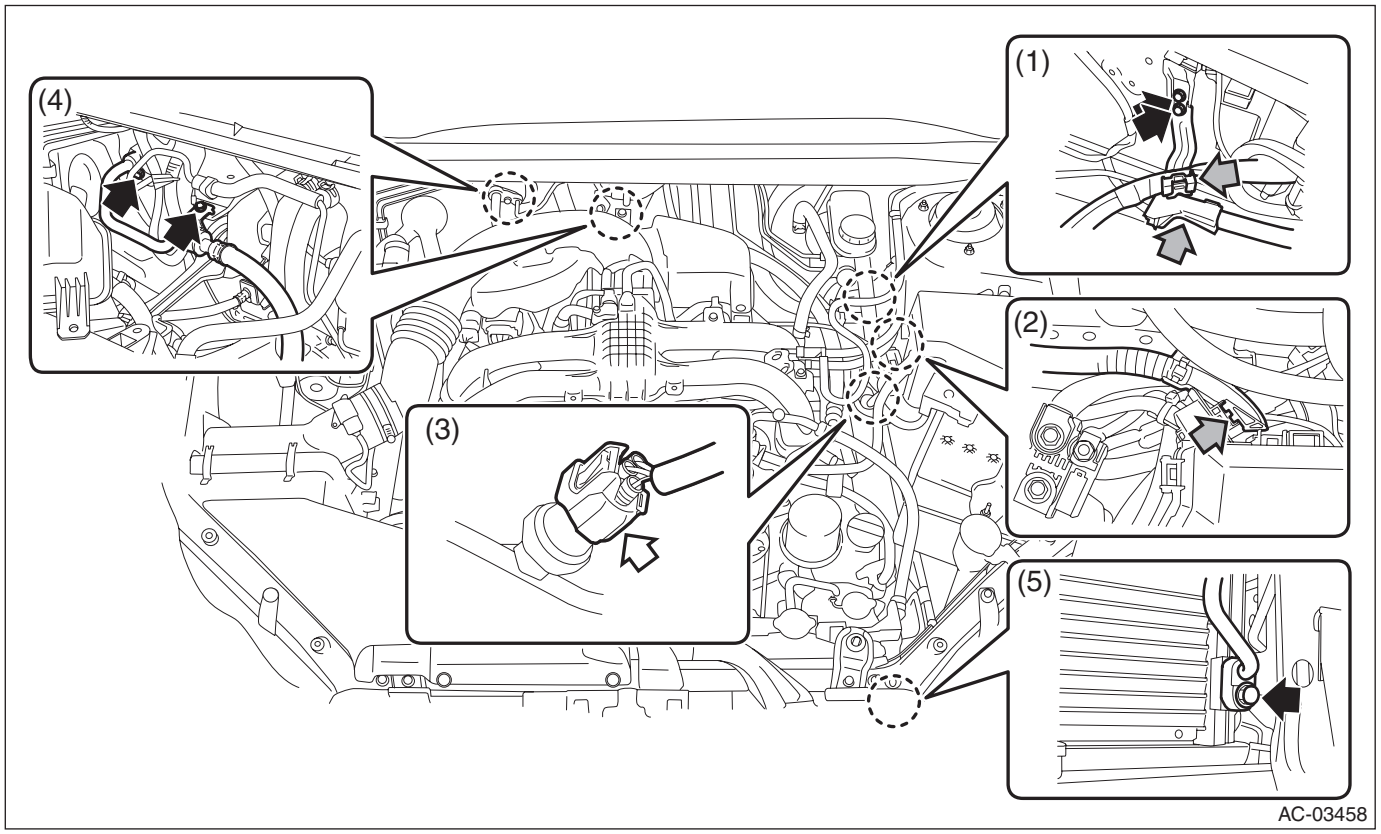


3. A/C PIPE

1) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
2) Remove the battery. (Gasoline engine model) <Ref. to SC(H4DO(w/o HEV))-52, REMOVAL, Battery.>
3) Remove the 12 volt auxiliary battery. (HEV model) <Ref. to SC(H4DO(HEV))-40, 12 VOLT AUXILIARY BATTERY, REMOVAL, Battery.>
4) Remove the reservoir tank. <Ref. to CO(H4DO(w/o HEV))-96, REMOVAL, Reservoir Tank.>
5) Remove the air intake boot. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-12, REMOVAL, Air Intake Boot.>

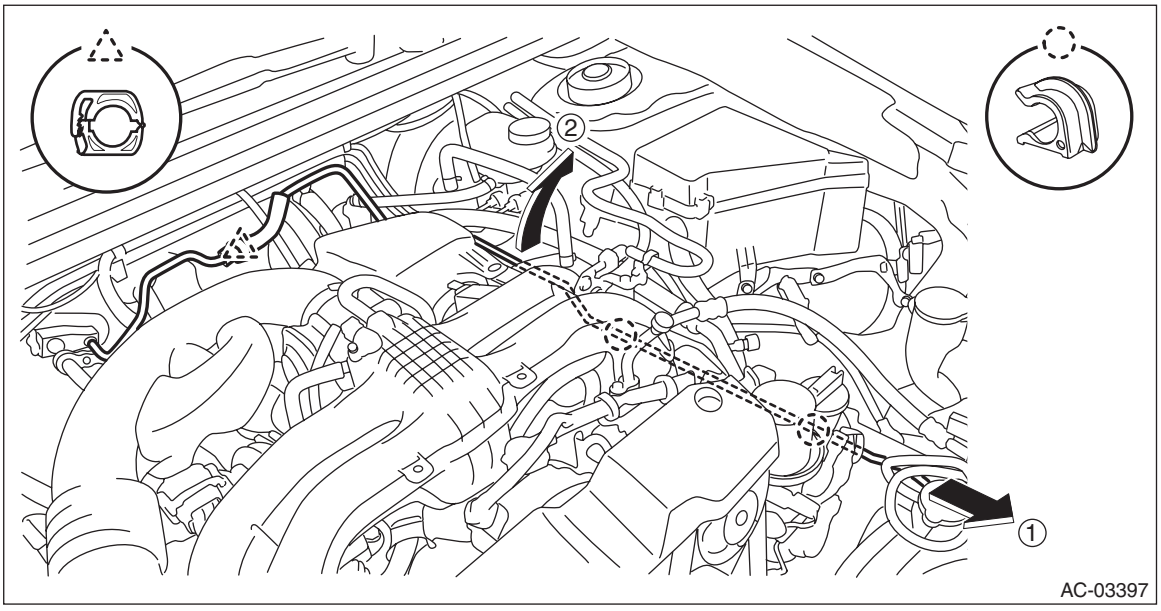
CAUTION:
Move aside the air intake boot to perform the operation without disconnecting the PCV hose.
6) Remove the air cleaner case. (HEV model) <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
7) Remove the pipe - evaporator cooling.
   (1) Remove the cable clamps and bolts, and remove the battery cable stay.
   (2) Remove the battery cable clamp. (HEV model)
   (3) Disconnect the pressure switch connector.
   (4) Remove the bolts, and detach the hose - pressure suction from the expansion valve - cooling.

(5) Remove the bolts, and detach the pipe - evaporator cooling from the condenser assembly - air conditioner.



(6) Remove the pipe - evaporator cooling from the clip and expansion valve, and remove the pipe - evaporator cooling in numerical order as shown in the figure.

CAUTION:
- **Do not apply excessive force to the pipe.**
- **Seal the engaging parts of disconnected pipe, hose, expansion valve and condenser with a plug or vinyl tape to prevent foreign matter from entering.**
- **Do not pull the harness and cable forcibly.**



B: INSTALLATION

CAUTION:
• If the hose and pipe have been replaced, add an appropriate amount of compressor oil to the compressor. <Ref. to AC-37, ADJUSTMENT, Compressor Oil.>
• Replace the O-rings with new parts, and then apply compressor oil.
• When connecting hoses and pipes, do not apply excessive force. After installing, check that no torsion or excessive tension applied to the hoses.
1) Install each part in the reverse order of removal.

Tightening torque:
Air conditioning unit: <Ref. to AC-11, AIR CONDITIONING UNIT, COMPONENT, General Description.>
Battery cable stay: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
2) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>

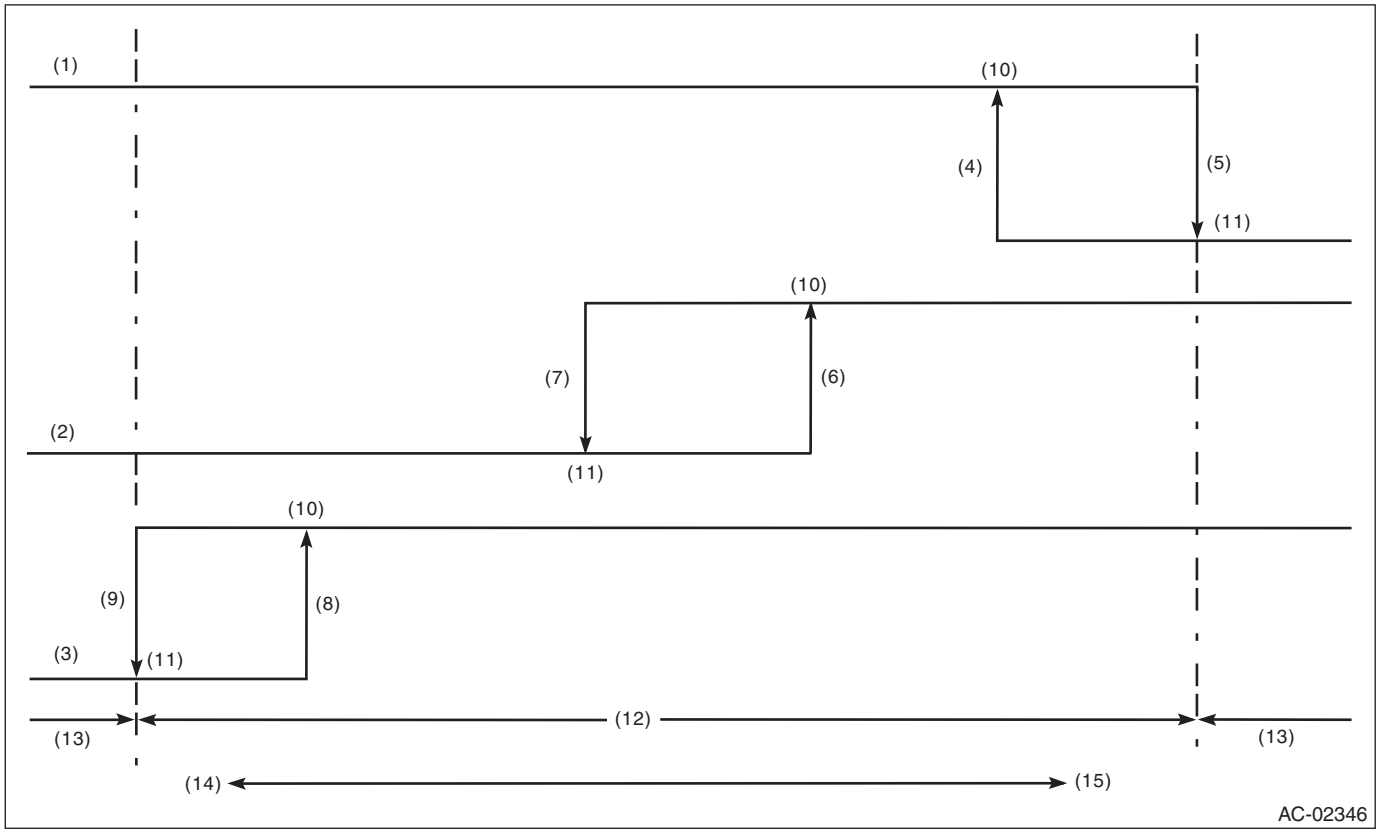
C: INSPECTION

1) Check the hoses for cracks, damage and expansion. Replace the hose if faulty.
2) Check the pipes for crack or damage. Replace the pipe if faulty.

21.Pressure Switch (Triple Pressure Switch)

A: INSPECTION

1) Connect the manifold gauge to the service valve on the high-pressure side.
2) Disconnect the connector.
3) Start the air conditioner, and check the operating pressure of switch by turning the compressor assembly (magnet clutch) to ON/OFF. Operation of each switch is as follows.



(1)	High pressure switch	(6)	1,770±100 kPa (18.05±1.02 kg/cm^2, 256.65±14.5 psi)	(11)	OFF
(2)	Middle pressure switch	(7)	1,470±120 kPa (14.99±1.22 kg/cm^2, 213.15±17.4 psi)	(12)	Operative range of compressor ASSY
(3)	Low pressure switch	(8)	225±30 kPa (2.29±0.31 kg/cm^2, 32.6±4.3 psi)	(13)	Inoperative range of compressor ASSY
(4)	2,350±200 kPa (24.00±2.04 kg/cm^2, 340.7±29.0 psi)	(9)	196±25 kPa (2.00±0.25 kg/cm^2, 28.4±3.6 psi)	(14)	Low pressure
(5)	2,940±200 kPa (29.98±2.04 kg/cm^2, 426.3±29.0 psi)	(10)	ON	(15)	High pressure

NOTE:
• High pressure switch turns the compressor assembly (magnet clutch) to OFF when the refrigerant pressure becomes extremely high to prevent the evaporator, air conditioner piping and expansion valve from getting damaged or frozen, etc.
• The middle pressure switch is used to effectively control the radiator fan output by judging high load/low load in normal pressure range.
• The low pressure switch detects a refrigerant shortage and deactivates the compressor assembly (magnet clutch) if the refrigerant pressure is abnormally low. (Because any further compressor assembly operation in such a state may lead to compressor seizure)

22.Ambient Sensor

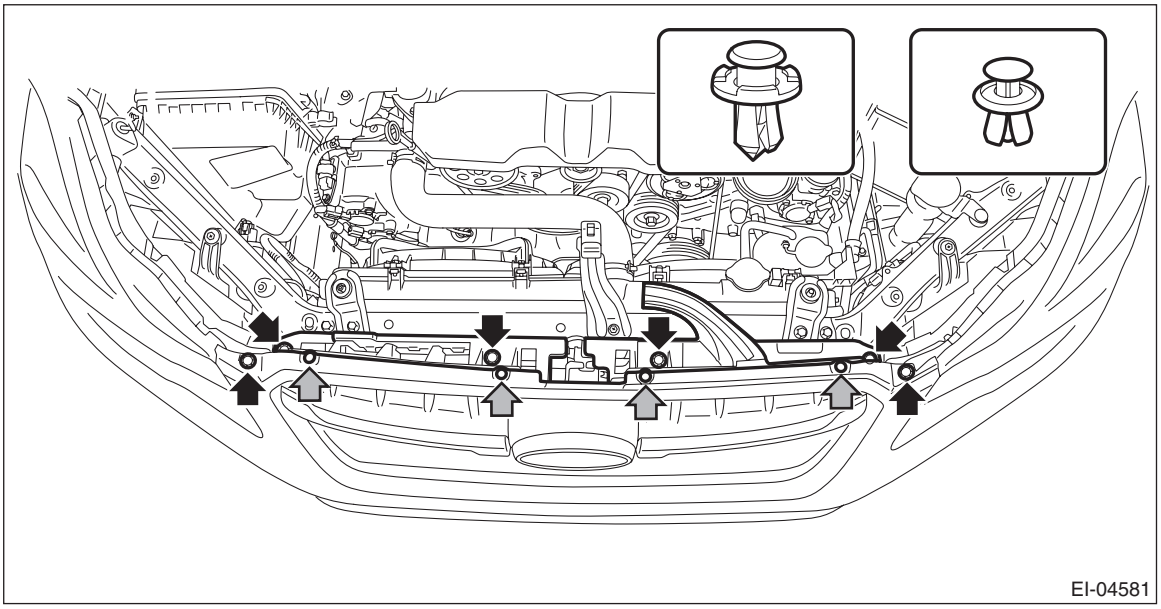
A: REMOVAL

1. GASOLINE ENGINE MODEL

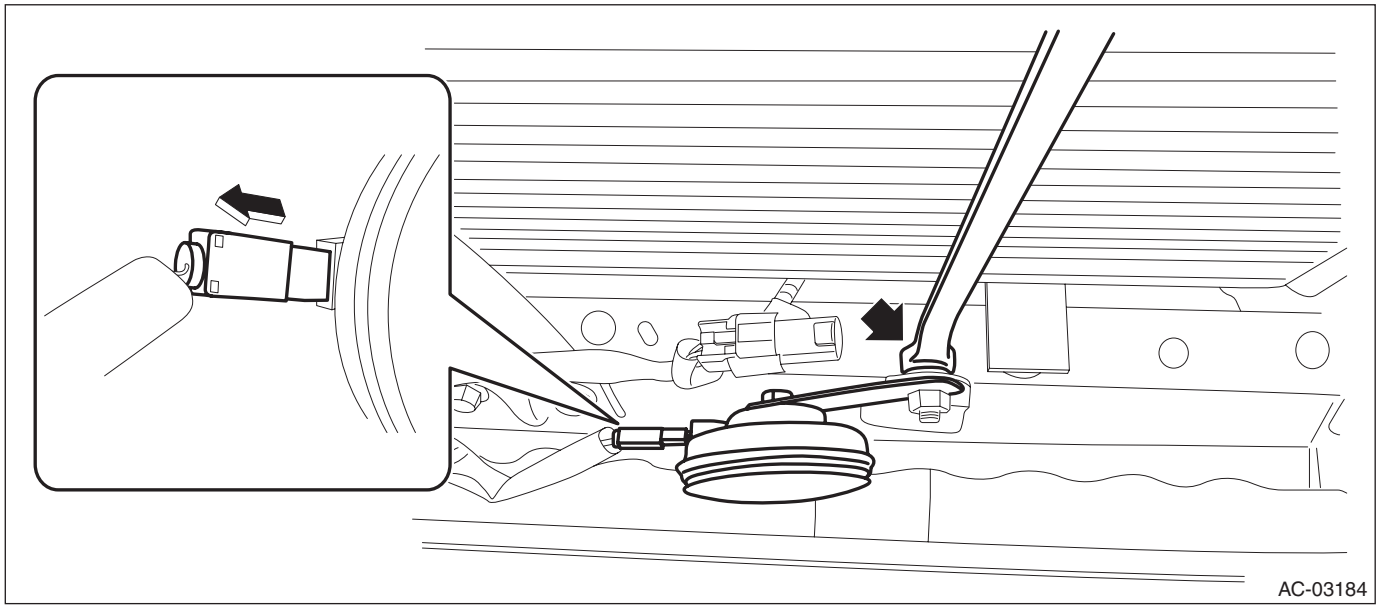
Impreza model

1) Disconnect the ground cable from battery.
2) Remove the clip, and remove the bracket - grille.

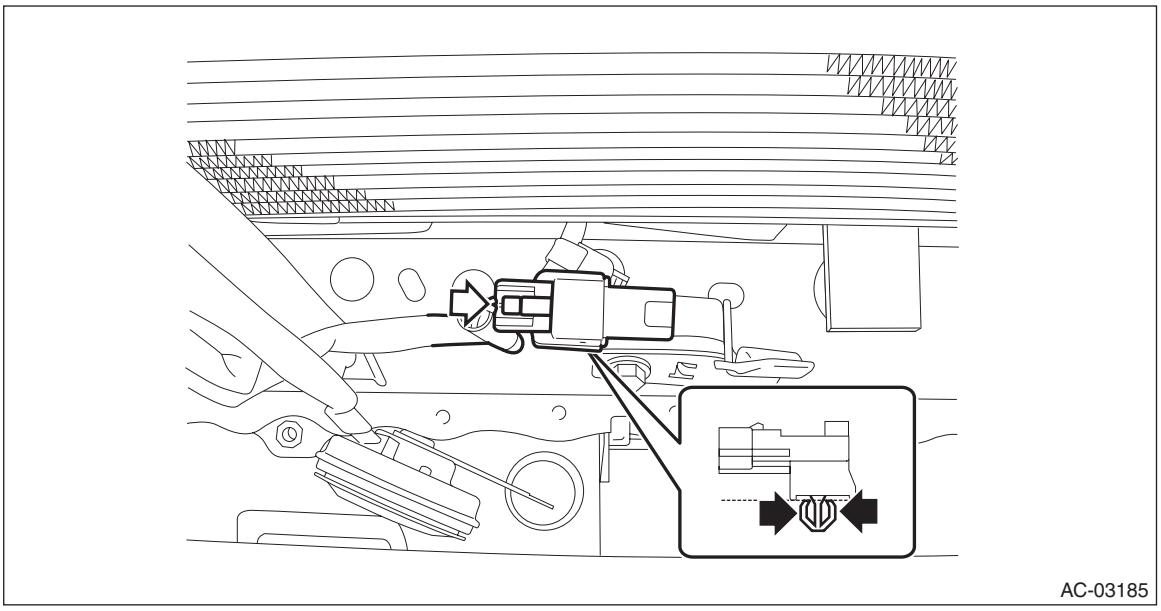
NOTE:
To prevent damage to the bracket - grille, make sure to remove all clips.



3) Remove the horn assembly - Lo.
   (1) Disconnect the connector.
   (2) Remove the horn bracket mounting bolt, and remove the horn assembly - Lo.

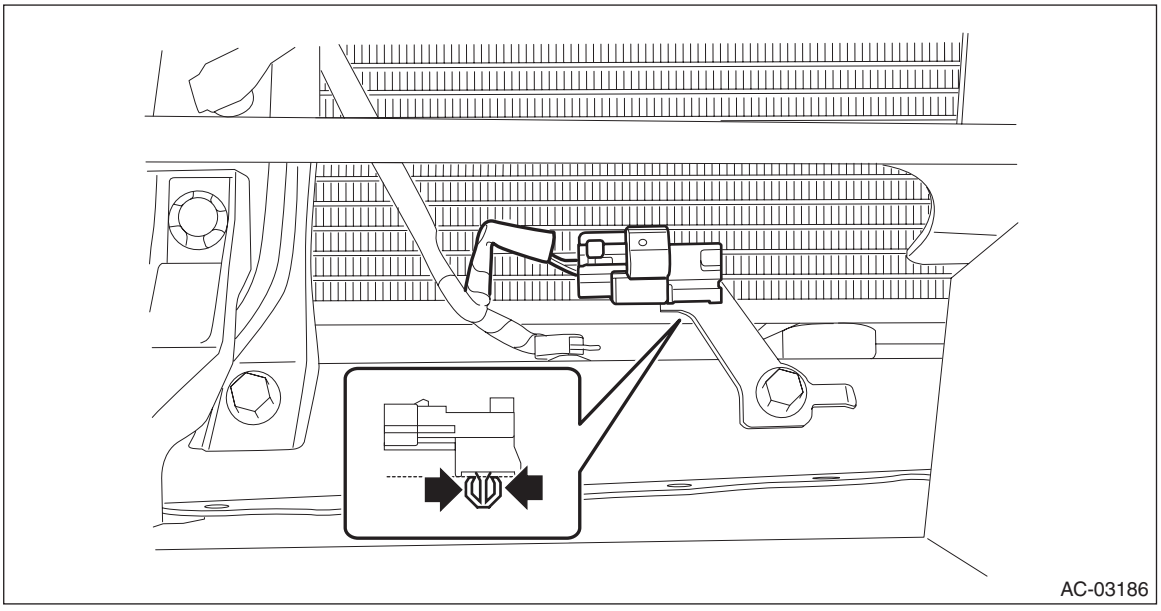


4) Remove the ambient sensor.
   (1) Disconnect the connector.
   (2) Release the claws, and then remove the ambient sensor from the bracket.



Crosstrek model

1) Disconnect the ground cable from battery.
2) Remove the ambient sensor.
   (1) Disconnect the connector.
   (2) Release the claws, and then remove the ambient sensor from the bracket.

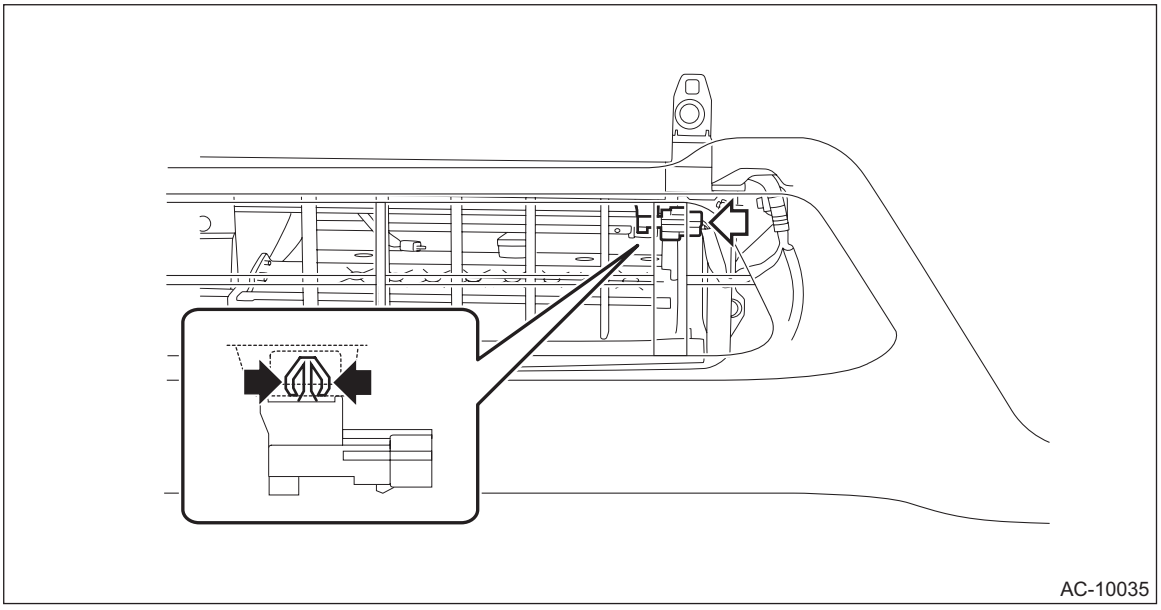


2. HEV MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the ambient sensor.
   (1) Release the claws and pull out the ambient sensor.
   (2) Disconnect the connector and remove the ambient sensor.



B: INSTALLATION

Install each part in the reverse order of removal.

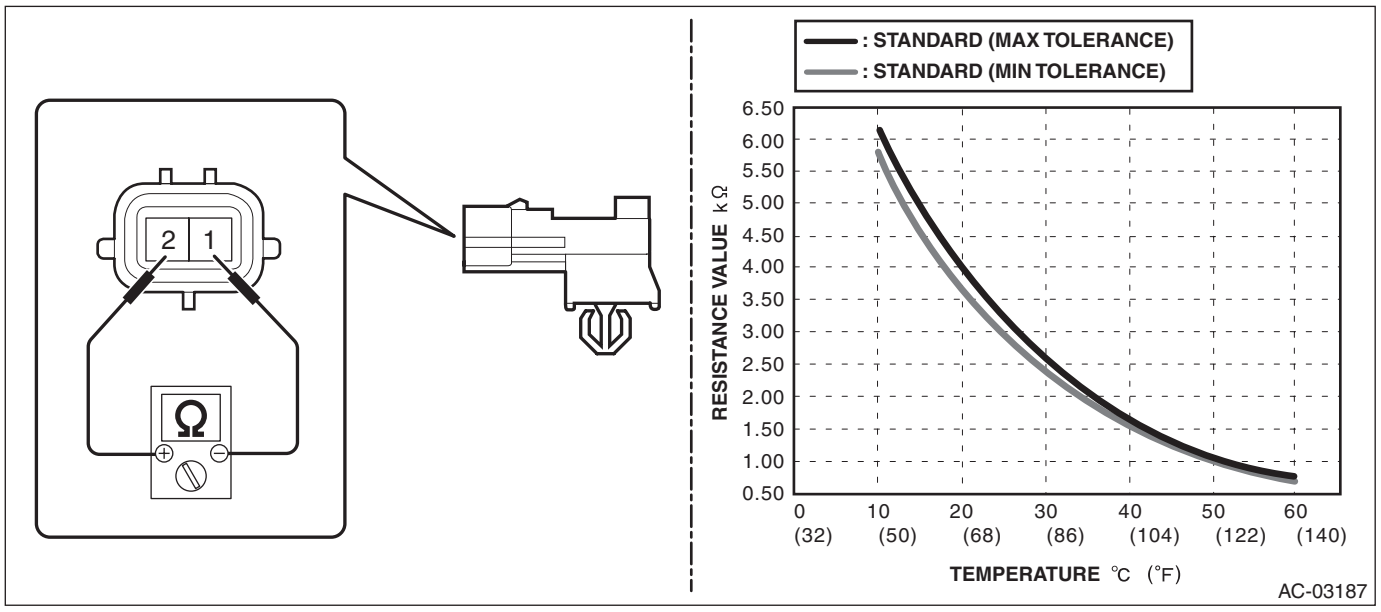
Tightening torque:
Horn assembly - Lo (gasoline engine, except for Crosstrek model): 18 N·m (1.84 kgf-m, 13.3 ft-lb)

C: INSPECTION

1) Visually check the ambient sensor for dirt or damage, and clean or replace as necessary.
2) Check the resistance between ambient sensor terminals.

CAUTION:
During inspection, be careful not to touch the sensor end in order to avoid misjudgment due to body temperature.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
1 — 2	10°C	5.82 — 6.18 kΩ
	15°C	4.58 — 4.87 kΩ
	20°C	3.64 — 3.86 kΩ
	25°C	2.91 — 3.09 kΩ
	30°C	2.35 — 2.49 kΩ
	35°C	1.9 — 2.02 kΩ
	40°C	1.56 — 1.65 kΩ
	45°C	1.28 — 1.36 kΩ
	50°C	1.06 — 1.12 kΩ
	55°C	0.88 — 0.93 kΩ
	60°C	0.74 — 0.78 kΩ

3) Replace the ambient sensor if the inspection result is not within the standard value.

23.Sunload Sensor (Auto A/C Model)

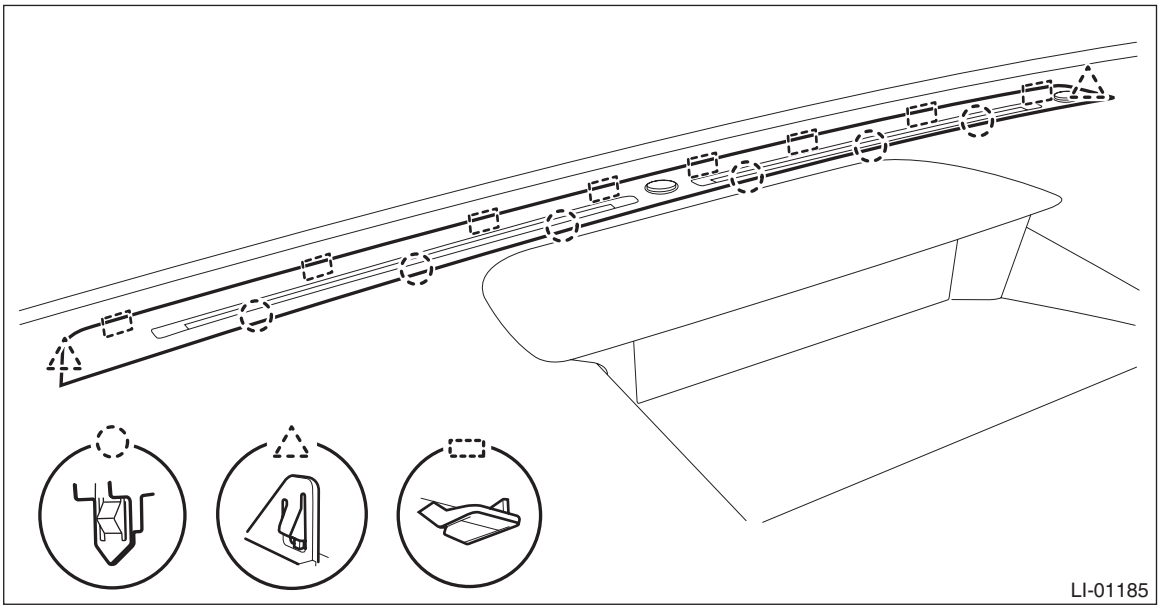
A: REMOVAL

CAUTION:
Be careful not to damage the sensors and interior trims when removing.

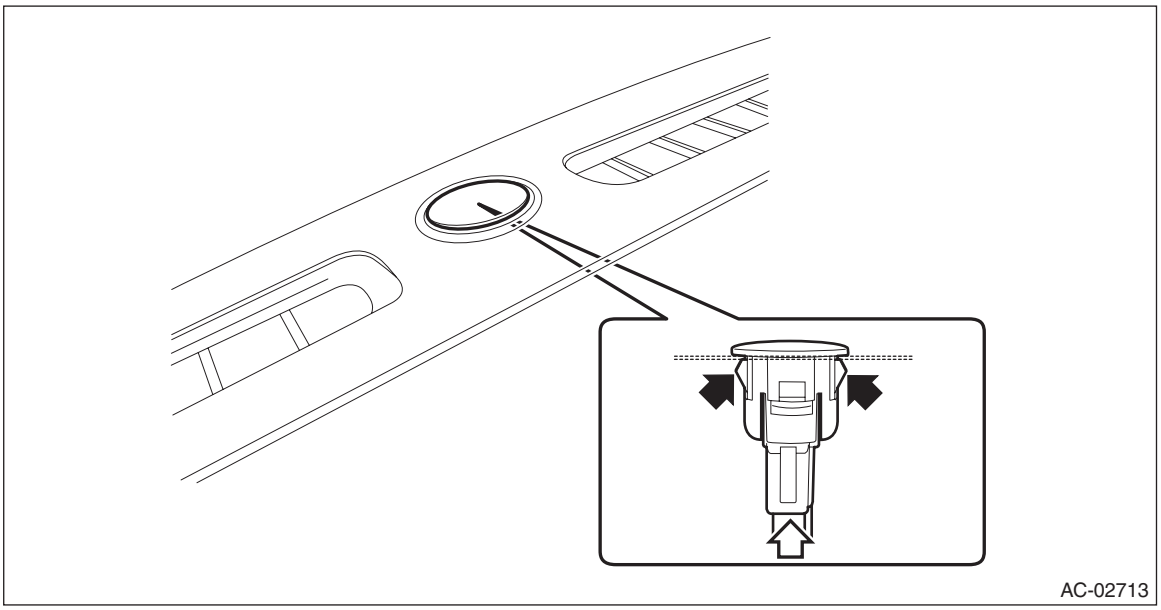
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the sunload sensor.
   (1) Release the connector and claws, and then remove the grille - front defroster.



   (2) Press the left and right claws to remove the sunload sensor from the grille - front defroster.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Check if there is anything that affects sensing, around the sunload sensor.
   (1) Is the sunload sensor free from any object that disturbs sensing?
   (2) Is the windshield glass free from any object such as sticker or film that disturbs sensing?
   - **Yes** → Go to step 2).
   - **No** → Remove everything that affects sensing.

2) Using the Subaru Select Monitor, check «Quantity of Sunload».

NOTE:
For detailed operation procedures, refer to “Application help”.
   (1) Cover the sunload sensor with cloth.
   (2) Does the «Quantity of Sunload» indicate 0 W/m^2 when the direct sunlight is shielded?
   - **Yes** → Go to step 3).
   - **No** → Replace the sunload sensor.

3) From step 2), expose the sunload sensor to light.
   (1) Place intense light such as incandescent light at 300 mm (11.81 in) or less from the sunload sensor.
   (2) Does «Quantity of Sunload» indicate 2,000 W/m^2 or less?

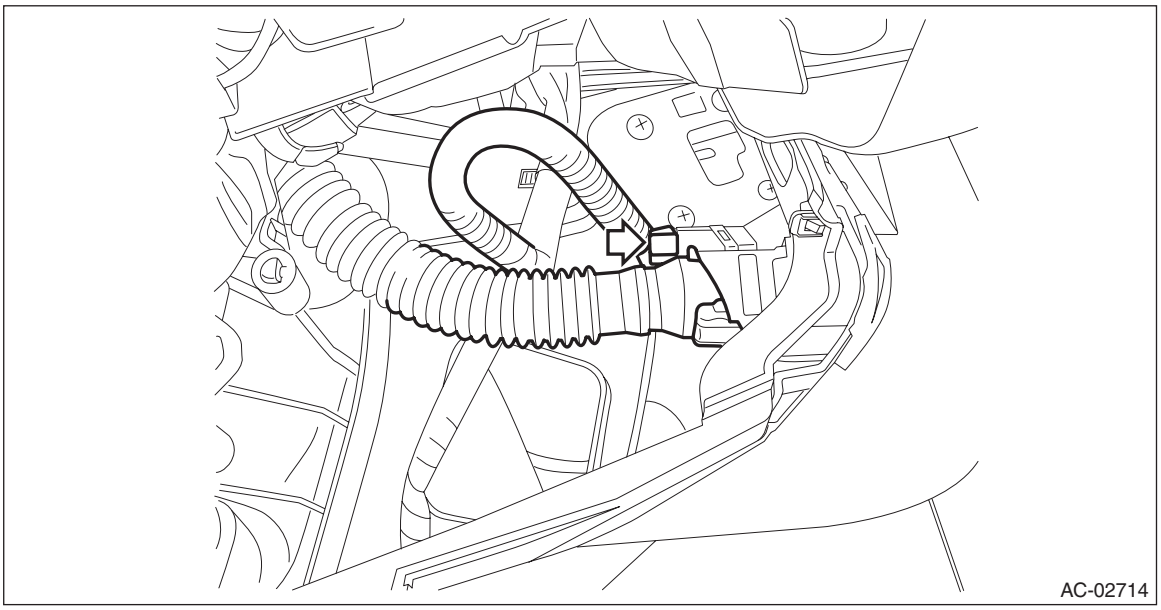
CAUTION:
The value changes depending on the angle of light.
   - **Yes** → The sunload sensor is normal.
   - **No** → Replace the sunload sensor.

24.In-Vehicle Sensor (Auto A/C Model)

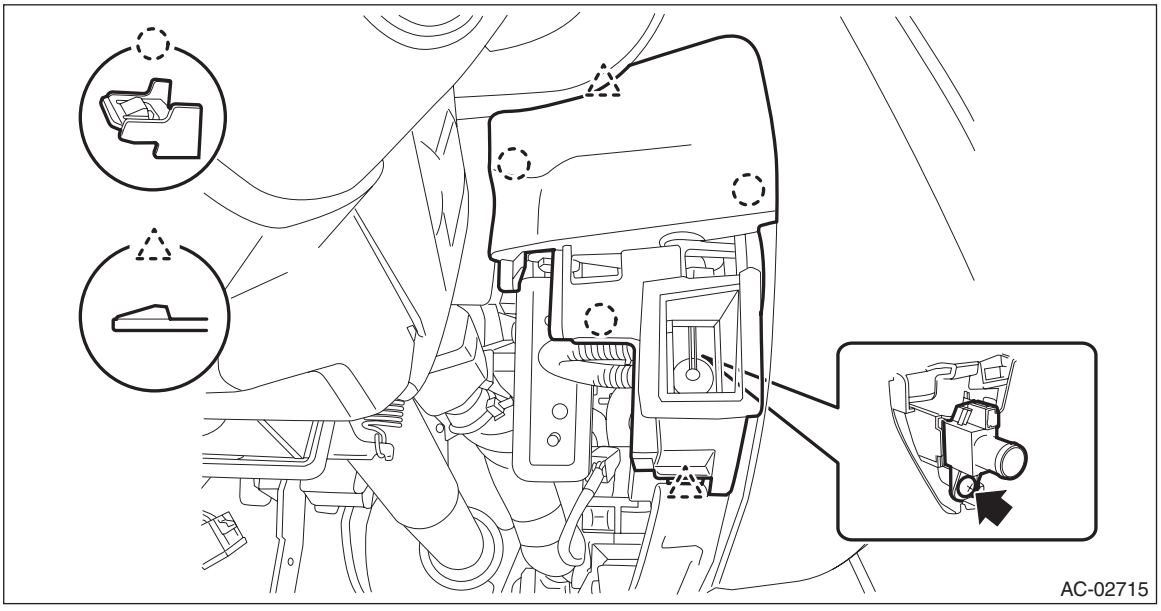
A: REMOVAL

CAUTION:
Be careful not to damage the sensors and interior trims when removing.
1) Disconnect the battery ground cable and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver INN. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the in-vehicle sensor.
(1) Disconnect the connector, and remove the aspirator hose.


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(2) Release the claws and remove the cover switch - starter.
(3) Remove the screw and remove the in-vehicle sensor from the cover switch - starter.


AC-02715

B: INSTALLATION

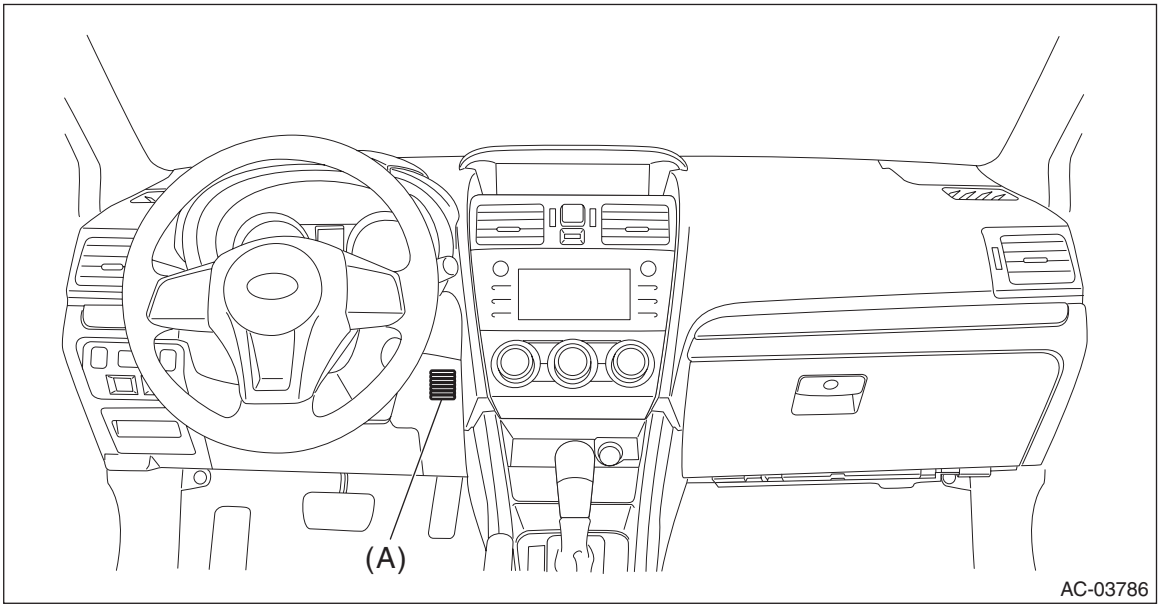
Install each part in the reverse order of removal.

C: INSPECTION

1) Set the vehicle to the following conditions.

Item	Condition
Ignition switch	ON
A/C switch	ON
Temperature adjustment dial	HI (MAX HOT)
Air flow control dial or switch	DEF
Fan dial	HI (MAX)

2) Check the suction port (A) for in-vehicle sensor of the cover assembly - instrument panel LWR driver INN.

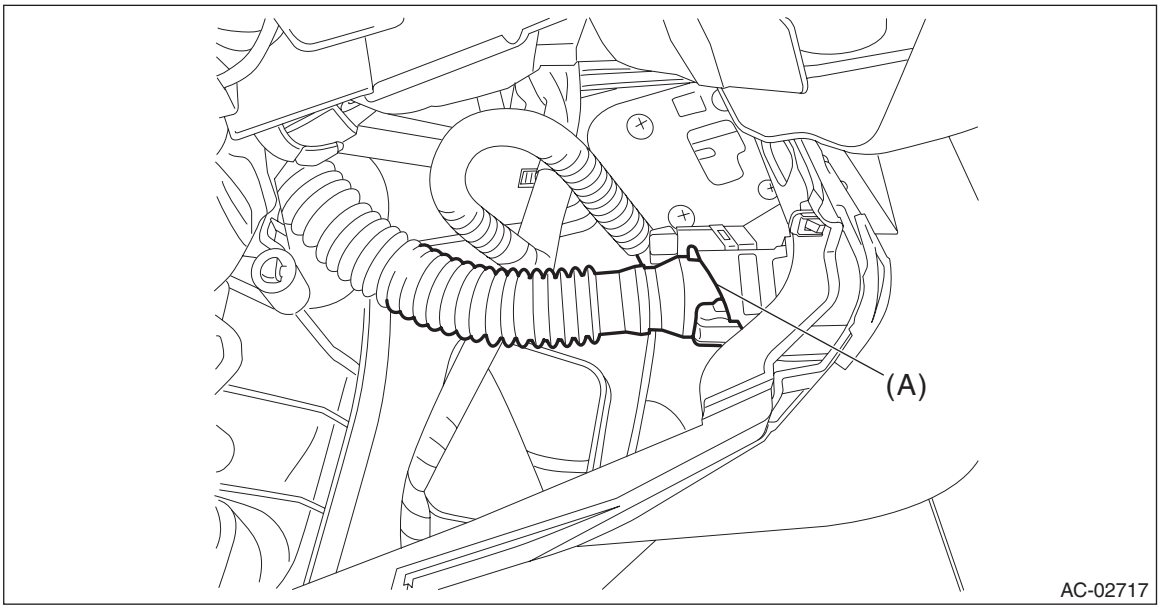


(1) Put a strip of paper close to the front side of the suction port (A).
(2) Can you see the paper moving towards the port and the air being sucked into the port?

CAUTION:
Be careful not to let the paper get sucked into the port.

- **Yes** → Go to step 5).
- **No** → Go to step 3).

3) Remove the cover assembly - instrument panel LWR driver INN, and check the aspirator hose (A).



(1) Are the aspirator hoses on both sides of the case and sensor connected securely?
(2) Is the aspirator hose free from any kinks or cracks?

- **Yes** → Go to step 4).
- **No** → Repair or replace the aspirator hose if necessary.

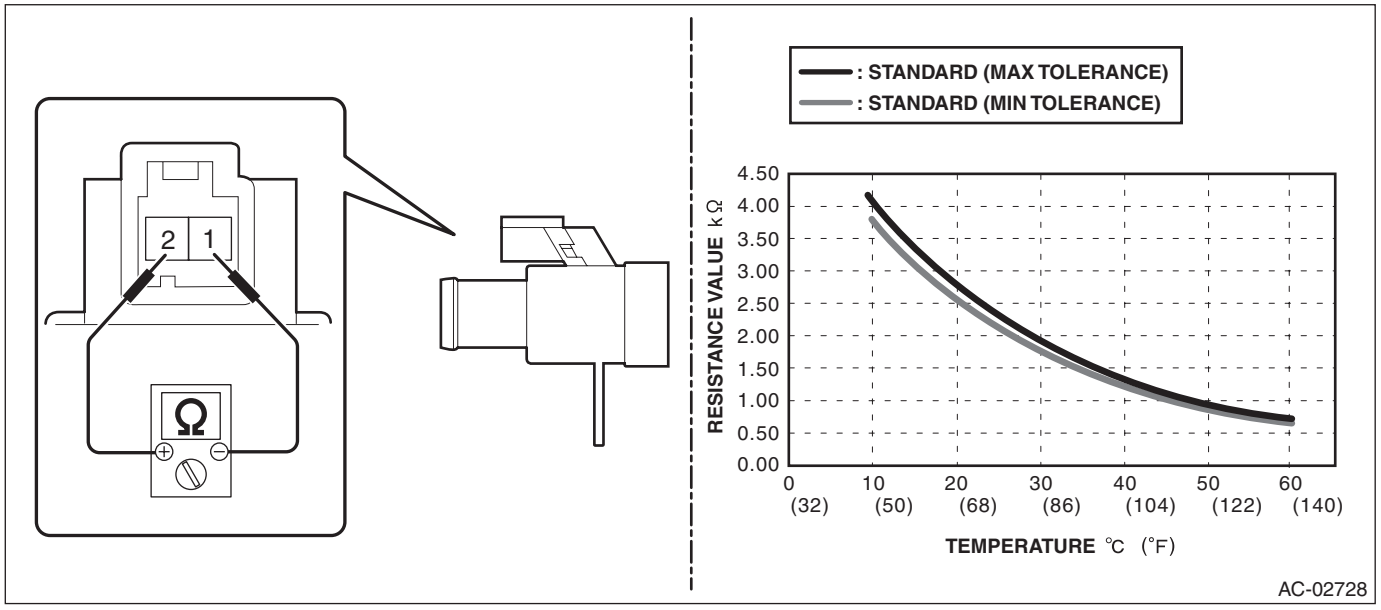
4) Check if there is anything that affects sensing, around the in-vehicle sensor.
(1) Is the in-vehicle sensor hole free from clogging?
(2) Is the peripheral area of in-vehicle sensor free from any heat-producing parts (such as audio, navigation system etc.)?

- **Yes** → Go to step 5).
- **No** → Remove everything that affects sensing.

5) Perform the inspection of in-vehicle sensor unit.
(1) Disconnect the in-vehicle sensor connector.
(2) Is the resistance between terminals of in-vehicle sensor within standard value?

CAUTION:
During inspection, be careful not to touch the sensor end in order to avoid misjudgment due to body temperature.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
1 — 2	10°C	3.772 — 4.101 kΩ
	15°C	3.096 — 3.338 kΩ
	20°C	2.556 — 2.734 kΩ
	25°C	2.121 — 2.251 kΩ
	30°C	1.756 — 1.878 kΩ
	35°C	1.462 — 1.574 kΩ
	40°C	1.223 — 1.326 kΩ
	45°C	1.028 — 1.122 kΩ
	50°C	0.868 — 0.9542 kΩ
	55°C	0.7363 — 0.8147 kΩ
	60°C	0.6273 — 0.6984 kΩ

- **Yes** → The in-vehicle sensor is normal.
- **No** → Replace the in-vehicle sensor.

25.Temperature and Humidity Sensor

A: REMOVAL

For operation procedures, refer to “In-vehicle Sensor” section. <Ref. to AC-78, REMOVAL, In-Vehicle Sensor (Auto A/C Model).>

B: INSTALLATION

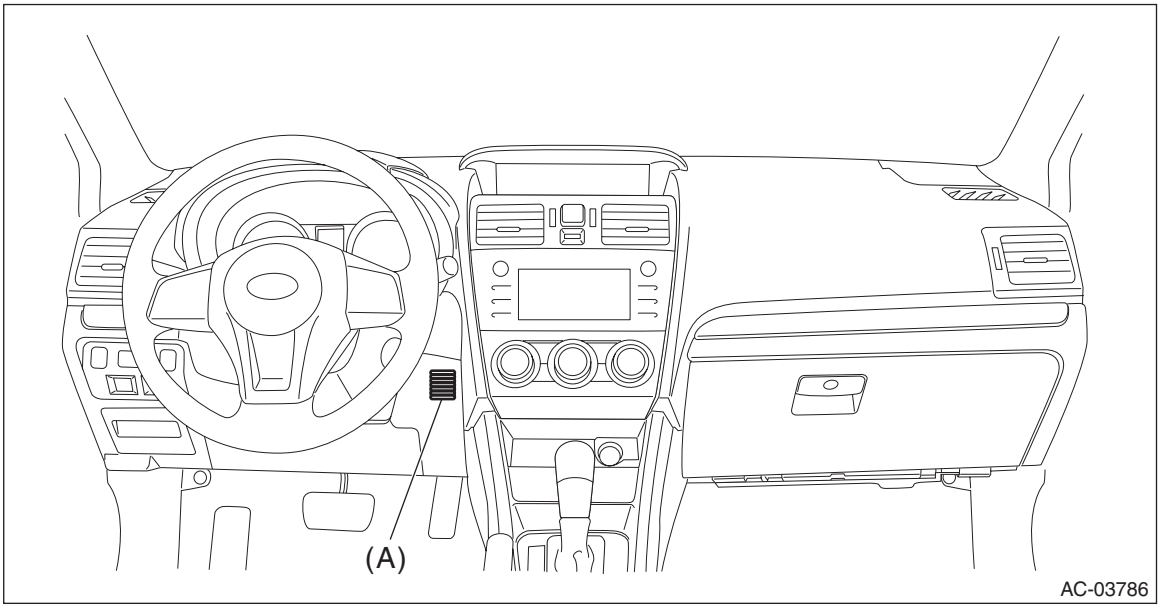
Install each part in the reverse order of removal.

C: INSPECTION

1) Set the vehicle to the following conditions.

Item	Condition
Ambient temperature	Approx. 25°C (77°F)
Ignition switch	ON
A/C switch	ON
Temperature adjustment dial	HI (MAX HOT)
Air flow control switch	DEF
Fan dial	HI (MAX)

2) Check the suction port (A) for the temperature and humidity sensor of the cover assembly - instrument panel LWR driver.

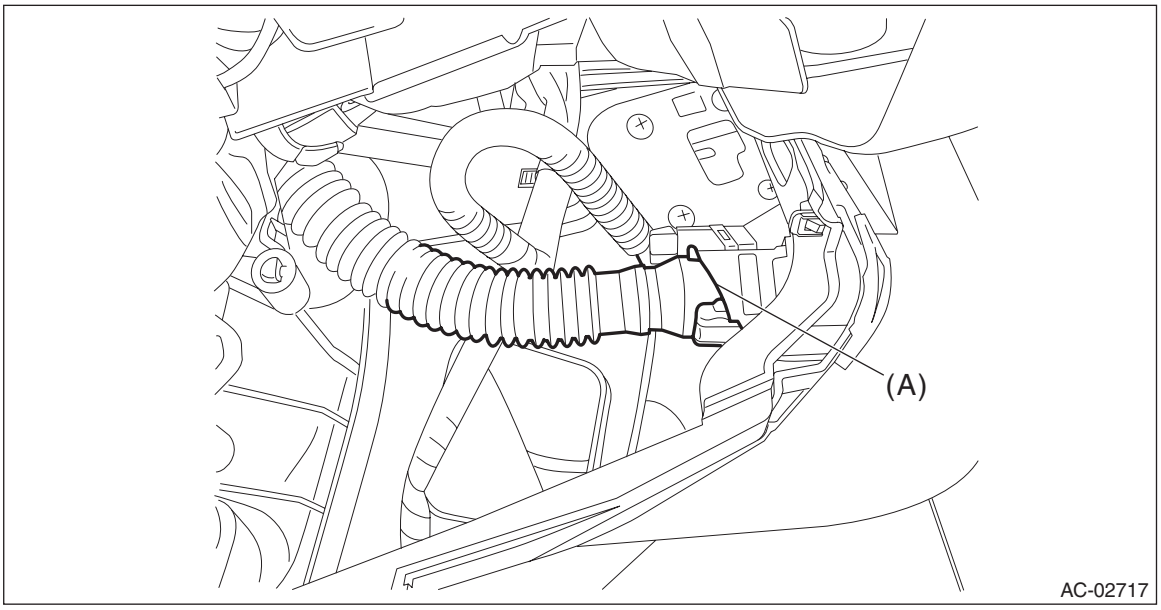


(1) Put a strip of paper close to the front side of the suction port (A).
(2) Can you see the paper moving towards the port and the air being sucked into the port?

CAUTION:
Be careful not to let the paper get sucked into the port.

- **Yes** → Go to step 5).
- **No** → Go to step 3).

3) Remove the cover assembly - instrument panel LWR driver, and check the aspirator hose (A).



(1) Are the aspirator hoses on both sides of the case and sensor connected securely?
(2) Is the aspirator hose free from any kinks or cracks?

- **Yes** → Go to step 4).
- **No** → Repair or replace the aspirator hose if necessary.

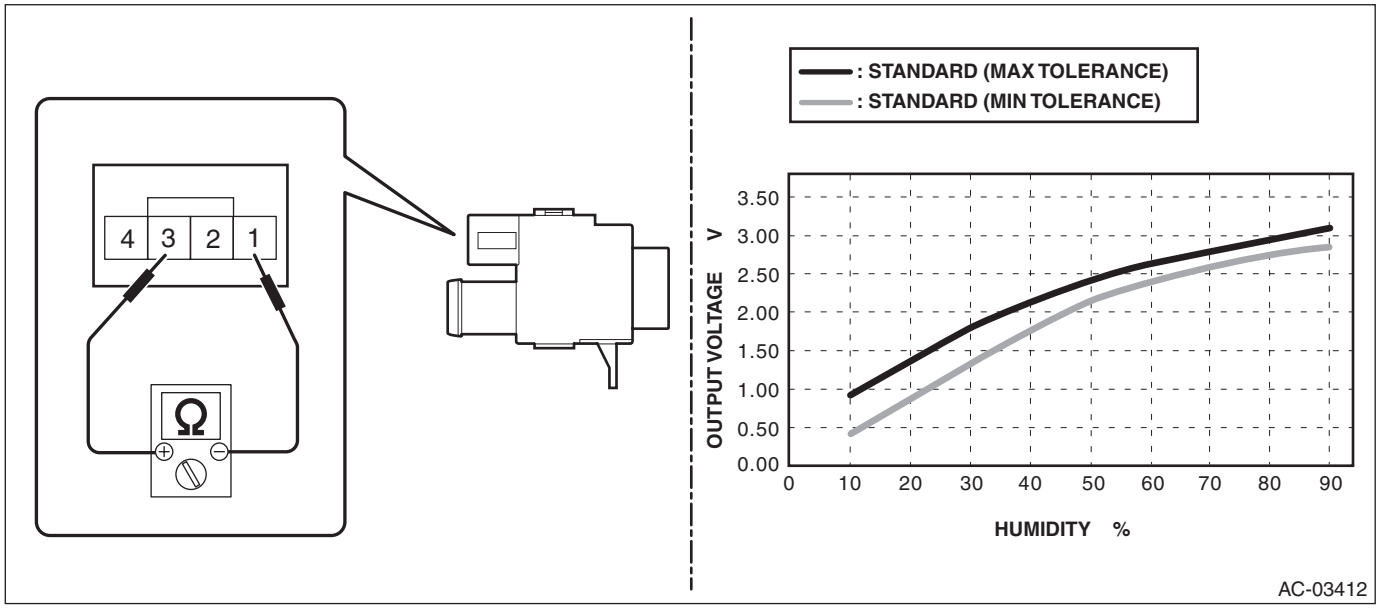
4) Check if there is anything that affects sensing around the temperature and humidity sensor.
(1) Is the temperature and humidity sensor hole free from clogging?
(2) Is the peripheral area of the temperature and humidity sensor free from any heat-producing parts (such as audio, navigation system etc.)?

- **Yes** → Go to step 5).
- **No** → Remove everything that affects sensing.

5) Perform the inspection of temperature and humidity sensor unit.
(1) Disconnect the temperature and humidity sensor connector.
(2) Is the voltage between terminals of temperature and humidity sensor within standard value?

CAUTION:
During inspection, be careful not to touch the sensor end in order to avoid misjudgment due to body temperature.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
1 — 3	10%	0.46 — 0.94 V
	20%	0.90 — 1.35 V
	30%	1.35 — 1.78 V
	40%	1.78 — 2.11 V
	50%	2.11 — 2.36 V
	60%	2.34 — 2.59 V
	70%	2.55 — 2.78 V
	80%	2.73 — 2.96 V
	90%	2.90 — 3.15 V

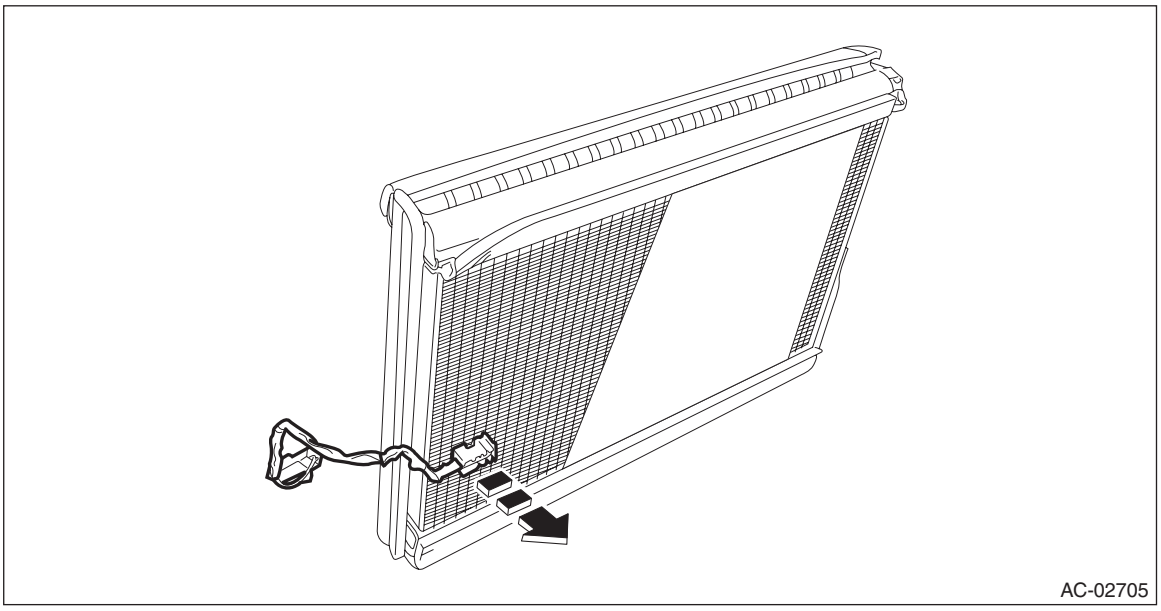
- **Yes** → The temperature and humidity sensor is normal.
- **No** → Replace the temperature and humidity sensor.

26.Evaporator Sensor

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Using the refrigerant recovery system, discharge refrigerant. <Ref. to AC-28, PROCEDURE, Refrigerant Recovery Procedure.>
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

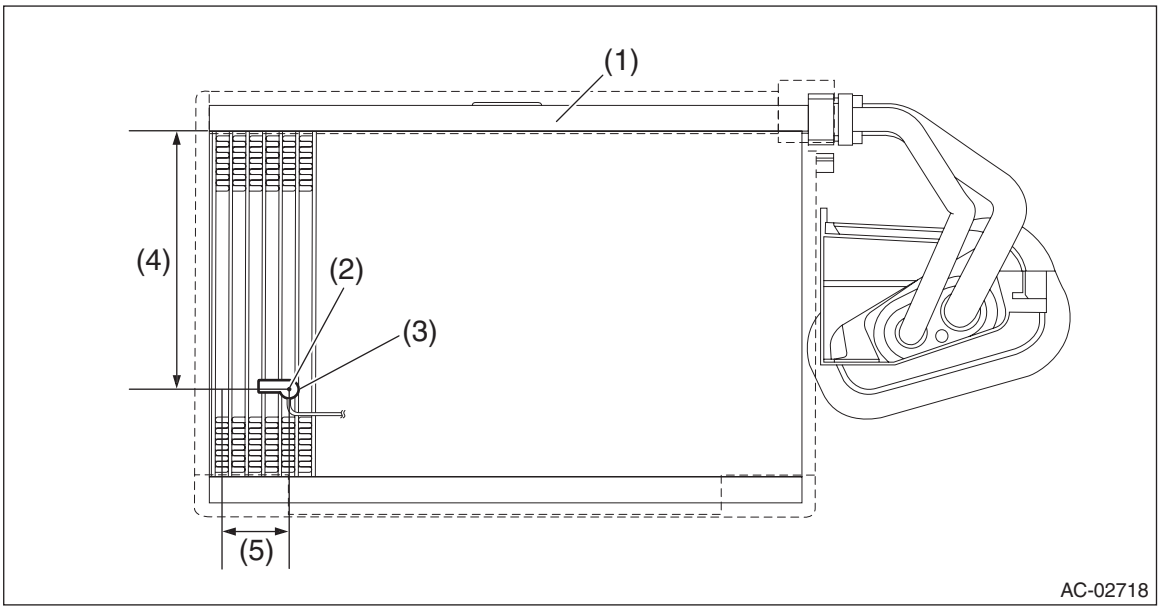
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the evaporator assembly - cooling. <Ref. to AC-60, REMOVAL, Evaporator.>
4) Remove the thermostat - cooling from the evaporator assembly - cooling.


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B: INSTALLATION

CAUTION:
- **Make sure that the water seal packing on the cover attachment area is securely attached.**
- **Replace the O-rings with new parts, and then apply compressor oil.**
- **Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>**

1) Install the thermostat - cooling at the position shown in the figure below.



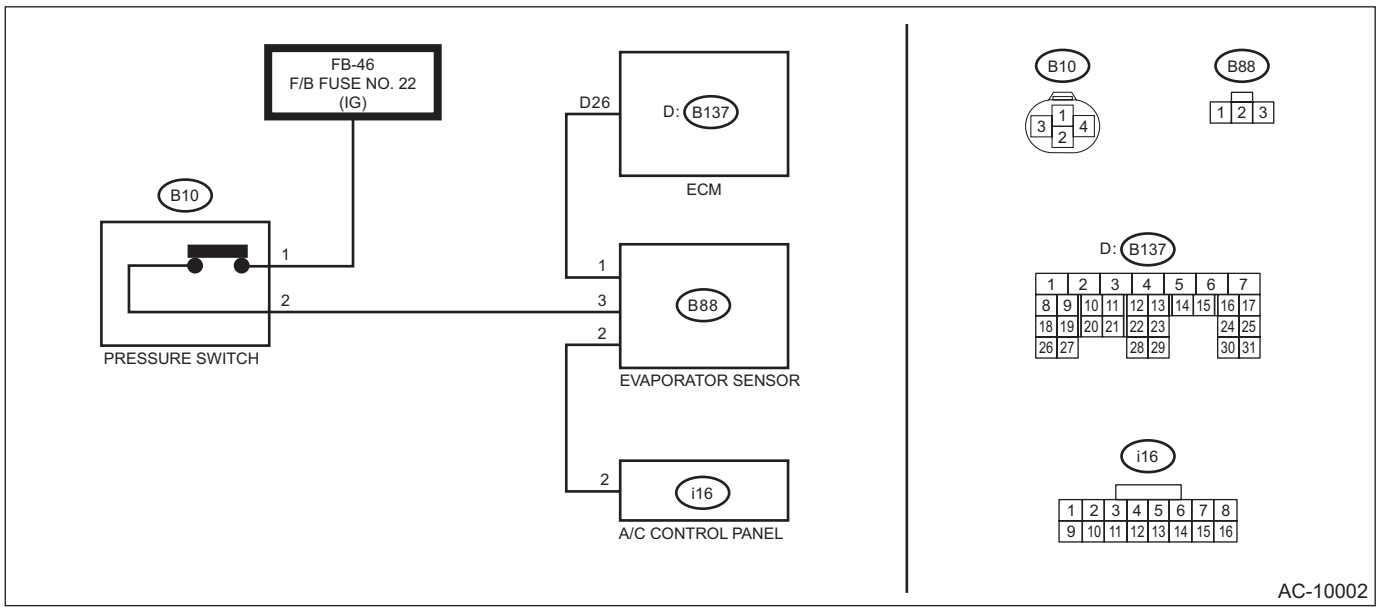
(1) Evaporator ASSY - cooling
(2) Center
(3) Thermostat - cooling
(4) 130 mm (5.12 in) from the upper end of the fins
(5) Fifth row fin from the left end

2) Install each part in the reverse order of removal.
3) Charge refrigerant. <Ref. to AC-30, PROCEDURE, Refrigerant Charging Procedure.>

C: INSPECTION

1. MANUAL A/C MODEL

WIRING DIAGRAM:



1) Prepare the vehicle.

NOTE:
Check that the ambient temperature is 25 — 40°C (77 — 104°F) and that the humidity is 30% — 80%.
- Place the vehicle in the workshop or in the shade and windless condition.
- Open all windows.

2) Set the vehicle to the following conditions and idle the engine for 15 minutes.

Item	Condition
Engine	Idling
Air vent grille	Shutter is fully open.
A/C switch	OFF
Temperature adjustment dial	LO (MAX COOL)
FRESH/RECIRC switch	RECIRC
Air flow control dial	VENT
Fan dial	3/4 level

3) Check evaporator sensor power supply input

Preparation tool:
Circuit tester
(1) Turn the ignition switch to OFF.
(2) Disconnect the evaporator sensor connector.
(3) Turn the ignition switch to ON.
(4) Measure the voltage between evaporator sensor connector and chassis ground.

Connector & terminal
(B88) No. 3 (+) — Chassis ground (–):
(5) Is the voltage approx. 12 V?
- **Yes** → Go to step 4).
- **No** → Repair or replace the harness.

4) Check evaporator sensor ground circuit
(1) Turn the ignition switch to OFF.
(2) Check continuity between evaporator sensor connector and chassis ground.

Connector & terminal
(B88) No. 2 — Chassis ground:
(3) Is there continuity?
- **Yes** → Go to step 6).
- **No** → Go to step 5).

5) Check open circuit in evaporator sensor ground circuit
(1) Disconnect the control panel connector.
(2) Check continuity between evaporator sensor connector and control panel connector.

Connector & terminal
(B88) No. 2 — (i16) No. 2:
(3) Is there continuity?
- **Yes** → Replace the control panel.
- **No** → Repair or replace the harness.

6) Check evaporator sensor signal output
(1) Connect the evaporator sensor connector and the control panel connector.
(2) Disconnect the engine control module (ECM) connector.
(3) Turn the ignition switch to ON.
(4) Turn the A/C switch to ON.
(5) Measure the voltage between engine control module (ECM) connector and chassis ground.

Connector & terminal
(B137) No. 26 (+) — Chassis ground (–):

(6) Is the voltage approx. 8 V or more?
- **Yes** → Evaporator sensor is normal.
- **No** → Go to step 7).

7) Check open circuit in evaporator sensor signal output circuit
(1) Turn the ignition switch to OFF.
(2) Disconnect the evaporator sensor connector.
(3) Check continuity between evaporator sensor connector and engine control module (ECM) connector.

Connector & terminal
(B88) No. 1 — (B137) No. 26:
(4) Is there continuity?
- **Yes** → Replace the evaporator sensor.
- **No** → Repair or replace the harness.

2. AUTO A/C MODEL

1) Prepare the vehicle.

NOTE:
Check that the ambient temperature is 25 — 40°C (77 — 104°F) and that the humidity is 30% — 80%.
- Place the vehicle in the workshop or in the shade and windless condition.
- Open all windows.

2) Set the vehicle to the following conditions.

Item	Condition
Engine	Idling
Air vent grille	Shutter is fully open.
A/C switch	OFF
Temperature adjustment dial	LO (MAX COOL)
FRESH/RECIRC switch	RECIRC
Air flow control dial or switch	VENT
Fan dial	5/7 level

3) Using the Subaru Select Monitor, check «Evaporator Temperature».

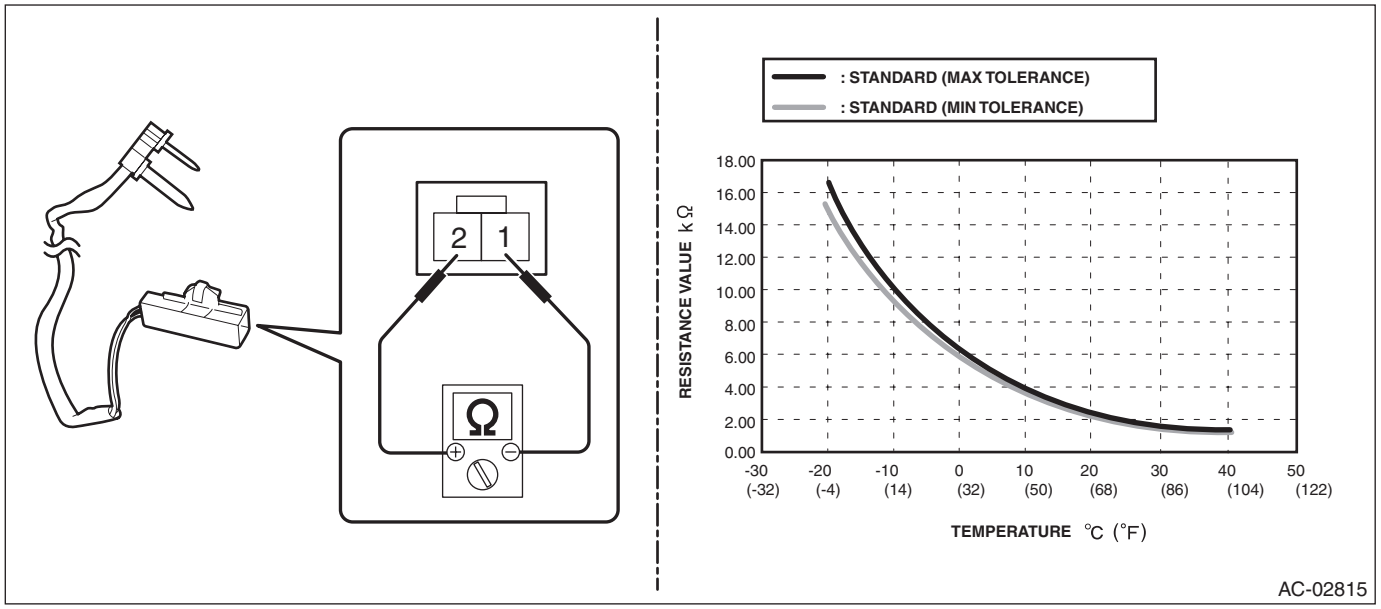
NOTE:
For detailed operation procedures, refer to “Application help”.
(1) Idle the engine for 15 minutes, and then compare the air flow outlet temperature with «Evaporator Temperature».

Preparation tool:
Thermometer and hygrometer

NOTE:
For outlet opening temperature, measure the average temperature of center grille assembly and side grille assembly.
(2) Do the air flow outlet temperature and «Evaporator Temperature» differ by 3°C (5.4°F) or more?
- **Yes** → Go to step 4).
- **No** → Evaporator sensor is normal.

4) Check the evaporator sensor.
(1) Disconnect the evaporator sensor connector.
(2) Is the resistance between terminals of evaporator sensor within standard value?

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
1 — 2	-20°C	15.37 — 16.62 kΩ
	-15°C	12.09 — 12.87 kΩ
	-10°C	9.576 — 10.05 kΩ
	-5°C	7.636 — 7.899 kΩ
	0°C	6.132 — 6.256 kΩ
	5°C	4.891 — 5.057 kΩ
	10°C	3.928 — 4.113 kΩ
	15°C	3.174 — 3.366 kΩ
	20°C	2.581 — 2.77 kΩ
	25°C	2.111 — 2.292 kΩ
	30°C	1.737 — 1.907 kΩ
	35°C	1.437 — 1.595 kΩ
	40°C	1.195 — 1.34 kΩ

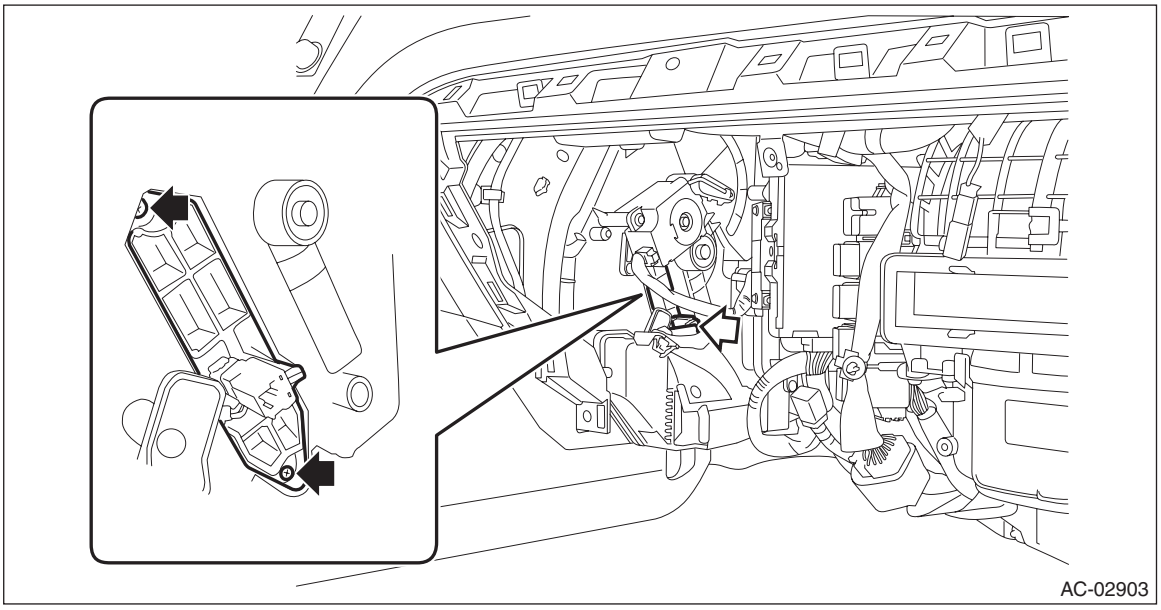
- **Yes** → Evaporator sensor is normal.
- **No** → Replace the evaporator sensor.

27.Heater Core Sensor

A: REMOVAL

NOTE:
Heater core sensor is installed only to HEV model.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the heater core sensor.
   (1) Disconnect the connector.
   (2) Remove the screw and detach the heater core sensor.



B: INSTALLATION

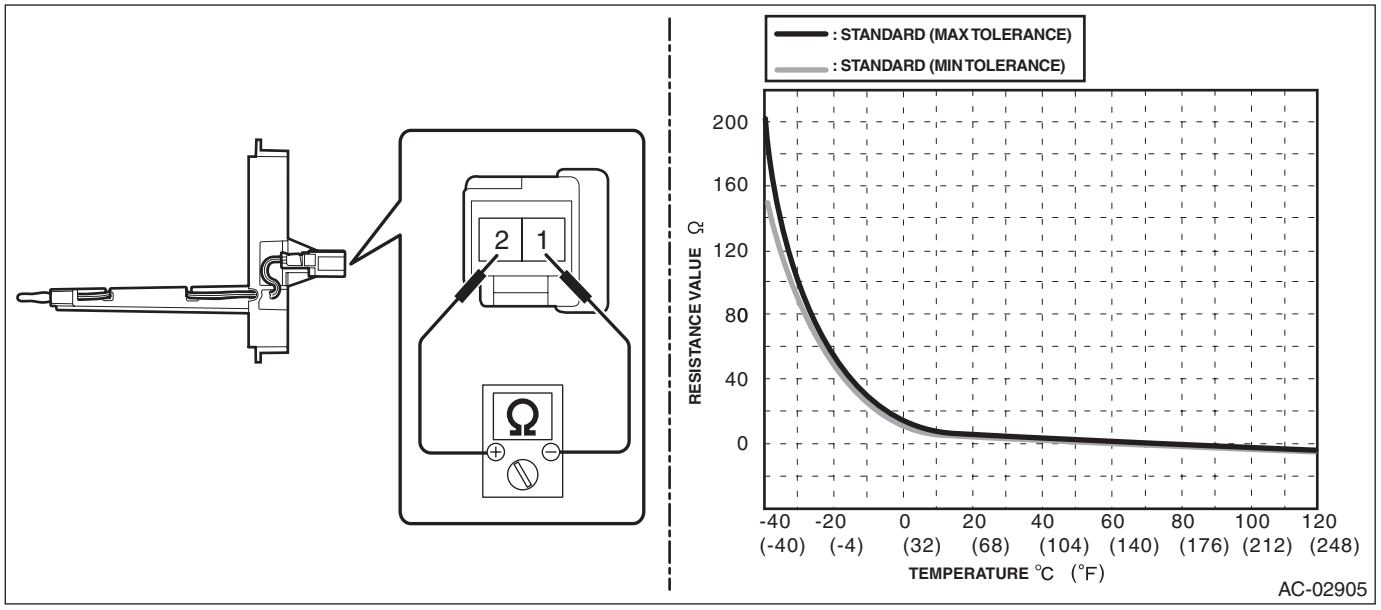
Install each part in the reverse order of removal.

C: INSPECTION

1) Check the resistance between heater core sensor terminals by using a circuit tester.

CAUTION:
During inspection, be careful not to touch the sensor end in order to avoid misjudgment due to body temperature.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
1 — 2	-40°C	151.6 — 201.1 Ω
	-35°C	109.9 — 142.7 Ω
	-30°C	80.55 — 102.4 Ω
	-25°C	59.69 — 74.44 Ω
	-20°C	44.69 — 54.69 Ω
	-15°C	33.79 — 40.61 Ω
	-10°C	25.79 — 30.45 Ω
	-5°C	19.86 — 23.06 Ω
	0°C	15.42 — 17.61 Ω
	5°C	12.05 — 13.55 Ω
	10°C	9.497 — 10.52 Ω
	15°C	7.538 — 8.229 Ω
	20°C	6.026 — 6.487 Ω
	25°C	4.85 — 5.15 Ω
	30°C	3.877 — 4.172 Ω
	35°C	3.12 — 3.4 Ω
	40°C	2.527 — 2.788 Ω
	45°C	2.059 — 2.299 Ω
	50°C	1.687 — 1.905 Ω
	55°C	1.39 — 1.588 Ω
	60°C	1.152 — 1.33 Ω
	65°C	0.9587 — 1.119 Ω
	70°C	0.8021 — 0.9457 Ω
	75°C	0.6743 — 0.8029 Ω
	80°C	0.5693 — 0.6846 Ω
	85°C	0.4828 — 0.586 Ω
	90°C	0.4112 — 0.5036 Ω
	95°C	0.3516 — 0.4345 Ω
	100°C	0.3017 — 0.3761 Ω
	105°C	0.26 — 0.3268 Ω
	110°C	0.2248 — 0.2849 Ω
	115°C	0.195 — 0.2491 Ω
	120°C	0.1697 — 0.2186 Ω

2) Replace the heater core sensor if the inspection result is not within the standard value.

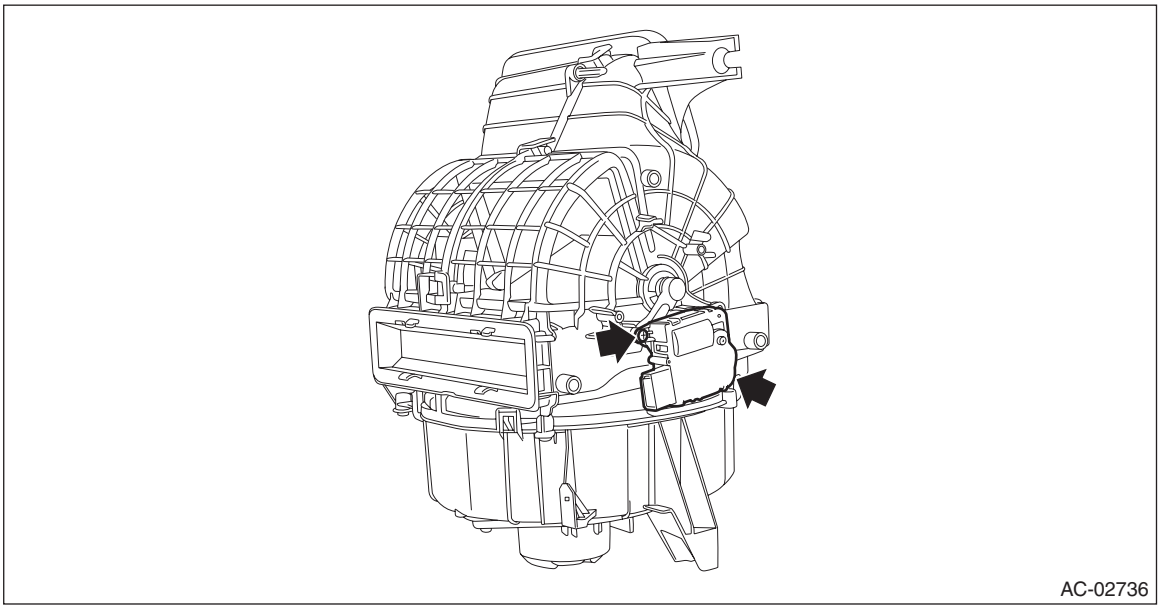
28.FRESH/RECIRC Door Actuator

A: REMOVAL

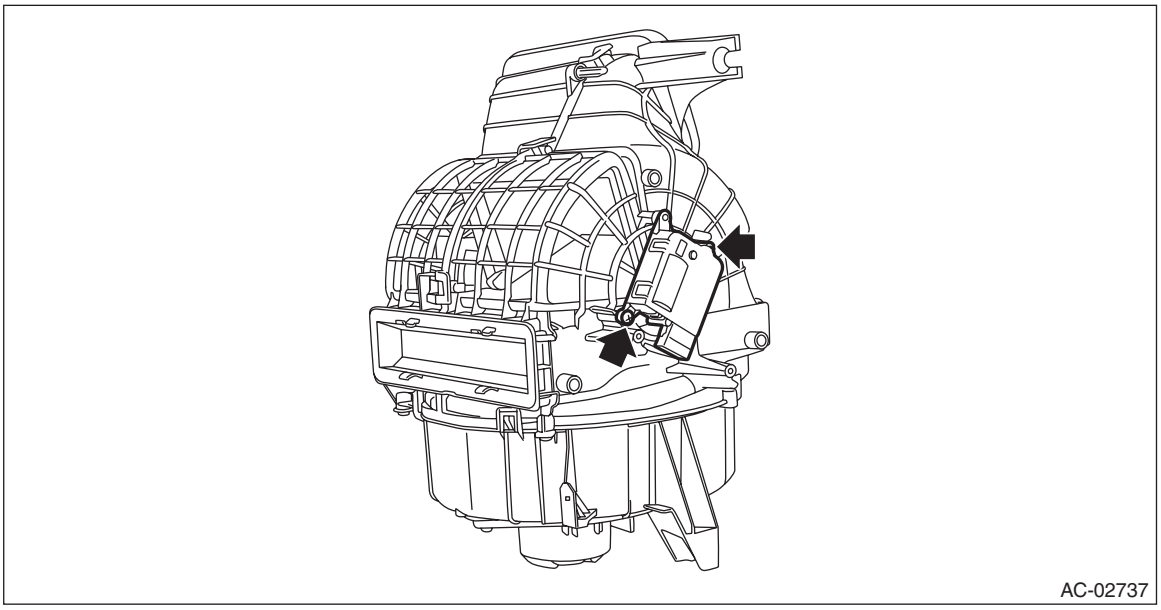
CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the engine control module (ECM).
- Gasoline engine model: <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).>
- HEV model: <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).>

4) Remove the blower motor unit assembly. <Ref. to AC-38, REMOVAL, Blower Motor Unit Assembly.>
5) Remove the screws and detach the motor - actuator blower.
- Manual A/C model


AC-02736

- Auto A/C model



B: INSTALLATION

CAUTION:
• After installing the grille assembly - ventilation RH, check that the air vent grille of the grille assembly - ventilation RH is inserted correctly into the air vent duct.
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

C: INSPECTION

1. CHECK LINK

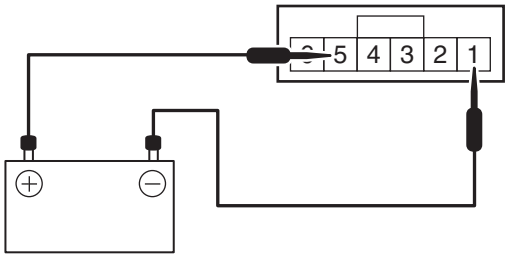
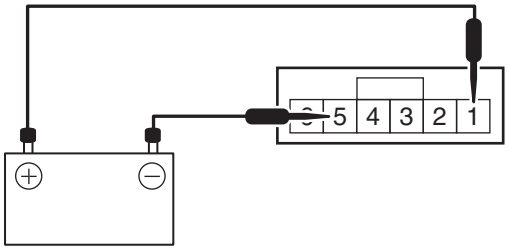
1) Visually check the operation range of the link, and remove the foreign material if any.
2) Operate the FRESH/RECIRC switch to check that the link operates normally.
3) If it does not operate normally as the result of inspection, check the motor - actuator blower.

2. CHECK ACTUATOR

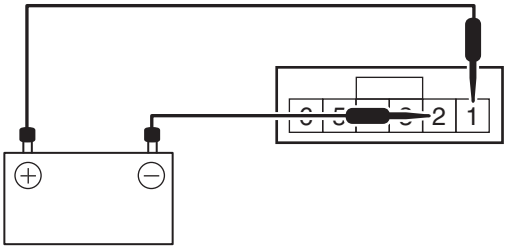
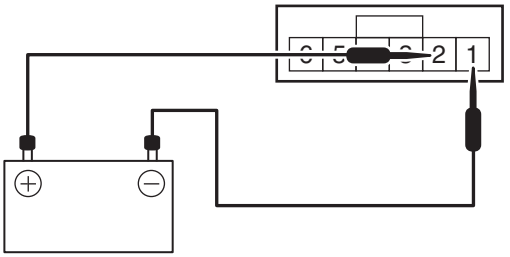
1) Check the actuator operation when battery voltage is applied between the terminals of actuator.

CAUTION:
Disconnect the battery immediately after the actuator stops operation. Otherwise, the motor may be damaged.

- Manual A/C model

Terminal No.	Inspection conditions	Operating position	Connection diagram
5 (+) — 1 (–)	Connect battery to the terminals	RECIRC	 AC-02738
1 (+) — 5 (–)		FRESH	 AC-02739

- Auto A/C model

Terminal No.	Inspection conditions	Operating position	Connection diagram
1 (+) — 2 (–)	Connect battery to the terminals	RECIRC	 AC-02742
2 (+) — 1 (–)		FRESH	 AC-02741

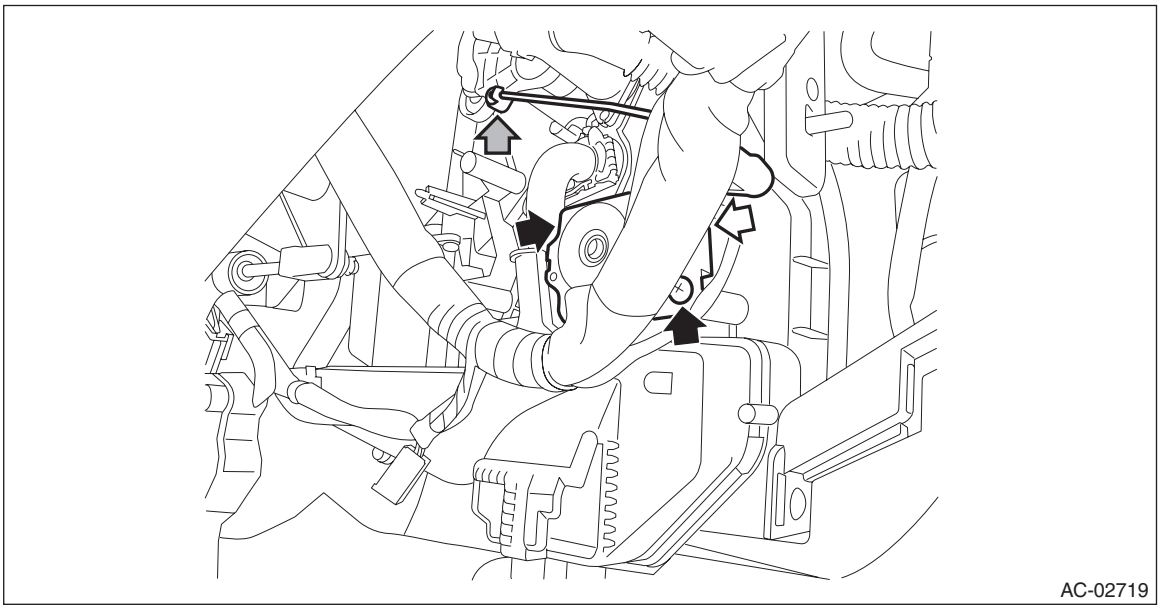
2) If it does not operate normally as the result of inspection, replace the motor - actuator blower.

29.Mode Door Actuator

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the motor - actuator mode.
   (1) Disconnect the connector, and remove the rod from the rod clamp.
   (2) Remove the screws and detach the motor - actuator mode.


AC-02719

B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

C: INSPECTION

1. CHECK LINK

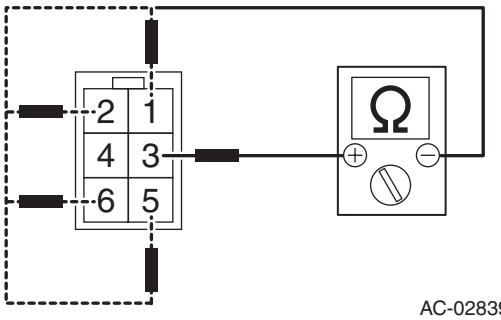
1) Visually check the operation range of the link, and remove the foreign material if any.
2) Operate the air flow control dial or switch to check that the link operates normally.
3) If it does not operate normally as the result of inspection, check the motor - actuator mode.

2. CHECK ACTUATOR

Unit inspection

1) Check the resistance between actuator terminals.

Preparation tool:
Circuit tester

Terminal No.	Inspection conditions	Standard	Connector Sketch
3 — 1	Always	80 — 100 Ω	
3 — 2			
3 — 5			
3 — 6			

2) Replace the motor - actuator mode if it is found defective as a result of inspection.

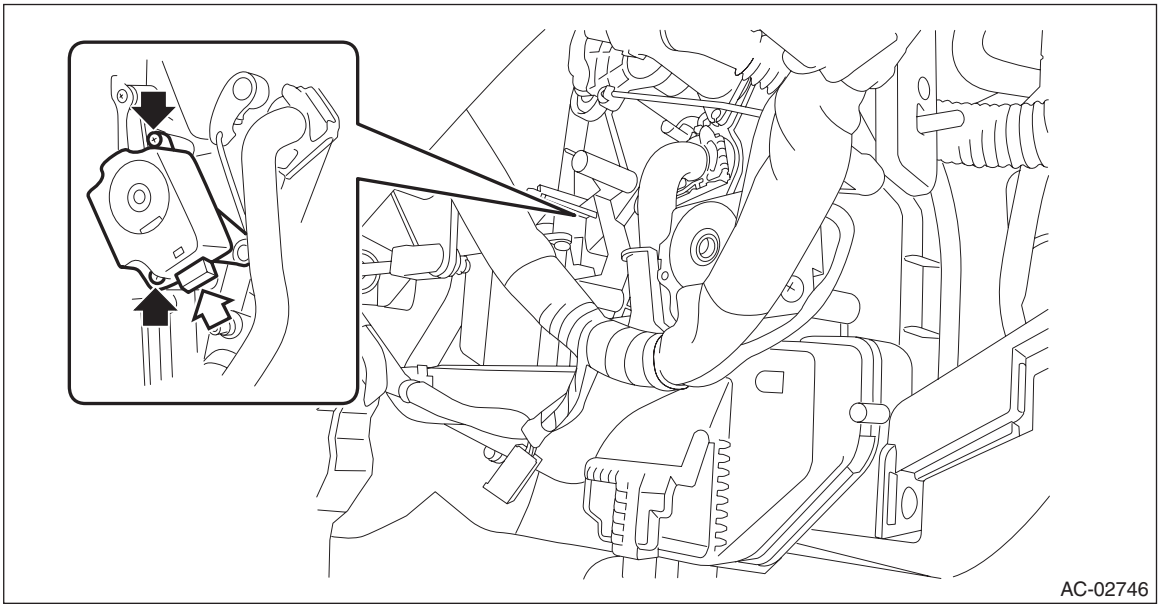
30.Air Mix Door Actuator

A: REMOVAL

1. LH

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the motor - actuator mix.
(1) Disconnect the connector, and remove the rod from the rod clamp.
(2) Remove the screws and detach the motor - actuator mix.

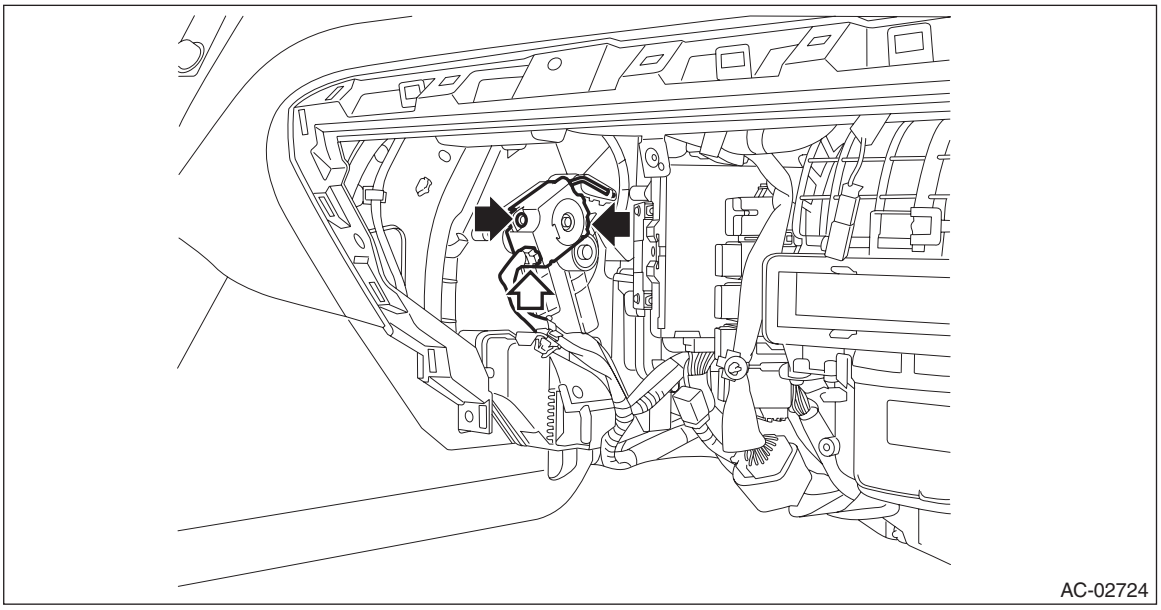

AC-02746

2. RH

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the motor - actuator mix.
(1) Disconnect the connector, and remove the rod from the rod clamp.

(2) Remove the screws and detach the motor - actuator mix.



B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

C: INSPECTION

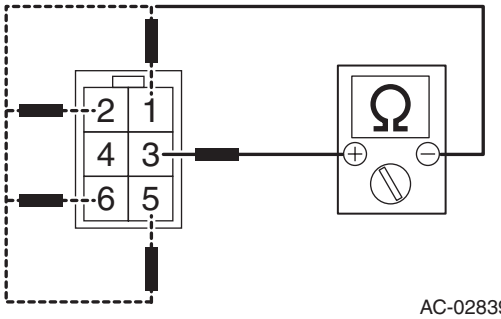
1. CHECK LINK

1) Visually check the operation range of the link, and remove the foreign material if any.
2) Operate the temperature control dial to check that the link operates normally.
3) If it does not operate normally as the result of inspection, check the motor - actuator mix.

2. CHECK ACTUATOR

1) Check the resistance between actuator terminals.

Preparation tool:
Circuit tester

Terminal No.	Inspection conditions	Standard	Connector Sketch
3 — 1	Always	80 — 100 Ω	
3 — 2			
3 — 5			
3 — 6			

2) Replace the motor - actuator mix if it is found defective as a result of inspection.

31.Air Vent Grille

A: REMOVAL

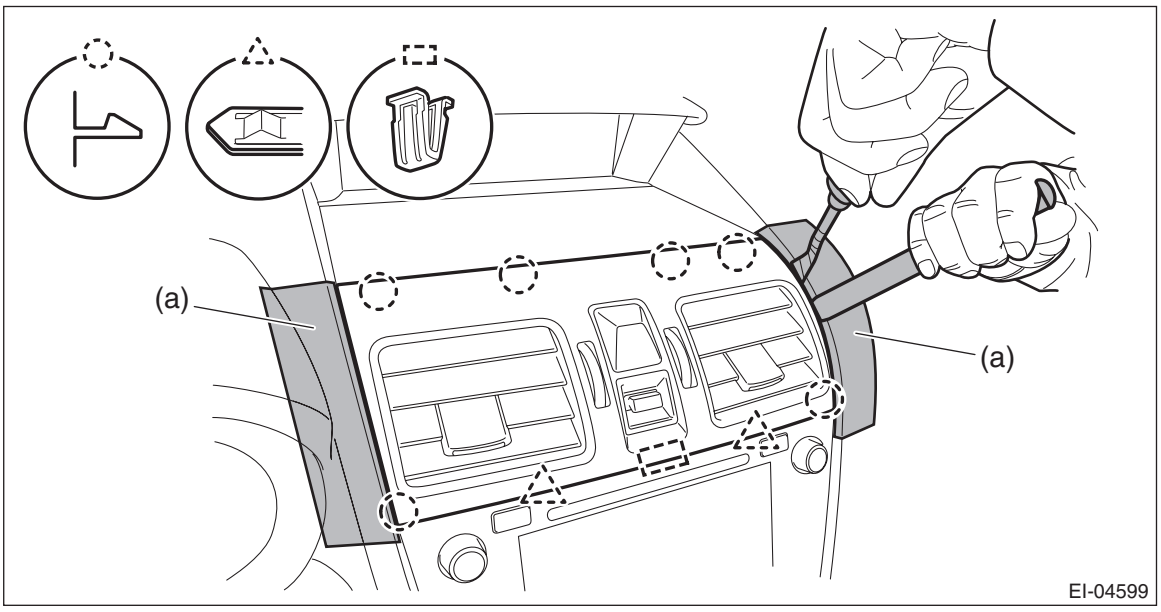
1. CENTER GRILLE ASSEMBLY

CAUTION:
- **Do not put your finger on the fin of the air vent grille. Doing so may damage the fin.**
- **Always pull the center grille assembly toward you slowly. If attempting to remove by turning it upward, the claws and connectors may be damaged.**

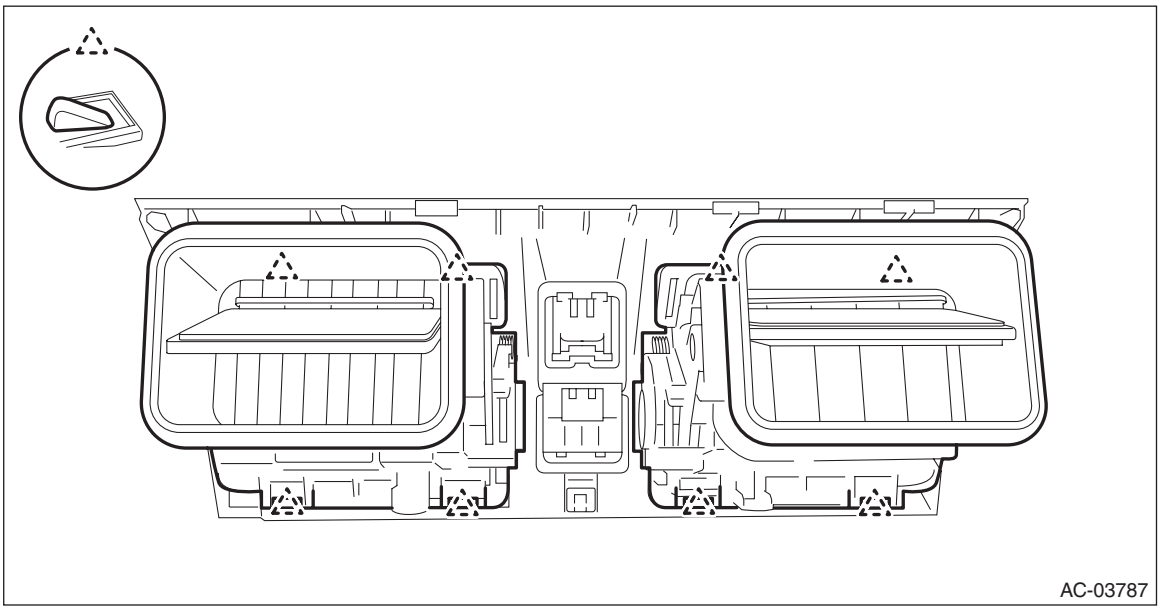
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the center grille assembly.
   (1) Attach the protective tape (a) to the instrument panel assembly.
   (2) Release the claw by using a clip remover wrapped with protective tape.
   (3) Disconnect the connector and remove the center grille assembly.



3) Release the claws, and then remove the grille assembly - CTR ventilation from the center grille assembly.



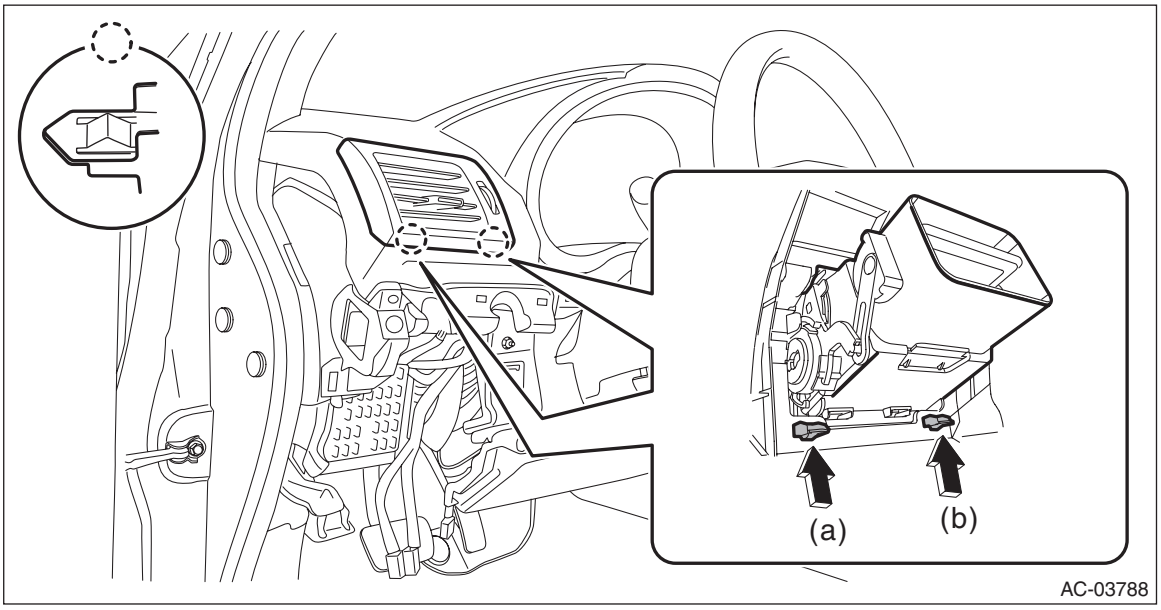
2. SIDE GRILLE ASSEMBLY

LH side

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver OUT. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the grille assembly - ventilation LH.

CAUTION:
• When using a flat tip screwdriver, apply protective tape or cloth and be careful not to cause damage.
• Do not pull the grille assembly - ventilation forcibly. Doing so may cause deformation or damage.
(1) Push the claw (a) on the outlet dial side upward from the back of the instrument panel assembly.
(2) While pushing, pull the grille assembly - ventilation toward you to release the claw.
(3) Release the other claw (b) in the same manner, then remove the grille assembly - ventilation LH.



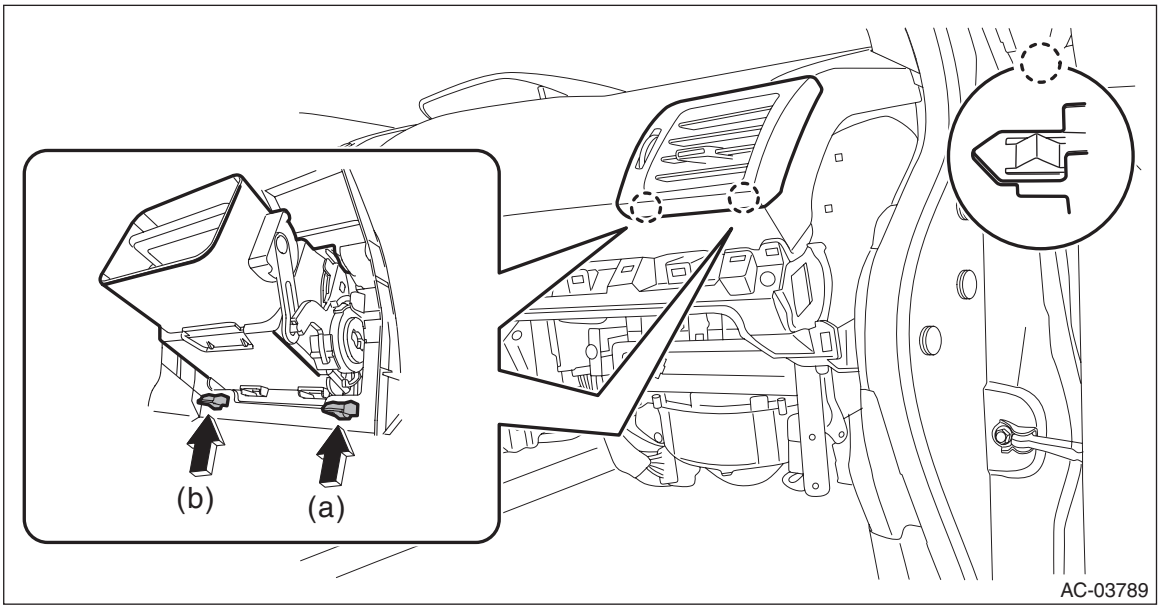
RH side

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the pocket assembly and the back panel - pocket. <Ref. to EI-74, REMOVAL, Glove Box.>
3) Remove the grille assembly - ventilation RH.

CAUTION:
• When using a flat tip screwdriver, apply protective tape or cloth and be careful not to cause damage.
• Do not pull the grille assembly - ventilation forcibly. Doing so may cause deformation or damage.
(1) Push the claw (a) on the outlet dial side upward from the back of the instrument panel assembly.
(2) While pushing, pull the grille assembly - ventilation toward you to release the claw.

(3) Release the other claw (b) in the same manner, then remove the grille assembly - ventilation RH.



B: INSTALLATION

CAUTION:
After installing the center grille assembly or grille assembly - ventilation, check that the air vent grille is inserted correctly into the air vent duct.
Install each part in the reverse order of removal.

C: INSPECTION

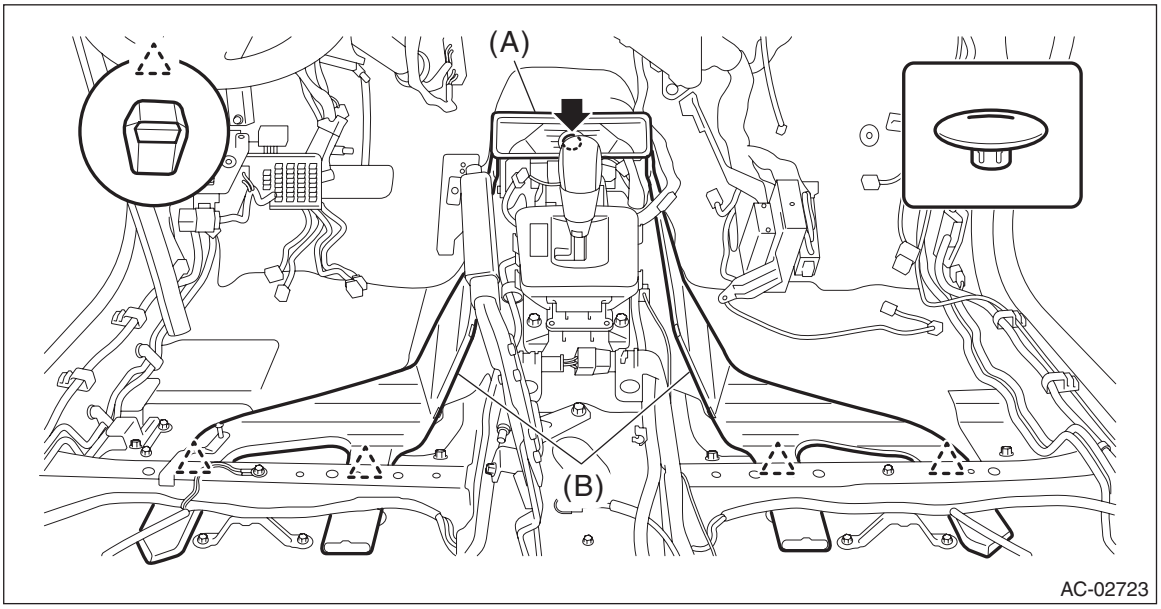
1) Check that the direction and amount of air can be adjusted smoothly. Replace the grille assembly - ventilation if faulty.
2) Check that the adjustment can be maintained in each position. Replace the grille assembly - ventilation if faulty.

32.Heater Duct

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the battery ground cable and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the front seats. <Ref. to SE-8, REMOVAL, Front Seat.>
3) Remove the heater and cooling unit assembly. <Ref. to AC-57, REMOVAL, Heater and Cooling Unit.>
4) Remove the duct - rear heater.
   (1) Lift the floor carpet.
   (2) Remove the clips, and remove the duct - rear heater CTR (A).
   (3) Release the claws, and remove the duct - rear heater (B) on LH and RH sides.



NOTE:
For HEV model, remove the duct - extension.

B: INSTALLATION

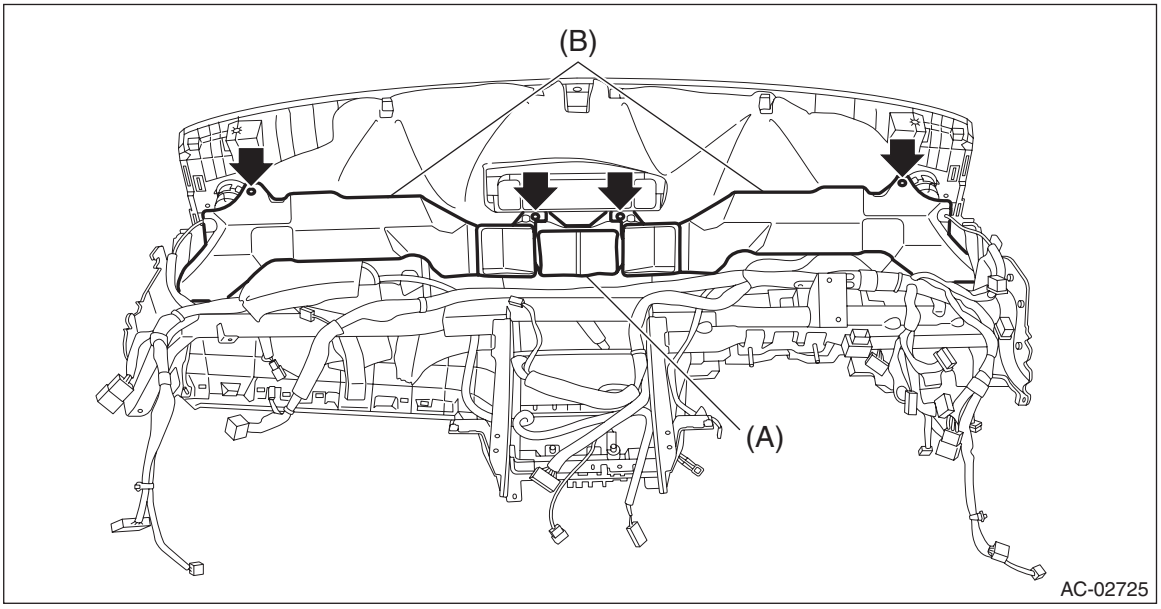
CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

33.Heater Vent Duct

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the battery ground cable and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the instrument panel assembly. <Ref. to EI-79, REMOVAL, Instrument Panel Assembly.>
3) Remove the screws and remove the duct - center vent (A) and the duct - side ventilation (B) on LH and RH sides.



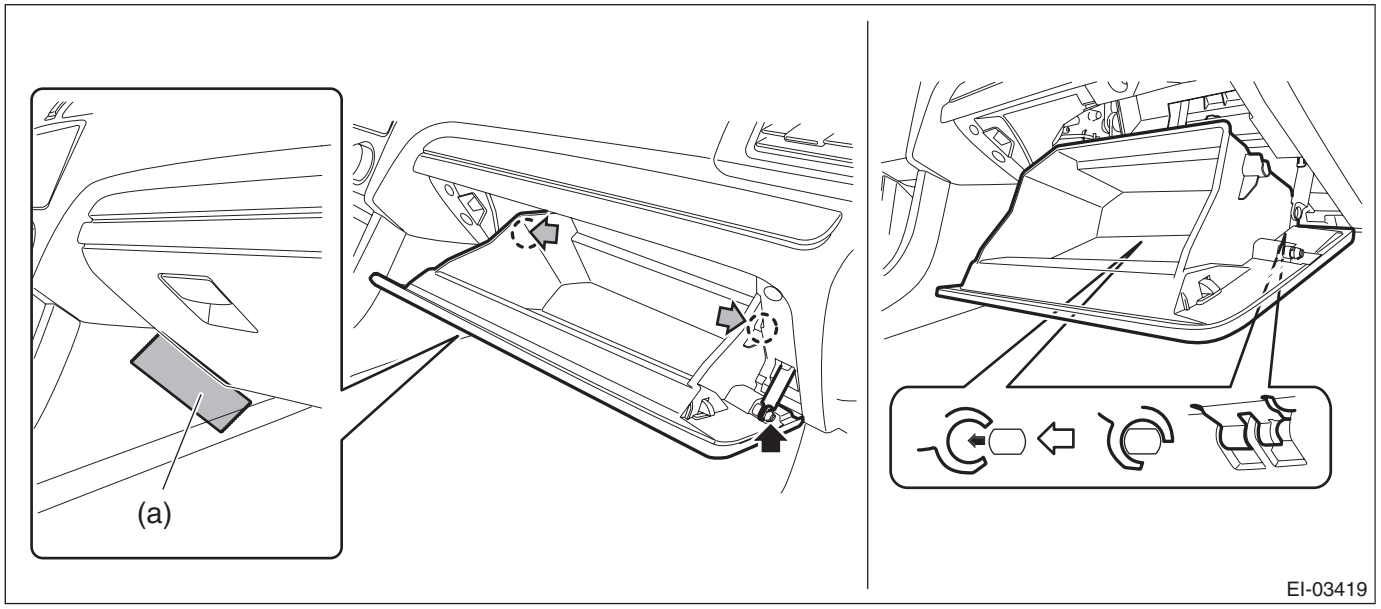
B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

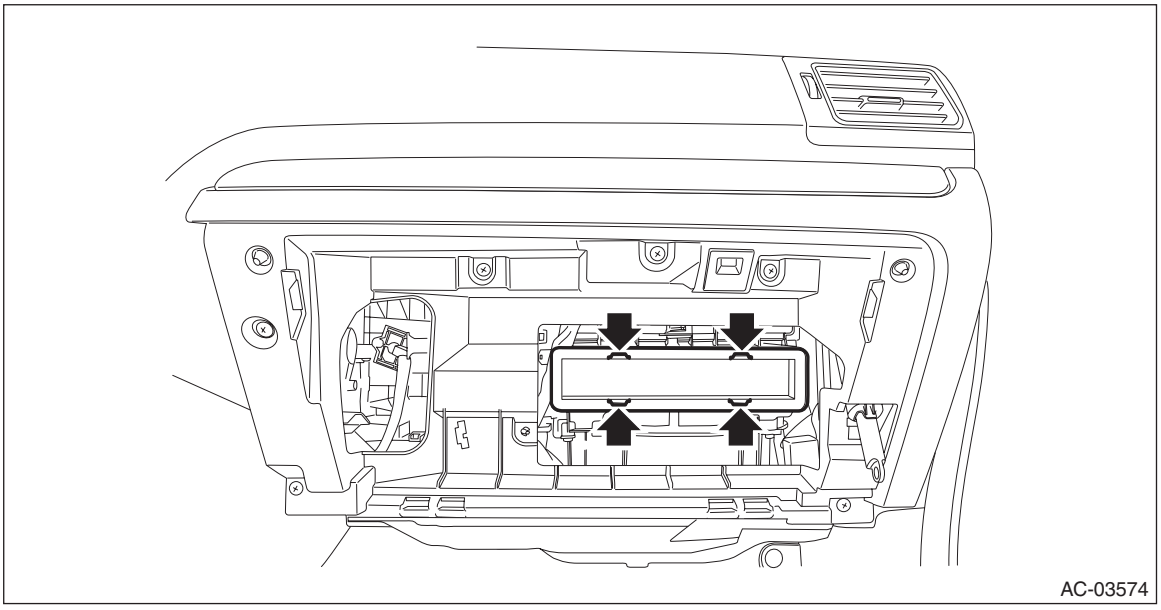
34.A/C Filter

A: REPLACEMENT

1) Remove the pocket assembly.
   (1) Attach the protective tape (a) to the panel center LWR.
   (2) Remove the damper COMPL - pocket.
   (3) Release the stoppers and remove the pocket assembly by pulling it toward you.



2) Pinch the tabs to release the lock, and remove the filter kit.



NOTE:
Pull out while tilting the front side of the filter downward to prevent dirt or dust from falling inside the case.

3) Install each part in the reverse order of removal.

35.Diagnostics with Phenomenon

A: INSPECTION

Refer to “Diagnostics with Phenomenon” for “HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)” section. <Ref. to AC(diag)-8, Diagnostics with Phenomenon.>

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

AC(diag)

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4. Auto A/C Control Module I/O Signal 6
5. Diagnostics with Phenomenon 8
6. Subaru Select Monitor 33
7. Read Diagnostic Trouble Code (DTC) 34
8. Clear Memory Mode 35
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10. Diagnostic Procedure for Subaru Select Monitor Communication 38
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1. Basic Diagnostic Procedure

A: PROCEDURE

NOTE:
When the sunload sensor check is performed indoors or in the shade, it could be diagnosed as sensor having an open circuit. Always perform the inspection in direct sunlight.

	Step	Check	Yes	No
1	**START INSPECTIONS.** 1) Prepare the tools. <Ref. to AC-19, PREPARATION TOOL, General Description.> 2) Perform the pre-inspection. <Ref. to AC(diag)-3, INSPECTION, General Description.>	Is any malfunction found in pre-inspection?	Fix the malfunction found in pre-inspection, and go to the next inspection step. Go to step **2**.	Go to step **2**.
2	**CHECK DTC.** 1) Under the failure condition, leave the vehicle for one minute or more. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).> NOTE: • If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to AC(diag)-38, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.> • Record the time stamp and the freeze frame data recorded together with the DTC. For time stamp, refer to “LAN SYSTEM”. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Is DTC displayed?	<Ref. to AC(diag)-40, LIST, List of Diagnostic Trouble Code (DTC).>	Refer to Diagnostics with Phenomenon. <Ref. to AC(diag)-8, INSPECTION, Diagnostics with Phenomenon.>

2. General Description

A: CAUTION

1) Never connect the battery in reverse polarity.
• Doing so may immediately damage the A/C control panel.
2) Do not disconnect the battery cables while the engine is running.
• A large counter electromotive force will be generated in the generator, and this voltage may damage electronic parts such as A/C control panel etc.
3) Before disconnecting the connectors of sensors and the A/C control panel, be sure to turn off the ignition switch.
• A/C control panel may be damaged.
4) Every A/C-related part is a precision part. Do not drop them.
5) Airbag system harness is routed near the A/C control panel and junction box.

CAUTION:
• Do not use electrical test equipment on the airbag system harness and connector.
• Be careful not to damage the airbag system harness when servicing the A/C control panel and junction box.

B: INSPECTION

Before performing diagnosis, check the following items which might affect the A/C system problems.

1. BATTERY

Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

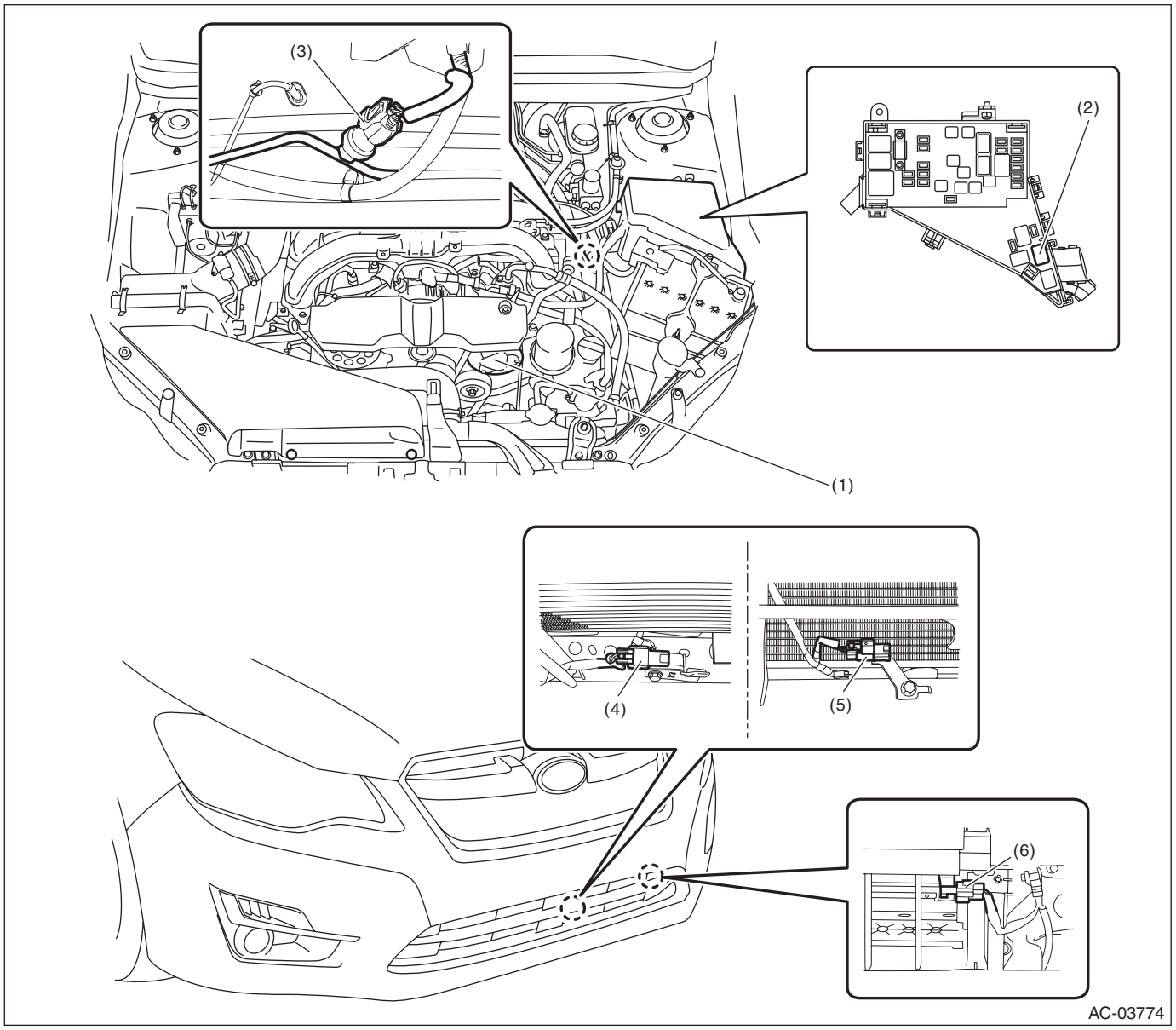
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

3. Electrical Component Location

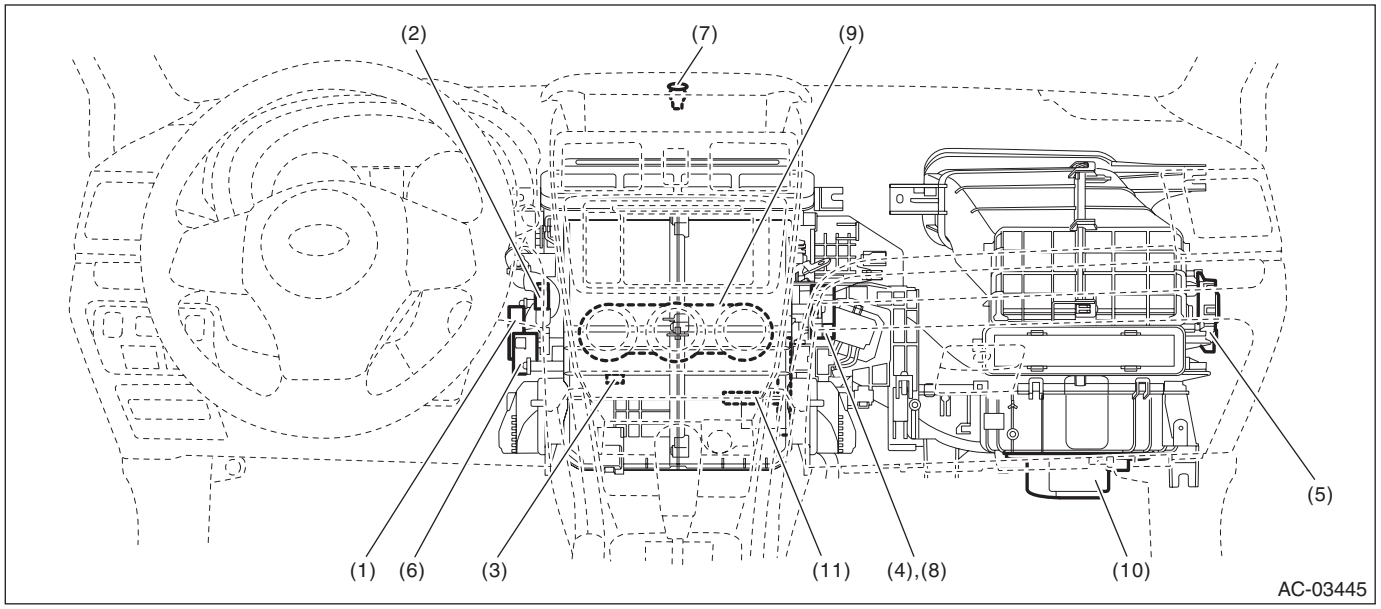
A: LOCATION

1. OUTSIDE VEHICLE



(1) A/C compressor
(2) A/C relay
(3) Pressure switch
(4) Ambient sensor (gasoline engine, other than Crosstrek model)
(5) Ambient sensor (gasoline engine, Crosstrek model)
(6) Ambient sensor (HEV model)

2. COMPARTMENT

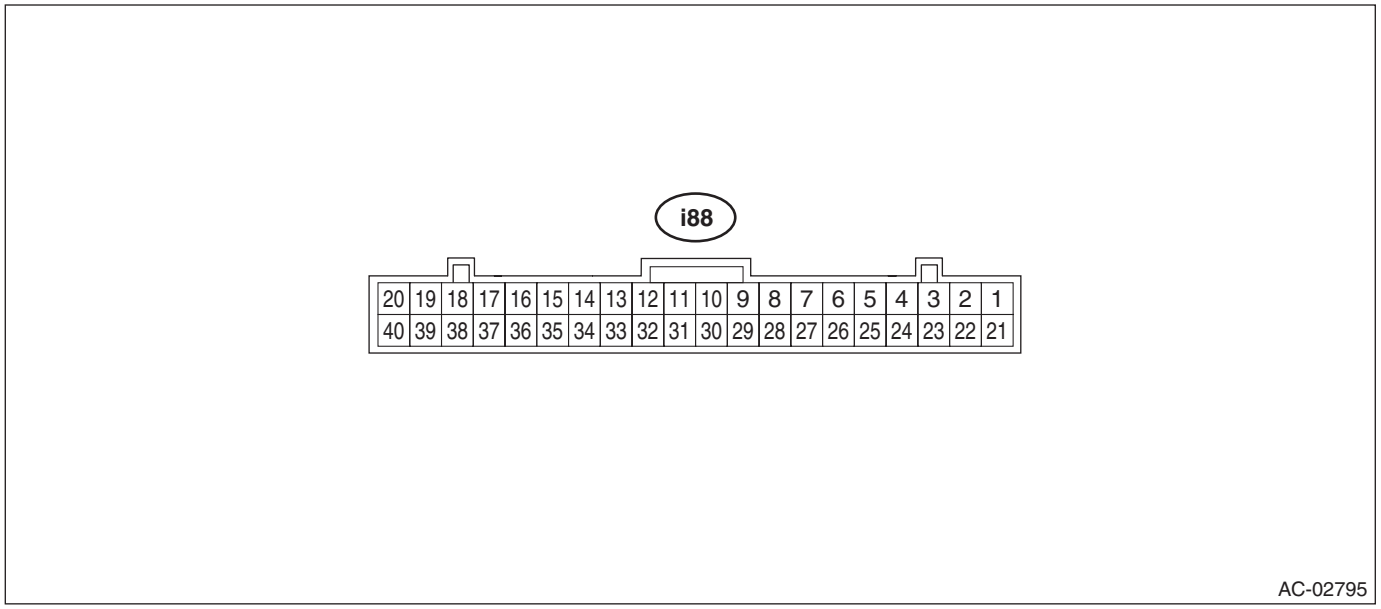


(1)	Air mix door actuator LH*2	(5)	Intake door actuator	(9)	A/C control panel
(2)	In-vehicle sensor or temperature and humidity sensor*3	(6)	Mode door actuator	(10)	Blower motor
(3)	Evaporator sensor	(7)	Sunload sensor	(11)	Heater core sensor*3
(4)	Air mix door actuator RH*2	(8)	Air mix door actuator*1		

*1: Without left/right independent air conditioning function
*2: With left/right independent air conditioning function
*3: HEV model

4. Auto A/C Control Module I/O Signal

A: ELECTRICAL SPECIFICATION



Terminal No.	Contents	Measuring condition	Standard
1	Mode door actuator #4	Digital signal; can not be measured	—
2	Mode door actuator #3	Digital signal; can not be measured	—
3	Mode door actuator #2	Digital signal; can not be measured	—
4	Mode door actuator #1	Digital signal; can not be measured	—
6	Intake door actuator (FRESH)	FRESH mode	8 V or more
8	Intake door actuator (RECIRC)	RECIRC mode	8 V or more
9	Blower fan ON signal	Blower fan is ON	1 V or less
10	Intake door potentiometer power supply	Ignition switch ON	5 V
11	A/C cut-off signal	A/C is cut off	1 V or less
12	Intake door potentiometer signal	Ignition switch ON	0 — 5 V
14	GND for sensors	Always	1 V or less
15	ACC power supply	ACC ON	Battery voltage
16	Sunload sensor	Sunlight is contacting sensor	1 — 4 V
17	RECIRC sensor	Ignition switch ON	25°C: 2.5 V
18	Post evaporator sensor	Depends on temperature after the evaporator.	1 — 4.5 V
19	CAN Lo	Digital signal; can not be measured	—
20	CAN Hi	Digital signal; can not be measured	—
21	Air mix door actuator LH #4*2	Digital signal; can not be measured	—
22	Air mix door actuator LH #3*2	Digital signal; can not be measured	—
23	Air mix door actuator LH #2*2	Digital signal; can not be measured	—
24	Air mix door actuator LH #1*2	Digital signal; can not be measured	—
25	Air mix door actuator #4 *1 or air mix door actuator RH #4 *2	Digital signal; can not be measured	—
26	Air mix door actuator #3 *1 or air mix door actuator RH #3 *2	Digital signal; can not be measured	—
27	Air mix door actuator #2 *1 or air mix door actuator RH #2 *2	Digital signal; can not be measured	—
28	Air mix door actuator #1 *1 or air mix door actuator RH #1 *2	Digital signal; can not be measured	—

Terminal No.	Contents	Measuring condition		Standard
31	BATT	Always		Battery voltage
32	IGN	Ignition ON		Battery voltage
33	Humidity sensor *3	Ignition ON (fluctuates depending on humidity of the vehicle interior.)		1 — 4.5 V
34	GND	Always		1 V or less
35	ILL–	Illumination ON (measure between 37 — 35)		Battery voltage
37	ILL+			
39	Heater core sensor*3	Ignition switch ON (Fluctuates depending on temperature after the heater core.)		0.5 — 4.0 V
40	Fan control signal	Ignition switch: ON, Blower switch: ON	1st	Approx. 9 V
			2nd	Approx. 8 V
			3rd	Approx. 7 V
			4th	Approx. 6 V
			5th	Approx. 5 V
			6th	Approx. 3.5 V
			7th	Approx. 0.5 V

*1: Without left/right independent air conditioning function
*2: With left/right independent air conditioning function
*3: HEV model

B: WIRING DIAGRAM

1. AIR CONDITIONER AUTO A/C MODEL

Refer to “Air Conditioning System” in the wiring diagram. <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

5. Diagnostics with Phenomenon

A: INSPECTION

1. Perform the diagnosis according to the diagnostic procedure of the corresponding symptom that is shown in the symptom list.
2. If there are multiple symptoms, perform the diagnosis in the symptom sequence (1 → 2 → ... → 13).

1. SYMPTOM LIST

Symptoms		Diagnostic procedure
1	Nothing is displayed on the screen. No illumination appears on the indicator.	<Ref. to AC(diag)-9, NOTHING IS DISPLAYED ON THE SCREEN. NO ILLUMINATION APPEARS ON THE INDICATOR, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
2	Air conditioner does not stop when pressing the OFF switch.	<Ref. to AC(diag)-10, AIR CONDITIONER DOES NOT STOP WHEN PRESSING THE OFF SWITCH, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
3	Windshield grass does not clear when pressing the DEF switch.	<Ref. to AC(diag)-11, WINDSHIELD GRASS DOES NOT CLEAR WHEN PRESSING THE DEF SWITCH, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
4	Cold air not emitted.	<Ref. to AC(diag)-12, COLD AIR NOT EMITTED, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
5	Warm air not emitted.	<Ref. to AC(diag)-14, WARM AIR NOT EMITTED, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
6	Compartment temperature is lower than setting temperature.	<Ref. to AC(diag)-17, COMPARTMENT TEMPERATURE IS LOWER THAN SETTING TEMPERATURE, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
7	Compartment temperature is higher than setting temperature.	<Ref. to AC(diag)-19, COMPARTMENT TEMPERATURE IS HIGHER THAN SETTING TEMPERATURE, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
8	Air does not come out. Airflow is low. (Blower motor does not rotate.)	<Ref. to AC(diag)-21, AIR DOES NOT COME OUT. AIRFLOW IS LOW, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
9	Airflow cannot be adjusted. (Blower motor turns at a high speed.)	<Ref. to AC(diag)-24, AIR CANNOT BE CONTROLLED, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
10	Cool air does not come out when pressing the A/C switch. Fog cannot be cleared. (Compressor does not operate.)	<Ref. to AC(diag)-26, COOL AIR DOES NOT COME OUT WHEN PRESSING THE A/C SWITCH. FOG CANNOT BE CLEARED. (COMPRESSOR DOES NOT OPERATE.), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
11	Unable to switch suction vents.	<Ref. to AC(diag)-29, UNABLE TO SWITCH SUCTION VENTS, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
12	Unable to switch blow vents.	<Ref. to AC(diag)-30, UNABLE TO SWITCH VENTS, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
13	Illumination does not illuminate or cannot be dimmed.	<Ref. to AC(diag)-31, ILLUMINATION DOES NOT ILLUMINATE OR CANNOT BE DIMMED, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

B: DIAGNOSTIC PROCEDURE WITH PHENOMENON

1. NOTHING IS DISPLAYED ON THE SCREEN. NO ILLUMINATION APPEARS ON THE INDICATOR

TROUBLE SYMPTOM:

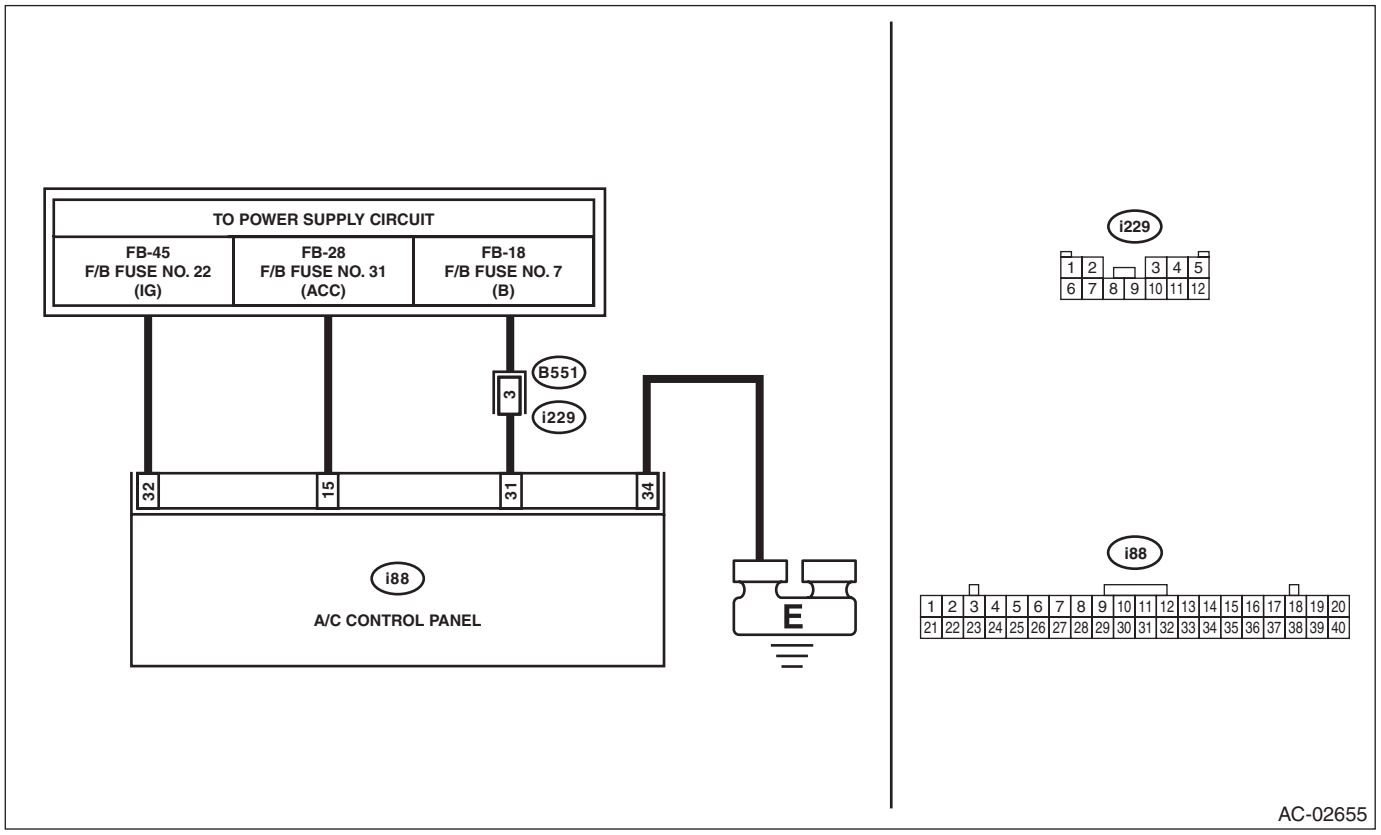
- When the AUTO button is pressed with IGN ON, nothing is displayed on the screen or indicators do not illuminate.
- Self diagnosis using A/C control panel does not operate.

TROUBLE CAUSES:

- A/C control panel power supply circuit failure
- CAN communication failure

WIRING DIAGRAM:

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove a fuse from fuse & relay box. 3) Check the condition of fuse.	Is the fuse blown out?	Replace the fuse.	Go to step **2**.
2	**CHECK CONNECTOR.** Check for poor contact of connector.	Is there poor contact of connector?	Repair the connector.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK A/C CONTROL PANEL POWER CIRCUIT.** 1) Remove the A/C control panel. 2) Disconnect the A/C control panel connector. 3) Measure the voltage between A/C control panel connector terminal and chassis ground after turning the ignition switch to ON. ***Connector & terminal*** ***(i88) No. 15 (+) — Chassis ground (–):*** ***(i88) No. 31 (+) — Chassis ground (–):*** ***(i88) No. 32 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Check for open or short circuit in the harness between A/C control panel and fuse.
4	**CHECK A/C CONTROL PANEL GROUND CIRCUIT.** Measure the resistance of harness between A/C control panel and chassis ground after turning the ignition switch to OFF. ***Connector & terminal*** ***(i88) No. 34 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair the harness for ground line.
5	**CHECK FOR POOR CONTACT.** Check poor contact of A/C control panel connector.	Is there poor contact of connector?	Repair the connector.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

2. AIR CONDITIONER DOES NOT STOP WHEN PRESSING THE OFF SWITCH

TROUBLE SYMPTOM:

Even when the OFF switch is pressed, the blower fan does not turn off, the inlet opening remains in FRESH mode, and the compressor does not turn off.

Trouble causes:

- CAN communication failure
- A/C control panel failure
- Blower motor failure
- Intake door actuator failure
- Compressor failure

	Step	Check	Yes	No
1	**CHECK A/C CONTROL PANEL.** 1) Turn the ignition switch to ON. 2) Press the OFF switch of the A/C control panel. 3) Using Subaru Select Monitor, check the following data in “Read Current Data”. <Ref. to AC(diag)-36, Read Current Data.> • Blower fan level • Fresh/Recircle Air Door Actuator Position Target	Does “Blower Fan Level” indicate 0 and “Fresh/Recircle Air Door Actuator Position Target” indicate 100%?	Go to step **2**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
2	**CHECK BLOWER MOTOR.** With the OFF switch pressed, check the blower motor operation.	Is the blower motor stopped?	Go to step **3**.	<Ref. to AC(diag)-24, AIR CANNOT BE CONTROLLED, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

	Step	Check	Yes	No
3	**CHECK INTAKE DOOR ACTUATOR.** With the OFF switch pressed, check the FRESH/RECIRC door operation.	Does the FRESH/RECIRC door set to FRESH?	Go to step **4**.	<Ref. to AC(diag)-29, UNABLE TO SWITCH SUCTION VENTS, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
4	**CHECK COMPRESSOR.** With the OFF switch pressed, check the compressor operation.	Is the compressor stopped?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	<Ref. to AC(diag)-26, COOL AIR DOES NOT COME OUT WHEN PRESSING THE A/C SWITCH. FOG CANNOT BE CLEARED. (COMPRESSOR DOES NOT OPERATE.), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

3. WINDSHIELD GRASS DOES NOT CLEAR WHEN PRESSING THE DEF SWITCH

TROUBLE SYMPTOM:

Even when the DEF switch is pressed, the defroster indicator does not illuminate, the outlet opening is not set to DEF, the compressor does not turn on and the FRESH/RECIRC does not switch to FRESH.

Trouble causes:

- CAN communication failure
- A/C control panel failure
- Mode door actuator failure
- Compressor failure
- Intake door actuator failure

	Step	Check	Yes	No
1	**CHECK A/C CONTROL PANEL.** 1) Turn the ignition switch to ON. 2) Press the DEF switch of the A/C control panel. 3) Using Subaru Select Monitor, check the following data in “Read Current Data”. <Ref. to AC(diag)-36, Read Current Data.> • Mode Door Actuator Position Target • Fresh/Recircle Air Door Actuator Position Target	Does “Mode Door Actuator Position Target” indicate 100% and “Fresh/Recircle Air Door Actuator Position Target” indicate 100%?	Go to step **2**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
2	**CHECK MODE DOOR ACTUATOR.** With the DEF switch ON, check the mode door operation.	Does the air come out from the DEF outlet opening?	Go to step **3**.	<Ref. to AC(diag)-30, UNABLE TO SWITCH VENTS, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

	Step	Check	Yes	No
3	**CHECK INTAKE DOOR ACTUATOR.** With the DEF switch ON, check the FRESH/RECIRC door operation.	Is FRESH/RECIRC switch turned to “FRESH?”	Go to step **4**.	<Ref. to AC(diag)-29, UNABLE TO SWITCH SUCTION VENTS, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
4	**CHECK COMPRESSOR.** With the DEF switch ON, check the compressor operation.	Does the compressor operate?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	<Ref. to AC(diag)-26, COOL AIR DOES NOT COME OUT WHEN PRESSING THE A/C SWITCH. FOG CANNOT BE CLEARED. (COMPRESSOR DOES NOT OPERATE.), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

4. COLD AIR NOT EMITTED

TROUBLE SYMPTOM:
Cold air not emitted.
Trouble causes:
- Airflow capacity failure
- Refrigerant pressure failure
- CAN communication failure
- A/C control panel failure
- Air mix actuator RH failure
- Air mix actuator LH failure (only with left/right independent air conditioning function)
- Intake door actuator failure
- Evaporator sensor failure
- In-vehicle sensor failure
- Ambient sensor failure
- Sunload sensor failure

	Step	Check	Yes	No
1	**CHECK MAX COOL.** Set the A/C control panel dials as follows. Temperature control dial: MAX COOL FRESH/RECIRC switch: RECIRC Mode switch or mode dial: VENT A/C switch: ON	Does it fail to blow the cold air?	Go to step **2**.	Go to step **4**.
2	**CHECK AIRFLOW CAPACITY.** Check the airflow capacity. <Ref. to AC(diag)-21, AIR DOES NOT COME OUT. AIRFLOW IS LOW, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>	Is the airflow capacity normal?	Go to step **3**.	Perform repair according to inspection procedure.

	Step	Check	Yes	No
3	**CHECK AMOUNT OF REFRIGERANT PRESSURE.** Check the refrigerant pressure. <Ref. to AC-23, REFRIGERANT GAS PRESSURE INSPECTION, PROCEDURE, Refrigerant Pressure with Manifold Gauge Set.>	Is the refrigerant pressure normal?	Go to step **4**.	Perform repair according to refrigerant pressure inspection.
4	**CHECK A/C CONTROL PANEL.** 1) Turn the temperature control dials (driver's side) and (passenger's side) to MAX COOL. 2) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Heater Control Panel Setting Value (driver's) • Heater Control Panel Setting Value (passenger's)	Do "Heater Control Panel Setting Value (Driver's)" and "Heater Control Panel Setting Value (Passenger's)" indicate "60"*1?	Go to step **5**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
5	**CHECK A/C CONTROL PANEL.** 1) Turn the temperature control dials (driver's side) and (passenger's side) to MAX HOT. 2) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Heater Control Panel Setting Value (driver's) • Heater Control Panel Setting Value (passenger's)	Do "Heater Control Panel Setting Value (Driver's)" and "Heater Control Panel Setting Value (Passenger's)" indicate "90"*2?	Go to step **6**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
6	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Turn the temperature control dial at MAX COOL and leave for 16 seconds or more. (For vehicles with left/right independent air conditioner, perform setting on both sides.) 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E1, B14E2, B14E3 or B14E4 displayed?	Perform the diagnosis according to DTC.	Go to step **7**.
7	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Turn the temperature control dial at MAX HOT and leave for 16 seconds or more. (For vehicles with left/right independent air conditioner, perform setting on both sides.) 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E1, B14E2, B14E3 or B14E4 displayed?	Perform the diagnosis according to DTC.	Go to step **8**.
8	**CHECK INTAKE DOOR ACTUATOR.** Visually check the intake door actuator operation.	Is the intake door actuator normal?	Go to step **9**.	Check the intake door actuator. <Ref. to AC(diag)-29, UNABLE TO SWITCH SUCTION VENTS, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
9	**CHECK EVAPORATOR SENSOR UNIT.** Perform the inspection of evaporator sensor unit. <Ref. to AC-86, INSPECTION, Evaporator Sensor.>	Is the evaporator sensor normal?	Go to step **10**.	Replace the evaporator sensor. <Ref. to AC-85, REMOVAL, Evaporator Sensor.>

	Step	Check	Yes	No
10	**CHECK IN-VEHICLE SENSOR OR TEMPERATURE AND HUMIDITY SENSOR UNIT.** Check the in-vehicle sensor or temperature and humidity sensor. <Ref. to AC-79, INSPECTION, In-Vehicle Sensor (Auto A/C Model).>	Is the in-vehicle sensor or temperature and humidity sensor normal?	Go to step **11**.	Replace the in-vehicle sensor or temperature and humidity sensor. <Ref. to AC-78, REMOVAL, In-Vehicle Sensor (Auto A/C Model).>
11	**CHECK AMBIENT SENSOR UNIT.** Check the ambient sensor. <Ref. to AC-75, INSPECTION, Ambient Sensor.>	Is the ambient sensor normal?	Go to step **12**.	Replace the ambient sensor. <Ref. to AC-72, REMOVAL, Ambient Sensor.>
12	**CHECK SUNLOAD SENSOR UNIT.** Check the sunload sensor unit. <Ref. to AC-77, INSPECTION, Sunload Sensor (Auto A/C Model).>	Is the sunload sensor normal?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the sunload sensor. <Ref. to AC-76, REMOVAL, Sunload Sensor (Auto A/C Model).>

*1: For the 75°F center specification. For the 25°C center specification, the value is 18.
*2: For the 75°F center specification. For the 25°C center specification, the value is 32.

5. WARM AIR NOT EMITTED

TROUBLE SYMPTOM:
Warm air not emitted.
Trouble causes:
- Airflow capacity failure
- Coolant level failure
- CAN communication failure
- A/C control panel failure
- Air mix actuator RH failure
- Air mix actuator LH failure (only with left/right independent air conditioning function)
- Intake door actuator failure
- Evaporator sensor failure
- In-vehicle sensor failure
- Ambient sensor failure
- Sunload sensor failure

	Step	Check	Yes	No
1	**CHECK MAX HOT.** Set the A/C control panel dials as follows. Temperature control dial: MAX HOT FRESH/RECIRC switch: FRESH Mode switch or mode dial: HEAT A/C switch: OFF	Does it fail to blow the hot air?	Go to step **2**.	Go to step **4**.

	Step	Check	Yes	No
2	**CHECK AIRFLOW CAPACITY.** Check the airflow capacity. <Ref. to AC(diag)-21, AIR DOES NOT COME OUT. AIRFLOW IS LOW, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>	Is the airflow capacity normal?	Go to step **3**.	Perform repair according to inspection procedure.
3	**CHECK ENGINE COOLANT.** Check engine coolant amount.	Is the engine coolant level within the specification?	Go to step **4**.	Fill engine coolant. If there is coolant leakage, repair the leaks according to Engine Cooling System Trouble in General. <Ref. to CO(H4DO(w/o HEV))-97, Engine Cooling System Trouble in General.>
4	**CHECK A/C CONTROL PANEL.** 1) Turn the temperature control dials (driver's side) and (passenger's side) to MAX COOL. 2) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Heater Control Panel Setting Value (driver's) • Heater Control Panel Setting Value (passenger's)	Do "Heater Control Panel Setting Value (Driver's)" and "Heater Control Panel Setting Value (Passenger's)" indicate "60"*1?	Go to step **5**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
5	**CHECK A/C CONTROL PANEL.** 1) Turn the temperature control dials (driver's side) and (passenger's side) to MAX HOT. 2) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Heater Control Panel Setting Value (driver's) • Heater Control Panel Setting Value (passenger's)	Do "Heater Control Panel Setting Value (Driver's)" and "Heater Control Panel Setting Value (Passenger's)" indicate "90"*2?	Go to step **6**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
6	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Turn the temperature control dial at MAX COOL and leave for 16 seconds or more. (For vehicles with left/right independent air conditioner, perform setting on both sides.) 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E1, B14E2, B14E3 or B14E4 displayed?	Perform the diagnosis according to DTC.	Go to step **7**.
7	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Turn the temperature control dial at MAX HOT and leave for 16 seconds or more. (For vehicles with left/right independent air conditioner, perform setting on both sides.) 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E1, B14E2, B14E3 or B14E4 displayed?	Perform the diagnosis according to DTC.	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK INTAKE DOOR ACTUATOR.** Visually check the intake door actuator operation.	Is the intake door actuator normal?	Go to step **9**.	Check the intake door actuator. <Ref. to AC(diag)-29, UNABLE TO SWITCH SUCTION VENTS, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
9	**CHECK EVAPORATOR SENSOR UNIT.** Perform the inspection of evaporator sensor unit. <Ref. to AC-86, INSPECTION, Evaporator Sensor.>	Is the evaporator sensor normal?	Go to step **10**.	Replace the evaporator sensor. <Ref. to AC-85, REMOVAL, Evaporator Sensor.>
10	**CHECK IN-VEHICLE SENSOR OR TEMPERATURE AND HUMIDITY SENSOR UNIT.** Check the in-vehicle sensor or temperature and humidity sensor circuit. <Ref. to AC-79, INSPECTION, In-Vehicle Sensor (Auto A/C Model).>	Is the in-vehicle sensor or temperature and humidity sensor circuit normal?	Go to step **11**.	Replace the in-vehicle sensor or temperature and humidity sensor. <Ref. to AC-78, REMOVAL, In-Vehicle Sensor (Auto A/C Model).>
11	**CHECK AMBIENT SENSOR UNIT.** Check the ambient sensor. <Ref. to AC-75, INSPECTION, Ambient Sensor.>	Is the ambient sensor normal?	Go to step **12**.	Replace the ambient sensor. <Ref. to AC-72, REMOVAL, Ambient Sensor.>
12	**CHECK SUNLOAD SENSOR UNIT.** Check the sunload sensor unit. <Ref. to AC-77, INSPECTION, Sunload Sensor (Auto A/C Model).>	Is the sunload sensor normal?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the sunload sensor. <Ref. to AC-76, REMOVAL, Sunload Sensor (Auto A/C Model).>

*1: For the 75°F center specification. For the 25°C center specification, the value is 18.
*2: For the 75°F center specification. For the 25°C center specification, the value is 32.

6. COMPARTMENT TEMPERATURE IS LOWER THAN SETTING TEMPERATURE

TROUBLE SYMPTOM:

Compartment temperature is excessively lower than setting temperature.

Trouble causes:

- Large airflow capacity
- Refrigerant pressure failure
- CAN communication failure
- A/C control panel failure
- Air mix actuator RH failure
- Air mix actuator LH failure (only with left/right independent air conditioning function)
- Evaporator sensor failure
- In-vehicle sensor failure
- Ambient sensor failure
- Sunload sensor failure

	Step	Check	Yes	No
1	**CHECK AIRFLOW CAPACITY.** Check the airflow capacity. <Ref. to AC(diag)-24, AIR CANNOT BE CONTROLLED, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>	Is the airflow capacity normal?	Go to step **2**.	Perform repair according to inspection procedure.
2	**CHECK AMOUNT OF REFRIGERANT PRESSURE.** Check the refrigerant pressure. <Ref. to AC-23, REFRIGERANT GAS PRESSURE INSPECTION, PROCEDURE, Refrigerant Pressure with Manifold Gauge Set.>	Is the refrigerant pressure normal?	Go to step **3**.	Perform repair according to refrigerant pressure inspection.
3	**CHECK A/C CONTROL PANEL.** 1) Turn the temperature control dials (driver's side) and (passenger's side) to MAX COOL. 2) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Heater Control Panel Setting Value (driver's) • Heater Control Panel Setting Value (passenger's)	Do "Heater Control Panel Setting Value (Driver's)" and "Heater Control Panel Setting Value (Passenger's)" indicate "60"*1?	Go to step **4**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
4	**CHECK A/C CONTROL PANEL.** 1) Turn the temperature control dials (driver's side) and (passenger's side) to MAX HOT. 2) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Heater Control Panel Setting Value (driver's) • Heater Control Panel Setting Value (passenger's)	Do "Heater Control Panel Setting Value (Driver's)" and "Heater Control Panel Setting Value (Passenger's)" indicate "90"*2?	Go to step **5**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
5	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Turn the temperature control dial at MAX COOL and leave for 16 seconds or more. (For vehicles with left/right independent air conditioner, perform setting on both sides.) 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E1, B14E2, B14E3 or B14E4 displayed?	Perform the diagnosis according to DTC.	Go to step **6**.

Step		Check	Yes	No
6	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Turn the temperature control dial at MAX HOT and leave for 16 seconds or more. (For vehicles with left/right independent air conditioner, perform setting on both sides.) 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E1, B14E2, B14E3 or B14E4 displayed?	Perform the diagnosis according to DTC.	Go to step **7**.
7	**CHECK EVAPORATOR SENSOR UNIT.** Perform the inspection of evaporator sensor unit. <Ref. to AC-86, INSPECTION, Evaporator Sensor.>	Is the evaporator sensor normal?	Go to step **8**.	Replace the evaporator sensor. <Ref. to AC-85, REMOVAL, Evaporator Sensor.>
8	**CHECK IN-VEHICLE SENSOR OR TEMPERATURE AND HUMIDITY SENSOR UNIT.** Check the in-vehicle sensor or temperature and humidity sensor circuit. <Ref. to AC-79, INSPECTION, In-Vehicle Sensor (Auto A/C Model).>	Is the in-vehicle sensor or temperature and humidity sensor circuit normal?	Go to step **9**.	Replace the in-vehicle sensor or temperature and humidity sensor. <Ref. to AC-78, REMOVAL, In-Vehicle Sensor (Auto A/C Model).>
9	**CHECK AMBIENT SENSOR UNIT.** Check the ambient sensor. <Ref. to AC-75, INSPECTION, Ambient Sensor.>	Is the ambient sensor normal?	Go to step **10**.	Replace the ambient sensor. <Ref. to AC-72, REMOVAL, Ambient Sensor.>
10	**CHECK SUNLOAD SENSOR UNIT.** Check the sunload sensor unit. <Ref. to AC-77, INSPECTION, Sunload Sensor (Auto A/C Model).>	Is the sunload sensor normal?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the sunload sensor. <Ref. to AC-76, REMOVAL, Sunload Sensor (Auto A/C Model).>

*1: For the 75°F center specification. For the 25°C center specification, the value is 18.
*2: For the 75°F center specification. For the 25°C center specification, the value is 32.

7. COMPARTMENT TEMPERATURE IS HIGHER THAN SETTING TEMPERATURE

TROUBLE SYMPTOM:

Compartment temperature is excessively higher than setting temperature.

Trouble causes:

- Large airflow capacity
- CAN communication failure
- A/C control panel failure
- Air mix actuator RH failure
- Air mix actuator LH failure (only with left/right independent air conditioning function)
- Intake door actuator failure
- Evaporator sensor failure
- In-vehicle sensor failure
- Ambient sensor failure
- Sunload sensor failure

	Step	Check	Yes	No
1	**CHECK AIRFLOW CAPACITY.** Check the airflow capacity. <Ref. to AC(diag)-24, AIR CANNOT BE CONTROLLED, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>	Is the airflow capacity normal?	Go to step **2**.	Perform repair according to inspection procedure.
2	**CHECK A/C CONTROL PANEL.** 1) Turn the temperature control dials (driver's side) and (passenger's side) to MAX COOL. 2) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Heater Control Panel Setting Value (driver's) • Heater Control Panel Setting Value (passenger's)	Do "Heater Control Panel Setting Value (Driver's)" and "Heater Control Panel Setting Value (Passenger's)" indicate "60"*1?	Go to step **3**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
3	**CHECK A/C CONTROL PANEL.** 1) Turn the temperature control dials (driver's side) and (passenger's side) to MAX HOT. 2) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Heater Control Panel Setting Value (driver's) • Heater Control Panel Setting Value (passenger's)	Do "Heater Control Panel Setting Value (Driver's)" and "Heater Control Panel Setting Value (Passenger's)" indicate "90"*2?	Go to step **4**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
4	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Turn the temperature control dial at MAX COOL and leave for 16 seconds or more. (For vehicles with left/right independent air conditioner, perform setting on both sides.) 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E1, B14E2, B14E3 or B14E4 displayed?	Perform the diagnosis according to DTC.	Go to step **5**.
5	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Turn the temperature control dial at MAX HOT and leave for 16 seconds or more. (For vehicles with left/right independent air conditioner, perform setting on both sides.) 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E1, B14E2, B14E3 or B14E4 displayed?	Perform the diagnosis according to DTC.	Go to step **6**.

	Step	Check	Yes	No
6	**CHECK INTAKE DOOR ACTUATOR.** Visually check the intake door actuator operation.	Is the intake door actuator normal?	Go to step **7**.	Check the intake door actuator. <Ref. to AC(diag)-29, UNABLE TO SWITCH SUCTION VENTS, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
7	**CHECK EVAPORATOR SENSOR UNIT.** Perform the inspection of evaporator sensor unit. <Ref. to AC-86, INSPECTION, Evaporator Sensor.>	Is the evaporator sensor normal?	Go to step **8**.	Replace the evaporator sensor. <Ref. to AC-85, REMOVAL, Evaporator Sensor.>
8	**CHECK IN-VEHICLE SENSOR OR TEMPERATURE AND HUMIDITY SENSOR UNIT.** Check the in-vehicle sensor or temperature and humidity sensor circuit. <Ref. to AC-79, INSPECTION, In-Vehicle Sensor (Auto A/C Model).>	Is the in-vehicle sensor or temperature and humidity sensor circuit normal?	Go to step **9**.	Replace the in-vehicle sensor or temperature and humidity sensor. <Ref. to AC-78, REMOVAL, In-Vehicle Sensor (Auto A/C Model).>
9	**CHECK AMBIENT SENSOR UNIT.** Check the ambient sensor. <Ref. to AC-75, INSPECTION, Ambient Sensor.>	Is the ambient sensor normal?	Go to step **10**.	Replace the ambient sensor. <Ref. to AC-72, REMOVAL, Ambient Sensor.>
10	**CHECK SUNLOAD SENSOR UNIT.** Check the sunload sensor unit. <Ref. to AC-77, INSPECTION, Sunload Sensor (Auto A/C Model).>	Is the sunload sensor normal?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the sunload sensor. <Ref. to AC-76, REMOVAL, Sunload Sensor (Auto A/C Model).>

*1: For the 75°F center specification. For the 25°C center specification, the value is 18.
*2: For the 75°F center specification. For the 25°C center specification, the value is 32.

8. AIR DOES NOT COME OUT. AIRFLOW IS LOW

TROUBLE SYMPTOM:

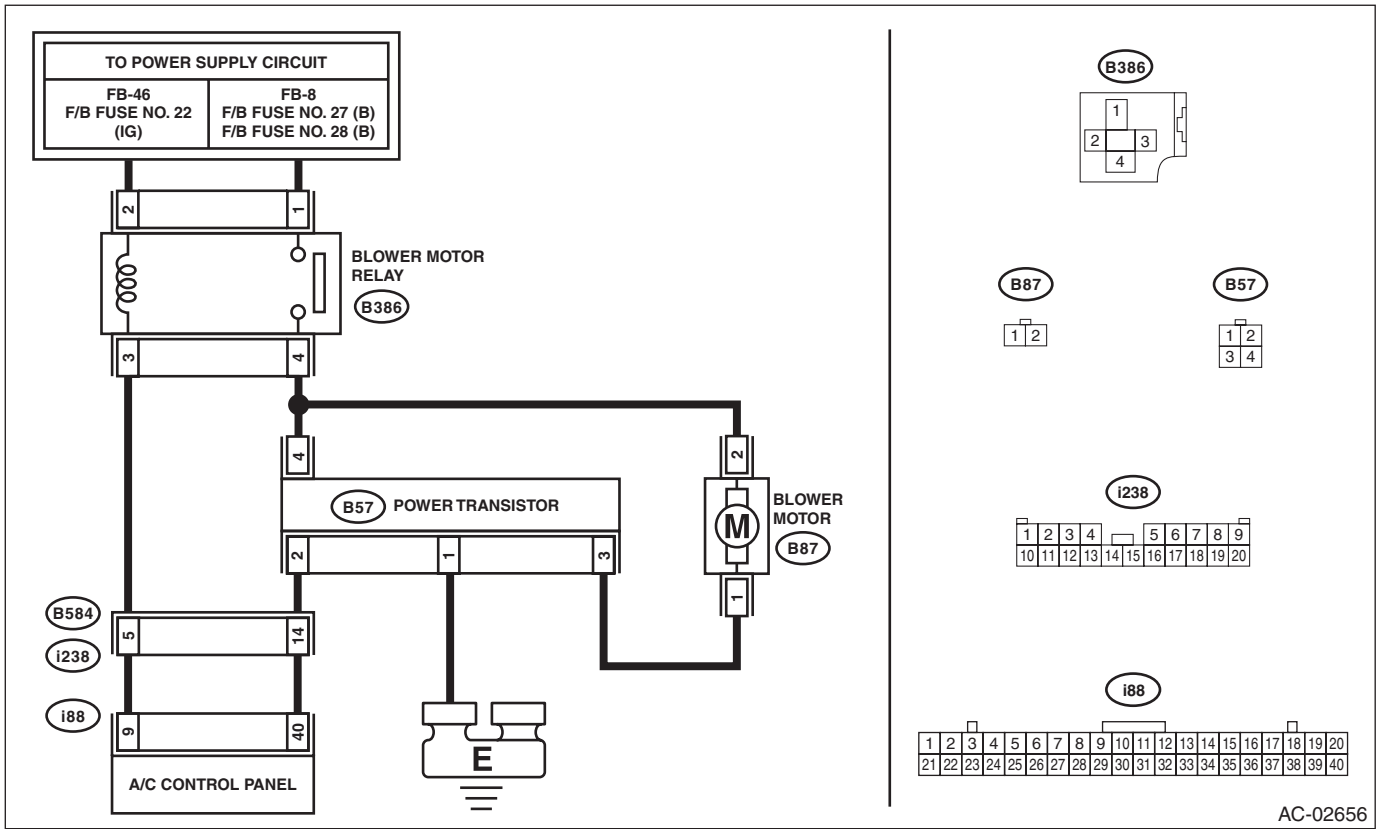
- Airflow capacity is insufficient.
- Air does not come out when operating the fan dial.

Trouble causes:

- Airflow capacity failure
- CAN communication failure
- A/C control panel failure
- Blower motor failure

WIRING DIAGRAM:

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



Step		Check	Yes	No
1	**CHECK A/C CONTROL PANEL.** 1) Using Subaru Select Monitor, display the following data in "Read Current Data". <Ref. to AC(diag)-36, Read Current Data.> • Air mix door actuator position (driver's side) • Air mix door actuator position (passenger's) • Blower fan level 2) Turn the temperature control dial at MAX COOL and increase and decrease the A/C control panel fan dial. (For vehicles with left/right independent air conditioner, perform setting on both sides.)	Do "Air mix door actuator position (driver's side)" and "Air mix door actuator position (passenger's side)" indicate "0%"? Also, does the value of "Blower Fan Level" increase or decrease in conjunction with the fan dial operation?	Go to step **2**.	Go to step **5**.

	Step	Check	Yes	No
2	**CHECK AIRFLOW CAPACITY.** Turn the temperature control dial to LO (both dials for the models equipped with left/right independent air conditioning function), A/C control panel fan dial to MAX and FRESH/RECIRC switch to RECIRC.	Is the airflow capacity insufficient for the same model?	Go to step **3**.	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK A/C FILTER.** Check the A/C filter.	Is the A/C filter normal?	Go to step **4**.	Clean or replace the A/C filter.
4	**CHECK EACH DUCT.** Check each duct joint for disconnection or clogging.	Is each duct normal?	Go to step **5**.	Repair the faulty duct.
5	**CHECK A/C CONTROL PANEL.** 1) Turn the ignition switch to ON. 2) Turn the fan dial to the maximum position. 3) Using the Subaru Select Monitor, check "Blower Fan Level" of the current data from the A/C diagnosis. <Ref. to AC(diag)-36, Read Current Data.>	Does "Blower Fan Level" indicate "7"?	Go to step **6**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
6	**CHECK A/C CONTROL PANEL.** 1) Turn the fan dial to the minimum position. 2) Using the Subaru Select Monitor, check "Blower Fan Level" of the current data from the A/C diagnosis. <Ref. to AC(diag)-36, Read Current Data.>	Does "Blower Fan Level" indicate "1"?	Go to step **7**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
7	**CHECK CONNECTOR.** Check for poor contact of connector.	Is there poor contact of connector?	Repair the connector.	Go to step **8**.
8	**CHECK FUSE.** 1) Remove a fuse in the fuse & relay box. 2) Check the condition of fuse.	Is the fuse blown out?	Replace the fuse.	Go to step **9**.
9	**CHECK BLOWER MOTOR RELAY ON SIGNAL.** 1) Stop the engine. 2) Turn the fan dial OFF. 3) Turn the ignition switch to ON. 4) Using a tester, measure the voltage between the A/C control panel connector (i88) and chassis ground. ***Connector & terminal*** ***(i88) No. 9 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **10**.	• Check for open or short circuit in the harness between fuse and ECM. • Check the blower relay connector and relay unit. <Ref. to AC-36, CHECK RELAY, INSPECTION, Relay and Fuse.>

	Step	Check	Yes	No
10	**CHECK BLOWER MOTOR RELAY ON SIGNAL.** 1) Start the engine. 2) Turn the fan dial to ON. 3) Using a tester, measure the voltage between the A/C control panel connector (i88) and chassis ground. ***Connector & terminal*** ***(i88) No. 9 (+) — Chassis ground (–):***	Is the voltage 0 V?	Go to step **11**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
11	**CHECK BLOWER MOTOR POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. 2) Turn the fan dial to ON. 3) Use a tester to measure the voltage between the blower motor connector (B87) and chassis ground. ***Connector & terminal*** ***(B87) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **12**.	• Check the blower motor power supply line harness for open circuit or connector disconnection. • Check the blower relay connector and relay unit. <Ref. to AC-36, CHECK RELAY, INSPECTION, Relay and Fuse.>
12	**CHECK BLOWER MOTOR UNIT.** Check the blower motor. <Ref. to AC-41, INSPECTION, Blower Motor.>	Is the blower motor OK?	Go to step **13**.	Replace the blower motor. <Ref. to AC-40, REMOVAL, Blower Motor.>
13	**CHECK HARNESS.** 1) Disconnect the power transistor and A/C control panel connector. 2) Using a tester, measure the resistance between harness terminals. ***Connector & terminal*** ***(B386) No. 4 — (B57) No. 4:*** ***(B87) No. 1 — (B57) No. 3:*** ***(B57) No. 2 — (i88) No. 40:*** ***(B57) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **14**.	Repair or replace the open circuit of harness.
14	**CHECK HARNESS.** Use a tester to measure the harness resistance between the power transistor connector and chassis ground. ***Connector & terminal*** ***(B57) No. 2 — Chassis ground:***	Is the resistance less than 1 Ω?	Repair or replace the short circuit of the harness.	Go to step **15**.
15	**CHECK POWER TRANSISTOR.** Replace the power transistor with a properly functioning part.	Does the blower motor rotate?	Replace the power transistor. <Ref. to AC-42, REMOVAL, Power Transistor (Auto A/C Model).>	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

9. AIR CANNOT BE CONTROLLED

TROUBLE SYMPTOM:

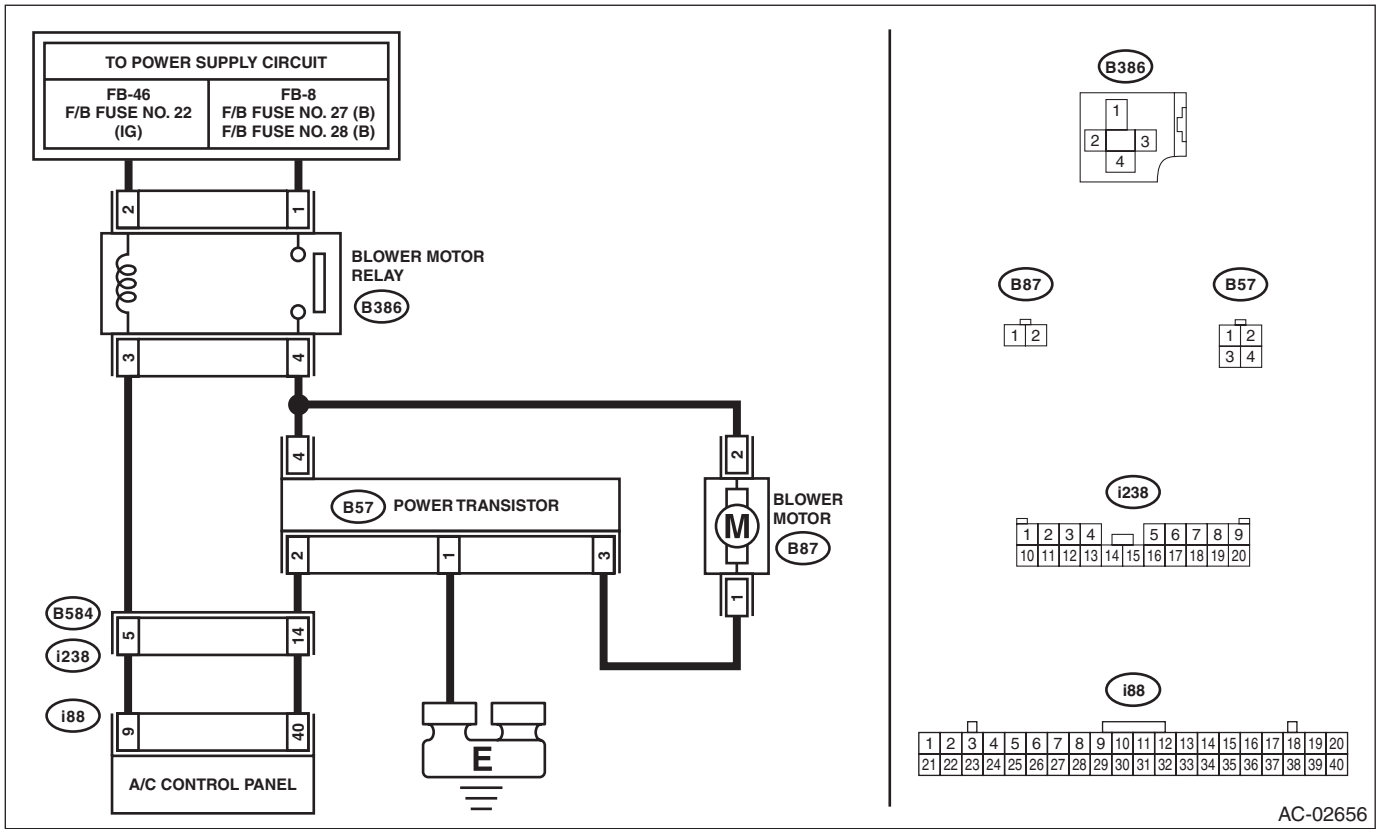
- The blower rotates even though the blower switch is not turned on.
- The blower motor continues to rotate at high speed. (Not adjustable.)

Trouble causes:

- Airflow capacity failure
- CAN communication failure
- A/C control panel failure
- Blower motor failure

WIRING DIAGRAM:

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

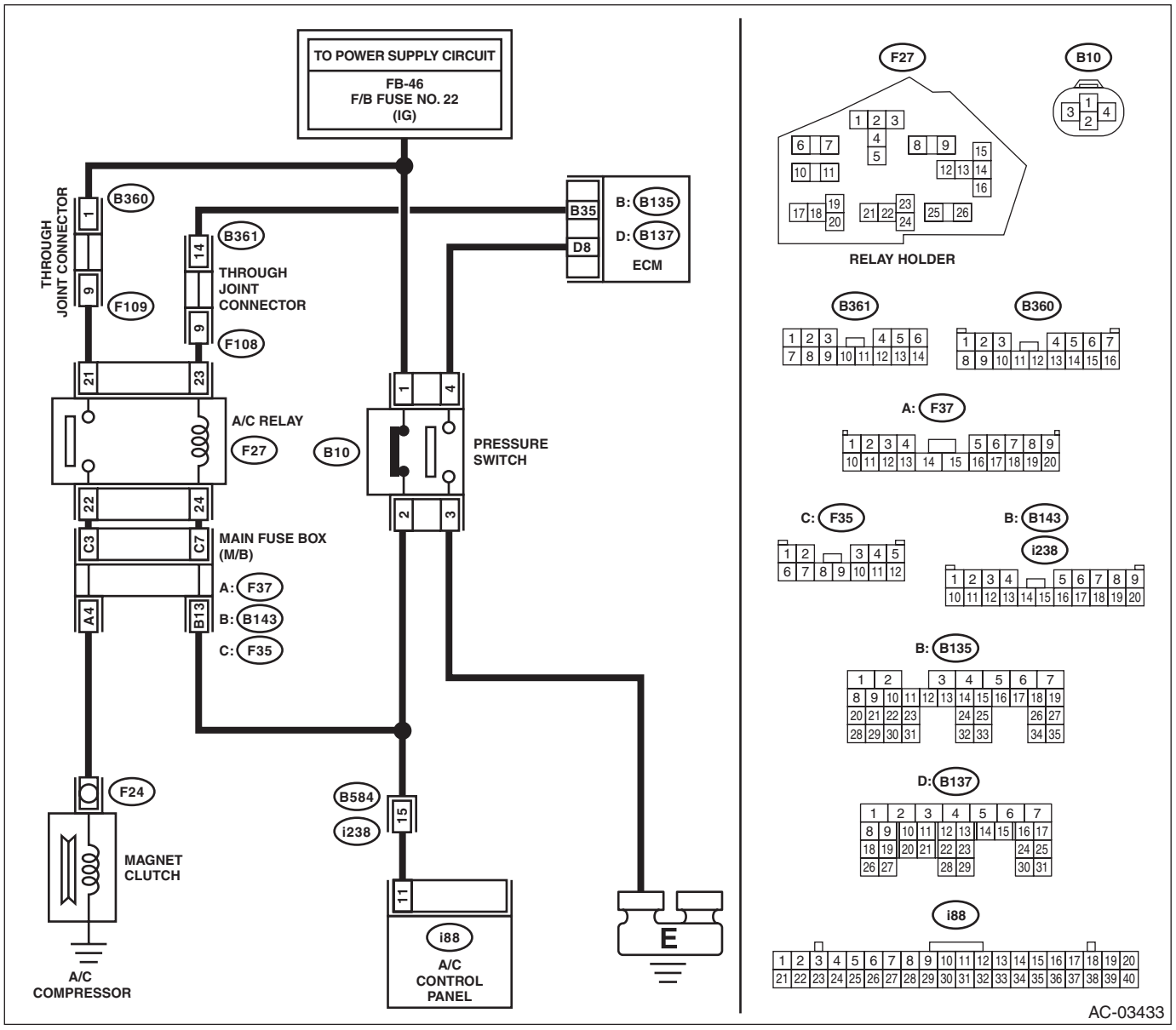


Step		Check	Yes	No
1	**CHECK A/C CONTROL PANEL.** 1) Turn the ignition switch to ON. 2) Turn the fan dial to the maximum position. 3) Using the Subaru Select Monitor, check "Blower Fan Level" of the current data from the A/C diagnosis. <Ref. to AC(diag)-36, Read Current Data.>	Does "Blower Fan Level" indicate "7"?	Go to step **2**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
2	**CHECK A/C CONTROL PANEL.** 1) Turn the fan dial to the minimum position. 2) Using the Subaru Select Monitor, check "Blower Fan Level" of the current data from the A/C diagnosis. <Ref. to AC(diag)-36, Read Current Data.>	Does "Blower Fan Level" indicate "1"?	Go to step **3**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the power transistor connector. 3) Use a tester to measure the resistance between the power transistor connector and chassis ground. ***Connector & terminal*** ***(B57) No. 4 — Chassis ground:***	Is the resistance less than 1 Ω?	Repair or replace the short circuit of the harness between blower motor and power transistor.	Go to step **4**.
4	**CHECK HARNESS.** 1) Remove the A/C control panel. 2) Turn the ignition switch to ON. 3) Use a tester to measure the resistance between the power transistor connector and chassis ground. ***Connector & terminal*** ***(B57) No. 2 — Chassis ground:***	Is the resistance less than 1 Ω?	Repair or replace the short circuit of the harness between A/C control panel and power transistor.	Go to step **5**.
5	**CHECK HARNESS.** 1) Connect the disconnected connectors. 2) Turn the ignition switch to ON. 3) Use a tester to measure the voltage between the power transistor connector and chassis ground. ***Connector & terminal*** ***(B57) No. 2 (+) — Chassis ground (–):***	Is the voltage approx. 9 V when fan dial in 1st, and approx. 3.5 V when fan dial in 6th?	Replace the power transistor. <Ref. to AC-42, REMOVAL, Power Transistor (Auto A/C Model).>	Go to step **6**.
6	**CHECK A/C CONTROL PANEL.** 1) Turn the fan dial OFF. 2) Disconnect the power transistor connector. 3) Use a tester to measure the resistance between the power transistor connector and chassis ground. ***Connector & terminal*** ***(B57) No. 2 — Chassis ground:***	When the fan dial is OFF and other than OFF, does the resistance change?	Replace the power transistor. <Ref. to AC-42, REMOVAL, Power Transistor (Auto A/C Model).>	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

10.COOL AIR DOES NOT COME OUT WHEN PRESSING THE A/C SWITCH. FOG CANNOT BE CLEARED. (COMPRESSOR DOES NOT OPERATE.)

TROUBLE SYMPTOM:
Compressor does not operate after turning the A/C switch to ON and fan dial between LO and HI.
Trouble causes:
Compressor failure
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



Step		Check	Yes	No
1	**CHECK A/C CONTROL PANEL.** 1) Leave the vehicle under the condition at ambient temperature of 15°C (59°F) or more. 2) Turn the ignition switch to ON. 3) Turn the fan dial to the maximum position. 4) Press the A/C switch.	Is "A/C" displayed on the A/C control panel?	Go to step **2**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

	Step	Check	Yes	No
2	**CHECK EVAPORATOR SENSOR.** Using the Subaru Select Monitor, check "Evaporator Temp." of the current data from the A/C diagnosis. <Ref. to AC(diag)-36, Read Current Data.>	Does the data indicate -0.5 degree or more?	Go to step **4**.	Go to step **3**.
3	**CHECK EVAPORATOR SENSOR.** Check the evaporator sensor. <Ref. to AC-86, INSPECTION, Evaporator Sensor.>	Is the sensor normal?	Go to step **4**.	Replace the evaporator sensor. <Ref. to AC-85, REMOVAL, Evaporator Sensor.>
4	**CHECK PRESSURE SWITCH.** Check the pressure switch connection.	Is the connector normal?	Go to step **5**.	Repair the connector.
5	**CHECK PRESSURE SWITCH.** Using the Subaru Select Monitor, check "A/C Pressure Switch" of the current data from Air Conditioning Diagnosis. <Ref. to AC(diag)-36, Read Current Data.>	Does the data indicate normal?	Go to step **10**.	Go to step **6**.
6	**CHECK AMOUNT OF REFRIGERANT PRESSURE.** Check the refrigerant pressure. <Ref. to AC-23, REFRIGERANT GAS PRESSURE INSPECTION, PROCEDURE, Refrigerant Pressure with Manifold Gauge Set.>	Is the refrigerant pressure normal?	Go to step **7**.	Perform repair according to refrigerant pressure inspection.
7	**CHECK CONNECTOR.** Check poor contact of A/C control panel connector.	Is the connector normal?	Go to step **8**.	Repair the connector.
8	**CHECK FUSE.** 1) Turn the ignition switch to ON. 2) Remove a fuse in the fuse & relay box. 3) Check the fuse.	Is the fuse normal?	Go to step **9**.	Replace the fuse.
9	**CHECK PRESSURE SWITCH SIGNAL.** 1) Turn the ignition switch to OFF. 2) Disconnect the A/C control panel connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between A/C control panel connector terminal and chassis ground. ***Connector & terminal*** ***(i88) No. 11 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	• Check for open or short circuit in the harness between fuse and A/C control panel. • Check for poor contact of pressure switch connector.
10	**CHECK CAN COMMUNICATION CIRCUIT.** Using the Subaru Select Monitor, check "A/C Switch" of the current data from Engine Diagnosis. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.> <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>	Does the data indicate ON?	Go to step **12**.	Go to step **11**.
11	**CHECK CAN COMMUNICATION CIRCUIT.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is the system normal?	Repair it according to DTC of LAN system.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

	Step	Check	Yes	No
12	**CHECK A/C RELAY ON SIGNAL.** 1) Disconnect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector terminal and chassis ground. ***Connector & terminal*** ***(B135) No. 35 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **13**.	• Check for open or short in the harness between pressure switch and ECM. • Check poor contact of A/C relay connector. • Check the A/C relay. <Ref. to AC-36, INSPECTION, Relay and Fuse.>
13	**CHECK A/C RELAY ON SIGNAL.** 1) Start the engine. 2) Turn the A/C switch to ON. 3) Turn the temperature control dial at maximum cool position. 4) Measure the voltage between ECM connector terminal and chassis ground. ***Connector & terminal*** ***(B135) No. 35 (+) — Chassis ground (–):***	Is the voltage 0 V?	Go to step **14**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
14	**CHECK MAGNET CLUTCH POWER SUPPLY CIRCUIT.** 1) Stop the engine. 2) Disconnect the magnet clutch connector. 3) Start the engine. 4) Turn the A/C switch to ON. 5) Turn the temperature control dial at maximum cool position. 6) Measure the voltage between magnet clutch connector terminal and chassis ground. ***Connector & terminal*** ***(F24) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Check the magnet clutch. <Ref. to AC-53, INSPECTION, Compressor.>	• Check for open or short circuit in the harness between fuse and magnet clutch. • Check poor contact of A/C relay connector. • Check the A/C relay. <Ref. to AC-36, INSPECTION, Relay and Fuse.>

11.UNABLE TO SWITCH SUCTION VENTS

TROUBLE SYMPTOM:

Even when the FRESH/RECIRC switch is pressed, the inlet opening does not switch to RECIRC → FRESH or FRESH → RECIRC.

Trouble causes:

Intake door actuator failure

	Step	Check	Yes	No
1	**VISUALLY CHECK FRESH/RECIRC DOOR OPERATION.** 1) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.> 2) Operate the FRESH/RECIRC switch, and visually check the intake door operation.	Does the intake door operate normally? Is the portion between intake door and intake door case sealed completely?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK A/C CONTROL PANEL.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check "Fresh/Recircle Air Door Actuator Position Target" of the current data from the A/C diagnosis. <Ref. to AC(diag)-36, Read Current Data.> 3) Operate the FRESH/RECIRC switch.	Does "Fresh/Recircle Air Door Actuator Position Target" indicate 0 ←→ 100?	Go to step **3**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
3	**CHECK DTC.** 1) Turn the FRESH/RECIRC switch to RECIRC, and leave for 16 seconds or more. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E9, B14EA and B14EB displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** 1) Turn the FRESH/RECIRC switch to FRESH, and leave for 16 seconds or more. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E9, B14EA and B14EB displayed?	Perform the diagnosis according to DTC.	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

12.UNABLE TO SWITCH VENTS

TROUBLE SYMPTOM:

- Unable to switch blow vents.
- Outlet opening does not switch in the sequence of FACE → B/L → FOOT → F/D after operating the mode switch or mode dial.

Trouble causes:

Mode door actuator failure

	Step	Check	Yes	No
1	**CHECK A/C CONTROL PANEL.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check "Mode Door Actuator Position Target" of the current data from the A/C diagnosis. <Ref. to AC(diag)-36, Read Current Data.> 3) Operate the mode change switch.	Does the value for "Mode Door Actuator Position Target" change?	Go to step **2**.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>
2	**CHECK DTC.** 1) Set the mode change switch to DEF, and wait for 16 seconds or more. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E5 and B14E6 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** 1) Set the mode change switch to VENT, and wait for 16 seconds or more. 2) Using the Subaru Select Monitor, read DTC of A/C control panel. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is DTC B14E5 and B14E6 displayed?	Perform the diagnosis according to DTC.	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

13.ILLUMINATION DOES NOT ILLUMINATE OR CANNOT BE DIMMED

TROUBLE SYMPTOM:

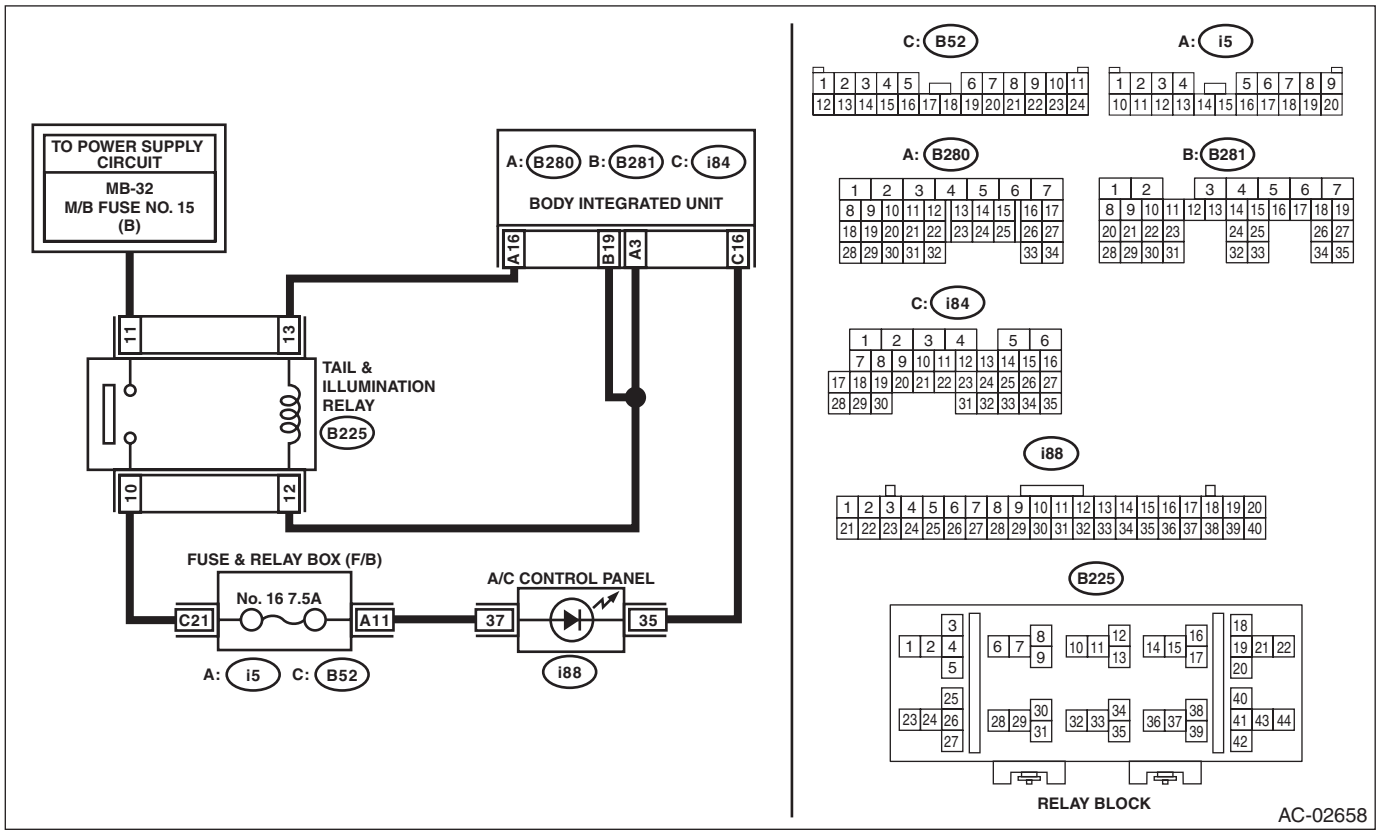
Even when the lighting switch is operated, the illumination does not come on. Even when the illumination control is operated, the illumination does not dim.

TROUBLE SYMPTOM:

Open circuit in illumination circuit

WIRING DIAGRAM:

Clearance Light and Illumination Light System <Ref. to WI(w/o HEV)-72, WIRING DIAGRAM, Clearance Light and Illumination Light System.> <Ref. to WI(HEV)-66, WIRING DIAGRAM, Clearance Light and Illumination Light System.>



Step		Check	Yes	No
1	**CHECK ILLUMINATION.** Make sure that all illuminations except A/C come on.	Do other illuminations come on?	Go to step **2**.	Check the illumination circuit. <Ref. to LI-11, INSPECTION, Clearance Light and Illumination Light System.>
2	**CHECK CONNECTOR.** Check for poor contact of connector.	Is there poor contact?	Repair the connector.	Go to step **3**.
3	**CHECK HARNESS.** 1) Turn the lighting switch to ON. 2) Using a tester, measure the voltage between the A/C control panel connector and chassis ground. ***Connector & terminal*** ***(i88) No. 37 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Turn the lighting switch to OFF. 2) Measure the resistance between A/C control panel connector and body integrated unit connector. ***Connector & terminal*** ***(i88) No. 35 — (i84) No. 16:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK A/C CONTROL PANEL UNIT.** Check the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Is A/C control panel OK?	A/C control panel illumination circuit is normal.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

6. Subaru Select Monitor

A: OPERATION

For detailed operation procedures, refer to “Application help”.

NOTE:
When initialization communication using Select Monitor is impossible, perform diagnosis according to “Diagnostic Procedure Used When Abnormal Communication with Subaru Select Monitor Occurs”. <Ref. to AC(diag)-38, Diagnostic Procedure for Subaru Select Monitor Communication.>

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Air Conditioner» and select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to AC(diag)-40, List of Diagnostic Trouble Code (DTC).>

8. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Air Conditioner» and select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

9. Read Current Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Air Conditioner» and select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

Items to be displayed	Unit of measure	Contents	Note
In-vehicle Sensor Temperature	°C (°F)	A/C control panel input value	—
Quantity of Sunload	W/m^2	A/C control panel input value	—
Air conditioner pressure SW	ON/OFF	A/C control panel input value	—
Heater Water Temperature	°C (°F)	Data value received by CAN	—
Heater Control Panel Setting Value (Driver’s)	LO: 18°C (60°F) HI: 32°C (90°F)	Control panel display value	—
Heater Control Panel Setting Value (Passenger’s)	LO: 18°C (60°F) HI: 32°C (90°F)	Control panel display value	For models with left/right independent air conditioning function only
Blower outlet request temperature (Driver’s)	°C (°F)	A/C control panel internal setting value	For models with left/right independent air conditioning function only
Blower outlet request temperature (Passenger’s)	°C (°F)	A/C control panel internal setting value	For models with left/right independent air conditioning function only
Airmix Door Actuator Position (Driver’s)	%	A/C control panel input value	—
Airmix Door Actuator Position (Passenger’s)	%	A/C control panel input value	For models with left/right independent air conditioning function only
Mode Door Actuator Position	%	A/C control panel input value	—
Fresh/Recircle Air Door Actuator Position	%	A/C control panel input value	—
Airmix Actuator Position Target (Driver’s)	%	A/C control panel input value	—
Airmix Actuator Position Target (Passenger’s)	%	A/C control panel input value	—
Mode Door Actuator Position Target	%	A/C control panel input value	—
Fresh/Recircle Air Door Actuator Position Target	%	A/C control panel input value	—
Blower Fan Level	Level	A/C control panel internal output value	—
Ambient Air Temperature	°C (°F)	Data value received by CAN	—
Compressor operation status	OFF/AUTO	A/C control panel input value	—

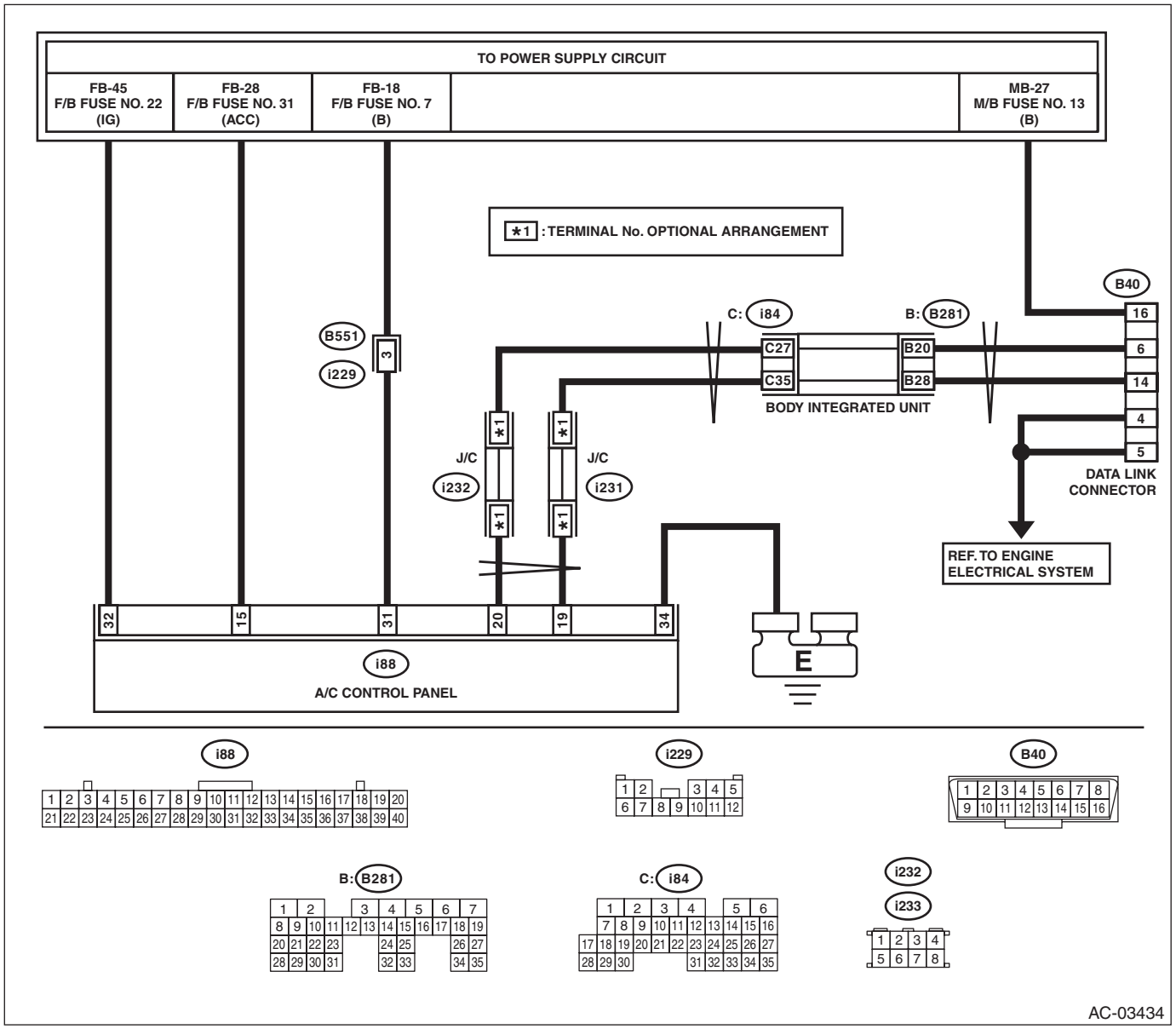
Items to be displayed	Unit of measure	Contents	Note
Blower Fan Operating Condition	MANU/AUTO	A/C control panel input value	—
A/C Operating Condition	MANU/AUTO	A/C control panel input value	—
Fresh/Recircle Air Operating Condition	MANU/AUTO	A/C control panel input value	—
Mode Operating Condition	MANU/AUTO	A/C control panel input value	—
Rear Defogger	ON/OFF	A/C control panel input value	—
Engine Speed	rpm	Data value received by CAN	—
Vehicle Speed	km/h	Data value received by CAN	—
Evaporator Temperature	°C (°F)	A/C control panel input value	—
Evaporator Temperature Target	°C (°F)	A/C control panel input value	—
Blower outlet Door Request Temperature	°C (°F)	A/C control panel internal setting value	—
PTC permitted number	0 — 3	A/C control panel input value	Not supported
PTC operation steps	0 — 3	A/C control panel input value	Not supported
PTC Heater 1	Inoperative/Operate	A/C control panel input value	Not supported
PTC Heater 2	Inoperative/Operate	A/C control panel input value	Not supported
PTC Heater 3	Inoperative/Operate	A/C control panel input value	Not supported
Request engine speed	0: Without Request 1: Cooler H 2: Heater H 3: Cooler L 4: Heater L	A/C control panel internal output value	—
Heater core Temp.	°C (°F)	A/C control panel input value	Only for HEV model
Humidity	%	A/C control panel input value	Only for HEV model

10.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Defective CAN communication circuit
TROUBLE SYMPTOM:
- LAN system is abnormal.
- Communication failure between Subaru Select Monitor and A/C control panel

WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



Step		Check	Yes	No
1	**CHECK POWER SUPPLY CIRCUIT.** Connect DST-i to data link connector.	Does DST-i turn ON?	Go to step **4**.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK POWER SUPPLY CIRCUIT.** Measure the voltage between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the power supply circuit. NOTE: In this case, repair the following item: • Open or ground short circuit of harness between battery and data link connector • Blown out of fuse (M/B No. 12)
3	**CHECK HARNESS BETWEEN DATA LINK CONNECTOR AND CHASSIS GROUND (OPEN).** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 4 — Chassis ground:*** ***(B40) No. 5 — Chassis ground:***	Is the resistance less than 5 Ω?	Repair the poor contact of data link connector.	Repair the harness and connector.
4	**CHECK SUBARU SELECT MONITOR.** 1) Connect the Subaru Select Monitor to a normal vehicle. 2) Start the engine and perform communication between the Subaru Select Monitor and vehicle.	Is communication possible?	Go to step **5**.	Use another Subaru Select Monitor because the CAN communication circuit of the Subaru Select Monitor is faulty.
5	**CHECK LAN SYSTEM.** Check the LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **6**.	Repair it according to the diagnosis for LAN system.
6	**CHECK CONNECTOR.** Check for poor contact of power supply circuit connector.	Is there poor contact of connector?	Repair the connector.	Go to step **7**.
7	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove a fuse from the fuse box. 3) Check the fuse.	Is the fuse blown out?	Replace the fuse.	Go to step **8**.
8	**CHECK A/C CONTROL PANEL POWER CIRCUIT.** 1) Disconnect the A/C control panel connector. 2) Measure the voltage between A/C control panel connector terminal and chassis ground after turning the ignition switch to ON. ***Connector & terminal*** ***(i88) No. 15 (+) — Chassis ground (–):*** ***(i88) No. 31 (+) — Chassis ground (–):*** ***(i88) No. 32 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **9**.	Check for open or short circuit in the harness between A/C control panel and fuse.
9	**CHECK A/C CONTROL PANEL GROUND CIRCUIT (OPEN).** Measure the resistance of harness between A/C control panel and chassis ground. ***Connector & terminal*** ***(i88) No. 34 — Chassis ground:***	Is the resistance less than 5 Ω?	Check the connection between the data link connector and Subaru Select Monitor.	Repair the harness for ground line.

11.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Note
B1430	IN-VEHICLE (POST EVAPORATOR) TEMPERATURE SENSOR CIRCUIT OPEN	In-vehicle air temperature sensor circuit or temperature and humidity sensor circuit is open.	<Ref. to AC(diag)-42, DTC B1430 IN-VEHICLE (POST EVAPORATOR) TEMPERATURE SENSOR CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1431	IN-VEHICLE (POST EVAPORATOR) TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT	In-vehicle air temperature sensor circuit or temperature and humidity sensor circuit is shorted.	<Ref. to AC(diag)-44, DTC B1431 IN-VEHICLE (POST EVAPORATOR) TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1432	AMBIENT TEMPERATURE SENSOR CIRCUIT OPEN (AIR-CONDITIONER)	Ambient air temperature sensor circuit is open.	<Ref. to AC(diag)-46, DTC B1432 AMBIENT TEMPERATURE SENSOR CIRCUIT OPEN (AIR-CONDITIONER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1433	AMBIENT TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT (AIR-CONDITIONER)	Ambient air temperature sensor circuit is shorted.	<Ref. to AC(diag)-49, DTC B1433 AMBIENT TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT (AIR-CONDITIONER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1434	EVAPORATOR TEMPERATURE SENSOR CIRCUIT OPEN	Post evaporator sensor circuit is open.	<Ref. to AC(diag)-52, DTC B1434 EVAPORATOR TEMPERATURE SENSOR CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1435	EVAPORATOR TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT	Post evaporator sensor circuit is shorted.	<Ref. to AC(diag)-54, DTC B1435 EVAPORATOR TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14A1	SUNLOAD SENSOR CIRCUIT LOW/OPEN	Sunload sensor circuit is open.	<Ref. to AC(diag)-56, DTC B14A1 SUNLOAD SENSOR CIRCUIT LOW/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14A2	SUNLOAD SENSOR CIRCUIT SHORT-CIRCUIT	Sunload sensor circuit is shorted.	<Ref. to AC(diag)-58, DTC B14A2 SUNLOAD SENSOR CIRCUIT SHORT-CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14E1	AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN (DRIVER)	Air mix door actuator stepping motor circuit is open.	<Ref. to AC(diag)-60, DTC B14E1 AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN (DRIVER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14E2	AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT (DRIVER)	Air mix door actuator stepping motor circuit is shorted.	<Ref. to AC(diag)-62, DTC B14E2 AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT (DRIVER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14E3	AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN (PASSENGER)	Air mix door actuator stepping motor circuit is open.	<Ref. to AC(diag)-64, DTC B14E3 AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN (PASSENGER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14E4	AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT (PASSENGER)	Air mix door actuator stepping motor circuit is shorted.	<Ref. to AC(diag)-66, DTC B14E4 AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT (PASSENGER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14E5	MODE DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN	Mode door actuator stepping motor circuit is open.	<Ref. to AC(diag)-68, DTC B14E5 MODE DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14E6	MODE DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT	Mode door actuator stepping motor circuit is shorted.	<Ref. to AC(diag)-70, DTC B14E6 MODE DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14E7	HEATER CORE SENSOR CIRCUIT OPEN	Heater core sensor circuit is open.	<Ref. to AC(diag)-72, DTC B14E7 HEATER CORE SENSOR CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Note
B14E8	HEATER CORE SENSOR CIRCUIT SHORT-CIRCUIT	Heater core sensor circuit is shorted.	<Ref. to AC(diag)-74, DTC B14E8 HEATER CORE SENSOR CIRCUIT SHORT-CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14E9	INTAKE DOOR ACTUATOR CIRCUIT OPEN	Intake door actuator potentiometer circuit is open.	<Ref. to AC(diag)-76, DTC B14E9 INTAKE DOOR ACTUATOR CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14EA	INTAKE DOOR ACTUATOR CIRCUIT SHORT-CIRCUIT	Intake door actuator potentiometer circuit is shorted.	<Ref. to AC(diag)-78, DTC B14EA INTAKE DOOR ACTUATOR CIRCUIT SHORT-CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14EB	INTAKE DOOR ACTUATOR STUCK	Intake door actuator is locked.	<Ref. to AC(diag)-80, DTC B14EB INTAKE DOOR ACTUATOR STUCK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14EC	HUMIDITY SENSOR CIRCUIT OPEN	Humidity sensor circuit is open.	<Ref. to AC(diag)-82, DTC B14EC HUMIDITY SENSOR CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B14ED	HUMIDITY SENSOR CIRCUIT SHORT	Humidity sensor circuit is shorted.	<Ref. to AC(diag)-84, DTC B14ED HUMIDITY SENSOR CIRCUIT SHORT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	CAN communication error occurred.	<Ref. to AC(diag)-85, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	ECM data receive error occurred.	<Ref. to AC(diag)-85, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	TCM data receive error occurred.	<Ref. to AC(diag)-85, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	VDC data receive error occurred.	<Ref. to AC(diag)-85, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	BIU data receive error occurred.	<Ref. to AC(diag)-86, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	METER data receive error occurred.	<Ref. to AC(diag)-86, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	An error occurred in ECM data.	<Ref. to AC(diag)-86, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	An error occurred in TCM data.	<Ref. to AC(diag)-86, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	An error occurred in VDC data.	<Ref. to AC(diag)-86, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	An error occurred in BIU data.	<Ref. to AC(diag)-86, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	An error occurred in METER data.	<Ref. to AC(diag)-86, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

12.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC B1430 IN-VEHICLE (POST EVAPORATOR) TEMPERATURE SENSOR CIRCUIT OPEN

DTC DETECTING CONDITION:

In-vehicle sensor or temperature and humidity sensor circuit is open.

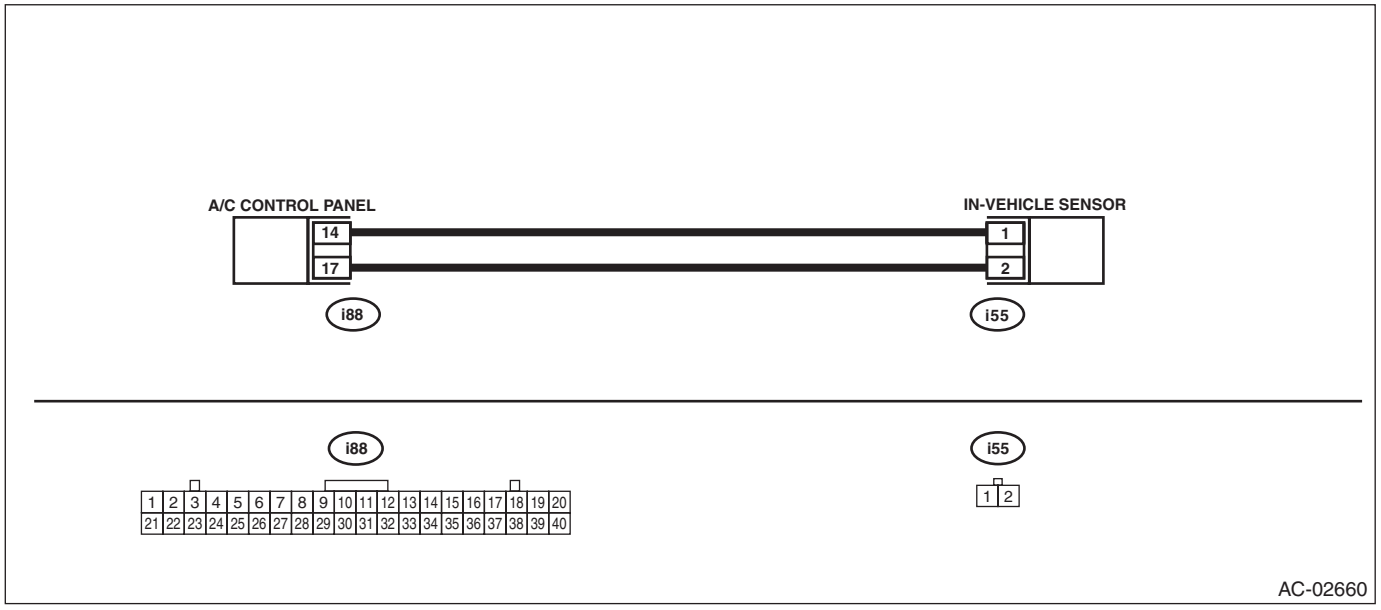
TROUBLE SYMPTOM:

In-vehicle air temperature is falsely recognized as 25°C (77°F), and the compartment temperature is adjusted.

WIRING DIAGRAM:

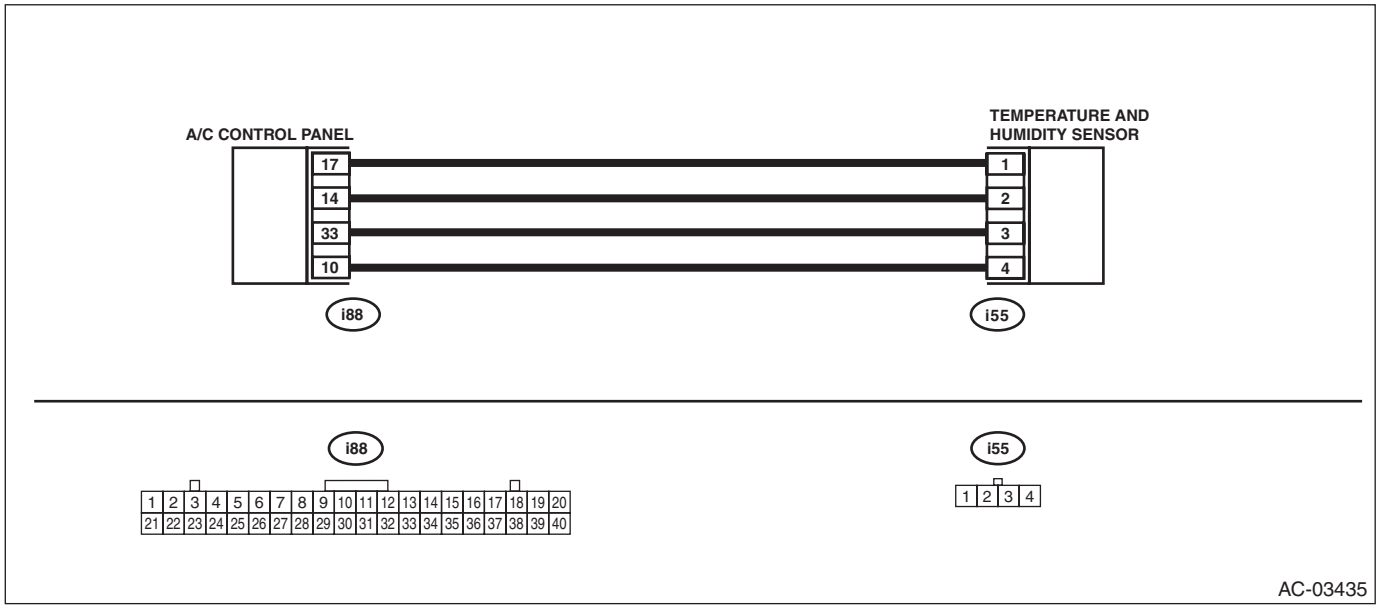
- Gasoline engine model

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.>



- HEV model

Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



	Step	Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1430 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK IN-VEHICLE SENSOR OR TEMPERATURE AND HUMIDITY SENSOR.** 1) Disconnect the in-vehicle sensor or temperature and humidity sensor. 2) Short the connector. 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1431 displayed?	Replace the in-vehicle sensor or temperature and humidity sensor. <Ref. to AC-78, REMOVAL, In-Vehicle Sensor (Auto A/C Model).>	Go to step **3**.
3	**CHECK HARNESS.** 1) Restore the temporary shorted lines made in step 2. 2) Turn the ignition switch to ON. 3) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***Gasoline engine model*** ***(i55) No. 2 (+) — No. 1 (–):*** ***HEV model*** ***(i55) No. 1 (+) — No. 2 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***Gasoline engine model*** ***(i55) No. 1 — (i88) No. 14:*** ***(i55) No. 2 — (i88) No. 17:*** ***HEV model*** ***(i55) No. 1 — (i88) No. 17:*** ***(i55) No. 2 — (i88) No. 14:***	Is there continuity?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Repair or replace the open circuit of harness.

B: DTC B1431 IN-VEHICLE (POST EVAPORATOR) TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT

DTC DETECTING CONDITION:

In-vehicle sensor or temperature and humidity sensor circuit is shorted.

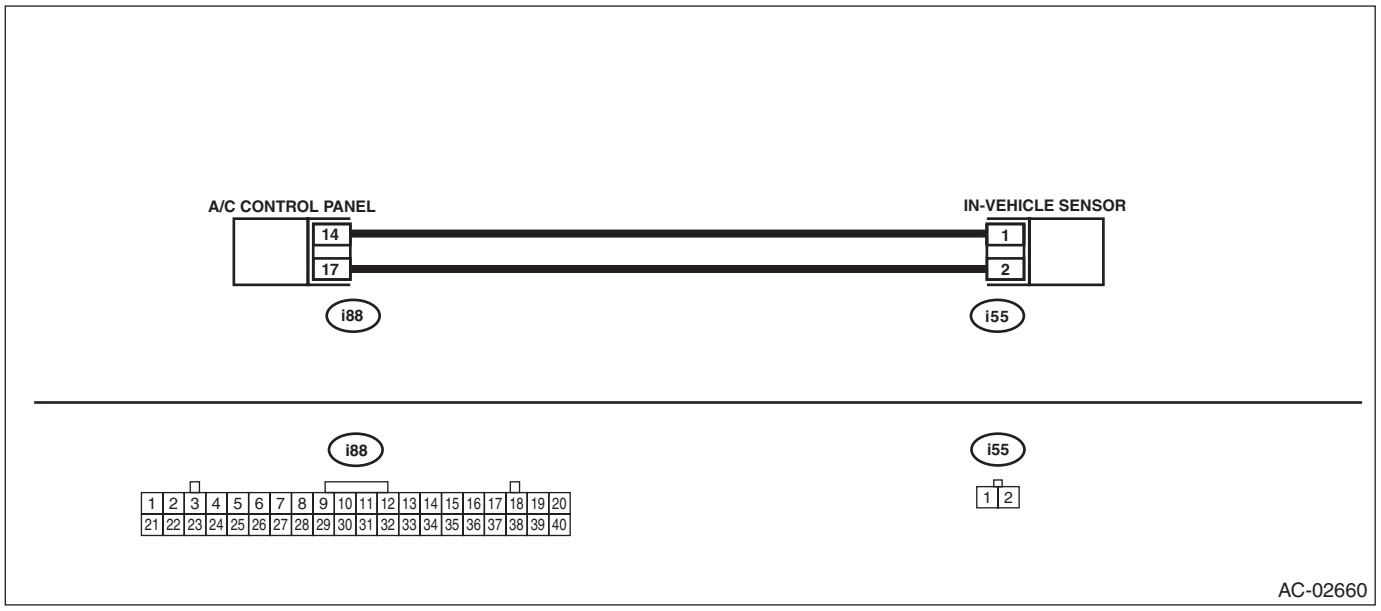
TROUBLE SYMPTOM:

In-vehicle air temperature is falsely recognized as 25°C (77°F), and the compartment temperature is adjusted.

WIRING DIAGRAM:

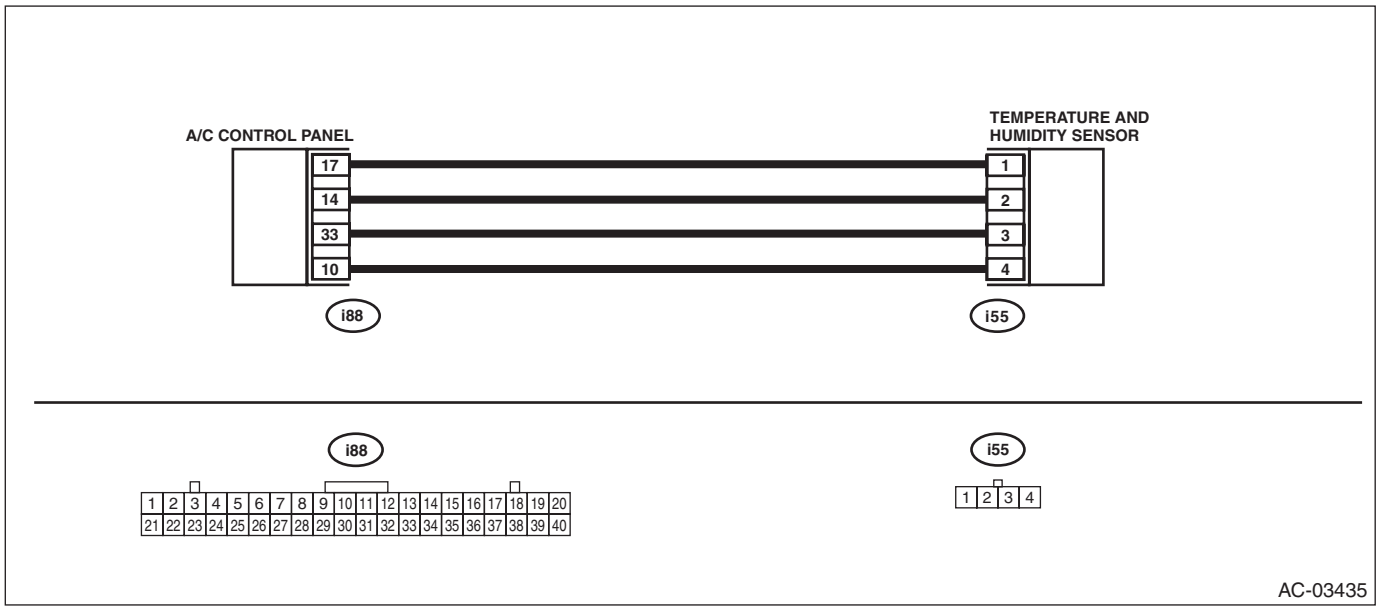
- Gasoline engine model

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.>



- HEV model

Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

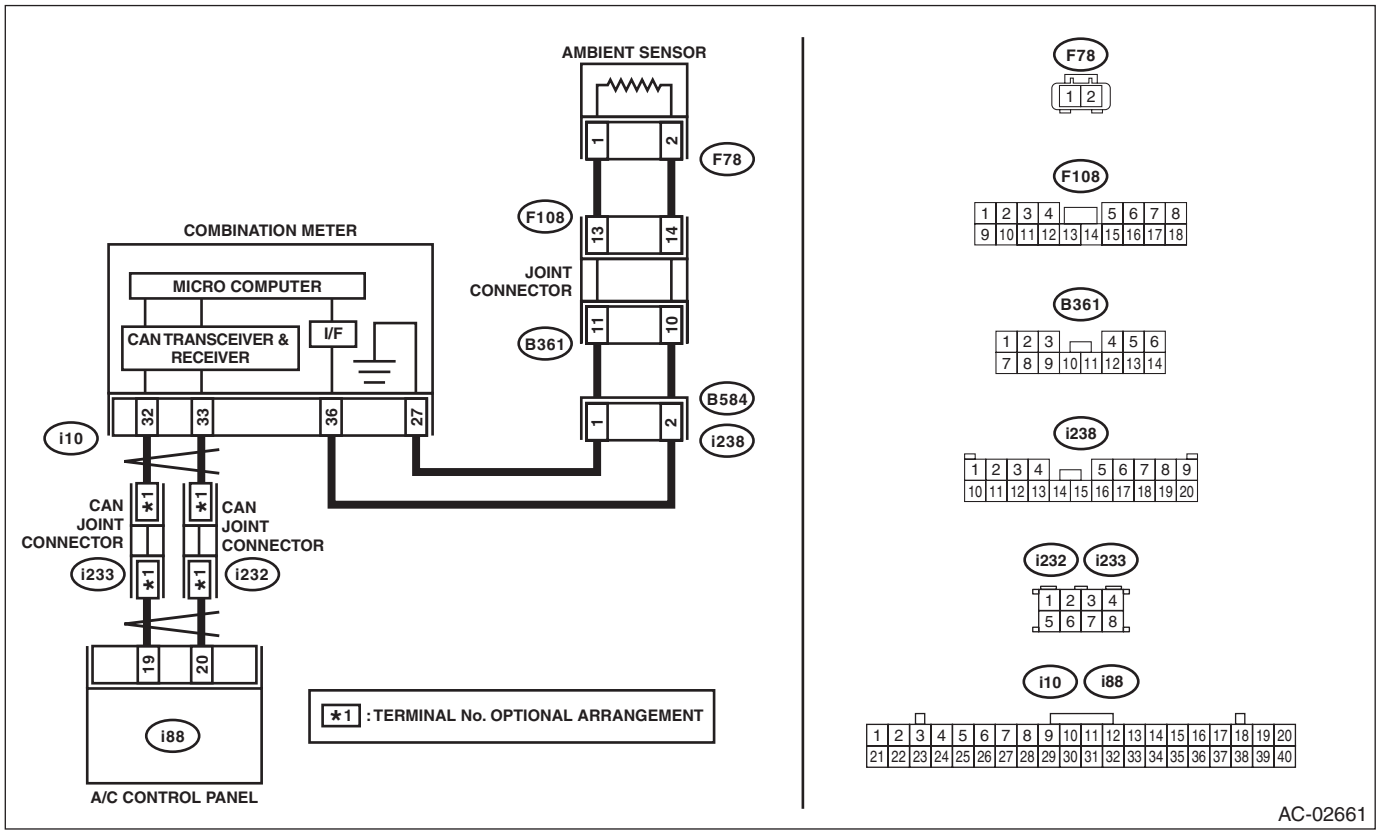


	Step	Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1431 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK IN-VEHICLE SENSOR OR TEMPERATURE AND HUMIDITY SENSOR.** 1) Disconnect the in-vehicle sensor or temperature and humidity sensor. <Ref. to AC-78, REMOVAL, In-Vehicle Sensor (Auto A/C Model).> 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1430 displayed?	Replace the in-vehicle sensor or temperature and humidity sensor. <Ref. to AC-78, REMOVAL, In-Vehicle Sensor (Auto A/C Model).>	Go to step **3**.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***Gasoline engine model*** ***(i55) No. 2 (+) — No. 1 (–):*** ***HEV model*** ***(i55) No. 1 (+) — No. 2 (–):***	Is the voltage 4.5 — 5.0 V?	Check the connection of the in-vehicle sensor or temperature and humidity sensor circuit.	Go to step **4**.
4	**CHECK HARNESS (SHORTED BETWEEN LINES).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(i55) No. 1 — No. 2:***	Is there continuity?	Repair or replace the short circuit of the harness.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

C: DTC B1432 AMBIENT TEMPERATURE SENSOR CIRCUIT OPEN (AIR-CONDITIONER)

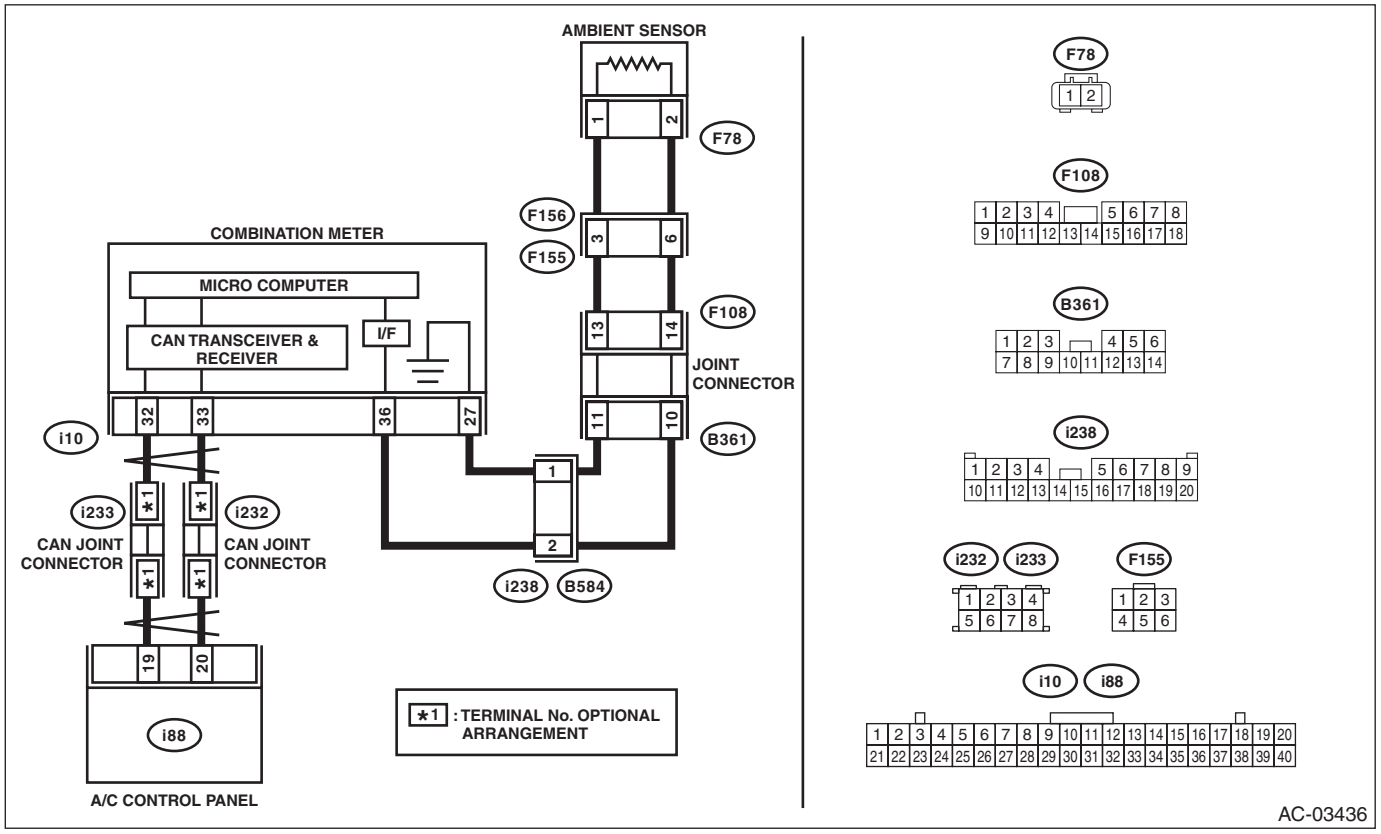
DTC DETECTING CONDITION:
Ambient sensor circuit is open.
TROUBLE SYMPTOM:
Ambient temperature is falsely recognized, and the compartment temperature is adjusted.
WIRING DIAGRAM:
- Gasoline engine model

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.>



- HEV model

Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



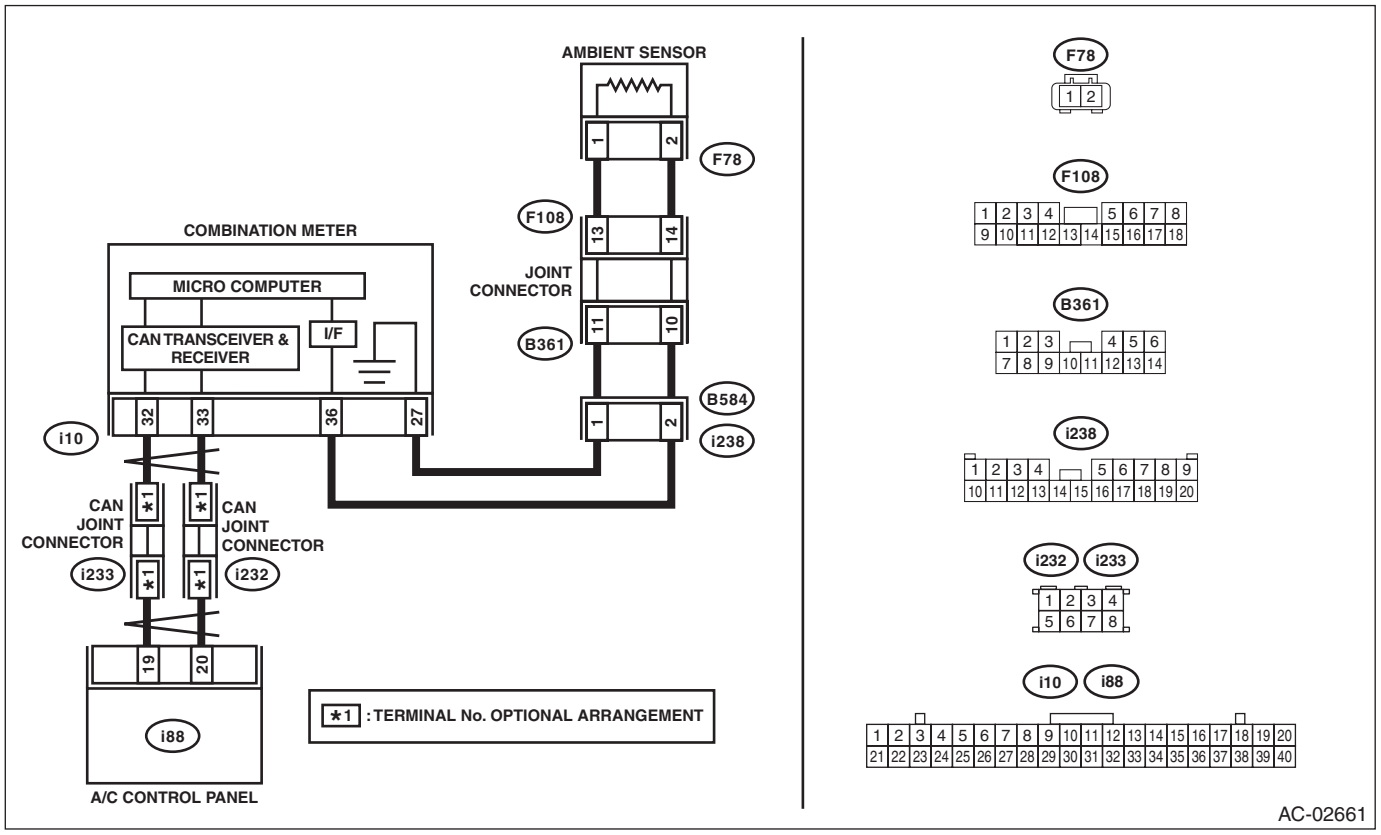
Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the connecting conditions of combination meter connector and ambient sensor connector. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1432 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK AMBIENT SENSOR.** 1) Disconnect the ambient sensor. 2) Short the connector F78. 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1433 displayed?	Replace the ambient sensor. <Ref. to AC-72, REMOVAL, Ambient Sensor.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Restore the temporary shorted lines made in step 2. 2) Turn the ignition switch to ON. 3) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(F78) No. 2 (+) — No. 1 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connector from the combination meter. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(F78) No. 1 — (i10) No. 27:*** ***(F78) No. 2 — (i10) No. 36:***	Is there continuity?	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>	Repair or replace the open circuit of harness.

D: DTC B1433 AMBIENT TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT (AIR-CONDITIONER)

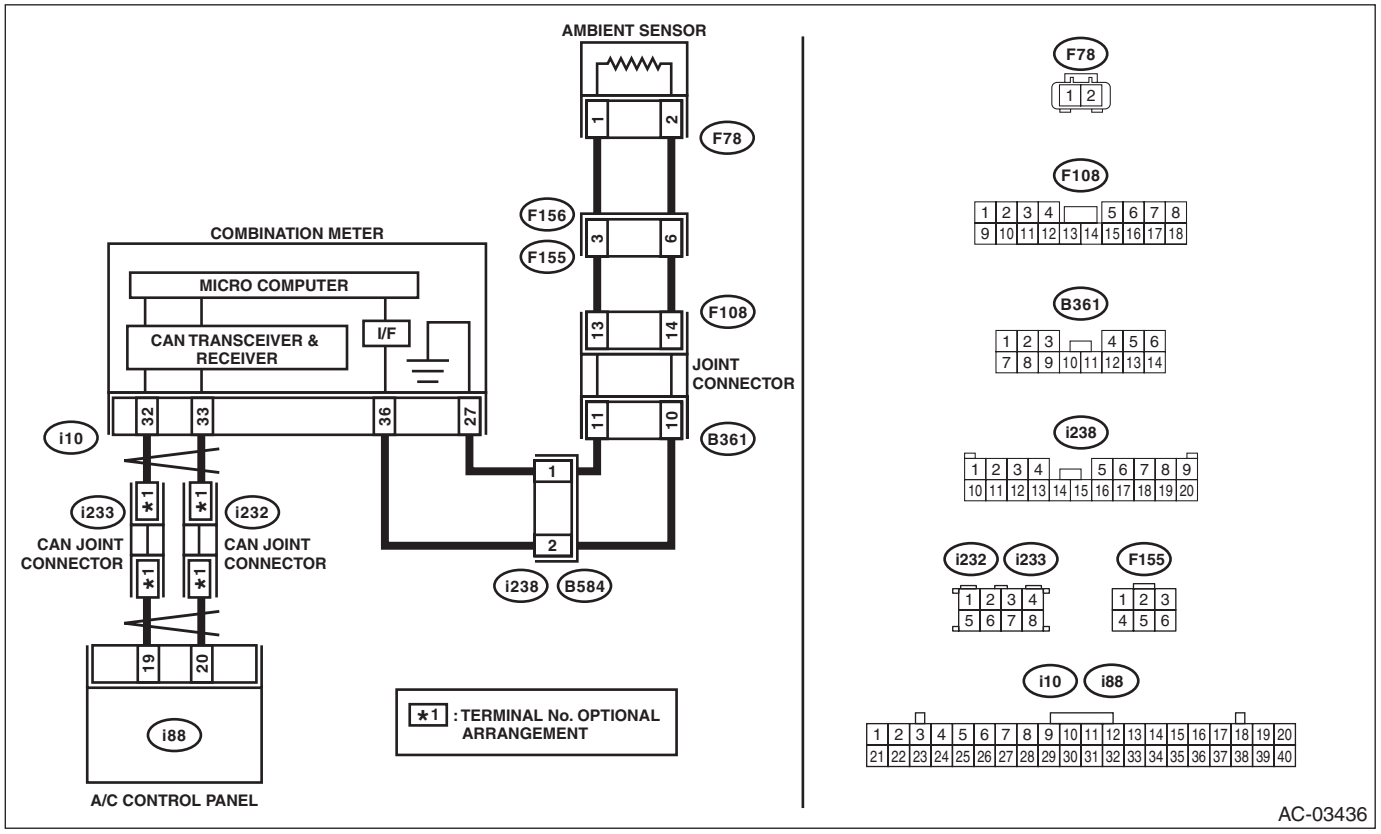
DTC DETECTING CONDITION:
Ambient sensor circuit is shorted.
TROUBLE SYMPTOM:
Ambient temperature is falsely recognized, and the compartment temperature is adjusted.
WIRING DIAGRAM:
- Gasoline engine model

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.>



- HEV model

Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

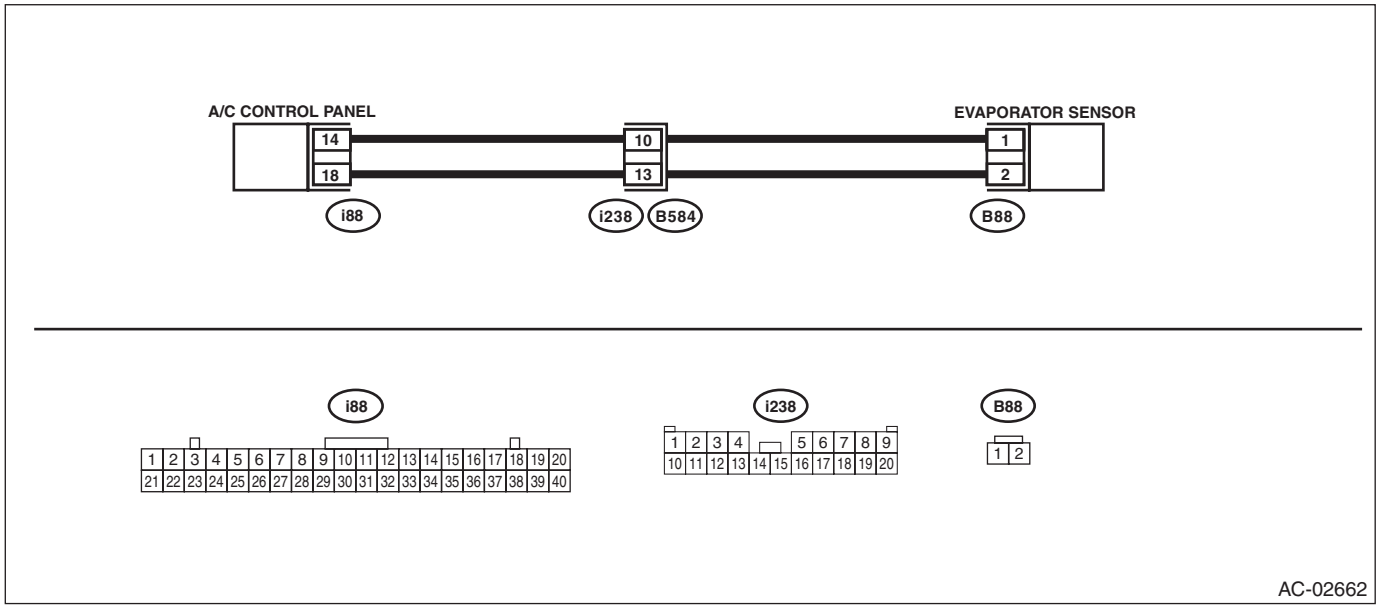


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the connecting conditions of combination meter connector and ambient sensor connector. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1433 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK AMBIENT SENSOR.** 1) Disconnect the ambient sensor. <Ref. to AC-72, REMOVAL, Ambient Sensor.> 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1432 displayed?	Replace the ambient sensor. <Ref. to AC-72, REMOVAL, Ambient Sensor.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(F78) No. 2 (+) — No. 1 (–):***	Is the voltage 4.5 — 5.0 V?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (SHORTED BETWEEN LINES).** 1) Disconnect the connector from the combination meter. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(F78) No. 1 — No. 2:***	Is there continuity?	Repair or replace the short circuit of the harness.	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

E: DTC B1434 EVAPORATOR TEMPERATURE SENSOR CIRCUIT OPEN

DTC DETECTING CONDITION:
Evaporator sensor circuit is open.
TROUBLE SYMPTOM:
Evaporator temperature is falsely recognized as low, and the compartment temperature is adjusted.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

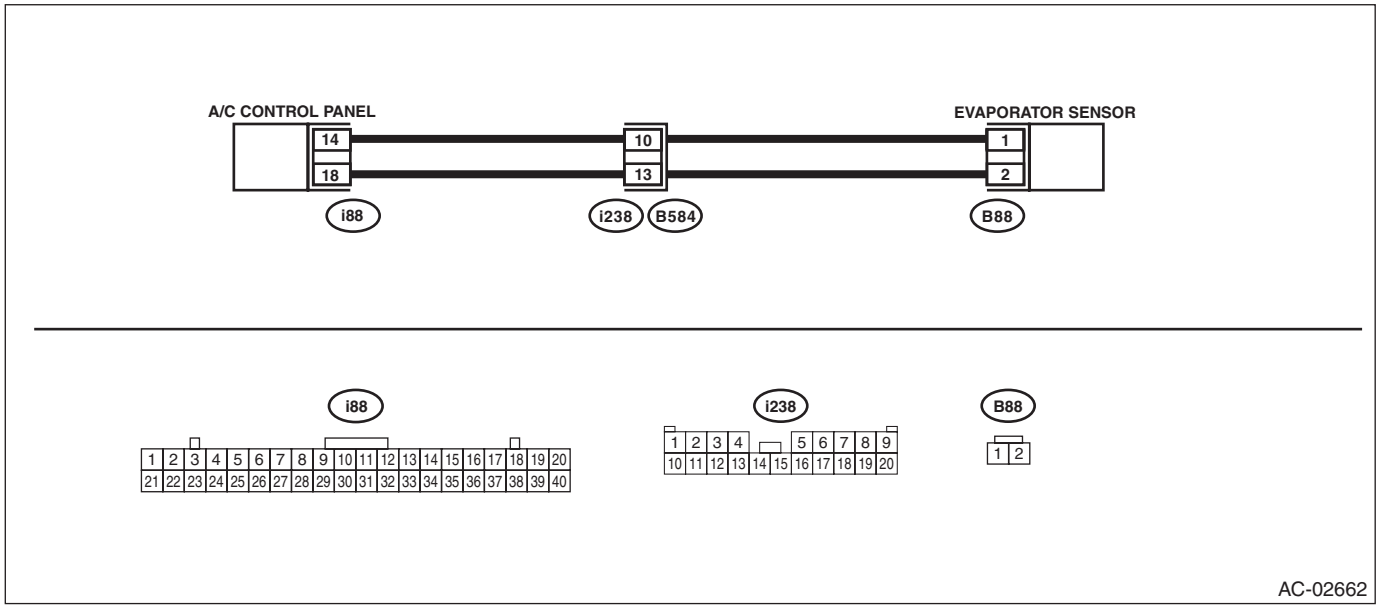


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1434 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK EVAPORATOR SENSOR.** 1) Disconnect the evaporator sensor. 2) Short the evaporator sensor connector (B88). 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1435 displayed?	Replace the evaporator sensor. <Ref. to AC-60, REMOVAL, Evaporator.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Restore the temporary shorted lines made in step 2. 2) Turn the ignition switch to ON. 3) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B88) No. 2 (+) — No. 1 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B88) No. 1 — (i88) No. 18:*** ***(B88) No. 2 — (i88) No. 14:***	Is there continuity?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Repair or replace the open circuit of harness.

F: DTC B1435 EVAPORATOR TEMPERATURE SENSOR CIRCUIT SHORT-CIRCUIT

DTC DETECTING CONDITION:
Evaporator sensor circuit is shorted.
TROUBLE SYMPTOM:
Evaporator temperature is falsely recognized as high, and the compartment temperature is adjusted.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1435 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK EVAPORATOR SENSOR.** 1) Disconnect the evaporator sensor. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B1434 displayed?	Replace the evaporator sensor. <Ref. to AC-60, REMOVAL, Evaporator.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B88) No. 2 (+) — No. 1 (–):***	Is the voltage 4.5 — 5.0 V?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (SHORTED BETWEEN LINES).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B88) No. 1 — No. 2:***	Is there continuity?	Repair or replace the short circuit of the harness.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

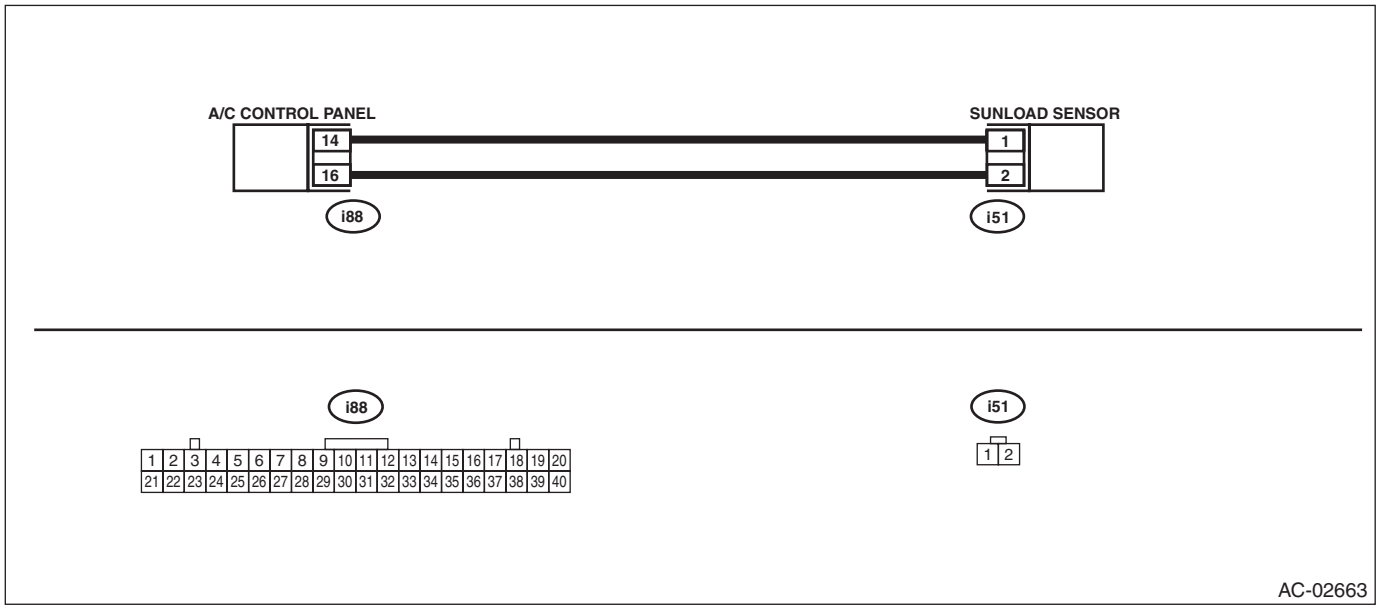
G: DTC B14A1 SUNLOAD SENSOR CIRCUIT LOW/OPEN

DTC DETECTING CONDITION:
Sunload sensor circuit is open. (Displayed for current malfunction)

NOTE:
When the sunload sensor check is performed indoors or in the shade, it could be diagnosed as having an open circuit. Always check the sunload sensor in direct sunlight.

TROUBLE SYMPTOM:
Operation is performed as no sunload.

WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

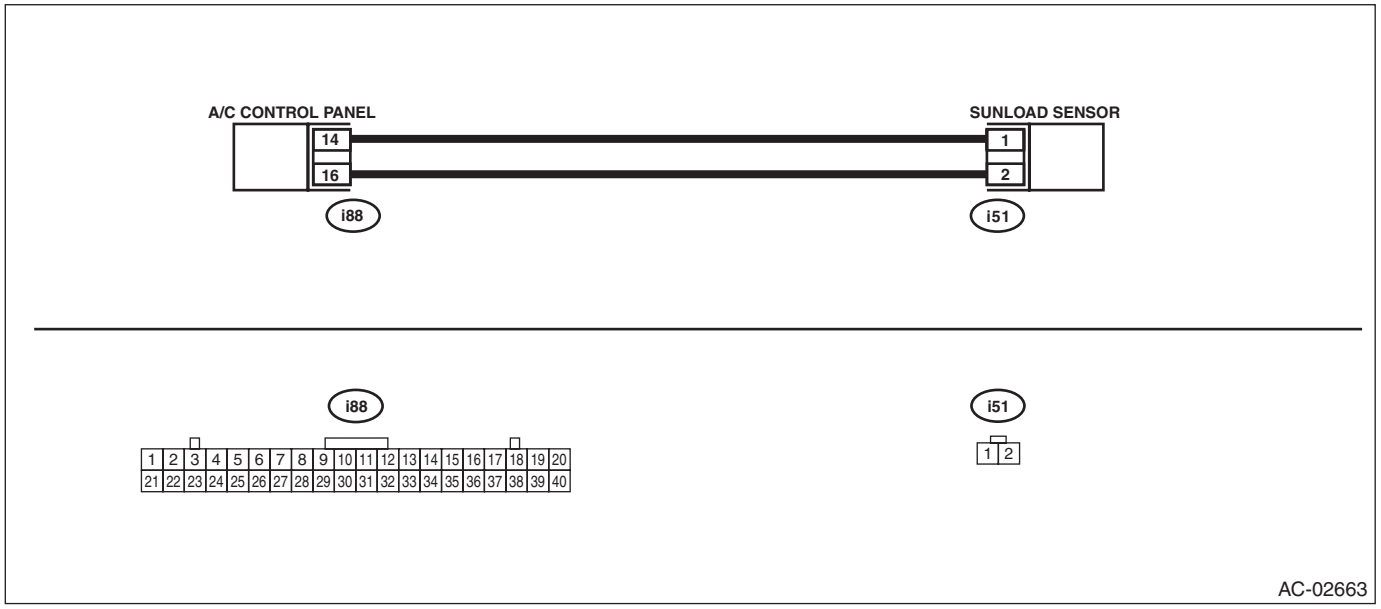


	Step	Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14A1 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK SUNLOAD SENSOR.** 1) Disconnect the sunload sensor. 2) Short the connector. 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14A2 displayed?	Replace the sunload sensor. <Ref. to AC-76, REMOVAL, Sunload Sensor (Auto A/C Model).>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Restore the temporary shorted lines made in step 2. 2) Turn the ignition switch to ON. 3) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i51) No. 2 (+) — No. 1 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **4**.	Repair or replace the open circuit of the harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(i51) No. 1 — (i88) No. 14:*** ***(i51) No. 1 — (i88) No. 16:***	Is there continuity?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Repair or replace the open circuit of harness.

H: DTC B14A2 SUNLOAD SENSOR CIRCUIT SHORT-CIRCUIT

DTC DETECTING CONDITION:
Sunload sensor circuit is shorted.
TROUBLE SYMPTOM:
Operation is performed as no sunload.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

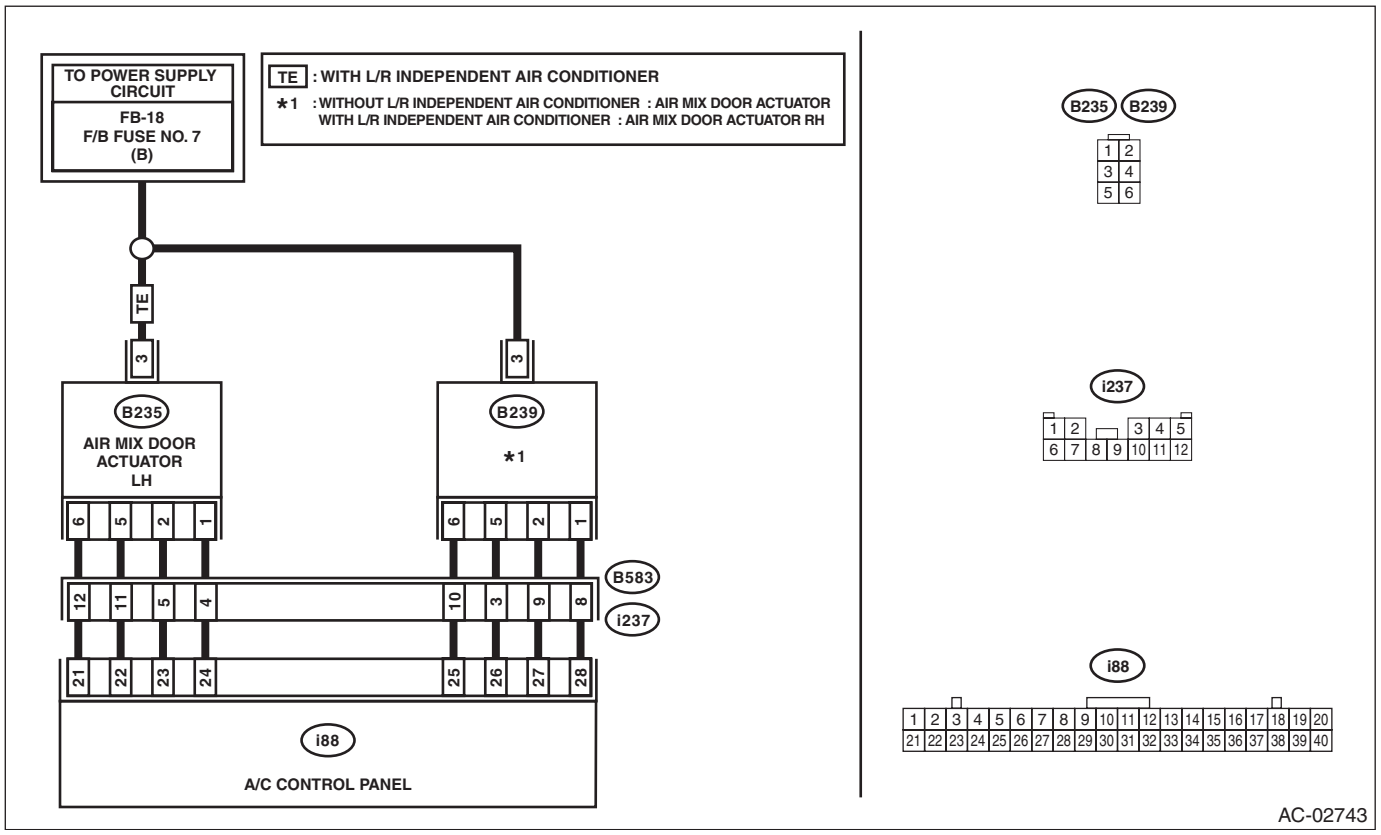


	Step	Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14A2 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK SUNLOAD SENSOR.** 1) Disconnect the sunload sensor. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14A1 displayed?	Replace the sunload sensor. <Ref. to AC-76, REMOVAL, Sunload Sensor (Auto A/C Model).>	Go to step **3**.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i51) No. 2 (+) — No. 1 (–):***	Is the voltage 4.5 — 5.0 V?	Check the connection of the sunload sensor circuit.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS (SHORTED BETWEEN LINES).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(i51) No. 1 — No. 2:***	Is there continuity?	Repair or replace the short circuit of the harness.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

I: DTC B14E1 AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN (DRIVER)

DTC DETECTING CONDITION:
Air mix door actuator stepping motor circuit is open.
TROUBLE SYMPTOM:
Temperature cannot be adjusted.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

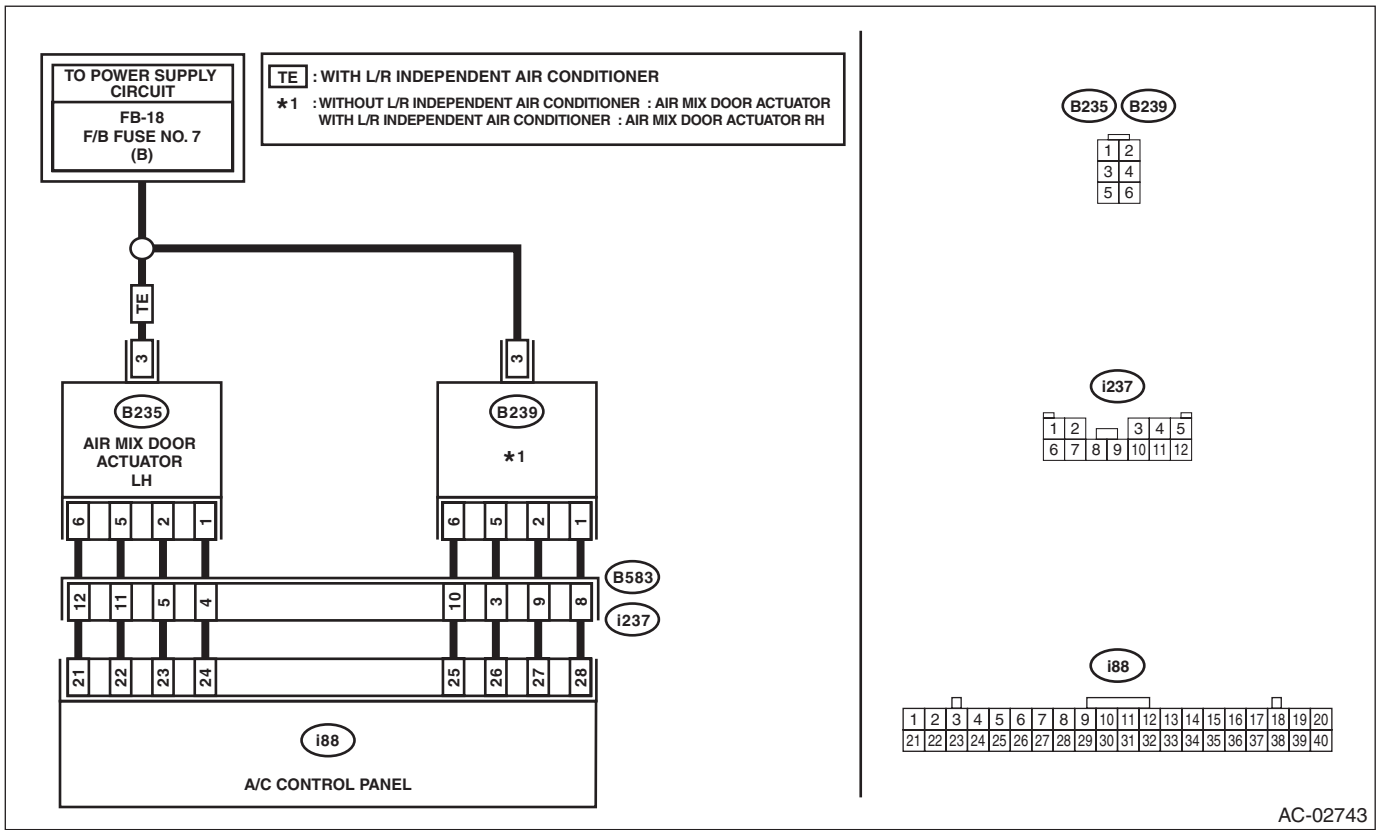


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E1 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the air mix door actuator connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the air mix door actuator connector terminal and chassis ground. ***Connector & terminal*** ***Without left/right independent air conditioning function*** ***(B239) No. 3 (+) — Chassis ground (–):*** ***With left/right independent air conditioning function*** ***(B235) No. 3 (+) — Chassis ground (–):***	Is the voltage approx. 10 V or more?	Go to step **3**.	Check the DC power supply circuit.
3	**CHECK AIR MIX DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between air mix door actuator terminals using a tester. ***Connector & terminal*** ***Without left/right independent air conditioning function*** ***(B239) No. 3 — No. 1:*** ***(B239) No. 3 — No. 2:*** ***(B239) No. 3 — No. 5:*** ***(B239) No. 3 — No. 6:*** ***With left/right independent air conditioning function*** ***(B235) No. 3 — No. 1:*** ***(B235) No. 3 — No. 2:*** ***(B235) No. 3 — No. 5:*** ***(B235) No. 3 — No. 6:***	Is the resistance 80 — 100 Ω?	Go to step **4**.	Replace the actuator. <Ref. to AC-98, REMOVAL, Air Mix Door Actuator.>
4	**CHECK HARNESS BETWEEN A/C CONTROL PANEL AND AIR MIX DOOR ACTUATOR (OPEN).** 1) Disconnect the A/C control panel connector. 2) Measure the resistance between A/C control panel and air mix door actuator connector. ***Connector & terminal*** ***Without left/right independent air conditioning function*** ***(B239) No. 1 — (i88) No. 28:*** ***(B239) No. 2 — (i88) No. 27:*** ***(B239) No. 5 — (i88) No. 26:*** ***(B239) No. 6 — (i88) No. 25:*** ***With left/right independent air conditioning function*** ***(B235) No. 1 — (i88) No. 24:*** ***(B235) No. 2 — (i88) No. 23:*** ***(B235) No. 5 — (i88) No. 22:*** ***(B235) No. 6 — (i88) No. 21:***	Is there continuity?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Repair or replace the open circuit of harness.

J: DTC B14E2 AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT (DRIVER)

DTC DETECTING CONDITION:
Air mix door actuator stepping motor circuit is shorted.
TROUBLE SYMPTOM:
Temperature cannot be adjusted.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

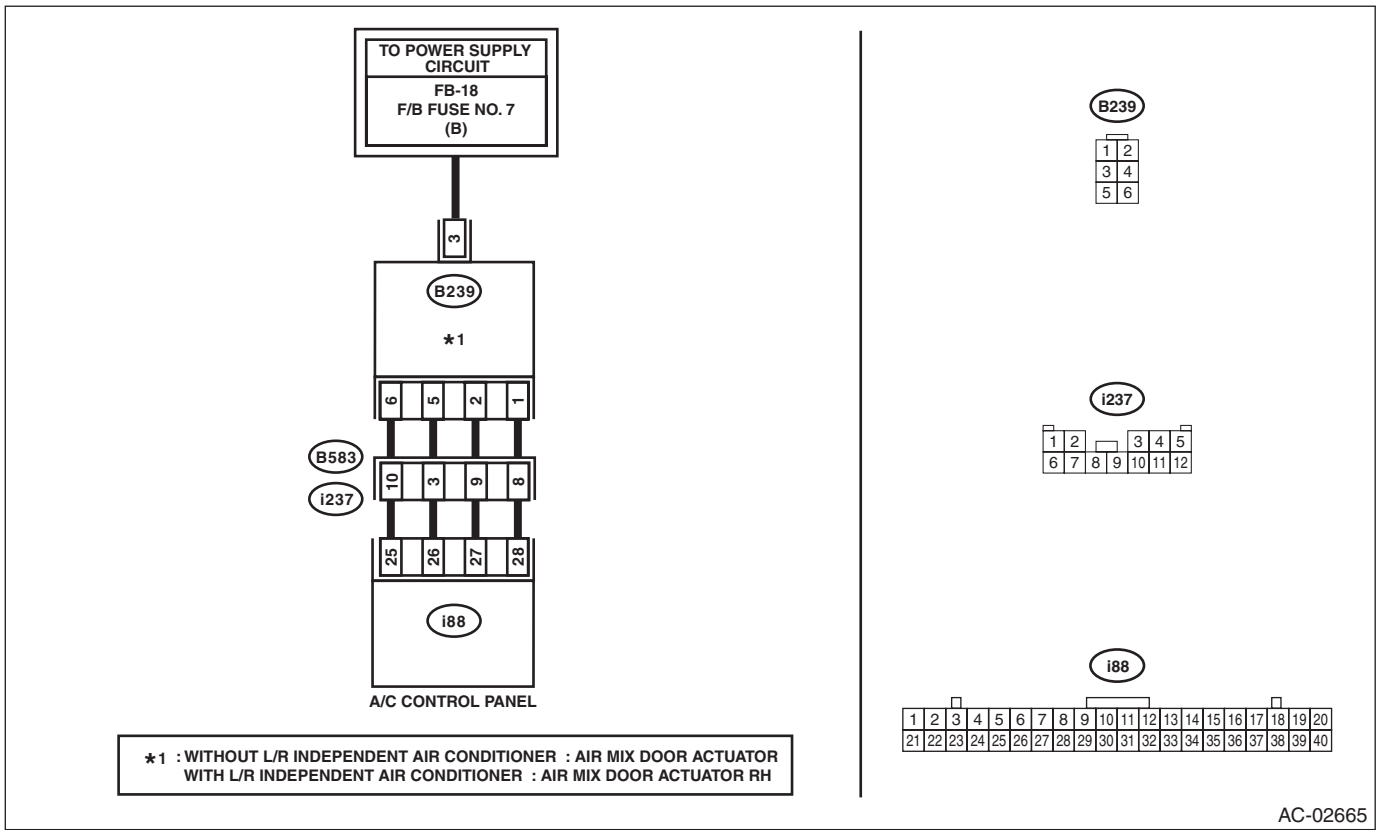


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E2 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK POWER SUPPLY OF AIR MIX DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the air mix door actuator connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the air mix door actuator connector terminal and chassis ground. ***Connector & terminal*** ***Without left/right independent air conditioning function*** ***(B239) No. 3 (+) — Chassis ground (–):*** ***With left/right independent air conditioning function*** ***(B235) No. 3 (+) — Chassis ground (–):***	Is the voltage approx. 10 V or more?	Go to step **3**.	Check the DC power supply circuit.
3	**CHECK AIR MIX DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between air mix door actuator terminals using a tester. ***Connector & terminal*** ***Without left/right independent air conditioning function*** ***(B239) No. 3 — No. 1:*** ***(B239) No. 3 — No. 2:*** ***(B239) No. 3 — No. 5:*** ***(B239) No. 3 — No. 6:*** ***With left/right independent air conditioning function*** ***(B235) No. 3 — No. 1:*** ***(B235) No. 3 — No. 2:*** ***(B235) No. 3 — No. 5:*** ***(B235) No. 3 — No. 6:***	Is the resistance 80 — 100 Ω?	Go to step **4**.	Replace the actuator. <Ref. to AC-98, REMOVAL, Air Mix Door Actuator.>
4	**CHECK HARNESS BETWEEN A/C CONTROL PANEL AND AIR MIX DOOR ACTUATOR (SHORTED TO POWER SUPPLY).** 1) Disconnect the A/C control panel connector. 2) Measure the voltage between air mix door actuator connector and chassis ground. ***Connector & terminal*** ***Without left/right independent air conditioning function*** ***(B239) No. 1 (+) — Chassis ground (–):*** ***(B239) No. 2 (+) — Chassis ground (–):*** ***(B239) No. 5 (+) — Chassis ground (–):*** ***(B239) No. 6 (+) — Chassis ground (–):*** ***With left/right independent air conditioning function*** ***(B235) No. 1 (+) — Chassis ground (–):*** ***(B235) No. 2 (+) — Chassis ground (–):*** ***(B235) No. 5 (+) — Chassis ground (–):*** ***(B235) No. 6 (+) — Chassis ground (–):***	Is there any voltage?	Repair or replace the short circuit of the harness.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

K: DTC B14E3 AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN (PASSENGER)

DTC DETECTING CONDITION:
Air mix door actuator stepping motor circuit is open.
TROUBLE SYMPTOM:
Temperature cannot be adjusted.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

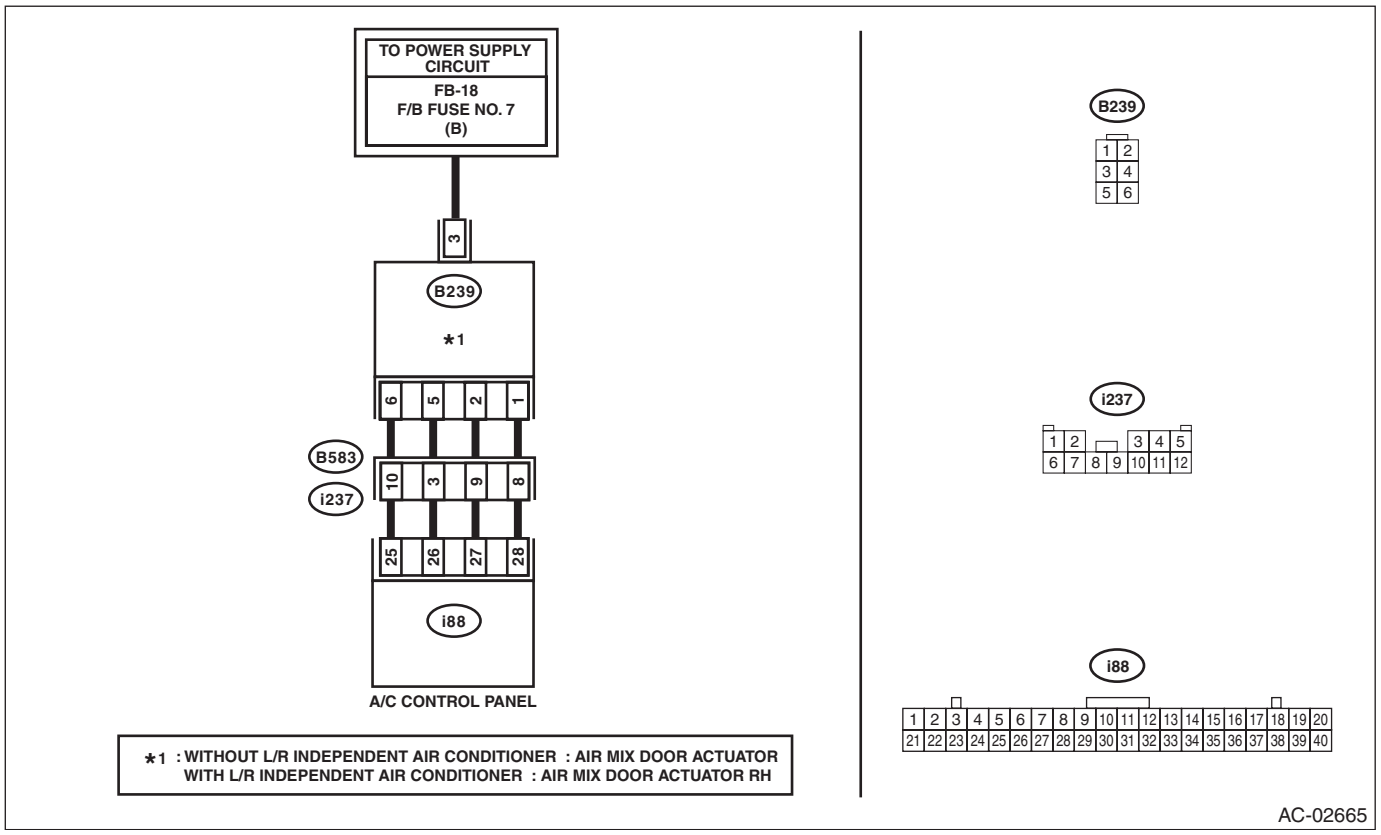


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E3 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the air mix door actuator connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the air mix door actuator connector terminal and chassis ground. ***Connector & terminal*** ***(B239) No. 3 (+) — Chassis ground (–):***	Is the voltage approx. 10 V or more?	Go to step **3**.	Check the DC power supply circuit.
3	**CHECK AIR MIX DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between air mix door actuator terminals using a tester. ***Connector & terminal*** ***(B239) No. 3 — No. 1:*** ***(B239) No. 3 — No. 2:*** ***(B239) No. 3 — No. 5:*** ***(B239) No. 3 — No. 6:***	Is the resistance 80 — 100 Ω?	Go to step **4**.	Replace the actuator. <Ref. to AC-98, REMOVAL, Air Mix Door Actuator.>
4	**CHECK HARNESS BETWEEN A/C CONTROL PANEL AND AIR MIX DOOR ACTUATOR (OPEN).** 1) Disconnect the A/C control panel connector. 2) Measure the resistance between A/C control panel and air mix door actuator connector. ***Connector & terminal*** ***(B239) No. 1 — (i88) No. 28:*** ***(B239) No. 2 — (i88) No. 27:*** ***(B239) No. 5 — (i88) No. 26:*** ***(B239) No. 6 — (i88) No. 25:***	Is there continuity?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Repair or replace the open circuit of harness.

L: DTC B14E4 AIR MIX DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT (PASSENGER)

DTC DETECTING CONDITION:
Air mix door actuator stepping motor circuit is shorted.
TROUBLE SYMPTOM:
Temperature cannot be adjusted.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

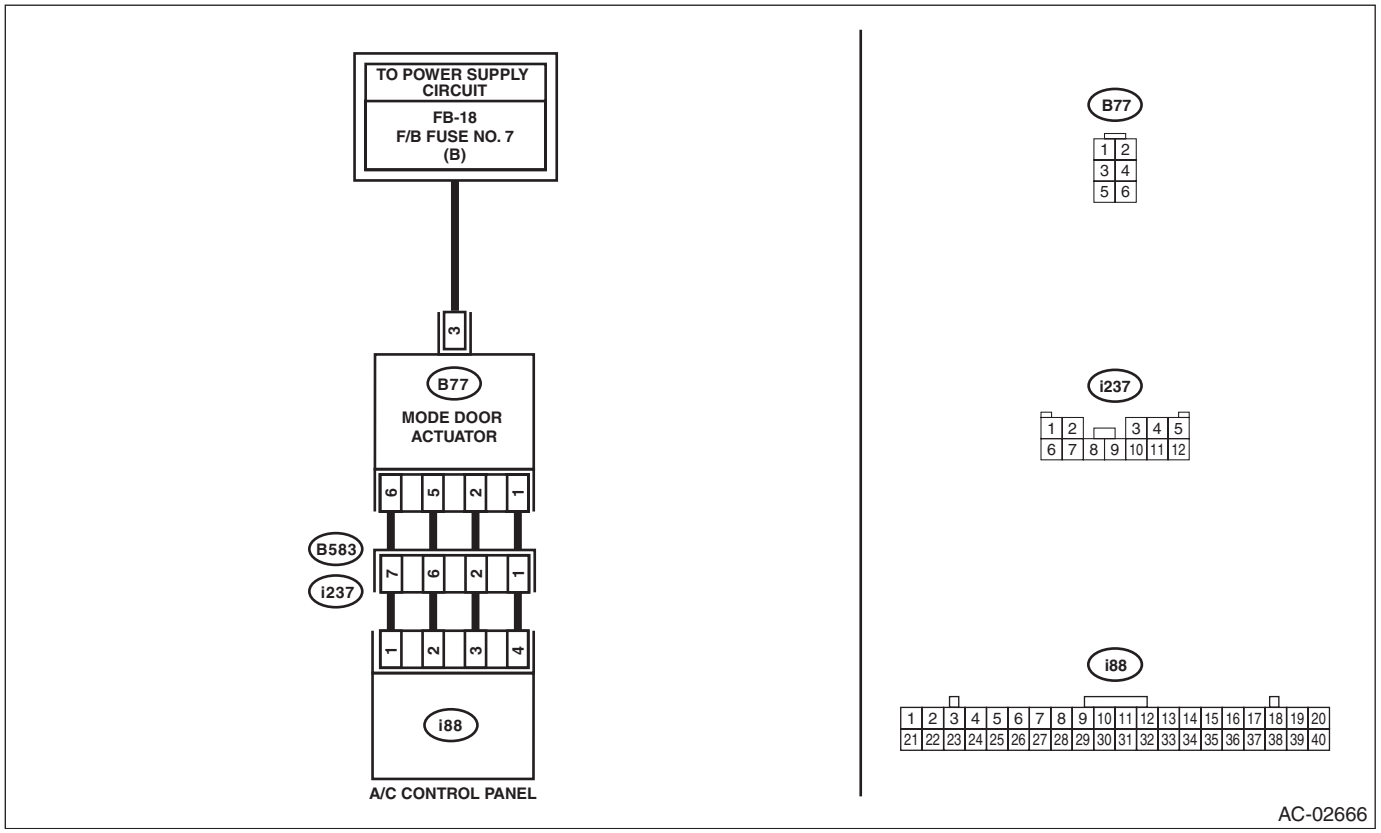


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E4 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK POWER SUPPLY OF AIR MIX DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the air mix door actuator connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the air mix door actuator connector terminal and chassis ground. ***Connector & terminal*** ***(B239) No. 3 (+) — Chassis ground (–):***	Is the voltage approx. 10 V or more?	Go to step **3**.	Check the DC power supply circuit.
3	**CHECK AIR MIX DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between air mix door actuator terminals using a tester. ***Connector & terminal*** ***(B239) No. 3 — No. 1:*** ***(B239) No. 3 — No. 2:*** ***(B239) No. 3 — No. 5:*** ***(B239) No. 3 — No. 6:***	Is the resistance 80 — 100 Ω?	Go to step **4**.	Replace the actuator. <Ref. to AC-98, REMOVAL, Air Mix Door Actuator.>
4	**CHECK HARNESS BETWEEN A/C CONTROL PANEL AND AIR MIX DOOR ACTUATOR (SHORTED TO POWER SUPPLY).** 1) Disconnect the A/C control panel connector. 2) Measure the voltage between air mix door actuator connector and chassis ground. ***Connector & terminal*** ***(B239) No. 1 (+) — Chassis ground (–):*** ***(B239) No. 2 (+) — Chassis ground (–):*** ***(B239) No. 5 (+) — Chassis ground (–):*** ***(B239) No. 6 (+) — Chassis ground (–):***	Is there any voltage?	Repair or replace the short circuit of the harness.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

M: DTC B14E5 MODE DOOR ACTUATOR STEPPING MOTOR CIRCUIT OPEN

DTC DETECTING CONDITION:
Mode door actuator stepping motor circuit is open.
TROUBLE SYMPTOM:
Vent does not change.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

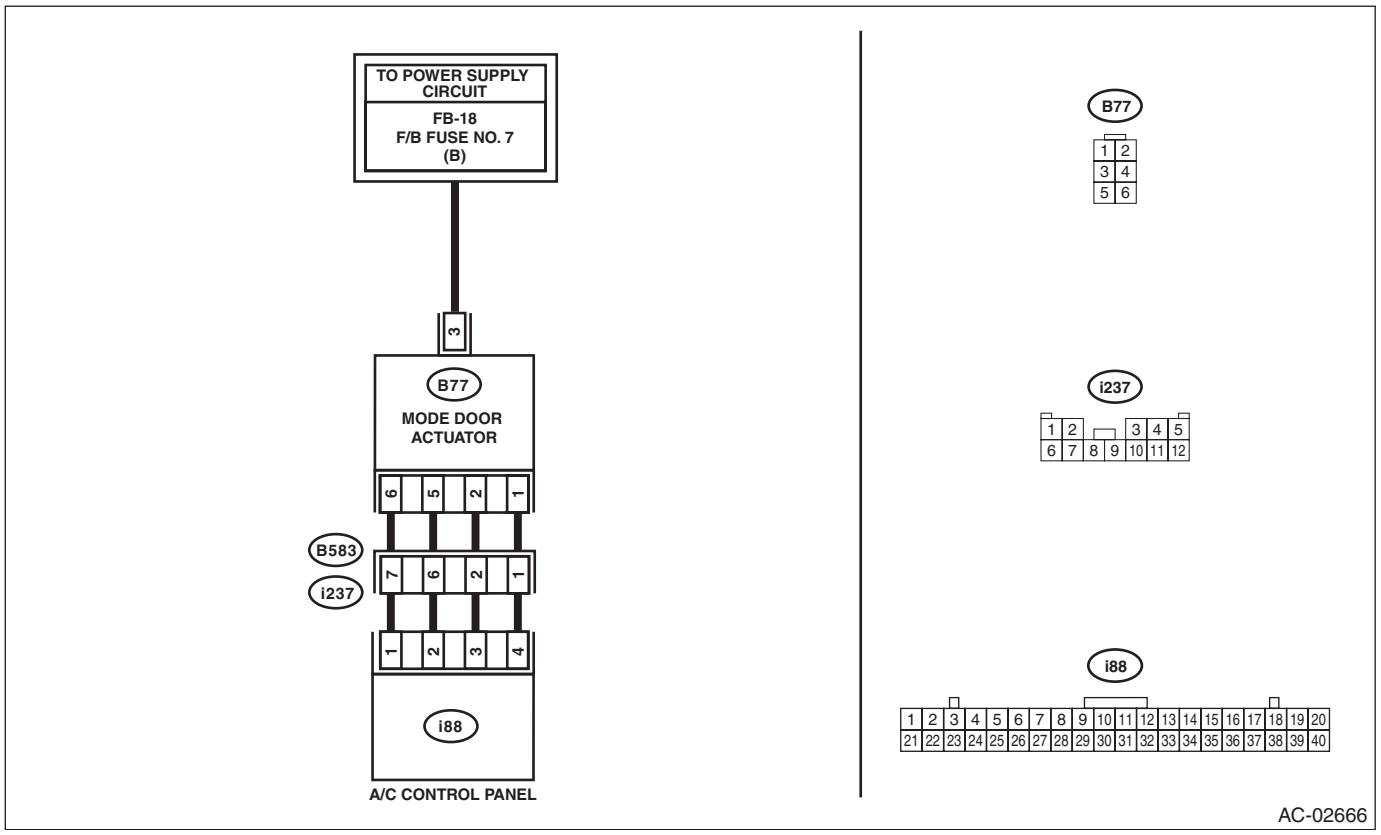


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E5 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the mode door actuator connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the mode door actuator connector terminal and chassis ground. ***Connector & terminal*** ***(B77) No. 3 (+) — Chassis ground (–):***	Is the voltage approx. 10 V or more?	Go to step **3**.	Check the DC power supply circuit.
3	**CHECK AIR MIX DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between mode door actuator terminals using a tester. ***Connector & terminal*** ***(B77) No. 3 — No. 1:*** ***(B77) No. 3 — No. 2:*** ***(B77) No. 3 — No. 5:*** ***(B77) No. 3 — No. 6:***	Is the resistance 80 — 100 Ω?	Go to step **4**.	Replace the actuator. <Ref. to AC-96, REMOVAL, Mode Door Actuator.>
4	**CHECK HARNESS BETWEEN A/C CONTROL PANEL AND MODE DOOR ACTUATOR (OPEN).** 1) Disconnect the A/C control panel connector. 2) Measure the resistance between A/C control panel and air mix door actuator connector. ***Connector & terminal*** ***(B77) No. 1 — (i88) No. 4:*** ***(B77) No. 2 — (i88) No. 3:*** ***(B77) No. 5 — (i88) No. 2:*** ***(B77) No. 6 — (i88) No. 1:***	Is there continuity?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Repair or replace the open circuit of harness.

N: DTC B14E6 MODE DOOR ACTUATOR STEPPING MOTOR CIRCUIT SHORT-CIRCUIT

DTC DETECTING CONDITION:
Mode door actuator stepping motor circuit is shorted.
TROUBLE SYMPTOM:
Vent does not change.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

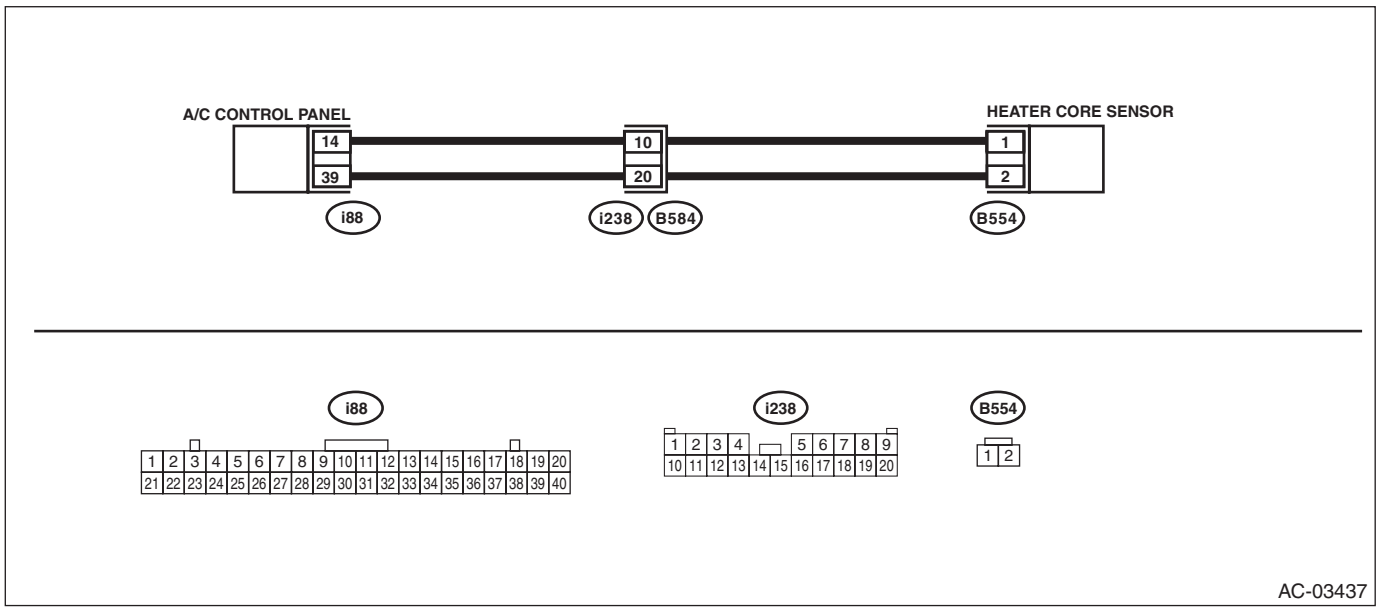


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E6 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK POWER SUPPLY FOR MODE DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the mode door actuator connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the mode door actuator connector terminal and chassis ground. ***Connector & terminal*** ***(B77) No. 3 (+) — Chassis ground (–):***	Is the voltage approx. 10 V or more?	Go to step **3**.	Check the DC power supply circuit.
3	**CHECK MODE DOOR ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between mode door actuator terminals using a tester. ***Connector & terminal*** ***(B77) No. 3 — No. 1:*** ***(B77) No. 3 — No. 2:*** ***(B77) No. 3 — No. 5:*** ***(B77) No. 3 — No. 6:***	Is the resistance 80 — 100 Ω?	Go to step **4**.	Replace the actuator. <Ref. to AC-96, REMOVAL, Mode Door Actuator.>
4	**CHECK HARNESS BETWEEN A/C CONTROL PANEL AND MODE DOOR ACTUATOR (SHORTED TO POWER SUPPLY).** 1) Disconnect the A/C control panel connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between mode door actuator connector and chassis ground. ***Connector & terminal*** ***(B77) No. 1 (+) — Chassis ground (–):*** ***(B77) No. 2 (+) — Chassis ground (–):*** ***(B77) No. 5 (+) — Chassis ground (–):*** ***(B77) No. 6 (+) — Chassis ground (–):***	Is there any voltage?	Repair or replace the short circuit of the harness.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

O: DTC B14E7 HEATER CORE SENSOR CIRCUIT OPEN

DTC DETECTING CONDITION:
Heater core sensor circuit is open.
TROUBLE SYMPTOM:
Proper outlet air temperature cannot be kept during Auto Start Stop.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

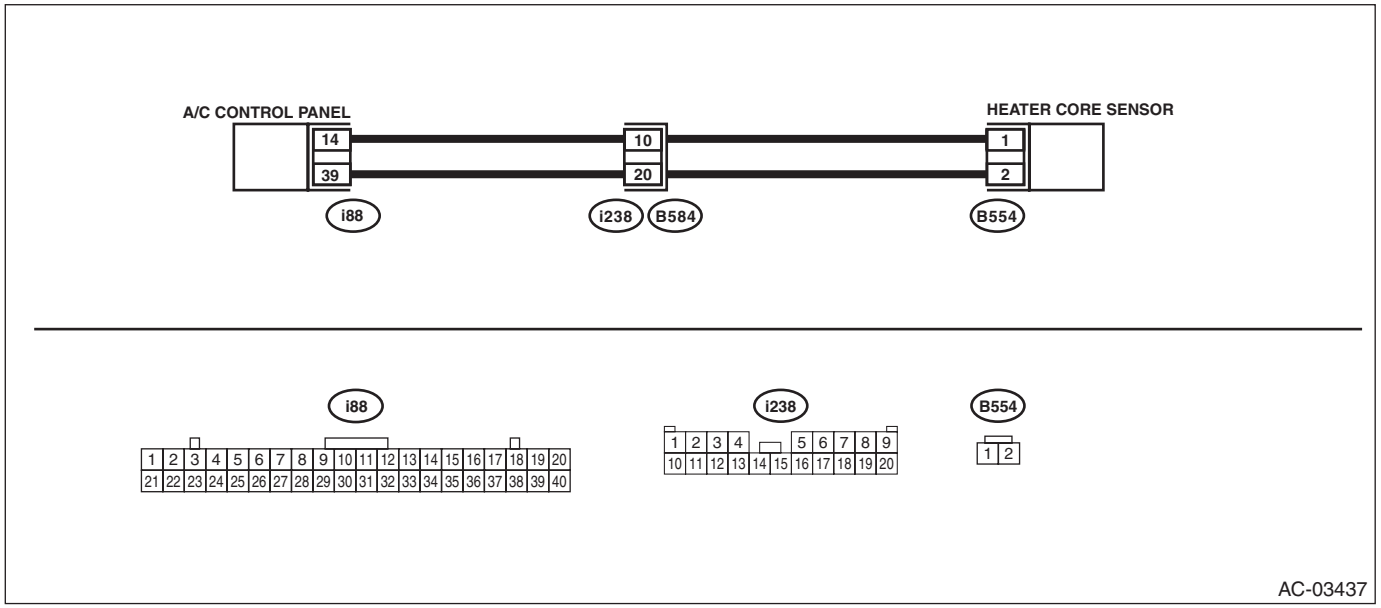


	Step	Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E7 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HEATER CORE SENSOR.** 1) Disconnect the heater core sensor. 2) Short the heater core sensor connector (B554). 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E8 displayed?	Replace the heater core sensor. <Ref. to AC-90, REMOVAL, Heater Core Sensor.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Restore the temporary shorted lines made in step 2. 2) Turn the ignition switch to ON. 3) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B554) No. 2 (+) — No. 1 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B554) No. 2 — (i88) No. 14:*** ***(B554) No. 2 — (i88) No. 39:***	Is there continuity?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Repair or replace the open circuit of harness.

P: DTC B14E8 HEATER CORE SENSOR CIRCUIT SHORT-CIRCUIT

DTC DETECTING CONDITION:
Heater core sensor circuit is shorted.
TROUBLE SYMPTOM:
Proper outlet air temperature cannot be kept during Auto Start Stop.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

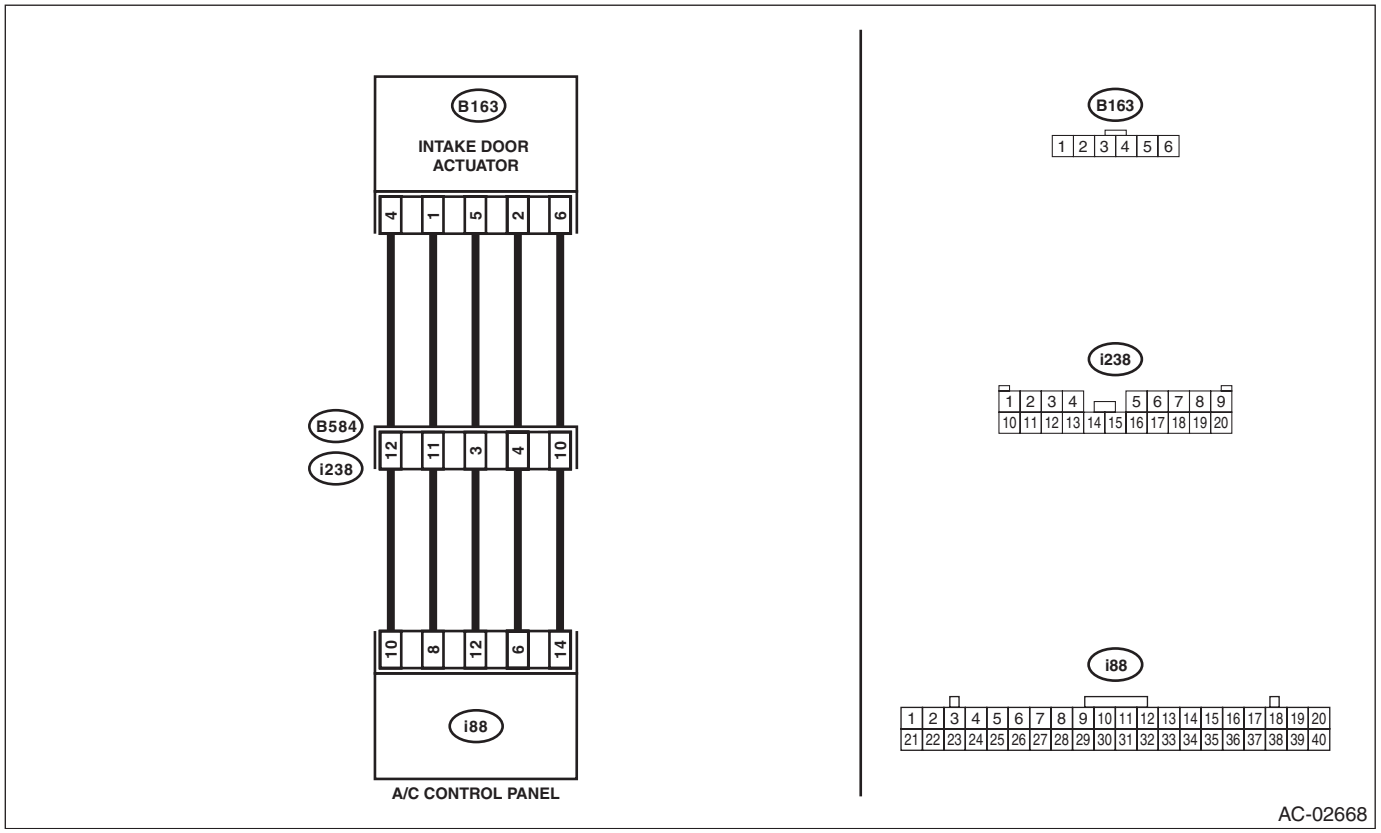


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E8 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HEATER CORE SENSOR.** 1) Disconnect the heater core sensor. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E7 displayed?	Replace the heater core sensor. <Ref. to AC-90, REMOVAL, Heater Core Sensor.>	Go to step **3**.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B554) No. 2 (+) — No. 1 (–):***	Is the voltage 4.5 — 5.0 V?	Check the connection of the heater core sensor circuit.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS (SHORTED BETWEEN LINES).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B554) No. 1 — No. 2:***	Is there continuity?	Repair or replace the short circuit of the harness.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

Q: DTC B14E9 INTAKE DOOR ACTUATOR CIRCUIT OPEN

DTC DETECTING CONDITION:
Intake door actuator potentiometer circuit is open.
TROUBLE SYMPTOM:
FRESH/RECIRC does not operate.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

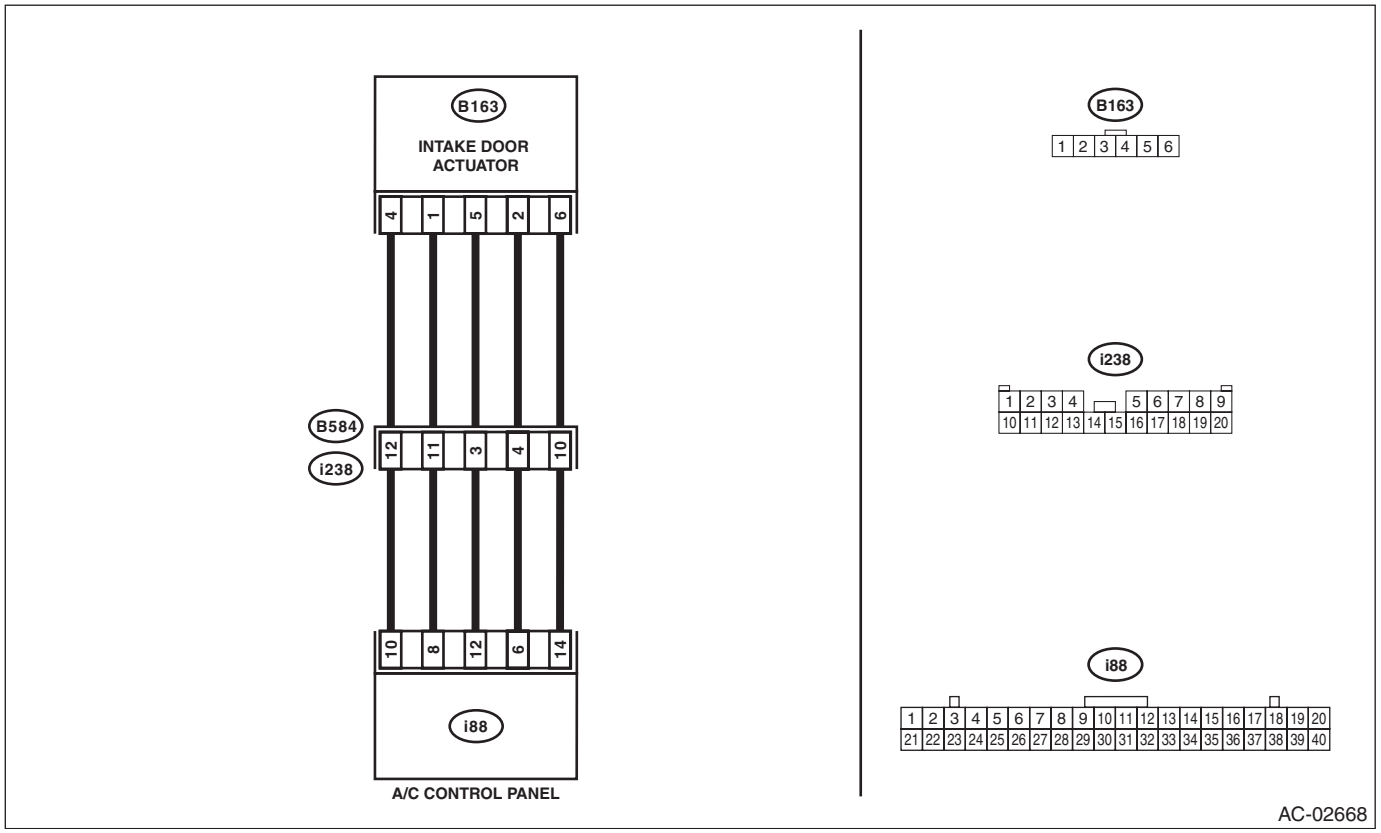


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14E9 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B163) No. 4 (+) — No. 6 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B163) No. 1 — (i88) No. 8:*** ***(B163) No. 2 — (i88) No. 6:*** ***(B163) No. 4 — (i88) No. 10:*** ***(B163) No. 5 — (i88) No. 12:*** ***(B163) No. 6 — (i88) No. 14:***	Is there continuity?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK ACTUATOR.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B163) No. 5 (+) — No. 6 (–):***	Is the voltage 0.5 — 4.5 V?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Go to step **5**.
5	**CHECK HARNESS (SHORTED BETWEEN LINES).** 1) Turn the ignition switch to OFF. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B163) No. 4 — No. 5:***	Is the resistance less than 1 Ω?	Repair or replace the short circuit of the harness.	Replace the actuator. <Ref. to AC-93, REMOVAL, FRESH/RECIRC Door Actuator.>

R: DTC B14EA INTAKE DOOR ACTUATOR CIRCUIT SHORT-CIRCUIT

DTC DETECTING CONDITION:
Intake door actuator potentiometer circuit is shorted.
TROUBLE SYMPTOM:
FRESH/RECIRC does not operate.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14EA displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK ACTUATOR.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B163) No. 4 (+) — No. 6 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B163) No. 4 — (i88) No. 10:*** ***(B163) No. 5 — (i88) No. 12:*** ***(B163) No. 6 — (i88) No. 14:***	Is there continuity?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK ACTUATOR.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B163) No. 5 (+) — No. 6 (–):***	Is the voltage 0.5 — 4.5 V?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Go to step **5**.
5	**CHECK HARNESS (SHORTED BETWEEN LINES).** 1) Turn the ignition switch to OFF. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B163) No. 5 — No. 6:***	Is the resistance less than 1 Ω?	Repair or replace the short circuit of the harness.	Replace the actuator. <Ref. to AC-93, REMOVAL, FRESH/RECIRC Door Actuator.>

S: DTC B14EB INTAKE DOOR ACTUATOR STUCK

DTC DETECTING CONDITION:

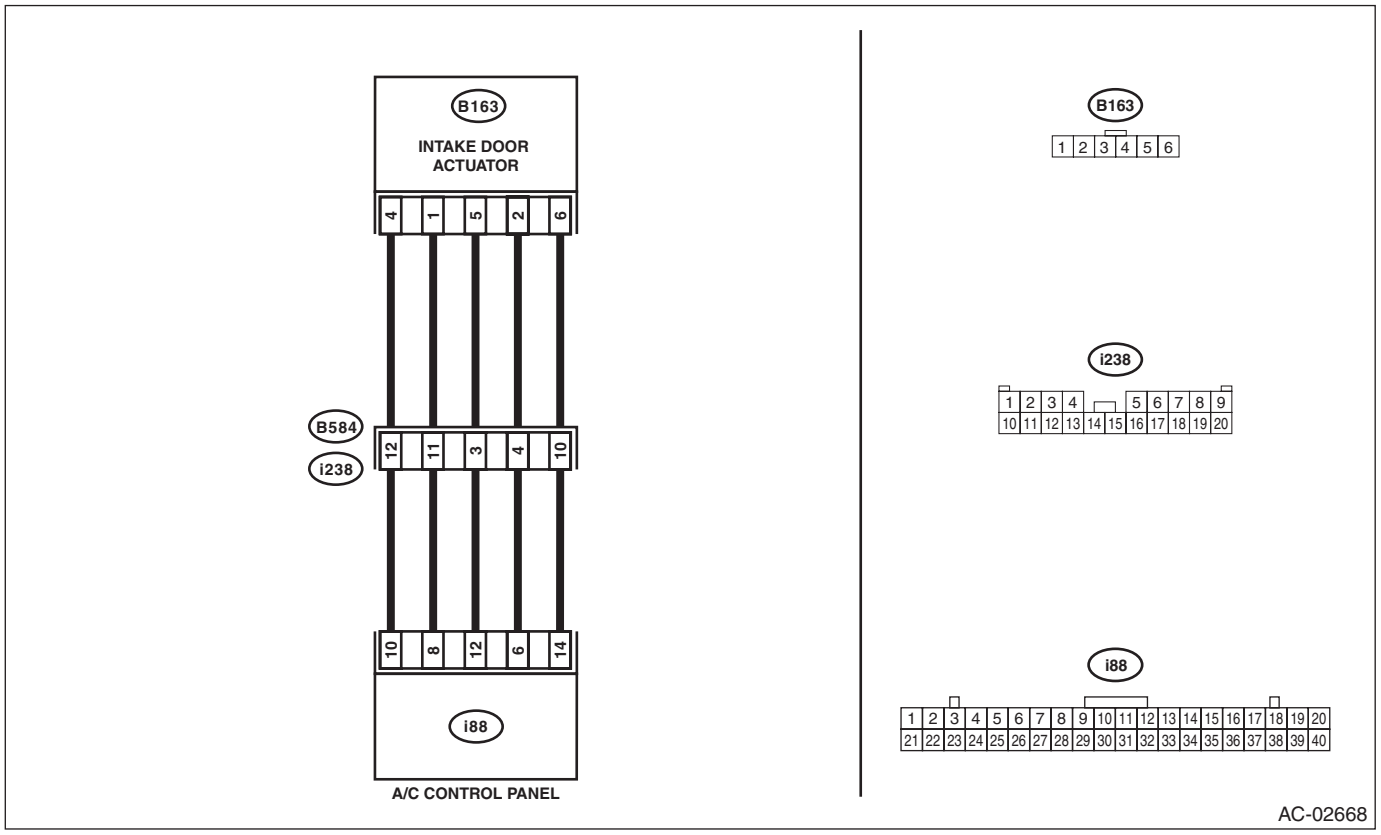
- Intake door actuator is locked.
- The potentiometer value of the actuator does not change.

TROUBLE SYMPTOM:

FRESH/RECIRC does not operate.

WIRING DIAGRAM:

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.> <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

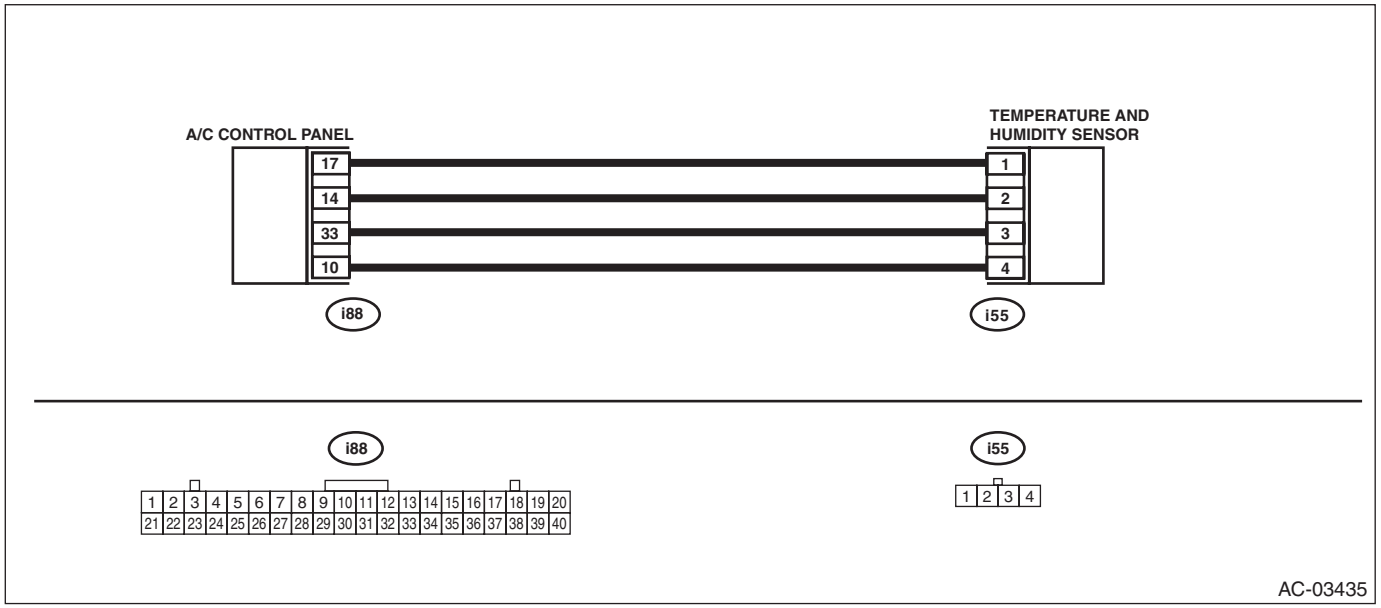


Step		Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14EB displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK SYSTEM OPERATION.** Using the Subaru Select Monitor, change the setting of "Fresh/Rec Air Dr Act Trgt Open Angle" from Air Conditioning Diagnosis and perform the active test.	Did the actuator move to the specified target opening angle?	Intake door actuator circuit is normal.	Go to step **3**.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i176) No. 4 (+) — No. 6 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(i163) No. 1 — (i88) No. 8:*** ***(i163) No. 2 — (i88) No. 6:*** ***(i163) No. 4 — (i88) No. 10:*** ***(i163) No. 5 — (i88) No. 12:*** ***(i163) No. 6 — (i88) No. 14:***	Is there continuity?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK INTAKE DOOR ACTUATOR.** Check the intake door actuator parts.	Is the actuator normal?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Replace the actuator. <Ref. to AC-93, REMOVAL, FRESH/RECIRC Door Actuator.>

T: DTC B14EC HUMIDITY SENSOR CIRCUIT OPEN

DTC DETECTING CONDITION:
Temperature and humidity sensor circuit is open.
TROUBLE SYMPTOM:
Proper outlet air temperature cannot be kept during Auto Start Stop.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>

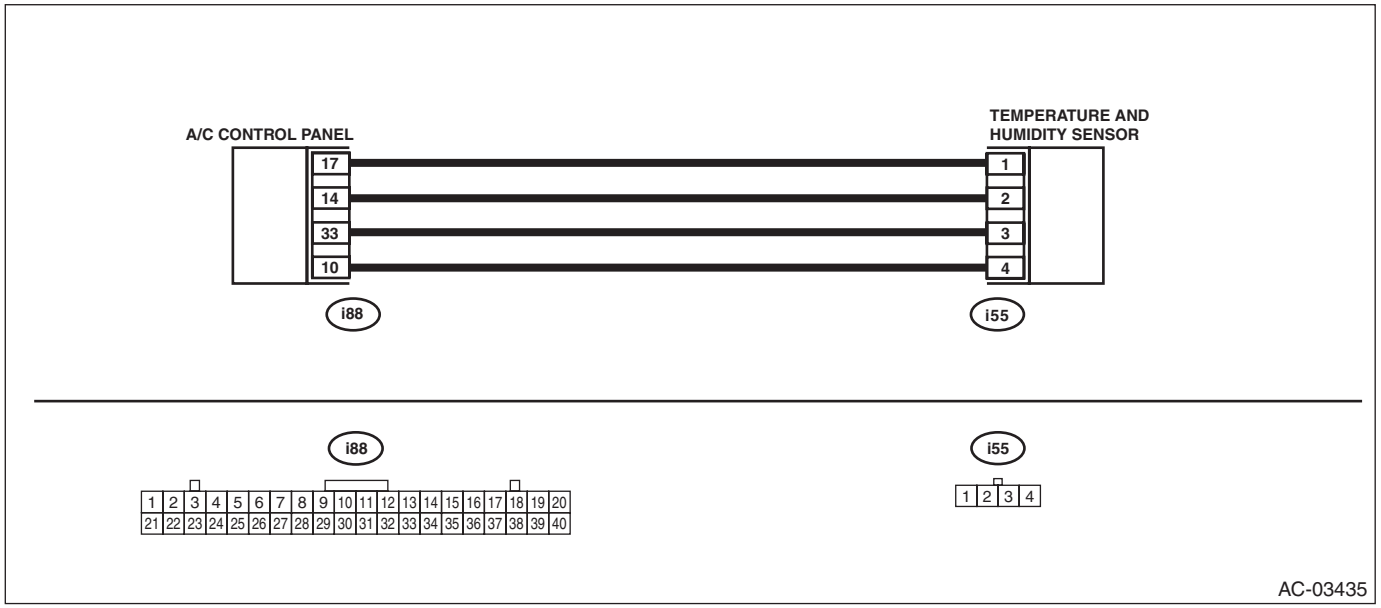


	Step	Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14EC displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK TEMPERATURE AND HUMIDITY SENSOR.** 1) Disconnect the temperature and humidity sensor. 2) Short the temperature and humidity sensor connector (i55). 3) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14ED displayed?	Replace the temperature and humidity sensor. <Ref. to AC-82, REMOVAL, Temperature and Humidity Sensor.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i55) No. 4 (+) — No. 3 (–):***	Is the voltage 4.5 — 5.0 V?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(i55) No. 3 — (i88) No. 33:*** ***(i55) No. 4 — (i88) No. 10:***	Is there continuity?	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>	Repair or replace the open circuit of harness.

U: DTC B14ED HUMIDITY SENSOR CIRCUIT SHORT

DTC DETECTING CONDITION:
Temperature and humidity sensor circuit is shorted.
TROUBLE SYMPTOM:
Proper outlet air temperature cannot be kept during Auto Start Stop.
WIRING DIAGRAM:
Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



	Step	Check	Yes	No
1	**CHECK CONNECTOR.** 1) Check the condition of connector connection. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14ED displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK TEMPERATURE AND HUMIDITY SENSOR.** 1) Disconnect the temperature and humidity sensor. 2) Read the DTC using Subaru Select Monitor. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>	Is B14EC displayed?	Replace the temperature and humidity sensor. <Ref. to AC-82, REMOVAL, Temperature and Humidity Sensor.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i55) No. 4 (+) — No. 3 (–):***	Is the voltage 4.5 — 5.0 V?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (SHORTED BETWEEN LINES).** 1) Disconnect the connector from the A/C control panel. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(i55) No. 4 — No. 3:***	Is there continuity?	Repair or replace the short circuit of the harness.	Replace the A/C control panel. <Ref. to AC-47, REMOVAL, Control Panel.>

V: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

Detected when CAN line abnormality is detected.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

W: DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

Detected when CAN data from the engine control module (ECM) does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

X: DTC U0101 LOST COMMUNICATION WITH TCM

Detected when CAN data from TCM does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

Y: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

Detected when CAN data from VDC does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

Z: DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

Detected when CAN data from BIU does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

AA:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

Detected when CAN data from meter does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

AB:DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

Detected when there is malfunction in CAN data from the engine control module (ECM).

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

AC:DTC U0402 INVALID DATA RECEIVED FROM TCM

This is detected when CAN data from TCM is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

AD:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

This is detected when CAN data from VDC is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

AE:DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

Detected when CAN data from BIU is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

AF:DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

This is detected when CAN data from meter is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

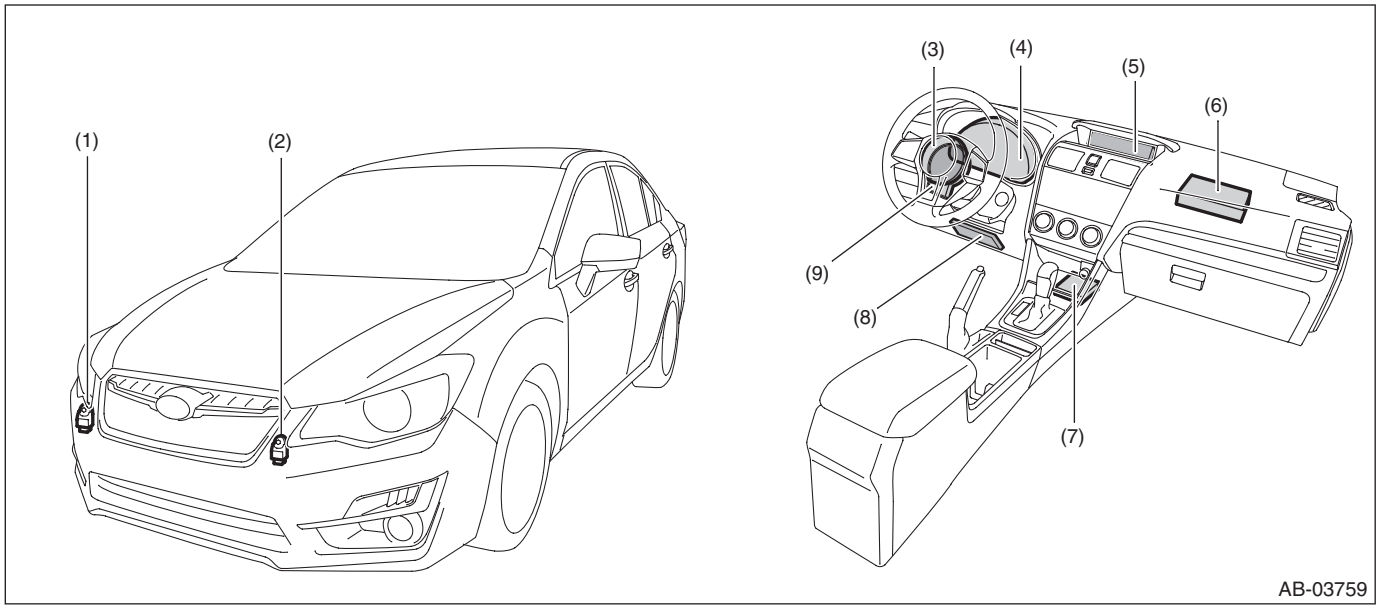
AIRBAG SYSTEM

AB

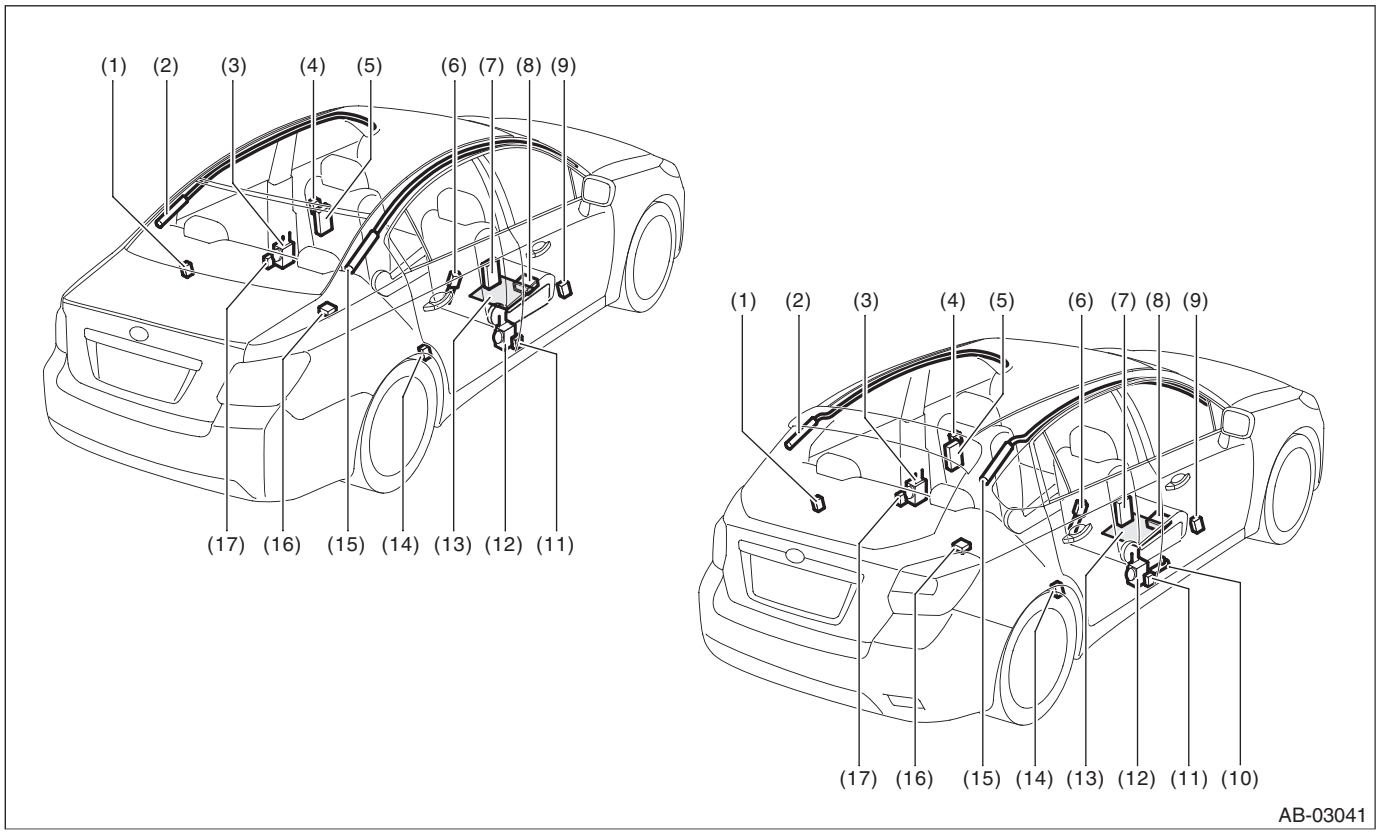
		Page
1.	General Description	2
2.	Airbag Connector	19
3.	Inspection Locations after a Collision	30
4.	Driver's Airbag Module	38
5.	Knee Airbag Module	41
6.	Passenger's Airbag Module	42
7.	Side Airbag Module	48
8.	Curtain Airbag Module	51
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12.	Side Airbag Sensor	60
13.	Curtain Airbag Sensor	63
14.	Satellite Safing Sensor	68
15.	Roll Connector	69
16.	Airbag Module Disposal (Deployment Processing on Vehicle)	73

1. General Description

A: COMPONENT

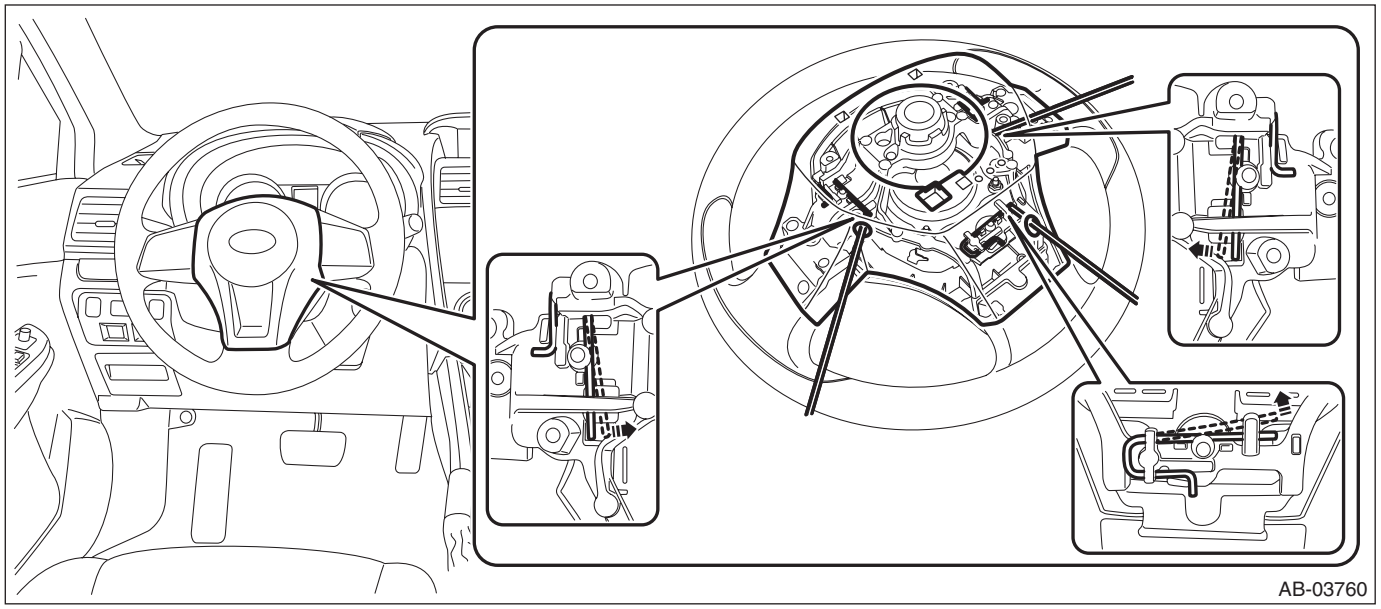


(1)	Front sub sensor RH	(4)	Airbag warning light (in combination meter)	(7)	Airbag control module
(2)	Front sub sensor LH	(5)	Airbag ON/OFF indicator light (MFD)	(8)	Knee airbag module
(3)	Driver's airbag module	(6)	Passenger's airbag module	(9)	Steering roll connector

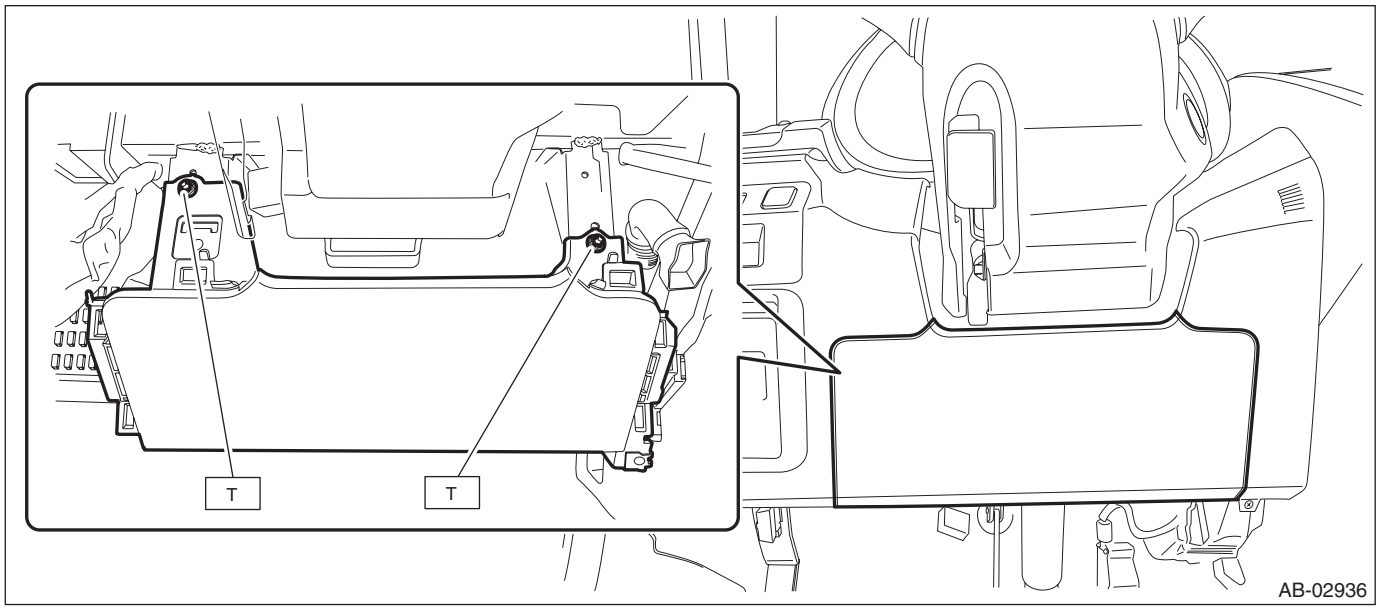


(1) Curtain airbag sensor LH
(2) Curtain airbag module LH
(3) Seat belt pretensioner LH
(4) Front door impact sensor LH
(5) Side airbag module LH
(6) Buckle switch RH
(7) Side airbag module RH
(8) Occupant detection control module
(9) Front door impact sensor RH
(10) Lap seat belt pretensioner RH (Crosstrek model)
(11) Side airbag sensor RH
(12) Seat belt pretensioner RH
(13) Occupant detection sensor
(14) Curtain airbag sensor RH
(15) Curtain airbag module RH
(16) Satellite safing sensor
(17) Side airbag sensor LH

1. DRIVER'S AIRBAG MODULE

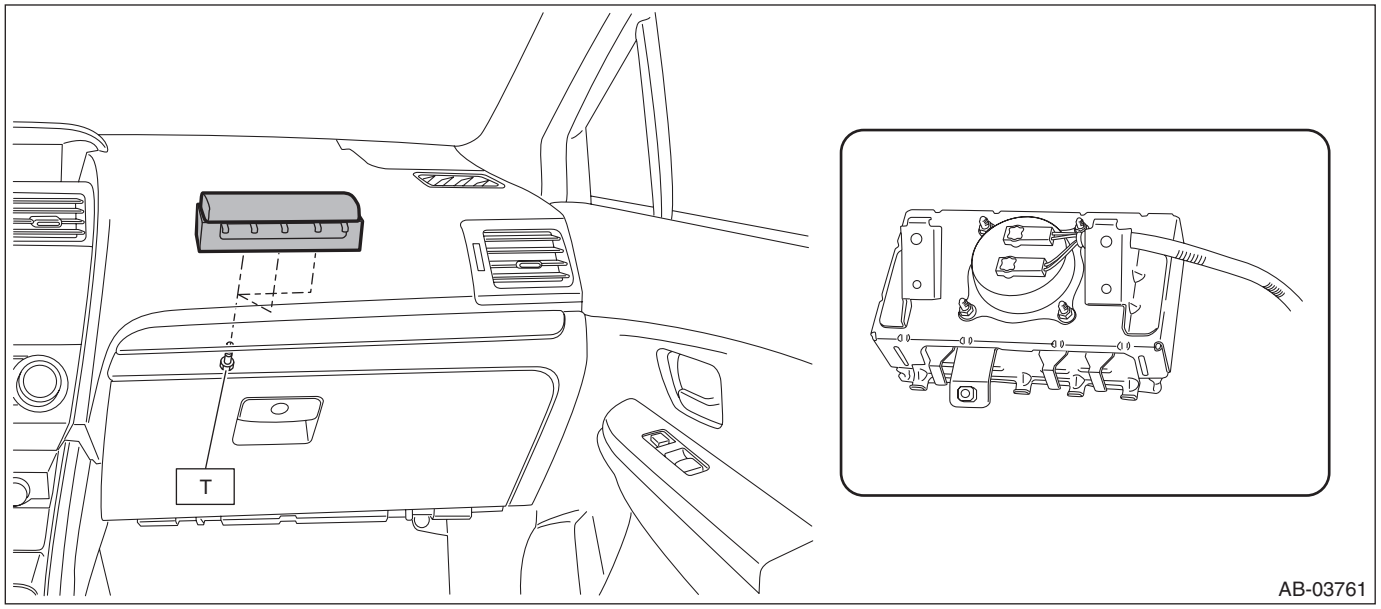


2. KNEE AIRBAG MODULE



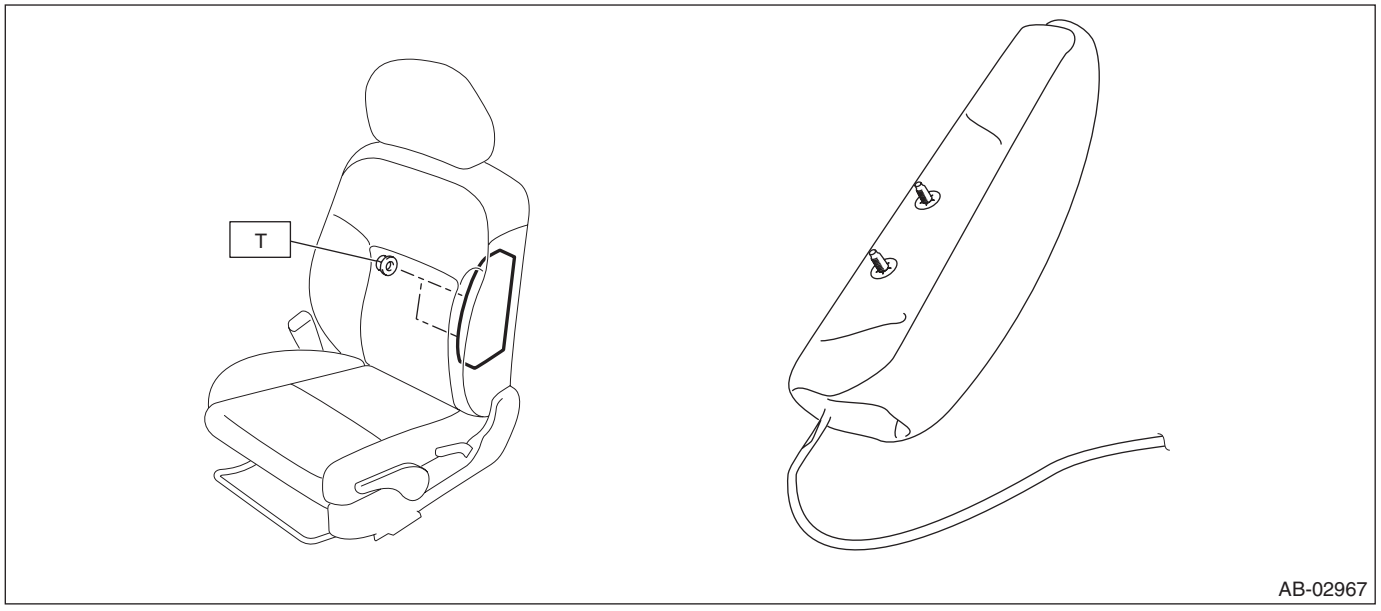
Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

3. PASSENGER'S AIRBAG MODULE



Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

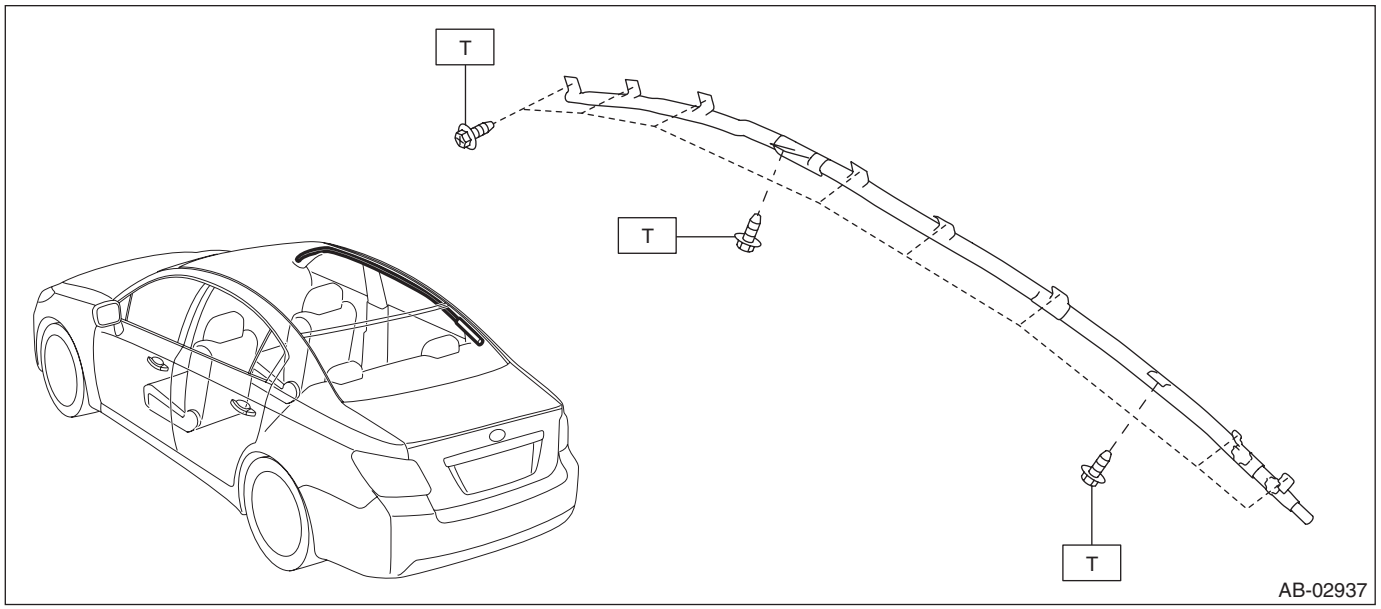
4. SIDE AIRBAG MODULE



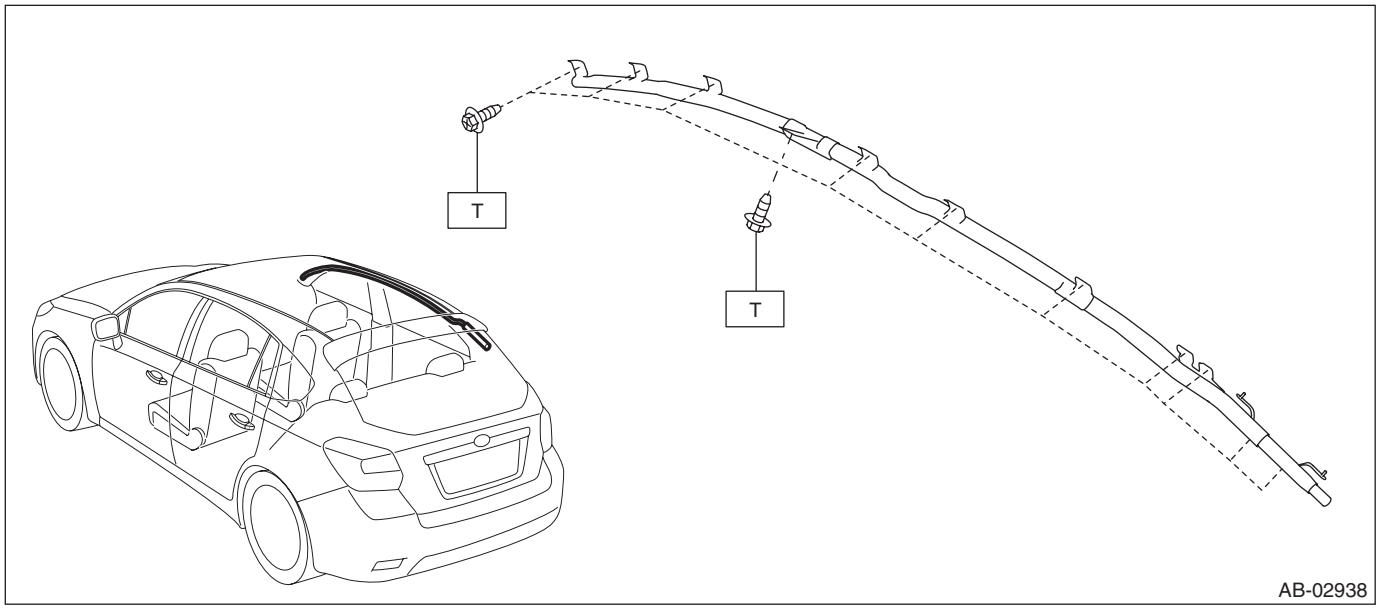
Tightening torque:
6 N·m (0.61 kgf-m, 4.4 ft-lb)

5. CURTAIN AIRBAG MODULE

- 4 door model



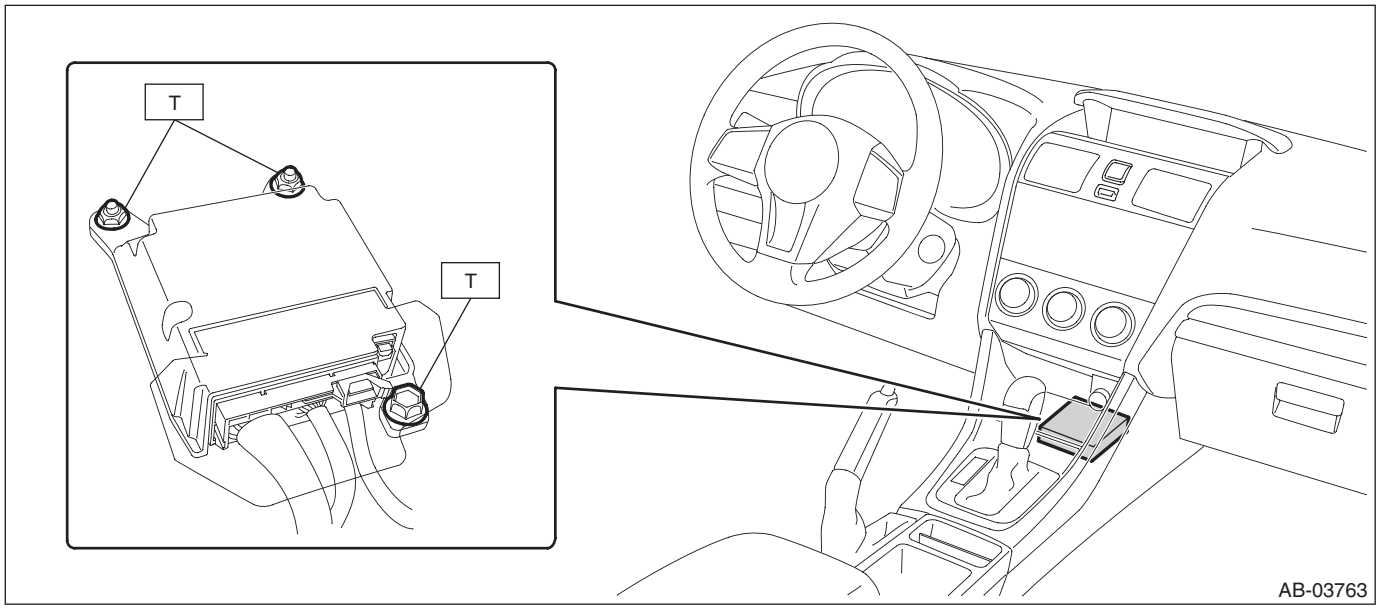
- 5 door model/Crosstrek model



Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

6. AIRBAG CONTROL MODULE

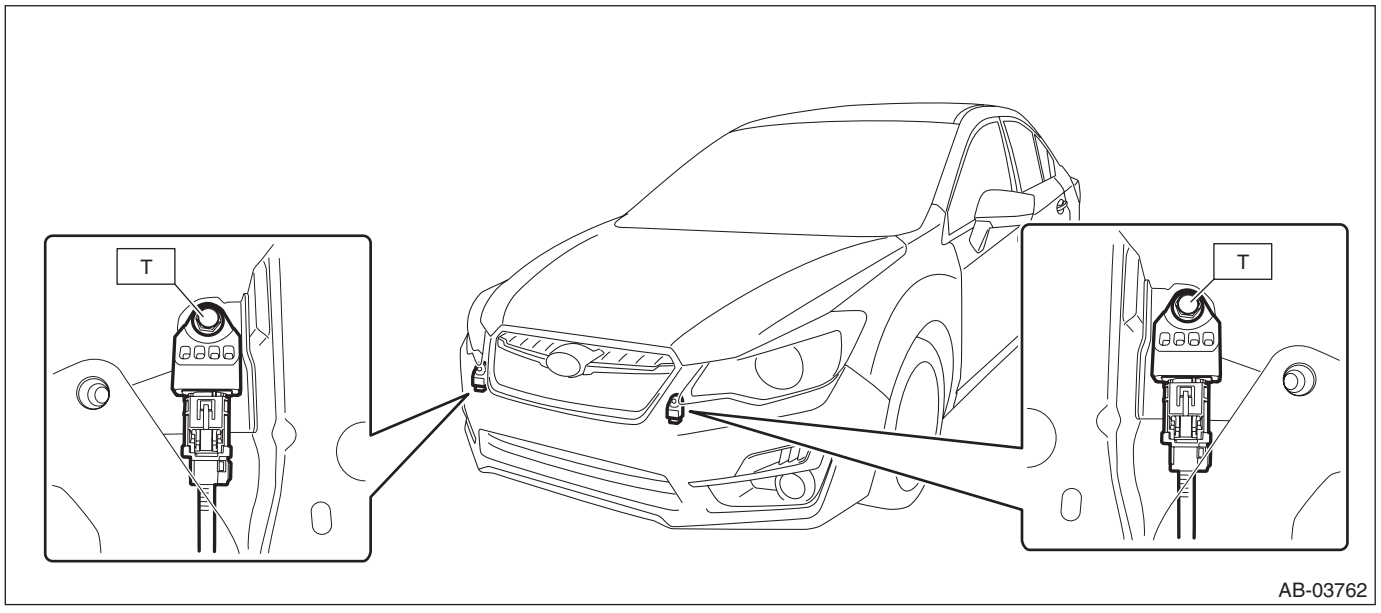
CAUTION:
Do not reuse mounting bolts and nuts.



Tightening torque:
25 N·m (2.55 kgf-m, 18.4 ft-lb)

7. FRONT SUB SENSOR

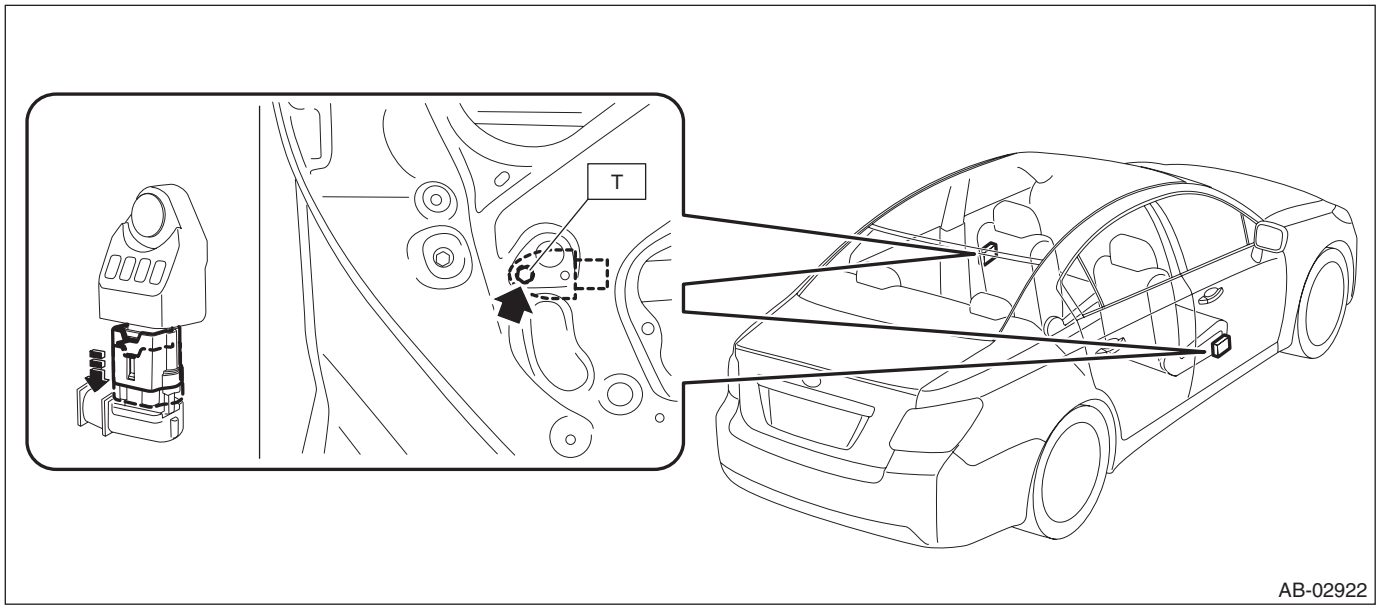
CAUTION:
Do not reuse mounting bolts and nuts.



Tightening torque:
13 N·m (1.33 kgf-m, 9.6 ft-lb)

8. FRONT DOOR IMPACT SENSOR

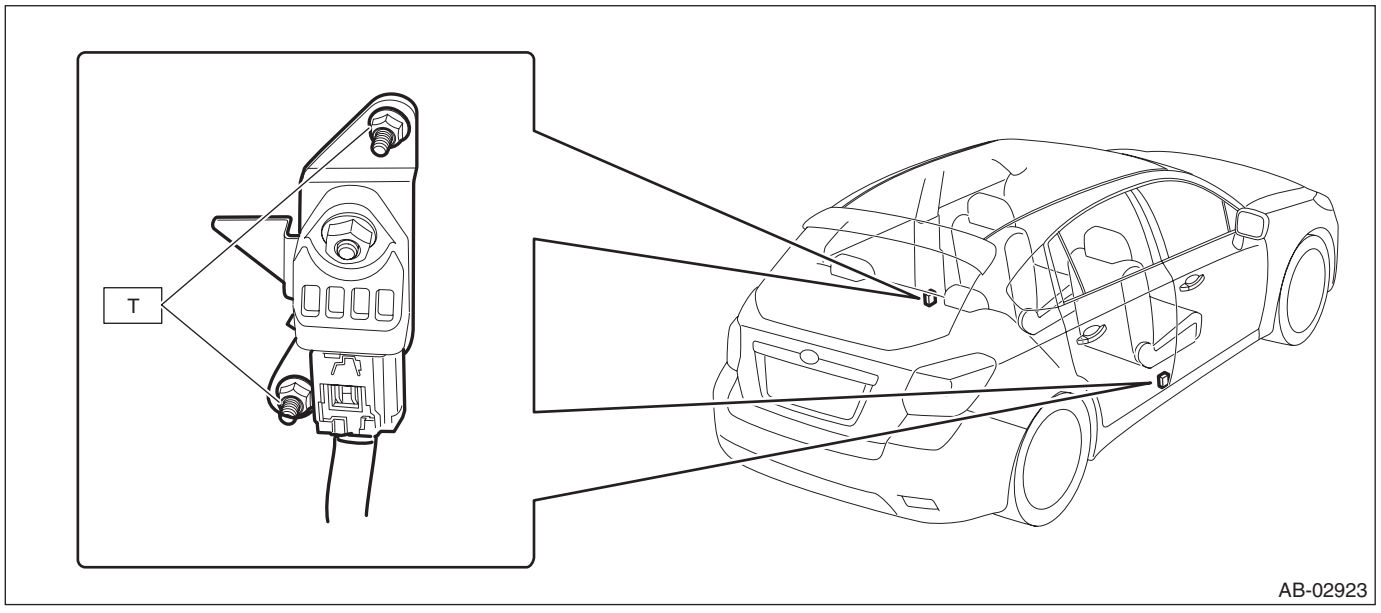
CAUTION:
Do not reuse mounting bolts and nuts.



Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

9. SIDE AIRBAG SENSOR

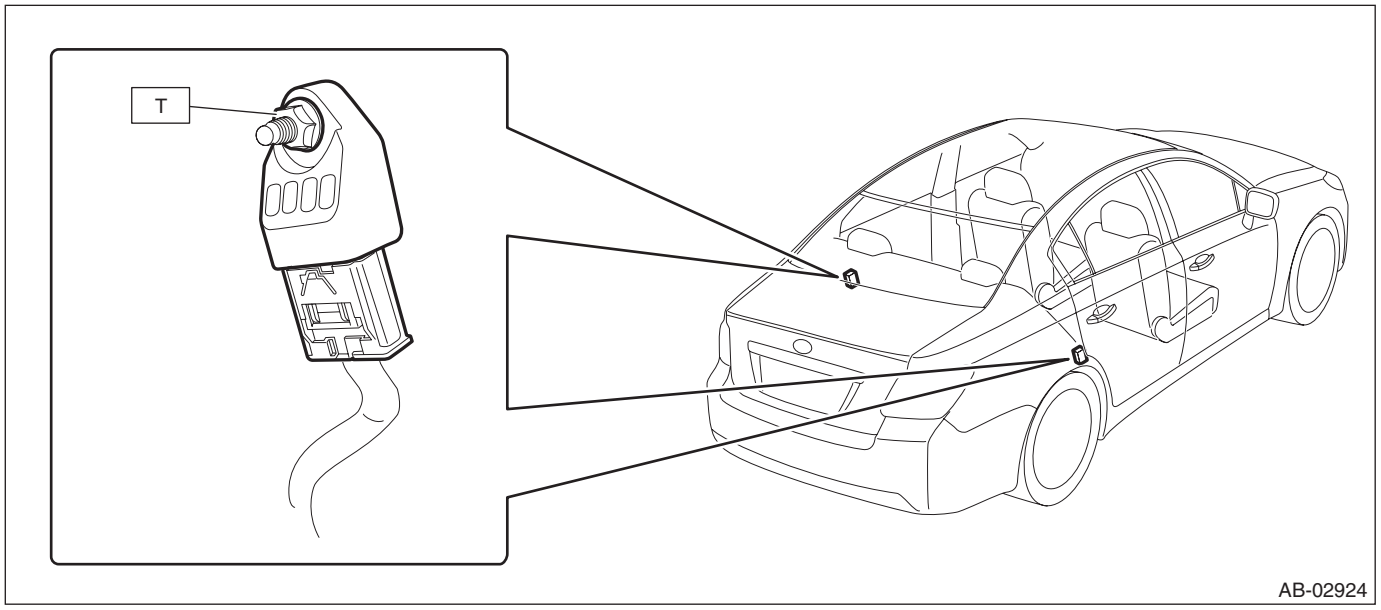
CAUTION:
Do not reuse mounting bolts and nuts.



Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

10.CURTAIN AIRBAG SENSOR

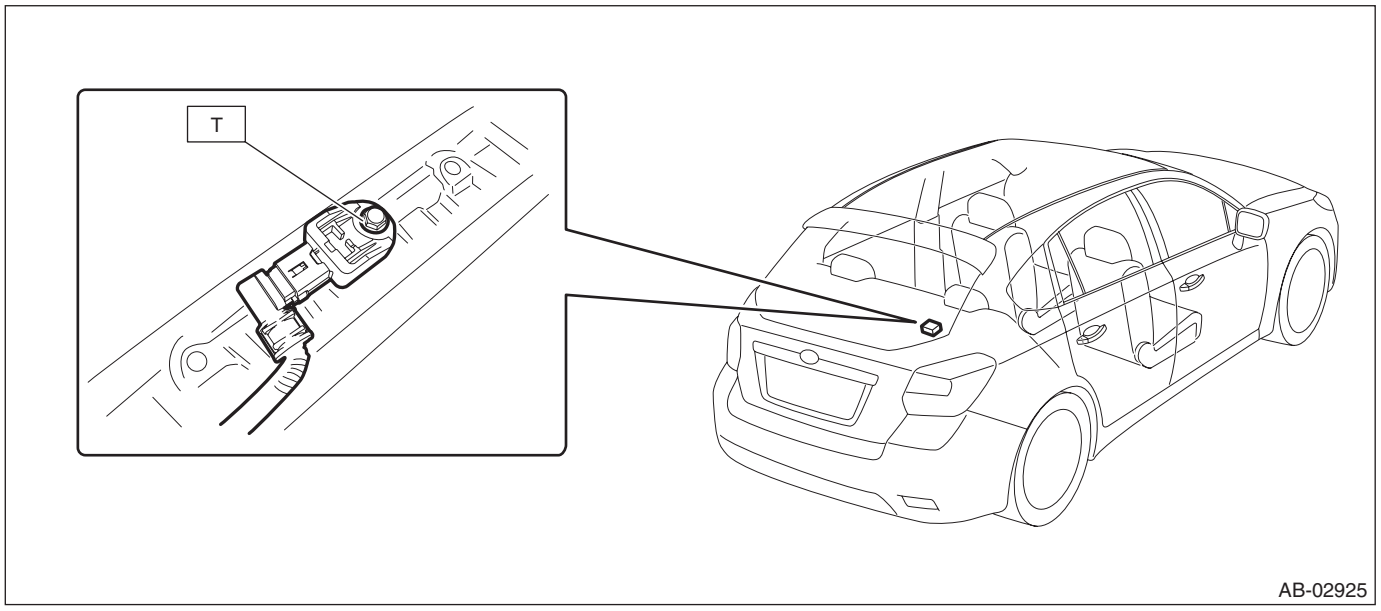
CAUTION:
Do not reuse mounting bolts and nuts.



Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

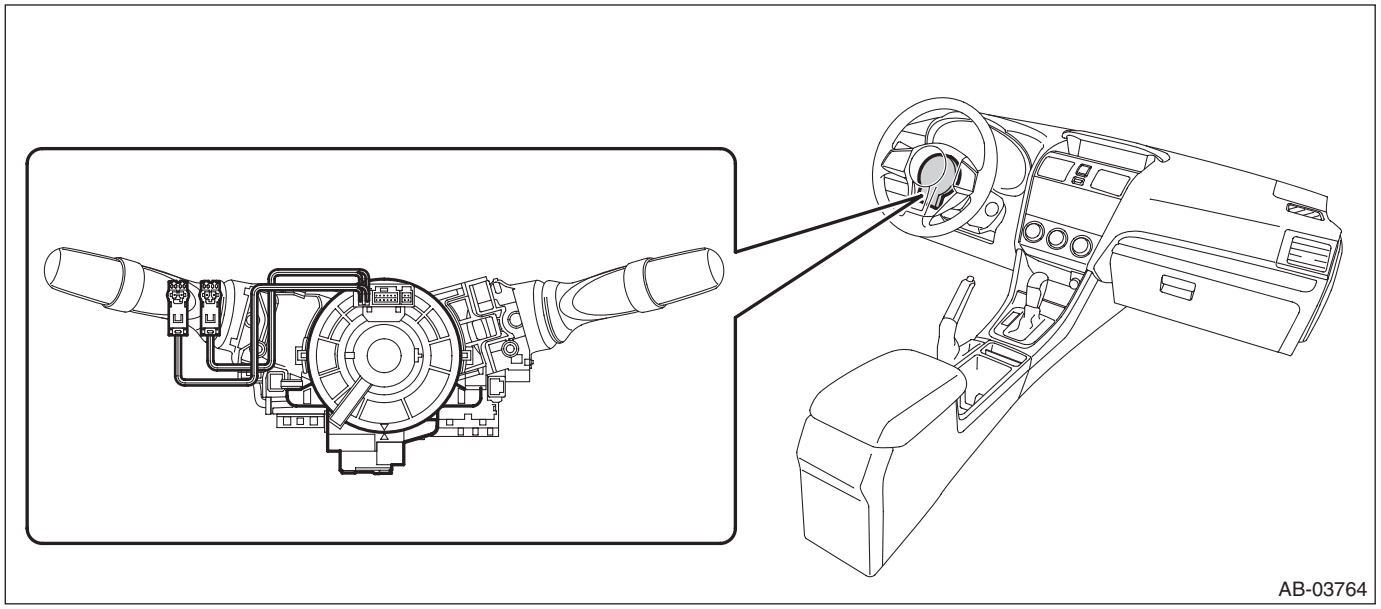
11.SATELLITE SAFING SENSOR

CAUTION:
Do not reuse mounting bolts and nuts.



Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

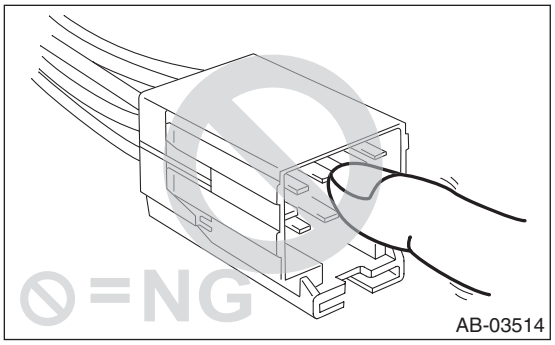
12.STEERING ROLL CONNECTOR



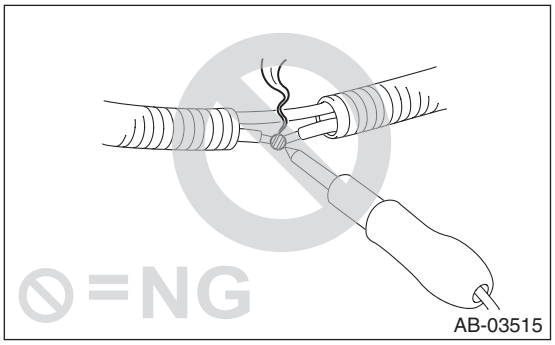
B: CAUTION

1. BEFORE STARTING ALL WORKS

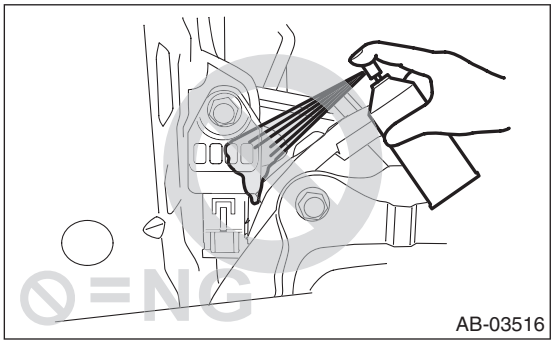
• The airbag system is fitted with a backup power supply. After disconnecting the battery ground cable, the airbag may operate if you do not wait for 60 seconds or more before starting the service of airbag system.
• When servicing a vehicle, be sure to turn the ignition switch to OFF, disconnect the ground cable from battery, and wait for 60 seconds or more before starting work.
• For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
• If the airbag warning light illuminates, check or repair the vehicle immediately to prevent it from airbag system malfunction.
• Do not allow water or oil to come in contact with the connector terminals. Also, do not touch the connector terminals directly.



• If damage, open circuit or rust is found on airbag system wiring harness, do not repair the harness. Always replace the faulty harness with a new genuine part.



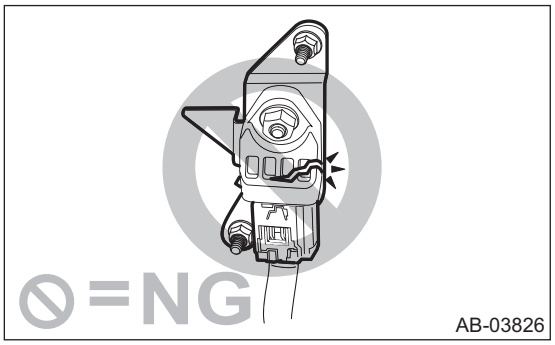
• When painting or performing sheet metal work on the front part of the vehicle, including the front wheel apron, front fender and radiator panel side, remove the front sub sensors and wiring harness of airbag system.
• When painting or performing sheet metal work on the side of the vehicle, including the side sill, center pillar and front and rear doors, remove the front door impact sensor, side airbag sensors, curtain airbag sensor, satellite safing sensor and wiring harness of the airbag system.



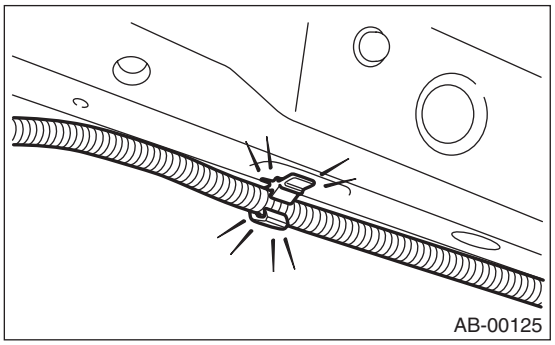
• When attaching the steering wheel and steering roll connector, be sure to adjust the steering roll connector.

2. BEFORE STARTING PARTS REPLACEMENT

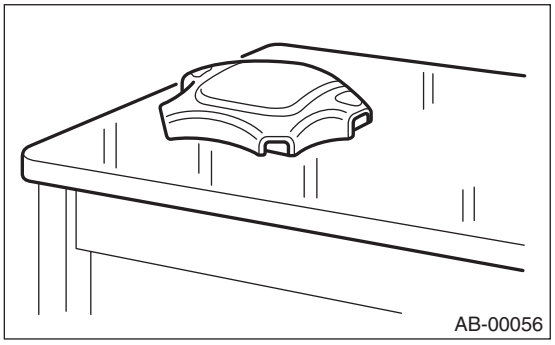
• If airbag sensors, airbag module, airbag control module, pretensioners, harnesses, or the cover - satellite safing are deformed or damaged, replace with new parts.



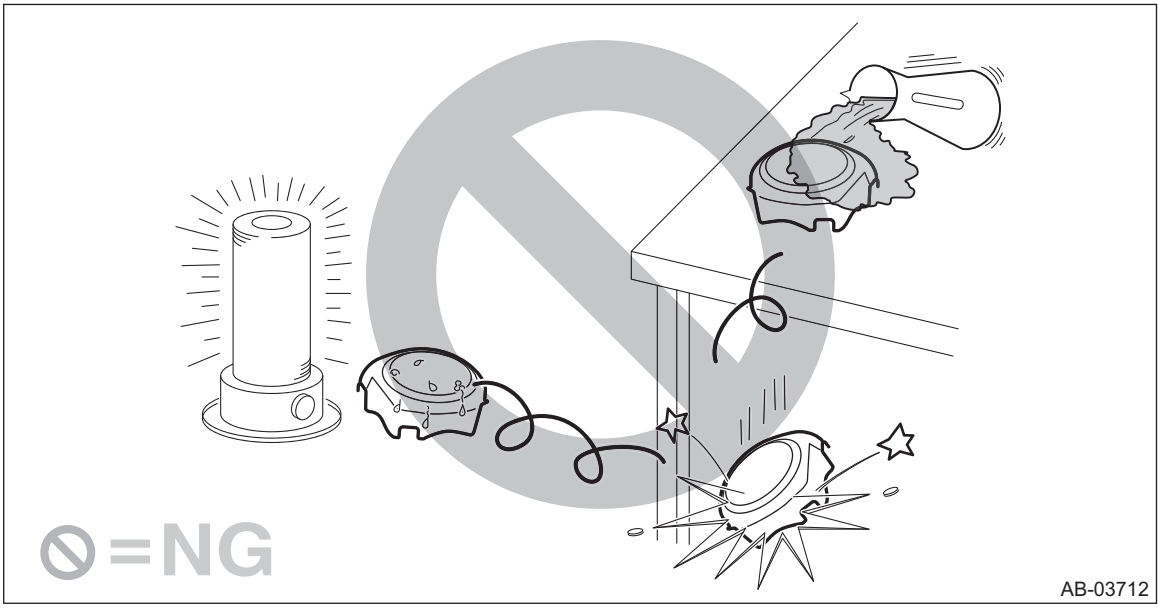
• Install the wiring harness securely with the specified clips to avoid interference or tangled with other parts.



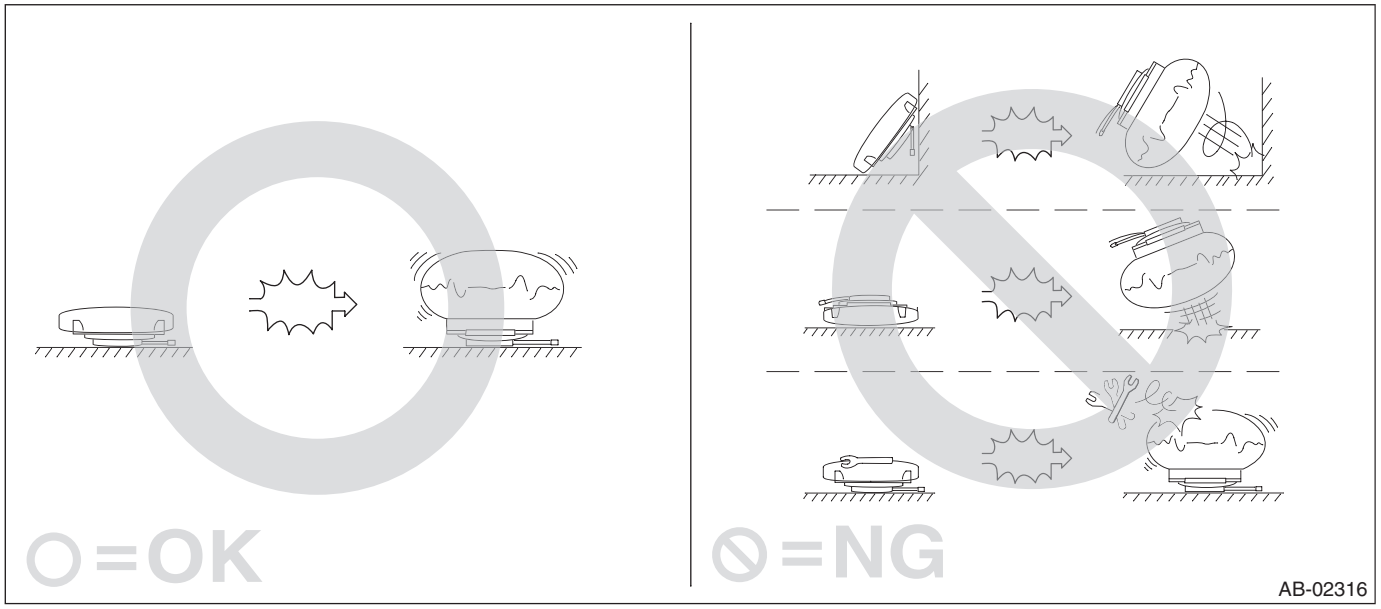
• Do not use the airbag or pretensioner parts from other vehicles. Always replace the defective parts with new parts.
• Never reuse any activated airbag module and pretensioner.
• Do not discard undeployed airbag or pretensioner. For the disposal procedures, refer to “Airbag Module Disposal”.
• Do not reuse the bolts and nuts when the following parts are removed. Always replace with the specified new bolts and nuts.
  – Airbag control module
  – Front door impact sensor
  – Front sub sensor
  – Satellite safing sensor
  – Side airbag sensor
  – Curtain airbag sensor
• When attaching the steering wheel and steering roll connector, be sure to adjust the steering roll connector.
• After removing each parts of the airbag system, keep them with the pad side facing upward on a dry, clean and flat surface away from heat, light sources, moisture and dust.



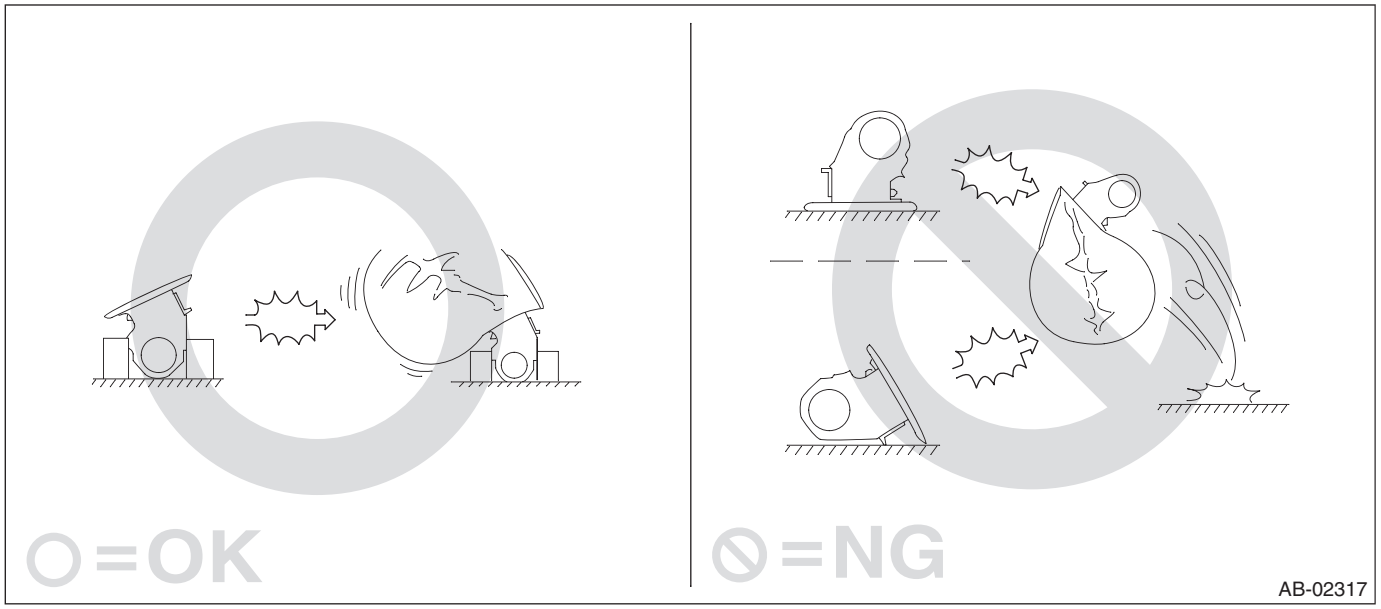
• Observe the following; the airbag system component or the internal parts of seat belt pretensioner may be damaged or the reliability may be greatly lowered.
  – Do not drop or otherwise apply impact.
  – Do not store under the condition at high temperature of 85°C (185°F) or more, or expose to flame.
  – Do not allow water, oil or grease to come in contact.



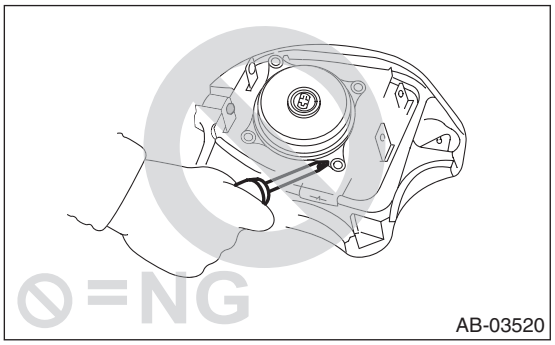
• When storing a removed airbag module, observe the following items. If the pad of the airbag module is in contact with other objects, it may cause a serious accident if the airbag accidentally operates.
  – Do not place the airbag module with the pad side facing downward.
  – Do not place any objects on the airbag module.
  – Do not pile up the airbag module.
  • Driver's airbag module



- Passenger's airbag module and side airbag module



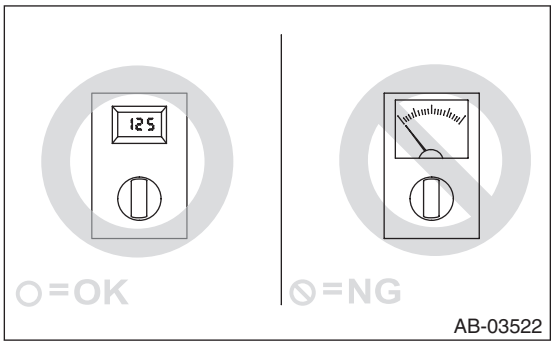
- Do not disassemble driver's airbag module, knee airbag module, passenger's airbag module, side airbag module, curtain airbag module or pretensioner.



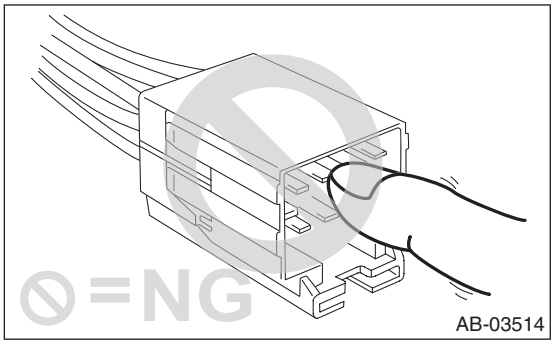
- The removed front seat with airbag module must be kept at least 200 mm (8 in) away from walls and other objects.

3. BEFORE STARTING TROUBLESHOOTING

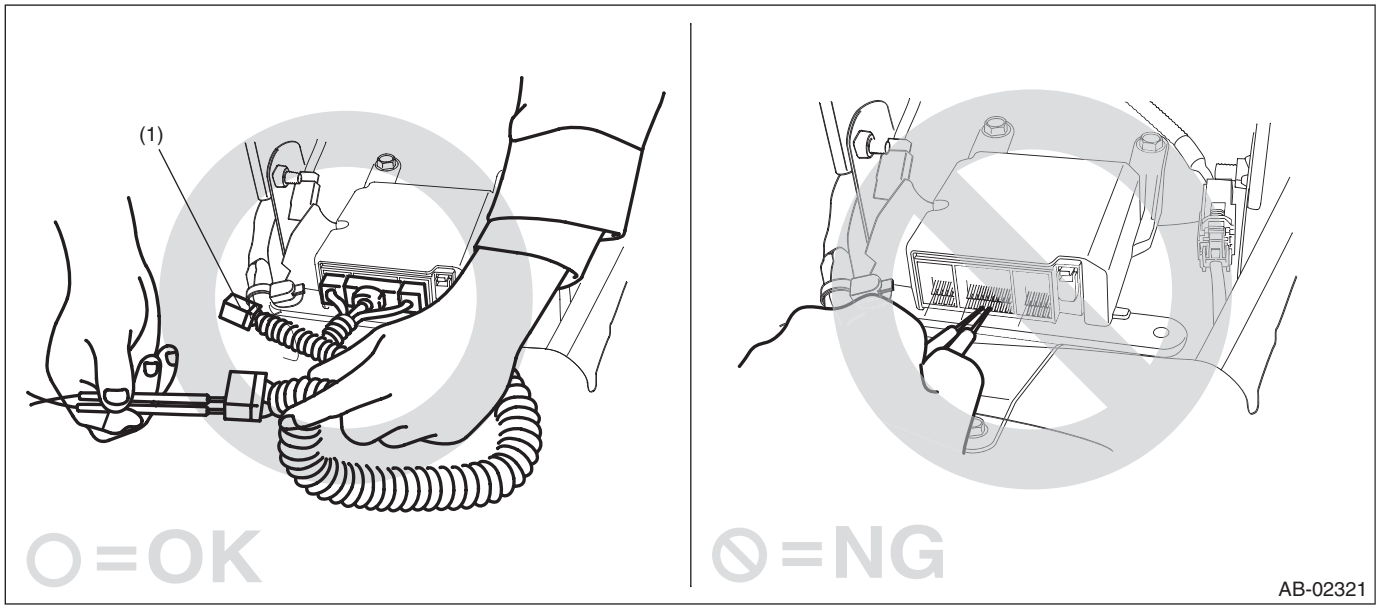
• Even if any part must be replaced as the result of troubleshooting, do not use an airbag part or pretensioner part from other vehicles. Always replace the defective parts with new parts.
• When checking the airbag system, be sure to use a digital circuit tester. Use of an analog circuit tester may cause the airbag to activate erroneously due to a minimal current inside tester.



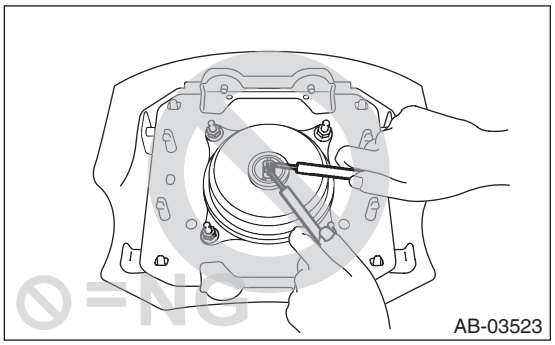
• Do not allow water or oil to come in contact with the connector terminals. Also, do not touch the connector terminals directly.



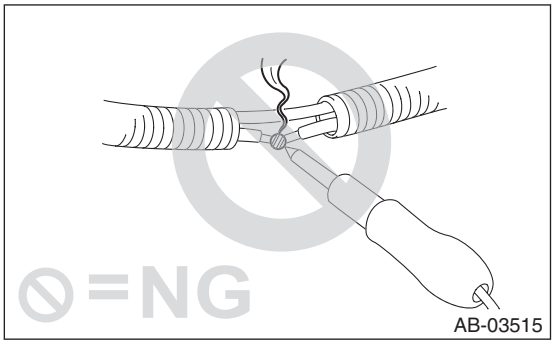
• When checking, use a test harness (1). Damage to connector terminal causes malfunction. Do not directly put the tester probe on airbag connector terminal.



• Do not check continuity of the driver's airbag module, knee airbag module, passenger's airbag module, side airbag module, curtain airbag module or pretensioner.



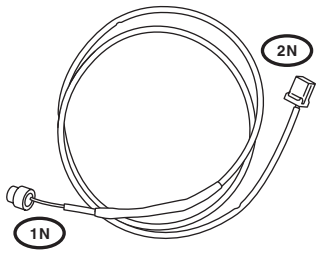
• If damage, open circuit or rust is found on airbag system wiring harness, do not repair the harness. Always replace the faulty harness with a new genuine part.



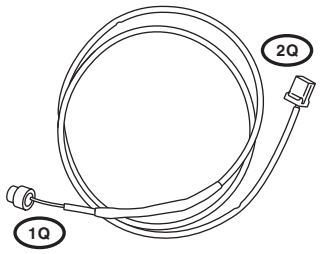
C: PREPARATION TOOL

1. SPECIAL TOOL

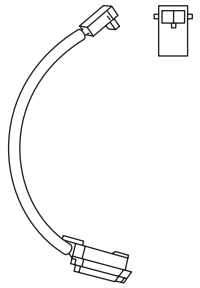
• TEST HARNESS N

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299SA000	98299SA000	TEST HARNESS N	Used for unit inspection of steering roll connector.

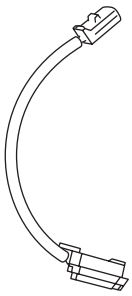
• TEST HARNESS Q

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299SA040	98299SA040	TEST HARNESS Q	Used for unit inspection of steering roll connector.

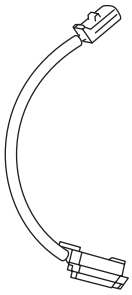
• TEST HARNESS ADAPTER D

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299SA010	98299SA010	TEST HARNESS ADAPTER D	• Used for operation process of knee airbag module. • Used for operation process of curtain airbag module. • Used together with AIRBAG DEPLOYMENT TOOL. (98299PA030)

- TEST HARNESS ADAPTER AM

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299FJ000	98299FJ000	TEST HARNESS ADAPTER AM	• Used for operation process of passenger's air-bag module. • Used together with AIRBAG DEPLOYMENT TOOL. (98299PA030)

- TEST HARNESS ADAPTER K

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299FG010	98299FG010	TEST HARNESS ADAPTER K	• Used for operation process of side airbag module. • Used together with AIRBAG DEPLOYMENT TOOL. (98299PA030)

- AIRBAG DEPLOYMENT TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299PA030	98299PA030	AIRBAG DEPLOYMENT TOOL	• Used for operation process of airbag module. • Used together with each test harness adapter.

2. GENERAL TOOL

TOOL NAME	REMARKS
Steering wheel puller	Used for removing the steering wheel.
TORX® T40	Used for removing and installing the beam COMPL - steering.
Circuit tester	Used for measuring resistance, voltage and current.

2. Airbag Connector

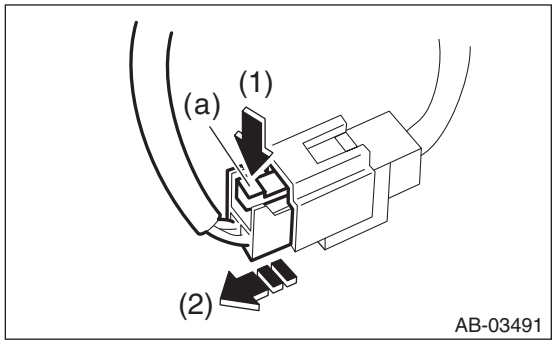
A: PROCEDURE

1. POWER SUPPLY

1) How to disconnect:

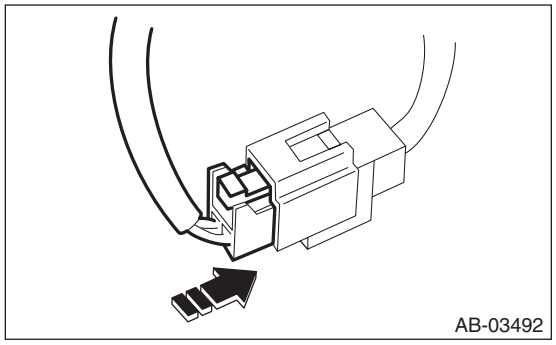
CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

(1) Push the lock (a).
(2) While holding down the lock (a), disconnect the connector.



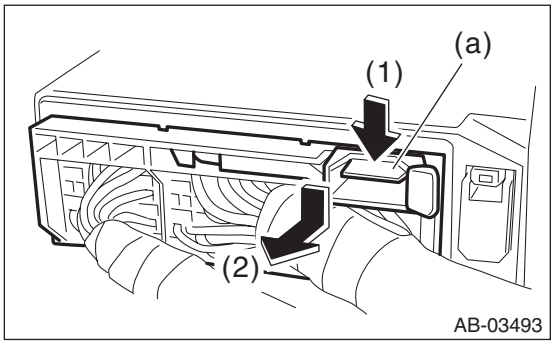
2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Holding the connector, push it in securely until a clicking sound is heard.



2. AIRBAG CONTROL MODULE

1) How to disconnect:
   (1) Push the lock lever plate (a).
   (2) While holding down the lock lever plate (a), pull the lever toward you.



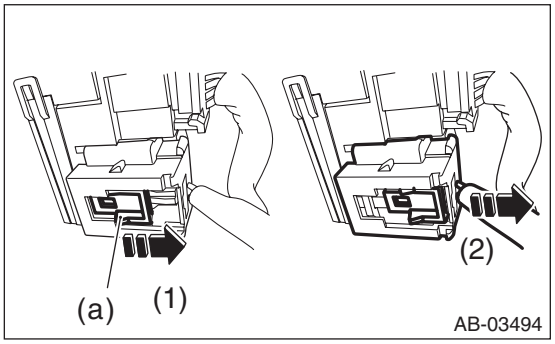
2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Insert the connector and push the lock lever in securely.

3. DRIVER'S AIRBAG MODULE (ROLL CONNECTOR)

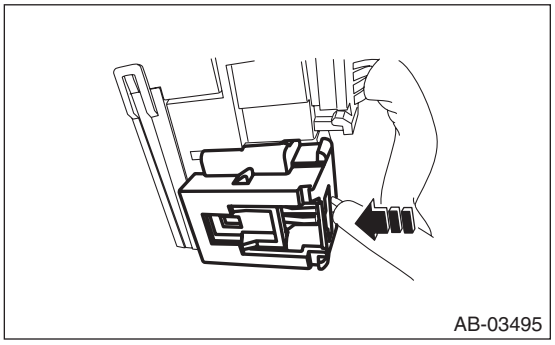
1) How to disconnect:

CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.
   (1) Pull the slide lock (a) in the direction of arrow.
   (2) With the slide lock pulled, disconnect the connector.



2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Holding the connector, push it in securely until a clicking sound is heard.

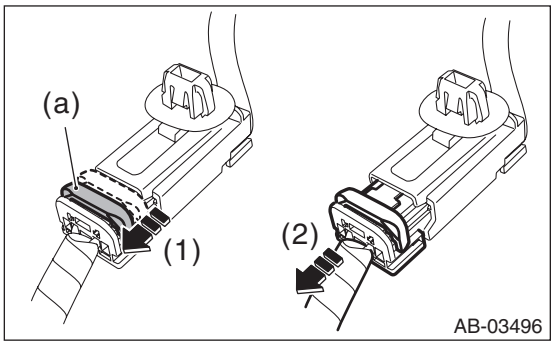


4. PASSENGER'S AIRBAG MODULE

1) How to disconnect:

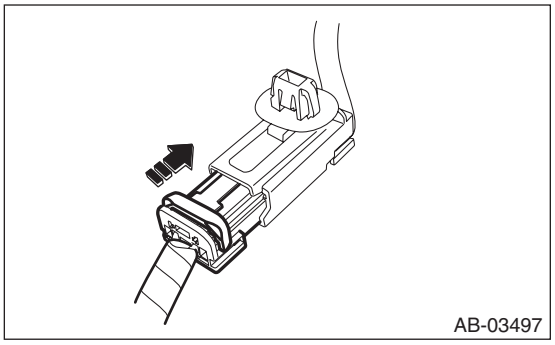
CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

(1) Pull the slide lock (a) in the direction of arrow.
(2) With the slide lock pulled, disconnect the connector.



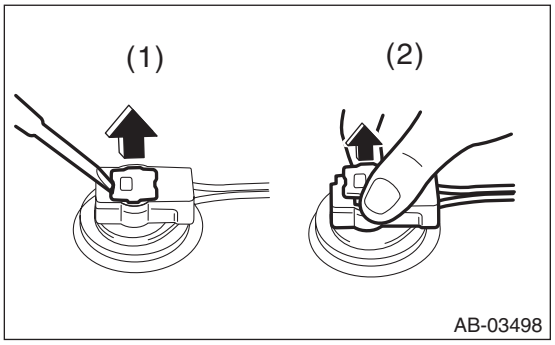
2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Holding the connector, push it in securely until a clicking sound is heard.



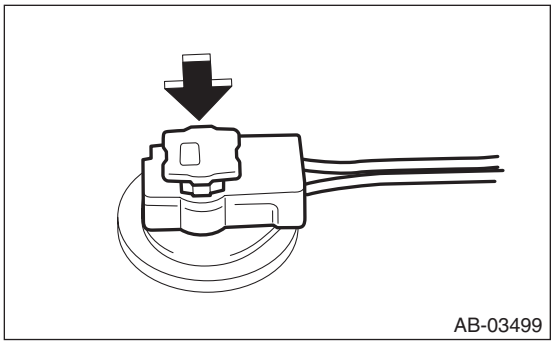
5. DRIVER'S AIRBAG MODULE, CURTAIN AIRBAG MODULE & PRETENSIONER

1) How to disconnect:
   (1) Using a flat tip screwdriver, pry the push lock upward to unlock.
   (2) Pull the connector to disconnect from the airbag module assembly or the retractor assembly.



2) How to connect:

CAUTION:
- **Be sure to insert the connector in until it is locked.**
- **Press in the push lock securely. Then pull it gently to make sure that it is locked.**



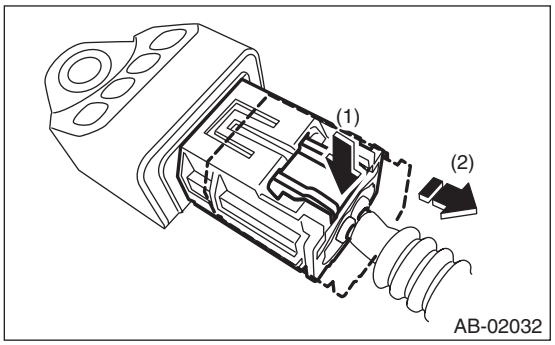
Connect the connector in the reverse order of disconnecting. At this time, be sure to insert until a clicking sound is heard.

6. FRONT SUB SENSOR

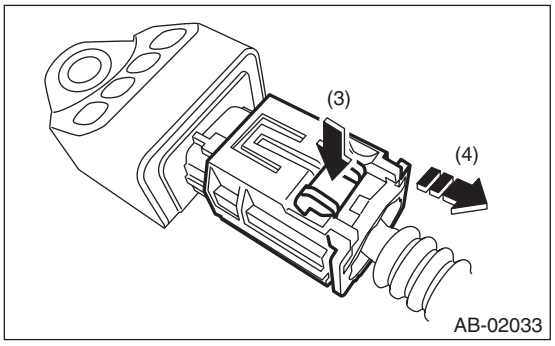
1) How to disconnect:

CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

(1) Push the lock arm.
(2) Holding outer part, pull it one step in the direction of arrow.

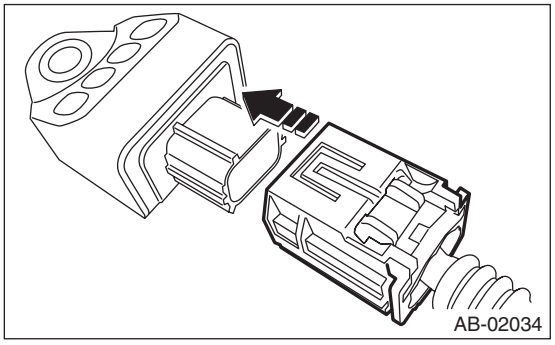


(3) Push the lock arm again.
(4) Holding outer part, pull it in the direction of arrow to disconnect the connector.



2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Holding the connector, push it in securely until a clicking sound is heard.

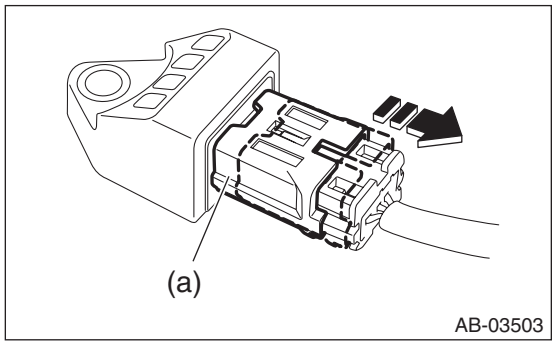


7. FRONT DOOR IMPACT SENSOR AND SATELLITE SAFING SENSOR

1) How to disconnect:

CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

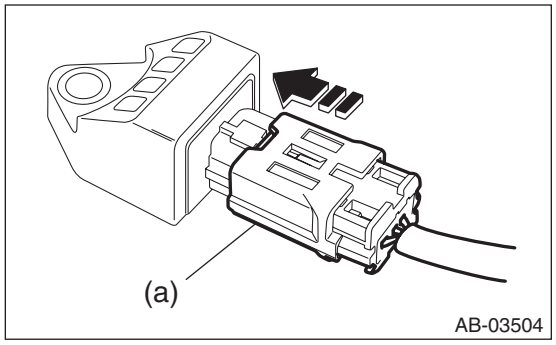
Holding outer part (a), pull it in the direction of arrow.



2) How to connect:

CAUTION:
- **The outer part (a) returns to the original position. Therefore do not touch the outer part.**
- **Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.**

Holding the connector, push it in securely until a clicking sound is heard.

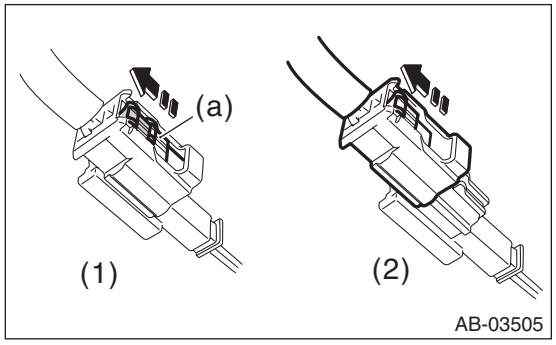


8. FRONT DOOR IMPACT SENSOR (BETWEEN AIRBAG REAR HARNESS AND DOOR HARNESS)

1) How to disconnect:

CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

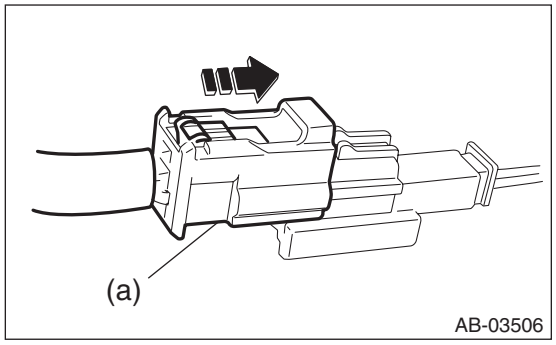
(1) Pull the slide lock (a) in the direction of arrow.
(2) With the slide lock pulled, disconnect the connector.



2) How to connect:

CAUTION:
- **The outer part (a) returns to the original position. Therefore do not touch the outer part.**
- **Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.**

Holding the connector, push it in securely until a clicking sound is heard.

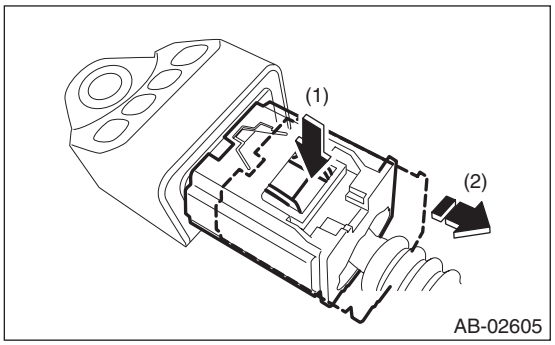


9. SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR

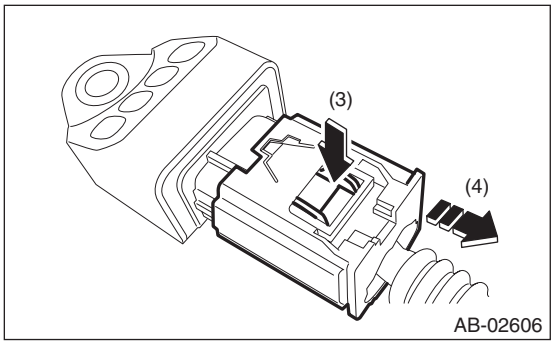
1) How to disconnect:

CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

(1) Push the lock arm.
(2) Holding outer part, pull it one step in the direction of arrow.

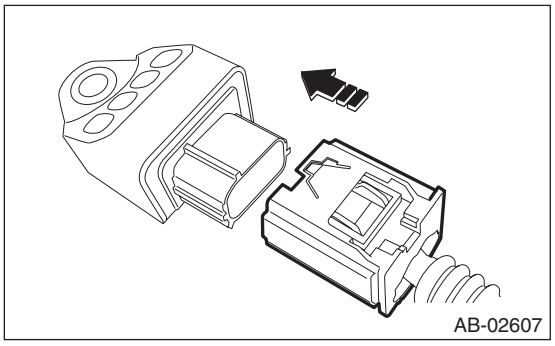


(3) Push the lock arm again.
(4) Holding outer part, pull it in the direction of arrow to disconnect the connector.



2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Holding the connector, push it in securely until a clicking sound is heard.

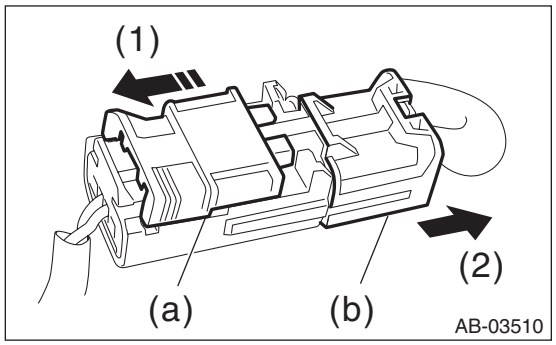


10.SIDE AIRBAG MODULE

1) How to disconnect:

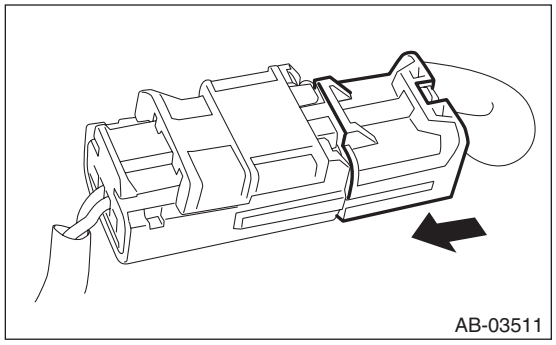
CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

(1) Move the slide lock (a) in the direction of arrow and hold it.
(2) While holding the slide lock (a), pull the connector (b) in the direction of arrow.



2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Holding the connector, push it in securely until a clicking sound is heard.

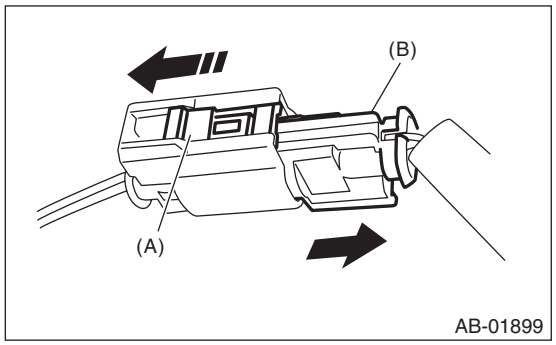


11.BUCKLE SWITCH RH

1) How to disconnect:

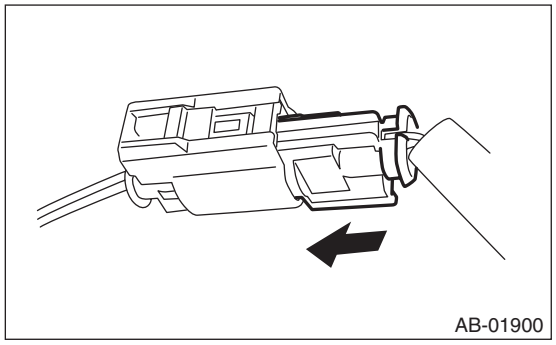
CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

(1) Move the slide lock (A) in the direction of arrow and hold it.
(2) While holding the slide lock (A), pull the connector (B) in the direction of arrow.



2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Holding the connector, push it in securely until a clicking sound is heard.

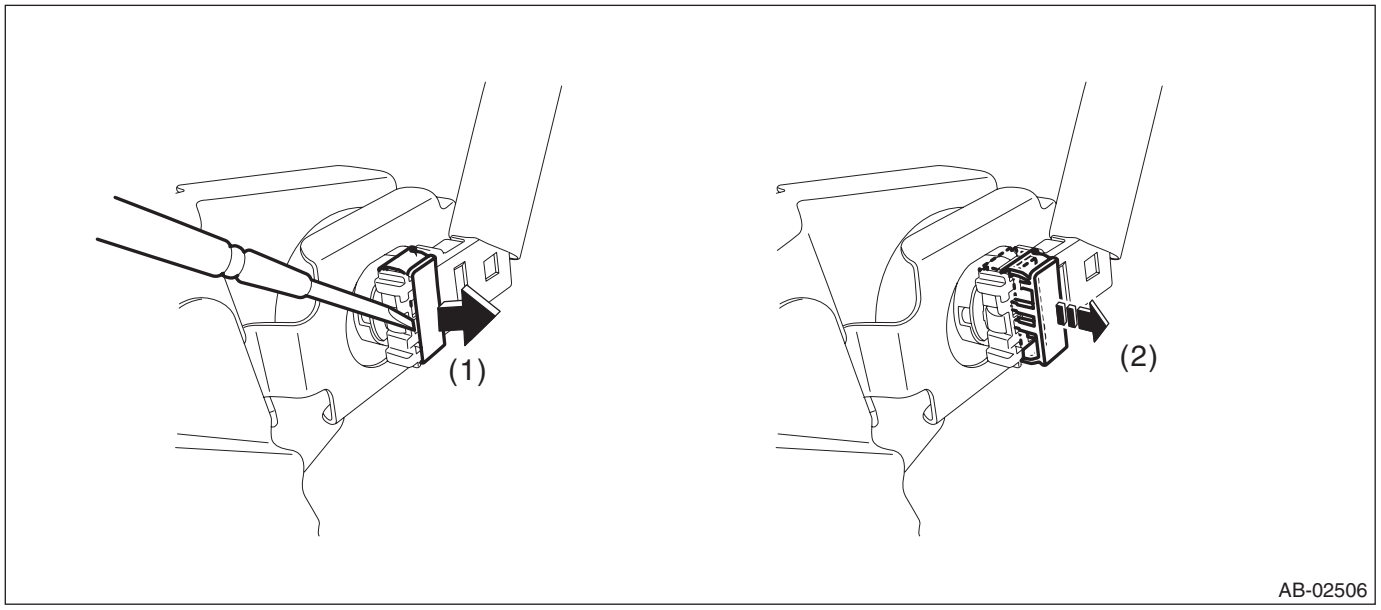


12.OCCUPANT DETECTION SYSTEM (BETWEEN AIRBAG REAR HARNESS AND SEAT HARNESS)

Refer to “OCCUPANT DETECTION SYSTEM” section. <Ref. to OD(diag)-13, OCCUPANT DETECTION SYSTEM (BETWEEN AIRBAG REAR HARNESS AND SEAT HARNESS), PROCEDURE, Airbag Connector.>

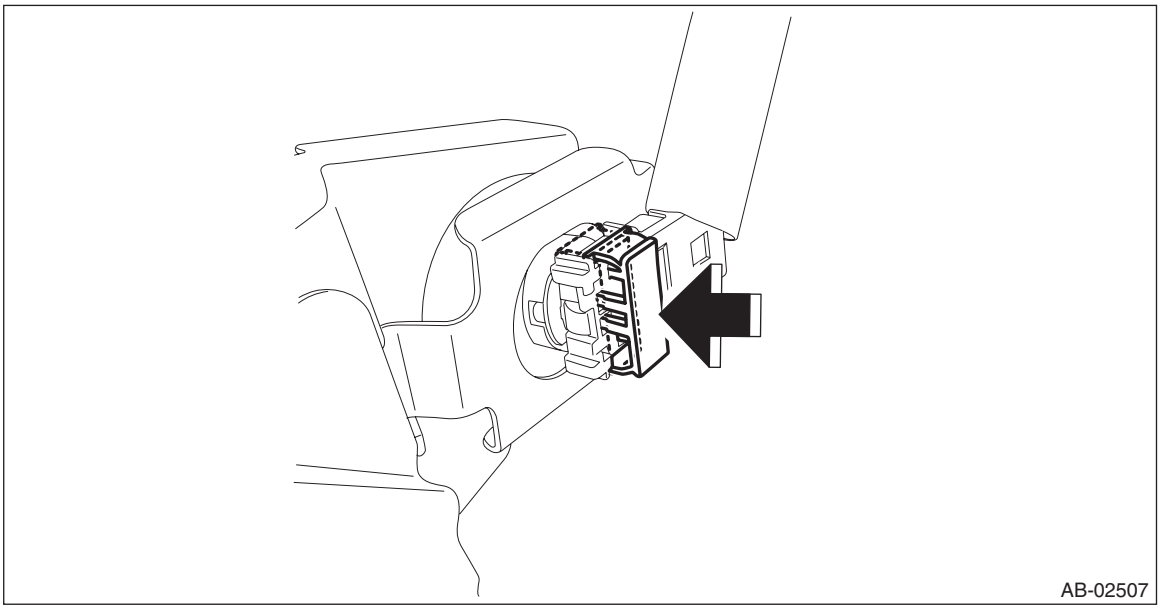
13.KNEE AIRBAG MODULE

1) How to disconnect:
   (1) Using a flat tip screwdriver, pry the push lock upward to unlock.
   (2) Pull the connector to disconnect from the airbag module assembly.



2) How to connect:

CAUTION:
- **Be sure to insert the connector in until it is locked.**
- **Press in the push lock securely. Then pull it gently to make sure that it is locked.**



Connect the connector in the reverse order of disconnecting. At this time, be sure to insert until a clicking sound is heard.

3. Inspection Locations after a Collision

A: INSPECTION

If the vehicle is involved in a collision, even if it is a slight collision, be sure to check the following systems.

1. DRIVER'S AIRBAG MODULE ASSEMBLY

1) Frontal collision (driver's airbag module assembly activated)

1. Replace the following parts with new ones.
   - Airbag control module
   - Driver's airbag module
   - Knee airbag module
   - Passenger's airbag module (if deployed)
   - Curtain airbag module (both sides / if deployed)
   - Seat belt pretensioner (right and left)
   - Lap seat belt pretensioner (Crosstrek model - passenger's side only)
   - Front sub sensor (right and left)
   - Instrument panel assembly (because it is integrated with passenger's airbag module) (if passenger's airbag module is deployed)
   - Column ASSY - steering
   - Roll connector
   - Trim panel - roof assembly (if the curtain airbag is deployed)
   - Trim panel of each pillar (if the curtain airbag is deployed)
2. Visually inspect the following items and replace any damaged part with a new one.
   - Steering wheel
   - Beam COMPL - steering
   - Harnesses and connectors on body side that are linked to the replaced parts

2) Frontal collision (driver's airbag module not activated)

Visually inspect the following items and replace any damaged or cracked part with a new one.
Specially inspect the damage of airbag module body, mounting bracket and harness connector.

- Driver's airbag module
- Knee airbag module
- Passenger's airbag module
- Seat belt pretensioner (right and left)
- Lap seat belt pretensioner (Crosstrek model - passenger's side only)
- Front sub sensor (right and left)
- Instrument panel assembly (because it is integrated with passenger's airbag module)

3) No frontal collision

Visually inspect the airbag modules for damage or contamination and replace any faulty part with a new one.

2. KNEE AIRBAG MODULE

1) Frontal collision (knee airbag module activated)

1. Replace the following parts with new ones.
   - Airbag control module
   - Driver's airbag module
   - Knee airbag module
   - Passenger's airbag module (if deployed)
   - Curtain airbag module (both sides / if deployed)
   - Seat belt pretensioner (right and left)
   - Lap seat belt pretensioner (Crosstrek model - passenger's side only)
   - Front sub sensor (right and left)
   - Instrument panel assembly (because it is integrated with passenger's airbag module) (if passenger's airbag module is deployed)
   - Column ASSY - steering
   - Roll connector
   - Trim panel - roof assembly (if the curtain airbag is deployed)
   - Trim panel of each pillar (if the curtain airbag is deployed)
2. Visually inspect the following items and replace any damaged part with a new one.
   - Steering wheel
   - Beam COMPL - steering
   - Harnesses and connectors on body side that are linked to the replaced parts

2) Frontal collision (knee airbag module not activated)

Visually inspect the following items and replace any damaged or cracked part with a new one.
Specially inspect the damage of airbag module body, mounting bracket and harness connector.

- Driver's airbag module
- Knee airbag module
- Passenger's airbag module
- Seat belt pretensioner (right and left)
- Lap seat belt pretensioner (Crosstrek model - passenger's side only)
- Front sub sensor (right and left)
- Instrument panel assembly (because it is integrated with passenger's airbag module)

3) No frontal collision

Visually inspect the airbag modules for damage or contamination and replace any faulty part with a new one.

3. PASSENGER'S AIRBAG MODULE

1) Frontal collision (passenger's airbag module activated)

1. Replace the following parts with new ones.
   - Airbag control module
   - Driver's airbag module
   - Knee airbag module
   - Passenger's airbag module
   - Curtain airbag module (both sides / if deployed)
   - Seat belt pretensioner (right and left)
   - Lap seat belt pretensioner (Crosstrek model - passenger's side only)
   - Front sub sensor (right and left)
   - Instrument panel assembly (because it is integrated with passenger's airbag module)
   - Trim panel - roof assembly (if the curtain airbag is deployed)
   - Trim panel of each pillar (if the curtain airbag is deployed)
2. Visually inspect the following items and replace any damaged part with a new one.
   - Beam COMPL - steering
   - Harnesses and connectors on body side that are linked to the replaced parts

2) Frontal collision (passenger's airbag module not activated)
Visually inspect the following items and replace any damaged or cracked part with a new one.
Specially inspect the damage of airbag module body, mounting bracket and harness connector.
- Driver's airbag module
- Knee airbag module
- Passenger's airbag module
- Seat belt pretensioner (right and left)
- Lap seat belt pretensioner (Crosstrek model - passenger's side only)
- Front sub sensor (right and left)
- Instrument panel assembly (because it is integrated with passenger's airbag module)

3) No frontal collision
Visually inspect the airbag modules for damage or contamination and replace any faulty part with a new one.

4. SIDE AIRBAG MODULE

1) Side impact (side airbag module activated)
1. Replace the following parts with new ones.
   - Airbag control module
   - Satellite safing sensor
   - Cover - satellite safing
   - Front door impact sensor
   - Seat belt pretensioner (collision side / if deployed)
   - Side airbag module (collision side)
   - Side airbag sensor (collision side)
   - Curtain airbag module (collision side)
   - Curtain airbag sensor (collision side)
   - Pad assembly - front seat backrest (collision side)
   - Frame assembly - front backrest (collision side)
   - Cover COMPL - front backrest (collision side)
   - Trim panel - roof assembly (collision side)
   - Trim panel for each pillar (collision side)
2. Visually inspect the following items and replace any damaged part with a new one.
   - Headrest assembly
   - Bushing - lock headrest
   - Slide rail ASSY - OUT
   - Slide rail ASSY - INN
   - Cover - hinge front seat
   - Knob - lifter
   - Lever - reclining
   - Harnesses and connectors on body side that are linked to the replaced parts

2) Side impact (side airbag module not activated)
Visually inspect the following items and replace any damaged or cracked part (collision side) with a new one.
Specially inspect the damage of airbag module body, mounting bracket and harness connector.
- Pad assembly - front seat backrest
- Frame assembly - front backrest
- Cover COMPL - front backrest
- Satellite safing sensor
- Cover - satellite safing
- Front door impact sensor
- Side airbag module
- Side airbag sensor
- Curtain airbag module
- Curtain airbag sensor

3) No side impact
Visually inspect the airbag modules for contamination and replace any faulty part (collision side) with a new one.

5. CURTAIN AIRBAG MODULE

1) Side impact or roll over (curtain airbag module activated)

1. Replace the following parts with new ones.
   - Airbag control module
   - Satellite safing sensor
   - Cover - satellite safing
   - Curtain airbag module (operating side)
   - Seat belt pretensioner (if deployed)
   - Front door impact sensor (operating side)
   - Side airbag sensor (operating side)
   - Curtain airbag sensor (operating side)
   - Pad assembly - front seat backrest (collision side)
   - Frame assembly - front backrest (collision side)
   - Cover COMPL - front backrest (collision side)
   - Trim panel - roof assembly
   - Trim panel for each pillar (operating side)
   - Airbag bracket (model with sunroof) (operating side)
2. Visually inspect the following items and replace any damaged part with a new one.
   - Assist rail - front and rear
   - Bracket - assist rail front and rear
   - Harnesses and connectors on body side that are linked to the replaced parts

2) Side impact (curtain airbag module not activated)

Visually inspect the following items and replace any damaged or cracked part with a new one.
Specially inspect the damage of airbag module body, mounting bracket and harness connector.

- Trim panel - roof assembly
- Trim panel for each pillar
- Curtain airbag module
- Satellite safing sensor
- Satellite safing cover
- Front door impact sensor
- Side airbag sensor
- Curtain airbag sensor

3) No side impact or roll over

Visually inspect the airbag modules for damage or contamination and replace any faulty part with a new one.

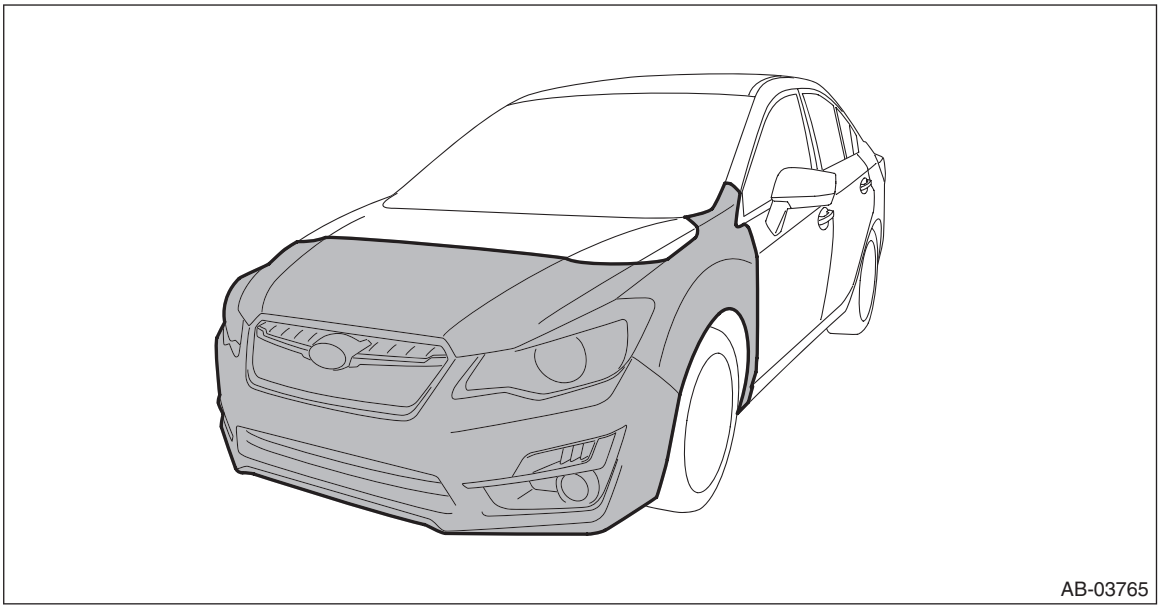
6. AIRBAG CONTROL MODULE

Check for the following, and replace the damaged parts with new parts.

- Control module is cracked or deformed.
- Mounting bracket is cracked or deformed.
- Connector is scratched, cracked or deformed.
- Driver’s airbag module has been activated.
- Knee airbag module has been activated.
- Passenger’s airbag module has been activated.
- Side airbag module has been activated.
- Curtain airbag module has been activated.
- Seat belt pretensioner has been activated.
- Lap seat belt pretensioner has been activated.

7. FRONT SUB SENSOR

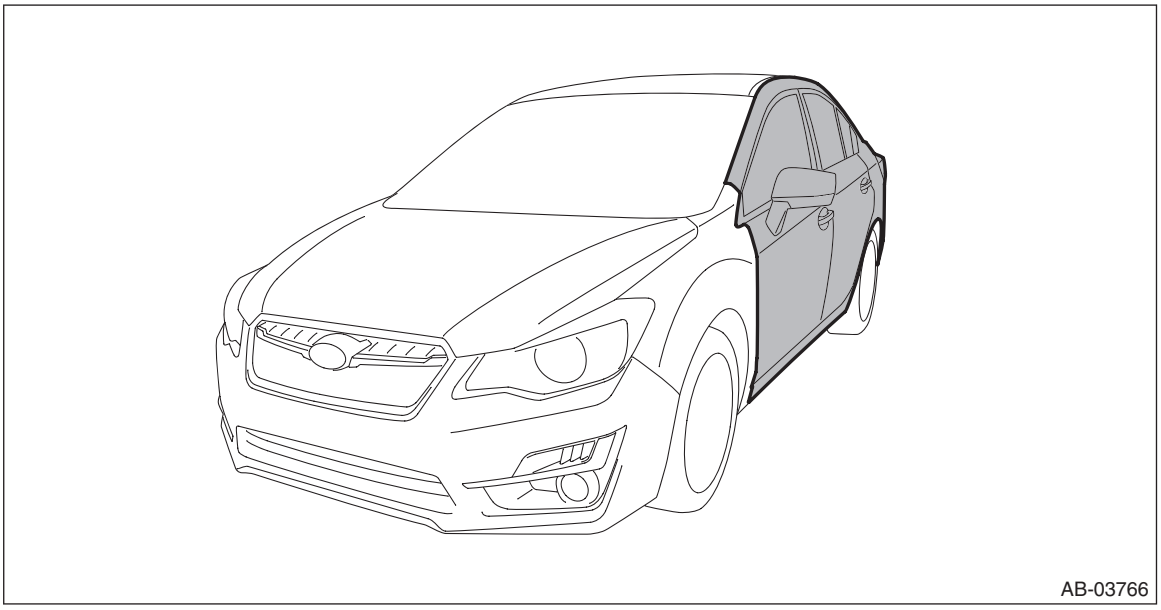
If the section of vehicle as shown in the figure is damaged, check the following items and replace the damaged parts with new parts.



- Front sub sensor is cracked or deformed.
- Connector is scratched, cracked or deformed.
- Driver's airbag module, knee airbag module or passenger's airbag module has been activated.

8. FRONT DOOR IMPACT SENSOR, SATELLITE SAFING SENSOR, SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR

If the section of vehicle as shown in the figure is damaged, check the following items and replace the damaged parts with new parts.



- Front door impact sensor, satellite safing sensor, sensor cover, side airbag sensor and curtain airbag sensor are cracked or deformed.
- Mounting bracket is cracked or deformed.
- Connector is scratched, cracked or deformed.
- Side airbag module or curtain airbag module has been activated. (Operating side)

9. ROLL CONNECTOR

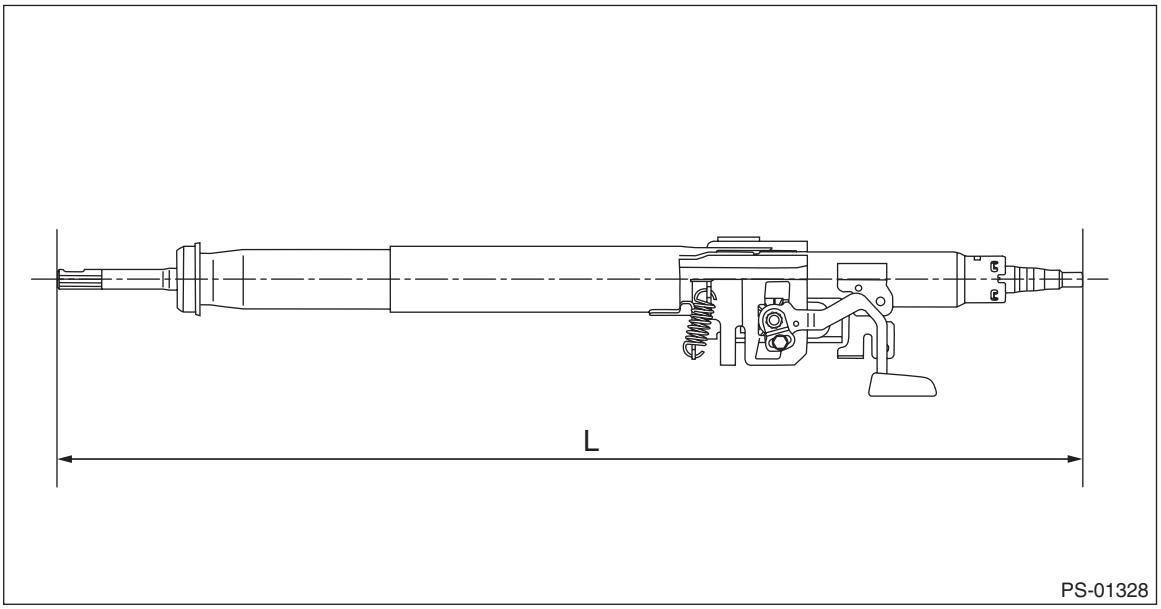
Check the following items and replace any damaged, cracked, or deformed parts with new parts.
- Combination switch
- Steering roll connector

10.COLUMN ASSEMBLY - STEERING & STEERING WHEEL

Check the following items, and if there is anything out of standard, it is considered to be damaged. If so, replace it with a new part.
- Measure the whole length of the column assembly - steering.

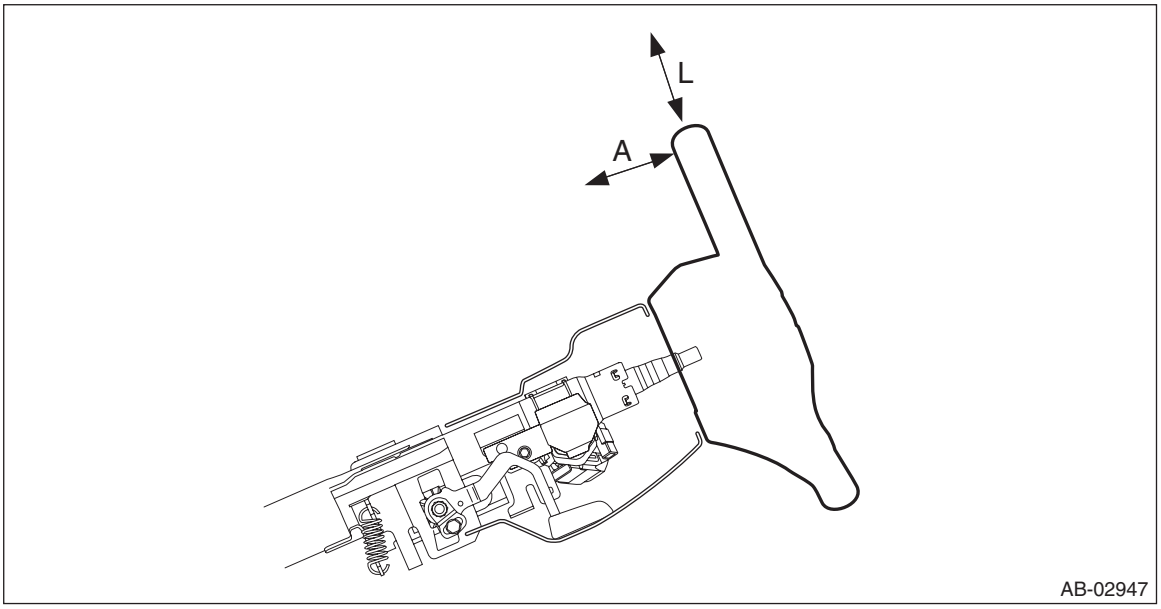
Standard: Overall length L

Tilt and telescopic column (measure while minimized)
$819.7^{+1.5}_{-1.5}$ mm ($32.27^{+0.059}_{-0.059}$ in)



- Check the steering wheel deflection in axial and vertical directions.

Specification:
Axial deflection A (deflection of steering wheel)
Less than 6 mm (0.24 in)
Vertical deflection L (runout of steering wheel)
Less than 17 mm (0.68 in)



11.PASSENGER'S SEAT

Check for the following, and replace the damaged parts with new parts.
- Body or bracket of the seat belt inner - front is scratched, cracked or deformed.
- Frame assembly - front backrest is cracked or deformed.
- Headrest assembly for deformation or play
- If the cover - front cushion and the cover COMPL - front backrest is damaged or frayed, replace the cover with a new part.

CAUTION:
If any of the following applies, replace the pad assembly - front seat cushion & frame assembly - front cushion as a unit. Do not disassemble.
- **The frame assembly - front cushion or the pad assembly - front seat cushion is cracked or deformed.**
- **Scratches, cracks, or deformation found on the occupant detection system sensor mat or occupant detection control module, or attachment brackets of the control module.**
- **Harness and/or connector is cracked, deformed or open. Harness wire is exposed.**

12.INSPECTION OF OTHER PARTS

Check for the following parts, and replace the damaged parts with new parts.
1) Steering wheel and column assembly - steering
• Mounting conditions and deflection of front and rear, upward and downward directions of the steering wheel and column assembly - steering
• Deflection in the front/rear and upward/downward directions of the column assembly - steering, as well as its mounting condition to vehicle body (After a collision, absorbing structure on the column assembly - steering may have been functioned.)
2) Check the direct type connector of driver's airbag module, knee airbag module, curtain airbag module, and pretensioner for damage, and also check each harness for pinching and connector damage. Replace the main harness as an assembly if damage is found.
3) Check the seat cushion, backrest, slide rail and headrest for installation condition and looseness.
4) If any break or fray is found in the cover COMPL - front backrest of the driver's seat or passenger's seat, the side airbag system may not operate normally. In this case, replace the cover COMPL - front backrest with a new part.
5) For the passenger's seat, replace the frame assembly - front cushion with a new part if the frame assembly - front cushion is deformed or cracked.
6) If there are tears or loosening in the seat cover - front cushion on the passenger's side, it may interfere with the proper operation of the occupant detection system. Replace the cover - front cushion with a new part.
7) When the passenger seat cushion cover has been removed or replaced, make sure that the occupant detection system operates normally.
8) Use the Subaru Select Monitor to check whether the passenger's seat belt buckle switch is operating normally.

4. Driver's Airbag Module

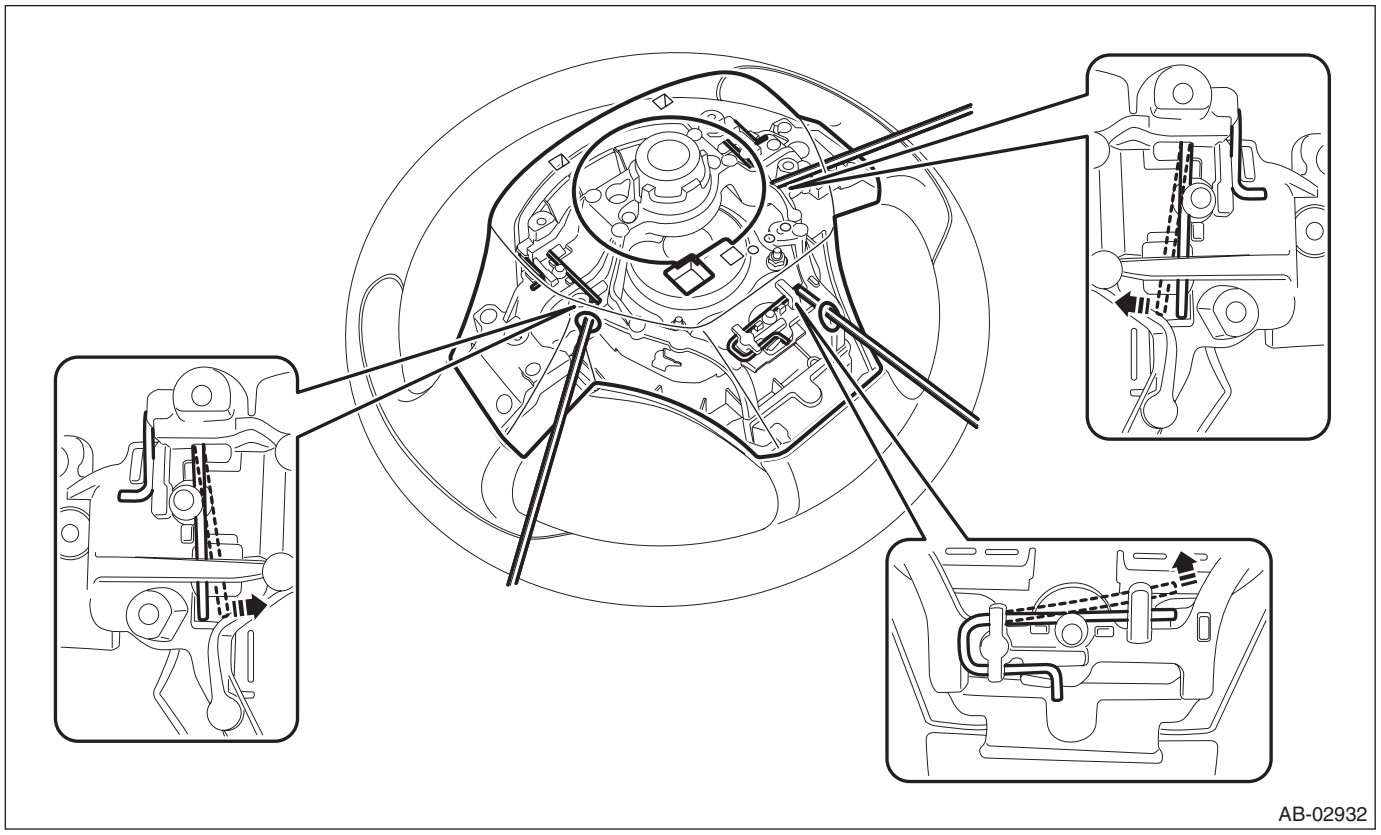
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

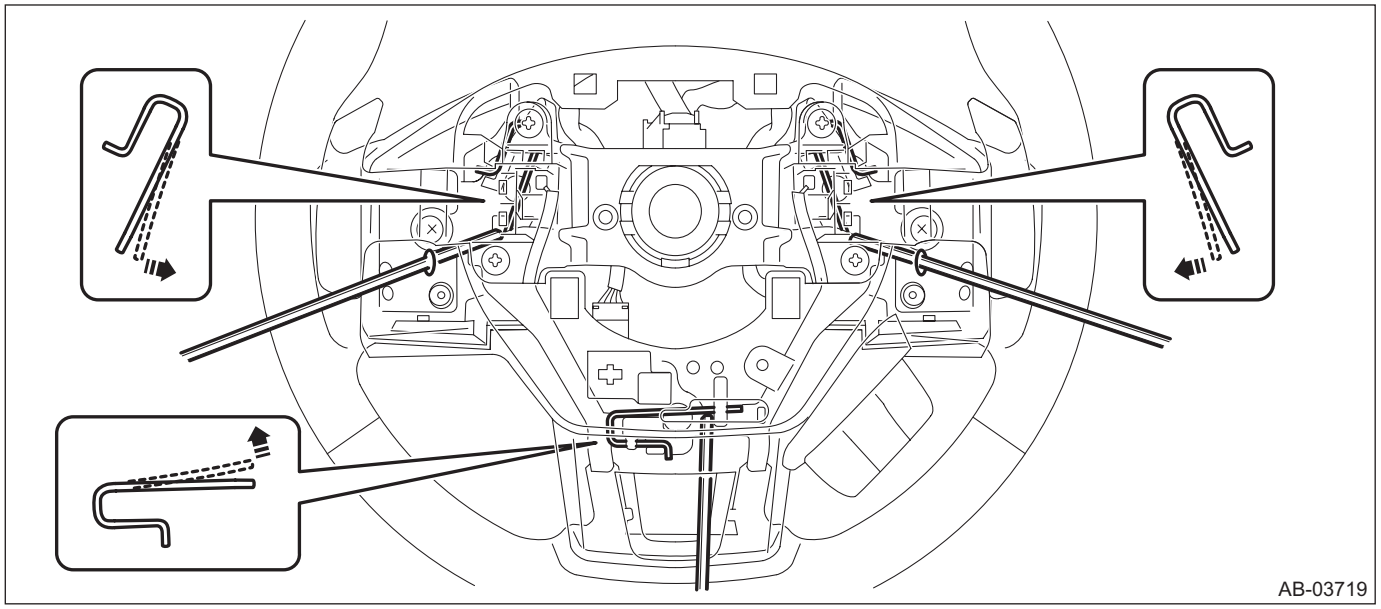
1) Position the front wheels straight ahead.
2) Turn the ignition switch to OFF.
3) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

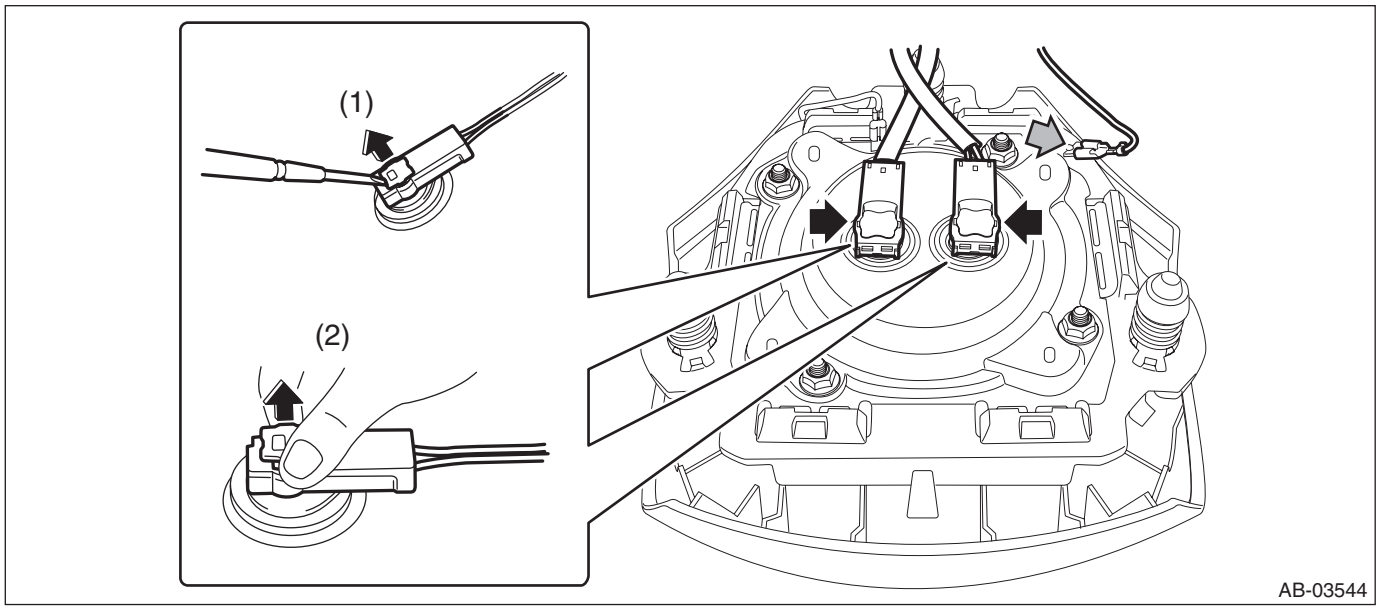
4) Remove the driver's airbag module.
   (1) Using a hexagon wrench etc. wrapped by protective tape, insert the snap pins and release the locks (three locations).
   - Impreza model



- Crosstrek model



(2) Disconnect the horn harness and airbag connector, and remove the driver's airbag module. <Ref. to AB-22, DRIVER'S AIRBAG MODULE, CURTAIN AIRBAG MODULE & PRETENSIONER, PROCEDURE, Airbag Connector.>



B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Airbag module is cracked or deformed.
- Harness and/or connector is cracked, deformed or open.
- Harness wire is exposed.
- The steering wheel is in the way, making it difficult to install the airbag module.
- The clearance between the driver's airbag module and steering wheel is not constant.

2) Install the driver's airbag module.
   (1) Connect the airbag connector to the airbag module securely.

CAUTION:
- **Be sure to insert the connector in until it is locked.**
- **Press in the push lock securely. Then pull it gently to make sure that it is locked.**

   (2) Connect the horn harness.
   (3) Press in the locks (three positions) to install the airbag module.

CAUTION:
Make sure that the airbag module locks (three positions) are securely locked.

3) Install each part in the reverse order of removal.

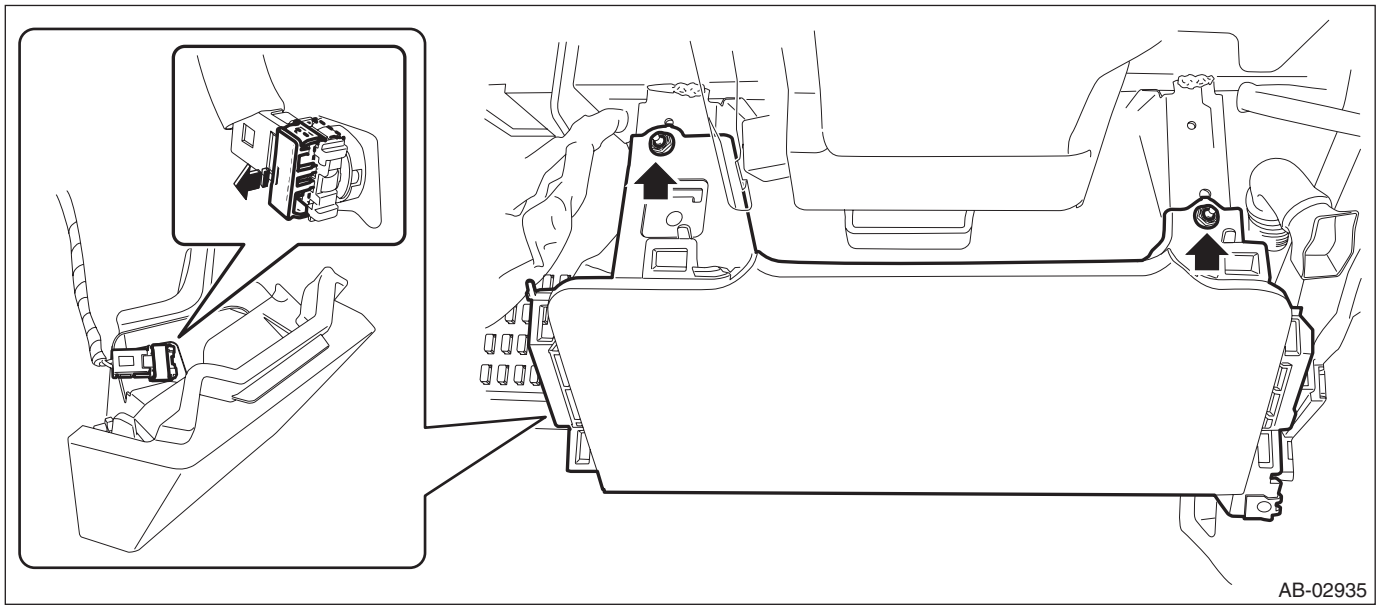
CAUTION:
Make sure that the snap pin is set inside the guide.

5. Knee Airbag Module

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
4) Remove the nuts to remove the knee airbag module and disconnect the harness connector. <Ref. to AB-29, KNEE AIRBAG MODULE, PROCEDURE, Airbag Connector.>



B: INSTALLATION

CAUTION:
- **Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>**
- **Do not allow harness and connectors to interfere or get tangled up with other parts.**
- **Be sure to insert the connector in until it is locked.**
- **Press in the push lock securely. Then pull it gently to make sure that it is locked.**

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Airbag module is cracked or deformed.
- Knee airbag module bracket is cracked or deformed.
- Harness and/or connector is cracked, deformed or open.
- Harness wire is exposed.
- Depending on the condition of the beam COMPL - steering, installation of the knee airbag module is difficult.

2) Install each part in the reverse order of removal.

Tightening torque:
Knee airbag module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

6. Passenger's Airbag Module

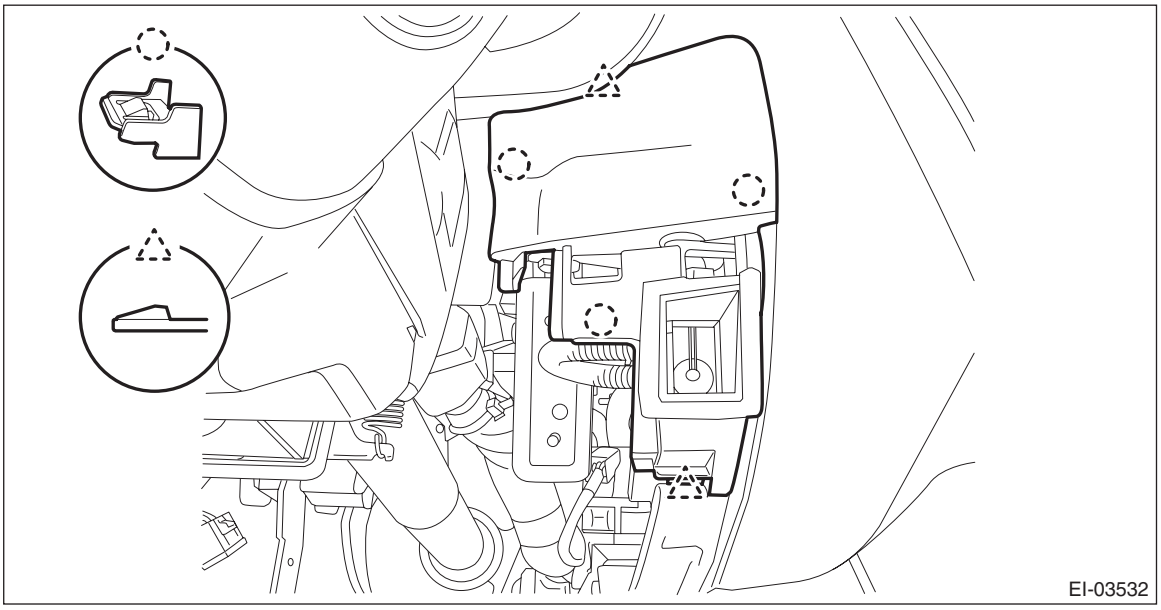
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

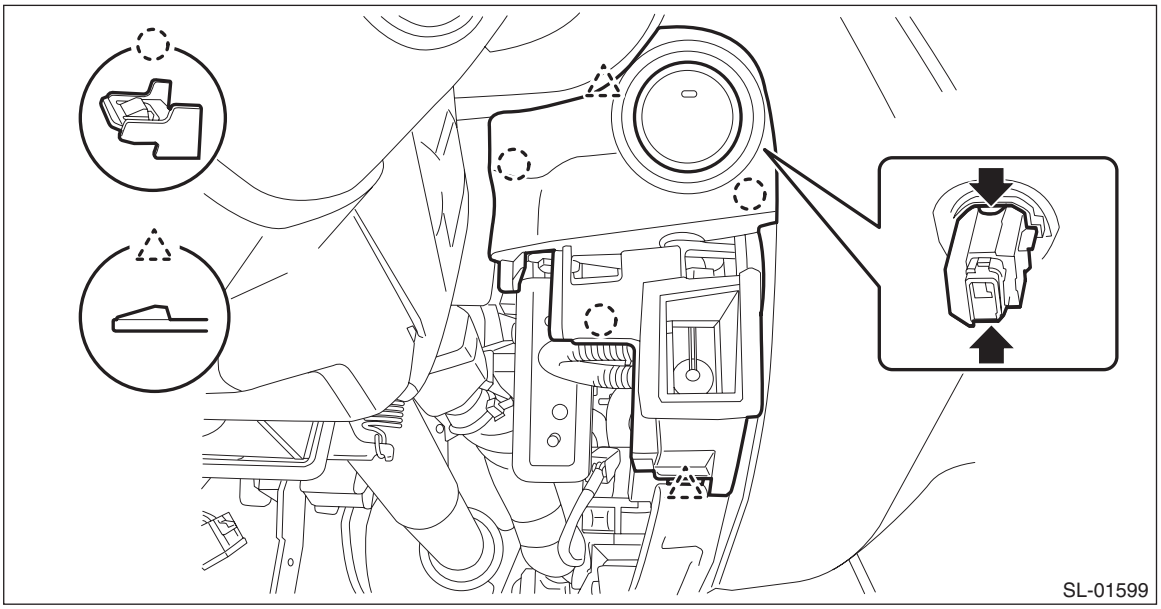
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
• For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine re-start battery sensor.
• On CVT models, shift the select lever into "N" before disconnecting the battery ground cable.

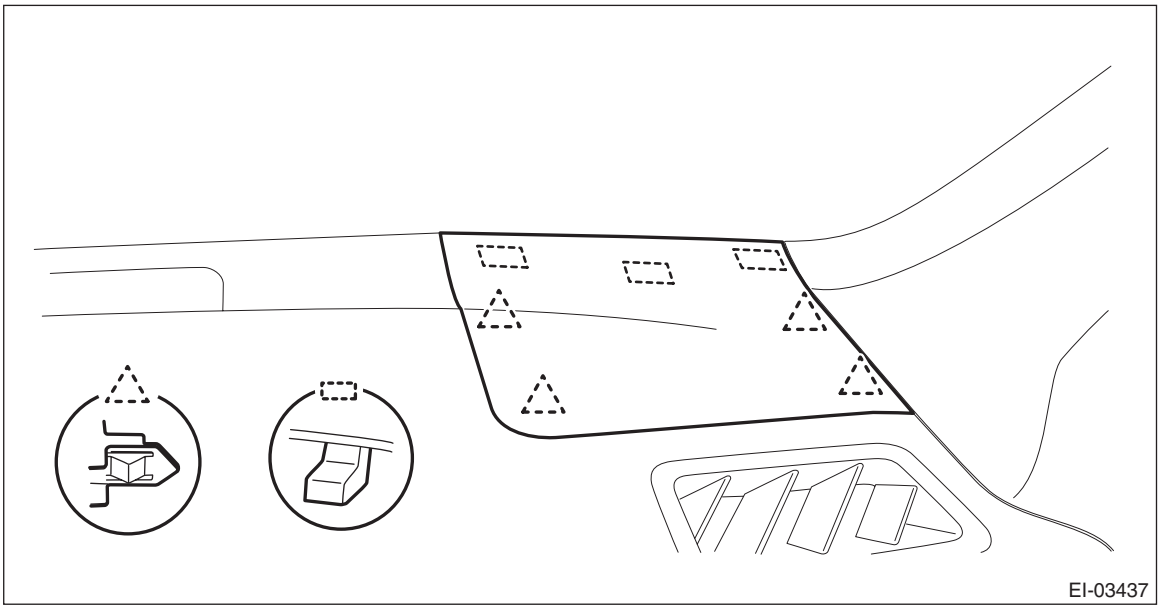
3) Remove the console box assembly, the cover - shift lever and the panel center LWR on the RH and LH sides. <Ref. to EI-77, REMOVAL, Console Box.>
4) Remove the cover - instrument panel side LH and cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
5) Remove the cover switch - starter. (Models without the keyless access with push button start)
   (1) Release the claws and remove the cover switch - starter.
   (2) Disconnect the connector and aspirator hose.



6) Remove the panel - switch. (Model with keyless access with push button start)
   (1) Release the claw of the switch - push button start, and disconnect the connector.
   (2) Release the claws, and then remove the panel - switch.
   (3) Disconnect the connector and aspirator hose.

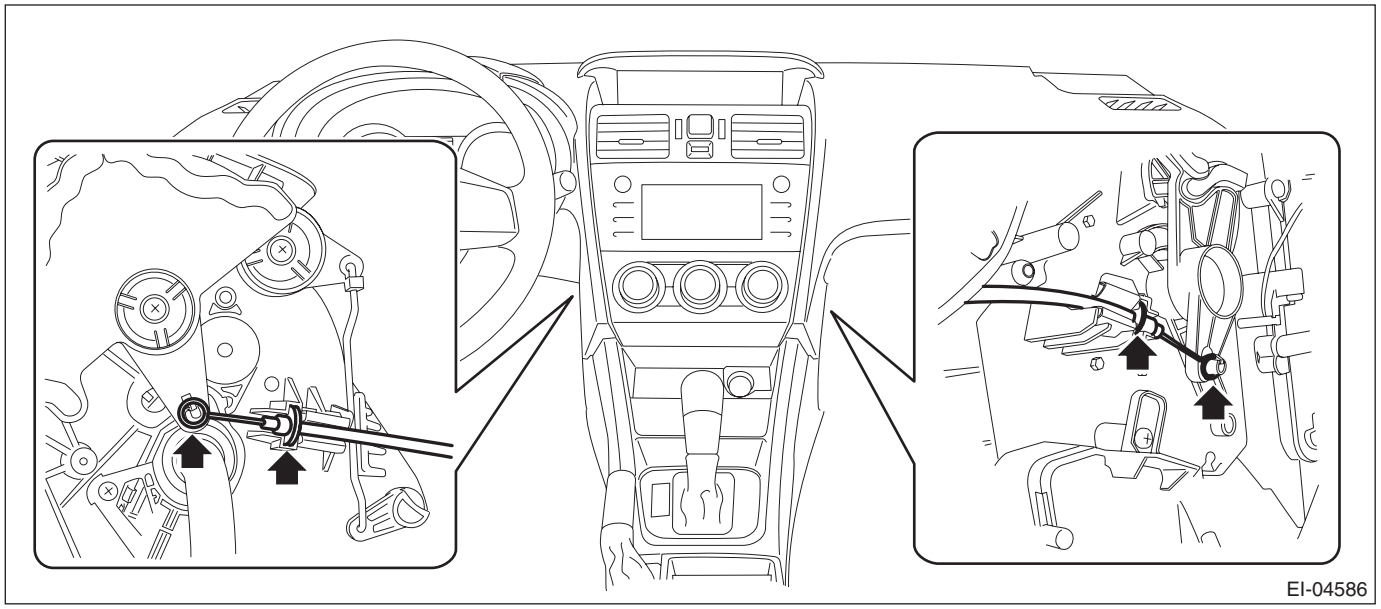


7) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
8) Release the clips and claws, then detach the left and right grille speaker side.

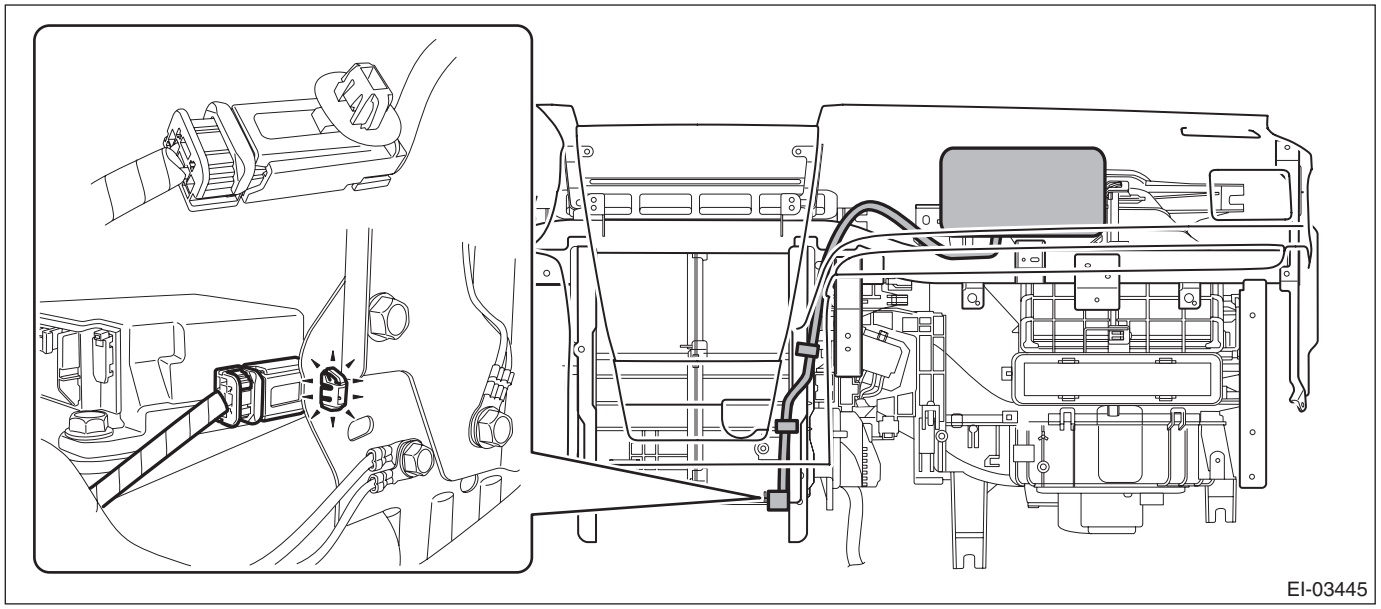


NOTE:
Remove the grille speaker side by using a plastic remover.
9) Remove the trim panel - front pillar UPR on the left and right sides. <Ref. to EI-94, REMOVAL, Upper Inner Trim.>
10) Remove the glove box assembly. <Ref. to EI-74, REMOVAL, Glove Box.>

11) On manual A/C models, disconnect the control cables from both sides of the heater & cooling unit.

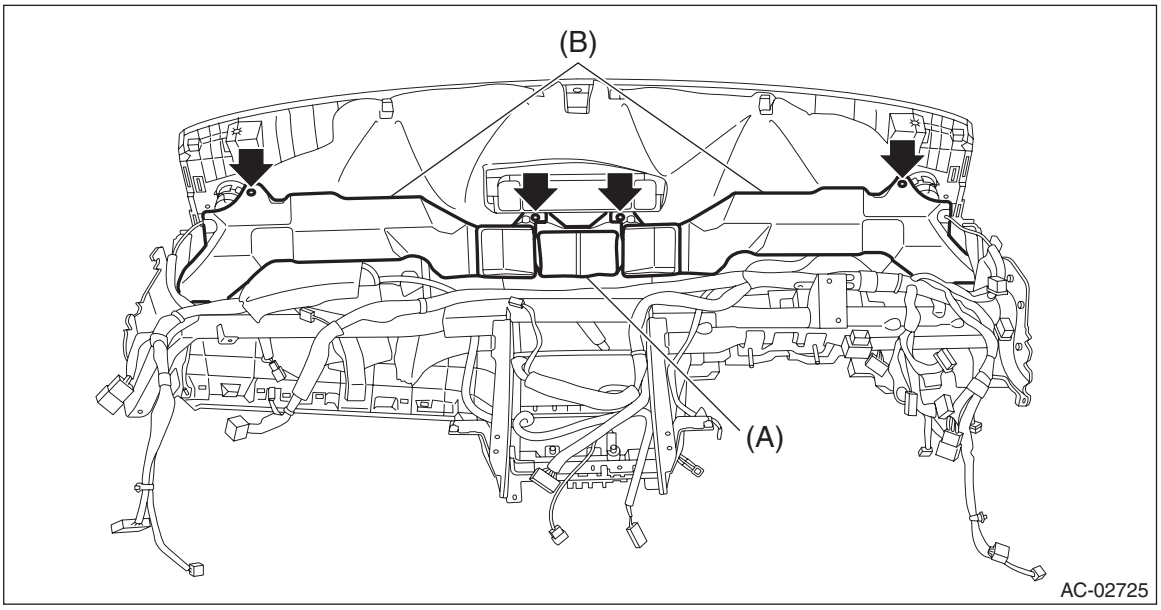


12) Remove the center grille assembly. <Ref. to AC-100, REMOVAL, Air Vent Grille.>
13) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
14) Remove the multi-function display assembly. <Ref. to IDI-26, REMOVAL, Multi-function Display (MFD).>
15) Remove the combination meter assembly. <Ref. to IDI-19, REMOVAL, Combination Meter.>
16) Disconnect the passenger's airbag module connector. <Ref. to AB-21, PASSENGER'S AIRBAG MODULE, PROCEDURE, Airbag Connector.>

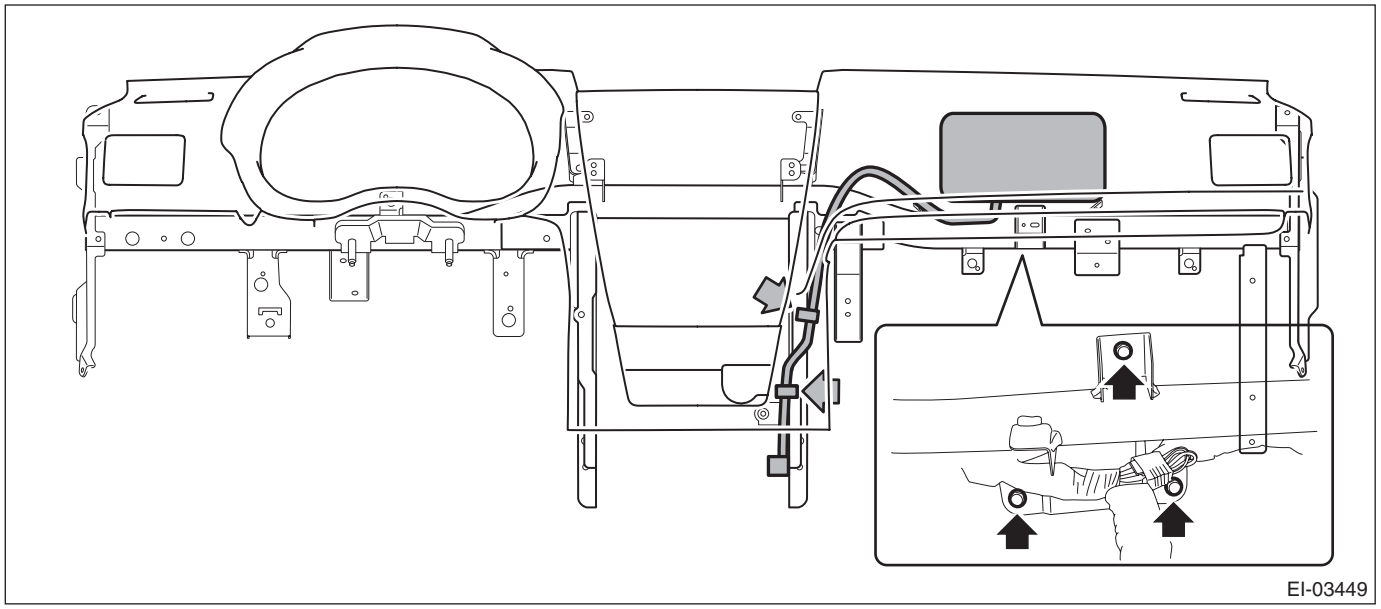


17) Remove the column assembly - steering. <Ref. to PS-21, REMOVAL, Steering Column.>
18) Remove the cover side sill - front INN and cover side sill - front on the RH and LH side. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
19) Remove the body side weather strip - flange front.
20) Remove the instrument panel assembly and the beam COMPL - steering as a unit. <Ref. to EI-79, REMOVAL, Instrument Panel Assembly.>

21) Remove the screws and remove the front (A) and side vent duct LH/RH (B).



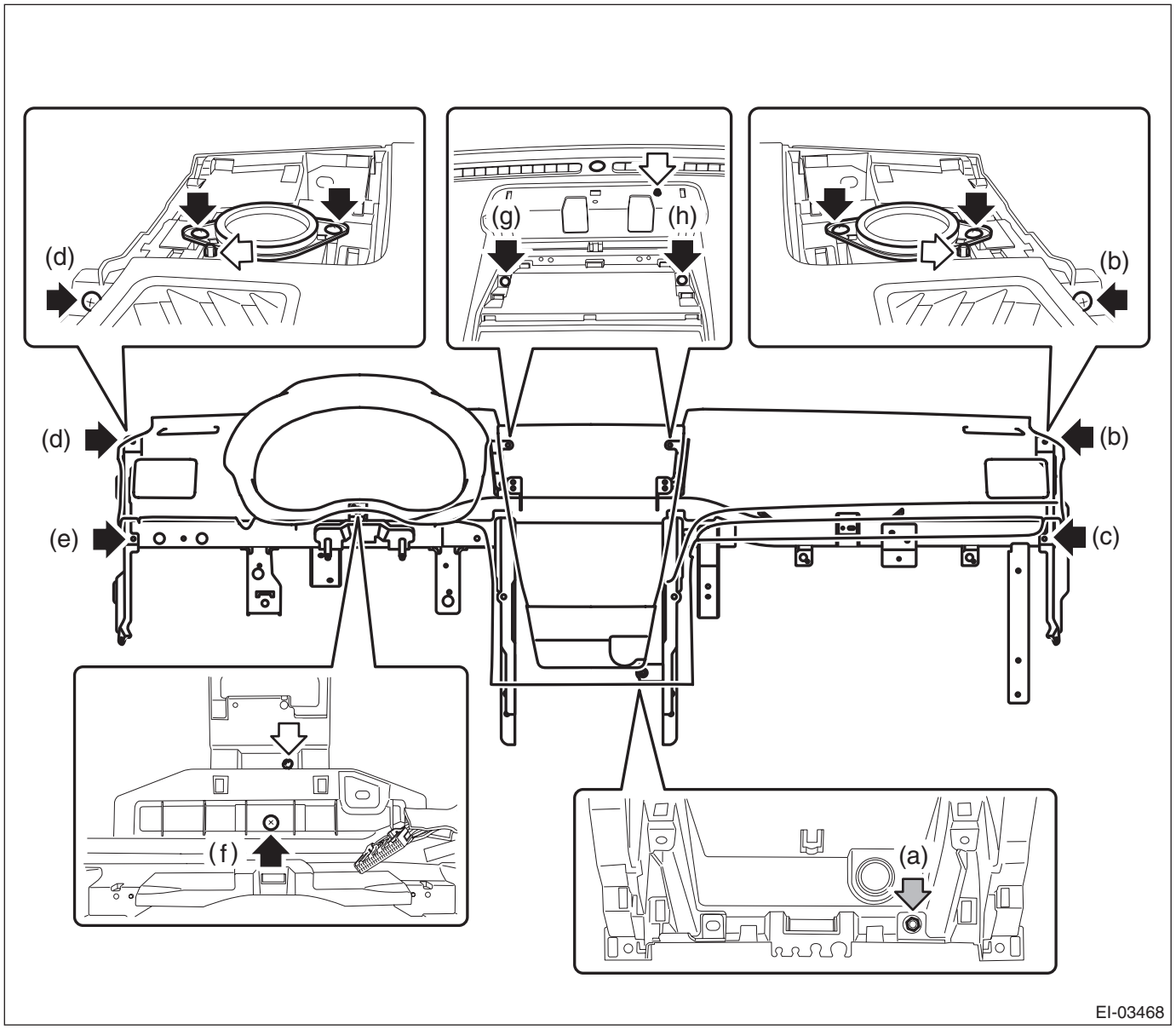
22) Separate the panel COMPL - instrument and the beam COMPL - steering.
(1) Remove the clamps and bolts of the passenger's airbag module harness.



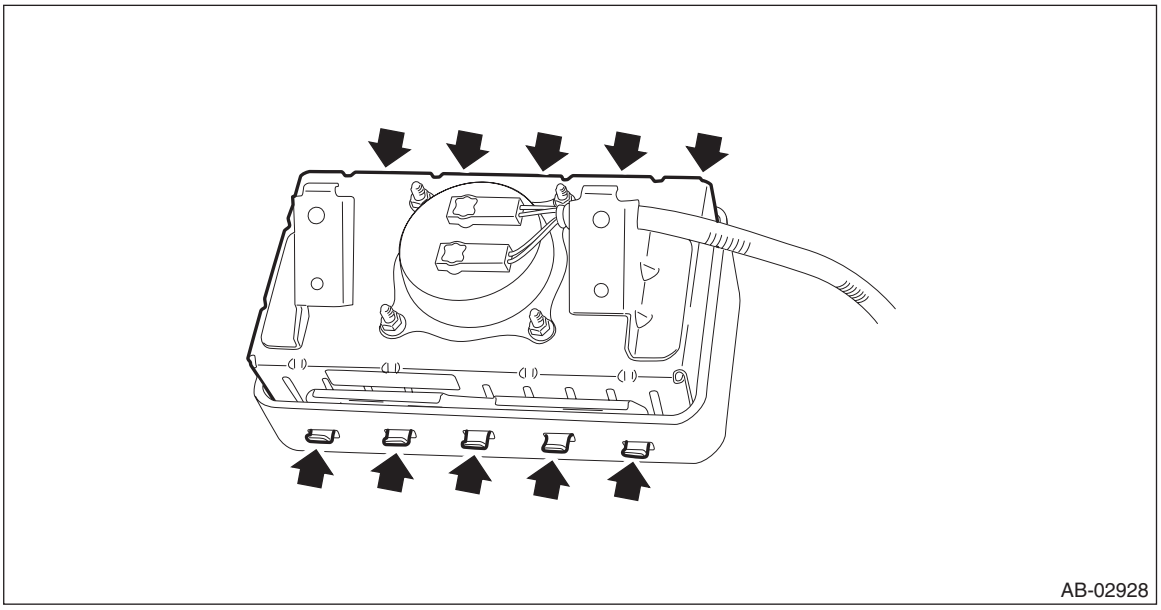
(2) Remove the left and right speakers and the sunload sensor.

NOTE:
Detach the harness clamp together.

(3) Disconnect the front accessory socket connector.
(4) Remove the nut (a) and screws (b), (c), (d), (e), (f), (g) and (h).
(5) While being careful with the harness, separate the panel COMPL - instrument and the beam COMPL - steering.



23) Remove the claws, and remove the passenger's airbag module.



24) For handling of the removed airbag module, refer to "CAUTION". <Ref. to AB-11, CAUTION, General Description.>

B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.
• When reusing the tether clip on the upper part of the trim panel - front pillar UPR, check that there is no damage to the tether clip. If the tether clip is damaged, always replace it with a new tether clip. If the tether clip is damaged, its holding force is reduced and the trim panel - front pillar UPR may come off.

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Passenger's airbag lid (instrument panel surface) is cracked or deformed.
- Airbag module is cracked or deformed.
- Harness and/or connector is cracked, deformed or open.
- Harness wire is exposed.
- Mounting bracket is cracked or deformed.

2) Install the remaining parts in the reverse order of removal.

Tightening torque:
Knee airbag module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

NOTE:
Refer to the installation procedure of the "Instrument Panel Assembly". <Ref. to EI-87, INSTALLATION, Instrument Panel Assembly.>

7. Side Airbag Module

A: REMOVAL

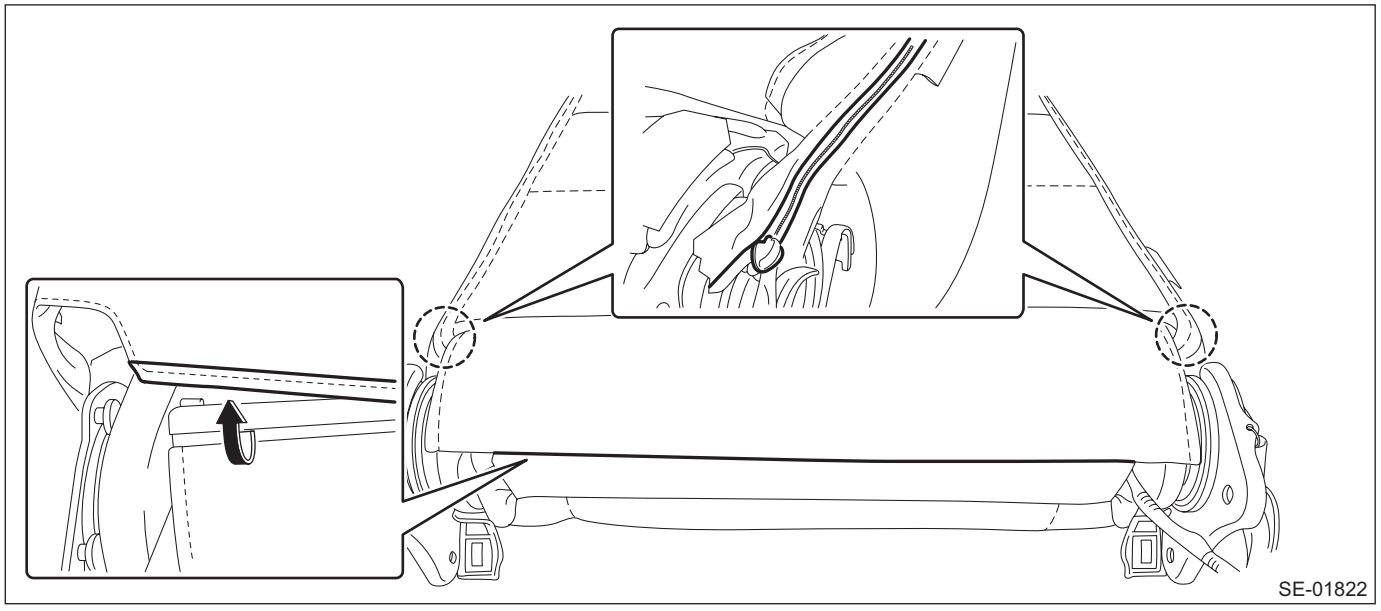
CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

NOTE:
Remove the passenger's side by referring to driver's side.
1) Remove the headrest assembly.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the front seats. <Ref. to SE-8, REMOVAL, Front Seat.>
4) Separate the backrest assembly and the seat cushion assembly. <Ref. to SE-10, DISASSEMBLY, Front Seat.>
5) Remove the side airbag module.

CAUTION:
Do not open the protective cover of the side airbag module. If any damage is present in the protective cover or the cloth of side airbag module comes out from the protective cover slit, replace the side airbag module with a new part.

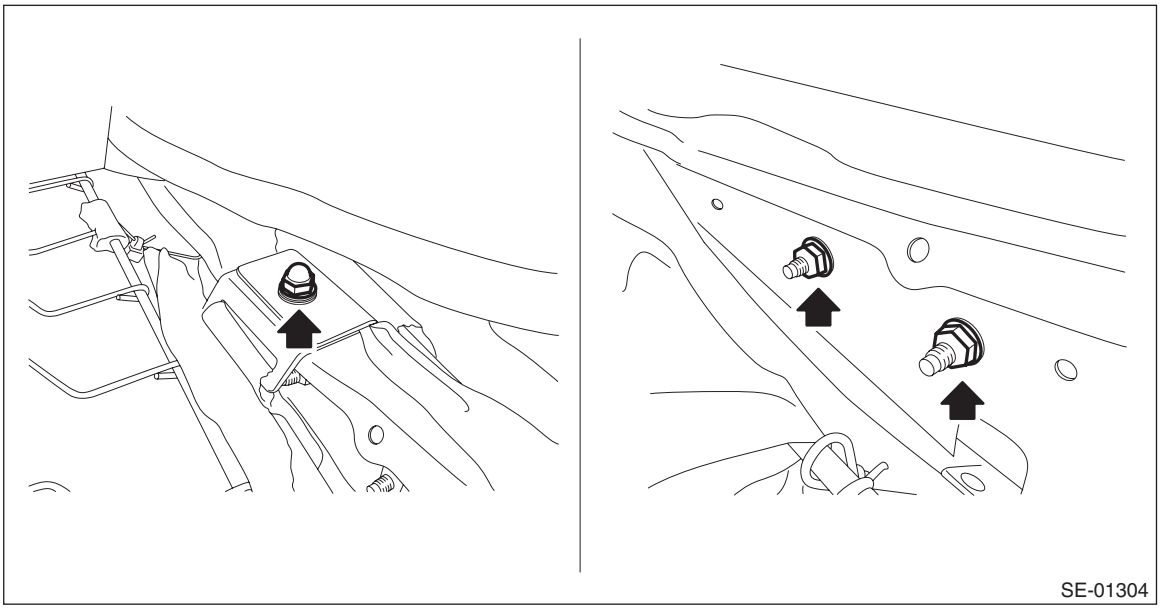
(1) Remove the plastic fastener at the back side (bottom) of backrest assembly.
(2) Open the fastener at the rear side of backrest assembly.



NOTE:
If it is hard to open, use a metal clip, etc.

(3) Remove the hexagon cap nut and nuts.

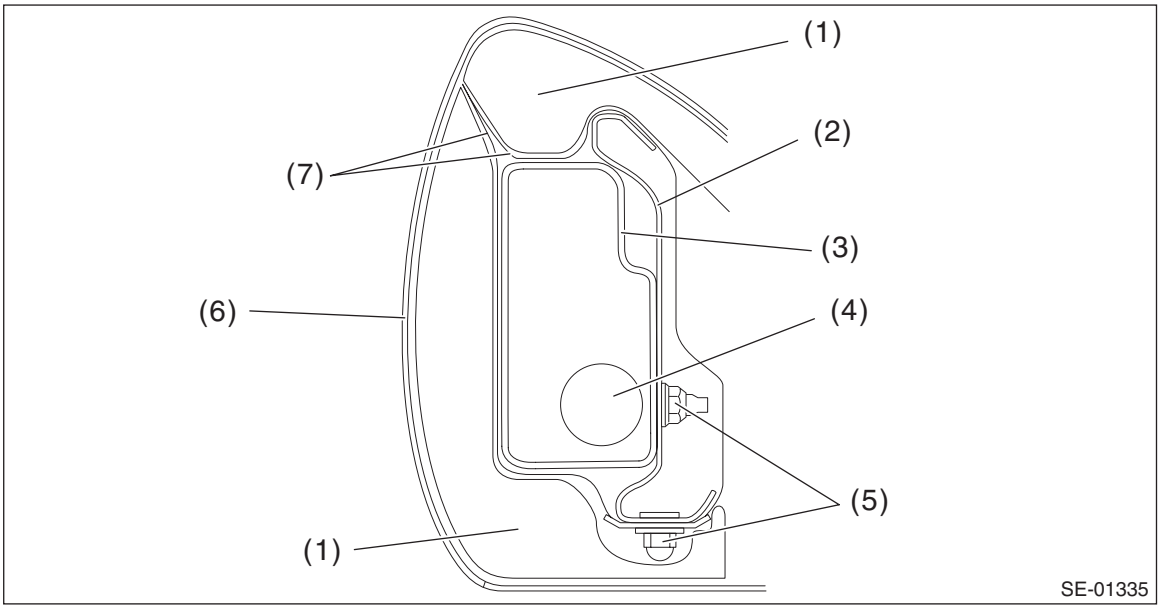
(4) While taking care not to damage the airbag protective cover, remove the side airbag module.



B: INSTALLATION

CAUTION:

- **Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>**
- **Make sure that the side airbag module is installed as shown in the figure.**



(1)	Pad ASSY - front seat backrest	(4)	Side airbag module inflator	(7)	Side airbag guide cloth
(2)	Frame ASSY - front backrest	(5)	Nut		
(3)	Side airbag module protective cover	(6)	Cover COMPL - front backrest		

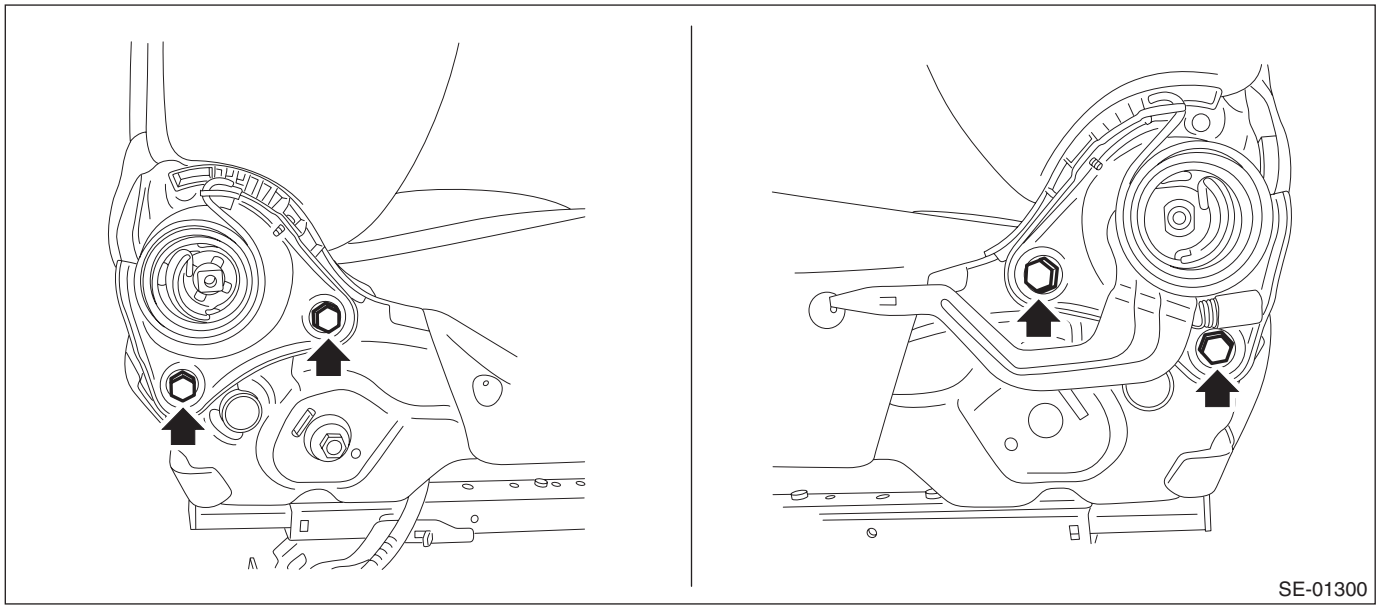
- **Be careful not to stain or damage the cover COMPL - front backrest during assembly.**
- **Do not reuse hog rings.**
- **Secure the hog ring using hog ring pliers.**
- **Install the hog rings to the specified points securely and make sure that there is no wrinkle or twisting on the cover COMPL - front backrest.**

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Make sure that there is no foreign matter on side airbag module.
- Front seat, airbag module and mounting bracket are damaged or deformed.
- Harness and/or connector is cracked, deformed or open.
- Harness wire is exposed.

2) Install the side airbag module to the frame assembly - front backrest.

Tightening torque:
Side airbag module: 6 N·m (0.61 kgf-m, 4.4 ft-lb)

3) Install the side airbag harness to the frame assembly - front backrest.
4) Install the cover COMPL - front backrest.
5) Secure the backrest hinge.



Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SE-2, FRONT SEAT, COMPONENT, General Description.>

6) Install the side airbag harness to the back of the seat cushion assembly using a cable clip.

CAUTION:
After restoring the seat, operate the reclining and sliding mechanisms to check that the side airbag harness is not caught.

7) Install the front seat assembly to the body. <Ref. to SE-9, INSTALLATION, Front Seat.>
8) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

8. Curtain Airbag Module

A: REMOVAL

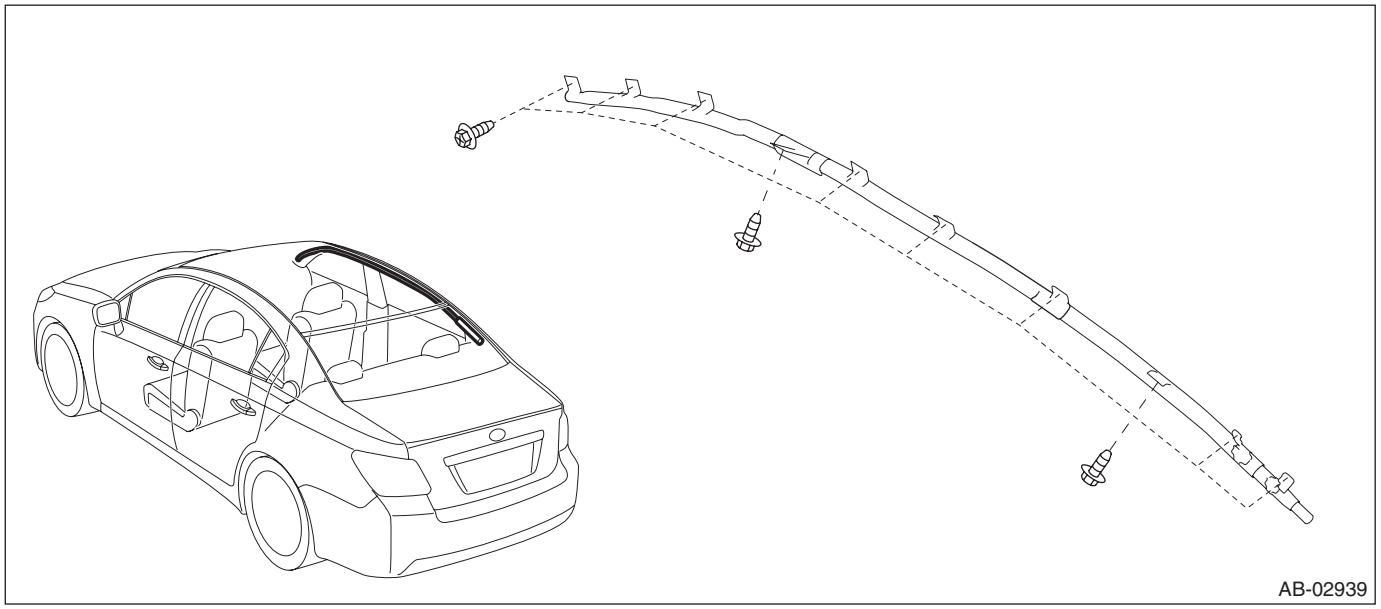
1. 4 DOOR MODEL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

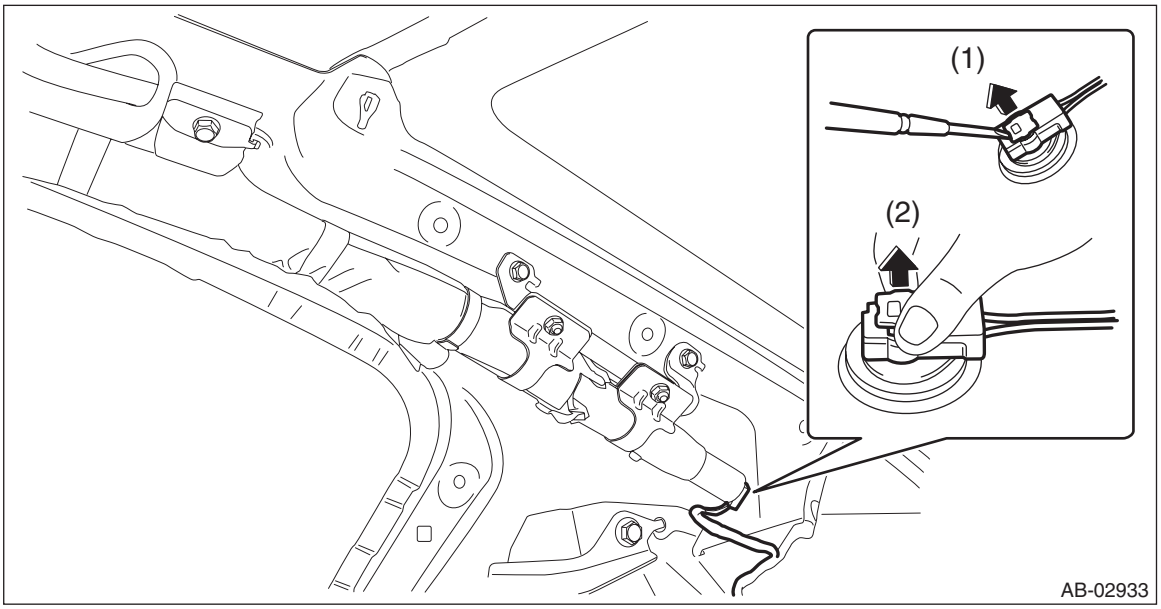
NOTE:
On CVT models, shift the select lever into "N" before disconnecting the battery ground cable.
3) Remove the trim panel - roof assembly. <Ref. to EI-109, 4 DOOR MODEL, REMOVAL, Roof Trim.>
4) Remove the curtain airbag module.

CAUTION:
- **Be careful not to damage the curtain airbag module during removal.**
- **Never open the curtain airbag module before activation. Never reuse the deployed curtain airbag module.**
- **Remove the modules in order starting from the vehicle front.**

(1) Remove all the bolts and clips, and remove the curtain airbag module.



(2) Disconnect the curtain airbag module connector. <Ref. to AB-22, DRIVER'S AIRBAG MODULE, CURTAIN AIRBAG MODULE & PRETENSIONER, PROCEDURE, Airbag Connector.>



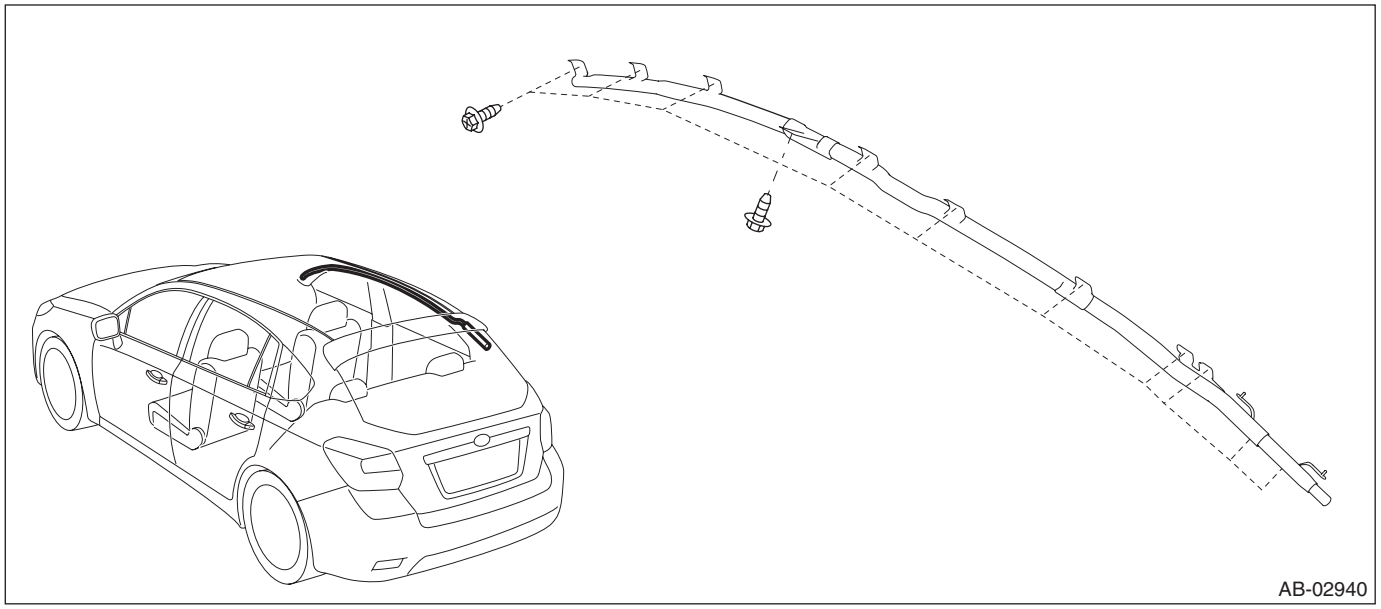
2. 5 DOOR MODEL/CROSSTREK MODEL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

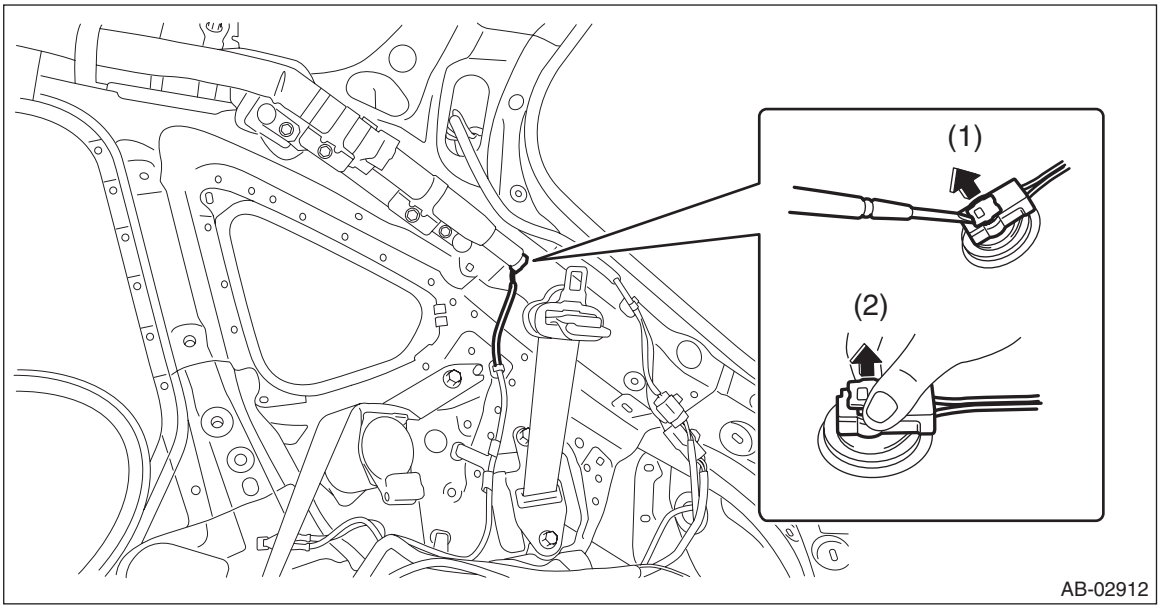
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the trim panel - roof assembly. <Ref. to EI-112, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Roof Trim.>
4) Remove the curtain airbag module.

CAUTION:
- **Be careful not to damage the curtain airbag module during removal.**
- **Never open the curtain airbag module before activation. Never reuse the deployed curtain airbag module.**
- **Remove the modules in order starting from the vehicle front.**

(1) Remove all the bolts and clips, and remove the curtain airbag module.



(2) Disconnect the curtain airbag module connector. <Ref. to AB-22, DRIVER'S AIRBAG MODULE, CURTAIN AIRBAG MODULE & PRETENSIONER, PROCEDURE, Airbag Connector.>



B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• When installing the curtain airbag module, install a specified part at specified place.
• Be careful not to damage the curtain airbag module during installation.
• Never open the curtain airbag module before activation. Never reuse the deployed curtain airbag module.
• Make sure that there are no foreign matter on airbag module.
• When reusing the tether clip on the upper part of the trim panel - front pillar UPR, check that there is no damage to the tether clip. If the tether clip is damaged, always replace it with a new tether clip. If the tether clip is damaged, its holding force is reduced and the trim panel - front pillar UPR may come off.
• For installation of the stereo camera cover, refer to "INSTALLATION", "Stereo Camera" in the "EyeSight" section and observe the precautions for installation. <Ref. to ES-10, INSTALLATION, Stereo Camera.>
1) Before installation, inspect the following items and replace any faulty part with a new one.
- Airbag cover is scratched or torn.
- Harness and/or connector is cracked, deformed or open.
- Harness wire is exposed.
- Mounting bracket and securing clip are cracked or deformed.

2) Install the curtain airbag module.

CAUTION:
• Be sure to insert the connector in until it is locked.
• Press in the push lock securely. Then pull it gently to make sure that it is locked.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

3) Install the remaining parts in the reverse order of removal.

9. Airbag Control Module

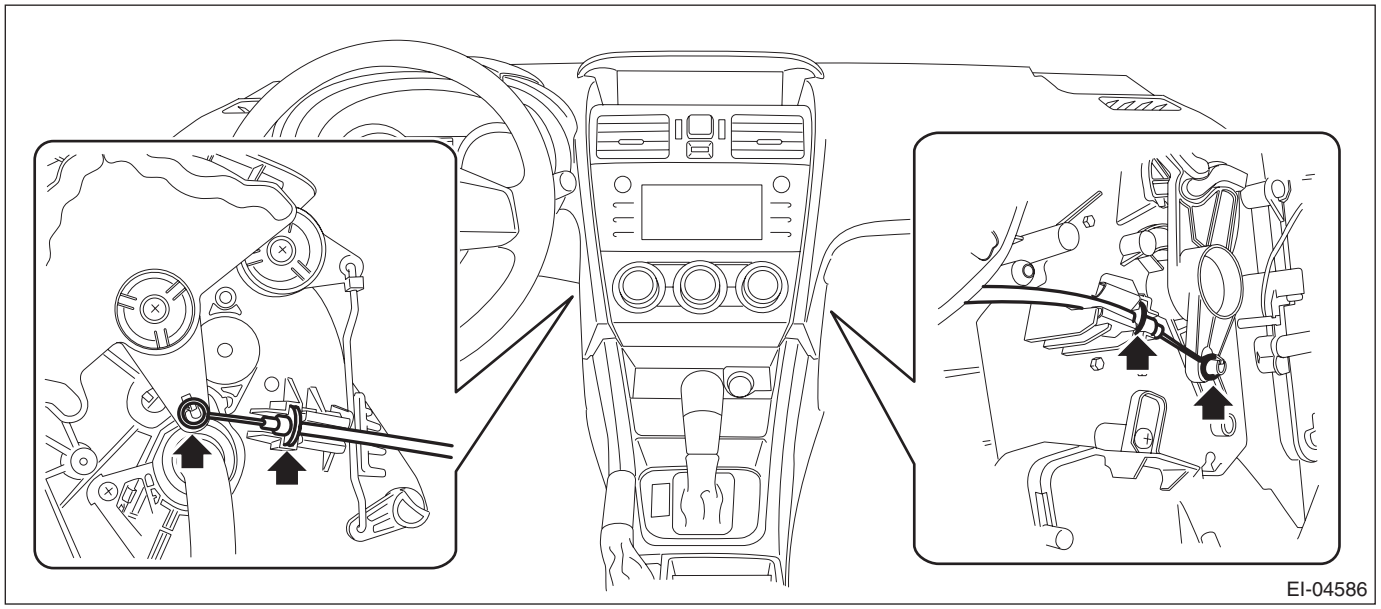
A: REMOVAL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not disassemble the airbag control module.
• If the airbag control module is deformed or if there is any trace of water on the module, replace the airbag control module with a new one.
• Do not drop the airbag control module.
• After removal, keep the airbag control module on a dry, clean surface away from moisture, heat and dust.

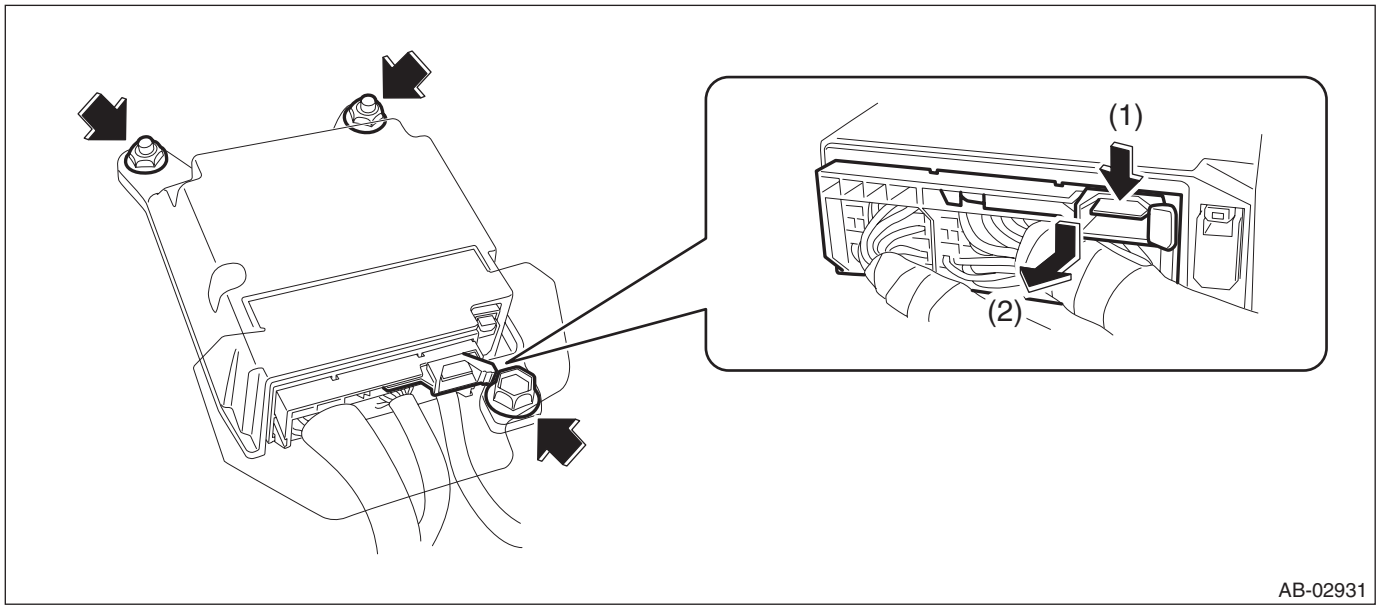
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
• For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine re-start battery sensor.
• On CVT models, shift the select lever into "N" before disconnecting the battery ground cable.

3) Remove the console box assembly and the cover - shift lever. <Ref. to EI-77, REMOVAL, Console Box.>
4) On manual A/C models, disconnect the control cables from both sides of the heater & cooling unit.


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5) Remove the center grille assembly. <Ref. to AC-100, REMOVAL, Air Vent Grille.>
6) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
7) Remove the airbag control module.
(1) Disconnect the connector from airbag control module. <Ref. to AB-20, AIRBAG CONTROL MODULE, PROCEDURE, Airbag Connector.>
(2) Remove the bolt and nuts and remove the airbag control module.



B: INSTALLATION

CAUTION:
Do not reuse the bolt and nut.
Always use new bolts and nuts for them.
1) Before installation, inspect the following items and replace any faulty part with a new one.
- Control module is deformed.
- Control module connector is damaged.
- Control module mounting bracket is damaged.

2) Install each part in the reverse order of removal.

Tightening torque:
Airbag control module: 25 N·m (2.55 kgf-m, 18.4 ft-lb)
Console box assembly: 6.5 N·m (0.66 kgf-m, 4.8 ft-lb)

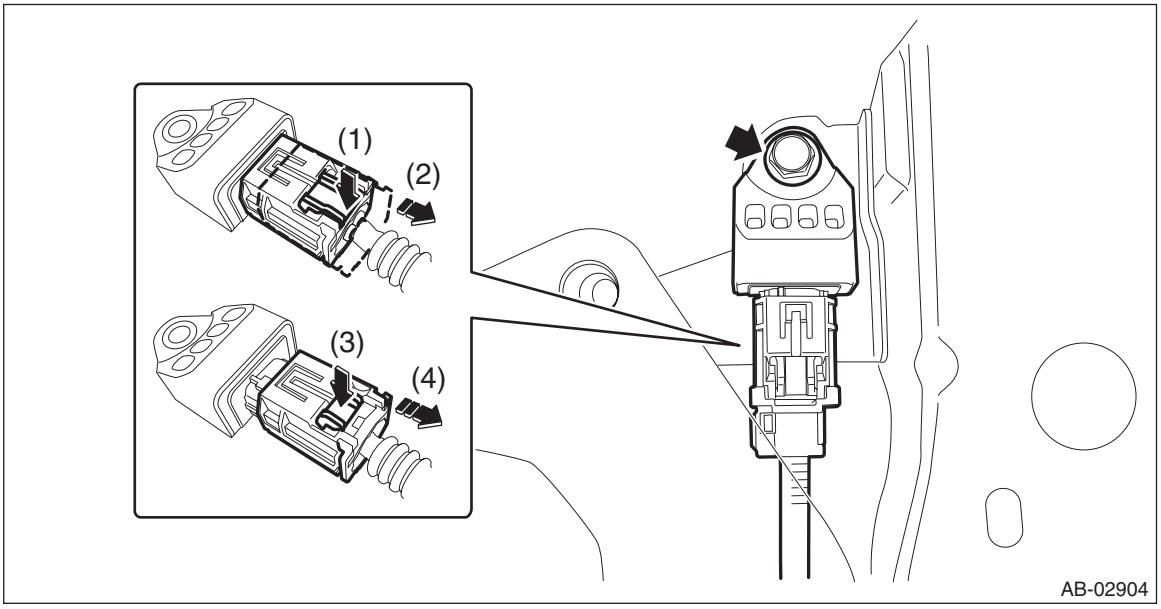
10.Front Sub Sensor

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the bumper face - front. <Ref. to EI-37, REMOVAL, Front Bumper.>

NOTE:
When removing the front sub sensor, remove the bumper beam COMPL - front as necessary.
4) Remove the bolt, and then detach the front sub sensor. <Ref. to AB-23, FRONT SUB SENSOR, PROCEDURE, Airbag Connector.>



B: INSTALLATION

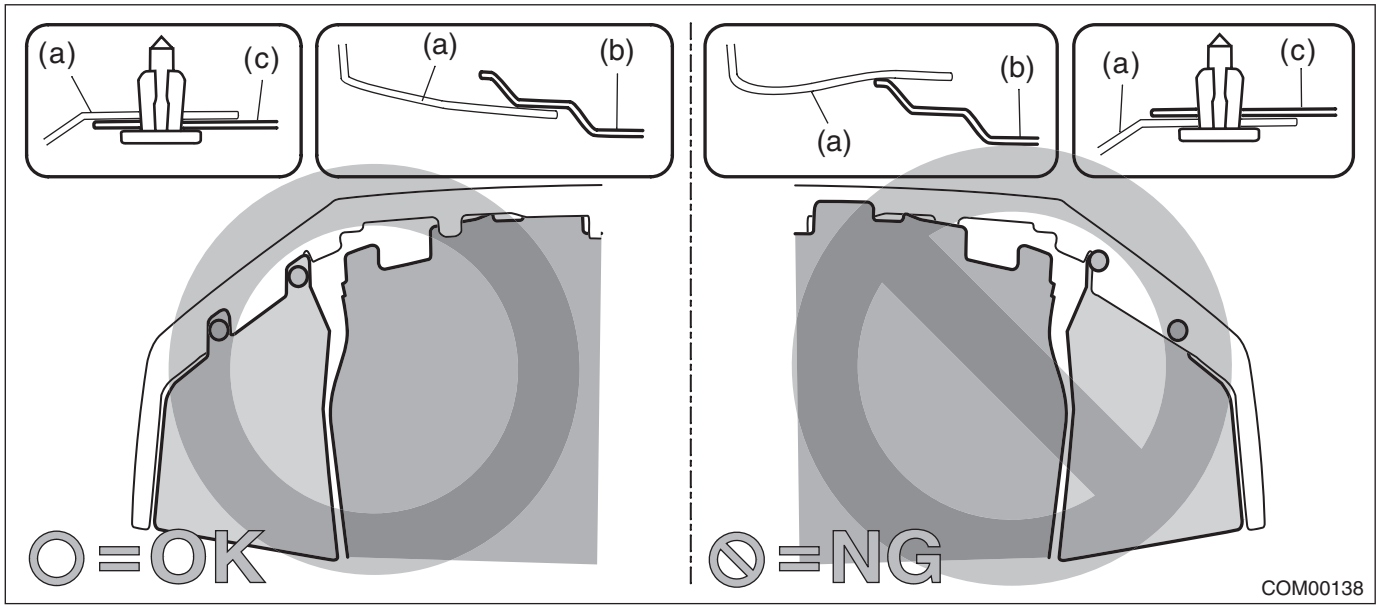
CAUTION:
- **If the airbag has been activated, replace the front sub sensor with a new part.**
- **Do not reuse the bolt and nut.**

Always replace with the specified new bolts and nuts.
- **When installing the sensor, insert the set pin on the backside of the sensor into the hole on the body side securely.**

1) Before installation, inspect the following items and replace any faulty part with a new part.
- Front sub sensor damage
- Connector damage

2) Install each part in the reverse order of removal.

CAUTION:
- **Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).**



- **Before installing the bumper face, match the claws on the bracket - front bumper with the engaging position of flange section on the bumper face side. If the engaging position is not correct, the flange section may be broken or the clearance between fender panel and bumper face may not be uniform.**

Tightening torque:
Front sub sensor: 13 N·m (1.33 kgf-m, 9.6 ft-lb)
Bumper beam COMPL - front: 32 N·m (3.36 kgf-m, 24.3 ft-lb)

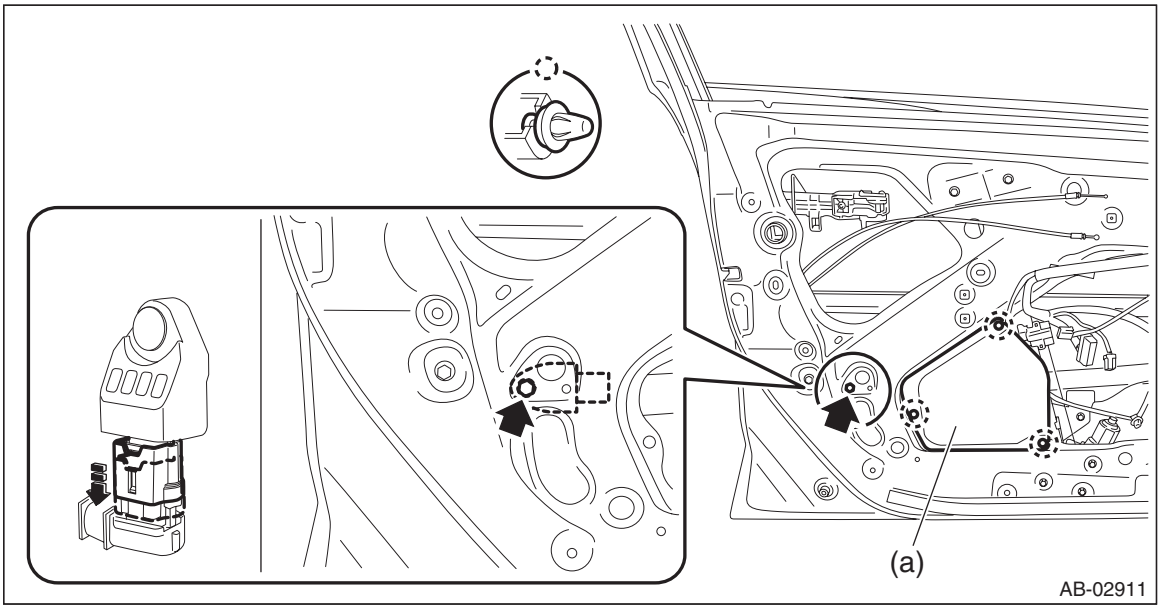
11.Front Door Impact Sensor

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Operate the power window switch to close the front door glass.
2) Turn the ignition switch to OFF.
3) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
4) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
5) Remove the sealing cover. <Ref. to EB-26, REMOVAL, Front Sealing Cover.>
6) Remove the front door impact sensor.
   (1) Remove the front door inner pad (a).

CAUTION:
If the clip is damaged, replace it with a new part because the panel assembly - front door may be deformed.
   (2) Remove the nuts and then remove the front door impact sensor.
   (3) Disconnect the airbag connector and remove the front door impact sensor. <Ref. to AB-24, FRONT DOOR IMPACT SENSOR AND SATELLITE SAFING SENSOR, PROCEDURE, Airbag Connector.>



B: INSTALLATION

CAUTION:
Do not reuse the bolt and nut.
Always replace with the specified new bolts and nuts.
1) Before installation, inspect the following items and replace any faulty part with a new part.
- The front door impact sensor or connector is damaged.
- Inner panel area of the panel assembly - front door is deformed.
- Side airbag module has been activated.

Tightening torque:
Front door impact sensor: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
2) Install each part in the reverse order of removal.

12.Side Airbag Sensor

A: REMOVAL

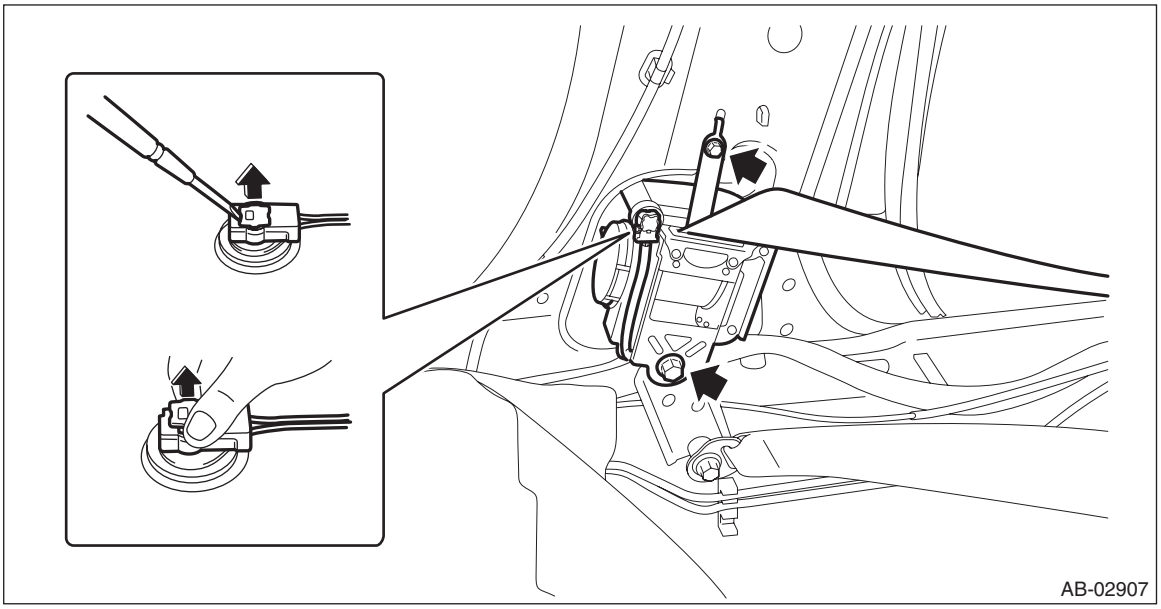
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Move the seat all the way forward, from which the side airbag sensor is to be removed.

NOTE:
This is to remove the seat belt retractor assembly.
2) Turn the ignition switch to OFF.
3) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
4) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the following lower inner trims. (On the side where the side airbag sensor is removed) <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
- Cover side sill - front INN
- Cover side sill - rear INN
- Trim panel - center pillar LWR

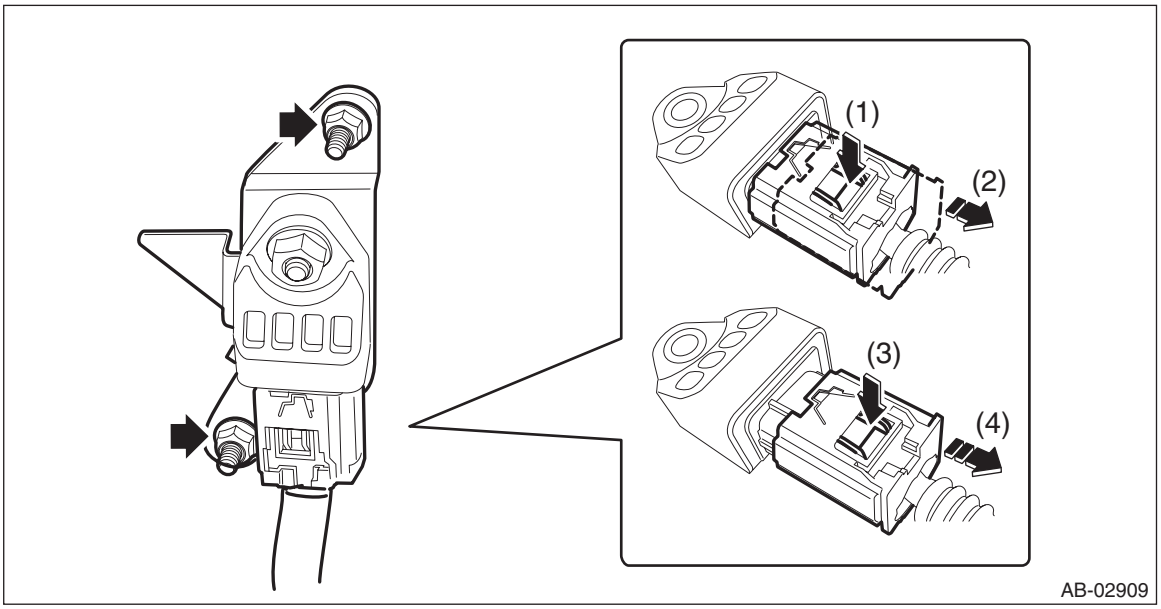
6) Remove the seat belt retractor. (On the side where the side airbag sensor is removed)
(1) Turn over the floor mat to disconnect the belt tension sensor connector. <Ref. to AB-22, DRIVER'S AIRBAG MODULE, CURTAIN AIRBAG MODULE & PRETENSIONER, PROCEDURE, Airbag Connector.>

NOTE:
For Crosstrek model, disconnect the connector of the passenger's lap seat belt pretensioner.
(2) Remove the bolt to remove the seat belt retractor.



7) Remove the nuts and then remove the side airbag sensor. <Ref. to AB-26, SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR, PROCEDURE, Airbag Connector.>

CAUTION:
- **Do not separate the side airbag sensor and bracket. It causes the airbag system malfunction.**
- **If the sensor is removed from the bracket, be sure to replace with a new part.**



B: INSTALLATION

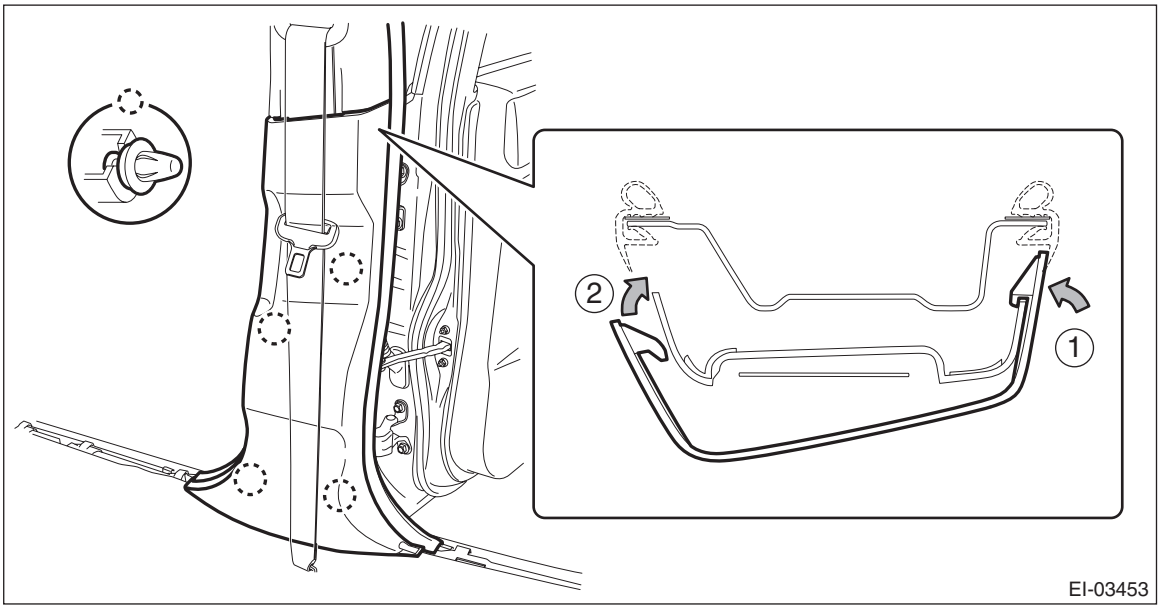
CAUTION:
Do not reuse the bolt and nut.
Always replace with the specified new bolts and nuts.

1) Before installation, inspect the following items and replace any faulty part with a new part.
- The side airbag sensor, sensor bracket, or connector are damaged.
- Side airbag module has been activated.
- Curtain airbag module has been activated.

Tightening torque:
Side airbag sensor: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

2) Install each part in the reverse order of removal.

NOTE:
Assemble the trim panel - center pillar LWR to the trim panel - center pillar UPR securely.



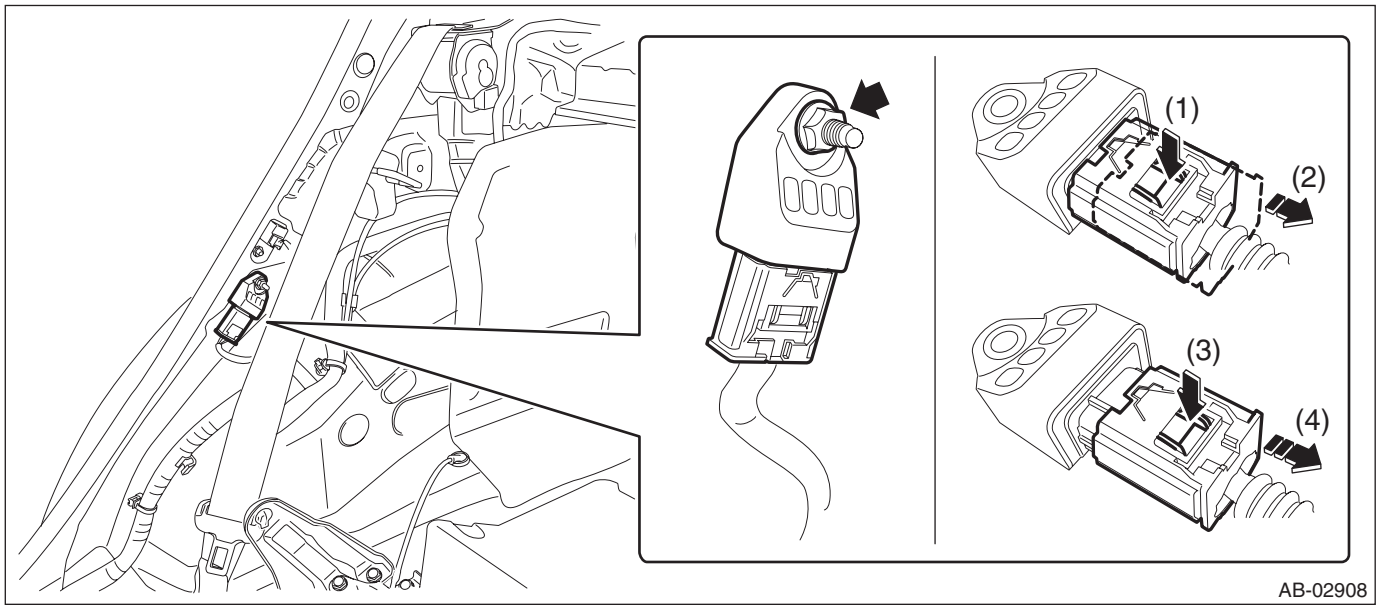
Tightening torque:
Front seat belt: <Ref. to SB-2, FRONT SEAT BELT, COMPONENT, General Description.>

13.Curtain Airbag Sensor

A: REMOVAL

1. 4 DOOR MODEL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the cover side sill - rear INN and the trim panel - rear pillar LWR. (On the side where the curtain airbag sensor is removed) <Ref. to EI-97, REMOVAL, Rear Quarter Trim.>
5) Remove the nuts and then remove the curtain airbag sensor. <Ref. to AB-26, SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR, PROCEDURE, Airbag Connector.>

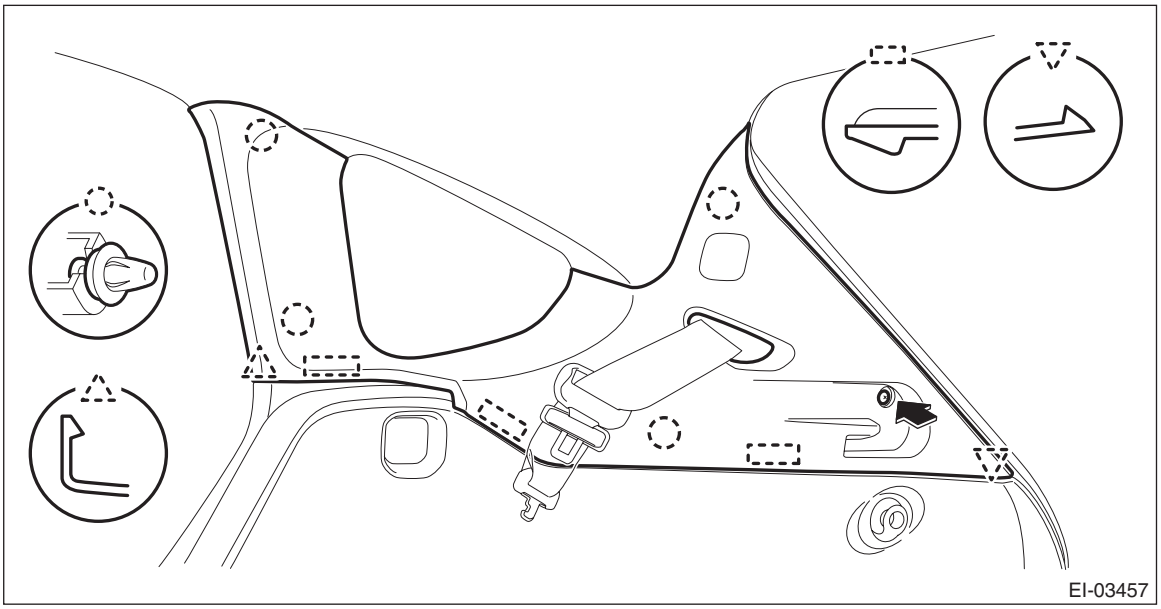


2. 5 DOOR MODEL/CROSSTREK MODEL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

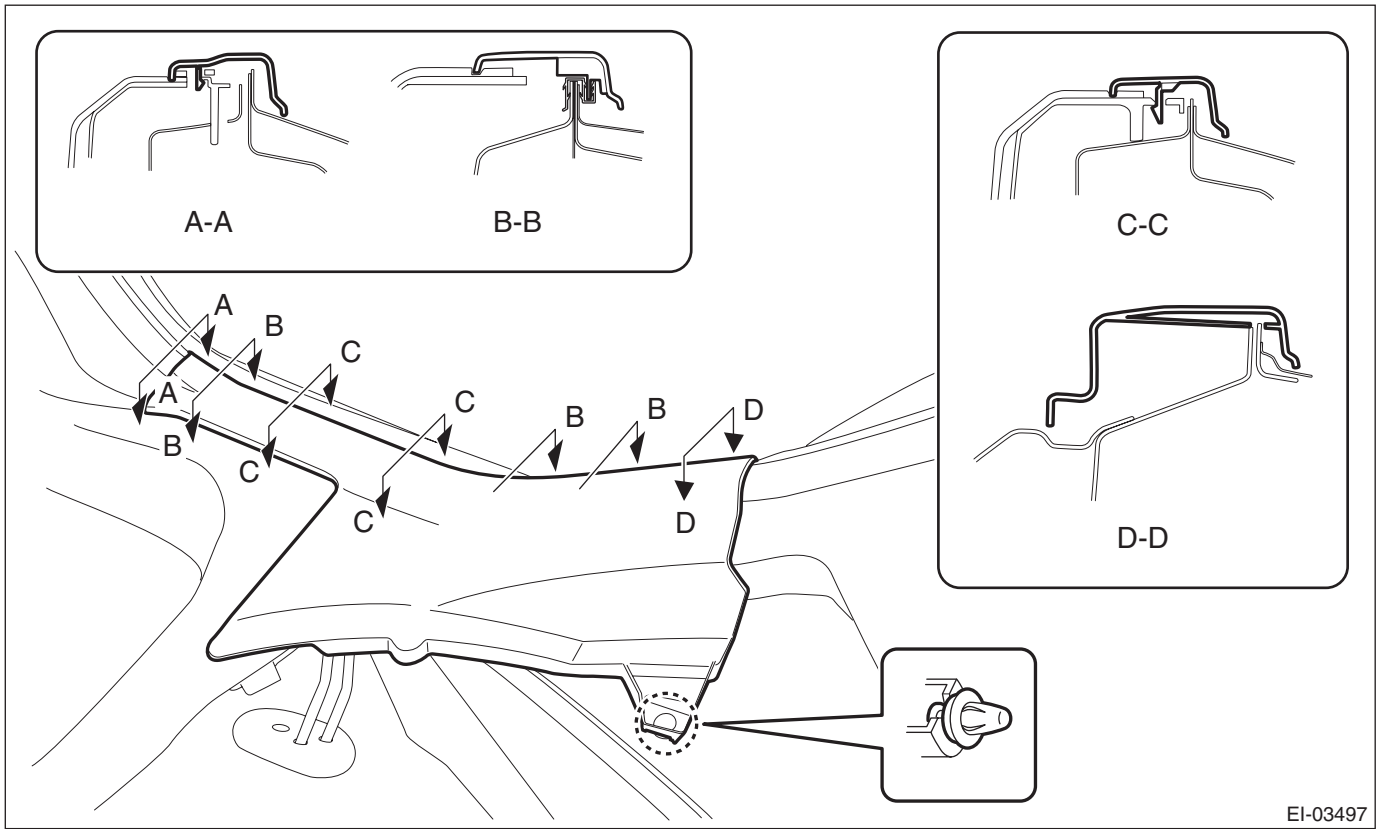
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the screws and clips, and remove the trim panel - rear quarter pillar UPR. (On the side where the curtain airbag sensor is removed)

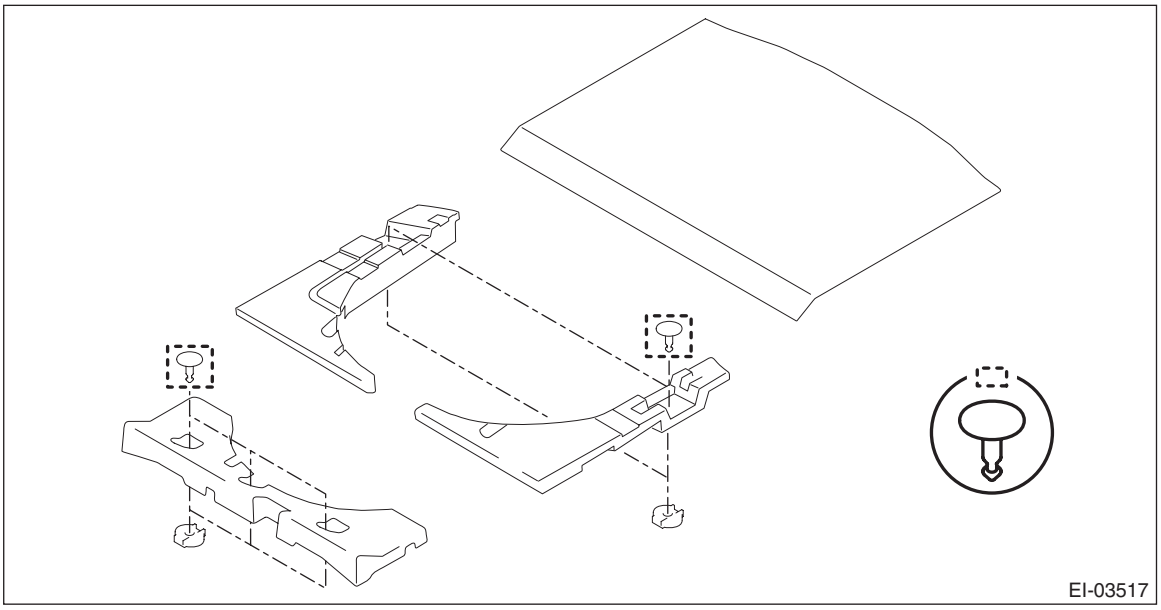


4) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Release the clips and claws, and then remove the side sill cover - rear INN. (On the side where the curtain airbag sensor is removed)

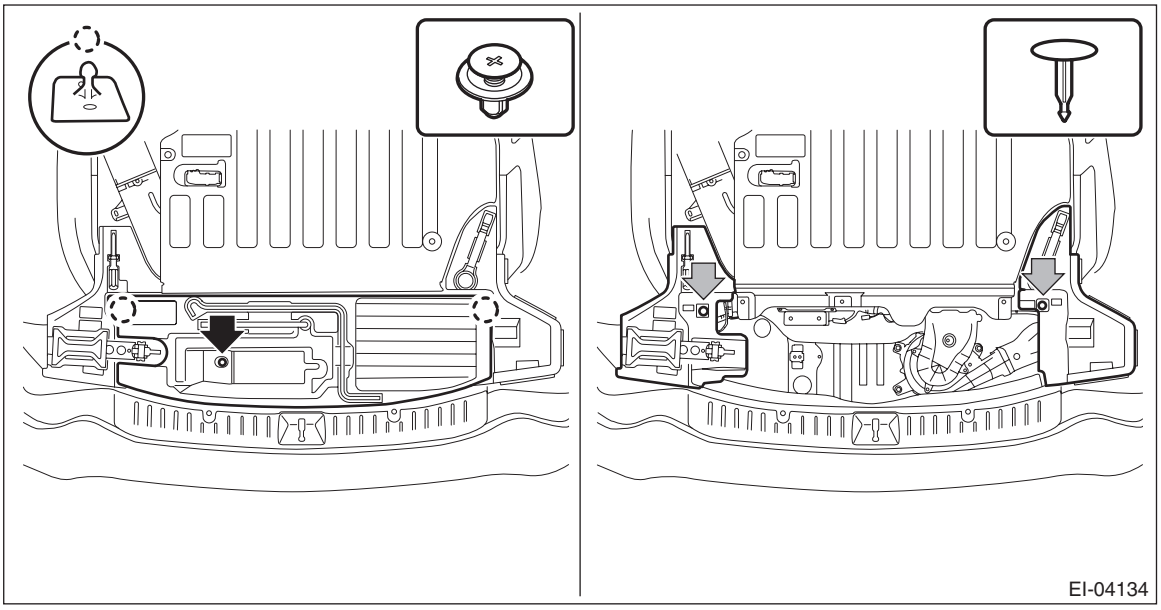
CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the side sill cover - rear INN.



6) Remove the mat - rear floor CTR and the spacer - rear floor side.

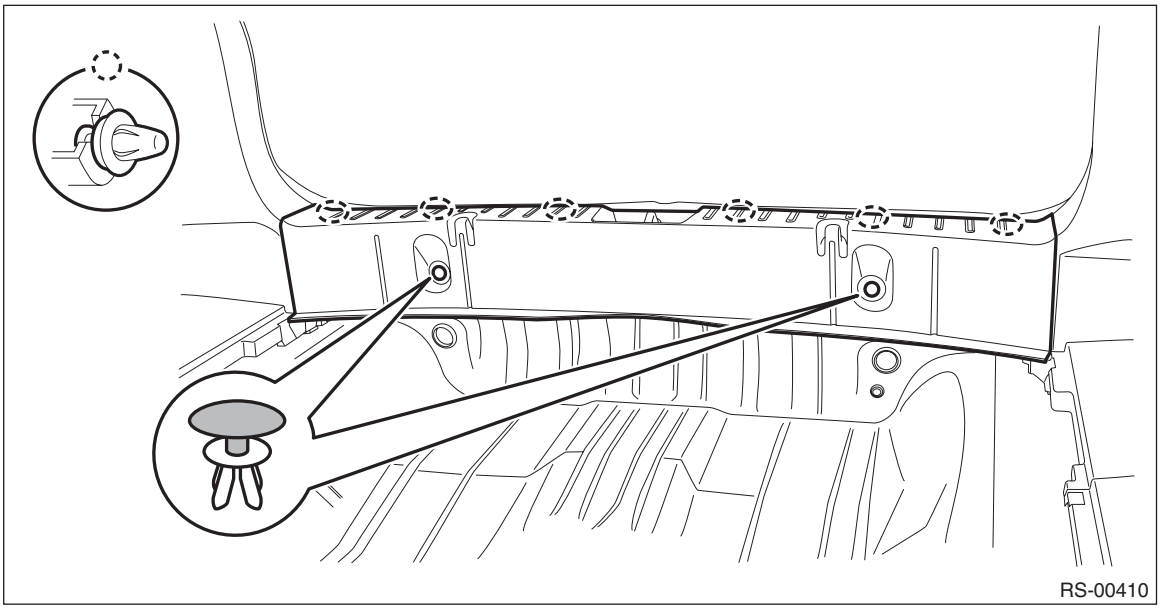


7) Remove the sub-trunk box and side spacers. (HEV model)



(1) Release the clips and side spacers, then detach the sub-trunk box.
(2) Remove the clips and detach the side spacers.

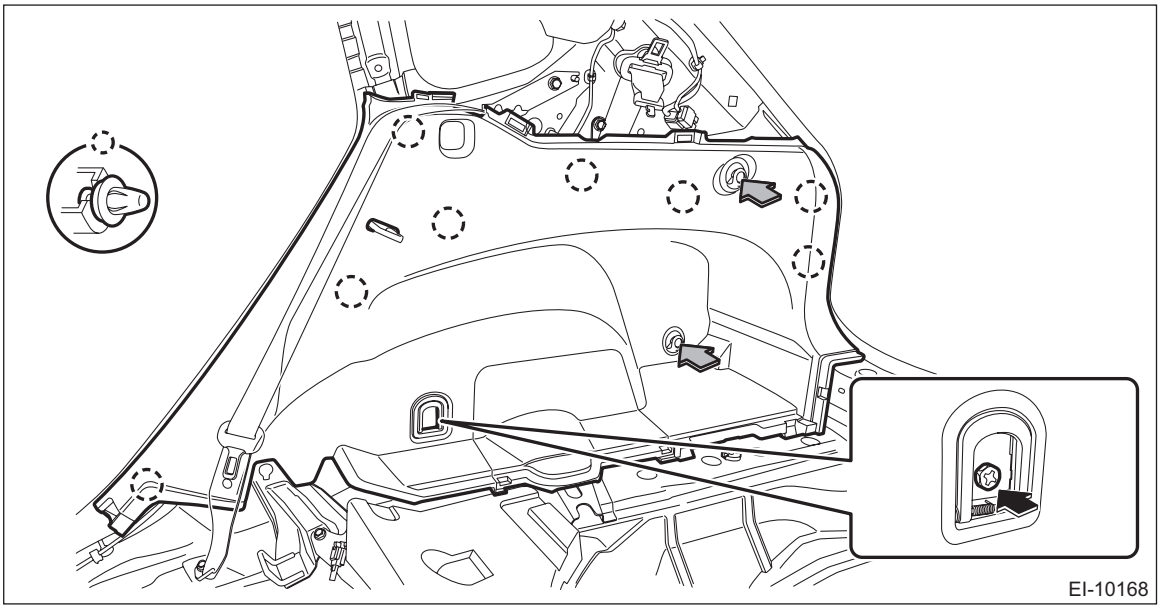
8) Remove the clips, and remove the trim panel - rear skirt.



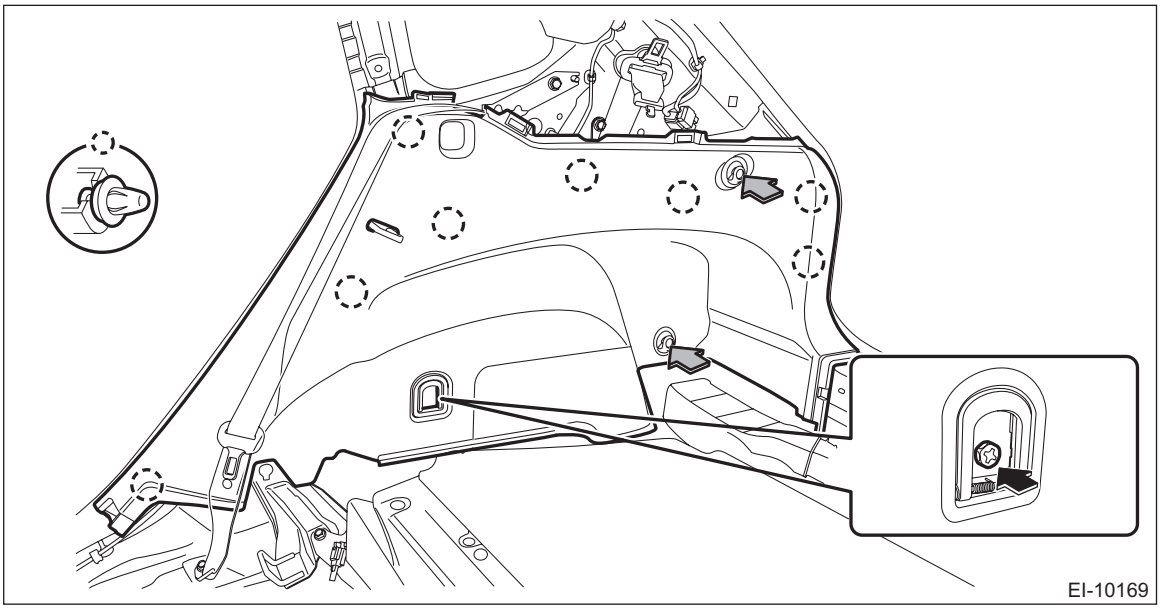
9) Remove the trim panel - rear apron. (On the side where the curtain airbag sensor is removed)
   (1) Remove the caps, and remove the bolts.
   (2) Remove the screws.
   (3) Disengage the clips, and remove the trim panel - rear apron.

NOTE:
For LH side, disconnect the connector of the luggage room light.

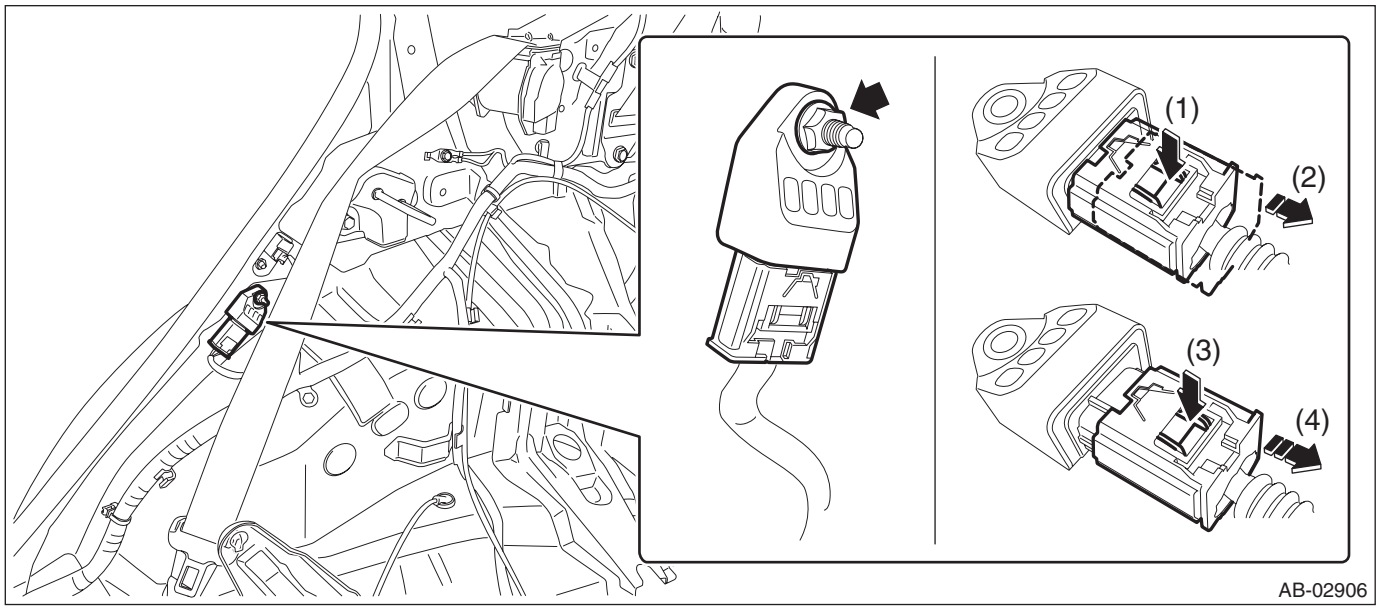
- Gasoline engine model



- HEV model



10) Remove the nuts and then remove the curtain airbag sensor. <Ref. to AB-26, SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR, PROCEDURE, Airbag Connector.>



B: INSTALLATION

CAUTION:
• Do not reuse the bolt and nut.
Always replace with the specified new bolts and nuts.
• When installing the sensor, insert the set pin on the backside of the sensor into the hole on the body side securely.

1) Before installation, inspect the following items and replace any faulty part with a new one.
- Curtain airbag sensor or connector is damaged.
- Curtain airbag module has been activated.

2) Install each part in the reverse order of removal.

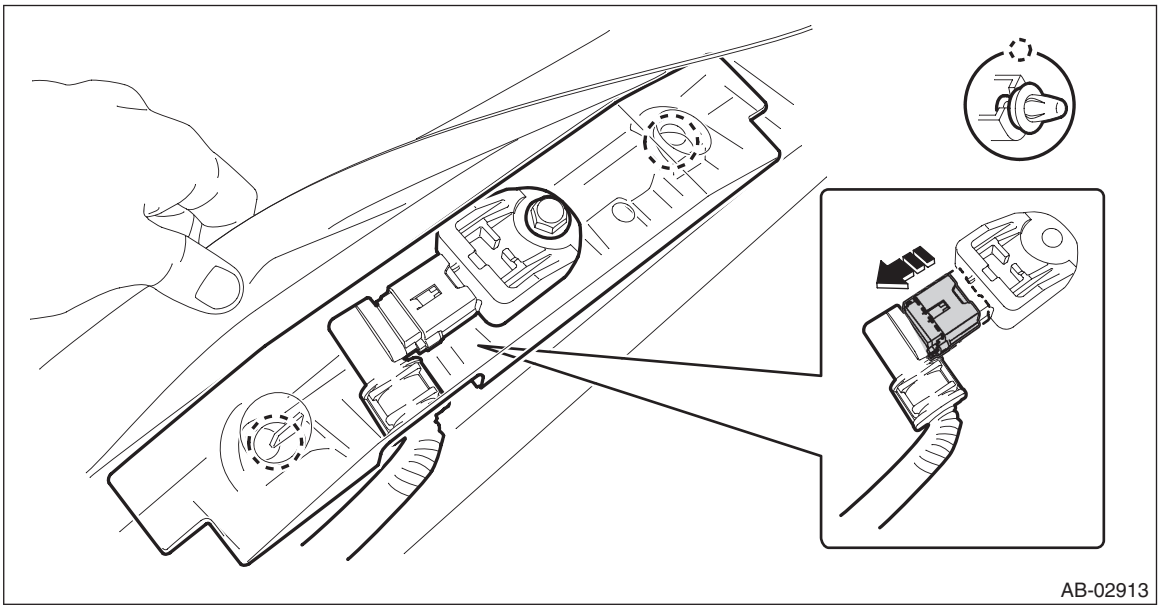
Tightening torque:
Curtain airbag sensor: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

14.Satellite Safing Sensor

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the satellite safing sensor.
   (1) Remove the clip, and remove the cover - satellite safing.
   (2) Remove the bolts and then remove the satellite safing sensor. <Ref. to AB-24, FRONT DOOR IMPACT SENSOR AND SATELLITE SAFING SENSOR, PROCEDURE, Airbag Connector.>



B: INSTALLATION

CAUTION:
• Do not reuse the bolt and nut.
Always replace with the specified new bolts and nuts.
• When installing the cover - satellite safing, push the cover securely until it contacts the floor panel.
• If the cover - satellite safing is too loose at its mounting portion to remove easily, replace with a new cover - satellite safing.
• After installing the cover - satellite safing, make sure that the sensor harness does not get caught.
1) Before installation, inspect the following items and replace any faulty part with a new one.
- The satellite safing sensor connector is damaged.
- The cover - satellite safing is damaged.
- Side airbag or curtain airbag has been activated.

2) Install the remaining parts in the reverse order of removal.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

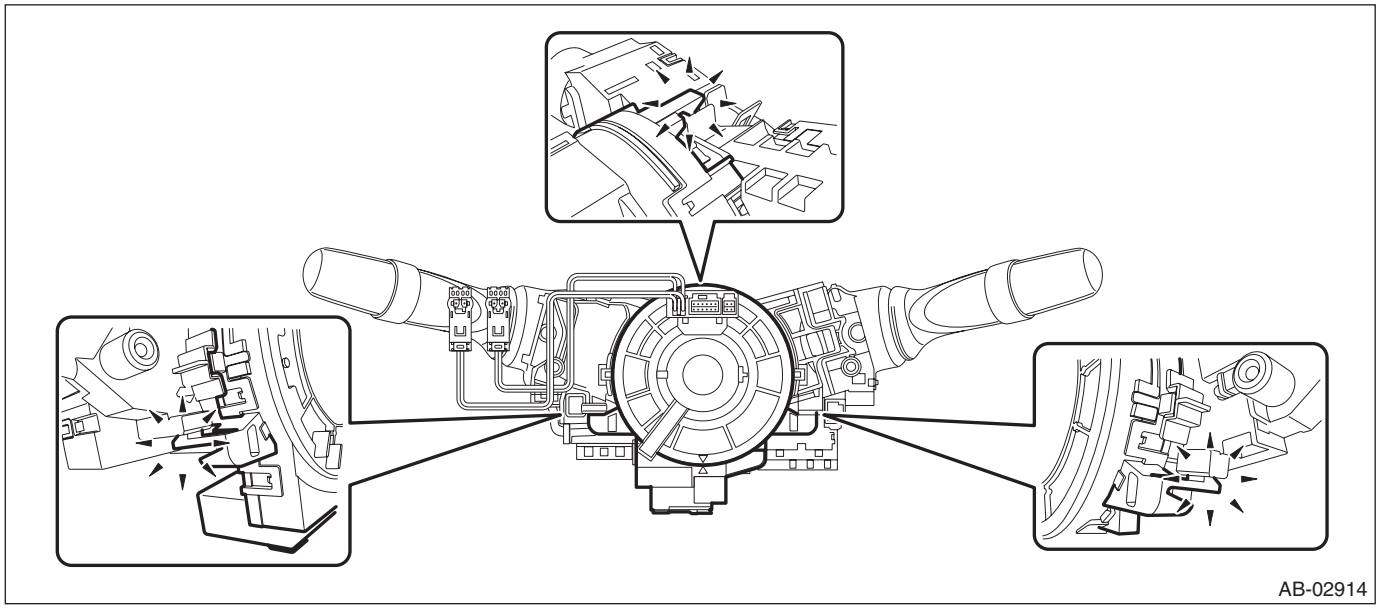
15.Roll Connector

A: REMOVAL

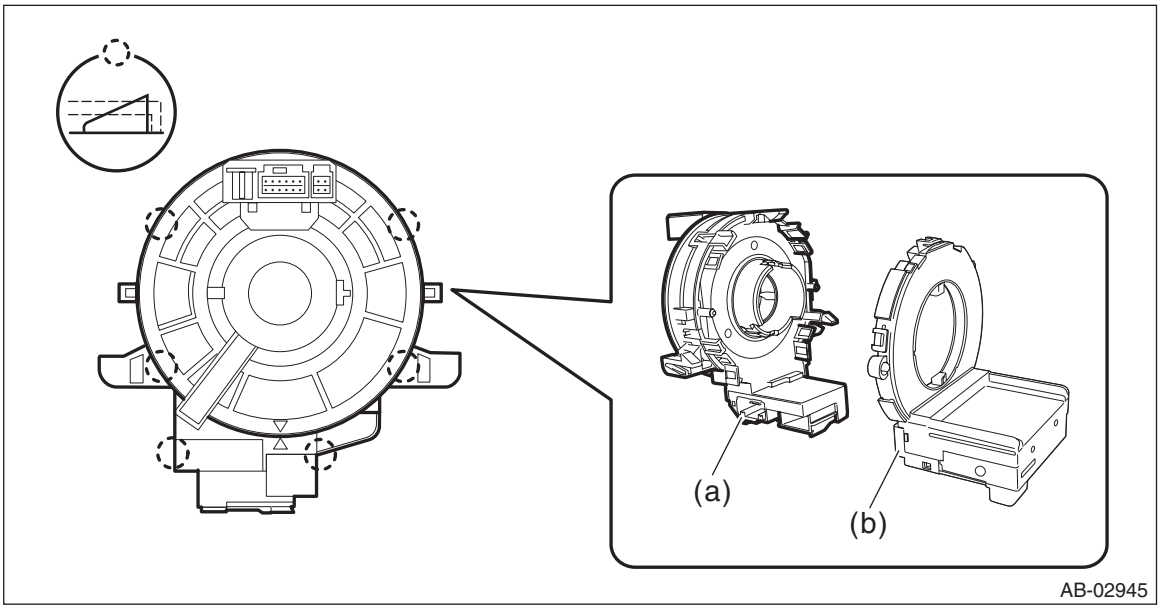
CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Position the front wheels straight ahead.
2) Turn the ignition switch to OFF.
3) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
4) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
5) Remove the steering wheel. <Ref. to PS-9, REMOVAL, Steering Wheel.>
6) Remove the cover assembly - column. <Ref. to PS-21, REMOVAL, Steering Column.>
7) Remove the roll connector.

CAUTION:
Make sure that the roll connector is not turned from the original position.
(1) Disconnect the connector under the roll connector.
(2) Release the claws and remove the roll connector.


AB-02914

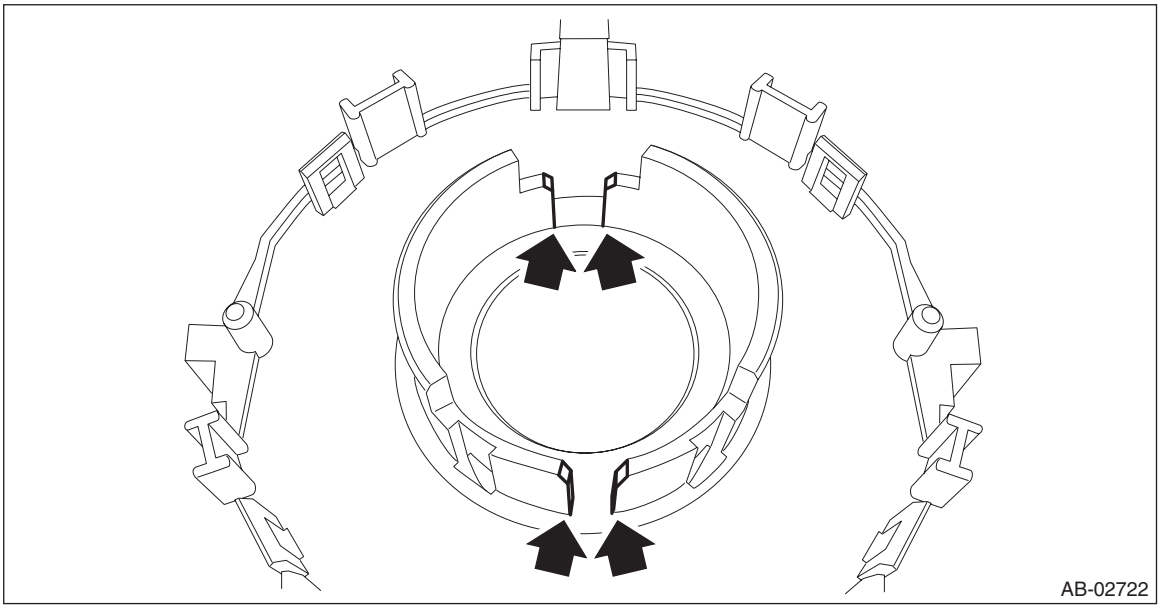
(3) Release the claws and separate the roll connector (a) and steering angle sensor (b).



B: INSTALLATION

CAUTION:
If the steering wheel and steering angle sensor (steering roll connector) are removed, perform the following operations.
- **Align the center position of the steering roll connector.**
- **Perform the neutral position setting of the steering angle sensor.**

1) Before attaching a new roll connector, apply a thin coat of grease contained in the connector onto the areas shown by the arrows.



2) Install each part in the reverse order of removal.
3) Align the center position of the steering roll connector. <Ref. to AB-72, ADJUSTMENT, Roll Connector.>
4) Install the steering wheel. <Ref. to PS-10, INSTALLATION, Steering Wheel.>
5) Install the driver's airbag module. <Ref. to AB-40, INSTALLATION, Driver's Airbag Module.>
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
7) Perform the neutral position setting of the steering angle sensor. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

C: INSPECTION

1. VISUAL INSPECTION

Check for the following, and replace the damaged parts with new parts.
- Combination switch is cracked or deformed.
- Roll connector is cracked or deformed.

2. UNIT INSPECTION OF ROLL CONNECTOR

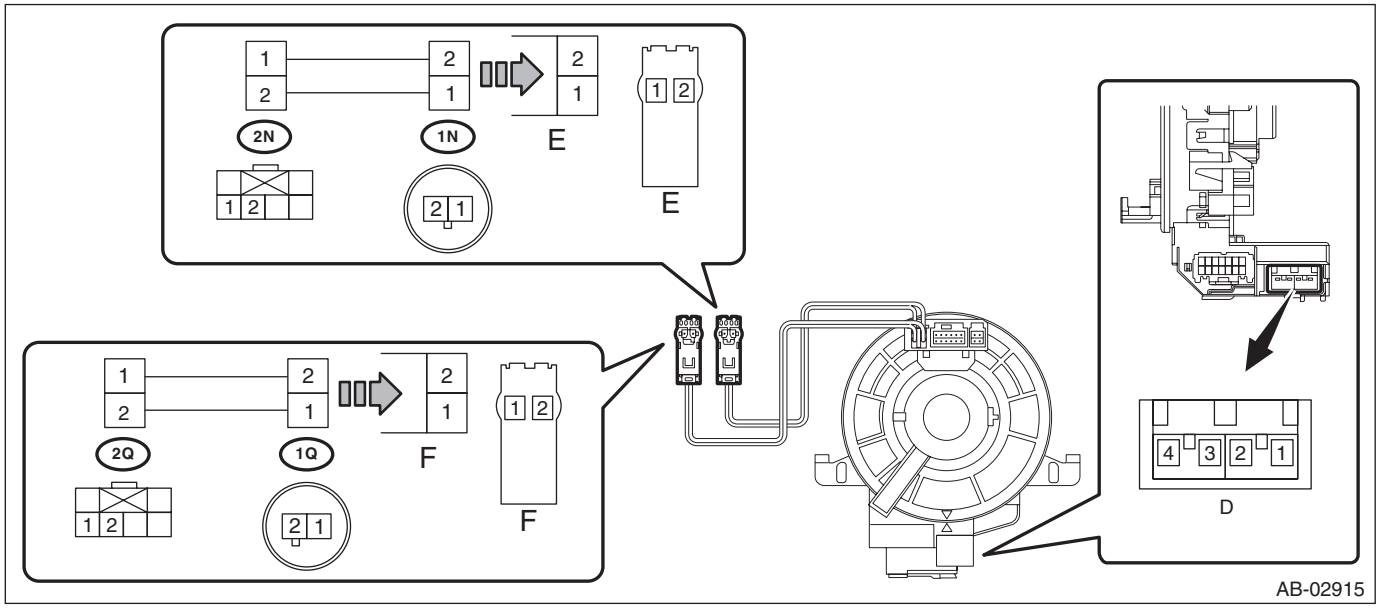
CAUTION:
• Do not rotate the roll connector to more than the specified number of turns. Otherwise, the roll connector internal wire may be broken.
• When determining the end stop, rotate the connector slowly without applying excessive force. Applying excessive force at the end stop may break the internal wire.

1) Adjust the roll connector. <Ref. to AB-72, ADJUSTMENT, Roll Connector.>
2) Set the roll connector to the central position.
3) Connect the test harness to the connector E and connector F.

Preparation tool:
Test harness N (98299SA000)
Test harness Q (98299SA040)
- Connector E - Test harness N (1N)
- Connector F - Test harness Q (1Q)

4) With the following conditions, check the resistance between the test harness connector terminals.
- Perform the check with the roll connector centered (front wheels direct straightforward).
- Rotate the roll connector counterclockwise from the center (front wheels direct straightforward) to an end stop. Then, perform the check while rotating it clockwise to approximately 4.5 turns.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
(2N) No. 1 — (2N) No. 2	Always	Less than 1 Ω
(2Q) No. 1 — (2Q) No. 2	Always	Less than 1 Ω

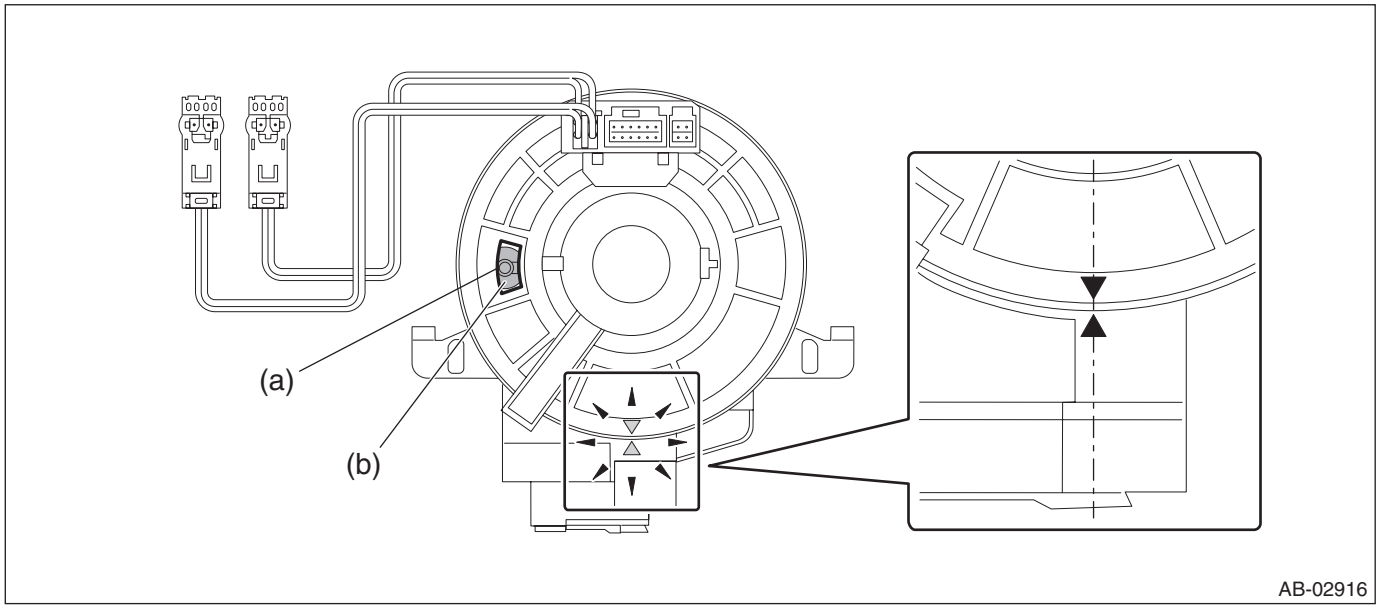
NOTE:
The connector D is designed to short the terminals D1/D2 and D3/D4 when disconnected.

5) Replace the roll connector with a new part if the inspection result is not within the standard value.

D: ADJUSTMENT

CAUTION:
• Do not rotate the roll connector to more than the specified number of turns. Otherwise, the roll connector internal wire may be broken.
• When determining the end stop, rotate the connector slowly without applying excessive force. Applying excessive force at the end stop may break the internal wire.
1) Check that front wheels are positioned in straight ahead direction.
2) Rotate the roll connector counterclockwise until it stops.
3) Rotate the roll connector clockwise approx. 2.5 turns until "▲" marks are aligned.

NOTE:
When the roll connector comes to the center position, the orange roller (b) can be seen from the sight glass (a).



16.Airbag Module Disposal (Deployment Processing on Vehicle)

A: PROCEDURE

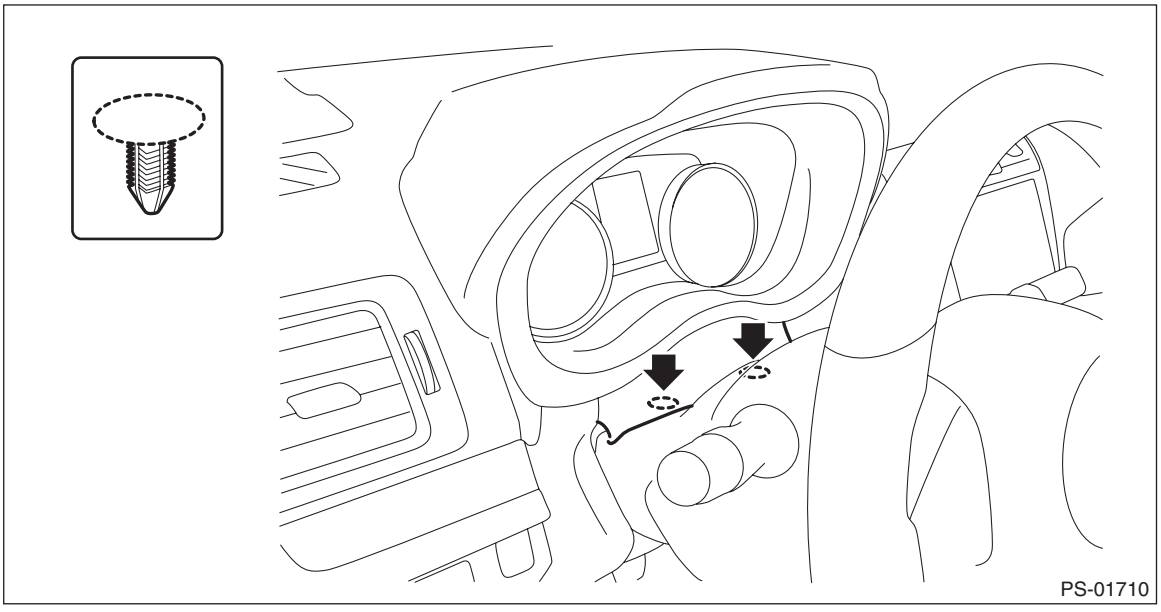
WARNING:
Make sure to follow the instructions below. Otherwise, personal injuries may occur.
• Before discarding an airbag module, always perform an operation process to prevent any false activation.
• Wear protective gloves, safety goggles and earplugs during this operation. Wash your hands afterwards.
• Do not touch the airbag module just after activation because it is very hot. Before handling it for disposal, wait for 40 minutes.

CAUTION:
• Airbag module operation process should be performed on a flat place in safety area. Do not perform the process outdoors when there is rain or strong wind.
• Activating an airbag module causes a high explosive noise, be sure to warn people in the area, and do not allow anyone within 5 m (16 ft) radius of the disposal site.
• After activating the airbag module, smoke may arise. Therefore, it must be activated in a well-ventilated place with no smoke detector nearby.
• Do not expose the activated airbag module to water.
• Wrap the activated airbag module in a sealed vinyl bag when discarding.
• If it is impossible to perform an airbag module operation process due to some situational reasons, consult SUBARU dealership or one of the authorized workshops.

1. DRIVER'S AIRBAG MODULE

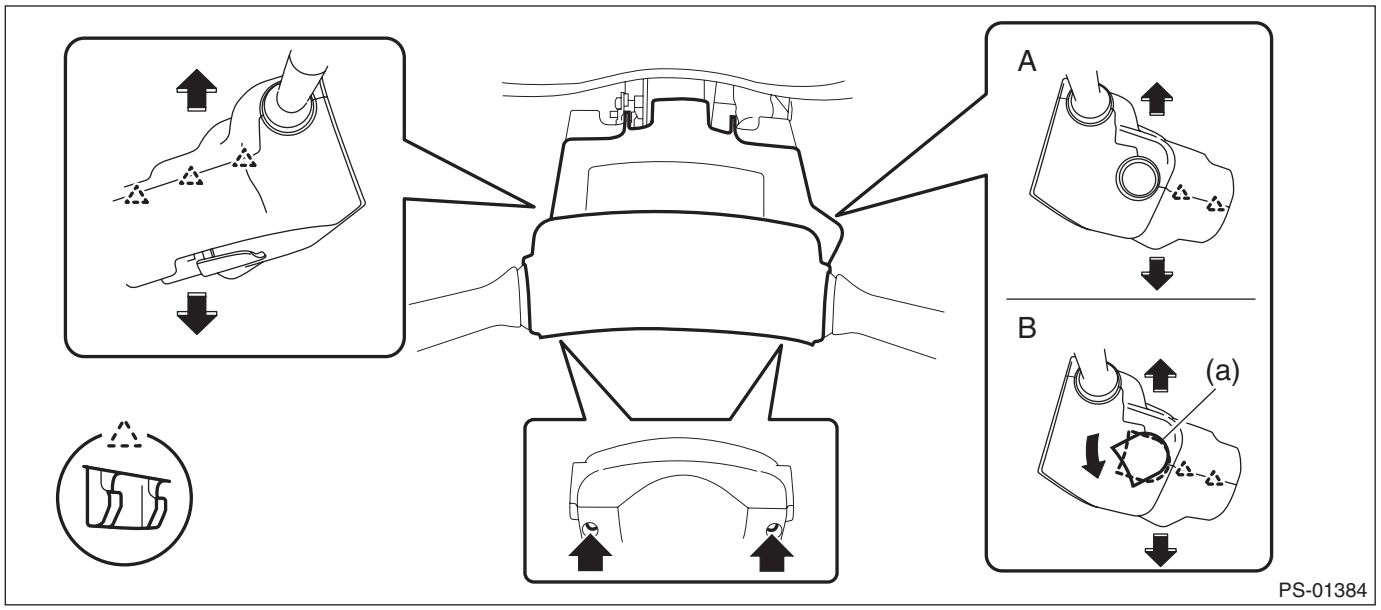
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the cover assembly - column.
(1) Remove the clips, and remove the cover - column.



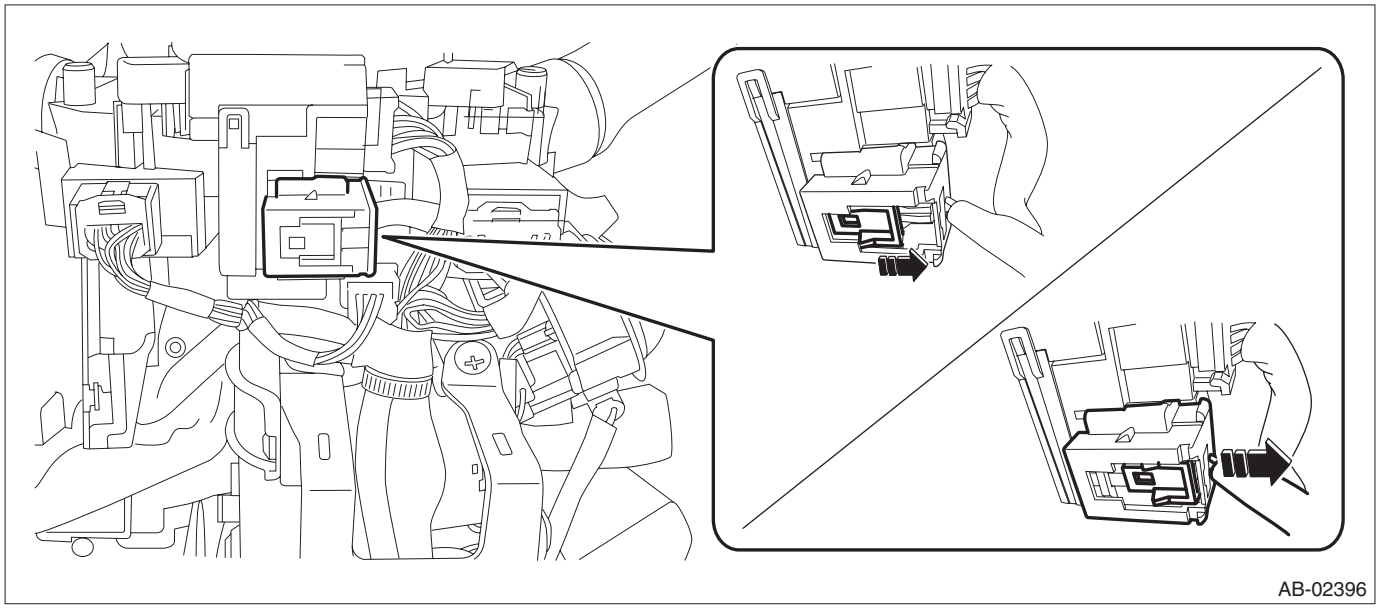
(2) Remove the screws.
(3) Remove the cap - key cylinder (a). (Model with keyless access with push button start)

(4) Release the claw, and remove the cover assembly - column UPR and the cover assembly - column LWR.



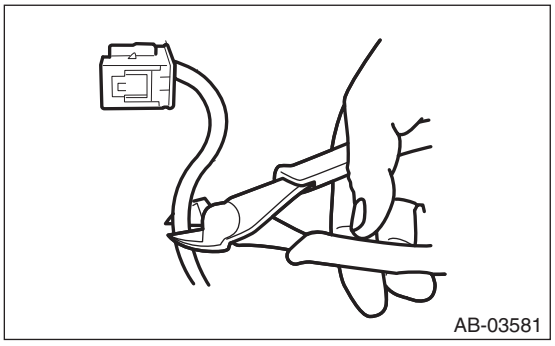
A	Model without keyless access with push button start	B	Model with keyless access with push button start

4) Disconnect the driver's airbag module connector.



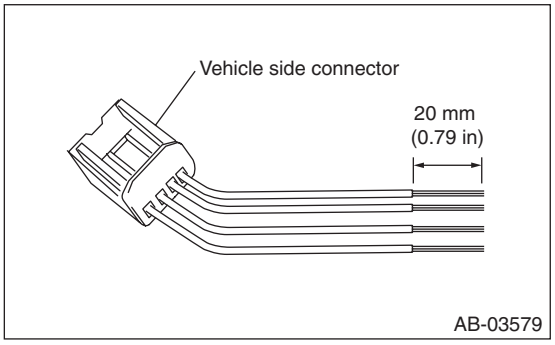
5) Cut off the harness on the body side of the removed connector approx. 70 mm (2.76 in) from the edge of the connector.

Preparation tool:
Nippers

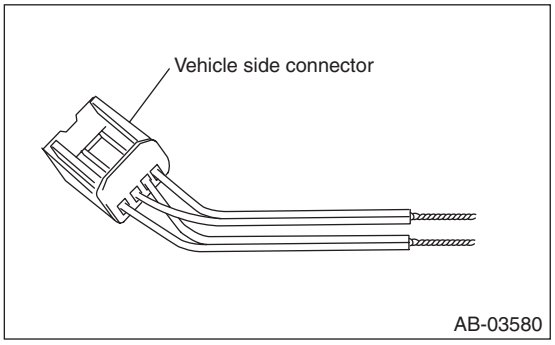


6) Peel off the shield approx. 20 mm (0.79 in) from the two harnesses of the removed body side connector.

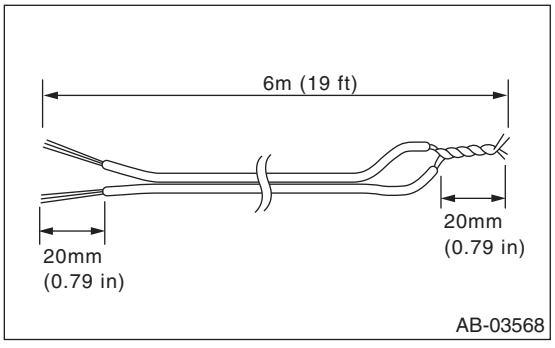
Preparation tool:
Wire stripper



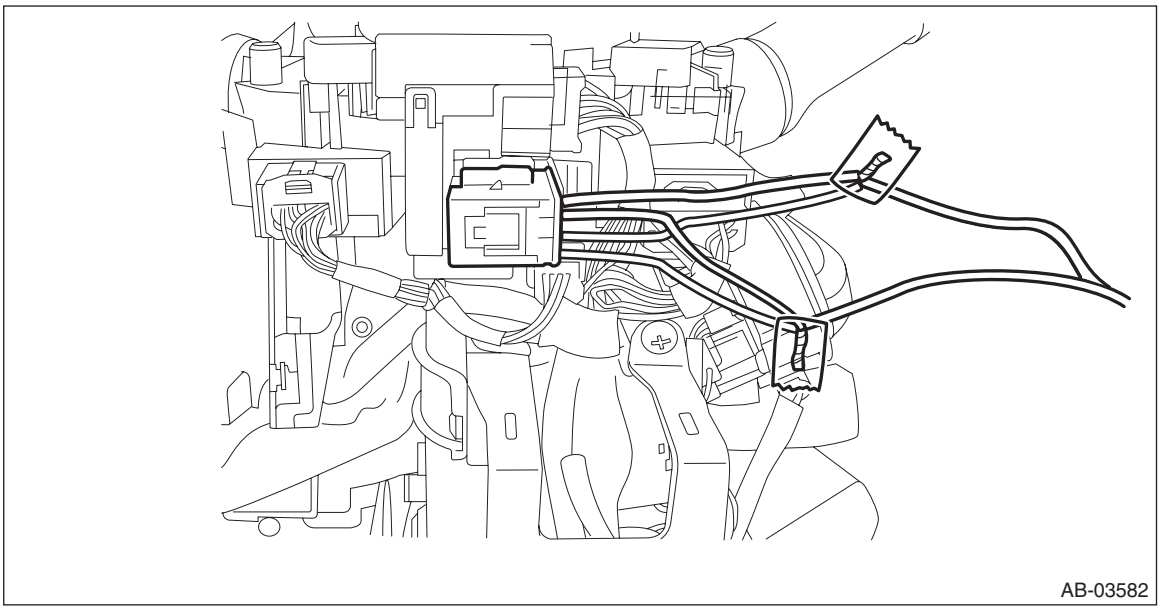
7) Twist the end of harness as shown in the figure.



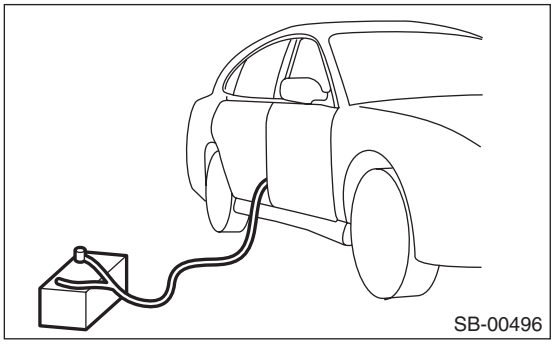
8) Prepare a six-meter (19 ft) long vinyl-shielded parallel wire. Peel off the shield of both ends approx. 20 mm (0.79 in) and twist one end together into shorted condition.
9) The other end, not shorted, will be connected to harnesses of repaired body connector as shown in the figure, and insulated with vinyl tape.



NOTE:
No concern about polarity.
10) After completing the connecting work, connect the body side connector to the connector of the airbag connector lower side again.

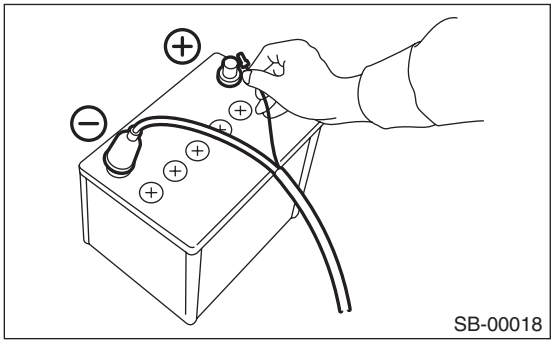


11) Bring the vinyl wire for operation out of the vehicle and make sure there is no person in the vehicle.
12) Extend the wiring of airbag deployment tool to the limit, and close all the windows and sunroof completely.

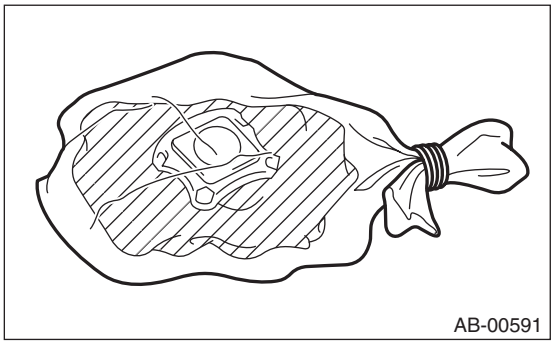


13) Move the battery at least 5 m (16 ft) from the vehicle, and confirm safety in the area.
14) Connect the airbag deployment tool alligator clip to the battery negative (–) terminal.
15) Connect the other cable of airbag deployment tool to the battery positive (+) terminal, and activate the airbag module.

CAUTION:
• After activation, the airbag module will be extremely hot. Let it cool down for at least 40 minutes in an area with no one around.
• Do not expose the activated airbag module to water.



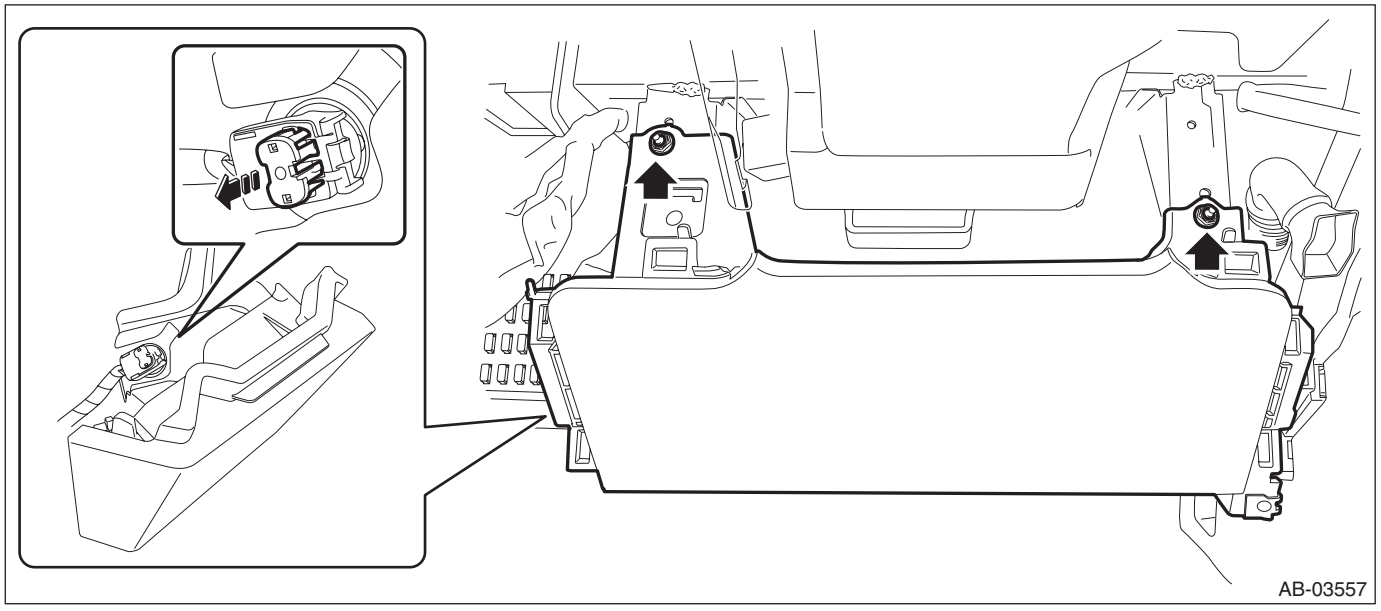
16) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
17) Place the activated airbag module in a sealed vinyl bag, then discard.



2. KNEE AIRBAG MODULE

1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
4) Remove the nuts to remove the knee airbag module and disconnect the harness connector. <Ref. to AB-22, DRIVER'S AIRBAG MODULE, CURTAIN AIRBAG MODULE & PRETENSIONER, PROCEDURE, Airbag Connector.>



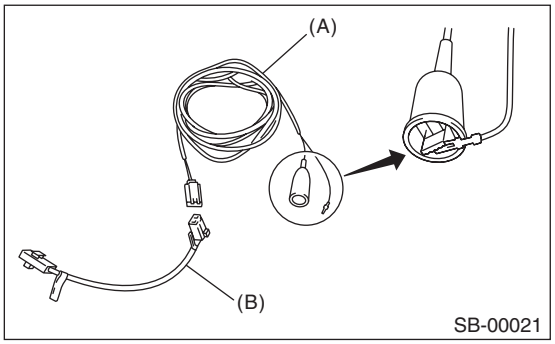
5) Short the terminal to the alligator clip furnished as airbag deployment tool.

CAUTION:
The airbag deployment tool should be kept shorted on the terminals until just before activation of airbag module.

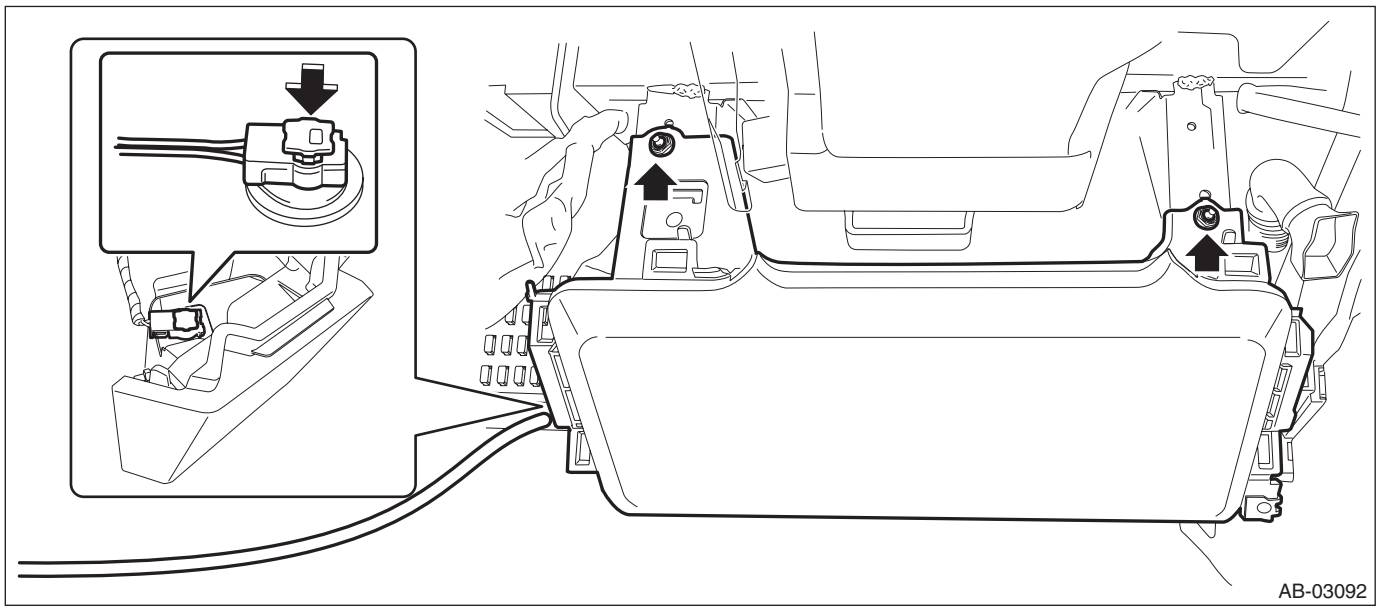
Preparation tool:
ST: AIRBAG DEPLOYMENT TOOL (98299PA030)

6) Connect the airbag deployment tool (A) and test harness adapter D (B).

Preparation tool:
ST: TEST HARNESS ADAPTER D (98299SA010)

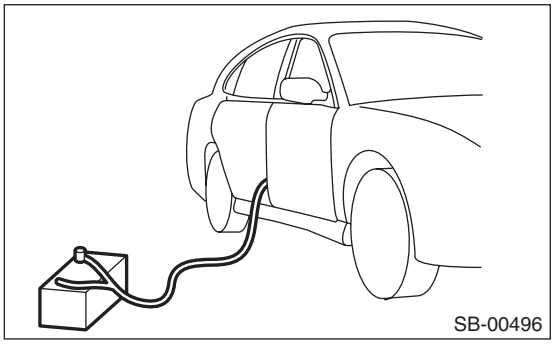


7) Connect the test harness adapter D to the knee airbag module and install the knee airbag module to the vehicle again.



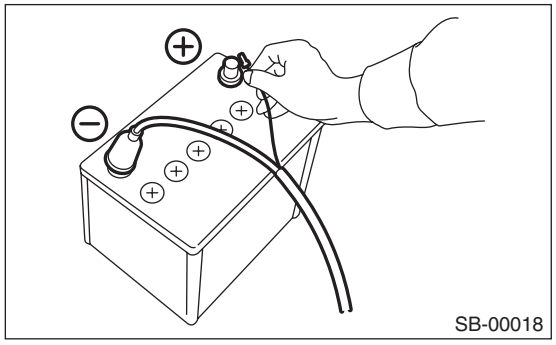
Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

8) Make sure there is no one inside the vehicle.
9) Extend the wiring of airbag deployment tool to the limit, and close all the windows and sunroof completely.

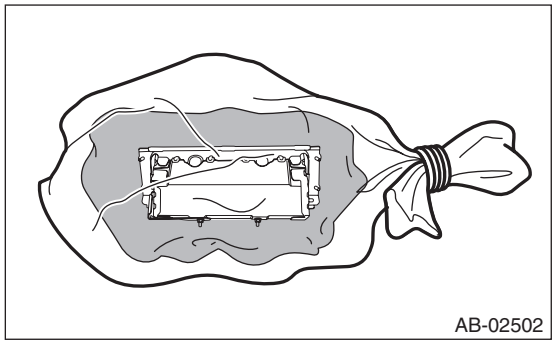


10) Move the battery at least 5 m (16 ft) from the vehicle, and confirm safety in the area.
11) Connect the airbag deployment tool alligator clip to the battery negative (–) terminal.
12) Connect the other cable of airbag deployment tool to the battery positive (+) terminal, and activate the airbag module.

CAUTION:
• After activation, the airbag module will be extremely hot. Let it cool down for at least 40 minutes in an area with no one around.
• Do not expose the activated airbag module to water.


SB-00018

13) Remove the bolts and remove knee airbag module.
14) Place the activated airbag module in a sealed vinyl bag, then discard.

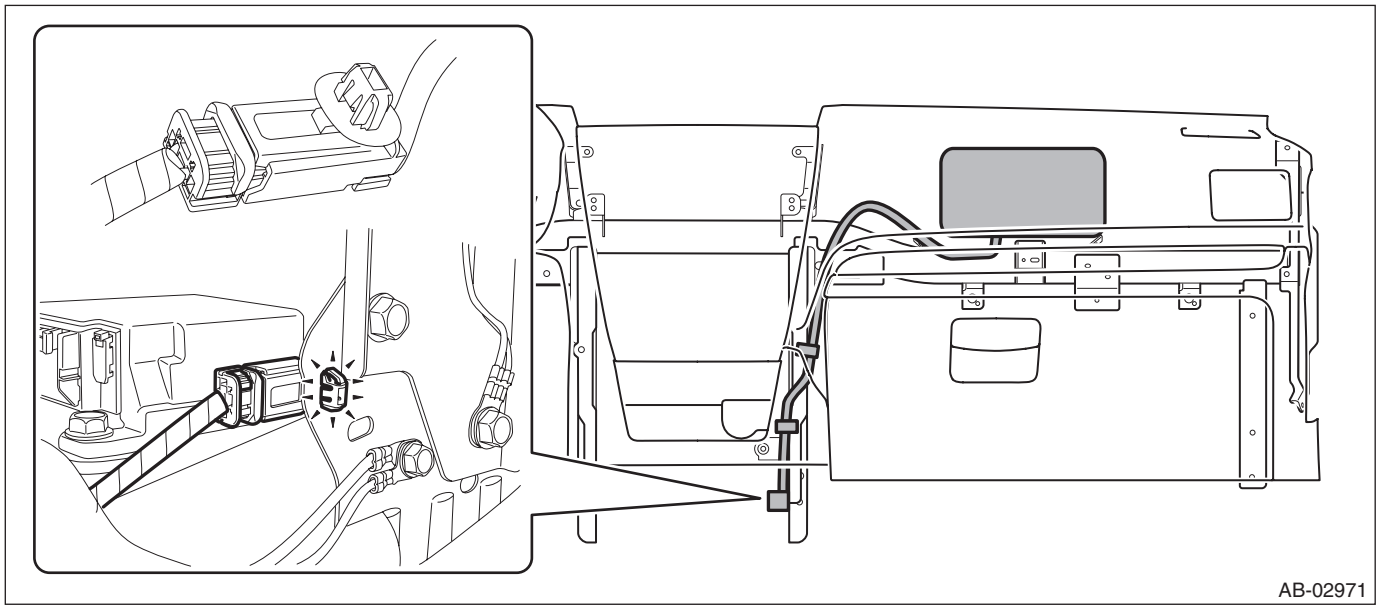

AB-02502

NOTE:
When necessary, fold the fabric part of airbag into three or four sections, rope and seal in a vinyl bag.

3. PASSENGER'S AIRBAG MODULE

1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the cover - shift lever, the panel center LWR RH, and the console box assembly. <Ref. to EI-77, REMOVAL, Console Box.>
4) Disconnect the passenger's airbag module connector.

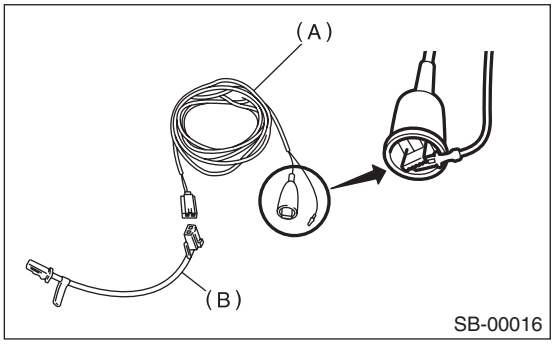


5) Short the terminal to the alligator clip furnished as airbag deployment tool.

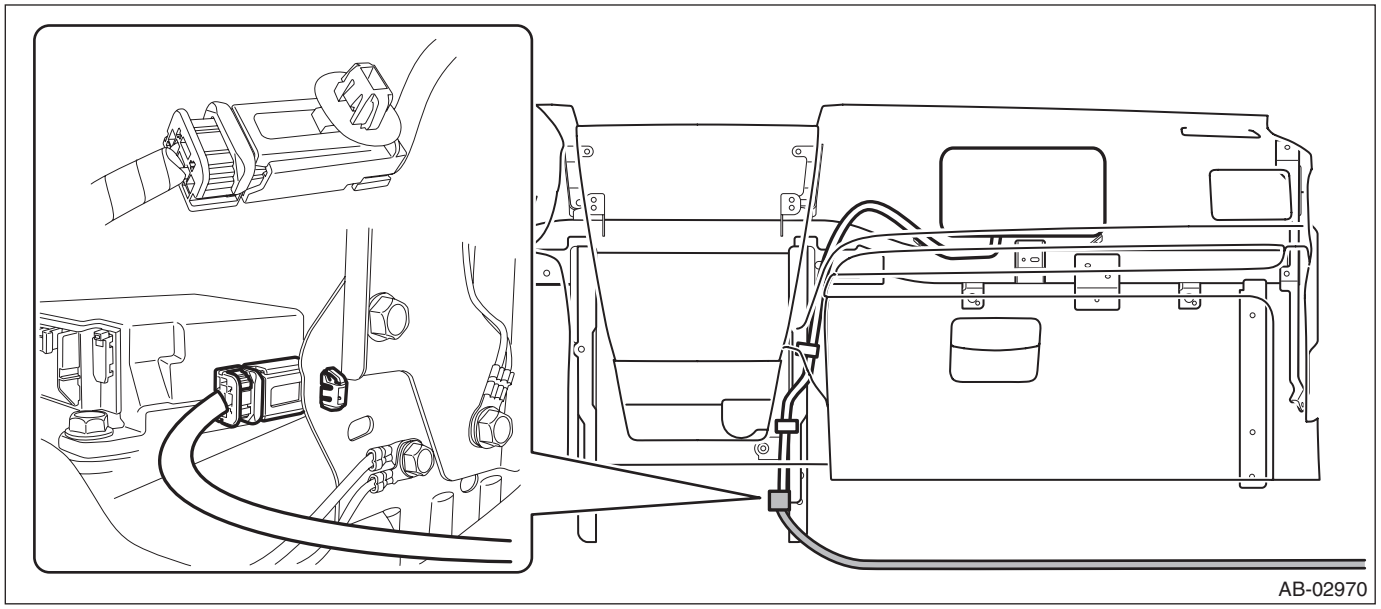
CAUTION:
The airbag deployment tool should be kept shorted on the terminals until just before activation of airbag module.

Preparation tool:
ST: AIRBAG DEPLOYMENT TOOL (98299PA030)
6) Connect airbag deployment tool (A) and test harness adapter AM (B).

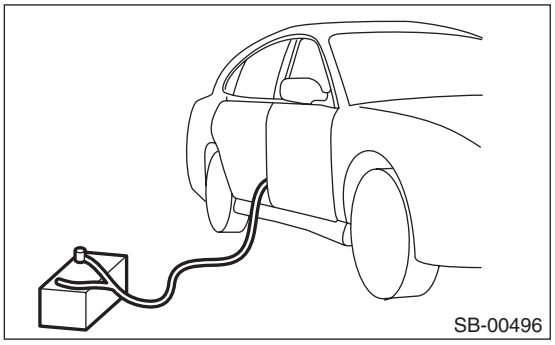
Preparation tool:
ST: TEST HARNESS ADAPTER AM (98299FJ000)



7) Connect test harness adapter AM to airbag connector.

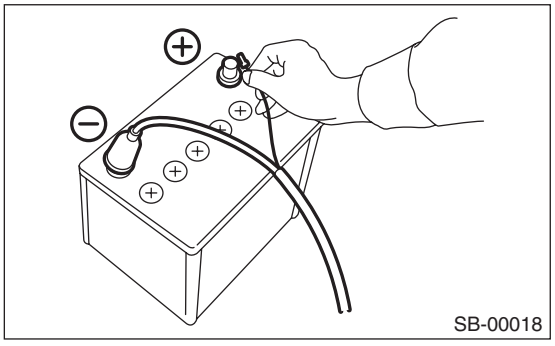


8) Make sure there is no one inside the vehicle.
9) Extend the wiring of airbag deployment tool to the limit, and close all the windows and sunroof completely.



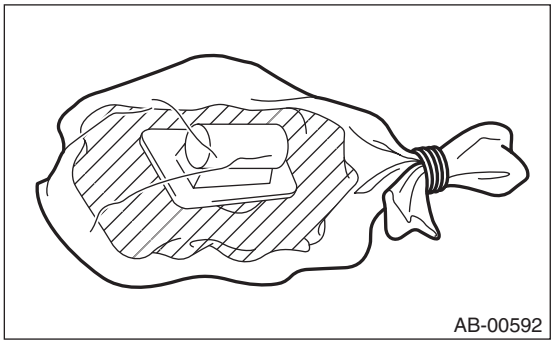
10) Move the battery at least 5 m (16 ft) from the vehicle, and confirm safety in the area.
11) Connect the airbag deployment tool alligator clip to the battery negative (–) terminal.
12) Connect the other cable of airbag deployment tool to the battery positive (+) terminal, and activate the airbag module.

CAUTION:
• After activation, the airbag module will be extremely hot. Let it cool down for at least 40 minutes in an area with no one around.
• Do not expose the activated airbag module to water.



13) Remove the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>

14) Place the activated airbag module in a sealed vinyl bag, then discard.



4. SIDE AIRBAG MODULE

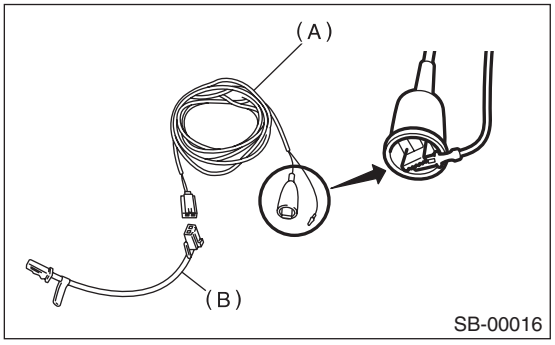
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Disconnect the side airbag module connector under the front seat cushion. <Ref. to AB-27, SIDE AIRBAG MODULE, PROCEDURE, Airbag Connector.>
4) Adjust both the front seat and front seat backrest to the center positions.
5) Short the terminal to the alligator clip furnished as airbag deployment tool.

CAUTION:
The airbag deployment tool should be kept shorted on the terminals until just before activation of airbag module.

Preparation tool:
ST: AIRBAG DEPLOYMENT TOOL (98299PA030)
6) Connect the airbag deployment tool (A) and test harness adapter K (B).

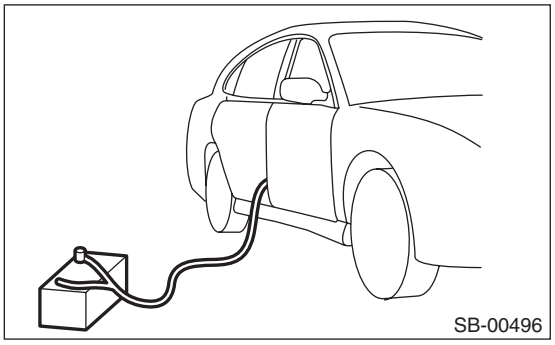
Preparation tool:
ST: TEST HARNESS ADAPTER K (98299FG010)



7) Connect the test harness adapter K to side airbag module connector (yellow).

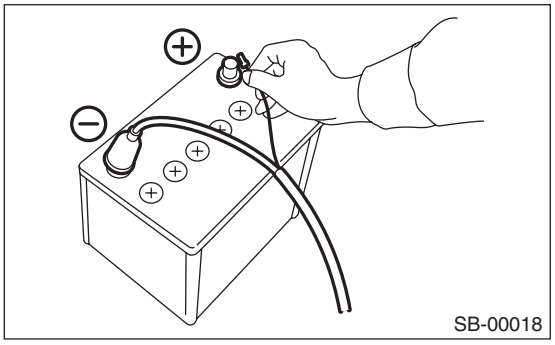
CAUTION:
Do not place any object on front seat.
8) Make sure there is no one inside the vehicle.

9) Extend the wiring of airbag deployment tool to the limit, and close all the windows and sunroof completely.

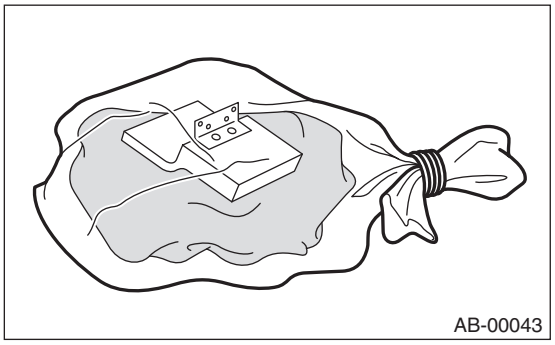


10) Move the battery at least 5 m (16 ft) from the vehicle, and confirm safety in the area.
11) Connect the airbag deployment tool alligator clip to the battery negative (–) terminal.
12) Connect the other cable of airbag deployment tool to the battery positive (+) terminal, and activate the airbag module.

CAUTION:
• After activation, the airbag module will be extremely hot. Let it cool down for at least 40 minutes in an area with no one around.
• Do not expose the activated airbag module to water.



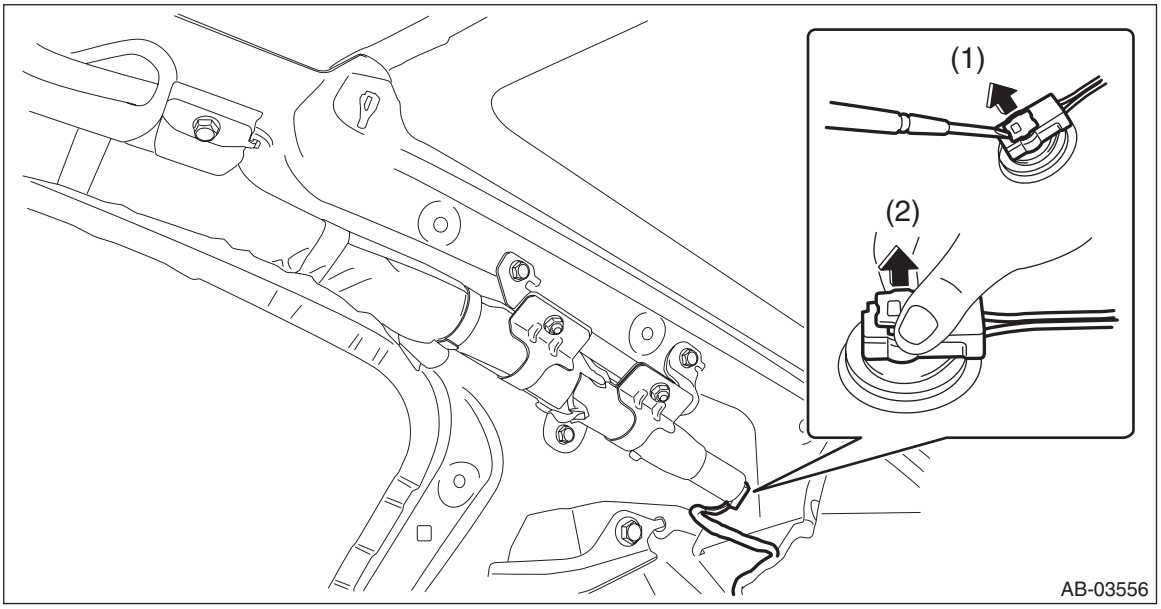
13) Remove the side airbag module. <Ref. to AB-48, REMOVAL, Side Airbag Module.>
14) Place the activated airbag module in a sealed vinyl bag, then discard.



5. CURTAIN AIRBAG MODULE

1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the roof trim. <Ref. to EI-109, REMOVAL, Roof Trim.>
4) Disconnect the curtain airbag harness. <Ref. to AB-19, PROCEDURE, Airbag Connector.>

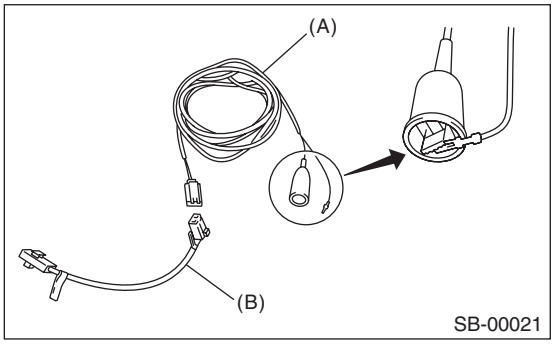


5) Short the terminal to the alligator clip furnished as airbag deployment tool.

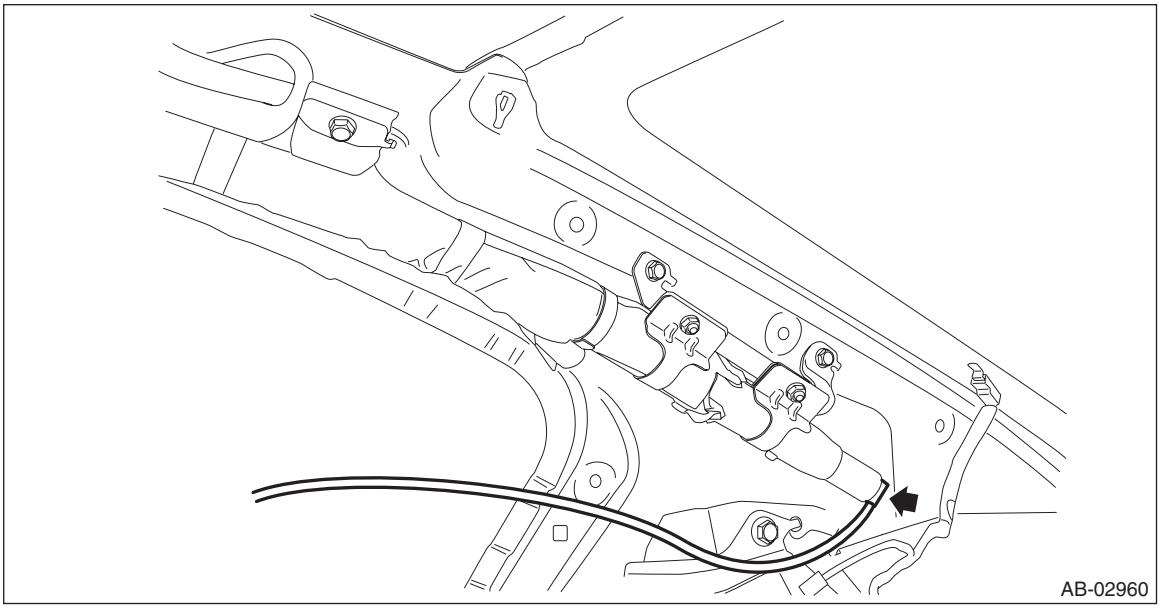
CAUTION:
The airbag deployment tool should be kept shorted on the terminals until just before activation of airbag module.

Preparation tool:
ST: AIRBAG DEPLOYMENT TOOL (98299PA030)
6) Connect the airbag deployment tool (A) and test harness adapter D (B).

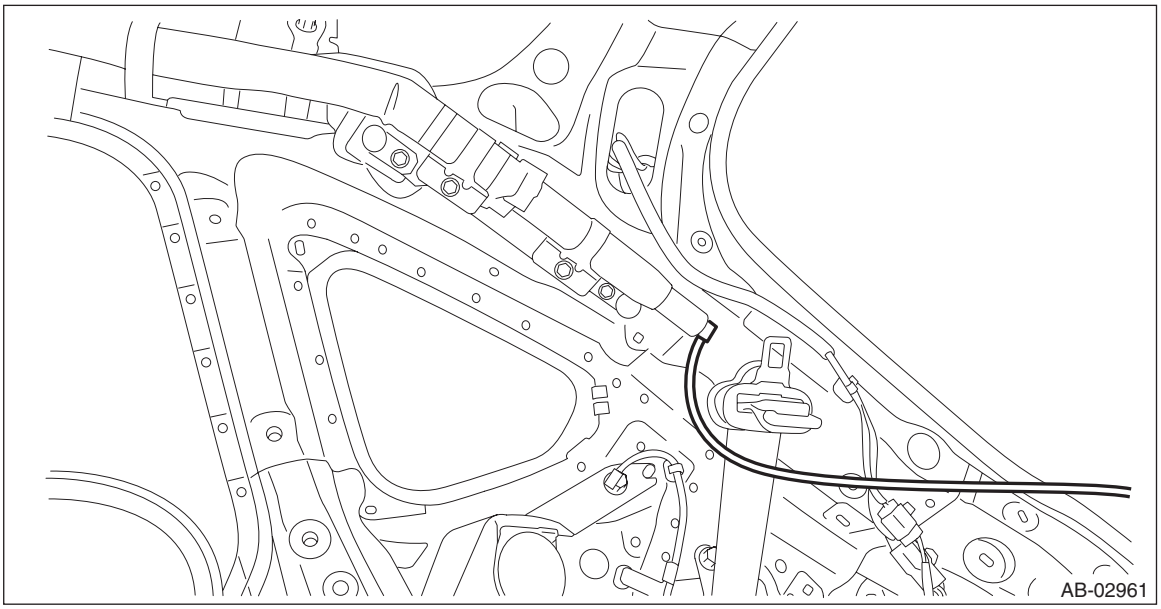
Preparation tool:
ST: TEST HARNESS ADAPTER D (98299SA010)



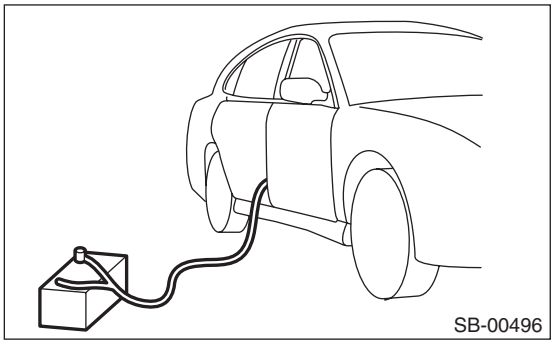
7) Connect the test harness adapter D to the curtain airbag module.
- 4 door model



- 5 door model

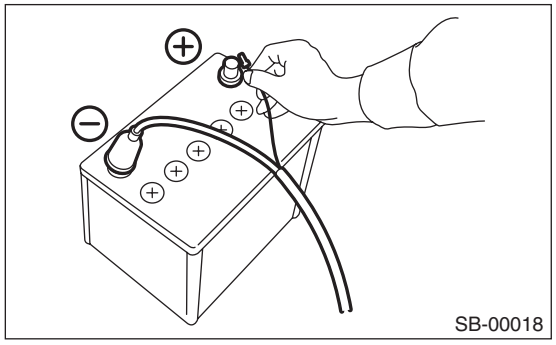


8) Make sure there is no one inside the vehicle.
9) Extend the wiring of airbag deployment tool to the limit, and close all the windows and sunroof completely.

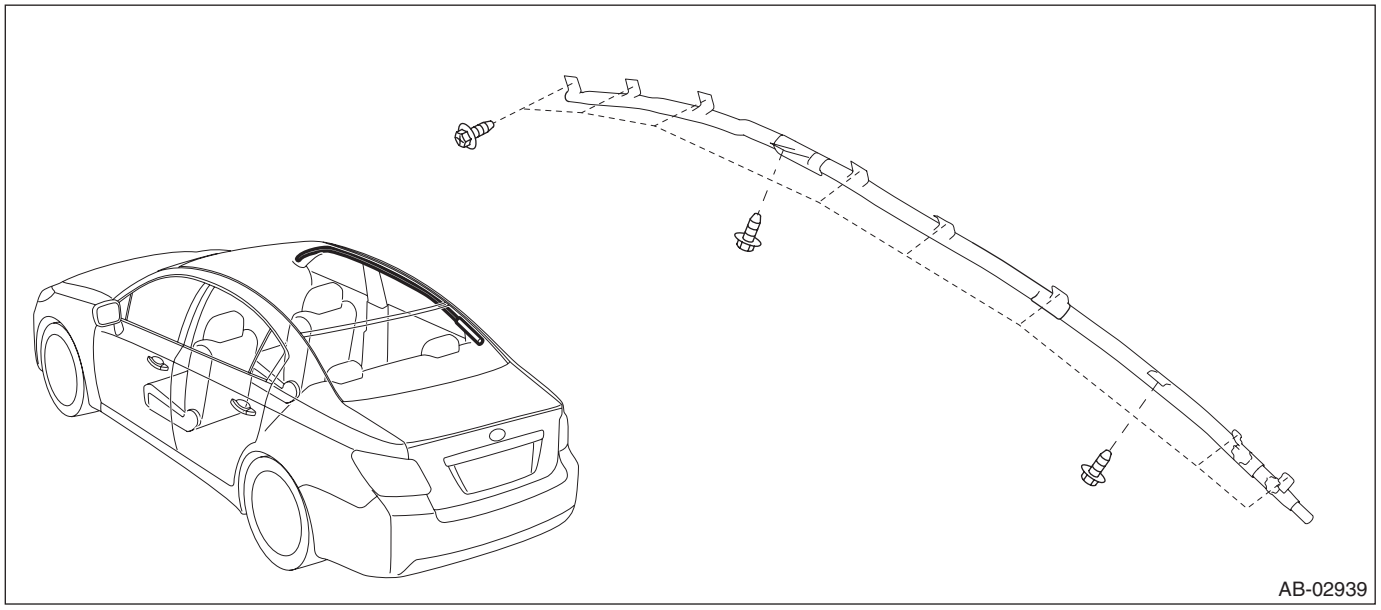


10) Move the battery at least 5 m (16 ft) from the vehicle, and confirm safety in the area.
11) Connect the airbag deployment tool alligator clip to the battery negative (–) terminal.
12) Connect the other cable of airbag deployment tool to the battery positive (+) terminal, and activate the airbag module.

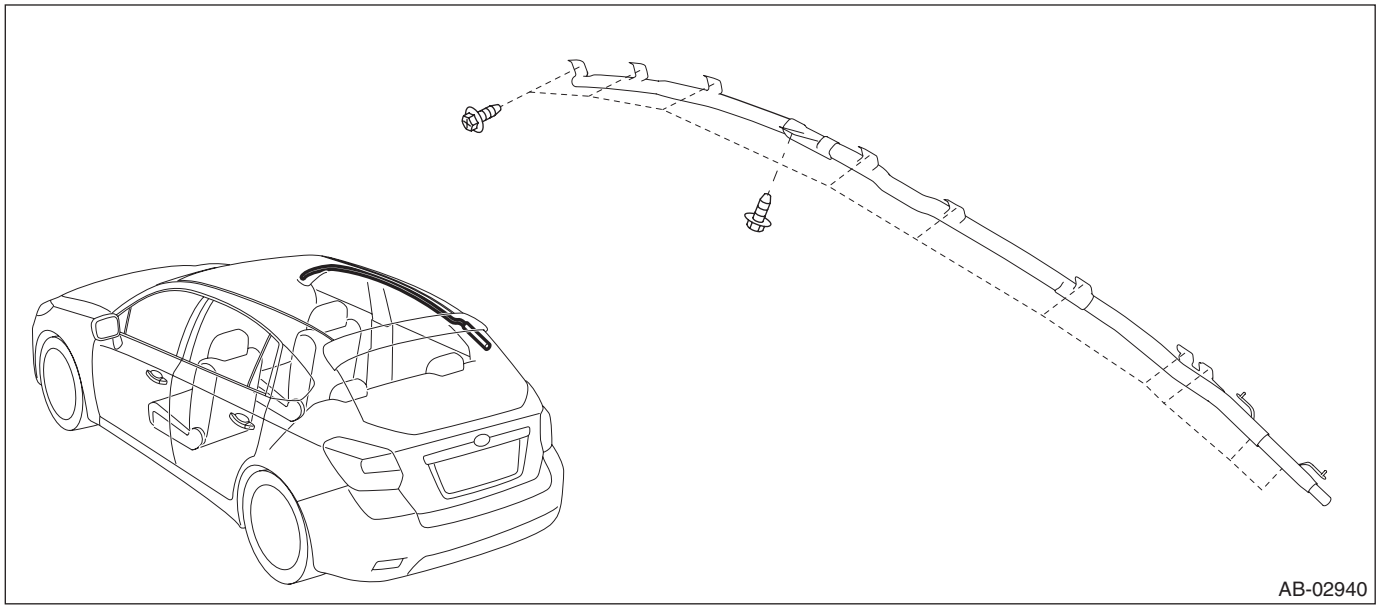
CAUTION:
• After activation, the airbag module will be extremely hot. Let it cool down for at least 40 minutes in an area with no one around.
• Do not expose the activated airbag module to water.



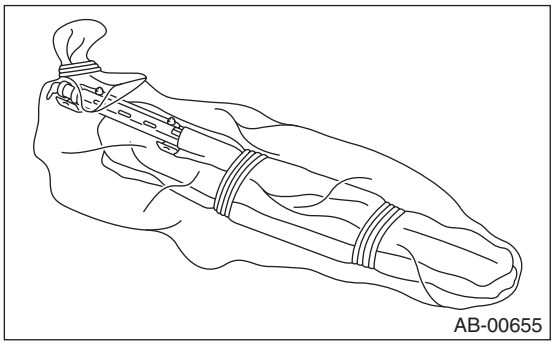
13) Remove the bolts and clips, and remove the curtain airbag module.
• 4 door model



- 5 door model



14) Place the activated airbag module in a sealed vinyl bag, then discard.



NOTE:
When necessary, fold the fabric part of airbag into three or four sections, rope and seal in a vinyl bag.

AIRBAG SYSTEM (DIAGNOSTICS)

AB(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

Step		Check	Yes	No
1	**CHECK WARNING LIGHT.** Check whether the airbag warning light in the combination meter is lit.	Does the airbag warning light illuminate?	Go to step **2**.	Perform the diagnosis according to phenomenon of the problem.
2	**READ DTC.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch to ON and run the Subaru Select Monitor. 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to AB(diag)-24, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.> 5) Record all DTCs, time stamp and freeze frame data. NOTE: For time stamp, refer to “LAN SYSTEM”. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Is DTC displayed?	Go to step **3**.	Go to “Airbag Warning Light Failure” <Ref. to AB(diag)-34, Airbag Warning Light Failure.>.
3	**PERFORM DIAGNOSIS.** 1) Determine the possible cause from “List of Diagnostic Trouble Code (DTC)” <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>. 2) Inspect the DTC using “List of Diagnostic Trouble Code (DTC)”. 3) Repair the trouble cause. 4) Perform the Clear Memory Mode. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read any other DTCs displayed. <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the procedure 1) to 5) in step 3.	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Customer's Name		Inspector's Name	
Date Vehicle Brought in	/ /	Registration No.	
Odometer Reading	km miles	V.I.N.	
Date Problem Occurred	/ /	Registration Year	/ /
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Others:		
Temperature	°C (°F)		
Road Condition	❑ Flat road ❑ Uphill ❑ Downhill ❑ Gravel road ❑ Others:		
Vehicle Operation	❑ Starting ❑ Idling ❑ Driving ❑ Constant speed ❑ Accelerating ❑ Decelerating ❑ Turning ❑ Others:		
Details of Problem			
Airbag Warning Light Operation	❑ Normal (After turning the ignition switch to ON, lit for approximately 6 seconds and goes off.) ❑ Remains ON ❑ Remains OFF		
DTC output	❑ OK code ❑ DTC: (Code:)		

3. General Description

A: CAUTION

Refer to “CAUTION” in “General Description” in Airbag System. <Ref. to AB-11, CAUTION, General Description.>

B: INSPECTION

Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>

C: PREPARATION TOOL

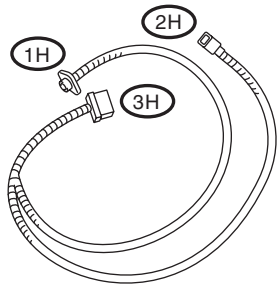
CAUTION:
To measure the voltage and resistance of airbag system component, be sure to use the specified test harness.

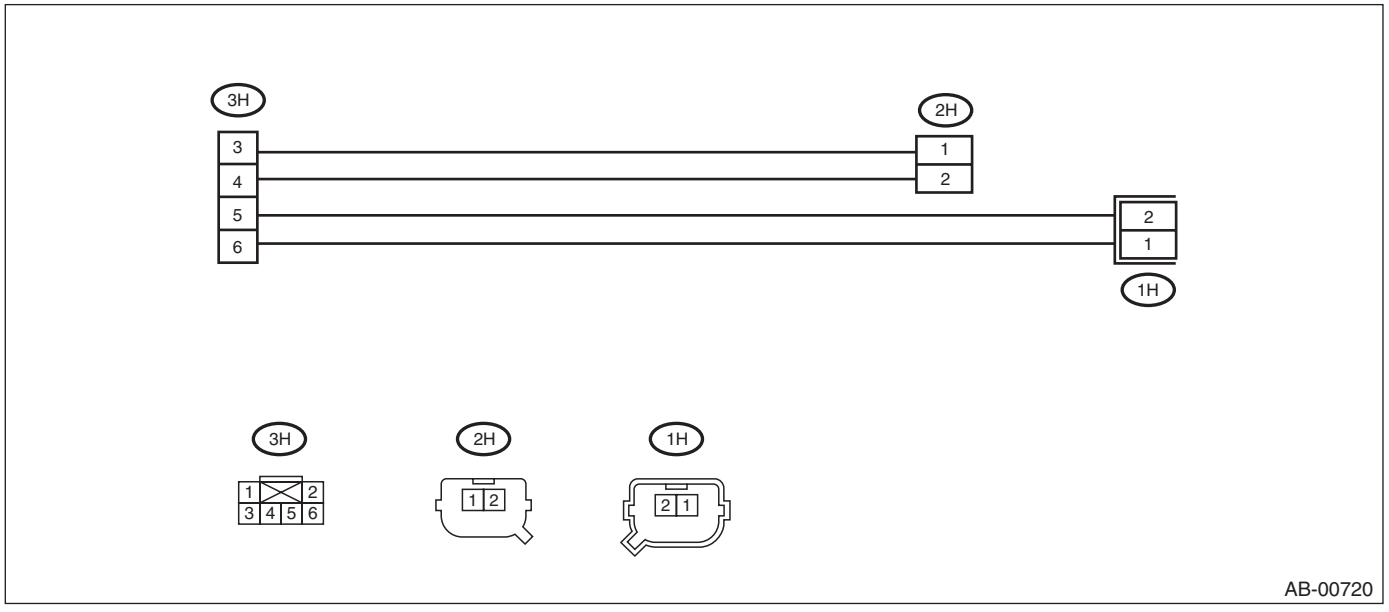
1. SPECIAL TOOL

- Subaru Select Monitor

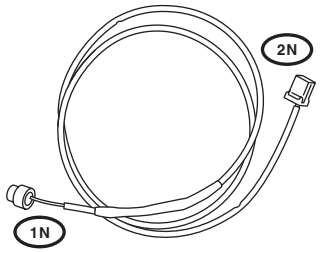
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

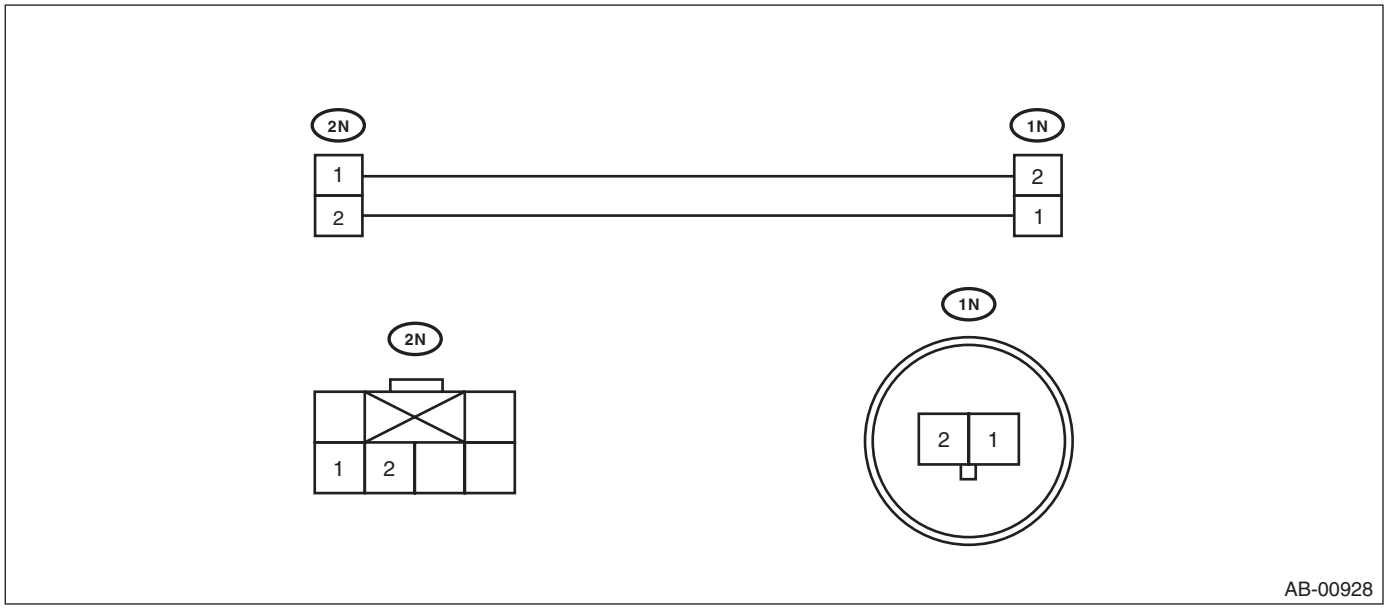
- TEST HARNESS H

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299FA030	98299FA030	TEST HARNESS H	Used when measuring voltage and resistance of front sub sensor and front door impact sensor.



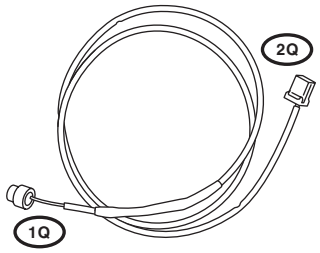
- TEST HARNESS N

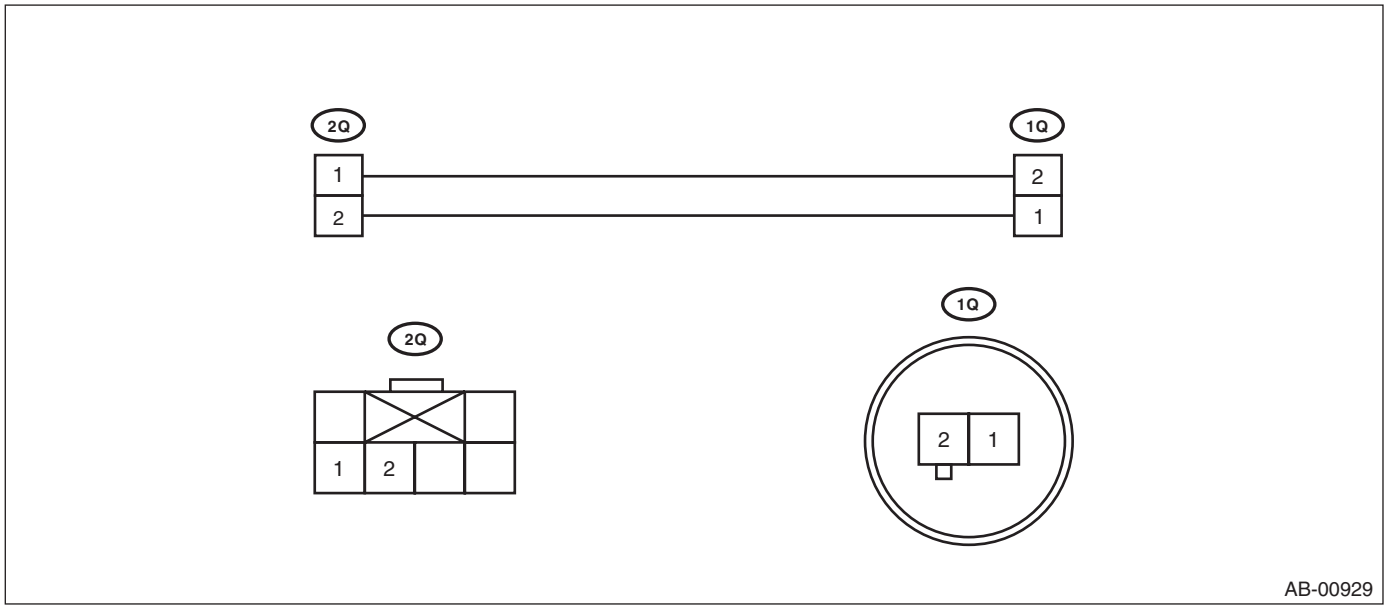
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299SA000	98299SA000	TEST HARNESS N	Used when measuring voltage and resistance of driver's airbag module, seat belt pretensioner and curtain airbag module.



AB-00928

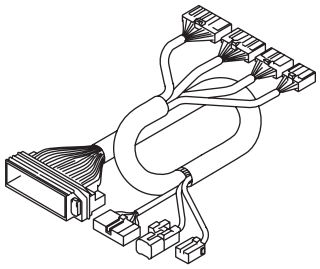
- TEST HARNESS Q

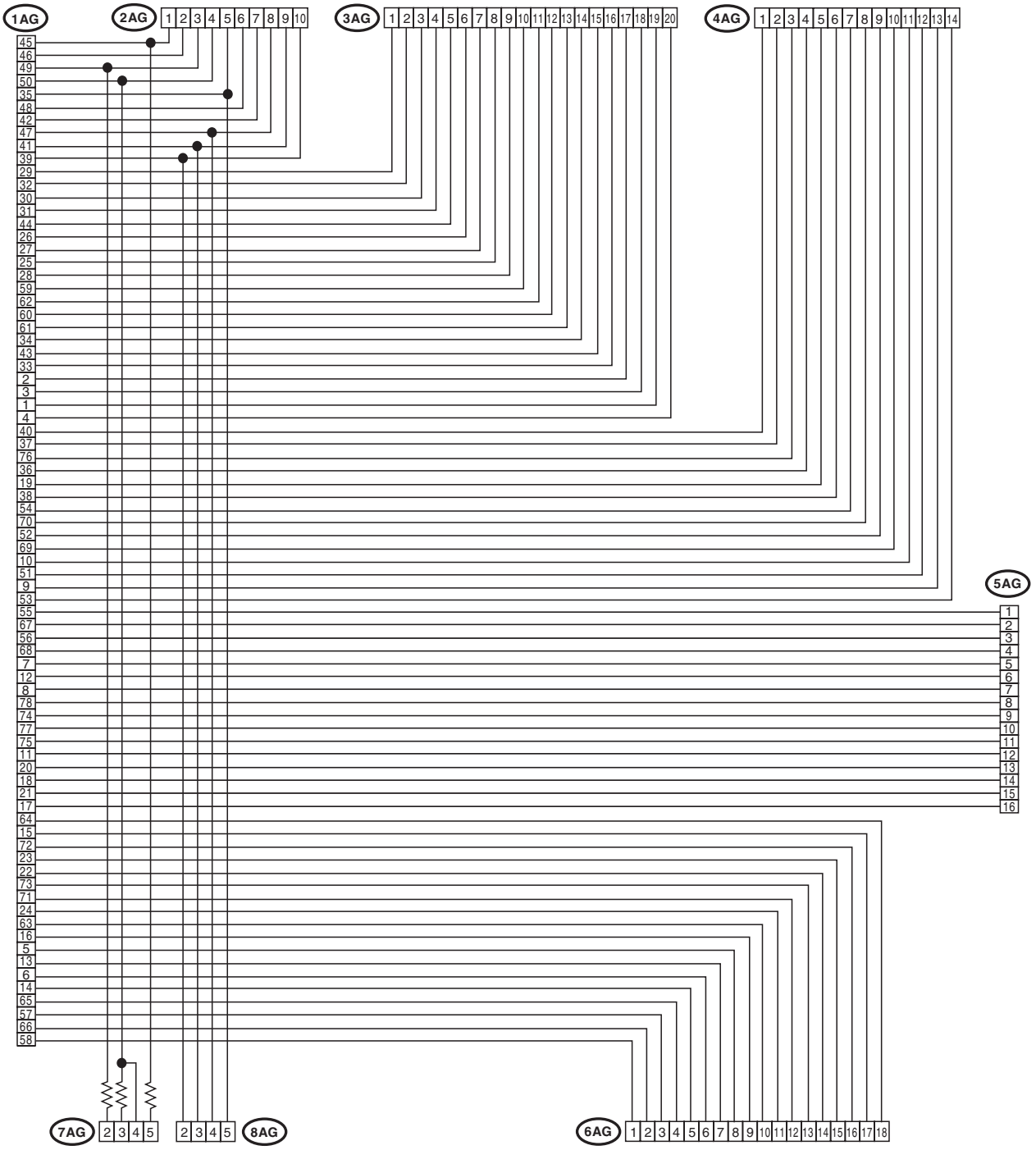
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299SA040	98299SA040	TEST HARNESS Q	Used when measuring voltage and resistance of driver's airbag module.



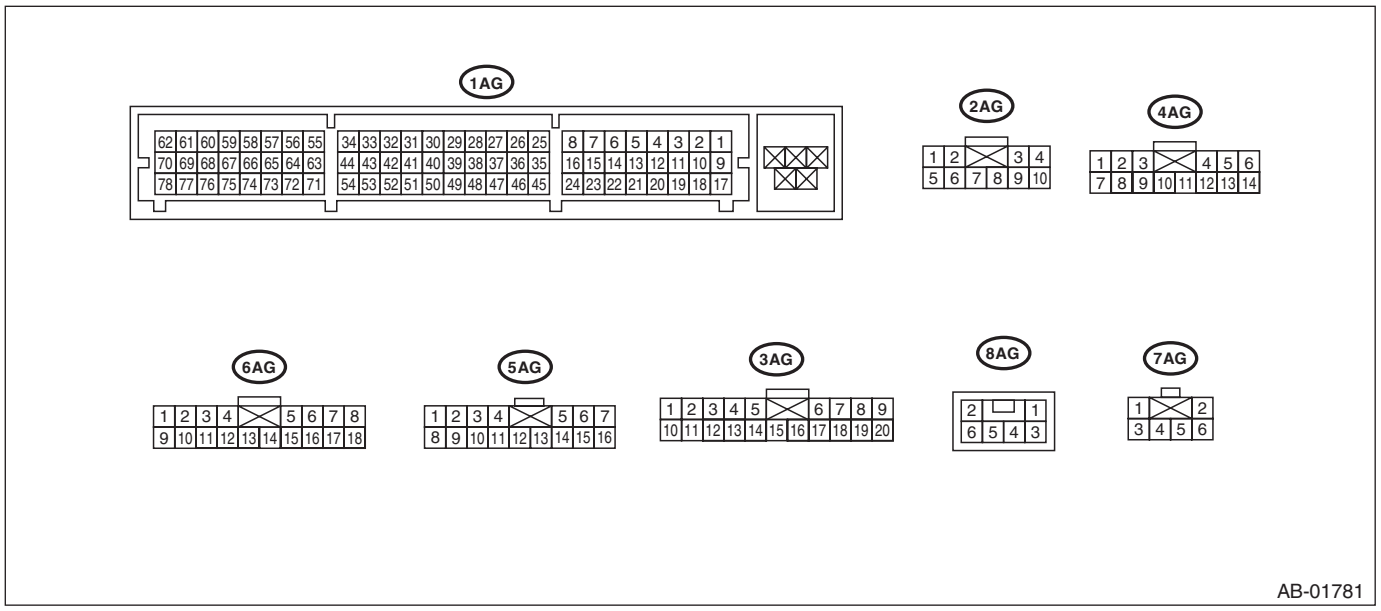
AB-00929

- TEST HARNESS AG

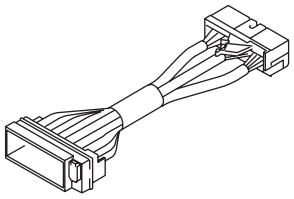
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299AG070	98299AG070	TEST HARNESS AG	Used when measuring voltage and resistance of airbag control module.

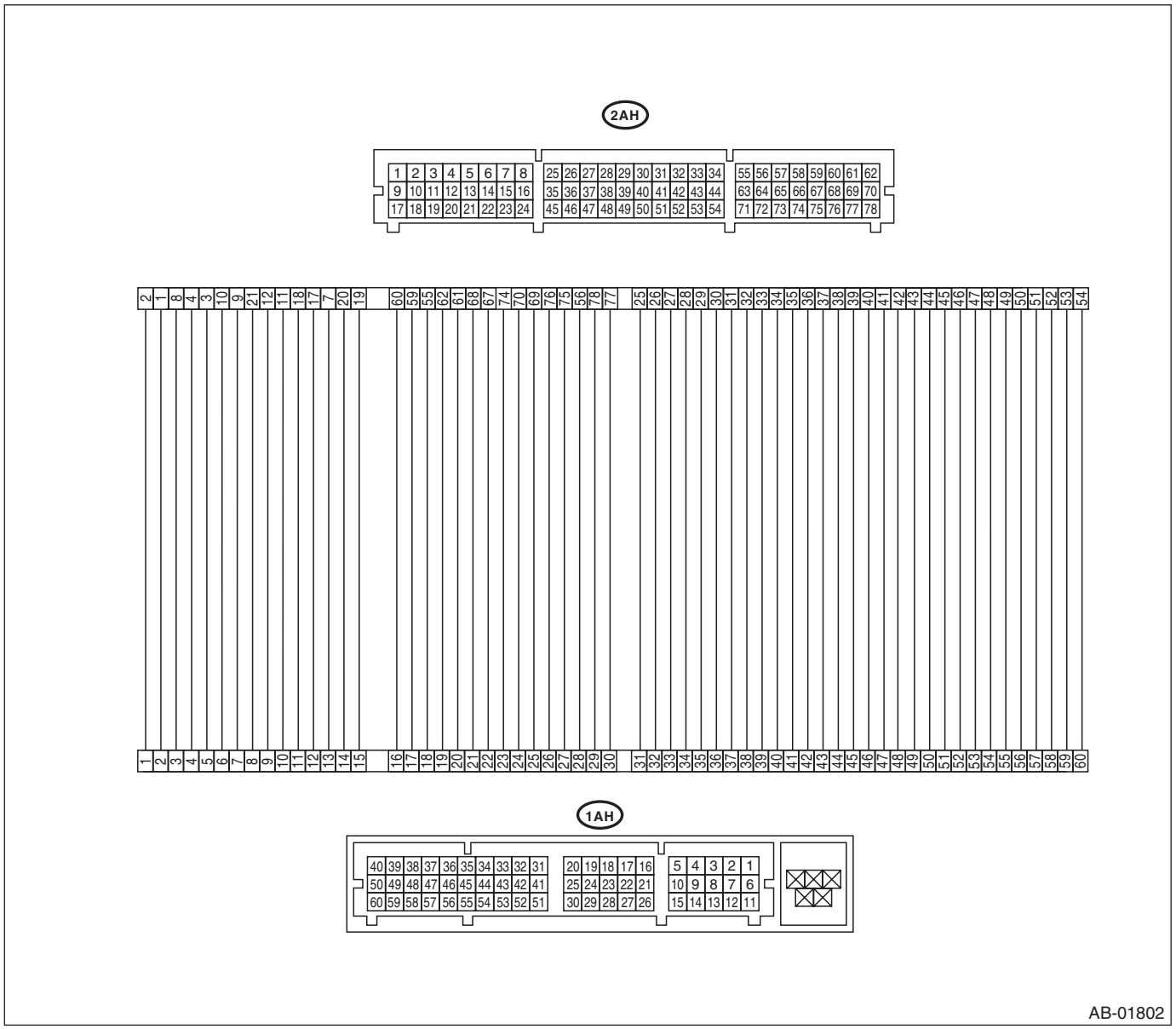

1AG
45 46 49 50 35 48 42 47 41 39 29 32 30 31 44 26 27 25 28 59 62 60 61 34 43 33 2 3 1 4 40 37 76 36 19 38 54 70 52 69 10 51 9 53 55 67 56 68 7 12 8 78 74 77 75 11 20 18 21 17 64 15 72 23 22 73 71 24 63 16 5 13 6 14 65 57 66 58
2AG
1 2 3 4 5 6 7 8 9 10
3AG
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
4AG
1 2 3 4 5 6 7 8 9 10 11 12 13 14
5AG
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
7AG
2 3 4 5
8AG
2 3 4 5
6AG
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

AB-01902

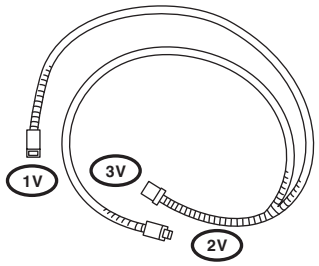

1AG
62 61 60 59 58 57 56 55
70 69 68 67 66 65 64 63
78 77 76 75 74 73 72 71
34 33 32 31 30 29 28 27 26 25
44 43 42 41 40 39 38 37 36 35
54 53 52 51 50 49 48 47 46 45
8 7 6 5 4 3 2 1
16 15 14 13 12 11 10 9
24 23 22 21 20 19 18 17
2AG
1 2 3 4
5 6 7 8 9 10
4AG
1 2 3 4 5 6
7 8 9 10 11 12 13 14
6AG
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16 17 18
5AG
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16
3AG
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19 20
8AG
2 1
6 5 4 3
7AG
1 2
3 4 5 6
AB-01781

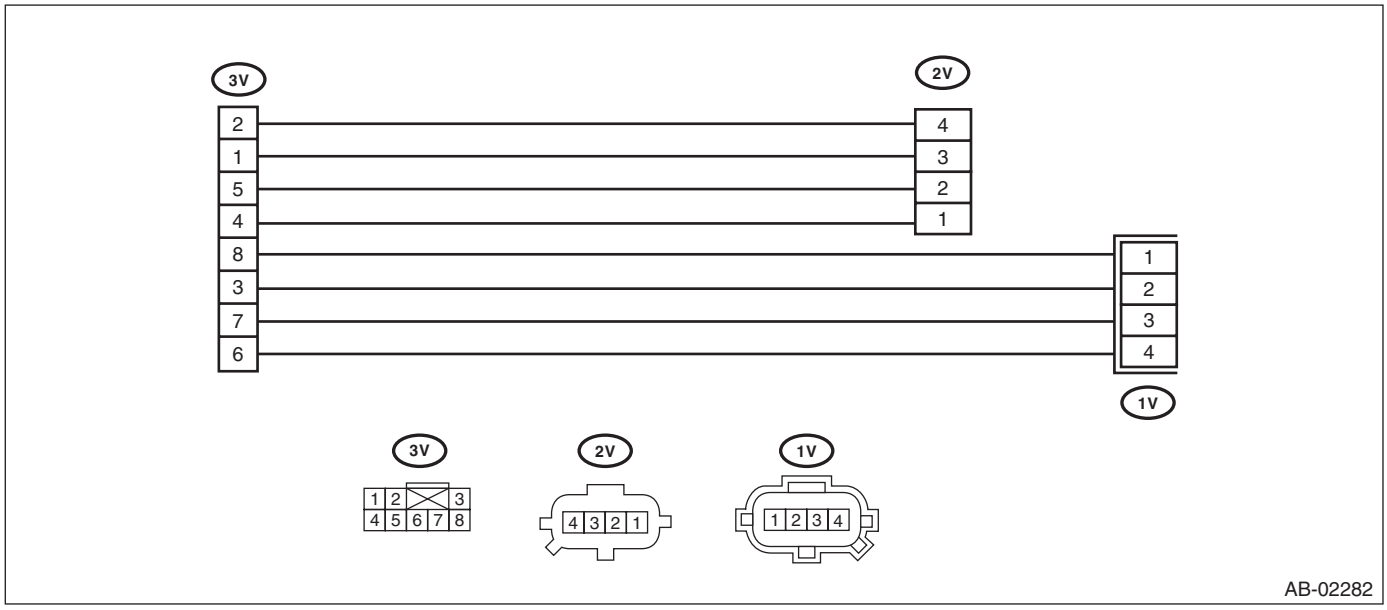
- TEST HARNESS AH

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299AG080	98299AG080	TEST HARNESS AH	Used together with test harness AG when measuring voltage and resistance of the airbag control module.

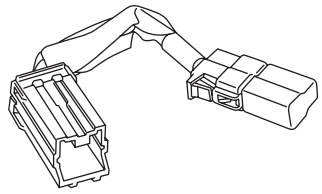


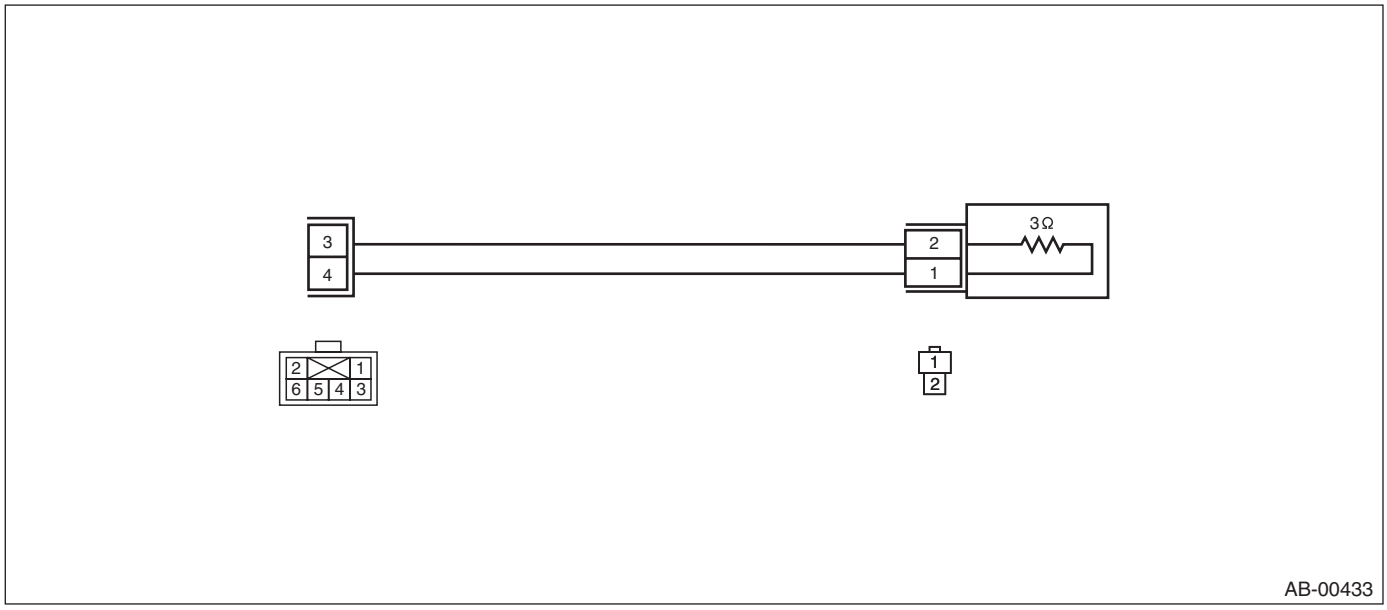
- TEST HARNESS V

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299AG010	98299AG010	TEST HARNESS V	Used when measuring voltage and resistance of side airbag sensor and curtain airbag sensor.

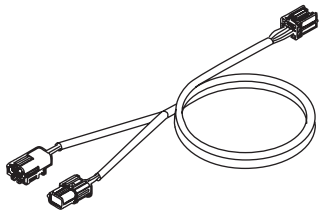


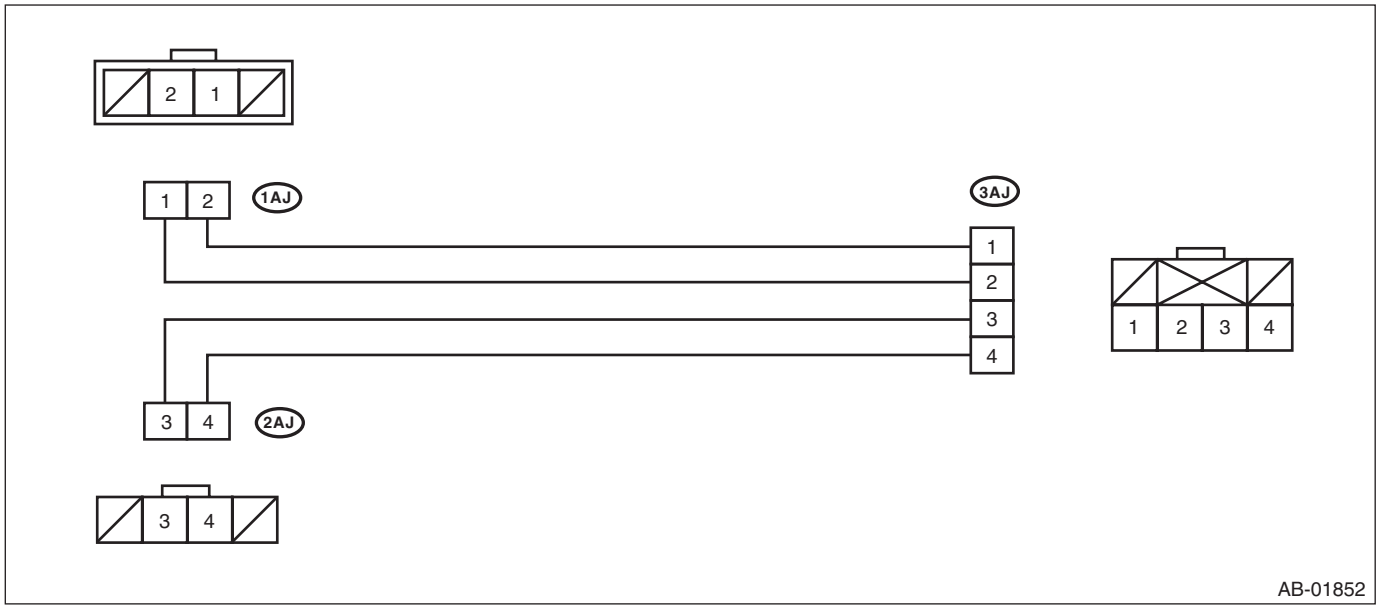
- AIRBAG RESISTOR

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299PA040	98299PA040	AIRBAG RESISTOR	Used in replacement of airbag module for which resistance value is same as airbag module. Two STs are required for diagnosis of two-stage inflator type airbag module.

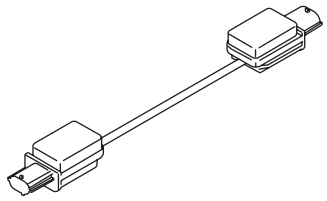


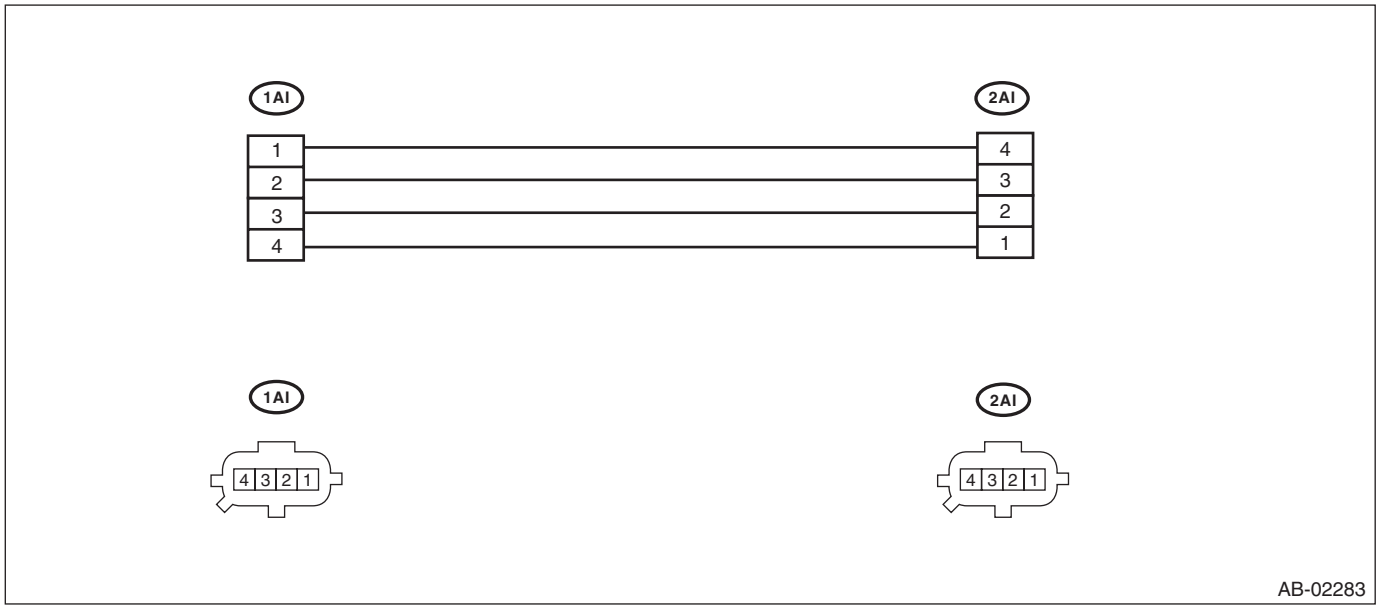
- TEST HARNESS AJ

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299FG000	98299FG000	TEST HARNESS AJ	Used when measuring power supply and resistance of side airbag harness.



• TEST HARNESS AI

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299AG090	98299AG090	TEST HARNESS AI	• Used for diagnoses of side airbag sensor and curtain airbag sensor. • Used together with test harness V.

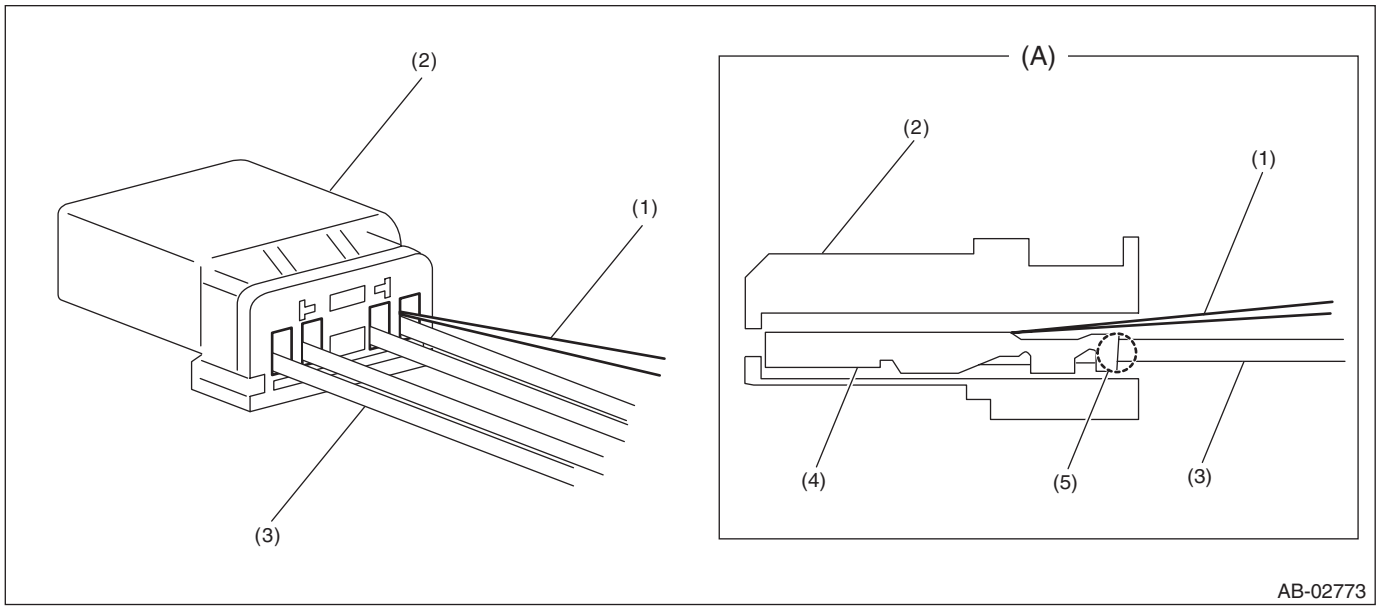


2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Probe	Used when measuring voltage and resistance of passenger's airbag module.
DST-i	Used together with Subaru Select Monitor 4.

3. HOW TO USE PROBE

Insert the probe into the harness hole, and contact it with the terminal.



(A) Cross section

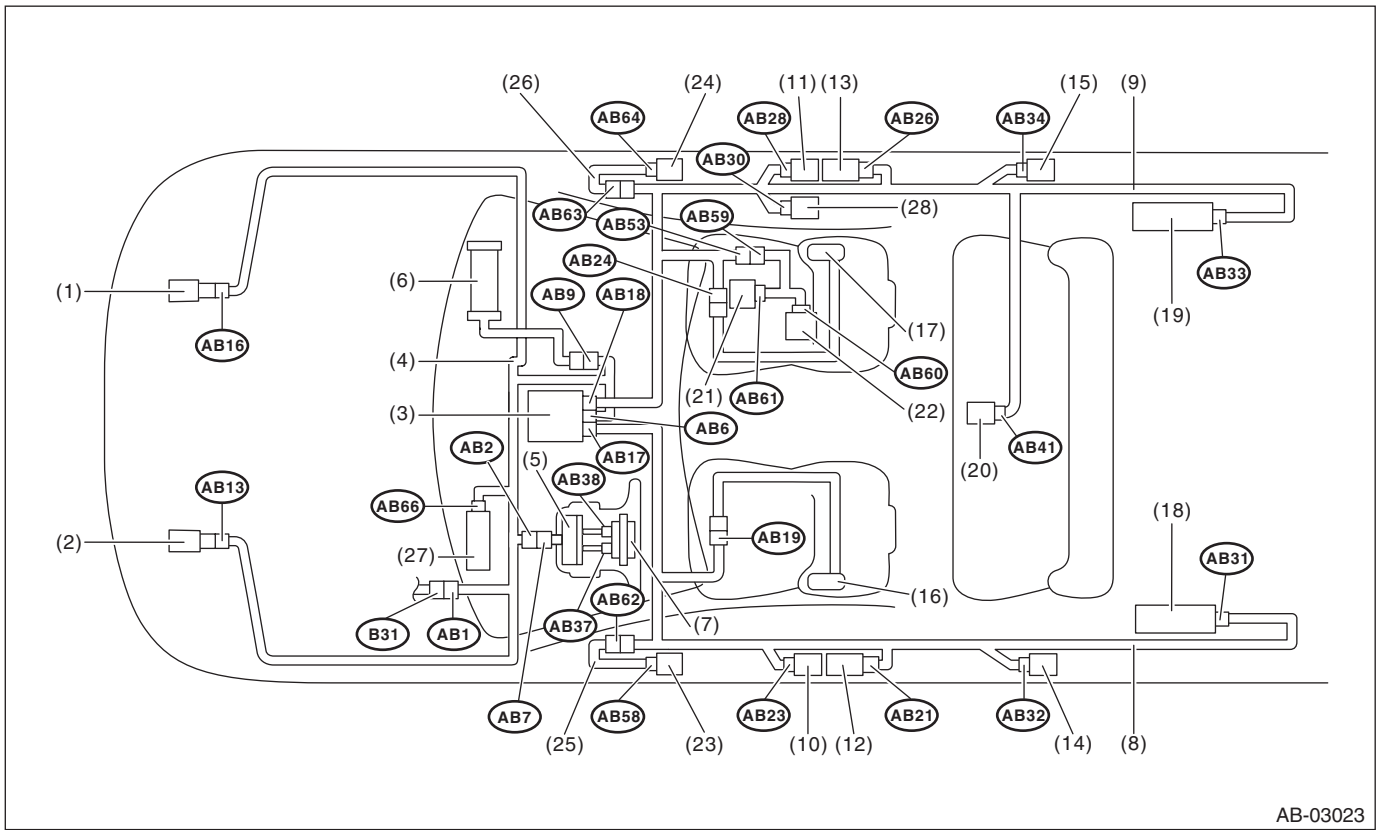
(1) Probe
(2) Connector (housing)
(3) Harness
(4) Terminal
(5) Connection

CAUTION:
• Do not insert the probe forcibly.
• Be careful not to contact it to the connection (5) between the terminal and harness. (Harness will come off easily from connector if doing so.)

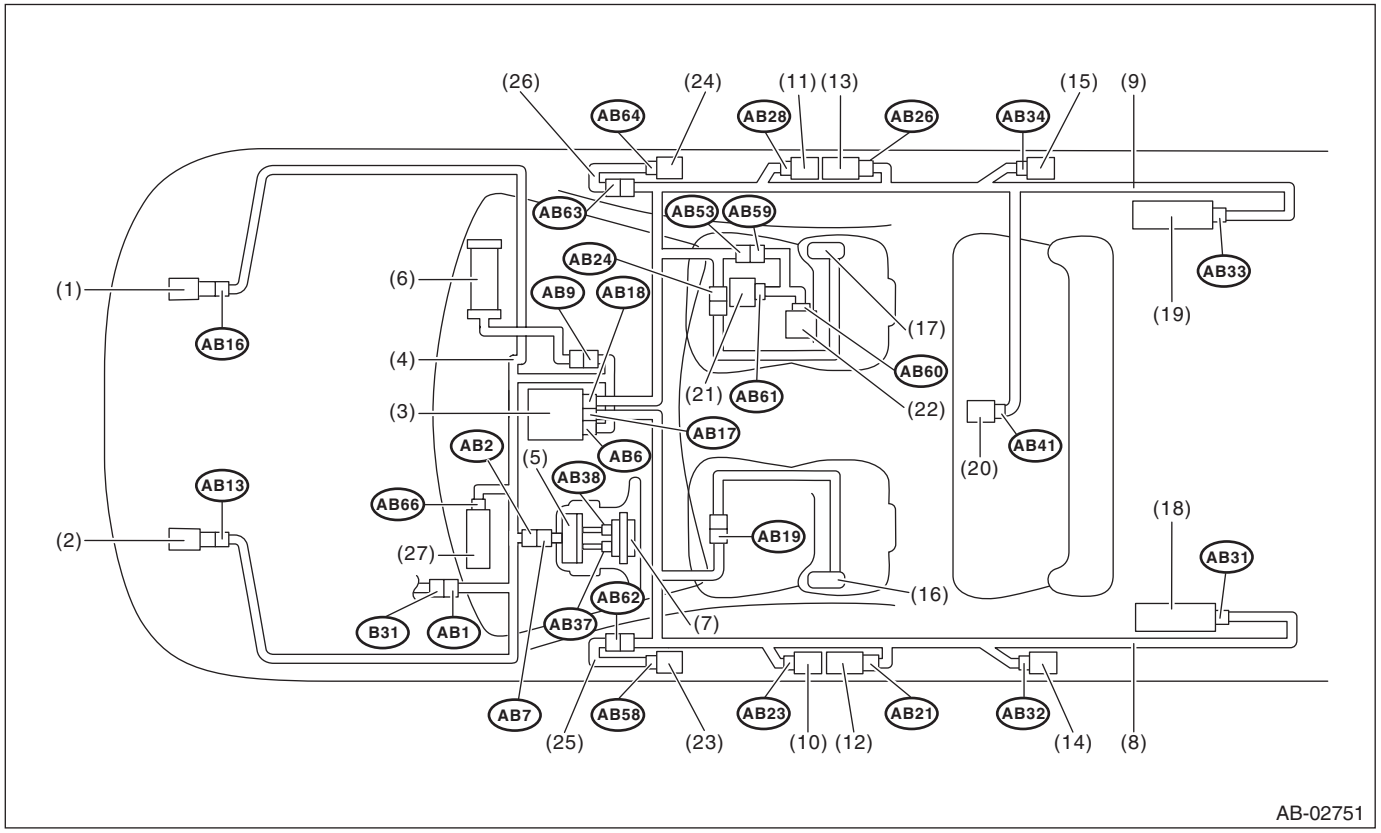
4. Electrical Component Location

A: LOCATION

- Crosstrek model



- Except for Crosstrek model



(1) Front sub sensor (RH)
(2) Front sub sensor (LH)
(3) Airbag control module
(4) Airbag main harness
(5) Roll connector
(6) Passenger's airbag inflator
(7) Driver's airbag inflator
(8) Airbag rear harness (LH)
(9) Airbag rear harness (RH)
(10) Side airbag sensor (LH)
(11) Side airbag sensor (RH)
(12) Seat belt pretensioner (LH)
(13) Seat belt pretensioner (RH)
(14) Curtain airbag sensor (LH)
(15) Curtain airbag sensor (RH)
(16) Side airbag inflator (LH)
(17) Side airbag inflator (RH)
(18) Curtain airbag inflator (LH)
(19) Curtain airbag inflator (RH)
(20) Satellite safing sensor
(21) Occupant detection control module
(22) Buckle switch (RH)
(23) Front door impact sensor (LH)
(24) Front door impact sensor (RH)
(25) Door harness (LH)
(26) Door harness (RH)
(27) Knee airbag inflator
(28) Lap seat belt pretensioner (RH)

Connector No.	(AB1)	(AB2)	(AB6)	(AB7)	(AB9)	(AB13)	(AB16)	(AB17)	(AB18)	(AB19)	(AB21)	(AB23)
Pin	10	4	30	4	4	2	2	15 or 24	15 or 24	4	2	4
Color	Gray	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Black	Yellow
Male/Female	Female	Female	Female	Male	Female	Female	Female	Female	Female	Female	Female	Female
Connector No.	(AB24)	(AB26)	(AB28)	(AB30)	(AB31)	(AB32)	(AB33)	(AB34)	(AB37)	(AB38)	(AB41)	(AB53)
Pin	4	2	4	2	2	4	2	4	2	2	2	3
Color	Yellow	Black	Yellow	Yellow	Black	Yellow	Black	Yellow	Orange	Black	Yellow	Brown
Male/Female	Female	Female	Female	Female	Female	Female	Female	Female	Female	Female	Female	Female
Connector No.	(AB58)	(AB59)	(AB60)	(AB61)	(AB62)	(AB63)	(AB64)	(AB66)				
Pin	2	3	2	10	2	2	2	2				
Color	Yellow	Brown	Yellow	Black	Yellow	Yellow	Yellow	Black				
Male/Female	Female	Male	Male	Female	Female	Female	Female	Female				

5. Airbag Connector

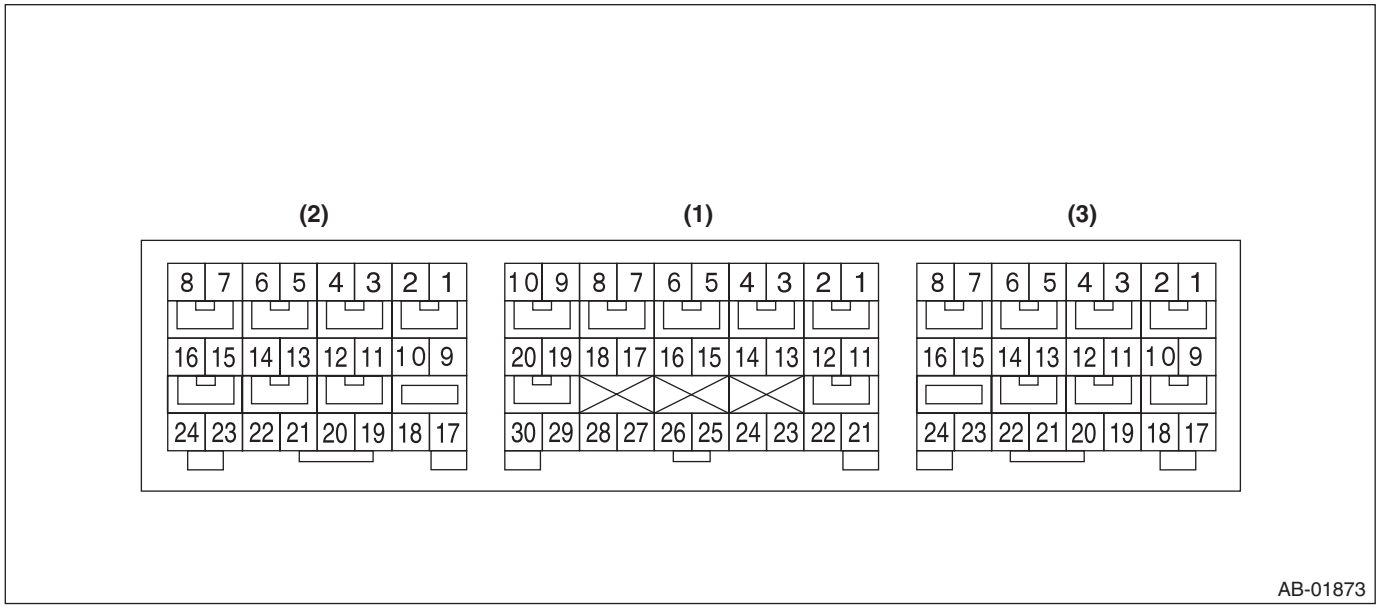
A: PROCEDURE

For operation procedures, refer to “Airbag Connector” of Airbag System. <Ref. to AB-19, Airbag Connector.>

6. Airbag Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

- Crosstrek model

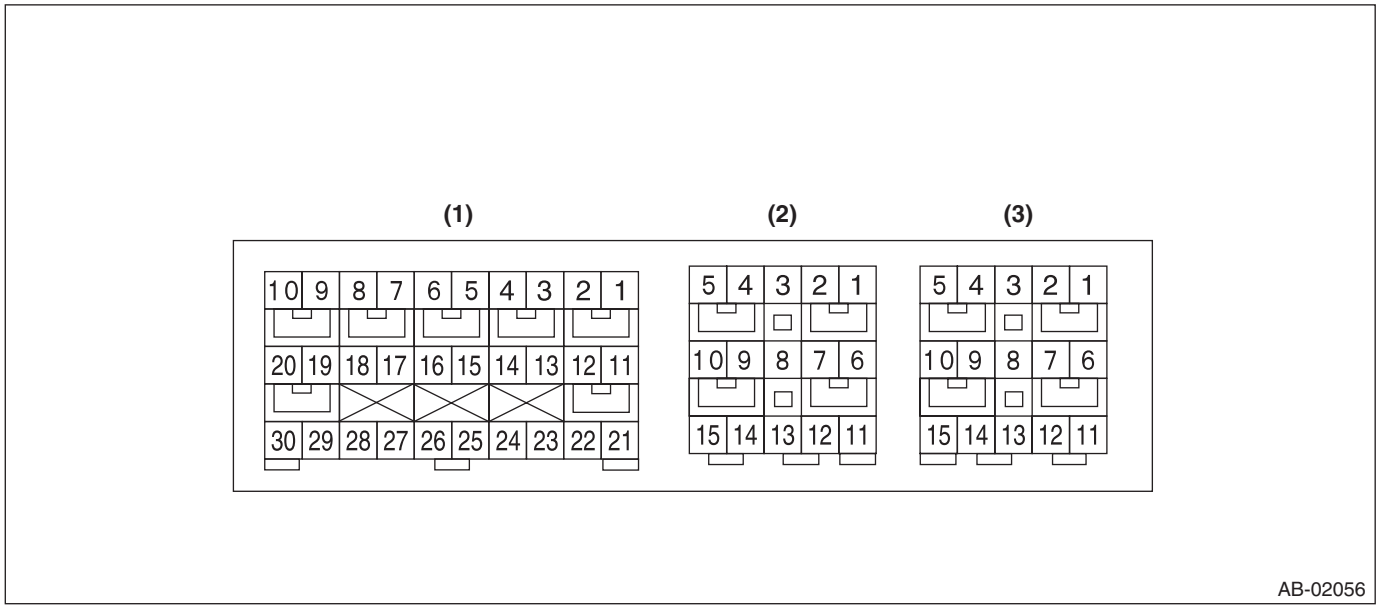


- Terminal numbers in airbag control module connector are shown in the figure.
- The airbag warning light illuminates when the connector is removed from the airbag control module.

Item		Control module terminal No.
Ignition power supply	Dedicated fuse	(1) — 21
Passenger's airbag module level one	+	(1) — 4
	–	(1) — 3
Passenger's airbag module level two	+	(1) — 1
	–	(1) — 2
Driver's airbag module level one	+	(1) — 5
	–	(1) — 6
Driver's airbag module level two	+	(1) — 8
	–	(1) — 7
Driver's knee airbag module	+	(1) — 9
	–	(1) — 10
CAN-H		(1) — 13
CAN-L		(1) — 22
Telematics communication line		(1) — 24
Front sub sensor LH	+	(1) — 30
	–	(1) — 28
Front sub sensor RH	+	(1) — 29
	–	(1) — 27
Ground line (GND)		(1) — 25
		(1) — 26
Passenger's airbag ON indicator		(1) — 23
Passenger's airbag OFF indicator		(1) — 17
Passenger's seat belt warning		(1) — 15
Side airbag sensor LH	+	(2) — 24
Curtain airbag sensor LH Front door impact sensor LH	–	(2) — 23

Item		Control module terminal No.
Seat belt pretensioner LH	+	(2) — 5
	–	(2) — 6
Side airbag module LH	+	(2) — 1
	–	(2) — 2
Curtain airbag module LH	+	(2) — 4
	–	(2) — 3
Occupant detection control module	+	(3) — 16
	–	(3) — 24
Side airbag sensor RH Curtain airbag sensor RH Front door impact sensor RH	+	(3) — 17
	–	(3) — 18
Side airbag module RH	+	(3) — 8
	–	(3) — 7
Curtain airbag module RH	+	(3) — 5
	–	(3) — 6
Seat belt pretensioner RH	+	(3) — 4
	–	(3) — 3
Lap seat belt pretensioner RH	+	(3) — 1
	–	(3) — 2
Satellite safing sensor	+	(3) — 21
	–	(3) — 22

- Except for Crosstrek model



- Terminal numbers in airbag control module connector are shown in the figure.
- The airbag warning light illuminates when the connector is removed from the airbag control module.

Item		Control module terminal No.
Ignition power supply	Dedicated fuse	(1) — 21
Passenger's airbag module level one	+	(1) — 4
	–	(1) — 3
Passenger's airbag module level two	+	(1) — 1
	–	(1) — 2
Driver's airbag module level one	+	(1) — 5
	–	(1) — 6

Item		Control module terminal No.
Driver's airbag module level two	+	(1) — 8
	–	(1) — 7
Driver's knee airbag module	+	(1) — 9
	–	(1) — 10
CAN-H		(1) — 13
CAN-L		(1) — 22
Front sub sensor LH	+	(1) — 30
	–	(1) — 28
Front sub sensor RH	+	(1) — 29
	–	(1) — 27
Ground line (GND)		(1) — 25
		(1) — 26
Passenger's airbag OFF indicator		(1) — 17
Passenger's airbag ON indicator		(1) — 23
Passenger's seat belt warning		(1) — 15
Side airbag sensor LH Curtain airbag sensor LH Front door impact sensor LH	+	(2) — 8
	–	(2) — 15
Side airbag module LH	+	(2) — 9
	–	(2) — 10
Curtain airbag module LH	+	(2) — 7
	–	(2) — 6
Seat belt pretensioner LH	+	(2) — 2
	–	(2) — 1
Satellite safing sensor	+	(3) — 15
	–	(3) — 14
Seat belt pretensioner RH	+	(3) — 4
	–	(3) — 5
Side airbag sensor RH Curtain airbag sensor RH Front door impact sensor RH	+	(3) — 8
	–	(3) — 11
Side airbag module RH	+	(3) — 7
	–	(3) — 6
Curtain airbag module RH	+	(3) — 9
	–	(3) — 10
Occupant detection control module	+	(3) — 12
	–	(3) — 13

B: WIRING DIAGRAM

Refer to "Airbag System" in WI section. <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>

7. Subaru Select Monitor

A: OPERATION

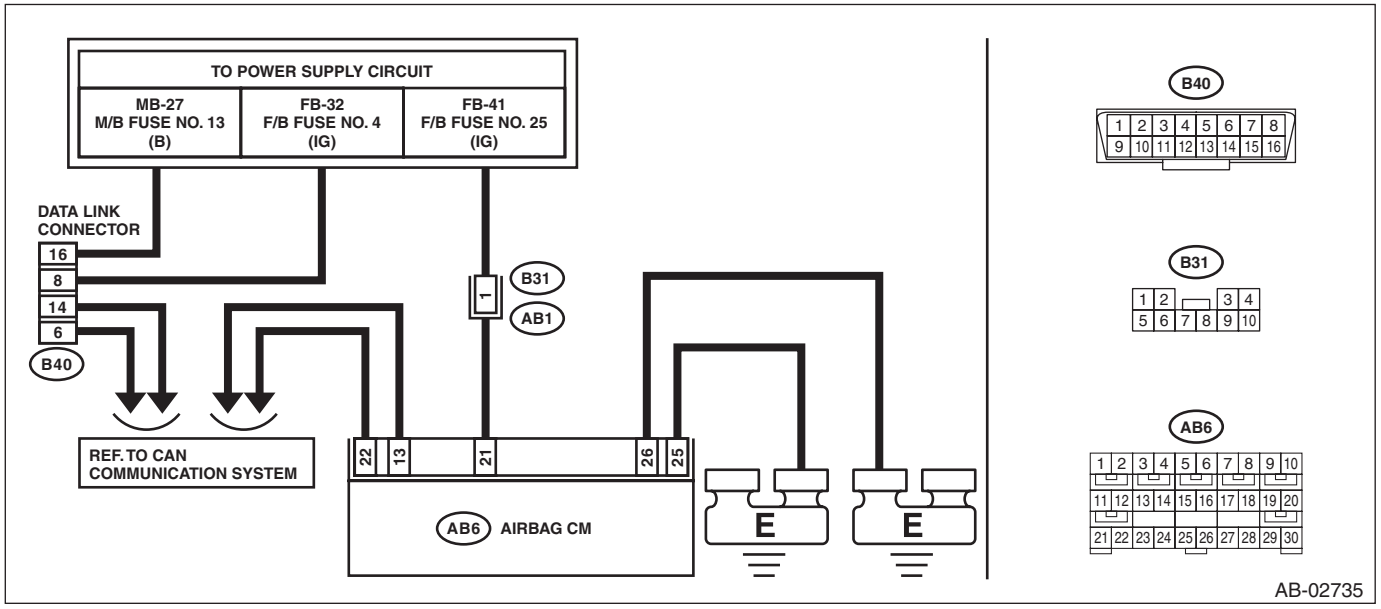
For detailed operation procedures, refer to “Application help”.

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DTC DETECTING CONDITION:
Defective harness connector
TROUBLE SYMPTOM:
Communication is impossible between the airbag control module and the Subaru Select Monitor.

CAUTION:
Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select the airbag mode using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage. NOTE: For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.** Check battery terminal. NOTE: For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Go to step **9**.	Go to step **5**.
5	**CHECK SUBARU SELECT MONITOR.**	Is Subaru Select Monitor powered on?	Go to step **7**.	Go to step **6**.
6	**CHECK FUSE.** Remove a fuse in the data link connector and visually check the fuse.	Is the fuse OK?	Repair the harness between the battery and the data link connector.	Replace the fuse. If the fuse is blown out again, check the power supply circuit.
7	**CHECK AIRBAG CONTROL MODULE CONNECTOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Confirm that the connectors of airbag control module (AB6, AB17, AB18) are securely connected.	Is the connector of the airbag control module securely connected?	Go to step **8**.	Connect the connector of the airbag control module.
8	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Disconnect the airbag control module connector. 2) Connect the battery ground terminal. NOTE: For HEV model, connect the negative terminal for 12 volt auxiliary battery, and connect the ground terminal to 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Turn the ignition switch to ON. 4) Check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **9**.
9	**CHECK FUSE.** Remove fuse No. 25 from the fuse & relay box, and perform visual inspection.	Is the fuse OK?	Go to step **10**.	Replace the fuse. If the fuse is blown out again, check the power supply circuit.

	Step	Check	Yes	No
10	**CHECK AIRBAG CONTROL MODULE CONNECTOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Confirm that the connectors of airbag control module (AB6, AB17, AB18) are securely connected.	Is the connector of the airbag control module securely connected?	Go to step **11**.	Connect the connector of the airbag control module.
11	**CHECK CAN COMMUNICATION.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Repair it according to the diagnosis for LAN system.	Go to step **12**.
12	**CHECK POWER SUPPLY CIRCUIT.** 1) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 2) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 3) Turn the ignition switch to ON. 4) Measure the voltage between connector (2AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(2AG) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **13**.	Repair the harness between the airbag control module and the battery. Or replace the airbag main harness along with the bulkhead harness.
13	**CHECK BETWEEN AIRBAG CONTROL MODULE AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between connector (2AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(2AG) No. 4 — Chassis ground:*** ***(2AG) No. 3 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **14**.	Repair the harness between the airbag control module and the chassis ground. Or replace the airbag main harness along with the bulkhead harness.
14	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of the control module power supply, ground circuit and data link connector?	Repair the connector. (Replace the harness without repairing the airbag system connector.)	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

8. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Airbag» and select «Enter».
5) On «Airbag» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC) in AIRBAG SYSTEM. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>

9. Inspection Mode

A: PROCEDURE

Recreate the circumstance by referring to the conditions described in the checklist.

10.Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Airbag» and select «Enter».
5) On «Airbag» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- Clear the DTC stored in the airbag control module after repairing the airbag system.

11.Read Current Data

A: OPERATION

Check the operating condition of each sensor in the event of malfunction in the seat belt buckle switch, or when the seat belt buckle switch has been replaced.
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Airbag» and select «Enter».
5) On «Airbag» display, select «Data monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

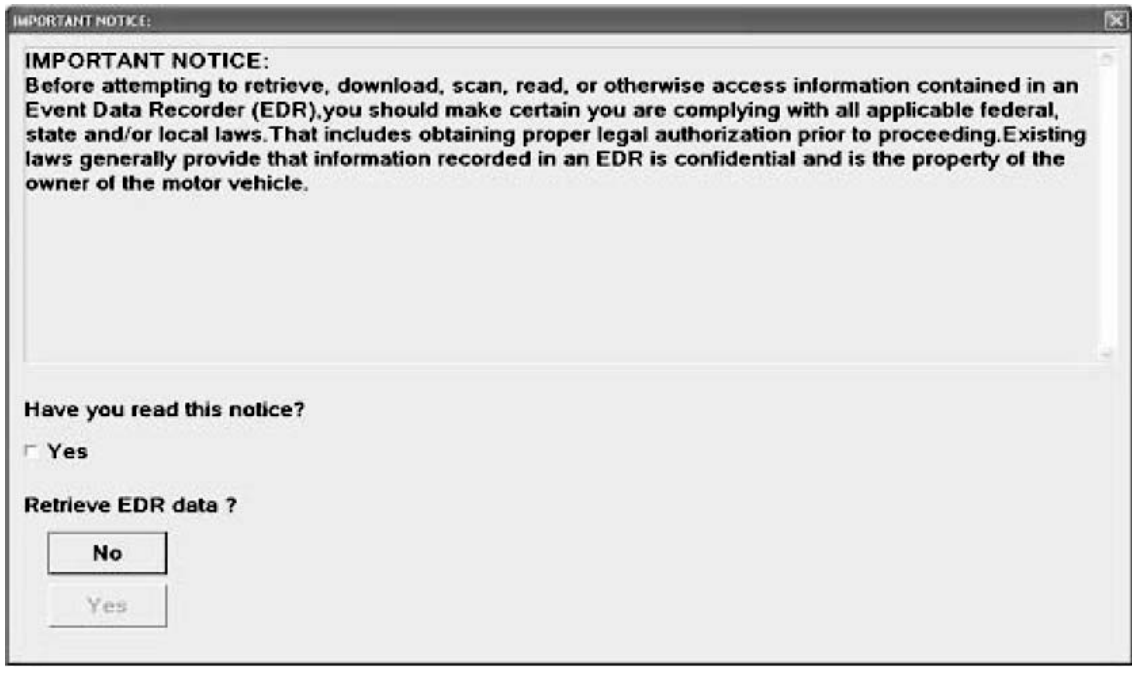
B: LIST

Item	Display	Note
Trip Count	—	—
Count	—	—
Time Count [msec]	—	—
Belt Buckle Switch RH	Unbelted/Belted	“Belted” when passenger’s seat belt is fastened “Unbelted” when passenger’s seat belt is not fastened
Passenger Occupant Status	Occupied/Empty or CRS	“Occupied” when the occupant is present “Empty or CRS” when the seat is unoccupied or when child restraint seat is installed **CAUTION:** **When checking the operating status, be careful of the followings.** **• When the seat is unoccupied: Do not place anything on the seat.** **• Child restraint seat: Install the seat according to its instruction manual.** **• When the seat is occupied: Someone who weighs at least approx. 70 kg (155 lb) must be seated during the check.**
Passenger Airbag Status	ON/OFF	“ON” when the passenger occupant status is “Occupied” “OFF” when the status is “Empty or CRS”

12.Event Record Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Airbag» and select «Enter».
5) On «Airbag» display, select «Work Support».
6) On «Work Support» display, select «Event Record Data». After selection, «IMPORTANT NOTICE» screen is displayed.
7) After checking the content of «IMPORTANT NOTICE», click the checkbox for “Yes”.
8) If the applicable law is not violated, click the «Yes» button to display the EDR data.



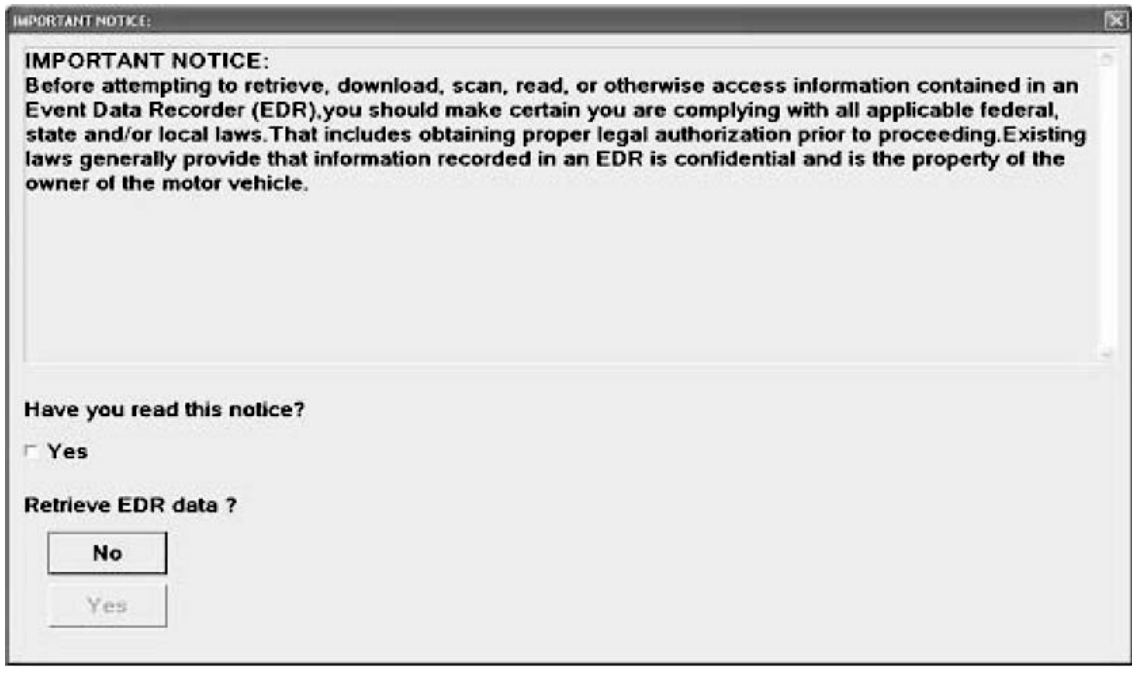
AB-02847

9) Select the items to be checked from each event record data.
10) Select the record data to be checked from each record data.
11) The selected record data is displayed. If there is no data recorded, «Event record data are not recorded» is displayed.
12) Select [Exit] to return to each event record data screen.

13.Batch save of Event record data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Airbag» and select «Enter».
5) On «Airbag» display, select «Work Support».
6) On «Work Support» display, select «Batch save of Event record data». After selection, «IMPORTANT NOTICE» screen is displayed.
7) After checking the content of «IMPORTANT NOTICE», click the checkbox for “Yes”.
8) If the applicable law is not violated, click the «Yes» button to display the EDR data.



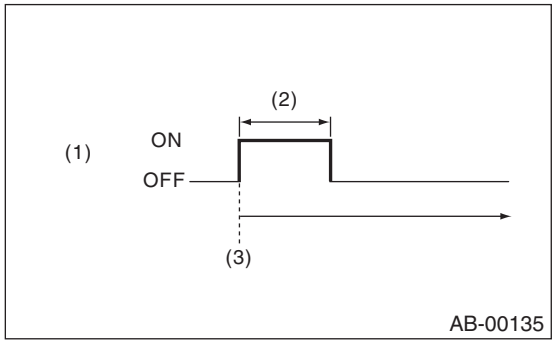
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9) Specify the destination for the event record data to save the data there.
10) After saving the file, click the «OK» button to return the menu screen.

14.Airbag Warning Light Illumination Pattern

A: INSPECTION

Turn the ignition switch to ON, and confirm that the airbag warning light remains on for approx. 6 seconds then turns off afterwards.



(1) Airbag warning light
(2) Approx. 6 seconds
(3) Ignition switch ON

15.Airbag Warning Light Failure

A: AIRBAG WARNING LIGHT REMAINS ON

DETECTING CONDITION:

- Airbag warning light is faulty.
- Airbag control module to combination meter circuit is shorted or open.
- Grounding circuit is faulty.
- Airbag control module is faulty.
- Connector connection is improper.
- Connections of (AB6, AB17, AB18) to airbag control module are improper.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK CAN COMMUNICATION.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Repair it according to diagnosis of LAN system.	Go to step **2**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Check the connection status of airbag CM connector.	Is there poor contact of connector?	Reconnect the connector. Or repair the connector.	Go to step **3**.
3	**CHECK FOR POOR CONTACT.** Check the combination meter. <Ref. to IDI(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Repair it according to INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS).	Replace the airbag CM. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

B: AIRBAG WARNING LIGHT REMAINS OFF

NOTE:
For the diagnostic procedure, refer to "AIRBAG WARNING LIGHT REMAINS ON". <Ref. to AB(diag)-34, AIRBAG WARNING LIGHT REMAINS ON, Airbag Warning Light Failure.>

16.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
U0073	CONTROL MODULE COMMUNICATION BUS OFF	CAN communication error occurred.	<Ref. to AB(diag)-46, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Chart with Trouble Code.>
B1000	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1003	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-47, DTC B1003 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1105	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-47, DTC B1105 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1106	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-47, DTC B1106 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1115	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-47, DTC B1115 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1116	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-47, DTC B1116 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1120	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-47, DTC B1120 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1121	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-47, DTC B1121 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1125	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1125 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1126	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1126 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1135	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1135 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1136	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1136 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B1145	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1145 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1146	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1146 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1170	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1170 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1185	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1185 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1195	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1195 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1196	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1196 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1199	AIRBAG ECU MALFUNCTION	Airbag control module is faulty.	<Ref. to AB(diag)-48, DTC B1199 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>
B11E0	ROLLOVER DEPLOYMENT HISTORY	Curtain airbag module (LH/RH) and seat belt pretensioner (LH/RH) are deployed.	<Ref. to AB(diag)-49, DTC B11E0 ROLLOVER DEPLOYMENT HISTORY, Diagnostic Chart with Trouble Code.>
B11F2	FRONT IMPACT DEPLOYMENT	Front airbag module and seat belt pretensioner (LH/RH) are inflated.	<Ref. to AB(diag)-49, DTC B11F2 FRONT IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B11F3	FRONT IMPACT DEPLOYMENT	Front airbag module and seat belt pretensioner (LH/RH) are inflated.	<Ref. to AB(diag)-49, DTC B11F3 FRONT IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B11F4	FRONT IMPACT DEPLOYMENT	Front airbag module and seat belt pretensioner (LH/RH) are inflated.	<Ref. to AB(diag)-49, DTC B11F4 FRONT IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B11F5	FRONT IMPACT DEPLOYMENT	Front airbag module and seat belt pretensioner (LH/RH) are inflated.	<Ref. to AB(diag)-49, DTC B11F5 FRONT IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B11F7	SIDE IMPACT DEPLOYMENT	• Side airbag module and curtain airbag module are deployed. • Curtain airbag module is deployed.	<Ref. to AB(diag)-50, DTC B11F7 SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B11F8	SIDE IMPACT DEPLOYMENT	• Side airbag module and curtain airbag module are deployed. • Curtain airbag module is deployed.	<Ref. to AB(diag)-50, DTC B11F8 SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B11F9	SIDE IMPACT DEPLOYMENT	• Side airbag module and curtain airbag module are deployed. • Curtain airbag module is deployed.	<Ref. to AB(diag)-50, DTC B11F9 SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B11FA	SIDE IMPACT DEPLOYMENT	• Side airbag module and curtain airbag module are deployed. • Curtain airbag module is deployed.	<Ref. to AB(diag)-50, DTC B11FA SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B11FB	SIDE IMPACT DEPLOYMENT	• Side airbag module and curtain airbag module are deployed. • Curtain airbag module is deployed.	<Ref. to AB(diag)-50, DTC B11FB SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B11FC	SIDE IMPACT DEPLOYMENT	• Side airbag module and curtain airbag module are deployed. • Curtain airbag module is deployed.	<Ref. to AB(diag)-50, DTC B11FC SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>
B1610	FRONT SUB SENSOR RH FAILURE	Front sub sensor (RH) is faulty	<Ref. to AB(diag)-50, DTC B1610 FRONT SUB SENSOR RH FAILURE, Diagnostic Chart with Trouble Code.>
B1612	FRONT SUB SENSOR RH LOST COMMUNICATION	• Open or short circuit in harness (RH) between airbag control module and front sub sensor. • Front sub sensor (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-50, DTC B1612 FRONT SUB SENSOR RH LOST COMMUNICATION, Diagnostic Chart with Trouble Code.>
B1613	FRONT SUB SENSOR RH INITIALIZATION ERROR		<Ref. to AB(diag)-51, DTC B1613 FRONT SUB SENSOR RH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>
B1615	FRONT SUB SENSOR LH FAILURE	Front sub sensor (LH) is faulty.	<Ref. to AB(diag)-53, DTC B1615 FRONT SUB SENSOR LH FAILURE, Diagnostic Chart with Trouble Code.>
B1617	FRONT SUB SENSOR LH LOST COMMUNICATION	• Open or short circuit in harness (LH) between airbag control module and front sub sensor. • Front sub sensor (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-53, DTC B1617 FRONT SUB SENSOR LH LOST COMMUNICATION, Diagnostic Chart with Trouble Code.>
B1618	FRONT SUB SENSOR LH INITIALIZATION ERROR		<Ref. to AB(diag)-54, DTC B1618 FRONT SUB SENSOR LH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>
B16F2	FRONT SUB SENSOR RH RECOGNITION ERROR	• Front sensor (RH) is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-57, DTC B16F2 FRONT SUB SENSOR RH RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B16F3	FRONT SUB SENSOR LH RECOGNITION ERROR	• Front sensor (LH) is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-57, DTC B16F3 FRONT SUB SENSOR LH RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B1620	SIDE AIRBAG SENSOR RH FAILURE	Side airbag sensor (RH) is faulty.	<Ref. to AB(diag)-58, DTC B1620 SIDE AIRBAG SENSOR RH FAILURE, Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B1622	SIDE AIRBAG SENSOR RH LOST COMMUNICATION	• Open or short circuit in harness (RH) between airbag control module and side airbag sensor. • Side airbag sensor (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-58, DTC B1622 SIDE AIRBAG SENSOR RH LOST COMMUNICATION, Diagnostic Chart with Trouble Code.>
B1623	SIDE AIRBAG SENSOR RH INITIALIZATION ERROR		<Ref. to AB(diag)-59, DTC B1623 SIDE AIRBAG SENSOR RH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>
B1625	SIDE AIRBAG SENSOR LH FAILURE	Side airbag sensor (LH) is faulty.	<Ref. to AB(diag)-61, DTC B1625 SIDE AIRBAG SENSOR LH FAILURE, Diagnostic Chart with Trouble Code.>
B1627	SIDE AIRBAG SENSOR LH LOST COMMUNICATION	• Open or short circuit in harness (LH) between airbag control module and side airbag sensor. • Side airbag sensor (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-61, DTC B1627 SIDE AIRBAG SENSOR LH LOST COMMUNICATION, Diagnostic Chart with Trouble Code.>
B1628	SIDE AIRBAG SENSOR LH INITIALIZATION ERROR		<Ref. to AB(diag)-62, DTC B1628 SIDE AIRBAG SENSOR LH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>
B1630	CURTAIN AIRBAG SENSOR RH FAILURE	Curtain airbag sensor (RH) is faulty.	<Ref. to AB(diag)-64, DTC B1630 CURTAIN AIRBAG SENSOR RH FAILURE, Diagnostic Chart with Trouble Code.>
B1632	CURTAIN AIRBAG SENSOR RH LOST COMMUNICATION	• Open or short circuit in harness (RH) between airbag control module and curtain airbag sensor. • Side airbag sensor (RH) is faulty. • Curtain airbag sensor (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-64, DTC B1632 CURTAIN AIRBAG SENSOR RH LOST COMMUNICATION, Diagnostic Chart with Trouble Code.>
B1633	CURTAIN AIRBAG SENSOR RH INITIALIZATION ERROR		<Ref. to AB(diag)-65, DTC B1633 CURTAIN AIRBAG SENSOR RH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>
B1635	CURTAIN AIRBAG SENSOR LH FAILURE	Curtain airbag sensor (LH) is faulty.	<Ref. to AB(diag)-68, DTC B1635 CURTAIN AIRBAG SENSOR LH FAILURE, Diagnostic Chart with Trouble Code.>
B1637	CURTAIN AIRBAG SENSOR LH LOST COMMUNICATION	• Open or short circuit in harness (LH) between airbag control module and curtain airbag sensor. • Side airbag sensor (LH) is faulty. • Curtain airbag sensor (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-68, DTC B1637 CURTAIN AIRBAG SENSOR LH LOST COMMUNICATION, Diagnostic Chart with Trouble Code.>
B1638	CURTAIN AIRBAG SENSOR LH INITIALIZATION ERROR		<Ref. to AB(diag)-69, DTC B1638 CURTAIN AIRBAG SENSOR LH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B16F4	SIDE AIRBAG SENSOR RH RECOGNITION ERROR	• Side airbag sensor (RH) is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-72, DTC B16F4 SIDE AIRBAG SENSOR RH RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B16F5	SIDE AIRBAG SENSOR LH RECOGNITION ERROR	• Side airbag sensor (LH) is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-72, DTC B16F5 SIDE AIRBAG SENSOR LH RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B16F6	CURTAIN AIRBAG SENSOR RH RECOGNITION ERROR	• Curtain airbag sensor (RH) is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-73, DTC B16F6 CURTAIN AIRBAG SENSOR RH RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B16F7	CURTAIN AIRBAG SENSOR LH RECOGNITION ERROR	• Curtain airbag sensor (LH) is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-73, DTC B16F7 CURTAIN AIRBAG SENSOR LH RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B1642	SIDE SATELLITE SENSOR BUS RH LOST COMMUNICATION	• Open or short circuit in harness (RH) between airbag control module and front door impact sensor. • Side airbag sensor (RH) is faulty. • Curtain airbag sensor (RH) is faulty. • Front door impact sensor (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-74, DTC B1642 SIDE SATELLITE SENSOR BUS RH LOST COMMUNICATION, Diagnostic Chart with Trouble Code.>
B1647	SIDE SATELLITE SENSOR BUS LH LOST COMMUNICATION	• Open or short circuit in harness (LH) between airbag control module and front door impact sensor. • Side airbag sensor (LH) is faulty. • Curtain airbag sensor (LH) is faulty. • Front door impact sensor (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-79, DTC B1647 SIDE SATELLITE SENSOR BUS LH LOST COMMUNICATION, Diagnostic Chart with Trouble Code.>
B1650	OCCUPANT DETECTION SYSTEM MALFUNCTION	• Occupant detection sensor is faulty. • Occupant detection control module is faulty. • Occupant detection harness is faulty. • Rear airbag harness (RH) is faulty. • Fuse No. 25 is blown.	<Ref. to AB(diag)-83, DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION, Diagnostic Chart with Trouble Code.>
B1655	FRONT BUCKLE SWITCH RH FAILURE	• Buckle switch (RH) circuit is open, shorted or shorted to ground. • Occupant detection system is faulty. • Occupant detection harness is faulty.	<Ref. to AB(diag)-83, DTC B1655 FRONT BUCKLE SWITCH RH FAILURE, Diagnostic Chart with Trouble Code.>
B1660	PASSENGER'S AIRBAG ON INDICATOR FAILURE	• Passenger's airbag indicator is faulty. • Airbag control module is faulty. • Airbag main harness circuit is open, shorted or shorted to ground. • Body harness circuit is open.	<Ref. to AB(diag)-84, DTC B1660 PASSENGER'S AIRBAG ON INDICATOR FAILURE, Diagnostic Chart with Trouble Code.>
B1675	SATELLITE SAFING SENSOR FAILURE	Satellite safing sensor is faulty.	<Ref. to AB(diag)-87, DTC B1675 SATELLITE SAFING SENSOR FAILURE, Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B1676	LOST COMMUNICATION WITH SATELLITE SAFING SENSOR	• Open or short circuit in harness between airbag control module and satellite safing sensor. • Satellite safing sensor is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-87, DTC B1676 LOST COMMUNICATION WITH SATELLITE SAFING SENSOR, Diagnostic Chart with Trouble Code.>
B1677	SATELLITE SAFING SENSOR INITIALIZATION INCOMPLETE		<Ref. to AB(diag)-88, DTC B1677 SATELLITE SAFING SENSOR INITIALIZATION INCOMPLETE, Diagnostic Chart with Trouble Code.>
B16F8	SATELLITE SAFING SENSOR RECOGNITION ERROR	• Satellite safing sensor is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-91, DTC B16F8 SATELLITE SAFING SENSOR RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B16F9	DOOR SENSOR RH RECOGNITION ERROR	• Front door impact sensor (RH) is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-91, DTC B16F9 DOOR SENSOR RH RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B1690	DOOR SENSOR RH FAILURE	Front door impact sensor (RH) is faulty.	<Ref. to AB(diag)-92, DTC B1690 DOOR SENSOR RH FAILURE, Diagnostic Chart with Trouble Code.>
B1692	LOST COMMUNICATION WITH DOOR SENSOR RH	• Open or short circuit in harness between curtain airbag sensor and front door impact sensor. • Front door impact sensor (RH) is faulty. • Curtain airbag sensor (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-92, DTC B1692 LOST COMMUNICATION WITH DOOR SENSOR RH, Diagnostic Chart with Trouble Code.>
B1693	DOOR SENSOR RH INITIALIZATION INCOMPLETE		<Ref. to AB(diag)-93, DTC B1693 DOOR SENSOR RH INITIALIZATION INCOMPLETE, Diagnostic Chart with Trouble Code.>
B16FA	DOOR SENSOR LH RECOGNITION ERROR	• Front door impact sensor (LH) is misinstalled. • Airbag control module is faulty.	<Ref. to AB(diag)-96, DTC B16FA DOOR SENSOR LH RECOGNITION ERROR, Diagnostic Chart with Trouble Code.>
B1695	DOOR SENSOR LH FAILURE	Front door impact sensor (LH) is faulty.	<Ref. to AB(diag)-96, DTC B1695 DOOR SENSOR LH FAILURE, Diagnostic Chart with Trouble Code.>
B1697	LOST COMMUNICATION WITH DOOR SENSOR LH	• Open or short circuit in harness between curtain airbag sensor and front door impact sensor. • Front door impact sensor (LH) is faulty. • Curtain airbag sensor (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-96, DTC B1697 LOST COMMUNICATION WITH DOOR SENSOR LH, Diagnostic Chart with Trouble Code.>
B1698	DOOR SENSOR LH INITIALIZATION INCOMPLETE		<Ref. to AB(diag)-97, DTC B1698 DOOR SENSOR LH INITIALIZATION INCOMPLETE, Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B161A	LOST COMMUNICATION WITH FRONT SATELLITE SENSOR BUS	• Open or short circuit in harness between airbag control module and front sub sensor. • Front sub sensor is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-100, DTC B161A LOST COMMUNICATION WITH FRONT SATELLITE SENSOR BUS, Diagnostic Chart with Trouble Code.>
B16F1	PASSENGER'S SEAT BELT WARNING FAILURE	• Airbag control module is faulty. • Meter is faulty • Harness circuits between meter and airbag control module are open, shorted or shorted to ground	<Ref. to AB(diag)-103, DTC B16F1 PASSENGER'S SEAT BELT WARNING FAILURE, Diagnostic Chart with Trouble Code.>
B16F0	PASSENGER'S AIRBAG OFF INDICATOR FAILURE	• Passenger's airbag indicator is faulty • Airbag control module is faulty. • Airbag main harness circuit is open or shorted • Body harness circuit is open	<Ref. to AB(diag)-105, DTC B16F0 PASSENGER'S AIRBAG OFF INDICATOR FAILURE, Diagnostic Chart with Trouble Code.>
B1760	OCCUPANT DETECTION SENSOR MAT	• Occupant detection sensor is open, shorted between terminals, shorted to power supply or shorted to ground. • Seat heater is open. • Occupant detection control module is faulty.	<Ref. to AB(diag)-105, DTC B1760 OCCUPANT DETECTION SENSOR MAT, Diagnostic Chart with Trouble Code.>
B1761	OCCUPANT DETECTION SENSOR MAT LIQUID COATING	• Detected that the occupant detection sensor is spattered with fluid. • Occupant detection sensor is faulty. • Occupant detection control module is faulty.	<Ref. to AB(diag)-105, DTC B1761 OCCUPANT DETECTION SENSOR MAT LIQUID COATING, Diagnostic Chart with Trouble Code.>
B1771	BUCKLE SWITCH	• Passenger's buckle switch circuit is open, shorted or shorted to ground. • Occupant detection system is faulty. • Occupant detection harness is faulty.	<Ref. to AB(diag)-105, DTC B1771 BUCKLE SWITCH, Diagnostic Chart with Trouble Code.>
B1795	OCCUPANT DETECTION MODULE INTERNAL CIRCUIT	Occupant detection control module is faulty.	<Ref. to AB(diag)-105, DTC B1795 OCCUPANT DETECTION MODULE INTERNAL CIRCUIT, Diagnostic Chart with Trouble Code.>
B1800	SHORT IN DRIVER'S AIRBAG	• Airbag main harness circuit is shorted. • Airbag module harness (driver's side) circuit is shorted. • Roll connector circuit is shorted. • Driver's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-106, DTC B1800 SHORT IN DRIVER'S AIRBAG, Diagnostic Chart with Trouble Code.>
B1801	OPEN IN DRIVER'S AIRBAG	• Airbag main harness circuit is open. • Airbag module harness circuit (driver's side) is open. • Roll connector circuit is open. • Driver's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-109, DTC B1801 OPEN IN DRIVER'S AIRBAG, Diagnostic Chart with Trouble Code.>
B1802	SHORT IN DRIVER'S AIRBAG (TO GROUND)	• Airbag main harness circuit is shorted to ground. • Airbag module harness (driver's side) circuit is shorted to ground. • Roll connector circuit is shorted to ground. • Driver's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-112, DTC B1802 SHORT IN DRIVER'S AIRBAG (TO GROUND), Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B1803	SHORT IN DRIVER'S AIRBAG (TO +B)	• Airbag main harness circuit is shorted to power supply. • Airbag module harness circuit (driver's side) is shorted to power supply. • Roll connector circuit is shorted to power supply. • Airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-115, DTC B1803 SHORT IN DRIVER'S AIRBAG (TO +B), Diagnostic Chart with Trouble Code.>
B1805	SHORT IN PASSENGER'S AIRBAG	• Airbag main harness circuit is shorted. • Airbag module harness circuit (passenger's side) is shorted. • Passenger's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-118, DTC B1805 SHORT IN PASSENGER'S AIRBAG, Diagnostic Chart with Trouble Code.>
B1806	OPEN IN PASSENGER'S AIRBAG	• Airbag main harness circuit is open. • Airbag module harness circuit (passenger's side) is open. • Passenger's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-121, DTC B1806 OPEN IN PASSENGER'S AIRBAG, Diagnostic Chart with Trouble Code.>
B1807	SHORT IN PASSENGER'S AIRBAG (TO GROUND)	• Airbag main harness circuit is shorted to ground. • Airbag module harness (passenger's side) circuit is shorted to ground. • Passenger's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-124, DTC B1807 SHORT IN PASSENGER'S AIRBAG (TO GROUND), Diagnostic Chart with Trouble Code.>
B1808	SHORT IN PASSENGER'S AIRBAG (TO +B)	• Airbag main harness circuit is shorted to power supply. • Airbag module harness (passenger's side) circuit is shorted to power supply. • Passenger's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-127, DTC B1808 SHORT IN PASSENGER'S AIRBAG (TO +B), Diagnostic Chart with Trouble Code.>
B1810	SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP	• Airbag main harness circuit is shorted. • Airbag module harness (driver's side) circuit is shorted. • Roll connector circuit is shorted. • Driver's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-131, DTC B1810 SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP, Diagnostic Chart with Trouble Code.>
B1811	OPEN IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP	• Airbag main harness circuit is open. • Airbag module harness circuit (driver's side) is open. • Roll connector circuit is open. • Driver's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-134, DTC B1811 OPEN IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP, Diagnostic Chart with Trouble Code.>
B1812	SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP (TO GROUND)	• Airbag main harness circuit is shorted to ground. • Airbag module harness (driver's side) circuit is shorted to ground. • Roll connector circuit is shorted to ground. • Driver's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-137, DTC B1812 SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP (TO GROUND), Diagnostic Chart with Trouble Code.>
B1813	SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP CIRCUIT (TO +B)	• Airbag main harness circuit is shorted to power supply. • Airbag module harness circuit (driver's side) is shorted to power supply. • Roll connector circuit is shorted to power supply. • Airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-140, DTC B1813 SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP CIRCUIT (TO +B), Diagnostic Chart with Trouble Code.>
B1815	SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP	• Airbag main harness circuit is shorted. • Airbag module harness circuit (passenger's side) is shorted. • Passenger's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-143, DTC B1815 SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP, Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B1816	OPEN IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP	• Airbag main harness circuit is open. • Airbag module harness circuit (passenger's side) is open. • Passenger's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-146, DTC B1816 OPEN IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP, Diagnostic Chart with Trouble Code.>
B1817	SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP (TO GROUND)	• Airbag main harness circuit is shorted to ground. • Airbag module harness (passenger's side) circuit is shorted to ground. • Passenger's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-149, DTC B1817 SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP (TO GROUND), Diagnostic Chart with Trouble Code.>
B1818	SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP CIRCUIT (TO +B)	• Airbag main harness circuit is shorted to power supply. • Airbag module harness (passenger's side) circuit is shorted to power supply. • Passenger's airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-152, DTC B1818 SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP CIRCUIT (TO +B), Diagnostic Chart with Trouble Code.>
B1820	SHORT IN SIDE AIRBAG RH	• Side airbag harness (RH) circuit is shorted. • Side airbag module (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-156, DTC B1820 SHORT IN SIDE AIRBAG RH, Diagnostic Chart with Trouble Code.>
B1821	OPEN IN SIDE AIRBAG RH	• Side airbag harness (RH) circuit is open. • Side airbag module (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-158, DTC B1821 OPEN IN SIDE AIRBAG RH, Diagnostic Chart with Trouble Code.>
B1822	SHORT IN SIDE AIRBAG RH (TO GROUND)	• Side airbag harness (RH) circuit is shorted to ground. • Side airbag module (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-160, DTC B1822 SHORT IN SIDE AIRBAG RH (TO GROUND), Diagnostic Chart with Trouble Code.>
B1823	SHORT IN SIDE AIRBAG RH (TO +B)	• Side airbag harness (RH) circuit is shorted to power supply. • Side airbag module (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-162, DTC B1823 SHORT IN SIDE AIRBAG RH (TO +B), Diagnostic Chart with Trouble Code.>
B1825	SHORT IN SIDE AIRBAG LH	• Side airbag harness (LH) circuit is shorted. • Side airbag module (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-164, DTC B1825 SHORT IN SIDE AIRBAG LH, Diagnostic Chart with Trouble Code.>
B1826	OPEN IN SIDE AIRBAG LH	• Side airbag harness (LH) circuit is open. • Side airbag module (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-166, DTC B1826 OPEN IN SIDE AIRBAG LH, Diagnostic Chart with Trouble Code.>
B1827	SHORT IN SIDE AIRBAG LH (TO GROUND)	• Side airbag harness (LH) circuit is shorted to ground. • Side airbag module (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-168, DTC B1827 SHORT IN SIDE AIRBAG LH (TO GROUND), Diagnostic Chart with Trouble Code.>
B1828	SHORT IN SIDE AIRBAG LH (TO +B)	• Side airbag harness (LH) circuit is shorted to power supply. • Side airbag module (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-170, DTC B1828 SHORT IN SIDE AIRBAG LH (TO +B), Diagnostic Chart with Trouble Code.>
B1830	SHORT IN CURTAIN AIRBAG RH SQUIB CIRCUIT	• Curtain airbag harness (RH) circuit is shorted. • Curtain airbag module (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-172, DTC B1830 SHORT IN CURTAIN AIRBAG RH SQUIB CIRCUIT, Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B1831	OPEN IN CURTAIN AIRBAG RH SQUIB CIRCUIT	• Curtain airbag harness (RH) circuit is open. • Curtain airbag module (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-175, DTC B1831 OPEN IN CURTAIN AIRBAG RH SQUIB CIRCUIT, Diagnostic Chart with Trouble Code.>
B1832	SHORT IN CURTAIN AIRBAG RH SQUIB CIRCUIT (TO GROUND)	• Curtain airbag harness (RH) circuit is shorted to ground. • Curtain airbag module (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-178, DTC B1832 SHORT IN CURTAIN AIRBAG RH SQUIB CIRCUIT (TO GROUND), Diagnostic Chart with Trouble Code.>
B1833	SHORT IN CURTAIN SHIELD AIRBAG RH SQUIB CIRCUIT (TO +B)	• Curtain airbag harness (RH) is shorted to power supply. • Curtain airbag module (RH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-180, DTC B1833 SHORT IN CURTAIN SHIELD AIRBAG RH SQUIB CIRCUIT (TO +B), Diagnostic Chart with Trouble Code.>
B1835	SHORT IN CURTAIN AIRBAG LH SQUIB CIRCUIT	• Curtain airbag harness (LH) circuit is shorted. • Curtain airbag module (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-183, DTC B1835 SHORT IN CURTAIN AIRBAG LH SQUIB CIRCUIT, Diagnostic Chart with Trouble Code.>
B1836	OPEN IN CURTAIN AIRBAG LH SQUIB CIRCUIT	• Curtain airbag harness (LH) circuit is open. • Curtain airbag module (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-186, DTC B1836 OPEN IN CURTAIN AIRBAG LH SQUIB CIRCUIT, Diagnostic Chart with Trouble Code.>
B1837	SHORT IN CURTAIN AIRBAG LH SQUIB CIRCUIT (TO GROUND)	• Curtain airbag harness (LH) circuit is shorted to ground. • Curtain airbag module (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-189, DTC B1837 SHORT IN CURTAIN AIRBAG LH SQUIB CIRCUIT (TO GROUND), Diagnostic Chart with Trouble Code.>
B1838	SHORT IN CURTAIN SHIELD AIRBAG LH SQUIB CIRCUIT (TO +B)	• Curtain airbag harness (LH) is shorted to power supply. • Curtain airbag module (LH) is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-191, DTC B1838 SHORT IN CURTAIN SHIELD AIRBAG LH SQUIB CIRCUIT (TO +B), Diagnostic Chart with Trouble Code.>
B1860	SHORT IN DRIVER'S KNEE AIRBAG	• Airbag main harness circuit is shorted. • Knee airbag module harness circuit is shorted. • Knee airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-194, DTC B1860 SHORT IN DRIVER'S KNEE AIRBAG, Diagnostic Chart with Trouble Code.>
B1861	OPEN IN DRIVER'S KNEE AIRBAG	• Airbag main harness circuit is open. • Knee airbag module harness circuit is open. • Knee airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-197, DTC B1861 OPEN IN DRIVER'S KNEE AIRBAG, Diagnostic Chart with Trouble Code.>
B1862	SHORT IN DRIVER'S KNEE AIRBAG (TO GROUND)	• Airbag main harness circuit is shorted to ground. • Knee airbag module harness circuit is shorted to ground. • Knee airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-200, DTC B1862 SHORT IN DRIVER'S KNEE AIRBAG (TO GROUND), Diagnostic Chart with Trouble Code.>
B1863	SHORT IN DRIVER'S KNEE AIRBAG (TO +B)	• Airbag main harness circuit is shorted to power supply. • Knee airbag module harness circuit is shorted to power supply. • Knee airbag module is faulty. • Airbag control module is faulty.	<Ref. to AB(diag)-203, DTC B1863 SHORT IN DRIVER'S KNEE AIRBAG (TO +B), Diagnostic Chart with Trouble Code.>

DTC	Item	Content of diagnosis	Reference
B1900	SHORT IN FRONT P/T RH	• Seat belt pretensioner (RH) circuit is shorted. • Pretensioner (RH) is faulty. • Pretensioner harness (RH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-206, DTC B1900 SHORT IN FRONT P/T RH, Diagnostic Chart with Trouble Code.>
B1901	OPEN IN FRONT P/T RH	• Seat belt pretensioner (RH) circuit is open. • Pretensioner (RH) is faulty. • Pretensioner harness (RH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-209, DTC B1901 OPEN IN FRONT P/T RH, Diagnostic Chart with Trouble Code.>
B1902	SHORT IN FRONT P/T RH (TO GROUND)	• Seat belt pretensioner (RH) circuit is shorted to ground. • Pretensioner (RH) is faulty. • Pretensioner harness (RH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-212, DTC B1902 SHORT IN FRONT P/T RH (TO GROUND), Diagnostic Chart with Trouble Code.>
B1903	SHORT IN FRONT P/T RH (TO +B)	• Seat belt pretensioner (RH) circuit is shorted to power supply. • Pretensioner (RH) is faulty. • Pretensioner harness (RH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-215, DTC B1903 SHORT IN FRONT P/T RH (TO +B), Diagnostic Chart with Trouble Code.>
B1905	SHORT IN FRONT P/T LH	• Seat belt pretensioner (LH) circuit is shorted. • Pretensioner (LH) is faulty. • Pretensioner harness (LH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-218, DTC B1905 SHORT IN FRONT P/T LH, Diagnostic Chart with Trouble Code.>
B1906	OPEN IN FRONT P/T LH	• Seat belt pretensioner (LH) circuit is open. • Pretensioner (LH) is faulty. • Pretensioner harness (LH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-221, DTC B1906 OPEN IN FRONT P/T LH, Diagnostic Chart with Trouble Code.>
B1907	SHORT IN FRONT P/T LH (TO GROUND)	• Seat belt pretensioner (LH) circuit is shorted to ground. • Pretensioner (LH) is faulty. • Pretensioner harness (LH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-224, DTC B1907 SHORT IN FRONT P/T LH (TO GROUND), Diagnostic Chart with Trouble Code.>
B1908	SHORT IN FRONT P/T LH (TO +B)	• Seat belt pretensioner (LH) circuit is shorted to power supply. • Pretensioner (LH) is faulty. • Pretensioner harness (LH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-227, DTC B1908 SHORT IN FRONT P/T LH (TO +B), Diagnostic Chart with Trouble Code.>
B19F0	SHORT IN FRONT P/T 2 RH	• Lap seat belt pretensioner (RH) circuit is shorted. • Lap seat belt pretensioner (RH) is faulty. • Lap seat belt pretensioner harness (RH) is shorted. • Airbag control module is faulty.	<Ref. to AB(diag)-230, DTC B19F0 SHORT IN FRONT P/T 2 RH, Diagnostic Chart with Trouble Code.>
B19F1	OPEN IN FRONT P/T 2 RH	• Lap seat belt pretensioner (RH) circuit is open. • Lap seat belt pretensioner (RH) is faulty. • Lap seat belt pretensioner harness (RH) is open. • Airbag control module is faulty.	<Ref. to AB(diag)-233, DTC B19F1 OPEN IN FRONT P/T 2 RH, Diagnostic Chart with Trouble Code.>
B19F2	SHORT IN FRONT P/T 2 RH (TO GROUND)	• Lap seat belt pretensioner (RH) circuit is shorted to ground. • Lap seat belt pretensioner (RH) is faulty. • Lap seat belt pretensioner harness (RH) is shorted to ground. • Airbag control module is faulty.	<Ref. to AB(diag)-236, DTC B19F2 SHORT IN FRONT P/T 2 RH (TO GROUND), Diagnostic Chart with Trouble Code.>
B19F3	SHORT IN FRONT P/T 2 RH (TO +B)	• Lap seat belt pretensioner (RH) circuit is shorted to power supply. • Lap seat belt pretensioner (RH) is faulty. • Lap seat belt pretensioner harness (RH) is shorted to power supply. • Airbag control module is faulty.	<Ref. to AB(diag)-239, DTC B19F3 SHORT IN FRONT P/T 2 RH (TO +B), Diagnostic Chart with Trouble Code.>

17.Diagnostic Chart with Trouble Code

A: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

DIAGNOSIS START CONDITION:
Ignition voltage remains at 10 V or more for 1 second.
DTC DETECTING CONDITION:
Detected when malfunction occurs in CAN line.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: DTC B1000 AIRBAG ECU MALFUNCTION

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is any of B1000, B1003, B1105, B1106, B1115, B1116, B1120, B1121, B1125, B1126, B1135, B1136, B1145, B1146, B1170, B1185, B1195, B1196 or B1199 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Perform the Clear Memory Mode. <Ref. to AB(diag)-29, Clear Memory Mode.>

C: DTC B1003 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1103 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

D: DTC B1105 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1105 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

E: DTC B1106 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1106 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

F: DTC B1115 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1115 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

G: DTC B1116 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1116 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

H: DTC B1120 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1120 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

I: DTC B1121 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1121 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

J: DTC B1125 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1125 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

K: DTC B1126 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1126 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

L: DTC B1135 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1135 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

M: DTC B1136 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1136 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

N: DTC B1145 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1145 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

O: DTC B1146 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1146 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

P: DTC B1170 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1170 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

Q: DTC B1185 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1185 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

R: DTC B1195 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1195 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

S: DTC B1196 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1196 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

T: DTC B1199 AIRBAG ECU MALFUNCTION

NOTE:
Refer to DTC B1199 for details on DTC B1000. <Ref. to AB(diag)-47, DTC B1000 AIRBAG ECU MALFUNCTION, Diagnostic Chart with Trouble Code.>

U: DTC B11E0 ROLLOVER DEPLOYMENT HISTORY

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
This DTC is indicated when the curtain airbag module and the seat belt pretensioner are deployed.
Once this DTC is displayed, the memory cannot be cleared. Replace the following parts.
- Airbag control module <Ref. to AB-55, Airbag Control Module.>
- Curtain airbag module <Ref. to AB-51, Curtain Airbag Module.>
- Front outer seat belt with pretensioner <Ref. to SB-17, Front Seat Belt.>

V: DTC B11F2 FRONT IMPACT DEPLOYMENT

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
This DTC is indicated when the front airbag module and the pretensioner are deployed.
Once this DTC is displayed, the memory cannot be cleared. Therefore replace the following parts.
- Airbag control module <Ref. to AB-55, Airbag Control Module.>
- Driver's airbag module <Ref. to AB-38, Driver's Airbag Module.>
- Passenger's airbag module <Ref. to AB-42, Passenger's Airbag Module.>
- Driver's knee airbag module <Ref. to AB-41, Knee Airbag Module.>
- Front sub sensor of both sides <Ref. to AB-57, Front Sub Sensor.>
- Front outer seat belt with pretensioner of both sides <Ref. to SB-17, Front Seat Belt.>
- Steering roll connector <Ref. to AB-69, Roll Connector.>
- Occupant detection system (passenger's seat cushion & frame assembly) <Ref. to SE-8, Front Seat.>
- Curtain airbag module on both sides (when activated) <Ref. to AB-51, Curtain Airbag Module.>

W: DTC B11F3 FRONT IMPACT DEPLOYMENT

NOTE:
For details on DTC B11F3, refer to DTC B11F2. <Ref. to AB(diag)-49, DTC B11F2 FRONT IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

X: DTC B11F4 FRONT IMPACT DEPLOYMENT

NOTE:
For details on DTC B11F4, refer to DTC B11F2. <Ref. to AB(diag)-49, DTC B11F2 FRONT IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

Y: DTC B11F5 FRONT IMPACT DEPLOYMENT

NOTE:
For details on DTC B11F5, refer to DTC B11F2. <Ref. to AB(diag)-49, DTC B11F2 FRONT IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

Z: DTC B11F7 SIDE IMPACT DEPLOYMENT

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
This DTC is displayed when the side airbag module and curtain airbag module are deployed.
Once this DTC is displayed, the memory cannot be cleared. Replace the following parts.

- Airbag control module <Ref. to AB-55, Airbag Control Module.>
- Side airbag module (operating side) <Ref. to AB-48, Side Airbag Module.>
- Side airbag sensor (operating side) <Ref. to AB-60, Side Airbag Sensor.>
- Curtain airbag module (operating side) <Ref. to AB-51, Curtain Airbag Module.>
- Curtain airbag sensor (operating side) <Ref. to AB-63, Curtain Airbag Sensor.>
- Satellite safing sensor <Ref. to AB-68, Satellite Safing Sensor.>
- Front door impact sensor (operating side) <Ref. to AB-59, Front Door Impact Sensor.>
- Front outer seat belt with pretensioner on the collision side (when activated) <Ref. to SB-17, Front Seat Belt.>

AA:DTC B11F8 SIDE IMPACT DEPLOYMENT

NOTE:
For details on DTC B11F8. refer to DTC B11F7. <Ref. to AB(diag)-50, DTC B11F7 SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

AB:DTC B11F9 SIDE IMPACT DEPLOYMENT

NOTE:
For details on DTC B11F9, refer to DTC B11F7. <Ref. to AB(diag)-50, DTC B11F7 SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

AC:DTC B11FA SIDE IMPACT DEPLOYMENT

NOTE:
For details on DTC B11FA, refer to DTC B11F7. <Ref. to AB(diag)-50, DTC B11F7 SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

AD:DTC B11FB SIDE IMPACT DEPLOYMENT

NOTE:
For details on DTC B11FB, refer to DTC B11F7. <Ref. to AB(diag)-50, DTC B11F7 SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

AE:DTC B11FC SIDE IMPACT DEPLOYMENT

NOTE:
For details on DTC B11FC, refer to DTC B11F7. <Ref. to AB(diag)-50, DTC B11F7 SIDE IMPACT DEPLOYMENT, Diagnostic Chart with Trouble Code.>

AF:DTC B1610 FRONT SUB SENSOR RH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Front sub sensor (RH) is faulty.
If DTC B1610 is displayed, the circuit within the front sub sensor (RH) is faulty.
Replace the front sub sensor (RH). <Ref. to AB-57, Front Sub Sensor.>

AG:DTC B1612 FRONT SUB SENSOR RH LOST COMMUNICATION

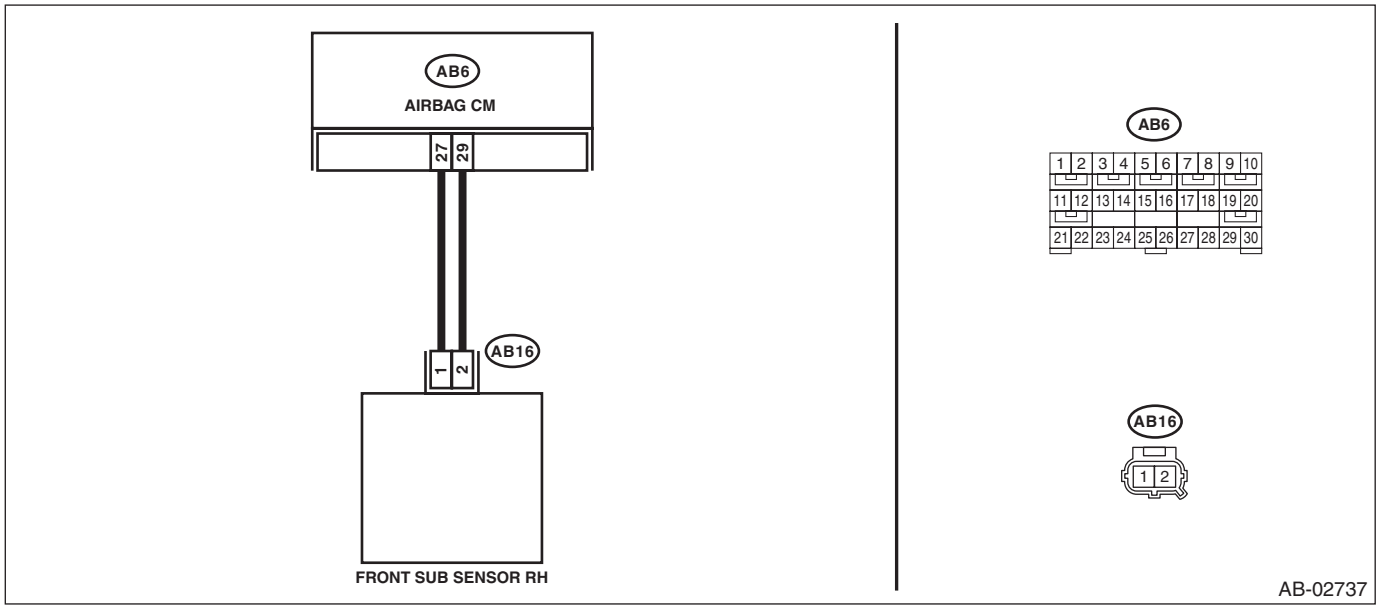
NOTE:
For details on DTC B1612, refer to DTC B1613. <Ref. to AB(diag)-51, DTC B1613 FRONT SUB SENSOR RH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>

AH:DTC B1613 FRONT SUB SENSOR RH INITIALIZATION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of front sensor bus (RH)
- Front sub sensor (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



	Step	Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors (AB6, AB16) between the airbag control module and the front sub sensor (RH).	Is there poor contact?	Replace the airbag main harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (FRONT SENSOR BUS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the instrument panel lower cover and column cover, and disconnect the connectors (AB7) and (AB2). 3) Remove the console front panel and disconnect the connector (AB9). 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Disconnect the connector (AB16) from the front sub sensor (RH), and then connect the connector (1H) in the test harness H to connector (AB16). 7) Measure the resistance between connector (4AG) in the test harness AG and connector (3H) in the test harness H. ***Connector & terminal*** ***(4AG) No. 14 — (3H) No. 5:*** ***(4AG) No. 12 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG MAIN HARNESS (FRONT SENSOR BUS RH).** Measure the resistance between connector (4AG) in the test harness AG and chassis ground, and the resistance between connector (4AG) terminals in the test harness AG. ***Connector & terminal*** ***(4AG) No. 12 — Chassis ground:*** ***(4AG) No. 14 — Chassis ground:*** ***(4AG) No. 12 — (4AG) No. 14:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag main harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1613 displayed?	Replace the front sub sensor (RH). <Ref. to AB-57, REMOVAL, Front Sub Sensor.> Replace the airbag control module if not operating normally even after replacing the sensor. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **5**.

Step		Check	Yes	No
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

AI: DTC B1615 FRONT SUB SENSOR LH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Front sub sensor (LH) is faulty.
If DTC B1615 is displayed, the circuit within the front sub sensor (LH) is faulty.
Replace the front sub sensor (LH). <Ref. to AB-57, Front Sub Sensor.>

AJ:DTC B1617 FRONT SUB SENSOR LH LOST COMMUNICATION

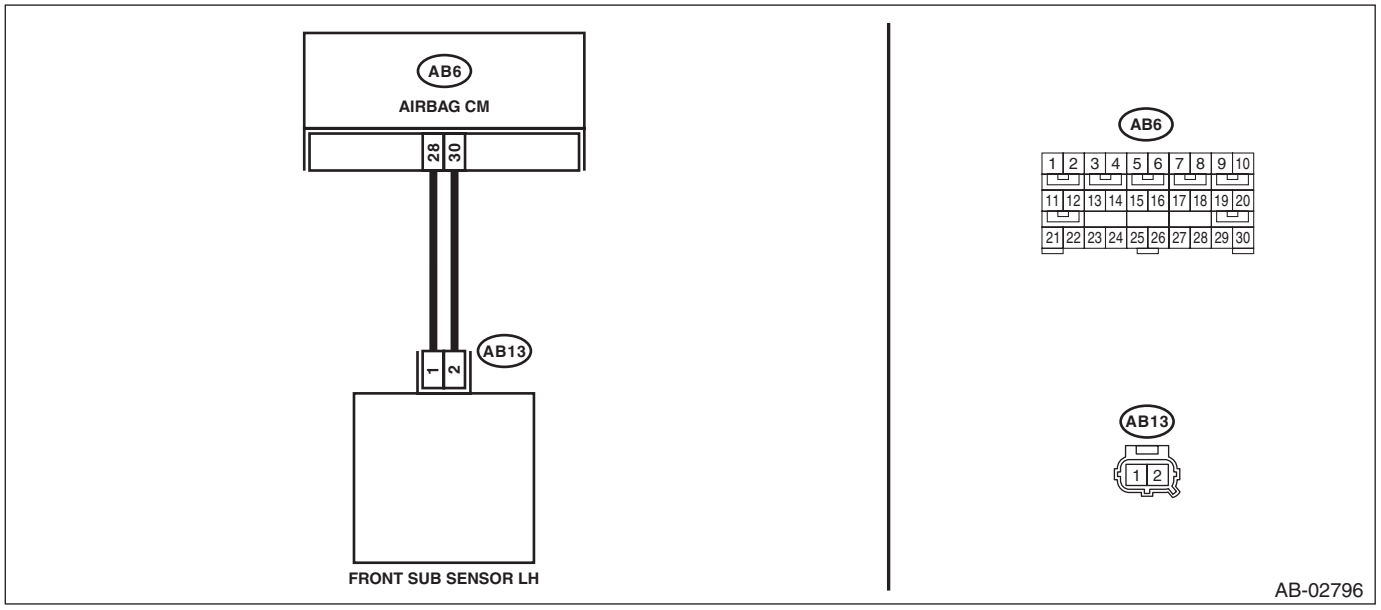
NOTE:
For details on DTC B1617, refer to DTC B1618. <Ref. to AB(diag)-54, DTC B1618 FRONT SUB SENSOR LH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>

AK:DTC B1618 FRONT SUB SENSOR LH INITIALIZATION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of front sensor bus (LH)
- Front sub sensor (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors (AB6, AB13) between the airbag control module and the front sub sensor (LH).	Is there poor contact?	Replace the airbag main harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (FRONT SENSOR BUS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the instrument panel lower cover and column cover, and disconnect the connectors (AB7) and (AB2). 3) Remove the console front panel and disconnect the connector (AB9). 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Disconnect the connector (AB13) from the front sub sensor (LH), and then connect the connector (1H) in the test harness H to connector (AB13). 7) Measure the resistance between connector (4AG) in the test harness AG and connector (3H) in the test harness H. ***Connector & terminal*** ***(4AG) No. 7 — (3H) No. 5:*** ***(4AG) No. 9 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG MAIN HARNESS (FRONT SENSOR BUS LH).** Measure the resistance between connector (4AG) in the test harness AG and chassis ground, and the resistance between connector (4AG) terminals in the test harness AG. ***Connector & terminal*** ***(4AG) No. 7 — Chassis ground:*** ***(4AG) No. 9 — Chassis ground:*** ***(4AG) No. 7 — (4AG) No. 9:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag main harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1618 displayed?	Replace the front sub sensor (LH). <Ref. to AB-57, REMOVAL, Front Sub Sensor.> Replace the airbag control module if not operating normally even after replacing the sensor. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **5**.

Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

AL:DTC B16F2 FRONT SUB SENSOR RH RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Front sub sensor (RH) is misinstalled.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**REPLACE FRONT SUB SENSOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the front sub sensor (RH) with a genuine sensor. <Ref. to AB-57, REMOVAL, Front Sub Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

AM:DTC B16F3 FRONT SUB SENSOR LH RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Front sub sensor (LH) is misinstalled.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**REPLACE FRONT SUB SENSOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the front sub sensor (LH) with a genuine sensor. <Ref. to AB-57, REMOVAL, Front Sub Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

AN:DTC B1620 SIDE AIRBAG SENSOR RH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Side airbag sensor (RH) is faulty.
When DTC B1620 is displayed, the circuit within the side airbag sensor (RH) is faulty.
Replace the side airbag sensor (RH). <Ref. to AB-60, Side Airbag Sensor.>

AO:DTC B1622 SIDE AIRBAG SENSOR RH LOST COMMUNICATION

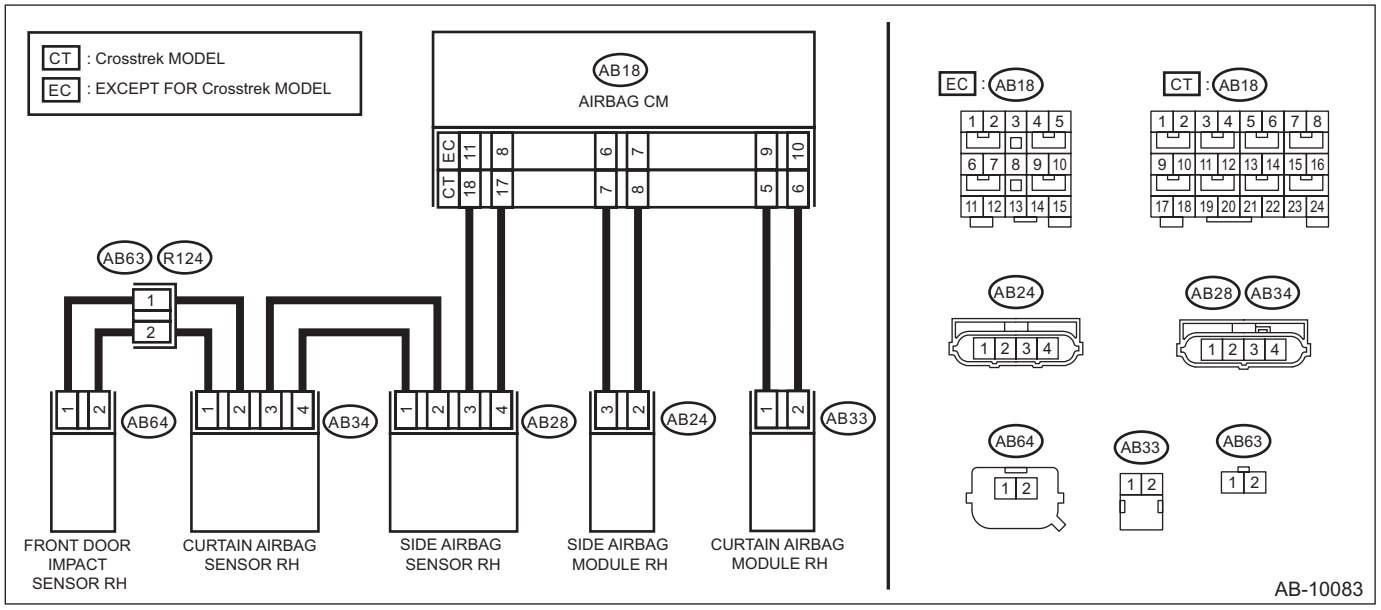
NOTE:
For details on DTC B1622, refer to DTC B1623. <Ref. to AB(diag)-59, DTC B1623 SIDE AIRBAG SENSOR RH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>

AP:DTC B1623 SIDE AIRBAG SENSOR RH INITIALIZATION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of side sensor bus (RH)
- Side airbag sensor (RH) and curtain airbag sensor (RH) are faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the side airbag sensor (RH).	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SIDE AIRBAG SENSOR RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect connector (AB24) of the side airbag module (RH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Disconnect the connector (AB28) from side airbag sensor (RH), and connect the connector (2V) in test harness V to connector (AB28). 8) Measure the resistance between connector (5AG) in the test harness AG and connector (3V) in the test harness V. ***Connector & terminal*** ***Crosstrek model*** ***(5AG) No. 14 — (3V) No. 1:*** ***(5AG) No. 16 — (3V) No. 2:*** ***Except for Crosstrek model*** ***(5AG) No. 14 — (3V) No. 1:*** ***(5AG) No. 15 — (3V) No. 2:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the airbag rear harness along with body harness.
3	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SIDE AIRBAG SENSOR RH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals in test harness V. ***Connector & terminal*** ***(3V) No. 1 — Chassis ground:*** ***(3V) No. 2 — Chassis ground:*** ***(3V) No. 1 — (3V) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1623 displayed?	Go to step **5**.	Go to step **6**.

	Step	Check	Yes	No
5	**REPLACE SIDE AIRBAG SENSOR (RH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the side airbag sensor (RH). <Ref. to AB-60, REMOVAL, Side Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is the system normal?	Go to step **6**.	Replace the curtain airbag sensor RH. <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.> Replace the airbag control module if not operating normally even after replacing the sensor. <Ref. to AB-55, REMOVAL, Airbag Control Module.>
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

AQ:DTC B1625 SIDE AIRBAG SENSOR LH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Side airbag sensor (LH) is faulty.
When DTC B1625 is displayed, the circuit within the side airbag sensor (LH) is faulty.
Replace the side airbag sensor (LH). <Ref. to AB-60, Side Airbag Sensor.>

AR:DTC B1627 SIDE AIRBAG SENSOR LH LOST COMMUNICATION

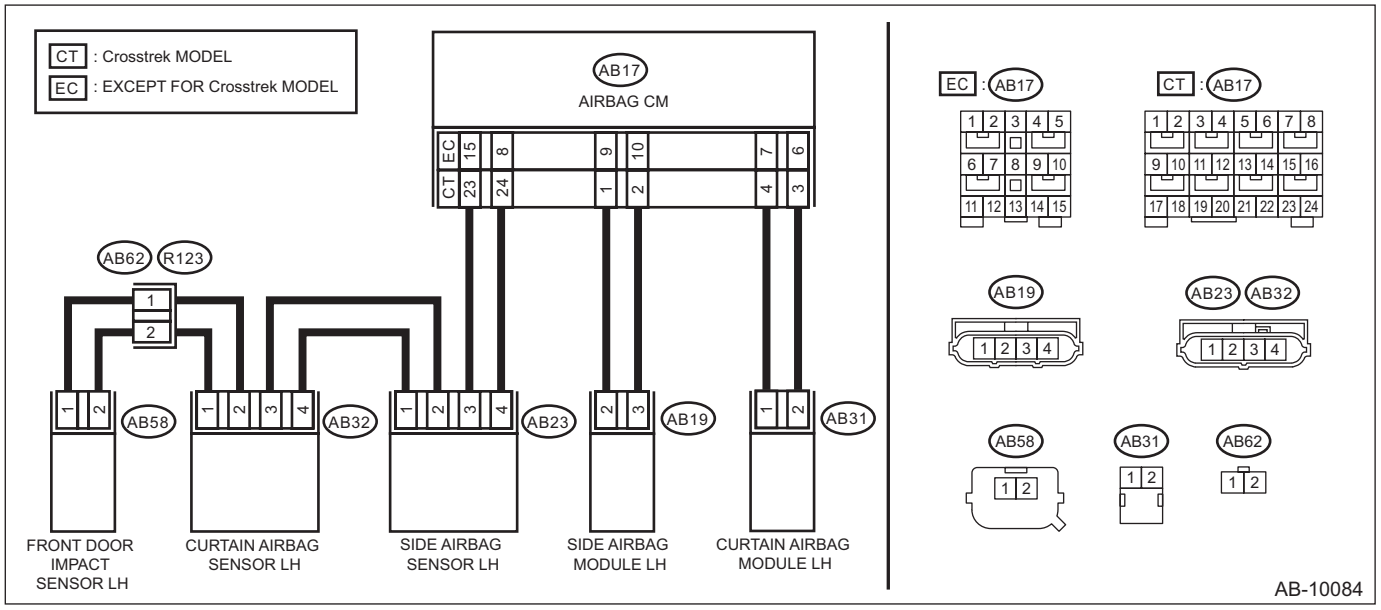
NOTE:
For details on DTC B1627, refer to DTC B1628. <Ref. to AB(diag)-62, DTC B1628 SIDE AIRBAG SENSOR LH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>

AS:DTC B1628 SIDE AIRBAG SENSOR LH INITIALIZATION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of side sensor bus (LH)
- Side airbag sensor (LH) and curtain airbag sensor (LH) are faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the side airbag sensor (RH).	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SIDE AIRBAG SENSOR LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect the connector (AB31) from curtain airbag module (LH). 4) Disconnect connector (AB19) of the side airbag module (LH). 5) Disconnect the connectors (AB17, AB6, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Disconnect the connector (AB23) from side airbag sensor (LH), and connect the connector (2V) in test harness V to connector (AB23). 8) Measure the resistance between connector (5AG) in the test harness AG and connector (3V) in the test harness V. ***Connector & terminal*** ***Crosstrek model*** ***(5AG) No. 8 — (3V) No. 2:*** ***(5AG) No. 10 — (3V) No. 1:*** ***Except for Crosstrek model*** ***(5AG) No. 9 — (3V) No. 2:*** ***(5AG) No. 10 — (3V) No. 1:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the airbag rear harness along with body harness.
3	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SIDE AIRBAG SENSOR LH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals in test harness V. ***Connector & terminal*** ***(3V) No. 1 — Chassis ground:*** ***(3V) No. 2 — Chassis ground:*** ***(3V) No. 1 — (3V) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1628 displayed?	Go to step **5**.	Go to step **6**.

	Step	Check	Yes	No
5	**REPLACE SIDE AIRBAG SENSOR (LH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the side airbag sensor (LH). <Ref. to AB-60, REMOVAL, Side Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is the system normal?	Go to step **6**.	Replace the curtain airbag sensor LH. <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.> Replace the airbag control module if not operating normally even after replacing the sensor. <Ref. to AB-55, REMOVAL, Airbag Control Module.>
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

AT:DTC B1630 CURTAIN AIRBAG SENSOR RH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Curtain airbag sensor (RH) is faulty.
If DTC B1630 is displayed, the circuit within the curtain airbag sensor (RH) is faulty.
Replace the curtain airbag sensor (RH). <Ref. to AB-63, Curtain Airbag Sensor.>

AU:DTC B1632 CURTAIN AIRBAG SENSOR RH LOST COMMUNICATION

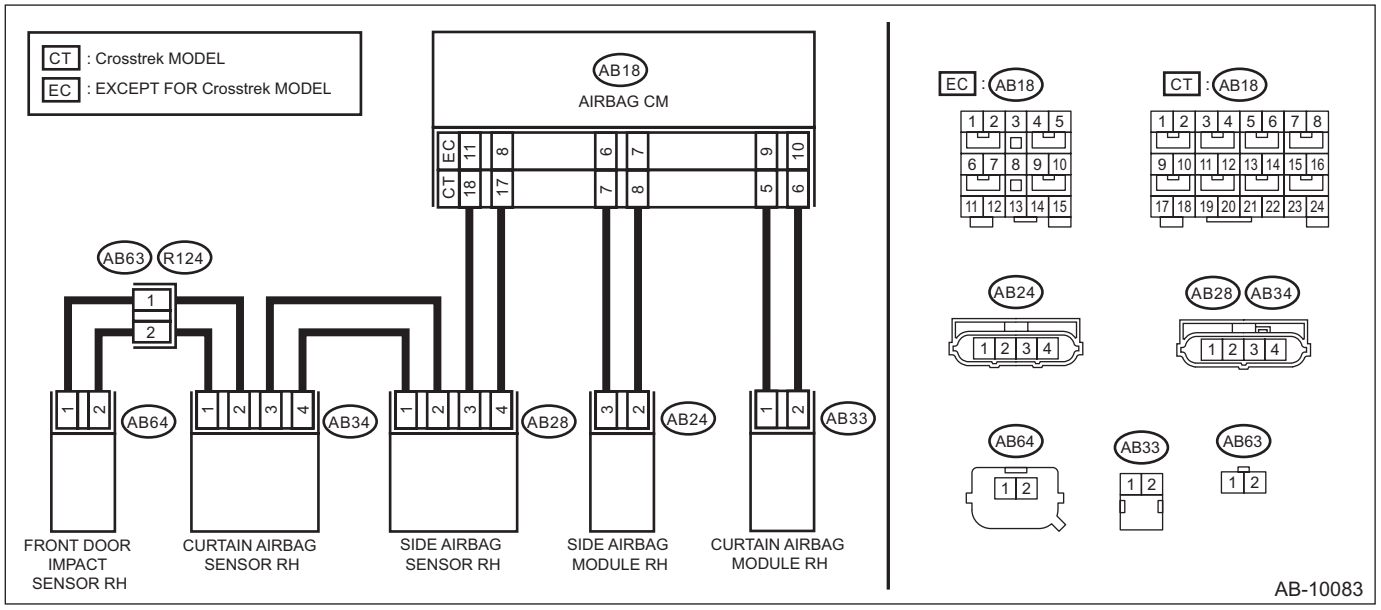
NOTE:
For details on DTC B1632, refer to DTC B1633. <Ref. to AB(diag)-65, DTC B1633 CURTAIN AIRBAG SENSOR RH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>

AV:DTC B1633 CURTAIN AIRBAG SENSOR RH INITIALIZATION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of side sensor bus (RH)
- Side airbag sensor (RH) and curtain airbag sensor (RH) are faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1622 or B1623 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the door sensor (RH).	Is there poor contact?	Replace the airbag rear harness and the door harness.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (BETWEEN SIDE AIRBAG SENSOR (RH) AND CURTAIN AIRBAG SENSOR (RH)).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect connector (AB24) of the side airbag module (RH). 5) Disconnect connector (AB28) from side airbag sensor (RH). 6) Connect the connector (AB28) of side airbag sensor (RH) and the connector (1AI) in the test harness AI. 7) Connect the connector (2AI) in the test harness AI and the connector (1V) in the test harness V. 8) Disconnect the connector (AB34) from curtain airbag sensor (RH), and connect the connector (2V) in test harness V to connector (AB34). 9) Measure the resistance between connector (3V) terminals in the test harness V. ***Connector & terminal*** ***(3V) No. 2 — (3V) No. 6:*** ***(3V) No. 1 — (3V) No. 7:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG REAR HARNESS (BETWEEN SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR RH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) in test harness V. ***Connector & terminal*** ***(3V) No. 2 — Chassis ground:*** ***(3V) No. 1 — Chassis ground:*** ***(3V) No. 2 — (3V) No. 1:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Replace the airbag rear harness along with body harness.
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1633 displayed?	Go to step **6**.	Go to step **7**.

	Step	Check	Yes	No
6	**REPLACE CURTAIN AIRBAG SENSOR (RH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the curtain airbag sensor (RH). <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1633 displayed?	Go to step **7**.	Go to step **8**.
7	**REPLACE SIDE AIRBAG SENSOR (RH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the side airbag sensor (RH). <Ref. to AB-60, REMOVAL, Side Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1633 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **8**.
8	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

AW:DTC B1635 CURTAIN AIRBAG SENSOR LH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Curtain airbag sensor (LH) is faulty.
If DTC B1635 is displayed, the circuit within the curtain airbag sensor (LH) is faulty.
Replace the curtain airbag sensor (LH). <Ref. to AB-63, Curtain Airbag Sensor.>

AX:DTC B1637 CURTAIN AIRBAG SENSOR LH LOST COMMUNICATION

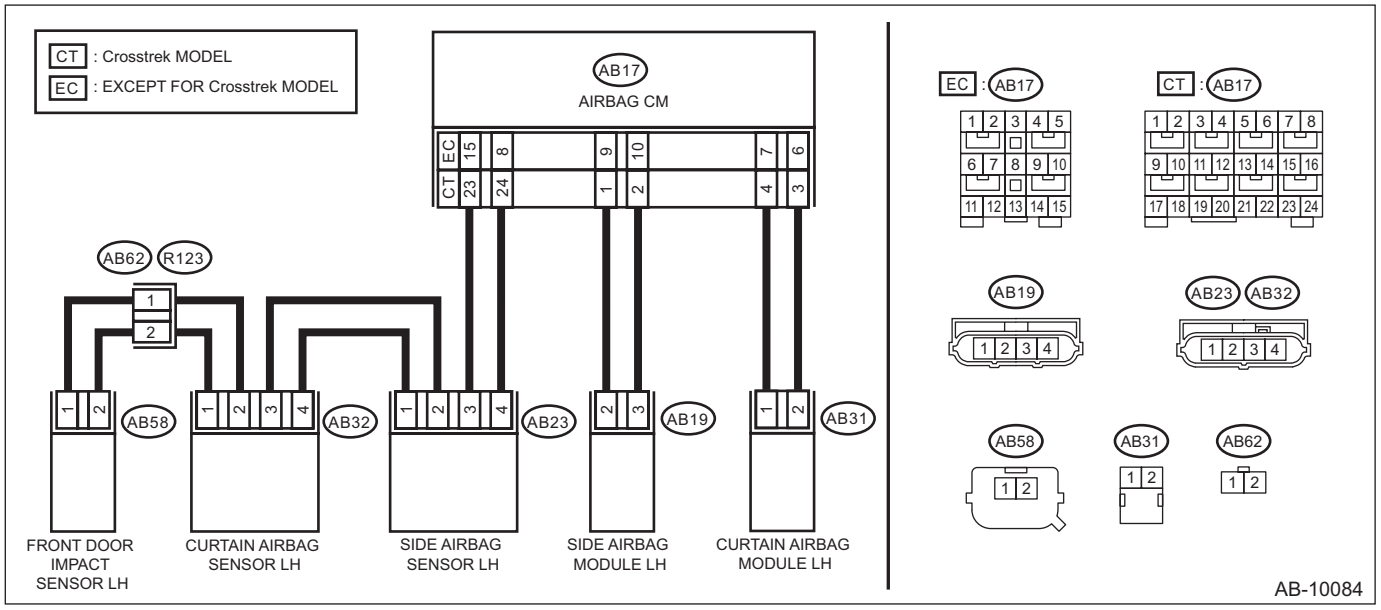
NOTE:
Refer to DTC B1637 for details on DTC B1638. <Ref. to AB(diag)-69, DTC B1638 CURTAIN AIRBAG SENSOR LH INITIALIZATION ERROR, Diagnostic Chart with Trouble Code.>

AY:DTC B1638 CURTAIN AIRBAG SENSOR LH INITIALIZATION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of side sensor bus (LH)
- Side airbag sensor (LH) and curtain airbag sensor (LH) are faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1627 or B1628 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the door sensor (LH).	Is there poor contact?	Replace the airbag rear harness and the door harness.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (BETWEEN SIDE AIRBAG SENSOR LH AND CURTAIN AIRBAG SENSOR LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect the connector (AB31) from curtain airbag module (LH). 4) Disconnect connector (AB19) of the side airbag module (LH). 5) Disconnect the connector (AB23) in the side airbag sensor (LH). 6) Connect the connector (AB23) of side airbag sensor (LH) and the connector (1AI) in the test harness AI. 7) Connect the connector (2AI) in the test harness AI and the connector (1V) in the test harness V. 8) Disconnect the connector (AB32) from curtain airbag sensor (LH), and connect to the connector (2V) in test harness V. 9) Measure the resistance between connector (3V) terminals in the test harness V. ***Connector & terminal*** ***(3V) No. 2 — (3V) No. 6:*** ***(3V) No. 1 — (3V) No. 7:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG REAR HARNESS (BETWEEN SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR LH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) in test harness V. ***Connector & terminal*** ***(3V) No. 1 — Chassis ground:*** ***(3V) No. 2 — Chassis ground:*** ***(3V) No. 1 — (3V) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Replace the airbag rear harness along with body harness.
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1638 displayed?	Go to step **6**.	Go to step **8**.

	Step	Check	Yes	No
6	**REPLACE CURTAIN AIRBAG SENSOR (LH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the curtain airbag sensor (LH). <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1638 displayed?	Go to step **7**.	Go to step **8**.
7	**REPLACE SIDE AIRBAG SENSOR (LH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the side airbag sensor (LH). <Ref. to AB-60, REMOVAL, Side Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1638 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **8**.
8	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

AZ:DTC B16F4 SIDE AIRBAG SENSOR RH RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
- Side airbag sensor RH is misinstalled.
- Airbag CM is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**REPLACE SIDE AIRBAG SENSOR (RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the side A/B sensor (RH) with a genuine sensor. <Ref. to AB-60, REMOVAL, Side Airbag Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

BA:DTC B16F5 SIDE AIRBAG SENSOR LH RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
- Side airbag sensor LH is misinstalled.
- Airbag CM is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**REPLACE SIDE AIRBAG SENSOR (LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the side A/B sensor (LH) with a genuine sensor. <Ref. to AB-60, REMOVAL, Side Airbag Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

BB:DTC B16F6 CURTAIN AIRBAG SENSOR RH RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
- Curtain airbag sensor RH is misinstalled.
- Airbag CM is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**REPLACE CURTAIN AIRBAG SENSOR (RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the curtain A/B sensor (RH) with a genuine sensor. <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

BC:DTC B16F7 CURTAIN AIRBAG SENSOR LH RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
- Curtain airbag sensor LH is misinstalled.
- Airbag CM is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

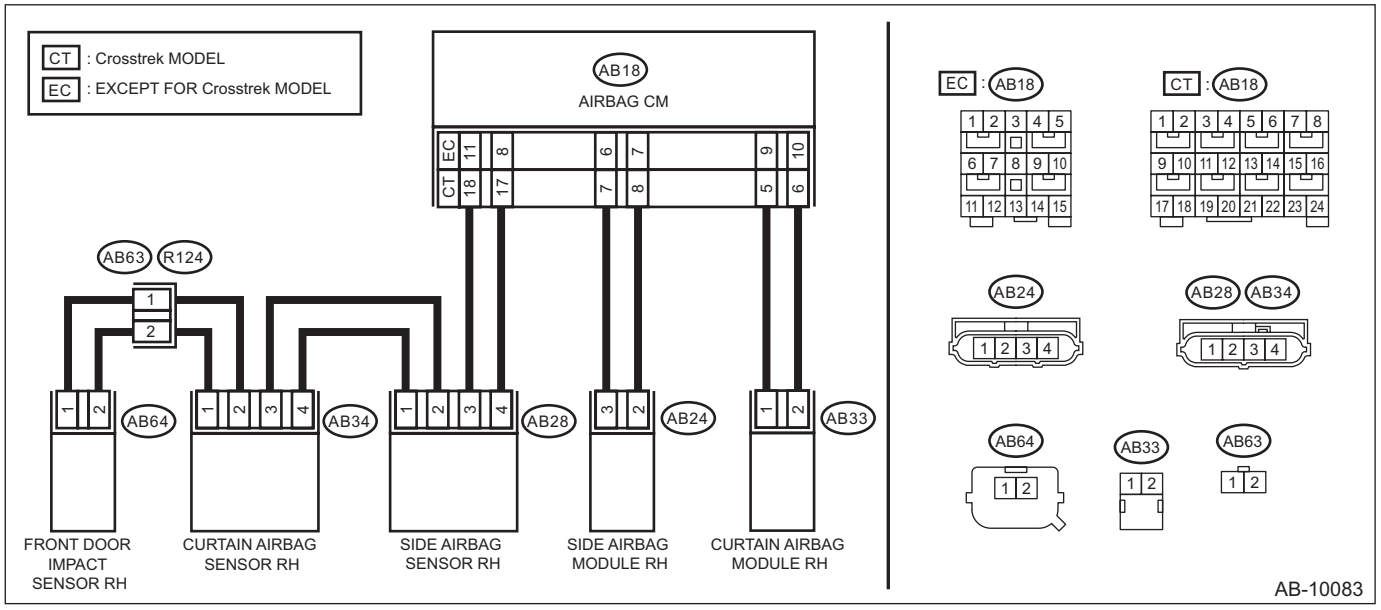
	Step	Check	Yes	No
1	**REPLACE CURTAIN AIRBAG SENSOR (LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the curtain A/B sensor (LH) with a genuine sensor. <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

BD:DTC B1642 SIDE SATELLITE SENSOR BUS RH LOST COMMUNICATION

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of side sensor bus (RH)
- Side airbag sensor (RH) is faulty.
- Curtain airbag sensor (RH) is faulty.
- Front door impact sensor (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1622 or B1623 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1632 or B1633 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1692 or B1693 displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the front door impact sensor (RH).	Is there poor contact?	Replace the airbag rear harness and the door harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SIDE AIRBAG SENSOR RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect connector (AB24) of the side airbag module (RH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Disconnect connector (AB28) from side airbag sensor (RH). 8) Connect the connector (2V) in the test harness V to the connector (AB28). 9) Measure the resistance between connector (5AG) in the test harness AG and connector (3V) in the test harness V. ***Connector & terminal*** ***Crosstrek model*** ***(5AG) No. 14 — (3V) No. 1:*** ***(5AG) No. 16 — (3V) No. 2:*** ***Except for Crosstrek model*** ***(5AG) No. 14 — (3V) No. 1:*** ***(5AG) No. 15 — (3V) No. 2:***	Is the resistance less than 10 Ω?	Go to step **6**.	Replace the airbag rear harness along with body harness.
6	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SIDE AIRBAG SENSOR RH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals. ***Connector & terminal*** ***(3V) No. 1 — Chassis ground:*** ***(3V) No. 2 — Chassis ground:*** ***(3V) No. 1 — (3V) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the airbag rear harness along with body harness.

	Step	Check	Yes	No
7	**CHECK AIRBAG REAR HARNESS (BETWEEN SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR RH).** 1) Disconnect the connector (2V) in the test harness V from the connector (AB28) of side airbag sensor (RH). 2) Connect the connector (AB28) of side airbag sensor (RH) and the connector (1AI) in the test harness AI. 3) Connect the connector (2AI) in the test harness AI and the connector (1V) in the test harness V. 4) Disconnect the connector (AB34) from curtain airbag sensor (RH), and connect the connector (2V) in test harness V to connector (AB34). 5) Measure the resistance between connector (3V) terminals in the test harness V. ***Connector & terminal*** ***(3V) No. 2 — (3V) No. 6:*** ***(3V) No. 1 — (3V) No. 7:***	Is the resistance less than 10 Ω?	Go to step **8**.	Replace the airbag rear harness along with body harness.
8	**CHECK AIRBAG REAR HARNESS (BETWEEN SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR RH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals in test harness V. ***Connector & terminal*** ***(3V) No. 2 — Chassis ground:*** ***(3V) No. 1 — Chassis ground:*** ***(3V) No. 1 — (3V) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **9**.	Replace the airbag rear harness along with body harness.
9	**CHECK AIRBAG REAR HARNESS AND DOOR HARNESS (BETWEEN CURTAIN AIRBAG SENSOR RH AND DOOR SENSOR RH).** 1) Disconnect the connector (AB64) from the front door impact sensor (RH), and connect the connector (1H) in the test harness H to connector (AB64). 2) Measure the resistance between connector (3V) in the test harness V and connector (3H) in the test harness H. ***Connector & terminal*** ***(3V) No. 4 — (3H) No. 5:*** ***(3V) No. 5 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **10**.	Check the door harness, and if any fault is found, replace the harness. If there is no fault, replace the airbag rear harness together with body harness.
10	**CHECK AIRBAG REAR HARNESS AND DOOR HARNESS (BETWEEN CURTAIN AIRBAG SENSOR RH AND FRONT DOOR IMPACT SENSOR RH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals in test harness V. ***Connector & terminal*** ***(3V) No. 4 — Chassis ground:*** ***(3V) No. 5 — Chassis ground:*** ***(3V) No. 4 — (3V) No. 5:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Check the door harness, and if any fault is found, replace the harness. If there is no fault, replace the airbag rear harness together with body harness.

	Step	Check	Yes	No
11	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1642 displayed?	Go to step **12**.	Go to step **15**.
12	**REPLACE SIDE AIRBAG SENSOR (RH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the side airbag sensor (RH). <Ref. to AB-60, REMOVAL, Side Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1642 displayed?	Go to step **13**.	Go to step **15**.
13	**REPLACE CURTAIN AIRBAG SENSOR (RH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the curtain airbag sensor (RH). <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1642 displayed?	Go to step **14**.	Go to step **15**.

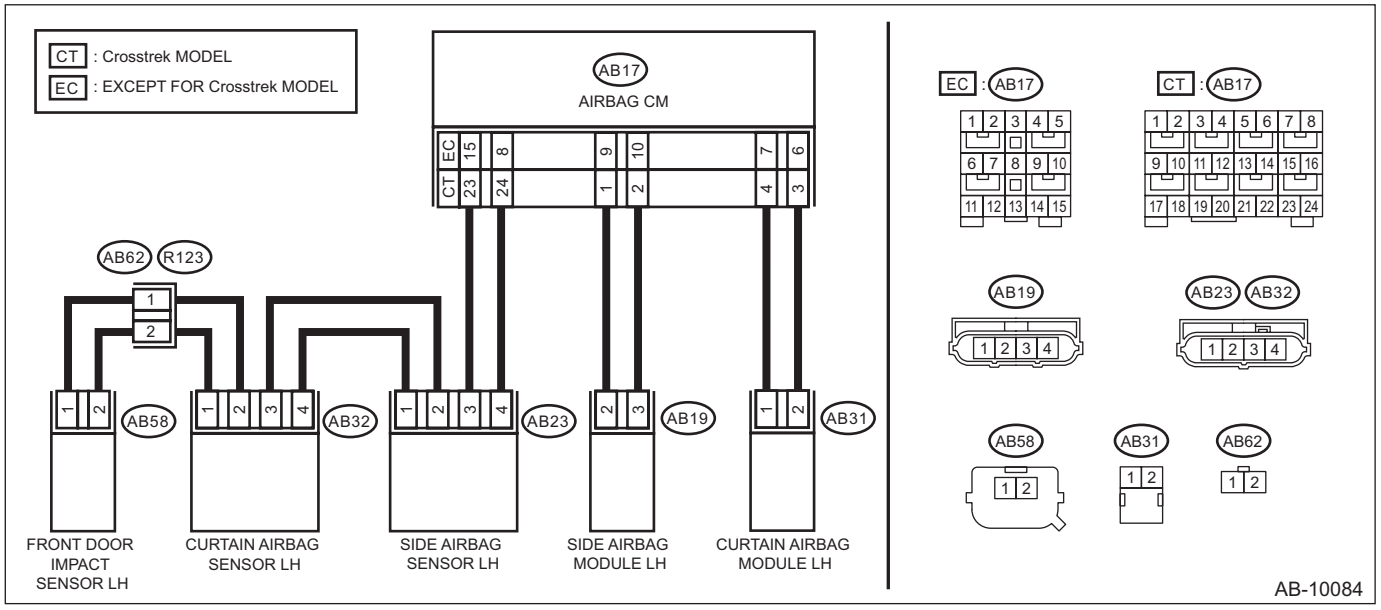
	Step	Check	Yes	No
14	**REPLACE FRONT DOOR IMPACT SENSOR (RH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the front door impact sensor (RH). <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1642 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **15**.
15	**CHECK FOR ANY OTHER DTC ON DISPLAY.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Finish the diagnosis.

BE:DTC B1647 SIDE SATELLITE SENSOR BUS LH LOST COMMUNICATION

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of side sensor bus (LH)
- Side airbag sensor (LH) is faulty.
- Curtain airbag sensor (LH) is faulty.
- Front door impact sensor (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1627 or B1628 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1637 or B1638 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1697 or B1698 displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the front door impact sensor (LH).	Is there poor contact?	Replace the airbag rear harness and the door harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SIDE AIRBAG SENSOR LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect the connector (AB31) from curtain airbag module (LH). 4) Disconnect connector (AB19) of the side airbag module (LH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Disconnect the connector (AB23) from the side airbag sensor (LH). 8) Connect the connector (2V) in the test harness V to the connector (AB23). 9) Measure the resistance between connector (5AG) in the test harness AG and connector (3V) in the test harness V. ***Connector & terminal*** ***Crosstrek model*** ***(5AG) No. 10 — (3V) No. 1:*** ***(5AG) No. 8 — (3V) No. 2:*** ***Except for Crosstrek model*** ***(5AG) No. 10 — (3V) No. 1:*** ***(5AG) No. 9 — (3V) No. 2:***	Is the resistance less than 10 Ω?	Go to step **6**.	Replace the airbag rear harness along with body harness.
6	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SIDE AIRBAG SENSOR LH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals. ***Connector & terminal*** ***(3V) No. 1 — Chassis ground:*** ***(3V) No. 2 — Chassis ground:*** ***(3V) No. 1 — (3V) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the airbag rear harness along with body harness.

	Step	Check	Yes	No
7	**CHECK AIRBAG REAR HARNESS (BETWEEN SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR LH).** 1) Disconnect the connector (2V) in the test harness V from the connector (AB23) of side airbag sensor (LH). 2) Connect the connector (AB23) of side airbag sensor (LH) and the connector (1AI) in the test harness AI. 3) Connect the connector (2AI) in the test harness AI and the connector (1V) in the test harness V. 4) Disconnect the connector (AB32) from curtain airbag sensor (LH), and connect the connector (2V) in test harness V to connector (AB32). 5) Measure the resistance between connector (3V) terminals in the test harness V. ***Connector & terminal*** ***(3V) No. 2 — (3V) No. 6:*** ***(3V) No. 1 — (3V) No. 7:***	Is the resistance less than 10 Ω?	Go to step **8**.	Replace the airbag rear harness along with body harness.
8	**CHECK AIRBAG REAR HARNESS (BETWEEN SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR LH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals in test harness V. ***Connector & terminal*** ***(3V) No. 2 — Chassis ground:*** ***(3V) No. 1 — Chassis ground:*** ***(3V) No. 1 — (3V) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **9**.	Replace the airbag rear harness along with body harness.
9	**CHECK AIRBAG REAR HARNESS AND DOOR HARNESS (BETWEEN CURTAIN AIRBAG SENSOR LH AND DOOR SENSOR LH).** 1) Disconnect the connector (AB58) from the front door impact sensor (LH), and connect the connector (1H) in the test harness H to connector (AB58). 2) Measure the resistance between connector (3V) in the test harness V and connector (3H) in the test harness H. ***Connector & terminal*** ***(3V) No. 4 — (3H) No. 5:*** ***(3V) No. 5 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **10**.	Check the door harness, and if any fault is found, replace the harness. If there is no fault, replace the airbag rear harness together with body harness.
10	**CHECK AIRBAG REAR HARNESS AND DOOR HARNESS (BETWEEN CURTAIN AIRBAG SENSOR LH AND DOOR SENSOR LH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals in test harness V. ***Connector & terminal*** ***(3V) No. 4 — Chassis ground:*** ***(3V) No. 5 — Chassis ground:*** ***(3V) No. 4 — (3V) No. 5:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Check the door harness, and if any fault is found, replace the harness. If there is no fault, replace the airbag rear harness together with body harness.

	Step	Check	Yes	No
11	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1647 displayed?	Go to step **12**.	Go to step **15**.
12	**REPLACE SIDE AIRBAG SENSOR (LH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the side airbag sensor (LH). <Ref. to AB-60, REMOVAL, Side Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1647 displayed?	Go to step **13**.	Go to step **15**.
13	**REPLACE CURTAIN AIRBAG SENSOR (LH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the curtain airbag sensor (LH). <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1647 displayed?	Go to step **14**.	Go to step **15**.

	Step	Check	Yes	No
14	**REPLACE FRONT DOOR IMPACT SENSOR (LH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the front door impact sensor (LH). <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1647 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **15**.
15	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Finish the diagnosis.

BF:DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION

NOTE:
Refer to “Occupant Detection System” for details on DTC B1650. <Ref. to OD(diag)-23, DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BG:DTC B1655 FRONT BUCKLE SWITCH RH FAILURE

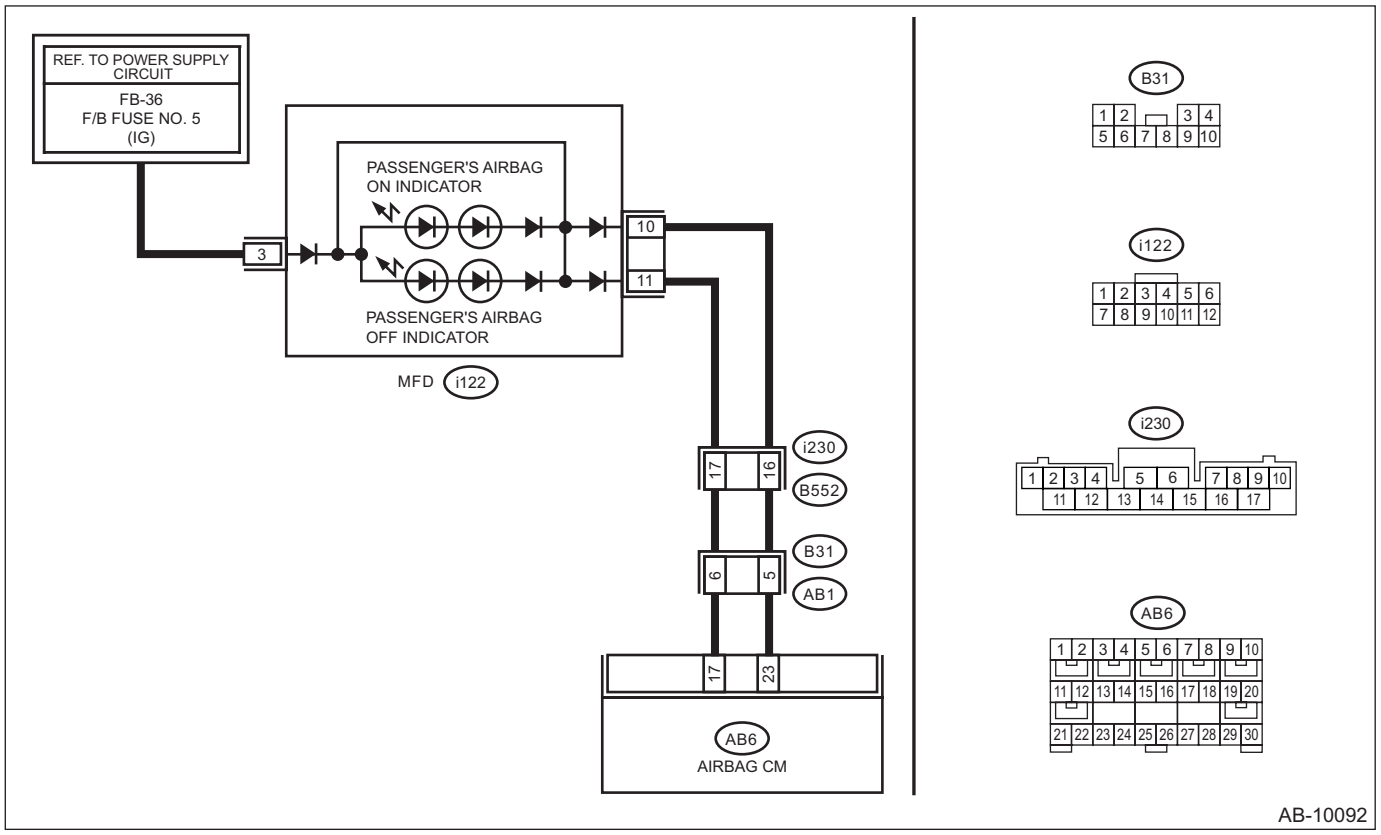
NOTE:
Refer to “Occupant Detection System” for details on DTC B1655. <Ref. to OD(diag)-26, DTC B1655 FRONT BUCKLE SWITCH RH FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BH:DTC B1660 PASSENGER'S AIRBAG ON INDICATOR FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Passenger's airbag indicator is faulty.
- Airbag control module is faulty.
- Airbag main harness circuit is open or shorted.
- Body harness circuit is open.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK FOR POOR CONTACT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Check that the connector between the airbag control module and MFD is securely connected.	Is there poor contact of any connector?	Repair the bulkhead harness. Or replace the airbag main harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS.** 1) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 2) Connect the battery ground terminal and turn the ignition switch to ON. NOTE: Neither of ON/OFF illuminates when it is normal.	Does the passenger's airbag indicator illuminate?	Go to step **3**.	Go to step **4**.
3	**CHECK AIRBAG MAIN HARNESS.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the MFD and disconnect the connector (i122). 3) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 4) Measure the resistance between connector (2AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(2AG) No. 9 — (2AG) No. 8:*** ***(2AG) No. 9 — Chassis ground:*** ***(2AG) No. 8 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the MFD. <Ref. to IDI-26, REMOVAL, Multi-function Display (MFD).>	Repair the bulkhead harness. Or replace the airbag main harness along with body harness.
4	**CHECK AIRBAG MAIN HARNESS.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AH) in the test harness AH. 3) Connect the connector (2AH) in the test harness AH and the connector (1AG) in the test harness AG. 4) Connect the connectors (7AG) and (8AG) in the test harness AG. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the passenger's airbag indicator illuminate?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK AIRBAG MAIN HARNESS.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the MFD and disconnect the connector (i122). 3) Measure the resistance between connector (2AG) in the test harness AG and connector (i122). ***Connector & terminal*** ***(2AG) No. 9 — (i122) No. 11:*** ***(2AG) No. 8 — (i122) No. 10:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair the bulkhead harness. Or replace the airbag main harness along with body harness.
6	**CHECK BODY HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between connector (i122) and chassis ground. ***Connector & terminal*** ***(i122) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the MFD. <Ref. to IDI-26, REMOVAL, Multifunction Display (MFD).>	Check the power supply circuit of MFD.

BI: DTC B1675 SATELLITE SAFING SENSOR FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
- Satellite safing sensor is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**REPLACE SATELLITE SAFING SENSOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the satellite safing sensor with a genuine sensor. <Ref. to AB-68, REMOVAL, Satellite Safing Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

BJ:DTC B1676 LOST COMMUNICATION WITH SATELLITE SAFING SENSOR

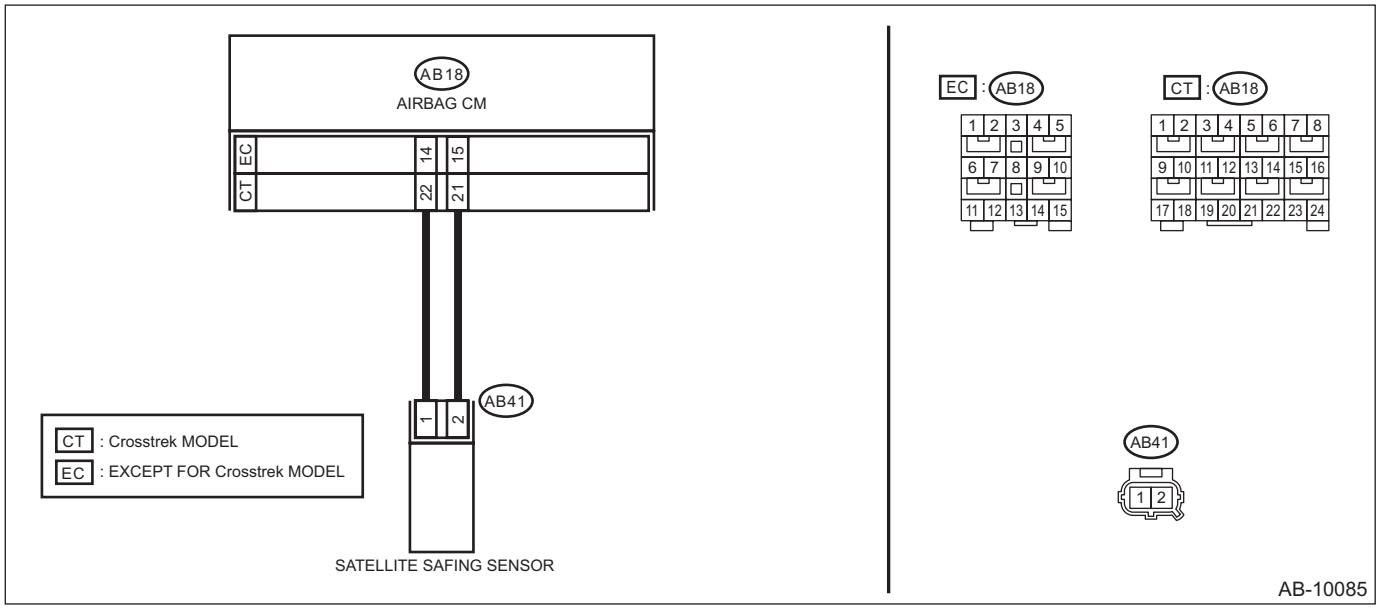
NOTE:
For details on DTC B1676, refer to DTC B1677. <Ref. to AB(diag)-88, DTC B1677 SATELLITE SAFING SENSOR INITIALIZATION INCOMPLETE, Diagnostic Chart with Trouble Code.>

BK:DTC B1677 SATELLITE SAFING SENSOR INITIALIZATION INCOMPLETE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of satellite safing sensor
- Satellite safing sensor is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors (AB18, AB41) between the airbag control module and the satellite safing sensor.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SATELLITE SAFING SENSOR).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB21, AB26) from seat belt pretensioner. 3) Disconnect the connectors (AB31, AB33) from curtain airbag module. 4) Disconnect connectors (AB19) and (AB24) from the side airbag module. 5) Disconnect the connectors (AB17, AB6, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Connect the connector (2AH) in the test harness AH and the connector (1AG) in the test harness AG. 8) Disconnect the connector (AB41) from the satellite safing sensor and connect to the test harness H connector (1H). 9) Measure the resistance between connector in the test harness AG and connector in the test harness H. ***Connector & terminal*** ***Crosstrek model*** ***(5AG) No. 15 — (3H) No. 5:*** ***(6AG) No. 14 — (3H) No. 6:*** ***Except for Crosstrek model*** ***(4AG) No. 5 — (3H) No. 5:*** ***(5AG) No. 13 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the airbag rear harness along with body harness.
3	**CHECK AIRBAG REAR HARNESS (BETWEEN AIRBAG CONTROL MODULE AND SATELLITE SAFING SENSOR).** Measure the resistance between connector in the test harness AG and chassis ground, and the resistance between connector terminals in the test harness AG. ***Connector & terminal*** ***Crosstrek model*** ***(5AG) No. 15 — Chassis ground:*** ***(6AG) No. 14 — Chassis ground:*** ***(5AG) No. 15 — (6AG) No. 14:*** ***Except for Crosstrek model*** ***(4AG) No. 5 — Chassis ground:*** ***(5AG) No. 13 — Chassis ground:*** ***(4AG) No. 5 — (5AG) No. 13:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.

	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1677 displayed?	Replace the satellite safing sensor. <Ref. to AB-68, REMOVAL, Satellite Safing Sensor.> Replace the airbag control module if not operating normally even after replacing the sensor. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

BL:DTC B16F8 SATELLITE SAFING SENSOR RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
- Satellite safing sensor is misinstalled.
- Airbag control module is faulty.

	Step	Check	Yes	No
1	**REPLACE SATELLITE SAFING SENSOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the satellite safing sensor with a genuine sensor. <Ref. to AB-68, REMOVAL, Satellite Safing Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

BM:DTC B16F9 DOOR SENSOR RH RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
- Front door impact sensor (RH) is misinstalled.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**REPLACE FRONT DOOR IMPACT SENSOR (RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the front door impact sensor (RH) with a genuine sensor. <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

BN:DTC B1690 DOOR SENSOR RH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Front door impact sensor (RH) is faulty.
If DTC B1690 is displayed, the circuit within the front door impact sensor (RH) is faulty.
Replace the front door impact sensor (RH). <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.>

BO:DTC B1692 LOST COMMUNICATION WITH DOOR SENSOR RH

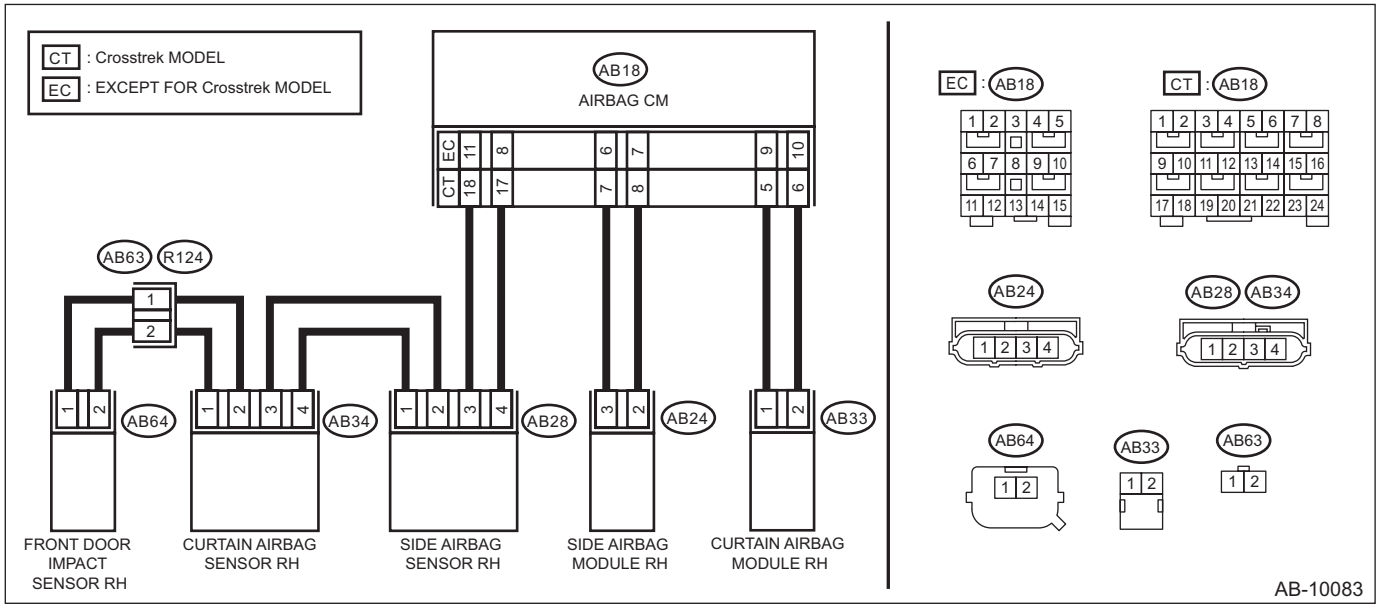
NOTE:
For details on DTC B1692, refer to DTC B1693. <Ref. to AB(diag)-93, DTC B1693 DOOR SENSOR RH INITIALIZATION INCOMPLETE, Diagnostic Chart with Trouble Code.>

BP:DTC B1693 DOOR SENSOR RH INITIALIZATION INCOMPLETE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of side sensor bus (RH)
- Front door impact sensor (RH) is faulty.
- Curtain airbag sensor (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1622 or B1623 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1632 or B1633 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the front door impact sensor (RH).	Is there poor contact?	Replace the airbag rear harness and the door harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK AIRBAG REAR HARNESS AND DOOR HARNESS (BETWEEN CURTAIN AIRBAG SENSOR RH AND DOOR SENSOR RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect connector (AB24) from side airbag module (RH). 5) Disconnect the connector (AB34) from curtain airbag sensor (RH), and connect the connector (2V) in test harness V to connector (AB34). 6) Disconnect the connector (AB64) from the front door impact sensor (RH), and connect the connector (1H) in the test harness H to connector (AB64). 7) Measure the resistance between connector (3V) in the test harness V and connector (3H) in the test harness H. ***Connector & terminal*** ***(3V) No. 4 — (3H) No. 5:*** ***(3V) No. 5 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **5**.	Check the door harness, and if any fault is found, replace the harness. If there is no fault, replace the airbag rear harness together with body harness.
5	**CHECK AIRBAG REAR HARNESS AND DOOR HARNESS (BETWEEN CURTAIN AIRBAG SENSOR RH AND DOOR SENSOR RH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals in test harness V. ***Connector & terminal*** ***(3V) No. 4 — Chassis ground:*** ***(3V) No. 5 — Chassis ground:*** ***(3V) No. 4 — (3V) No. 5:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Check the door harness, and if any fault is found, replace the harness. If there is no fault, replace the airbag rear harness together with body harness.
6	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1693 displayed?	Go to step **7**.	Go to step **9**.

	Step	Check	Yes	No
7	**REPLACE FRONT DOOR IMPACT SENSOR (RH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the front door impact sensor (RH). <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1693 displayed?	Go to step **8**.	Go to step **9**.
8	**REPLACE CURTAIN AIRBAG SENSOR (RH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the curtain airbag sensor (RH). <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1693 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **9**.
9	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code”. <Ref. to AB(diag)-35, LIST, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

BQ:DTC B16FA DOOR SENSOR LH RECOGNITION ERROR

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
- Front door impact sensor (LH) is misinstalled.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

	Step	Check	Yes	No
1	**REPLACE FRONT DOOR IMPACT SENSOR (LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the front door impact sensor (LH) with a genuine sensor. <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.>	Does the warning light go off?	Finish the diagnosis.	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>

BR:DTC B1695 DOOR SENSOR LH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:
Front door impact sensor (LH) is faulty.
If DTC AB is displayed, the circuit within the front door impact sensor (LH) is faulty.
Replace the front door impact sensor (LH). <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.>

BS:DTC B1697 LOST COMMUNICATION WITH DOOR SENSOR LH

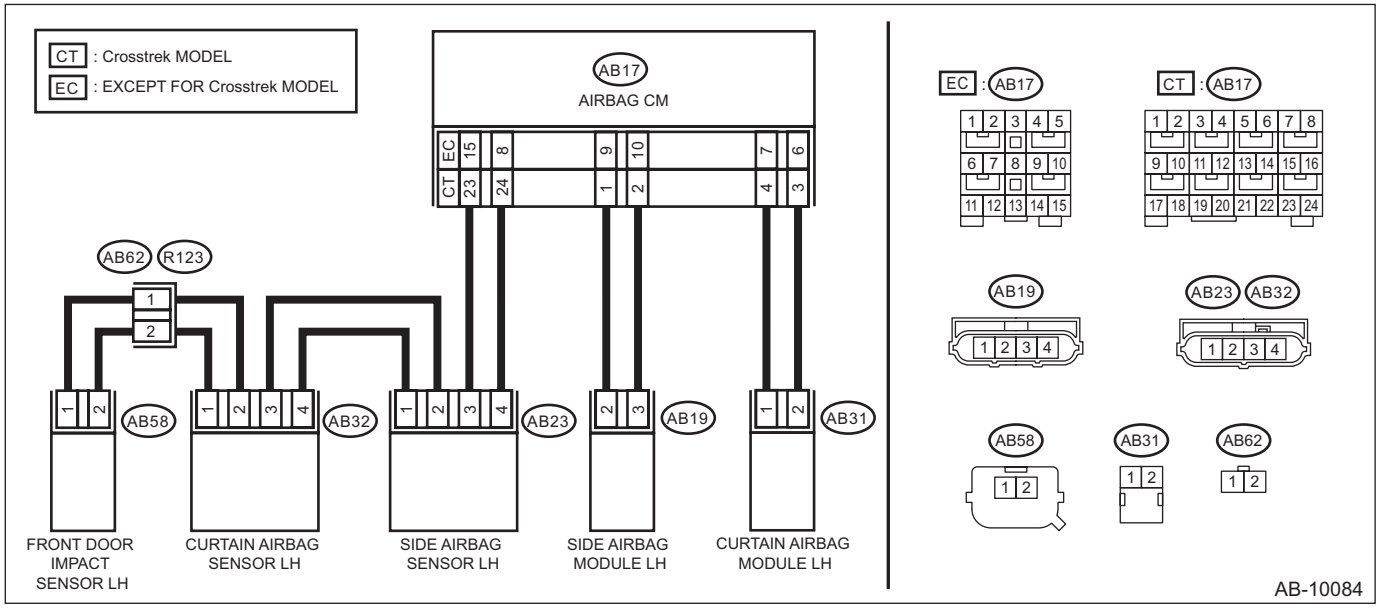
NOTE:
Refer to DTC B1697 for details on DTC B1698. <Ref. to AB(diag)-97, DTC B1698 DOOR SENSOR LH INITIALIZATION INCOMPLETE, Diagnostic Chart with Trouble Code.>

BT:DTC B1698 DOOR SENSOR LH INITIALIZATION INCOMPLETE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Open or short circuit in harness of side sensor bus (LH)
- Front door impact sensor (LH) is faulty.
- Curtain airbag sensor (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1627 or B1628 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK DTC.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1637 or B1638 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the front door impact sensor (LH).	Is there poor contact?	Replace the airbag rear harness and the door harness.	Go to step **4**.

Step		Check	Yes	No
4	**CHECK AIRBAG REAR HARNESS AND DOOR HARNESS (BETWEEN CURTAIN AIRBAG SENSOR LH AND FRONT DOOR IMPACT SENSOR LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect the connector (AB31) from curtain airbag module (LH). 4) Disconnect connector (AB19) from side airbag module (LH). 5) Disconnect the connector (AB32) from curtain airbag sensor (LH), and connect the connector (2V) in test harness V to connector (AB32). 6) Disconnect the connector (AB58) from the front door impact sensor (LH), and connect the connector (1H) in the test harness H to connector (AB58). 7) Measure the resistance between connector (3V) in the test harness V and connector (3H) in the test harness H. ***Connector & terminal*** ***(3V) No. 4 — (3H) No. 5:*** ***(3V) No. 5 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **5**.	Check the door harness, and if any fault is found, replace the harness. If there is no fault, replace the airbag rear harness together with body harness.
5	**CHECK AIRBAG REAR HARNESS AND DOOR HARNESS (BETWEEN CURTAIN AIRBAG SENSOR LH AND FRONT DOOR IMPACT SENSOR LH).** Measure the resistance between connector (3V) in test harness V and chassis ground, and the resistance between connector (3V) terminals in test harness V. ***Connector & terminal*** ***(3V) No. 4 — Chassis ground:*** ***(3V) No. 5 — Chassis ground:*** ***(3V) No. 4 — (3V) No. 5:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Check the door harness, and if any fault is found, replace the harness. If there is no fault, replace the airbag rear harness together with body harness.
6	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1698 displayed?	Go to step **7**.	Go to step **9**.

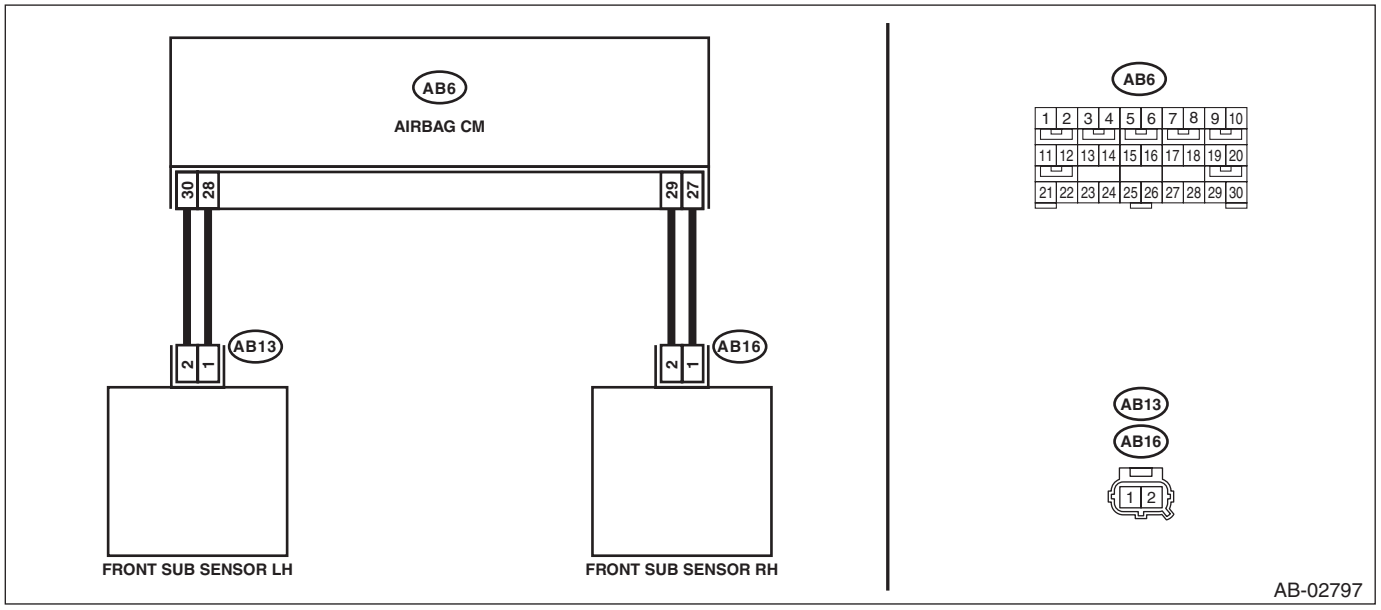
	Step	Check	Yes	No
7	**REPLACE FRONT DOOR IMPACT SENSOR (LH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the front door impact sensor (LH). <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1698 displayed?	Go to step **8**.	Go to step **9**.
8	**REPLACE CURTAIN AIRBAG SENSOR (LH) AND CHECK AIRBAG CONTROL MODULE AFTER REPLACEMENT.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Replace the curtain airbag sensor (LH). <Ref. to AB-63, REMOVAL, Curtain Airbag Sensor.> 3) Connect all connectors. 4) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1698 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **9**.
9	**CHECK FOR ANY OTHER DTC ON DISPLAY.** Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code”. <Ref. to AB(diag)-35, LIST, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

BU:DTC B161A LOST COMMUNICATION WITH FRONT SATELLITE SENSOR BUS

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Harness between airbag control module and front sub sensor is open or shorted.
- Front sub sensor is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the front sub sensor.	Is there poor contact?	Replace the airbag main harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (FRONT SENSOR BUS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the instrument panel lower cover and column cover, and disconnect the connectors (AB7) and (AB2). 3) Remove the console front panel and disconnect the connector (AB9). 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Disconnect the connector (AB13) from the front sub sensor (LH), and then connect the connector (1H) in the test harness H to connector (AB13). 7) Measure the resistance between connector (4AG) in the test harness AG and connector (3H) in the test harness H. ***Connector & terminal*** ***(4AG) No. 7 — (3H) No. 5:*** ***(4AG) No. 9 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG MAIN HARNESS (FRONT SENSOR BUS LH).** Measure the resistance between connector (4AG) in the test harness AG and chassis ground, and the resistance between connector (4AG) terminals in the test harness AG. ***Connector & terminal*** ***(4AG) No. 7 — Chassis ground:*** ***(4AG) No. 9 — Chassis ground:*** ***(4AG) No. 7 — (4AG) No. 9:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG MAIN HARNESS (FRONT SENSOR BUS RH).** 1) Disconnect the connector (AB16) from the front sub sensor (RH), and then connect the connector (1H) in the test harness H to connector (AB16). 2) Measure the resistance between connector (4AG) in the test harness AG and connector (3H) in the test harness H. ***Connector & terminal*** ***(4AG) No. 14 — (3H) No. 5:*** ***(4AG) No. 12 — (3H) No. 6:***	Is the resistance less than 10 Ω?	Go to step **5**.	Replace the airbag main harness along with body harness.

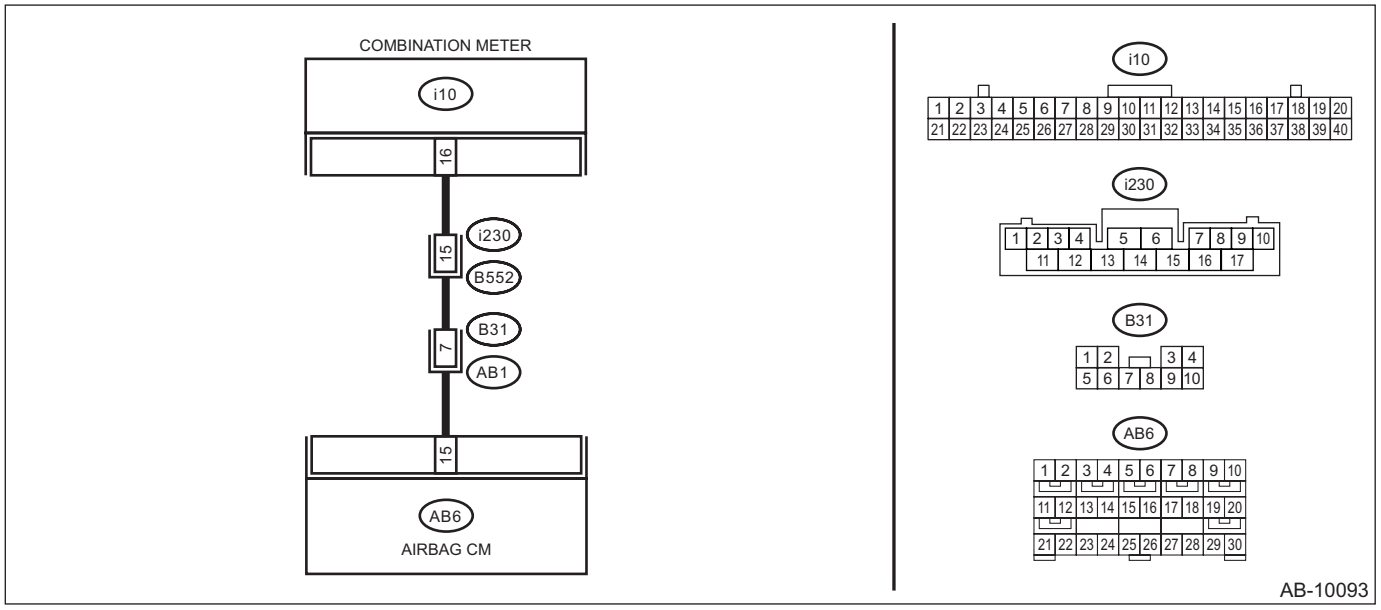
	Step	Check	Yes	No
5	**CHECK AIRBAG MAIN HARNESS (FRONT SENSOR BUS RH).** Measure the resistance between connector (4AG) in the test harness AG and chassis ground, and the resistance between connector (4AG) terminals in the test harness AG. ***Connector & terminal*** ***(4AG) No. 12 — Chassis ground:*** ***(4AG) No. 14 — Chassis ground:*** ***(4AG) No. 12 — (4AG) No. 14:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the airbag rear harness along with body harness.
6	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B161A displayed?	Replace the front sub sensor (LH) and front sub sensor (RH). <Ref. to AB-57, REMOVAL, Front Sub Sensor.> Replace the airbag control module if not operating normally even after replacing the sensor. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **7**.
7	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

BV:DTC B16F1 PASSENGER'S SEAT BELT WARNING FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag control module is faulty.
- Meter is faulty.
- Harness circuits between meter and airbag control module are open, shorted or shorted to ground.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK AIRBAG HARNESS.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 3) Connect the battery ground terminal and turn the ignition switch to ON.	Does the passenger's seat belt warning light blink for 6 seconds and go off?	Go to step **3**.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG HARNESS.** 1) Turn the ignition switch to OFF. 2) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 3) Measure the resistance between connector (2AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(2AG) No. 10 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>	Repair the bulkhead harness and instrument panel harness. Or replace the airbag main harness along with body harness.
3	**CHECK AIRBAG HARNESS.** 1) Turn the ignition switch to OFF. 2) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 3) Connect the connectors (7AG) and (8AG) in the test harness AG. 4) Turn the ignition switch to ON.	Does the passenger's seat belt warning light blink for 6 seconds, then repeatedly light and go off?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **4**.
4	**CHECK AIRBAG HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors (7AG) and (8AG) in the test harness AG in the condition of step 3. 3) Disconnect the connector (i10) from meter. 4) Measure the resistance between connector (2AG) in the test harness AG and connector (i84). ***Connector & terminal*** ***(2AG) No. 10 — (i10) No. 16:***	Is the resistance less than 10 Ω?	Replace the meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>	Repair the bulkhead harness and instrument panel harness. Or replace the airbag main harness along with body harness.

BW:DTC B16F0 PASSENGER'S AIRBAG OFF INDICATOR FAILURE

NOTE:
For details on DTC B16F0, refer to DTC B1660. <Ref. to AB(diag)-84, DTC B1660 PASSENGER'S AIRBAG ON INDICATOR FAILURE, Diagnostic Chart with Trouble Code.>

BX:DTC B1760 OCCUPANT DETECTION SENSOR MAT

NOTE:
Refer to "Occupant Detection System" for details on DTC B1760. <Ref. to OD(diag)-28, DTC B1760 OCCUPANT DETECTION SENSOR MAT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BY:DTC B1761 OCCUPANT DETECTION SENSOR MAT LIQUID COATING

NOTE:
Refer to "Occupant Detection System" for details on DTC B1761. <Ref. to OD(diag)-29, DTC B1761 OCCUPANT DETECTION SENSOR MAT LIQUID COATING, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BZ:DTC B1771 BUCKLE SWITCH

NOTE:
Refer to "Occupant Detection System" for details on DTC B1771. <Ref. to OD(diag)-29, DTC B1771 BUCKLE SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CA:DTC B1795 OCCUPANT DETECTION MODULE INTERNAL CIRCUIT

NOTE:
Refer to "Occupant Detection System" for details on DTC B1795. <Ref. to OD(diag)-29, DTC B1795 OCCUPANT DETECTION MODULE INTERNAL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

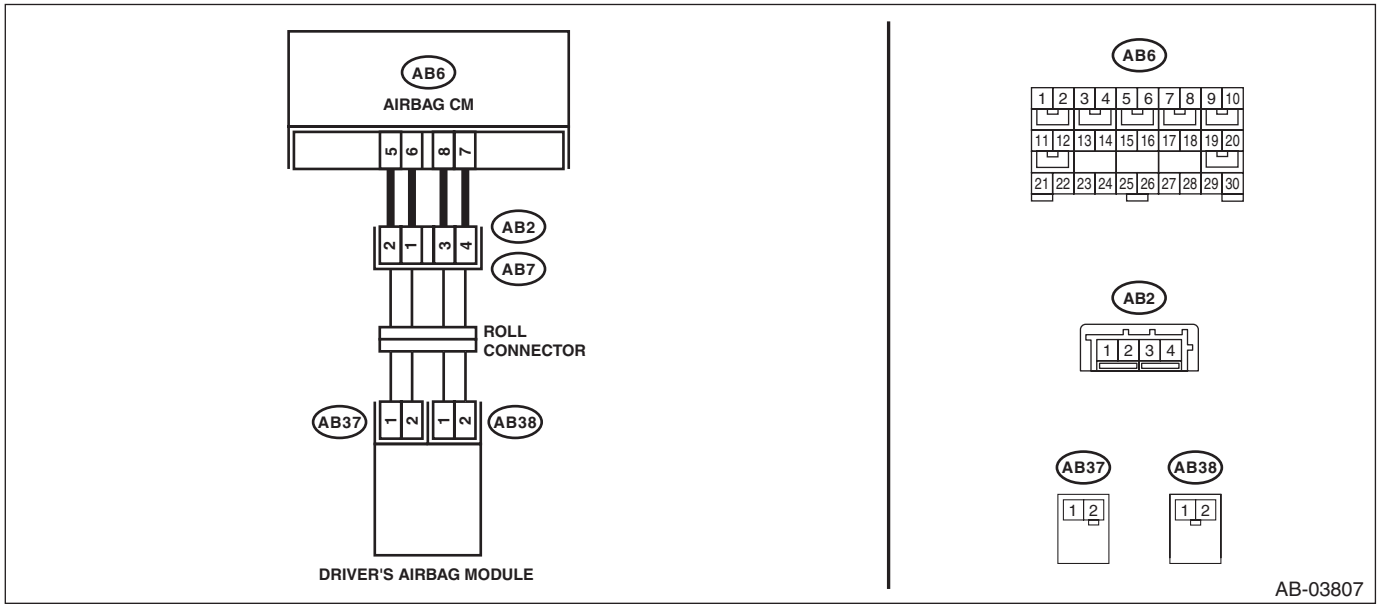
CB:DTC B1800 SHORT IN DRIVER'S AIRBAG

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted.
- Airbag module harness (driver's side) circuit is shorted.
- Roll connector circuit is shorted.
- Driver's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

NOTE:
Prior to starting work, prepare two AIRBAG RESISTORs (98299PA040).
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the driver's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DRIVER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the driver's airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB38). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the connector (1Q) in the test harness Q to connector (AB37). 6) Connect the airbag resistor to the connector (2Q) in the test harness Q. 7) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the driver's airbag module. <Ref. to AB-38, Driver's Airbag Module.>	Go to step **3**.
3	**CHECK ROLL CONNECTOR AND AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the console front panel and disconnect the connector (AB9). 3) Disconnect the driver's knee airbag module connector (AB66). 4) Disconnect the airbag resistor from the connector (2N) in test harness N and from the connector (2Q) in test harness Q. 5) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG. NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Measure the resistance between connector (2Q) terminals in test harness Q. ***Connector & terminal*** ***(2Q) No. 1 — (2Q) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 2) Measure the resistance between connector (3AG) terminals in test harness AG. ***Connector & terminal*** ***(3AG) No. 1 — (3AG) No. 3:***	Is the resistance 1 MΩ or more?	Replace the roll connector. <Ref. to AB-69, Roll Connector.>	Replace the airbag main harness along with body harness.
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1800 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

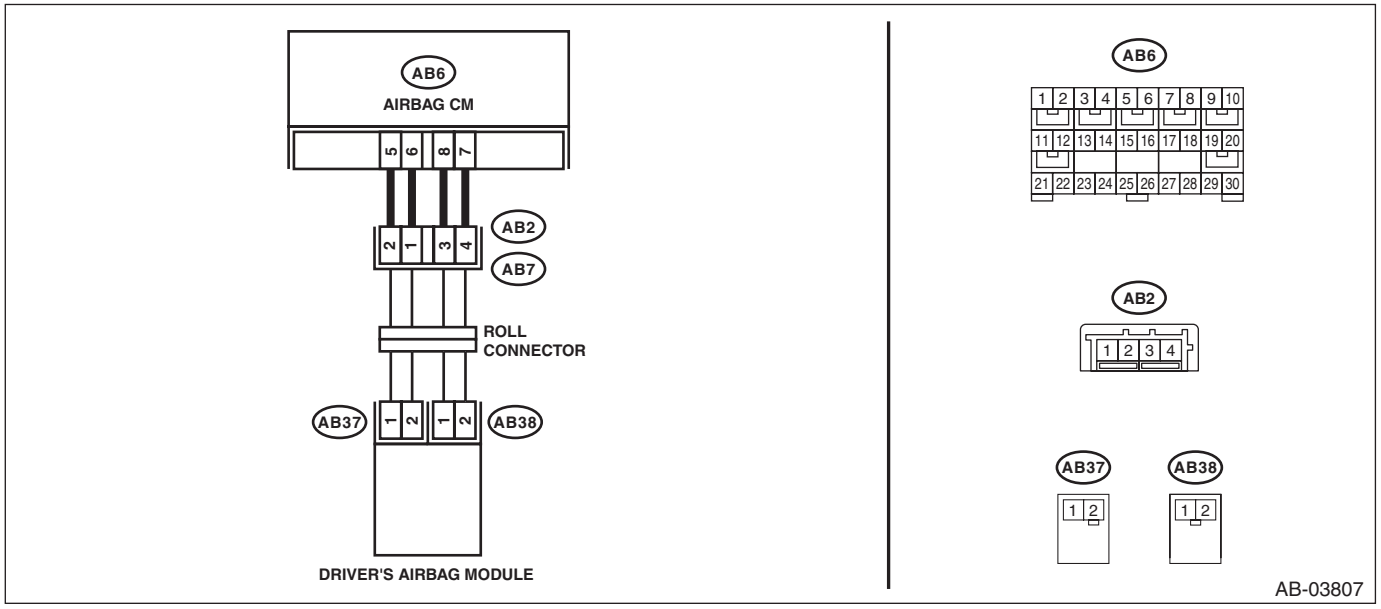
CC:DTC B1801 OPEN IN DRIVER'S AIRBAG

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is open.
- Airbag module harness (driver's side) circuit is open.
- Roll connector is open.
- Driver's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

NOTE:
Prior to starting work, prepare two AIRBAG RESISTORs (98299PA040).
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the driver's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DRIVER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the driver's airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB38). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the connector (1Q) in the test harness Q to connector (AB37). 6) Connect the airbag resistor to the connector (2Q) in the test harness Q. 7) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the driver's airbag module. <Ref. to AB-38, Driver's Airbag Module.>	Go to step **3**.
3	**CHECK ROLL CONNECTOR AND AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the console front panel and disconnect the connector (AB9). 3) Disconnect the driver's knee airbag module connector (AB66). 4) Disconnect the airbag resistor from the connector (2N) in test harness N. 5) Disconnect the airbag resistor from the connector (2Q) of test harness Q. 6) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 7) Measure the resistance between connector (2Q) terminals in test harness Q. ***Connector & terminal*** ***(2Q) No. 1 — (2Q) No. 2:***	Is the resistance less than 10 Ω?	Go to step **5**.	Go to step **4**.
4	**CHECK ROLL CONNECTOR.** 1) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 2) Measure the resistance between connector (2Q) terminals in test harness Q. ***Connector & terminal*** ***(2Q) No. 1 — (2Q) No. 2:***	Is the resistance less than 10 Ω?	Replace the airbag main harness along with body harness.	Replace the roll connector. <Ref. to AB-69, Roll Connector.>

	Step	Check	Yes	No
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1801 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

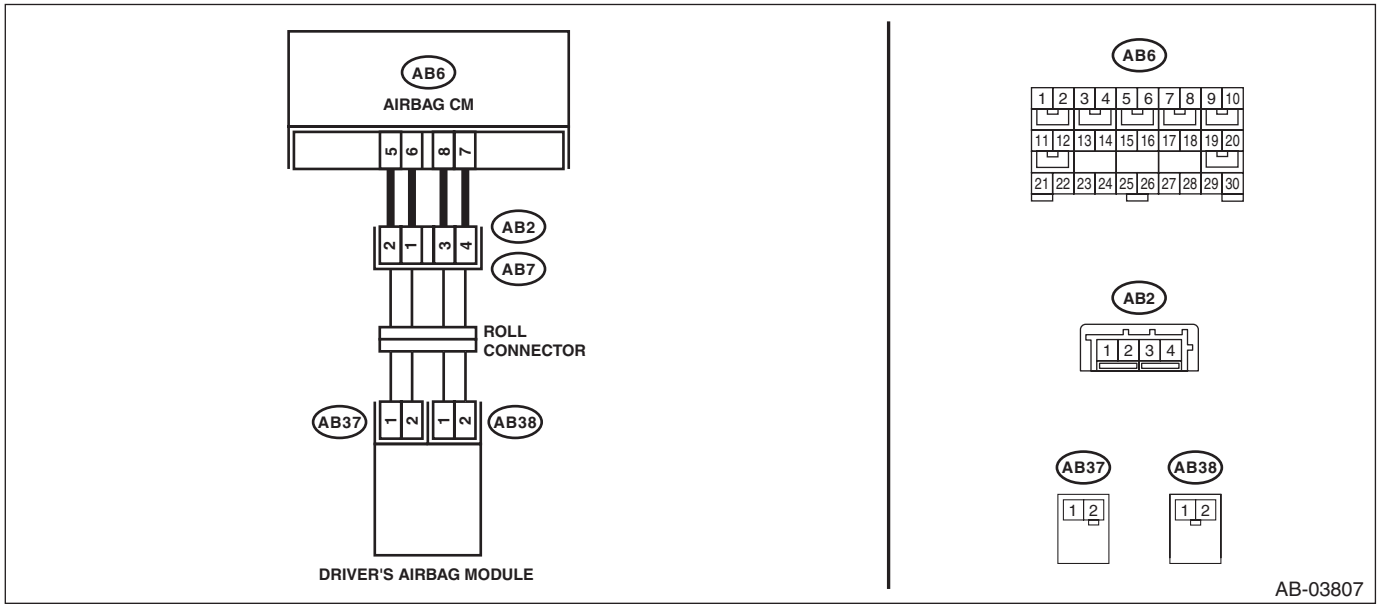
CD:DTC B1802 SHORT IN DRIVER'S AIRBAG (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to ground.
- Airbag module harness (driver's side) circuit is shorted to ground.
- Roll connector circuit is shorted to ground.
- Driver's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

NOTE:
Prior to starting work, prepare two AIRBAG RESISTORs (98299PA040).
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the driver's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DRIVER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the driver's airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB38). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the connector (1Q) in the test harness Q to connector (AB37). 6) Connect the airbag resistor to the connector (2Q) in the test harness Q. 7) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the driver's airbag module. <Ref. to AB-38, Driver's Airbag Module.>	Go to step **3**.
3	**CHECK ROLL CONNECTOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 3) Disconnect the driver's knee airbag module connector (AB66). 4) Disconnect the airbag resistor from the connector (2N) in test harness N and from the connector (2Q) in test harness Q. 5) Measure the resistance between connector (2Q) in the test harness Q and chassis ground. ***Connector & terminal*** ***(2Q) No. 1 — Chassis ground:*** ***(2Q) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the roll connector. <Ref. to AB-69, Roll Connector.>

	Step	Check	Yes	No
4	**CHECK AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Disconnect the test harness N from connector (AB38). 2) Disconnect the test harness Q from connector (AB37). 3) Remove the console front panel and disconnect the connector (AB9). 4) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG. NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 5) Measure the resistance between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 1 — Chassis ground:*** ***(3AG) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Replace the airbag main harness along with body harness.
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1802 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

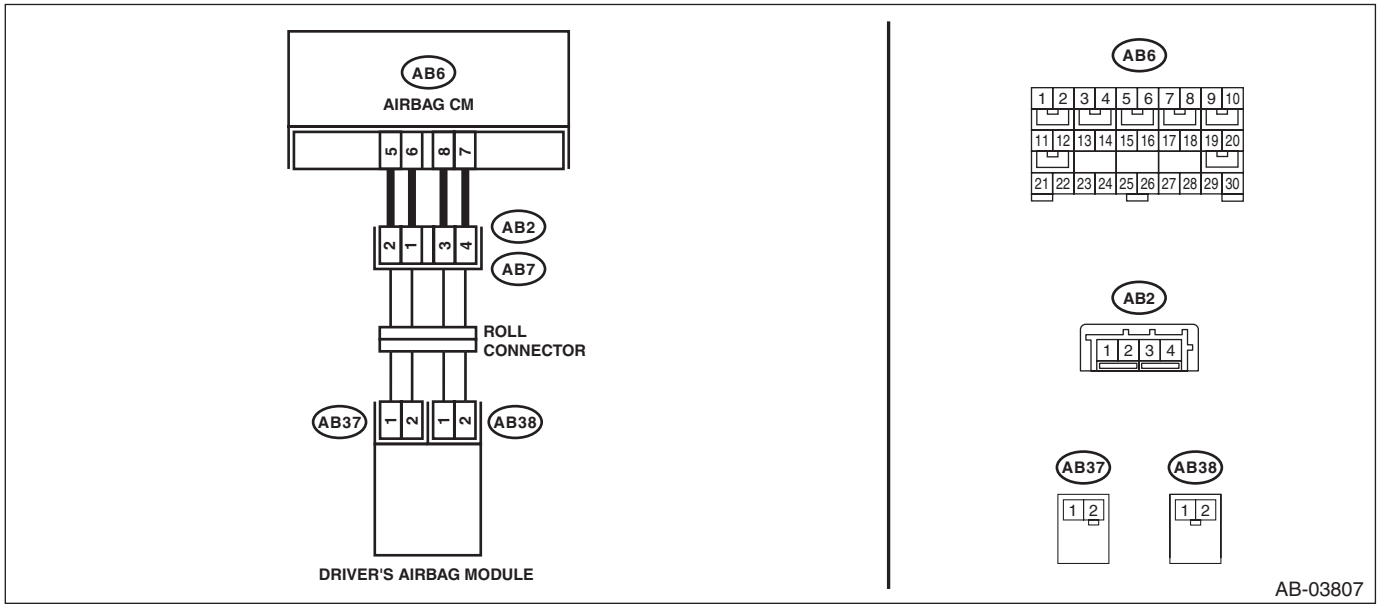
CE:DTC B1803 SHORT IN DRIVER'S AIRBAG (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to power supply.
- Airbag module harness (driver's side) circuit is shorted to power supply.
- Roll connector circuit is shorted to power supply.
- Driver's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

NOTE:
Prior to starting work, prepare two AIRBAG RESISTORs (98299PA040).
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the driver's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DRIVER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the driver's airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB38). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the connector (1Q) in the test harness Q to connector (AB37). 6) Connect the airbag resistor to the connector (2Q) in the test harness Q. 7) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the driver's airbag module. <Ref. to AB-38, Driver's Airbag Module.>	Go to step **3**.
3	**CHECK ROLL CONNECTOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 3) Disconnect the driver's knee airbag module connector (AB66). 4) Disconnect the airbag resistor from the connector (2N) in test harness N and from the connector (2Q) in test harness Q. 5) Measure the voltage between connector (2Q) in the test harness Q and chassis ground. ***Connector & terminal*** ***(2Q) No. 1 (+) — Chassis ground (–):*** ***(2Q) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the roll connector. <Ref. to AB-69, Roll Connector.>

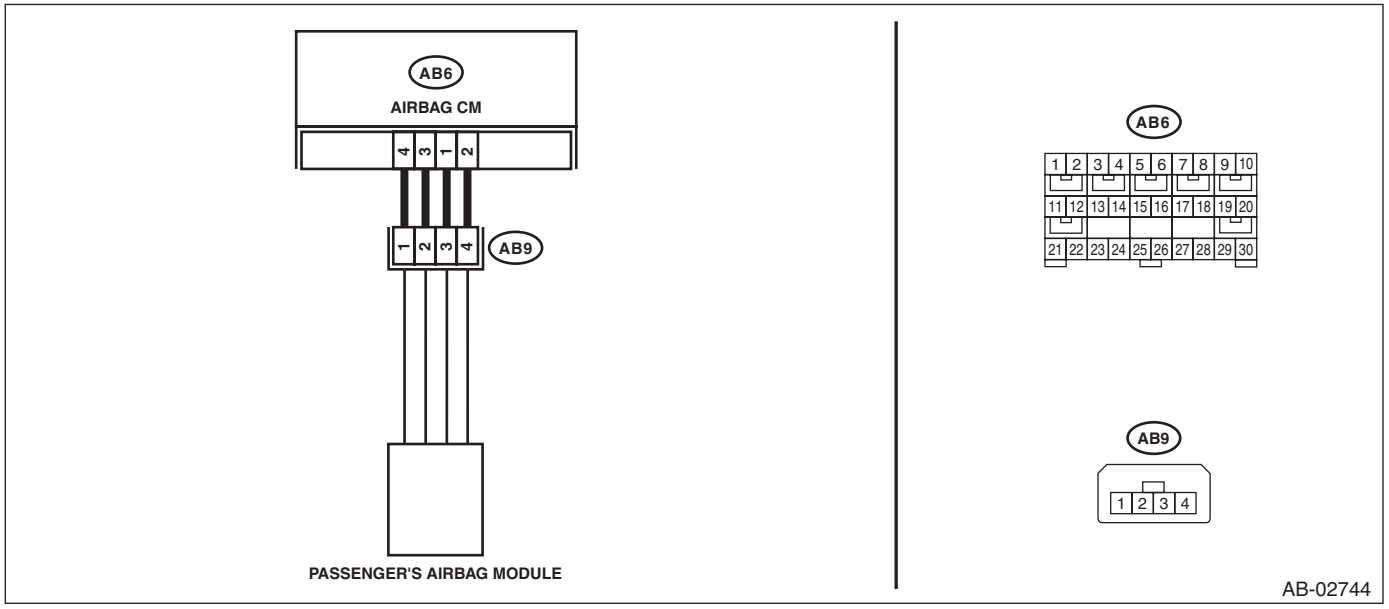
	Step	Check	Yes	No
4	**CHECK AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Disconnect the test harness N from connector (AB38). 2) Disconnect the test harness Q from connector (AB37). 3) Remove the console front panel and disconnect the connector (AB9). 4) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG. NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 5) Connect the battery ground terminal and turn the ignition switch to ON. 6) Measure the voltage between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 1 (+) — Chassis ground (–):*** ***(3AG) No. 3 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Replace the airbag main harness along with body harness.
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1803 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CF:DTC B1805 SHORT IN PASSENGER'S AIRBAG

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted.
- Airbag module harness circuit (passenger's side) is shorted.
- Passenger's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the passenger's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (PASSENGER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB7) and (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, connect the connector (1AG) in the test harness AG, and release the short mechanism of the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect the connectors (AB6, AB17, AB18) and the connector (1AH) in the test harness AH. 5) Disconnect the passenger's airbag module connector (AB9). 6) Using a probe, measure the resistance between the terminals of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When measuring the resistance, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 1 — (AB9) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG CONTROL MODULE.** 1) Disconnect the test harness AG or test harness AH from the connectors (AB6, AB17, AB18). 2) Connect the connectors (AB6, AB17, AB18) and the airbag control module. 3) Connect the connectors (AB7) and (AB2). 4) Connect the connector (AB66) to the driver's knee airbag module. 5) Connect the battery ground terminal and turn the ignition switch to ON. 6) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 7) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1805 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **4**.

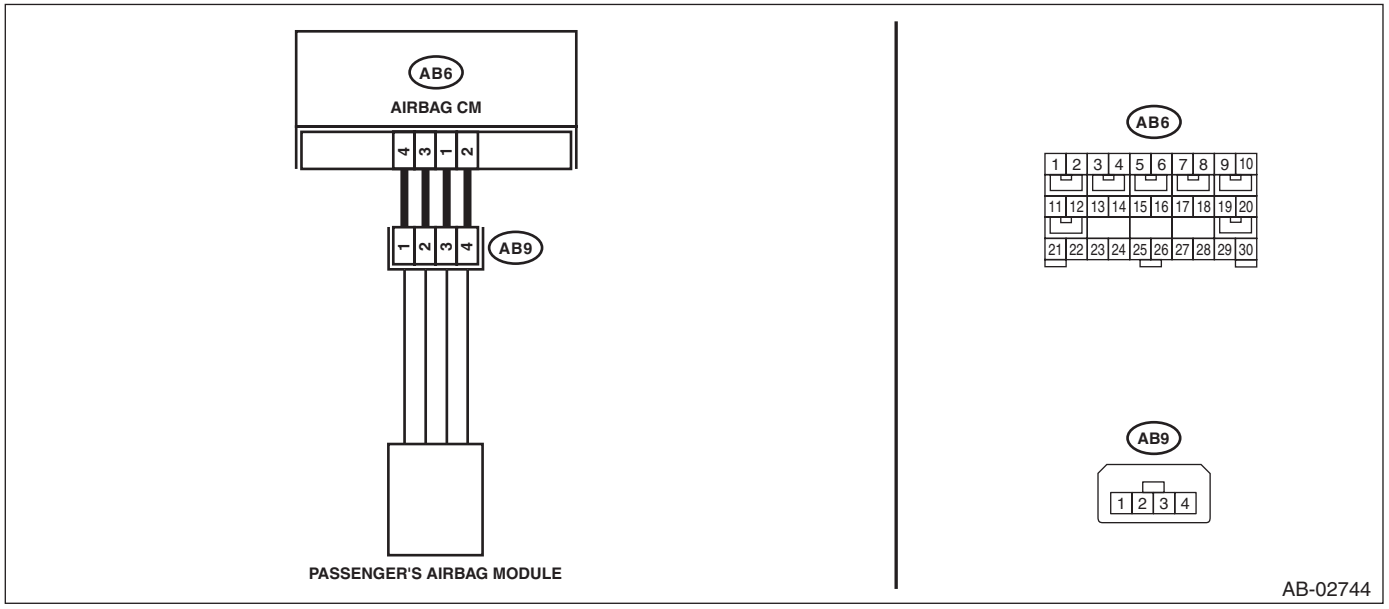
	Step	Check	Yes	No
4	**CHECK PASSENGER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Connect the passenger's airbag module connector (AB9). 3) Connect the battery ground terminal and turn the ignition switch to ON. 4) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 5) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1805 displayed?	Replace the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CG:DTC B1806 OPEN IN PASSENGER'S AIRBAG

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is open.
- Airbag module harness (passenger's side) circuit is open.
- Passenger's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the passenger's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

Step		Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (PASSENGER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB7) and (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Disconnect the passenger's airbag module connector (AB9). 6) Using a probe, measure the resistance between the terminals of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When measuring the resistance, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 1 — (AB9) No. 2:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG CONTROL MODULE.** 1) Connect the connectors (AB6, AB17, AB18) and the airbag control module. 2) Connect the connectors (AB7) and (AB2). 3) Connect the connector (AB66) to the driver's knee airbag module. 4) Using a probe, short the terminals No. 1 and No. 2 of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When shorting the terminals, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 1 — (AB9) No. 2:*** 5) Connect the battery ground terminal and turn the ignition switch to ON. 6) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 7) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1806 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **4**.

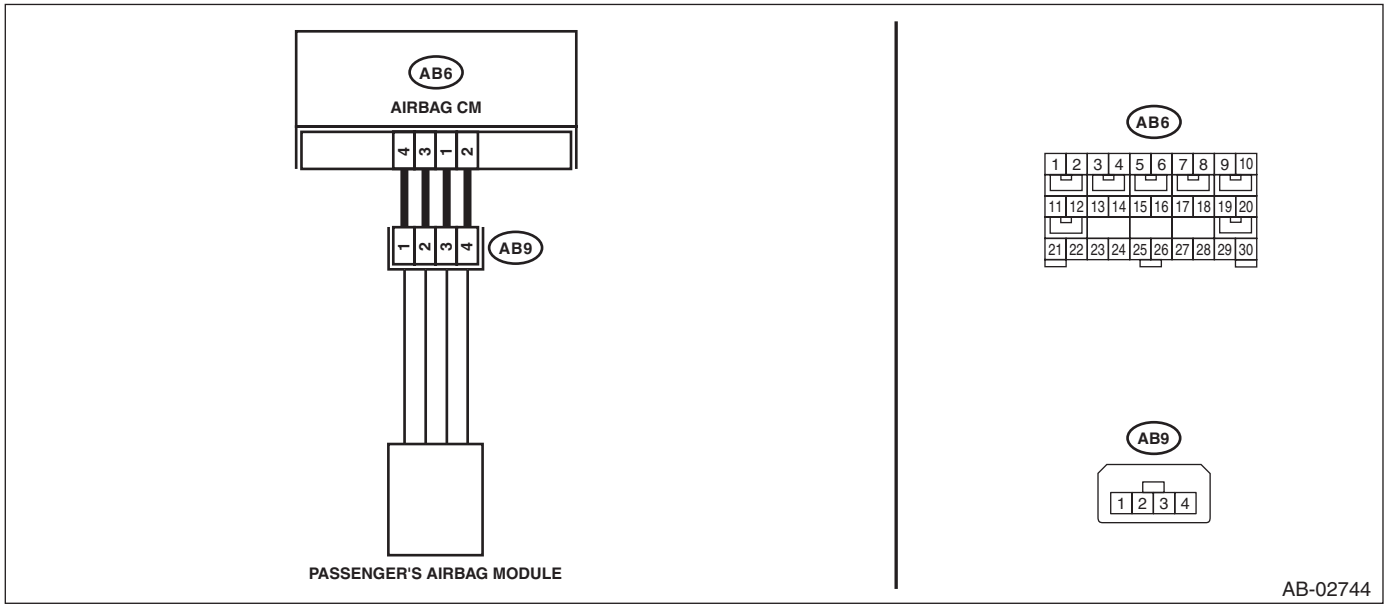
	Step	Check	Yes	No
4	**CHECK PASSENGER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Connect the passenger's airbag module connector (AB9). 3) Connect the battery negative terminal, and clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 4) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 5) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1806 displayed?	Replace the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CH:DTC B1807 SHORT IN PASSENGER'S AIRBAG (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to ground.
- Airbag module harness (passenger's side) circuit is shorted to ground.
- Passenger's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the passenger's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (PASSENGER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB7) and (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Disconnect the passenger's airbag module connector (AB9). 6) Using a probe, measure the resistance between the connector (AB9) and chassis ground. <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When measuring the resistance, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 1 — Chassis ground:*** ***(AB9) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG CONTROL MODULE.** 1) Connect the connectors (AB6, AB17, AB18) and the airbag control module. 2) Using a probe, short the terminals No. 1 and No. 2 of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When shorting the terminals, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 1 — (AB9) No. 2:*** 3) Connect the battery ground terminal and turn the ignition switch to ON. 4) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 5) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1807 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **4**.

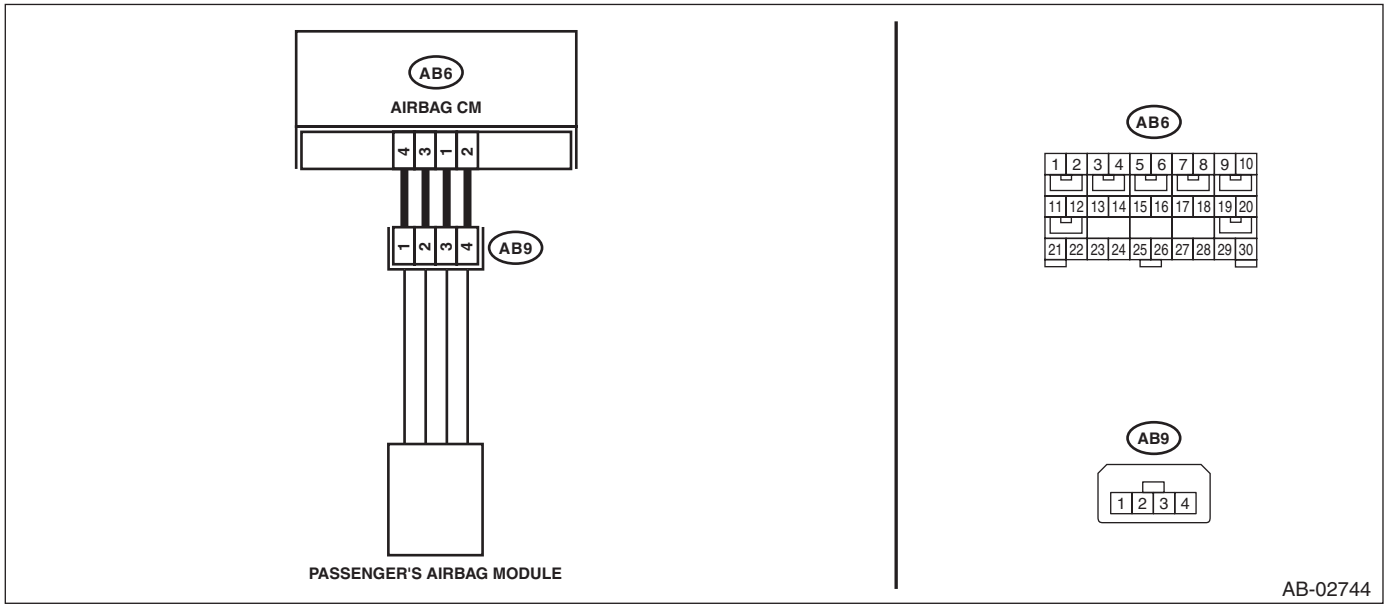
	Step	Check	Yes	No
4	**CHECK PASSENGER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Release the short circuit of connector (AB9). 3) Connect the passenger's airbag module connector (AB9). 4) Connect the connectors (AB7) and (AB2). 5) Connect the connector (AB66) to the driver's knee airbag module. 6) Connect the battery ground terminal and turn the ignition switch to ON. 7) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 8) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1807 displayed?	Replace the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CI: DTC B1808 SHORT IN PASSENGER'S AIRBAG (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to power supply.
- Airbag module harness (passenger's side) circuit is shorted to power supply.
- Passenger's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the passenger's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (PASSENGER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB7) and (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Disconnect the passenger's airbag module connector (AB9). 6) Using a probe, measure the voltage between the connector (AB9) and chassis ground. <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When measuring the voltage, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 1 (+) — Chassis ground (–):*** ***(AB9) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **3**.	Replace the airbag main harness along with body harness.

	Step	Check	Yes	No
3	**CHECK AIRBAG CONTROL MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Connect the connectors (AB6, AB17, AB18) and the airbag control module. 3) Using a probe, short the terminals No. 1 and No. 2 of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When shorting the terminals, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 1 — (AB9) No. 2:*** 4) Connect the battery ground terminal and turn the ignition switch to ON. 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1808 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **4**.
4	**CHECK PASSENGER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Release the short circuit of connector (AB9). 3) Connect the passenger's airbag module connector (AB9). 4) Connect the connectors (AB7) and (AB2). 5) Connect the connector (AB66) to the driver's knee airbag module. 6) Connect the battery ground terminal and turn the ignition switch to ON. 7) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 8) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1808 displayed?	Replace the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>	Go to step **5**.

Step		Check	Yes	No
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

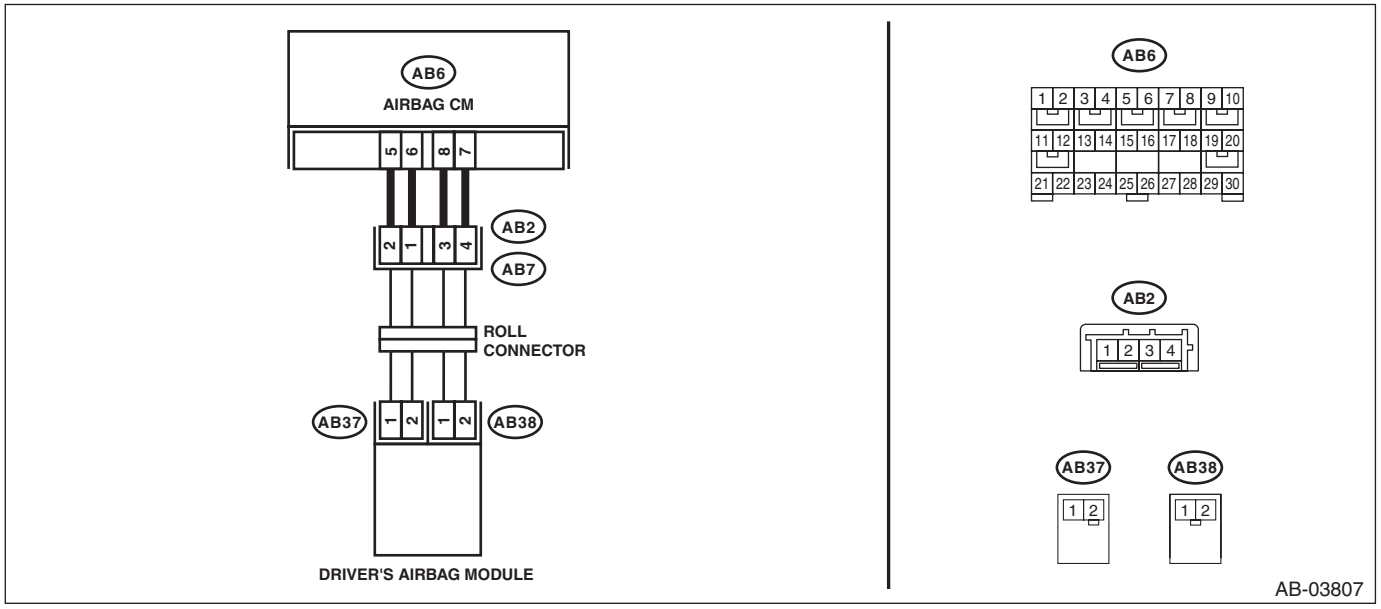
CJ:DTC B1810 SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted.
- Airbag module harness (driver's side) circuit is shorted.
- Roll connector circuit is shorted.
- Driver's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

NOTE:
Prior to starting work, prepare two AIRBAG RESISTORs (98299PA040).
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the driver's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DRIVER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the driver's airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB38). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the connector (1Q) in the test harness Q to connector (AB37). 6) Connect the airbag resistor to the connector (2Q) in the test harness Q. 7) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the driver's airbag module. <Ref. to AB-38, Driver's Airbag Module.>	Go to step **3**.
3	**CHECK ROLL CONNECTOR AND AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the console front panel and disconnect the connector (AB9). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the airbag resistor from the connector (2N) in test harness N and from the connector (2Q) in test harness Q. 5) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG. NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Measure the resistance between connector (2N) terminals in test harness N. ***Connector & terminal*** ***(2N) No. 1 — (2N) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 2) Disconnect the test harness Q from connector (AB37). 3) Measure the resistance between connector (3AG) terminals in test harness AG. ***Connector & terminal*** ***(3AG) No. 2 — (3AG) No. 4:***	Is the resistance 1 MΩ or more?	Replace the roll connector. <Ref. to AB-69, Roll Connector.>	Replace the airbag main harness along with body harness.
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1810 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

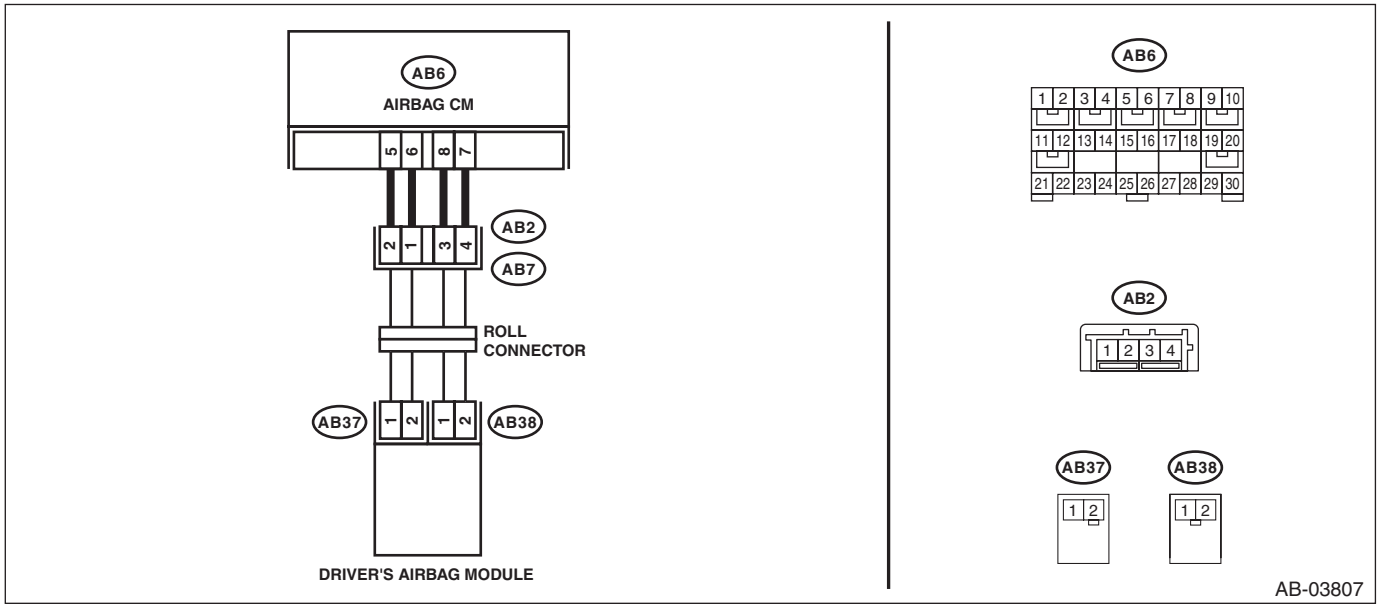
CK:DTC B1811 OPEN IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is open.
- Airbag module harness (driver's side) circuit is open.
- Roll connector circuit is open.
- Driver's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

NOTE:
Prior to starting work, prepare two AIRBAG RESISTORs (98299PA040).
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the driver's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DRIVER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the driver's airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB38). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the connector (1Q) in the test harness Q to connector (AB37). 6) Connect the airbag resistor to the connector (2Q) in the test harness Q. 7) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the driver's airbag module. <Ref. to AB-38, Driver's Airbag Module.>	Go to step **3**.
3	**CHECK ROLL CONNECTOR AND AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the console front panel and disconnect the connector (AB9). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the airbag resistor from the connector (2N) in test harness N. 5) Disconnect the airbag resistor from the connector (2Q) of test harness Q. 6) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 7) Measure the resistance between connector (2N) terminals in test harness N. ***Connector & terminal*** ***(2N) No. 1 — (2N) No. 2:***	Is the resistance less than 10 Ω?	Go to step **5**.	Go to step **4**.
4	**CHECK ROLL CONNECTOR.** 1) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 2) Measure the resistance between connector (2N) terminals in test harness N. ***Connector & terminal*** ***(2N) No. 1 — (2N) No. 2:***	Is the resistance less than 10 Ω?	Replace the airbag main harness along with body harness.	Replace the roll connector. <Ref. to AB-69, Roll Connector.>

	Step	Check	Yes	No
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1811 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

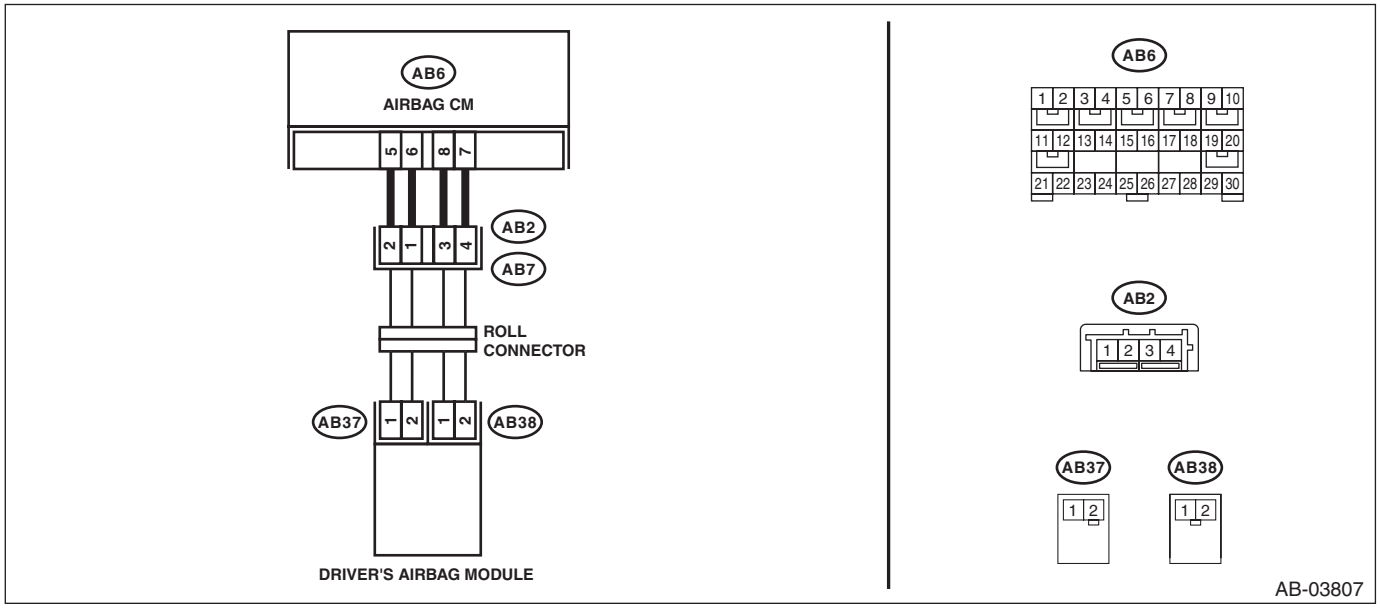
CL:DTC B1812 SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to ground.
- Airbag module harness (driver's side) circuit is shorted to ground.
- Roll connector circuit is shorted to ground.
- Driver's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

NOTE:
Prior to starting work, prepare two AIRBAG RESISTORs (98299PA040).
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the driver's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DRIVER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the driver's airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB38). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the connector (1Q) in the test harness Q to connector (AB37). 6) Connect the airbag resistor to the connector (2Q) in the test harness Q. 7) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the driver's airbag module. <Ref. to AB-38, Driver's Airbag Module.>	Go to step **3**.
3	**CHECK ROLL CONNECTOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the airbag resistor from the connector (2N) in test harness N and from the connector (2Q) in test harness Q. 5) Measure the resistance between connector (2N) in the test harness N and chassis ground. ***Connector & terminal*** ***(2N) No. 1 — Chassis ground:*** ***(2N) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the roll connector. <Ref. to AB-69, Roll Connector.>

	Step	Check	Yes	No
4	**CHECK AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Disconnect the test harness N from connector (AB38). 2) Disconnect the test harness Q from connector (AB37). 3) Remove the console front panel and disconnect the connector (AB9). 4) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG. NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 5) Measure the resistance between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 2 — Chassis ground:*** ***(3AG) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Replace the airbag main harness along with body harness.
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1812 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

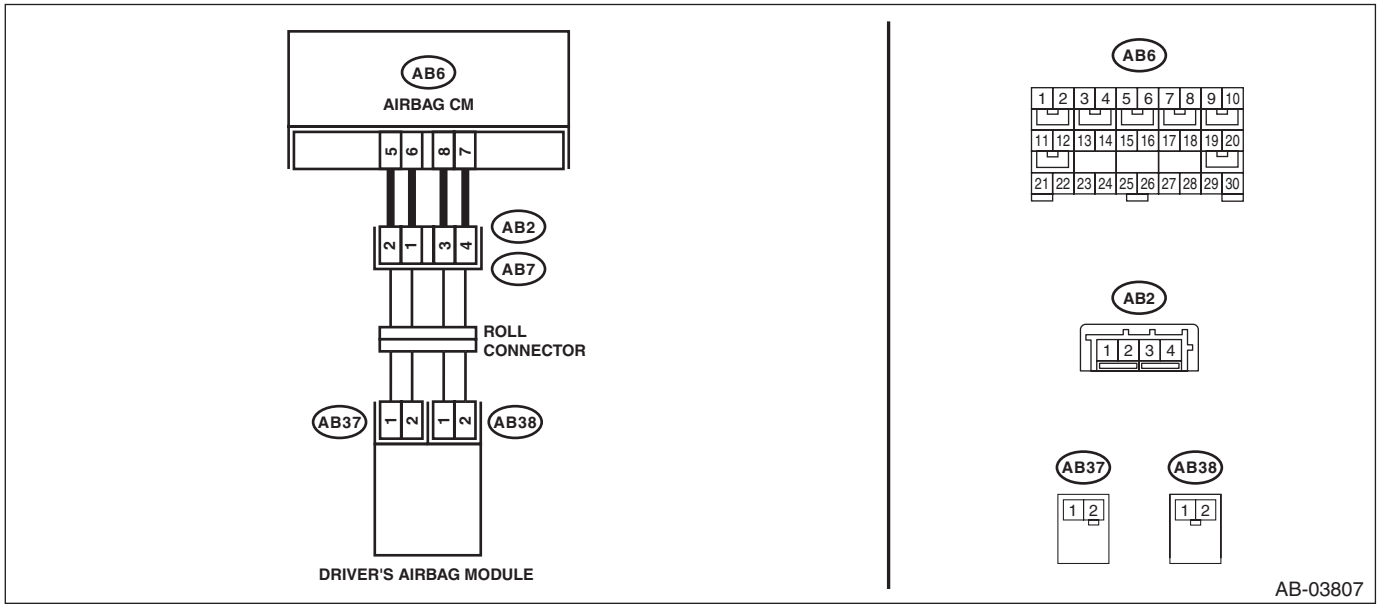
CM:DTC B1813 SHORT IN DRIVER'S AIRBAG DUAL STAGE - 2ND STEP CIRCUIT (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to power supply.
- Airbag module harness (driver's side) circuit is shorted to power supply.
- Roll connector is shorted to power supply.
- Driver's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>

NOTE:
Prior to starting work, prepare two AIRBAG RESISTORs (98299PA040).
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the driver's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DRIVER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the driver's airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB38). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the connector (1Q) in the test harness Q to connector (AB37). 6) Connect the airbag resistor to the connector (2Q) in the test harness Q. 7) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the driver's airbag module. <Ref. to AB-38, Driver's Airbag Module.>	Go to step **3**.
3	**CHECK ROLL CONNECTOR.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the airbag resistor from the connector (2N) in test harness N and from the connector (2Q) in test harness Q. 5) Measure the voltage between connector (2N) in the test harness N and chassis ground. ***Connector & terminal*** ***(2N) No. 1 (+) — Chassis ground (–):*** ***(2N) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the roll connector. <Ref. to AB-69, Roll Connector.>

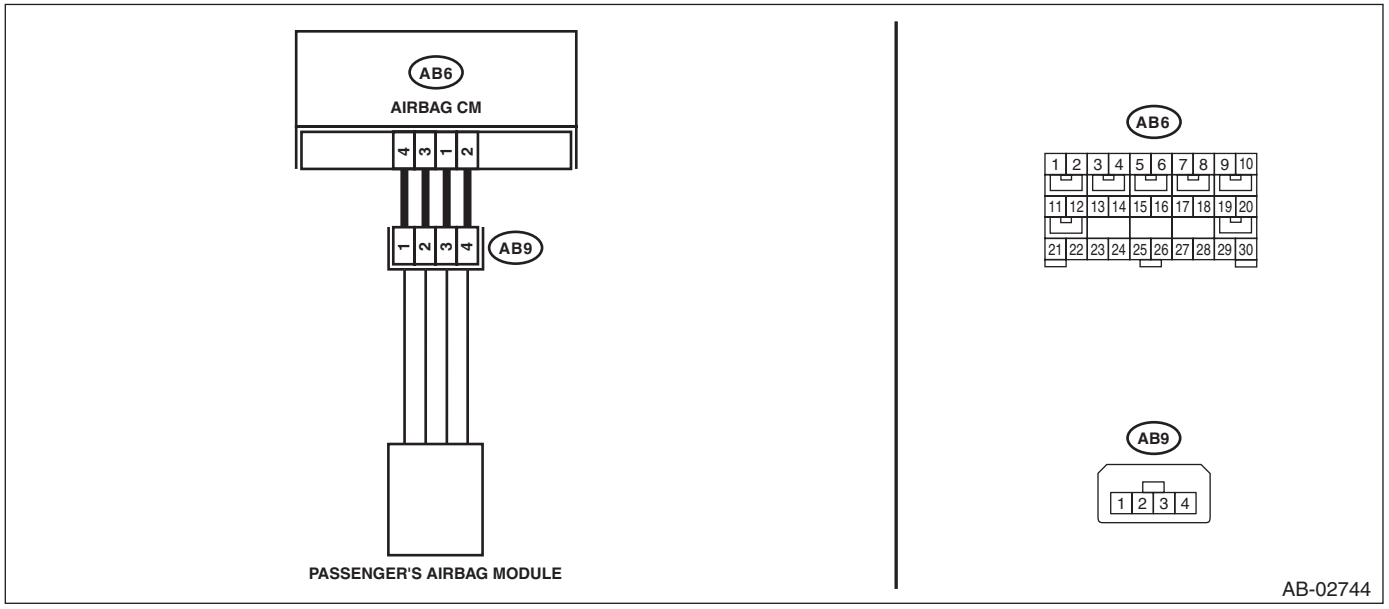
	Step	Check	Yes	No
4	**CHECK AIRBAG MAIN HARNESS (DRIVER'S AIRBAG HARNESS).** 1) Disconnect the test harness N from connector (AB38). 2) Disconnect the test harness Q from connector (AB37). 3) Remove the console front panel and disconnect the connector (AB9). 4) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG. NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 5) Measure the voltage between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 2 (+) — Chassis ground (–):*** ***(3AG) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Replace the airbag main harness along with body harness.
5	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1813 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CN:DTC B1815 SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted.
- Airbag module harness circuit (passenger's side) is shorted.
- Passenger's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the passenger's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (PASSENGER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB7) and (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, connect the connector (1AG) in the test harness AG, and release the short mechanism of the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect the connectors (AB6, AB17, AB18) and the connector (1AH) in the test harness AH. 5) Disconnect the passenger's airbag module connector (AB9). 6) Using a probe, measure the resistance between the terminals of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When measuring the resistance, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal (AB9) No. 3 — (AB9) No. 4:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG CONTROL MODULE.** 1) Disconnect the test harness AG and test harness AH from the connectors (AB6, AB17, AB18). 2) Connect the connectors (AB6, AB17, AB18) and the airbag control module. 3) Connect the connectors (AB7) and (AB2). 4) Connect the connector (AB66) to the driver's knee airbag module. 5) Connect the battery ground terminal and turn the ignition switch to ON. 6) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 7) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1815 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **4**.

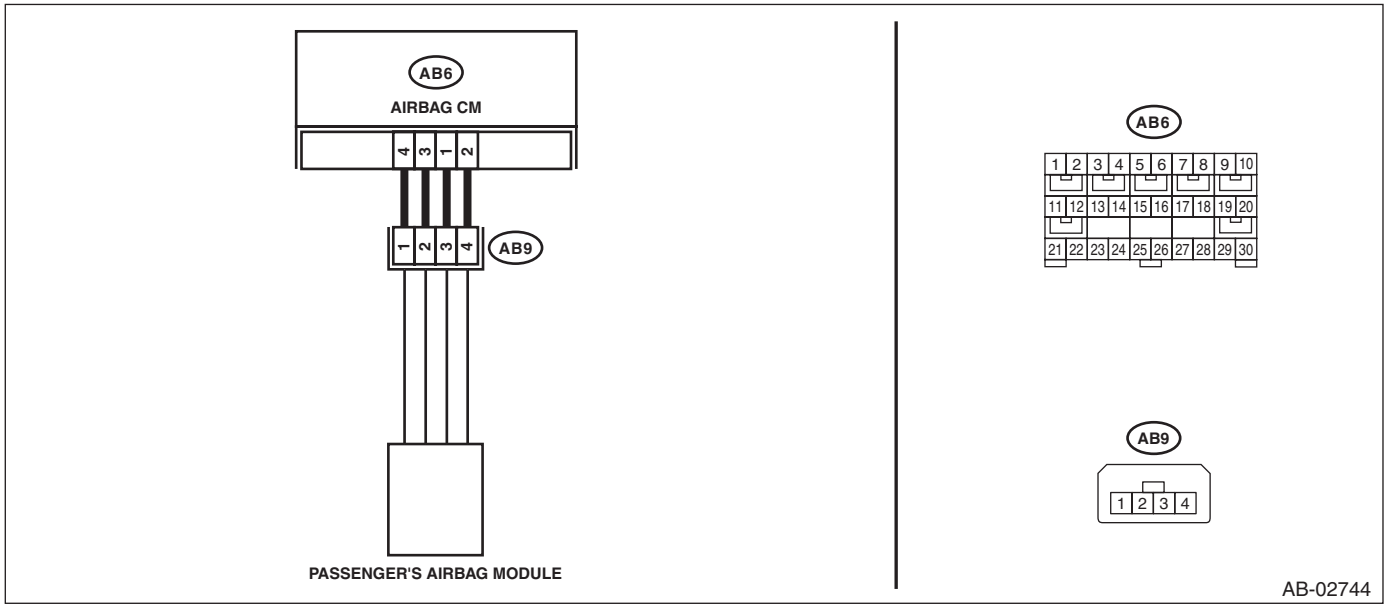
	Step	Check	Yes	No
4	**CHECK PASSENGER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Connect the passenger's airbag module connector (AB9). 3) Connect the battery ground terminal and turn the ignition switch to ON. 4) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 5) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1815 displayed?	Replace the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CO:DTC B1816 OPEN IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is open.
- Airbag module harness (passenger's side) circuit is open.
- Passenger's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the passenger's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (PASSENGER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB7) and (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Disconnect the passenger's airbag module connector (AB9). 6) Using a probe, measure the resistance between the terminals of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When measuring the resistance, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 3 — (AB9) No. 4:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG CONTROL MODULE.** 1) Connect the connectors (AB6, AB17, AB18) and the airbag control module. 2) Connect the connectors (AB7) and (AB2). 3) Connect the connector (AB66) to the driver's knee airbag module. 4) Using a probe, short the terminals No. 3 and No. 4 of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When shorting the terminals, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 3 — (AB9) No. 4:*** 5) Connect the battery ground terminal and turn the ignition switch to ON. 6) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 7) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1816 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **4**.

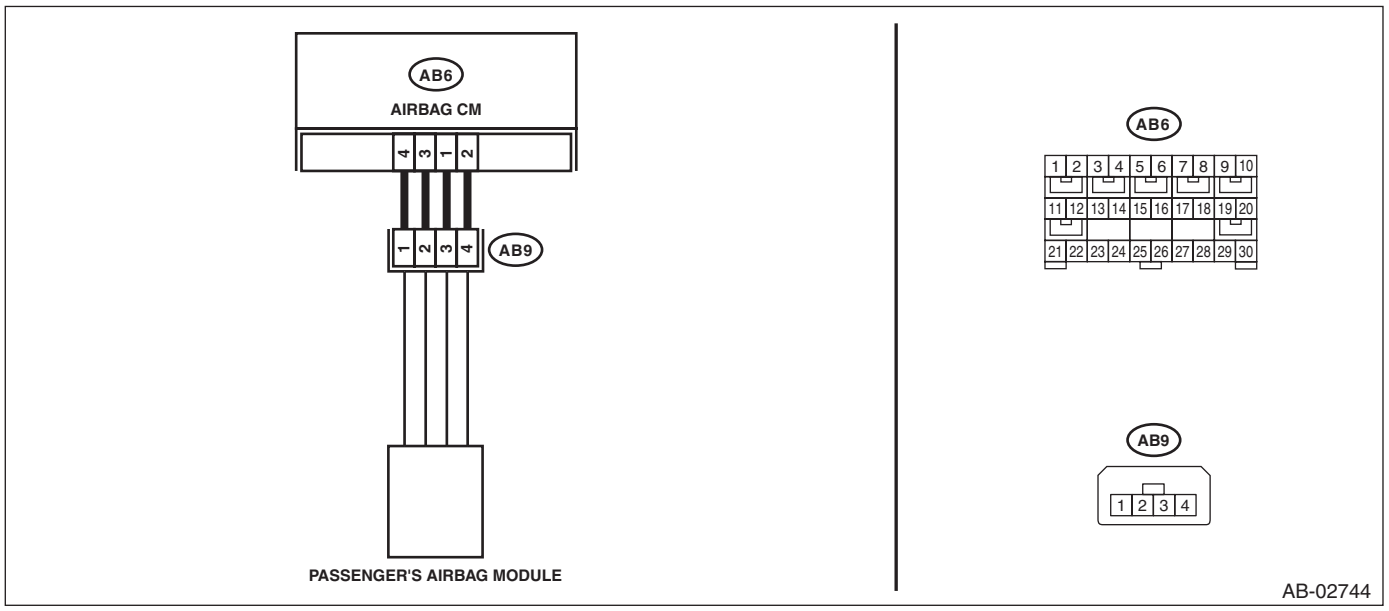
	Step	Check	Yes	No
4	**CHECK PASSENGER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Connect the passenger's airbag module connector (AB9). 3) Connect the battery ground terminal and turn the ignition switch to ON. 4) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 5) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1816 displayed?	Replace the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CP:DTC B1817 SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to ground.
- Airbag module harness (passenger's side) circuit is shorted to ground.
- Passenger's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the passenger's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (PASSENGER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB7) and (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Disconnect the passenger's airbag module connector (AB9). 6) Using a probe, measure the resistance between the connector (AB9) and chassis ground. <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When measuring the resistance, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 3 — Chassis ground:*** ***(AB9) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Replace the airbag main harness along with body harness.
3	**CHECK AIRBAG CONTROL MODULE.** 1) Connect the connectors (AB6, AB17, AB18) and the airbag control module. 2) Using a probe, short the terminals No. 3 and No. 4 of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When shorting the terminals, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 3 — (AB9) No. 4:*** 3) Connect the battery ground terminal and turn the ignition switch to ON. 4) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 5) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1817 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **4**.

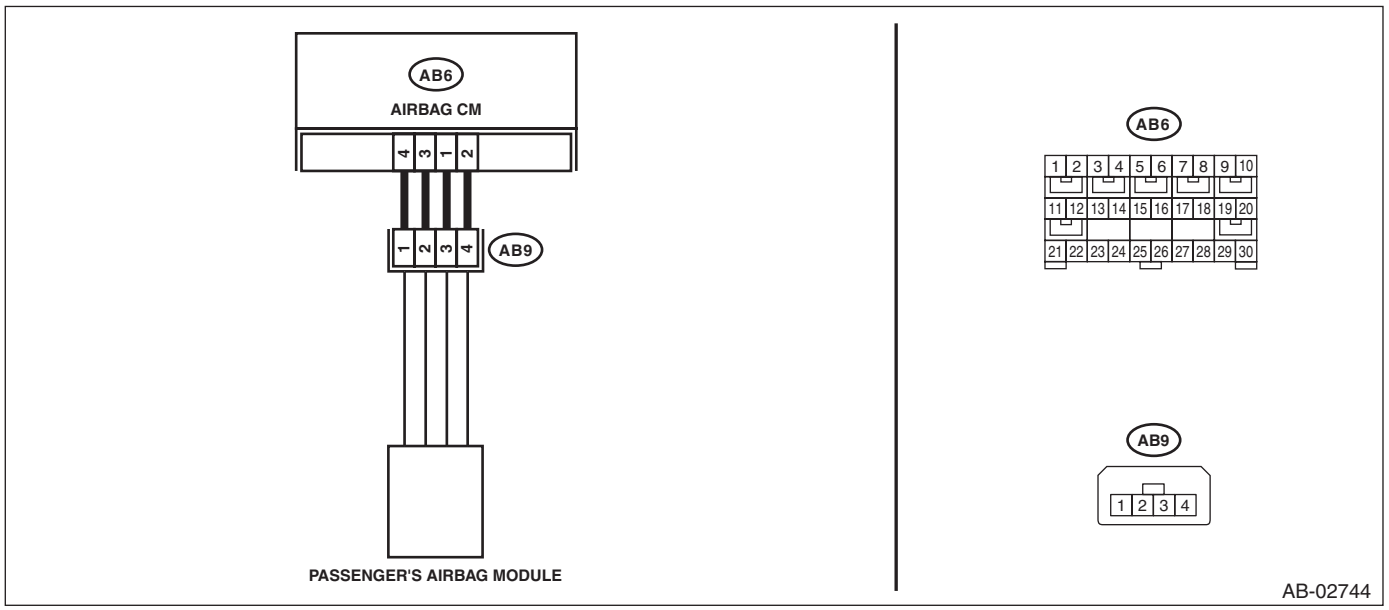
	Step	Check	Yes	No
4	**CHECK PASSENGER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Release the short circuit of connector (AB9). 3) Connect the passenger's airbag module connector (AB9). 4) Connect the connectors (AB7) and (AB2). 5) Connect the connector (AB66) to the driver's knee airbag module. 6) Connect the battery ground terminal and turn the ignition switch to ON. 7) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 8) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1817 displayed?	Replace the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CQ:DTC B1818 SHORT IN PASSENGER'S AIRBAG DUAL STAGE - 2ND STEP CIRCUIT (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to power supply.
- Airbag module harness (passenger's side) circuit is shorted to power supply.
- Passenger's airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the passenger's airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK AIRBAG MAIN HARNESS (PASSENGER'S AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB7) and (AB2). 3) Disconnect the connector (AB66) from the driver's knee airbag module. 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Disconnect the passenger's airbag module connector (AB9). 6) Using a probe, measure the voltage between the connector (AB9) and chassis ground. <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When measuring the voltage, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 3 (+) — Chassis ground (–):*** ***(AB9) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **3**.	Replace the airbag main harness along with body harness.

	Step	Check	Yes	No
3	**CHECK AIRBAG CONTROL MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Connect the connectors (AB6, AB17, AB18) and the airbag control module. 3) Using a probe, short the terminals No. 3 and No. 4 of connector (AB9). <Ref. to AB(diag)-16, HOW TO USE PROBE, PREPARATION TOOL, General Description.> **CAUTION:** **When shorting the terminals, make sure that the probe is inserted from the back side (harness side) of the connector. Also, do not insert the probe forcibly.** ***Connector & terminal*** ***(AB9) No. 3 — (AB9) No. 4:*** 4) Connect the battery ground terminal and turn the ignition switch to ON. 5) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 6) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1818 displayed?	Replace the airbag control module. <Ref. to AB-55, REMOVAL, Airbag Control Module.>	Go to step **4**.
4	**CHECK PASSENGER'S AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Release the short circuit of connector (AB9). 3) Connect the passenger's airbag module connector (AB9). 4) Connect the connectors (AB7) and (AB2). 5) Connect the connector (AB66) to the driver's knee airbag module. 6) Connect the battery ground terminal and turn the ignition switch to ON. 7) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 8) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1818 displayed?	Replace the passenger's airbag module. <Ref. to AB-42, REMOVAL, Passenger's Airbag Module.>	Go to step **5**.

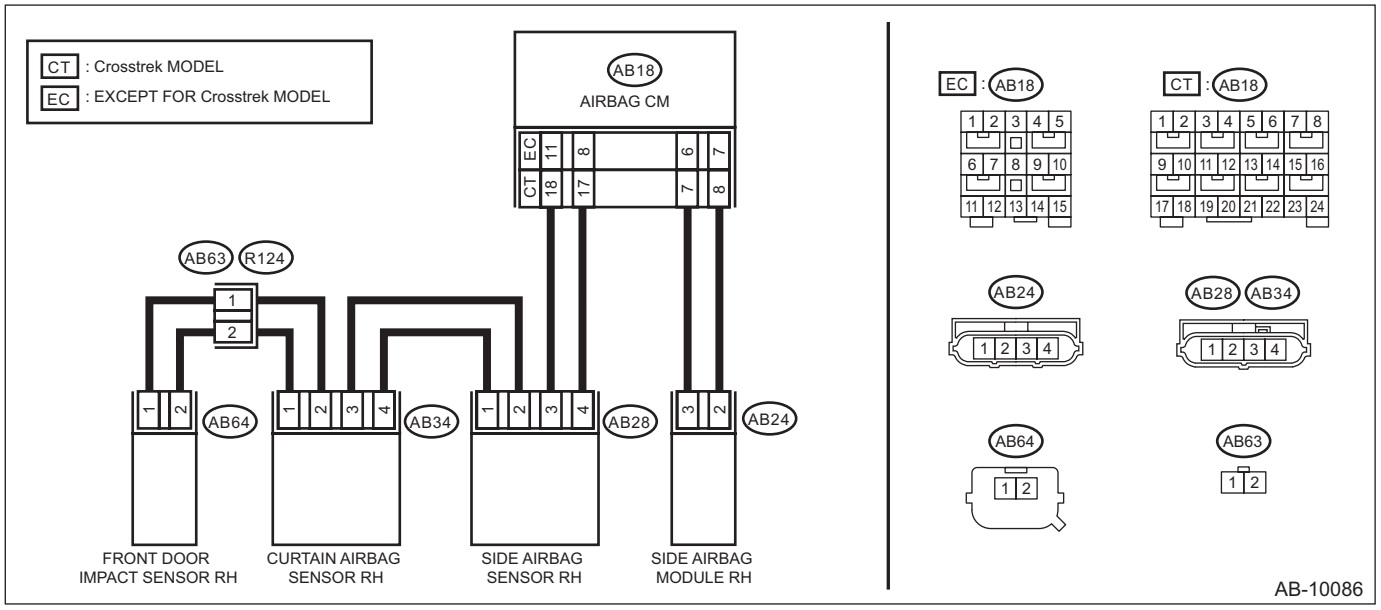
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CR:DTC B1820 SHORT IN SIDE AIRBAG RH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Side airbag harness (RH) circuit is shorted.
- Side airbag module (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



	Step	Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, side airbag module RH and the side airbag sensor RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK SIDE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB24) from the side airbag module (RH), and connect the connector (1AJ) in the test harness AJ to connector (AB24). 3) Connect the airbag resistor to the test harness AJ connector (3AJ). 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the side airbag module (RH). <Ref. to AB-48, REMOVAL, Side Airbag Module.>	Go to step **3**.

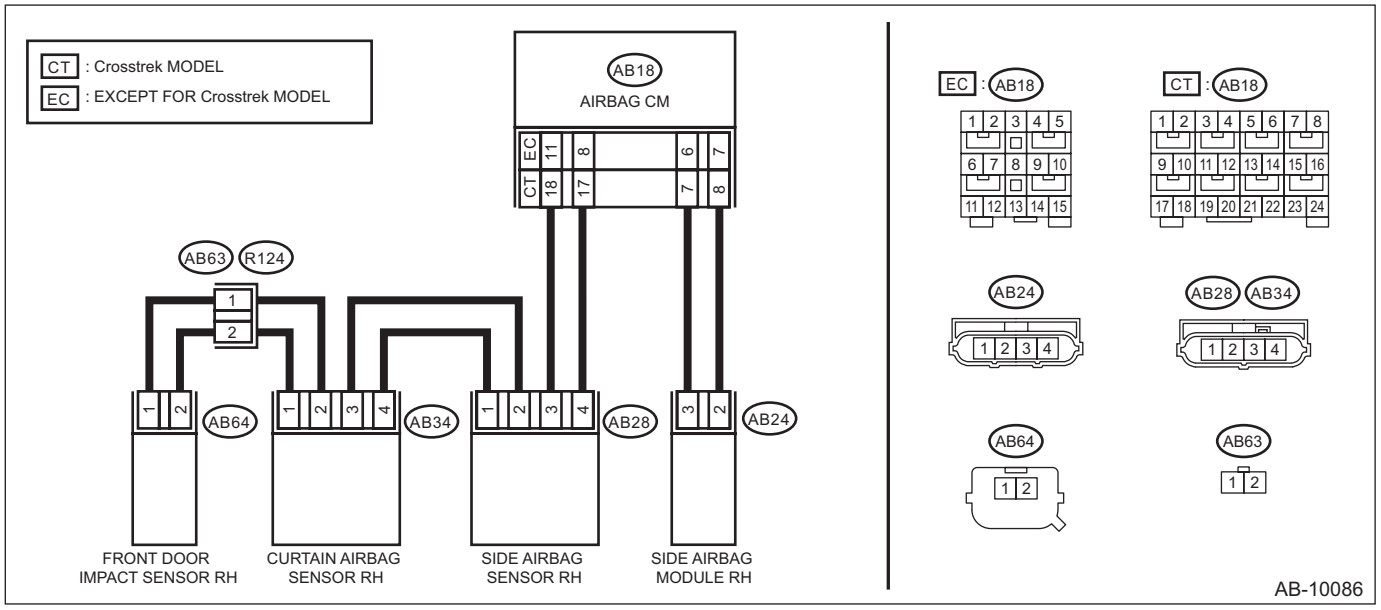
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG MODULE HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect the airbag resistor from test harness AJ. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AJ) in the test harness AJ and chassis ground. ***Connector & terminal*** ***(3AJ) No. 1 — (3AJ) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1820 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CS:DTC B1821 OPEN IN SIDE AIRBAG RH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Side airbag harness (RH) circuit is open.
- Side airbag module (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, side airbag module RH and the side airbag sensor RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK SIDE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB24) from the side airbag module (RH), and connect the connector (1AJ) in the test harness AJ to connector (AB24). 3) Connect the airbag resistor to the test harness AJ connector (3AJ). 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the side airbag module (RH). <Ref. to AB-48, REMOVAL, Side Airbag Module.>	Go to step **3**.

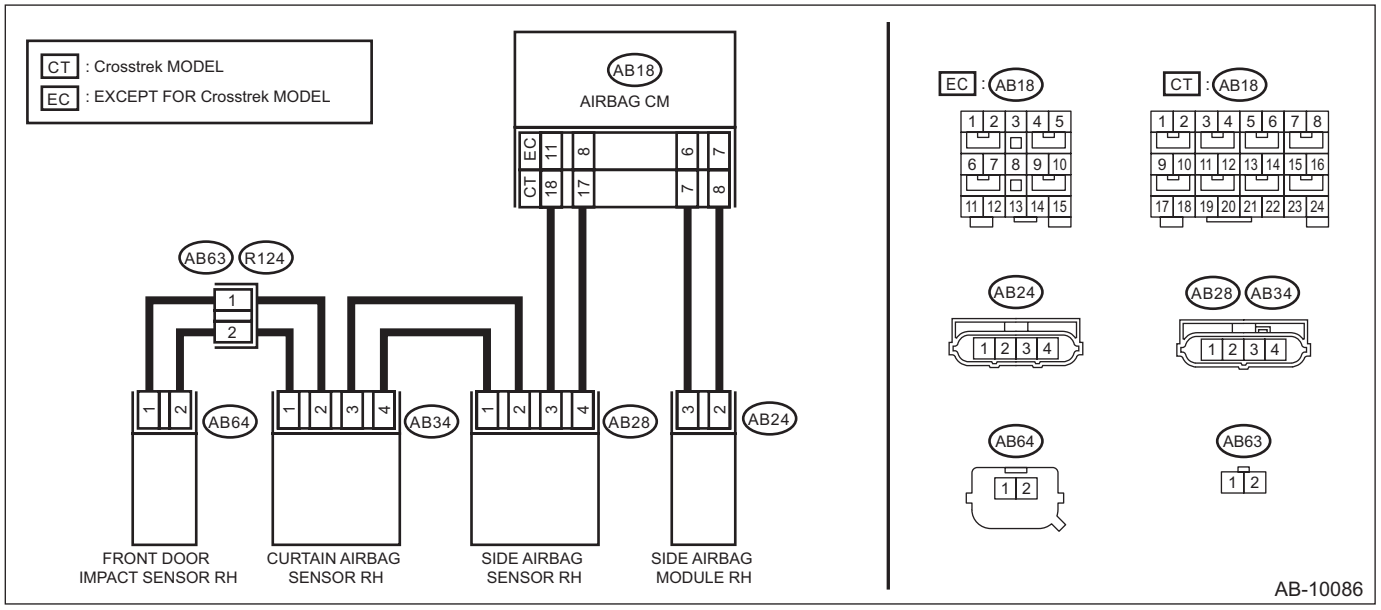
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG MODULE HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect the airbag resistor from test harness AJ. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector in the test harness AG and connector in the test harness AJ. ***Connector & terminal*** ***Crosstrek model*** ***(5AG) No. 5 — (3AJ) No. 1:*** ***(5AG) No. 7 — (3AJ) No. 2:*** ***Except for Crosstrek model*** ***(4AG) No. 11 — (3AJ) No. 1:*** ***(4AG) No. 13 — (3AJ) No. 2:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1821 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CT:DTC B1822 SHORT IN SIDE AIRBAG RH (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Side airbag harness (RH) circuit is shorted to ground.
- Side airbag module (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, side airbag module RH and the side airbag sensor RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK SIDE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB24), and connect the connector (1AJ) in test harness AJ to connector (AB24). 3) Connect the airbag resistor to the test harness AJ connector (3AJ). 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the side airbag module (RH). <Ref. to AB-48, REMOVAL, Side Airbag Module.>	Go to step **3**.

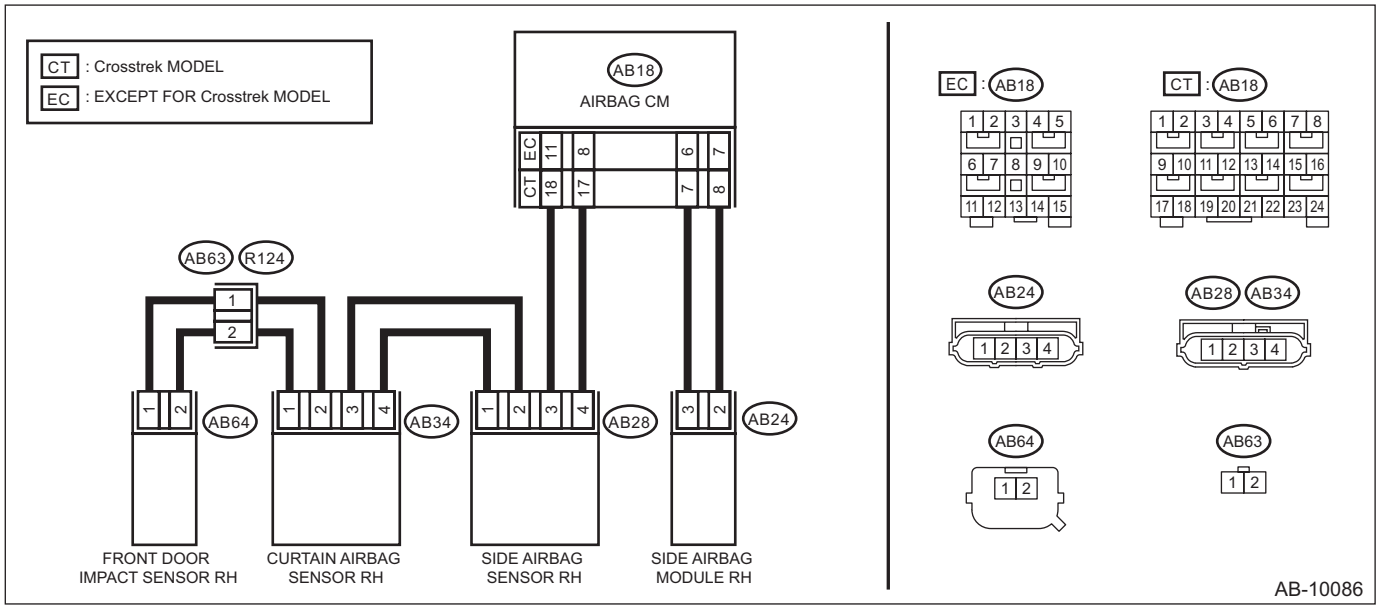
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG MODULE HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect the airbag resistor from test harness AJ. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AJ) in the test harness AJ and chassis ground. ***Connector & terminal*** ***(3AJ) No. 1 — Chassis ground:*** ***(3AJ) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1822 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CU:DTC B1823 SHORT IN SIDE AIRBAG RH (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Side airbag harness (RH) is shorted to power supply.
- Side airbag module (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, side airbag module RH and the side airbag sensor RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK SIDE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB24), and connect the connector (1AJ) in test harness AJ to connector (AB24). 3) Connect the airbag resistor to the test harness AJ connector (3AJ). 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the side airbag module (RH). <Ref. to AB-48, REMOVAL, Side Airbag Module.>	Go to step **3**.

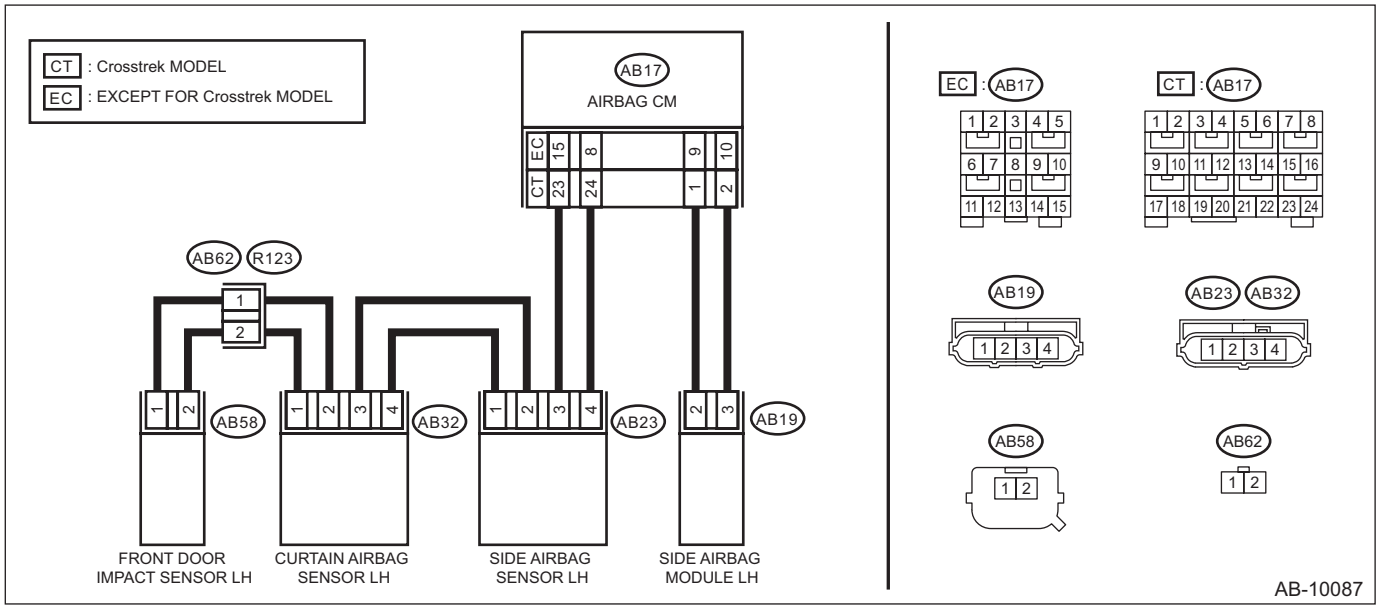
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG MODULE HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect the airbag resistor from test harness. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Connect the battery ground terminal and turn the ignition switch to ON. 8) Measure the voltage between connector (3AJ) in the test harness AJ and chassis ground. ***Connector & terminal*** ***(3AJ) No. 1 (+) — Chassis ground (–):*** ***(3AJ) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1823 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CV:DTC B1825 SHORT IN SIDE AIRBAG LH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Side airbag harness (LH) circuit is shorted.
- Side airbag module (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, side airbag module LH and the side airbag sensor LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK SIDE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB19) from the side airbag module (LH), and connect the connector (1AJ) in test harness AJ to the connector (AB19). 3) Connect the airbag resistor to the test harness AJ connector (3AJ). 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the side airbag module (LH). <Ref. to AB-48, REMOVAL, Side Airbag Module.>	Go to step **3**.

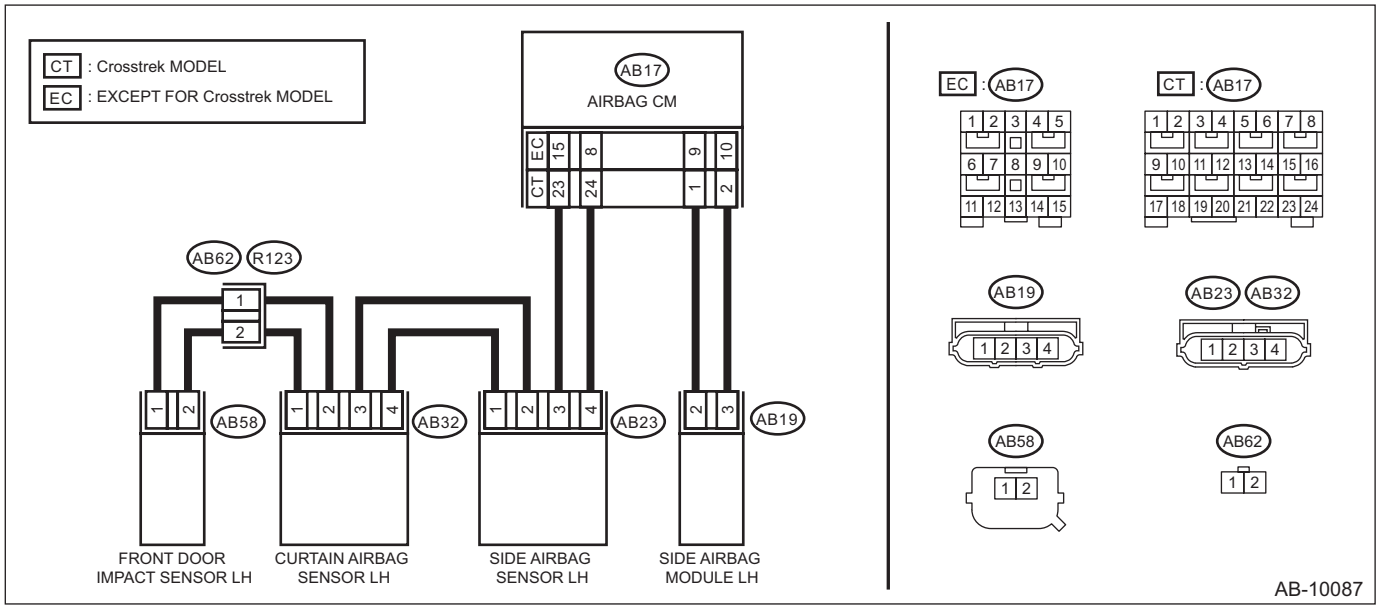
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG MODULE HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect the connector (AB31) from curtain airbag module (LH). 4) Disconnect the airbag resistor from test harness AJ. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AJ) terminals in test harness AJ. ***Connector & terminal (3AJ) No. 1 — (3AJ) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1825 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CW:DTC B1826 OPEN IN SIDE AIRBAG LH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Side airbag harness (LH) circuit is open.
- Side airbag module (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, side airbag module LH and the side airbag sensor LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK SIDE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB19) from the side airbag module (LH), and connect the connector (1AJ) in test harness AJ to the connector (AB19). 3) Connect the airbag resistor to the test harness AJ connector (3AJ). 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the side airbag module (LH). <Ref. to AB-48, REMOVAL, Side Airbag Module.>	Go to step **3**.

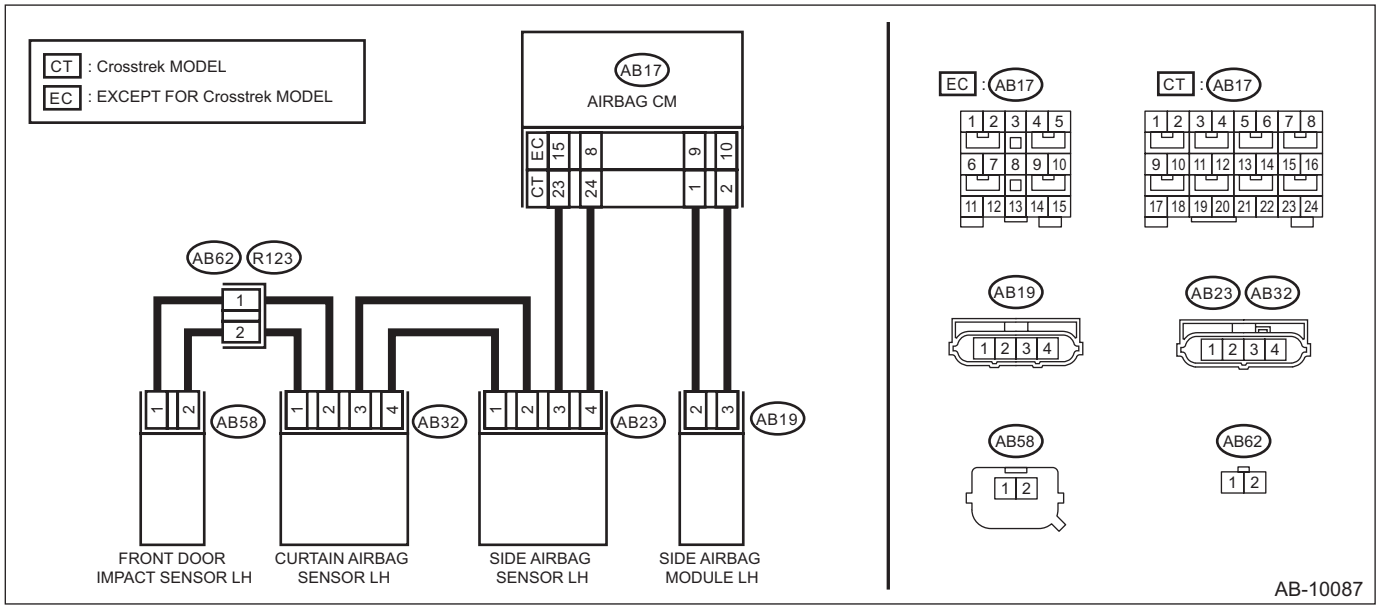
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG MODULE HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect the connector (AB31) from curtain airbag module (LH). 4) Disconnect the airbag resistor from test harness AJ. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (4AG) or (5AG) in the test harness AG and connector (3AJ) in the test harness AJ. ***Connector & terminal*** ***Crosstrek model*** ***(5AG) No. 1 — (3AJ) No. 2:*** ***(5AG) No. 3 — (3AJ) No. 1:*** ***Except for Crosstrek model*** ***(4AG) No. 8 — (3AJ) No. 2:*** ***(4AG) No. 10 — (3AJ) No. 1:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1826 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CX:DTC B1827 SHORT IN SIDE AIRBAG LH (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Side airbag harness (LH) circuit is shorted to ground.
- Side airbag module (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



	Step	Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, side airbag module LH and the side airbag sensor LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK SIDE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB19), and connect the connector (1AJ) in test harness AJ to connector (AB19). 3) Connect the airbag resistor to the test harness AJ connector (3AJ). 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the side airbag module (LH). <Ref. to AB-48, REMOVAL, Side Airbag Module.>	Go to step **3**.

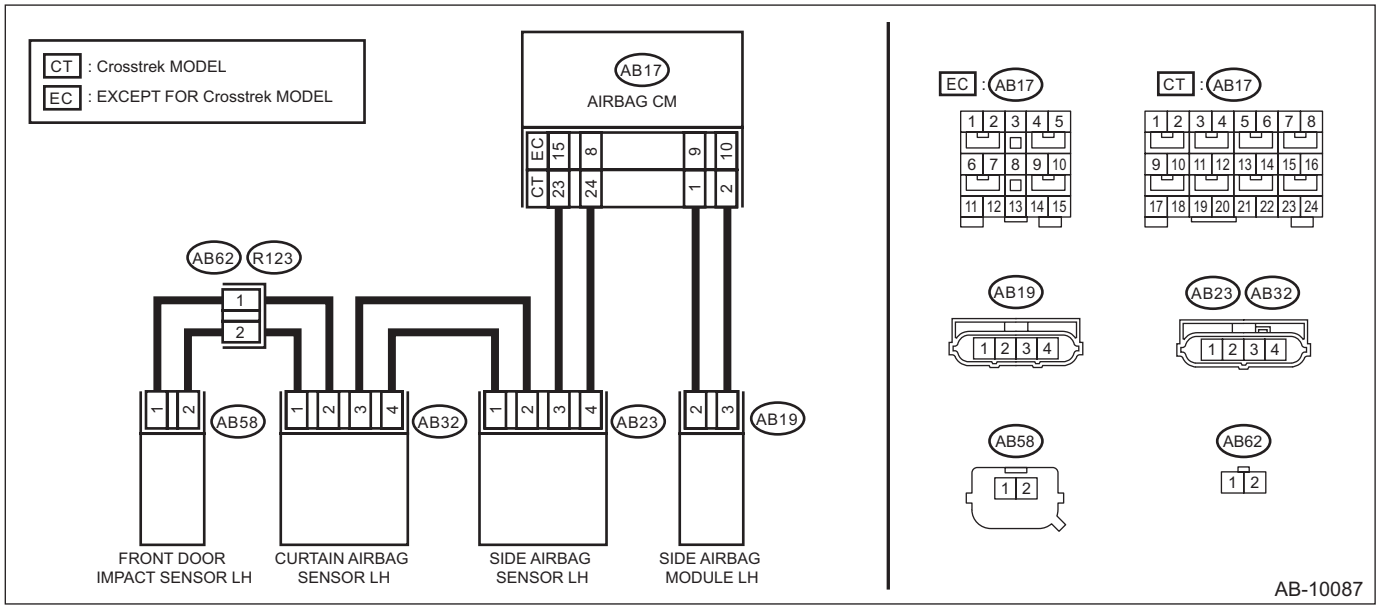
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG MODULE HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect the connector (AB31) from curtain airbag module (LH). 4) Disconnect the airbag resistor from test harness. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AJ) in the test harness AJ and chassis ground. ***Connector & terminal*** ***(3AJ) No. 1 — Chassis ground:*** ***(3AJ) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1827 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CY:DTC B1828 SHORT IN SIDE AIRBAG LH (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Side airbag harness (LH) is shorted to power supply.
- Side airbag module (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, side airbag module LH and the side airbag sensor LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK SIDE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB19), and connect the connector (1AJ) in test harness AJ to connector (AB19). 3) Connect the airbag resistor to the test harness AJ connector (3AJ). 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the side airbag module (LH). <Ref. to AB-48, REMOVAL, Side Airbag Module.>	Go to step **3**.

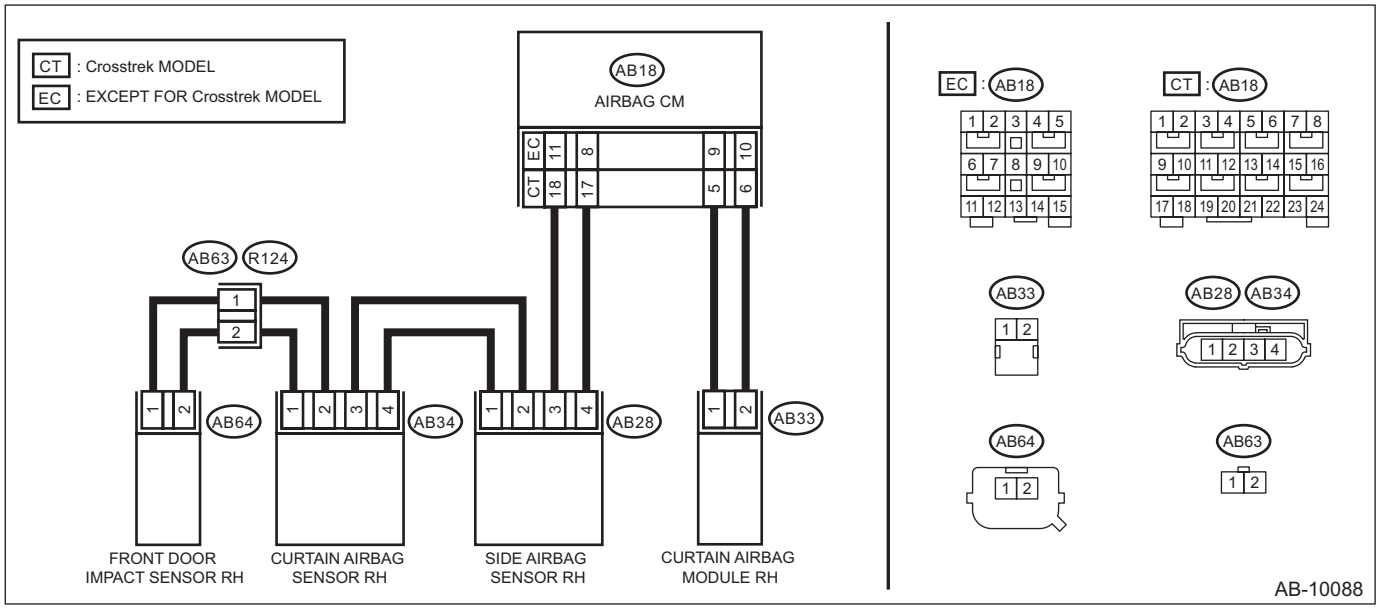
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG MODULE HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect the connector (AB31) from curtain airbag module (LH). 4) Disconnect the airbag resistor from test harness. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Connect the battery ground terminal and turn the ignition switch to ON. 8) Measure the voltage between connector (3AJ) in the test harness AJ and chassis ground. ***Connector & terminal*** ***(3AJ) No. 1 (+) — Chassis ground (–):*** ***(3AJ) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1828 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

CZ:DTC B1830 SHORT IN CURTAIN AIRBAG RH SQUIB CIRCUIT

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Curtain airbag harness (RH) circuit is shorted.
- Curtain airbag module (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, curtain airbag module RH and the curtain airbag sensor RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURTAIN AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB33) from curtain airbag module (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB33). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the curtain airbag module (RH). <Ref. to AB-51, Curtain Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (CURTAIN AIRBAG MODULE HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect connector (AB24) from side airbag module (RH). 4) Disconnect the airbag resistor from test harness N. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (2N) terminals in test harness N. ***Connector & terminal (2N) No. 1 — (2N) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1830 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

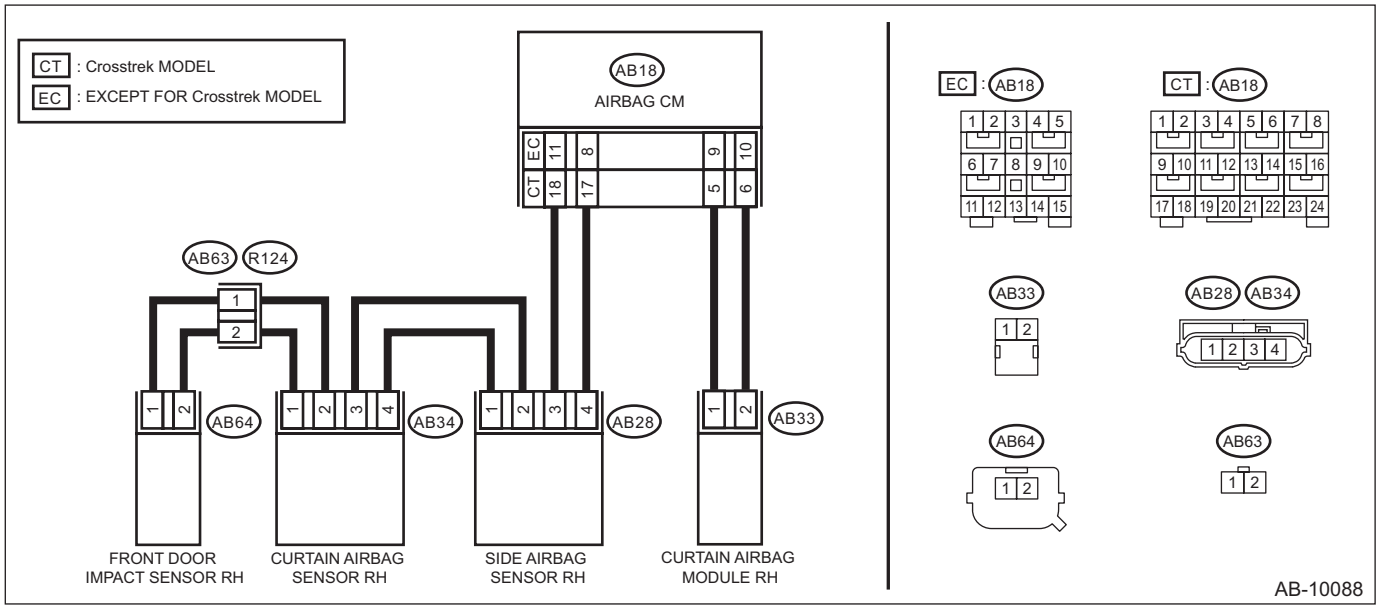
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DA:DTC B1831 OPEN IN CURTAIN AIRBAG RH SQUIB CIRCUIT

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Curtain airbag harness (RH) circuit is open.
- Curtain airbag module (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, curtain airbag module RH and the curtain airbag sensor RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURTAIN AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB33) from curtain airbag module (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB33). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the curtain airbag module (RH). <Ref. to AB-51, Curtain Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (CURTAIN AIRBAG MODULE HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect connector (AB24) from side airbag module (RH). 4) Disconnect the airbag resistor from test harness N. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (5AG) or (6AG) in the test harness AG and connector (2N) in the test harness N. ***Connector & terminal*** ***Crosstrek model*** ***(6AG) No. 8 — (2N) No. 2:*** ***(6AG) No. 6 — (2N) No. 1:*** ***Except for Crosstrek model*** ***(5AG) No. 6 — (2N) No. 2:*** ***(5AG) No. 12 — (2N) No. 1:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.

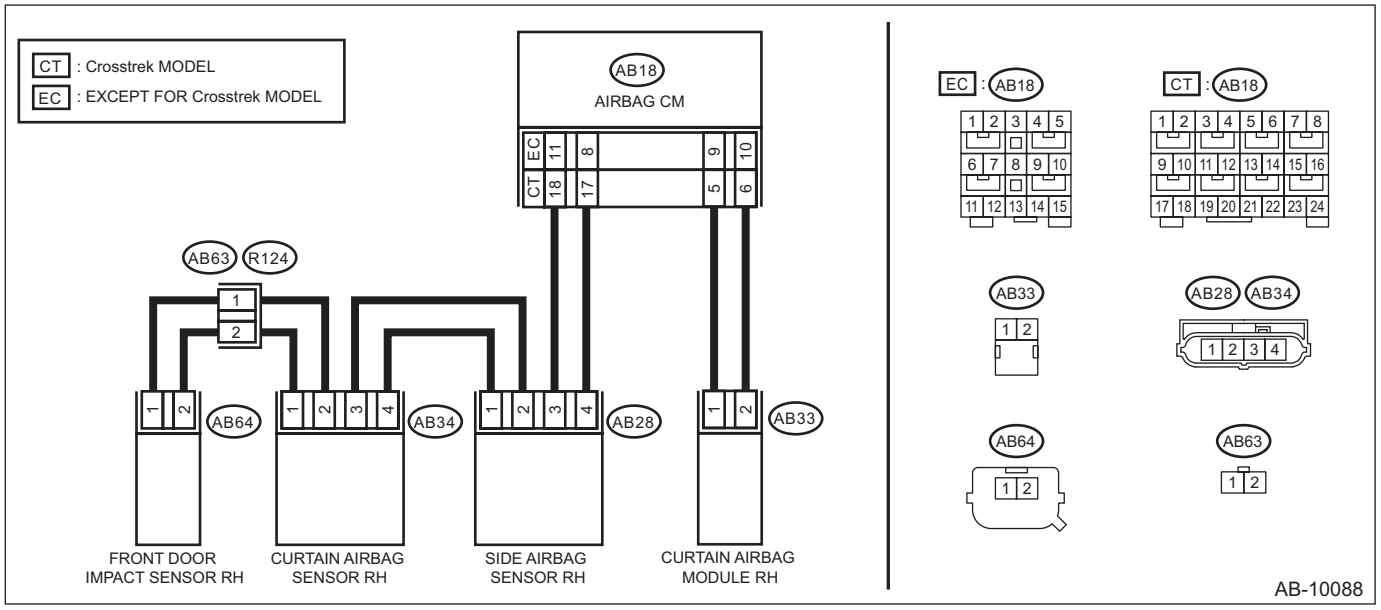
	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1831 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DB:DTC B1832 SHORT IN CURTAIN AIRBAG RH SQUIB CIRCUIT (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Curtain airbag harness (RH) circuit is shorted to ground.
- Curtain airbag module (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, curtain airbag module RH and the curtain airbag sensor RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK CURTAIN AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB33), and connect the connector (1N) in test harness N to connector (AB33). 3) Connect the airbag resistor to the connector (2N) of test harness N. 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the curtain airbag module (RH). <Ref. to AB-51, Curtain Airbag Module.>	Go to step **3**.

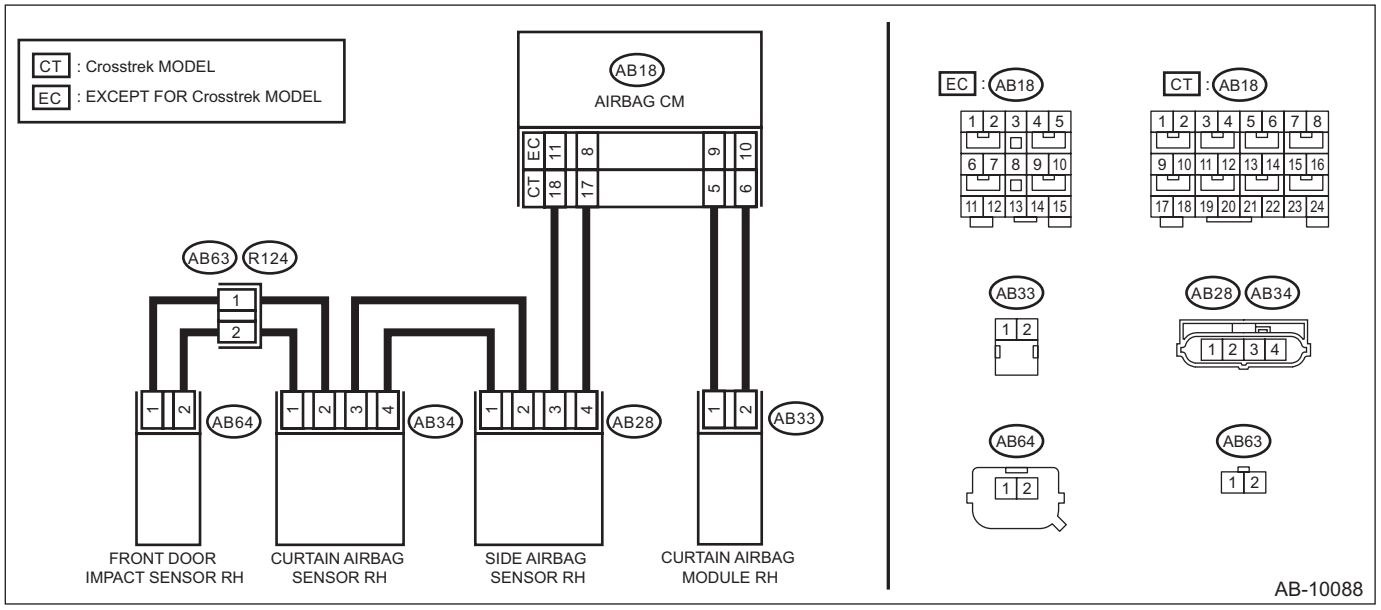
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (CURTAIN AIRBAG MODULE HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect connector (AB24) from side airbag module (RH). 4) Disconnect the airbag resistor from test harness N. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: For Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (2N) in the test harness N and chassis ground. ***Connector & terminal*** ***(2N) No. 1 — Chassis ground:*** ***(2N) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1832 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DC:DTC B1833 SHORT IN CURTAIN SHIELD AIRBAG RH SQUIB CIRCUIT (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Curtain airbag harness (RH) is shorted to power supply.
- Curtain airbag module (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, curtain airbag module RH and the curtain airbag sensor RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURTAIN AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB33), and connect the connector (1N) in test harness N to connector (AB33). 3) Connect the airbag resistor to the connector (2N) of test harness N. 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the curtain airbag module (RH). <Ref. to AB-51, Curtain Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (CURTAIN AIRBAG MODULE HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Disconnect connector (AB24) from side airbag module (RH). 4) Disconnect the airbag resistor from test harness N. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Connect the battery ground terminal and turn the ignition switch to ON. 8) Measure the voltage between connector (2N) in the test harness N and chassis ground. ***Connector & terminal*** ***(2N) No. 1 (+) — Chassis ground (–):*** ***(2N) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1833 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

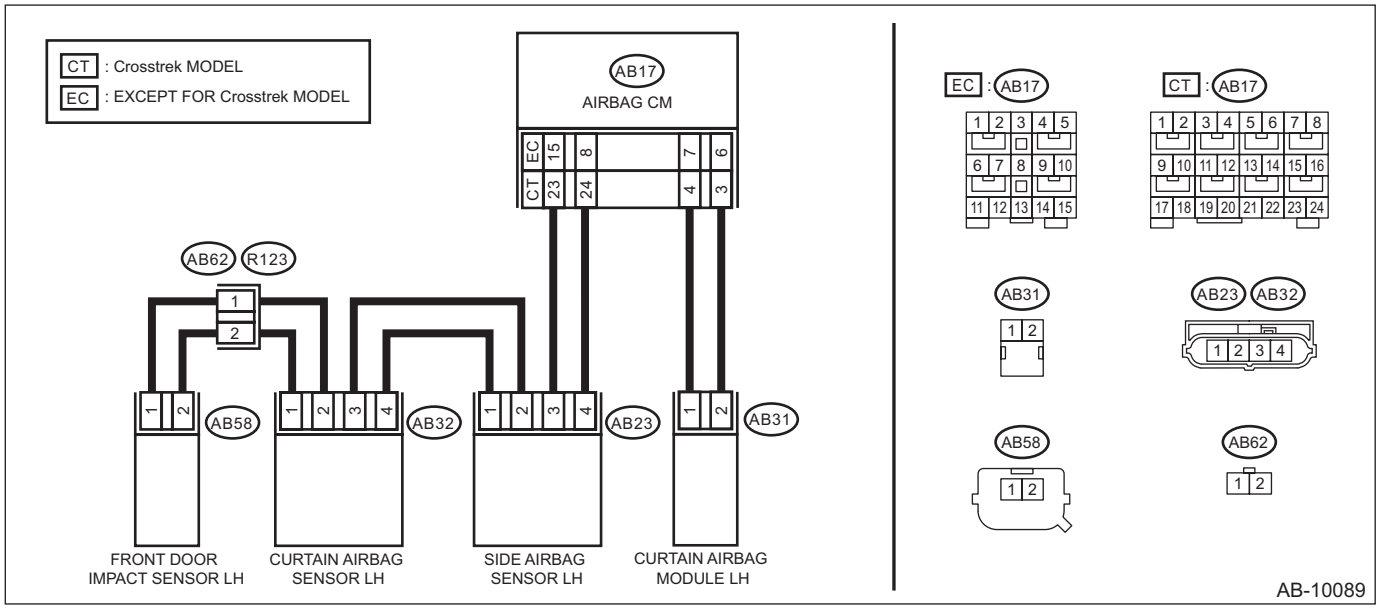
Step		Check	Yes	No
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DD:DTC B1835 SHORT IN CURTAIN AIRBAG LH SQUIB CIRCUIT

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Curtain airbag harness (LH) circuit is shorted.
- Curtain airbag module (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, curtain airbag module LH and the curtain airbag sensor LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURTAIN AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB31) from curtain airbag module (LH). 3) Connect the connector (1N) in the test harness N to the connector (AB31). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the curtain airbag module (LH). <Ref. to AB-51, Curtain Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (CURTAIN AIRBAG MODULE HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect connector (AB19) from side airbag module (LH). 4) Disconnect the airbag resistor from test harness N. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (2N) terminals in test harness N. ***Connector & terminal (2N) No. 1 — (2N) No. 2:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1835 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

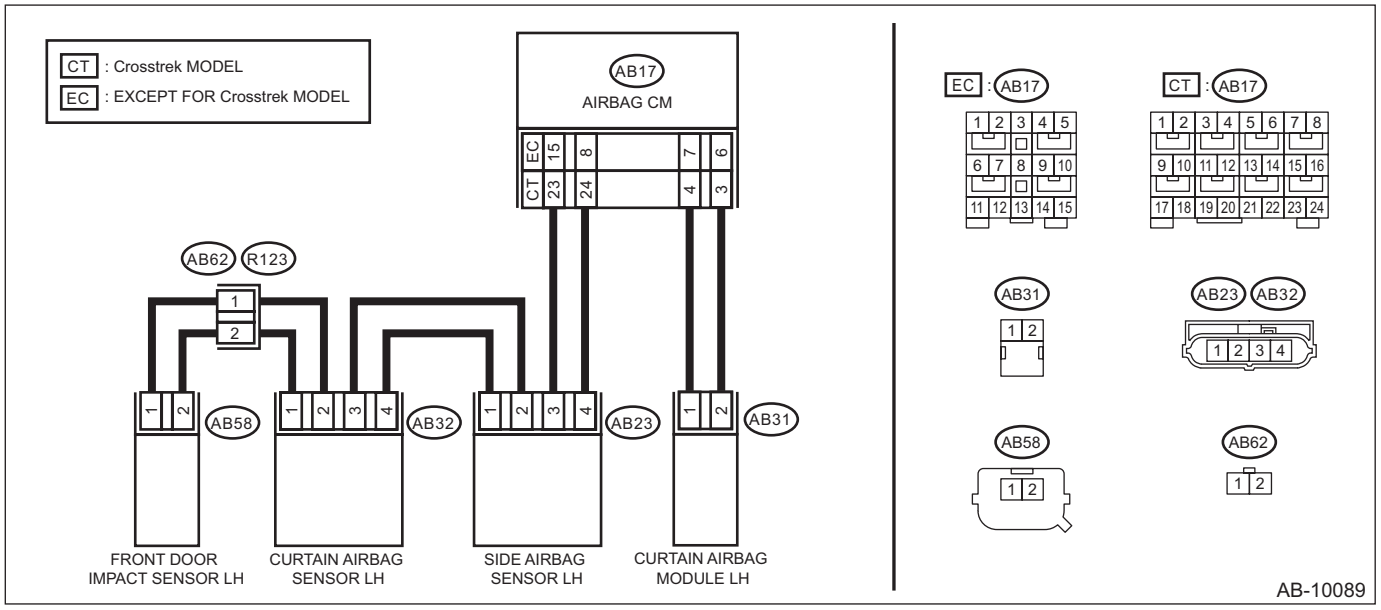
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DE:DTC B1836 OPEN IN CURTAIN AIRBAG LH SQUIB CIRCUIT

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Curtain airbag harness (LH) circuit is open.
- Curtain airbag module (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, curtain airbag module LH and the curtain airbag sensor LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURTAIN AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB31) from curtain airbag module (LH). 3) Connect the connector (1N) in the test harness N to the connector (AB31). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the curtain airbag module (LH). <Ref. to AB-51, Curtain Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (CURTAIN AIRBAG MODULE HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect connector (AB19) from side airbag module (LH). 4) Disconnect the airbag resistor from test harness N. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (5AG) or (6AG) in the test harness AG and connector (2N) in the test harness N. ***Connector & terminal*** ***Crosstrek model*** ***(6AG) No. 1 — (2N) No. 2:*** ***(6AG) No. 3 — (2N) No. 1:*** ***Except for Crosstrek model*** ***(5AG) No. 2 — (2N) No. 2:*** ***(5AG) No. 4 — (2N) No. 1:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.

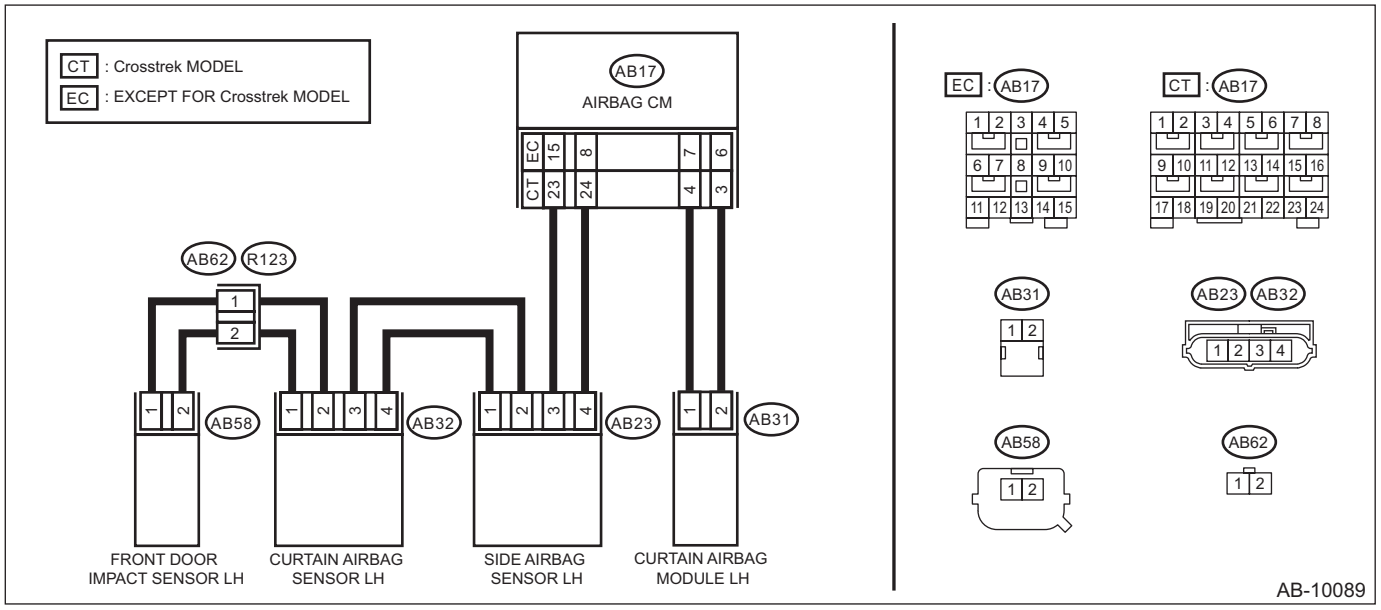
	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1836 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DF:DTC B1837 SHORT IN CURTAIN AIRBAG LH SQUIB CIRCUIT (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Curtain airbag harness (LH) circuit is shorted to ground.
- Curtain airbag module (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



	Step	Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, curtain airbag module LH and the curtain airbag sensor LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.
2	**CHECK CURTAIN AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB31), and connect the connector (1N) in test harness N to connector (AB31). 3) Connect the airbag resistor to the connector (2N) of test harness N. 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the curtain airbag module (LH). <Ref. to AB-51, Curtain Airbag Module.>	Go to step **3**.

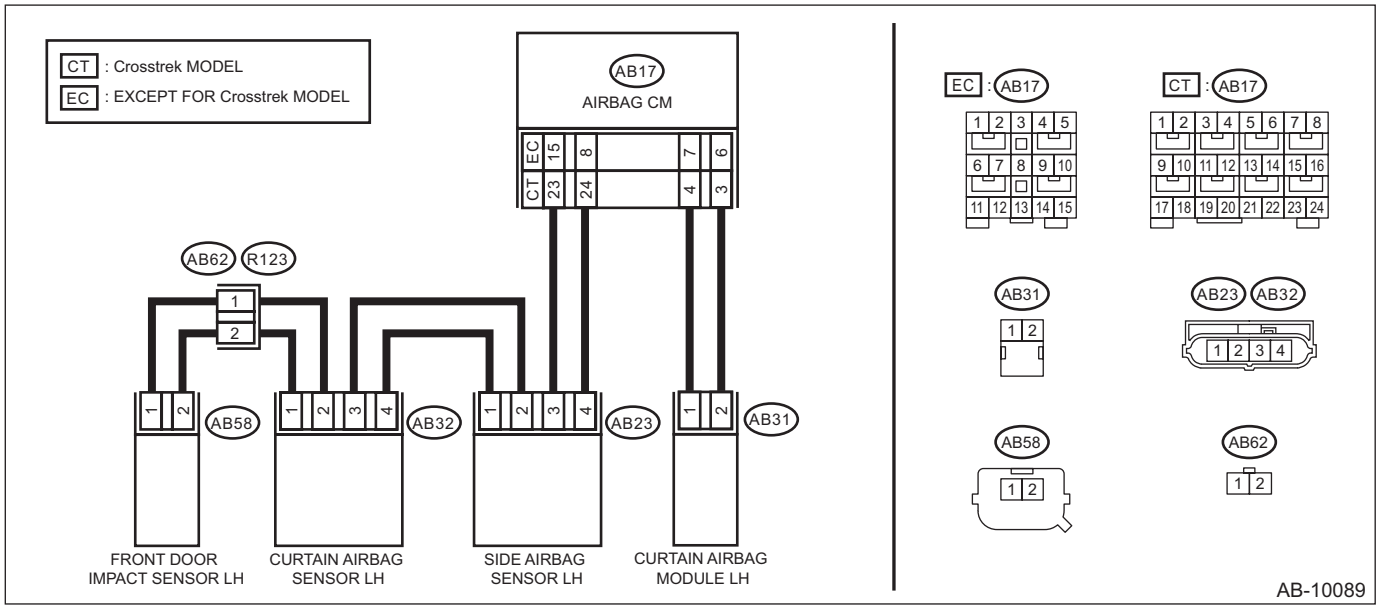
	Step	Check	Yes	No
3	**CHECK AIRBAG REAR HARNESS (CURTAIN AIRBAG MODULE HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect connector (AB19) from side airbag module (LH). 4) Disconnect the airbag resistor from test harness N. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (2N) in the test harness N and chassis ground. ***Connector & terminal*** ***(2N) No. 1 — Chassis ground:*** ***(2N) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1837 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DG:DTC B1838 SHORT IN CURTAIN SHIELD AIRBAG LH SQUIB CIRCUIT (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Curtain airbag harness (LH) is shorted to power supply.
- Curtain airbag module (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module, curtain airbag module LH and the curtain airbag sensor LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURTAIN AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB31), and connect the connector (1N) in test harness N to connector (AB31). 3) Connect the airbag resistor to the connector (2N) of test harness N. 4) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the curtain airbag module (LH). <Ref. to AB-51, Curtain Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (CURTAIN AIRBAG MODULE HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Disconnect connector (AB19) from side airbag module (LH). 4) Disconnect the airbag resistor from test harness N. 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Connect the battery ground terminal and turn the ignition switch to ON. 8) Measure the voltage between connector (2N) in the test harness N and chassis ground. ***Connector & terminal*** ***(2N) No. 1 (+) — Chassis ground (–):*** ***(2N) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1838 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

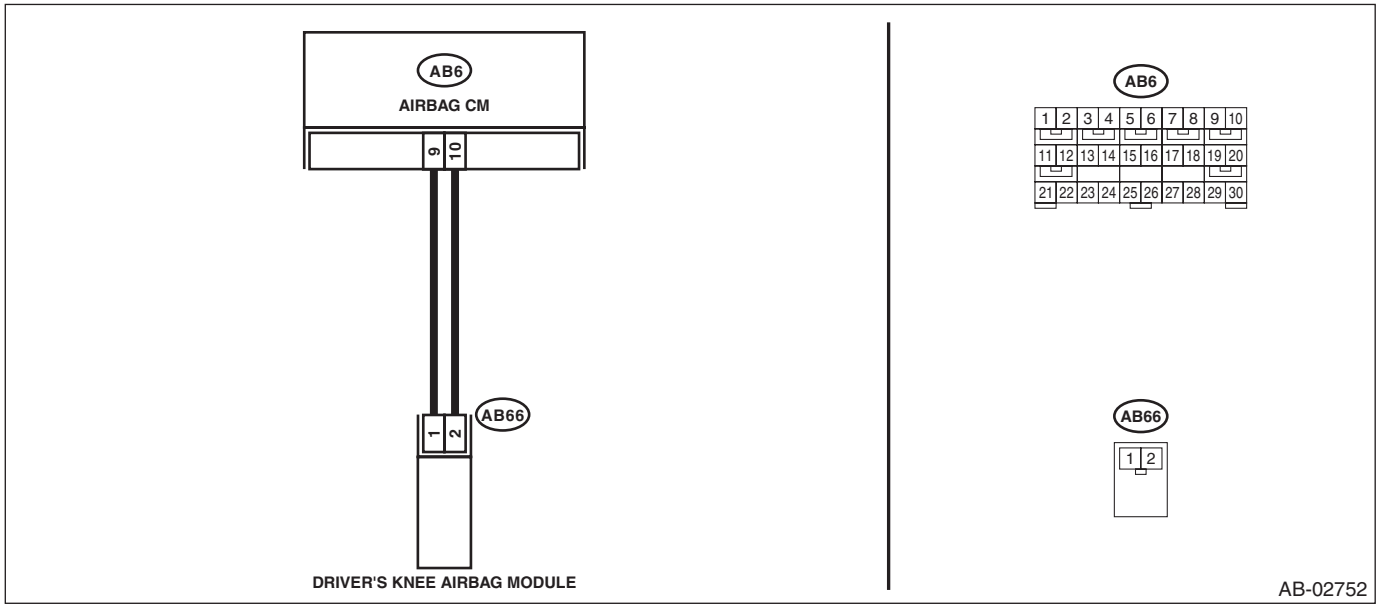
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DH:DTC B1860 SHORT IN DRIVER'S KNEE AIRBAG

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted.
- Knee airbag module harness circuit is shorted.
- Knee airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the knee airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK KNEE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB66) from knee airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB66). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG MAIN HARNESS (KNEE AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 4) Remove the console front panel and disconnect the connector (AB9). 5) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG to connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Measure the resistance between connector (3AG) terminals in test harness AG. ***Connector & terminal*** ***(3AG) No. 14 — (3AG) No. 16:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag main harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1860 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

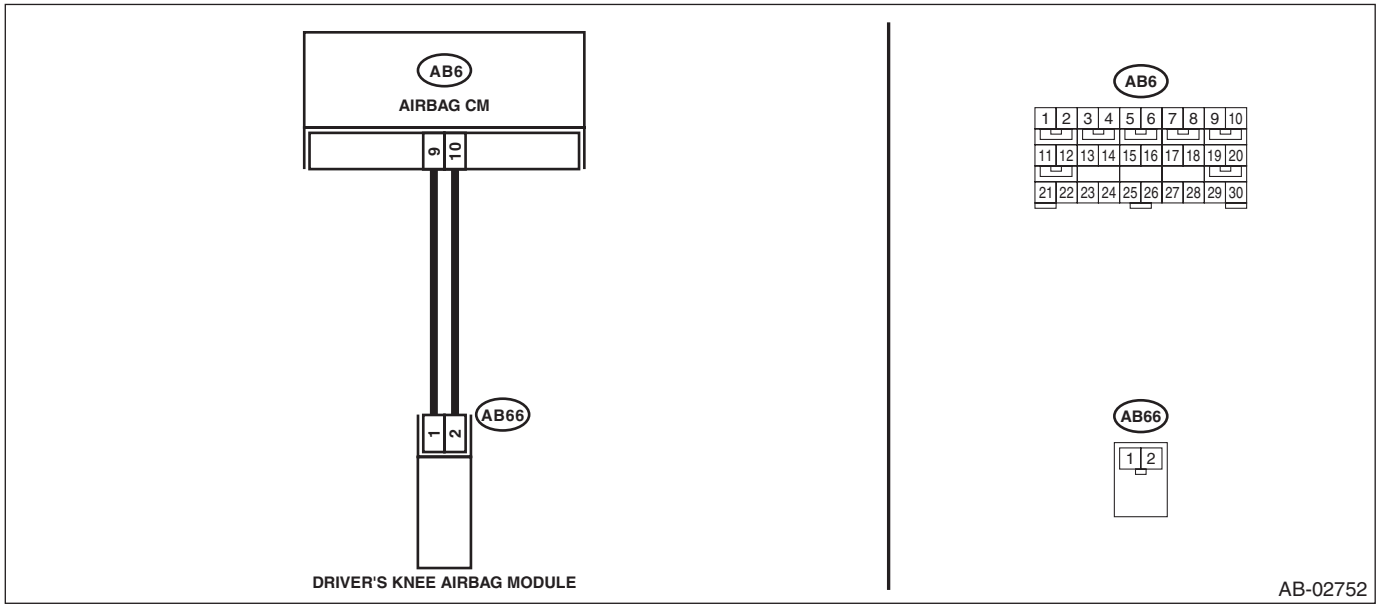
Step		Check	Yes	No
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DI: DTC B1861 OPEN IN DRIVER'S KNEE AIRBAG

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is open.
- Knee airbag module harness circuit is open.
- Knee airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the knee airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK KNEE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB66) from knee airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB66). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG MAIN HARNESS (KNEE AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 4) Remove the console front panel and disconnect the connector (AB9). 5) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG to connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Measure the resistance between connector (3AG) in the test harness AG and connector (2N) in the test harness N. ***Connector & terminal*** ***(3AG) No. 14 — (2N) No. 1:*** ***(3AG) No. 16 — (2N) No. 2:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag main harness along with body harness.

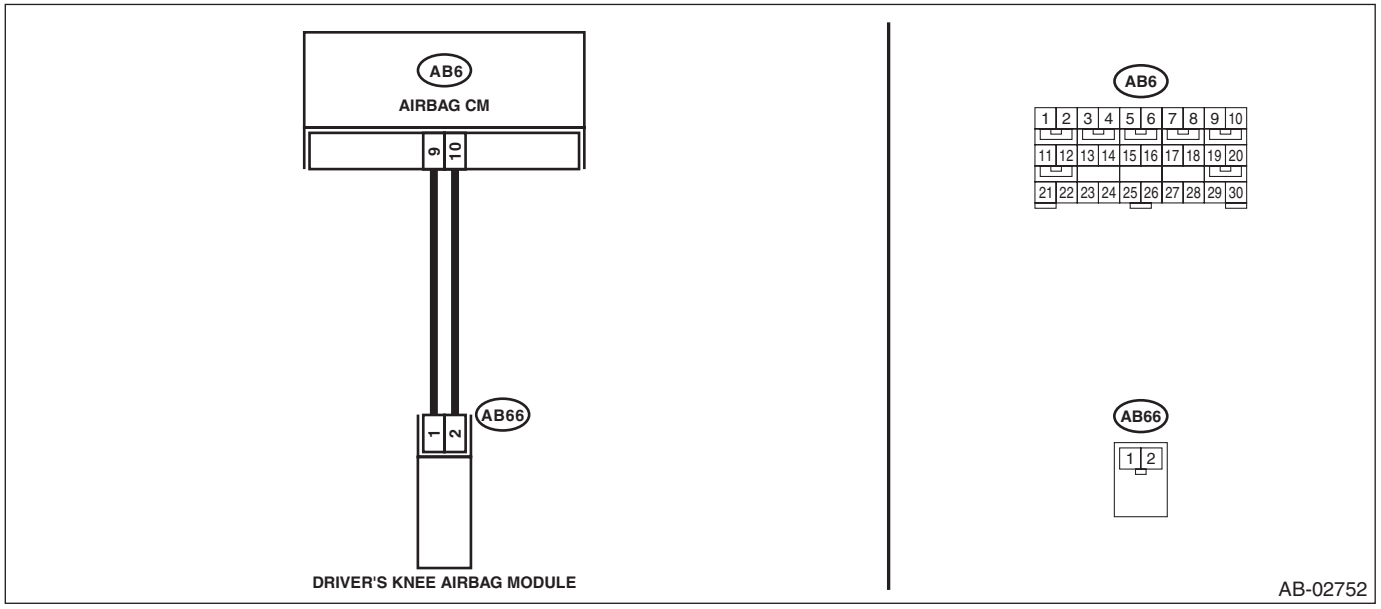
	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1861 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DJ:DTC B1862 SHORT IN DRIVER'S KNEE AIRBAG (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to ground.
- Knee airbag module harness circuit is shorted to ground.
- Knee airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the knee airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK KNEE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB66) from knee airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB66). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG MAIN HARNESS (KNEE AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 4) Remove the console front panel and disconnect the connector (AB9). 5) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG to connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Measure the resistance between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 14 — Chassis ground:*** ***(3AG) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag main harness along with body harness.

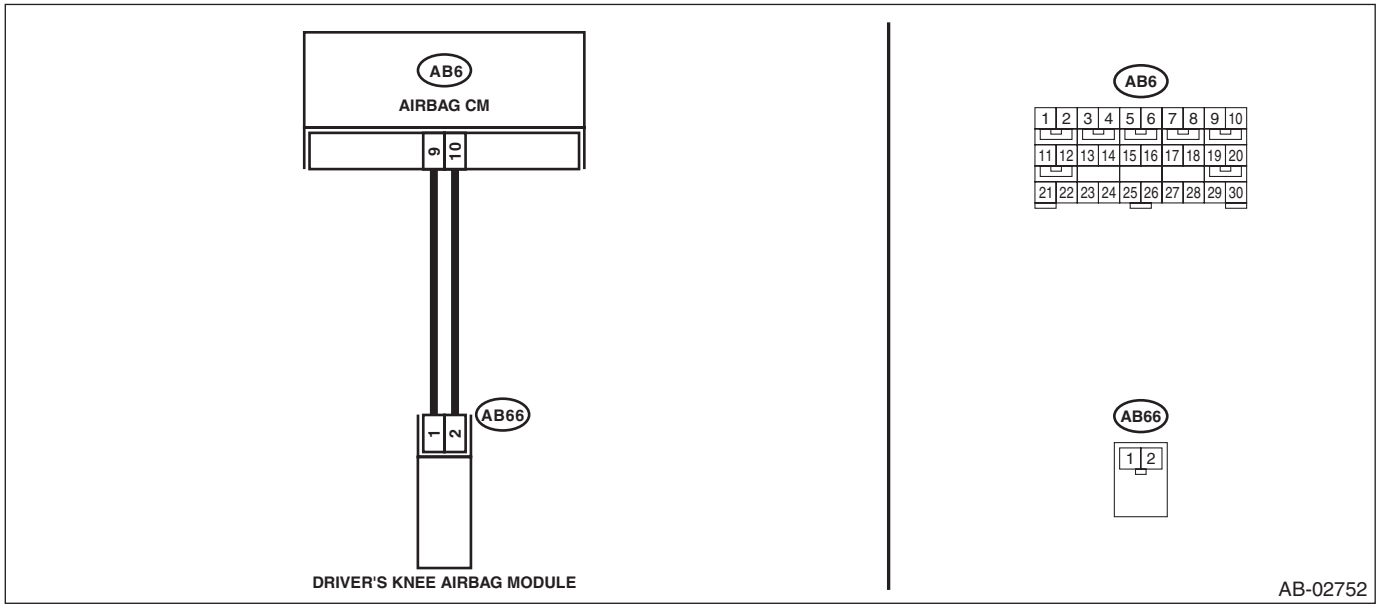
	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1862 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DK:DTC B1863 SHORT IN DRIVER'S KNEE AIRBAG (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Airbag main harness circuit is shorted to power supply.
- Knee airbag module harness circuit is shorted to power supply.
- Knee airbag module is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the knee airbag module.	Is there poor contact?	Replace the airbag harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK KNEE AIRBAG MODULE.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB66) from knee airbag module. 3) Connect the connector (1N) in the test harness N to the connector (AB66). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>	Go to step **3**.
3	**CHECK AIRBAG MAIN HARNESS (KNEE AIRBAG HARNESS).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Remove the instrument panel lower cover and column cover, and disconnect the connector (AB7) from (AB2). 4) Remove the console front panel and disconnect the connector (AB9). 5) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG. NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 6) Connect the battery ground terminal and turn the ignition switch to ON. 7) Measure the voltage between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 14 (+) — Chassis ground (–):*** ***(3AG) No. 16 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the airbag main harness along with body harness.

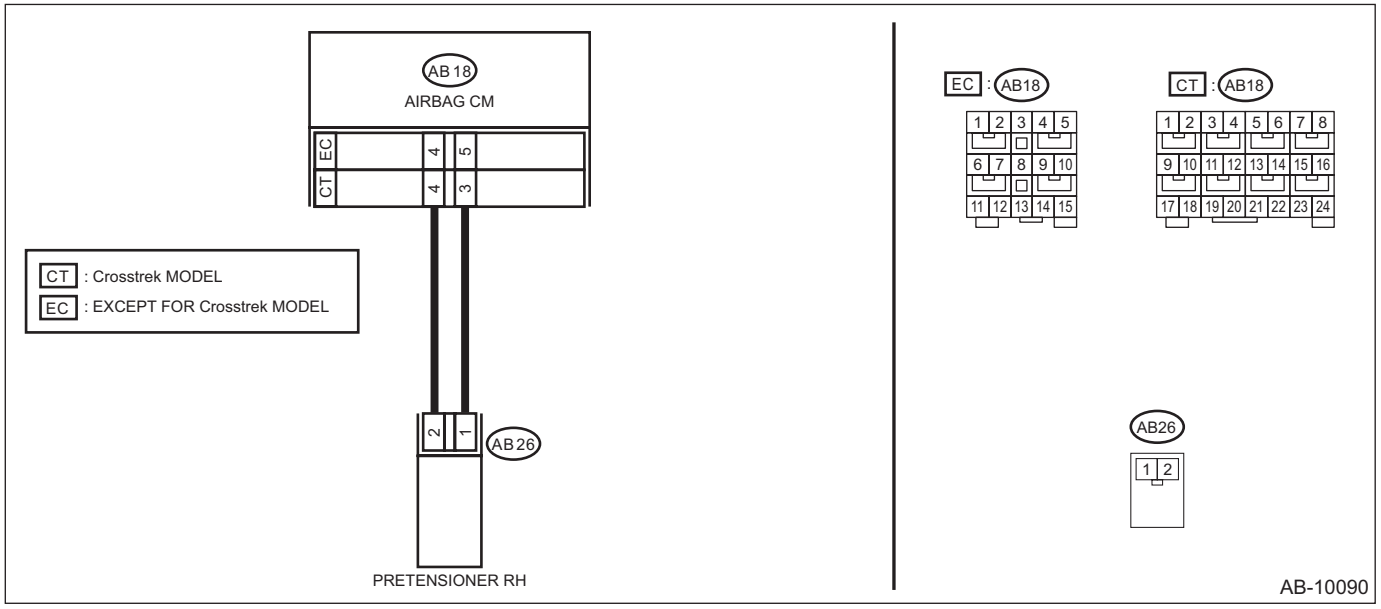
	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1863 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DL:DTC B1900 SHORT IN FRONT P/T RH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Seat belt pretensioner (RH) circuit is shorted.
- Pretensioner (RH) is faulty.
- Pretensioner harness (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the seat belt pretensioner RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB26). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the seat belt pretensioner (RH). <Ref. to SB-17, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (PRETENSIONER HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Disconnect connector (AB24) from side airbag module (RH). 4) Disconnect the connector (AB33) from curtain airbag module (RH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AG) terminals in test harness AG. ***Connector & terminal*** ***(3AG) No. 18 — (3AG) No. 20:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1900 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

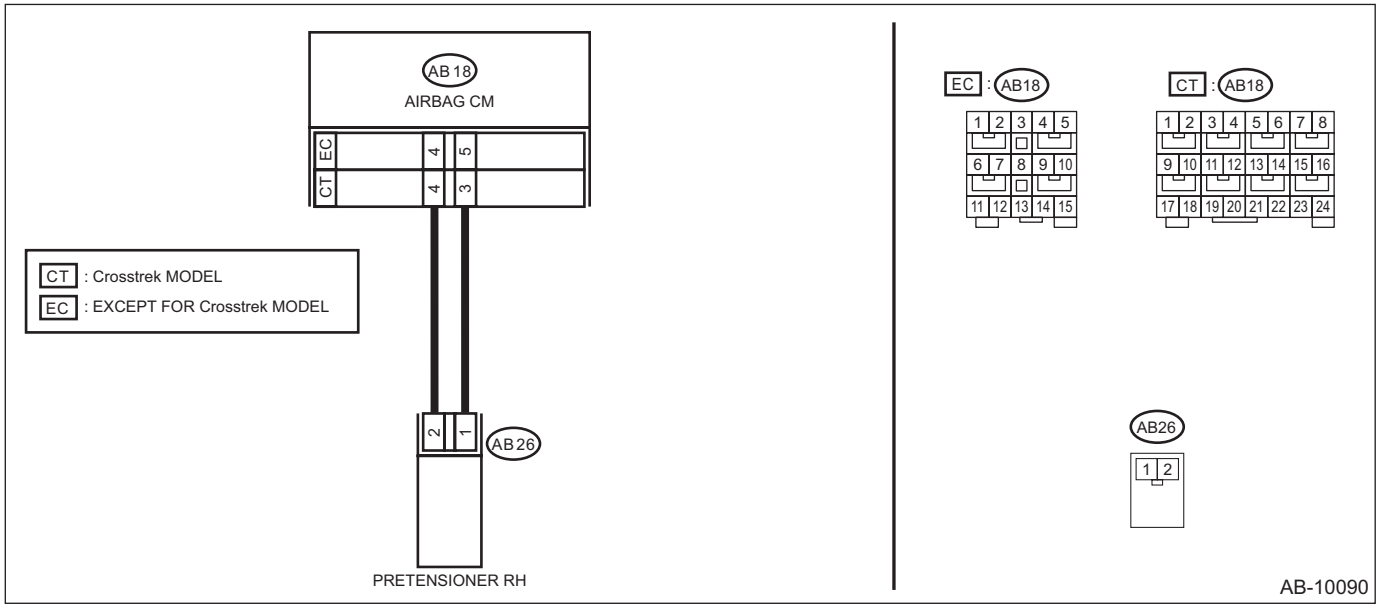
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DM:DTC B1901 OPEN IN FRONT P/T RH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Seat belt pretensioner (RH) circuit is open.
- Pretensioner (RH) is faulty.
- Pretensioner harness (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the seat belt pretensioner RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB26). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the seat belt pretensioner (RH). <Ref. to SB-17, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (PRETENSIONER HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from the connector (2N) of test harness N. 3) Disconnect connector (AB24) from side airbag module (RH). 4) Disconnect the connector (AB33) from curtain airbag module (RH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AG) in the test harness AG and connector (2N) in the test harness N. ***Connector & terminal*** ***(3AG) No. 18 — (2N) No. 2:*** ***(3AG) No. 20 — (2N) No. 1:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1901 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

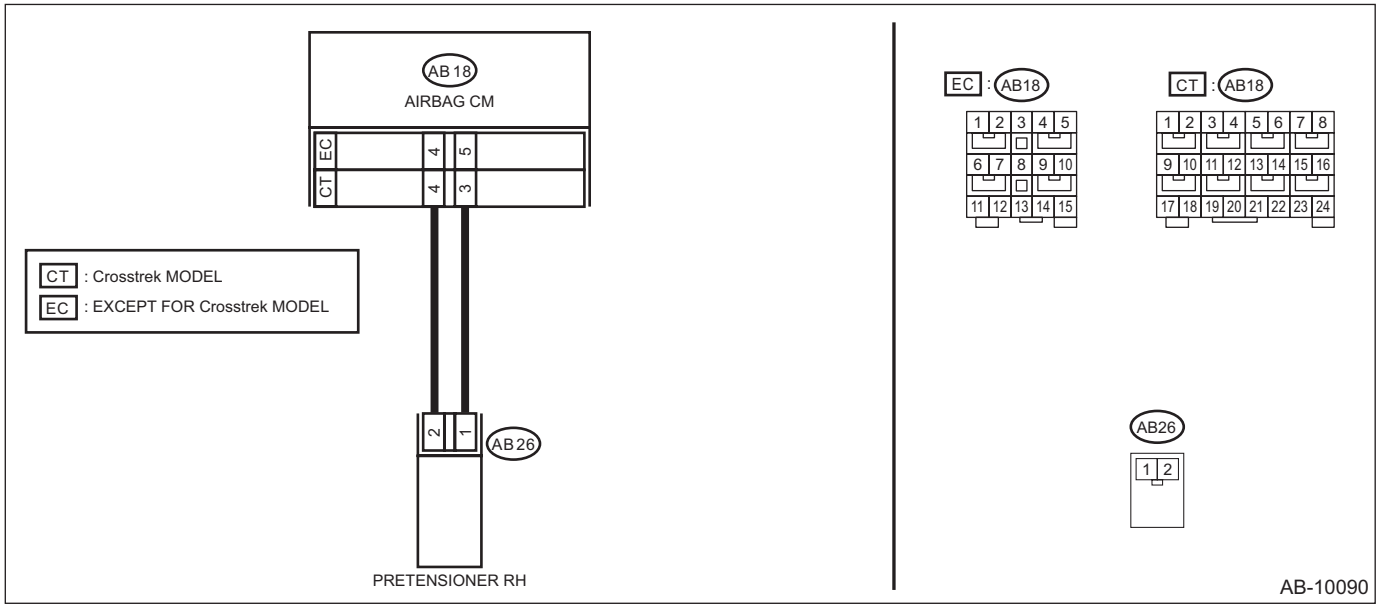
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DN:DTC B1902 SHORT IN FRONT P/T RH (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Seat belt pretensioner (RH) circuit is shorted to ground.
- Pretensioner (RH) is faulty.
- Pretensioner harness (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the seat belt pretensioner RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB26). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the seat belt pretensioner (RH). <Ref. to SB-17, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (PRETENSIONER HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from the connector (2N) of test harness N. 3) Disconnect connector (AB24) from side airbag module (RH). 4) Disconnect the connector (AB33) from curtain airbag module (RH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 18 — Chassis ground:*** ***(3AG) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1902 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

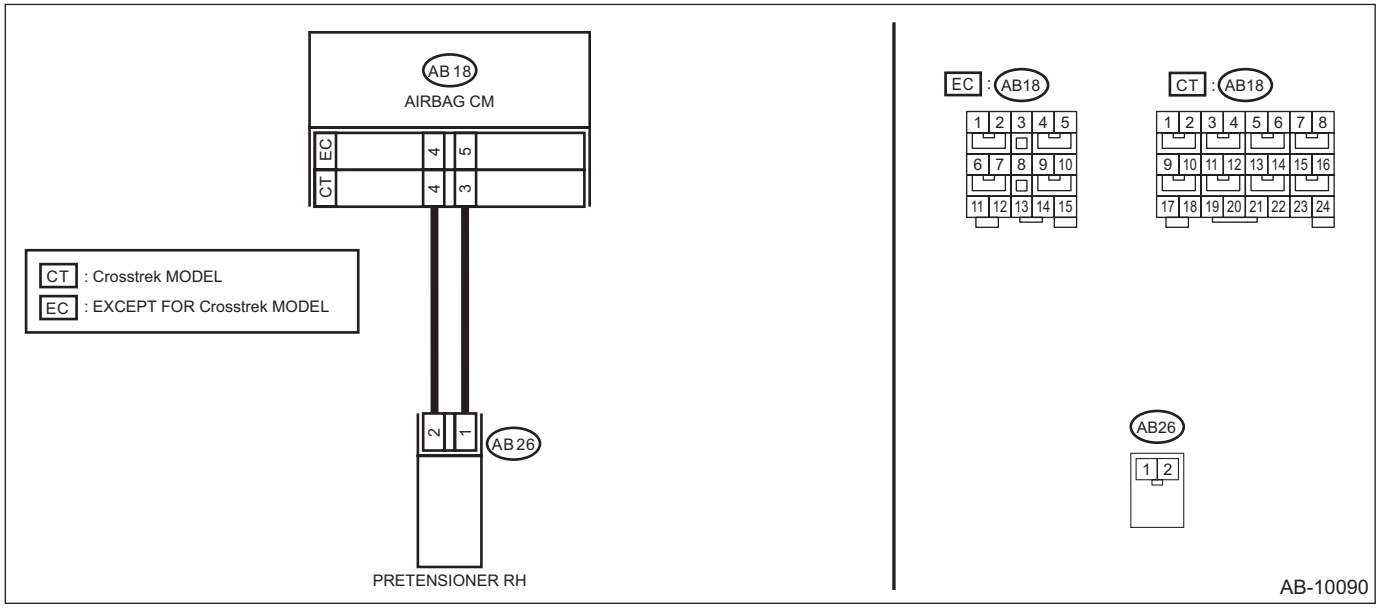
Step		Check	Yes	No
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DO:DTC B1903 SHORT IN FRONT P/T RH (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Seat belt pretensioner (RH) circuit is shorted to power supply.
- Pretensioner (RH) is faulty.
- Pretensioner harness (RH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the seat belt pretensioner RH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB26) from seat belt pretensioner (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB26). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the seat belt pretensioner (RH). <Ref. to SB-17, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (PRETENSIONER HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from the connector (2N) of test harness N. 3) Disconnect connector (AB24) from side airbag module (RH). 4) Disconnect the connector (AB33) from curtain airbag module (RH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Connect the battery ground terminal and turn the ignition switch to ON. 8) Measure the voltage between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 20 (+) — Chassis ground (–):*** ***(3AG) No. 18 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the airbag rear harness along with body harness.

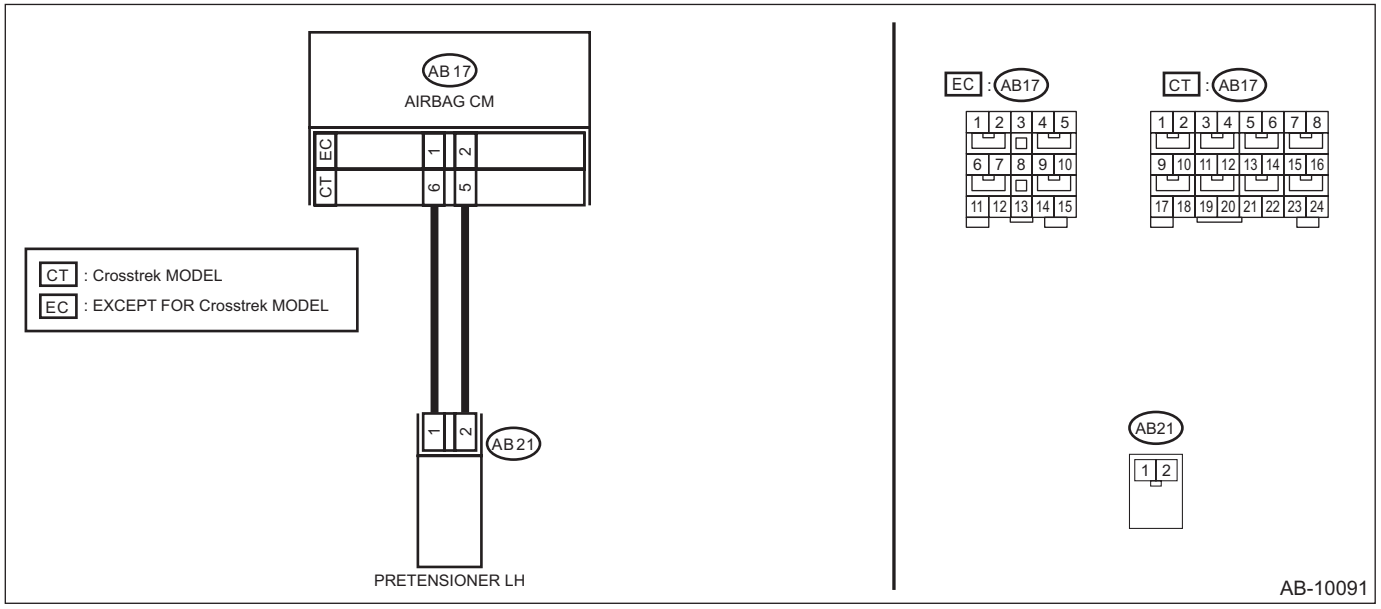
	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1903 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DP:DTC B1905 SHORT IN FRONT P/T LH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Seat belt pretensioner (LH) circuit is shorted.
- Pretensioner (LH) is faulty.
- Pretensioner harness (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the seat belt pretensioner LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Connect the connector (1N) in the test harness N to the connector (AB21). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the seat belt pretensioner (LH). <Ref. to SB-17, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (PRETENSIONER HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from the connector (2N) of test harness N. 3) Disconnect connector (AB19) from side airbag module (LH). 4) Disconnect the connector (AB31) from curtain airbag module (LH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AG) terminals in test harness AG. ***Connector & terminal*** ***(3AG) No. 10 — (3AG) No. 12:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1905 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

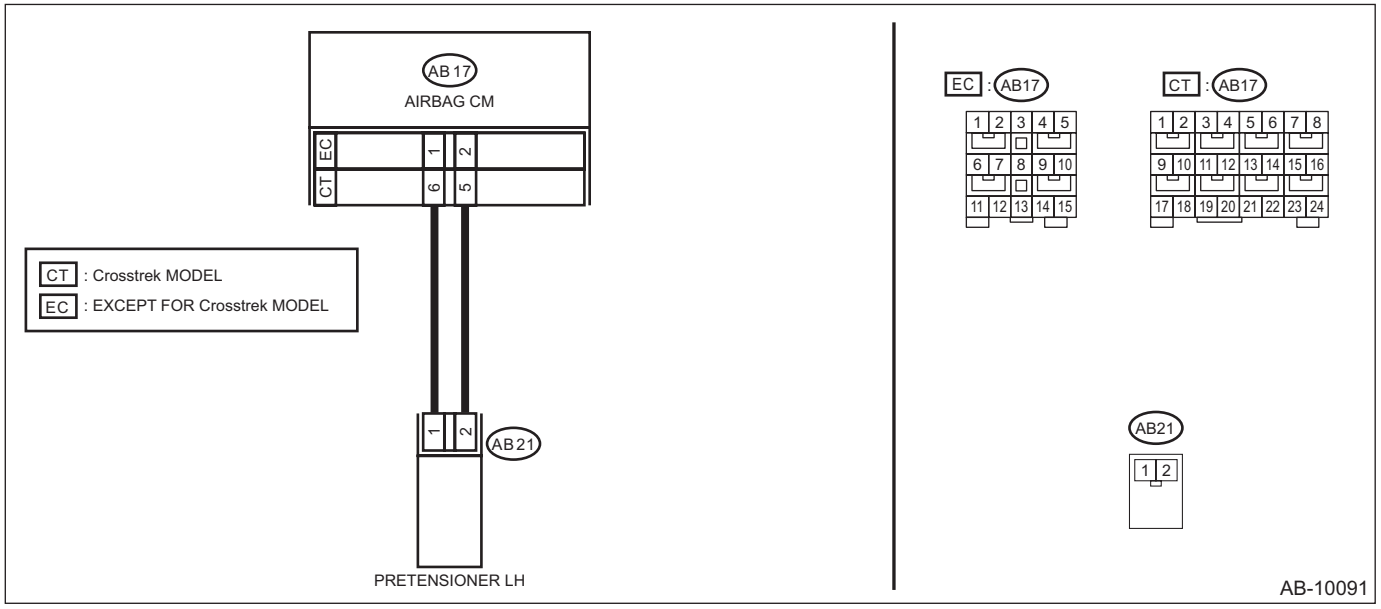
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DQ:DTC B1906 OPEN IN FRONT P/T LH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Seat belt pretensioner (LH) circuit is open.
- Pretensioner (LH) is faulty.
- Pretensioner harness (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the seat belt pretensioner LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Connect the connector (1N) in the test harness N to the connector (AB21). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the seat belt pretensioner (LH). <Ref. to SB-17, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (PRETENSIONER HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from the connector (2N) of test harness N. 3) Disconnect connector (AB19) from side airbag module (LH). 4) Disconnect the connector (AB31) from curtain airbag module (LH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AG) in the test harness AG and connector (2N) in the test harness N. ***Connector & terminal*** ***(3AG) No. 10 — (2N) No. 1:*** ***(3AG) No. 12 — (2N) No. 2:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1906 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

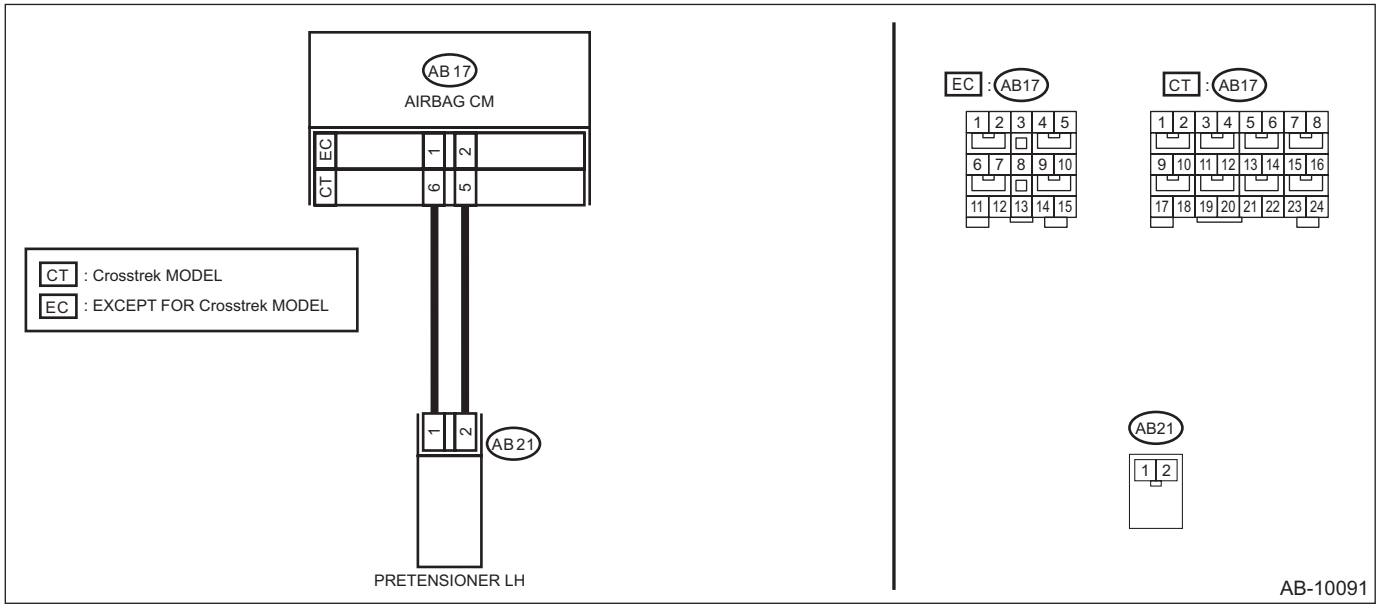
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DR:DTC B1907 SHORT IN FRONT P/T LH (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Seat belt pretensioner (LH) circuit is shorted to ground.
- Pretensioner (LH) is faulty.
- Pretensioner harness (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the seat belt pretensioner LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Connect the connector (1N) in the test harness N to the connector (AB21). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the seat belt pretensioner (LH). <Ref. to SB-17, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (PRETENSIONER HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from the connector (2N) of test harness N. 3) Disconnect connector (AB19) from side airbag module (LH). 4) Disconnect the connector (AB31) from curtain airbag module (LH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Measure the resistance between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 10 — Chassis ground:*** ***(3AG) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1907 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

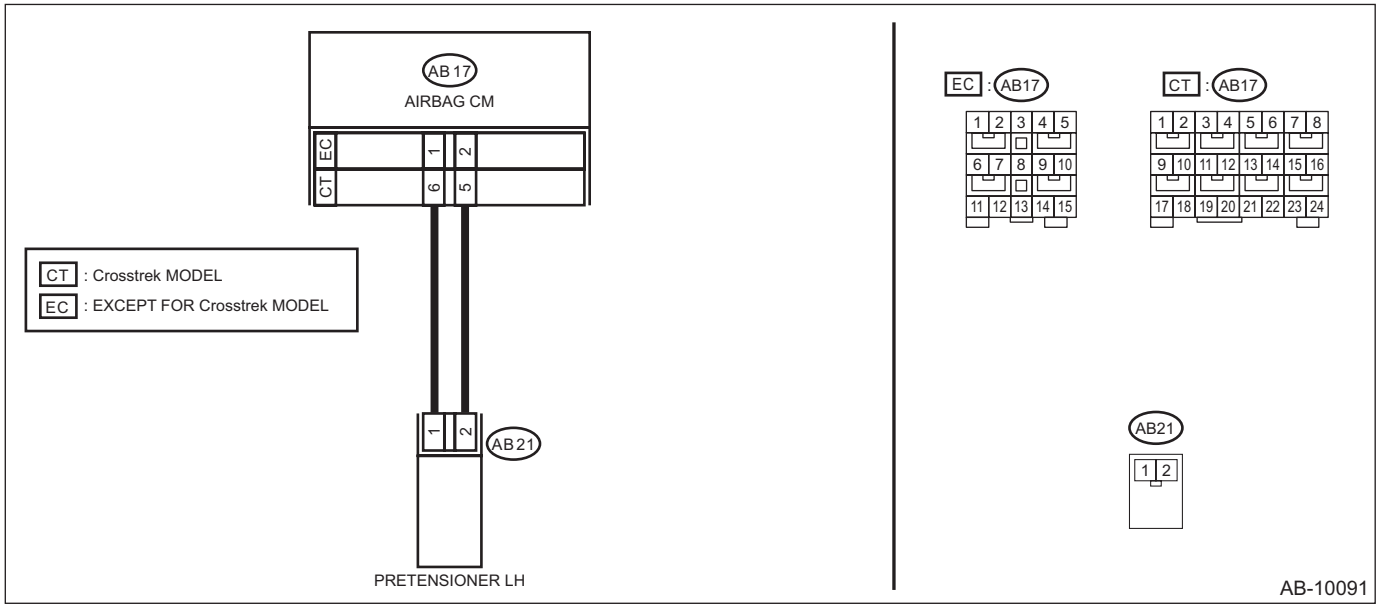
Step		Check	Yes	No
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DS:DTC B1908 SHORT IN FRONT P/T LH (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Seat belt pretensioner (LH) circuit is shorted to power supply.
- Pretensioner (LH) is faulty.
- Pretensioner harness (LH) is faulty.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the seat belt pretensioner LH.	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB21) from seat belt pretensioner (LH). 3) Connect the connector (1N) in the test harness N to the connector (AB21). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for six seconds and go off?	Replace the seat belt pretensioner (LH). <Ref. to SB-17, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (PRETENSIONER HARNESS LH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from the connector (2N) of test harness N. 3) Disconnect connector (AB19) from side airbag module (LH). 4) Disconnect the connector (AB31) from curtain airbag module (LH). 5) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 6) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 7) Connect the battery ground terminal and turn the ignition switch to ON. 8) Measure the voltage between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 10 (+) — Chassis ground (–):*** ***(3AG) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the airbag rear harness along with body harness.

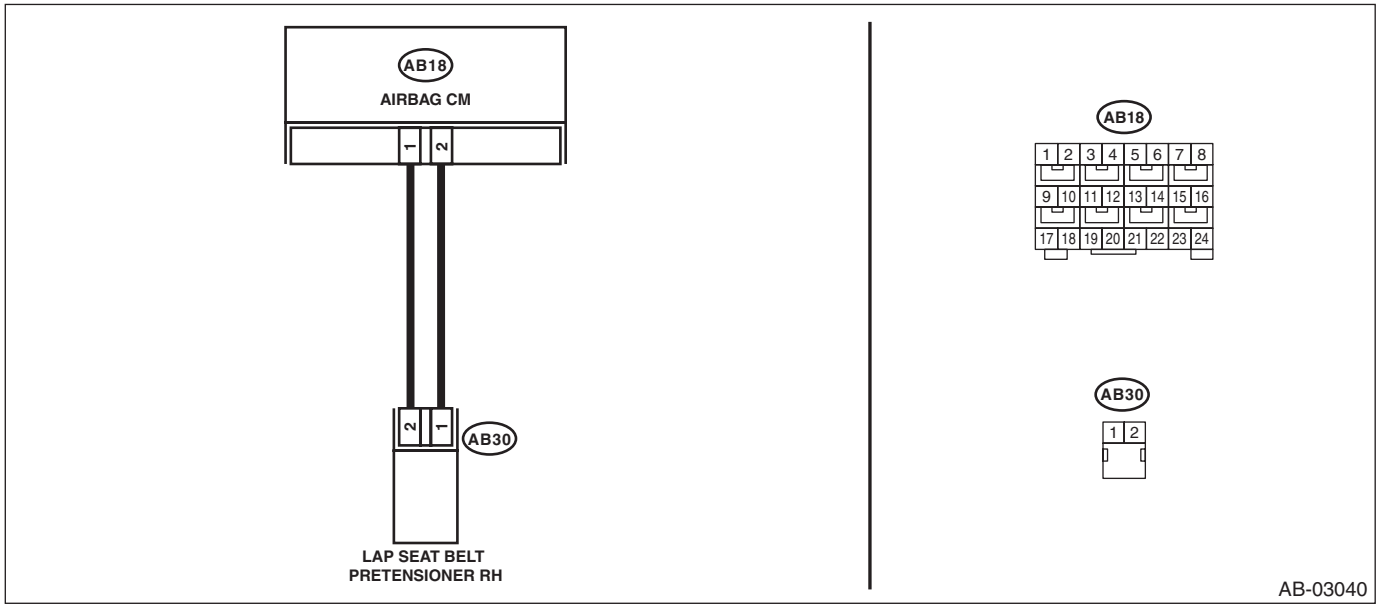
	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B1908 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DT:DTC B19F0 SHORT IN FRONT P/T 2 RH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Lap seat belt pretensioner (RH) circuit is shorted.
- Lap seat belt pretensioner (RH) is faulty.
- Lap seat belt pretensioner harness (RH) is shorted.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the lap seat belt pretensioner (RH).	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK LAP SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB30) from lap seat belt pretensioner (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB30). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the lap seat belt pretensioner (RH). <Ref. to SB-19, SEAT BELT INNER - FRONT, REMOVAL, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (LAP SEAT BELT PRETENSIONER HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect connector (AB24) from side airbag module (RH). 5) Disconnect the connector (AB26) from seat belt pretensioner. 6) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 7) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). 8) Measure the resistance between connector (3AG) terminals in test harness AG. ***Connector & terminal*** ***(3AG) No. 17 — (3AG) No. 19:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B19F0 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

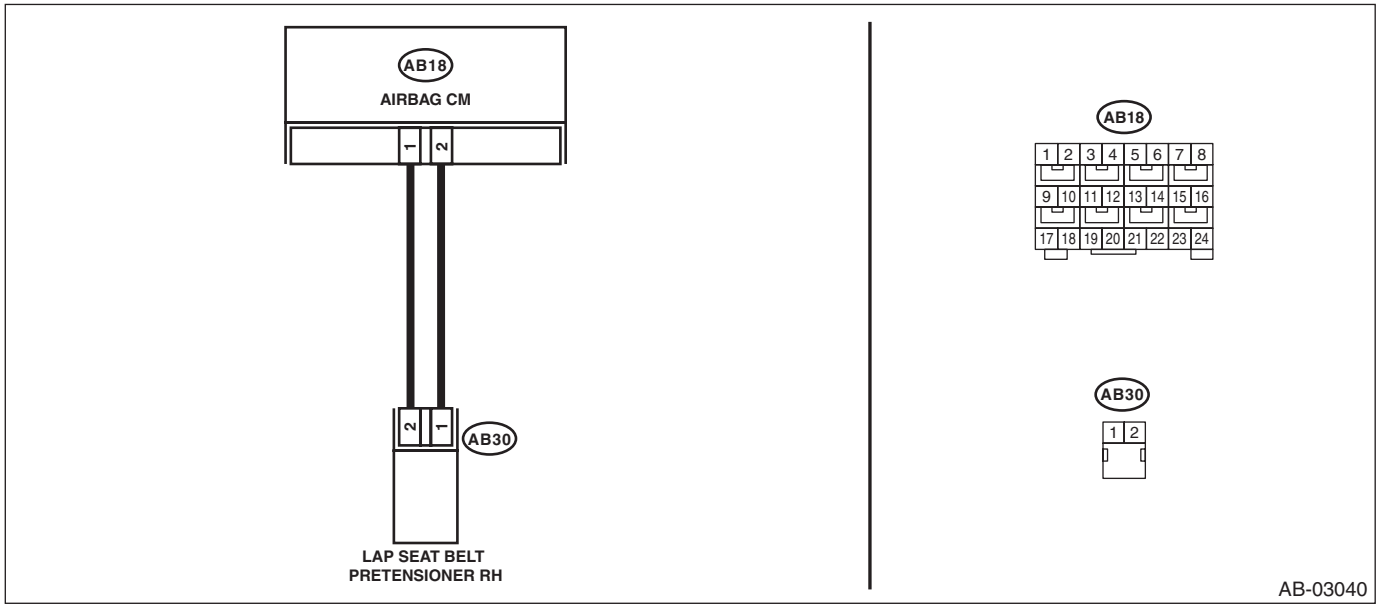
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DU:DTC B19F1 OPEN IN FRONT P/T 2 RH

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Lap seat belt pretensioner (RH) circuit is open.
- Lap seat belt pretensioner (RH) is faulty.
- Lap seat belt pretensioner harness (RH) is open.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the lap seat belt pretensioner (RH).	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK LAP SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB30) from lap seat belt pretensioner (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB30). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the lap seat belt pretensioner (RH). <Ref. to SB-19, SEAT BELT INNER - FRONT, REMOVAL, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (SIDE AIRBAG HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect connector (AB24) from side airbag module (RH). 5) Disconnect the connector (AB26) from seat belt pretensioner. 6) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 7) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). 8) Measure the resistance between connector (3AG) in the test harness AG and connector (2N) in the test harness N. ***Connector & terminal*** ***(3AG) No. 17 — (2N) No. 2:*** ***(3AG) No. 19 — (2N) No. 1:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B19F1 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

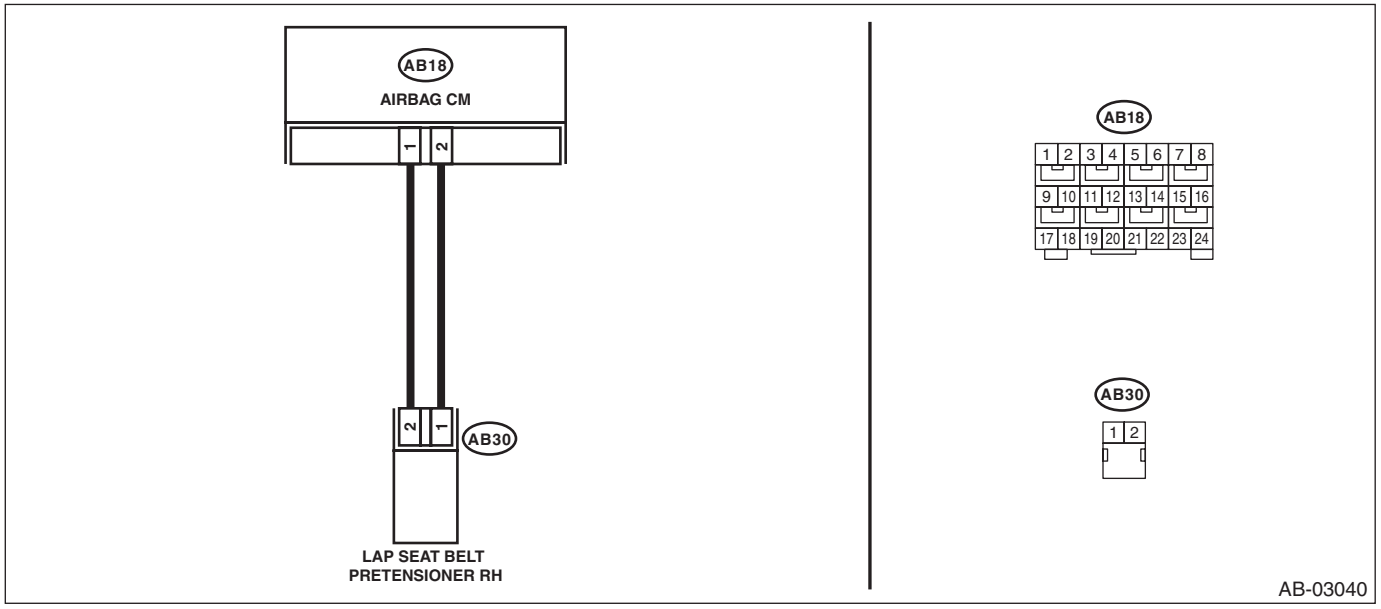
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DV:DTC B19F2 SHORT IN FRONT P/T 2 RH (TO GROUND)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Lap seat belt pretensioner (RH) circuit is shorted to ground.
- Lap seat belt pretensioner (RH) is faulty.
- Lap seat belt pretensioner harness (RH) is shorted to ground.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the lap seat belt pretensioner (RH).	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK LAP SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB30) from lap seat belt pretensioner (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB30). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the lap seat belt pretensioner (RH). <Ref. to SB-19, SEAT BELT INNER - FRONT, REMOVAL, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (LAP SEAT BELT PRETENSIONER HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect connector (AB24) from side airbag module (RH). 5) Disconnect the connector (AB26) from seat belt pretensioner. 6) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 7) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). 8) Measure the resistance between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 17 — Chassis ground:*** ***(3AG) No. 19 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the airbag rear harness along with body harness.
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B19F2 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.

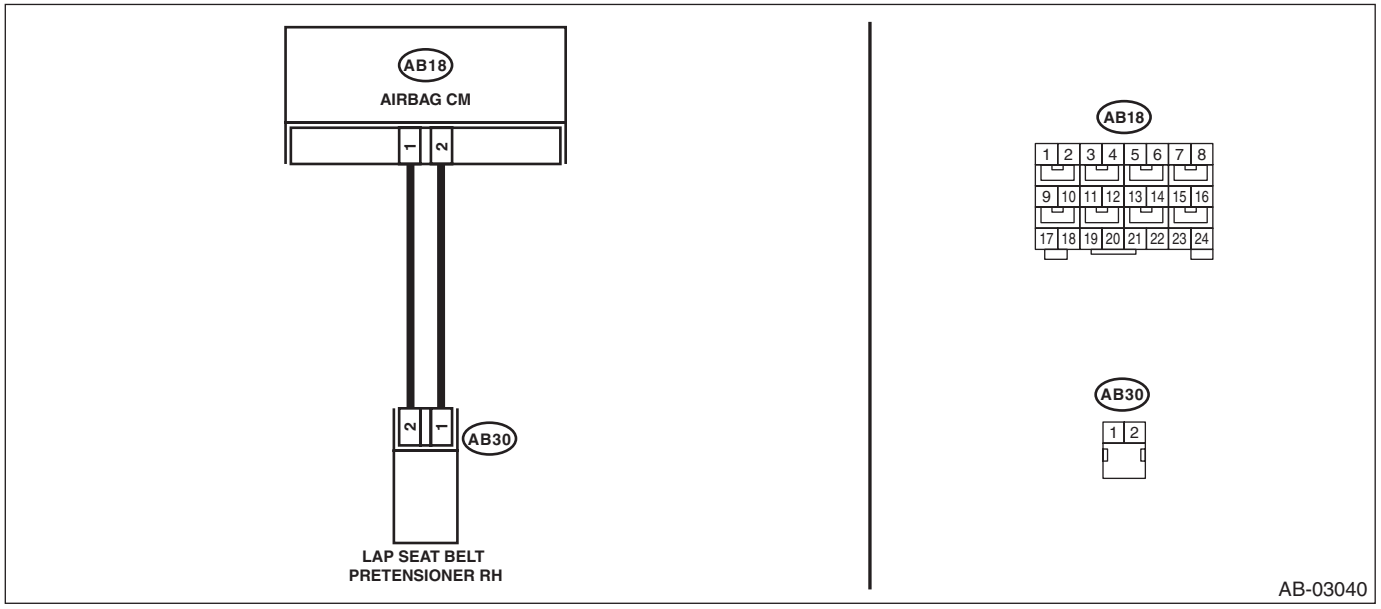
Step		Check	Yes	No
5	CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

DW:DTC B19F3 SHORT IN FRONT P/T 2 RH (TO +B)

DIAGNOSIS START CONDITION:
Ignition voltage is 10 V to 16 V.
DTC DETECTING CONDITION:

- Lap seat belt pretensioner (RH) circuit is shorted to power supply.
- Lap seat belt pretensioner (RH) is faulty.
- Lap seat belt pretensioner harness (RH) is shorted to power supply.
- Airbag control module is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Airbag system <Ref. to WI(w/o HEV)-40, WIRING DIAGRAM, Airbag System.> <Ref. to WI(HEV)-42, WIRING DIAGRAM, Airbag System.>



Step		Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the airbag control module and the lap seat belt pretensioner (RH).	Is there poor contact?	Replace the airbag rear harness along with body harness.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK LAP SEAT BELT PRETENSIONER.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connector (AB30) from lap seat belt pretensioner (RH). 3) Connect the connector (1N) in the test harness N to the connector (AB30). 4) Connect the airbag resistor to the connector (2N) of test harness N. 5) Connect the battery ground terminal and turn the ignition switch to ON.	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the lap seat belt pretensioner (RH). <Ref. to SB-19, SEAT BELT INNER - FRONT, REMOVAL, Front Seat Belt.>	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS (LAP SEAT BELT PRETENSIONER HARNESS RH).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag resistor from test harness N. 3) Disconnect the connector (AB33) from curtain airbag module (RH). 4) Disconnect connector (AB24) from side airbag module (RH). 5) Disconnect the connector (AB26) from seat belt pretensioner. 6) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 7) Connect the connector (1AG) in the test harness AG to the connectors (AB6, AB17, AB18). 8) Connect the battery ground terminal and turn the ignition switch to ON. 9) Measure the voltage between connector (3AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***(3AG) No. 17 (+) — Chassis ground (–):*** ***(3AG) No. 19 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace the airbag rear harness along with body harness.

	Step	Check	Yes	No
4	**CHECK AIRBAG CONTROL MODULE.** 1) Connect all connectors. 2) Clear the memory. <Ref. to AB(diag)-29, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to AB(diag)-28, Inspection Mode.> 4) Read the DTC. (Current malfunction) <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC B19F3 displayed?	Replace the airbag control module. <Ref. to AB-55, Airbag Control Module.>	Go to step **5**.
5	**CHECK FOR ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

OCCUPANT DETECTION SYSTEM (DIAGNOSTICS)

OD(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**CHECK WARNING LIGHT.** Check whether the airbag warning light in the combination meter is lit.	Does the airbag warning light illuminate?	Go to step **2**.	Perform the diagnosis according to phenomenon of the problem.
2	**READ DTC.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch to ON and run the Subaru Select Monitor. 4) Read the DTC. <Ref. to OD(diag)-16, OPERATION, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to OD(diag)-15, INSPECTION, Subaru Select Monitor.> 5) Record all DTCs and freeze frame data.	Is DTC displayed?	Go to step **3**.	Go to "Airbag Warning Light Failure" <Ref. to AB(diag)-34, Airbag Warning Light Failure.>.
3	**PERFORM DIAGNOSIS.** 1) Determine the possible cause from "List of Diagnostic Trouble Code (DTC)" <Ref. to OD(diag)-22, List of Diagnostic Trouble Code (DTC).>. 2) Inspect the DTC using "List of Diagnostic Trouble Code (DTC)". 3) Repair the trouble cause. 4) Perform the Clear Memory Mode. <Ref. to OD(diag)-18, Clear Memory Mode.> 5) Perform the Inspection Mode. <Ref. to OD(diag)-17, Inspection Mode.> 6) Read any other DTCs displayed.	Is DTC displayed?	Perform the procedure 1) to 5) in step 3.	Finish the diagnosis.

2. Check List for Interview

A: CHECK

1. CONDITIONS OF MALFUNCTION

Customer's Name		Inspector's Name	
Date Vehicle Brought in	/ /	Registration No.	
Odometer reading	km miles	V.I.N.	
Date Problem Occurred	/ /	Registration Year	/ /
Occupant detection sensor mat serial No.		Occupant detection control module serial No.	
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Others:		
Location where problem occurred			
Temperature	°C (°F)		
Humidity	% RH		
A/C operation	❑ None ❑ On (°C)		
Road Condition	❑ Flat road ❑ Uphill ❑ Downhill ❑ Gravel road ❑ Stone pavement ❑ Others:		
Vehicle Operation	❑ Starting ❑ Idling ❑ Driving ❑ Constant speed ❑ Accelerating ❑ Decelerating ❑ Turning ❑ Others:		
Time the seat is occupied	❑ Time length from when you started driving to when the warning light illuminated:		
Details of Problem			
Status of airbag warning light at dealer inspection Refer to "Indicator light illumination pattern". <Ref. to OD(diag)-6, INDICATOR LIGHT ILLUMINATION PATTERN, CHECK, Check List for Interview.>	❑ Remains ON ❑ Remains OFF ❑ Illuminated, but goes off after the ignition switch is turned to OFF and then to ON		
Status of airbag warning light at malfunction occurrence Refer to "Indicator light illumination pattern". <Ref. to OD(diag)-6, INDICATOR LIGHT ILLUMINATION PATTERN, CHECK, Check List for Interview.>	❑ Remains ON ❑ Remains OFF ❑ Illuminated, but goes off after the ignition switch is turned to OFF and then to ON		
Status of passenger's airbag ON/OFF indicator light at dealer inspection Refer to "Indicator light illumination pattern". <Ref. to OD(diag)-6, INDICATOR LIGHT ILLUMINATION PATTERN, CHECK, Check List for Interview.>	❑ ON light illuminates ❑ The airbag ON indicator illuminates, when the CRS is installed or when the passenger's seat is not occupied. ❑ OFF light illuminates ❑ The airbag OFF indicator illuminates, when an adult occupies the seat. ❑ Both remain ON ❑ Both remain OFF		

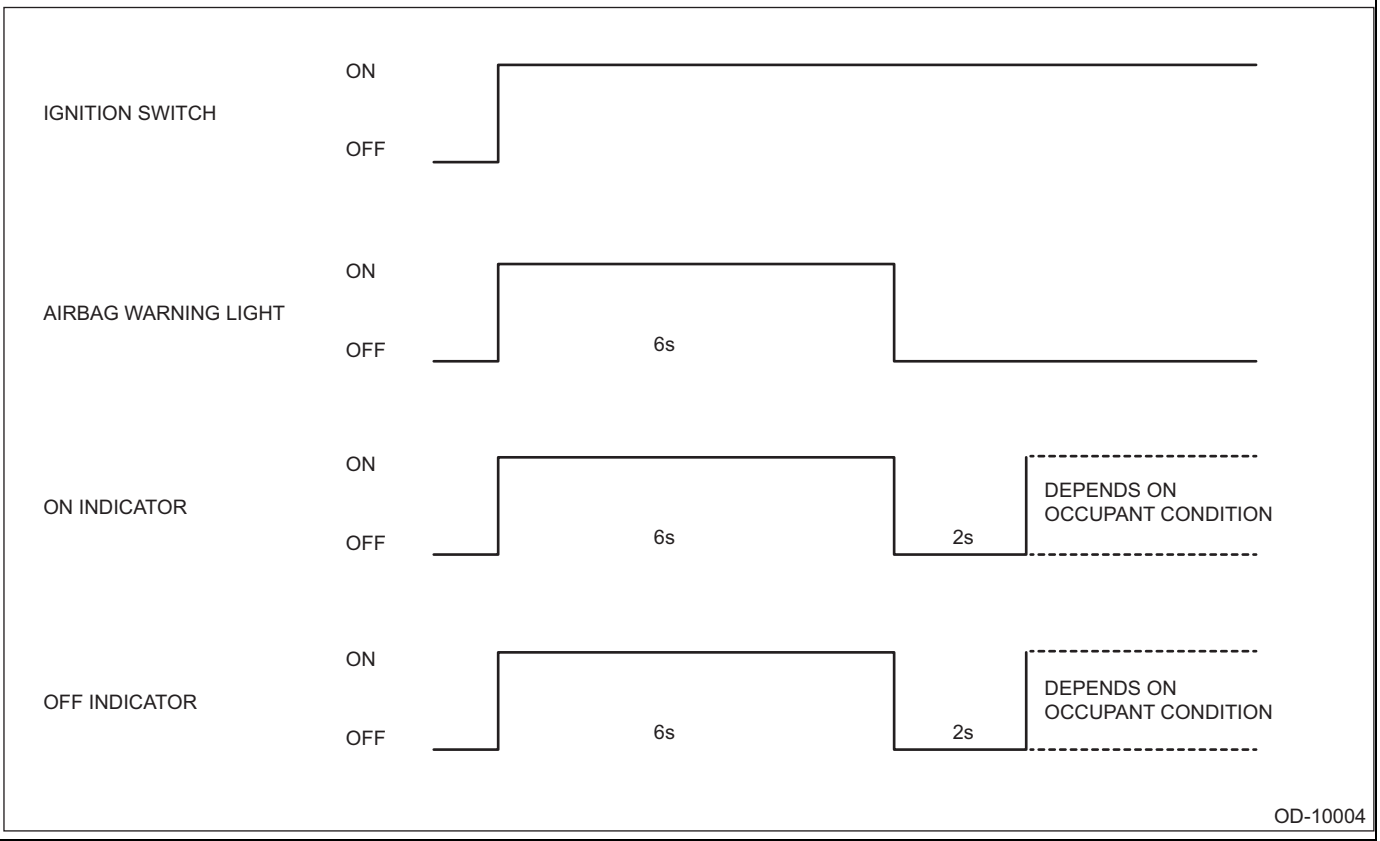
Status of passenger's airbag ON/OFF indicator at malfunction occurrence Refer to "Indicator light illumination pattern". <Ref. to OD(diag)-6, INDICATOR LIGHT ILLUMINATION PATTERN, CHECK, Check List for Interview.>	❑ ON light illuminates ❑ The airbag ON indicator illuminates, when the CRS is installed or when the passenger's seat is not occupied. ❑ OFF light illuminates ❑ The airbag OFF indicator illuminates, when an adult occupies the seat. ❑ Both remain ON ❑ Both remain OFF
DTC output	❑ OK code ❑ Airbag CM current malfunction code: (Code:) ❑ Airbag CM past malfunction code: (Code:) ❑ Occupant detection CM current malfunction code: (Code:) ❑ Occupant detection CM past malfunction code: (Code:)
Seat specification (With/without seat heater)	❑ Without seat heater ❑ With seat heater ❑ Seat heater was ON when fault was detected. ❑ Seat heater was OFF when fault was detected. ❑ Heater circuit is open.
Seat occupant status at malfunction occurrence	❑ With passenger Refer to "No. 1 in STATUS OF PASSENGER'S SEAT". <Ref. to OD(diag)-5, STATUS OF PASSENGER'S SEAT, CHECK, Check List for Interview.> ❑ With CRS installation Refer to "No. 2 in STATUS OF PASSENGER'S SEAT". <Ref. to OD(diag)-5, STATUS OF PASSENGER'S SEAT, CHECK, Check List for Interview.> ❑ Without passenger and without CRS installation Refer to "No. 3 in STATUS OF PASSENGER'S SEAT". <Ref. to OD(diag)-5, STATUS OF PASSENGER'S SEAT, CHECK, Check List for Interview.>

2. STATUS OF PASSENGER'S SEAT

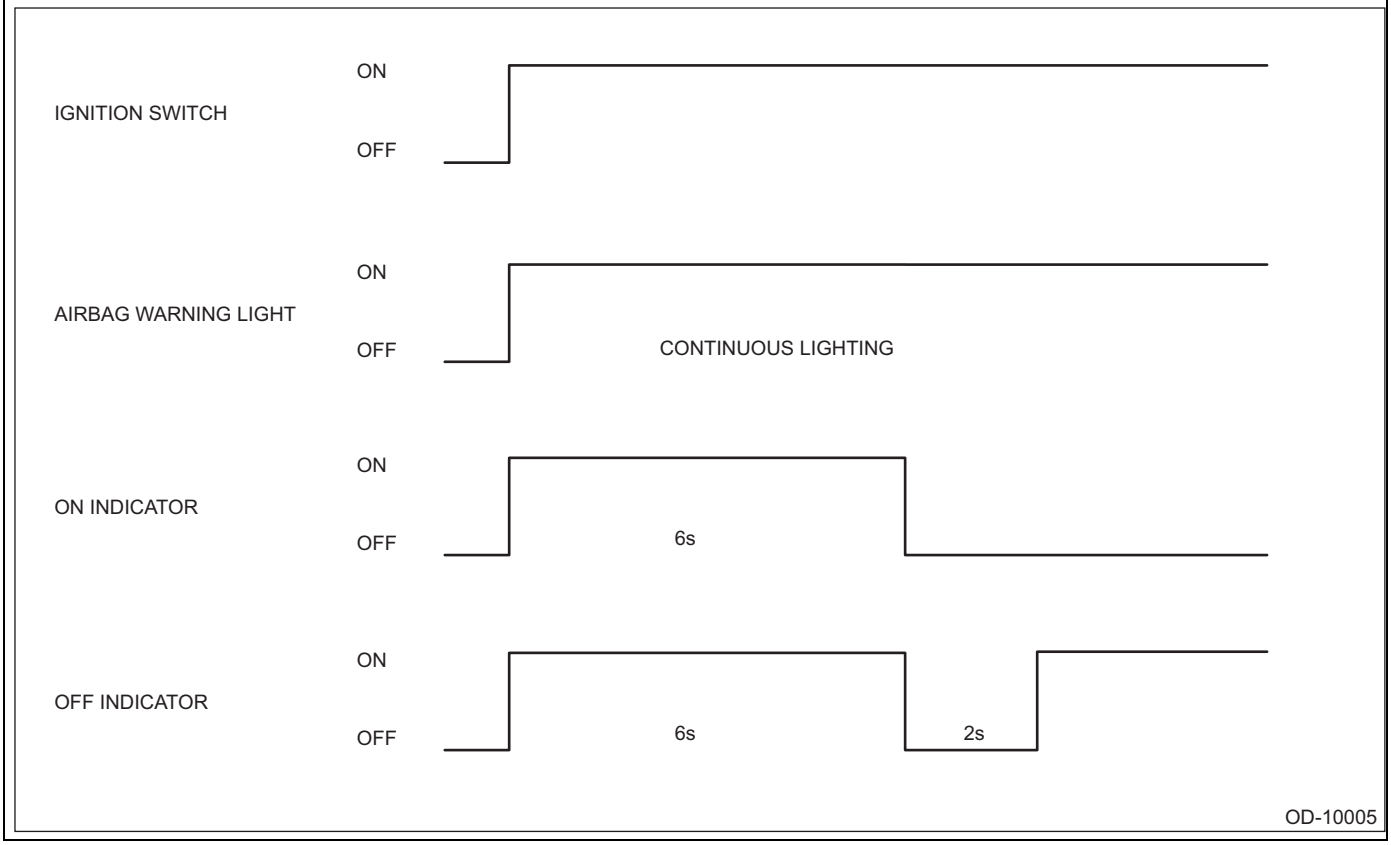
No. 1	When the passenger's seat was occupied	❑ Height: ❑ Weight: ❑ With ski wear, coat, or other thick lower garments such as snowsuit worn ❑ Without ski wear, coat, or other thick lower garments such as snowsuit worn ❑ Seat belt fastened ❑ Seat belt not fastened ❑ Seat slide position (position from the full forward position) ❑ Seat backrest reclining angle (position from the fully upright position) ❑ Posture (normally seated, reached for items on the rear seat, moved the seat slide, lied down on the fully flattened seat, legs placed on the instrument panel, or other:) ❑ Seat got wet due to rain, spill of drink, etc. ❑ Seat accessory (refer to No. 4 below) attached between the passenger and seat ❑ Items (shoe placement item, other:) placed between the passenger and floor carpet ❑ Metal parts inside the vehicle contacted upon fault detection (towel bar, seat frame, vehicle body, cigarette socket, other:) ❑ Electronic components (refer to No. 5 below) used ••• When yes, go to No. 5. ❑ Electronic components not used ❑ With an item installed under the passenger's seat: Installed item ( )
No. 2	When the CRS was installed on the passenger's seat	❑ A child occupied the seat ••• When yes, go to No. 1. ❑ No child occupied the seat ❑ Seat belt fastened (Appropriately? Yes / No) ❑ Seat belt not fastened ❑ Type of the CRS (infant car seat, rear facing installation, forward facing installation, booster seat, other) ❑ CRS manufacturer, model ❑ Seat got wet due to rain, spill of drink, etc. ❑ Seat accessory (refer to No. 4 below) attached between the passenger and seat ❑ Electronic components (refer to No. 6 below) installed ••• When yes, go to No. 6. ❑ Without any installation item other than the CRS ❑ With an item installed under the passenger's seat: Installed item ( )
No. 3	Without a passenger on the passenger's seat, and without CRS installation	❑ Seat got wet due to rain, spill of drink, etc. ❑ Seat accessory (refer to No. 4 below) attached ••• When yes, go to No. 4. ❑ With other goods (bag, luggage, beverage bottle, other:) ❑ Electronic components (refer to No. 6 below) installed ••• When yes, go to No. 6. ❑ Without any goods ❑ With an item installed under the passenger's seat: Installed item ( )
No. 4	When accessories are installed on the passenger's seat	❑ With seat accessory installed (retrofitted seat heater, seat cooler, cushion mat, seat cover, other:)
No. 5	When the passenger on the passenger's seat was using electronic components.	❑ Electronic components used (personal computer, tablet device, mobile phone, smartphone, portable music player, portable game device, portable radio, portable navigation, other:) ❑ Above-listed device used while being connected to power supply inside the vehicle such as a cigarette lighter socket ❑ Above-listed device used without being connected to power supply inside the vehicle such as a cigarette lighter socket ❑ Above-listed device used while being connected to other power supply
No. 6	When the electronic components were placed on the passenger's seat (no occupant on the seat)	❑ Electronic components placed (personal computer, tablet device, mobile phone, smartphone, portable music player, portable game device, portable radio, portable navigation, other:) ❑ Above-listed device connected to power supply inside the vehicle such as a cigarette lighter socket ❑ Above-listed device not connected to power supply inside the vehicle such as a cigarette lighter socket ❑ Above-listed device connected to other power supply

3. INDICATOR LIGHT ILLUMINATION PATTERN

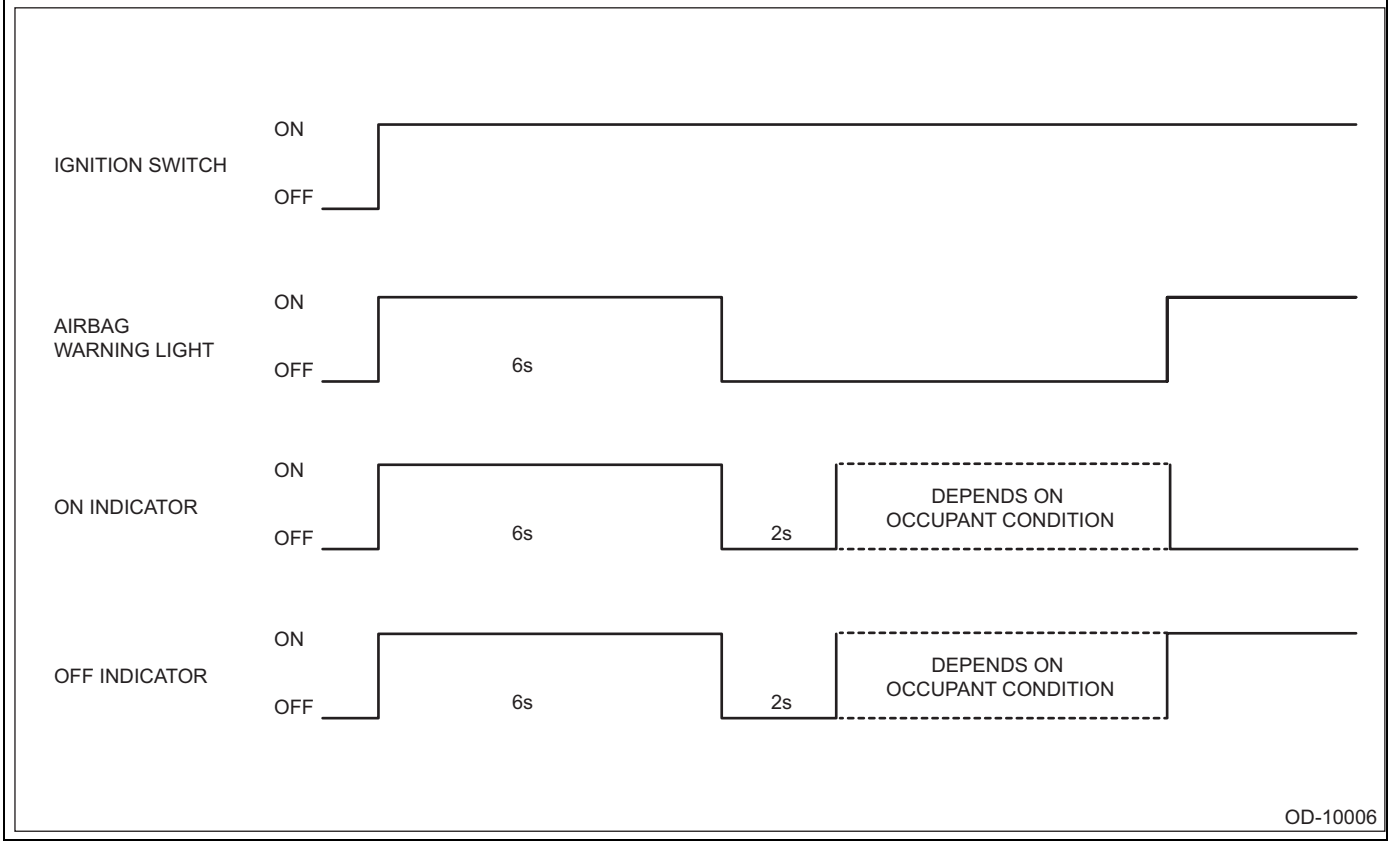
❑ When all the systems are normal.



❑ When there has been a failure on the occupant detection control module since the ignition switch was turned ON.



❑ Arbitrary length of time has elapsed after the ignition switch was turned ON → A failure occurred on the occupant detection control module.



3. General Description

A: CAUTION

1) The occupant detection system (passenger seat only) control module and the occupant detection sensor are fixed to the seat cushion frame. Never remove the occupant detection control module or the occupant detection sensor from the seat cushion frame.
2) Do not replace the seat cushion pad by itself. Always replace the seat cushion pad and frame assembly as a set. The seat cushion pad and cushion frame are adjusted as a set at the time of manufacture. If cushion pads and cushion frames are combined from those of other vehicles or other sets, the occupant detection system may not operate properly.
3) If the seat cushion cover is removed, make sure to replace the hang wire on the seat cushion side with a new wire.
4) Never connect the battery in reverse polarity. Occupant detection system may be destroyed instantly.
5) Do not disconnect the battery cables while the engine is running. A large counter electromotive force will be generated in the generator, and this voltage may damage electronic parts such as occupant detection control module.
6) Before disconnecting the connectors of each sensor and control module, be sure to turn the ignition switch to OFF and wait for 60 seconds or more. Occupant detection control module may be damaged.
7) Every occupant detection system-related part is a precision part. Do not drop them.

CAUTION:
• Do not use electrical test equipment on wiring harness and connector circuits of the airbag system.
• Be careful not to damage the airbag system wiring harness when servicing the occupant detection system.
• Refer to CAUTION in Airbag System when repairing the occupant detection system. <Ref. to AB-11, CAUTION, General Description.>

B: INSPECTION

Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>

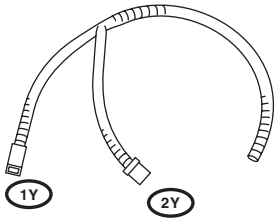
C: PREPARATION TOOL

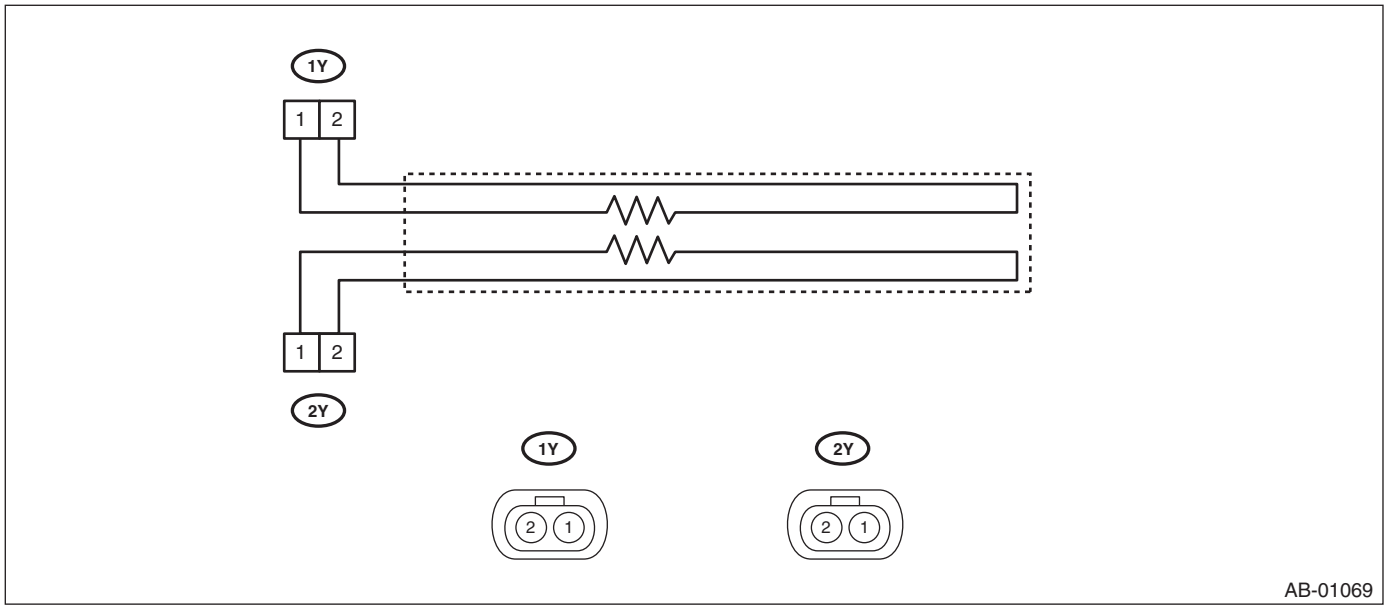
CAUTION:
To measure the voltage and resistance of airbag system and occupant detection system components, be sure to use the specified test harness.

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and troubleshooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

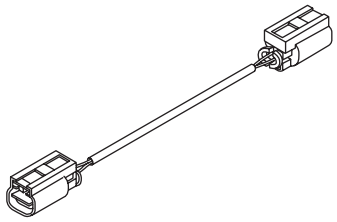
- TEST HARNESS Y

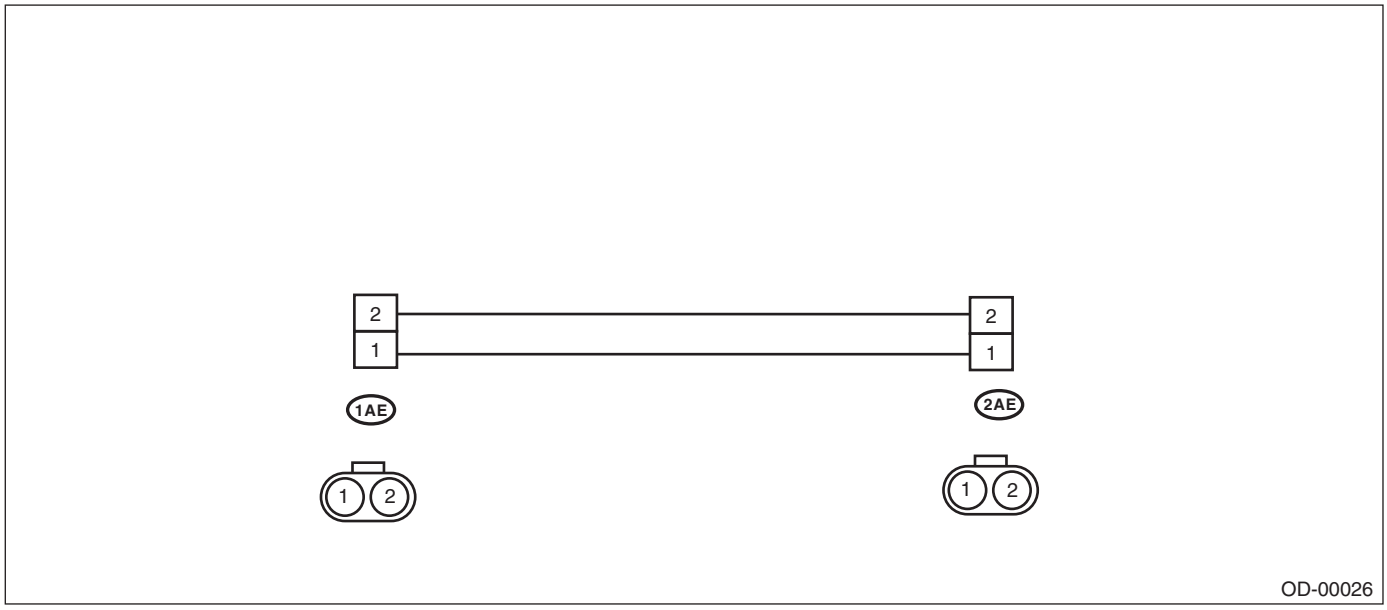
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299AG040	98299AG040	TEST HARNESS Y	Used for troubleshooting seat belt buckle switch.



AB-01069

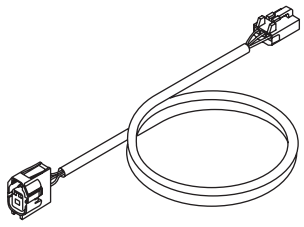
- TEST HARNESS AE

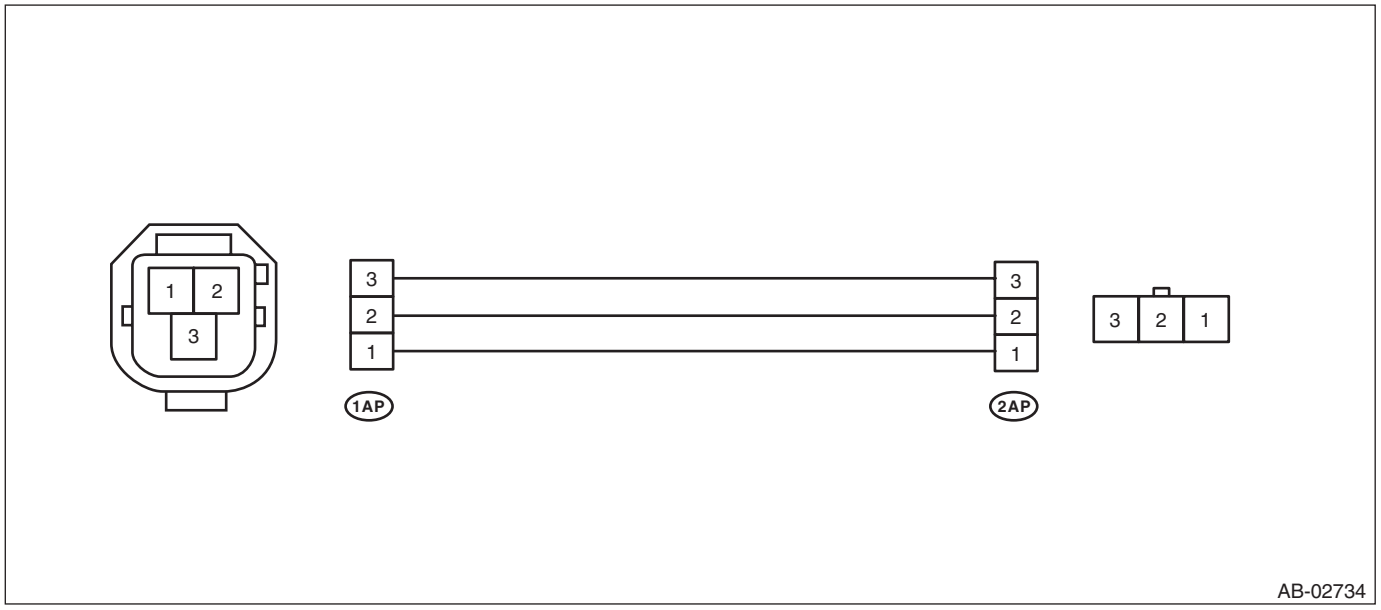
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299XA030	98299XA030	TEST HARNESS AE	TEST HARNESS Y adapter harness. Used for troubleshooting seat belt buckle switch.



OD-00026

- TEST HARNESS AP

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299FJ030	98299FJ030	TEST HARNESS AP	Used when measuring voltage and resistance of occupant detection system.



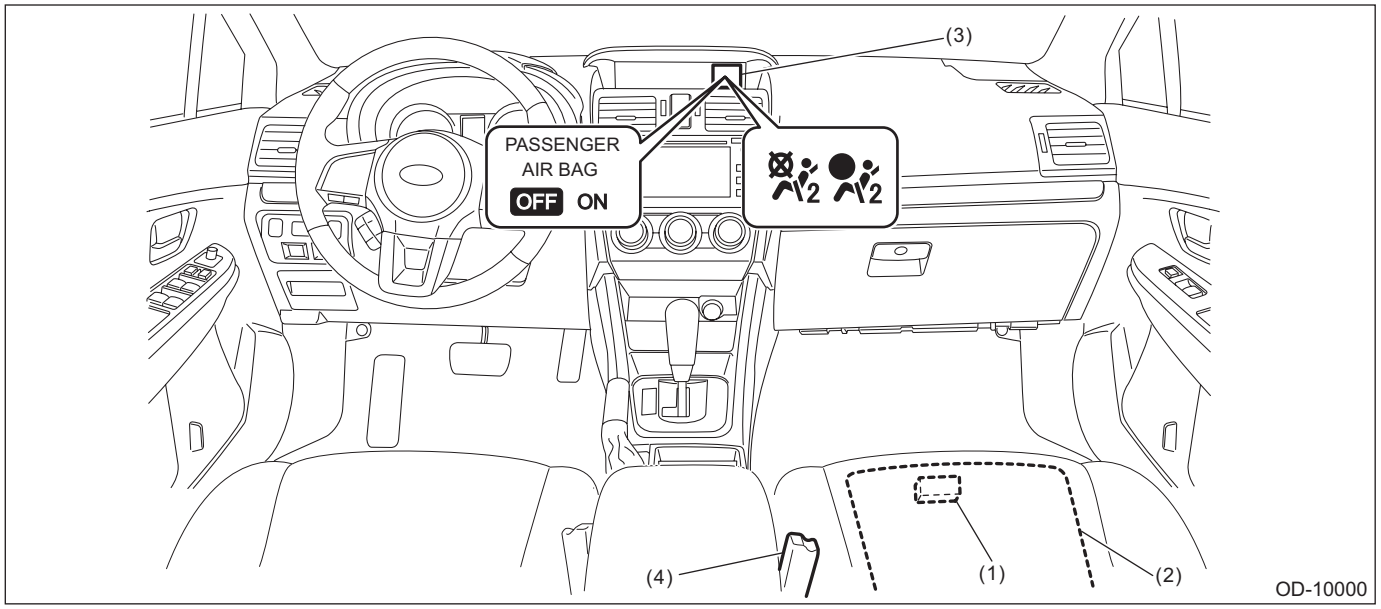
AB-02734

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

A: LOCATION



(1) Occupant detection control module
(2) Occupant detection sensor
(3) Airbag ON/OFF indicator light
(4) Buckle switch (passenger's seat)

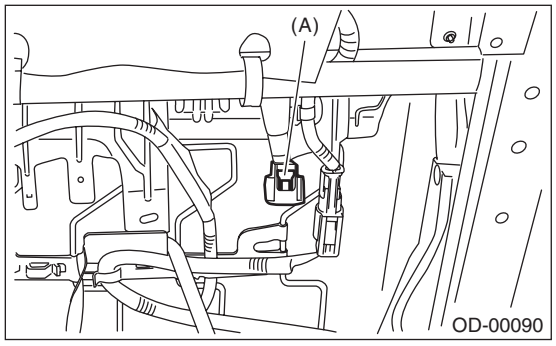
5. Airbag Connector

A: PROCEDURE

1. OCCUPANT DETECTION SYSTEM (BETWEEN AIRBAG REAR HARNESS AND SEAT HARNESS)

1) How to disconnect:
Press the lock arm (A) and disconnect the connector.

CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.



2) How to connect:
Holding the connector, push it in securely until a clicking sound is heard.

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.

2. AIRBAG CONTROL MODULE

Refer to the airbag system section. <Ref. to AB-20, AIRBAG CONTROL MODULE, PROCEDURE, Airbag Connector.>

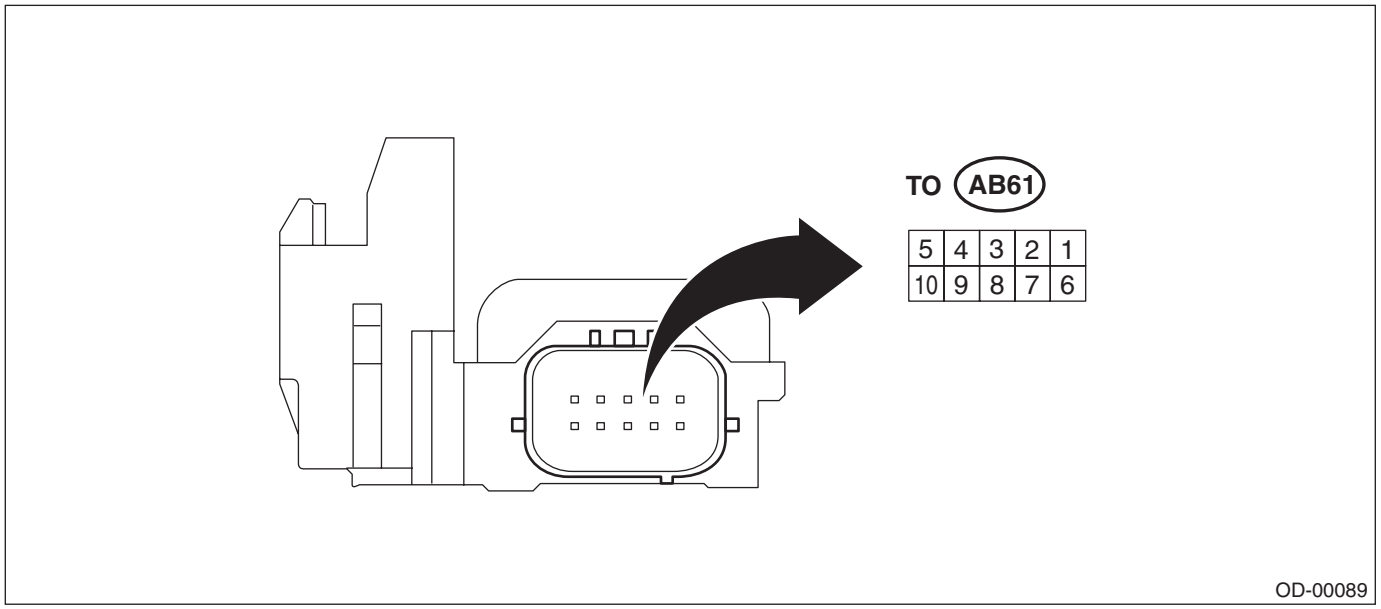
3. BUCKLE SWITCH RH

Refer to the airbag system section. <Ref. to AB-28, BUCKLE SWITCH RH, PROCEDURE, Airbag Connector.>

6. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

CAUTION:
Never remove the occupant detection control module, occupant detection sensor or seat frame because they are integrated into one unit.



Terminal No.	Terminal name	Input/Output value	Note
1	Airbag CM communication (FSR+)	—	Communication line
2	Not used	—	—
3	Not used	—	—
4	Buckle switch– (BER–)	0 V	Switch ground
5	Not used	—	—
6	IG power supply (IG)	8 — 16 V	When ignition SW is ON
7	Not used	—	—
8	Buckle switch+	0 — IG voltage	Ignition voltage when the switch is ON
9	Airbag CM communication (FSR–)	0V	GND
10	Not used	—	—

B: WIRING DIAGRAM

Refer to “Occupant Detection System” in the wiring diagram. <Ref. to WI(w/o HEV)-179, WIRING DIAGRAM, Occupant Detection System.> <Ref. to WI(HEV)-158, WIRING DIAGRAM, Occupant Detection System.>

7. Subaru Select Monitor

A: OPERATION

For detailed operation procedures, refer to “Application help”.

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING THE AIRBAG SYSTEM IS IMPOSSIBLE

DETECTING CONDITION:
Defective harness connector
TROUBLE SYMPTOM:
Communication is impossible between the airbag control module and the Subaru Select Monitor.

NOTE:
Refer to “Communication for Initializing Impossible” in AIRBAG SYSTEM (DIAGNOSTICS). <Ref. to AB(diag)-24, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>

2. COMMUNICATION FOR INITIALIZING ONLY THE OCCUPANT DETECTION SYSTEM IS IMPOSSIBLE

NOTE:
The occupant detection system communicates with the Subaru Select Monitor via the airbag control module.
DETECTING CONDITION:
Defective harness connector between airbag control module and occupant detection control module
TROUBLE SYMPTOM:
Communication is impossible between the airbag control module and the occupant detection control module.
Perform the diagnosis from step 2 in “DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION”. <Ref. to OD(diag)-23, DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

8. Read Diagnostic Trouble Code (DTC)

A: OPERATION

Read out DTCs stored in the airbag system and the occupant detection system.

1. AIRBAG SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Airbag» and select «Enter».
5) On «Airbag» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC) in AIRBAG SYSTEM. <Ref. to AB(diag)-35, List of Diagnostic Trouble Code (DTC).>

2. OCCUPANT DETECTION SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Occupant Detection» and then select «Enter».
5) On «Occupant Detection» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to OD(diag)-22, List of Diagnostic Trouble Code (DTC).>

9. Inspection Mode

A: PROCEDURE

Recreate the circumstance by referring to the conditions described in the checklist.

10.Clear Memory Mode

A: OPERATION

After repairing the occupant detection system, clear the DTCs stored in the airbag control module and the occupant detection control module.

1. AIRBAG SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Airbag» and select «Enter».
5) On «Airbag» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

2. OCCUPANT DETECTION SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Occupant Detection» and then select «Enter».
5) On «Occupant Detection» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

11.Read Current Data

A: OPERATION

Check the operating condition of each sensor in the event of malfunction in the seat belt buckle switch, or when the seat belt buckle switch has been replaced.

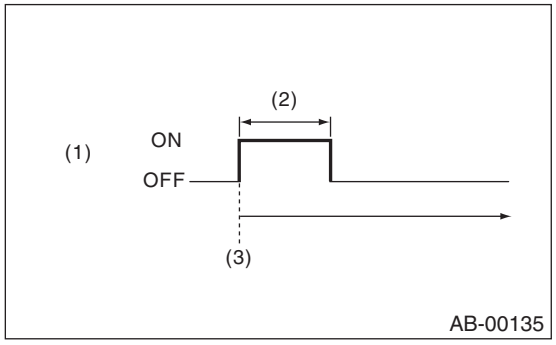
NOTE:
For detailed operation procedures, refer to “Application help”.
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Occupant Detection».
5) On «Occupant Detection» display, select «Data Monitor».
The following table is for support data.

Item	Display	Note
Front Passenger Seat Status	Empty or Child/Adult or Child	“Adult or Child” when the seat is occupied “Empty or Child” when the seat is unoccupied or when child restraint seat is installed **CAUTION:** **When checking the operating status, be careful of the followings.** **• When the seat is unoccupied: Do not place anything on the seat.** **• Child restraint seat: Install the seat according to its instruction manual.** **• When the seat is occupied: Someone who weighs at least approx. 70 kg (155 lb) must be seated during the check.**

12.Airbag Warning Light Illumination Pattern

A: INSPECTION

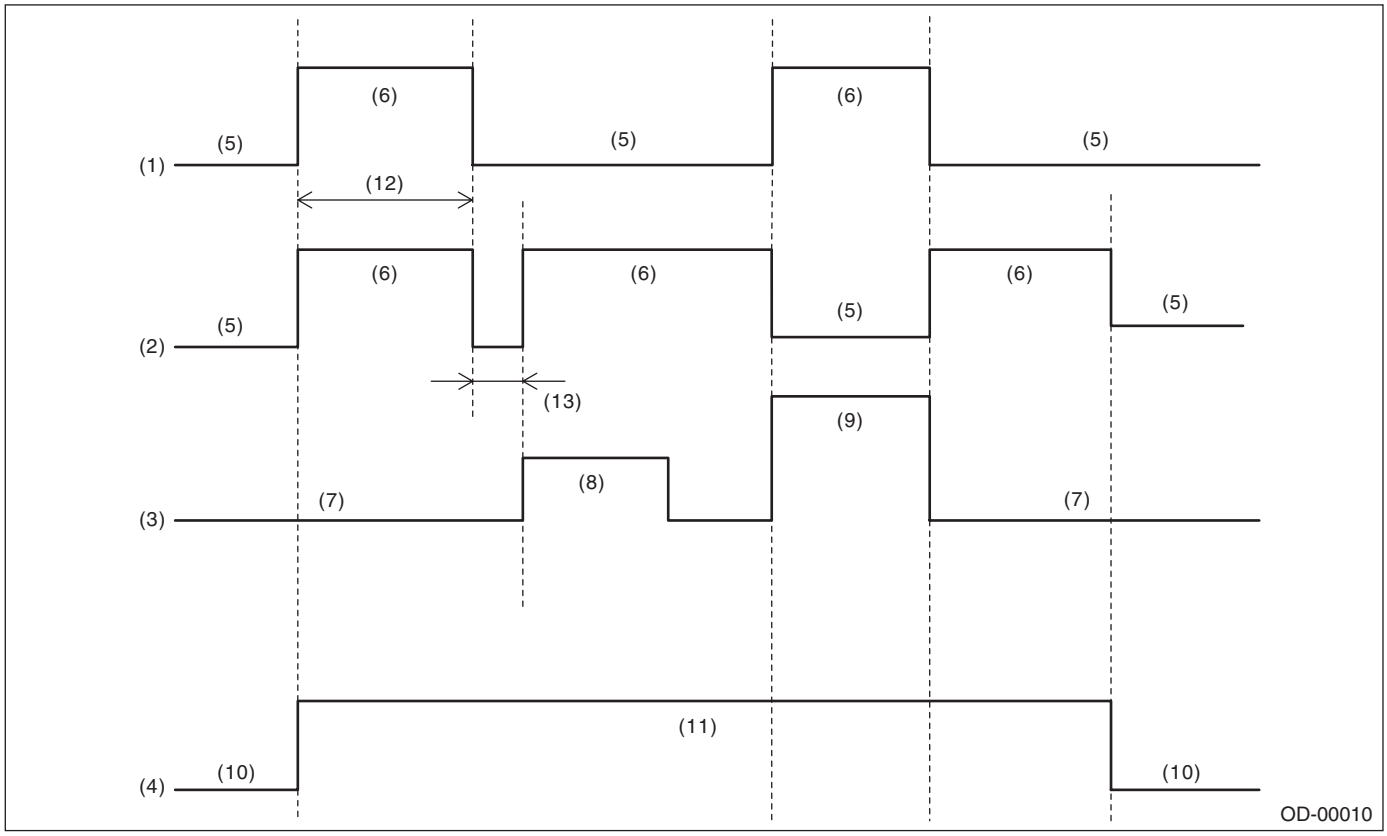
Turn the ignition switch to ON, and confirm that the airbag warning light remains on for approx. 6 seconds then turns off afterwards.



(1) Airbag warning light
(2) Approx. 6 seconds
(3) Ignition switch ON

13.Passenger's Airbag ON/OFF Indicator Light Illumination Pattern

A: INSPECTION



(1)	Passenger's airbag ON indicator light	(6)	Light ON	(10)	OFF
(2)	Passenger's airbag OFF indicator light	(7)	Empty	(11)	ON
(3)	Occupant seating	(8)	Child	(12)	Approx. 6 sec.
(4)	Ignition switch	(9)	Adult	(13)	Approx. 2 sec.
(5)	Light OFF				

14.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
B1650	OCCUPANT DETECTION SYSTEM MALFUNCTION	• Occupant detection sensor is faulty. • Occupant detection control module is faulty. • Occupant detection harness is faulty. • Fuse No. 25 is blown. • Rear airbag harness is faulty.	<Ref. to OD(diag)-23, DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1655	FRONT BUCKLE SWITCH RH FAILURE	• Passenger's buckle switch circuit is open, shorted or shorted to ground. • Occupant detection system is faulty. • Occupant detection harness is faulty.	<Ref. to OD(diag)-26, DTC B1655 FRONT BUCKLE SWITCH RH FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1760	OCCUPANT DETECTION SENSOR MAT	• Occupant detection sensor is faulty. • Occupant detection sensor is open, shorted between terminals, shorted to power supply or shorted to ground. • Seat heater is open. • Occupant detection control module is faulty.	<Ref. to OD(diag)-28, DTC B1760 OCCUPANT DETECTION SENSOR MAT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1761	OCCUPANT DETECTION SENSOR MAT LIQUID COATING	• Detected that the occupant detection sensor is spattered with fluid. • Occupant detection sensor is faulty. • Occupant detection control module is faulty.	<Ref. to OD(diag)-29, DTC B1761 OCCUPANT DETECTION SENSOR MAT LIQUID COATING, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1771	BUCKLE SWITCH	• Passenger's buckle switch is faulty. • Passenger's buckle switch circuit is open, shorted or shorted to ground. • Occupant detection system is faulty. • Occupant detection harness is faulty.	<Ref. to OD(diag)-29, DTC B1771 BUCKLE SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1795	OCCUPANT DETECTION MODULE INTERNAL CIRCUIT	Occupant detection control module is faulty.	<Ref. to OD(diag)-29, DTC B1795 OCCUPANT DETECTION MODULE INTERNAL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

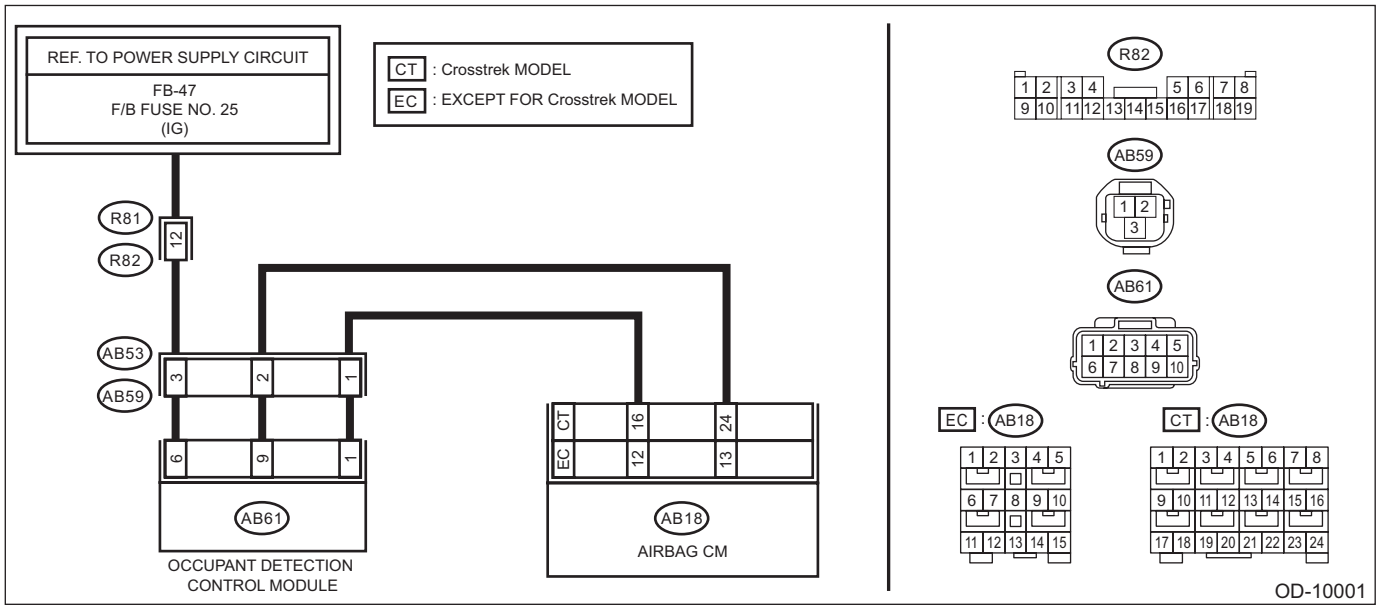
15.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION

DIAGNOSIS START CONDITION:
Ignition voltage is 8 V to 16 V.
DTC DETECTING CONDITION:

- Occupant detection sensor is faulty.
- Occupant detection control module is faulty.
- Occupant detection harness is faulty.
- Fuse No. 25 is blown out.
- Rear airbag harness is faulty.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Occupant detection system <Ref. to WI(w/o HEV)-179, WIRING DIAGRAM, Occupant Detection System.> <Ref. to WI(HEV)-158, WIRING DIAGRAM, Occupant Detection System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC of the occupant detection system. <Ref. to OD(diag)-16, OCCUPANT DETECTION SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1760, B1761, B1771, and B1795 detected?	Perform the diagnosis according to DTC.	Go to step **2**.

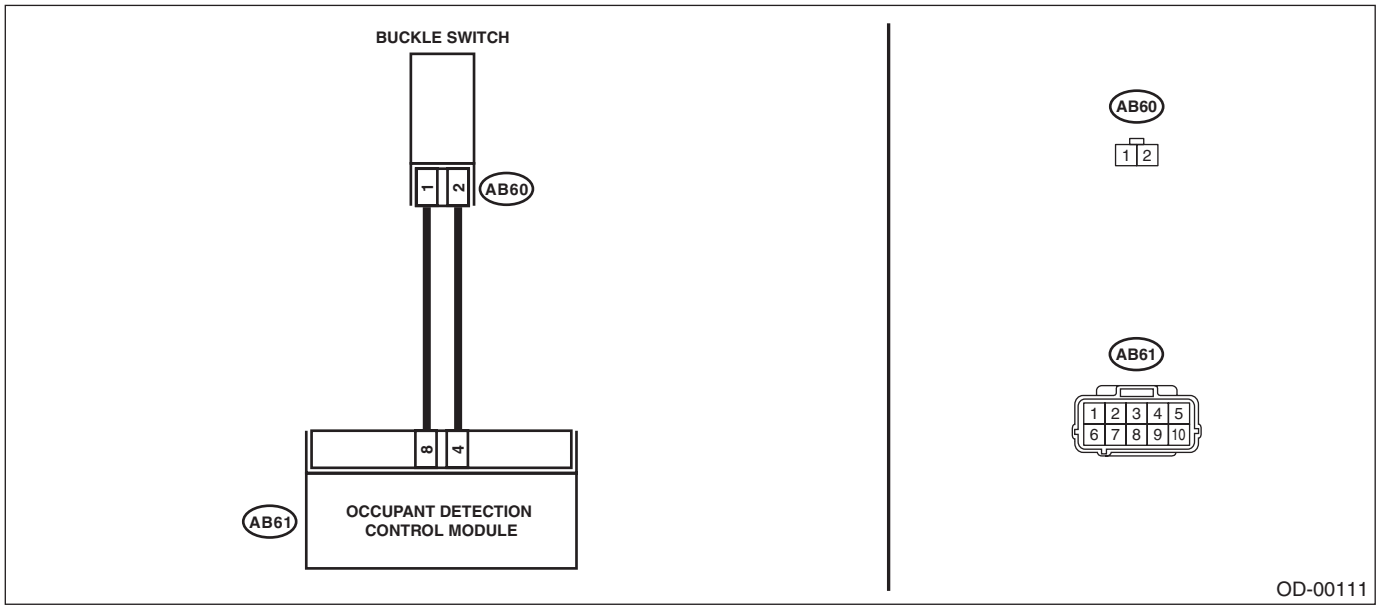
	Step	Check	Yes	No
2	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the occupant detection control module and airbag control module.	Is there poor contact?	When the connector is not fully connected, reconnect the connector correctly. Replace the faulty harness if the connector is faulty. (Replace the airbag rear harness along with body harness. Or replace the occupant detection harness (seat harness).)	Go to step **3**.
3	**CHECK AIRBAG REAR HARNESS.** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the connectors (AB59) and (AB53) under the passenger's seat. 3) Disconnect the connectors (AB6, AB17, AB18) from the airbag control module, and connect the connector (1AG) in the test harness AG to connectors (AB6, AB17, AB18). NOTE: Except for Crosstrek model, connect test harness AH between the connectors (AB6, AB17, AB18) and (1AG). 4) Connect the connector (1AP) in the test harness AP to the connector (AB53). 5) Measure the resistance between connector (5AG) in the test harness AG and connector (2AP) in the test harness AP. ***Connector & terminal*** ***Crosstrek model*** ***(6AG) No. 9 — (2AP) No. 2:*** ***(6AG) No. 11 — (2AP) No. 1:*** ***Except for Crosstrek model*** ***(5AG) No. 5 — (2AP) No. 1:*** ***(5AG) No. 16 — (2AP) No. 2:***	Is the resistance less than 10 Ω?	Go to step **4**.	Replace the airbag rear harness along with body harness.

	Step	Check	Yes	No
4	**CHECK AIRBAG REAR HARNESS.** Measure the resistance between connector (5AG) in the test harness AG and chassis ground. ***Connector & terminal*** ***Crosstrek model*** ***(6AG) No. 9 — Chassis ground:*** ***(6AG) No. 11 — Chassis ground:*** ***(6AG) No. 9 — (6AG) No. 11:*** ***Except for Crosstrek model*** ***(5AG) No. 5 — Chassis ground:*** ***(5AG) No. 16 — Chassis ground:*** ***(5AG) No. 5 — (5AG) No. 16:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Replace the airbag rear harness along with body harness.
5	**CHECK OCCUPANT DETECTION HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between connector (2AP) in the test harness AP and chassis ground. ***Connector & terminal*** ***(2AP) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the occupant detection harness (seat harness). If defective is not improved, replace the occupant detection system (seat cushion & frame assembly), and then the airbag control module in this order. <Ref. to SE-17, PASSENGER'S SEAT, DISASSEMBLY, Front Seat.>	Check the battery voltage and fuse. If there is no fault, replace the airbag rear harness together with body harness.

B: DTC B1655 FRONT BUCKLE SWITCH RH FAILURE

DIAGNOSIS START CONDITION:
Ignition voltage is 8 V to 16 V.
DTC DETECTING CONDITION:
- Passenger's buckle switch circuit is open, shorted or shorted to ground.
- Occupant detection system is faulty.
- Occupant detection harness is faulty.

WIRING DIAGRAM:
Occupant detection system <Ref. to WI(w/o HEV)-179, WIRING DIAGRAM, Occupant Detection System.> <Ref. to WI(HEV)-158, WIRING DIAGRAM, Occupant Detection System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the occupant detection system. <Ref. to OD(diag)-16, OCCUPANT DETECTION SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1760, B1761, B1771, and B1795 detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of the connectors between the occupant detection control module and buckle switch.	Is there poor contact?	When the connector is not fully connected, reconnect the connector correctly. Replace the airbag harness if the connector is faulty.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK BUCKLE SWITCH.** 1) Turn the ignition switch to OFF, disconnect the battery ground terminal, and wait for 60 seconds. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the buckle switch connector (AB60). 3) Connect the test harness AE and test harness connector Y to buckle switch connector (AB60). 4) Connect the battery ground terminal and turn the ignition switch to ON. NOTE: For HEV model, connect the negative terminal for 12 volt auxiliary battery, and connect the ground terminal to 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.>	Does the airbag warning light illuminate for 6 seconds and go off?	Replace the buckle switch. <Ref. to SB-17, SEAT BELT OUTER - FRONT, REMOVAL, Front Seat Belt.>	Check the seat harness, and if any fault is found, replace the seat harness. If the fault is not fixed, replace the occupant detection system. <Ref. to SE-17, PASSENGER'S SEAT, DISASSEMBLY, Front Seat.>

C: DTC B1760 OCCUPANT DETECTION SENSOR MAT

DIAGNOSIS START CONDITION:
Ignition voltage is 8 V to 16 V.
DTC DETECTING CONDITION:
- Occupant detection sensor is faulty.
- Occupant detection sensor circuit is open, shorted between terminals, shorted to power supply or shorted to ground.
- Seat heater circuit is open.
- Occupant detection control module is faulty.

	Step	Check	Yes	No
1	**CHECK POOR CONTACT OF CONNECTORS.** Check for poor contact of connectors between the occupant detection control module and the occupant detection sensor.	Is there poor contact of connector?	When the connector is not fully connected, reconnect the connector correctly. Replace the faulty harness if the connector is faulty. (Replace the occupant detection harness or replace the occupant detection system (passenger's & frame assembly)). <Ref. to SE-17, PASSENGER'S SEAT, DISASSEMBLY, Front Seat.>	Replace the occupant detection system (passenger's & frame assembly). <Ref. to SE-17, PASSENGER'S SEAT, DISASSEMBLY, Front Seat.>

D: DTC B1761 OCCUPANT DETECTION SENSOR MAT LIQUID COATING

DIAGNOSIS START CONDITION:
Ignition voltage is 8 V to 16 V.
DTC DETECTING CONDITION:
- Occupant detection sensor is spattered with fluid.
- Occupant detection sensor is faulty.
- Occupant detection control module is faulty.

	Step	Check	Yes	No
1	**DRY THE SEAT.** 1) Open the vehicle windows in a well-ventilated place indoors and dry the seat for 24 hours. 2) Check that the seat is not wet. If the seat is wet, extend the drying time to dry the seat well. 3) Read the DTC of the occupant detection system. <Ref. to OD(diag)-16, OCCUPANT DETECTION SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC detected?	When DTC B1761 is detected again, replace the occupant detection system (passenger's & frame assembly). <Ref. to SE-17, PASSENGER'S SEAT, DISASSEMBLY, Front Seat.> When any other DTC is detected, perform the diagnosis according to the DTC.	Clear the memory. <Ref. to OD(diag)-18, OCCUPANT DETECTION SYSTEM, OPERATION, Clear Memory Mode.>

E: DTC B1771 BUCKLE SWITCH

DIAGNOSIS START CONDITION:
Ignition voltage is 8 V to 16 V.
DTC DETECTING CONDITION:
- Passenger's seat buckle switch is faulty.
- Passenger's buckle switch circuit is open, shorted or shorted to ground.
- Occupant detection system is faulty.
- Occupant detection harness is faulty.

Perform the diagnosis from step 2 in "DTC B1655 FRONT BUCKLE SWITCH RH FAILURE". <Ref. to OD(diag)-26, DTC B1655 FRONT BUCKLE SWITCH RH FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

F: DTC B1795 OCCUPANT DETECTION MODULE INTERNAL CIRCUIT

DIAGNOSIS START CONDITION:
Ignition voltage is 8 V to 16 V.
DTC DETECTING CONDITION:
Occupant detection control module is faulty.
When "DTC B1795 OCCUPANT DETECTION MODULE INTERNAL CIRCUIT" is displayed, the occupant detection control module is faulty. Replace the occupant detection system (passenger's & frame assembly). <Ref. to SE-17, PASSENGER'S SEAT, DISASSEMBLY, Front Seat.>

SEAT BELT SYSTEM

SB

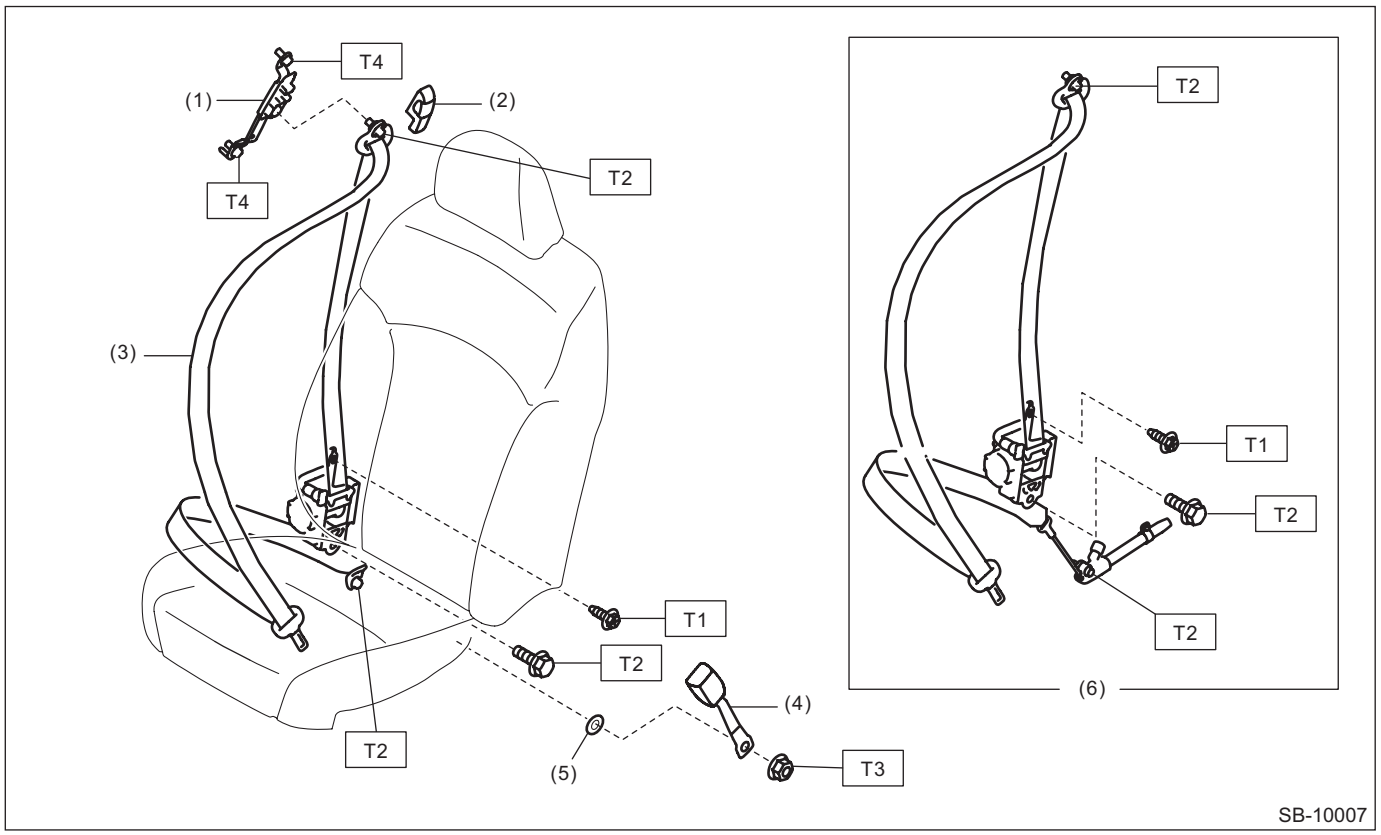
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1. General Description 2
2. Pretensioner Connector 12
3. Inspection Locations after a Collision 13
4. Seat Belt Warning System 14
5. Front Seat Belt 17
6. Rear Seat Belt 24
7. Disposal of Pretensioner 34

1. General Description

A: COMPONENT

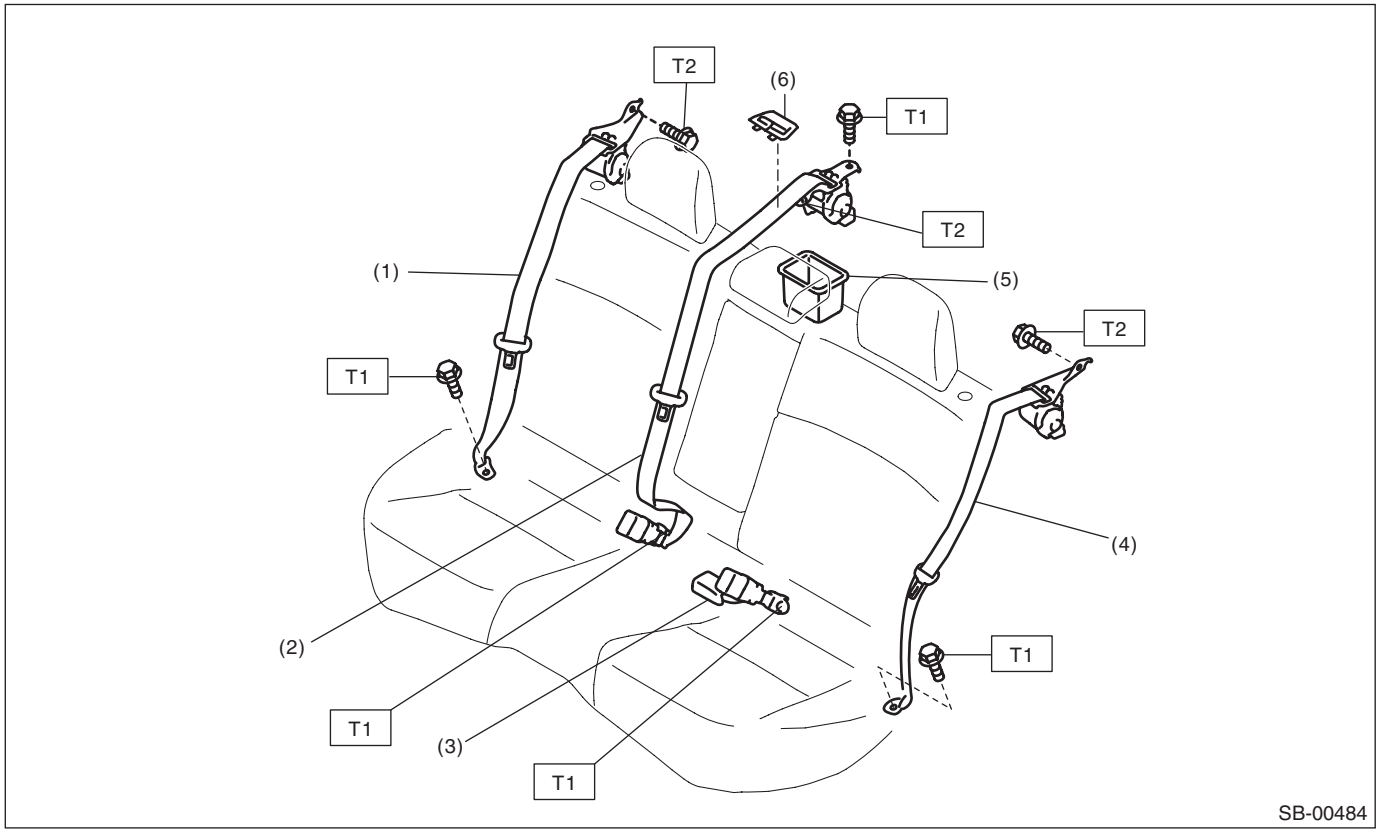
1. FRONT SEAT BELT



(1) Adjuster ASSY - seat belt
(2) Cover through
(3) Seat belt outer - front
(4) Seat belt inner - front
(5) Wave washer
(6) Seat belt outer - front (only on passenger's side for Crosstrek model with lap seat belt pretensioner)

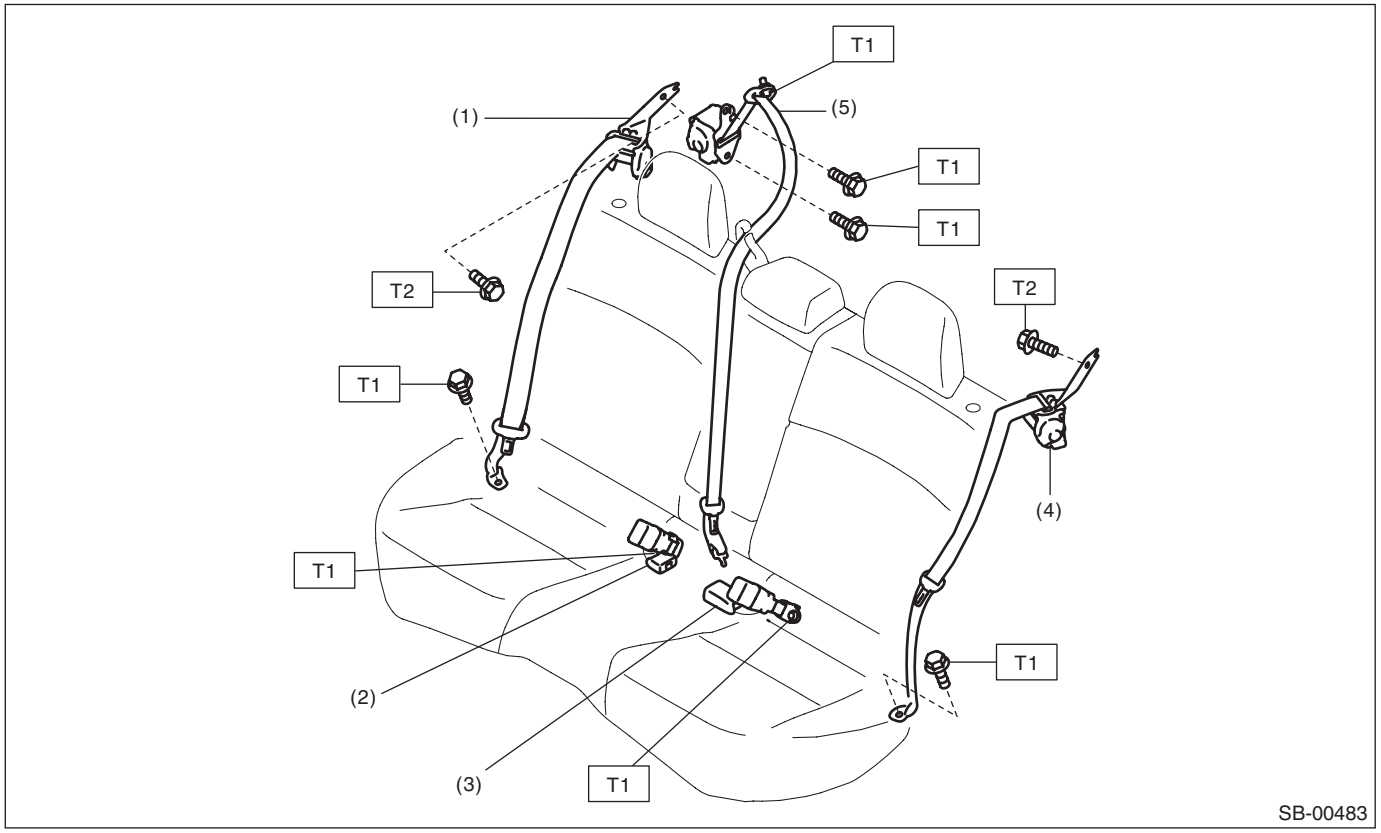
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 30 (3.06, 22.1)
T3: 38 (3.87, 28.0)
T4: 53 (5.4, 39.1)

2. REAR SEAT BELT (4 DOOR MODEL)



(1)	Seat belt outer - rear RH	(4)	Seat belt outer - rear LH	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Seat belt - rear shoulder CTR	(5)	Cover - ELR	***T1: 30 (3.06, 22.1)***
(3)	Seat belt - CTR LH	(6)	Cover - belt rear	***T2: 53 (5.4, 39.1)***

3. REAR SEAT BELT (5 DOOR MODEL/CROSSTREK MODEL)



(1) Seat belt outer - rear RH
(2) Seat belt - CTR RH
(3) Seat belt - CTR LH
(4) Seat belt outer - rear LH
(5) Seat belt - rear shoulder CTR

Tightening torque: N·m (kgf-m, ft-lb)
T1: 30 (3.06, 22.1)
T2: 53 (5.4, 39.1)

B: CAUTION

For details of the following precautions for seat belt pretensioner, refer to “AIRBAG SYSTEM” section. <Ref. to AB-11, CAUTION, General Description.>

- Before starting the work, turn the ignition switch to OFF, disconnect the battery ground cable and wait for 60 seconds or more.
- For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
- The airbag system (including pretensioner) is fitted with a backup power supply. After disconnecting the battery ground cable, the airbag may operate if you do not wait for 60 seconds or more before starting the service of airbag system.
- Do not drop or apply any impact to the pretensioner.
- Do not allow oil, grease or water to come in contact with the pretensioner.
- Do not expose the pretensioner to high temperature or flame.
- Do not allow current to flow through or voltage to reach the pretensioner. Do not use a circuit tester to check resistance of the pretensioner.
- Do not disassemble or attempt to repair the pretensioner. If it is dented, cracked or deformed, replace it with a new genuine part.
- Do not use the airbag or pretensioner parts from other vehicles. Always replace parts with new genuine parts.
- When handling a seat belt with deployed pretensioner, wear gloves and goggles. Wash your hands afterwards.
- Do not reuse a seat belt with deployed pretensioner.
- Before disposal, make sure to perform an operation process to the pretensioners. <Ref. to SB-34, PROCEDURE, Disposal of Pretensioner.>
- If material from the pretensioner enters the eyes or contacts skin during operation process, wash it away with clean water, and then consult a doctor.

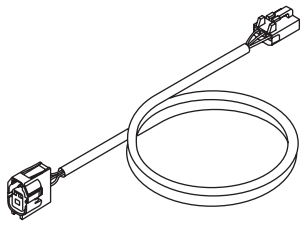
C: PREPARATION TOOL

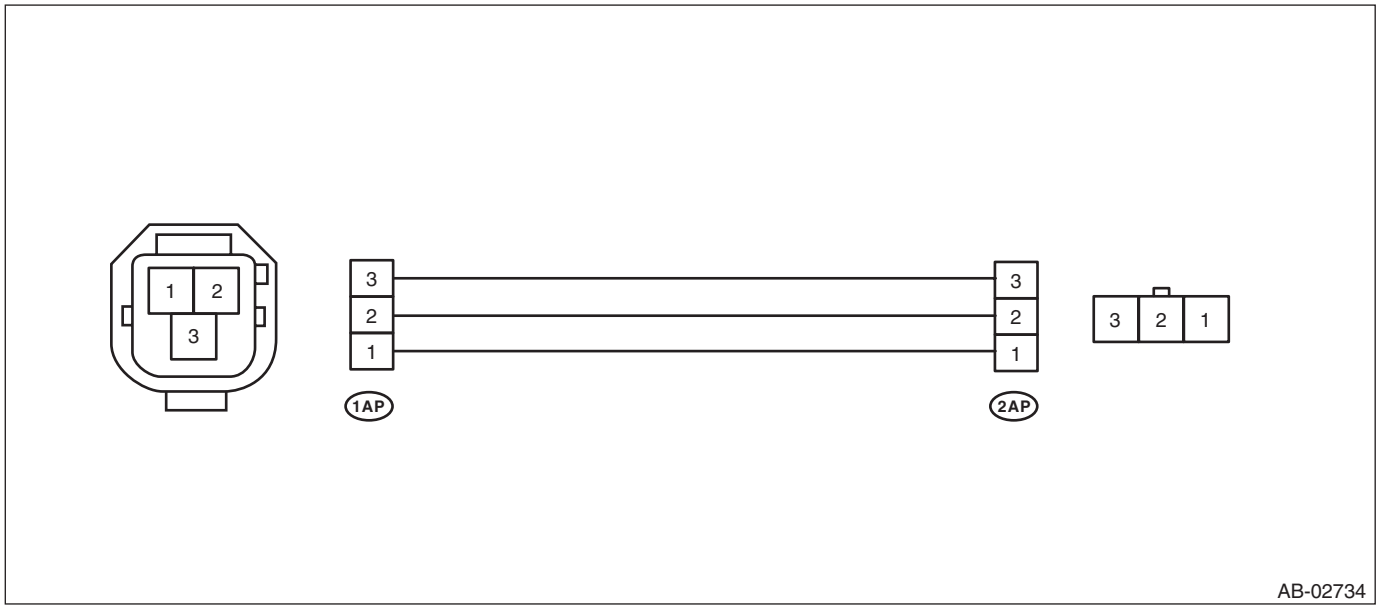
1. SPECIAL TOOL

- Subaru Select Monitor

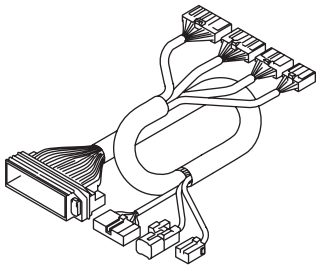
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

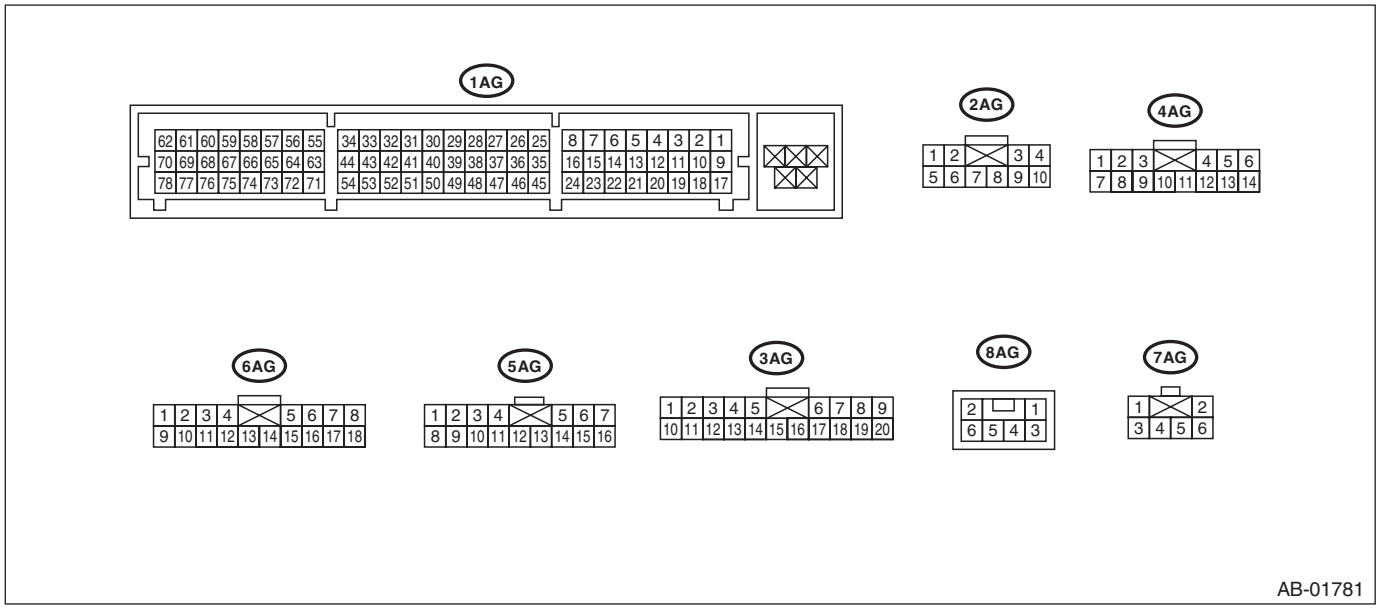
- TEST HARNESS AP

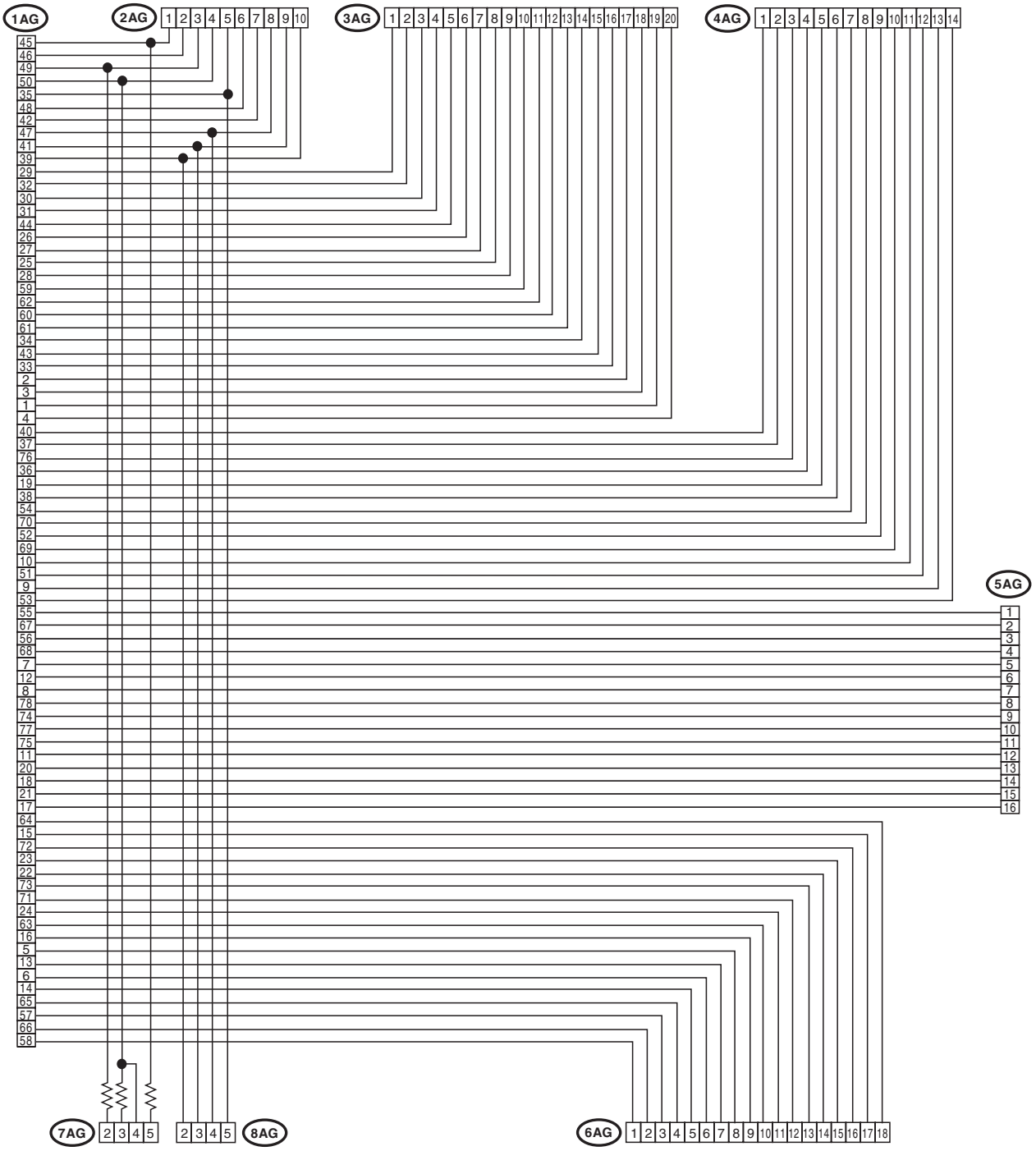
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299FJ030	98299FJ030	TEST HARNESS AP	Used when measuring voltage and resistance of occupant detection system.



- TEST HARNESS AG

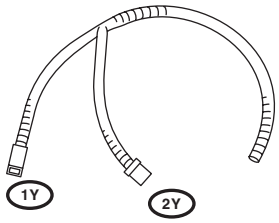
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299AG070	98299AG070	TEST HARNESS AG	Used when measuring voltage and resistance of airbag control module.

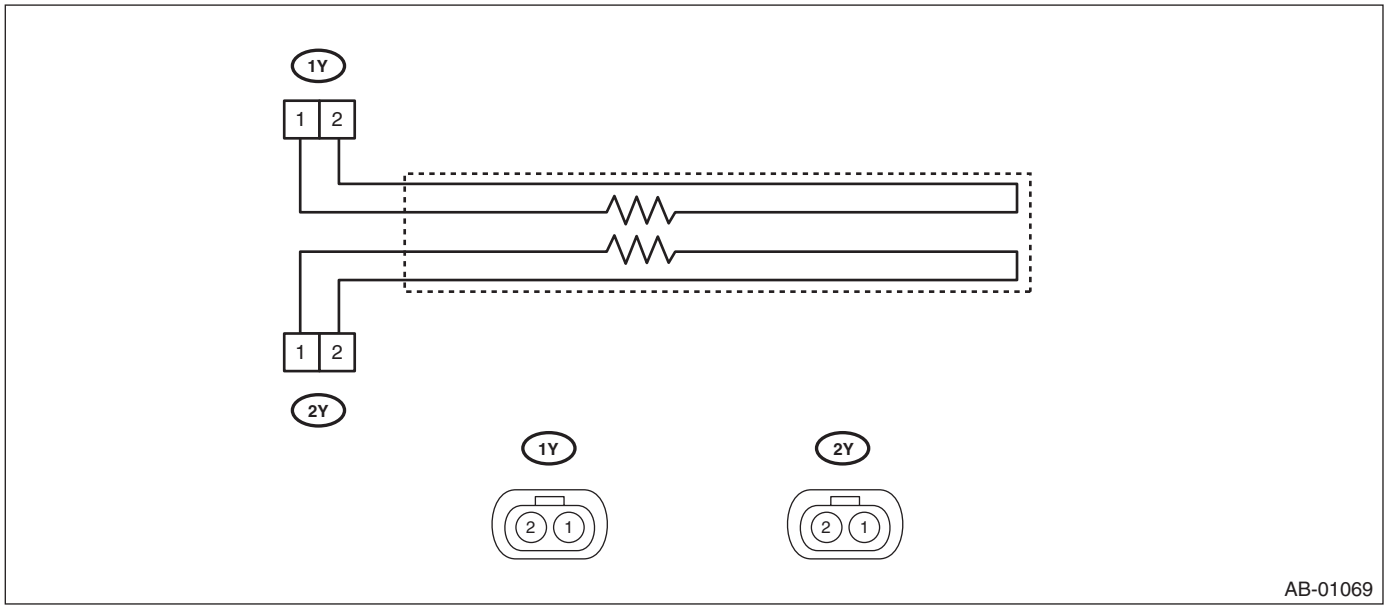




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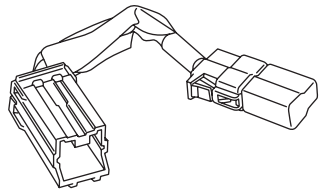
- TEST HARNESS Y

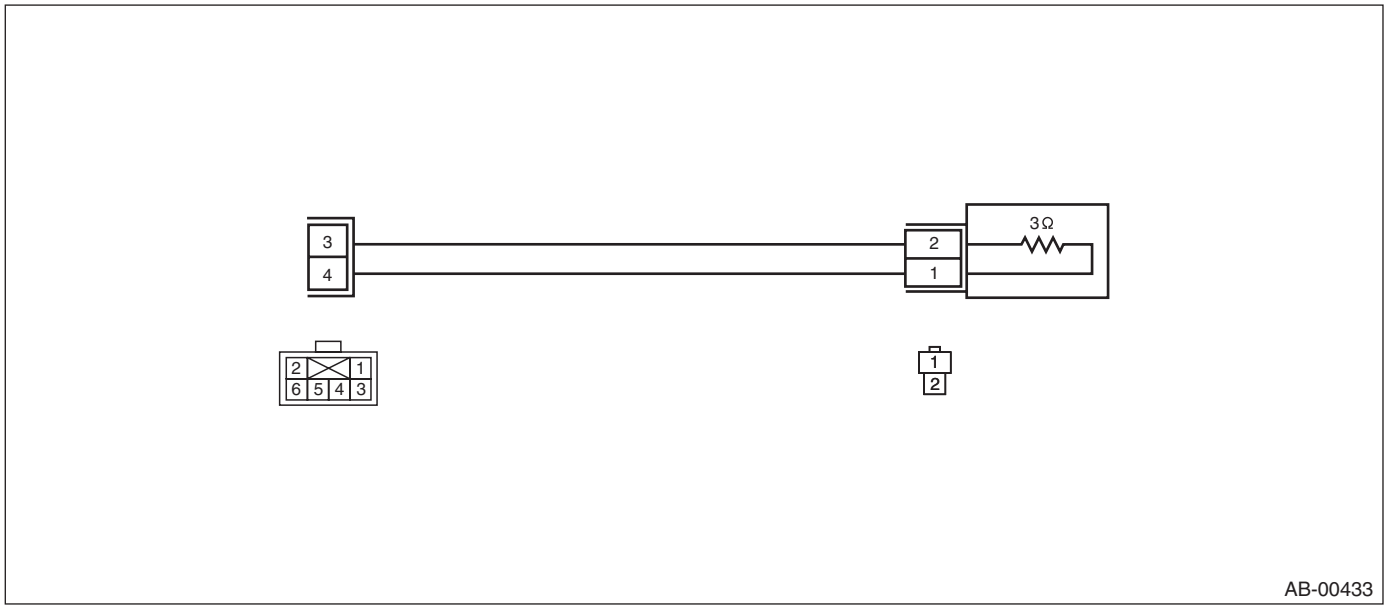
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299AG040	98299AG040	TEST HARNESS Y	Used for troubleshooting seat belt buckle switch.



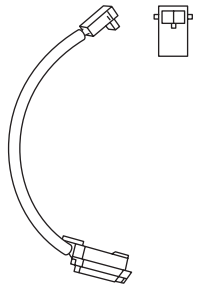
AB-01069

- AIRBAG RESISTOR

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299PA040	98299PA040	AIRBAG RESISTOR	Used in replacement of airbag module for which resistance value is same as airbag module.



- TEST HARNESS ADAPTER D

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299SA010	98299SA010	TEST HARNESS ADAPTER D	• Used for operation process of pretensioner. • Used together with AIRBAG DEPLOYMENT TOOL. (98299PA030)

- AIRBAG DEPLOYMENT TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST98299PA030	98299PA030	AIRBAG DEPLOYMENT TOOL	• Used for operation process of pretensioner. • Used together with each test harness adapter.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

2. Pretensioner Connector

A: PROCEDURE

For connectors of seat belt pretensioner, lap seat belt pretensioner and buckle switch RH, refer to “Airbag Connector” of “AIRBAG SYSTEM” section or “OCCUPANT DETECTION SYSTEM” section.

- Airbag system: <Ref. to AB-19, PROCEDURE, Airbag Connector.>
- Occupant detection system: <Ref. to OD(diag)-13, PROCEDURE, Airbag Connector.>

3. Inspection Locations after a Collision

A: INSPECTION

Refer to “Inspection Locations after a Collision” of “AIRBAG SYSTEM” section. <Ref. to AB-30, Inspection Locations after a Collision.>

4. Seat Belt Warning System

A: WIRING DIAGRAM

Refer to “Seat Belt Warning System” in the wiring diagram.
- Gasoline engine model <Ref. to WI(w/o HEV)-205, WIRING DIAGRAM, Seat Belt Warning System.>
- HEV model <Ref. to WI(HEV)-182, WIRING DIAGRAM, Seat Belt Warning System.>

B: INSPECTION

CAUTION:
• Before handling the airbag system components, refer to “CAUTION” of “General Description” in “AIRBAG SYSTEM”. <Ref. to AB-11, CAUTION, General Description.>
• When inspecting the airbag main harness, disconnect the connectors of the driver’s airbag module, passenger’s airbag module and knee airbag module for safety reasons.
• When inspecting the airbag rear harness, disconnect the side airbag module connector, curtain airbag module connector and seat belt pretensioner connector for safety reasons.

	Step	Check	Yes	No
1	**CHECK FUNCTION.** 1) Sit on the driver’s seat and passenger’s seat and disconnect the seat belts of the both. 2) Turn the ignition switch to ON (engine OFF). 3) Check the illumination of the driver’s seat belt warning light in the combination meter, and the passenger’s seat belt warning light in the MFD, and the sounding of the buzzer.	Do the driver’s warning light and passenger’s warning light blink and the buzzer sound while blinking?	Go to step **2**.	Go to step **12**.
2	**CHECK FUNCTION.** 1) Wait until the buzzer sound stops in step 1. (For approximately six seconds after starting sounding) 2) Connect and disconnect the seat belts of the driver’s and passenger’s. 3) Check the illumination of the driver’s seat belt warning light in the combination meter and the passenger’s seat belt warning light in the MFD.	Do the seat belts warning light illuminate ←→ go off according to the operation?	Go to step **3**.	Go to step **8**.
3	**CHECK FUNCTION.** 1) Wait until the buzzer sound stops in step 2. (For approximately six seconds after starting sounding) 2) Start the engine, and set the vehicle speed at 20 km/h (12 MPH) or more. 3) Check the seat belt warning lights of the driver’s and the passenger’s, and if the warning buzzer sounds.	Do the driver’s warning light and passenger’s warning light blink and the buzzer sound while blinking?	Go to step **4**.	Go to step **14**.
4	**CHECK HARNESS.** 1) Disconnect the negative terminal from the battery, and wait for 60 seconds or more. NOTE: For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor. 2) Disconnect the connectors of the combination meter and the seat belt buckle switch LH. 3) Check for short circuit to battery, open circuit and short circuit to ground between the combination meter and the seat belt buckle switch LH. ***Connector & terminal*** ***(i10) No. 15 — (R107) No. 2:***	Is the harness normal?	Go to step **5**.	Repair or replace the harness.

	Step	Check	Yes	No
5	**CHECK HARNESS.** Measure the resistance between the seat belt buckle switch LH and chassis ground. ***Connector & terminal*** ***(R107) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the harness.
6	**CHECK SEAT BELT BUCKLE SWITCH LH.** Measure the resistance between the connector terminals of the driver's seat belt switch when the driver's seat belt is fastened and detached. ***Connector & terminal*** ***(R107) No. 2 — (R107) No. 1:***	Is the resistance when the belt is fastened 1 MΩ or more, and less than 10 Ω when the belt is detached?	Go to step **7**.	Replace the seat belt inner - front LH. <Ref. to SB-17, SEAT BELT OUTER - FRONT, REMOVAL, Front Seat Belt.>
7	**CHECK COMBINATION METER.** Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	At the start of combination meter self diagnosis, did the buzzer sound and the seat belt warning light illuminate?	Replace the combination meter. There may be a reception failure of the combination meter.	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>
8	**CHECK DATA MONITOR.** 1) Sit in the passenger's seat. 2) Using the Subaru Select Monitor, select «Data monitor» and display data of «Passenger seat seat-belt wearing state». NOTE: For detailed operation procedures, refer to "Application help". 3) Fasten and detach the passenger's side seat belt buckle, and read the data of the seat belt switch. <Ref. to IDI(diag)-16, LIST, Read Current Data.>	Does the seat belt switch display turn ON ←→ OFF according to the operation of the seat belt buckle?	Go to step **12**.	Go to step **9**.
9	**CHECK AIRBAG SYSTEM AND OCCUPANT DETECTION SYSTEM.** Perform the check in accordance with the diagnostic procedure DTC B1650 of the airbag system. <Ref. to OD(diag)-23, DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is the inspection result normal?	Go to step **10**.	Repair or replace with new parts according to DTC B1650.
10	**CHECK BUCKLE SWITCH RH.** Perform the check in accordance with the diagnostic procedure DTC B1655 of the occupant detection system. <Ref. to OD(diag)-26, DTC B1655 FRONT BUCKLE SWITCH RH FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is the inspection result normal?	Go to step **11**.	Repair or replace with new parts according to DTC B1655.
11	**CHECK AIRBAG CONTROL MODULE AND COMBINATION METER.** Check the airbag control module, occupant detection sensor and seat belt buckle switch RH. Perform the check in accordance with the diagnostic procedure DTC B16F1 of the airbag system. <Ref. to AB(diag)-103, DTC B16F1 PASSENGER'S SEAT BELT WARNING FAILURE, Diagnostic Chart with Trouble Code.>	Is the inspection result normal?	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>	Repair or replace with new parts according to DTC B16F1.

	Step	Check	Yes	No
12	**CHECK MFD POWER SUPPLY VOLTAGE.** 1) Disconnect the MFD connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between the ignition power supply and the MFD. ***Connector & terminal*** ***(i122) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **13**.	Check the harness for open or short between the fuse and MFD.
13	**CHECK MFD GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between MFD and chassis ground. ***Connector & terminal*** ***(i122) No. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **14**.	Repair or replace the harness.
14	**CHECK HARNESS BETWEEN MFD AND COMBINATION METER.** 1) Disconnect the harness of the MFD and the combination meter. 2) Measure the resistance between MFD and combination meter. ***Connector & terminal*** ***(i122) No. 9 — (i10) No. 28:***	Is the resistance less than 10 Ω?	Go to step **15**.	Repair or replace the harness.
15	**CHECK COMMUNICATION STATUS BETWEEN MFD AND COMBINATION METER.** 1) Remove the MFD, and install a properly operating MFD (new MFD). 2) Connect the connector and then turn the ignition switch to ON. ***Connector & terminal*** ***(i122) No. 9 — (i10) No. 28:***	Is the MFD properly displayed?	Replace the MFD.	Replace the combination meter case assembly.

5. Front Seat Belt

A: REMOVAL

1. SEAT BELT OUTER - FRONT

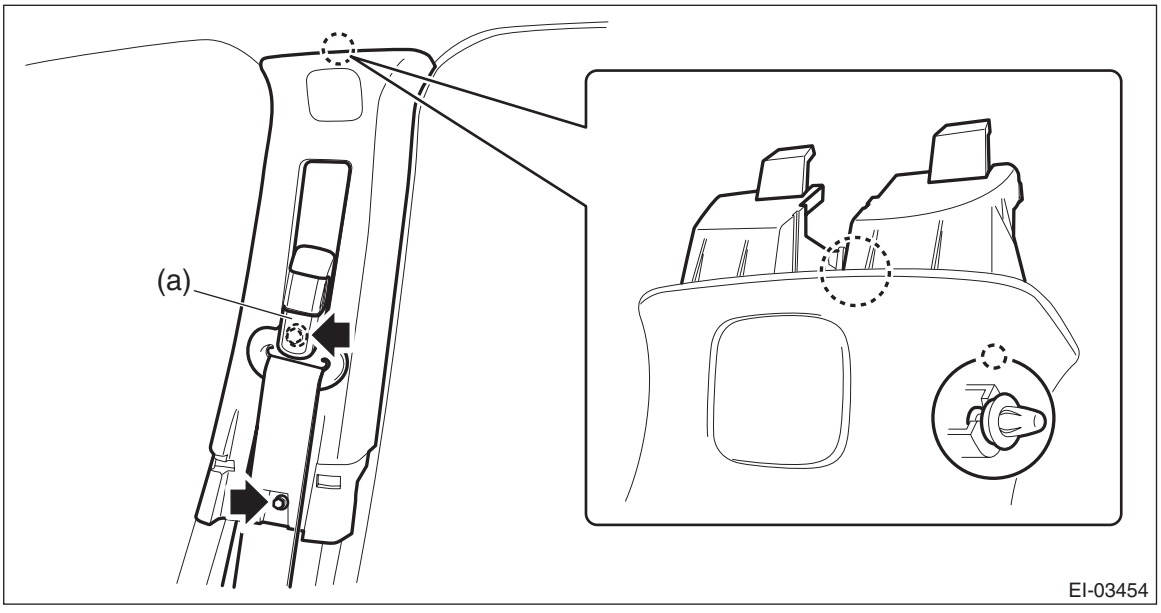
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
• Do not drop or subject the pretensioner to any impact.
• Since the pretensioner and bracket are integrated as a unit, do not disassemble them.

1) Turn the ignition switch to OFF.
2) Disconnect the ground terminal from the 12V engine restart battery sensor, and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

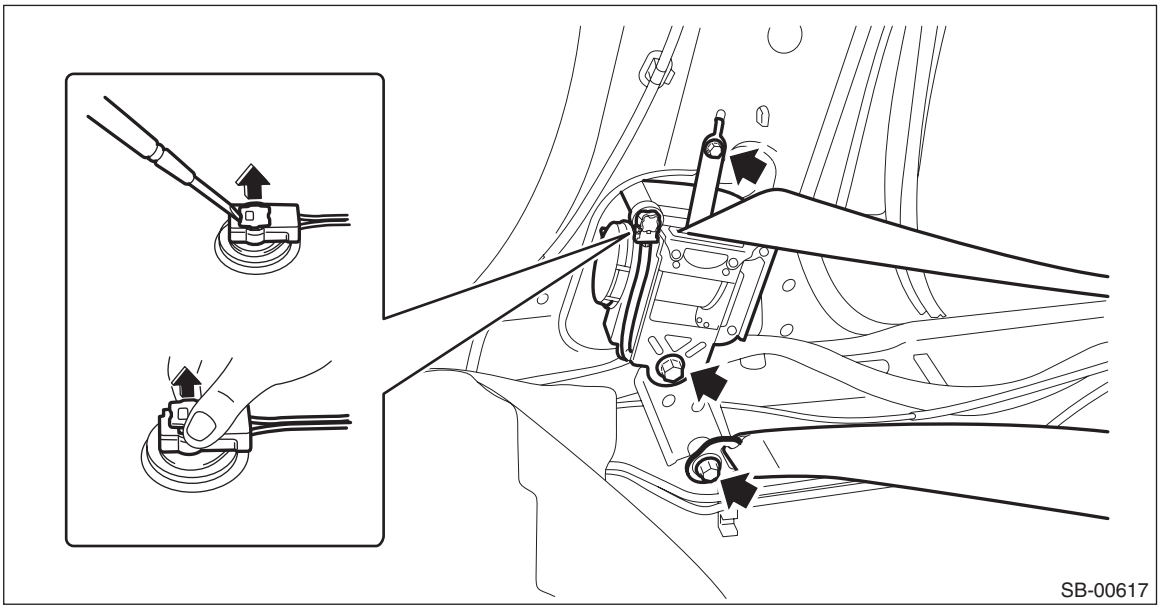
3) Tilt the front seat backrest assembly forward, and move the front seat all the way forward.
4) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the cover side sill - front INN, cover side sill - rear INN, and trim panel - center pillar LWR. (On the side where seat belt assembly is removed) <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
6) Remove the trim panel - center pillar UPR. (On the side where seat belt assembly is removed)
   (1) Remove the cover through (a), and remove the seat belt anchor bolt.
   (2) Remove the bolt on the lower side of the trim panel - center pillar UPR.
   (3) Remove the clip by pulling the upper part of the trim toward you, and while lowering the entire trim, remove the trim panel - center pillar UPR.

CAUTION:
Do not reuse the upper clips of the trim panel - center pillar UPR. Once the clip is removed, its holding force is reduced. Be sure to replace it with a new clip.

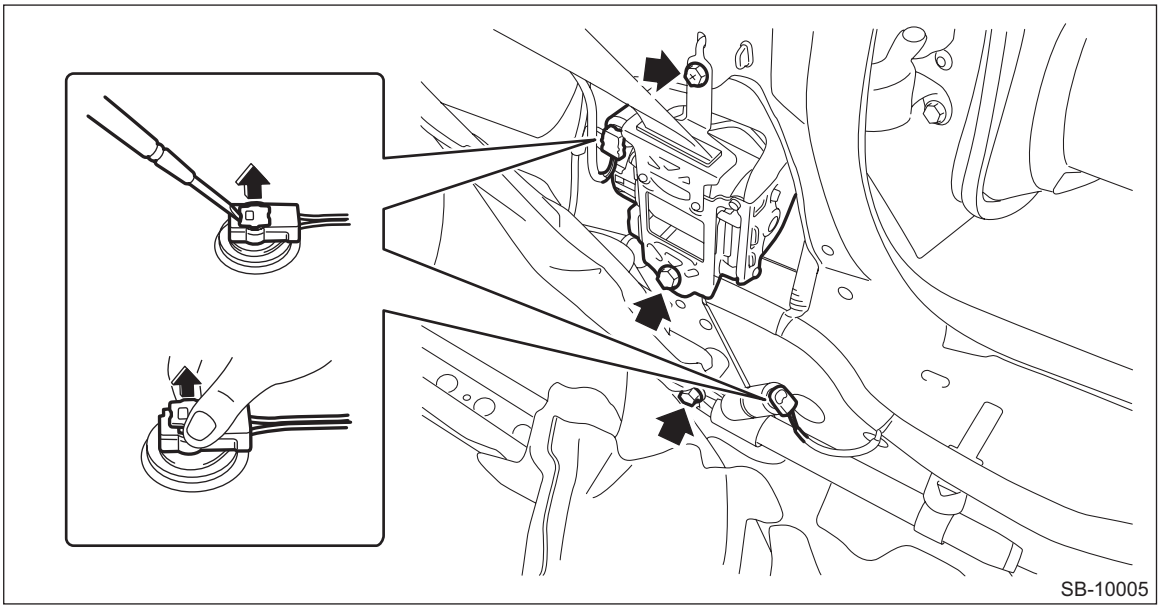


7) Remove the seat belt outer - front.
(1) Turn over the floor mat to disconnect the belt tension sensor connector. <Ref. to AB-22, DRIVER'S AIRBAG MODULE, CURTAIN AIRBAG MODULE & PRETENSIONER, PROCEDURE, Airbag Connector.>

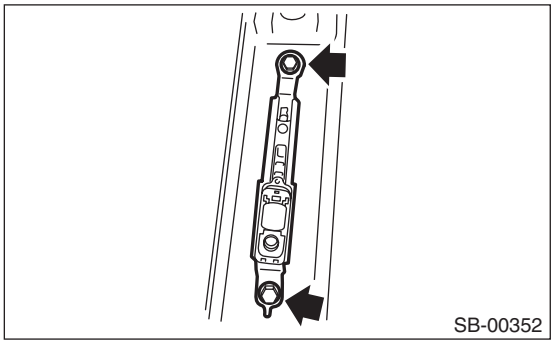
NOTE:
For Crosstrek model, disconnect the connector of the passenger's lap seat belt pretensioner.
(2) Remove the bolt to remove the seat belt retractor.
(3) Remove the lower anchor bolt, and remove the seat belt outer - front.
- Driver's side



- Passenger's side



8) Remove the bolts, and then remove the adjuster assembly - seat belt.



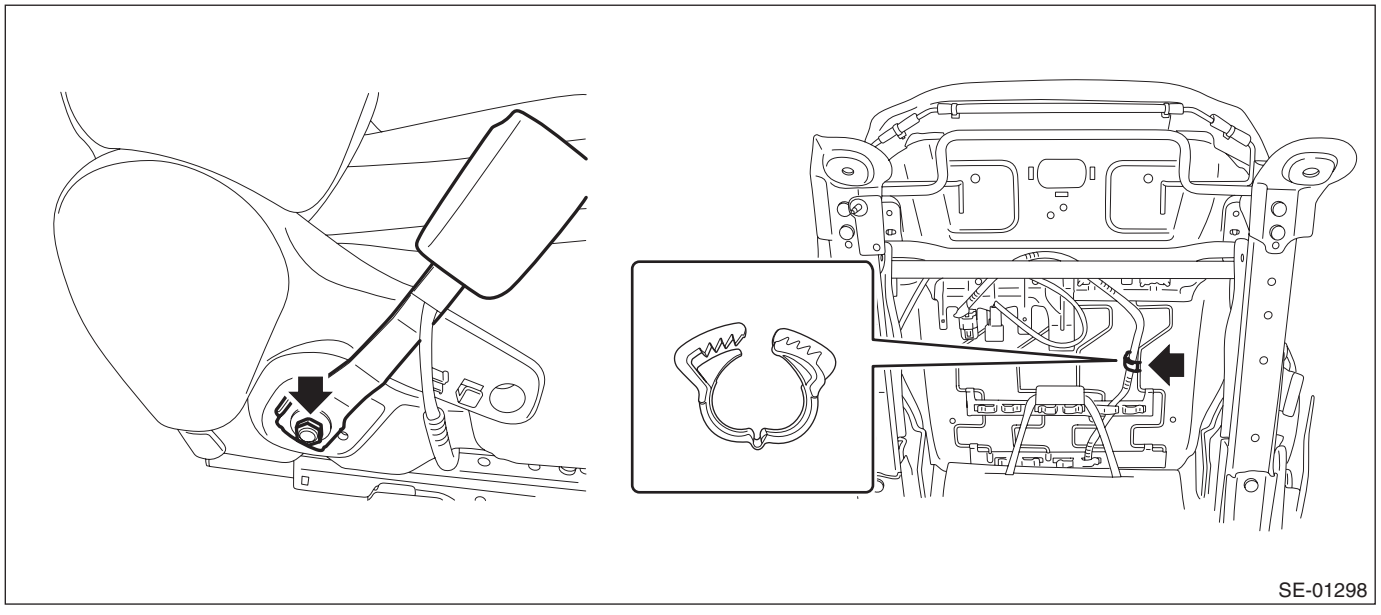
2. SEAT BELT INNER - FRONT

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the front seats. <Ref. to SE-8, REMOVAL, Front Seat.>
4) Remove the seat belt inner - front.
   (1) Remove the nut, and remove the seat belt inner - front.
   (2) Remove the clip for the inner seat belt harness located under the seat cushion.



B: INSTALLATION

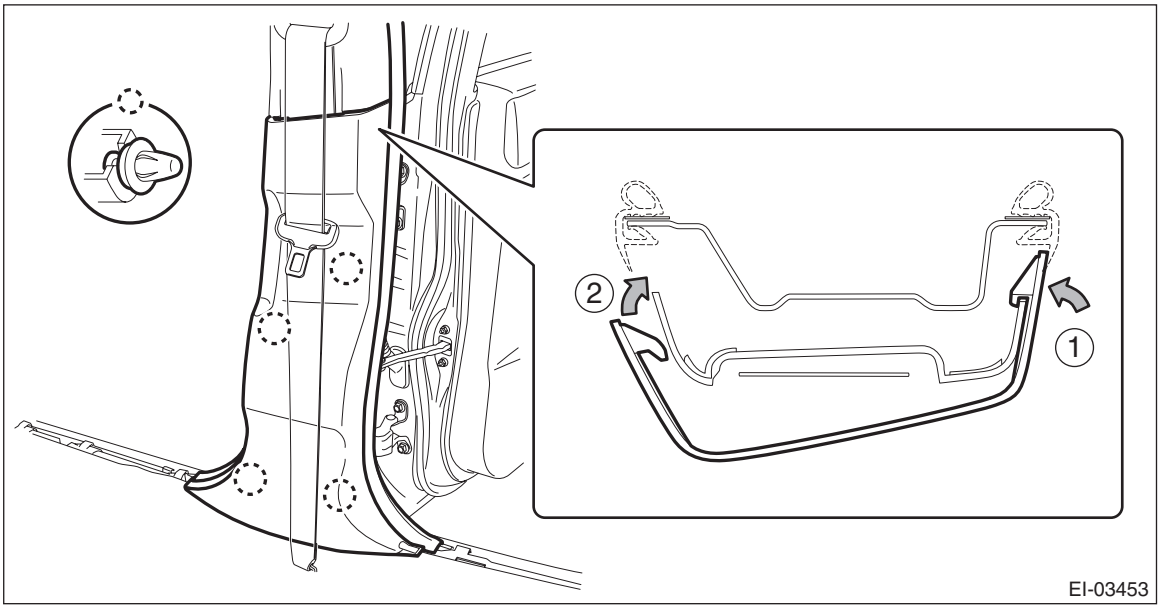
1. SEAT BELT OUTER - FRONT

CAUTION:
• The parts of the driver and passenger sides are not the same. Before installation, make sure that the correct part is used.
• During installation, make sure that the seat belts are not twisted.
• After installation, make sure that the seat belt can be pulled out and retracted smoothly.
• Make sure that the seat belt harness is not caught anywhere. Wrong harness rooting may cause the harness short from pinch.
• Do not reuse the upper clips of the trim panel - center pillar UPR. Once the clip is removed, its holding force is reduced. Be sure to replace it with a new clip.
1) Before installation, perform a unit inspection of retractor. <Ref. to SB-22, INSPECTION, Front Seat Belt.>
2) Install the adjuster assembly - seat belt and the seat belt outer - front.

Tightening torque:
Front seat belt: <Ref. to SB-2, FRONT SEAT BELT, COMPONENT, General Description.>
3) Install the remaining parts in the reverse order of removal.

Tightening torque
Trim panel - center pillar UPR: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

NOTE:
Assemble the trim panel - center pillar LWR to the trim panel - center pillar UPR securely.



4) After installation, check the following points.
• The seat belt is not twisted.
• The seat belt can be pulled out and retracted smoothly.
• The adjuster assembly - seat belt can be moved smoothly.
• Check that the airbag warning light lights up for approximately 6 seconds and then turns off when connecting the battery ground cable and turning the ignition switch to ON.

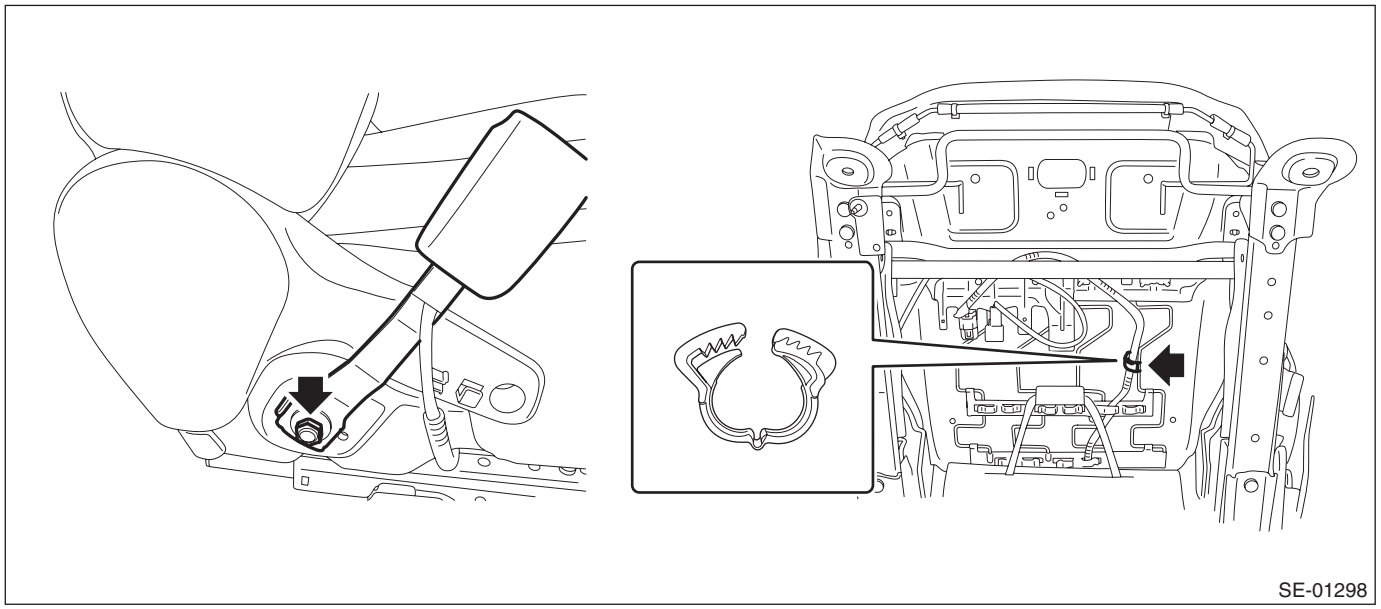
2. SEAT BELT INNER - FRONT

CAUTION:
- **Before installation, make sure that the correct part is used.**
- **During installation, make sure that the seat belts are not twisted.**
- **Check that there is no pinching of the seat belt harness. Wrong harness rooting may cause the harness short from pinch.**
- **Do not forget the wave washer, when installing front seat inner belt assembly.**

1) Install the seat belt inner - front.

Tightening torque:
Front seat belt: <Ref. to SB-2, FRONT SEAT BELT, COMPONENT, General Description.>

2) Locate the seat belt harness and retain it with a harness clip.



3) Install the seat assembly to the body. <Ref. to SE-9, INSTALLATION, Front Seat.>
4) Check that no harness is caught by sliding the seat back and forth.
5) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, connect the ground terminal to 12V engine restart battery sensor.

3. ADJUSTABLE ANCHOR ASSY

Referring to the installation procedure for seat belt outer - front, install the parts in the reverse order of removal.

Tightening torque:
Front seat belt: <Ref. to SB-2, FRONT SEAT BELT, COMPONENT, General Description.>
Trim panel - center pillar UPR: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

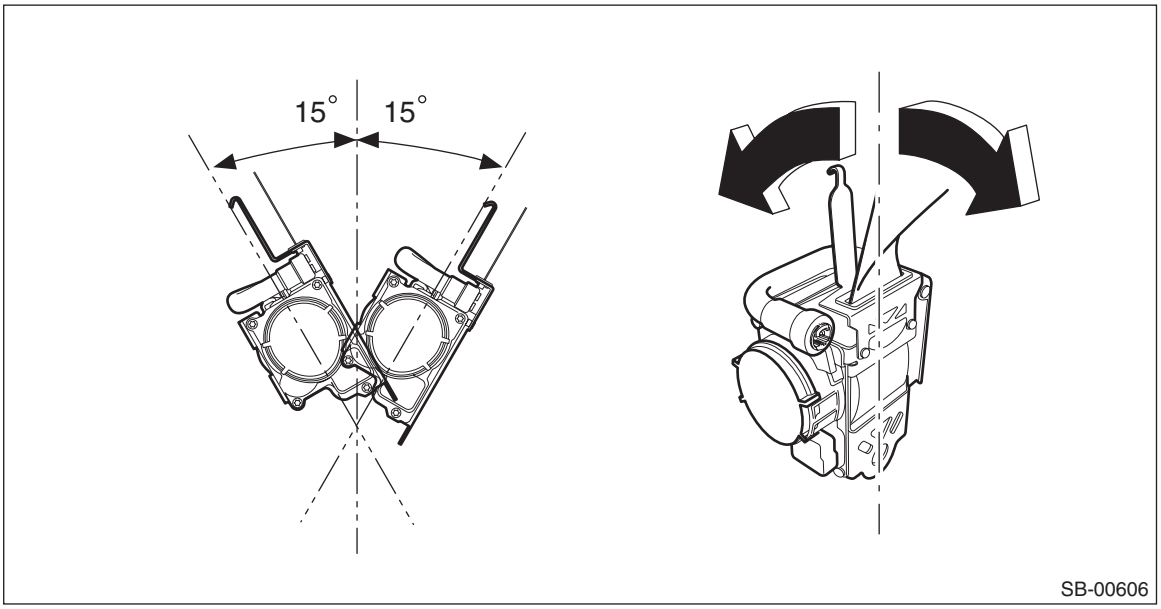
C: INSPECTION

1. VISUAL INSPECTION

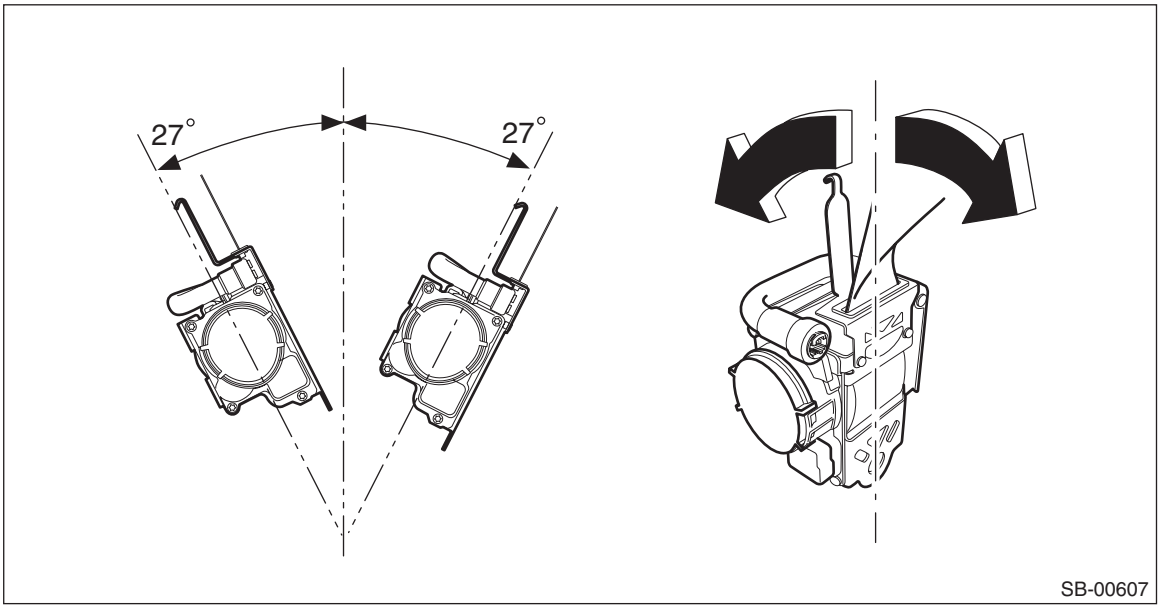
Check for the following, and replace with new parts if necessary.
- Pretensioner is cracked or deformed.
- Adjuster assembly - seat belt is cracked or deformed.
- Seat belt is slackened, bent or worn.
- Seat belt is abnormally wound or extended.
- Seat belt inner - front is deformed or damaged.
- Seat belt buckle cannot be engaged properly.

2. ELR LOCK MECHANISM INSPECTION

1) Hold the retractor upright (as installed in the vehicle) and check the ELR lock mechanism.
2) Tilt the retractor from the upright posture and check the following points.
- It does not lock if the inclination angle is 15° or less.



- It remains locked if the inclination angle is 27° or more.



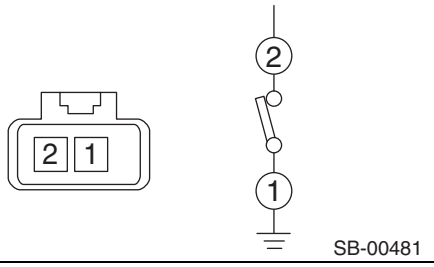
3) If the ELR lock mechanism does not operate properly, replace the seat belt outer - front with a new part.

3. SEAT BELT SWITCH INSPECTION

Preparation tool:
Circuit tester

- Driver's seat

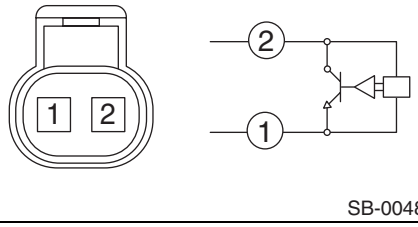
Check the resistance between the terminals when the seat belt inner - front is in each of the following operation conditions.

Terminal No.	Inspection conditions	Standard	Circuit
2 — 1	Tongue plate inserted	1 MΩ or more	
2 — 1	Tongue plate detached	1 Ω or less	

Replace the seat belt inner - front if the inspection result is not within the standard.

- Passenger's seat

Check the current between the terminals when the seat belt inner - front is in each of the following operation conditions.

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Tongue plate inserted	12 — 18 mA	
1 — 2	Tongue plate detached	4 — 7 mA	

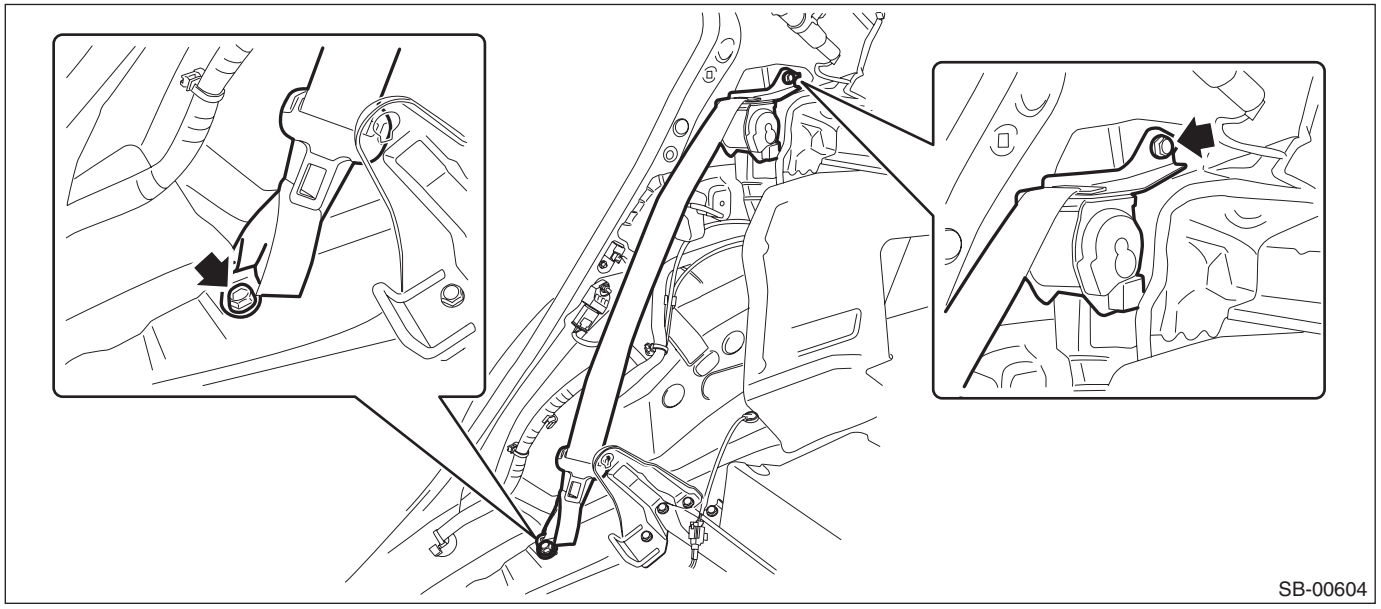
Replace the seat belt inner - front if the inspection result is not within the standard.

6. Rear Seat Belt

A: REMOVAL

1. SEAT BELT OUTER - REAR RH AND LH (4 DOOR MODEL)

CAUTION:
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work.
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the cover side sill - rear INN and the trim panel - center pillar LWR. (On the side where seat belt assembly is removed) <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
5) Remove the bolts, and remove the seat belt outer - rear.

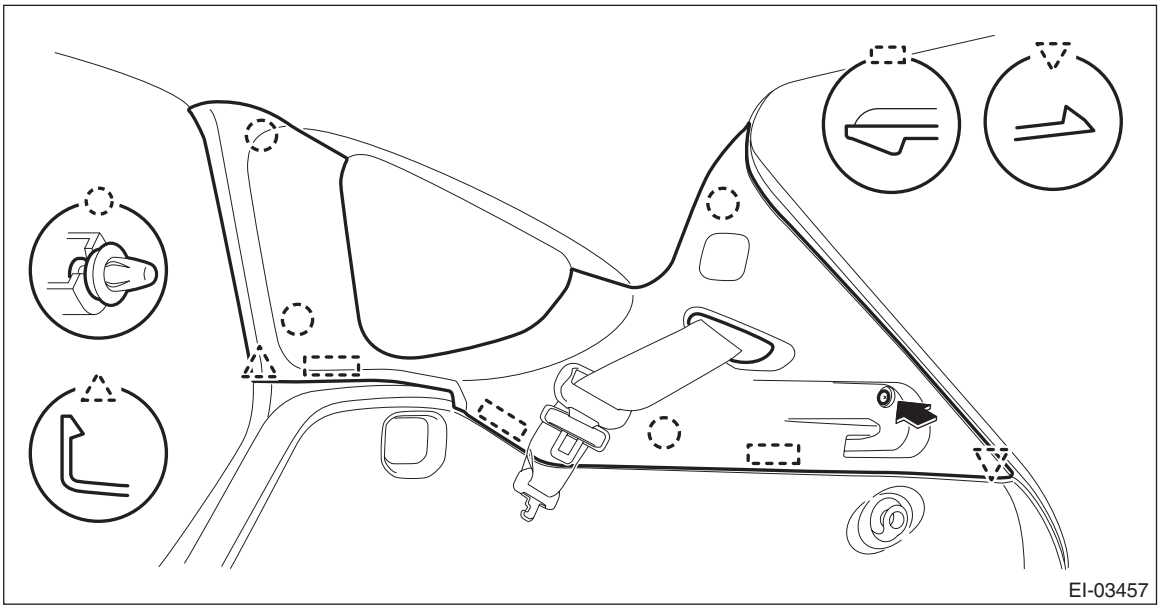

SB-00604

2. SEAT BELT OUTER - REAR RH AND LH (5 DOOR MODEL/CROSSTREK MODEL)

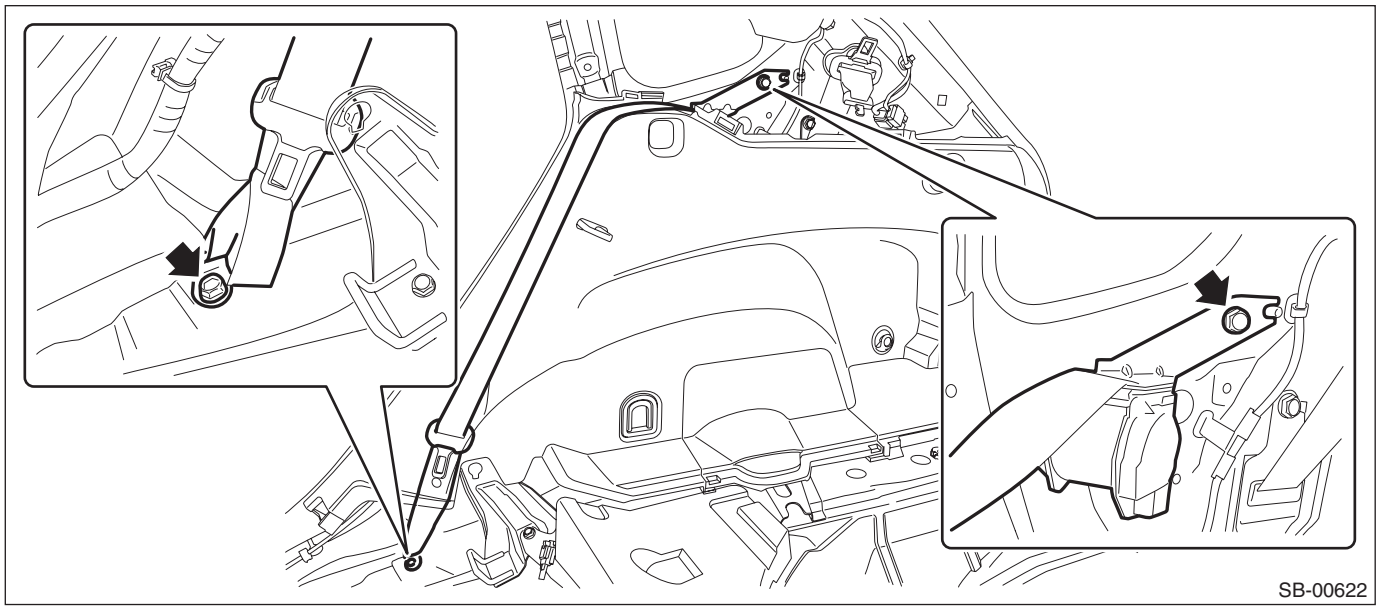
CAUTION:
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>

4) Remove the screws and clips, and remove the trim panel - rear quarter pillar UPR. (On the side where seat belt assembly is removed)



5) Remove the bolts, and remove the seat belt outer - rear.



3. SEAT BELT - REAR SHOULDER CTR (4 DOOR MODEL)

CAUTION:

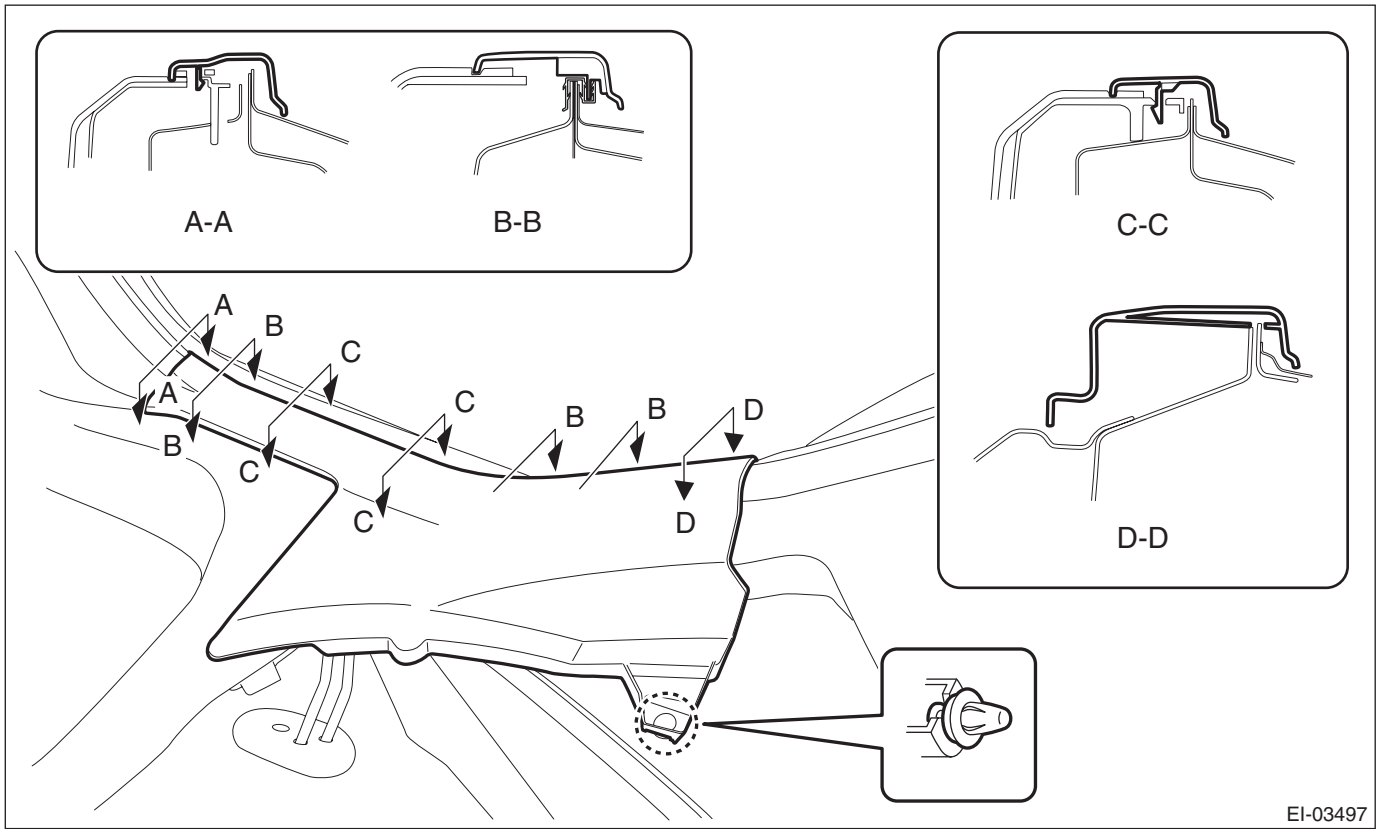
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.

• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

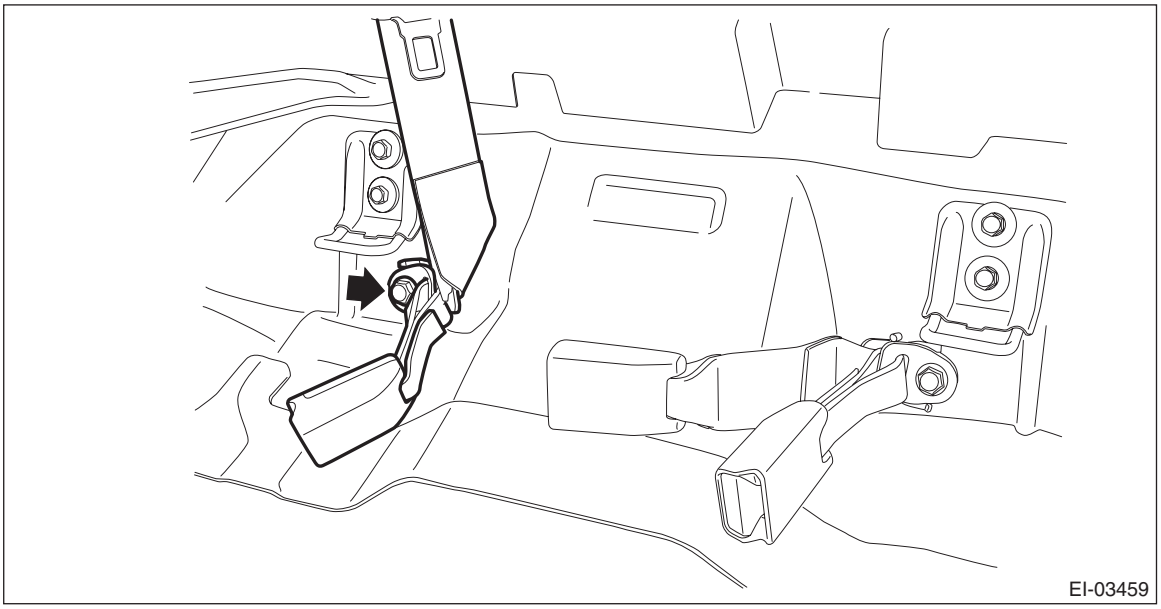
1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work.
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>

4) Release the clips and claws, and remove the side sill covers - rear INN on the left and right sides.

CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the side sill cover - rear INN.

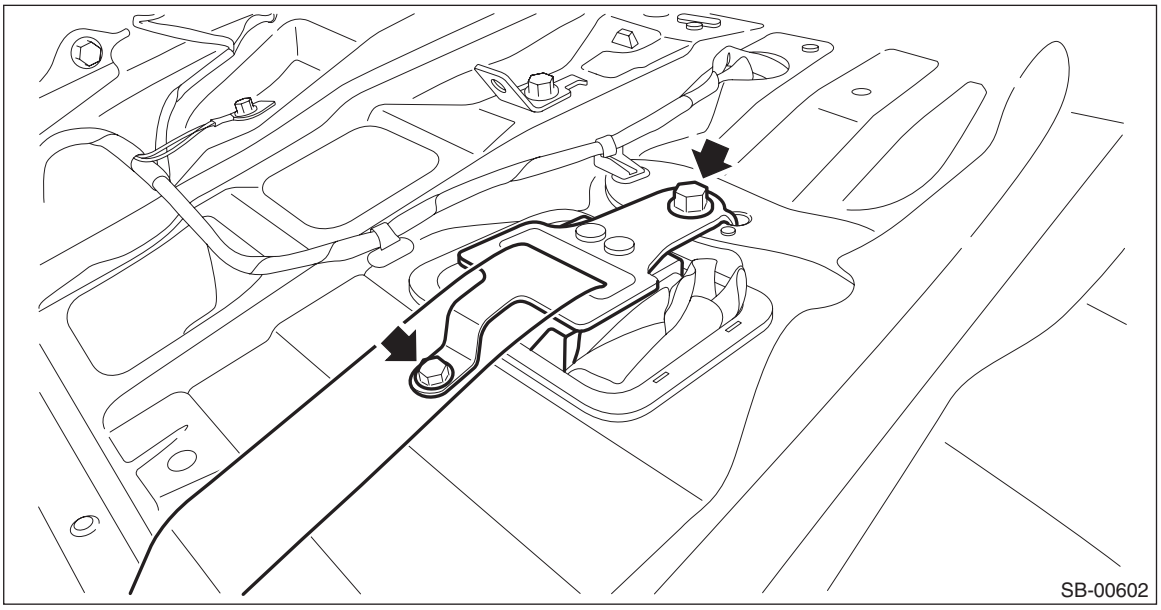


5) Remove the trim panel - rear pillar UPR and trim panel - rear pillar LWR on the RH and LH sides. <Ref. to EI-97, 4 DOOR MODEL, REMOVAL, Rear Quarter Trim.>
6) Remove the bolts, and remove the lower anchor of the seat belt - rear shoulder CTR.



7) Remove the high-mounted stop light. <Ref. to LI-74, REMOVAL, High-mounted Stop Light.>
8) Remove the trim panel - rear shelf assembly. <Ref. to EI-103, REMOVAL, Rear Shelf Trim.>

9) Remove the bolts, and remove the seat belt - rear shoulder CTR.



4. SEAT BELT - REAR SHOULDER CTR (5 DOOR MODEL/CROSSTREK MODEL)

CAUTION:

• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.

• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

1) Turn the ignition switch to OFF.

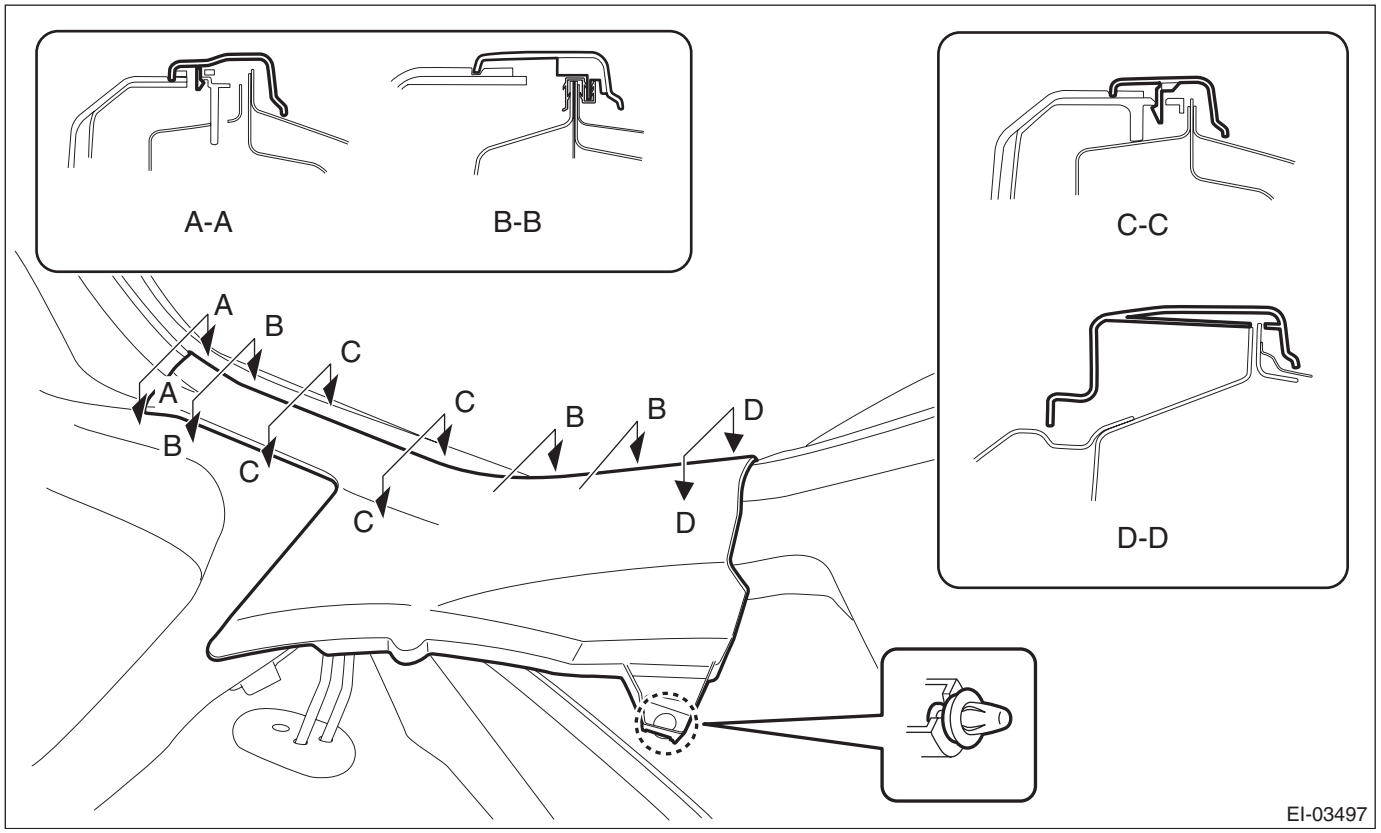
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

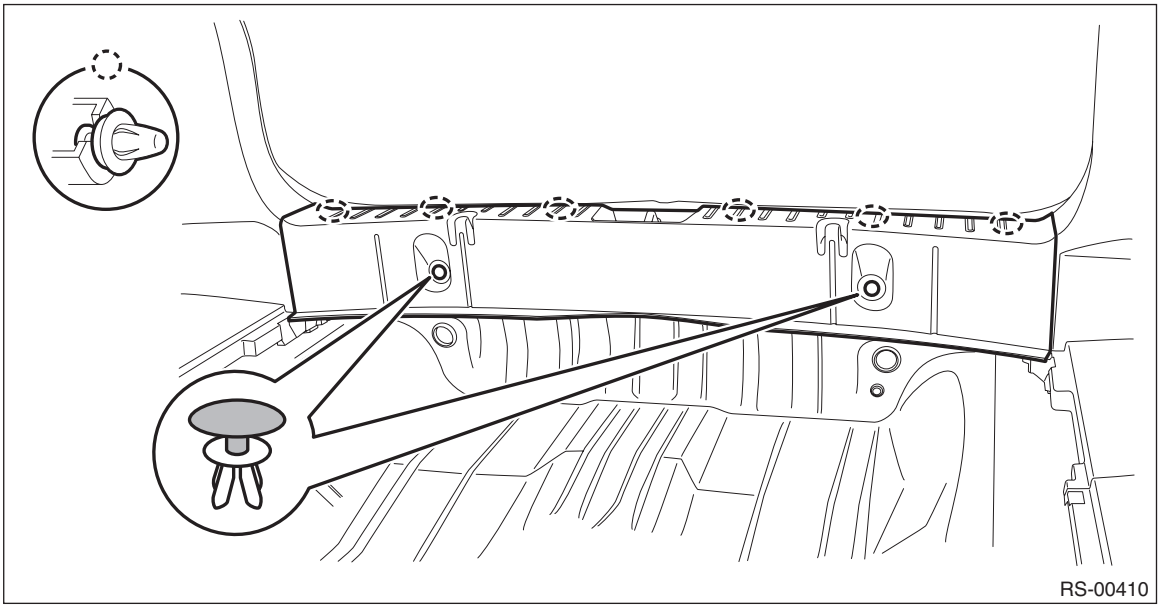
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>

4) Release the clips and claws, and then remove the cover side sill - rear INN RH.

CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the cover side sill - rear INN.

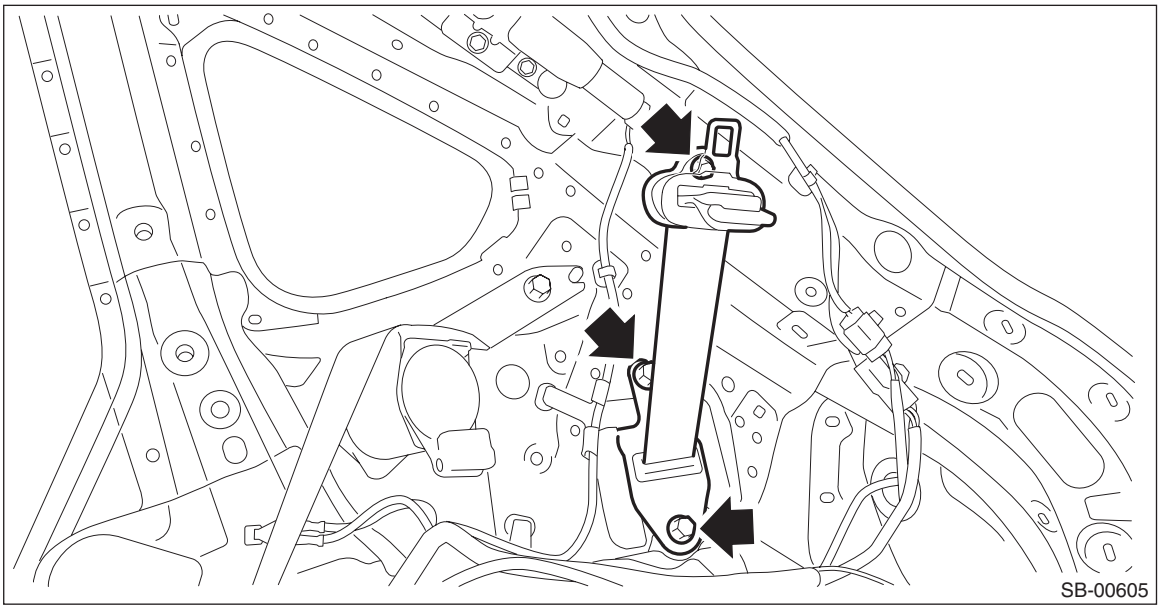


5) Remove the clips, and remove the trim panel - rear skirt.



6) Remove the trim panel - rear quarter pillar UPR RH and trim panel - rear apron RH. <Ref. to EI-99, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Rear Quarter Trim.>

7) Remove the bolts, and remove the seat belt - rear shoulder CTR.



5. SEAT BELT - CTR RH AND LH

CAUTION:

• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.

1) Turn the ignition switch to OFF.

2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

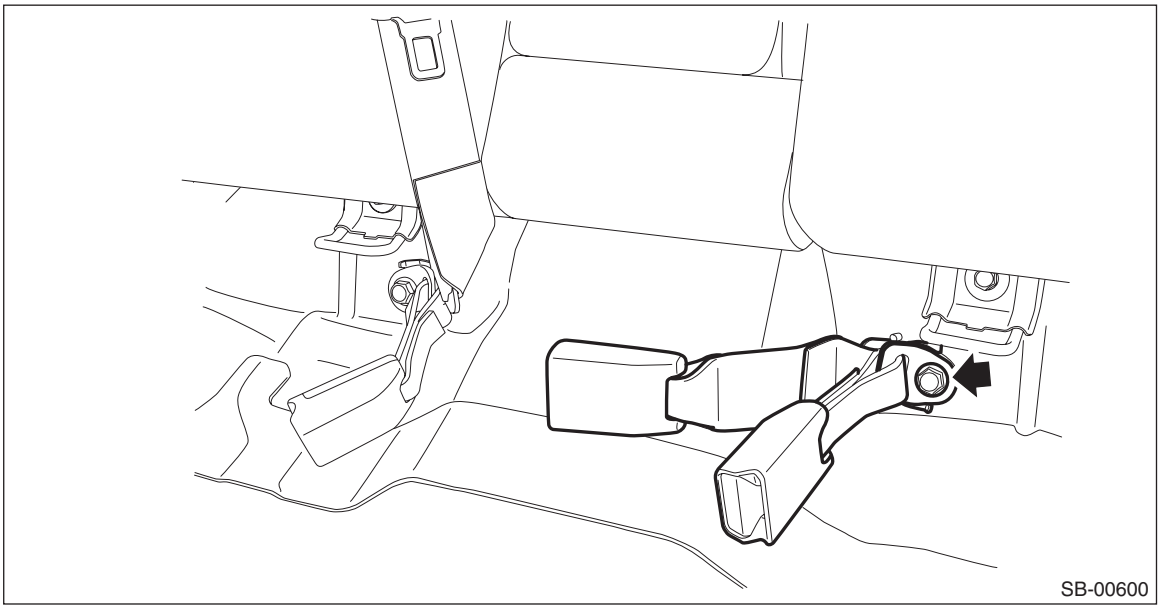
NOTE:

For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

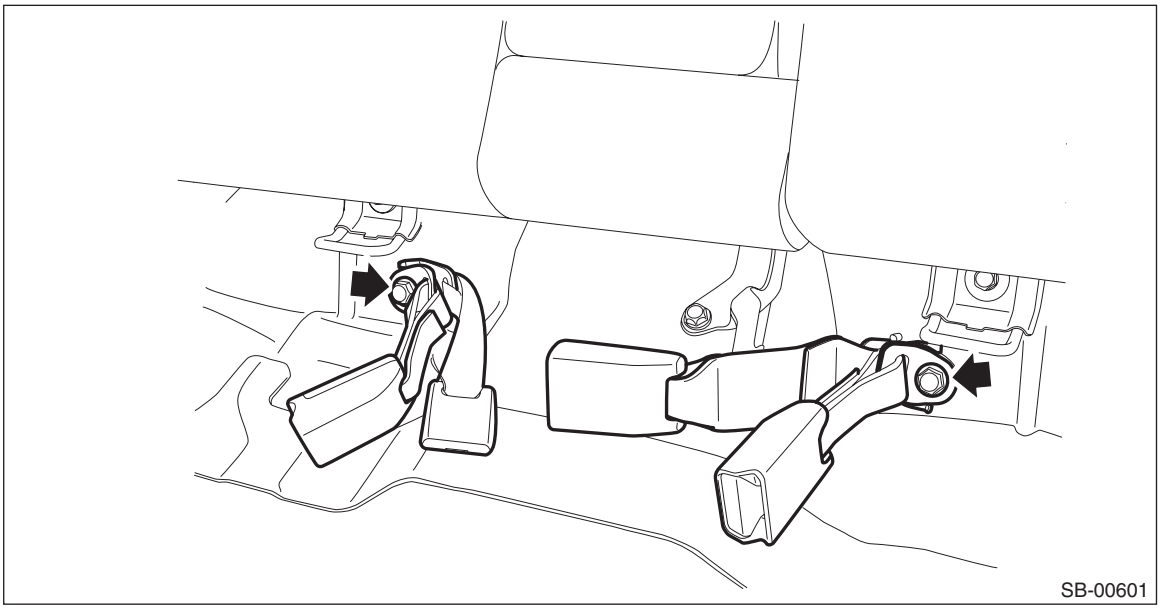
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>

4) Remove the bolts, and remove the seat belt - CTR RH and LH.

- 4 door model: Seat belt - CTR LH



- 5 door model/Crosstrek model: Seat belt - CTR RH and LH



B: INSTALLATION

1. SEAT BELT OUTER - REAR RH AND LH (4 DOOR MODEL)

1) Before installation, perform a unit inspection of retractor. <Ref. to SB-32, INSPECTION, Rear Seat Belt.>
2) Install the seat belt outer - rear.

CAUTION:
- **During installation, make sure that the seat belts are not twisted.**
- **After installation, make sure that the seat belts are smoothly extended and wound.**

Tightening torque:
Rear seat belt (4 door model): <Ref. to SB-3, REAR SEAT BELT (4 DOOR MODEL), COMPONENT, General Description.>

3) Install the remaining parts in the reverse order of removal.
4) After installation, check the following points.
- The seat belt is not twisted.
- The seat belt can be pulled out and retracted smoothly.

2. SEAT BELT OUTER - REAR RH AND LH (5 DOOR MODEL/CROSSTREK MODEL)

1) Before installation, perform a unit inspection of retractor. <Ref. to SB-32, INSPECTION, Rear Seat Belt.>
2) Install the seat belt outer - rear.

CAUTION:
- **During installation, make sure that the seat belts are not twisted.**
- **After installation, make sure that the seat belts are smoothly extended and wound.**

Tightening torque:
Rear seat belt (5 door model/Crosstrek model): <Ref. to SB-4, REAR SEAT BELT (5 DOOR MODEL/CROSSTREK MODEL), COMPONENT, General Description.>

3) Install the trim panel - rear quarter trim UPR.
4) Install the remaining parts in the reverse order of removal.
5) After installation, check the following points.
- The seat belt is not twisted.
- The seat belt can be pulled out and retracted smoothly.

3. SEAT BELT - REAR SHOULDER CTR (4 DOOR MODEL)

1) Install the retractor of seat belt - rear shoulder CTR.

Tightening torque:
Rear seat belt (4 door model): <Ref. to SB-3, REAR SEAT BELT (4 DOOR MODEL), COMPONENT, General Description.>

2) Install the trim panel assembly - rear shelf.
3) Install the lower anchor of seat belt - rear shoulder CTR.

CAUTION:
- **During installation, make sure that the seat belts are not twisted.**
- **After installation, make sure that the seat belts are smoothly extended and wound.**

Tightening torque:
Rear seat belt (4 door model): <Ref. to SB-3, REAR SEAT BELT (4 DOOR MODEL), COMPONENT, General Description.>

4) Install the remaining parts in the reverse order of removal.
5) After installation, check the following points.
- The seat belt is not twisted.
- The seat belt can be pulled out and retracted smoothly.

4. SEAT BELT - REAR SHOULDER CTR (5 DOOR MODEL/CROSSTREK MODEL)

1) Install the seat belt - rear shoulder CTR.

Tightening torque:
Rear seat belt (5 door model/Crosstrek model): <Ref. to SB-4, REAR SEAT BELT (5 DOOR MODEL/CROSSTREK MODEL), COMPONENT, General Description.>

2) Install the remaining parts in the reverse order of removal.
3) After installation, check the following points.
- The seat belt is not twisted.
- The seat belt can be pulled out and retracted smoothly.

5. SEAT BELT - CTR RH AND LH

1) Install the seat belt - CTR RH/LH.

Tightening torque:
Rear seat belt (4 door model): <Ref. to SB-3, REAR SEAT BELT (4 DOOR MODEL), COMPONENT, General Description.>
Rear seat belt (5 door model/Crosstrek model): <Ref. to SB-4, REAR SEAT BELT (5 DOOR MODEL/CROSSTREK MODEL), COMPONENT, General Description.>

2) Install the rear seat cushion.
3) Install the remaining parts in the reverse order of removal.
4) After installation, check the following points.
- The seat belt is not twisted.
- Check that the airbag warning light lights up for approximately 6 seconds and then turns off when connecting the battery ground cable and turning the ignition switch to ON.

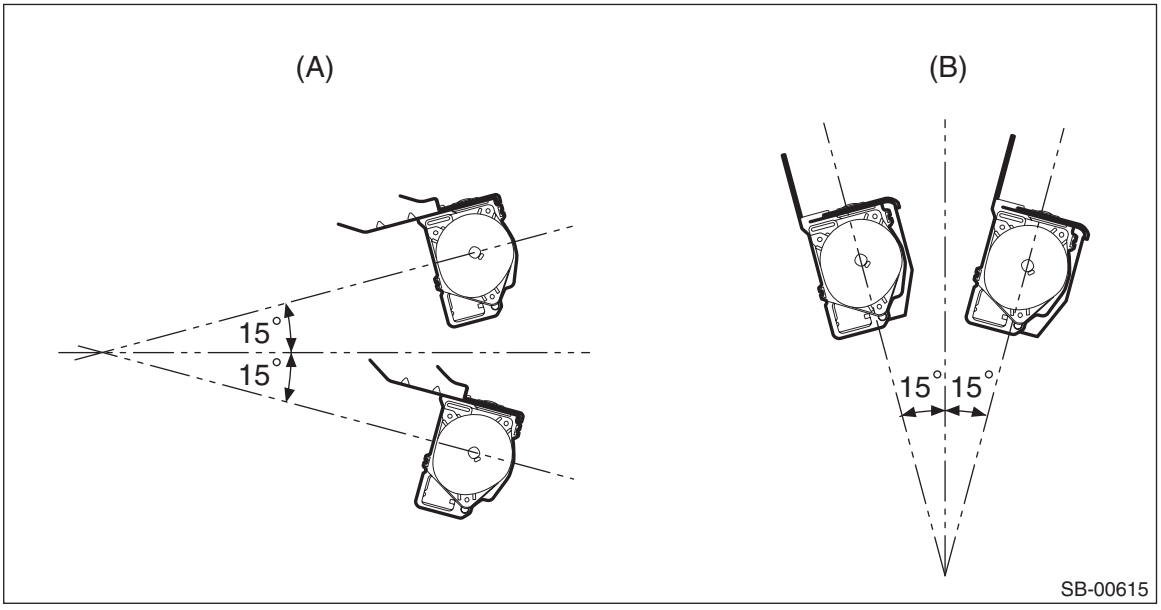
C: INSPECTION

1. VISUAL INSPECTION

Check for the following, and replace with new parts if necessary.
- Seat belt is slackened, bent or worn.
- Seat belt is abnormally wound or extended.
- Seat belt inner - rear is deformed or damaged.
- Seat belt buckle cannot be engaged properly.

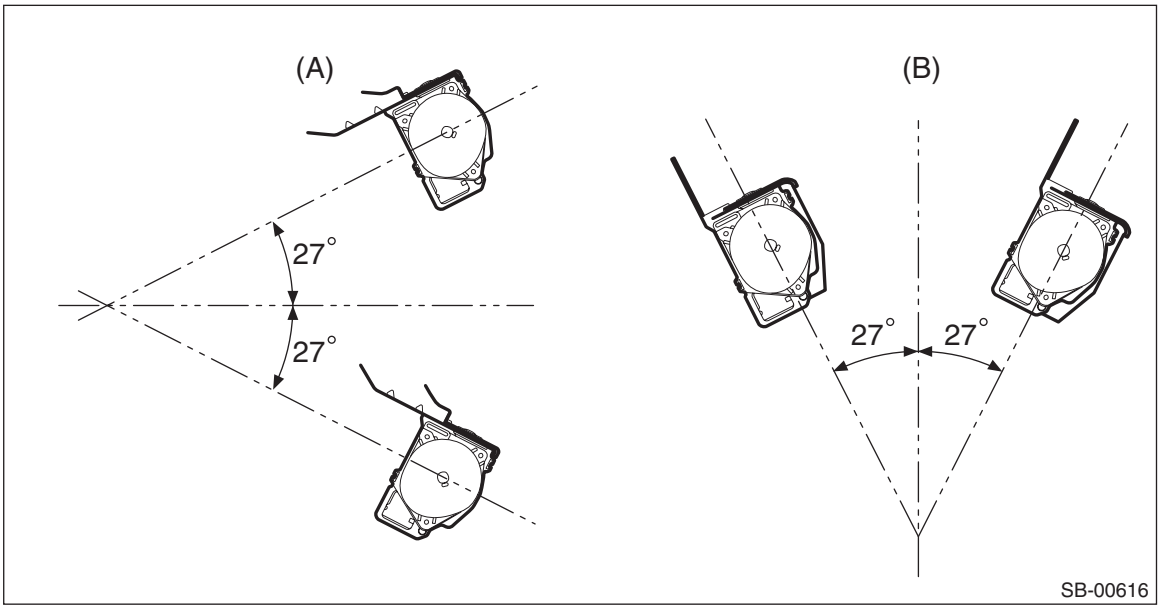
2. ELR LOCK MECHANISM INSPECTION

1) Hold the retractor upright (as installed in the vehicle) and check the ELR lock mechanism.
2) Tilt the retractor from the upright posture and check the following points.
- It does not lock if the inclination angle is 15° or less.



(A) Except for seat belt - rear shoulder CTR (5 door model/Crosstrek model)
(B) Seat belt - rear shoulder CTR (5 door model/Crosstrek model)

- It remains locked if the inclination angle is 27° or more.



(A) Except for seat belt - rear shoulder CTR (5 door model/Crosstrek model)
(B) Seat belt - rear shoulder CTR (5 door model/Crosstrek model)

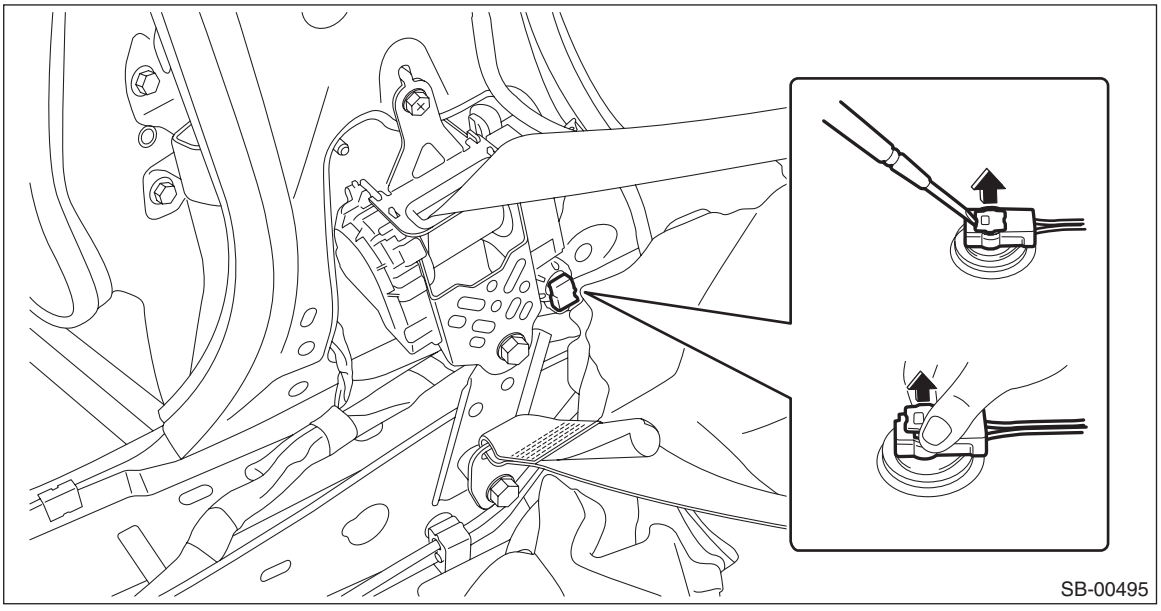
3) If the ELR lock mechanism does not operate properly, replace the seat belt outer - rear with a new part.

7. Disposal of Pretensioner

A: PROCEDURE

WARNING:
Make sure to follow the instructions below. Otherwise, personal injuries may occur.
• Before discarding a pretensioner, always perform an activation process to prevent any false activation.
• Wear protective gloves, safety goggles and earplugs during this operation. Wash your hands afterwards.
• Do not touch the pretensioner just after activation because it is very hot. Before handling it for disposal, wait for 40 minutes.

CAUTION:
• Perform a pretensioner operation process in a safe, level place. Do not perform the process outdoors when there is a strong rain or wind.
• Do not drop or damage the pretensioner.
• A large explosive noise will occur when the pretensioner is deployed. Warn persons in the area, and do not allow anyone to approach a radius of 5 m (16 ft) from the discard location.
• After activating the pretensioner, smoke may arise. Therefore, always perform an operation process in a well-ventilated place without any smoke sensor.
• Do not expose the activated pretensioner to water.
• Wrap the activated pretensioner in a sealed vinyl bag when discarding.
• If it is impossible to perform a pretensioner activation process due to some situational reasons, consult SUBARU dealership or one of the authorized workshops.
1) Fold the backrest all the way forward, and move the front seat all the way forward.
2) Turn the ignition switch to OFF.
3) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>
4) Disconnect connector of the pretensioner.



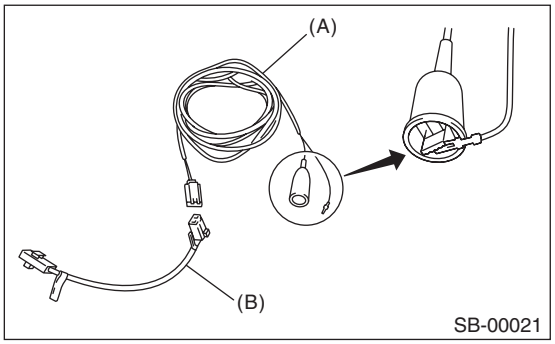
5) Short the alligator clip and terminal of the airbag deployment tool together.

CAUTION:
Short the airbag deployment tool terminals until just before the pretensioner operation process.

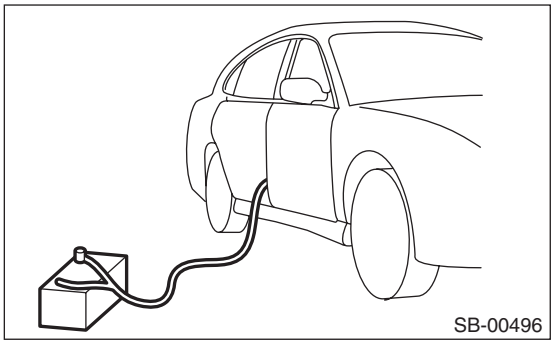
Preparation tool:
ST: AIRBAG DEPLOYMENT TOOL (98299PA030)

6) Connect the airbag deployment tool (A) and test harness adapter D (B).

Preparation tool:
ST: TEST HARNESS ADAPTER D (98299SA010)

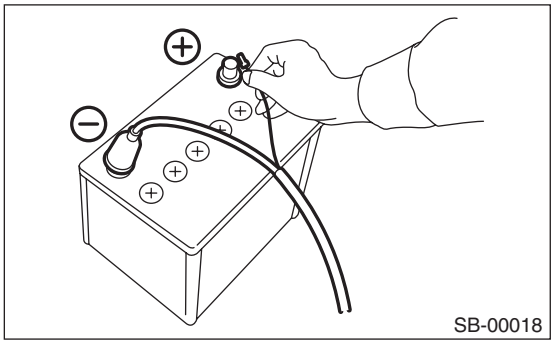


7) Connect the test harness adapter D connector to the pretensioner.
8) Make sure there is no one inside the vehicle.
9) Extend the wiring of the airbag deployment tool to its limit, and completely close all the windows and sunroof.



10) Move the battery 5 m (16 ft) or more from the vehicle, and affix nearby.
11) Connect the airbag deployment tool alligator clip to the battery negative (–) terminal.
12) Connect the other cable of airbag deployment tool to the battery positive (+) terminal, and activate the pretensioner.

CAUTION:
• After activation, the pretensioner will be extremely hot. Let it cool down for at least 40 minutes in an area with no one around.
• Do not expose the activated pretensioner to water.



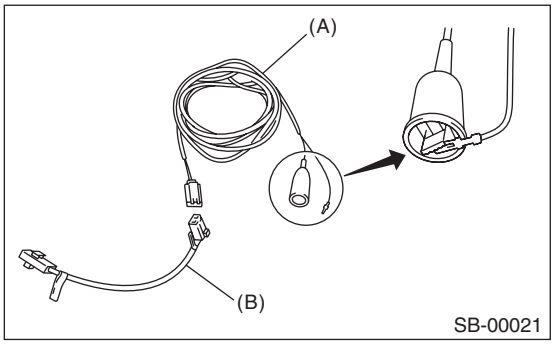
13) Perform operation process of lap seat belt pretensioner from steps 13) to 21) for the passenger's side.
14) Disconnect the connector from the lap seat belt pretensioner.
15) Short the alligator clip and terminal of the airbag deployment tool together.

CAUTION:
Short the airbag deployment tool terminals until just before the pretensioner operation process.

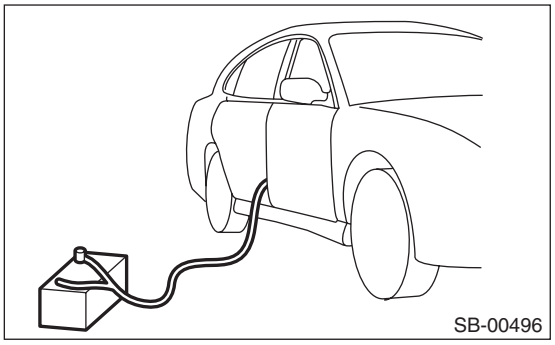
Preparation tool:
ST: AIRBAG DEPLOYMENT TOOL (98299PA030)

16) Connect the airbag deployment tool (A) and test harness adapter D (B).

Preparation tool:
ST: TEST HARNESS ADAPTER D (98299SA010)

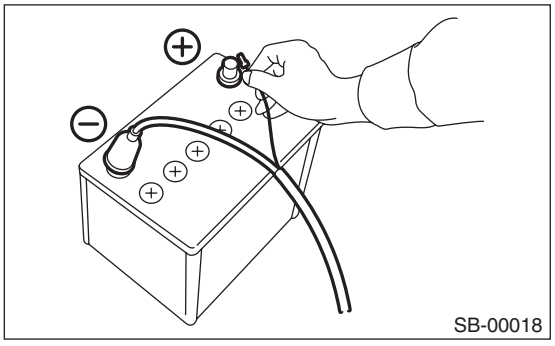


17) Connect the test harness adapter D connector to the lap seat belt pretensioner.
18) Make sure there is no one inside the vehicle.
19) Extend the wiring of airbag deployment tool to the limit, and close all the windows and sunroof completely.



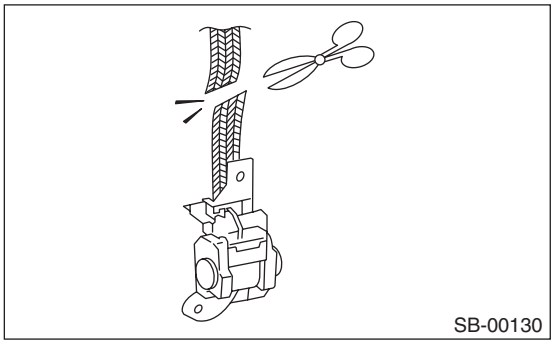
20) Move the battery 5 m (16 ft) or more from the vehicle, and affix nearby.
21) Connect the airbag deployment tool alligator clip to the battery negative (–) terminal.
22) Connect the other cable of airbag deployment tool to the battery positive (+) terminal, and activate the pretensioner.

CAUTION:
• After activation, the pretensioner will be extremely hot. Let it cool down for at least 40 minutes in an area with no one around.
• Do not expose the activated pretensioner to water.

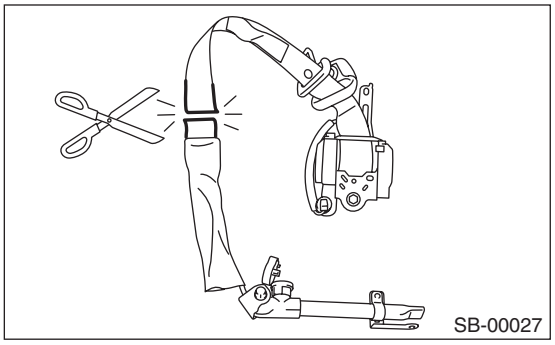


23) Remove the seat belt outer - front. <Ref. to SB-17, REMOVAL, Front Seat Belt.>

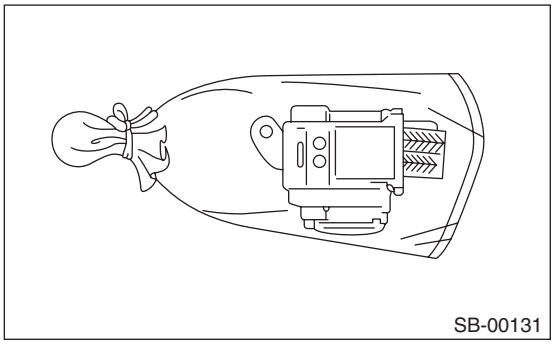
24) Cut the seat belt at a position as close as possible to the seat belt retractor.

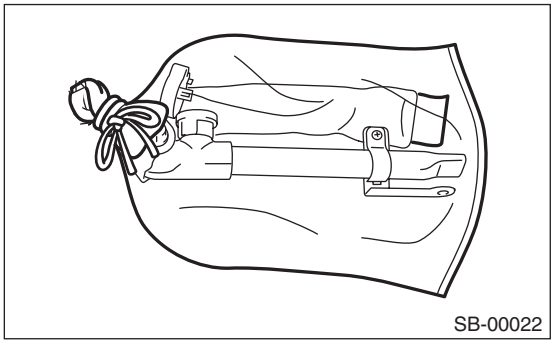


25) Cut the seat belt at a position as close as possible to the lap seat belt pretensioner.



26) Place the activated pretensioner in a sealed vinyl bag, then discard.





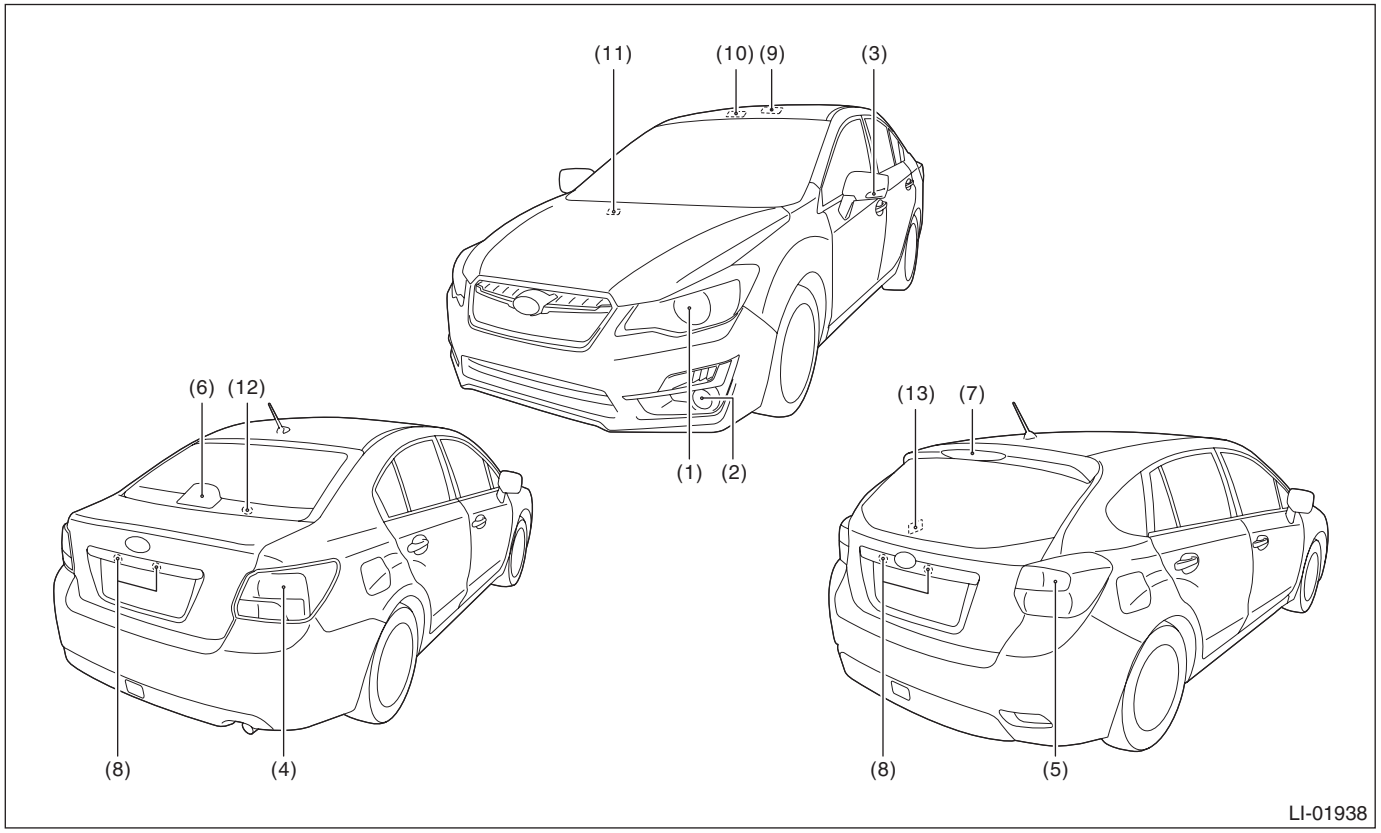
LIGHTING SYSTEM

LI

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1. General Description

A: SPECIFICATION



No.	Description		Capacity and wattage	Type
(1)	Headlight	Low beam (halogen type)	12 V — 55 W	H11
		Low beam (HID type)	12 V — 35 W	D2R
		High beam	12 V — 60 W	HB3
		Front turn signal light	12 V — 21 W	WY21W
		Parking light	12 V — 5 W	W5W
		Side marker light	12 V — 5 W	W5W
(2)	Front fog light	Model without SRF	12 V — 24 W	PSX24W
		Model with SRF	12 V — 55 W	H11
(3)	Side turn signal light		12 V — 1.1 W (LED)	*
(4)	Rear combination light (4 door model)	Tail & side marker/stop light	12 V — 5 / 21 W	W21/5W
		Turn signal light	12 V — 21 W	WY21W
		Back-up light	12 V — 16 W	W16W
(5)	Rear combination light (5 door/Crosstrek model)	Tail/stop light	12 V — 5 / 21 W	W21/5W
		Back-up light	12 V — 16 W	W16W
		Turn signal light	12 V — 21 W	WY21W
		Side marker light	12 V — 5 W	W5W
	Rear combination light (HEV model)	Tail light	12 V — 5 W	W5W
		Stop light	12 V — 2.0 W (LED)	*
		Back-up light	12 V — 16 W	W16W
		Turn signal light	12 V — 21 W	WY21W
		Side marker light	12 V — 5 W	W5W
(6)	High-mounted stop light (4 door model)		12 V — 0.7 W (LED)	*
(7)	High-mounted stop light	5 door/Crosstrek model	12 V — 2.1 W (LED)	*
		HEV model	12 V — 1.1 W (LED)	*
(8)	License plate light		12 V — 5 W	W5W
(9)	Room light		12 V — 8 W	—
(10)	Spot map light		12 V — 8 W	—
(11)	Glove box light		12 V — 1.4 W	*
(12)	Trunk room light (4 door model)		12 V — 5 W	W5W
(13)	Luggage room light (5 door/Crosstrek model)		12 V — 5 W	W5W

*: Non-disassembly type

B: CAUTION

• Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that the each component operates normally.
• Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Using a tester above such circuits may cause malfunction of airbag system. Follow the cautions of “AIRBAG SYSTEM” in this case. <Ref. to AB-11, CAUTION, General Description.>
• Be careful not to damage the airbag system wiring harness when servicing electrical parts and switches.
• When removing, installing or replacing the VDCCM&H/U, VDCCM&H/U bracket, steering wheel or steering angle sensor (steering roll connector), perform the VDC setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• When removing and installing the bulb, use a dry and clean cloth so that no grease or water adheres to the glass portion.
• Always replace with a bulb that is the same model and wattage as those of the old one.

C: PREPARATION TOOL

1. SPECIAL TOOL

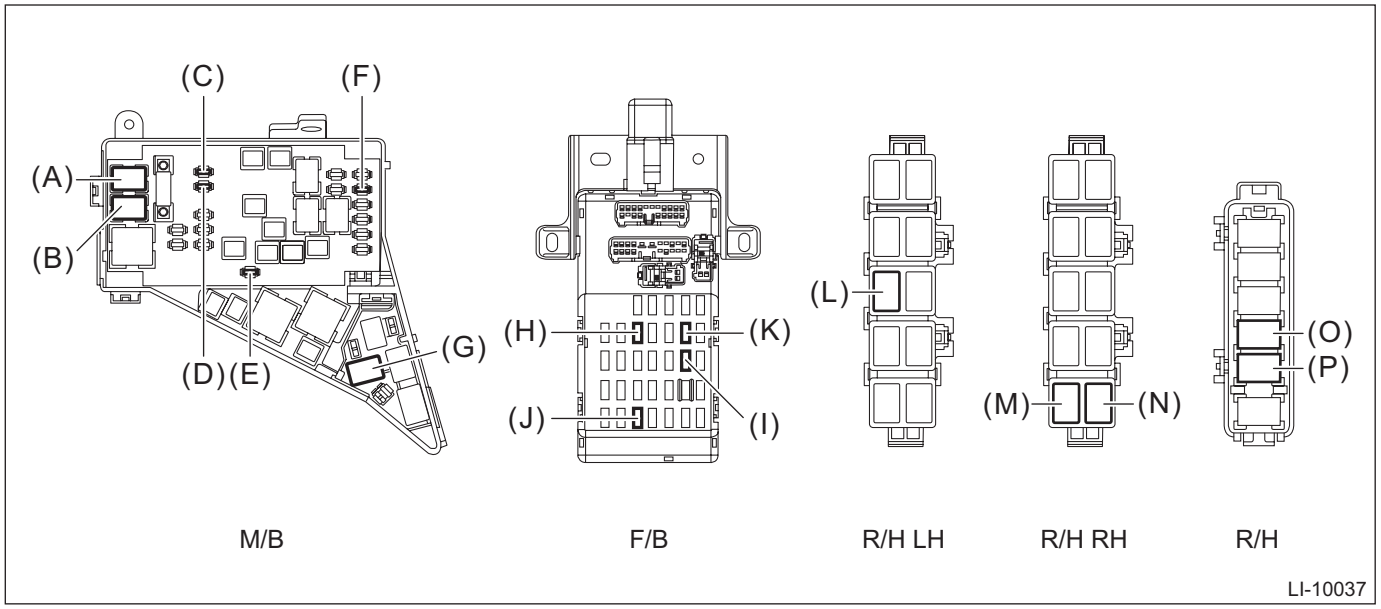
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

2. Relay and Fuse

A: LOCATION



Main fuse box	Headlight relay (HI)	(A)
	Headlight relay (LO)	(B)
	Fuse 5 A (daytime running light relay)	(C)
	Fuse 30 A (combination light LH/RH)	(D)
	Fuse 20 A (spot map light, room light, ignition switch illumination (immobilizer antenna))	(E)
	Fuse 15 A (tail and illumination relay, daytime running light relay) (gasoline engine model)	(F)
	Fuse 15 A (tail relay, daytime running light relay) (HEV model)	
	Daytime running light relay	(G)
Relay & fuse box	Fuse 10 A (stop light and brake switch, brake relay)	(H)
	Fuse 10 A (inhibitor switch, back-up light switch, auto headlight beam leveler CM) (gasoline engine model)	(I)
	Fuse 10 A (R range relay, auto headlight beam leveler CM) (HEV model)	
	Fuse 15 A (front fog light relay LH/RH)	(J)
	Fuse 7.5 A (turn signal & hazard unit)	(K)
Relay holder LH (passenger room)	Tail & illumination relay (gasoline engine model)	(L)
	Tail relay (HEV model)	
Relay holder RH (passenger room)	R range relay (HEV model)	(M)
	Front fog light relay (model without SRF)	(N)
Relay holder (engine compartment)	Front fog light relay RH (model with SRF)	(O)
	Front fog light relay LH (model with SRF)	(P)

NOTE:
For other related fuses, refer to the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model: <Ref. to WI(HEV)-21, Power Supply Circuit.>

B: INSPECTION

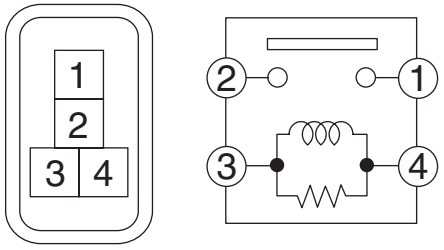
1. CHECK FUSE

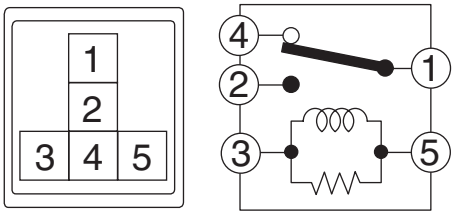
1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

2. CHECK RELAY

1) Check the resistance between relay terminals.

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01273
1 — 2	Apply battery voltage between terminals 4 and 3.	Less than 1 Ω	

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01274
1 — 4	Always	Less than 1 Ω	
1 — 2	Apply battery voltage between terminals 3 and 5.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard value.

3. Headlight System

A: WIRING DIAGRAM

Refer to “Headlight System” in the wiring diagram.

- Gasoline engine model: <Ref. to WI(w/o HEV)-142, WIRING DIAGRAM, Headlight System.>
- HEV model: <Ref. to WI(HEV)-118, WIRING DIAGRAM, Headlight System.>

B: INSPECTION

1. AUTO HEADLIGHT SYSTEM CHECK

	Step	Check	Yes	No
1	**CHECK HEADLIGHT ILLUMINATION.** Set the lighting switch to the switch 1 (TAIL) and switch 2 (HEAD).	Do the tail and headlight illuminate?	Go to step **2**.	Check the combination switch (light) and headlight bulb.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, display the data of «Lighting AUTO input». NOTE: For detailed operation procedures, refer to “Application help”.	Does the display switch between OFF ←→ ON when the lighting switch is moved to AUTO position?	Go to step **3**.	Go to step **8**.
3	**CHECK CURRENT DATA.** 1) Using the Subaru Select Monitor, display the data of «Illumination Sensor Output». 2) Measure the voltage when the area around the light control sensor, which was dark, becomes bright. ***Illumination sensor output*** ***Dark condition: Approx. 0.6 V or less*** ***Bright condition: Approx. 3.0 V or more***	Is the voltage output according to the brightness?	Check and replace the body integrated unit. • Inspection: <Ref. to BC(diag)-2, Basic Diagnostic Procedure.> • Replacement: <Ref. to SL-80, Body Integrated Unit.>	Go to step **4**.
4	**CHECK HARNESS.** 1) Disconnect the connectors from body integrated unit and light control sensor. 2) Check the harness between body integrated unit and light control sensor. ***Connector & terminal*** ***(B280) No. 19 — (i226) No. 2:*** ***(B280) No. 29 — (i226) No. 1:*** ***(B281) No. 1 — (i226) No. 3:***	Is harness normal?	Go to step **5**.	Repair or replace the harness.
5	**CHECK HARNESS.** 1) Connect the connector of body integrated unit. 2) Turn the ignition switch to ON. 3) Measure the voltage between light control sensor connector and chassis ground. ***Connector & terminal*** ***(i226) No. 3 (+) — Chassis ground (–):***	Is the voltage 4.5 — 5.5 V?	Go to step **6**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
6	**CHECK BODY INTEGRATED UNIT.** Measure the resistance between the body integrated unit and chassis ground. ***Connector & terminal*** ***(B280) No. 29 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **7**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
7	**CHECK LIGHT CONTROL SENSOR.** 1) Connect the light control sensor connector. 2) Check the light control sensor. <Ref. to LI-24, INSPECTION, Light Control Sensor.>	Is the light control sensor normal?	Go to step **8**.	Replace the light control sensor.

	Step	Check	Yes	No
8	**CHECK COMBINATION SWITCH (LIGHT).** Check the combination switch (light). <Ref. to LI-22, INSPECTION, Combination Switch (Light).>	Is the combination switch (light) normal?	Go to step **9**.	Replace the combination switch (light).
9	**CHECK HARNESS.** 1) Disconnect the connectors of body integrated unit and combination switch (light). 2) Check the harness between body integrated unit and combination switch (light). ***Connector & terminal*** ***(B71) No. 19 — (B281) No. 16:***	Is harness normal?	Check and replace the body integrated unit. • Inspection: <Ref. to BC(diag)-2, Basic Diagnostic Procedure.> • Replacement: <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the harness.

2. CHECK OF WELCOME LIGHTING SYSTEM

TROUBLE SYMPTOM:

Welcome lighting does not illuminate.

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED UNIT SETTING.** Display the data of «Welcome Light Off Delay Time(Approaching)» or «Welcome Light Off Delay Time(Exiting)» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Application help”.	Is the setting ON?	Go to step **2**.	Turn the setting to ON.
2	**CHECK BODY INTEGRATED UNIT SETTING.** Display the data of «Illumination Sensor Setting» using Subaru Select Monitor.	Is the setting “ON”?	Go to step **3**.	Turn the setting to “ON”.
3	**CHECK AUTO HEADLIGHT.** 1) Set the lighting switch to AUTO position. 2) Make the light control sensor vicinity dark. 3) Turn the ignition switch to ON.	Do the parking light, tail and headlight illuminate?	Go to step **4**.	Check the auto headlight system. <Ref. to LI-7, AUTO HEADLIGHT SYSTEM CHECK, INSPECTION, Headlight System.>
4	**CHECK DOOR LOCK.** Operate the door lock using the keyless transmitter or the access key.	Do the lock and unlock operate properly?	Go to step **5**.	• Check keyless entry system. <Ref. to SL-18, INSPECTION, Keyless Entry System.> • Check the keyless access with push button start system. <Ref. to KPS(diag)-2, Basic Diagnostic Procedure.>
5	**CHECK BODY INTEGRATED UNIT.** 1) Display the data of «IG power supply voltage» using Subaru Select Monitor. 2) Turn the ignition switch to ON.	Is the voltage 10 — 15 V?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the harness.

3. CHECK OF WELCOME LIGHTING SYSTEM

TROUBLE SYMPTOM:

Welcome lighting does not go off.

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED UNIT SETTING.** Display the data of «Welcome Light Off Delay Time(Approaching)» or «Welcome Light Off Delay Time(Exiting)» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Application help".	Is the illumination time setting correct?	Go to step **2**.	Set the illumination time.
2	**CHECK THE LIGHTS.** Set the lighting switch to the switch 1 (PARKING) and switch 2 (HEAD).	Do the parking light, tail light and headlight illuminate?	Go to step **3**.	Check the combination switch (light) and each light circuit.
3	**CHECK BODY INTEGRATED UNIT.** Using the Subaru Select Monitor, display the data of «Driver's door SW input».	Does the display switch between OFF ←→ ON when driver's door is opened/closed?	Go to step **4**.	Check the door switch. <Ref. to SL-22, CHECK DOOR SWITCH, INSPECTION, Keyless Entry System.>
4	**CHECK DOOR LOCK.** Operate the door lock using the keyless transmitter or the access key.	Do the lock and unlock operate properly?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	• Check keyless entry system. <Ref. to SL-18, INSPECTION, Keyless Entry System.> • Check the keyless access with push button start system. <Ref. to KPS(diag)-2, Basic Diagnostic Procedure.>

4. CHECK LIGHTING SWITCH

Refer to the "INSPECTION" of the "Combination Switch (Light)". <Ref. to LI-22, INSPECTION, Combination Switch (Light).>

5. CHECK DIMMER & PASSING SWITCH

Refer to the "INSPECTION" of the "Combination Switch (Light)". <Ref. to LI-22, INSPECTION, Combination Switch (Light).>

C: NOTE

For operation procedures of each component of the headlight system, refer to the respective section.

- Headlight Assembly: <Ref. to LI-25, Headlight Assembly.>
- Headlight bulb: <Ref. to LI-32, Headlight Bulb.>
- Combination switch (light): <Ref. to LI-20, Combination Switch (Light).>
- Light control sensor: <Ref. to LI-23, Light Control Sensor.>

4. Day Time Running Light System

A: WIRING DIAGRAM

Refer to “Headlight System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-142, WIRING DIAGRAM, Headlight System.>
- HEV model: <Ref. to WI(HEV)-118, WIRING DIAGRAM, Headlight System.>

B: INSPECTION

1. DAYTIME RUNNING LIGHT SYSTEM CHECK

	Step	Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the headlight HI fuse.	Is the fuse OK?	Go to step **2**.	Replace the fuse.
2	**CHECK RELAY.** Check the daytime running light relay and headlight HI relay.	Is the relay OK?	Go to step **3**.	Replace the relay.
3	**CHECK BODY INTEGRATED UNIT.** Read the DTC of body integrated unit using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Application help”.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK CURRENT DATA.** Display the following items using Subaru Select Monitor. • «Parking Brake Switch Input» • «Shift position» • «Lighting II Switch Input»	Is the input signal normal?	Go to step **5**.	Check the defective part.
5	**CHECK HEADLIGHT ILLUMINATION.** 1) Turn the ignition switch to ON. 2) Turn the lighting switch to the switch II (HEAD) position. 3) Turn the dimmer & passing switch to the switch UP position.	Does the headlight (high beam) illuminate?	Go to step **6**.	Check the combination switch (light) and headlight bulb.
6	**CHECK DAYTIME RUNNING LIGHT RESISTOR.** 1) Turn the ignition switch to OFF. 2) Check the daytime running light resistor. <Ref. to LI-94, INSPECTION, Day Time Running Resistor.>	Does the daytime running light resistor normal?	Go to step **7**.	Replace the daytime running light resistor.
7	**CHECK HARNESS.** 1) Disconnect the connectors of body integrated unit, daytime running light relay, daytime running light resistor, and headlight. 2) Check each harness.	Is harness normal?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the harness.

C: NOTE

For operation procedures of each component of the daytime running light system, refer to the respective section.
- Headlight Assembly: <Ref. to LI-25, Headlight Assembly.>
- Headlight bulb: <Ref. to LI-32, Headlight Bulb.>
- Combination switch (light): <Ref. to LI-20, Combination Switch (Light).>
- Daytime running resistor: <Ref. to LI-93, Day Time Running Resistor.>

5. Clearance Light and Illumination Light System

A: WIRING DIAGRAM

Refer to “Clearance Light and Illumination Light System” in the wiring diagram.

- Gasoline engine model: <Ref. to WI(w/o HEV)-72, WIRING DIAGRAM, Clearance Light and Illumination Light System.>
- HEV model: <Ref. to WI(HEV)-66, WIRING DIAGRAM, Clearance Light and Illumination Light System.>

B: INSPECTION

1. CHECK LIGHTING SWITCH

Refer to the “INSPECTION” of the “Combination Switch (Light)”. <Ref. to LI-22, INSPECTION, Combination Switch (Light).>

C: NOTE

For operation procedures of each component of the clearance light & illumination light system, refer to the respective sections.

- Combination switch (light): <Ref. to LI-20, Combination Switch (Light).>
- Parking light bulb: <Ref. to LI-46, Clearance/Parking Light Bulb.>
- Front side marker light bulb: <Ref. to LI-48, Front Side Marker Light Bulb.>
- Rear combination light assembly: <Ref. to LI-57, Rear Combination Light Assembly.>
- Tail light/stop light bulb: <Ref. to LI-60, Tail/Stop Light Bulb.>
- Rear side marker light bulb: <Ref. to LI-66, Rear Side Marker Light Bulb.>
- License plate light: <Ref. to LI-72, License Plate Light.>
- Ignition switch illumination: <Ref. to LI-87, Ignition Switch Illumination.>

6. Front Fog Light System

A: WIRING DIAGRAM

Refer to “Front Fog Light System” in the wiring diagram.

- Gasoline engine model
  - Model without SRF: <Ref. to WI(w/o HEV)-135, WITHOUT SRF, WIRING DIAGRAM, Front Fog Light System.>
  - Model with SRF: <Ref. to WI(w/o HEV)-136, WITH SRF, WIRING DIAGRAM, Front Fog Light System.>
- HEV model: <Ref. to WI(HEV)-111, WIRING DIAGRAM, Front Fog Light System.>

B: INSPECTION

1. CHECK FRONT FOG LIGHT SWITCH

Refer to the “INSPECTION” of the “Combination Switch (Light)”. <Ref. to LI-22, INSPECTION, Combination Switch (Light).>

C: NOTE

For operation procedures of each component of the front fog light system, refer to the respective section.

- Combination switch (light): <Ref. to LI-20, Combination Switch (Light).>
- Front fog light assembly: <Ref. to LI-50, Front Fog Light Assembly.>
- Front fog light bulb: <Ref. to LI-54, Front Fog Light Bulb.>

7. Turn Signal Light and Hazard Light System

A: WIRING DIAGRAM

Refer to “Turn Signal Light and Hazard Light System” in the wiring diagram.

- Gasoline engine model: <Ref. to WI(w/o HEV)-230, WIRING DIAGRAM, Turn Signal Light and Hazard Light System.>
- HEV model: <Ref. to WI(HEV)-198, WIRING DIAGRAM, Turn Signal Light and Hazard Light System.>

B: INSPECTION

1. CHECK TURN SIGNAL SWITCH

Refer to the “INSPECTION” of the “Combination Switch (Light)”. <Ref. to LI-22, INSPECTION, Combination Switch (Light).>

2. CHECK HAZARD SWITCH

Refer to the “INSPECTION” of the “Hazard Switch”. <Ref. to LI-41, INSPECTION, Hazard Switch.>

3. CHECK TURN SIGNAL & HAZARD UNIT

Refer to “INSPECTION” of the “Turn Signal Light & Hazard Light Unit”. <Ref. to LI-42, INSPECTION, Turn Signal Light & Hazard Light Unit.>

4. CHECK ONE-TOUCH TURN SIGNAL SYSTEM

TROUBLE SYMPTOM:

The lane change signal function of the turn signal indicator does not operate.

	Step	Check	Yes	No
1	**CHECK CUSTOMIZATION.** Display the data of «Lane change signal setting» and «One-touch Turn Signal System Setup» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Application help".	Is the setting «Support» and «ON»?	Go to step **2**.	Change the setting to «Support» and «ON».
2	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Display the data of «Left turn signal input» and «Right turn signal input» using Subaru Select Monitor.	Does the display change to OFF ←→ ON, when the combination switch is operated?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Go to step **3**.
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors of the body integrated unit and turn signal & hazard unit. 3) Check the harness between body integrated unit and turn signal & hazard unit. ***Connector & terminal*** ***(B281) No. 21 — (B32) No. 5:*** ***(B281) No. 9 — (B32) No. 6:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the harness.
4	**CHECK HARNESS.** Measure the resistance between the body integrated unit connector and chassis ground. ***Connector & terminal*** ***(B281) No. 21 — Chassis ground:*** ***(B281) No. 9 — Chassis ground:*** NOTE: Check with the combination switch in the OFF position.	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair or replace the harness.
5	**CHECK HARNESS.** 1) Disconnect the connector of the combination switch. 2) Measure the resistance between the combination switch connector and chassis ground. ***Connector & terminal*** ***(B71) No. 12 — Chassis ground:***	Is the resistance less than 1 Ω?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the harness.

C: NOTE

For operation procedures of each component of the turn signal and hazard light system, refer to the respective sections.

- Combination switch (light): <Ref. to LI-20, Combination Switch (Light).>
- Front turn signal light bulb: <Ref. to LI-44, Front Turn Signal Light Bulb.>
- Side turn signal light assembly: <Ref. to LI-56, Side Turn Signal Light Assembly.>
- Rear combination light assembly: <Ref. to LI-57, Rear Combination Light Assembly.>
- Rear turn signal light bulb: <Ref. to LI-63, Rear Turn Signal Light Bulb.>
- Hazard switch: <Ref. to LI-40, Hazard Switch.>
- Turn signal & hazard unit: <Ref. to LI-42, Turn Signal Light & Hazard Light Unit.>

8. Back-up Light System

A: WIRING DIAGRAM

Refer to “Back-up Light System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-65, WIRING DIAGRAM, Back-up Light System.>
- HEV model: <Ref. to WI(HEV)-56, WIRING DIAGRAM, Back-up Light System.>

B: INSPECTION

1. CHECK BACK-UP LIGHT SWITCH (MT MODEL)

Refer to “INSPECTION” of the “Switches and Harness” in “MANUAL TRANSMISSION AND DIFFERENTIAL” section. <Ref. to 5MT-37, BACK-UP LIGHT SWITCH, INSPECTION, Switches and Harness.>

2. CHECK INHIBITOR SWITCH (CVT MODEL)

Refer to “INSPECTION” of the “Inhibitor Switch” in “CONTINUOUSLY VARIABLE TRANSMISSION” section.
- Gasoline engine model: <Ref. to CVT(TR580)-100, INSPECTION, Inhibitor Switch.>
- HEV model: <Ref. to CVT(TH58A)-97, INSPECTION, Inhibitor Switch.>

C: NOTE

For operation procedures of each component of the back-up light system, refer to the respective section.
- Rear combination light assembly: <Ref. to LI-57, Rear Combination Light Assembly.>
- Back-up light bulb: <Ref. to LI-69, Back-up Light Bulb.>

9. Stop Light System

A: WIRING DIAGRAM

Refer to “Stop Light System” in the wiring diagram.

- Gasoline engine model
  – 4 door model (without EyeSight): <Ref. to WI(w/o HEV)-219, 4 DOOR MODEL (WITHOUT EyeSight), WIRING DIAGRAM, Stop Light System.>
  – 4 door model (with EyeSight): <Ref. to WI(w/o HEV)-220, 4 DOOR MODEL (WITH EyeSight), WIRING DIAGRAM, Stop Light System.>
  – 5 door model/Crosstrek model (without EyeSight): <Ref. to WI(w/o HEV)-222, 5 DOOR MODEL (WITHOUT EyeSight), WIRING DIAGRAM, Stop Light System.>
  – 5 door model/Crosstrek model (with EyeSight): <Ref. to WI(w/o HEV)-223, 5 DOOR MODEL (WITH EyeSight), WIRING DIAGRAM, Stop Light System.>
- HEV model: <Ref. to WI(HEV)-191, WIRING DIAGRAM, Stop Light System.>

B: INSPECTION

1. CHECK STOP LIGHT SWITCH

Refer to “INSPECTION” of the “Stop Light Switch” in “BRAKE” section. <Ref. to BR-77, INSPECTION, Stop Light Switch.>

C: NOTE

For operation procedures of each component of the stop light system, refer to the respective section.

- Rear combination light assembly: <Ref. to LI-57, Rear Combination Light Assembly.>
- Tail light/stop light bulb: <Ref. to LI-60, Tail/Stop Light Bulb.>
- High-mounted stop light: <Ref. to LI-74, High-mounted Stop Light.>

10.Interior Light System

A: WIRING DIAGRAM

Refer to “Interior Light System” in the wiring diagram.

- Gasoline engine model
  – Without EyeSight: <Ref. to WI(w/o HEV)-151, WITHOUT EyeSight, WIRING DIAGRAM, Interior Light System.>
  – With EyeSight: <Ref. to WI(w/o HEV)-154, WITH EyeSight, WIRING DIAGRAM, Interior Light System.>
- HEV model: <Ref. to WI(HEV)-136, WIRING DIAGRAM, Interior Light System.>

B: INSPECTION

1. CHECK DOOR SWITCH

Refer to the “INSPECTION” of the “Door Switch”. <Ref. to LI-96, INSPECTION, Door Switch.>

2. CHECK REAR GATE LATCH SWITCH

Refer to “INSPECTION” of the “Rear Gate Latch and Actuator Assembly” in “SECURITY AND LOCKS” section. <Ref. to SL-52, ACTUATOR, INSPECTION, Rear Gate Latch and Actuator Assembly.>

3. CHECK TRUNK LID LATCH SWITCH

Refer to “INSPECTION” of the “Trunk Lid Latch and Actuator Assembly” in “SECURITY AND LOCKS” section. <Ref. to SL-54, ACTUATOR, INSPECTION, Trunk Lid Latch and Actuator Assembly.>

C: NOTE

For operation procedures of each component of the interior light system, refer to the respective section.

- Spot map light: <Ref. to LI-77, Spot Map Light.>
- Room light: <Ref. to LI-80, Room Light.>
- Luggage room light: <Ref. to LI-82, Luggage Room Light.>
- Trunk room light: <Ref. to LI-84, Trunk Room Light.>
- Glove box light: <Ref. to LI-85, Glove Box Light.>
- Door switch: <Ref. to LI-96, Door Switch.>

11.Auto Headlight Beam Leveler System

A: WIRING DIAGRAM

Refer to “Headlight Beam Leveler System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-140, WIRING DIAGRAM, Headlight Beam Leveler System.>
- HEV model: <Ref. to WI(HEV)-116, WIRING DIAGRAM, Headlight Beam Leveler System.>

B: SPECIFICATION

1. AUTO HEADLIGHT BEAM LEVELER CM

Refer to “Control Module I/O Signal” of “AUTO HEADLIGHT BEAM LEVELER SYSTEM (DIAGNOSTICS)” section. <Ref. to AL(diag)-6, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

Refer to “Basic Diagnostic Procedure” of “AUTO HEADLIGHT BEAM LEVELER SYSTEM (DIAGNOSTICS)” section. <Ref. to AL(diag)-2, Basic Diagnostic Procedure.>

D: PROCEDURE

When parts related to the auto headlight beam leveler system are removed or replaced, perform the following procedures to initialize or reinitialize.

NOTE:
Before performing initialization or reinitialization, check the following:
- The vehicle is parked on a level surface.
- The inflation pressure of tires is correct.
- The vehicle does not have load.
- Vehicle’s fuel tank is fully filled.
- Refer to the following chart to determine whether to initialize or reinitialize.

Initialization	When the auto headlight beam leveler CM was replaced with a new module.
Reinitialization	• When the auto headlight beam leveler CM was replaced with a part from another vehicle. • When suspension parts have been removed or replaced. (Crossmember, front arm, sub frame, lateral link, housing, strut etc.) • When the vehicle height sensor has been replaced or removed.

CAUTION:
If the indicator does not flash three times or the headlight beam does not operate, it can be assumed that there is an open circuit or faulty wiring in the harness of the auto headlight beam leveler CM, vehicle height sensors or headlight assembly. Perform inspection and repair according to the inspection results, then perform initialization/reinitialization again.
- **Initialization: <Ref. to LI-18, INITIALIZATION, PROCEDURE, Auto Headlight Beam Leveler System.>**
- **Reinitialization: <Ref. to LI-19, REINITIALIZATION, PROCEDURE, Auto Headlight Beam Leveler System.>**

1. INITIALIZATION

1) Check that the indicator in the meter is flashing twice repeatedly.
2) Bounce the vehicle several times to normalize the suspension.
3) Make certain that someone is seated in the driver’s seat.
4) Turn the ignition switch to ON, and within 1.5 — 20 seconds, turn the headlight switch OFF → ON for three successive times.
5) Make sure that the indicator in the meter flashes three times and then turns OFF, indicating that initialization has been successfully completed. (At this time, the headlight beam drops once, and then returns to the original position.)
6) Perform beam adjustment for the headlight. <Ref. to LI-30, ADJUSTMENT, Headlight Assembly.>

2. REINITIALIZATION

1) Bounce the vehicle several times to normalize the suspension.
2) Make certain that someone is seated in the driver's seat.
3) Turn the ignition switch to ON, and, within 1.5 — 10 seconds, turn the headlight switch OFF → ON five or more successive times.
4) Check that the headlight beam drops once, then returns to normal.
5) After confirming 4), turn the ignition switch to OFF within 30 seconds.
6) Turn the ignition switch to ON again, and, within 1.5 — 10 seconds, turn the headlight switch OFF → ON five or more successive times.
7) Make sure that the indicator in the meter flashes three times and then turns OFF, indicating that reinitialization has been successfully completed. (At this time, the headlight beam drops once, and then returns to the original position.)
8) Perform beam adjustment for the headlight. <Ref. to LI-30, ADJUSTMENT, Headlight Assembly.>

E: NOTE

For operation procedures of each component of the auto headlight beam leveler system, refer to the respective section.

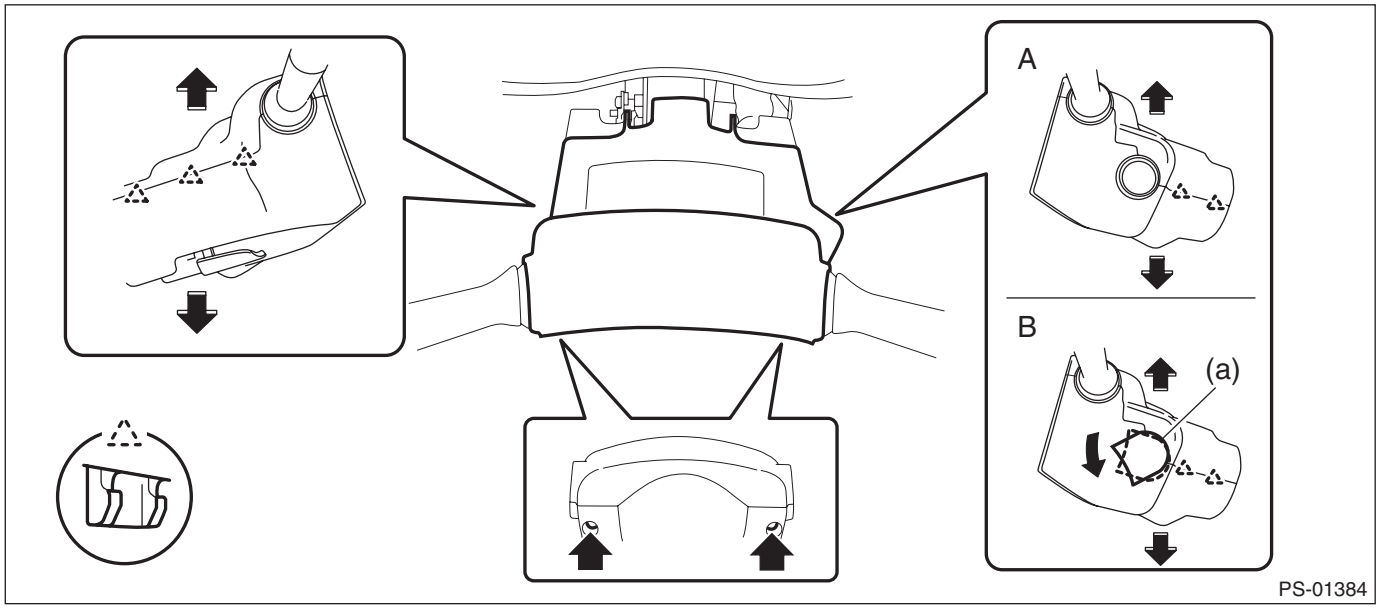
- Auto headlight beam leveler CM: <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>
- Vehicle height sensor: <Ref. to LI-91, Rear Height Sensor.>

12.Combination Switch (Light)

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Set the tire to the straight-ahead position.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

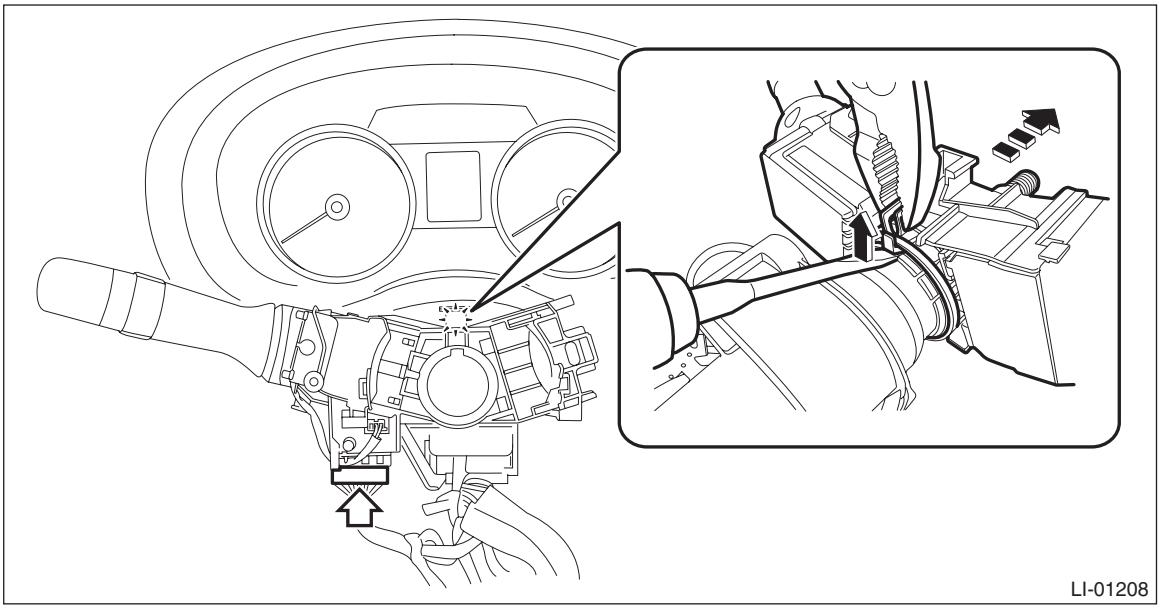
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
4) Remove the steering wheel. <Ref. to PS-9, REMOVAL, Steering Wheel.>
5) Remove the cover assembly - column.
   (1) Release the screws and claws.
   (2) Remove the cap - key cylinder (a).
   (3) Release the claw, and remove the cover assembly - column UPR and the cover assembly - column LWR.



A Model without keyless access with push button start
B Model with keyless access with push button start

6) Remove the steering roll connector. <Ref. to AB-69, REMOVAL, Roll Connector.>
7) Remove the switch assembly - combination wiper select. <Ref. to WW-11, REMOVAL, Combination Switch (Wiper).>

8) Remove the switch assembly - combination turn dimmer.
(1) Disconnect the connector, and loosen the clamp to release the claws.
(2) Pull out the switch assembly - combination turn dimmer from the column assembly - steering.



B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.
• If the steering wheel has been removed, make sure that the steering roll connector is not turned from the original position.
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform the VDC setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
1) Align the center position of the steering roll connector. <Ref. to AB-72, ADJUSTMENT, Roll Connector.>
2) Install each part in the reverse order of removal.

NOTE:
Align the alignment marks on the steering wheel and the column assembly - steering.

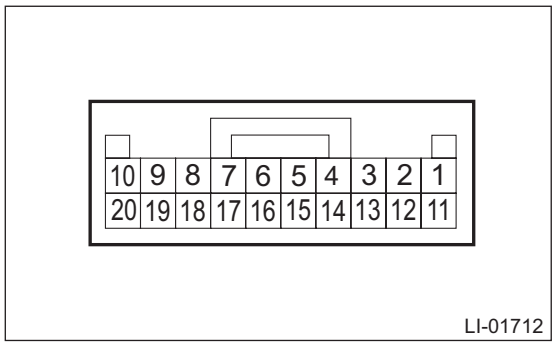
Tightening torque:
Steering wheel: 39 N·m (3.98 kgf-m, 28.8 ft-lb)

Clearance:
Between cover assembly - column and steering wheel: 4 — 6 mm (0.16 — 0.24 in)

C: INSPECTION

Measure the resistance between connector terminals. If it is not within the standard value, replace the switch assembly - combination turn dimmer.

Preparation tool:
Circuit tester



1. LIGHTING SWITCH

Terminal No.	Inspection conditions	Standard
18 — 12 19 — 12 20 — 12	Switch OFF	1 MΩ or more
19 — 12	Switch AUTO	Less than 1 Ω
18 — 12	Switch 1 (TAIL)	Less than 1 Ω
18 — 12 20 — 12	Switch 2 (HEAD)	Less than 1 Ω

2. DIMMER & PASSING SWITCH

Terminal No.	Inspection conditions	Standard
11 — 12 17 — 12	Switch PASS	Less than 1 Ω
11 — 12	Switch UP	Less than 1 Ω

3. TURN SIGNAL SWITCH

Terminal No.	Inspection conditions	Standard
13 — 12	Switch TURN (RH)	Less than 1 Ω
15 — 12	Switch TURN (LH)	Less than 1 Ω

4. FRONT FOG LIGHT SWITCH

Terminal No.	Inspection conditions	Standard
4 — 3	Switch OFF	1 MΩ or more
	Switch ON	Less than 1 Ω

13.Light Control Sensor

A: REMOVAL

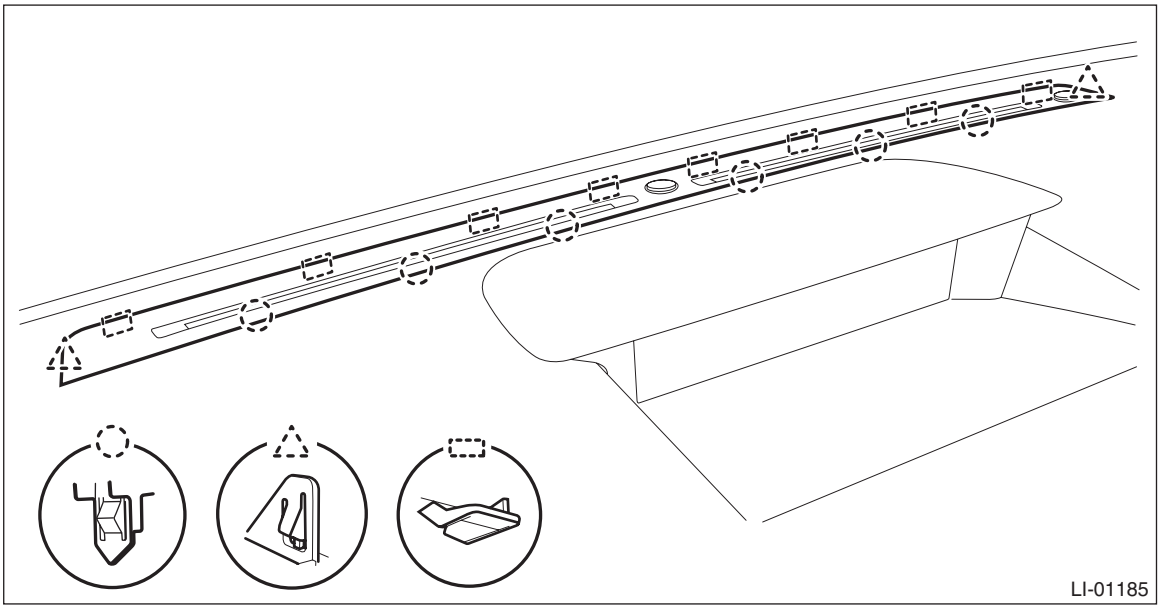
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

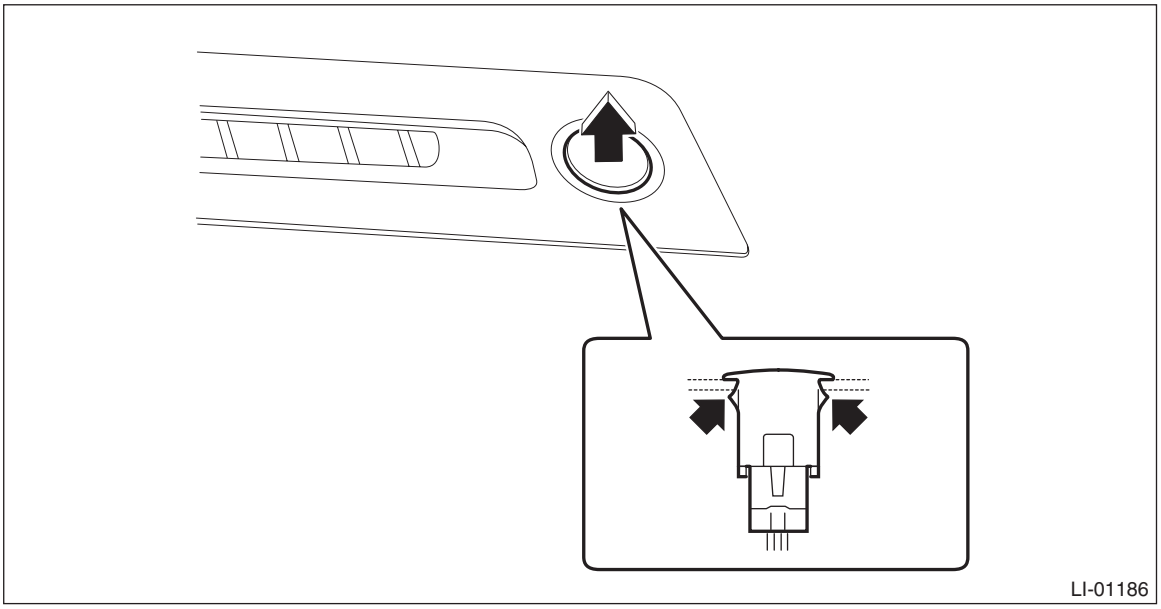
2) Remove the sensor - automatic light.

CAUTION:
Be careful not to damage the sensors and interior trims when removing.

(1) Release the connector and claws, and remove the grille front defroster.



(2) Release the claws, and then remove the sensor - automatic light from the grille front defroster.



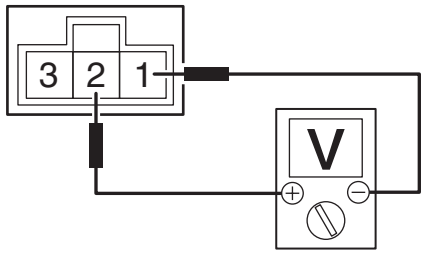
B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

Preparation tool:
Circuit tester

1) Turn the ignition switch to ON.
2) Set the lighting switch to AUTO position.
3) Check the voltage between the sensor terminals.

Terminal No.	Inspection conditions	Standard	Connection diagram
2 (+) — 1 (–)	Measure the voltage when the area around the sensor - automatic light, which was dark, becomes bright.	Dark condition: Approx. 0.6 V or less Bright condition: Approx. 3.0 V or more	 LI-01280

4) Replace the sensor - automatic light if the inspection result is not within the standard value.

14.Headlight Assembly

A: REMOVAL

CAUTION:
- **Do not perform work with wet hands, because there is a possibility of electrical shock.**
- **The HID type uses very high voltages for the lighting circuit. Make sure that the power supply is turned OFF before working.**

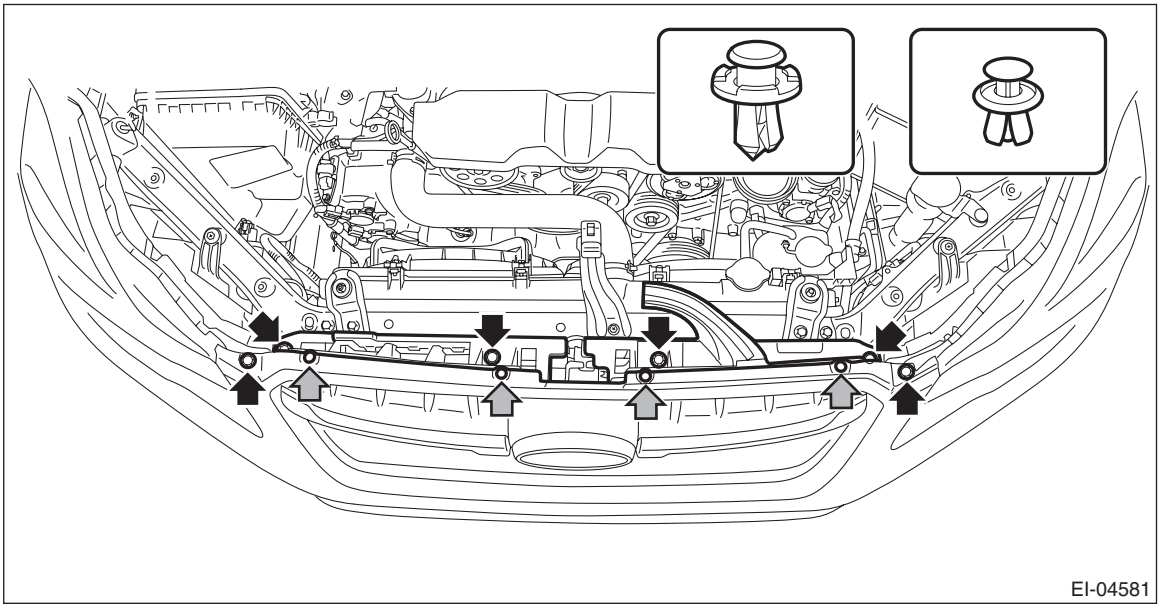
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the air intake duct. (When removing the right side of gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>

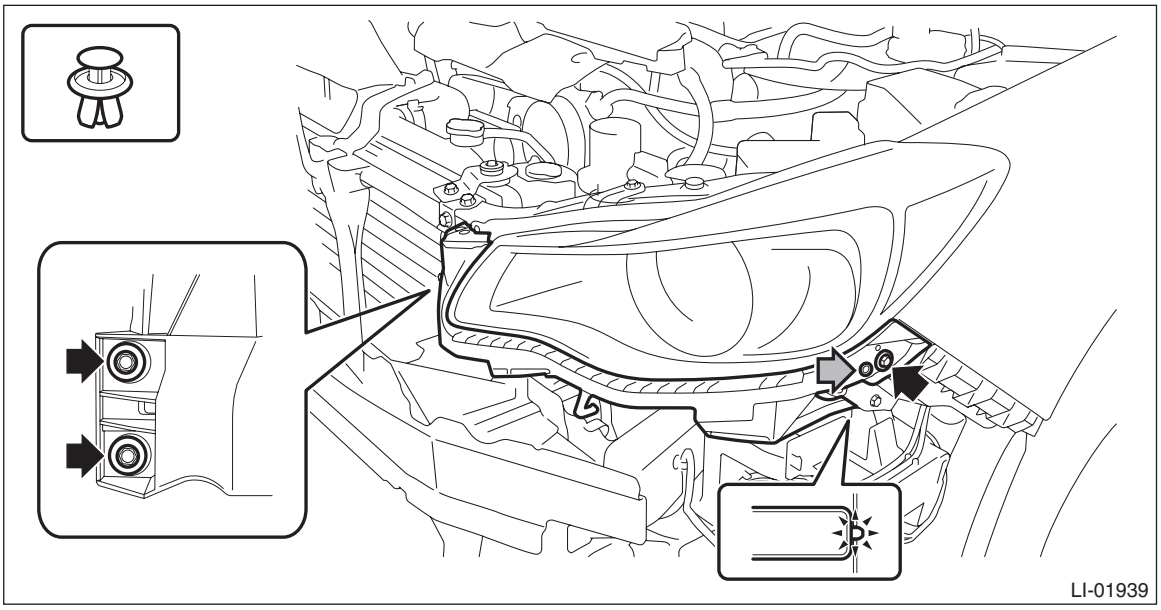
3) Remove the clip, and remove the bracket - grille.

CAUTION:
To prevent damage to the bracket - grille, make sure to remove all clips.

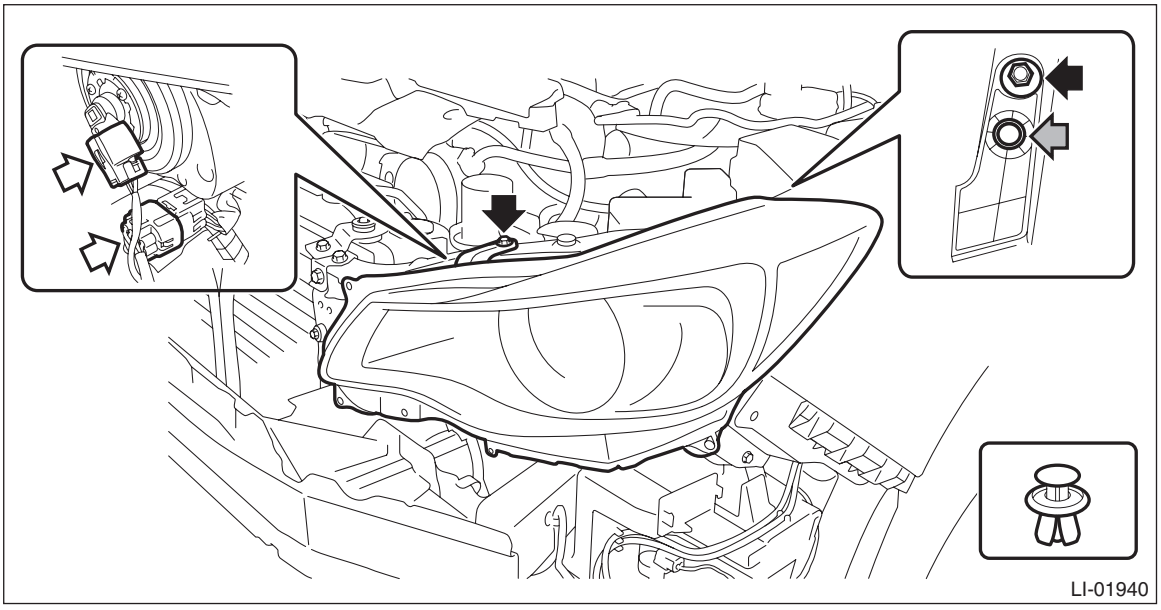


4) Remove the bumper face - front. <Ref. to EI-37, REMOVAL, Front Bumper.>

5) Remove the bolts and clips, and remove the bracket - front bumper corner.



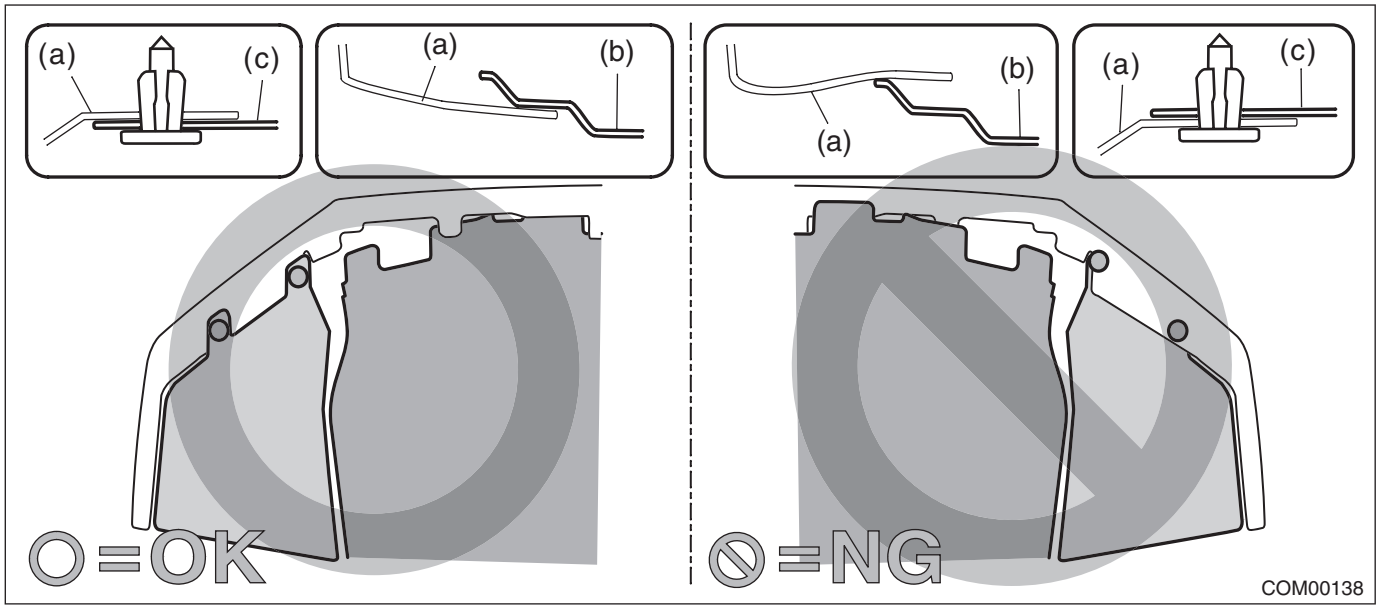
6) Remove the light assembly - head.
   (1) Disconnect the connector.
   (2) Remove the bolts and clips, and remove the light assembly - head.



B: INSTALLATION

1) Install each part in the reverse order of removal.
2) Secure the flange section of the bumper face - front to the bracket - front bumper side.

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



Tightening torque:
Light assembly - head: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

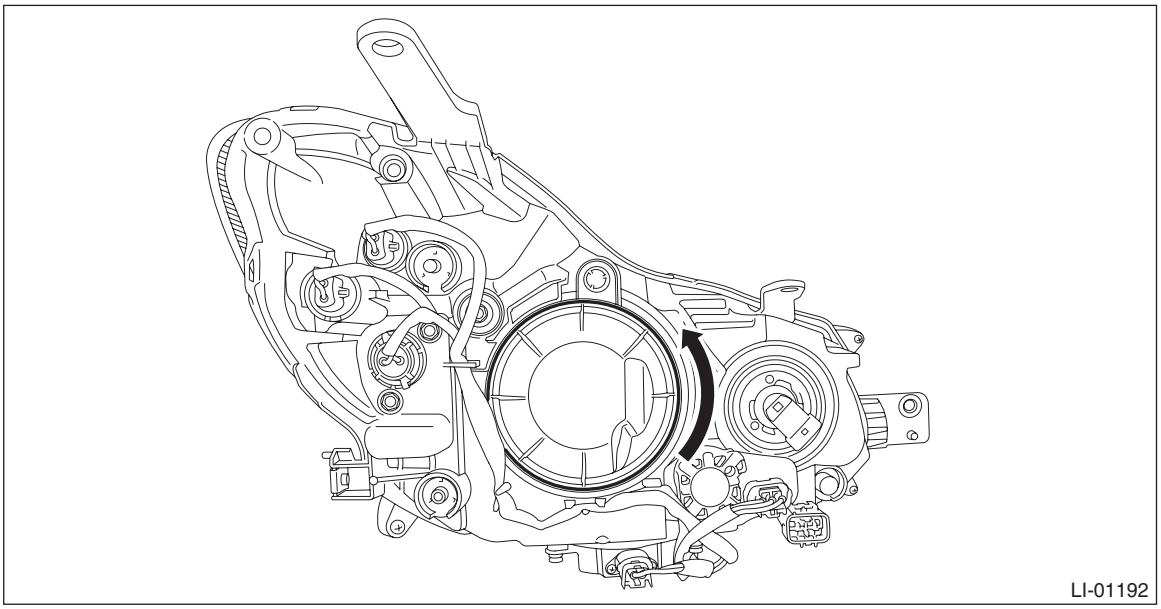
3) Adjust the headlight beam and fog light beam.
- Adjust the headlight beam. <Ref. to LI-30, HEADLIGHT BEAM ADJUSTMENT, ADJUSTMENT, Headlight Assembly.>
- Adjust the fog light beam. (Model with fog light) <Ref. to LI-52, FOG LIGHT AIMING, ADJUSTMENT, Front Fog Light Assembly.>

C: DISASSEMBLY

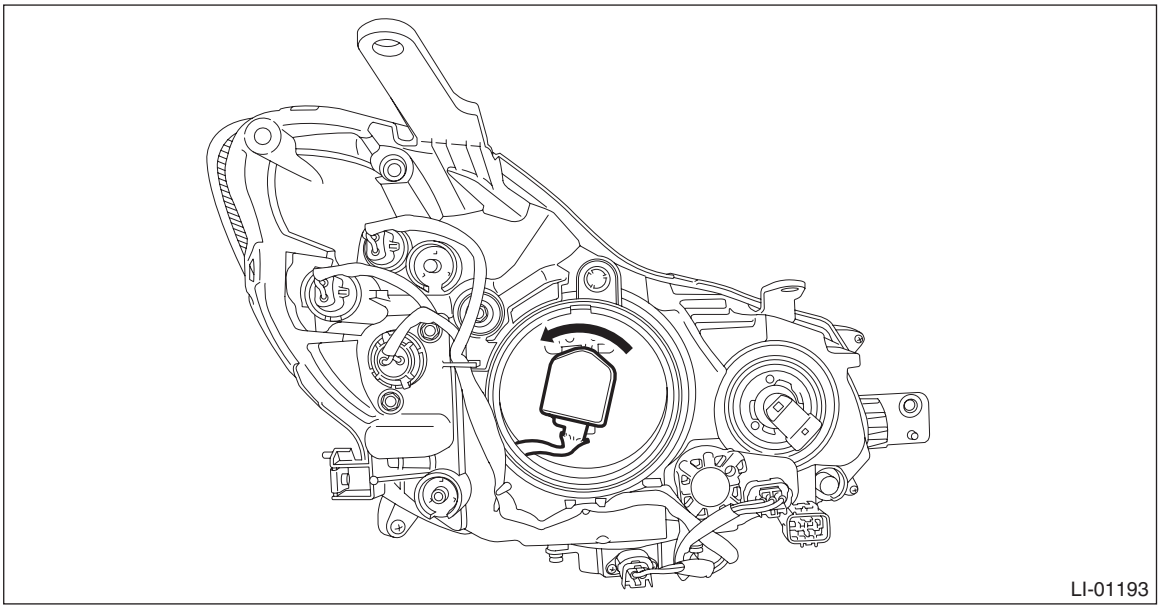
1. HID HEADLIGHT BALLAST

CAUTION:
Do not leave the light assembly - head without the ballast - headlight for a long time. Dust, moisture, etc. entering the light assembly - head may affect its performance.

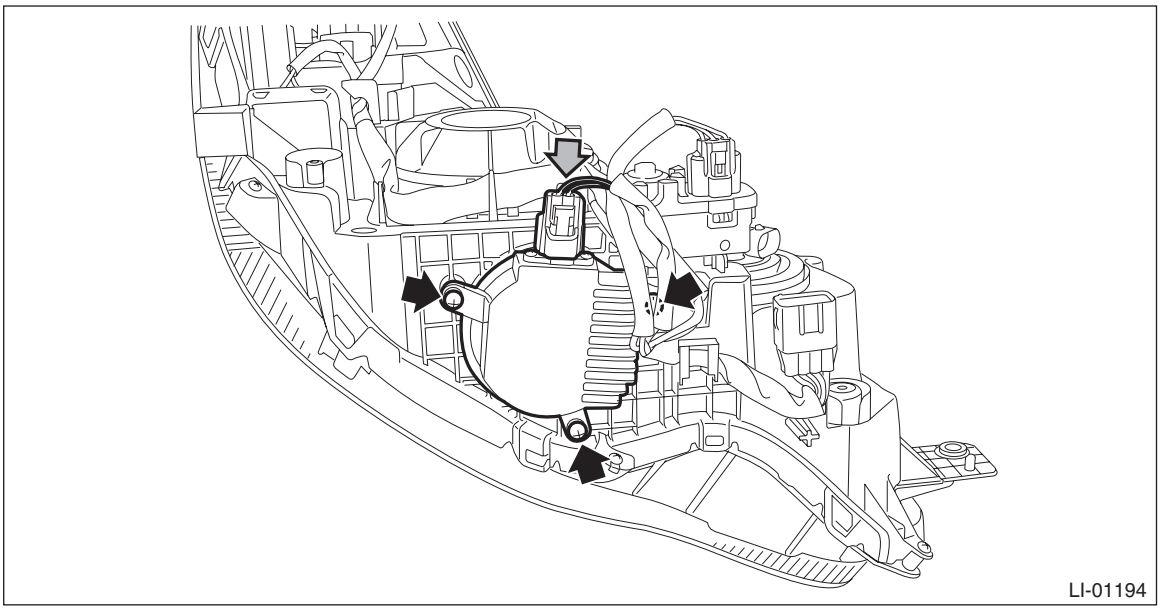
1) Remove the cover - headlight.



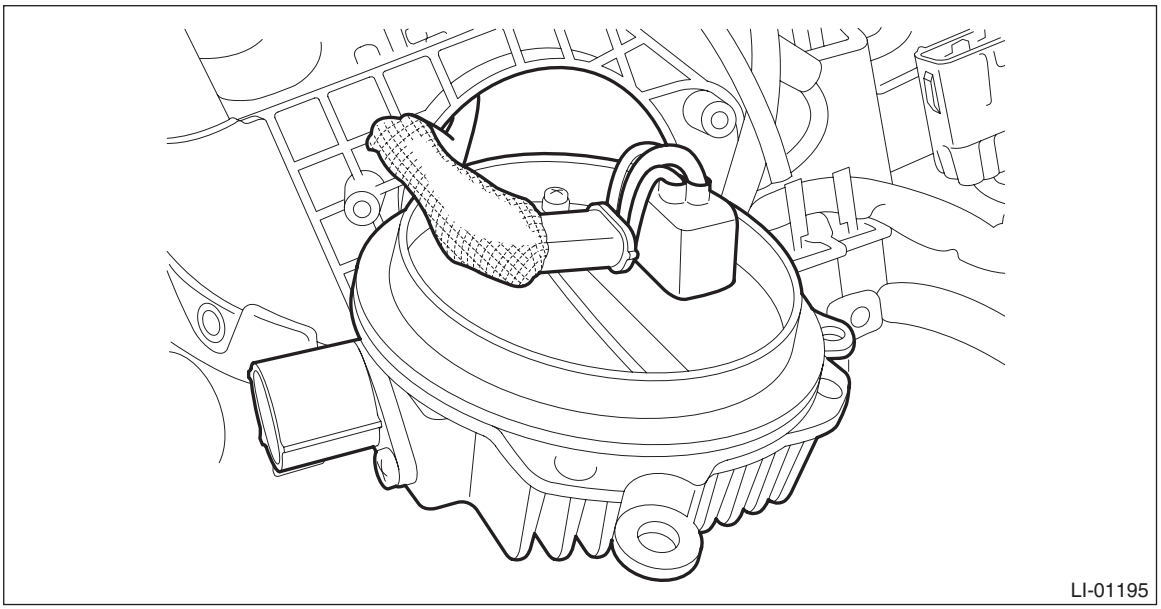
2) Disconnect the bulb socket.



3) Remove the ballast - headlight.
(1) Disconnect the connector.
(2) Remove the screws and remove the ballast - headlight.


LI-01194

(3) Guiding the bulb socket through the gap between housing and reflector, pull out the ballast - headlight.


LI-01195

D: ASSEMBLY

1. HID HEADLIGHT BALLAST

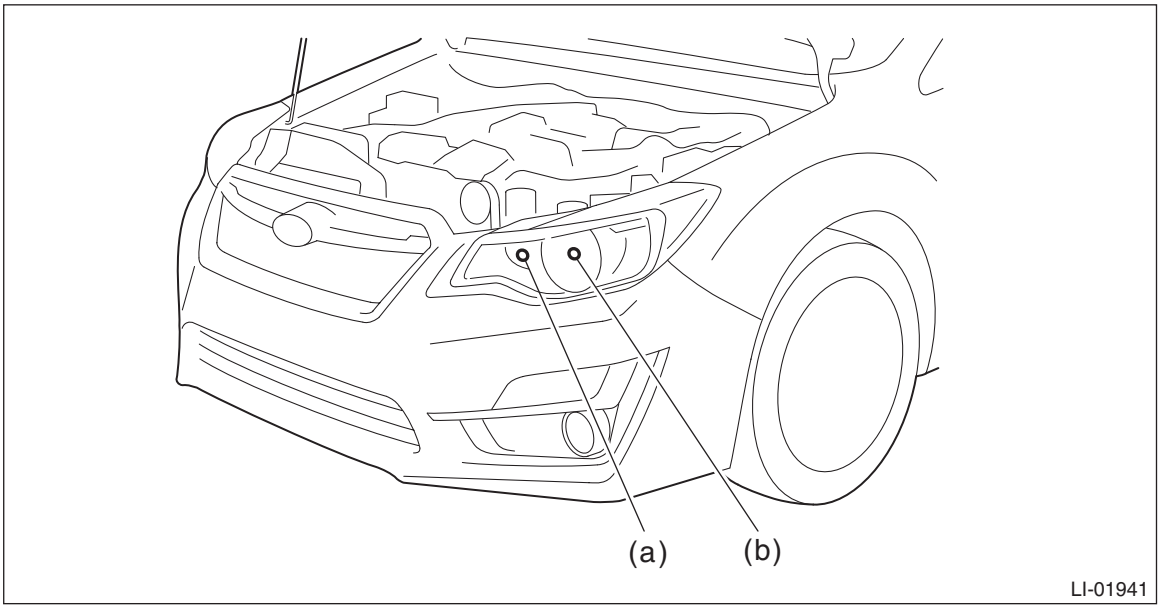
CAUTION:
- **When installing the ballast - headlight, be sure to install the gasket.**
- **After installing the ballast to the vehicle, be sure to perform beam adjustment.**

Assemble each part in the reverse order of disassembly.

E: ADJUSTMENT

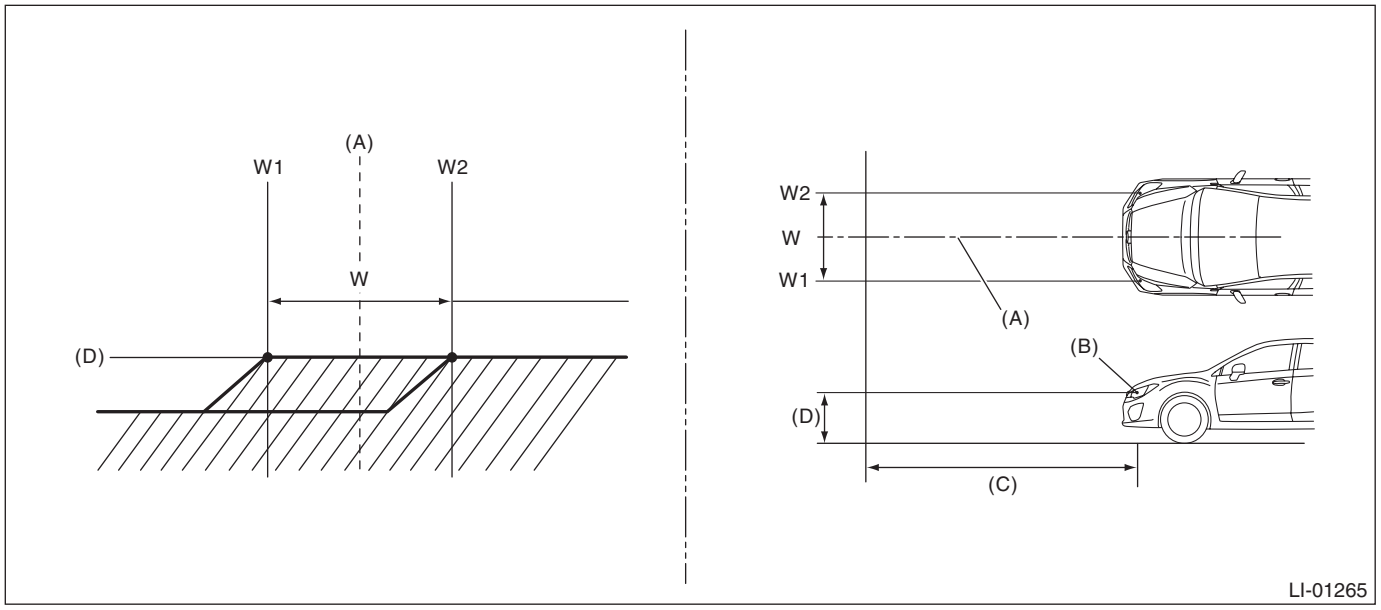
1. HEADLIGHT BEAM ADJUSTMENT

CAUTION:
• Turn off the light before adjusting the beam level of the light assembly - head. If it is necessary to inspect the beam level, do not keep the light on for two minutes or more.
• When blocking the light emitted from the headlight, use a light shield or equivalent.
Do not apply the tape on the lens or place the cloth over it. It may raise the temperature in the light and cause deformation/bubble formations of the plastic lens.
1) Before checking the beam level of the light assembly - head, be sure of the following:
• The area around the light assembly - head has not sustained any scratches, damage or other type of deformation.
• The vehicle is parked on a level surface.
• The inflation pressure of tires is correct.
• The vehicle does not have load.
• Vehicle's fuel tank is fully filled.
2) Bounce the vehicle several times to normalize the suspension.
3) Make certain that someone is seated in the driver's seat.
4) Measure the distance between the low beam bulb centers and the height of the bulb center.



(a) High beam (b) Low beam

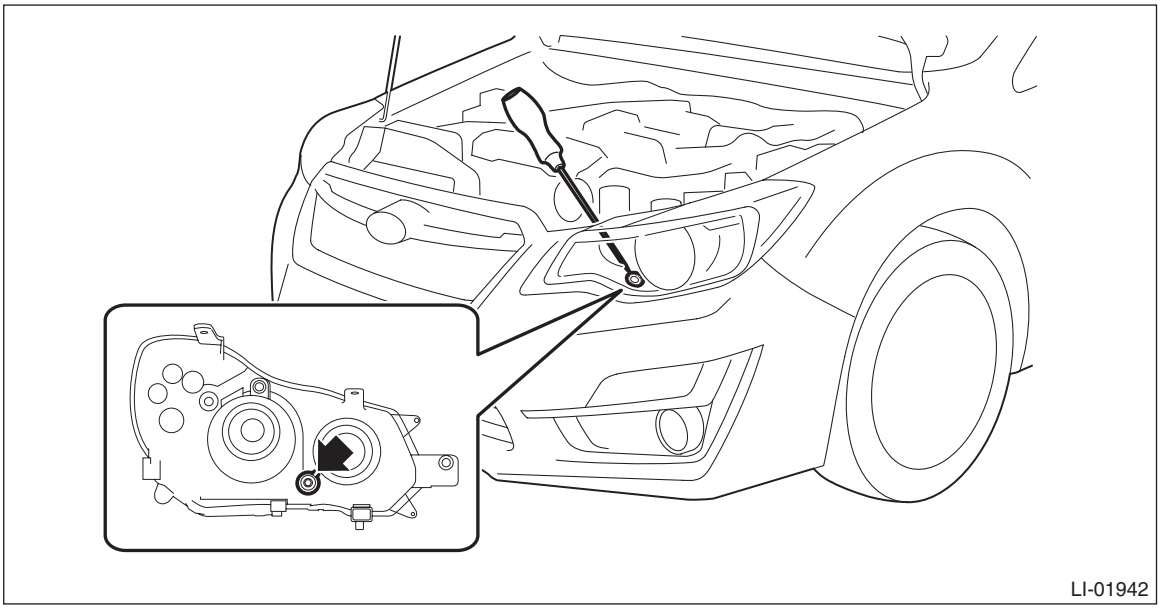
5) Adjust the beam level of the light assembly - head (low beam).
(1) Place the vehicle with the front end facing to the measurement panel, then illuminate the low beam.



(A) Vehicle center
(B) Bulb center marking
(C) 3 m (10 ft)
(D) Height of headlight center

W mm (in)
1,281 (50.44)

(2) Adjust the low beam by turning the aiming screw.



15.Headlight Bulb

A: REMOVAL

1. HIGH BEAM

CAUTION:
- **Do not perform work with wet hands, because there is a possibility of electrical shock.**
- **Do not leave the light assembly - head without the bulb for a long time. Dust, moisture, etc. entering the light may affect its performance.**

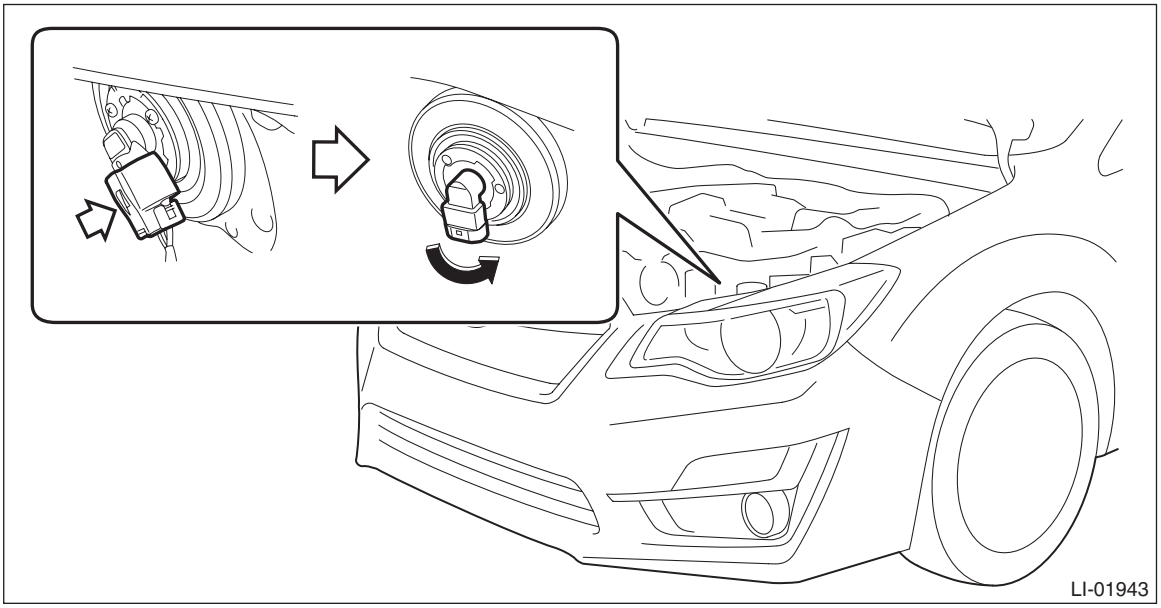
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the air intake duct. (When removing the right side of gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>

3) Disconnect the connector and remove the high beam bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



2. HALOGEN TYPE LOW BEAM

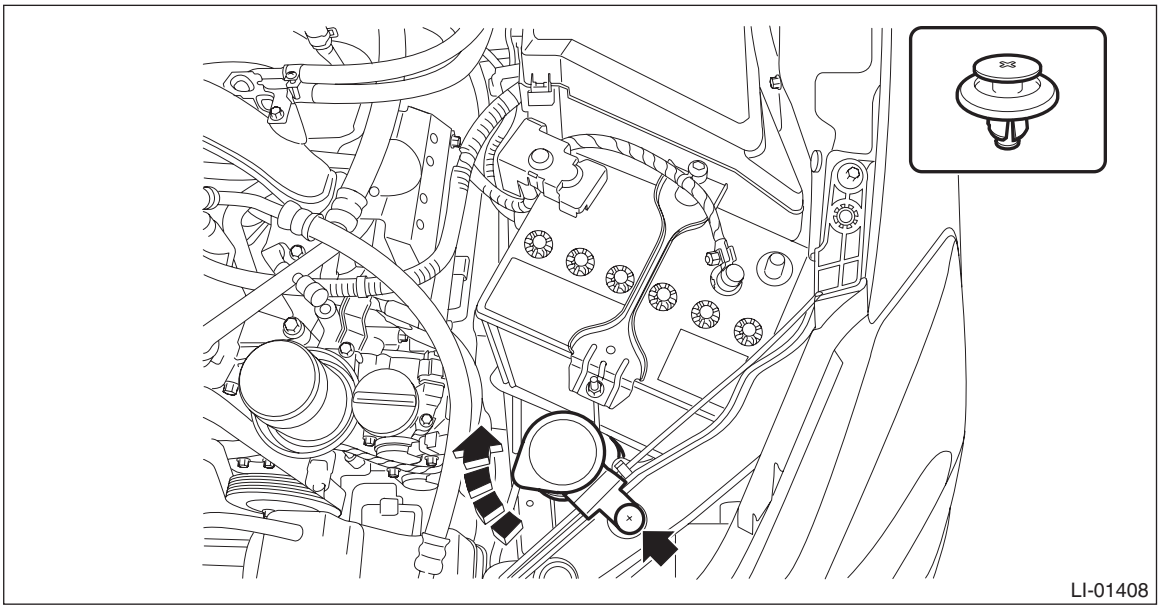
CAUTION:
- **Do not perform work with wet hands, because there is a possibility of electrical shock.**
- **Do not leave the light assembly - head without the bulb for a long time. Dust, moisture, etc. entering the light may affect its performance.**

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the air intake duct. (When removing the right side of gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>

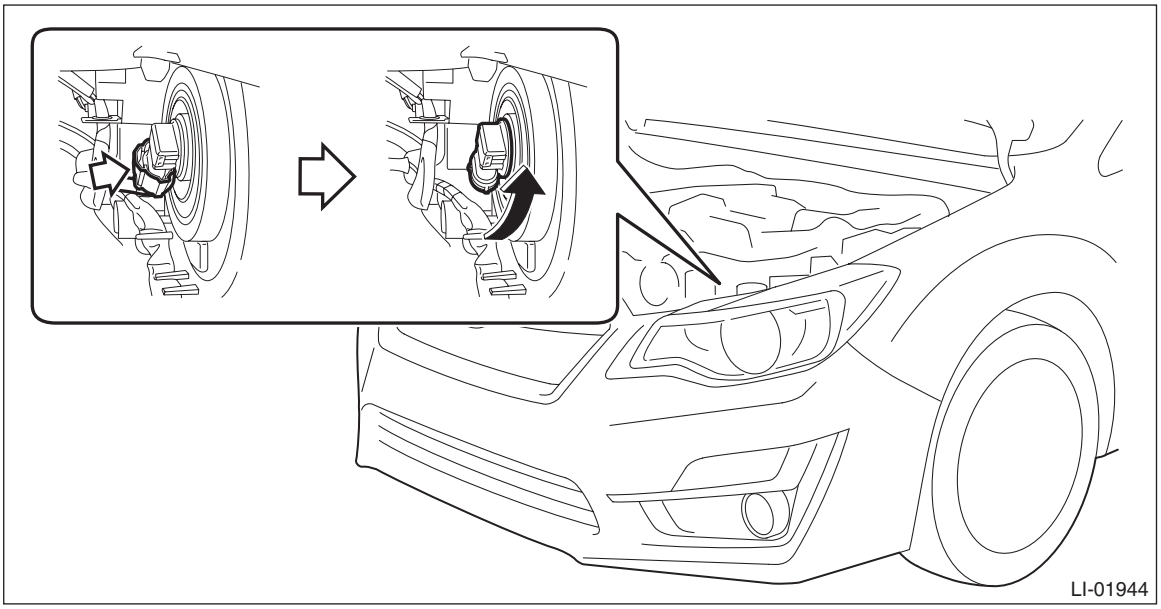
3) Turn the filler neck of the tank - washer front clockwise. (When removing LH side)



4) Disconnect the connector and remove the low beam bulb.

CAUTION:

- **Make sure to check if any bulb O-ring is remained on the housing side as this may sometimes happen.**
- **Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.**



3. HID TYPE LOW BEAM

When removing RH side

CAUTION:
- **Do not perform work with wet hands, because there is a possibility of electrical shock.**
- **Because the lighting circuit uses high voltage, be sure to confirm that the power supply is turned off before operation.**
- **Do not leave the light assembly - head without the bulb and cover - headlight for a long time. Dust, moisture, etc. entering the light may affect its performance.**

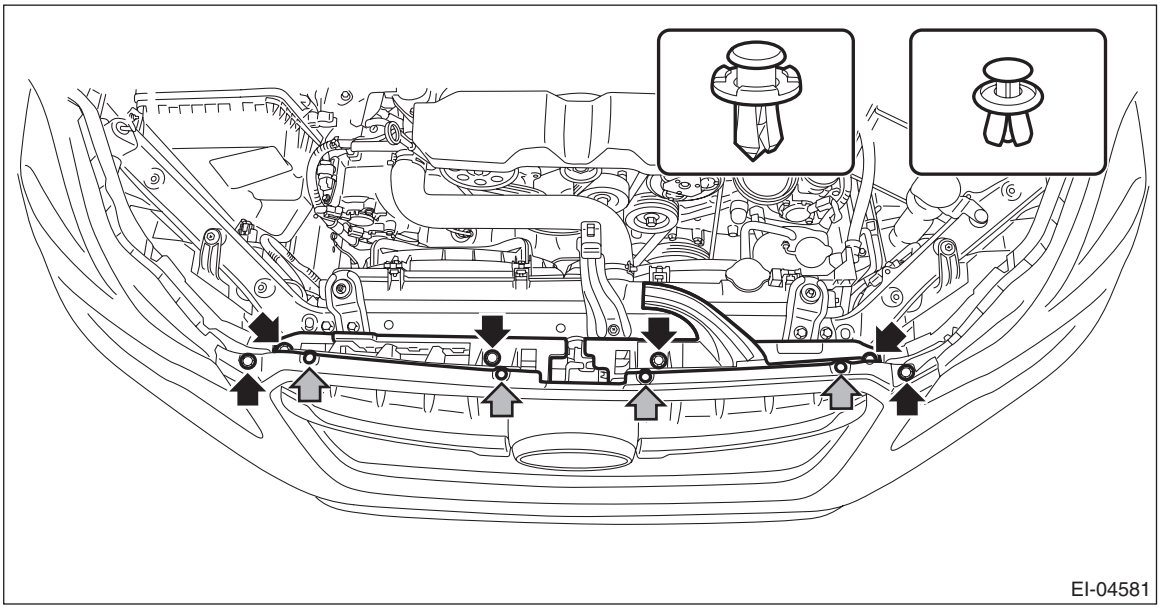
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the air intake duct. (Gasoline engine model) <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>

3) Remove the clip, and remove the bracket - grille.

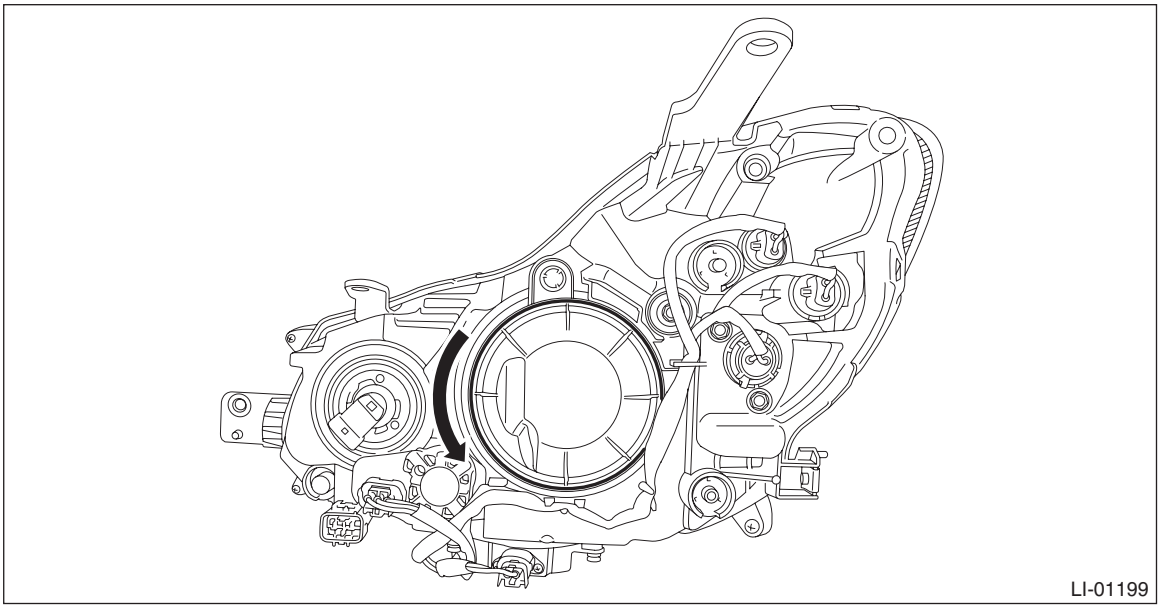
CAUTION:
To prevent damage to the bracket - grille, make sure to remove all clips.



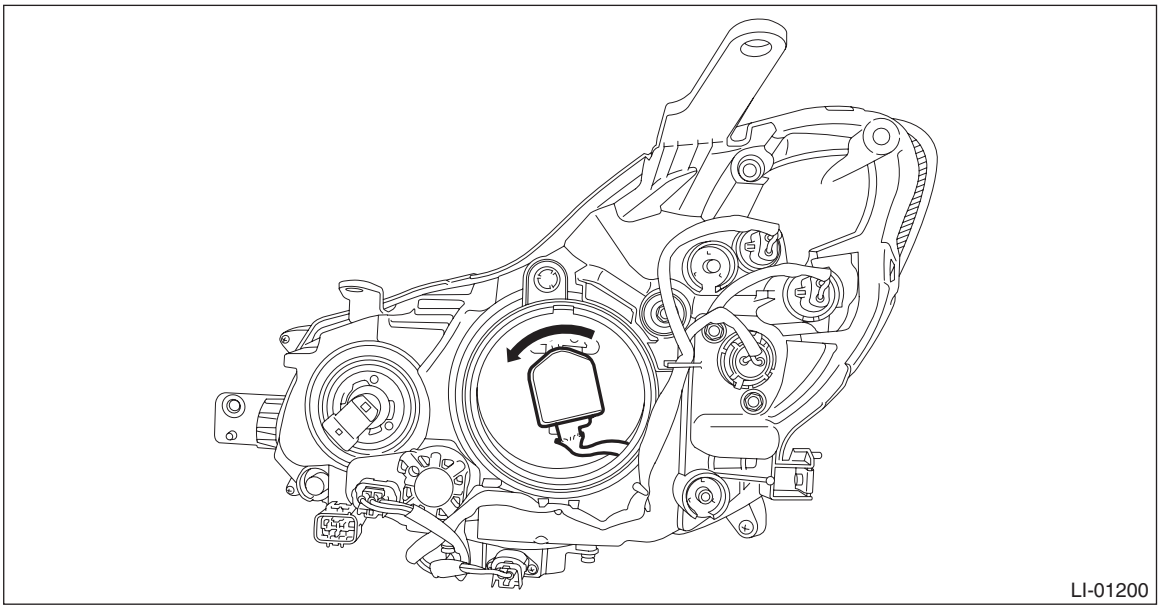
4) Remove the bumper face - front. <Ref. to EI-37, REMOVAL, Front Bumper.>

5) Remove the light assembly - head. <Ref. to LI-25, REMOVAL, Headlight Assembly.>

6) Remove the low beam bulb.
(1) Remove the cover - headlight.

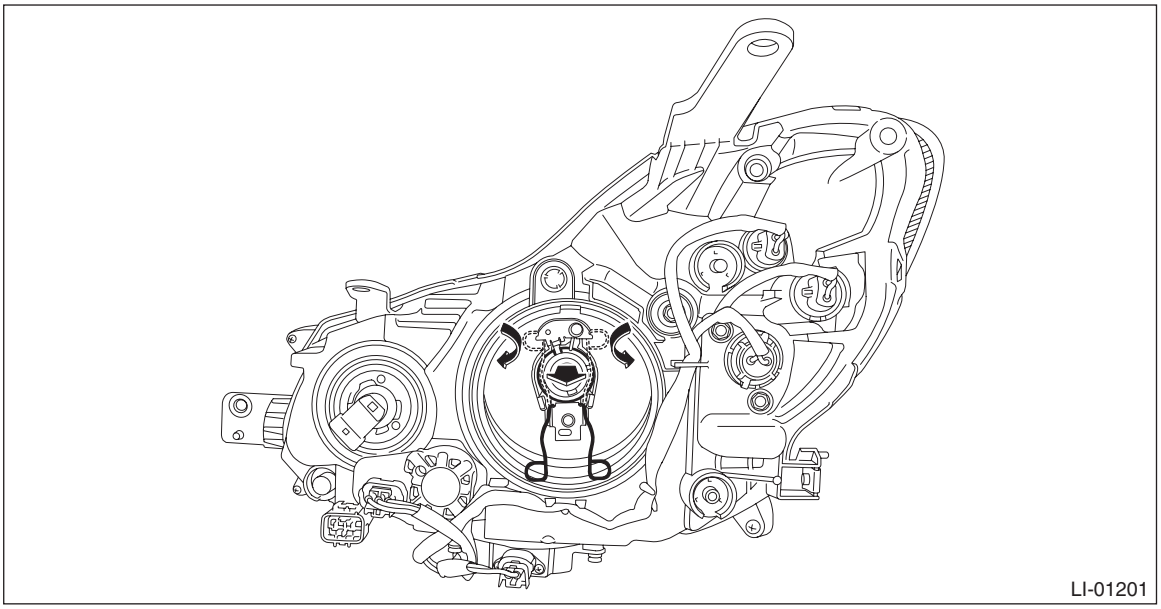


(2) Remove the bulb socket.



(3) Unlock the bulb spring, and remove the low beam bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.

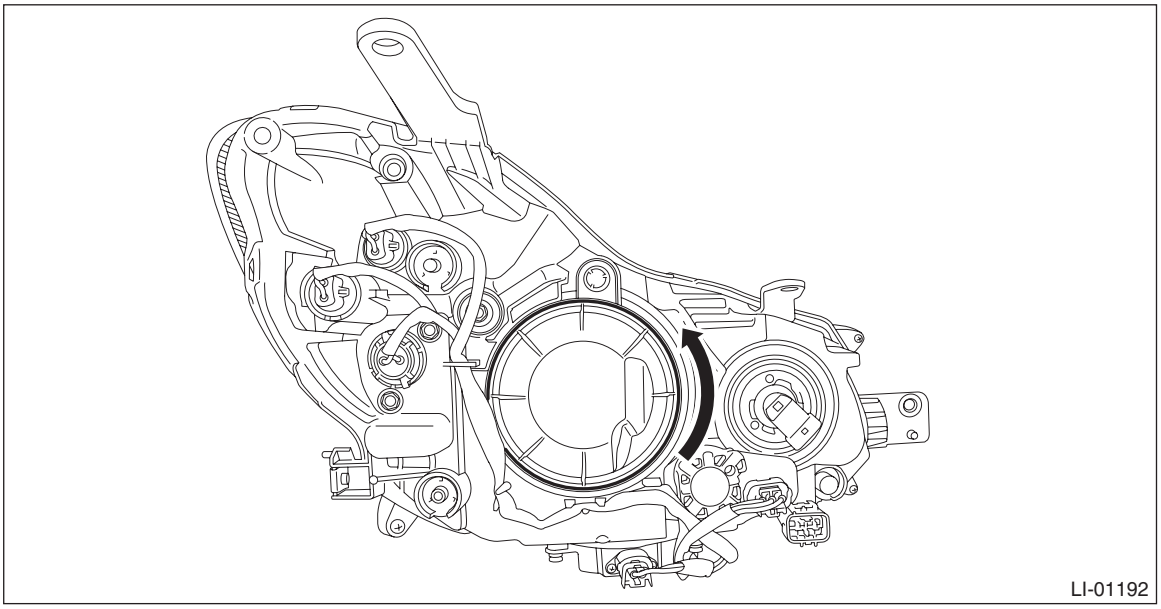


When removing LH side

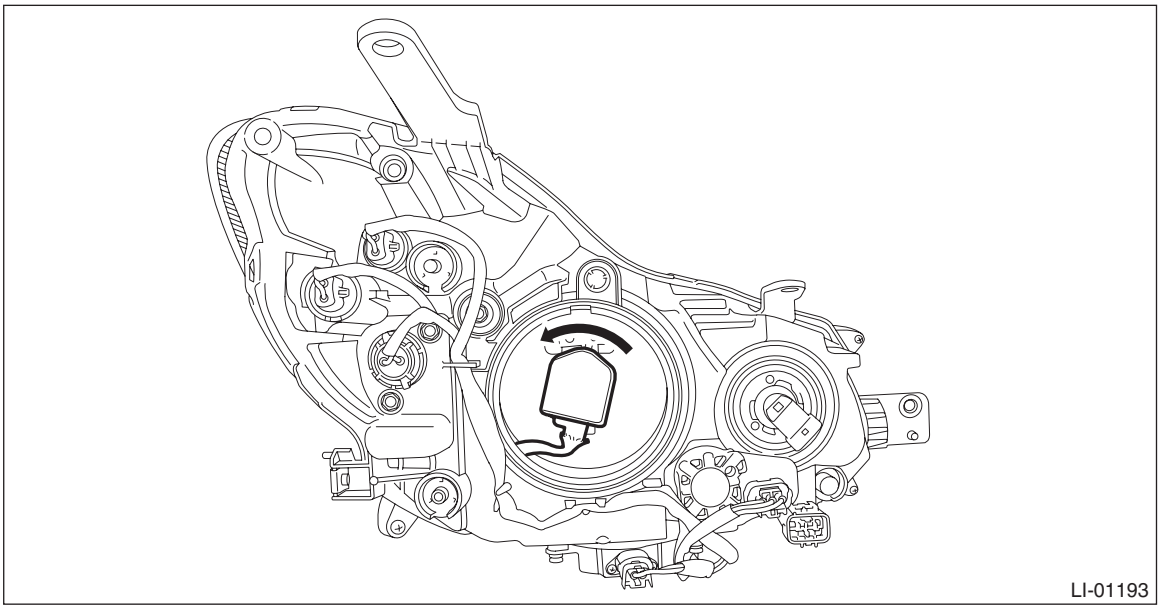
CAUTION:
- **Do not perform work with wet hands, because there is a possibility of electrical shock.**
- **Because the lighting circuit uses high voltage, be sure to confirm that the power supply is turned off before operation.**
- **Do not leave the light assembly - head without the bulb and cover - headlight for a long time. Dust, moisture, etc. entering the light may affect its performance.**

1) Remove the battery.
- Gasoline engine model: <Ref. to SC(H4DO(w/o HEV))-52, REMOVAL, Battery.>
- HEV model: <Ref. to SC(H4DO(HEV))-40, REMOVAL, Battery.>

2) Remove the low beam bulb.
(1) Remove the cover - headlight.

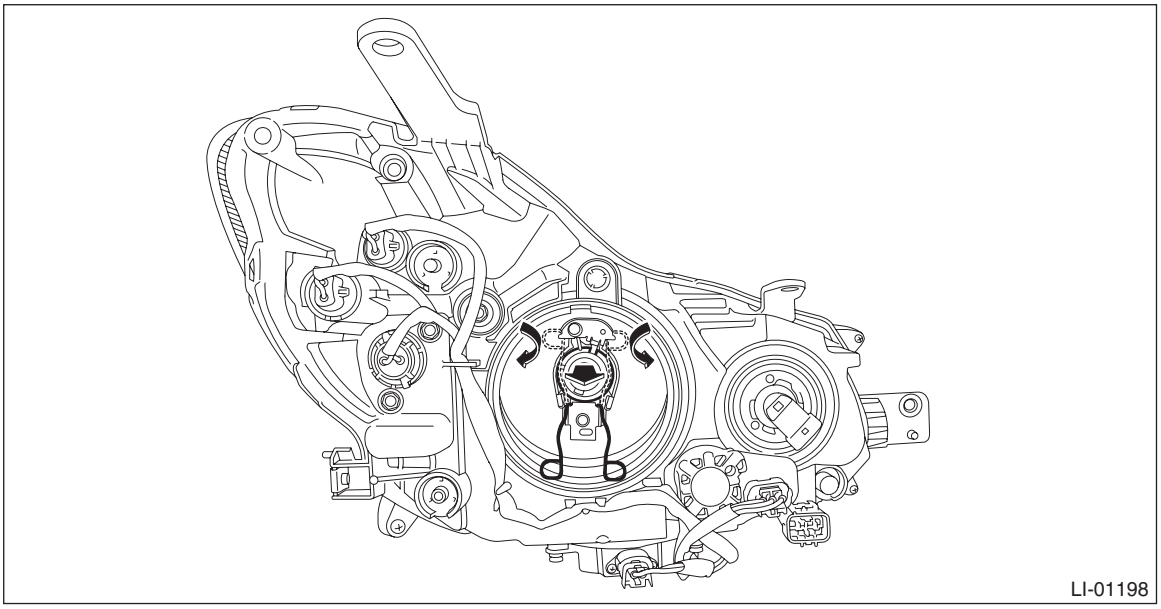


(2) Remove the bulb socket.



(3) Unlock the bulb spring, and remove the low beam bulb.

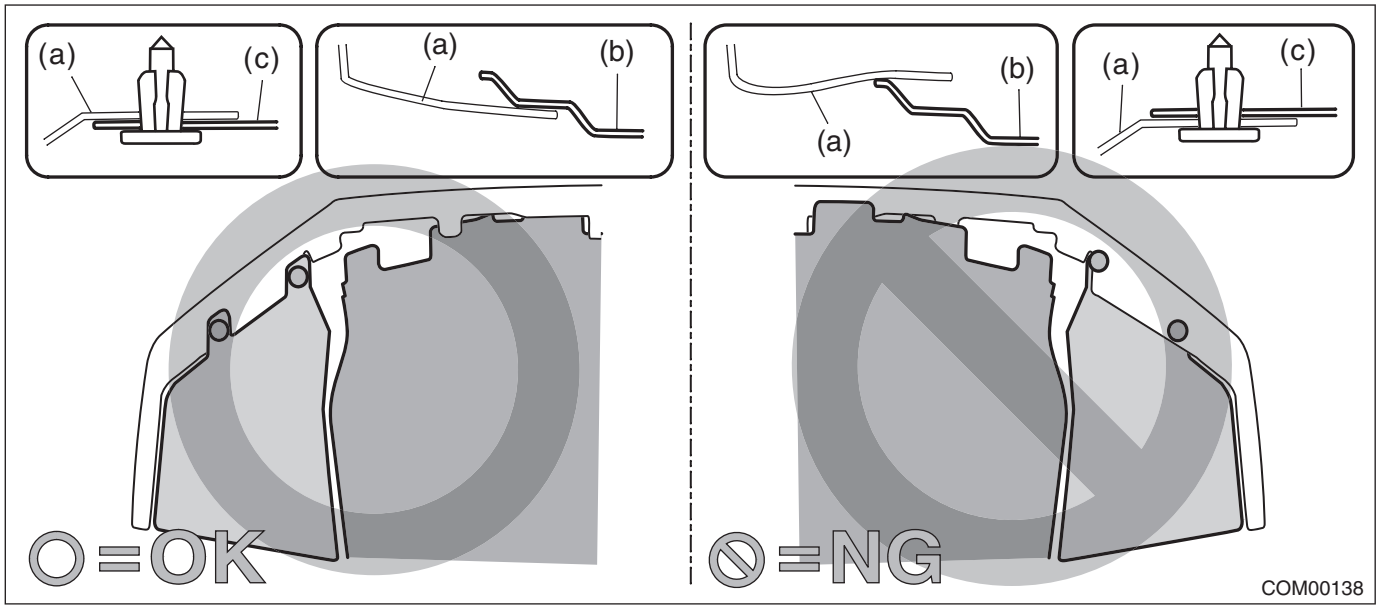
CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



B: INSTALLATION

1) Install each part in the reverse order of removal.
2) When performing the work of HID type low beam RH, secure the flange section of the bumper face - front to the bracket - front bumper side.

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



Tightening torque:
Light assembly - head: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

3) When performing the work of HID type low beam RH, adjust the fog light beam. (Model with fog light) <Ref. to LI-52, FOG LIGHT AIMING, ADJUSTMENT, Front Fog Light Assembly.>

C: INSPECTION

1. HALOGEN TYPE

CAUTION:
- **Do not perform work with wet hands, because there is a possibility of electrical shock.**
- **Do not leave the light assembly - head without the bulb and cover - headlight for a long time. Dust, moisture, etc. entering the headlight may affect its performance.**

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

2. HID TYPE

CAUTION:
- **Do not perform work with wet hands, because there is a possibility of electrical shock.**
- **Do not leave the light assembly - head without the bulb and cover - headlight for a long time. Dust, moisture, etc. entering the headlight may affect its performance.**
- **When lit (lighting switch is ON), do not touch the harness, light internals, or metal parts of the light.**
- **When performing a lighting test, make sure that the headlight is mounted on the vehicle, and the power supply is connected to the connector on the vehicle's side.**

1) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
2) Install the factory HID bulb to check whether it lights properly.
3) If it does not light properly, replace with a new bulb.
4) Inspect the HID ballast.

Inspect the ballast in the following manner, and determine whether or not to reuse.

(1) Perform cold starts (light the headlight after turning off for 10 minutes or more), and hot starts (light the headlight for 15 minutes or more, then turn off for 1 minute and relight) several times, to make sure that the headlight lights properly.

(2) Monitor the lighting condition right after a cold start up to a stable state (approx. 5 min.), to see if there are any unstable conditions such as flickering.

(3) Install bulbs with the same number of operating hours on both headlights, and light for approximately 30 minutes. Check for whether there is a difference in brightness on the right and left sides.

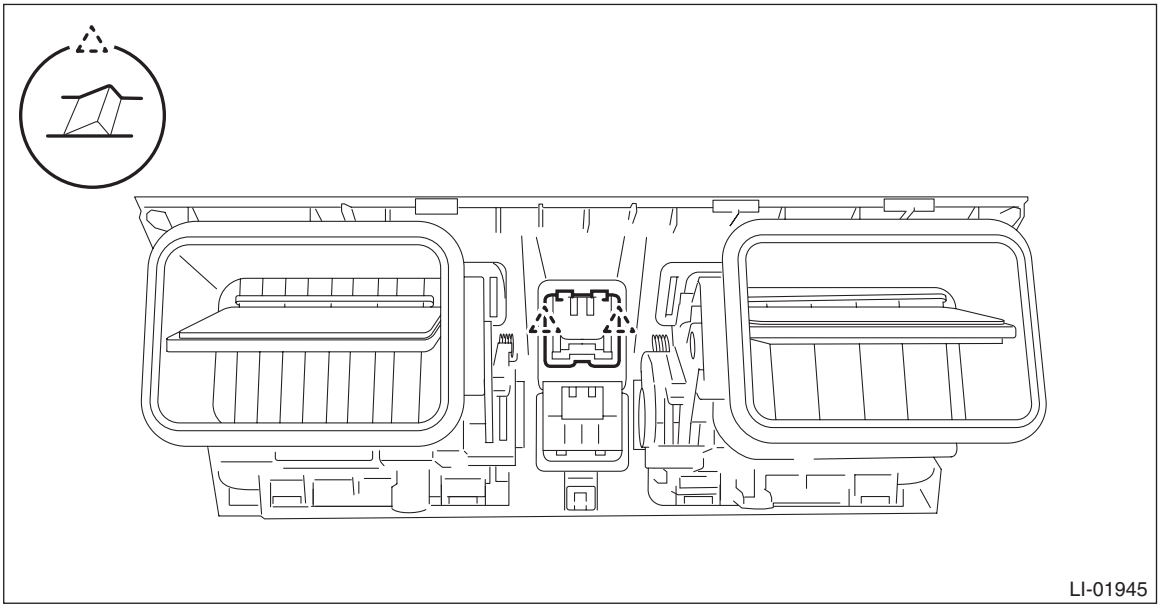
5) Replace the ballast if it is found defective.

16.Hazard Switch

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
3) Release the claws, and remove the switch - hazard from the center grille assembly.



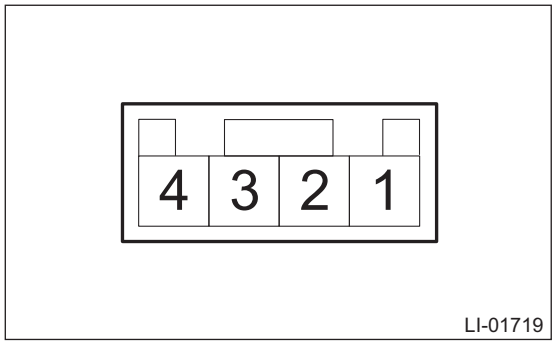
B: INSTALLATION

CAUTION:
After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
Install each part in the reverse order of removal.

C: INSPECTION

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
2 — 3	Switch OFF	1 MΩ or more
	Switch ON	Less than 1 Ω

2) Apply battery voltage between the connector terminals to check the lighting condition of the light.

Terminal No.	Inspection conditions	Specification
4 (+) — 1 (–)	Apply battery voltage.	Light ON

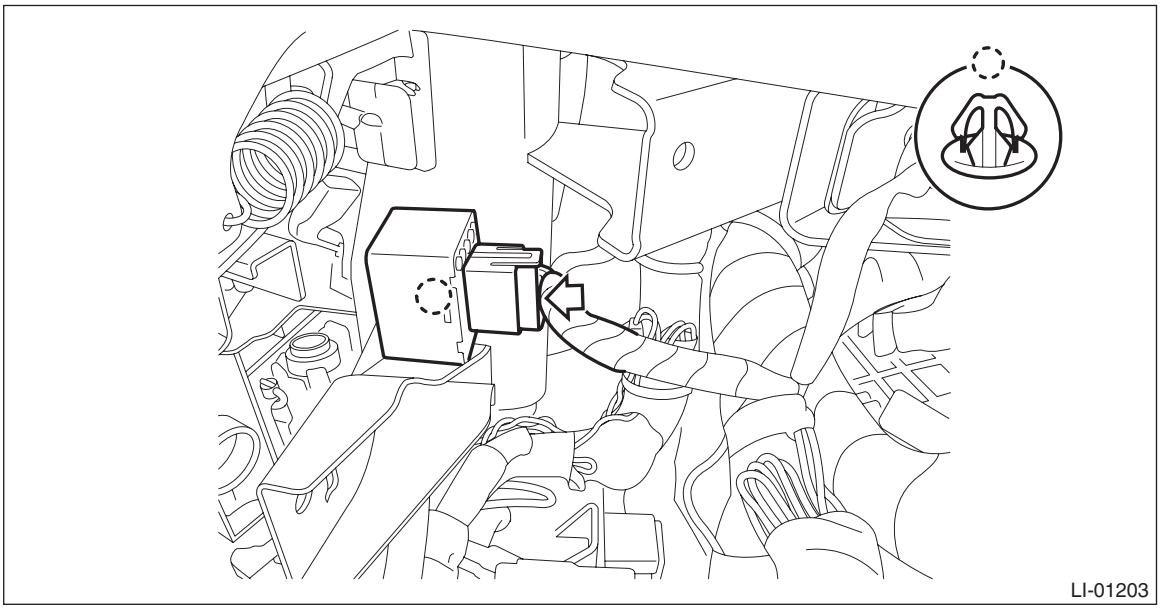
3) Replace the switch - hazard if the inspection result is not within the standard value.

17.Turn Signal Light & Hazard Light Unit

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the instrument panel lower cover. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the turn signal & hazard unit.
   (1) Disconnect the connector.
   (2) Release the claws and remove the turn signal & hazard unit from the beam COMPL - steering.



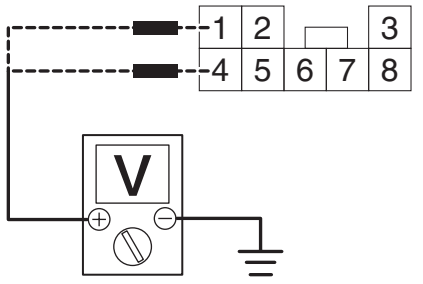
B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

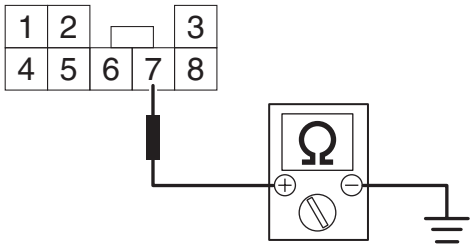
C: INSPECTION

1) Disconnect the connector of the turn signal & hazard unit.
2) Measure the voltage between the turn signal & hazard unit connector and the chassis ground.

Preparation tool:
Circuit tester

Terminal No.	Inspection conditions	Standard	Connection diagram
4 (+) — Chassis ground (–)	Always	10 — 14 V	 LI-01281
1 (+) — Chassis ground (–)	IG OFF → ON	Less than 1 V → 10 — 14 V	

Repair or replace the harness if the inspection result is not within the standard value.
3) Measure the resistance between the turn signal & hazard unit connector and the chassis ground.

Terminal No.	Inspection conditions	Standard	Connection diagram
7 — Chassis ground	Always	Less than 1 Ω	 LI-01282

Repair or replace the harness if the inspection result is not within the standard value.
4) Connect the turn signal & hazard unit connector.
5) Measure the voltage between turn signal & hazard unit and chassis ground.

Terminal No.	Input/Output	Inspection conditions	Standard
6 (+) — Chassis ground (–)	Input	Turn signal switch (right) OFF → ON	9 V or more → less than 1 V
5 (+) — Chassis ground (–)	Input	Turn signal switch (left) OFF → ON	9 V or more → less than 1 V
8 (+) — Chassis ground (–)	Input	Hazard switch OFF → ON	9 V or more → less than 1 V
2 (+) — Chassis ground (–)	Output	Turn signal switch (right) OFF → ON	Repeat less than 1 V → less than 1 V ←→ more than 9 V at 60 to 120 times per minute.
3 (+) — Chassis ground (–)	Output	Turn signal switch (left) OFF → ON	Repeat less than 1 V → less than 1 V ←→ more than 9 V at 60 to 120 times per minute.
2 (+) — Chassis ground (–)	Output	Hazard switch OFF → ON	Repeat less than 1 V → less than 1 V ←→ more than 9 V at 60 to 120 times per minute.
3 (+) — Chassis ground (–)	Output	Hazard switch OFF → ON	Repeat less than 1 V → less than 1 V ←→ more than 9 V at 60 to 120 times per minute.

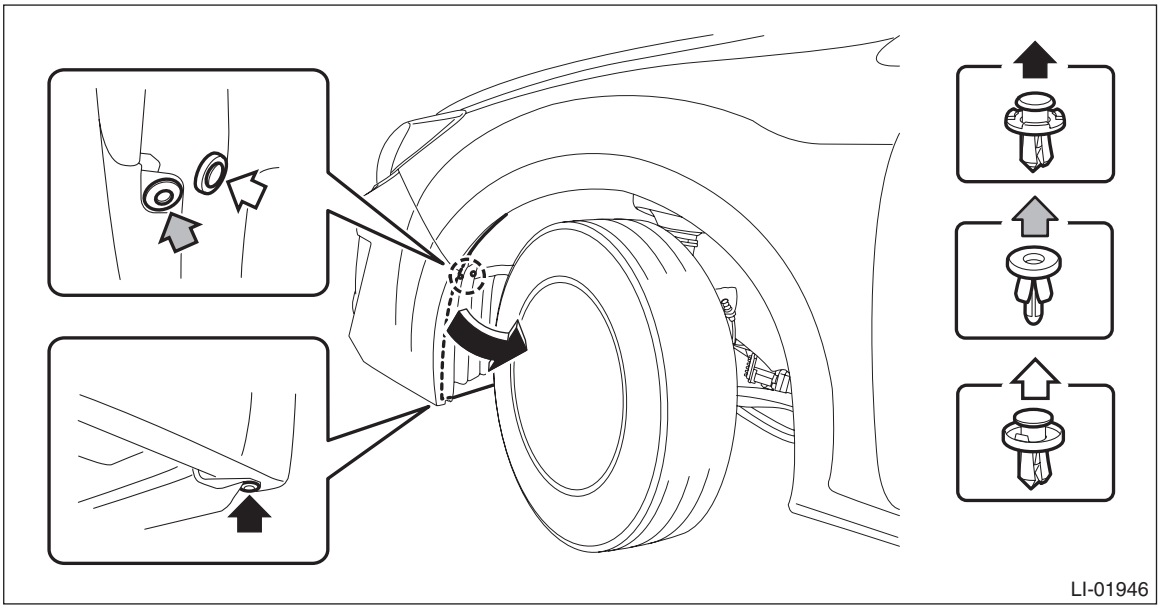
Replace the turn signal & hazard unit if the inspection result is not within the standard value.

18.Front Turn Signal Light Bulb

A: REMOVAL

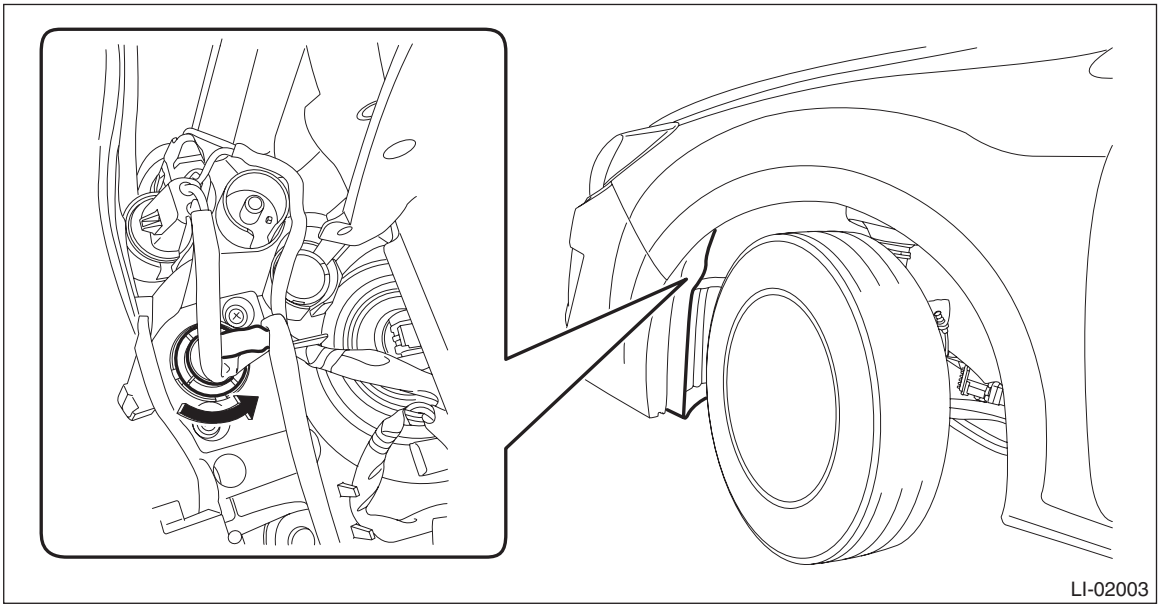
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Turn the steering wheel in the opposite direction from the parts to be removed. Then remove the clips and turn over the mud guard - front.



3) Remove the bulb socket and front turn signal light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

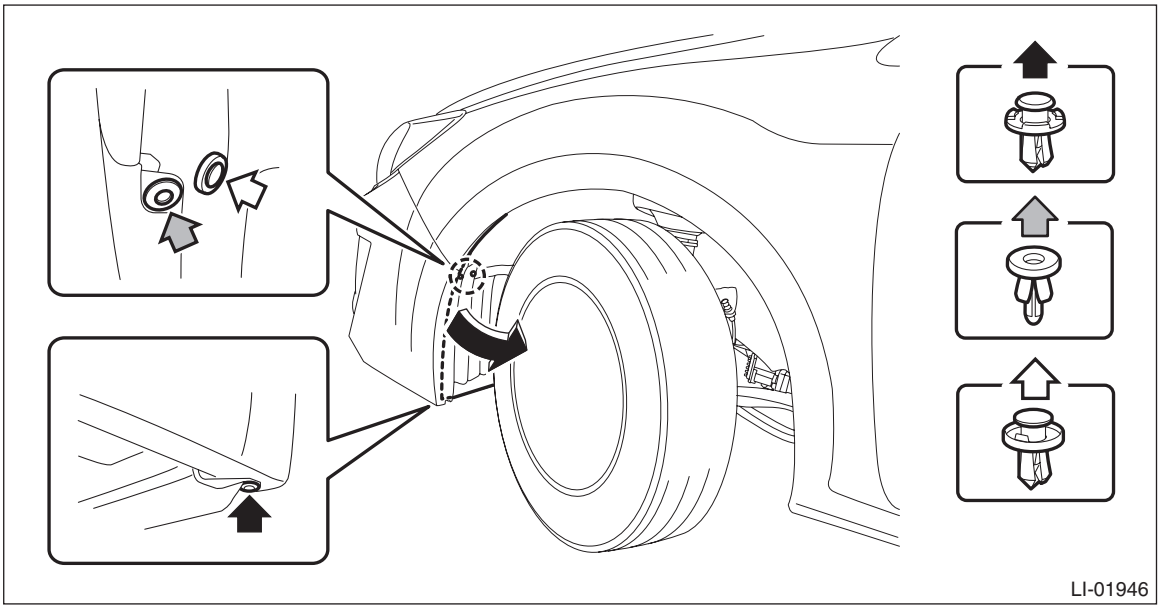
1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

19.Clearance/Parking Light Bulb

A: REMOVAL

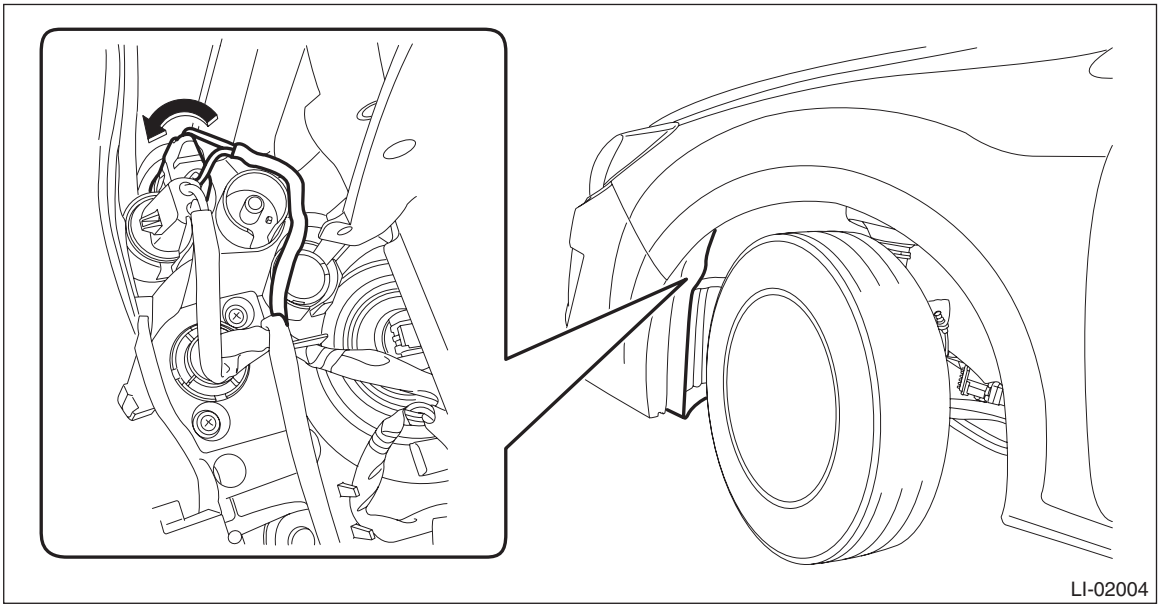
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Turn the steering wheel in the opposite direction from the parts to be removed. Then remove the clips and turn over the mud guard - front.



3) Remove the bulb socket and parking light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

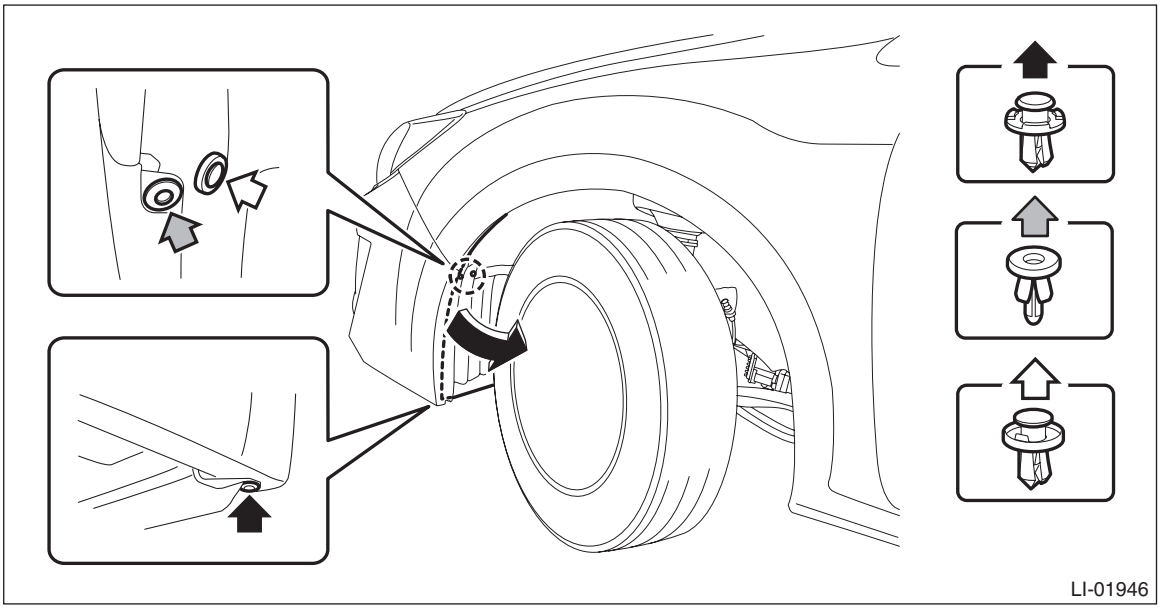
1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

20.Front Side Marker Light Bulb

A: REMOVAL

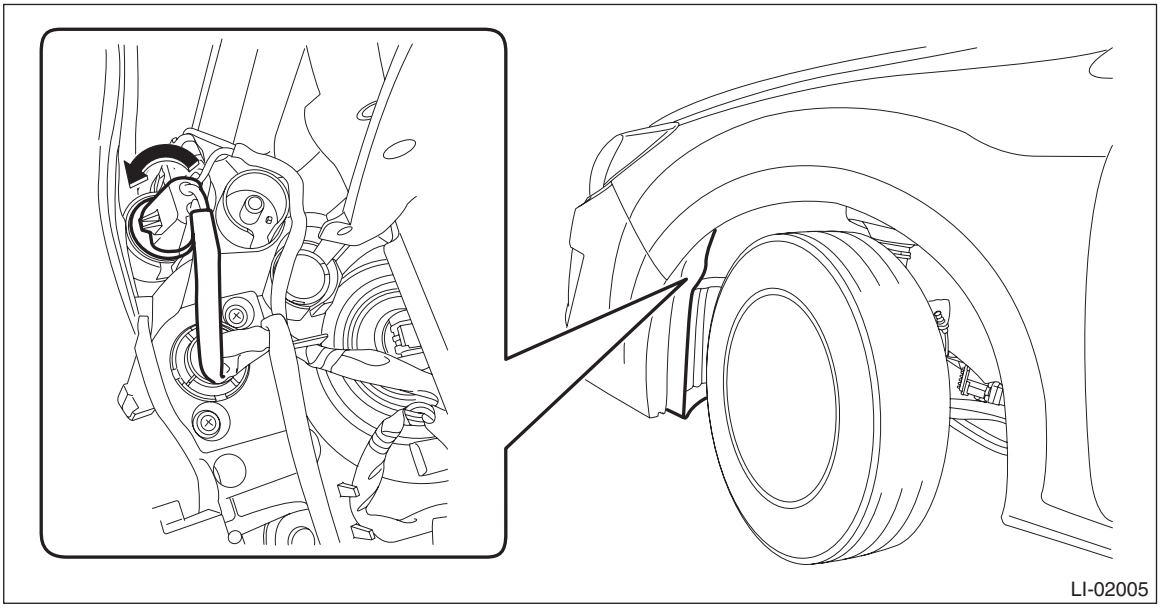
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Turn the steering wheel in the opposite direction from the parts to be removed. Then remove the clips and turn over the mud guard - front.



3) Remove the bulb socket and front side marker light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

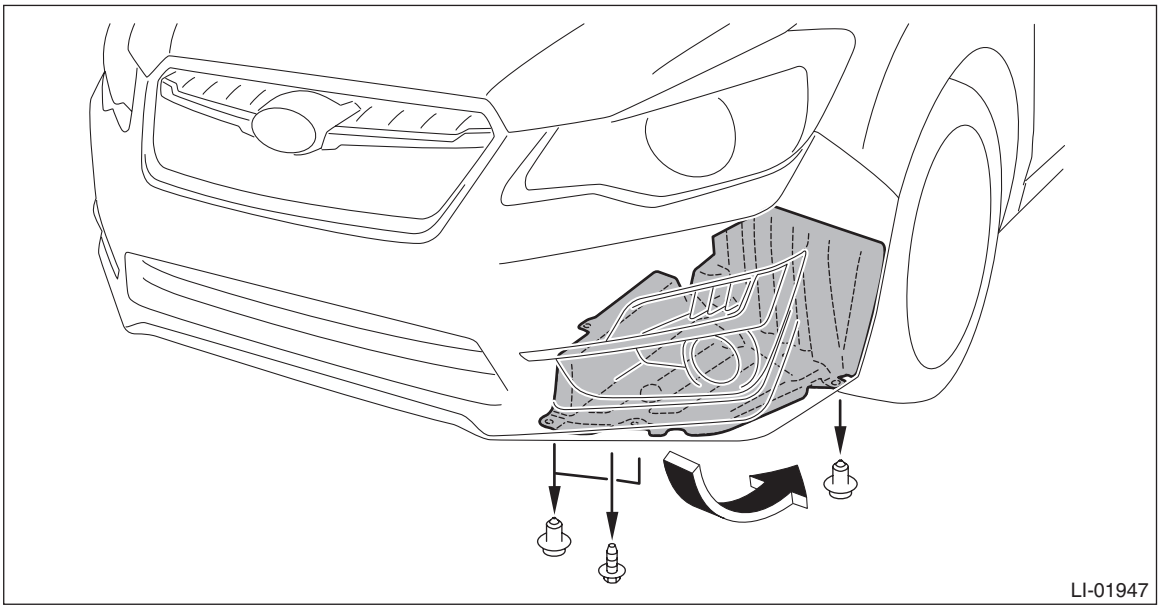
21.Front Fog Light Assembly

A: REMOVAL

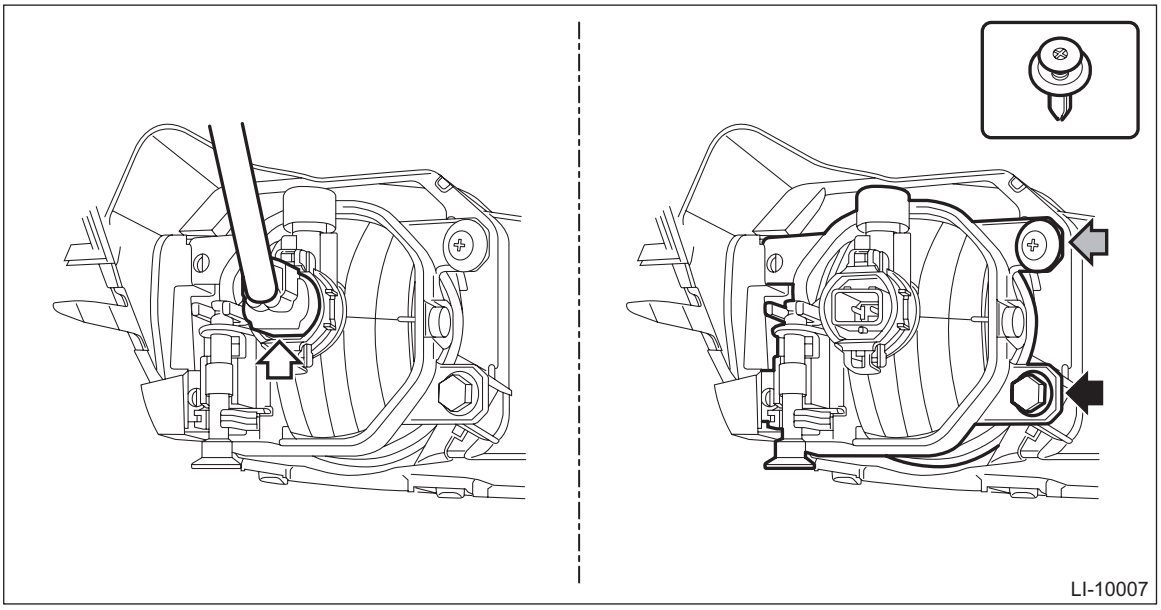
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

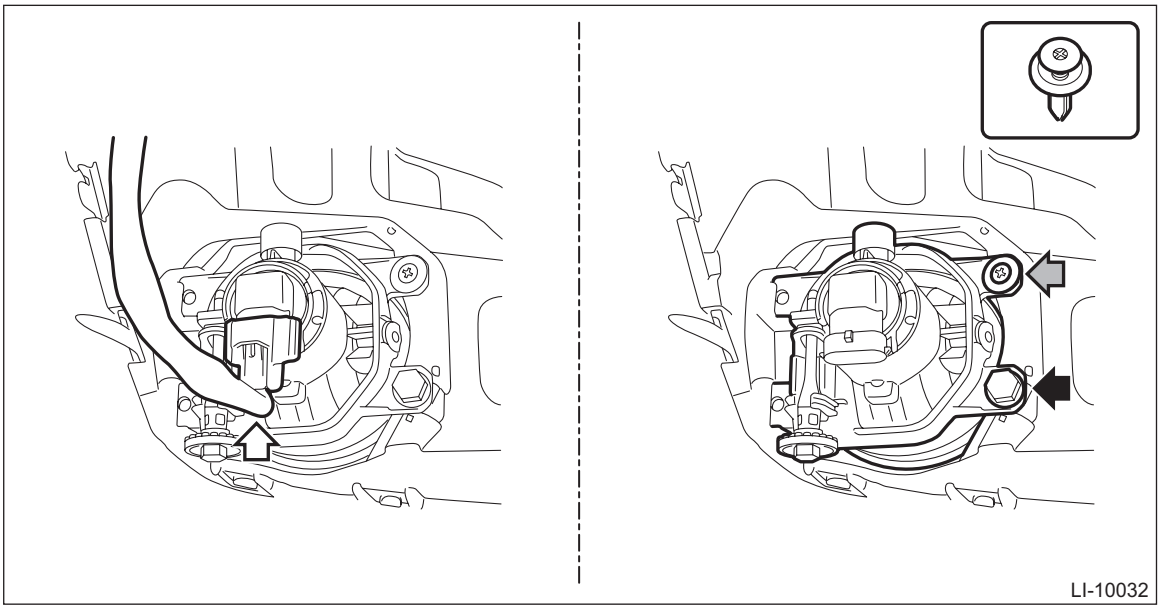
2) Lift up the vehicle.
3) Remove the screw and clips, and turn over the front side of the mud guard - front.



4) From the bottom of the bumper face - front, remove the fog light assembly - front.
   (1) Disconnect the connector.
   (2) Remove the bolts and clips, and remove the fog light assembly - front.
   - Model without SRF

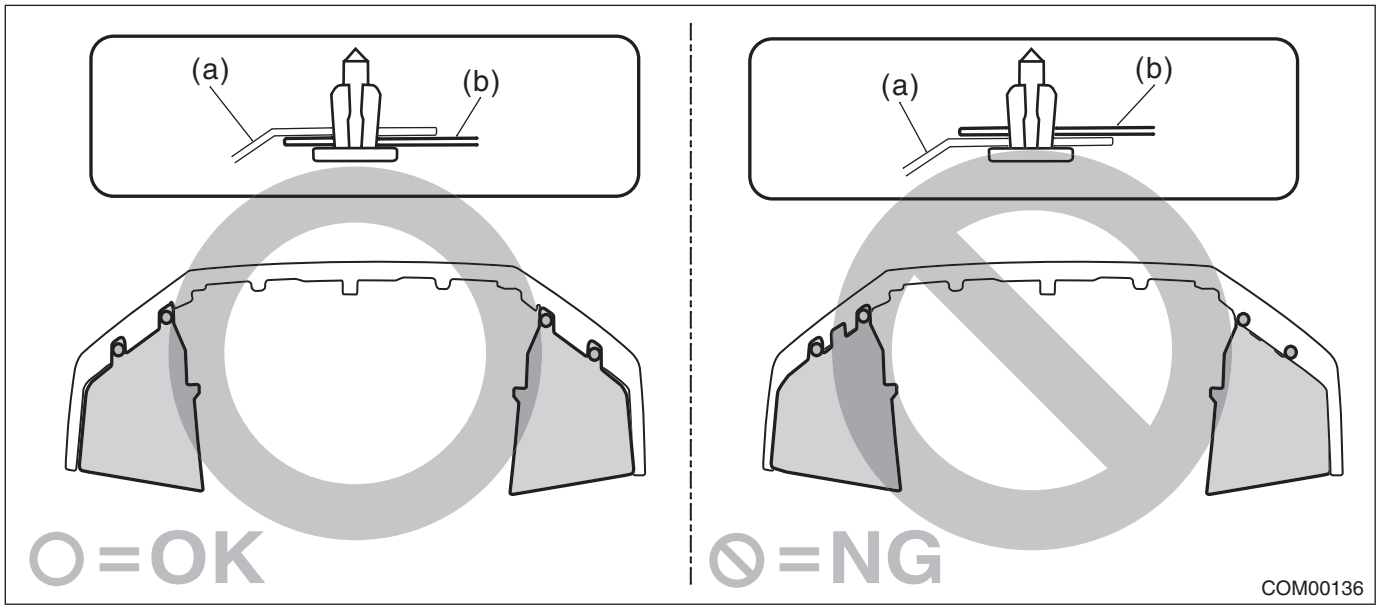


- Model with SRF



B: INSTALLATION

CAUTION:
Install the mud guard - front so that the front end of the mud guard (b) comes outside the bumper face - front (a).



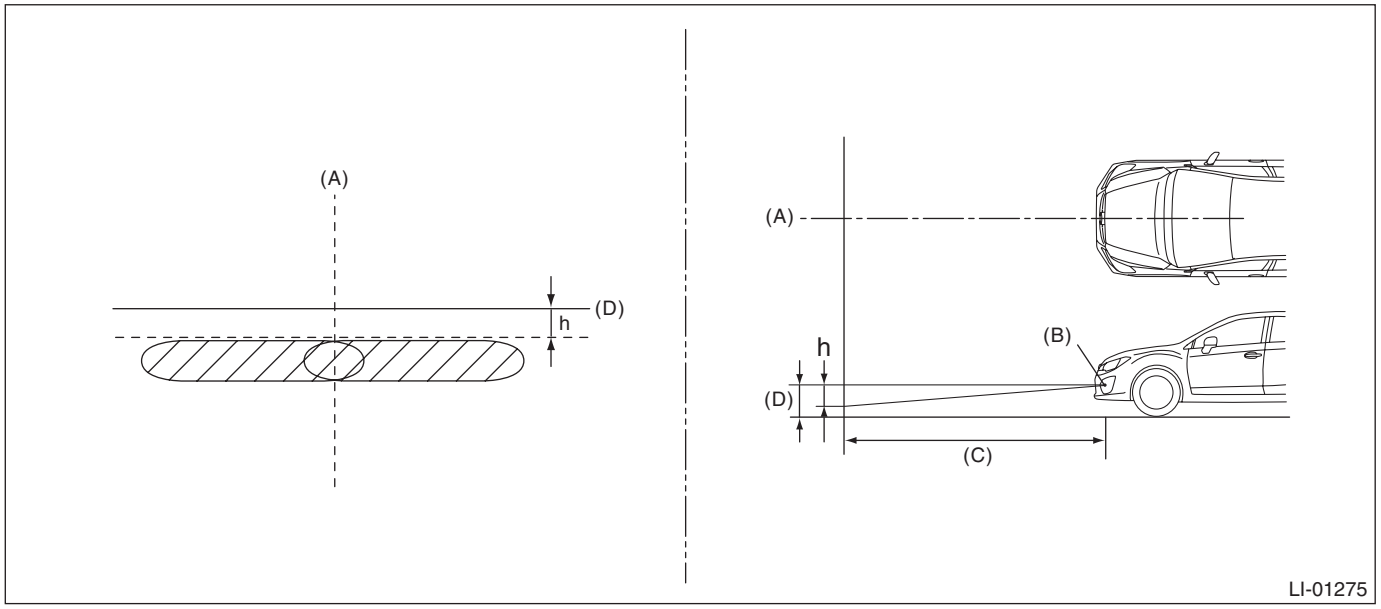
1) Install each part in the reverse order of removal.

Tightening torque:
Fog light assembly - front: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
2) Adjust the fog light beam. <Ref. to LI-52, FOG LIGHT AIMING, ADJUSTMENT, Front Fog Light Assembly.>

C: ADJUSTMENT

1. FOG LIGHT AIMING

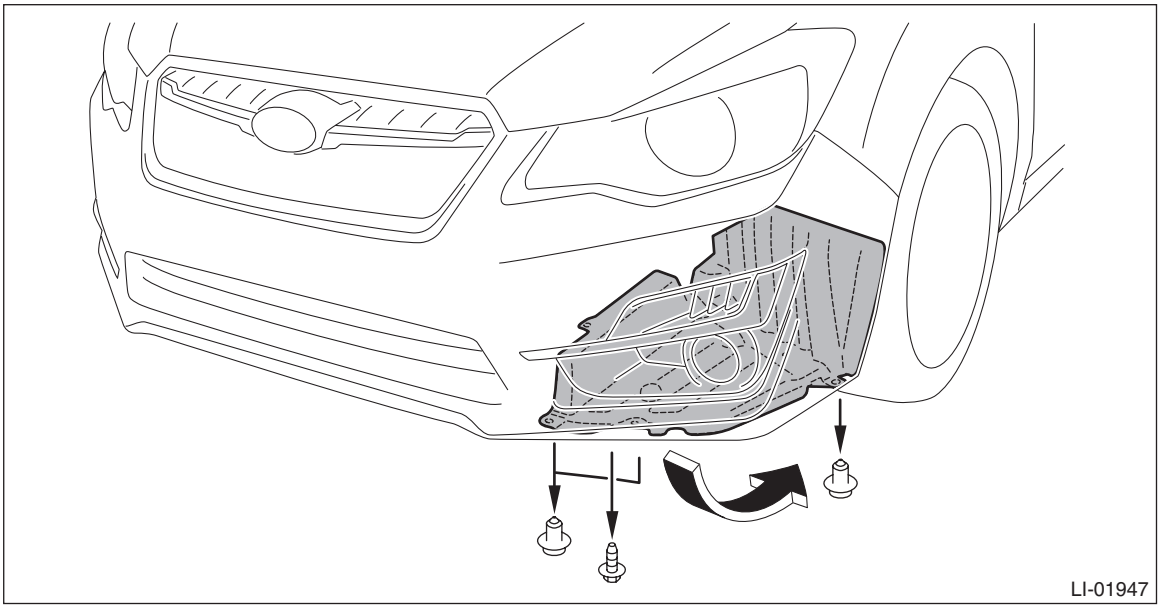
1) Before checking the fog light assembly - front beam level, be sure of the following:
• The area around the fog light assembly - front has not sustained any scratches, damage or other type of deformation.
• The vehicle is parked on a level surface.
• The inflation pressure of tires is correct.
• The vehicle does not have load.
• Vehicle's fuel tank is fully filled.
2) Bounce the vehicle several times to normalize the suspension.
3) Make certain that someone is seated in the driver's seat.
4) Place the vehicle with the front end facing to the measurement panel.



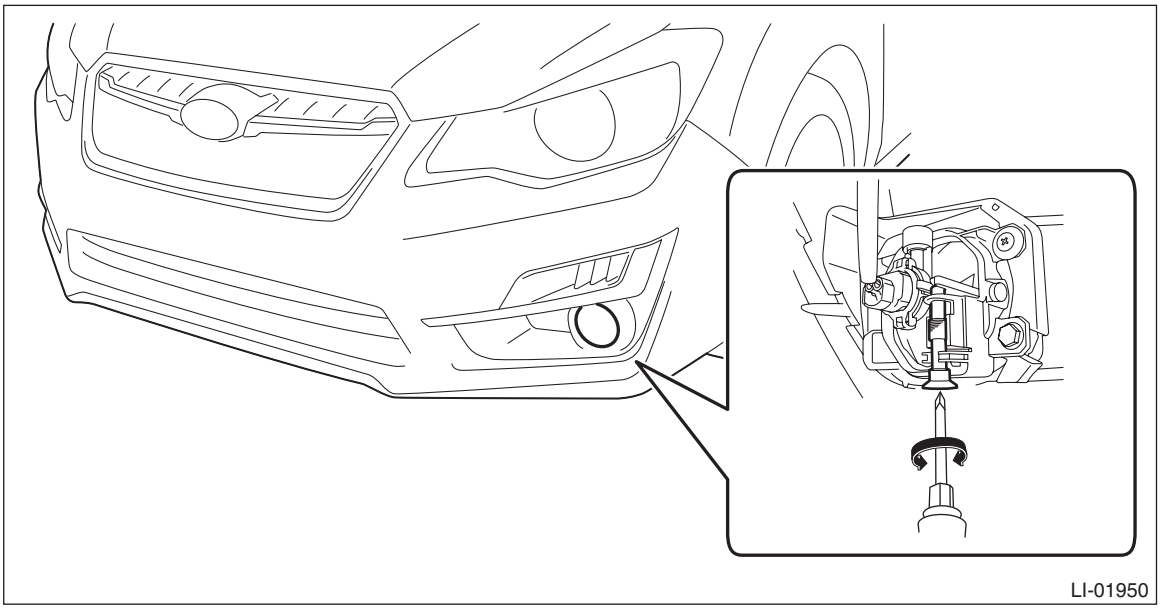
(A) Vehicle center
(B) Bulb center marking
(C) 3 m (10 ft)
(D) Height of fog light center

h mm (in) at 3 m (10 ft)
40 (1.58)

5) Adjust the fog light assembly - front beam.
(1) Remove the screw and clips, and turn over the front side of the mud guard - front.



(2) Adjust the beam direction by turning the aiming screw from the bottom of the bumper face - front.



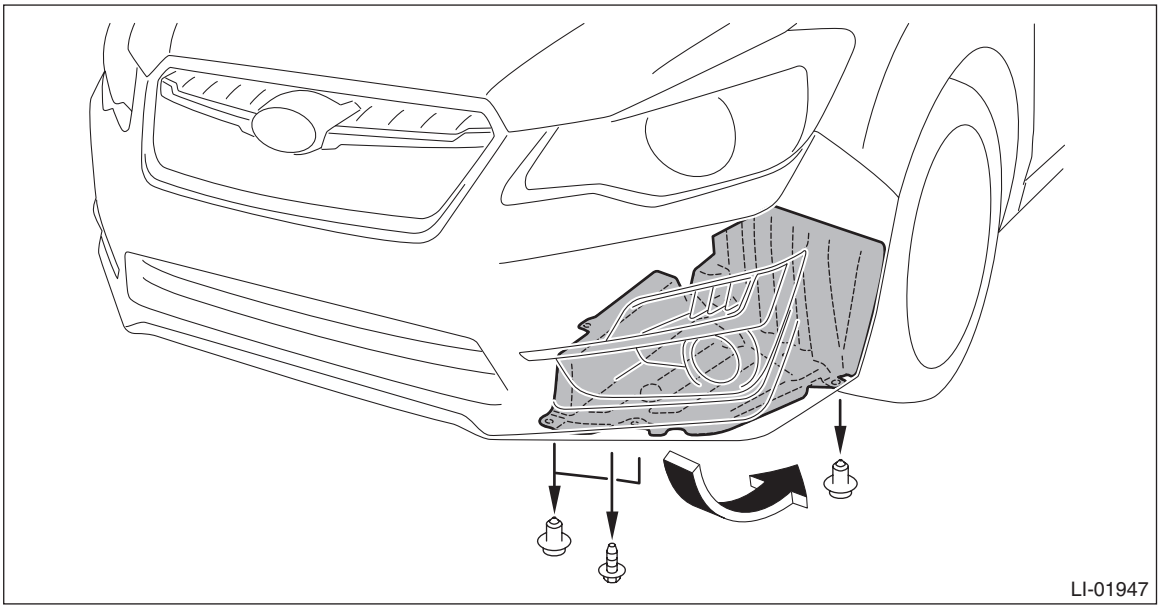
22.Front Fog Light Bulb

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the screw and clips, and turn over the front side of the mud guard - front.

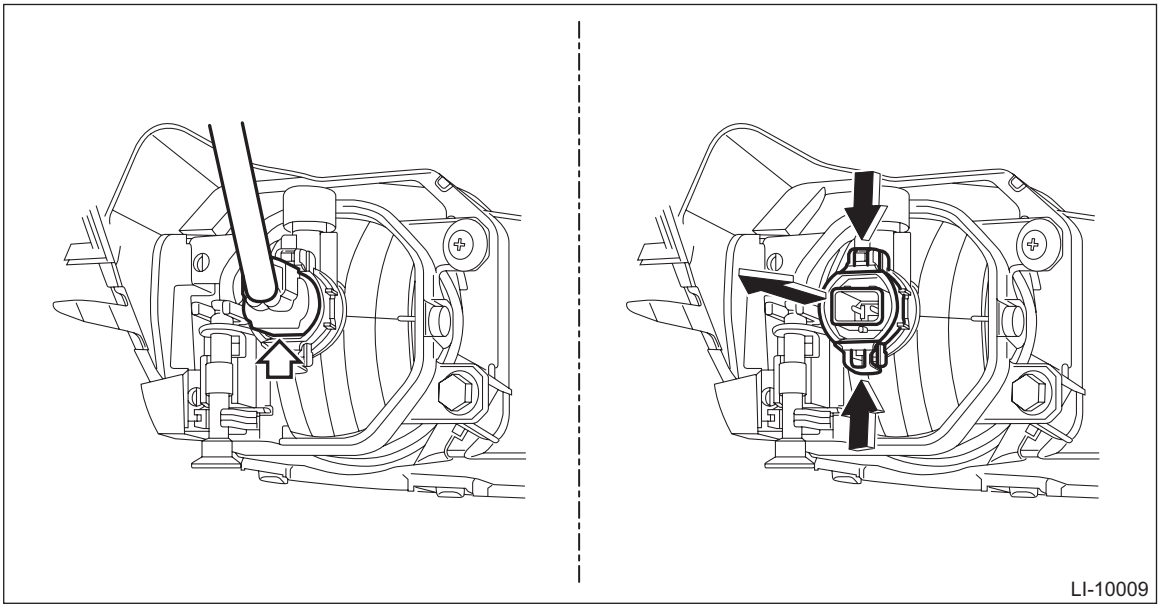


3) From the bottom of the bumper face - front, remove the front fog light bulb.

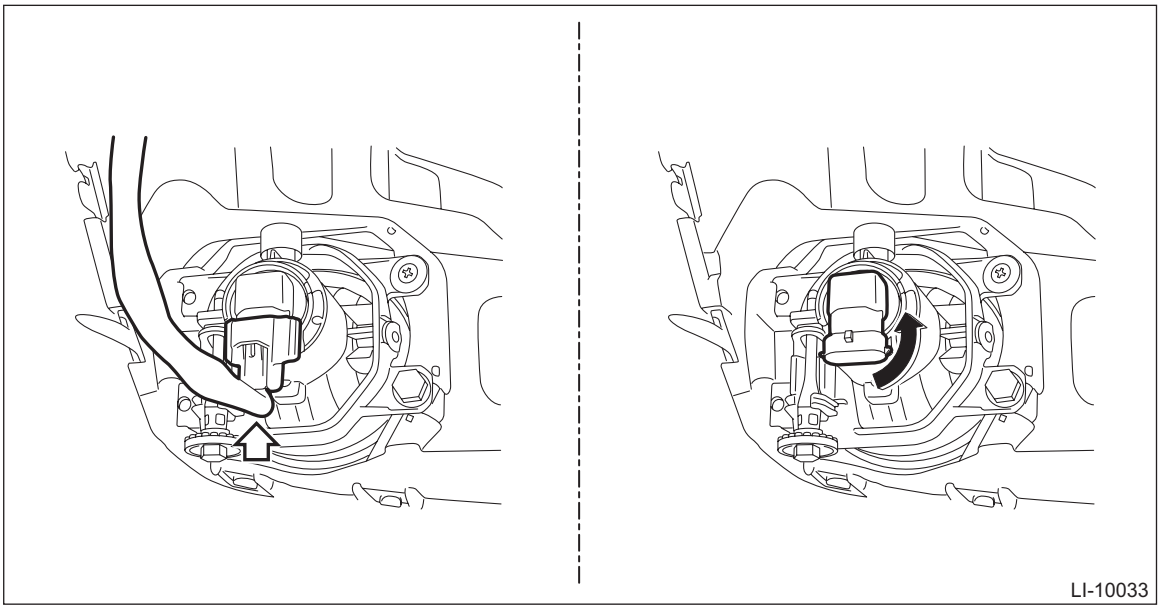
CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.

(1) Disconnect the connector.
(2) Remove the bulb.

- Model without SRF

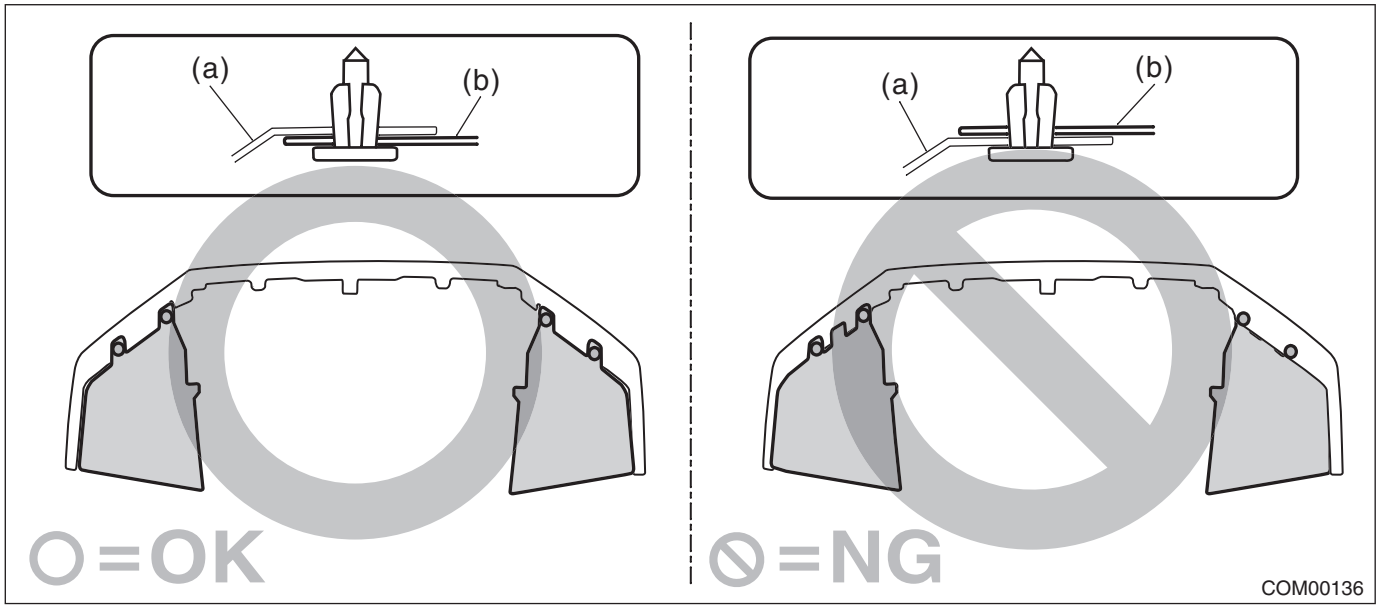


- Model with SRF



B: INSTALLATION

CAUTION:
- **After connecting the connector, make sure that the bulb is locked securely.**
- **Install the mud guard - front so that the front end of the mud guard (b) comes outside the bumper face - front (a).**



Install each part in the reverse order of removal.

C: INSPECTION

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

23.Side Turn Signal Light Assembly

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the light assembly - side turn mirror. <Ref. to GW-26, DISASSEMBLY, Outer Mirror Assembly.>

B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Install the light to check if it blinks normally.
2) If it fails to blink normally, replace the light assembly - side turn mirror with a new part.

NOTE:
Since LED (Light Emitting Diode) is used for the light, replace the light assembly - side turn mirror if the LED burns out.

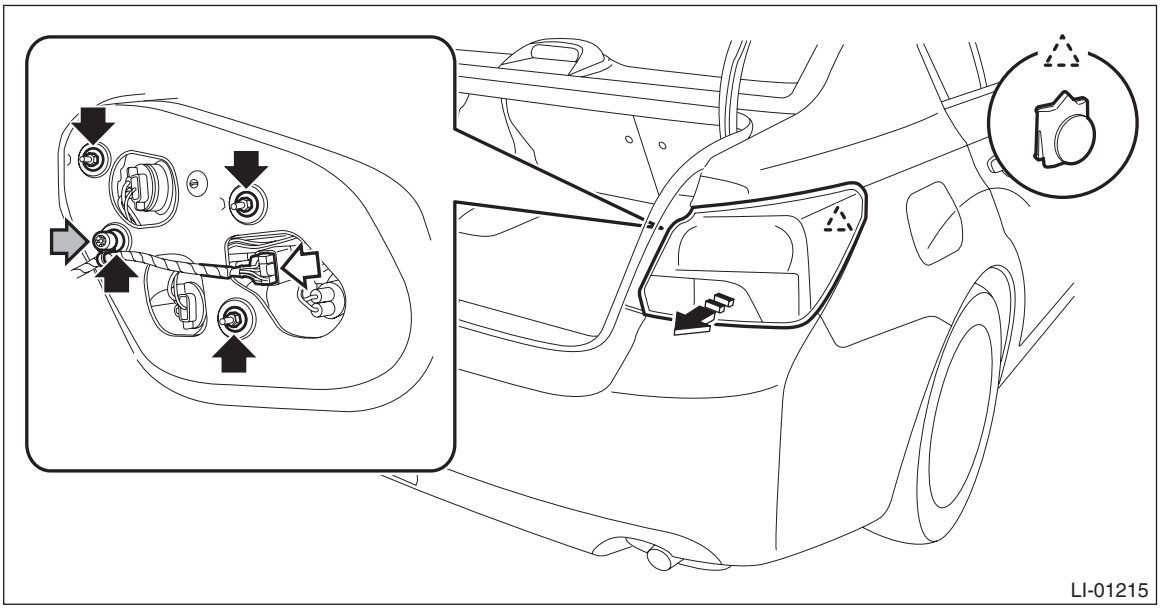
24.Rear Combination Light Assembly

A: REMOVAL

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery.
2) Remove the mat - trunk.
3) Remove the trim panel - trunk side. <Ref. to EI-105, REMOVAL, Trunk Room Trim.>
4) Remove the light assembly - rear combination.
   (1) Remove the harness clip and connector.
   (2) Release the nuts and clips, then remove the light assembly - rear combination.

CAUTION:
Be careful not to damage the clips.



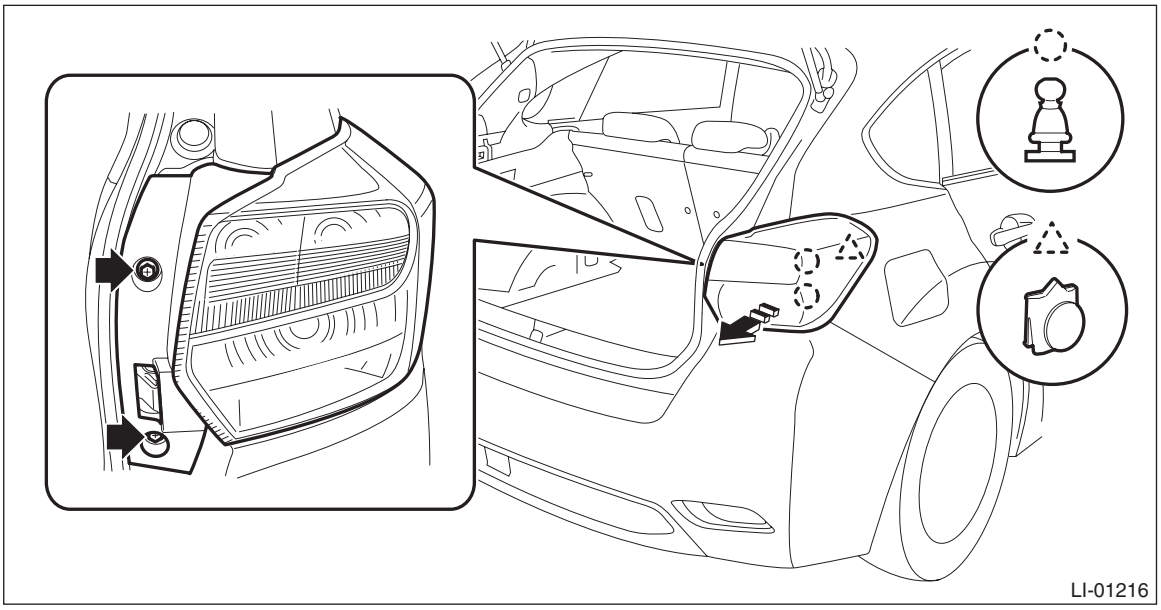
2. 5 DOOR MODEL/CROSSTREK MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the light assembly - rear combination.

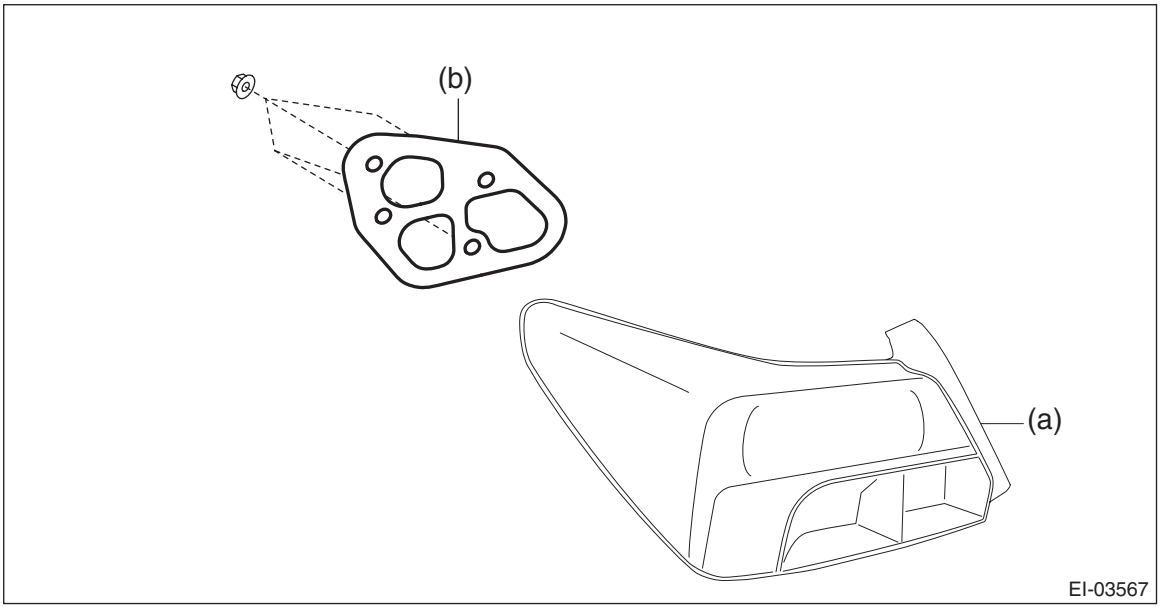
CAUTION:
Be careful not to damage the clips.
   (1) Release the bolts and clips, then pull out the light assembly - rear combination to the vehicle rear.

(2) Disconnect the connector and remove the light assembly - rear combination.



B: INSTALLATION

CAUTION:
For 4 door model, replace the gasket - rear combination (b) of the light assembly - rear combination (a) with a new part. If the gasket - rear combination is reused, water may come inside of the vehicle.



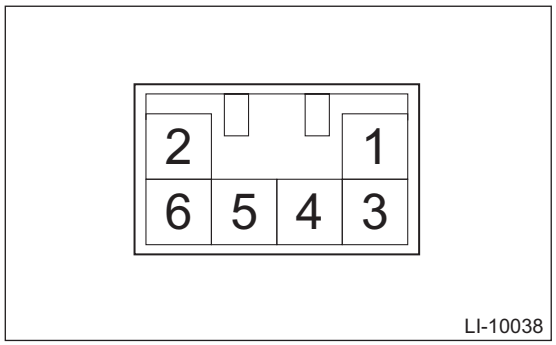
Install each part in the reverse order of removal.

Tightening torque:
Light assembly - rear combination: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

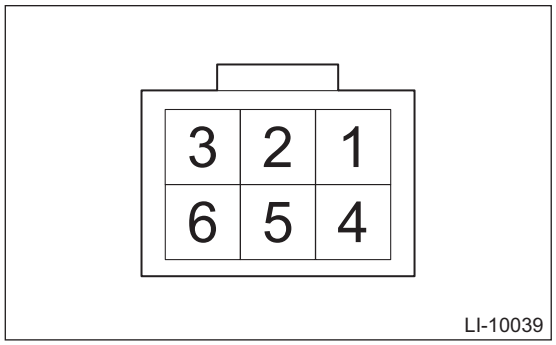
1) Apply battery voltage between the connector terminals to check the lighting condition of the light.

- 4 door model



Terminal No.	Inspection conditions	Specification
6 (+) — 2 (–)	Apply battery voltage.	Stop light on
4 (+) — 2 (–)		Tail (small) light on
3 (+) — 2 (–)		Turn signal light on
1 (+) — 2 (–)		Back-up light on

- 5 door model/Crosstrek model



Terminal No.	Inspection conditions	Specification
6 (+) — 3 (–)	Apply battery voltage.	Stop light on
2 (+) — 3 (–)		Tail (small)/side marker light on
4 (+) — 3 (–)		Turn signal light on
1 (+) — 3 (–)		Back-up light on

2) Replace the harness and bulb if it is found defective.

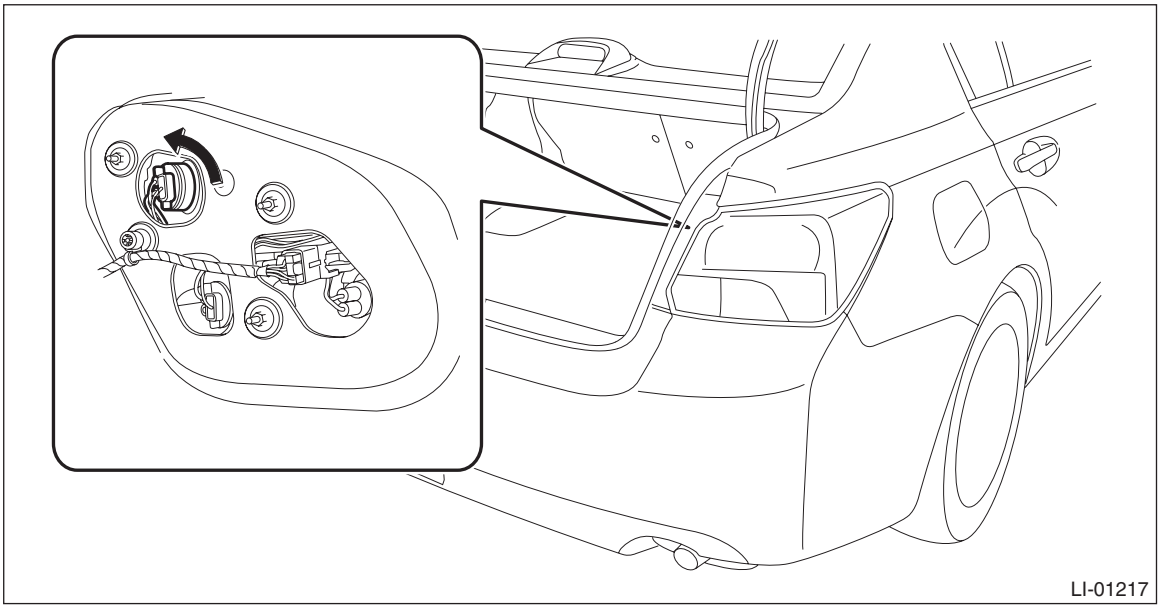
25.Tail/Stop Light Bulb

A: REMOVAL

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery.
2) Remove the mat - trunk.
3) Remove the trim panel - trunk side. <Ref. to EI-105, REMOVAL, Trunk Room Trim.>
4) Remove the bulb socket and tail light/stop light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



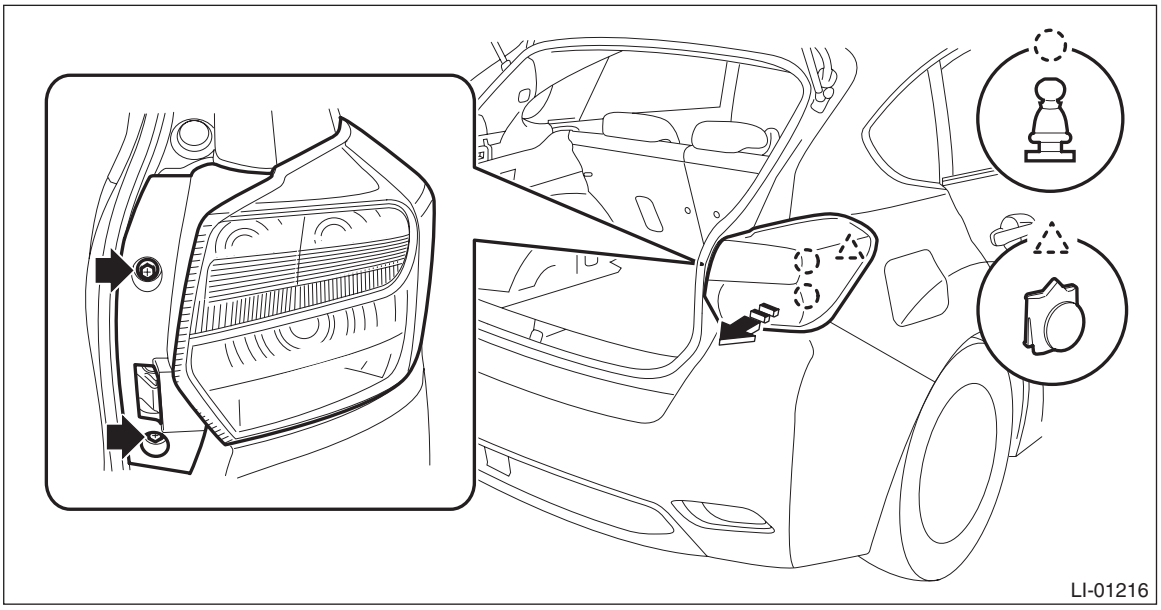
2. 5 DOOR MODEL/CROSSTREK MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the light assembly - rear combination.

CAUTION:
Be careful not to damage the clips.
(1) Release the bolts and clips, then pull out the light assembly - rear combination to the vehicle rear.

(2) Disconnect the connector and remove the light assembly - rear combination.

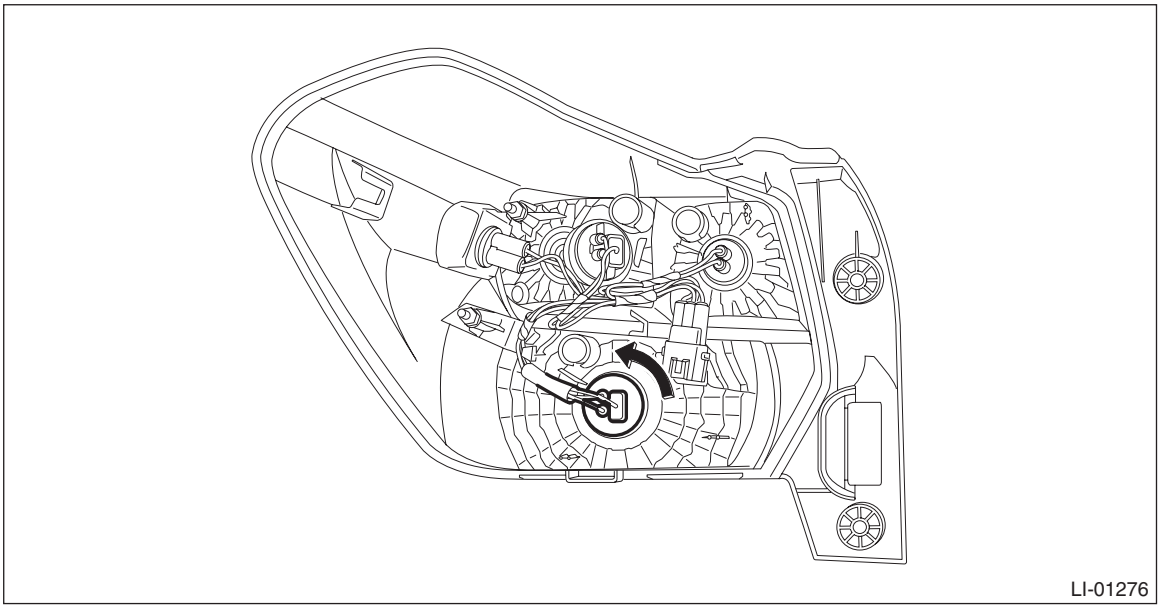


3) Remove the bulb socket and tail light/stop light bulb.

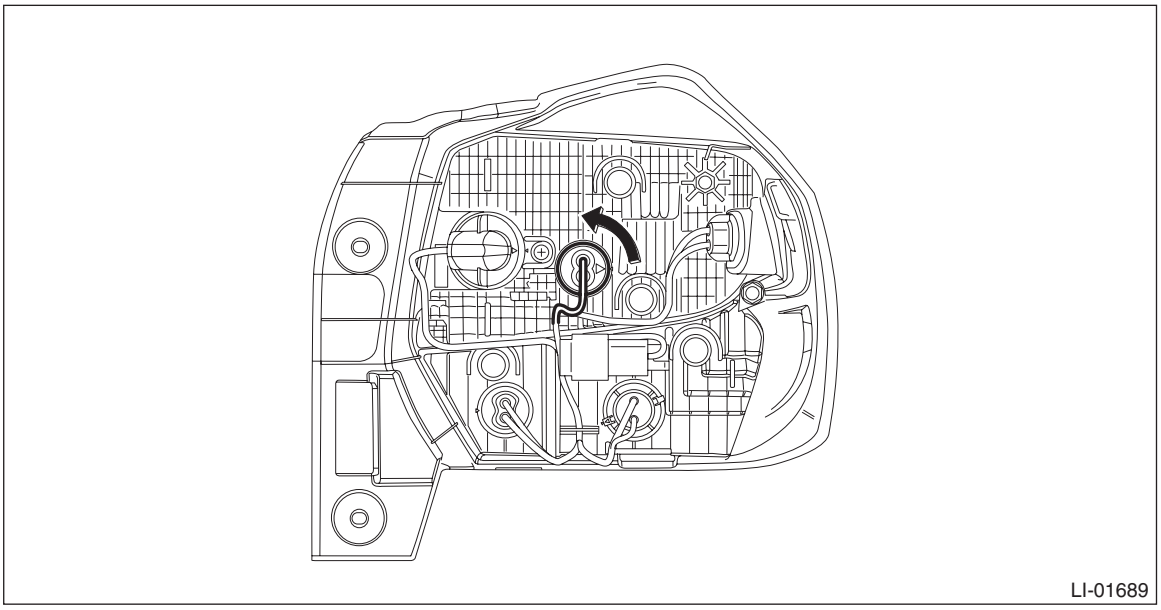
CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.

NOTE:
Only tail light bulb for HEV model

- Gasoline engine model



- HEV model



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Light assembly - rear combination (5 door model/Crosstrek model): 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

NOTE:
Since LED (Light Emitting Diode) is used for the HEV model's stop light, replace the light assembly - rear combination if the light does not blink normally after installation.

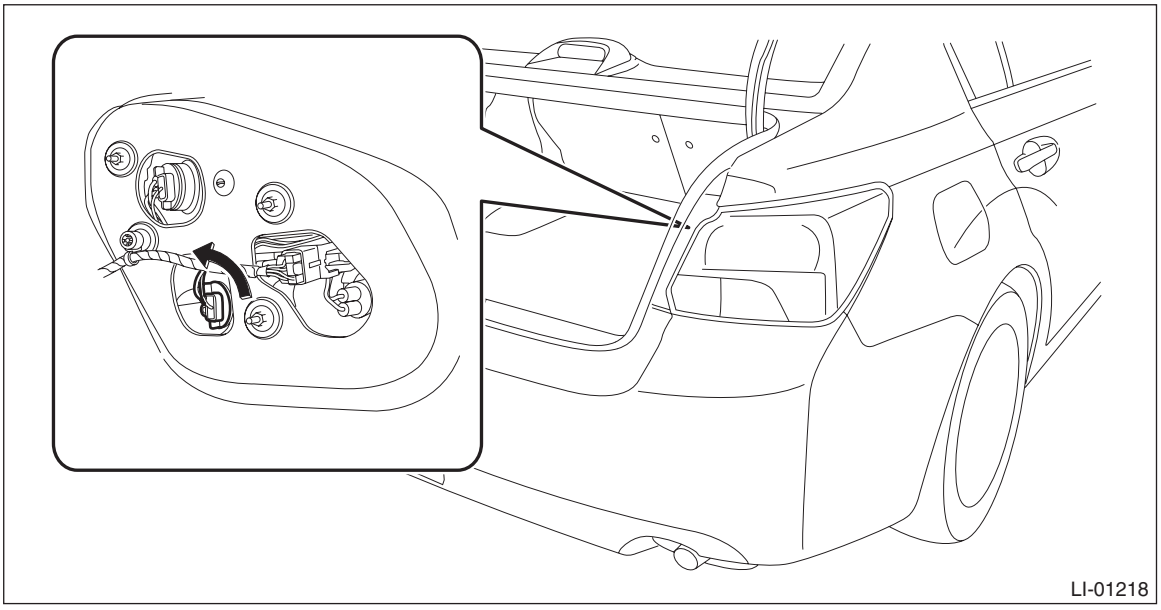
26.Rear Turn Signal Light Bulb

A: REMOVAL

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery.
2) Remove the mat - trunk.
3) Remove the trim panel - trunk side. <Ref. to EI-105, REMOVAL, Trunk Room Trim.>
4) Remove the bulb socket and rear turn signal light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



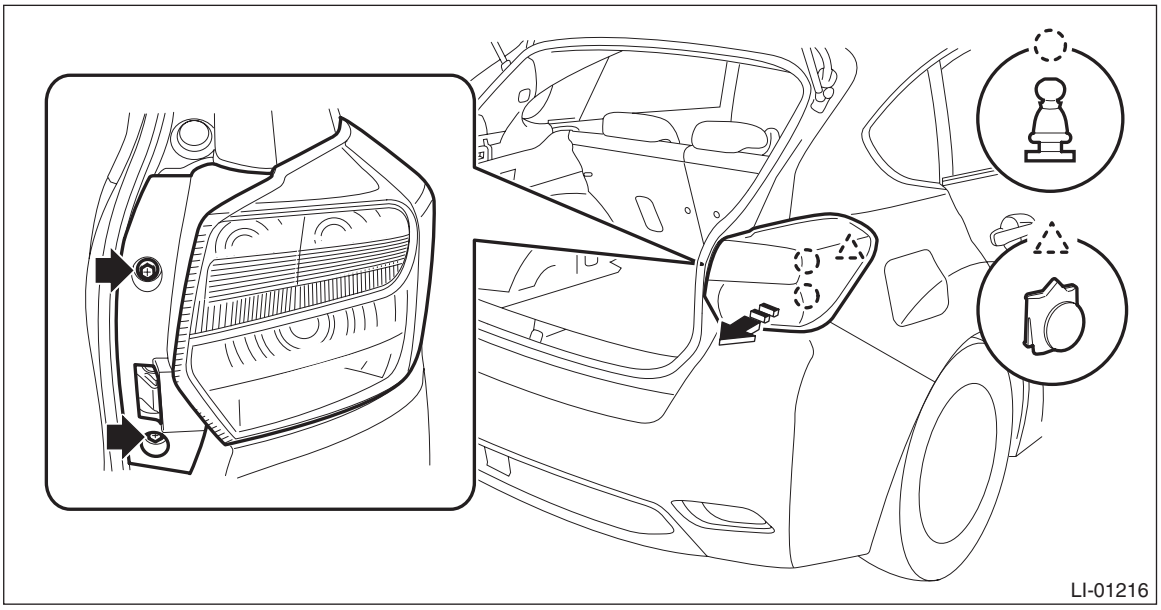
2. 5 DOOR MODEL/CROSSTREK MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the light assembly - rear combination.

CAUTION:
Be careful not to damage the clips.
(1) Release the bolts and clips, then pull out the light assembly - rear combination to the vehicle rear.

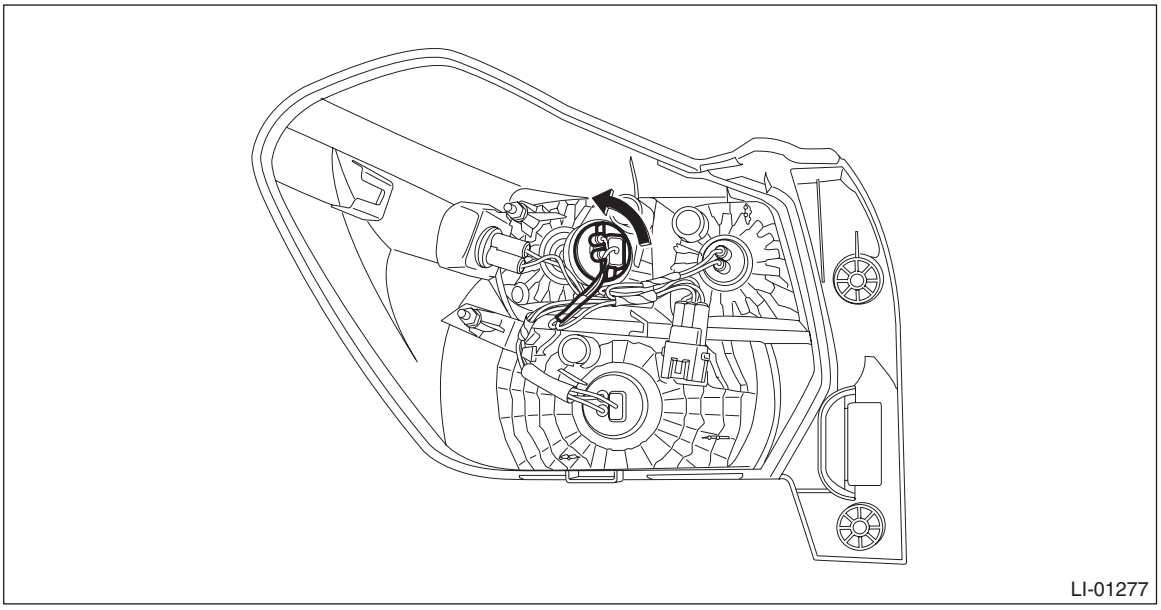
(2) Disconnect the connector and remove the light assembly - rear combination.



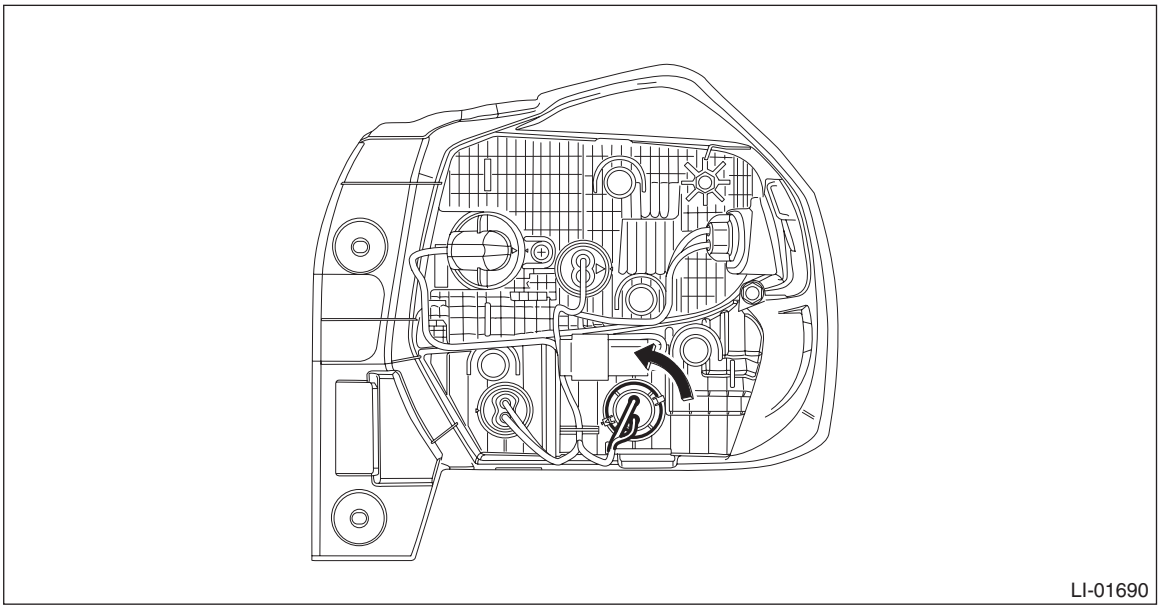
3) Remove the bulb socket and rear turn signal light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.

- Gasoline engine model



- HEV model



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Light assembly - rear combination (5 door model/Crosstrek model): 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

27.Rear Side Marker Light Bulb

A: REMOVAL

1. 4 DOOR MODEL

It is integrated with the tail light bulb. For details concerning operation procedures, refer to “REMOVAL” of “Tail/Stop Light Bulb”. <Ref. to LI-60, REMOVAL, Tail/Stop Light Bulb.>

2. 5 DOOR MODEL/CROSSTREK MODEL

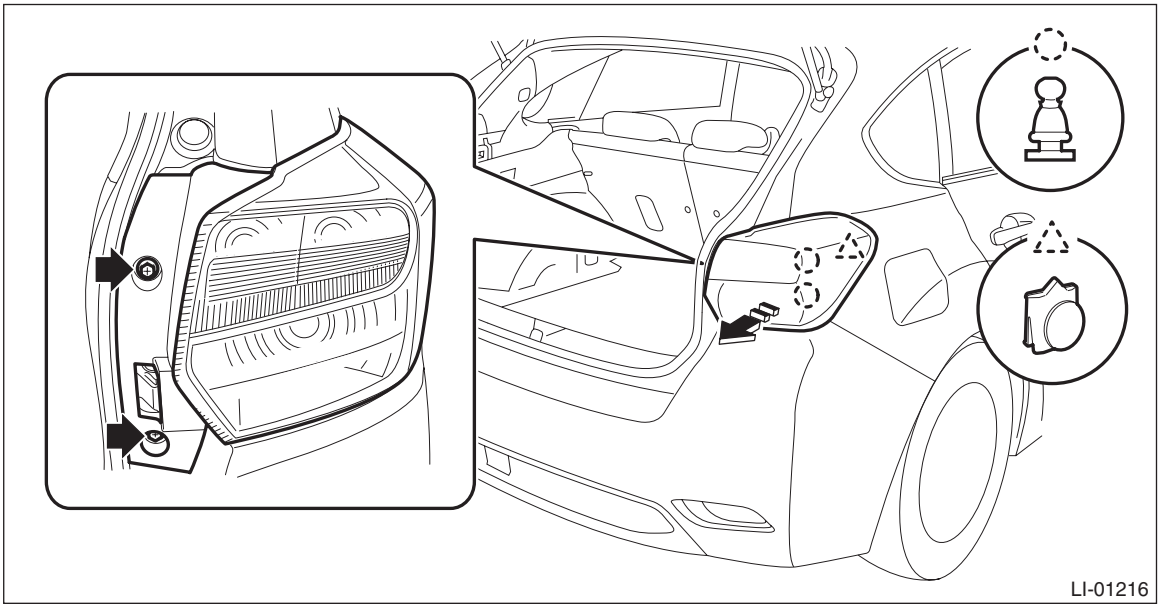
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the light assembly - rear combination.

CAUTION:
Be careful not to damage the clips.

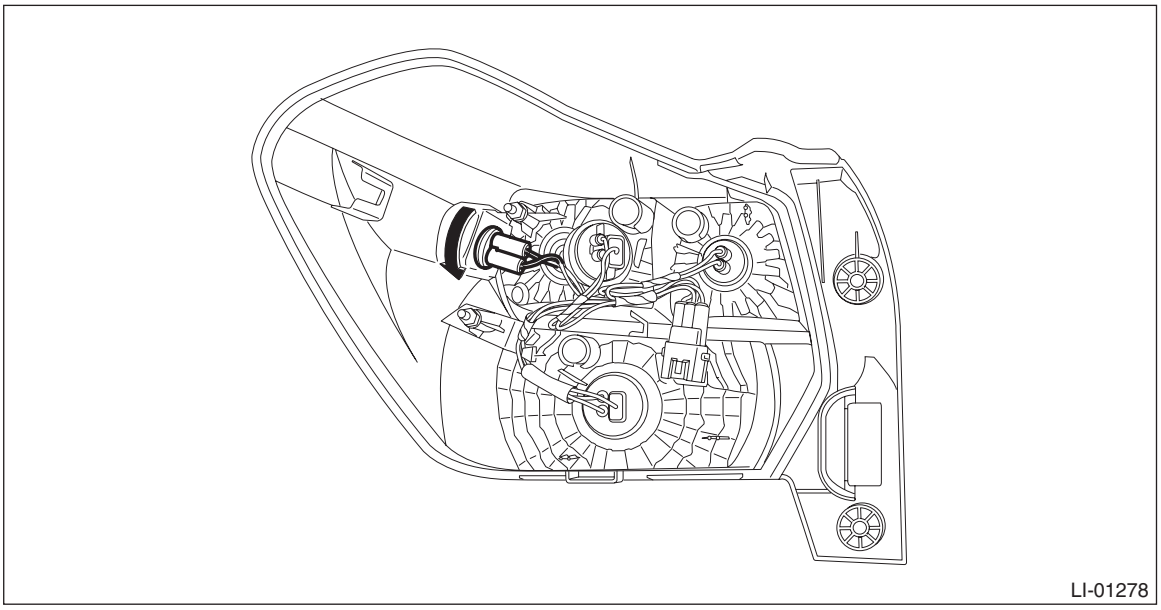
(1) Release the bolts and clips, then pull out the light assembly - rear combination to the vehicle rear.
(2) Disconnect the connector and remove the light assembly - rear combination.



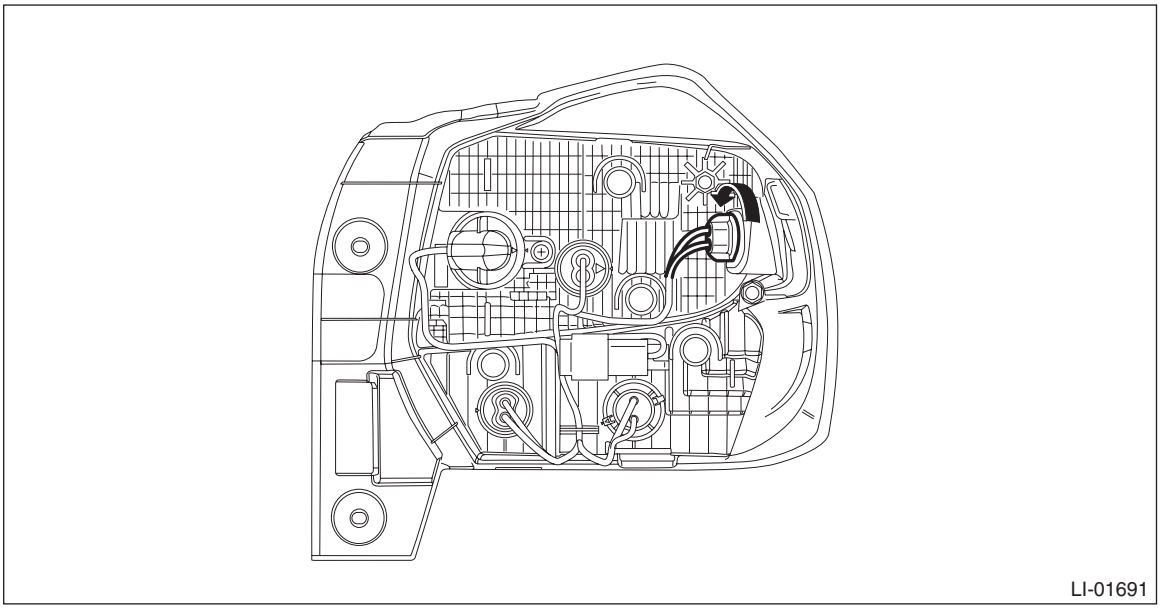
3) Remove the bulb socket, and remove the rear side marker light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.

- Gasoline engine model



- HEV model



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Light assembly - rear combination (5 door model/Crosstrek model): 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

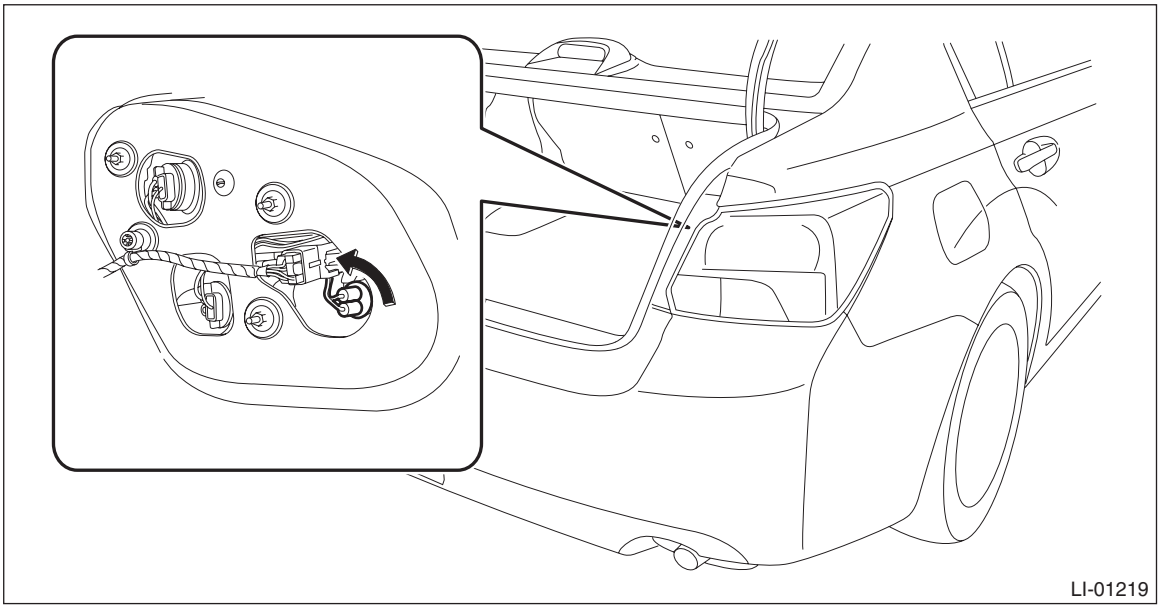
28.Back-up Light Bulb

A: REMOVAL

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery.
2) Remove the mat - trunk.
3) Remove the trim panel - trunk side. <Ref. to EI-105, REMOVAL, Trunk Room Trim.>
4) Remove the bulb socket and back-up light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



2. 5 DOOR MODEL/CROSSTREK MODEL

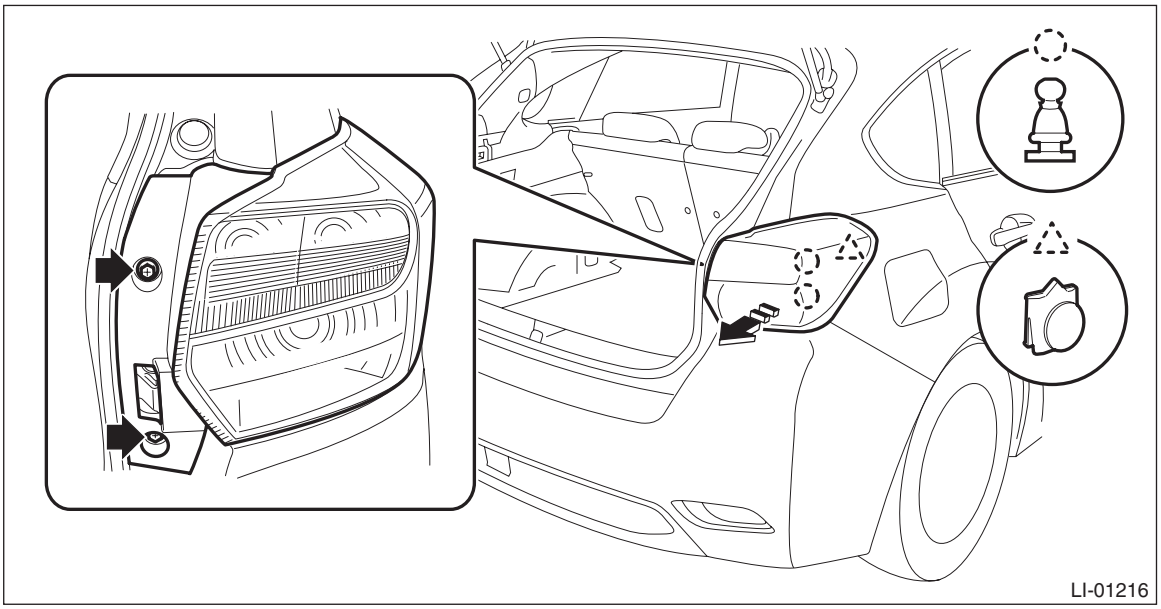
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the light assembly - rear combination.

CAUTION:
Be careful not to damage the clips.

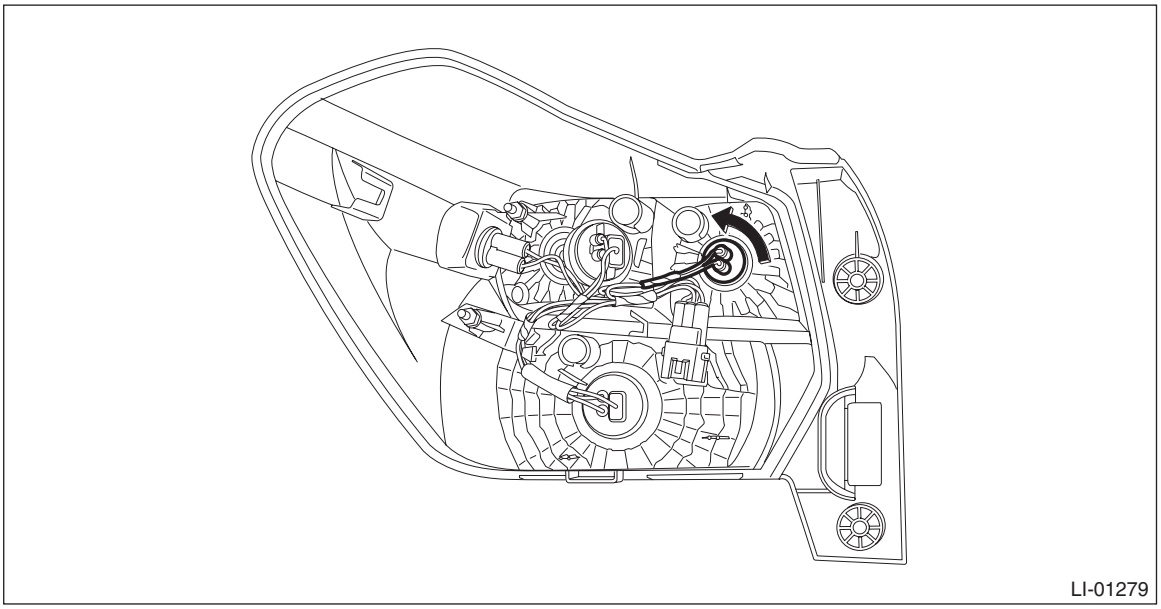
(1) Release the bolts and clips, then pull out the light assembly - rear combination to the vehicle rear.
(2) Disconnect the connector and remove the light assembly - rear combination.



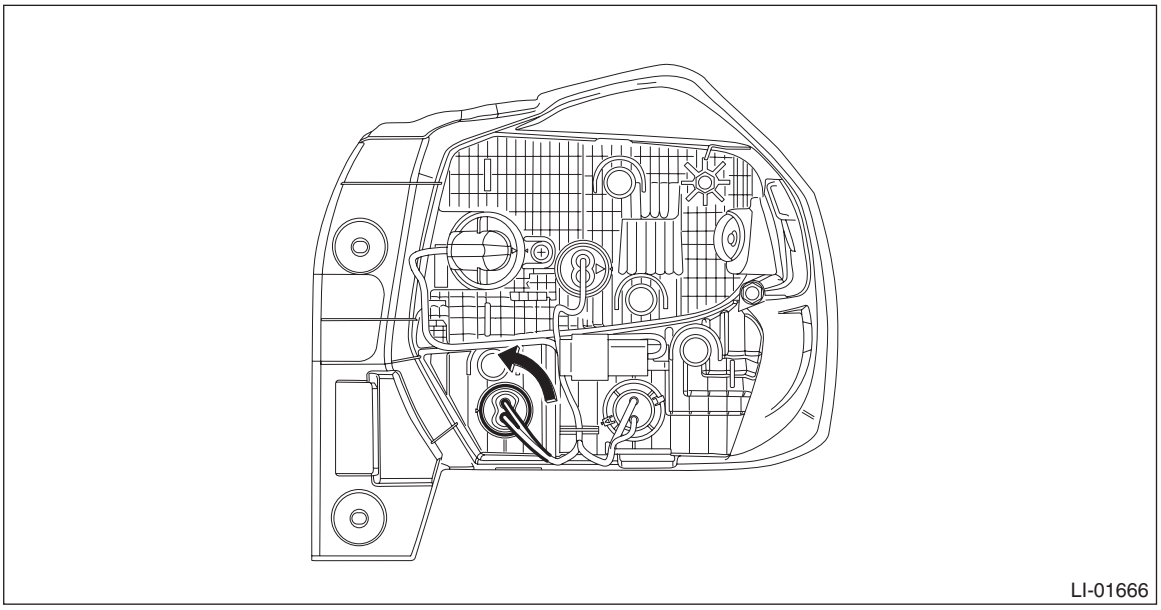
3) Remove the bulb socket and rear turn signal light bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.

- Gasoline engine model



- HEV model



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Light assembly - rear combination (5 door model/Crosstrek model): 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

29.License Plate Light

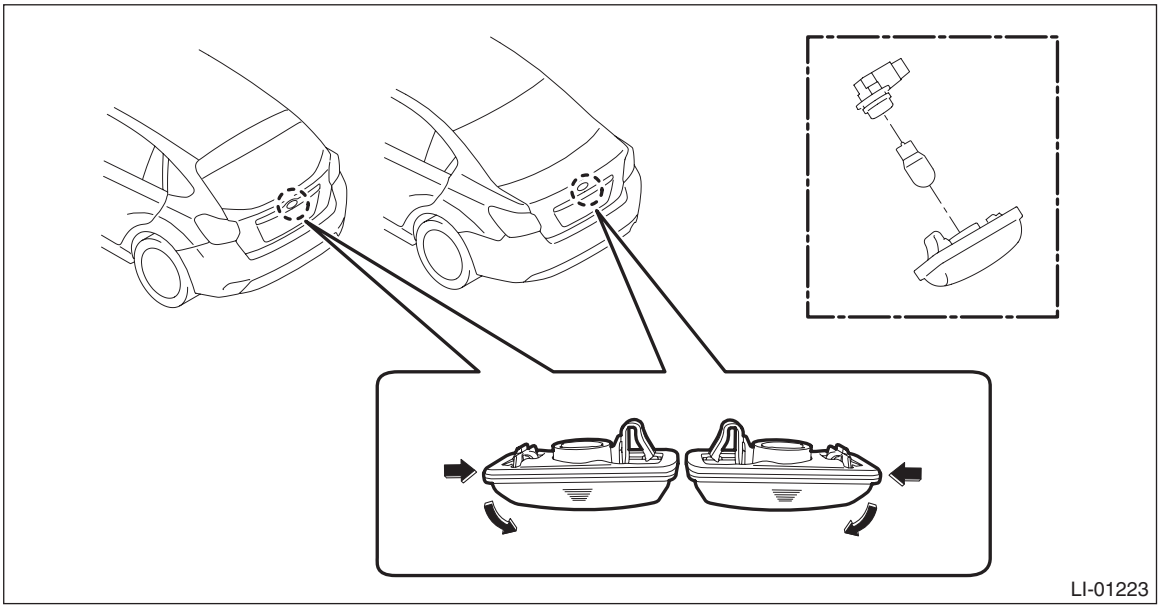
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

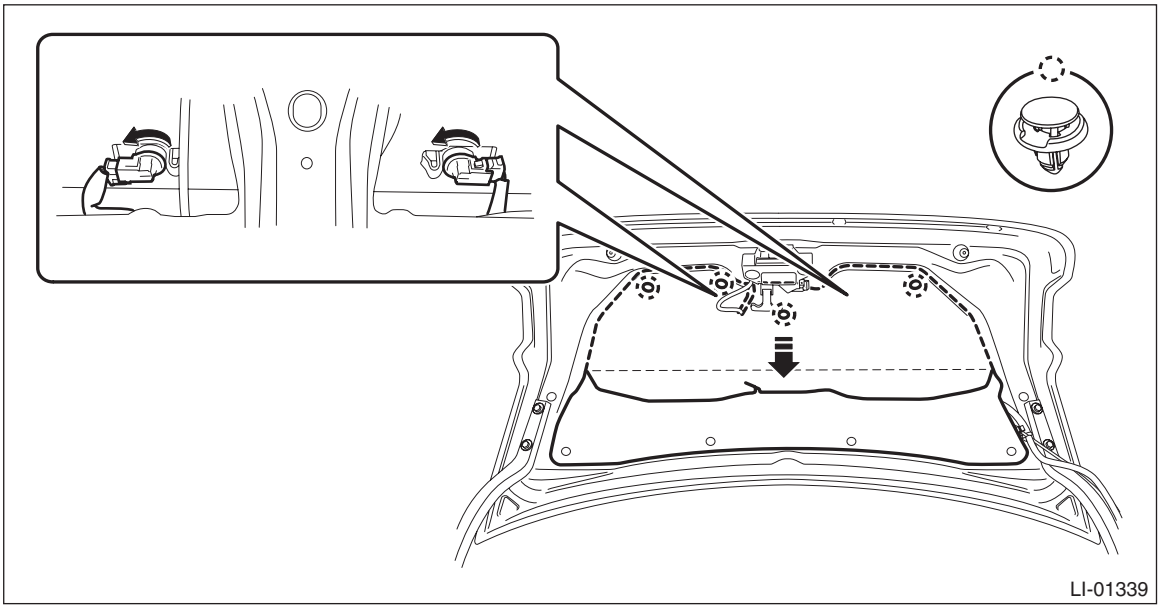
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the garnish - trunk. (4 door model) <Ref. to EI-126, REMOVAL, Trunk Lid Garnish.>
3) Remove the license plate light.
   (1) Release the claws and pull out the license plate light.
   (2) Disconnect the connector and remove the bulb socket and bulb from the license plate light.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



NOTE:
For 4 door model, when removing the bulb only, remove the trim panel - trunk lid halfway, then remove the bulb socket and the bulb.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

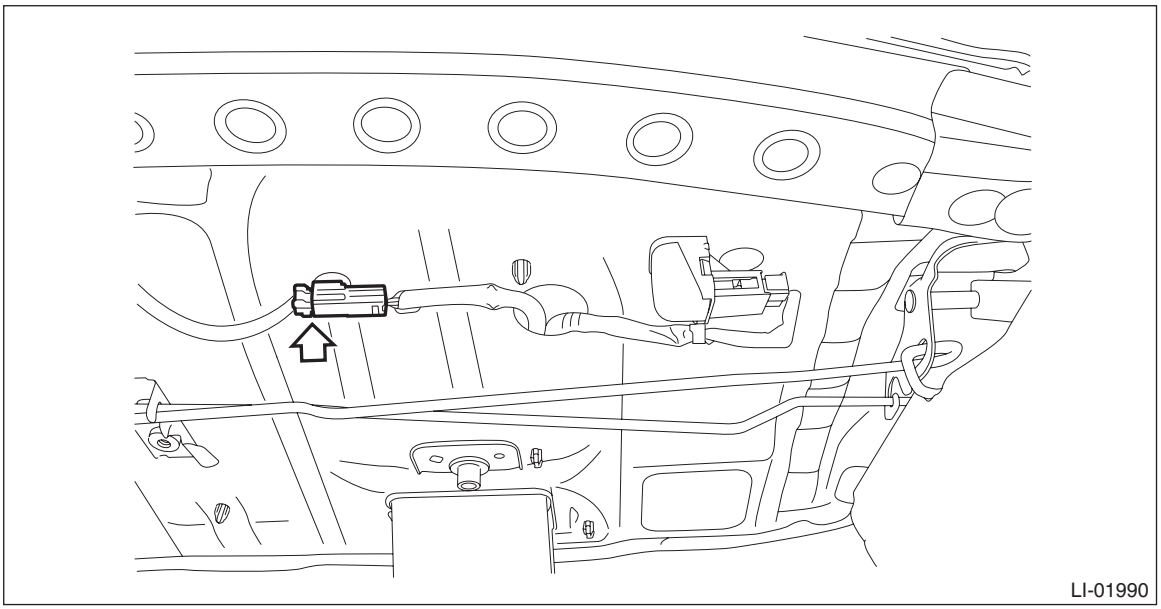
1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

30.High-mounted Stop Light

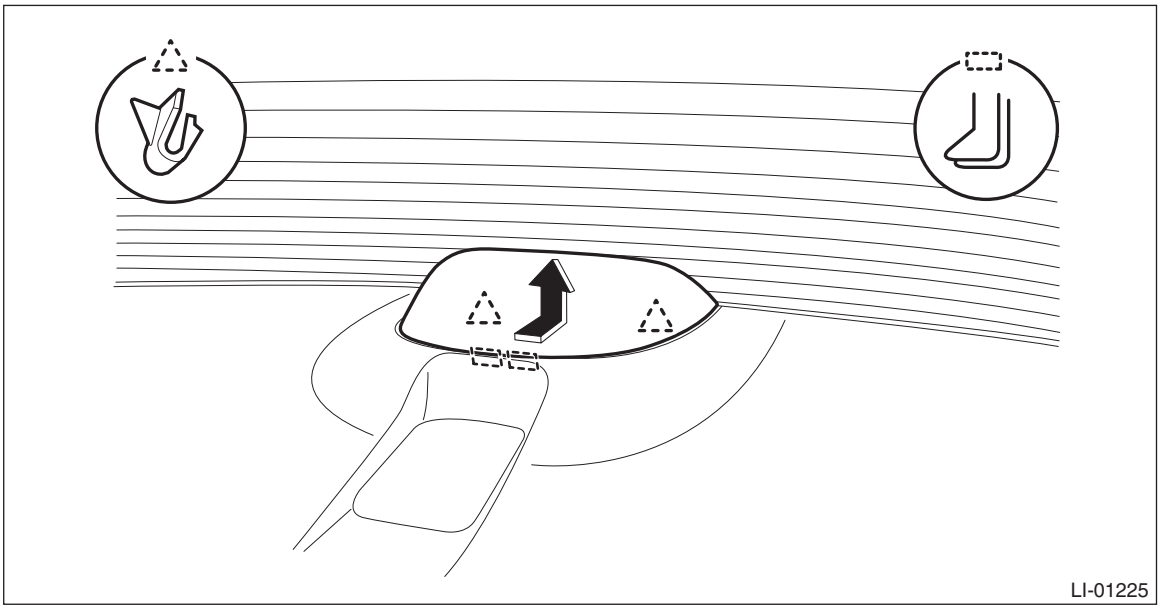
A: REMOVAL

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery.
2) Remove the light assembly - high-mounted.
   (1) Disconnect the connector.

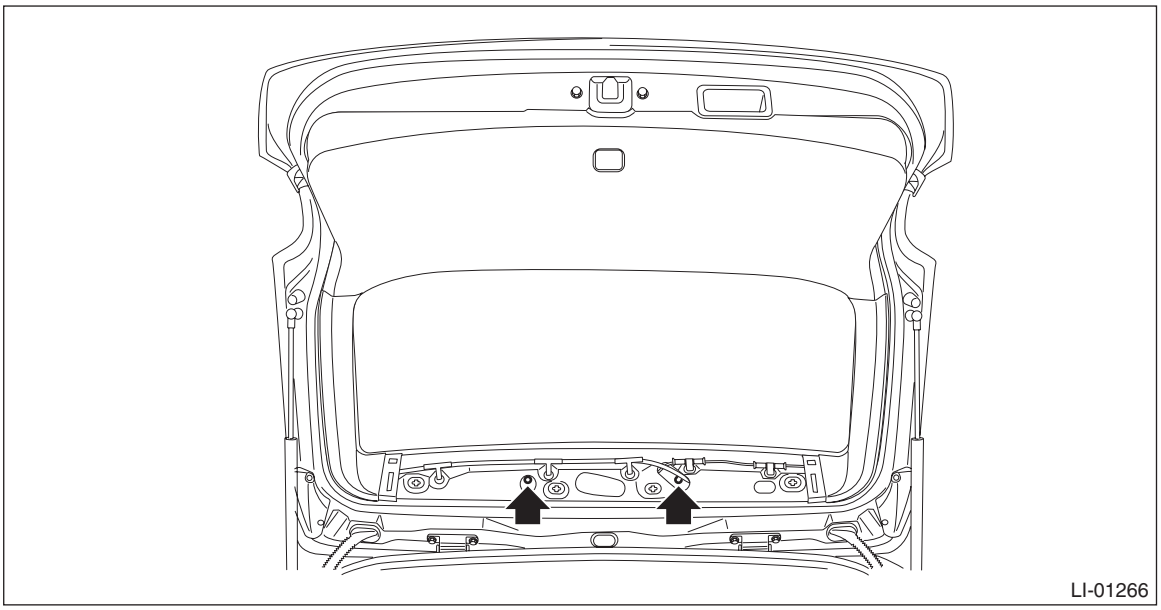


   (2) Release the claws, and remove the light assembly - high-mounted.

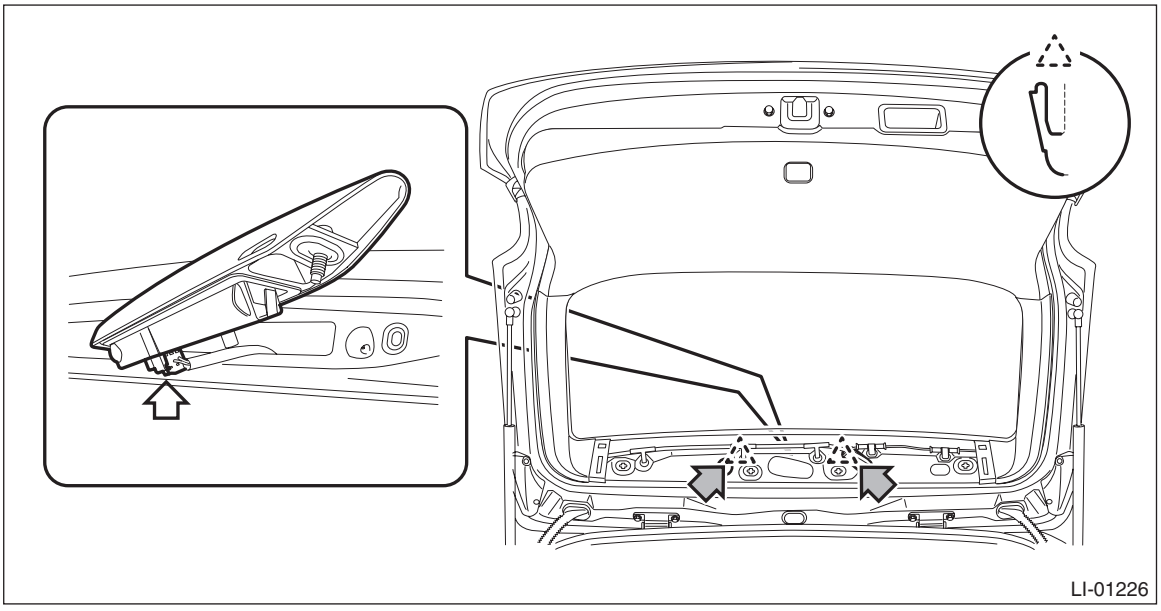


2. 5 DOOR/CROSSTREK MODEL

1) Disconnect the ground cable from battery.
2) Remove the trim panel - rear gate UPR. <Ref. to EI-122, REMOVAL, Rear Gate Trim.>
3) Remove the light assembly - high-mounted.
   (1) Remove the nut.



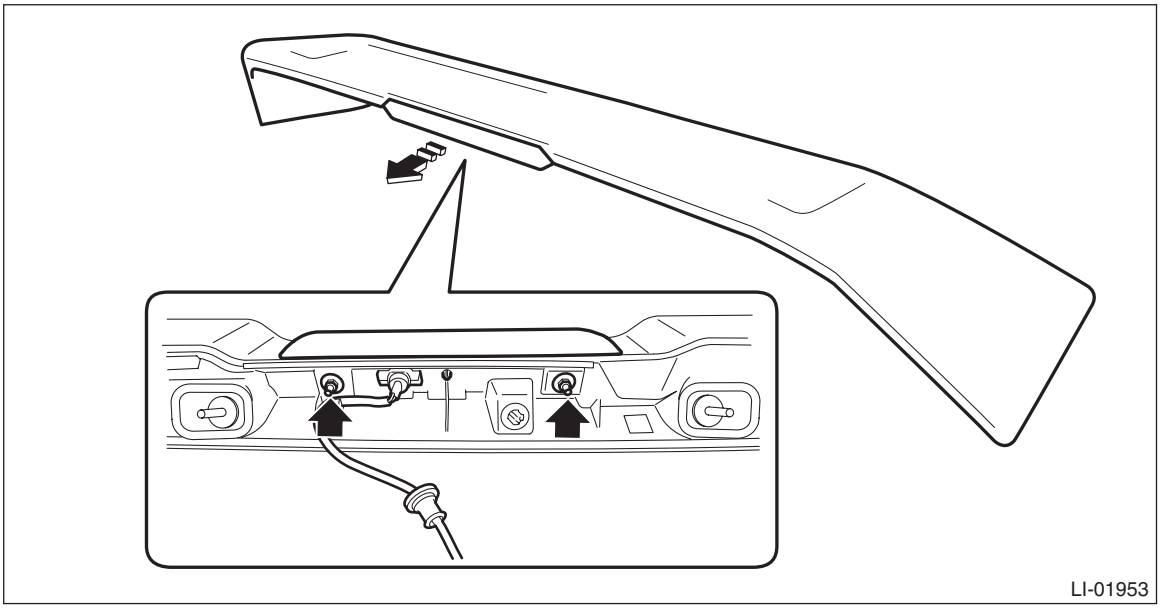
   (2) From the inside of the rear gate, push the claws on both side of the light assembly - high-mounted to take it out toward vehicle rear.
   (3) Disconnect the connector and remove the light assembly - high-mounted.



3. HEV MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - rear gate UPR and the trim panel - rear gate pillar side. <Ref. to EI-122, REMOVAL, Rear Gate Trim.>
3) Remove the roof spoiler assembly. <Ref. to EI-67, REMOVAL, Roof Spoiler.>
4) Remove the nuts and remove the light assembly - high-mounted.



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Light assembly - high-mounted (5 door model/Crosstrek (gasoline engine) model and HEV model): 4.5 N·m (0.46 kgf-m, 3.3 ft-lb)

C: INSPECTION

1) Install the light to test if it illuminates normally.
2) If it fails to illuminate normally, replace the light assembly - high-mounted with a new part.

NOTE:
Since LED (Light Emitting Diode) is used for the light, replace the light assembly - high-mounted if the LED burns out.

31.Spot Map Light

A: REMOVAL

1. MODELS WITHOUT EyeSight

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

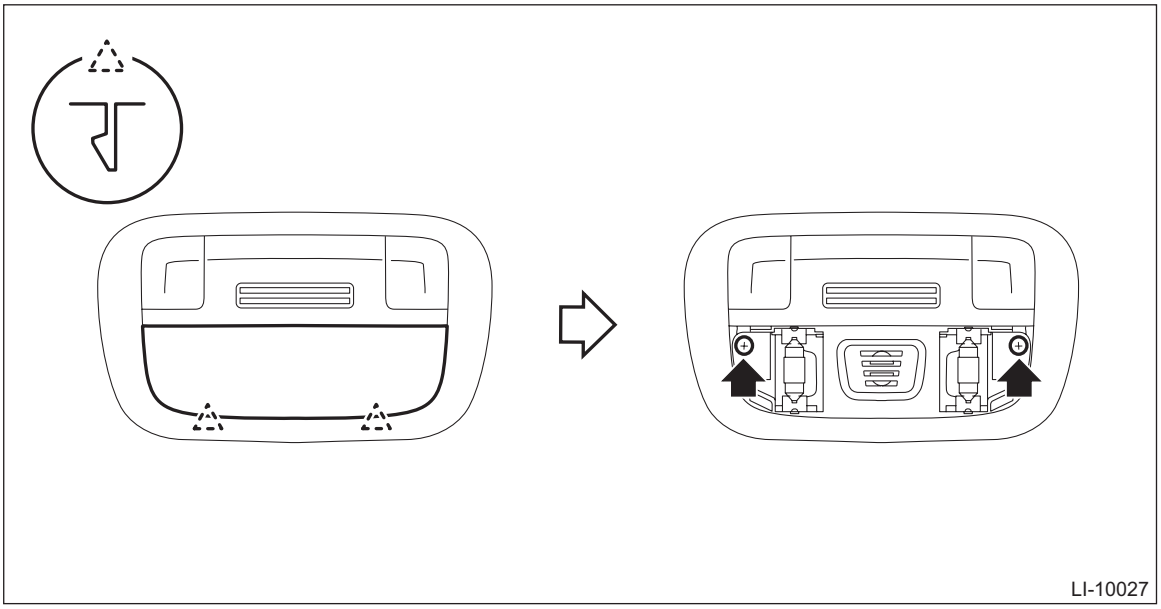
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the light assembly - map.

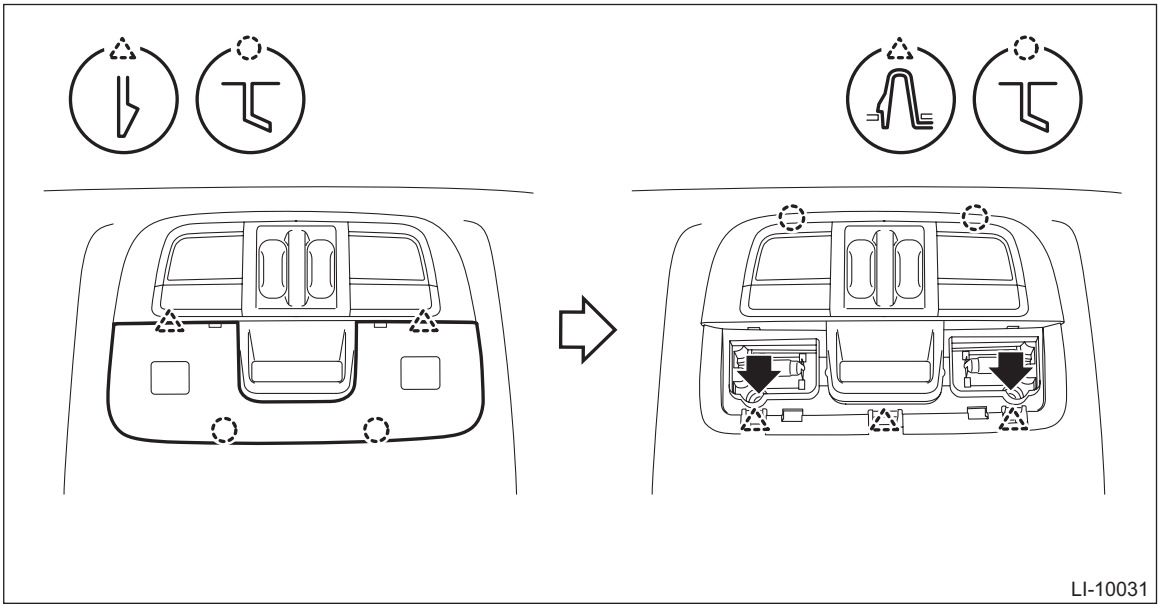
CAUTION:
When using a flat tip screwdriver, choose a suitable sized tool for the insertion opening. Apply protective tape or cloth and be careful not to cause damage.

(1) Release the claws and remove the lens.
(2) Remove the screws and pull out the light assembly - map.

- Model without sunroof



- Model with sunroof



(3) Disconnect the connector and remove the light assembly - map and the bulb.

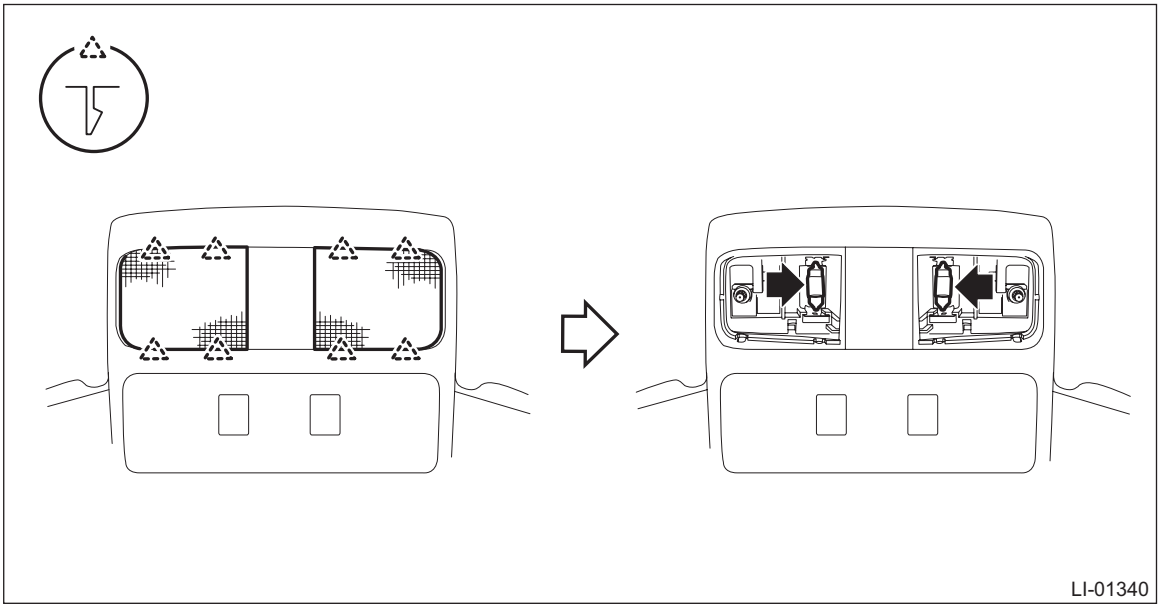
CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.

2. MODELS WITH EyeSight

NOTE:
The spot map light is a single unit with the stereo camera cover.
1) Disconnect the ground cable from battery.
2) Remove the stereo camera cover. <Ref. to ES-7, REMOVAL, Stereo Camera.>

CAUTION:
When using a flat tip screwdriver, choose a suitable sized tool for the insertion opening. Apply protective tape or cloth and be careful not to cause damage.
3) Release the claws and remove the lens.
4) Remove the bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1. SPOT MAP LIGHT BULB

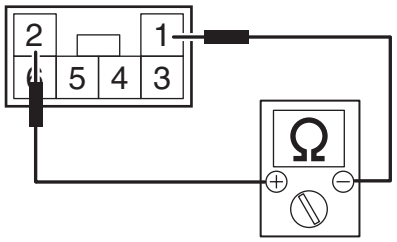
1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

2. SPOT MAP LIGHT SWITCH

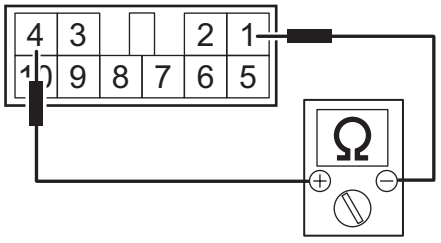
1) Check the resistance between switch terminals.

Preparation tool:
Circuit tester

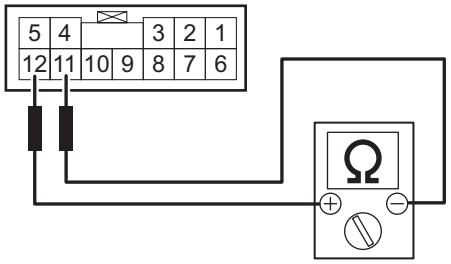
- Models without EyeSight
  – Model without sunroof

Terminal No.	Inspection conditions	Standard	Connection diagram
1 — 2	Switch OFF	1 MΩ or more	 LI-01955
	Switch ON	Approx. 18 Ω	

– Model with sunroof

Terminal No.	Inspection conditions	Standard	Connection diagram
1 — 4	Switch OFF	1 MΩ or more	 LI-10028
	Switch ON	Approx. 18 Ω	

- Models with EyeSight

Terminal No.	Inspection conditions	Standard	Connection diagram
11 — 12	Switch OFF	1 MΩ or more	 LI-01341
	Switch ON	Approx. 18 Ω	

2) Replace the light assembly - map if the inspection result is not within the standard value.

32.Room Light

A: REMOVAL

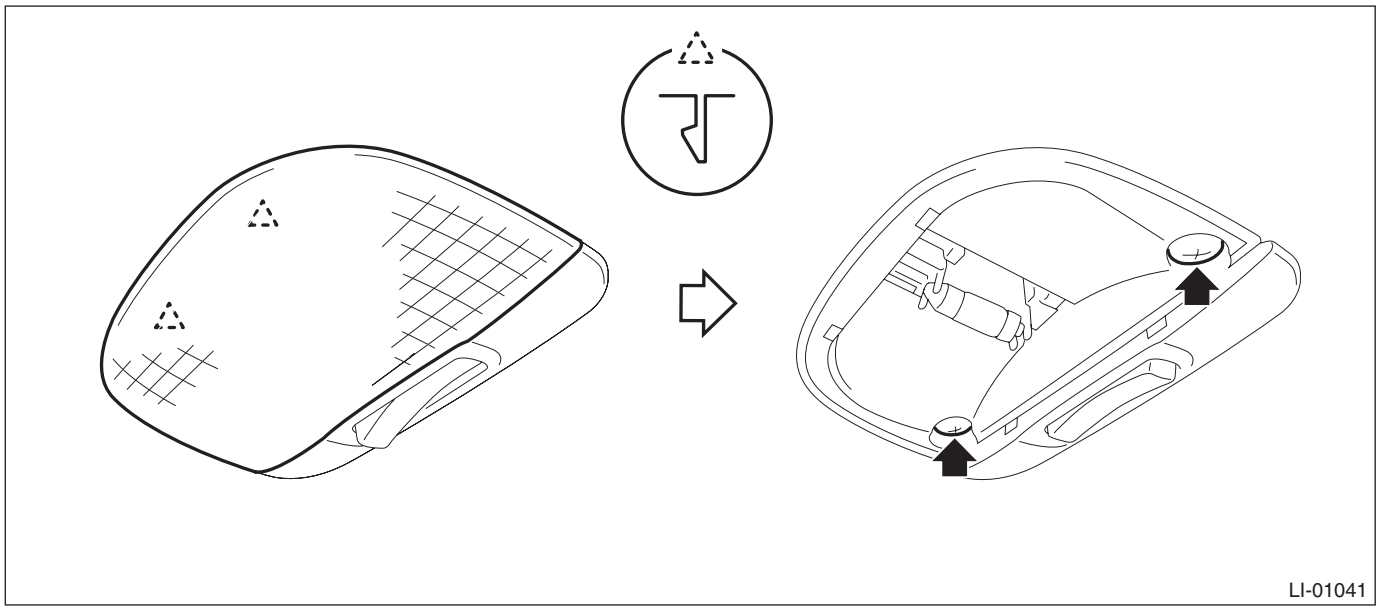
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the light assembly - room.

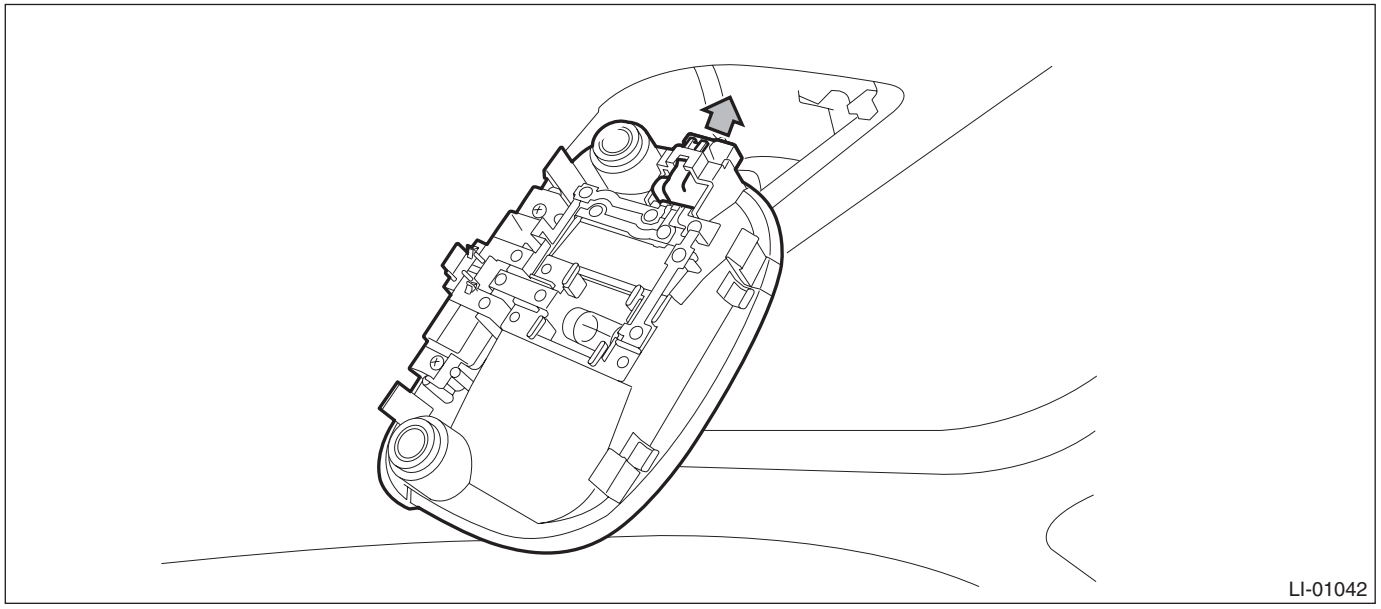
CAUTION:
When using a flat tip screwdriver, apply protective tape or cloth and be careful not to cause damage.

(1) Release the claws and remove the lens.
(2) Remove the screws and pull out the light assembly - room.



(3) Disconnect the connector and remove the light assembly - room and the bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

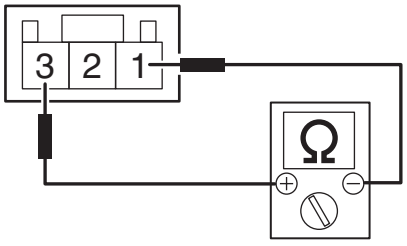
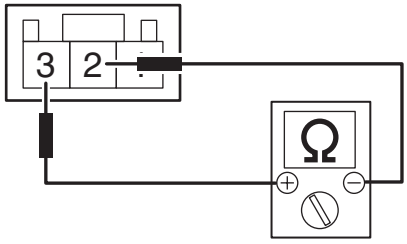
1. ROOM LIGHT BULB

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

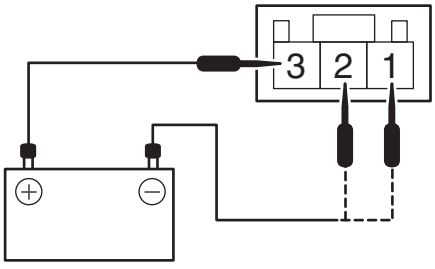
2. ROOM LIGHT SWITCH

1) Check the resistance between switch terminals.

Preparation tool:
Circuit tester

Terminal No.	Inspection conditions	Standard	Connection diagram
1 — 3	Switch OFF	1 MΩ or more	 LI-01254
	Switch ON	Less than 1 Ω	
2 — 3	Switch door	Less than 1 Ω	 LI-01255

2) Apply battery voltage to check the lighting condition of the light.

Terminal No.	Inspection conditions	Specification	Connection diagram
3 (+) — 1, 2 (–)	Switch OFF	Light OFF	 LI-01256
	Switch ON	Light ON	
	Switch door	Light ON	

3) Replace the light assembly - room if the inspection result is not within the standard value.

33.Luggage Room Light

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

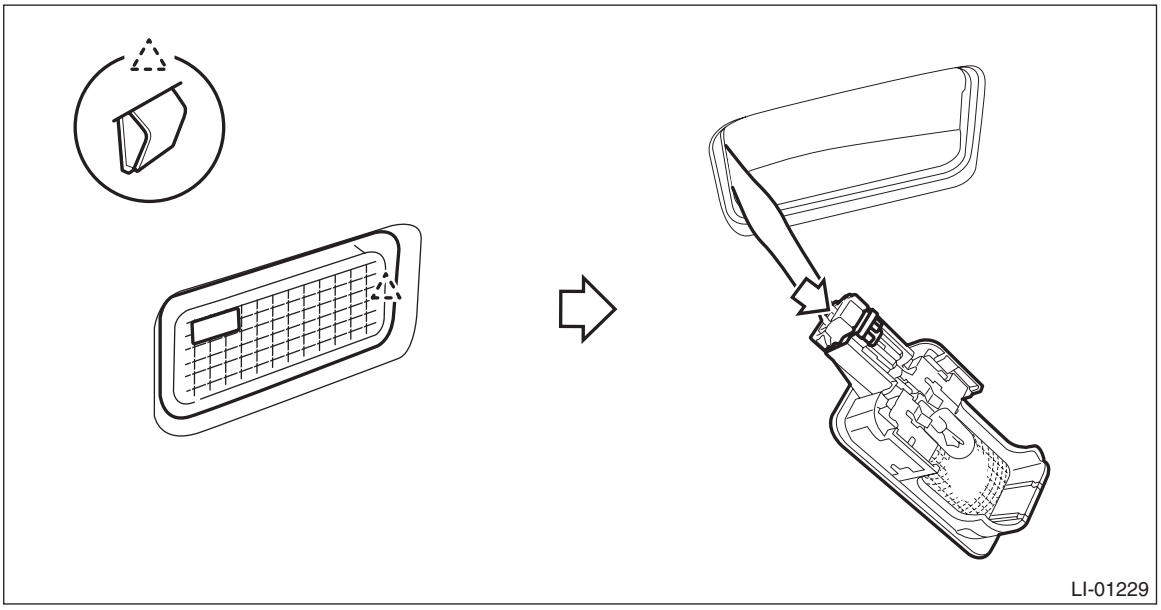
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the light assembly - luggage room.

CAUTION:
When using a flat tip screwdriver, apply protective tape or cloth and be careful not to cause damage.

(1) Release the claws and remove the main body of the light assembly - luggage room.
(2) Disconnect the connector and remove the light assembly - luggage room and the bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

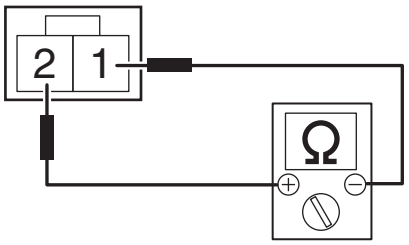
1. LUGGAGE ROOM LIGHT BULB

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

2. LUGGAGE ROOM LIGHT SWITCH

1) Check the resistance between switch terminals.

Preparation tool:
Circuit tester

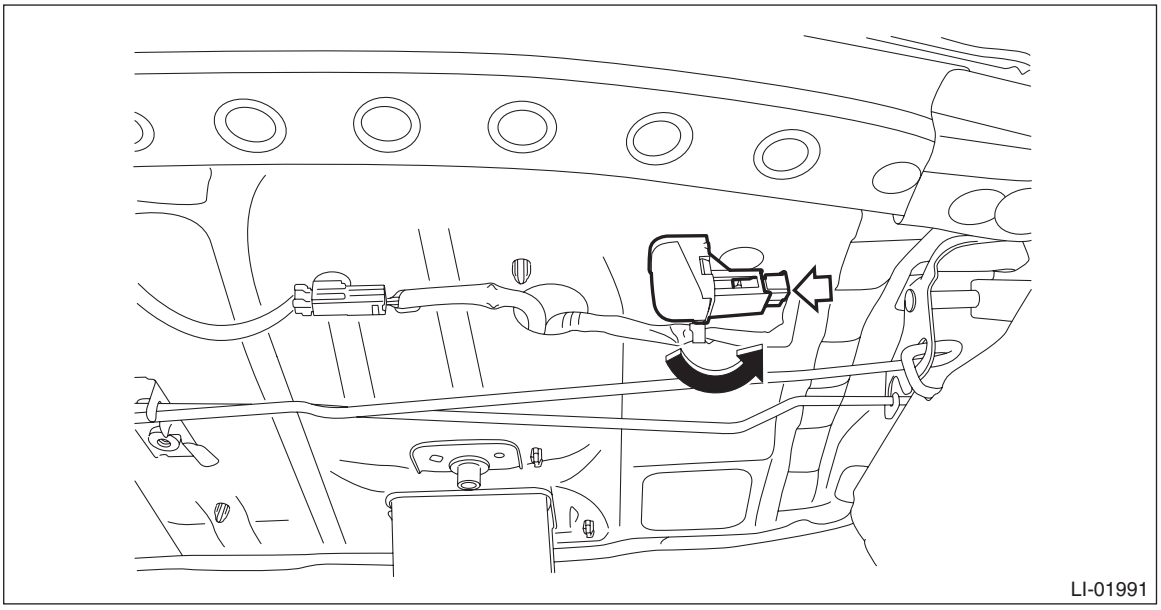
Terminal No.	Inspection conditions	Specification	Connection diagram
1 — 2	Switch OFF	1 MΩ or more	 LI-01253
	Switch ON	Less than 1 Ω	

2) Replace the light assembly - luggage room if the inspection result is not within the standard value.

34.Trunk Room Light

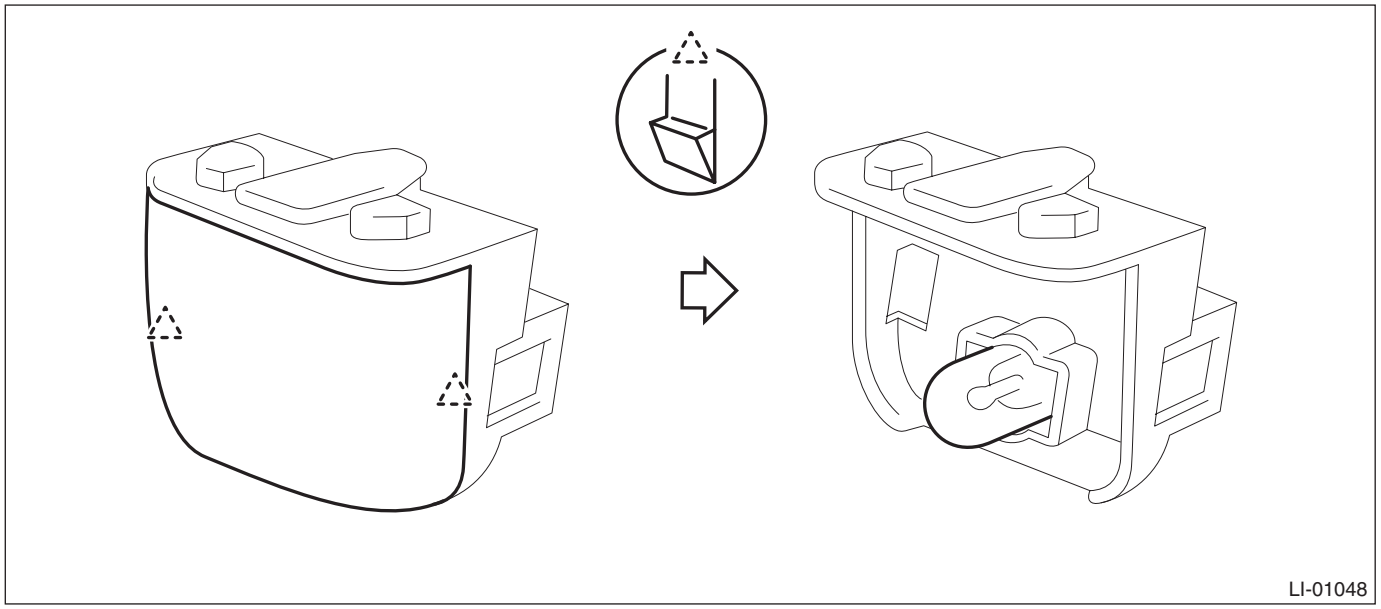
A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the light assembly - trunk room.
   (1) Disconnect the connector.
   (2) Turn the light assembly - trunk room counterclockwise to 60° and remove the light.



3) Release the claws, and detach the lens and bulb.

CAUTION:
Use a dry clean cloth so that no grease or water adheres to the glass portion of the bulb.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Visually check the bulb for blow out.
2) Check the bulb specification. <Ref. to LI-2, SPECIFICATION, General Description.>
3) Replace the bulb if it is found defective.

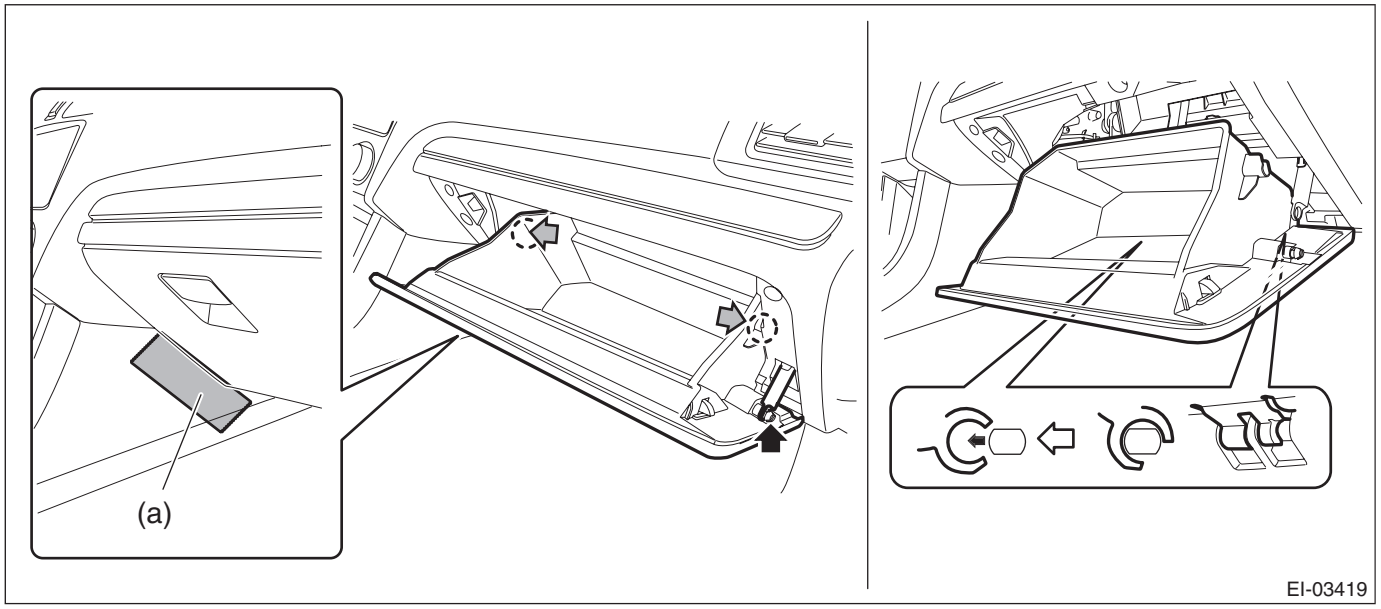
35.Glove Box Light

A: REMOVAL

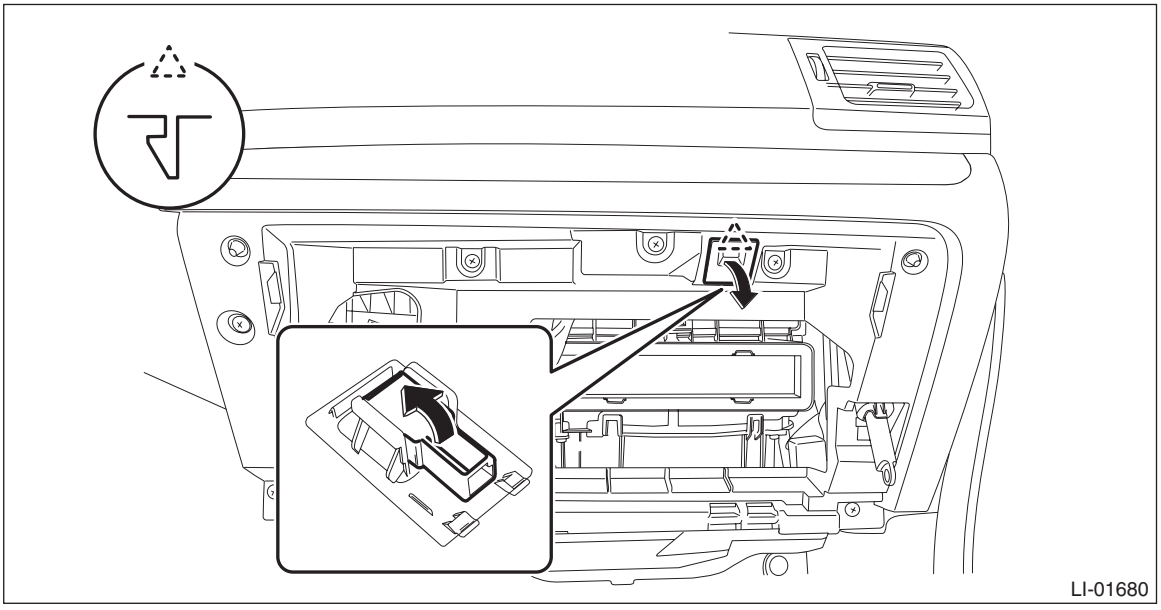
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the pocket assembly.
   (1) Attach the protective tape (a) to the panel center LWR.
   (2) Remove the damper COMPL - pocket.
   (3) Release the stoppers and remove the pocket assembly by pulling it toward you.



3) Remove the light - pocket.
   (1) Release the claws and remove the light - pocket cover from the back panel - pocket.
   (2) Disconnect the connector and remove the light - pocket from the cover.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Install the light to test if it illuminates normally.
2) If it fails to illuminate normally, replace the light - pocket with a new part.

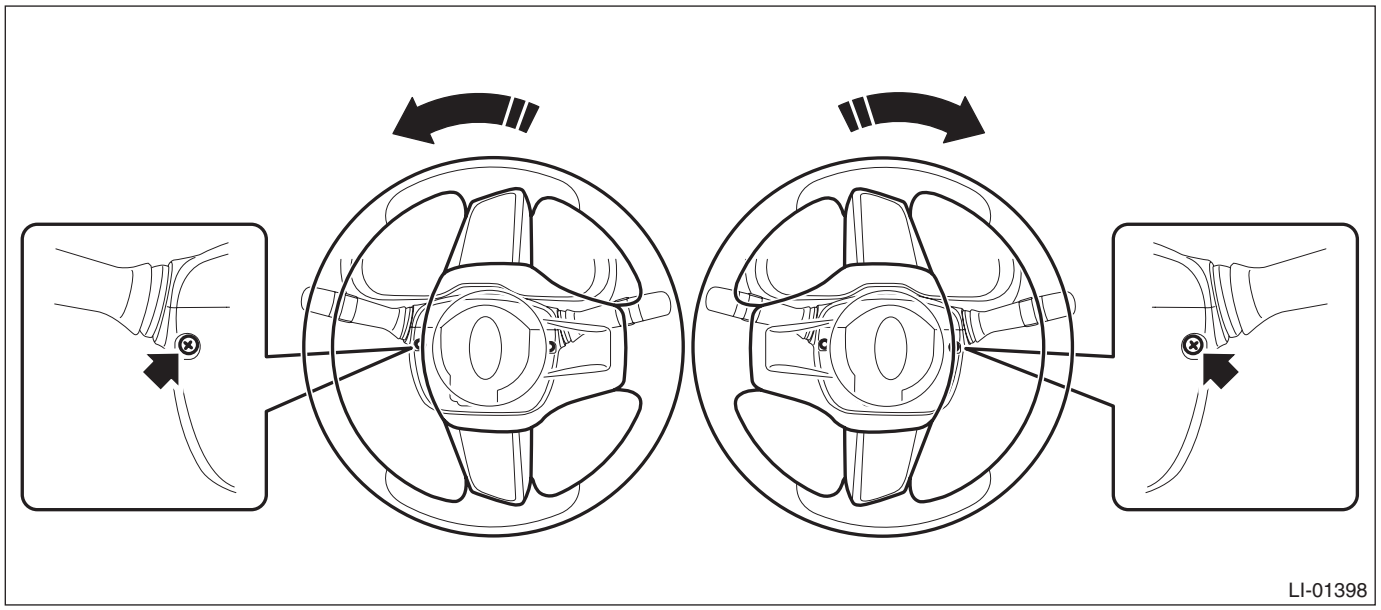
NOTE:
Since LED (Light Emitting Diode) is used for the light, replace the light - pocket if the LED burns out.

36.Ignition Switch Illumination

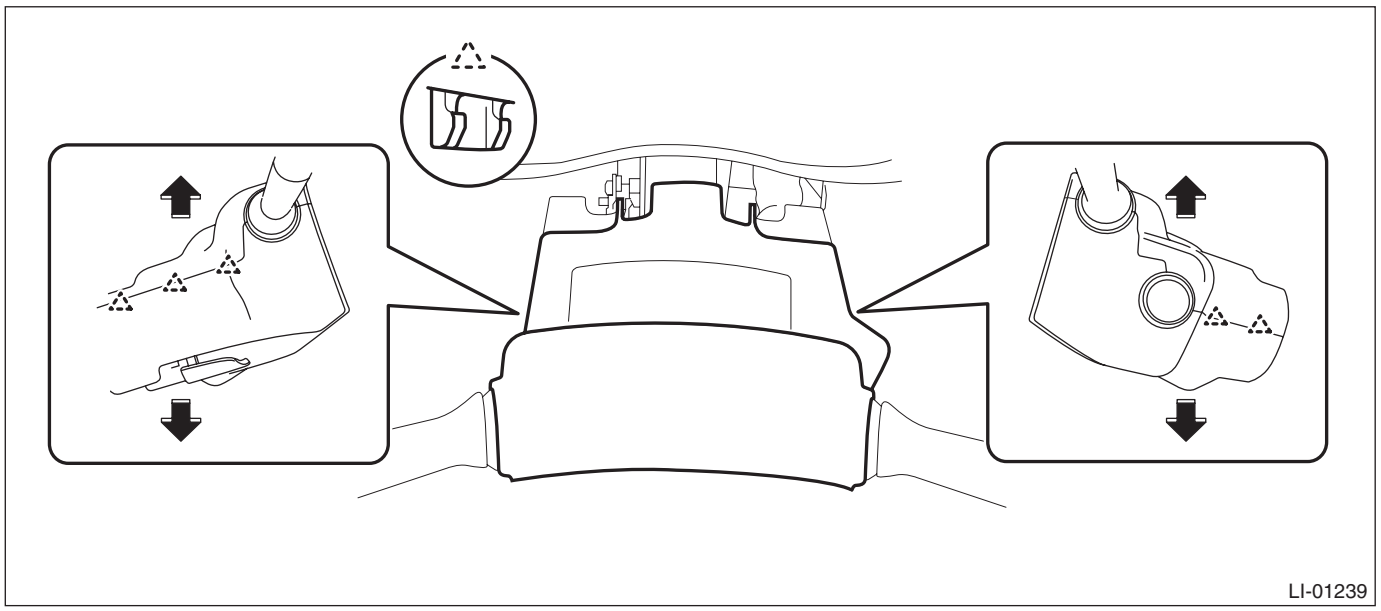
A: REMOVAL

NOTE:
The ignition switch illumination is integrated into the immobilizer antenna assembly.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - column.
(1) Remove the screws by turning the steering wheel to right and left.

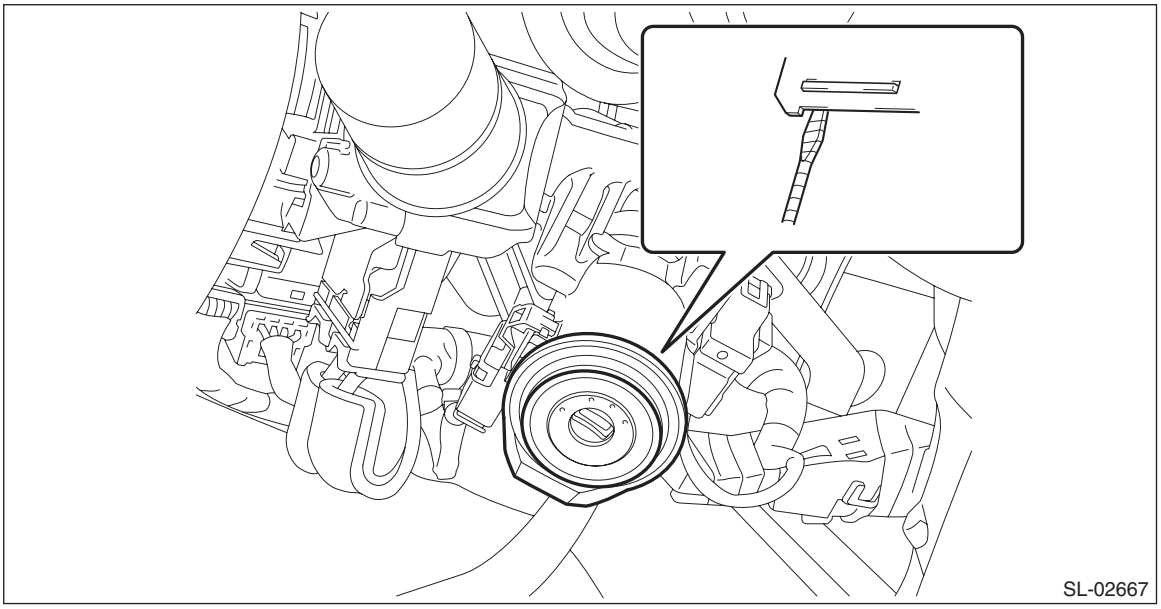


(2) Release the claw, and remove the cover assembly - column UPR and the cover assembly - column LWR.



3) Remove the ignition switch illumination.
   (1) Disconnect the connector.
   (2) Release the claw using a flat tip screwdriver or similar tool wrapped with a protection tape, and remove the ignition switch illumination.

CAUTION:
Do not apply excessive force to remove the ignition switch illumination lock. Otherwise they may be broken because those parts are the products made of a plastic.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

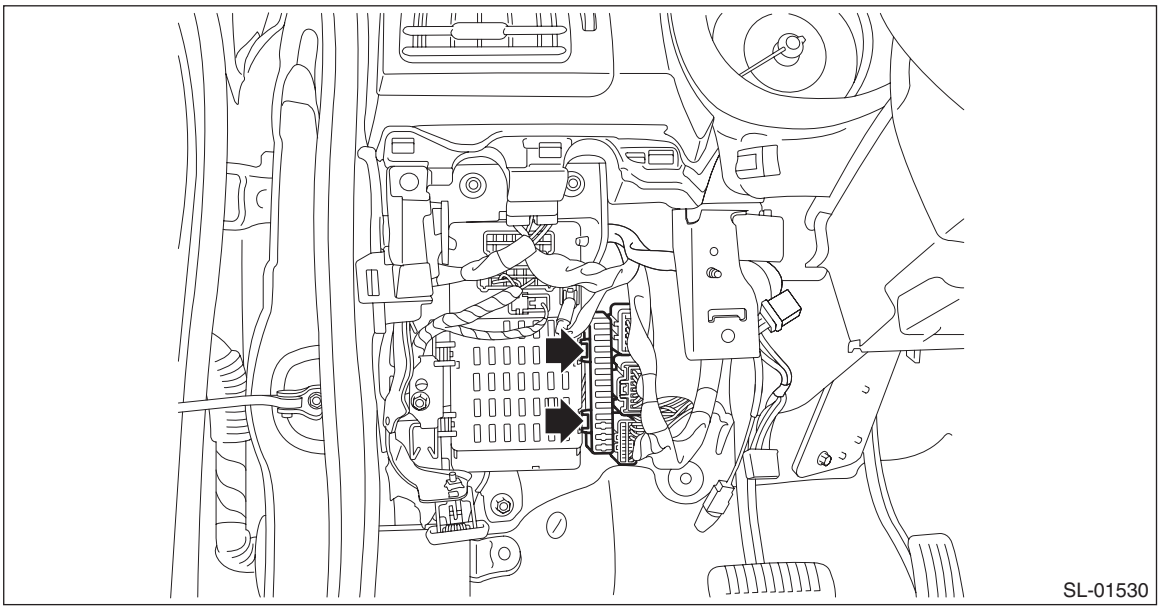
Step		Check	Yes	No
1	**CHECK THE IGNITION SWITCH ILLUMINATION.** Make sure the ignition switch illumination illuminates when driver's side door is open.	Does the ignition switch illumination illuminate?	Ignition switch illumination is normal.	Go to step **2**.
2	**CHECK THE IGNITION SWITCH ILLUMINATION.** Make sure the ignition switch illumination blinks when the ignition switch is turned to ON.	Does the ignition switch illumination blink?	Check the function setting of body integrated unit. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>	Check the ignition switch illumination circuit. <Ref. to SL-26, CHECK IGNITION SWITCH ILLUMINATION, INSPECTION, Keyless Entry System.>

37.Auto Headlight Beam Leveler Control Module

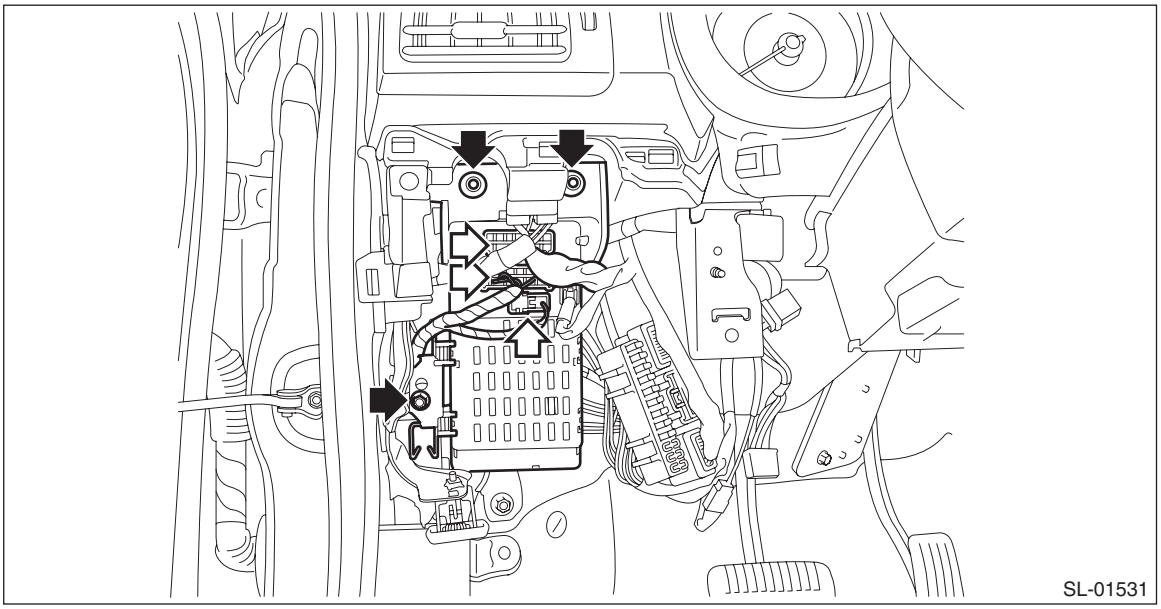
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Release the lock and remove the fuse holder.

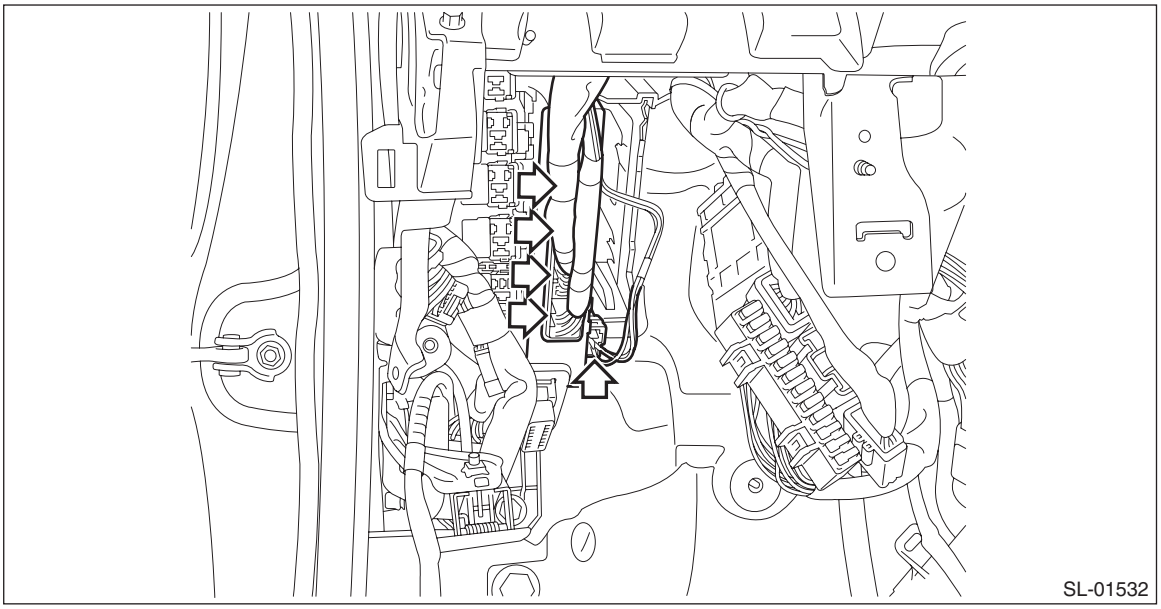

SL-01530

5) Remove the relay & fuse box.
(1) Disconnect the connector.
(2) Remove the bolts and nuts, and remove the relay & fuse box.

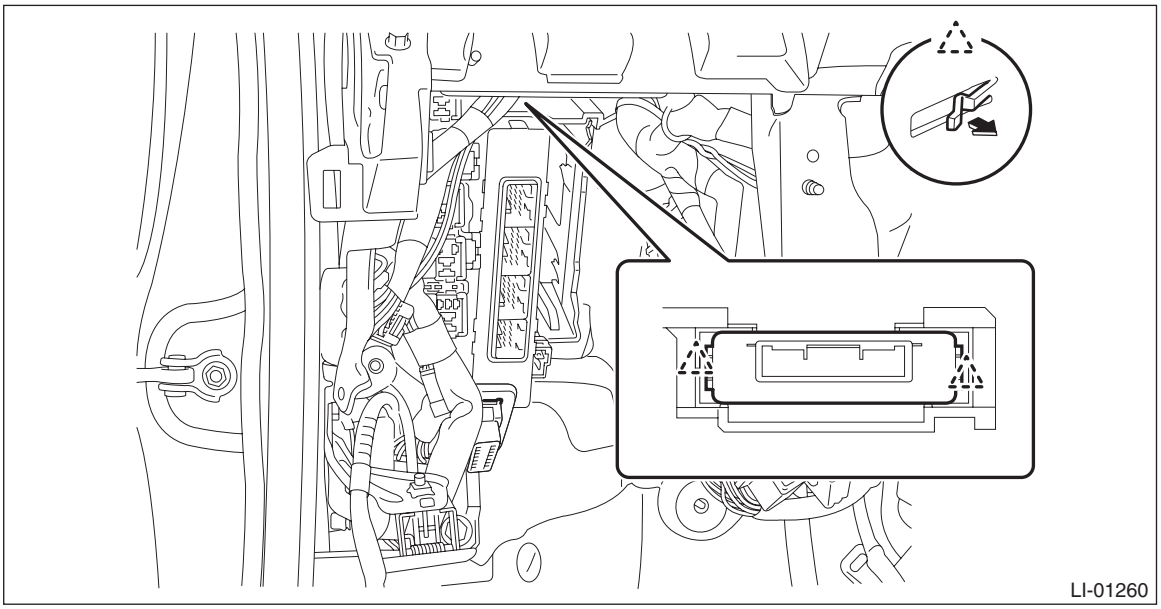

SL-01531

6) Disconnect the connector of body integrated unit.

NOTE:
For model with keyless access with push button start, disconnect the keyless access CM connector.



7) Remove the auto headlight beam leveler CM.
   (1) Disconnect the connector.
   (2) Release the claws and pull out the auto headlight beam leveler CM.



B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

Tightening torque:
Relay & fuse box: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

NOTE:
When the auto headlight beam leveler CM is removed, perform initialization or reinitialization. <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

38.Rear Height Sensor

A: REMOVAL

CAUTION:
Always remove the sensor assembly - headlight beam leveler before removing any parts related to the suspension.

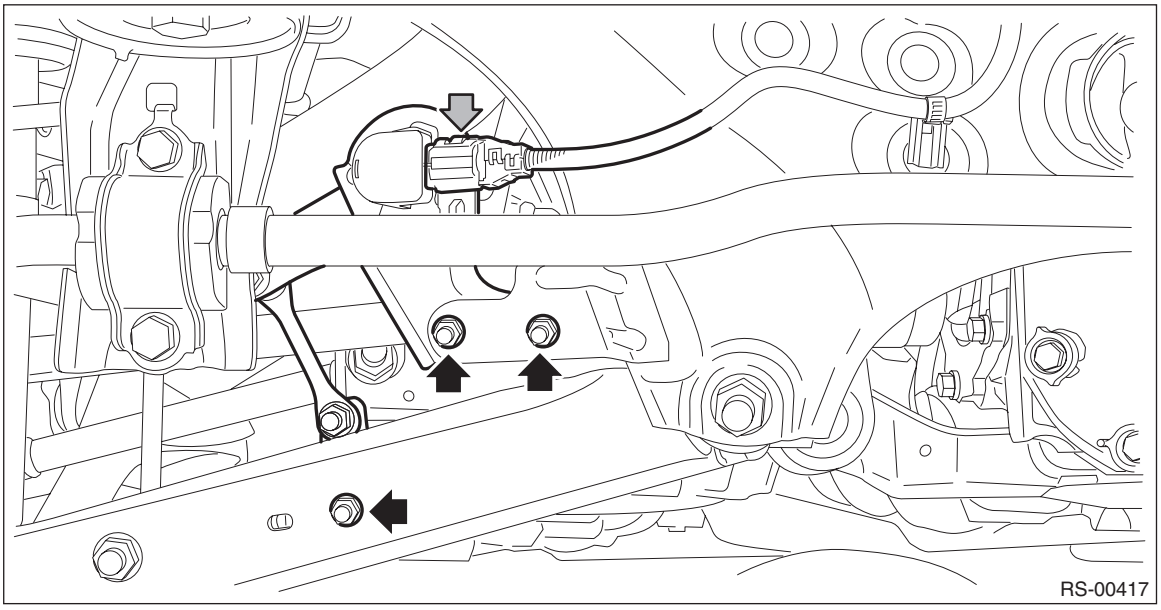
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle, and remove the left rear wheel.
3) Remove the sensor assembly - headlight beam leveler.

CAUTION:
Do not disassemble the sensor and lever.

(1) Disconnect the connector.
(2) Remove the nuts, and remove the sensor assembly - headlight beam leveler.



B: INSTALLATION

1) Install each part in the reverse order of removal.

Tightening torque:
Sensor assembly - headlight beam leveler: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
Rear wheel: Except for C4 model
120 N·m (12.24 kgf-m, 88.5 ft-lb)
Rear wheel: C4 model
100 N·m (10.20 kgf-m, 73.8 ft-lb)

2) Perform reinitialization of the sensor assembly - headlight beam leveler. <Ref. to LI-19, REINITIALIZATION, PROCEDURE, Auto Headlight Beam Leveler System.>

NOTE:
When replacing the sensor assembly - headlight beam leveler with a new part, perform the initialization. <Ref. to LI-18, INITIALIZATION, PROCEDURE, Auto Headlight Beam Leveler System.>

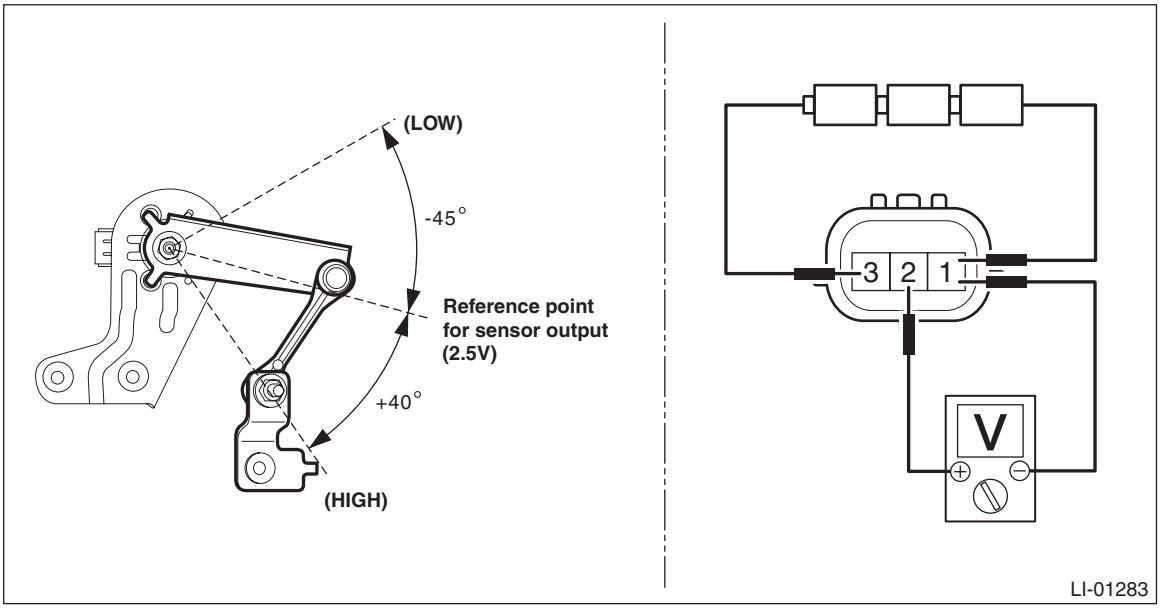
C: INSPECTION

1) Connect three dry cell batteries (1.5 V) in series.

NOTE:
- Use new dry-cell batteries.
- Using a circuit tester, check that the initial voltage of each dry-cell battery is 1.6 V or more. And also check that the voltage of three batteries in series is between 4.8 V and 5.2 V.
- For power supply, 5 V DC constant voltage power source can also be used.

2) Connect the cell battery positive terminal to the connector terminal No. 3, and the cell battery negative terminal to the connector terminal No. 1.
3) With voltage applied, check the voltage between terminals when the sensor link is moved slowly up and down.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
2 (+) — 1 (–)	Move the link within the operation range.	0.5 — 4.1 V

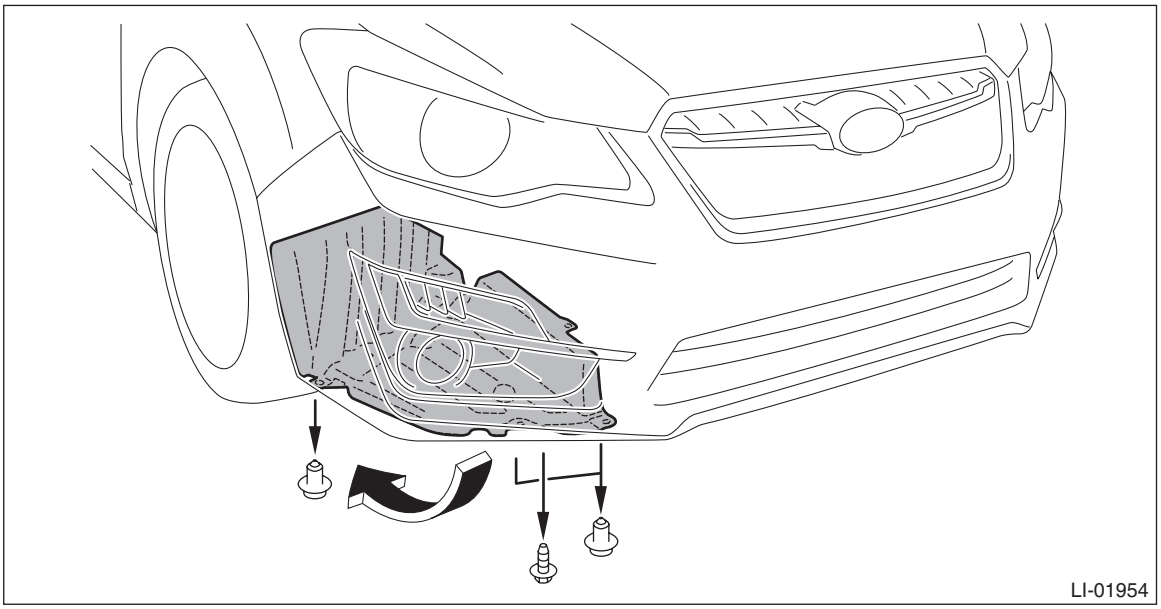
4) Replace the sensor assembly - headlight beam leveler if the inspection result is not within the standard value.

39.Day Time Running Resistor

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

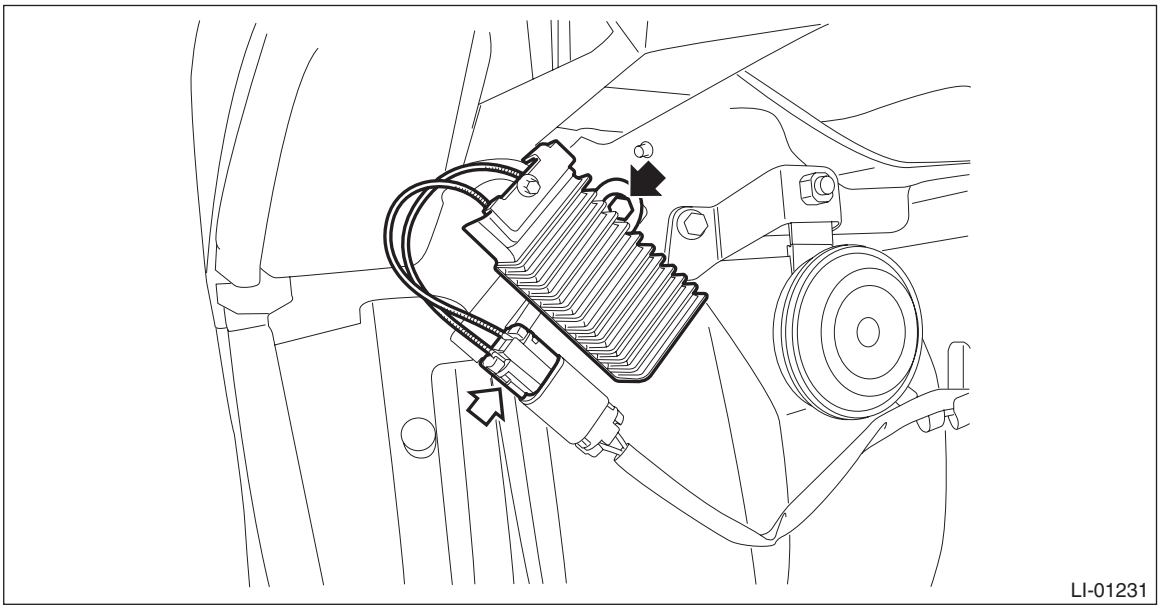
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the screw and clips, and turn over the front side of the mud guard - front.



4) Remove the resistor assembly - daytime running light.

CAUTION:
The resistor may become hot. Be careful not to burn yourself when removing it.

(1) Disconnect the connector.
(2) Remove the bolts, then remove the resistor assembly - daytime running light.



B: INSTALLATION

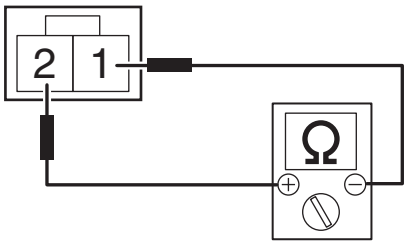
Install each part in the reverse order of removal.

Tightening torque:
Resistor assembly - daytime running light: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester

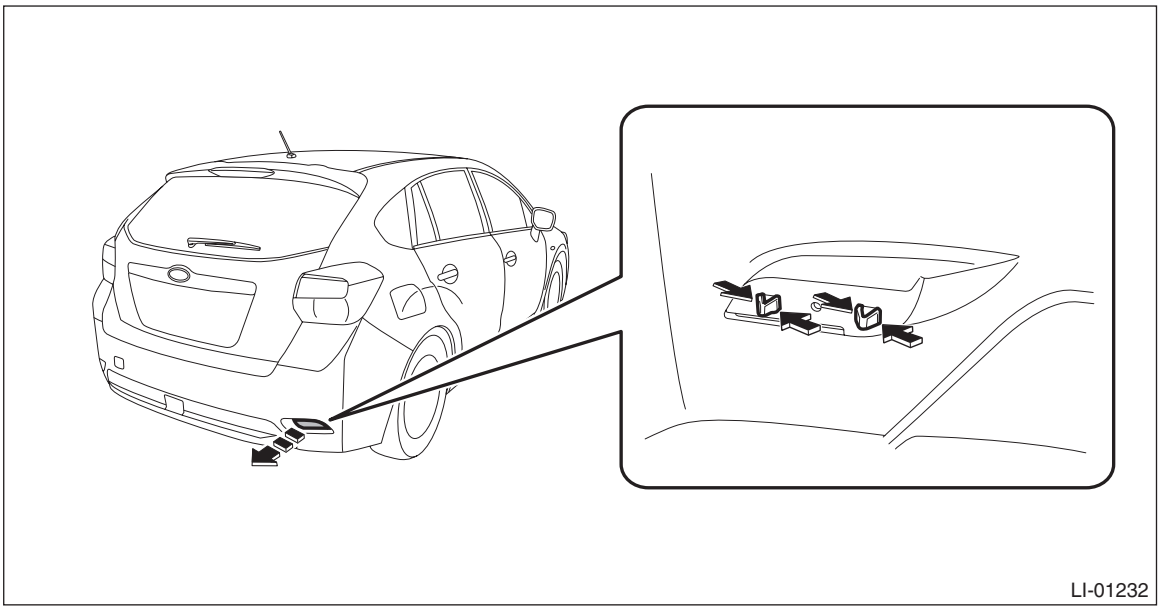
Terminal No.	Inspection conditions	Specification	Connection diagram
1 — 2	Always	1.13±0.05 Ω	 LI-01253

2) Replace the resistor assembly - daytime running light if the inspection result is not within the standard.

40.Reflex Reflector

A: REMOVAL

From behind the bumper face - rear, release the claws and remove the reflex reflector assembly.



B: INSTALLATION

Install each part in the reverse order of removal.

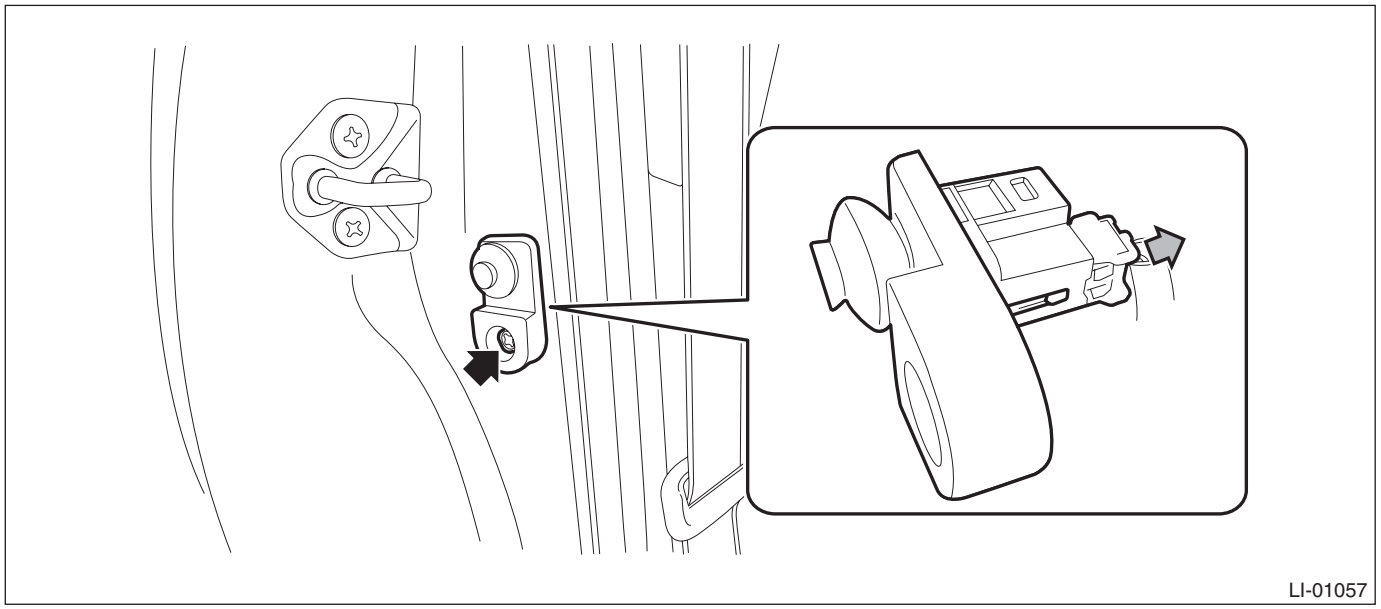
41.Door Switch

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the switch assembly - door.
   (1) Remove the screws, and pull out the switch assembly - door toward you.
   (2) Disconnect the connector and remove the switch assembly - door.



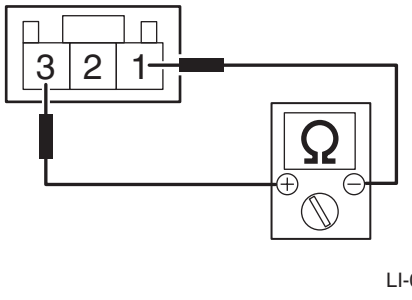
B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Check the resistance between switch terminals.

Preparation tool:
Circuit tester

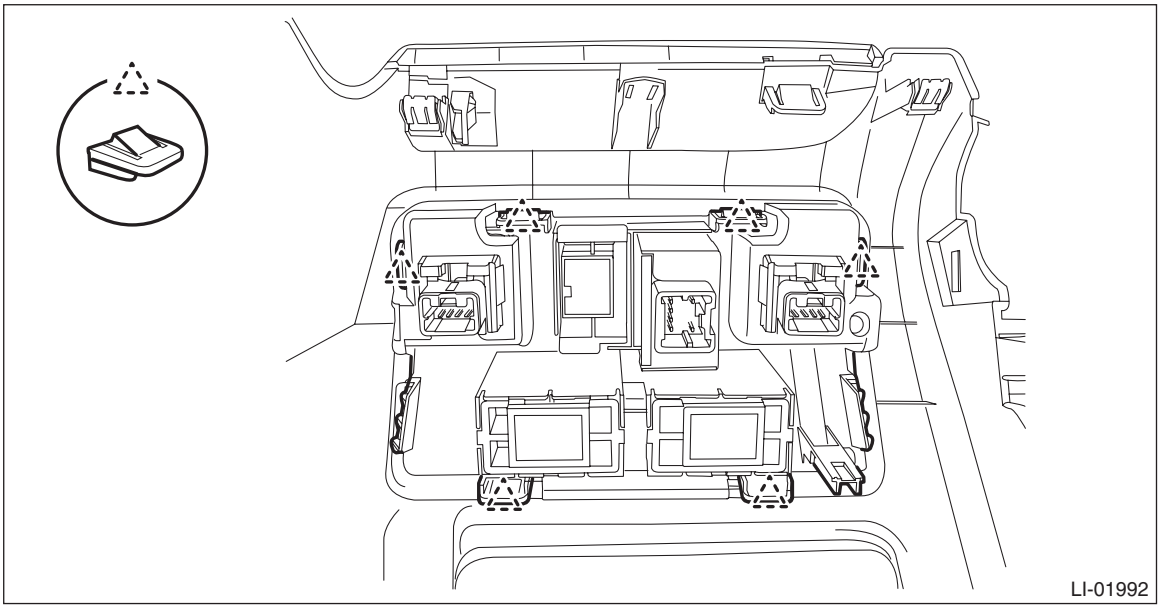
Terminal No.	Inspection conditions	Standard	Connection diagram
1 — 3	When door is opened	Less than 1 Ω	 LI-01327
	When door is closed	1 MΩ or more	

2) Replace the switch assembly - door if the inspection result is not within the standard value.

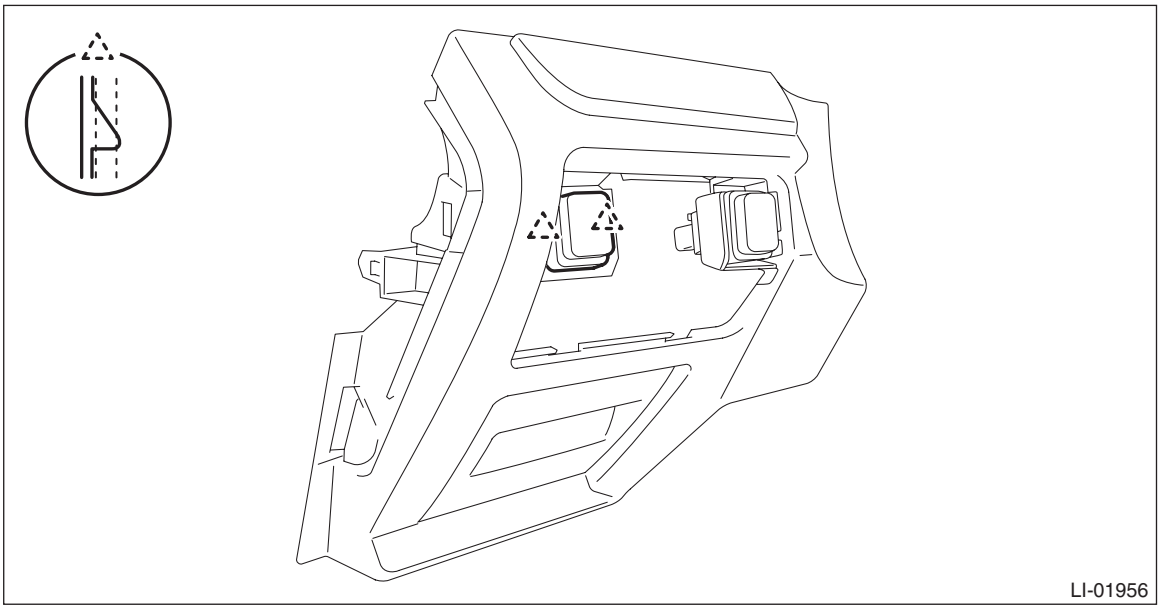
42.SRF OFF Switch

A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the cover assembly - instrument panel LWR driver OUT. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Release the claws, and then remove the cover.



4) Release the claws and remove the SRF OFF switch.



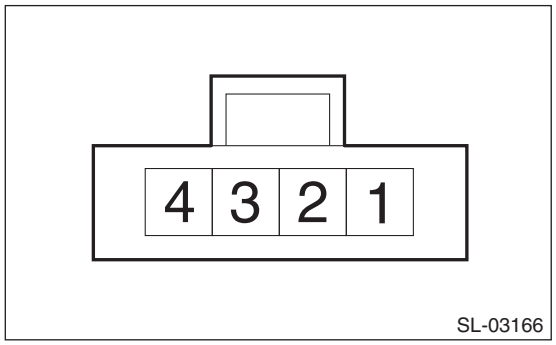
B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
2 — 3	OFF	1 MΩ or more
	ON	Less than 1 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

Terminal No.	Inspection conditions	Specification
1 (+) — 4 (–)	Apply battery voltage.	Light ON

3) Replace the SRF OFF switch if the inspection result is not within the standard value.

AUTO HEADLIGHT BEAM LEVELER SYSTEM (DIAGNOSTICS)

AL(diag)

		Page
1.	Basic Diagnostic Procedure	2
2.	Check List for Interview	3
3.	General Description	4
4.	Electrical Component Location	5
5.	Control Module I/O Signal	6
6.	Subaru Select Monitor	7
7.	Read Diagnostic Trouble Code (DTC)	10
8.	Clear Memory Mode	11
9.	Read Current Data	12
10.	List of Diagnostic Trouble Code (DTC)	13
11.	Diagnostic Procedure with Diagnostic Trouble Code (DTC)	14
12.	Diagnostics with Phenomenon	18

1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**PERFORM CUSTOMER INTERVIEW.** Using the Check List for Interview, ask the customer the condition of how the trouble occurred. <Ref. to AL(diag)-3, CHECK, Check List for Interview.>	Did you interview the customer?	Go to step **2**.	Interview the customer. <Ref. to AL(diag)-3, CHECK, Check List for Interview.>
2	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Perform the inspection according to the diagnosis for LAN system.	Go to step **3**.
3	**CHECK AUTO HEADLIGHT BEAM LEVELER SYSTEM.** Using the Subaru Select Monitor, read DTC of the auto headlight beam leveler system inspection. <Ref. to AL(diag)-10, OPERATION, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to AL(diag)-8, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>	Is DTC displayed?	Record DTC and time stamp, and perform the diagnosis according to DTC. <Ref. to AL(diag)-13, LIST, List of Diagnostic Trouble Code (DTC).> For time stamp, refer to “LAN SYSTEM”. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Go to step **4**.
4	**CHECK DIAGNOSTICS WITH PHENOMENON.** Check “Diagnostics with Phenomenon”. <Ref. to AL(diag)-18, Diagnostics with Phenomenon.>	Does the symptom apply?	Perform diagnosis according to the procedures in the diagnostics with phenomenon.	Go to step **5**.
5	**CHECK TROUBLE PHENOMENON.** 1) Perform the basic inspection and function check. <Ref. to AL(diag)-4, INSPECTION, General Description.> 2) Check the auto headlight beam leveler CM. <Ref. to AL(diag)-6, Control Module I/O Signal.> 3) Perform check of current data. <Ref. to AL(diag)-12, Read Current Data.> 4) Perform a unit check.	Was the trouble cause found?	Repair or replace the cause of trouble.	System is normal.

2. Check List for Interview

A: CHECK

- Inspect the following items regarding the vehicle's state.
- Print out this page for interviewing customers.

<table>
<tr><td colspan="4">Auto Headlight Beam Leveler System Check List for Interview
Date the Vehicle is Received Year Month Day</td></tr>
<tr><td colspan="2" rowspan="2">Customer's name</td><td>Registration No.</td><td>Initial year of registration
Year Month Date</td></tr>
<tr><td>Vehicle model</td><td>Frame number</td></tr>
<tr><td>Interviewer</td><td>Inspector</td><td>Engine type</td><td>Odometer reading</td></tr>
<tr><td colspan="4">Customer specified content
•
•
•</td></tr>
<tr><td>Date and time when the trouble occurred</td><td></td><td>Frequency of trouble occurrence</td><td>Always occurs
Sometimes occurs
(times per day, times per month)</td></tr>
<tr><td rowspan="2">Condition of trouble occurrence (How the trouble occurs)</td><td rowspan="2"></td><td>Weather</td><td>Fine • Cloudy • Rainy • Snowy • Others ( )</td></tr>
<tr><td>Temperature</td><td>°C (°F) — °C (°F)</td></tr>
<tr><td>Road conditions</td><td></td><td>Occurrence location</td><td></td></tr>
<tr><td>Accessory installation condition</td><td colspan="3"></td></tr>
<tr><td>Confirmation of trouble condition</td><td colspan="3"></td></tr>
<tr><td>❑ Diagnostic code</td><td colspan="3"></td></tr>
</table>

3. General Description

A: CAUTION

1. AIRBAG SYSTEM

CAUTION:
• Do not use the electrical test equipment on the airbag system wiring harnesses and connector circuits.
• Be careful not to damage the airbag system wiring harness.

B: INSPECTION

1. BASIC INSPECTION

Before performing the diagnosis, check the following items which may cause problems relating the wiper or light.
1) Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
2) Check the relay and fuse condition. <Ref. to LI-5, Relay and Fuse.>
3) Check the connecting condition of harness and harness connector.

2. FUNCTION CHECK

With the ignition switch ON and the lighting switch set at low beam, change the vehicle posture while the vehicle is stopped. Check that the beam moves, when the vehicle condition is kept for three seconds or more.

C: PREPARATION TOOL

1. SPECIAL TOOL

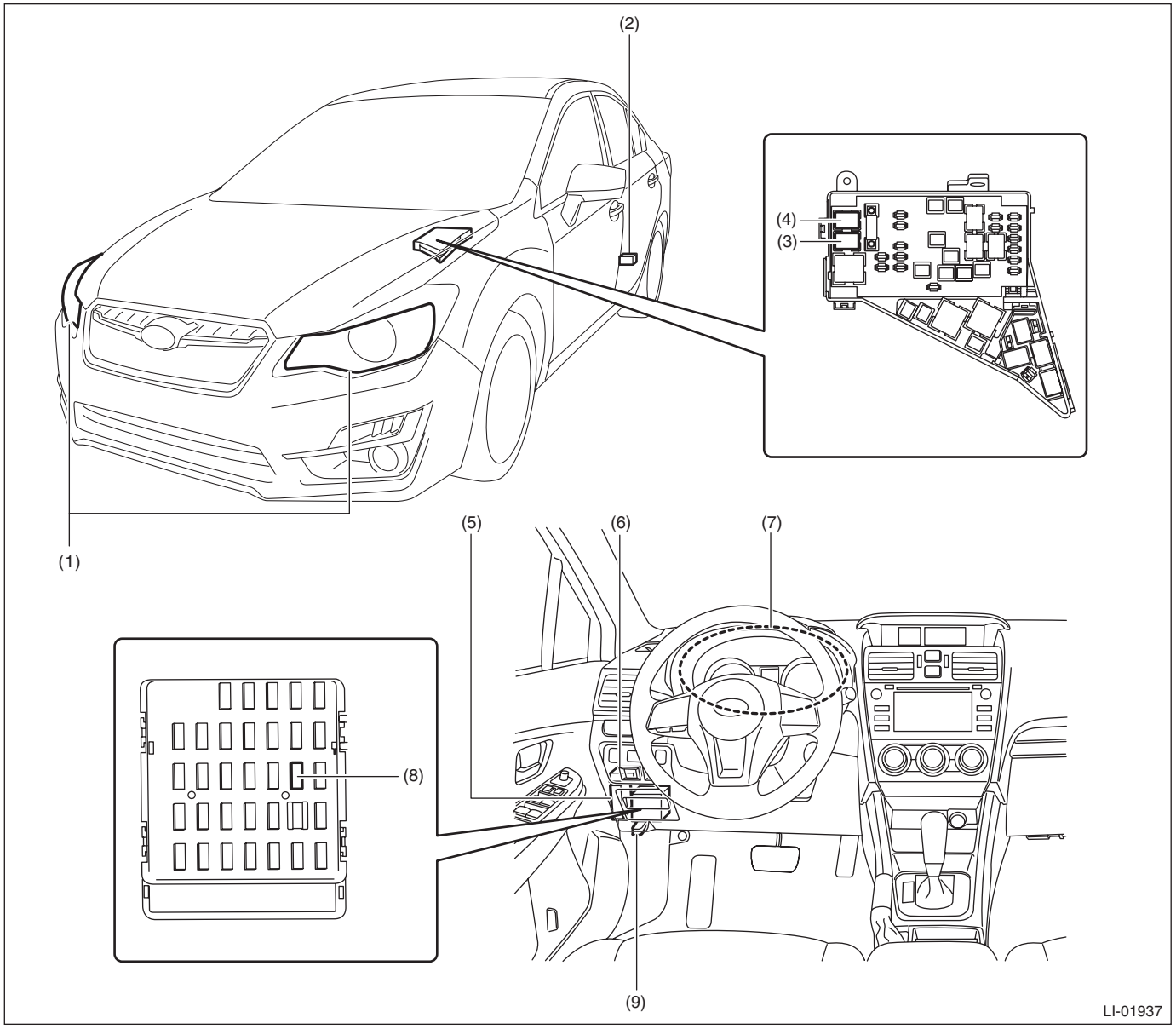
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

A: LOCATION

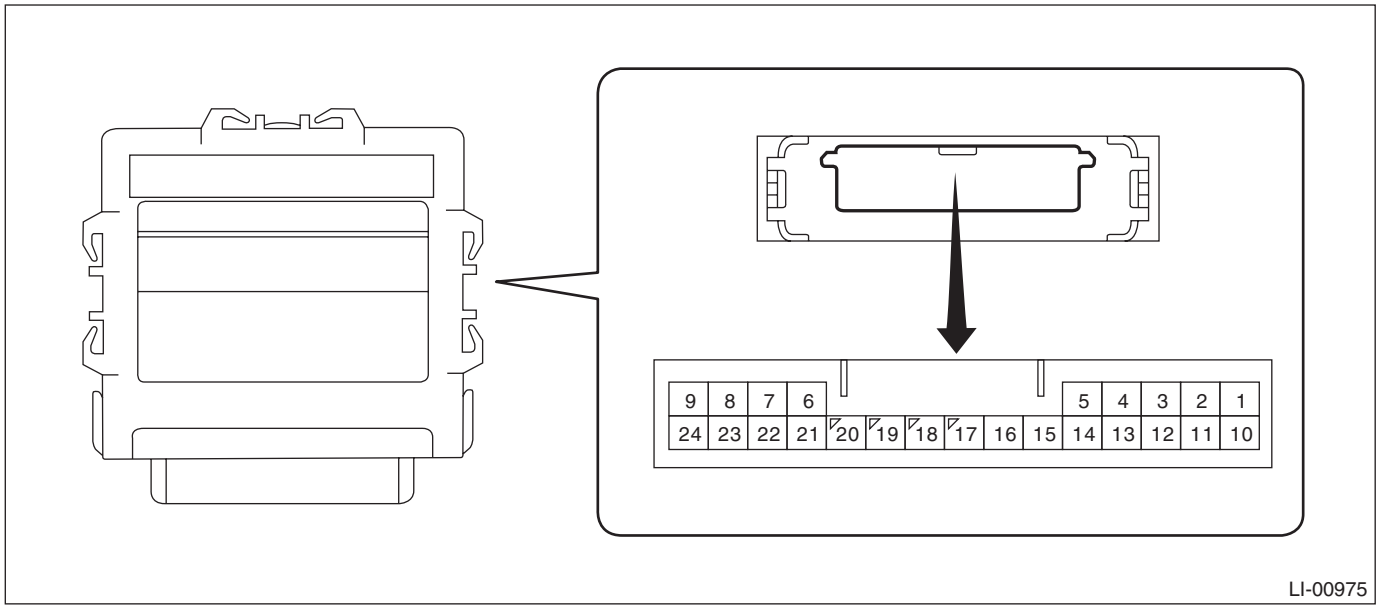


(1)	Headlight ASSY – Headlight beam leveler actuator	(4)	Headlight relay (Hi)	(7)	Combination meter
(2)	Rear vehicle height sensor	(5)	Body integrated unit	(8)	Fuse 10 A (auto headlight beam leveler CM)
(3)	Headlight relay (Lo)	(6)	Auto headlight beam leveler CM	(9)	Data link connector

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

1. AUTO HEADLIGHT BEAM LEVELER CM



Description	Terminal No.	Measuring condition	Standard
IG power supply	1 ←→ Chassis ground	Ignition switch ON	8 — 16 V
GND	2 ←→ Chassis ground	Always	Less than 1 Ω
Rear height sensor GND	3 ←→ Chassis ground	Always	Less than 1 Ω
Indicator output	6 ←→ Chassis ground	After turning the ignition switch to ON, for 3 seconds (warning light on) → after 3 seconds (warning light off)	Less than 1.35 V → 8 — 16 V
Leveling actuator power supply	10 ←→ Chassis ground	Ignition switch ON	10 — 16 V
Leveling actuator GND	11 ←→ Chassis ground	Always	Less than 1 Ω
Rear height sensor power supply	12 ←→ 3	Ignition switch ON	4.75 — 5.25 V
Leveling actuator signal	17 ←→ Chassis ground	Headlight off → on	Less than 1 V → 1.0 — 14.4 V (for 17 seconds)
		Headlight on, no vehicle height change → change and hold vehicle height for 3 seconds or more	
Rear sensor signal	19 ←→ Chassis ground	IG ON (with no passenger, no load and vehicle stopped)	Approx. 2.5 V (changes according to vehicle condition)
CAN-H	23	Cannot be measured (CAN communication line)	—
CAN-L	24	Cannot be measured (CAN communication line)	—

B: WIRING DIAGRAM

Refer to “Headlight Beam Leveler System” in the wiring diagram. <Ref. to WI(w/o HEV)-140, WIRING DIAGRAM, Headlight Beam Leveler System.> <Ref. to WI(HEV)-116, WIRING DIAGRAM, Headlight Beam Leveler System.>

6. Subaru Select Monitor

A: OPERATION

- For detailed operation procedures, refer to “Application help”.
- If the auto headlight beam leveler CM can not communicate with Subaru Select Monitor, perform “COMMUNICATION FOR INITIALIZING IMPOSSIBLE”. <Ref. to AL(diag)-8, INSPECTION, Subaru Select Monitor.>

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

Communication error with auto headlight beam leveler CM

DETECTING CONDITION:

- Defective harness connector
- Power supply circuit malfunction
- Defective auto headlight beam leveler CM
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

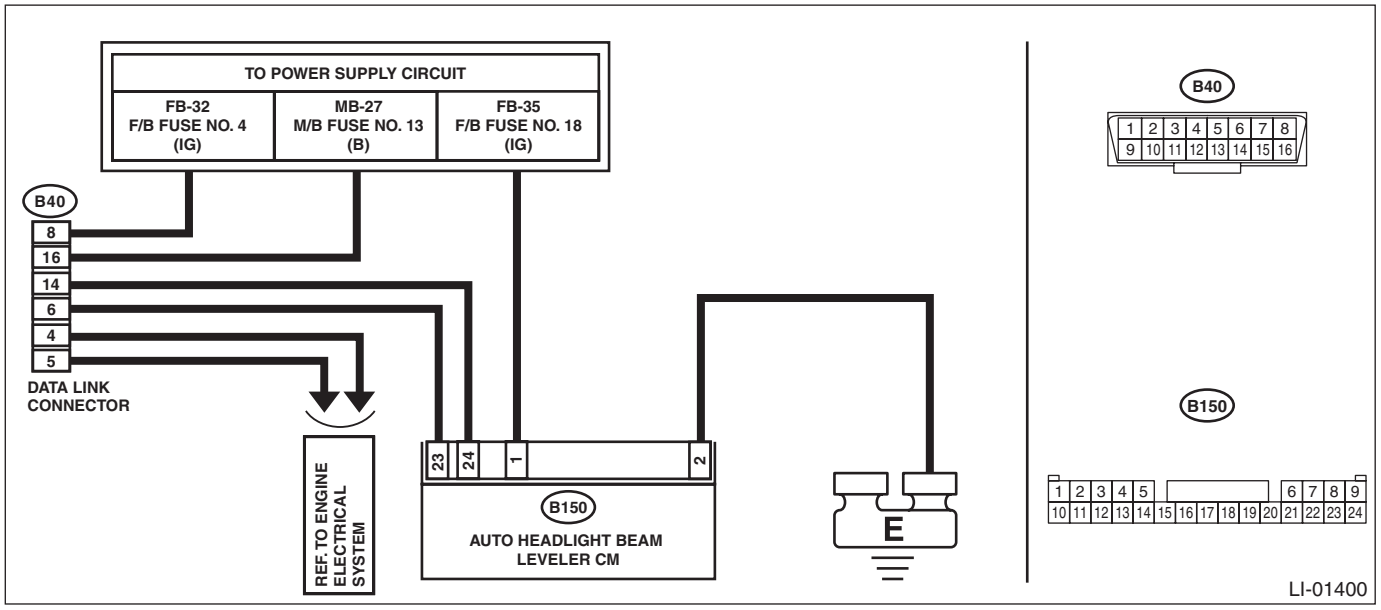
Communication is impossible between auto headlight beam leveler CM and Subaru Select Monitor.

CAUTION:

Initialization is required after replacing the auto headlight beam leveler CM.

WIRING DIAGRAM:

Headlight beam leveler system <Ref. to WI(w/o HEV)-140, WIRING DIAGRAM, Headlight Beam Leveler System.> <Ref. to WI(HEV)-116, WIRING DIAGRAM, Headlight Beam Leveler System.>



Step		Check	Yes	No
1	**CHECK OTHER COMMUNICATION.** Communicate with the system other than the auto headlight beam leveler CM using the Subaru Select Monitor.	Is the communication to other control module possible?	Go to step **2**.	Perform the "Communication for Initializing Impossible" of LAN system. <Ref. to LAN(w/o HEV)(diag)-11, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.> <Ref. to LAN(HEV)(diag)-12, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>

	Step	Check	Yes	No
2	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Perform the inspection according to the diagnosis for LAN system.	Go to step **3**.
3	**CHECK FOR POOR CONTACT.** 1) Turn the ignition switch to OFF. 2) Disconnect the auto headlight beam leveler CM connector. 3) Connect the disconnected connectors. 4) Communicate with the auto headlight beam leveler CM using the Subaru Select Monitor.	Is communication possible?	It is possible that temporary poor communication occurs.	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Headlight / Foglight» and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to AL(diag)-13, List of Diagnostic Trouble Code (DTC).>

8. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Headlight / Foglight» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

9. Read Current Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Headlight / Foglight» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

Item Name	Contents	Standard	Note
Trip Count	Time stamp information, trip counter	—	—
Count	Time stamp information, original counter identification information	—	—
Time Count [msec]	Time stamp information, time counter	—	—
F Sensor Signal	Output voltage value from front vehicle height sensor Display range: 0.00 — 5.00 V	5 V	Fixed at 5 V because front vehicle height sensor is not equipped.
R Sensor Signal	Output voltage value from rear vehicle height sensor Display range: 0.00 — 5.00 V	Approx. 2.5 V	Changes according to vehicle condition.
Actuator Signal	Power supply voltage value to headlight beam leveler actuator Display range: 0% — 100%	Not in operation: 0% In operation: 10 — 90% (17 seconds)	Changes according to vehicle condition.
ECU ACC	IG voltage condition of auto headlight beam leveler CM Display range: 0.00 — 25.76 V	8 — 16 V	—
Indicator Signal	Meter indicator condition Display range: Light off/Light up/Flashing	Light off: Normal Light up: Abnormal Blink: When not initialized	—
Vehicle Speed Signal	Vehicle speed condition Display range: 0.00 — 3686.34 km/h	Show vehicle speed	—
H/L Lo Signal	Headlight lighting condition Display range: Light off/Light up	Light off: light switch OFF Light up: light switch HEAD or light switch AUTO with light sensor operated	—

10.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
U0073	CONTROL MODULE COMMUNICATION BUS OFF	Detected when CAN line abnormality is detected.	<Ref. to AL(diag)-14, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Detected when CAN data from VDC (vehicle speed signal) does not arrive.	<Ref. to AL(diag)-14, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Detected when CAN data from body integrated unit (headlight ON signal) does not arrive.	<Ref. to AL(diag)-14, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2900	AHL CONTROL	Detected when an error occurred in auto headlight beam leveler CM.	<Ref. to AL(diag)-15, DTC B2900 AHL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2902	REAR HEIGHT SENSOR CIRCUIT	Detected when an error occurred in rear vehicle height sensor.	<Ref. to AL(diag)-16, DTC B2902 REAR HEIGHT SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2903	VDC DATA ERROR	Detected when data from VDC (vehicle speed signal) is abnormal.	<Ref. to AL(diag)-17, DTC B2903 VDC DATA ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

11.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

Detected when CAN line abnormality is detected.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

Detected when CAN data (vehicle speed signal) is not received from VDC.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

C: DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

Detected when CAN data (headlights ON signal) is not received from the body integrated unit.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

D: DTC B2900 AHL CONTROL

DTC DETECTING CONDITION:
Detected when internal malfunction occurs in the auto headlight beam leveler CM.
TROUBLE SYMPTOM:
The auto headlight beam leveler does not operate.

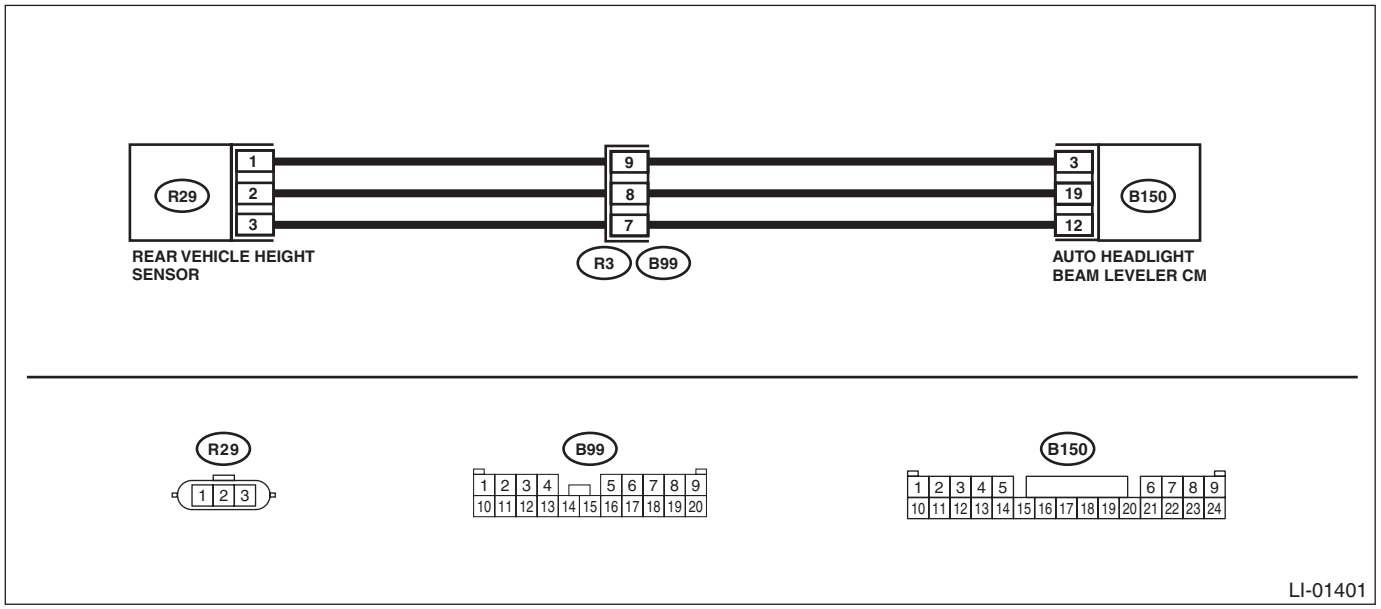
CAUTION:
Initialization is required after replacing the auto headlight beam leveler CM.

Step		Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to OFF → ON. 2) Turn on the headlight low beam. 3) Using the Subaru Select Monitor, clear the auto headlight beam leveler system memory. <Ref. to AL(diag)-11, Clear Memory Mode.> 4) Turn the ignition switch to OFF → ON. 5) Use the Subaru Select Monitor and read DTCs. <Ref. to AL(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is DTC B2900 displayed? (current malfunction)	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

E: DTC B2902 REAR HEIGHT SENSOR CIRCUIT

DTC DETECTING CONDITION:
Detected when error occurs in the rear height sensor.
TROUBLE SYMPTOM:
The auto headlight beam leveler does not operate.

CAUTION:
Initialization is required after replacing the auto headlight beam leveler CM.
WIRING DIAGRAM:
Headlight beam leveler system <Ref. to WI(w/o HEV)-140, WIRING DIAGRAM, Headlight Beam Leveler System.> <Ref. to WI(HEV)-116, WIRING DIAGRAM, Headlight Beam Leveler System.>



	Step	Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to OFF → ON. 2) Turn on the headlight low beam. 3) Using the Subaru Select Monitor, clear the auto headlight beam leveler system memory. <Ref. to AL(diag)-11, Clear Memory Mode.> 4) Turn the ignition switch to OFF → ON. 5) Use the Subaru Select Monitor and read DTCs. <Ref. to AL(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is DTC B2902 displayed? (current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK CURRENT DATA.** Display «R Sensor Signal» using Subaru Select Monitor. <Ref. to AL(diag)-12, Read Current Data.>	Does the data indicate the standard value (approx. 2.5 V when on a level road with one person in the vehicle)?	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** 1) Display «R Sensor Signal» using Subaru Select Monitor. <Ref. to AL(diag)-12, Read Current Data.> 2) Change the vehicle posture.	Does the data change?	Go to step **6**.	Go to step **4**.
4	**CHECK OUTPUT VOLTAGE BETWEEN AUTO HEADLIGHT BEAM LEVELER CM AND VEHICLE HEIGHT SENSOR.** 1) Disconnect the vehicle height sensor connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between the vehicle height sensor connector and chassis ground. ***Connector & terminal*** ***(R29) No. 3 (+) — Chassis ground (–):***	Is the voltage 5±0.25 V?	Go to step **5**.	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>
5	**CHECK REAR HEIGHT SENSOR.** 1) Remove the rear vehicle height sensor. 2) Perform the inspection of rear height sensor unit. <Ref. to LI-92, INSPECTION, Rear Height Sensor.>	Is the rear height sensor normal?	Go to step **6**.	Replace the rear height sensor. <Ref. to LI-91, Rear Height Sensor.>
6	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the auto headlight beam leveler CM connector. 2) Using a tester, measure the resistance between the auto headlight beam leveler CM connector and rear height sensor connector. ***Connector & terminal*** ***(B150) No. 3 — (R29) No. 1:*** ***(B150) No. 19 — (R29) No. 2:*** ***(B150) No. 12 — (R29) No. 3:***	Is there continuity?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the auto headlight beam leveler CM connector and chassis ground. ***Connector & terminal*** ***(B150) No. 3 — Chassis ground:*** ***(B150) No. 19 — Chassis ground:*** ***(B150) No. 12 — Chassis ground:***	Is the resistance 10 kΩ or more?	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>	Repair or replace the short circuit of the harness.

F: DTC B2903 VDC DATA ERROR

DTC DETECTING CONDITION:
Detected when data (vehicle speed signal) from VDC CM is abnormal.
TROUBLE SYMPTOM:
The auto headlight beam leveler does not operate.

NOTE:
Perform the diagnosis for VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

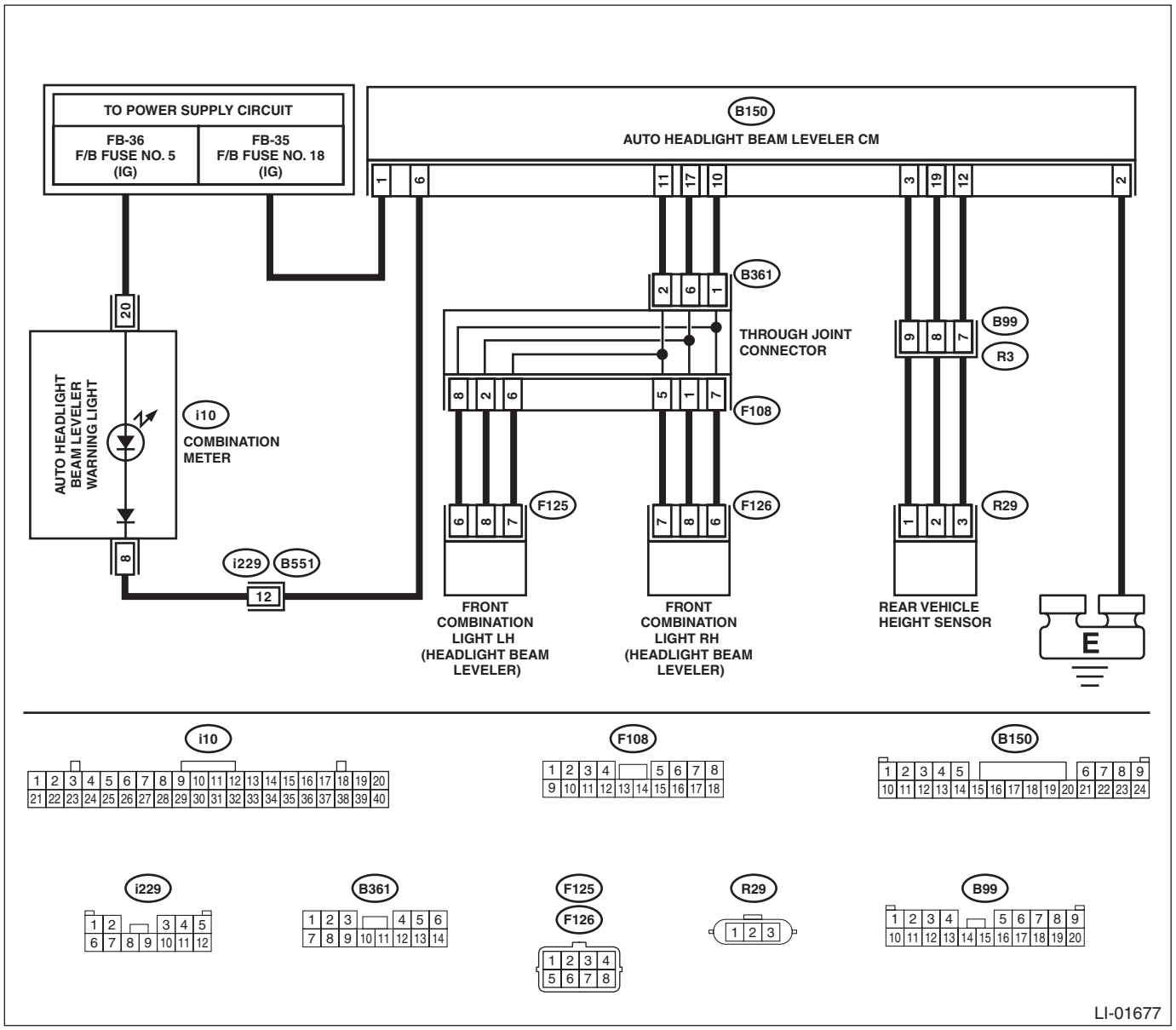
12.Diagnostics with Phenomenon

A: INSPECTION

1. BEAM LEVEL CONTROL DOES NOT FUNCTION

CAUTION:
- **Before performing diagnosis, check the fuse in this circuit.**
- **Initialization is required after replacing the auto headlight beam leveler CM.**

WIRING DIAGRAM:
Headlight beam leveler system <Ref. to WI(w/o HEV)-140, WIRING DIAGRAM, Headlight Beam Leveler System.> <Ref. to WI(HEV)-116, WIRING DIAGRAM, Headlight Beam Leveler System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** Display «Control module voltage» using Subaru Select Monitor. <Ref. to AL(diag)-12, Read Current Data.>	Does the current data indicate the standard value?	Go to step **3**.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN POWER SUPPLY — AUTO HEADLIGHT BEAM LEVELER CM.** 1) Disconnect the auto headlight beam leveler CM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between the auto headlight beam leveler CM connector and chassis ground. ***Connector & terminal*** ***(B150) No. 1 (+) — Chassis ground (–):***	Is the voltage 8 — 16 V?	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>	Repair or replace the harness.
3	**CHECK INDICATOR OUTPUT.** Turn the ignition switch to ON.	Does the warning indicator turn on for three seconds?	Go to step **5**.	Go to step **4**.
4	**CHECK CURRENT DATA.** 1) Display «Indicator Signal» using Subaru Select Monitor. <Ref. to AL(diag)-12, Read Current Data.> 2) Turn the ignition switch to ON.	Is it set as ON for 3 seconds?	Go to step **6**.	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>
5	**CHECK INDICATOR OUTPUT.** Leave the ignition switch to ON for 10 seconds.	Does the warning indicator light go off?	Go to step **9**.	Go to step **13**.
6	**CHECK HARNESS BETWEEN BATTERY — INDICATOR BULB — AUTO HEADLIGHT BEAM LEVELER CM.** 1) Disconnect the auto headlight beam leveler CM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between the auto headlight beam leveler CM (indicator bulb) connector and chassis ground. ***Connector & terminal*** ***(B150) No. 6 (+) — Chassis ground (–):***	Is the voltage 12 V?	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>	Go to step **7**.
7	**CHECK INDICATOR BULB.** Perform the system operation check mode of combination meter. <Ref. to IDI(diag)-20, System Operation Check Mode.>	Does the warning indicator illuminate?	Go to step **8**.	Replace the meter case assembly. <Ref. to IDI-19, Combination Meter.>
8	**CHECK HARNESS BETWEEN AUTO HEADLIGHT BEAM LEVELER CM AND INDICATOR BULB (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the continuity between the auto headlight beam leveler CM and the combination meter. ***Connector & terminal*** ***(B150) No. 6 — (i10) No. 8:***	Is there continuity?	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>	Repair the open circuit and poor contact of the connector in the harness between the auto headlight beam leveler CM and indicator.
9	**CHECK HEADLIGHT ASSEMBLY (ACTUATOR) DRIVE.** 1) Connect the auto headlight beam leveler CM connector. 2) Turn the ignition switch to ON, and within 10 seconds, repeat the OFF → Low beam of headlight switch 5 times. 3) Check that the headlight beam drops once, then returns to normal. 4) Then, after waiting for 30 seconds or more with the ignition ON, turn the ignition switch to OFF.	Does the headlight beam drop down once, and then return?	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK HEADLIGHT ASSEMBLY (ACTUATOR) OUTPUT.** 1) Display «Actuator Signal» using Subaru Select Monitor. <Ref. to AL(diag)-12, Read Current Data.> 2) Turn the ignition switch to ON, and within 10 seconds, repeat the OFF → Low beam of headlight switch 5 times. 3) Check that the headlight beam drops once, then returns to normal. 4) Then, after waiting for 30 seconds or more with the ignition ON, turn the ignition switch to OFF.	Does the current data indicate the standard value? (Does the value change at 10 — 90%?)	Go to step **11**.	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>
11	**CHECK OUTPUT VOLTAGE BETWEEN HEADLIGHT ASSEMBLY (ACTUATOR).** 1) Disconnect the auto headlight beam leveler CM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between the auto headlight beam leveler CM connector and chassis ground. ***Connector & terminal*** ***(B150) No. 10 (+) — Chassis ground (–):***	Is the voltage 12 V?	Replace the headlight assembly. <Ref. to LI-25, Headlight Assembly.>	Go to step **12**.
12	**CHECK HARNESS BETWEEN AUTO HEADLIGHT BEAM LEVELER CM AND HEADLIGHT ASSEMBLY (ACTUATOR) (OPEN CIRCUIT).** 1) Disconnect the connector of headlight assembly. 2) Measure the continuity between the auto headlight beam leveler CM connector and headlight assembly (actuator) connector. ***Connector & terminal*** ***• Headlight beam leveler RH*** ***(B150) No. 10 — (F126) No. 6:*** ***(B150) No. 17 — (F126) No. 8:*** ***(B150) No. 11 — (F126) No. 7:*** ***• Headlight beam leveler LH*** ***(B150) No. 10 — (F125) No. 6:*** ***(B150) No. 17 — (F125) No. 8:*** ***(B150) No. 11 — (F125) No. 7:***	Is there continuity?	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>	Repair the open circuit or poor contact of the connector in the harness between headlight assembly and auto headlight beam leveler CM.
13	**CHECK DTC.** Display DTC using the Subaru Select Monitor. <Ref. to AL(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to AL(diag)-13, LIST, List of Diagnostic Trouble Code (DTC).>	Replace the auto headlight beam leveler CM. <Ref. to LI-89, Auto Headlight Beam Leveler Control Module.>

STEERING RESPONSIVE FOG LIGHTS (DIAGNOSTICS)

SRF(diag)

Page

1. General Description 2

1. General Description

A: PROCEDURE

For diagnostic procedures of the steering responsive fog light, refer to “BODY CONTROL SYSTEM (DIAGNOSTICS)”. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>

WIPER AND WASHER SYSTEMS

WW

		Page
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5.	Wiper Blade	18
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9.	Front Washer Nozzle and Hose	37
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1. General Description

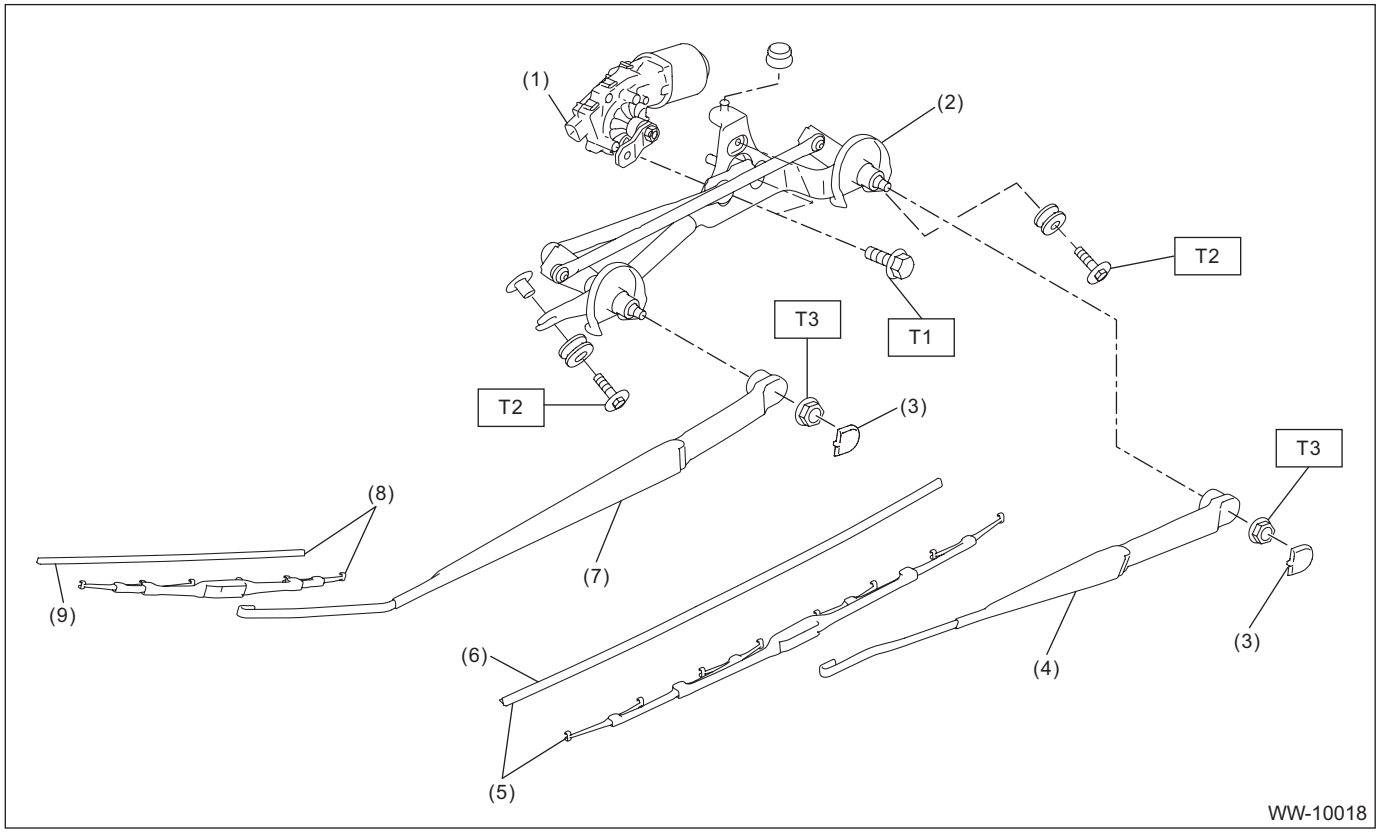
A: SPECIFICATION

Front wiper motor	Input	12 V — 72 W or less
Rear wiper motor	Input	12 V — 42 W or less
Front washer motor	Pump type	Centrifugal
	Input	12 V — 60 W or less
Rear washer motor	Pump type	Centrifugal
	Input	12 V — 36 W or less

B: COMPONENT

1. FRONT WIPER

- Models without EyeSight

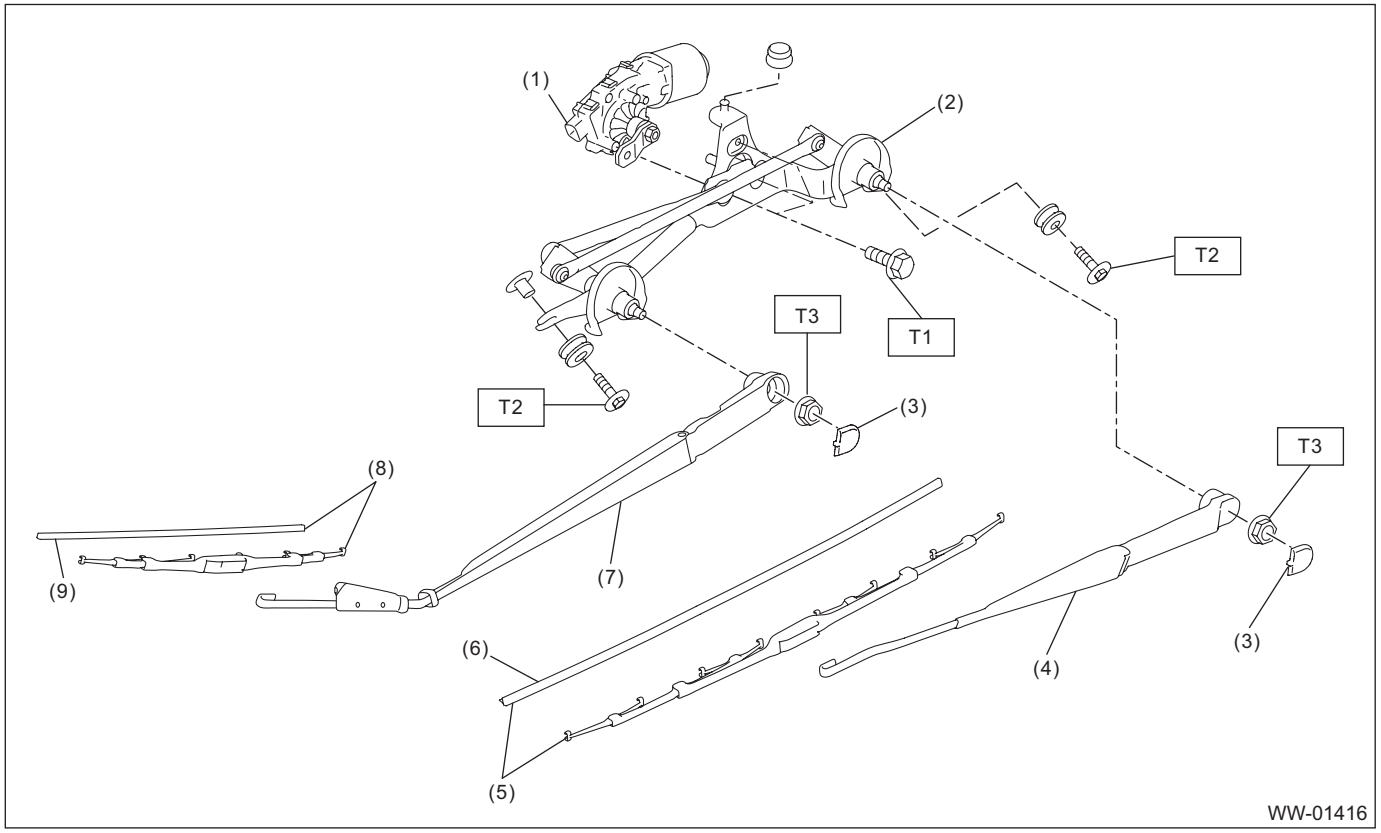


(1) Motor ASSY - windshield wiper
(2) Link ASSY - windshield wiper
(3) Cover - windshield wiper arm
(4) Arm ASSY - windshield wiper driver
(5) Blade ASSY - windshield wiper driver
(6) Rubber ASSY - windshield wiper driver
(7) Arm ASSY - windshield wiper assistor
(8) Blade ASSY - windshield wiper assistor
(9) Rubber ASSY - windshield wiper assistor

Tightening torque: N·m (kgf-m, ft-lb)

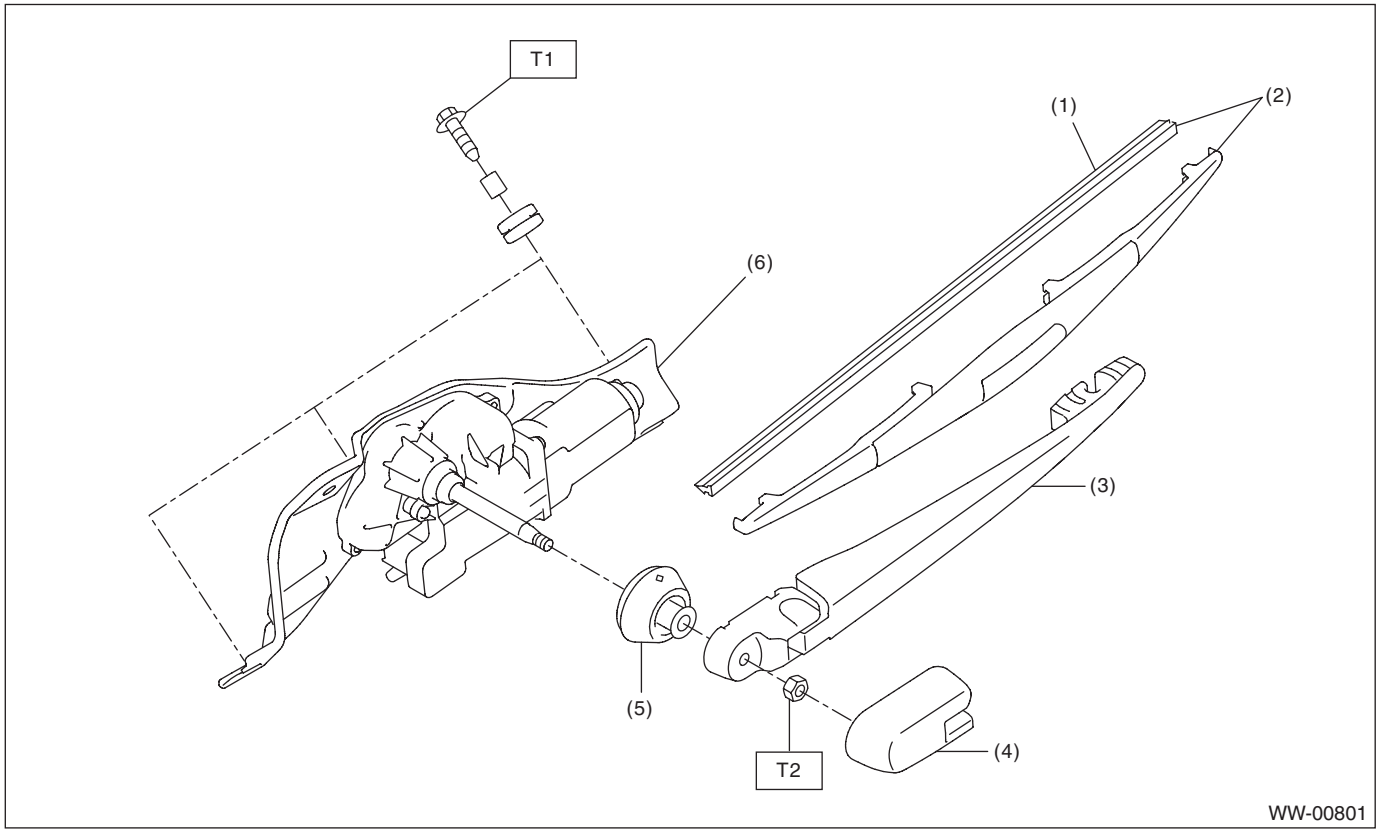
T1: 5.5 (0.56, 4.1)
T2: 6 (0.61, 4.4)
T3: 26 (2.65, 19.2)

- Models with EyeSight



(1)	Motor ASSY - windshield wiper	(6)	Rubber ASSY - windshield wiper driver	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Link ASSY - windshield wiper	(7)	Arm ASSY - windshield wiper assistor	***T1: 5.5 (0.56, 4.1)***
(3)	Cover - windshield wiper arm	(8)	Blade ASSY - windshield wiper assistor	***T2: 6 (0.61, 4.4)***
(4)	Arm ASSY - windshield wiper driver	(9)	Rubber ASSY - windshield wiper assistor	***T3: 26 (2.65, 19.2)***
(5)	Blade ASSY - windshield wiper driver			

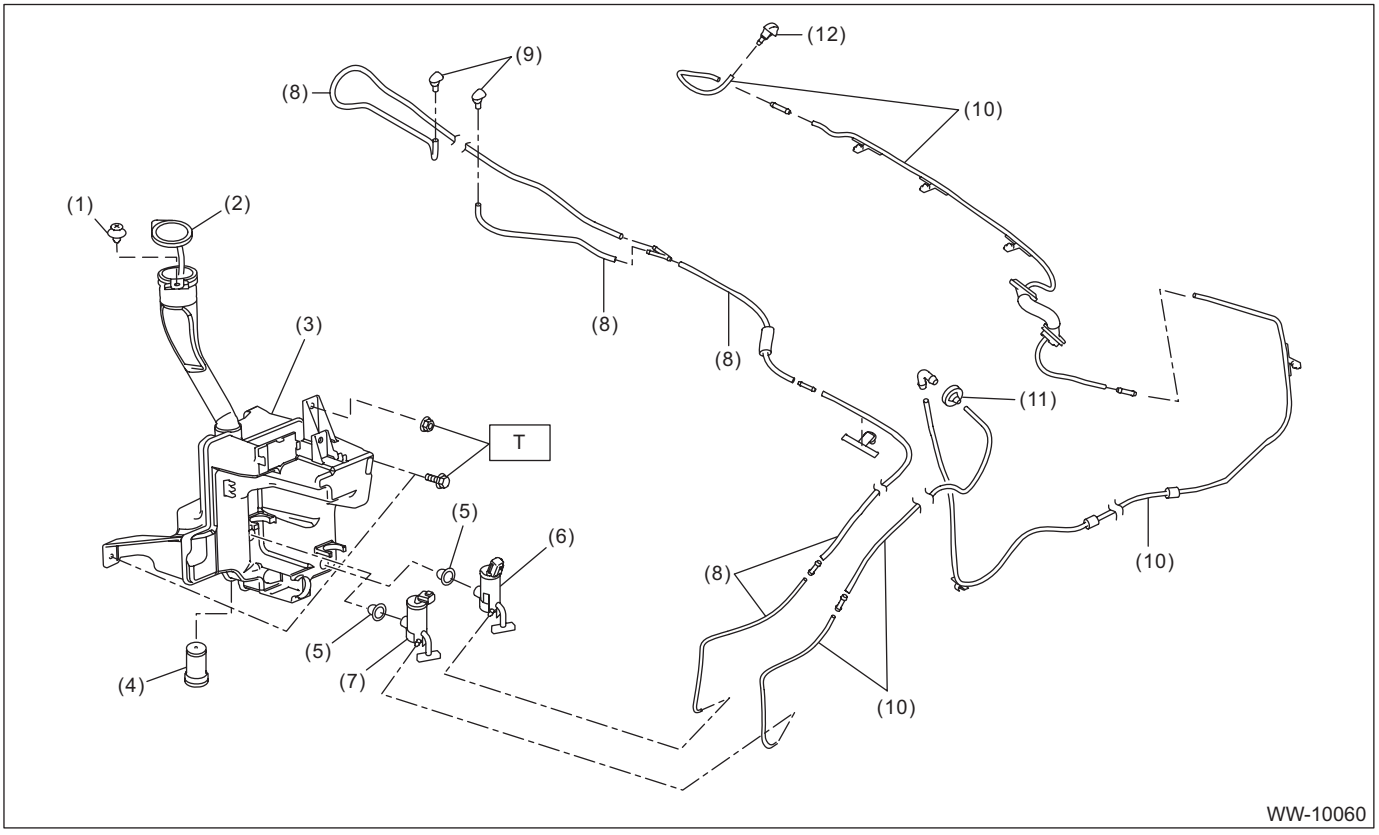
2. REAR WIPER



(1)	Rubber ASSY - rear wiper	(4)	Cover - rear wiper arm	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Blade ASSY - rear wiper	(5)	Cap - pivot wiper	***T1: 6 (0.61, 4.4)***
(3)	Arm ASSY - rear wiper	(6)	Motor ASSY - rear wiper	***T2: 8 (0.82, 5.9)***

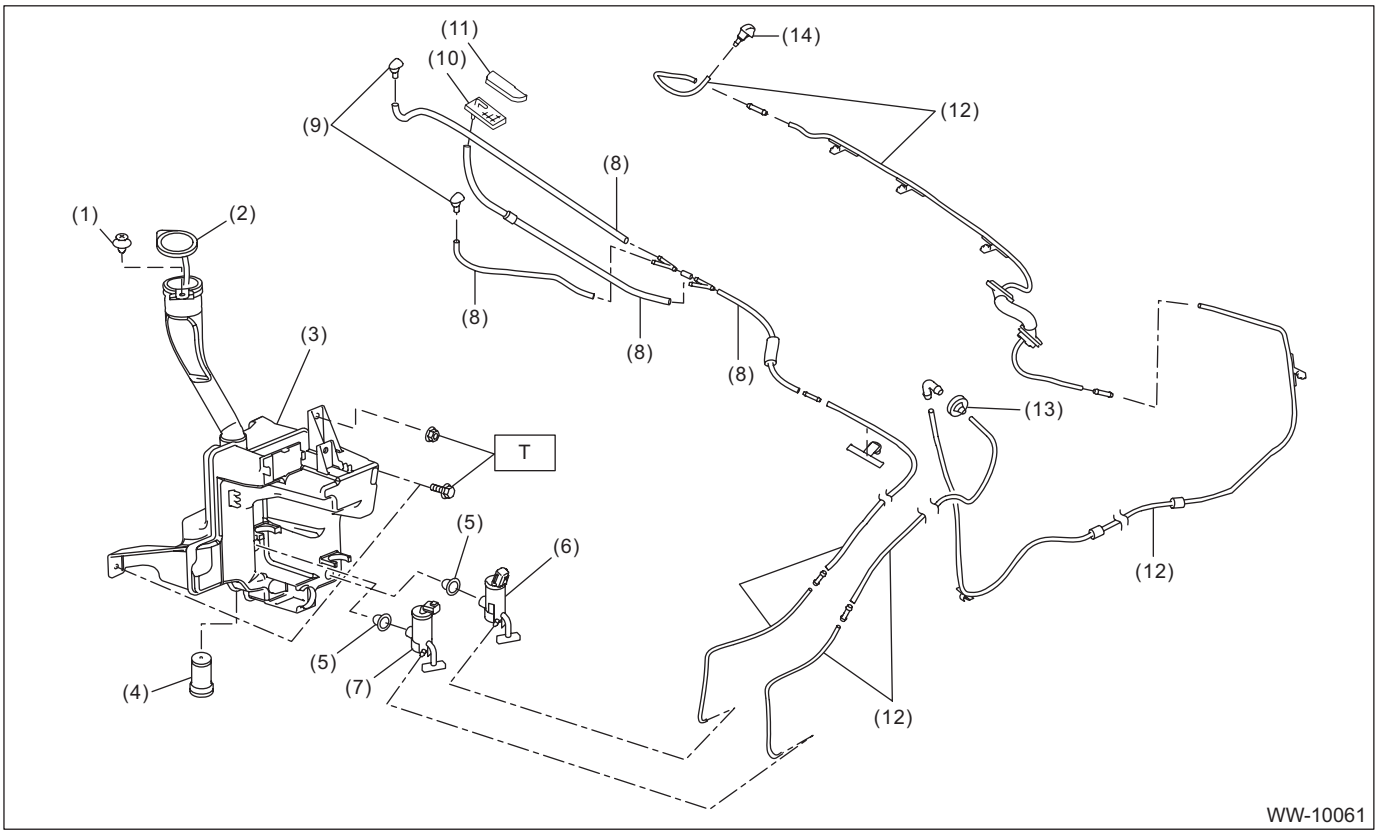
3. WASHER TANK

- Models without EyeSight



(1)	Clip	(7)	Motor pump ASSY - washer rear (5 door model/Crosstrek model only)	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Holder - windshield washer tank	(8)	Hose - windshield washer	***T: 6 (0.61, 4.4)***
(3)	Tank - washer	(9)	Nozzle - windshield washer	
(4)	Sensor - washer tank	(10)	Hose ASSY - rear washer (5 door model/Crosstrek model)	
(5)	Packing - washer motor	(11)	Grommet - washer hose	
(6)	Motor pump ASSY - washer front	(12)	Nozzle - rear washer (5 door model/Crosstrek model only)	

- Models with EyeSight



(1)	Clip	(7)	Motor pump ASSY - washer rear (5 door model/Crosstrek model only)	(13)	Grommet - washer hose
(2)	Holder - windshield washer tank	(8)	Hose - windshield washer	(14)	Nozzle - rear washer (5 door model/Crosstrek model only)
(3)	Tank - washer	(9)	Nozzle - windshield washer		
(4)	Sensor - washer tank	(10)	Joint - washer hose		
(5)	Packing - washer motor	(11)	Cover - joint		
(6)	Motor pump ASSY - washer front	(12)	Hose ASSY - rear washer (5 door model/Crosstrek model)		

Tightening torque: N·m (kgf-m, ft-lb)
T: 6 (0.61, 4.4)

C: CAUTION

- Connect the connectors and hoses securely during reassembly.
- After reassembly, make sure that the each component or each function operates normally.
- Be careful with the airbag system wiring harness which passes near electrical parts and switches.
- Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Using a tester above such circuits may cause malfunction of airbag system. Follow the cautions of “AIRBAG SYSTEM” in this case. <Ref. to AB-11, CAUTION, General Description.>
- When connecting the pipe hoses, be careful not to cause bend or blockage.
- If even a small amount of silicon oil or grease enters the tank - washer and the washer fluid passages, an oil film will be formed on the glass and will cause the wiper to chatter and judder. Make sure that no oil comes into contact with the system.

D: PREPARATION TOOL

1. SPECIAL TOOL

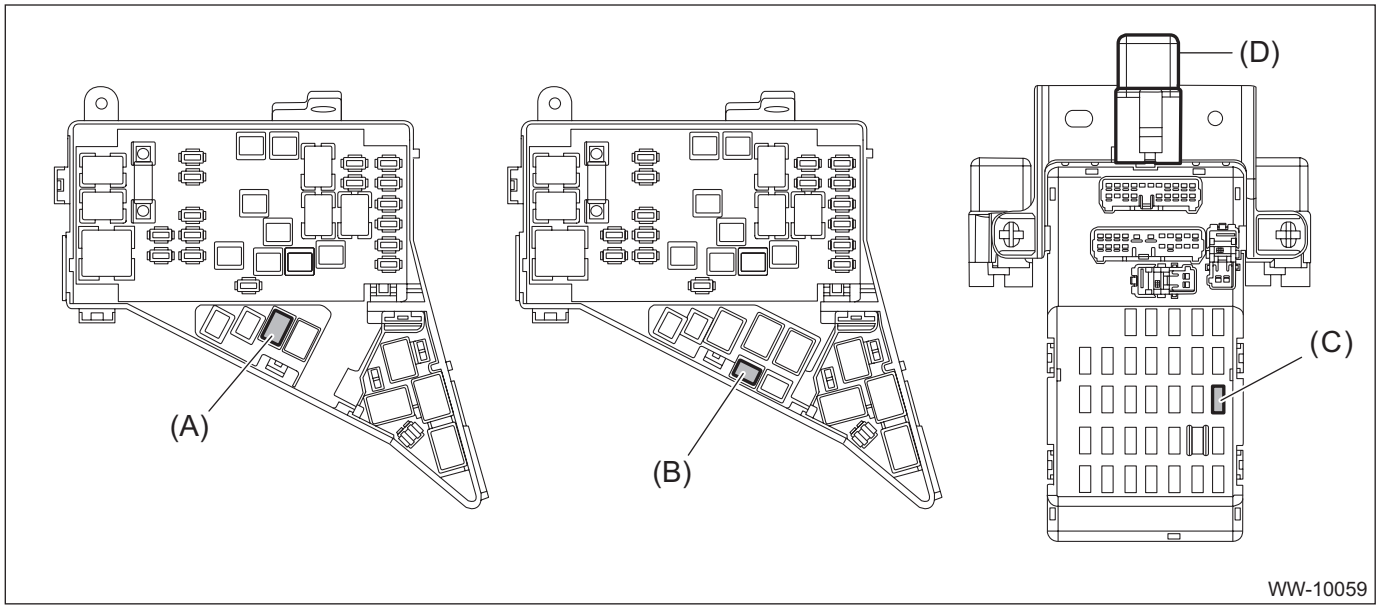
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

2. Relay and Fuse

A: LOCATION



Main fuse box	Fuse 30 A (wiper)	(A): Gasoline engine model
		(B): HEV model
Relay & fuse box	Fuse 7.5 A (wiper)	(C)
Relay holder	Wiper relay	(D)

NOTE:
For other related fuses, refer to the wiring diagram. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>

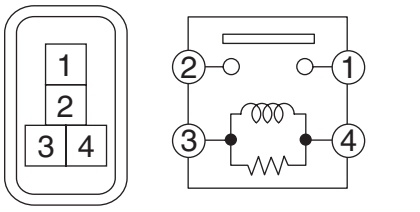
B: INSPECTION

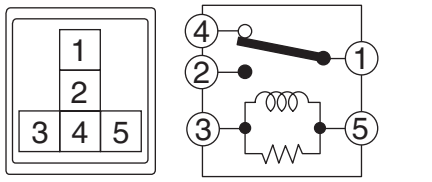
1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

2. CHECK RELAY

1) Check the resistance between relay terminals.

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 SR-00180
1 — 2	Apply battery voltage between terminals 4 and 3.	Less than 1 Ω	

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 SL-01085
1 — 4	Always	Less than 1 Ω	
1 — 2	Apply battery voltage between terminals 3 and 5.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard.

3. Wiper and Washer System

A: WIRING DIAGRAM

1. WIPER AND WASHER (FRONT)

Refer to “Front Wiper and Washer System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-137, WIRING DIAGRAM, Front Wiper and Washer System.>
- HEV model: <Ref. to WI(HEV)-113, WIRING DIAGRAM, Front Wiper and Washer System.>

2. WIPER AND WASHER (REAR)

Refer to “Rear Wiper and Washer System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-198, WIRING DIAGRAM, Rear Wiper and Washer System.>
- HEV model: <Ref. to WI(HEV)-175, WIRING DIAGRAM, Rear Wiper and Washer System.>

B: INSPECTION

Symptoms	Repair order
Wiper and washers do not operate.	1. Wiper fuse (F/B No. 14, 15) 2. Combination switch 3. Motor assembly - wiper 4. Wiring harness
Wipers do not operate in LO or HI.	1. Combination switch 2. Motor assembly - wiper 3. Wiring harness
Wipers do not operate in INT.	1. Combination switch 2. Motor assembly - wiper 3. Wiring harness
Washer motor does not operate.	1. Combination switch 2. Motor pump assembly - washer 3. Wiring harness
Wipers do not operate when washer switch is ON.	1. Motor assembly - wiper 2. Wiring harness
Washer fluid spray does not operate properly.	1. Motor pump assembly - washer 2. Hose assembly - washer 3. Nozzle - washer
Wiper chatters or judders during operation.	1. Oil film and dirt on the glass 2. Arm assembly - windshield wiper 3. Motor assembly - wiper

C: NOTE

For procedure of each component of the wiper and washer system, refer to the respective sections.
- Combination switch (wiper): <Ref. to WW-11, Combination Switch (Wiper).>
- Wiper blade: <Ref. to WW-18, Wiper Blade.>
- Front wiper arm: <Ref. to WW-27, Front Wiper Arm.>
- Front wiper motor and link: <Ref. to WW-33, Front Wiper Motor and Link.>
- Rear wiper arm: <Ref. to WW-43, Rear Wiper Arm.>
- Rear wiper motor: <Ref. to WW-45, Rear Wiper Motor.>
- Washer tank and motor: <Ref. to WW-23, Washer Tank and Motor.>
- Front washer nozzle and hose: <Ref. to WW-37, Front Washer Nozzle and Hose.>
- Rear washer nozzle: <Ref. to WW-48, Rear Washer.>

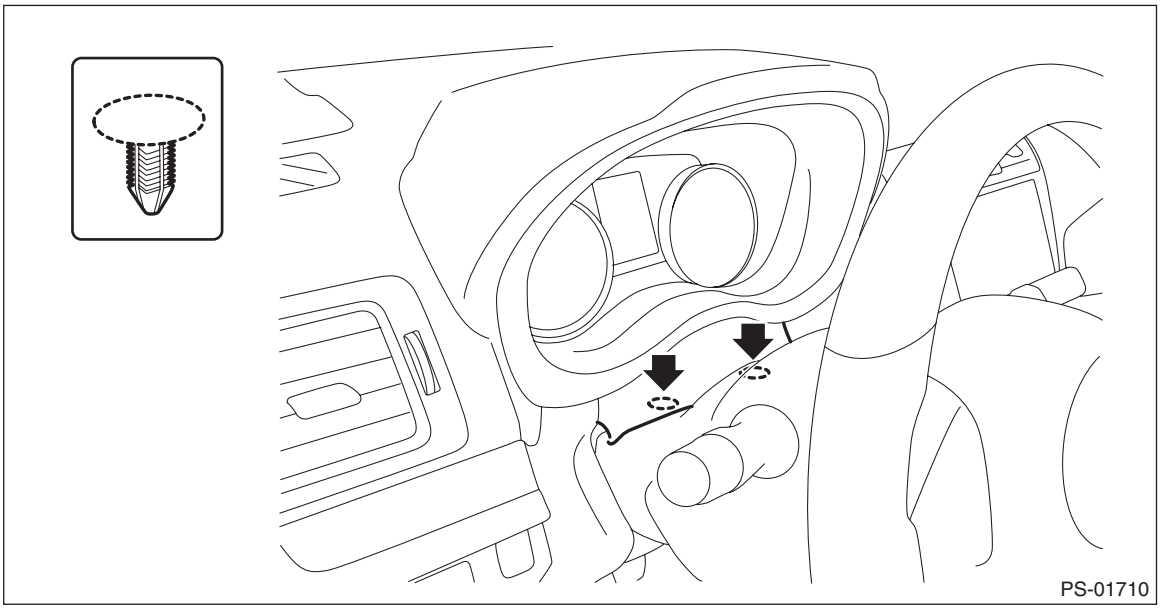
4. Combination Switch (Wiper)

A: REMOVAL

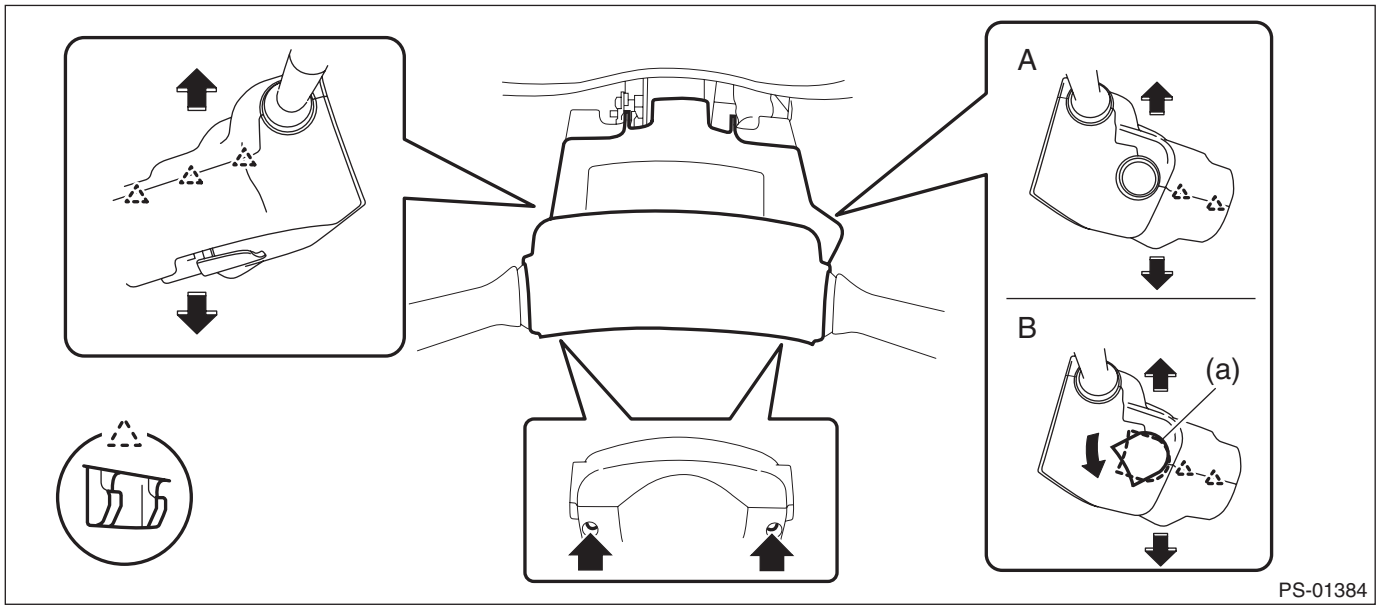
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the cover assembly - column.
   (1) Release the clips, and remove the cover assembly - steering UPR.



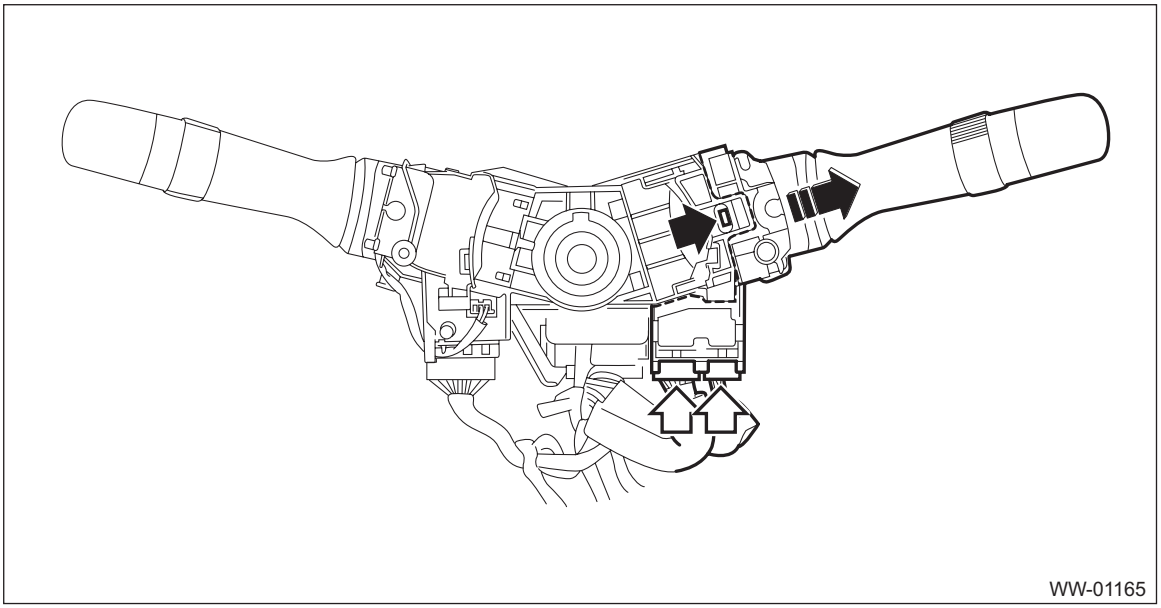
   (2) Remove the screws by turning the steering wheel to right and left.
   (3) Remove the cap - key cylinder (a). (Model with keyless access with push button start)
   (4) Release the claw, and remove the cover assembly - column UPR and the cover assembly - column LWR.



A Model without keyless access with push button start
B Model with keyless access with push button start

3) Remove the switch assembly - combination wiper select.
   (1) Disconnect the connector.
   (2) Release the claws, and pull out the switch assembly - combination wiper select.

CAUTION:
Do not press the claws with excessive force. They may be damaged.



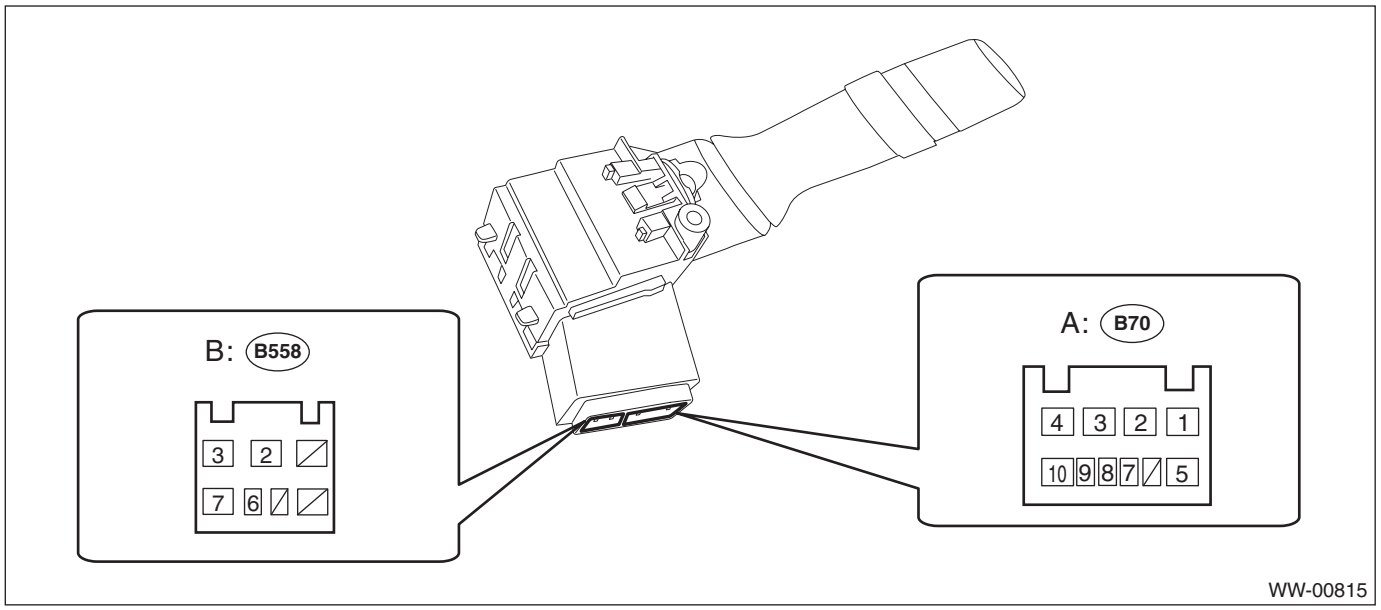
B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1. INSPECTION OF SWITCH UNIT

1) Operate the switches to check the continuity between terminals.



	Switch position	Terminal No.	Standard
Front	OFF	A1 and A3	Less than 1 Ω
	INT	A1 and A3	Less than 1 Ω
	LO	A2 and A3	Less than 1 Ω
	HI	A2 and A4	Less than 1 Ω
	Washer ON	B2 and B3	Less than 1 Ω
Rear	OFF	A5 and B2 B6 and B2 B7 and B2	1 MΩ or more
	LO	B6 and B2	Less than 1 Ω
	HI	B7 and B2	Less than 1 Ω
	Washer ON	A5 and B2	Less than 1 Ω

2) Replace the switch if the inspection result is not within the standard.

2. FRONT WIPER

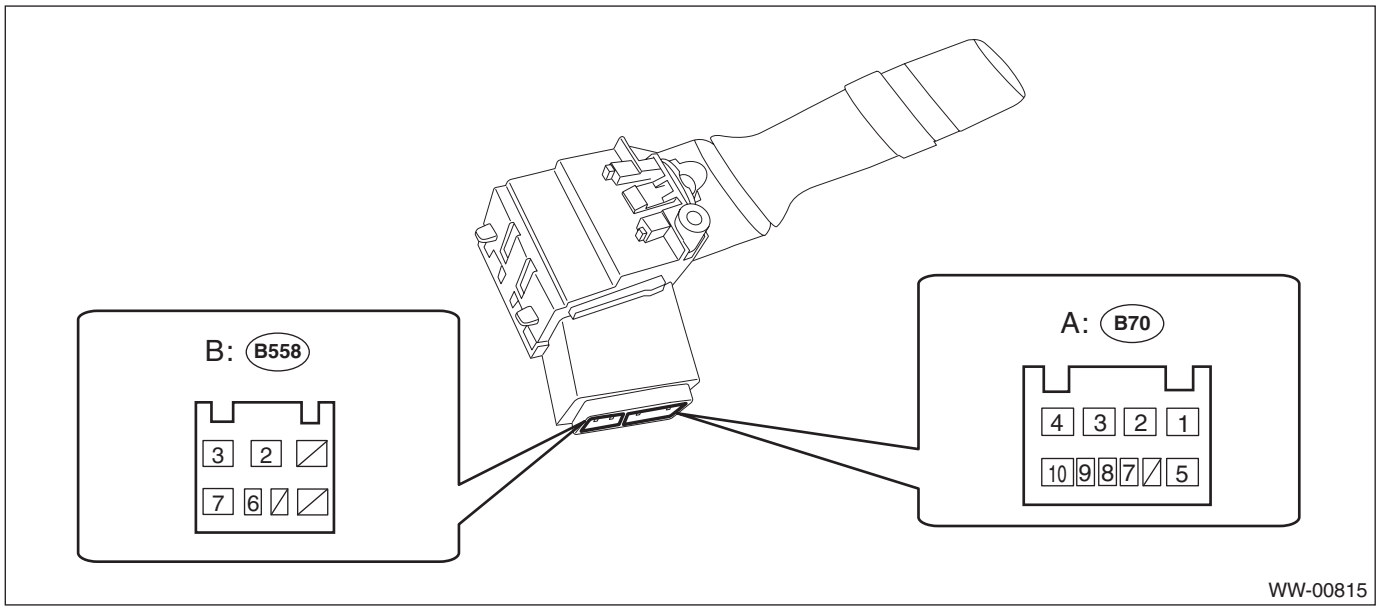
1) Check with Subaru Select Monitor

NOTE:
For detailed operation procedures, refer to “Application help”.

(1) Check the input signal when the switch assembly - combination wiper select is turned to LO or HI, using the «Data monitor» display.
(2) Does the input signal change corresponding to the switch operation?

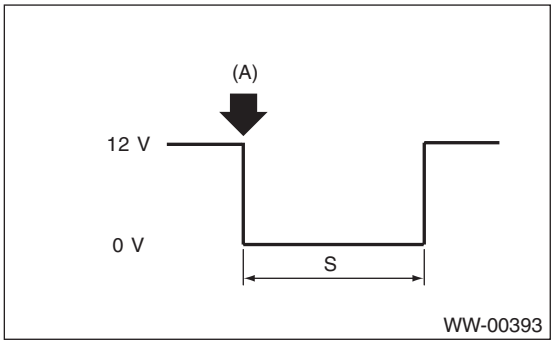
- **Yes** → Finish the diagnosis.
- **No** → Check the harness.

2) Check the intermittent operation (inspection of the wiper switch alone)



(1) Set the voltmeter between terminals No. A2 (+) and No. B2 (–).
(2) Connect the battery to connector. (Terminal No. A2 (+), terminal No. B2 & A3 (–))
(3) Turn the switch assembly - combination wiper select to INT.
(4) Connect the battery (+) to the terminal No. A2 for 5 seconds.
(5) Connect the battery (–) to the terminal No. B2, and check the voltage between terminals No. A2 and No. A3 during intermittent operation.
(6) Perform step (1) to (5) above when intermittent control switch is in MIN or MAX, and replace the switch if the operation is not as specified.

Intermittent stationary time
MIN: Approx. 2 seconds
MAX: Approx. 16 seconds



(A): Connect the battery (–) to the terminal No. B2.
S: Intermittent downtime (sec.)

3. REAR WIPER

1) Check input of body integrated unit
Check the input signal when the rear wiper switch is operated using Subaru Select Monitor.

NOTE:
For detailed operation procedures, refer to “Application help”.

(1) Turn the ignition switch to ON.
(2) Operate the rear wiper switch to each position of ON, INT and Washer ON.
(3) Does the input signal change corresponding to the switch operation?

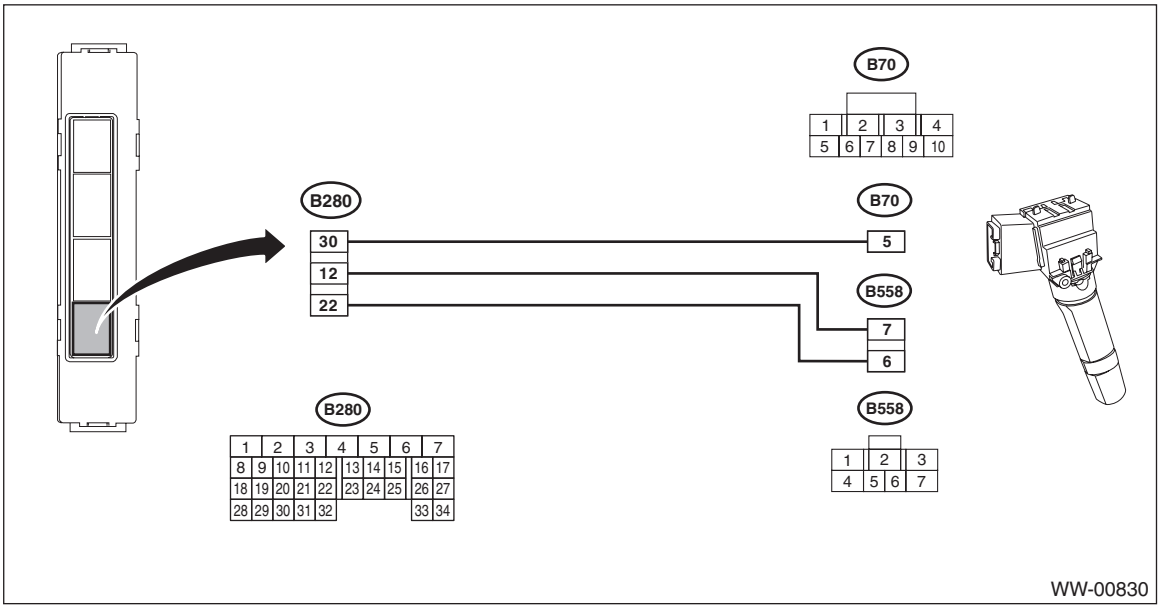
- **Yes** → Go to step 4.
- **No** → Go to step 2.

2) Check harness

(1) Turn the ignition switch to OFF, disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

(2) Disconnect the connector of body integrated unit and wiper switch.
(3) Measure the resistance between body integrated unit and wiper switch.



Connector & terminal
(B280) No. 30 — (B70) No. 5:
(B280) No. 22 — (B558) No. 6:
(B280) No. 12 — (B558) No. 7:

(4) Is the resistance less than 10 Ω?

- **Yes** → Go to step 3.
- **No** → Repair the harness between the body integrated unit and wiper switch.

3) Check input voltage of body integrated unit

(1) Connect the ground cable to battery.
(2) Turn the ignition switch to ON and check the input voltage of body integrated unit.

Connector & terminal
(i84) No. 6 (+) — Chassis ground (–):
(B281) No. 3 (+) — Chassis ground (–):

(3) Is the voltage 10 V or more?

- **Yes** → Go to step 4.
- **No** → Check the harness and fuse.

4) Check output of body integrated unit
Check the output signal when the rear wiper switch is operated using Subaru Select Monitor.
(1) Turn the ignition switch to ON.
(2) Operate the rear wiper switch to ON and Washer ON.
(3) When the operation in step (2) is performed, check the output signal of body integrated unit to rear wiper motor.
(4) When the rear wiper switch is set to ON, is ON output continuous? Also, when the washer is set to ON, is ON output?
- **Yes** → Go to step 5.
- **No** → Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

5) Check output of body integrated unit
Check the output signal when the rear wiper switch is operated using Subaru Select Monitor.
(1) Turn the ignition switch to ON.
(2) Set the rear wiper switch to INT.
(3) When the operation in step (2) is performed, check the output signal of body integrated unit.
(4) When the rear wiper switch is set to INT, is ON/OFF output repeated? (INT OFF time (when vehicle parked): 12 seconds)
- **Yes** → Go to step 8.
- **No** → Go to step 6.

6) Check harness between body integrated unit and rear wiper motor
(1) Turn the ignition switch to OFF, disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
(2) Disconnect the connector of body integrated unit and wiper switch.
(3) Measure the resistance between the harness connector terminals of the body integrated unit and rear wiper motor.

Connector & terminal
(B280) No. 6 — (B97) No. 11:
(4) Is the resistance less than 10 Ω?
- **Yes** → Go to step 7.
- **No** → Repair the open circuit of the harness between body integrated unit and rear wiper motor.

7) Check stop position circuit of the rear wiper motor
(1) Disconnect the harness connector of the motor assembly - rear wiper.
(2) Check the continuity of the circuit of rear wiper motor stop position.

Connector & terminal
(D43) No. 1 (+) — (D43) No. 4 (–):
(3) Is there continuity between terminals?
- **Yes** → Go to step 8.
- **No** → Replace the motor assembly - rear wiper.

8) Check power supply circuit of the rear wiper motor
(1) Disconnect the harness connector of the motor assembly - rear wiper.
(2) Turn the ignition switch to ON.
(3) Measure the voltage between the rear wiper motor harness connector terminal and chassis ground.

Connector & terminal
(D43) No. 3 (+) — Chassis ground (–):
(4) Is the voltage 10 V or more?
- **Yes** → Go to step 9.
- **No** → Check the fuse (No. 27 in main fuse box).

9) Check ground circuit of rear wiper motor
(1) Turn the ignition switch to OFF.
(2) Measure the resistance between the rear wiper motor harness connector terminal and chassis ground.

Connector & terminal
(D43) No. 4 — Chassis ground:
(3) Is the resistance less than 10 Ω?
- **Yes** → Go to step 10.
- **No** → Repair the open circuit of the rear wiper motor ground circuit.

10) Check harness between body integrated unit and rear wiper motor
(1) Turn the ignition switch to OFF.
(2) Disconnect the harness connector of body integrated unit.
(3) Disconnect the harness connector of the motor assembly - rear wiper.
(4) Measure the resistance between the harness connector terminals of the body integrated unit and rear wiper motor.

Connector & terminal
(B280) No. 7 — (D43) No. 2:
(5) Is the resistance less than 10 Ω?
- **Yes** → Go to step 11.
- **No** → Repair the open circuit of the harness between body integrated unit and rear wiper motor.

11) Check output of body integrated unit
(1) Connect the harness connector of body integrated unit.
(2) Disconnect the connector of the motor assembly - rear wiper.
(3) Turn the ignition switch to ON.
(4) Measure the voltage between rear wiper motor connector and chassis ground.

Connector & terminal
(D43) No. 2 (+) — Chassis ground (–):
(5) Is the voltage less than 1.5 V when the rear wiper switch is OFF, and is the voltage 10 V or more when the rear wiper switch is ON?
- **Yes** → Go to step 12.
- **No** → Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

12) Check operation of rear wiper motor
(1) Remove the motor assembly - rear wiper.
(2) Check the rear wiper motor. <Ref. to WW-46, INSPECTION, Rear Wiper Motor.>
(3) Does the rear wiper motor rotate normally?
- **Yes** → Finished.
- **No** → Replace the motor assembly - rear wiper.

NOTE:
Rear wiper intermittent time

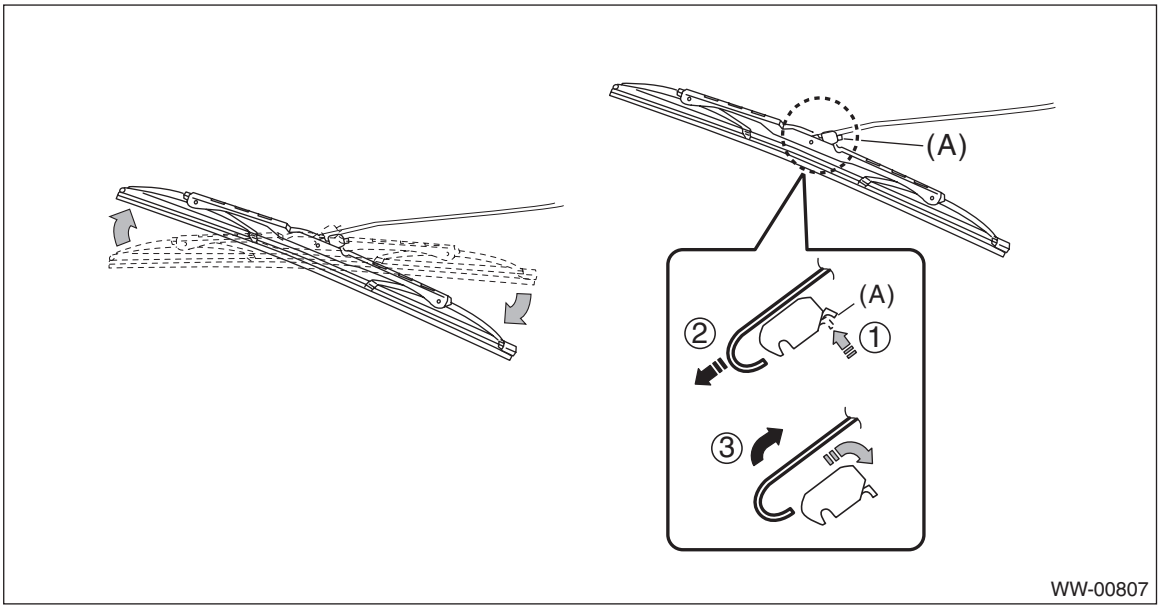
Select lever position	Vehicle speed (km/h (MPH))	Intermittent stopping time (sec.)
		5 door model/Crosstrek model
Rev.	—	Continuous operation
Except for reverse mode	80 — (50 —)	3
	50 — 80 (31 — 50)	6
	20 — 50 (12 — 31)	9
	0 — 20 (0 — 12)	12

5. Wiper Blade

A: REMOVAL

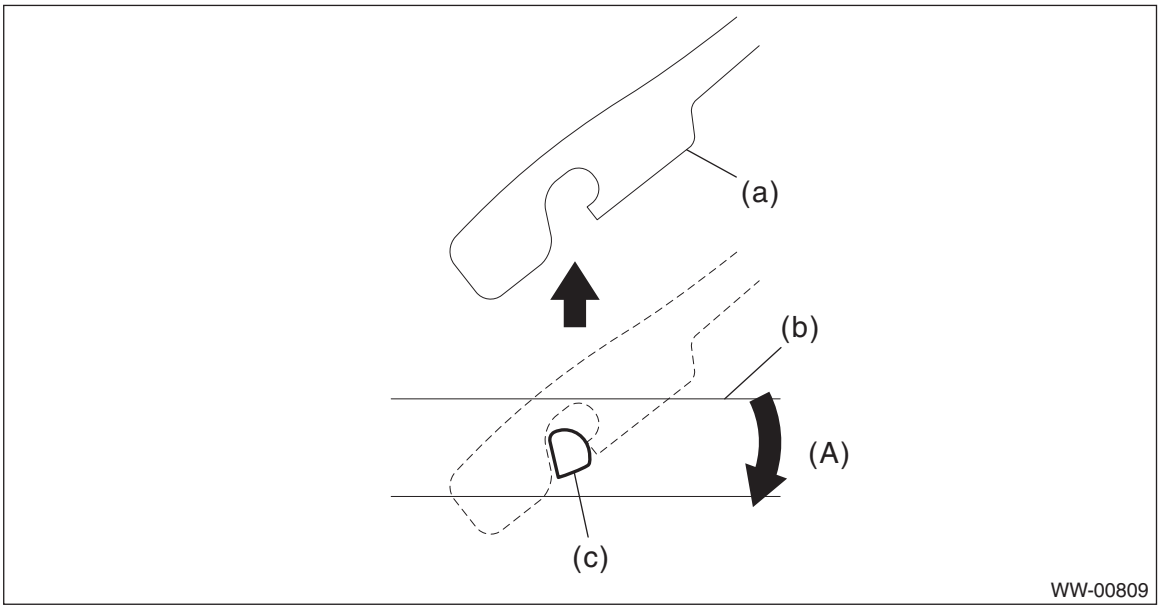
1. FRONT

While pushing the locking clip (A) up, pull out the blade assembly - windshield wiper in the direction of the arrow, and remove it from the arm assembly - windshield wiper.



2. REAR

Turn the blade assembly - rear wiper in the direction of arrow (A) and remove it from the arm assembly - rear wiper.



(A) Turn the wiper blade.

(a) Arm ASSY - rear wiper (b) Blade ASSY - rear wiper (c) Wiper blade attachment section

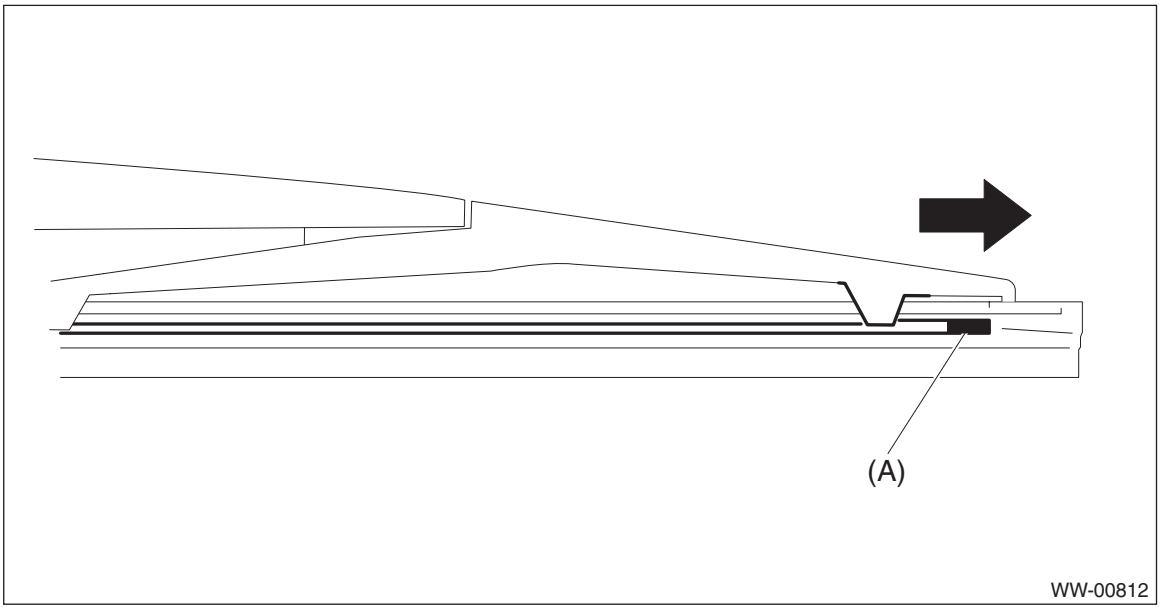
B: INSTALLATION

1) Install each part in the reverse order of removal.
2) Confirm that the clip is locked securely.

C: DISASSEMBLY

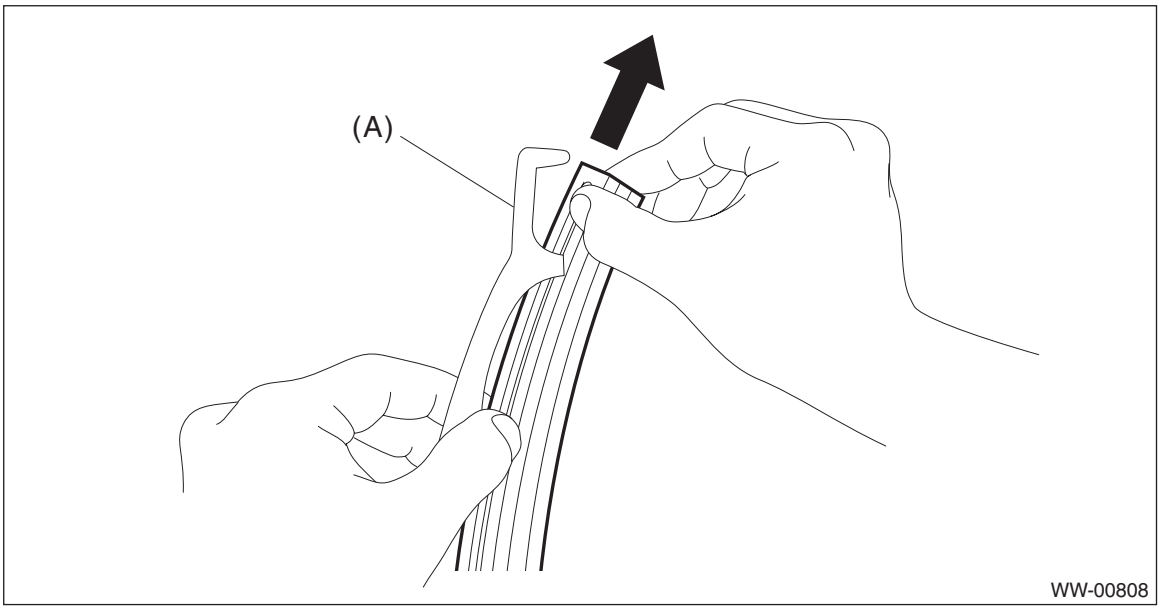
1. FRONT

Pull side (A) of the wiper rubber stopper, and remove the rubber assembly - windshield wiper from the blade assembly - windshield wiper.



2. REAR

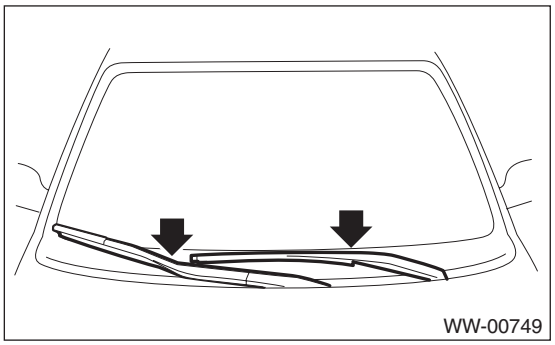
Slightly pull the top of the rubber assembly - rear wiper from the stopper (A), and pull out completely.



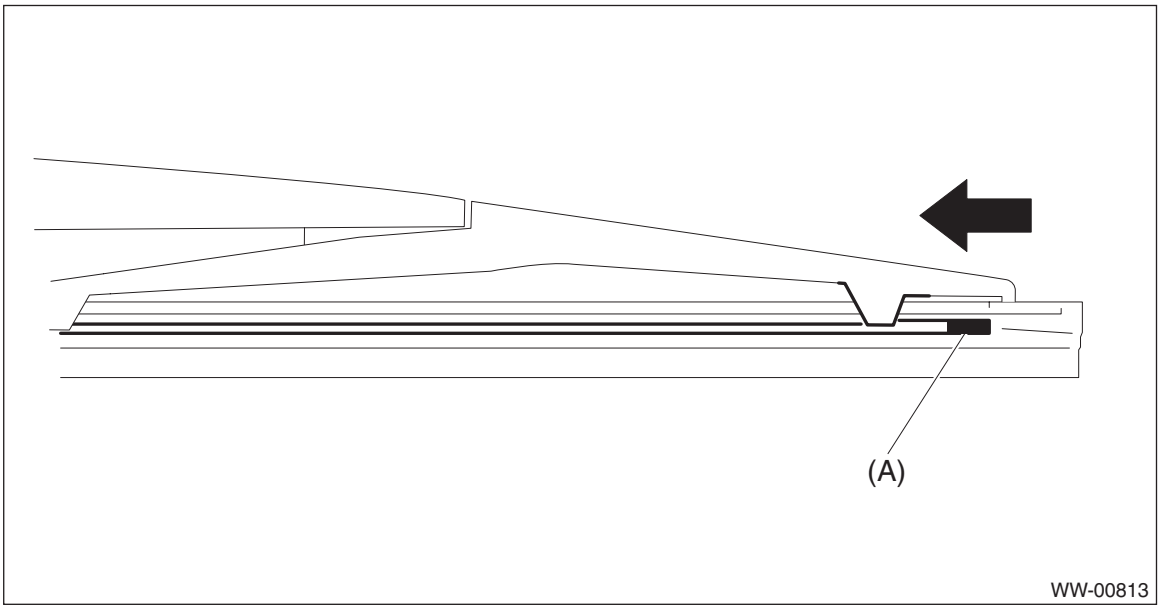
D: ASSEMBLY

1. FRONT

1) Insert the rubber assembly - windshield wiper onto the blade - windshield wiper so that the stopper is in the position shown in the figure.

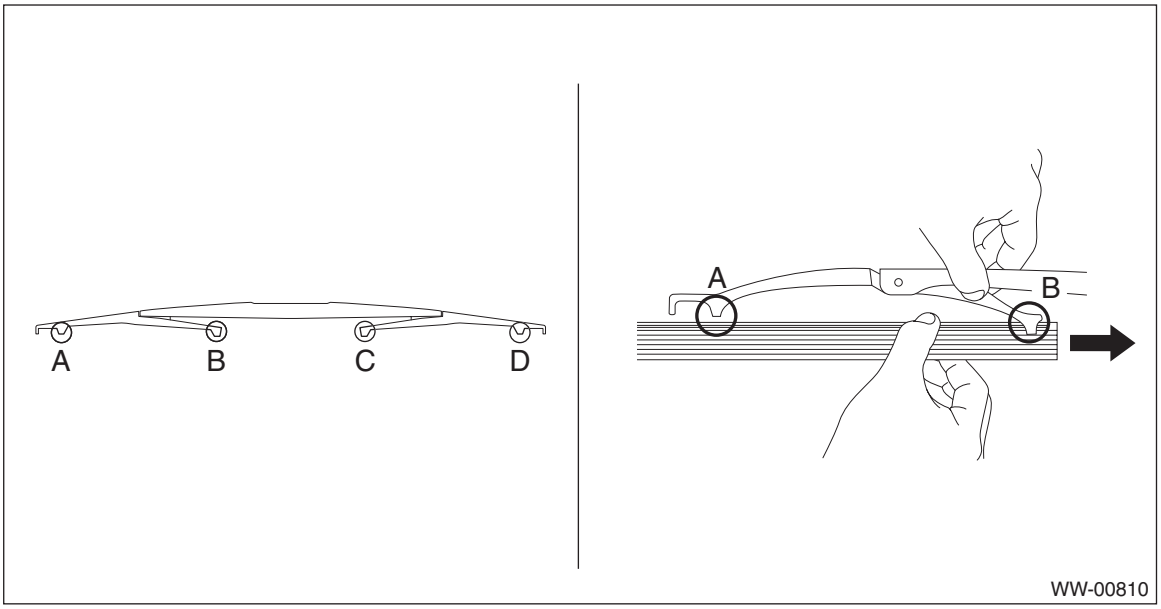


2) Make sure the rubber assembly - windshield wiper is securely fastened to the pull stopper (A).

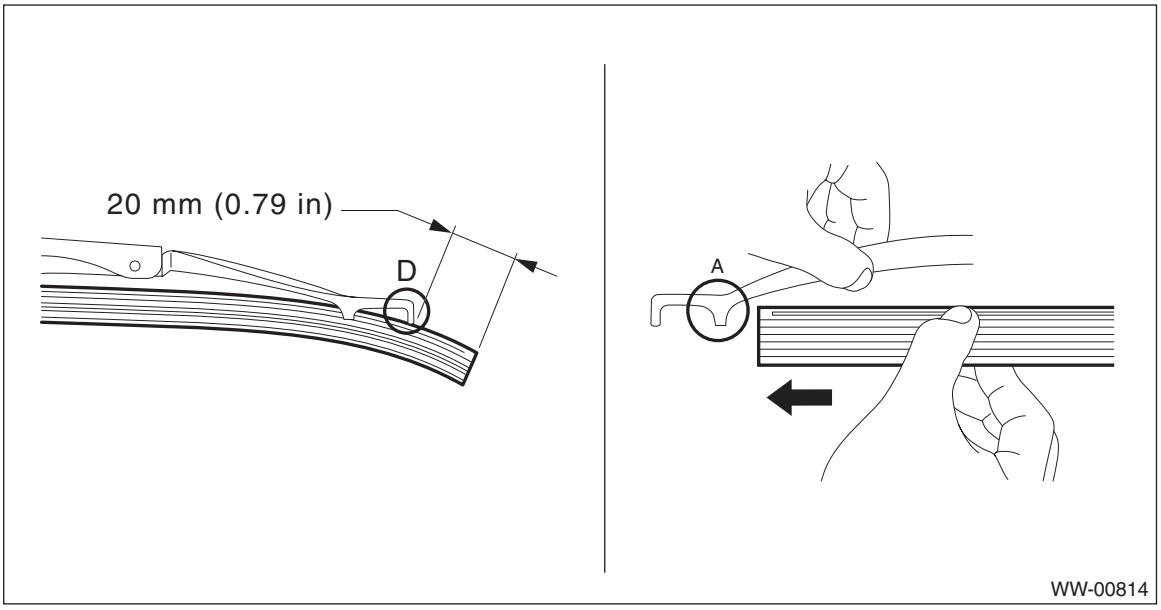


2. REAR

1) Insert the rubber assembly - rear wiper into claw (B).



2) Insert the rubber assembly - rear wiper until its top end protrudes approx. 20 mm (0.79 in) from stopper (D).
3) Insert the rubber assembly - rear wiper into claw (A).



E: INSPECTION

1) Check and clean the rubber assembly - wiper.

CAUTION:
• Do not use organic solvent-based cleaner when cleaning rubber parts in order to avoid rubber part deterioration.
• Clean rubber parts using a soft cloth or paper towel dampened with windshield washer fluid or mild synthetic detergent.

Replace the rubber assembly - wiper if rubber part hardening, deformation or damage is found.
2) Operate the washer system to check if a chattering sound or insufficient wiping occurs.
3) If a chattering sound or insufficient wiping occurs, perform the following procedures.
(1) Make sure that the blade assembly - wiper is not deformed and the movable part moves smoothly.
(2) Remove oil film and dirt from the glass.

CAUTION:
• When powder-type glass cleaner is used, use after having been dissolved in water sufficiently. If it is used in less water, the glass surface may be damaged.
• Clean the glass surface using a soft cloth or sponge with glass cleaner.

(3) Operate the windshield wiper again. If a chattering sound or insufficient wiping occurs, perform the procedures again.
4) If defective is not improved after performing step 1) to step 3), replace the rubber assembly - wiper with a new part.

6. Washer Tank and Motor

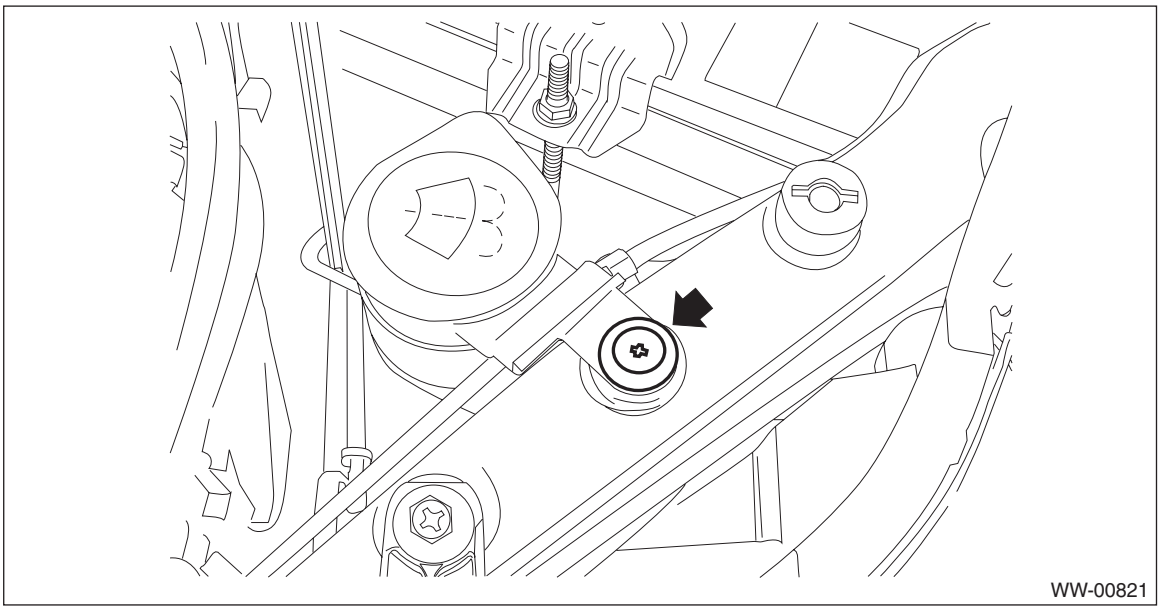
A: REMOVAL

1. WASHER TANK

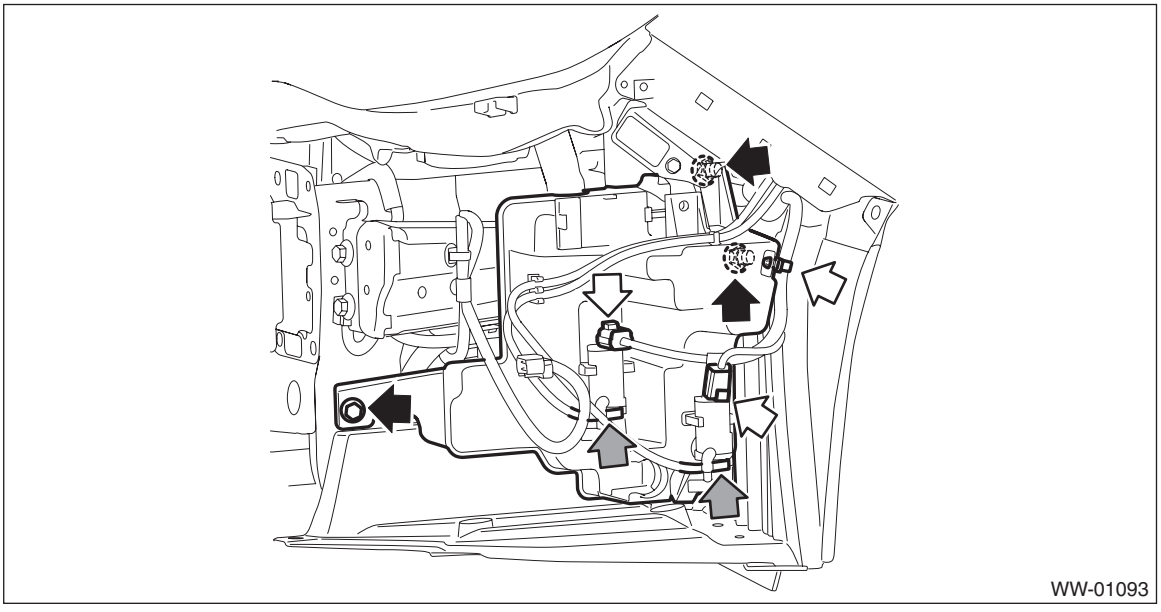
1) Open the hood COMPL - front.
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the bumper face - front. <Ref. to EI-37, REMOVAL, Front Bumper.>
4) Remove the tank - washer assembly.
   (1) Remove the clip of the holder - windshield washer tank.



   (2) Disconnect the connector from the motor pump assembly - washer and the sensor - washer tank, and then remove the harness clip.
   (3) Prepare a container before disconnecting the hose - washer, and drain all washer fluid in the tank - washer.
   (4) Remove the bolt and nuts and remove the tank - washer assembly.

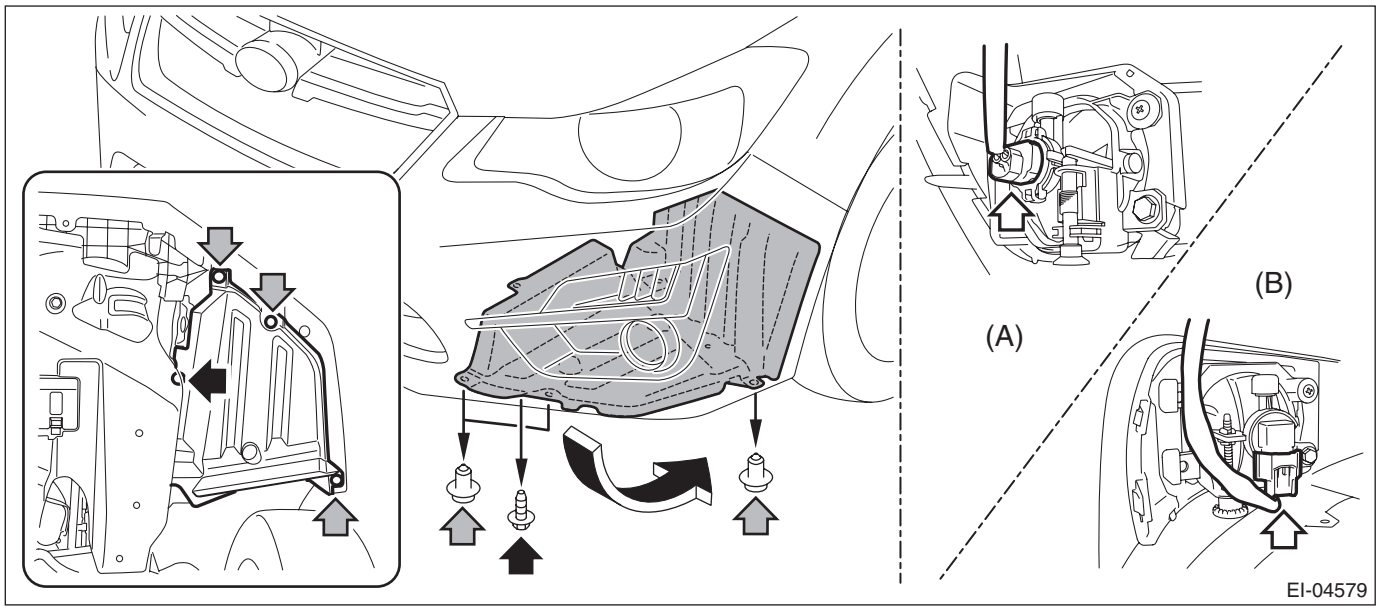


2. WASHER MOTOR

1) Open the hood COMPL - front.
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

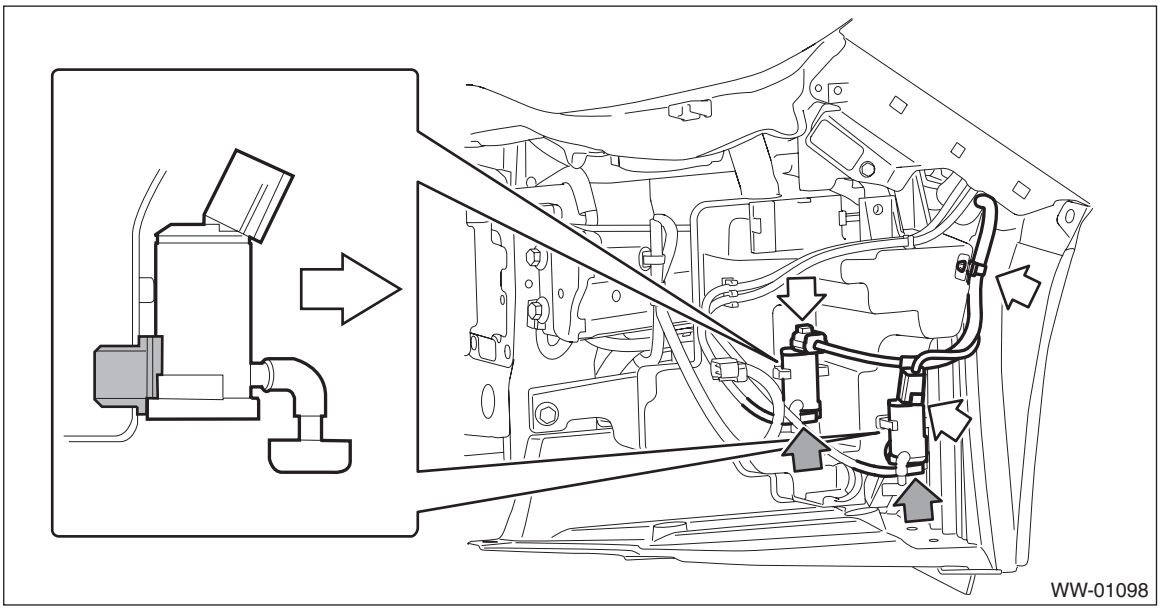
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the screws and clips, turn over the mud guard - front LH, and disconnect the connector of the fog light assembly - front. (Model with fog light)



(A) Type without SRF (B) Type with SRF

4) Disconnect the connector from the motor pump assembly - washer and remove the harness clip.
5) Prepare a container before disconnecting the hose - washer, and drain all washer fluid in the tank - washer.
6) Remove the motor pump assembly - washer from the tank - washer.

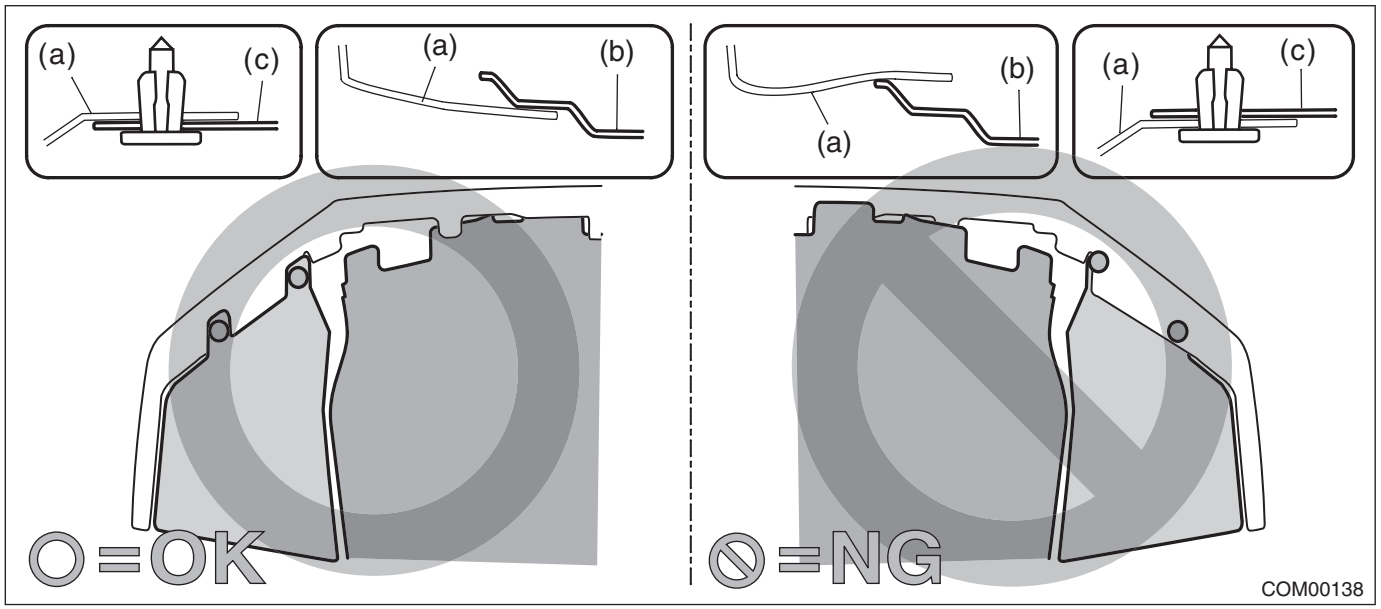


B: INSTALLATION

1) Install each part in the reverse order of removal.

CAUTION:

• Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



• Before installing the bumper face, match the claws on the bracket - front bumper with the engaging position of flange section on the bumper face side. If the engaging position is not correct, the flange section may be broken or the clearance between fender panel and bumper face may not be uniform.

Tightening torque:
6.0 N·m (0.61 kgf-m, 4.4 ft-lb)

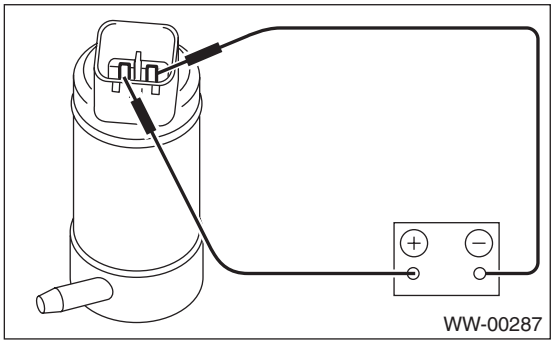
2) Add new washer fluid.

3) Adjust the fog light beam. (Model with fog light) <Ref. to LI-52, FOG LIGHT AIMING, ADJUSTMENT, Front Fog Light Assembly.>

C: INSPECTION

1. WASHER PUMP

Apply battery voltage to the connector terminal of the motor pump assembly - washer, and make sure that the motor operates.



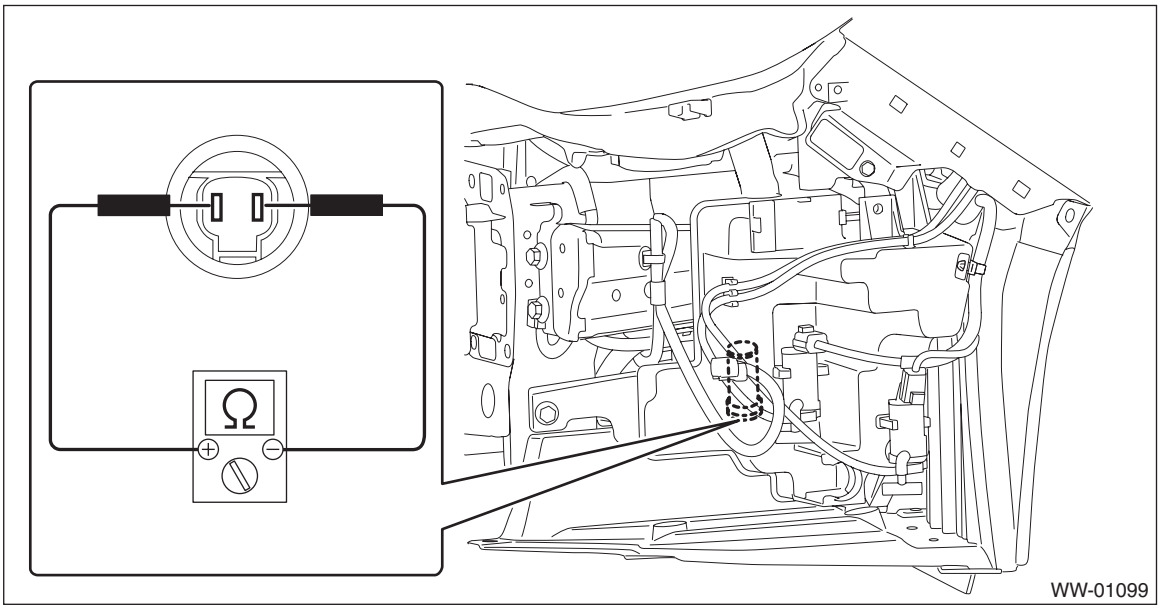
2. WASHER FLUID LEVEL SENSOR

1) Check the connection status of washer fluid level sensor connector.
2) Does the low washer fluid warning light illuminate after draining the washer fluid? And does the low washer fluid warning light go off after refilling the washer fluid?
- **Yes → Normal operation.**
- **No → Perform step 3.**

3) Using a tester, measure the voltage of the washer fluid level sensor connector.
   (1) Is the voltage approx. 8.5 V or more?
   - **Yes → Perform step 4.**
   - **No → Check harness, meter and integrated unit, and replace if necessary.**

4) Does the meter indicator illuminate if you short the washer fluid level sensor connector?
- **Yes → Perform step 5.**
- **No → Check meter and integrated unit, and replace if necessary.**

5) Using a tester, measure the resistance of the washer fluid level sensor.
   (1) Turn over the mud guard.
   (2) Measure the resistance of the washer fluid level sensor.



Amount of washer fluid in the tank	Standard
No remaining quantity (ON)	Less than 10 Ω
There is remaining quantity (OFF)	1 MΩ or more

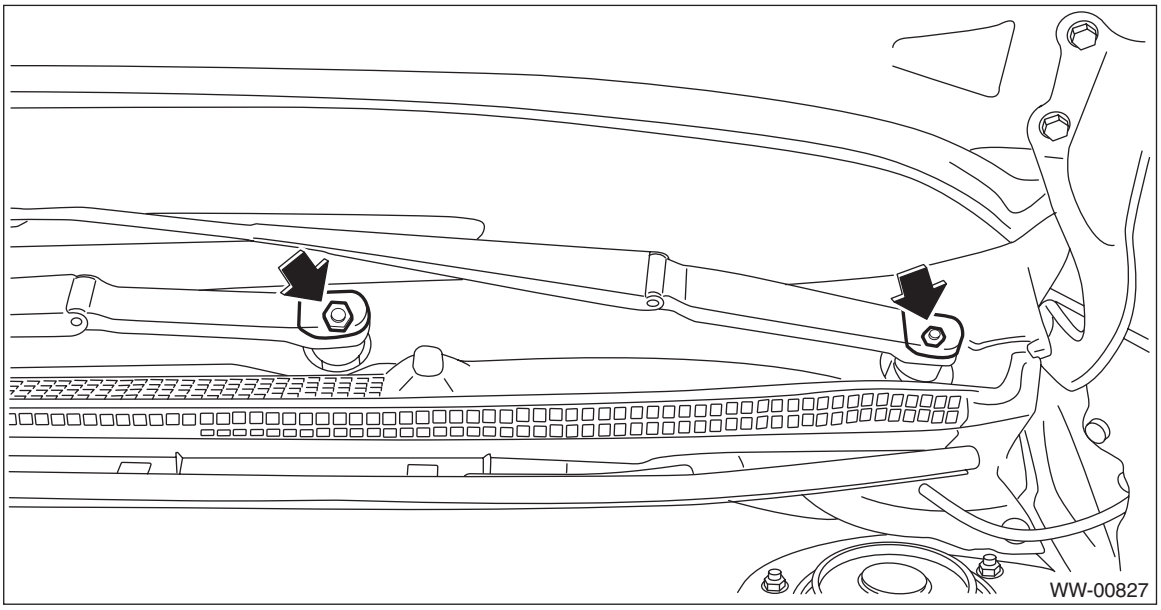
   (3) Is the resistance within the standard?
   - **Yes → Normal operation.**
   - **No → Replace the washer fluid level sensor along with the washer tank.**

7. Front Wiper Arm

A: REMOVAL

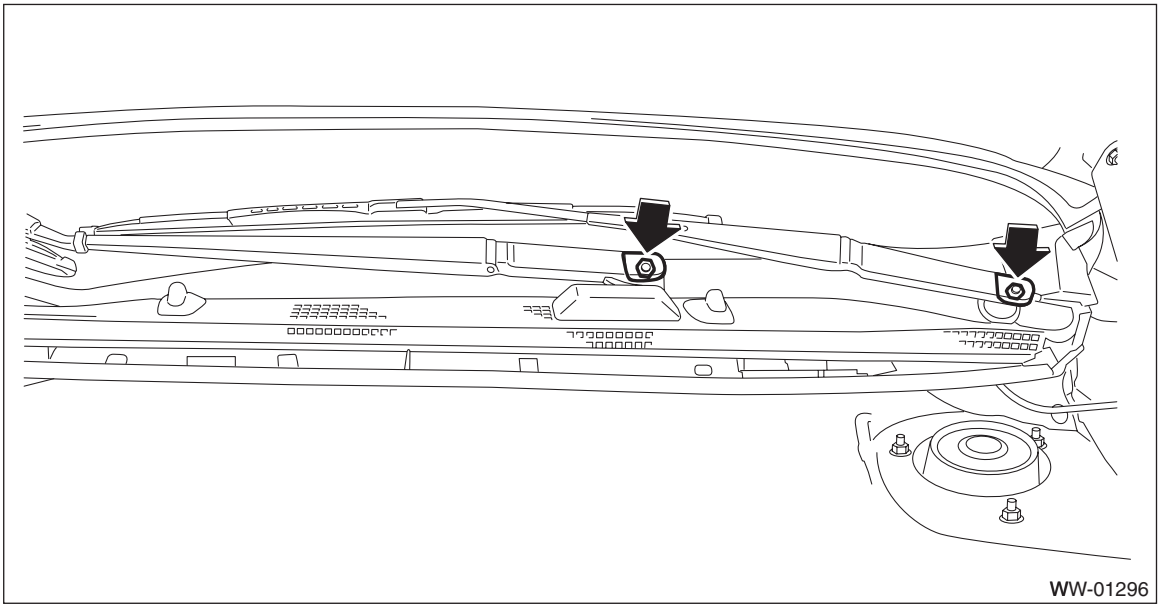
1. MODELS WITHOUT EyeSight

1) Remove the cover - windshield wiper arm.
2) Remove the nuts, and remove the arm assembly - windshield wiper.

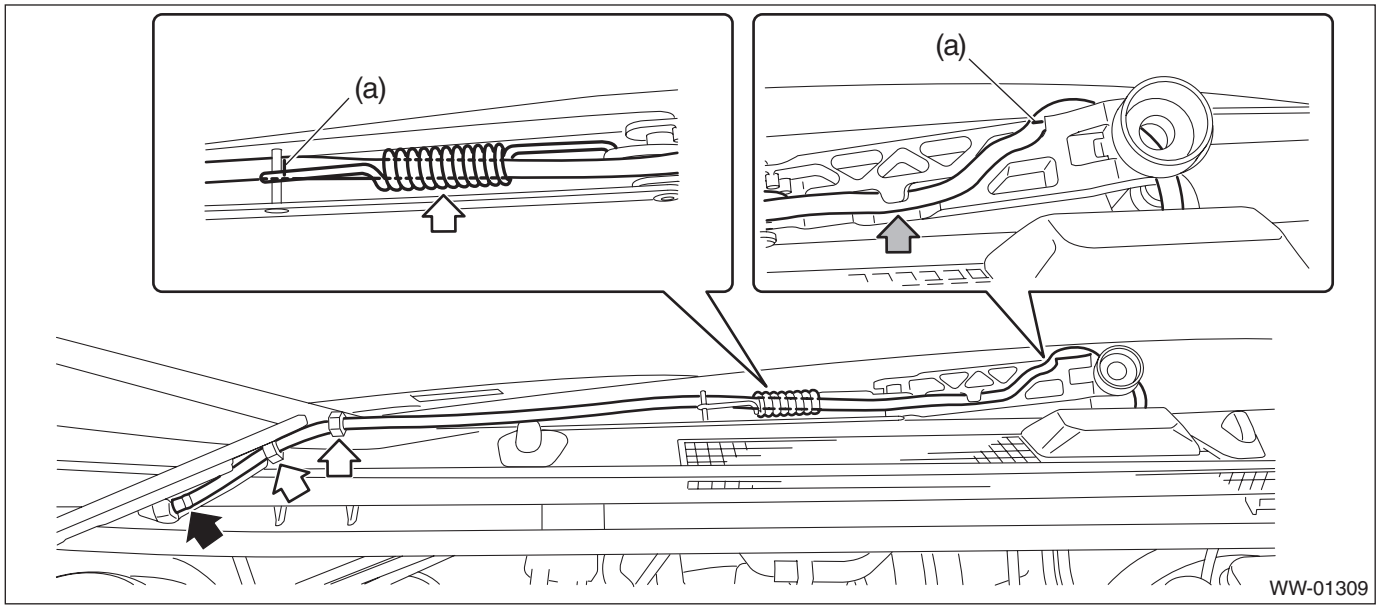


2. MODELS WITH EyeSight

1) Remove the cover - windshield wiper arm.
2) Remove the arm assembly - windshield wiper.
   (1) Remove the nuts, and remove the arm assembly - windshield wiper.



(2) Add the alignment mark (a), and remove the hose from the arm assembly - windshield wiper assistor.

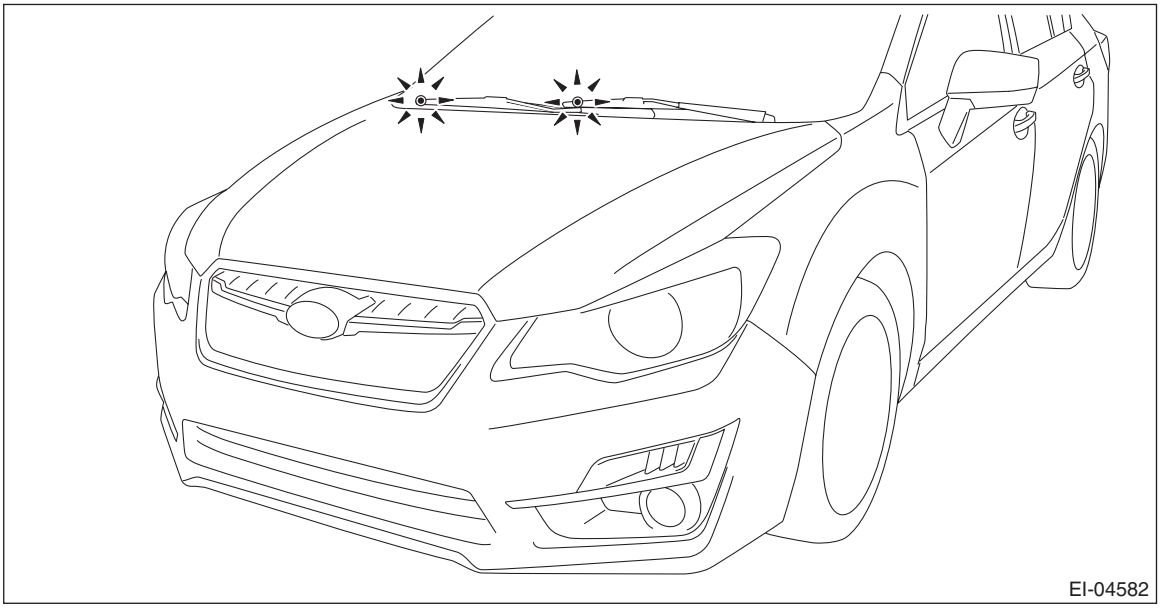


(3) Remove the cowl panel assembly. <Ref. to EI-57, REMOVAL, Cowl Panel.>
(4) Release the claws of the cover - joint, and remove the cover - joint from the cowl panel assembly. <Ref. to WW-38, NOZZLE - WINDSHIELD WASHER (MODEL WITH EyeSight), REMOVAL, Front Washer Nozzle and Hose.>
(5) Remove the hose from the joint - washer hose.

B: INSTALLATION

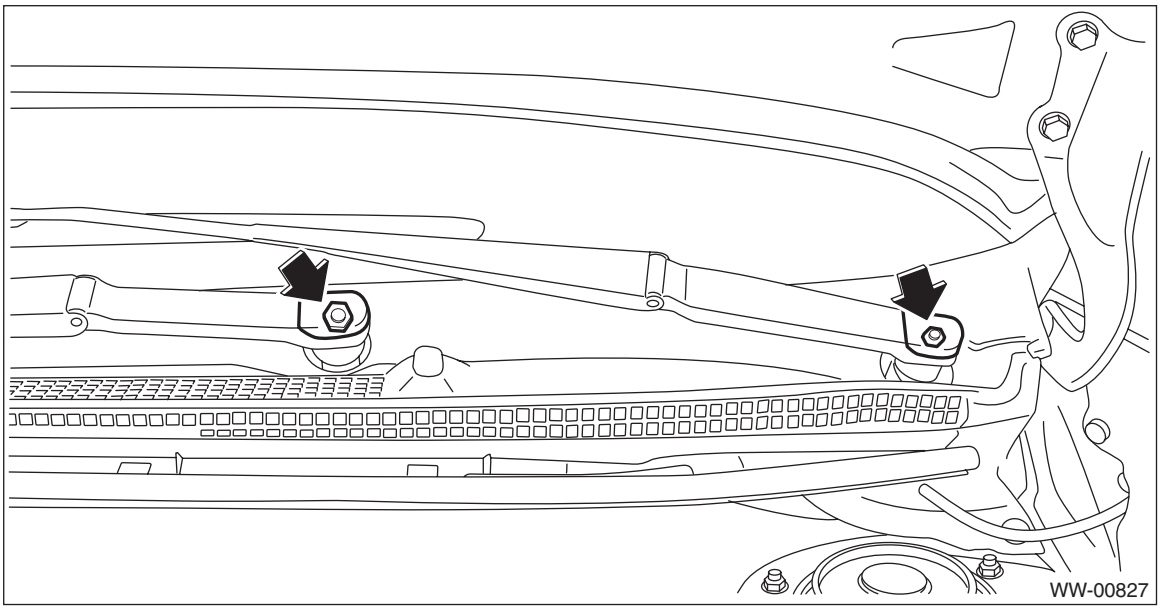
1. MODELS WITHOUT EyeSight

1) Install the arm assembly - windshield wiper.
(1) Assemble the arm assembly - windshield wiper so that the blade assembly - windshield wiper is aligned to the ceramic print point mark of the windshield glass.



(2) Tighten the arm assembly - windshield wiper to specified torque and install the cap.

Tightening torque:
26 N·m (2.65 kgf-m, 19.2 ft-lb)

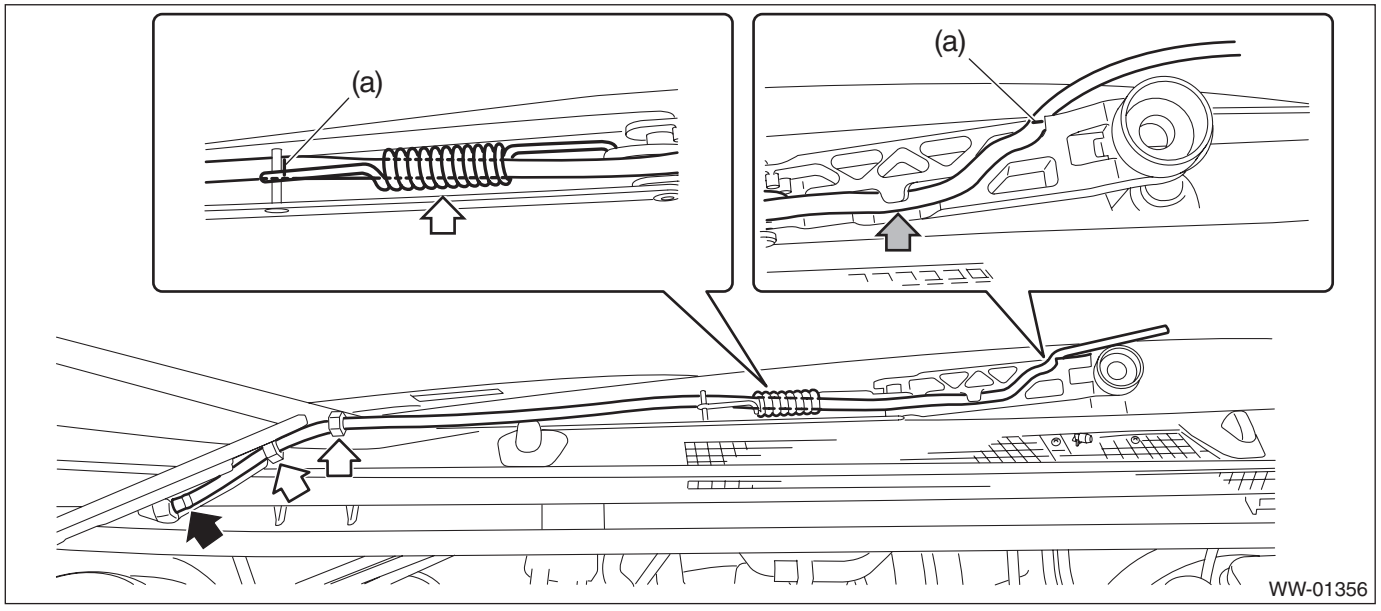


2) Check the position of windshield wiper. <Ref. to WW-32, ADJUSTMENT, Front Wiper Arm.>

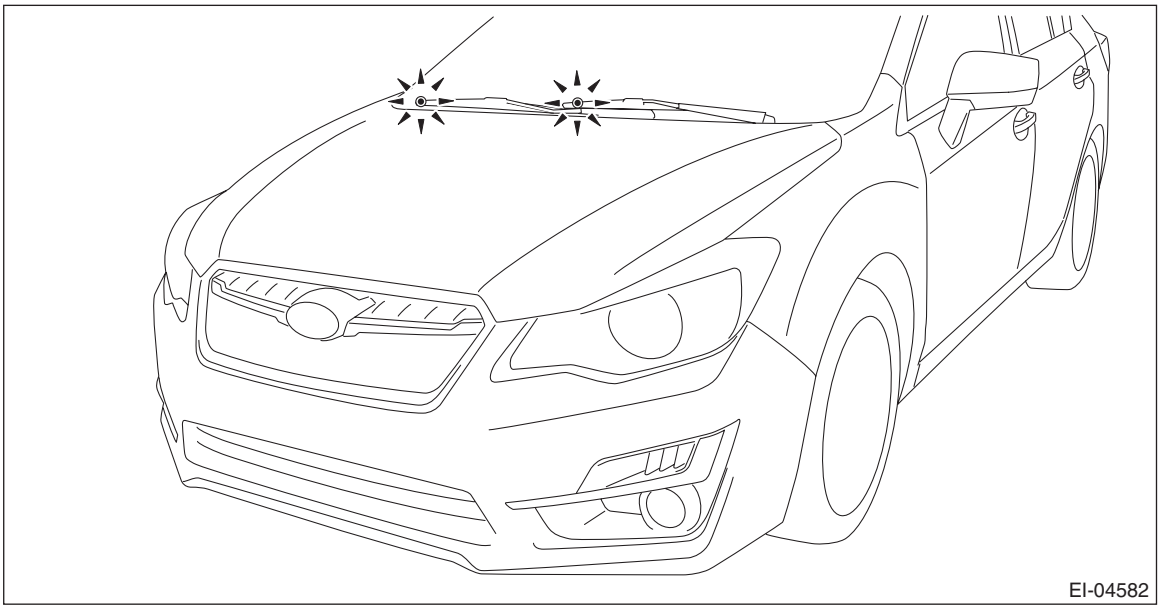
2. MODELS WITH EyeSight

CAUTION:
Install firmly so that the hose is not bent, compressed or flattened.

1) Install the cowl panel assembly. <Ref. to EI-59, INSTALLATION, Cowl Panel.>
2) Install the arm assembly - windshield wiper.
(1) Align the alignment mark (a), and install the hose to the arm assembly - windshield wiper assistor.

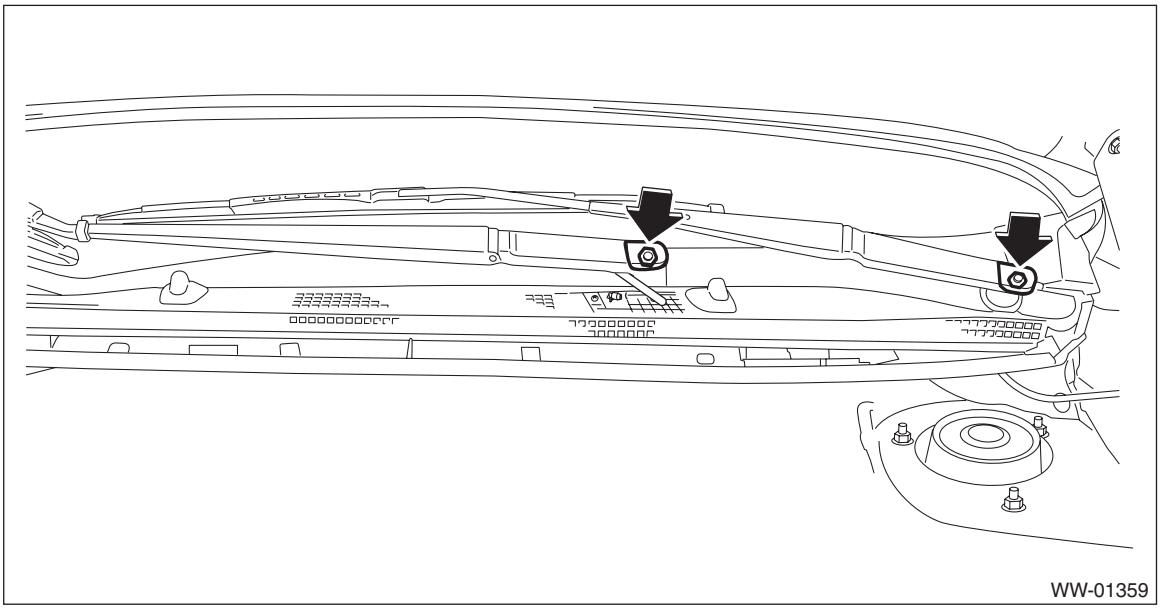


(2) Assemble the arm assembly - windshield wiper so that the blade assembly - windshield wiper is aligned to the ceramic print point mark of the windshield glass.

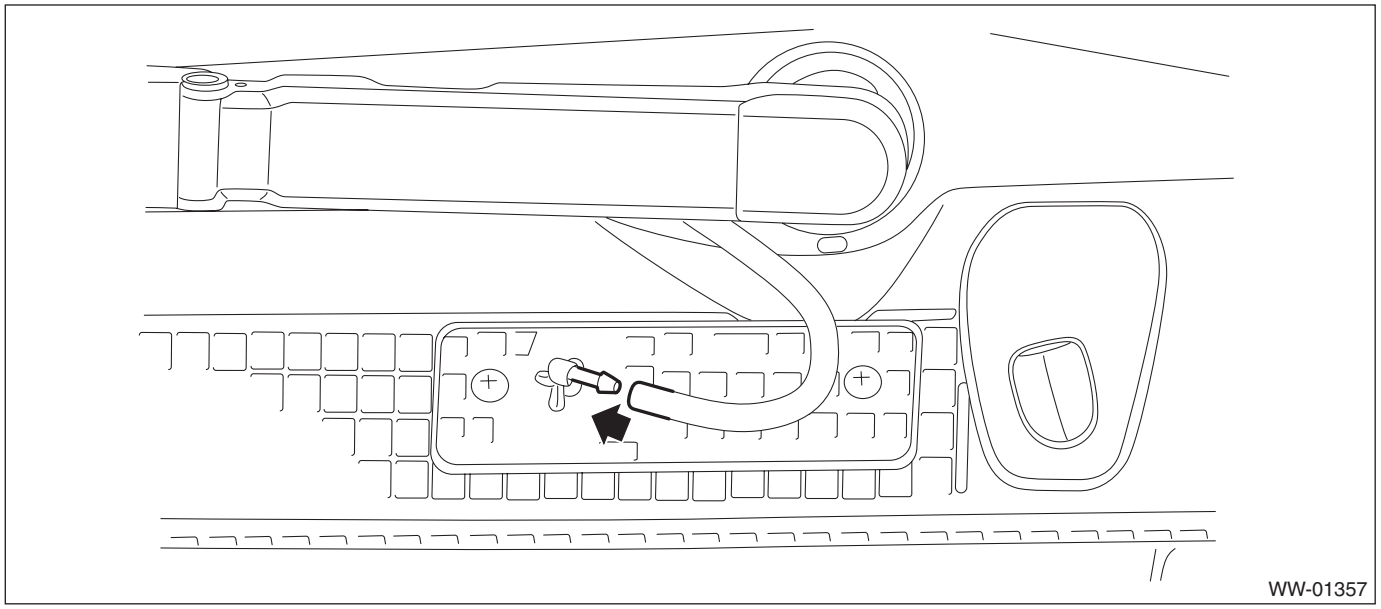


(3) Tighten the arm assembly - windshield wiper to specified torque and install the cap.

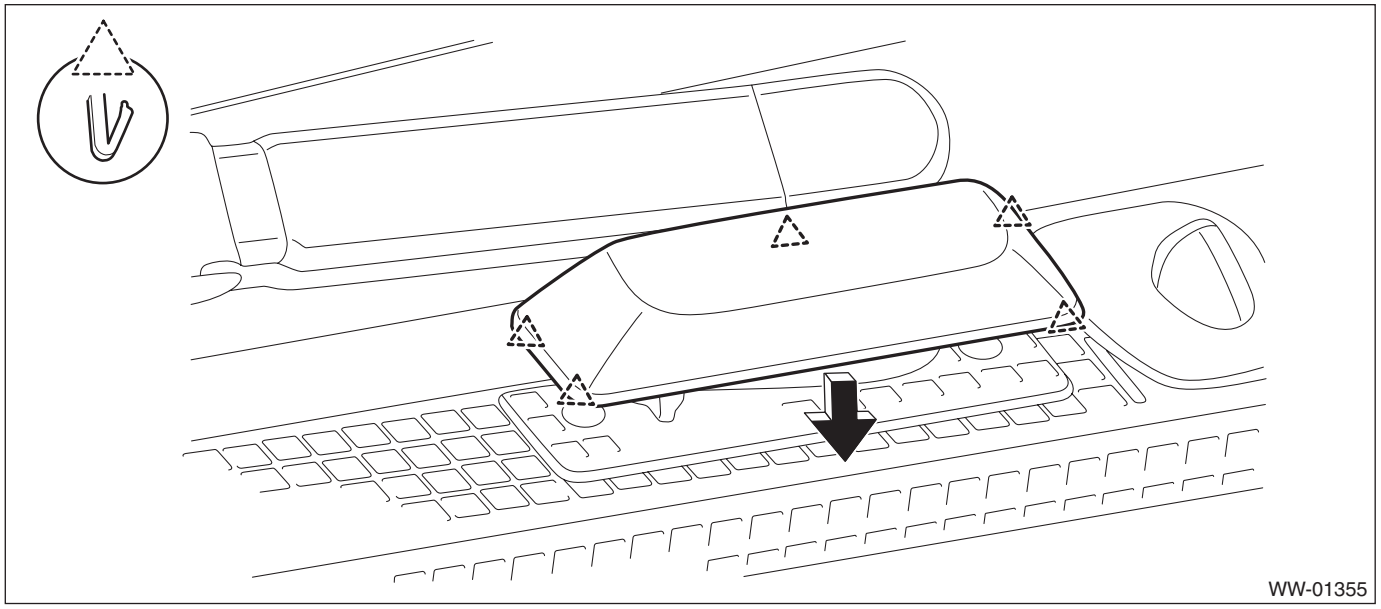
Tightening torque:
26 N·m (2.65 kgf-m, 19.2 ft-lb)



(4) Install the hose to the joint - washer hose.



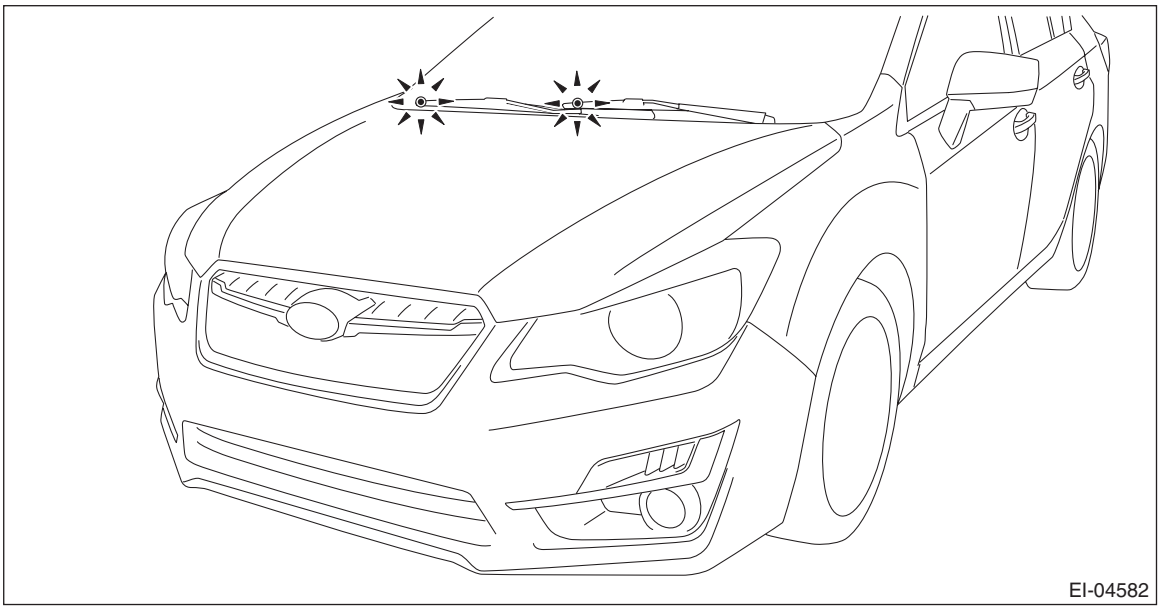
(5) Install the cover - joint to the cowl panel assembly.



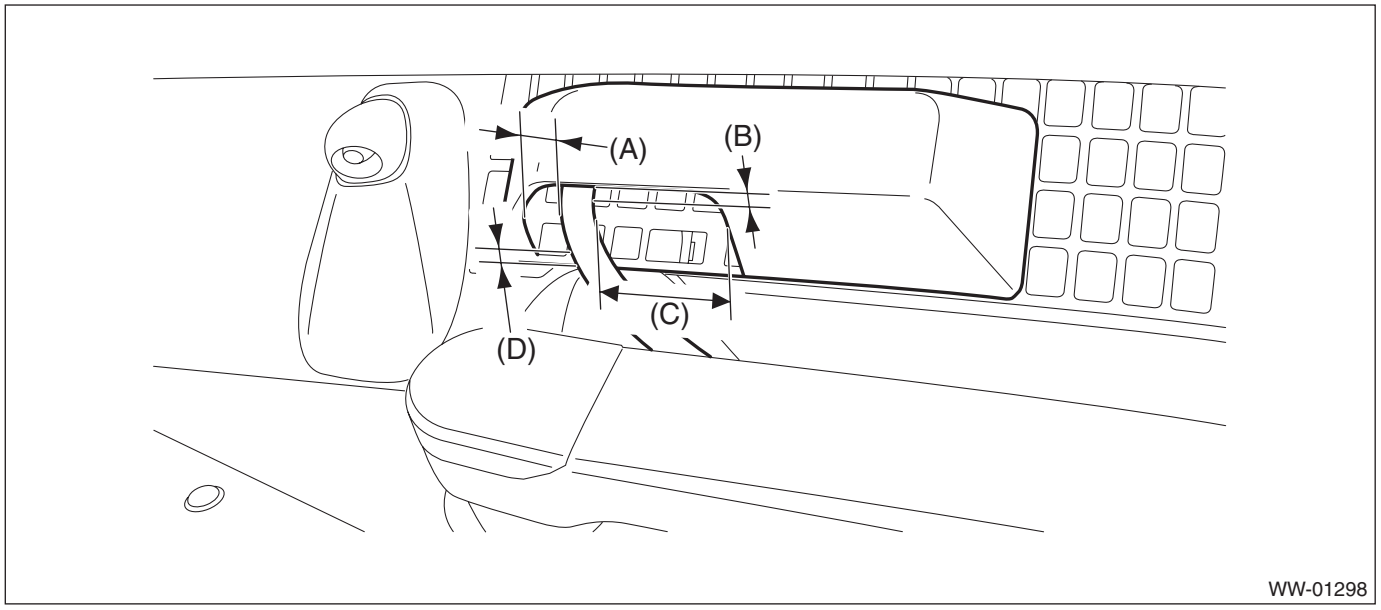
3) Check the position of windshield wiper. <Ref. to WW-32, ADJUSTMENT, Front Wiper Arm.>

C: ADJUSTMENT

1) Operate the windshield wiper once.
2) Check that the wiper blade is aligned with the point mark.



3) Make sure that there is a gap of 1 mm (0.04 in) or more between the hose and the cover - joint and between the hose and the joint - washer hose during windshield wiper operation.



(A) Gap between hose and cover - joint outer side
(B) Gap between hose and cover - joint upper side
(C) Gap between hose and cover - joint inner side
(D) Gap between hose and cover - joint lower side

4) If there is a gap between the hose and the cover - joint, a gap between the hose and the joint - washer hose and misalignment of the point mark, remove and install the windshield wiper. <Ref. to WW-27, REMOVAL, Front Wiper Arm.>

8. Front Wiper Motor and Link

A: REMOVAL

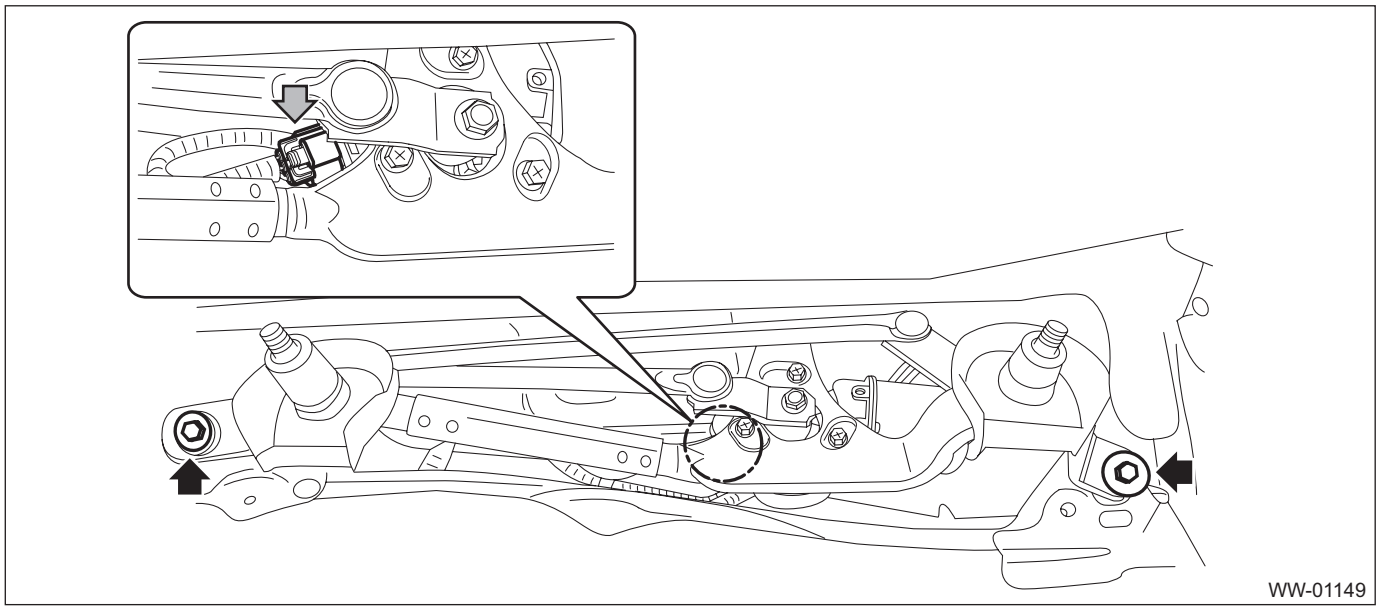
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the arm assembly - windshield wiper. <Ref. to WW-27, REMOVAL, Front Wiper Arm.>
3) Remove the cowl panel assembly. <Ref. to EI-57, REMOVAL, Cowl Panel.>

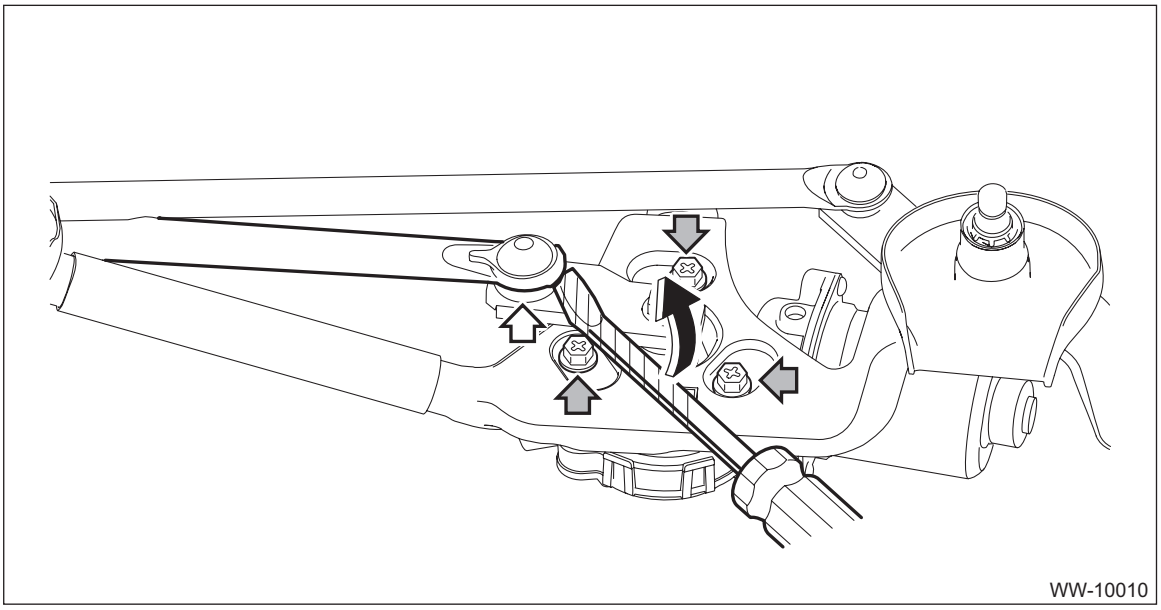
CAUTION:
Before removing the cowl panel, use an air blower and nylon brush to sweep gravel from the lower area of the front side of the glass.

4) Remove the link assembly - windshield wiper.
   (1) Disconnect the connector of the motor assembly - windshield wiper.
   (2) Remove the bolts and harness clips, and remove the link assembly - windshield wiper.



5) Remove the motor assembly - windshield wiper.
   (1) Using a crowbar wrapped with protective tape, disconnect the link assembly - windshield wiper from the link plate.

(2) Remove the bolts, and remove the motor assembly - windshield wiper.



B: INSTALLATION

CAUTION:
• If the cowl panel assembly cannot be installed properly, do not hit or set it forcibly. The claws of the cowl panel or the windshield glass may be damaged.
• Before installing the windshield glass and cowl panel, make sure there are no gravel in the installing area.

1) Connect the battery ground terminal.
2) To confirm that the motor assembly - windshield wiper is at the auto stop position, connect the harness to the motor and turn the wiper switch to ON/OFF once.

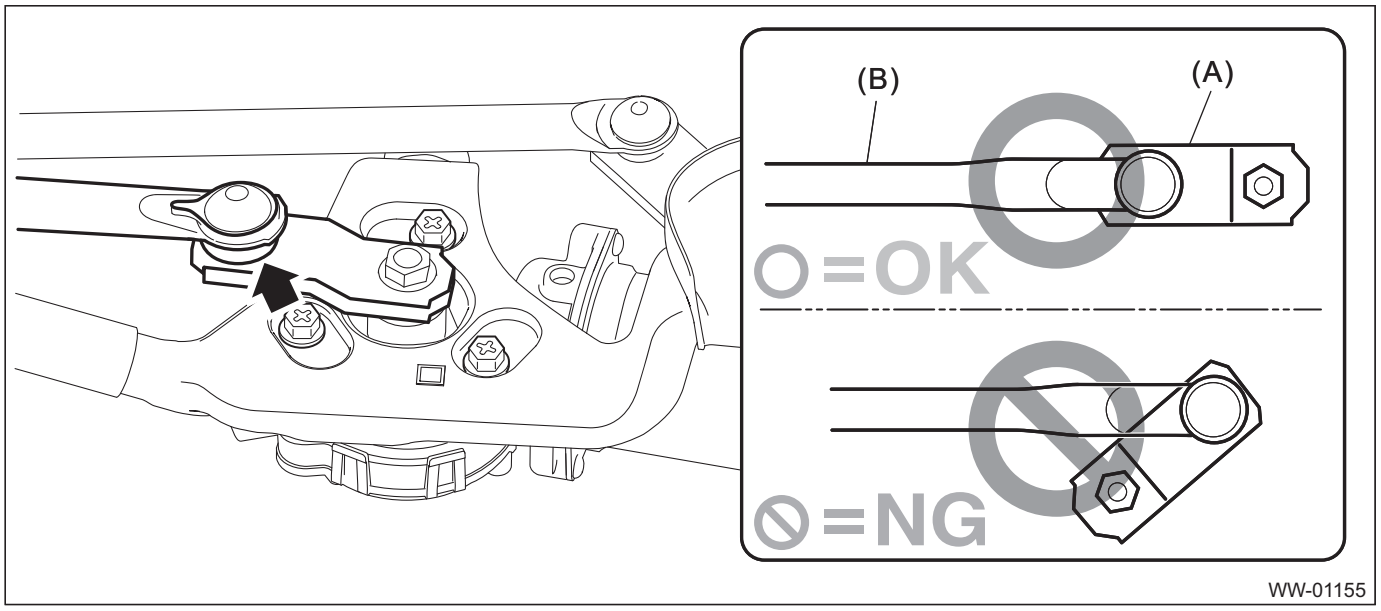
CAUTION:
During motor operation, do not touch the movable part.

3) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

4) Install the motor assembly - windshield wiper.

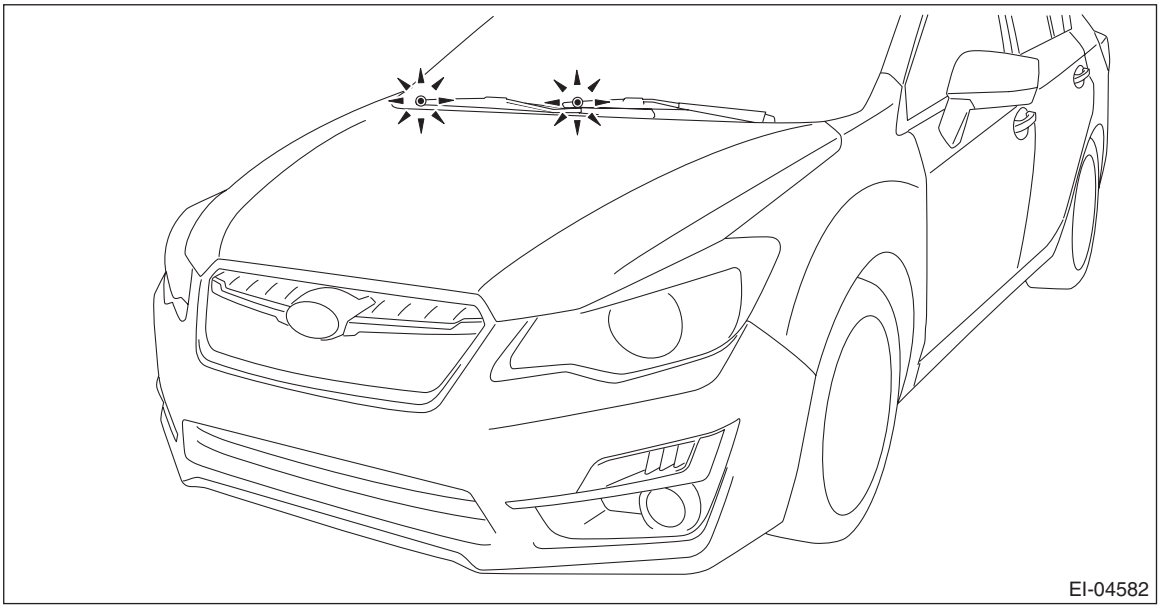
CAUTION:
Install the motor assembly - windshield wiper at the position where the rod (B) and link plate (A) are aligned in a straight line.



5) Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to WW-2, FRONT WIPER, COMPONENT, General Description.>

6) Operate the windshield wiper once.
7) Check that the wiper blade is aligned with the point mark.

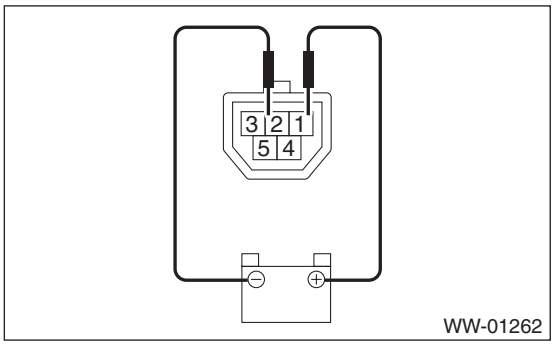


C: INSPECTION

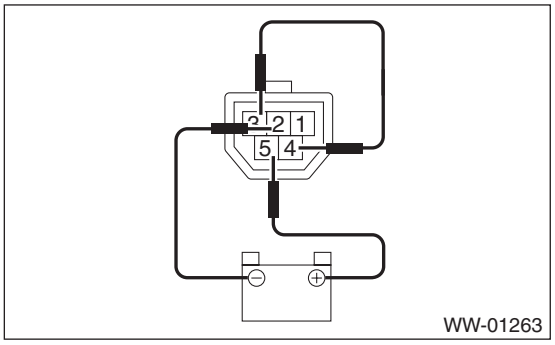
1) Check that the following operations perform normally.

CAUTION:
Fix the motor to prevent the motor from being shorted by moving during operation.

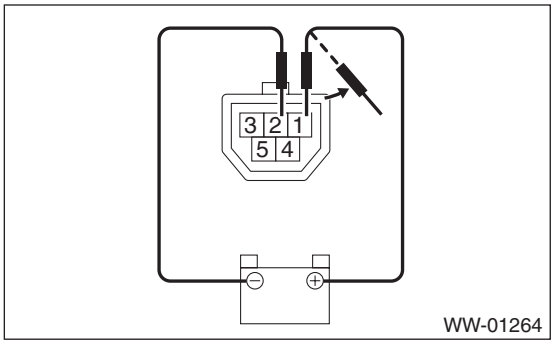
(1) When the battery is connected to the terminal of connectors, confirm that the motor operates at low speed.



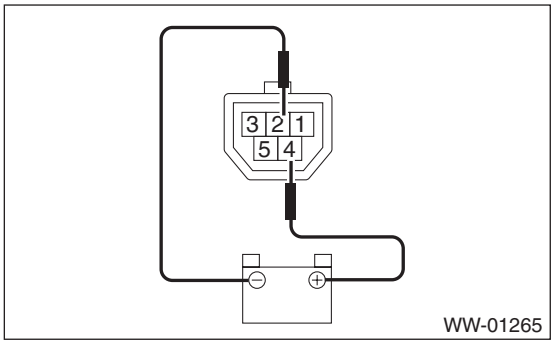
(2) When the battery is connected to the terminal of connectors, confirm that the motor operates at high speed.



(3) Connect the battery to terminals of the connector, and remove the terminal connection with motor rotating at low speed, and stop the motor assembly - windshield wiper in mid-operation.



(4) Connect the battery and check that the motor stops at the automatic stop position after the motor operates at low speed again.



NOTE:
Replace the motor assembly - windshield wiper if the inspection result is not within the standard.

2) Install the motor assembly - windshield wiper. <Ref. to WW-34, INSTALLATION, Front Wiper Motor and Link.>

9. Front Washer Nozzle and Hose

A: REMOVAL

1. NOZZLE - WINDSHIELD WASHER (MODEL WITHOUT EyeSight)

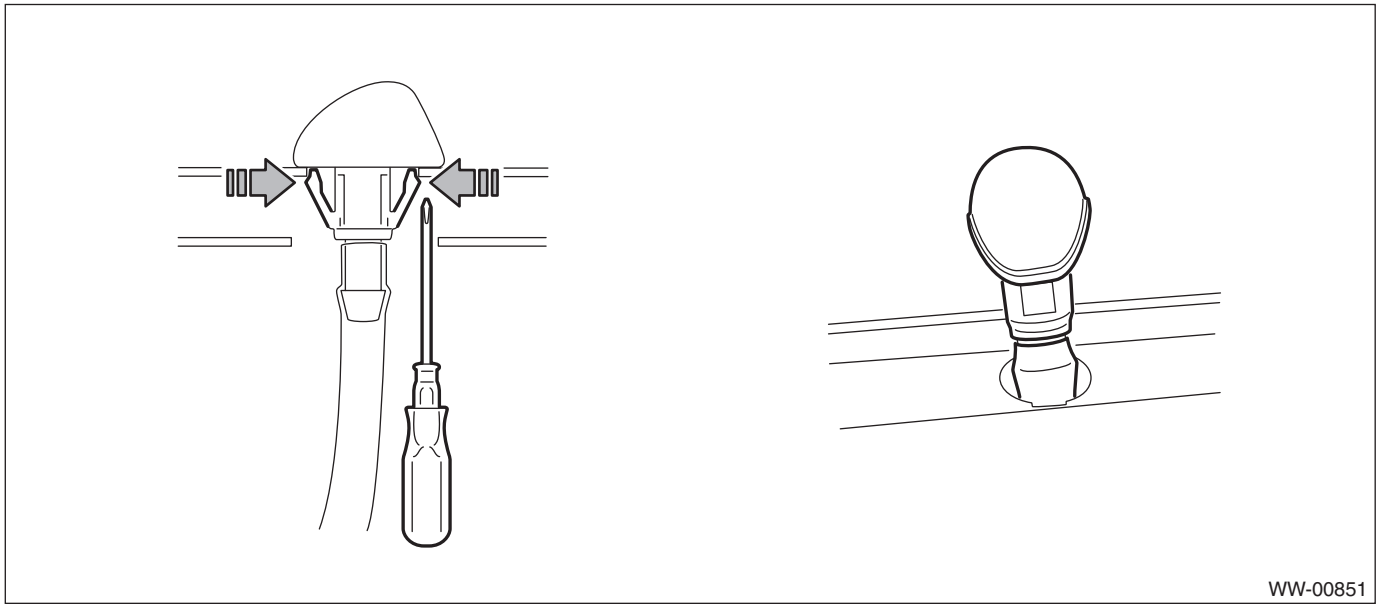
1) Open the hood COMPL - front.
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

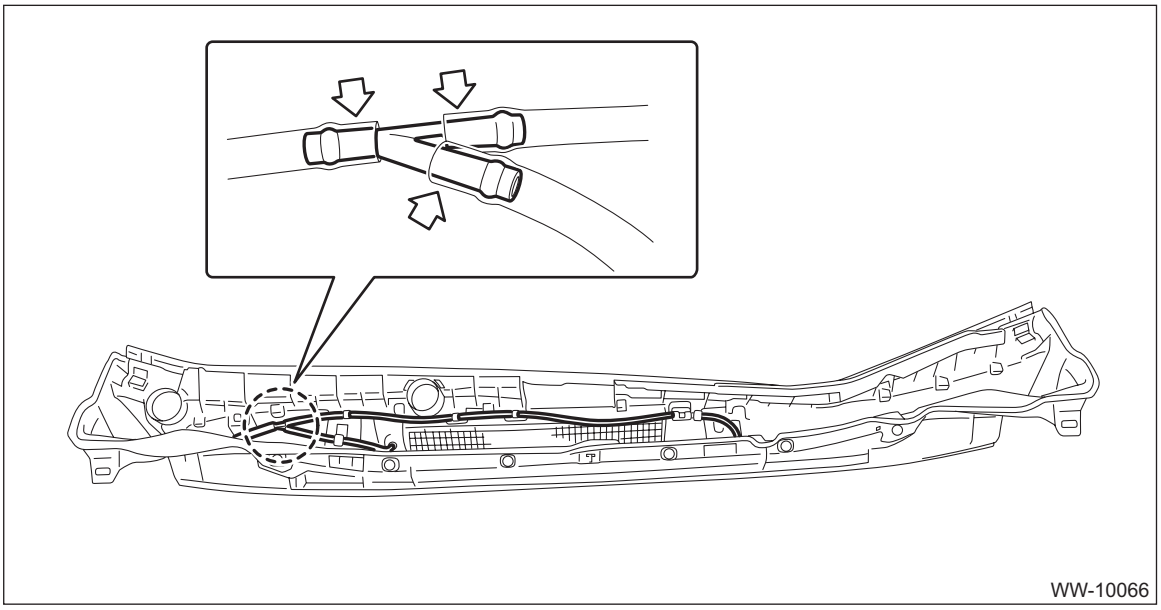
3) Remove the arm assembly - windshield wiper. <Ref. to WW-27, REMOVAL, Front Wiper Arm.>
4) Remove the cowl panel assembly. <Ref. to EI-57, REMOVAL, Cowl Panel.>

CAUTION:
Before removing the cowl panel, use an air blower and nylon brush to sweep gravel from the lower area of the front side of the glass.

5) Remove the nozzle - windshield washer.
   (1) Push the claw using a flat tip screwdriver, etc.
   (2) When the nozzle - windshield washer lifts up, pull out the nozzle - windshield washer using a clip remover, etc.
   (3) Disconnect the hose - windshield washer, and remove the nozzle - windshield washer.



6) Remove the hose - windshield washer as required.



2. NOZZLE - WINDSHIELD WASHER (MODEL WITH EyeSight)

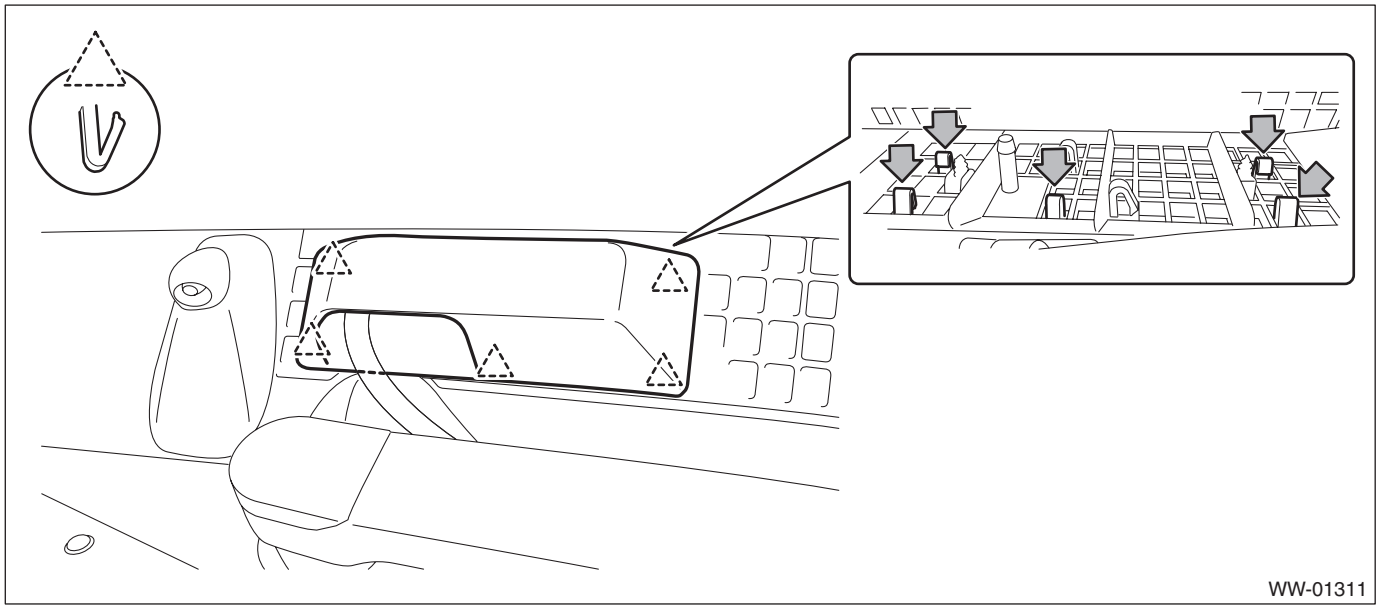
1) Open the hood COMPL - front.
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

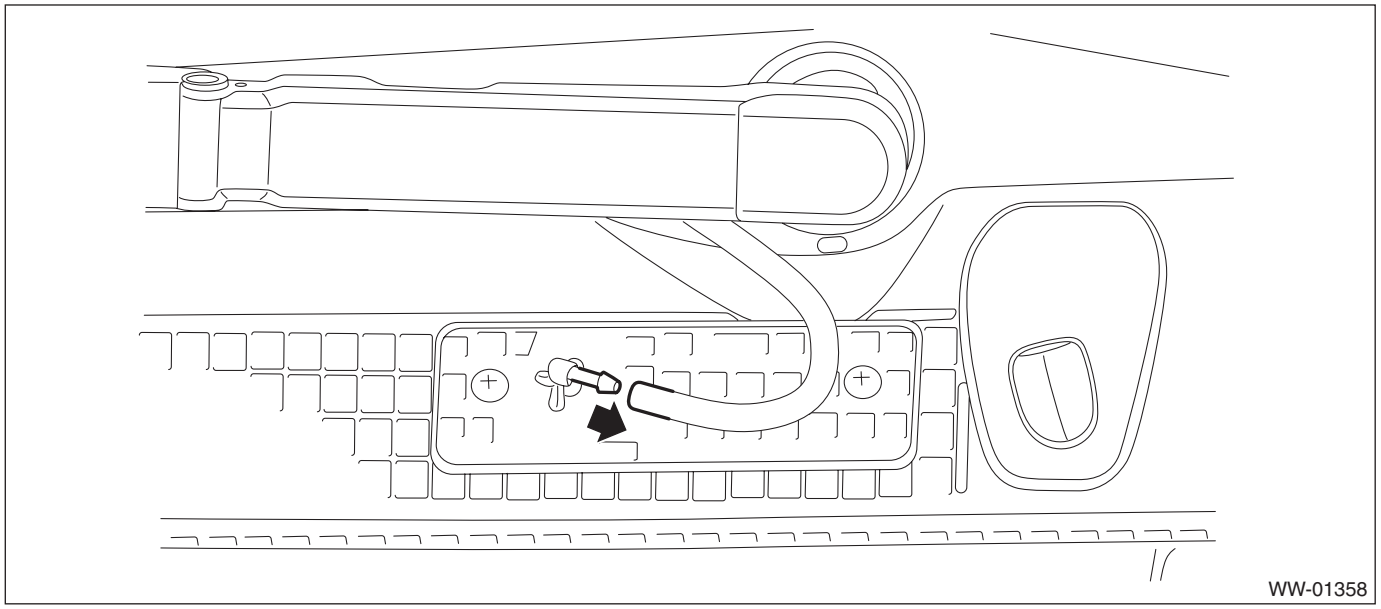
3) Remove the arm assembly - windshield wiper. <Ref. to WW-27, REMOVAL, Front Wiper Arm.>
4) Remove the cowl panel assembly. <Ref. to EI-57, REMOVAL, Cowl Panel.>

CAUTION:
Before removing the cowl panel, use an air blower and nylon brush to sweep gravel from the lower area of the front side of the glass.

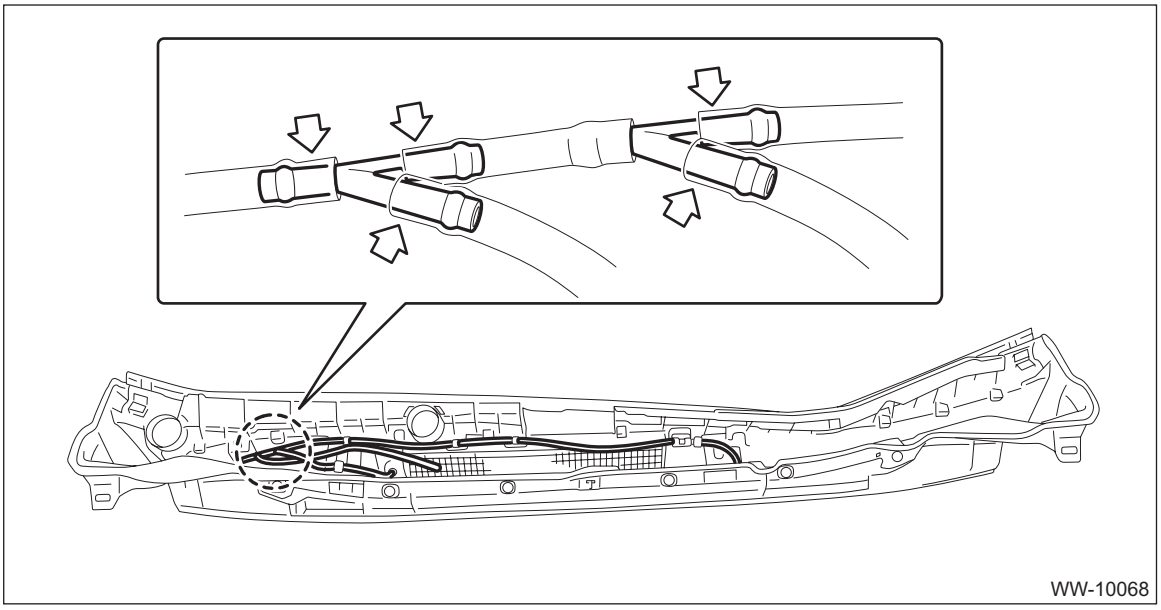
5) Release the claws, and remove the cover - joint from cowl panel assembly.



6) Remove the hose from the joint - washer hose.



7) Remove the hose - windshield washer as required.



B: INSTALLATION

CAUTION:
Before installing the windshield glass and cowl panel, make sure there are no gravel in the installing area.

1) Install the hose - windshield washer.
2) Install the cowl panel assembly. <Ref. to EI-59, INSTALLATION, Cowl Panel.>
3) Install the arm assembly - windshield wiper. <Ref. to WW-28, INSTALLATION, Front Wiper Arm.>
4) Install the hose to the joint - washer hose. (Models with EyeSight)
5) Install the cover - joint to the cowl panel assembly. (Models with EyeSight)
6) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
7) Adjust the position of the nozzle - windshield washer. <Ref. to WW-40, ADJUSTMENT, Front Washer Nozzle and Hose.>

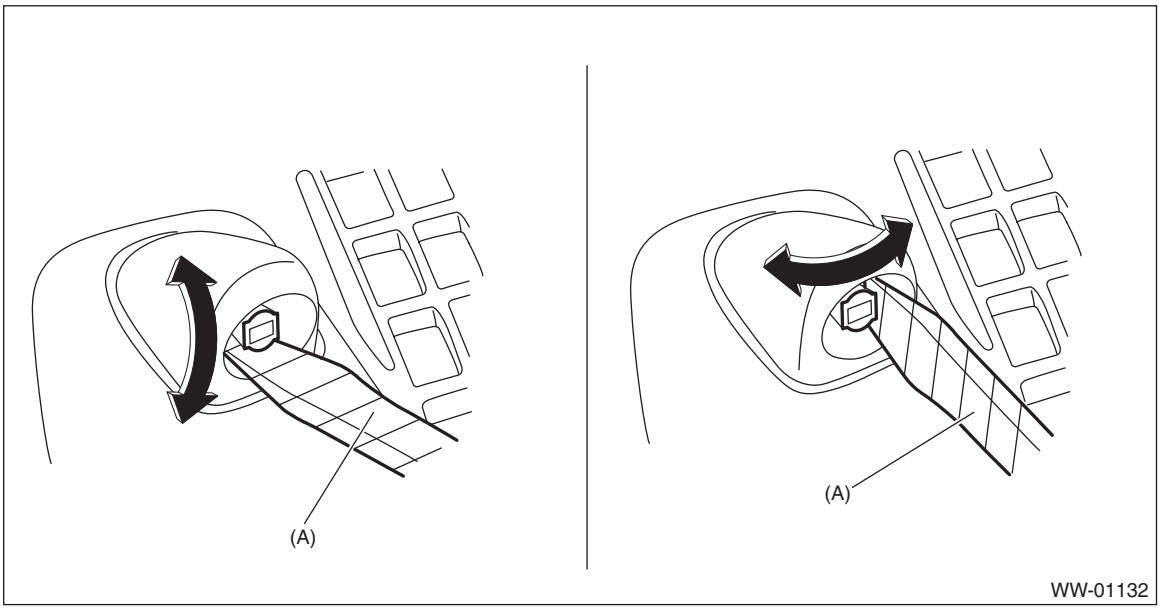
C: INSPECTION

- Make sure the nozzle - windshield washer and the hose - windshield washer are not clogged.
- Make sure the hose - windshield washer is not bent.
- Check the position of the nozzle - windshield washer. <Ref. to WW-40, ADJUSTMENT, Front Washer Nozzle and Hose.>

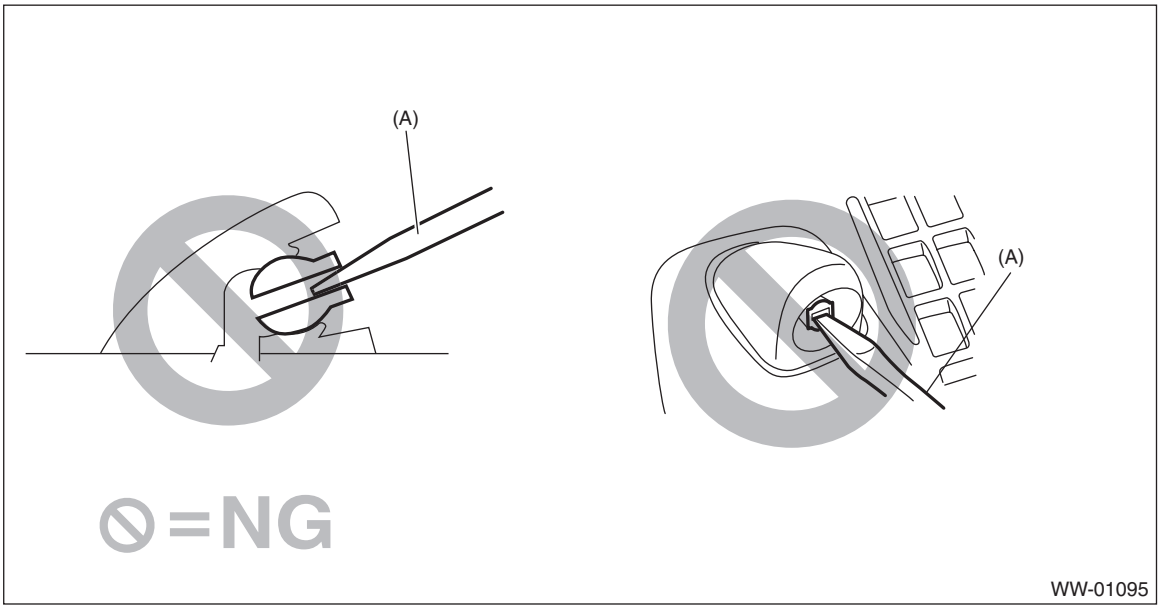
D: ADJUSTMENT

1. NOZZLE - WINDSHIELD WASHER

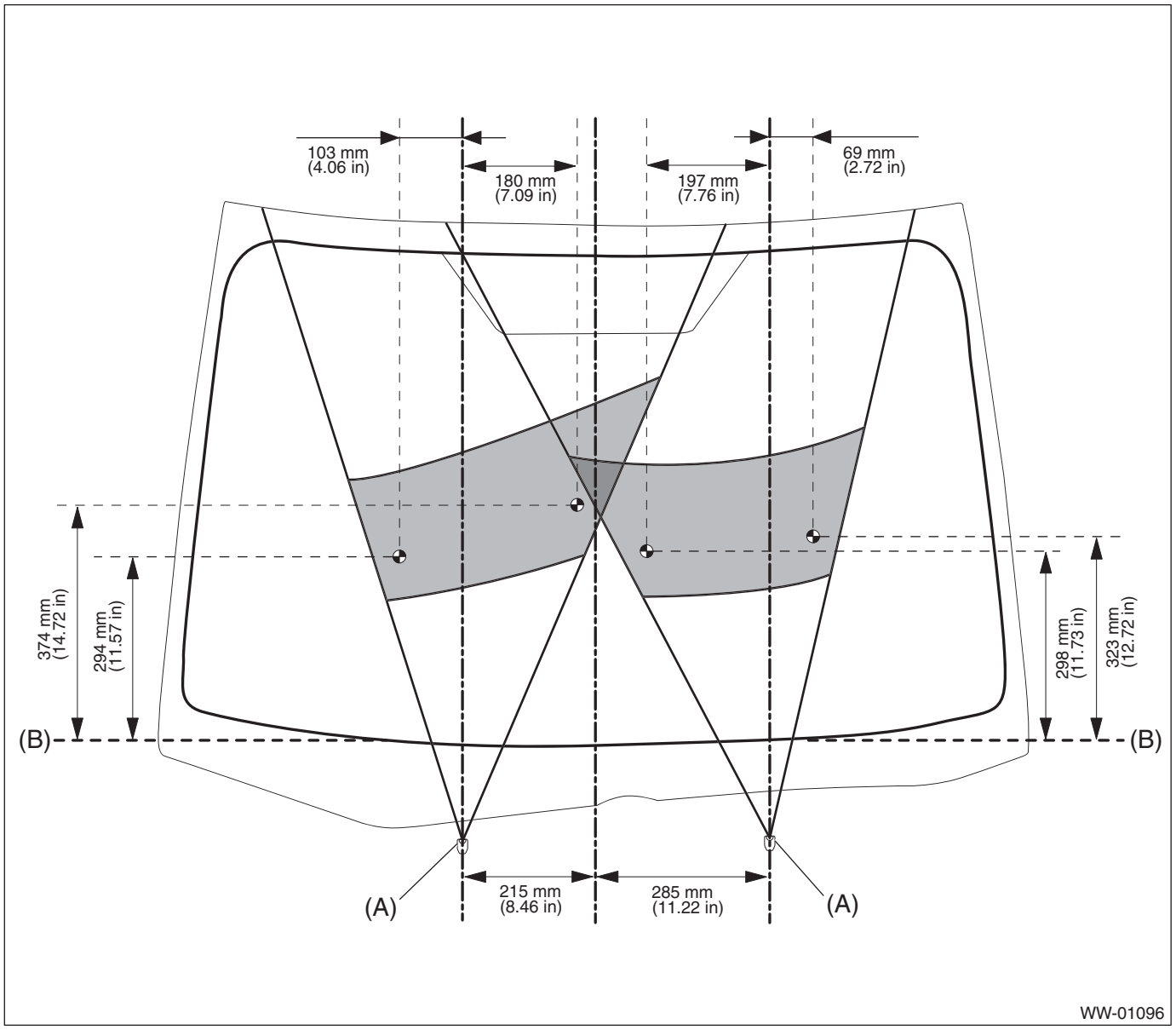
1) Turn the wiper switch to OFF position.
2) While the vehicle is at a standstill, insert a precision screwdriver (A) or equivalent wrapped with protective tape into the clearance on the upper/lower side or the right/left side of the nozzle - windshield washer to perform necessary adjustment.



CAUTION:
- **The nozzle - windshield washer is made of resin. If precision screwdriver (A) or equivalent is inserted into discharge port for adjustment, the discharge port can be deformed, and washer fluid cannot be sprayed.**
- **Do not rotate the discharge port of the nozzle - windshield washer, otherwise it may be damaged.**



3) Adjust the washer injection position as shown in the figure.

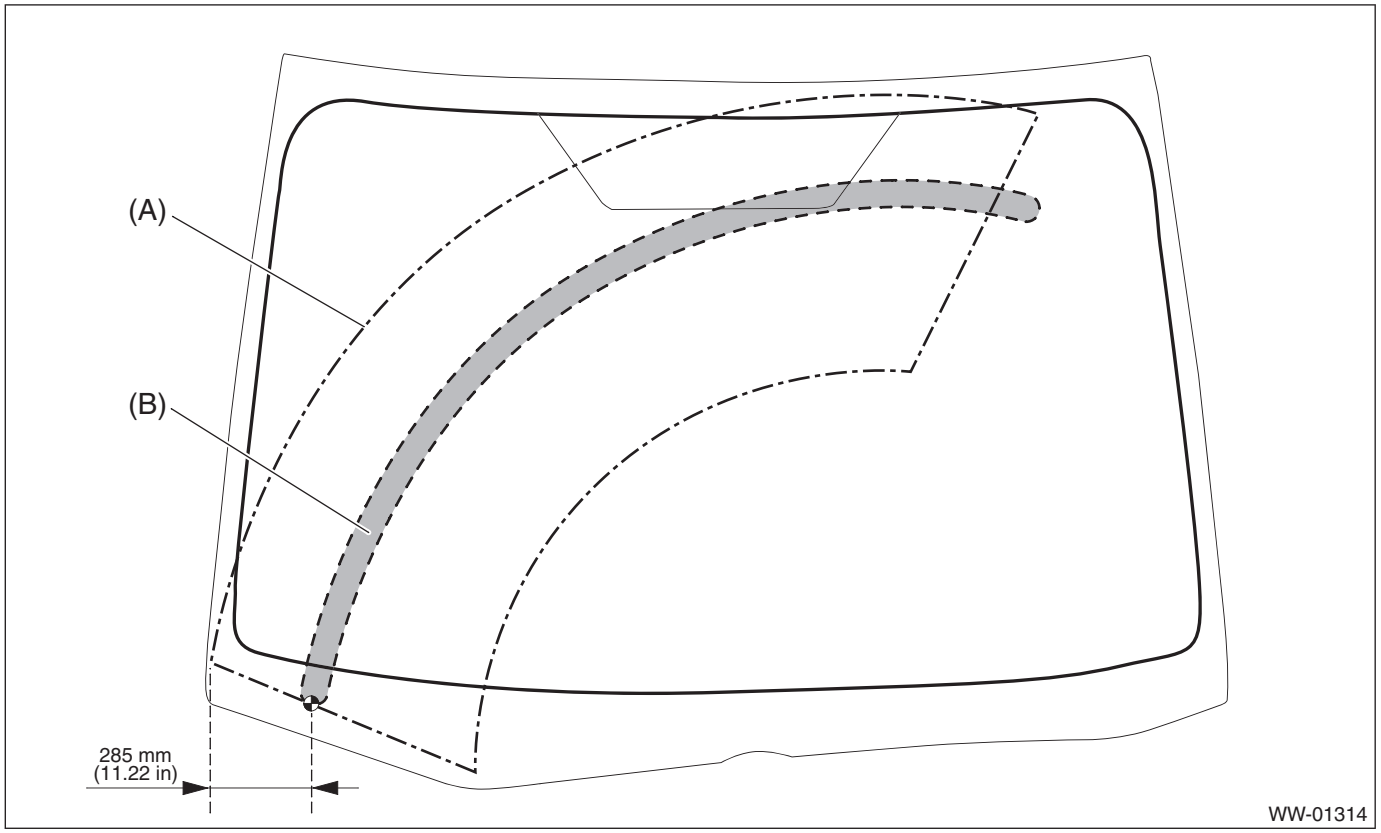


(A) Nozzle - windshield washer (B) Ceramic line

2. NOZZLE - WIPER ARM WASHER (MODEL WITH EyeSight)

CAUTION:
Check and adjust the spray position of the nozzle - wiper arm at the position where the wiper arm stops.

1) Turn the wiper switch to OFF position.
2) While the vehicle is stopped, check that the washer spray position is as shown in the figure.
3) After inspection, if the spray position is really out of the specified range, replace with a new arm assembly - windshield wiper assistor.

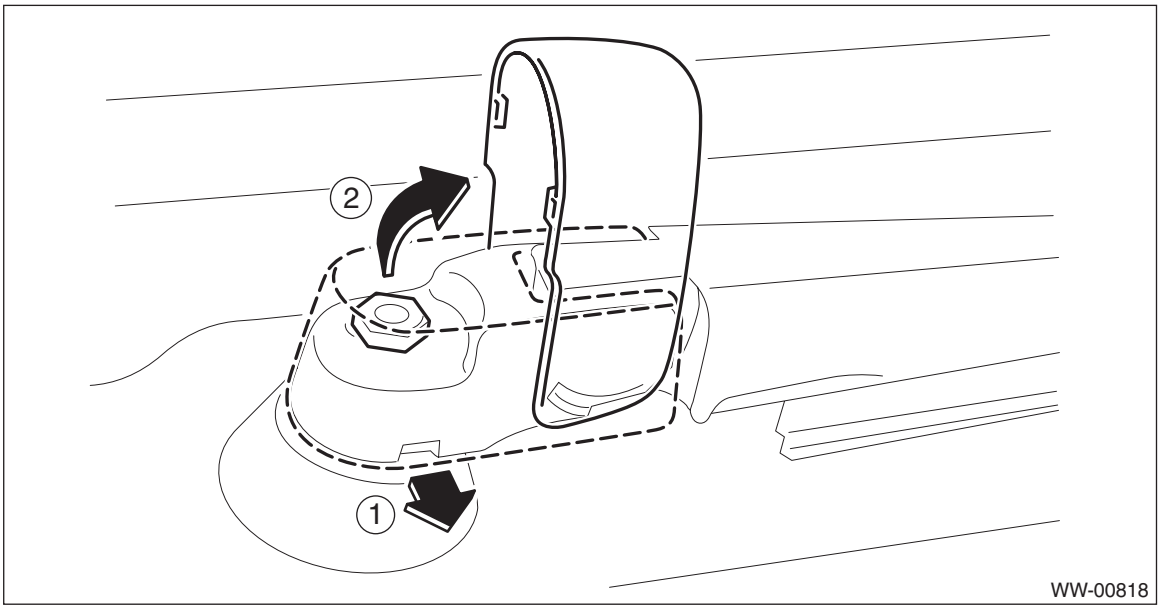


(A) Wiping area of arm ASSY - windshield wiper assistor
(B) Spray area

10.Rear Wiper Arm

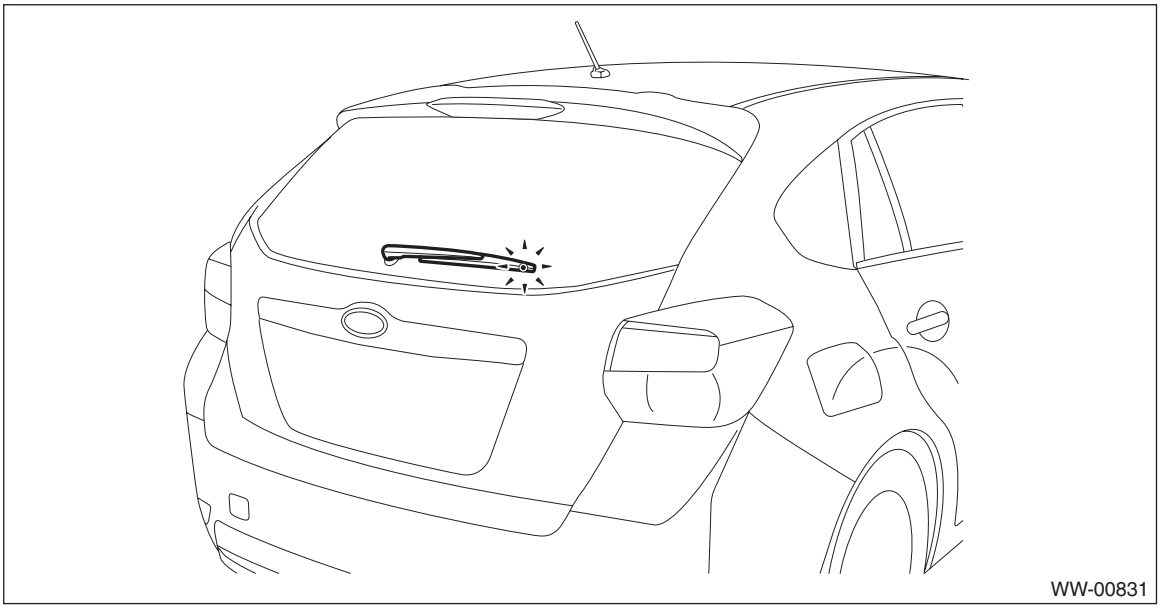
A: REMOVAL

1) Pull up the cover - rear wiper arm.
2) Remove the nut, and remove the arm assembly - rear wiper.



B: INSTALLATION

1) Install in the reverse order of removal.
2) Operate the rear wiper once.
3) Align the blade assembly - rear wiper with the marking on the glass, and then tighten the nut to the specified torque.

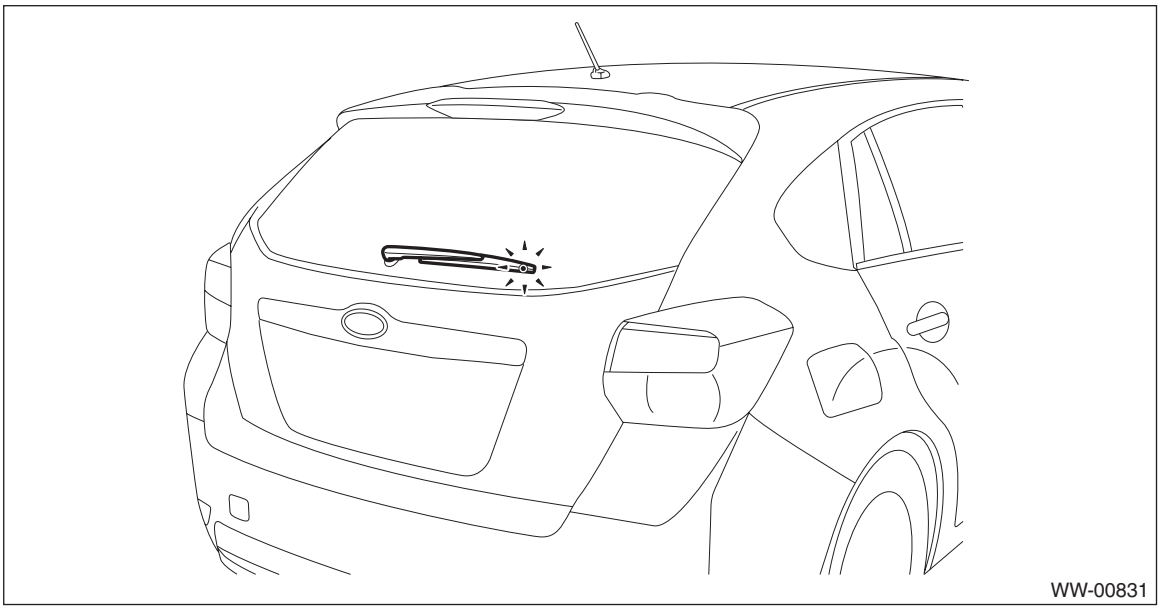


Tightening torque:
8 N·m (0.82 kgf-m, 5.9 ft-lb)

4) Operate the wiper to check whether the wiper blade aligns with the point mark. If not, perform installation over again.

C: ADJUSTMENT

1) Operate the rear wiper once.
2) Align the blade assembly - rear wiper with the marking on the glass.



3) If the wiper blade is not aligned with the point mark, perform the removal of the rear wiper arm to align with the marking. <Ref. to WW-43, REMOVAL, Rear Wiper Arm.>

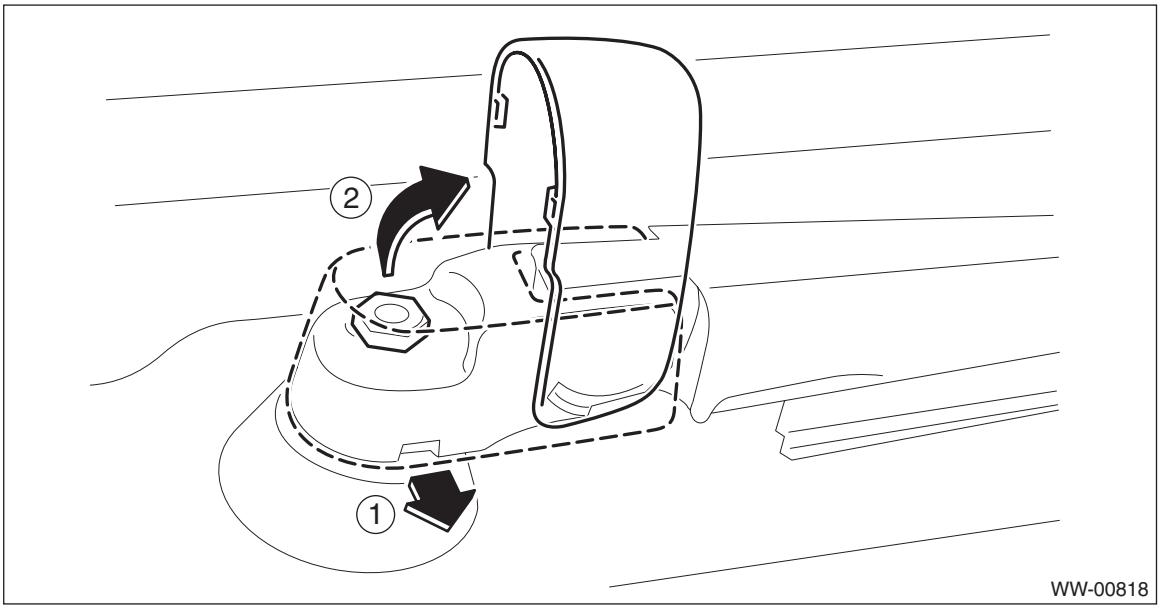
11.Rear Wiper Motor

A: REMOVAL

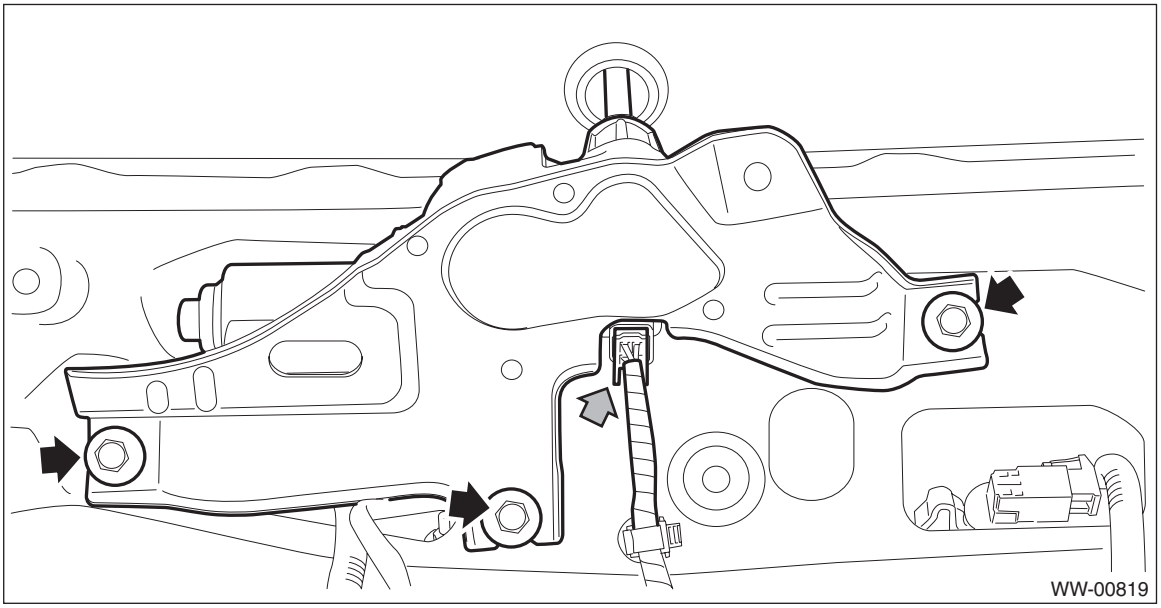
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear gate. <Ref. to EI-122, REMOVAL, Rear Gate Trim.>
3) Remove the arm assembly - rear wiper.
   (1) Remove the cover - rear wiper arm.
   (2) Remove the nut, and remove the arm assembly - rear wiper.

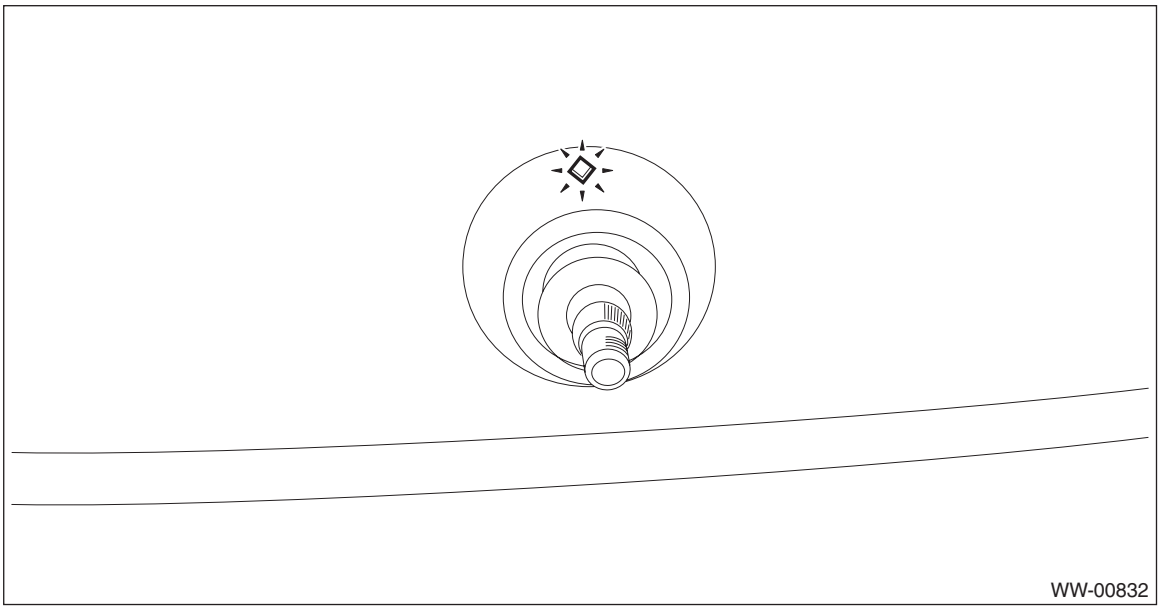


4) Remove the motor assembly - rear wiper.
   (1) Disconnect the harness connector of the motor assembly - rear wiper.
   (2) Remove the bolts, and remove the motor assembly - rear wiper.



B: INSTALLATION

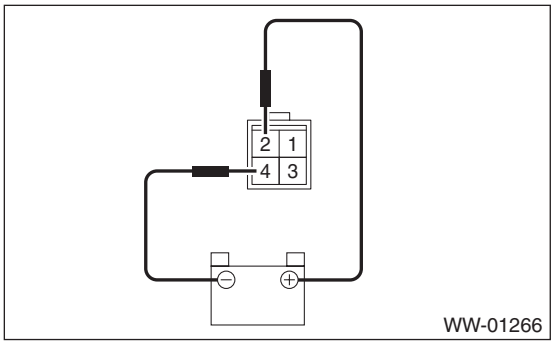
1) Install each part in the reverse order of removal.
2) Check that the mark on the cap - pivot wiper faces up, as shown in the figure.



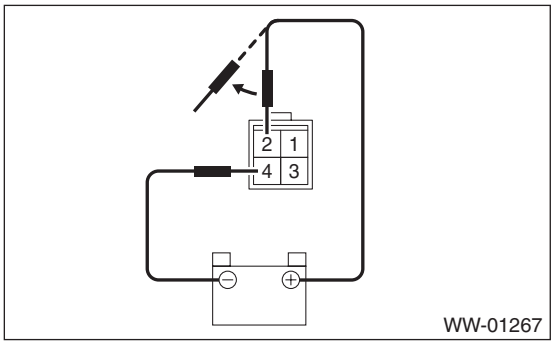
Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to WW-4, REAR WIPER, COMPONENT, General Description.>

C: INSPECTION

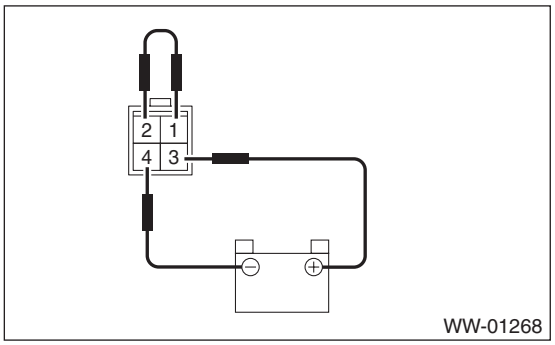
CAUTION:
Fix the motor to prevent the motor from being shorted by moving during operation.
1) Connect the battery to the motor assembly - rear wiper connector, and check that the motor assembly - rear wiper operates.



2) Connect the battery to terminals of the connector, and remove the terminal connection with motor rotating, and stop the motor in mid-operation.



3) Connect the battery and check that the motor stops at the automatic stop position after the motor operates at low speed again.



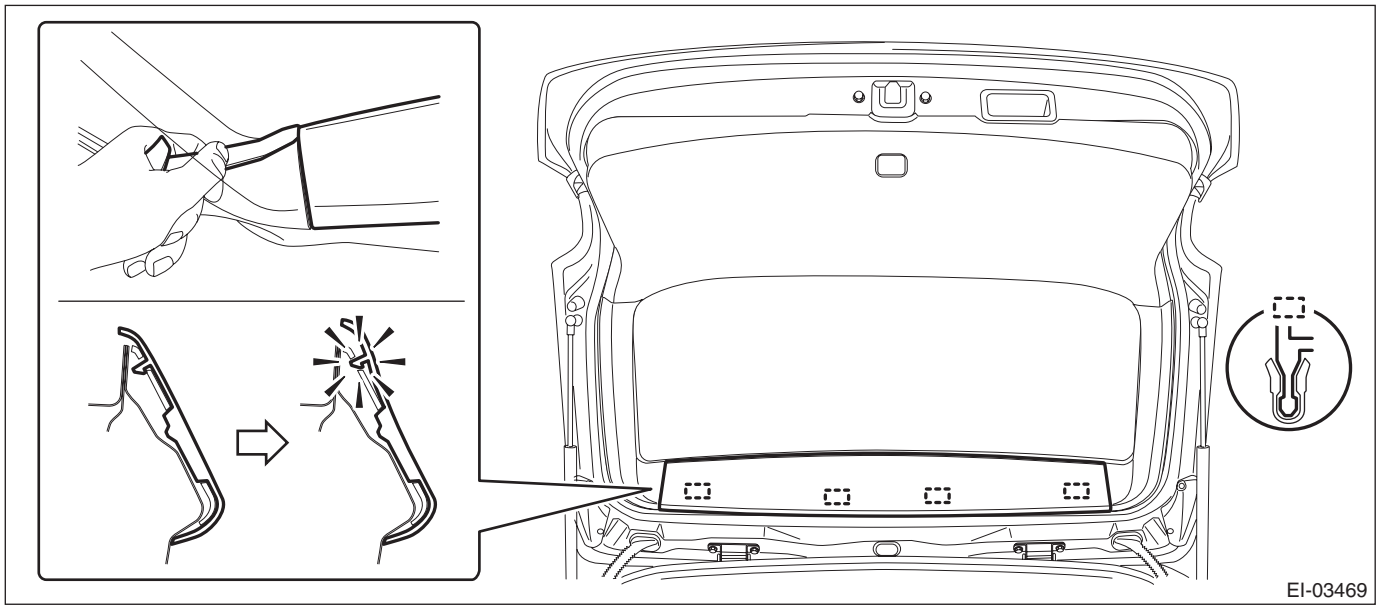
12.Rear Washer

A: REMOVAL

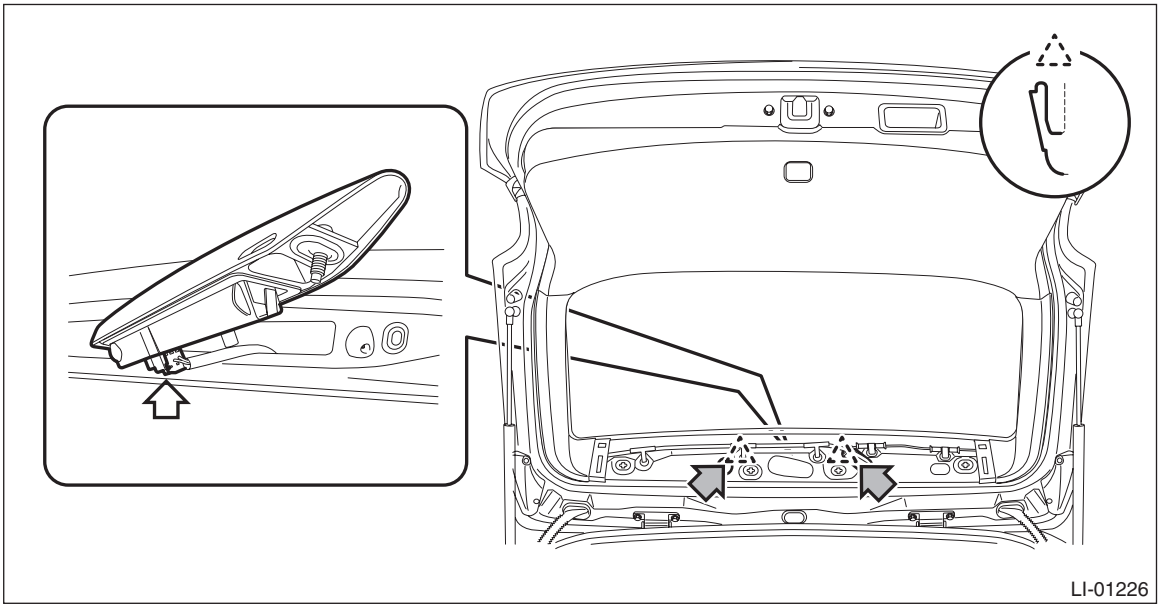
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear gate UPR.
   (1) Remove the claws on the trim edge.
   (2) Release the claws in the center of trim, and remove the trim panel - rear gate UPR.



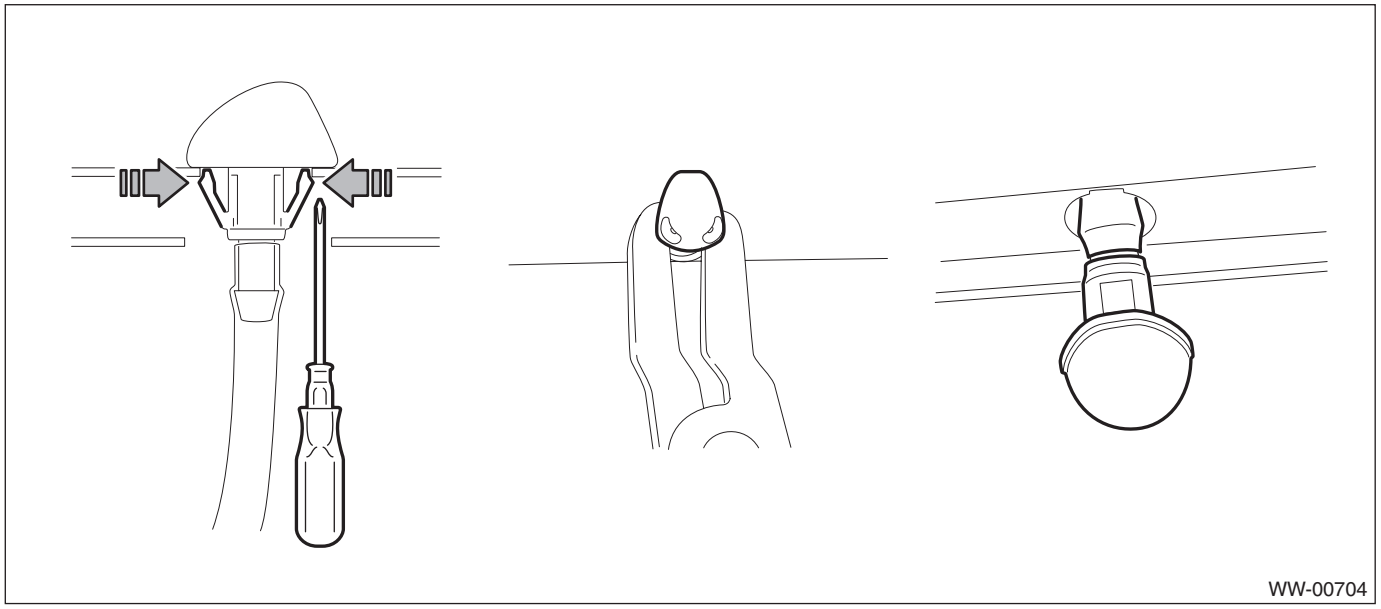
3) Remove the roof spoiler assembly. (Model with roof spoiler) <Ref. to EI-67, REMOVAL, Roof Spoiler.>
4) Remove the light assembly - high-mounted.
   (1) Remove the nut.
   (2) Disconnect the connector and remove the light assembly - high-mounted.



5) Remove the nozzle - rear washer.

CAUTION:
Before removing, apply protective tape to the body panel and used tools not to damage the panel - rear gate.

(1) Push the claw using a flat tip screwdriver, etc.
(2) When the nozzle - rear washer lifts up, pull out the nozzle - rear washer using a clip remover, etc.
(3) Disconnect the hose - rear washer, and remove the nozzle - rear washer.



B: INSTALLATION

1) Install each part in the reverse order of removal.

Tightening torque:
Light assembly - high-mounted: 4.5 N·m (0.46 kgf-m, 3.3 ft-lb)
Roof spoiler assembly: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

2) Check the nozzle - rear washer position. <Ref. to WW-50, VISUAL INSPECTION, INSPECTION, Rear Washer.>

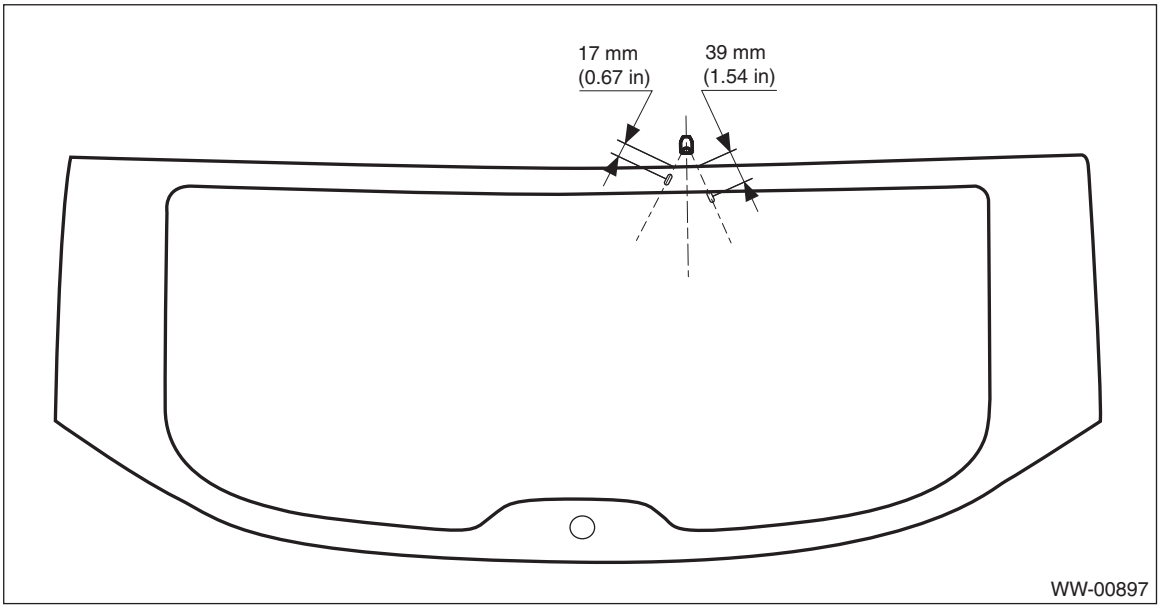
C: INSPECTION

1. VISUAL INSPECTION

Check for the following items, and if any malfunction is found, replace the corresponding part.
- Make sure the nozzle - rear washer and the hose - rear washer are not clogged.
- Make sure the hose - rear washer is not bent.

2. INSPECTING THE SPRAY POSITION

1) Turn the wiper switch to OFF position.
2) While the vehicle is stopped, check that the washer spray position is as shown in the figure.
3) After inspection, if the spray position is significantly out of the specified range, replace the nozzle - rear washer with a new part.



ENTERTAINMENT

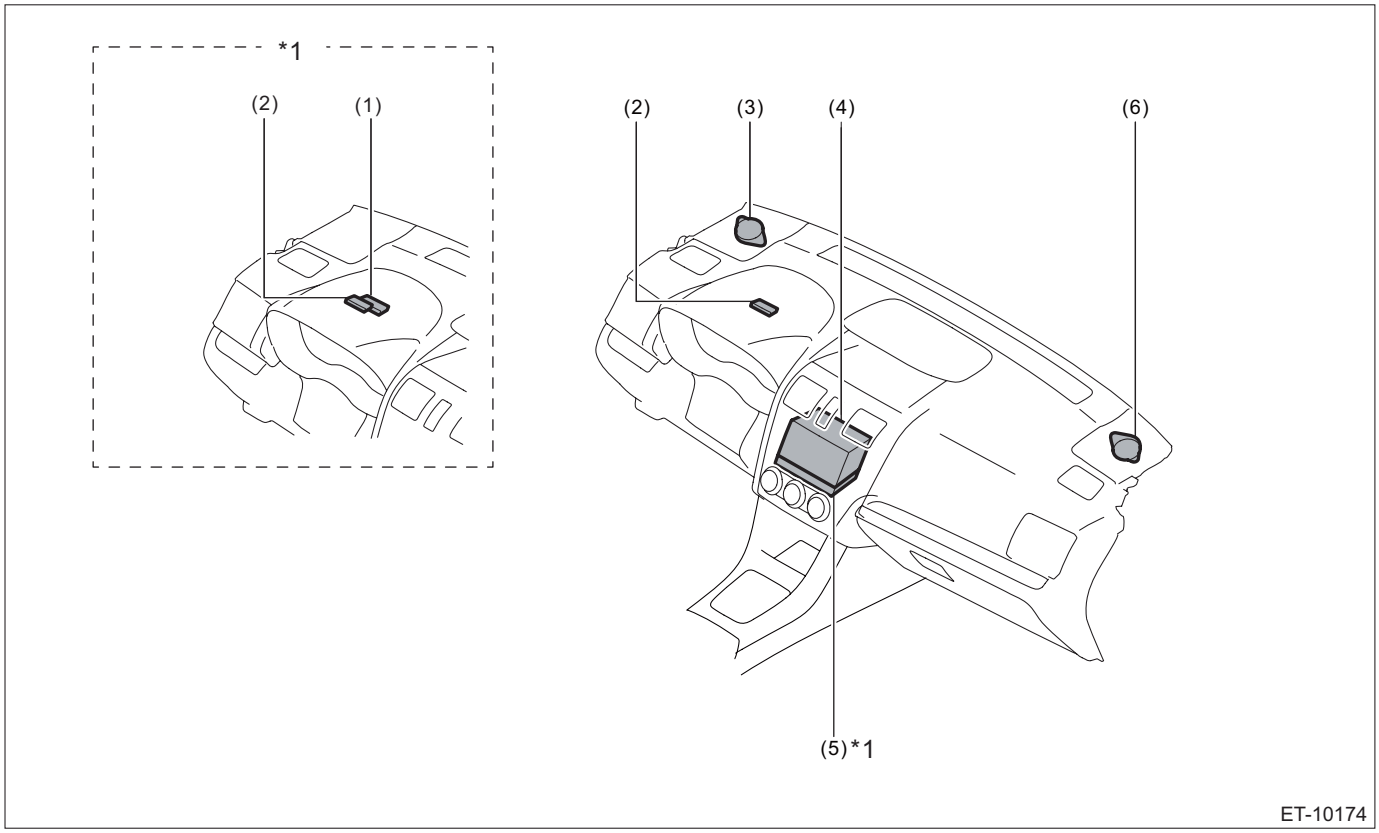
ET

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1. General Description

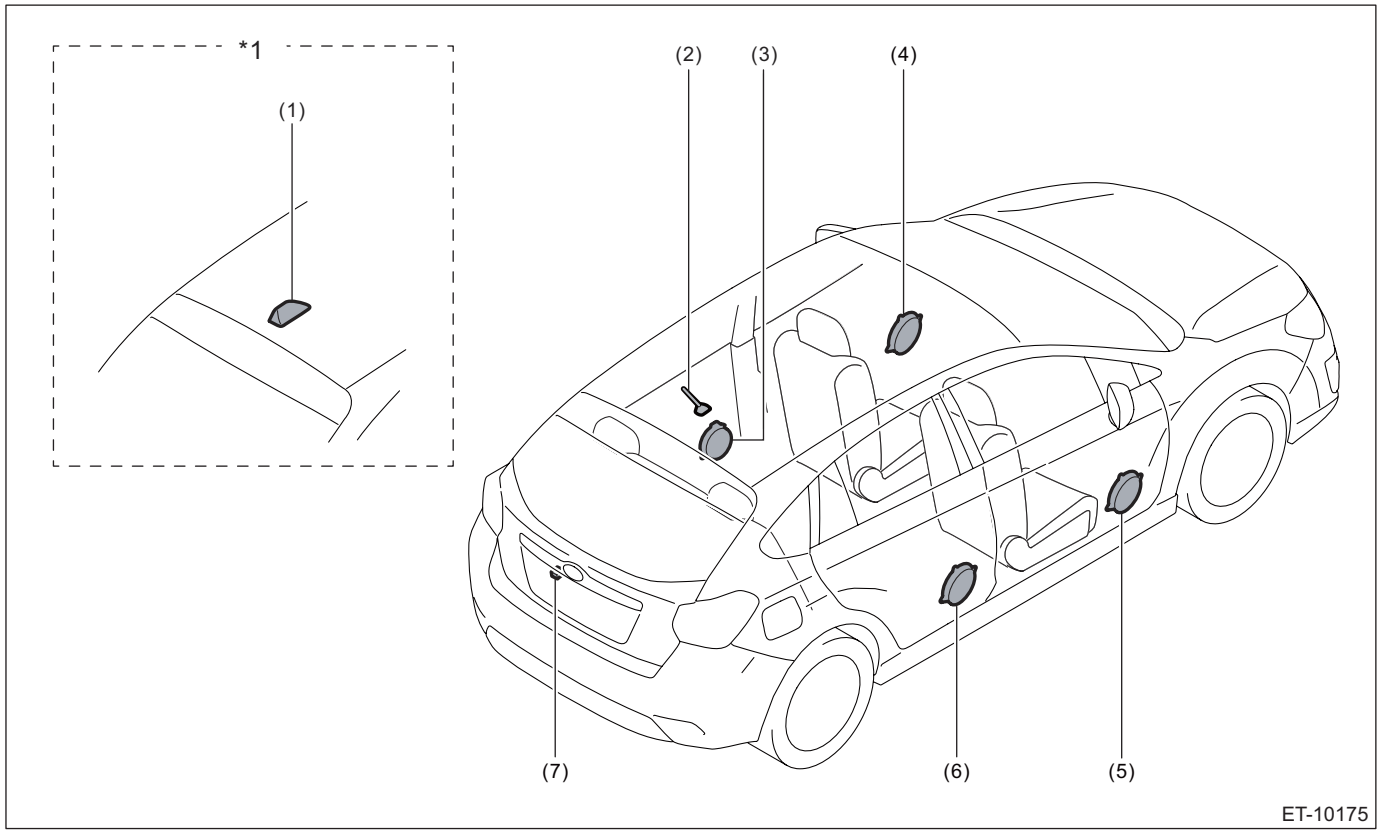
A: LOCATION

1. AUDIO AND NAVIGATION SYSTEM



(1) Telematics sub antenna
(2) GPS antenna ASSY
(3) Speaker ASSY - tweeter front LH
(4) Audio ASSY or navigation ASSY
(5) Data communication module
(6) Speaker ASSY - tweeter front RH

*1: Model with telematics



(1) Telematics antenna
(2) Antenna ASSY - roof
(3) Rear door speaker ASSY LH
(4) Front door speaker ASSY LH
(5) Front door speaker ASSY RH
(6) Rear door speaker ASSY RH
(7) Rearview camera ASSY

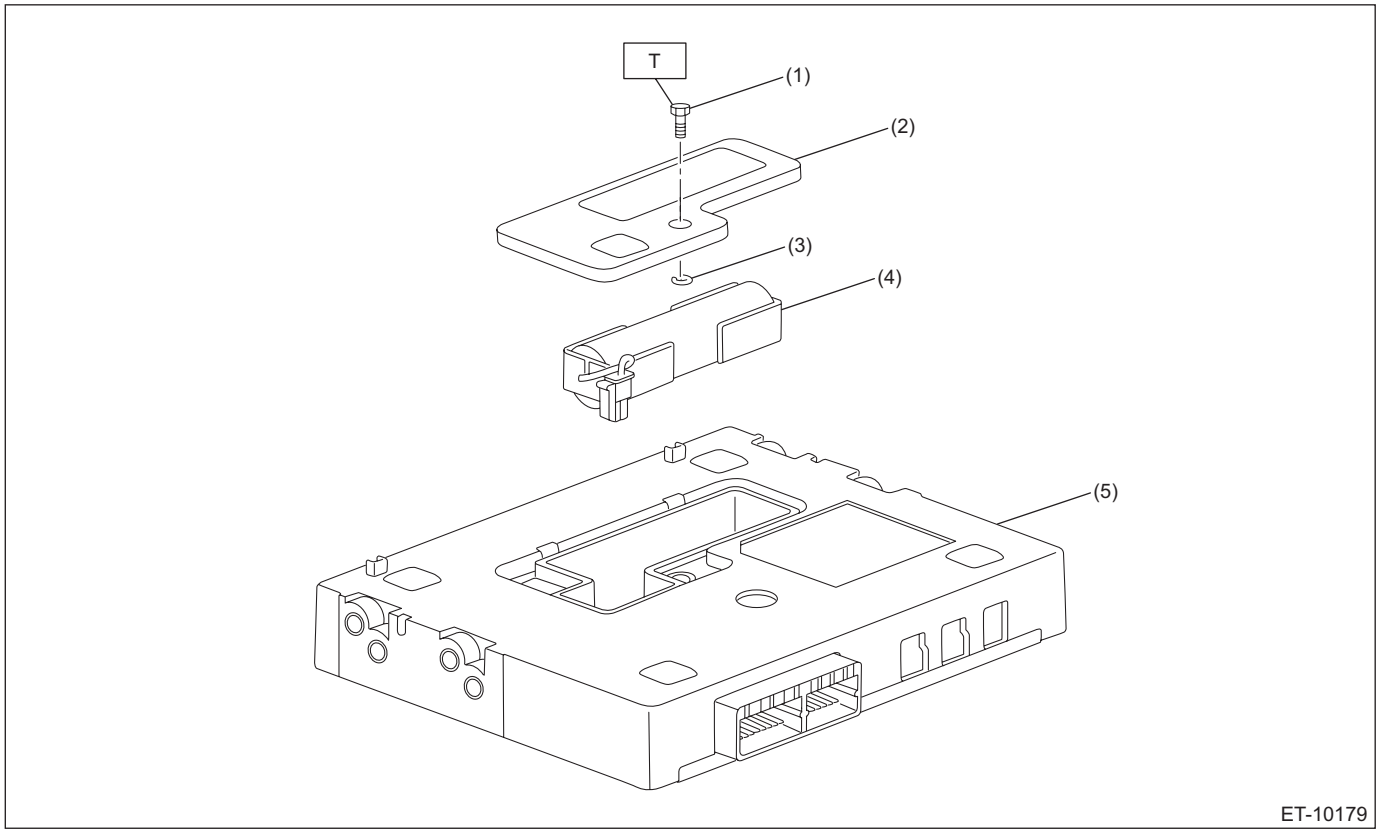
*1: Model with telematics

2. TELEMATICS SYSTEM

Refer to “LOCATION” of “TELEMATICS SYSTEM (DIAGNOSTICS)” section. <Ref. to TEL(diag)-6, LOCATION, Electrical Component Location.>

B: COMPONENT

1. DATA COMMUNICATION MODULE



(1) Cap screw
(2) Backup battery cover
(3) Circlip
(4) Backup battery
(5) Data communication module

Tightening torque: N·m (kgf-m, ft-lb)
T: 0.3 (0.03, 0.2)

C: CAUTION

• Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Adjust parts to the given specifications.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that the each component operates smoothly.
• Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Using a tester above such circuits may cause malfunction of airbag system. Follow the cautions of “AIRBAG SYSTEM” in this case. <Ref. to AB-11, CAUTION, General Description.>
• Be careful not to damage the airbag system wiring harness when servicing electrical parts and switches.
• When removing, installing or replacing the VDCCM&H/U, VDCCM&H/U bracket, steering wheel or steering angle sensor (steering roll connector), perform the VDC setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

D: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.

2. Check List for Interview

A: CHECK

- Inspect the following items regarding the vehicle's state.
- Print out this page for interviewing customers.

1. MODEL WITH 6.2 INCH DISPLAY

<table>
<tr><td colspan="2">Check List for Interview</td><td colspan="2">Date of Vehicle Bring-in Year Month Date</td></tr>
<tr><td colspan="2" rowspan="2">Customer's name</td><td>Registration No.</td><td>Initial year of registration
Year Month Date</td></tr>
<tr><td>Vehicle model</td><td>Frame number</td></tr>
<tr><td>Interviewer</td><td>Inspector</td><td>Engine type</td><td>Odometer reading</td></tr>
<tr><td colspan="4">Customer specified content
•
•
•
•</td></tr>
<tr><td rowspan="3">Product information</td><td>Part No.</td><td>Manufacturer model number</td><td>Serial No.</td></tr>
<tr><td colspan="3">Software version*1</td></tr>
<tr><td colspan="3">Connected device (example: iPod connected via USB cable)</td></tr>
<tr><td>SUBARU STARLINK connection ID*1</td><td colspan="3"></td></tr>
<tr><td>SUBARU STARLINK app version</td><td colspan="3"></td></tr>
<tr><td rowspan="3">Mobile phone</td><td colspan="3">Mobile phone carrier (example: AT&T)</td></tr>
<tr><td colspan="3">Mobile phone model (example: Apple iPhone 6)</td></tr>
<tr><td colspan="3">Mobile phone OS version (example: software version information)</td></tr>
<tr><td>Date when problem occurred</td><td colspan="3">Year Month Date</td></tr>
<tr><td rowspan="3">Conditions at event</td><td colspan="3">Weather
❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Others ( )</td></tr>
<tr><td colspan="3">Temperature
°C (°F)</td></tr>
<tr><td colspan="3">How often
❑ Always (Check here if reproduced.) ❑ Once in the past
❑ Sometimes (times a day / times a week / times a month)</td></tr>
<tr><td>When</td><td colspan="3">Example: It occurs about 30 minutes after driving.</td></tr>
<tr><td>Occurrence condition 1
(In what situations did it occur?)</td><td colspan="3">❑ Fast Driving ❑ Rough Roads ❑ Parked ❑ Unknown ❑ Others</td></tr>
<tr><td>Occurrence condition 2
(In what operations did it occur?)</td><td colspan="3">❑ ACC On ❑ Insert Disc ❑ Press Specific Button ❑ Press Specific Mode
❑ Unknown ❑ Others</td></tr>
<tr><td>Recovering condition (What helped the status return to normal?)</td><td colspan="3">❑ Recover on its own ❑ ACC Off and On ❑ Does not recover ❑ Others</td></tr>
</table>

Occurrence location	❑ Unknown ❑ Any Place ❑ Driving around open areas like in the country ❑ Driving around hills or mountains ❑ Driving around cities with large buildings ❑ Driving around residential areas or no large buildings ❑ Driving around areas with power
Error message content (error message displayed)	
Display trouble	❑ Black screen ❑ White screen ❑ Blue screen ❑ Dim ❑ Vertical/horizontal noise (lines) ❑ Poor color tone ❑ Unclear ❑ Display corruption ❑ No picture ❑ Others
Occurrence conditions (screen display related problems)	❑ CD ❑ Radio ❑ External devices ❑ Others ( )
Operating problems	❑ Display does not switch ❑ Display changes unexpectedly ❑ Response is dull/slow ❑ Does not respond to key entry ❑ Does not respond to steering switch entry ❑ Does not change to night mode screen ❑ Discs cannot be inserted or ejected ❑ Others
Display/touch switch malfunction	❑ Brightness / Contrast ❑ Discoloration ❑ No rear camera ❑ Partial Display ❑ Lines in screen ❑ No Audio Control Screen ❑ No Navi Map on Screen ❑ Others
Voice recognition malfunction	❑ Voice recognition is not ready ❑ Not recognize commands ❑ Others
BEEP on operation entry	❑ Present ❑ None
Radio malfunction	❑ AM: Station (Hz)❑ FM: Station (Hz)❑ SXM: Station (channel) (only for North America) ❑ HD: Station (channel) (only for North America)❑ No Sound ❑ No / Poor Sound ❑ Noise / Static ❑ Sound cuts in / out ❑ Others
SW color change at operation	❑ Present ❑ None
Audio malfunction	❑ Does not sound ❑ Front (❑ R ❑ L)❑ Rear (❑ R ❑ L) ❑ Others ( ) ❑ Operation related problems ❑ Cannot adjust volume level ❑ Cannot use tone control or adjust tone range ❑ Cannot record ❑ Sound skipping ❑ CD ❑ DVD ❑ Others ( ) • Specific mode/disc ( )
CD/USB/SD/iPod malfunction	❑ Will not accept ❑ Will not eject (CD)❑ Will not play ❑ Skips / Jump Chapter ❑ No Sound ❑ Noise / Static❑ Sound cuts in / out ❑ Shows Error ❑ Others
Bluetooth Audio related malfunction	❑ Will Not Pair ❑ Will Not Play ❑ No Sound ❑ Noise / Static ❑ Disconnect on its own ❑ Others
Bluetooth handsfree related malfunction	❑ Will Not Pair ❑ Cannot Hear (Receiver) ❑ Cannot Hear (Caller) ❑ Sounds Garbled ❑ Address Book Will Not Transfer ❑ Disconnect on its own
SUBARU STARLINK malfunction	❑ Bluetooth connection not established ❑ SUBARU STARLINK app disabled ❑ SUBARU STARLINK app disabled ❑ Communication gets out of service ❑ Pandora disabled❑ MirrorLink disabled❑ AHA disabled ❑ USB connection not established❑ Others
Check result	Reproductivity ❑ Reproduced ❑ Always ❑ Sometimes ❑ Cannot be reproduced ❑ Others
	Condition ❑ Cold ❑ Warm ❑ At starting ❑ Immediately after starting ❑ During warm-up ❑ At idling ❑ When start driving ❑ While driving ❑ At acceleration ❑ At deceleration ❑ When applying brake

*1: For confirmation procedure, refer to Audio System. <Ref. to ET-10, OPERATION, Audio System.>

2. MODEL WITH 7 INCH DISPLAY (AUDIO)

Refer to model with 6.2 inch display. <Ref. to ET-5, MODEL WITH 6.2 INCH DISPLAY, CHECK, Check List for Interview.>

3. MODEL WITH 7 INCH DISPLAY (NAVIGATION)

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❑ Driving around areas with power</td></tr>
</table>

Check List for Interview

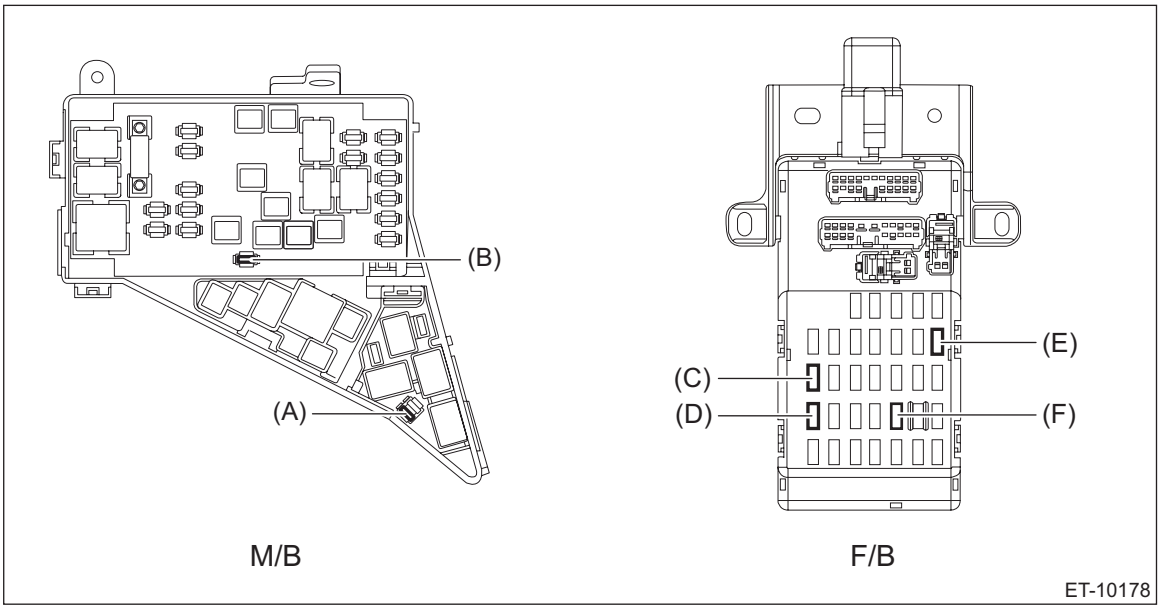
ENTERTAINMENT

Error message content (error message displayed)	
Display trouble	❑ Black screen ❑ White screen ❑ Blue screen ❑ Dim ❑ Vertical/horizontal noise (lines) ❑ Poor color tone ❑ Unclear ❑ Display corruption ❑ No picture ❑ Others
Occurrence conditions (screen display related problems)	❑ Navigation ❑ CD ❑ Radio ❑ External devices ❑ Others ( )
Operating problems	❑ Display does not switch ❑ Display changes unexpectedly ❑ Response is dull/slow ❑ Does not respond to key entry ❑ Does not respond to steering switch entry ❑ Does not change to night mode screen ❑ Discs cannot be inserted or ejected ❑ Others
Display/touch switch malfunction	❑ Brightness / Contrast ❑ Discoloration ❑ No rear camera ❑ Partial Display ❑ Lines in screen ❑ No Audio Control Screen ❑ No Navi Map on Screen ❑ Others
Voice recognition malfunction	❑ Voice recognition is not ready ❑ Not recognize commands ❑ Others
BEEP on operation entry	❑ Present ❑ None
Radio malfunction	❑ AM: Station (Hz)❑ FM: Station (Hz)❑ SXM: Station (channel) (only for North America) ❑ HD: Station (channel) (only for North America)❑ No Sound ❑ No / Poor Sound ❑ Noise / Static ❑ Sound cuts in / out ❑ Others
SW color change at operation	❑ Present ❑ None
Audio malfunction	❑ Does not sound ❑ Front (❑ R ❑ L)❑ Rear (❑ R ❑ L)❑ Others ( ) ❑ Operation related problems ❑ Cannot adjust volume level ❑ Cannot use tone control or adjust tone range ❑ Cannot record ❑ Sound skipping ❑ CD ❑ DVD ❑ Others ( ) • Specific mode/disc ( )
CD/USB/SD/iPod malfunction	❑ Will not accept ❑ Will not eject (CD)❑ Will not play ❑ Skips / Jump Chapter ❑ No Sound ❑ Noise / Static❑ Sound cuts in / out ❑ Shows Error ❑ Others
Navigation failure	❑ Cursor or map rotating❑ Wrong location of vehicle ❑ Cursor hopping during driving ❑ Map image incomplete ❑ No GPS marks displayed ❑ Incorrect time display ❑ Guide not initiated ❑ No route search ❑ Caution remains on navigation screen ❑ Unexpected return back to opening screen ❑ No Voice Guidance ❑ Guidance Volume too Low ❑ Will Not Read Data ❑ Will Not Update ❑ Destination / Route Problem ❑ Display Does Not Change (Frozen) ❑ Overall Navi Operation Slow ❑ No GPS reception ❑ Others
Bluetooth Audio related malfunction	❑ Will Not Pair ❑ Will Not Play ❑ No Sound ❑ Noise / Static ❑ Disconnect on its own ❑ Others
Bluetooth handsfree related malfunction	❑ Will Not Pair ❑ Cannot Hear (Receiver) ❑ Cannot Hear (Caller) ❑ Sounds Garbled ❑ Address Book Will Not Transfer ❑ Disconnect on its own
SUBARU STARLINK malfunction	❑ Bluetooth connection not established ❑ SUBARU STARLINK app disabled ❑ SUBARU STARLINK app disabled ❑ Communication gets out of service ❑ Pandora disabled❑ MirrorLink disabled❑ AHA disabled❑ USB connection not established ❑ Others
Check result	Reproductivity ❑ Reproduced ❑ Always ❑ Sometimes ❑ Cannot be reproduced ❑ Others
	Condition ❑ Cold ❑ Warm ❑ At starting ❑ Immediately after starting ❑ During warm-up ❑ At idling ❑ When start driving ❑ While driving ❑ At acceleration ❑ At deceleration ❑ When applying brake

*1: For confirmation procedure, refer to Navigation System. <Ref. to ET-20, OPERATION, Navigation System.>

3. Relay and Fuse

A: LOCATION



Main fuse box	Fuse 10 A (data communication module)*1	(A)
	Fuse 20 A (audio, navigation unit)	(B)
Relay & fuse box	Fuse 20 A (rear accessory power supply socket)	(C)
	Fuse 10 A (front accessory power supply socket)	(D)
	Fuse 15 A (data communication module)*1	(E)
	Fuse 10 A (audio, navigation unit, AUX input terminal, data communication module*1)	(F)

*1: Model with telematics

NOTE:
For other related fuses, refer to the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model: <Ref. to WI(HEV)-21, Power Supply Circuit.>

B: INSPECTION

1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

4. Audio System

A: WIRING DIAGRAM

1. AUDIO

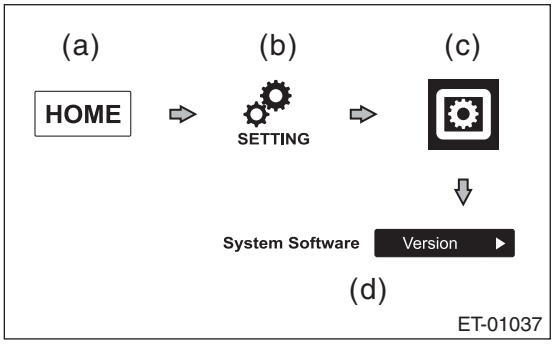
Refer to “Audio System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-52, WIRING DIAGRAM, Audio System.>
- HEV model: <Ref. to WI(HEV)-52, WIRING DIAGRAM, Audio System.>

B: OPERATION

1. SUBARU STARLINK CONNECTION ID DISPLAY

Model with 6.2 inch display

1) Turn the ignition switch to ACC.
2) Press the HOME button (a) to display the {HOME} screen.
3) Touch the {SETTINGS} (b) to display the {SETTINGS} screen.
4) Touch the {Settings General} (c) to display the {Settings General} screen.
5) Touch the {Version} (d) in {System Software}.



6) Confirm the Serial Number (8 digits).

Model with 7 inch display

Operation is the same as that of navigation assembly, therefore, refer to “Navigation System”. <Ref. to ET-20, SUBARU STARLINK CONNECTION ID DISPLAY, OPERATION, Navigation System.>

2. SOFTWARE VERSION DISPLAY

Model with 6.2 inch display

1) Perform the same procedure as for the SUBARU STARLINK connection ID display. <Ref. to ET-10, SUBARU STARLINK CONNECTION ID DISPLAY, OPERATION, Audio System.>
2) Confirm the Software Ver.

Model with 7 inch display

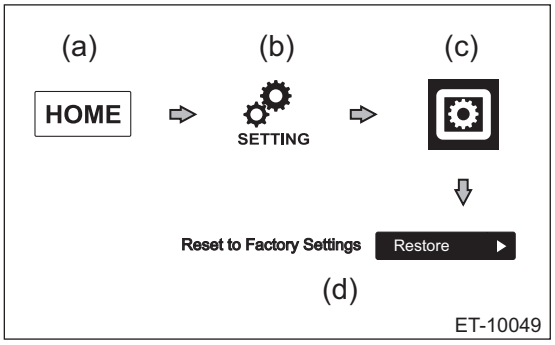
Operation is the same as that of navigation assembly, therefore, refer to “Navigation System”. <Ref. to ET-20, SOFTWARE VERSION DISPLAY, OPERATION, Navigation System.>

3. INITIALIZATION (FACTORY DEFAULT)

Model with 6.2 inch display

1) Turn the ignition switch to ACC.
2) Press the HOME button (a) to display the {HOME} screen.
3) Touch the {SETTINGS} (b) to display the {SETTINGS} screen.
4) Touch the {Settings General} (c) to display the {Settings General} screen.

5) Touch the {Restore} (d) in {Reset to Factory Settings}.



6) Touch {OK} after {Are you sure you want to delete All Data?} is displayed.
7) {DO NOT OPERATE. Initializing now.} is displayed, and all data deletion is initiated.
8) When all data is deleted, {All date has been deleted. Start up the engine to reboot.} is displayed.

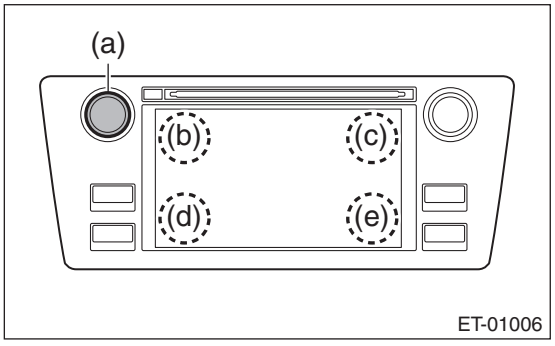
Model with 7 inch display

Operation is the same as that of navigation assembly, therefore, refer to “Navigation System”. <Ref. to ET-20, INITIALIZATION (FACTORY DEFAULT), OPERATION, Navigation System.>

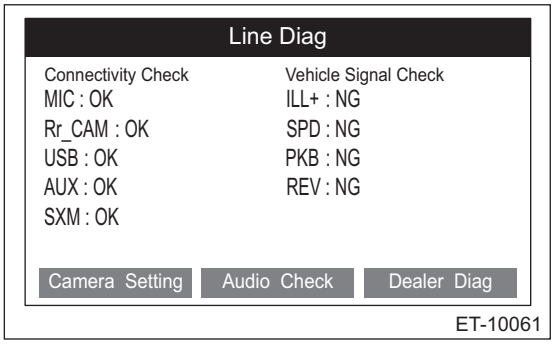
4. CHECK CONNECTIONS WITH LINE DIAG MODE

Model with 6.2 inch display

1) Turn the ignition switch to ACC.
2) Press the button (a) to display the Audio OFF screen.
3) Touch the screen in order from (b) to (e).



NOTE:
Pressing the button (a) or turning the ignition switch from the OFF to ACC position can exit the Line Diag mode.
4) {Line Diag} screen is displayed.
5) Check the connection status with the {Connectivity Check} in the {Line Diag} screen.



OK: Each connection device is connected properly.
NG: No connection or abnormal connection is detected.

NOTE:
Check the external connection terminals (USB 1, 2 and AUX) by connecting a memory for check or a pin jack.

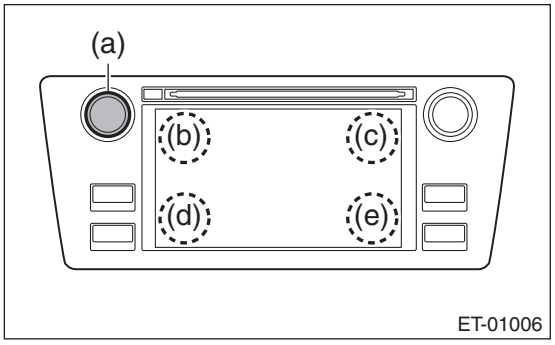
Model with 7 inch display

Operation is the same as that of navigation assembly, therefore, refer to “Navigation System”. <Ref. to ET-21, CHECK CONNECTIONS WITH LINE DIAG MODE, OPERATION, Navigation System.>

5. CHECK VEHICLE SIGNALS WITH LINE DIAG MODE

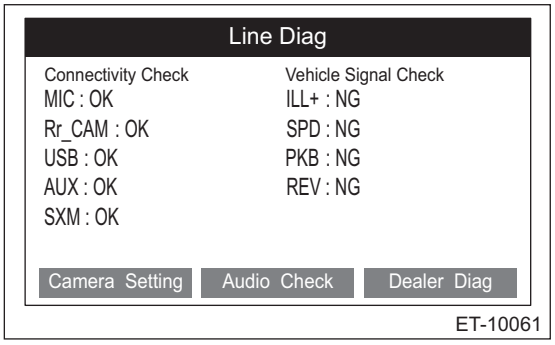
Model with 6.2 inch display

1) Turn the ignition switch to ACC.
2) Press the button (a) to display the Audio OFF screen.
3) Touch the screen in order from (b) to (e).



NOTE:
Pressing the button (a) or turning the ignition switch from the OFF to ACC position can exit the diagnostic mode.

4) {Line Diag} screen is displayed.
5) Check the connection status with the {Vehicle Signal Check} in the {Line Diag} screen.



- Check illumination

NOTE:
Make sure that the bright switch is not ON.

1. Set the lighting switch to the parking position.
2. Make sure that {OK} lights in ILL+ and then the screen becomes dim.

OK: Normal.
NG: Abnormal. Check the signal line connector. If there are no problems, the unit could be faulty.

- Check speed sensor

NOTE:
– Before starting inspections, check the safety around the vehicle.
– Lift up the vehicle as necessary.
– When the diagnostic trouble code is input in the VDC CM, perform the Clear Memory Mode.

1. Drive the vehicle at 8 km/h (5 MPH) or more.
2. Check that {OK} is displayed in SPD.

OK: Normal.
NG: Vehicle speed is less than 8 km/h (5 MPH), or malfunction is detected in the signal line. Check the signal line connector. If there are no problems, the unit could be faulty.

- Check parking brake signal
  1. Pull parking brake lever.
  2. Check that {OK} is displayed in PKB.
  OK: Normal.
  NG: Abnormal. Check the signal line connector. If there are no problems, the unit could be faulty.
- Check back sensor

NOTE:
Before starting inspections, check the safety behind the vehicle.
  1. Turn the ignition to ON.
  2. Pull the parking brake lever and depress the brake pedal, then place the select lever or gear shift lever in reverse.
  3. Make sure that {OK} is displayed in REV.
  OK: Normal.
  NG: Abnormal. Check the signal line connector. If there are no problems, the unit could be faulty.

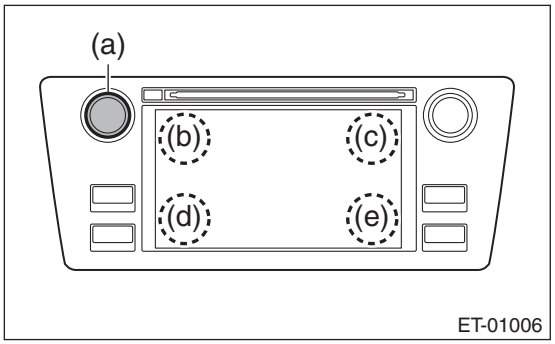
Model with 7 inch display

Operation is the same as that of navigation assembly, therefore, refer to “Navigation System”. <Ref. to ET-21, CHECK VEHICLE SIGNALS WITH LINE DIAG MODE, OPERATION, Navigation System.>

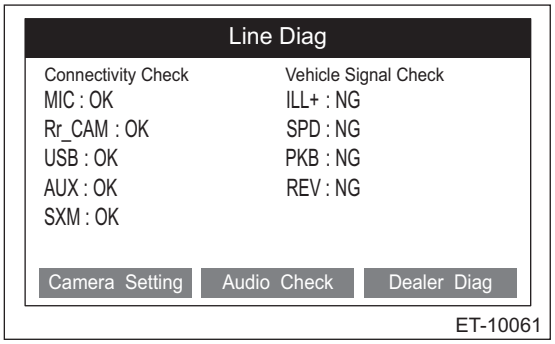
6. CHECK SPEAKER OUTPUT WITH LINE DIAG MODE

Model with 6.2 inch display

1) Turn the ignition switch to ACC.
2) Press the button (a) to display the Audio OFF screen.
3) Touch the screen in order from (b) to (e).

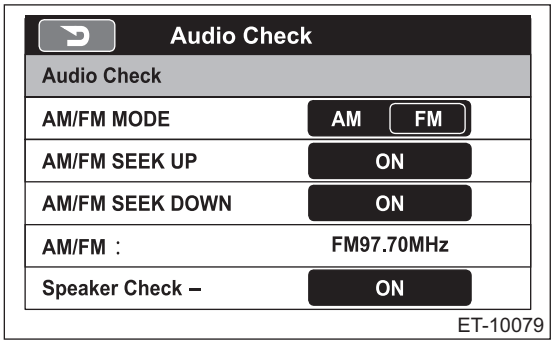


NOTE:
Pressing the button (a) or turning the ignition switch from the OFF to ACC position can exit the Line Diag mode.
4) {Line Diag} screen is displayed.



5) Touch {Audio Check} on the {Line Diag} screen.

6) {Audio Check} screen is displayed.



7) Touch the {ON} key of {Speaker Check} to check speaker output.

NOTE:
- The speaker front left → front right → rear right → rear left will sound in order for 2 seconds each.
- The speaker sounds at the maximum volume during speaker check.
- Press the {BACK} key to return to the {Line Diag} screen.

Model with 7 inch display

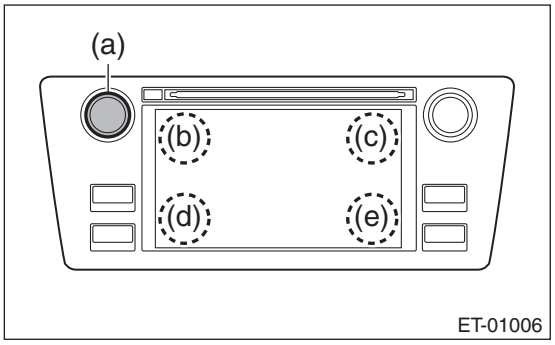
Operation is the same as that of navigation assembly, therefore, refer to “Navigation System”. <Ref. to ET-23, CHECK SPEAKER OUTPUT WITH LINE DIAG MODE, OPERATION, Navigation System.>

7. CHECK RADIO FREQUENCY RANGE SWITCH-OVER

NOTE:
Some items are not displayed according to destination.

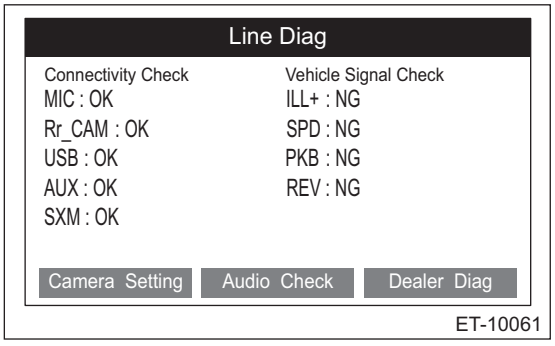
Model with 6.2 inch display

1) Turn the ignition switch to ACC.
2) Press the button (a) to display the Audio OFF screen.
3) Touch the screen in order from (b) to (e).

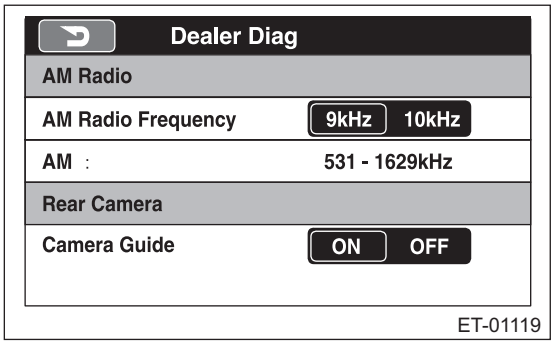


NOTE:
Pressing the button (a) or turning the ignition switch from the OFF to ACC position can exit the Line Diag mode.

4) {Line Diag} screen is displayed.



5) Touch {Dealer Diag} on the {Line Diag} screen.
6) The {Dealer Diag} screen is displayed.



7) Touch the {9kHz} or {10kHz} key to switch the AM radio frequency range.

Display key	Frequency range
9kHz	Set the AM frequency range to 531 — 1629 kHz.
10kHz	Set the AM frequency range to 530 — 1710 kHz.

NOTE:
• When the setting is changed, reboot confirmation for frequency switch-over is displayed. Select {OK} to reboot. When {cancel} is pressed, the {Dealer Diag} screen is displayed.
• The initial settings is at 9 kHz.

Model with 7 inch display

Operation is the same as that of navigation assembly, therefore, refer to “Navigation System”. <Ref. to ET-23, CHECK SPEAKER OUTPUT WITH LINE DIAG MODE, OPERATION, Navigation System.>

C: INSPECTION

1. BASIC INSPECTION

Model with 6.2 inch display

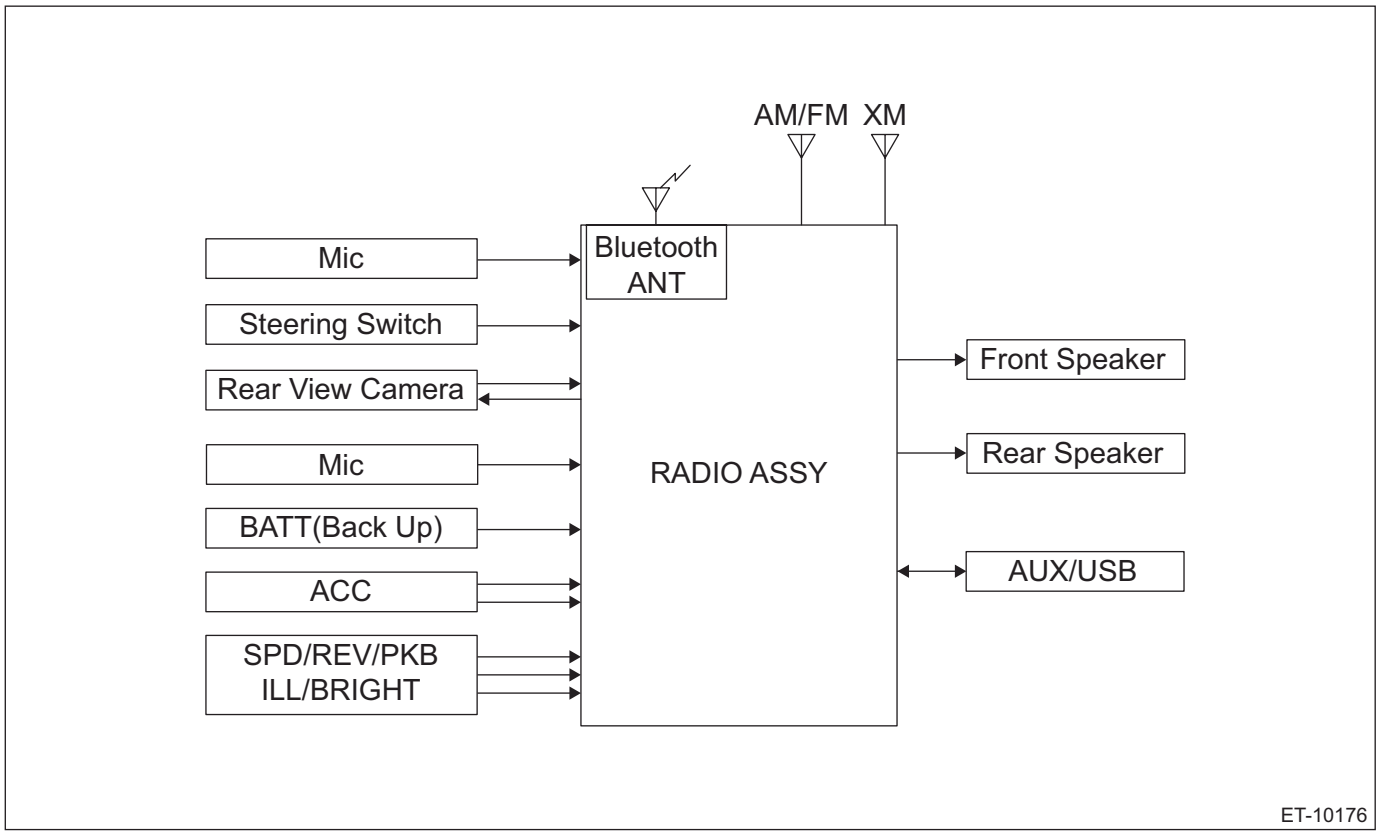
1) Using the Check List for Interview, ask the customer the condition of how the trouble occurred. <Ref. to ET-5, MODEL WITH 6.2 INCH DISPLAY, CHECK, Check List for Interview.>
2) Check the battery.
• Gasoline engine model: <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>
• HEV model: <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>
3) Check the list of Diagnostics with Phenomenon, and perform diagnosis according to the procedures. <Ref. to ET-56, AUDIO SYSTEM, LIST, Diagnostics with Phenomenon.>

Model with 7 inch display

Refer to “BASIC INSPECTION” in “Navigation System”. <Ref. to ET-25, BASIC INSPECTION, INSPECTION, Navigation System.>

2. SYSTEM BLOCK DIAGRAM

Model with 6.2 inch display



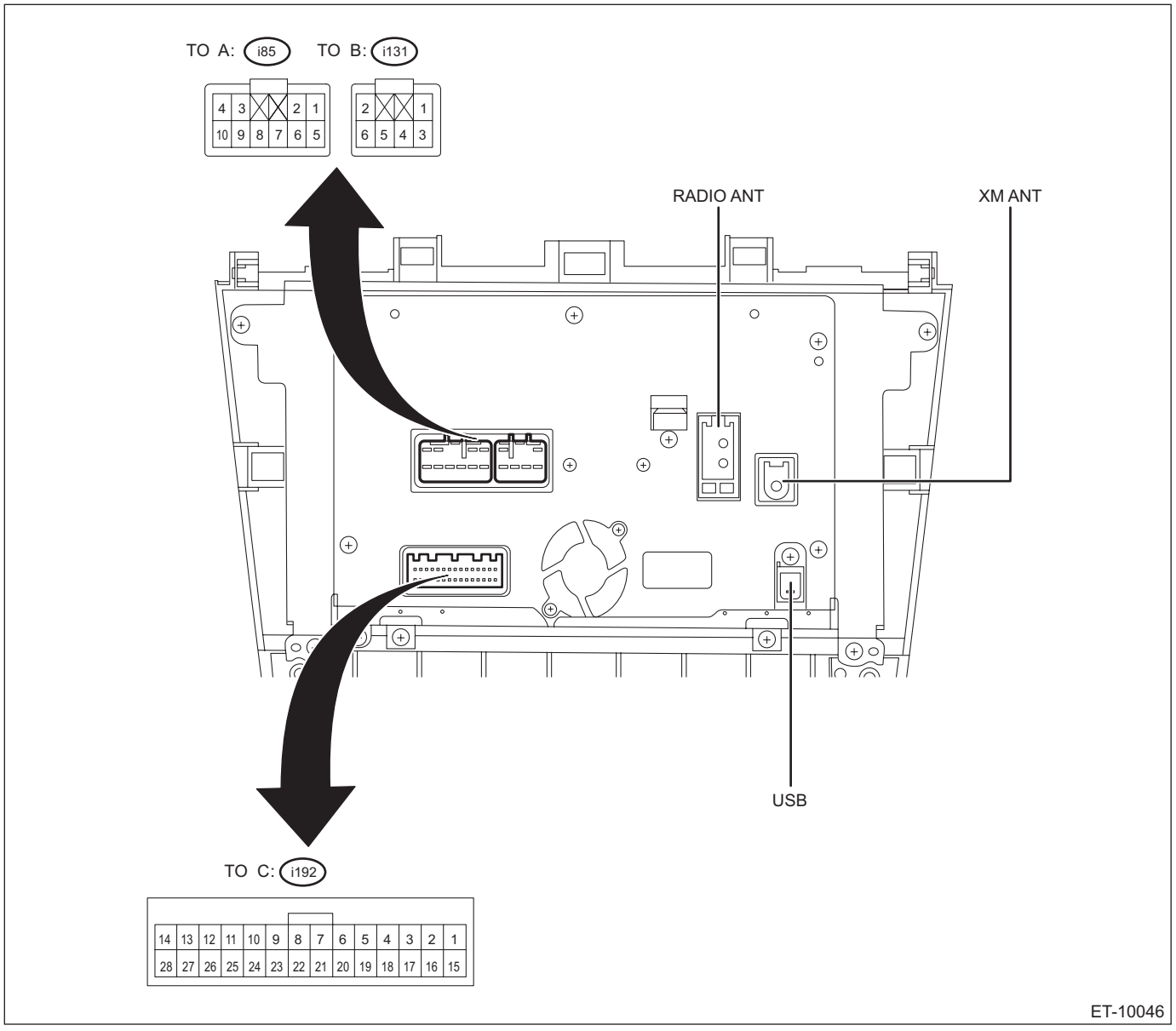
*1: Model with telematics

Model with 7 inch display

Refer to “System Block Diagram” in “Navigation System”. <Ref. to ET-25, SYSTEM BLOCK DIAGRAM, INSPECTION, Navigation System.>

3. MODULE I/O SIGNAL

Model with 6.2 inch display



- Power supply and speaker output terminal

Terminal No.	Content	Measuring condition	Measurement value	Note
(i85) No. 1	FRONT-RH (+)	—	—	—
(i85) No. 2	FRONT-LH (+)	—	—	—
(i85) No. 3 ←→ Chassis ground	ACC	ACC ON	11 — 15 V	—
(i85) No. 4 ←→ Chassis ground	+B	Always	11 — 15 V	—
(i85) No. 5	FRONT-RH (–)	—	—	—
(i85) No. 6	FRONT-LH (–)	—	—	—
(i85) No. 7 ←→ Chassis ground	GND	Always	0 V	—
(i85) No. 8	ANTENNA-ON	—	—	—
(i85) No. 9	N.C.	—	—	—
(i85) No. 10	ILLUMI (+)	—	—	—
(i131) No. 1	REAR-RH (+)	—	—	—
(i131) No. 2	REAR-LH (+)	—	—	—
(i131) No. 3	REAR-RH (–)	—	—	—
(i131) No. 4	N.C.	—	—	—
(i131) No. 5	ILLUMI (–)	—	—	—
(i131) No. 6	REAR-LH (–)	—	—	—

- Steering switch and AUX input terminal for microphone etc.

Terminal No.	Content	Measuring condition	Measurement value	Note
(i192) No. 1	N.C.	—	—	—
(i192) No. 2	REV	—	—	—
(i192) No. 3	BRIGHT	—	—	—
(i192) No. 4	MAC+B	—	—	—
(i192) No. 5	MIC (+)	—	—	—
(i192) No. 6	MIC-DET	—	—	—
(i192) No. 7	N.C.	—	—	—
(i192) No. 8	N.C.	—	—	—
(i192) No. 9	N.C.	—	—	—
(i192) No. 10	N.C.	—	—	—
(i192) No. 11	CAM + 6V	—	—	—
(i192) No. 12	CV (+)	—	—	—
(i192) No. 13	CV (–) (SHIELD)	—	—	—
(i192) No. 14	SHIELD-GND (AUX)	—	—	—
(i192) No. 15 ←→ Chassis ground	PKB	At parking ON	1 V or less	—
(i192) No. 16	N.C.	—	—	—
(i192) No. 17 ←→ Chassis ground	SPD	When the tire is rotating	Pulse signal	—
(i192) No. 18	SHIELD-GND (MIC)	—	—	—
(i192) No. 19	MIC (–)	—	—	—
(i192) No. 20	GND (CAMERA)	—	—	—
(i192) No. 21	SW1 (+)	—	—	—
(i192) No. 22	SW2 (+)	—	—	—
(i192) No. 23	SW-GND	—	—	—
(i192) No. 24	N.C.	—	—	—
(i192) No. 25	AUX-ON	—	—	—
(i192) No. 26	AUX-R (+)	—	—	—
(i192) No. 27	AUX-LR (–)	—	—	—
(i192) No. 28	AUX-L (+)	—	—	—

Model with 7 inch display

Refer to “Control Module I/O Signal” in “Navigation System”. <Ref. to ET-26, MODULE I/O SIGNAL, INSPECTION, Navigation System.>

D: NOTE

For procedure of each component in the audio system, refer to the respective sections.

- Audio unit: <Ref. to ET-29, Audio.>
- Front speaker
  - Tweeter (instrument panel): <Ref. to ET-32, TWEETER, REMOVAL, Front Speaker.>
  - Door speaker: <Ref. to ET-33, DOOR SPEAKER, REMOVAL, Front Speaker.>
- Rear speaker: <Ref. to ET-34, Rear Speaker.>
- Antenna: <Ref. to ET-35, Antenna.>
- Switches and harness: <Ref. to ET-38, Switches and Harness.>
- External connection terminal: <Ref. to ET-55, External Connection Terminal.>
- Rearview camera: <Ref. to ET-49, Rearview Camera System.>

5. Navigation System

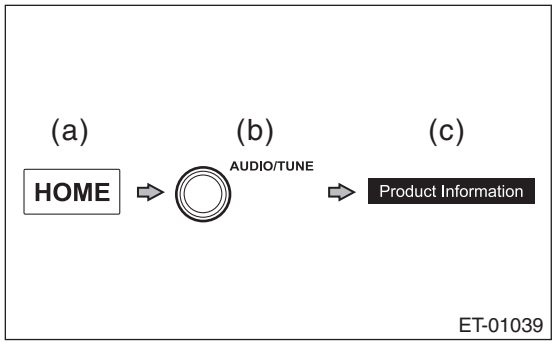
A: WIRING DIAGRAM

Refer to “Navigation System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-170, WIRING DIAGRAM, Navigation System.>
- HEV model: <Ref. to WI(HEV)-148, WIRING DIAGRAM, Navigation System.>

B: OPERATION

1. SUBARU STARLINK CONNECTION ID DISPLAY

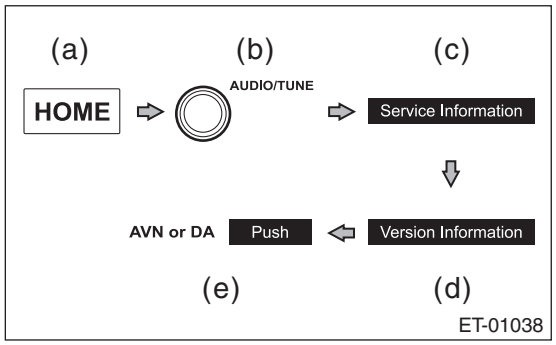
1) Turn the ignition switch to ACC.
2) Press the AUDIO/TUNE knob (b) five times with the HOME button (a) pressed to display the {Service Menu} screen.
3) Touch the {Product Information} (c) to display the {Product Information} screen.



4) Confirm the connectivity ID (16 digits).

2. SOFTWARE VERSION DISPLAY

1) Turn the ignition switch to ACC.
2) Press the AUDIO/TUNE knob (b) five times with the HOME button (a) pressed to display the {Service Menu} screen.
3) Touch the {Service Information} (c).
4) Touch the {Version Information} (d) to display the {Version Information} screen.
5) Touch the {AVN or DA} (e) to display the {Unit Version Information} screen.



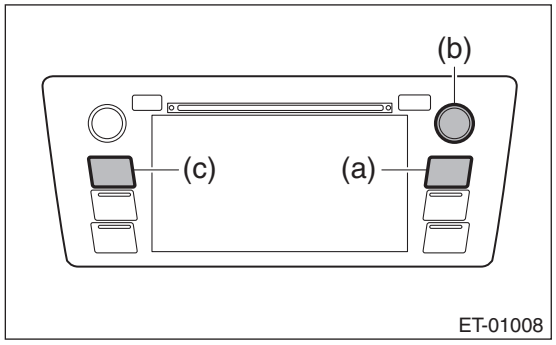
6) Confirm the version.

3. INITIALIZATION (FACTORY DEFAULT)

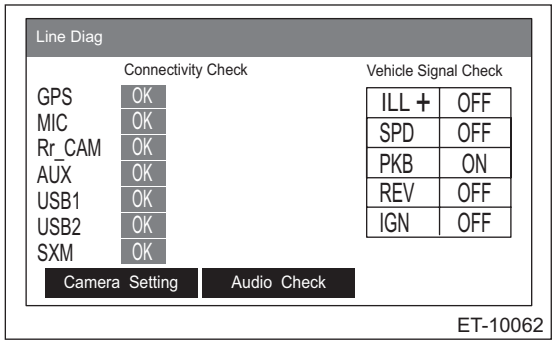
1) Turn the ignition switch to ACC.
2) Press the HOME button to display the {HOME} screen.
3) Touch the {SETTINGS} to display the {SETTINGS} screen.
4) Touch the {General} to display the {General Setting} screen.
5) Touch the {Delete Personal Data}, and touch the {Delete}.
6) {Deleting personal date. Please do not turn the vehicle off.} is displayed, and all data deletion is initiated.
7) When all data is deleted, {Initialization Complete.} is displayed.

4. CHECK CONNECTIONS WITH LINE DIAG MODE

1) Turn the ignition switch to ACC.
2) Press the button (b) twice with the button (a) pressed.



NOTE:
Pressing the button (c) for 3 seconds or more, or turning the ignition switch from the OFF to ACC position can exit the diagnostic mode.
3) {Line Diag} screen is displayed.
4) Check the connection status with the {Connectivity Check} in the {Line Diag} screen.

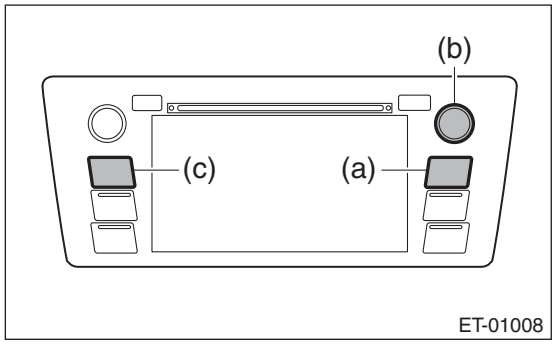


NOTE:
GPS is displayed only for the navigation system.
OK: Each connection device is connected properly.
NG: No connection or abnormal connection is detected.

NOTE:
Check the external connection terminals (USB 1, 2 and AUX) by connecting a memory for check or a pin jack.

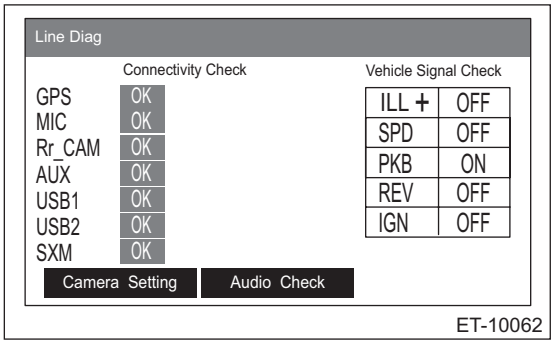
5. CHECK VEHICLE SIGNALS WITH LINE DIAG MODE

1) Turn the ignition switch to ACC.
2) Press the button (b) twice with the button (a) pressed.



NOTE:
Pressing the button (c) for 3 seconds or more, or turning the ignition switch from the OFF to ACC position can exit the diagnostic mode.
3) {Line Diag} screen is displayed.

4) Check the connection status with the {Vehicle Signal Check} in the {Line Diag} screen.



NOTE:
GPS is displayed only for the navigation system.

- Check illumination

NOTE:
Make sure that the bright switch is not ON.

1. Turn the ignition to ON.
2. Set the lighting switch to the parking position.
3. Make sure that {ON} lights in ILL+ and then the screen becomes dim.

ON: Normal
OFF: Abnormal Check the signal line connector. If there are no problems, the unit could be faulty.

- Check speed sensor

NOTE:
– Before starting inspections, check the safety around the vehicle.
– Lift up the vehicle as necessary.
– When the diagnostic trouble code is input in the VDC CM, perform the Clear Memory Mode.

1. Drive the vehicle at 9 km/h (6 MPH) or more.
2. Check that {ON} is displayed in SPD.

ON: Normal
OFF: Vehicle speed is less than 7 km/h (4 MPH), or malfunction is detected in the signal line. Check the signal line connector. If there are no problems, the unit could be faulty.

- Check parking brake signal

1. Pull parking brake lever.
2. Check that {ON} is displayed in PKB.

ON: Normal
OFF: Abnormal Check the signal line connector. If there are no problems, the unit could be faulty.

- Check back sensor

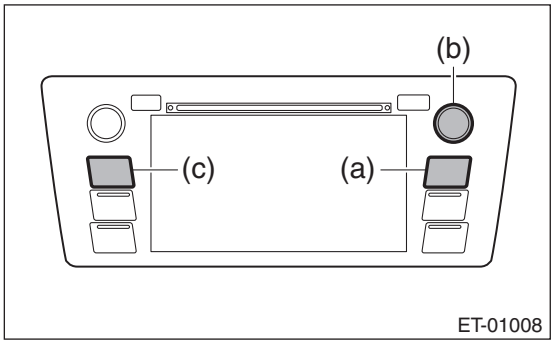
NOTE:
Before starting inspections, check the safety behind the vehicle.

1. Turn the ignition to ON.
2. Pull the parking brake lever and depress the brake pedal, then place the select lever or gear shift lever in reverse.
3. Make sure that {OK} is displayed in REV.

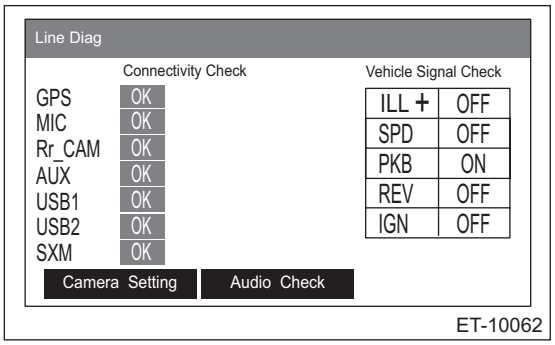
ON: Normal
OFF: Abnormal Check the signal line connector. If there are no problems, the unit could be faulty.

6. CHECK SPEAKER OUTPUT WITH LINE DIAG MODE

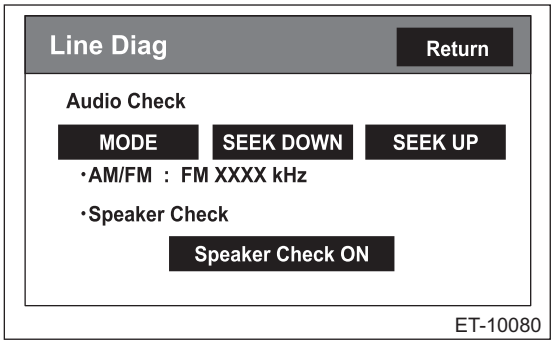
1) Turn the ignition switch to ACC.
2) Press the button (b) twice with the button (a) pressed.



NOTE:
Pressing the button (c) for 3 seconds or more, or turning the ignition switch from the OFF to ACC position can exit the diagnostic mode.
3) {Line Diag} screen is displayed.



4) Touch {Audio Check} on the {Line Diag} screen.
5) {Audio Check} screen is displayed.

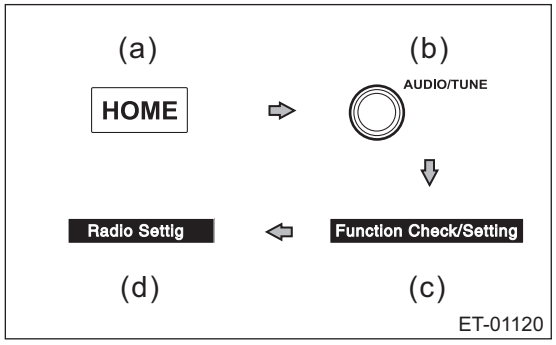


6) Touch the {ON} key of {Speaker Check} to check speaker output.

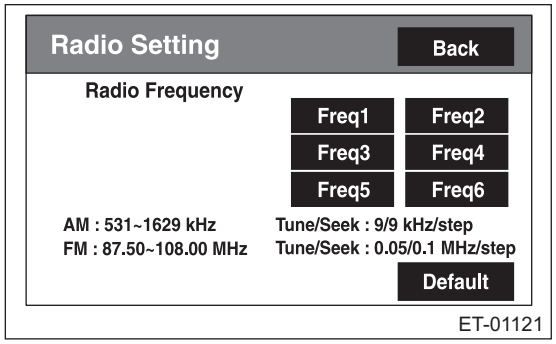
NOTE:
- The speaker front left → front right → rear right → rear left will sound in order for 2 seconds each.
- The speaker sounds at the maximum volume during speaker check.
- Press the {BACK} key to return to the {Line Diag} screen.

7. CHECK RADIO FREQUENCY RANGE SWITCH-OVER

NOTE:
Some items are not displayed according to destination.
1) Turn the ignition switch to ACC.
2) Press the AUDIO/TUNE knob (b) five times with the HOME button (a) pressed to display the {Service Menu} screen.
3) Touch {Function Check/Setting} (c) to display the {Function Check/Setting} screen.
4) Touch {Radio Setting} (c) to display the {Radio Setting} screen.



5) Touch the {Freq} 1 to {Freq} 6 keys to switch the radio frequency range.



Display key	AM		FM	
	Frequency range (kHz)	Tune/Seek (kHz/Step)	Frequency range (MHz)	Tune/Seek (MHz/Step)
Freq1	531 — 1629	9/9	87.50 — 108.00	0.05/0.1
Freq2	530 — 1710	5/5	87.50 — 108.00	0.05/0.1
Freq3	531 — 1602	9/9	87.50 — 108.00	0.05/0.1
Freq4	531 — 1602	9/9	87.50 — 108.00	0.05/0.05
Freq5	530 — 1620	5/10	87.90 — 108.00	0.1/0.1
Freq6	530 — 1620	5/10	87.40 — 108.00	0.1/0.1

NOTE:
• Pressing the HOME button (a) for 3 seconds or more or turning the ignition switch from the OFF to ACC position can exit the service diagnostic mode.
• The initial settings is at Freq1.

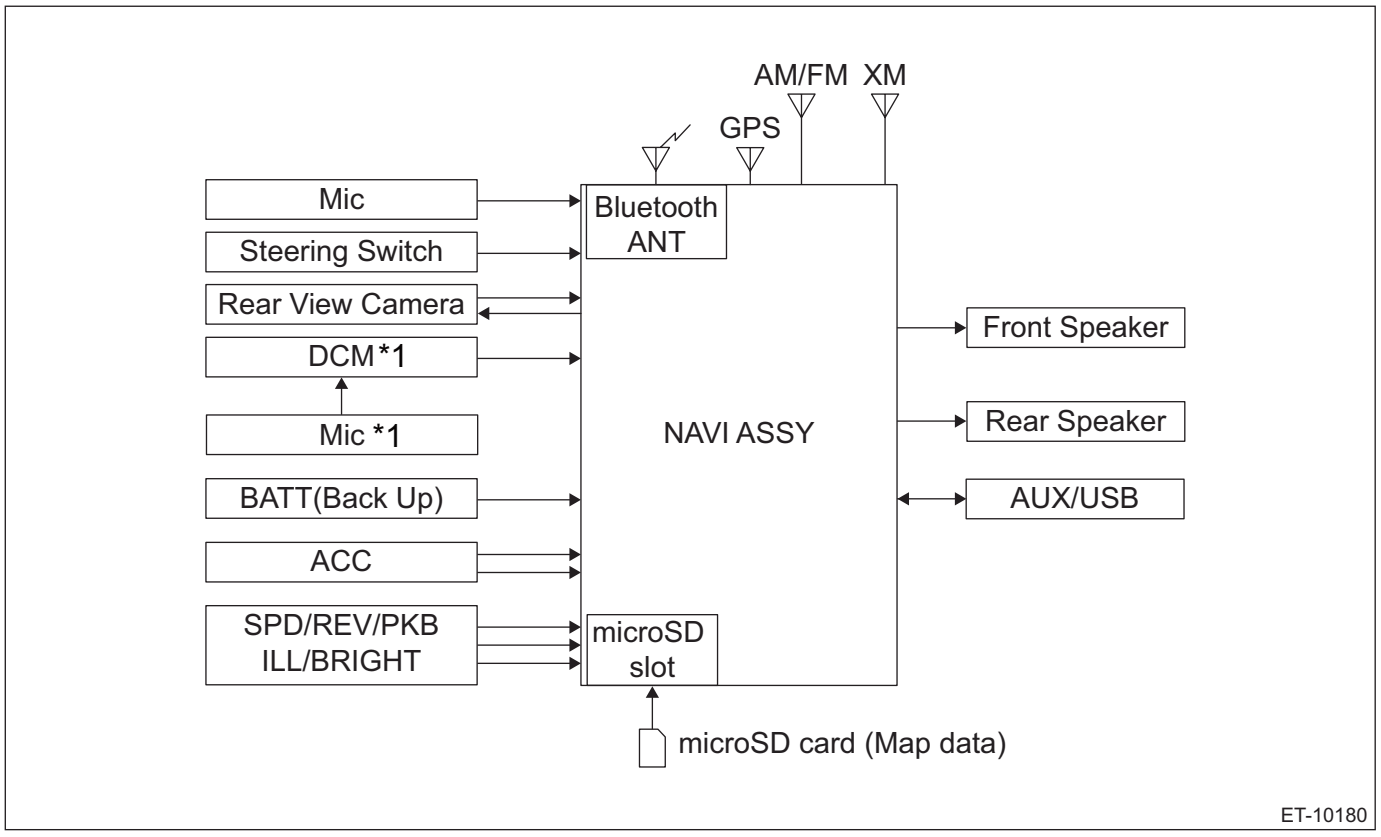
C: INSPECTION

1. BASIC INSPECTION

1) Using the Check List for Interview, ask the customer the condition of how the trouble occurred. <Ref. to ET-5, MODEL WITH 6.2 INCH DISPLAY, CHECK, Check List for Interview.>
2) Check the battery.
- Gasoline engine model: <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>
- HEV model: <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>

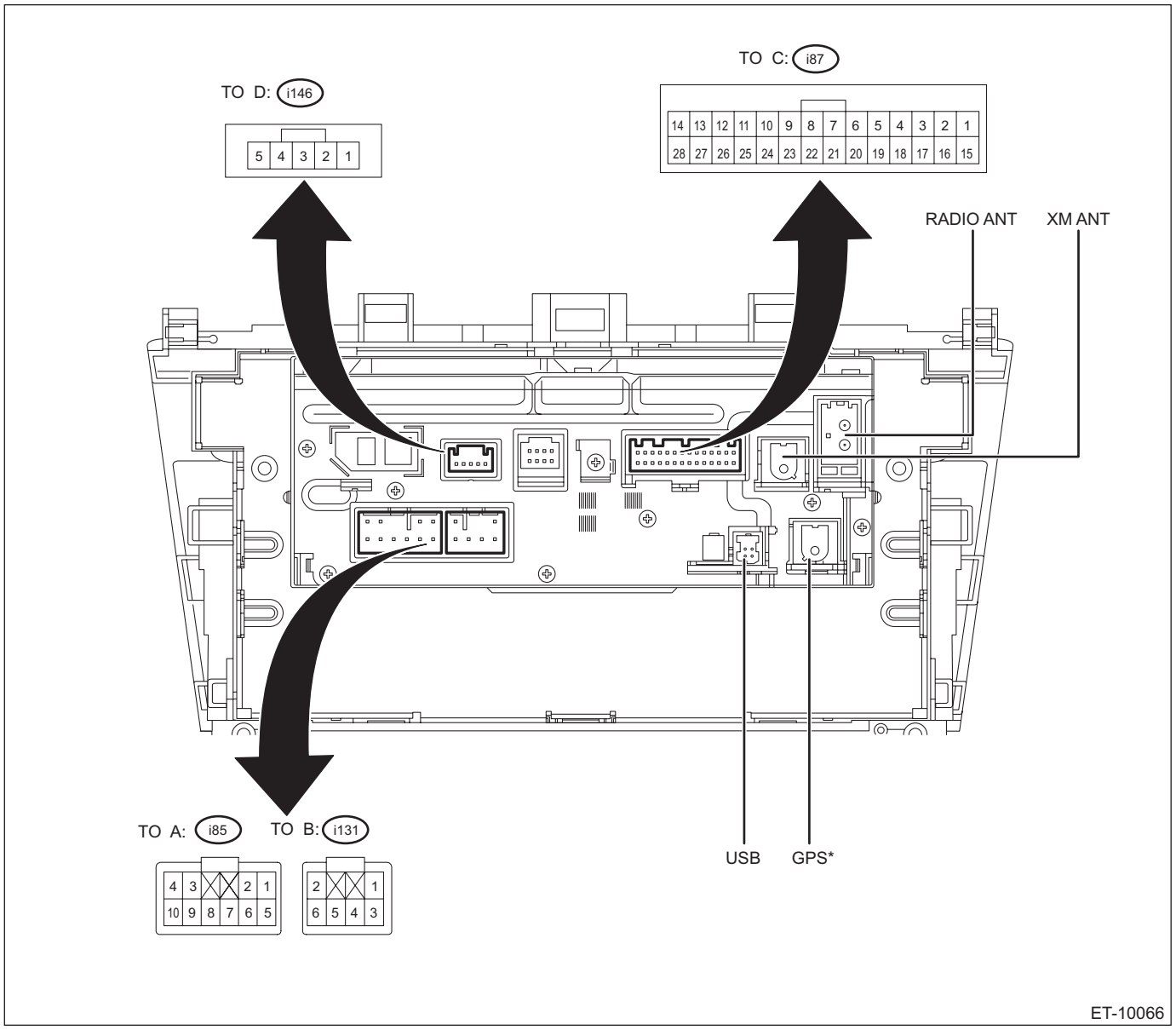
3) Check the list of Diagnostics with Phenomenon, and perform diagnosis according to the procedures. <Ref. to ET-56, NAVIGATION SYSTEM, LIST, Diagnostics with Phenomenon.>

2. SYSTEM BLOCK DIAGRAM



*1: Model with telematics

3. MODULE I/O SIGNAL



*: Model with navigation system

- Power supply and speaker output terminal

Terminal No.	Content	Measuring condition	Measurement value	Note
(i85) No. 1	FRONT-RH (+)	—	—	—
(i85) No. 2	FRONT-LH (+)	—	—	—
(i85) No. 3 ←→ Chassis ground	ACC	ACC ON	11 — 15 V	—
(i85) No. 4 ←→ Chassis ground	+B	Always	11 — 15 V	—
(i85) No. 5	FRONT-RH (–)	—	—	—
(i85) No. 6	FRONT-LH (–)	—	—	—
(i85) No. 7 ←→ Chassis ground	GND	Always	0 V	—
(i85) No. 8	ANTENNA-ON	—	—	—
(i85) No. 9	N.C.	—	—	—
(i85) No. 10	ILLUMI (+)	—	—	—
(i131) No. 1	REAR-RH (+)	—	—	—
(i131) No. 2	REAR-LH (+)	—	—	—
(i131) No. 3	REAR-RH (–)	—	—	—

Terminal No.	Content	Measuring condition	Measurement value	Note
(i131) No. 4	N.C.	—	—	—
(i131) No. 5	ILLUMI (–)	—	—	—
(i131) No. 6	REAR-LH (–)	—	—	—

- Steering switch and AUX input terminal for microphone etc.

Terminal No.	Content	Measuring condition	Measurement value	Note
(i87) No. 1 ←→ Chassis ground	N.C.	—	—	—
(i87) No. 2	REV	—	—	—
(i87) No. 3	BRIGHT	—	—	—
(i87) No. 4	MACC	—	—	—
(i87) No. 5	MIC+	—	—	—
(i87) No. 6	MIC-DET	—	—	—
(i87) No. 7	N.C.	—	—	—
(i87) No. 8	N.C.	—	—	—
(i87) No. 9	N.C.	—	—	—
(i87) No. 10	N.C.	—	—	—
(i87) No. 11	N.C.	—	—	—
(i87) No. 12	N.C.	—	—	—
(i87) No. 13	N.C.	—	—	—
(i87) No. 14	N.C.	—	—	—
(i87) No. 15 ←→ Chassis ground	PKB	At parking ON	1 V or less	—
(i87) No. 16	N.C.	—	—	—
(i87) No. 17 ←→ Chassis ground	SPD	When the tire is rotating	Pulse signal	—
(i87) No. 18	N.C.	—	—	—
(i87) No. 19	MIC-	—	—	—
(i87) No. 20	N.C.	—	—	—
(i87) No. 21	SW1	—	—	—
(i87) No. 22	SW2	—	—	—
(i87) No. 23	SWG	—	—	—
(i87) No. 24	N.C.	—	—	—
(i87) No. 25	AUX-DET	—	—	—
(i87) No. 26	AUX-R (+)	—	—	—
(i87) No. 27	AUX-LR (–)	—	—	—
(i87) No. 28	AUX-L (+)	—	—	—

- Rearview camera

Terminal No.	Content	Measuring condition	Measurement value	Note
(i146) No. 1 ←→ Chassis ground	CGND	Always	0 V	—
(i146) No. 2	CB+	—	—	—
(i146) No. 3	CV+	—	—	—
(i146) No. 4	CV–	—	—	—
(i146) No. 5	N.C.	—	—	—

D: NOTE

For procedure of each component in the navigation system, refer to the respective section.
- Navigation unit: <Ref. to ET-42, Navigation Body.>
- GPS antenna: <Ref. to ET-43, GPS Antenna.>

6. TELEMATICS SYSTEM

A: WIRING DIAGRAM

Refer to “Telematics System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-170, WIRING DIAGRAM, Navigation System.>
- HEV model: <Ref. to WI(HEV)-148, WIRING DIAGRAM, Navigation System.>

B: OPERATION

1. REGISTRATION (COMM CHECK)

CAUTION:
Because it will go back to Factory mode when the signal is weak, that you do not press the i button more than 2 seconds during a communication check. If it had returned to Factory mode, carrying out the CommCheck again. Each mode state can be confirmed in the “Subscription Status” in the current data display of SSM.

1) Replace the data communication module with a new part.
2) Check the LED of overhead console or stereo camera cover assembly illuminates in green.
3) Press and hold the i-button for 2 seconds or more.

NOTE:
When the subscription is completed, the telematics system will automatically activate.

C: INSPECTION

Refer to “Basic Diagnostic Procedure” in “TELEMATICS SYSTEM (DIAGNOSTICS)”. <Ref. to TEL(diag)-2, Basic Diagnostic Procedure.>

D: NOTE

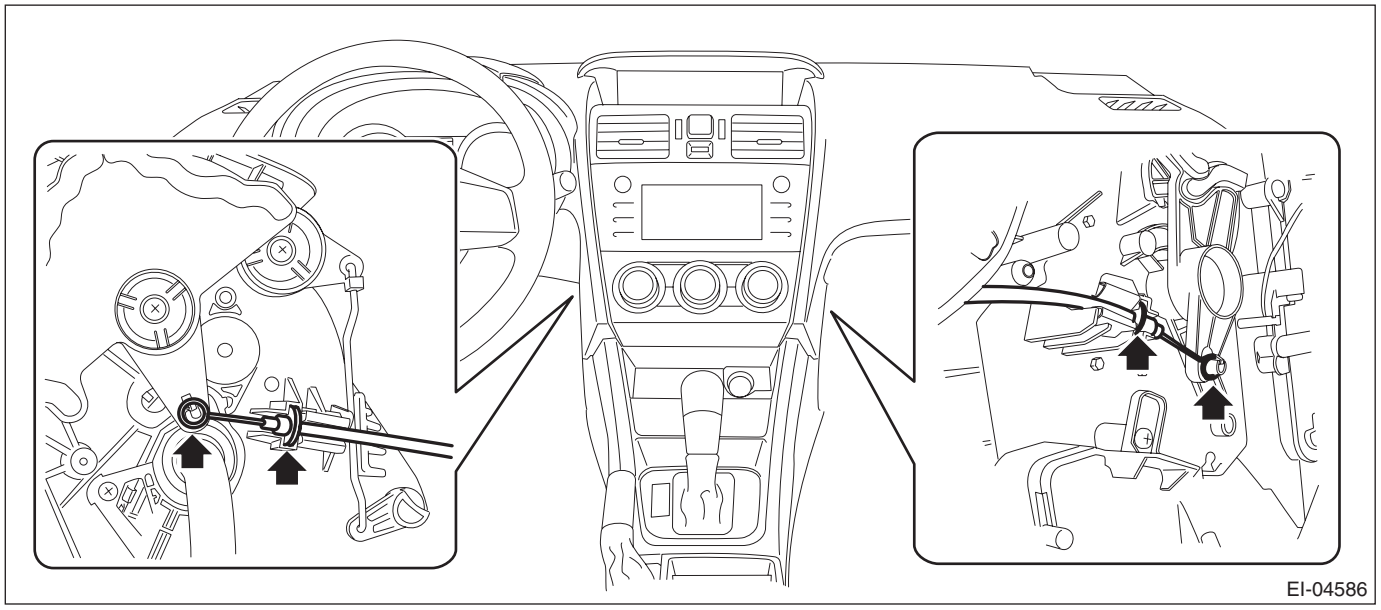
For procedure of each component in the telematics system, refer to the respective section.
- Data communication module: <Ref. to ET-42, Navigation Body.>
- Antenna: <Ref. to ET-35, Antenna.>
- GPS antenna: <Ref. to ET-43, GPS Antenna.>
- Switches and harness: <Ref. to ET-38, Switches and Harness.>

7. Audio

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

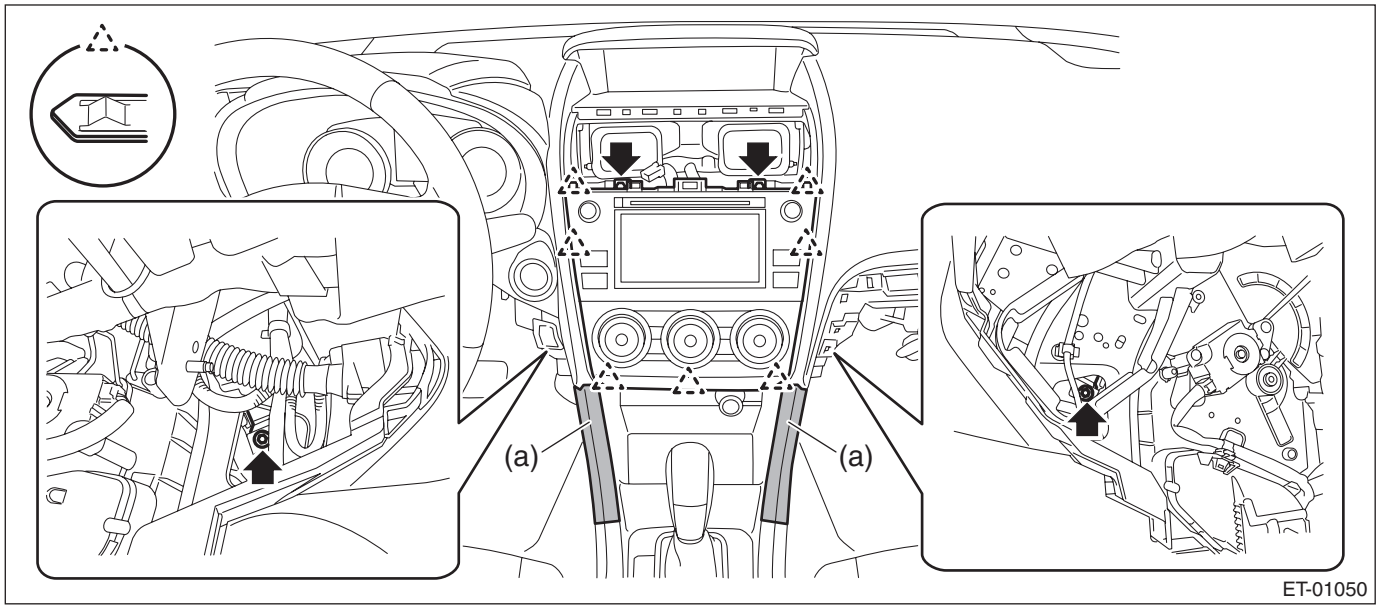
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver and the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
3) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
4) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
5) Remove the audio assembly.
(1) On manual A/C models, disconnect the control cables from both sides of the heater & cooling unit.


EI-04586

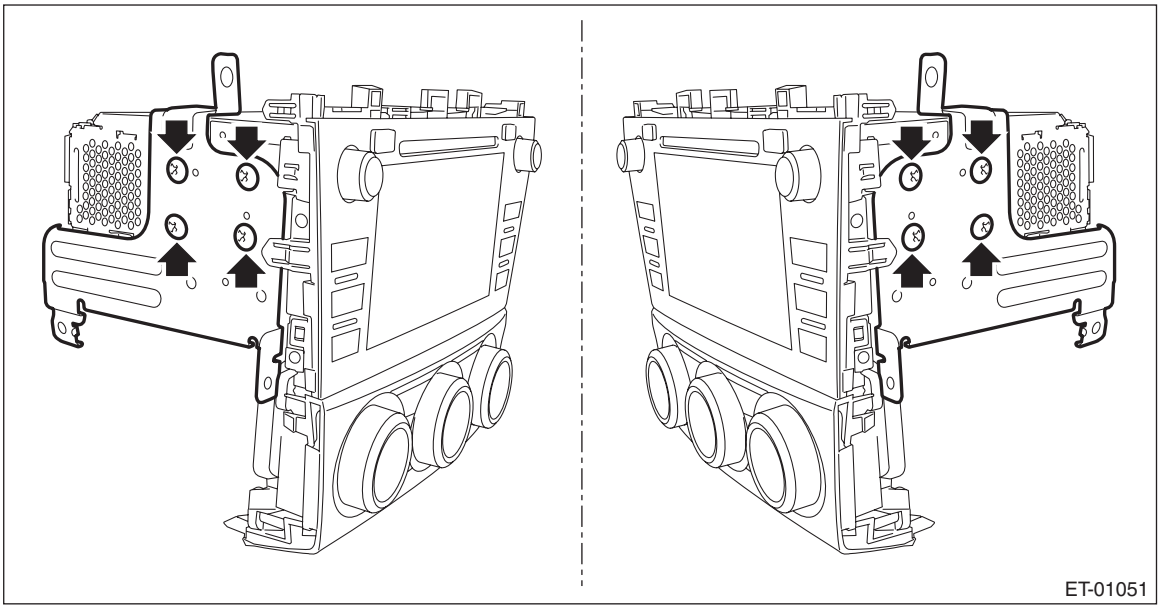
(2) Attach the protective tape (a) to the cover - shift lever.
(3) Remove the bolts, release the claws, and partially pull out the audio assembly.

NOTE:
- Release the claw by using a clip remover wrapped with protective tape.
- For models with telematics, if the antenna cable interferes with removal of the side mounting bolts, put aside the antenna cable as necessary.

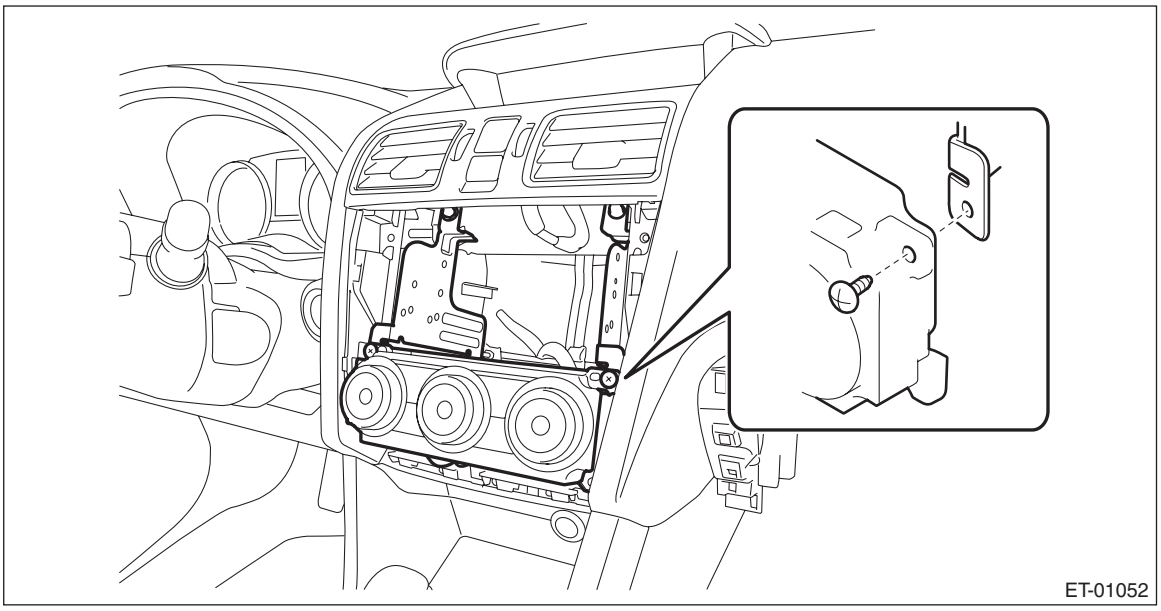
(4) Disconnect the connectors, and remove the audio assembly.



6) Remove the screws, and then remove the audio bracket.



NOTE:
• The model with telematics is equipped with the data communication module under the audio assembly.
• When sending the audio for repair, remove the audio bracket and heater control assembly, and install on the vehicle as shown in the figure below. <Ref. to AC-47, REMOVAL, Control Panel.>



B: INSTALLATION

CAUTION:
• After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and cables to interfere with or get caught by other parts.
Install each part in the reverse order of removal.

Tightening torque:
Audio assembly: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

8. Front Speaker

A: REMOVAL

1. TWEETER

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

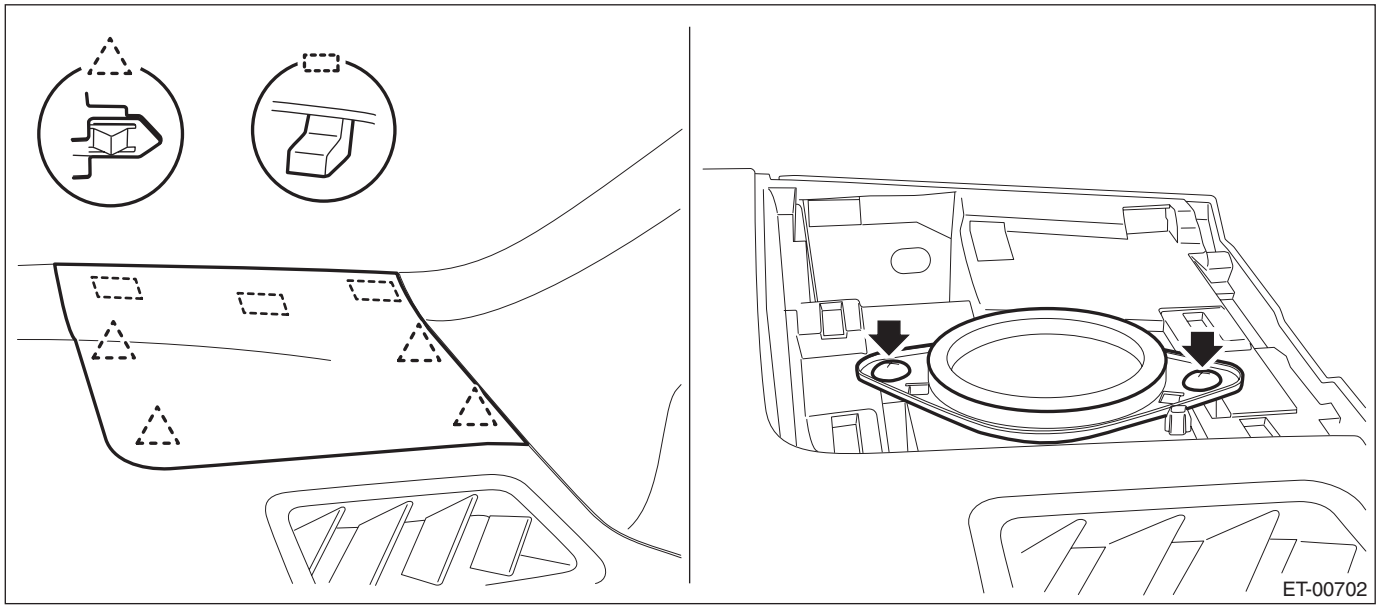
2) Remove the speaker assembly - tweeter.
   (1) Release the clips and claws, then detach the grille speaker side.

NOTE:
Remove the grille speaker side by using a plastic remover.

   (2) Remove the screws.

Preparation tool:
Stubby screwdriver

   (3) Disconnect the connector and remove the speaker assembly - tweeter.

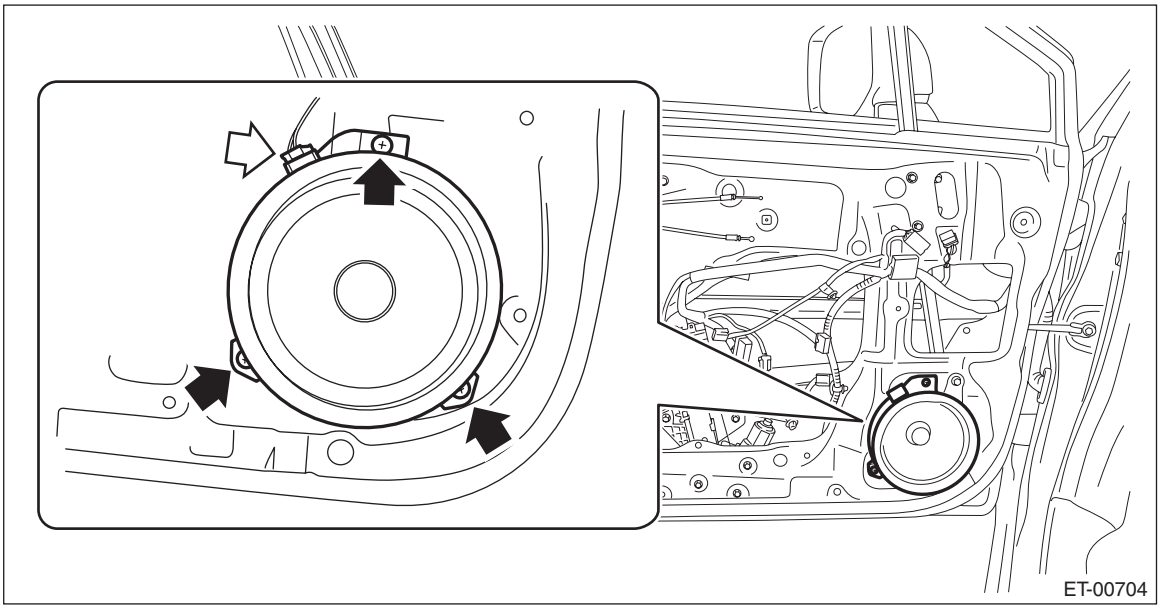


2. DOOR SPEAKER

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
3) Remove the front door speaker assembly.
   (1) Disconnect the connector.
   (2) Remove the screws to remove the front door speaker assembly.



B: INSTALLATION

Install each part in the reverse order of removal.

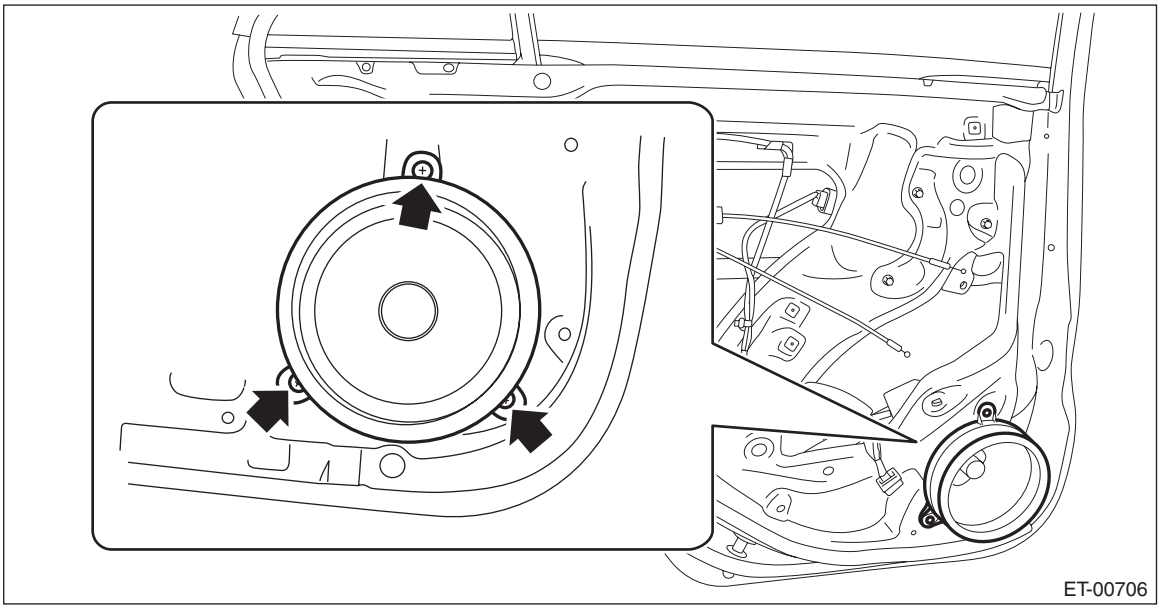
9. Rear Speaker

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
3) Remove the rear speaker assembly.
   (1) Remove the screws.
   (2) Disconnect the connector behind the speaker and remove the rear speaker assembly.



B: INSTALLATION

Install each part in the reverse order of removal.

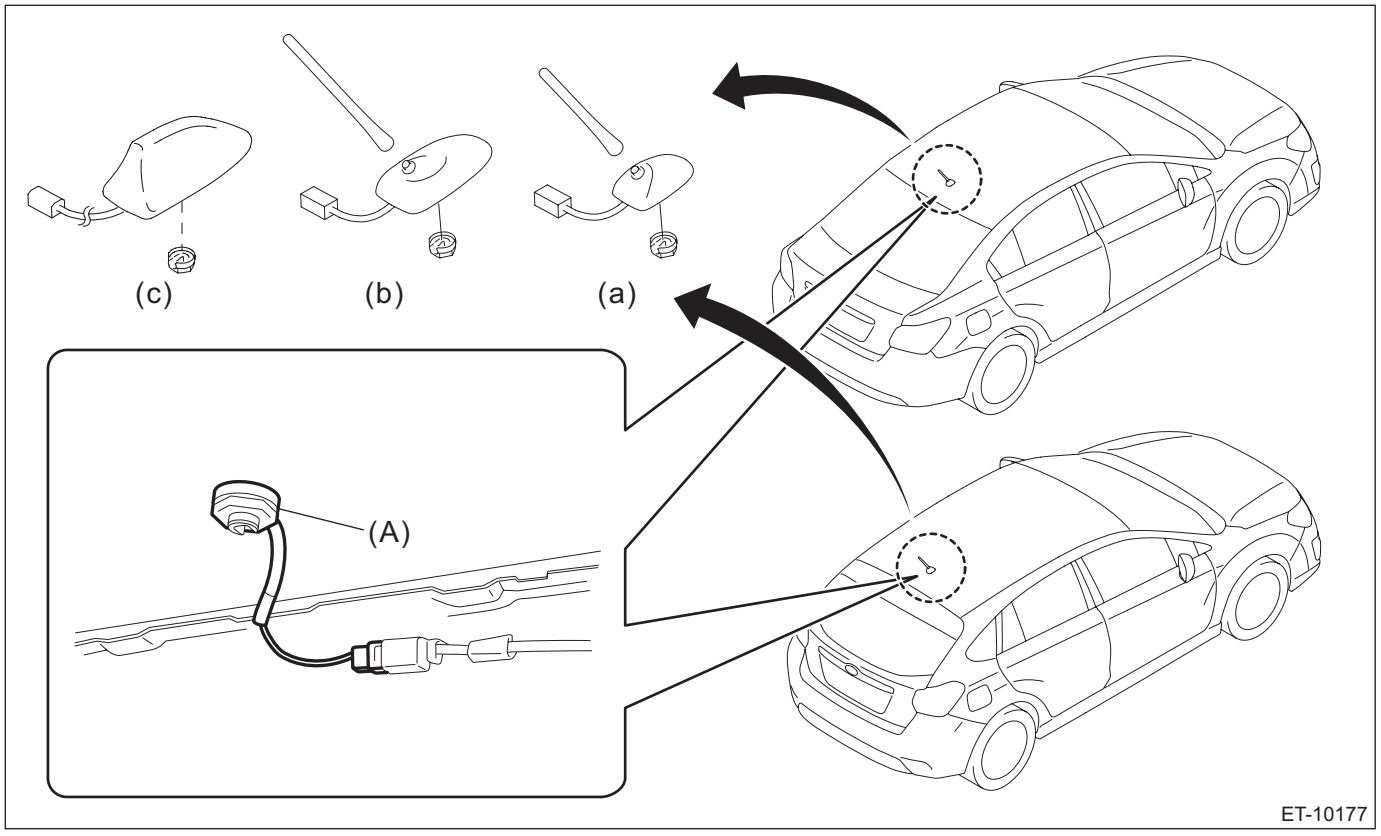
10.Antenna

A: REMOVAL

1. RADIO/TELEMATICS ANTENNA

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - roof assembly. <Ref. to EI-109, REMOVAL, Roof Trim.>
3) Remove the antenna assembly - radio or telematics.
   (1) Disconnect the connector and terminal, and remove the mounting nut (A).
   (2) Pull out the antenna assembly - radio or telematics from the roof panel top.



(a) Radio antenna (b) XM radio antenna (c) Telematics antenna

2. ANTENNA FEEDER CORD

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - roof assembly. <Ref. to EI-109, REMOVAL, Roof Trim.>
3) Remove the cover assembly - instrument panel LWR driver and the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
5) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
6) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
7) Turn over the floor mat. <Ref. to EI-124, REMOVAL, Floor Mat.>
8) Remove the cord assembly - antenna feeder.

3. TELEMATICS SUB ANTENNA

CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver and the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
3) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
4) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
5) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>

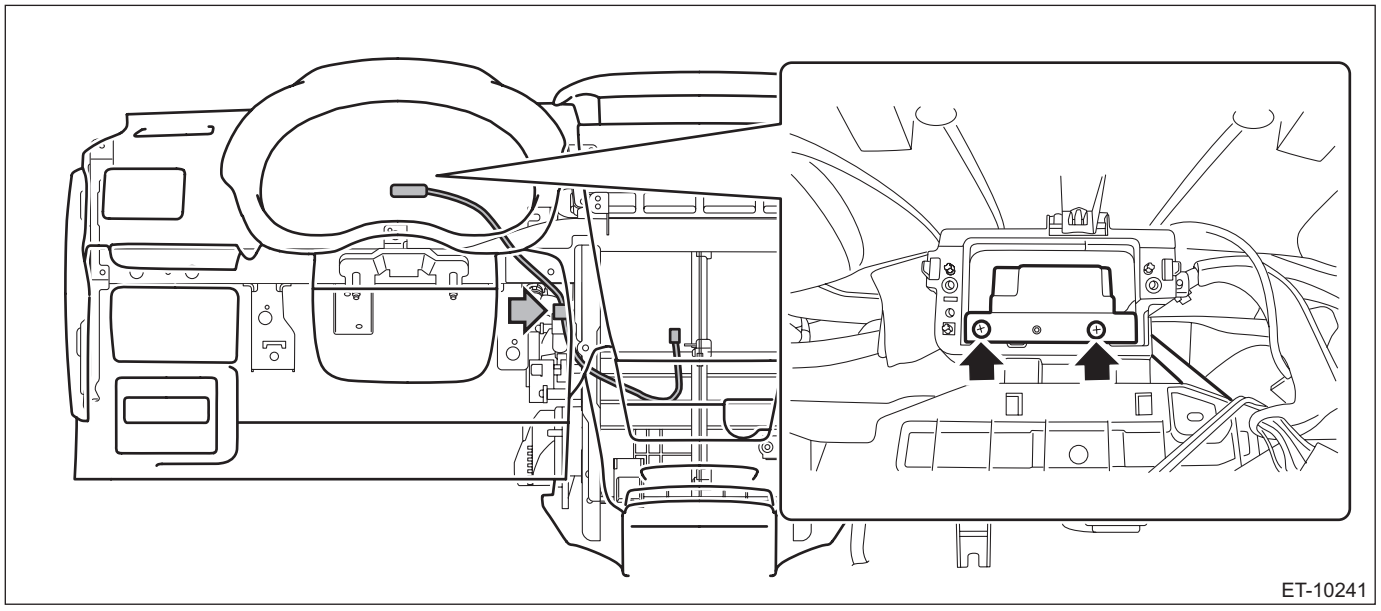
NOTE:
Remove the data communication module simultaneously.
6) Remove the combination meter assembly. <Ref. to IDI-19, REMOVAL, Combination Meter.>
7) Remove the GPS antenna.

NOTE:
Remove the antenna section only. Do not pull out the cord.

8) Remove the telematics sub antenna.
(1) Disconnect the telematics sub antenna connector on the data communication module side, and tie a string to the connector.

NOTE:
A string makes operation easier during installation.

(2) Remove the screw and harness clamp, and pull out the telematics sub antenna from the combination meter side.



(3) After the telematics sub antenna has been pulled out, remove the string attached to the connector in step (1).

B: INSTALLATION

CAUTION:
• After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
• Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
• Do not allow harness and cables to interfere with or get caught by other parts.

Install each part in the reverse order of removal.

Tightening torque:
Antenna assembly - radio or antenna assembly - telematics: 4.5 N·m (0.46 kgf-m, 3.3 ft-lb)

11.Switches and Harness

A: REMOVAL

1. SATELLITE SWITCH ASSEMBLY

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Set the tire to the straight-ahead position.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
4) Remove the steering wheel. <Ref. to PS-9, REMOVAL, Steering Wheel.>
5) Remove the satellite switch assembly. <Ref. to PS-10, DISASSEMBLY, Steering Wheel.>

2. TELEMATICS BUTTON

The telematics button is a single unit with the spot map light or stereo camera cover assembly. For operation procedures, refer to "LIGHTING SYSTEM" section. <Ref. to LI-77, REMOVAL, Spot Map Light.>

B: INSTALLATION

1. SATELLITE SWITCH ASSEMBLY

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.
• If the steering wheel has been removed, make sure that the steering roll connector is not turned from the original position.
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform "VSC(VDC) Centering Mode" of the VDC. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• Securely install the switch. Improper insertion of the pin or claw of the switch may cause improper installation.
1) Align the center position of the steering roll connector. <Ref. to AB-72, ADJUSTMENT, Roll Connector.>
2) Install each part in the reverse order of removal.

NOTE:
Align the alignment marks on the steering wheel and the column assembly - steering.

Tightening torque:
Steering wheel: 39 N·m (3.98 kgf-m, 28.8 ft-lb)

Clearance:
Between cover assembly - column and steering wheel: 4 — 6 mm (0.16 — 0.24 in)

2. TELEMATICS BUTTON

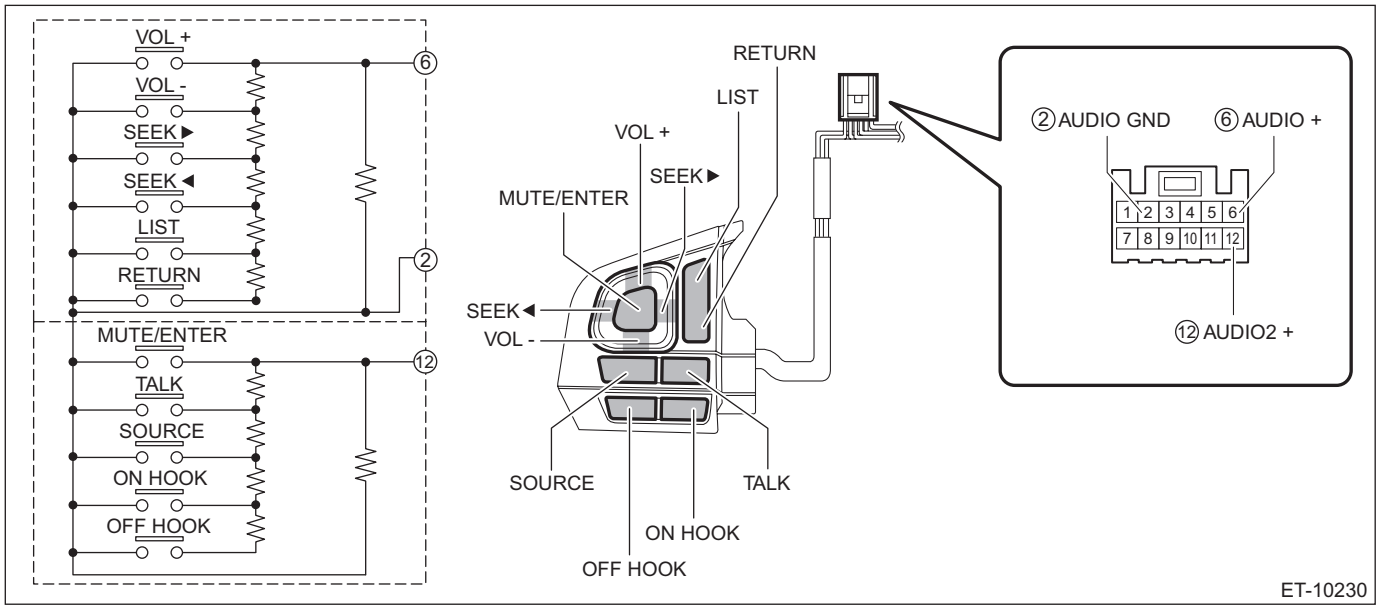
The telematics button is a single unit with the spot map light or stereo camera cover assembly. For operation procedures, refer to "LIGHTING SYSTEM" section. <Ref. to LI-78, INSTALLATION, Spot Map Light.>

C: INSPECTION

1. SATELLITE SWITCH ASSEMBLY

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions		Standard
6 — 2	VOL (+) VOL (–) SEEK (›) SEEK (‹) LIST RETURN	A circuit is all OFF.	Approx. 100 kΩ
	VOL (+)	ON	Less than 1 Ω
	VOL (–)	ON	Approx. 50 Ω
	Preset CH UP/SEEK (›)	ON	Approx. 120 Ω
	Preset CH DOWN/SEEK (‹)	ON	Approx. 230 Ω
	LIST	ON	Approx. 430 Ω
	RETURN	ON	Approx. 1,000 Ω
12 — 2	MUTE/ENTER TALK SOURCE ON HOOK OFF HOOK	B circuit is all OFF.	Approx. 100 kΩ
	MUTE/ENTER	ON	Less than 1 Ω
	TALK	ON	Approx. 50 Ω
	SOURCE	ON	Approx. 120 Ω
	ON HOOK	ON	Approx. 230 Ω
	OFF HOOK	ON	Approx. 430 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

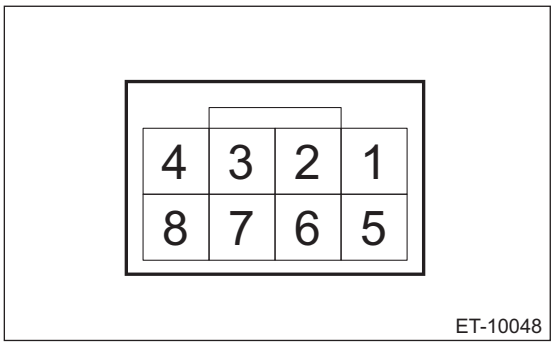
Terminal No.	Inspection conditions	Specification
10 (+) — 11 (–)	Apply battery voltage.	Light ON

3) If the result of the measurement is not at the standard, replace the satellite switch assembly.

2. TELEMATICS BUTTON

1) Check the button.
(1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



- SOS button

Terminal No.	Inspection conditions	Standard
6 — 1	OFF	Approx. 1.6 kΩ
	ON	Less than 1 Ω

- i-button

Terminal No.	Inspection conditions	Standard
3 — 1	OFF	Approx. 1.6 kΩ
	ON	Less than 1 Ω

(2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

Terminal No.	Inspection conditions	Specification
8 (+) — 2 (–)	Apply battery voltage.	Light ON

2) Check the indicator.
(1) Check the continuity between the connectors.

Terminal No.	Indicator	Specification
4 — 1	Green	Continuity exists
7 — 1	Red	Continuity exists

3) Replace the spot map light or stereo camera cover assembly if the inspection result is not within the standard value.

12.Microphone

A: NOTE

The microphone is integrated in the spot map light or stereo camera cover.
For operation procedures, refer to “LIGHTING SYSTEM” section. <Ref. to LI-77, Spot Map Light.>

13.Navigation Body

A: NOTE

For the operation procedures for navigation assembly, refer to “Audio” section. <Ref. to ET-29, Audio.>

14.GPS Antenna

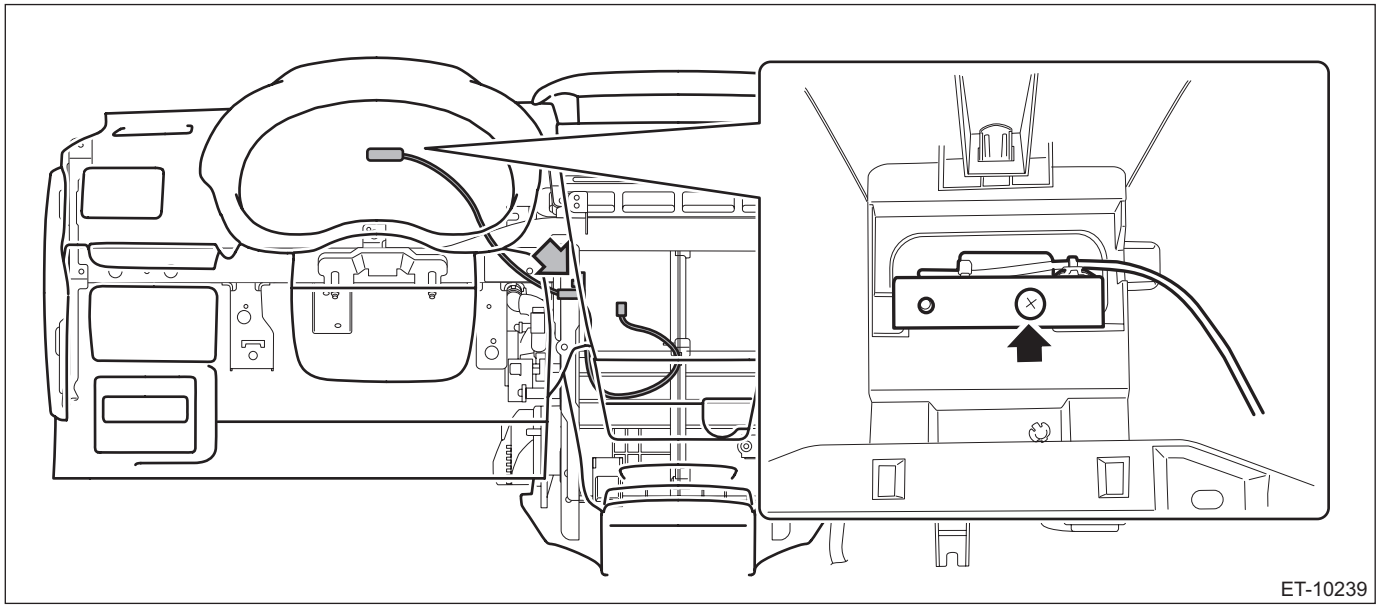
A: REMOVAL

CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

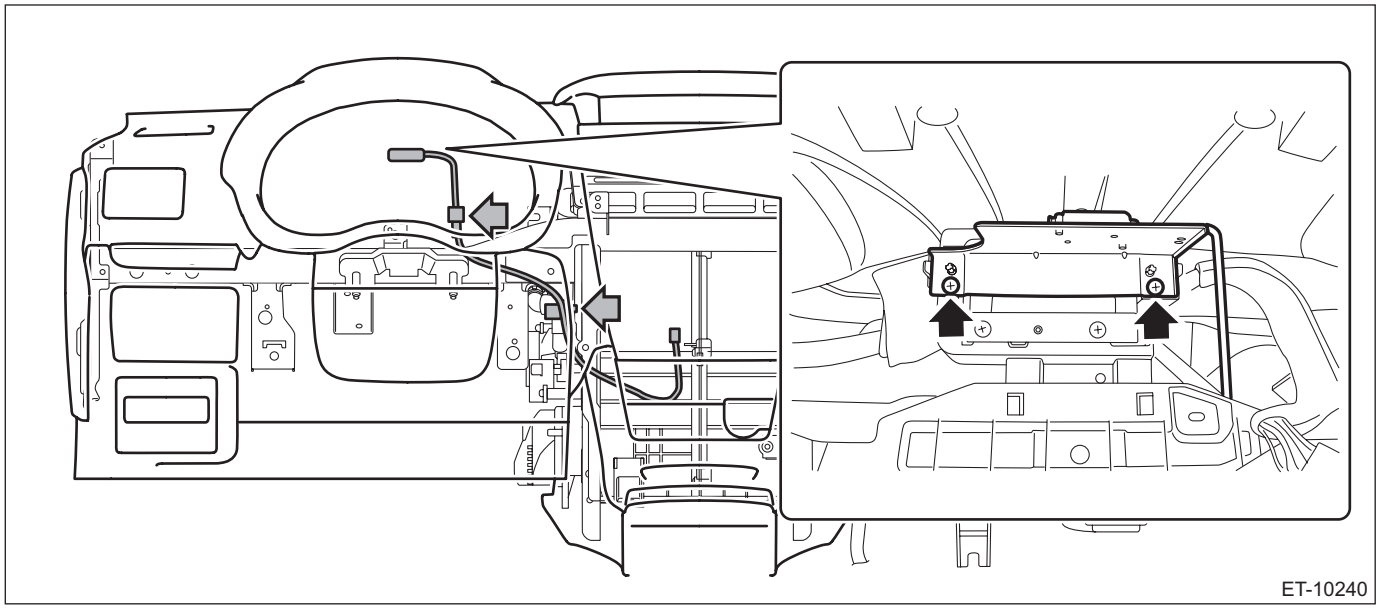
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver and the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
3) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
4) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
5) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
6) Remove the combination meter assembly. <Ref. to IDI-19, REMOVAL, Combination Meter.>
7) Remove the GPS antenna assembly.
(1) Tie a string to the GPS antenna assembly harness connector on the navigation unit side.

NOTE:
- A string makes operation easier during installation.
- For the model with telematics, also tie a string to the connector on the data communication module side.

(2) Remove the screw and harness clamp, and pull out the GPS antenna assembly harness from the combination meter side.
- Model without telematics



- Model with telematics



(3) When the GPS antenna assembly is pulled out, remove the string attached to the connector in step (1).

B: INSTALLATION

CAUTION:
• After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
• Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
• Do not allow harness and cables to interfere with or get caught by other parts.
Install each part in the reverse order of removal.

15.DATA COMMUNICATION MODULE

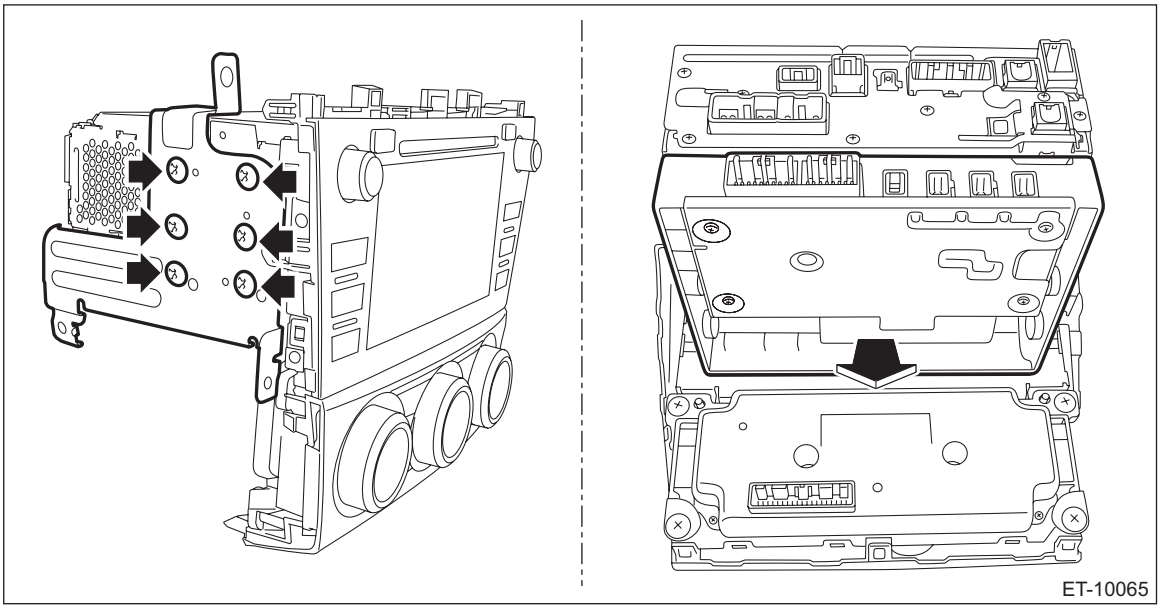
A: REMOVAL

1. DATA COMMUNICATION MODULE

CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver and the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
3) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
4) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
5) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
6) Remove the data communication module.
(1) Remove the screws.
(2) Remove the audio bracket or navigation bracket, and then remove the data communication module.

CAUTION:
Do not drop or apply any impact to the data communication module.



2. BACKUP BATTERY

CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

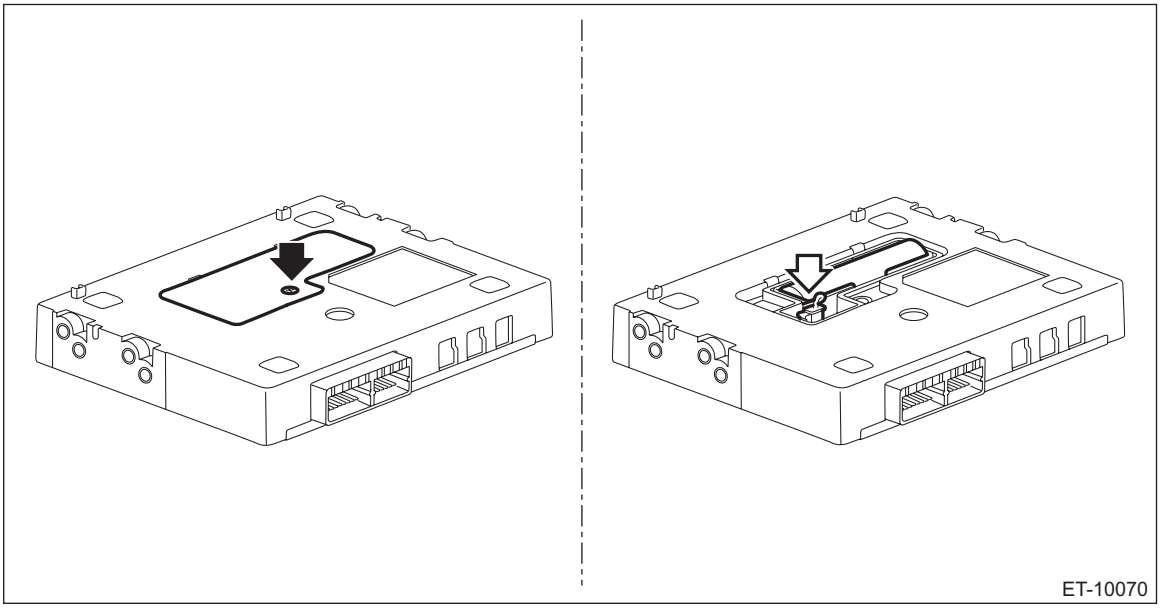
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the data communication module. <Ref. to ET-45, DATA COMMUNICATION MODULE, REMOVAL, DATA COMMUNICATION MODULE.>

3) Remove the backup battery.
   (1) Remove the screws, and then remove the battery cover.

Preparation tool:
TORX® T10

   (2) Disconnect the connector and remove the backup battery.

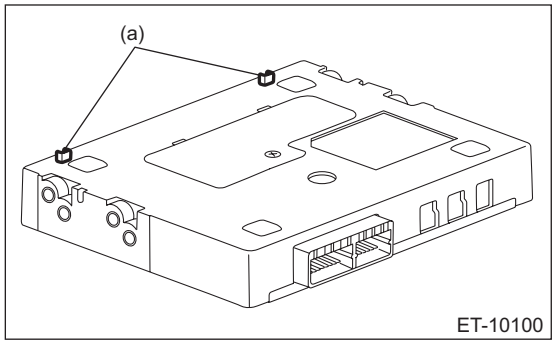


B: INSTALLATION

1. DATA COMMUNICATION MODULE

CAUTION:
• After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
• Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
1) Install each part in the reverse order of removal.

NOTE:
Align the positioning pin (a) of the data communication module with the positioning hole of the audio assembly or navigation assembly.



2) Perform the registration if the data communication module is replaced with a new part. <Ref. to ET-28, OPERATION, TELEMATICS SYSTEM.>
3) Check LED lighting status of overhead console or stereo camera cover assembly. <Ref. to TEL(diag)-4, LED ILLUMINATION STATUS LIST, CHECK, Check List for Interview.>

2. BACKUP BATTERY

CAUTION:
• After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
• Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
1) Install each part in the reverse order of removal.

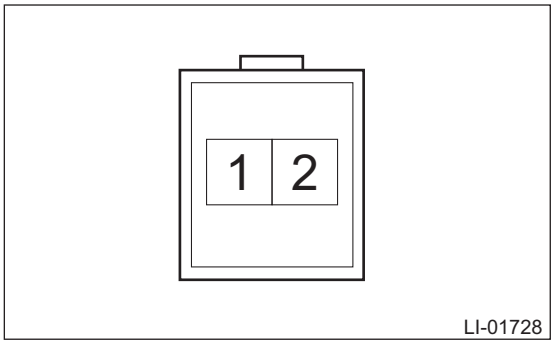
Tightening torque:
Backup battery: 0.3 N·m (0.03 kgf-m, 0.2 ft-lb)

C: INSPECTION

1. BACKUP BATTERY

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Standard
1 (+) — 2 (–)	2 V or more

2) Replace the backup battery if the inspection result is not within the standard value.

16.Rearview Camera System

A: WIRING DIAGRAM

Refer to “Rearview Camera System” in the wiring diagram.

- Gasoline engine model
  – 4 door model (6.2 inch display): <Ref. to WI(w/o HEV)-193, 4 DOOR MODEL (6.2 INCH DISPLAY), WIRING DIAGRAM, Rearview Camera System.>
  – 4 door model (7 inch display): <Ref. to WI(w/o HEV)-194, 4 DOOR MODEL (7 INCH DISPLAY), WIRING DIAGRAM, Rearview Camera System.>
  – 5 door model (6.2 inch display): <Ref. to WI(w/o HEV)-195, 5 DOOR MODEL (6.2 INCH DISPLAY), WIRING DIAGRAM, Rearview Camera System.>
  – 5 door model (7 inch display): <Ref. to WI(w/o HEV)-196, 5 DOOR MODEL (7 INCH DISPLAY), WIRING DIAGRAM, Rearview Camera System.>
- HEV model
  – Model without navigation system: <Ref. to WI(HEV)-172, MODELS WITHOUT NAVIGATION SYSTEM, WIRING DIAGRAM, Rearview Camera System.>
  – Model with navigation system: <Ref. to WI(HEV)-173, MODELS WITH NAVIGATION SYSTEM, WIRING DIAGRAM, Rearview Camera System.>

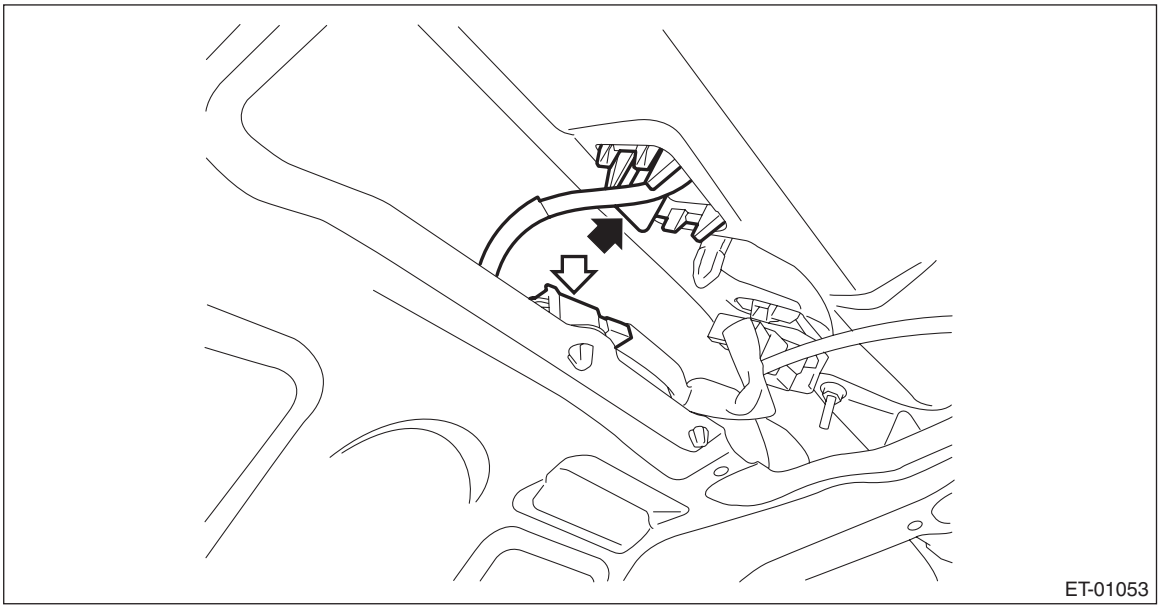
B: REMOVAL

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery.
2) Remove the garnish - trunk. <Ref. to EI-126, REMOVAL, Trunk Lid Garnish.>
3) Remove the rearview camera assembly.

CAUTION:
Do not drop or apply any impact to the rearview camera because it is a precision equipment.

(1) Disconnect the rearview camera connector.
(2) Disconnect the claws and then remove the rearview camera assembly.

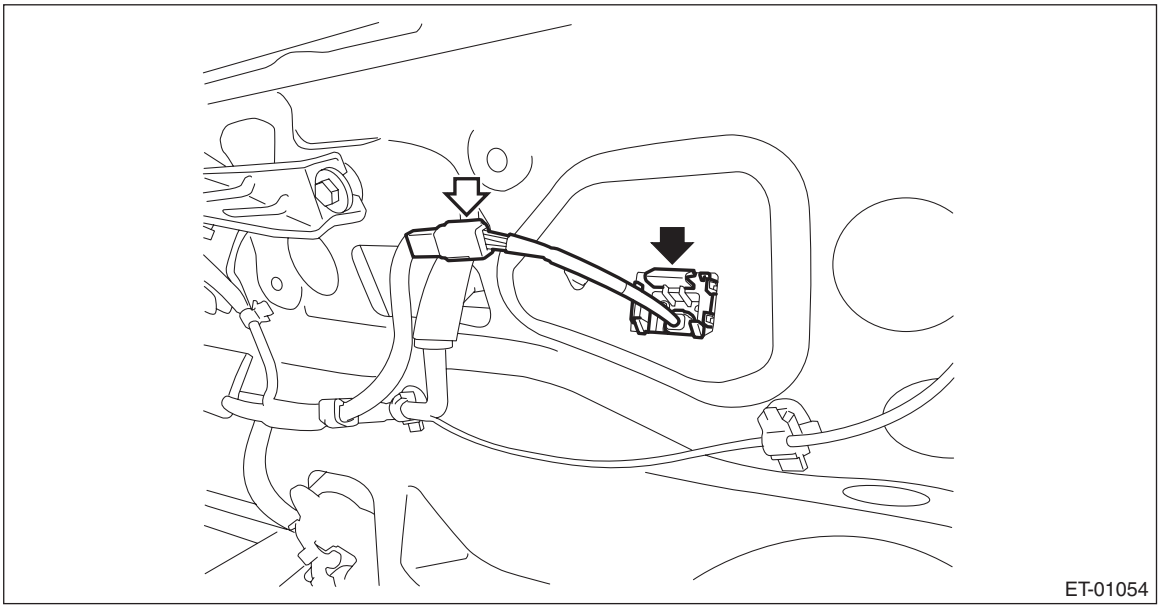


2. 5 DOOR MODEL/CROSSTREK MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - rear gate. <Ref. to EI-122, REMOVAL, Rear Gate Trim.>
3) Remove the arm assembly - rear wiper. <Ref. to WW-43, REMOVAL, Rear Wiper Arm.>
4) Remove the motor assembly - rear wiper. <Ref. to WW-45, REMOVAL, Rear Wiper Motor.>
5) Remove the garnish assembly - rear gate. <Ref. to EI-127, REMOVAL, Rear Gate Garnish.>
6) Remove the rearview camera assembly.

CAUTION:
Do not drop or apply any impact to the rearview camera because it is a precision equipment.
(1) Disconnect the rearview camera connector.
(2) Disconnect the claws and then remove the rearview camera assembly.



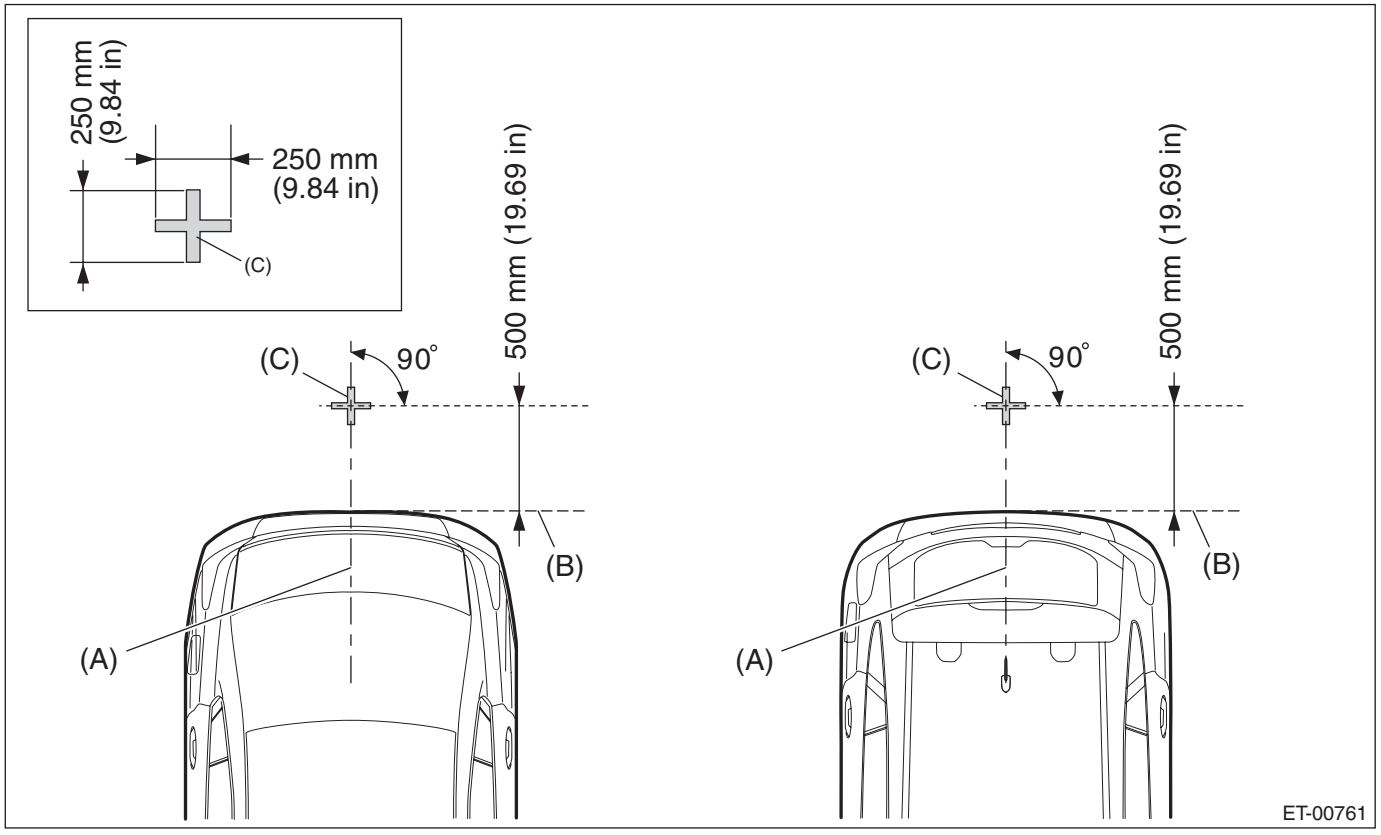
C: INSTALLATION

CAUTION:
Be sure to confirm the marker position, whenever the rearview camera is removed/installed/replaced.
Install each part in the reverse order of removal.

D: INSPECTION

1) Park the vehicle at the level place where there are enough area at the rear of the vehicle.
2) Attach the tape as the target point for standard at the floor rearward of the vehicle as shown in the figure below.

NOTE:
Standard tape width is about 30 — 50 mm (1.18 — 1.97 in) and brilliant color shall be used.



(A) Vehicle body center line (B) Rear edge of bumper (C) Target point

3) Confirm the following before checking the corresponding items.
(1) Rearview camera image is not displayed. (Audio and navigation screens are displayed normally.)
1. Check the condition of back sensor connection.
• Audio system: <Ref. to ET-12, CHECK VEHICLE SIGNALS WITH LINE DIAG MODE, OPERATION, Audio System.>
• Navigation system: <Ref. to ET-21, CHECK VEHICLE SIGNALS WITH LINE DIAG MODE, OPERATION, Navigation System.>
2. Check the condition of rearview camera connection.
• Audio system: <Ref. to ET-11, CHECK CONNECTIONS WITH LINE DIAG MODE, OPERATION, Audio System.>
• Navigation system: <Ref. to ET-21, CHECK CONNECTIONS WITH LINE DIAG MODE, OPERATION, Navigation System.>
(2) Marker position is not aligned or displayed.
The rearview camera or its installation location on the vehicle may be deformed. Check the rearview camera and its installation location on the vehicle, and repair or replace if necessary.

17.Front Accessory Power Supply Socket

A: WIRING DIAGRAM

Refer to “Front Accessory Power Supply Socket System” in the wiring diagram.

- Gasoline engine model: <Ref. to WI(w/o HEV)-134, WIRING DIAGRAM, Front Accessory Power Supply Socket System.>
- HEV model: <Ref. to WI(HEV)-110, WIRING DIAGRAM, Front Accessory Power Supply Socket System.>

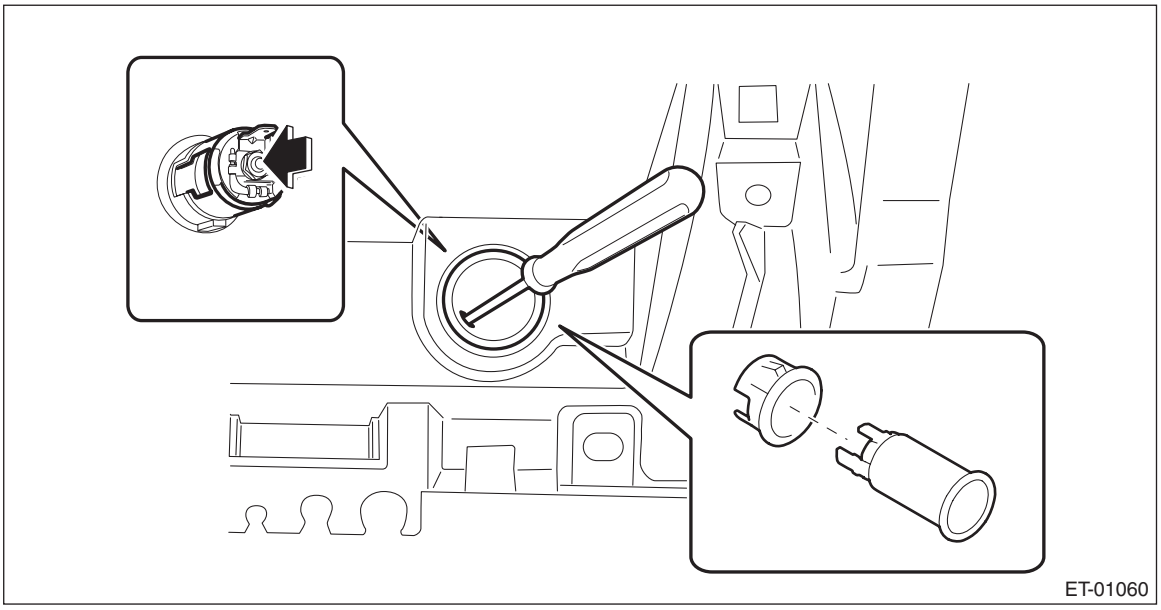
B: REMOVAL

CAUTION:
Before handling the airbag system components, always refer to “CAUTION” of “General Description” in “AIRBAG SYSTEM”.

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the cover assembly - instrument panel LWR driver and the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
3) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
4) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
5) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
6) Remove the socket assembly.
   (1) Disconnect the connector.
   (2) While releasing the claw inside, press it in from the rear to remove the socket assembly.

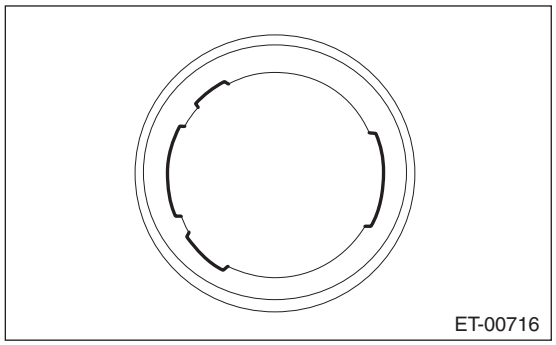


   (3) Remove the clip - socket.

C: INSTALLATION

CAUTION:
• After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
• Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
Install each part in the reverse order of removal.

NOTE:
Align the grooves of the holder with the claws of accessory power supply socket.



18.Rear Accessory Power Supply Socket

A: WIRING DIAGRAM

Refer to “Rear Accessory Power Supply Socket System” in the wiring diagram.

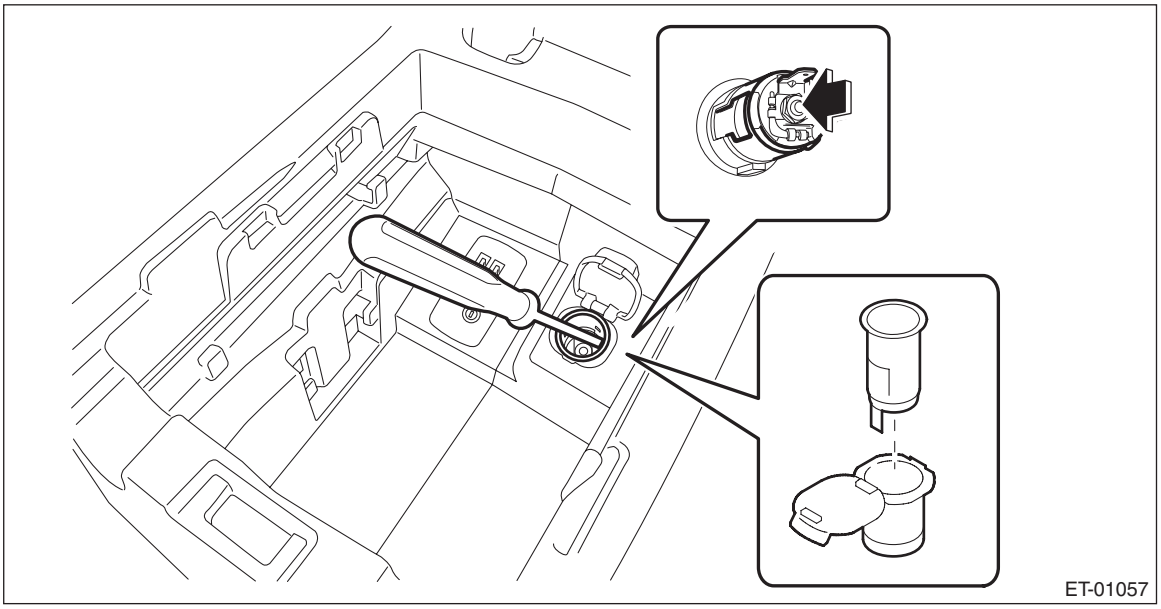
- Gasoline engine model: <Ref. to WI(w/o HEV)-191, WIRING DIAGRAM, Rear Accessory Power Supply Socket System.>
- HEV model: <Ref. to WI(HEV)-170, WIRING DIAGRAM, Rear Accessory Power Supply Socket System.>

B: REMOVAL

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the console box assembly. <Ref. to EI-77, REMOVAL, Console Box.>
3) While releasing the claw inside, press it in from the rear to remove the socket assembly.
   (1) While releasing the claw inside, press it in from the rear to remove the socket assembly.

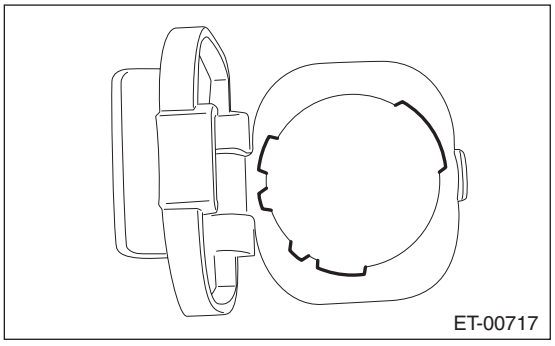


   (2) Remove the cap - socket.

C: INSTALLATION

Install each part in the reverse order of removal.

NOTE:
Align the grooves of the holder with the claws of accessory power supply socket.



19.External Connection Terminal

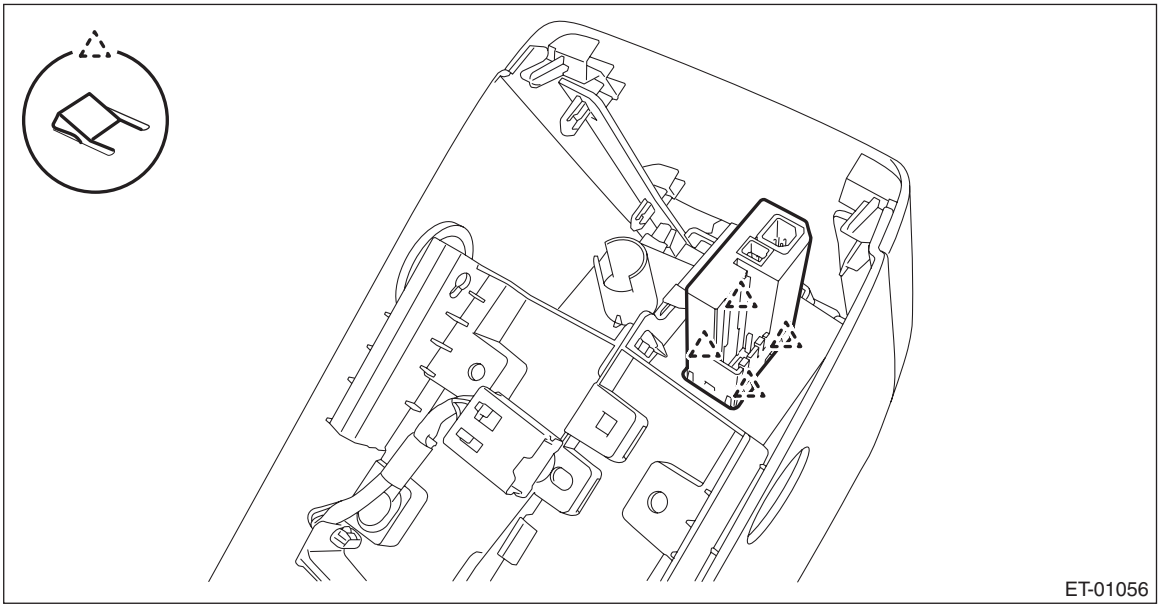
A: REMOVAL

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the console box assembly. <Ref. to EI-77, REMOVAL, Console Box.>

3) While pressing the claw, press it in from the rear to remove the unit assembly - AUX.



B: INSTALLATION

Install each part in the reverse order of removal.

20.Diagnostics with Phenomenon

A: LIST

1. AUDIO SYSTEM

Symptoms	Reference
Power will not turn ON.	<Ref. to ET-62, POWER WILL NOT TURN ON, INSPECTION, Diagnostics with Phenomenon.>
The screen freezes and does not accept any operation entry.	<Ref. to ET-63, THE SCREEN FREEZES AND DOES NOT ACCEPT ANY OPERATION ENTRY, INSPECTION, Diagnostics with Phenomenon.>
The screen is blacked out, or the screen is not displayed.	<Ref. to ET-64, THE SCREEN IS BLACKED OUT, OR THE SCREEN IS NOT DISPLAYED, INSPECTION, Diagnostics with Phenomenon.>
System is reset.	<Ref. to ET-65, SYSTEM IS RESET, INSPECTION, Diagnostics with Phenomenon.>
CDs cannot be played back.	<Ref. to ET-66, CDS CANNOT BE PLAYED BACK, INSPECTION, Diagnostics with Phenomenon.>
Sound does not come out from the speaker.	<Ref. to ET-67, SOUND DOES NOT COME OUT FROM THE SPEAKER, INSPECTION, Diagnostics with Phenomenon.>
Bluetooth connection cannot be established.	<Ref. to ET-68, BLUETOOTH CONNECTION CANNOT BE ESTABLISHED, INSPECTION, Diagnostics with Phenomenon.>
Bluetooth does not operate.	<Ref. to ET-69, BLUETOOTH DOES NOT OPERATE, INSPECTION, Diagnostics with Phenomenon.>
Radio volume is low or interference noise occurs.	<Ref. to ET-70, RADIO VOLUME IS LOW OR INTERFERENCE NOISE OCCURS, INSPECTION, Diagnostics with Phenomenon.>
Error message is displayed.	<Ref. to ET-60, ERROR MESSAGE IS DISPLAYED, LIST, Diagnostics with Phenomenon.>
SUBARU STARLINK is faulty.	<Ref. to ET-57, CHECK ABNORMALITY OF SUBARU STARLINK, LIST, Diagnostics with Phenomenon.>

2. NAVIGATION SYSTEM

Symptoms	Reference
Power will not turn ON.	<Ref. to ET-62, POWER WILL NOT TURN ON, INSPECTION, Diagnostics with Phenomenon.>
The screen freezes and does not accept any operation entry.	<Ref. to ET-63, THE SCREEN FREEZES AND DOES NOT ACCEPT ANY OPERATION ENTRY, INSPECTION, Diagnostics with Phenomenon.>
The screen is blacked out, or the screen is not displayed.	<Ref. to ET-64, THE SCREEN IS BLACKED OUT, OR THE SCREEN IS NOT DISPLAYED, INSPECTION, Diagnostics with Phenomenon.>
System is reset.	<Ref. to ET-65, SYSTEM IS RESET, INSPECTION, Diagnostics with Phenomenon.>
CDs cannot be played back.	<Ref. to ET-66, CDS CANNOT BE PLAYED BACK, INSPECTION, Diagnostics with Phenomenon.>
Sound does not come out from the speaker.	<Ref. to ET-67, SOUND DOES NOT COME OUT FROM THE SPEAKER, INSPECTION, Diagnostics with Phenomenon.>
Bluetooth connection cannot be established.	<Ref. to ET-68, BLUETOOTH CONNECTION CANNOT BE ESTABLISHED, INSPECTION, Diagnostics with Phenomenon.>
Bluetooth does not operate.	<Ref. to ET-69, BLUETOOTH DOES NOT OPERATE, INSPECTION, Diagnostics with Phenomenon.>
Radio volume is low or interference noise occurs.	<Ref. to ET-70, RADIO VOLUME IS LOW OR INTERFERENCE NOISE OCCURS, INSPECTION, Diagnostics with Phenomenon.>
Wrong location of vehicle, or no GPS reception.	<Ref. to ET-71, WRONG LOCATION OF VEHICLE, NO GPS RECEPTION, INSPECTION, Diagnostics with Phenomenon.>
Error message is displayed.	<Ref. to ET-60, ERROR MESSAGE IS DISPLAYED, LIST, Diagnostics with Phenomenon.>
SUBARU STARLINK is faulty.	<Ref. to ET-57, CHECK ABNORMALITY OF SUBARU STARLINK, LIST, Diagnostics with Phenomenon.>

3. CHECK ABNORMALITY OF SUBARU STARLINK

Symptoms	Counter-measure
SUBARU STARLINK app was terminated.	Perform the procedures described on “Check connection between smartphone and unit”. <Ref. to ET-72, CHECK CONNECTION BETWEEN SMARTPHONE AND UNIT, INSPECTION, Diagnostics with Phenomenon.>
Smartphone was powered off while connecting via the SUBARU STARLINK.	
Bluetooth connection stops while connecting via the SUBARU STARLINK.	
Communication gets out of service while connecting via the SUBARU STARLINK.	
Radio wave reception becomes worse while connecting via the SUBARU STARLINK.	

NOTE:
Possible error messages with relation to the above symptoms. When the message below is displayed, perform inspection according to “Inspection when an error message is displayed (SUBARU STARLINK)”. <Ref. to ET-57, INSPECTION WHEN AN ERROR MESSAGE IS DISPLAYED (SUBARU STARLINK), LIST, Diagnostics with Phenomenon.>

Details of message
Please disconnect mobile device and install the STARLINK application on your mobile device and try again. Bluetooth disconnected, please reconnect and try again. Smartphone data connection is poor, please try to connect again.

4. INSPECTION WHEN AN ERROR MESSAGE IS DISPLAYED (SUBARU STARLINK)

No.	Inspection	Possible cause	Action 1	Action 2
1	Check internet connection of smartphone	Check that the Internet sites can be viewed with a web browser of the smartphone. NOTE: Make sure that the displayed contents are not from previously loaded screen (cache) and that new contents can be reloaded.	When connection to the Internet fails, confirm that connection can be established where the radio wave condition is good, and go to No. 2.	Check that the smartphone can perform communication.
2	Activate SUBARU STARLINK application for the smartphone	Activate the “SUBARU STARLINK” application for the smartphone.	Check that the SUBARU STARLINK application is activated, and go to No. 5.	If the SUBARU STARLINK application is not installed, go to No. 3 and 4.
3	Install the SUBARU STARLINK application (Android)	Search the SUBARU STARLINK on Google Play, and install the application.	After installation, go to No. 2.	When installation cannot be completed, check the setting of the smartphone. (Communication environment, account, etc.)
4	Install the SUBARU STARLINK application (iPhone)	Search the SUBARU STARLINK on APP Store, and install the app.	After installation, go to No. 2.	When installation cannot be completed, check the setting of the smartphone. (Communication environment, account, etc.)
5	Check connection to the SUBARU STARLINK server	Select “SETTING” tab from the SUBARU STARLINK application for the smartphone, and select “Press to check network status”.	When “The network connection is good” is displayed, go to No. 8.	For the case other than shown on the left, go to No. 6 or No. 7.
6		When “NETWORK PROBLEMS” is displayed.	Move to a location where the radio wave condition is good, and go to No. 5.	—
7		When “SERVER MAINTENANCE” is displayed.	Wait until the server maintenance completes, and go to No. 5.	—
8	Check the smartphone type	Check the phone type (iPhone or Android).	For iPhone, go to No. 12.	For Android, go to No. 10.

No.	Inspection	Possible cause	Action 1	Action 2
9	Check Bluetooth connection between smartphone — on-vehicle device	On the on-vehicle device, select [HOME]-[SETTINGS]-Bluetooth tab-“BT devices Connection”, and check that Bluetooth setting at the upper right is ON.	When the setting is OFF, switch to ON and go to No. 10.	When the setting is ON, switch to OFF once and to ON again, then go to No. 10.
10		From the Setting app for the smartphone, select Bluetooth and check that it is set to ON. (Note that procedures vary depending on a device.)	When the setting is OFF, switch to ON and go to No. 11.	When the setting is ON, switch to OFF once and to ON again, then go to No. 11.
11		Check that Bluetooth pairing is established between the smartphone and on-vehicle device. • The selected smartphone icon is displayed on the on-vehicle device. • The smartphone BT is connected to the on-vehicle device.	If the connection cannot be confirmed, go to No. 9.	—
12	Check USB connection between smartphone — on-vehicle device (with iPhone)	Check that the smartphone and on-vehicle device are connected via USB.	After connecting via USB, go to No. 13.	—
13	Check the SUBARU STARLINK initial screen	On the on-vehicle device, press down [APPS] - [SUBARU STARLINK], and check that the SUBARU STARLINK initial screen is displayed.	If the activation cannot be confirmed, go to 14.	—
14	Delete the SUBARU STARLINK connection information inside the on-vehicle device.	Clear the Browser cache on the on-vehicle device. (Select the tool tab from the SETTING menu, select Browser cache “Delete”, and select “OK”. Then, press [SETTINGS] from the APPS screen. From SETTING, select the Bluetooth - tab, and select BT Devices Connection. Select the “Trash can” icon of the registered device. Select “OK” on the confirmation pop-up screen.)	For Android, go to No. 15. For iPhone, go to No. 17.	—
15		Clear the Bluetooth connection information inside the on-vehicle device.	Go to No. 16.	—
16		Turn OFF the power supply of the on-vehicle device, and wait for 30 seconds or more before turning ON the power supply again.	Go to No. 17.	—

No.	Inspection	Possible cause	Action 1	Action 2
17	Delete the SUBARU STARLINK connection information inside the smartphone.	Delete data in the SUBARU STARLINK app. (Click the “SETTING” icon of the “SUBARU STARLINK” application. Then, press [CONFIG] from the APPS list screen. Select “Delete the SUBARU STARLINK application data” to delete the data in the application. Activate the Setting app for the smartphone. From SETTING, select the Bluetooth-tab, and select BT Devices Connection. Select the Bluetooth setting item. Select the connection information. Select the “Trash can” icon of the registered device. Select “Forget This Device” to delete the connection information.	Go to No. 18.	—
18		Delete the Bluetooth connection information.	Go to No. 19.	—
19		Turn OFF the power of the smartphone, then turn it ON again.	Go to No. 20.	—
20	Re-connect SUBARU STARLINK	Establish connection according to the SUBARU STARLINK connection procedure.	—	—

5. ERROR MESSAGE IS DISPLAYED

- 6.2-inch display

Mode	Message	Cause	Action
aha	Please reconnect your mobile device or restart the Aha app. Press VOLUME knob twice to retry, or press AUDIO/TUNE knob to exit.	Displayed when Aha Application needs to be rebooted.	Reboot Aha Application.
	Please login to Aha on your mobile device before accessing in the vehicle.	Displayed when selecting the Aha mode while being log-out.	Log in to Aha on the device that is disconnected from the on-vehicle device, re-connect this device to the on-vehicle device, and select the Aha mode.
	Please update to the latest version of the Aha app on your mobile device.	Displayed when Aha Application needs to be updated.	Update Aha Application.
	Please reconnect mobile device to continue using Aha.	Displayed when the smartphone is disconnected.	Recovers when the connection is established.
	Aha is temporarily unavailable. Please try again later.	Displayed when the connected network is invalid.	Recovers when connection is established again and the network is valid.
	Aha is temporarily unavailable. Please try again later.	When an error occurred during the Start session.	Recovers when the communication between the device and server is normalized.
Pandora	Please reconnect your mobile device or restart the Pandora App. Press VOLUME knob twice to retry, or press AUDIO/TUNE knob to exit.	Displayed when connection is not established, and when Pandora Application needs to be rebooted.	Reboot Pandora Application.
	No saved stations. Please create one on the Pandora mobile app. Press VOLUME knob twice to retry, or press AUDIO/TUNE knob to exit.	Displayed when no Station is set up with Pandora Application.	Recovers when at least one Station is set up on the device side.
	Pandora is temporarily unavailable. Please try again later.	Displayed when Pandora Server is under Maintenance.	Recovers when Maintenance of Pandora Server is completed and Server is resumed.
	Please update the Pandora app on your mobile device.	Displayed when Pandora Application needs to be updated.	Update Pandora Application.
	You have reached the maximum number of saved stations. Please delete a station before creating a new one.	Displayed when the number of Station has already reached the upper limit.	Displays for five seconds.
	Pandora is not available in the current region.	Displayed when connection to Pandora is attempted from outside of the U.S.	Re-connect from inside the U.S.
	Pandora user not logged in. Please login to Pandora on your mobile device. Press VOLUME knob twice to retry, or press AUDIO/TUNE knob to exit.	Displayed when selecting the Pandora mode while being log-out.	Log in and select the Pandora mode.
	Insufficient network connectivity to play Pandora. Waiting to regain connectivity.	Displayed when the connected network is invalid.	Re-connect with valid network.

- Model with 7 inch display (audio and navigation)

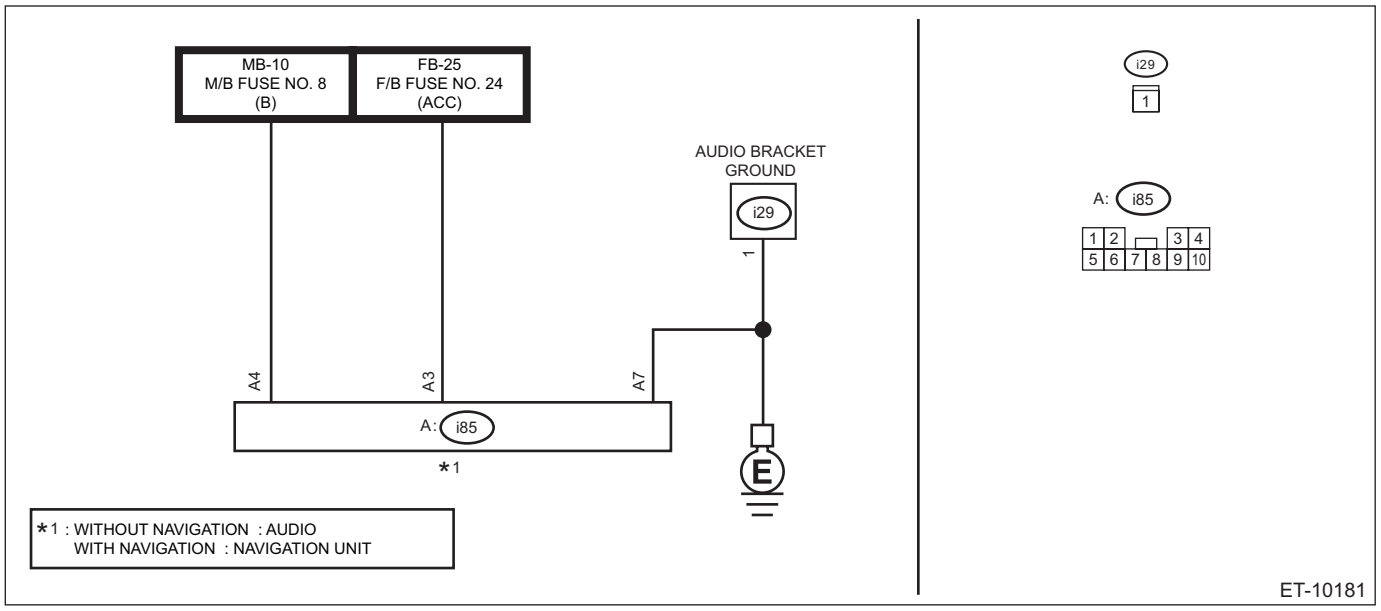
Mode	Message	Cause	Action
aha	“Information acquisition error. (Information acquisition error.)”	When not able to get the requested information.	Please try again (Refresh etc.) later or reconnect it.
	“Poor wireless reception. (Poor wireless reception.)”	When a communication error has been detected.	Please try again in a better communications environment.
	“Entry not recognized. (Entry not recognized.)”	When an invalid operation has been executed.	Please try again (Refresh etc.) later or reconnect it.
	“The station list cannot be acquired. (The station list cannot be acquired.)”	When not able to get the station information.	Please try again (Refresh etc.) later or reconnect it.
	“The content cannot be acquired. (The content cannot be acquired.)”	• When not able to get the content information. • When not able to switch to the Top content when touching.	• Please try again (Refresh etc.) later or reconnect it. • Select the desired station again when the station list appears.
	“Action not available. (Action not available.)”	When content-specific operations such as “fast forward” or “reverse” are not available.	Please try again (Refresh etc.) later or reconnect it.
	“Failed. (Failed.)”	When data transmission failed when touching.	Please try again later.
	“aha communication error - Please check Owner's Manual. (aha communication error - Please check Owner's Manual.)”	• When invalid data is received from the aha application or there is no response. • When the connection to the aha application via Bluetooth is not available. • When the data reception from this unit is rejected.	Please try again (Refresh etc.) later or reconnect it. If it is still not improved, restart the aha application.
	“Please select the type of connection in “aha Settings”. (Please select the type of connection in “aha Settings”.)”	When aha radio setting is set to (USB) when the Android device is going to be paired via Bluetooth.	When you want to connect to the aha application with the Android device, select (Bluetooth) in the aha radio setting from the setting screen.
Pandora	“No stations have been added to your list. (No stations have been added to your list.)”	When no stations have been registered.	Please register stations.
	“Your ratings information was not saved. (Your ratings information was not saved.)”	When ratings information has not been updated to the Pandora server.	Please try again later.
	“Bookmark not saved. (Bookmark not saved.)”	When bookmark registration information has not been updated to the Pandora server.	Please try again later.
	“Pandora is not available at your current location. (Pandora is not available at your current location.)”	When Pandora is used in an area where it is not available.	Please try again at a different location.
	“The selected Pandora station is no longer available. (The selected Pandora station is no longer available.)”	When the selected station has been deleted, or has expired.	Please select another station.
	“Pandora Error. (Pandora Error.)”	When the Pandora server is undergoing maintenance, or another error has occurred.	Please try again later.

B: INSPECTION

1. POWER WILL NOT TURN ON

WIRING DIAGRAM:

- Gasoline engine model
  - Audio system: <Ref. to WI(w/o HEV)-52, WIRING DIAGRAM, Audio System.>
  - Navigation system: <Ref. to WI(w/o HEV)-170, WIRING DIAGRAM, Navigation System.>
- HEV model
  - Audio system: <Ref. to WI(HEV)-52, WIRING DIAGRAM, Audio System.>
  - Navigation system: <Ref. to WI(HEV)-148, WIRING DIAGRAM, Navigation System.>



	Step	Check	Yes	No
1	**CHECK CONNECTOR CONNECTION.** Check that the connector is connected to the unit.	Is the connector connected?	Go to step **2**.	Connect the connector.
2	**CHECK CONNECTOR.** Check for poor contact of connectors or terminals.	Is the connector OK?	Go to step **3**.	Repair or replace the harness.
3	**CHECK POWER SUPPLY VOLTAGE.** 1) Disconnect the connector. 2) Turn the ignition switch to ACC. 3) Using a tester, measure the voltage between connector and chassis ground. NOTE: Turn the electrical parts to OFF. ***Connector & terminal*** ***(i85) No. 4 (+) — Chassis ground (–):***	Is the voltage 12 V or more?	Go to step **8**.	Go to step **4**.
4	**CHECK FUSE.** 1) Turn the ignition to OFF. 2) Check the fuse No. 8 inside the main fuse box.	Is the fuse OK?	Go to step **5**.	Replace the fuse. If the fuse is blown again, check or replace the short circuit of the power supply harness.
5	**CHECK HARNESS (POWER SUPPLY).** Measure the resistance between main fuse box and connector. ***Connector & terminal*** ***F/B fuse No. 8 — (i85) No. 4:***	Is the resistance 1 Ω or less?	Go to step **6**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
6	**CHECK HARNESS (GROUND).** Measure the resistance between connector and chassis ground. ***Connector & terminal*** ***(i85) No. 7 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK BATTERY.** Check the battery. • Gasoline engine model: <Ref. to SC(H4DO(w/o HEV))-52, Battery.> • HEV model: <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the battery OK?	Go to step **8**.	Charge or replace the battery.
8	**CHECK OPERATION.** 1) Connect all connectors. 2) Turn the ignition switch to ACC and the power supply switch of the unit to ON.	Does the power turn ON?	Currently no failure is found.	Replace the unit. <Ref. to ET-29, Audio.>

2. THE SCREEN FREEZES AND DOES NOT ACCEPT ANY OPERATION ENTRY

	Step	Check	Yes	No
1	**CHECK RESTARTING DISPLAY.** Turn the ignition switch OFF → ACC.	Is the screen freeze eliminated?	Go to step **5**.	Go to step **2**.
2	**REMOVE OTHER MEDIA OR EXTERNAL DEVICES.** Remove the CD, SD card (model with SD card slot) or external devices connected to USB. Also, remove the external devices with Bluetooth.	Is the screen freeze eliminated?	Go to step **3**.	Go to step **6**.
3	**CHECK OTHER EXTERNAL DEVICE CONNECTION.** When screen freeze is eliminated, connect external devices one by one to identify the device that causes screen freeze.	Is the device that reproduces screen freeze identified?	Go to step **4**.	Go to step **5**.
4	**CHECK OTHER EXTERNAL DEVICE CONNECTION.** 1) Replace the identified device with the one that has the same performance. 2) Turn the ignition switch to ACC.	Does the screen freeze occur?	Replace the unit. <Ref. to ET-29, Audio.>	The external device may be defective.
5	**CHECK OPERATION PROCEDURE.** Ask how the user operates when screen freeze occurs, and perform using the same procedure.	Are the operation and screen normal?	Currently no failure is found.	Go to step **6**.
6	**CHECK ENVIRONMENTAL CONDITION.** Check if any external devices which emit strong electromagnetic waves and noises, such as a radio antenna, is installed inside the vehicle.	Is an external device installed?	Remove the external device and perform the inspection from step 2 again. If the fault is not fixed: Go to step **7**.	Go to step **7**.

	Step	Check	Yes	No
7	**PERFORM INITIALIZATION PROCEDURE.** Perform the initialization procedure for the unit. **CAUTION:** **When the initialization procedure is performed, the data, telephone directory, etc. recorded in the unit body will be deleted. Before initialization, obtain permission from the user.** • Audio system: <Ref. to ET-10, INITIALIZATION (FACTORY DEFAULT), OPERATION, Audio System.> • Navigation system: <Ref. to ET-20, INITIALIZATION (FACTORY DEFAULT), OPERATION, Navigation System.>	Is the screen freeze eliminated?	Go to step **5**. If the screen freeze occurs again, replace the unit. <Ref. to ET-29, Audio.>	Replace the unit. <Ref. to ET-29, Audio.>

3. THE SCREEN IS BLACKED OUT, OR THE SCREEN IS NOT DISPLAYED

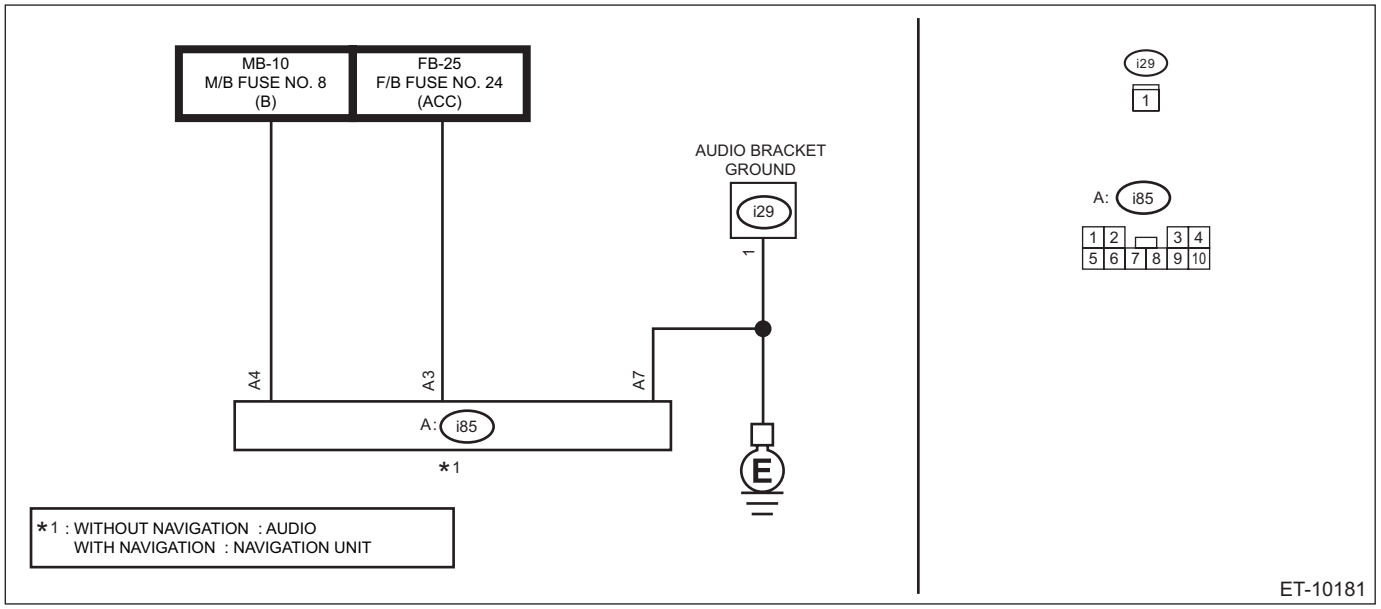
	Step	Check	Yes	No
1	**CHECK RESTARTING DISPLAY.** Turn the ignition switch OFF → ACC.	Is the screen properly displayed?	Currently no failure is found.	Go to step **2**.
2	**CHECK POWER SUPPLY BUTTON.** Check if the screen OFF mode is turned on by pressing the power supply button of the unit body.	Is the screen properly displayed?	The screen OFF mode might be activated. Currently no failure is found.	Go to step **3**.
3	**CHECK BUTTON ILLUMINATION.** Turn the ignition switch to ACC.	Do the buttons located beside the screen illuminate?	Go to step **4**.	Perform "Power will not turn ON" in Diagnostics with Phenomenon. <Ref. to ET-62, POWER WILL NOT TURN ON, INSPECTION, Diagnostics with Phenomenon.>
4	**CHECK INDICATION WITH ILLUMINATION ON.** Turn the lighting switch to ON.	Does the screen brightness change?	Go to step **7**.	Go to step **5**.
5	**CHECK HARNESS.** Check for poor contact of the harnesses, connectors and terminals that are connected to the unit body.	Is harness normal?	Go to step **6**.	Repair or replace the harness.
6	**CHECK BODY INTEGRATED UNIT.** Display the data of «Lighting I Switch input» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Application help”.	Is the input signal normal?	Go to step **7**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
7	**CHECK UNDER OVERLOAD CONDITION.** 1) Turn the ignition to OFF. 2) Leave as is for 10 minutes (cooling down), and then turn the ignition to ACC to check the operation.	Is the screen properly displayed?	Go to step **8**.	Replace the unit. <Ref. to ET-29, Audio.>
8	**OPERATIONAL CHECK.** Obtain the information about the audio device that the user used (SD, Bluetooth, CD, etc.), and connect the same device. Then play the device for 10 minutes or more.	Is the screen properly displayed?	Currently no failure is found.	Go to step **9**.

Step		Check	Yes	No
9	**CHECK EXTERNAL DEVICE.** 1) Replace the external device that might cause trouble with another device. (If trouble occurs while using a CD, replace the CD with another one. If trouble occurs while using an external device that is connected via USB, replace the external device with another device.) 2) Operate for 10 minutes or more.	Is the screen properly displayed?	The external device might have trouble, resulting in the overload state.	Replace the unit. <Ref. to ET-29, Audio.>

4. SYSTEM IS RESET

WIRING DIAGRAM:

- Gasoline engine model
  - Audio system: <Ref. to WI(w/o HEV)-52, WIRING DIAGRAM, Audio System.>
  - Navigation system: <Ref. to WI(w/o HEV)-170, WIRING DIAGRAM, Navigation System.>
- HEV model
  - Audio system: <Ref. to WI(HEV)-52, WIRING DIAGRAM, Audio System.>
  - Navigation system: <Ref. to WI(HEV)-148, WIRING DIAGRAM, Navigation System.>



Step		Check	Yes	No
1	**CHECK ENVIRONMENTAL CONDITION.** Check if any external devices which emit strong electromagnetic waves and noises, such as a radio antenna, is installed inside the vehicle.	Is an external device installed?	Remove the external device to check the operation. If the fault is not fixed: Go to step **2**.	Go to step **2**.
2	**CHECK CONNECTOR CONNECTION.** Check that the connector is connected to the unit.	Is the connector connected?	Go to step **3**.	Connect the connector.
3	**CHECK CONNECTOR.** Check for poor contact of connectors or terminals.	Is the connector OK?	Go to step **4**.	Repair or replace the harness.

Step		Check	Yes	No
4	**CHECK POWER SUPPLY VOLTAGE.** 1) Turn the ignition switch to ACC. 2) Using a tester, measure the voltage between connector and chassis ground. NOTE: Turn the electrical parts to OFF. ***Connector & terminal*** ***(i85) No. 4 (+) — Chassis ground (–):***	Is the voltage 12 V or more?	Go to step **8**.	Go to step **5**.
5	**CHECK OPEN CIRCUIT IN HARNESS (POWER SUPPLY).** Using the tester, measure the resistance between connector and chassis ground while shaking the harness. ***Connector & terminal*** ***(i85) No. 4 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK OPEN CIRCUIT IN HARNESS (GROUND).** Using the tester, measure the resistance between connector and chassis ground while shaking the harness. Connector & terminal ***(i85) No. 7 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK BATTERY.** Check the battery. • Gasoline engine model: <Ref. to SC(H4DO(w/o HEV))-52, Battery.> • HEV model: <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the battery OK?	Go to step **8**.	Replace the unit. <Ref. to ET-29, Audio.>
8	**CHECK UNIT OPERATION.** 1) Connect all connectors. 2) Turn the ignition switch to ACC and the power supply switch of the unit to ON.	Is the reset eliminated?	Currently no failure is found.	Replace the unit. <Ref. to ET-29, Audio.>

5. CDS CANNOT BE PLAYED BACK

Step		Check	Yes	No
1	**CONFIRM CD INSERTION CONDITION.** Check that the CD is inserted properly.	Is the CD normal?	Go to step **2**.	Insert the CD properly.
2	**CHECK CD.** Check the CD surfaces are free from scratches or dirt.	Is the CD normal?	Go to step **3**.	The CD is defective.
3	**CHECK CD.** Replace the CD with another one. (Use a playable CD. Refer to owner's manual for details.)	Is the CD played back?	The CD is defective.	Go to step **4**.
4	**CHECK DEW CONDENSATION IN UNIT.** 1) After starting the engine, turn ON the air conditioner and dry inside the vehicle for 10 minutes or more. 2) Check the CD operation.	Is the CD played back?	Dew condensation occurred inside the unit.	Replace the unit. <Ref. to ET-29, Audio.>

6. SOUND DOES NOT COME OUT FROM THE SPEAKER

	Step	Check	Yes	No
1	**CHECK THE MODE IN WHICH NO SOUND COME OUT.** Check if sound comes out in each mode such as CD, radio, etc.	Dose it have no sound in all modes?	Go to step **2**.	Check each mode in which no sound come out. For CD: <Ref. to ET-66, CDS CANNOT BE PLAYED BACK, INSPECTION, Diagnostics with Phenomenon.> For radio: <Ref. to ET-70, RADIO VOLUME IS LOW OR INTERFERENCE NOISE OCCURS, INSPECTION, Diagnostics with Phenomenon.> For Bluetooth audio: <Ref. to ET-68, BLUETOOTH CONNECTION CANNOT BE ESTABLISHED, INSPECTION, Diagnostics with Phenomenon.>
2	**CHECK DIAGNOSTIC MODE.** Perform {Audio Check} on the {Line Diag} screen. • Audio system: <Ref. to ET-13, CHECK SPEAKER OUTPUT WITH LINE DIAG MODE, OPERATION, Audio System.> • Navigation system: <Ref. to ET-23, CHECK SPEAKER OUTPUT WITH LINE DIAG MODE, OPERATION, Navigation System.>	Dose it have no sound in all speakers?	Go to step **3**.	Check the harness between the unit and speaker for open circuit or short circuit. If no fault is found, replace the speaker.
3	**CHECK MUTE MODE.** Check if the MUTE mode is turned on when the MUTE button is installed.	Is the volume level set to the minimum?	Since the MUTE mode is on or the volume level is set to the minimum, sound does not come out.	Go to step **4**.
4	**CHECK DTC (MODEL WITH TELEMATICS).** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Are B2A0E (mute line circuit), B2A05 (left speaker/audio circuit) and B2A06 (right speaker/audio circuit) displayed?	Perform the diagnosis according to DTC. <Ref. to TEL(diag)-53, DTC B2A0E MUTE LINE CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **5**.
5	**CHECK CONNECTOR.** Check for poor contact in the connector of the unit and the connector of each speaker.	Are the connectors and terminals normal?	Replace the unit. <Ref. to ET-29, Audio.>	Repair or replace the harness.

7. BLUETOOTH CONNECTION CANNOT BE ESTABLISHED

	Step	Check	Yes	No
1	**CHECK BLUETOOTH DEVICE.** Restart the Bluetooth device, and connect again.	Does it start properly?	Currently no failure is found.	Go to step **2**.
2	**CHECK BLUETOOTH DEVICE.** Re-register the Bluetooth device, and connect again.	Is communication successful?	Currently no failure is found.	Go to step **3**.
3	**CHECK BLUETOOTH DEVICE.** 1) Connect another Bluetooth device. NOTE: For Bluetooth supported standard, refer to the Notes in the margin.	Is connection established?	Bluetooth device which cannot be connected might be faulty.	Go to step **4**.
4	**CHECK ENVIRONMENTAL CONDITION.** Check if any external devices which emit strong electromagnetic waves and noises, such as a radio antenna, is installed inside the vehicle.	Is an external device installed?	Remove the external device and perform the inspection from step 1 again.	Replace the unit. <Ref. to ET-29, Audio.>

NOTE:
Supported standard
Supported standard for model with 7-inch display: Ver. 3.0 +EDR supported
- Bluetooth Phone

Profile
  - HFP: Ver. 1.6
  - OPP: Ver. 1.2
  - PBAP: Ver. 1.1
  - MAP: Ver. 1.0
  - SPP: Ver. 1.1

- Bluetooth Audio Device

Profile
  - A2DP: Ver. 1.2
  - AVRCP: Ver. 1.4

Supported standard for model with 6.2-inch display: Ver. 2.1 +EDR supported
- Bluetooth Phone

Profile
  - HFP: Ver. 1.5
  - OPP: Ver. 1.1
  - PBAP: Ver. 1.0
  - MAP: Ver. 1.0
  - SPP: Ver. 1.0

- Bluetooth Audio Device

Profile
  - A2DP: Ver. 1.2
  - AVRCP: Ver. 1.4

8. BLUETOOTH DOES NOT OPERATE

	Step	Check	Yes	No
1	**CHECK BLUETOOTH DEVICE.** Restart the Bluetooth device, and connect again.	Does it start properly?	Currently no failure is found.	Go to step **2**.
2	**CHECK BLUETOOTH DEVICE.** Re-register the Bluetooth device, and connect again.	Is communication successful?	Currently no failure is found.	Go to step **3**.
3	**CHECK BLUETOOTH DEVICE.** 1) Connect another Bluetooth device. NOTE: For Bluetooth supported standard, refer to the Notes in the margin.	Is connection established?	Bluetooth device which cannot be connected might be faulty.	Go to step **4**.
4	**CHECK ENVIRONMENTAL CONDITION.** Check if any external devices which emit strong electromagnetic waves and noises, such as a radio antenna, is installed inside the vehicle.	Is an external device installed?	Remove the external device and perform the inspection from step 1 again.	Replace the unit. <Ref. to ET-29, Audio.>

NOTE:
Supported standard
Supported standard for model with 7-inch display: Ver. 3.0 +EDR supported
- Bluetooth Phone

Profile
  - HFP: Ver. 1.6
  - OPP: Ver. 1.2
  - PBAP: Ver. 1.1
  - MAP: Ver. 1.0
  - SPP: Ver. 1.1
- Bluetooth Audio Device

Profile
  - A2DP: Ver. 1.2
  - AVRCP: Ver. 1.4

Supported standard for model with 6.2-inch display: Ver. 2.1 +EDR supported
- Bluetooth Phone

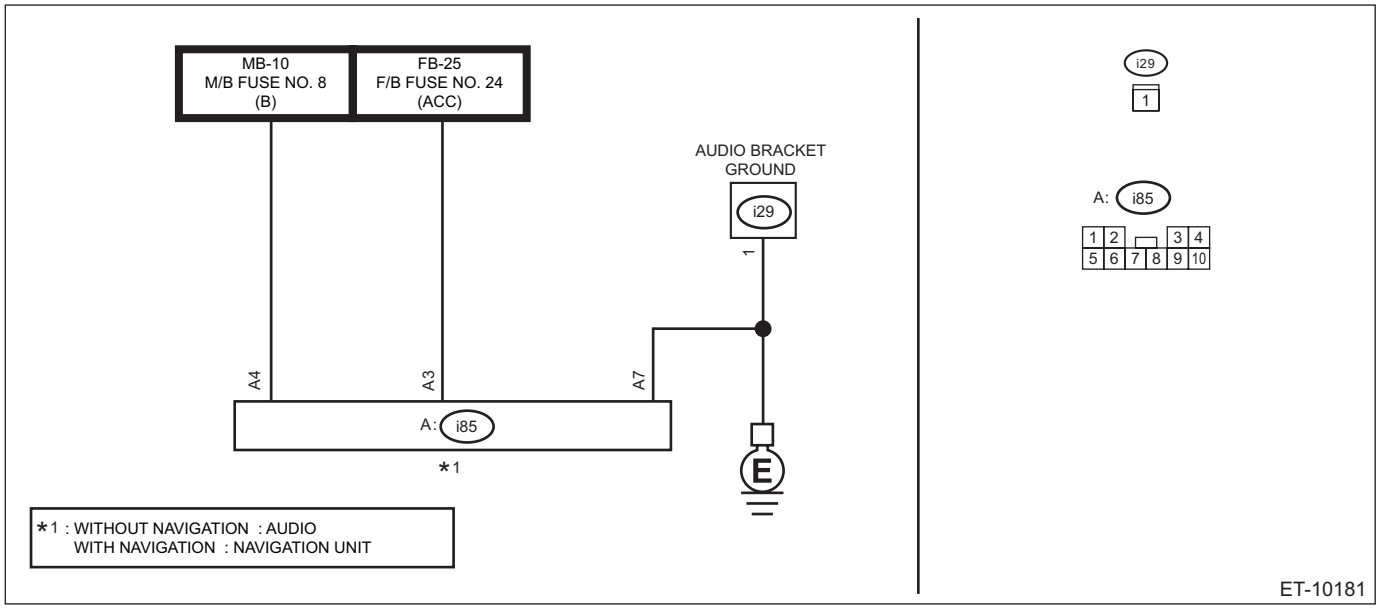
Profile
  - HFP: Ver. 1.5
  - OPP: Ver. 1.1
  - PBAP: Ver. 1.0
  - MAP: Ver. 1.0
  - SPP: Ver. 1.0
- Bluetooth Audio Device

Profile
  - A2DP: Ver. 1.2
  - AVRCP: Ver. 1.4

9. RADIO VOLUME IS LOW OR INTERFERENCE NOISE OCCURS

CAUTION:
- **If non-genuine electrical parts are installed, they may cause interference noise.**
- **Refer to the following diagnostic procedure if equipped with the digital radio using the Internet connection.**
  - **– Check SUBARU STARLINK service: <Ref. to ET-73, CHECK SUBARU STARLINK SERVICE, INSPECTION, Diagnostics with Phenomenon.>**
  - **– Bluetooth connection cannot be established: <Ref. to ET-68, BLUETOOTH CONNECTION CANNOT BE ESTABLISHED, INSPECTION, Diagnostics with Phenomenon.>**
  - **– Check connection between smartphone and unit: <Ref. to ET-72, CHECK CONNECTION BETWEEN SMARTPHONE AND UNIT, INSPECTION, Diagnostics with Phenomenon.>**

WIRING DIAGRAM:
- Gasoline engine model
  - – Audio system: <Ref. to WI(w/o HEV)-52, WIRING DIAGRAM, Audio System.>
  - – Navigation system: <Ref. to WI(w/o HEV)-170, WIRING DIAGRAM, Navigation System.>
- HEV model
  - – Audio system: <Ref. to WI(HEV)-52, WIRING DIAGRAM, Audio System.>
  - – Navigation system: <Ref. to WI(HEV)-148, WIRING DIAGRAM, Navigation System.>



Step		Check	Yes	No
1	**CHECK SYMPTOM.** Check in which condition (place) the noise occurs.	Does it occur in any places?	Go to step **2**.	Radio wave reception condition is poor. (In tunnel, buildings, etc.) There is no failure on the vehicle.
2	**CHECK ANTENNA.** Check for poor contact of connectors or terminals.	Is the connector OK?	Go to step **3**.	Repair or replace the harness.
3	**CHECK HARNESS.** Check the antenna harness for an open or short circuit, and check the booster.	Is harness normal?	Go to step **4**.	Repair or replace the harness.
4	**CHECK UNIT GROUND CIRCUIT.** Check the unit ground connector (1P on back side).	Is the engine ground circuit normal?	Go to step **5**.	Repair or replace the ground circuit.

	Step	Check	Yes	No
5	**CHECK ENVIRONMENTAL CONDITION.** Check if any external devices which emit strong electromagnetic waves and noises, such as a radio antenna, is installed inside the vehicle.	Is an external device installed?	Remove the external device. There is no failure if it returns to normal. If the fault is not fixed: Go to step **6**.	Go to step **6**.
6	**CHECK NOISE OCCURRENCE CONDITION.** Stop the engine, and turn the ignition switch to ON to check for noise occurrence.	Does the noise occur while the engine stops?	Replace the unit. <Ref. to ET-29, Audio.>	Check that the engine ignition system, generator, engine ground circuit and chassis ground circuit are connected securely.

NOTE:
When the volume of Aha and Pandora is low, connect the smartphone to the Internet, and check that Aha and Pandora is audible on the smartphone itself. When it is inaudible, or the volume is too low, there is a problem with the smartphone, Internet connection or service provider. When it is audible with the smartphone without any troubles, there is a problem with connection to the vehicle (USB connection or Bluetooth connection).

10.WRONG LOCATION OF VEHICLE, NO GPS RECEPTION

	Step	Check	Yes	No
1	**CHECK SYMPTOM.** Check in which condition (place) the vehicle is located out of position.	Does it occur in any places?	Go to step **2**.	Go to step **4**.
2	**CHECK EXTERNAL DEVICE INSTALLATION.** Check if an external device is installed near the GPS antenna or unit.	Is an external device installed?	Remove the external device. There is no failure if it returns to normal. If the fault is not fixed: Go to step **3**.	Go to step **3**.
3	**CHECK DIAGNOSTIC MODE.** Check the GPS item on the {Line Diag} screen.	Is the display OK?	Go to step **5**.	Go to step **4**.
4	**CHECK GPS ANTENNA.** Check that the GPS antenna connector is connected.	Is the connector connected?	Replace the navigation assembly. <Ref. to ET-42, Navigation Body.>	Replace the GPS antenna. <Ref. to ET-43, GPS Antenna.>
5	**INSPECTION OF VEHICLE SPEED SENSOR.** Read the DTC of VDC CM using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Application help”.	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-41, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **6**.
6	**CHECK VEHICLE SPEED SIGNAL.** Check the vehicle speed pulse using an oscilloscope.	Is the pulse normal?	Replace the navigation assembly. <Ref. to ET-42, Navigation Body.>	Go to step **7**.
7	**CHECK VEHICLE SPEED PULSE SIGNAL HARNESS.** 1) Disconnect the VDC CM connector. 2) Check the vehicle speed pulse with VDC CM connector using an oscilloscope.	Is there any noise while the vehicle stops?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Repair or replace the harness.

11.CHECK CONNECTION BETWEEN SMARTPHONE AND UNIT

	Step	Check	Yes	No
1	**CHECK COMPATIBILITY OF SMARTPHONE.** Check that the customer's smartphone is compatible with the system. • iPhone: iOS 4.3.5 or later • Android: Android 4.0 or later	Is it compatible?	Go to step **2**.	The smartphone is not compatible; therefore, it does not work with the system.
2	**ACTIVATION OF APP.** Check the SUBARU STARLINK app of the smartphone.	Is it installed?	Go to step **4**.	Go to step **3**.
3	**INSTALLATION OF APP.** Install SUBARU STARLINK app to smartphone.	Is installation successful?	Go to step **4**.	Reboot the smartphone, and install the SUBARU STARLINK.
4	**ACTIVATION OF APP.** Activate SUBARU STARLINK app.	Is SUBARU STARLINK app activated?	Go to step **5**.	Reinstall the app and activate it. If you still fail to activate it, the smartphone may be defective.
5	**CHECK BLUETOOTH CONNECTION.** NOTE: For model with 6.2-inch display and iPhone (with USB connection): Go to step **6**. Confirm the Bluetooth connection with the unit.	Is Bluetooth connection established?	Go to step **7**.	Check that the unit can connect with other smartphones. If successful, the smartphone may be defective. If the unit cannot communicate with other smartphones, replace the unit. <Ref. to ET-29, Audio.>
6	**CHECK USB (FOR MODEL WITH 6.2-INCH DISPLAY AND IPHONE).** Check that the USB cable is connected to the unit.	Is USB connection successful?	Go to step **7**.	Check that the unit can connect with other smartphones. If successful, the smartphone may be defective. If the unit cannot communicate with other smartphones, replace the unit. <Ref. to ET-29, Audio.>
7	**REBOOT SMARTPHONE.** 1) Reboot the smartphone. 2) Reinstall the SUBARU STARLINK app.	Is it operating normally?	The system has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK POWER SUPPLY.** Turn the ignition to OFF → ACC ON.	Is it operating normally?	The system has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Go to step **9**.
9	**DELETE CACHE INFORMATION OF UNIT.** Delete cache information of the unit. Refer to the Notes in the margin.	Is it operating normally?	Cache information temporary stored in the unit was corrupted. Currently, it is normal.	Perform the procedures described on "Check SUBARU STARLINK service". <Ref. to ET-73, CHECK SUBARU STARLINK SERVICE, INSPECTION, Diagnostics with Phenomenon.>

NOTE:
- 7-inch display
  1. Select SUBARU STARLINK from the APPS screen.
  2. On the SUBARU STARLINK display (including an error message screen), press and hold the right bottom corner of the screen for 30 seconds or more.
  3. Lift your finger off the screen. If the message [Select Audio Source] appears when you lift your finger off the screen, the cache information is successfully deleted.
- 6.2-inch display
  1. Press the HOME button to display the HOME screen.
  2. Press the SETTINGS key to display the SETTINGS screen. (The most recent set entry is displayed.)
  3. Press the Settings General key to display the Settings General screen.
  4. Press the System Software key to display the System Software screen.
  5. Press the Delete key, and press OK on the confirmation message display. Then the cache information is successfully deleted.

12.CHECK SUBARU STARLINK SERVICE

	Step	Check	Yes	No
1	**CHECK SMARTPHONE.** Check the smartphone connection.	Can the smartphone connect the Internet?	Go to step **4**.	Go to step **2**.
2	**CHECK RADIO WAVE CONDITION.** Move to a location where the radio wave condition is good, and confirm the connection.	Can the smartphone connect the Internet?	Go to step **4**.	Go to step **3**.
3	**CHECK RADIO WAVE CONDITION.** Communication network gets busy at times even in a good radio wave location. In this case, wait for some time and then try again.	Can the smartphone connect the Internet?	Go to step **4**.	The smartphone may be defective.
4	**CHECK SUBARU STARLINK.** Check service provision status with SUBARU STARLINK.	Is there any problem in the service provision status?	Try to connect after the problem in service provision is solved.	Replace the unit. <Ref. to ET-29, Audio.>

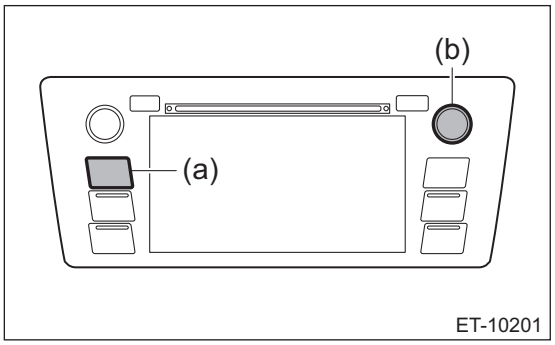
21.Service Diagnostics Mode

A: OPERATION

NOTE:
Installed only to model with 7 inch display.

1. PROCEDURE TO SWITCH TO SERVICE DIAGNOSTICS MODE

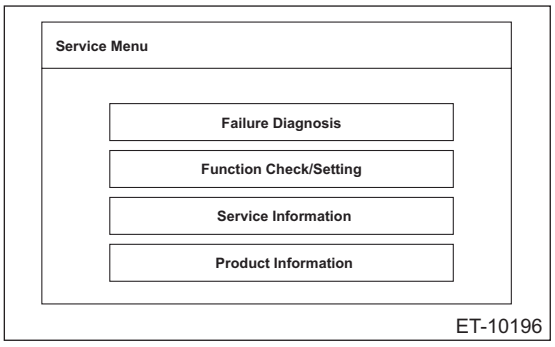
1) Turn the ignition switch to ACC.
2) After turning the ignition switch to ACC and wait for 20 seconds or more, press the button (d) five times with the button (a) pressed.



NOTE:
Pressing the button (a) for 3 seconds or more, or turning the ignition switch from the OFF to ACC position can exit the diagnostic mode.

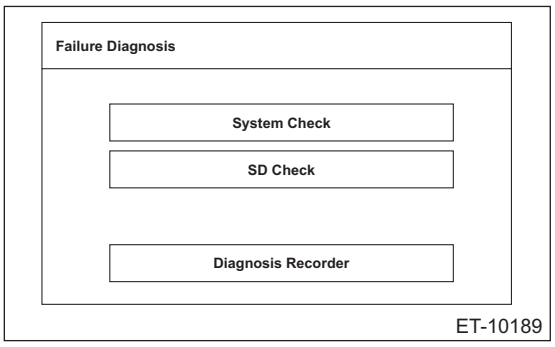
2. SERVICE INSPECTION

Upon entering the service diagnostics mode, the following screen is displayed.



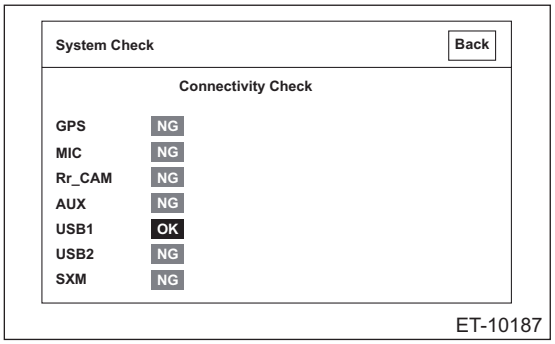
Failure Diagnosis menu

On Service Menu, click Failure Diagnosis to display the following screen.



NOTE:
SD Check is displayed only for the navigation system.

1) System Check
On the Failure Diagnosis screen, click System Check to display the following screen.

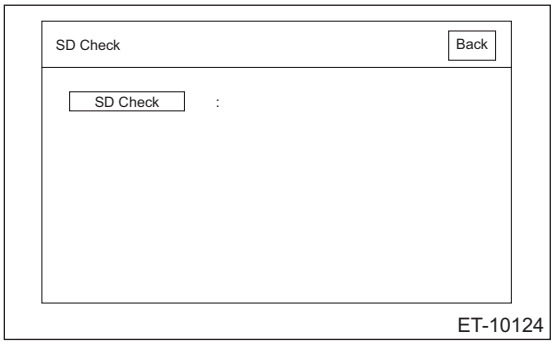


OK: Each connection device is connected properly.
NG: Connection is not established, or connection status (including harness) is faulty.
Check the connection status of the connector and harness. If there are no problems, the connection device or unit could be faulty.

NOTE:
• Check the external connection terminals (USB 1, USB 2 and AUX) by connecting memory or a pin jack for inspection.
• The following shows information to be displayed and its description.

Item	Item detection method	OK judgment condition	Note
GPS	Direct line	GPS antenna is connected. (NG is displayed when short circuit is detected.)	Only model with navigation system
MIC	Direct line	(i87) No. 6 falls to GND level.	—
Rr_CAM	Direct line	Synchronized signals from the camera are input to (i146) No. 3.	—
AUX	Direct line	(i87) No. 25 falls to GND level.	—
USB1	Communication	USB device is connected to USB-HUB to obtain USB device information properly. (Should be recognizable as a supported USB device.)	—
USB2	Communication	USB device is connected to USB-HUB to obtain USB device information properly. (Should be recognizable as a supported USB device.)	—
SXM	Direct line	XM-ANT is connected. (NG is displayed when short circuit is detected.)	It takes approx. 30 seconds to become recognizable.

2) SD Check
On the Failure Diagnosis screen, click SD Check to display the following screen.



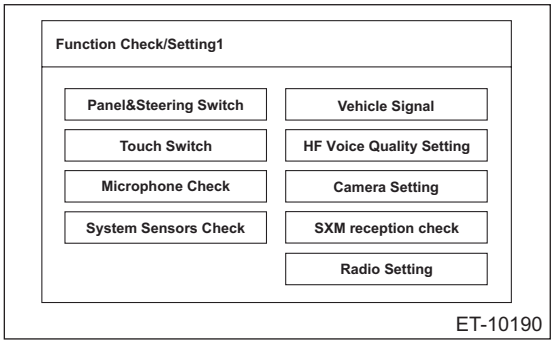
On the SD Check screen, click SD Check to display a diagnostic result.
OK: There is no defect on the SD card.
NG: There is defect on the SD card.

NOTE:
The following shows information to be displayed and its description.

Item	Content
OK	SD card diagnosis is completed. Diagnostic result is OK.
NG	SD card diagnosis is completed. Diagnostic result is NG.
During diagnosis	SD card diagnosis is in progress.

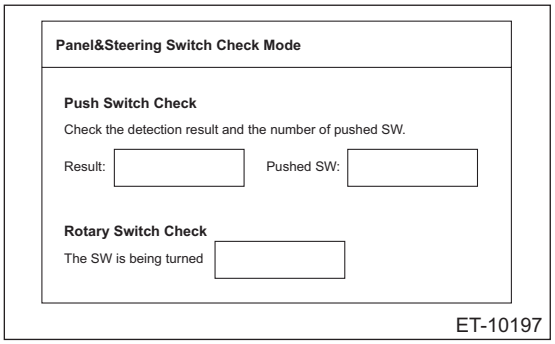
Function Check/Setting

On Service Menu, click Function Check/Setting to display the following screen.



NOTE:
- System Sensors Check is displayed only for the navigation system.
- SXM reception check is displayed only for model with SXM.
- Radio Setting is displayed only for the audio system.

1) Panel & Steering Switch Check Mode
On the Function Check/Setting screen, click Panel & Steering Switch to display the following screen.

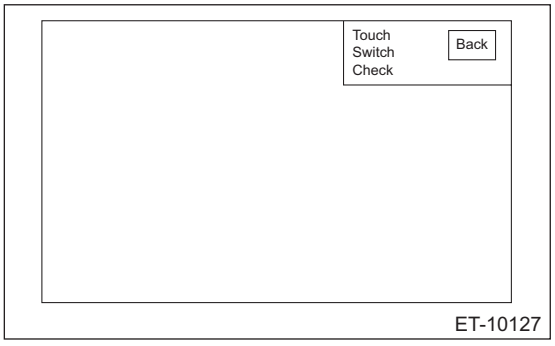


Once the screen is displayed, press the push switches to check that the number of pushed switches matches the number shown in Pushed SW.
If the number of SW does not match, SW conditions are not properly recognized. Therefore, perform inspection for unrecognized switches.
In addition, turn the rotary switch clockwise or counterclockwise to check that the screen indicates correct status according to the operation. If the screen display does not match the actual operation, the rotary SW may be faulty. Perform inspection for the rotary SW.

NOTE:
The following shows information to be displayed and its description.

Item	Display	Content
Result	Pressed	Pressing of switch is detected.
Pushed SW	1	One pressed switch is detected.
	2	Two pressed switches are detected.
	3	Three pressed switches are detected.
	4	Four pressed switches are detected.
The SW is being turned	Clockwise	The rotary switch is turned clockwise.
	Counterclockwise	The rotary switch is turned counterclockwise.

2) Touch Switch Check
On the Function Check/Setting screen, click Touch Switch to display the following screen.

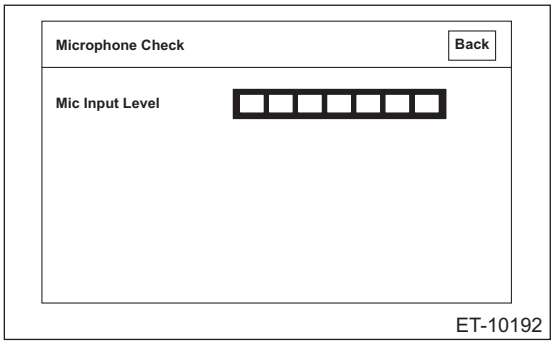


Once the screen appears, touch the screen. + (cursor) appears where you touched.

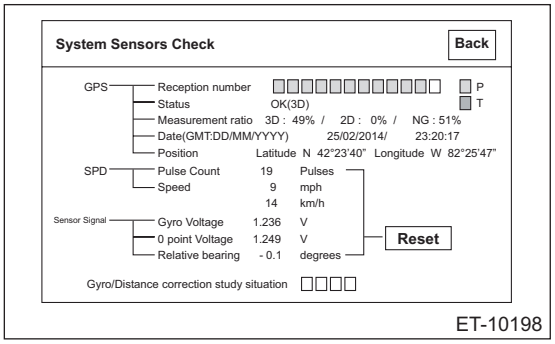
NOTE:
The following shows information to be displayed and its description.

Item	Content
+ (Cursor)	Appears when the screen is touched. The displayed white-outlined + (cursor) stays on, even when a touching finger is removed, until the screen is switched.

3) Microphone Check
On the Function Check/Setting screen, click Microphone Check to perform inspection for microphone.



With the microphone input level screen displayed, make sound toward the microphone.
Fluctuate the sound volume to check that the microphone input level changes accordingly.
If the input level does not become green or the input level does not change even when the sound volume is fluctuated, the microphone may be faulty.
4) System Sensors Check
On the Function Check/Setting screen, click Touch Switch to display the following screen.



GPS related check: Status of the GPS signal reception can be checked. When there is faulty in reception status, position detection or date indication, re-check the reception status at a location with a fine view and no obstacles around that will interrupt the signal reception. When normal condition is still not obtained, the GPS antenna may be faulty.
- GPS/Reception number: Normal when it is indicated in blue.
- GPS/Status: Normal when OK is indicated.
- GPS/Measurement ratio 3D:
- GPS/Measurement ratio 2D:
- GPS/Date: Normal when current time is indicated. When current date/time is not indicated, click the Date Setting button to set the current date on the displayed date setting screen.
- GPS/Position: Normal when longitude and latitude of the current position are indicated.

SPD check: Status of the vehicle speed sensor signal can be checked.
1. Before starting inspections, check the safety around the vehicle. (Lift up the vehicle as necessary.)
2. When VDC CM detected DTC, clear the DTC.
3. Drive the vehicle at 9 km/h (6 MPH) or more.
4. Check that SPD indicates vehicle speed that is almost equivalent to the figure displayed on the combination meter.
5. Vehicle speed is not displayed. Or, when the vehicle speed is not correct, check if the DTC related to the vehicle sensor is stored for the VDC system, and perform inspection according to the procedure. If no fault is found with the vehicle speed sensor, and the vehicle speed is displayed on the combination meter, the unit itself may be faulty.

Gyro sensor related check: Status of the Gyro sensor signal can be checked. If fault is found with the Gyro sensor related indications, the main unit could be faulty.
- Gyro sensor/Gyro Voltage: Shake the vehicle to the left and right to check that the voltage changes.
- Gyro sensor/Relative bearing: Normal when the value changes when direction of the vehicle is changed.

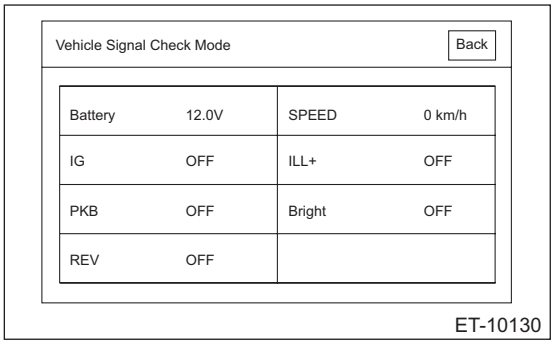
• Inclined angle sensor/relative angle: Park the vehicle on uphill or downhill surface. Normal when the value changes.
• Gyro/Distance correction study situation: Study situation can be checked.
• Reset: Press and hold the Reset button for three seconds to reset the pulse count of SPD, relative bearing of Gyro sensor, relative angle of inclined angle sensor.

NOTE:
The following shows information to be displayed and its description.

Item	Display	Content
GPS/Reception number	Blue	When notification of “Positioning with collected data is used” is received from the GPS reception device. (Status: In-use)
	Yellow	When notification of “Tracking in progress” is received from the GPS reception device. (Status: Reception in progress)
	Transparent	When notification of “Positioning with collected data is not used” or “Searching in progress” is received from the GPS reception device. (Status: Not used)
GPS/Status	OK (H3D)	When three-dimensional positioning (Hyper 3D positioning) using satellites with less accuracy degradation is used.
	OK (H2D)	When two-dimensional positioning (Hyper 2D positioning) using satellites with less accuracy degradation is used.
	OK (3D)	When three-dimensional positioning is used.
	OK (2D)	When two-dimensional positioning is used.
	NG	When the positioning data is not available.
	error	When a reception error occurred.
	—	For cases other than above.
GPS/Measurement ratio 3D	Ratio	Displays ratio of three-dimensional positioning satellites.
GPS/Measurement ratio 2D	Ratio	Displays ratio of two-dimensional positioning satellites.
GPS/Measurement ratio NG	Ratio	Displays ratio of non-positioning satellites.
GPS/Date	Current date and time	Displays date information obtained from GPS in four digits for year and 24-hour clock for time. Date information is displayed as [Y/M/D].
GPS/Position (latitude)	Current position, latitude information.	Displays latitude information of the current position in “degree”, “minute” and “second”. When positioning information is not obtained, it appears as 00° 00’ 00”.
GPS/Position (longitude)	Current position, longitude information.	Displays longitude information of the current position in “degree”, “minute” and “second”. When positioning information is not obtained, it appears as 00° 00’ 00”.
SPD/Pulse Count	Pulse count.	Displays SPD signal status in the following format. • The number of input pulses accumulated since this screen is displayed. (Indicated in four-digit DEC code.) • The number returns to 0 after 9999. • Reset with ACC OFF/ON.
SPD/Speed	Speed.	Displays SPD signal status in the following format. • LSB: Displays in km-per-hour as 1 [km/h]. • Displays 255 [km/h] for MAX value or more, and 0 [km/h] for MIN value or less.
Gyro sensor/Gyro Voltage	Voltage value.	Voltage value (unit: V, LSB: 1 mV)

Item	Display	Content
Gyro sensor/0 point Voltage	Unit: 0 point voltage.	Displays 0 point voltage of the Gyro sensor used by each company.
Gyro sensor/Relative bearing	Relative bearing.	–360.0° — +360.0°
Inclined angle sensor/relative angle	Relative angle.	Displays longitudinal inclination angle of the vehicle in the relative angle (unit: °, LSB: 1°, no sign for elevation angle, negative sign for depression angle: –), while the position when this screen appears is set as [0°].
Gyro/Distance correction study situation	Gyro/Distance correction study situation.	Gyro/Distance correction study situation is displayed.
Reset	Reset the following display items to [0]. • SPD pulse count • Relative bearing of Gyro sensor • Relative angle of inclined angle sensor	Press and hold the Reset button for three seconds or more.

5) Vehicle Signal Check
On the Function Check/Setting screen, click Vehicle Signal to display the following screen.



- Battery: Status of the battery voltage signal input can be checked.

Measure the battery voltage using a tester. System is normal when the indicated voltage is almost equivalent to the tester value. When the indicated voltage is different from the tester value, perform inspection for the power supply circuit of main unit.

- SPEED: Status of the vehicle speed signal input can be checked.
  1. Before starting inspections, check the safety around the vehicle. (Lift up the vehicle as necessary.)
  2. When VDC CM detected DTC, clear the DTC.
  3. Drive the vehicle at 9 km/h (6 MPH) or more.
  4. Check that SPD indicates vehicle speed that is almost equivalent to the figure displayed on the combination meter.
  5. Vehicle speed is not displayed. Or, when the vehicle speed is not correct, check if the DTC related to the vehicle sensor is stored for the VDC system, and perform inspection according to the procedure. If no fault is found with the vehicle speed sensor, and the vehicle speed is displayed on the combination meter, the unit itself may be faulty.
- IG: Status of the IG signal input can be checked.

Turn the ignition switch to ON, and check that the IG indication appears as ON. If the indication does not appear as ON, check the IG signal line.

- ILL+: Status of the illumination signal input can be checked.
  1. Before starting inspections, turn the ignition to ON.
  2. Set the lighting switch to the parking position.
  Make sure that the bright switch is not turned ON at this time.
  3. Check that ON lights in ILL+ and then the screen becomes dim.
  ON: Normal
  OFF: Abnormal Check the signal line and connector. If no faulty is found, the unit itself may be faulty.
- PKB: Status of the parking brake signal input can be checked.

• GPS: Normal when longitude and latitude of the current position are indicated.

Pull parking brake lever. Check that ON is displayed in PKB.

ON: Normal

OFF: Abnormal Check the signal line and connector. If no faulty is found, the unit itself may be faulty.

• Bright: Status of the Bright signal input can be checked.

Operate the dial-type bright switch next to the steering wheel. System is normal when the signal indicates ON.

If the signal does not indicate ON, check the bright switch.

• REV: Status of the reverse range signal input can be checked.

1. Before starting inspections, check the safety around the rear end of the vehicle and then turn the ignition to ON.
2. Pull the parking brake lever and depress the brake pedal, then place the select lever or gear shift lever in reverse.
3. Check that ON is displayed in REV.

ON: Normal

OFF: Abnormal Check the signal line and connector. If no faulty is found, the unit itself may be faulty.

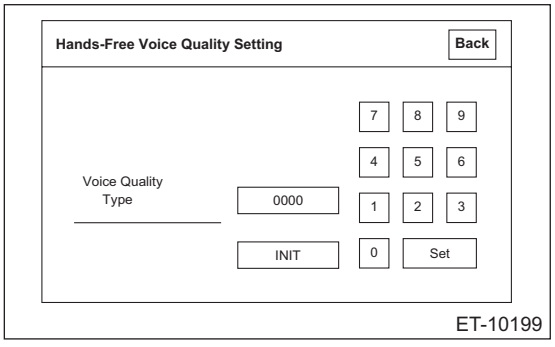
NOTE:

The following shows information to be displayed and its description.

Item	Display	Content
Battery	Status of battery voltage	0 [V] — 24.0 [V] (Minimum unit: 0.1 [V])
SPEED	Status of vehicle speed	0 [km/h] — 255 [km/h] (Minimum unit 1 [km/h])
IG	ON	IG power supply ON
	OFF	IG power supply OFF
ILL+	ON	ILL+ signal ON
	OFF	ILL+ signal OFF
PKB	ON	PKB signal ON
	OFF	PKB signal OFF
Bright	ON	Bright with dimmer
	OFF	Bright without dimmer
REV	ON	REV signal ON
	OFF	REV signal OFF

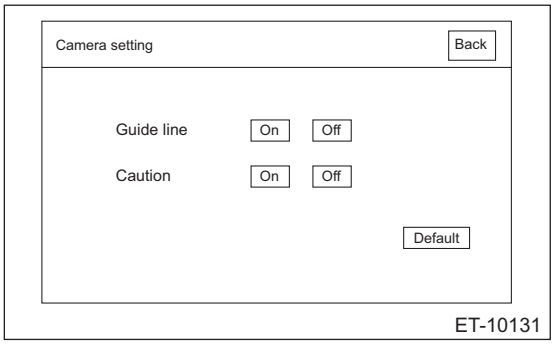
6) Hands-free voice quality setting

On the Function Check/Setting screen, click Hands-Free Voice Quality Setting to display the following screen.



Setting of the hands-free voice quality setting is possible.

7) Camera setting
On the Function Check/Setting screen, click Camera setting to display the following screen.



Setting of the rearview camera adjustment is possible.
- Guide line: Turn ON the guide line display to show the guide lines.
- Caution: Turn ON the caution display to enable caution display during the rearview camera display.
- Default: Click the Default button to return the Guide line display and Caution display settings to the initial settings.

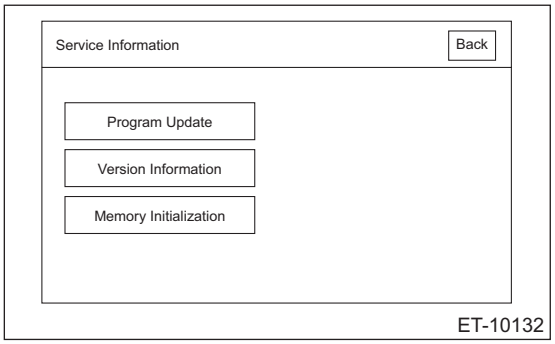
NOTE:
The following shows information to be displayed and its description.

Item	Content
Guide line	Guide line display setting switch • Turns on/off the guide line display for the rearview camera display screen. • When On is selected, guide lines will appear on the rearview camera display screen.
Caution	Caution display setting switch • Turns on/off the caution display for the rearview camera display screen. • When On is selected, the caution will appear on the rearview camera display screen.
Default	Default setting switch • Returns the Guide line display setting and Caution display setting to the default settings.

8) SXM reception check
On the Function Check/Setting screen, click SXM Reception Check to display the following screen.
9) Radio setting
On the Function Check/Setting screen, click Radio Setting to display the radio frequency range switch-over screen. For details, refer to “Navigation System”. <Ref. to ET-24, CHECK RADIO FREQUENCY RANGE SWITCH-OVER, OPERATION, Navigation System.>

Service Information

On Service Menu, click Service Information to display the following screen.

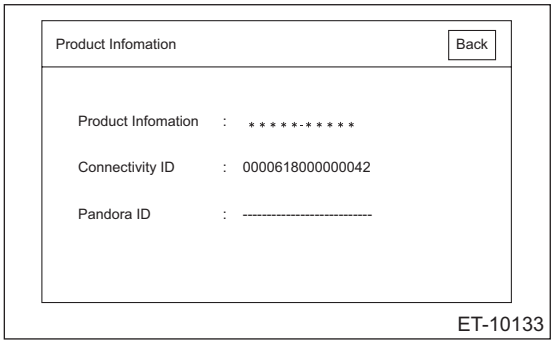


- Program Update: This function is used when the main unit program is updated, and not used as troubleshooting.
- Version Information: This function is used to view version of the main unit, and not used as troubleshooting.
- Memory Initialization: This function is used to initialize information stored in the main unit memory.

CAUTION:
When this function is used, music information and navigation setting information saved in the main unit will be deleted. Therefore, obtain permission from the user before using this function.
When initializing the memory, perform procedures by following the indicated messages. Also, when clicking the OK button, press and hold it.

Product information

On Service Menu, click Product Information to display the following screen.



- Product Information: Displays the product number of the main unit.
- Connectivity ID: ID that is required upon using the SUBARU STARLINK functions. When this ID is not indicated, the SUBARU STARLINK functions are not accessible.
- Pandora ID: ID that is required upon using Pandora. When this ID is not indicated, Pandora is not accessible.

COMMUNICATION SYSTEM

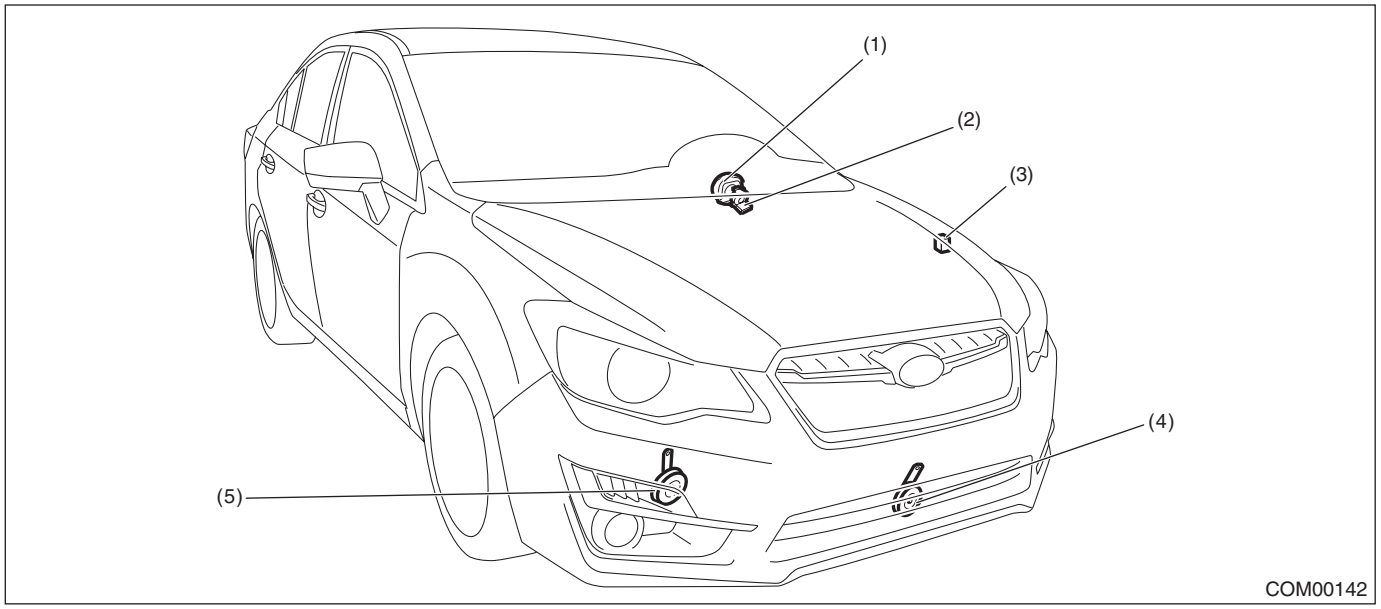
COM

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1. General Description 2
2. Relay and Fuse 3
3. Horn System 4
4. Horn 5
5. Horn Switch 8

1. General Description

A: COMPONENT



(1) Horn switch (driver's airbag module ASSY)
(2) Roll connector
(3) Horn relay
(4) Horn ASSY - Lo
(5) Horn ASSY - Hi

B: CAUTION

• Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that the each component operates normally.
• Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Using a tester above such circuits may cause malfunction of airbag system. Follow the cautions of "AIRBAG SYSTEM" in this case. <Ref. to AB-11, CAUTION, General Description.>
• Be careful not to damage the airbag system wiring harness when servicing electrical parts and switches.

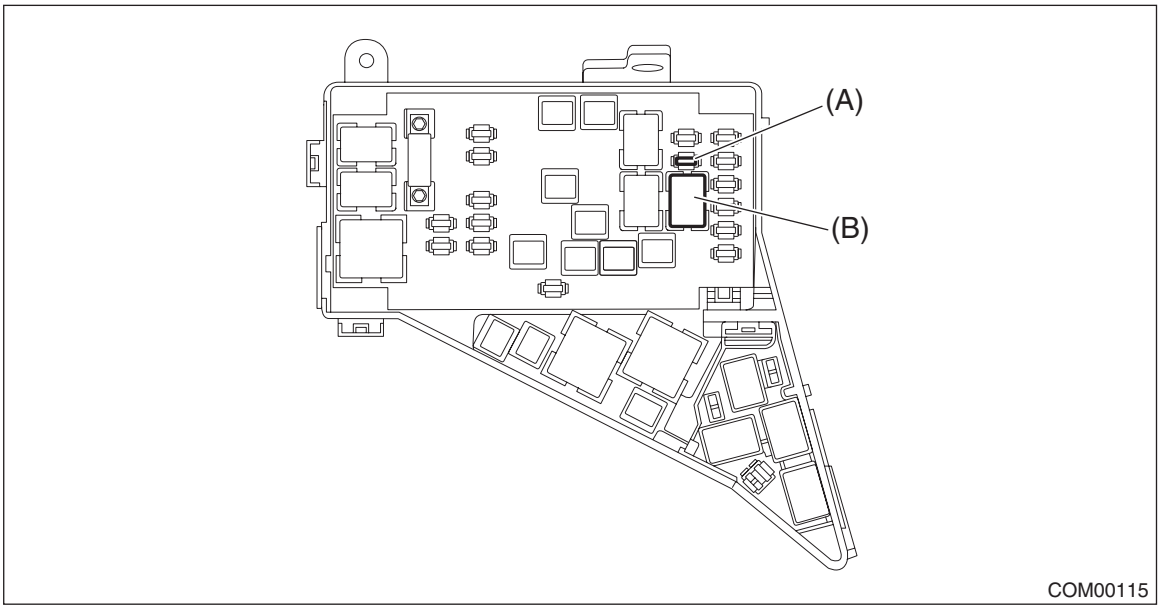
C: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.

2. Relay and Fuse

A: LOCATION



Main fuse box	Fuse 15 A (horn ASSY - Hi, Lo)	(A)
	Horn relay	(B)

NOTE:
For other related fuses, refer to the wiring diagram.
- Gasoline engine model <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model <Ref. to WI(HEV)-21, Power Supply Circuit.>

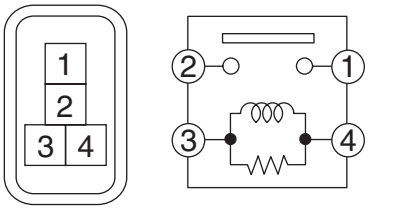
B: INSPECTION

1. CHECK FUSE

1) Remove the fuse and check visually.
2) If the fuse is blown out, replace the fuse.

2. CHECK RELAY

1) Check the resistance between relay terminals.

Terminal No.	Inspection conditions	Specification	Circuit
1 — 2	Always	1 MΩ or more	
1 — 2	Apply battery voltage between 4 — 3 terminals.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard value.

3. Horn System

A: WIRING DIAGRAM

Refer to “Horn System” in the wiring diagram.

- Gasoline engine model <Ref. to WI(w/o HEV)-146, WIRING DIAGRAM, Horn System.>
- HEV model <Ref. to WI(HEV)-132, WIRING DIAGRAM, Horn System.>

B: INSPECTION

Symptoms	Inspection steps
Horn does not sound	1. Check the fuse.
	2. Check the horn relay.
	3. Check the role connector.
	4. Check the horn switch.
	5. Check the horn assembly.
	6. Check the harness.

C: NOTE

For operation procedures of each component of the horn system, refer to the respective section.

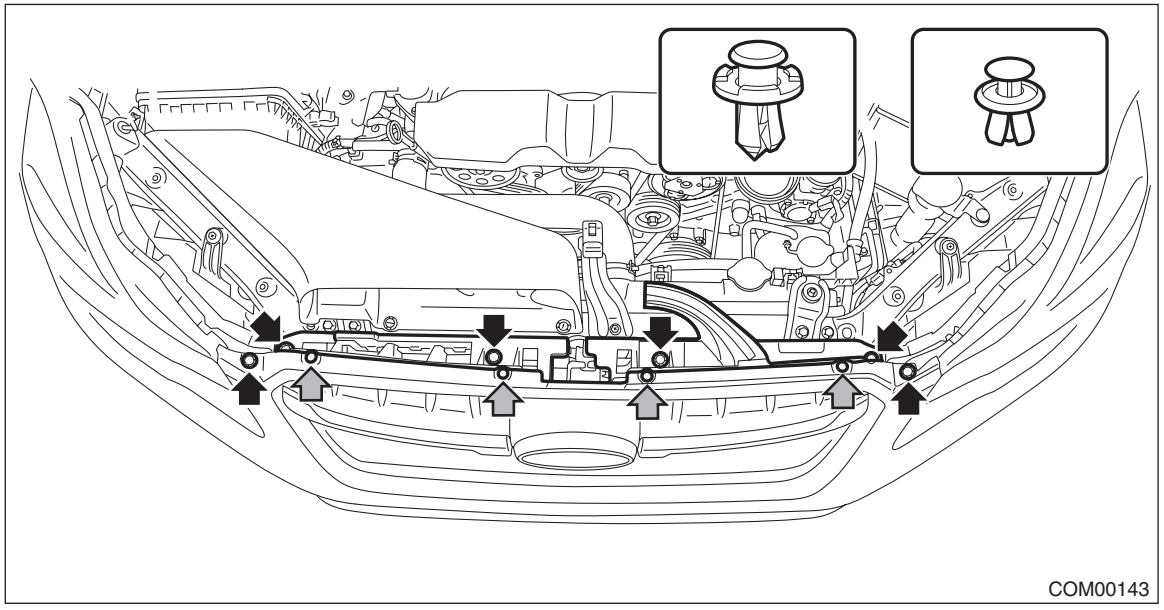
- Horn ASSY: <Ref. to COM-5, Horn.>
- Horn switch: <Ref. to COM-8, Horn Switch.>

4. Horn

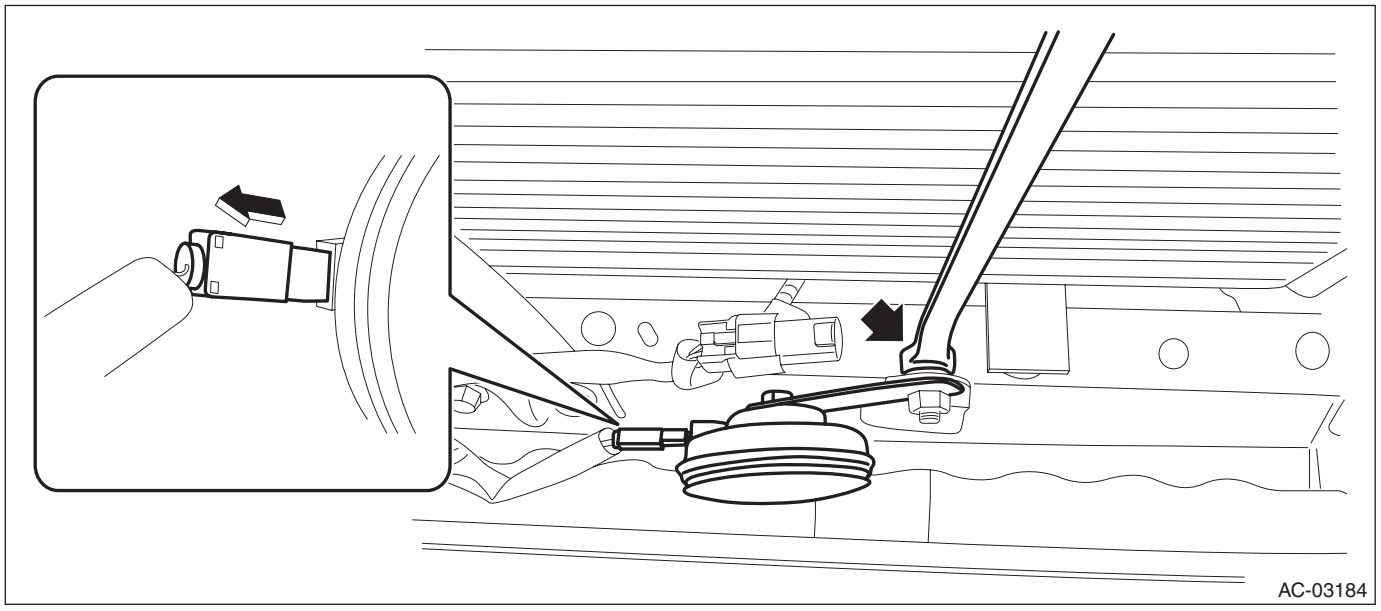
A: REMOVAL

CAUTION:
Do not remove the bumper face - front when removing the horn, in order to prevent damaging the claws of the bracket - front bumper corner and the bracket - front bumper side.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

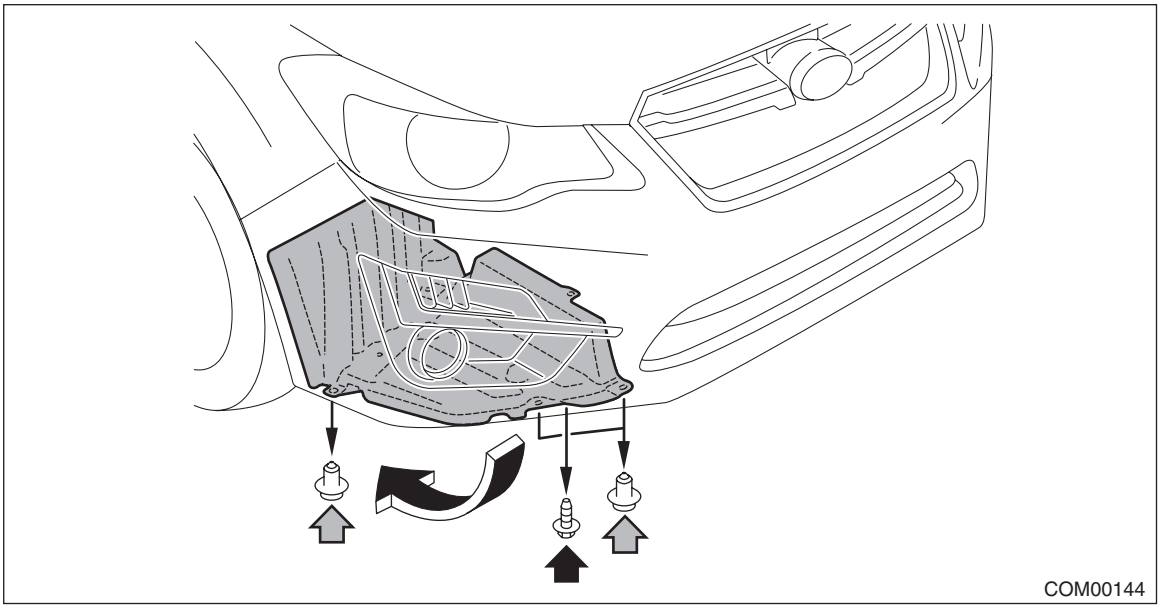
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Disconnect the ground cable from battery.
3) Remove the clip, and remove the bracket - grille.


COM00143

4) Remove the horn assembly - Lo.
   (1) Disconnect the connector.
   (2) Remove the horn bracket mounting bolt, and remove the horn assembly - Lo.

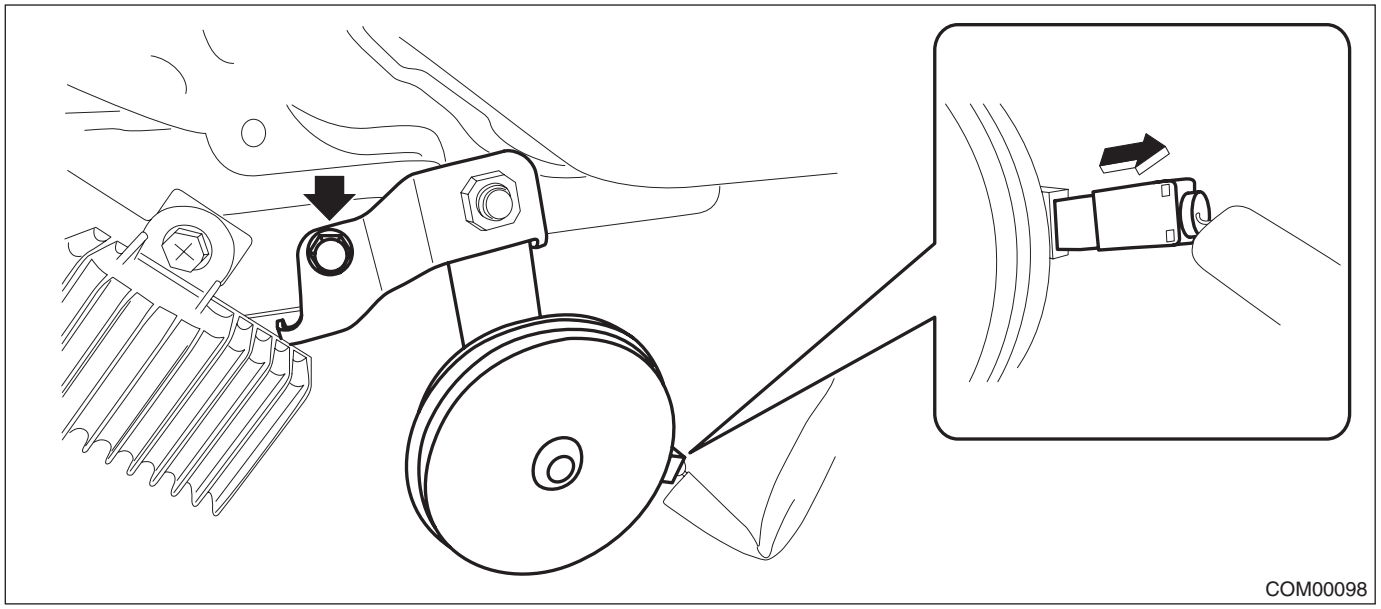

AC-03184

5) Remove the horn assembly - Hi.
(1) Remove the screw and clips, and turn over the front side of the mud guard - front.



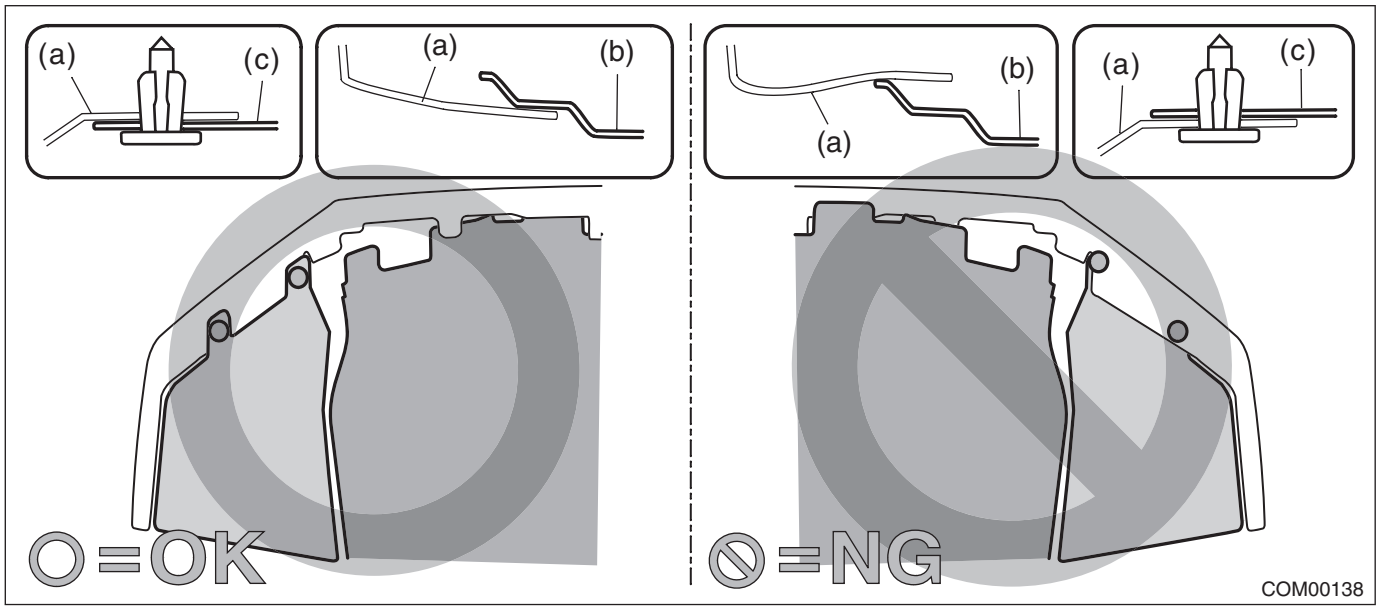
(2) Disconnect the horn connector.
(3) Remove the horn bracket mounting bolt, and remove the horn assembly - Hi.

CAUTION:
The resistor may become hot. Be careful not to burn yourself.



B: INSTALLATION

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



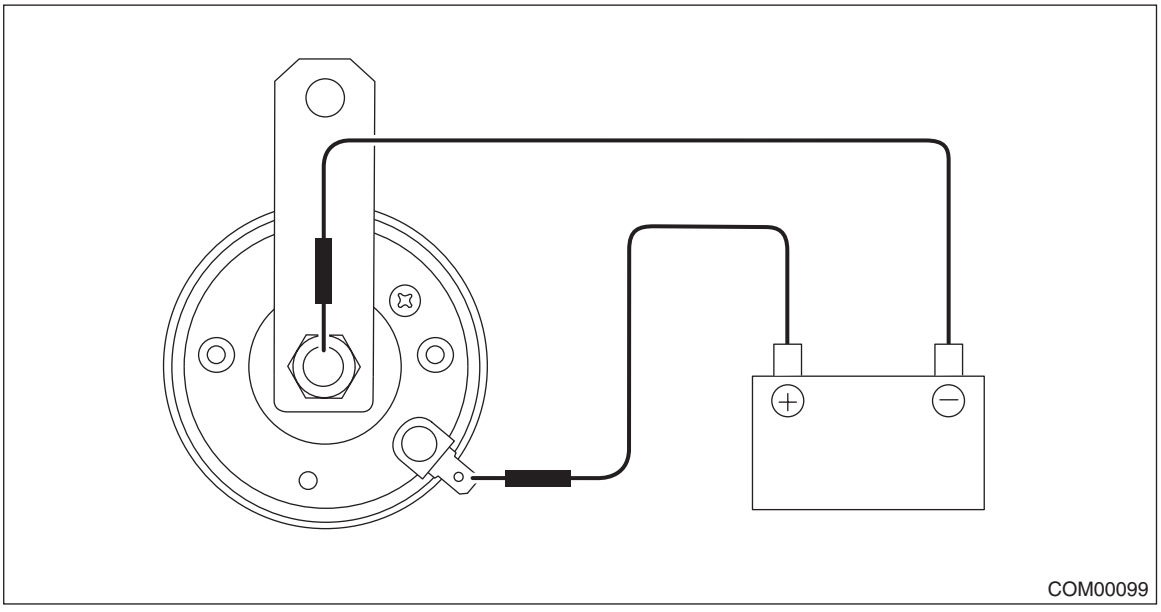
Install each part in the reverse order of removal.

Tightening torque:
Horn assembly - Hi: 13 N·m (1.33 kgf-m, 9.6 ft-lb)
Horn assembly - Lo: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

C: INSPECTION

1. CHECK HORN ASSEMBLY

1) Remove the horn assembly (Hi & Lo). <Ref. to COM-5, REMOVAL, Horn.>
2) Check the horn sounds when applying the battery voltage to the horn assembly.



Terminal No.	Inspection conditions	Specification
Horn terminal (+) — Horn case (–)	Connect battery to the terminals	Sounds

3) If it does not operate normally, replace the horn assembly.

5. Horn Switch

A: NOTE

Horn switch is a unit with the driver's airbag module. For operation procedures, refer to "Driver's Airbag Module" in "AIRBAG SYSTEM". <Ref. to AB-38, Driver's Airbag Module.>

B: INSPECTION

1. CHECK HORN SWITCH

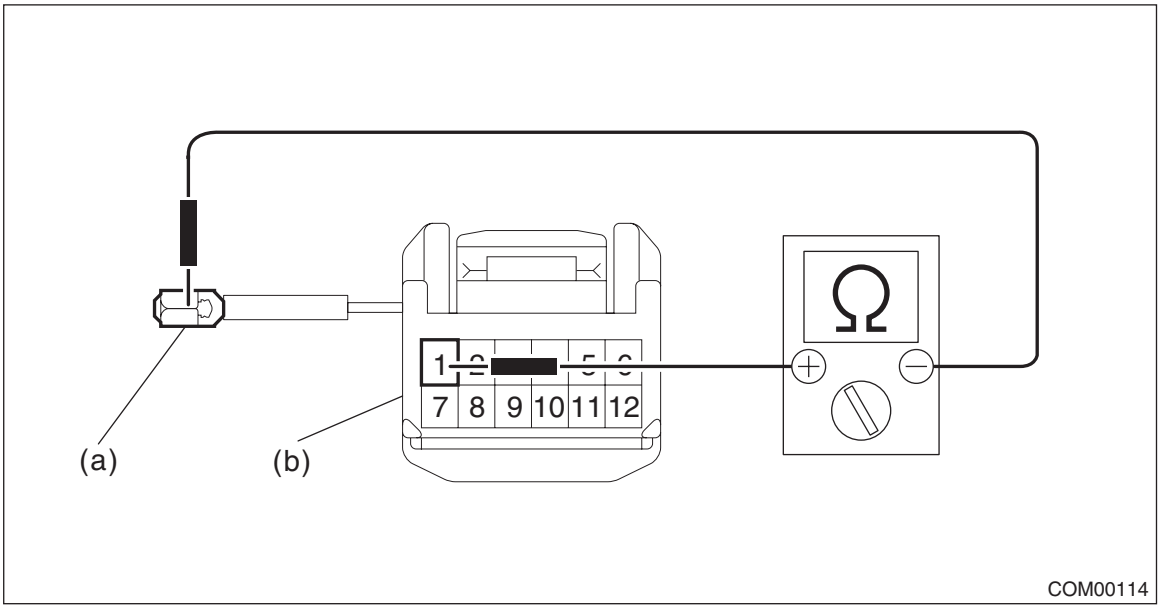
CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
4) Check that the connection of the horn switch harness connector is correct.
5) Disconnect the horn switch harness connector and check the resistance between the harness connectors.

Preparation tool:
Circuit tester



(a) Ground terminal (b) Horn switch terminal

Terminal No.	Inspection conditions	Standard
Horn switch terminal — ground terminal	Always	Less than 1 Ω

6) Replace the driver's airbag module if the inspection result is not within the standard value.

2. CHECK ROLL CONNECTOR

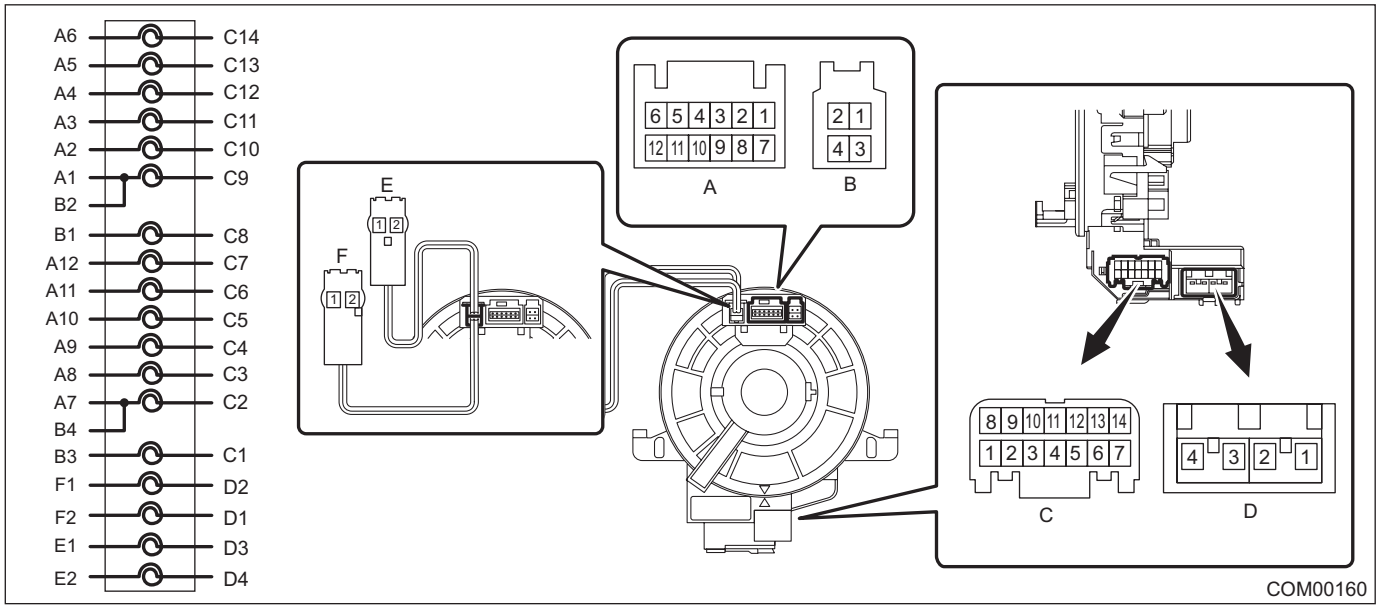
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform the following operations.
– Align the center position of the steering roll connector.
– Perform the neutral position setting of the steering angle sensor.

1) Turn the ignition switch to OFF.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the roll connector. <Ref. to AB-69, REMOVAL, Roll Connector.>
4) Check the resistance between roll connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
A1 — C9	Always	Less than 1 Ω

5) Replace the roll connector if the inspection result is not within the standard value.

GLASS/WINDOWS/MIRRORS

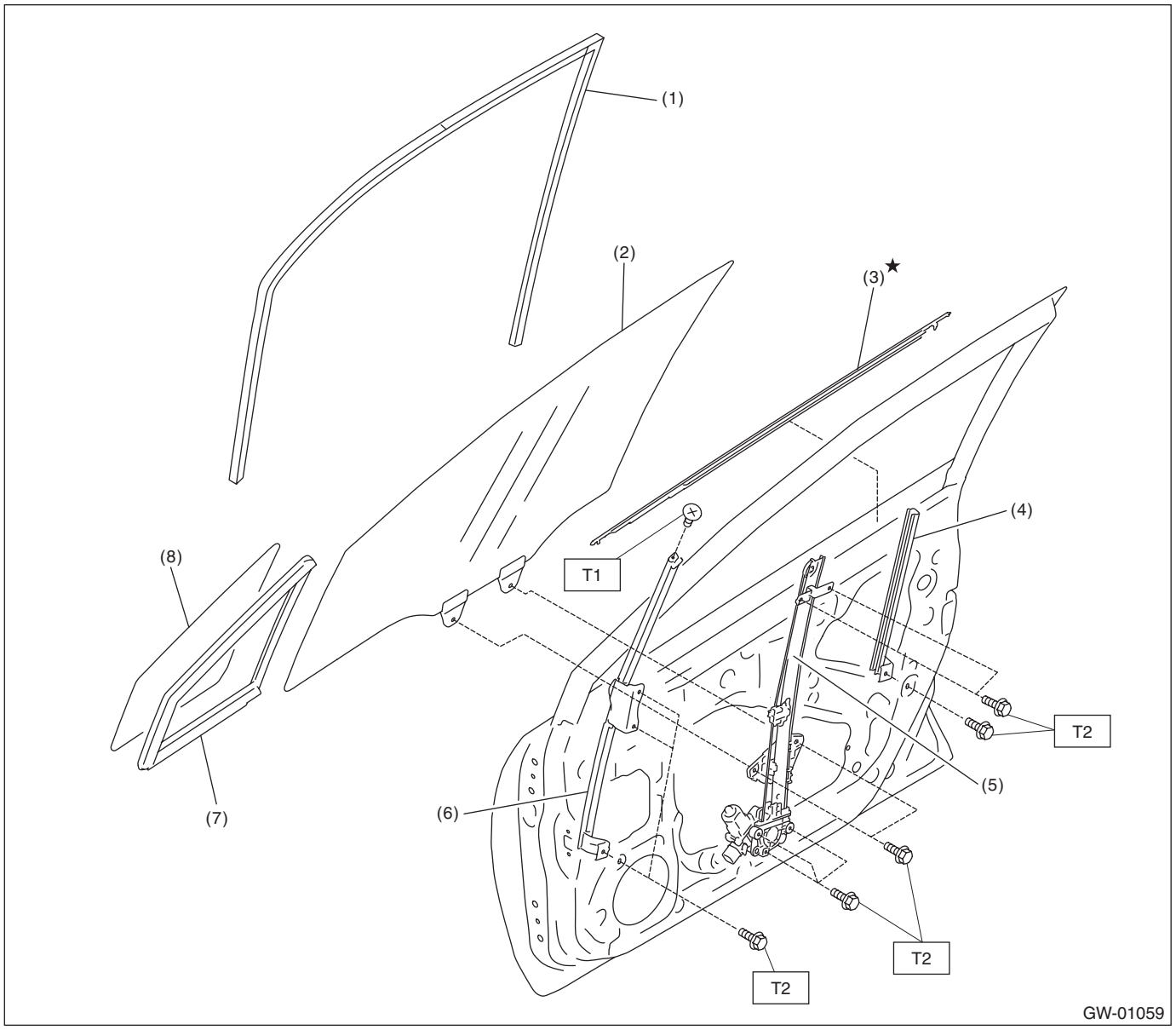
GW

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5.	Front Door Glass	19
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1. General Description

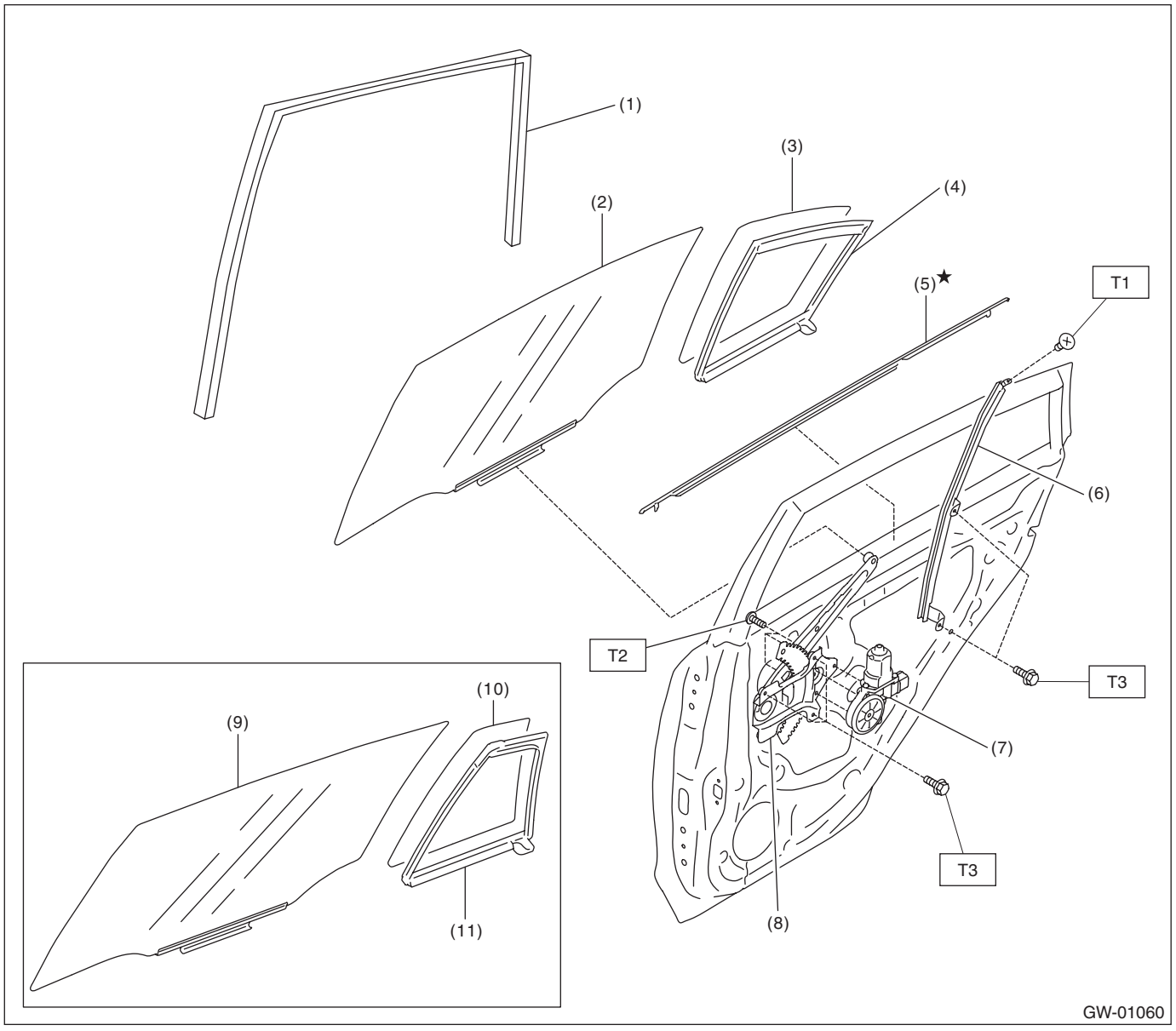
A: COMPONENT

1. FRONT DOOR GLASS



(1)	Running channel - front door	(5)	Regulator & motor ASSY - front	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Glass ASSY - front door	(6)	Sash COMPL - partition	***T1: 2.2 (0.22, 1.6)***
(3)	Weather strip outer - front door	(7)	Weather strip - front door partition	***T2: 7.5 (0.76, 5.5)***
(4)	Sash COMPL - lower	(8)	Glass - front door partition	

2. REAR DOOR GLASS



(1)	Running channel - rear door	(7)	Motor - rear
(2)	Glass ASSY - rear door (4 door model)	(8)	Regulator - rear
(3)	Glass - rear door partition (4 door model)	(9)	Glass ASSY - rear door (5 door model/Crosstrek model)
(4)	Weather strip - rear door partition (4 door model)	(10)	Glass - rear door partition (5 door model/Crosstrek model)
(5)	Weather strip outer - rear door	(11)	Weather strip - rear door partition (5 door model/Crosstrek model)
(6)	Sash COMPL - rear partition		

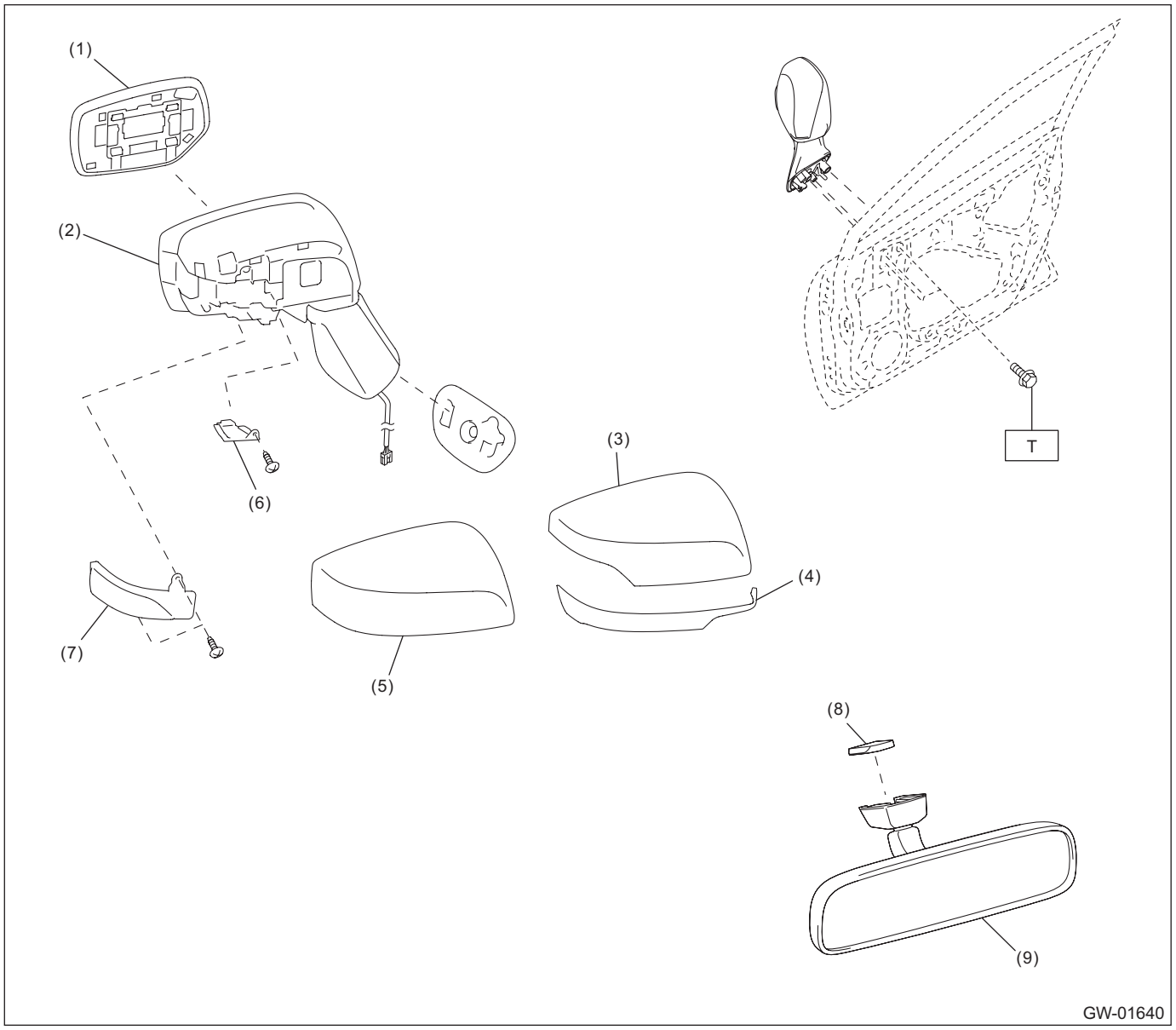
Tightening torque: N·m (kgf-m, ft-lb)

T1: 2.2 (0.22, 1.6)

T2: 5.9 (0.6, 4.4)

T3: 7.5 (0.76, 5.5)

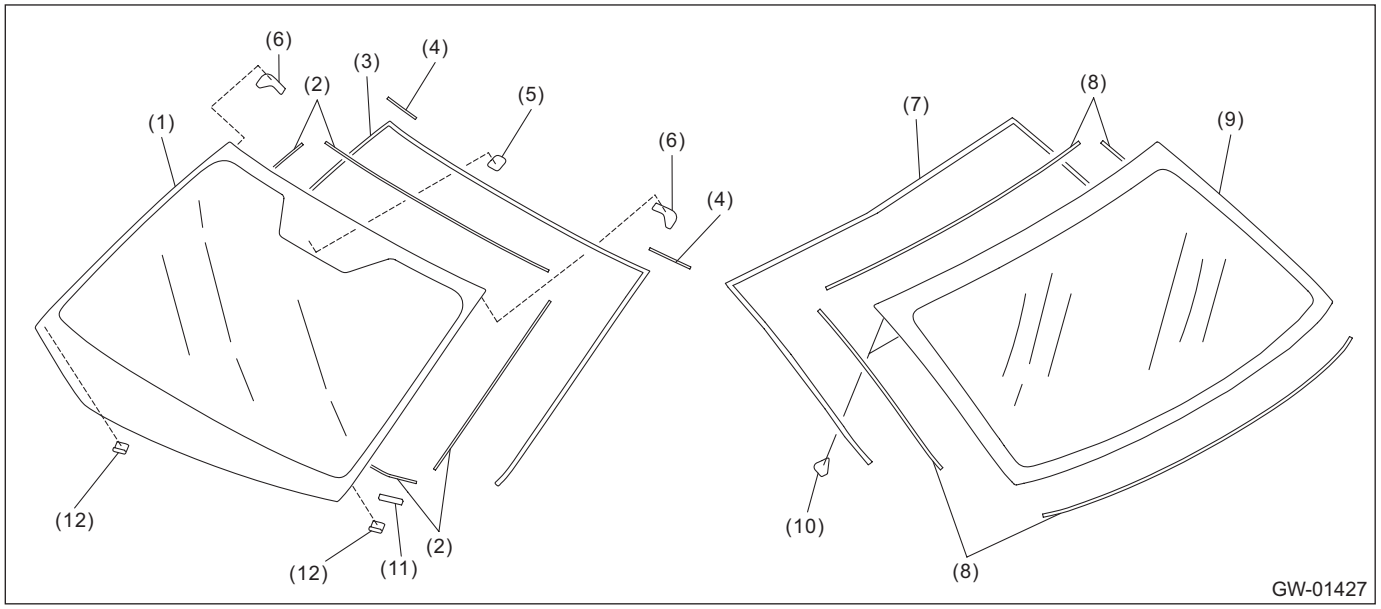
3. MIRROR



(1)	Mirror - repair	(5)	Cover - cap outer mirror (model without side turn)	(9)	Mirror ASSY - inner rearview
(2)	Mirror unit - door	(6)	Cover		
(3)	Cover - cap outer mirror (model with side turn)	(7)	Light ASSY - side turn mirror (model with side turn)	***Tightening torque: N·m (kgf-m, ft-lb)***	
(4)	Cover - cap outer mirror lower	(8)	Base - inner mirror	***T: 7.5 (0.76, 5.5)***	

NOTE:
The base - inner mirror cannot be removed from the glass - front window.

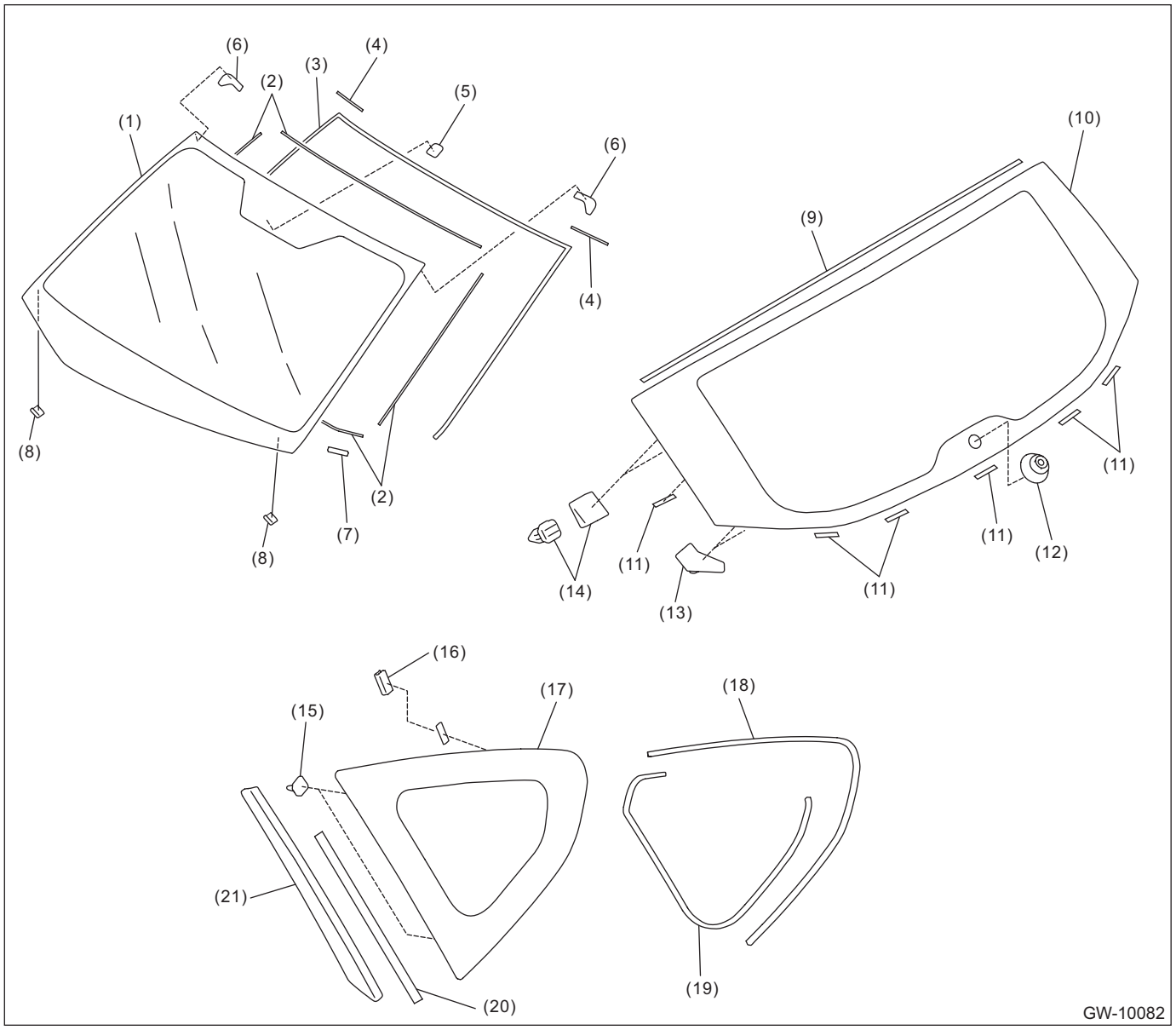
4. FIXED GLASS (4 DOOR MODEL)



(1)	Glass - front window	(5)	Base - inner mirror	(9)	Glass - rear window
(2)	Dam rubber - front	(6)	Locating pin - front window	(10)	Locating pin - rear window
(3)	Molding - front window	(7)	Molding - rear window	(11)	Seal - lower VIN
(4)	Seal - upper	(8)	Dam rubber - rear	(12)	Seal - lower

NOTE:
The base - inner mirror cannot be removed from the glass - front window.

5. FIXED GLASS (5 DOOR MODEL/CROSSTREK MODEL)



(1)	Glass - front window	(8)	Seal - lower	(15)	Locating pin - rear quarter
(2)	Dam rubber - front	(9)	Dam rubber - rear gate	(16)	Fastener - rear quarter
(3)	Molding - front window	(10)	Glass - rear gate	(17)	Glass - rear quarter
(4)	Seal - upper	(11)	Spacer - rear gate	(18)	Dam rubber - rear quarter
(5)	Base - inner mirror	(12)	Cap - pivot	(19)	Seal - rear quarter
(6)	Locating pin - front window	(13)	Locating pin - rear gate	(20)	Protective plate
(7)	Seal - lower VIN	(14)	Holder - rear gate	(21)	Molding - rear quarter

NOTE:
The base - inner mirror cannot be removed from the glass - front window.

B: CAUTION

• Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Avoid impact and damage to the glass.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that the each component operates normally.

C: PREPARATION TOOL

1. SPECIAL TOOL

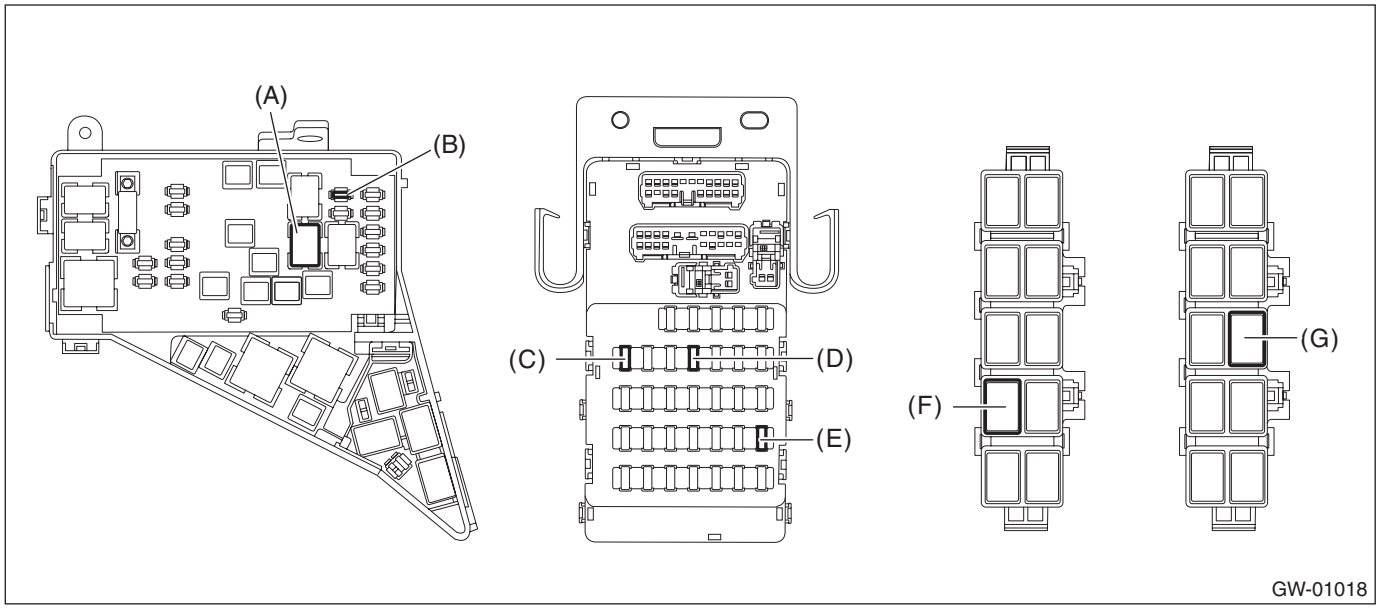
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.
Piano wire	Used for removing the window glass.
Cutter knife	Used for removing the window glass.
Windshield glass knife	Used for removing the window glass.

2. Relay and Fuse

A: LOCATION



Main fuse box	Rear defogger relay	(A)
	Fuse 25 A (rear defogger)	(B)
Relay & fuse box	Fuse 7.5 A (remote control mirror)	(C)
	Fuse 15 A (wiper deicer)	(D)
	Fuse 7.5 A (power window)	(E)
Relay holder	Power window relay	(F)
	Wiper deicer relay	(G)

NOTE:
For other related fuses, refer to the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model: <Ref. to WI(HEV)-21, Power Supply Circuit.>

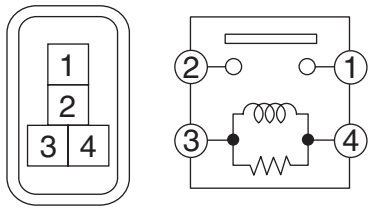
B: INSPECTION

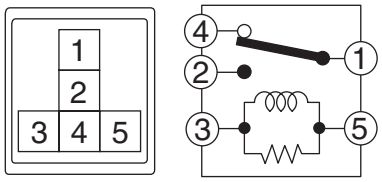
1. CHECK FUSE

1) Remove the fuse and check visually.
2) If the fuse is blown out, replace the fuse.

2. CHECK RELAY

1) Check the resistance between relay terminals.

Terminal No.	Inspection conditions	Specification	Circuit
1 — 2	Always	1 MΩ or more	 SR-00180
1 — 2	Apply battery voltage between 4 — 3 terminals.	Less than 1 Ω	

Terminal No.	Inspection conditions	Specification	Circuit
1 — 2	Always	1 MΩ or more	 SL-01085
1 — 4	Always	Less than 1 Ω	
1 — 2	Apply battery voltage between 3 — 5 terminals.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard value.

3. Power Window System

A: WIRING DIAGRAM

Refer to “Power Window System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-182, WIRING DIAGRAM, Power Window System.>
- HEV model: <Ref. to WI(HEV)-161, WIRING DIAGRAM, Power Window System.>

B: INSPECTION

Symptoms	Inspection order
All power windows do not operate.	1. Check the fuse. 2. Check the power window relay. 3. Check the wiring harness.
Particular window does not operate.	1. Check the fuse. 2. Check the switch - power window main. 3. Check the switch - power window sub. 4. Check the power window motor. 5. Check the wiring harness.
“Window Lock” does not operate.	Check the switch - power window main.
Driver’s side window moves slightly (approx. 20 mm (0.79 in)).	1. Check the motor - front. 2. Check the switch - power window main. 3. Check the wiring harness.
Driver’s side window moves slightly (approx. 50 mm (1.97 in)). (This status is not a failure.)	Perform reset operation A. <Ref. to GW-10, RESET OPERATION A, OPERATION, Power Window System.>
Driver’s side window does not close completely. (Using AUTO UP allows the window to fully close first and then move in reverse resulting in slightly opening.)	Perform reset operation B. <Ref. to GW-10, RESET OPERATION B, OPERATION, Power Window System.>

C: OPERATION

1. RESET OPERATION A

1) Sit in the driver’s seat and close the door.
2) Turn the ignition switch to ON.
3) Operate the switch - power window main to open the glass assembly - front door halfway.
4) Operate the switch - power window main in “UP” direction to fully close the glass assembly - front door on the driver’s side.
5) While the glass assembly - front door is fully closed, hold down the switch - power window main in “UP” direction for one second.
6) Operate the switch - power window main in “AUTO DOWN” direction to check whether the window fully opens properly.

NOTE:
If the window does not fully open properly, repeat steps 1) to 6).

2. RESET OPERATION B

1) Sit in the driver’s seat and close the door.
2) Turn the ignition switch to ON.
3) On the glass assembly - front door of the driver’s side, operate the “AUTO UP” function (fully pull up the switch) using the switch - power window main, and perform auto-reverse operations 10 times in a row (after the window fully closes, it slightly opens).
4) Check that the “AUTO UP” function no longer operates.
5) Perform reset operation A.
6) Check that the window operates properly by operating the “AUTO UP” and “AUTO DOWN” switch.

NOTE:
If the window does not fully open/close properly, repeat steps 1) to 6).

D: NOTE

For operation procedures of each component of the power window system, refer to the respective sections.
- Power window control switch: <Ref. to GW-12, Power Window Control Switch.>
- Front door glass: <Ref. to GW-19, Front Door Glass.>
- Front regulator and motor assembly: <Ref. to GW-22, Front Regulator and Motor Assembly.>
- Rear door glass: <Ref. to GW-33, Rear Door Glass.>
- Rear regulator and motor assembly: <Ref. to GW-35, Rear Regulator and Motor Assembly.>

4. Power Window Control Switch

A: REMOVAL

1. MAIN SWITCH

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

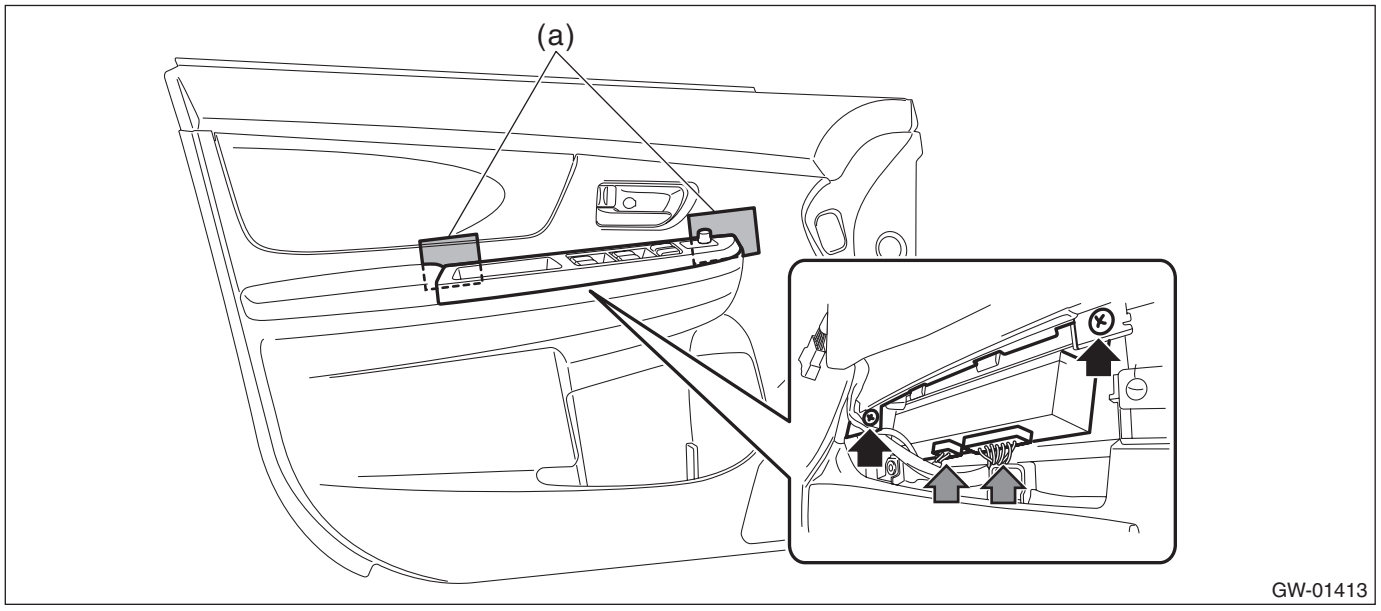
2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>

3) Remove the panel - power window main switch.

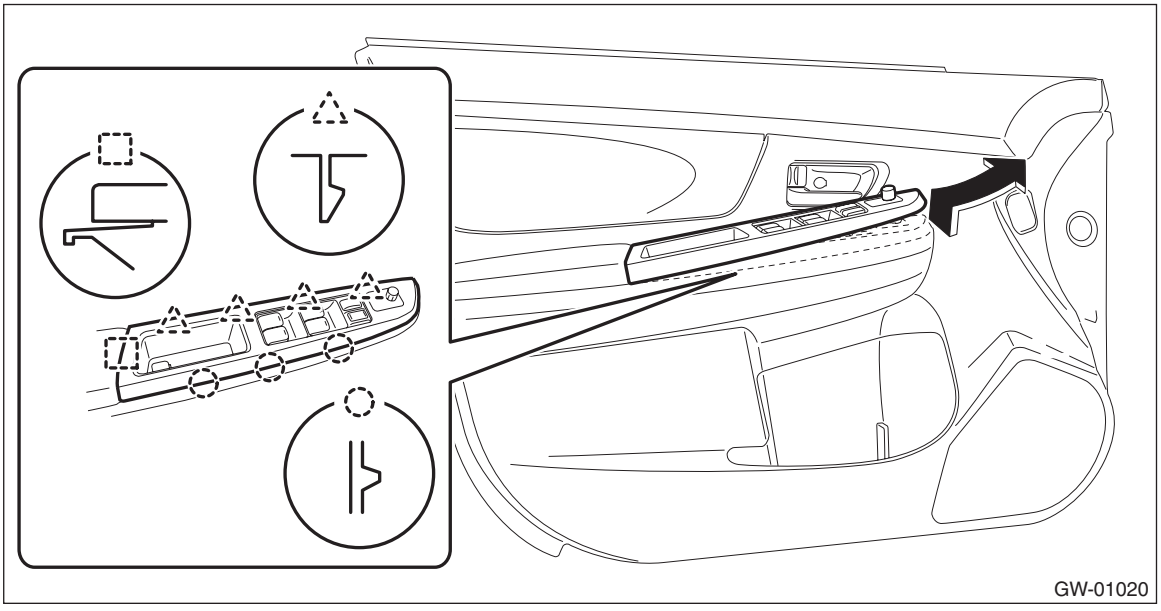
CAUTION:
Be careful not to damage the trim panel - front door with the panel - power window main switch.

(1) Insert a sheet of protective paper (a) between panel - power window main switch and trim panel - front door.

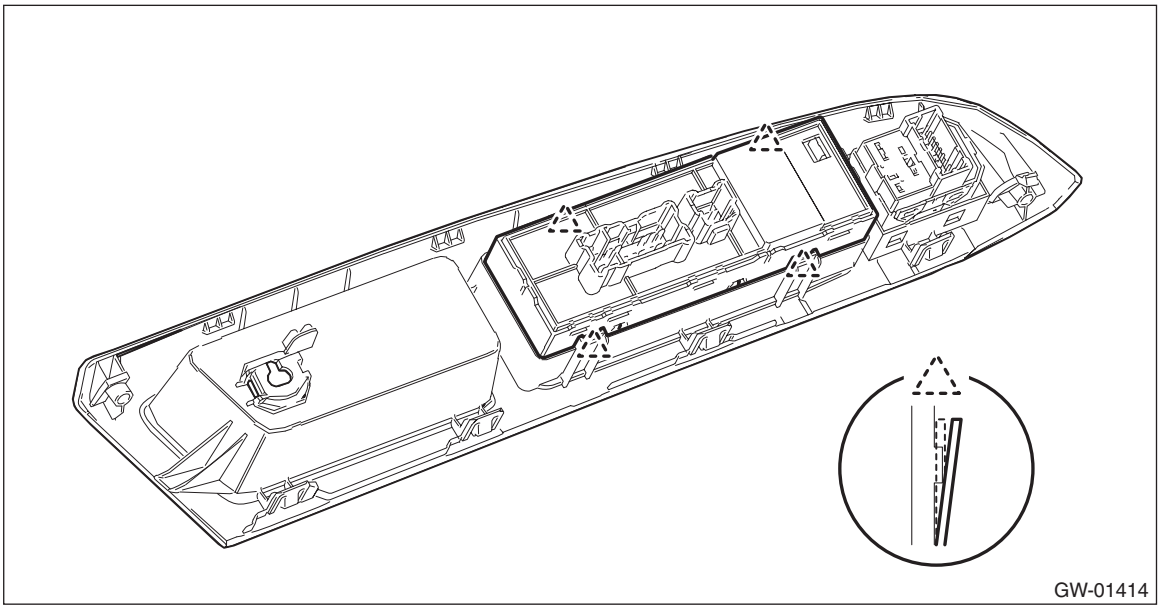
(2) Remove the screws and disconnect the connector.



(3) Release the claws, and then remove the panel - power window main switch.



(4) Release the claws, and then remove the switch - power window main.



2. SUB-SWITCH

Switch - power window sub front

For removal of the switch - power window sub front on the passenger's seat, refer to the removal procedure of the switch - power window main. <Ref. to GW-12, MAIN SWITCH, REMOVAL, Power Window Control Switch.>

Switch - power window sub rear

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

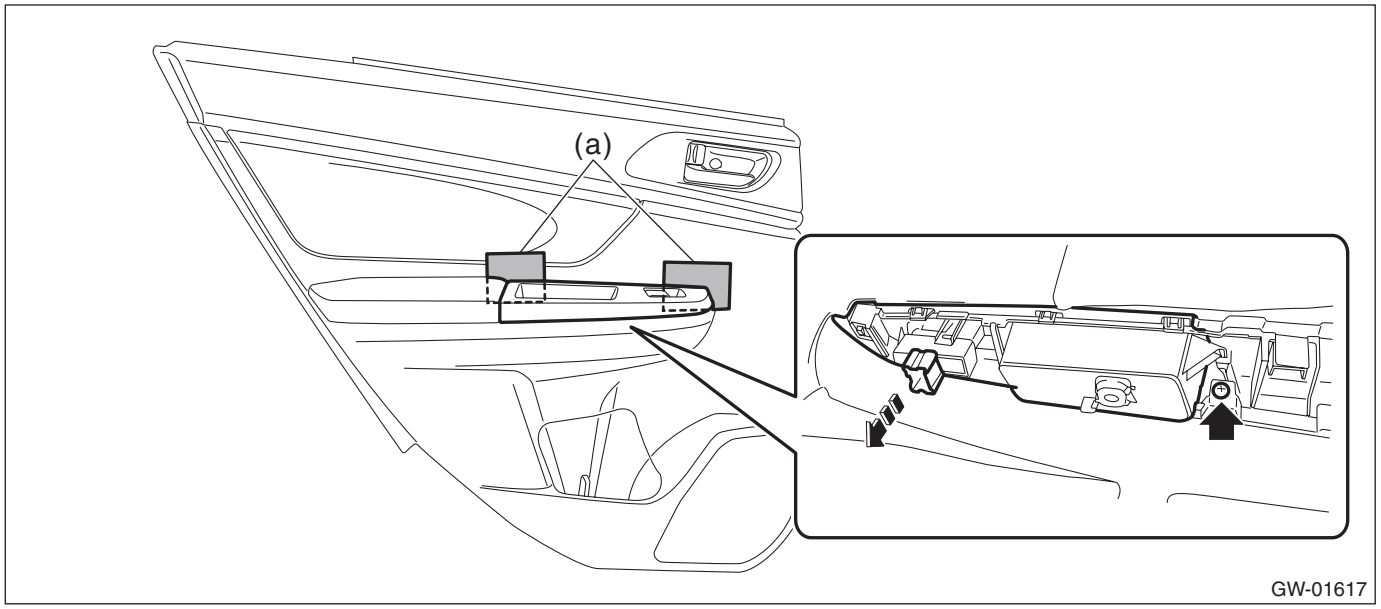
2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>

3) Remove the panel - power window sub switch rear.

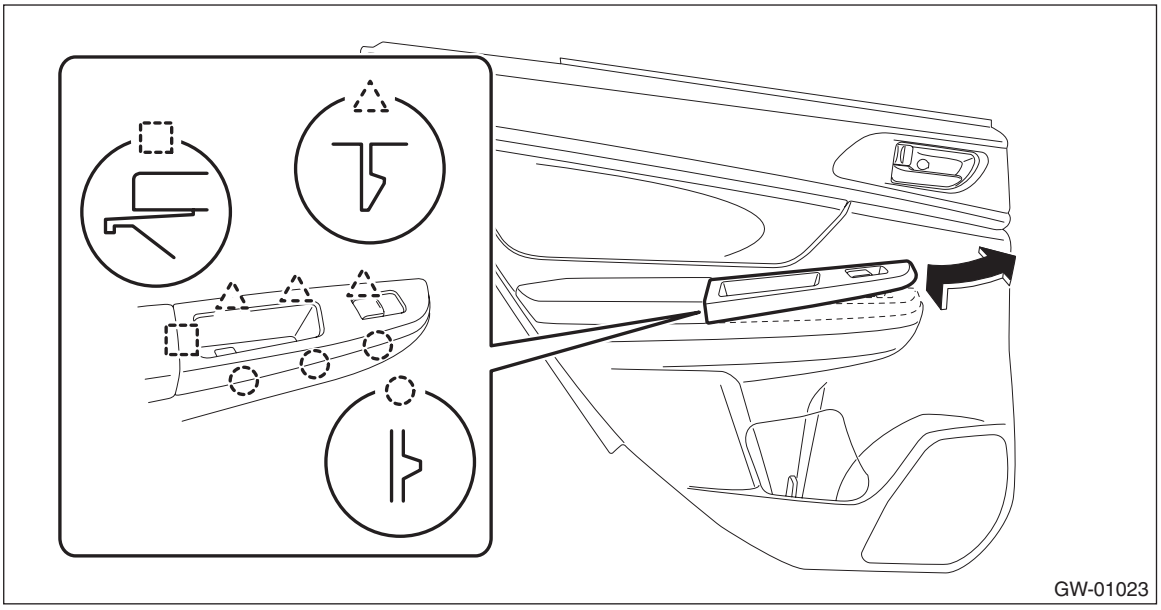
CAUTION:
Be careful not to damage the trim panel - rear door with the panel - power window sub switch rear.

(1) Insert a sheet of protective paper (a) between panel - power window sub switch rear and trim panel - rear door.

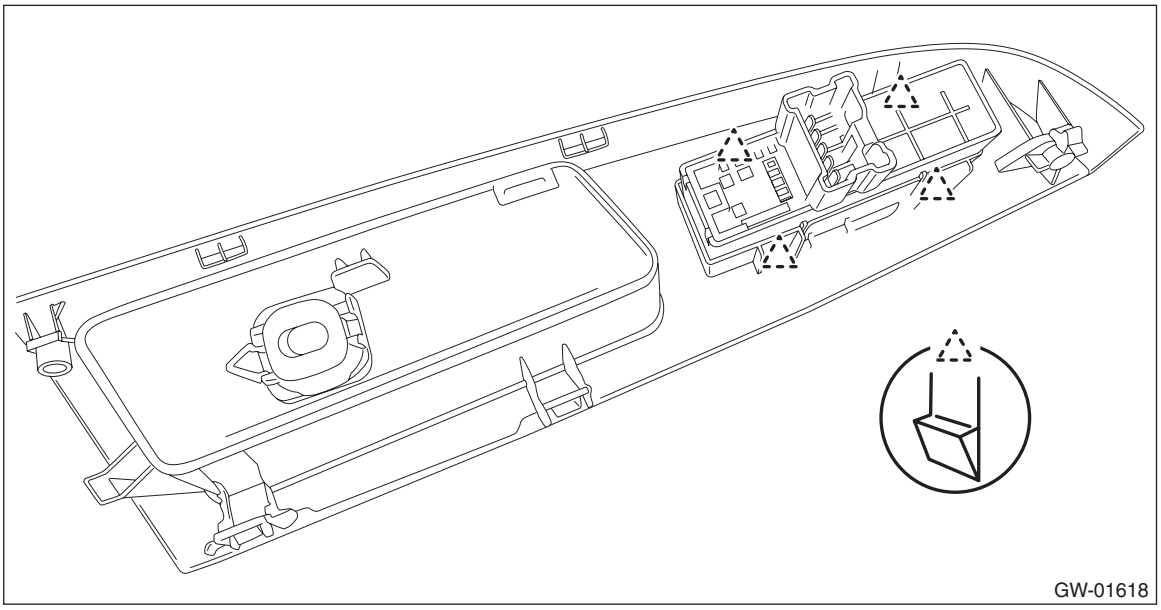
(2) Remove the screws and disconnect the connector.



(3) Release the claws, and then remove the panel - power window sub switch rear.



4) Release the claws, and then remove the switch - power window sub rear.



B: INSTALLATION

CAUTION:
• After installing the switch - power window main, always perform the initial setting.
Failure to do so may cause the improper activation of auto-reverse operation for pinching hazard prevention.
• Use protective paper to avoid damage to the trim panel.

1) Install each part in the reverse order of removal.
2) Perform initial setting operation (reset operation A). <Ref. to GW-10, RESET OPERATION A, OPERATION, Power Window System.>

C: INSPECTION

1. MAIN SWITCH

• Driver's seat

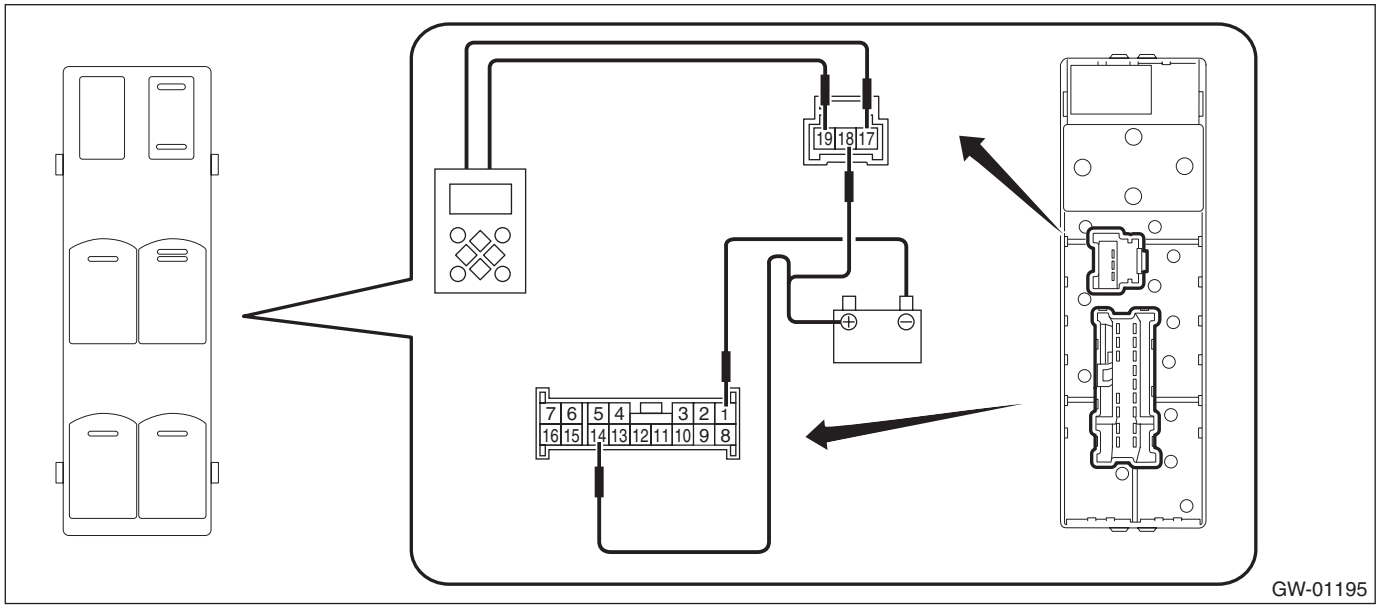
CAUTION:
Since the switch - power window main is controlled by CPU, do not check continuity for switch alone with the circuit tester. Performing continuity check with circuit tester can damage the switch - power window main circuit.

Check output from the switch - power window main to the driver's side motor using the oscilloscope function in the Subaru Select Monitor.

1) Remove the switch - power window main.
2) Connect the battery and the Subaru Select Monitor to the switch - power window main terminal.

CAUTION:
Never mix up the terminals when connecting the harness connector of the switch - power window main and the battery. If the connection is wrong, the switch - power window main may be damaged.

NOTE:
• When the battery is connected to the switch - power window main terminal, the letters “AUTO” on the driver’s side knob illuminates.
• For detailed procedures, refer to “Subaru Select Monitor Operation Manual”.



3) Operate the switch - power window main and check the output.

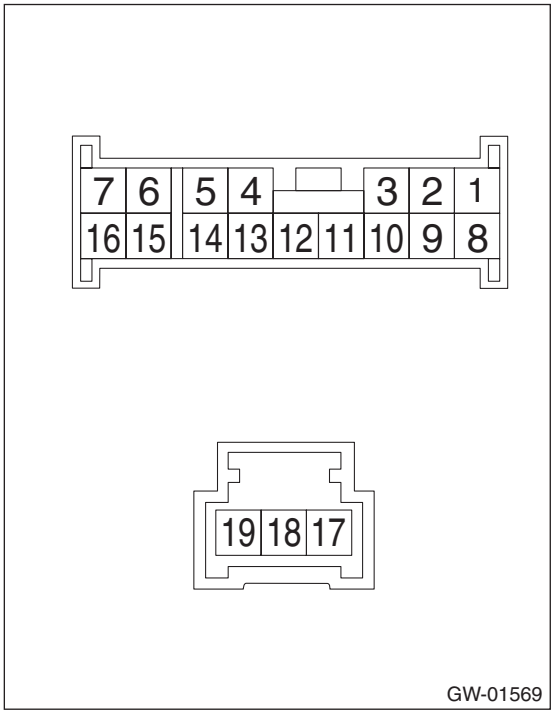
NOTE:
Since output time during window UP operation is extremely short, it cannot be checked without using a measuring instrument such as oscilloscope. Output is constantly produced while the switch is operated for window DOWN operation.

Inspection conditions	Output time	Standard
AUTO UP	Approx. 130 ms	Battery voltage
UP		
OFF	—	0 V
DOWN	During switch operation	Battery voltage
AUTO DOWN	Approx. 300 ms	

4) If the inspection result is not within the standard, replace the switch - power window main.

• **Except for driver's seat**

1) Check the resistance between terminals of the switch - power window main.

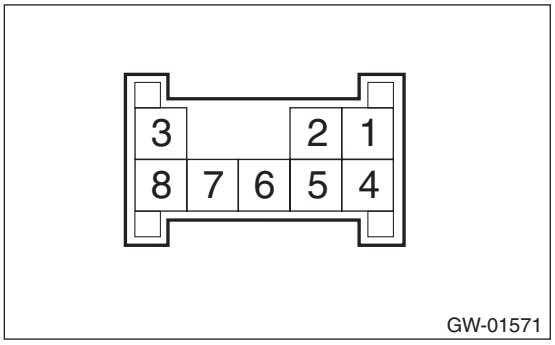


	Terminal No.	Inspection conditions	Standard
Passenger's seat	14 — 8 1 — 2	UP	Less than 1 Ω
	14 — 2 14 — 8	OFF	1 MΩ or more
	1 — 8 1 — 2 8 — 2		Less than 1 Ω
	14 — 2 1 — 8	DOWN	Less than 1 Ω
Rear LH	14 — 15 1 — 16	UP	Less than 1 Ω
	14 — 15 14 — 16	OFF	1 MΩ or more
	1 — 15 1 — 16 15 — 16		Less than 1 Ω
	14 — 16 1 — 15	DOWN	Less than 1 Ω
Rear RH	14 — 7 1 — 6	UP	Less than 1 Ω
	14 — 7 14 — 6	OFF	1 MΩ or more
	1 — 6 1 — 7 6 — 7		Less than 1 Ω
	14 — 6 1 — 7	DOWN	Less than 1 Ω

2) If the inspection result is not within the standard, replace the switch - power window main.

2. SUB-SWITCH

1) Remove the switch - power window sub.
2) Check the resistance between terminals of the switch - power window sub.



	Terminal No.	Inspection conditions	Standard
Passenger seat, rear	6 — 5 8 — 7	UP	Less than 1 Ω
	7 — 6 4 — 6	OFF	1 MΩ or more
	5 — 4 8 — 7		Less than 1 Ω
	6 — 8 5 — 4	DOWN	Less than 1 Ω

3) If the inspection result is not within the standard, replace the switch - power window sub.

5. Front Door Glass

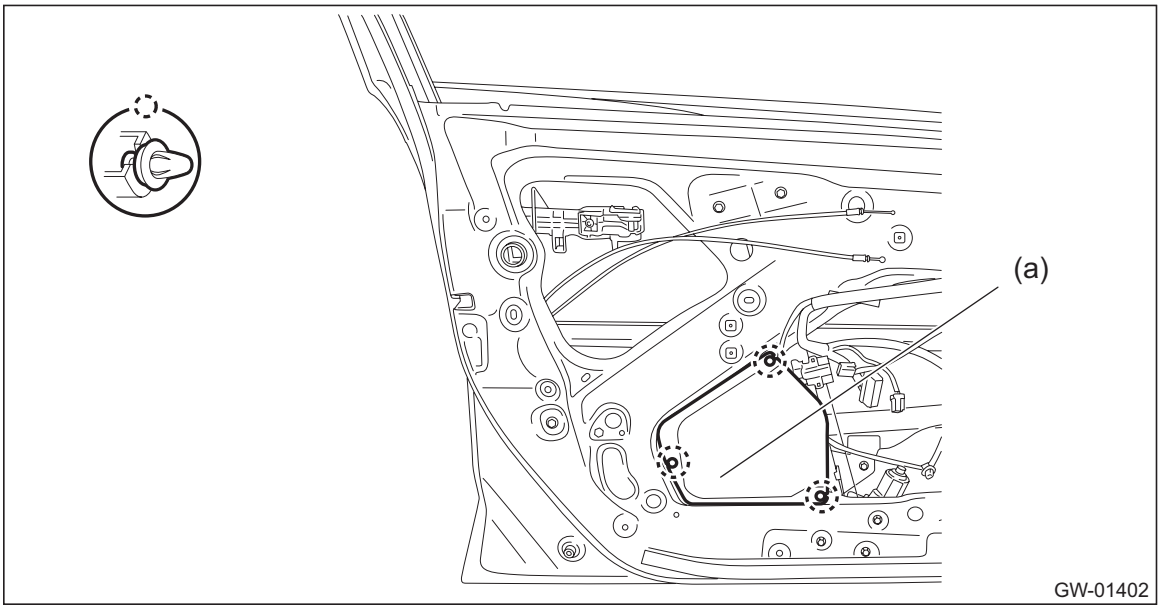
A: REMOVAL

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

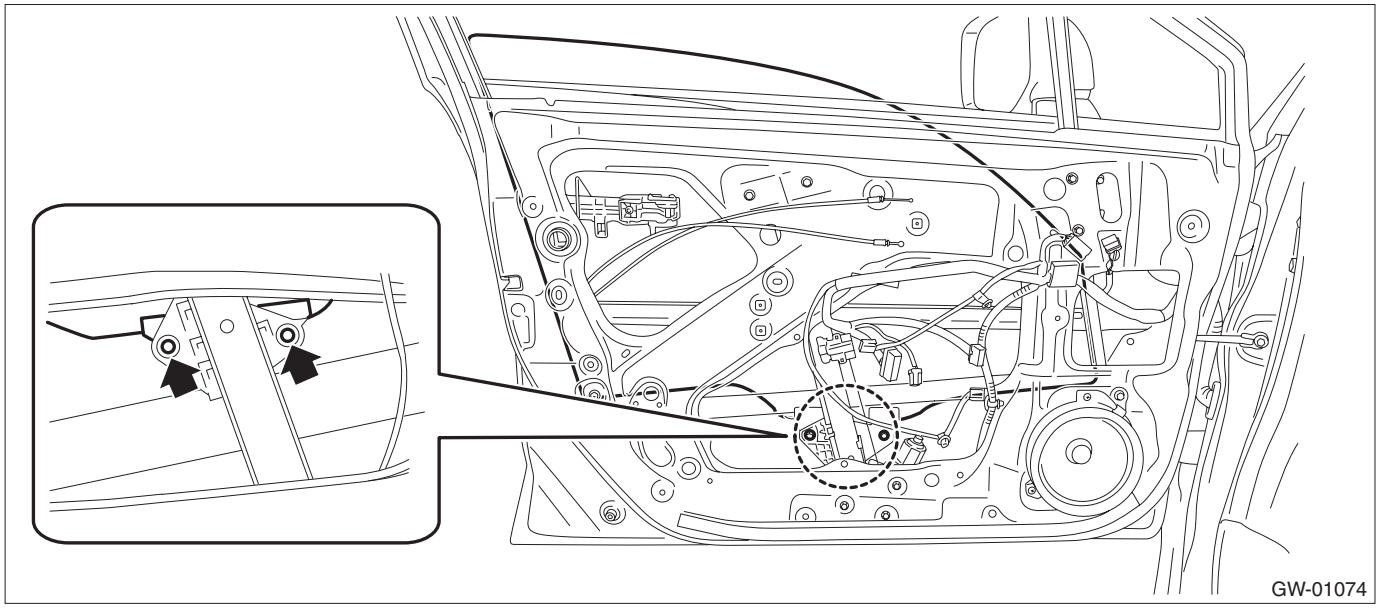
2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - front door. <Ref. to EB-26, REMOVAL, Front Sealing Cover.>
4) Remove the front door inner pad (a).

CAUTION:
If the clip is damaged, replace it with a new part because the panel assembly - front door may be deformed.



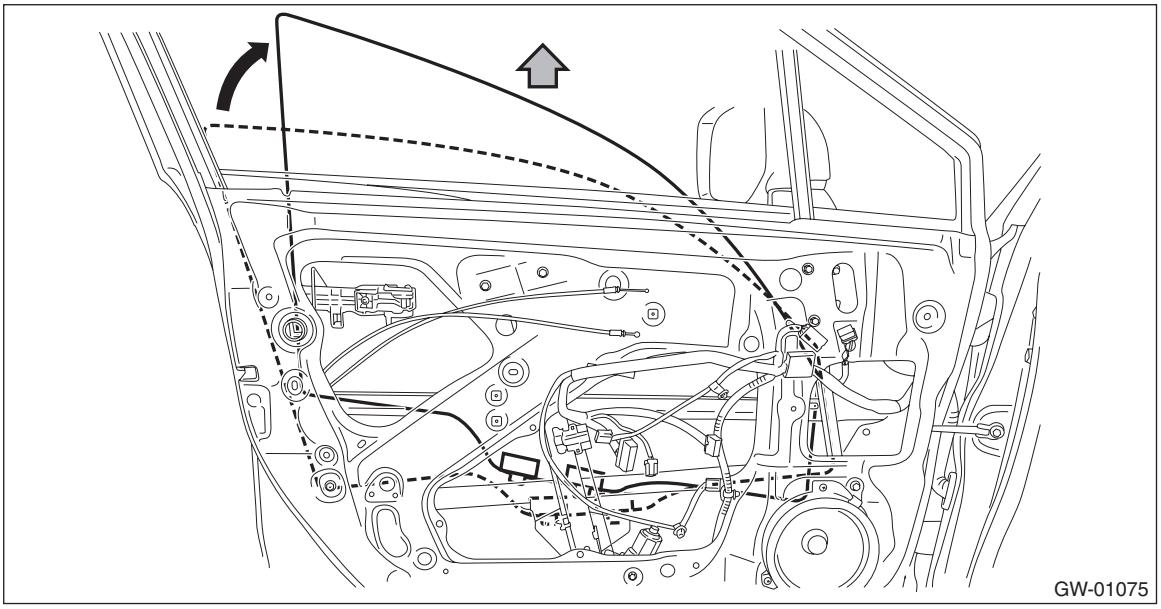
5) Attach the battery ground cable and the switch - power window, and turn the ignition switch to ON. <Ref. to NT-6, BATTERY, NOTE, Note.>
6) Remove the glass assembly - front door.
   (1) Operate the switch - power window to move the glass assembly - front door to the position where the mounting bolts can be seen.
   (2) Remove the running channel - front door.

(3) Remove the mounting bolts from the glass assembly - front door.

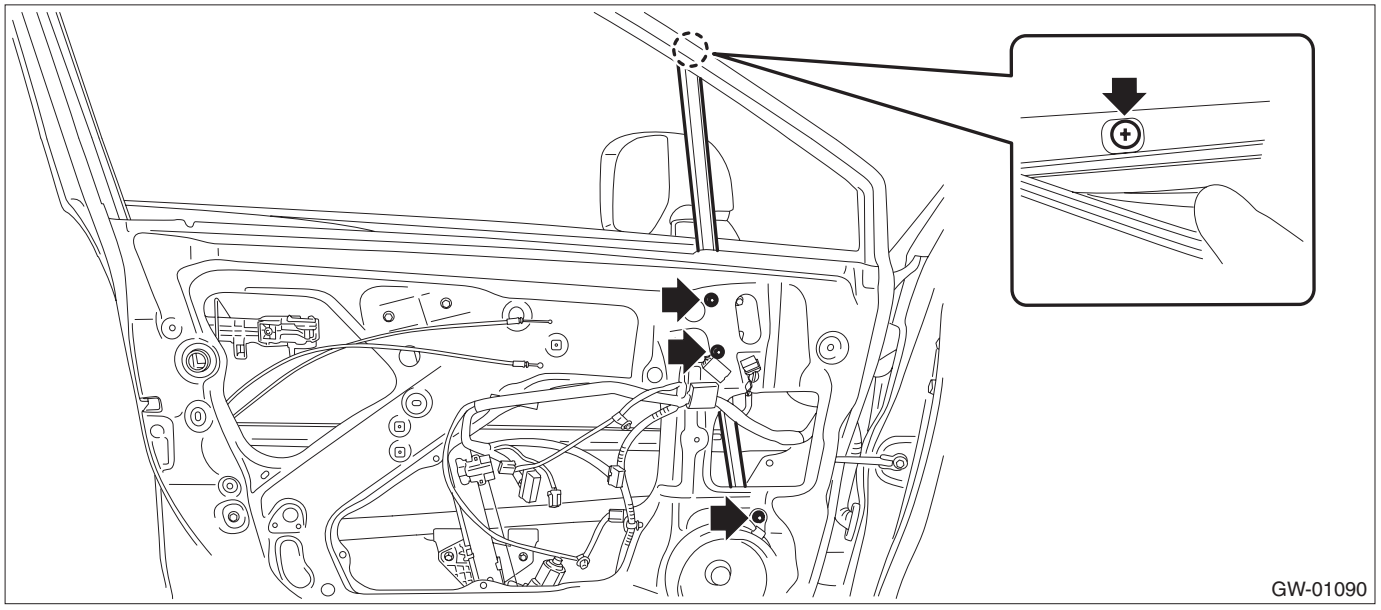


(4) While tilting the glass, remove the glass assembly - front door.

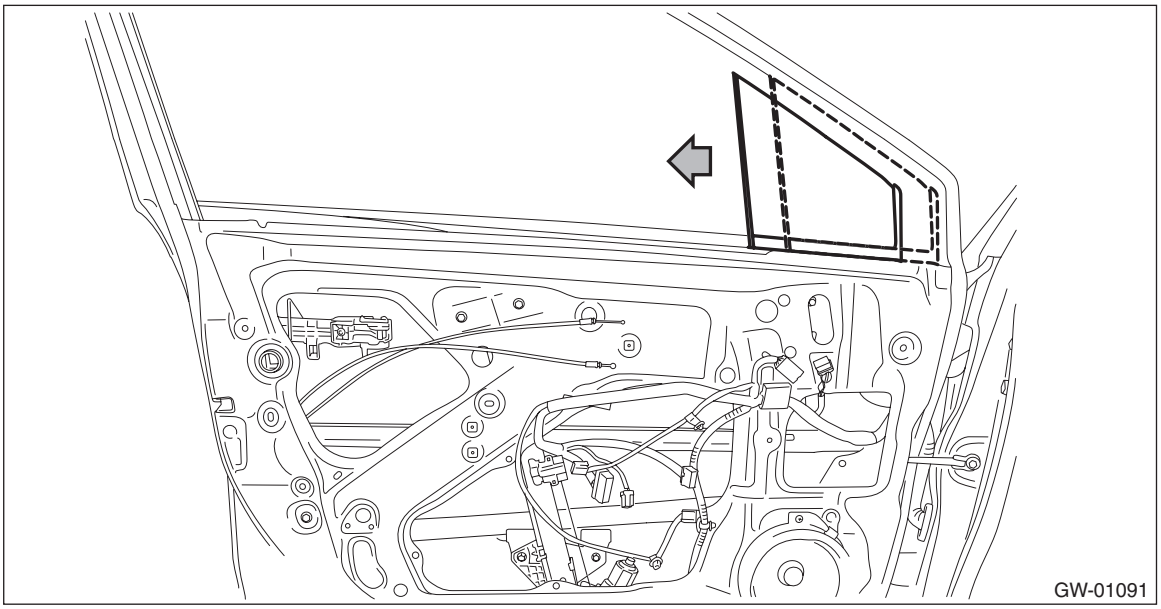
CAUTION:
Avoid impact and damage to the glass assembly - front door.



7) Remove the glass - front door partition.
(1) Remove the bolts and screws, and then remove the sash COMPL - partition.



(2) Remove the glass - front door partition.



B: INSTALLATION

CAUTION:
• Check that the running channel - front door is securely fixed to the panel assembly - front door and to the sash COMPL - partition.
• Before installing the glass assembly - front door, check the lip of the running channel - front door for being everted or tuck-in.
Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to GW-2, FRONT DOOR GLASS, COMPONENT, General Description.>

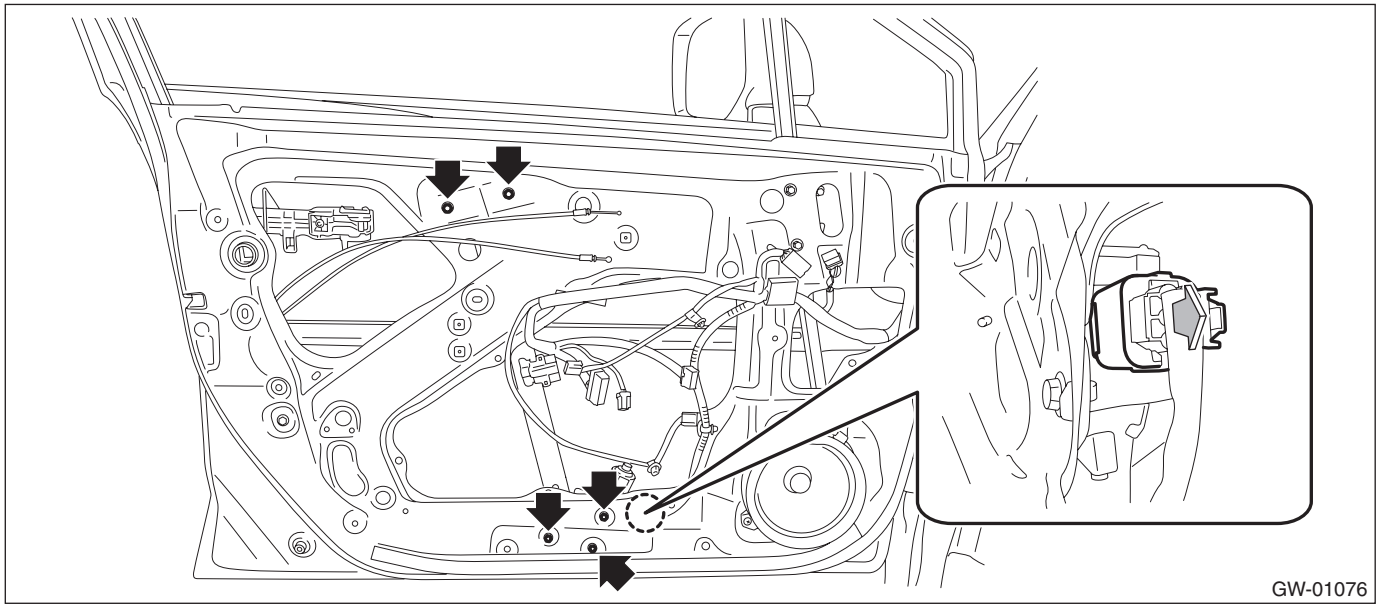
6. Front Regulator and Motor Assembly

A: REMOVAL

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - front door. <Ref. to EB-26, REMOVAL, Front Sealing Cover.>
4) Remove the glass assembly - front door. <Ref. to GW-19, REMOVAL, Front Door Glass.>
5) Remove the regulator and motor assembly - front.
   (1) Disconnect the motor - front connector.
   (2) Remove the bolts, and then remove the regulator and motor assembly - front.



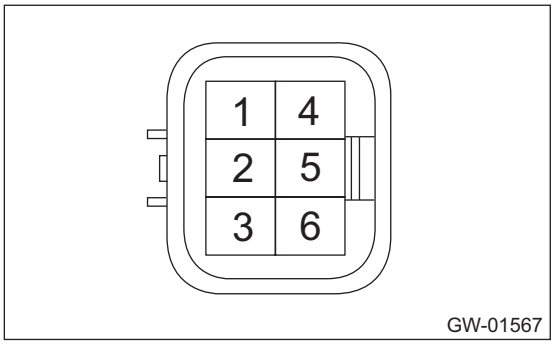
B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to GW-2, FRONT DOOR GLASS, COMPONENT, General Description.>

C: INSPECTION

1) Disconnect the connector of the motor - front.
2) Check the motor operation when battery voltage is applied between terminals of the motor - front connector.



- LH side

Terminal No.	Inspection conditions	Standard
4 (+) — 1 (–)	Apply battery voltage between terminals.	Increase
1 (+) — 4 (–)	Apply battery voltage between terminals.	Decrease

- RH side

Terminal No.	Inspection conditions	Standard
3 (+) — 6 (–)	Apply battery voltage between terminals.	Increase
6 (+) — 3 (–)	Apply battery voltage between terminals.	Decrease

3) If it does not operate properly as a result of inspection, replace the regulator and motor assembly - front.

7. Remote Control Mirror System

A: WIRING DIAGRAM

Refer to “Remote Control Mirror System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-200, WIRING DIAGRAM, Remote Control Mirror System.>
- HEV model: <Ref. to WI(HEV)-177, WIRING DIAGRAM, Remote Control Mirror System.>

B: INSPECTION

1. SYMPTOM CHART

Symptoms	Inspection order
All function does not operate.	1. Check the fuse. 2. Check the remote control mirror switch. 3. Check the wiring harness.
One side of the mirror motor does not operate.	1. Check the remote control mirror switch. 2. Check the mirror motor. 3. Check the wiring harness.
Mirror heater does not operate.	1. Check the rear defogger switch. 2. Check the rear defogger relay. 3. Check the mirror heater. 4. Check the wiring harness. 5. Check body integrated unit.

NOTE:
The mirror heater operates with the rear window defogger at the same time. Refer to “INSPECTION” of “Rear Window Defogger System” for details. <Ref. to GW-52, INSPECTION, Rear Window Defogger System.>

C: NOTE

For procedure of each component in the remote control mirror system, refer to the respective section.
- Outer mirror assembly: <Ref. to GW-25, Outer Mirror Assembly.>
- Remote control mirror switch: <Ref. to GW-30, Remote Control Mirror Switch.>

8. Outer Mirror Assembly

A: REMOVAL

Refer to “DISASSEMBLY” for removal procedures of scalp cap and mirror face. <Ref. to GW-26, DISASSEMBLY, Outer Mirror Assembly.>

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

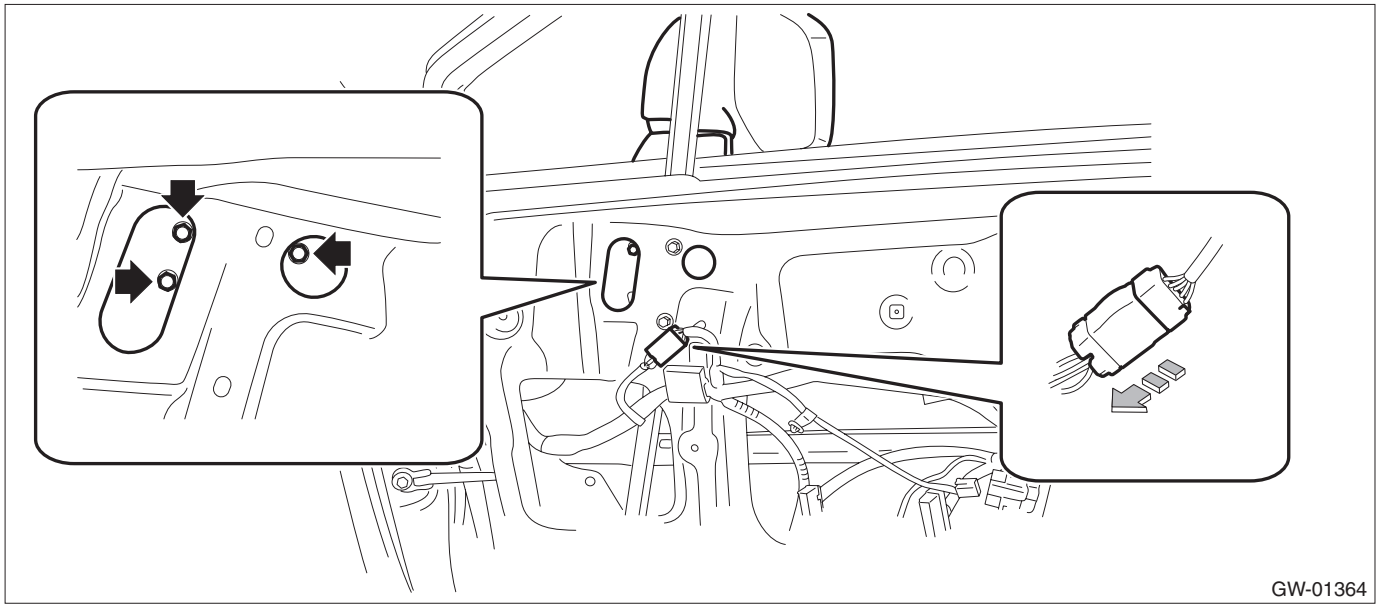
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
3) Turn over the sealing cover - front door.

CAUTION:
- **Carefully remove the butyl tape. Excessive force will easily break the sealing cover - front door.**
- **If the sealing cover - front door gets broken, replace it with a new part.**
- **Be careful not to allow the butyl tape to contact any trims and seats because the butyl tape, which has a strong adhesive force, is difficult to remove once it adhered.**

(1) Remove the connector clip that is installed on the panel assembly - front door, and disconnect the connector.
(2) Carefully remove and turn over the sealing cover - front door within the area where the operation can be performed.

4) Remove the outer mirror assembly.
(1) Remove the connector clip that is installed on the panel assembly - front door, and disconnect the connector.
(2) Turn over the sealing cover - front door.
(3) Remove the bolts to remove outer mirror assembly.


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B: INSTALLATION

CAUTION:
Be careful not to catch the harness in between the parts.
Install each part in the reverse order of removal.

Tightening torque:
Outer mirror assembly: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

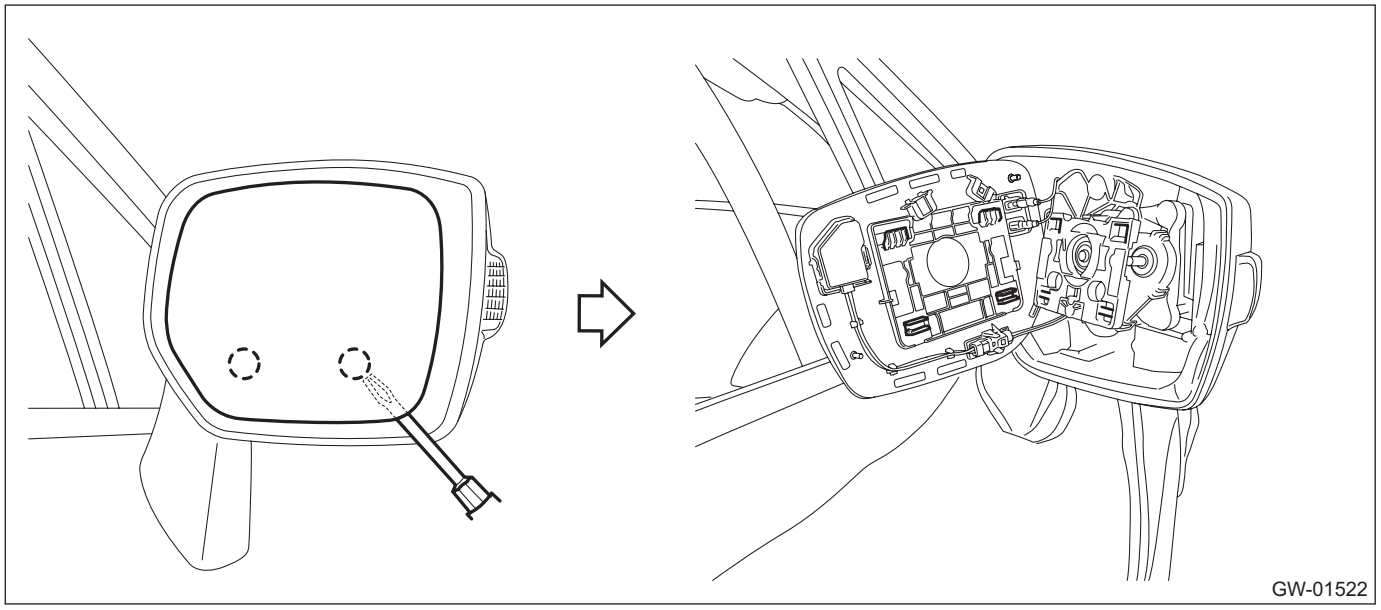
C: DISASSEMBLY

CAUTION:
- **When removing the mirror - repair, be careful not to damage the back surface of mirror - repair with a flat tip screwdriver.**
- **When installing the mirror - repair, insert the connector and clip securely.**

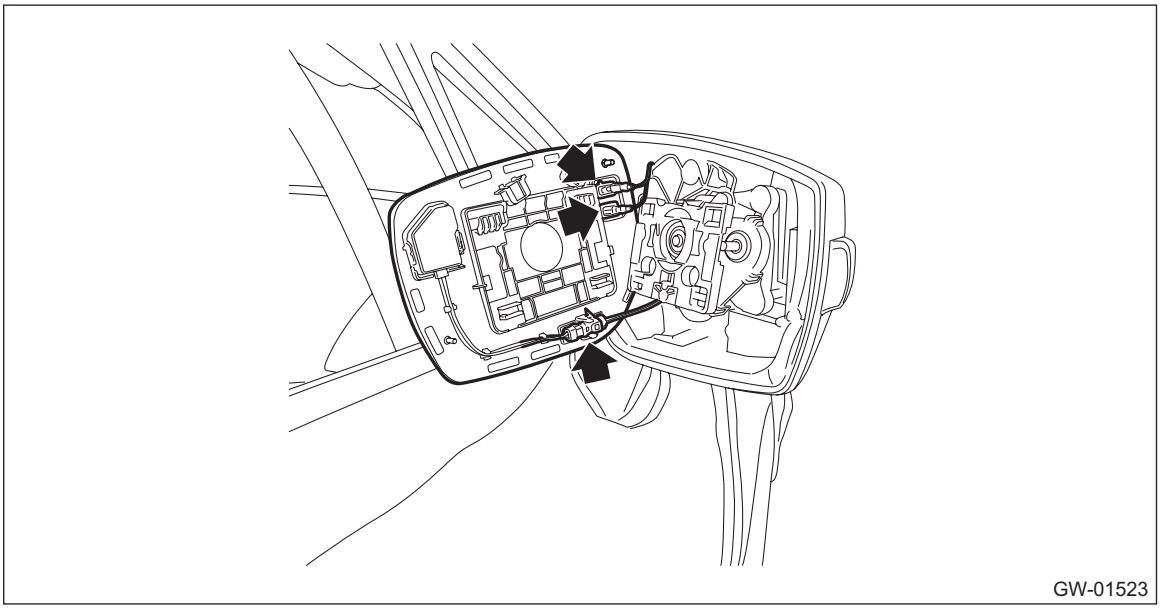
1) Operate the remote control mirror switch to face the mirror - repair upward.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

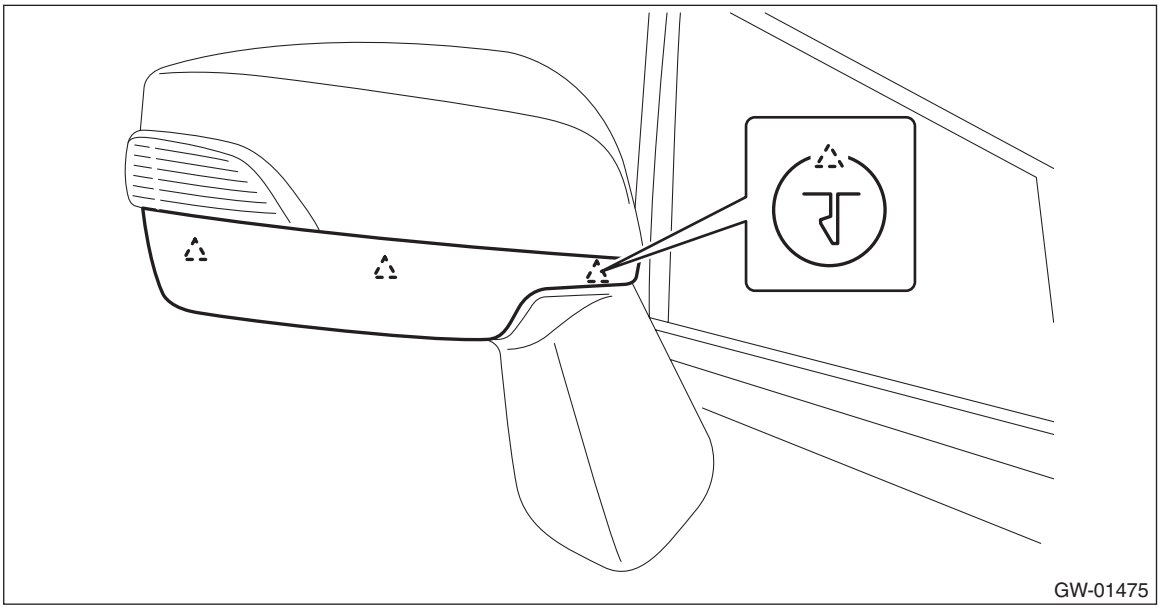
3) Remove the mirror - repair.
   (1) Using a flat tip screwdriver, release the clip, and slide the mirror - repair downward to remove.


GW-01522

   (2) Disconnect connectors. (Model with mirror heater and Subaru Rear Vehicle Detection system)

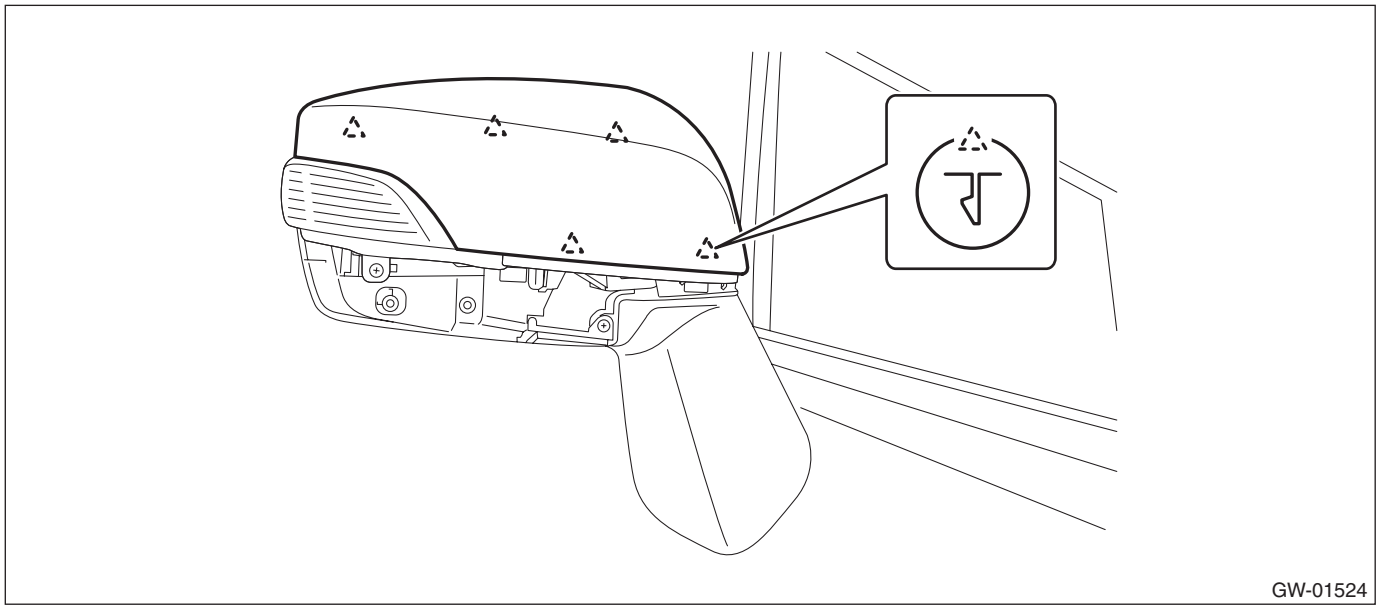

GW-01523

4) Release the claws, and then remove the cover - cap outer mirror lower.

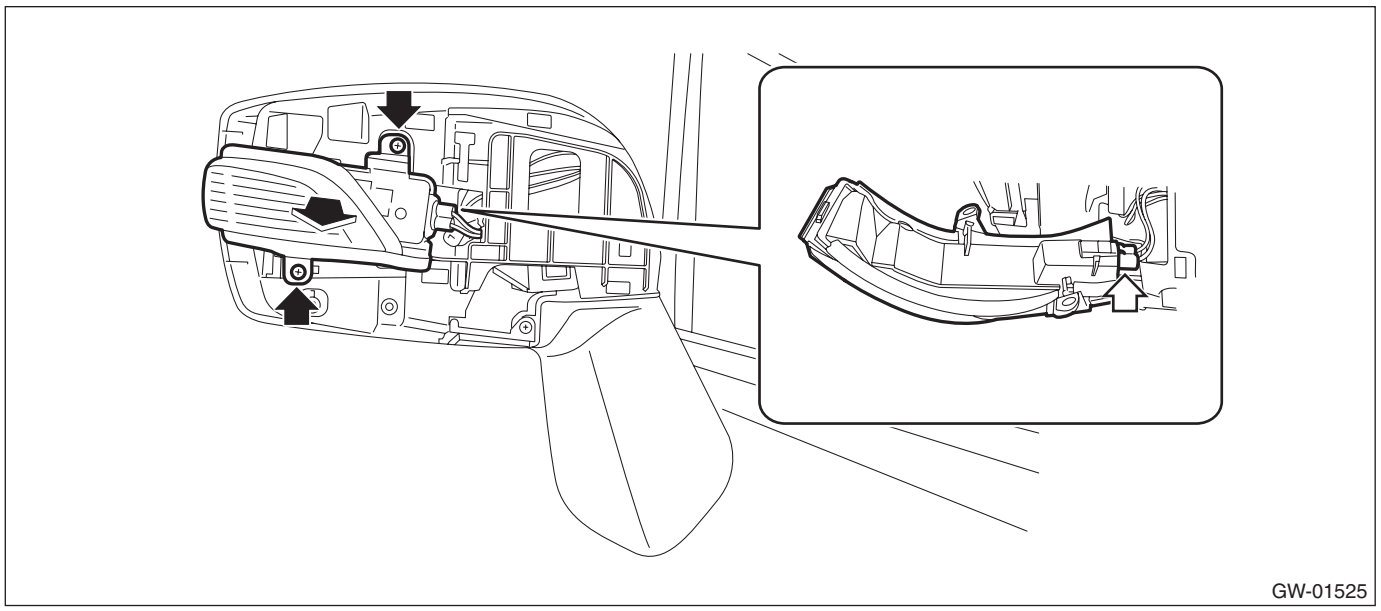


5) Release the claws, and then remove the cover - cap outer mirror.

CAUTION:
Be careful not to apply excessive force when removing the cover - cap outer mirror, as the lower hooks may become damaged.



6) Remove the light assembly - side turn mirror. (Model with side turn signal light)
   (1) Remove the screws and pull out the light assembly - side turn mirror to the front of the vehicle.
   (2) Disconnect the connector and remove the light assembly - side turn mirror.



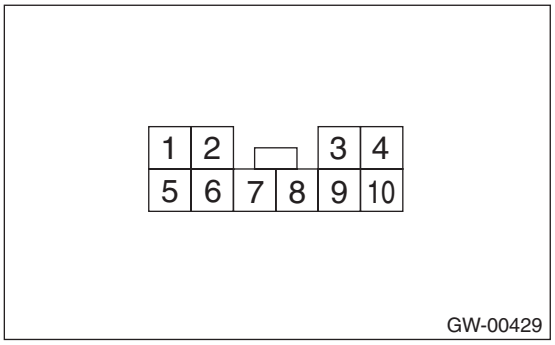
D: ASSEMBLY

CAUTION:
Be careful not to catch the harness in between the parts.
1) Install the light assembly - side turn mirror.
2) Install the cover - cap outer mirror.
3) Install the cover - cap outer mirror lower.
4) Check that all the claws are securely engaged.
5) Install the mirror - repair.

E: INSPECTION

1. CHECK OPERATION

1) Disconnect the outer mirror connector.
2) Apply battery voltage between the outer mirror connector terminals and check the mirror operation.



Terminal No.	Inspection conditions	Switch position
—	—	OFF
3 (+) — 8 (–)	Apply battery voltage between terminals.	UP
8 (+) — 3 (–)	Apply battery voltage between terminals.	DOWN
7 (+) — 3 (–)	Apply battery voltage between terminals.	LEFT
3 (+) — 7 (–)	Apply battery voltage between terminals.	RIGHT

3) If it does not operate normally, replace the outer mirror assembly.

2. CHECK OPERATION OF Subaru Rear Vehicle Detection INDICATOR

1) Check the Subaru Rear Vehicle Detection system. <Ref. to RVD(diag)-2, Basic Diagnostic Procedure.>
2) Check the outer mirror assembly.
   (1) Check that it illuminates normally when the BSD/RCTA OFF switch is turned ON while it is installed to the vehicle.
   (2) If it does not illuminate normally, replace the mirror - repair.
   (3) Check that it illuminates normally again. If it does not illuminate normally, replace the outer mirror assembly.

9. Remote Control Mirror Switch

A: REMOVAL

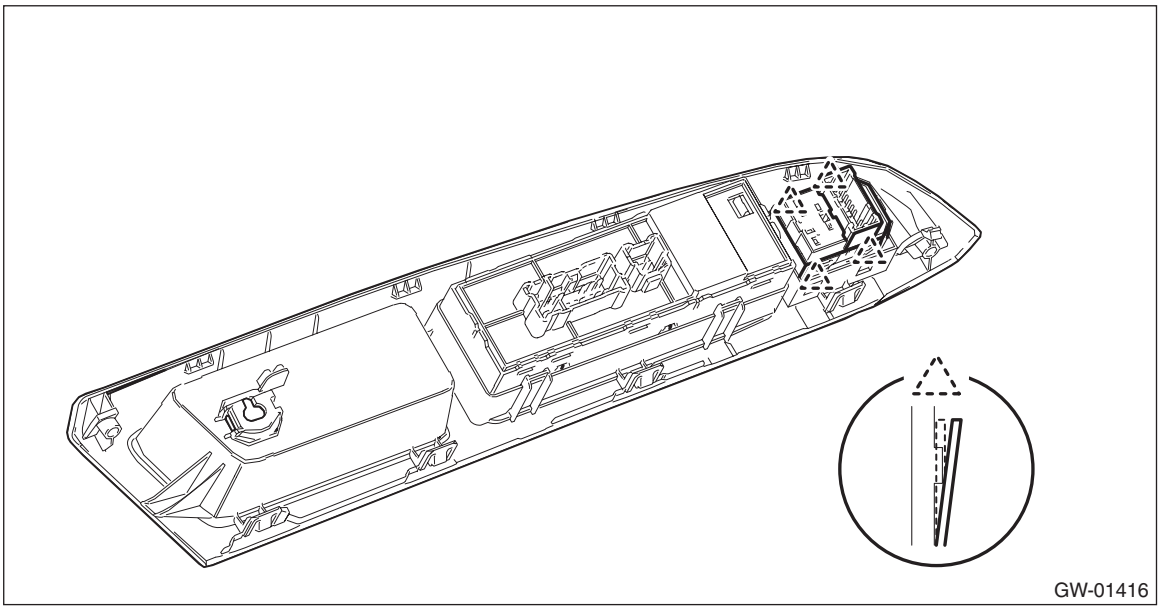
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>

3) Remove the panel - power window main switch. <Ref. to GW-12, MAIN SWITCH, REMOVAL, Power Window Control Switch.>

4) Release the claws, and then remove the switch - door mirror.



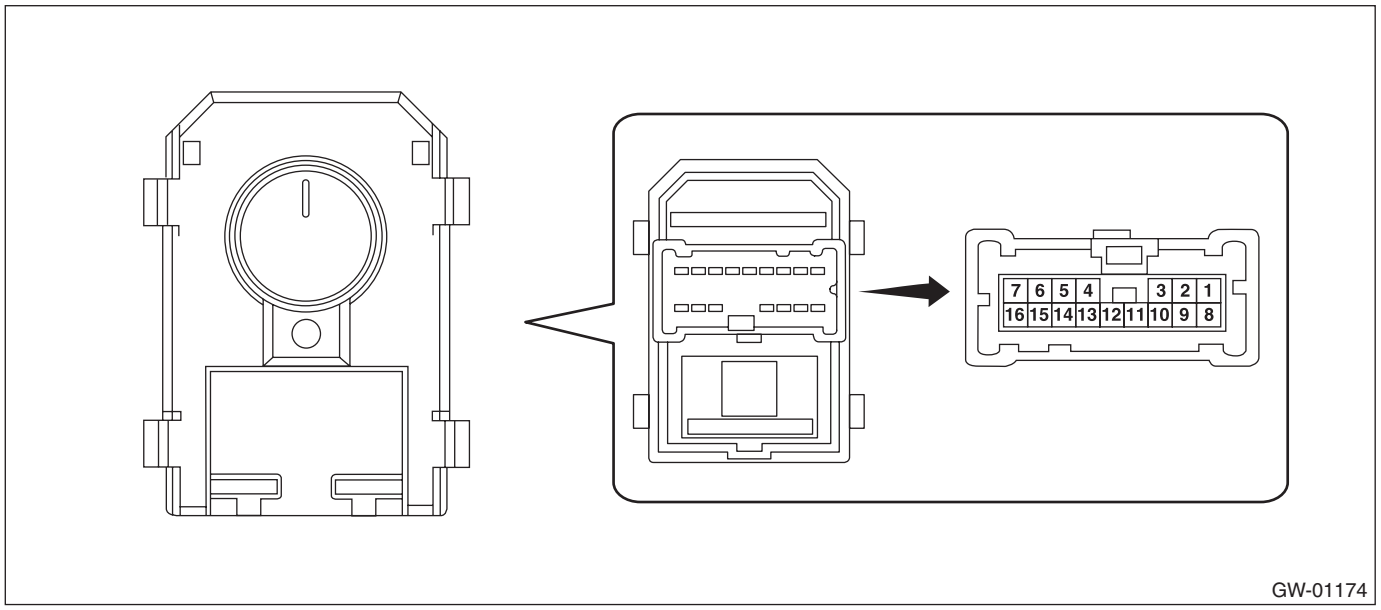
B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Disconnect the connector of the switch - door mirror.
2) Check the resistance between switch - door mirror terminals.

Preparation tool:
Circuit tester



- Changeover switch RH

Terminal No.	Inspection conditions	Standard
—	OFF	1 MΩ or more
1 — 12 9 — 7	UP	Less than 1 Ω
1 — 9 12 — 7	DOWN	Less than 1 Ω
1 — 11 12 — 7	LEFT	Less than 1 Ω
1 — 12 11 — 7	RIGHT	Less than 1 Ω

- Changeover switch LH

Terminal No.	Inspection conditions	Standard
—	OFF	1 MΩ or more
1 — 14 8 — 7	UP	Less than 1 Ω
1 — 8 14 — 7	DOWN	Less than 1 Ω
1 — 10 14 — 7	LEFT	Less than 1 Ω
1 — 14 10 — 7	RIGHT	Less than 1 Ω

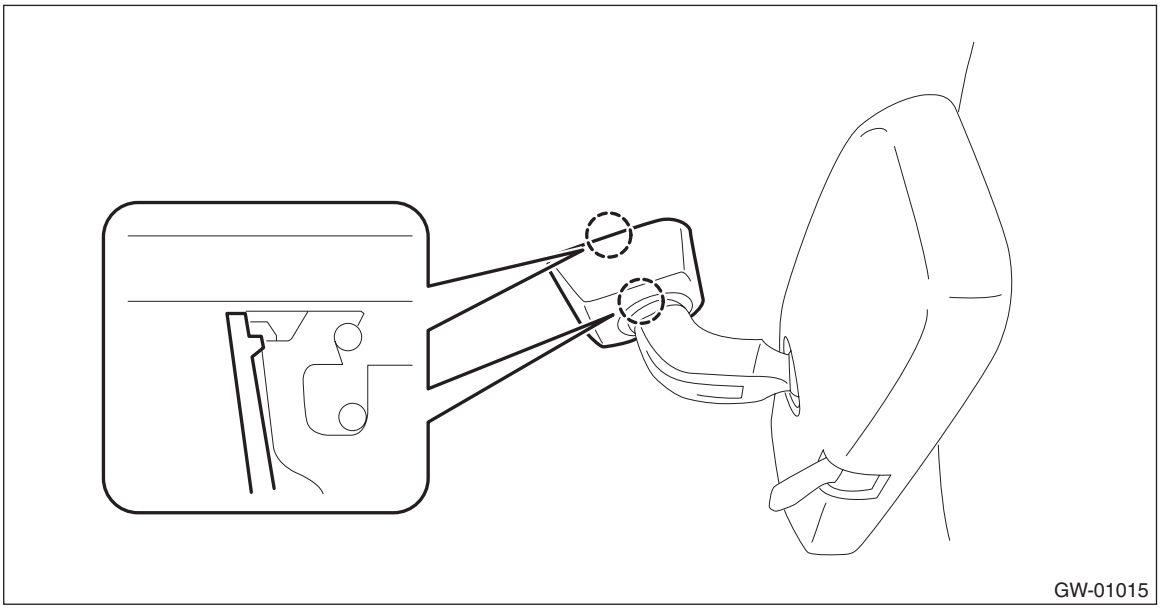
3) If the inspection result is not within the standard, replace the switch - door mirror.

10.Rearview Mirror

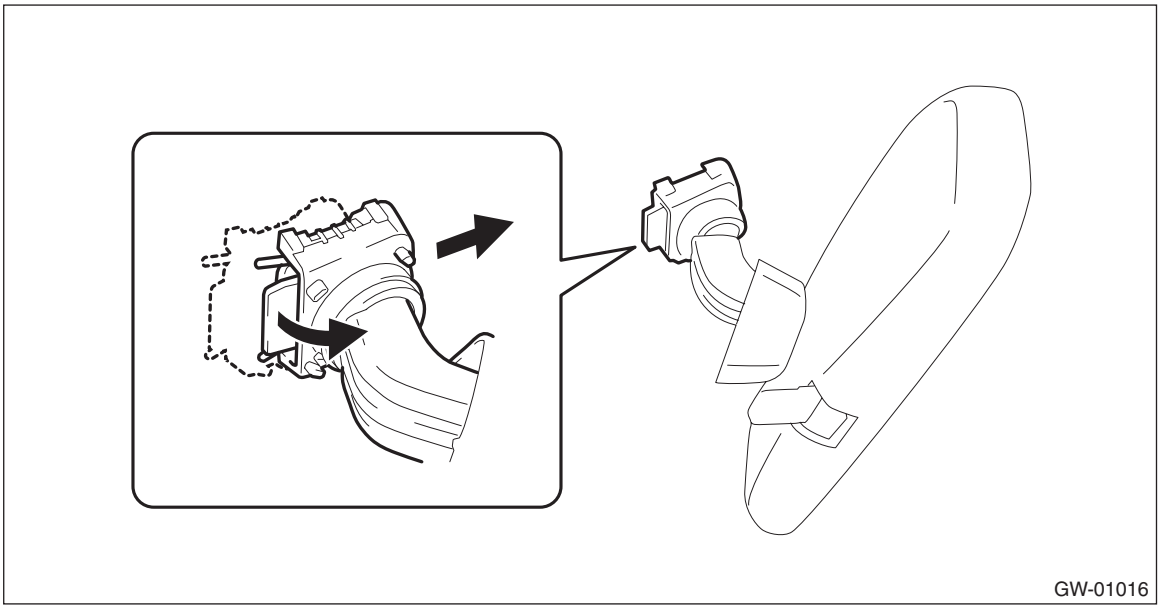
A: REMOVAL

CAUTION:
- **Be careful not to damage the mirror surface and the glass - front window.**
- **Do not remove the base - inner mirror from the glass - front window.**

1) Release the claws, and then remove the cover.



2) Release the lock lever, and slide the mirror assembly - inner rearview to remove.



3) If the base - inner mirror is damaged, replace it together with the glass - front window.

B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

Check that the mirror assembly - inner rearview and base - inner mirror for damage.

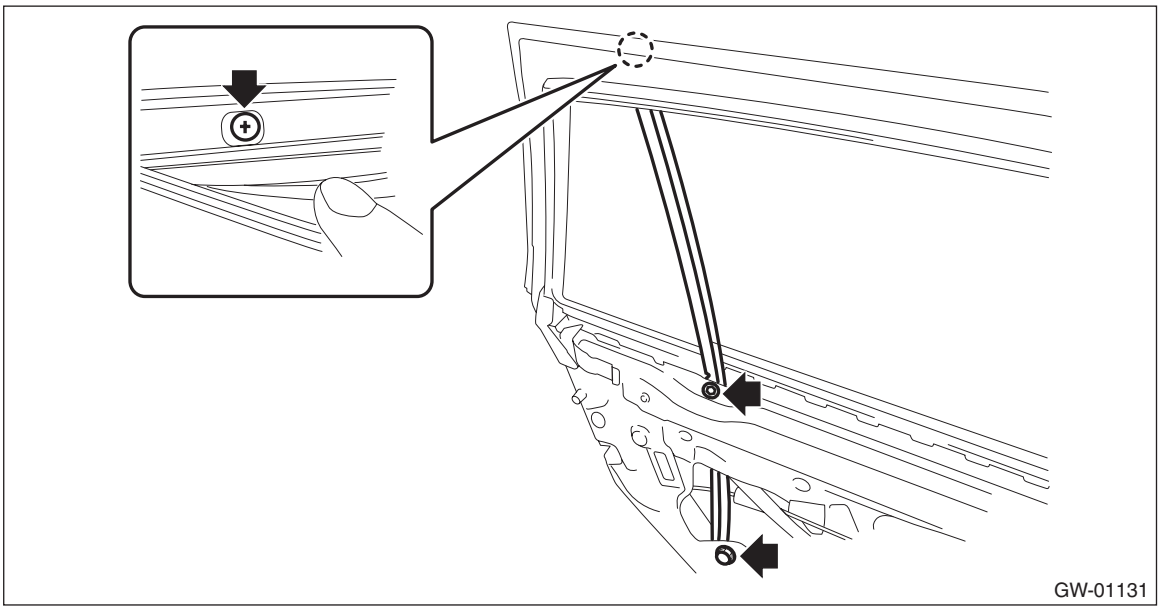
11.Rear Door Glass

A: REMOVAL

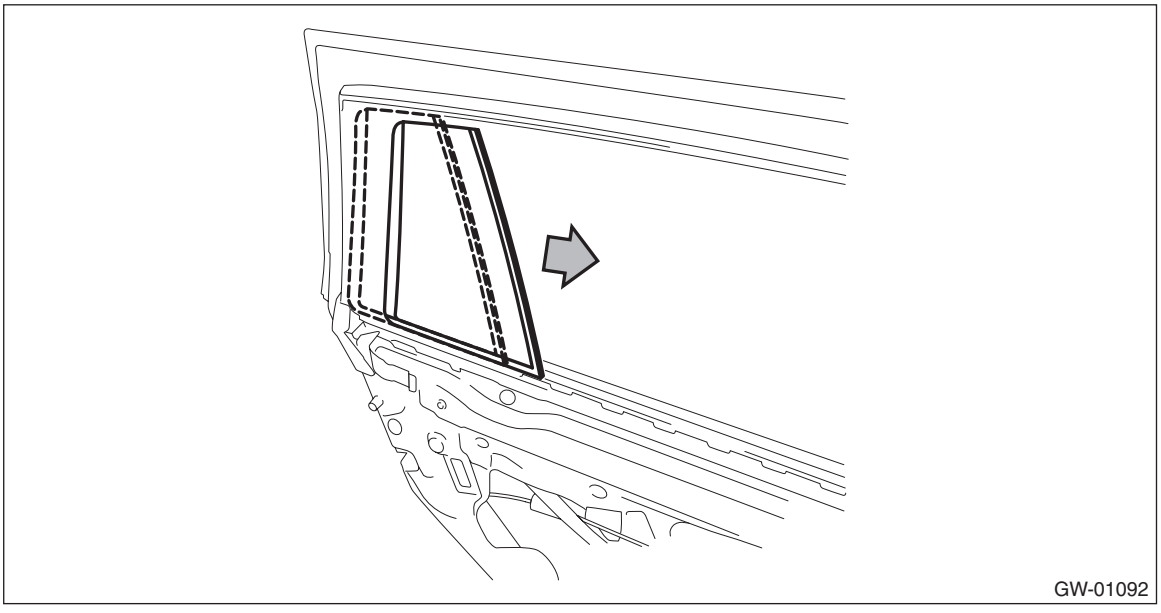
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - rear door. <Ref. to EB-34, REMOVAL, Rear Sealing Cover.>
4) Attach the battery ground cable and the switch - power window, and turn the ignition switch to ON.
5) Remove the glass assembly - rear door.
   (1) Operate the switch - power window sub rear to move the glass assembly - rear door to the lowest position.
   (2) Remove the running channel - rear door.
   (3) Remove the screws and bolts, and then remove the sash COMPL - rear partition.

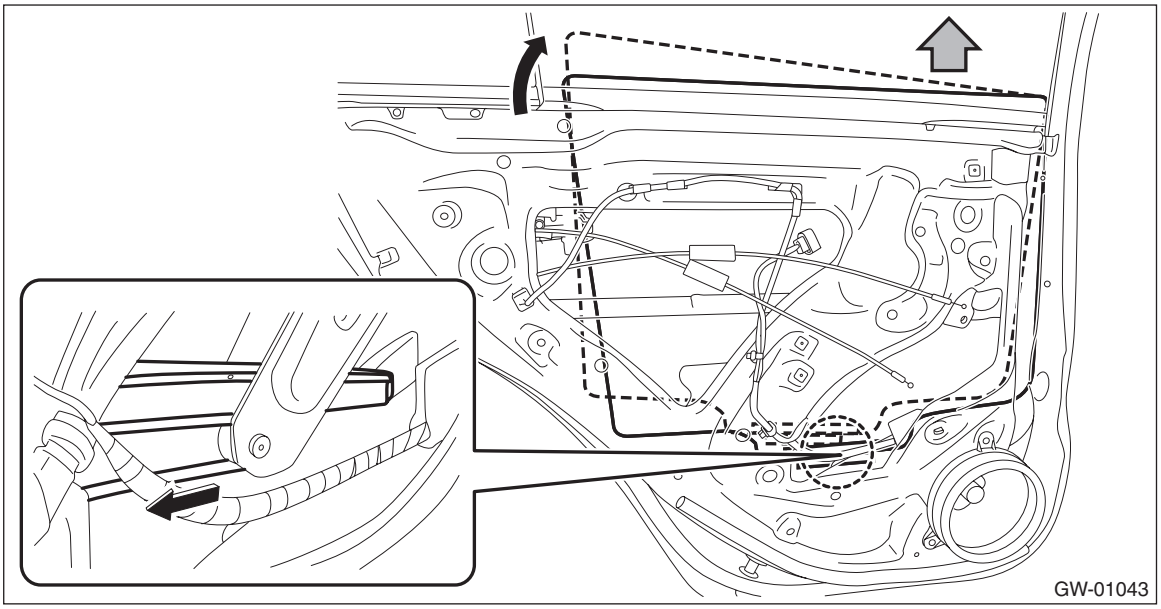

GW-01131

   (4) Remove the glass - rear door partition.


GW-01092

(5) While tilting the glass assembly - rear door, remove the guide from the roller of the regulator and motor assembly - rear, then remove the glass assembly - rear door.

CAUTION:
Avoid impact and damage to the glass assembly - rear door.



B: INSTALLATION

CAUTION:
• Check that the running channel - rear door is securely fixed to the panel assembly - rear door and to the sash COMPL - rear partition.
• Before installing the glass assembly - rear door, check the lip of the running channel - rear door for being everted or tuck-in.
Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to GW-3, REAR DOOR GLASS, COMPONENT, General Description.>

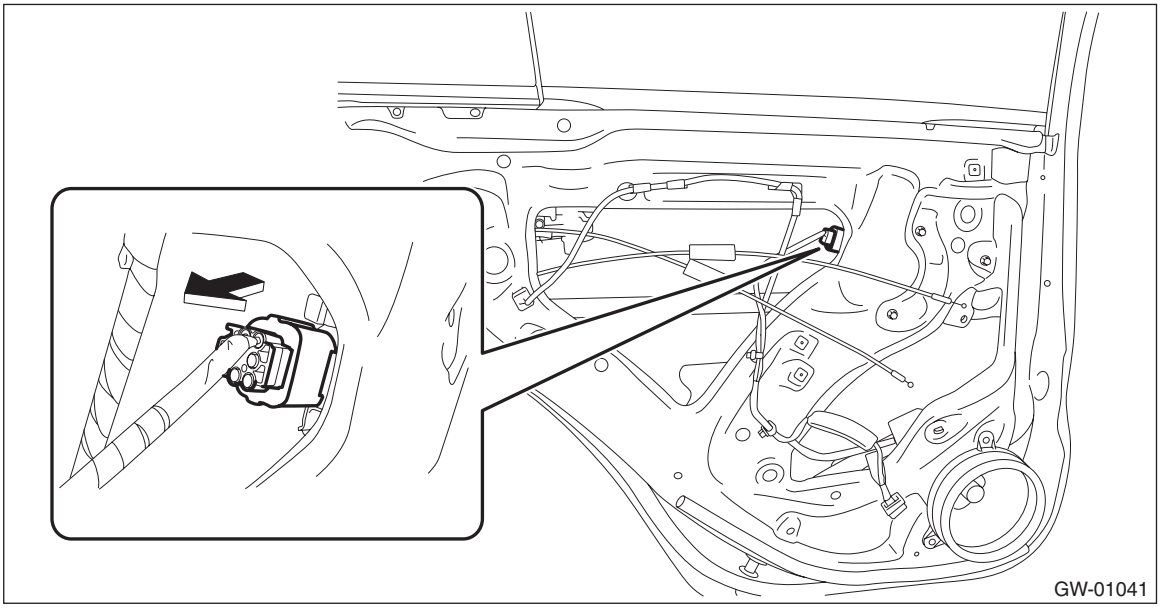
12.Rear Regulator and Motor Assembly

A: REMOVAL

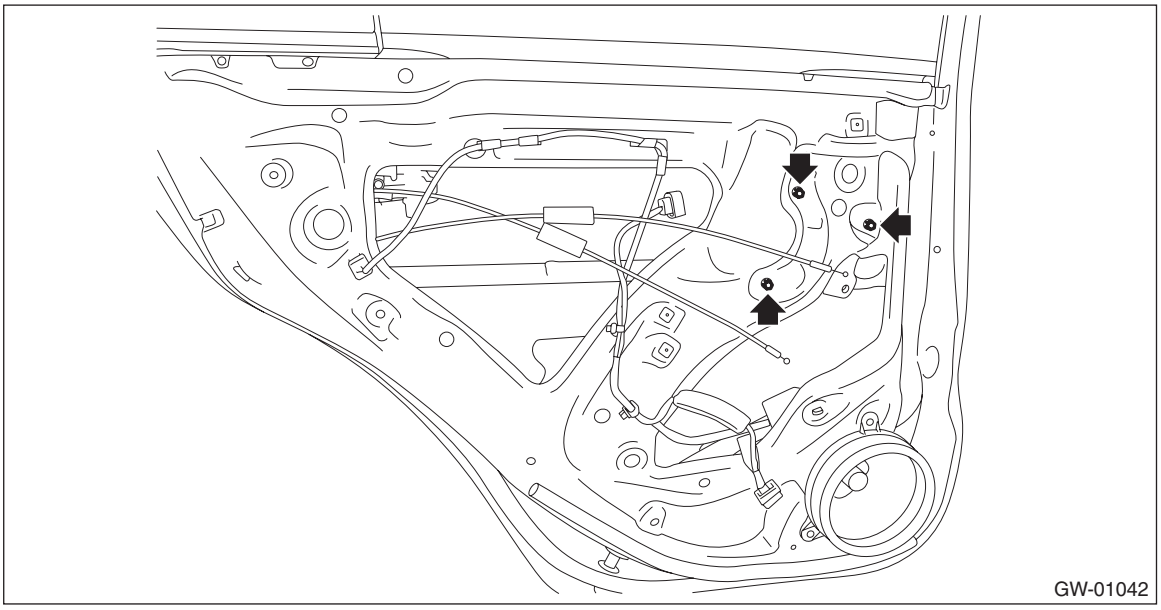
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - rear door. <Ref. to EB-34, REMOVAL, Rear Sealing Cover.>
4) Remove the glass assembly - rear door. <Ref. to GW-33, REMOVAL, Rear Door Glass.>
5) Remove the rear regulator and motor assembly.
   (1) Disconnect the motor - rear connector.


GW-01041

   (2) Remove the bolts, and then remove the rear regulator and motor assembly.


GW-01042

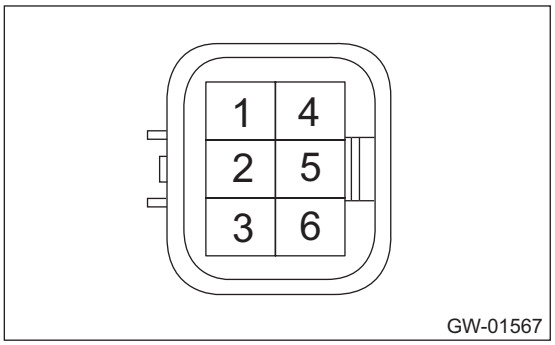
B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to GW-3, REAR DOOR GLASS, COMPONENT, General Description.>

C: INSPECTION

1) Disconnect the connector of the motor - rear.
2) Check the motor operation when battery voltage is applied between terminals of the motor - rear connector.



- LH side

Terminal No.	Inspection conditions	Standard
4 (+) — 1 (–)	Apply battery voltage between terminals.	Increase
1 (+) — 4 (–)	Apply battery voltage between terminals.	Decrease

- RH side

Terminal No.	Inspection conditions	Standard
3 (+) — 6 (–)	Apply battery voltage between terminals.	Increase
6 (+) — 3 (–)	Apply battery voltage between terminals.	Decrease

3) If it does not operate properly as a result of inspection, replace the regulator and motor assembly - rear.

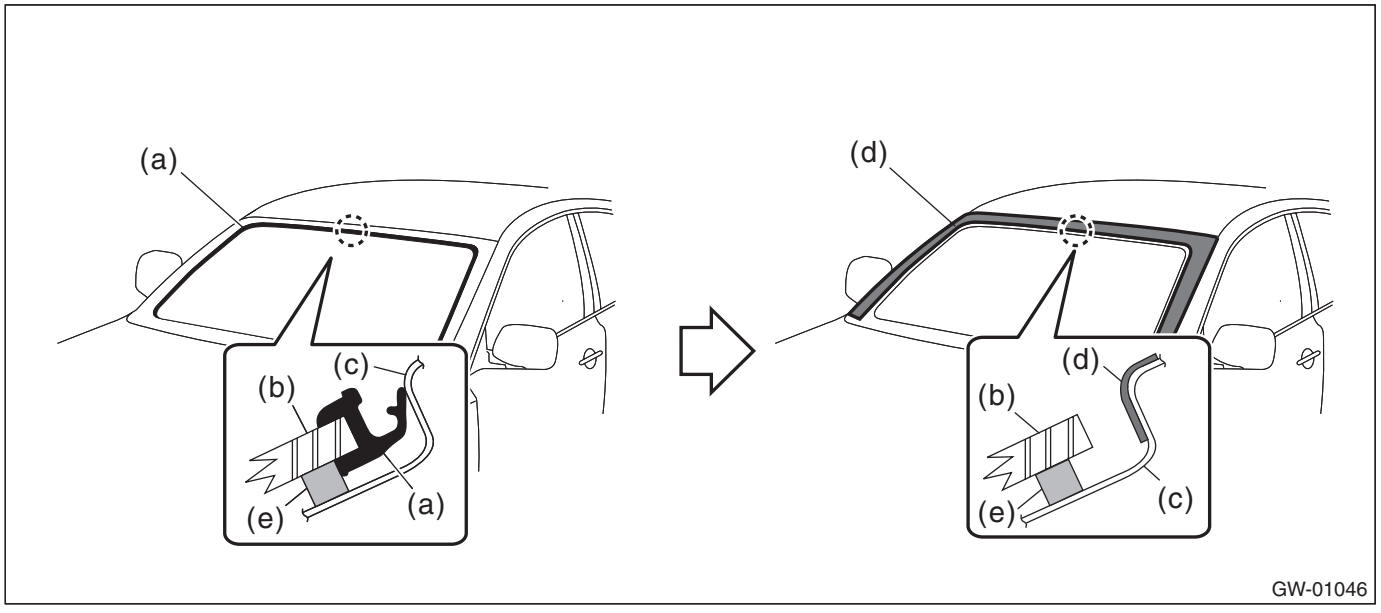
13.Windshield Glass

A: REMOVAL

1. USING WINDSHIELD GLASS KNIFE

CAUTION:
• For model with EyeSight, always remove the glass - front window after the stereo camera is removed.
• For model with EyeSight, always use Subaru genuine windshield glass specially designed for EyeSight. (If the windshield glass other than the glass specially designed for EyeSight is used, the visibility of the camera is blocked or the distortion of the glass prevents the correct measurement of the object, resulting in the EyeSight abnormal operation.)
• For model with EyeSight, if the windshield glass is installed after removal or replaced, always perform the "Inspection" and "Adjustment and check" of the stereo camera.
Inspection: <Ref. to ES(diag)-7, INSPECTION, General Description.>
Adjustment and check: <Ref. to ES-12, Camera Adjustment, Inspection.>
• For model with EyeSight, if the damage is found in the glass repair prohibited area, always replace the glass. Damage in the prohibited area can affect the recognition of the stereo camera even if it is repaired, and thereby EyeSight function may not operate properly.
1) Disconnect the ground cable from battery. (Models with wiper deicer) <Ref. to NT-6, BATTERY, NOTE, Note.>

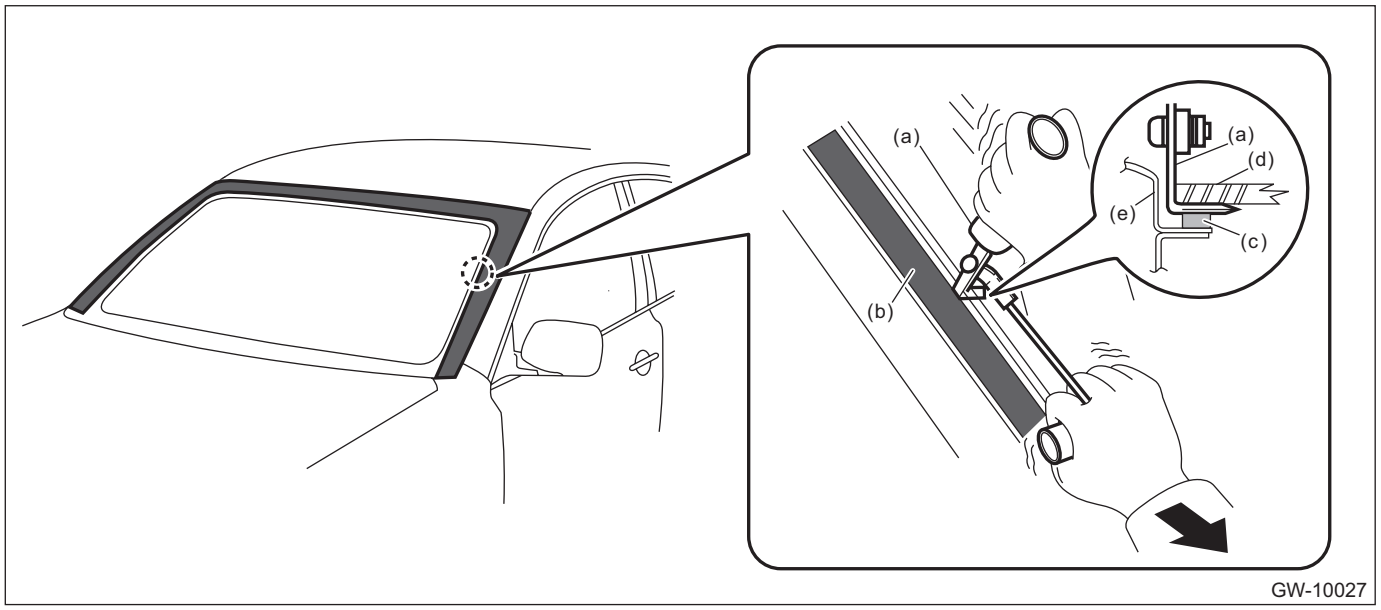
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - front pillar UPR. <Ref. to EI-94, REMOVAL, Upper Inner Trim.>
3) Remove the cowl panel assembly. <Ref. to EI-57, REMOVAL, Cowl Panel.>
4) Disconnect the wiper deicer connector. (Models with wiper deicer)
5) Remove the stereo camera cover and stereo camera. (Models with EyeSight) <Ref. to ES-7, REMOVAL, Stereo Camera.>
6) Remove the molding - front window from the glass - front window, and attach protective tape on the body side of the circumference of the glass - front window.



(a) Molding - front window
(b) Glass - front window
(c) Body panel
(d) Protective tape
(e) Adhesive

7) Remove the glass - front window.
(1) Apply sufficient amount of soapy water to the adhesive part and insert the windshield glass knife.
(2) While holding the edges of the knife and the glass - front window at a right angle, move the windshield glass knife parallel to the edge of the glass - front window, and cut the adhesive along the surface and the edge of the glass - front window.

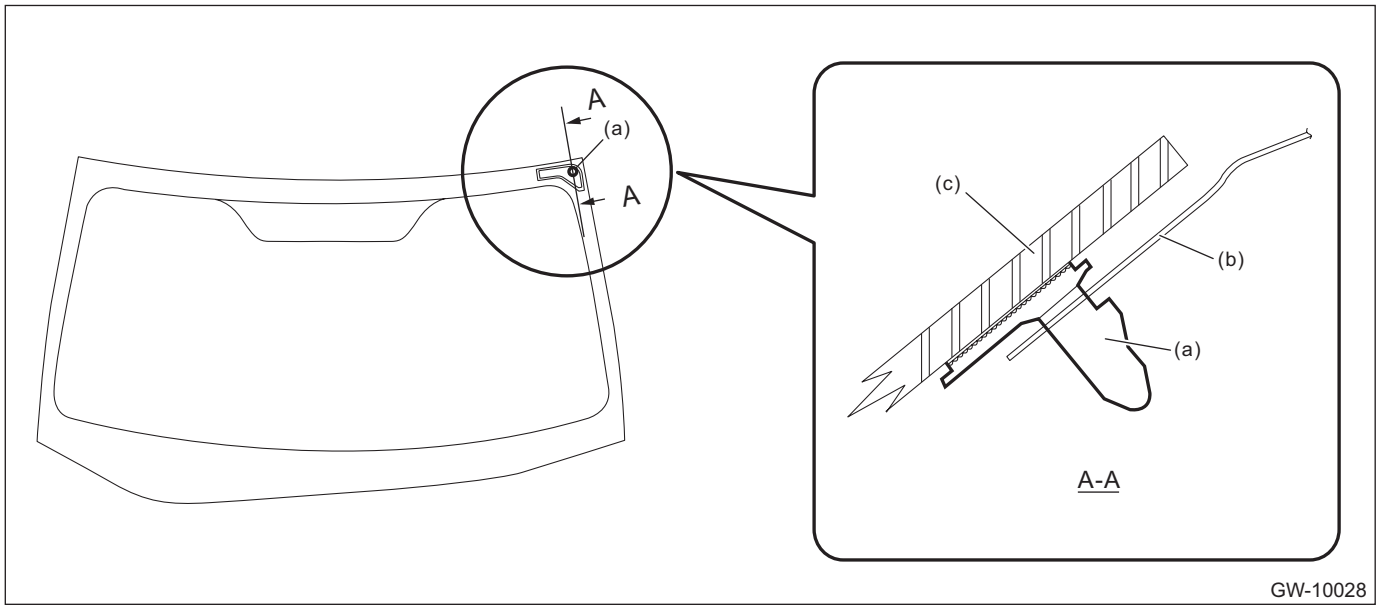
CAUTION:
• Cutting of adhesive part should be started from an area with wider gap between the glass - front window and the body.
• Never twist the windshield glass knife.



(a) Windshield glass knife
(b) Protective tape
(c) Adhesive
(d) Glass - front window
(e) Body panel

(3) Disconnect the locating pin - front window, and remove the glass - front window.

NOTE:
The locating pin - front window are bonded to the corners of the glass - front window. Use piano wire to disconnect the pins.



(a) Locating pin - front window
(b) Body panel
(c) Glass - front window

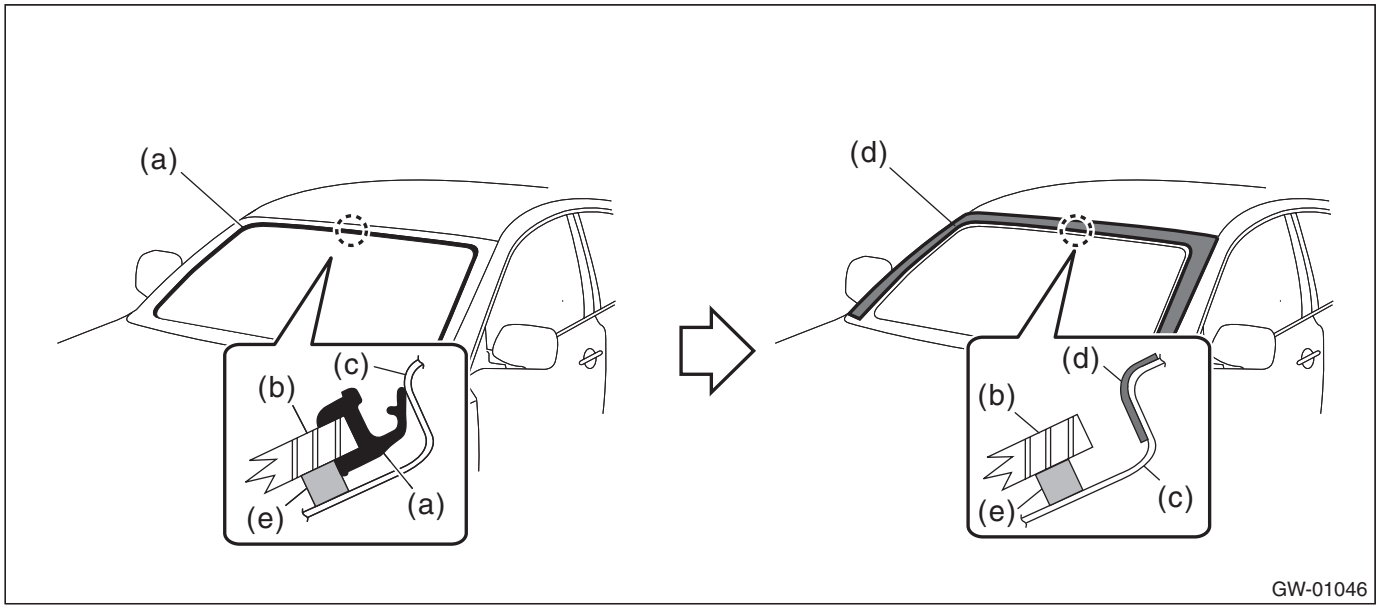
2. USING PIANO WIRE

CAUTION:
- **Do not tightly pull the piano wire against the glass - front window edge.**
- **Apply protective tape, etc, and be careful that the inner and outer components of the vehicle are not damaged.**
- **Do not cross piano wires. Otherwise they may be cut.**

1) Disconnect the ground cable from battery. (Models with wiper deicer) <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

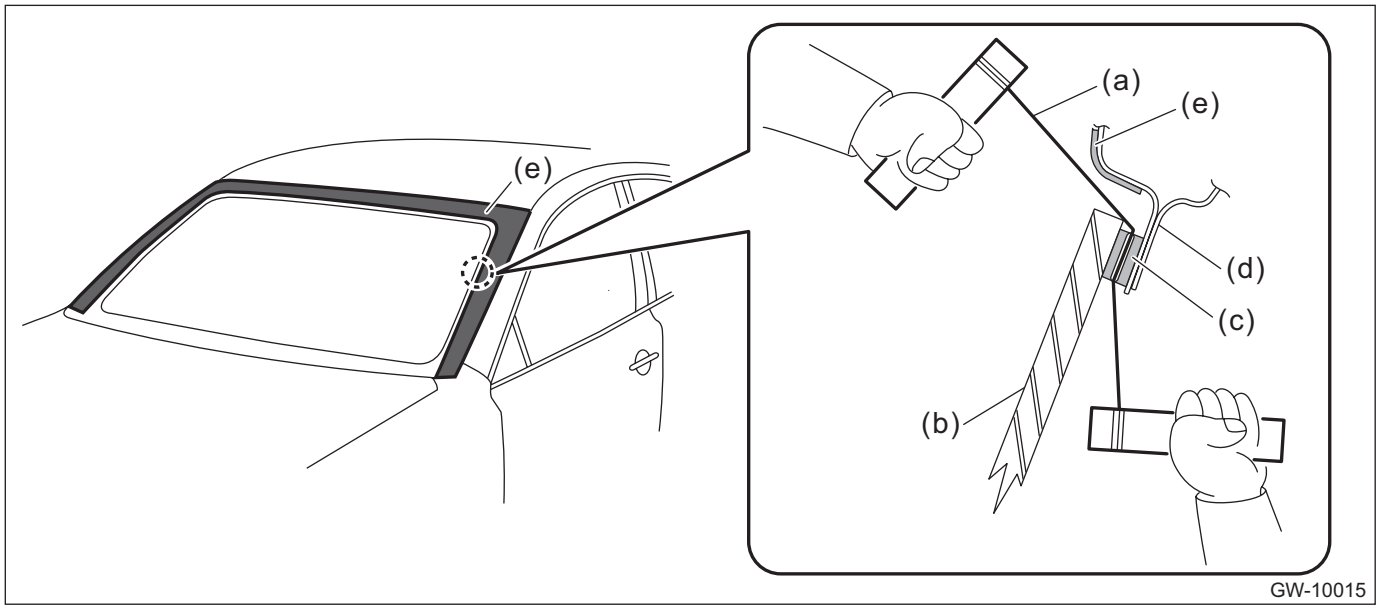
2) Remove the trim panel - front pillar UPR. <Ref. to EI-94, REMOVAL, Upper Inner Trim.>
3) Remove the cowl panel assembly. <Ref. to EI-57, REMOVAL, Cowl Panel.>
4) Disconnect the wiper deicer connector. (Models with wiper deicer)
5) Remove the stereo camera cover and stereo camera. (Models with EyeSight) <Ref. to ES-7, REMOVAL, Stereo Camera.>
6) Remove the molding - front window from the glass - front window, and attach protective tape on the body side of the circumference of the glass - front window.



(a) Molding - front window
(b) Glass - front window
(c) Body panel
(d) Protective tape
(e) Adhesive

7) Remove the glass - front window.
(1) Using a drill, make a hole in the adhesive part.
(2) Pass the piano wire through the hole, and pull the wire ends alternately to cut off the adhesive part and the locating pin - front window.

CAUTION:
Attach a piece of wood to both piano wire ends.

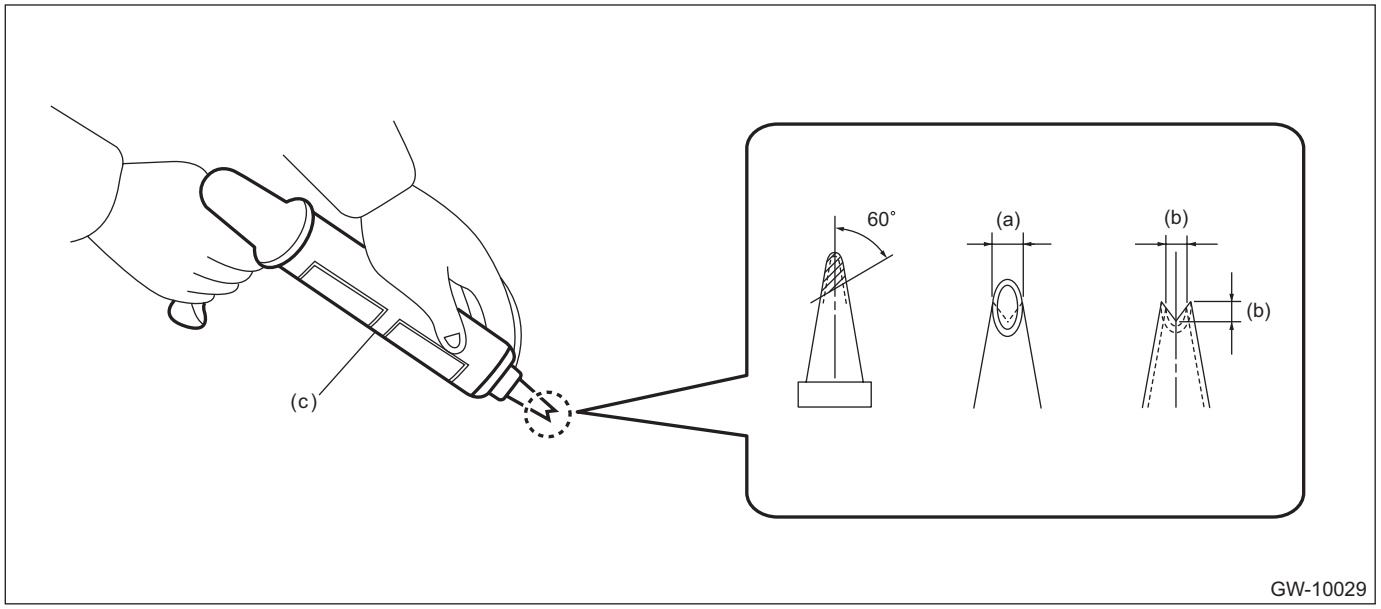


(a) Piano wire
(b) Glass - front window
(c) Adhesive
(d) Body panel
(e) Protective tape

B: INSTALLATION

CAUTION:
• For model with EyeSight, always use Subaru genuine windshield glass specially designed for EyeSight. (If the windshield glass other than the glass specially designed for EyeSight is used, the visibility of the camera is blocked or the distortion of the glass prevents the correct measurement of the object, resulting in the EyeSight abnormal operation.)
• For model with EyeSight, if the windshield glass is installed after removal or replaced, always perform the "Inspection" and "Adjustment and check" of the stereo camera.
Inspection: <Ref. to ES(diag)-7, INSPECTION, General Description.>
Adjustment and check: <Ref. to ES-12, Camera Adjustment, Inspection.>
• For model with EyeSight, if the damage is found in the glass repair prohibited area, always replace the glass. Damage in the prohibited area can affect the recognition of the stereo camera even if it is repaired, and thereby EyeSight function may not operate properly.

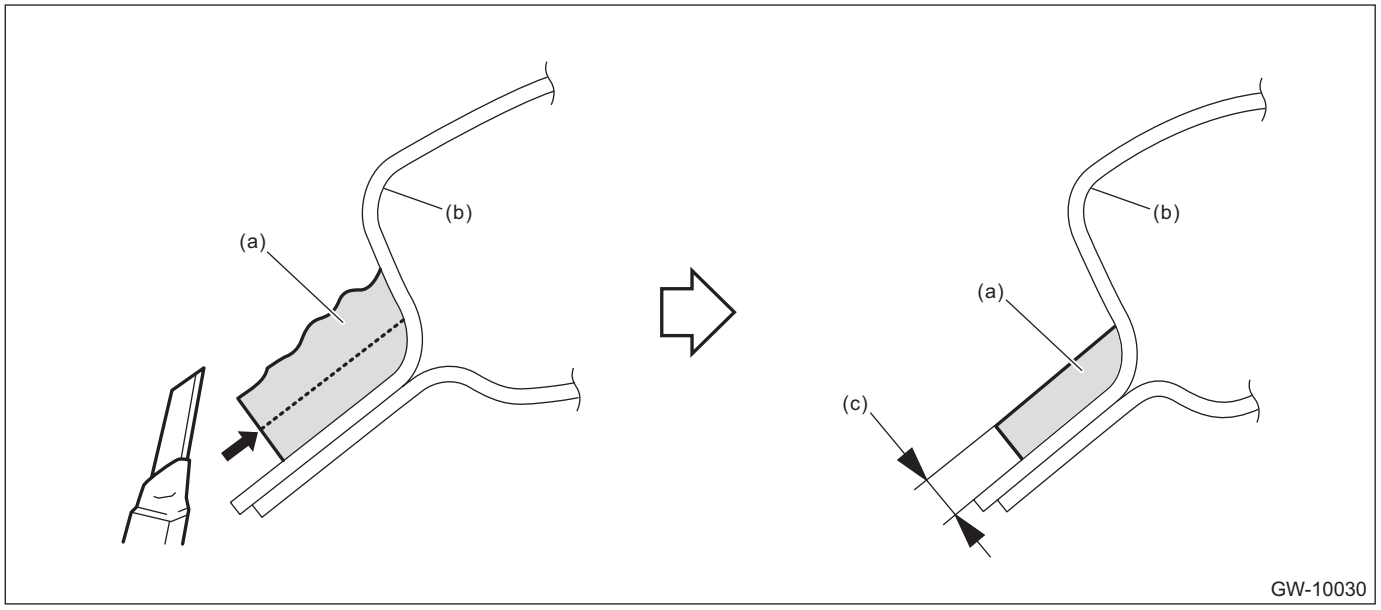
1) Fabricate the cartridge nozzle tip as shown and set the sealant gun with the adhesive.



(a) 10 mm (0.39 in) (b) 8 mm (0.31 in) (c) Sealant gun

2) Remove the adhesive layer on the body using cutter knife to obtain smooth face of 2 mm (0.08 in) thick.

CAUTION:
- **Be careful not to damage the body and paint surface.**
- **Be sure to keep some amount of old adhesive.**

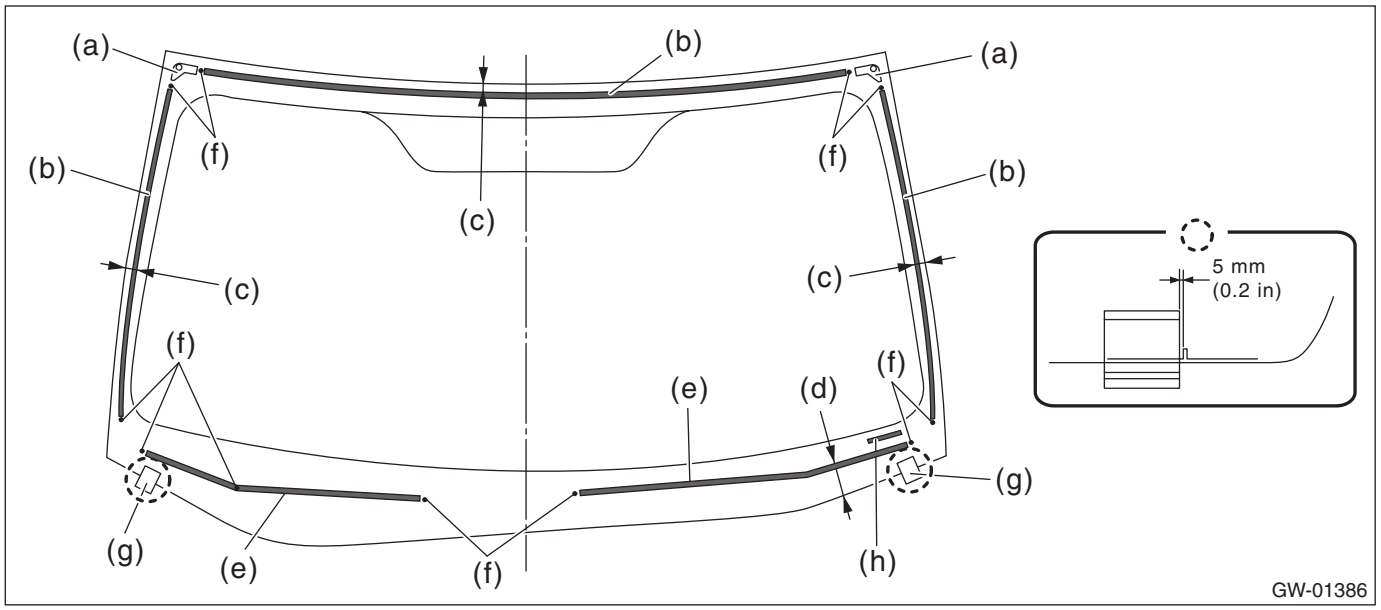


(a) Adhesive (b) Body panel (c) 2 mm (0.08 in)

3) Clean the glass - front window and the body with alcohol or appropriate cleaning solvent to completely eliminate cutting powder, dust and dirt.
4) Attach the dam rubber - front to the glass - front window.

CAUTION:
- **Attach the driver's side dam rubber - front lower to the constant distance of 19.1 mm (0.75 in) from the glass end.**

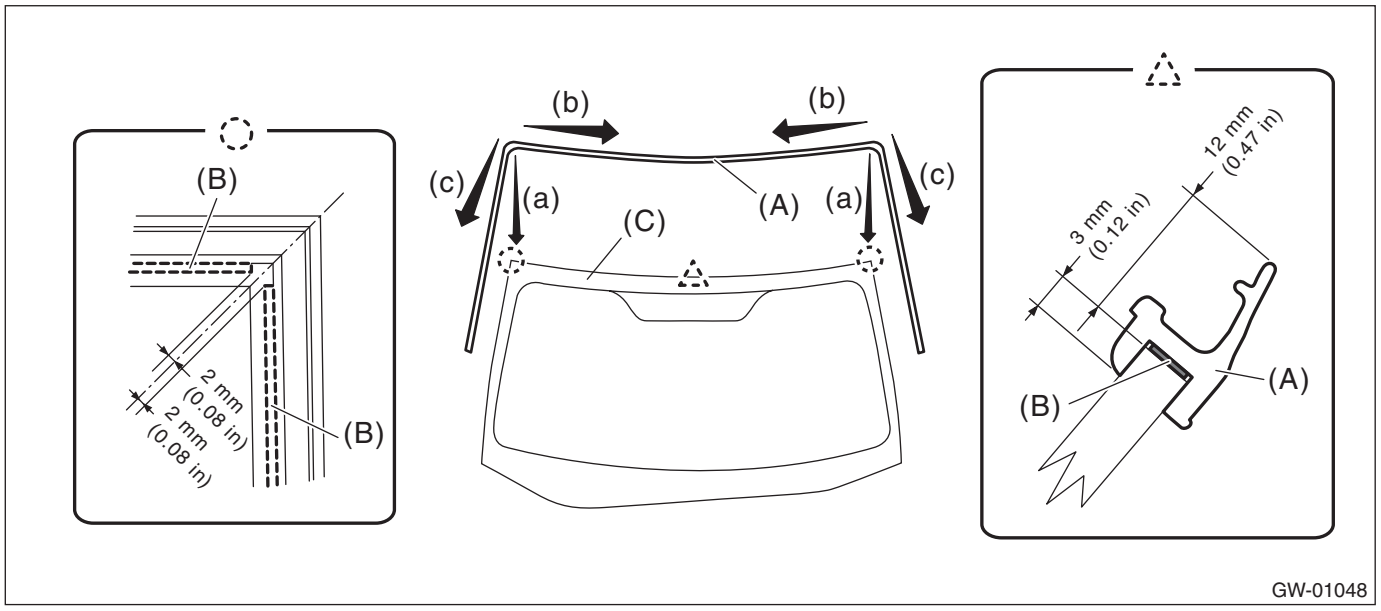
• Attach the passenger's side dam rubber - front lower straight between the dam rubber set marks while aligning with the dam rubber set mark.



(a)	Locating pin - front window	(d)	19.1 mm (0.75 in)	(g)	Seal - lower
(b)	Dam rubber - front upper	(e)	Dam rubber - front lower	(h)	Seal - lower VIN
(c)	16 mm (0.63 in)	(f)	Dam rubber set mark		

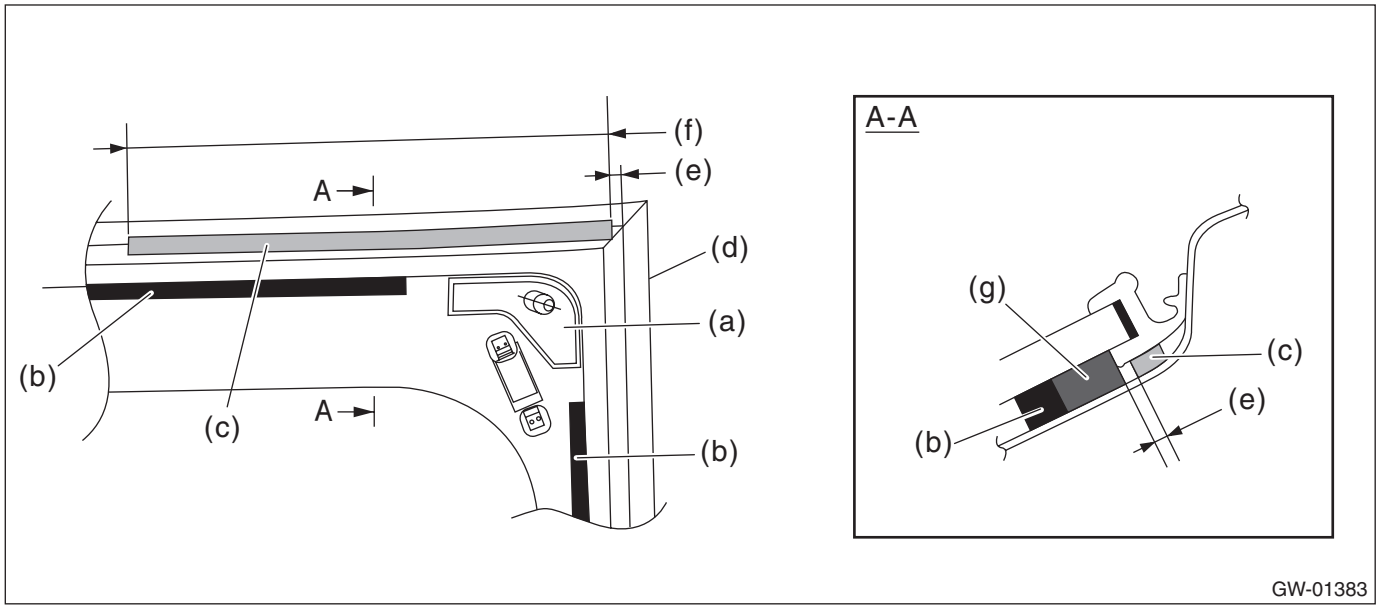
5) Attach the molding - front window to the glass - front window.

CAUTION:
Be careful to attach the molding - front window so that the molding has no loose or undulating part.



(1) Align the molding - front window (A) to the upper ends (a) of the glass - front window (C).
(2) Install the molding - front window from both corners of the upper edge toward the center (b).
(3) Install the molding - front window from both corners of the upper edge toward the lower side (c).
(4) Firmly apply the double sided tape (B) of the molding - front window evenly to the surface of the glass - front window.

6) Attach the seal - upper to the molding - front window.



(a) Locating pin - front window
(b) Dam rubber - front upper
(c) Seal - upper
(d) Molding - front window
(e) 3 mm (0.12 in)
(f) 165 mm (6.50 in)
(g) Adhesive

7) Install the glass - front window.
(1) Apply the primer to the adhesive surface of glass - front window side and body side using sponge.

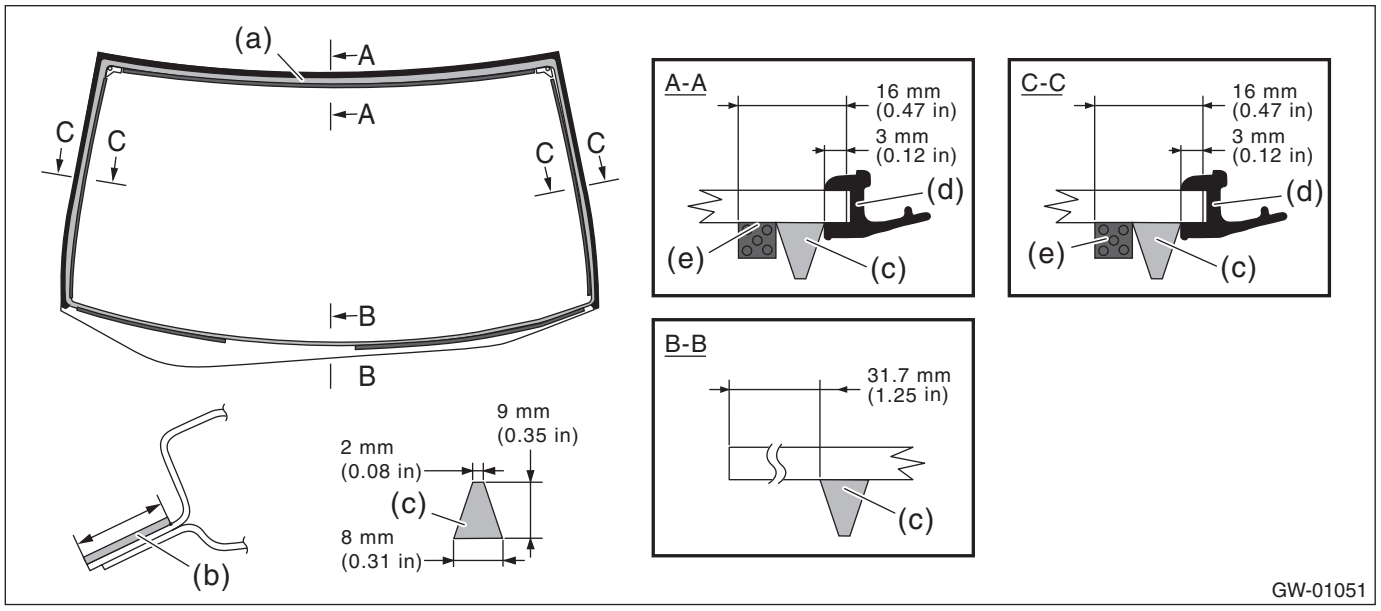
Glass primer:
Dow Automotive's
ESSEX U-401, U-402 or equivalent

Painted surface primer:
Dow Automotive's
ESSEX U-413 or equivalent

NOTE:
• Primer once attached to the painted surface of the body and internal trim is hard to wipe off. Mask the circumference of such area.
• Let primer dry for about ten minutes before installing the glass - front window.
• Do not touch the surface coated with primer.

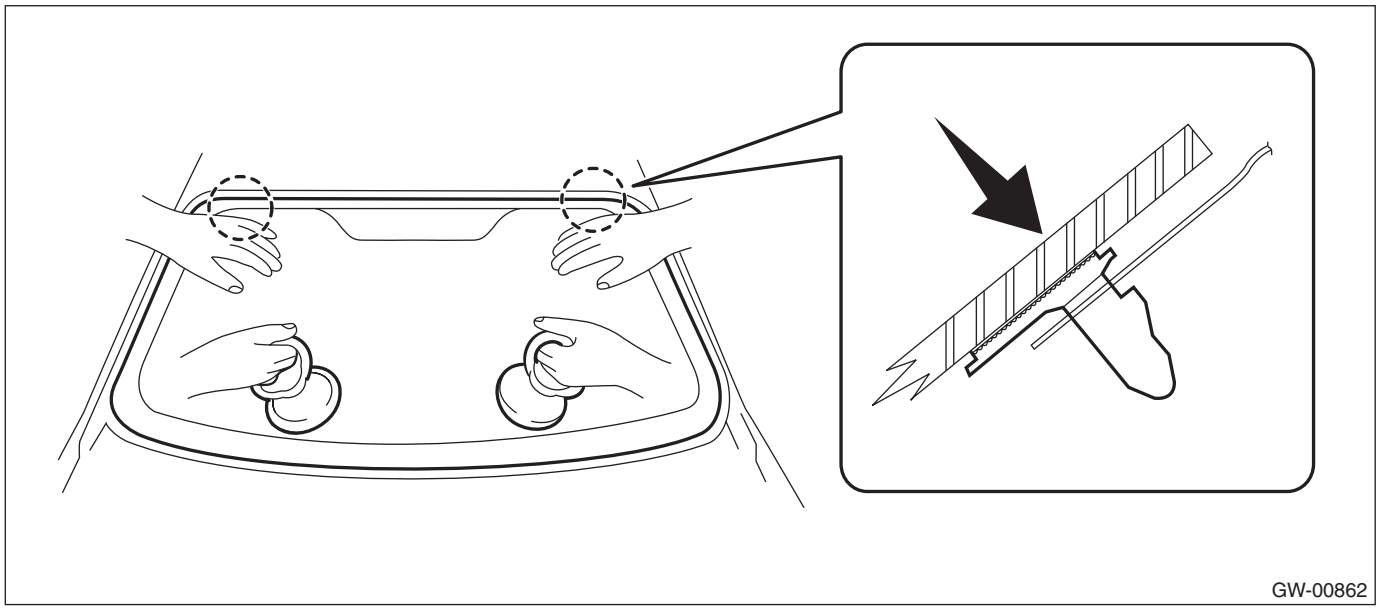
(2) Apply adhesive to the end back surface of the glass - front window.

Adhesive:
Dow Automotive's
ESSEX U-400HV or equivalent



(a) Application of primer (glass side)
(b) Application of primer (body side)
(c) Adhesive
(d) Molding - front window
(e) Dam rubber - front

(3) Fit the locating pins - front window to the vehicle body using suction rubber cups to install the windshield glass.



(4) Lightly press the entire perimeter of the glass - front window for tight fit.
(5) Make flush the adhesive surface jutted out using spatula.

8) After completion of all work, allow the vehicle to stand for about 24 hours.

NOTE:
• When opening/closing the door after the glass - front window was bonded, always lower the glass assembly - door first, and then open/close it carefully.
• Move the vehicle slowly.
• For minimum drying time and vehicle standing time before driving after bonding, follow instructions or instruction manual from the adhesive manufacturer.

9) Connect the wiper deicer connector. (Models with wiper deicer)
10) Install the cowl panel assembly. <Ref. to EI-59, INSTALLATION, Cowl Panel.>
11) Install the stereo camera cover and stereo camera. (Models with EyeSight) <Ref. to ES-10, INSTALLATION, Stereo Camera.>
12) Install the trim panel - front pillar UPR. <Ref. to EI-96, INSTALLATION, Upper Inner Trim.>
13) Connect the battery ground terminal. (Models with wiper deicer) <Ref. to NT-6, BATTERY, NOTE, Note.>
14) After curing of adhesive, pour the water on external surface of vehicle to check that there are no water leaks.

NOTE:
When a vehicle is returned to the user, tell him or her that the vehicle should not be subjected to heavy impact for at least three days.

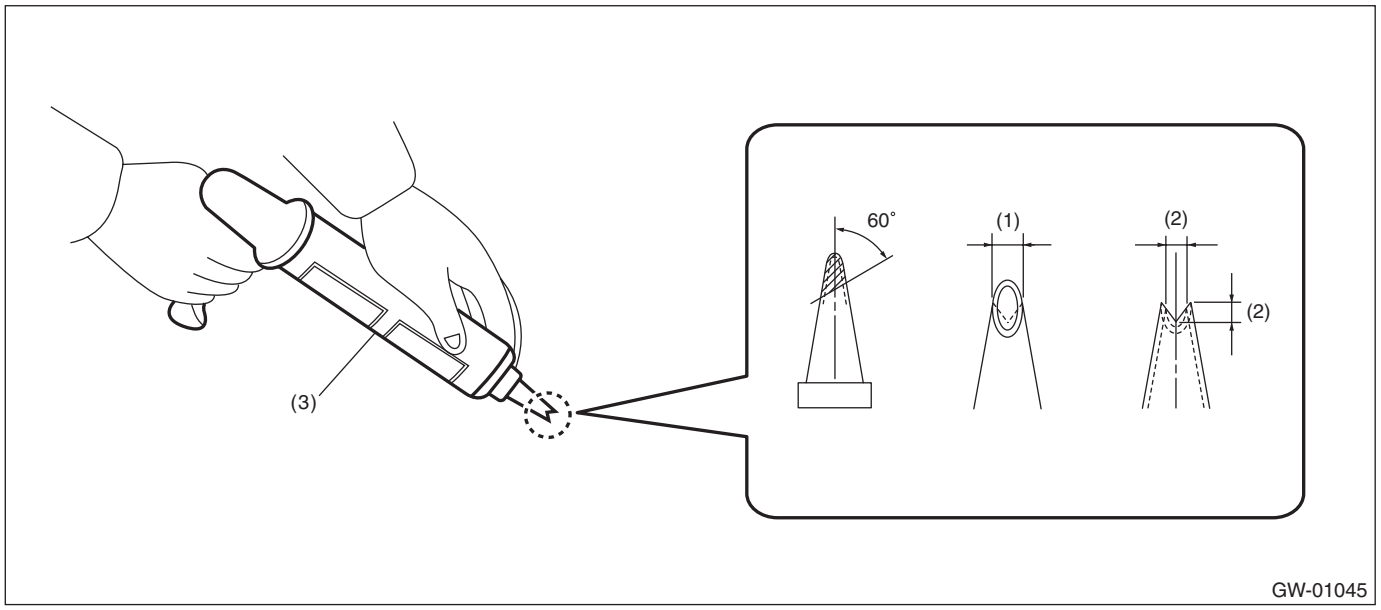
14.Rear Window Glass

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Disconnect the rear defogger connector.
3) Remove the glass - rear window in the same procedure as for the glass - front window. <Ref. to GW-37, REMOVAL, Windshield Glass.>

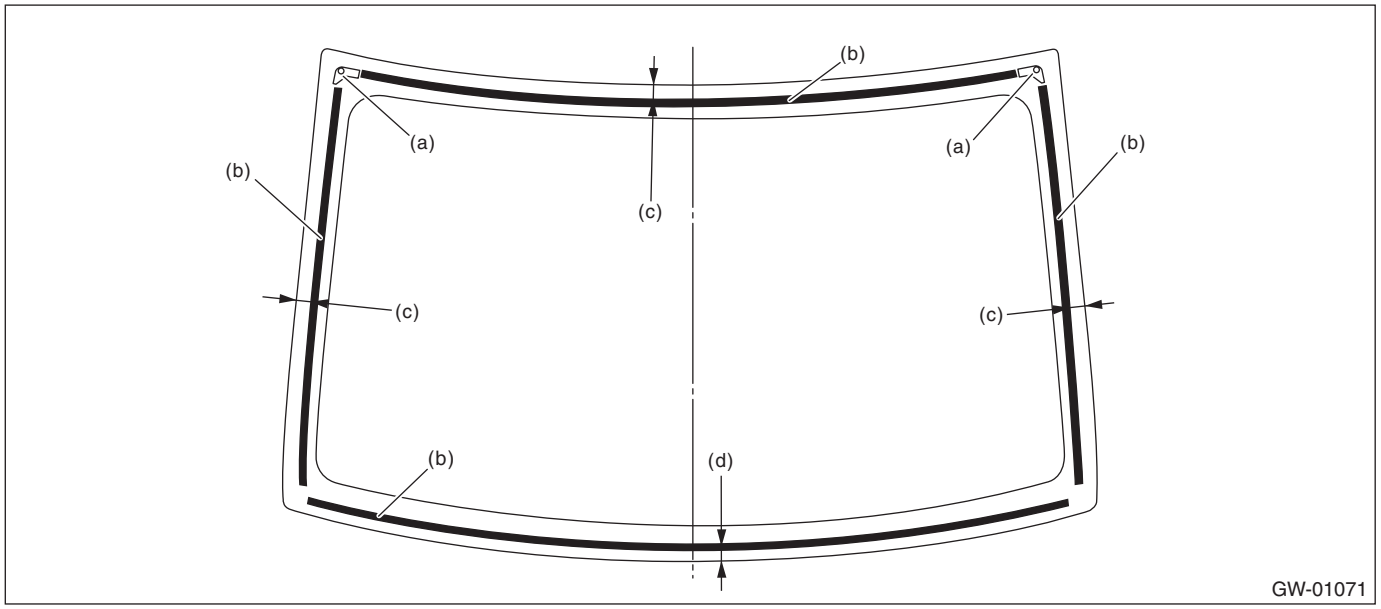
B: INSTALLATION

1) Fabricate the cartridge nozzle tip as shown and set the sealant gun with the adhesive.



(1) 10 mm (0.39 in) (2) 8 mm (0.31 in) (3) Sealant gun

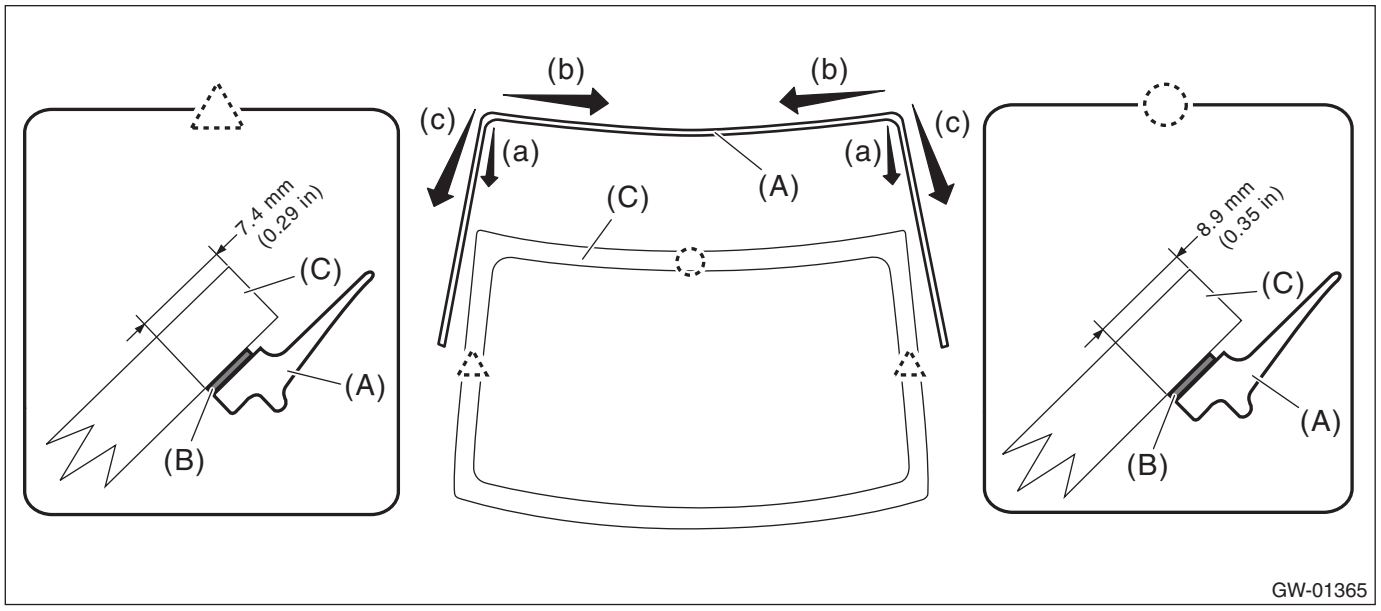
2) Smoothen and clean the adhesive surfaces of the glass - rear window and body using the same procedures as for the glass - front window. <Ref. to GW-40, INSTALLATION, Windshield Glass.>
3) Attach the dam rubber - rear to the glass - rear window.



(a) Locating pin - rear window (c) 21.9 mm (0.86 in) (d) 10.7 mm (0.42 in)
(b) Dam rubber - rear

4) Attach the molding - rear window to the glass - rear window.

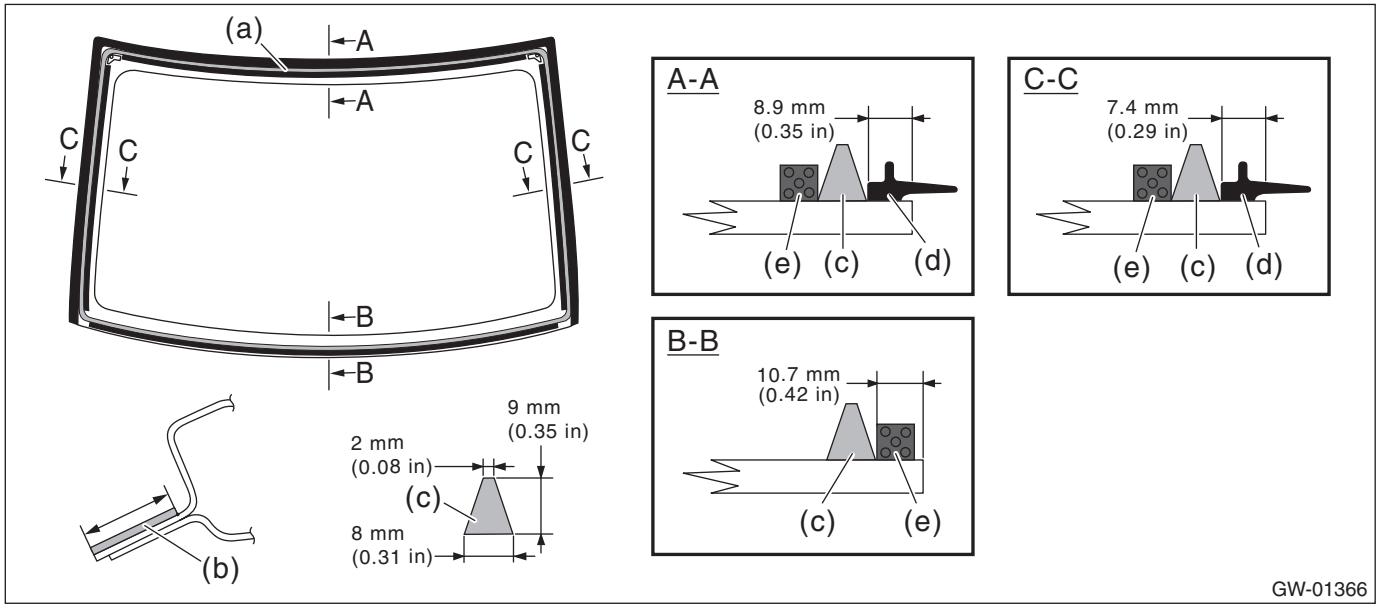
CAUTION:
Be careful to attach the molding - rear window so that the molding has no loose or undulating part.



(1) Align the molding - rear window (A) to the upper ends (a) of the glass - rear window (C).
(2) Install the molding - rear window from both corners of the upper edge toward the center (b).
(3) Install the molding - rear window from both corners of the upper edge toward the lower side (c).
(4) Firmly apply the double sided tape (B) of the molding - rear window evenly to the surface of the glass - rear window.

5) Install the glass - rear window in the same procedure as for the glass - front window. <Ref. to GW-40, INSTALLATION, Windshield Glass.>

(1) Apply the primer to the adhesive surface of glass - rear window side and body side using sponge.
(2) Apply adhesive to the end back surface of the glass - rear window.



(a) Application of primer (glass side)
(b) Application of primer (body side)
(c) Adhesive
(d) Molding - rear window
(e) Dam rubber - rear

(3) Insert the locating pins - rear window into the rear panel holes, and install the glass - rear window.
(4) Lightly press the entire perimeter of the glass - rear window for tight fit.
(5) Make flush the adhesive surface jutted out using spatula.

6) After completion of all work, allow the vehicle to stand for about 24 hours.

NOTE:
- When opening/closing the door after the glass - rear window was bonded, always lower the glass assembly - door first, and then open/close it carefully.
- Move the vehicle slowly.
- For minimum drying time and vehicle standing time before driving after bonding, follow instructions or instruction manual from the adhesive manufacturer.

7) Connect the rear defogger connector.
8) After curing of adhesive, pour the water on external surface of vehicle to check that there are no water leaks.

NOTE:
When a vehicle is returned to the user, tell him or her that the vehicle should not be subjected to heavy impact for at least three days.

15.Rear Gate Glass

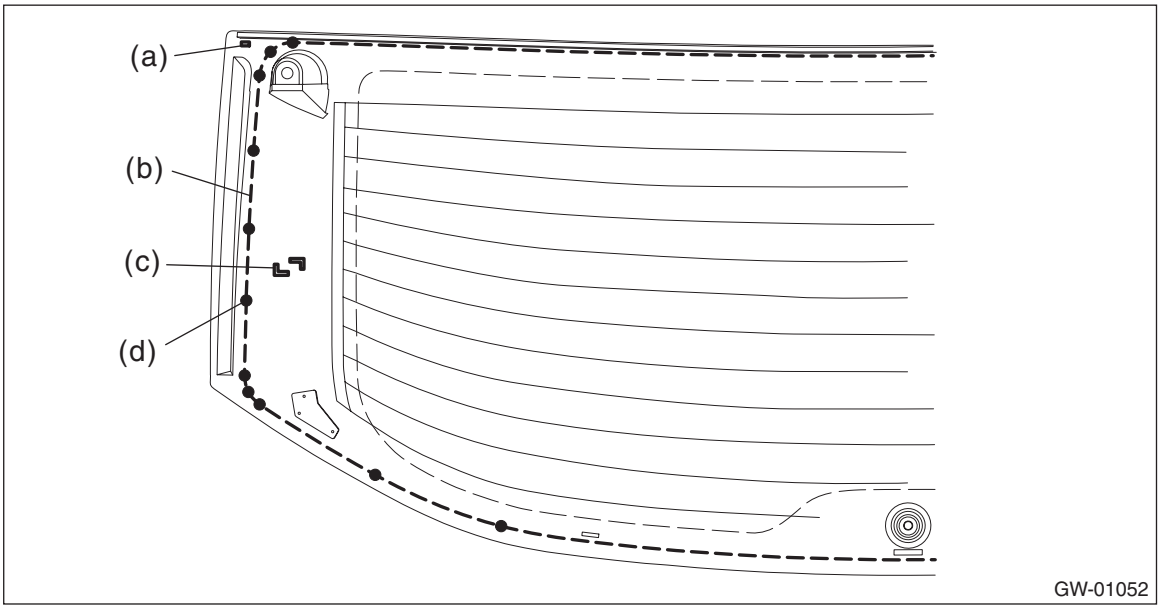
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the roof spoiler. (Crosstrek model) <Ref. to EI-67, REMOVAL, Roof Spoiler.>
3) Remove the trim panel - rear gate and the motor assembly - rear wiper. <Ref. to WW-45, REMOVAL, Rear Wiper Motor.>
4) Disconnect the rear defogger connector.
5) Remove the glass - rear gate in the same procedure as for the glass - front window. <Ref. to GW-37, REMOVAL, Windshield Glass.>

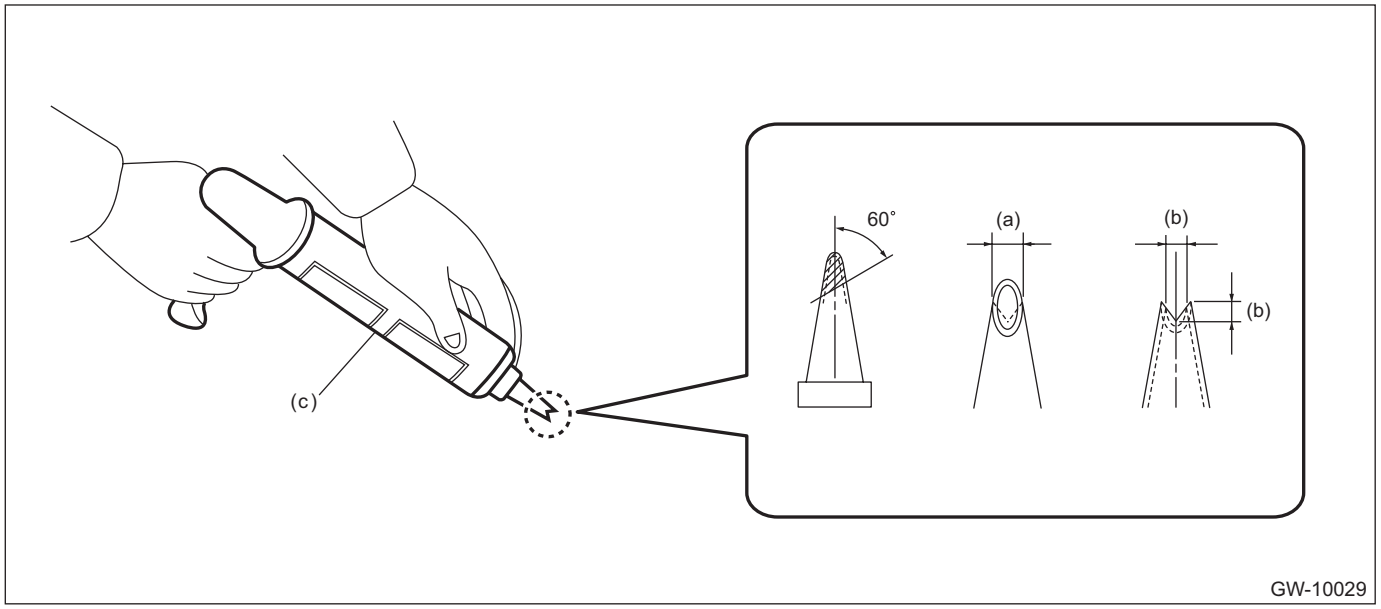
B: INSTALLATION

NOTE:
Use the markings on the glass to apply adhesive and primer, and to install the dam rubber - rear gate and the spacer - rear gate.



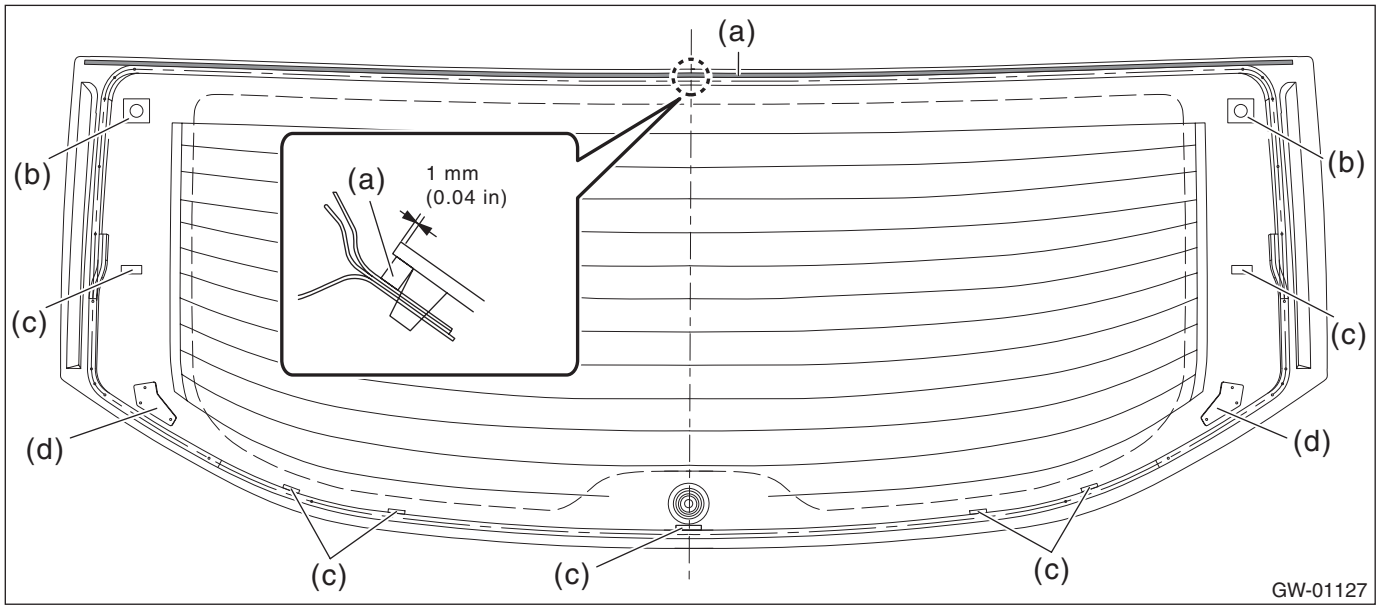
(a) Marking for dam rubber - rear gate application (Ag print)
(b) Center line for adhesive
(c) Marking for spacer - rear gate application (Ag print)
(d) Marking for primer application

1) Fabricate the cartridge nozzle tip as shown and set the sealant gun with the adhesive.



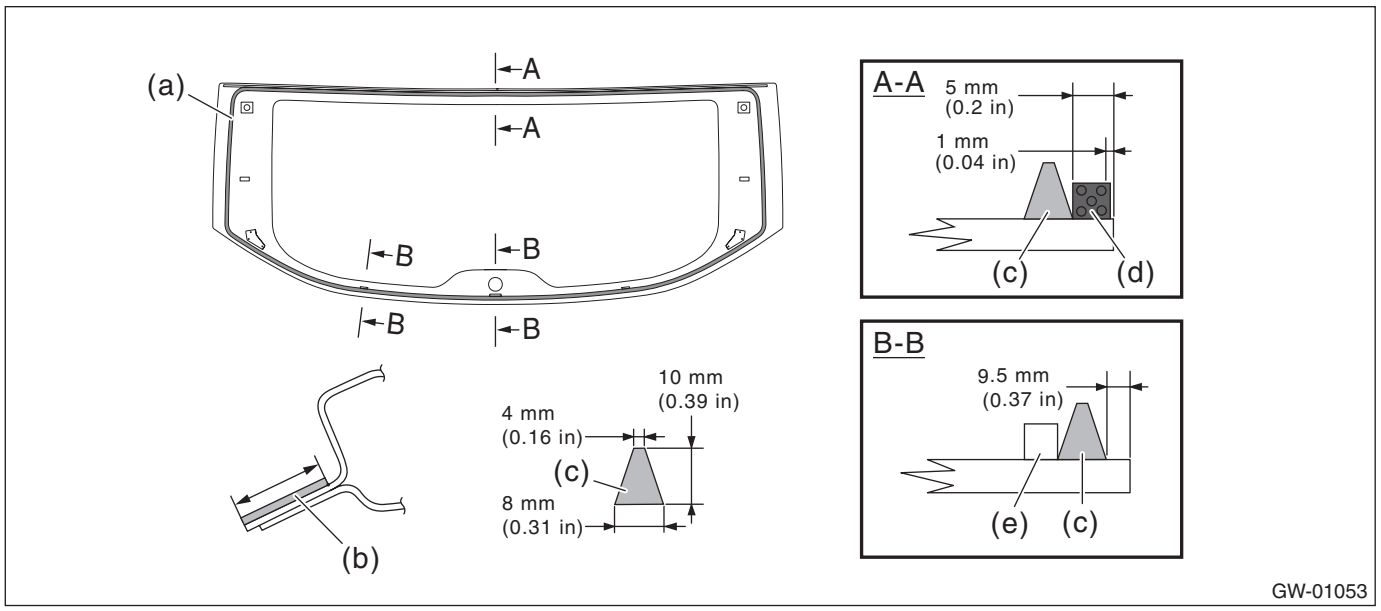
(a) 10 mm (0.39 in) (b) 8 mm (0.31 in) (c) Sealant gun

2) Smoothen and clean the adhesive surfaces of the glass - rear gate and body using the same procedures as for the glass - front window. <Ref. to GW-40, INSTALLATION, Windshield Glass.>
3) Attach the dam rubber - rear gate to the glass - rear gate.



(a) Dam rubber - rear gate (c) Spacer - rear gate (d) Locating pin - rear gate
(b) Holder - rear gate

4) Install the glass - rear gate.
(1) Apply the primer to the adhesive surface of glass - rear gate side and body side using sponge.
(2) Apply adhesive to the glass - rear gate end back surface.



(a) Application of primer (glass side)
(b) Application of primer (body side)
(c) Adhesive
(d) Dam rubber - rear gate
(e) Spacer - rear gate

(3) Attach the clip to the holder - rear gate of the glass - rear gate.
(4) Insert the locating pins - rear gate into the rear gate panel holes, and install the glass - rear gate.
(5) Lightly press the entire perimeter of the glass - rear gate for tight fit.
(6) Make flush the adhesive surface jutted out using spatula.

5) After completion of all work, allow the vehicle to stand for about 24 hours.

NOTE:
• When opening/closing the door after the glass - rear gate was bonded, always lower the glass assembly - door first, and then open/close it carefully.
• Move the vehicle slowly.
• For minimum drying time and vehicle standing time before driving after bonding, follow instructions or instruction manual from the adhesive manufacturer.

6) Connect the rear defogger connector.
7) Install the motor assembly - rear wiper and the arm assembly - rear wiper.

Tightening torque:
Motor assembly - rear wiper and arm assembly - rear wiper: <Ref. to WW-4, REAR WIPER, COMPONENT, General Description.>

8) Install the roof spoiler. <Ref. to EI-128, INSTALLATION, Rear Gate Garnish.>

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

9) Install the trim panel - rear gate. <Ref. to EI-123, INSTALLATION, Rear Gate Trim.>
10) After curing of adhesive, pour the water on external surface of vehicle to check that there are no water leaks.

NOTE:
When a vehicle is returned to the user, tell him or her that the vehicle should not be subjected to heavy impact for at least three days.

16.Rear Window Defogger System

A: WIRING DIAGRAM

Refer to “Rear Defogger System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-192, WIRING DIAGRAM, Rear Defogger System.>
- HEV model: <Ref. to WI(HEV)-171, WIRING DIAGRAM, Rear Defogger System.>

B: INSPECTION

1. CHECK SYSTEM

Symptoms	Inspection order
Rear window defogger does not operate.	1. Check the fuse. 2. Check the rear defogger relay. 3. Check the rear window defogger switch. 4. Check the heat wire. 5. Check the wiring harness. 6. Check body integrated unit.

NOTE:
Rear window defogger system can be customized using the Subaru Select Monitor, when the customize setting {Auto A/C Setting} of the body integrated unit is set to {support}.

System name	Initial setting	Customize setting
Rear defogger operation mode	Normal	Continuous

2. CHECK WITH SUBARU SELECT MONITOR

CAUTION:
Check whether the Rr Defogger op. mode setting is in initial setting or customize setting before performing inspection.

1) Check the input signal when the rear window defogger switch is operated using Subaru Select Monitor.
   (1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to “Application help”.

   (2) Turn the ignition switch to ON.
   (3) On «Start» display, select «Diagnosis».
   (4) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
   (5) On «Main Menu» display, select «Each System».
   (6) On «Select System» display, select «Integ. Unit Mode» and select «Enter».
   (7) On «Select Function» display, select «Data Monitor».
   (8) From the data monitor item list, select «Auto A/C Setting».
   (9) Check the vehicle equipment and the settings of body integrated unit.
   If correct, go to (10).
   If not correct, go to (13).
   (10) From the data monitor item list, select «Rr Defogger output».
   (11) Check the displayed data (ON/OFF) by operating the rear window defogger switch.
   (12) On «Select Function» display, select «Customize».
   (13) From the Customize item list, select «Auto A/C Setting» and match the auto A/C ECM setting to the actual vehicle equipment.

2) Check the operation with rear window defogger switch ON.
- When customize setting is set as “Continuous”, it is normal if the 15-minute operation and 2-minute stop repeats.
- When customize setting is “Normal”, it is normal if the operation lasts for 15 minutes and then turns OFF.

3) When the operation in 2) above fails, replace the body integrated unit.

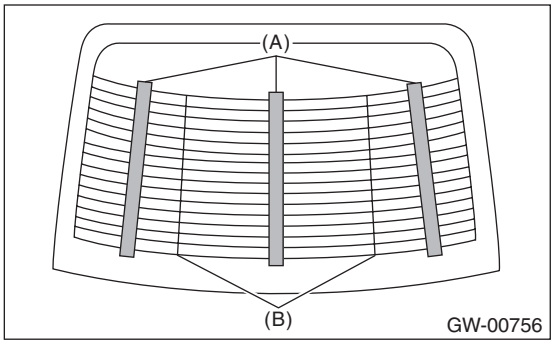
3. HEAT WIRE INSPECTION

CAUTION:
Use a dry soft cloth to wipe off dirt on the glass along the heat wires with care not to damage the heat wires.

1) Prepare the following checking items.
- Liquid crystal thermograph sheet (approximate Size: 300 × 300 mm (11.8 × 11.8 in) and thermal temperature: 35 — 40°C (95 — 104°F))
- Aluminum foil

2) Turn the ignition switch to ON.
3) Turn the defogger switch to ON.
4) Push the liquid crystal thermograph sheet from the outside of the glass - rear window.

NOTE:
Use the liquid crystal thermograph sheet every range it is separated with the separate line.



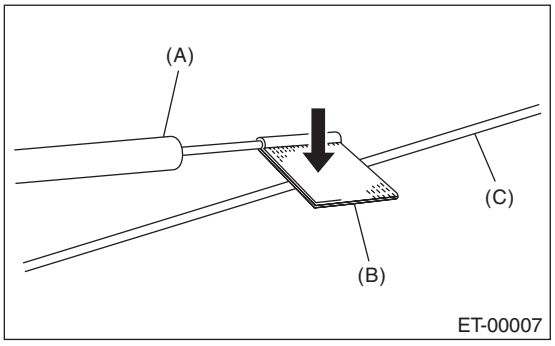
(A) Liquid crystal thermograph sheet
(B) Separate line

5) Determine the faulty heat wire by checking the color of the liquid crystal thermograph sheet.

Liquid crystal thermograph sheet	Criteria
Change occurred (red → blue)	Normal
No change (black)	Open

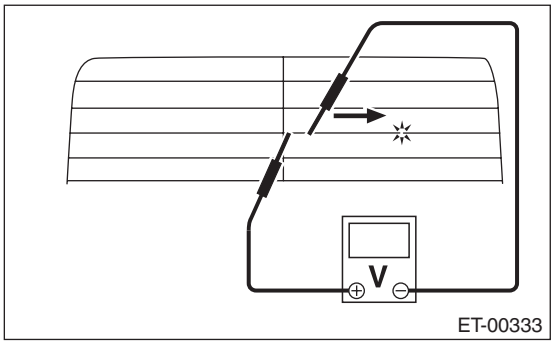
NOTE:
- Check from the inside of the glass - rear window if the liquid crystal thermograph sheet does not change.
- The time for the color change may differ depends on the surface temperature of the glass.

6) Wrap a piece of aluminum foil around the tip of tester probe and press it against the heat wire with your finger.



(A) Tester probe
(B) Aluminum foil
(C) Heat wire

7) To both ends of the section that has been found to include an open in the step 5), apply the tester positive (+) probe and the negative (–) probe.
8) Move the tester probe on the negative (–) side slowly along the heat wire. If voltage changes from zero while moving the tester probe, heat wire is open at the voltage change point.

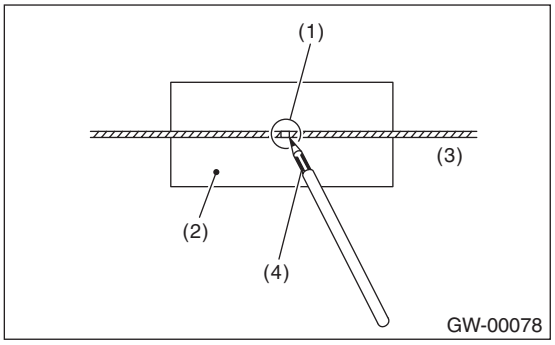


9) Repair the heat wire that determines the place of the open circuit. <Ref. to GW-54, REPAIR, Rear Window Defogger System.>

C: REPAIR

1) Clean the broken portion with alcohol or appropriate cleaning solvent.
2) Mask both side of wire with masking tape.
3) Apply the conductive silver composition to the broken portion.

Conductive silver composition:
By Permatex
QUICK GRID



(1) Broken portion
(2) Masking tape
(3) Broken wire
(4) Conductive silver composition

4) Dry using a dryer after applying the composition.
5) After repair, check the wire.

17.Rear Quarter Glass

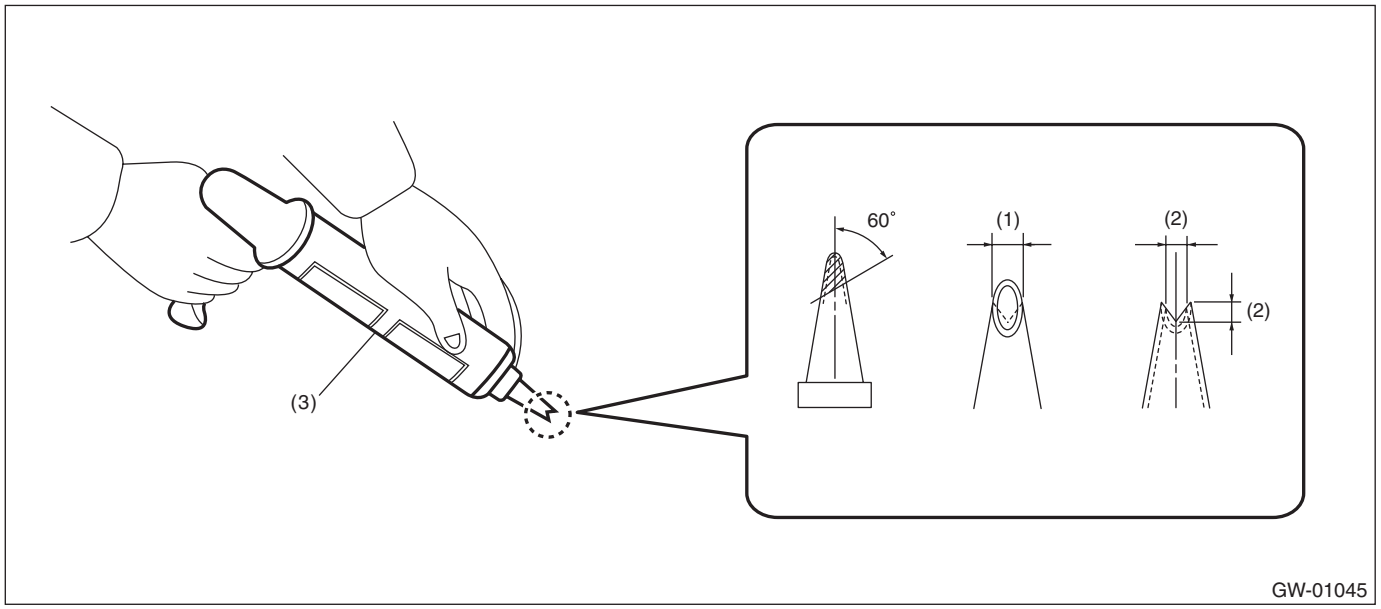
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - rear pillar UPR. <Ref. to EI-99, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Rear Quarter Trim.>
3) Remove the glass - rear quarter in the same procedure as for the glass - front window. <Ref. to GW-37, REMOVAL, Windshield Glass.>

B: INSTALLATION

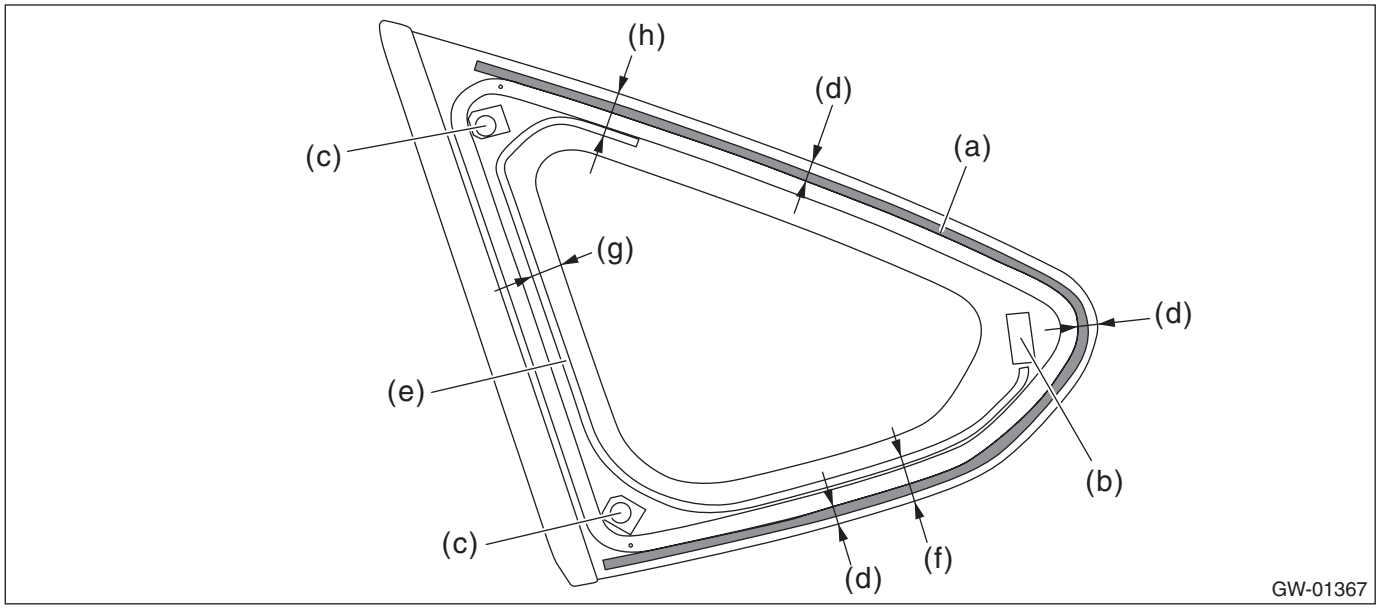
1) Fabricate the cartridge nozzle tip as shown and set the sealant gun with the adhesive.



(1) 10 mm (0.39 in) (2) 8 mm (0.31 in) (3) Sealant gun

2) Smoothen and clean the adhesive surfaces of the glass - rear quarter and body using the same procedures as for the glass - front window. <Ref. to GW-40, INSTALLATION, Windshield Glass.>

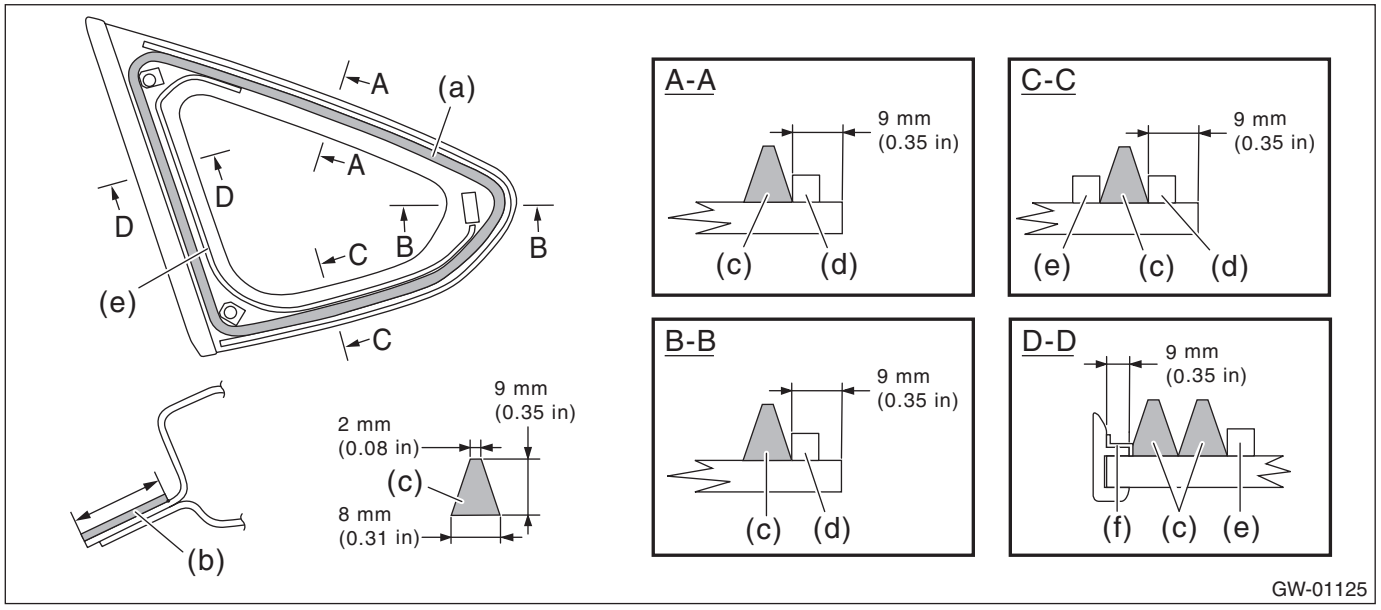
3) Install the dam rubber - rear and the seal - rear quarter to the glass - rear quarter.



(a) Dam rubber - rear quarter
(b) Fastener - rear quarter
(c) Locating pin - rear quarter
(d) 9 mm (0.35 in)
(e) Seal - rear quarter
(f) 23.1 mm (0.91 in)
(g) 15.2 mm (0.60 in)
(h) 22.4 mm (0.88 in)

4) Install the glass - rear quarter in the same procedure as for the glass - front window. <Ref. to GW-40, INSTALLATION, Windshield Glass.>

(1) Apply the primer to the adhesive surface of glass - rear quarter side and body side using sponge.
(2) Apply adhesive to the glass - rear quarter end back surface.



(a) Application of primer (glass side)
(b) Application of primer (body side)
(c) Adhesive
(d) Dam rubber - rear quarter
(e) Seal - rear quarter
(f) Protective plate

(3) Mount the fastener - rear quarter on the vehicle body.
(4) Insert the locating pins - rear quarter into the side panel holes, and install the glass - rear quarter.
(5) Lightly press the entire perimeter of the glass - rear quarter for tight fit.
(6) Make flush the adhesive surface jutted out using spatula.

5) After completion of all work, allow the vehicle to stand for about 24 hours.

NOTE:
- When opening/closing the door after the glass - rear quarter was bonded, always lower the glass assembly - door first, and then open/close it carefully.
- Move the vehicle slowly.
- For minimum drying time and vehicle standing time before driving after bonding, follow instructions or instruction manual from the adhesive manufacturer.

6) Install the trim panel - rear pillar UPR. <Ref. to EI-102, INSTALLATION, Rear Quarter Trim.>

7) After curing of adhesive, pour the water on external surface of vehicle to check that there are no water leaks.

NOTE:
When a vehicle is returned to the user, tell him or her that the vehicle should not be subjected to heavy impact for at least three days.

18.Wiper Deicer System

A: WIRING DIAGRAM

Refer to “Wiper Deicer System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-243, WIRING DIAGRAM, Wiper Deicer System.>
- HEV model: <Ref. to WI(HEV)-208, WIRING DIAGRAM, Wiper Deicer System.>

B: INSPECTION

1. CHECK SYSTEM

NOTE:
- The wiper deicer does not operate when the ambient temperature becomes 5°C (41°F) or more.
- The wiper deicer operates with the rear window defogger at the same time.
- It is possible to perform a forced operation if you keep holding the rear window defogger switch for 3 seconds or more.

Symptoms	Inspection order
Wiper deicer does not operate.	1. Check the fuse. 2. Check the wiper deicer relay. 3. Check the wiper deicer switch. 4. Check the heat wire. 5. Check the wiring harness. 6. Check body integrated unit.

NOTE:
- Wiper deicer system can be customized using the Subaru Select Monitor, when the customize setting «Auto A/C Setting» of the body integrated unit is set to {support}.
- Set the system using the Rr Defogger op. mode, and setting will be the same as rear defogger system setting.

System name	Initial setting	Customize setting
Rr defogger op. mode	Normal	Continuous*

*: When one of the following conditions occurs, the continuous operation is suspended and turned to the normal operation.
- Ambient temperature at 5°C (41°F) or more continues for 10 seconds.
- Malfunction occurs on ambient sensor.
- Vehicle speed of 15 km/h (9 MPH) or less continues 15 minutes (OFF when conditions are met)
- Malfunction occurs in CAN communication.
- Battery voltage remains at 10 V or less for 30 seconds.

2. CHECK WITH SUBARU SELECT MONITOR

CAUTION:
Before performing the inspection, check the following settings.
- **Wiper deicer setting → "support". If "no support", set to "support" using customize setting.**
- **Rr Defogger op. mode setting → Initial setting or customize setting.**

1) Check the input signal when the rear window defogger switch is operated using Subaru Select Monitor.
   (1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to "Application help".
   (2) Turn the ignition switch to ON.
   (3) On «Start» display, select «Diagnosis».
   (4) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
   (5) On «Main Menu» display, select «Each System».
   (6) On «Select System» display, select «Integ. Unit Mode» and select «Enter».
   (7) On «Select Function» display, select «Data Monitor».
   (8) From the data monitor item list, select «Auto A/C Setting».
   (9) Check the vehicle equipment and the settings of body integrated unit.
   If correct, go to (10).
   If not correct, go to (13).
   (10) From the data monitor item list, select «Rr Defogger output».
   (11) Check the displayed data (ON/OFF) by operating the rear window defogger switch.
   (12) On «Select Function» display, select «Customize».
   (13) From the Customize item list, select «Auto A/C Setting» and match the auto A/C ECM setting to the actual vehicle equipment.

2) Check the operation with rear window defogger switch ON.
- When customize setting is set as "Continuous", it is normal if the 15-minute operation and 2-minute stop repeats.
- When customize setting is "Normal", it is normal if the operation lasts for 15 minutes and then turns OFF.

3) When the operation in 2) above fails, replace the body integrated unit.

3. HEAT WIRE INSPECTION

Refer to "HEAT WIRE INSPECTION" of "Rear Window Defogger System". <Ref. to GW-53, HEAT WIRE INSPECTION, INSPECTION, Rear Window Defogger System.>

NOTE:
Heat wire inspection needs removing/installing procedure of instrument panel assembly.

C: REPAIR

Refer to "REPAIR" of "Rear Window Defogger System". <Ref. to GW-54, REPAIR, Rear Window Defogger System.>

NOTE:
Heat wire repair needs removing/installing procedure of instrument panel assembly.

BODY STRUCTURE

BS

Page
1. General Description 2

1. General Description

A: SPECIFICATION

Refer to “Body Repair Manual” for general description of body structure, reference points and reference dimensions.

INSTRUMENTATION/DRIVER INFO

IDI

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3.	Combination Meter System	8
4.	Multi-function Display (MFD) System	13
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6.	Speedometer	22
7.	Tachometer	23
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10.	Multi-function Display (MFD)	26
11.	Steering Switch	30

1. General Description

A: SPECIFICATION

1. COMBINATION METER ASSEMBLY

NOTE:
Specifications of the combination meter vary depending on the market and the grade.
- Gasoline engine model

Meter, display	Operation method, display method	Drive control	When checking the indicator needle operation/needle reading operation
Speedometer	Stepping motor type	Combination meter	—
Tachometer			
ECO gauge			
ABS warning light	LED	Combination meter	On/Off
STEERING warning light			
AT oil temperature warning light			
Driver's seat belt warning light			
Door warning light			
Tire pressure warning light			
AWD warning light			
Hill start assist OFF indicator light / hill start assist warning light			
VDC warning light / VDC operation indicator light			
VDC OFF indicator light			
High beam indicator light			
Front fog light indicator light			
Lighting indicator light			
Fuel level warning light			
Malfunction indicator light			
Airbag warning light			
Engine oil level warning light			
Washer fluid level warning light			
Lane departure warning OFF indicator light			
Pre-collision brake OFF indicator light			
Meter illumination back light			Light ON
LCD/TFT back-up light			
Engine coolant temperature warning light (red)			On (red)/Off
Engine coolant temperature indicator light (blue)			Off/On (blue)
Oil pressure warning light		Oil pressure switch	Turns on or off according to module control
Charge warning light		Generator	
Turn signal indicator light		Turn signal and hazard unit	
Security/immobilizer indicator light		Body integrated unit	
Auto leveler warning light		Auto headlight beam leveler CM	
Parking brake/brake fluid level warning light		Combination meter/ brake fluid level switch	On/Turns on or off according to module control

Meter, display	Operation method, display method	Drive control	When checking the indicator needle operation/needle reading operation
ODO indicator	LCD/TFT	Combination meter	—
Trip indicator			
Select lever / shift position indicator			
Information (intervention) display & indicator			
FUEL meter			
Cruise control system indicator • Constant speed cruise • SET • Set speed			
EyeSight system indicator • Adaptive cruise • SET • READY • EyeSight warning • EyeSight temporary stop • OFF • Preceding vehicle • Following distance setting • Set speed			

- HEV model

Meter, display	Operation method, display method	Drive control	When checking the indicator needle operation/needle reading operation
Speedometer	Stepping motor type	Combination meter	—
Tachometer			
ECO gauge			
ABS warning light	LED	Combination meter	On/Off
STEERING warning light			
AT oil temperature warning light			
Driver's seat belt warning light			
Door warning light			
Access key warning light			
Tire pressure warning light			
AWD warning light			
Hill start assist OFF indicator light / hill start assist warning light			
VDC warning light / VDC operation indicator light			
VDC OFF indicator light			
High beam indicator light			
Front fog light indicator light			
Lighting indicator light			
Fuel level warning light			
Malfunction indicator light			
Airbag warning light			
Engine oil level warning light			
Washer fluid level warning light			
Oil pressure warning light			
Vacuum pump warning light			
Hybrid fail lamp			
EV mode lamp			
Hybrid READY indicator light			
Charge warning light			
BSD/RCTA warning light			
BSD/RCTA OFF indicator light			
Meter illumination back light			Light ON
LCD back light			
Engine coolant temperature warning light (red)			On (red)/Off
Engine coolant temperature indicator light (blue)			Off/On (blue)
Turn signal indicator light		Turn signal and hazard unit	Turns on or off according to module control
Security/immobilizer indicator light		Body integrated unit	
Auto leveler warning light		Auto headlight beam leveler CM	
Pedestrian alert warning light		Pedestrian alert control unit	On/Turns on or off according to module control
Parking brake/brake fluid level warning light		Combination meter/ brake fluid level switch	

Meter, display	Operation method, display method	Drive control	When checking the indicator needle operation/needle reading operation
ODO indicator	LCD	Combination meter	—
Trip indicator			
Select lever / shift position indicator			
FUEL meter			
Cruise control system indicator • Constant speed cruise • SET • Set speed			

2. MULTI-FUNCTION DISPLAY

NOTE:
Specifications of the multi-function display vary depending on the market and the grade.

- Standard type

Display	Display method
Average/instantaneous fuel economy, cruising distance, ambient temperature, current time, continuous driving time, average vehicle speed	LCD
Passenger's seat airbag indicator light	LED
Passenger's airbag ON indicator light	
Passenger's airbag OFF indicator light	
Passenger's seat belt warning light	

- High grade type

Display	Display method
Fuel economy screen, economy gauge (history) screen, EyeSight screen, preventive safety screen, triple meter screen, clock/ambient temperature screen, setting screen, self-check screen, information screen, diagnostic mode screen, energy flow screen (HEV model), FUEL SAVE screen (HEV model)	TFT
Air conditioner display	LCD
Passenger's seat airbag indicator light	LED
Passenger's airbag ON indicator light	
Passenger's airbag OFF indicator light	
Passenger's seat belt warning light	

B: LOCATION

Refer to "LOCATION" of "INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS)" section. <Ref. to IDI(diag)-6, LOCATION, Electrical Component Location.>

C: CAUTION

• Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Use gloves to avoid damage and getting fingerprints on the glass surface and meter surfaces.
• Do not apply an excessive force on the printed circuit.
• Do not drop or otherwise apply impact.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that each component operates normally.
• When the combination meter assembly has been replaced, be sure to perform the following operations.
  – For models without the keyless access with push button start except for C5, be sure to perform the registration of immobilizer. For the relevant procedures, refer to the “REGISTRATION MANUAL FOR IMMOBILIZER”.
  – Be sure to reset the ODO fuel economy value of the multi-function display (MFD). (High grade type) <Ref. to IDI-15, ODO FUEL ECONOMY VALUE RESET (HIGH GRADE TYPE ONLY), OPERATION, Multi-function Display (MFD) System.>
• Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Using a tester above such circuits may cause malfunction of airbag system. Follow the cautions of “AIRBAG SYSTEM” in this case. <Ref. to AB-11, CAUTION, General Description.>
• Be careful not to damage the airbag system wiring harness when servicing electrical parts and switches.
• When removing, installing or replacing the VDCCM&H/U, VDCCM&H/U bracket, steering wheel or steering angle sensor (steering roll connector), perform the VDC setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

D: PREPARATION TOOL

1. SPECIAL TOOL

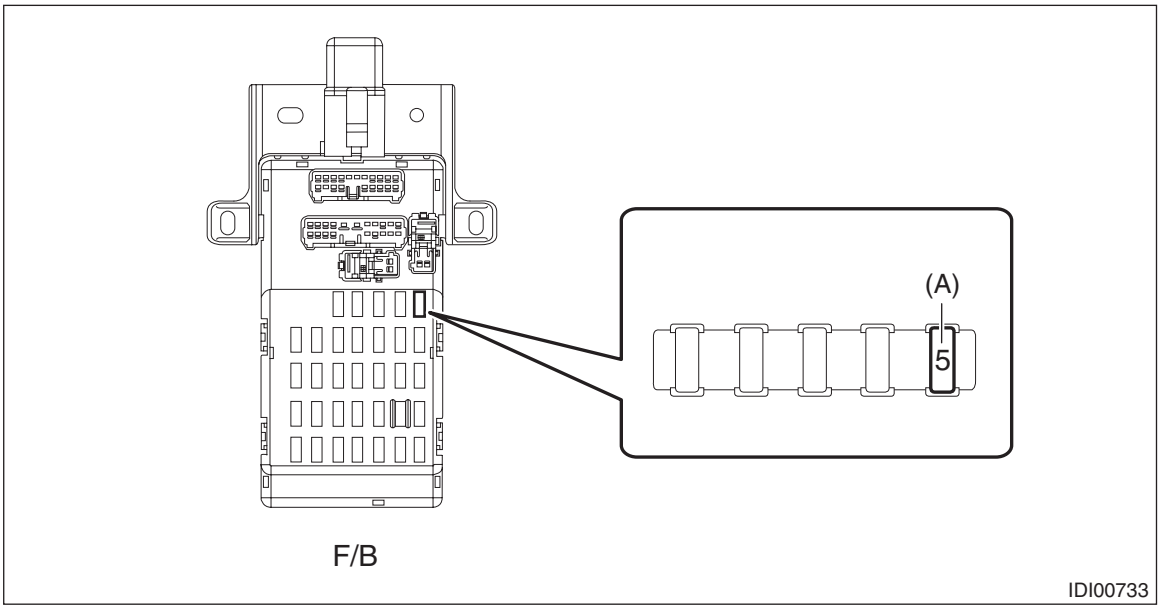
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

2. Relay and Fuse

A: LOCATION



Relay & fuse box	Fuse 10 A (combination meter, MFD)	(A)

NOTE:
For other related fuses, refer to the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model: <Ref. to WI(HEV)-21, Power Supply Circuit.>

B: INSPECTION

1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

3. Combination Meter System

A: WIRING DIAGRAM

Refer to “Combination Meter System” in the wiring diagram.

- Gasoline engine model
  – Models with normal meters: <Ref. to WI(w/o HEV)-77, MODEL WITH NORMAL METER, WIRING DIAGRAM, Combination Meter System.>
  – Model with color TFT meter: <Ref. to WI(w/o HEV)-82, MODEL WITH COLOR TFT METER, WIRING DIAGRAM, Combination Meter System.>
- HEV model: <Ref. to WI(HEV)-71, WIRING DIAGRAM, Combination Meter System.>

B: ELECTRICAL SPECIFICATION

1. COMBINATION METER ASSEMBLY

Refer to “Control Module I/O Signal” of “INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS)” section. <Ref. to IDI(diag)-7, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: OPERATION

1. SELF-DIAGNOSIS DISPLAY MODE

The self-diagnosis (checking of each meter, warning light, indicator light, illumination, LCD/TFT) of combination meter can be performed in the following procedure.
1) Procedure

CAUTION:
Perform the steps described in (1) through (4) within 10 seconds.

(1) Unfasten → fasten the driver’s seat belt within 3 seconds after the ignition switch is turned to ON.
(2) With the driver’s seat belt fastened, press the trip meter knob three times.
(3) Unfasten the driver’s seat belt, and then press the trip meter knob three times.
(4) Fasten the driver’s seat belt again, and then press the trip meter knob three times.

NOTE:

- When the self-diagnosis function operates, the warning light, indicator light, and LCD/TFT display checks are performed. After that, the buzzer will sound for 0.5 seconds every time the trip meter knob is pressed, and operation checks are performed in the order of meter indicator needle operation, meter indicator needle indication, and LCD/TFT. Turn the ignition switch to OFF to cancel the self-diagnosis function.
- When the engine starts during diagnosis, the self-diagnosis function is not cancelled, however, once the vehicle starts driving, the self-diagnosis function is deactivated automatically.

2) Go to “Check meter indicator operation”.
Check meter operation, warning light, indicator light, illumination and LCD/TFT.

NOTE:

- After “_S_1” is displayed on the LCD/TFT, the meter indicator operation check mode is initiated.
- Each of the meter indicator operation display and LCD/TFT display switches every 6 seconds.

Meter indicator	LCD/TFT display, illumination	Warning light/ indicator light
MIN indication ↓ MAX indication	ILL1 (Min. brightness) ↓*4 ILL6 (Max. brightness)	*1, *2, *3
MAX indication ↓ MIN indication	ILL6 (Max. brightness) ↓*4 ILL1 (Min. brightness)	

*1: Warning lights and indicator lights controlled by the meter drive circuit are illuminated. <Ref. to IDI-2, SPECIFICATION, General Description.>
*2: Warning lights and indicator lights controlled by other module are turned on/off according to the module control. <Ref. to IDI-2, SPECIFICATION, General Description.>
*3: Engine coolant temperature warning light illuminates in red.
*4: Display for one second for each level.

3) Press the trip meter knob once.
4) Go to “Meter Indicator Needle Indication Check”.
Check meter operation, warning light, indicator light, and LCD/TFT.

NOTE:
• Meter indicator switches every 1.5 seconds for each indication.
• ILL indication illuminates at the same brightness as when entering “Meter Indicator Needle Indication Check”.
• During operation, “_S_2” is displayed on the LCD/TFT trip display.

Speedometer (km/h)	Tachometer (r/min)	ECO gauge	Warning light/ indicator light
0	0	Lowest point	*1, *2, *3
0	0	–Max	
40	1,000	0	
100	4,000	+Max	
40	1,000	0	
0	0	–Max	

*1: Warning lights and indicator lights controlled by the meter drive circuit go off. <Ref. to IDI-2, SPECIFICATION, General Description.>
*2: Warning lights and indicator lights controlled by other module are turned on/off according to the module control. <Ref. to IDI-2, SPECIFICATION, General Description.>
*3: Engine coolant temperature indicator light illuminates in blue.
5) Press the trip meter knob once.
6) Go to “Check LCD/TFT display”.
Check the LCD/TFT display.

NOTE:
• After “_S_3” is displayed on the LCD/TFT, the LCD/TFT display check mode is initiated.
• LCD/TFT display switches every 1 second.
• Warning lights and indicator lights controlled by the meter drive circuit go off. <Ref. to IDI-2, SPECIFICATION, General Description.>
• Warning lights and indicator lights controlled by other module are turned on/off according to the module control. <Ref. to IDI-2, SPECIFICATION, General Description.>
• The meter indication remains at the same level as “Meter Indicator Needle Indication Check”.
• ILL indication illuminates at ILL6 level (max. brightness).
• After No. 14 is displayed in the illumination order, display is repeated from No. 1 again. (Except for color TFT type)
• After No. 8 is displayed in the illumination order, display is repeated from No. 1 again. (Color TFT type)
• The version display contents of the illumination order No. 1 varies depending on the vehicle. (Color TFT type)

Except for color TFT type

ORDER	AT/SS	SHIFT UP	CRUISE/SET	MODE X/S/I/S#	TRIP/ODO	FUEL METER	LFW
1	▲ ▼	▲	SET	[S] [I] S#	A B 8 8 8 . 8 8 8 8 8 8 km	E F	OFF
2			OFF	OFF	1 1 1 . 1 1 1 1 1 1	E F	ON
3	▲		OFF	OFF	A 2 2 2 . 2 2 2 2 2 2 km	E F	ON
4			OFF		3 3 3 . 3 3 3 3 3 3	E F	OFF
5	▼	▲	OFF	OFF	B 4 4 4 . 4 4 4 4 4 4 km	E F	OFF
6			OFF	OFF	5 5 5 . 5 5 5 5 5 5	E F	OFF
7	▲			[S]	A 6 6 6 . 6 6 6 6 6 6 km	E F	OFF
8			OFF	OFF	7 7 7 . 7 7 7 7 7 7	E F	OFF
9	▼		SET	OFF	B 8 8 8 . 8 8 8 8 8 8 km	E F	OFF
10			OFF	[I]	9 9 9 . 9 9 9 9 9 9	E F	OFF
11	▲	▲	OFF	OFF	A 0 0 0 . 0 0 0 0 0 0 km	E F	OFF
12			OFF	OFF	8 8 8 . 8 8 8 8 8 8	E F	OFF
13	▼		SET	S#	B 8 8 8 . 8 8 8 8 8 8 km	E F	ON
14			OFF	OFF	8 8 8 . 8 8 8 8 8 8		OFF

IDI00712

Color TFT type

Order	TFT display
1	Version display & color gradation
2	Black
3	Red
4	Green
5	Blue
6	White
7	Color gradation
8	Cross talking

2. DEMONSTRATION MODE (EXCEPT FOR COLOR TFT TYPE)

The demonstration mode screen of the combination meter can be displayed according to the following procedure.

CAUTION:

• Perform the steps while the ignition switch is OFF (ACC OFF) and the odo/trip meter is not displayed.

• To avoid battery discharge, perform the operation under the following condition.

– Perform the operation while the battery is being charged.

– While performing the operation and displaying the demonstration mode, close all doors and do not operate any electrical parts.

• If the battery voltage is low, the demonstration mode is not initiated.

• To display the demonstration mode, set the "Demonstration mode permission / fault permission" of the user customize mode to "permission". For operation procedures, refer to "Application help".

• When the demonstration mode display is completed, make sure to set "Demonstration mode permission / fault permission" of the user customize mode to "fault permission". Do not deliver the vehicle to the customer with "Demonstration mode permission / fault permission" set to "permission".

• Even if the backup fuse is removed, the demonstration mode can be initiated.

1) Procedure

CAUTION:

Perform the steps described in (1) through (4) within 10 seconds.

(1) Press the trip meter knob twice.

NOTE:

When the trip meter knob is pressed once, the odo/trip meter is displayed.

(2) Press the MID (i/SET) switch three times within three seconds after the operation (1) above is performed.

(3) Press the trip meter knob once, and press the MID (i/SET) switch three times.

(4) Press the trip meter knob once, and press the MID (i/SET) switch three times.

2) The “demonstration mode” is initiated.

CAUTION:
If the procedure is not performed properly, stop the operation and wait until the odo/trip meter display disappears (for approx. 10 seconds), and then perform the procedure from (1) to (4) again after confirming that the display disappeared.

NOTE:
The demonstration mode will be cancelled in the following condition.
When resuming the operation after cancellation, the demonstration mode is displayed, however, for the model with keyless access with push button start, the resuming can only be accepted after approx. 1 minute.
- At the completion of the “goodbye screen” display that is shown 60 minutes after the demonstration mode is initiated
- When the ignition switch is turned to ON
- When the MID (i/SET) switch is turned to ON for two seconds
- When the battery voltage is low
- When the push button ignition switch is pressed with the access key out of the passenger room (model with keyless access with push button start)
- When any request switch is pressed with the access key in the passenger room (model with keyless access with push button start)

D: INSPECTION

Refer to “Basic Diagnostic Procedure” of “INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS)” section. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

E: NOTE

For procedure of each component in the combination meter system, refer to the respective section.
- Combination meter assembly: <Ref. to IDI-19, Combination Meter.>
- Speedometer: <Ref. to IDI-22, Speedometer.>
- Tachometer: <Ref. to IDI-23, Tachometer.>
- FUEL meter: <Ref. to IDI-24, Fuel Gauge.>
- ECO gauge: <Ref. to IDI-25, ECO Gauge.>

4. Multi-function Display (MFD) System

A: WIRING DIAGRAM

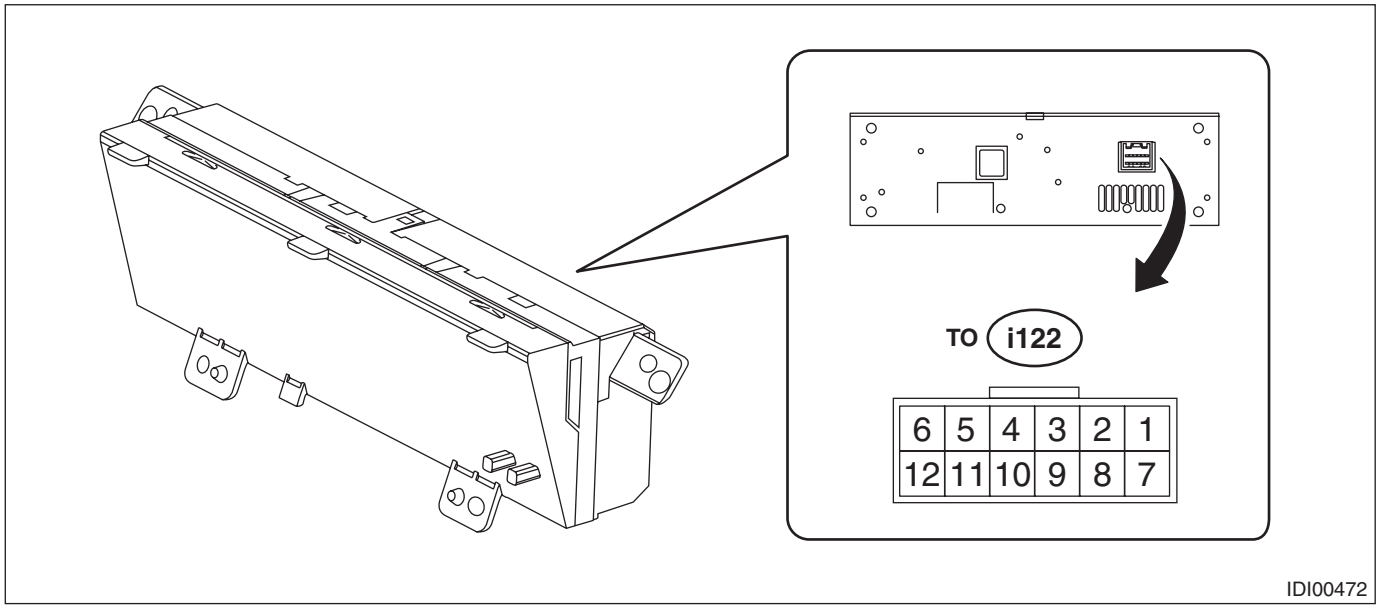
Refer to “Multi-function Display (MFD) System” in WI section.

- Gasoline engine model: <Ref. to WI(w/o HEV)-168, WIRING DIAGRAM, Multi-function Display (MFD) System.>
- HEV model: <Ref. to WI(HEV)-146, WIRING DIAGRAM, Multi-function Display (MFD) System.>

B: ELECTRICAL SPECIFICATION

1. MULTI FUNCTION DISPLAY

- Standard type



Terminal No.	Item	Measuring condition	Standard
1 (+B) ←→ Chassis ground	Voltage	Always	10 — 14 V
2 (GND) ←→ Chassis ground	Resistance	Always	Less than 1 Ω
3 (IG) ←→ Chassis ground	Voltage	IG OFF → ON	0 V → 10 — 14 V
9 (U-ART com.)	—	Cannot be measured	—
10 ←→ Chassis ground	Voltage	Passenger’s airbag ON indicator light OFF → ON	0 V → 1.5 V
11 ←→ Chassis ground	Voltage	Passenger’s airbag OFF indicator light OFF → ON	0 V → 1.5 V

- High grade type

Refer to “Control Module I/O Signal” of “INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS)” section. <Ref. to IDI(diag)-7, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: OPERATION

1. DIAGNOSTIC MODE (HIGH GRADE TYPE ONLY)

The settings of the multi-function display can be changed by performing the following procedures to display the diagnostic mode. To show the demonstration display only, refer to “DEMONSTRATION DISPLAY”.

CAUTION:
• To avoid battery discharge, perform the procedure while charging the battery.
• While performing the work, close the front hood and all doors, and do not operate any electrical parts.
• Display can not be switched to diagnostic mode if the illumination control dial is set to the position for the dimming cancel function (maximum brightness).

1) Procedure

CAUTION:
Perform the steps described in (2) through (4) within 10 seconds.

(1) Turn the ignition switch to ON, and within 3 seconds, turn the lighting switch to Switch 1 (PARKING) or Switch 2 (HEAD).
(2) While keeping the lighting switch to Switch 1 (PARKING) or Switch 2 (HEAD) position, press the MFD (ENTER) switch three times.
(3) Turn the lighting switch to OFF, and press the MFD (ENTER) switch three times.
(4) Turn the lighting switch to Switch 1 (PARKING) or Switch 2 (HEAD) position again, and press the MFD (ENTER) switch three times.

NOTE:
• Except for the demonstration display setting of the diagnostic mode, the display will terminate by turning the ignition switch to OFF (ACC OFF) or by selecting “Back” from the menu screen.
• The demonstration display setting of the diagnostic mode will terminate by starting the engine or removing the battery. Even if the ignition switch is turned to OFF (ACC OFF), then to ON again, the diagnostic mode will not terminate.
• To select other menus from the demonstration display setting, terminate the diagnostic mode by starting the engine or removing the battery, then access to the diagnostic mode again.

2) Display menu

Change the display and settings from each menu.

Menu	Item	Content
Demonstration display setting	—	Shows demonstration display.
Vehicle status confirmation	• CAN communication	Displays the connection status of input signals.
	• U-ART communication	
	• Camera connection	
Customize	• Key operation sound	Select “ON” or “OFF”, then select “Set” to determine.
	• Correction of lifetime fuel economy value*	Adjust the fuel economy value within the range of -10 — +10 km/l, then determine the value with MFD (ENTER) switch.
Back	—	Finish the diagnostic mode.

*: Correction of lifetime fuel economy value is used only when the multi-function display has been replaced. This function is provided as a compensation feature to bring the current lifetime fuel economy value to the one before the replacement of multi-function display.

2. DEMONSTRATION SCREEN DISPLAY (GASOLINE ENGINE MODEL, HIGH GRADE TYPE ONLY)

The demonstration screen can be displayed according to the following procedure.

CAUTION:
- **Perform the steps while the ignition switch is OFF (ACC OFF).**
- **To avoid battery discharge, perform the operation under the following condition.**
  - **– Perform the operation while the battery is being charged.**
  - **– While performing the operation and displaying the demonstration mode, do not operate any electrical parts.**

1) Procedure

CAUTION:
Perform the steps described in (2) through (5) within 10 seconds.

(1) Sit in the driver's seat and close the door.
(2) Open the driver's door, and within 5 seconds, press the MFD (ENTER) switch three times.
(3) Close the driver's door, and press the MFD (ENTER) switch three times.
(4) Open the driver's door, and press the MFD (ENTER) switch three times.
(5) Close the driver's door, and press the MFD (ENTER) switch three times.

2) Go to "Demonstration screen display".

NOTE:
The demonstration display will be cancelled in any of the following conditions.
- When 60 minutes elapsed since the demonstration mode started
- When the ignition switch is turned to ON
- When the MFD (ENTER) switch is turned to ON for two seconds
- When the battery voltage is low

3. ODO FUEL ECONOMY VALUE RESET (HIGH GRADE TYPE ONLY)

Follow the procedure below to initialize the ODO setting value.
1) Turn the ignition switch to ON, and press the MFD (ENTER) switch for two seconds.
2) Select "Factory delivery setting" from "Setting screen".
3) Select "ODO setting reset" and determine with "Yes".
4) The screen that indicates the completion of the setting is displayed for three seconds. This is the end of operation.

NOTE:
- The resetting operation is confirmed twice. Select confirmation according to the screen.
- The display will terminate by turning the ignition switch to OFF (ACC OFF) or by selecting "Back" from the menu screen.

D: INSPECTION

- Standard type

Refer to the following inspection steps. <Ref. to IDI-16, SYMPTOM CHART, INSPECTION, Multi-function Display (MFD) System.>

- High grade type

Refer to “Basic Diagnostic Procedure” of “INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS)” section. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

1. SYMPTOM CHART

Symptoms	Repair order	Note
No display is shown.	1. Power supply 2. Ground circuit 3. Communication circuit harness 4. MFD	<Ref. to IDI-16, CHECK POWER SUPPLY AND GROUND CIRCUIT AND COMMUNICATION CIRCUIT, INSPECTION, Multi-function Display (MFD) System.>
Ambient air temperature/fuel economy displays do not appear.	1. Power supply 2. Ground circuit 3. MFD	<Ref. to IDI-17, CHECK CLOCK SYSTEM COMMUNICATION CIRCUIT, INSPECTION, Multi-function Display (MFD) System.>
Only ambient air temperature display is not displayed.	1. Power supply 2. Harness 3. Ambient sensor 4. Communication circuit 5. MFD	<Ref. to IDI-17, CHECK AMBIENT TEMPERATURE METER SYSTEM COMMUNICATION CIRCUIT, INSPECTION, Multi-function Display (MFD) System.>
Only fuel economy display is not displayed.	1. Setting 2. MFD	<Ref. to IDI-18, CHECK COMMUNICATION CIRCUIT OF FUEL ECONOMY SYSTEM, INSPECTION, Multi-function Display (MFD) System.>

2. CHECK POWER SUPPLY AND GROUND CIRCUIT AND COMMUNICATION CIRCUIT

	Step	Check	Yes	No
1	**CHECK POWER SUPPLY.** 1) Disconnect the MFD connector. 2) Measure the voltage between MFD connector and chassis ground. ***Connector & terminal*** ***(i122) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Check the harness for open or short between the fuse and MFD.
2	**CHECK GROUND CIRCUIT.** Measure the resistance between MFD connector and chassis ground. ***Connector & terminal*** ***(i122) No. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair or replace the harness.
3	**CHECK HARNESS BETWEEN MFD AND COMBINATION METER ASSEMBLY.** 1) Disconnect the connector of combination meter assembly. 2) Check the harness between MFD and combination meter assembly. ***Connector & terminal*** ***(i122) No. 9 — (i10) No. 28:***	Is harness normal?	Go to step **4**.	Repair or replace the harness.
4	**CHECK MFD.** 1) Remove the MFD. 2) Attach the clock to another vehicle on which the clock display operates normally, and check its operation.	Is MFD normal?	Replace the meter - main assembly. <Ref. to IDI-19, Combination Meter.>	Replace the MFD.

3. CHECK CLOCK SYSTEM COMMUNICATION CIRCUIT

	Step	Check	Yes	No
1	**CHECK POWER SUPPLY.** 1) Disconnect the MFD connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between MFD connector and chassis ground. ***Connector & terminal*** ***(i122) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Repair or replace the harness.
2	**CHECK GROUND CIRCUIT.** Measure the resistance between MFD connector and chassis ground. ***Connector & terminal*** ***(i122) No. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair or replace the harness.
3	**CHECK MFD.** 1) Remove the MFD. 2) Attach the clock to another vehicle on which the clock display operates normally, and check its operation.	Is the MFD normal?	Repair the poor contact of connector.	Replace the MFD.

4. CHECK AMBIENT TEMPERATURE METER SYSTEM COMMUNICATION CIRCUIT

	Step	Check	Yes	No
1	**CHECK AMBIENT SENSOR POWER SUPPLY.** 1) Disconnect the ambient sensor connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between the ambient sensor connector and chassis ground. ***Connector & terminal*** ***(F78) No. 1 (+) — Chassis ground (–):***	Is the voltage 4 V or more?	Go to step **2**.	Check the harness for open or short between the fuse and MFD.
2	**CHECK HARNESS BETWEEN AMBIENT SENSOR AND COMBINATION METER ASSEMBLY.** 1) Disconnect the connector of combination meter assembly. 2) Check harness between ambient sensor and combination meter assembly. ***Connector & terminal*** ***(F78) No. 1 — (i10) No. 27:*** ***(F78) No. 2 — (i10) No. 36:***	Is harness normal?	Go to step **3**.	Repair or replace the harness.
3	**CHECK AMBIENT SENSOR.** Check the ambient sensor. <Ref. to AC-75, INSPECTION, Ambient Sensor.>	Is the ambient sensor operating properly?	Go to step **4**.	Replace the ambient sensor.
4	**CHECK AMBIENT TEMPERATURE DISPLAY.** 1) Connect the combination meter assembly connector. 2) Install the 3 kΩ resistance between connector terminals of the ambient sensor. 3) Turn the ignition switch to ON. ***Connector & terminal*** ***(F78) No. 1 — No. 2:***	Does the ambient temperature display 25°C (77°F)?	Repair the poor contact between the ambient sensor and harness connector.	Go to step **5**.
5	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, display the data of «Ambient Air Temperature». NOTE: For detailed operation procedures, refer to “Application help”.	Is the ambient temperature of 25°C (77°F) output?	Go to step **6**.	Replace the meter - main assembly. <Ref. to IDI-19, Combination Meter.>

	Step	Check	Yes	No
6	**CHECK MFD.** 1) Remove the MFD. 2) Attach the ambient temperature display to another vehicle on which the ambient temperature display operates normally to check its operation.	Does the ambient temperature display 25°C (77°F)?	Replace the MFD.	Replace the meter - main assembly. <Ref. to IDI-19, Combination Meter.>

5. CHECK COMMUNICATION CIRCUIT OF FUEL ECONOMY SYSTEM

	Step	Check	Yes	No
1	**CHECK FUEL ECONOMY DISPLAY OFF MODE.** Check that the mode display changes when the MFD changeover knob is operated. (Display changes in the following order: cruising distance → average fuel economy → instantaneous fuel economy → continuous driving time → average vehicle speed → blank display)	Is fuel economy displayed?	MFD is normal.	Go to step **2**.
2	**CHECK MFD.** 1) Remove the MFD. 2) Attach the fuel economy display to another vehicle on which the fuel economy display operates normally to check its operation.	Is the fuel economy display correct?	Replace the meter - main assembly. <Ref. to IDI-19, Combination Meter.>	Replace the MFD.

E: NOTE

For procedure of each component in the Multi-Function Display (MFD) system, refer to the respective section.

- Multi-function display: <Ref. to IDI-26, Multi-function Display (MFD).>

5. Combination Meter

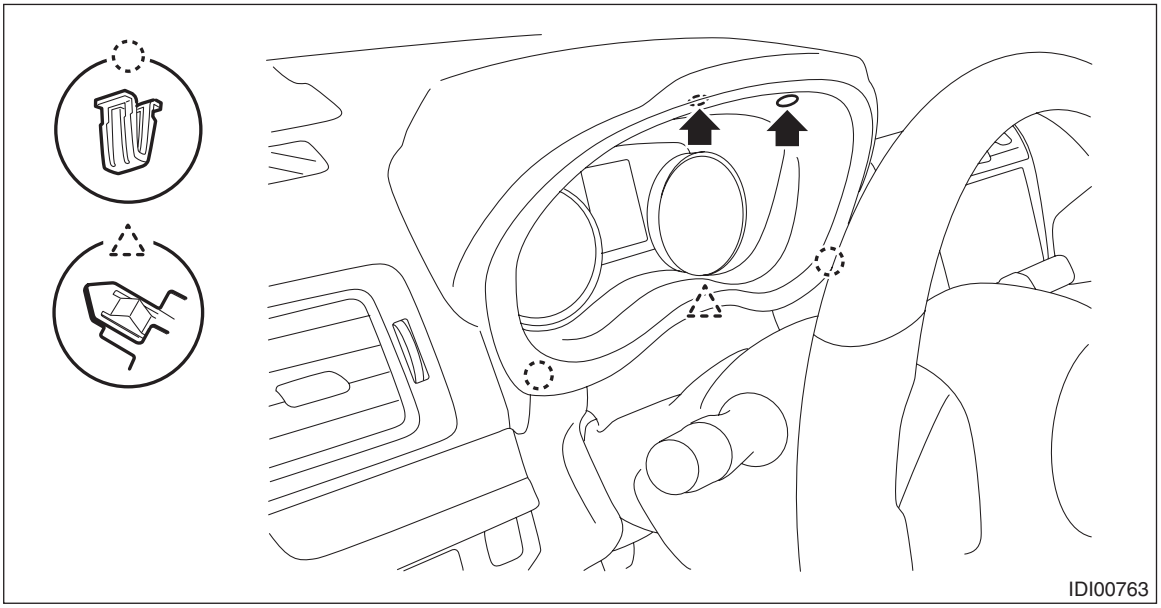
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Release the lock, tilt the steering column to the lowest end and fully extend the column by the telescopic system.

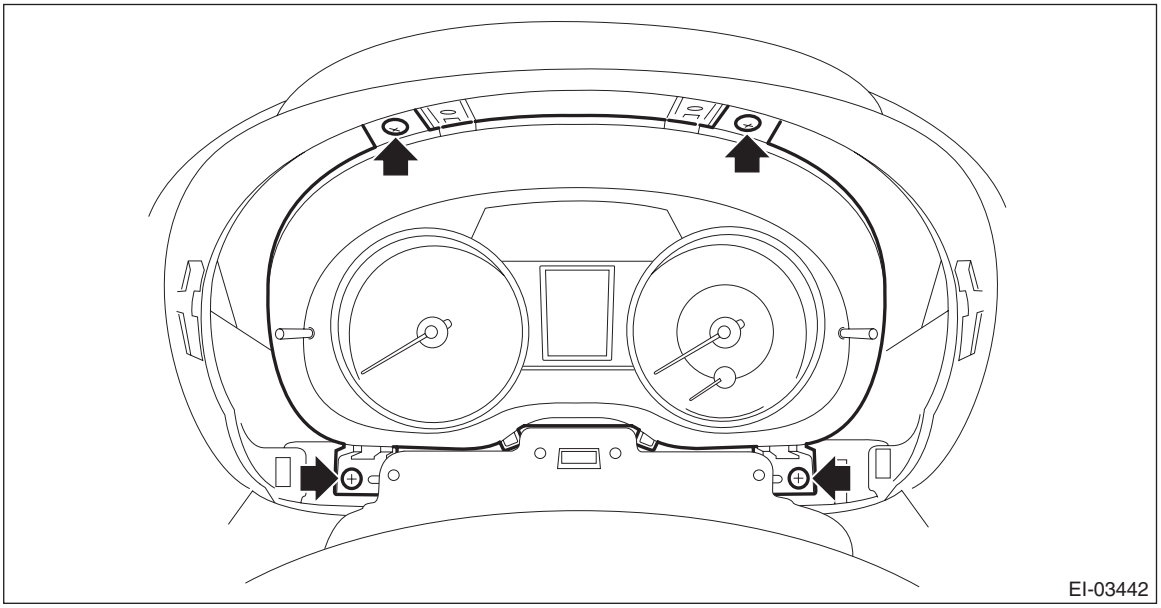
3) Release the screws, clips and claws, and remove the visor - combination meter.



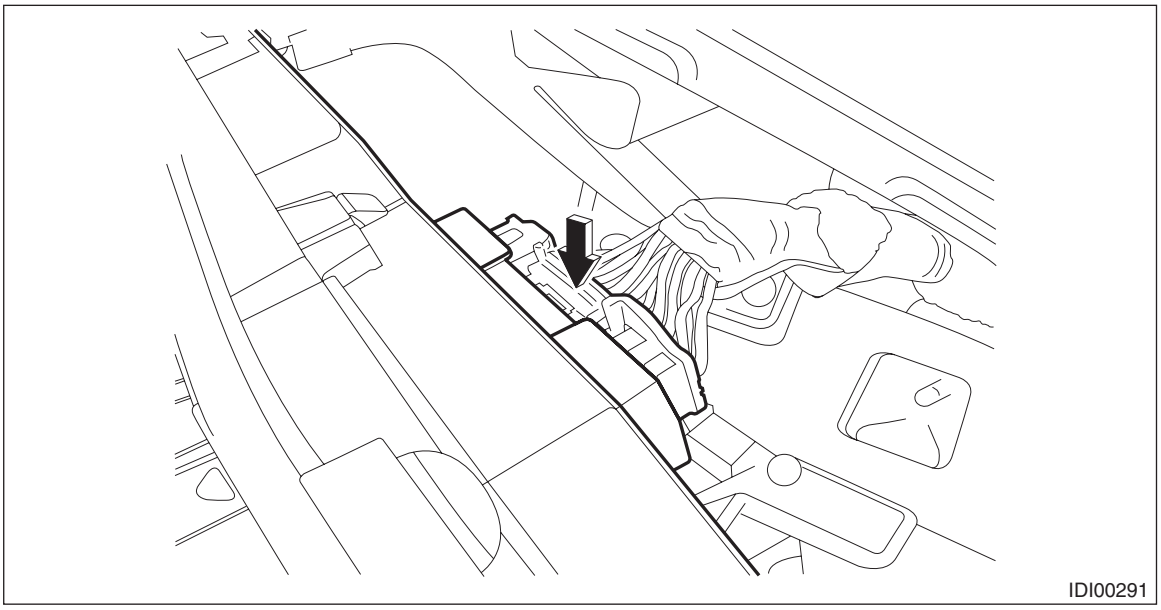
4) Remove the combination meter assembly.

CAUTION:
- **Be careful not to damage the meter or instrument panel.**
- **Pay particular attention to avoid damaging the meter glass.**

(1) Remove the screws.



(2) Pull the combination meter assembly toward you and disconnect the connector.



B: INSTALLATION

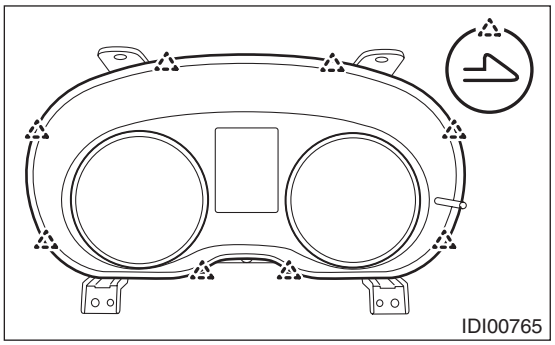
CAUTION:
- **Make sure the electrical connector is connected securely.**
- **Make sure that each meter operates normally.**
- **When the combination meter assembly has been replaced, be sure to perform the following operations.**
  - **For models without the keyless access with push button start except for C5, be sure to perform the registration of immobilizer. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER".**
  - **Be sure to reset the ODO fuel economy value of the multi-function display (MFD). <Ref. to IDI-15, ODO FUEL ECONOMY VALUE RESET (HIGH GRADE TYPE ONLY), OPERATION, Multi-function Display (MFD) System.>**

Install each part in the reverse order of removal.

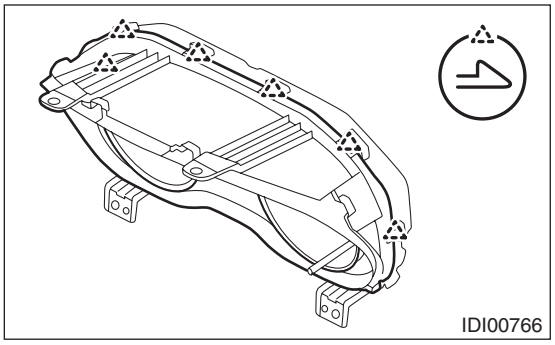
C: DISASSEMBLY

CAUTION:
- **Use gloves to avoid damage and getting fingerprints on the glass surface and meter surfaces.**
- **Be careful not to apply excessive force to the trip knob.**
- **Be sure not to touch the meter indicator needle.**
- **Because LEDs are used for all of warning lights and indicator lights, they are not removable from the meter - main assembly.**

1) Release the claws, and then remove the glass - combination meter.



2) Release the claws, and then remove the visor - combination meter.



D: ASSEMBLY

Assemble each part in the reverse order of disassembly.

6. Speedometer

A: SPECIFICATION

Since the meter - main assembly cannot be disassembled, do not remove or inspect the speedometer alone. (Do not remove the cover on the back surface.)

7. Tachometer

A: SPECIFICATION

Since the meter - main assembly cannot be disassembled, do not remove or inspect the tachometer alone. (Do not remove the cover on the back surface.)

8. Fuel Gauge

A: SPECIFICATION

Since the meter - main assembly cannot be disassembled, do not remove or inspect the fuel gauge alone. (Do not remove the cover on the back surface.)

9. ECO Gauge

A: SPECIFICATION

Since the meter - main assembly cannot be disassembled, do not remove or inspect the ECO gauge alone. (Do not remove the cover on the back surface.)

10.Multi-function Display (MFD)

A: REMOVAL

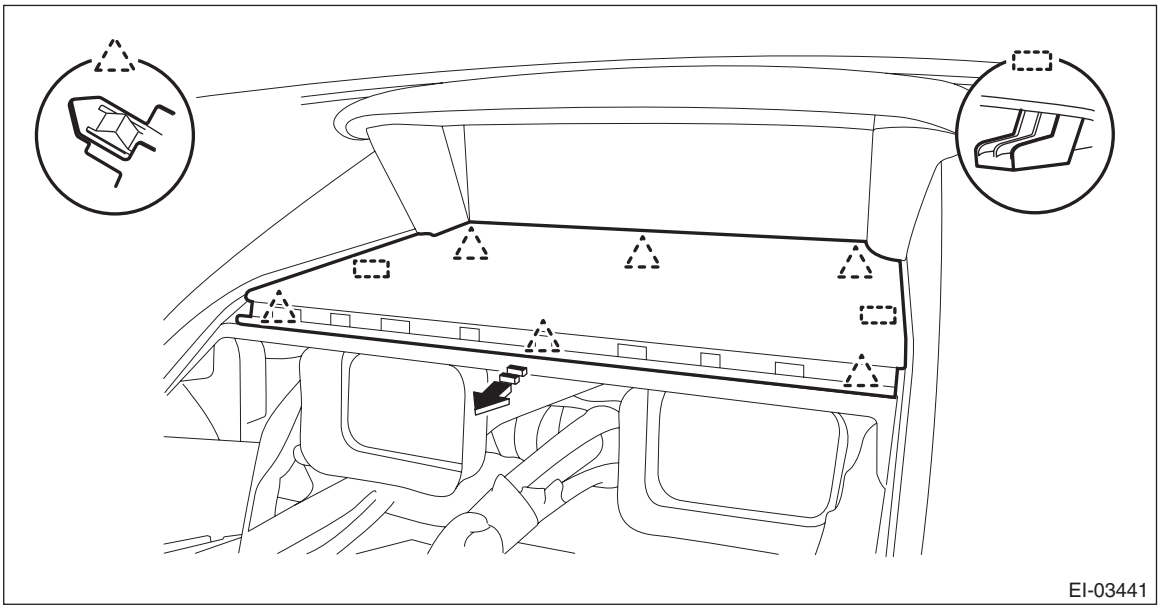
1. MULTI FUNCTION DISPLAY

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>

3) Release the claw and hook, and then remove the cover center UPR.

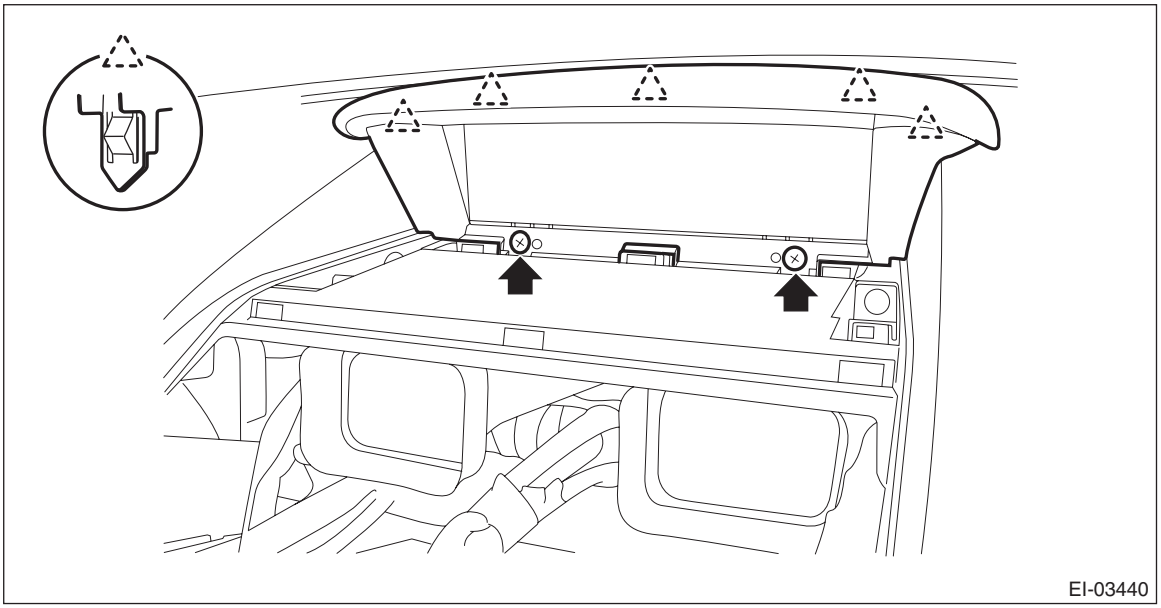


NOTE:
Lightly push up the back of the cover center UPR, hook the finger to the end portion and pull it toward you to remove it.

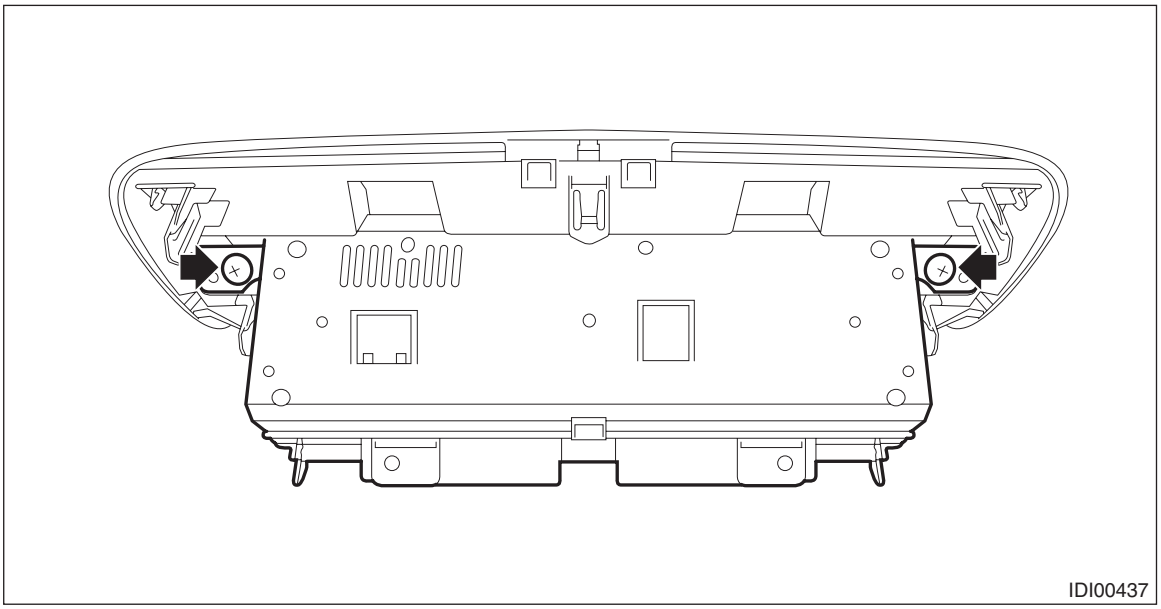
4) Remove the multi-function display.

CAUTION:
Be careful not to damage the multi-function display or instrument panel.

(1) Release the screws and claws.
(2) Pull the multi-function display assembly toward you, and disconnect the connector.



(3) Remove the screw, and remove the multi-function display from the panel - display.



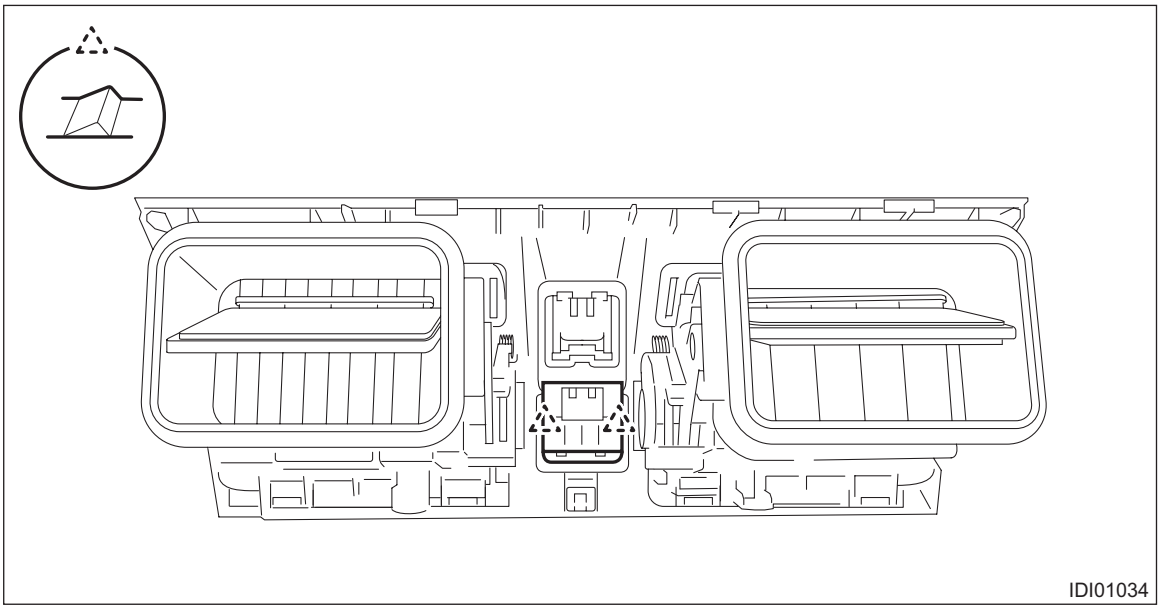
2. MULTI-FUNCTION DISPLAY SWITCH

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>

3) Release the claws and remove the switch - multi-function display.



B: INSTALLATION

CAUTION:
- **Make sure the electrical connector is connected securely.**
- **Make sure that the multi-function display (MFD) operates normally.**
- **After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.**
- **When the multi-function display has been replaced, perform the following operations.**
  – Be sure to reset the ODO fuel economy value of the multi-function display (MFD). <Ref. to IDI-15, ODO FUEL ECONOMY VALUE RESET (HIGH GRADE TYPE ONLY), OPERATION, Multi-function Display (MFD) System.>
  – Be sure to correction the lifetime fuel economy value of the multi-function display (MFD). <Ref. to IDI-14, DIAGNOSTIC MODE (HIGH GRADE TYPE ONLY), OPERATION, Multi-function Display (MFD) System.>

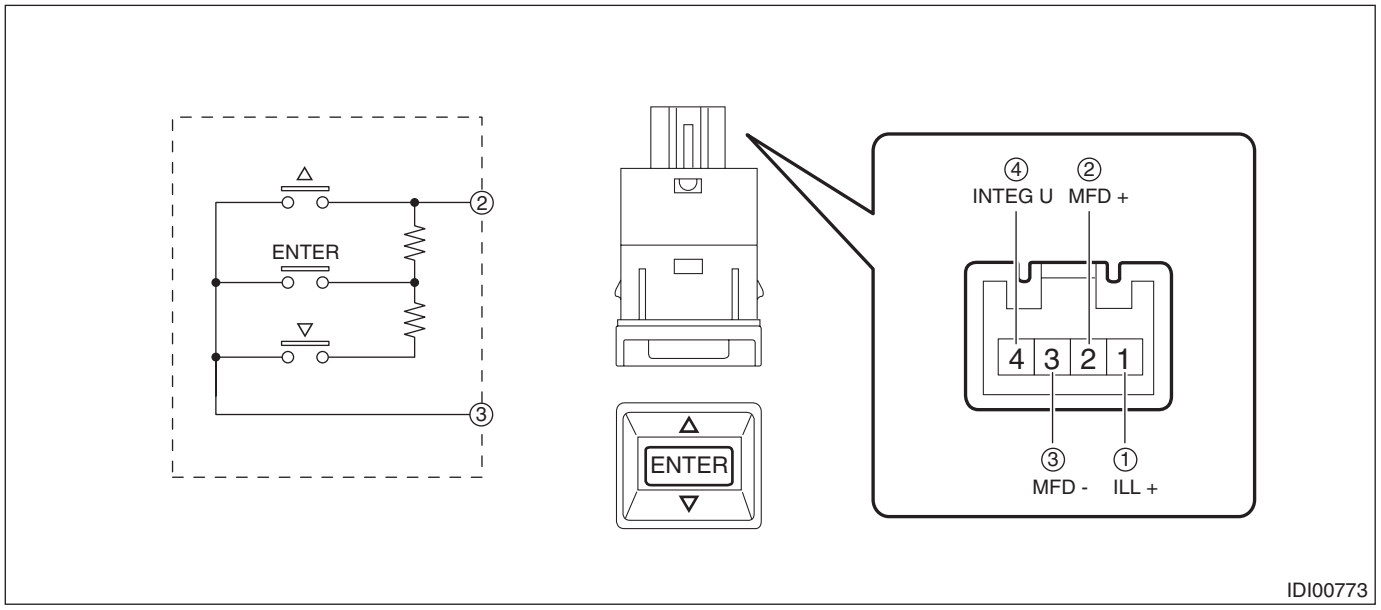
Install each part in the reverse order of removal.

C: INSPECTION

1. MULTI-FUNCTION DISPLAY SWITCH

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions		Standard
2 — 3	△ (UP) ENTER ▽ (DOWN)	All OFF	1 MΩ or more
	△ (UP)	ON	Less than 1 Ω
	ENTER	ON	Approx. 1,000 Ω
	▽ (DOWN)	ON	Approx. 3,670 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

Terminal No.	Inspection conditions	Specification
4 (+) — 1 (–)	Apply battery voltage.	Light ON

3) If the inspection result is not within the standard, replace the switch - multi-function display.

11.Steering Switch

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Set the tire to the straight-ahead position.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
4) Remove the steering wheel. <Ref. to PS-9, REMOVAL, Steering Wheel.>
5) Remove the MID switch. <Ref. to PS-10, DISASSEMBLY, Steering Wheel.>

B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.
• If the steering wheel has been removed, make sure that the steering roll connector is not turned from the original position.
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform the VDC setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• Securely install the switch. Improper insertion of the pin or claw of the switch may cause improper installation.
1) Align the center position of the steering roll connector. <Ref. to AB-72, ADJUSTMENT, Roll Connector.>
2) Install each part in the reverse order of removal.

NOTE:
Align the alignment marks on the steering wheel and the column assembly - steering.

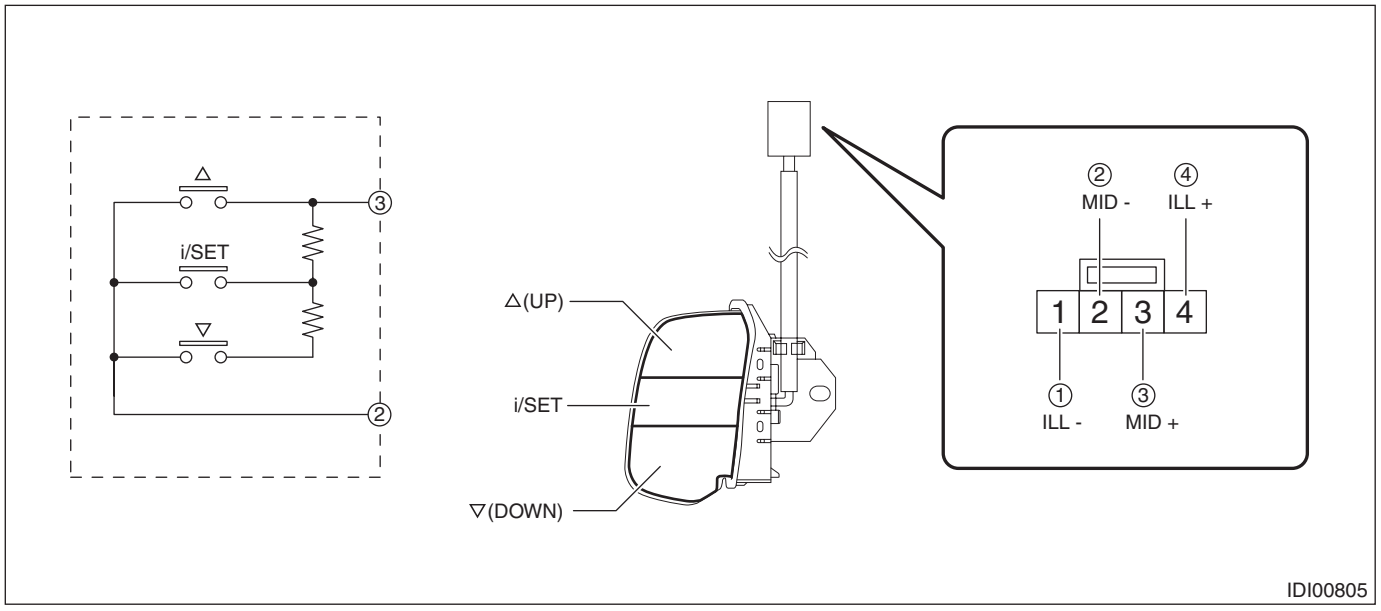
Tightening torque:
Steering wheel: 39 N·m (3.98 kgf-m, 28.8 ft-lb)

Clearance:
Between cover assembly - column and steering wheel: 4 — 6 mm (0.16 — 0.24 in)

C: INSPECTION

1) Measure the resistance between switch terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions		Standard
3 — 2	△ (UP) i/SET ▽ (DOWN)	All OFF	Approx. 1 MΩ or more
	△ (UP)	ON	Less than 1 Ω
	i/SET	ON	Approx. 1,000 Ω
	▽ (DOWN)	ON	Approx. 3,670 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

Terminal No.	Inspection conditions	Specification
4 (+) — 1 (–)	Apply battery voltage.	Light ON

3) Replace the MID switch if the inspection result is not within the standard value.

INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS)

IDI(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

1. COMBINATION METER

	Step	Check	Yes	No
1	**PERFORM CUSTOMER INTERVIEW.** Using the Check List for Interview, ask the customer the condition of how trouble occurs. <Ref. to IDI(diag)-4, CHECK, Check List for Interview.>	Did you interview the customer?	Go to step **2**.	Interview the customer. <Ref. to IDI(diag)-4, CHECK, Check List for Interview.>
2	**CHECK CAN COMMUNICATION.** Read the DTC of the CAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, OPERATION, Read Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-31, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the inspection according to the basic diagnostic procedure for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Go to step **3**.
3	**CHECK COMBINATION METER.** Using the Subaru Select Monitor, read DTC of combination meter. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Record DTC and time stamp, and perform the diagnosis according to DTC. <Ref. to IDI(diag)-25, LIST, List of Diagnostic Trouble Code (DTC).> For time stamp, refer to “LAN SYSTEM”. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Go to step **4**.
4	**CHECK COMBINATION METER.** Check the operation of combination meter. <Ref. to IDI(diag)-20, System Operation Check Mode.>	Is it operating normally?	System is normal.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

2. MFD

	Step	Check	Yes	No
1	**PERFORM CUSTOMER INTERVIEW.** Using the Check List for Interview, ask the customer the condition of how trouble occurs. <Ref. to IDI(diag)-4, CHECK, Check List for Interview.>	Did you interview the customer?	Go to step **2**.	Interview the customer. <Ref. to IDI(diag)-4, CHECK, Check List for Interview.>
2	**CHECK CAN COMMUNICATION.** Read the DTC of the CAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, OPERATION, Read Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-31, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the inspection according to the basic diagnostic procedure for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Go to step **3**.
3	**CHECK MFD.** Read the DTC relating the MFD using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Record DTC and time stamp, and perform the diagnosis according to DTC. <Ref. to IDI(diag)-25, LIST, List of Diagnostic Trouble Code (DTC).> For time stamp, refer to “LAN SYSTEM”. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Go to step **4**.
4	**CHECK MFD.** Check the MFD display using the system operation check mode of combination meter. <Ref. to IDI(diag)-20, System Operation Check Mode.>	Is the display normal?	System is normal.	Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>

2. Check List for Interview

A: CHECK

- Inspect the following items regarding the vehicle's state.
- Print out this page for interviewing customers.

<table>
<tr><td colspan="4">Combination Meter / MFD Check List for Interview
Date the Vehicle is Received Year Month Day</td></tr>
<tr><td colspan="2" rowspan="2">Customer's name</td><td>Registration No.</td><td>Initial year of registration
Year Month Date</td></tr>
<tr><td>Vehicle model</td><td>Frame number</td></tr>
<tr><td>Interviewer</td><td>Inspector</td><td>Engine type</td><td>Odometer reading</td></tr>
<tr><td colspan="4">Customer specified content
•
•
•</td></tr>
<tr><td>Date and time when the trouble occurred</td><td></td><td>Frequency of trouble occurrence</td><td>Always occurs
Sometimes occurs
(times per day, times per month)</td></tr>
<tr><td rowspan="2">Condition of trouble occurrence (How the trouble occurs)</td><td rowspan="2"></td><td>Weather</td><td>Fine • Cloudy • Rainy • Snowy • Others ( )</td></tr>
<tr><td>Temperature</td><td>°C (°F) — °C (°F)</td></tr>
<tr><td>Road conditions</td><td></td><td>Occurrence location</td><td></td></tr>
<tr><td>Accessory installation condition</td><td colspan="3"></td></tr>
<tr><td colspan="4">Confirmation of trouble condition</td></tr>
<tr><td rowspan="3">❑ Combination meter</td><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="3">❑ MFD</td><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>❑ Diagnostic code</td><td colspan="3"></td></tr>
</table>

3. General Description

A: CAUTION

1. AIRBAG SYSTEM

CAUTION:
• Do not use the electrical test equipment on the airbag system wiring harnesses and connector circuits.
• Be careful not to damage the airbag system wiring harness.

B: INSPECTION

Before performing the diagnosis, check the following items which may cause problems relating the wiper or light.
1) Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
2) Check the fuse condition.
3) Check the connecting condition of harness and harness connector.

C: PREPARATION TOOL

1. SPECIAL TOOL

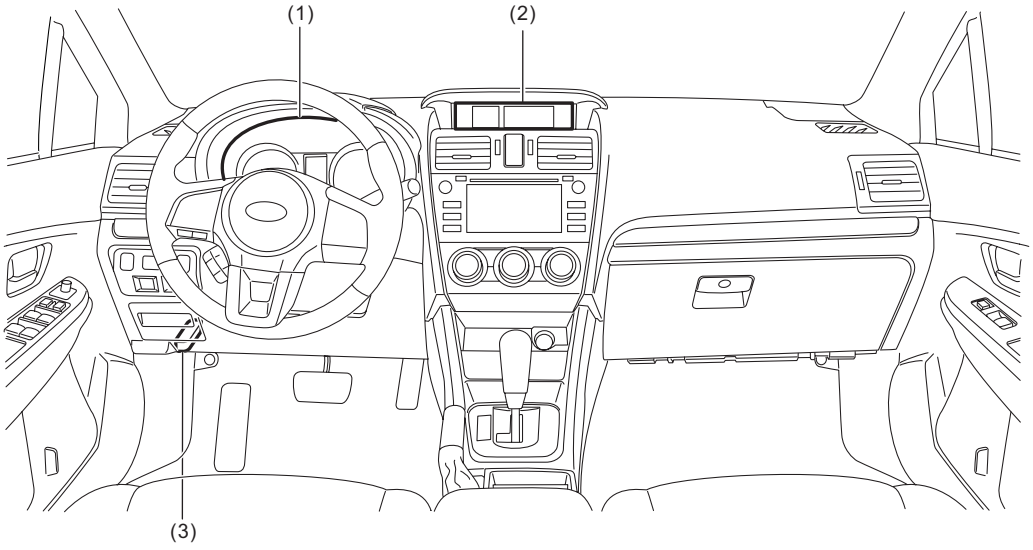
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

A: LOCATION

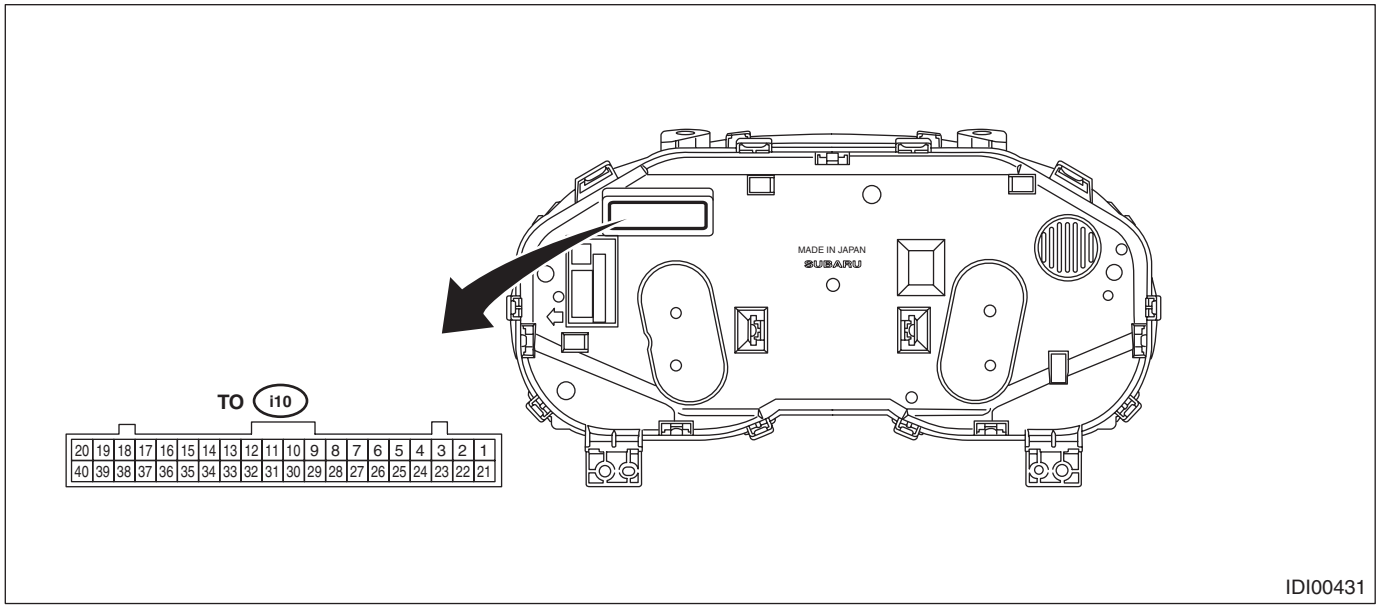


(1) Combination meter
(2) MFD
(3) Data link connector

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

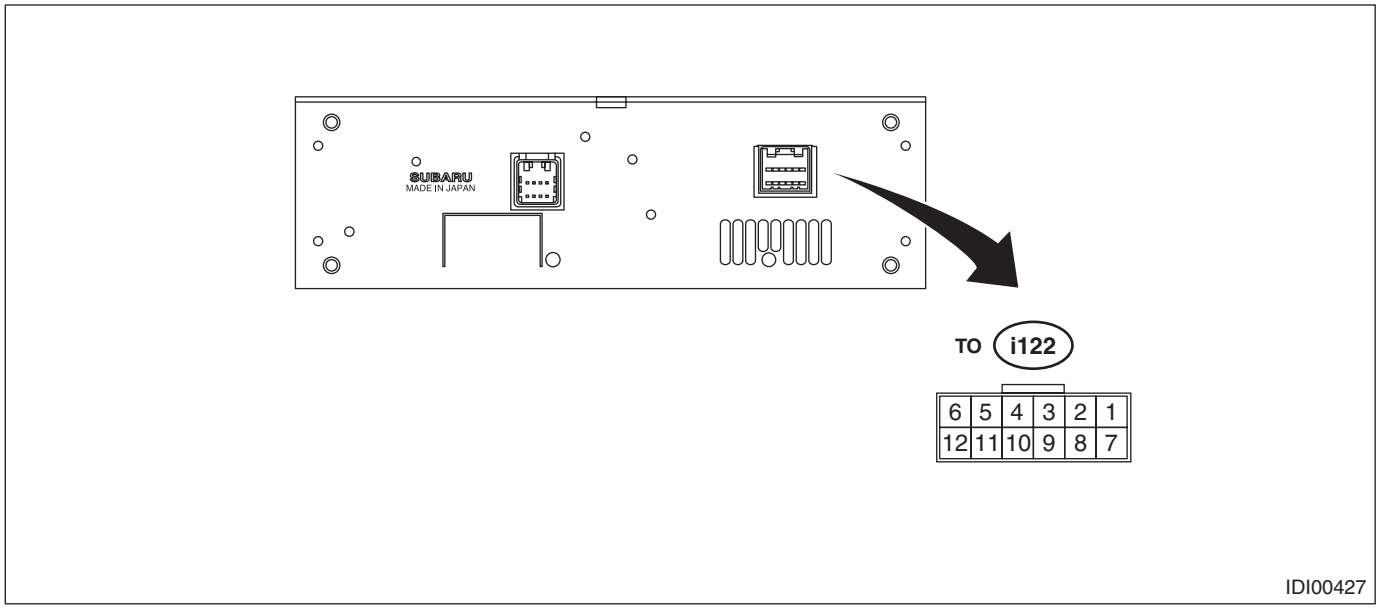
- Combination meter



Terminal No.	Description	Terminal No.	Description
1	Immobilizer/security indicator light	27	Ambient sensor
2	Charge warning light	28	UART (MFD)
3	Oil pressure warning light	29	Steering switch (+)
4	RH turn indicator	30	Pedestrian alert system
6	LH turn indicator	32	CAN communication line (–)
8	Auto headlight beam leveler warning light	33	CAN communication line (+)
15	Driver's seat belt switch	36	Ambient sensor GND
16	Passenger's seat belt switch	37	Fuel level sensor GND
20	Ignition power supply	38	GND
21	Washer fluid level sensor	39	Backup ignition power supply
23	Brake fluid level switch	40	Battery power supply
25	Fuel level sensor	—	—

Terminal No.	Item	Measuring condition	Standard
1 ←→ Chassis ground	Voltage	Security/immobilizer indicator light off → on	0 V → 10 — 14 V
2 ←→ Chassis ground	Voltage	Charge warning light off → on	0 V → 10 — 14 V
3 ←→ Chassis ground	Voltage	Oil pressure warning light off → on	0 V → 10 — 14 V
4 ←→ Chassis ground	Voltage	RH turn indicator off → on	0 V → 10 — 14 V
6 ←→ Chassis ground	Voltage	LH turn indicator off → on	0 V → 10 — 14 V
8 ←→ Chassis ground	Voltage	Auto headlight beam leveler warning light off → on	0 V → 10 — 14 V
15 ←→ Chassis ground	Resistance	Driver's seat belt switch ON	Less than 1 Ω
16 ←→ Chassis ground	Resistance	Passenger's seat belt switch ON	Less than 1 Ω
20 ←→ Chassis ground	Voltage	IG OFF → ON	0 V → 10 — 14 V
21 ←→ Chassis ground	—	Washer fluid level sensor	—
23 ←→ Chassis ground	—	Brake fluid level switch	—
25 ←→ 37	Resistance	Fuel level sensor	10 — 600 Ω
27 ←→ 36	Resistance	Ambient sensor	1 — 35 kΩ
28 (UART) ←→ Chassis ground	—	Cannot be measured	—
32 (CAN–) ←→ Chassis ground	—	Cannot be measured	—
33 (CAN+) ←→ Chassis ground	—	Cannot be measured	—
34 ←→ Chassis ground	Resistance	Always	Less than 1 Ω
35 ←→ Chassis ground	Resistance	Always	Less than 1 Ω
36 ←→ Chassis ground	Resistance	Always	Less than 1 Ω
37 ←→ Chassis ground	Resistance	Always	Less than 1 Ω
38 ←→ Chassis ground	Resistance	Always	Less than 1 Ω
39 ←→ Chassis ground	Resistance	Always	Less than 1 Ω
40 ←→ Chassis ground	Voltage	Always	10 — 14 V

- MFD



Terminal No.	Description	Terminal No.	Description
1	Battery power supply	7	—
2	GND	8	—
3	Ignition power supply	9	UART (meter)
4	Switch communication line (–)	10	Passenger's airbag ON
5	CAN communication line (–)	11	Passenger's airbag OFF
6	CAN communication line (+)	12	Switch communication line (+)

Terminal No.	Item	Measuring condition	Standard
1 (+B) ←→ Chassis ground	Voltage	Always	10 — 14 V
2 (GND) ←→ Chassis ground	Resistance	Always	Less than 1 Ω
3 (IGN) ←→ Chassis ground	Voltage	IG OFF → ON	0 V → 10 — 14 V
4 (STR-) ←→ Chassis ground	—	Cannot be measured (switch communication line)	—
5 (CAN-) ←→ Chassis ground	—	Cannot be measured (CAN communication line)	—
6 (CAN+) ←→ Chassis ground	—	Cannot be measured (CAN communication line)	—
9 (UART) ←→ Chassis ground	—	Cannot be measured (meter communication line)	—
10 ←→ Chassis ground	Voltage	Passenger's airbag ON indicator (when illuminating)	Less than 1 V
11 ←→ Chassis ground	Voltage	Passenger's airbag OFF indicator (when illuminating)	Less than 1 V
12 (STR+) ←→ Chassis ground	—	Cannot be measured (switch communication line)	—

6. Subaru Select Monitor

A: OPERATION

- For detailed operation procedures, refer to “Application help”.
- If the combination meter or MFD can not communicate with Subaru Select Monitor, perform the “Communication for Initializing Impossible”. <Ref. to IDI(diag)-11, INSPECTION, Subaru Select Monitor.>

If the DTCs related to the LAN system are not displayed, perform the inspection by connecting the Subaru Select Monitor to another vehicle which is operating properly and by establishing the communication.

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE (COMBINATION METER)

DETECTING CONDITION:

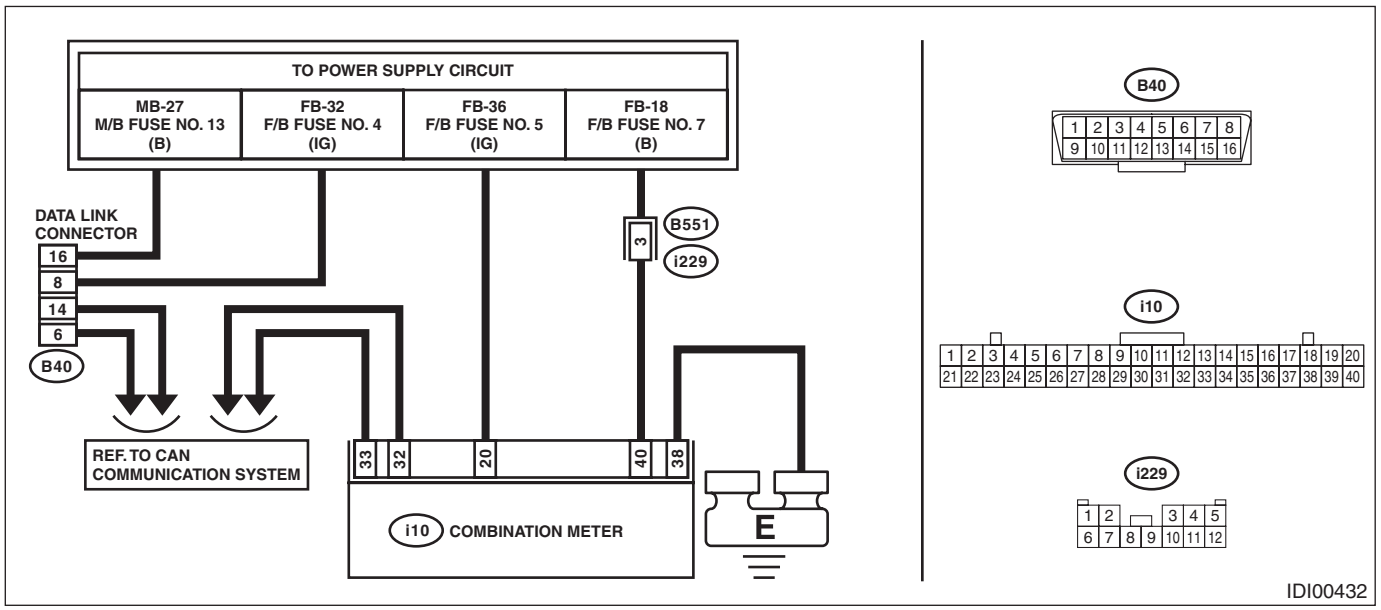
- Defective harness connector
- Power supply circuit malfunction
- Defective combination meter
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Communication is impossible between combination meter and Subaru Select Monitor.

WIRING DIAGRAM:

- Combination meter system <Ref. to WI(w/o HEV)-77, WIRING DIAGRAM, Combination Meter System.> <Ref. to WI(HEV)-71, WIRING DIAGRAM, Combination Meter System.>
- CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.> <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



Step		Check	Yes	No
1	**CHECK OTHER COMMUNICATION.** Communicate with the system other than the combination meter using the Subaru Select Monitor.	Is the communication to other control module possible?	Go to step **2**.	Perform the “Communication for Initializing Impossible” of LAN system. <Ref. to LAN(w/o HEV)(diag)-11, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.> <Ref. to LAN(HEV)(diag)-12, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>

Step		Check	Yes	No
2	**CHECK DTC.** Read the DTC of the LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, OPERATION, Read Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-31, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of combination meter. 3) Connect the disconnected connectors. 4) Communicate with the combination meter using the Subaru Select Monitor.	Is communication possible?	It is possible that temporary poor communication occurs.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

2. COMMUNICATION FOR INITIALIZING IMPOSSIBLE (MFD)

DETECTING CONDITION:

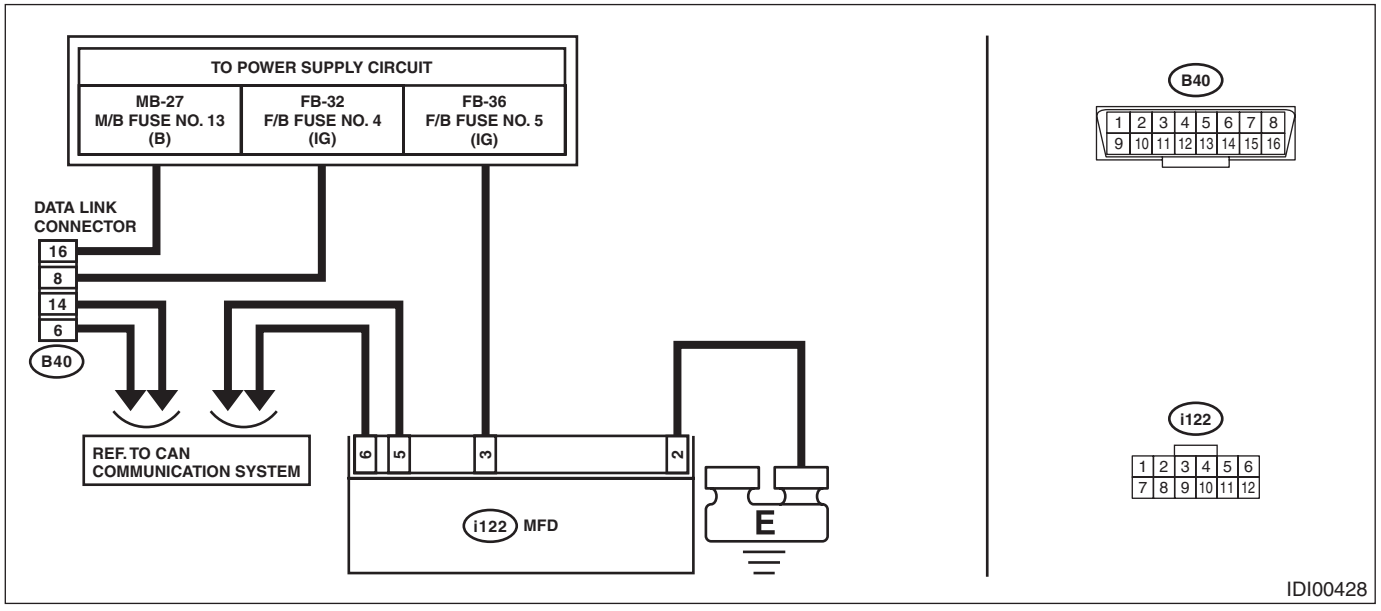
- Defective harness connector
- Power supply circuit malfunction
- Defective MFD
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Communication is impossible between MFD and Subaru Select Monitor.

WIRING DIAGRAM:

- Multi-function display (MFD) system <Ref. to WI(w/o HEV)-168, WIRING DIAGRAM, Multi-function Display (MFD) System.> <Ref. to WI(HEV)-146, WIRING DIAGRAM, Multi-function Display (MFD) System.>
- CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.> <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



	Step	Check	Yes	No
1	**CHECK OTHER COMMUNICATION.** Communicate with the system other than the MFD using the Subaru Select Monitor.	Is the communication to other control module possible?	Go to step **2**.	Perform the "Communication for Initializing Impossible" of LAN system. <Ref. to LAN(w/o HEV)(diag)-11, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.> <Ref. to LAN(HEV)(diag)-12, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
2	**CHECK DTC.** Read the DTC of the LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, OPERATION, Read Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-31, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK MFD.** 1) Turn the ignition switch to OFF. 2) Disconnect the MFD connector. 3) Connect the disconnected connectors. 4) Communicate with the MFD using the Subaru Select Monitor.	Is communication possible?	It is possible that temporary poor communication occurs.	Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. COMBINATION METER

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Combination Meter» and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to IDI(diag)-25, List of Diagnostic Trouble Code (DTC).>

2. MFD

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Multi-function Display», and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to IDI(diag)-25, List of Diagnostic Trouble Code (DTC).>

8. Clear Memory Mode

A: OPERATION

1. COMBINATION METER

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Combination Meter» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

2. MFD

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Multi-function Display», and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

9. Read Current Data

A: OPERATION

1. COMBINATION METER

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Combination Meter» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

2. MFD

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Multi-function Display», and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

- Combination meter (models with normal meters)

Items to be displayed	Unit of measure	Contents	Note
Power on trip number	times	Time stamp information	—
Power on supply system	—	Time stamp information	—
past time after Power on	ms	Time stamp information	—
Fuel level resistance	Ω	Fuel sensor value display	—
Ambient air temperature	°C	External temperature sensor value display	—
External air temperature indication value	°C	Calculated value of external temperature for indication	—
Vehicle speed data	km/h	Vehicle speed value detected by meter	—
Engine revolution data	rpm	Engine speed value detected by meter	—
Driver side seat belt state	—	Displays ON/OFF	—
Passenger side seat belt state	—	Displays ON/OFF	—
Rear side (right) seat belt state	—	Displays ON/OFF	—
Rear side (center) seatbelt state	—	Displays ON/OFF	—
Rear side (left) seat belt state	—	Displays ON/OFF	—

- Combination meter (models with color TFT)

Items to be displayed	Unit of measure	Contents	Note
IG on trip number	times	Time stamp information	—
IG on supply system	—	Time stamp information	—
past time after IG on	ms	Time stamp information	—
Fuel level resistance	Ω	Fuel sensor value display	—
Ambient air temperature	°C	External temperature sensor value display	—
Air temperature correction	°C	Correction value for displaying ambient temperature	—
Mean fuel efficiency correction	%	Correction value for displaying average fuel economy	—
Second level belt warning customize	2-stage warning implemented/2-stage warning not implemented	Implementation status of seat belt second stage warning	—
External air temperature indication value	°C	Calculated value of external temperature for indication	—
Vehicle speed data	km/h	Vehicle speed value detected by meter	—
Engine revolution data	rpm	Engine speed value detected by meter	—
Driver side seat belt state	Drivers seat seat-belt sitting state/Drivers seat seat-belt non-wearing state	Seat belt fastening status	—
Passenger side seat belt state	Passenger seat seat-belt sitting state/Passenger seat seat-belt non-wearing state	Seat belt fastening status	—
Rear side (right) seat belt state	Rear seat right seat-belt sitting state/Rear seat right seat-belt non-wearing state	Seat belt fastening status	—
Rear side (center) seatbelt state	Rear seat center seat-belt sitting state/Rear seat center seat-belt non-wearing state	Seat belt fastening status	—
Rear side (left) seat belt state	Rear seat left seat-belt sitting state/Rear seat left seat-belt non-wearing state	Seat belt fastening status	—
EPS setting presence state	Electric power steering/No Electric power steering	Electric power steering equipment status	—
R.DIFF oil temperature sensing level	°C	Rear differential oil temperature sensor value	—
Outside temperature for diagnosis	°C	External temperature sensor value display	—
Demonstration mode permission / fault permission	Demonstration mode permission / fault permission	Demonstration mode permission status	—

- MFD

Items to be displayed	Unit of measure	Contents	Note
MFD hardware fail flag	Normal/MFD Fail	MFD abnormal status	—
MFD U-ART communication error flag	Normal/MFD U-ART Fail		—
MFD CAN communication error flag	Normal/MFD CAN Fail		—
MFD destination abnormal flag	Normal/MFD destination error		—
MFD failure information	No error High-speed CAN error counter abnormal High-speed CAN bus OFF detection High-speed CAN data abnormal High-speed CAN data not received UART data abnormal UART data not received IGN line wire break System microcomputer abnormal GERDA abnormal		—
Birthday1 setting M	—	Birthday setting value	—
Birthday1 setting D	—		—
Birthday2 setting M	—	Birthday setting value	—
Birthday2 setting D	—		—
Anniversary1 setting M	—	Anniversary setting value	—
Anniversary1 setting D	—		—
Anniversary2 setting M	—	Anniversary setting value	—
Anniversary2setting D	—		—
Driving record1 setting Yard	—	Driving record 1 setting value	—
Driving record1 setting Time	—		—
Driving record1setting fuel cons. Ave.	—		—
Driving record1 setting M	—		—
Driving record1 setting D	—		—
Driving record2 setting DIS	—	Driving record 2 setting value	—
Driving record2 setting Time	—		—
Driving record2setting fuel cons. Ave.	—		—
Driving record2 setting M	—		—
Driving record2 setting D	—		—
Clock/OFF setting	OFF External air temperature + analog clock External air temperature + digital clock	Clock display setting	—
Engine oil maintenance setting Y	—	Oil maintenance setting value	—
Engine oil maintenance setting M	—		—
Engine oil maintenance setting D	—		—
Engine oil maintenance setting meter	—		—
Oil filter maintenance setting Y	—	Oil filter maintenance setting value	—
Oil filter maintenance setting M	—		—
Oil filter maintenance setting D	—		—
Oil filter maintenance setting meter	—		—
Tire maintenance setting Y	—	Tire maintenance setting value	—
Tire maintenance setting M	—		—
Tire maintenance setting D	—		—
Tire maintenance setting meter	—		—

Items to be displayed	Unit of measure	Contents	Note
Maintenance schedule Y	—	Periodic inspection setting value	—
Maintenance schedule M	—		—
Maintenance schedule D	—		—
Maintenance schedule meter	—		—
Sub-meter(left) setting NO1	Indication OFF Mean vehicle speed ODO fuel efficiency ECVT Fluid Temp. Accel opening angle Section time Section distance Section fuel efficiency	Meter display setting	—
Sub-meter(left) setting NO2	Analog display Digital display	Meter display setting	—
Sub-meter(center) setting NO1	Indication OFF Mean vehicle speed ODO fuel efficiency ECVT Fluid Temp. Accel opening angle Section time Section distance Section fuel efficiency	Meter display setting	—
Sub-meter(center) setting NO2	Analog display Digital display	Meter display setting	—
Sub-meter(right) setting NO1	Indication OFF Mean vehicle speed ODO fuel efficiency ECVT Fluid Temp. Accel opening angle Section time Section distance Section fuel efficiency	Meter display setting	—
Sub-meter(right) setting NO2	Analog display Digital display	Meter display setting	—
MFD brightness setting NO1	—	MFD setting	—
MFD brightness setting NO2	—	MFD setting	—
MFD contrast setting NO1	-5 — +5	MFD setting	—
MFD contrast setting NO2	-5 — +5	MFD setting	—
ECO evaluation ON-OFF setting	OFF/ON	MFD setting	—
Info area setting	OFF Average Fuel Efficiency FUEL CONS Range	MFD setting	—
Menu language setting	(Corresponding languages)	MFD setting	—
Buzzer volume setting	OFF Small Loud	MFD setting	—
Fuel cons. Setting	00/OFF	MFD setting	—
Auto Start Stop interrupt display setting	OFF/ON	MFD setting	Not applicable
Welcome display ON-OFF setting	OFF/ON	MFD setting	—
Self check ON-OFF setting	OFF/ON	MFD setting	—

10.System Operation Check Mode

A: OPERATION

1. COMBINATION METER

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Combination Meter» and then select «Enter».
5) On «Select Function» display, select «Active Test».
6) On «Active Test» display, select an item to be checked.

NOTE:
- For detailed operation procedures, refer to “Application help”.
- If not equipped (depending on destination area or vehicle equipment condition), process will not go on.

CAUTION:
After executing the system operation check mode, execute the Clear Memory Mode. <Ref. to IDI(diag)-15, OPERATION, Clear Memory Mode.>

B: LIST

- Combination meter (models with normal meters)

Check item	Item 1	Item 2	Note
Pointer operation check	Speedometer	Speedometer 0 km/h (MPH) indication	—
		Speedometer 40 km/h (MPH) indication	—
		Speedometer 80 km/h (MPH) indication	—
		Speedometer 120 km/h (MPH) indication	—
		Speedometer 160 km/h (MPH) indication	—
		Speedometer 200 km/h (MPH) indication	—
		Speedometer 240 km/h (MPH) indication	—
		Speedometer 280 km/h (MPH) indication	—
	Tacho meter	Tachometer 0 rpm indication	—
		Tachometer 1000 rpm indication	—
		Tachometer 2000 rpm indication	—
		Tachometer 3000 rpm indication	—
		Tachometer 4000 rpm indication	—
		Tachometer 5000 rpm indication	—
		Tachometer 6000 rpm indication	—
		Tachometer 7000 rpm indication	—
	Eco gauge	Fuel efficiency gauge (ECO gauge) MIN scale command	—
		Fuel efficiency gauge (ECO gauge) 1/4 scale command	—
		Fuel efficiency gauge (ECO gauge) 1/2 scale command	—
		Fuel efficiency gauge (ECO gauge) 3/4 scale command	—
		Fuel efficiency gauge (ECO gauge) MAX scale command	—

Check item	Item 1	Item 2	Note
Segment of liquid crystal display check	LCD display all lighted		—
	AT shift (CVT only)	P range display	—
		R range display	—
		N range display	—
		L range display	—
		Display △	—
		Display ▽	—
		8 range display	—
		7 range display	—
		6 range display	—
		5 range display	—
		4 range display	—
		3 range display	—
		2 range display	—
		1 range display	—
	Odometer	Odometer numerical device display 0	—
		Odometer numerical device display 1	—
		Odometer numerical device display 2	—
		Odometer numerical device display 3	—
		Odometer numerical device display 4	—
		Odometer numerical device display 5	—
		Odometer numerical device display 6	—
		Odometer numerical device display 7	—
		Odometer numerical device display 8	—
		Odometer numerical device display 9	—
	Trip meter	Trip meter numerical device display 0	—
		Trip meter numerical device display 1	—
		Trip meter numerical device display 2	—
		Trip meter numerical device display 3	—
		Trip meter numerical device display 4	—
		Trip meter numerical device display 5	—
		Trip meter numerical device display 6	—
		Trip meter numerical device display 7	—
		Trip meter numerical device display 8	—
		Trip meter numerical device display 9	—
	Fuel gauge bar display	Fuel sender E-point command	—
		Meter E scale command	—
		Fuel warning lit position command (fuel warning also lights)	—
		Meter 1/4 scale command	—
		Meter 1/2 scale command	—
		Meter 3/4 scale command	—
		Meter F-scale command	—
		Fuel sender F-point command	—
	Shift-up indicator		MT only
	CRUISE(CC) indicator		—
	SET indicator		—
	READY indicator		Only for HEV model

Check item	Item 1	Item 2	Note
Lamp check	All lamps lighted		—
	Indicator drive	High-beam indicator	—
		Position light indicator	High grade meter only
		Front fog light indicator	—
		Water temperature (COOL) indicator	—
		VDC OFF indicator	—
		VDC operation/failure indicator	—
		Hill start assist OFF/failure indicator	—
		EV mode indicator	—
		HEV READY indicator	—
		SRF OFF indicator	—
		SRVD OFF indicator	—
	Warning drive	Driver side seat belt warning	—
		Airbag warning	—
		TPMS warning	US only
		All seats door warning	—
		Water temperature (HOT) warning	—
		E/G remaining oil warning	—
		AT (CVT) oil temperature warning	CVT only
		ABS warning	—
		BRAKE warning	—
		AWD warning	CVT only
		Remaining washer fluid washer	—
		Remaining fuel warning	—
		EPS warning	—
		Check E/G warning	—
		HEV fail warning	—
		Charge warning	—
		Oil pressure warning	—
		Vacuum pump warning	—
		SRVD warning	—
MFD output check	Passenger side seat belt warning		—
	Momentary fuel efficiency display value		—
	Mean fuel efficiency A display value		—
	Mean fuel efficiency B display value		—
	Remaining fuel cruising distance display value		—
	External air temperature indication value		—
	Mean vehicle speed display value		—
Buzzer	Sounding output ON/OFF		—
Illumination Check	Brightness check		—

- Combination meter (models with color TFT)

Check item	Item 1	Item 2	Note
Pointer operation check	Speedometer	—	—
	Tacho meter	—	—
	Fuel Meter Operation	—	—
	Water thermometer	—	—
Lamp check	All lamps lighted	—	—
	Indicator drive	High-beam indicator	—
		Position light indicator	—
		Front fog light indicator	—
		Rear fog light indicator	—
		VDC OFF indicator	—
		VDC operation/failure indicator	—
		Hill start assist OFF/failure indicator	—
	Warning drive	Driver side seat belt warning	—
		Airbag warning	—
		TPMS warning	—
		E/G remaining oil warning	—
		AT (CVT) oil temperature warning	—
		ABS warning	—
		BRAKE warning	—
		AWD warning	—
		Remaining fuel warning	—
		EPS warning	—
		Check E/G warning	—
		Charge warning	—
		Oil pressure warning	—
		HID auto leveler warning	—
MFD output check	Passenger side seat belt warning	—	—
	Rear seat (right) seat belt warning	—	—
	Rear seat (center) seat belt warning	—	—
	Rear seat (left) seat belt warning	—	—
	Momentary fuel efficiency display value	—	—
	Mean fuel efficiency A display value	—	—
	Mean fuel efficiency B display value	—	—
	Remaining fuel cruising distance display value	—	—
	External air temperature indication value	—	—
	Mean vehicle speed display value	—	—
Illumination Check	Brightness check	—	—
Buzzer	Sounding output ON/OFF	—	—
Display Operation Check Mode	White indication	—	—
	Black indication	—	—
	Red indication	—	—
	Green indication	—	—
	Blue indication	—	—
	Gradation indication	—	—
	Flicker indication	—	—
	Cross talking indication	—	—

11.User Customizing

A: OPERATION

1. COMBINATION METER

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Combination Meter» and then select «Enter».
5) On «Select Function» display, select «Customize».
6) On «Customize» display, select an item to be customized.

NOTE:
- For detailed operation procedures, refer to “Application help”.
- If not equipped (depending on destination area or vehicle equipment condition), some items are not displayed.

B: LIST

- Combination meter (models with normal meter)

Items to be displayed	Initial setting value	Customize setting	Note
Air temperature correction	±0°C	-5°C — +5°C	Temperature compensation can only be performed by 1°C (1°C change = 1.8°F) interval.
Mean fuel efficiency correction	±0°%	+10% — -10%	—

- Combination meter (models with color TFT)

Items to be displayed	Initial setting value	Customize setting	Note
Air temperature correction	±0°C	-5°C — +5°C	Temperature compensation can only be performed by 1°C (1°C change = 1.8°F) interval.
Mean fuel efficiency correction	±0°%	+10% — -10%	—
Seat belt 2-stage warning implementation YES/NO	2-stage warning implemented	2-stage warning implemented/2-stage warning not implemented	—
Demonstration mode permission / fault permission	OFF	fault permission / Demonstration mode permission	Demonstration mode must not be permitted when used by a customer.

12.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
U0073	CONTROL MODULE COMMUNICATION BUS OFF	Detected when CAN line abnormality is detected.	<Ref. to IDI(diag)-27, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	Detected when CAN data from the engine control module (ECM) does not arrive.	<Ref. to IDI(diag)-27, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	Detected when CAN data from TCM does not arrive.	<Ref. to IDI(diag)-27, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Detected when CAN data from VDC does not arrive.	<Ref. to IDI(diag)-27, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0131	LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE	Detected when CAN data from electric power steering CM does not arrive.	<Ref. to IDI(diag)-27, DTC U0131 LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Detected when CAN data from body integrated unit does not arrive.	<Ref. to IDI(diag)-27, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0151	LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE	Detected when CAN data from airbag CM does not arrive.	<Ref. to IDI(diag)-28, DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE	Detected when CAN data from A/C CM does not arrive.	<Ref. to IDI(diag)-28, DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE	Detected when CAN data from HPCM does not arrive.	<Ref. to IDI(diag)-28, DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0327	SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE	Detected when CAN data from keyless access CM does not arrive.	<Ref. to IDI(diag)-28, DTC U0327 SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1201	CAN-HS COUNTER ABNORMAL	Detected when CAN data is abnormal.	<Ref. to IDI(diag)-28, DTC U1201 CAN-HS COUNTER ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1650	INVALID DATA RECEIVED FROM METER (UART)	UART data from the combination meter is abnormal.	<Ref. to IDI(diag)-29, DTC U1650 INVALID DATA RECEIVED FROM METER (UART), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1651	LOST COMMUNICATION WITH METER (UART)	UART data from the combination meter has not arrived.	<Ref. to IDI(diag)-31, DTC U1651 LOST COMMUNICATION WITH METER (UART), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2220	BREAK THE WIRE OF IGN	Voltage malfunction caused by poor contact of IGN power supply circuits.	<Ref. to IDI(diag)-33, DTC B2220 BREAK THE WIRE OF IGN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2222	SYSTEM MICROCOMPUTER FAIL	When microcomputer froze.	<Ref. to IDI(diag)-34, DTC B2222 SYSTEM MICROCOMPUTER FAIL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2223	GERDA MALFUNCTION	When transmitting and receiving of data cannot be done normally between system microcomputer and image microcomputer.	<Ref. to IDI(diag)-34, DTC B2223 GERDA MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
B1500	FUEL SENDER OPEN/ SHORT-CIRCUIT DETECTION	Fuel gauge circuit is open or shorted.	<Ref. to IDI(diag)-35, DTC B1500 FUEL SENDER OPEN/SHORT-CIRCUIT DETECTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1501	POWER SUPPLY SYSTEM ERROR DETECTION	Combination meter power supply circuit is open or shorted.	<Ref. to IDI(diag)-38, DTC B1501 POWER SUPPLY SYSTEM ERROR DETECTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1507	EXTERNAL AIR TEMPERATURE OPEN/SHORT-CIRCUIT DETECTION	External air temperature sensor circuit is open or shorted.	<Ref. to IDI(diag)-40, DTC B1507 EXTERNAL AIR TEMPERATURE OPEN/SHORT-CIRCUIT DETECTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

13.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

Detected when CAN line abnormality is detected.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

Detected when CAN data from the engine control module (ECM) does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

C: DTC U0101 LOST COMMUNICATION WITH TCM

Detected when CAN data from TCM does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

D: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

Detected when CAN data from VDC does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

E: DTC U0131 LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE

Detected when CAN data is not received from electric power steering CM.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

F: DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

Detected when CAN data is not received from body integrated unit.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

G: DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE

Detected when CAN data is not received from airbag CM.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

H: DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE

Detected when CAN data is not received from A/C CM.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

I: DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE

Detected when CAN data from HPCM does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

J: DTC U0327 SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE

Detected when CAN data is not received from keyless access CM.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

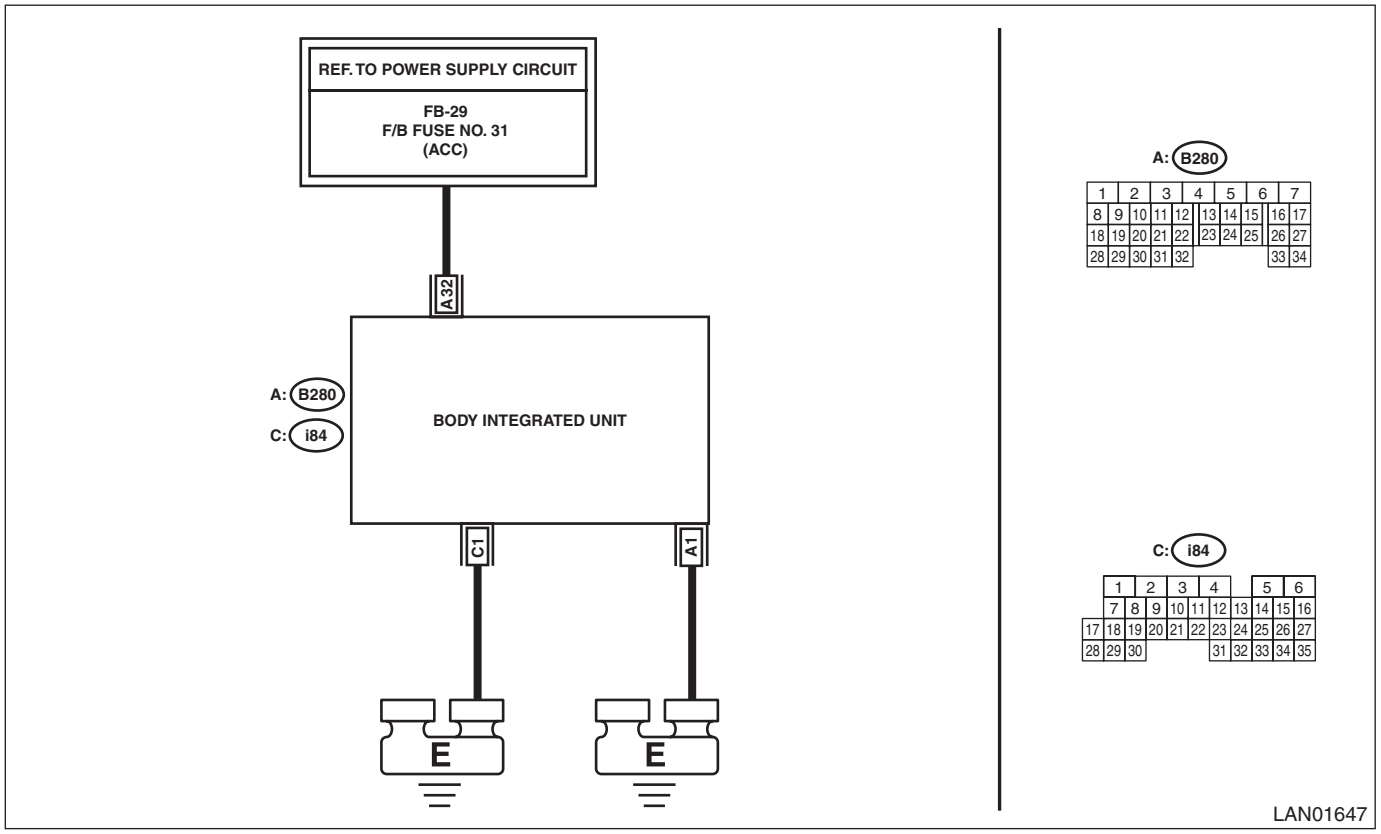
K: DTC U1201 CAN-HS COUNTER ABNORMAL

Detected when CAN data is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

L: DTC U1650 INVALID DATA RECEIVED FROM METER (UART)

DTC DETECTING CONDITION:
There is an abnormality in UART data from combination meter.
TROUBLE SYMPTOM:
LCD is not displayed.
WIRING DIAGRAM:
Clearance Light and Illumination Light System <Ref. to WI(w/o HEV)-72, Clearance Light and Illumination Light System.>

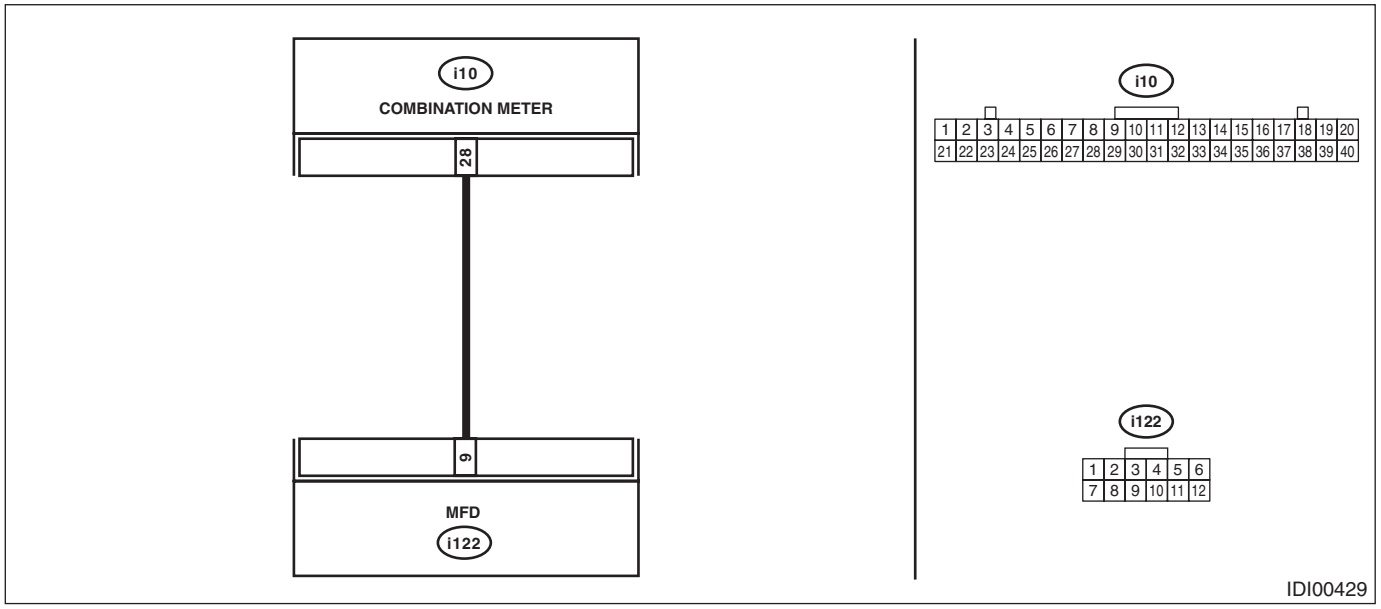


	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Read the DTC of body integrated unit and LAN system using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).> <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is any DTC other than U1650 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK FUSE.** Check the fuse No. 31 in the fuse & relay box.	Is the fuse OK?	Go to step **3**.	Replace the fuse. When the fuse is blown easily, check the wiring.
3	**CHECK HARNESS.** 1) Disconnect the body integrated unit connector. 2) Turn the ignition switch OFF → ACC. 3) Measure the voltage between body integrated unit connector and chassis ground using tester. ***Connector & terminal*** ***(B280) No. 32 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the ACC power supply circuit of the body integrated unit.

	Step	Check	Yes	No
4	**CHECK CURRENT DATA OF INTEGRATED UNIT.** 1) Connect the Subaru Select Monitor. 2) Turn the ignition switch to ON. 3) Check the current data «ACC voltage» of the body integrated unit. <Ref. to BC(diag)-12, Read Current Data.>	Is the voltage 10 V or more?	Go to step **5**.	Inspect and correct the body integrated unit connector. If there is no abnormality, replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.> (There may be a poor contact in the body integrated unit connector ((B280) terminal No. 32), or an internal malfunction of the integrated unit.) (If the current data indicates ACC voltage value ≈ Battery voltage, there will be no malfunction up to inside of the integrated unit. If U1650 is still detected in this condition as current malfunction, perform step 5 and subsequent procedures.)
5	**CHECK CONNECTOR.** 1) Disconnect the MFD connector and the combination meter connector. 2) Connect the disconnected connectors. 3) Read the DTC of the MFD using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC U1650 a current malfunction?	Go to step **6**.	There was poor contact of connector. Repair the poor contact of connector. (Poor contact in combination connector (i10) terminal No. 20 or MFD connector (i122) terminal No. 9)
6	**CHECK COMBINATION METER.** 1) Replace the combination meter. <Ref. to IDI-19, Combination Meter.> 2) Read the DTC of the MFD using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC U1650 a current malfunction?	Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>	There was something wrong with the combination meter.

M: DTC U1651 LOST COMMUNICATION WITH METER (UART)

DTC DETECTING CONDITION:
UART data from combination meter is not received.
TROUBLE SYMPTOM:
LCD is not displayed.
WIRING DIAGRAM:
Multi-function display (MFD) system <Ref. to WI(w/o HEV)-168, WIRING DIAGRAM, Multi-function Display (MFD) System.> <Ref. to WI(HEV)-146, WIRING DIAGRAM, Multi-function Display (MFD) System.>

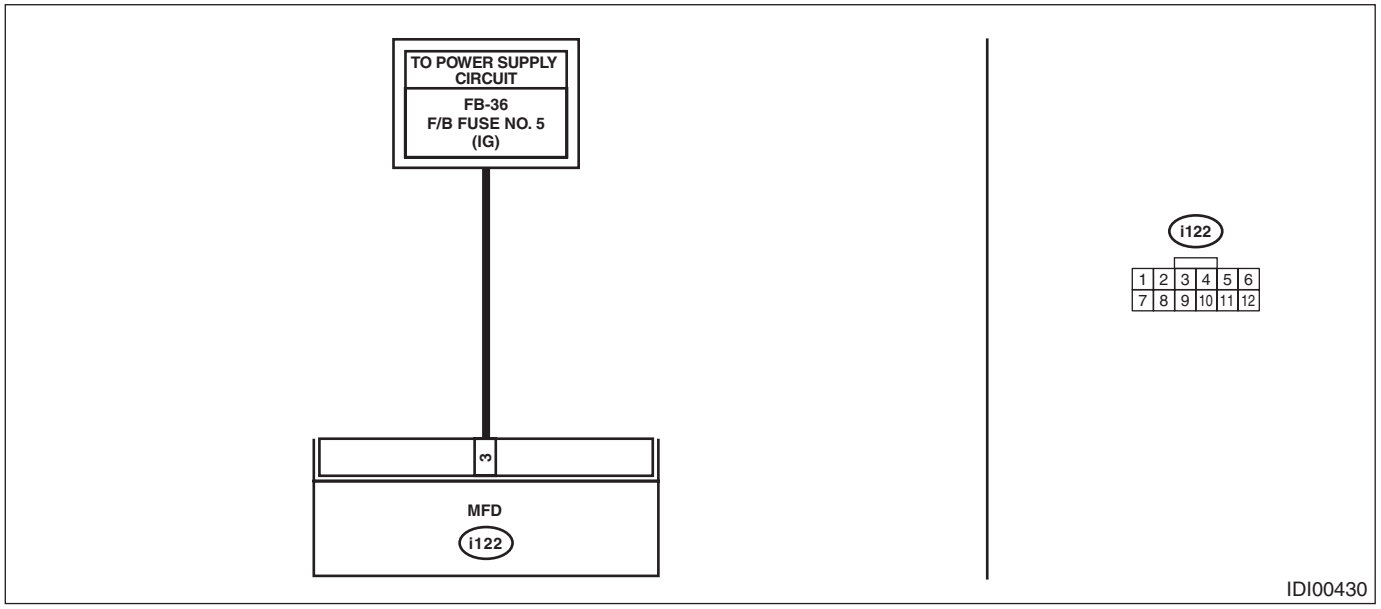


	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Read the DTC of the LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, OPERATION, Read Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-31, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK CONNECTOR.** 1) Disconnect the MFD connector and combination meter connector. 2) Connect the disconnected connectors. 3) Read the DTC of the MFD using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC U1651 a current malfunction?	Go to step **3**.	There was poor contact of connector.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the MFD connector and combination meter connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i10) No. 28 — (i122) No. 9:***	Is the resistance 10 Ω or less?	Go to step **4**.	Repair the open circuit of harness or replace harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i122) No. 9 — Chassis ground:***	Is the resistance 10 Ω or less?	Repair the short circuit of harness or replace harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK COMBINATION METER.** 1) Replace the combination meter. <Ref. to IDI-19, Combination Meter.> 2) Read the DTC of the MFD using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC U1651 a current malfunction?	Go to step **6**.	There was something wrong with the combination meter.
6	**CHECK COMBINATION METER.** 1) Replace the current combination meter with the original combination meter. 2) Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).> 3) Read the DTC of the MFD using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC U1651 a current malfunction?	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>	There was an abnormality in MFD.

N: DTC B2220 BREAK THE WIRE OF IGN

DTC DETECTING CONDITION:
There was voltage malfunction caused by poor contact of IGN power supply circuits.
TROUBLE SYMPTOM:
Airbag indicator does not illuminate.
WIRING DIAGRAM:
Multi-function display (MFD) system <Ref. to WI(w/o HEV)-168, WIRING DIAGRAM, Multi-function Display (MFD) System.> <Ref. to WI(HEV)-146, WIRING DIAGRAM, Multi-function Display (MFD) System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the MFD using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC B2220 a current malfunction?	Go to step **2**.	Go to step **5**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the MFD connector and reconnect it. 3) Turn the ignition switch to ON. 4) Read the DTC relating the MFD using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC B2220 a current malfunction?	Go to step **3**.	Go to step **5**.
3	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse.	Is the fuse OK?	Go to step **4**.	Replace the defective fuse.
4	**CHECK HARNESS.** 1) Disconnect the MFD connector. 2) Turn the ignition switch to ON. 3) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i122) No. 3 (+) — Chassis ground (–):***	Is the voltage 8.5 — 16.5 V?	Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>	Repair the harness between MFD and fuse.

Step		Check	Yes	No
5	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the MFD connector.	Is there poor contact of connector?	Repair or replace the poor contact of connector.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

O: DTC B2222 SYSTEM MICROCOMPUTER FAIL

DTC DETECTING CONDITION:
When the microcomputer froze.
TROUBLE SYMPTOM:
MFD does not operate.

NOTE:
Reset the MFD. If it does not return to the normal operation, replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>

P: DTC B2223 GERDA MALFUNCTION

DTC DETECTING CONDITION:
When the system microcomputer can not send/receive the data with the image microcomputer normally.
TROUBLE SYMPTOM:
There is no display on the TFT. Operation is normal.

NOTE:
Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>

Q: DTC B1500 FUEL SENDER OPEN/SHORT-CIRCUIT DETECTION

DTC DETECTING CONDITION:

The fuel gauge circuit is open or shorted.

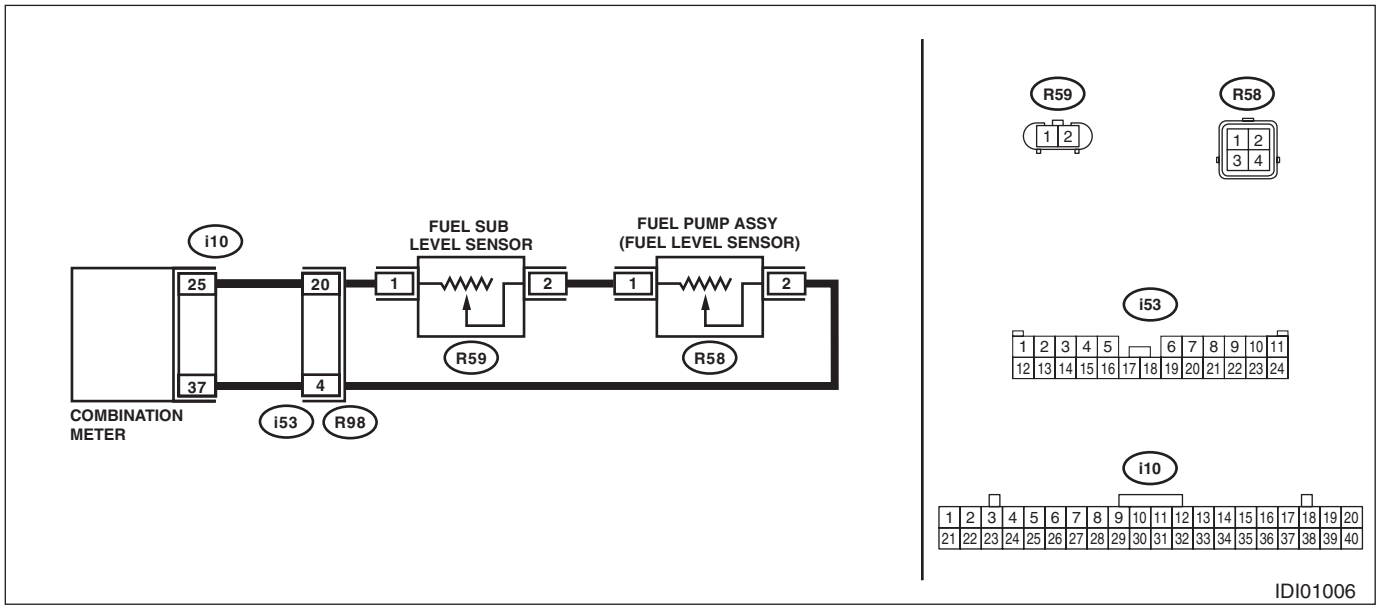
TROUBLE SYMPTOM:

- Defective fuel gauge.
- Fuel level warning light blinks.

WIRING DIAGRAM:

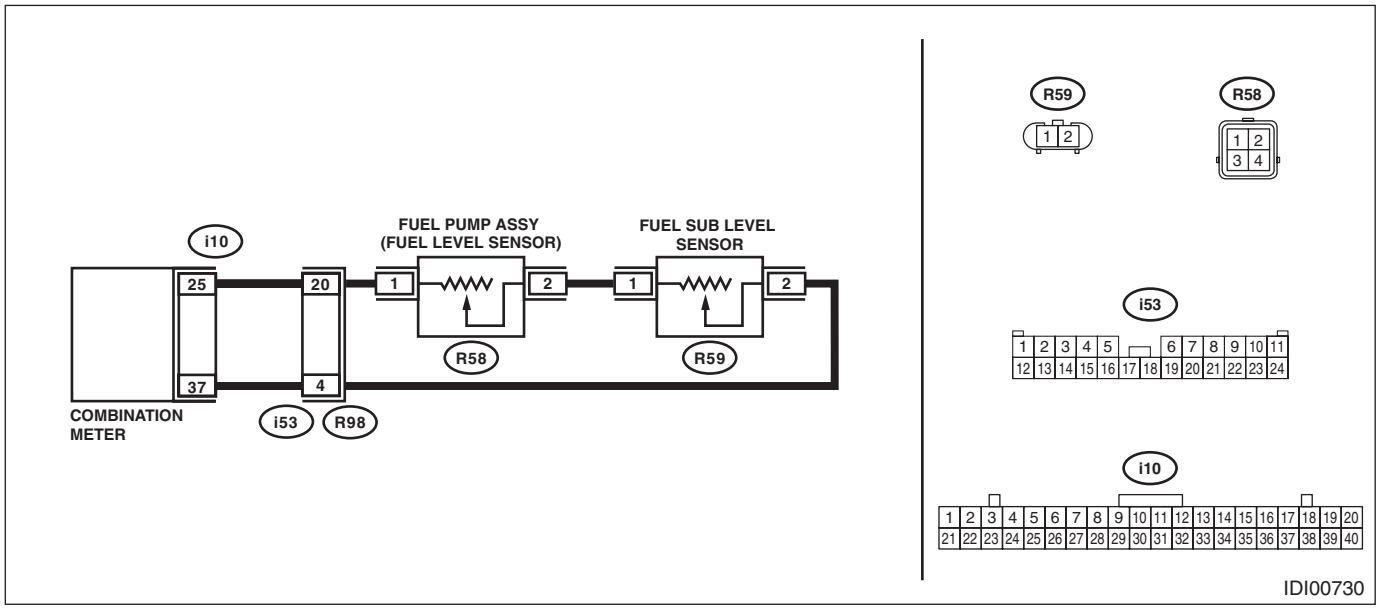
- Gasoline engine model

Fuel gauge system <Ref. to WI(w/o HEV)-139, WIRING DIAGRAM, Fuel Gauge System.>



- HEV model

Fuel gauge system <Ref. to WI(HEV)-115, WIRING DIAGRAM, Fuel Gauge System.>

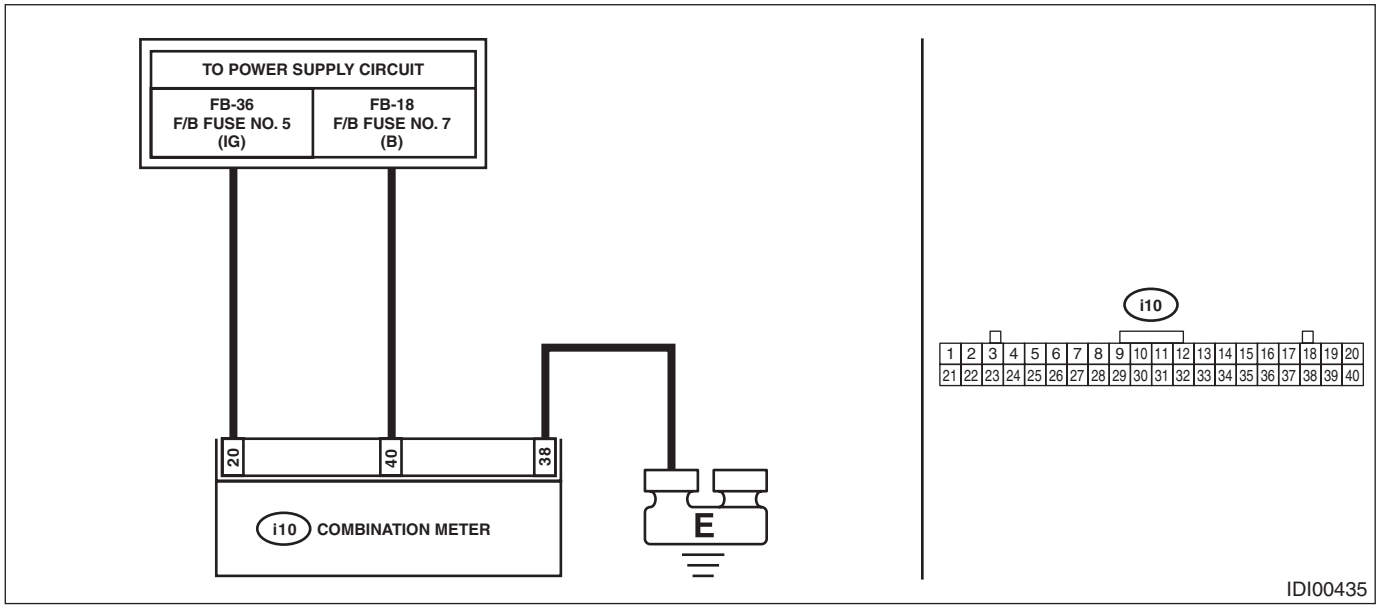


	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the combination meter using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC B1500 a current malfunction?	Go to step **2**.	Go to step **7**.
2	**CHECK COMBINATION METER.** 1) Check the operation of combination meter using Subaru Select Monitor. 2) From «Active Test», select «Fuel Meter Operation» and «Remaining fuel warning». <Ref. to IDI(diag)-20, System Operation Check Mode.>	Is the operation of combination meter OK?	Go to step **3**.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the combination meter connector and the fuel sub level sensor connector and the fuel level sensor connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***Gasoline engine model*** ***(i10) No. 25 — (R59) No. 1:*** ***(i10) No. 37 — (R58) No. 2:*** ***(R58) No. 1 — (R59) No. 2:*** ***HEV model*** ***(i10) No. 25 — (R58) No. 1:*** ***(i10) No. 37 — (R59) No. 2:*** ***(R58) No. 2 — (R59) No. 1:***	Is the resistance 10 Ω or less?	Go to step **4**.	Repair the open circuit of harness or replace harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i10) No. 25 — Chassis ground:*** ***(i10) No. 37 — Chassis ground:***	Is the resistance 10 Ω or less?	Repair the short circuit of harness or replace harness.	Go to step **5**.
5	**CHECK FUEL SUB LEVEL SENSOR.** Check the fuel sub level sensor as a single part. <Ref. to FU(H4DO(w/o HEV))-157, INSPECTION, Fuel Sub Level Sensor.>	Is the sensor normal?	Go to step **6**.	Replace the sensor. <Ref. to FU(H4DO(w/o HEV))-157, INSPECTION, Fuel Sub Level Sensor.>
6	**CHECK FUEL LEVEL SENSOR.** Check the fuel level sensor as a single part. <Ref. to FU(H4DO(w/o HEV))-147, INSPECTION, Fuel Level Sensor.>	Is the sensor normal?	Go to step **7**.	Replace the sensor. <Ref. to FU(H4DO(w/o HEV))-147, INSPECTION, Fuel Level Sensor.>
7	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect connectors.	Is there poor contact of connector?	Repair or replace the poor contact of connector.	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, display «Fuel level resistance» from «Data monitor». <Ref. to IDI(diag)-16, Read Current Data.>	Does the data display 10 — 570 Ω?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

R: DTC B1501 POWER SUPPLY SYSTEM ERROR DETECTION

DTC DETECTING CONDITION:
Open or short in combination meter power supply circuit
TROUBLE SYMPTOM:
Defective operation of combination meter
WIRING DIAGRAM:
Combination meter system <Ref. to WI(w/o HEV)-77, WIRING DIAGRAM, Combination Meter System.> <Ref. to WI(HEV)-71, WIRING DIAGRAM, Combination Meter System.>



Step		Check	Yes	No
1	**CHECK POWER SUPPLY CIRCUIT.** Turn the ignition switch to ON, and confirm that the illumination of combination meter lights.	Does the illumination light?	Go to step **2**.	Go to step **3**.
2	**CHECK DTC.** Read the DTC of the combination meter using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC B1501 a current malfunction?	Go to step **3**.	Go to step **5**.
3	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse. <Ref. to IDI-7, Relay and Fuse.>	Is the fuse OK?	Go to step **4**.	Replace the defective fuse.
4	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the combination meter connector. 3) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i10) No. 20 (+) — Chassis ground (–):*** ***(i10) No. 40 (+) — Chassis ground (–):***	Is the voltage 8.5 — 16.5 V?	Go to step **5**.	Repair the open circuit of harness or replace harness.

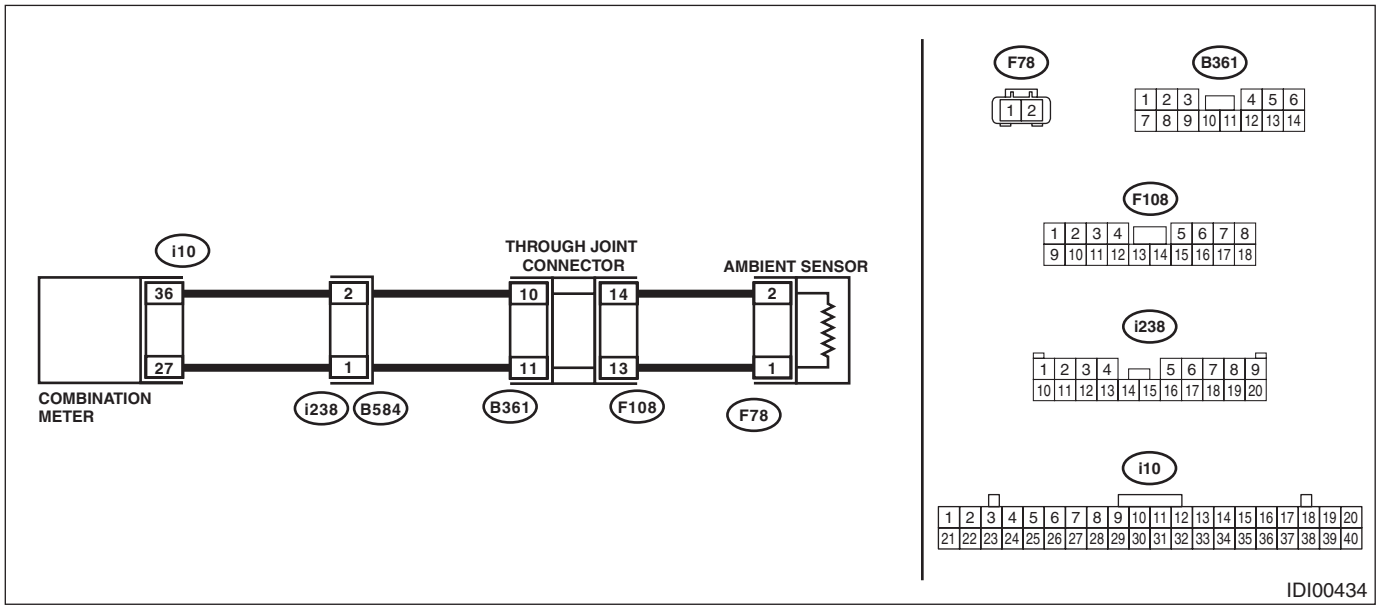
	Step	Check	Yes	No
5	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect connectors.	Is there poor contact of connector?	Repair or replace the poor contact of connector.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

S: DTC B1507 EXTERNAL AIR TEMPERATURE OPEN/SHORT-CIRCUIT DETECTION

DTC DETECTING CONDITION:
Open or short circuit in ambient sensor
TROUBLE SYMPTOM:
- Defective ambient temperature display
- Defective air conditioner operation

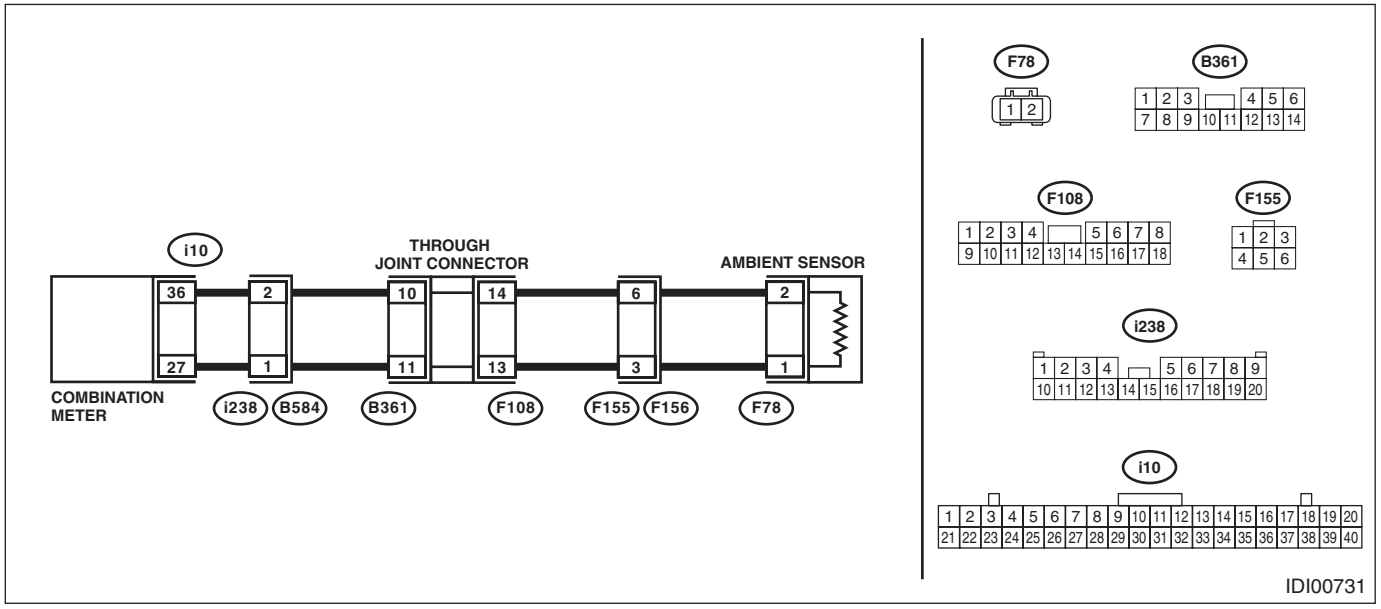
WIRING DIAGRAM:
- Gasoline engine model

Air conditioning system <Ref. to WI(w/o HEV)-45, WIRING DIAGRAM, Air Conditioning System.>



- HEV model

Air conditioning system <Ref. to WI(HEV)-47, WIRING DIAGRAM, Air Conditioning System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the combination meter using the Subaru Select Monitor. <Ref. to IDI(diag)-14, Read Diagnostic Trouble Code (DTC).>	Is DTC B1507 a current malfunction?	Go to step **2**.	Go to step **6**.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, display «Ambient air temperature» from «Data monitor». <Ref. to IDI(diag)-16, Read Current Data.>	Is data displayed?	System is normal.	Go to step **3**.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the combination meter connector and ambient sensor connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i10) No. 36 — (F78) No. 2:*** ***(i10) No. 27 — (F78) No. 1:***	Is the resistance 10 Ω or less?	Go to step **4**.	Repair the open circuit of harness or replace harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i10) No. 36 — Chassis ground:*** ***(i10) No. 27 — Chassis ground:***	Is the resistance 10 Ω or less?	Repair the short circuit of harness or replace harness.	Go to step **5**.
5	**CHECK AMBIENT SENSOR.** Perform the inspection of ambient sensor unit. <Ref. to AC-72, Ambient Sensor.>	Is the sensor normal?	Go to step **6**.	Replace the sensor. <Ref. to AC-72, Ambient Sensor.>
6	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect connectors.	Is there poor contact of connector?	Repair or replace the poor contact of connector.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

14.Charge Warning Light

A: INSPECTION

Illuminated when the ignition switch is turned ON, and goes off after the engine has been started.

NOTE:
For HEV model, when the charge warning light stays lit after the engine has been started, perform inspection for the charge warning light. <Ref. to SC(H4DO(HEV))-39, CHECK CHARGE WARNING LIGHT, INSPECTION, Integrated Starter Generator (ISG).>

SEATS

SE

Page

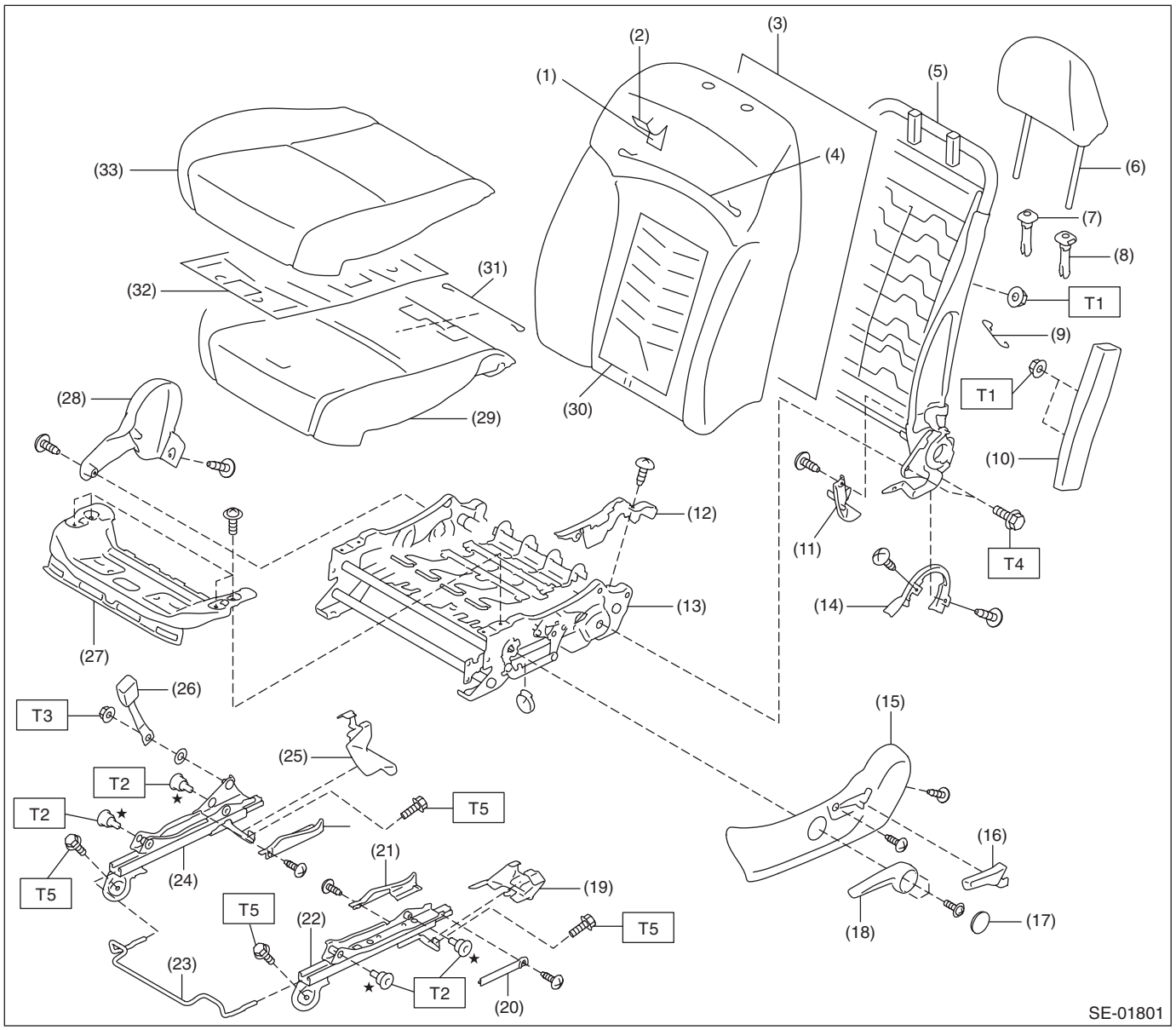
1. General Description 2
2. Front Seat 8
3. Rear Seat 24
4. Seat Heater System 37

1. General Description

A: COMPONENT

1. FRONT SEAT

- Manual seat LH



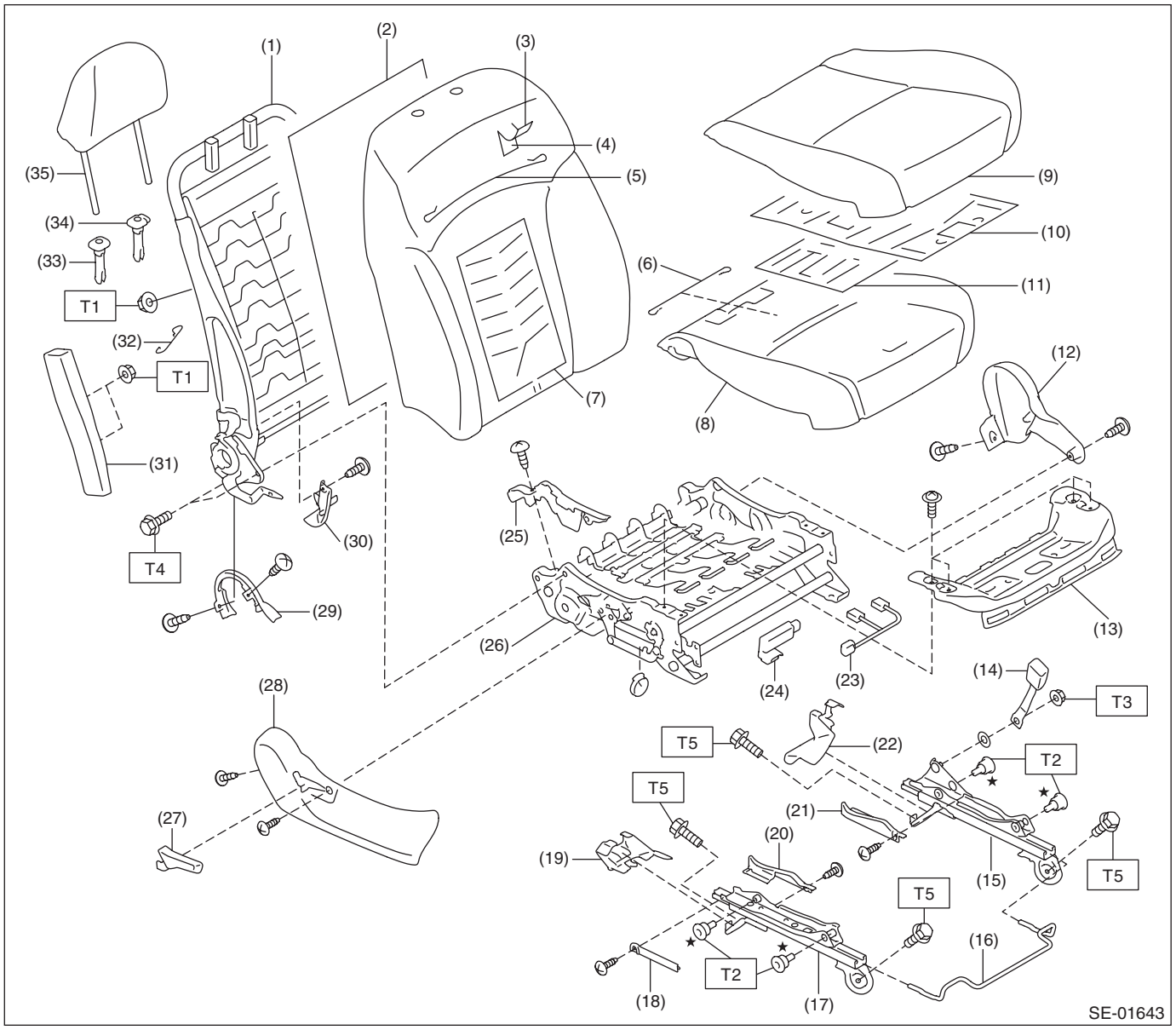
(1) Pad ASSY - front seat backrest
(2) Cover COMPL - front backrest
(3) Cover - silencer front seat backrest
(4) Wire set - front seat backrest
(5) Frame ASSY - front backrest
(6) Headrest ASSY - front
(7) Bushing - free headrest
(8) Bushing - lock headrest
(9) Hook - backrest front
(10) Side airbag module LH
(11) Cover - inner front
(12) Cover - frame front cushion
(13) Frame ASSY - front cushion
(14) Cover - hinge base front seat
(15) Cover - hinge front seat OUT
(16) Lever - reclining
(17) Cap - lifter lever
(18) Knob - lifter
(19) Cover - bolt rear OUT
(20) Cover - slide rail OUT
(21) Cover - slide rail OUT
(22) Slide rail ASSY - OUT
(23) Lever - towel bar
(24) Slide rail ASSY - INN
(25) Cover - bolt rear INN
(26) Seat belt inner - front
(27) Panel - front seat
(28) Cover - hinge front seat INN
(29) Pad ASSY - front seat cushion
(30) Heater unit - front seat backrest
(31) Wire set - front seat cushion
(32) Heater unit - front seat cushion
(33) Cover - front cushion

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6 (0.61, 4.4)
T2: 15 (1.53, 11.1)
T3: 38 (3.87, 28.0)
T4: 52 (5.3, 38.4)
T5: 53 (5.4, 39.1)

SEATS

- Manual seat RH

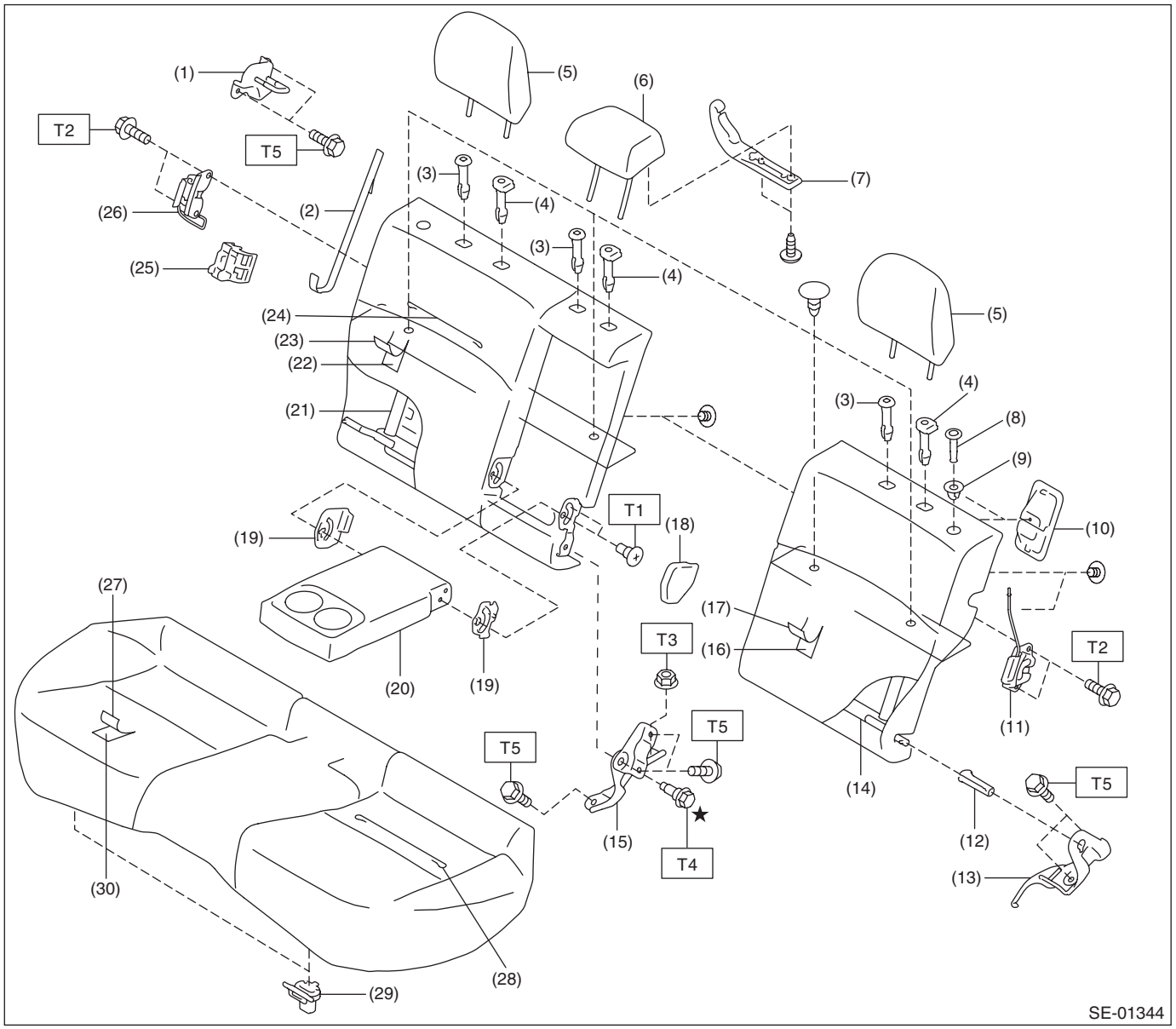


(1) Frame ASSY - front backrest
(2) Cover - silencer front seat backrest
(3) Cover COMPL - front backrest
(4) Pad ASSY - front seat backrest
(5) Wire set - front seat backrest
(6) Wire set - front seat cushion
(7) Heater unit - front seat backrest
(8) Pad ASSY - front seat cushion
(9) Cover - front cushion
(10) Heater unit - front cushion
(11) Occupant detection sensor
(12) Cover - hinge front seat INN
(13) Panel - front seat
(14) Seat belt inner - front
(15) Slide rail ASSY - INN
(16) Lever - towel bar
(17) Slide rail ASSY - OUT
(18) Cover - slide rail OUT
(19) Cover - bolt rear OUT
(20) Cover - slide rail OUT
(21) Cover - slide rail INN
(22) Cover - bolt rear INN
(23) Harness - occupant detection sensor
(24) Control unit - occupant detection sensor
(25) Cover - frame front seat cushion
(26) Frame ASSY - front seat cushion
(27) Lever - reclining
(28) Cover - hinge front seat OUT
(29) Cover - hinge base front seat
(30) Cover - inner front
(31) Side airbag module RH
(32) Hook - backrest front
(33) Bushing - free headrest
(34) Bushing - lock headrest
(35) Headrest ASSY - front

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6 (0.61, 4.4)
T2: 15 (1.53, 11.1)
T3: 38 (3.87, 28.0)
T4: 52 (5.3, 38.4)
T5: 53 (5.4, 39.1)

2. REAR SEAT



(1) Striker - backrest rear RH
(2) Knob - strap (4 door model)
(3) Bushing - headrest
(4) Bushing - lock ASSY
(5) Headrest ASSY - rear backrest
(6) Headrest ASSY - rear center
(7) Belt guide - rear seat (5 door model/Crosstrek model)
(8) Knob - backrest rear
(9) Knob - guide
(10) Tether anchor cover
(11) Lock ASSY - backrest rear LH
(12) Bushing - backrest hinge
(13) Hinge ASSY - rear backrest
(14) Frame ASSY - rear backrest LH
(15) Hinge ASSY - backrest center
(16) Pad ASSY - rear seat backrest LH
(17) Cover COMPL - rear backrest LH
(18) Cover - armrest
(19) Bushing - rear armrest
(20) Armrest ASSY - rear center
(21) Frame ASSY - rear backrest RH
(22) Pad ASSY - rear seat backrest RH
(23) Cover COMPL - rear backrest RH
(24) Wire set - rear backrest
(25) Knob - strap guide (4 door model)
(26) Lock ASSY - backrest rear RH
(27) Cover - rear cushion
(28) Wire set - rear cushion
(29) Hook - seat cushion rear
(30) Pad and frame ASSY - rear cushion

Tightening torque: N·m (kgf-m, ft-lb)	
T1:	14.7 (1.5, 10.8)
T2:	22.5 (2.3, 16.6)
T3:	24.5 (2.5, 18.1)
T4:	28.9 (2.9, 21.3)
T5:	33 (3.4, 24.3)

B: CAUTION

When removing the front seat from the vehicle, refer to “CAUTION” of “General Description” in “AIRBAG SYSTEM” section. <Ref. to AB-11, CAUTION, General Description.>

C: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Long nose pliers	Used for removing the hog ring.
Hog ring pliers	Used for installing the hog ring.
Circuit tester	Used for measuring resistance, voltage and current.

2. Front Seat

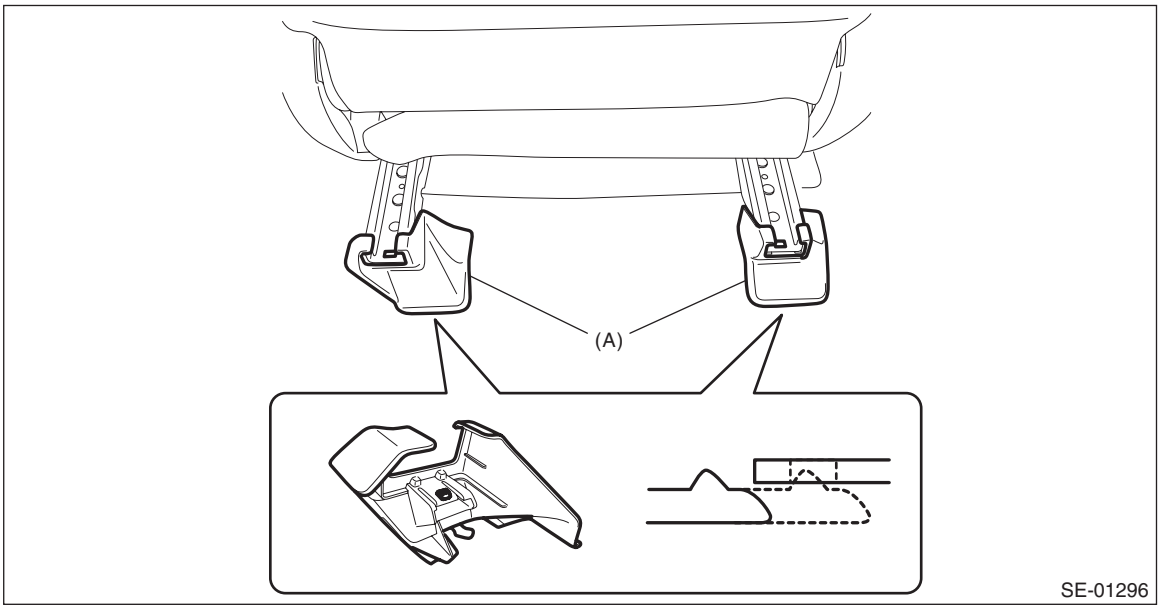
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

1) Remove the headrest assembly - front.
2) Turn the ignition switch to OFF.
3) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

4) Remove the slide rail assembly installing bolt.
   (1) Tilt the backrest assembly forward and move the front seat to the front most position.
   (2) Remove the cover - bolt rear (A) and remove the bolts.



   (3) Move the front seat to the rearmost position, and remove the bolts.

5) Disconnect the connector under the front seat.
- Seat belt warning light connector (driver's seat)
- Occupant detection system harness connector (passenger's seat) <Ref. to OD(diag)-13, OCCUPANT DETECTION SYSTEM (BETWEEN AIRBAG REAR HARNESS AND SEAT HARNESS), PROCEDURE, Airbag Connector.>
- Side airbag connector <Ref. to AB-27, SIDE AIRBAG MODULE, PROCEDURE, Airbag Connector.>
- Seat heater connector (model with seat heater)
- Buckle switch RH connector (passenger's seat) <Ref. to AB-28, BUCKLE SWITCH RH, PROCEDURE, Airbag Connector.>

6) Take out the front seat from the vehicle.

CAUTION:
Be careful not to damage the body.

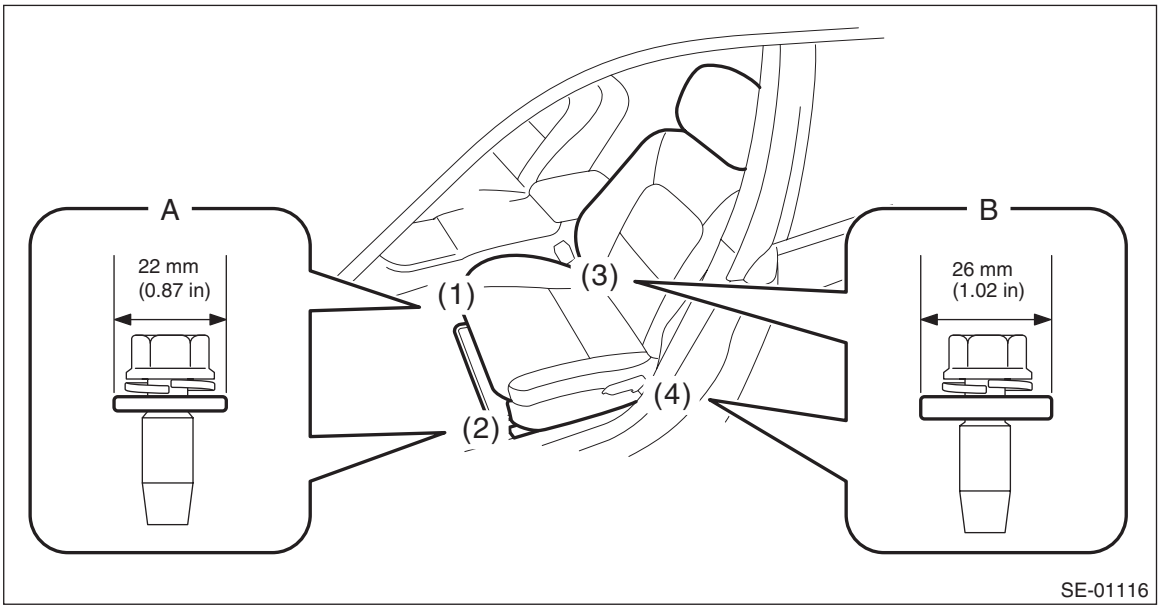
B: INSTALLATION

Install each part in the reverse order of removal.

CAUTION:

• The front seat mounting bolts differ between the front mounting points and the rear mounting points. When installing the front seat, make sure that you are using correct bolts at correct positions.

• Tighten the slide rail assembly installing bolts in the order as shown in the figure, in several steps by gradually increasing the torque until they reach the specified torque.



- **Front (bolt A): Washer diameter 22 mm (0.87 in)**
- **Rear (bolt B): Washer diameter 26 mm (1.02 in)**

Tightening torque:

Front seat assembly: 53 N·m (5.4 kgf-m, 39.1 ft-lb)

C: DISASSEMBLY

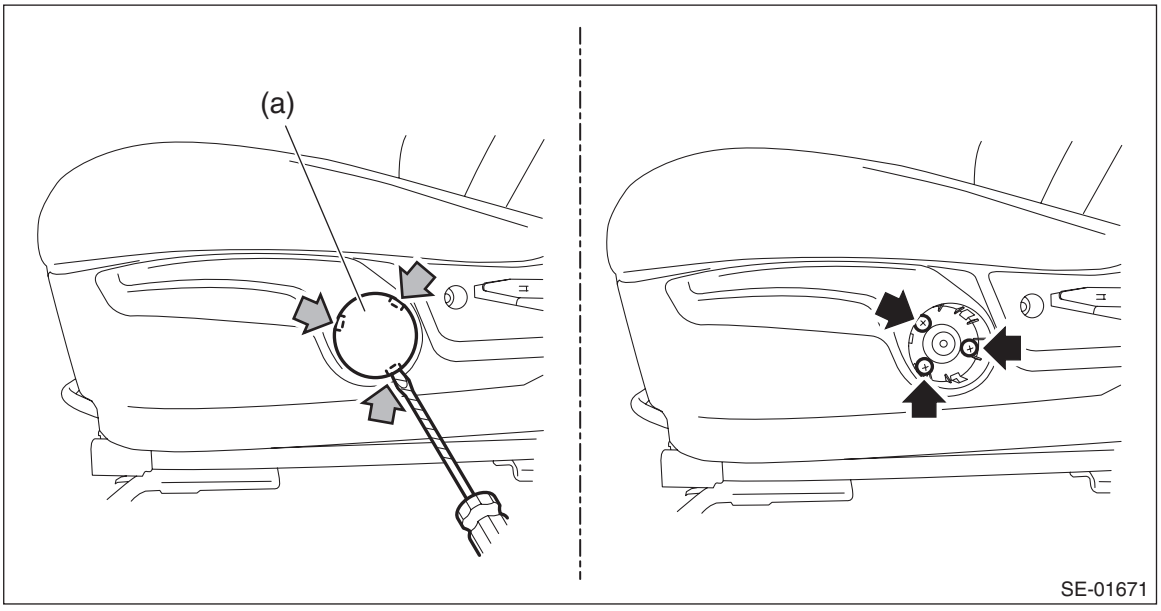
1. DRIVER'S SEAT

CAUTION:
Before assembling, make sure how the harnesses such as the side airbag harness and the seat belt inner - front harness are routed in order to avoid misarranging. Assembling with harnesses improperly routed may cause the harness to get caught and short out.

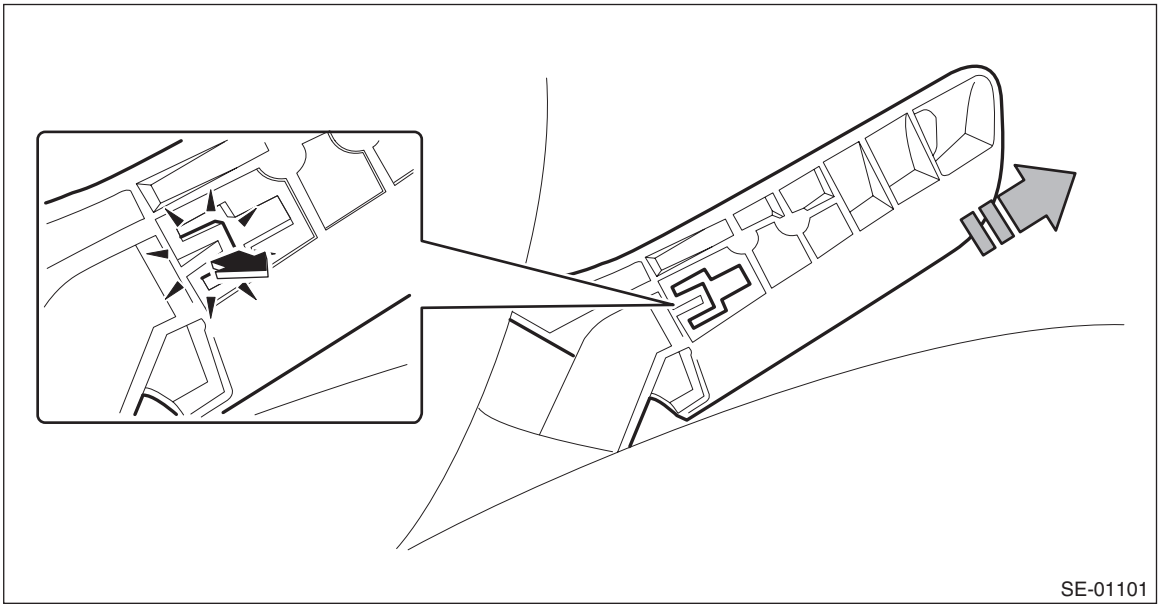
1) Remove the front seat from vehicle. <Ref. to SE-8, REMOVAL, Front Seat.>
2) Remove the knob - lifter.
   (1) Remove the cap - lifter lever (a).

NOTE:
Insert a flat tip screwdriver or similar tool wrapped with protective tape into the gap (shown with arrow) between the cap - lifter lever and the knob - lifter.

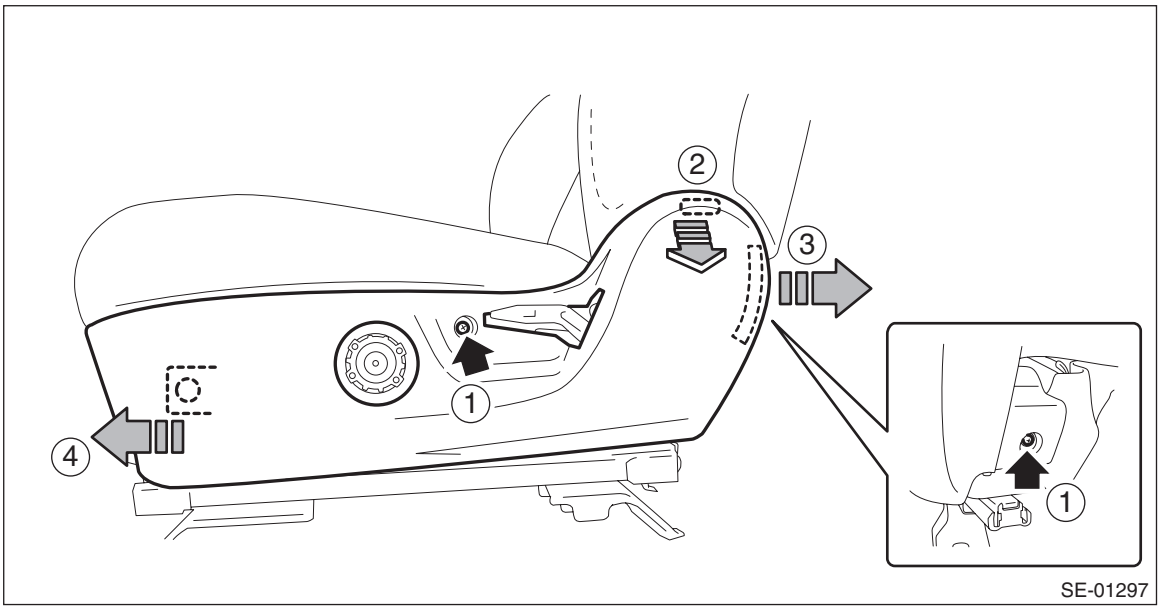
   (2) Remove the screws and remove the knob - lifter.



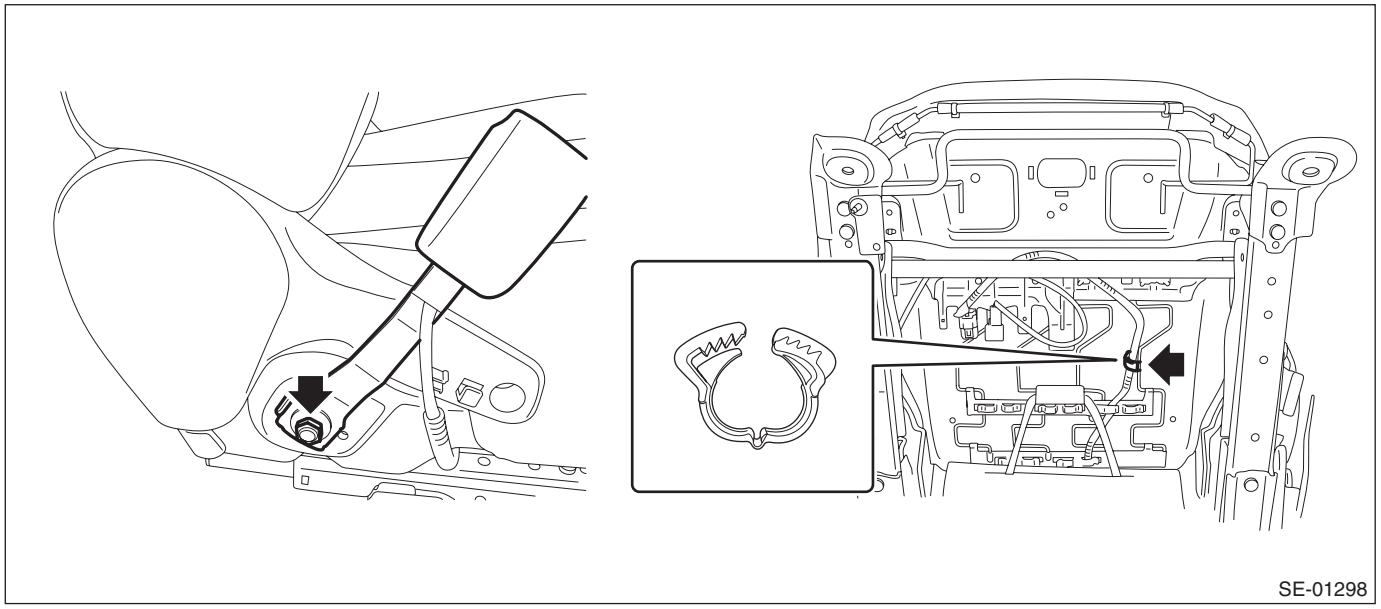
3) Remove the lever - reclining.
   (1) Pull up the lever - reclining and release the claws on the back.
   (2) Pull out the lever - reclining.



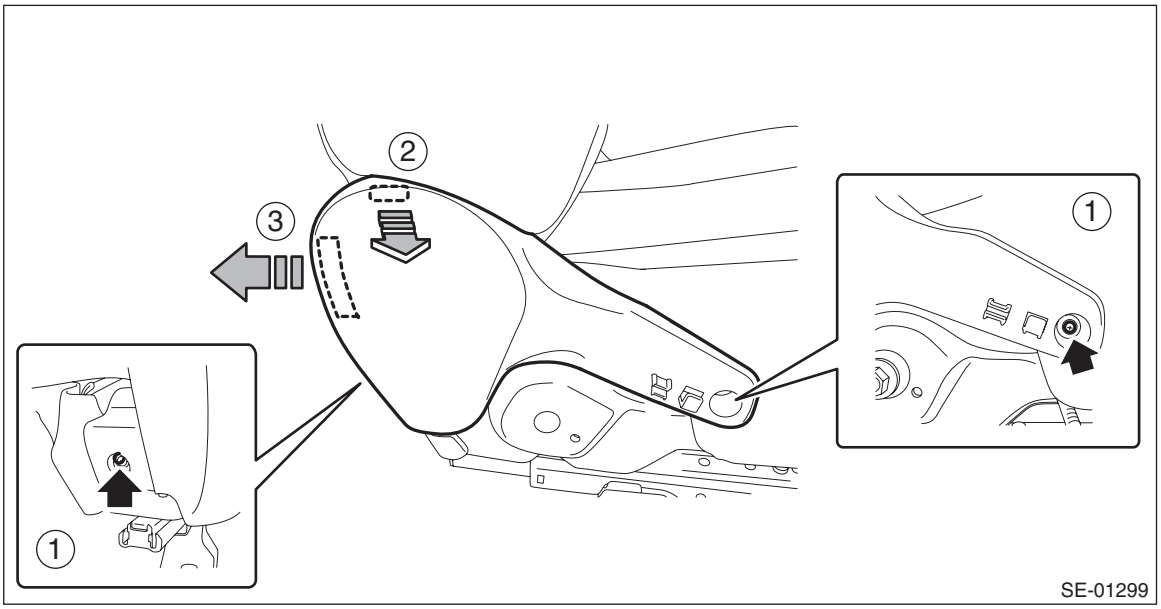
4) Remove the cover - hinge front seat OUT.
(1) Remove the screws.
(2) Release the claw in the upper section of the cover - hinge front seat OUT.
(3) Release the claw in the rear section of the cover - hinge front seat OUT.
(4) Release the claw in the front section of the cover - hinge front seat OUT, then remove the cover - hinge front seat OUT.



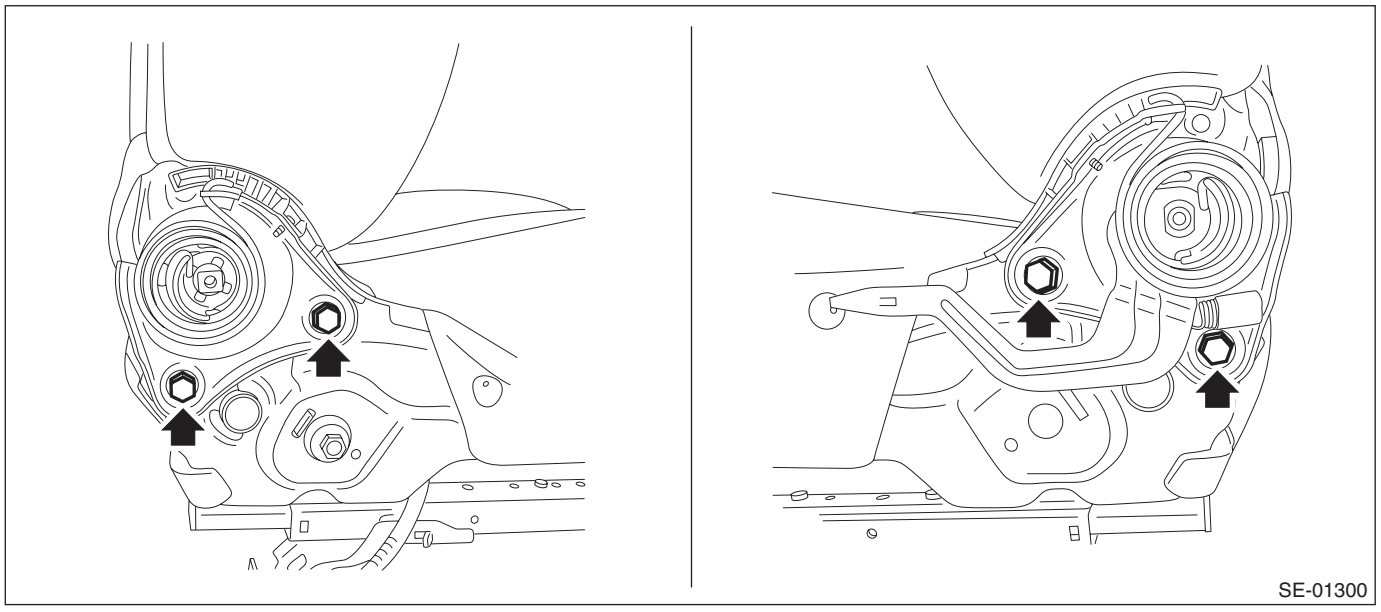
5) Remove the seat belt inner - front.
(1) Remove the nut, and remove the seat belt inner - front.
(2) Remove the clip for the seat belt inner - front located under the seat cushion assembly.



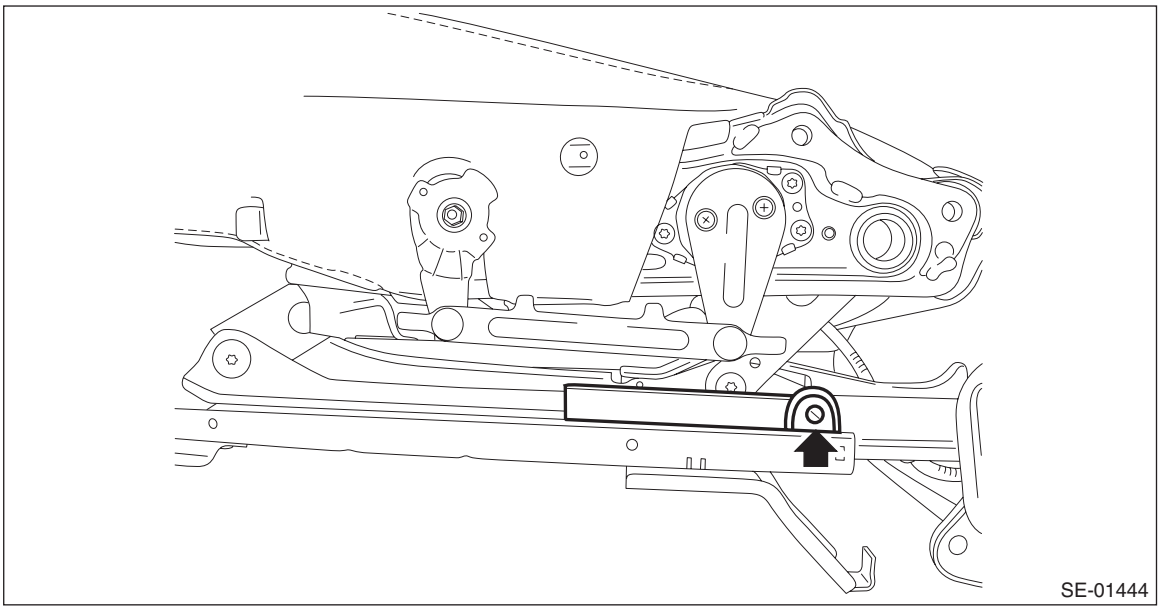
6) Remove the cover - hinge front seat INN.
(1) Remove the screws.
(2) Release the claw in the upper section of the cover - hinge front seat INN.
(3) Release the claw in the rear section of the cover - hinge front seat INN, then remove the cover - hinge front seat INN.



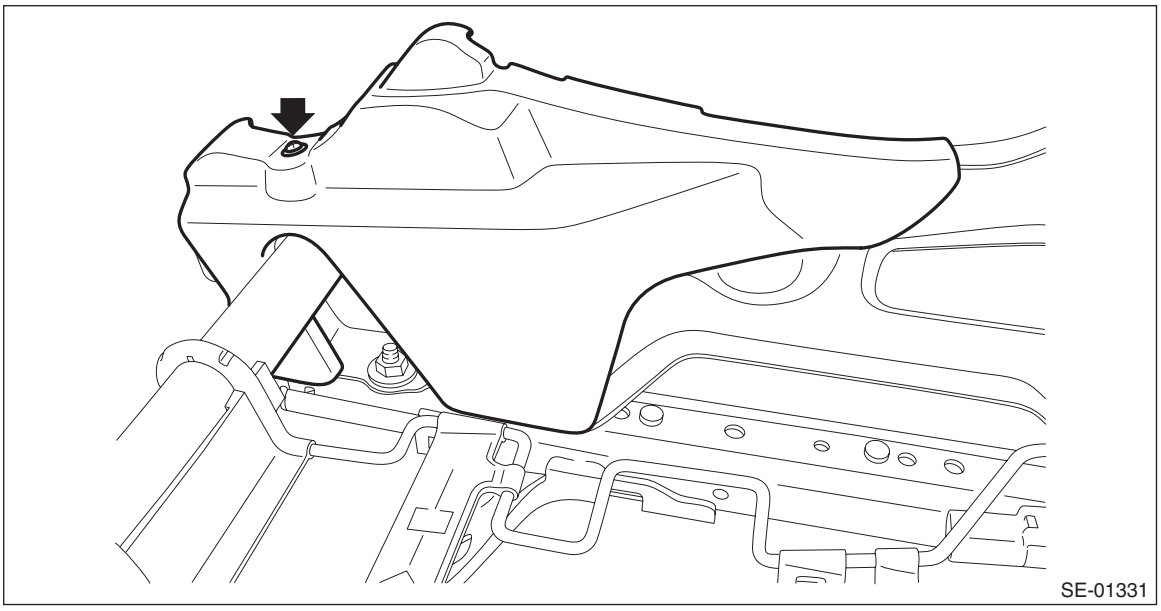
7) Separate the backrest assembly and the seat cushion assembly.
(1) Remove the clip for the side airbag harness located under the seat cushion assembly. (seat with side airbag)
(2) Remove the bolts from reclining hinge of both sides.
(3) While taking care not to damage the airbag harness, separate the backrest assembly and the seat cushion assembly.



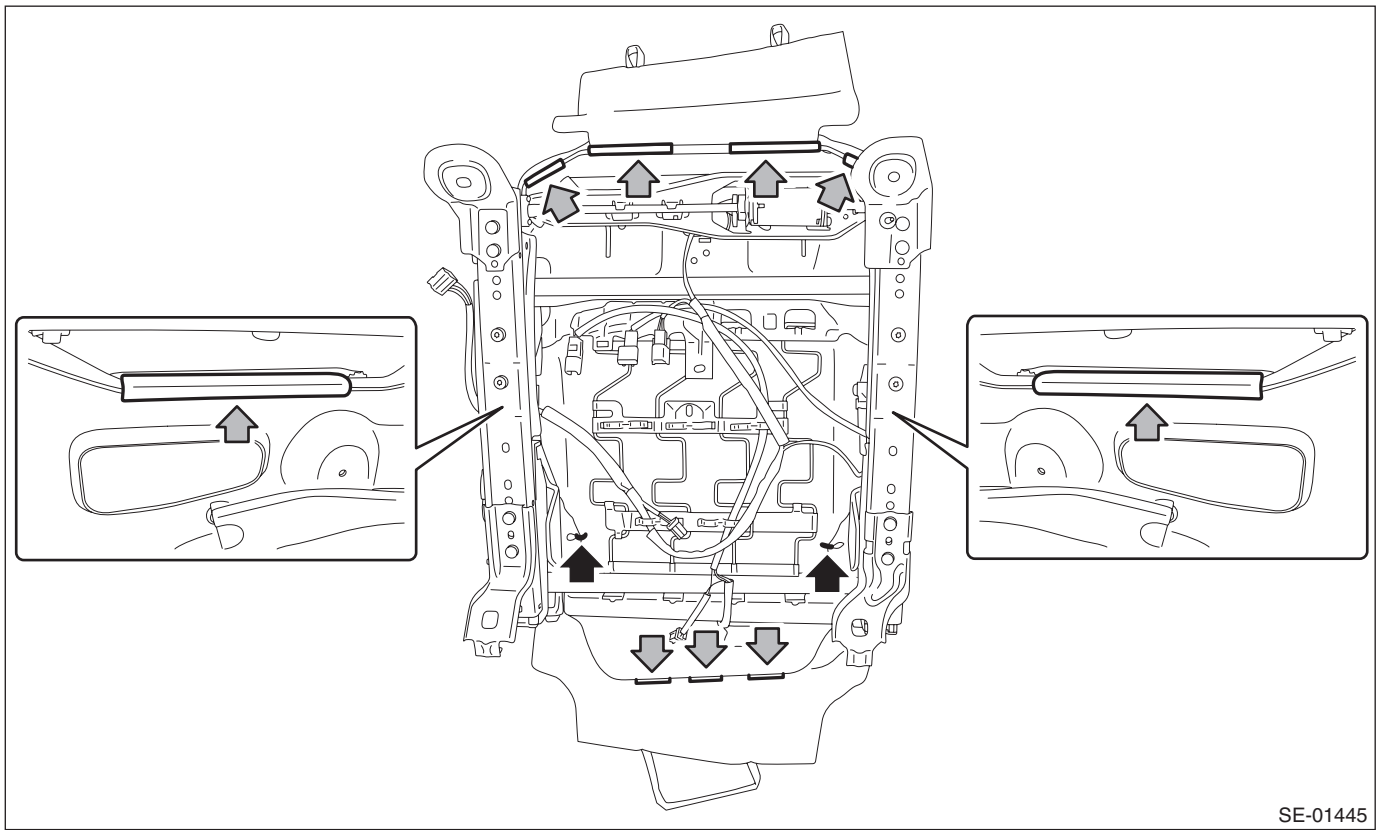
8) Remove the cover - slide rail OUT.
   (1) Remove the clip.
   (2) Remove the hook, and detach the cover - slide rail OUT.


SE-01444

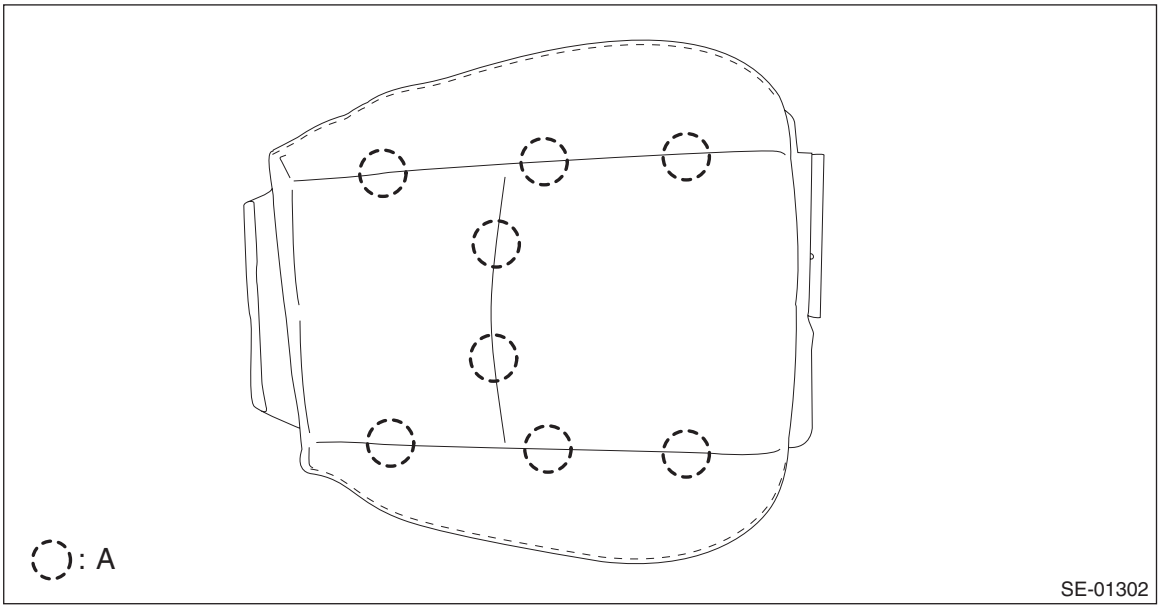
9) Remove the screws and detach the cover - slide rail INN.


SE-01331

10) Remove the pad assembly - front seat cushion and the cover - front cushion.
(1) Remove the hooks and hog rings.
(2) Remove the pad assembly - front seat cushion and the cover - front cushion from the seat cushion assembly.



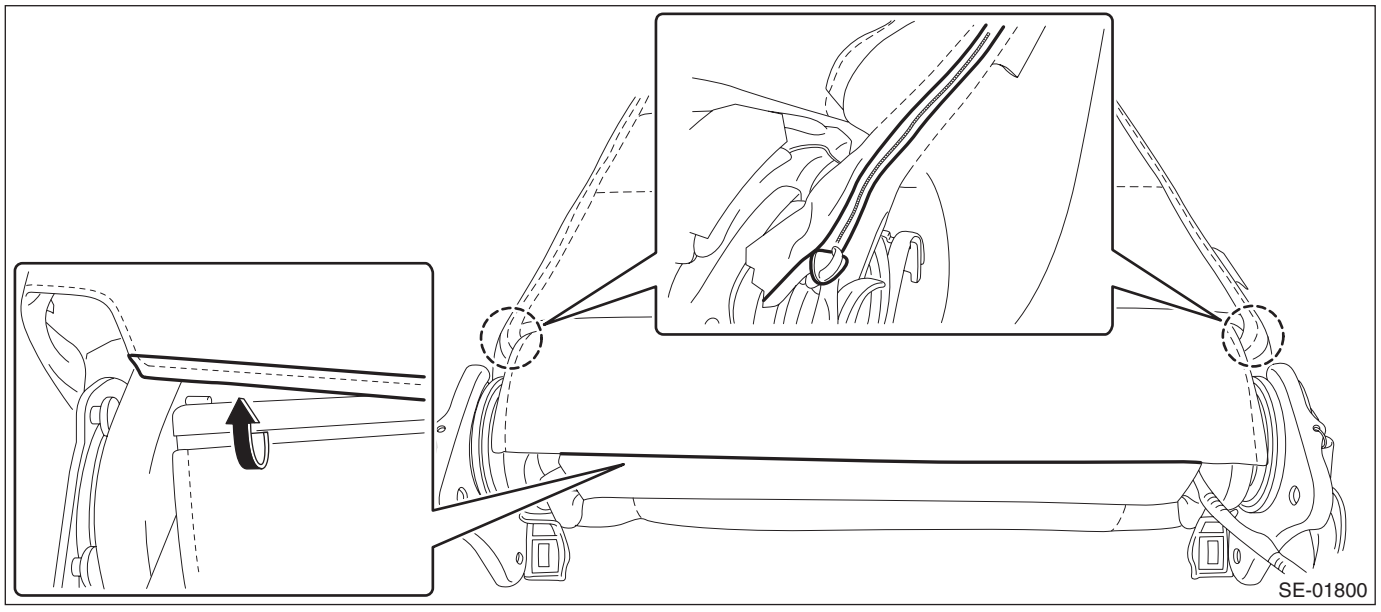
11) Remove the cover - front cushion.
(1) Remove the hog ring (A).



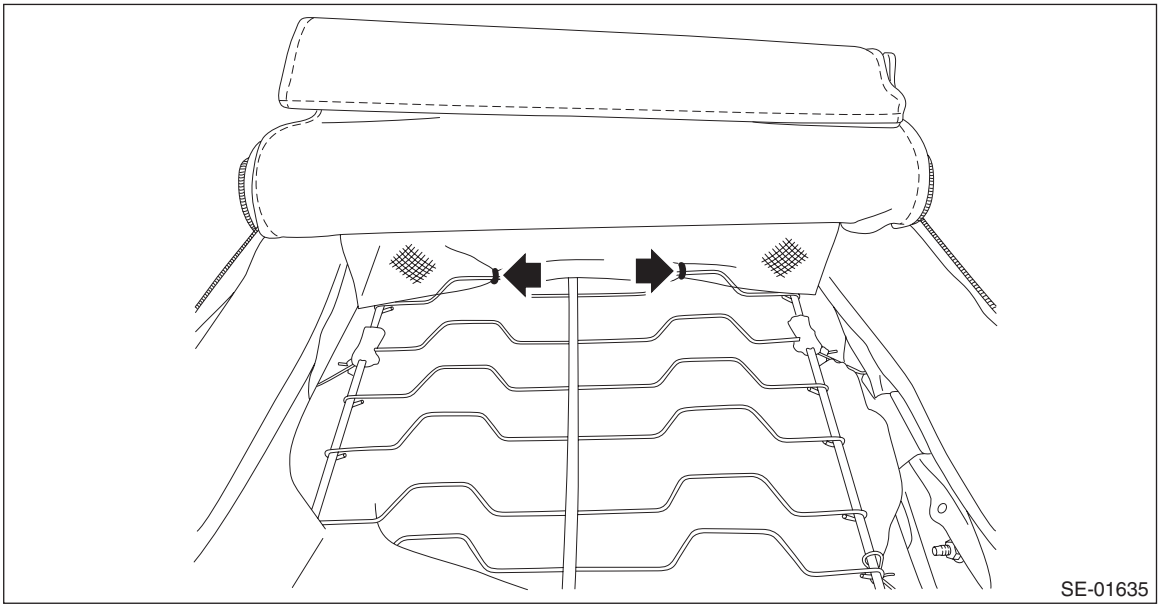
(2) Pull out the pad assembly - front seat cushion from the cover - front cushion.
(3) Remove the seat heater module from the pad assembly as necessary.

CAUTION:
- **If the seat heater module is removed, replace the pad assembly with a new part.**
- **If the seat heater module is reused, remove the polyurethane section from the reverse side completely.**

12) Remove the pad assembly - front seat backrest and the cover COMPL - front backrest.
(1) Remove the plastic fastener at the back side (bottom) of backrest assembly.
(2) Open the fastener at the rear side of backrest assembly.



NOTE:
If it is hard to open, use a metal clip, etc.
(3) Remove the hog ring.

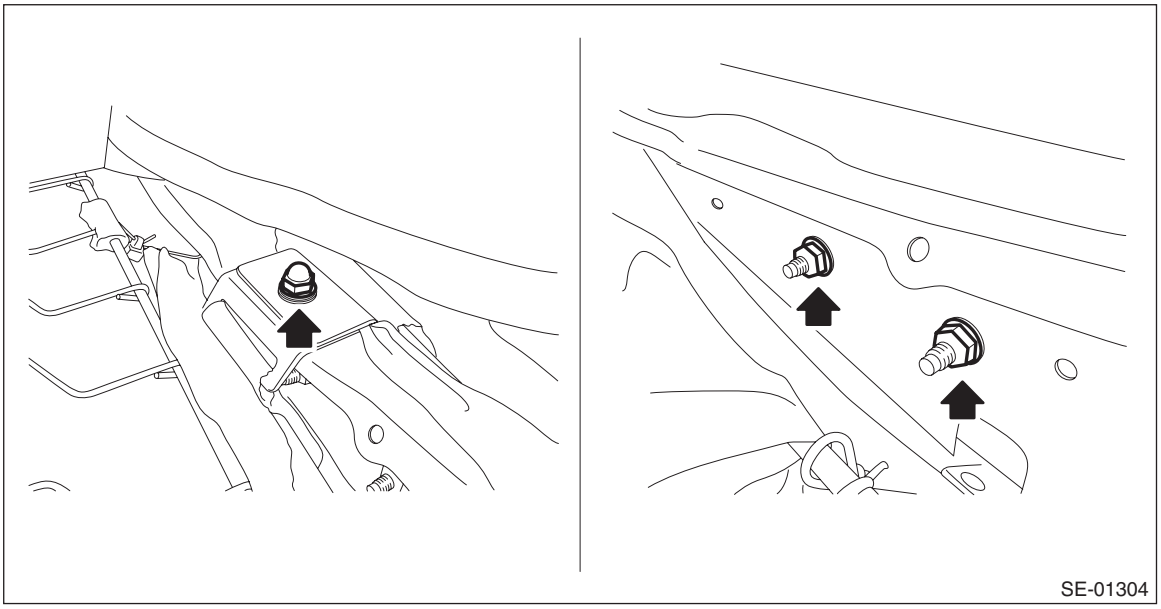


(4) Remove the pad assembly - front seat backrest and the cover COMPL - front backrest from the backrest assembly.

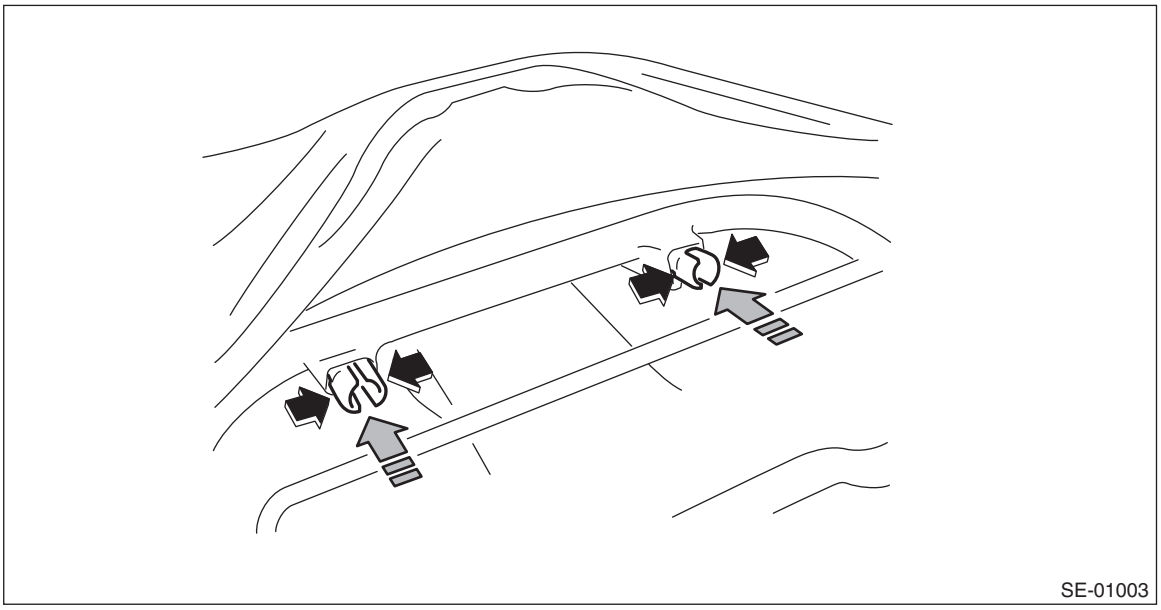
13) Remove the side airbag module.

CAUTION:
Do not open the protective cover of the side airbag. If any damage is present in the protective cover or the cloth of side airbag module comes out from the protective cover slit, replace the side airbag module with a new part.

(1) Remove the hexagon cap nut and nuts.
(2) While taking care not to damage the airbag protective cover, remove the side airbag module.

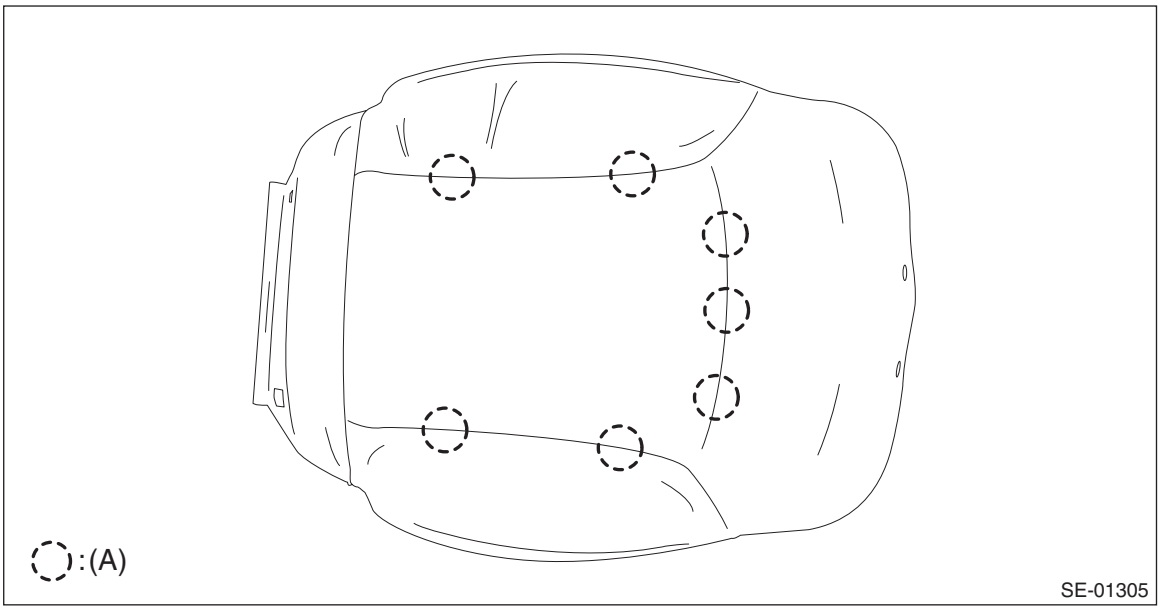


14) Remove the bushing - headrest.



NOTE:
Catch the tip of the bushing - headrest with pliers and push it outward from the inside of seat to remove it.

15) Pull out the frame assembly - front backrest.
16) Remove the cover COMPL - front backrest.
(1) Remove the hog ring (A).



(2) Pull out the pad assembly - front seat backrest from the cover COMPL - front backrest.
(3) Remove the seat heater module from the pad assembly as necessary.

CAUTION:
• If the seat heater module is removed, replace the pad assembly with a new part.
• If the seat heater module is reused, remove the polyurethane section from the reverse side completely.

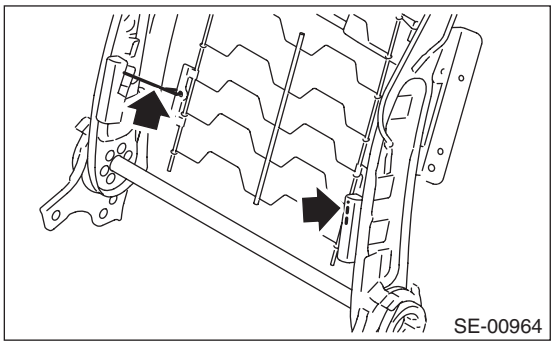
2. PASSENGER'S SEAT

CAUTION:
• The occupant detection system (passenger's seat only) control module, the occupant detection sensor, the pad assembly - front seat cushion and the frame assembly - front cushion are considered as a single seat cushion pad & frame assembly. Never remove the occupant detection control module or the occupant detection sensor from the frame assembly - front cushion.
• If the cover - front cushion is removed, make sure to replace the hang wire on the cover - front cushion side with a new wire.
• Never remove the occupant detection sensor connector from the occupant detection control module.
• When replacing the seat cover, be careful not to damage the occupant detection sensor while installing the hog ring.
• When removing or replacing the seat cover, perform "Occupant Detection System Inspection" after installing the seat to check if the occupant detection system operates normally. <Ref. to PI-14, SEAT, PRE-DELIVERY INSPECTION (PDI) PROCEDURE, Pre-delivery Inspection.>
• If the seat heater module is removed, replace the seat cushion pad & frame assembly with a new part.
• If the seat heater module is reused, remove the polyurethane section from the reverse side completely.

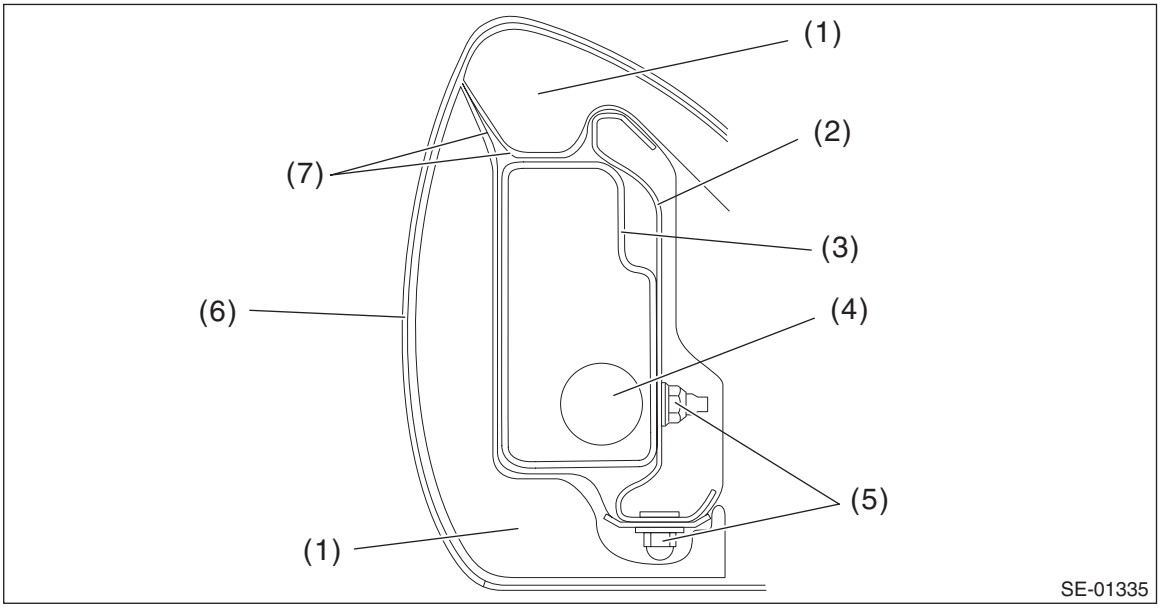
1) Remove the front seat (passenger's side) from vehicle. <Ref. to SE-8, REMOVAL, Front Seat.>
2) Refer to the disassembly procedures for the driver's seat. <Ref. to SE-10, DRIVER'S SEAT, DISASSEMBLY, Front Seat.>

D: ASSEMBLY

CAUTION:
• Do not confuse the harness routing of the side airbag harness and the seat belt inner - front harness, etc. Assembling with harnesses improperly routed may cause the harness to get caught and short out.
• If the flat mat hook of the frame assembly - front backrest is deformed or comes off due to the deformation, replace the hook with a new part.



• Make sure that the side airbag module is installed as shown in the figure.



(1) Pad ASSY - front seat backrest
(2) Frame ASSY - front backrest
(3) Side airbag module protective cover
(4) Side airbag module inflator
(5) Nut
(6) Cover COMPL - front backrest
(7) Side airbag guide cloth

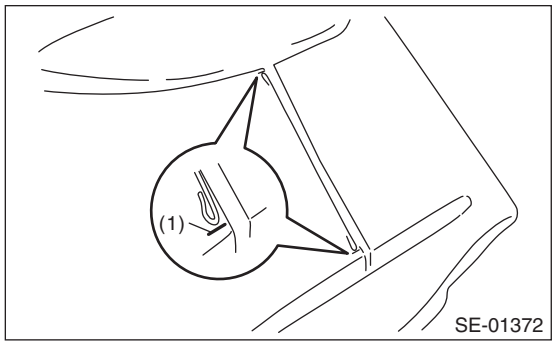
Besides, if the cover COMPL - front backrest is not installed securely, the side airbag may not be activated properly, therefore keep strictly to the following procedures.
• Be careful not to stain or damage the cover COMPL - front backrest during assembly.
• Do not reuse hog rings.
• Secure the hog ring using hog ring pliers.
• Install the hog rings to the specified points securely and make sure that there is no wrinkle or twisting on the cover COMPL - front backrest.

1) Install the seat heater module.

CAUTION:
• If the seat heater module is removed, replace the pad assembly with a new part. (Driver's seat)
• If the seat heater module is removed, replace the seat cushion pad & frame assembly with a new part. (Passenger's seat)
• If the seat heater module is reused, remove the polyurethane section from the reverse side completely and attach a new pad assembly with a double-sided tape.

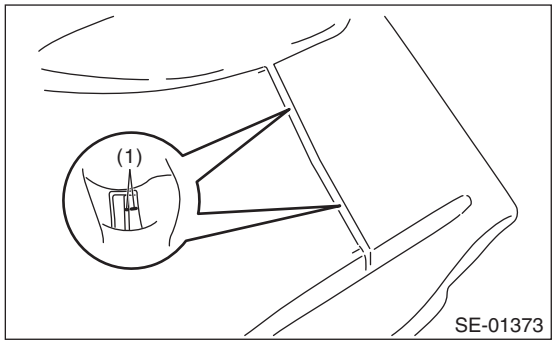
Double-sided tape:
NITTO DENKO's 501L or equivalent

2) Make sure that there is no foreign matter on side airbag module.
3) Assemble the seat cover.
(1) Adjust so that the left and right clearances between wire and seat pad become equal, and mark the seat pad.



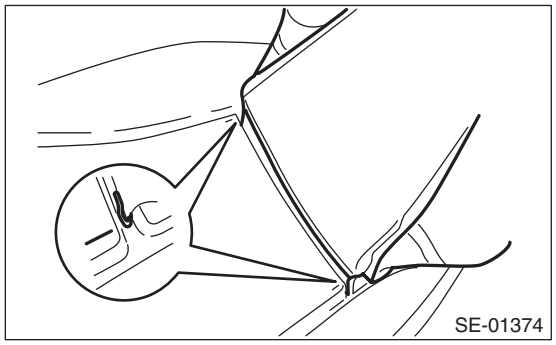
(1) Marking

(2) Mark the center of the wire on the pad side to which the hog ring is attached.

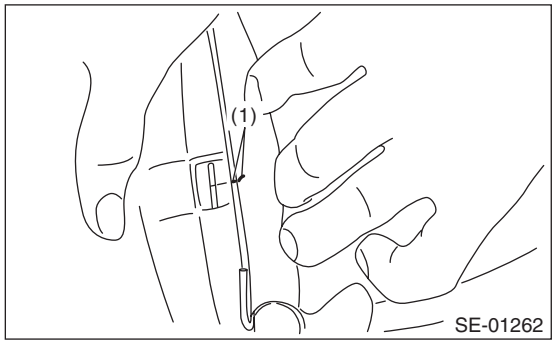


(1) Marking

(3) Insert the wire into the seat cover, and align the wire with the position marked in step 1).

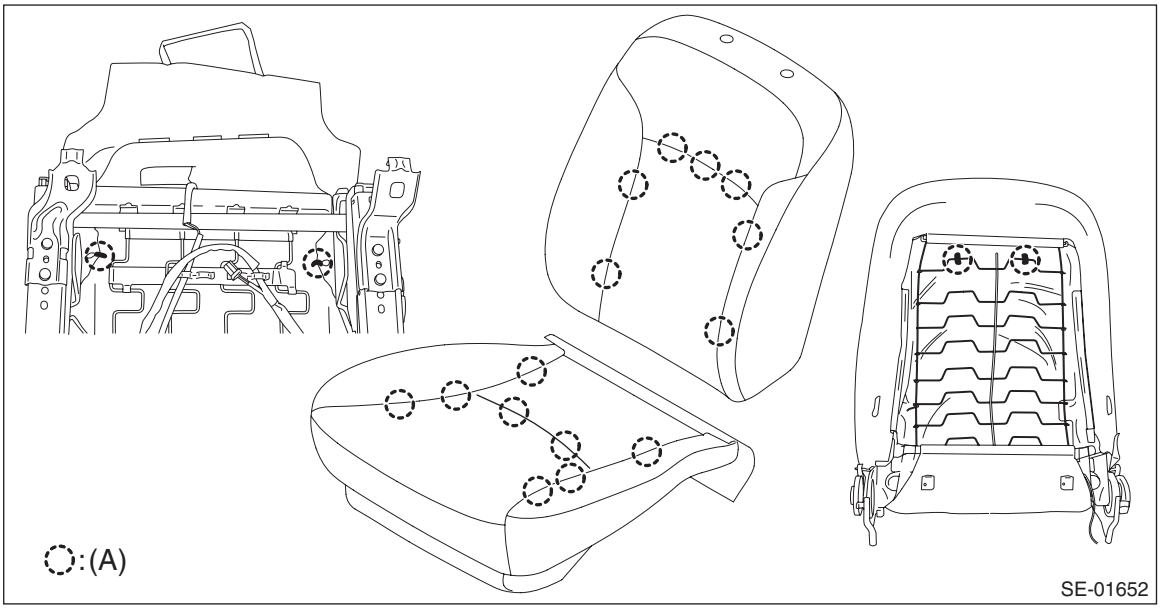


(4) Mark the wire on the seat cover side according to the markings on the seat pad.



(1) Marking

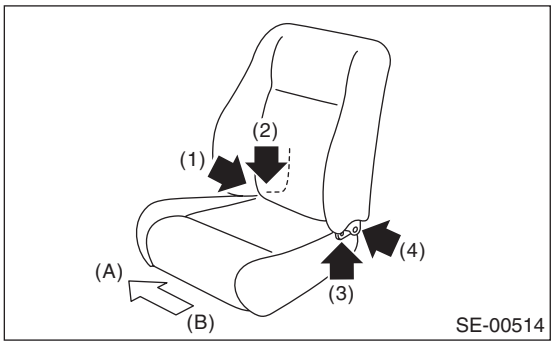
(5) Perform steps 1) — 4) to all sections to which the hog rings are attached.
(6) Make sure that all hog rings (A) are attached securely.



4) Assemble remaining parts in the reverse order of disassemble.

NOTE:
• When installing the seat belt inner - front, follow the procedures described in the seat belt section. <Ref. to SB-20, INSTALLATION, Front Seat Belt.>
• Install the backrest assembly and seat cushion assembly in the following procedure.
  1. Temporarily tighten the four reclining hinge bolts.
  2. Place the backrest in the most upright position.

3. Tighten the reclining hinge bolts in order from (1) to (4) two or three times, until they reach the specified torque.



(A) Vehicle inside
(B) Vehicle outside

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SE-2, FRONT SEAT, COMPONENT, General Description.>

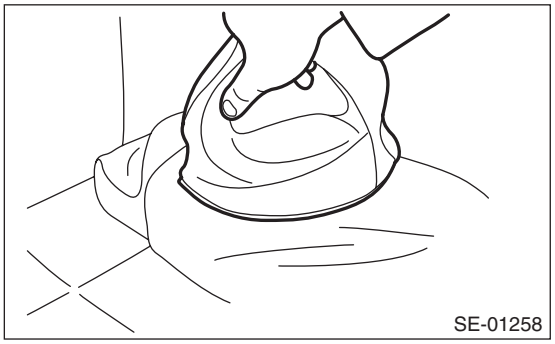
5) If any wrinkles are found after the assembly of the seat cover, finish the seat cover with iron.
(1) Place the wet towel on wrinkles.



(2) Touch up with warm iron.

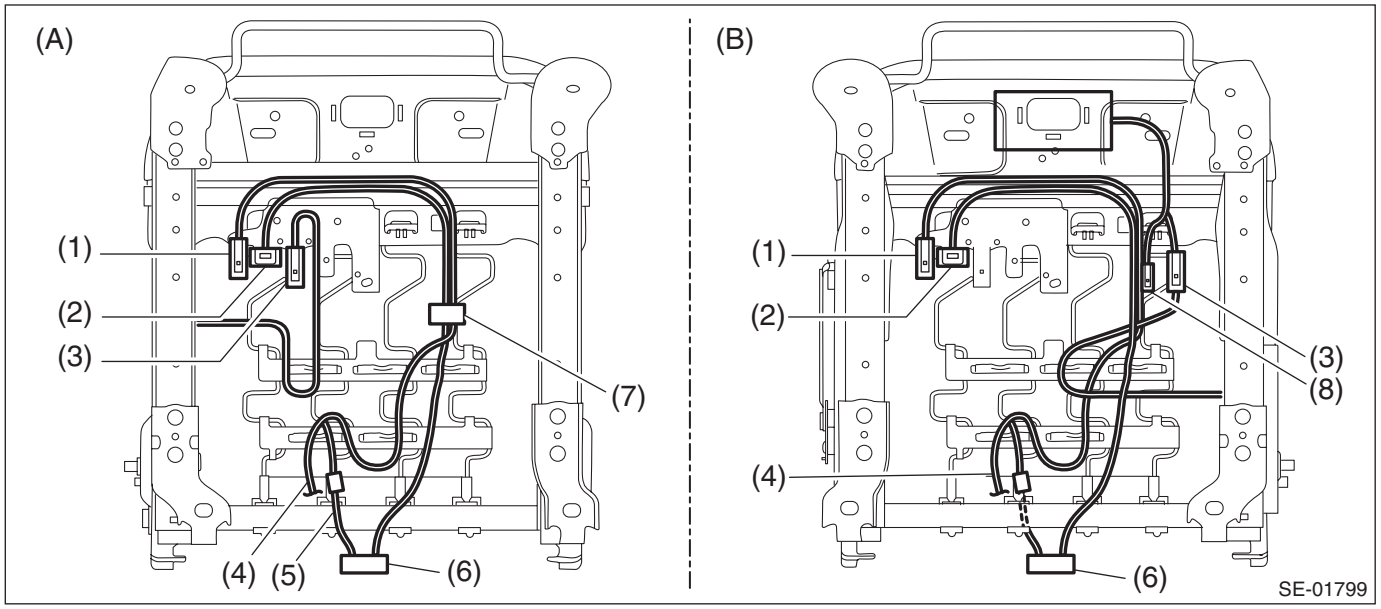
CAUTION:
Keep moving the iron, otherwise the seat cover surface can be damaged.

NOTE:
This method is available for genuine leather, synthetic leather, cloth, etc.



6) Install connectors located under the front seat.

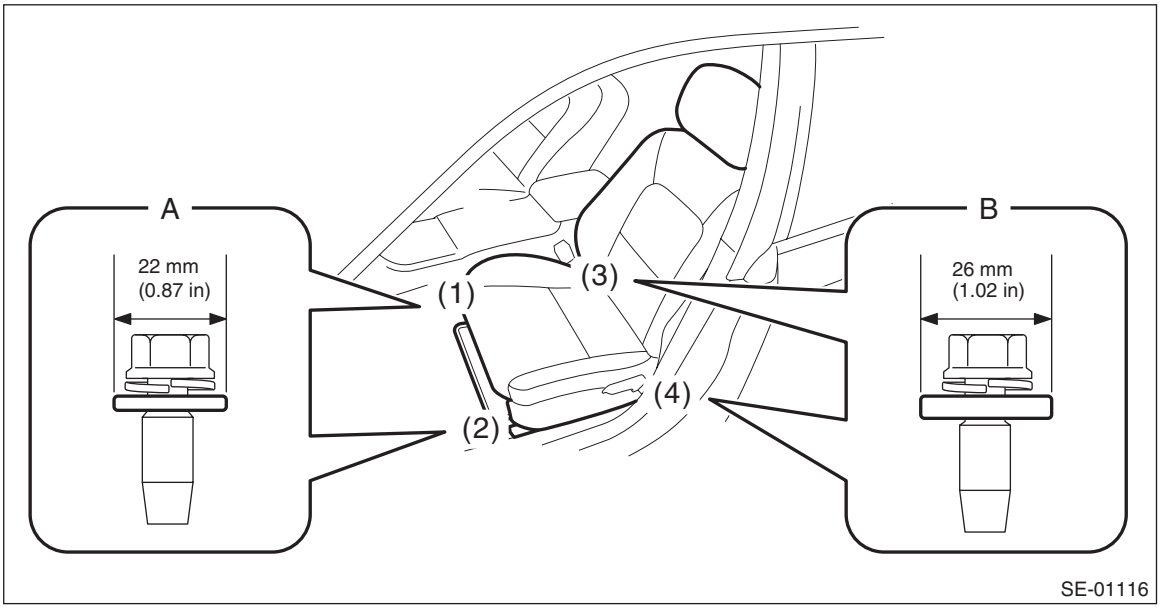
- Manual seat



(A)	Driver's seat (six-way)	(B)	Passenger's seat (four-way)		
(1)	Seat cushion heater connector	(4)	Seat cushion - heater harness	(7)	Band A
(2)	Side airbag connector	(5)	Backrest heater harness	(8)	Occupant detection control module
(3)	Seat belt switch connector	(6)	Velcro		

7) Install the seat assembly.

CAUTION:
• The seat mounting bolts differ between the front mounting points and the rear mounting points. Make sure that you are using correct bolts at correct positions.
• Tighten the slide rail installing bolts in the order as shown in the figure, in several steps by gradually increasing the torque until they reach the specified torque.



- **Front (bolt A): Washer diameter 22 mm (0.87 in)**
- **Rear (bolt B): Washer diameter 26 mm (1.02 in)**

Tightening torque: 53 N·m (5.4 kgf-m, 39.1 ft-lb)

E: INSPECTION

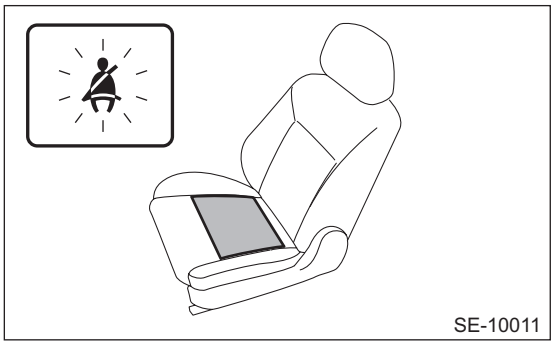
1. SEAT COVER

Check that there is no tear or fray on the cover COMPL - front backrest and the cover - front cushion.

NOTE:
For model with side airbag, if the door side of the cover COMPL - front backrest is torn or frayed, the side airbag may not be deployed properly. In this case, replace the cover COMPL - front backrest with a new part.

2. CHECK ILLUMINATION OF PASSENGER'S SEAT BELT WARNING LIGHT

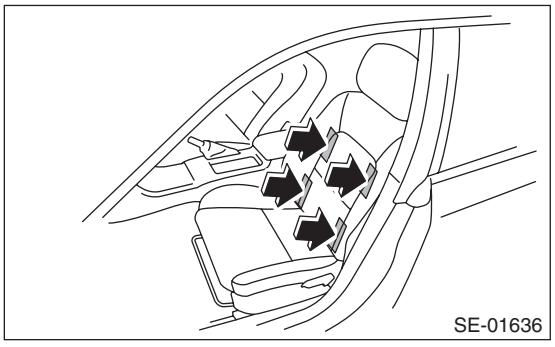
Check that the passenger's seat belt warning light illuminates when the passenger's seat is occupied.


SE-10011

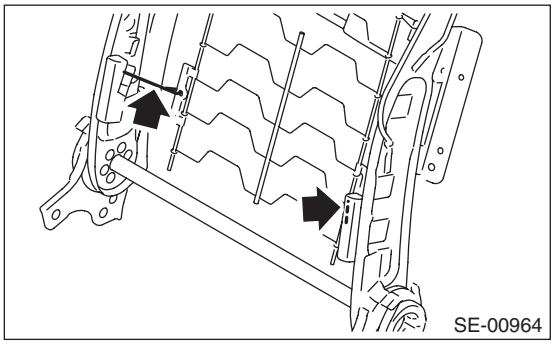
If it does not illuminate, check the seat belt warning system and the occupant detection system.
- Seat belt warning system: <Ref. to SB-14, Seat Belt Warning System.>
- Occupant detection system: <Ref. to OD(diag)-2, Basic Diagnostic Procedure.>

3. FLAT MAT HOOK

Check the flat mat hook by applying weight to the backrest assembly.


SE-01636

NOTE:
If the appropriate stiffness is not obtained by applying weight to the backrest assembly, the hook may be disengaged.
If it is due to the deformation of the hook, replace the hook with a new part.


SE-00964

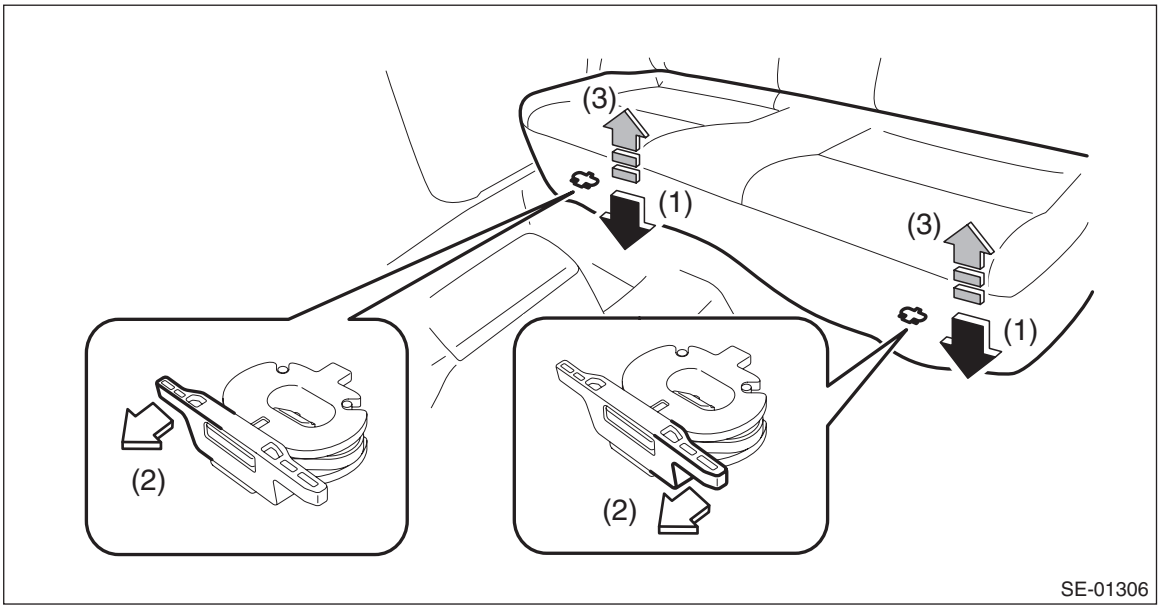
3. Rear Seat

A: REMOVAL

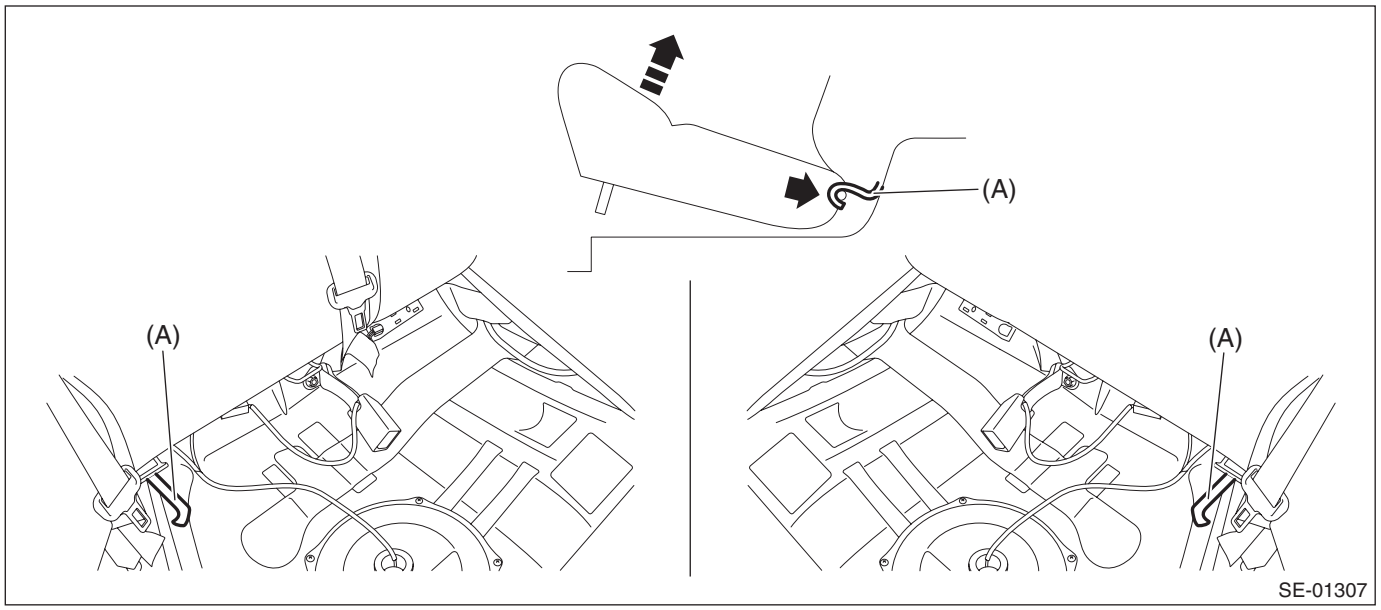
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the rear seat cushion assembly.
(1) Push the corners of the rear seat cushion from above.
(2) While pushing the corners of the rear seat cushion from above, pull the knob of the hook - seat cushion rear towards yourself.
(3) While pulling the knob towards yourself, disconnect the hooks by lifting up the rear seat cushion.

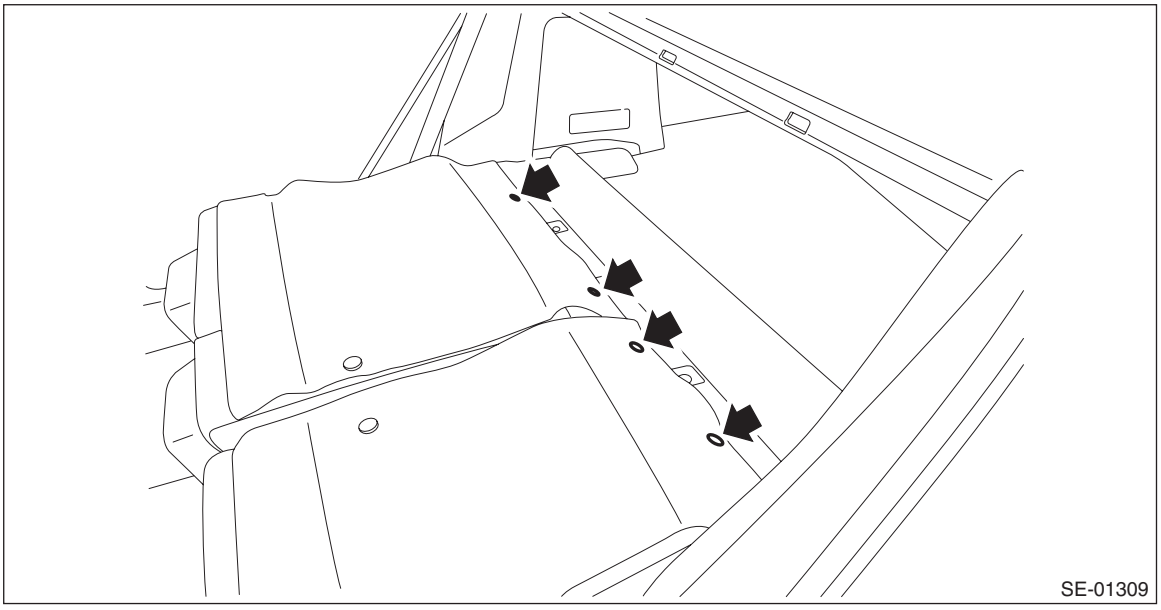
NOTE:
Pull the left side of the knob to disconnect the LH side hook, and pull the right side of the knob to disconnect the RH side hook.



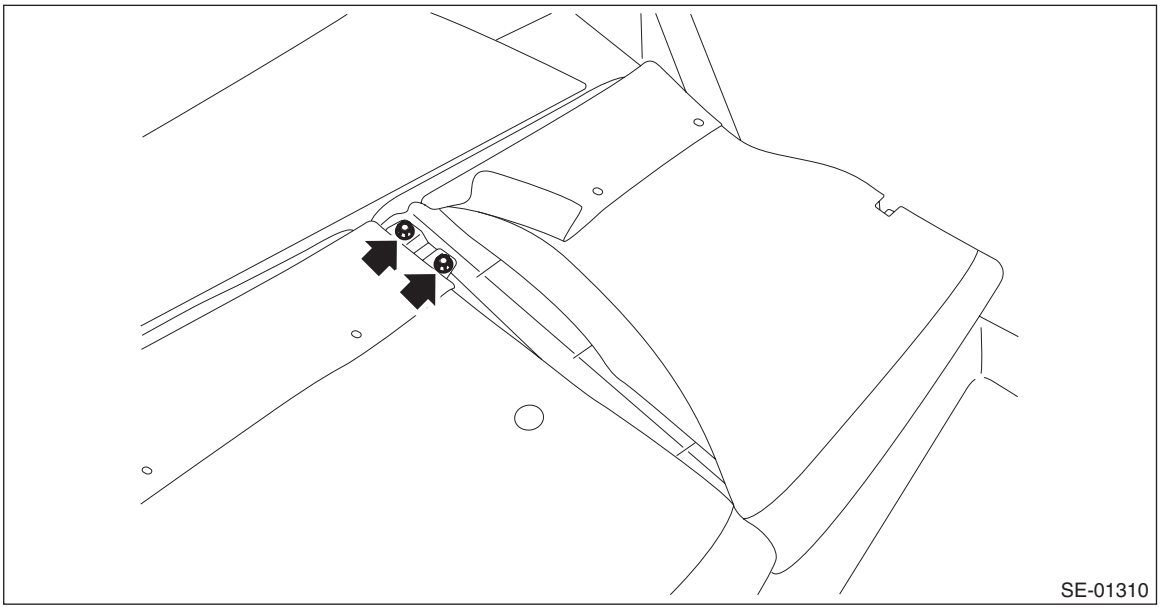
(4) Remove the hook (A) by pushing it back while lifting the front side of the rear seat cushion, and remove the rear seat cushion.



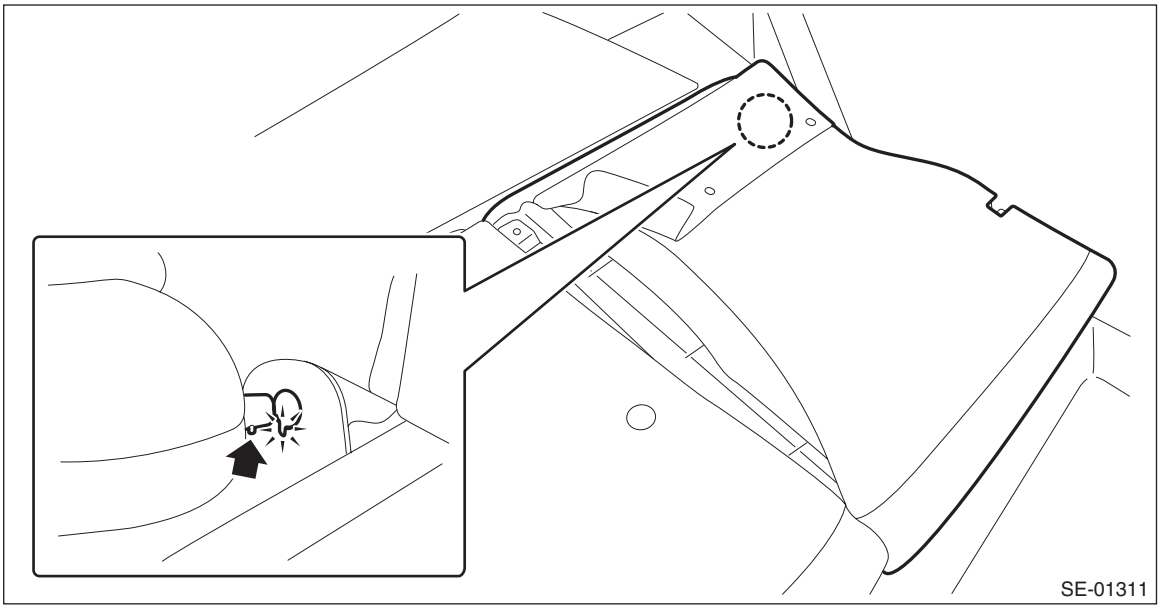
3) Remove the backrest assembly LH.
(1) Tilt the backrest assembly LH forward.
(2) Remove the clips located at the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.



(3) Turn over the cover COMPL - rear backrest LH to remove the bolts.

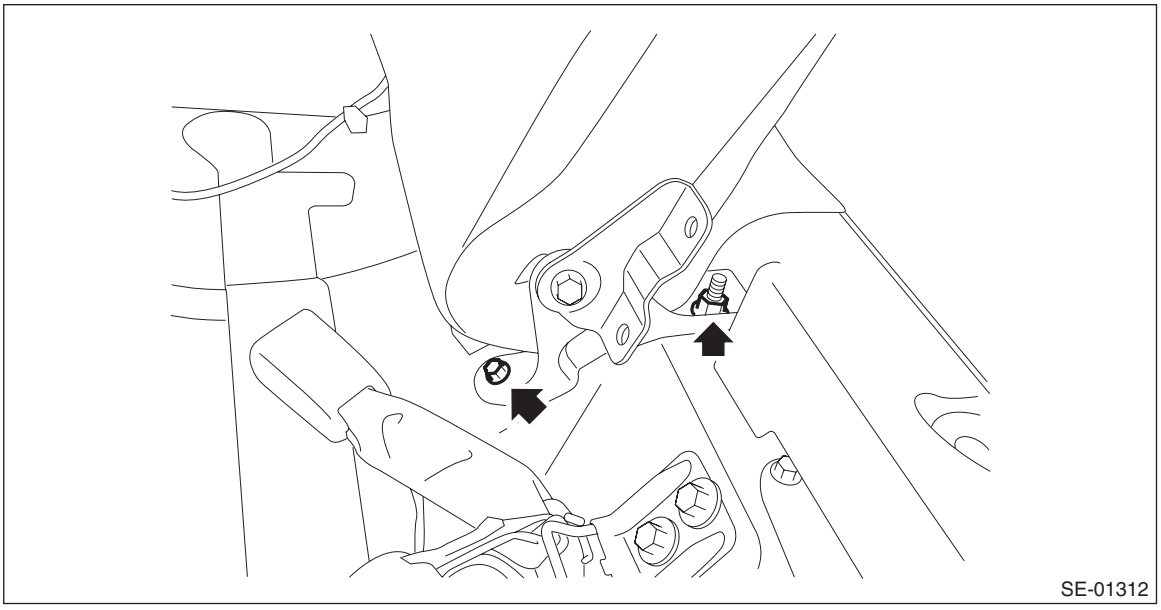


(4) Remove the backrest assembly LH from the hinge assembly.

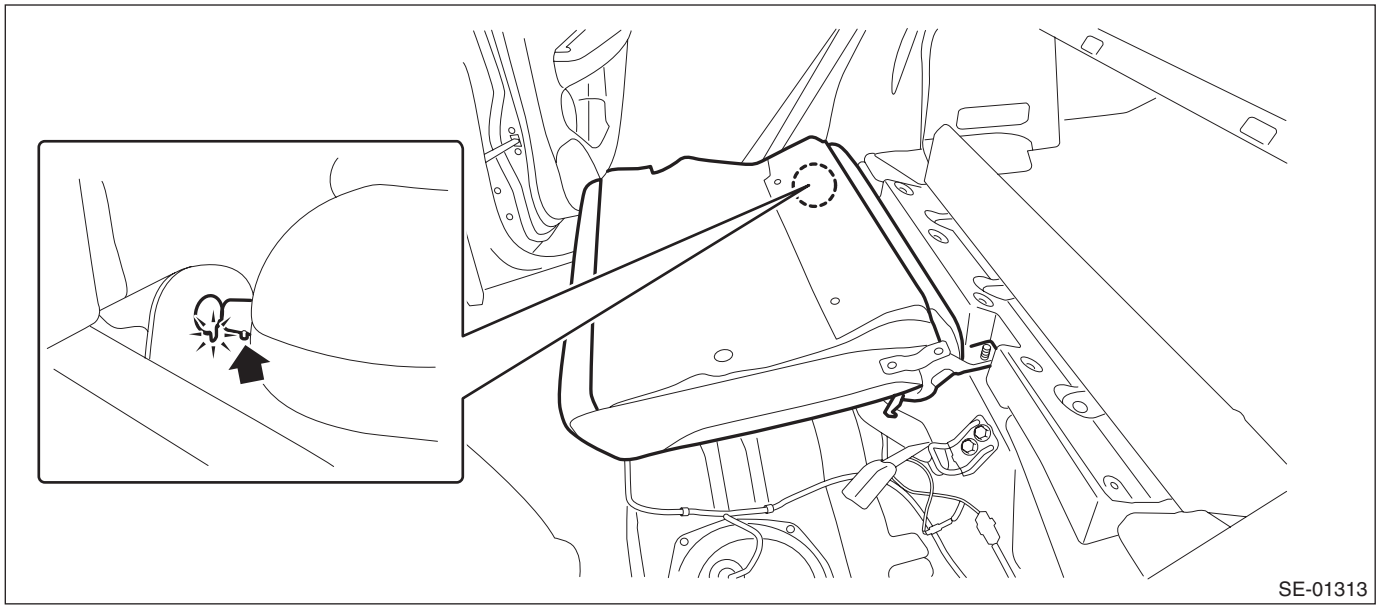


NOTE:
The backrest assembly cannot be removed unless pin positions on the hinge assembly side and backrest assembly side are aligned.

4) Remove the backrest assembly RH.
(1) Remove the bolts and nuts.



(2) Remove the backrest assembly RH from the hinge assembly.



NOTE:
The backrest assembly cannot be removed unless pin positions on the hinge assembly side and backrest assembly side are aligned.

B: INSTALLATION

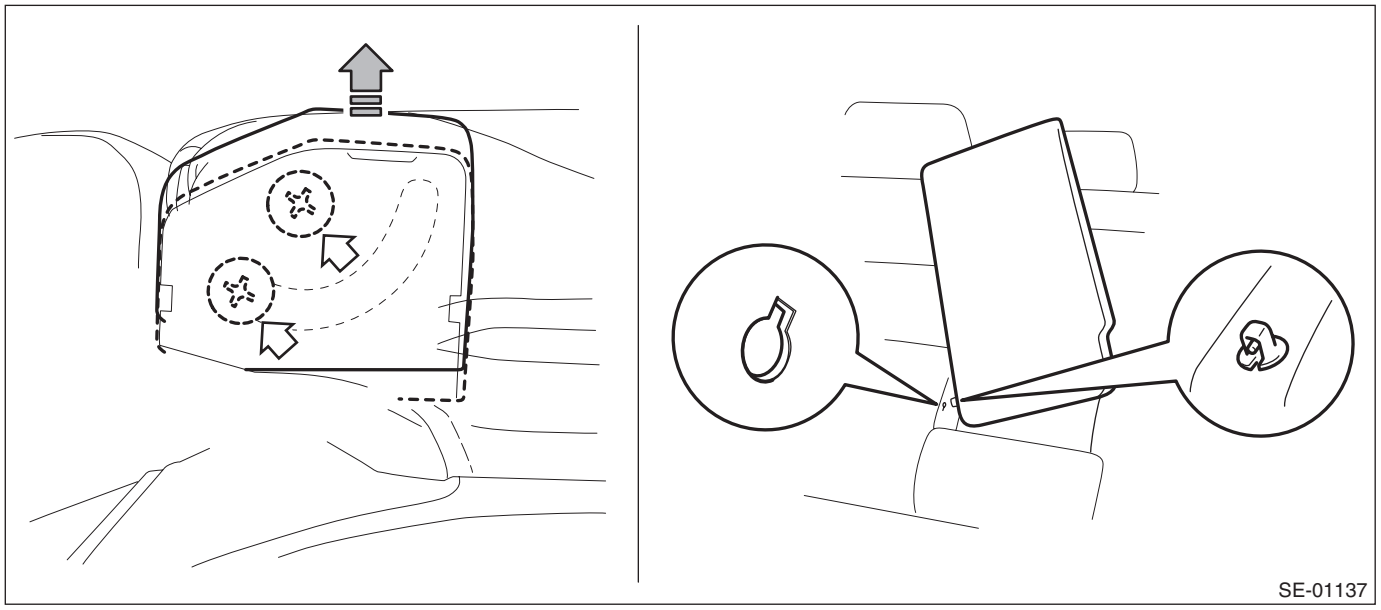
Install each part in the reverse order of removal.

NOTE:
- After installing the backrest assembly, make sure that each seat belt operates normally.
- Make sure that they are properly secured on each hook on the vehicle side.

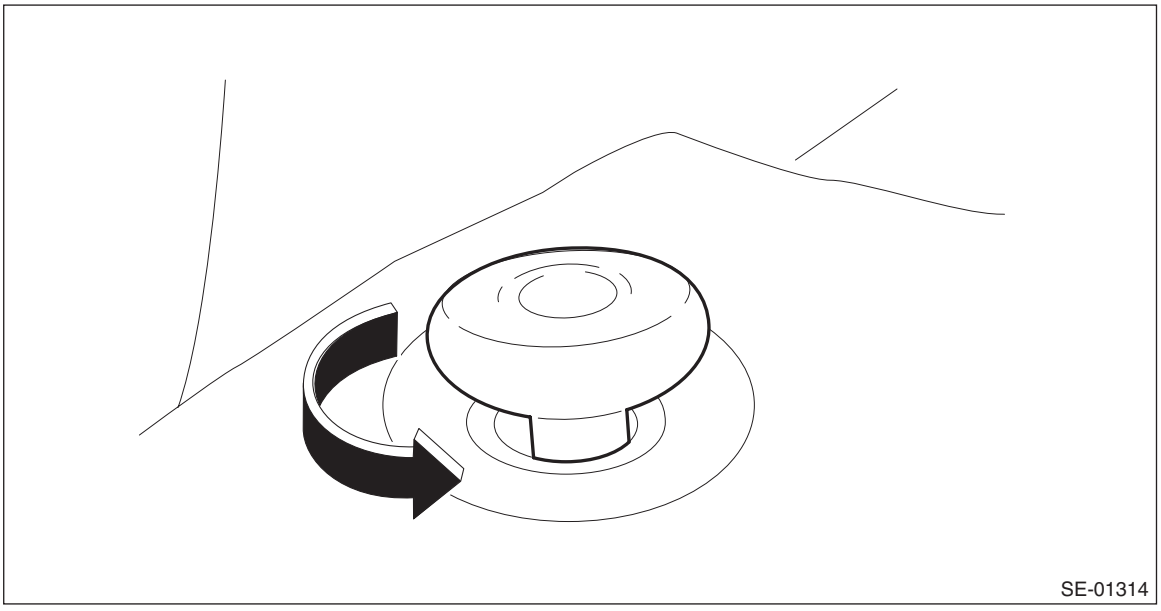
Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SE-6, REAR SEAT, COMPONENT, General Description.>

C: DISASSEMBLY

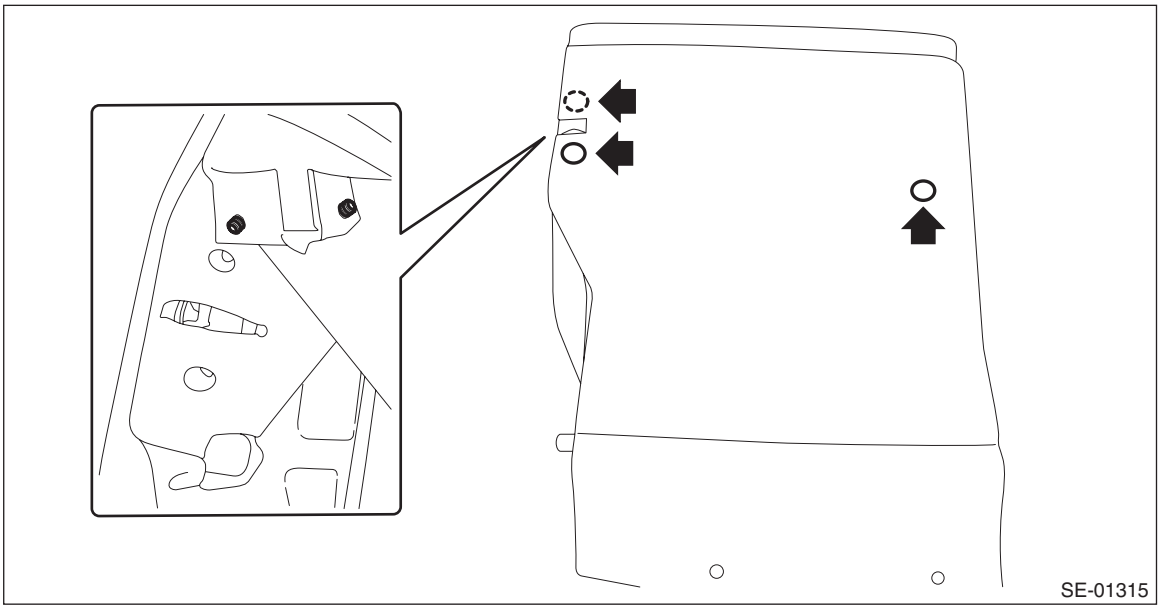
1) Remove the rear seat. <Ref. to SE-24, REMOVAL, Rear Seat.>
2) Remove the headrest assembly - rear backrest.
3) Remove the armrest assembly - rear center. (model with armrest assembly - rear center)
   (1) Remove the cover - armrest by pulling it in the direction of the arrow (black).
   (2) Remove the screws and remove the armrest assembly - rear center.



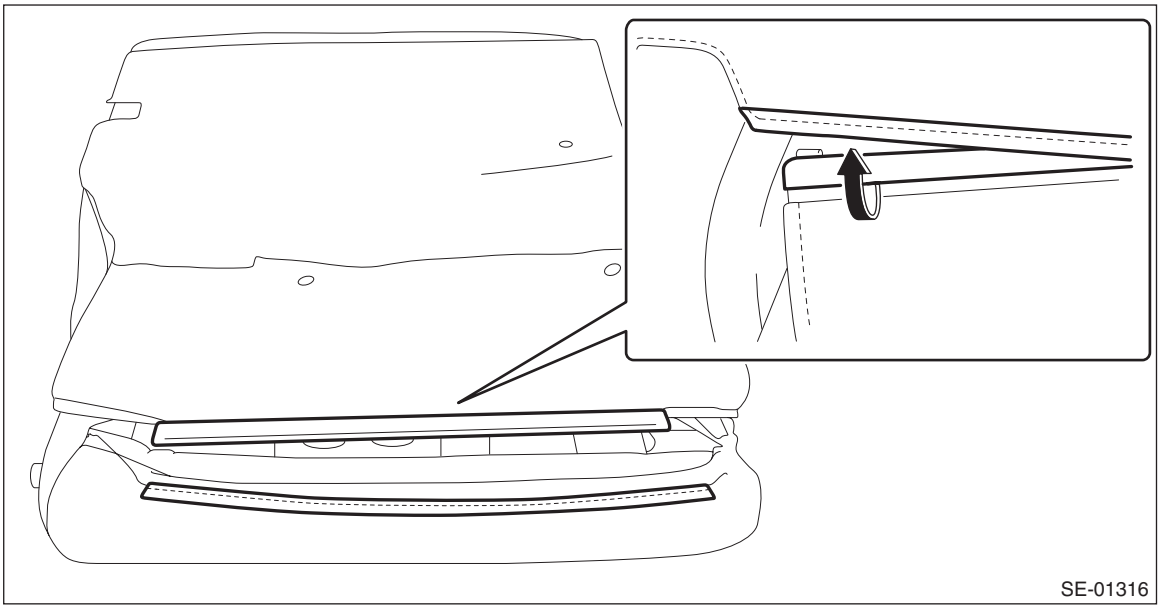
NOTE:
The armrest assembly - rear center cannot be detached unless pin positions on the RH side of the backrest assembly and on the center side of the armrest assembly - rear are aligned.
4) Remove the knob - backrest. (Screw-in type)



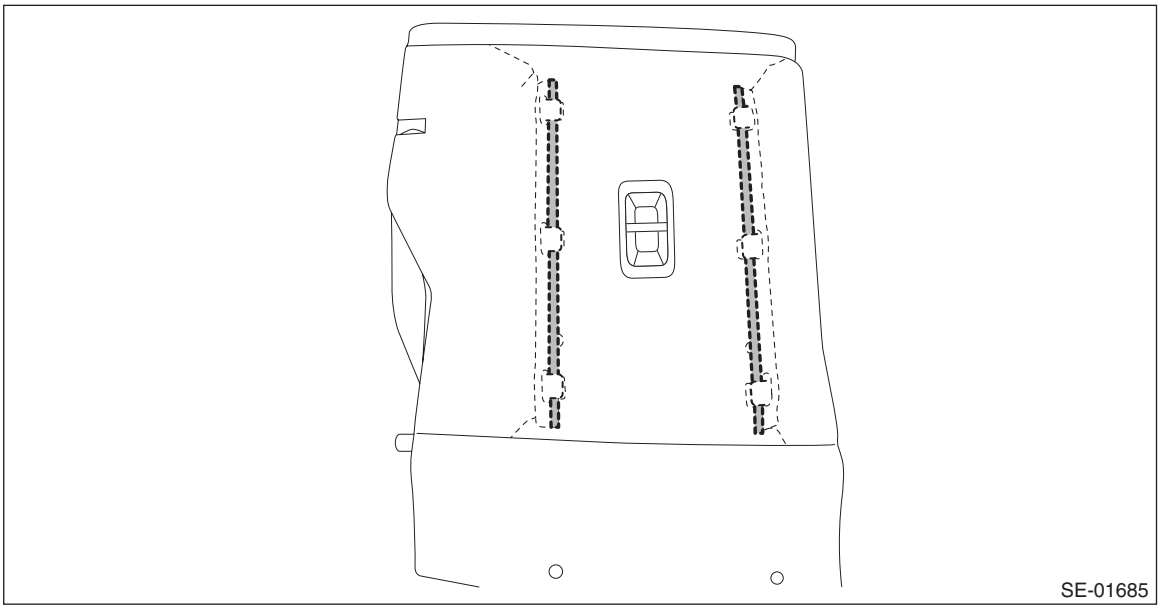
5) Remove the clips on the backside of the cover COMPL - rear backrest LH.



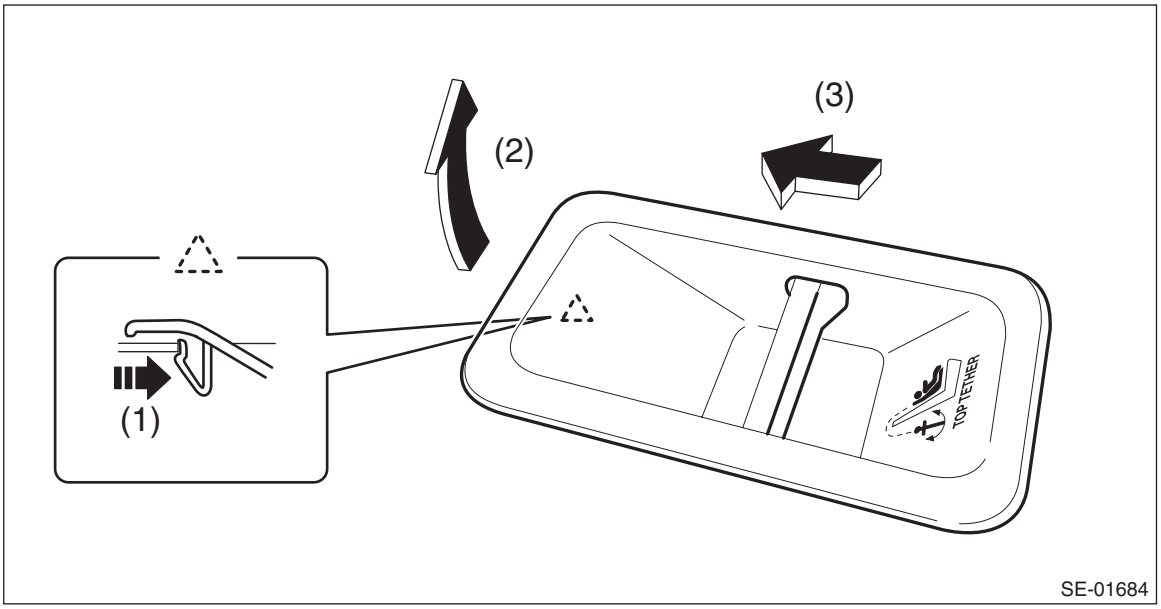
6) Detach the plastic fastener at the bottom of backrest assembly LH and turn over the cover COMPL - rear backrest LH.



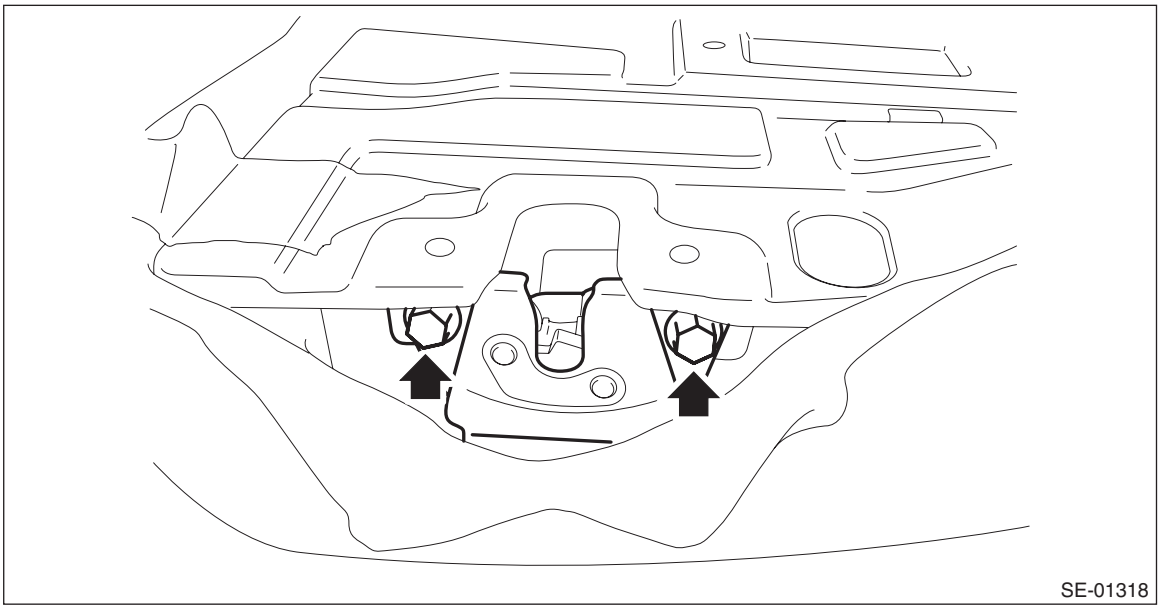
7) Remove the plastic hooks on the back side of the backrest assembly LH, and turn over the backrest assembly.



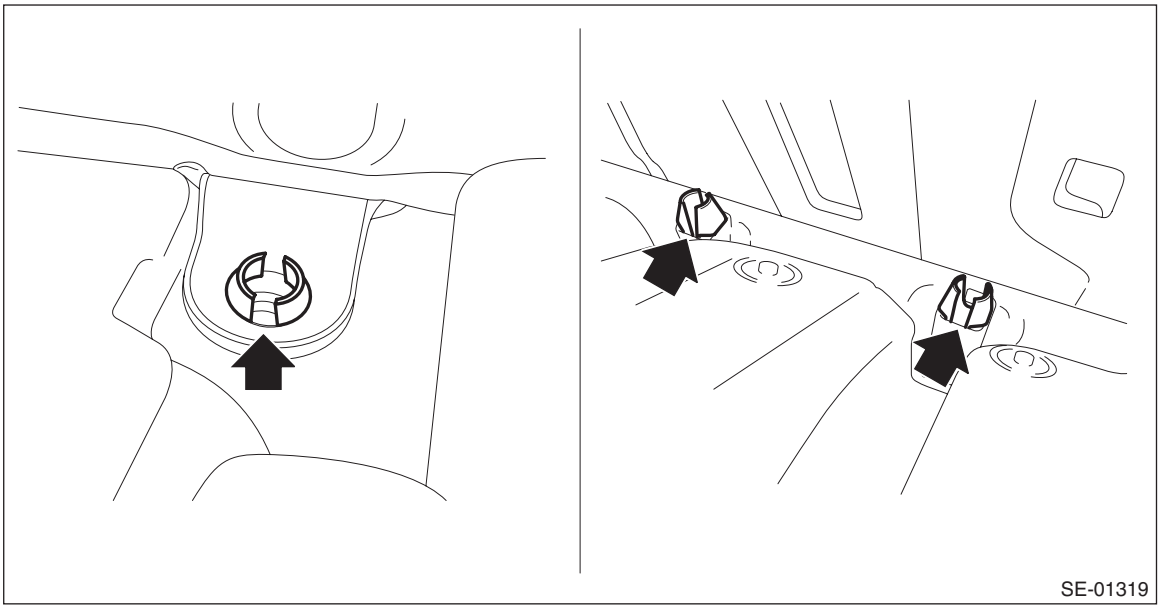
8) Pull up the pad and cover, and remove the tether anchor cover from the inside of back board.



9) Remove the lock assembly - rear backrest rear LH.

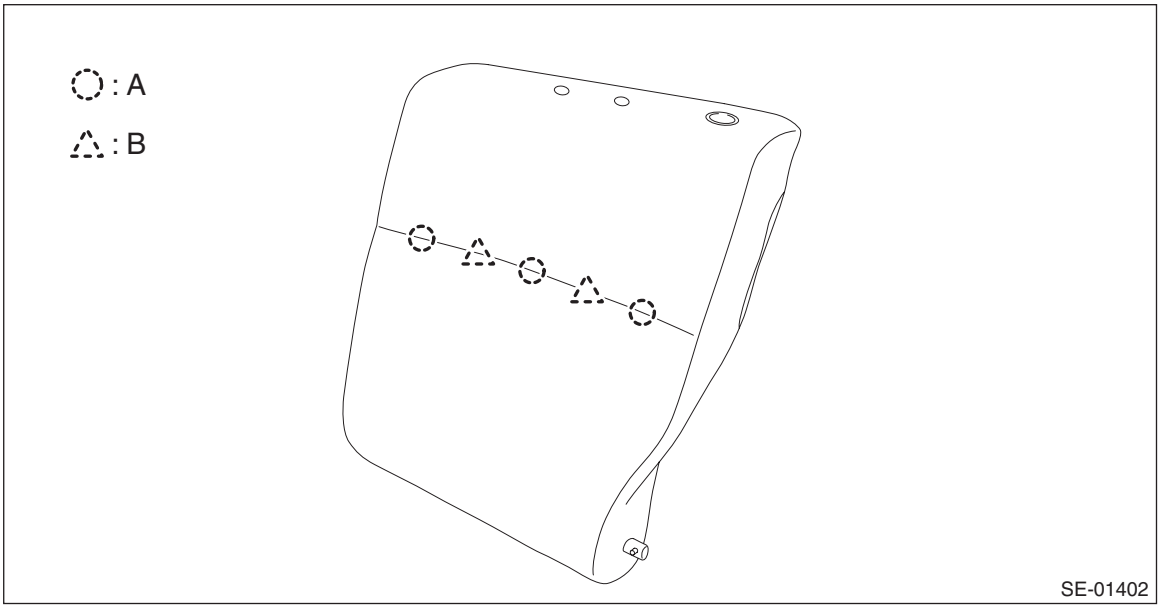


10) Detach the bushing - headrest and the bushing - lock assembly, and remove the frame assembly - rear backrest LH from the pad assembly - main LH.

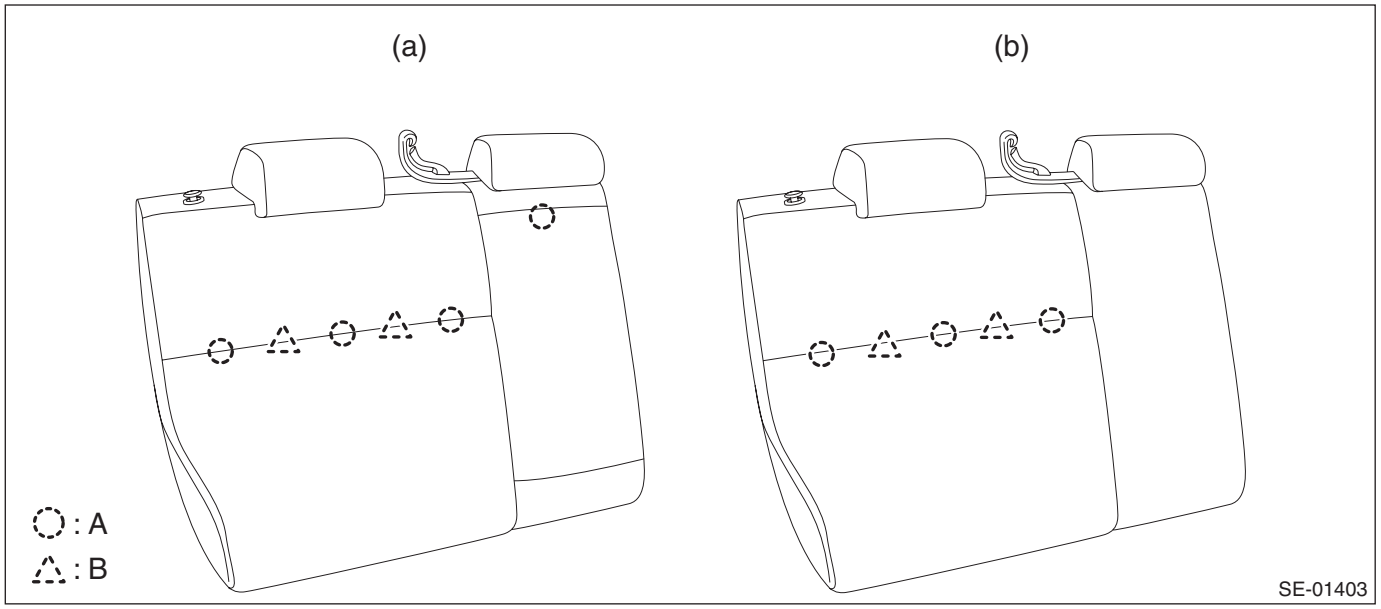


11) Remove the hog rings (A) and wire clip (B), then remove the cover COMPL - rear backrest LH.

- LH side



- RH side

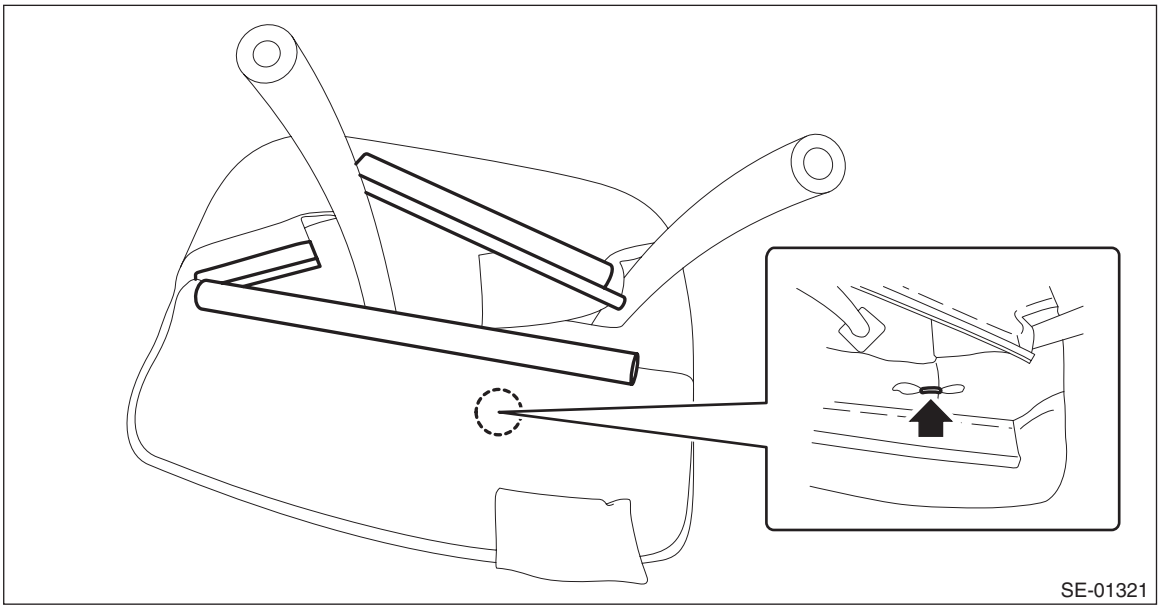


(a) Model with armrest assembly - rear center

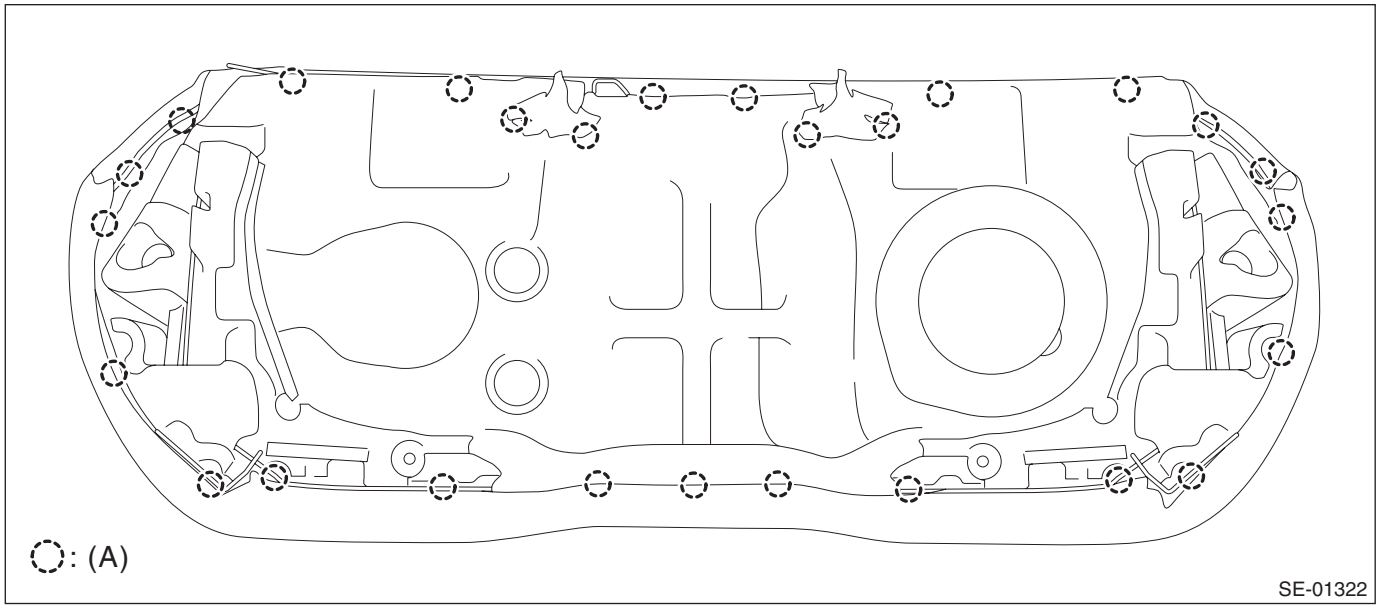
(b) Model without armrest ASSY - rear center

12) Referring to the above steps, disassemble the backrest assembly RH.

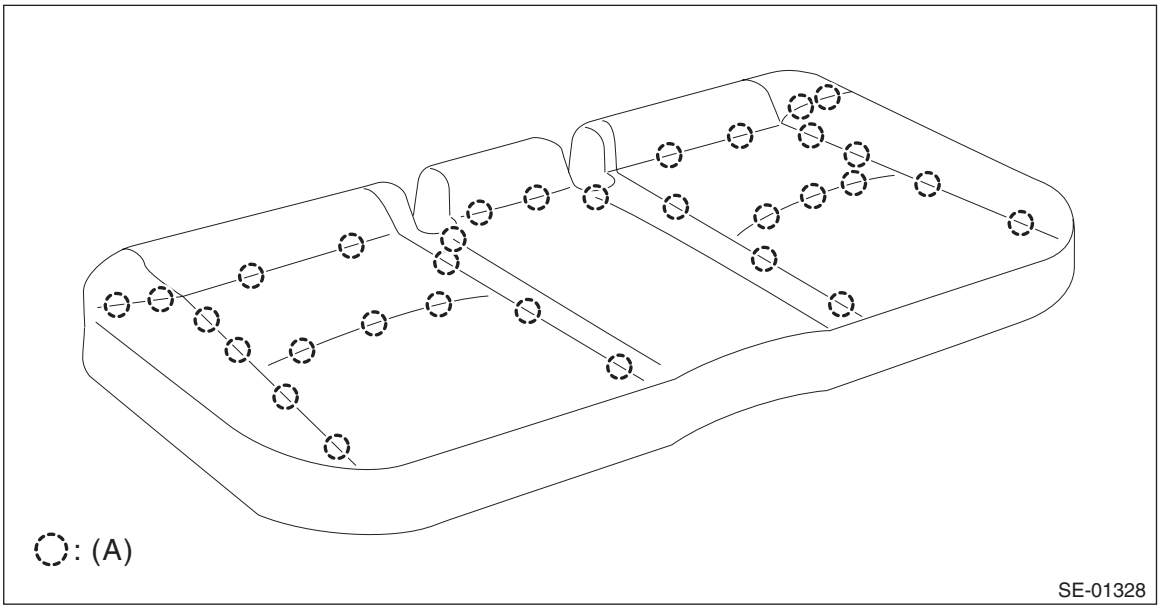
13) Detach the plastic fastener and hog ring, and then remove the headrest cover.



14) Remove the hog rings (A) on the back side of the rear seat cushion assembly.



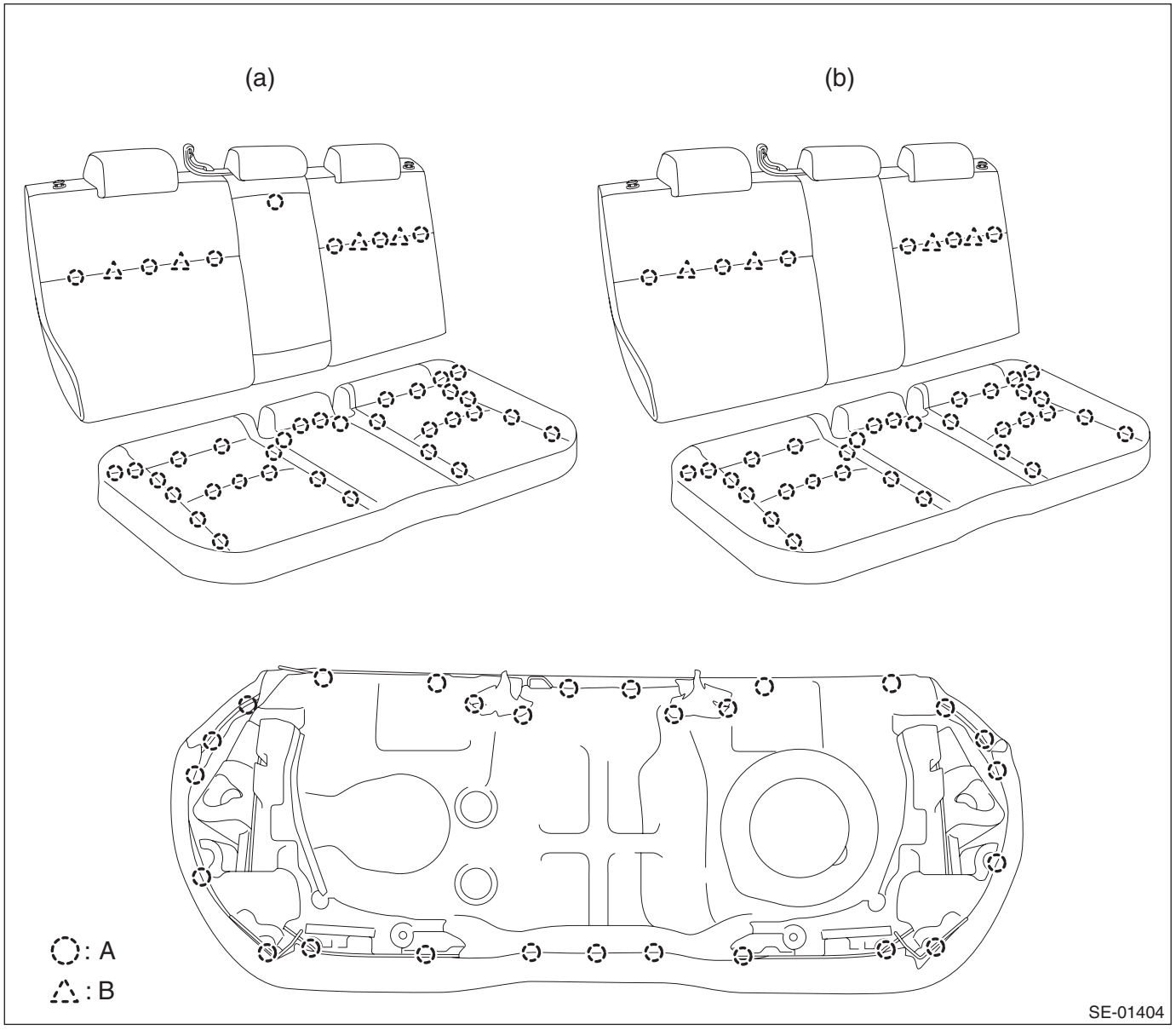
15) Remove the hog rings (A), then remove the cover - rear cushion.



D: ASSEMBLY

CAUTION:
- **Do not reuse hog rings.**
- **Secure the hog ring using hog ring pliers.**
- **Install the hog rings to the specified points securely and make sure that there is no wrinkle or twisting on the cover COMPL - rear backrest.**

1) Assemble the cover COMPL - rear backrest and the cover - rear cushion in the same manner as for the front seat. <Ref. to SE-18, ASSEMBLY, Front Seat.>
2) Make sure that all hog rings (A) and wire clips (B) are attached securely.



(a) Model with armrest assembly - rear center
(b) Model without armrest assembly - rear center

3) Assemble each part in the reverse order of disassembly.

NOTE:
- Do not contaminate or damage the cover COMPL - rear backrest and the cover - rear cushion.
- While installing the hog rings, prevent the cover COMPL - rear backrest and the cover - rear cushion from getting wrinkled.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SE-6, REAR SEAT, COMPONENT, General Description.>

4) Before installation, check the following items.
- No tear and fray on the cover COMPL - rear backrest and the cover - rear cushion.
- No fray or deformation on each wire cable.

5) Install each part in the reverse order of removal.

E: INSPECTION

1. SEAT COVER

Check that there is no tear or fray on the cover COMPL - rear backrest and the cover - rear cushion.

4. Seat Heater System

A: REMOVAL

1. SEAT HEATER UNIT

1) Remove the front seats. <Ref. to SE-8, REMOVAL, Front Seat.>
2) Remove the backrest cover of front seat and seat cushion cover. <Ref. to SE-10, DISASSEMBLY, Front Seat.>
3) Remove the seat heater module.

CAUTION:
If the seat heater module is removed, replace the pad assembly with a new part.

2. SEAT HEATER SWITCH

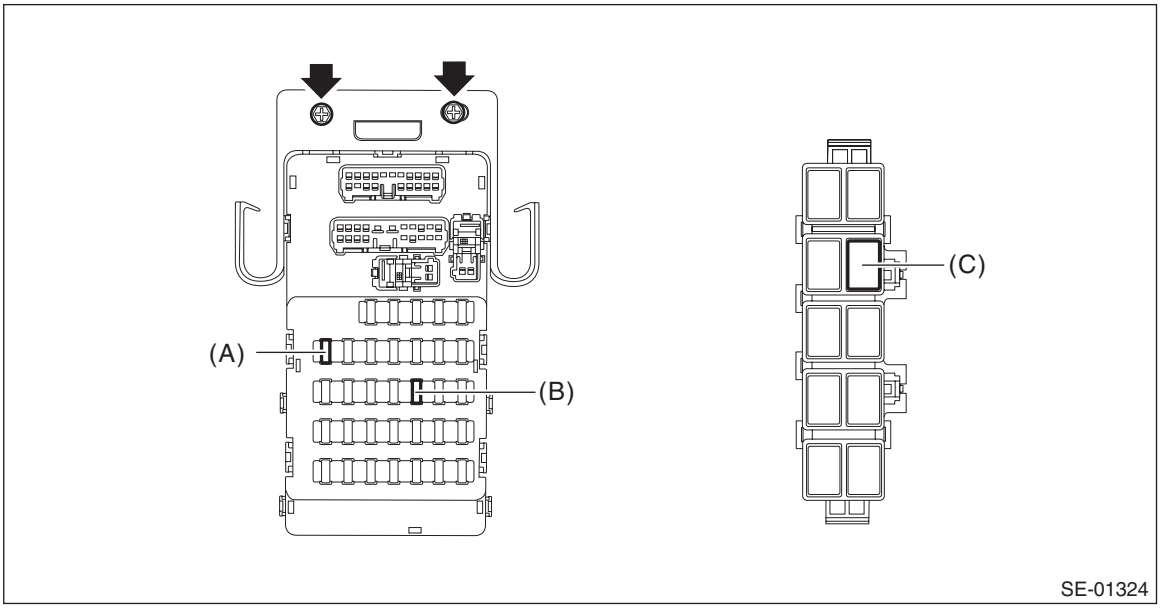
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
• For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
• On CVT models, shift the select lever into “N” before disconnecting the battery ground cable.
2) Remove the console box assembly. <Ref. to EI-77, REMOVAL, Console Box.>
3) Remove the screws and remove the seat heater switch from the backside of the console box assembly.

3. SEAT HEATER RELAY AND FUSE

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the glove box assembly. <Ref. to EI-74, REMOVAL, Glove Box.>
4) Remove the seat heater relay and fuse.
(1) Remove the relay & fuse box bolts.
(2) Remove the seat heater relay from the relay holder.



Relay & fuse box	Fuse 7.5 A (remote control mirror)	(A)
	Fuse 15 A (seat heater)	(B)
Relay holder	Seat heater relay	(C)

B: INSTALLATION

CAUTION:
• If the cover - front cushion is removed, make sure to replace the hang wire on the cover - front cushion side with a new wire.
• When replacing the seat cover, be careful not to damage the occupant detection sensor while installing the hog ring.
• When removing or replacing the seat cover, perform "Occupant Detection System Inspection" after installing the seat to check if the occupant detection system operates normally. <Ref. to PI-14, SEAT, PRE-DELIVERY INSPECTION (PDI) PROCEDURE, Pre-delivery Inspection.>
• If the seat heater module is removed, replace the seat cushion pad & frame assembly with a new part.
• If the seat heater module is reused, remove the polyurethane section from the reverse side completely.
Install each part in the reverse order of removal.

Double-sided tape for seat heater module adhesion:
NITTO DENKO's 501L or equivalent

C: INSPECTION

1. WIRING DIAGRAM

Refer to "Seat Heater System" in the wiring diagram.
- Gasoline engine model <Ref. to WI(w/o HEV)-206, WIRING DIAGRAM, Seat Heater System.>
- HEV model <Ref. to WI(HEV)-183, WIRING DIAGRAM, Seat Heater System.>

2. DIAGNOSTIC CHART

Symptoms	Repair order
Seat heater does not operate.	1. Check the fuse. <Ref. to SE-38, CHECK SEAT HEATER FUSE, INSPECTION, Seat Heater System.>
	2. Check the seat heater relay. <Ref. to SE-39, CHECK SEAT HEATER RELAY, INSPECTION, Seat Heater System.>
	3. Check the seat heater system power supply and ground circuit. <Ref. to SE-39, CHECK POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, Seat Heater System.>
	4. Check the seat heater module. <Ref. to SE-40, SEAT HEATER UNIT, INSPECTION, Seat Heater System.>
	5. Check the seat heater switch circuit. <Ref. to SE-40, SEAT HEATER SWITCH, INSPECTION, Seat Heater System.>

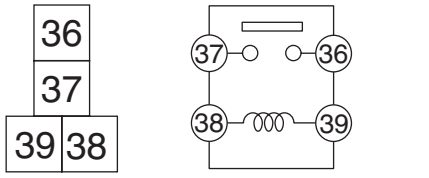
3. CHECK SEAT HEATER FUSE

Remove the seat heater fuse and inspect visually.
Is the fuse blown out?
- **Yes** → Replace the fuse.
- **No** → Check the power supply and ground circuits.

4. CHECK SEAT HEATER RELAY

1) Remove the seat heater relay from the relay holder.
2) Measure the resistance between seat heater relay terminals.

Preparation tool: Circuit tester

Terminal No.	Inspection conditions	Standard	Circuit
36 — 37	Always	1 MΩ or more	
36 — 37	Apply battery voltage between terminals 38 — 39.	Less than 1 Ω	

SE-01325

3) Replace the seat heater relay if the inspection result is not within the standard.

5. CHECK POWER SUPPLY AND GROUND CIRCUIT

1) Check power supply circuit
   (1) Disconnect the harness connector of seat heater switch.
   (2) Turn the ignition switch to ON.
   (3) Measure the voltage between harness connector terminal and chassis ground.

Connector & terminal
(R43) No. 7 (+) — Chassis ground (–):
Is the voltage 12 V or more?
- **Yes** → Go to step 2.
- **No** → Check the harness between the seat heater switch and fuse.

2) Check ground circuit
Measure the resistance between harness connector terminal and chassis ground.

Connector & terminal
(R43) No. 2 — Chassis ground:
Is the resistance less than 10 Ω?
- **Yes** → Go to step 3.
- **No** → Repair the harness.

3) Check ground circuit
Measure the resistance between seat heater switch terminals.

Connector & terminal
(R43) No. 7 — (R43) No. 2:
Is the resistance less than 10 Ω?
- **Yes** → The power supply and ground circuits are normal.
- **No** → Replace the seat heater switch.

6. SEAT HEATER UNIT

1) Disconnect the seat heater unit connector, and check the continuity between terminals of connector.

Connector & terminal

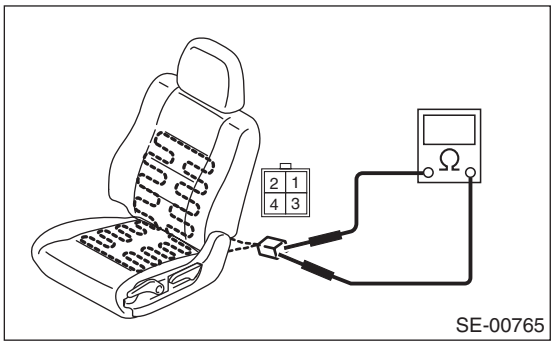
HI

No. 1 — No. 3:

No. 3 — No. 4:

LOW

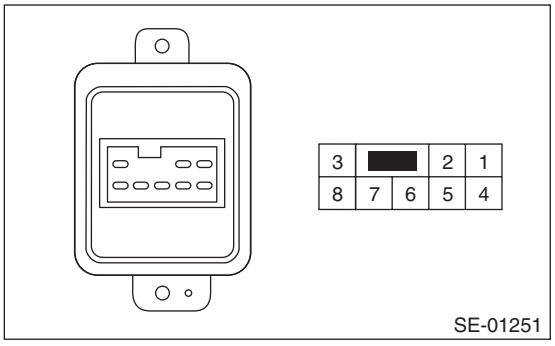
No. 1 — No. 4:



2) If no continuity exists, replace the seat heater module with a new part.

7. SEAT HEATER SWITCH

1) Inspect the continuity between the seat heater switch terminals.



Connector & terminal

HI

No. 7 — No. 2:

No. 7 — No. 4:

No. 7 — No. 8:

LOW

No. 7 — No. 1:

No. 7 — No. 2:

No. 7 — No. 3:

2) If no continuity exists, replace the seat heater switch with a new part.

BODY 2 SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

SECURITY AND LOCKS	SL
SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)	SR
EXTERIOR/INTERIOR TRIM	EI
EXTERIOR BODY PANELS	EB
CRUISE CONTROL SYSTEM	CC
CRUISE CONTROL SYSTEM (DIAGNOSTICS)	CC(w/o HEV)(diag)
CRUISE CONTROL SYSTEM (DIAGNOSTICS)	CC(HEV)(diag)
IMMOBILIZER (DIAGNOSTICS)	IM(diag)
EyeSight	ES
EyeSight (DIAGNOSTICS)	ES(diag)
Blind Spot Detection/Rear Cross Traffic Alert	RVD
Blind Spot Detection/Rear Cross Traffic Alert (DIAGNOSTICS)	RVD(diag)
LAN SYSTEM (DIAGNOSTICS)	LAN(w/o HEV)(diag)
LAN SYSTEM (DIAGNOSTICS)	LAN(HEV)(diag)
HYBRID ELECTRIC VEHICLE	HEV
HYBRID ELECTRIC VEHICLE (DIAGNOSTICS)	HEV(diag)
PEDESTRIAN ALERT SYSTEM	PA

BODY 2 SECTION

PEDESTRIAN ALERT SYSTEM (DIAGNOSTICS)	PA(diag)
KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)	KPS(diag)
BODY CONTROL SYSTEM (DIAGNOSTICS)	BC(diag)
TELEMATICS SYSTEM (DIAGNOSTICS)	TEL(diag)

SECURITY AND LOCKS

SL

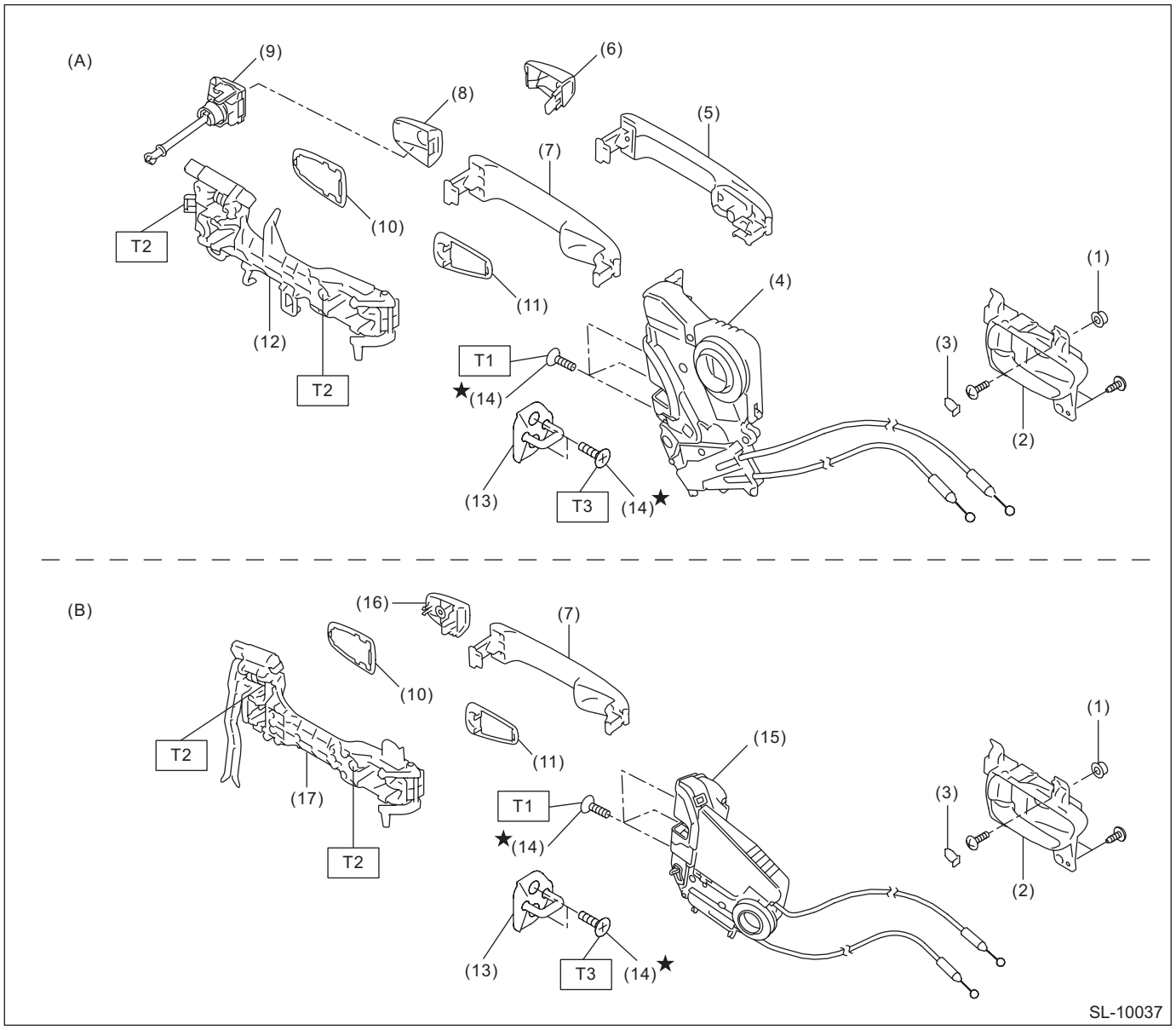
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1. General Description

A: COMPONENT

1. DOOR LOCK ASSEMBLY

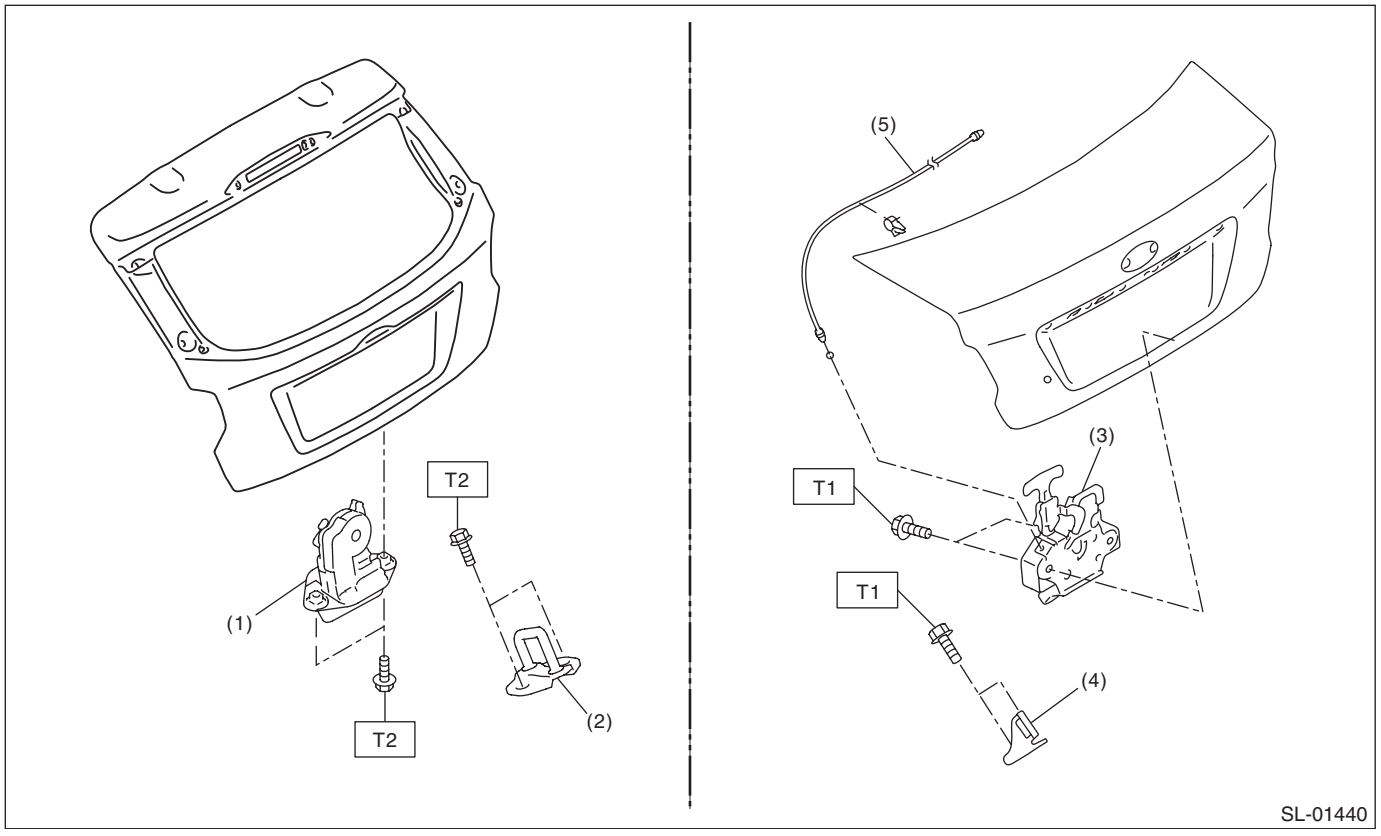


(A) Front
(B) Rear

(1) Grommet - screw
(2) Remote ASSY - door
(3) Cap remote
(4) Latch & actuator ASSY - front
(5) Handle - door outer (model with keyless access with push button start)
(6) Cover - handle front outer (passenger's seat)
(7) Handle - door outer (model without keyless access with push button start)
(8) Cover - handle front outer (driver's seat)
(9) Key lock - door (driver's seat only)
(10) Spacer - door handle outer B
(11) Spacer - door handle outer A
(12) Frame ASSY - front door outer
(13) Striker - door
(14) Screw
(15) Latch & actuator ASSY - rear
(16) Cover - handle rear outer
(17) Frame ASSY - rear door outer

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.5 (0.66, 4.8)
T2: 7.5 (0.76, 5.5)
T3: 18 (1.84, 13.3)

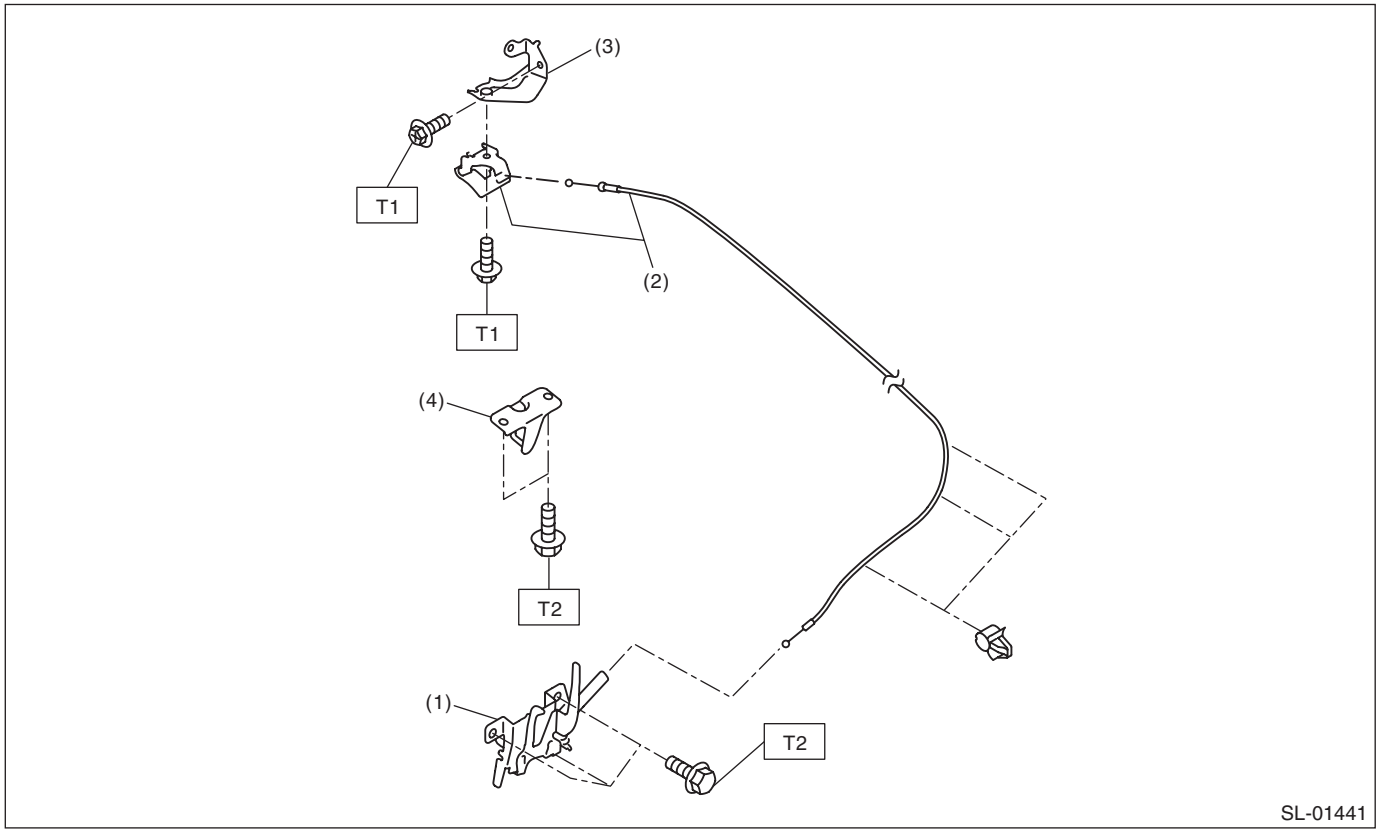
2. REAR GATE LOCK AND TRUNK LID LOCK



(1) Latch & actuator - rear gate
(2) Striker - rear gate
(3) Lock ASSY - trunk lid
(4) Striker - trunk lid
(5) Cable ASSY - trunk lid

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 25 (2.55, 18.4)

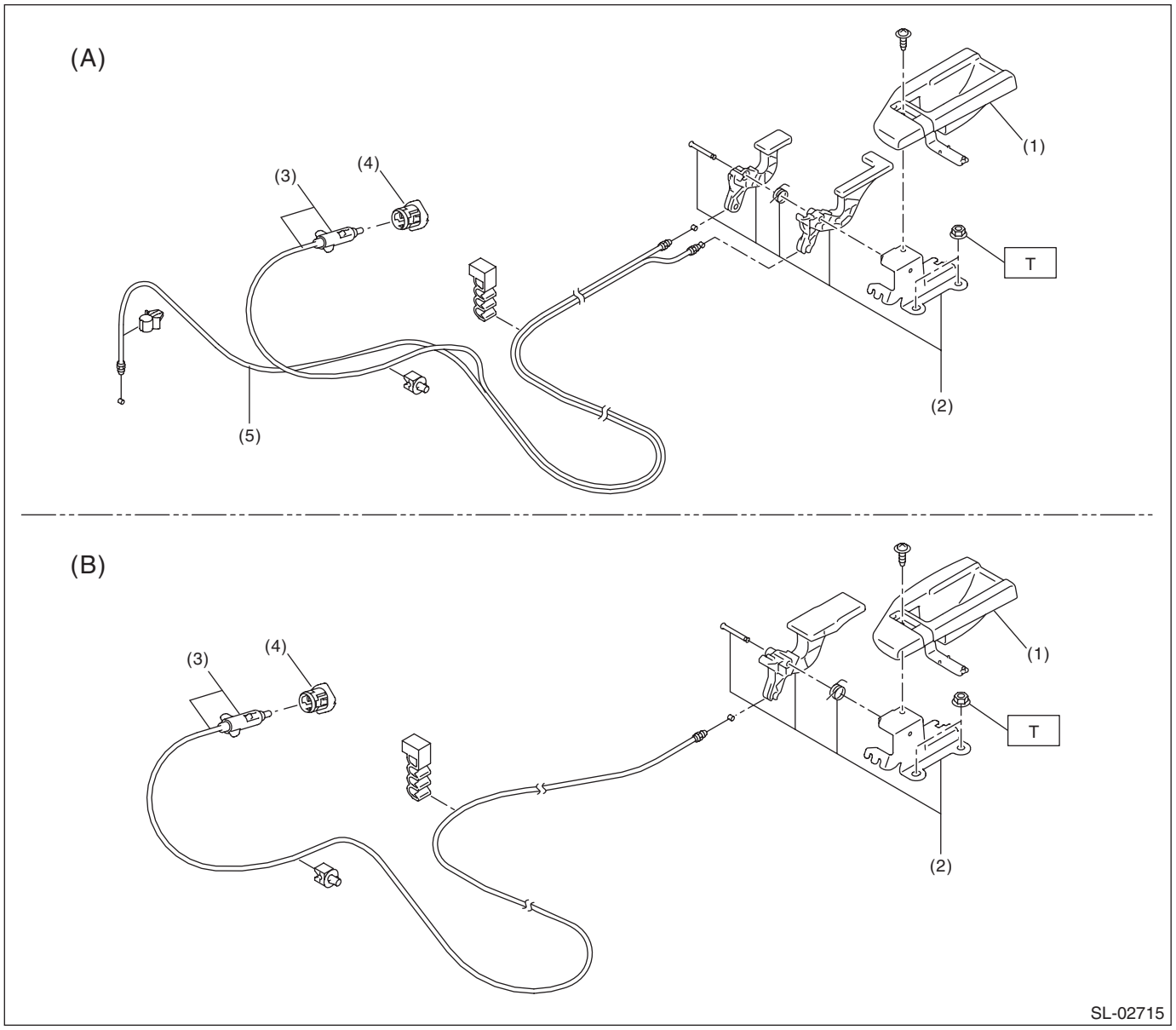
3. FRONT HOOD LOCK



(1) Lock ASSY - front hood
(2) Cable - front hood
(3) Bracket - opener handle
(4) Striker - front hood

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 33 (3.36, 24.3)

4. REMOTE OPENER

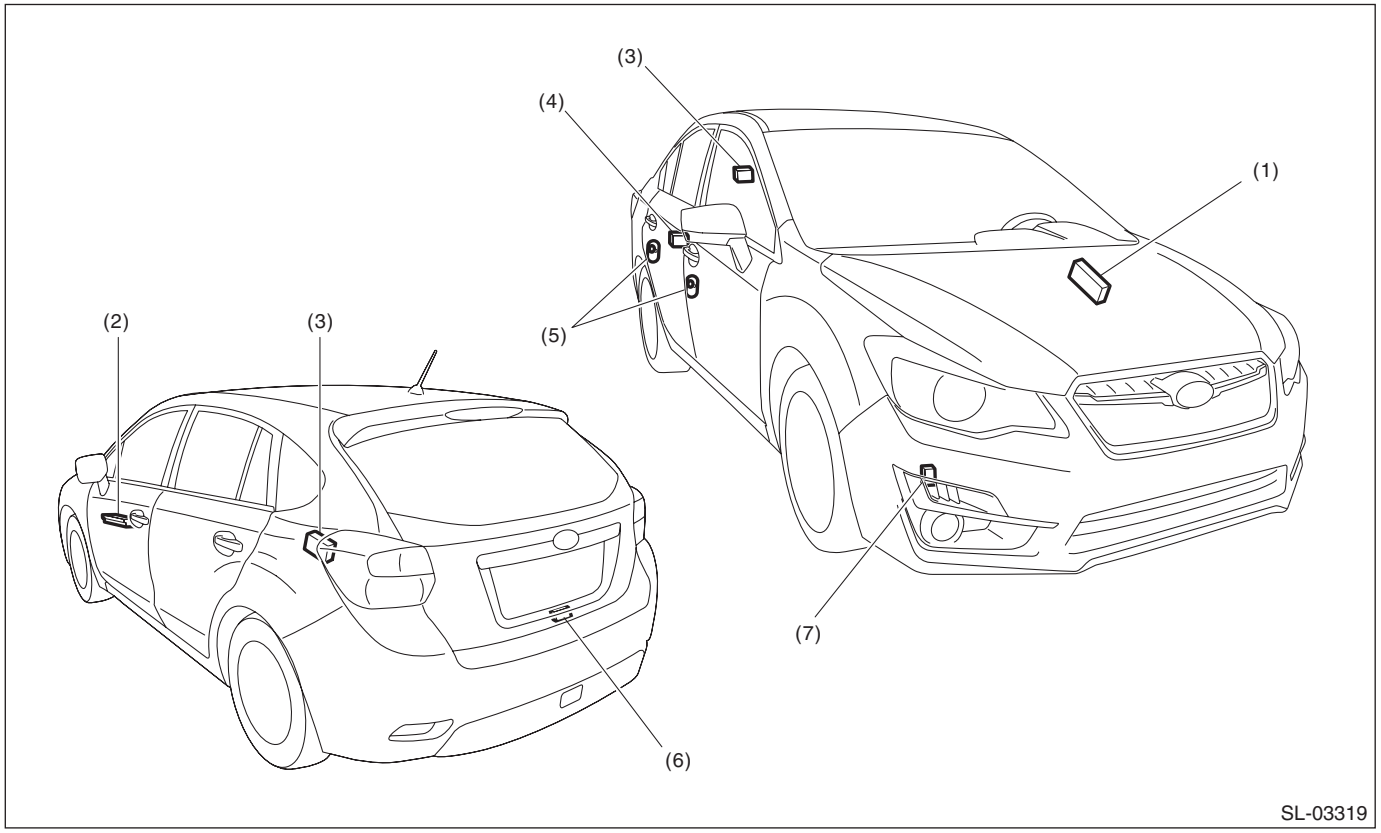


(A) 4 door model
(B) 5 door model/Crosstrek model

(1) Cover - handle
(2) Pull handle - opener
(3) Cable ASSY - fuel
(4) Holder
(5) Cable ASSY - trunk lid

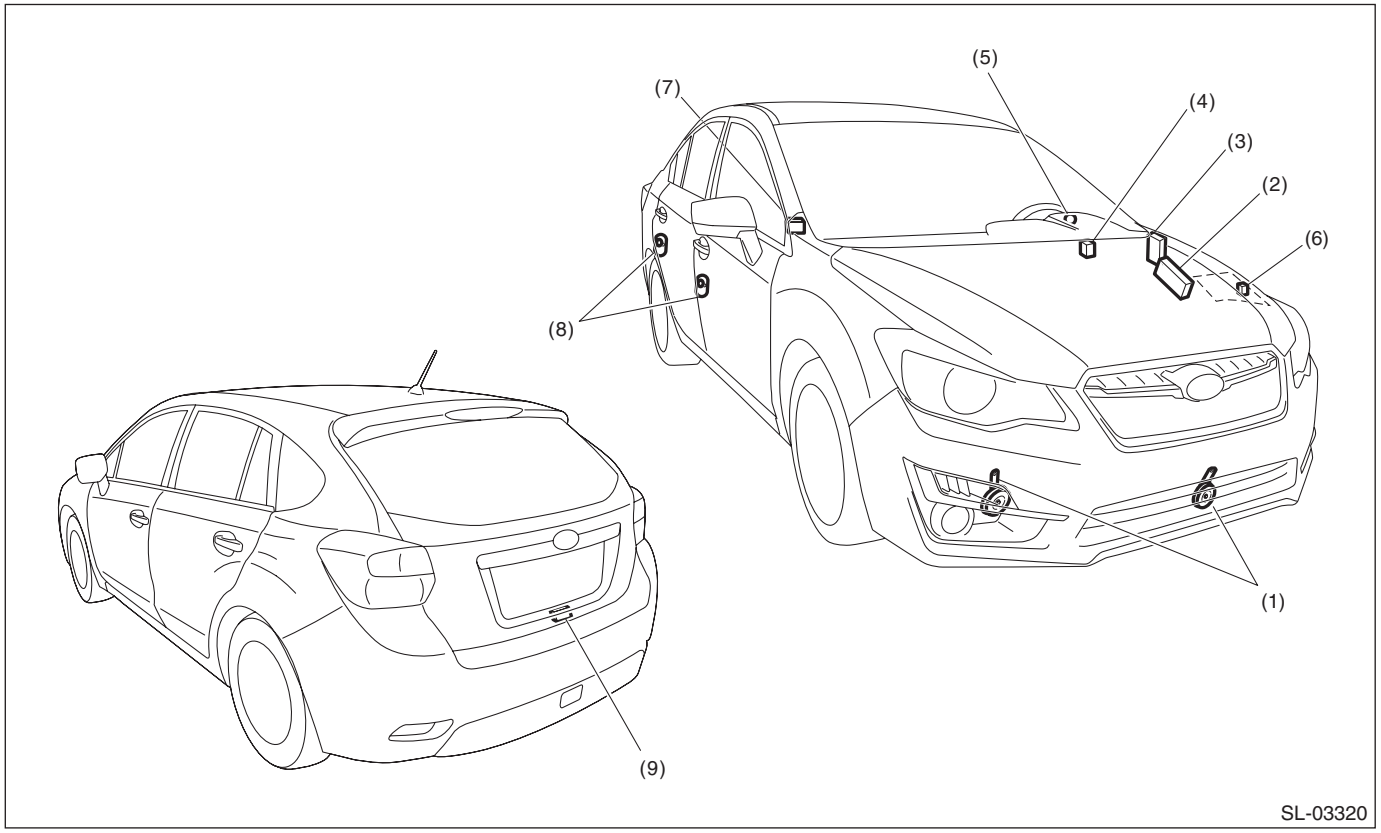
Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

5. KEYLESS ENTRY SYSTEM



(1) Body integrated unit
(2) Power window main switch
(3) Keyless entry control module
(4) Trunk lid latch switch (4 door model)
(5) Door switch
(6) Rear gate latch switch (5 door model/Crosstrek model)
(7) Keyless buzzer

6. SECURITY SYSTEM



(1)	Horn	(4)	Turn signal and hazard module	(7)	Trunk lid latch switch (4 door model)
(2)	Body integrated unit	(5)	Security indicator light (in combination meter)	(8)	Door switch
(3)	Impact sensor (driver's seat instrument panel side) (dealer option)	(6)	Horn relay (in main fuse box)	(9)	Rear gate latch switch (5 door model/Crosstrek model)

7. KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM

NOTE:
Refer to "Electrical Component Location" of "KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)" section. <Ref. to KPS(diag)-11, Electrical Component Location.>

B: CAUTION

• Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that the each component operates normally.
• If any immobilizer related part has been replaced, make sure to register the immobilizer.
• Be careful of the following items. Failing to do so may cause the airbag system malfunction.
  – Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. When using a tester on these circuits, follow the cautions of “AIRBAG SYSTEM”. <Ref. to AB-11, CAUTION, General Description.>
  – Be careful not to damage the airbag system wiring harness when servicing the electrical parts around the steering column.
• Be careful not to damage the airbag system wiring harness when servicing the ignition key cylinder.
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform the VDC midpoint setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

C: PREPARATION TOOL

1. SPECIAL TOOL

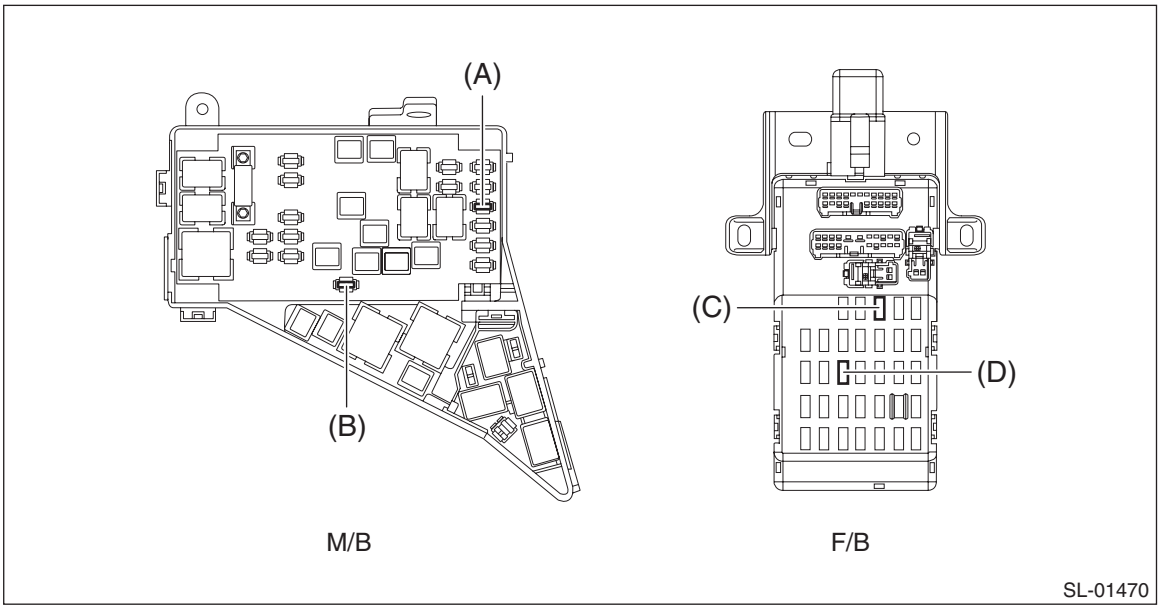
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.
Drill	Used for replacing ignition key lock.
Reverse tap	Used for replacing ignition key lock.
TORX® T30	Used for removing and installing door outer handle cover and frame assembly.
Clip remover	Used for removing trim clip.

2. Relay and Fuse

A: LOCATION



Main fuse box	Fuse 15 A (turn signal and hazard unit, body integrated unit)	(A)
	Fuse 20 A (body integrated unit, immobilizer antenna)	(B)
Relay & fuse box	Fuse 15 A (body integrated unit)	(C)
	Fuse 10 A (keyless access CM, TPMS & keyless entry CM)	(D)

NOTE:
For other related fuses, refer to the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model: <Ref. to WI(HEV)-21, Power Supply Circuit.>

B: INSPECTION

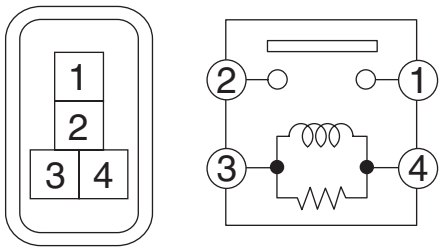
1. CHECK FUSE

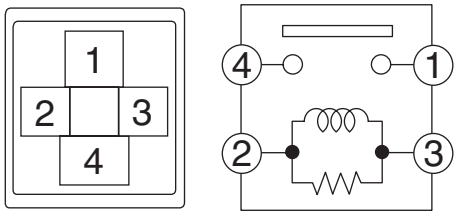
1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

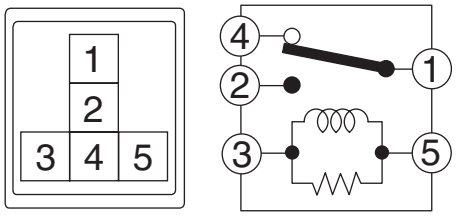
NOTE:
If the fuse is blown again, check the system wiring harness.

2. CHECK RELAY

1) Check the resistance between relay terminals.

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01273
1 — 2	Apply battery voltage between terminals 4 and 3.	Less than 1 Ω	

Terminal No.	Inspection conditions	Standard	Circuit
1 — 4	Always	1 MΩ or more	 AC-02796
1 — 4	Apply battery voltage between terminals 2 and 3.	Less than 1 Ω	

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 SL-01566
1 — 4	Always	Less than 1 Ω	
1 — 2	Apply battery voltage between terminals 3 and 5.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard value.

3. Door Lock Control System

A: WIRING DIAGRAM

Refer to “Keyless Entry System” in the wiring diagram. <Ref. to WI(w/o HEV)-164, WIRING DIAGRAM, Keyless Entry System.>

B: ELECTRICAL SPECIFICATION

1. BODY INTEGRATED UNIT

Refer to “Control Module I/O Signal” of “BODY CONTROL SYSTEM (DIAGNOSTICS)” section. <Ref. to BC(diag)-6, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

1. SYMPTOM CHART

Symptoms	Repair order	Reference
The door lock control system does not operate.	1. Remove and visually inspect the following fuses. • No. 3 (in fuse & relay box) • No. 7 (in fuse & relay box) • No. 8 (in main fuse box)	If the fuse is blown out, replace the fuse with a new part. When there is no defective with the fuse, check the power supply and ground circuit. <Ref. to SL-13, CHECK POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, Door Lock Control System.>
	2. Check the power supply and ground circuit for body integrated unit.	<Ref. to SL-13, CHECK POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, Door Lock Control System.>
	3. Check the door lock switch and the circuit.	<Ref. to SL-13, CHECK DOOR LOCK SWITCH, INSPECTION, Door Lock Control System.>
	4. Check the rear gate opener button and the circuit.	<Ref. to SL-14, CHECK REAR GATE OPENER BUTTON CIRCUIT, INSPECTION, Door Lock Control System.>
	5. Check the door lock actuator and the circuit.	<Ref. to SL-15, CHECK DOOR LOCK ACTUATOR AND CIRCUIT, INSPECTION, Door Lock Control System.>
A specific door lock actuator does not operate.	Check the door lock actuator and circuit.	<Ref. to SL-15, CHECK DOOR LOCK ACTUATOR AND CIRCUIT, INSPECTION, Door Lock Control System.>

2. CHECK POWER SUPPLY AND GROUND CIRCUIT

	Step	Check	Yes	No
1	**CHECK POWER SUPPLY.** 1) Disconnect the connector of body integrated unit. 2) Measure the voltage between the body integrated unit connector and chassis ground. ***Connector & terminal*** ***(i84) No. 6 (+) — Chassis ground (–):*** ***(i171) No. 1 (+) — Chassis ground (–):*** ***(B281) No. 7 (+) — Chassis ground (–):***	Is the voltage 9 V or more?	Go to step **2**.	Check the harness for open or short circuit between body integrated unit and fuse.
2	**CHECK GROUND CIRCUIT.** Measure the resistance between the body integrated unit connector and chassis ground. ***Connector & terminal*** ***(i84) No. 1 — Chassis ground:*** ***(B280) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	The power supply and ground circuit are OK.	Repair or replace the harness.

3. CHECK DOOR LOCK SWITCH

	Step	Check	Yes	No
1	**CHECK DATA MONITOR.** Using the Subaru Select Monitor, display the data of «Manual lock SW input». NOTE: For detailed operation procedures, refer to "Application help".	Does the display switch between OFF ←→ ON when each door lock switch is moved to LOCK?	Go to step **2**.	Go to step **3**.
2	**CHECK DOOR LOCK SWITCH.** From the condition in step 1), operate each door lock switch (driver's and passenger's) in the UNLOCK direction.	Does the display switch between OFF ←→ ON?	The door lock switch is OK.	Go to step **4**.
3	**CHECK POWER WINDOW MAIN SWITCH (DOOR LOCK SWITCH).** 1) Disconnect the power window main switch (door lock switch) connector. 2) Measure the continuity between terminals when moving the power window main switch (door lock switch) in LOCK direction. ***Terminals*** ***Driver's side*** ***(D7) No. 10 — (D102) No. 3:*** ***Passenger's side*** ***(D125) No. 4 — (D125) No. 5:***	Did the indicator change from "No continuity" (1 MΩ or more) to "Continuity exists" (less than 10 Ω)?	Go to step **4**.	Replace the power window main switch or door lock switch.
4	**CHECK POWER WINDOW MAIN SWITCH (DOOR LOCK SWITCH).** Measure the continuity between terminals when moving the power window main switch (door lock switch) in UNLOCK direction. ***Terminals*** ***Driver's side*** ***(D7) No. 2 — (D102) No. 3:*** ***Passenger's side*** ***(D125) No. 2 — (D125) No. 5:***	Did the indicator change from "No continuity" (1 MΩ or more) to "Continuity exists" (less than 10 Ω)?	Go to step **5**.	Replace the power window main switch or door lock switch.

	Step	Check	Yes	No
5	**CHECK HARNESS.** Measure the resistance between the power window main switch (door lock switch) connector and chassis ground. ***Connector & terminal*** ***Driver's side*** ***(D102) No. 3 — Chassis ground:*** ***Passenger's side*** ***(D125) No. 5 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the harness.
6	**CHECK HARNESS.** Check the harness between body integrated unit and power window main switch (door lock switch). ***Connector & terminal*** ***Driver's side*** ***(D7) No. 10 — (i84) No. 9:*** ***(D7) No. 2 — (i84) No. 20:*** ***Passenger's side*** ***(D125) No. 4 — (i84) No. 9:*** ***(D125) No. 2 — (i84) No. 20:***	Is harness normal?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the harness.

4. CHECK REAR GATE OPENER BUTTON CIRCUIT

	Step	Check	Yes	No
1	**CHECK DATA MONITOR.** Using the Subaru Select Monitor, display the data of «R Gate Release SW input». NOTE: For detailed operation procedures, refer to "Application help".	Does the display change to OFF ←→ ON, when the rear gate opener button is operated?	Rear gate opener button is normal.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the connectors of body integrated unit and rear gate opener button. 2) Check the harness between the body integrated unit and rear gate opener button. ***Connector & terminal*** ***(i84) No. 10 — (D47) No. 1:***	Is harness normal?	Go to step **3**.	Repair or replace the harness.
3	**CHECK HARNESS.** Measure the resistance between the rear gate opener button connector and chassis ground. ***Connector & terminal*** ***(D47) No. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair or replace the harness.
4	**CHECK REAR GATE OPENER BUTTON.** Measure the resistance between terminals both when the rear gate opener button is pressed and when not pressed. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 10 Ω when the switch is pressed and 1 MΩ or more when not pressed?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the rear gate opener button.

5. CHECK DOOR LOCK ACTUATOR AND CIRCUIT

	Step	Check	Yes	No
1	**CHECK HARNESS (DOOR LOCK).** 1) Disconnect the body integrated unit and each door lock actuator connector. 2) Check the harness between body integrated unit and each door lock actuator. ***Connector & terminal*** ***Front door LH*** ***(i171) No. 2 — (D72) No. 4:*** ***Front door RH*** ***(i171) No. 2 — (D18) No. 4:*** ***Rear door LH*** ***(i171) No. 2 — (D26) No. 4:*** ***Rear door RH*** ***(i171) No. 2 — (D32) No. 4:***	Is harness normal?	Go to step **2**.	Repair or replace the harness.
2	**CHECK HARNESS (DOOR UNLOCK).** Check the harness between body integrated unit and each door lock actuator. ***Connector & terminal*** ***Front door LH*** ***(i171) No. 4 — (D72) No. 1:*** ***Front door RH*** ***(i171) No. 3 — (D18) No. 1:*** ***Rear door LH*** ***(i171) No. 3 — (D26) No. 1:*** ***Rear door RH*** ***(i171) No. 3 — (D32) No. 1:***	Is harness normal?	4 door model: Go to step **5**. 5 door model/ Crosstrek model: Go to step **3**.	Repair or replace the harness.
3	**CHECK HARNESS (REAR GATE UNLOCK).** Check the harness between the body integrated unit and rear gate lock actuator. ***Connector & terminal*** ***(i171) No. 7 — (D46) No. 1:***	Is harness normal?	Go to step **4**.	Repair or replace the harness.
4	**CHECK HARNESS (REAR GATE UNLOCK).** Measure the resistance between the rear gate lock actuator connector and chassis ground. ***Connector & terminal*** ***(D46) No. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair or replace the harness.
5	**CHECK HARNESS (TRUNK UNLOCK).** Check the harness between the body integrated unit and trunk lid lock actuator. ***Connector & terminal*** ***(i171) No. 7 — (R186) No. 1:***	Is harness normal?	Go to step **6**.	Repair or replace the harness.
6	**CHECK HARNESS (TRUNK UNLOCK).** Measure the resistance between the trunk lid lock actuator connector and chassis ground. ***Connector & terminal*** ***(R186) No. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair or replace the harness.
7	**CHECK BODY INTEGRATED UNIT OUTPUT SIGNAL.** 1) Connect the body integrated unit connector. 2) Measure the voltage between terminals of the body integrated unit when operating the door lock switch to LOCK direction. ***Connector & terminal*** ***Except for front door LH*** ***(i171) No. 2 (+) — (i171) No. 3 (–):*** ***Front door LH*** ***(i171) No. 2 (+) — (i171) No. 4 (–):***	Does the voltage change from less than 1 V → 9 V or more? (During lock output)	Go to step **8**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

	Step	Check	Yes	No
8	**CHECK BODY INTEGRATED UNIT OUTPUT SIGNAL.** Measure the voltage between terminals of the body integrated unit when operating the door lock switch to UNLOCK direction. ***Connector & terminal*** ***Except for front door LH*** ***(i171) No. 3 (+) — (i171) No. 2 (–):*** ***Front door LH*** ***(i171) No. 4 (+) — (i171) No. 2 (–):***	Does the voltage change from less than 1 V → 9 V or more? (During unlock output)	Go to step **9**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
9	**CHECK BODY INTEGRATED UNIT OUTPUT SIGNAL.** Measure the voltage between body integrated unit and chassis ground when operating the rear gate opener button. ***Connector & terminal*** ***(i171) No. 7 (+) — Chassis ground (–):***	Does the voltage change from less than 1 V → 9 V or more? (During unlock output)	Go to step **10**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
10	**CHECK DOOR LOCK ACTUATOR.** Check the door lock actuator. • Front door lock actuator: <Ref. to SL-41, INSPECTION, Front Door Latch and Door Lock Actuator Assembly.> • Rear door lock actuator: <Ref. to SL-48, INSPECTION, Rear Door Latch and Door Lock Actuator Assembly.>	Is the door lock actuator OK?	• 4 door model: Go to step **12**. • 5 door model/ Crosstrek model: Go to step **11**.	Replace the door latch and door lock actuator assembly.
11	**CHECK REAR GATE LOCK ACTUATOR.** Check the rear gate lock actuator. <Ref. to SL-51, Rear Gate Latch and Actuator Assembly.>	Is the rear gate lock actuator normal?	Check the connection status of the harness and connector that may have a temporary poor contact.	Replace the rear gate latch and actuator assembly.
12	**CHECK TRUNK LID LOCK ACTUATOR.** Check the trunk lid lock actuator. <Ref. to SL-53, Trunk Lid Latch and Actuator Assembly.>	Is trunk lid lock actuator normal?	Check the connection status of the harness and connector that may have a temporary poor contact.	Replace the trunk lid latch & actuator assembly.

4. Keyless Entry System

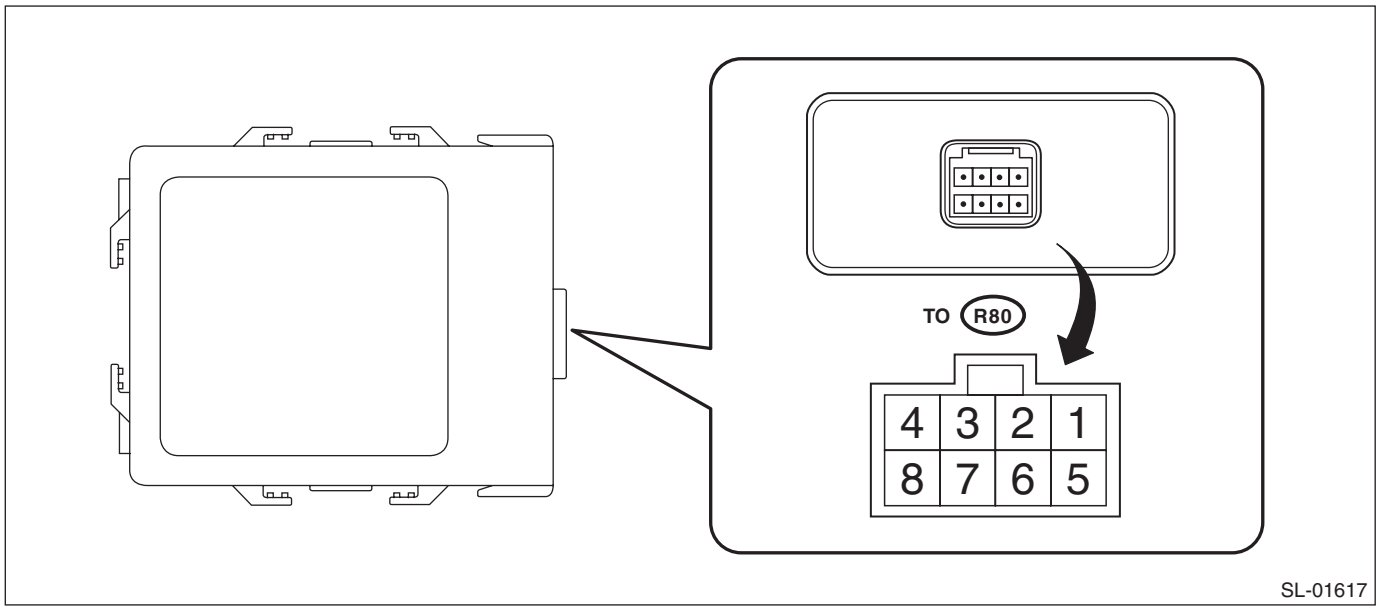
A: WIRING DIAGRAM

Refer to “Keyless Entry System” in the wiring diagram. <Ref. to WI(w/o HEV)-164, WIRING DIAGRAM, Keyless Entry System.>

B: ELECTRICAL SPECIFICATION

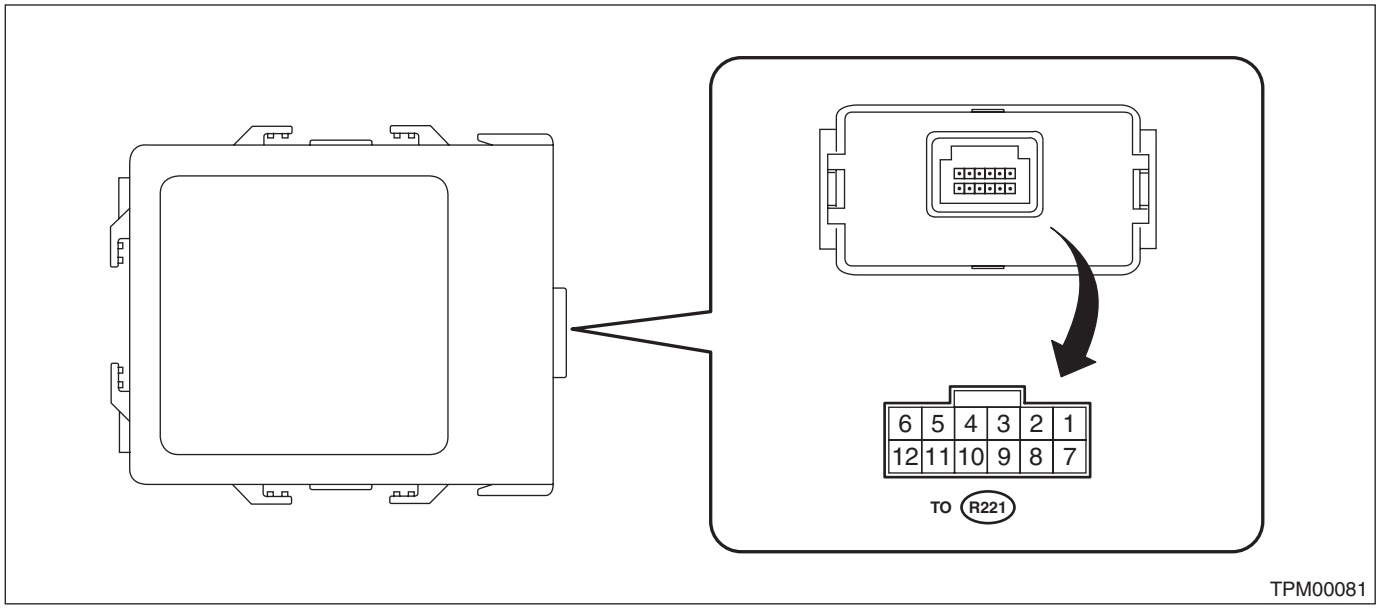
1. KEYLESS ENTRY CONTROL MODULE

- Model without tire pressure monitoring system



Terminal No.	Item	Measuring condition	Standard
3 (U-ART com.)	—	Cannot be measured	—
4 (+B) ←→ Chassis ground	Voltage	Always	10 — 14 V
7 (GND) ←→ Chassis ground	Resistance	Always	Less than 1 Ω

- Model with tire pressure monitoring system



Terminal No.	Item	Measuring condition	Standard
4 (IG) ←→ Chassis ground	Resistance	IG OFF → ON	0 V → 10 — 14 V
5 (GND) ←→ Chassis ground	Resistance	Always	Less than 1 Ω
6 (+B) ←→ Chassis ground	Voltage	Always	10 — 14 V
11 (U-ART com.)	—	Cannot be measured	—

2. BODY INTEGRATED UNIT

Refer to “Control Module I/O Signal” of “BODY CONTROL SYSTEM (DIAGNOSTICS)” section. <Ref. to BC(diag)-6, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

1. SYMPTOM CHART

Symptoms	Repair order	Reference
None of the functions of the keyless entry system operate.	1. Check the keyless transmitter battery.	<Ref. to SL-20, CHECK KEYLESS TRANSMITTER BATTERY AND FUNCTION, INSPECTION, Keyless Entry System.>
	2. Remove and visually inspect the following fuses. • No. 3 (in fuse & relay box) • No. 7 (in fuse & relay box) • No. 8 (in main fuse box)	If the fuse is blown out, replace the fuse with a new part. When there is no defective with the fuse, check the power supply and ground circuit. <Ref. to SL-13, CHECK POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, Door Lock Control System.>
	3. Check the keyless entry control module.	<Ref. to SL-21, CHECK KEYLESS ENTRY CONTROL MODULE, INSPECTION, Keyless Entry System.>
	4. Check the power supply and ground circuit for body integrated unit.	<Ref. to SL-21, CHECK BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, Keyless Entry System.>
	5. Check the key warning switch.	<Ref. to SL-23, CHECK KEY WARNING SWITCH, INSPECTION, Keyless Entry System.>
	6. Check the body integrated unit.	<Ref. to BC(diag)-2, Basic Diagnostic Procedure.>

Symptoms	Repair order	Reference
The keyless transmitter cannot be registered.	1. Check the keyless transmitter battery.	<Ref. to SL-20, CHECK KEYLESS TRANSMITTER BATTERY AND FUNCTION, INSPECTION, Keyless Entry System.>
	2. Check the key warning switch.	<Ref. to SL-23, CHECK KEY WARNING SWITCH, INSPECTION, Keyless Entry System.>
	3. Check the keyless entry control module.	<Ref. to SL-21, CHECK KEYLESS ENTRY CONTROL MODULE, INSPECTION, Keyless Entry System.>
	4. Check the body integrated unit.	<Ref. to BC(diag)-2, Basic Diagnostic Procedure.>
Door lock or unlock does not operate. NOTE: If the door lock control system does not operate when using the door lock switch, check the door lock control system. <Ref. to SL-12, INSPECTION, Door Lock Control System.>	1. Check the keyless transmitter battery.	<Ref. to SL-20, CHECK KEYLESS TRANSMITTER BATTERY AND FUNCTION, INSPECTION, Keyless Entry System.>
	2. Check the key warning switch.	<Ref. to SL-23, CHECK KEY WARNING SWITCH, INSPECTION, Keyless Entry System.>
	3. Check the door switch signal.	<Ref. to SL-22, CHECK DOOR SWITCH, INSPECTION, Keyless Entry System.>
	4. Check the keyless entry control module.	<Ref. to SL-21, CHECK KEYLESS ENTRY CONTROL MODULE, INSPECTION, Keyless Entry System.>
	5. Check the body integrated unit.	<Ref. to BC(diag)-2, Basic Diagnostic Procedure.>
The keyless buzzer and hazard light do not operate.	1. Check the keyless buzzer operation.	<Ref. to SL-25, CHECK KEYLESS BUZZER, INSPECTION, Keyless Entry System.>
	2. Check the hazard light operation.	<Ref. to SL-25, CHECK HAZARD LIGHT OPERATION, INSPECTION, Keyless Entry System.>
	3. Check the body integrated unit.	<Ref. to BC(diag)-2, Basic Diagnostic Procedure.>
Room light does not operate.	1. Check the room light operation.	<Ref. to SL-24, CHECK ROOM LIGHT OPERATION, INSPECTION, Keyless Entry System.>
	2. Check the body integrated unit.	<Ref. to BC(diag)-2, Basic Diagnostic Procedure.>
Ignition switch illumination does not operate.	1. Check the ignition switch illumination.	<Ref. to SL-26, CHECK IGNITION SWITCH ILLUMINATION, INSPECTION, Keyless Entry System.>
	2. Check the body integrated unit.	<Ref. to BC(diag)-2, Basic Diagnostic Procedure.>

2. CHECK KEYLESS TRANSMITTER BATTERY AND FUNCTION

CAUTION:
Be sure to reset keyless transmitter of other vehicles registered to the inspection target vehicle, and vehicles to which keyless transmitters were registered for inspection, to the condition before performing the inspection. (Re-register the keyless transmitters.)

	Step	Check	Yes	No
1	**CHECK KEYLESS TRANSMITTER BATTERY.** 1) Remove the battery from the keyless transmitter. <Ref. to SL-83, REMOVAL, Keyless Transmitter.> 2) Check the battery voltage. <Ref. to SL-84, INSPECTION, Keyless Transmitter.>	Is the voltage 2.5 V or more?	Go to step **2**.	Replace the keyless transmitter battery.
2	**CHECK KEYLESS TRANSMITTER.** Register the keyless transmitter which operates normally on other vehicles to the inspection target vehicle. <Ref. to SL-84, REGISTRATION OF KEYLESS TRANSMITTER WITH SUBARU SELECT MONITOR, REPLACEMENT, Keyless Transmitter.> 1) Close all the doors and rear gate (5 door model/Crosstrek model) or trunk lid (4 door model) of the inspection target vehicle. 2) Using the keyless transmitter, lock and unlock the doors and rear gate of vehicle. For the 4 door model, unlock the trunk lid.	Can lock, unlock of doors and unlock of the trunk lid be performed properly on the inspection target vehicle?	Go to step **3**.	Due to vehicle malfunction, continue the keyless entry system diagnosis.
3	**CHECK KEYLESS TRANSMITTER.** Register the keyless transmitter of the inspected vehicle to another vehicle whose keyless system operates normally. <Ref. to SL-84, REGISTRATION OF KEYLESS TRANSMITTER WITH SUBARU SELECT MONITOR, REPLACEMENT, Keyless Transmitter.>	Is the keyless transmitter registered correctly?	Go to step **4**.	Replace the keyless transmitter and perform registration.
4	**CHECK KEYLESS TRANSMITTER.** Check the registered keyless transmitter. 1) Close all the doors and rear gate (5 door model/Crosstrek model) or trunk lid (4 door model) of the vehicle on which the keyless system works normally. 2) Using the keyless transmitter, lock and unlock the doors and rear gate of vehicle. For the 4 door model, unlock the trunk lid.	Can lock, unlock of doors and unlock of the trunk lid be performed properly on the vehicle?	Keyless transmitter is OK.	Replace the keyless transmitter and perform registration.

3. CHECK KEYLESS ENTRY CONTROL MODULE

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED UNIT.** Read the DTC using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Application help".	Is DTC B1500 "KEYLESS UART COM. MALFUNCTION" displayed?	Go to step **2**.	Keyless entry control module is normal.
2	**CHECK POWER SUPPLY.** 1) Disconnect the keyless entry control module connector. 2) Measure the voltage between keyless entry control module connector and chassis ground. ***Connector & terminal*** ***Model without tire pressure monitoring system*** ***(R80) No. 4 (+) — Chassis ground (–):*** ***Model with tire pressure monitoring system*** ***(R221) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Check the harness for open or short circuits between the keyless entry control module and the fuse.
3	**CHECK GROUND CIRCUIT.** Measure the resistance between keyless entry control module connector and chassis ground. ***Connector & terminal*** ***Model without tire pressure monitoring system*** ***(R80) No. 7 — Chassis ground:*** ***Model with tire pressure monitoring system*** ***(R221) No. 5 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair or replace the harness.
4	**CHECK KEYLESS ENTRY CONTROL MODULE CIRCUIT.** 1) Disconnect the body integrated unit connector. 2) Check the harness between keyless entry control module and body integrated unit. ***Connector & terminal*** ***Model without tire pressure monitoring system*** ***(i171) No. 11 — (R80) No. 3:*** ***Model with tire pressure monitoring system*** ***(i171) No. 11 — (R221) No. 11:***	Is harness normal?	Replace the keyless entry control module.	Repair or replace the harness.

4. CHECK BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT

Refer to the "INSPECTION of POWER SUPPLY AND GROUND CIRCUIT" of "Door Lock Control System" for detailed procedures. <Ref. to SL-13, CHECK POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, Door Lock Control System.>

5. CHECK DOOR SWITCH

	Step	Check	Yes	No
1	**CHECK DATA MONITOR.** Display the following items using Subaru Select Monitor. • «Driver's door SW input» • «P-door SW input» • «Rear right door SW input» • «Rear left door SW input» • «R Gate SW input» NOTE: For detailed operation procedures, refer to "Application help".	Does the display switch between OFF ←→ ON when each door, rear gate, or trunk lid is opened/closed?	The door switches, trunk lid latch switch or rear gate latch switch are normal.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the connector of body integrated unit. 2) Disconnect the connector of the door switch, trunk lid latch switch or rear gate latch switch that the display does not change. 3) Check the harness between body integrated unit and defective switch. ***Connector & terminal*** ***Front door LH*** ***(i84) No. 14 — (R9) No. 1:*** ***Front door RH*** ***(i84) No. 13 — (R12) No. 1:*** ***Rear door LH*** ***(i84) No. 24 — (R22) No. 1:*** ***Rear door RH*** ***(i84) No. 25 — (R16) No. 1:*** ***Trunk lid*** ***(i84) No. 33 — (R186) No. 3:*** ***Rear gate*** ***(i84) No. 33 — (D46) No. 3:***	Is harness normal?	Go to step **3**.	Repair or replace the harness.
3	**CHECK HARNESS.** Measure the resistance between the faulty switch connector and chassis ground. ***Connector & terminal*** ***Front door LH*** ***(R9) No. 3 — Chassis ground:*** ***Front door RH*** ***(R12) No. 3 — Chassis ground:*** ***Rear door LH*** ***(R22) No. 3 — Chassis ground:*** ***Rear door RH*** ***(R16) No. 3 — Chassis ground:*** ***Trunk lid*** ***(R186) No. 2 — Chassis ground:*** ***Rear gate*** ***(D46) No. 4 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair or replace the harness.

	Step	Check	Yes	No
4	**CHECK DOOR SWITCH.** Measure the resistance between faulty switch terminals. ***Terminals*** ***Front LH door switch*** ***No. 1 — No. 3:*** ***Front RH door switch*** ***No. 1 — No. 3:*** ***Rear LH door switch*** ***No. 1 — No. 3:*** ***Rear RH door switch*** ***No. 1 — No. 3:*** ***Trunk lid latch switch*** ***No. 3 — No. 2:*** ***Rear gate latch switch*** ***No. 3 — No. 4:***	Is the resistance 1 MΩ or more when the door switch is pushed, or the trunk lid or rear gate is closed?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the faulty parts. • Door switches • Trunk lid latch and actuator assembly • Rear gate latch and actuator assembly

6. CHECK KEY WARNING SWITCH

	Step	Check	Yes	No
1	**CHECK DATA MONITOR.** Using the Subaru Select Monitor, display the data of «key-lock warning SW». NOTE: For detailed operation procedures, refer to “Application help”.	Is the normal input signal displayed when the key is inserted in/removed from the ignition switch?	The key warning switch is OK.	Go to step **2**.
2	**CHECK FUSE.** Remove and visually check fuse No. 14 (in the main fuse box).	Is the fuse blown out?	Replace the fuse with a new part.	Go to step **3**.
3	**CHECK KEY WARNING SWITCH CIRCUIT.** 1) Disconnect the connector of body integrated unit. 2) Insert the key into ignition switch. (LOCK position) 3) Measure the voltage between the body integrated unit connector and chassis ground. ***Connector & terminal*** ***(B280) No. 4 (+) — Chassis ground (–):***	Is the voltage 9 V or more?	Go to step **4**.	Go to step **5**.
4	**CHECK KEY WARNING SWITCH CIRCUIT.** 1) Remove the key from ignition switch. 2) Measure the voltage between the body integrated unit connector and chassis ground. ***Connector & terminal*** ***(B280) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1.5 V?	The key warning switch is OK.	Go to step **5**.
5	**CHECK KEY WARNING SWITCH.** 1) Disconnect the connector of key warning switch. 2) Insert the key into ignition switch. (LOCK position) 3) Measure the resistance between key warning switch terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **6**.	Replace the key warning switch.

	Step	Check	Yes	No
6	**CHECK KEY WARNING SWITCH.** 1) Remove the key from ignition switch. 2) Measure the resistance between key warning switch terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 1 MΩ or more?	Check the following: • Harness for open circuits and shorts between the key warning switch and fuse. • Harness for open or short between the body integrated unit and key warning switch.	Replace the key warning switch.

7. CHECK ROOM LIGHT OPERATION

	Step	Check	Yes	No
1	**CHECK ROOM LIGHT OPERATION.** Make sure the room light illuminates when the room light switch is ON, and goes off when the switch is OFF.	Does the room light illuminate or go off?	Go to step **2**.	Check the room light circuit. <Ref. to LI-81, INSPECTION, Room Light.>
2	**CHECK ROOM LIGHT OPERATION.** 1) Turn the room light switch to the "DOOR" position. 2) Open and close any door.	Does the room light illuminate ←→ go off (including off delay) when the door is opened and closed?	Go to step **3**.	Go to step **4**.
3	**CHECK KEYLESS ENTRY OPERATION.** Press the LOCK/UNLOCK button of the keyless transmitter.	Does it operate properly?	Room light is normal.	Check keyless entry system. <Ref. to SL-18, SYMPTOM CHART, INSPECTION, Keyless Entry System.>
4	**CHECK ROOM LIGHT.** Check the room light. <Ref. to LI-81, INSPECTION, Room Light.>	Is room light normal?	Go to step **5**.	Replace the bulb or room light assembly.
5	**CHECK HARNESS.** 1) Disconnect the connectors of body integrated unit and room light. 2) Check the harness between body integrated unit and room light. ***Connector & terminal*** ***(i84) No. 4 — (R52) No. 2:***	Is harness normal?	Go to step **6**.	Repair or replace the harness.
6	**CHECK HARNESS.** Measure the voltage between the room light connector and chassis ground. ***Connector & terminal*** ***(R52) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the harness.

8. CHECK HAZARD LIGHT OPERATION

	Step	Check	Yes	No
1	**CHECK HAZARD LIGHT OPERATION.** Make sure the hazard light blinks when hazard switch is turned to ON.	Does the hazard light blink?	Go to step **2**.	Check the hazard light circuit.
2	**CHECK BODY INTEGRATED UNIT SETTING.** Display the data of «Abnormal warning lamp flashing setting» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Application help".	Is the setting ON?	Go to step **3**.	Turn the setting to ON.
3	**CHECK DATA MONITOR.** Display the data of «Hazard Output» using Subaru Select Monitor.	Is output signal present when operating the transmitter LOCK/UNLOCK button?	Go to step **4**.	Go to step **5**.
4	**CHECK KEYLESS ENTRY OPERATION.** Press the LOCK/UNLOCK button of the keyless transmitter.	Does it operate properly?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Check keyless entry system. <Ref. to SL-18, SYMPTOM CHART, INSPECTION, Keyless Entry System.>
5	**CHECK HAZARD LIGHT CIRCUIT.** 1) Disconnect the connectors of the body integrated unit and turn signal & hazard unit. 2) Check the harness between body integrated unit and turn signal & hazard unit. ***Connector & terminal*** ***(i171) No. 18 — (B32) No. 8:***	Is harness normal?	Check body integrated unit. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>	Repair or replace the harness.

9. CHECK KEYLESS BUZZER

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED UNIT SETTING.** Display the data of «Answer-back buzzer setup» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Application help".	Is the setting ON?	Go to step **2**.	Turn the setting to ON.
2	**CHECK BODY INTEGRATED UNIT.** Select and perform the «Keyless Buzzer Output» using Subaru Select Monitor.	Does the keyless buzzer sound?	Check the keyless control module.	Go to step **3**.
3	**CHECK KEYLESS BUZZER CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors of the body integrated unit and keyless buzzer. 3) Check the harness between body integrated unit and keyless buzzer. ***Connector & terminal*** ***(B280) No. 20 — (B164) No. 1:***	Is harness normal?	Go to step **4**.	Repair or replace the harness.
4	**CHECK HARNESS.** Measure the resistance between keyless buzzer connector and chassis ground. ***Connector & terminal*** ***(B164) No. 1 — Chassis ground:***	Is the resistance value 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK KEYLESS BUZZER CIRCUIT.** Measure the resistance between the keyless buzzer connector and chassis ground. ***Connector & terminal*** ***(B164) No. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the harness.

	Step	Check	Yes	No
6	**CHECK BODY INTEGRATED UNIT.** 1) Connect the connector of body integrated unit. 2) Select and perform the «Keyless Buzzer Output» using Subaru Select Monitor. 3) Measure the voltage between body integrated unit connector and chassis ground using an oscilloscope. ***Connector & terminal*** ***(B280) No. 20 (+) — Chassis ground (–):***	Is the frequency 2 kHz or the voltage 9 V or more?	Replace the keyless buzzer.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

10.CHECK DOOR LOCK SWITCH

For operation procedures, refer to the “INSPECTION OF DOOR LOCK SWITCH” of the “Door Lock Control System”. <Ref. to SL-13, CHECK DOOR LOCK SWITCH, INSPECTION, Door Lock Control System.>

11.CHECK IGNITION SWITCH ILLUMINATION

	Step	Check	Yes	No
1	**CHECK IGNITION CIRCUIT.** Check the ignition circuit. <Ref. to SL-33, CHECK IGNITION SWITCH CIRCUIT, INSPECTION, Security System.>	Is the switch circuit normal?	Go to step **2**.	Repair or replace.
2	**CHECK DOOR SWITCH CIRCUIT.** Inspect door switch circuit. <Ref. to SL-22, CHECK DOOR SWITCH, INSPECTION, Keyless Entry System.>	Is the switch circuit normal?	Go to step **3**.	Repair or replace.
3	**CHECK FUSE.** Remove and visually check fuse No. 14 (in the main fuse box).	Is the fuse blown out?	Replace the fuse with a new part.	Go to step **4**.
4	**CHECK HARNESS.** 1) Disconnect the ignition switch illumination connector. NOTE: The ignition switch illumination is integrated into the immobilizer antenna. 2) Measure the voltage between ignition switch illumination connector and chassis ground. ***Connector & terminal*** ***(B415) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Check the harness for open or short circuits between the ignition switch illumination and fuse.
5	**CHECK IGNITION SWITCH ILLUMINATION CIRCUIT.** 1) Disconnect the connector of body integrated unit. 2) Check the harness between body integrated unit and ignition switch illumination. ***Connector & terminal*** ***(B280) No. 25 — (B415) No. 6:***	Is harness normal?	Go to step **6**.	Check the harness for open circuits and shorts between the body integrated unit and ignition switch illumination.
6	**CHECK IGNITION SWITCH ILLUMINATION BULB.** Apply battery voltage between terminals of the bulb. ***Terminals*** ***No. 2 (+) — No. 6 (–):***	Does the bulb illuminate?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the immobilizer antenna. <Ref. to SL-88, REMOVAL, Immobilizer Antenna.>

5. Keyless Access System

A: WIRING DIAGRAM

For wiring diagrams related to the keyless access system, refer to the following items. (HEV model)

- Gasoline engine model
  - Keyless access system: <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.>
  - Push button start system: <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.>
- HEV model
  - Keyless access system: <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>
  - Push button start system: <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>

B: ELECTRICAL SPECIFICATION

Refer to “Control Module I/O Signal” of “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-15, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

1. KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM

Refer to “Basic Diagnostic Procedure” of “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-2, Basic Diagnostic Procedure.>

6. Push Button Start System

A: WIRING DIAGRAM

For wiring diagrams related to the push button start system (ignition change), refer to the following items. (HEV model)

- Gasoline engine model
  - Keyless access system: <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.>
  - Push button start system: <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.>
- HEV model
  - Keyless access system: <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>
  - Push button start system: <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>

B: ELECTRICAL SPECIFICATION

Refer to “Control Module I/O Signal” of “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-15, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

1. POWER SUPPLY SWITCH FUNCTION INSPECTION

1) Check push button ignition switch function

(1) Check the change control through push button ignition switch, brake pedal operation, and shift position.

Shift lever position	Brake pedal operation	Push button ignition switch operation
P	Released	Repeat Ignition switch OFF → ACC ON → Ignition switch ON → Ignition switch OFF
P	Released	Engine running or hybrid system operating → Ignition switch OFF
P	Depressed	Ignition switch OFF → Engine or hybrid system started
P	Depressed	ACC ON → Engine or hybrid system started
P	Depressed	Ignition switch ON → Engine or hybrid system started
P	Depressed	Engine running or hybrid system operating → Ignition switch OFF
N	Released	Repeat Ignition switch OFF → ACC ON → Ignition switch ON → ACC ON
N	Released	Engine running or hybrid system operating → ACC ON
N	Depressed	Ignition switch OFF → Engine or hybrid system started
N	Depressed	ACC ON → Engine or hybrid system started
N	Depressed	Ignition switch ON → Engine or hybrid system started
N	Depressed	Engine running or hybrid system operating → ACC ON
Other than P or N	Released	Repeat Ignition switch OFF → ACC ON → Ignition switch ON → ACC ON
Other than P or N	Released	Engine running or hybrid system operating → ACC ON
Other than P or N	Depressed	Ignition switch OFF → Ignition switch ON
Other than P or N	Depressed	ACC ON → Ignition switch ON
Other than P or N	Depressed	Engine running or hybrid system operating → ACC ON

(2) Check the changeover functions other than push button ignition switch operation.
With ACC ON or the ignition switch ON, and the shift lever in “P” position, check that ACC is ON or Ignition switch is ON → Ignition switch is OFF when the vehicle is left for 1 hour or more.

(3) If the inspection result indicates an improper operation, check the push button start system. <Ref. to KPS(diag)-108, POWER SUPPLY SWITCHING SYSTEM, INSPECTION, General Diagnostic Table.>

2) Check power status display
(1) Check the power indicator display of the push button ignition switch.

NOTE:
*1: Key collation is normal, and the stop light switch (AT) is ON.
Indicator display

Push button ignition switch status	Indicator lighting status
Ignition OFF (except for condition *1)	Light OFF
ACC ON (except for condition *1)	Orange light
Ignition ON (except for condition *1)	Orange light
Engine or hybrid system in start standby mode (*1)	Green light
After engine or hybrid system started	Light OFF

(2) If the inspection result indicates an improper operation, check the push button start system. <Ref. to KPS(diag)-108, POWER SUPPLY SWITCHING SYSTEM, INSPECTION, General Diagnostic Table.>

NOTE:
The indicator blinks if any of the following malfunctions are detected.

Detected malfunction	Indicator lighting status
Steering lock stuck	Green blinking
Steering lock CM internal malfunction	Orange blinking
Keyless access CM internal malfunction	Orange blinking
Vehicle speed signal malfunction	Orange blinking

7. Security System

A: WIRING DIAGRAM

Refer to “Security System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-207, WIRING DIAGRAM, Security System.>
- HEV model: <Ref. to WI(HEV)-184, WIRING DIAGRAM, Security System.>

B: ELECTRICAL SPECIFICATION

Refer to “Control Module I/O Signal” of “BODY CONTROL SYSTEM (DIAGNOSTICS)” section. <Ref. to BC(diag)-6, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

1. BASIC DIAGNOSTIC PROCEDURE

	Step	Check	Yes	No
1	**INITIAL CHECK.** Check the keyless entry system or keyless access system operation.	Does the keyless entry system or keyless access system operate normally?	Go to step **2**.	Check the keyless entry system or keyless access system. • Keyless entry system: <Ref. to SL-18, INSPECTION, Keyless Entry System.> • Keyless access system: <Ref. to KPS(diag)-5, KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM, CAUTION, General Description.>
2	**CHECK SECURITY ON/OFF SETTING.** 1) Remove the key from ignition switch or turn the power OFF, and then close all doors. 2) Check the status of security indicator light. 3) Press the LOCK button of the keyless transmitter or access key. 4) Check the security indicator light blinking patterns.	Is the security indicator light blinking patterns as follows? • Before pressing the LOCK button: Blinks once within 3 seconds • After pressing the LOCK button: When monitoring lag is set to 0 second, flashes twice within 0.5 seconds in 2 second intervals / When monitoring lag is set to 30 seconds, flashes once within 0.4 seconds in 30 seconds.	Go to step **4**.	Go to step **3**.
3	**CHANGE SETTING OF SECURITY SYSTEM.** Change the setting of security system to ON using Subaru Select Monitor. <Ref. to SL-32, SECURITY SYSTEM ON/OFF SETTING, INSPECTION, Security System.>	Is setting change completed correctly?	Go to step **4**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
4	**CHECK SECURITY SYSTEM OPERATION.** 1) Remove the key from ignition switch or turn the power OFF, and then close all doors. 2) Press the LOCK button on the keyless transmitter or access key, then wait for 30 seconds. 3) Check the security indicator light blinking patterns.	Does the security indicator light blink twice within 0.5 seconds in 2 second intervals?	Go to step **5**.	Check the security indicator light. <Ref. to SL-33, CHECK SECURITY INDICATOR LIGHT CIRCUIT, INSPECTION, Security System.>

	Step	Check	Yes	No
5	**CHECK SECURITY ALARM OPERATION.** 1) Operate the driver's door lock switch to the UNLOCK side. 2) Open any door, trunk lid or rear gate.	Does the security alarm operate when opening any door, trunk lid, or rear gate?	Go to step **6**.	Check the following parts. <Ref. to SL-22, CHECK DOOR SWITCH, INSPECTION, Keyless Entry System.> • Door switches • Trunk lid latch switch • Rear gate latch switch
6	**CHECK SECURITY ALARM OPERATION.** Check the security alarm operation status.	During the operation, does the horn keep sounding and the hazard light blink?	Go to step **7**.	Check the following parts. <Ref. to SL-22, CHECK DOOR SWITCH, INSPECTION, Keyless Entry System.> • Horn: <Ref. to SL-33, CHECK HORN, INSPECTION, Security System.> • Hazard light: <Ref. to SL-33, CHECK HAZARD LIGHT OPERATION, INSPECTION, Security System.>
7	**CHECK SECURITY ALARM CANCEL OPERATION.** Press any button of the transmitter or access key while the security alarm is operating.	Do the horn sound and the blinking of the hazard light stop?	Go to step **8**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
8	**CHECK IMPACT SENSOR (DEALER OPTION).** Check the sensibility of impact sensor. <Ref. to SL-75, CHECK IMPACT SENSOR, ADJUSTMENT, Impact Sensor.>	Is the sensibility set properly?	Go to step **9**.	Adjust the sensitivity. <Ref. to SL-75, IMPACT SENSITIVITY ADJUSTMENT, ADJUSTMENT, Impact Sensor.>
9	**CHECK SECURITY SYSTEM CONDITION MEMORY.** 1) Remove the key from ignition switch or turn the power OFF, and then close all doors. 2) Open the front hood. 3) Press the LOCK button on the keyless transmitter or access key, then wait for 30 seconds. 4) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.> NOTE: For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor. 5) Connect the ground cable to battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 6) Check the status of security indicator light.	Does the security indicator light blinks twice within 0.5 seconds at 2 second intervals?	Go to step **10**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

Step		Check	Yes	No
10	**CHECK SECURITY SYSTEM MANUAL ON/OFF SETTING.** 1) Press the UNLOCK button of the keyless transmitter or access key. 2) Change the setting of security system. <Ref. to SL-32, SECURITY SYSTEM ON/OFF SETTING, INSPECTION, Security System.>	Is setting change completed correctly?	Restore the security system settings to those before the diagnosis and finish the diagnosis.	Check the following parts. • Ignition switch circuit: <Ref. to SL-66, INSPECTION, Ignition Key Lock.> • Door lock switch circuit: <Ref. to SL-13, CHECK DOOR LOCK SWITCH, INSPECTION, Door Lock Control System.>

NOTE:
If the horn sounds when the security is turned on (monitor condition) using the keyless transmitter or access key, check the function setting of the body integrated unit. As a cause, it is possible that the impact sensor present (ON) / not present (OFF) setting is set to ON in the customization function though there is no impact sensor. <Ref. to BC(diag)-17, User Customizing.>

2. CHECK SECURITY SYSTEM CONDITION MEMORY

1) Pull out the key from the ignition switch, or turn the ignition switch to OFF.
2) Close all the doors, trunk lid or rear gate.
3) Open the front hood.
4) Press the LOCK button of the keyless transmitter or access key.

NOTE:
Wait until the security indicator light blinks twice within 0.5 seconds at 2 second intervals.
If the 30 second monitoring lag has been set, wait for 30 seconds.
5) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
6) Connect the ground cable to battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
7) Check that the security indicator light blinks twice within 0.5 seconds at 2 second intervals. When it does not blink, replace the body integrated unit.

3. SECURITY SYSTEM ON/OFF SETTING

NOTE:
It can be set by «Security Alarm Setup» in unit customizing using Subaru Select Monitor.
For detailed operation procedures, refer to “Application help”.
1) Close all doors, trunk lid or rear gate, and sit down on the driver seat. Press the UNLOCK button of the keyless transmitter or access key.
2) Turn the ignition switch to ON.
3) Press the central door unlock switch and open the driver’s door simultaneously. (Keep the central door unlock switch pressed down.)
4) When the condition in step 3) continues for 10 seconds, the system switches to a mode reverse to the current mode.

Setting	Horn activation	Meter display
ON → OFF	Twice	[AL_OF]
OFF → ON	Once	[AL_ON]

4. CHECK DOOR SWITCH

For operation procedure, refer to “CHECK DOOR SWITCH” of “Keyless Entry System”. <Ref. to SL-22, CHECK DOOR SWITCH, INSPECTION, Keyless Entry System.>

5. CHECK SECURITY INDICATOR LIGHT CIRCUIT

For operation procedures, refer to “CHECK SECURITY INDICATOR LIGHT CIRCUIT” of “IMMOBILIZER (DIAGNOSTICS)” section. <Ref. to IM(diag)-11, CHECK SECURITY INDICATOR LIGHT CIRCUIT, INSPECTION, Diagnostics Chart for Security Indicator Light.>

6. CHECK HORN

	Step	Check	Yes	No
1	**CHECK HORN OPERATION.** Check the horn sounds when the horn switch is pushed.	Does the horn sound?	Go to step **2**.	Check the horn circuit.
2	**CHECK BODY INTEGRATED UNIT.** Select and perform the «Horn Output» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Application help”.	Does the horn sound?	Horn circuit is OK.	Go to step **3**.
3	**CHECK HORN RELAY CIRCUIT.** 1) Turn the ignition switch to OFF or turn the power to OFF. 2) Disconnect the connector of body integrated unit. 3) Remove the horn relay. 4) Check the harness between body integrated unit and horn relay. ***Connector & terminal*** ***(B280) No. 24 — Horn relay No. 4:***	Is harness normal?	Check body integrated unit. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>	Repair or replace the harness.

7. CHECK HAZARD LIGHT OPERATION

For operation procedure, refer to “CHECK HAZARD LIGHT OPERATION” of “Keyless Entry System”. <Ref. to SL-25, CHECK HAZARD LIGHT OPERATION, INSPECTION, Keyless Entry System.>

8. CHECK IGNITION SWITCH CIRCUIT

	Step	Check	Yes	No
1	**CHECK DATA MONITOR.** Display the data of «BATT voltage» and «IG power supply voltage» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Application help”.	Does the «IG power supply voltage» indicate 0 V when the ignition is OFF, and fall within a range of ±1 V from the «BATT voltage» when the ignition is ON?	The ignition switch input circuit is OK.	Go to step **2**.
2	**CHECK IGNITION SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF or turn the power to OFF. 2) Disconnect the connector of body integrated unit. 3) Turn the ignition switch to ON. 4) Measure the voltage between the body integrated unit connector and chassis ground. ***Connector & terminal*** ***(B281) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Check body integrated unit. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>	Check the harness for open or short circuit between body integrated unit and fuse.

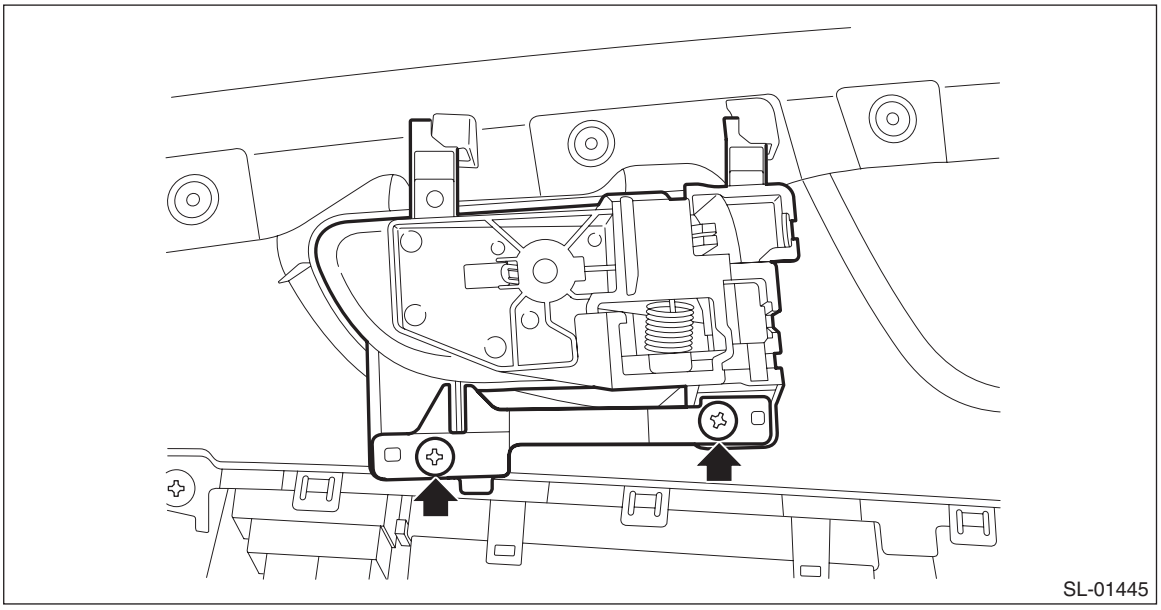
8. Front Inner Remote

A: REMOVAL

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
3) Remove the screw, and remove the remote assembly - door.

CAUTION:
The remote assembly - door is tightened with the plate. Be careful not to drop or damage the part.



B: INSTALLATION

1) Before installation, check the following items.
- Cable is free from deformation such as fray.
- Grease is applied sufficiently to cable joints.

If grease is insufficient, add it as necessary before assembling the cable.
- If the lever is faulty, replace the front inner remote handle.

2) Install each part in the reverse order of removal.

CAUTION:
Securely install the plate.

C: INSPECTION

Check if the remote handle operates normally.
- If the lever is faulty, replace the remote handle.
- If the cable is deformed, replace the latch & actuator assembly - front.

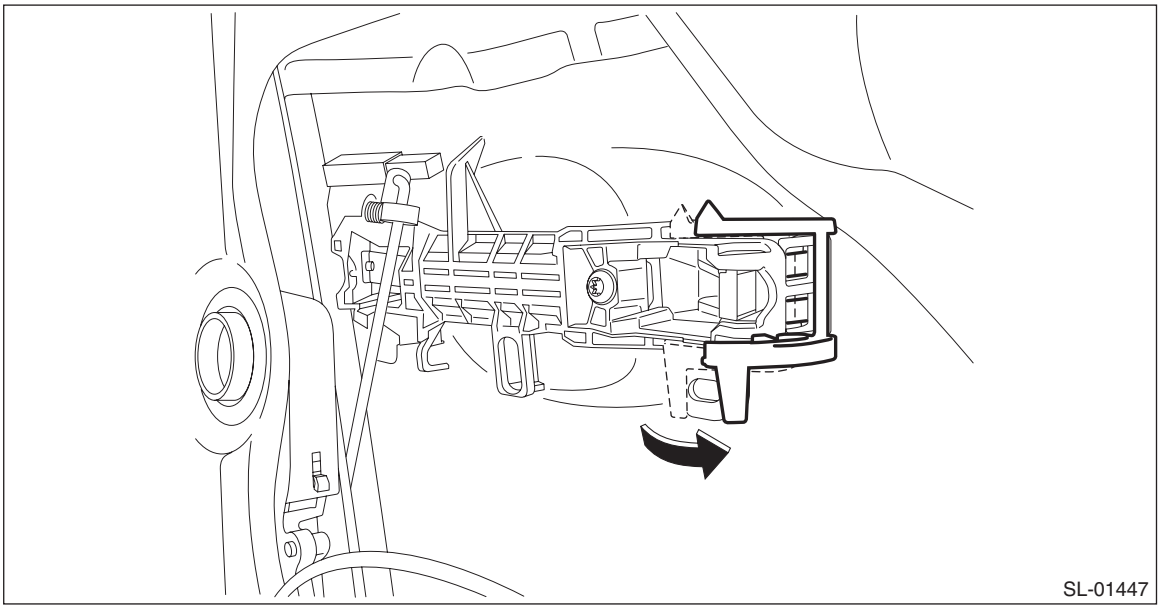
9. Front Outer Handle

A: REMOVAL

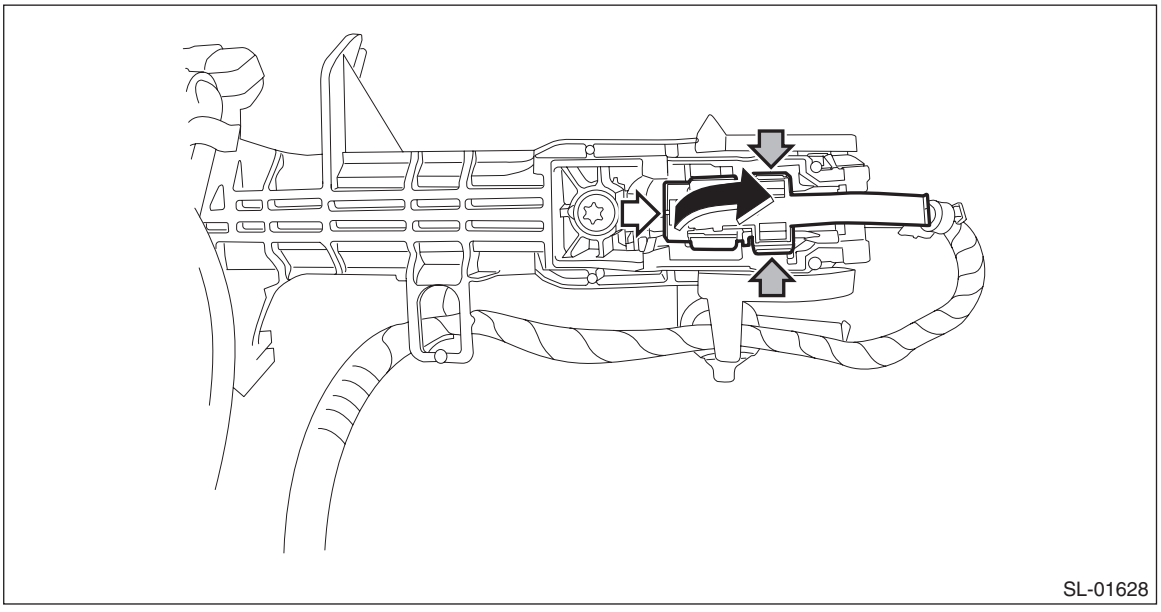
1) Raise the glass assembly - front door to the top position.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
4) Remove the sealing cover - front door. <Ref. to EB-26, REMOVAL, Front Sealing Cover.>
5) Remove the holder of the frame assembly - front door outer.


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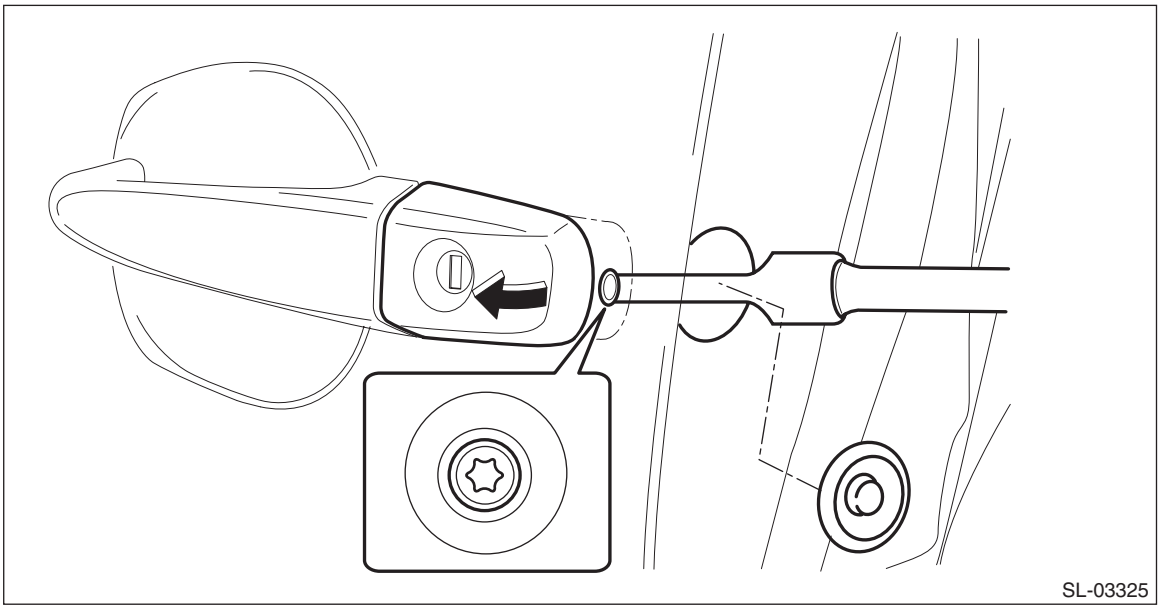
NOTE:
For model with keyless access with push button start, disconnect the harness clip and exterior antenna (touch sensor) connector.


SL-01628

6) Remove the cover - handle front outer.

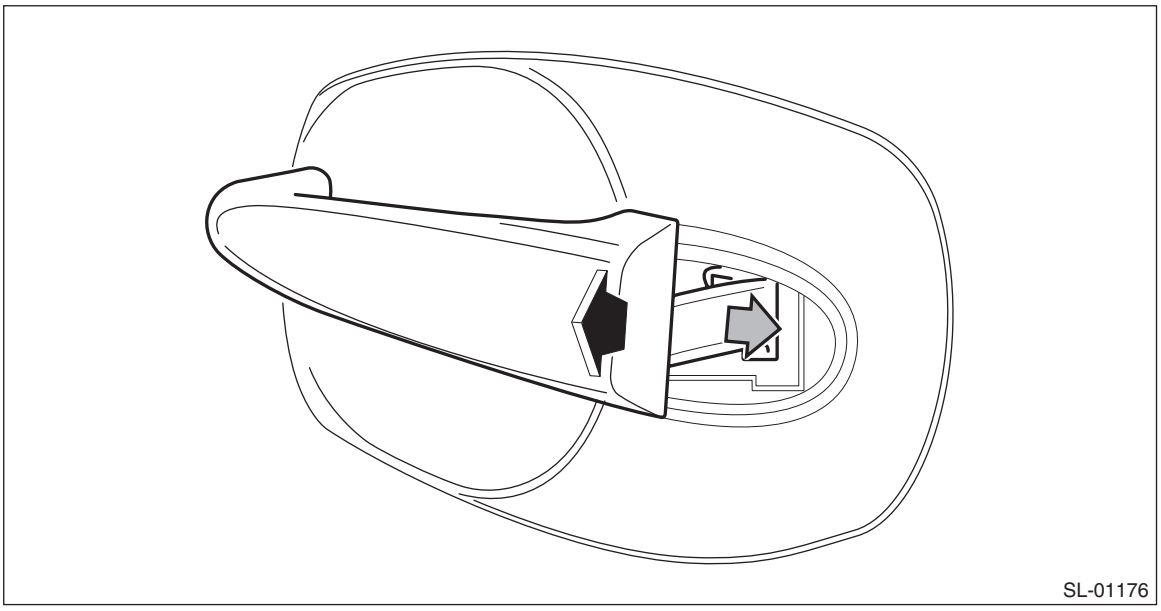
Preparation tool:
TORX® T30

(1) Remove the plug at the rear end of the panel assembly - front door.
(2) Loosen the TORX® bolt and remove the cover - handle front outer.


SL-03325

7) Remove the handle - door outer by moving it rearward.

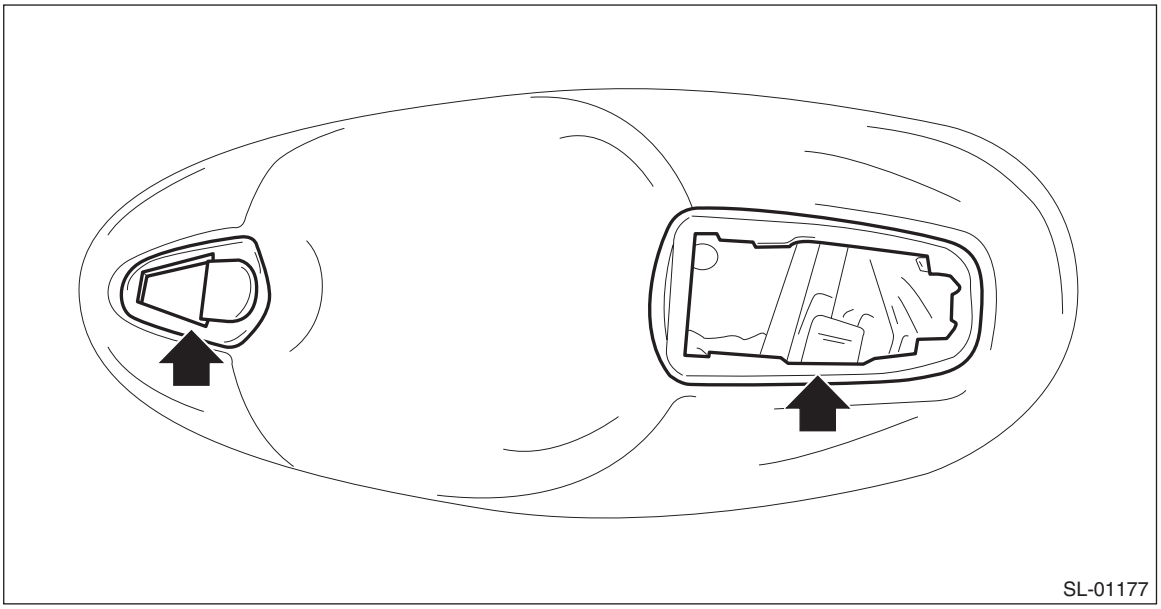
CAUTION:
Do not apply excessive force to remove the handle - door outer from the panel assembly - front door. The panel assembly - front door may be deformed.


SL-01176

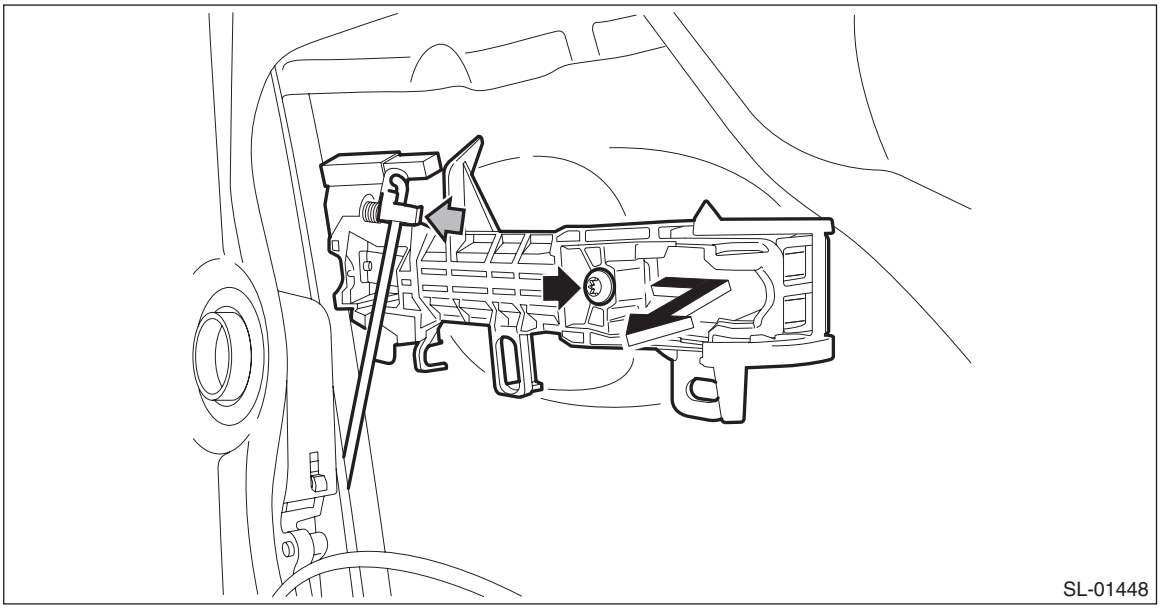
8) Remove the frame assembly - front door outer.

Preparation tool:
TORX® T30

(1) Remove the spacer - door handle outer.



(2) Remove the rod from the rod clamp of the frame assembly - front door outer.
(3) Loosen the TORX® bolt and remove the frame assembly - front door outer from inside the panel assembly - front door.



B: INSTALLATION

1) Before installation, check the following items.
- Rod is free from deformation.
- Grease is applied sufficiently to rod joints.

If grease is insufficient, add it as necessary before assembling the rod.
- If the lever is faulty, replace the front outer handle.
- If the rod is deformed, replace the latch & actuator assembly - front.

2) Install each part in the reverse order of removal.

CAUTION:
When installing the cover - handle front outer on driver's side, make sure that the key cylinder shaft is correctly inserted into the latch & actuator assembly - front.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SL-3, DOOR LOCK ASSEMBLY, COMPONENT, General Description.>

C: INSPECTION

Check if the outer handle operates normally.
- If the lever is faulty, replace the handle - door outer.
- If the rod is deformed, replace the latch & actuator assembly - front.

For models with keyless access system with push button start, check that the keyless access function operates normally.
If the system does not operate normally, refer to "General Diagnostic Table" of the "KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)" section. <Ref. to KPS(diag)-108, KEYLESS ACCESS SYSTEM, INSPECTION, General Diagnostic Table.>

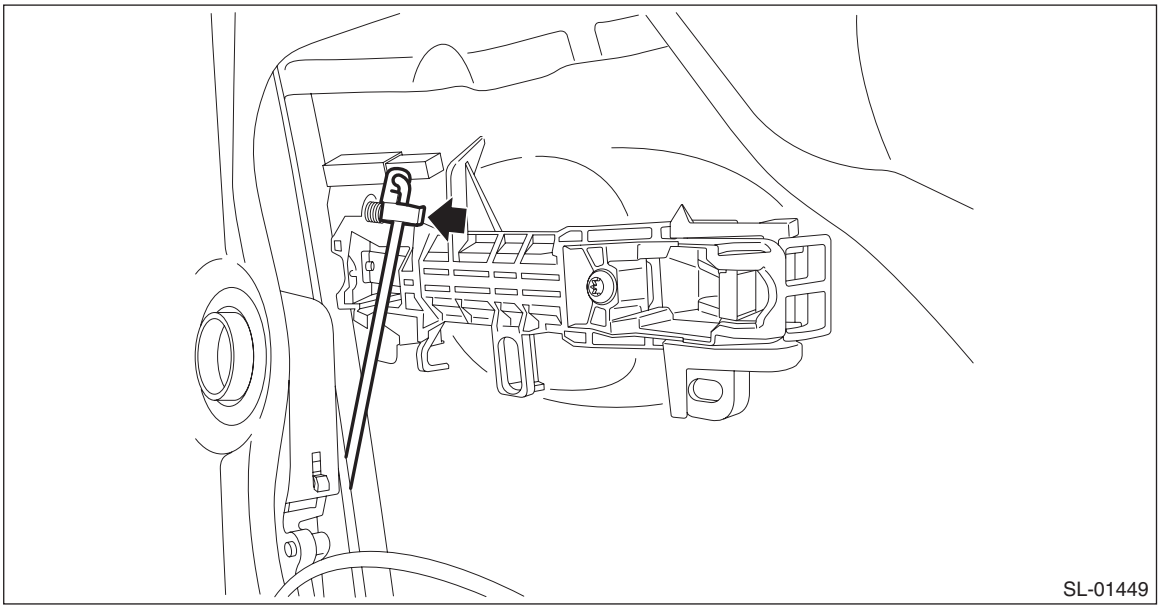
10.Front Door Latch and Door Lock Actuator Assembly

A: REMOVAL

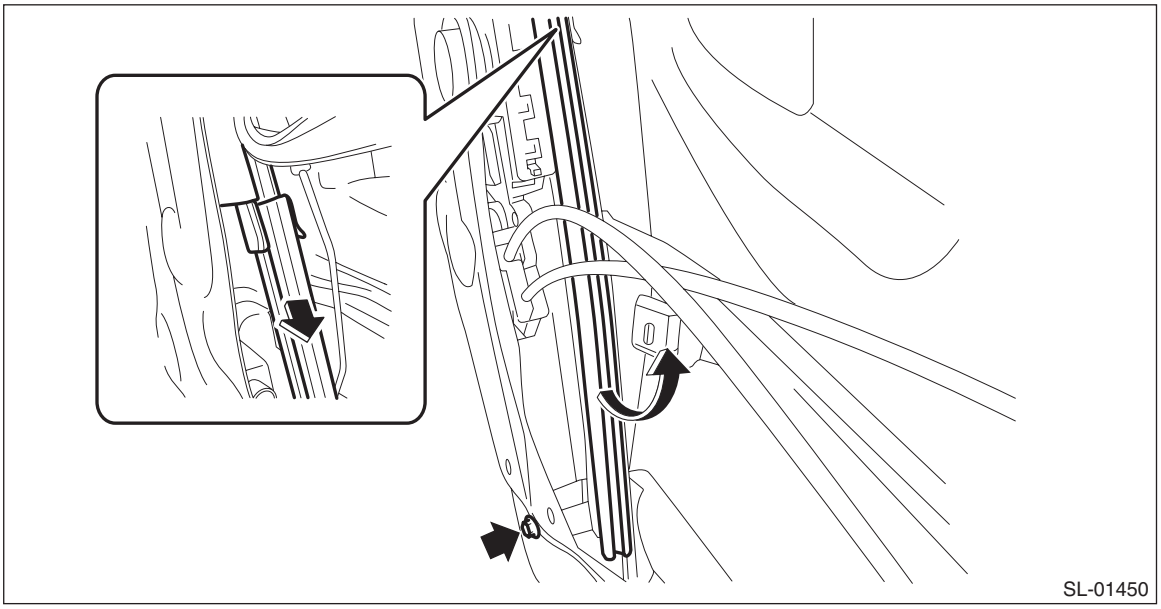
1) Raise the glass assembly - front door to the top position.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
4) Remove the sealing cover - front door. <Ref. to EB-26, REMOVAL, Front Sealing Cover.>
5) Remove the rod from the rod clamp of the frame assembly - front door outer.

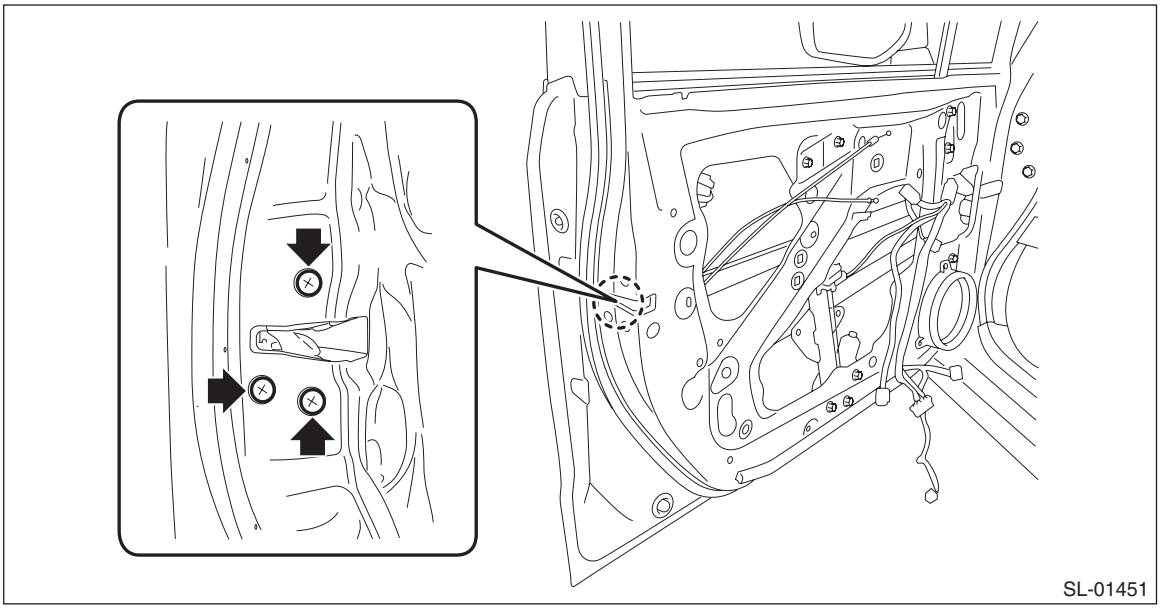

SL-01449

6) Remove the cover - handle front outer. <Ref. to SL-70, FRONT DOOR, REPLACEMENT, Key Lock Cylinders.>
7) Remove the sash COMPL - lower.
   (1) Remove the lower side of the running channel - front door.
   (2) Remove the bolts, and remove the sash COMPL - lower.


SL-01450

8) Remove the screws to remove the latch & actuator assembly - front.

CAUTION:
Do not re-use the screws. Always replace with a new part.



B: INSTALLATION

1) Before installation, check the following items.
- Rod is free from deformation.
- Grease is applied sufficiently to rod joints.

If grease is insufficient, add it as necessary before assembling the rod.
- If the lever is faulty, replace the front outer handle.
- If the rod is deformed, replace the latch & actuator assembly - front.

2) Install each part in the reverse order of removal.

CAUTION:
Do not reuse the screws of the latch and actuator assembly - front. Always replace with a new part.

Tightening torque:
Door lock assembly: <Ref. to SL-3, DOOR LOCK ASSEMBLY, COMPONENT, General Description.>
Sash COMPL - lower: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

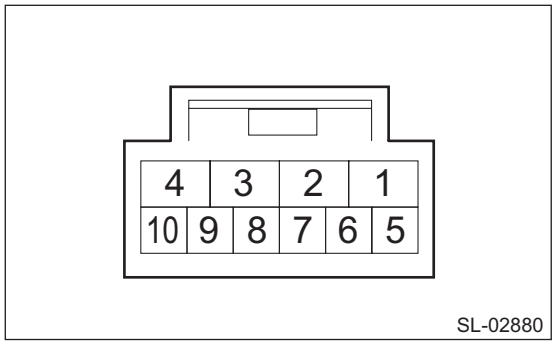
1. LATCH

Check if the latch operates normally.
If the cable or rod is faulty, replace the latch & actuator assembly - front.

2. LOCK ACTUATOR

Preparation tool:
Circuit tester

1) Check door lock operation
Check the door lock operation when battery voltage is applied between the terminals of actuator.



Terminal No.	Inspection conditions	Standard
4 (+) — 1 (–)	Apply battery voltage.	LOCK
1 (+) — 4 (–)		UNLOCK

2) Check position switch
Check the resistance between actuator terminals.

Preparation tool:
Circuit tester

Terminal No.	Inspection conditions	Standard
8 — 7	LOCK	1 MΩ or more
	UNLOCK	Less than 1 Ω

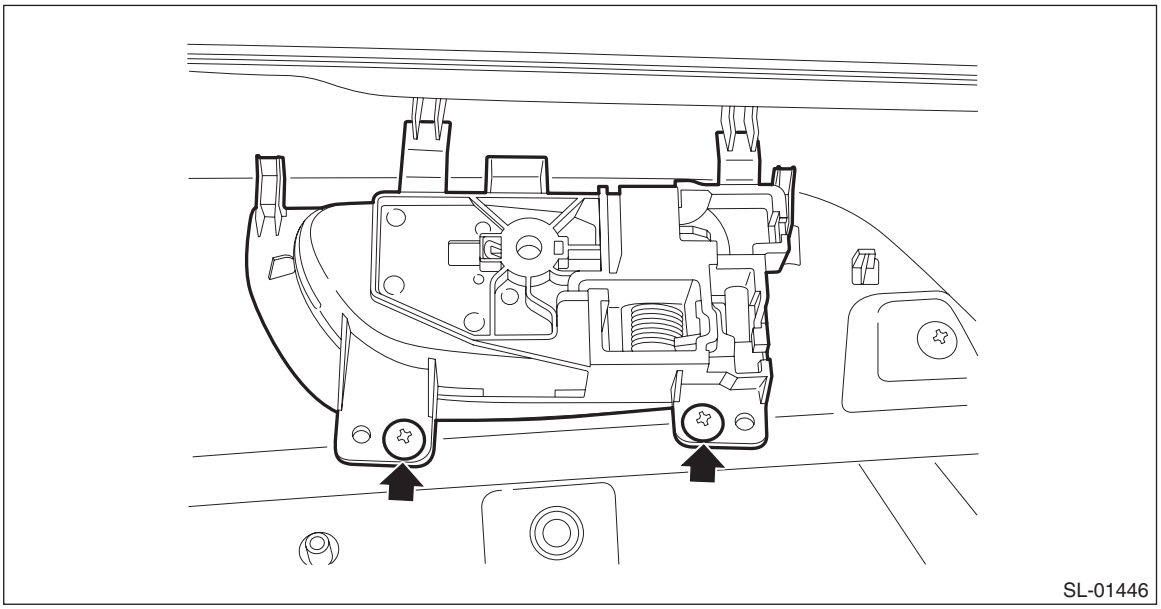
3) Replace the latch & actuator assembly - front if it is found defective.

11.Rear Inner Remote

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
3) Remove the screw, and remove the remote assembly - door.



B: INSTALLATION

1) Before installation, check the following items.
- Cable is free from deformation such as fray.
- Grease is applied sufficiently to cable joints.

If grease is insufficient, add it as necessary before assembling the cable.
- If the lever is faulty, replace the rear inner remote handle.

2) Install each part in the reverse order of removal.

C: INSPECTION

Check if the remote handle operates normally.
- If the lever is faulty, replace the remote handle.
- If the cable is deformed, replace the latch & actuator assembly - rear.

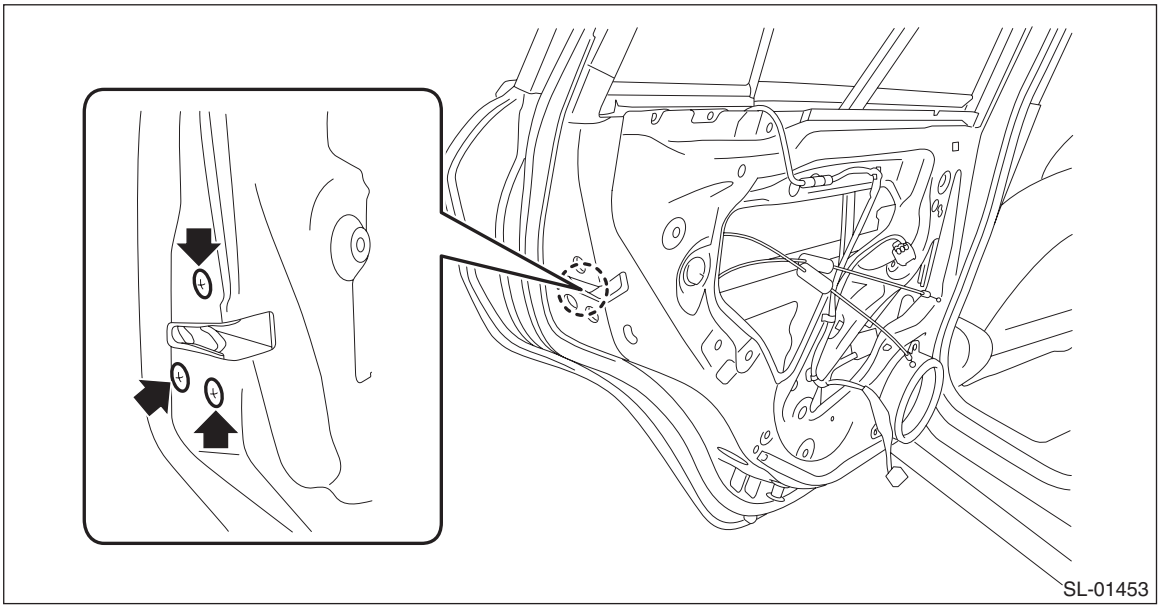
12.Rear Outer Handle

A: REMOVAL

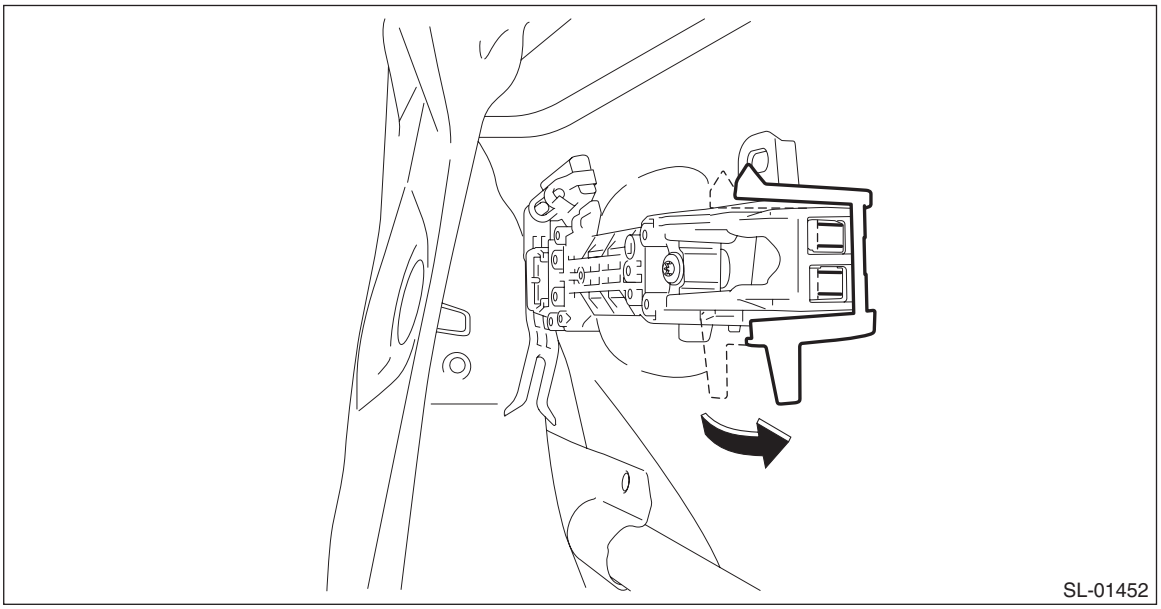
1) Raise the glass assembly - rear door to the top position.
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
4) Remove the sealing cover - rear door. <Ref. to EB-34, REMOVAL, Rear Sealing Cover.>
5) Remove the screws and move downward the latch & actuator assembly - rear.

CAUTION:
Do not re-use the screws. Always replace with a new part.



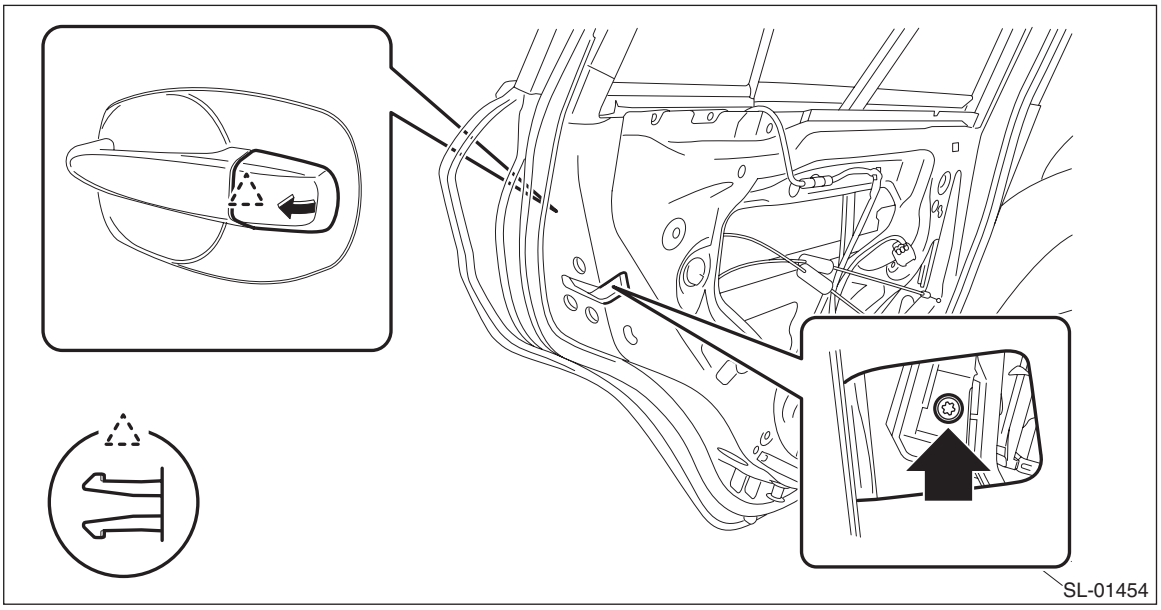
6) Remove the holder of the frame assembly - rear door outer.



7) Remove the cover - handle rear outer.

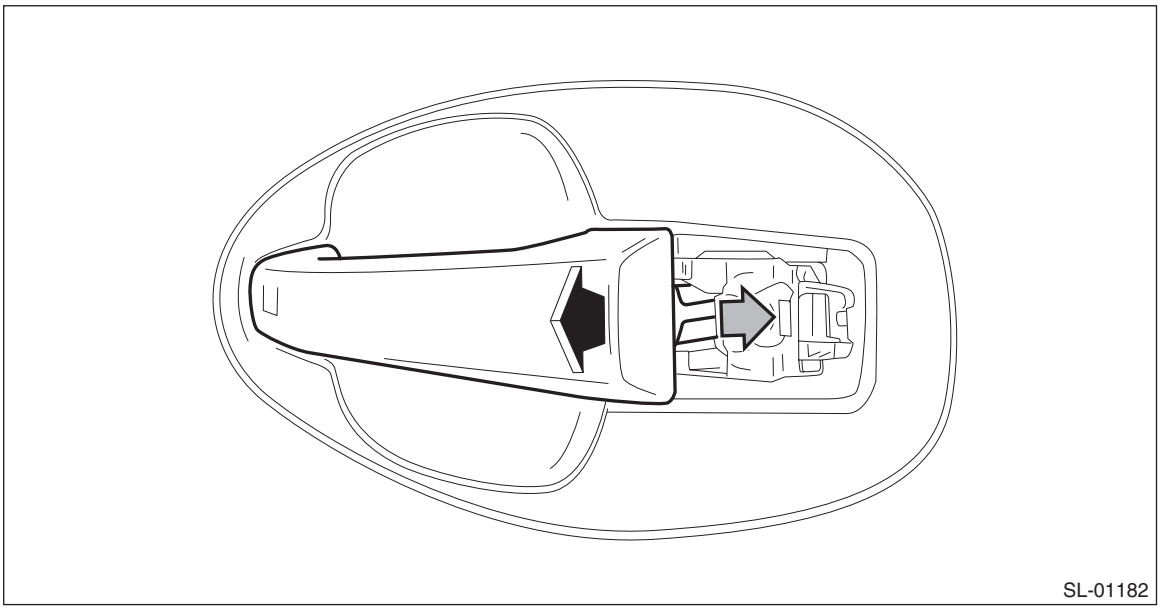
Preparation tool:
TORX® T30

(1) Loosen the TORX® bolt.
(2) Release the claws, and then remove the cover - handle rear outer.



8) Remove the handle - door outer by moving it rearward.

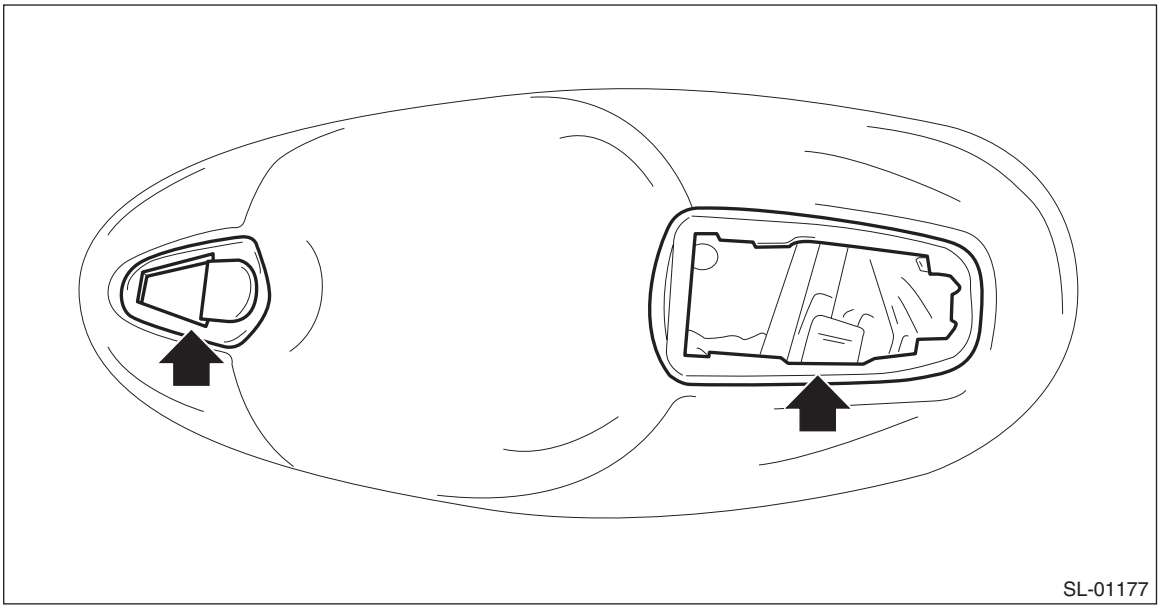
CAUTION:
Do not apply excessive force to remove the handle - door outer from the panel assembly - rear door. The panel assembly - rear door may be deformed.



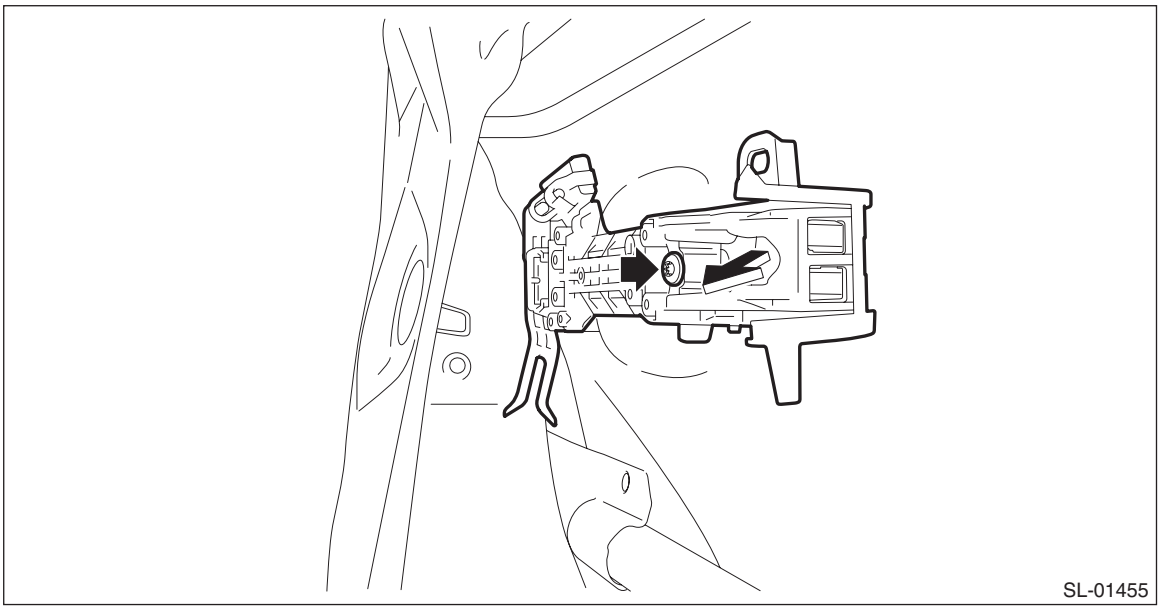
9) Remove the frame assembly - rear door outer.

Preparation tool:
TORX® T30

(1) Remove the spacer - door handle outer.



(2) Loosen the TORX® bolt and remove the frame assembly - rear door outer from inside the panel assembly - rear door.



B: INSTALLATION

1) Before installation, check the following items.
- Lever is free from deformation.
- Grease is applied sufficiently to lever joints.

If grease is insufficient, add it as necessary before assembling.
- If the lever is faulty, replace the rear outer handle.
- If the lever is deformed, replace the latch & actuator assembly - rear.

2) Install each part in the reverse order of removal.

CAUTION:
Do not reuse the screws of the latch and actuator assembly - rear. Always replace with a new part.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SL-3, DOOR LOCK ASSEMBLY, COMPONENT, General Description.>

C: INSPECTION

Check if the outer handle operates normally.
If the lever is faulty, replace the handle - door outer.

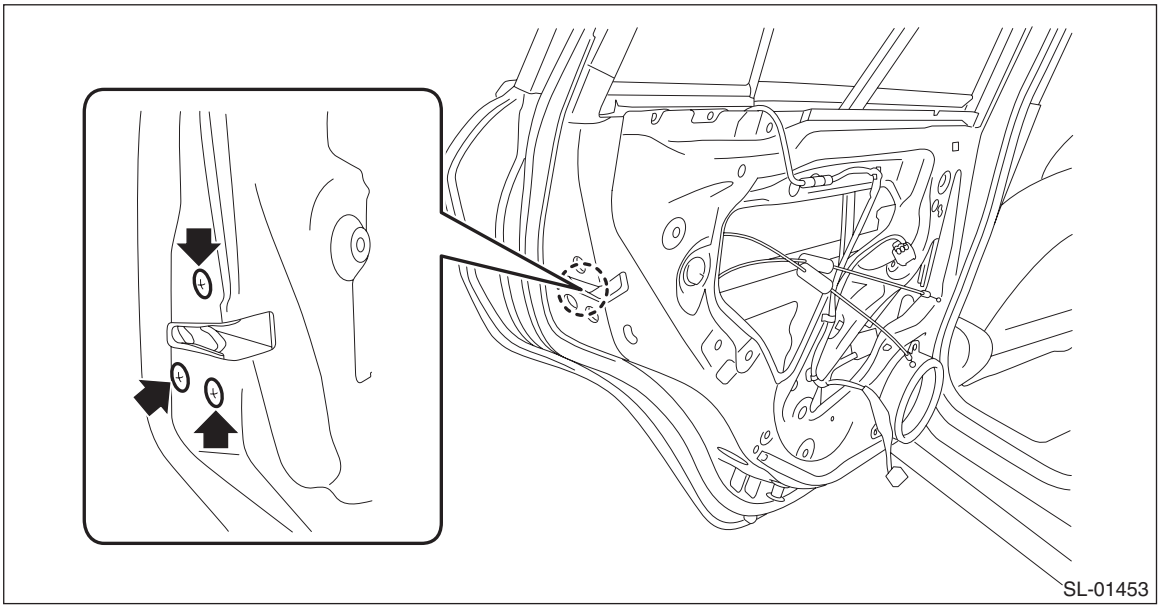
13.Rear Door Latch and Door Lock Actuator Assembly

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - rear door. <Ref. to EB-34, REMOVAL, Rear Sealing Cover.>
4) Remove the glass assembly - rear door. <Ref. to GW-33, REMOVAL, Rear Door Glass.>
5) Remove the screws to remove the latch & actuator assembly - rear.

CAUTION:
Do not re-use the screws. Always replace with a new part.



B: INSTALLATION

1) Before installation, check the following items.
- Lever is free from deformation.
- Grease is applied sufficiently to lever joints.

If grease is insufficient, add it as necessary before assembling.
- If the lever is faulty, replace the rear outer handle.
- If the lever is deformed, replace the latch & actuator assembly - rear.

2) Install each part in the reverse order of removal.

CAUTION:
Do not reuse the screws of the latch and actuator assembly - rear. Always replace with a new part.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SL-3, DOOR LOCK ASSEMBLY, COMPONENT, General Description.>

NOTE:
Make sure the child safety lock works correctly after installation.

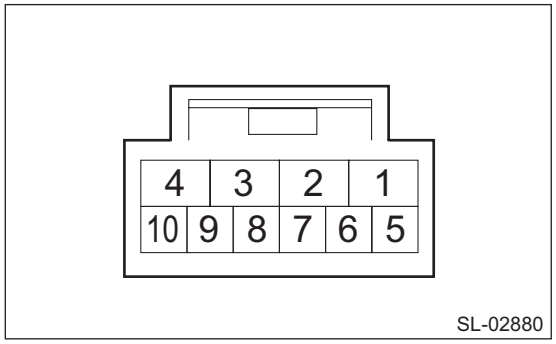
C: INSPECTION

1. LATCH

Check if the latch operates normally.
If the cable is faulty, replace the latch & actuator assembly - rear.

2. ACTUATOR

1) Check door lock operation
Check the door lock operation when battery voltage is applied between the terminals of actuator.



Terminal No.	Inspection conditions	Standard
4 (+) — 1 (–)	Apply battery voltage.	LOCK
1 (+) — 4 (–)		UNLOCK

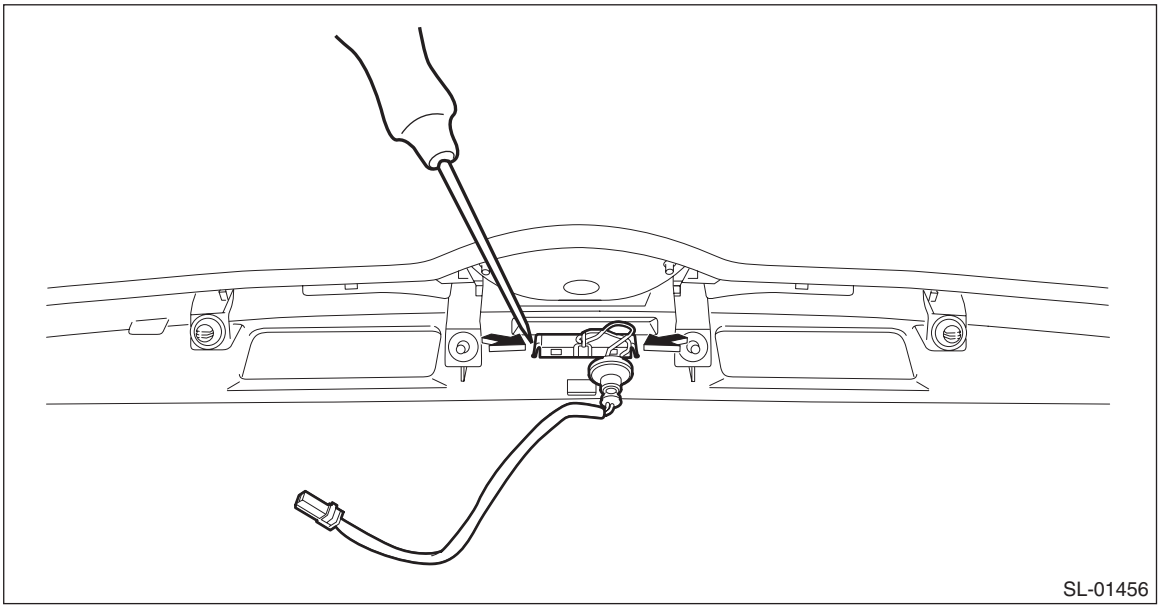
2) If it does not operate properly as a result of inspection, replace the latch & actuator assembly - rear.

14.Rear Gate Opener Button

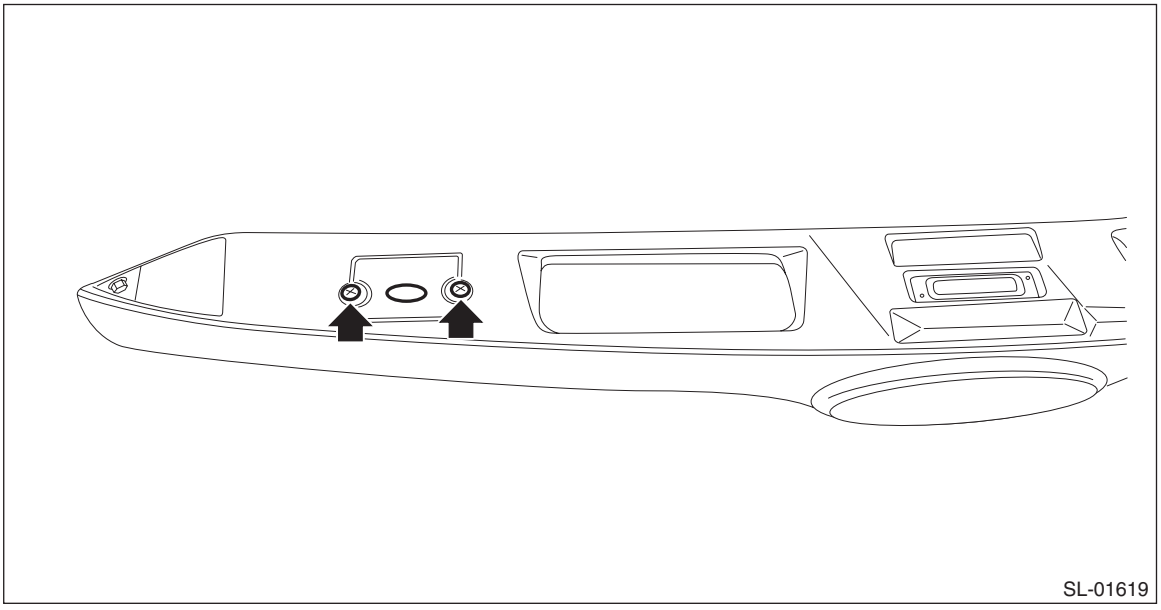
A: REMOVAL

NOTE:
• The button - opener rear gate is integrated with the rear lock button. (Model with keyless access with push button start)
• Open the panel - rear gate before disconnecting the ground terminal from the battery.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the garnish assembly - rear gate. <Ref. to EI-127, REMOVAL, Rear Gate Garnish.>
3) Release the locks at both ends of the button - opener rear gate by pushing them with a flat tip screwdriver, and remove the button - opener rear gate.


SL-01456

4) Remove the screws, and remove the rear lock button, and remove the integrated harness. (Model with keyless access with push button start)


SL-01619

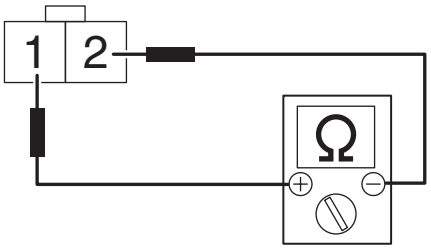
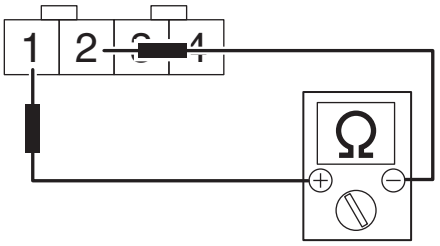
B: INSTALLATION

CAUTION:
Make sure that the harness grommet is securely installed.
If not properly installed, this may cause leaks.
Install each part in the reverse order of removal.

C: INSPECTION

Preparation tool:
Circuit tester

1) Check the resistance between switch terminals.

Terminal No.	Inspection conditions	Standard	Connection diagram
1 — 2	OPEN	Less than 5 Ω	•Model without keyless access with push button start  SL-01476
	CLOSE	1 MΩ or more	•Model with keyless access with push button start  SL-01578

2) If the inspection result is not within the standard, replace the button - opener rear gate.

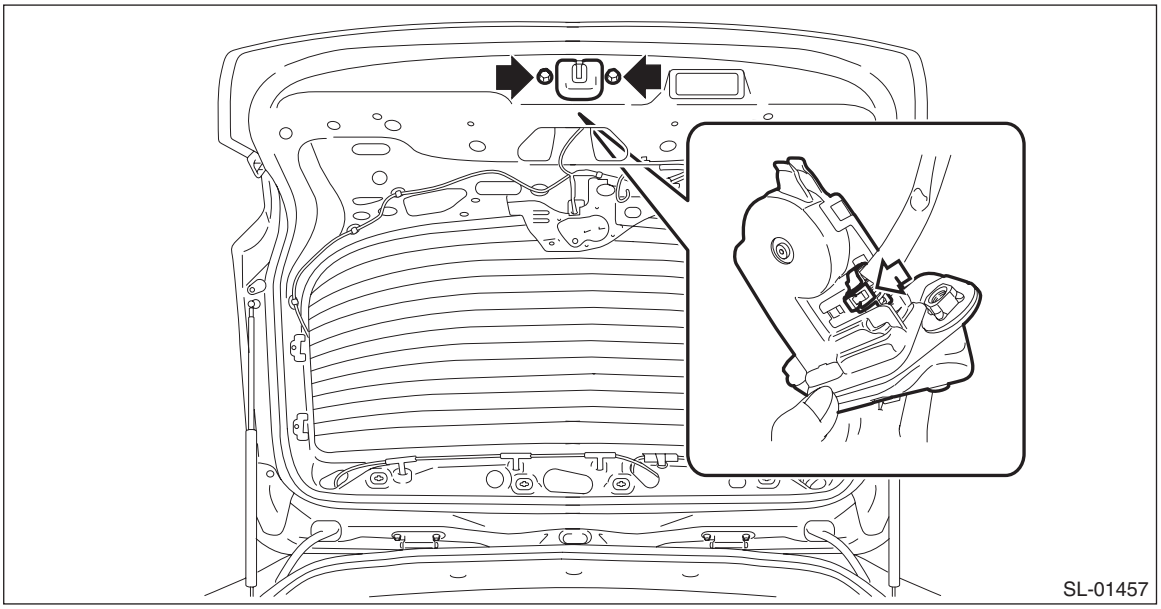
15.Rear Gate Latch and Actuator Assembly

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear gate. <Ref. to EI-122, REMOVAL, Rear Gate Trim.>
3) Remove the latch and actuator - rear gate.
   (1) Disconnect the connector.
   (2) Remove the bolts, and remove the latch and actuator - rear gate.



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SL-4, REAR GATE LOCK AND TRUNK LID LOCK, COMPONENT, General Description.>

C: INSPECTION

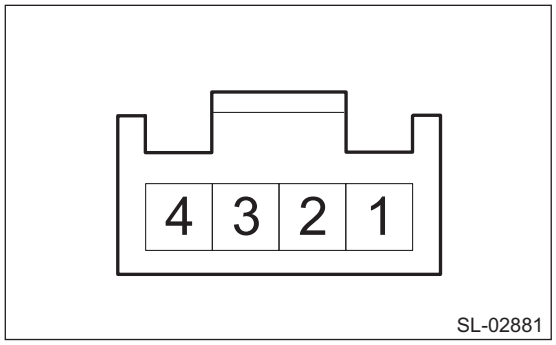
1. LATCH

Check if the latch operates normally.
If latch deformation, abnormal wear, or unsmooth lock operation is observed, replace the latch and actuator - rear gate.

2. ACTUATOR

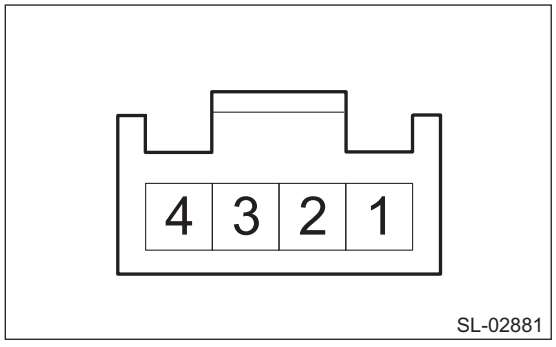
Preparation tool:
Circuit tester

1) Check door lock operation
Check the door lock operation when battery voltage is applied between the terminals of actuator.



Terminal No.	Inspection conditions	Specification
1 (+) — 2 (–)	Connect battery to the terminals	OPEN

2) Check switch
Check the resistance between actuator terminals.



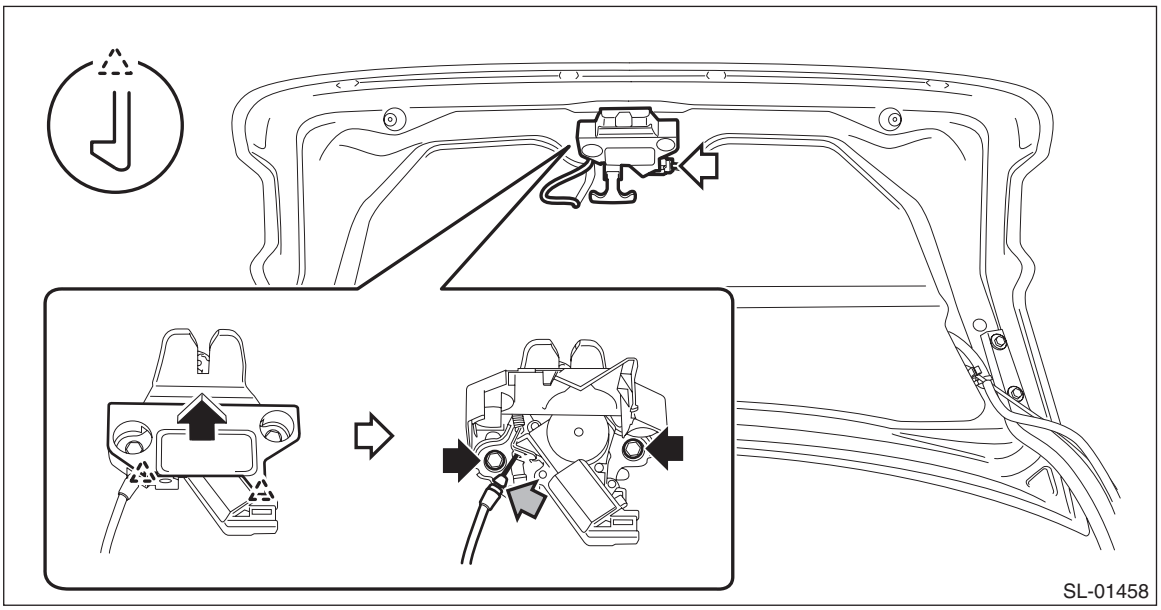
Terminal No.	Inspection conditions	Standard
3 — 4	OPEN	Less than 1.5 Ω
	CLOSE	1 MΩ or more

3) If it does not operate properly as a result of inspection, replace the latch and actuator - rear gate.

16.Trunk Lid Latch and Actuator Assembly

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the lock assembly - trunk lid.
   (1) Disconnect the connector.
   (2) Release the claws, and open the lock cover.
   (3) Remove the bolts, and disconnect the release cable, and then remove the lock assembly - trunk lid.



NOTE:
When disconnecting the release cable, refer to “TRUNK LID OPENER” of “Remote Openers”. <Ref. to SL-59, TRUNK LID OPENER, REMOVAL, Remote Openers.>

B: INSTALLATION

1) Before installation, check the following items.
- Is the cable deformed?
- Grease is applied sufficiently to cable joints.

If grease is insufficient, add it as necessary before assembling the cable.
2) Install each part in the reverse order of removal.

Tightening torque:
Refer to “COMPONENT” of “General Description”. <Ref. to SL-4, REAR GATE LOCK AND TRUNK LID LOCK, COMPONENT, General Description.>

C: INSPECTION

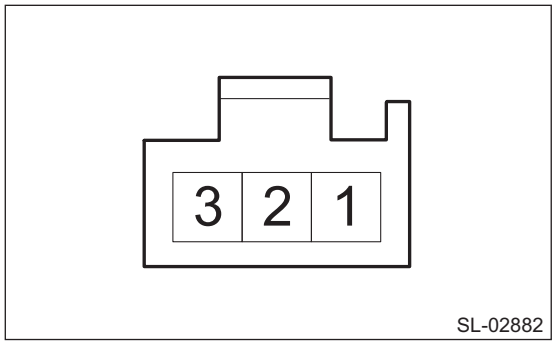
1. LATCH

Check if the latch operates normally.
If latch deformation, abnormal wear, or unsmooth lock operation is observed, replace the lock assembly - trunk lid.

2. ACTUATOR

Preparation tool:
Circuit tester

1) Check door lock operation
Check the door lock operation when battery voltage is applied between the terminals of actuator.



Terminal No.	Inspection conditions	Standard
1 (+) — 2 (–)	Connect battery to the terminals	LOCK → UNLOCK

2) Check switch
Check the resistance between actuator terminals.

Preparation tool:
Circuit tester

Terminal No.	Inspection conditions	Standard
2 — 3	LOCK	1 MΩ or more
	UNLOCK	Less than 1 Ω

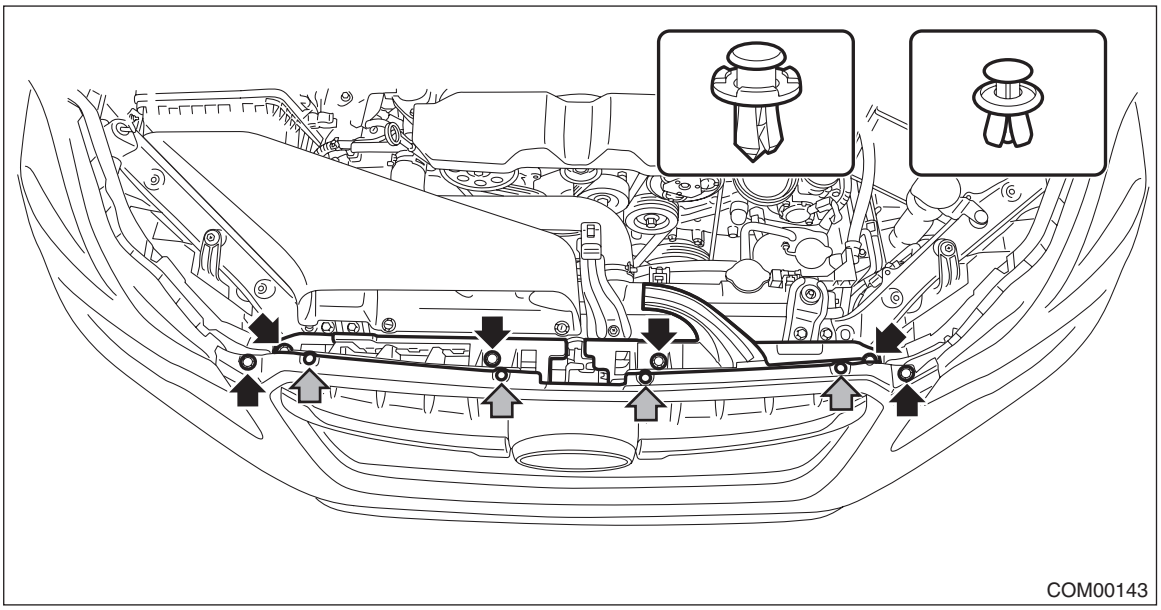
3) If it does not operate normally, replace the lock assembly - trunk lid.

17.Front Hood Lock Assembly

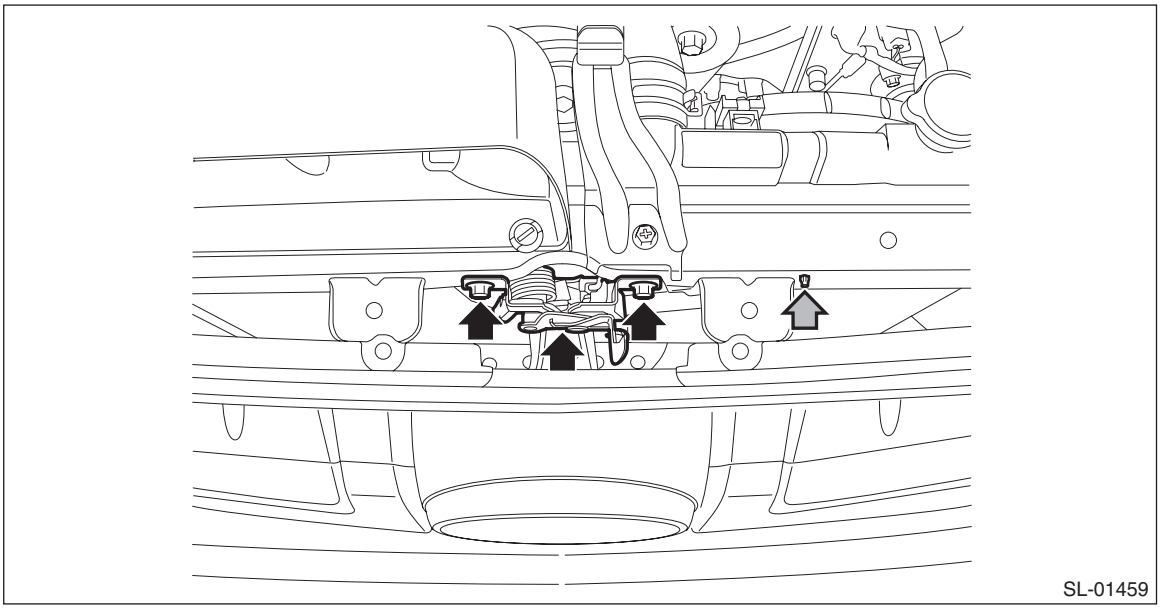
A: REMOVAL

1) Open the front hood.
2) Remove the clip, and remove the bracket - grille.

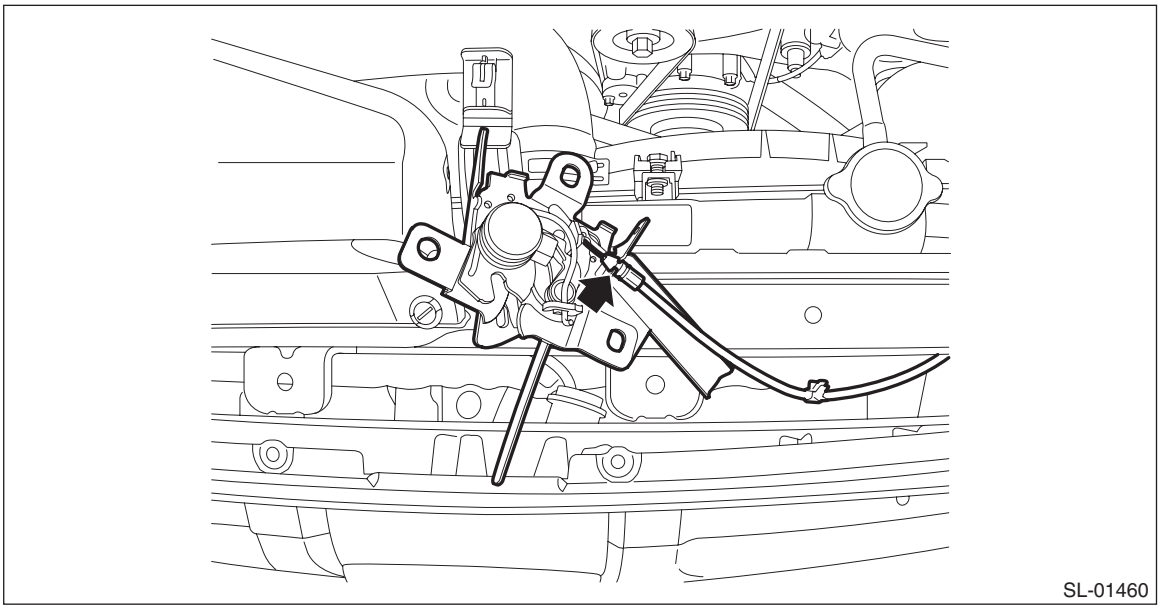
NOTE:
To prevent damage to the bracket - grille, make sure to remove all clips.



3) Remove the lock assembly - front hood.
   (1) Remove the bolt and clip.



(2) Disconnect the release cable, and detach the lock assembly - front hood.



NOTE:
When disconnecting the release cable, refer to “FRONT HOOD OPENER” of “Remote Openers”. <Ref. to SL-58, FRONT HOOD OPENER, REMOVAL, Remote Openers.>

B: INSTALLATION

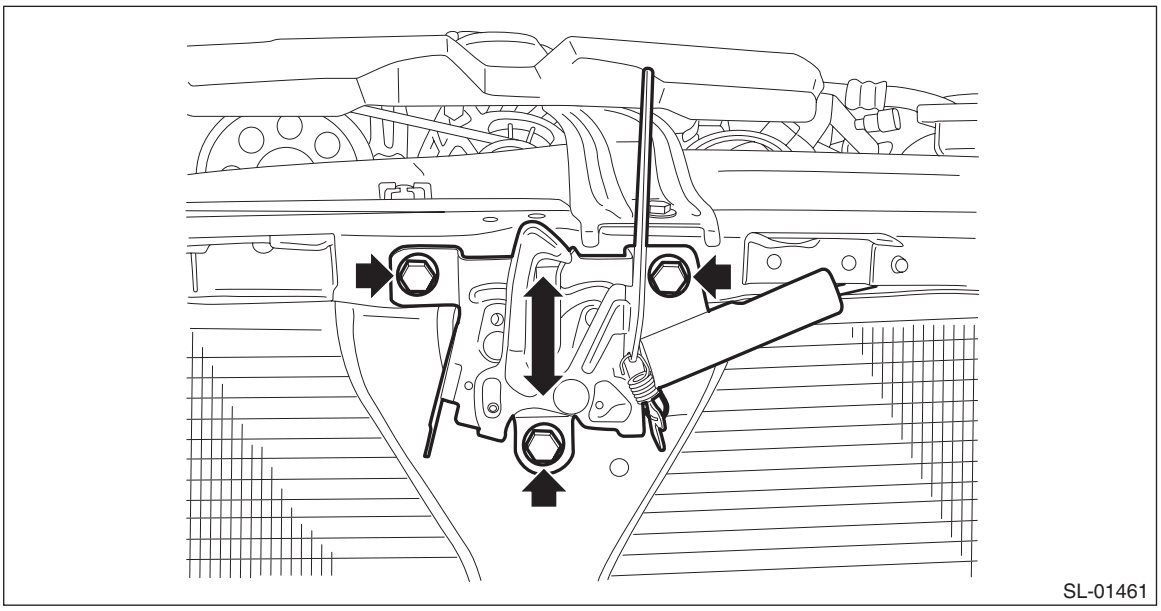
1) Before installation, check the following items.
- Is the cable deformed?
- Grease is applied sufficiently to cable joints.

If grease is insufficient, add it as necessary before assembling the cable.
2) Install each part in the reverse order of removal.

Tightening torque:
Refer to “COMPONENT” of “General Description”. <Ref. to SL-5, FRONT HOOD LOCK, COMPONENT, General Description.>

C: ADJUSTMENT

1) Loosen the bolt, and adjust the lock assembly - front hood while moving it up and down.



2) After adjustment, tighten the bolts securely.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SL-5, FRONT HOOD LOCK, COMPONENT, General Description.>

D: INSPECTION

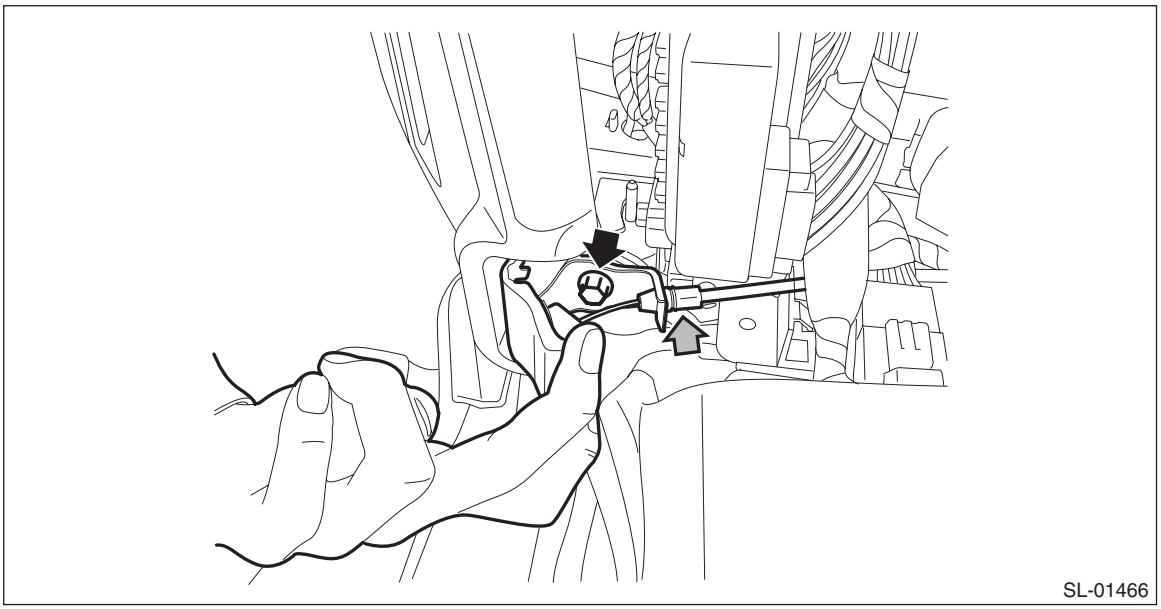
Check if the lock assembly operates normally.
If lever deformation, abnormal wear, or unsmooth lock operation is observed, replace the lock assembly - front hood.

18.Remote Openers

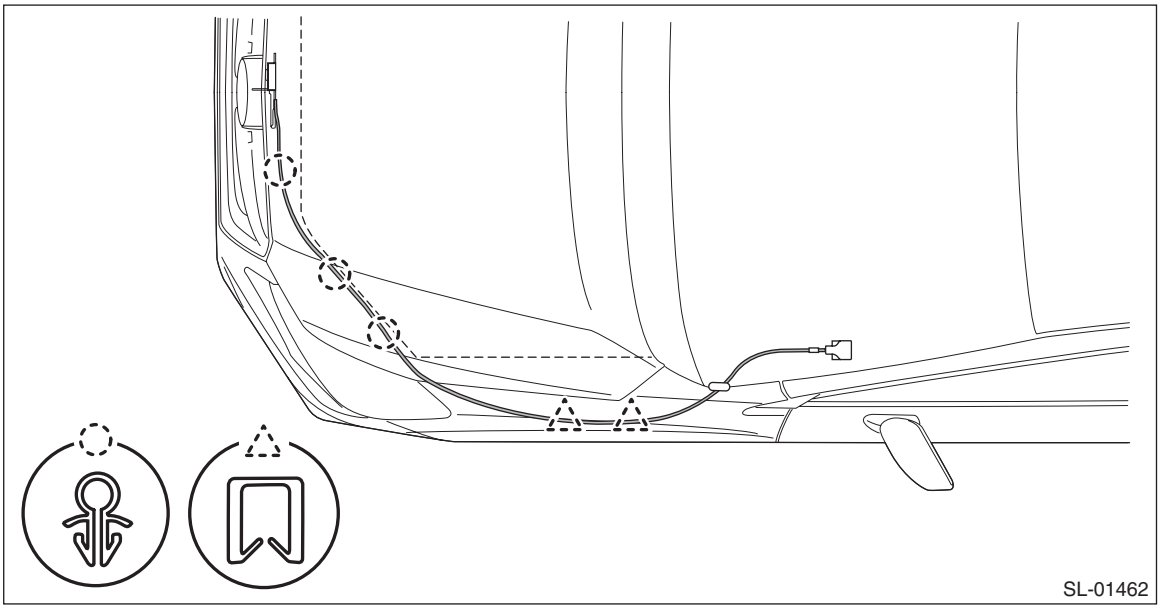
A: REMOVAL

1. FRONT HOOD OPENER

1) Remove the opener handle.
   (1) Remove the cable.
   (2) Remove the bolt, and remove the opener handle.

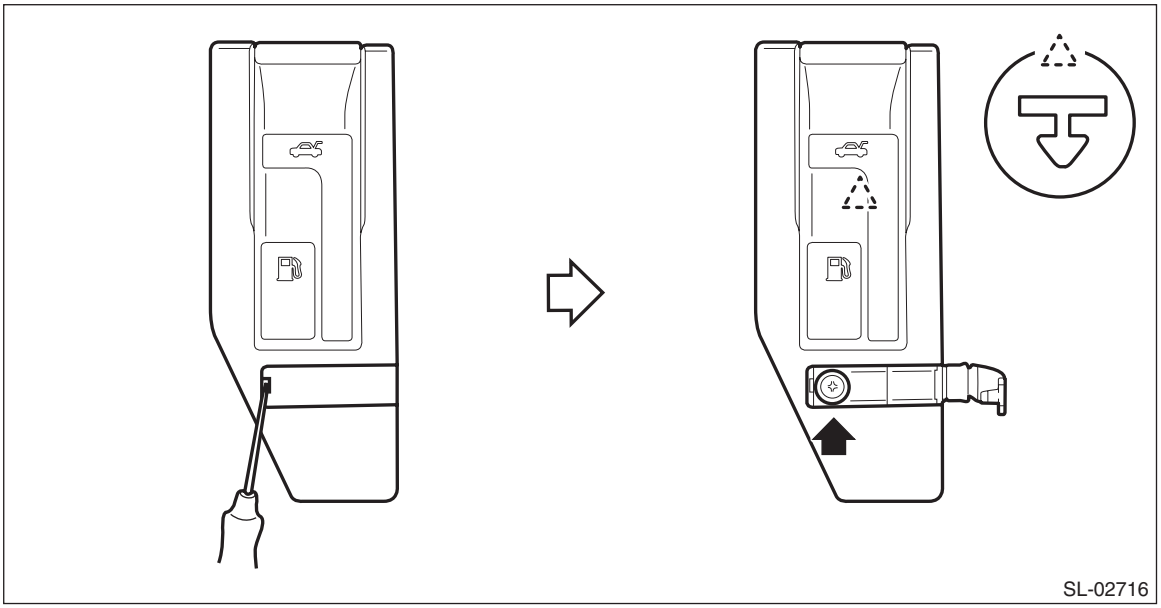


2) Remove the following parts and remove the cable clip and cable.
- Lock assembly - front hood: <Ref. to SL-55, REMOVAL, Front Hood Lock Assembly.>
- Cover assembly - instrument panel LWR driver: <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>

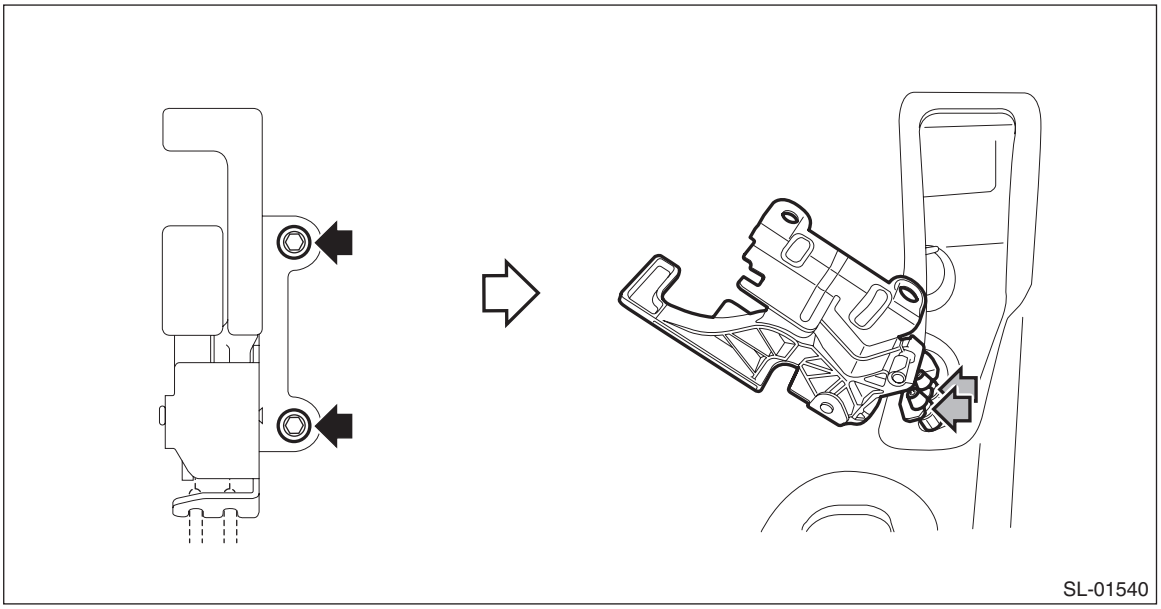


2. TRUNK LID OPENER

1) Remove the cover - handle.
   (1) Open the cover by using a flat tip screwdriver.
   (2) Remove the screws and detach the cover - handle.

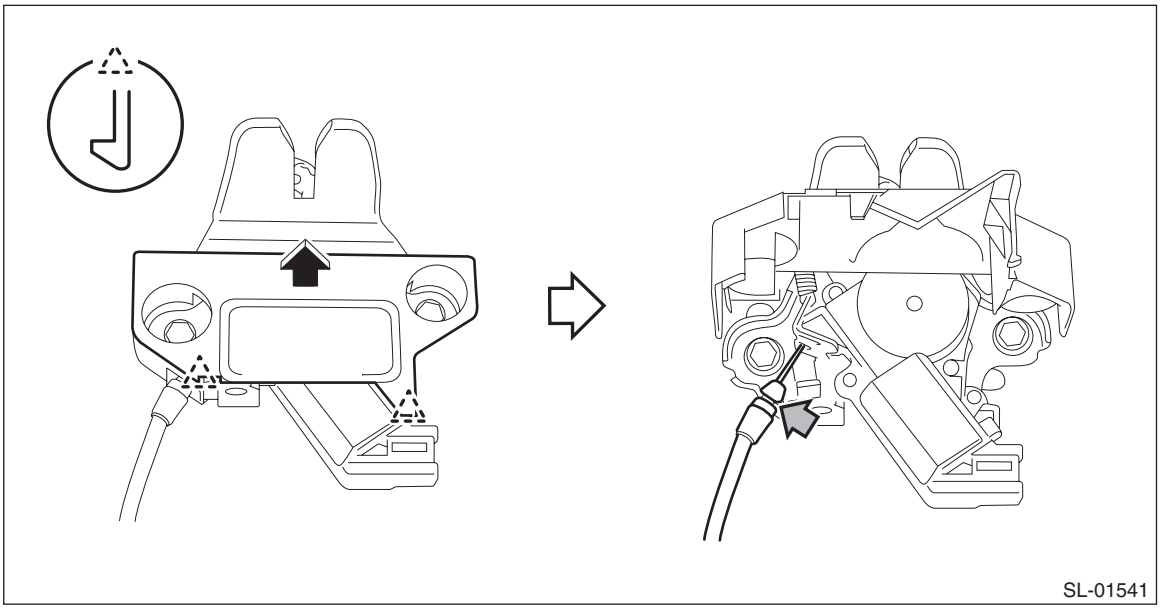


2) Remove the pull handle - opener.
   (1) Remove the nut.
   (2) Remove the cable from pull handle - opener.

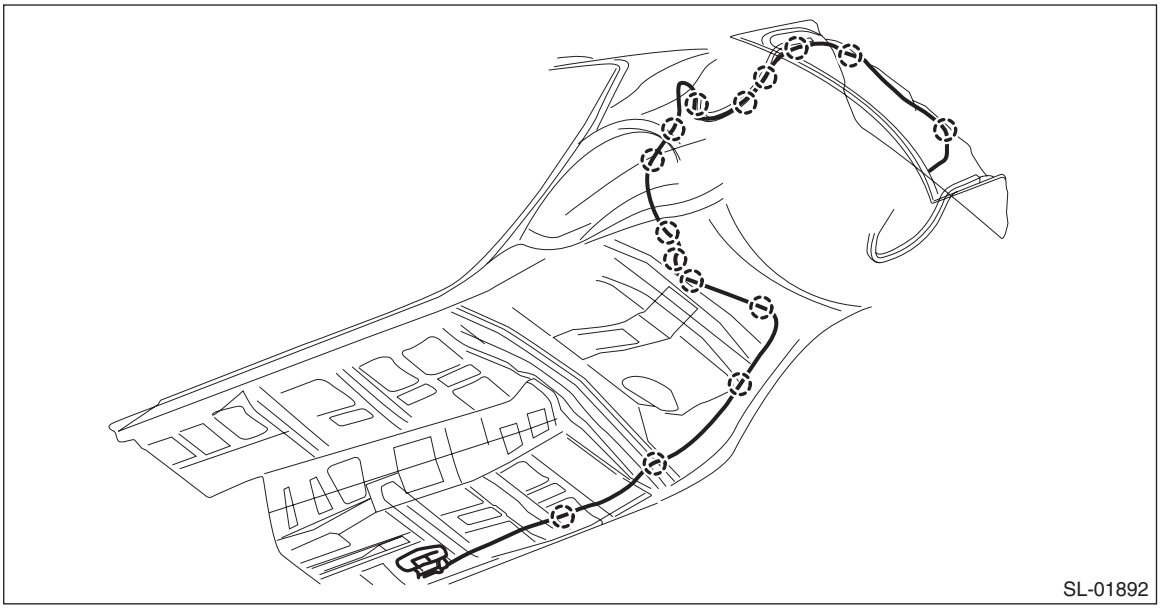


3) Remove the trim panel - trunk side RH and trim panel - trunk lid. <Ref. to EI-105, REMOVAL, Trunk Room Trim.>
4) Remove the lower inner trim. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>

5) Disconnect the cable from the lock assembly - trunk lid.

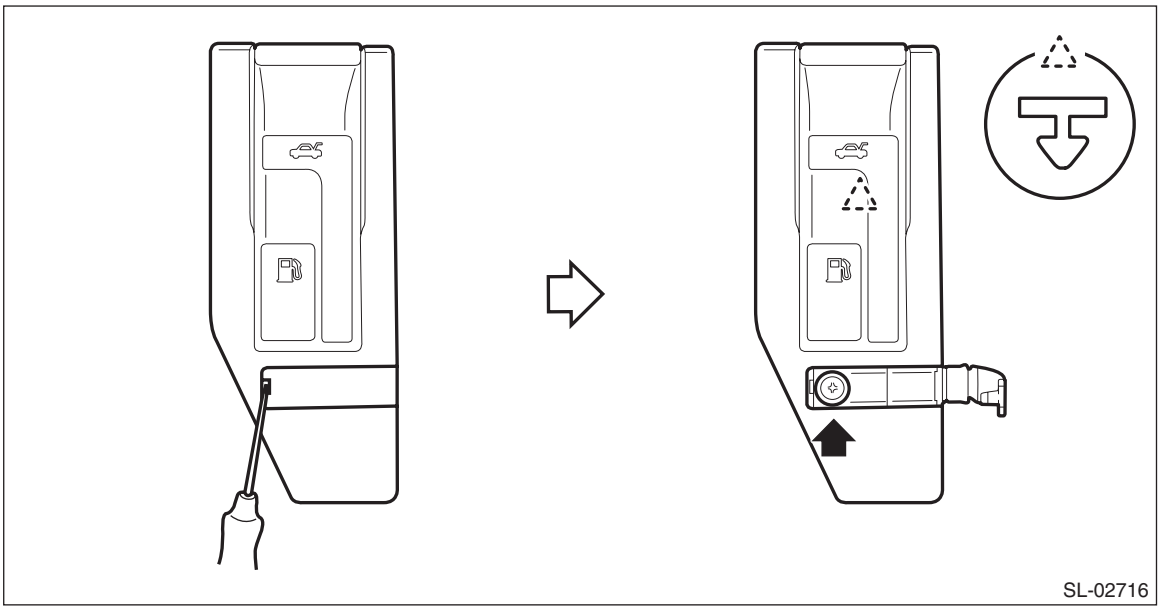


6) Remove the cable clip, and remove the cable.

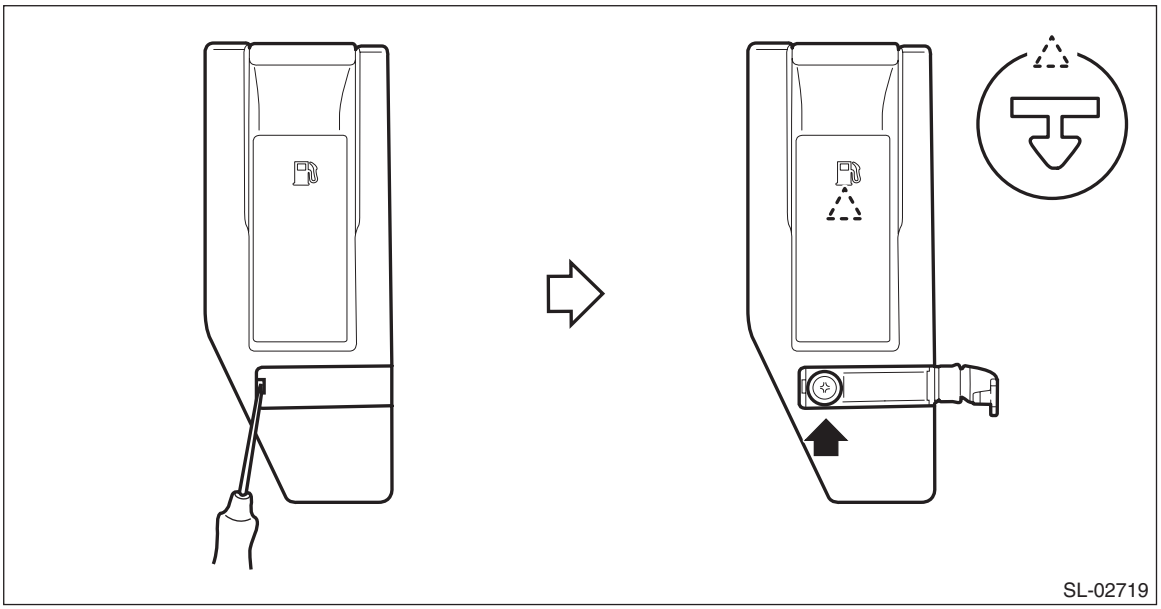


3. FUEL FLAP OPENER

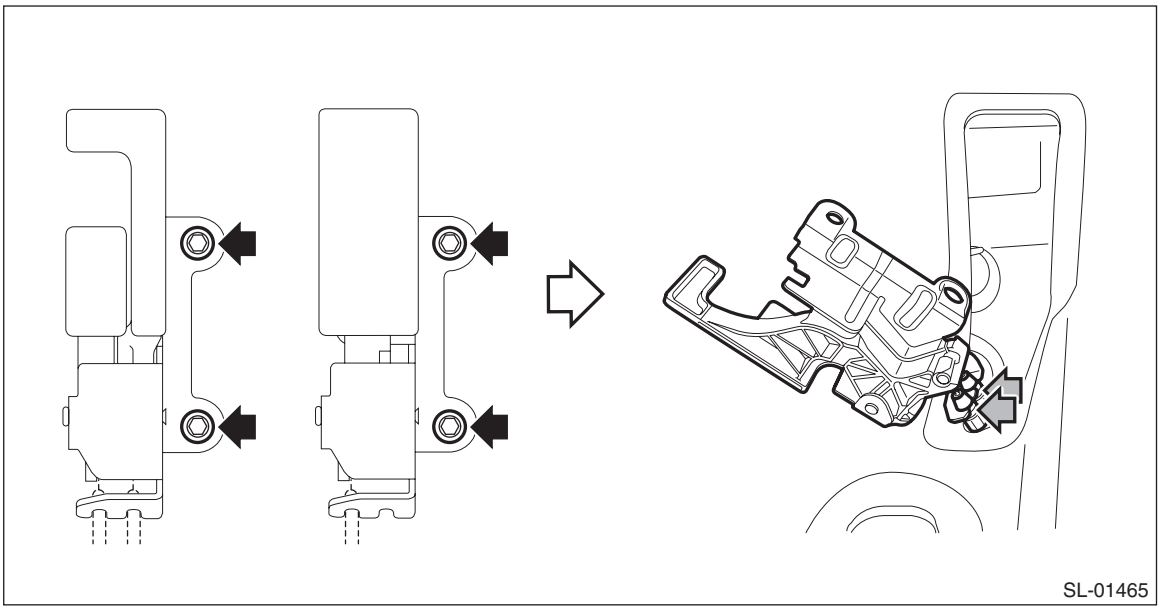
1) Remove the cover - handle.
   (1) Open the cover by using a flat tip screwdriver.
   (2) Remove the screws and detach the cover - handle.
   - 4 door model



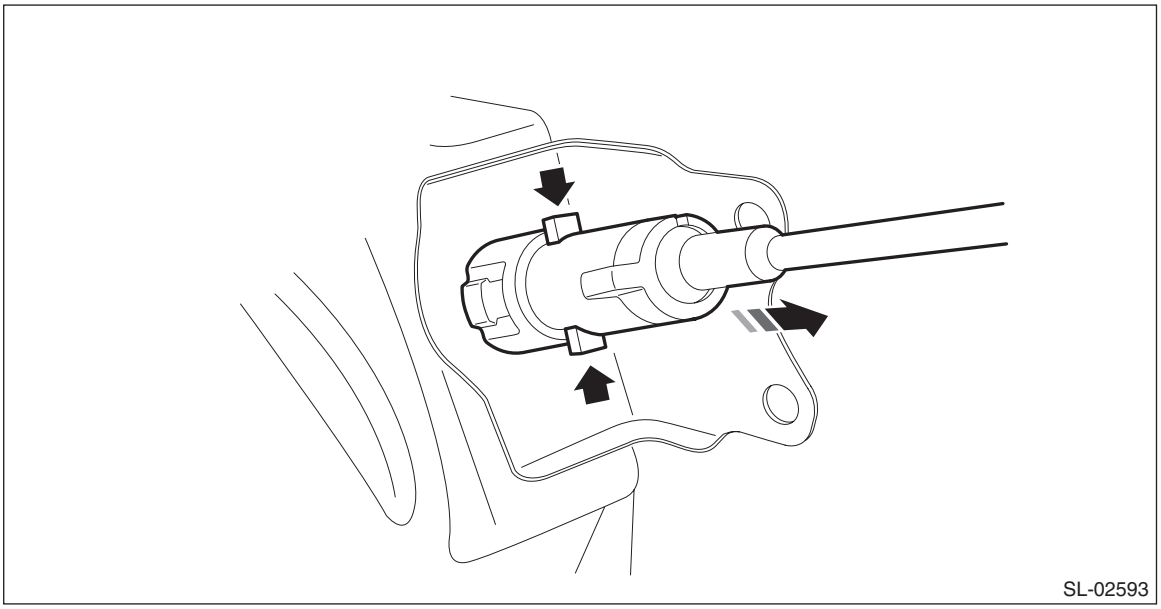
   - 5 door model/Crosstrek model



2) Remove the pull handle - opener.
   (1) Remove the nut.
   (2) Remove the cable from pull handle - opener.

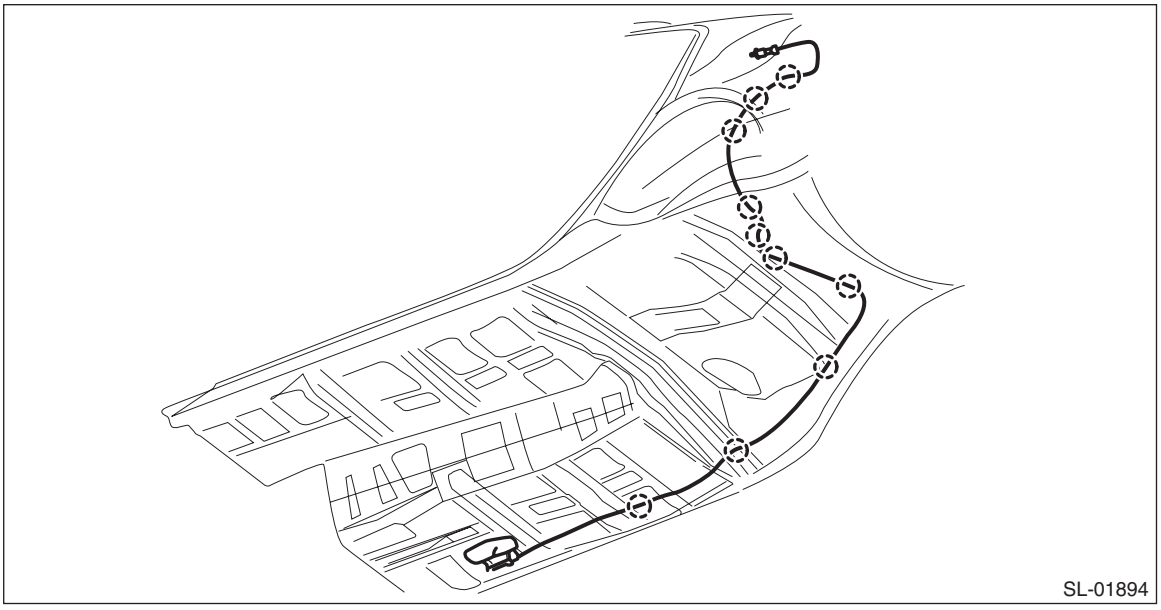


3) Remove the trim panel - trunk side RH. (4 door model) <Ref. to EI-105, REMOVAL, Trunk Room Trim.>
4) Remove the trim panel - rear apron RH. (5 door model/Crosstrek model) <Ref. to EI-99, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Rear Quarter Trim.>
5) Remove the fuel lock inside the quarter panel.
   (1) Press the claws of the fuel lock.
   (2) While keeping the condition in step (1), pull the fuel lock to the rearward of the vehicle.

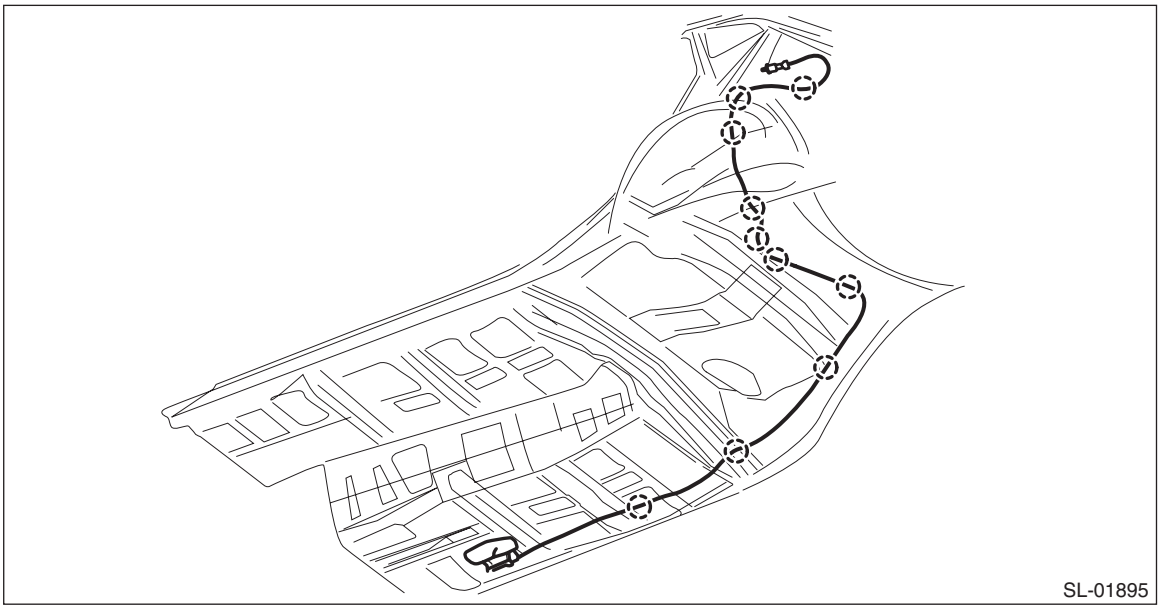


6) Remove the lower inner trim. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>

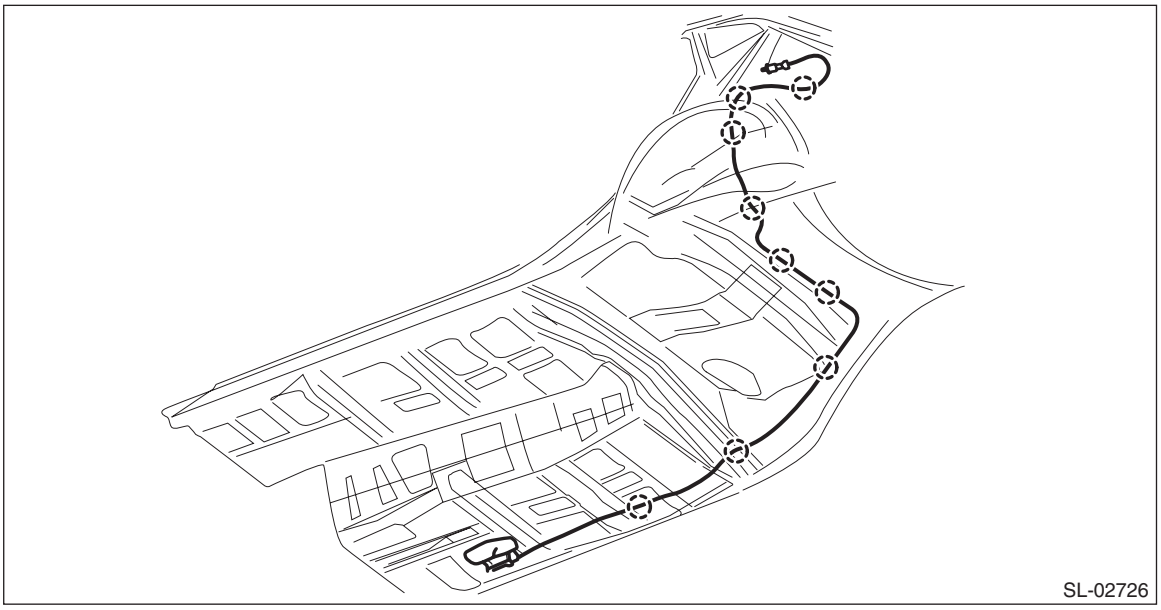
7) Remove the cable clip, and remove the cable.
- 4 door model


SL-01894

- 5 door model/Crosstrek model


SL-01895

- HEV model



B: INSTALLATION

1) Before installation, check the following items.
- Cable is free from deformation such as fray.

2) Install each part in the reverse order of removal.

Tightening torque:
Front hood lock: <Ref. to SL-5, FRONT HOOD LOCK, COMPONENT, General Description.>
Remote opener: <Ref. to SL-6, REMOTE OPENER, COMPONENT, General Description.>

C: INSPECTION

Check if the front hood and fuel flap operate normally.

19.Ignition Key Lock

A: REPLACEMENT

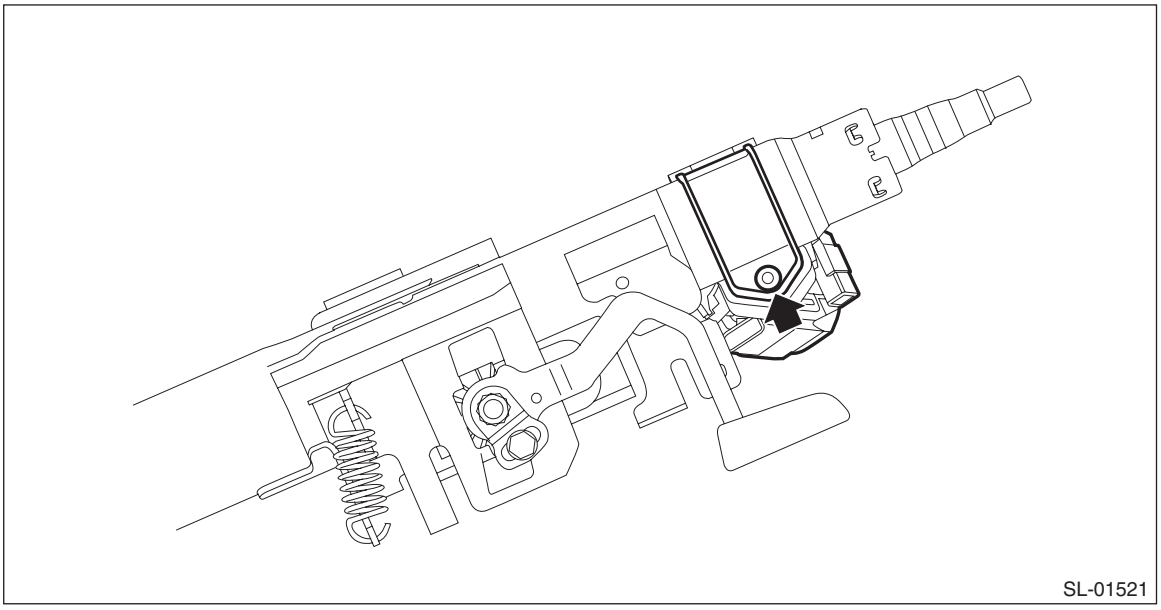
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDC-CM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH Eye-Sight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the cover assembly - instrument panel LWR driver. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the column assembly - steering. <Ref. to PS-21, REMOVAL, Steering Column.>
5) Remove the ignition key lock.
(1) Secure the column assembly - steering in a vise.
(2) Use the reverse tap and drill to remove the set bolt and remove the ignition key lock.

CAUTION:
Do not apply any impact to the set bolt by a chisel or punch.



6) Install the ignition key lock.
(1) Secure the ignition key lock to the column assembly - steering.
(2) Use new set bolts. Tighten the bolt until the bolt head is broken (bolt head wrenched off).

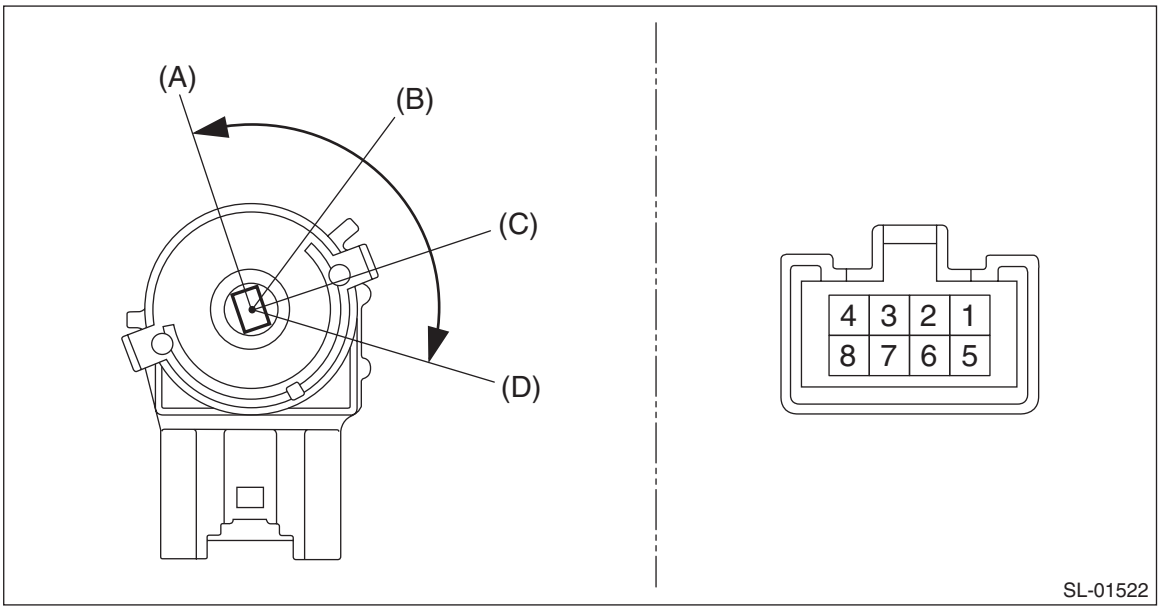
B: DISASSEMBLY

NOTE:
Refer to “Key Lock Cylinders” for disassembly of the ignition key lock. <Ref. to SL-67, STEERING LOCK, REPLACEMENT, Key Lock Cylinders.>

C: INSPECTION

Preparation tool:
Circuit tester

1) Check the resistance between switch terminals.



Terminal No.	Inspection conditions		Standard
Between all terminals	(A)	LOCK	1 MΩ or more
2 — 4	(B)	ACC	Less than 1 Ω
1 — 2 — 4 5 — 6	(C)	ON	Less than 1 Ω
1 — 3 — 4 5 — 6 — 7	(D)	ST	Less than 1 Ω

2) Replace the ignition switch assembly if the inspection result is not within the standard.

20.Key Lock Cylinders

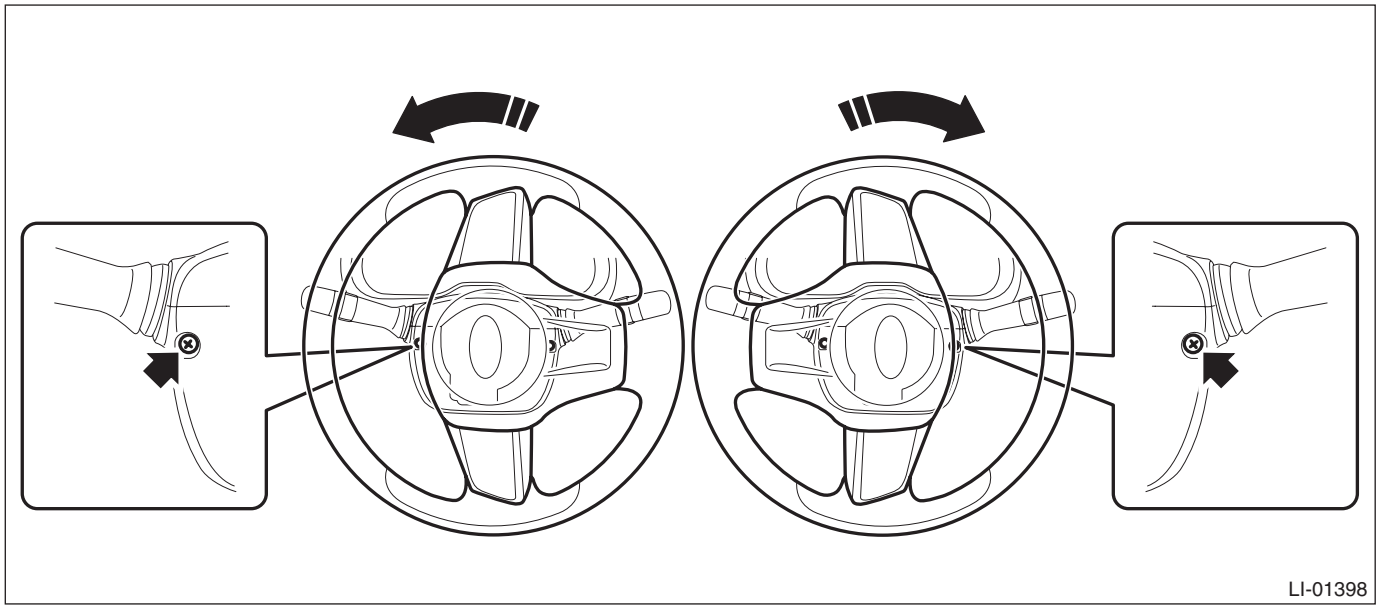
A: REPLACEMENT

1. STEERING LOCK

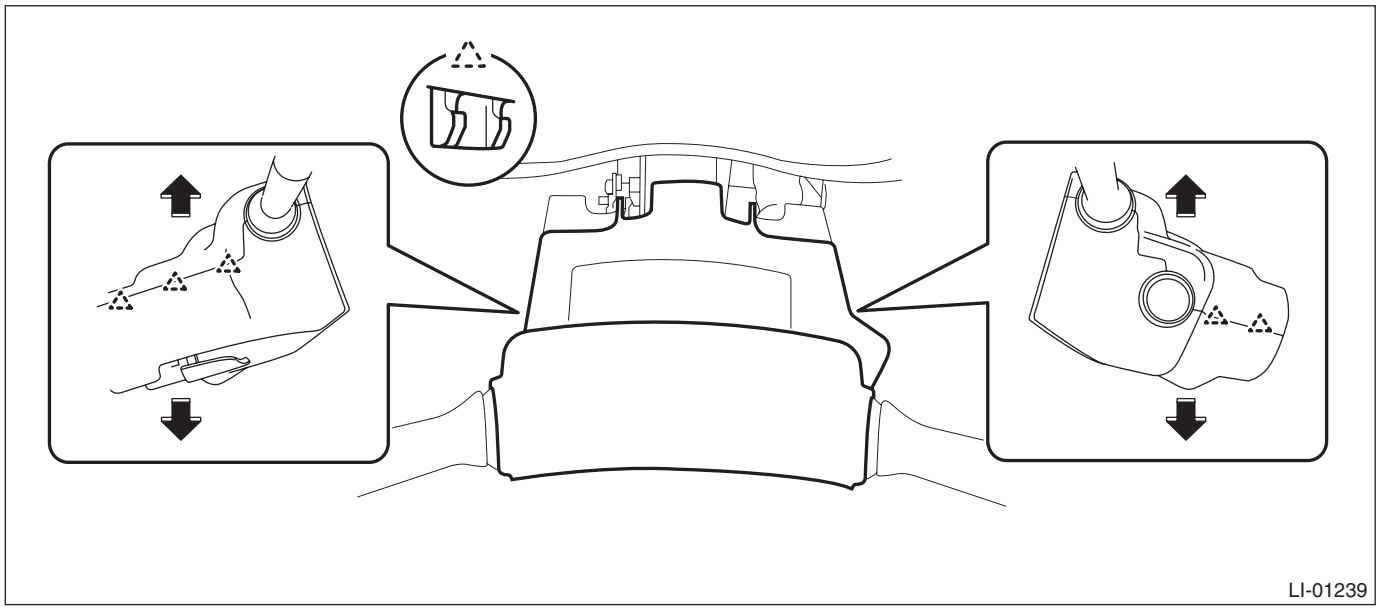
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the cover assembly - column.
   (1) Remove the screws by turning the steering wheel to right and left.

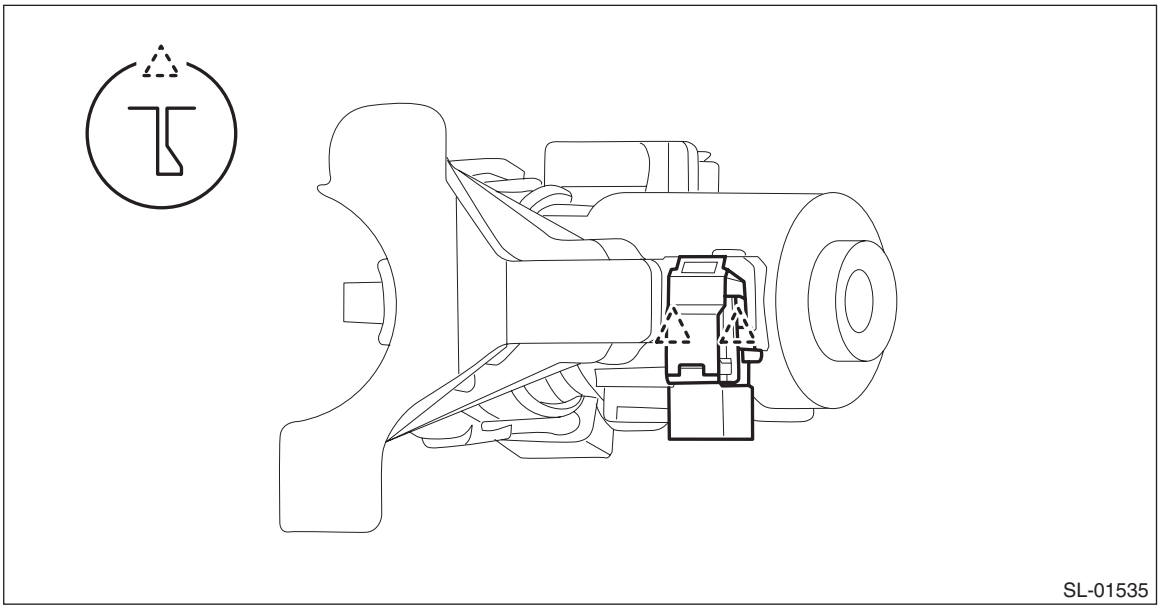


   (2) Release the claw, and remove the cover assembly - column UPR and the cover assembly - column LWR.

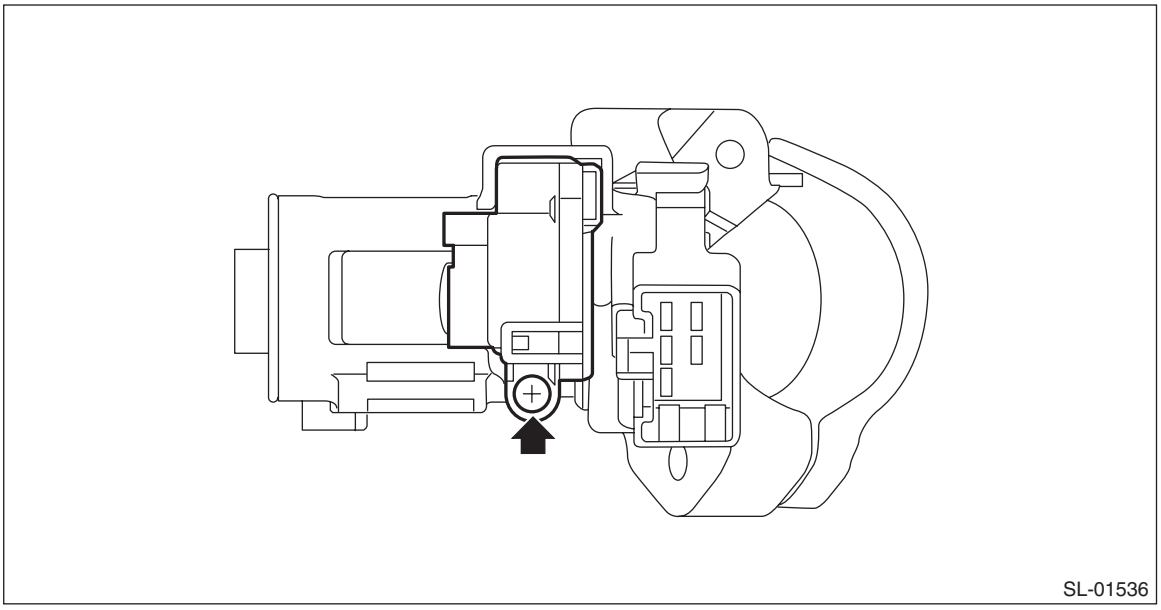


3) Remove the immobilizer antenna assembly or the ignition switch illumination. <Ref. to SL-88, REMOVAL, Immobilizer Antenna.>

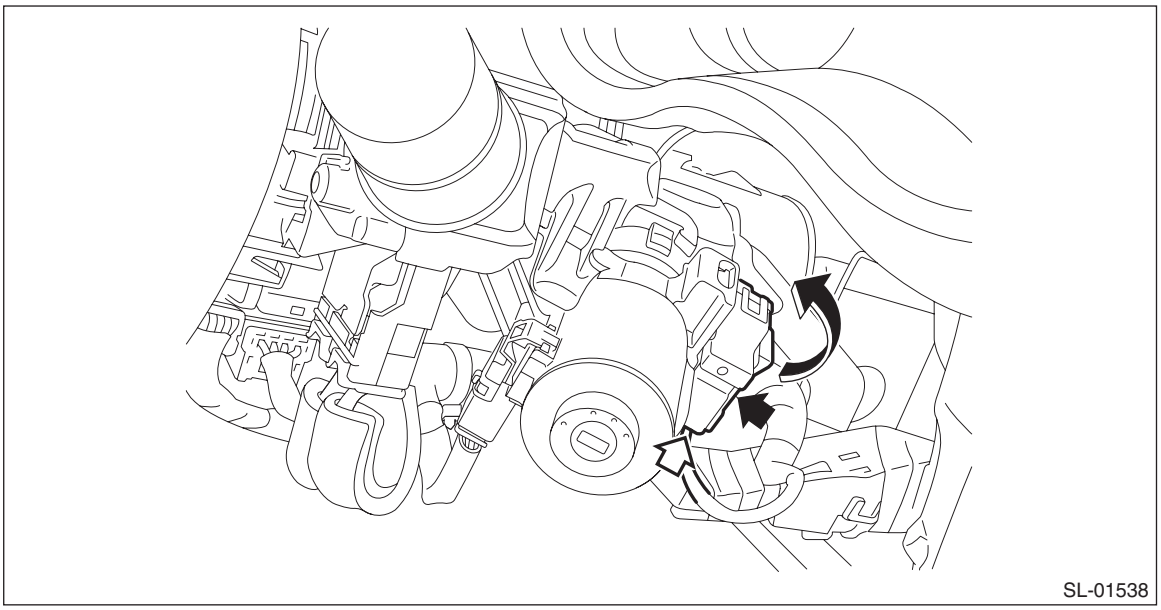
4) Release the claws, and pull the key warning switch downwards to remove.



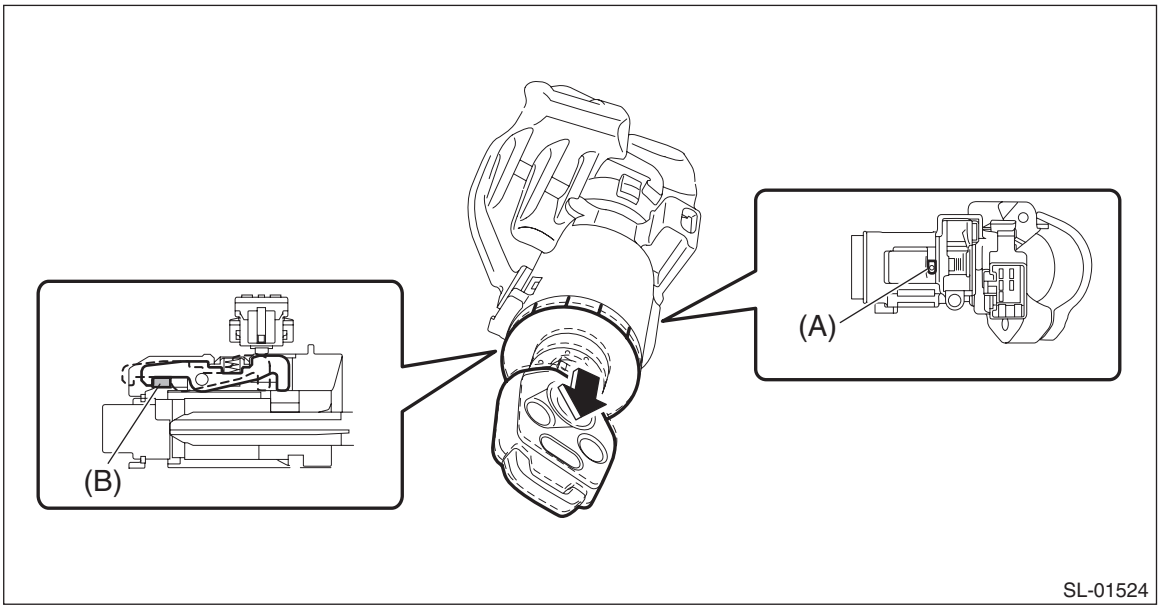
5) Remove the screws and remove the key lock solenoid.



6) Remove the key lock solenoid.
(1) Disconnect the connector.
(2) Remove the screws and remove the key lock solenoid.

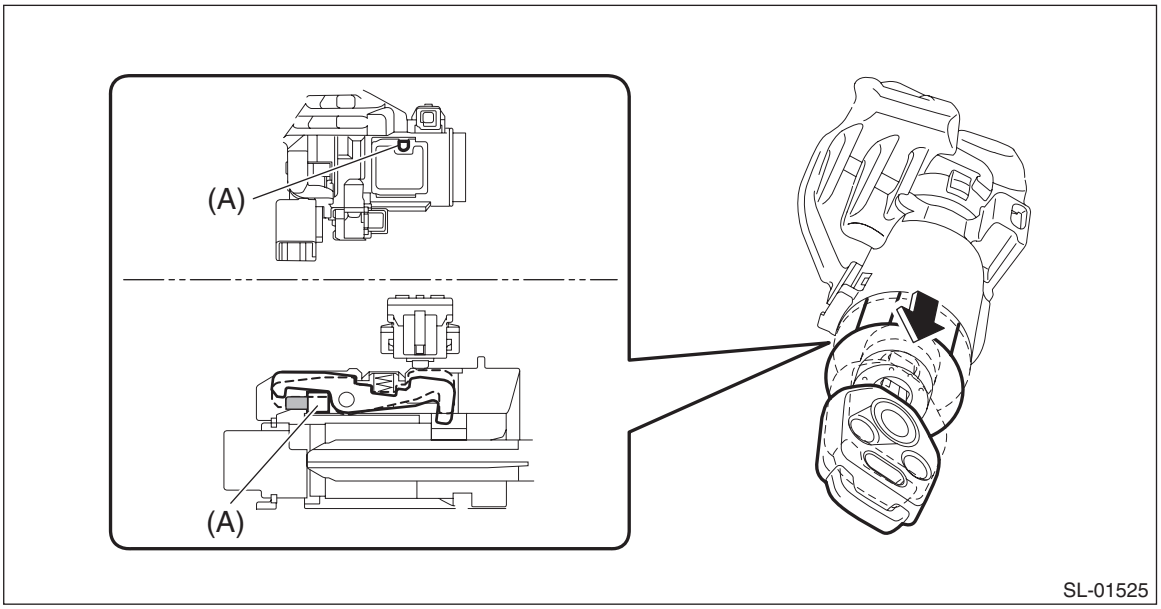

SL-01538

7) Replace the key cylinder.
(1) Insert the key into the key cylinder, and turn the key to the ACC position.
(2) Insert a flat tip screwdriver from the steering lock frame hole (A), and pull the key cylinder until the key cylinder claws touch the steering lock frame stopper (B).



SL-01524

(3) Insert a flat tip screwdriver from the steering lock frame hole (A), and release the claws to pull out the key cylinder.



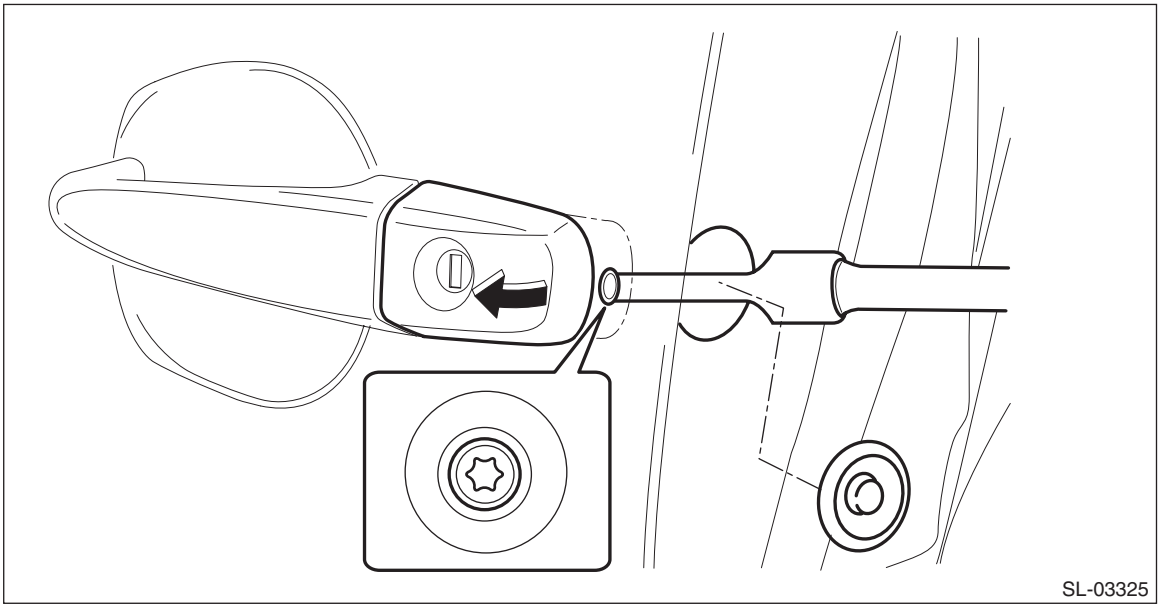
8) Install each part in the reverse order of removal.

2. FRONT DOOR

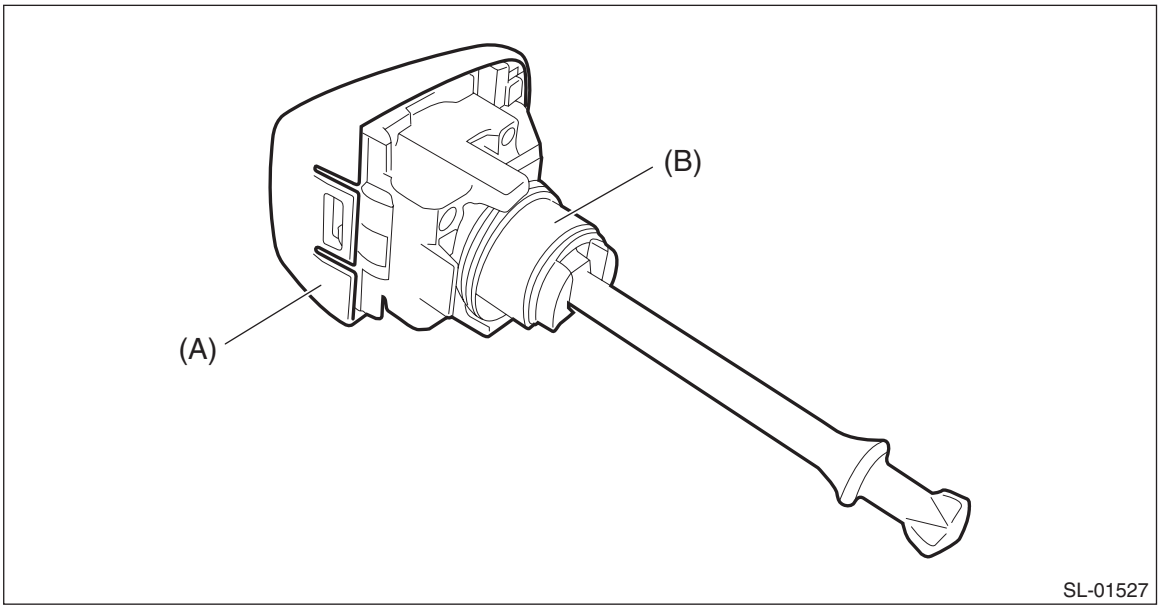
1) Raise the glass assembly - front door to the top position.
2) Remove the cover - handle front outer.

Preparation tool:
TORX® T30

(1) Remove the plug at the rear end of the panel assembly - front door.
(2) Loosen the TORX® bolt and remove the cover - handle front outer.



3) Remove the key cylinder (B) from the cover - handle front outer (A), and replace the key cylinder.



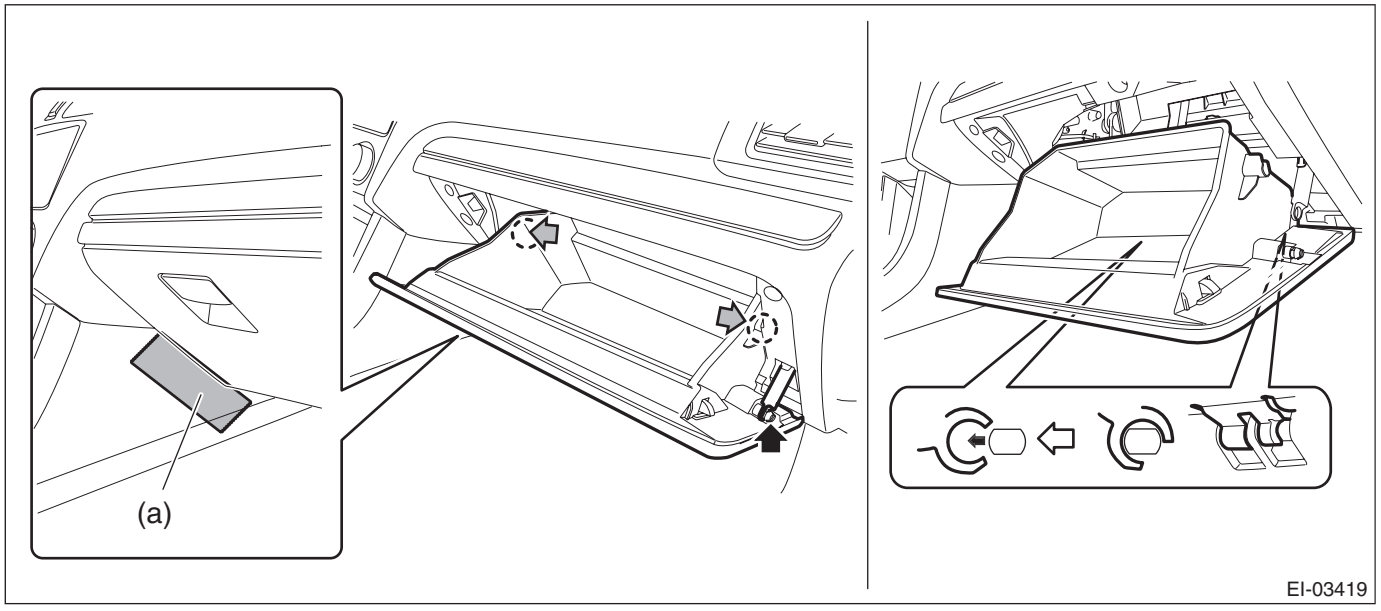
4) Install each part in the reverse order of removal.

CAUTION:
When installing the cover - handle front outer on driver's side, make sure that the key cylinder shaft is correctly inserted into the latch & actuator assembly - front.

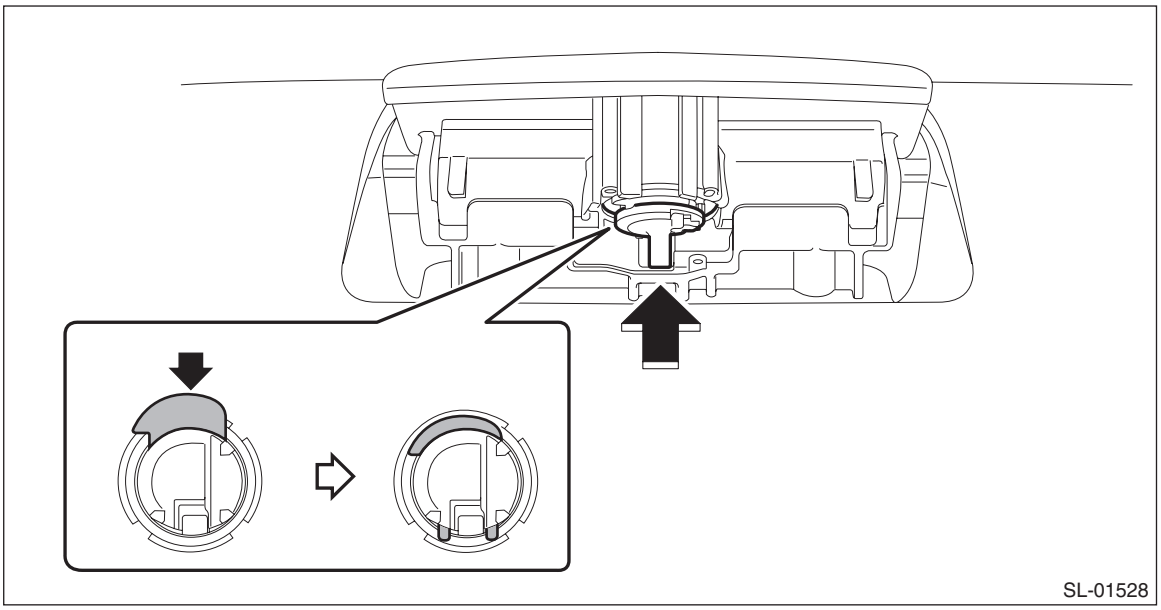
Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SL-3, DOOR LOCK ASSEMBLY, COMPONENT, General Description.>

3. GLOVE BOX LID

1) Remove the pocket assembly.
(1) Attach the protective tape (a) to the panel center LWR.
(2) Remove the damper COMPL - pocket.
(3) Release the stoppers and remove the pocket assembly by pulling it toward you.



2) Replace the key cylinder.
   (1) Pull up the lock knob.
   (2) Push out the key cylinder from the pocket assembly while pressing in the metal plate.



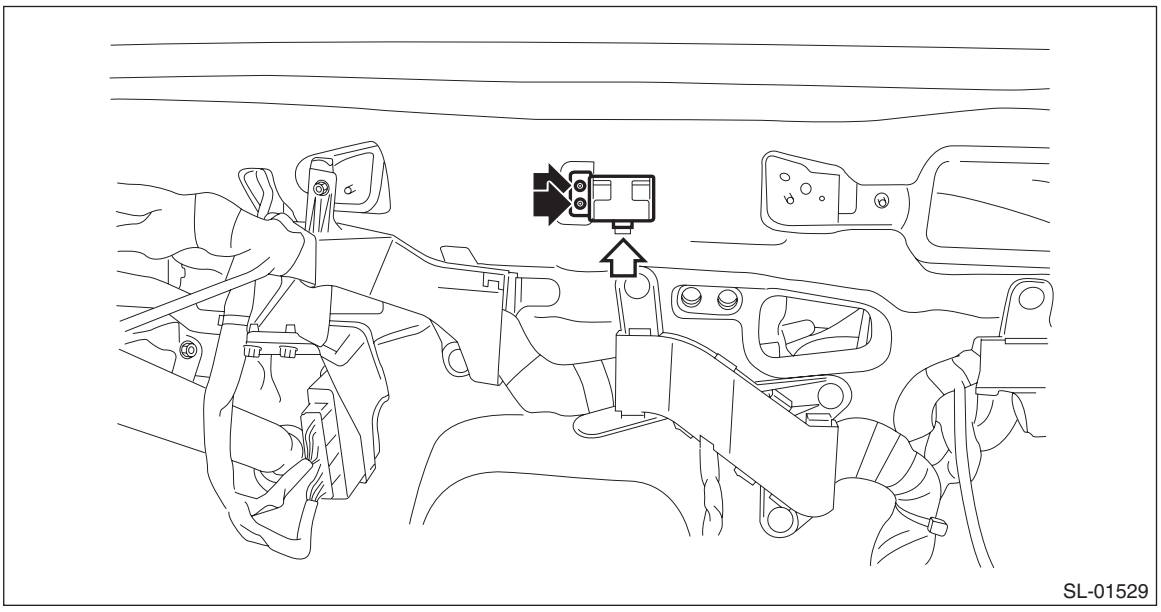
3) Install each part in the reverse order of removal.

21.Security Control Module

A: REMOVAL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform "VSC(VDC) Centering Mode" of the VDC. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

1) Remove the steering wheel. <Ref. to PS-9, REMOVAL, Steering Wheel.>
2) Remove the instrument panel assembly. <Ref. to EI-79, REMOVAL, Instrument Panel Assembly.>
3) Remove the heater and cooling unit assembly. <Ref. to AC-57, REMOVAL, Heater and Cooling Unit.>
4) Remove the security control module.
   (1) Disconnect the connector.
   (2) Remove the nuts, and remove the security control module.


SL-01529

B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Security control module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

22.Impact Sensor

A: REMOVAL

1) Pull out the key from the ignition switch, or turn the power to OFF.
2) Close all the doors, trunk lid and rear gate.
3) Press the UNLOCK button of the keyless transmitter or access key.
4) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
5) Remove the impact sensor.
6) Change the setting of impact sensor using Subaru Select Monitor.

B: INSTALLATION

1) Pull out the key from the ignition switch, or turn the ignition switch to OFF.
2) Close all the doors, trunk lid and rear gate.
3) Press the UNLOCK button of the keyless transmitter or access key.
4) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
5) Install the impact sensor.
6) Change the setting of impact sensor using Subaru Select Monitor.

C: OPERATION

1. IMPACT SENSOR SETTING USING SUBARU SELECT MONITOR

1) Make an impact monitor setting.
   (1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to “Application help”.
   (2) Turn the ignition switch to ON.
   (3) On «Start» display, select «Diagnosis».
   (4) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
   (5) On «Main Menu» display, select «Each System».
   (6) On «Select System» display, select «Body Control» and then select «Enter».
   (7) On «Select Function» display, select «Customize».
   (8) From the Customize item list, select «Impact sensor» or «Impact Sensor Setup».
   (9) Make an impact monitor setting.
   - When installing: ON
   - When removing: OFF

   (10) Make an impact monitor ON/OFF setting.
   - When installing: ON
   - When removing: OFF

   (11) Turn the ignition switch to OFF, and then remove the Subaru Select Monitor.

D: ADJUSTMENT

1. CHECK IMPACT SENSOR

1) Pull out the key from the ignition switch, or turn the ignition switch to OFF.
2) Close all the windows.
3) Close all the doors, trunk lid and rear gate. Leave open the front hood.
4) Press the LOCK button of the keyless transmitter or access key from outside of vehicle.
5) Check that the security indicator light blinks twice within 0.5 seconds in 2 second cycles after 30 seconds.
6) Hit all windows with the palm with force repeatedly, to check for whether the security alarm operates. Lift up the front hood approx. 12 cm (4.7 in) or more, and then drop it off to check the operation of security alarm.
7) If NG, adjust the impact sensitivity.

2. IMPACT SENSITIVITY ADJUSTMENT

1) Adjust the impact sensitivity.
   (1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to “Application help”.

   (2) Turn the ignition switch to ON.
   (3) On «Start» display, select «Diagnosis».
   (4) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
   (5) On «Main Menu» display, select «Each System».
   (6) On «Select System» display, select «Impact Sensor» and then «Enter».
   (7) On «Select Function» display, select «Work Support».
   (8) From the work support item list, select «Sensitivity Adjustment Mode».
   (9) Make a «Sensitivity Adjustment».
   - Sensitivity can be adjusted in 11 levels (0 to 10).
   - Initial setting is 5.
   - Smaller number means more sensitive.
   - Larger number means less sensitive.

   (10) Turn the ignition switch to OFF, and then remove the Subaru Select Monitor.

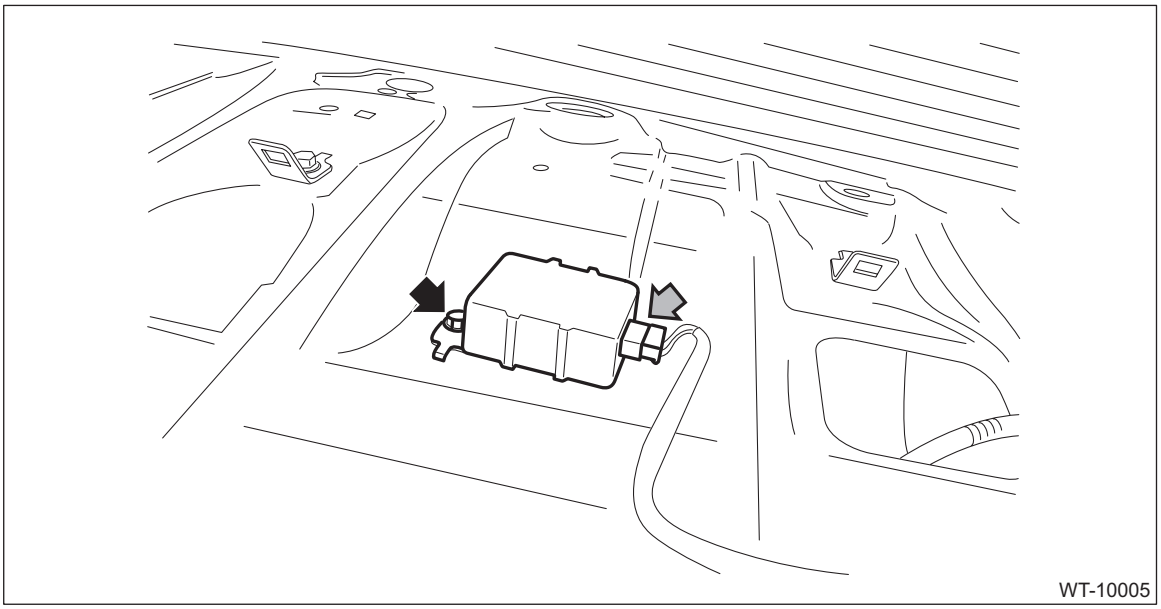
NOTE:
- Set the sensor so that it is not triggered by normal vibrations (someone reclining on the door, hit by a ball, etc.).
- Set the sensor to operate the alarm when the windshield glass or door is hit hard repeatedly, etc, where it can be assumed that there is an attempt to damage the car by a burglar, etc.
- Even if there is no burglary attempt, if there is vibration (road construction, elevated parking lots, passage of trains or boarding of ferries), the alarm can be triggered. Because of this, ask the customer about their parking conditions, and set an appropriate sensitivity level after discussion.
- If the sensitivity setting was not performed properly, a buzzer will sound four times. In this case, check that there is no error in CAN communication.

23.Keyless Entry Control Module

A: REMOVAL

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the trim panel assembly - rear shelf. <Ref. to EI-103, REMOVAL, Rear Shelf Trim.>
3) Remove the keyless entry control module.
   (1) Disconnect the connector.
   (2) Remove the bolt and then remove the keyless entry control module.

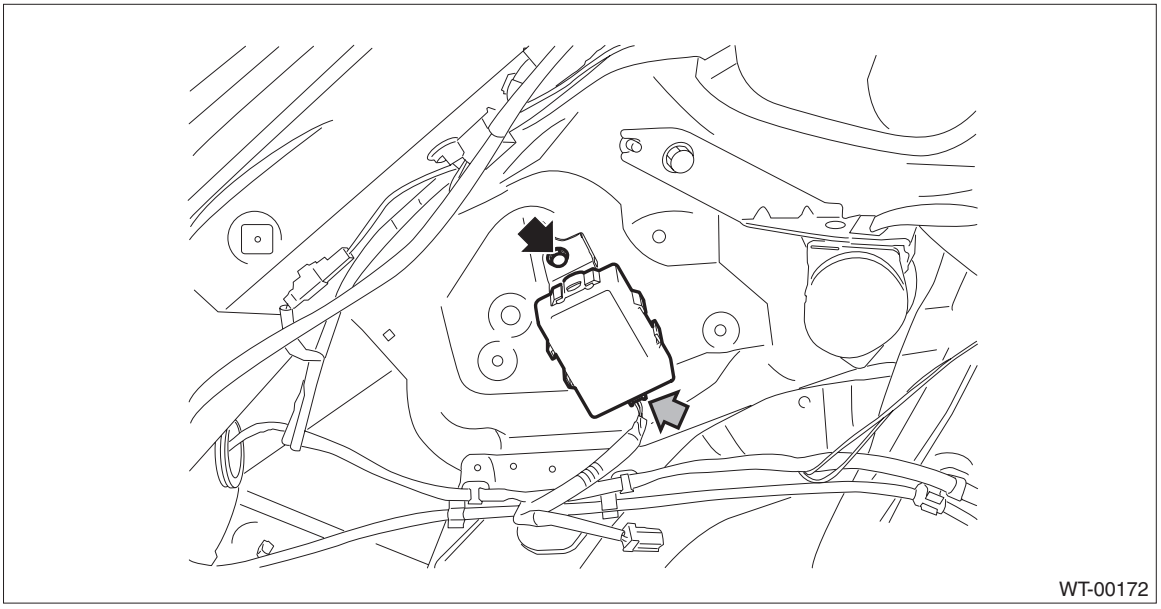


2. 5 DOOR MODEL/CROSSTREK MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear apron LH. <Ref. to EI-97, REMOVAL, Rear Quarter Trim.>
3) Remove the keyless entry control module.
   (1) Disconnect the connector.
   (2) Remove the bolt and then remove the keyless entry control module.



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Keyless entry control module: 13 N·m (1.33 kgf-m, 9.6 ft-lb)

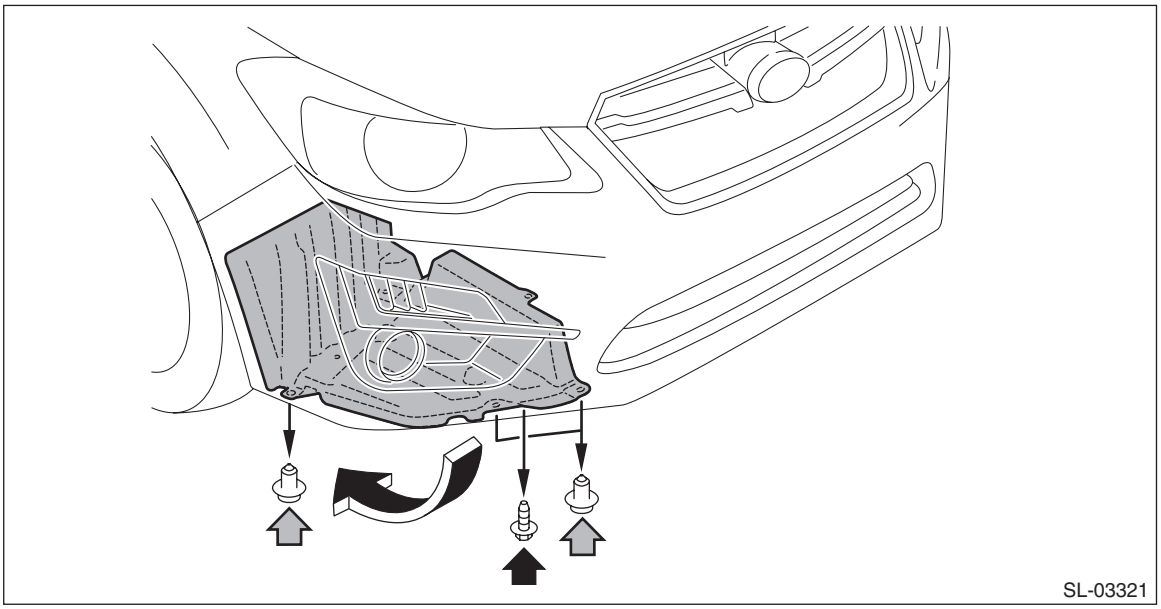
24.Keyless Buzzer

A: REMOVAL

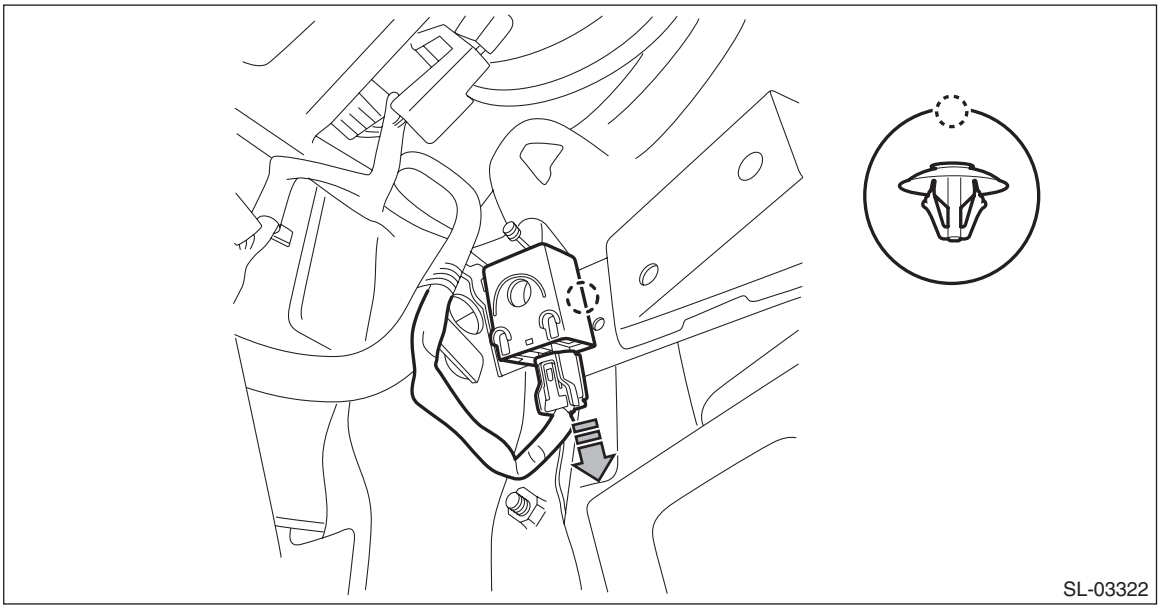
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

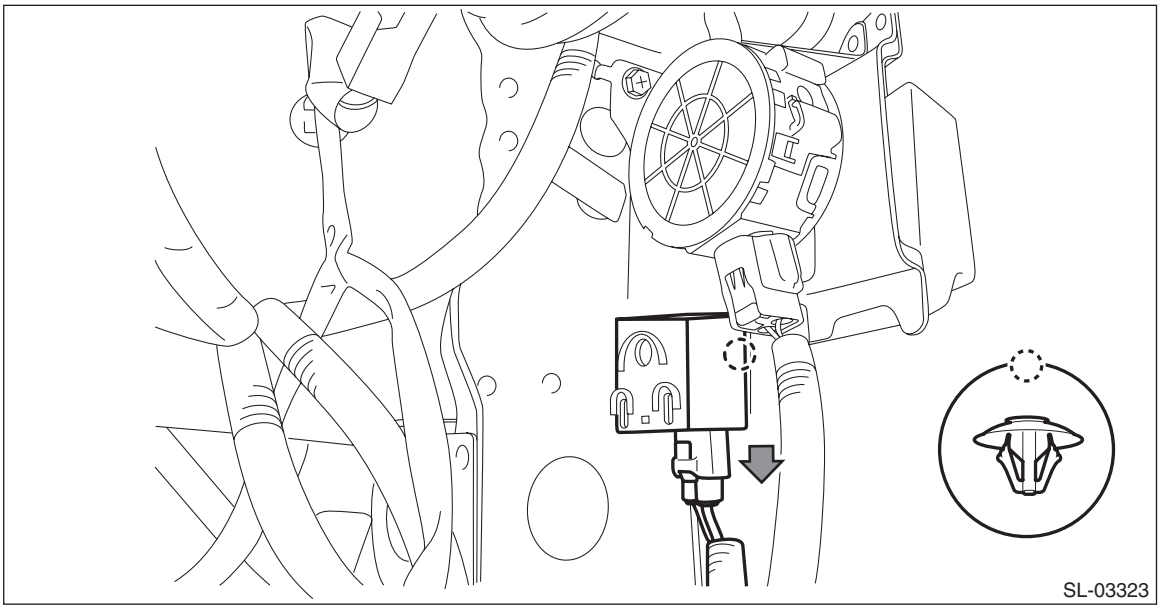
2) Lift up the vehicle.
3) Remove the clips and screws, and turn over the front side of the mud guard - front.


SL-03321

4) Remove the keyless buzzer.
   (1) Disconnect the connector.
   (2) Remove the clip and detach the keyless buzzer.
   • Gasoline engine model


SL-03322

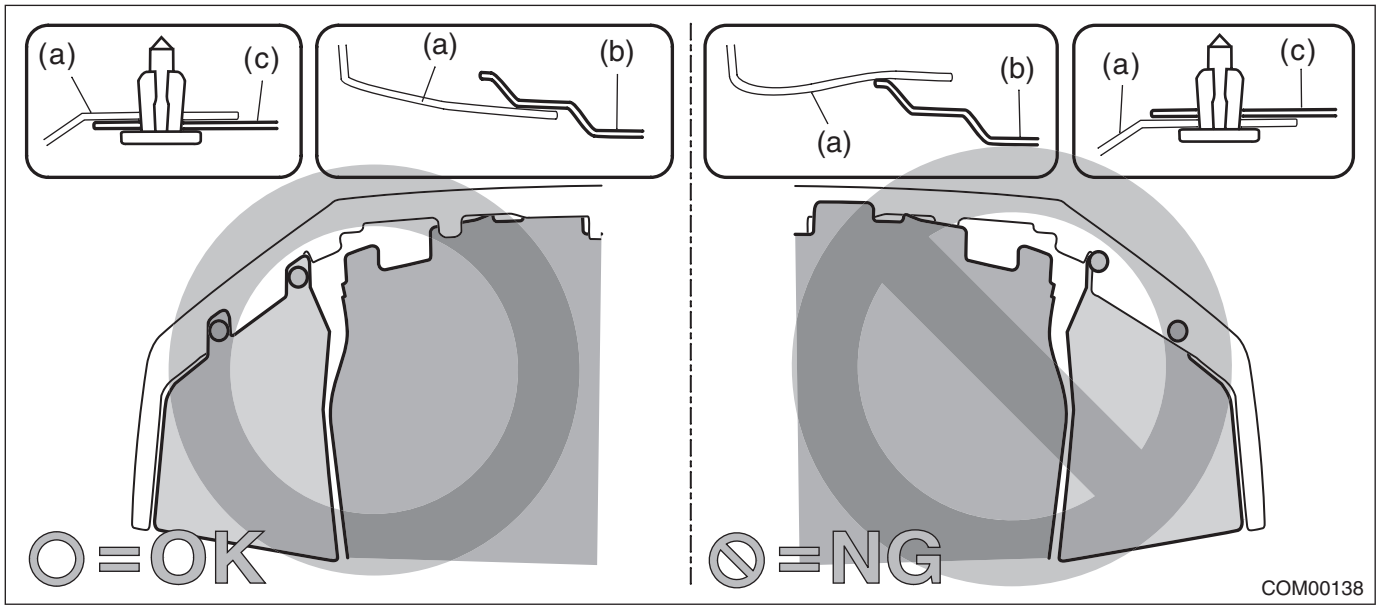
- HEV model



B: INSTALLATION

Install each part in the reverse order of removal.

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



C: INSPECTION

Using the Subaru Select Monitor, perform forced operation of the keyless buzzer. <Ref. to BC(diag)-17, OPERATION, User Customizing.>
If the buzzer does not sound, replace the keyless buzzer.

25.Body Integrated Unit

A: NOTE

1. WHEN REPLACING THE BODY INTEGRATED UNIT

1) Check and record the current setting. <Ref. to BC(diag)-20, CONFIRM CURRENT SETTING, OPERATION, Registration Body Integrated Unit.>
2) Prepare all immobilizer keys already registered. (Models without the keyless access with push button start)

NOTE:
If some of the registered immobilizer keys are missing, the following parts must be replaced.
- Except for C5 model: combination meter
- For C5 model: security control module

2. AFTER REPLACING THE BODY INTEGRATED UNIT

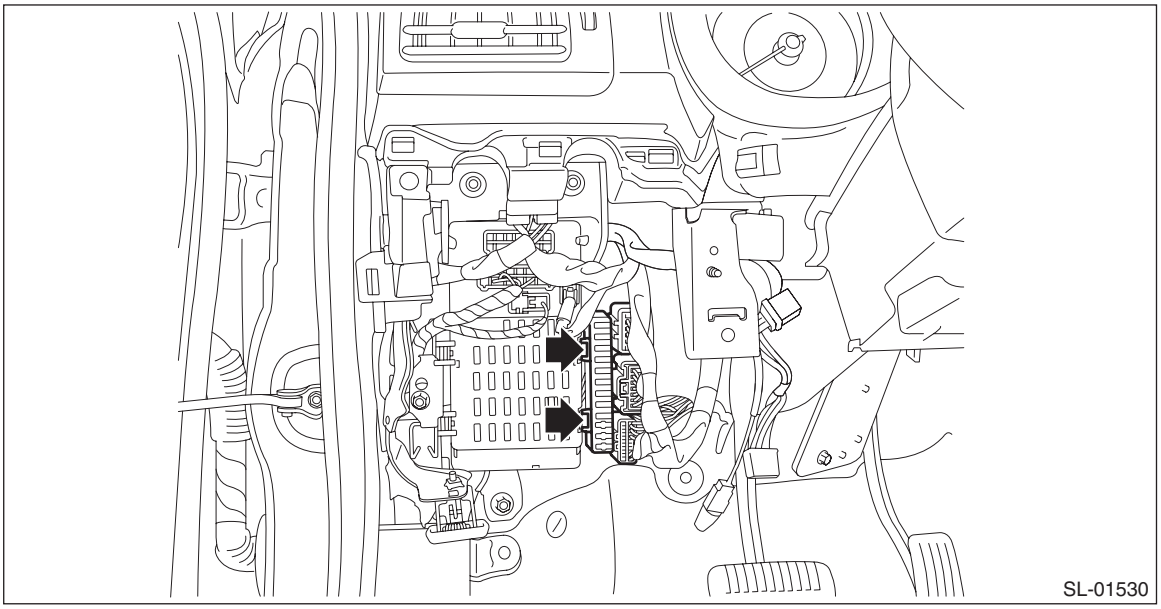
1) Register the immobilizer. (Models without the keyless access with push button start)

NOTE:
For detailed operation procedure, refer to the “REGISTRATION MANUAL FOR IMMOBILIZER”.
2) Set the current settings as recorded.

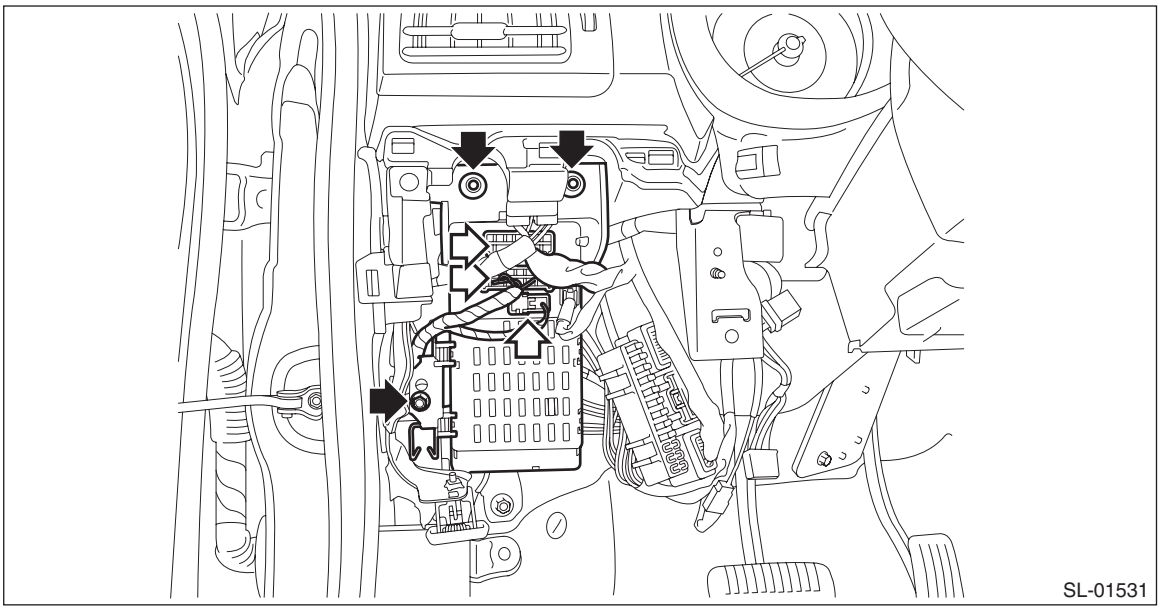
B: REMOVAL

CAUTION:
Before handling the airbag system components, refer to “CAUTION” of “General Description” in “AIRBAG SYSTEM”. <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Release the lock and remove the fuse holder.

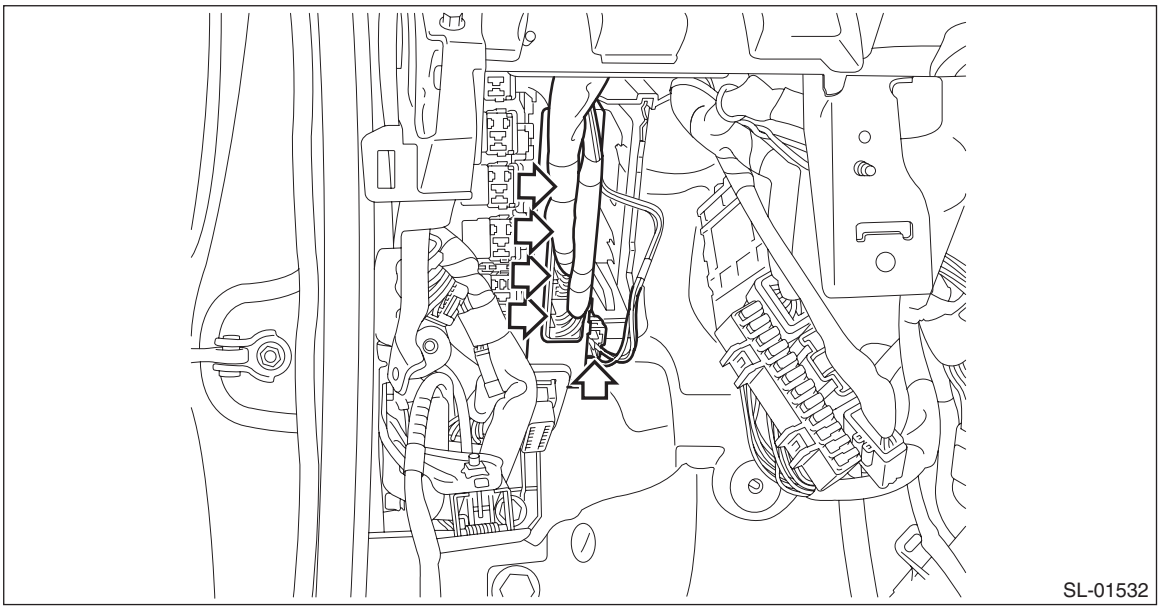


5) Remove the relay & fuse box.
(1) Disconnect the connector.
(2) Remove the bolts and nuts, and remove the relay & fuse box.

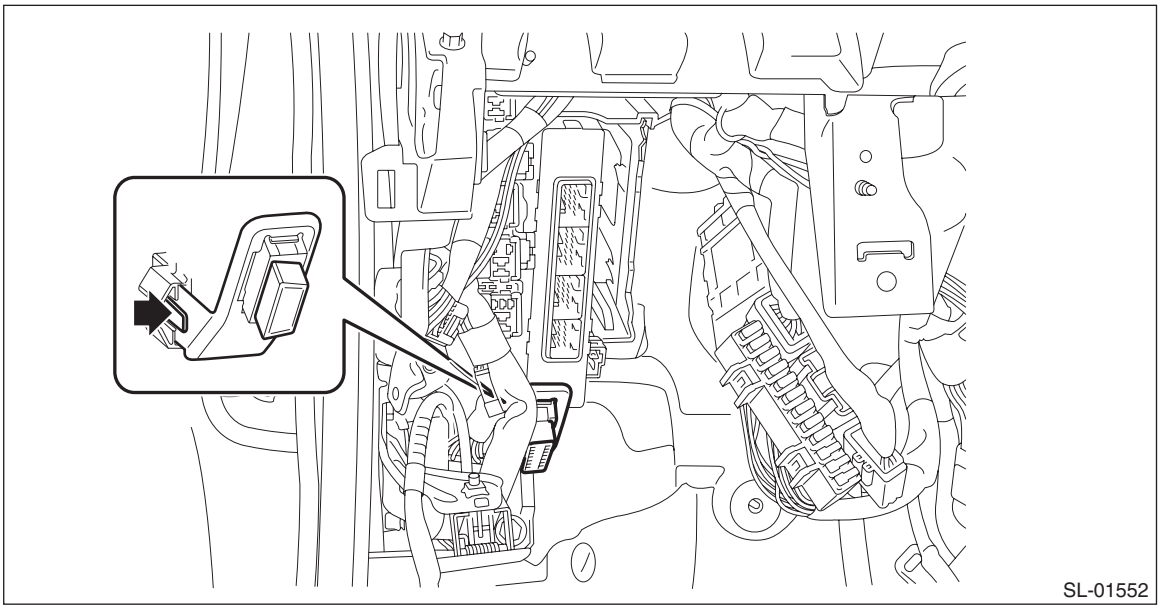

SL-01531

6) Remove the body integrated unit.

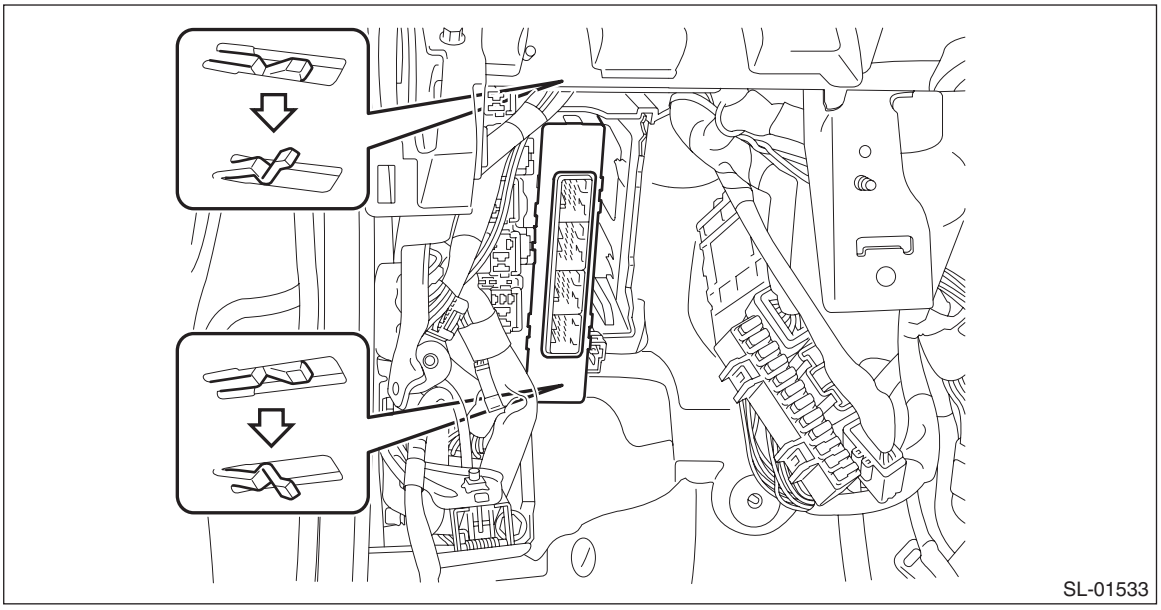
CAUTION:
Be careful to keep water and other foreign materials away from body integrated unit.
(1) Disconnect the connector.


SL-01532

(2) Release the lock, and remove the data link connector bracket from the bracket.



(3) Release the claws, and pull out the body integrated unit from the bracket.



C: INSTALLATION

CAUTION:

- **Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>**
- **Do not allow harness and connectors to interfere or get tangled up with other parts.**

Install each part in the reverse order of removal.

Tightening torque:

Relay & fuse box: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

NOTE:

Make sure that there are no differences from the contents of the current settings after installation. <Ref. to BC(diag)-12, LIST, Read Current Data.>

26.Keyless Transmitter

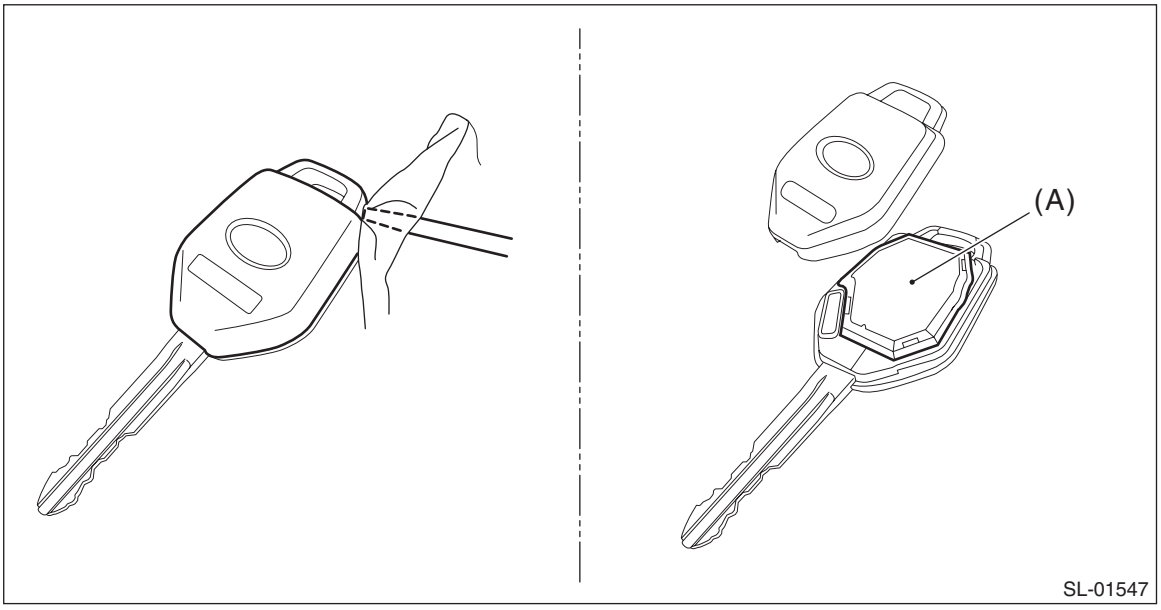
A: REMOVAL

1. KEYLESS TRANSMITTER BATTERY

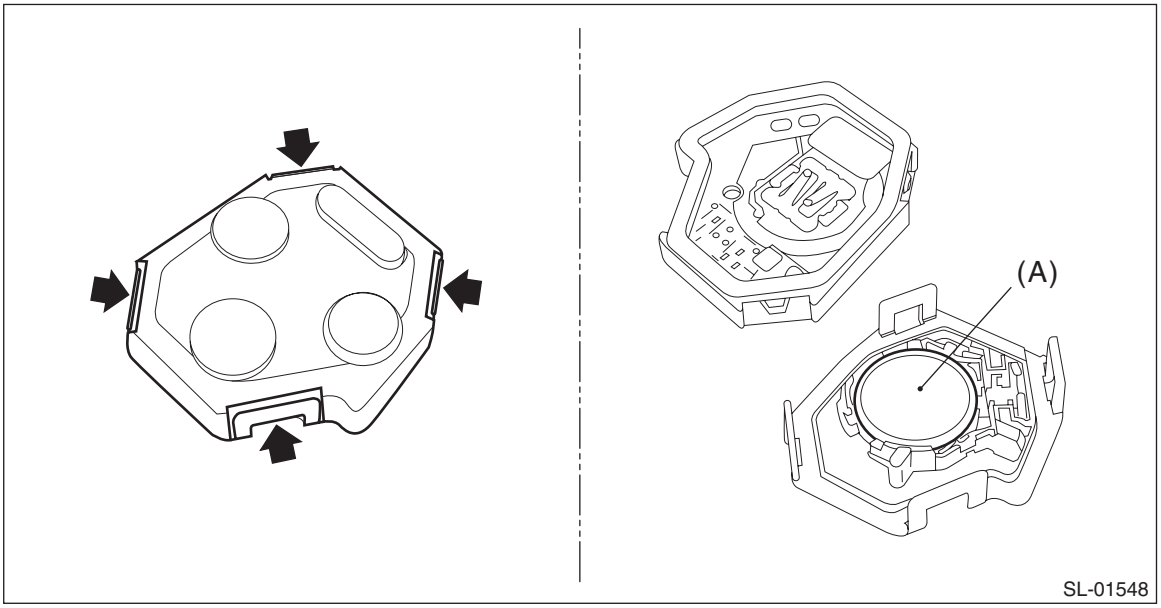
CAUTION:
To prevent static electricity damage to the keyless transmitter printed circuit board, touch the steel area of building with hand to discharge static electricity carried on body or clothes before disassembling the keyless transmitter.

1) Remove the keyless transmitter cover, and take out the transmitter case (A).

NOTE:
Use a flat tip screwdriver with protective tape or cloth in order not to damage the components.



2) Release the claws to open the transmitter case, then remove the battery (A).



B: INSTALLATION

1. KEYLESS TRANSMITTER BATTERY

Install each part in the reverse order of removal.

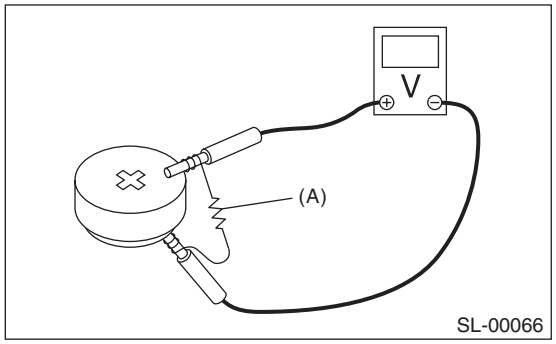
C: INSPECTION

1. KEYLESS TRANSMITTER BATTERY

1) Check the keyless transmitter battery voltage.

PREPARATION TOOL:
Circuit tester

NOTE:
Complete the measurement within 5 seconds because the battery discharges during measurement.



Battery terminal	Inspection Conditions	Standard
(+) — (–)	Connect resistor (A) 47 Ω	2.5 — 3.0 V

2) Replace the battery if the inspection result is not within the standard. (Use CR1620 or equivalent.)

D: REPLACEMENT

1. REGISTRATION OF KEYLESS TRANSMITTER WITH SUBARU SELECT MONITOR

NOTE:
- A maximum of four keyless transmitters can be registered for each individual vehicle.
- When replacing or adding the keyless transmitter, new registration of transmitter is necessary.

1) Register the transmitter.
(1) Connect the Subaru Select Monitor to data link connector.

NOTE:
For detailed operation procedures, refer to “Application help”.
(2) Turn the ignition switch to ON.
(3) On «Start» display, select «Diagnosis».
(4) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
(5) On «Main Menu» display, select «Each System».
(6) On «Select System» display, select «Integ. Unit Mode» and select «Enter».
(7) On «Select Function» display, select «Work Support».
(8) On «Work Support» display, select «Keyless ID registration».
(9) According to the directions on the screen, press the button of the transmitter to be registered in the LOCK → UNLOCK order. When registration completed, external buzzer sound once. Repeat the registration as many times as desired.
(10) Press the [Exit] button to finish the operations.

NOTE:
When attempting to register a key that has already been registered, the external buzzer sounds twice.

27.Access Key

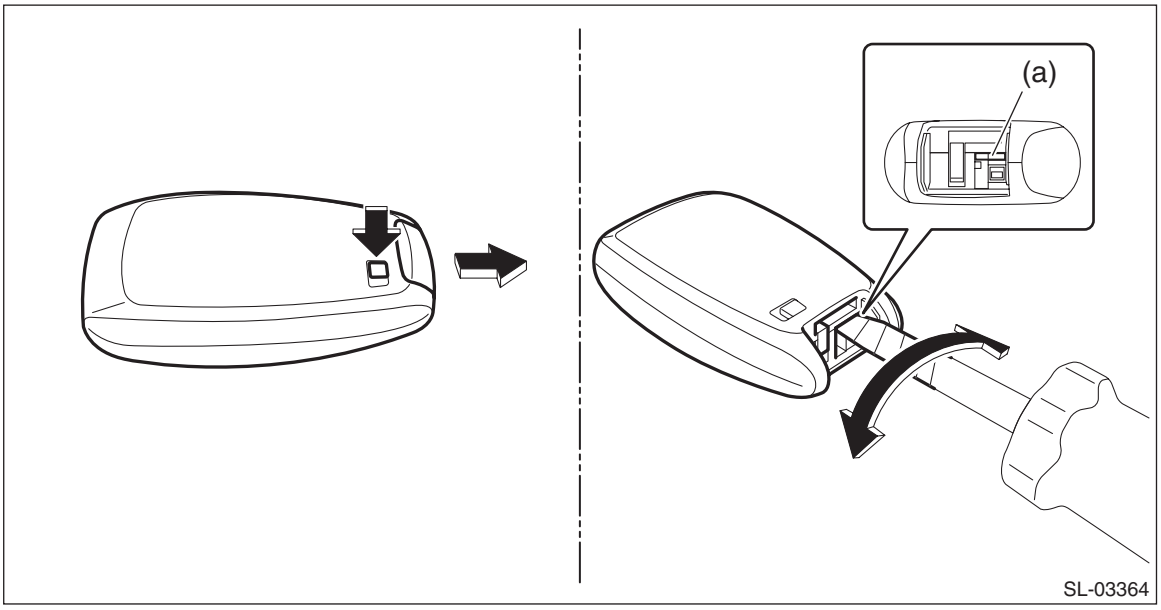
A: REMOVAL

NOTE:
Refer to keyless transmitter for model without keyless access with push button start. <Ref. to SL-83, KEYLESS TRANSMITTER BATTERY, REMOVAL, Keyless Transmitter.>

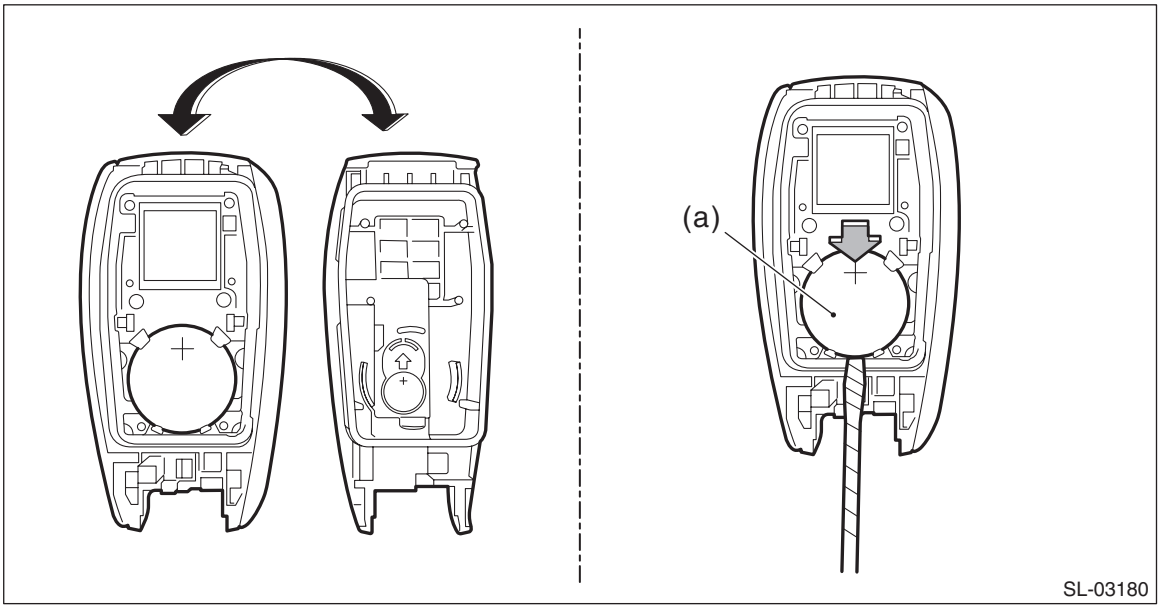
1. ACCESS KEY BATTERY

CAUTION:
To prevent static electricity damage to the access key printed circuit board, touch the steel area of building with hand to discharge static electricity carried on body or clothes before disassembling the access key.

1) Push the lock button and remove the mechanical key from the access key.
2) Insert a flat tip screwdriver end wrapped with insulating tape etc. into the slit (a) of the access key to open the case.



3) Insert a flat tip screwdriver wrapped with insulating tape, and while holding the upper side of the battery (a), remove the battery (a) from the case.



B: INSTALLATION

1. ACCESS KEY BATTERY

Install each part in the reverse order of removal.

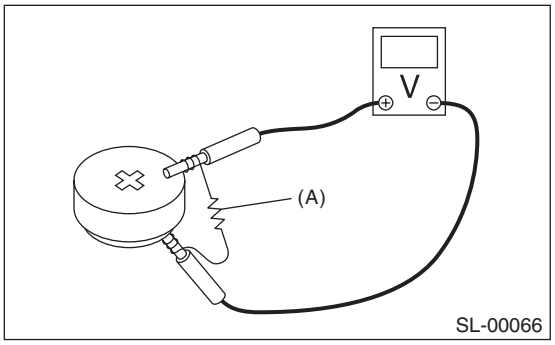
C: INSPECTION

1. ACCESS KEY BATTERY

Check the access key battery voltage.

Preparation tool:
Circuit tester

NOTE:
Complete the measurement within 5 seconds because the battery discharges during measurement.



Battery terminal	Inspection conditions	Standard
(+) — (–)	Connect resistor (A) 47 Ω	2.5 — 3.0 V

Replace the battery if the inspection result is not within the standard value. (Use CR2032V or equivalent.)

D: REPLACEMENT

1. ACCESS KEY REGISTRATION

NOTE:
- A maximum of seven access keys can be registered for each individual vehicle.
- When replacing or adding an access key, new registration of the access key is necessary.
- When the access key has been newly added, it is registered to the immobilizer system at the same time.

2. CLEARING ACCESS KEY REGISTRATION

Refer to the “REGISTRATION MANUAL FOR IMMOBILIZER” for clearing access key registration.

28.Immobilizer Control Module

A: NOTE

The control of immobilizer system is carried out in body integrated unit. For the detailed procedure, refer to the section of body integrated unit.

- Removal: <Ref. to SL-80, REMOVAL, Body Integrated Unit.>
- Installation: <Ref. to SL-82, INSTALLATION, Body Integrated Unit.>

29.Immobilizer Antenna

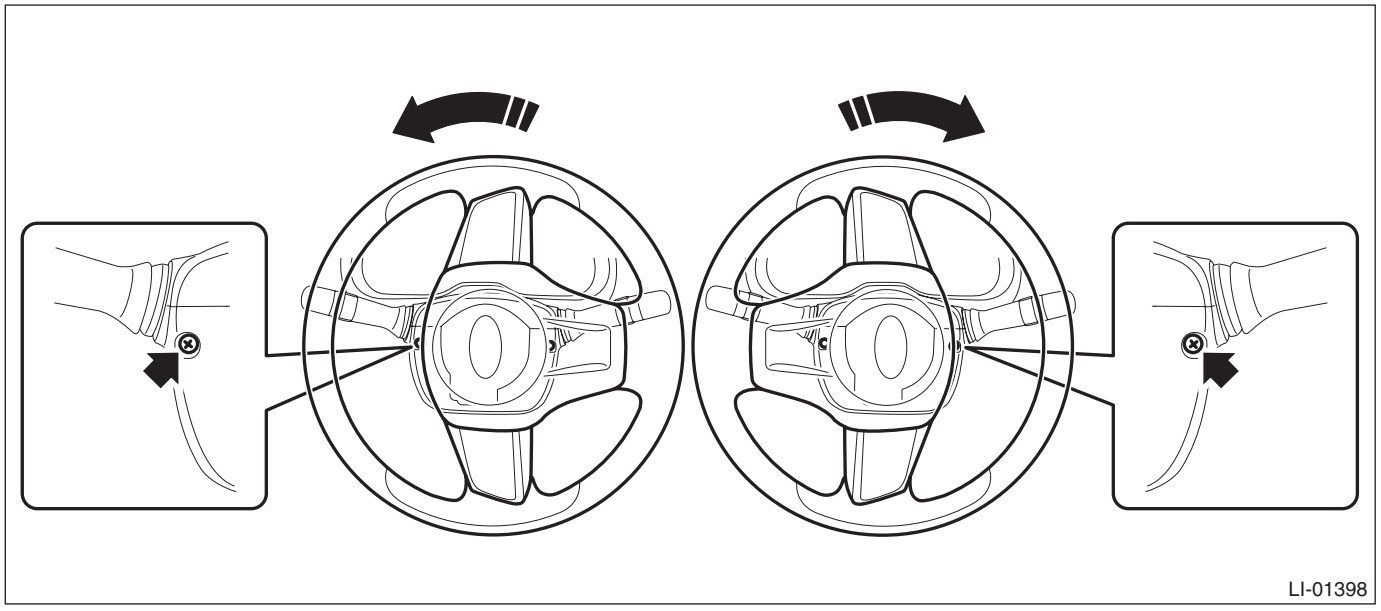
A: REMOVAL

1. MODEL WITHOUT KEYLESS ACCESS WITH PUSH BUTTON START

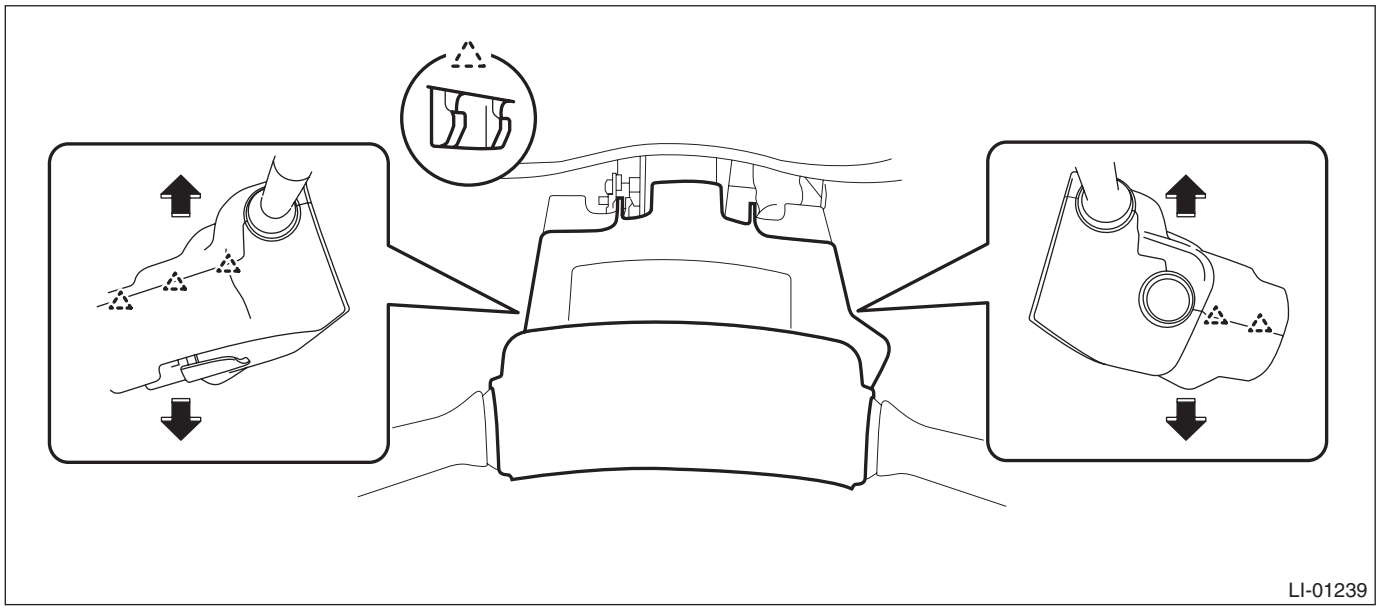
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the cover assembly - column.
   (1) Remove the screws by turning the steering wheel to right and left.

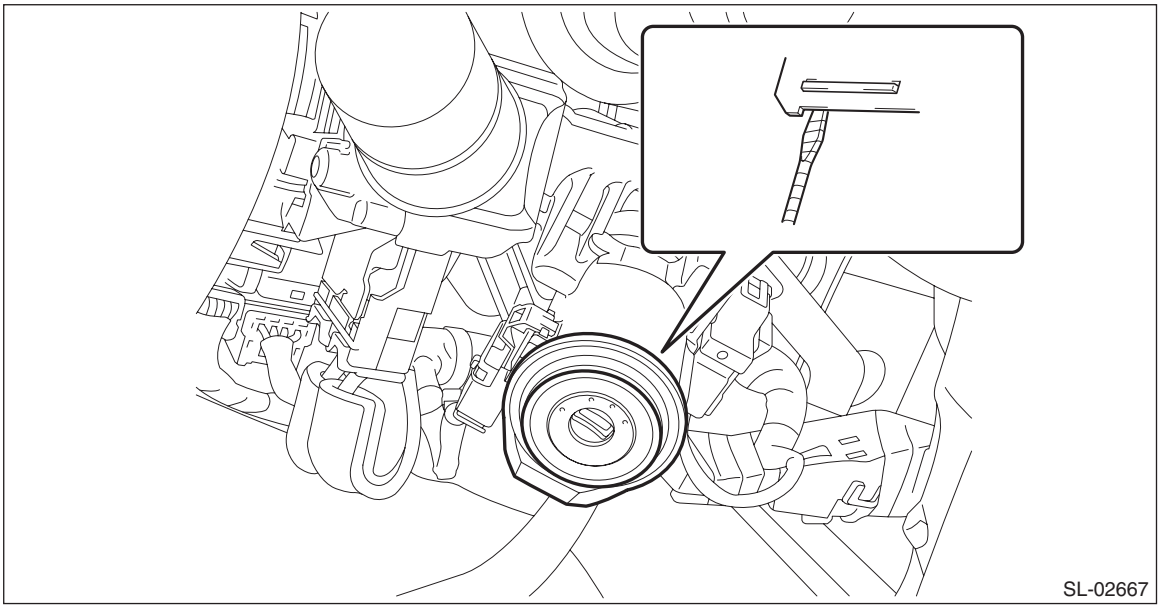


   (2) Release the claw, and remove the cover assembly - column UPR and the cover assembly - column LWR.



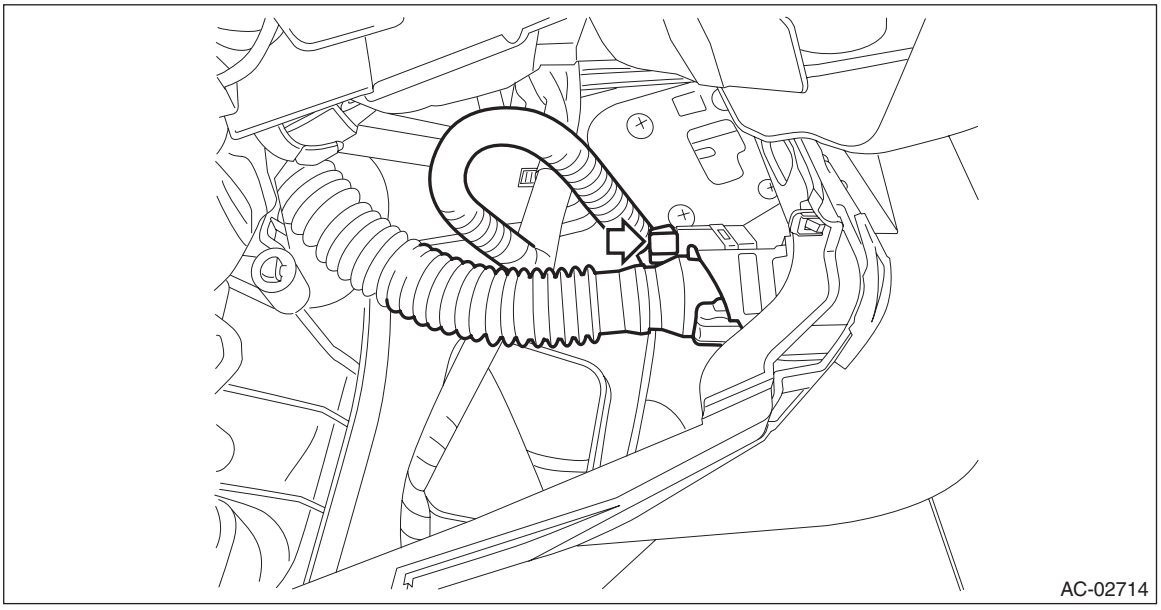
3) Remove the immobilizer antenna assembly.
(1) Disconnect the connector.
(2) Release two claws using a flat tip screwdriver or similar tool wrapped with a protection tape, and remove the immobilizer antenna assembly.

CAUTION:
Do not apply excessive force to disengage the lock of immobilizer antenna assembly. Otherwise they may be broken because those parts are the products made of a plastic.



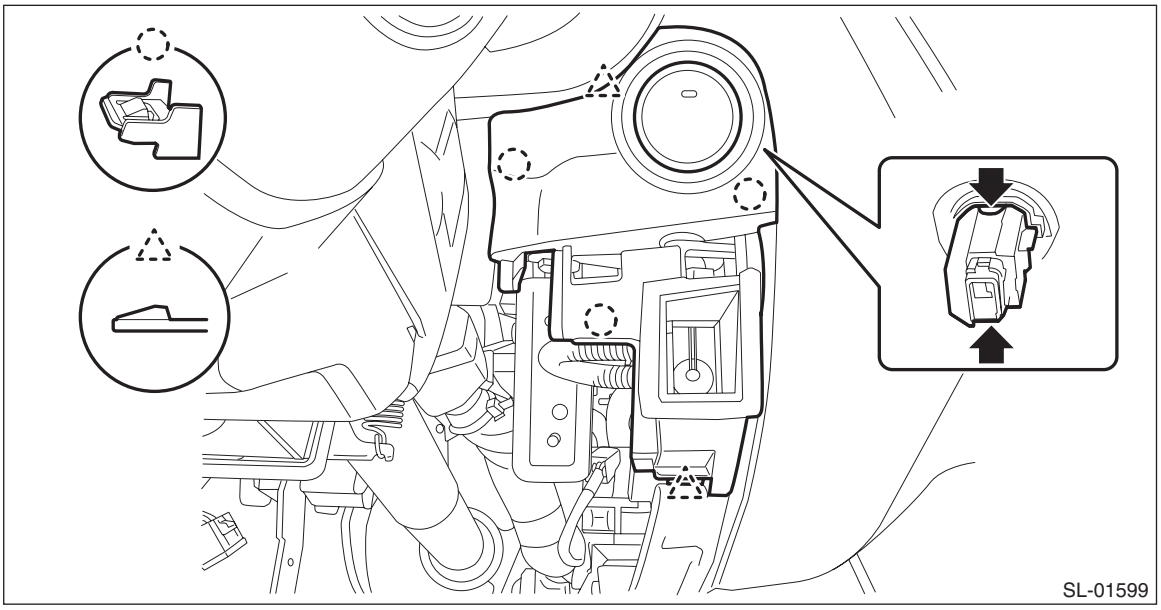
2. MODEL WITH KEYLESS ACCESS WITH PUSH BUTTON START

NOTE:
Immobilizer antenna is integrated with the push button ignition switch.
1) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
2) Remove the push button ignition switch.
(1) Disconnect the connector, and remove the aspirator hose.



(2) Release the claws, and then remove the panel - switch.

(3) Release the claws, and then remove the push button ignition switch from the panel - switch.



B: INSTALLATION

Install each part in the reverse order of removal.

30.Keyless Access Indoor Antenna

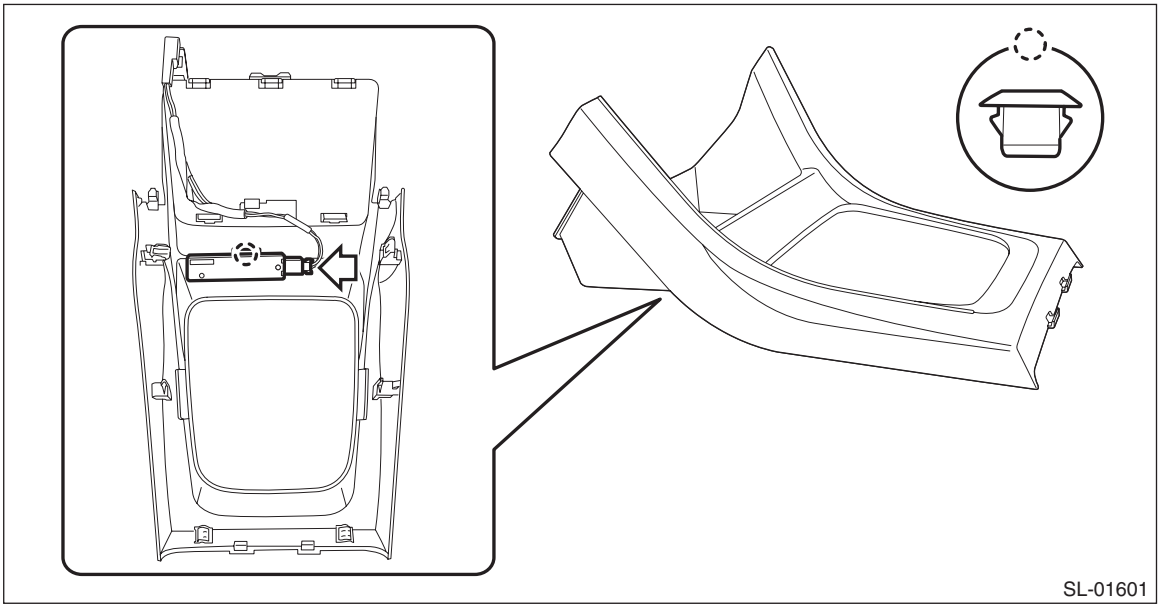
A: REMOVAL

1. FRONT ANTENNA

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the cover - shift lever. <Ref. to EI-77, REMOVAL, Console Box.>
3) Disconnect the connector and remove the front antenna assembly - interior.



2. CENTER ANTENNA

NOTE:
Equipped with 4 door model and HEV model.

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

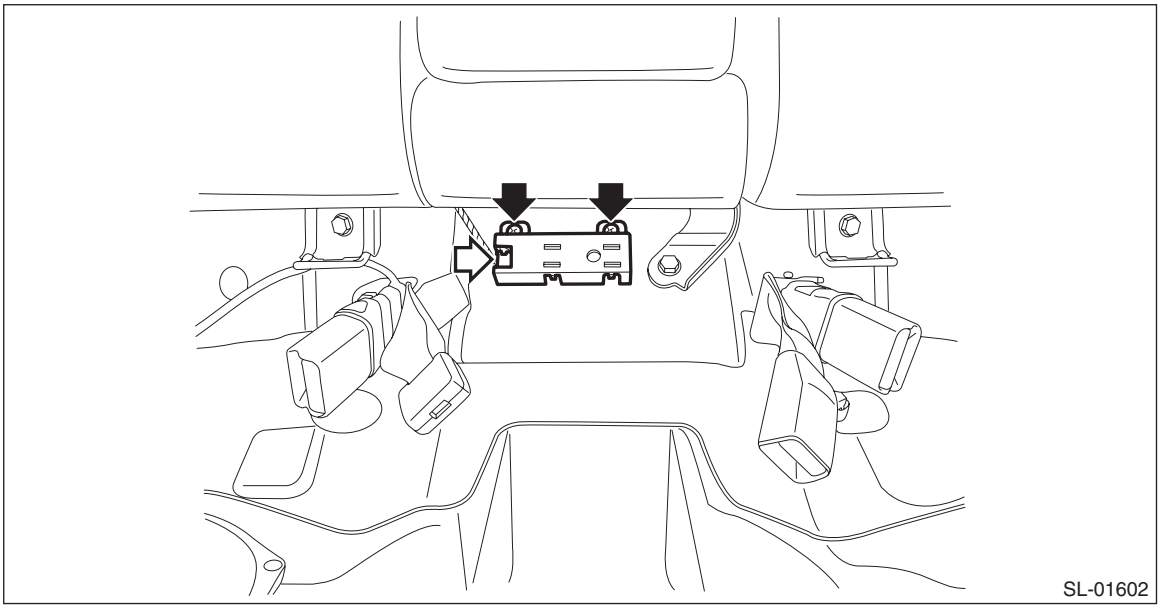
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>

3) Remove the center antenna assembly - interior.

NOTE:
Do not remove the antenna assembly from the cover. If removed, the antenna assembly and cover mounting becomes loose, causing abnormal noises.

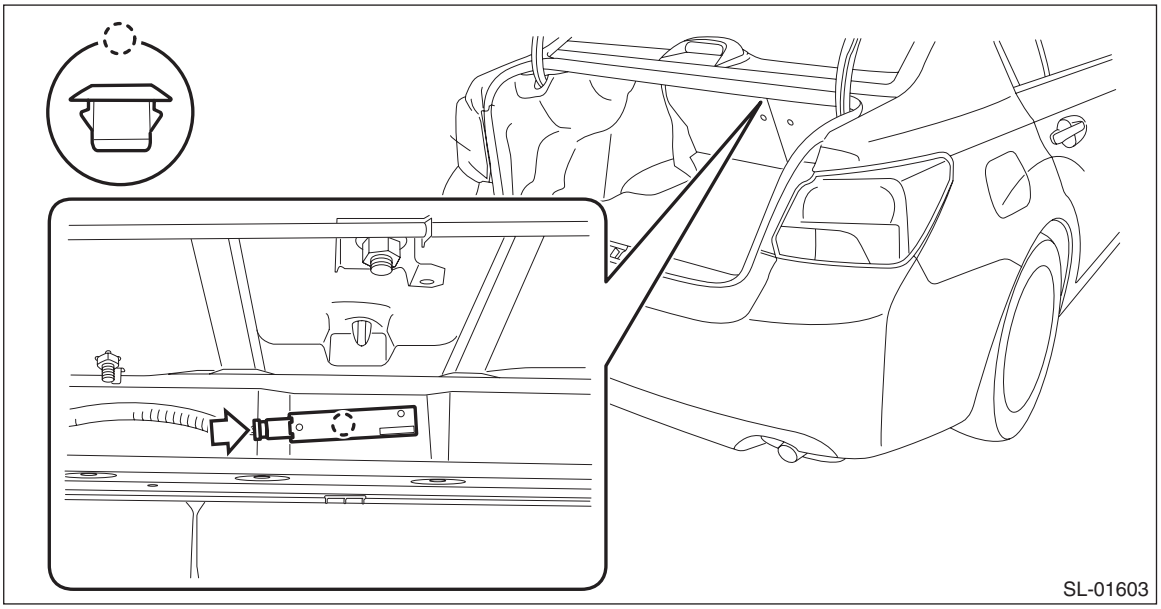
(1) Disconnect the connector.
(2) Remove the screw, and remove the center antenna assembly - interior.



3. REAR ANTENNA

• 4 door model

1) Disconnect the ground cable from battery.
2) Disconnect the connector and remove the rear antenna assembly - interior.

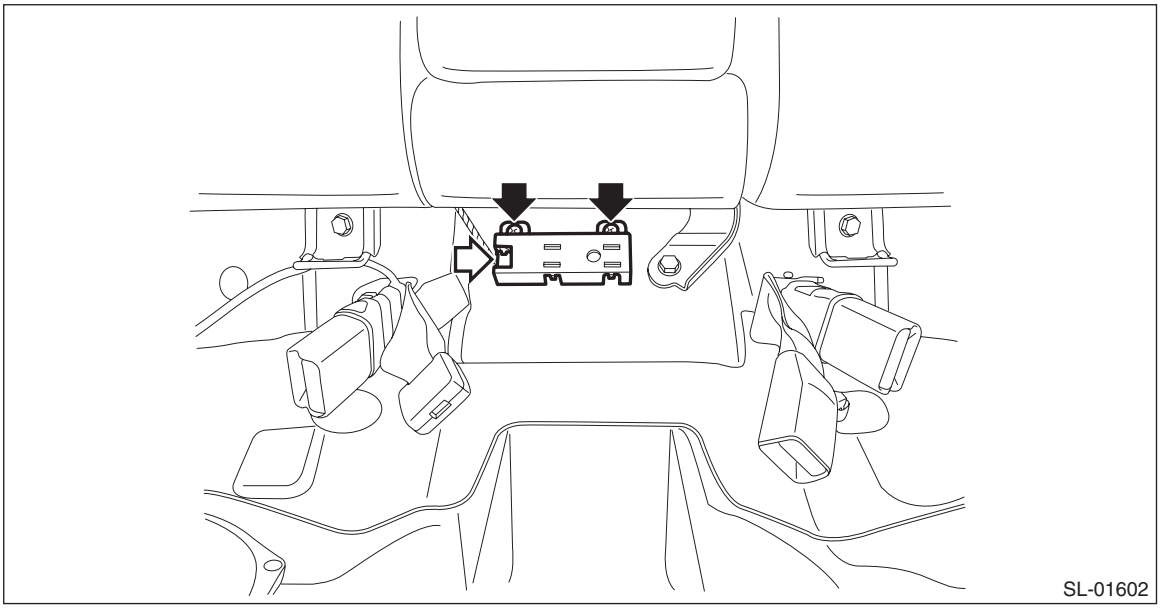


• 5 door model/Crosstrek model

1) Disconnect the ground cable from battery.
2) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
3) Remove the rear antenna assembly - interior.

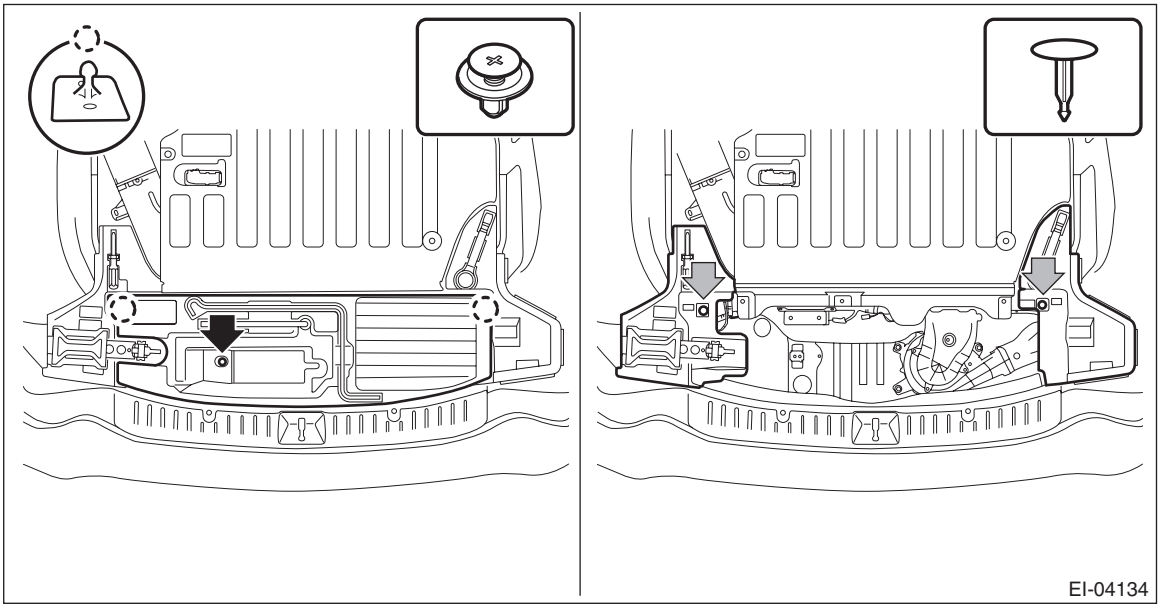
NOTE:
Do not remove the antenna assembly from the cover. If removed, the antenna assembly and cover mounting becomes loose, causing abnormal noises.

(1) Disconnect the connector.
(2) Remove the screw, and remove the rear antenna assembly - interior.

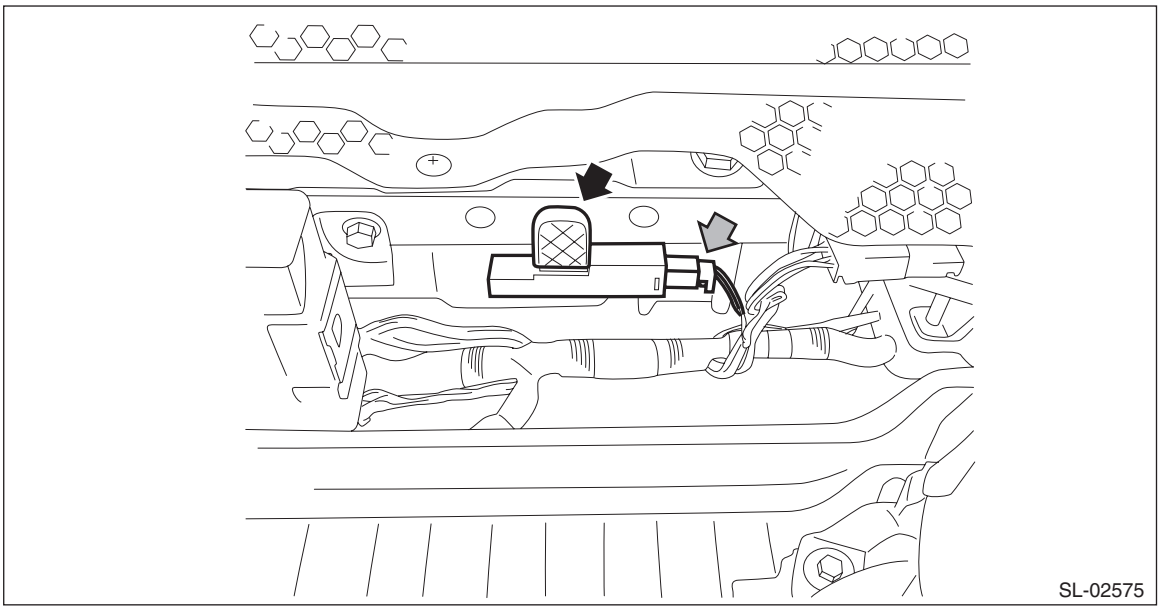


• HEV model

1) Disconnect the ground terminal from 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the mat - rear floor CTR.
3) Remove the clips, and remove the sub-trunk box.



4) Remove the rear antenna assembly - interior.
(1) Disconnect the connector.
(2) Release the claw, and remove the rear antenna assembly - interior.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

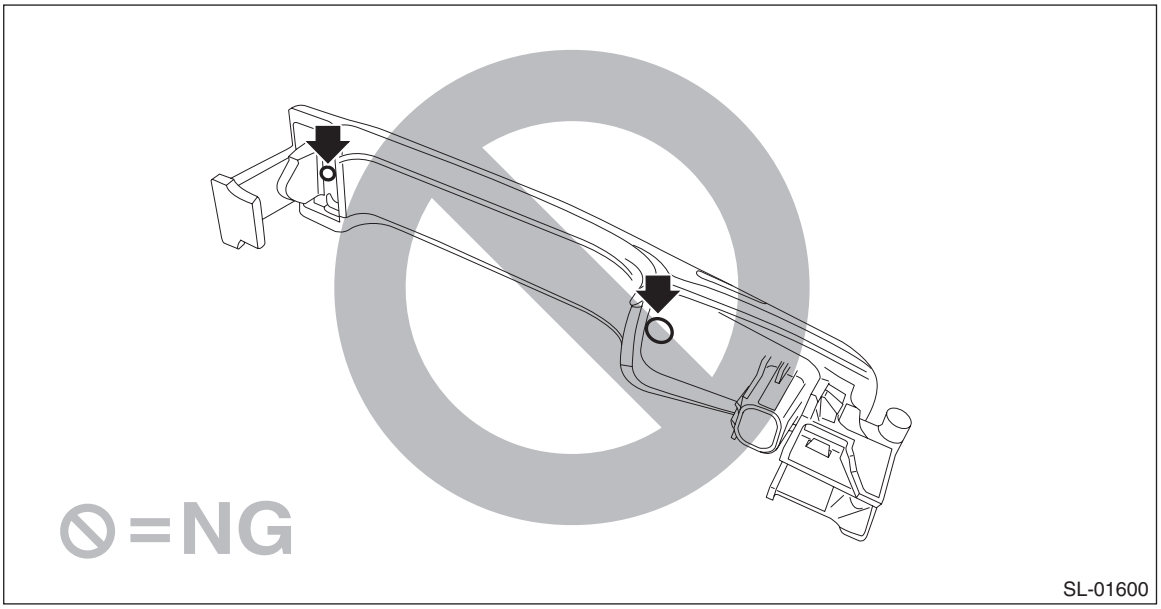
1) Check the setting by performing Keyless access system check using the Subaru Select Monitor. <Ref. to KPS(diag)-36, OPERATION, Keyless Access System Check.>
2) Disconnect the Subaru Select Monitor. Operate the touch sensor of the door outer handle to check if door lock operates.
3) If the system does not operate normally as the result of inspection, refer to “General Diagnostic Table” of the “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-108, KEYLESS ACCESS SYSTEM, INSPECTION, General Diagnostic Table.>

31.Keyless Access Outdoor Antenna

A: REMOVAL

1. FRONT ANTENNA

CAUTION:
Do not remove the antenna from the front door outer handle.
If replacement is needed, replace the front outer handle assembly as a set.



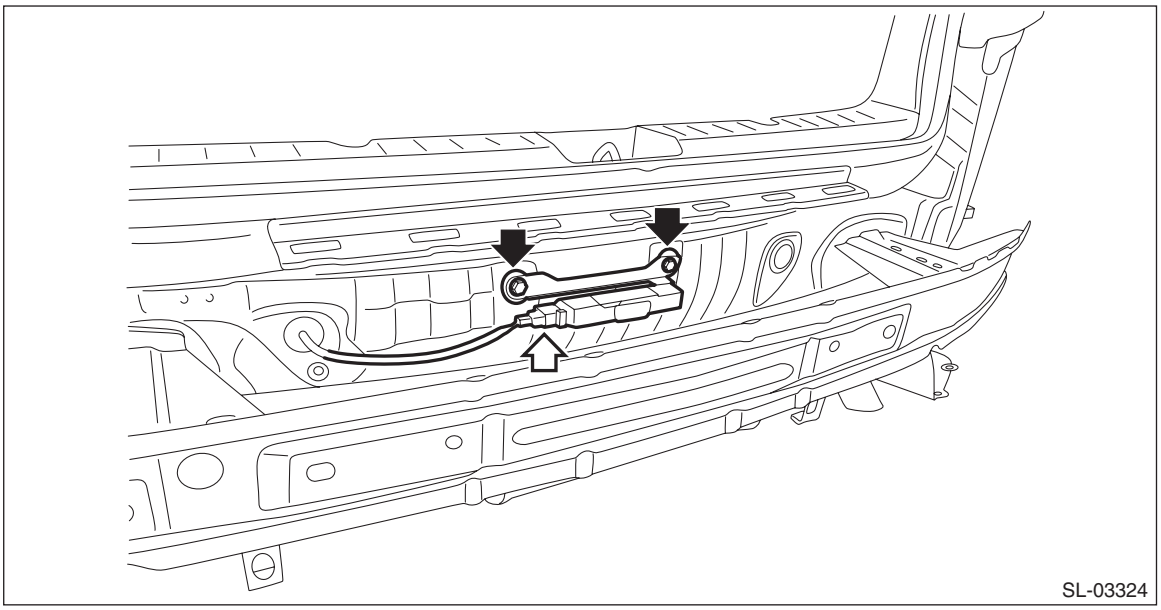
Remove the handle - door outer. <Ref. to SL-35, REMOVAL, Front Outer Handle.>

2. REAR ANTENNA

CAUTION:
• Do not detach the antenna except when replacing it. Detaching unnecessarily will lead to insecure attachment of the antenna.
• When replacing the antenna, do not reuse the tapping screw. Always replace with new tapping screws.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the bumper face - rear. <Ref. to EI-52, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Rear Bumper.>

3) Remove the rear antenna assembly - exterior.
(1) Disconnect the connector.
(2) Remove the screws, and remove the rear antenna assembly - exterior.



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Rear antenna assembly - exterior: 1.5 N·m (0.2 kgf-m, 1.1 ft-lb)

C: INSPECTION

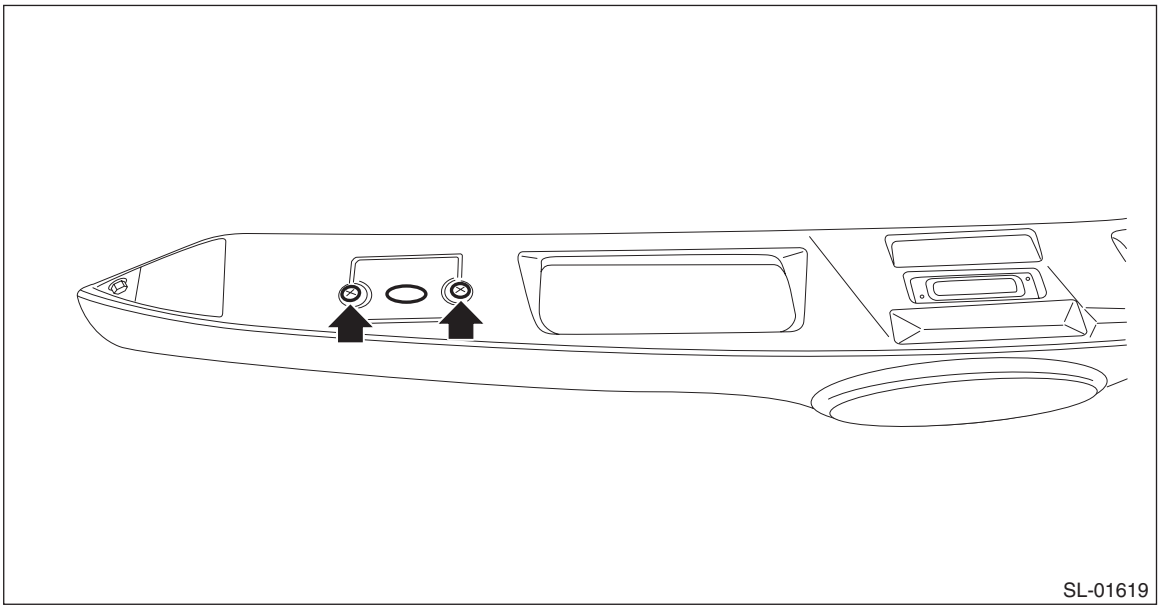
1) Check the setting by performing Keyless access system check using the Subaru Select Monitor. <Ref. to KPS(diag)-36, OPERATION, Keyless Access System Check.>
2) Disconnect the Subaru Select Monitor. While bringing the access key, operate the touch sensor on door handle to check if door lock or unlock operates.
3) Disconnect the Subaru Select Monitor. While bringing the access key, operate the opener switch on the rear gate and the lock request switch to check if the door lock or lock operates. (5 door model/Crosstrek model)
4) Disconnect the Subaru Select Monitor. While bringing the access key, operate the trunk opener button to check if the trunk is opened. (4 door model)
5) If the system does not operate normally as the result of inspection, refer to “General Diagnostic Table” of the “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-108, KEYLESS ACCESS SYSTEM, INSPECTION, General Diagnostic Table.>

32.Rear Lock Button

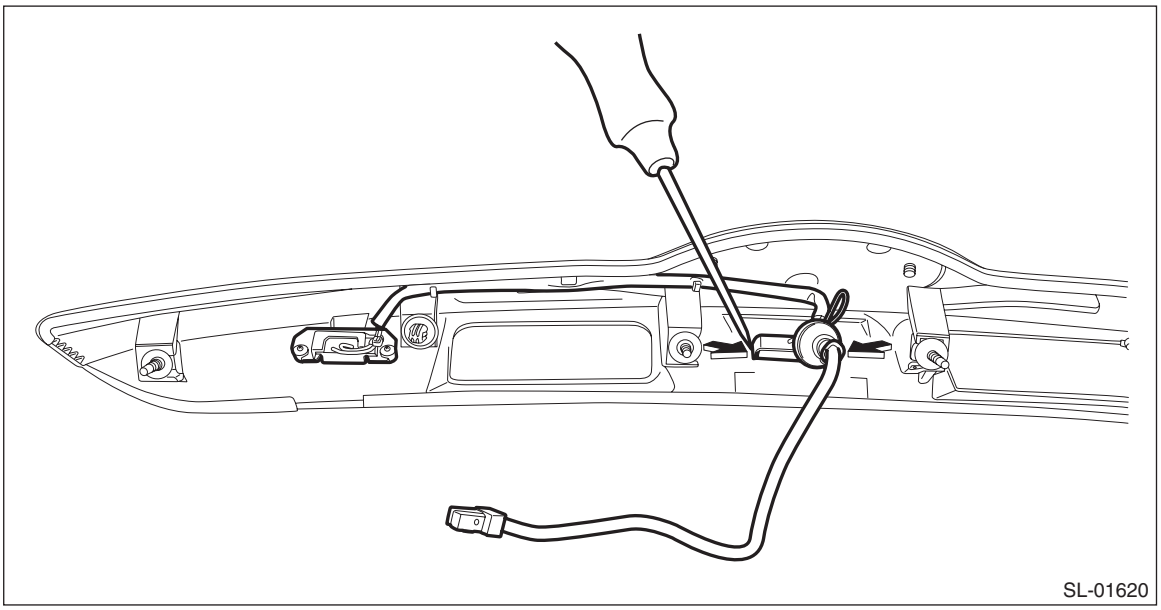
A: REMOVAL

NOTE:
The rear lock button is integrated into the rear gate opener button.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the garnish assembly - rear gate. <Ref. to EI-127, REMOVAL, Rear Gate Garnish.>
3) Remove the screws and remove the rear lock button.


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4) Release the locks at both ends of the button - opener rear gate by pushing them with a flat tip screwdriver, remove the button - opener rear gate and remove the integrated harness.


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B: INSTALLATION

CAUTION:
Make sure that the harness grommet is securely installed.
If not properly installed, this may cause leaks.
Install each part in the reverse order of removal.

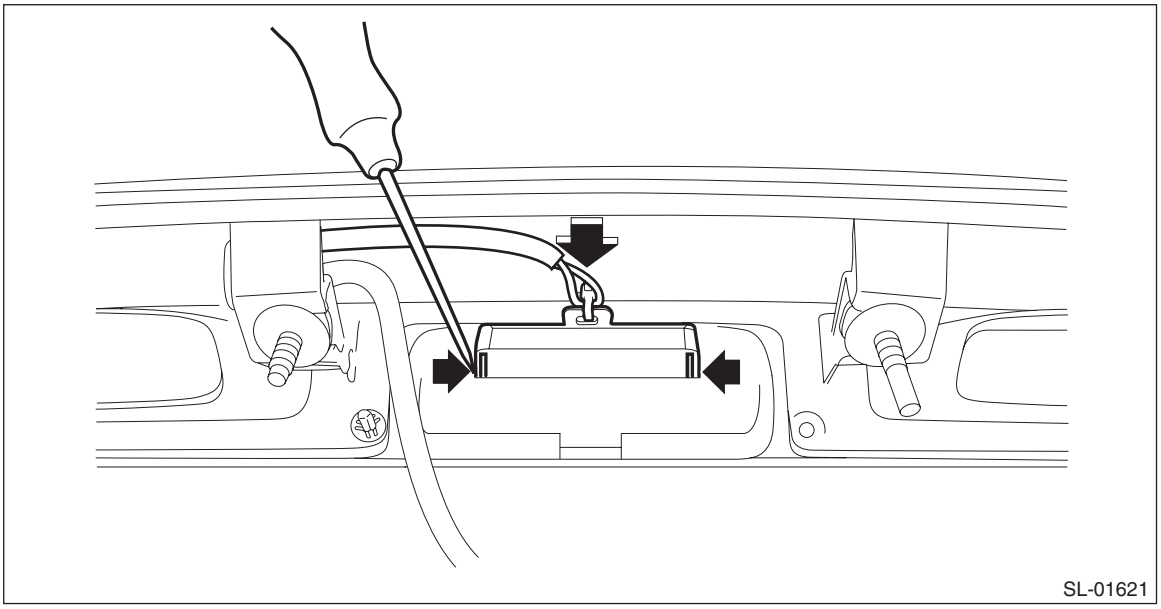
C: INSPECTION

1) Using the Subaru Select Monitor, display «Rear gate/Trunk UNLOCK output» from «Data monitor».
2) Check if the display changes when the rear lock button is operated.
3) If the display is not correct as the result of inspection, refer to “General Diagnostic Table” of the “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-108, KEYLESS ACCESS SYSTEM, INSPECTION, General Diagnostic Table.>

33.Trunk Opener Button

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the garnish - trunk. <Ref. to EI-126, REMOVAL, Trunk Lid Garnish.>
3) Release the locks at both ends of the trunk opener button by pushing them with a flat tip screwdriver.



B: INSTALLATION

Install each part in the reverse order of removal.

C: INSPECTION

1) Using the Subaru Select Monitor, display «Rear gate/Trunk UNLOCK output» from «Data monitor».
2) Check that the display changes when the trunk opener button is operated.
3) If the display is not correct as the result of inspection, refer to “General Diagnostic Table” of the “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-108, KEYLESS ACCESS SYSTEM, INSPECTION, General Diagnostic Table.>

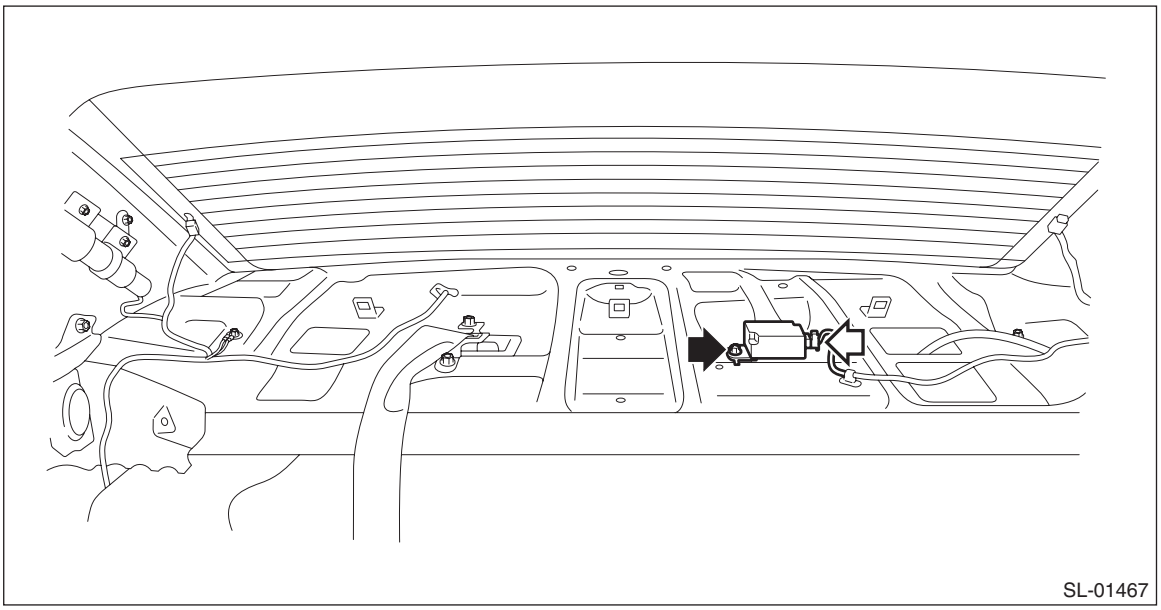
34.Receiver

A: REMOVAL

NOTE:
Except for model with keyless entry

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the trim panel assembly - rear shelf. <Ref. to EI-103, REMOVAL, Rear Shelf Trim.>
3) Remove the receiver assembly.
   (1) Disconnect the connector.
   (2) Remove the bolt and remove the receiver assembly.

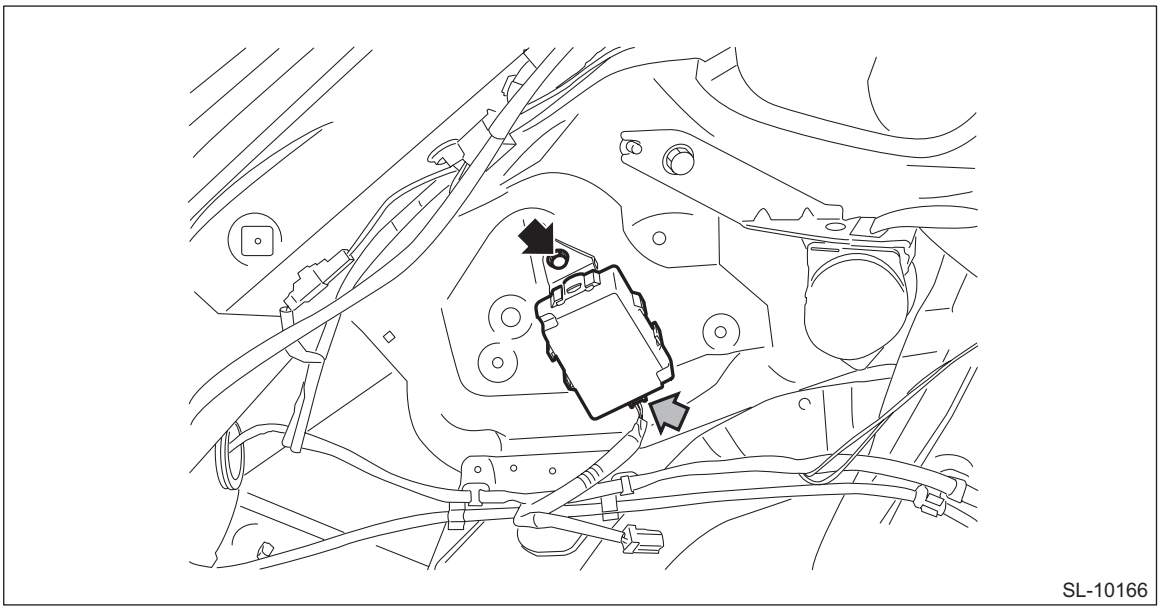


2. 5 DOOR MODEL/CROSSTREK MODEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear apron LH. <Ref. to EI-97, REMOVAL, Rear Quarter Trim.>
3) Remove the receiver assembly.
   (1) Disconnect the connector.
   (2) Remove the bolt and remove the receiver assembly.



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Receiver assembly: 13 N·m (1.33 kgf-m, 9.6 ft-lb)

C: INSPECTION

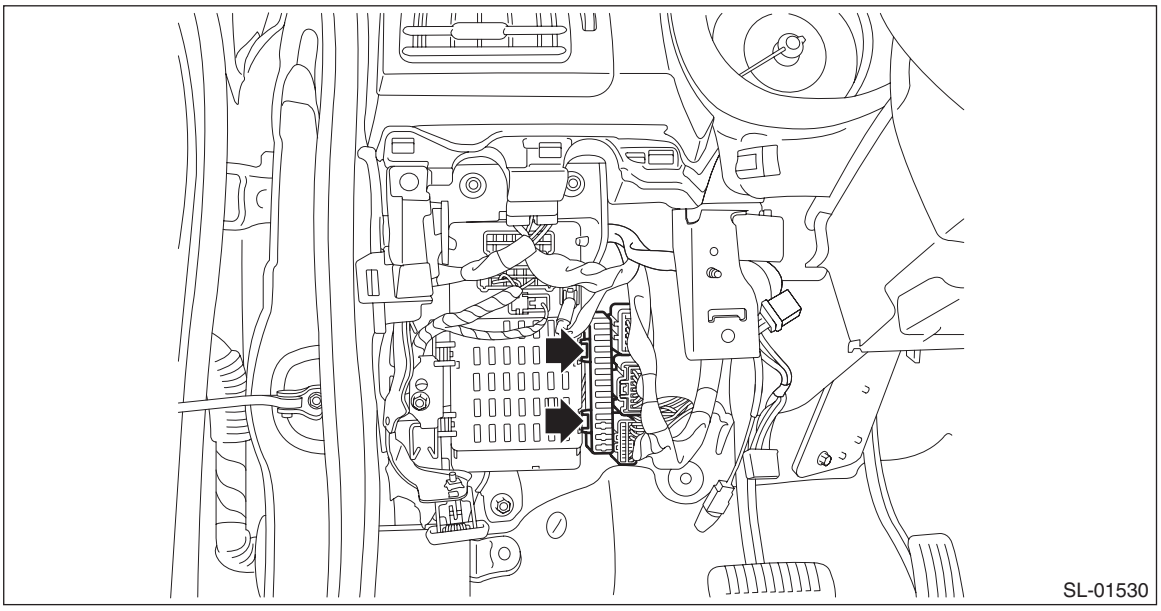
1) Check if the door lock operates when the touch sensor of the door outer handle, rear lock button or trunk opener button is operated.
2) If the system does not operate normally as the result of inspection, refer to “General Diagnostic Table” of the “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-108, KEYLESS ACCESS SYSTEM, INSPECTION, General Diagnostic Table.>

35.Keyless Access CM

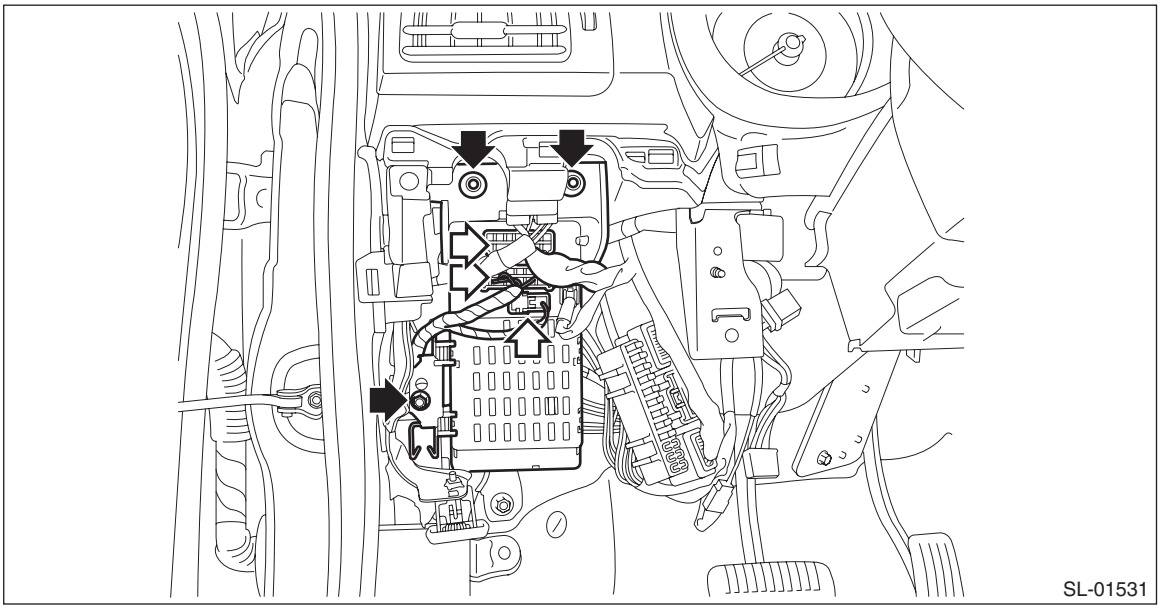
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Release the lock and remove the fuse holder.


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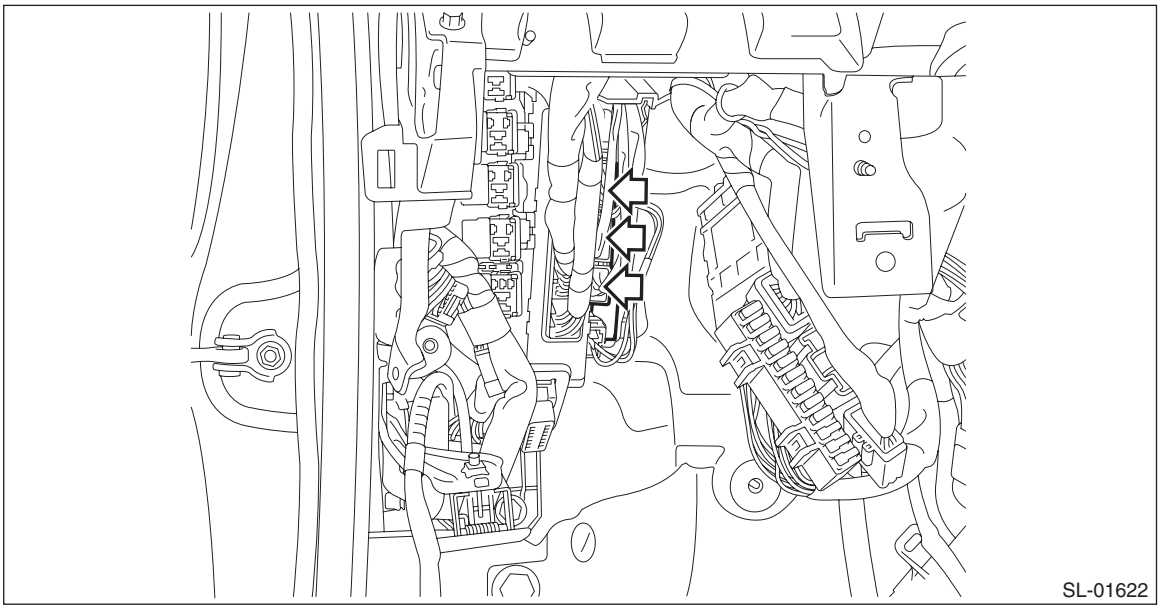
5) Remove the relay & fuse box.
(1) Disconnect the connector.
(2) Remove the bolts and nuts, and remove the relay & fuse box.


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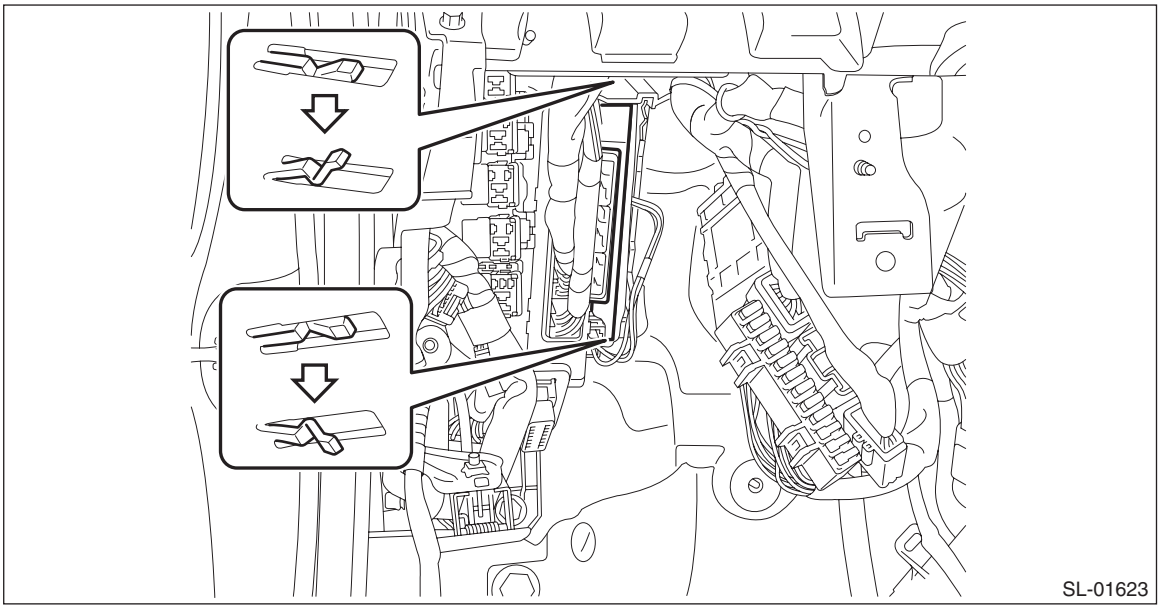
6) Remove the keyless access CM.

CAUTION:
Be careful to keep water and other foreign materials away from body integrated unit.

(1) Disconnect the connector.



(2) Release the claws, and pull out the keyless access CM from the bracket.



B: INSTALLATION

CAUTION:
• Registration of the immobilizer is necessary when a immobilizer-related control module has been replaced. For detailed operation procedure, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER".
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

Install each part in the reverse order of removal.

Tightening torque:
Relay & fuse box: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

36.ID Code Box

A: NOTE

NOTE:
- Equipped on C5 model with keyless access with push button start.
- The ID code box is located at the place of security control module.

Refer to “Security Control Module” for operation procedures on ID code box. <Ref. to SL-73, Security Control Module.>

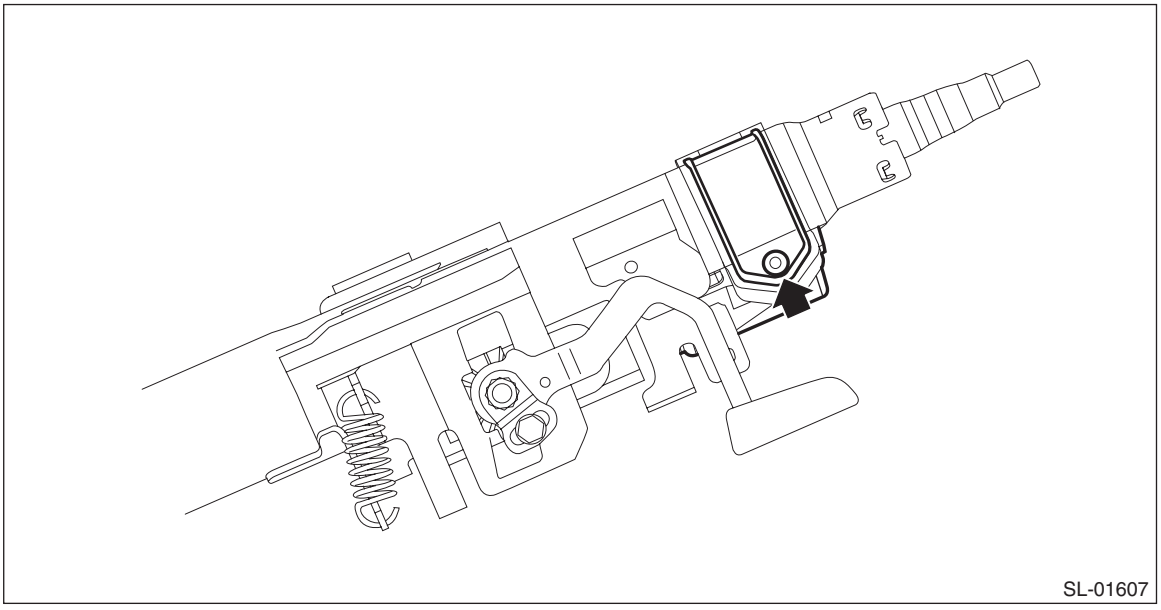
37.Steering Lock CM

A: REMOVAL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform "VSC(VDC) Centering Mode" of the VDC. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the column assembly - steering. <Ref. to PS-21, REMOVAL, Steering Column.>
3) Remove the steering lock CM.
(1) Secure the column assembly - steering in a vise.
(2) Use the reverse tap or drill to remove the set bolt and remove the steering lock CM.

CAUTION:
Do not apply any impact to the set bolt by a chisel or punch.


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B: INSTALLATION

CAUTION:
• Registration of the immobilizer is necessary when a immobilizer-related control module has been replaced. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER".
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform "VSC(VDC) Centering Mode" of the VDC. <Ref. to VDC-25, VDC SENSOR MIDPOINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
1) Secure the steering lock CM to the steering column.
2) Use new set bolts. Tighten the bolt until the bolt head is broken (bolt head wrenched off).

C: INSPECTION

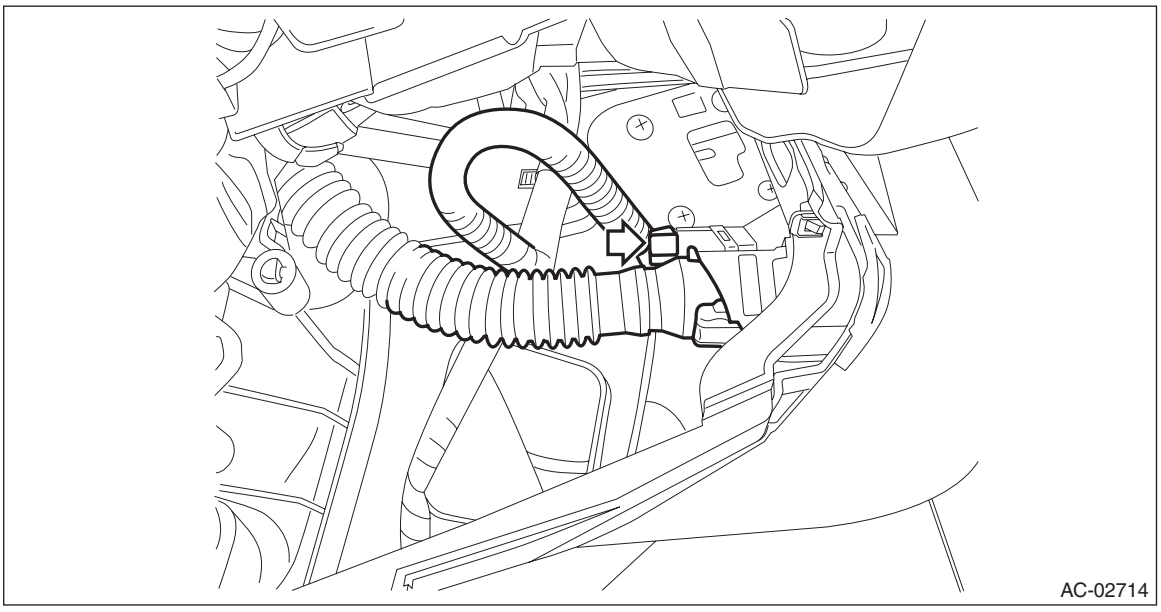
1) Check if the steering lock is released when you start the engine using the push button ignition switch.
2) If the system does not operate normally as the result of inspection, refer to “General Diagnostic Table” of the “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-108, STEERING LOCK SYSTEM, INSPECTION, General Diagnostic Table.>

38.Push Button Ignition Switch

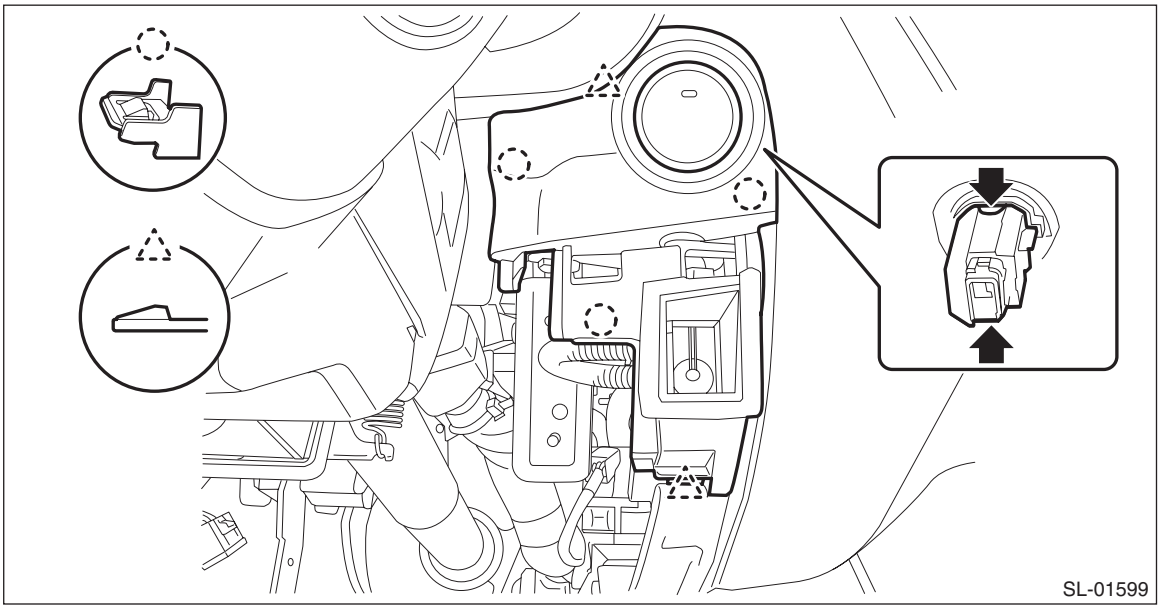
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Remove the push button ignition switch.
(1) Disconnect the connector, and remove the aspirator hose.


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(2) Release the claws, and then remove the panel - switch.
(3) Release the claws, and then remove the push button ignition switch from the panel - switch.


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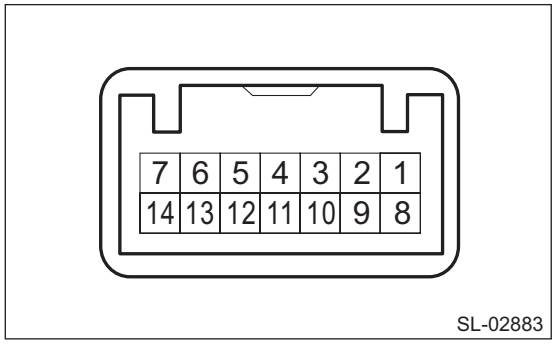
B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

C: INSPECTION

1) Check the continuity between push button ignition switch terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Specification
4 (COM) — 5 (GND)	Always	Continuity exists
7 (SSW1) — 5 (GND)	Push button ignition switch released → pressed	Continuity exists
2 (SSW2) — 5 (GND)	Push button ignition switch released → pressed	Continuity exists

2) Check the push button ignition switch operation when battery voltage is applied between the terminals of the push button ignition switch.

Terminal No.	Inspection conditions	Specification
11 (SWIL) — 5 (GND)	Connect battery to the terminals	Goes off → Red switch illumination light
12 (INDS) — 5 (GND)		Turns off → Switch indicator lights in green
13 (INDW) — 5 (GND)		Turns off → Switch indicator lights in orange

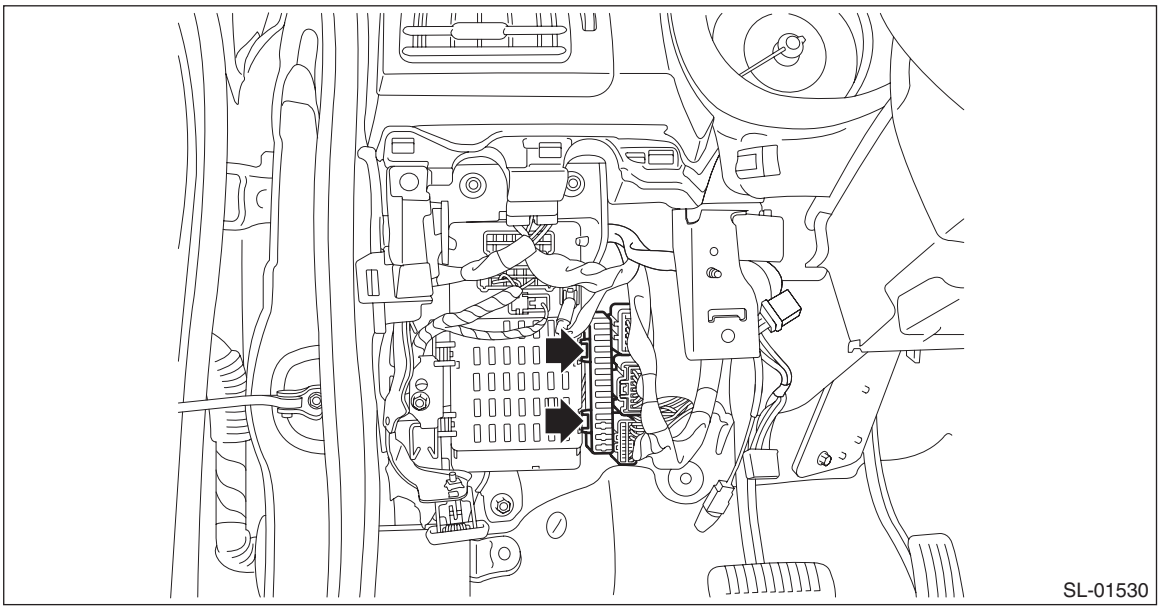
3) Replace the push button ignition switch if the inspection result is not within the standard value.

39.Starter Relay (Push Button Start)

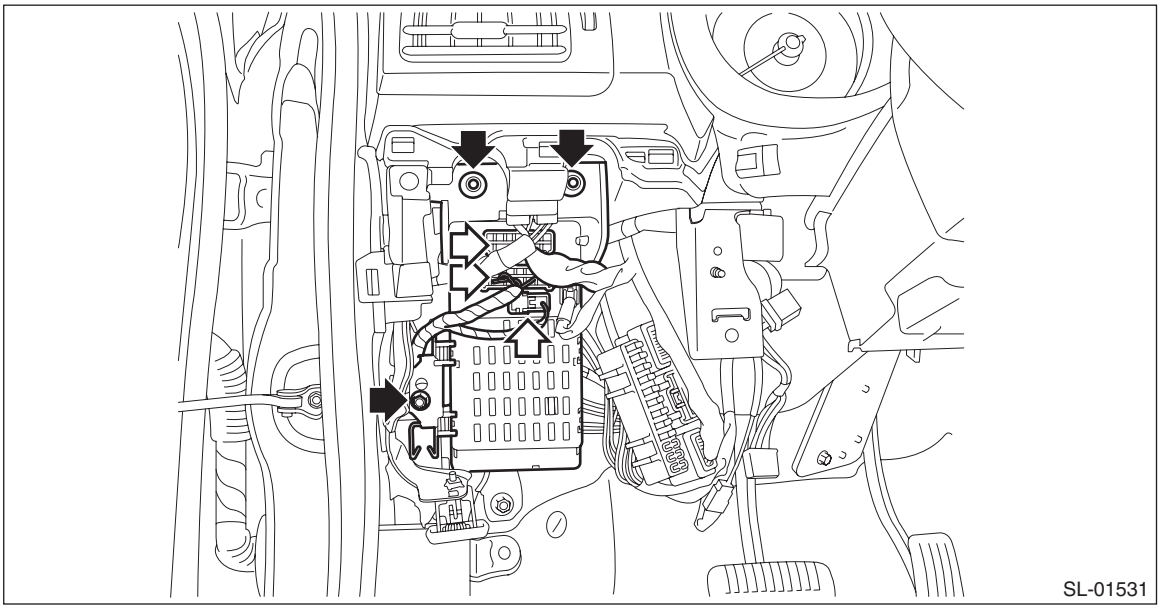
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

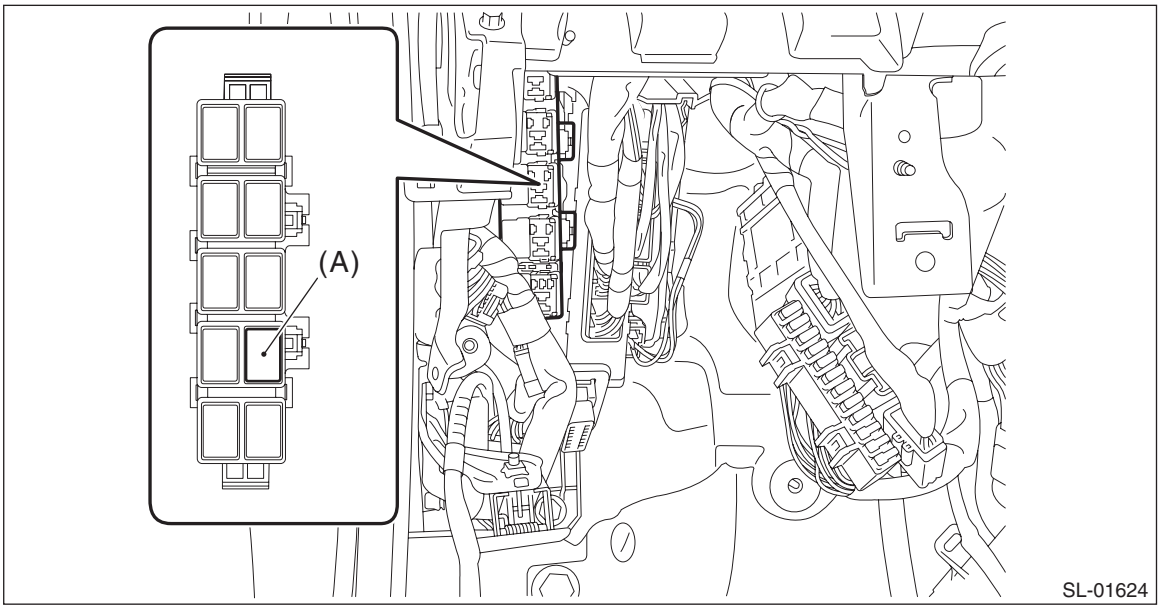
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Release the lock and remove the fuse holder.


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5) Remove the relay & fuse box.
   (1) Disconnect the connector.
   (2) Remove the bolts and nuts, and remove the relay & fuse box.


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6) Remove the starter relay (push button start) (A) from the relay holder.



B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

Tightening torque:
Relay & fuse box: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

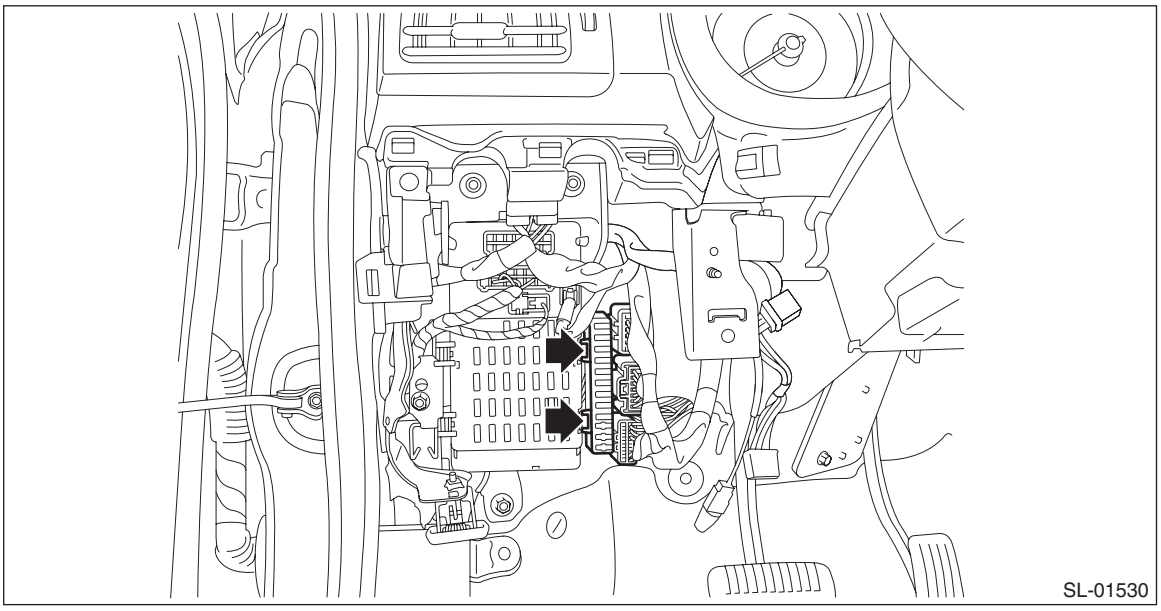
Refer to "CHECK RELAY" in "Relay and Fuse". <Ref. to SL-11, CHECK RELAY, INSPECTION, Relay and Fuse.>

40.IG Relay1 (Push Button Start)

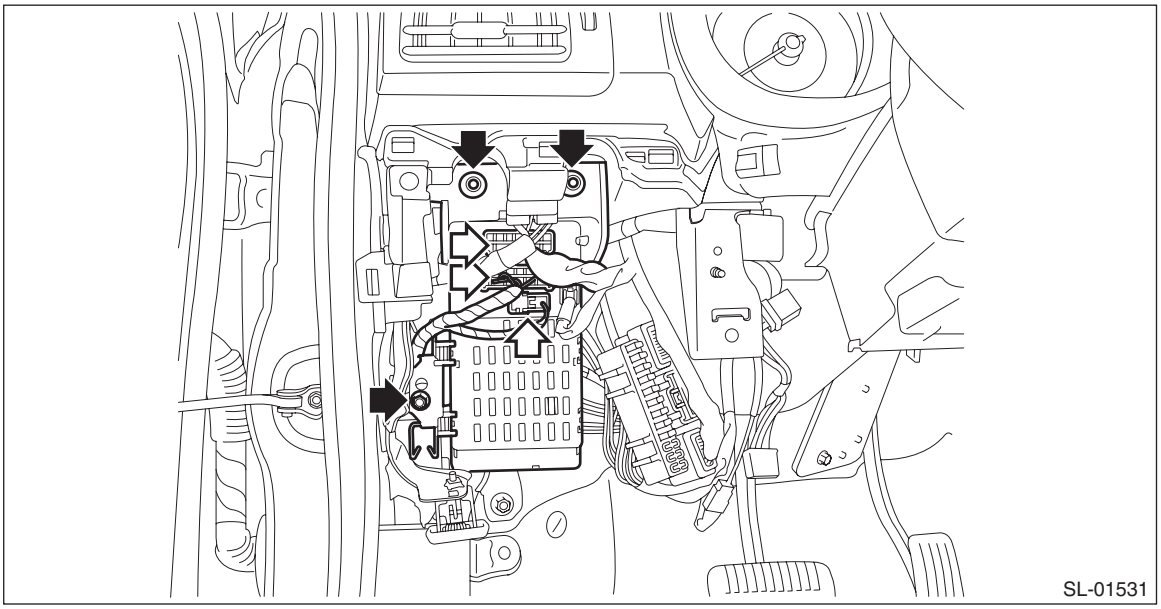
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

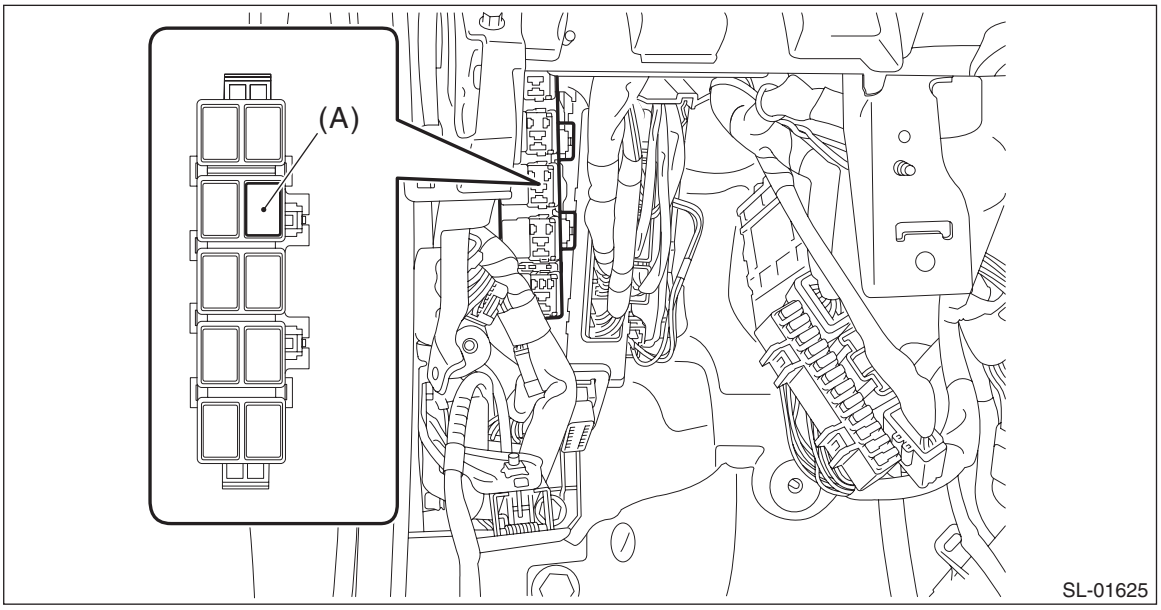
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Release the lock and remove the fuse holder.


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5) Remove the relay & fuse box.
(1) Disconnect the connector.
(2) Remove the bolts and nuts, and remove the relay & fuse box.


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6) Remove IG relay 1 (push button start) (A) from the relay holder.



B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

Tightening torque:
Relay & fuse box: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

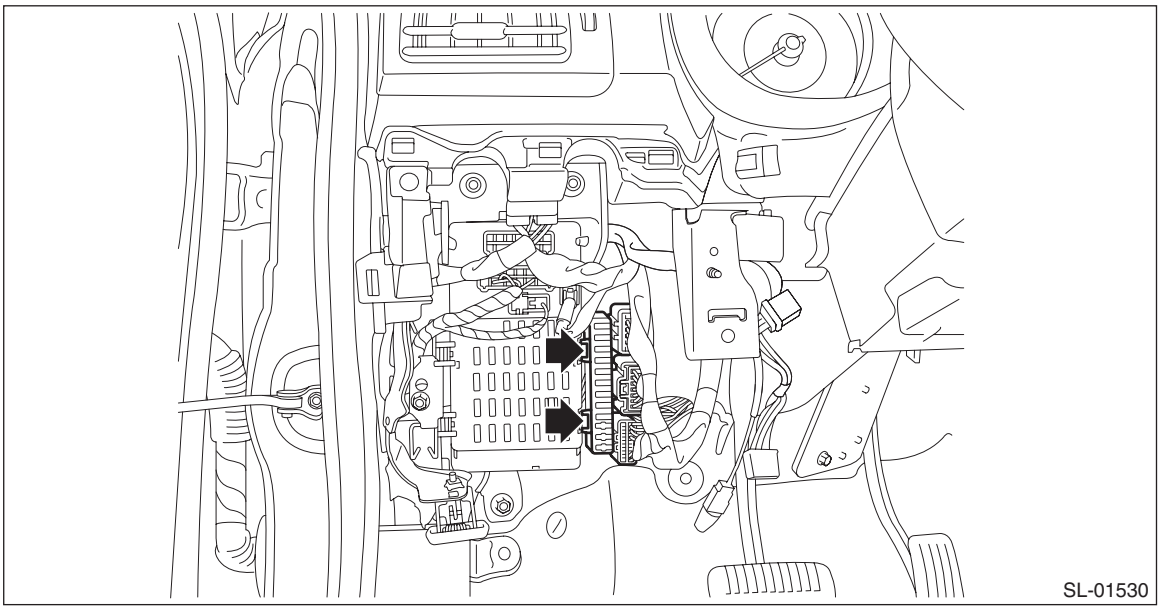
Refer to "CHECK RELAY" in "Relay and Fuse". <Ref. to SL-11, CHECK RELAY, INSPECTION, Relay and Fuse.>

41.IG Relay2 (Push Button Start)

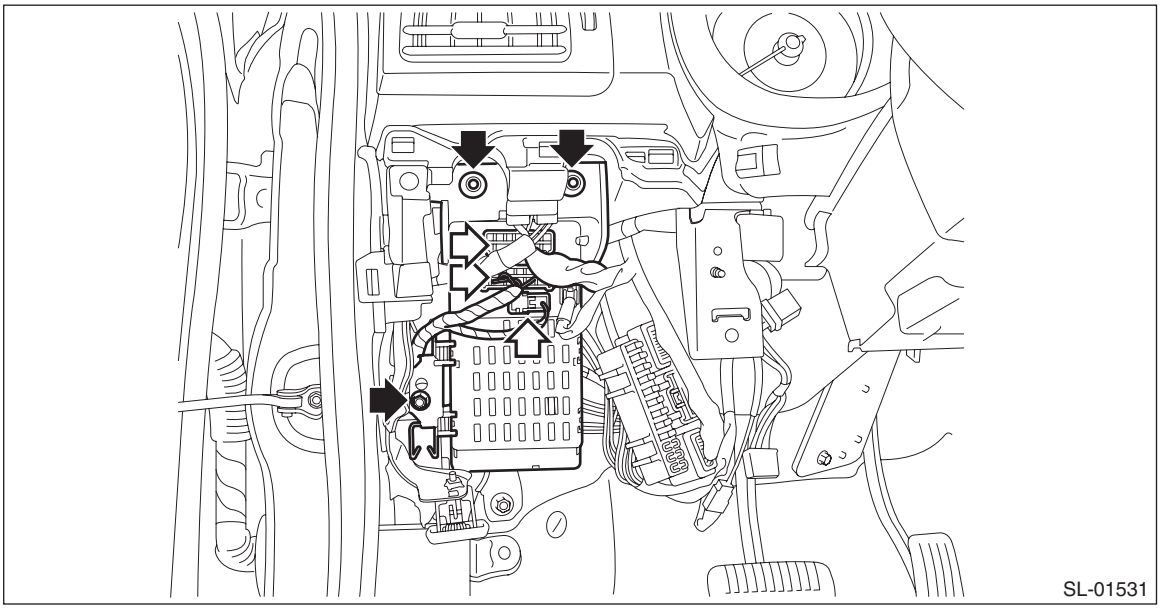
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

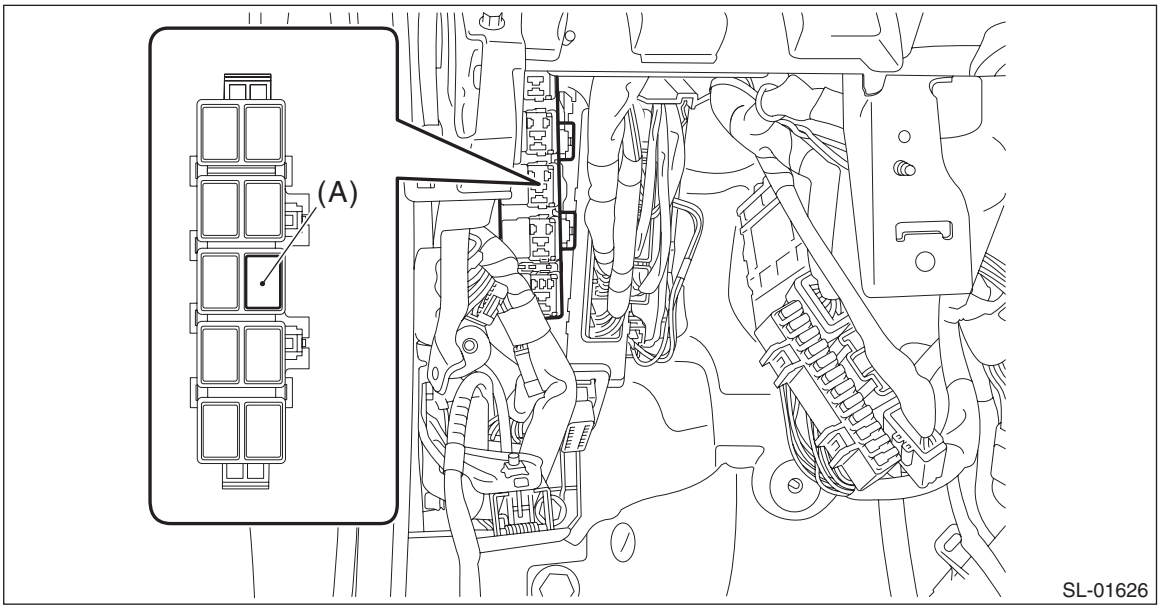
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Release the lock and remove the fuse holder.


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5) Remove the relay & fuse box.
(1) Disconnect the connector.
(2) Remove the bolts and nuts, and remove the relay & fuse box.


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6) Remove IG relay 2 (push button start) (A) from the relay holder.



B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

Tightening torque:
Relay & fuse box: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

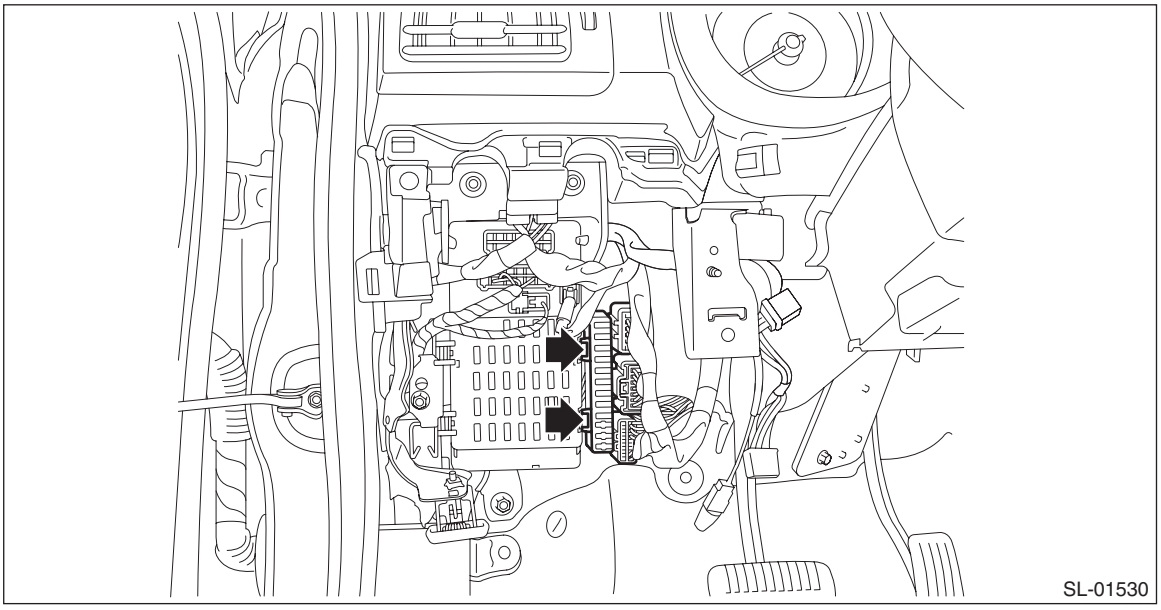
Refer to "CHECK RELAY" in "Relay and Fuse". <Ref. to SL-11, CHECK RELAY, INSPECTION, Relay and Fuse.>

42.Accessory Relay (Push Button Start)

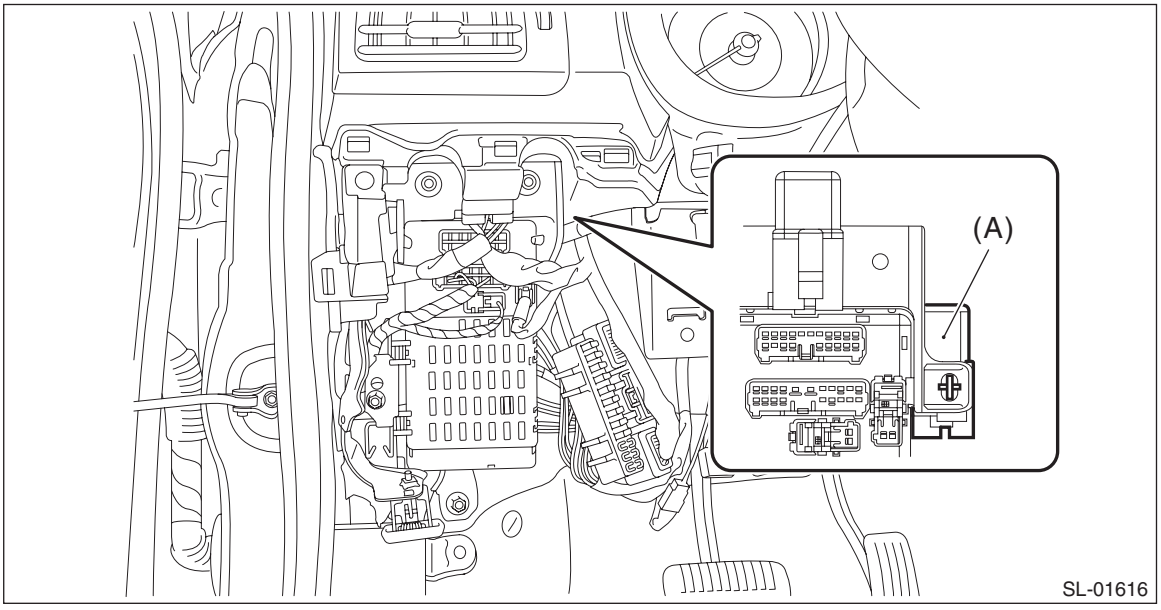
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Release the lock and remove the fuse holder.


SL-01530

5) Remove the accessory relay (push button start) (A) from the relay and fuse box.



SL-01616

B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to “CAUTION” of “General Description” in “AIRBAG SYSTEM”. <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

C: INSPECTION

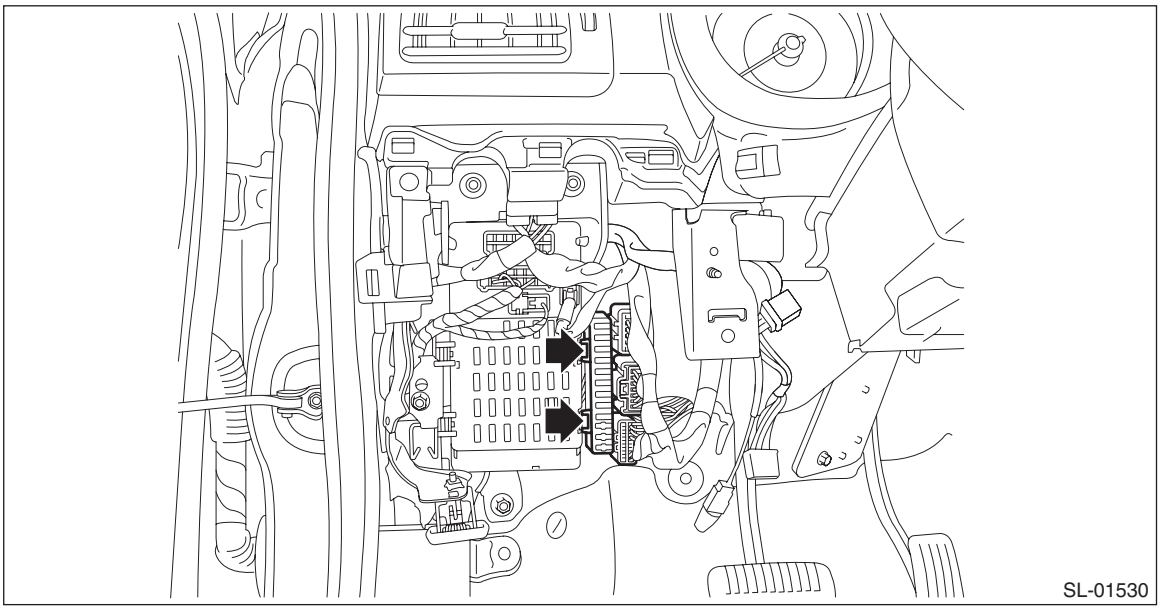
Refer to “CHECK RELAY” in “Relay and Fuse”. <Ref. to SL-11, CHECK RELAY, INSPECTION, Relay and Fuse.>

43.Starter Cut Relay

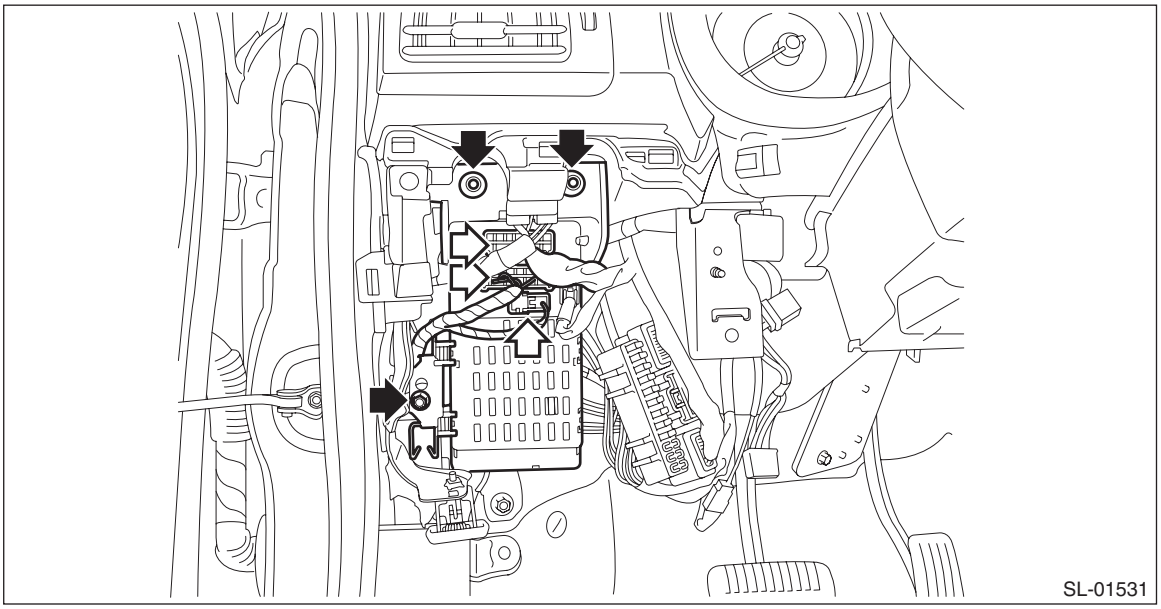
A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

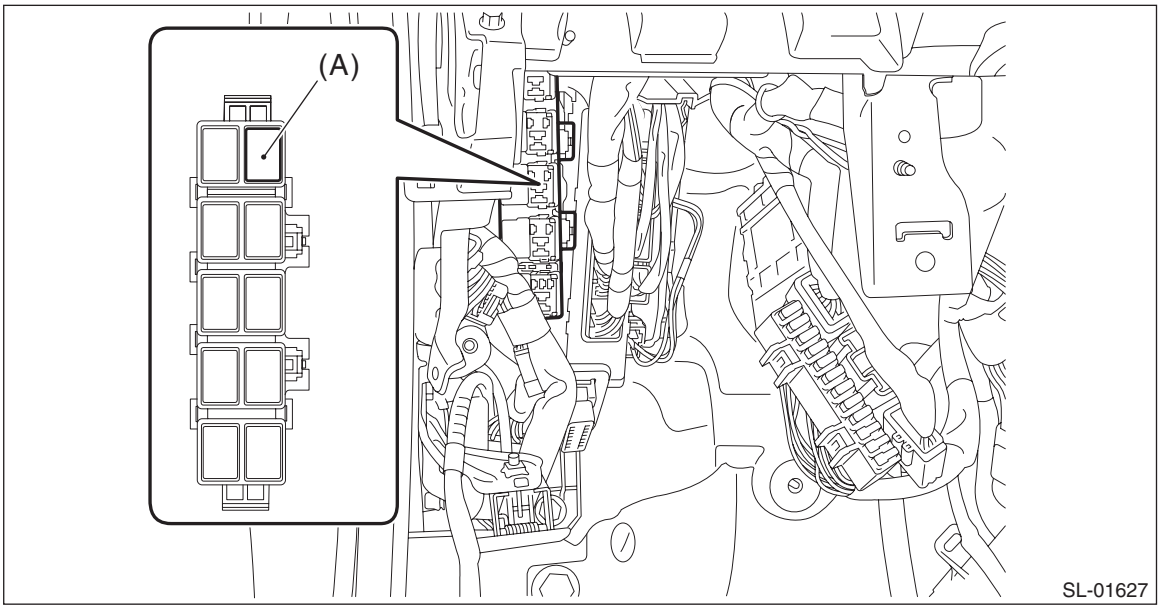
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
4) Release the lock and remove the fuse holder.


SL-01530

5) Remove the relay & fuse box.
   (1) Disconnect the connector.
   (2) Remove the bolts and nuts, and remove the relay & fuse box.


SL-01531

6) Remove the starter cut relay (A) from the relay holder.



B: INSTALLATION

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
Install each part in the reverse order of removal.

Tightening torque:
Relay & fuse box: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

Refer to "CHECK RELAY" in "Relay and Fuse". <Ref. to SL-11, CHECK RELAY, INSPECTION, Relay and Fuse.>

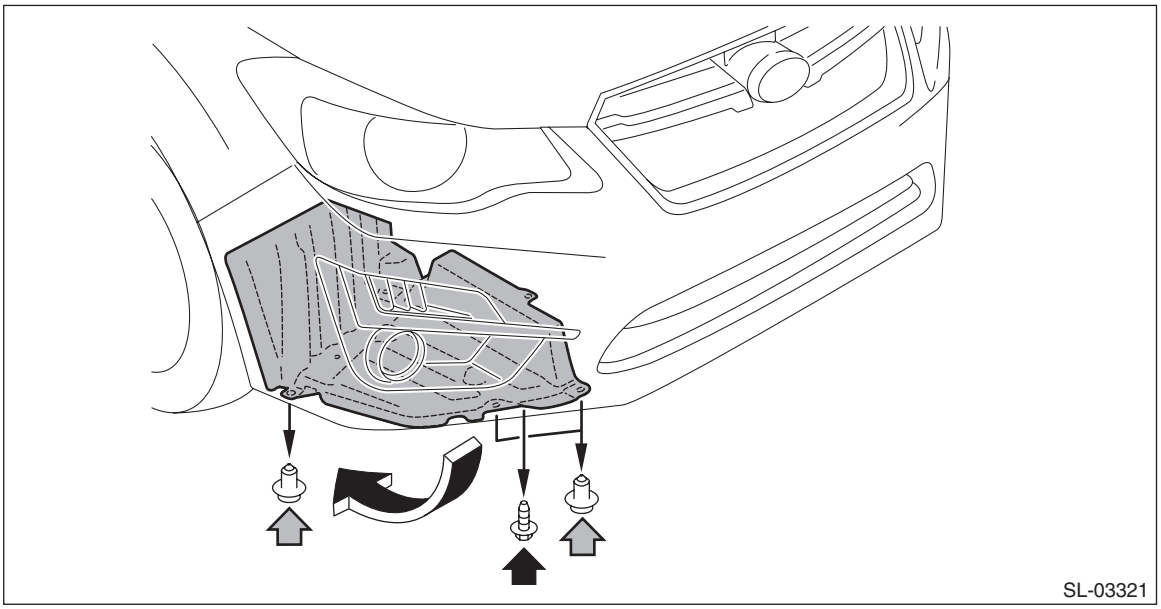
44.Access Buzzer

A: REMOVAL

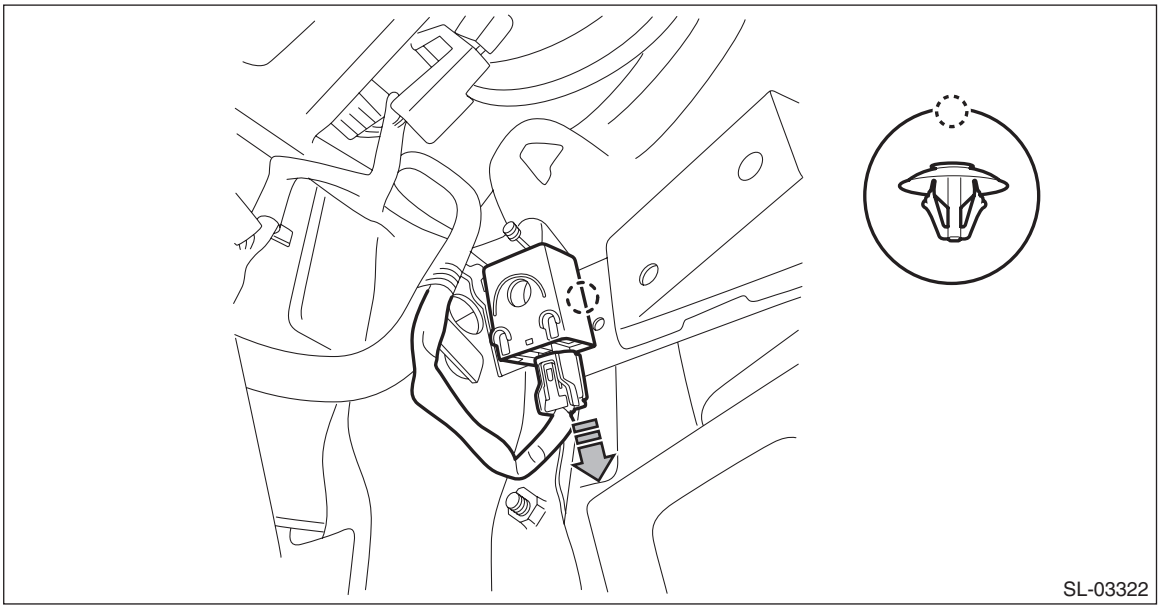
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

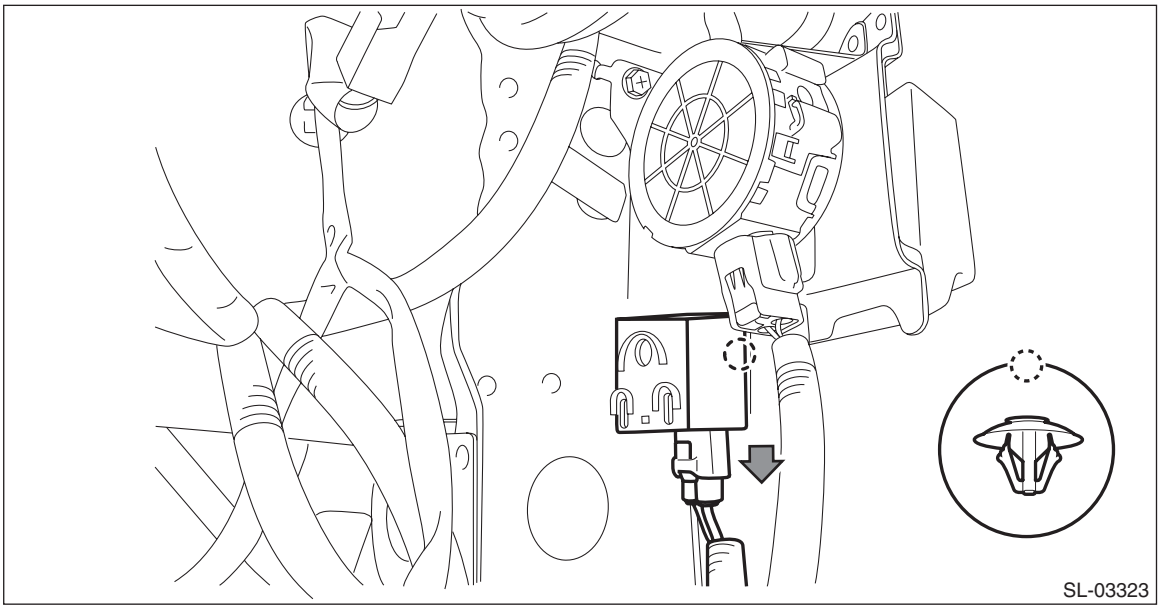
2) Lift up the vehicle.
3) Remove the clips and screws, and turn over the front side of the mud guard - front.



4) Remove the keyless buzzer.
   (1) Disconnect the connector.
   (2) Remove the clip and detach the keyless buzzer.
   • Gasoline engine model



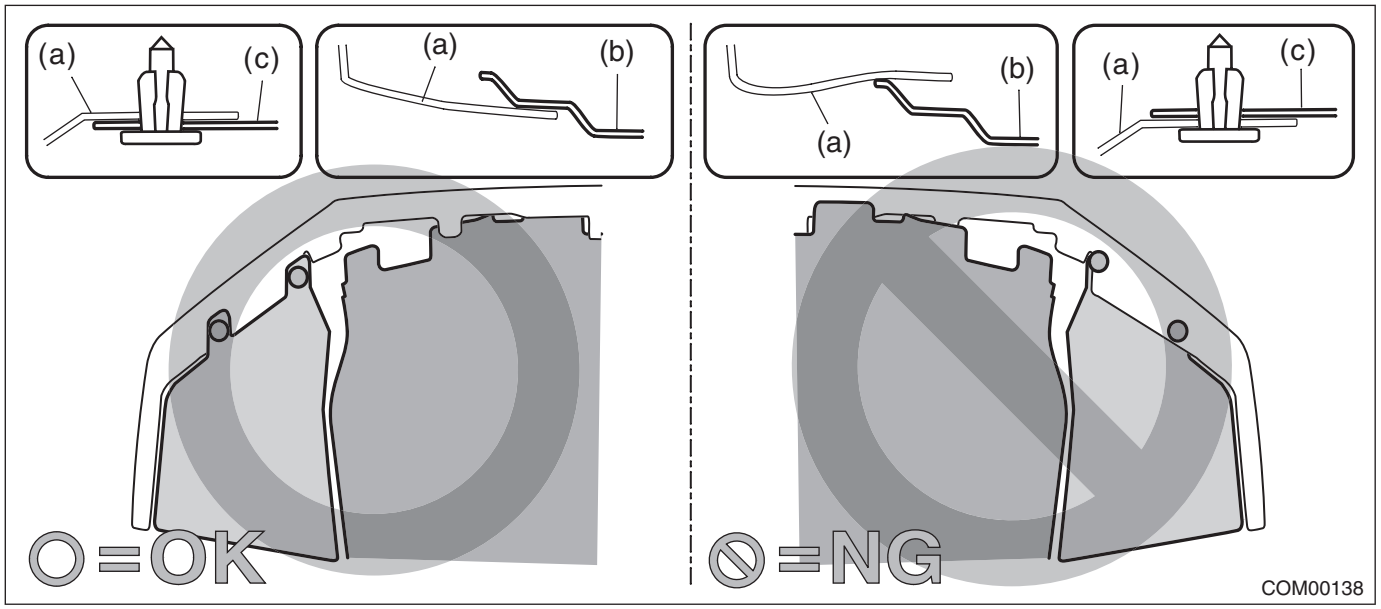
- HEV model



B: INSTALLATION

Install each part in the reverse order of removal.

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



C: INSPECTION

Using the Subaru Select Monitor, perform forced operation of the keyless buzzer. <Ref. to BC(diag)-17, OPERATION, User Customizing.>
If the buzzer does not sound, replace the keyless buzzer.

45.Function Setting (Customize)

A: OPERATION

Disabling/Activating the keyless access system

The following functions are disabled when the keyless access system functions are disabled:
- LOCK function performed by the operation of touch sensor on the door outer handle
- Rear gate LOCK function by rear lock button operation
- UNLOCK function by the door touch sensor
- Rear gate open function by rear gate opener button operation in the rear gate lock condition
- Trunk lid open function by trunk opener button operation in the trunk lid lock condition
- Lockout prevention feature
- Warning function
- Engine starting control using keyless access collation

B: PROCEDURE

1. METHOD FOR STOPPING KEYLESS ACCESS SYSTEM FUNCTION BY OPENING/CLOSING DOORS

1) Check that the vehicle status is as follows:
- Ignition switch OFF
- One window is completely open
- Keyless access system is activated (or disabled if re-activating)

2) Sit in the driver's seat with the door closed and press the door lock switch to UNLOCK once.
3) Open the driver's door within five seconds.
4) Within 5 seconds, with the driver's door opened, slowly press the door lock switch to UNLOCK twice.
5) Within 10 seconds after finishing step 4), perform the closing → opening operation of the driver's door twice.
6) Within 10 seconds after finishing step 5), with the driver's door opened, slowly press the door lock switch to UNLOCK twice.
7) Within 10 seconds after finishing step 6), perform the closing → opening operation of the driver's door once.
8) Within five seconds, close the driver's door.

NOTE:
- Perform the same procedures to re-activate the keyless access system from the disabled condition.
- If the driver's door is opened or closed in step 4) and step 6), the cancel operation is disabled.

2. METHOD FOR STOPPING KEYLESS ACCESS SYSTEM FUNCTION BY OPERATING ACCESS KEY

1) Open the driver's door and press the door lock knob forward (in the LOCK direction).
2) Press the lock button and the trunk/rear gate button of the access key simultaneously for at least five seconds.
3) A buzzer sounds for two seconds and the function stops.

NOTE:
Perform the same procedures to re-activate the keyless access system from the disabled condition.

46.Keyless Access With Push Button Start System

A: DIAGNOSTIC PROCEDURE WITH PHENOMENON

Refer to “Diagnostics with Phenomenon” of “KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)” section. <Ref. to KPS(diag)-109, Diagnostics with Phenomenon.>

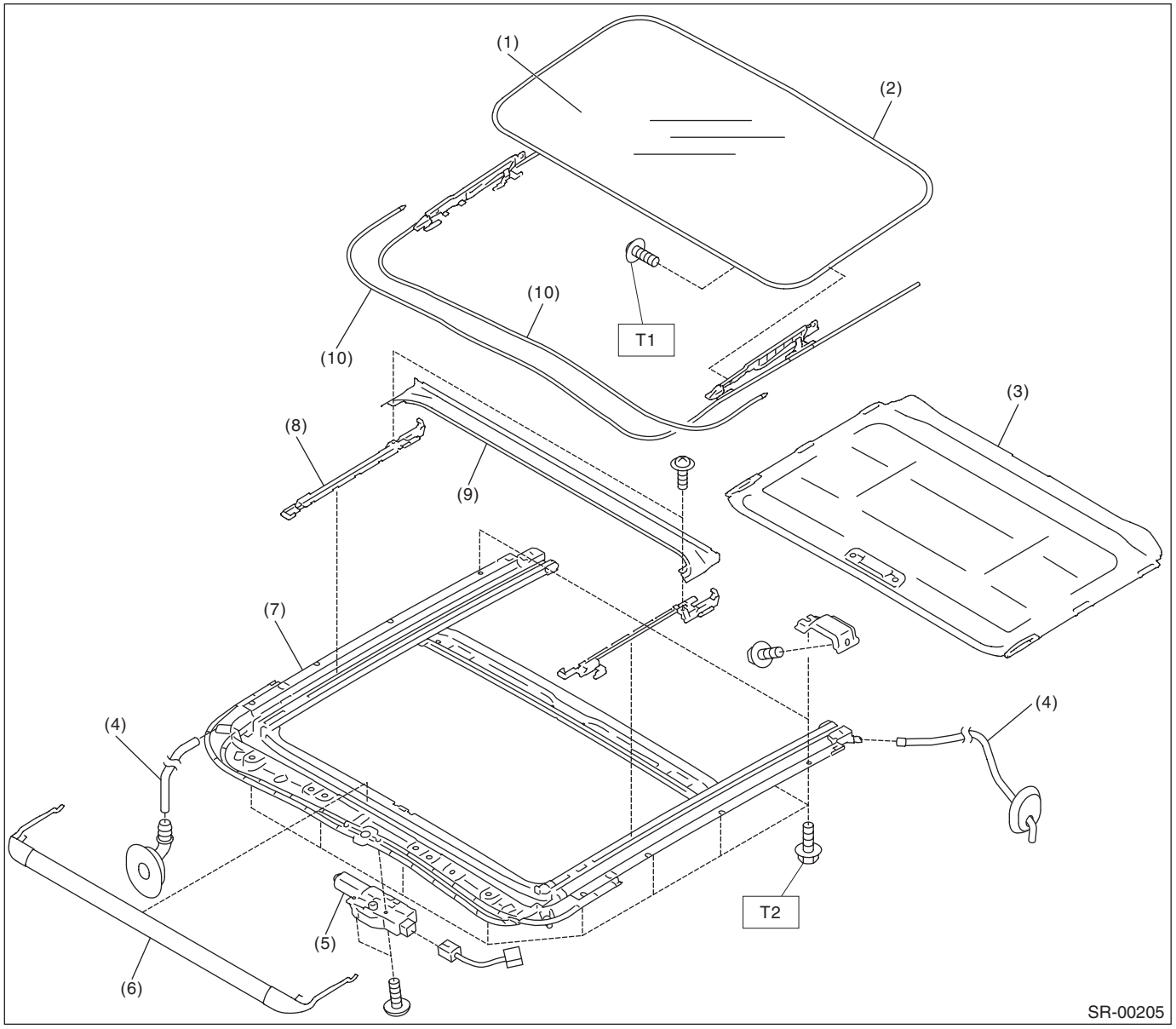
SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

SR

		Page
1.	General Description	2
2.	Relay and Fuse	4
3.	Sunroof Control System	5
4.	Glass Lid	7
5.	Sunroof Assembly	11
6.	Sunroof Motor	18
7.	Sunroof Switch	20
8.	Sunshade	22

1. General Description

A: COMPONENT



(1) Lid ASSY - sunroof
(2) Weather strip
(3) Sunshade ASSY
(4) Drain tube - sunroof
(5) Motor ASSY - sunroof
(6) Deflector ASSY - sunroof
(7) Rail ASSY - sunroof
(8) Link - drain sunroof
(9) Drain ASSY - sunroof
(10) Cable ASSY

Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.5 (0.46, 3.3)
T2: 6 (0.61, 4.4)

B: CAUTION

Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery. When replacing the audio and MFD parts provided with memory functions, record the memory contents before disconnecting the battery ground cable.

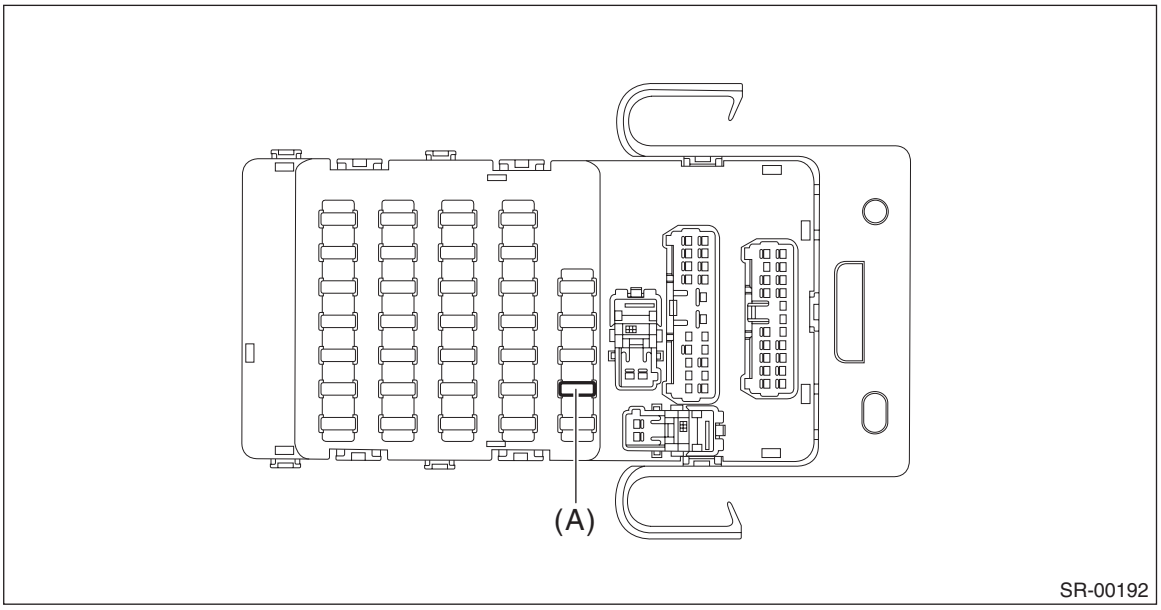
C: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Hexagon wrench	Used for forcibly driving the motor assembly - sunroof. Width across flat 4 mm (0.16 in)
TORX® T25	Used for removing and installing the lid assembly - sunroof.

2. Relay and Fuse

A: LOCATION



Relay & fuse box	Fuse 10A (IG 2)	(A)

NOTE:
For other related fuses, refer to the wiring diagram. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>

B: INSPECTION

1. CHECK FUSE

1) Remove the fuse and check visually.
2) If the fuse is blown out, replace the fuse.

3. Sunroof Control System

A: WIRING DIAGRAM

Refer to “Sunroof Control System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-225, WIRING DIAGRAM, Sunroof Control System.>
- HEV model: <Ref. to WI(HEV)-192, WIRING DIAGRAM, Sunroof Control System.>

B: INSPECTION

Symptoms	Inspection steps
Water leakage	1. Check the roof panel and the lid assembly - sunroof for improper or poor sealing. 2. Check the drain tube - sunroof for clogging. 3. Check the joints of the rail assembly - sunroof for improper sealing and for proper installation to the body.
Booming noise, wind noise and other noise	1. Check the lid assembly - sunroof and the roof panel for improper clearance. 2. Check the sunshade assembly and the trim panel - roof assembly for improper clearance.
Abnormal motor noise	1. Check installing part of motor for looseness. 2. Check gears and bearings for wear. 3. Check cable assembly for wear. 4. Check cable pipe for deformities.
Failure of sunroof (Motor operates properly.)	1. Check guide rail for foreign particles. 2. Check guide rail for improper installation. 3. Check parts for mutual interference. 4. Check cable slider for improper clinching. 5. Check cable assembly for improper installation.
Motor does not rotate or rotate improperly.	1. Check fuse for blown out. 2. Check switch for improper function. 3. Check motor assembly for incorrect terminal voltage. 4. Check the relay for improper operation. 5. Check harness for open or short and terminals for poor connections.
Incorrect reverse operation of the lid assembly - sunroof	Check guide rail for foreign particles.

- Incorrect reverse operation of the lid assembly - sunroof while driving on rough road

The lid assembly - sunroof has auto-reverse function. When the lid assembly - sunroof is pushed in the opening direction with a force of 100 N (10.2 kgf, 22.5 lbf) or less, the glass lid moves in reverse and then stops. Therefore, if you operate (open or close) the lid assembly - sunroof while driving on rough road, the vibration may be judged as a force and the lid may incorrectly move in the reverse direction.
When the incorrect reverse operation is occurred repeatedly, perform inspection around the sunroof frame. If there are no problems, perform the initialization operation with following procedure.

C: OPERATION

1. INITIALIZE OPERATION

CAUTION:
During initialization, perform the position learning and the sliding learning. Sliding learning mode can not be initiated unless the position learning is performed.

NOTE:
When initialize operation is performed, it is necessary to press the switch repeatedly as it operates for only at the moment when the switch is pressed, even when the switch is held down.

- Position learning

1) Position the lid assembly - sunroof at the full tilt up position, and press and hold the tilt up switch for ten seconds.
2) The motion of the glass lid shifts to inching operation until it reaches the full close position. After that, it returns to the full tilt up position and then stops.
3) Release the tilt up switch to finish the position learning.

- Sliding learning

4) Within six seconds after the position learning is finished, press and hold the tilt up switch again.
5) The lid assembly - sunroof moves to the full close position, full open position, and the full close position successively, and stops at the full close position.
6) Release the tilt up switch and turn the ignition switch to OFF to finish the initializing.

D: NOTE

For operation procedures of each component of the sunroof control system, refer to the respective section.

- Glass lid: <Ref. to SR-7, Glass Lid.>
- Sunroof assembly: <Ref. to SR-11, Sunroof Assembly.>
- Sunroof motor: <Ref. to SR-18, Sunroof Motor.>
- Sunroof switch: <Ref. to SR-20, Sunroof Switch.>
- Sunshade: <Ref. to SR-22, Sunshade.>

4. Glass Lid

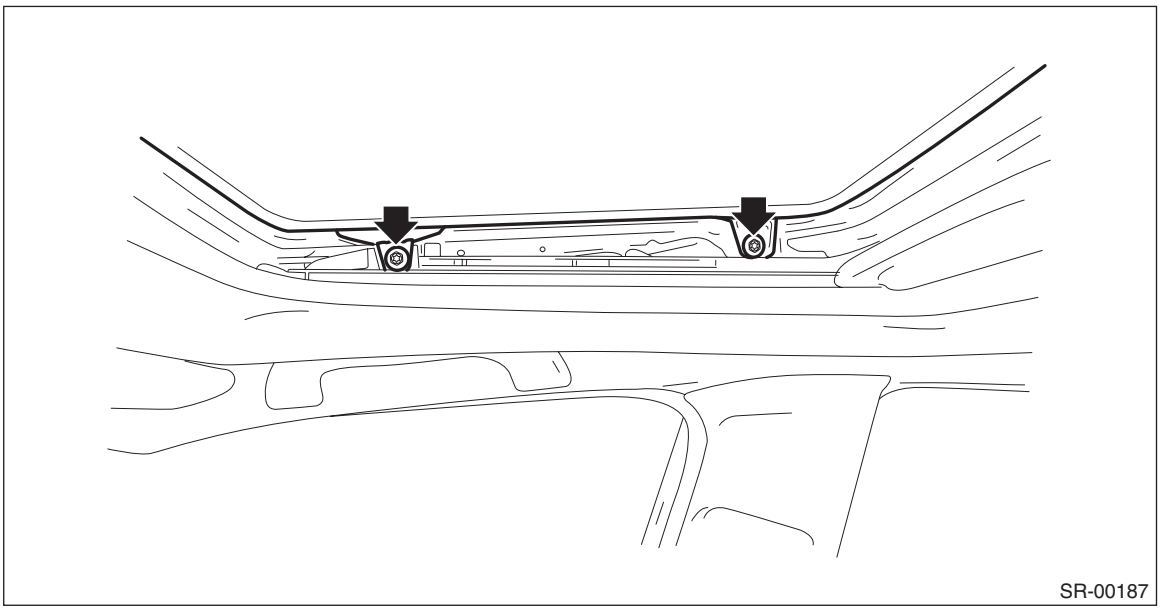
A: REMOVAL

1. GLASS LID

1) Completely close the lid assembly - sunroof, and open the sunshade assembly.
2) Remove the TORX® bolt, and then remove the lid assembly - sunroof.

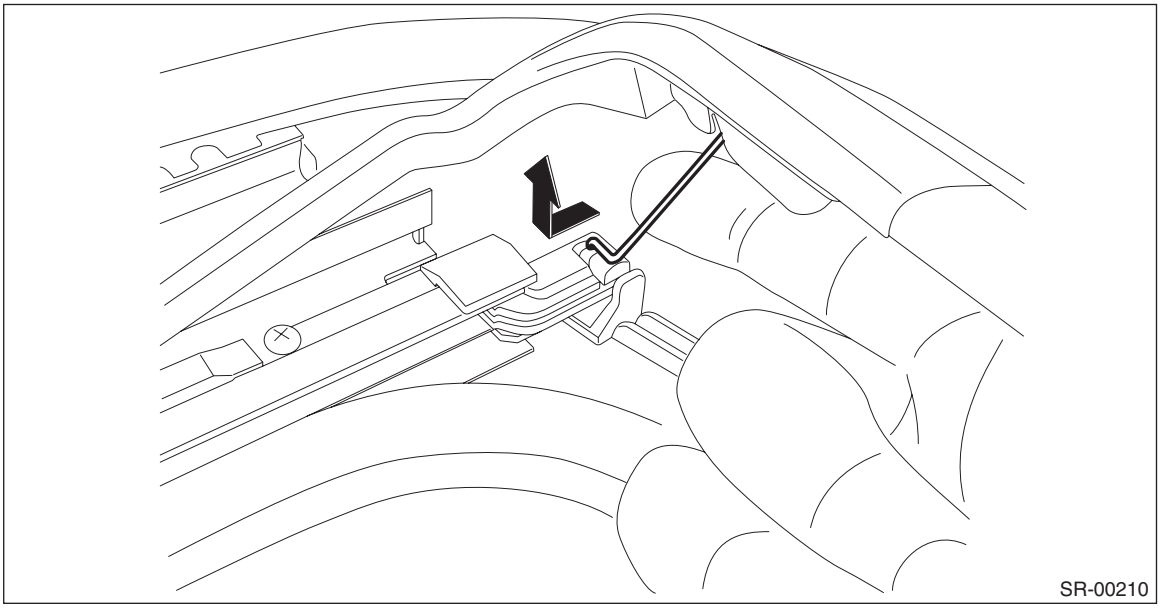
CAUTION:
Be careful not to damage the lid assembly - sunroof.

PREPARATION TOOL:
TORX® T25

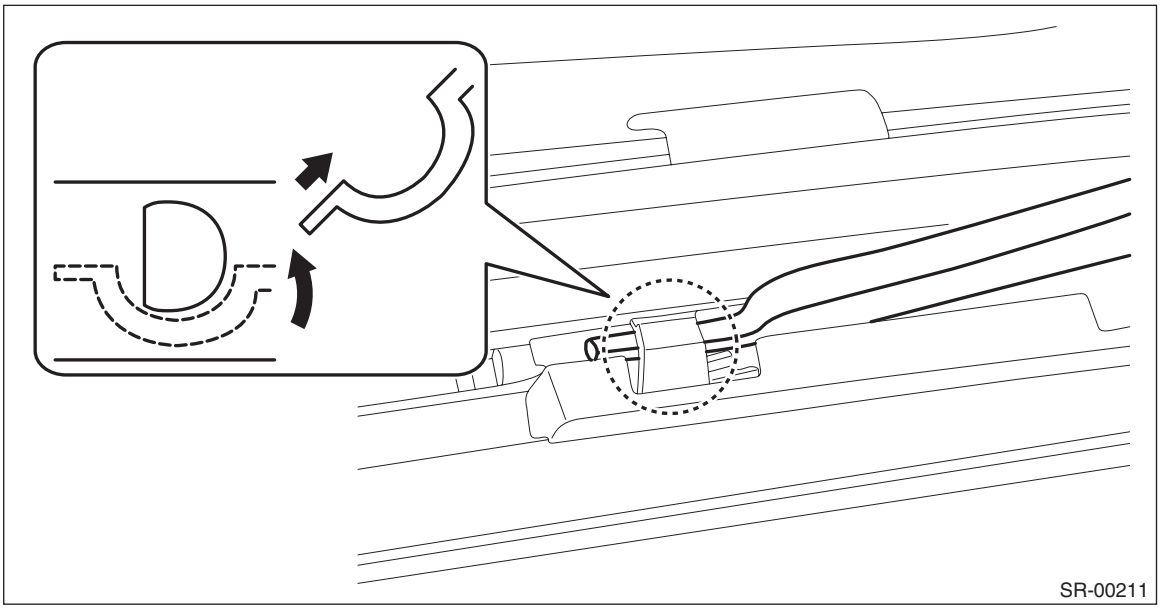


2. DEFLECTOR ASSEMBLY

1) Open the lid assembly - sunroof and the sunshade assembly.
2) Remove the deflector assembly - sunroof.
   (1) Remove the spring from the rail assembly - sunroof.



(2) While lifting up the deflector assembly - sunroof, remove the deflector assembly - sunroof from the hook on the rail assembly - sunroof.



B: INSTALLATION

1. GLASS LID

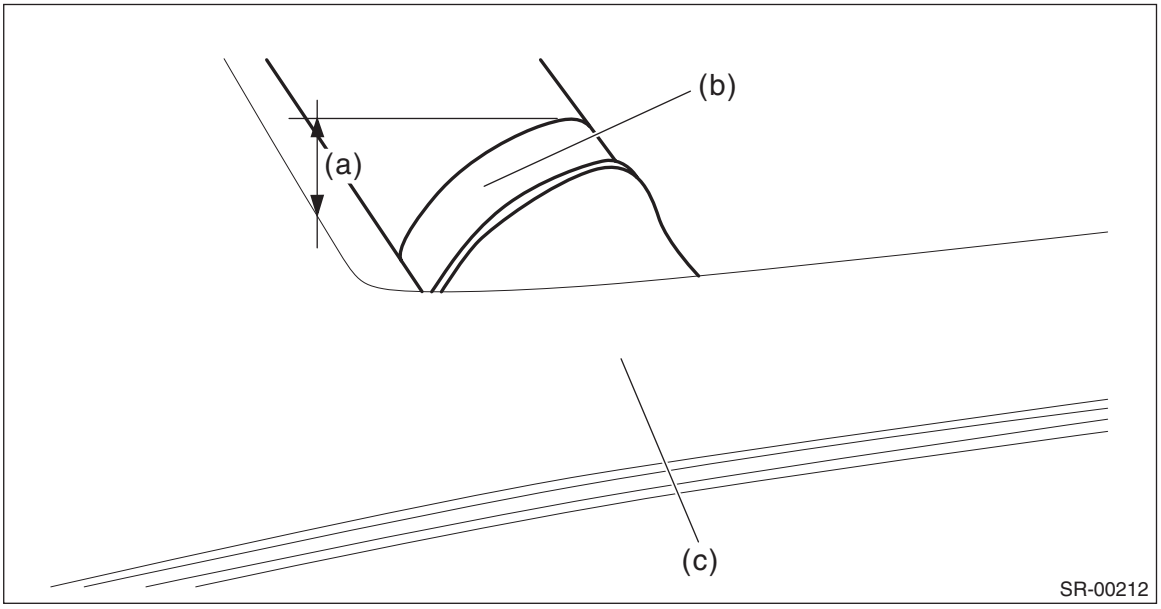
1) Using a new TORX® bolt, install the lid assembly - sunroof.

Tightening torque:
4.5 N·m (0.46 kgf-m, 3.3 ft-lb)

2) Perform the open/close operation checks for the glass lid.
3) Check the height of the lid assembly - sunroof and the roof panel, and perform adjustment when there is a difference between up and down, and left and right. <Ref. to SR-9, ADJUSTMENT, Glass Lid.>

2. DEFLECTOR ASSEMBLY

1) Install each part in the reverse order of removal.
2) After installation, measure the height from the roof panel when deflector assembly - sunroof is activated.

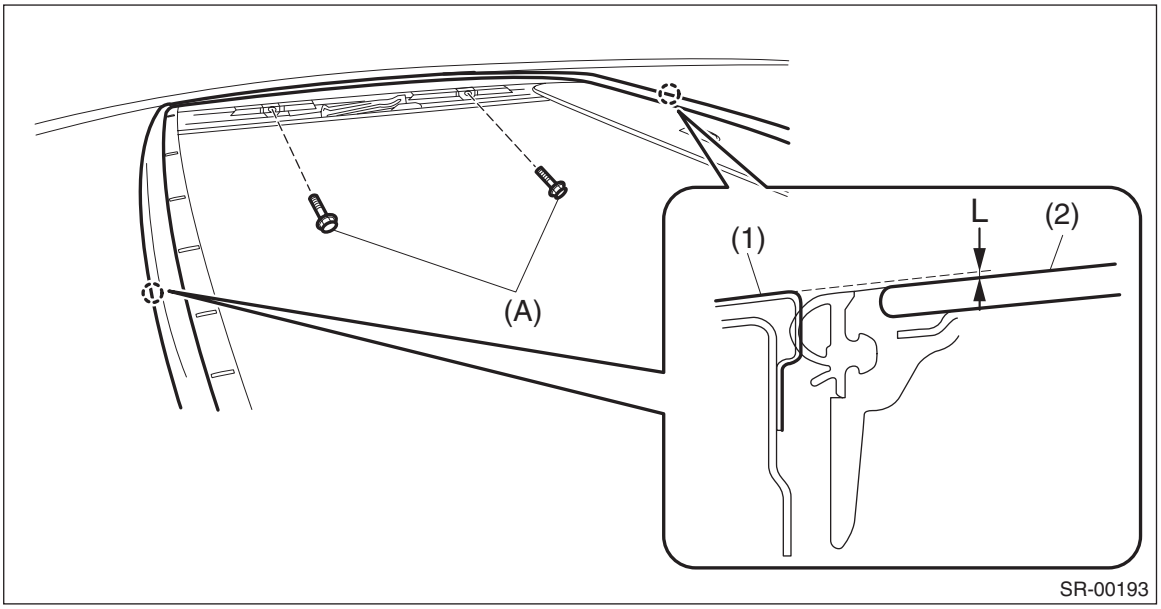


(a) 14 mm (0.55 in) (b) Deflector ASSY - sunroof (c) Roof panel

C: ADJUSTMENT

1) Adjust the height of the lid assembly - sunroof and the roof panel.
2) Loosen the lid assembly - sunroof mounting bolts (A), and then adjust the height by moving the lid assembly - sunroof side.

Lid assembly - sunroof height difference L:
Lid assembly - sunroof to Roof panel: 0.7±1.0 mm (0.03±0.04 in)



(1) Roof panel
(2) Lid ASSY - sunroof

Tightening torque:
4.5 N·m (0.46 kgf-m, 3.3 ft-lb)

D: FORCED DRIVE

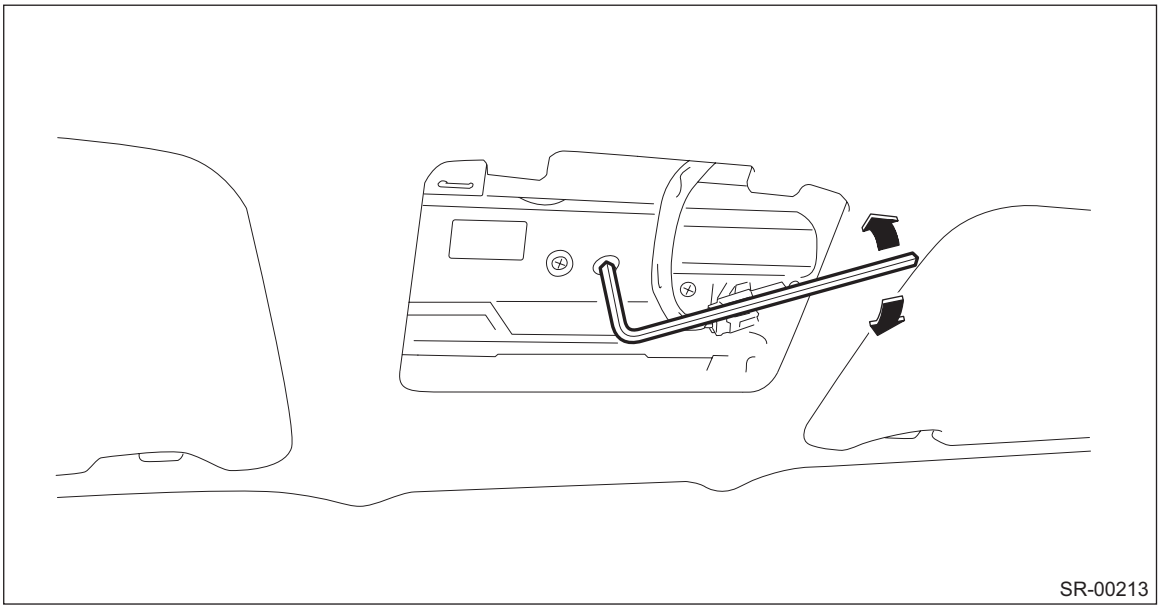
If the lid assembly - sunroof does not operate or the motor assembly is not supplied with power, move the lid assembly - sunroof using the hexagon wrench.

Preparation tool:
Hexagon wrench: width across flat 4 mm (0.16 in)

CAUTION:
After a forced operation, make sure to perform an initialize operation. <Ref. to SR-6, INITIALIZE OPERATION, OPERATION, Sunroof Control System.>
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the light assembly - map. <Ref. to LI-77, REMOVAL, Spot Map Light.>
3) Remove the stereo camera. (Models with EyeSight) <Ref. to ES-7, REMOVAL, Stereo Camera.>
4) Insert the hexagon wrench securely until it touches the motor shaft end.
5) Turn the hexagon wrench, and move the lid assembly - sunroof.
- Turning right, the lid assembly - sunroof opens.
- Turning left, the lid assembly - sunroof closes.

CAUTION:
Be careful not to damage the adjacent parts with the rod end when moving the lid assembly - sunroof with the hexagon wrench.



5. Sunroof Assembly

A: REMOVAL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• When removing the clip, use great care not to damage the trim panel - roof assembly.

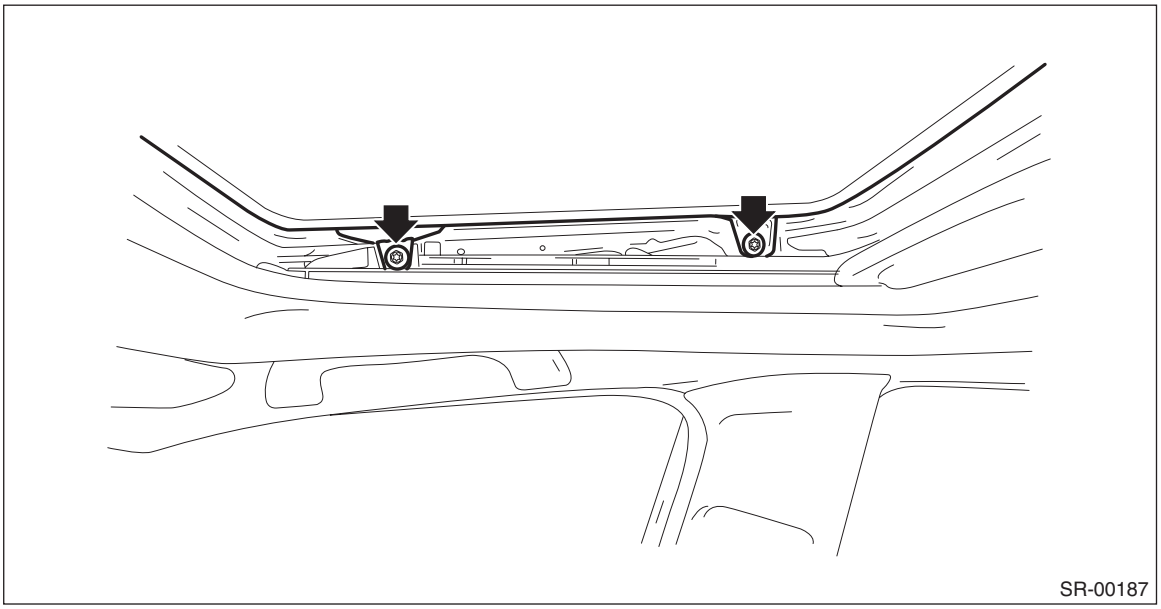
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the lid assembly - sunroof.
   (1) Completely close the lid assembly - sunroof, and open the sunshade assembly.
   (2) Remove the TORX® bolt, and then remove the lid assembly - sunroof.

CAUTION:
Be careful not to damage the lid assembly - sunroof.

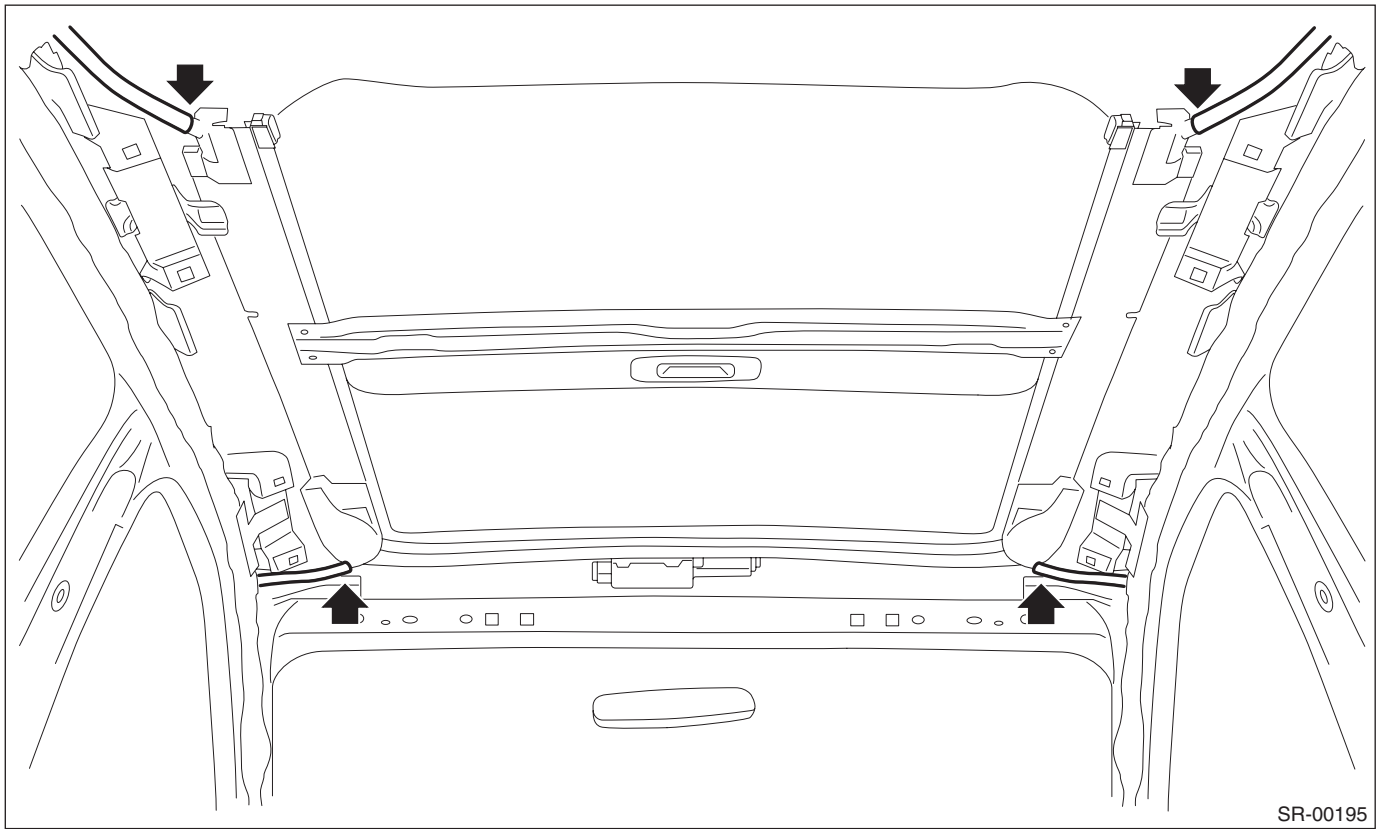
Preparation tool:
TORX® T25



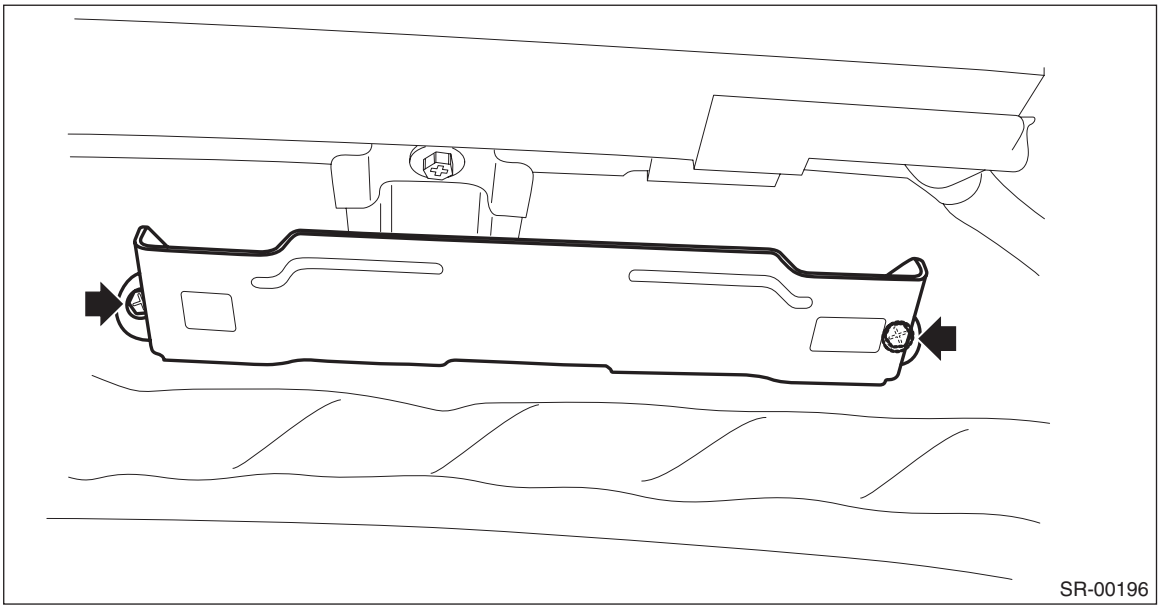
3) Remove the trim panel - roof assembly. <Ref. to EI-109, REMOVAL, Roof Trim.>
4) Disconnect the harness connector of the motor assembly.

5) Remove the drain tube - sunroof.

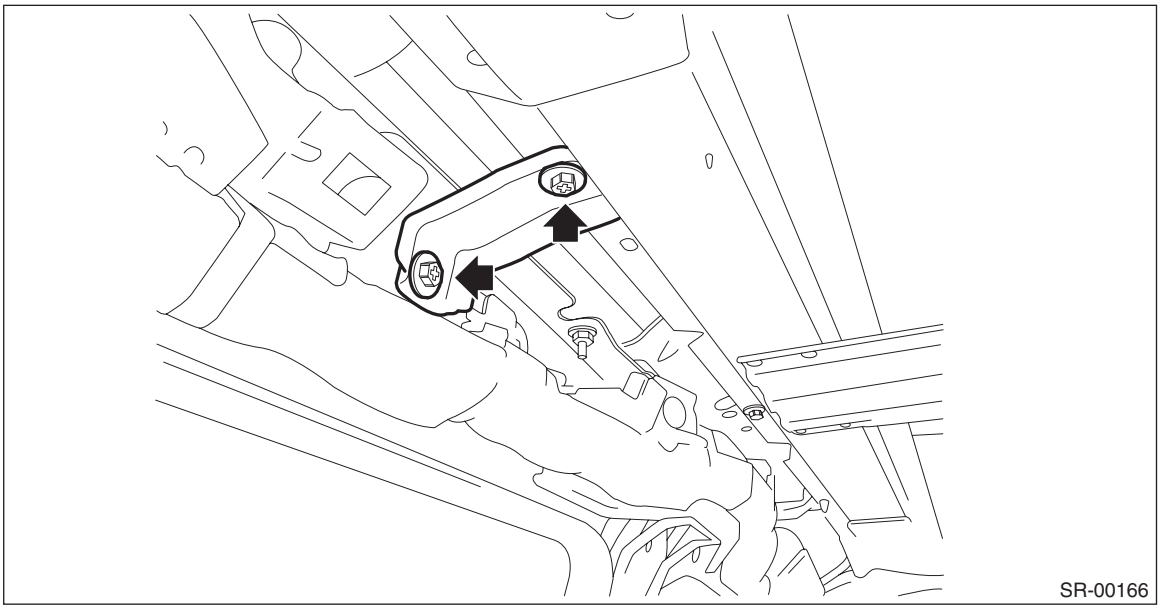
NOTE:
When removing the drain tube - sunroof completely, perform the step 8).



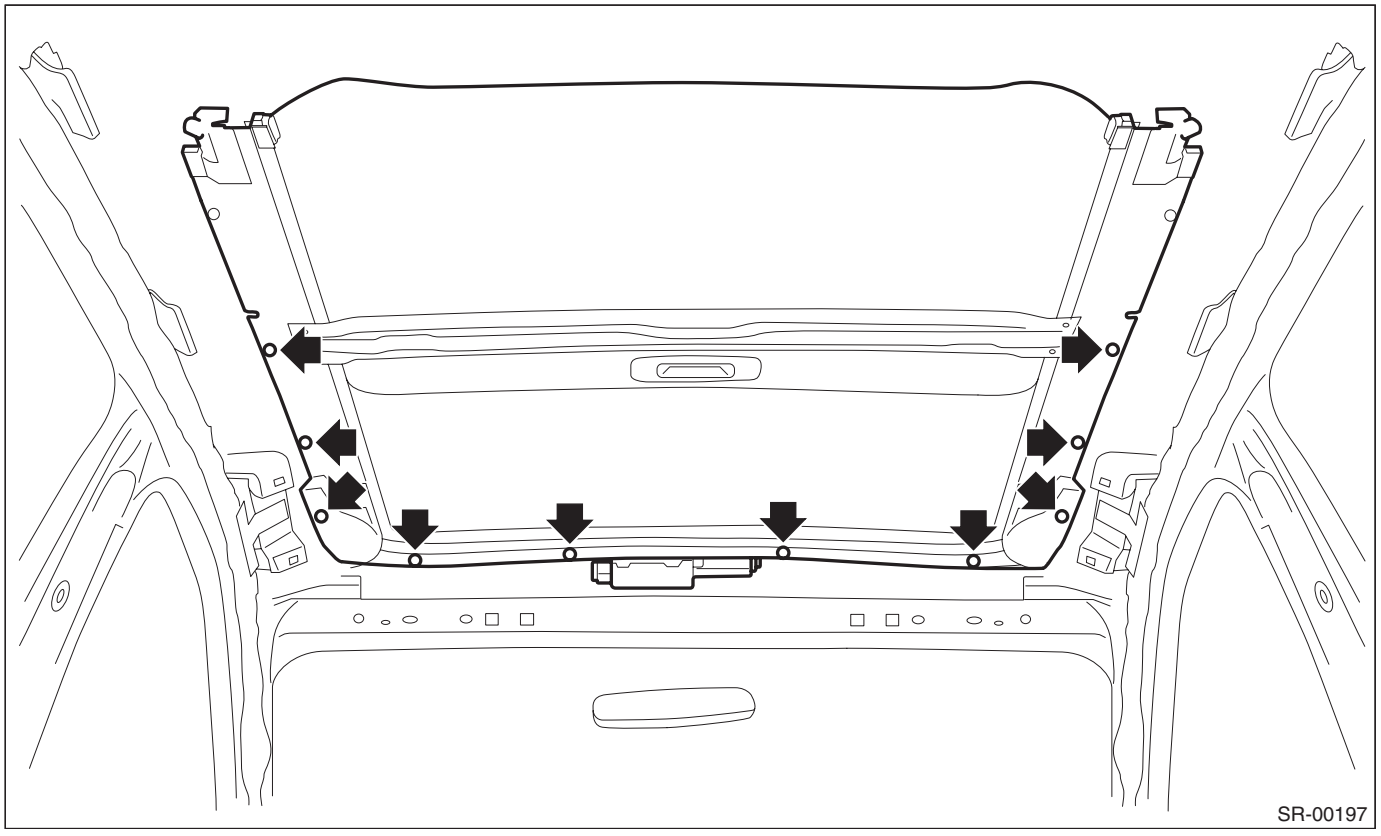
6) Remove the rail assembly.
   (1) Remove the curtain airbag module. <Ref. to AB-51, REMOVAL, Curtain Airbag Module.>
   (2) Remove the bolts, and then remove the bracket - assist rail.



(3) Remove the bolts and then remove the sunroof bracket.



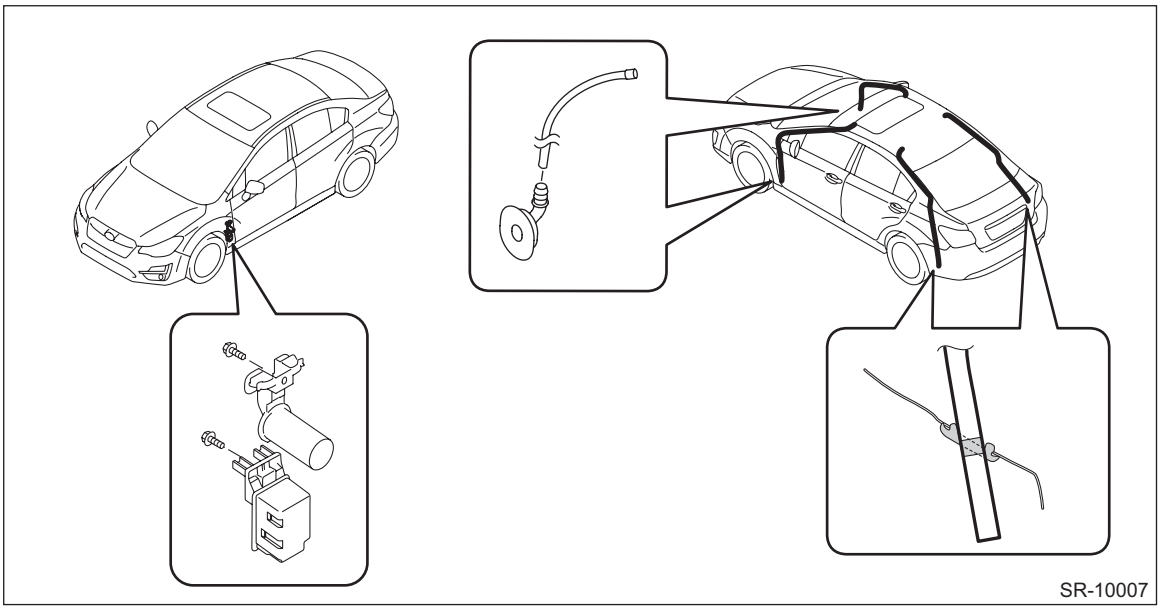
(4) Remove the bolts, then remove the rail assembly.

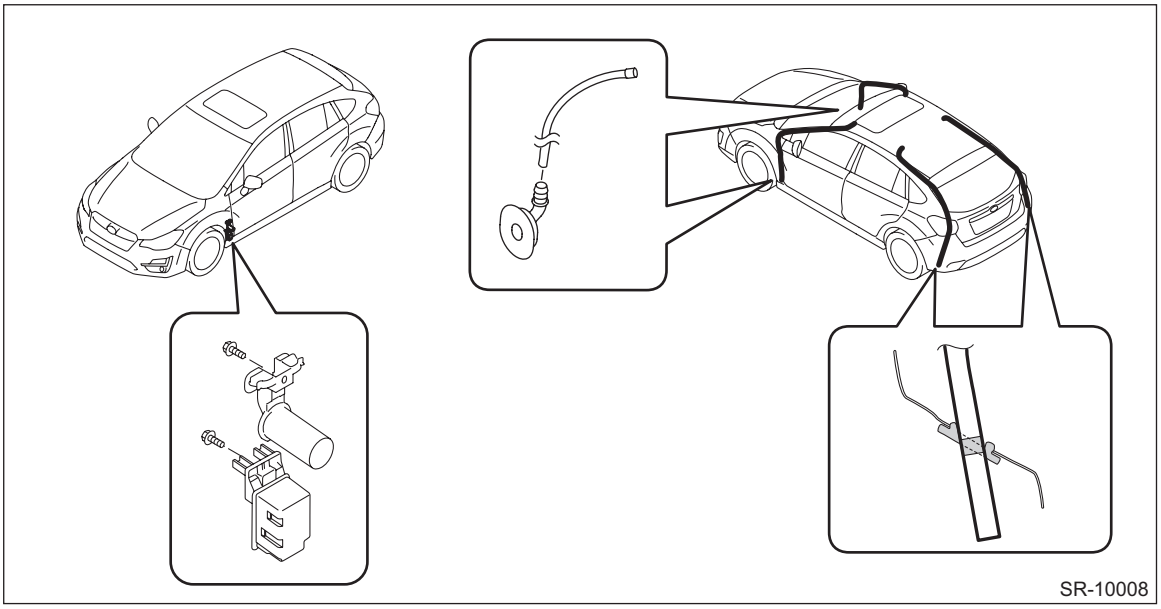


7) Remove the drain tube - sunroof.

NOTE:
For easy replacement work, attach a string when pulling the drain tube - sunroof.

(1) Remove the cover side sill - front INN and cover side sill - front. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
(2) Disconnect each connector, bolt and clip, then remove the connector holder.
(3) Remove the front side of drain tube - sunroof.
(4) Remove the mat - rear floor and the spacer - rear floor.
(5) Remove the rear side of drain tube - sunroof.


SR-10007


SR-10008

B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• For installation of the stereo camera cover, refer to "INSTALLATION", "Stereo Camera" in the "EyeSight" section and observe the precautions for installation. <Ref. to ES-10, INSTALLATION, Stereo Camera.>
• Be careful not to snag the harness.

1) Install each connector and the drain tube - sunroof.

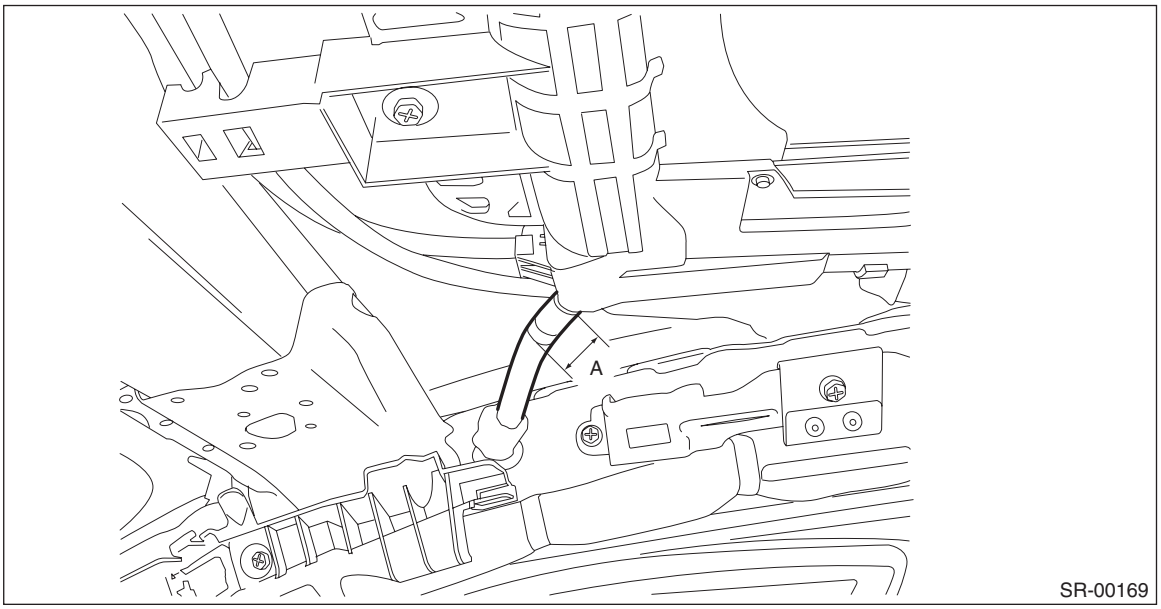
Tightening torque:
Connector holder: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
Ground bolt: 13 N·m (1.33 kgf-m, 9.6 ft-lb)

2) Install the sunroof bracket and the rail assembly - sunroof.

Tightening torque:
6 N·m (0.61 kgf-m, 4.4 ft-lb)

3) Connect the harness connector of the drain tube - sunroof and the motor assembly.

CAUTION:
Insert the four drain tubes 15 mm (0.59 in) or more into the drain pipes (A).



4) Install the curtain airbag module. <Ref. to AB-54, INSTALLATION, Curtain Airbag Module.>
5) Install the bracket - assist rail.

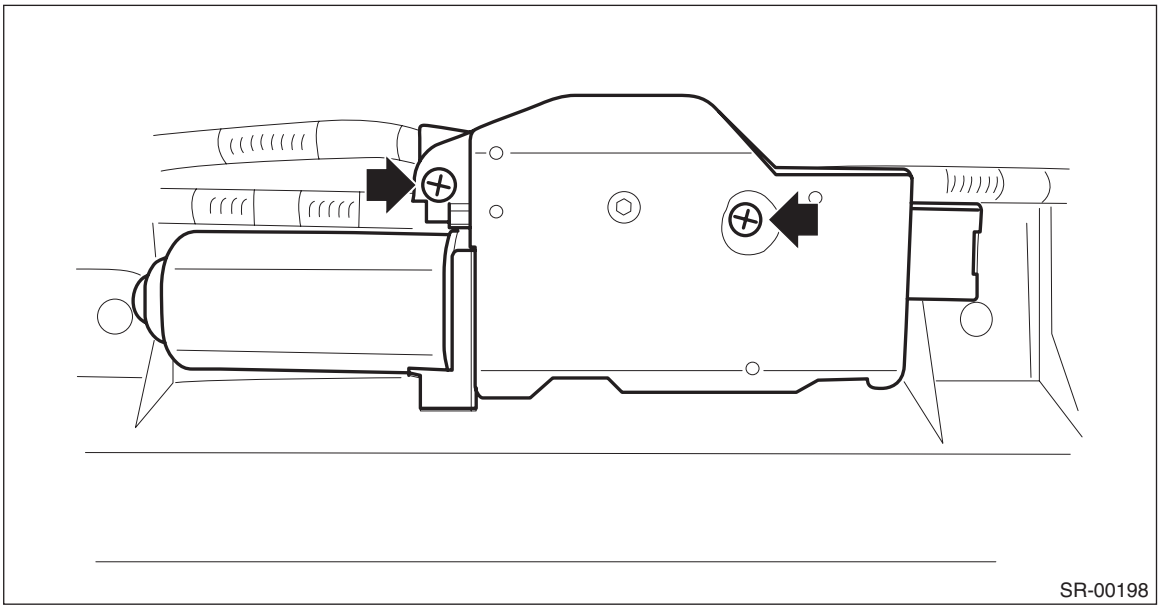
Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

6) Install the trim panel - roof assembly. <Ref. to EI-118, INSTALLATION, Roof Trim.>
7) Using a new TORX® bolt, install the lid assembly - sunroof.

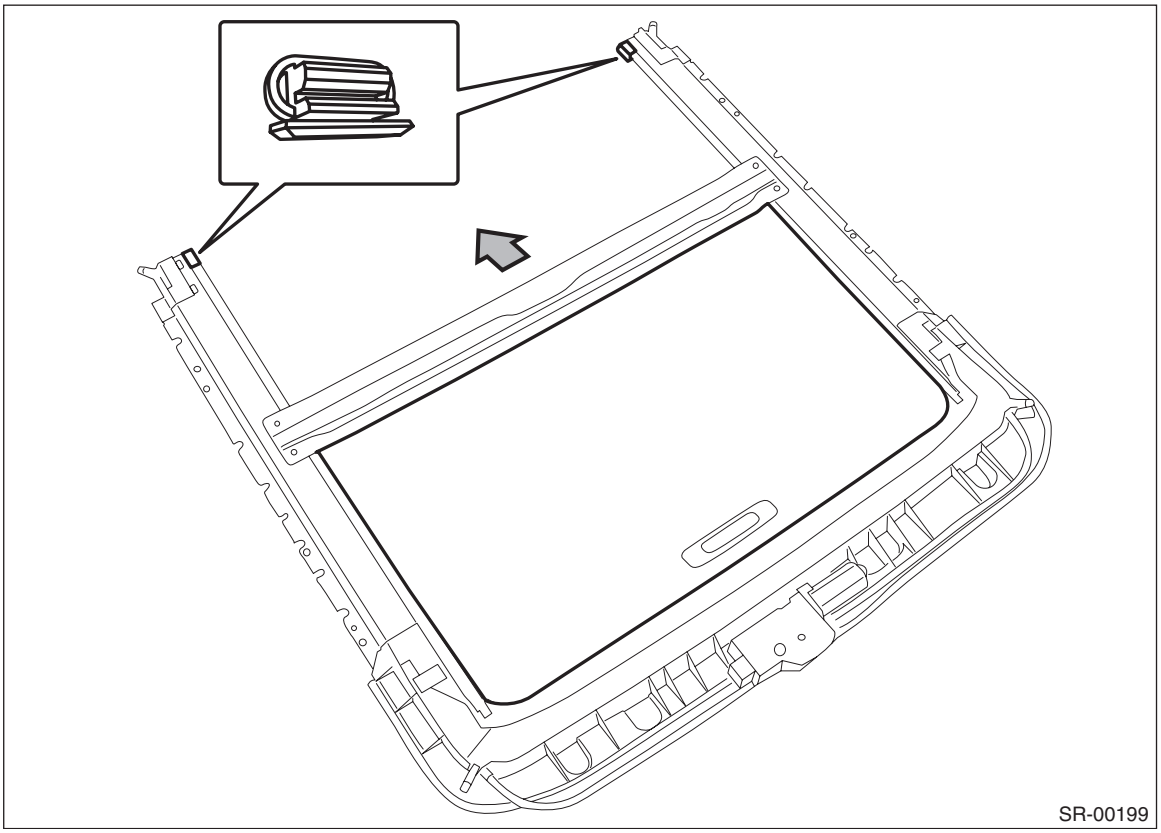
Tightening torque:
4.5 N·m (0.46 kgf-m, 3.3 ft-lb)

C: DISASSEMBLY

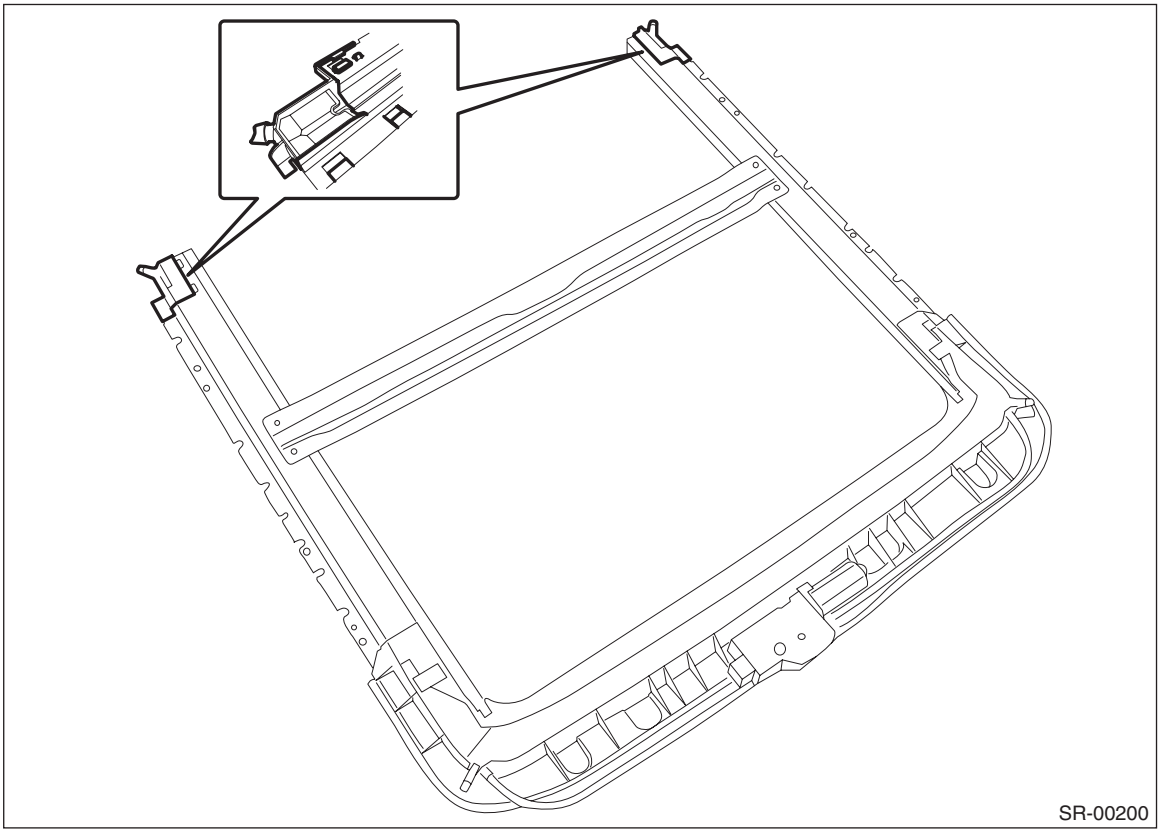
1) Remove the screw and remove the sunroof motor.



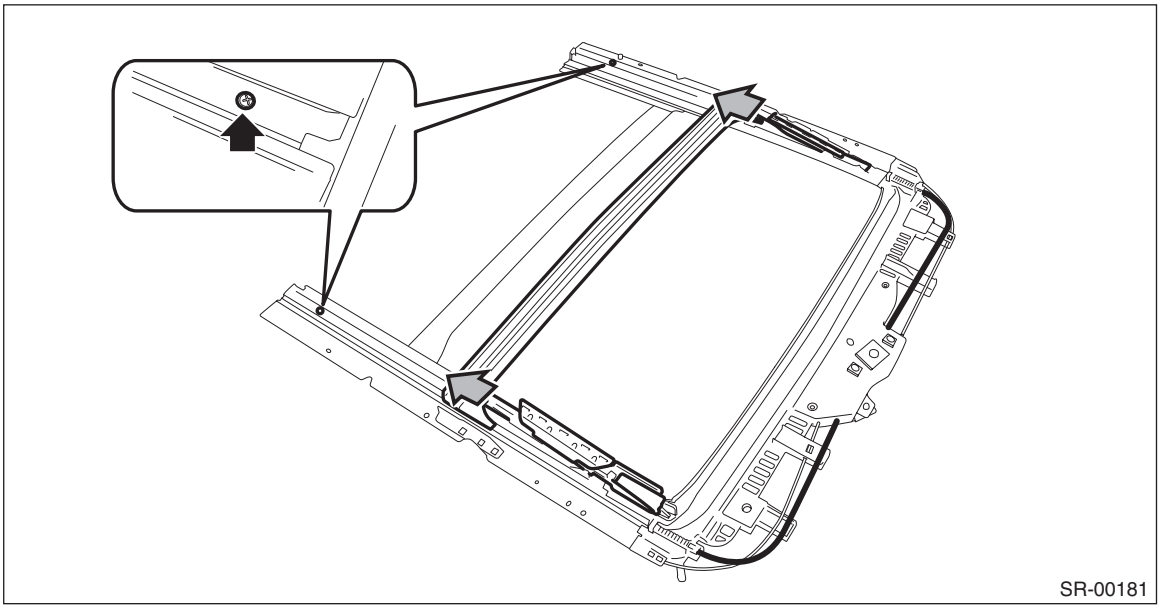
2) Remove the stopper rubber and pull out the sunshade assembly from the rail assembly - sunroof.



3) Disconnect the claws and then remove the drain holder.



4) Remove the screw and pull out the cable assembly from the rail assembly - sunroof.



D: ASSEMBLY

Install each part in the reverse order of removal.

6. Sunroof Motor

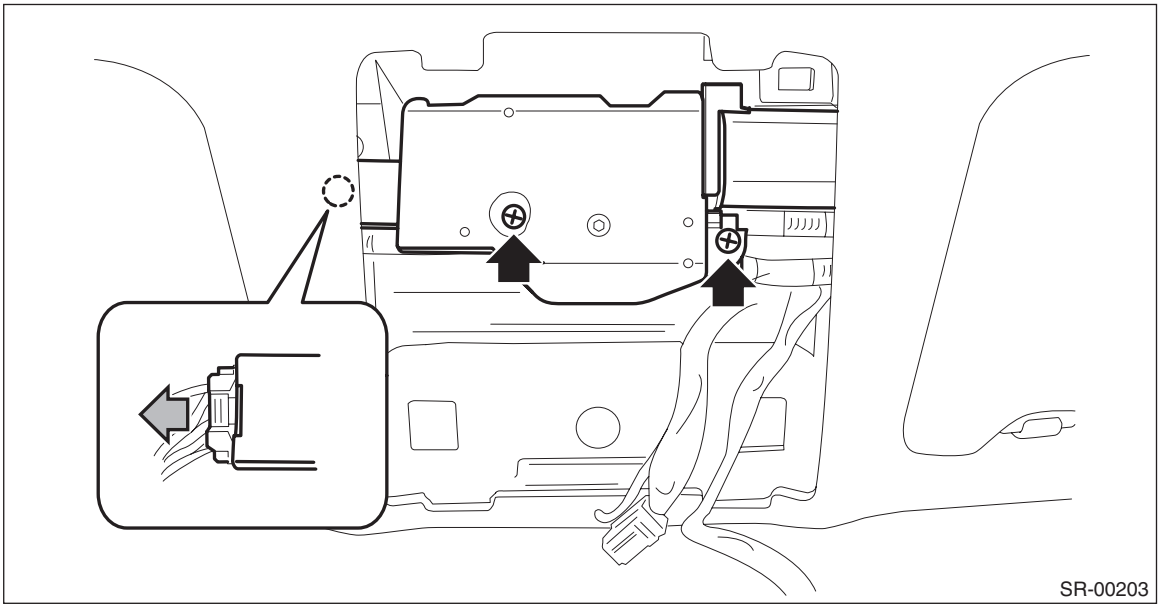
A: REMOVAL

1) Completely close the lid assembly - sunroof.
2) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

3) Remove the light assembly - map. (Models without EyeSight) <Ref. to LI-77, REMOVAL, Spot Map Light.>
4) Remove the stereo camera cover. (Models with EyeSight) <Ref. to ES-7, REMOVAL, Stereo Camera.>
5) Remove the motor assembly - sunroof.
   (1) Disconnect the harness connector.
   (2) Remove the screws and remove the motor assembly - sunroof.

CAUTION:
When removing the motor assembly - sunroof, secure the cable assembly so that it does not move.



B: INSTALLATION

CAUTION:
• For installation of the stereo camera cover, refer to "INSTALLATION", "Stereo Camera" in the "EyeSight" section and observe the precautions for installation. <Ref. to ES-10, INSTALLATION, Stereo Camera.>
• When installing the motor assembly - sunroof, be careful not to move the cable assembly.
1) Install the motor assembly - sunroof.
2) Install the stereo camera cover. (Models with EyeSight) <Ref. to ES-10, INSTALLATION, Stereo Camera.>
3) Install the light assembly - map. (Models without EyeSight)
4) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>
5) Perform the initialize operation. <Ref. to SR-6, INITIALIZE OPERATION, OPERATION, Sunroof Control System.>
6) Check the operation of sunroof by following the table below.

Operation	Switch position
(1) Lid assembly - sunroof closes completely.	Close
(2) Lid assembly - sunroof is tilted up to the top position.	Tilt up
(3) Lid assembly - sunroof closes completely.	Tilt down
(4) Lid assembly - sunroof opens 295 mm (11.61 in) away from completely closed position.	Open
(5) Lid assembly - sunroof opens completely.	Open
(6) Lid assembly - sunroof closes completely.	Close

C: INSPECTION

Check the auto-reverse mechanism.

CAUTION:
Do not place objects in the way to check the auto-reverse mechanism.
1) Open the lid assembly - sunroof.
2) Push the lid assembly - sunroof in the opening direction with a force of 110±10 N (11.2 kgf, 24.7 lbf±1.0 kgf, 2.2 lbf) during the auto-closing operation, and check whether the window auto-reverse mechanism functions.

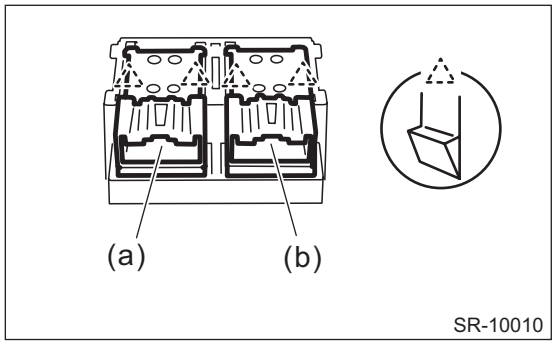
NOTE:
If the auto function is cancelled, perform the initialize operation. <Ref. to SR-6, INITIALIZE OPERATION, OPERATION, Sunroof Control System.>

7. Sunroof Switch

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the light assembly - map. (Models without EyeSight) <Ref. to LI-77, REMOVAL, Spot Map Light.>
3) Remove the stereo camera cover. (Models with EyeSight) <Ref. to ES-7, REMOVAL, Stereo Camera.>
4) Release the claws and remove the sunroof switch from the light assembly - map.



(a) Sunroof switch (tilt)
(b) Sunroof switch (slide)

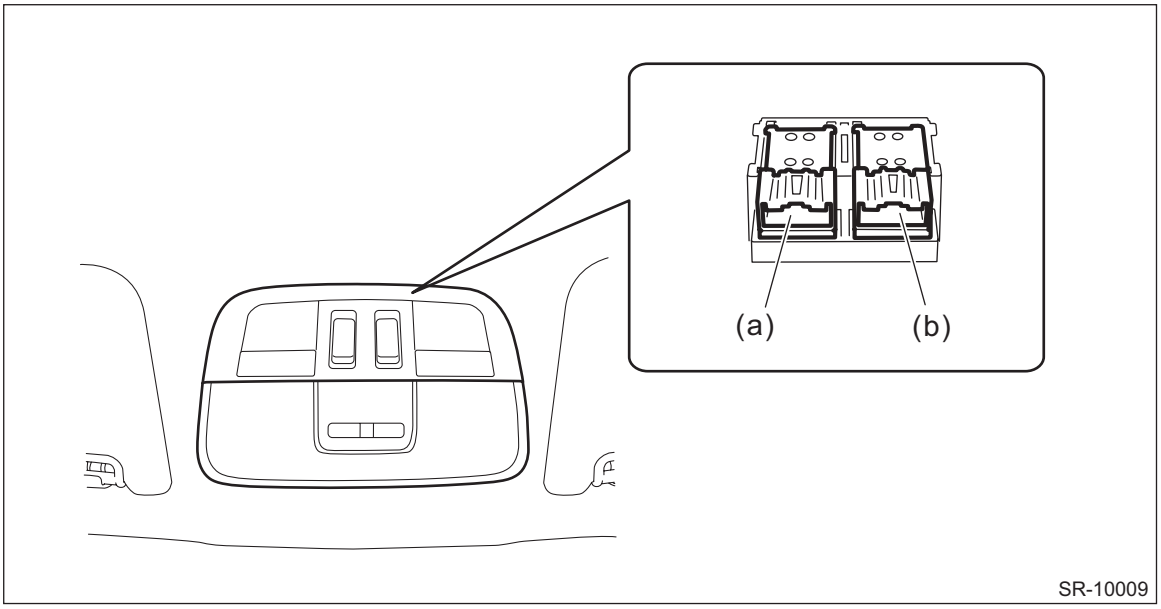
B: INSTALLATION

CAUTION:
For installation of the stereo camera cover, refer to "INSTALLATION", "Stereo Camera" in the "EyeSight" section and observe the precautions for installation. <Ref. to ES-10, INSTALLATION, Stereo Camera.>
1) Install the sunroof switch.
2) Install the stereo camera cover. (Models with EyeSight) <Ref. to ES-10, INSTALLATION, Stereo Camera.>
3) Install the light assembly - map. (Models without EyeSight)
4) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1) Check the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard	Connector
1 — 3	Open	Less than 1 Ω	(b): Slide switch
4 — 3	Close	Less than 1 Ω	
1 — 3	Tilt up	Less than 1 Ω	(a): Tilt switch
4 — 3	Tilt down	Less than 1 Ω	

2) Replace the sunroof switch if the inspection result is not within the standard value.

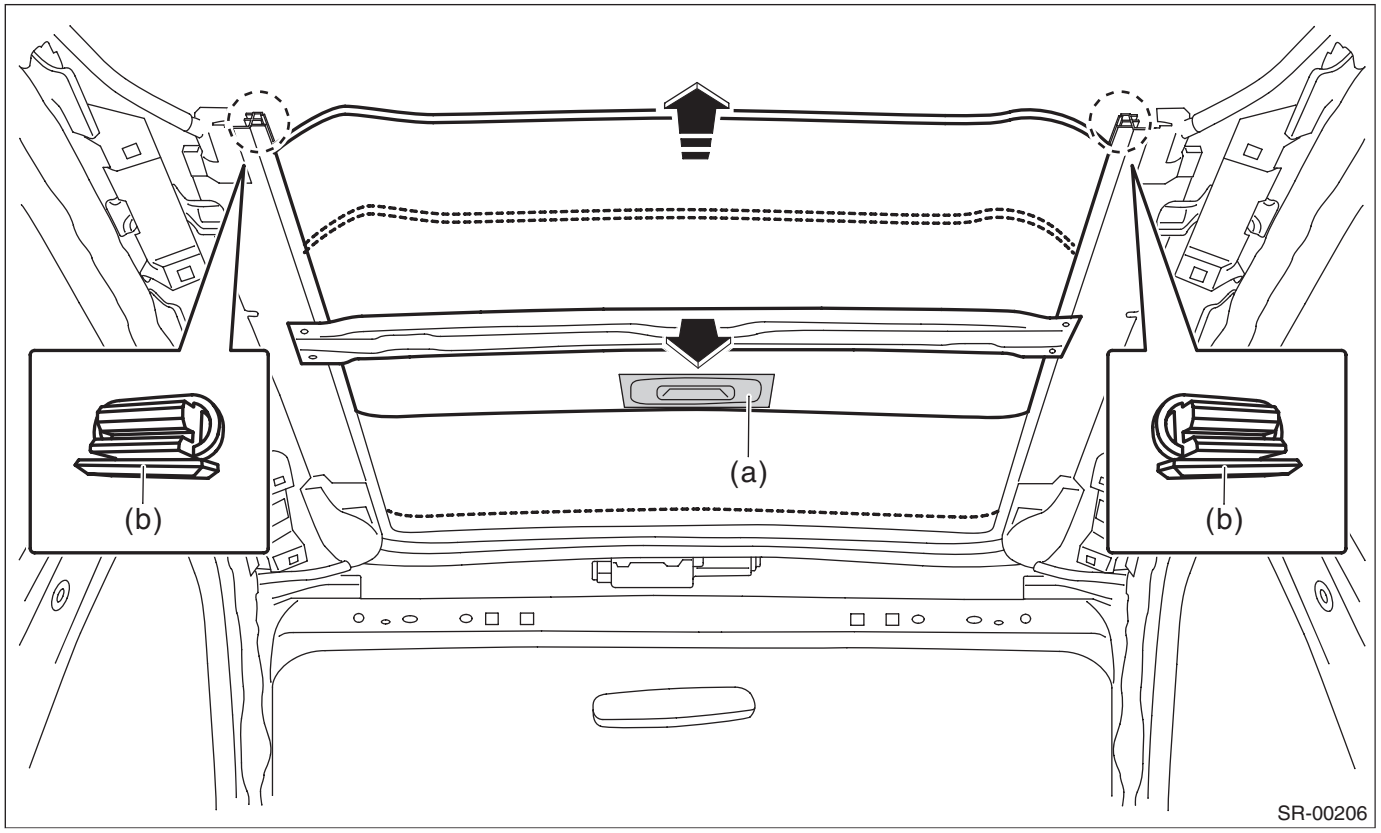
8. Sunshade

A: REMOVAL

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the lid assembly - sunroof. <Ref. to SR-7, REMOVAL, Glass Lid.>
3) Remove the trim panel - roof assembly. <Ref. to EI-109, REMOVAL, Roof Trim.>
4) Remove the sunshade assembly.
   (1) Attach protective tape (a) on the handle of sunshade assembly.
   (2) Remove the left and right stoppers (b).
   (3) Remove the sunshade assembly while pulling the center of the brace downward.

CAUTION:
Be careful not to damage the sunshade assembly.



B: INSTALLATION

CAUTION:
For installation of the stereo camera cover, refer to "INSTALLATION", "Stereo Camera" in the "EyeSight" section and observe the precautions for installation. <Ref. to ES-10, INSTALLATION, Stereo Camera.>
1) Install the sunshade assembly.

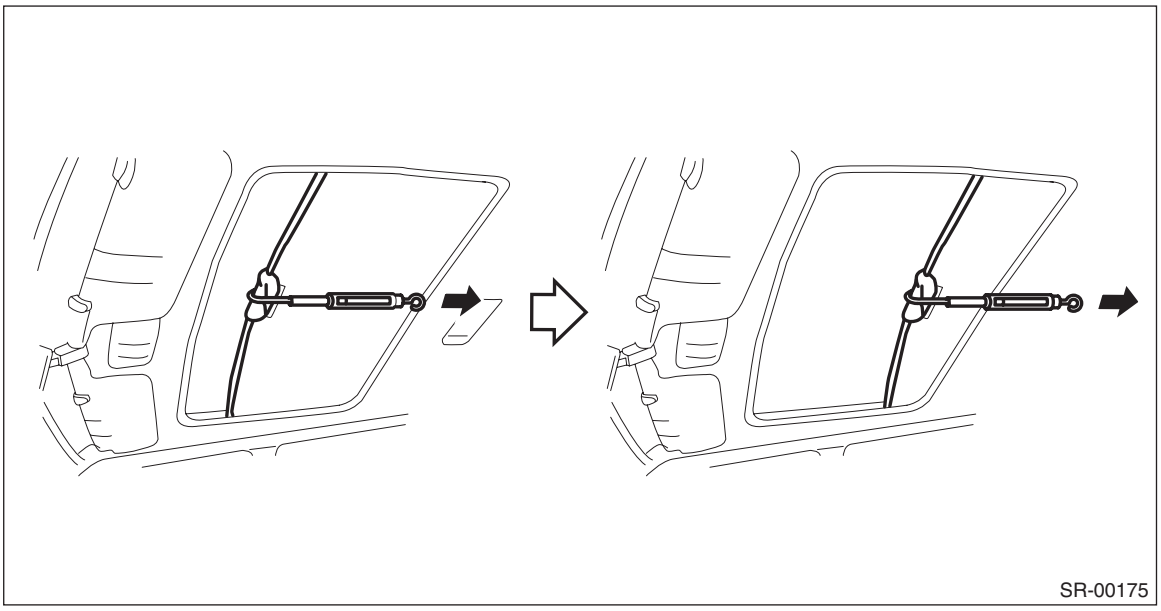
Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to SR-2, COMPONENT, General Description.>
2) Install the trim panel - roof assembly. <Ref. to EI-118, INSTALLATION, Roof Trim.>
3) Install the lid assembly - sunroof. <Ref. to SR-7, REMOVAL, Glass Lid.>
4) Connect the battery ground terminal. <Ref. to NT-6, BATTERY, NOTE, Note.>

C: INSPECTION

1. MOVING LOAD OF SUNSHADE ASSEMBLY

1) Attach a spring scale together with a cloth to the edge of sunshade assembly.
2) Pull the spring scale to check the moving load of the sunshade assembly.

Moving load of sunshade assembly:
14±6 N (1.43 kgf, 3.1 lbf±0.61 kgf, 1.3 lbf)



NOTE:
Moving load is larger at the beginning of pulling a spring scale, so take a spring scale reading while the sunshade assembly is sliding smoothly.
3) If the inspection result exceeds the standard, check the sunshade assembly or the rail assembly - sunroof for improper installation, and replace if necessary.

EXTERIOR/INTERIOR TRIM

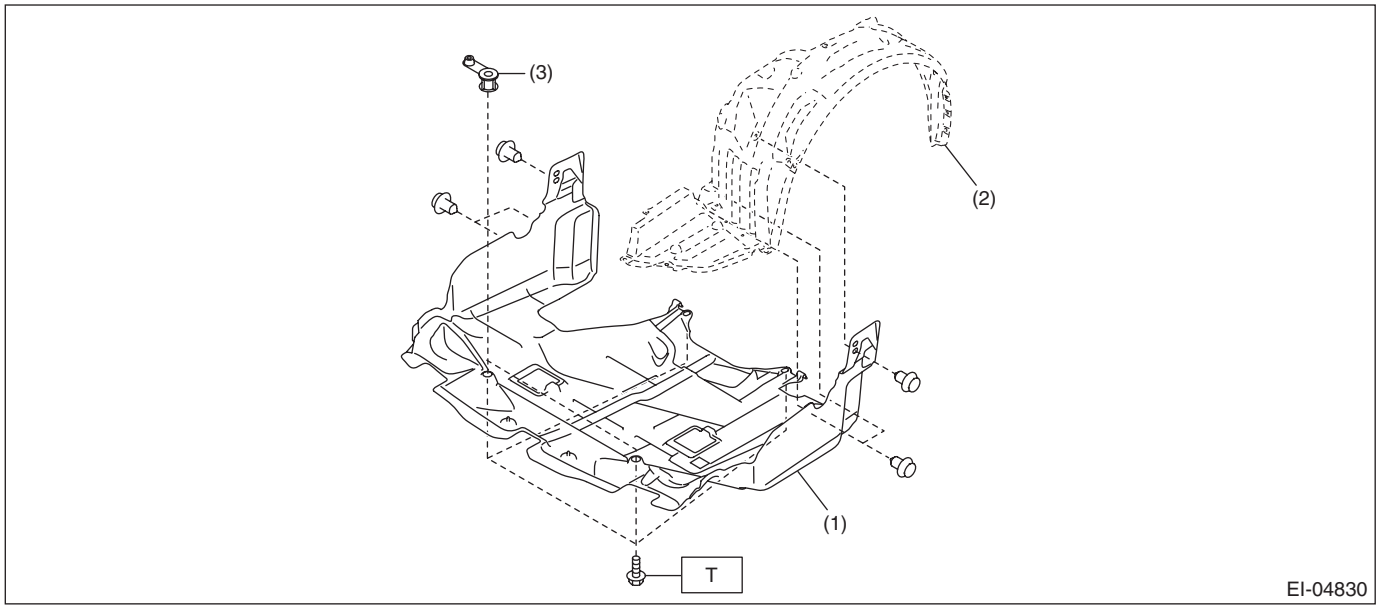
EI

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1. General Description

A: COMPONENT

1. FRONT UNDER COVER

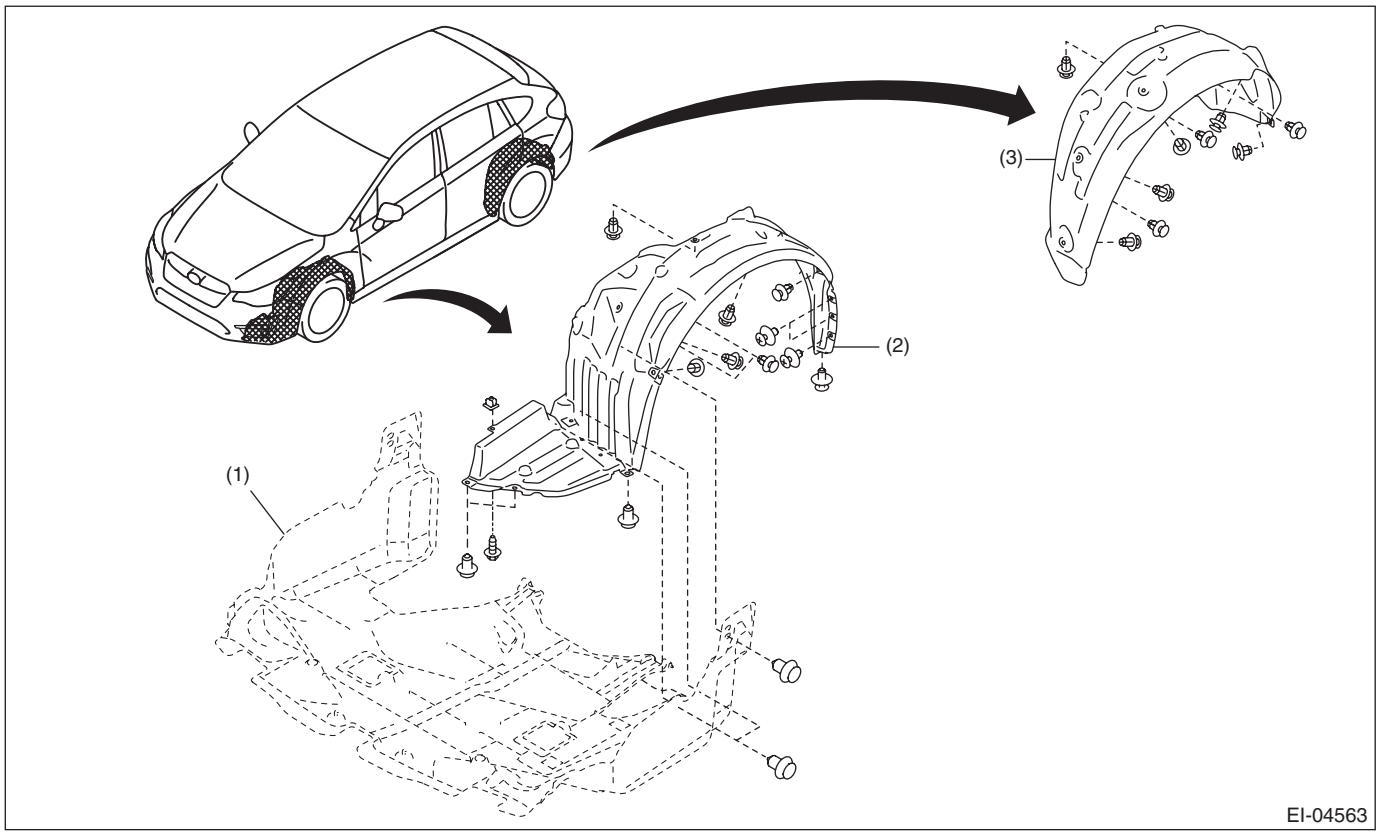


(1) Under cover - front
(2) Mud guard - front
(3) Spacer - under cover (Crosstrek model)

Tightening torque: N·m (kgf-m, ft-lb)

T: 18 (1.84, 13.3)

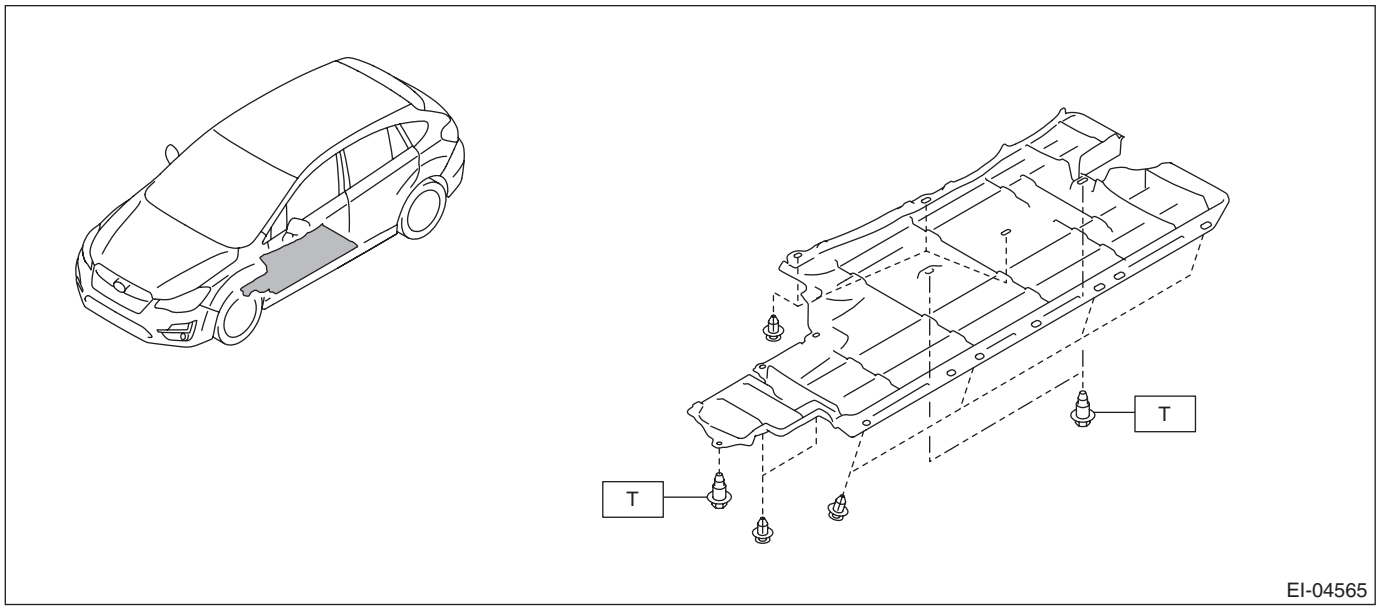
2. MUD GUARD



(1) Under cover - front
(2) Mud guard - front
(3) Mud guard - rear

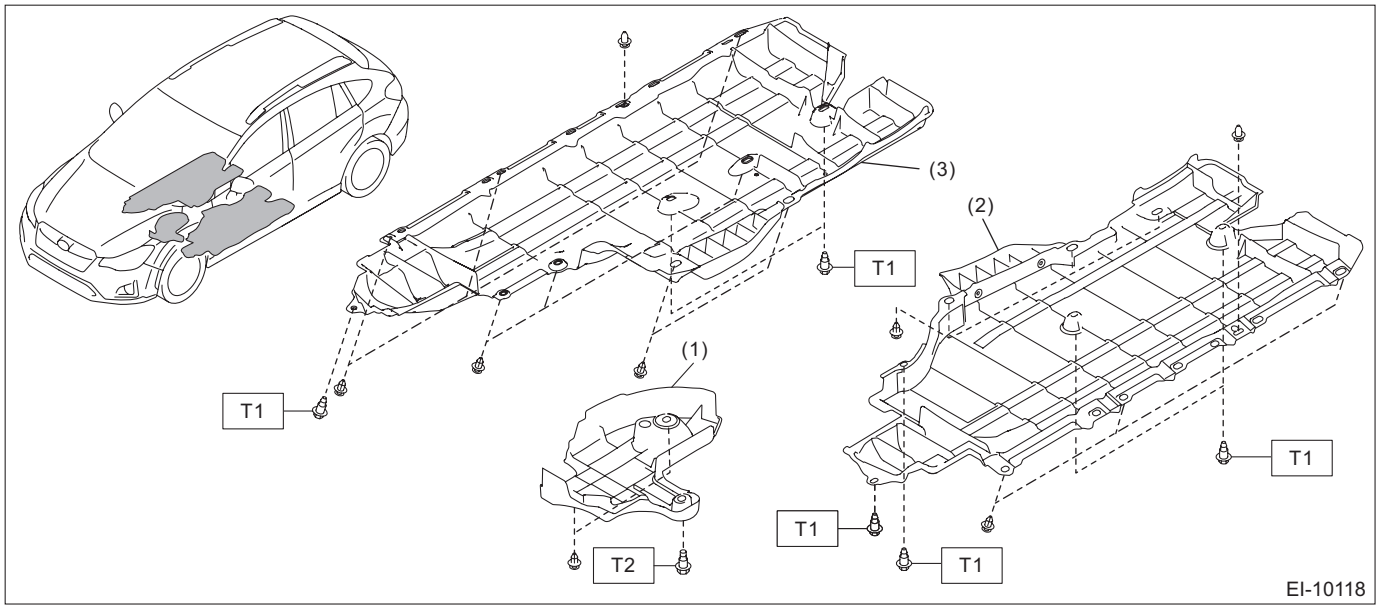
3. FLOOR UNDER PROTECTOR

- Type A



Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

- Type B



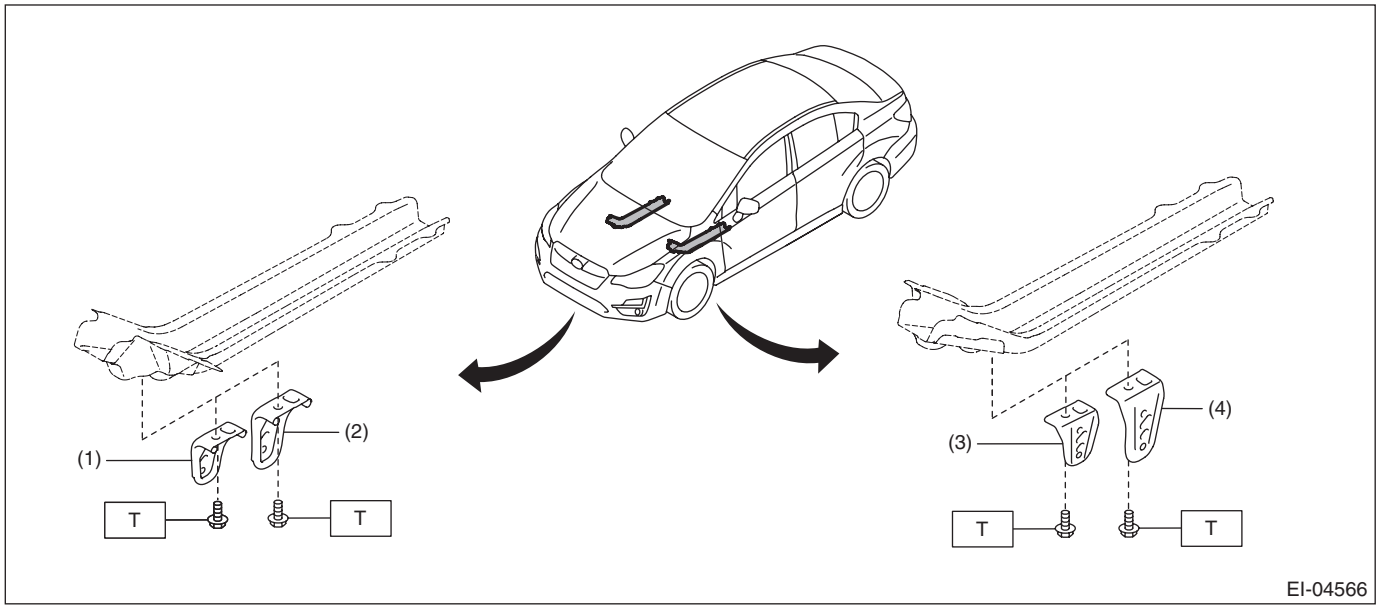
(1) Under cover front - cable
(2) Under cover - rear LH
(3) Under cover - rear RH

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 18 (1.84, 13.3)

4. FUEL TANK PROTECTOR

For exploded view of the fuel tank protector, refer to “FUEL TANK” of “FUEL INJECTION” section. <Ref. to FU(H4DO(w/o HEV))-7, FUEL TANK, COMPONENT, General Description.>

5. PROTECTOR OIL COVER



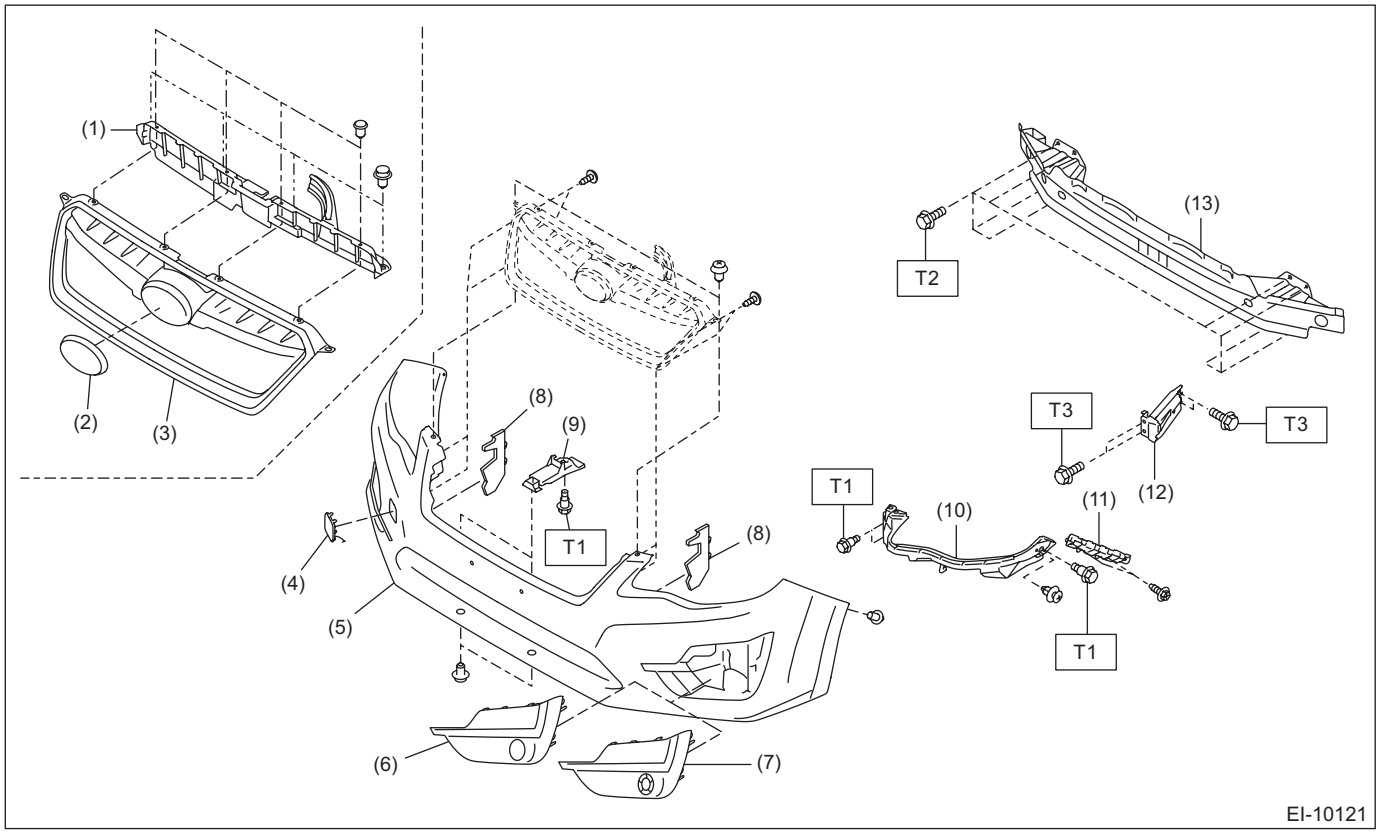
(1) Protector oil cover RH (Impreza model)
(2) Protector oil cover RH (Crosstrek model)
(3) Protector oil cover LH (Impreza model)
(4) Protector oil cover LH (Crosstrek model)

Tightening torque: N·m (kgf-m, ft-lb)

T: 100 (10.2, 73.3)

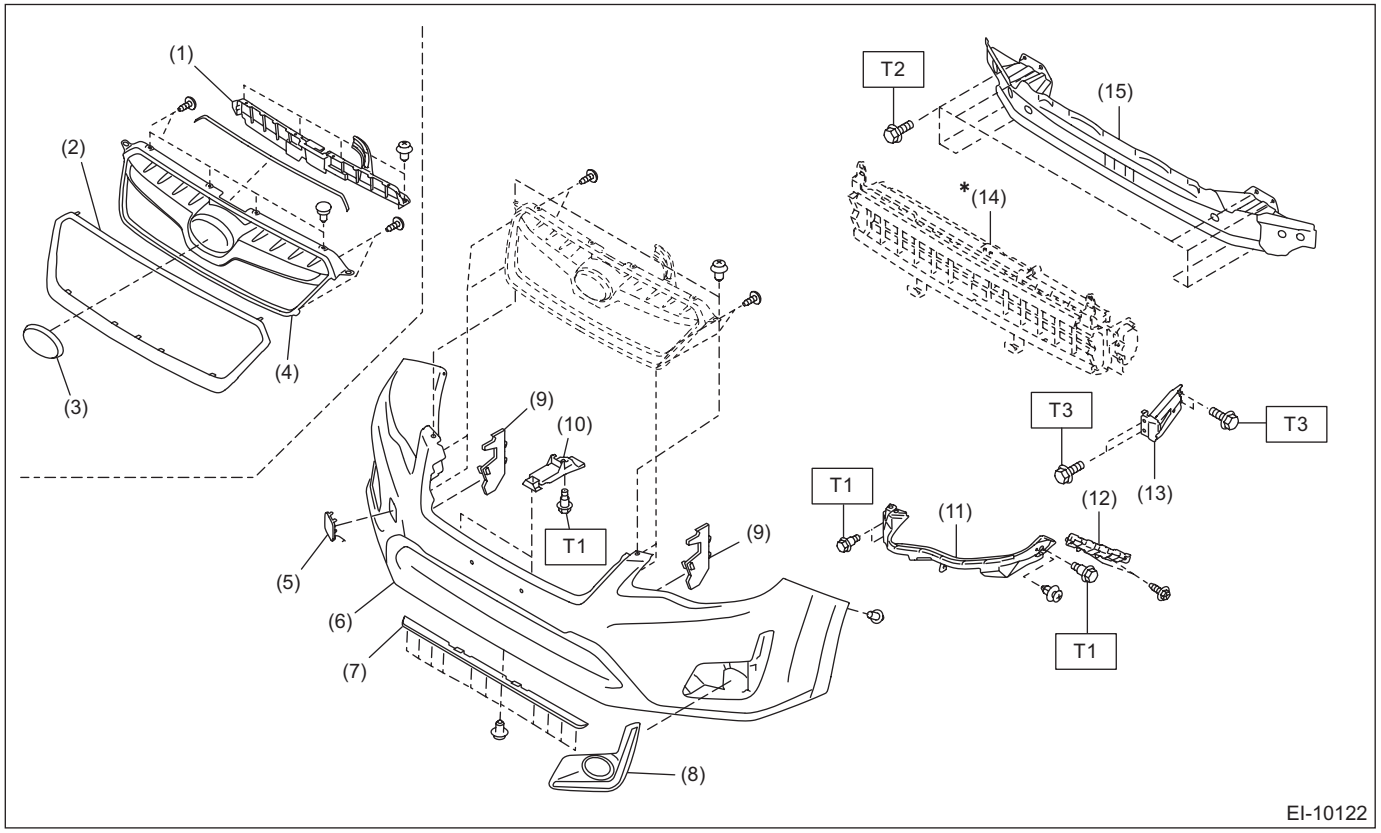
6. FRONT BUMPER

- Impreza model



(1)	Bracket - grille	(7)	Cover - front bumper B	(13)	Bumper beam COMPL - front
(2)	Ornament front	(8)	Radiator gasket		
(3)	Front grille ASSY	(9)	Bracket - front center LWR	***Tightening torque: N·m (kgf-m, ft-lb)***	
(4)	Cover - front bumper A	(10)	Bracket - front bumper corner	***T1:***	***7.5 (0.76, 5.5)***
(5)	Bumper face - front	(11)	Bracket - front bumper side	***T2:***	***32 (3.26, 23.6)***
(6)	Cover - fog light A	(12)	Gusset COMPL - front side	***T3:***	***65 (6.63, 47.9)***

- Crosstrek model



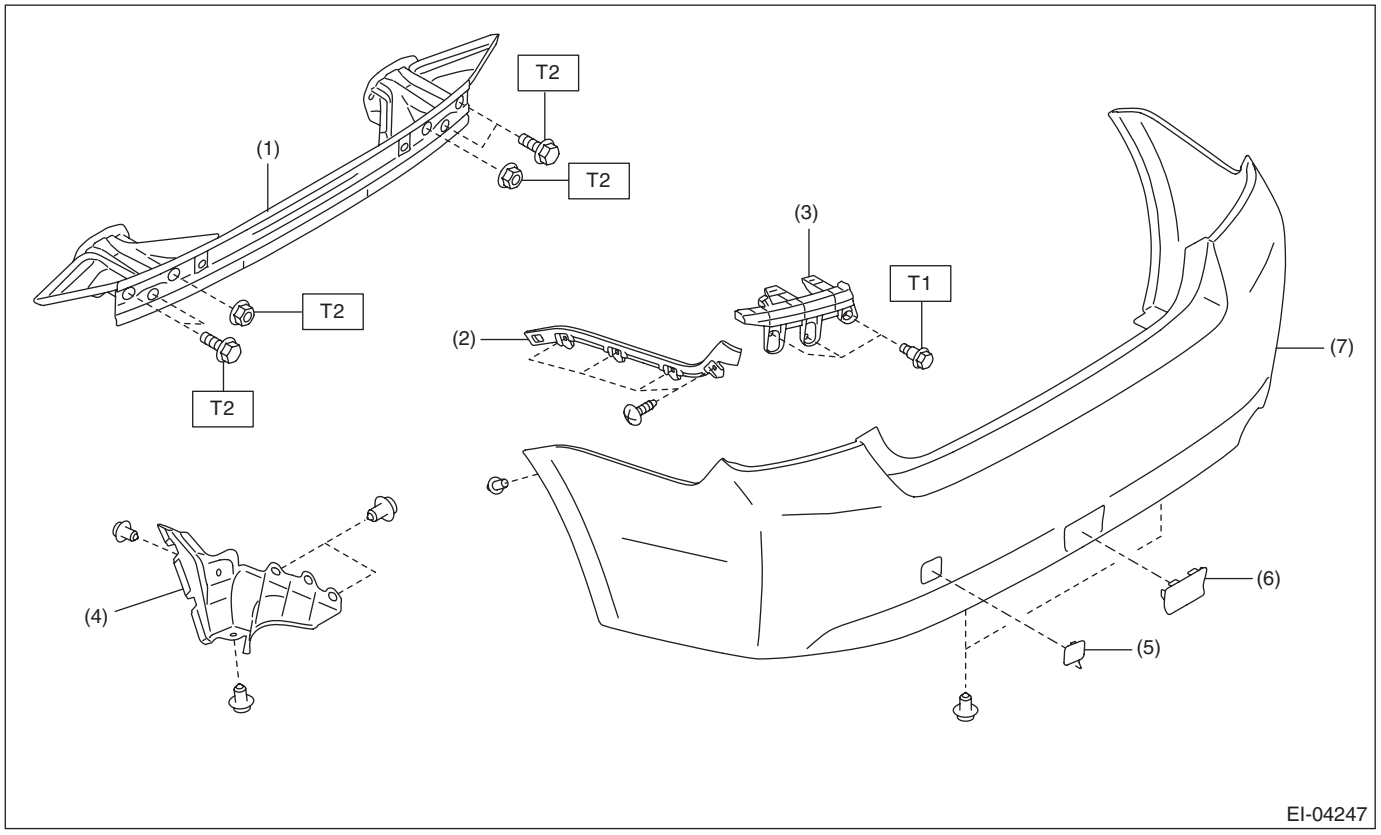
(1)	Bracket - grille	(8)	Cover - fog light A	(15)	Bumper beam COMPL - front (HEV model)
(2)	Ornament front	(9)	Radiator gasket		
(3)	Front grille ASSY	(10)	Bracket - front center LWR		
(4)	Ring - front grille	(11)	Bracket - front bumper corner		
(5)	Cover - front bumper A	(12)	Bracket - front bumper side		
(6)	Bumper face - front	(13)	Gusset COMPL - front side		
(7)	Under spoiler - front	(14)	Active grille shutter (ACTGS)		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 32 (3.26, 23.6)
T3: 65 (6.63, 47.9)

*: For exploded view of the active grille shutter (ACTGS), refer to “ACTIVE GRILLE SHUTTER” of “HYBRID ELECTRIC VEHICLE” section. <Ref. to HEV-9, HYBRID POWERTRAIN CONTROL MODULE, COMPONENT, General Description.>

7. REAR BUMPER

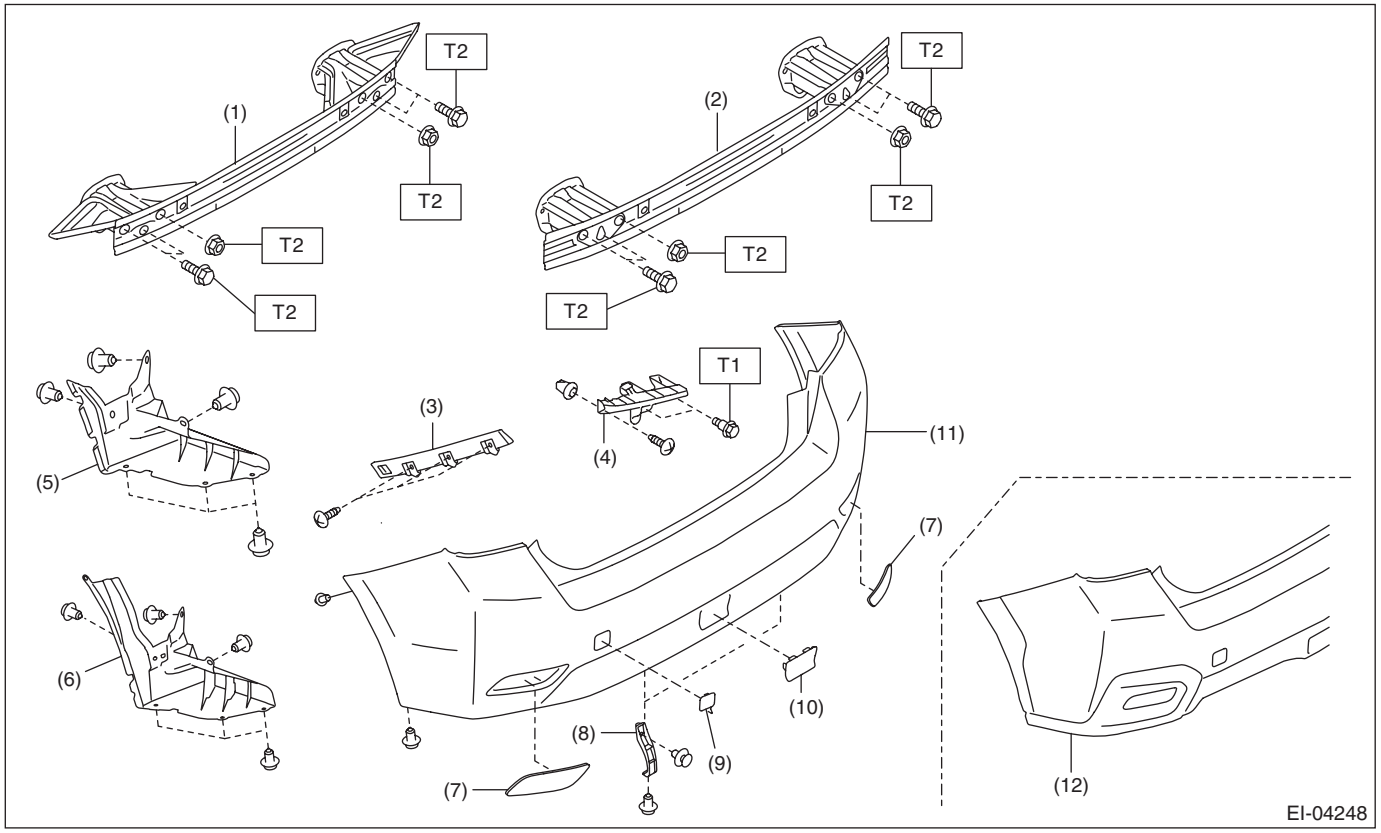
- 4 door model



(1) Bumper beam COMPL - rear
(2) Bracket - rear bumper side
(3) Bracket - rear bumper corner
(4) Cover - rear bumper side
(5) Cover - rear bumper A
(6) Cover - rear bumper B
(7) Bumper face - rear

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 70 (7.14, 51.6)

- 5 door model/Crosstrek model



(1)	Bumper beam COMPL - rear (Impreza model)	(7)	Reflex reflector ASSY
(2)	Bumper beam COMPL - rear (Crosstrek model)	(8)	Bracket - rear bumper lower
(3)	Bracket - rear bumper side	(9)	Cover - rear bumper A
(4)	Bracket - rear bumper corner	(10)	Cover - rear bumper B
(5)	Cover - rear bumper side (Impreza model)	(11)	Bumper face - rear (Impreza model)
(6)	Cover - rear bumper side (Crosstrek model)	(12)	Bumper face - rear (Crosstrek model)

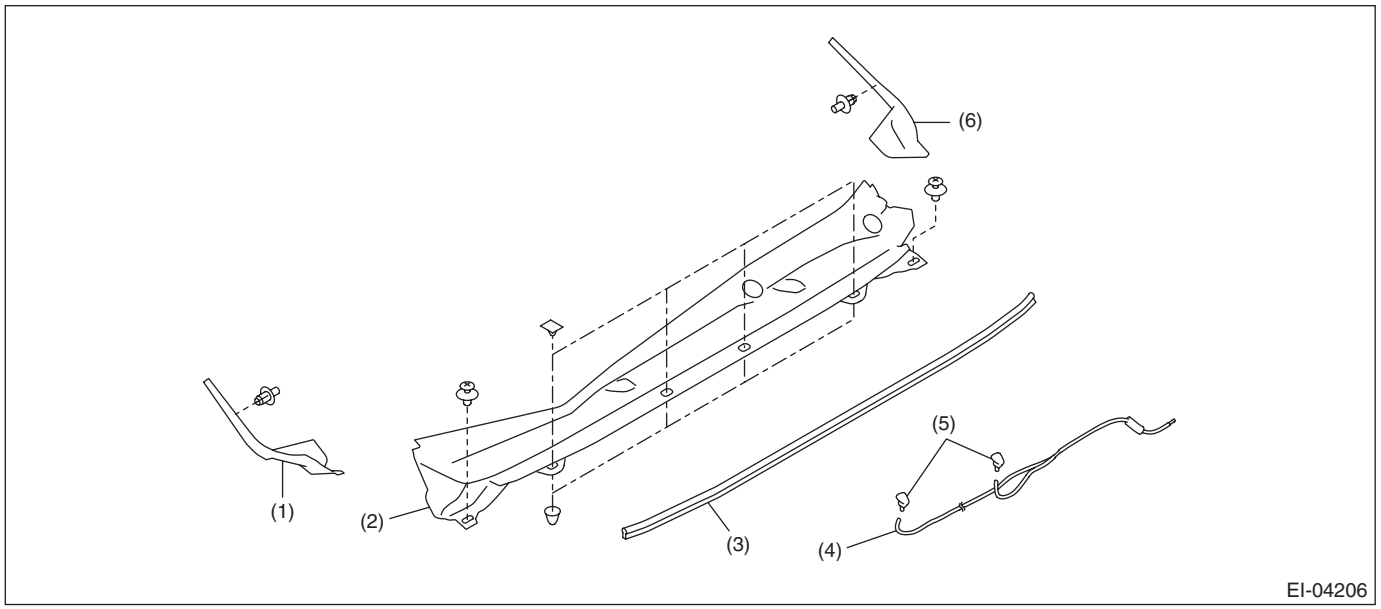
Tightening torque: N·m (kgf-m, ft-lb)

T1: 7.5 (0.76, 5.5)

T2: 70 (7.14, 51.6)

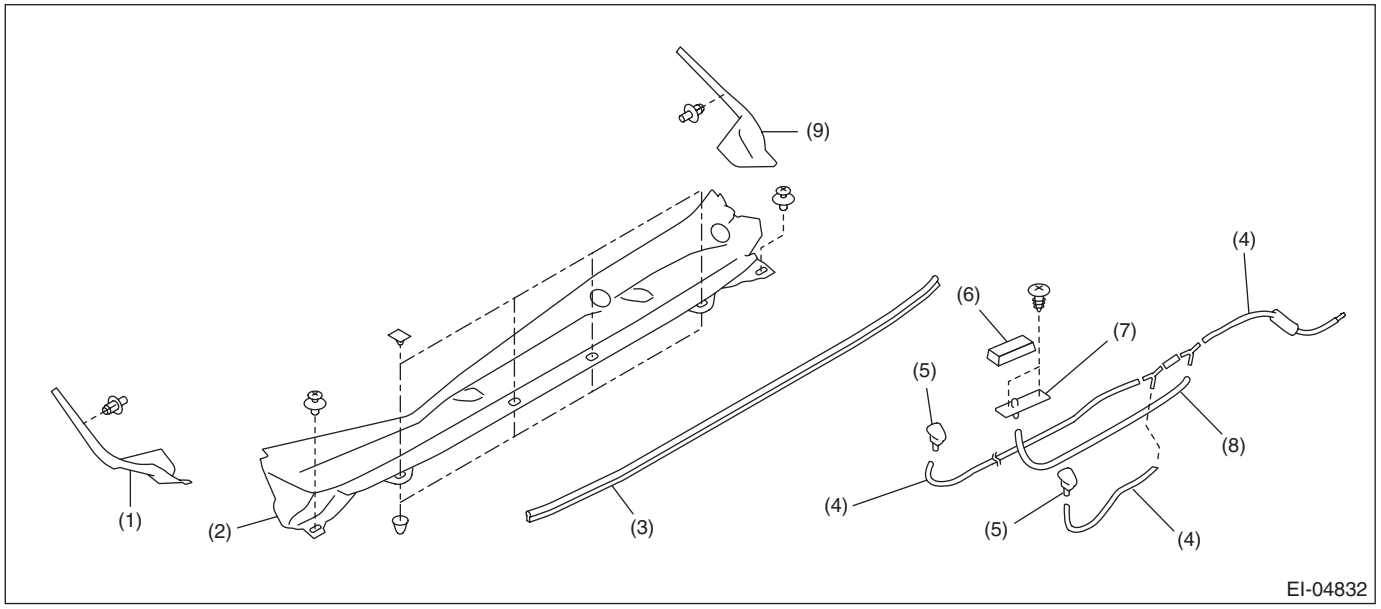
8. COWL PANEL

- Models without EyeSight



(1) Cowl panel - side RH
(2) Cowl panel ASSY
(3) Seal - front panel
(4) Hose - windshield washer
(5) Nozzle - windshield washer
(6) Cowl panel - side LH

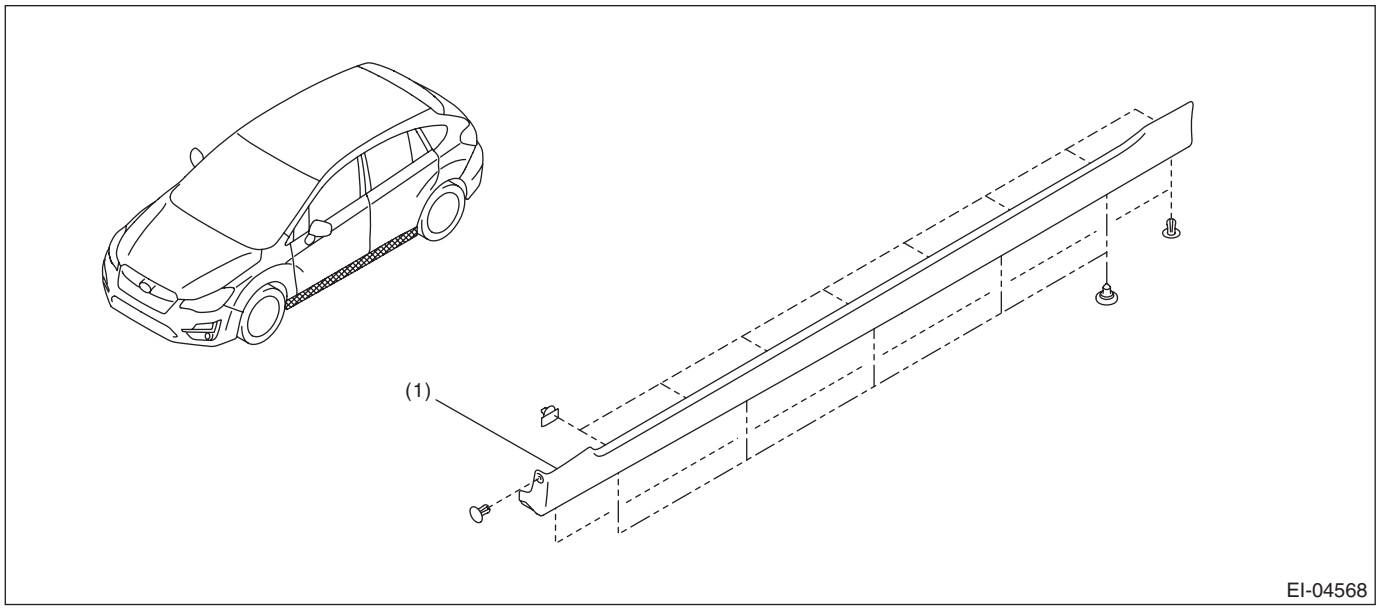
- Models with EyeSight



(1) Cowl panel - side RH
(2) Cowl panel ASSY
(3) Seal - front panel
(4) Hose - windshield washer
(5) Nozzle - windshield washer
(6) Cover - joint
(7) Joint - washer hose
(8) Hose - wiper arm
(9) Cowl panel - side LH

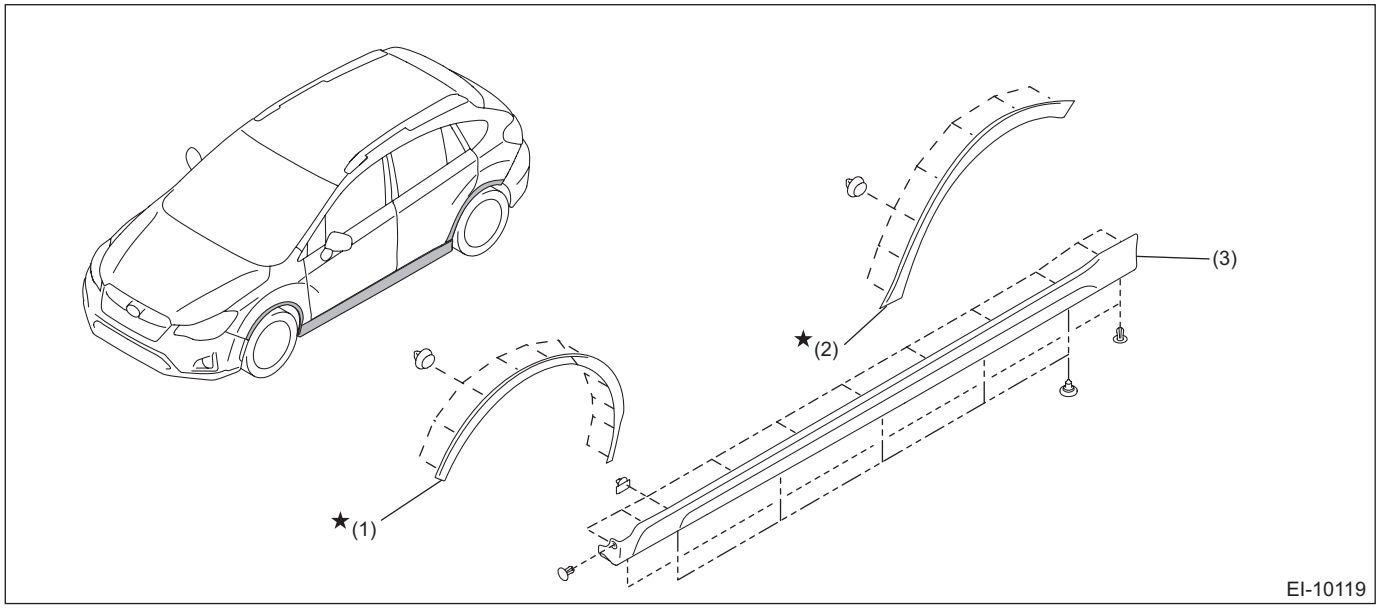
9. SIDE GARNISH

- Impreza model



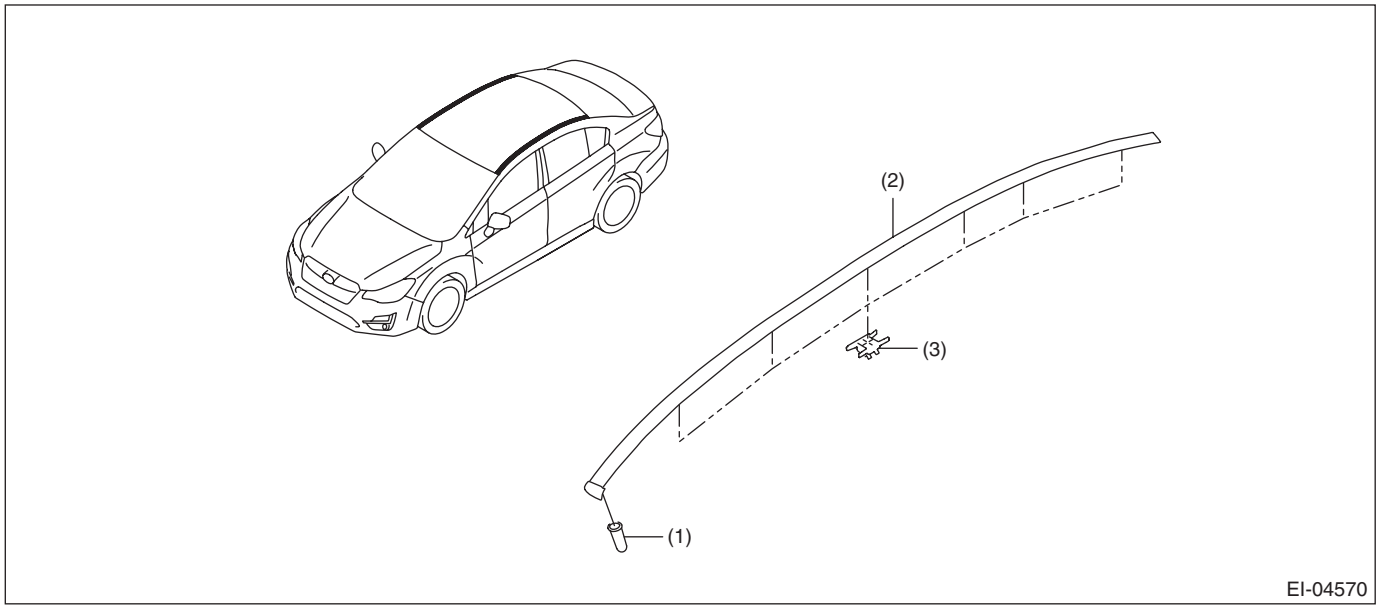
(1) Garnish ASSY - side sill

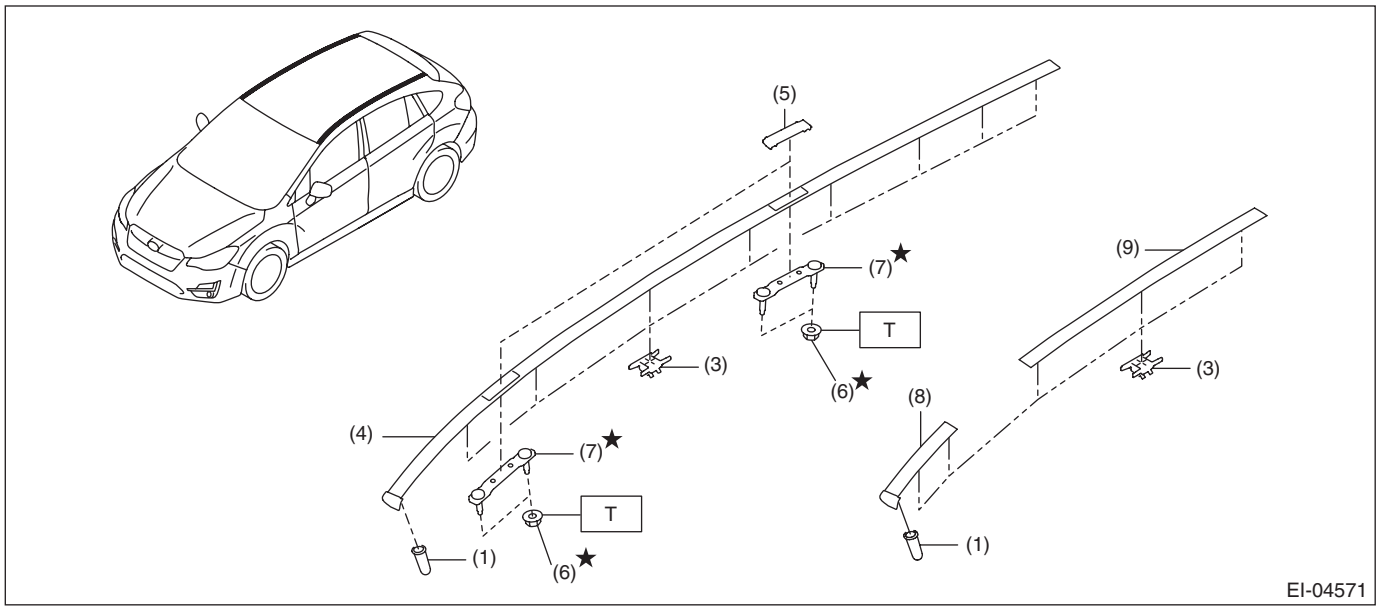
- Crosstrek model



(1) Garnish ASSY - fender
(2) Garnish ASSY - rear quarter
(3) Garnish ASSY - side sill

10.ROOF MOLDING

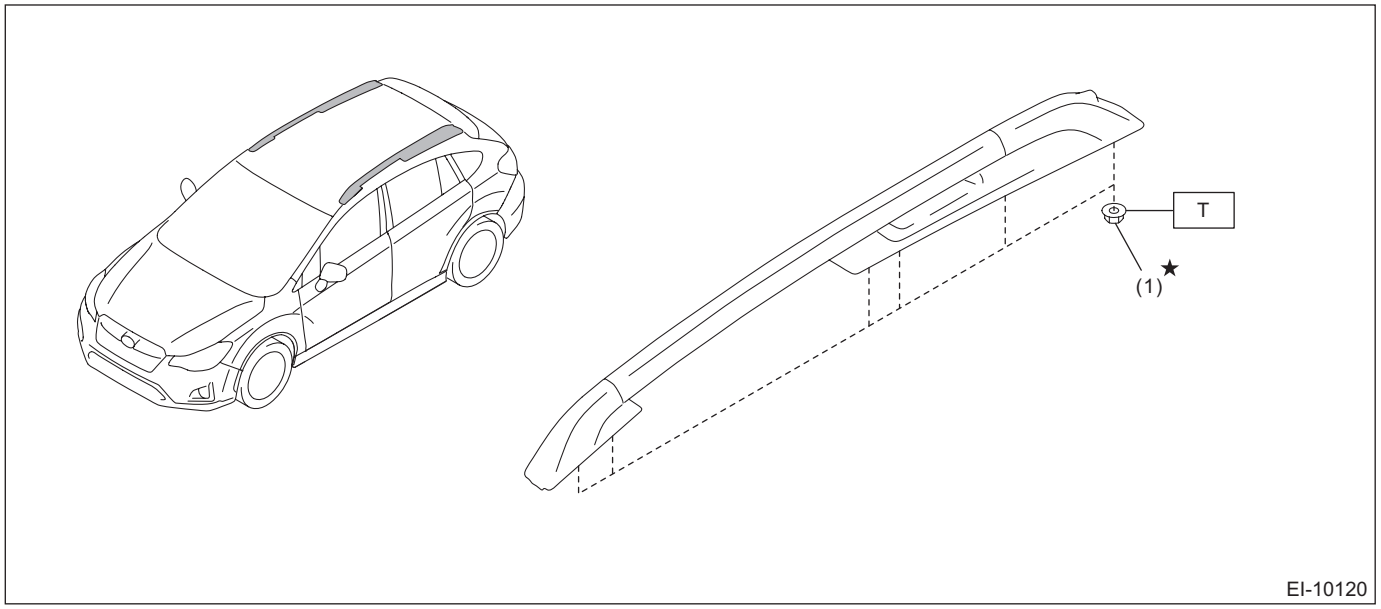




(1) Rivet
(2) Molding - roof (4 door model)
(3) Fastener
(4) Molding - roof (5 door model/ Crosstrek model)
(5) Cap - molding
(6) Flange nut
(7) Bracket - molding roof
(8) Molding - roof front (model with Crosstrek roof rail)
(9) Molding - roof rear (model with Crosstrek roof rail)

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

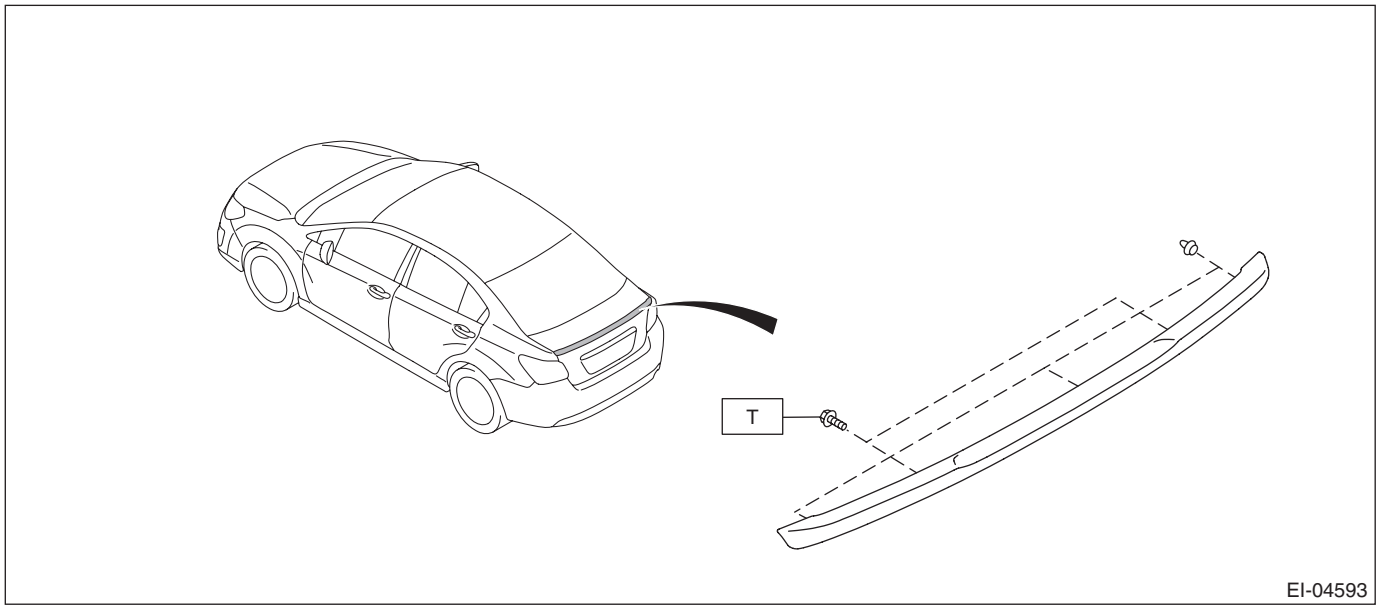
11.ROOF RAIL



(1) Self-locking nut

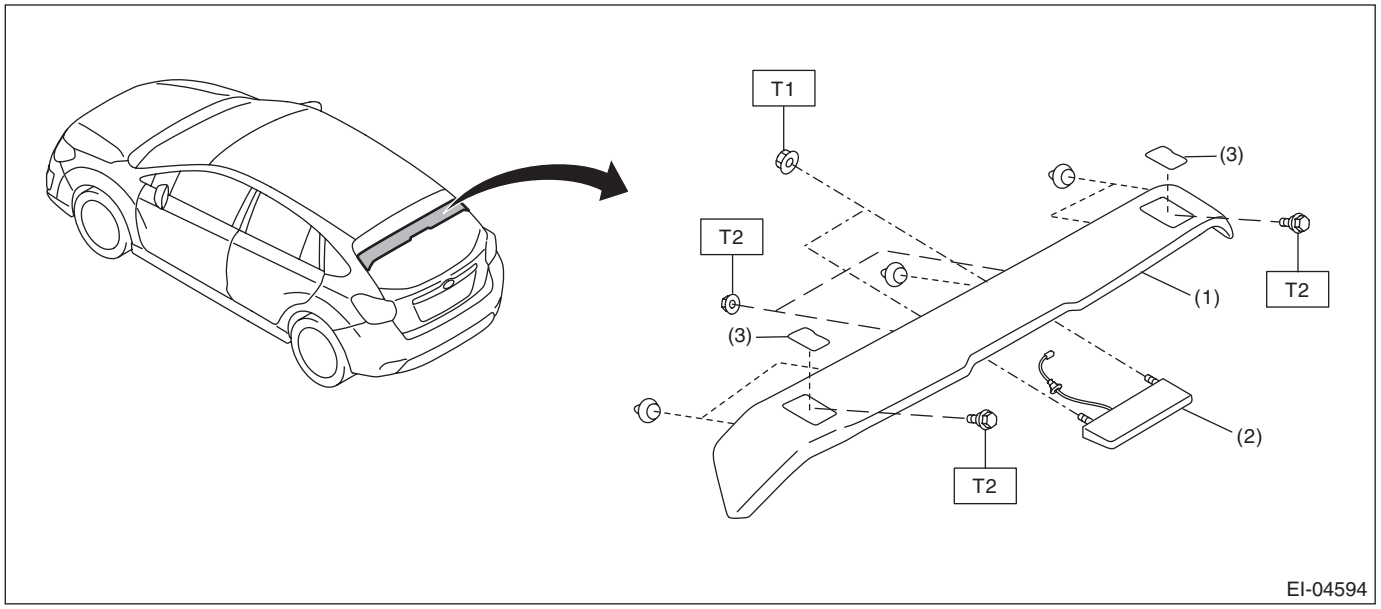
Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

12.REAR SPOILER



Tightening torque: N·m (kgf-m, ft-lb)
T: 4.5 (0.46, 3.3)

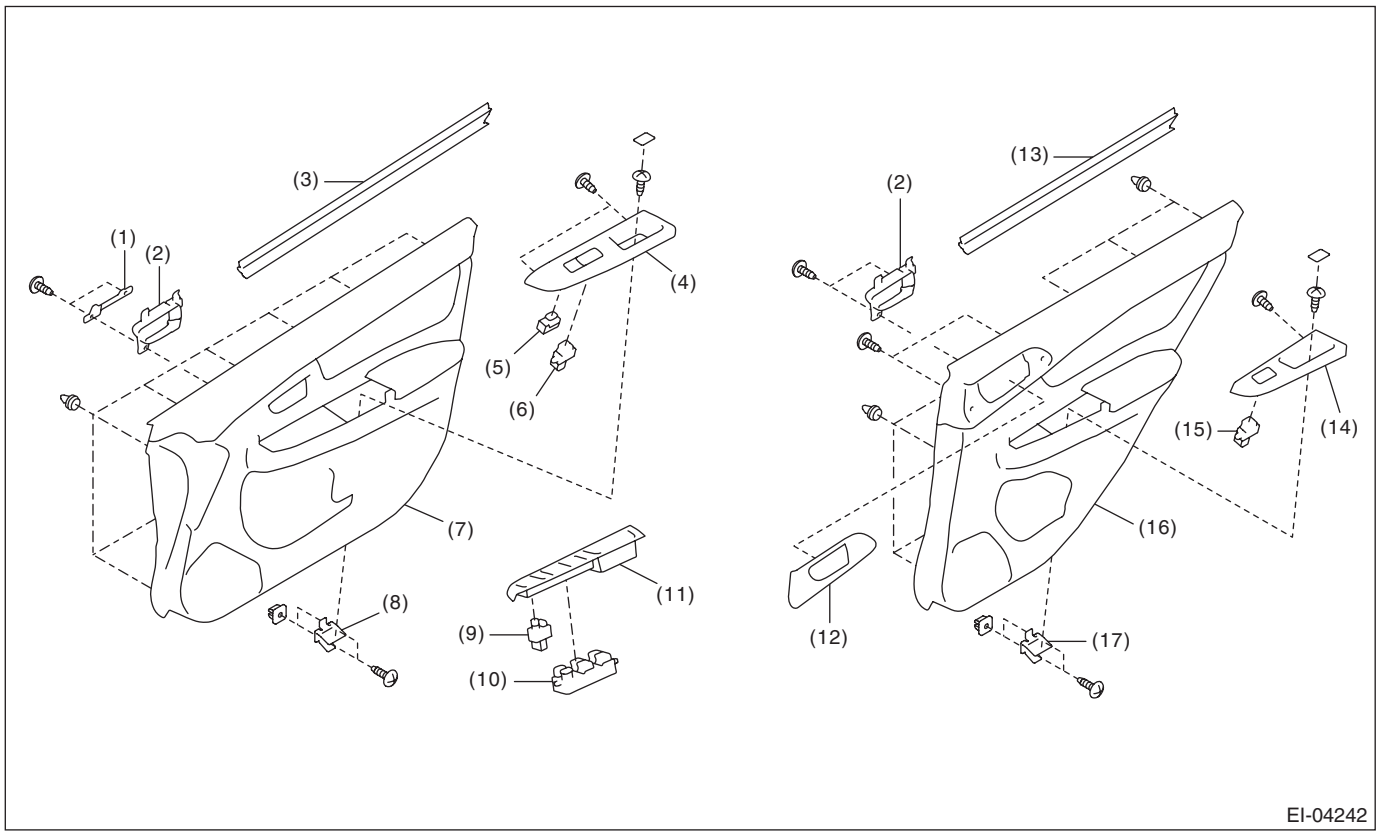
13.ROOF SPOILER



(1) Roof spoiler
(2) High-mounted stop light ASSY
(3) Cap

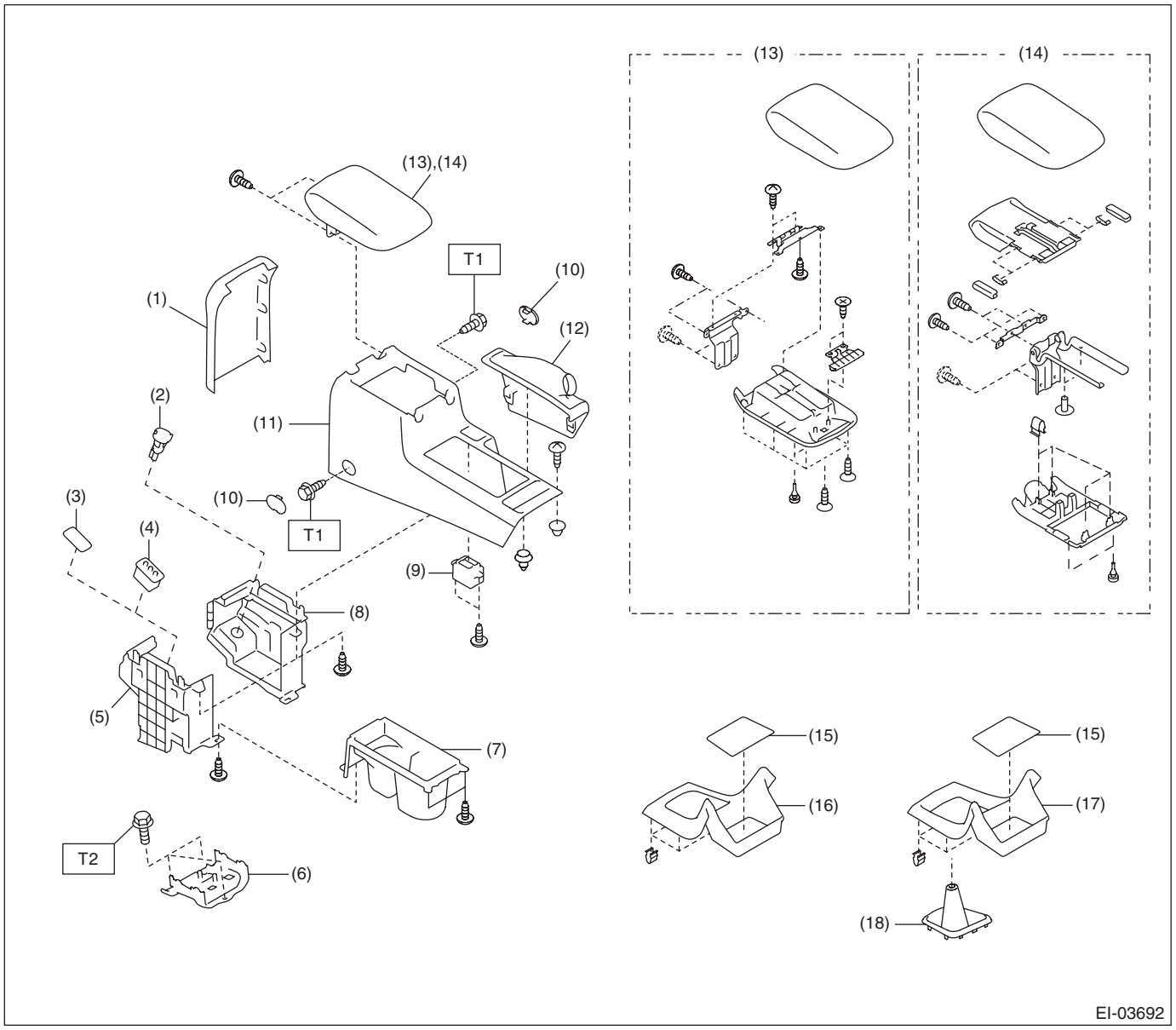
Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.5 (0.46, 3.3)
T2: 7.5 (0.76, 5.5)

14.DOOR TRIM



(1)	Plate	(7)	Trim panel - front door	(13)	Weather strip - door rear INN
(2)	Remote ASSY - door	(8)	Bracket - door trim front	(14)	Panel - power window sub-switch rear
(3)	Weather strip - door front INN	(9)	Switch - door mirror	(15)	Switch - power window sub rear
(4)	Panel - power window sub-switch front	(10)	Switch - power window main	(16)	Trim panel - rear door
(5)	Switch - door lock sub	(11)	Panel - power window main switch	(17)	Bracket - door trim rear
(6)	Switch - power window sub front	(12)	Cover - remote rear door		

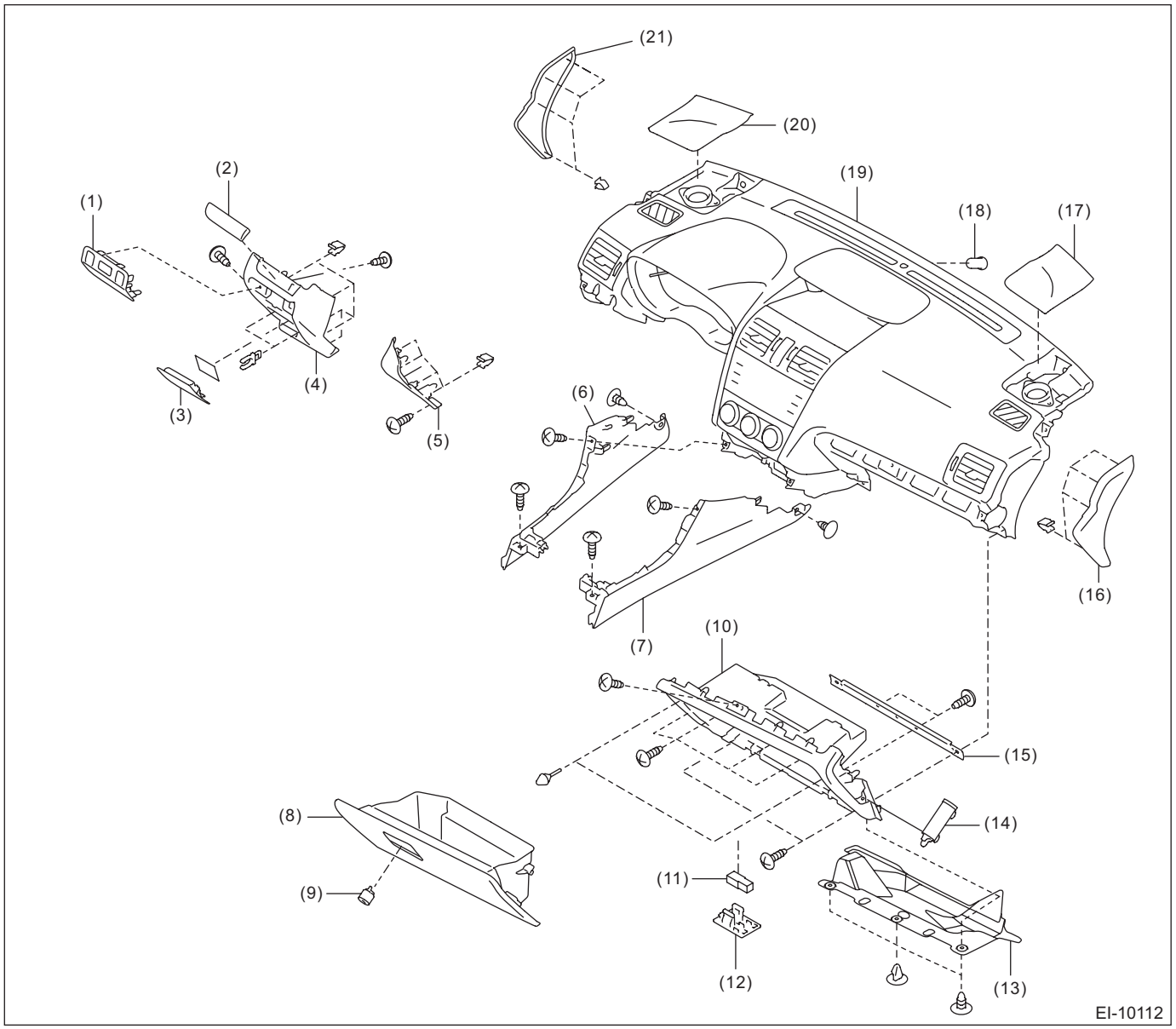
15.CONSOLE BOX



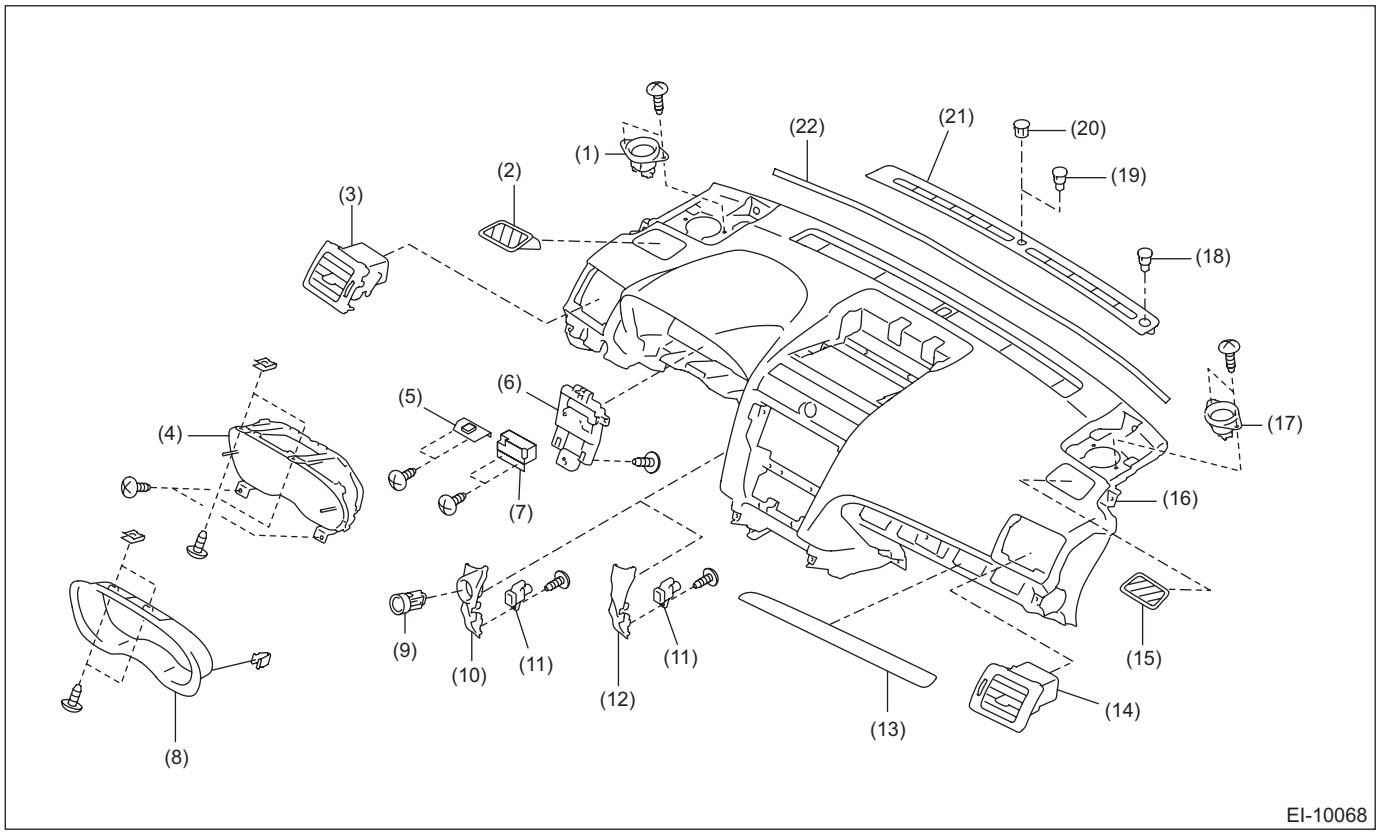
(1) Console box, rear
(2) Accessory socket
(3) Cap
(4) AUX unit
(5) Pocket console box RH
(6) Bracket - console box
(7) Cup holder
(8) Pocket console box LH
(9) Switch - seat heater
(10) Cap - console box
(11) Console box
(12) Boot - parking brake
(13) Lid ASSY - console box (fixed type)
(14) Lid ASSY - console box (sliding type)
(15) Mat
(16) Cover front (CVT model)
(17) Cover front (MT model)
(18) Boot - shift lever (MT model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.5 (0.66, 4.8)
T2: 18 (1.84, 13.3)

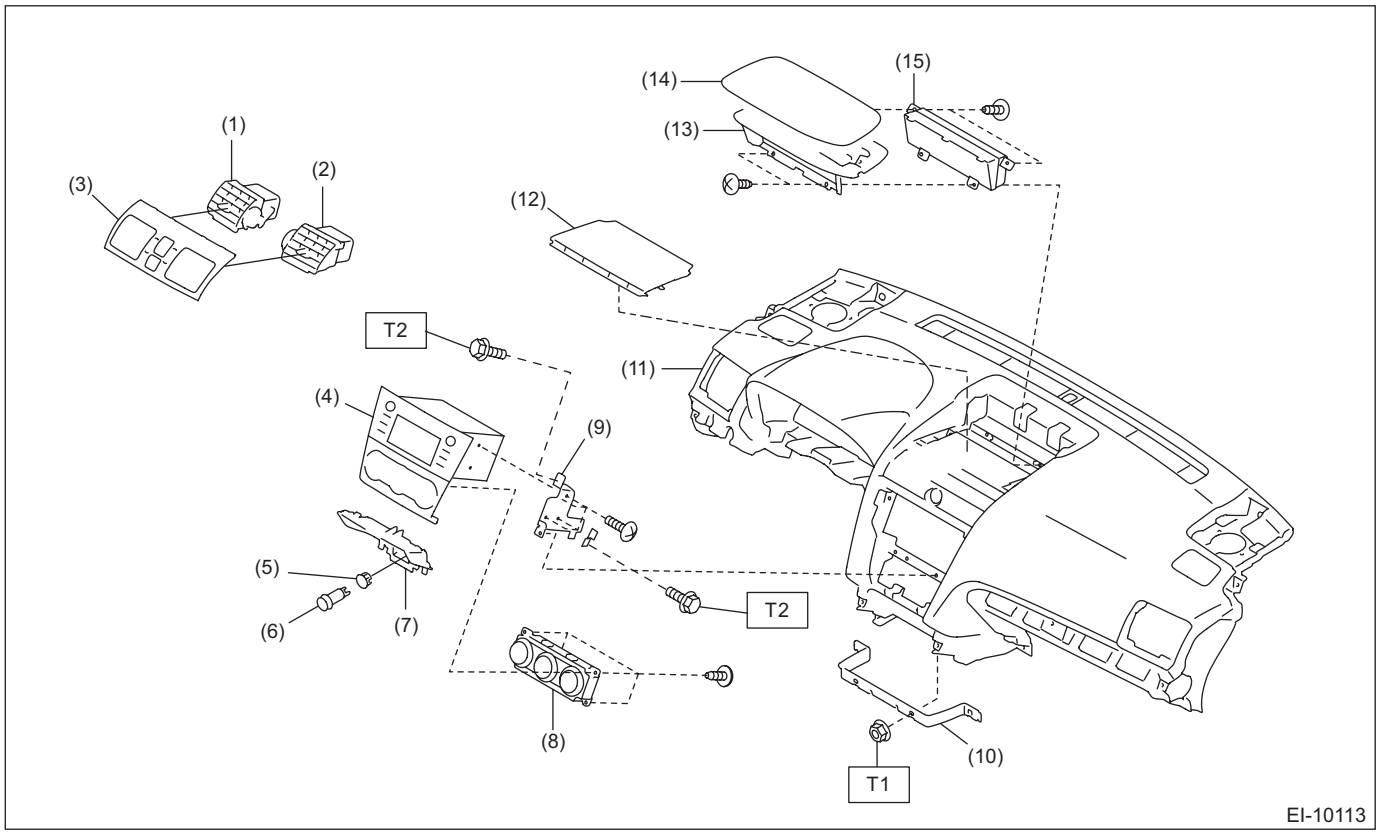
16.INSTRUMENT PANEL



(1)	Panel - switch	(8)	Pocket ASSY	(15)	Reinforcement - passenger
(2)	Ornament - panel ASSY driver	(9)	Key cylinder - pocket	(16)	Cover - instrument panel side RH
(3)	Lid ASSY - fuse box	(10)	Back panel - pocket	(17)	Grille speaker side RH
(4)	Cover ASSY - instrument panel LWR driver OUT	(11)	Light - pocket	(18)	Cap - guide pin
(5)	Cover ASSY - instrument panel LWR driver INN	(12)	Holder	(19)	Panel COMPL - instrument
(6)	Panel center LWR LH	(13)	Under cover ASSY - passenger	(20)	Grille speaker side LH
(7)	Panel center LWR RH	(14)	Damper COMPL - pocket	(21)	Cover - instrument panel side LH

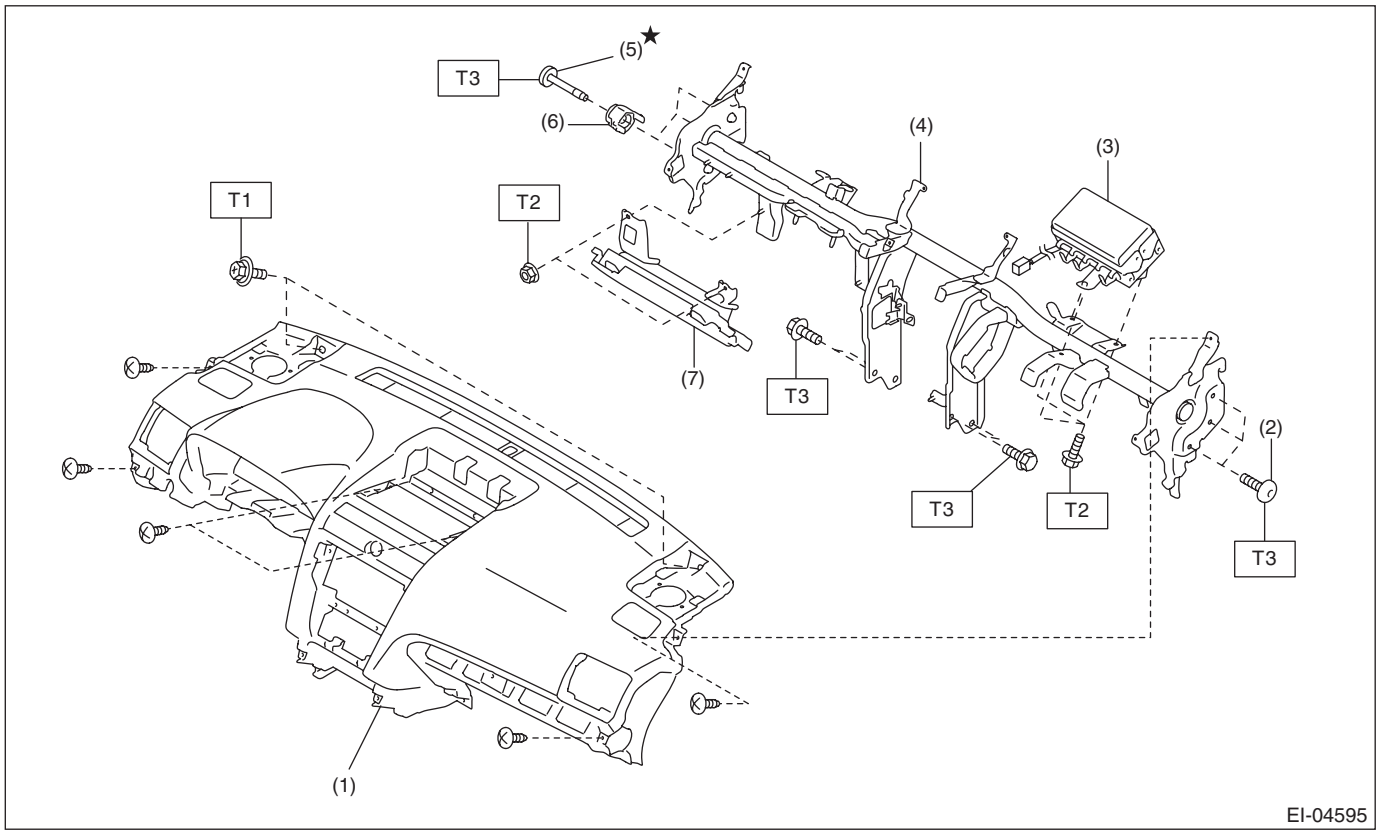


(1) Speaker ASSY - tweeter LH
(2) Grille defroster - front LH
(3) Grille ASSY - ventilation LH
(4) Combination meter ASSY
(5) Antenna ASSY - GPS
(6) Reinforcement - combination meter
(7) SUB antenna ASSY - telematics
(8) Visor - combination meter
(9) Switch - push button start
(10) Panel - switch
(11) Case - sensor
(12) Cover - switch starter
(13) Ornament - panel ASSY passenger
(14) Grille ASSY - ventilation RH
(15) Grille defroster - front RH
(16) Panel COMPL - instrument
(17) Speaker ASSY - tweeter RH
(18) Sensor - rain
(19) Sunload sensor
(20) Cap
(21) Grille front defroster
(22) Cushion



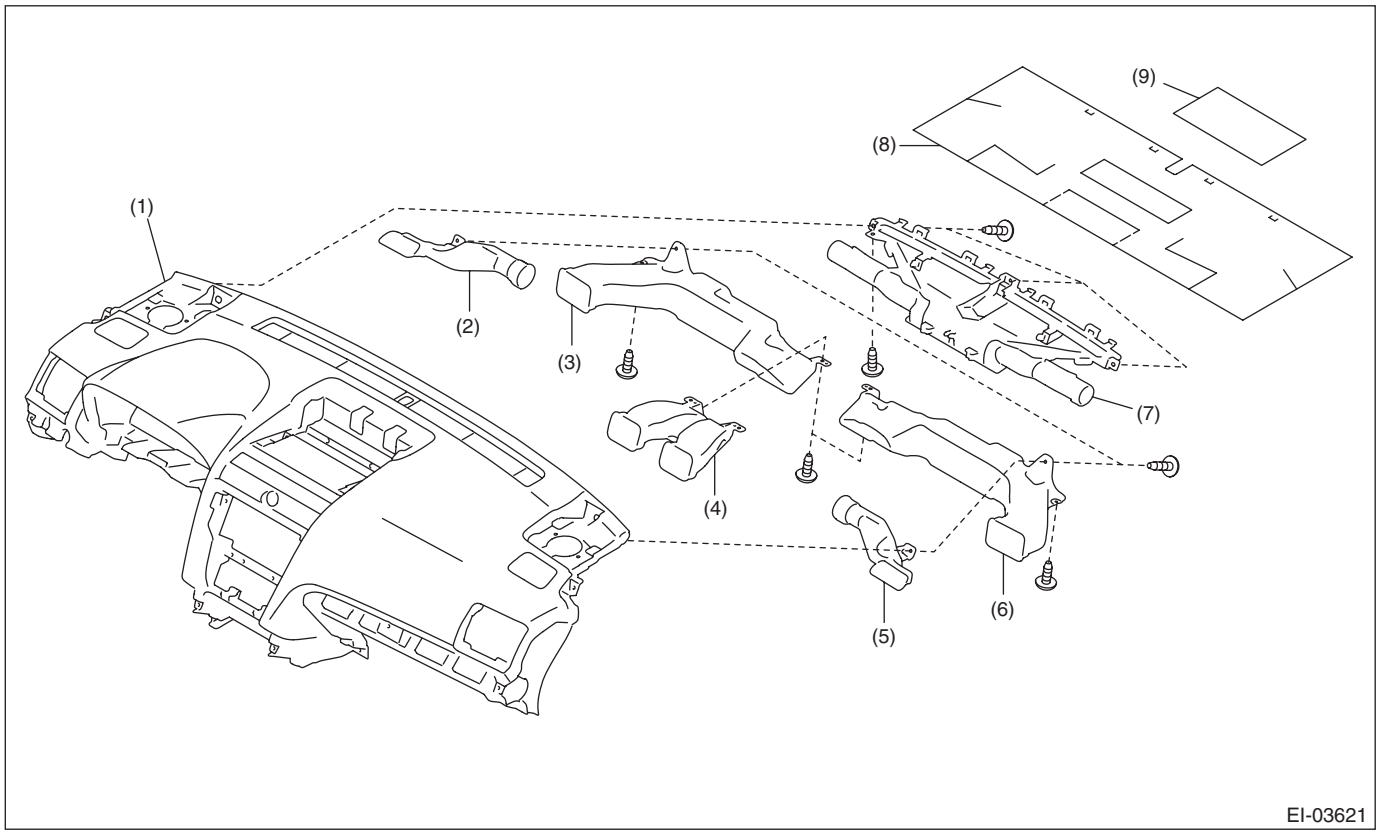
(1) Grille ASSY - CTR ventilation LH
(2) Grille ASSY - CTR ventilation RH
(3) Panel center ASSY
(4) Audio ASSY
(5) Cap
(6) Socket ASSY
(7) Back panel - center pocket
(8) Heater control ASSY
(9) Bracket - audio
(10) Reinforcement - CTR LWR
(11) Panel COMPL - instrument
(12) Cover center UPR
(13) Panel - display LWR
(14) Panel - display UPR
(15) Multi-function display ASSY

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.71, 5.2)
T2: 7.5 (0.76, 5.5)



(1) Panel COMPL - instrument
(2) TORX® bolt (M8 × 37)
(3) Passenger's airbag module
(4) Beam COMPL - steering
(5) TORX® bolt (M8 × 57)
(6) Adjuster - clip space
(7) Knee airbag module

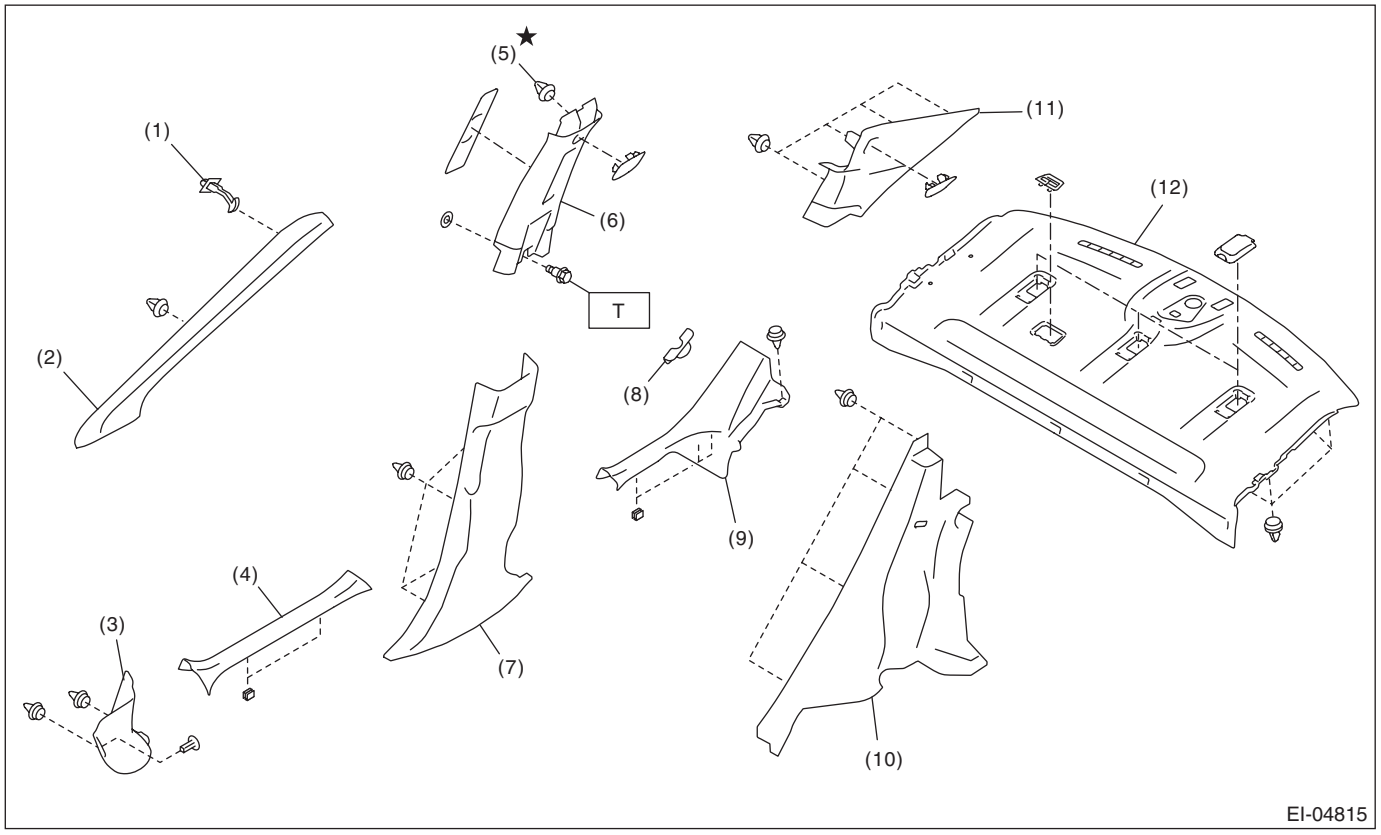
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.71, 5.2)
T2: 7.5 (0.76, 5.5)
T3: 25 (2.55, 18.4)



(1) Panel COMPL - instrument
(2) Duct - side defroster LH
(3) Duct - side ventilation LH
(4) Duct - center vent
(5) Duct - side defroster RH
(6) Duct - side ventilation RH
(7) Nozzle - front defroster
(8) Insulator - instrument
(9) Insulator - airbag

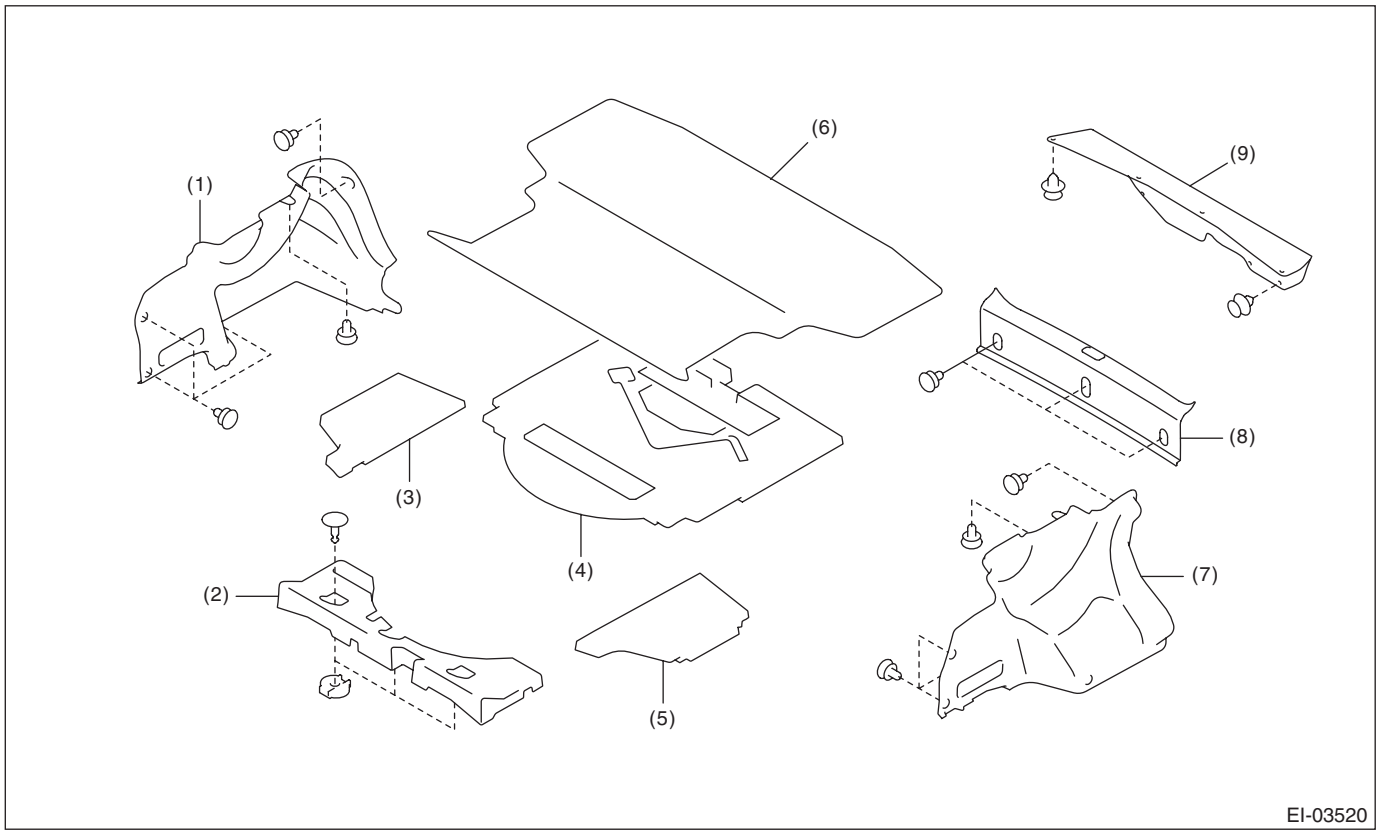
17.INNER TRIM

- 4 door model



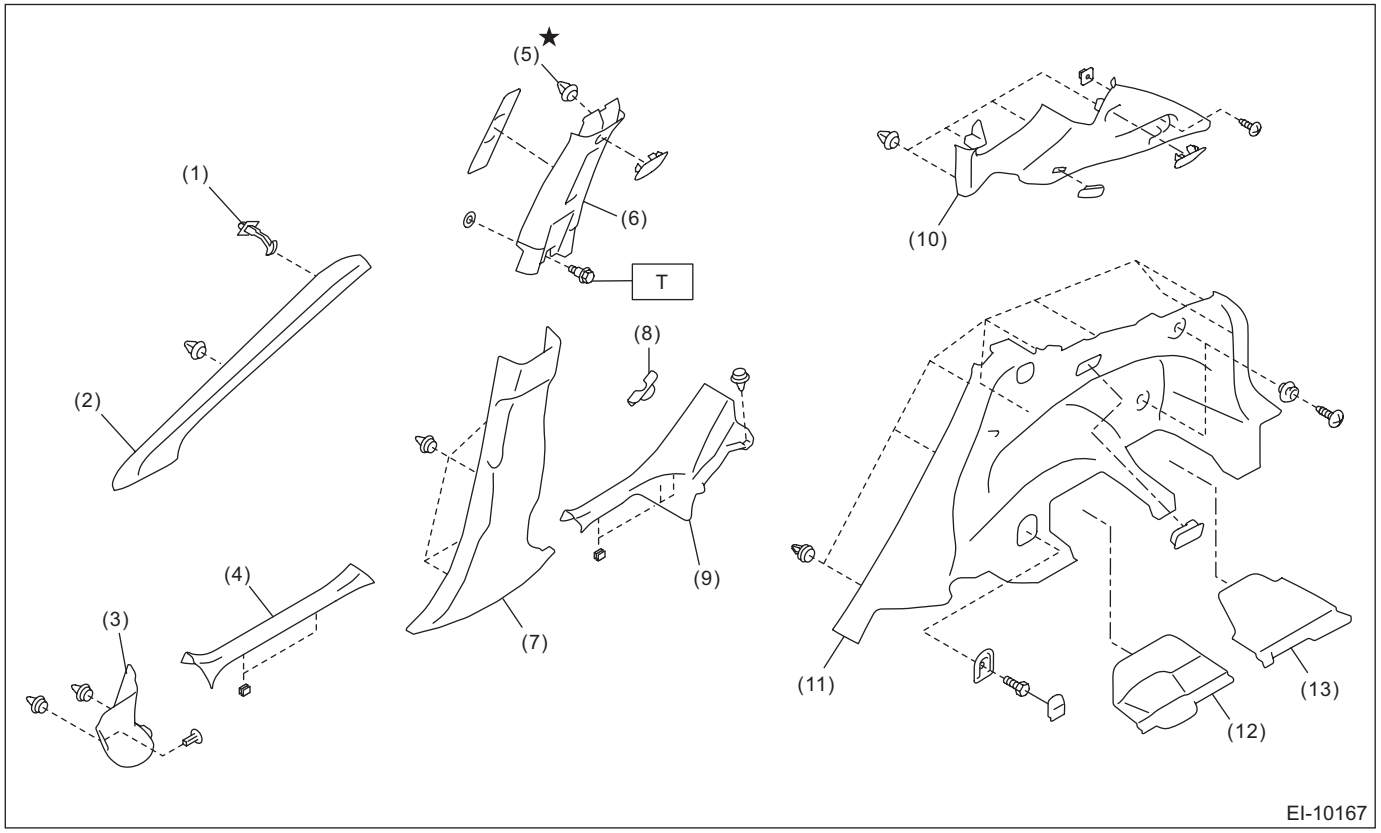
(1) Tether clip
(2) Trim panel - front pillar UPR
(3) Cover side sill - front
(4) Cover side sill - front INN
(5) Clip
(6) Trim panel - center pillar UPR
(7) Trim panel - center pillar LWR
(8) Cover - catcher
(9) Cover side sill - rear INN
(10) Trim panel - rear pillar LWR
(11) Trim panel - rear pillar UPR
(12) Trim panel ASSY - rear shelf

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)



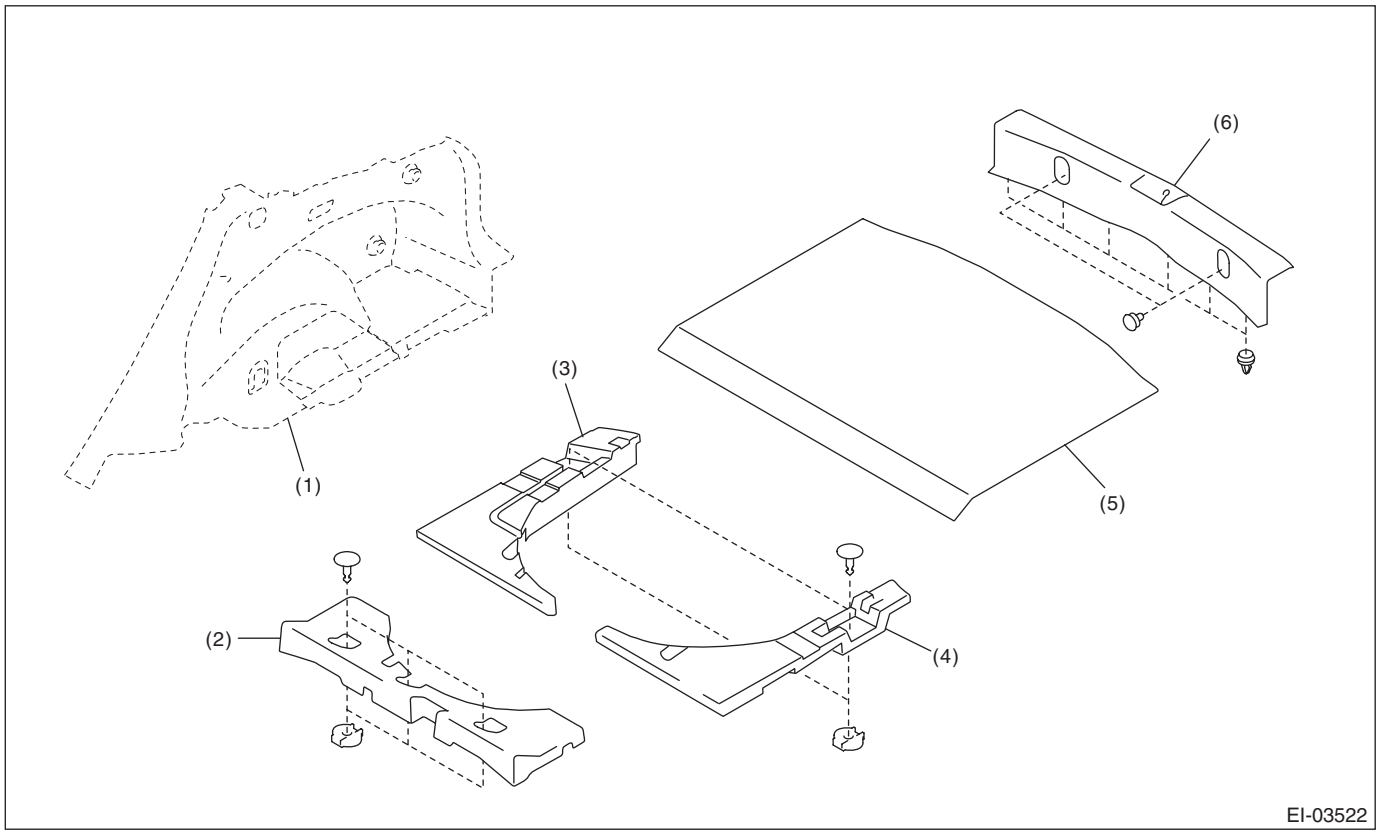
(1) Trim panel - trunk side RH
(2) Spacer - rear floor front
(3) Spacer - rear floor side RH
(4) Sub-trunk ASSY
(5) Spacer - rear floor side LH
(6) Mat - trunk
(7) Trim panel - trunk side LH
(8) Trim panel - trunk rear
(9) Trim panel - trunk lid

- 5 door model (gasoline engine model)



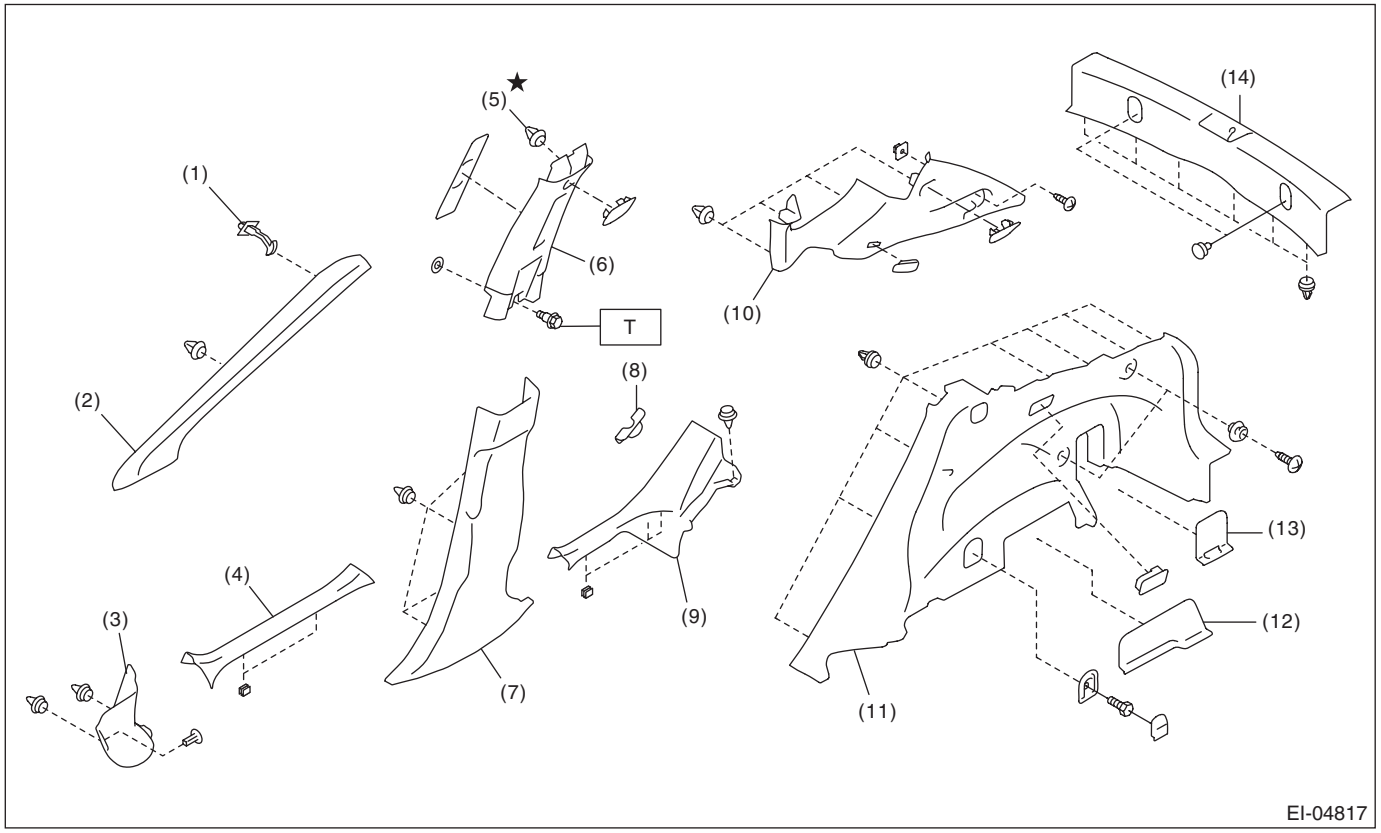
(1) Tether clip
(2) Trim panel - front pillar UPR
(3) Cover side sill - front
(4) Cover side sill - front INN
(5) Clip
(6) Trim panel - center pillar UPR
(7) Trim panel - center pillar LWR
(8) Cover - catcher
(9) Cover side sill - rear INN
(10) Trim panel - rear quarter UPR
(11) Trim panel - rear apron
(12) Cap - rear strut
(13) Lid upper rear

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)



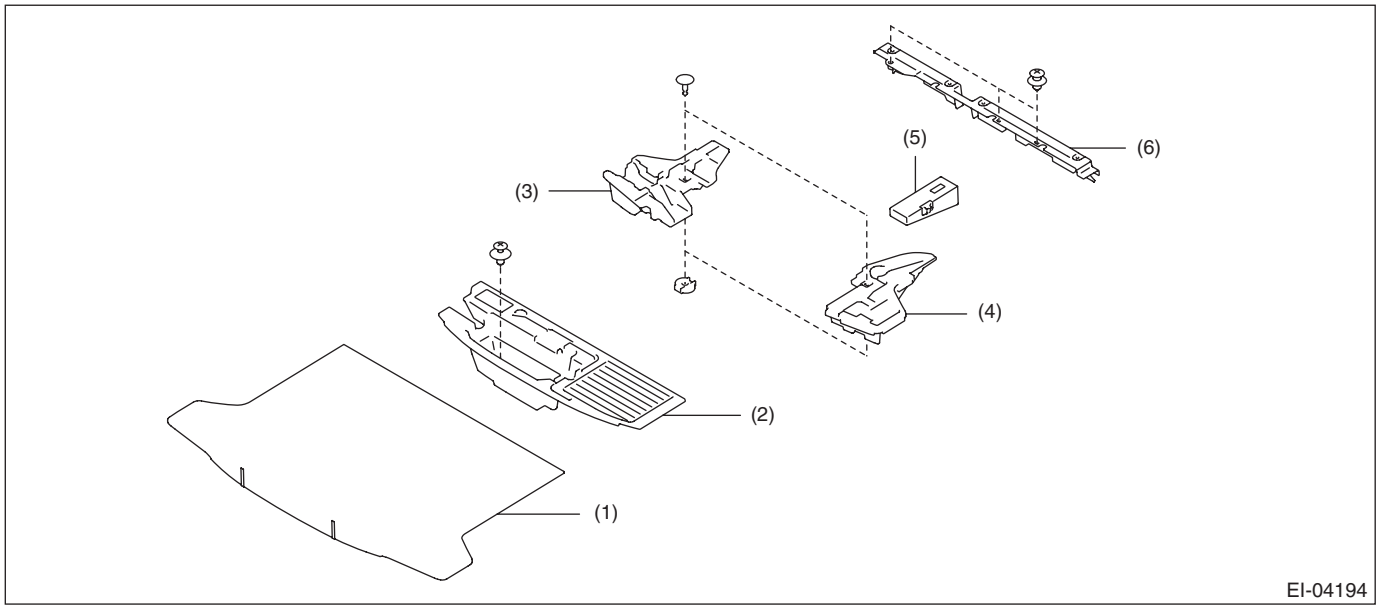
(1) Trim panel - rear apron
(2) Spacer - rear floor
(3) Spacer - rear floor side RH
(4) Spacer - rear floor side LH
(5) Mat - rear floor CTR
(6) Trim panel - rear skirt

- 5 door model (HEV model)



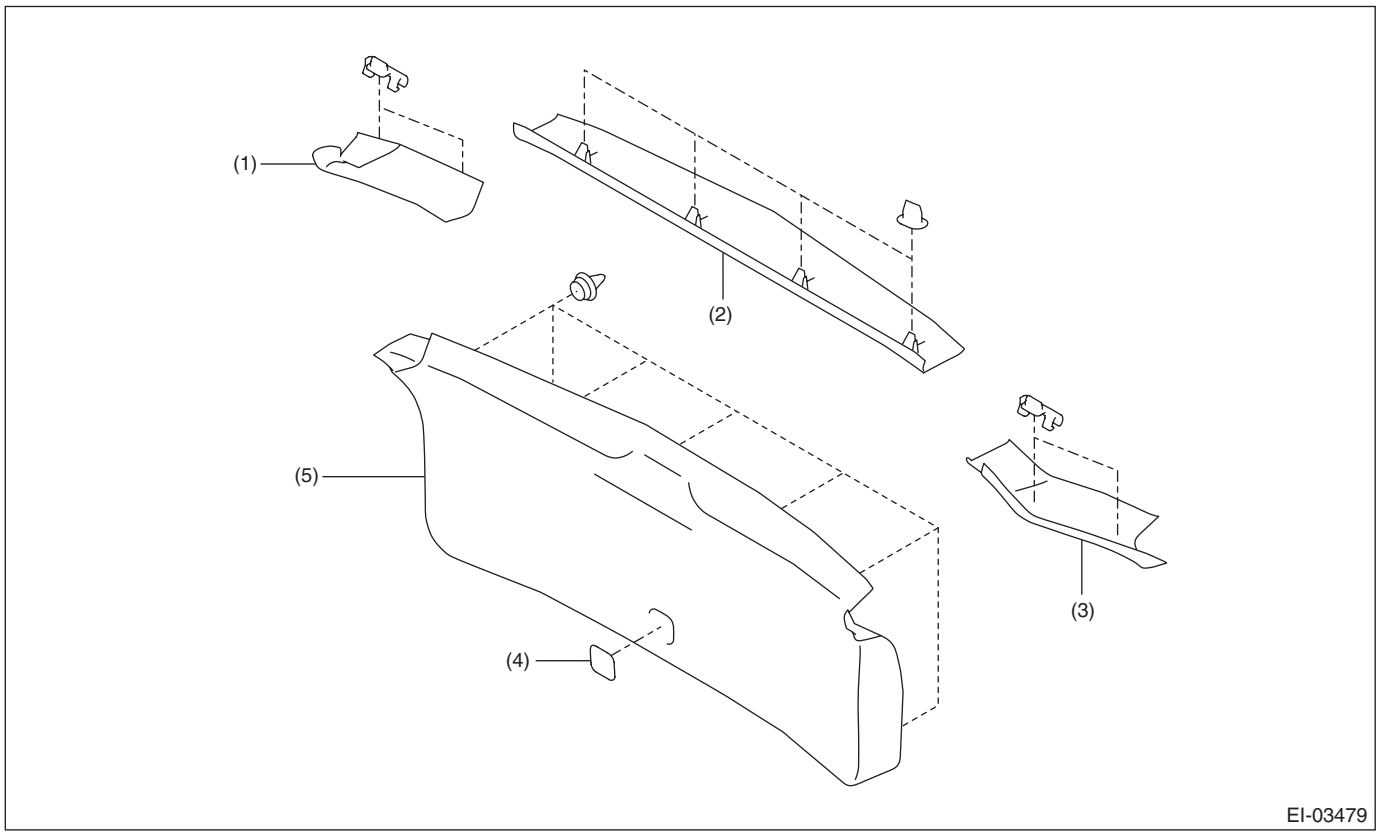
(1) Tether clip
(2) Trim panel - front pillar UPR
(3) Cover side sill - front
(4) Cover side sill - front INN
(5) Clip
(6) Trim panel - center pillar UPR
(7) Trim panel - center pillar LWR
(8) Cover - catcher
(9) Cover side sill - rear INN
(10) Trim panel - rear quarter UPR
(11) Trim panel - rear apron
(12) Cap - rear strut
(13) Cover - jack (LH side only)
(14) Trim panel - rear skirt

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)



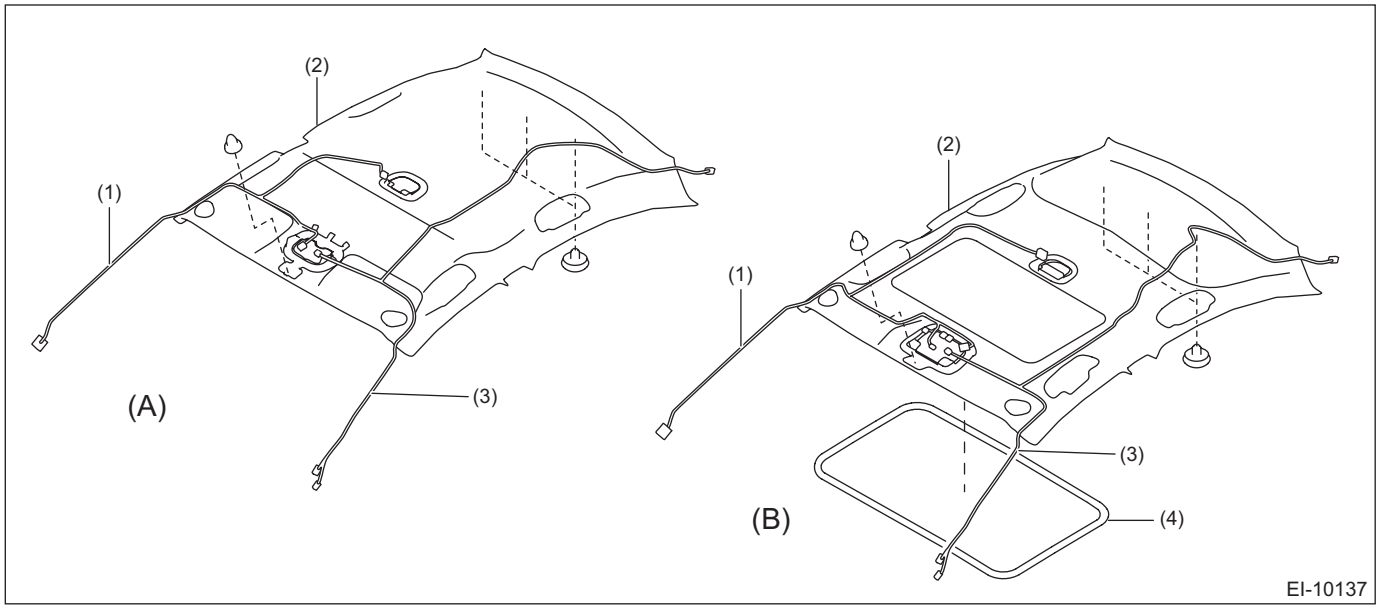
(1) Mat - rear floor CTR
(2) Sub-trunk box
(3) Side spacer LH
(4) Side spacer RH
(5) Inverter spacer
(6) Spacer - rear floor front

18.REAR GATE TRIM

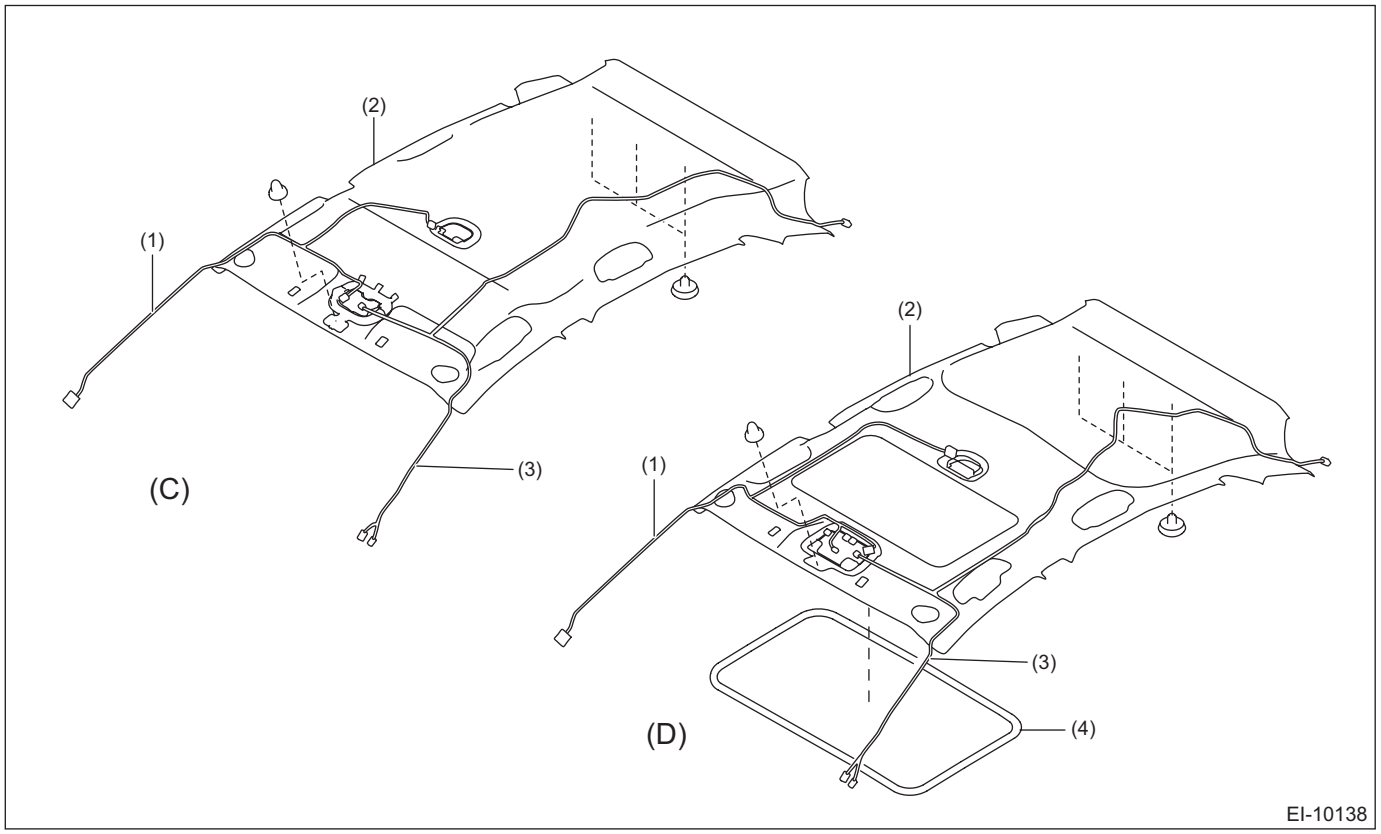


(1) Trim panel - rear gate pillar side RH
(2) Trim panel - rear gate UPR
(3) Trim panel - rear gate pillar side LH
(4) Cap
(5) Trim panel - rear gate LWR

19.ROOF TRIM



EI-10137

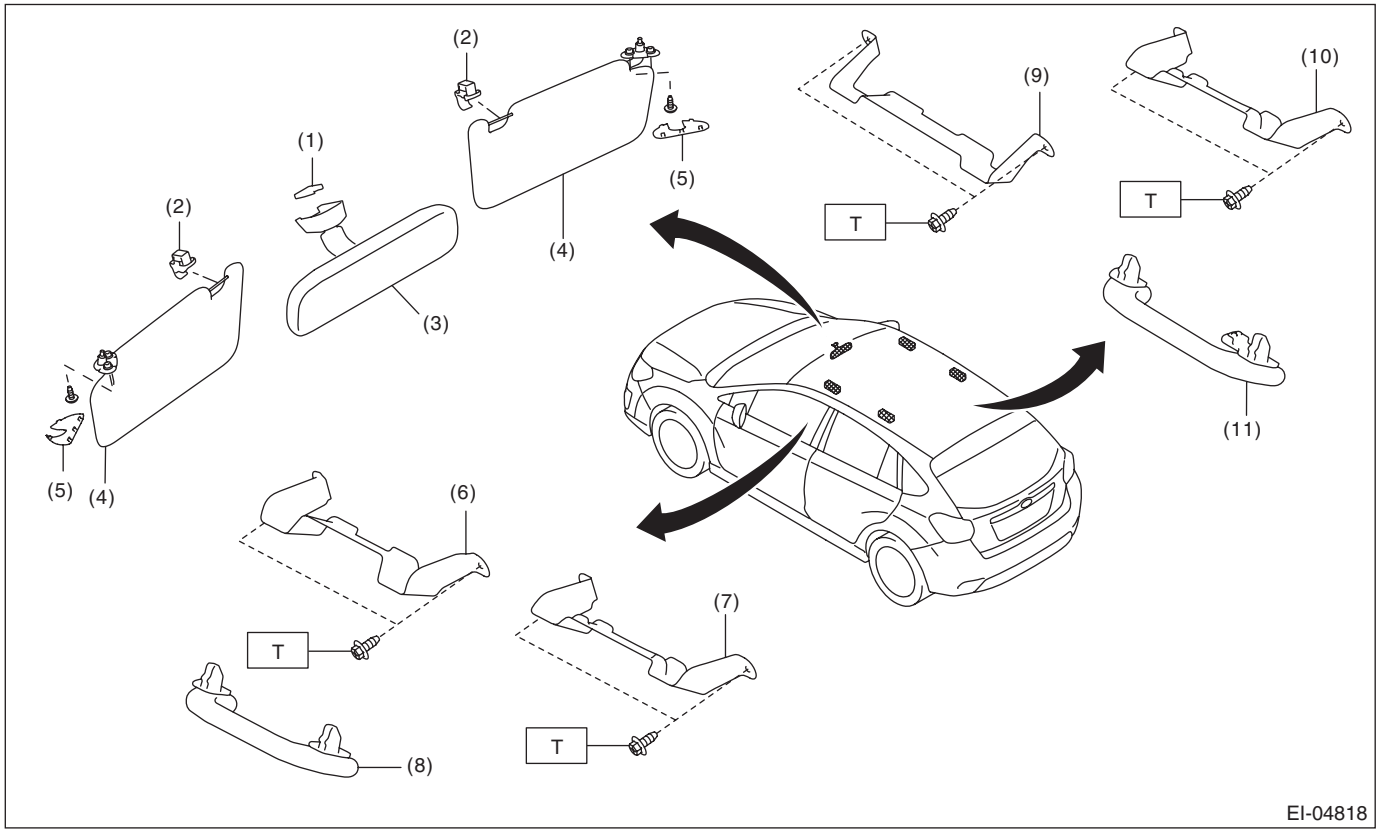


EI-10138

(A) Normal roof type (4 door model)
(B) Sunroof type (4 door model)
(C) Normal roof type (5 door model/ Crosstrek model)
(D) Sunroof type (5 door model/ Crosstrek model)

(1) Cord - roof
(2) Trim panel - roof ASSY
(3) Cord ASSY - antenna feeder
(4) Garnish - roof

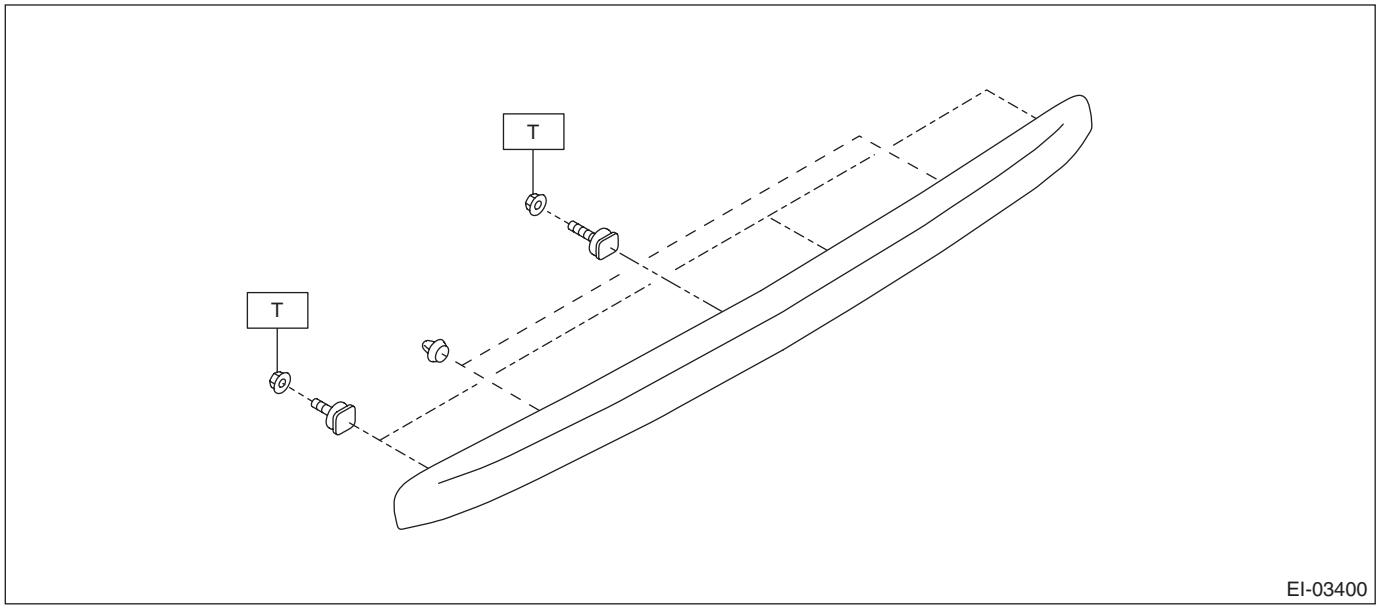
20.ROOM INNER PARTS



(1)	Base - inner mirror	(6)	Bracket - assist rail front (model with sunroof)	(11)	Assist rail - rear
(2)	Hook - sun visor	(7)	Bracket - assist rail front (normal roof)		
(3)	Mirror ASSY rearview inner	(8)	Assist rail - front		
(4)	Sun visor ASSY	(9)	Bracket - assist rail rear (model with sunroof)		
(5)	Cap - sun visor	(10)	Bracket - assist rail rear (normal roof)		

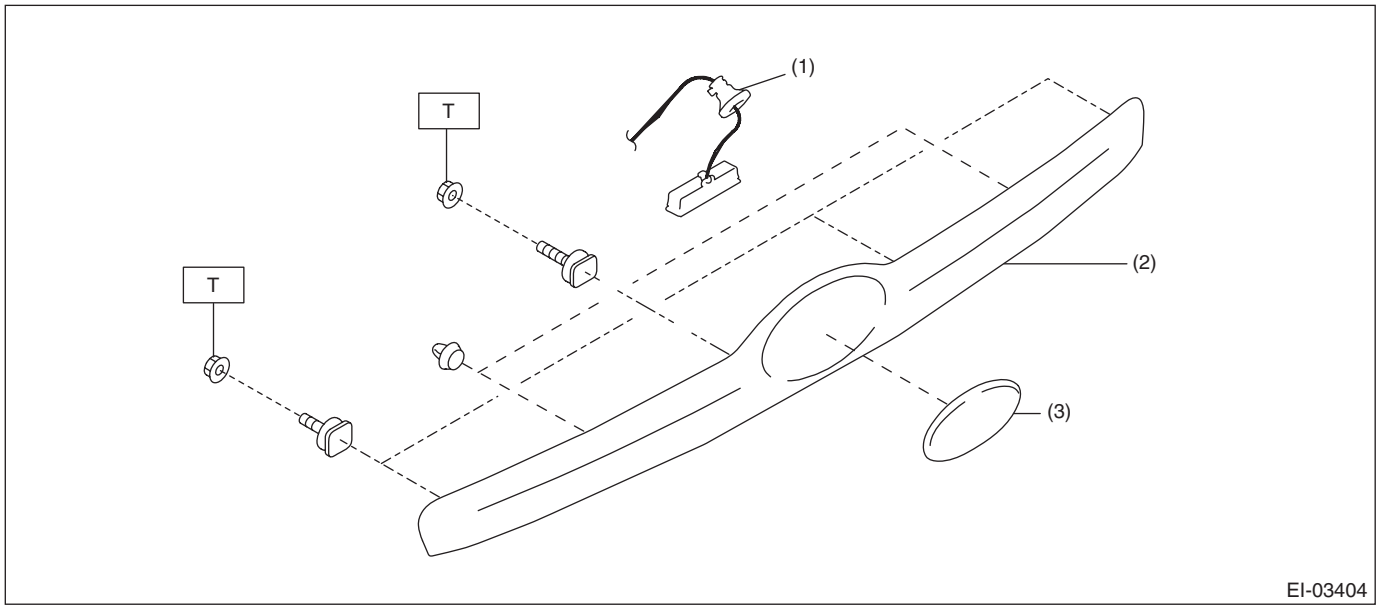
Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

21.TRUNK LID GARNISH



Tightening torque: N·m (kgf-m, ft-lb)
T: 4.5 (0.46, 3.3)

22.REAR GATE GARNISH



(1) Switch - opener rear gate
(2) Garnish assembly - rear gate
(3) Ornament rear

Tightening torque: N·m (kgf-m, ft-lb)
T: 4.5 (0.46, 3.3)

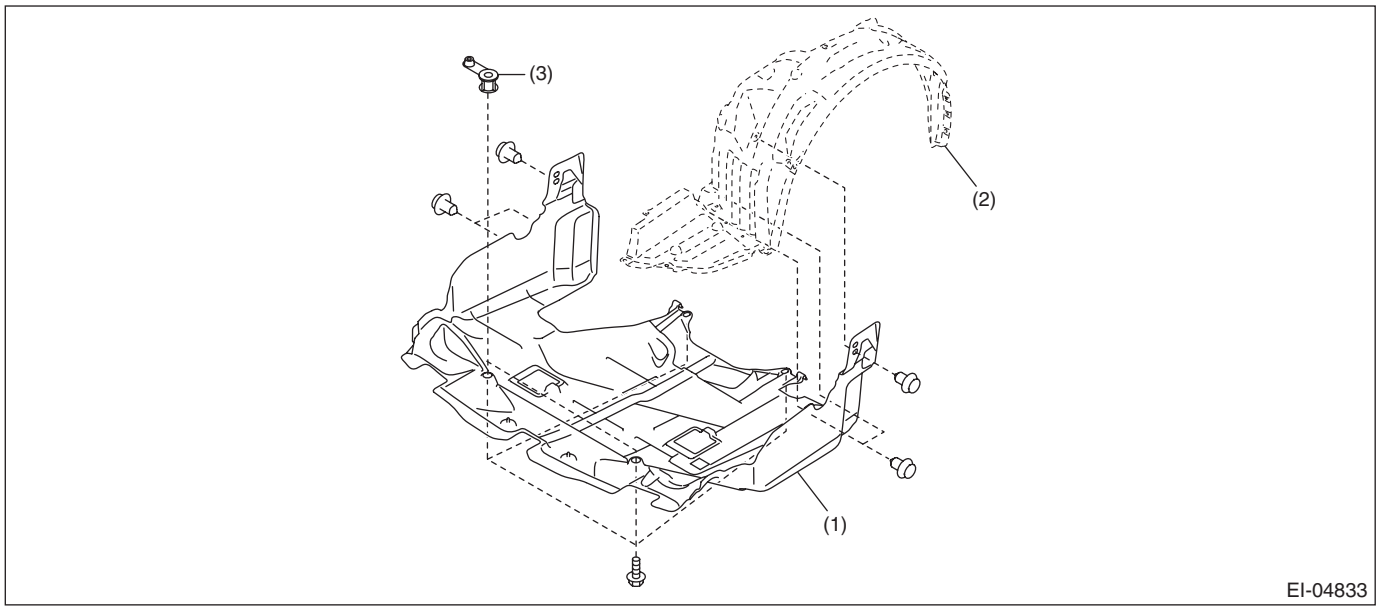
B: PREPARATION TOOL

TOOL NAME	REMARKS
Clip remover	Used for removing trim. • KTC AP201-10A • KTC AP201-N • KTC AP203-10A • KTC AP20L-10B Or equivalent.
Clip clamp pliers	Used for removal of various clips and clamps. • KTC CCP-190 Or equivalent.

2. Front Under Cover

A: REMOVAL

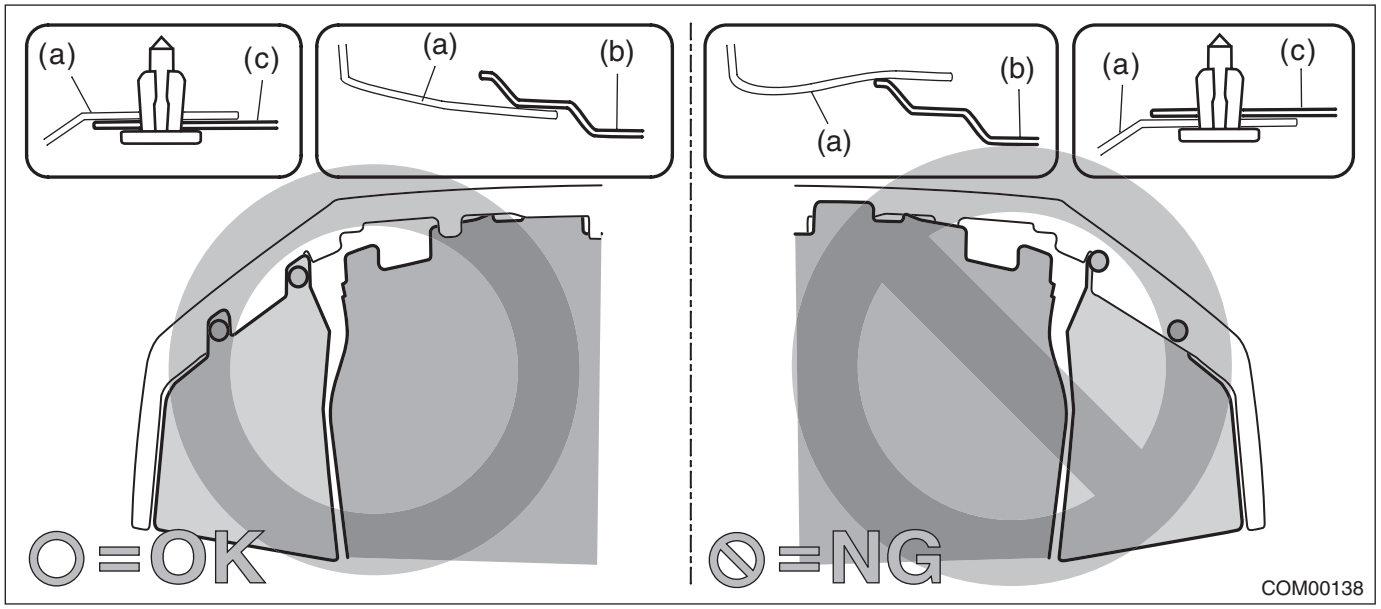
1) Lift up the vehicle.
2) Remove the bolts and clips, and remove the under cover - front.



(1) Under cover - front
(2) Mud guard - front
(3) Spacer - under cover (Crosstrek model)

B: INSTALLATION

CAUTION:
Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



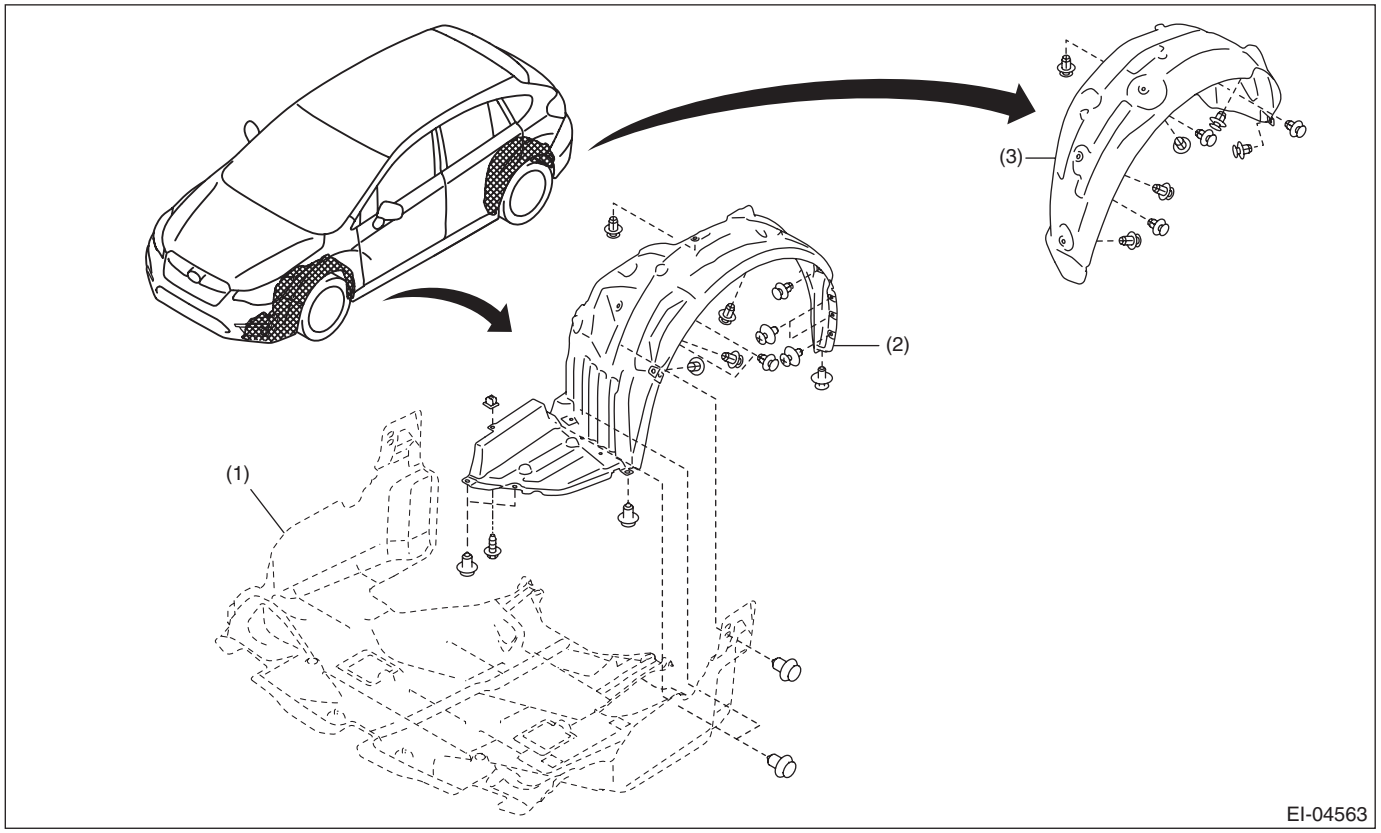
Install each part in the reverse order of removal.

Tightening torque:
18 N·m (1.84 kgf-m, 13.3 ft-lb)

3. Mud Guard

A: REMOVAL

1) Lift up the vehicle.
2) Remove the wheels.
3) Remove the screws and clips to remove the mud guard.



(1) Under cover - front
(2) Mud guard - front
(3) Mud guard - rear

B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.2 kgf-m, 73.8 ft-lb)

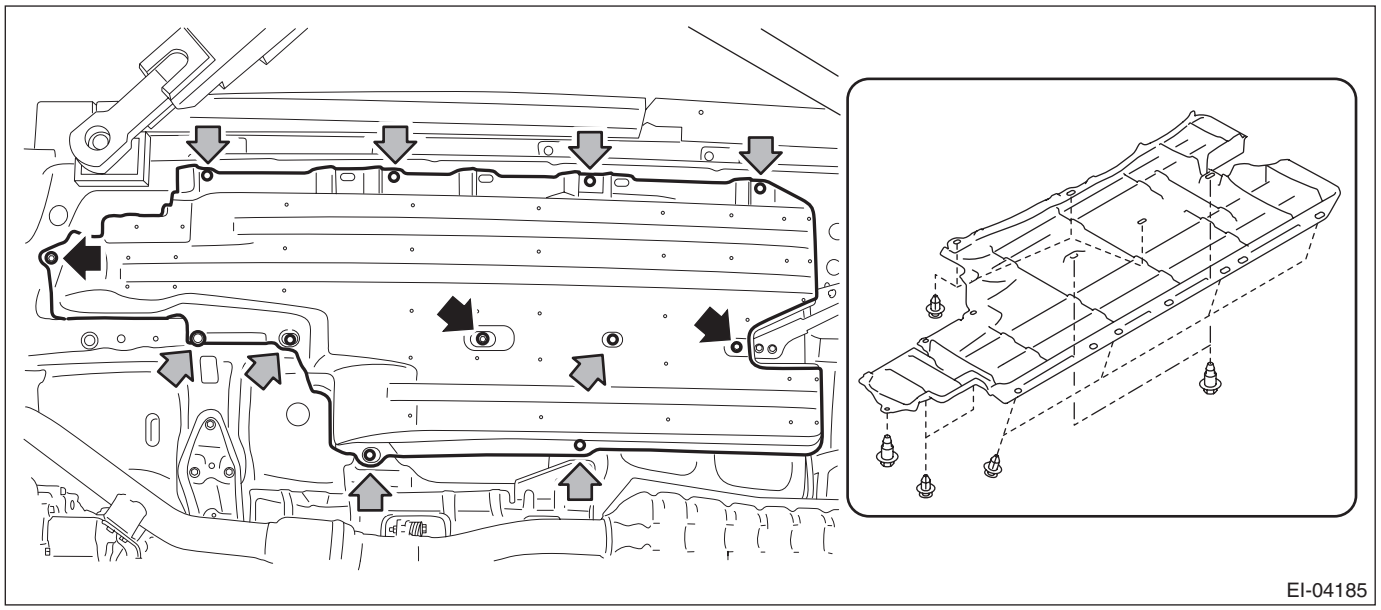
4. Floor Under Protector

A: REMOVAL

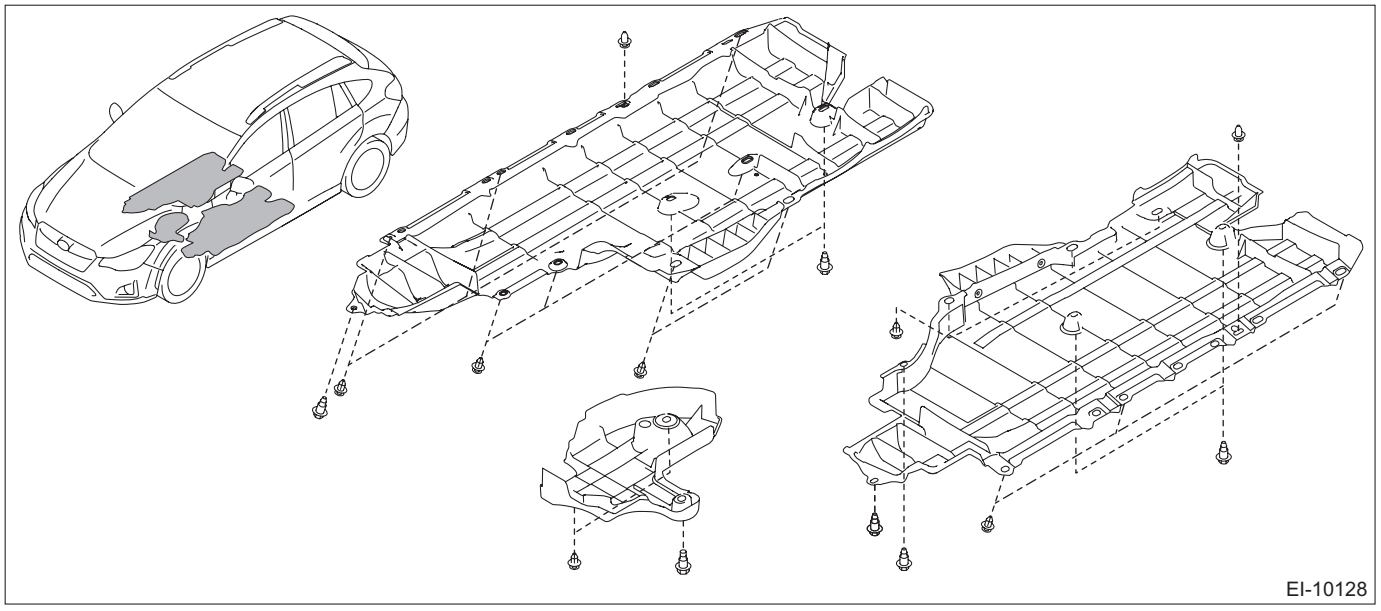
1) Lift up the vehicle.

NOTE:
A plate type lift cannot be used.
2) Remove the bolts and clips, and remove the floor under protector.

- Type A



- Type B



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to EI-3, FLOOR UNDER PROTECTOR, COMPONENT, General Description.>

5. Fuel Tank Protector

A: NOTE

• Refer to “FUEL INJECTION” section for removal and installation procedure of the fuel tank protector. (Gasoline engine model) <Ref. to FU(H4DO(w/o HEV))-114, Fuel Tank Protector.>
• Refer to “FUEL INJECTION” section for removal and installation procedure of the fuel tank protector. (HEV model) <Ref. to FU(H4DO(HEV))-105, Fuel Tank Protector.>

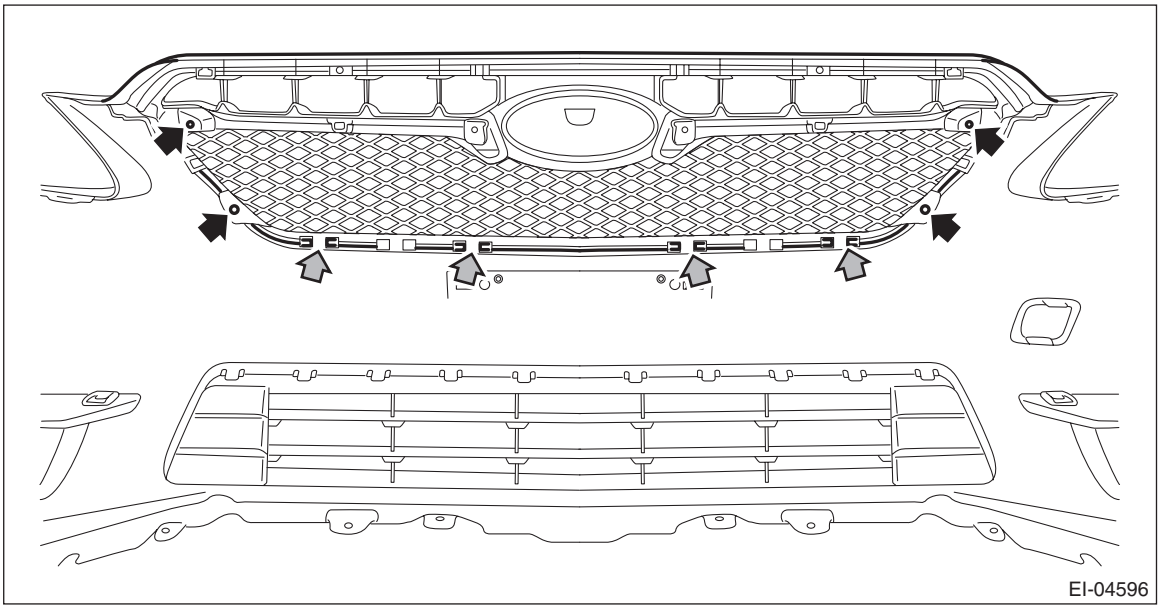
6. Front Grille

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

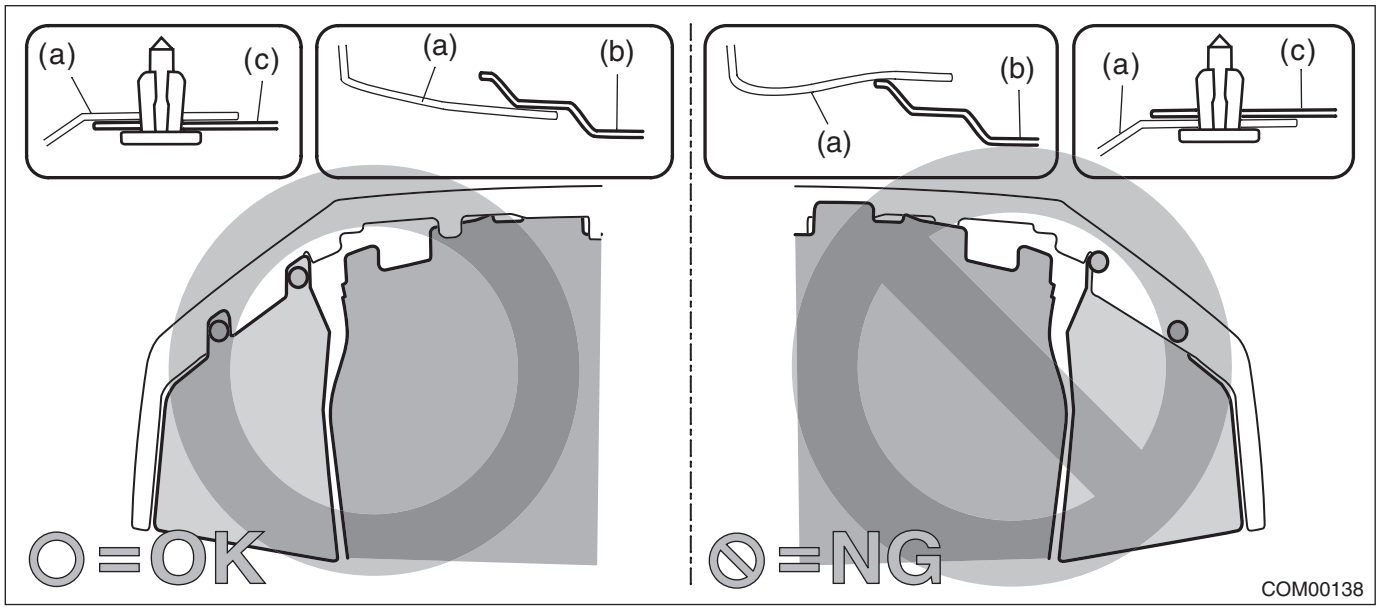
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the bumper face - front. <Ref. to EI-37, REMOVAL, Front Bumper.>
3) Remove the front grille assembly.
   (1) Remove the screws from the back side of the bumper face - front.
   (2) Release the claws, and remove the front grille assembly.



B: INSTALLATION

CAUTION:
• Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



• Before installing the bumper face, match the claws on the bracket - front bumper with the engaging position of flange section on the bumper face side. If the engaging position is not correct, the flange section may be broken or the clearance between fender panel and bumper face may not be uniform.
1) Install each part in the reverse order of removal.
2) Adjust the fog light beam. (Model with fog light) <Ref. to LI-52, FOG LIGHT AIMING, ADJUSTMENT, Front Fog Light Assembly.>

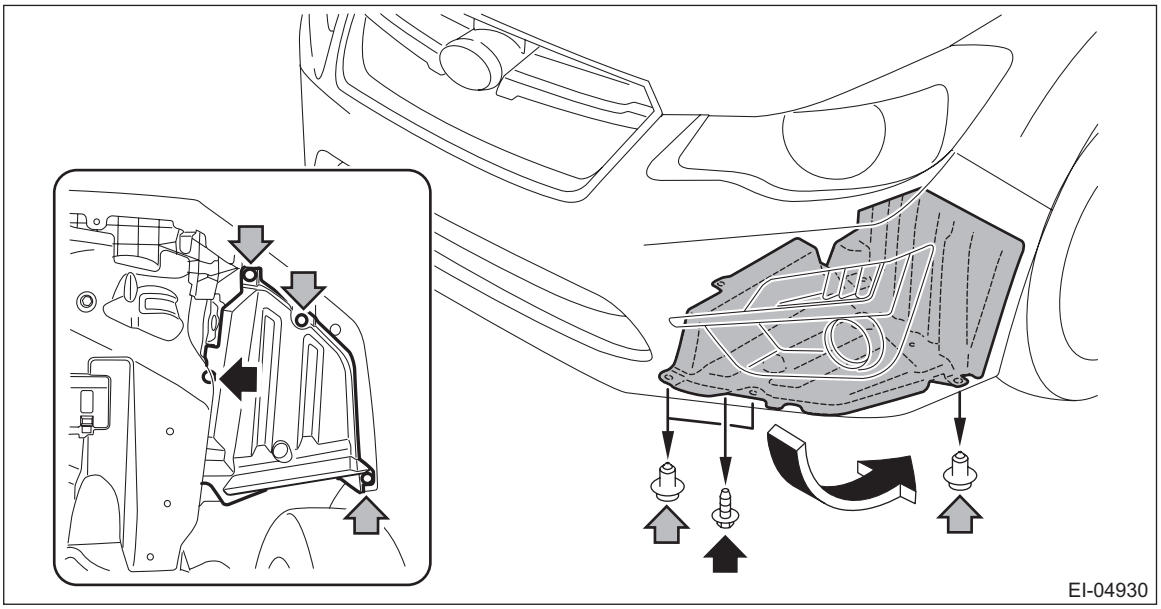
7. Front Bumper

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

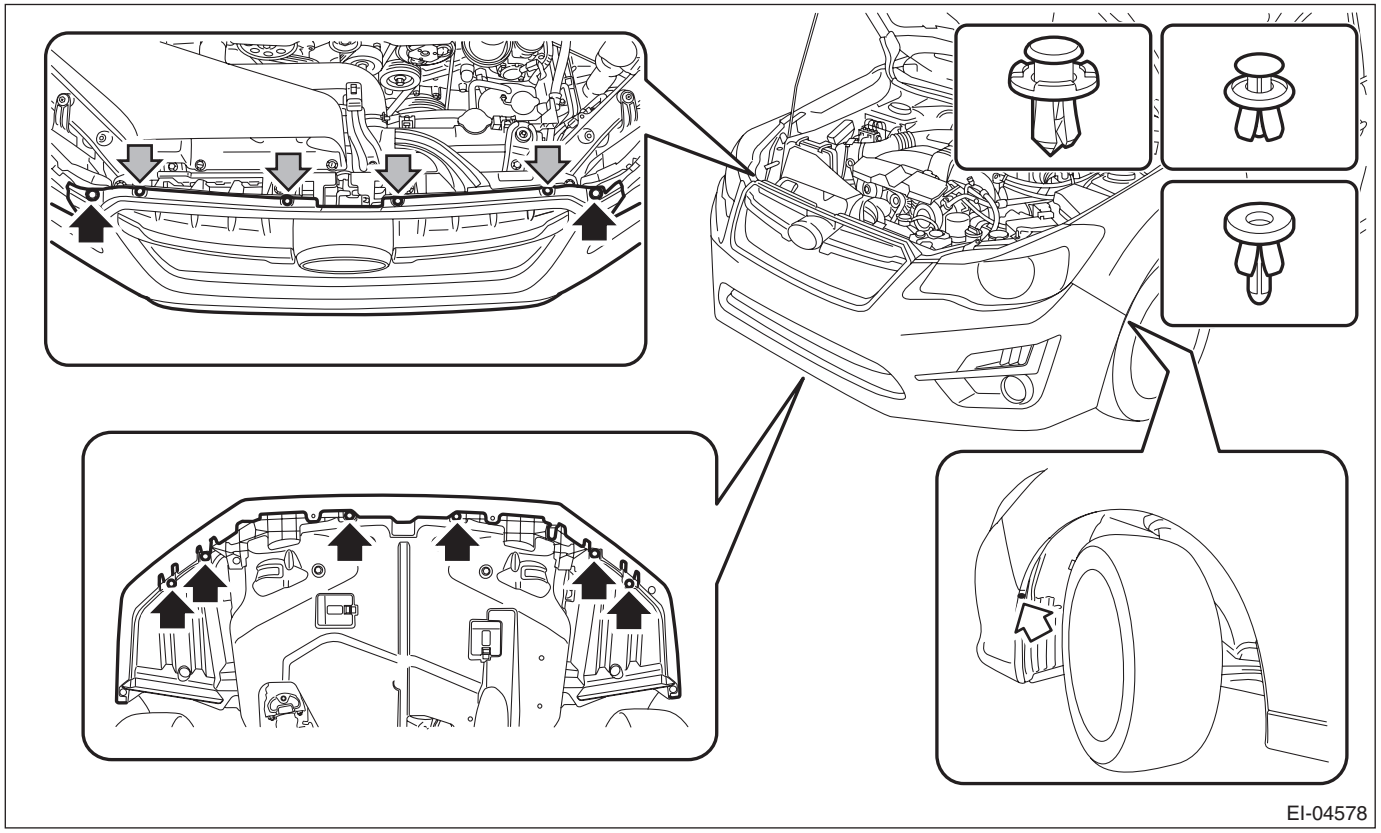
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the bumper face - front.
   (1) Remove the screw and clips, and turn over the mud guard - front.



   (2) Disconnect the connectors of the left and right fog light assembly - front. (Model with fog light)
   (3) Remove the clips at the upper side of the bumper face - front.
   (4) Remove the clips from the fender.

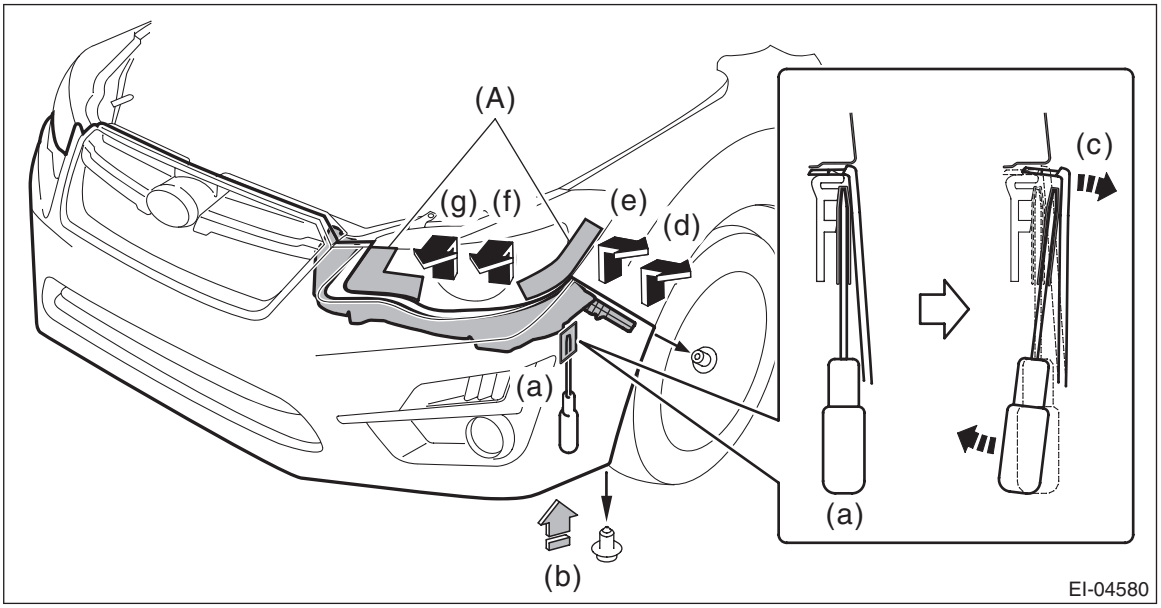
(5) Remove the clips at the lower side of the bumper face - front.



(6) Apply protective tape (A) to the light assembly - head.
(7) Detach the flange section on the bumper face side from the bracket - front bumper side.

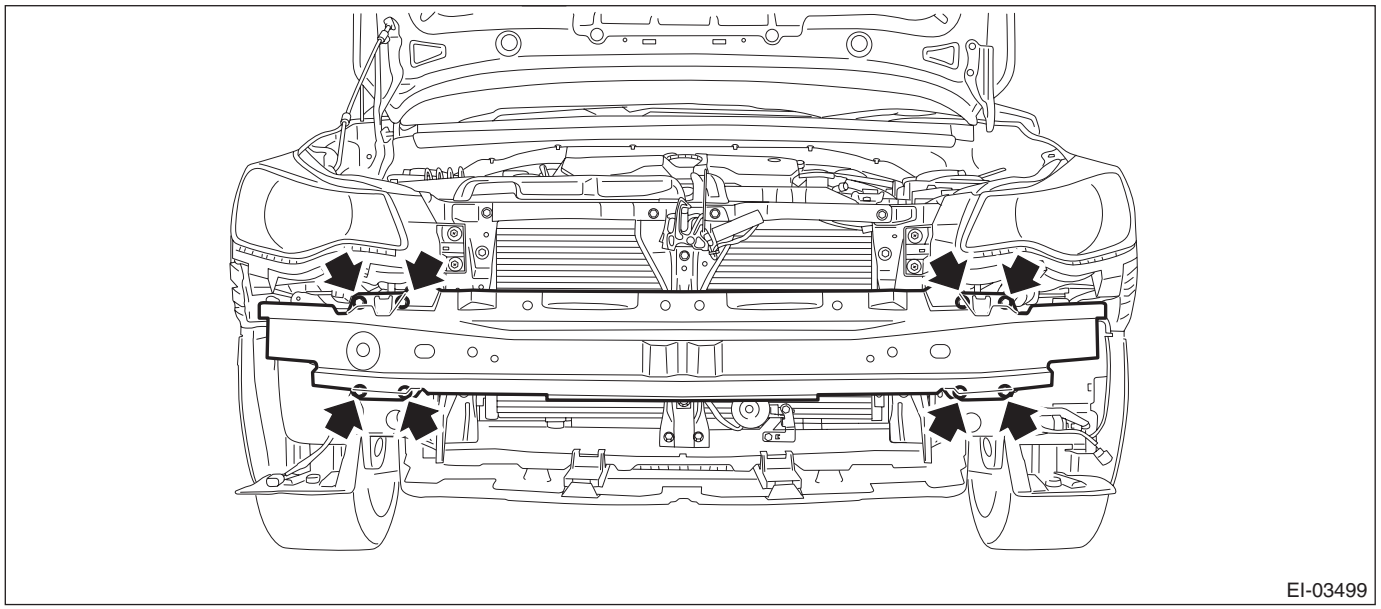
CAUTION:
Do not pull forcibly. It may damage the flange section on the bumper face - front side when it comes off from the claws of the bracket - front bumper.

NOTE:
Remove the bumper face - front according to the following procedures.



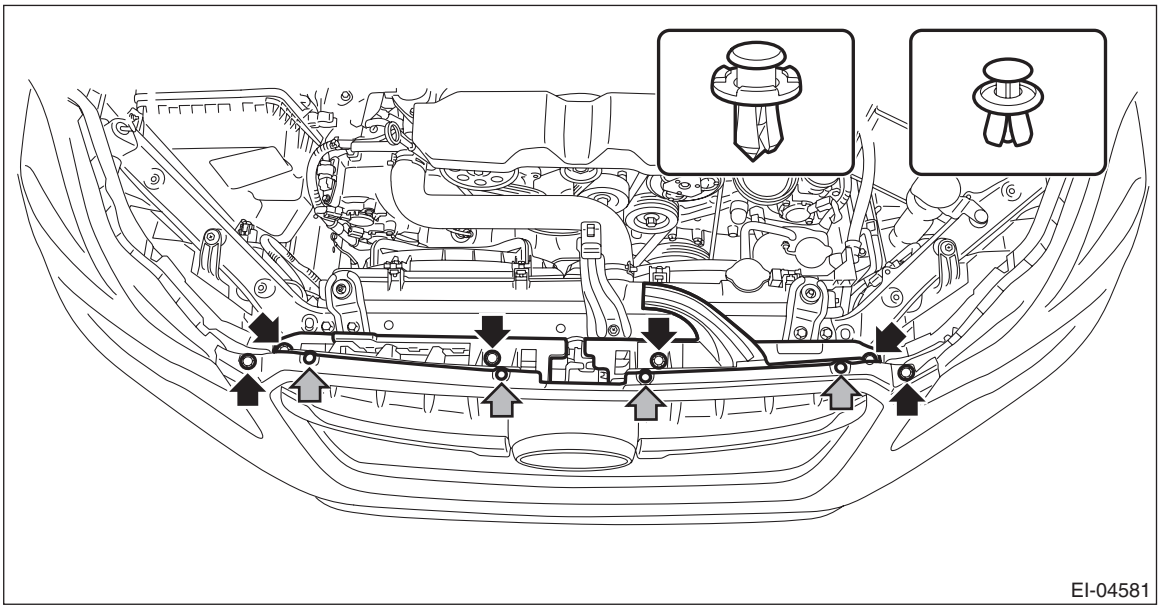
1. Remove the clips, turn over the mud guard, and insert a flat tip screwdriver with protection for damage prevention into the clearance between bumper and bracket. (a)
2. Push out the bumper with the flat tip screwdriver while pushing up the bumper from below. (b), (c)
3. Release the engagement of clips in the order of (d) to (g) while pushing up the bumper from below.
4. Perform the same procedures to remove the opposite side.

3) Remove the active grille shutter. (HEV model) <Ref. to HEV-77, REMOVAL, Active Grille Shutter.>
4) Remove the bolts, and remove the bumper beam COMPL - front.


EI-03499

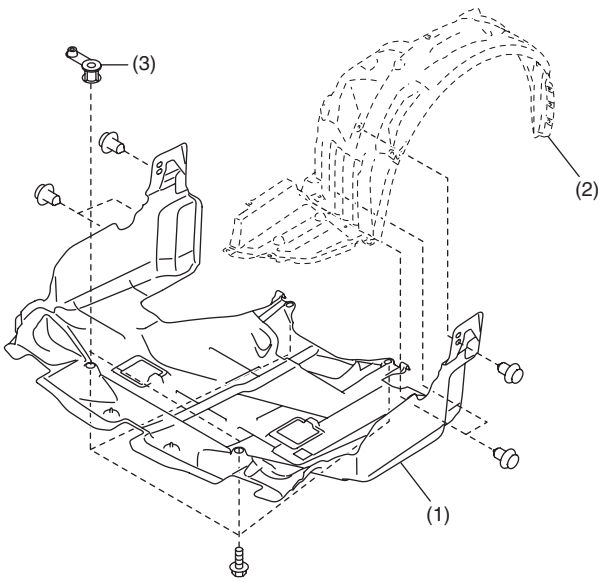
5) Remove the clip, and remove the bracket - grille.

CAUTION:
To prevent damage to the bracket - grille, make sure to remove all clips.


EI-04581

NOTE:
The bracket - grille can be removed without removing the bumper face - front.

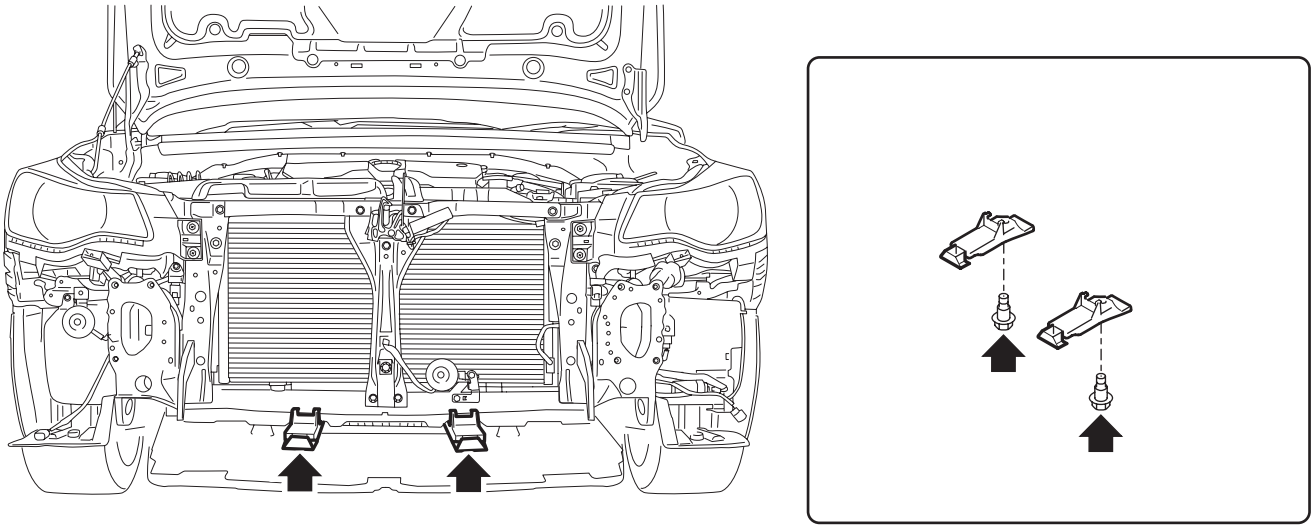
6) Remove the bracket - front center LWR.
(1) Remove the bolts and clips, and turn over the under cover - front.



EI-04833

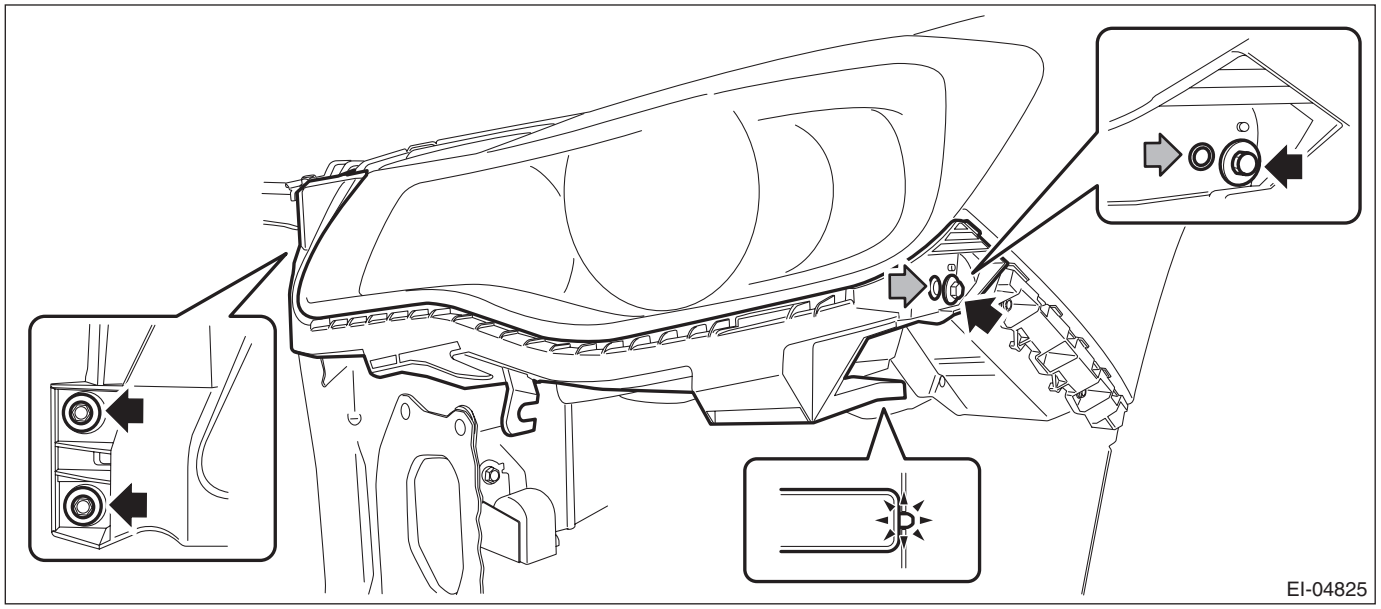
(1) Under cover - front
(2) Mud guard - front
(3) Spacer - under cover (Crosstrek model)

(2) Remove the bolts, and remove the bracket - front center LWR.



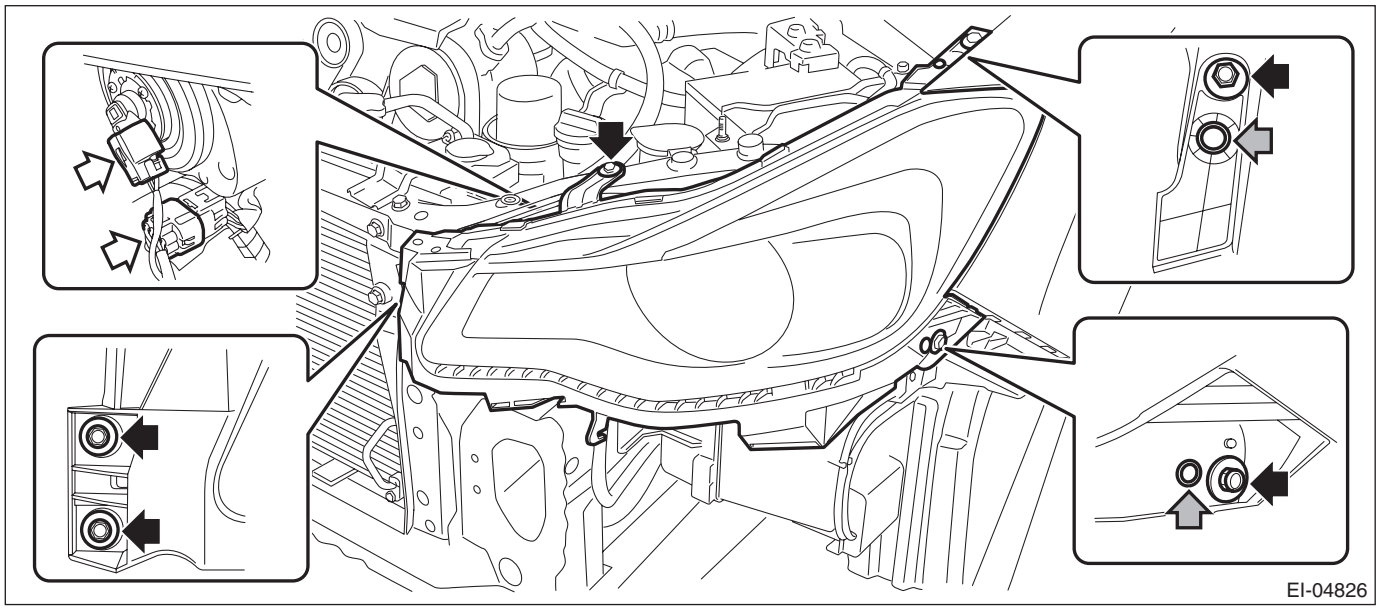
EI-03498

7) Remove the bolts and clips, and remove the bracket - front bumper corner.

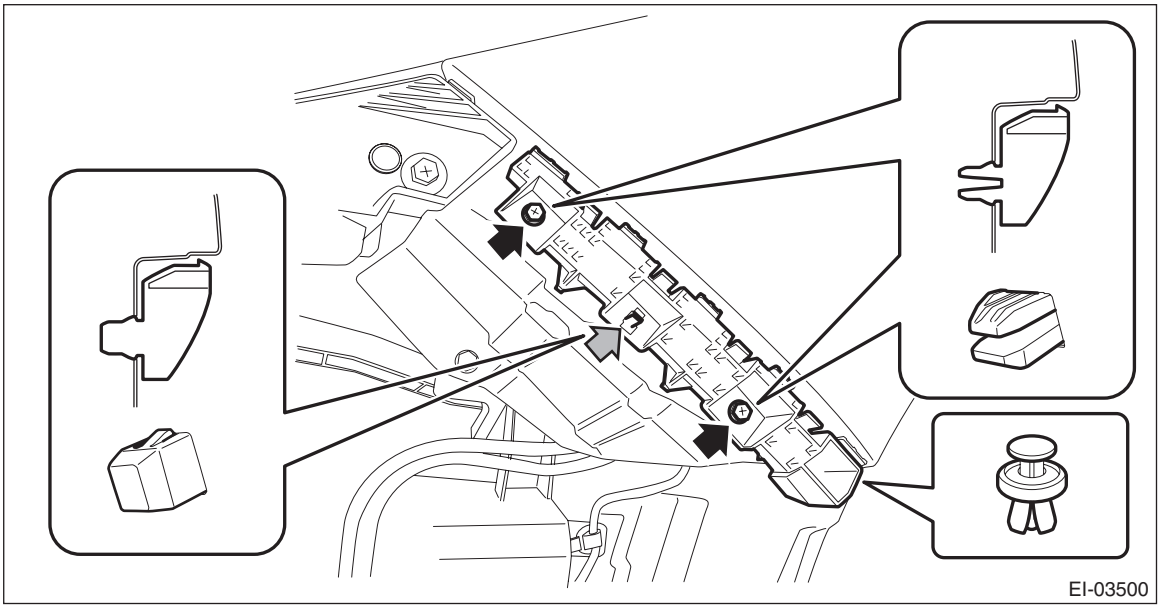


NOTE:
When removing the bracket - front bumper corner only, do not remove the light assembly - head.

8) Remove the bracket - front bumper side.
   (1) Remove the bolts and clips, and remove the light assembly - head and the bracket - front bumper corner.



(2) Remove the screws.
(3) Remove the claws from behind the fender COMPL - front, and remove the bracket - front bumper side.

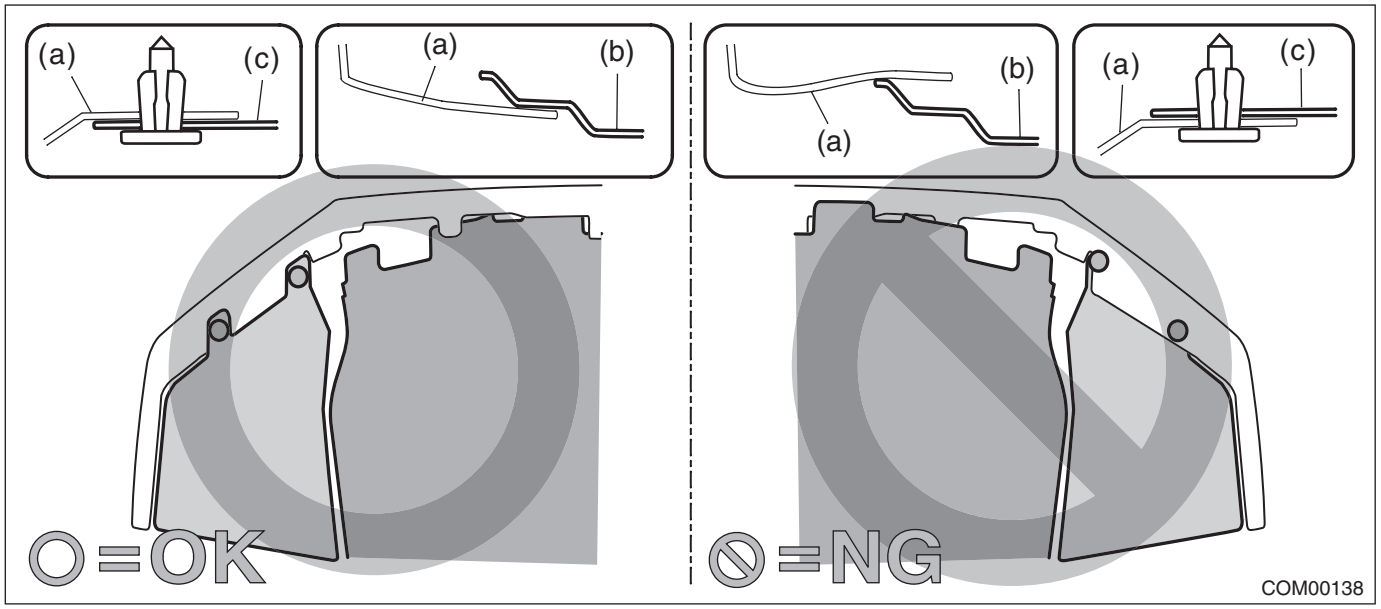


9) Remove the bolts and clips, and remove the fog light assembly - front.

B: INSTALLATION

1) Install each part in the reverse order of removal.
2) Secure the flange section of the bumper face - front to the bracket - front bumper side.

CAUTION:
• Install so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



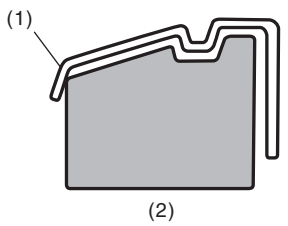
• Before installing the bumper face, match the claws on the bracket - front bumper with the engaging position of flange section on the bumper face side. If the engaging position is not correct, the flange section may be broken or the clearance between fender panel and bumper face may not be uniform.

Tightening torque:
Front bumper-related parts: <Ref. to EI-5, FRONT BUMPER, COMPONENT, General Description.>
Under cover - front: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

3) Install each part in the reverse order of removal.
4) Adjust the headlight beam and fog light beam.
• Adjust the headlight beam. <Ref. to LI-30, HEADLIGHT BEAM ADJUSTMENT, ADJUSTMENT, Headlight Assembly.>
• Adjust the fog light beam. (Model with fog light) <Ref. to LI-52, FOG LIGHT AIMING, ADJUSTMENT, Front Fog Light Assembly.>

C: REPAIR

1. COATING METHOD FOR PP BUMPER

<table>
<tr><th>Process No.</th><th>Process name</th><th colspan="2">Job contents</th></tr>
<tr><td>1</td><td>Bumper installation</td><td>Place the bumper on a paint worktable as required. Use the paint worktable conforming to inner shape of bumper if possible.</td><td>Cross section of bumper


EI-00234
(1) Bumper
(2) Paint worktable</td></tr>
<tr><td>2</td><td>Masking</td><td colspan="2">Mask specified part (black base) with masking tape. Use masking tape for PP.</td></tr>
<tr><td>3</td><td>Degreasing/cleaning</td><td colspan="2">Clean all parts to be painted with appropriate cleaning solvent, normal alcohol, etc. to remove dirt, oil, grease, etc.</td></tr>
<tr><td>4</td><td>Primer paint</td><td colspan="2">Apply primer to all parts to be painted, using spray gun. Use primer (clear).</td></tr>
<tr><td>5</td><td>Drying</td><td colspan="2">Dry at normal temperature. [10 — 15 min. at 20°C (68°F)]
In half-dried condition, PP primer paint is dissolved by solvent, e.g. thinner, etc.
Therefore, if dust or dirt must be removed, use ordinary alcohol etc.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Top coat paint (I)</td><td>Non-colored</td><td>Metallic paint</td></tr>
<tr><td>Use section (block) paint for top coat.
For paint/hardener mixture, observe the specifications recommended by the manufacturers.
• Viscosity: 10 — 13 sec./20°C (68°F)
• Film thickness: 35 — 45 µ
• Spraying pressure: 245 — 343 kPa
(2.5 — 3.5 kgf/cm^2, 36 — 50 psi)</td><td>Use section (block) paint for top coat.
For paint/hardener mixture, observe the specifications recommended by the manufacturers.
• Viscosity: 10 — 13 sec./20°C (68°F)
• Film thickness: 15 — 20 µ
• Spraying pressure: 245 — 343 kPa
(2.5 — 3.5 kgf/cm^2, 36 — 50 psi)</td></tr>
<tr><td>7</td><td>Drying</td><td>Not required.</td><td>Dry at normal temperature [at least 10 min. at 20°C (68°F)].
In half-dried condition, avoid dust, dirt.</td></tr>
<tr><td>8</td><td>Top coat paint (II)</td><td>Not required.</td><td>Apply a clear coat to parts with top coat paint (I), three times at 5 — 7 minute intervals.
For paint/hardener mixture, observe the specifications recommended by the manufacturers.
• Viscosity: 14 — 16 sec./20°C (68°F)
• Film thickness: 25 — 30 µ
• Spraying pressure: 245 — 343 kPa
(2.5 — 3.5 kgf/cm^2, 36 — 50 psi)</td></tr>
<tr><td>9</td><td>Drying</td><td colspan="2">60°C (140°F), 60 min. or 80°C (176°F), 30 min.
If the temperature is higher than 80°C (176°F), PP may be deformed. Keep maximum temperature at 80°C (176°F) or less.</td></tr>
<tr><td>10</td><td>Inspection</td><td colspan="2">Check paint.</td></tr>
<tr><td>11</td><td>Removal of masking</td><td colspan="2">Remove the masking tape applied in procedure 2.</td></tr>
</table>

2. REPAIR INSTRUCTIONS FOR COLORED PP BUMPER

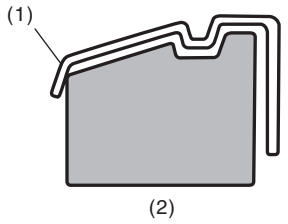
NOTE:
All PP bumpers are provided with a grained surface, and if the surface is damaged, it cannot normally be restored to its former condition. Damages limited to the shallow scratches that cause only a change in the luster of the base material or coating, can be almost fully restored. Before repairing a damaged area, explain this point to the customer and obtain an understanding about the matter.
Repair methods are outlined below, based on a classification of the extent of damage.
1) Minor damage causing only a change in the luster of the bumper due to a light touch
Almost restorable.

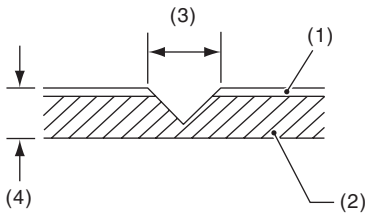
<table>
<tr><th>Process No.</th><th>Process name</th><th colspan="2">Job contents</th></tr>
<tr><td>1</td><td>Cleaning</td><td colspan="2">Clean the area to be repaired using water.</td></tr>
<tr><td>2</td><td>Sanding</td><td colspan="2">Grind the repairing area with #500 sand paper in a “feathering” motion.</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Finish</td><td>Resin section</td><td>Coated section</td></tr>
<tr><td>Repeatedly apply wax to the affected area using soft cloth (such as flannel).
Recommended wax: Tire wax or equivalent</td><td rowspan="2">Perform either the same procedures as for the resin section or process No. 18 and subsequent in section 3), depending on the degree and nature of damage.</td></tr>
<tr><td>Polish the waxed area with clean cloth after 5 — 10 minutes.</td></tr>
</table>

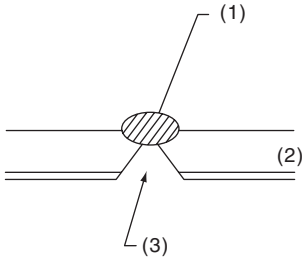
2) Deep damage caused by scratching with fences etc.
A dent cannot be repaired but a whitened or swelled part can be removed.

<table>
<tr><th>Process No.</th><th>Process name</th><th colspan="2">Job contents</th></tr>
<tr><td>1</td><td>Cleaning</td><td colspan="2">Clean the damaged area with water.</td></tr>
<tr><td>2</td><td>Removal of damaged area</td><td colspan="2">Cut off protruding area, if any, due to collision, using a putty knife.</td></tr>
<tr><td>3</td><td>Sanding</td><td colspan="2">Grind the affected area with #100 — #500 sand paper.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Finish</td><td>Resin section</td><td>Coated section</td></tr>
<tr><td>Same as process No. 3 in section “1)”.</td><td>Perform process No. 12 and subsequent operations in section “3)”.</td></tr>
</table>

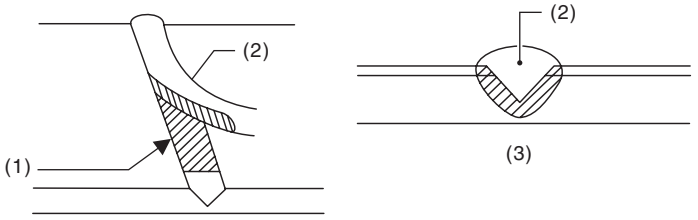
3) Deep damage such as a break or hole that requires filling
Much of the peripheral grained surface must be sacrificed for repair. The degree of restoration is not really worth the expense. (The surface, however, will become almost flush with adjacent areas.)

<table>
<tr><th>Process No.</th><th>Process name</th><th colspan="2">Job contents</th></tr>
<tr><td>1</td><td>Bumper removal</td><td colspan="2">Remove the bumper as required.</td></tr>
<tr><td>2</td><td>Removal of parts</td><td colspan="2">Remove the parts built into bumper as required.</td></tr>
<tr><td>3</td><td>Bumper placement</td><td>Place the bumper on a paint worktable as required.
It is recommended to use the paint worktable conforming to internal shape of bumper.</td><td>Cross section of bumper


EI-00234
(1) Bumper
(2) Paint worktable</td></tr>
<tr><td>4</td><td>Surface preparation</td><td colspan="2">Remove dust, oil, etc. from areas to be repaired and surrounding areas, using an appropriate solvent (appropriate cleaning solvent or alcohol, etc.).</td></tr>
<tr><td>5</td><td>Cutting</td><td>If the damage is a crack or a hole, cut a guide slit of 20 to 30 mm (0.79 to 1.18 in) in length along the crack or hole up to the bumper base surface. Next, use a knife or grinder to carve a V-shaped groove in the area for repair.</td><td>

EI-00235
(1) Paint surface
(2) PP base surface
(3) 20 — 30 mm (0.79 — 1.18 in)
(4) 3 mm (0.12 in)</td></tr>
<tr><td>6</td><td>Sanding (I)</td><td colspan="2">Grind beveled surface with sand paper (#40 — #60) to smooth finish.</td></tr>
<tr><td>7</td><td>Cleaning</td><td colspan="2">Clean the sanded surface with the same solvent as used in process No. 4.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Temporary welding</td><td colspan="2">Grind the side just opposite the beveled area with sand paper (#40 — #60) and clean using a solvent.
Temporarily spot-weld the side, using PP welding rod and heater gun.</td></tr>
<tr><td colspan="2">

EI-00236
(1) Welded point (Use heater gun and PP welding rod)
(2) PP base surface
(3) Beveled section
NOTE:
• Do not melt welding rod until it flows out. This results in reduced strength.
• Leave the welded spot unattended until it cools completely.</td></tr>
</table>

Process No.	Process name	Job contents
9	Welding	Using a heater gun and PP welding rod, weld the beveled spot while melting both the rod and damaged area.
		 EI-00237 (1) Welding rod (2) Melt hatched area (3) Section NOTE: • Melt the sections indicated by hatched area. • Do not melt the welding rod until it flows out, in order to provide strength. • Always keep the heater gun 1 to 2 cm (0.4 to 0.8 in) away from the welding spot. • Leave the welded spot unattended until it cools completely.
10	Sanding (II)	Remove excess part of weld with a putty knife. If a drill or disc wheel is used instead of the knife, operate it at less than 1,500 r/min and grind the excess part little by little. A higher rpm will cause the PP substrate to melt from the heat.
		 EI-00042
		Sand the welded spot smooth with #240 sand paper.
11	Masking	Mask the black substrate section using masking tape.
12	Cleaning/degreasing	Completely clean the entire coated area, using solvent similar to that used in process No. 4.
13	Primer coating	Apply a coat of primer for bumpers to the repaired surface and its surrounding areas. Mask these areas, if necessary. NOTE: Be sure to apply a coat of primer using a spray gun at a pressure of 245 — 343 kPa (2.5 — 3.5 kgf/cm^2, 36 — 50 psi).
14	Leave unattended	Leave the repaired area unattended at 20°C (68°F) for 10 to 15 minutes until primer is half-dry. NOTE: If dirt or dust comes in contact with the coated area, wipe it off with a cloth dampened with alcohol. (Do not use thinner since it could melt the coated area.)
15	Surfacer coating	Apply a coat of surfacer for PP bumpers to the repaired area two or three times at an interval of 3 — 5 minutes. For surfacer/hardener mixture, viscosity and paint thickness, observe the specifications of the surfacers to be used.
16	Drying	Allow the coated surface to dry for 20 minutes at 20°C (68°F) [or 30 minutes at 60°C (140°F)].
17	Sanding (III)	Sand the coated surface and its surrounding areas using #400 sand paper and water.
18	Cleaning/degreasing	Same as process No. 12.

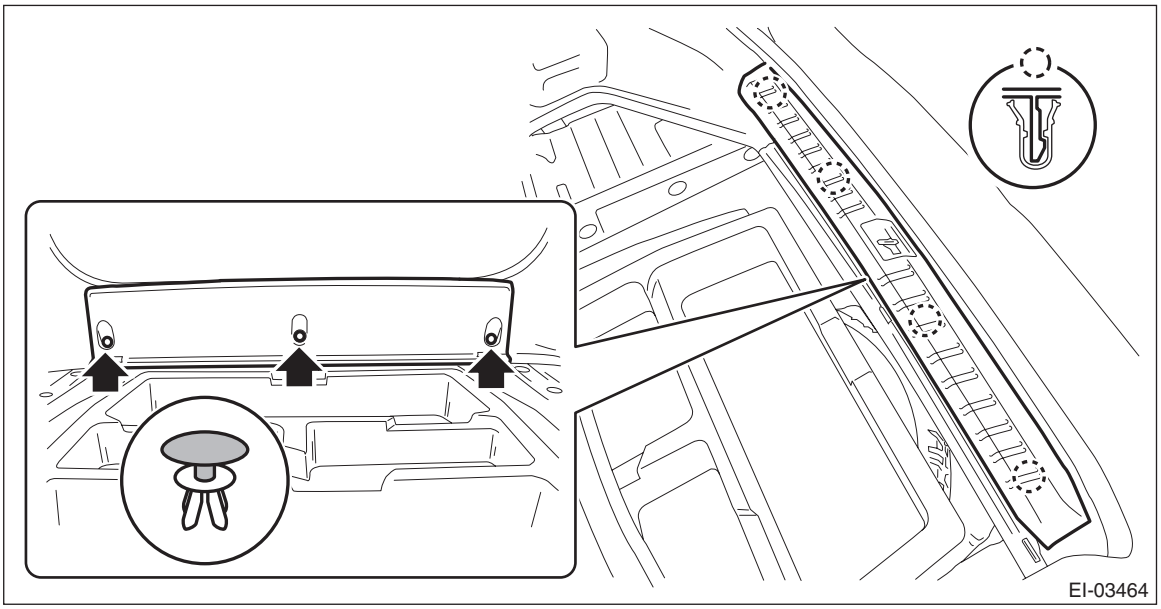
Process No.	Process name	Job contents	
		Non-colored	Metallic paint
19	Top coat (I)	Use a “block” coating method. For paint/hardener mixture, observe the specifications recommended by the manufacturers. • Viscosity: 11 — 13 sec./20°C (68°F) • Coating film thickness: 40 — 50 µ • Spraying pressure: 245 — 343 kPa (2.5 — 3.5 kgf/cm^2, 36 — 50 psi)	Use a “block” coating method. For paint/hardener mixture, observe the specifications recommended by the manufacturers. • Viscosity: 11 — 13 sec./20°C (68°F) • Coating film thickness: 20 — 30 µ • Spraying pressure: 245 — 343 kPa (2.5 — 3.5 kgf/cm^2, 36 — 50 psi)
20	Leave unattended	Not required.	Leave unattended at 20°C (68°F) for at least 10 minutes until the topcoated area is half-dry. NOTE: Be careful to keep dust or dirt from coming in contact with the affected area.
21	Top coat (II)	Not required.	Apply a clear coat three times at an interval of 3 to 5 minutes. For paint/hardener mixture, observe the specifications recommended by the manufacturers. • Viscosity: 10 — 13 sec./20°C (68°F) • Coating film thickness: 20 — 30 µ • Spraying pressure: 245 — 343 kPa (2.5 — 3.5 kgf/cm^2, 36 — 50 psi)
22	Drying	Allow the coated surface to dry for two hours at 20°C (68°F) or 30 minutes at 60°C (140°F). NOTE: Do not allow the temperature to exceed 80°C (176°F) since this will deform the PP substrate.	
23	Inspection	Carefully check the condition of the repaired area.	
24	Removal of masking	Remove the masking tape applied in process No. 11 and 13.	
25	Parts installation	Install parts on the bumper in reverse order of removal.	
26	Bumper installation	Install the bumper.	

8. Rear Bumper

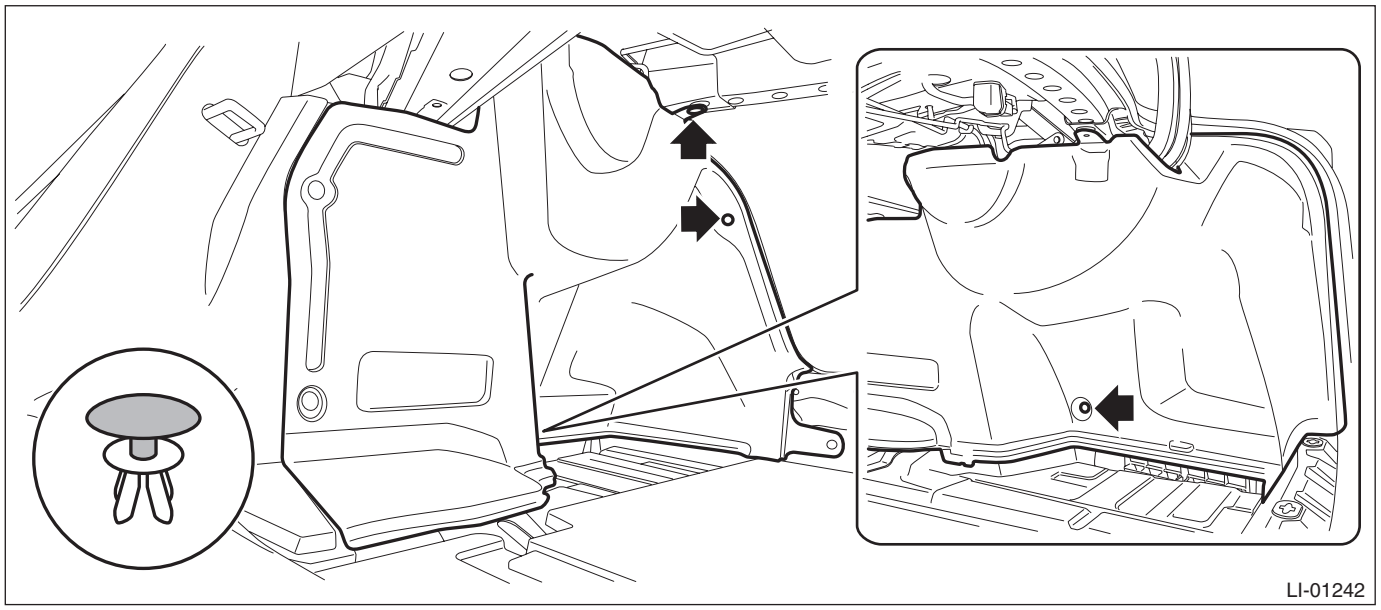
A: REMOVAL

1. 4 DOOR MODEL

1) Disconnect the ground cable from battery.
2) Remove the trunk room mat.
3) Remove the trim panel - trunk rear.
   (1) Remove the clip.
   (2) Release the claws, and remove the trim panel - trunk rear.

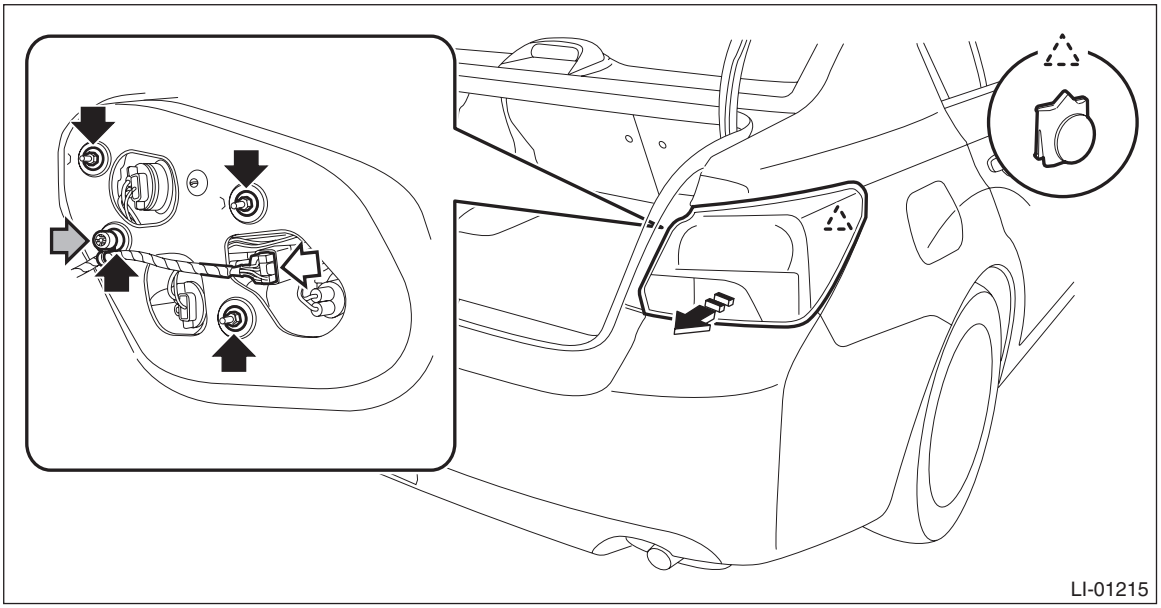


4) Remove the clips, and turn over the trim panel - trunk side.

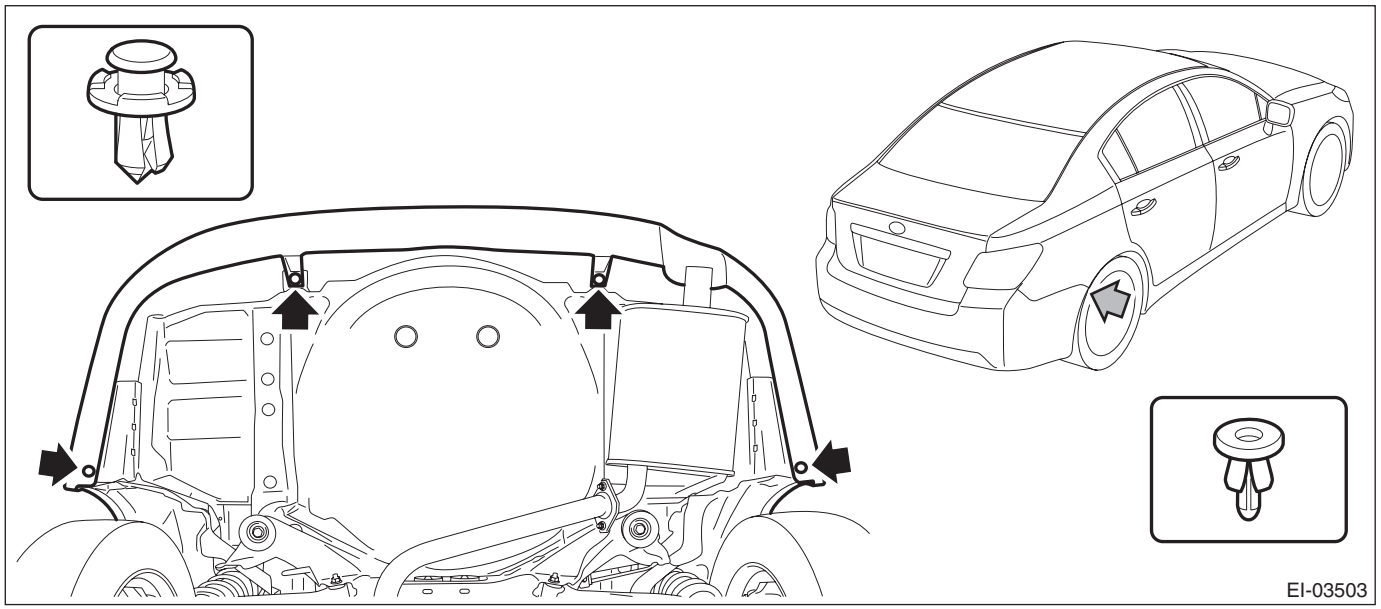


5) Remove the light assembly - rear combination.
   (1) Remove the harness clamp and connector.
   (2) Release the nuts and clips, then remove the light assembly - rear combination.

CAUTION:
Be careful not to damage the clips.

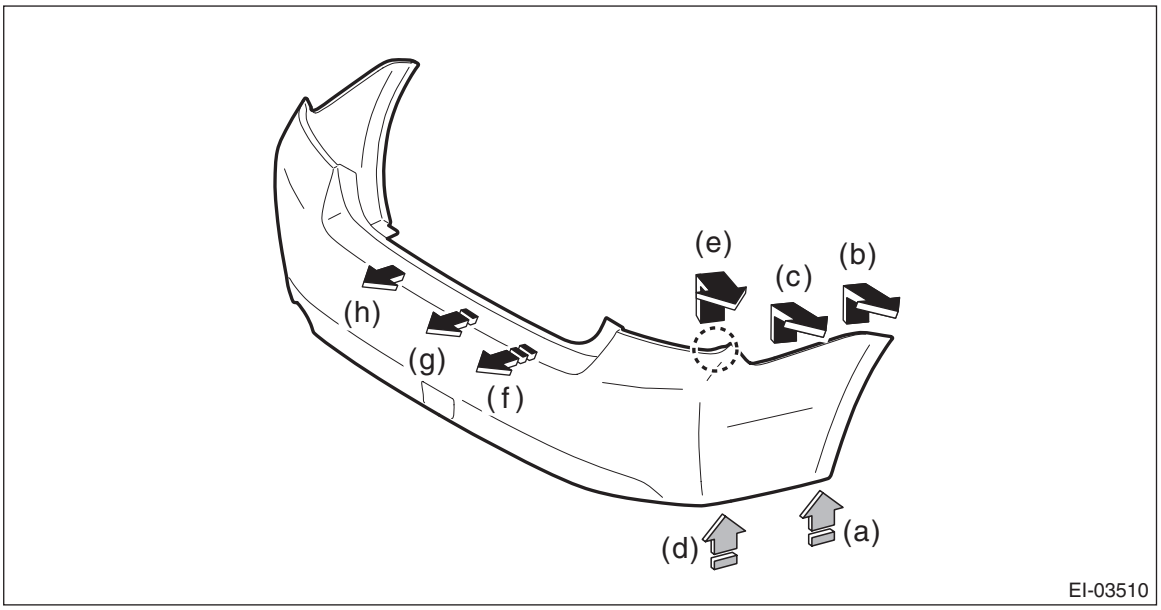


6) Remove the bumper face - rear.
   (1) Remove the clips inside the wheel housing.
   (2) Remove the clips at the lower side of the bumper face - rear.

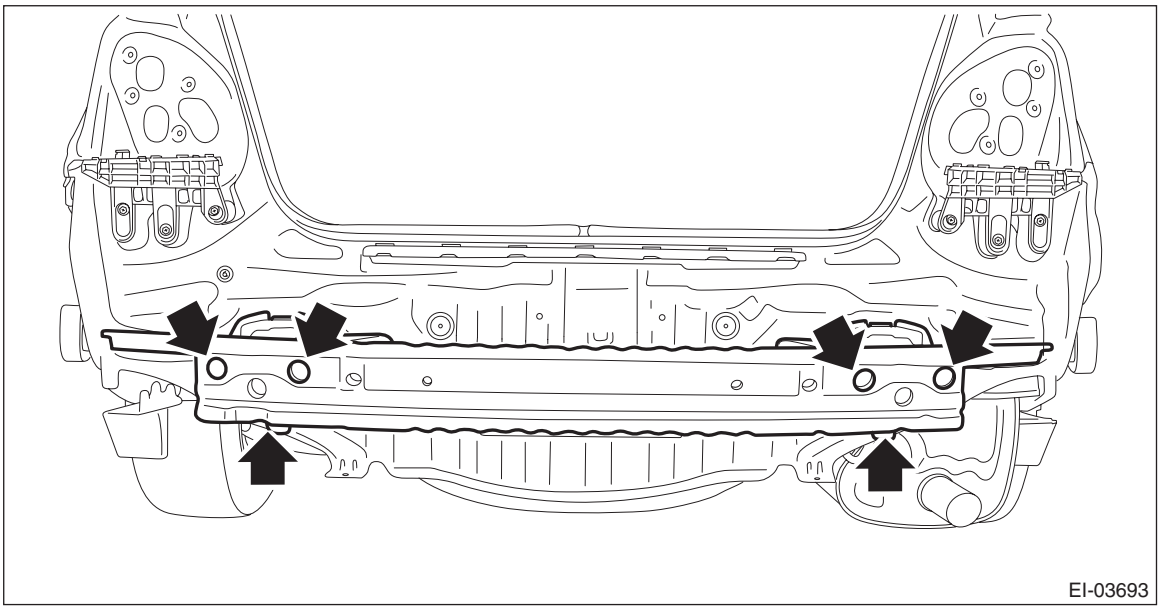


(3) Detach (b) and (c) while pulling up (a) of the bumper face - rear.
(4) Detach (e) while pulling up (d) of the bumper face - rear.
(5) Detach the opposite side in the same manner.
(6) Detach in order from (f) to (h) while pulling up the center part of the bumper face - rear.

CAUTION:
Pulling with excessive force may damage the bracket.

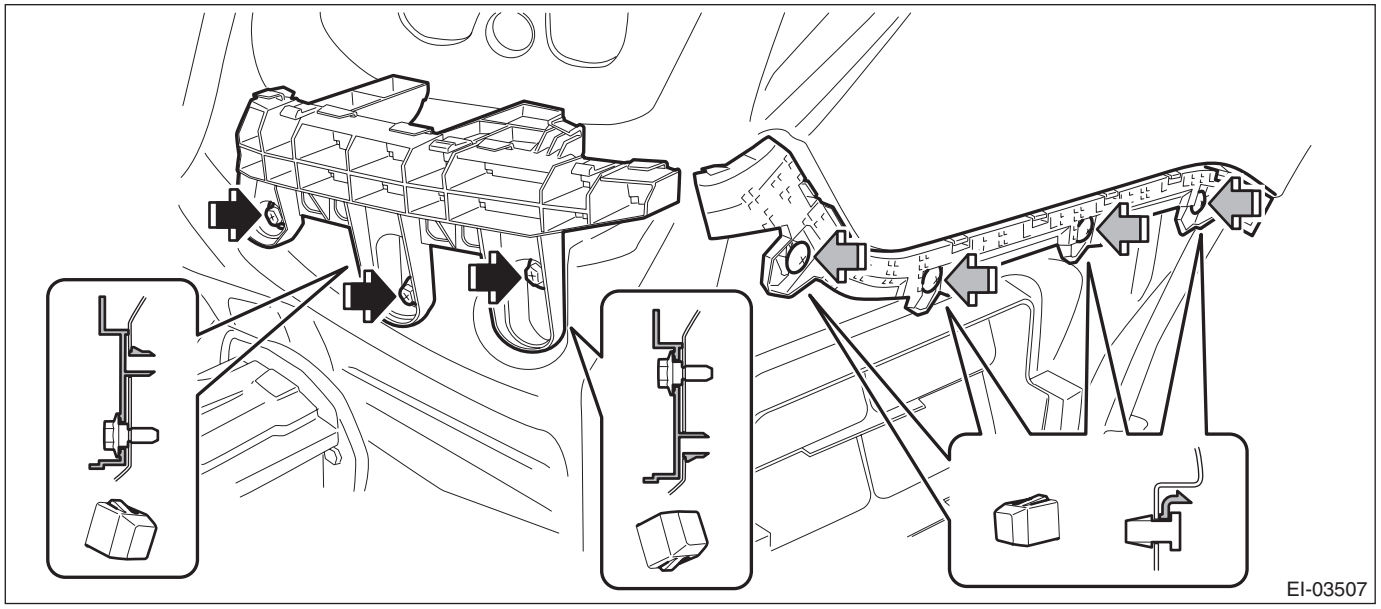


7) Remove the bolts and nuts, and remove the bumper beam COMPL - rear.



NOTE:
After all nuts are removed, raise the bumper beam COMPL - rear a little to remove it from vehicle body.

8) Remove bumper brackets.
(1) Remove the screws.
(2) Turn over the trim panel - trunk side, and detach the claw of the clip from the back side.



2. 5 DOOR MODEL/CROSSTREK MODEL

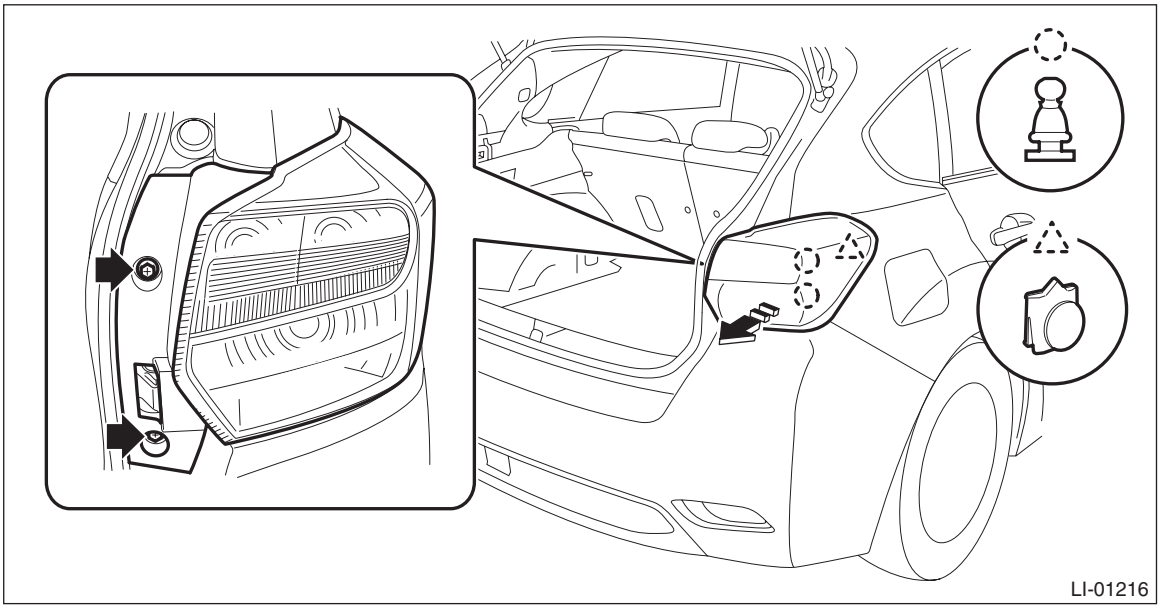
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

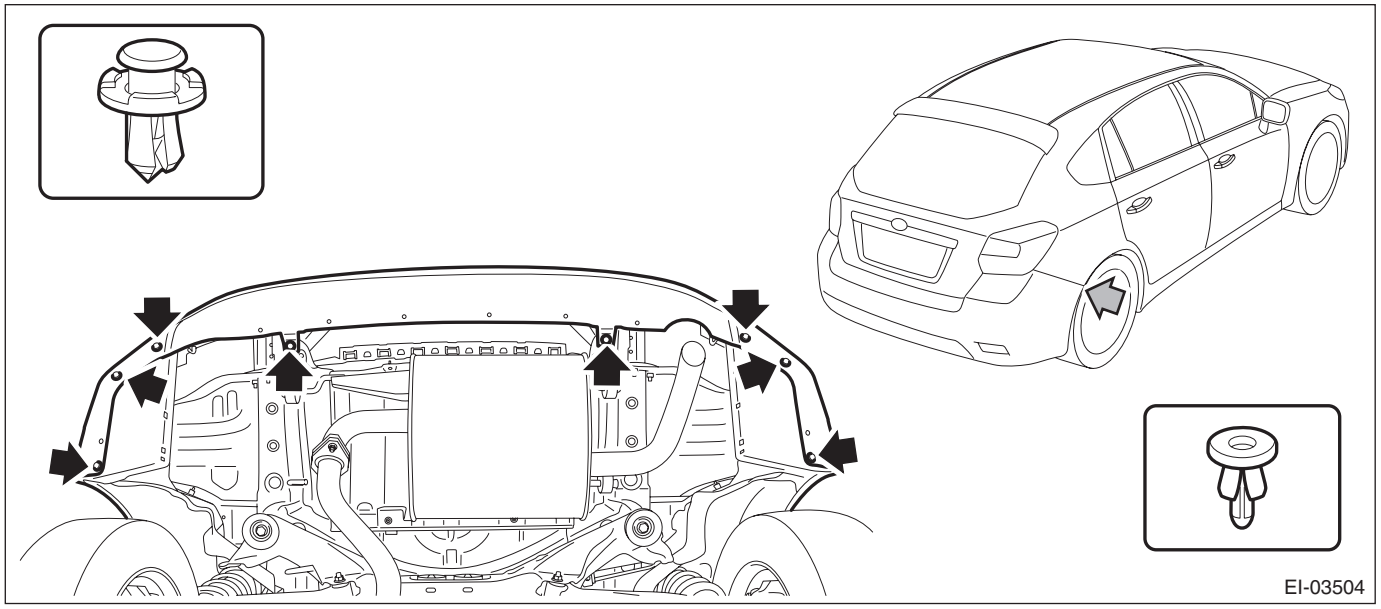
2) Remove the light assembly - rear combination.

CAUTION:
Be careful not to damage the clips.

(1) Release the bolts and clips, then pull out the light assembly - rear combination to the vehicle rear.
(2) Disconnect the connector and remove the light assembly - rear combination.

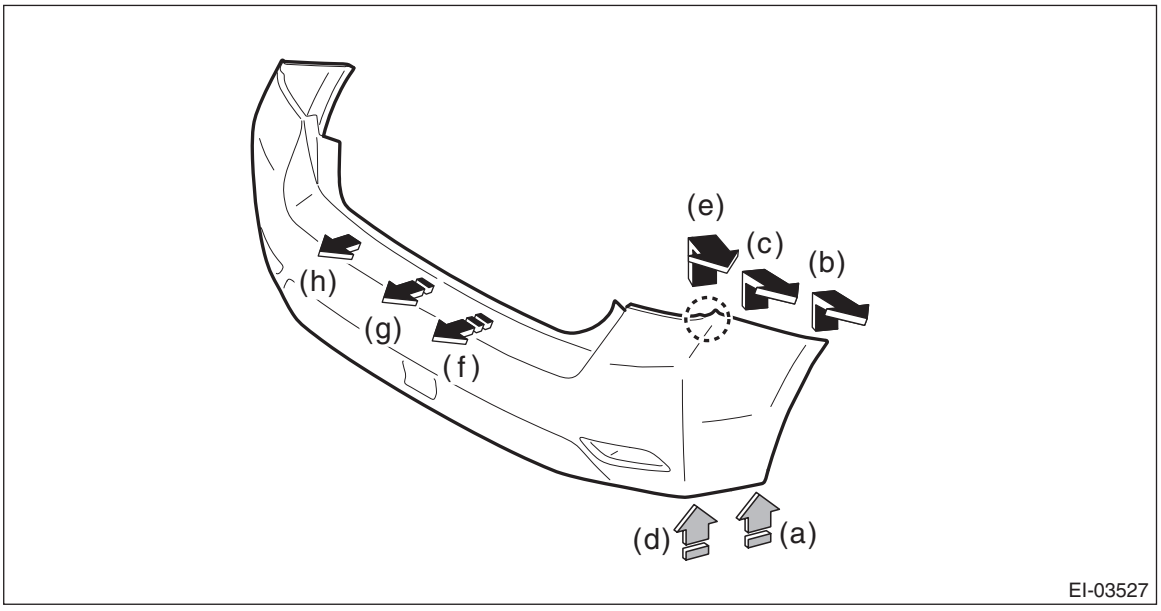


3) Remove the bumper face - rear.
(1) Remove the clips inside the wheel housing.
(2) Remove the clips at the lower side of the bumper face - rear.



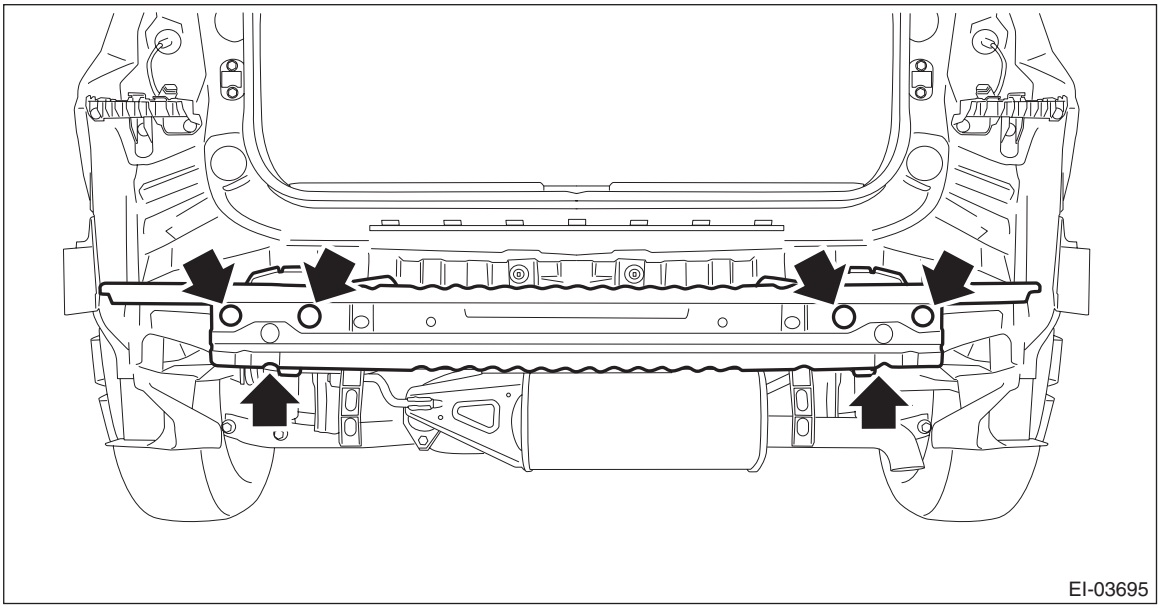
(3) Detach (b) and (c) while pulling up (a) of the bumper face - rear.
(4) Detach (e) while pulling up (d) of the bumper face - rear.
(5) Detach the opposite side in the same manner.
(6) Detach in order from (f) to (h) while pulling up the center part of the bumper face - rear.

CAUTION:
Do not pull forcibly. It may damage the flange section on the bumper face - rear side when it comes off from the claws of the bracket - rear bumper.

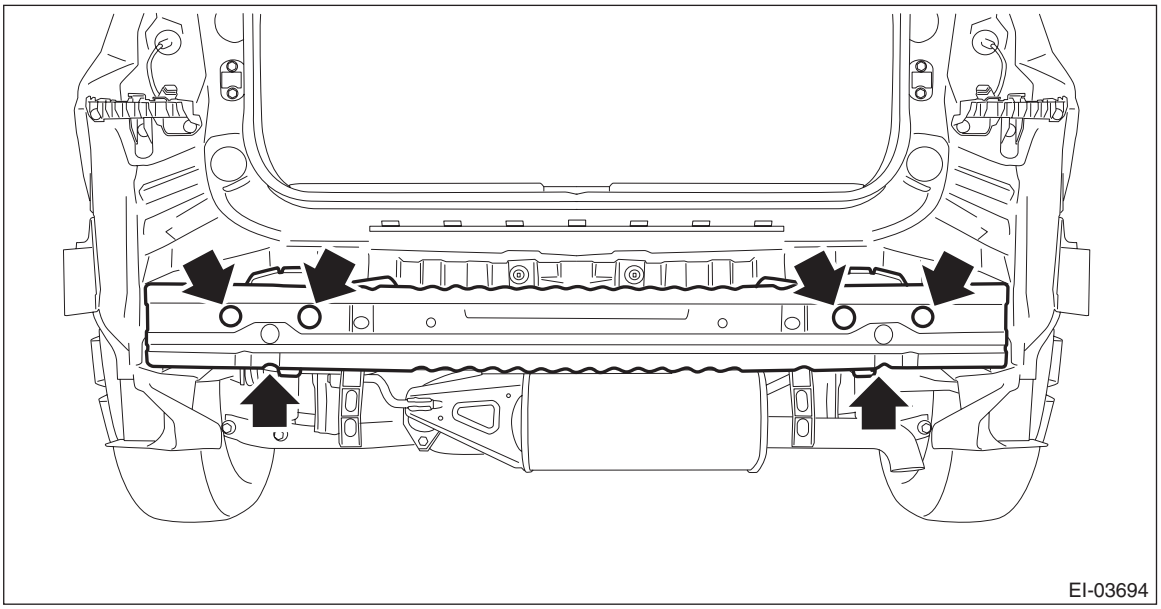


4) Remove the bolts and nuts, and remove the bumper beam COMPL - rear.

- Impreza model

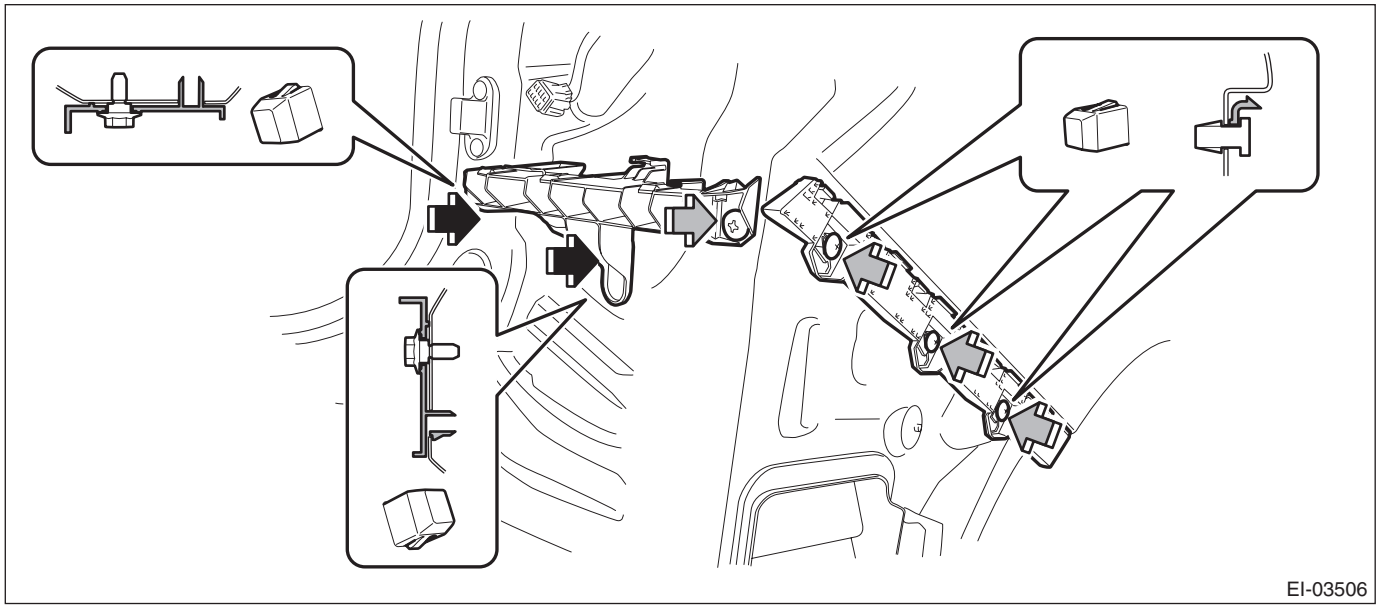


- Crosstrek model

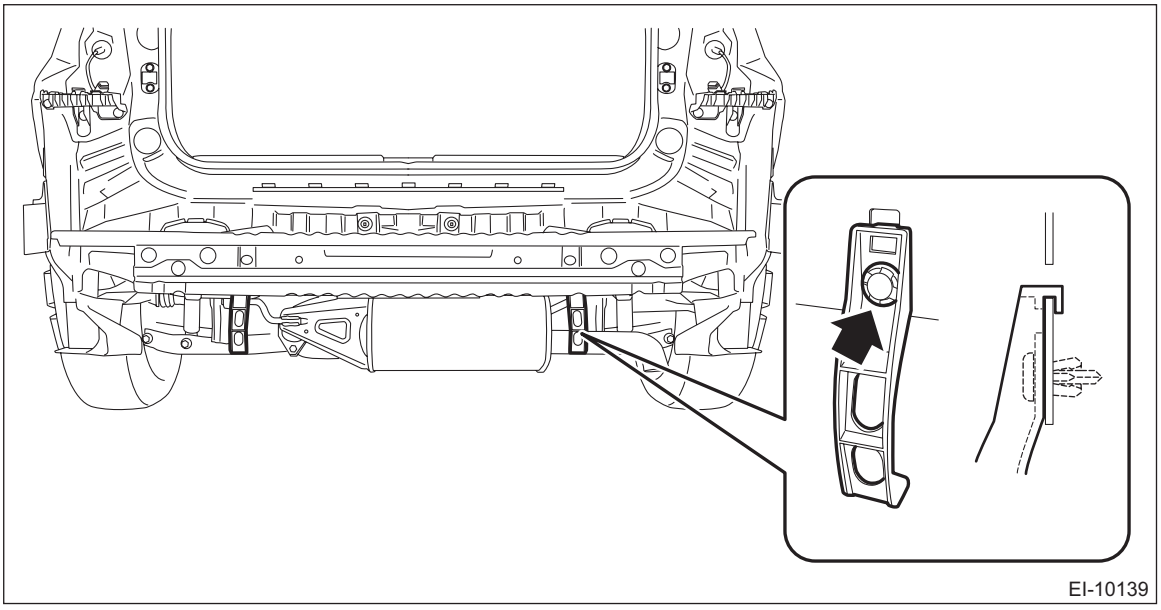


NOTE:
After all nuts are removed, raise the bumper beam COMPL - rear a little to remove it from vehicle body.

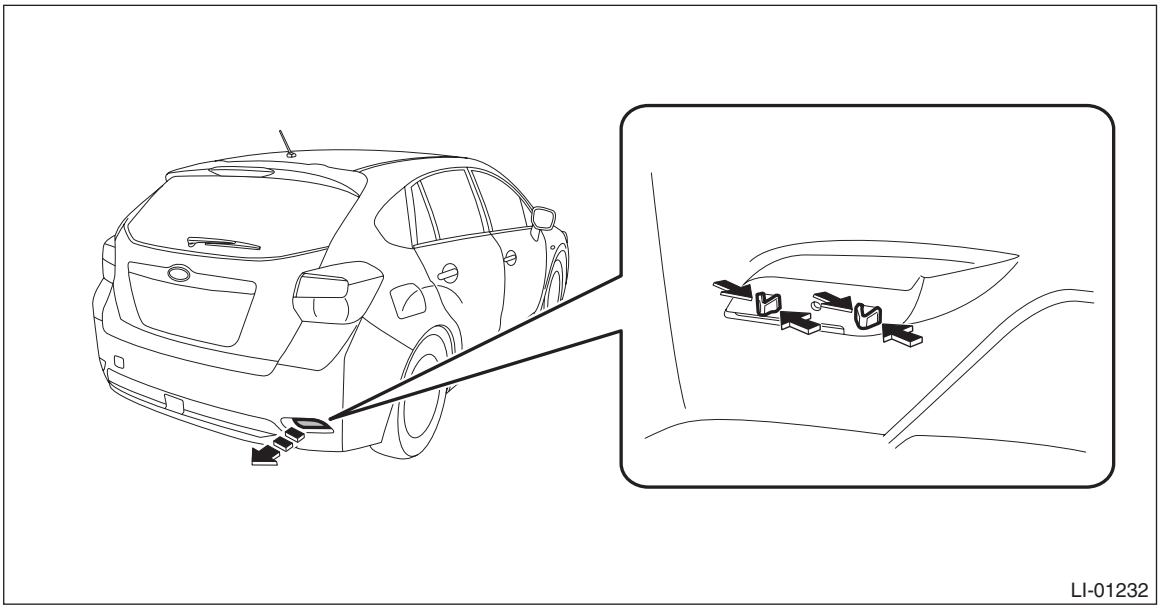
5) Remove bumper brackets.
(1) Remove the screws.
(2) Turn over the trim panel - trunk side, and detach the claw of the clip from the back side.


EI-03506

(3) Remove the clip, and remove the bracket - rear bumper lower.


EI-10139

6) From behind the bumper, release the claws, and remove the reflex reflector assembly.

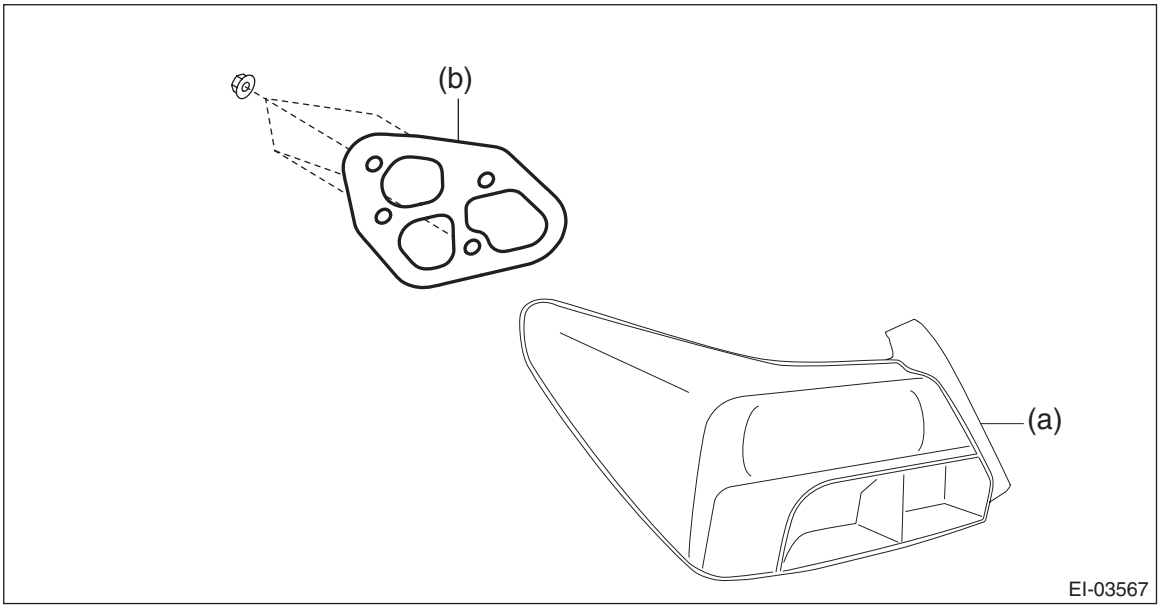


B: INSTALLATION

Install each part in the reverse order of removal.

CAUTION:

• For 4 door model, replace the seal gasket (b) of rear combination light assembly (a) with a new part. If the seal gasket is reused, water leaks may occur.



• Before installing the bumper face, match the claws on the bracket - rear bumper with the engaging position of flange section on the bumper face side. If the engaging position is not correct, the flange section may be broken or the clearance between fender panel and bumper face may not be uniform.

NOTE:
If the bumper face - rear comes off too easily, adjust the hook of the bracket side.

Tightening torque:

Rear bumper component: <Ref. to EI-7, REAR BUMPER, COMPONENT, General Description.>
Light assembly - rear combination: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: REPAIR

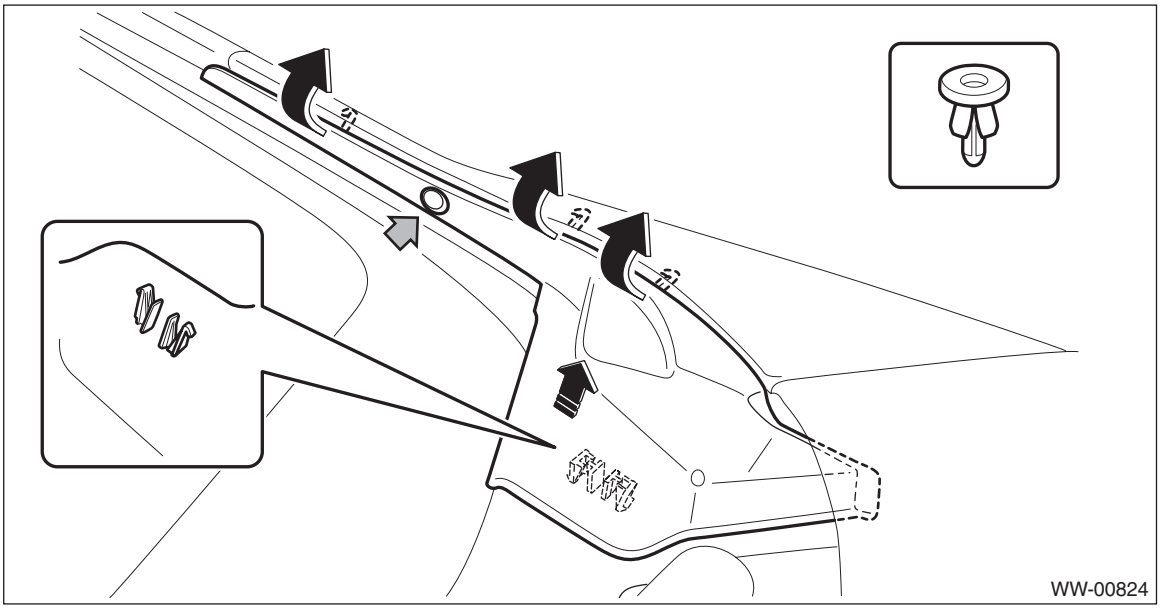
Refer to the description concerning repair in “Front Bumper” section. <Ref. to EI-44, REPAIR, Front Bumper.>

9. Cowl Panel

A: REMOVAL

1) Open the front hood.
2) Remove the arm assembly - windshield wiper. <Ref. to WW-27, REMOVAL, Front Wiper Arm.>
3) Remove the cowl panel - side.
   (1) Remove the clips.
   (2) Release the claws, and then remove the cowl panel - side.

CAUTION:
Pulling with excessive force may damage the cowl panel - side. If it is difficult to remove, use a plastic remover or equivalent tool.



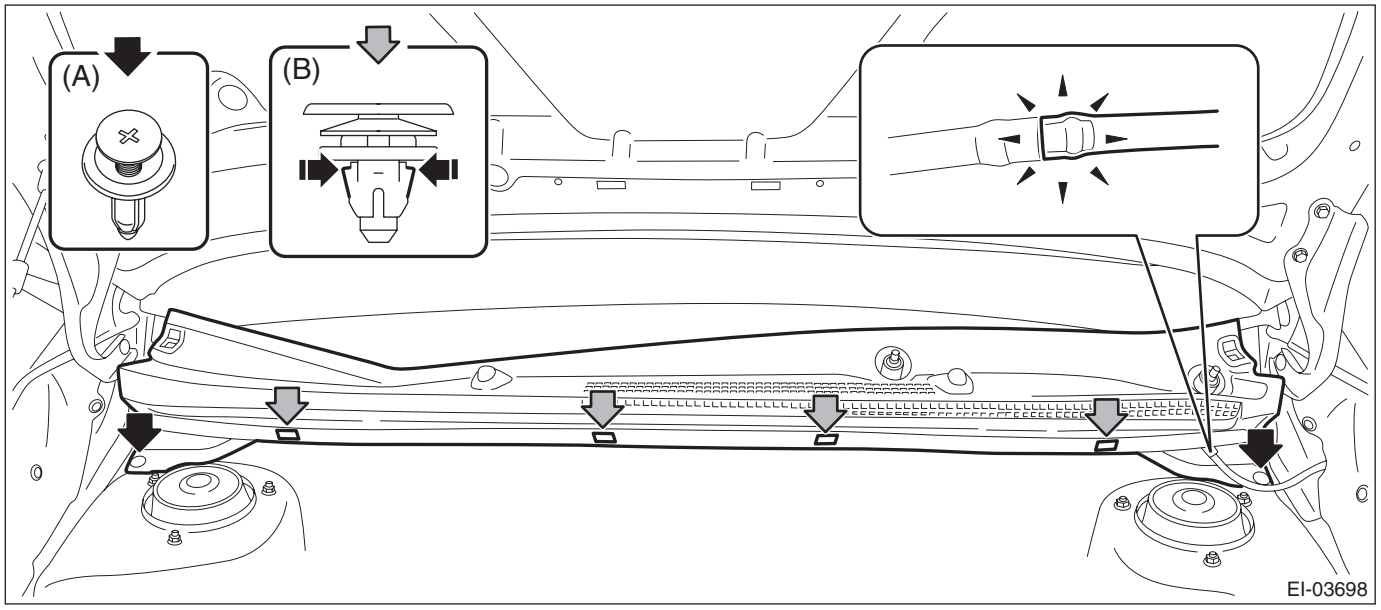
4) Remove the cowl panel assembly.

CAUTION:
Before removing the cowl panel, use an air blower and nylon brush to sweep gravel from the lower area of the front side of the glass.

(1) Disconnect the washer hose.
(2) Remove clips (A).
(3) Check the direction of the clip (B), and push the claws from both sides to remove it.

CAUTION:
When removing the clip (B), push the claws of the clip first.
Be careful not to apply excessive force when pulling the clip (B), as the clip may become damaged.

(4) Remove the cowl panel assembly by pulling it out towards the front of the vehicle.



5) Remove the washer nozzle and the washer hose as required. <Ref. to WW-37, REMOVAL, Front Washer Nozzle and Hose.>

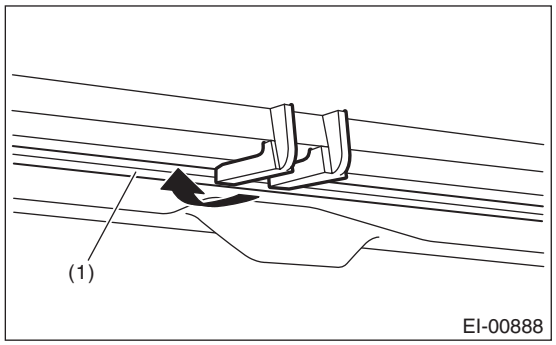
B: INSTALLATION

CAUTION:
Before installing the windshield glass and cowl panel, make sure there are no gravel in the installing area.

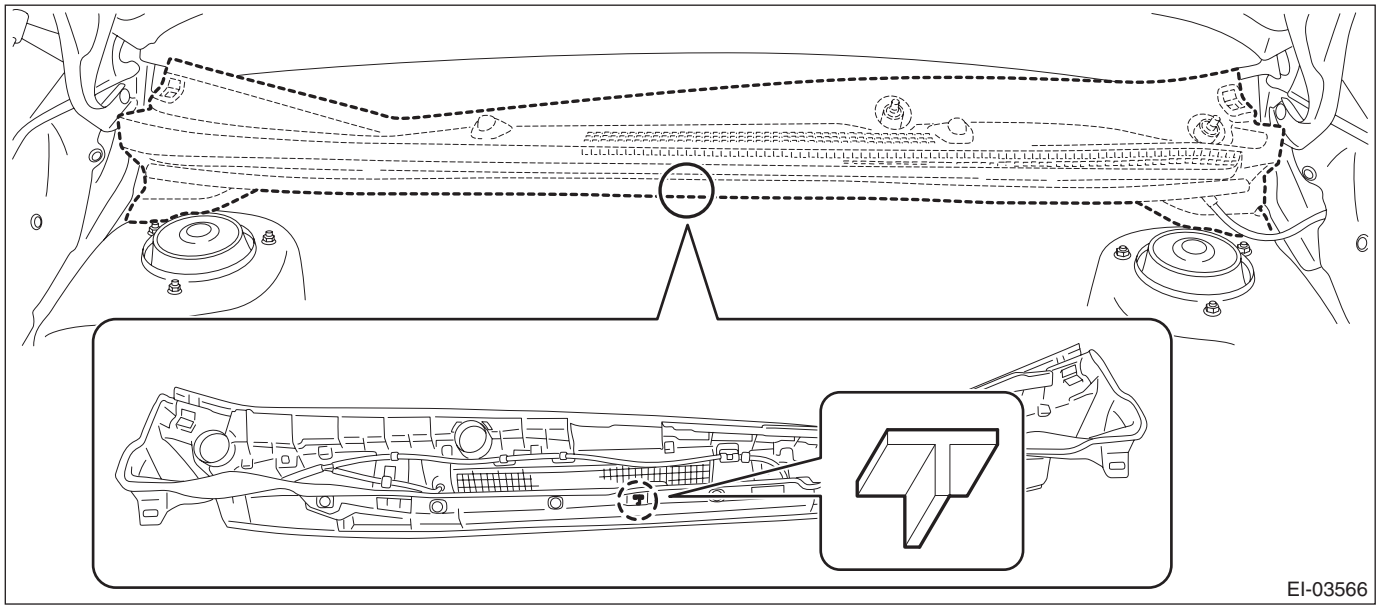
1) Install the cowl panel assembly.

CAUTION:
If the cowl panel assembly cannot be installed properly, do not hit or set it forcibly. The claws of the cowl panel or the windshield glass may be damaged.

(1) Hook the claw of the cowl panel on the lower end (1) of the windshield glass.



(2) Align the center protrusion of the cowl panel assembly to the cutout portion of the vehicle side, then install the cowl panel assembly.



(3) Attach the clip and connect the washer hose.

2) Install the arm assembly - windshield wiper. <Ref. to WW-28, INSTALLATION, Front Wiper Arm.>

3) Install the remaining parts in the reverse order of removal.

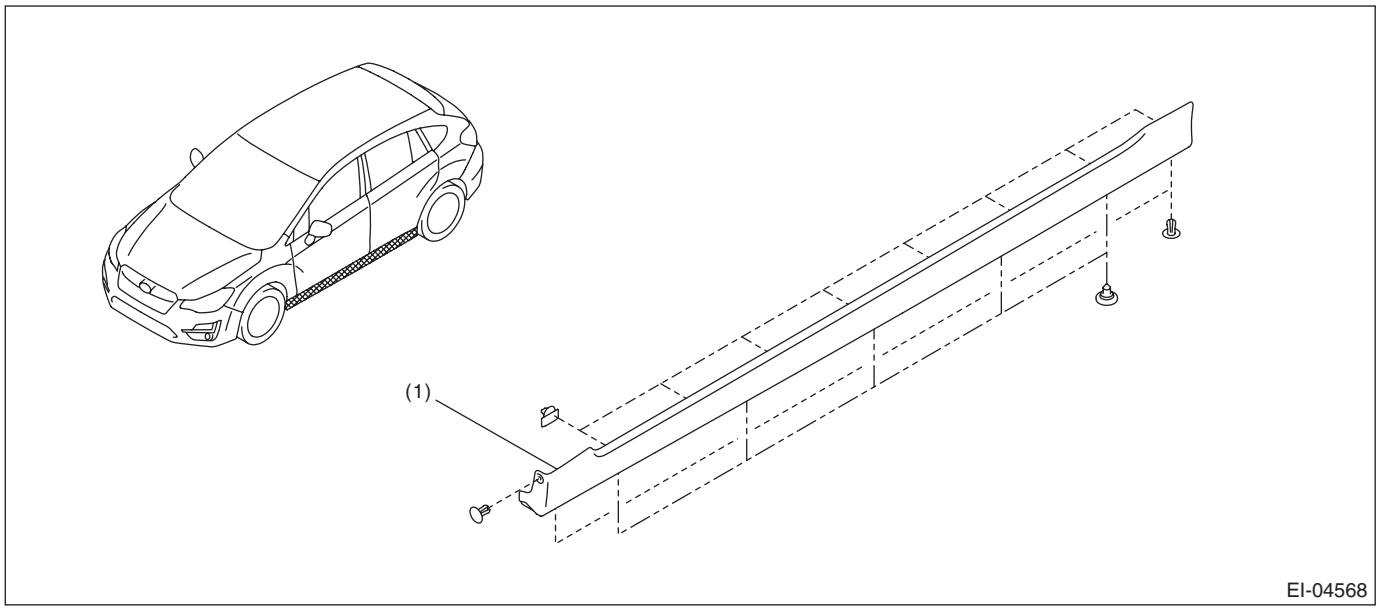
4) If the washer nozzles have been removed from the cowl panel assembly, adjust the washer spray positions. <Ref. to WW-40, ADJUSTMENT, Front Washer Nozzle and Hose.>

10.Side Garnish

A: REMOVAL

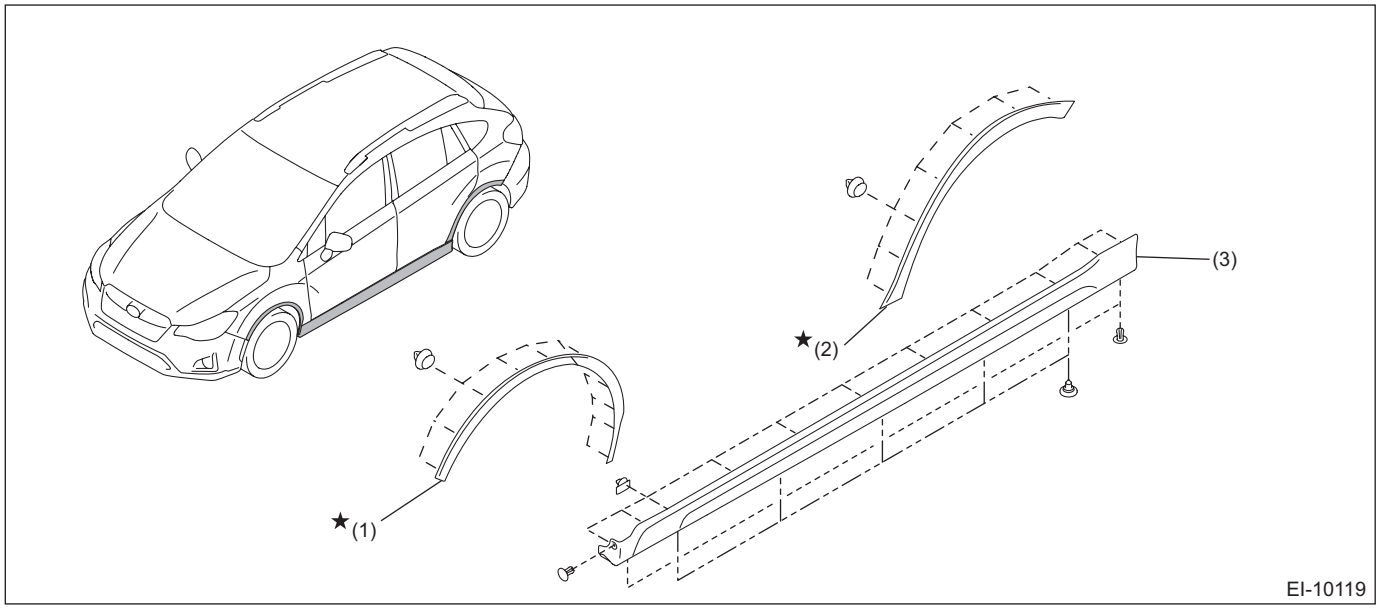
1) Remove the clips and detach the side garnish assembly.

- Impreza model



(1) Garnish ASSY - side sill

- Crosstrek model



(1) Garnish ASSY - fender (2) Garnish ASSY - rear quarter (3) Garnish ASSY - side sill

2) For Crosstrek model, remove the garnish assembly or protector on the fender panel.

CAUTION:
Do not reuse the garnish assembly or protector if they are deformed during removal.

(1) Attach the protective tape to the periphery of the garnish and protector.
(2) Heat the garnish and protector sections for 3 — 5 minutes at 40 — 60°C using a heat light or a drier.

CAUTION:
Be careful not to burn yourself.

(3) Separate the bonded part of double sided tape with a nylon cord or equivalent.
(4) Release the clips, and remove the garnish assembly and protector.

B: INSTALLATION

CAUTION:
Do not reuse the garnish assembly. Deformation occurs on the garnish assembly when once removed, and this may cause improper adhesion.

1) Install each part in the reverse order of removal.
2) For Crosstrek model, install the garnish assembly - fender and the garnish assembly - rear quarter.
(1) Remove the double-sided tape remaining on the vehicle body, then clean the adhesive surface.

CAUTION:
If even a slight amount of double-sided tape remains on the adhesive surface, it may lead to improper adhesion.

(2) Heat the vehicle body and the garnish for 1 — 3 minutes using a heat light or a drier.

CAUTION:
Be careful not to burn yourself.

(3) Apply primer to the installation surfaces of garnish, and wait till the primer dries.
(4) Attach new double-sided tape on garnish.
(5) Peel off the backing papers, engage the clips, and adhere the garnish assembly to the vehicle body.

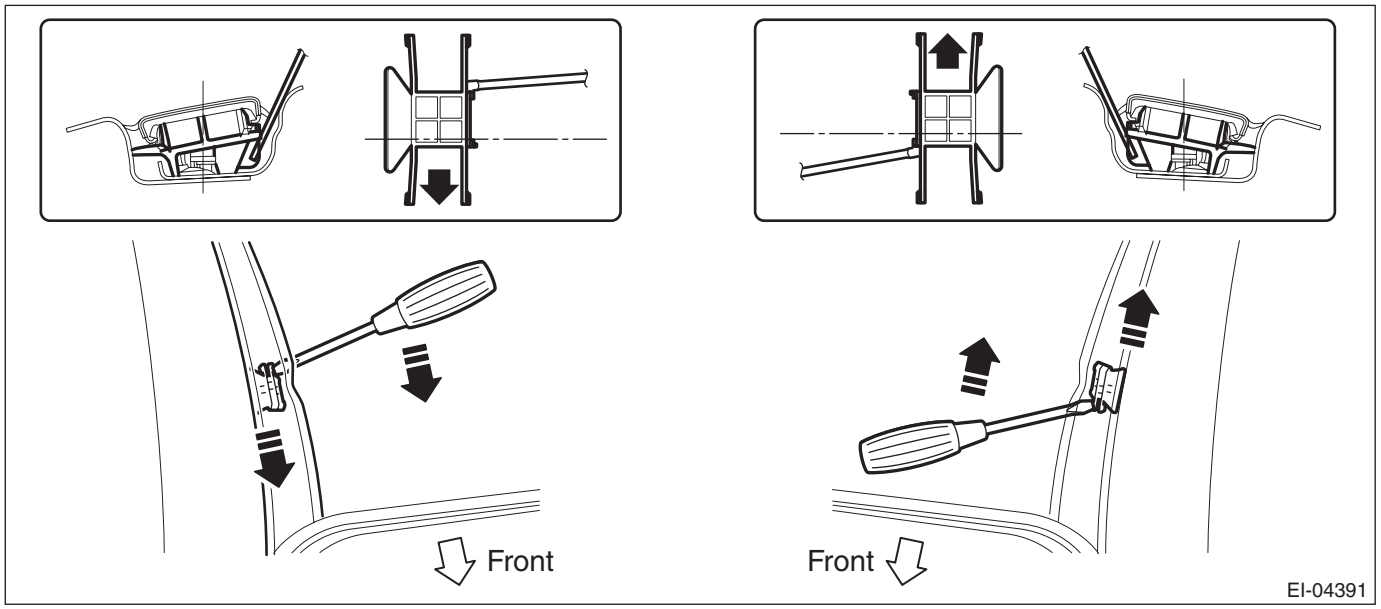
CAUTION:
Press-fit the garnish assembly to adhere securely.

11.Roof Molding

A: REMOVAL

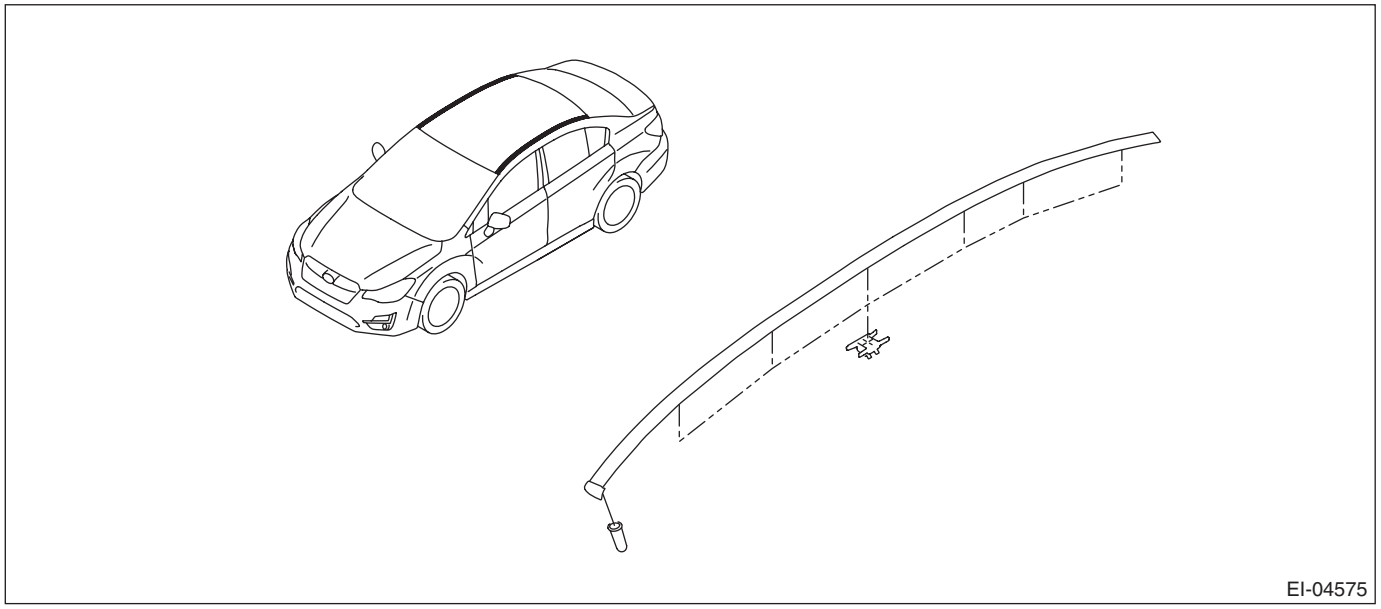
CAUTION:
Be careful not to damage the body.

1) Remove the roof rail assembly. (model with roof rail) <Ref. to EI-65, REMOVAL, Roof Rail.>
2) Turn over the front end of the molding - roof.
3) Slide the inner fastener in the direction of the arrow using a flat tip screwdriver, then remove the fastener from the stud on the vehicle side.

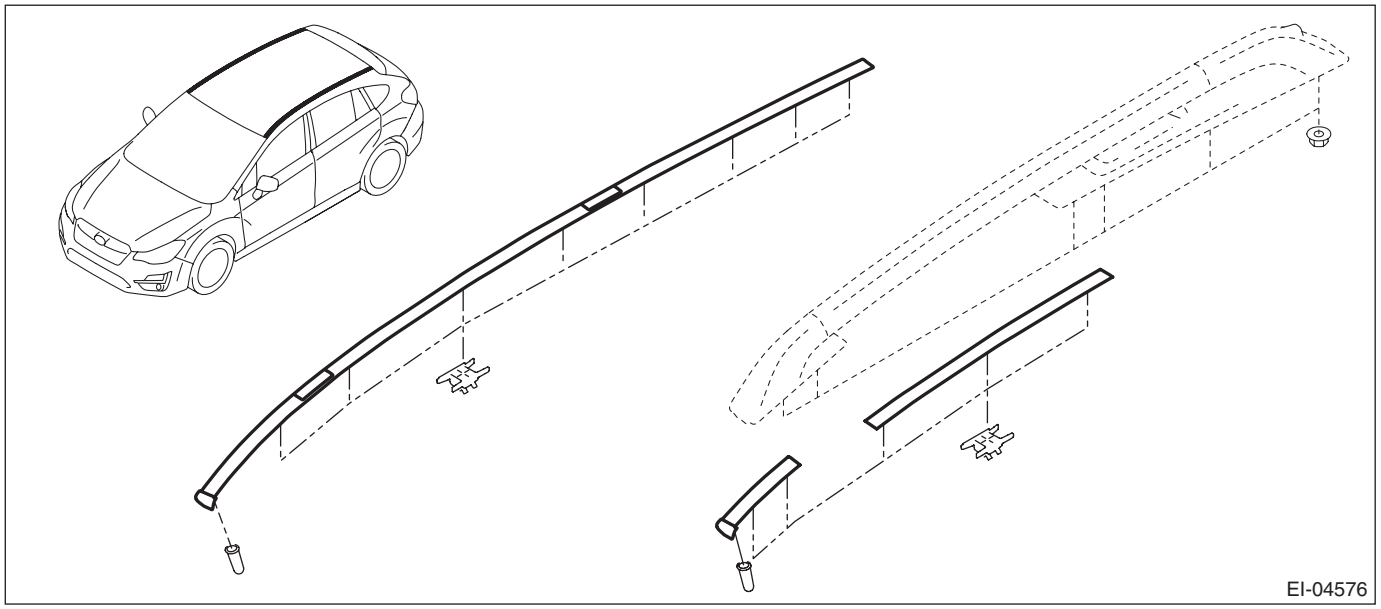


Right side: Slide towards the front of the vehicle.
Left side: Slide towards the rear of the vehicle.

- 4 door model: 6 locations per side



- 5 door model/Crosstrek model
  – Model without roof rail: 8 locations per side
  – Model with roof rail: 5 locations per side

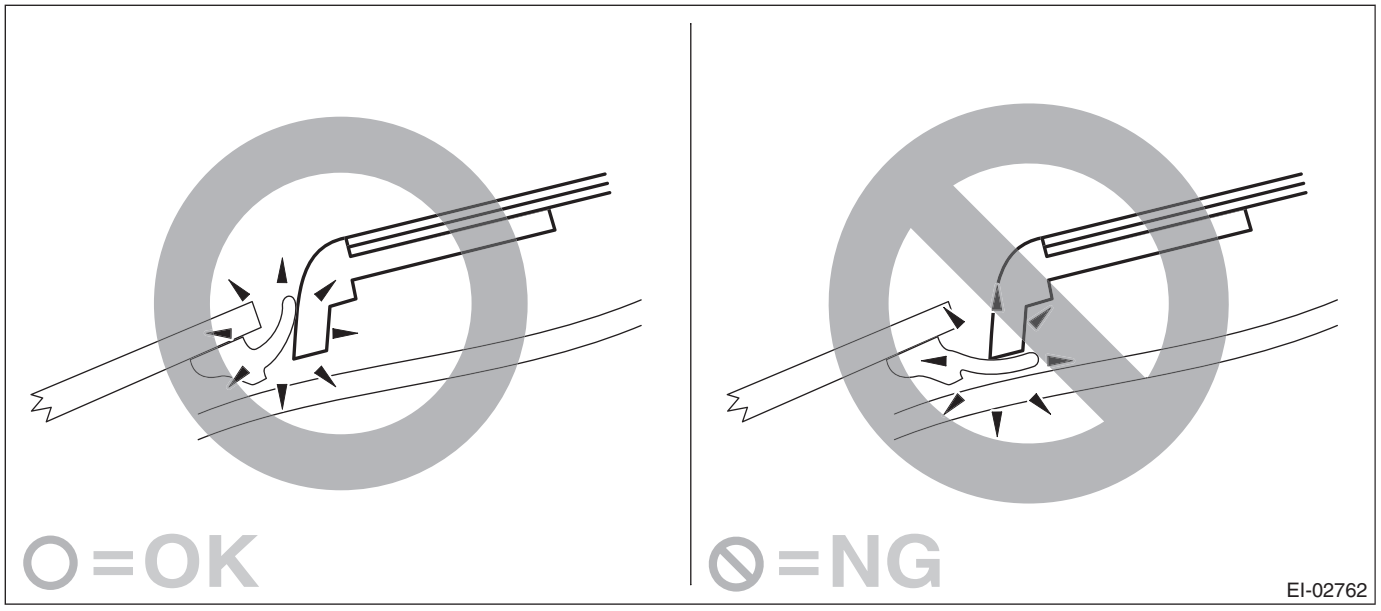


4) Pull up the molding - roof, and remove from the vehicle.

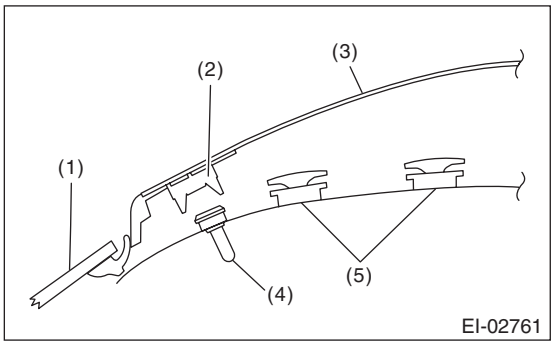
B: INSTALLATION

1) Remove the clips from the molding - roof, and attach to the studs on the vehicle.

CAUTION:
- **Always replace the clips that were damaged during removal of the molding - roof with new parts.**
- **While installing the molding - roof, be careful not to catch the glass molding with the tip of the front side and rear side.**



2) Push the front end of the molding - roof against the front window, and attach the forward positioning clip onto the rivet on the body.



(1) Windshield
(2) Positioning clip
(3) Molding - roof
(4) Rivet
(5) Clip

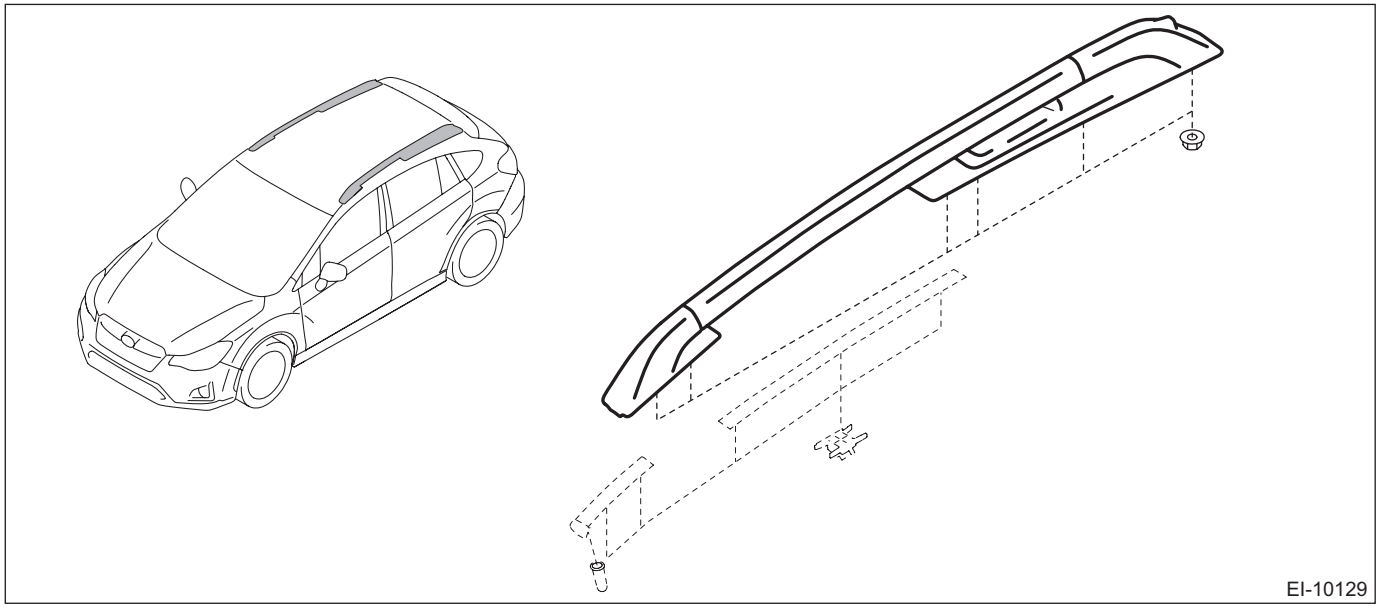
3) While pushing down the molding - roof from above, connect the molding - roof and the clip.

12.Roof Rail

A: REMOVAL

1) Remove the trim panel - roof. <Ref. to EI-112, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Roof Trim.>
2) Remove the curtain airbag module. <Ref. to AB-52, 5 DOOR MODEL/CROSSTREK MODEL, REMOVAL, Curtain Airbag Module.>

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Be careful not to damage the curtain airbag module during removal.
3) Remove the six installing nuts.



B: INSTALLATION

CAUTION:
When removing or installing the roof rail, be careful not to scratch the body panel with the stud bolt of roof rail.
Install each part in the reverse order of removal.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

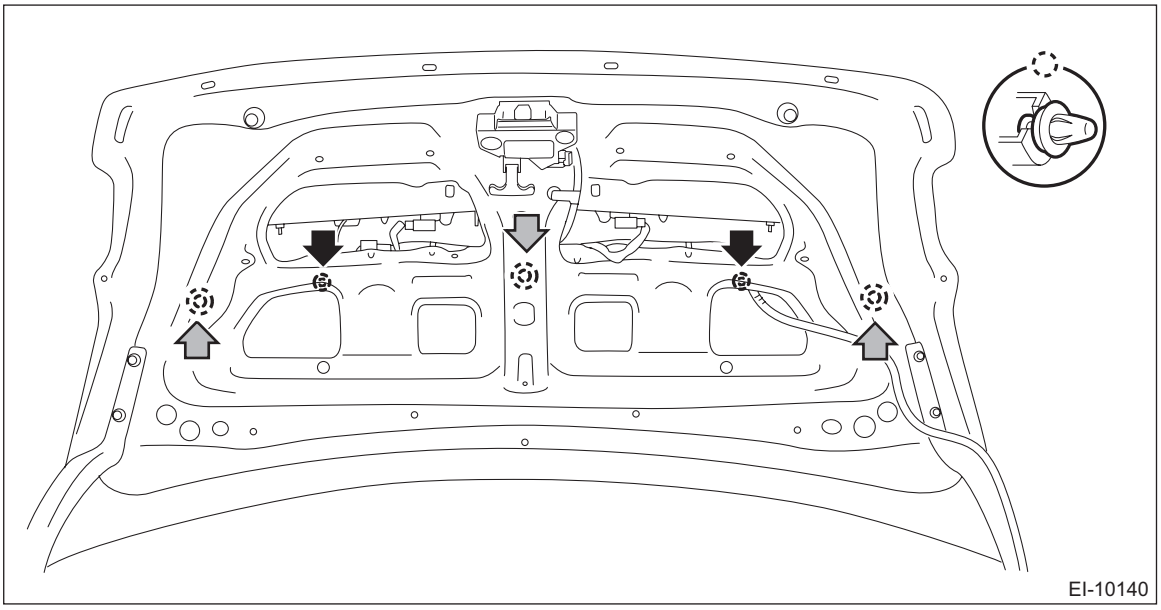
13.Rear Spoiler

A: REMOVAL

1) Remove the trim panel - trunk lid. <Ref. to EI-105, REMOVAL, Trunk Room Trim.>
2) Detach the rear spoiler assembly.

CAUTION:
- **When removing the nut, be careful not to drop the nut inside the trunk lid panel.**
- **Be careful not to damage the vehicle body during removal and installation.**

(1) Remove the nuts.
(2) Disengage the clips and remove the rear spoiler assembly.



B: INSTALLATION

1) Clean the trunk lid and spoiler attachment surface before installation.

CAUTION:
Make sure that there is a gasket attached on the clip of the rear spoiler assembly. If a gasket is not attached, water leakage may occur.
2) Install the rear spoiler assembly.

Tightening torque:
4.5 N·m (0.46 kgf-m, 3.3 ft-lb)

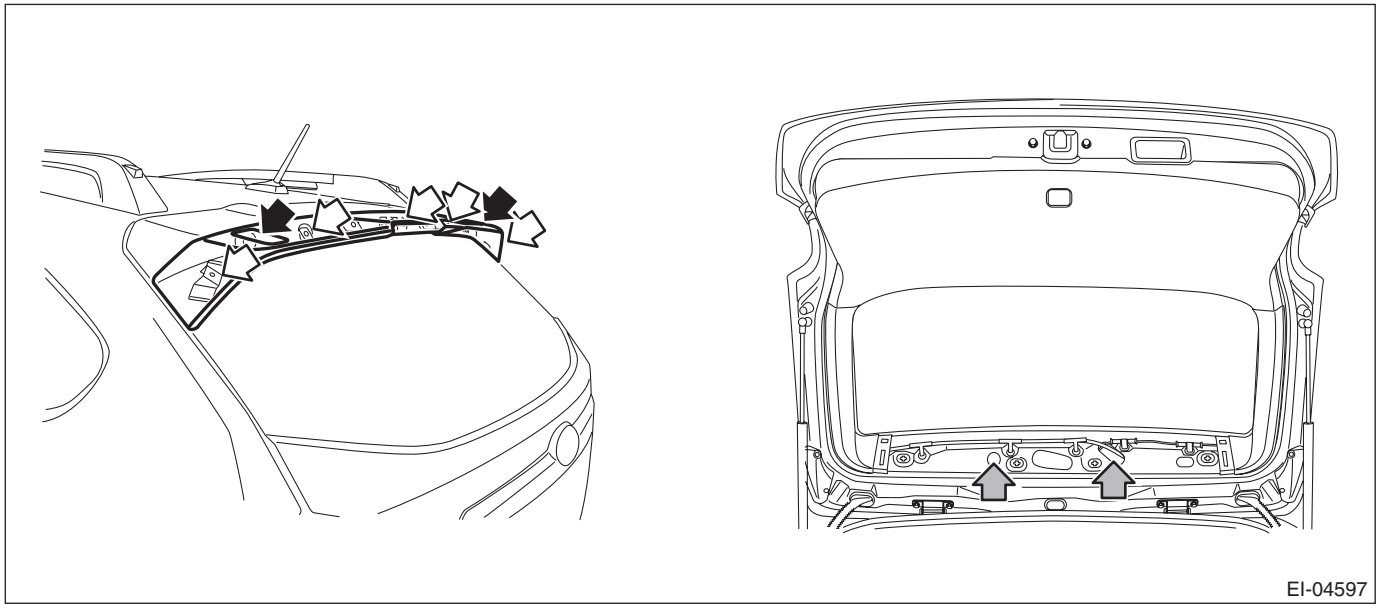
14.Roof Spoiler

A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear gate UPR. <Ref. to EI-122, REMOVAL, Rear Gate Trim.>
3) Remove the roof spoiler assembly.
   (1) Disconnect the connector of high-mounted stop light.
   (2) Remove the caps, and remove the bolts.
   (3) Remove the nuts.
   (4) Remove the nuts, and then remove the roof spoiler assembly.



B: INSTALLATION

CAUTION:
• Make sure that packings are attached on the clips of the roof spoiler assembly. If a gasket is not attached, water leakage may occur.
• Make sure the bolt is tightened securely because improper installation may cause the water leakage.

1) Install the roof spoiler assembly.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

2) Connect the connector of high-mounted stop light.
3) Install the trim panel - rear gate UPR. <Ref. to EI-123, INSTALLATION, Rear Gate Trim.>
4) Connect the ground terminal to battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.>

15.Door Trim

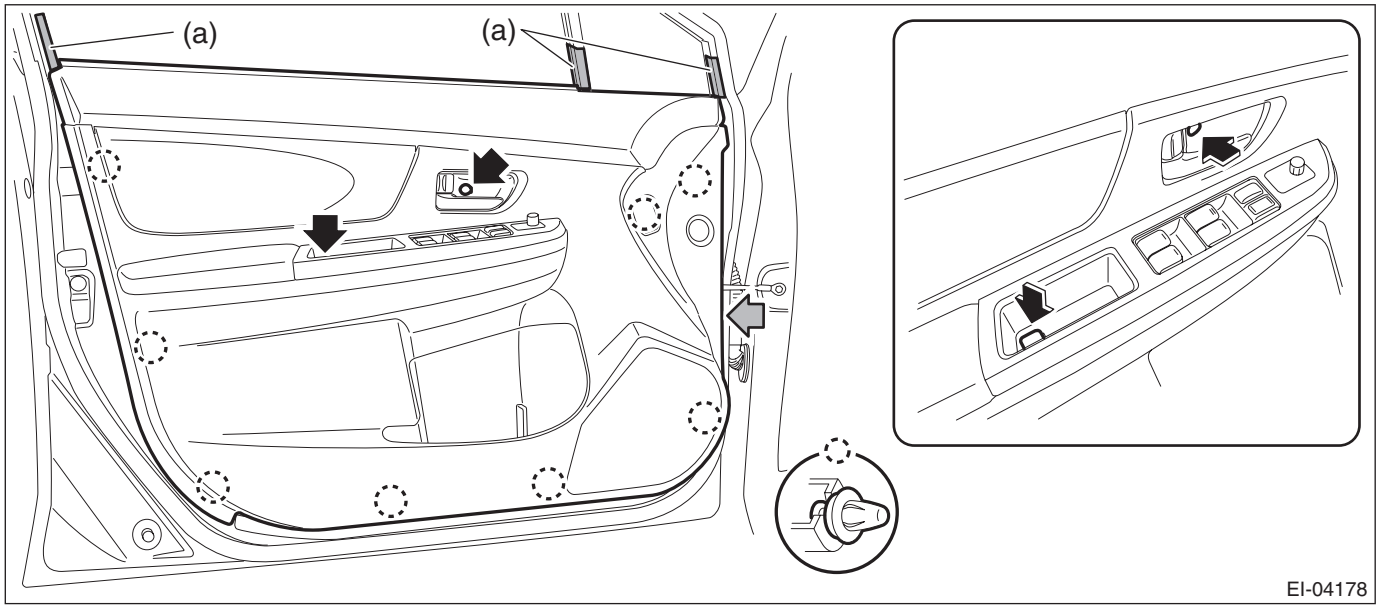
A: REMOVAL

1. FRONT DOOR

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

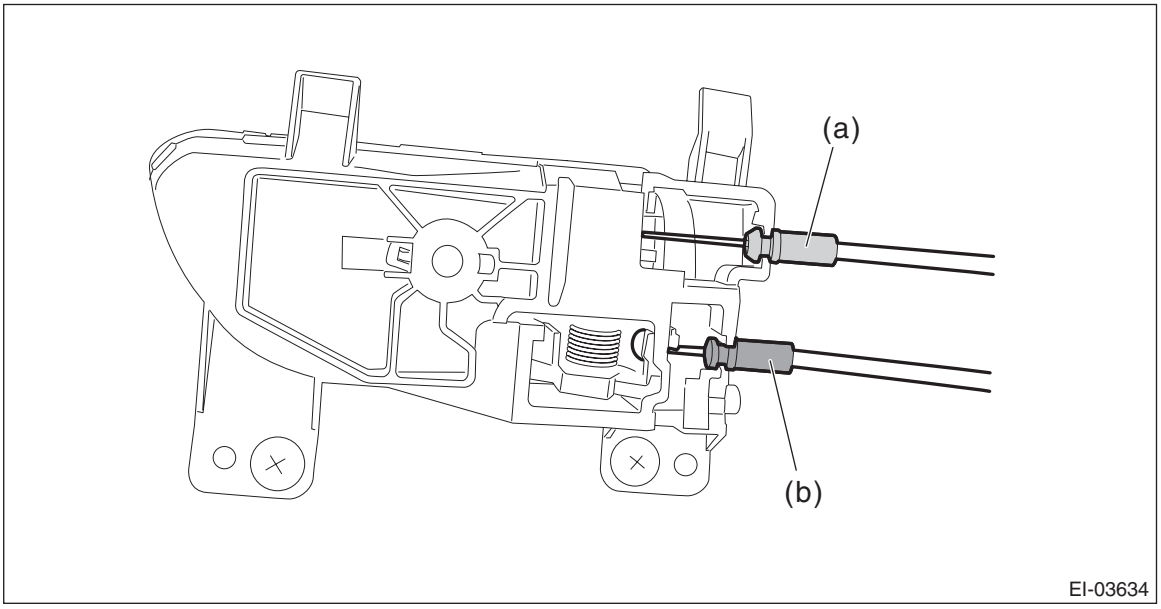
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - front door.
   (1) Attach the protective tape (a).
   (2) Open the cover and remove the screw.
   (3) Remove the clips, and remove the trim panel - front door from the panel assembly - front door.



NOTE:
It is easier to remove the door trim if the removal is performed from the gray arrow section.

   (4) Detach the door lock cable (a) and door open cable (b) from the remote assembly - door.



   (5) Disconnect the harness connector and remove the trim panel - front door.

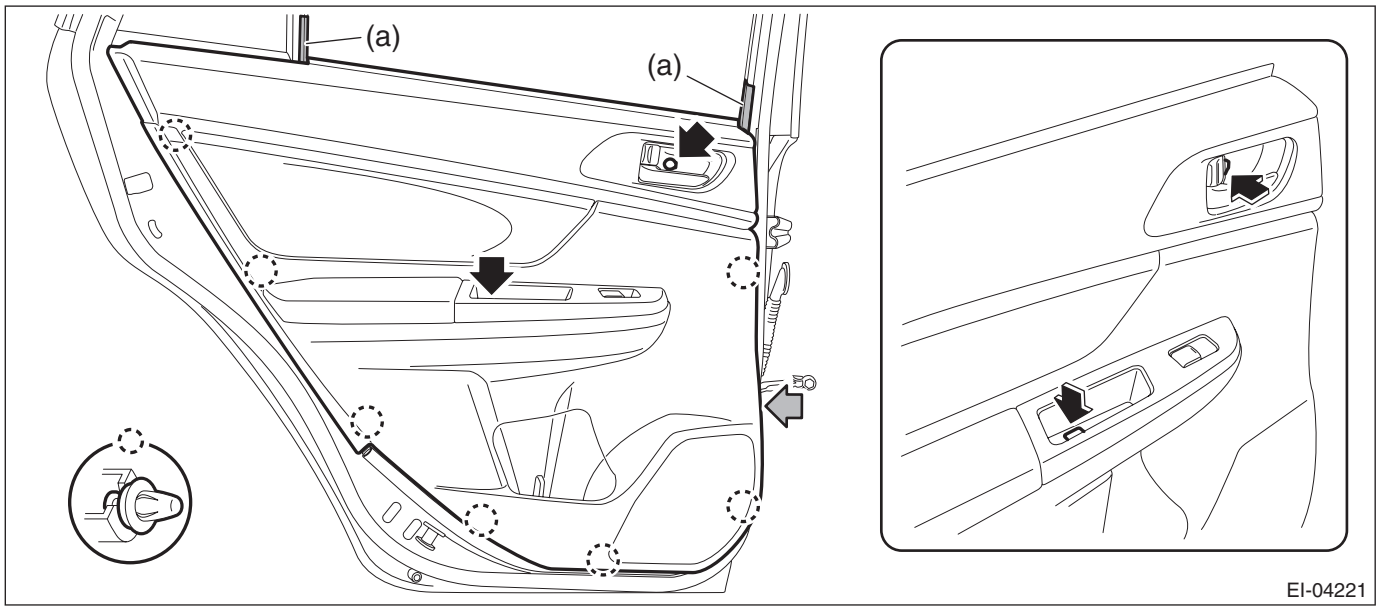
3) Remove each part as required.
- Remote assembly - door: <Ref. to SL-34, REMOVAL, Front Inner Remote.>
- Switch - power window main: <Ref. to GW-12, MAIN SWITCH, REMOVAL, Power Window Control Switch.>
- Weather strip - door INN: <Ref. to EI-70, DISASSEMBLY, Door Trim.>

2. REAR DOOR

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

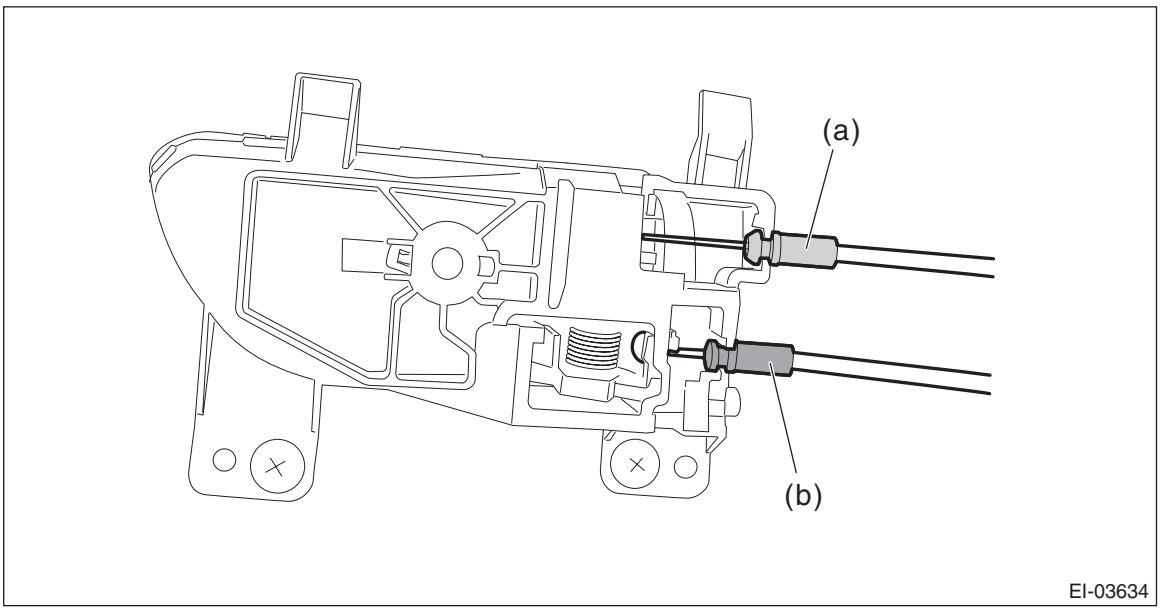
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear door.
   (1) Attach the protective tape (a).
   (2) Open the cover and remove the screw.
   (3) Remove the clips, and remove the trim panel - rear door from the panel assembly - rear door.



NOTE:
It is easier to remove the door trim if the removal is performed from the gray arrow section.

   (4) Detach the door lock cable (a) and door open cable (b) from the remote assembly - door.



(5) Disconnect the harness connector and remove the trim panel - rear door.

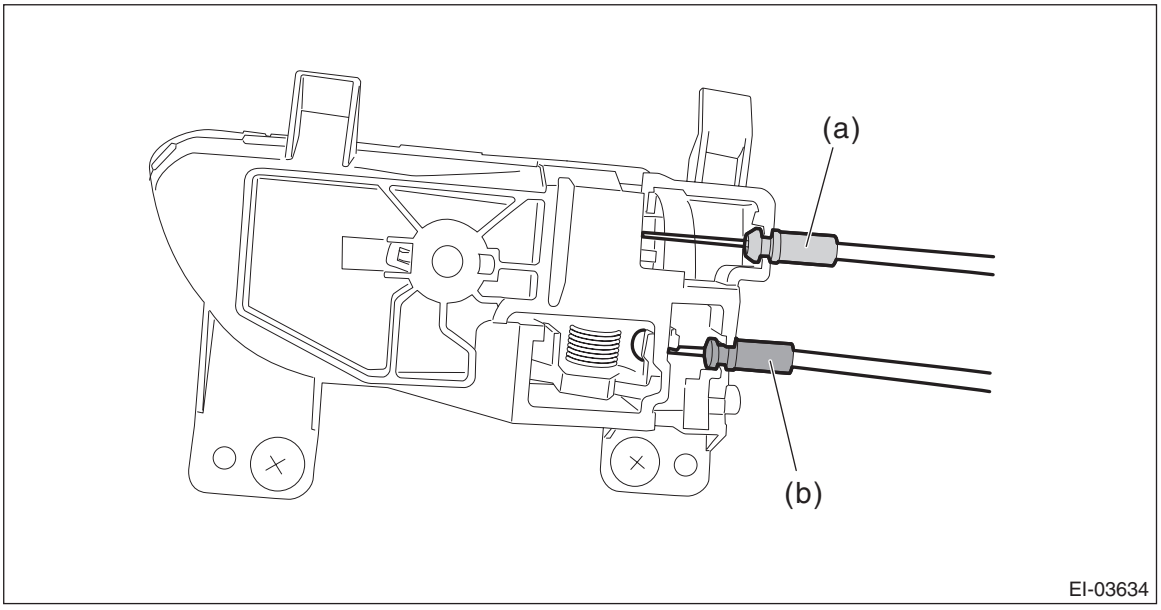
3) Remove each part as required.

- Remote assembly - door: <Ref. to SL-42, REMOVAL, Rear Inner Remote.>
- Switch - power window sub: <Ref. to GW-13, SUB-SWITCH, REMOVAL, Power Window Control Switch.>
- Weather strip - door INN: <Ref. to EI-70, DISASSEMBLY, Door Trim.>

B: INSTALLATION

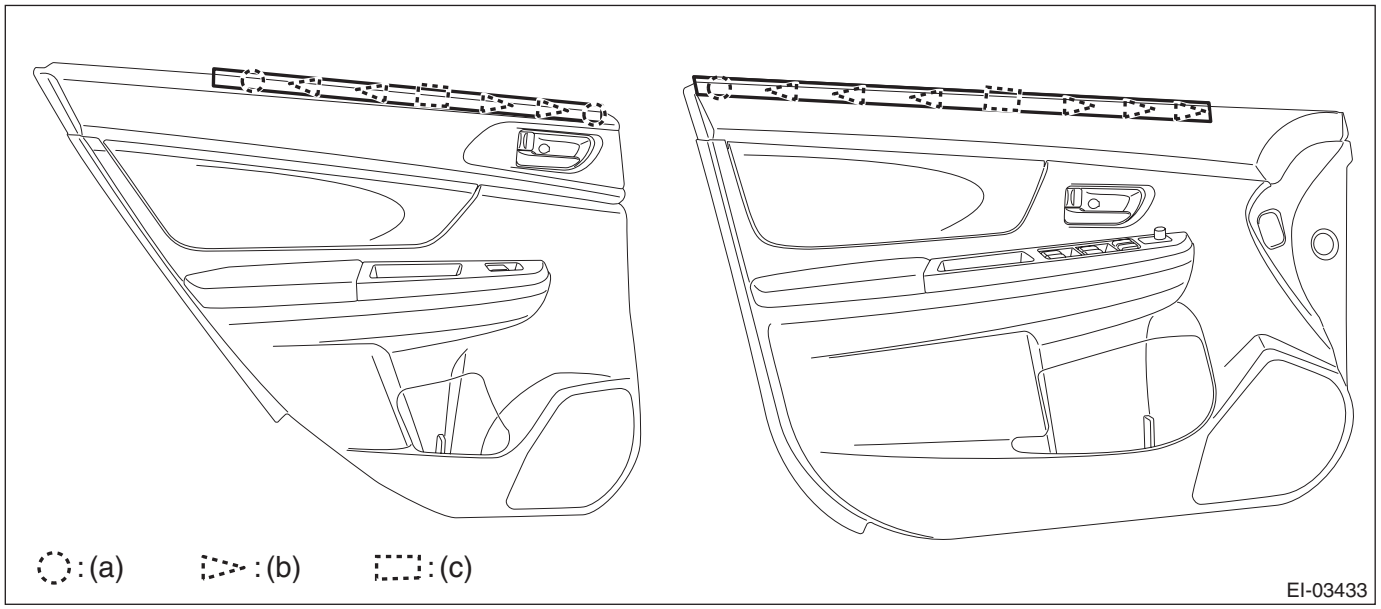
Install each part in the reverse order of removal.

NOTE:
Attach the door lock cable (a - end ball: small) to the upper side, and attach the door open cable (b - end ball: large) to the lower side.



C: DISASSEMBLY

1) Remove the door trim.
2) Remove the rivets and claws, and remove the weather strip - door INN from the door trim.



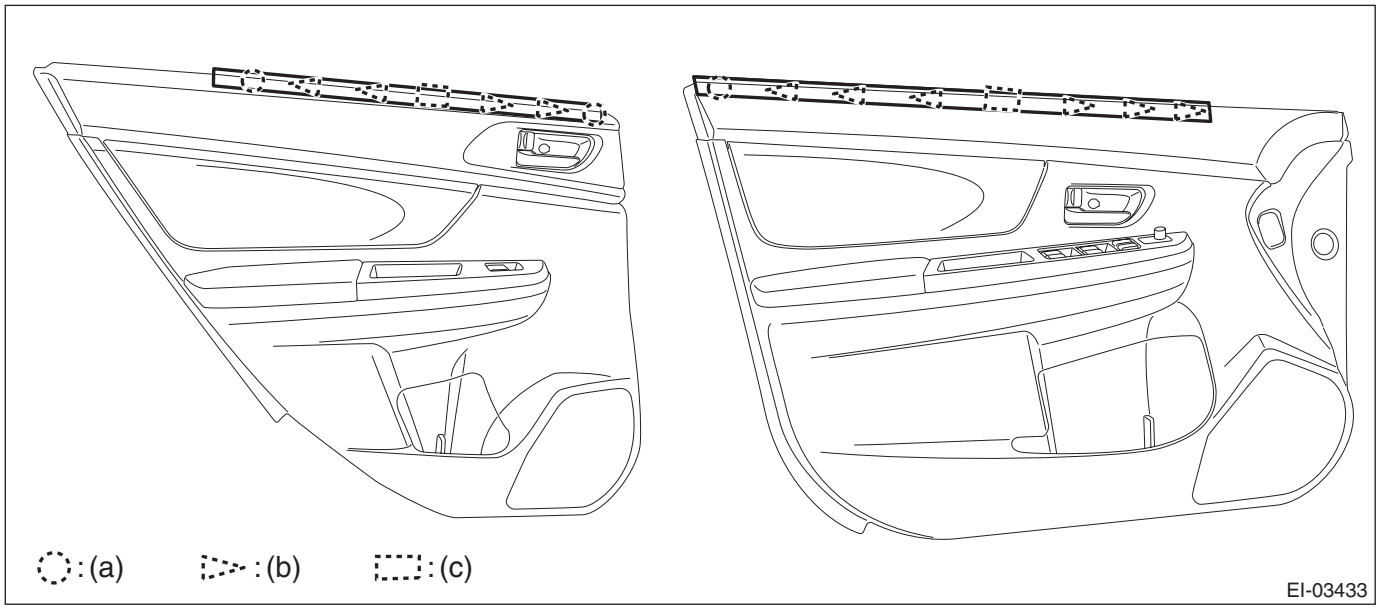
(a) Rivet (b) Claw (c) Claw

NOTE:
Remove the rivets by using the rivet cutter or nippers.

D: ASSEMBLY

1) Bend the claws while pushing the weather strip - door INN against the door trim so that there is no gap.

CAUTION:
Beware of the direction of folding the claws.



(a) Rivet
(b) Direction of folding claws
(c) Claw bending direction: bend forward for LH side, backward for RH side.

2) Install the rivet.

CAUTION:
• Set the height of rivet crimped section as 3 mm (0.12 in). If the crimp is not sufficient, press it with pliers, etc. in order not to interfere the trim panel - door.
• Apply unwoven cloth tape so that the rivet crimped section is covered. If unwoven cloth tape is not applied, a knocking noise may occur when the door panel contacts the rivet crimped section.

Preparation tool and item:
Hand riveter (corresponding to ϕ3.2 mm (0.13 in))
Rivet
Tape: 94029FG000/TAPE or unwoven cloth

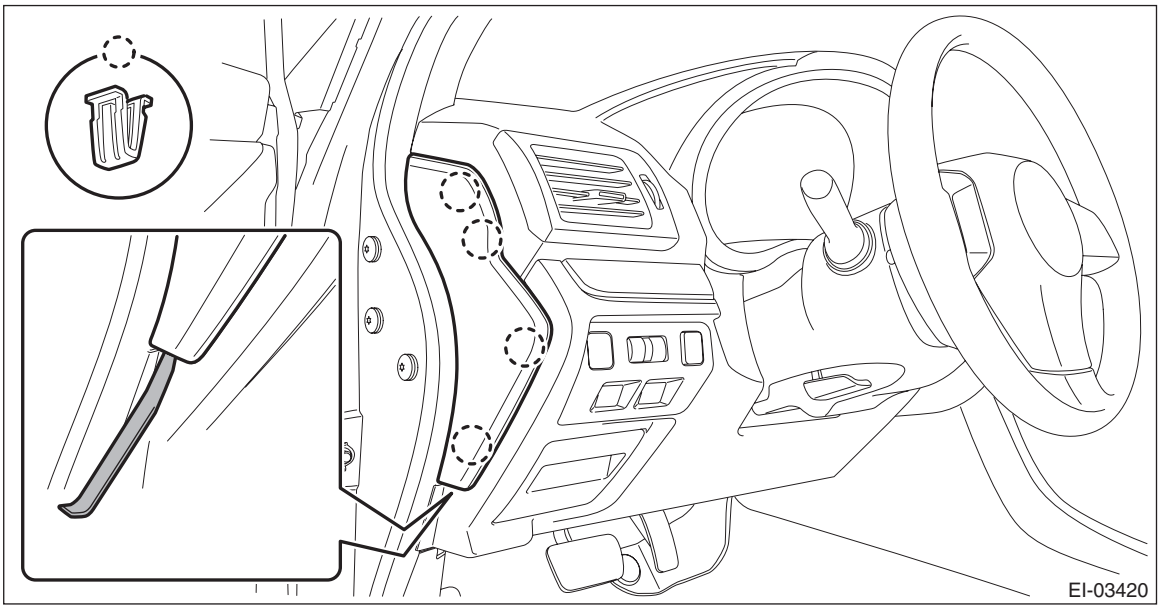
3) After installing the weather strip - door INN, perform the following checks.
• Make sure there are no gaps between the weather strip - door INN and the door trim.
• Make sure there are no looseness when pulling the weather strip - door INN lightly.

16.Instrument Panel Lower Cover

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

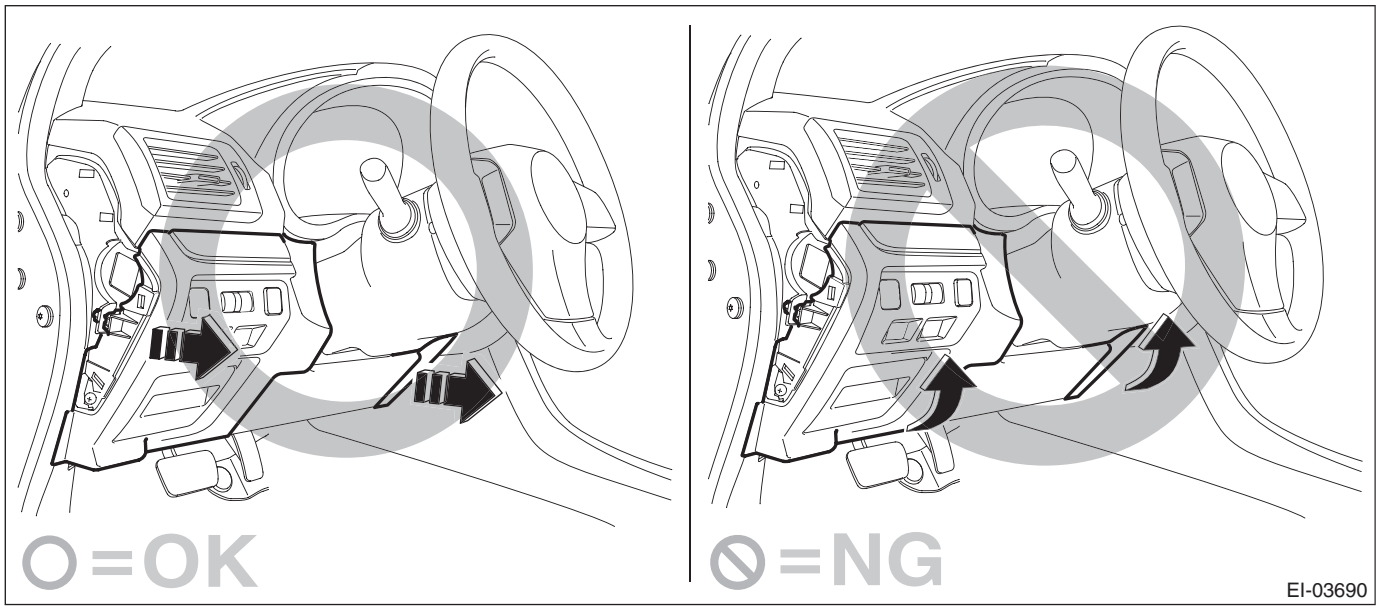
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the clips, and remove the cover - instrument panel side LH.



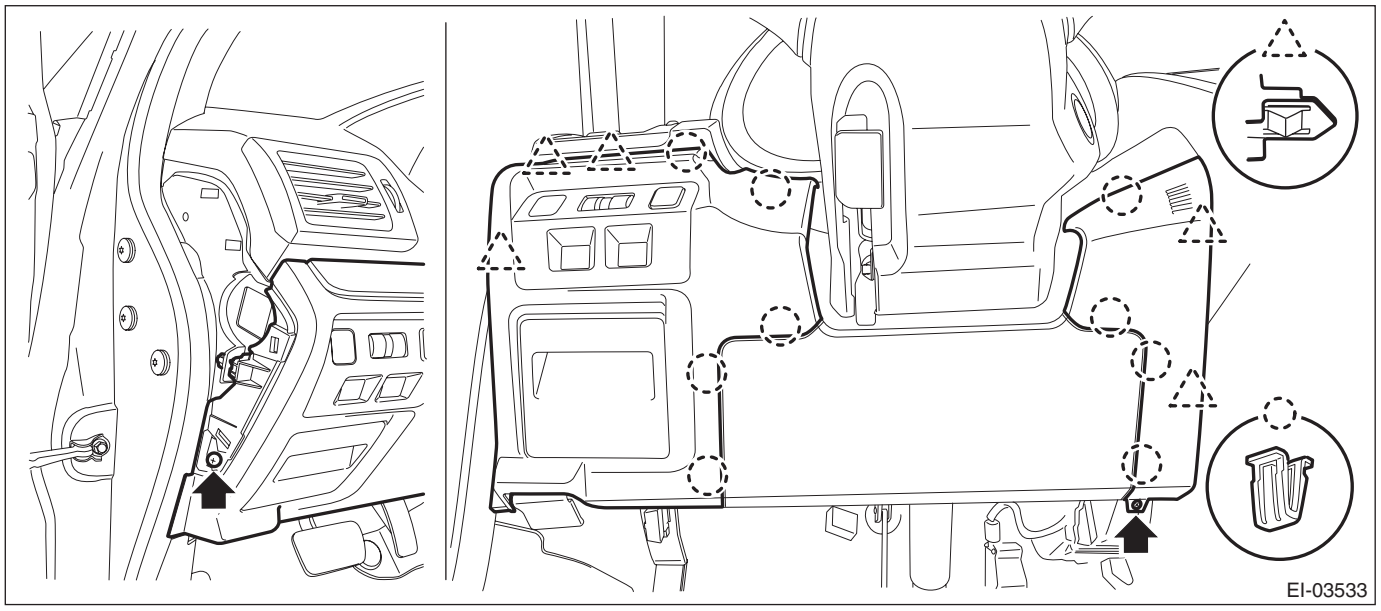
NOTE:
Using a plastic remover, open the cover - instrument panel side LH.

3) Remove the cover assembly - instrument panel LWR driver INN and OUT.

CAUTION:
When removing the cover assembly - instrument panel LWR driver, be sure to pull it toward you. If attempting to remove by turning it upward, the claws may be damaged.



(1) Remove the screws and release the clips and claws.
(2) Disconnect the harness connectors, and remove the cover assembly - instrument panel LWR driver INN and OUT.



B: INSTALLATION

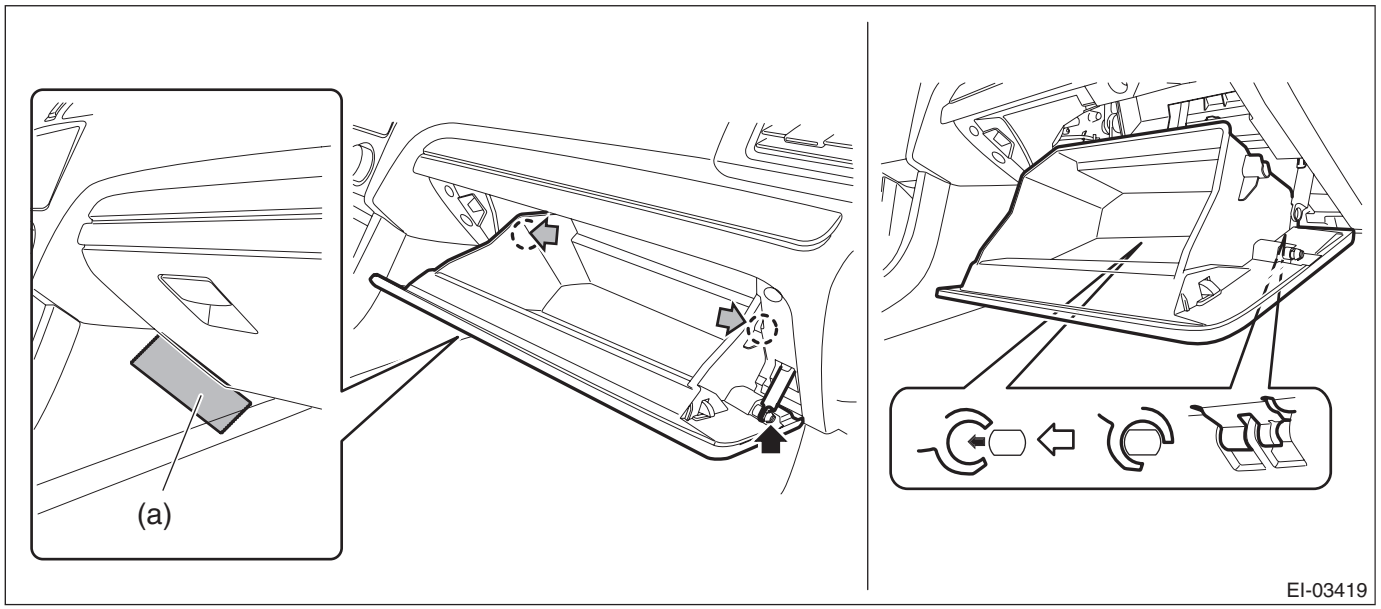
Install each part in the reverse order of removal.

17.Glove Box

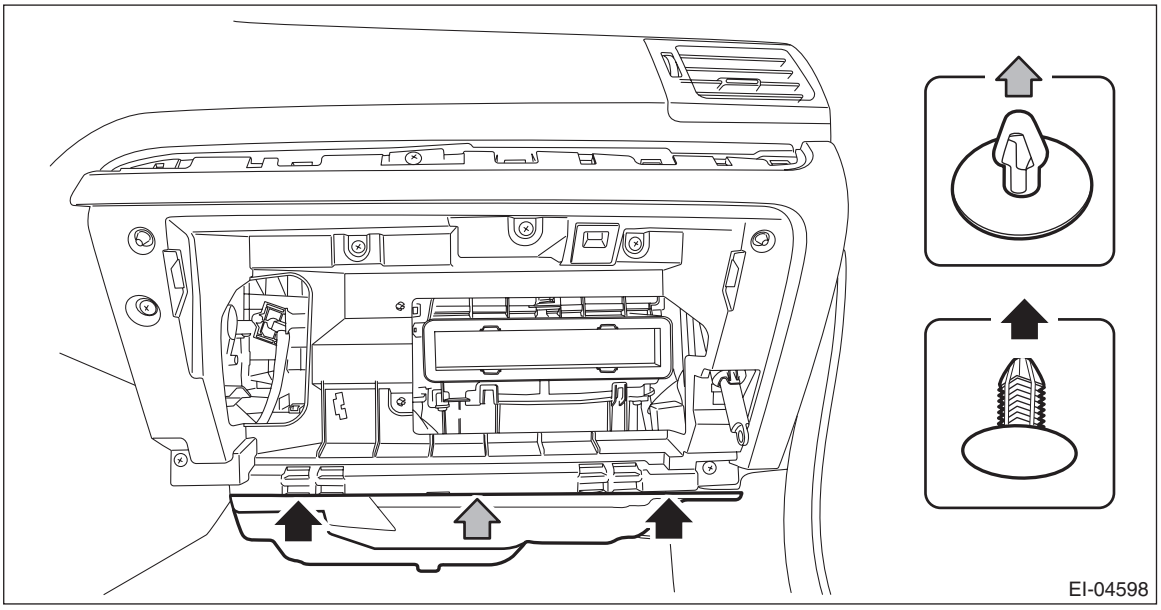
A: REMOVAL

NOTE:
Refer to “Security and Locks” section for key cylinder replacement. <Ref. to SL-71, GLOVE BOX LID, REPLACEMENT, Key Lock Cylinders.>

1) Remove the pocket assembly.
   (1) Attach the protective tape (a) to the panel center LWR.
   (2) Remove the damper COMPL - pocket.
   (3) Release the stoppers and remove the pocket assembly by pulling it toward you.



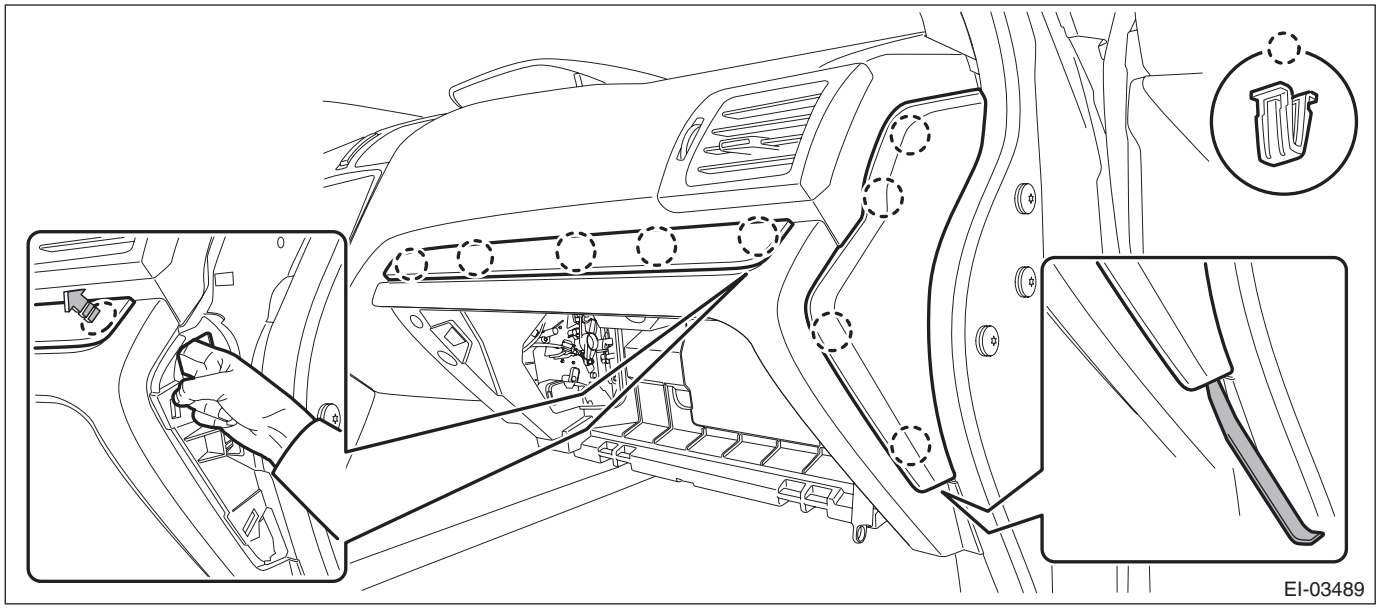
2) Remove the back panel - pocket.
   (1) Release the clips, and remove the under cover assembly - passenger.



(2) Remove the clips, and remove the cover - instrument panel side RH.

NOTE:
Remove the cover - instrument panel side RH by using a plastic remover.

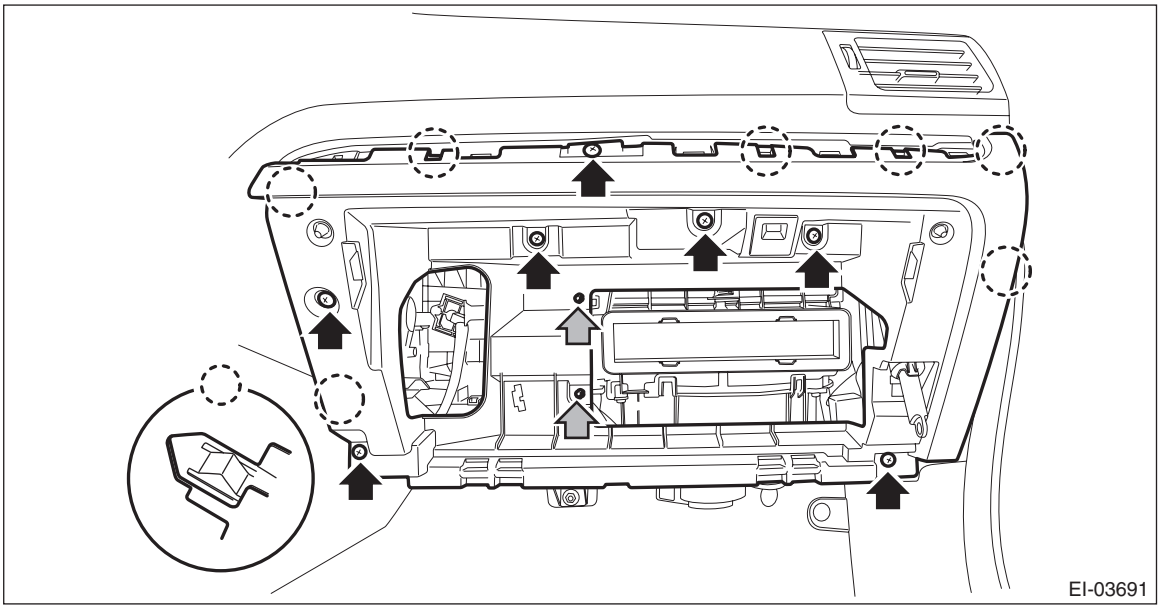
(3) Release the clips, and remove the ornament - panel assembly passenger.



NOTE:
To facilitate the removal, push the clip of the ornament - panel assembly passenger from the backside.

(4) Remove the glove box light LED, and disconnect the connector.

(5) Remove the screws, claws and harness clamp, then remove the back panel - pocket.



B: INSTALLATION

Install each part in the reverse order of removal.

18.Center Console

A: REMOVAL

1) Remove the center grille assembly. <Ref. to AC-100, REMOVAL, Air Vent Grille.>
2) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>

B: INSTALLATION

CAUTION:
After installing the panel center assembly, check that the air vent grille of the panel center assembly is inserted correctly into the air vent duct.
Install each part in the reverse order of removal.

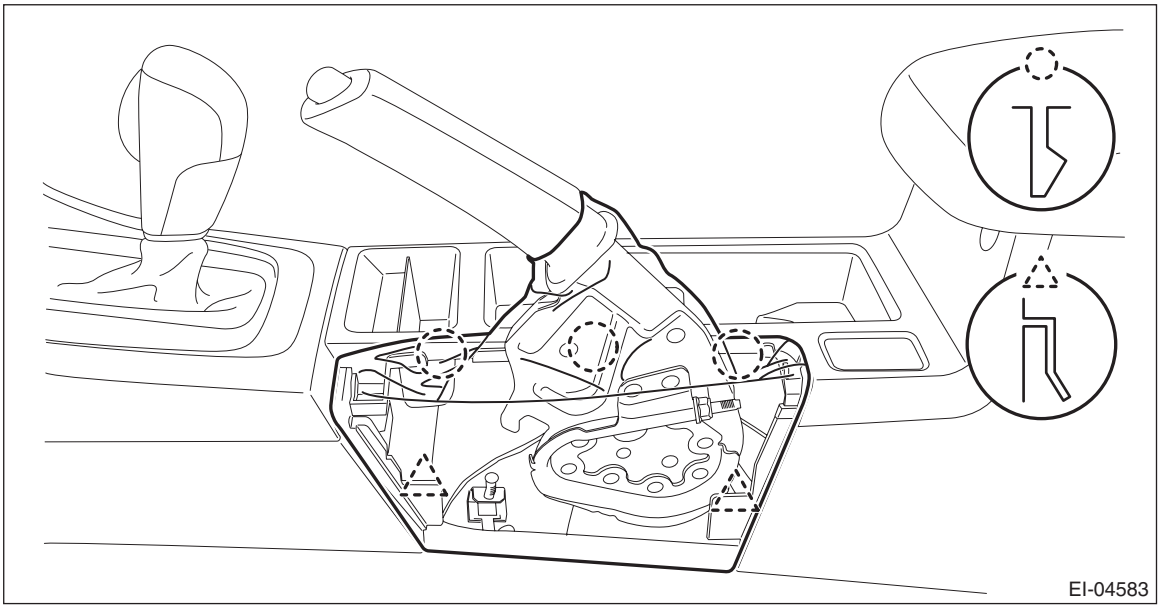
19.Console Box

A: REMOVAL

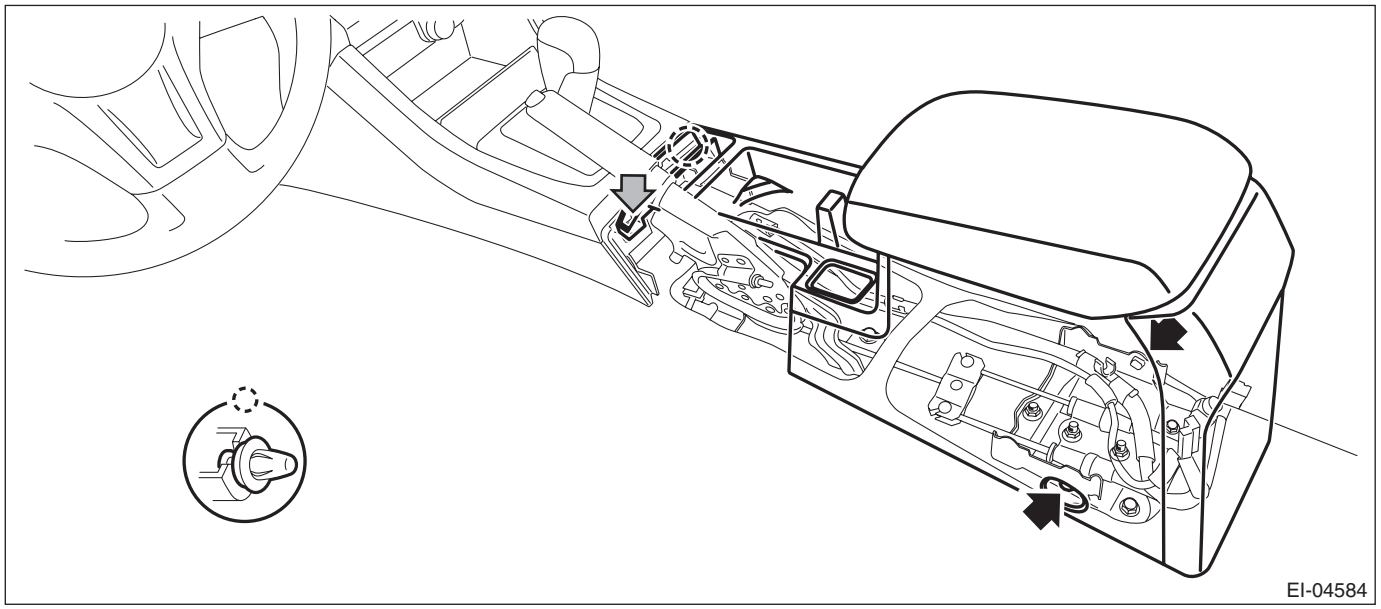
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
• For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
• On CVT models, shift the select lever into “N” before disconnecting the battery ground cable.

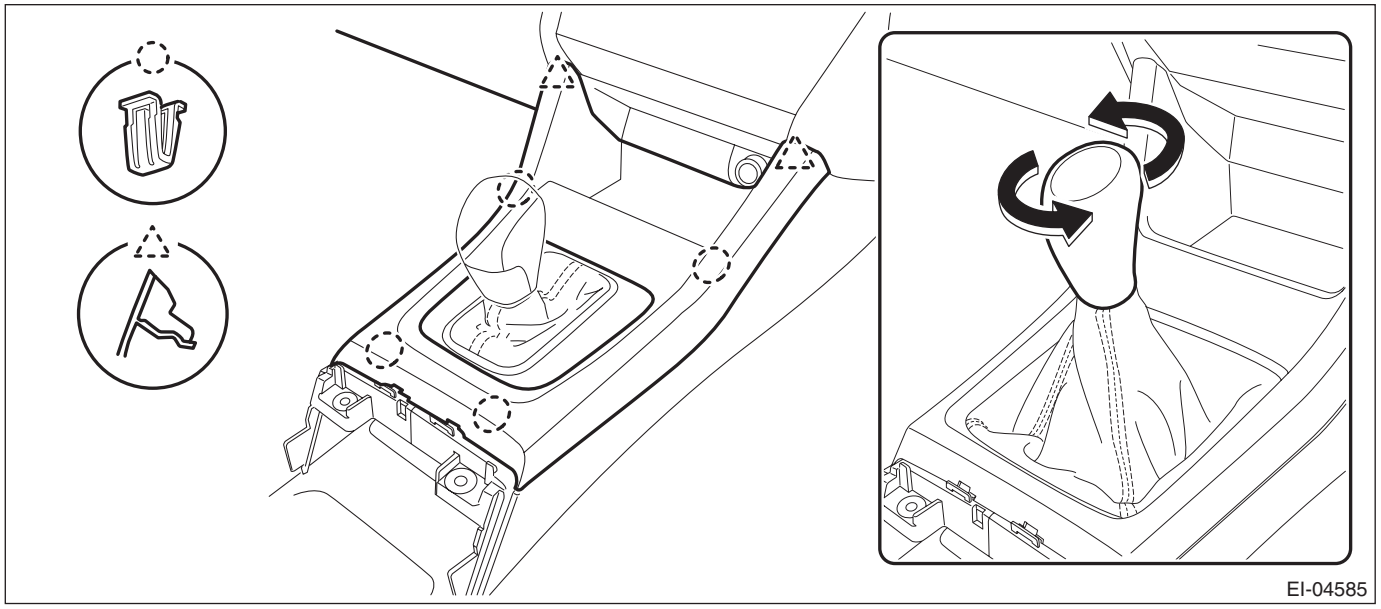
2) Remove the console box assembly.
(1) Release the claws, and then remove the boot - hand brake.



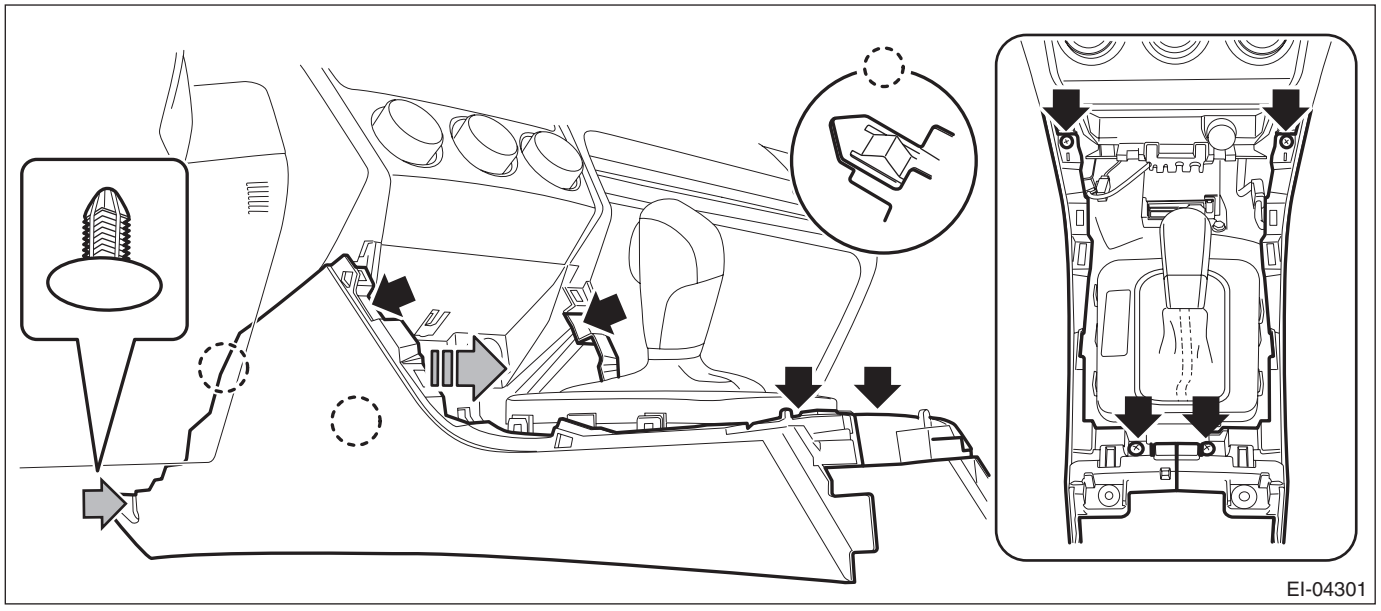
(2) Move the seat forward, and remove the bolts after detaching the left and right caps.
(3) Remove the screws and clips, disconnect the harness connector and remove the console box assembly.



3) Remove the cover - shift lever.
   (1) Remove the shift knob. (MT model)
   (2) Release the clips and claws, then pull up the cover - shift lever.


EI-04585

4) Remove the left and right panel center LWR.
   (1) Remove the screws and clips.
   (2) Release the claws, and then pull the panel center LWR to remove.


EI-04301

B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
6.5 N·m (0.66 kgf-m, 4.8 ft-lb)

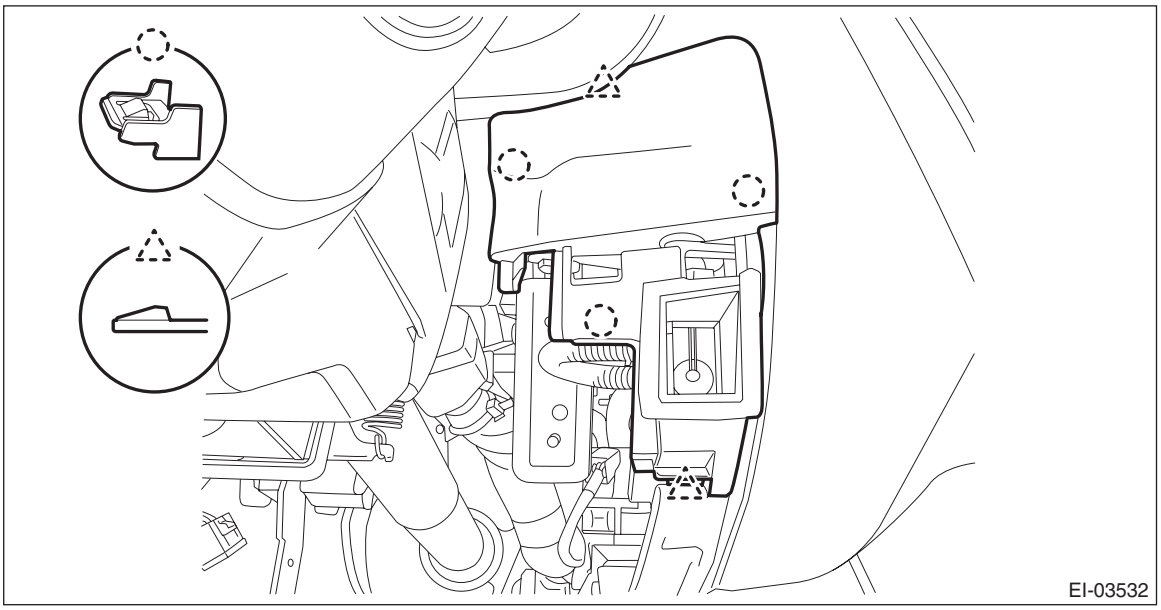
20.Instrument Panel Assembly

A: REMOVAL

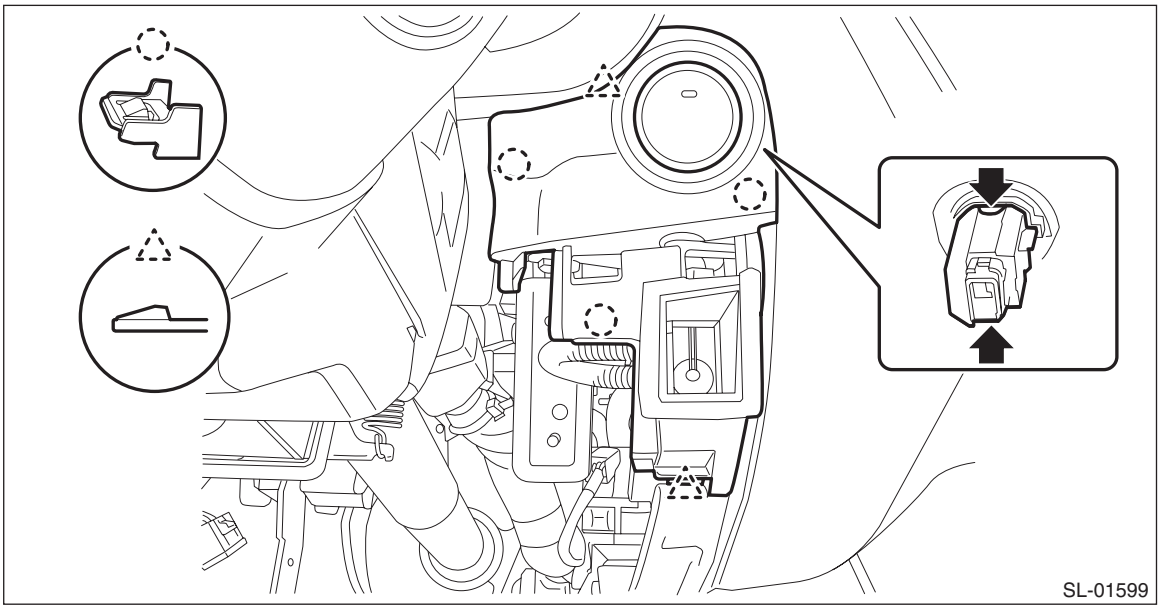
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Be careful not to damage the airbag system harness when servicing the instrument panel. Damage may cause the system to malfunction.

NOTE:
Remove the instrument panel assembly and the beam COMPL - steering as a unit.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

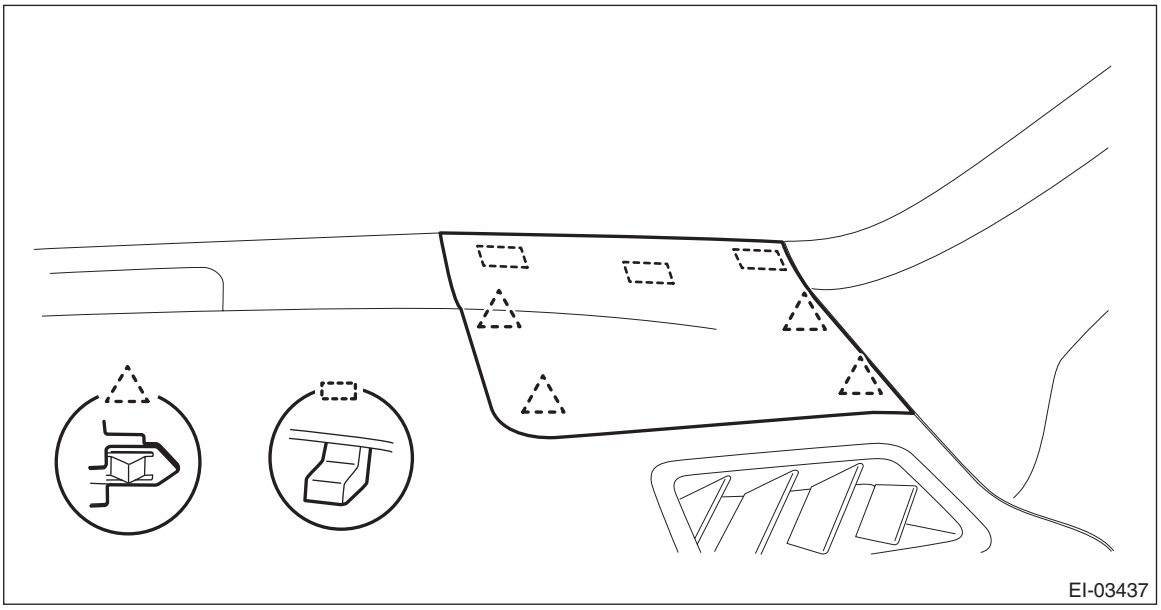
NOTE:
• For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine re-start battery sensor.
• On CVT models, shift the select lever into "N" before disconnecting the battery ground cable.
2) Remove the console box assembly, the cover - shift lever and the panel center LWR on the RH and LH sides. <Ref. to EI-77, REMOVAL, Console Box.>
3) Remove the cover - instrument panel side and cover assembly - instrument panel LWR driver. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>
4) Remove the cover switch - starter. (Models without the keyless access with push button start)
(1) Release the claws and remove the cover switch - starter.
(2) Disconnect the connector and aspirator hose.


EI-03532

5) Remove the panel - switch. (Model with keyless access with push button start)
   (1) Release the claw of the switch - push button start, and disconnect the connector.
   (2) Release the claws, and then remove the panel - switch.
   (3) Disconnect the connector and aspirator hose.

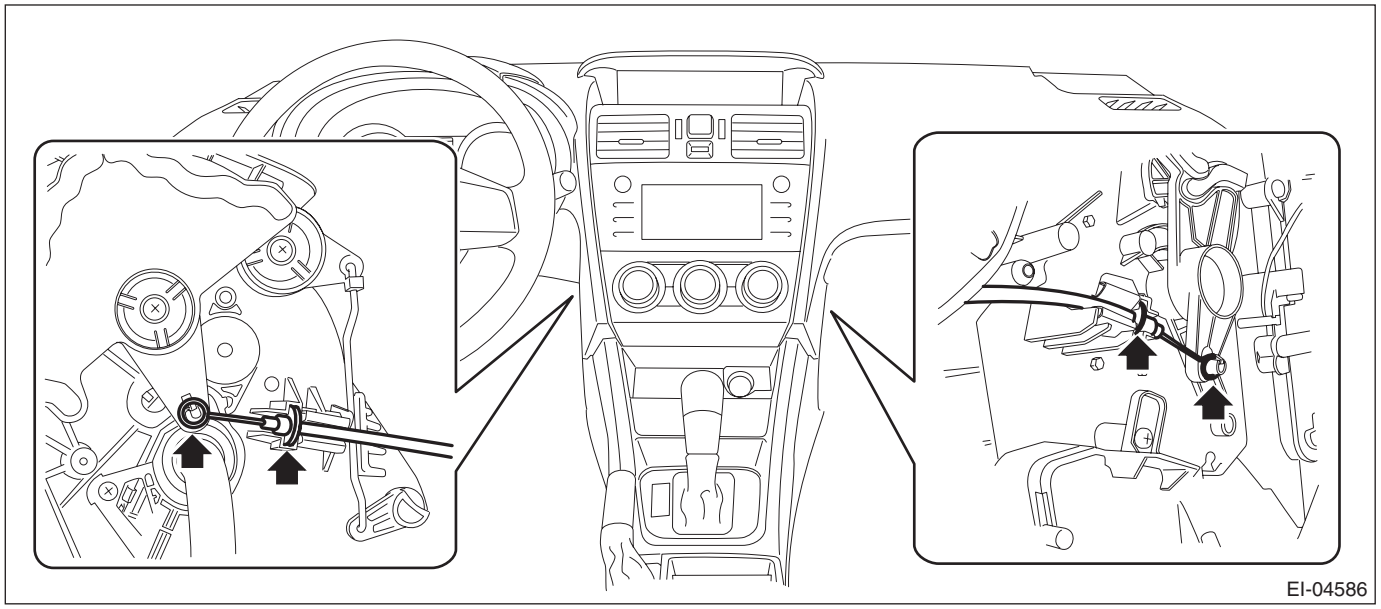


6) Remove the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
7) Release the clips and claws, then detach the left and right grille speaker side.

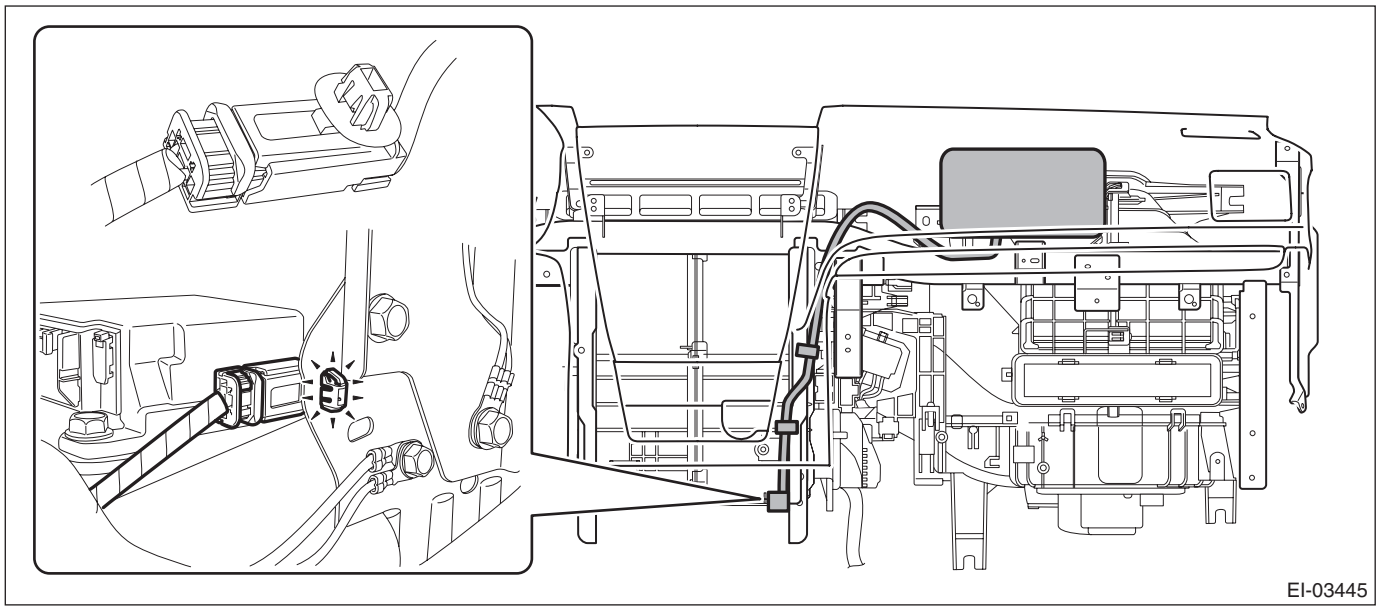


NOTE:
Remove the grille speaker side by using a plastic remover.
8) Remove the trim panel - front pillar UPR on the left and right sides. <Ref. to EI-94, REMOVAL, Upper Inner Trim.>
9) Remove the glove box assembly. <Ref. to EI-74, REMOVAL, Glove Box.>

10) On manual A/C models, disconnect the control cables from both sides of the heater & cooling unit.


EI-04586

11) Remove the center grille assembly. <Ref. to AC-100, REMOVAL, Air Vent Grille.>
12) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
13) Remove the multi-function display assembly. <Ref. to IDI-26, REMOVAL, Multi-function Display (MFD).>
14) Remove the combination meter assembly. <Ref. to IDI-19, REMOVAL, Combination Meter.>
15) Disconnect the passenger's airbag module connector. <Ref. to AB-21, PASSENGER'S AIRBAG MODULE, PROCEDURE, Airbag Connector.>


EI-03445

16) Remove the column assembly - steering. <Ref. to PS-21, REMOVAL, Steering Column.>
17) Remove the cover side sill - front INN and cover side sill - front on the RH and LH side. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
18) Remove the body side weather strip - flange front.

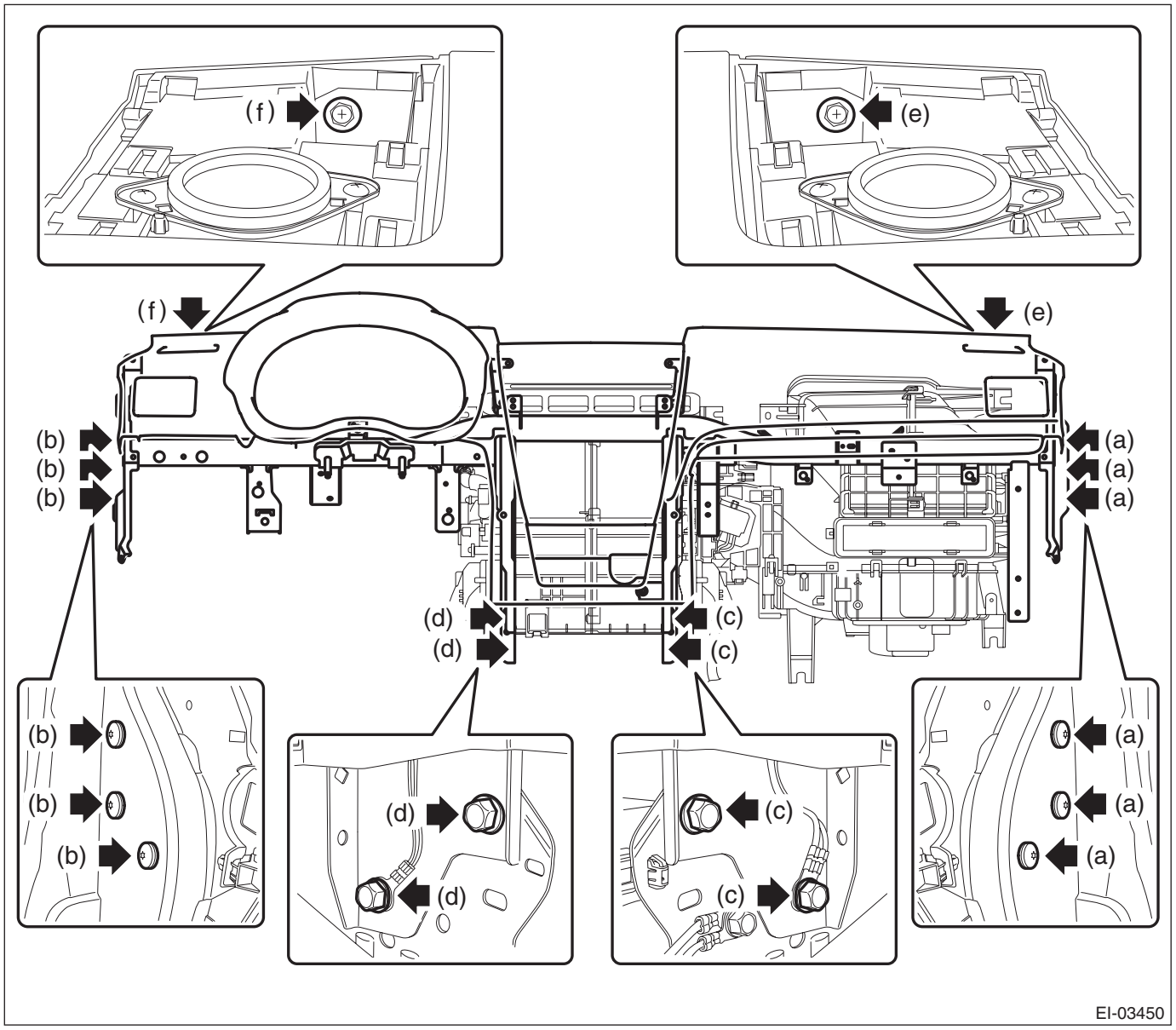
19) Remove the instrument panel assembly and the beam COMPL - steering as a unit.

CAUTION:
The instrument panel assembly and the beam COMPL - steering are heavy. Always work in a team of two persons when removing them from the vehicle, so as not to damage the vehicle interior.

(1) Remove the fuse box and relay box.
(2) Disconnect all harness clamps and connectors of the instrument panel harness.
(3) Remove the TORX® bolt. (a), (b)

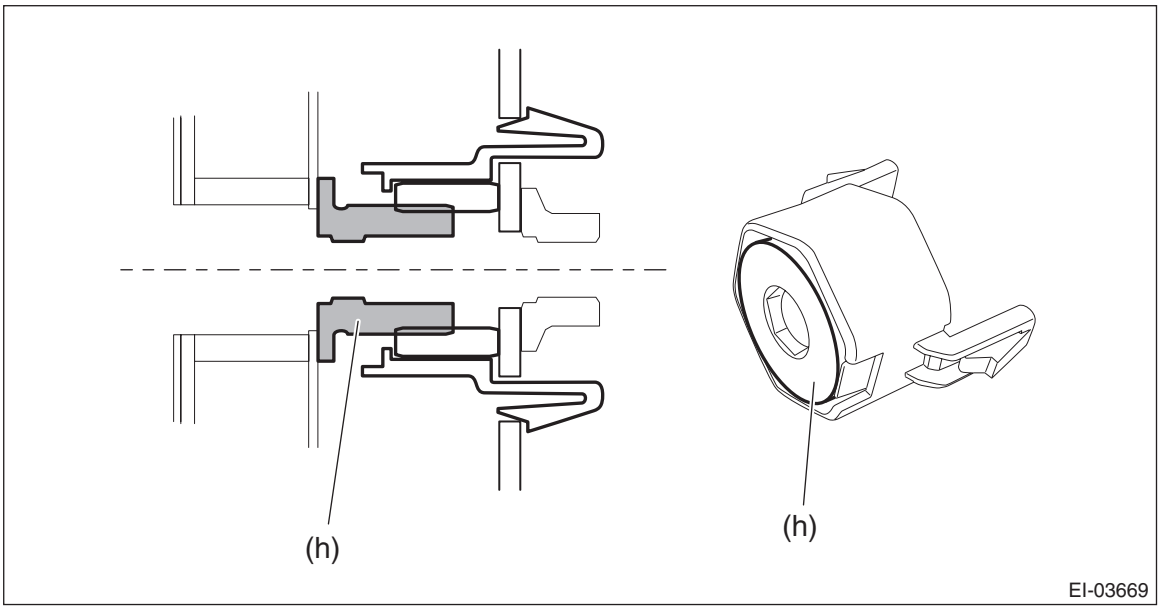
Preparation tool:
TORX® T40

(4) Remove the bolts at the floor center. (c), (d)
(5) Remove the bolt. (e), (f)



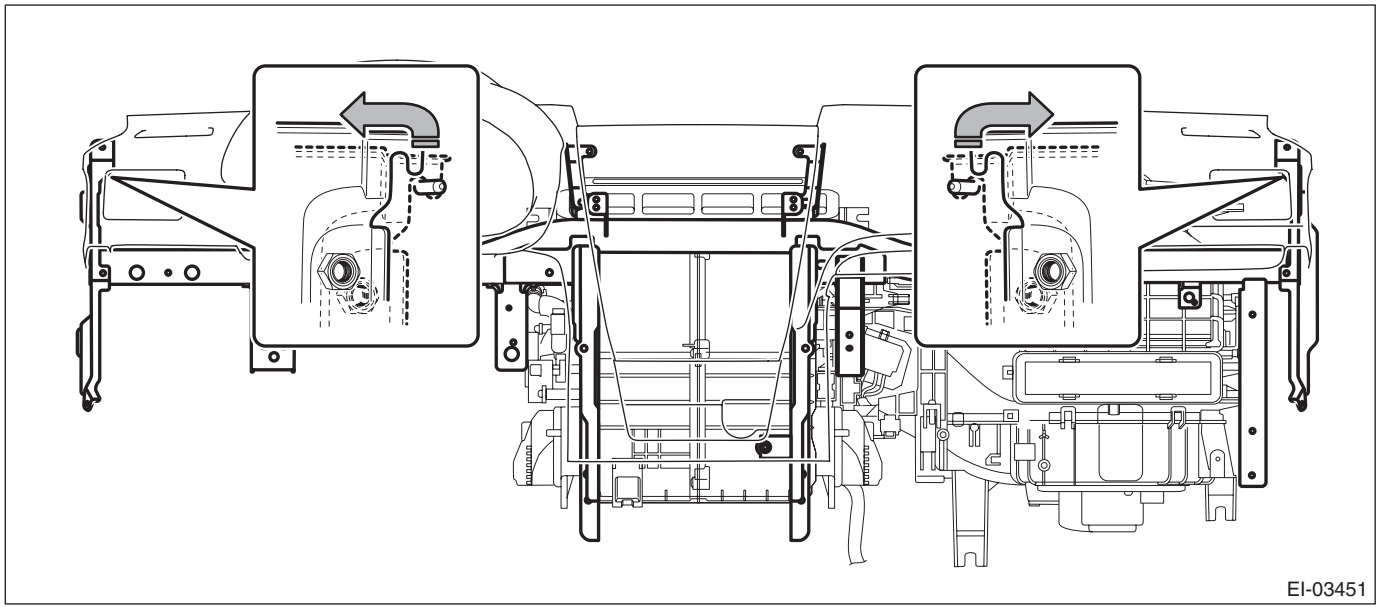
(6) Loosen the adjuster portion (h) of the adjuster - clip space. (Only LH side of the beam COMPL - steering)

Preparation tool:
Hexagon wrench: 8 mm (0.31 in)

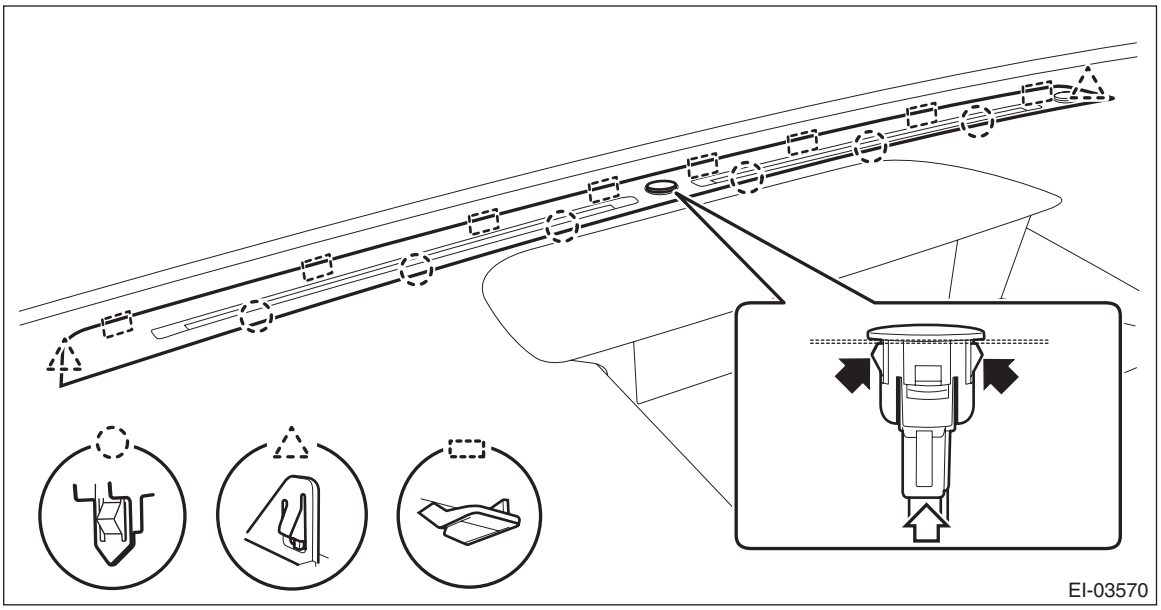


(7) Slightly lift the instrument panel assembly together with the beam COMPL - steering to detach the left and right pins. Then pull it toward you to remove the assembly.

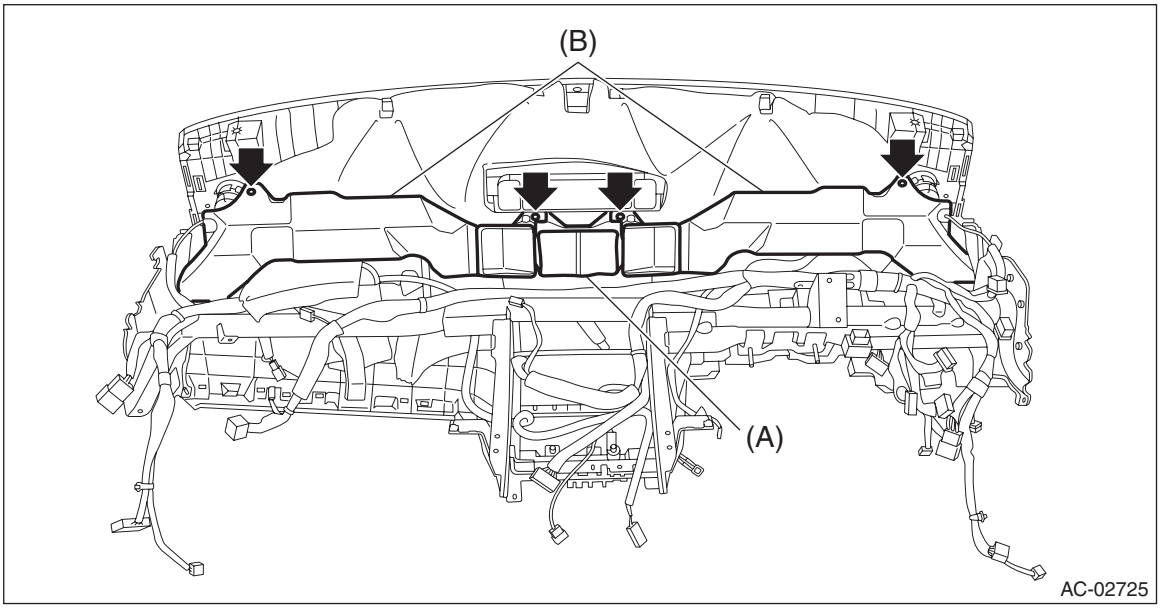
CAUTION:
• Check that all harness clamps and connectors are detached.
• The instrument panel assembly and the beam COMPL - steering are heavy. Always work in a team of two persons when removing them from the vehicle, so as not to damage the vehicle interior.



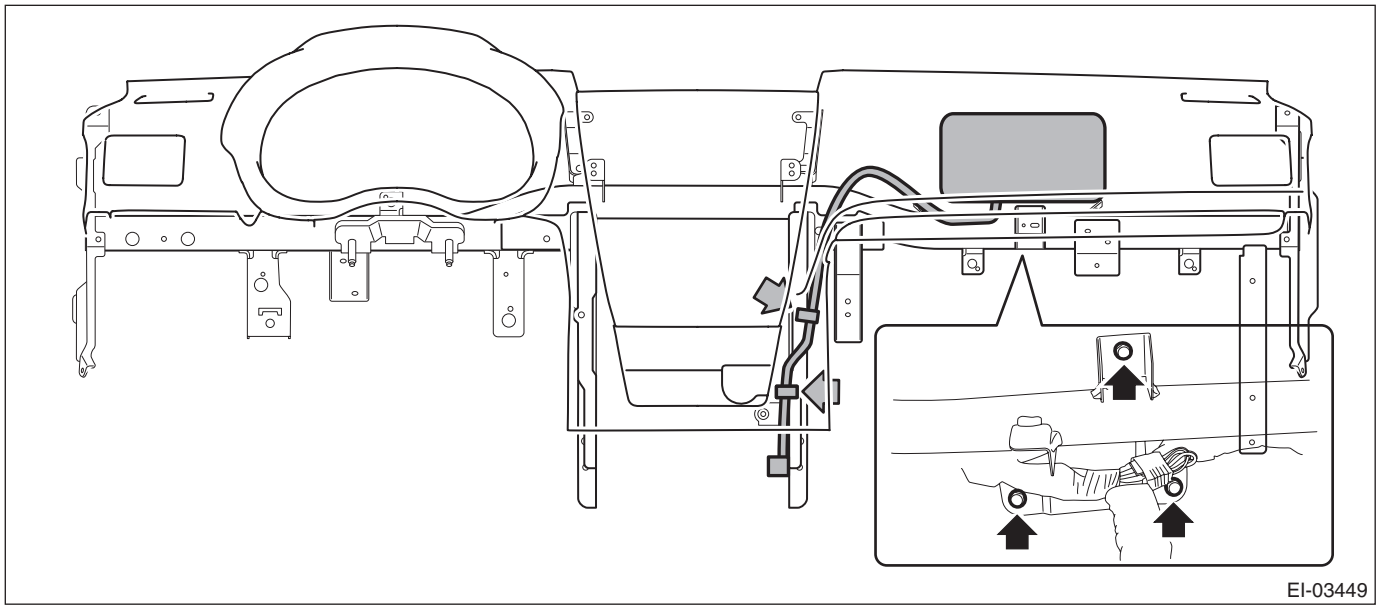
20) Remove the grille front defroster.
(1) Disconnect the sunload sensor.
(2) Release the claws and remove the grille front defroster.



21) Remove the screws and remove the front (A) and side vent duct (B) LH, RH.



22) Separate the panel COMPL - instrument and the beam COMPL - steering.
(1) Remove the clamps and bolts of the passenger's airbag module harness.

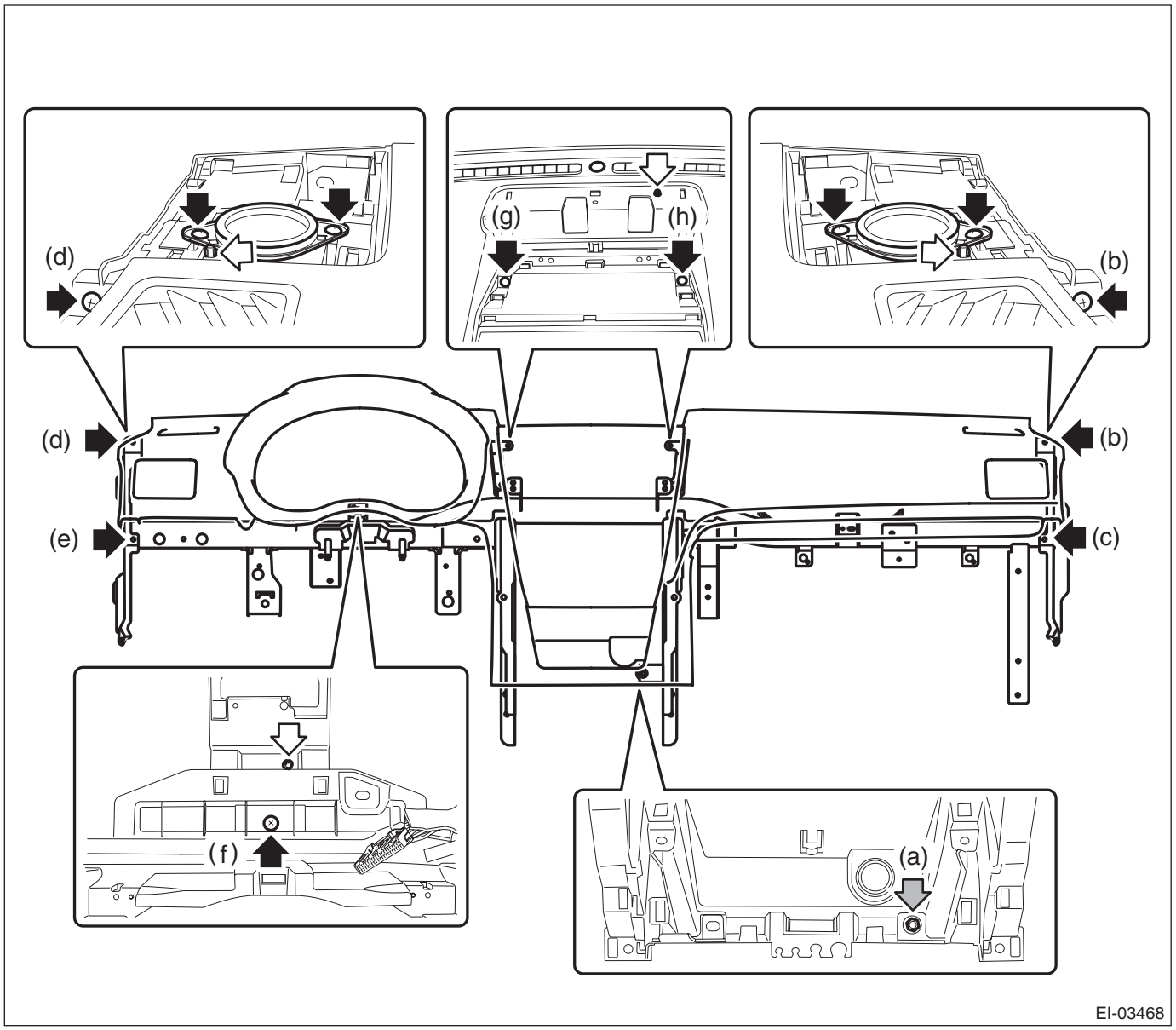

EI-03449

(2) Remove the left and right speakers.

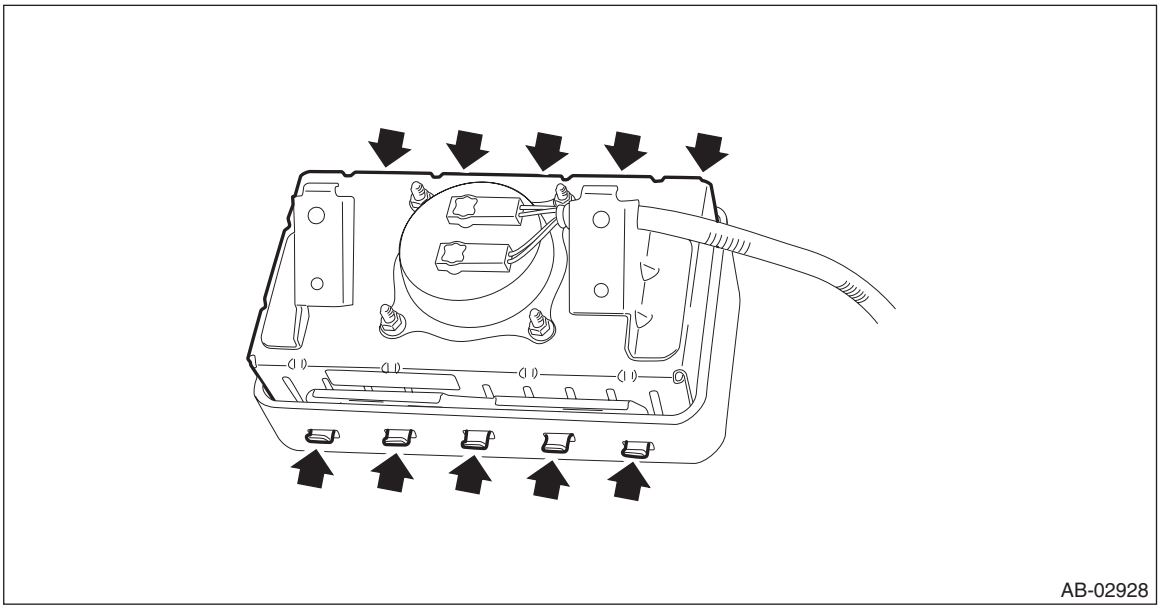
NOTE:
Detach the harness clamp together.

(3) Disconnect the front accessory socket connector.

(4) Remove the nut (a) and screws (b), (c), (d), (e), (f), (g) and (h).
(5) While being careful with the harness, separate the panel COMPL - instrument and the beam COMPL - steering.

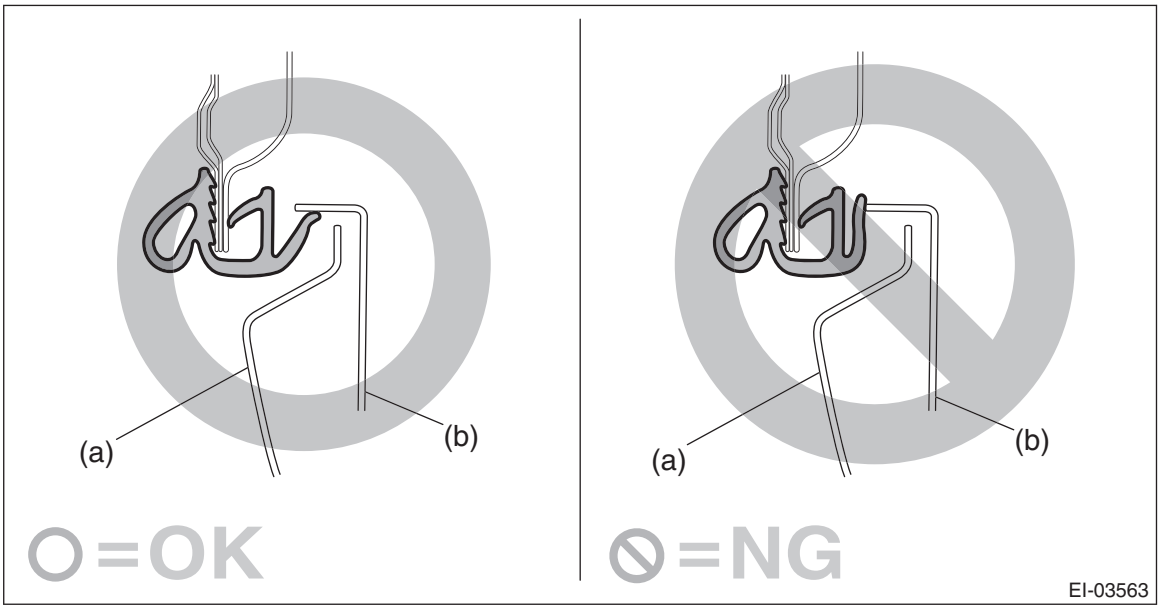


23) Remove the claws, and remove the passenger's airbag module.

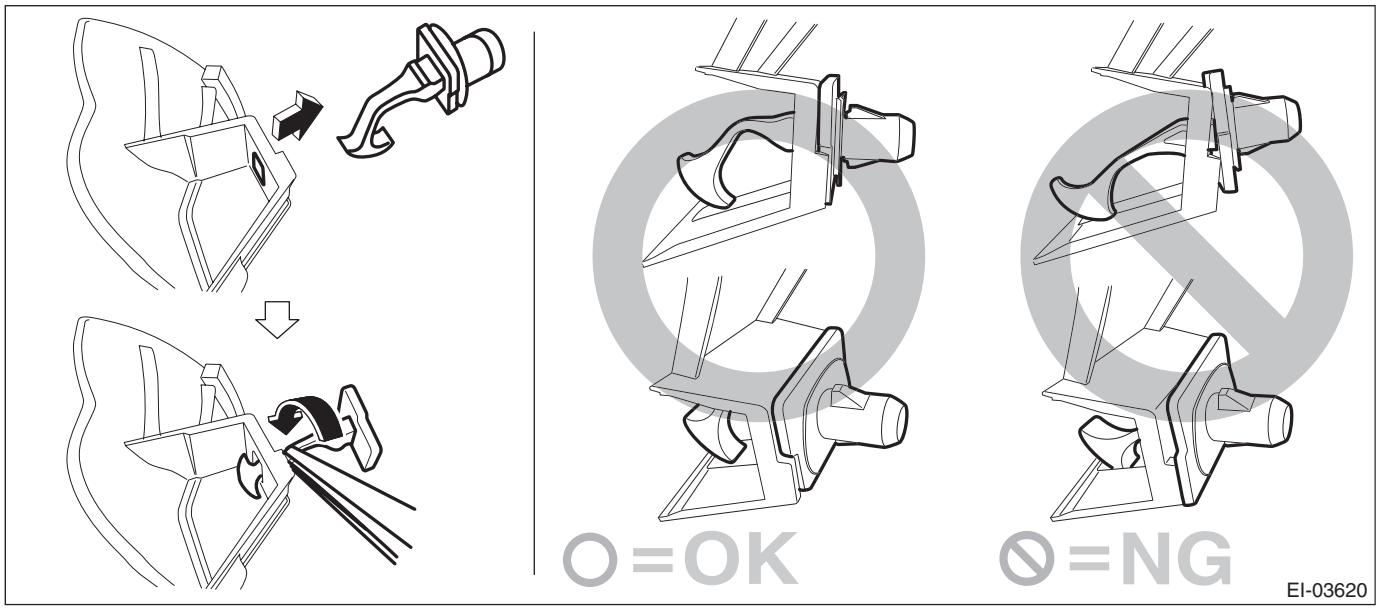


B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• After installing the panel center assembly, check that the air vent grille of the panel center assembly is inserted correctly into the air vent duct.
• When installing the cover - instrument panel side (a), make sure that the body side weather strip - flange front does not come inside the panel COMPL - instrument (b).



• When reusing the tether clip on the upper part of the trim panel - front pillar UPR, check that there is no damage to the tether clip. If the tether clip is damaged, always replace it with a new tether clip. If the tether clip is damaged, its holding force is reduced and the trim panel - front pillar UPR may come off.
• Do not reuse the tether clip removed from the upper part of the trim panel - front pillar UPR. Always replace with a new part.
• Check the installation status of the tether clips and install the trim panel - front pillar UPR.



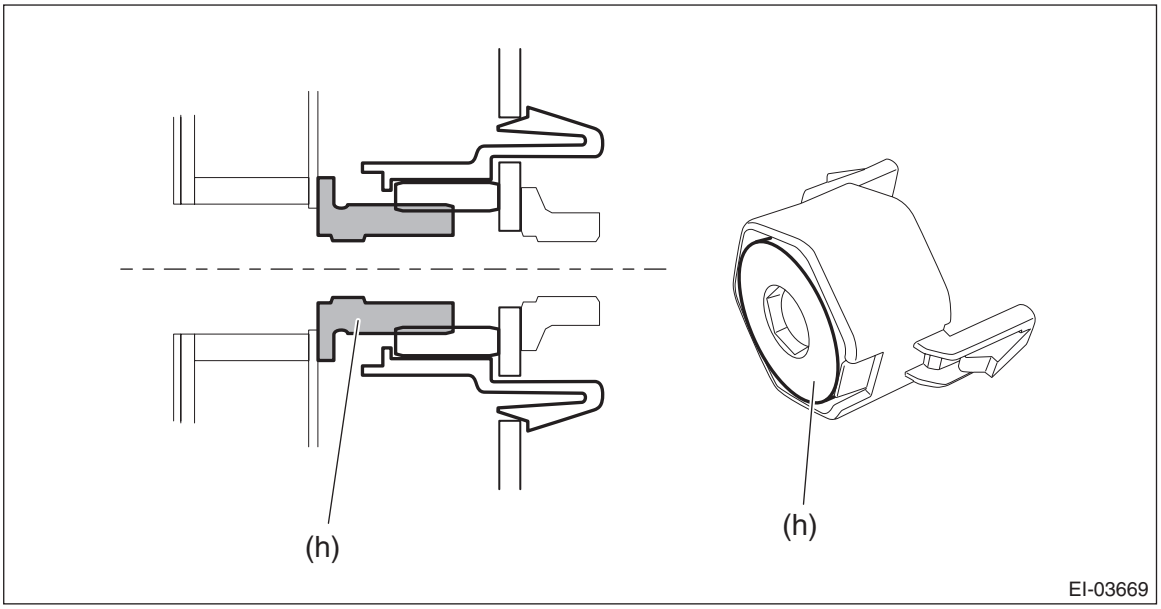
1) Attach components until the instrument panel assembly is formed, in the reverse order of removal.

NOTE:
Method of installing insulator
• Adhesive
Use polyurethane adhesive. When assembling the instrument panel assembly, wait until the adhesive has evaporated to prevent filling of the smell in the compartment.
• Double-sided tape
Use commercial double-sided tape. (Use strong double-sided adhesive tape.)
2) Insert the matching pins on the body side (three locations - one in the center and the remaining two on both sides) into the instrument panel assembly and the beam COMPL - steering.
3) Check that the matching pins are inserted securely, and then route the harness.
4) Install the sunload sensor and the grille - front defroster.
5) Secure the instrument panel assembly and the beam COMPL - steering to the vehicle body.
(1) Position the instrument panel assembly and the beam COMPL - steering to the vehicle body and tighten the adjuster - clip space.

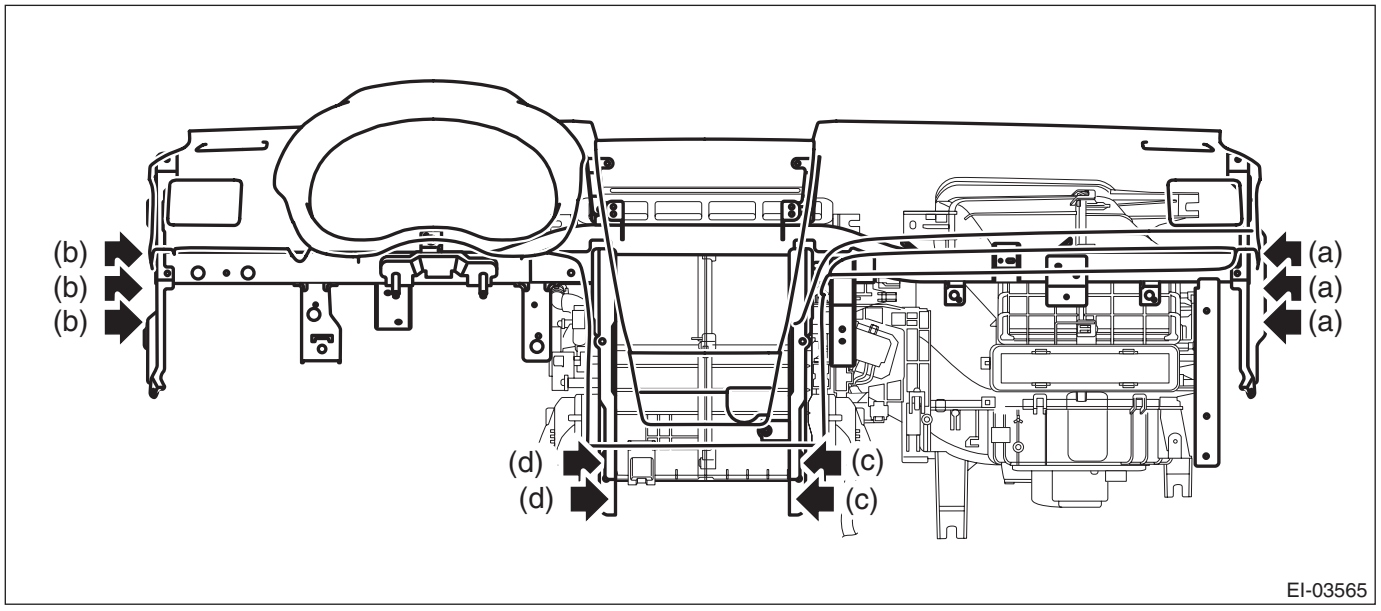
Preparation tool:
Hexagon wrench: 8 mm (0.31 in)

NOTE:
Tighten so that there is no gap between the adjuster portion (h) and the body.

Tightening torque:
Adjuster - clip space: 0.8 — 4 N·m (0.08 — 0.41 kgf-m, 0.6 — 2.95 ft-lb)



(2) Temporarily tighten the bolts (a), (b), (c) and (d) of the beam COMPL - steering.



(3) Tighten the beam COMPL - steering in the order from (a) to (d) to the specified torque.

Tightening torque:
Beam COMPL - steering: 25 N·m (2.55 kgf-m, 18.4 ft-lb)
Passenger's airbag module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

6) Install each part in the reverse order of removal.

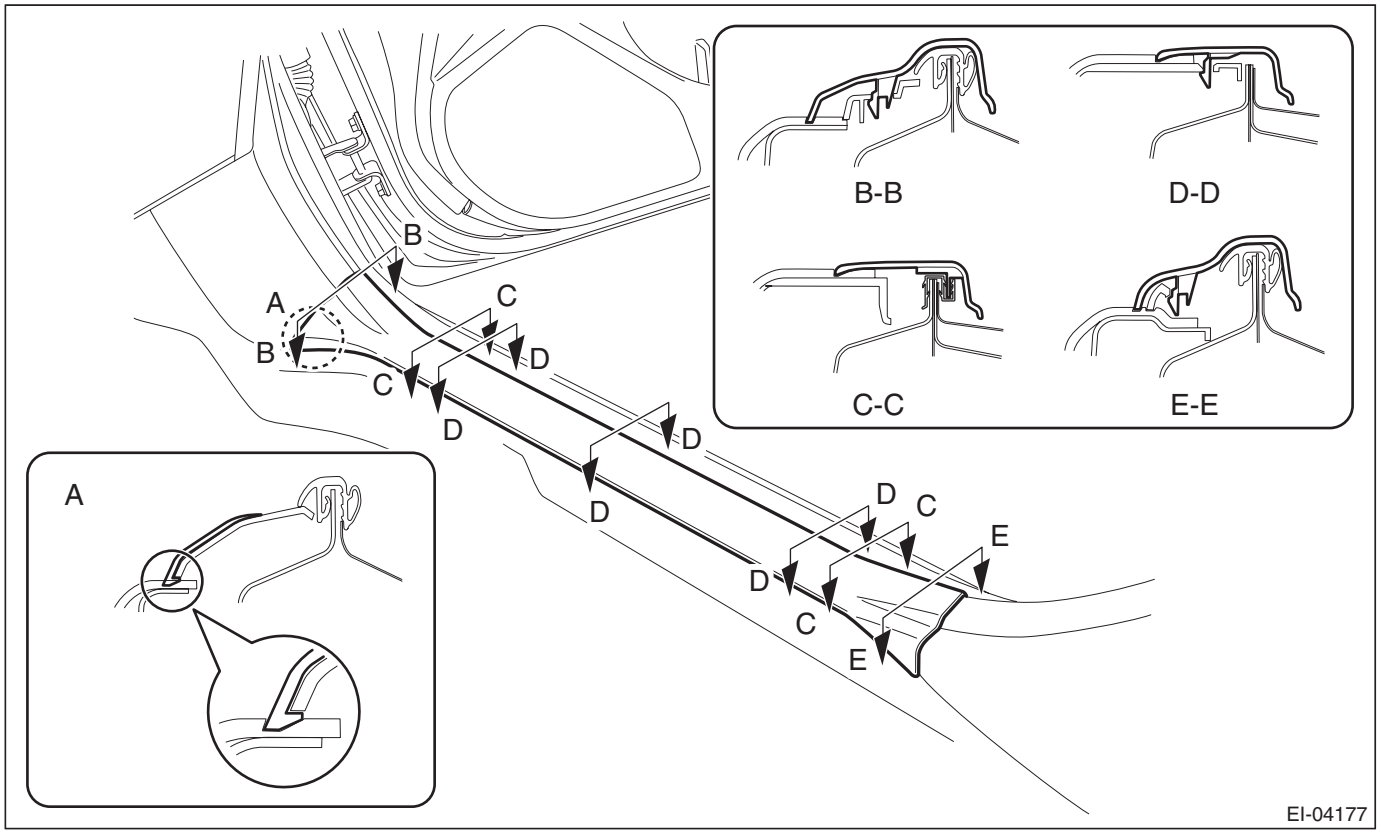
Tightening torque:
Column assembly - steering: <Ref. to PS-3, STEERING WHEEL AND COLUMN, COMPONENT, General Description.>
Knee airbag module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
Console box assembly: 6.5 N·m (0.66 kgf-m, 4.8 ft-lb)

21.Lower Inner Trim

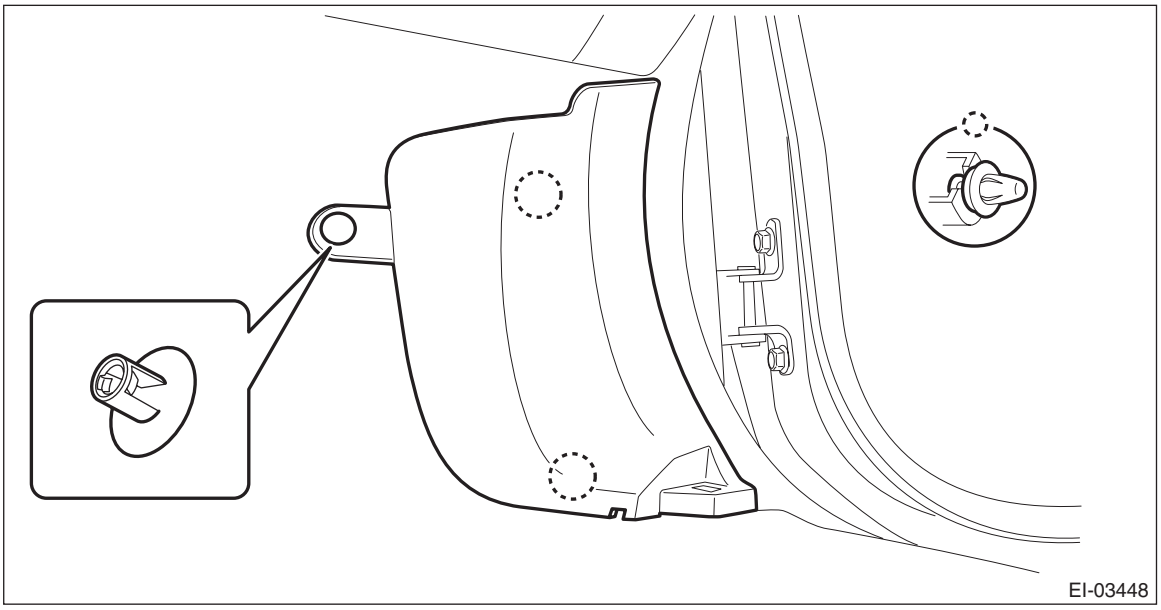
A: REMOVAL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Release the claws, and then remove the cover side sill - front INN.

CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the cover side sill - front INN.

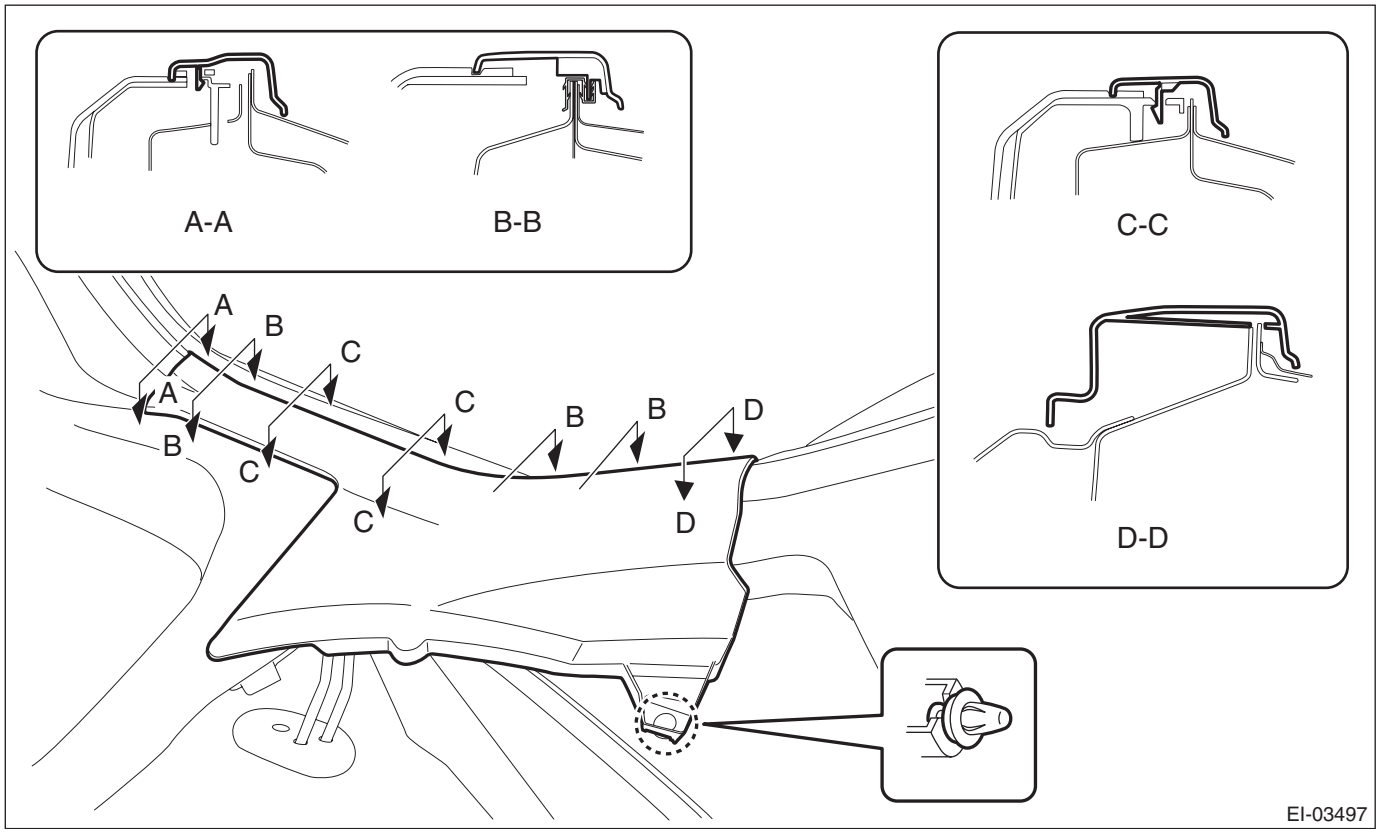


2) Remove the clips, and remove the cover side sill - front.



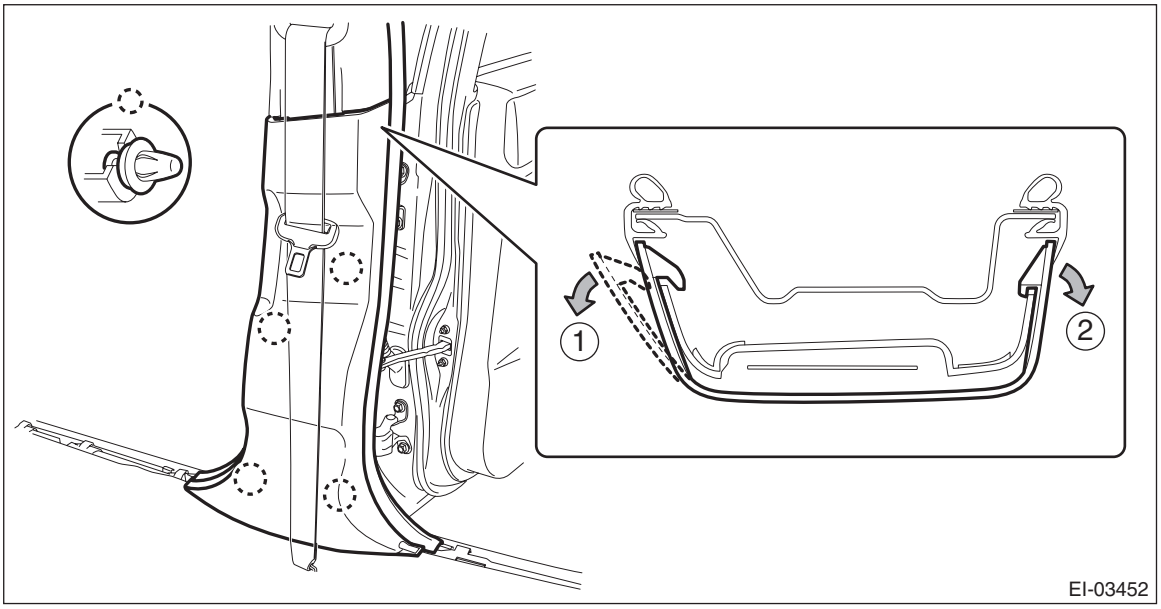
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Release the clips and claws, and then remove the cover side sill - rear INN.

CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the cover side sill - rear INN.

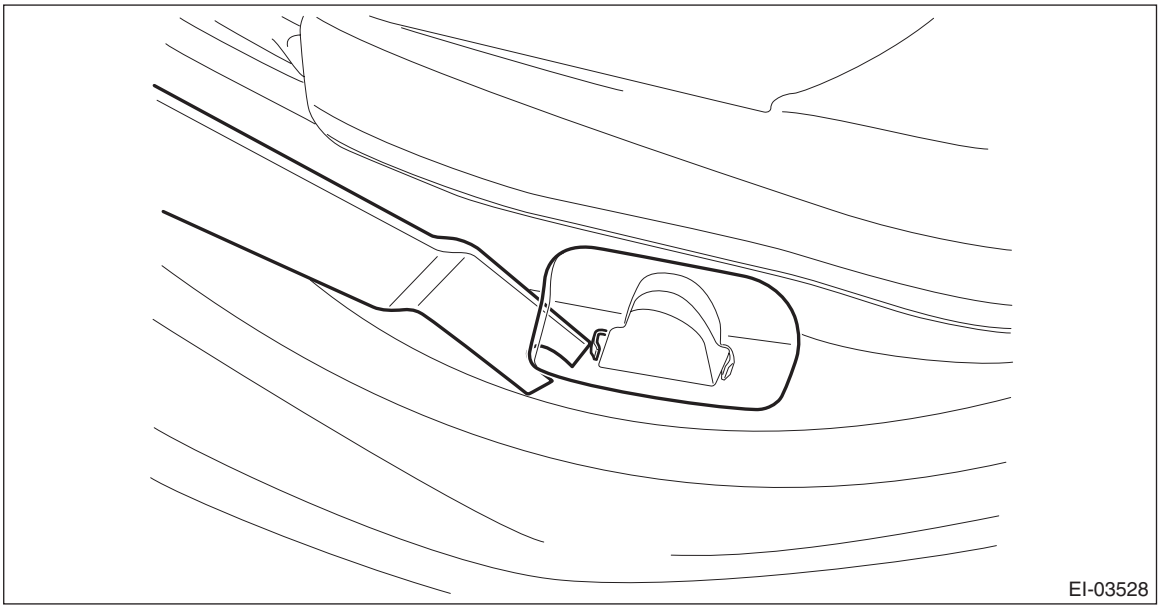


5) Remove the trim panel - center pillar LWR.
(1) Release the clip by pulling the trim panel - center pillar LWR toward you.
(2) Expand the claws of the trim panel - center pillar LWR outward, and remove it from the trim panel - center pillar UPR.

CAUTION:
Do not expand the trim panel - center pillar LWR excessively. Doing so may damage the trim.



NOTE:
First release the claw located to the front of the vehicle.
6) Disconnect the claws and remove the cover - catcher.

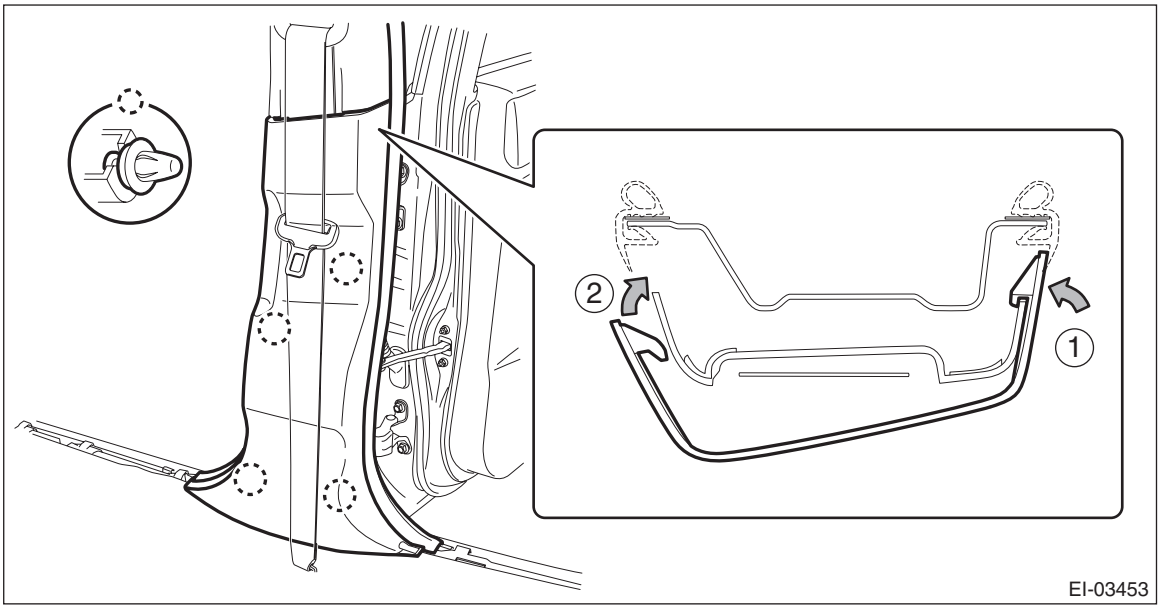


NOTE:
Remove the cover - catcher by using a plastic remover.

B: INSTALLATION

Install each part in the reverse order of removal.

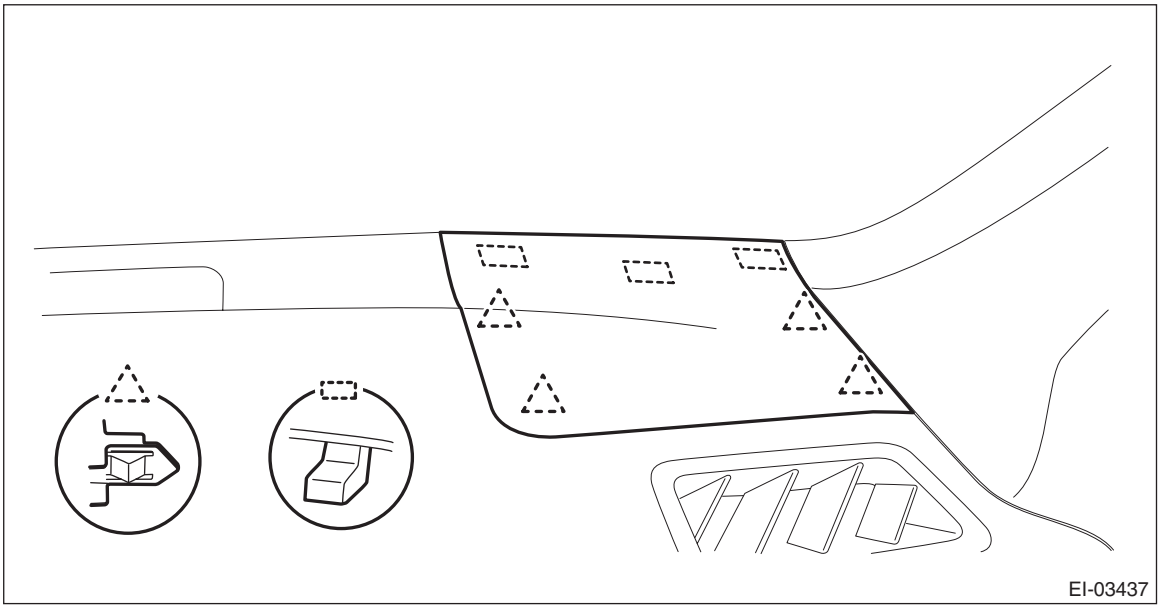
NOTE:
Assemble the trim panel - center pillar LWR to the trim panel - center pillar UPR securely.



22.Upper Inner Trim

A: REMOVAL

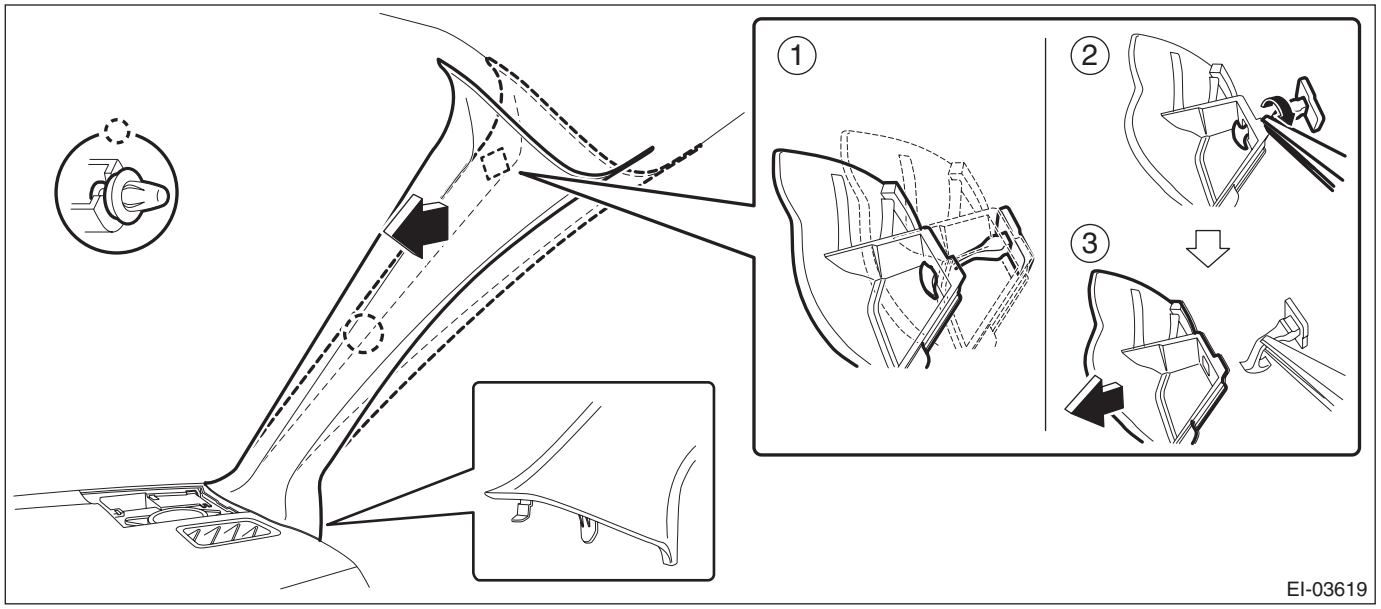
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Release the clips and claws, then detach the grille speaker side.



NOTE:
Remove the grille speaker side by using a plastic remover.
3) Remove the trim panel - front pillar UPR.
(1) Pull the upper part of the trim panel - front pillar UPR towards the center of the vehicle.
(2) Insert long-nose pliers into the top part of the trim, grip the tether clip with the pliers and twist 90° in that position.

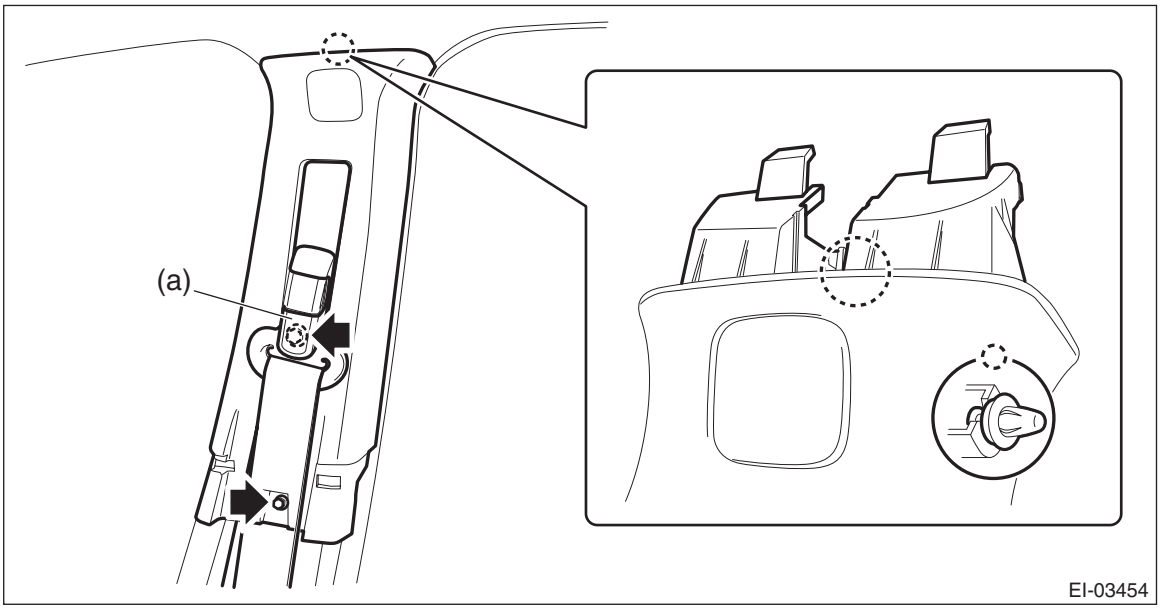
CAUTION:
Be careful not to damage the pillar trim surface and curtain airbag module when inserting the pliers.
(3) Holding the tether clip twisted as in the previous step, remove the trim panel - front pillar UPR from the tether clip.

(4) Remove the clips, and remove the trim panel - front pillar UPR.



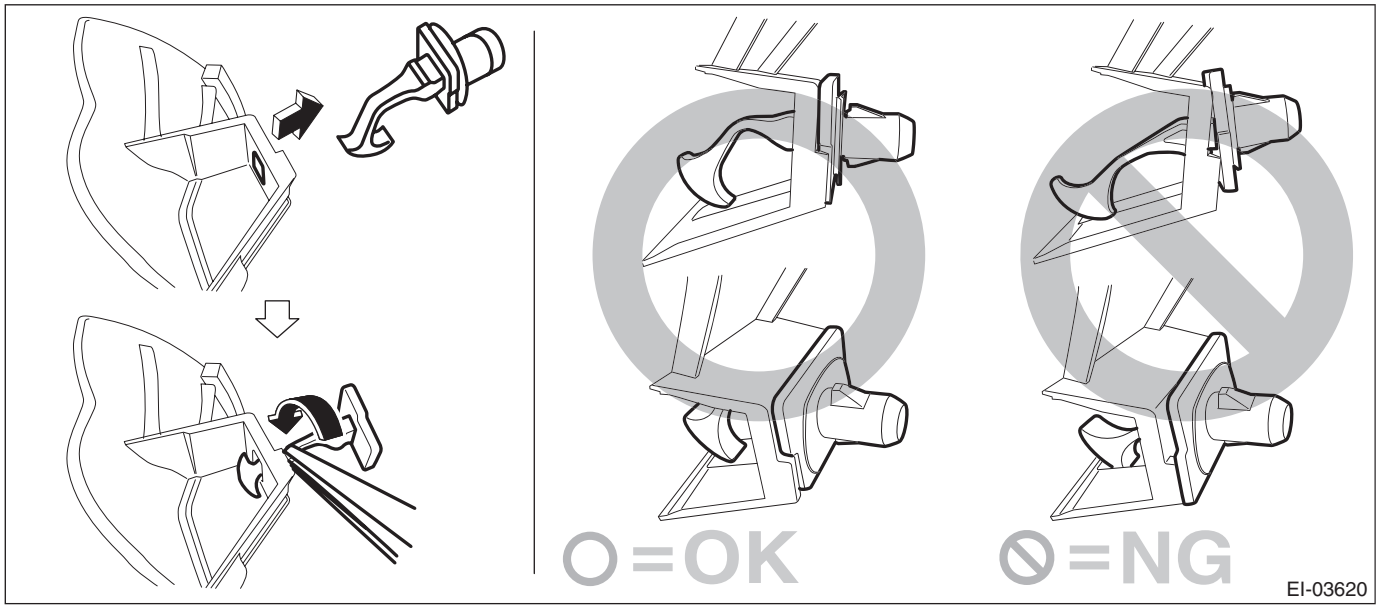
4) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the cover side sill - front INN, cover side sill - rear INN, and trim panel - center pillar LWR. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
6) Remove the trim panel - center pillar UPR.
   (1) Remove the cover through (a), and remove the seat belt anchor bolt.
   (2) Remove the bolt on the lower side of the trim panel - center pillar UPR.
   (3) Remove the clip by pulling the upper part of the trim toward you, and while lowering the entire trim, remove the trim panel - center pillar UPR.

CAUTION:
Do not reuse the upper clips of the trim panel - center pillar UPR. Once the clip is removed, its holding force is reduced. Be sure to replace it with a new clip.



B: INSTALLATION

CAUTION:
• When reusing the tether clip on the upper part of the trim panel - front pillar UPR, check that there is no damage to the tether clip. If the tether clip is damaged, always replace it with a new tether clip. If the tether clip is damaged, its holding force is reduced and the trim panel - front pillar UPR may come off.
• Do not reuse the tether clip removed from the upper part of the trim panel - front pillar UPR. Always replace with a new part.
• Do not reuse the upper clips of the trim panel - center pillar UPR. Once the clip is removed, its holding force is reduced. Be sure to replace it with a new clip.
• Before installing the trim panel - front pillar UPR, check the condition of protective non-woven fabric (white) of the curtain airbag. If it is damaged (airbag module cloth is exposed), replace the curtain airbag module assembly with a new part.
1) Remove the remaining tether clips from the vehicle body.
2) Install the trim panel - front pillar UPR.
(1) Check the installation status of the tether clips and install the trim panel - front pillar UPR.



3) Install each part in the reverse order of removal.

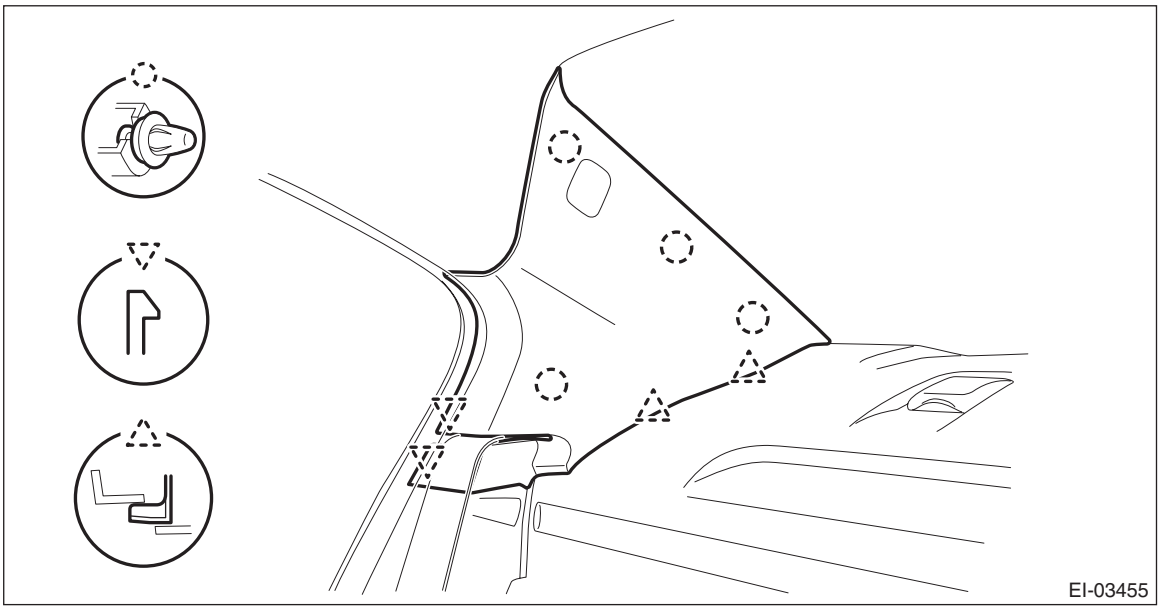
Tightening torque
Front seat belt: <Ref. to SB-2, FRONT SEAT BELT, COMPONENT, General Description.>
Trim panel - center pillar UPR: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

23.Rear Quarter Trim

A: REMOVAL

1. 4 DOOR MODEL

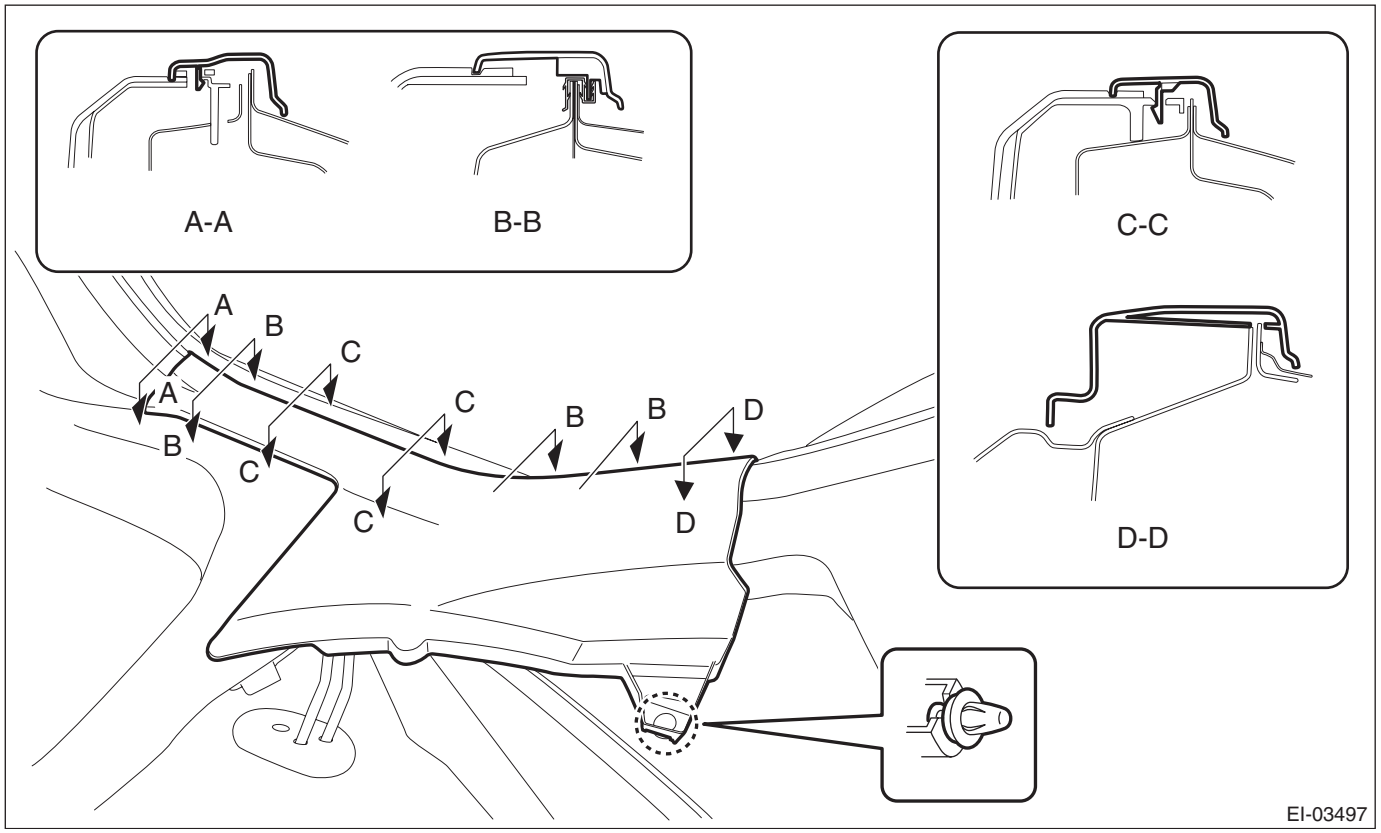
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>
2) Remove the clips, and remove the trim panel - rear pillar UPR.



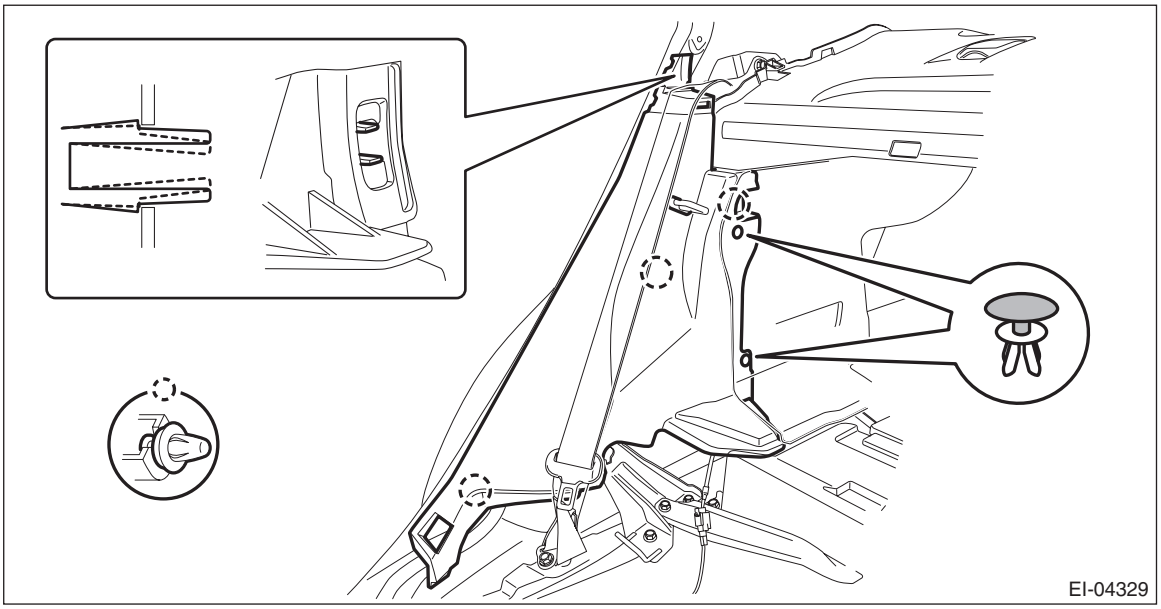
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>

4) Release the clips and claws, and then remove the cover side sill - rear INN.

CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the cover side sill - rear INN.



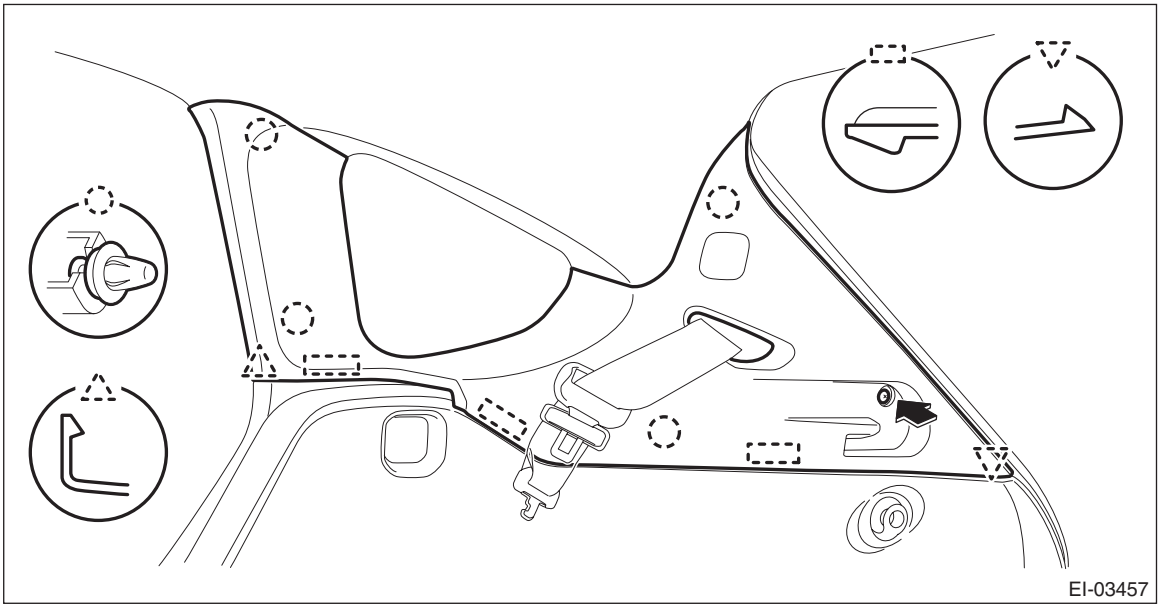
5) Remove the trim panel - rear pillar LWR.
(1) Remove the clips, and turn over the trim panel - trunk side.
(2) Remove the clips, and remove the trim panel - rear pillar LWR.



2. 5 DOOR MODEL/CROSSTREK MODEL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

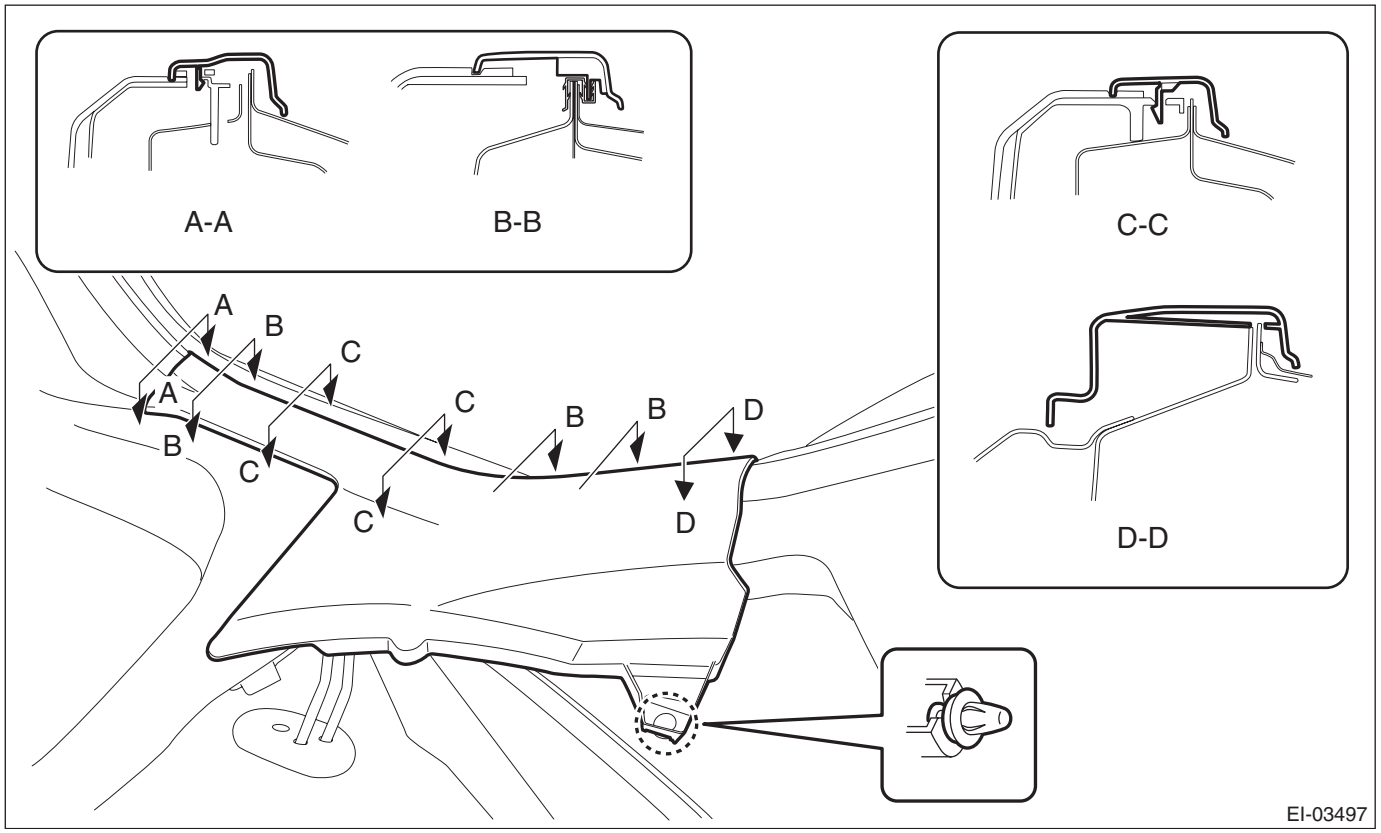
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the screws and clips, and remove the trim panel - rear quarter pillar UPR.



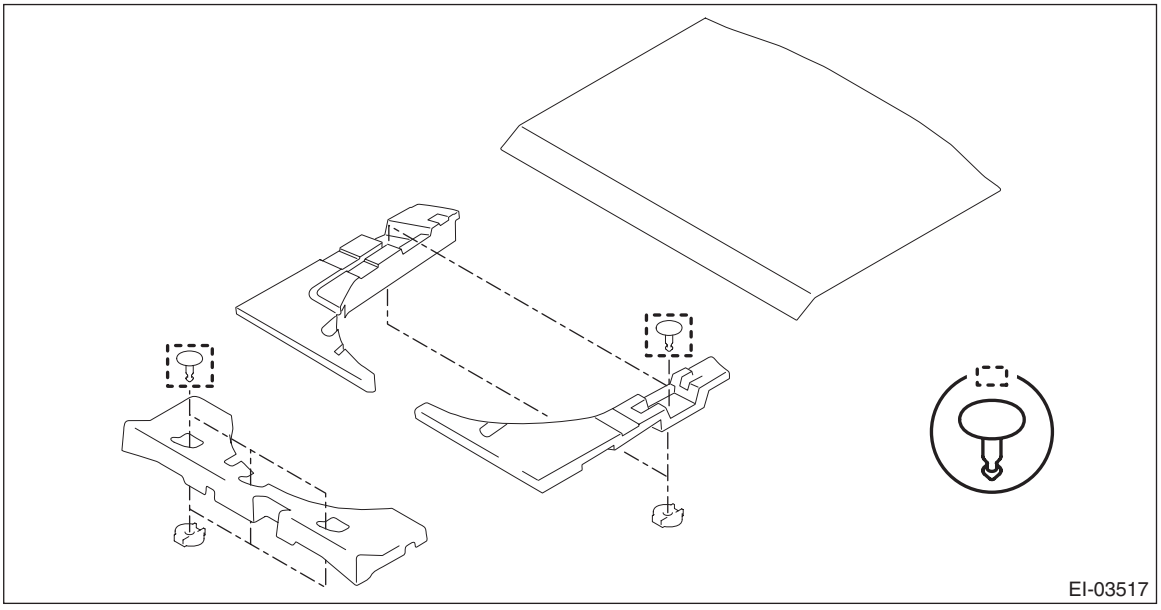
3) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>

4) Release the clips and claws, and then remove the cover side sill - rear INN.

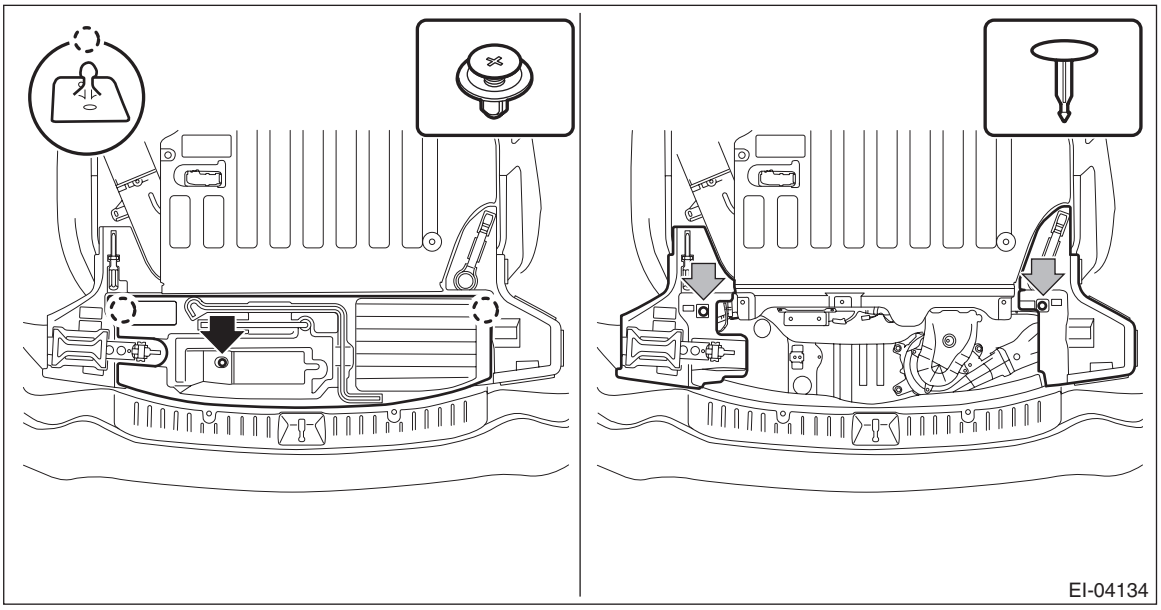
CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the cover side sill - rear INN.



5) Remove the mat - rear floor CTR and the spacer - rear floor side.

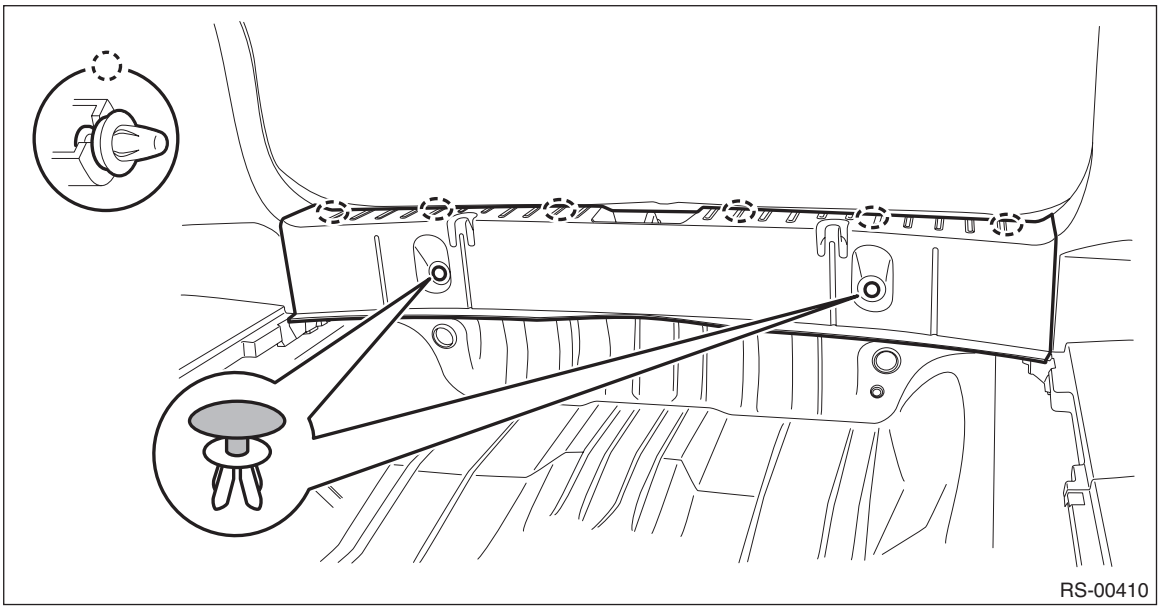


6) Remove the sub-trunk box and side spacers. (HEV model)



(1) Release the clips and side spacers, then detach the sub-trunk box.
(2) Remove the clips and detach the side spacers.

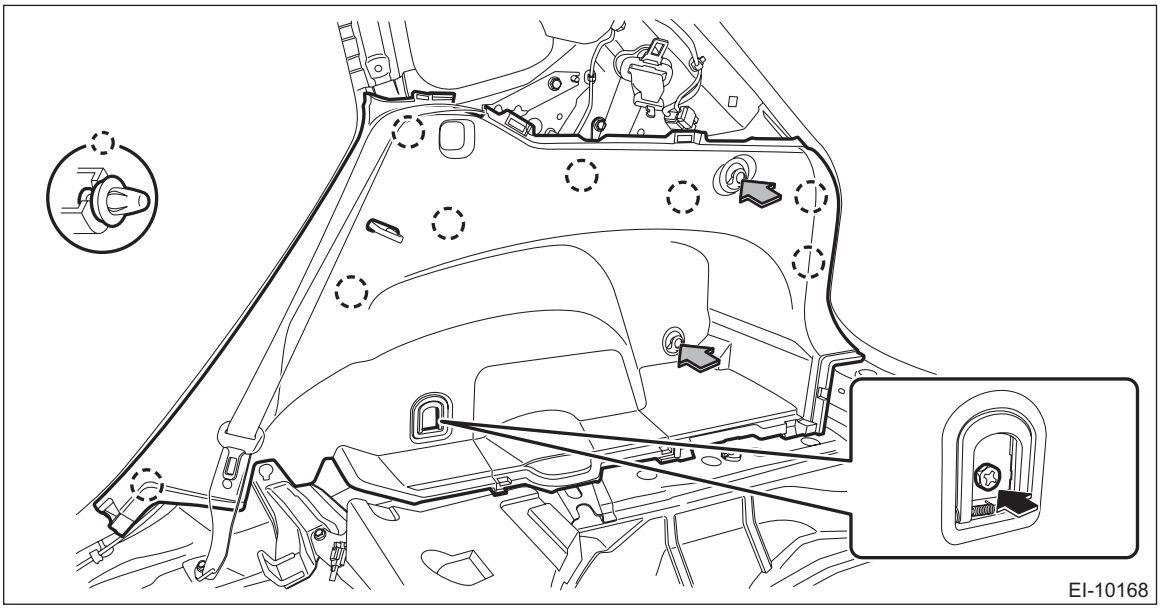
7) Remove the clips, and remove the trim panel - rear skirt.



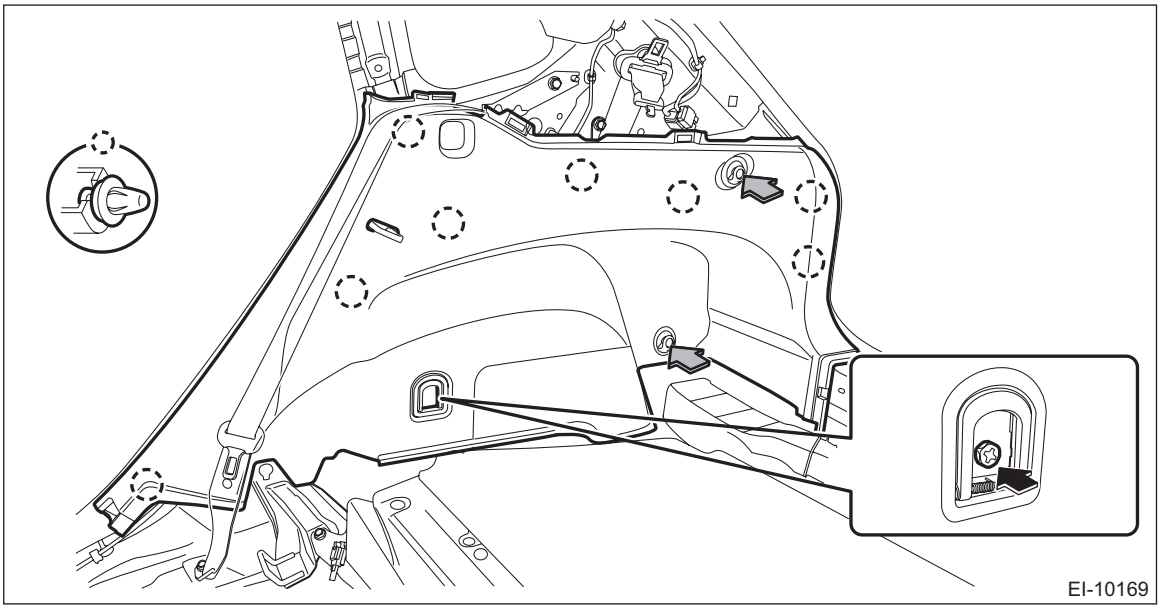
8) Remove the trim panel - rear apron.
   (1) Remove the caps, and remove the bolts.
   (2) Remove the screws.
   (3) Disengage the clips, and remove the trim panel - rear apron.

NOTE:
For LH side, disconnect the connector of the luggage room light.

- Gasoline engine model



- HEV model



B: INSTALLATION

Install each part in the reverse order of removal.

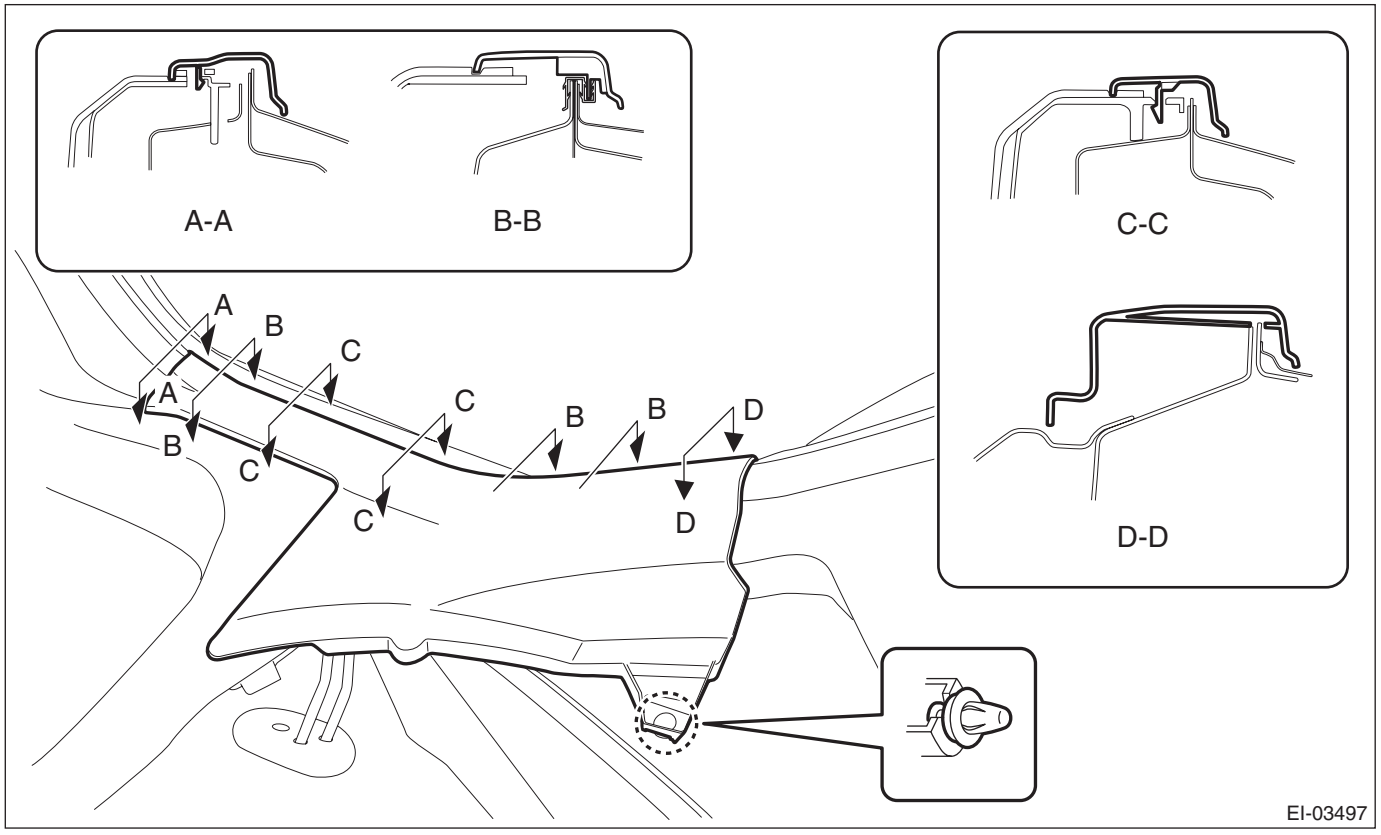
24.Rear Shelf Trim

A: REMOVAL

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

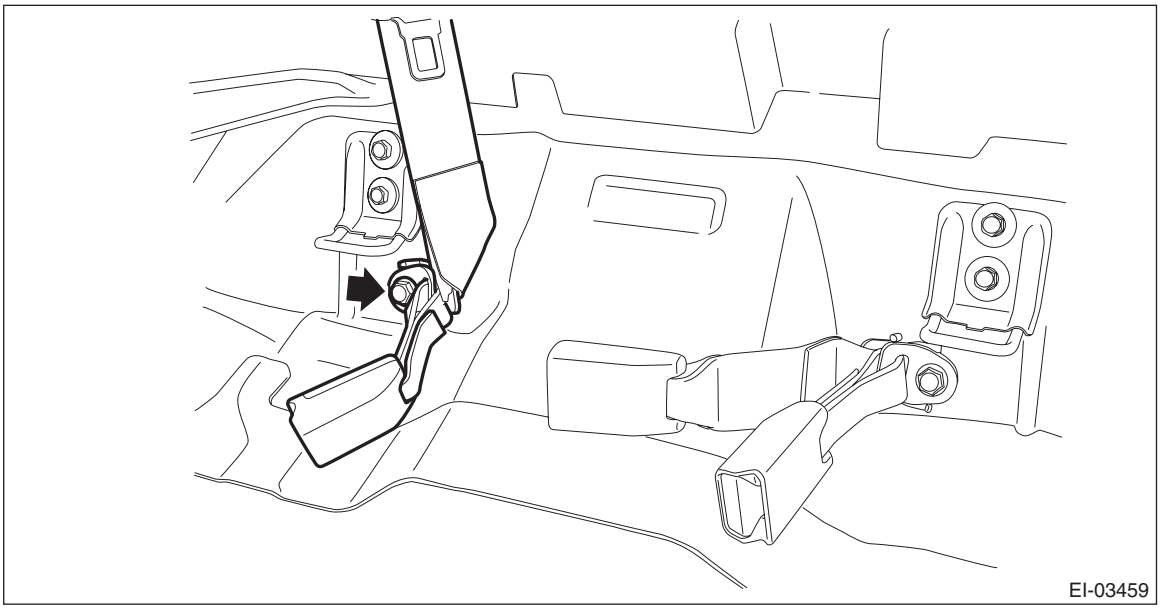
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
3) Release the clips and claws, and remove the side sill covers - rear INN on the left and right sides.

CAUTION:
Do not pull with excessive force. Doing so may damage the claws of the side sill cover - rear INN.

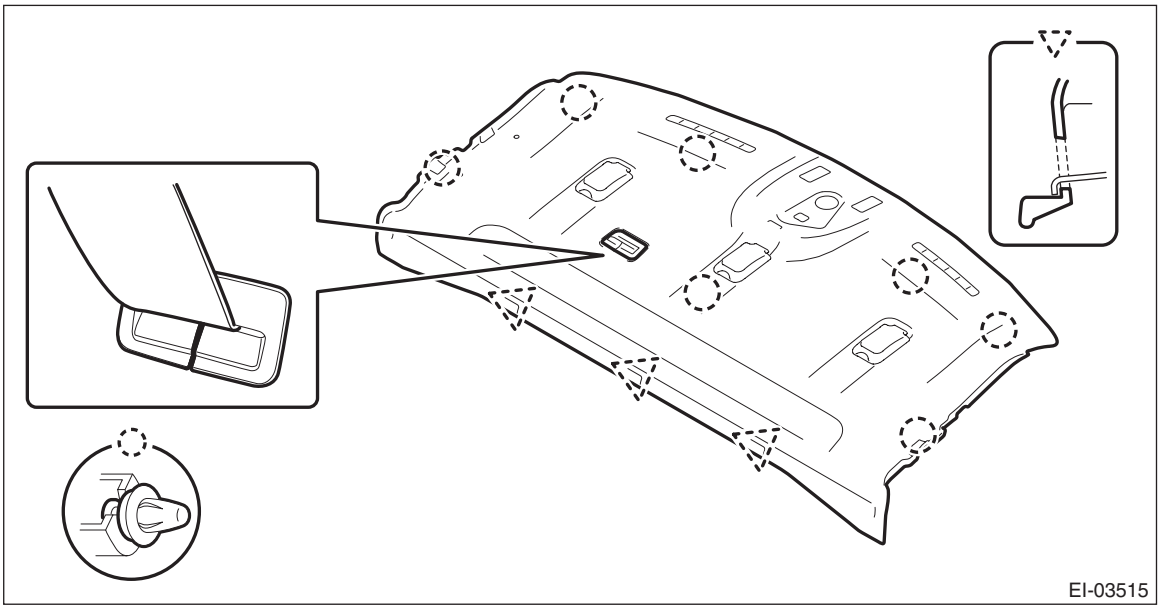


4) Remove the trim panel - rear pillar UPR and trim panel - rear pillar LWR on the RH and LH sides. <Ref. to EI-97, REMOVAL, Rear Quarter Trim.>

5) Remove the bolts, and remove the lower anchor of the seat belt - rear shoulder CTR.



6) Remove the high-mounted stop light. <Ref. to LI-74, REMOVAL, High-mounted Stop Light.>
7) Remove the trim panel assembly - rear shelf.
   (1) Release the clips to float the trim panel assembly - rear shelf.
   (2) Release the belt guide, and guide the anchor of the seat belt - rear shoulder CTR to behind the trim panel - rear shelf assembly.
   (3) Remove the trim panel assembly - rear shelf.



B: INSTALLATION

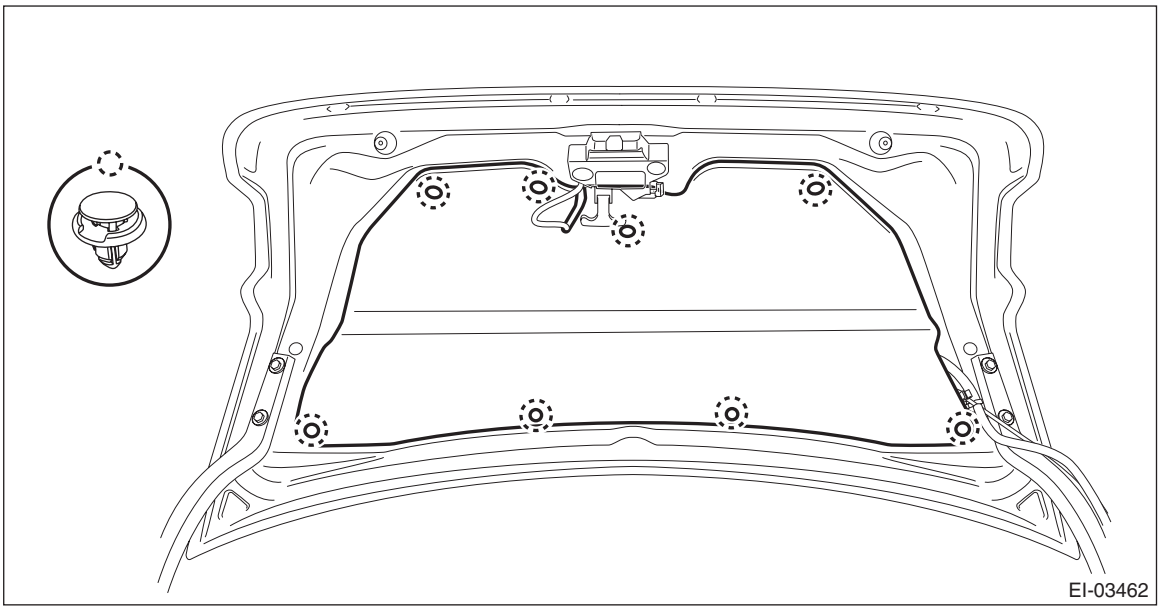
CAUTION:
Make sure that the claw behind the light assembly - high-mounted is securely attached to the trim panel assembly - rear shelf.
Install each part in the reverse order of removal.

Tightening torque:
Rear seat belt: <Ref. to SB-3, REAR SEAT BELT (4 DOOR MODEL), COMPONENT, General Description.>

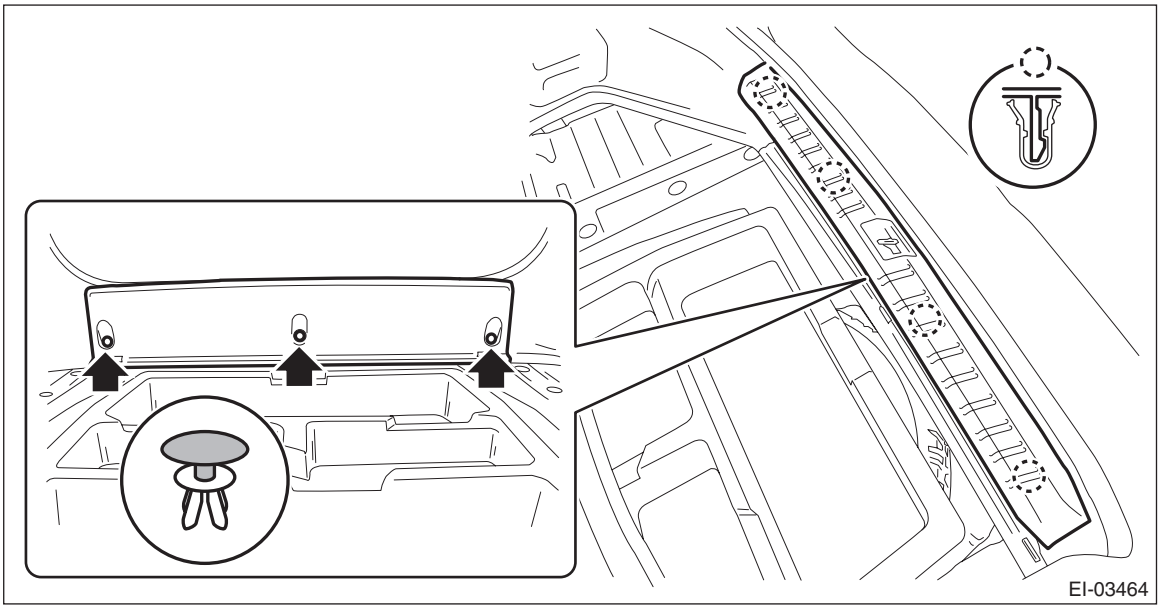
25.Trunk Room Trim

A: REMOVAL

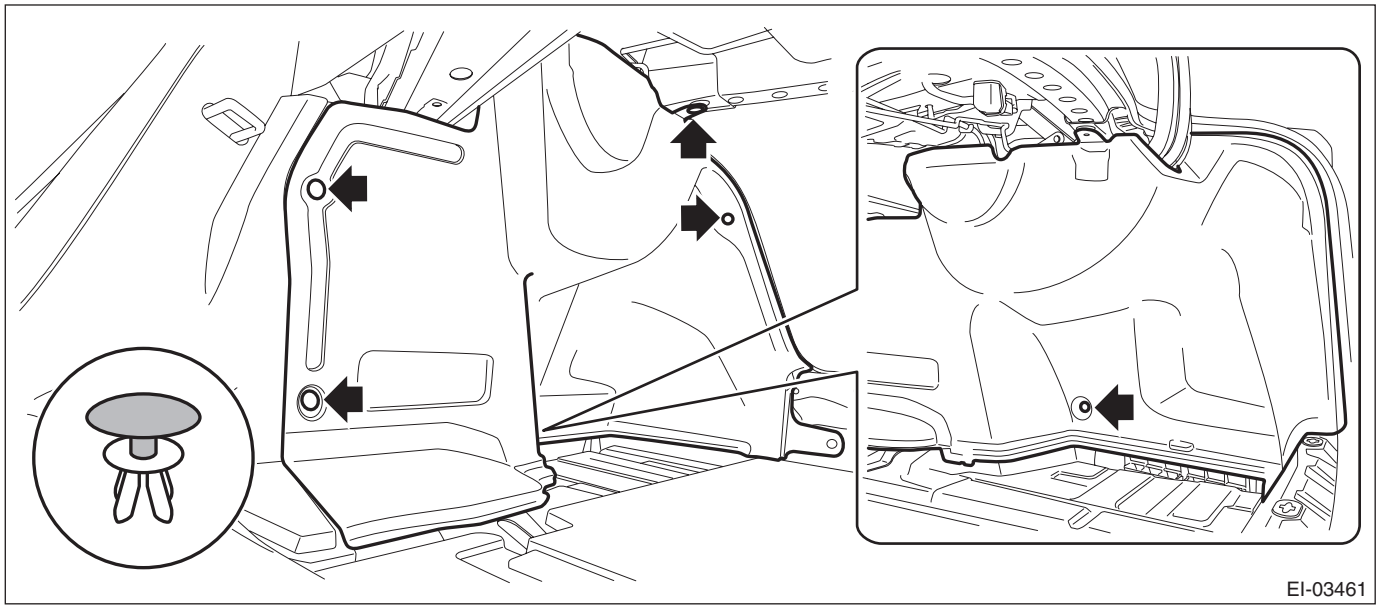
1) Remove the clips, and remove the trim panel - trunk lid.



2) Tilt the backrest assembly forward.
3) Remove the mat - trunk.
4) Remove the trim panel - trunk rear.
   (1) Remove the clip.
   (2) Release the claws, and remove the trim panel - trunk rear.



5) Remove the clips, and remove the trim panel - trunk side.



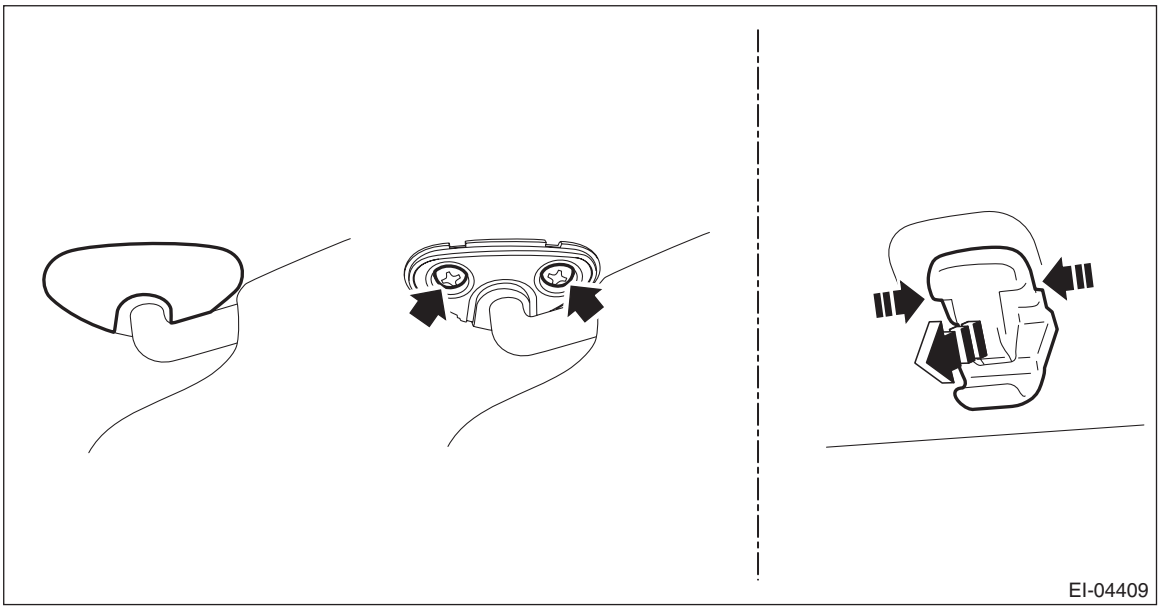
B: INSTALLATION

Install each part in the reverse order of removal.

26.Sun Visor

A: REMOVAL

1) Remove the sun visor assembly.
   (1) Remove the cap - sun visor, and then remove the screws.
   (2) Disconnect the connector and remove the sun visor assembly.
2) Remove the hook - sun visor.
   (1) Press both sides using a flat tip screwdriver.
   (2) Remove the hook - sun visor by pulling it toward you.



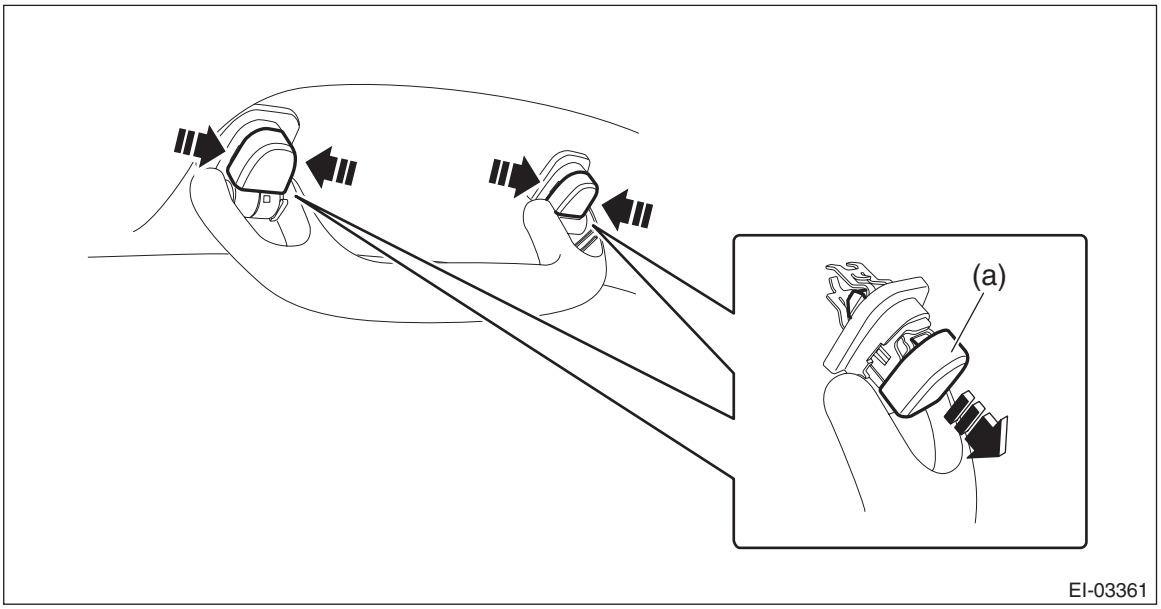
B: INSTALLATION

Install each part in the reverse order of removal.

27.Assist Grip

A: REMOVAL

1) Pull both sides of the cap (a) using a flat tip screwdriver or similar tool wrapped with a protection tape.
2) Pull the assist grip toward yourself (toward the vehicle center) to remove.



B: INSTALLATION

Install each part in the reverse order of removal.

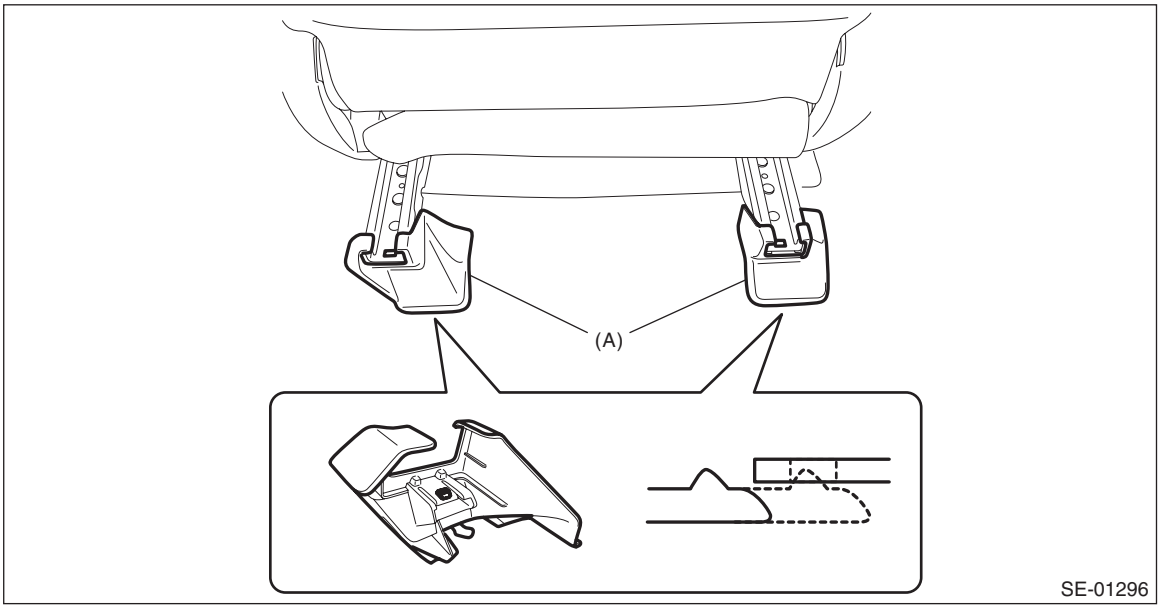
28.Roof Trim

A: REMOVAL

1. 4 DOOR MODEL

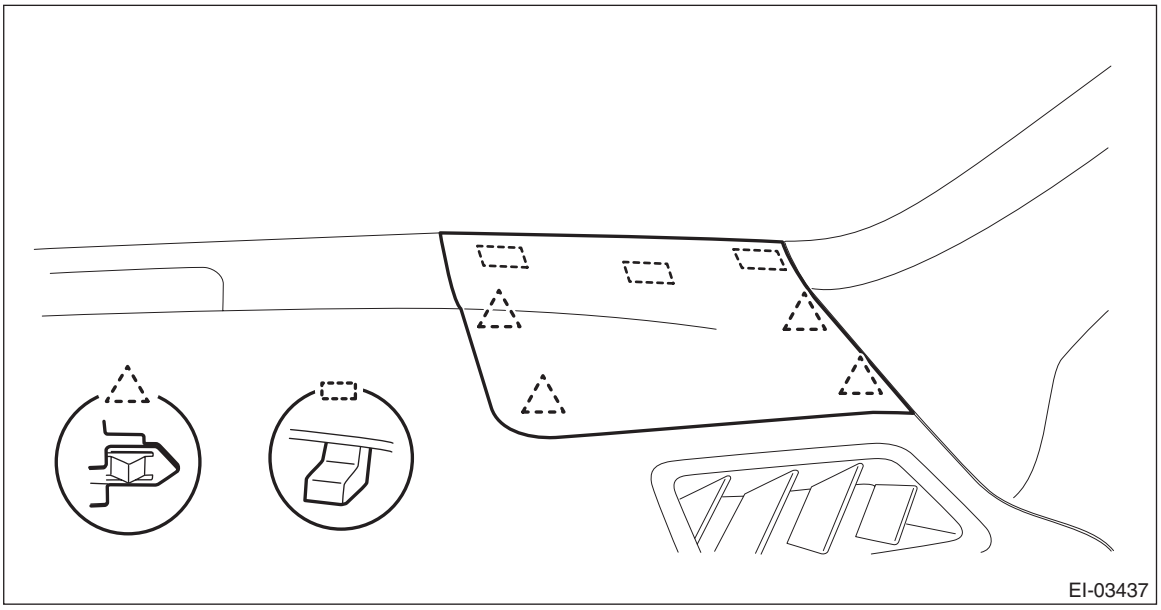
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work.
2) Remove the driver's seat.
   (1) Tilt the backrest forward and move the seat to the front most position.
   (2) Remove the rear bolt cover (A) and remove the two bolts.
   (3) Move the seat to the rearmost position, and remove the front bolts.

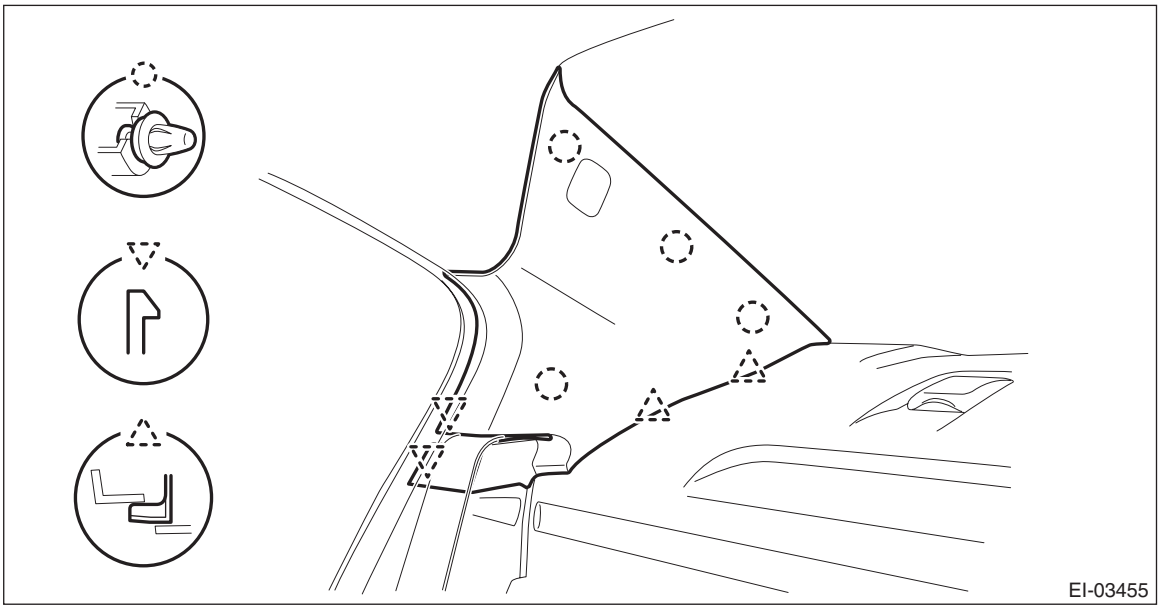


   (4) Disconnect the connector under the front seat.
   • Seat belt warning light connector (driver's seat)
   • Side airbag module connector <Ref. to AB-27, SIDE AIRBAG MODULE, PROCEDURE, Airbag Connector.>
   • Seat heater connector (model with seat heater)
   (5) Remove the headrest and take out the driver's seat from the vehicle.
3) Adjust the passenger's seat position.
   (1) Remove the headrest.
   (2) Move the passenger's seat to the front-most position and tilt the backrest rearward.
4) Remove the boot - hand brake, console box assembly and cover - shift lever. <Ref. to EI-77, REMOVAL, Console Box.>
5) Cover the following areas to protect from damage.
• Steering wheel surface
• Instrument panel surface
• Glove box surface
6) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>

7) Release the clips and claws, then detach the left and right grille speaker side.

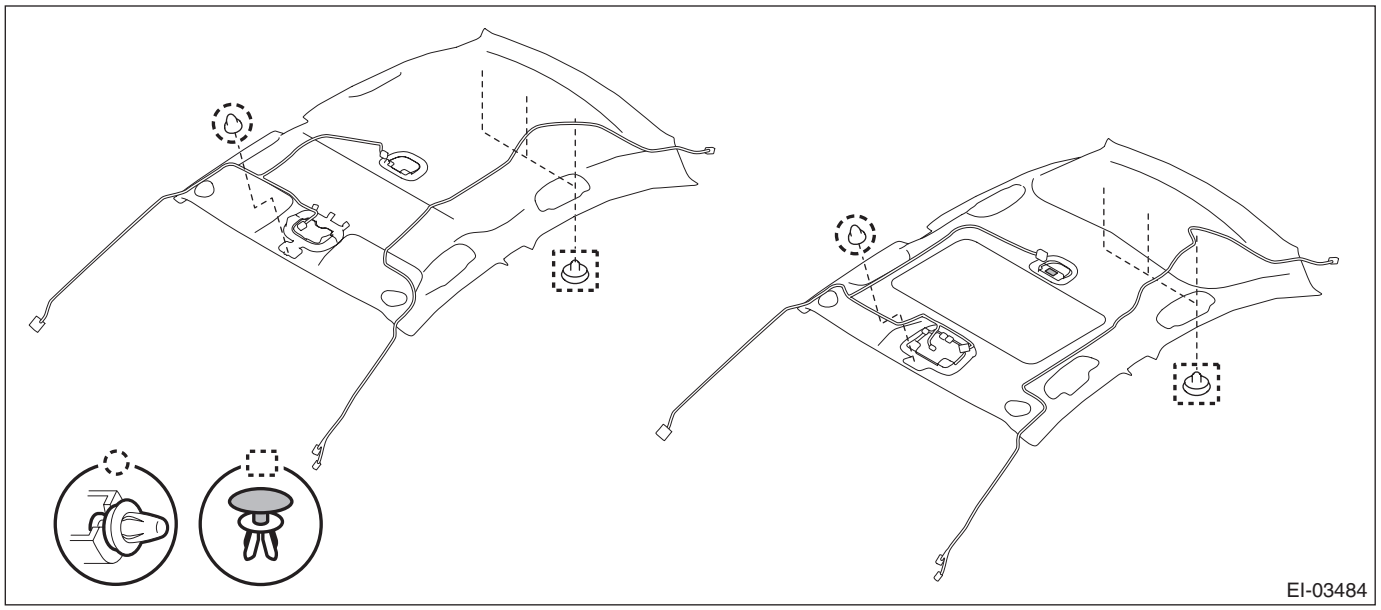


NOTE:
Remove the grille speaker side by using a plastic remover.
8) Remove the lower inner trim on the RH and LH sides. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
9) Remove the upper inner trim on the RH and LH sides. <Ref. to EI-94, REMOVAL, Upper Inner Trim.>
10) Remove the clips, and remove the trim panel - rear pillar UPR on the left and right sides.

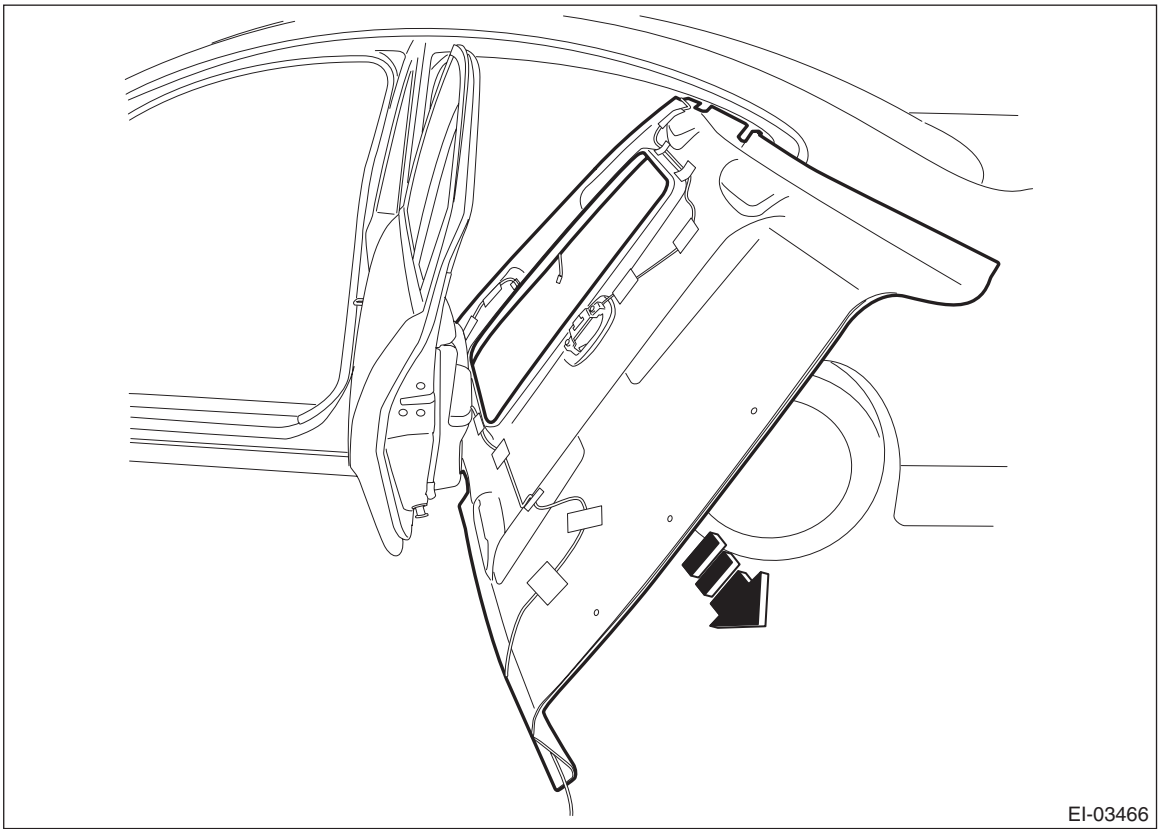


11) Remove the light assembly - map. (Models without EyeSight) <Ref. to LI-77, REMOVAL, Spot Map Light.>
12) Remove the stereo camera cover. (Models with EyeSight) <Ref. to ES-7, REMOVAL, Stereo Camera.>
13) Remove the left and right sun visor assembly. <Ref. to EI-107, REMOVAL, Sun Visor.>
14) Remove the light assembly - room. <Ref. to LI-80, REMOVAL, Room Light.>
15) Remove all assist rails. <Ref. to EI-108, REMOVAL, Assist Grip.>
16) Remove the garnish - roof. (Model with sunroof)
17) Remove the trim panel - roof assembly.
(1) Remove the harness clamp of the cord assembly - antenna feeder and the cord - roof, and disconnect the connectors.
(2) Remove the clips and the touch fastener behind the room light.

(3) Remove the weather strip - body side flange from the front/rear and left/right doors, and remove the trim panel - roof assembly.



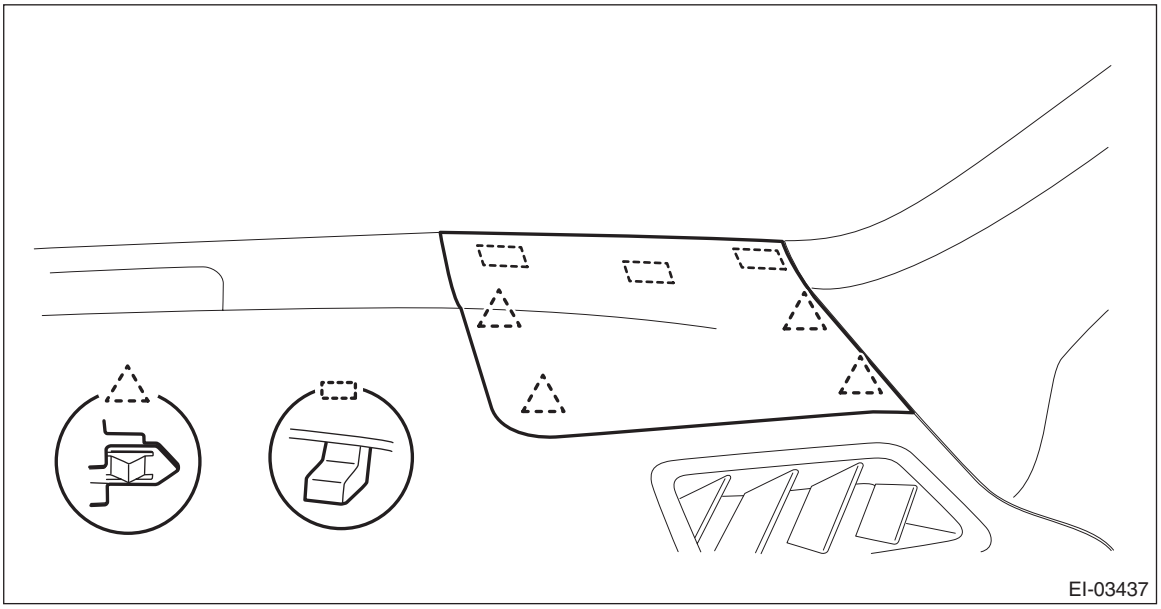
(4) Take out the trim panel - roof assembly from the vehicle.



2. 5 DOOR MODEL/CROSSTREK MODEL

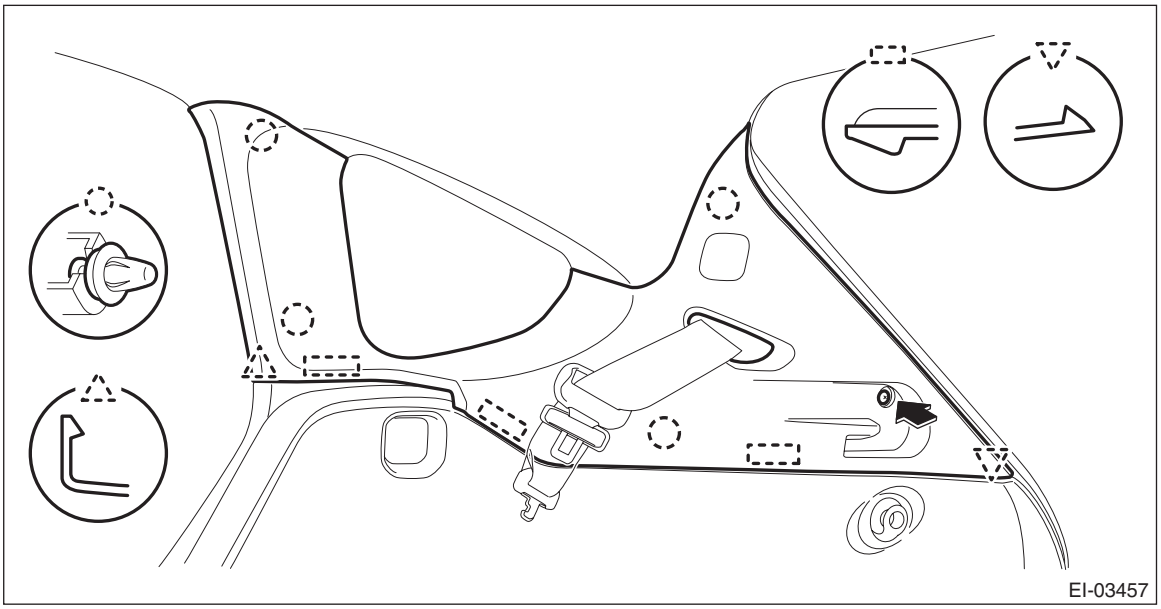
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Adjust the front seat position.
   (1) Remove the headrest.
   (2) Move the seat to the front-most position and tilt the backrest rearward.
3) Remove the rear seat cushion assembly and backrest assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Release the clips and claws, then detach the left and right grille speaker side.

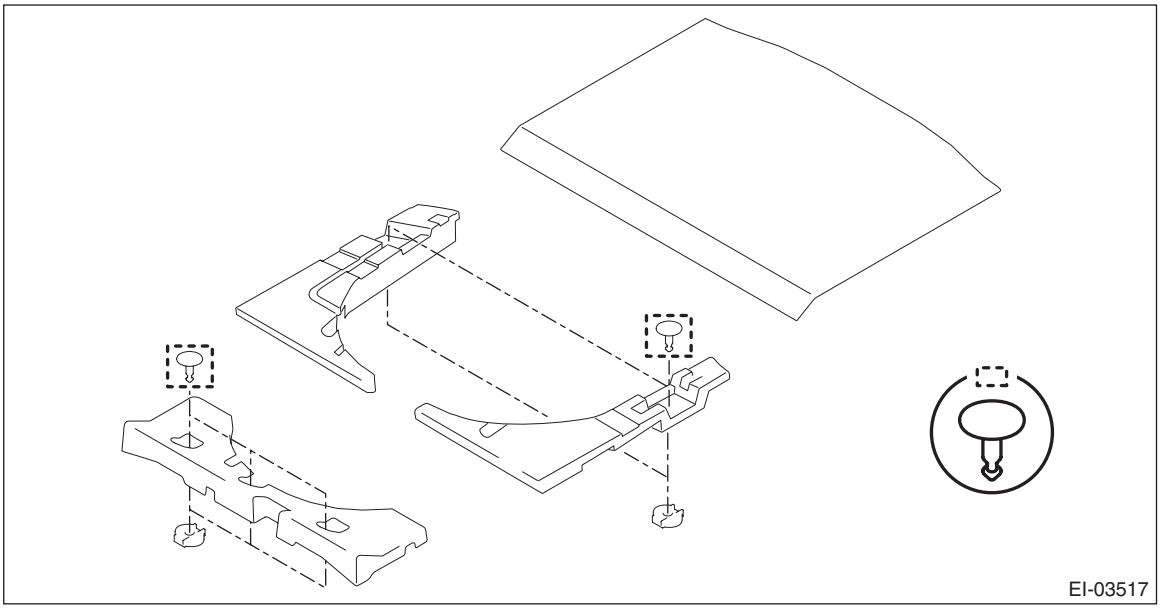


NOTE:
Remove the grille speaker side by using a plastic remover.
5) Remove the lower inner trim on the RH and LH sides. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
6) Remove the upper inner trim on the RH and LH sides. <Ref. to EI-94, REMOVAL, Upper Inner Trim.>

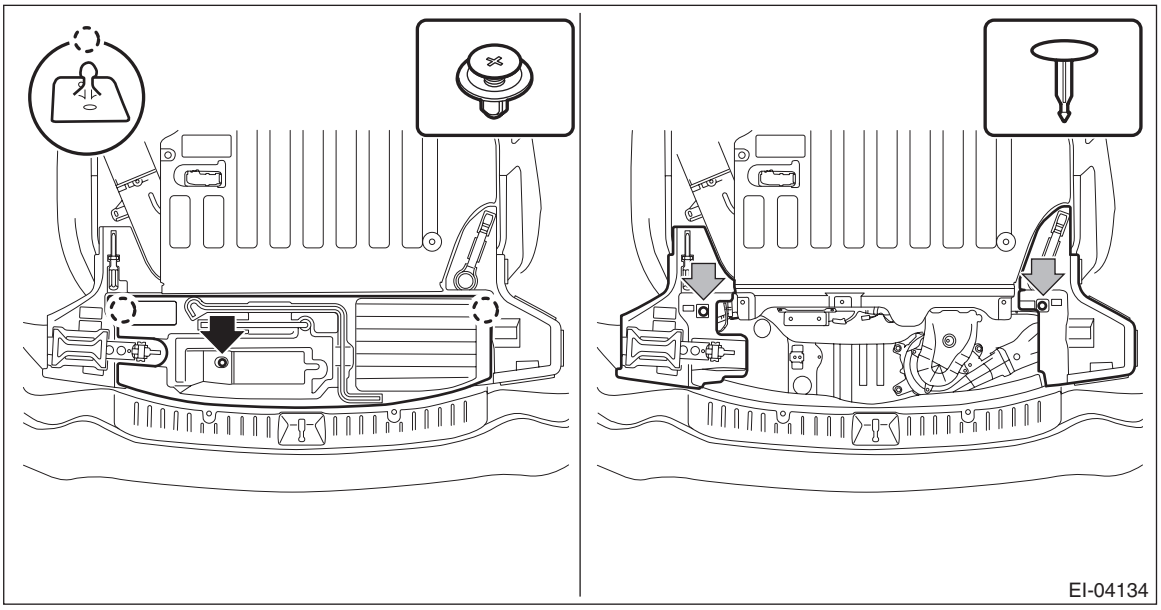
7) Remove the screws and clips, and remove the trim panel - rear quarter pillar UPR on the left and right sides.



8) Remove the mat - rear floor CTR and the spacer - rear floor side.

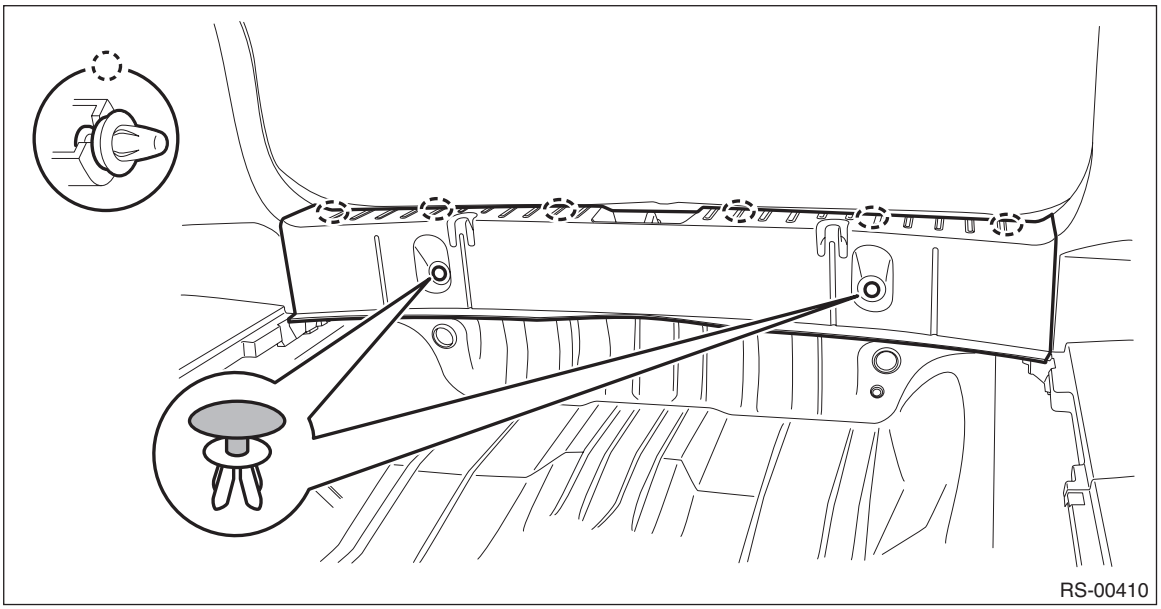


9) Remove the sub-trunk box and side spacers. (HEV model)



(1) Release the clips and side spacers, then detach the sub-trunk box.
(2) Remove the clips and detach the side spacers.

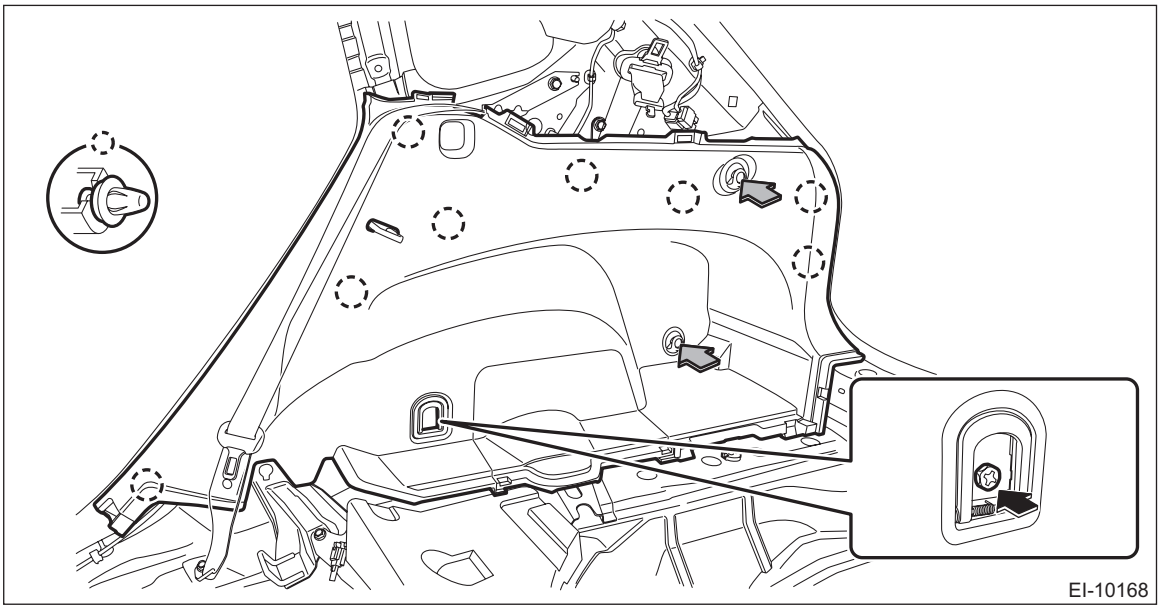
10) Remove the clips, and remove the trim panel - rear skirt.



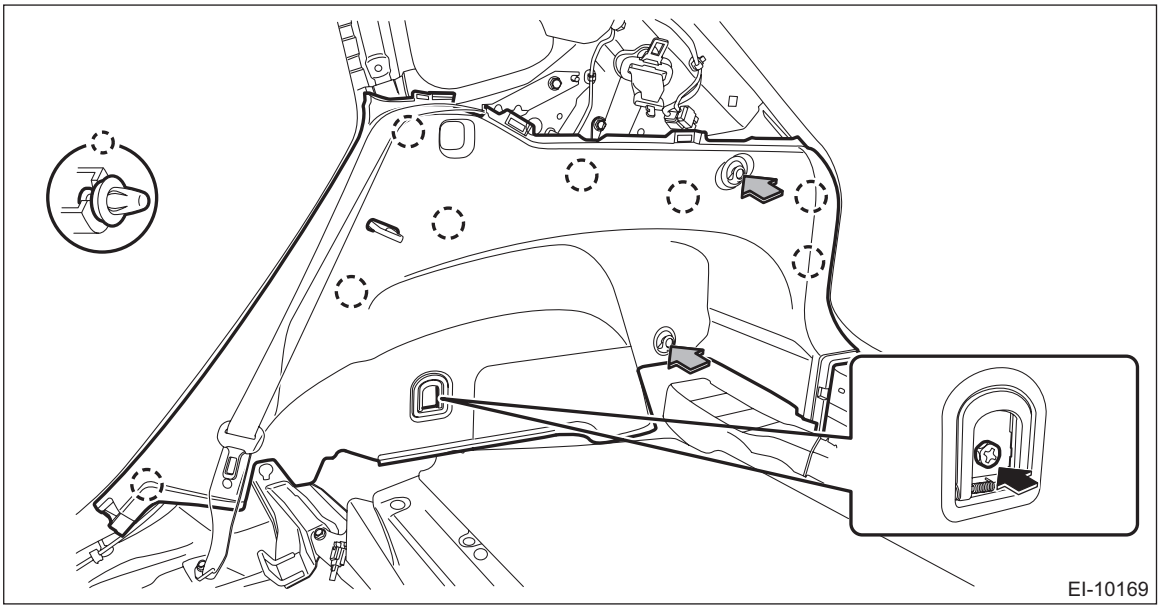
11) Remove the trim panel - rear apron.
(1) Remove the caps, and remove the bolts.
(2) Remove the screws.
(3) Disengage the clips, and remove the trim panel - rear apron.

NOTE:
For LH side, disconnect the connector of the luggage room light.

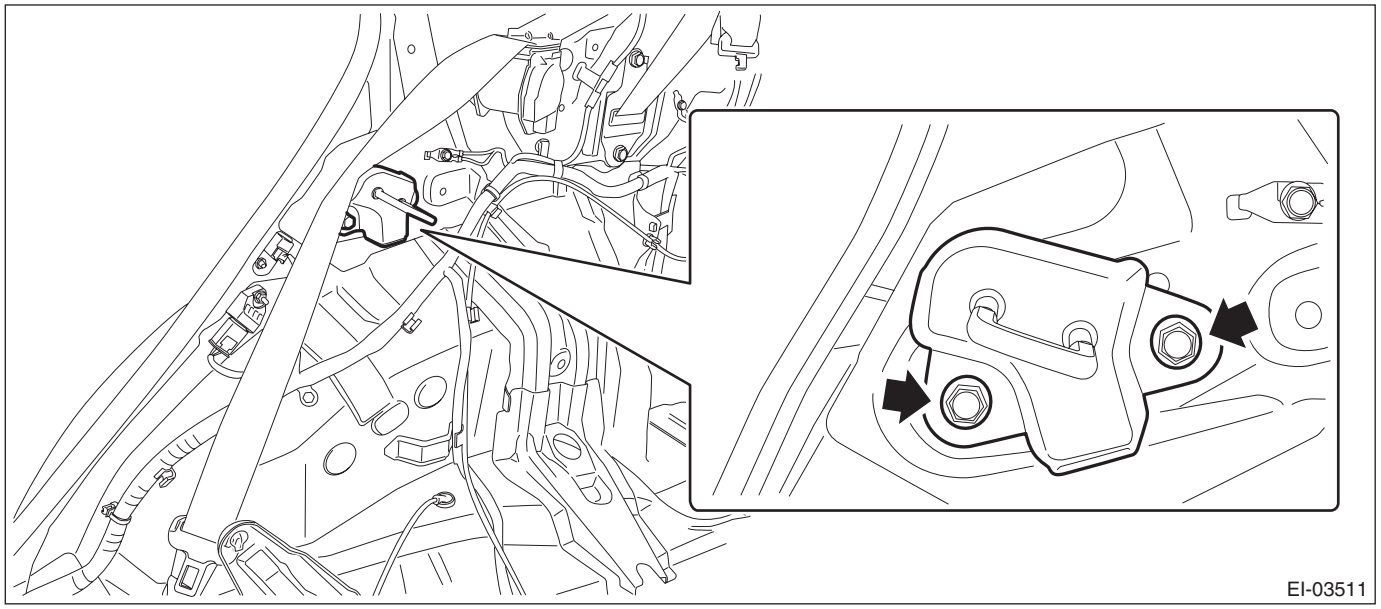
- Gasoline engine model



- HEV model

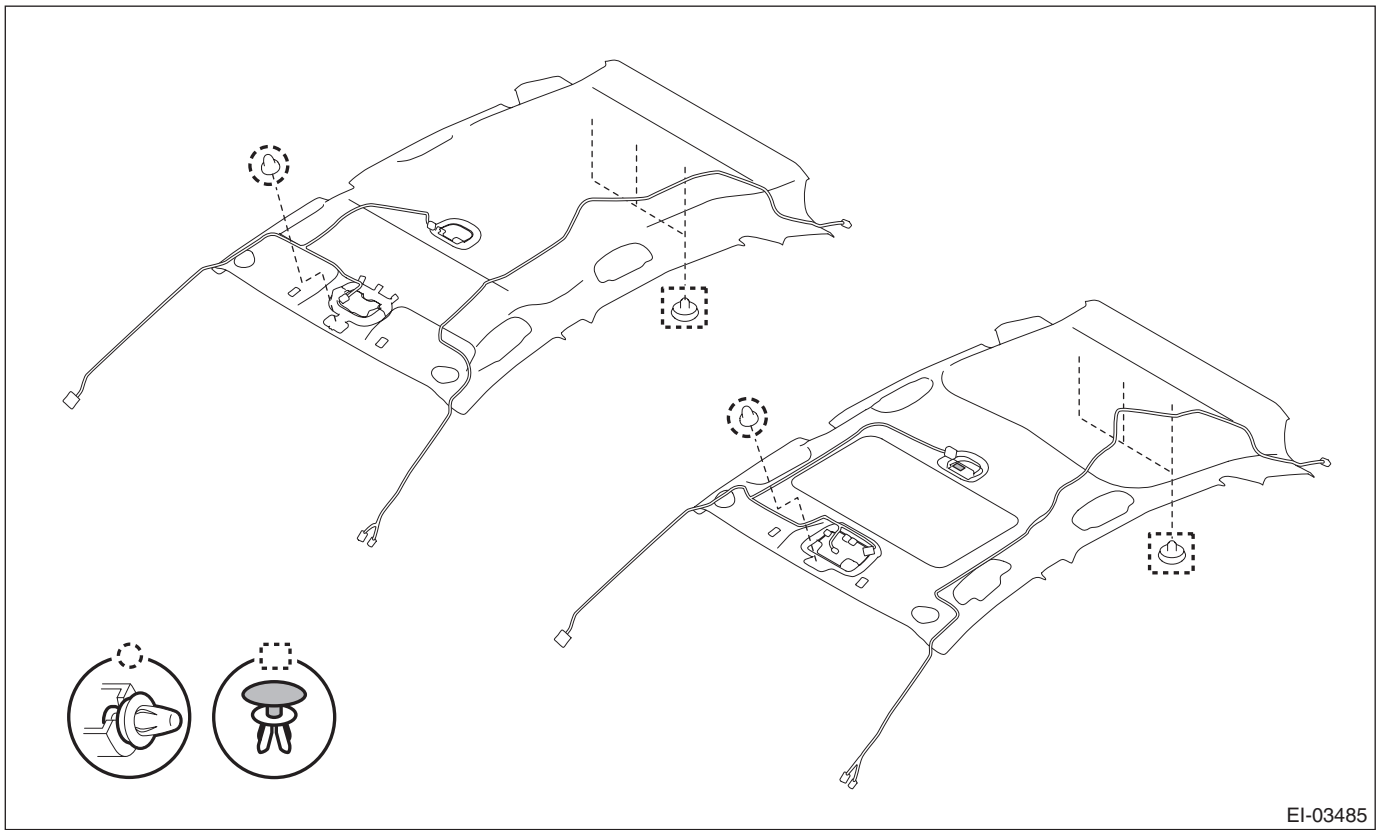


12) Remove the bolts, and remove the striker - backrest rear on the passenger's side.



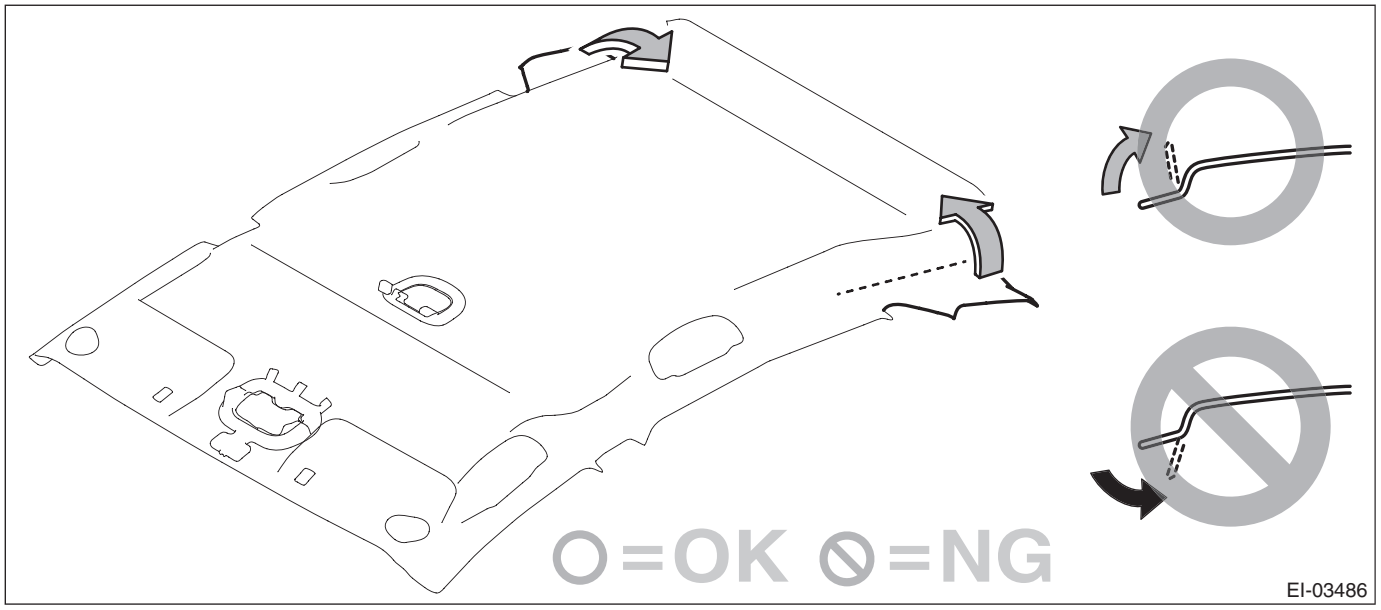
13) Remove the light assembly - map. (Models without EyeSight) <Ref. to LI-77, REMOVAL, Spot Map Light.>
14) Remove the stereo camera cover. (Models with EyeSight) <Ref. to ES-7, REMOVAL, Stereo Camera.>
15) Remove the left and right sun visor assembly. <Ref. to EI-107, REMOVAL, Sun Visor.>
16) Remove the light assembly - room. <Ref. to LI-80, REMOVAL, Room Light.>
17) Remove all assist rails. <Ref. to EI-108, REMOVAL, Assist Grip.>
18) Remove the garnish - roof. (Model with sunroof)

19) Remove the trim panel - roof assembly.
(1) Remove the harness clamp of the cord assembly - antenna feeder and the cord - roof, and disconnect the connectors.
(2) Remove the clips and remove the touch fastener behind the room light.



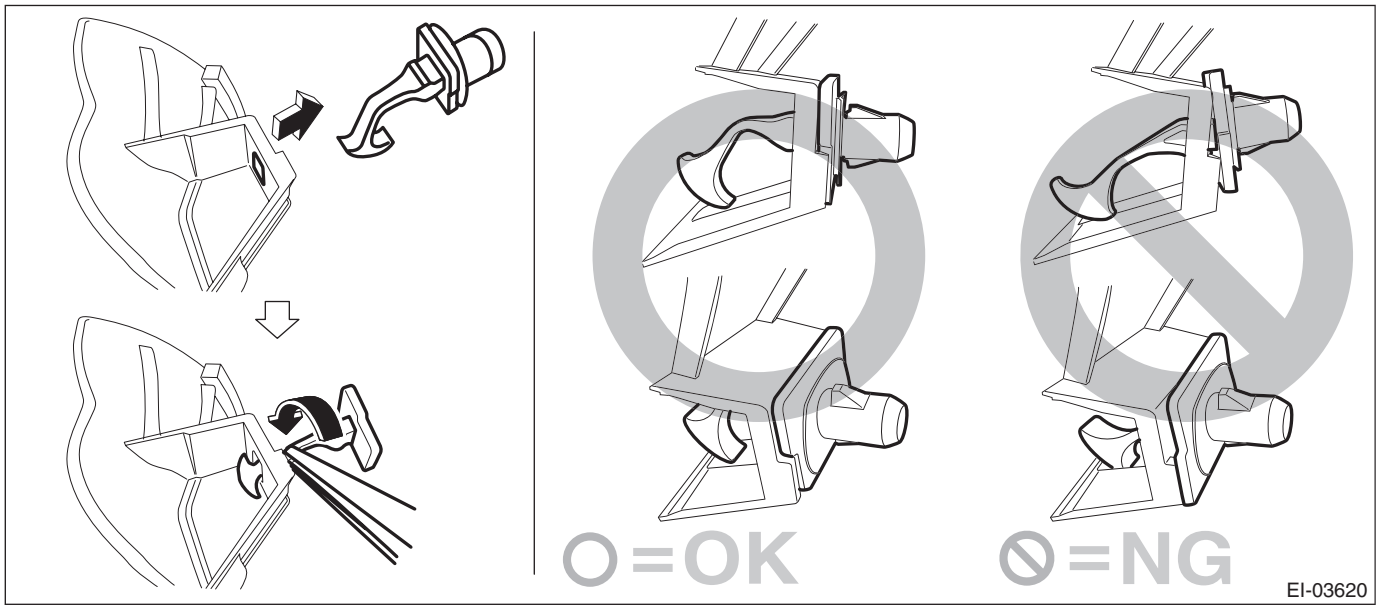
(3) Remove the weather strip - body side flange from the front/rear and left/right doors, and remove the trim panel - roof assembly.
(4) Slightly bend the rear end of the trim panel - roof assembly along the character line, and take it out from the rear gate opening.

CAUTION:
Be careful of the bending direction. If the direction is wrong, the trim panel - roof assembly may be wrinkled.



B: INSTALLATION

CAUTION:
• For installation of the stereo camera cover, refer to "INSTALLATION", "Stereo Camera" in the "EyeSight" section and observe the precautions for installation. <Ref. to ES-10, INSTALLATION, Stereo Camera.>
• When reusing the tether clip on the upper part of the trim panel - front pillar UPR, check that there is no damage to the tether clip. If the tether clip is damaged, always replace it with a new tether clip. If the tether clip is damaged, its holding force is reduced and the trim panel - front pillar UPR may come off.
• Do not reuse the tether clip removed from the upper part of the trim panel - front pillar UPR. Always replace with a new part.
• Do not reuse the upper clips of the trim panel - center pillar UPR. Once the clip is removed, its holding force is reduced. Be sure to replace it with a new clip.
• Before installing the trim panel - front pillar UPR, check the condition of protective non-woven fabric (white) of the curtain airbag. If it is damaged (airbag module cloth is exposed), replace the curtain airbag module assembly with a new part.
• Check the installation status of the tether clips and install the trim panel - front pillar UPR.



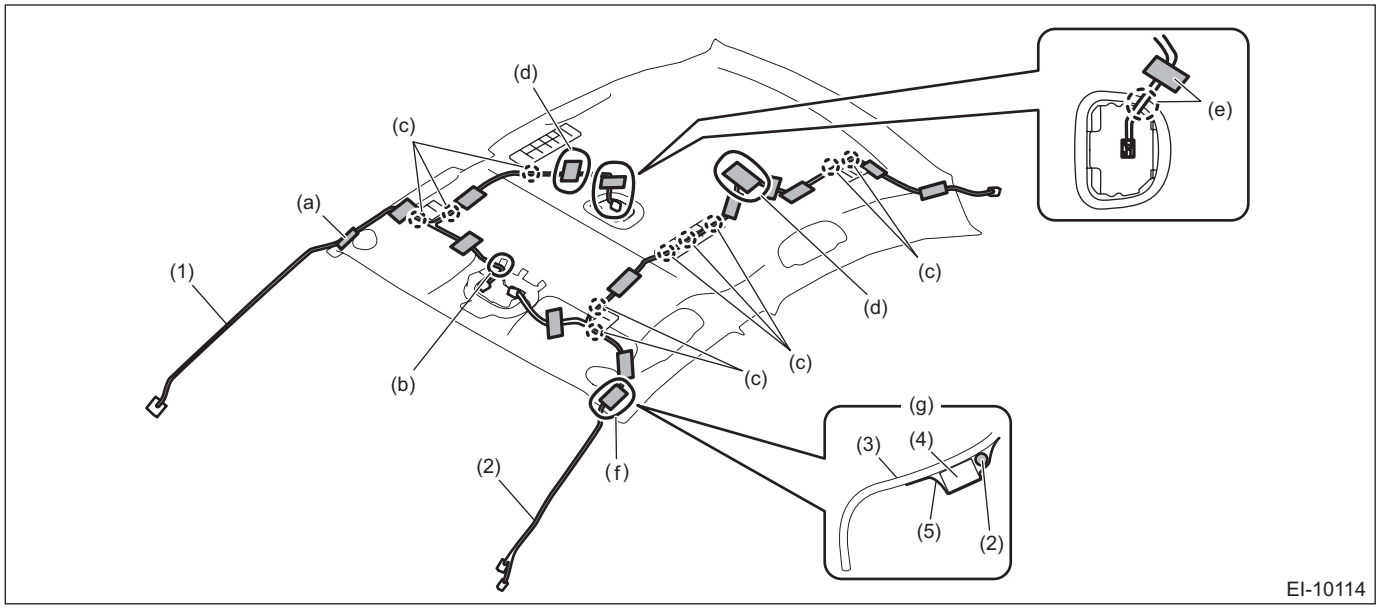
1) Attach the feeder cord and roof cord to the roof trim.

CAUTION:
Route each cord carefully. The cord may interfere, thus preventing normal deployment of the curtain airbag when necessary.

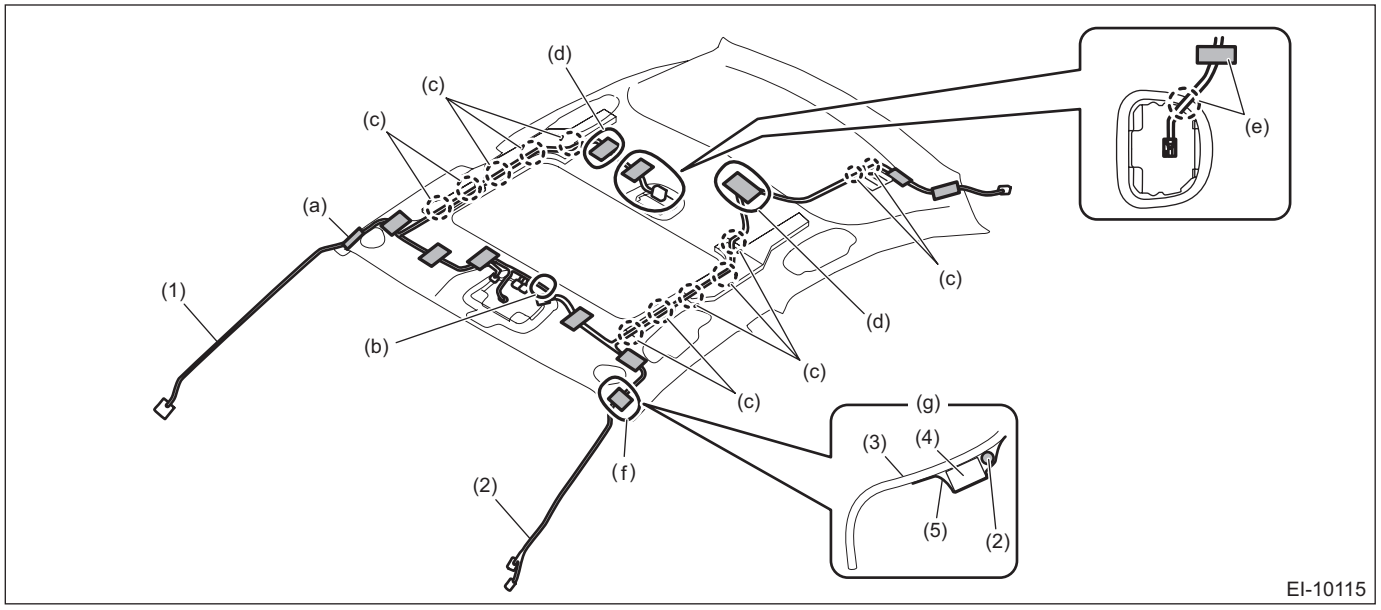
Tape:
Item number: 86359SC000/TAPE

NOTE:
Use the tape (service parts) by cutting into 80 mm × 50 mm (3.2 in × 2.0 in).

- 4 door model



EI-10114

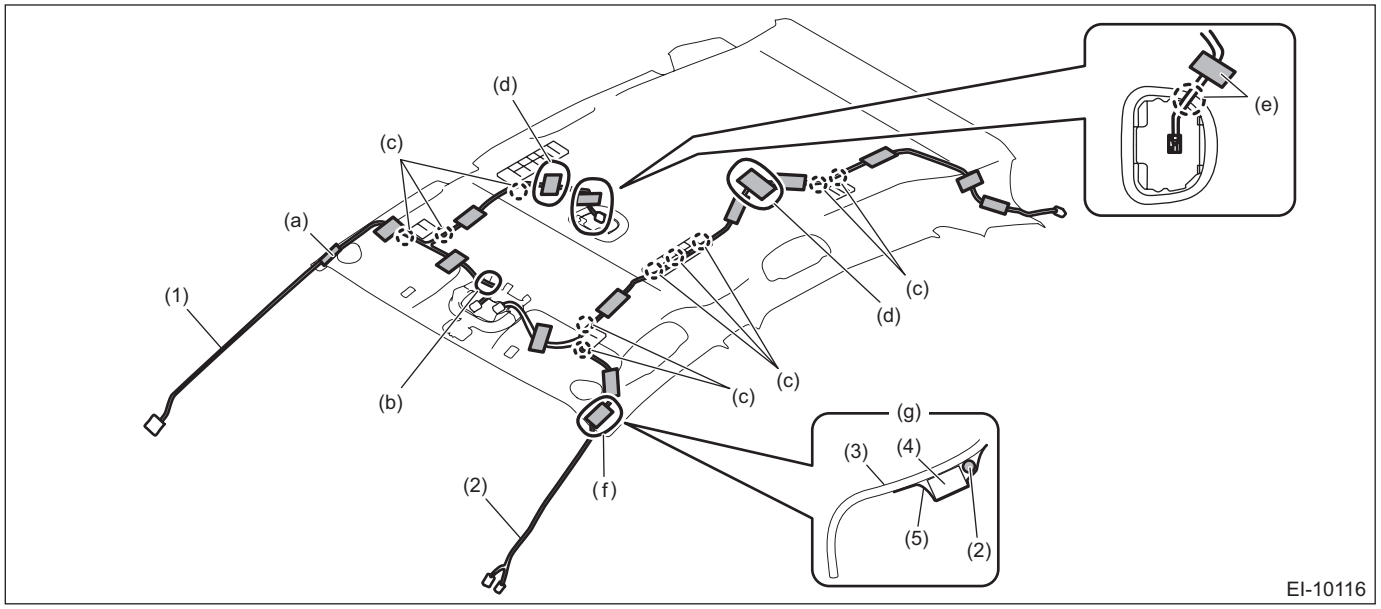


EI-10115

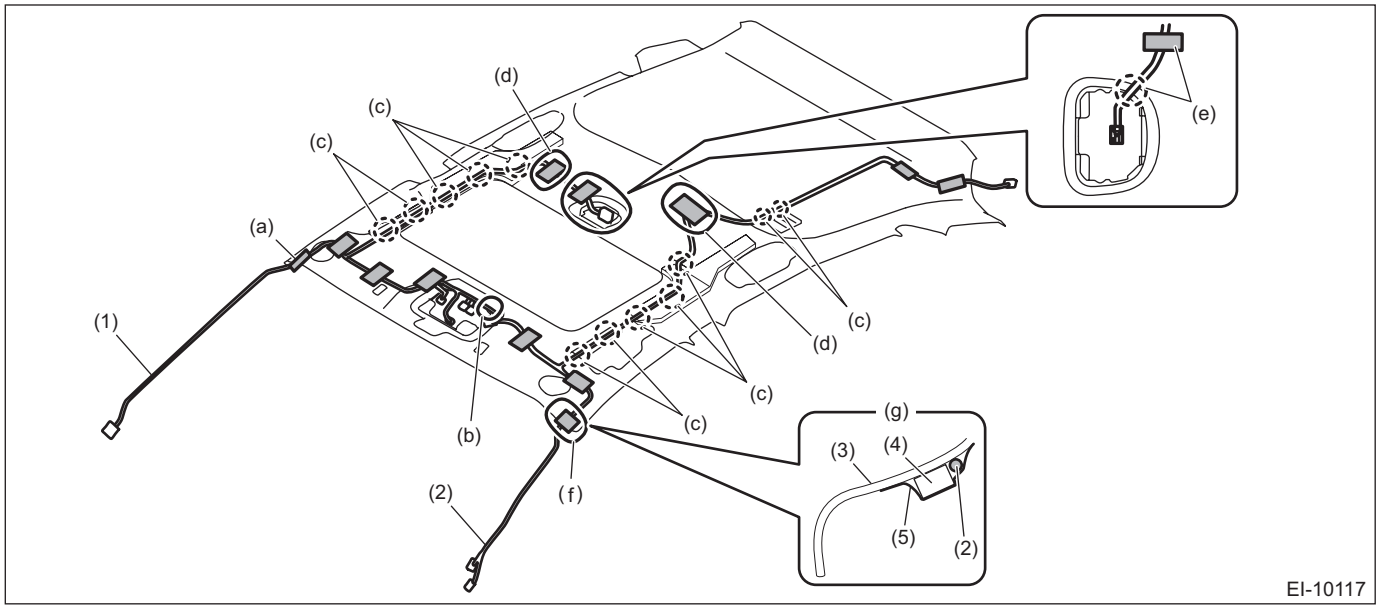
(1) Roof cord
(2) Feeder cord
(3) Trim panel - roof
(4) Cushion
(5) Tape

(a) Align the center of the marking (white tape) on the cord with the trim end, then secure using the tape.
(b) Align the marking (white tape) of the cord with the clamp to secure.
(c) Secure the cord to the roof pad clamp.
(d) Adjust the excess cord at (d) position and secure using the tape.
(e) Secure the marking (white tape) of the cord using the tape so that the marking cannot be viewed from the passenger room.
(f) Align the center of the marking (red tape) on the cord with the roof trim end, then secure using the tape.
(g) Route the cord along inside of the cushion (to the vehicle center) and secure using the tape.

- 5 door model/Crosstrek model



EI-10116

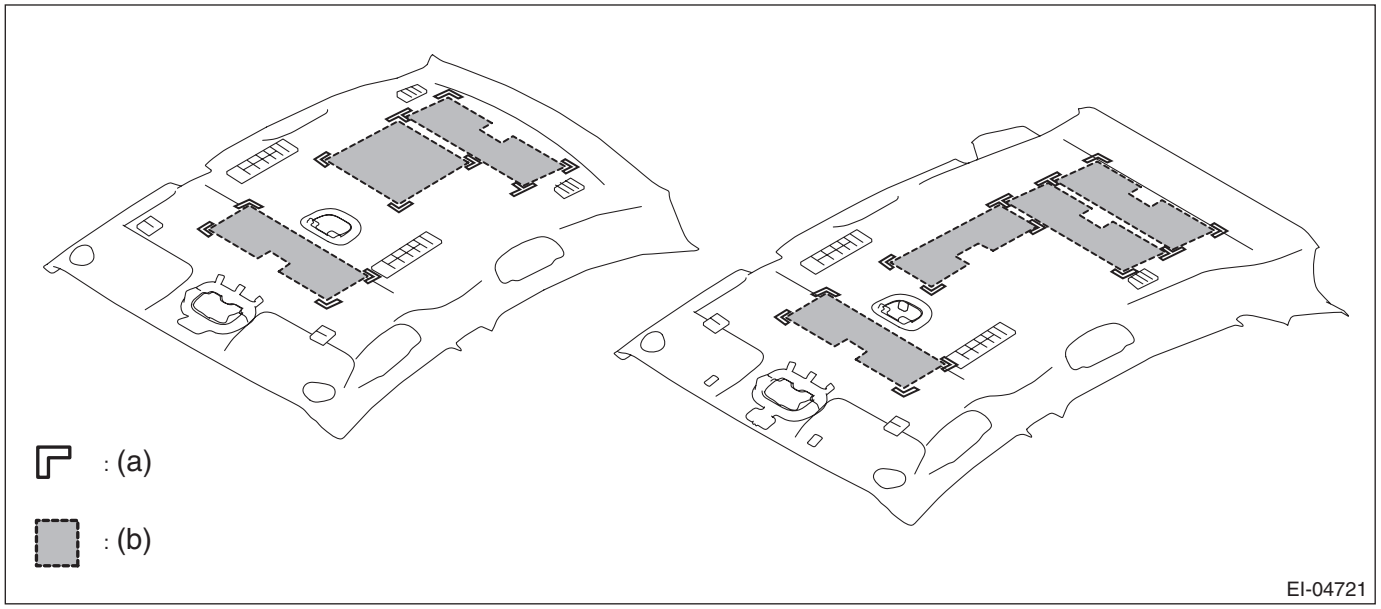


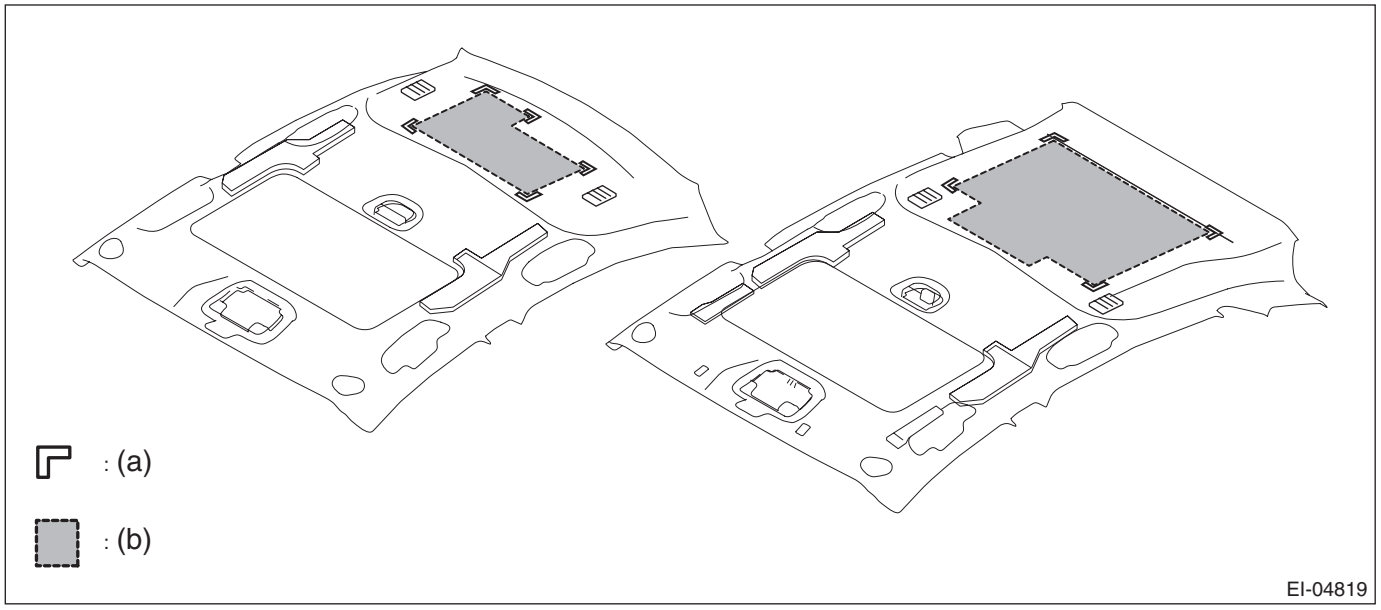
EI-10117

(1) Roof cord
(2) Feeder cord
(3) Trim panel - roof
(4) Cushion
(5) Tape

(a) Align the center of the marking (white tape) on the cord with the trim end, then secure using the tape.
(b) Align the marking (white tape) of the cord with the clamp to secure.
(c) Secure the cord to the roof pad clamp.
(d) Adjust the excess cord at (d) position and secure using the tape.
(e) Secure the marking (white tape) of the cord using the tape so that the marking cannot be viewed from the passenger room.
(f) Align the center of the marking (red tape) on the cord with the roof trim end, then secure using the tape.
(g) Route the cord along inside of the cushion (to the vehicle center) and secure using the tape.

2) Affix the insulator along with the mark-off line on the back surface of the roof trim.





(a) Mark-off line (b) Insulator

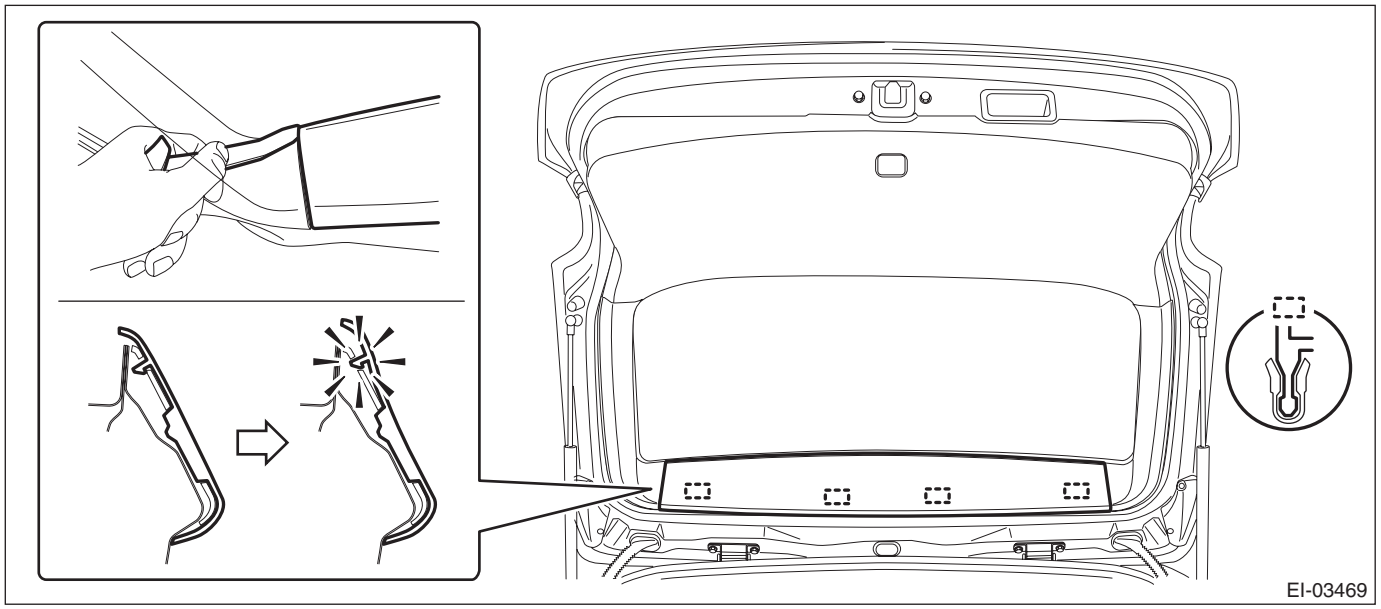
3) Install each part in the reverse order of removal.

Tightening torque:
Console box assembly: 6.5 N·m (0.66 kgf-m, 4.8 ft-lb)
Rear seat backrest assembly: <Ref. to SE-6, REAR SEAT, COMPONENT, General Description.>

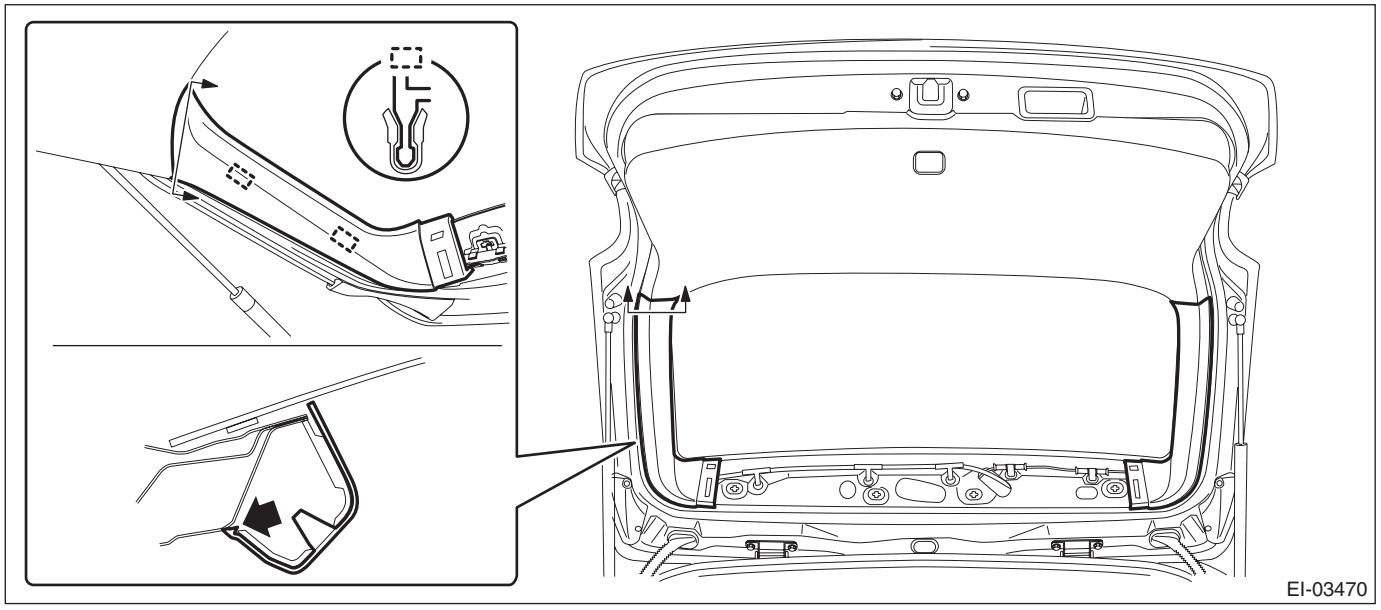
29.Rear Gate Trim

A: REMOVAL

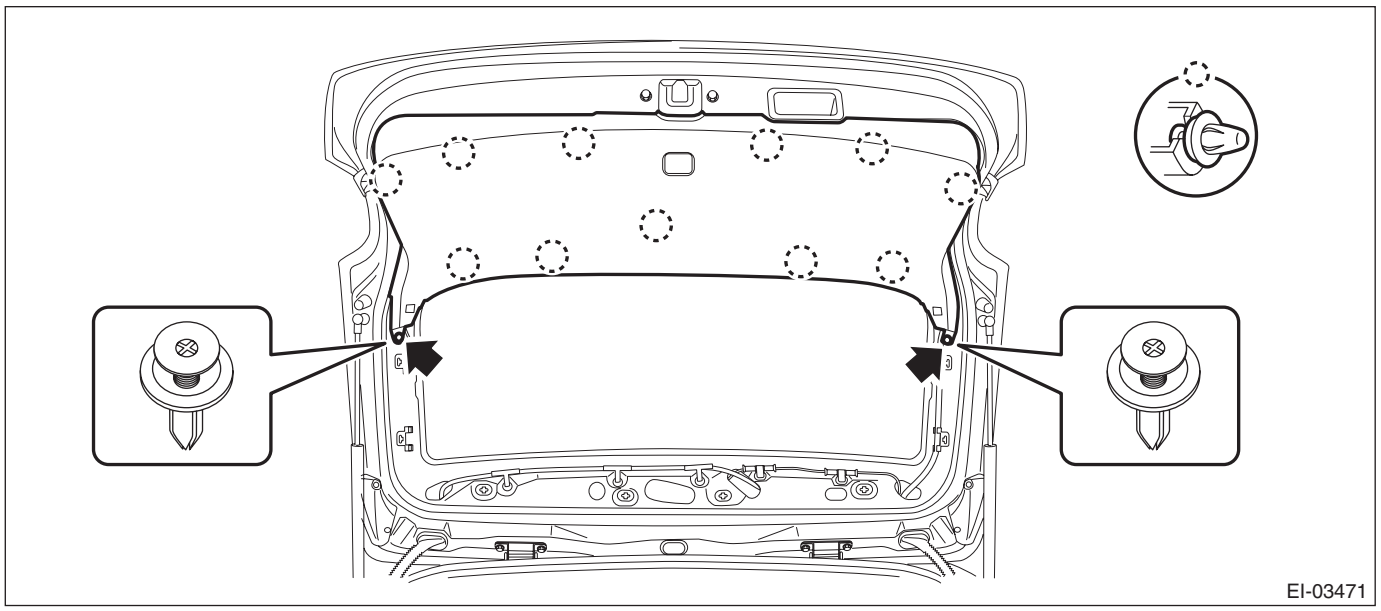
1) Remove the trim panel - rear gate UPR.
   (1) Remove the claws on the trim edge.
   (2) Release the claws in the center of trim, and remove the trim panel - rear gate UPR.



2) Remove the trim panel - rear gate pillar side.
   (1) Release the claws.
   (2) Remove the claws on the bottom of trim, and remove the trim panel - rear gate pillar side.



3) Remove the trim panel - rear gate LWR.
   (1) Remove the clips on both ends.
   (2) Release the clips, and remove the trim panel - rear gate LWR.



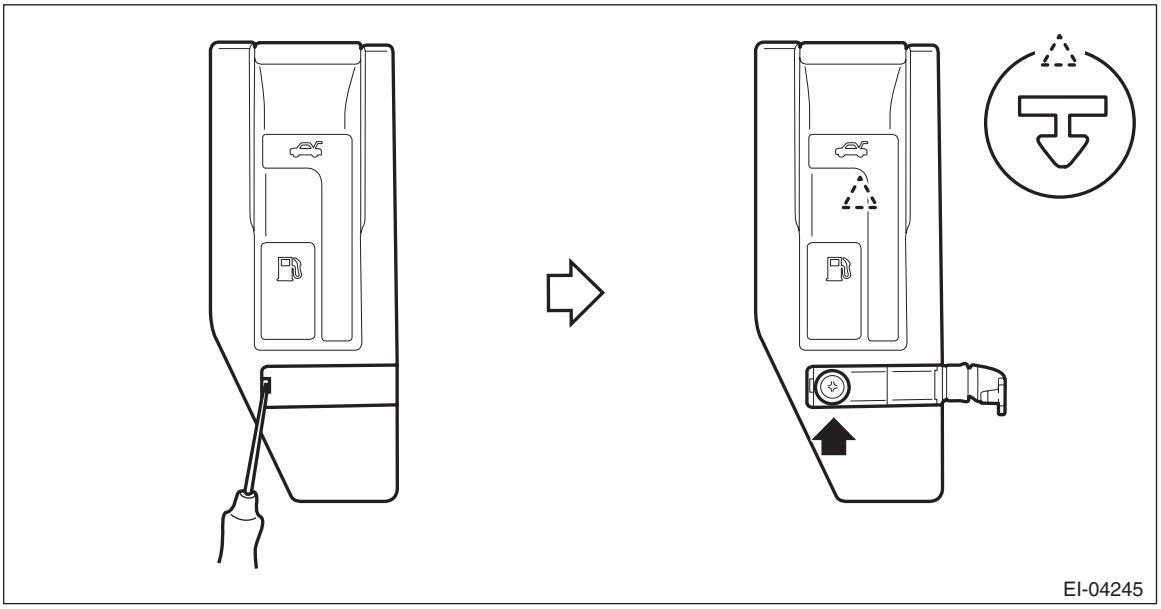
B: INSTALLATION

Install each part in the reverse order of removal.

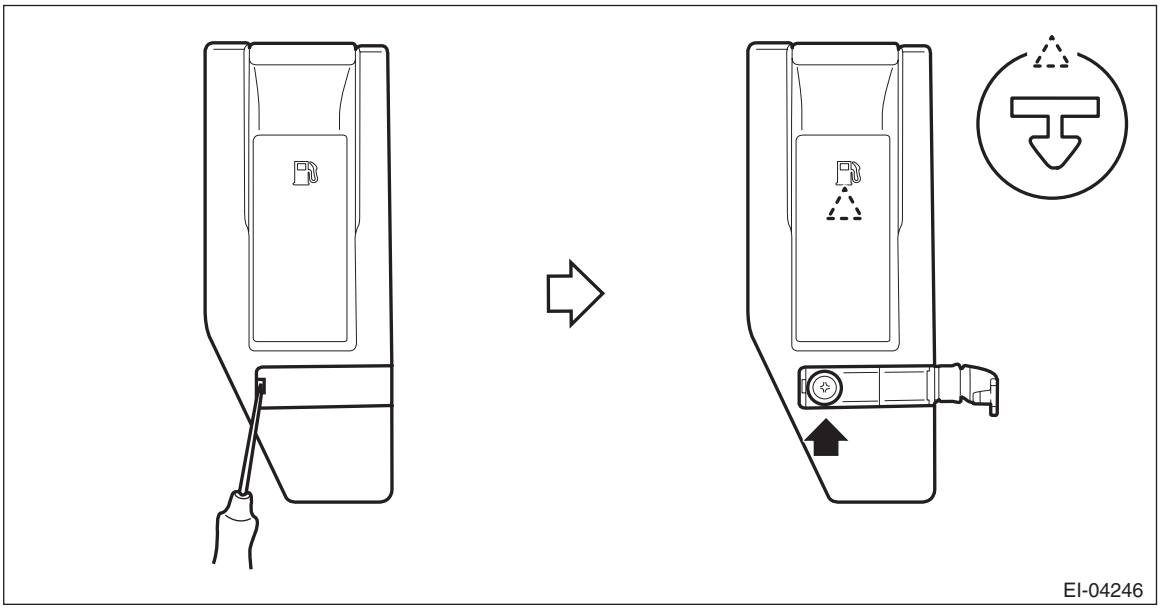
30.Floor Mat

A: REMOVAL

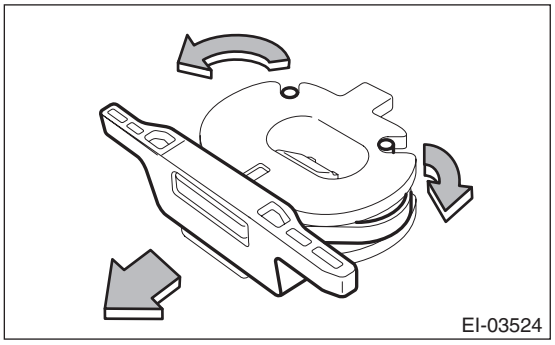
CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Be careful not to apply strong impact to the sensor when performing operations, while the rear seat cushion is removed.
1) Remove the front seat assembly. <Ref. to SE-8, REMOVAL, Front Seat.>
2) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
3) Remove the console box assembly and panel center LWR. <Ref. to EI-77, REMOVAL, Console Box.>
4) Remove the lower inner trim. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>
5) Remove the pull handle cover.
   (1) Open the cover by using a flat tip screwdriver.
   (2) Remove the screw and remove the pull handle cover.
   • 4 door model


EI-04245

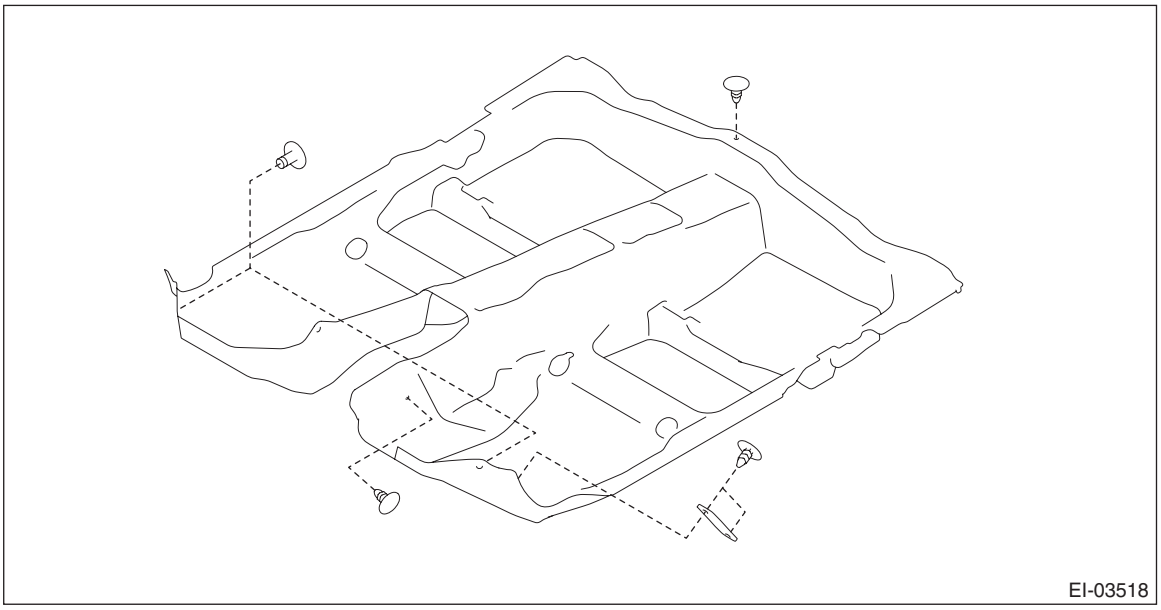
   • 5 door model/Crosstrek model


EI-04246

6) Remove the knobs of the hook - seat cushion rear.



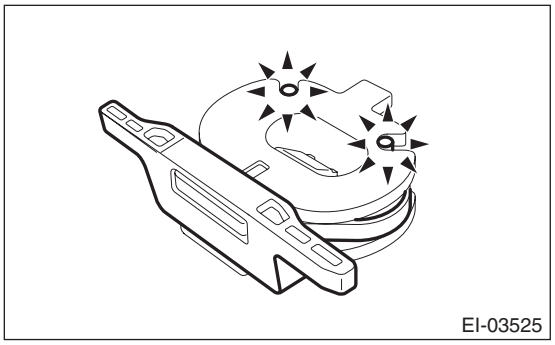
7) Take out the floor mat from the vehicle.
   (1) Remove the clips from the floor mat.
   (2) Remove the mat hook on both sides.
   (3) Take out the floor mat after folding down.



B: INSTALLATION

Install each part in the reverse order of removal.

CAUTION:
Make sure that the knobs of the hook - seat cushion rear are securely installed.

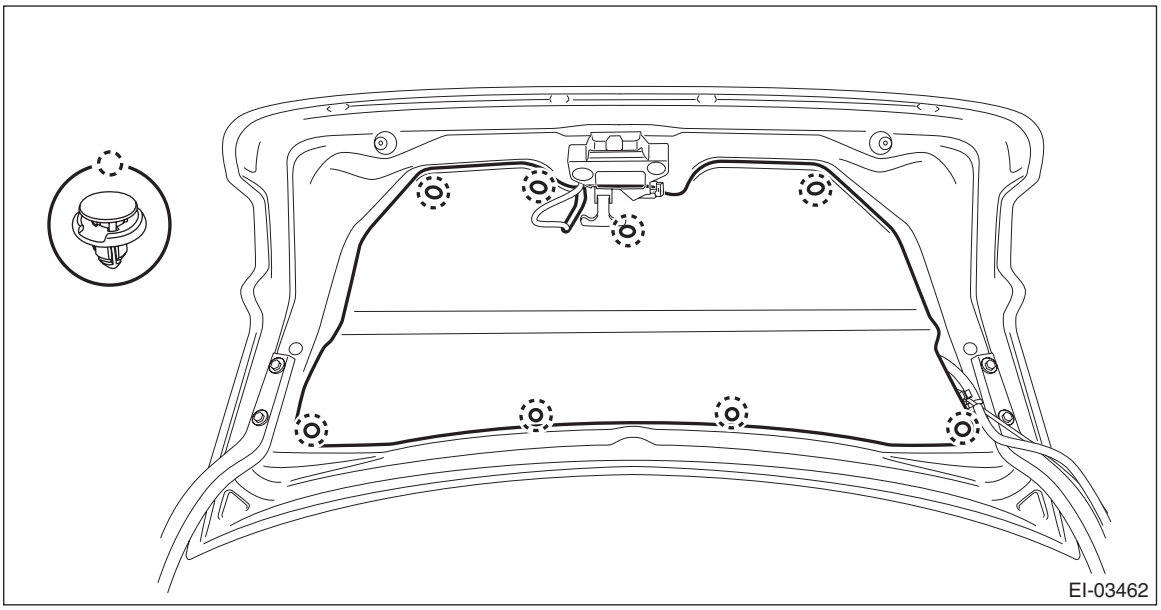


NOTE:
Secure the mat firmly with clips.

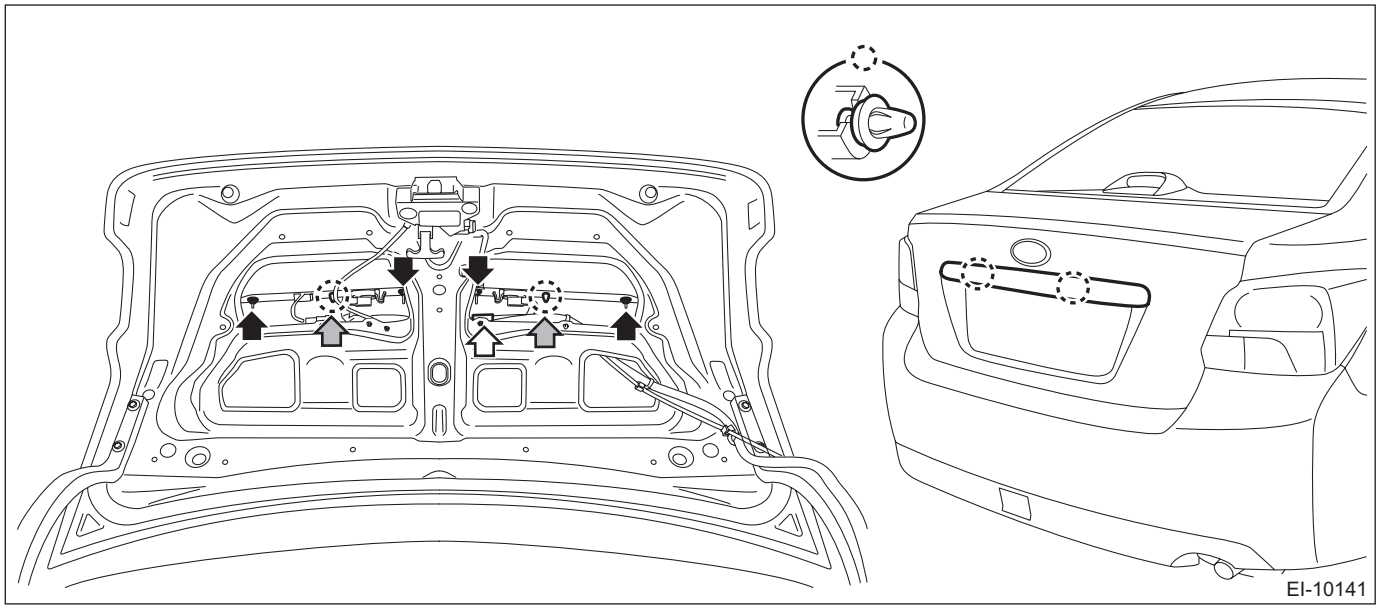
31.Trunk Lid Garnish

A: REMOVAL

1) Remove the clips, and remove the trim panel - trunk lid.



2) Remove the garnish - trunk.
   (1) Remove the nut.
   (2) Remove the clips, and remove the garnish - trunk.



B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
4.5 N·m (0.46 kgf-m, 3.3 ft-lb)

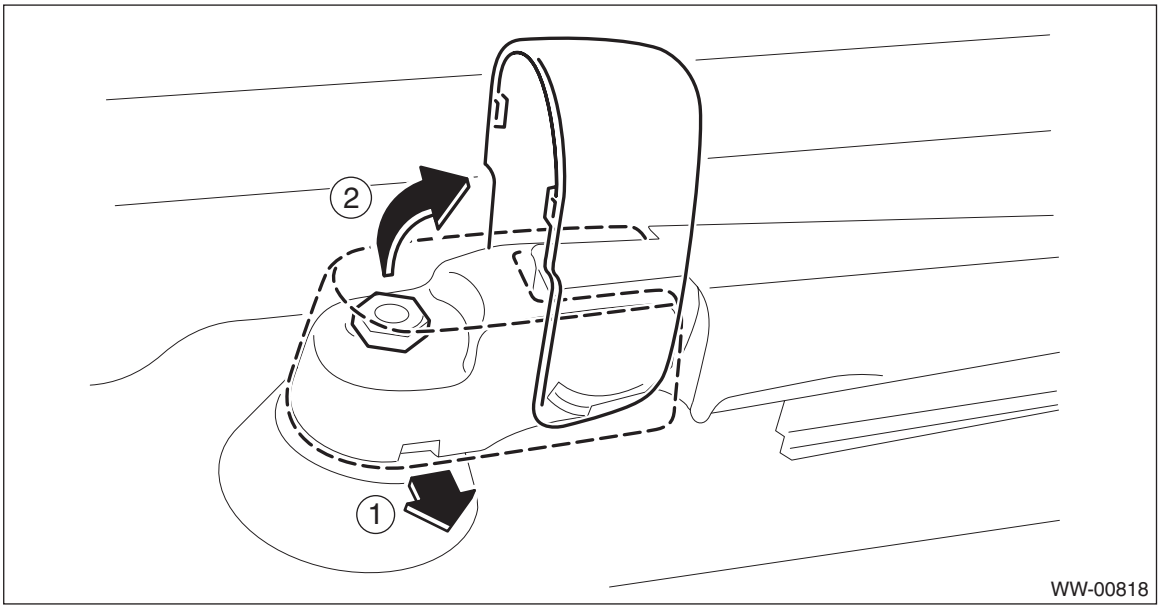
32.Rear Gate Garnish

A: REMOVAL

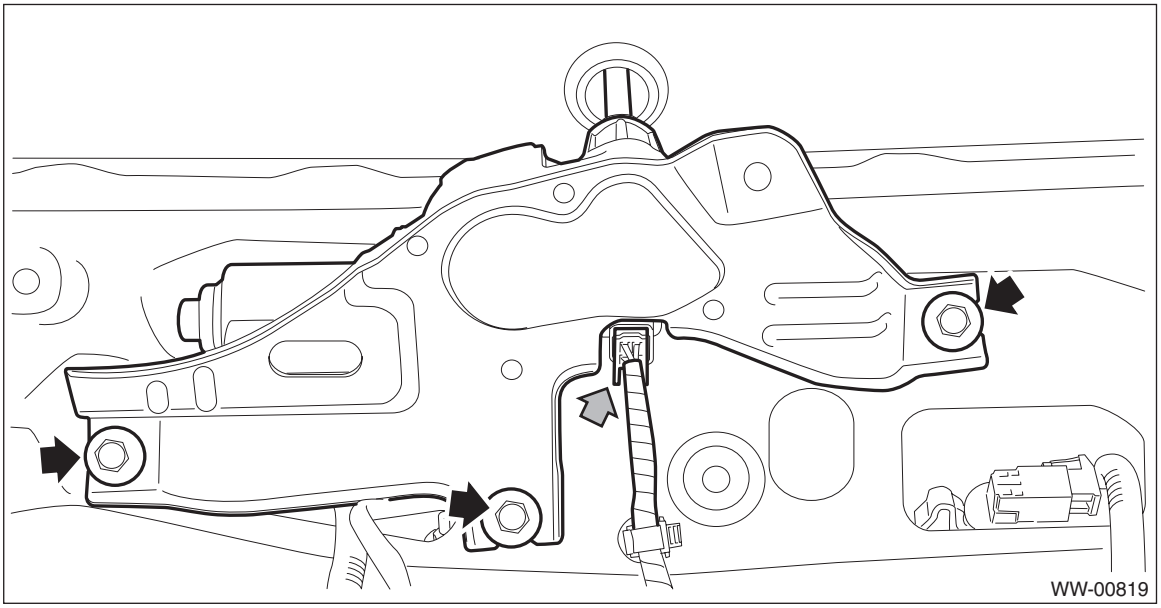
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

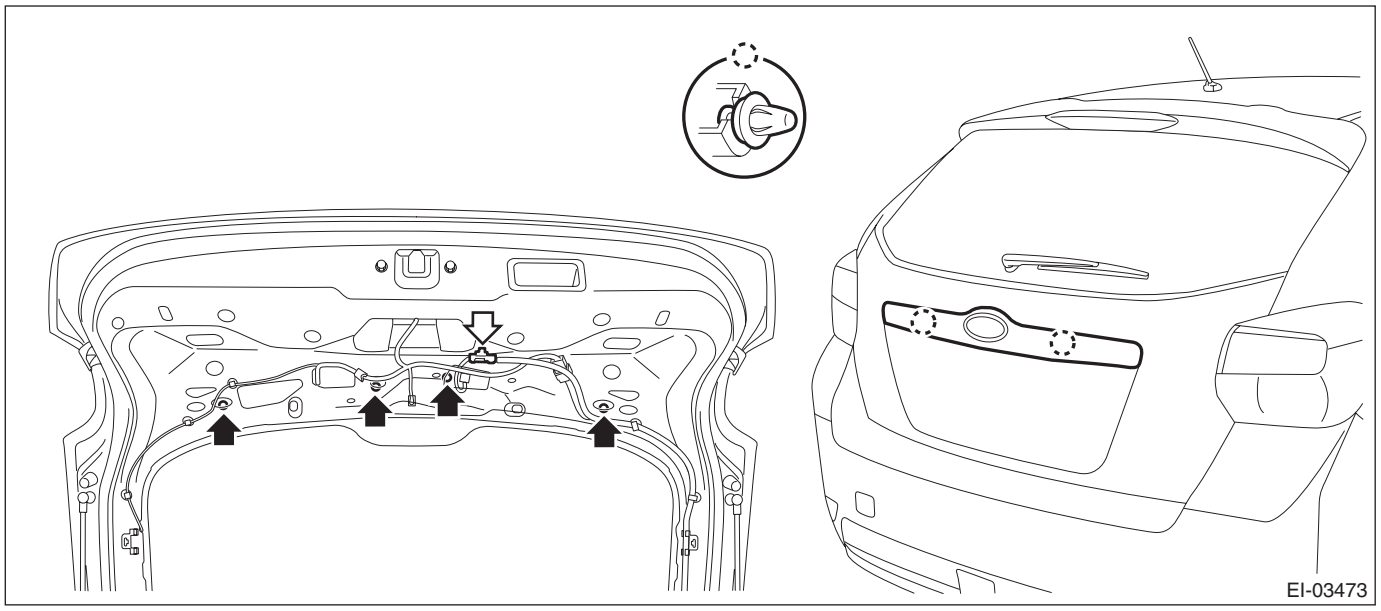
2) Remove the trim panel - rear gate. <Ref. to EI-122, REMOVAL, Rear Gate Trim.>
3) Remove the arm assembly - rear wiper.
   (1) Remove the cover - rear wiper arm.
   (2) Remove the nut, and remove the arm assembly - rear wiper.



4) Remove the motor assembly - rear wiper.
   (1) Disconnect the harness connector of the motor assembly - rear wiper.
   (2) Remove the bolts, and remove the motor assembly - rear wiper.



5) Remove the garnish assembly - rear gate.
   (1) Disconnect the harness connector of license plate light assembly.
   (2) Remove the nuts.
   (3) Remove the clips and remove the garnish assembly - rear gate.



B: INSTALLATION

CAUTION:
Make sure that the harness grommet is securely installed.
If not properly installed, this may cause leaks.
Install each part in the reverse order of removal.

Tightening torque
Garnish assembly - rear gate: 4.5 N·m (0.46 kgf-m, 3.3 ft-lb)
Motor assembly - rear wiper: 6 N·m (0.61 kgf-m, 4.4 ft-lb)
Arm assembly - rear wiper: 8 N·m (0.82 kgf-m, 5.9 ft-lb)

33.Heat Shield Cover

A: NOTE

Refer to “EXHAUST” section for removal and installation procedure of the heat shield cover.

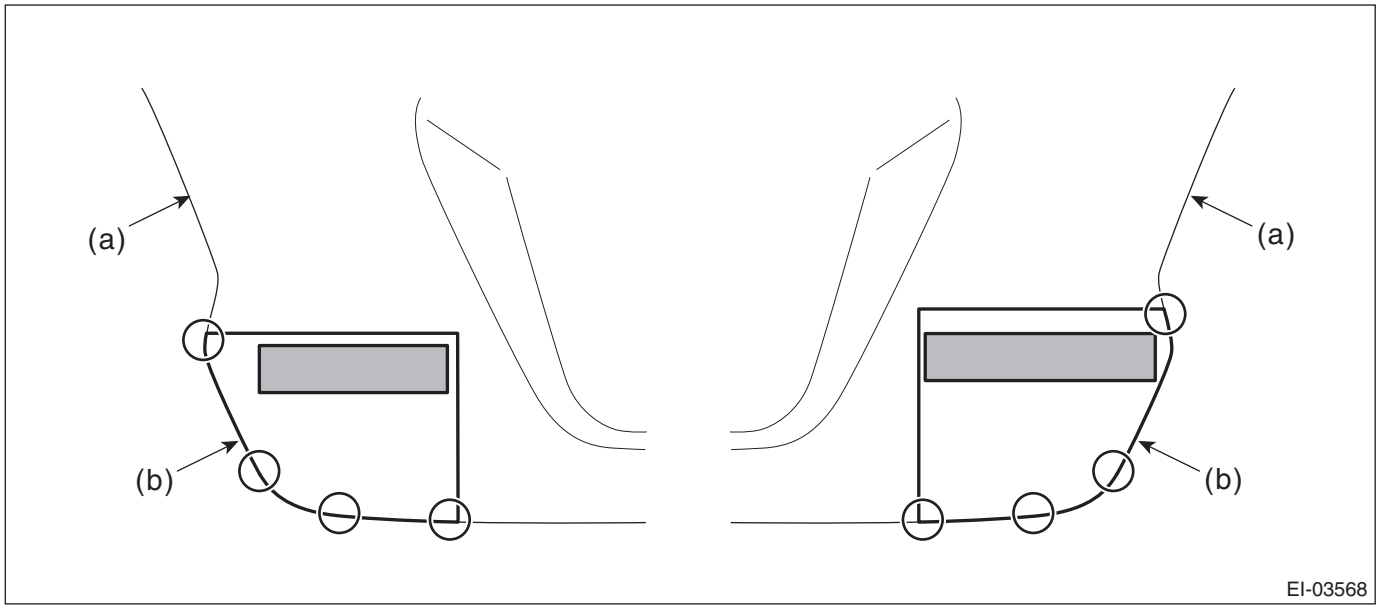
34.Ornament

A: INSTALLATION

1. LETTER MARK

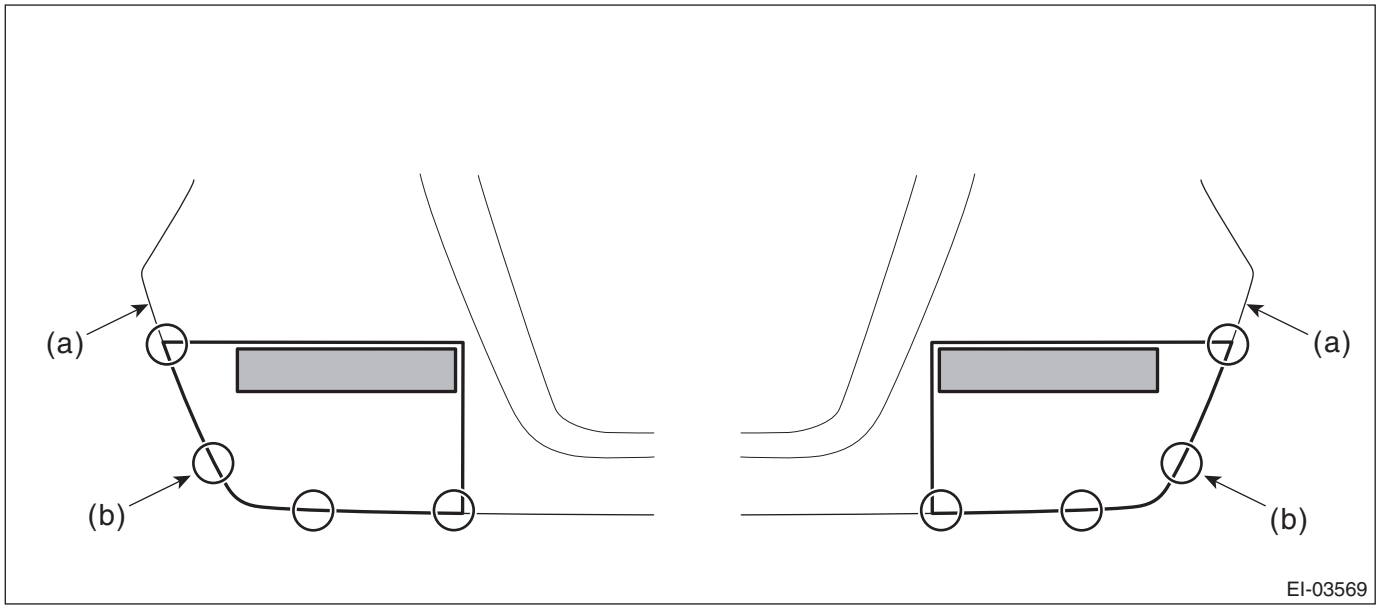
Align the end of application tape with the end of panel, then adhere the letter mark.

- 4 door model



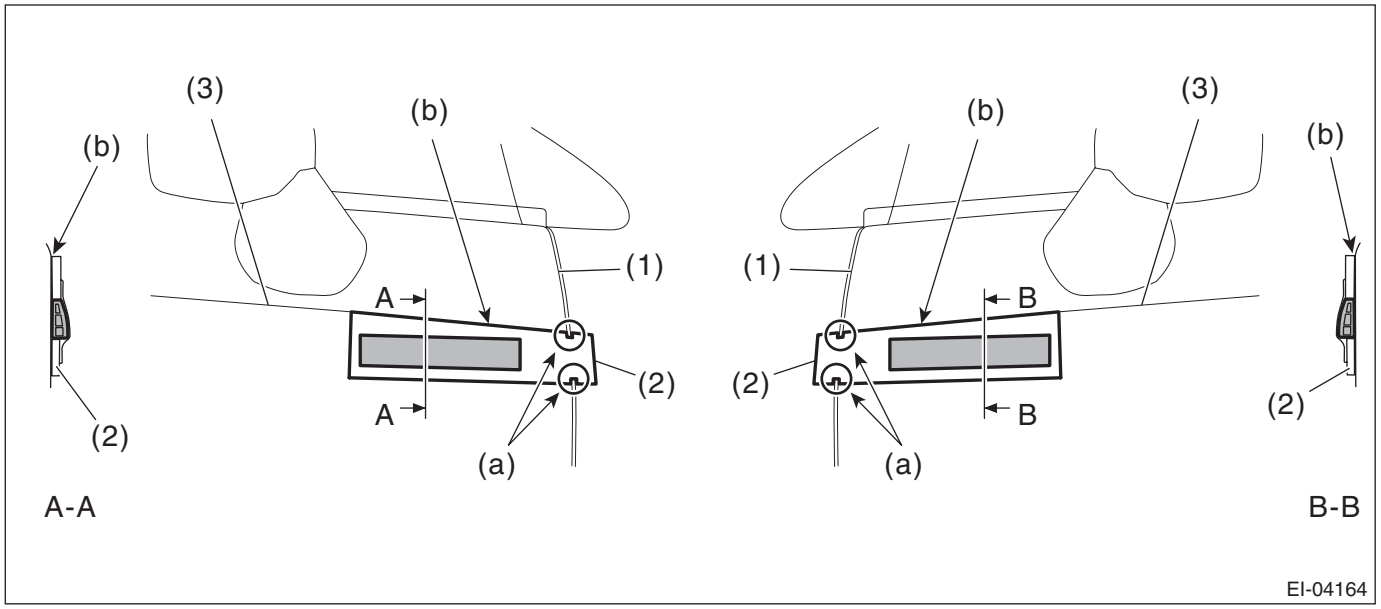
(a) Trunk lid COMPL end (b) Application tape end

- 5 door model/Crosstrek model



(a) Panel - rear gate end (b) Application tape end

- HEV model



(1) Front door end (2) Application tape end (3) Curved section of character line

NOTE:
- Align the cutout of application tape with the front door end standard. (a)
- Align the top end of application tape with the R section end of the character line. (b)

EXTERIOR BODY PANELS

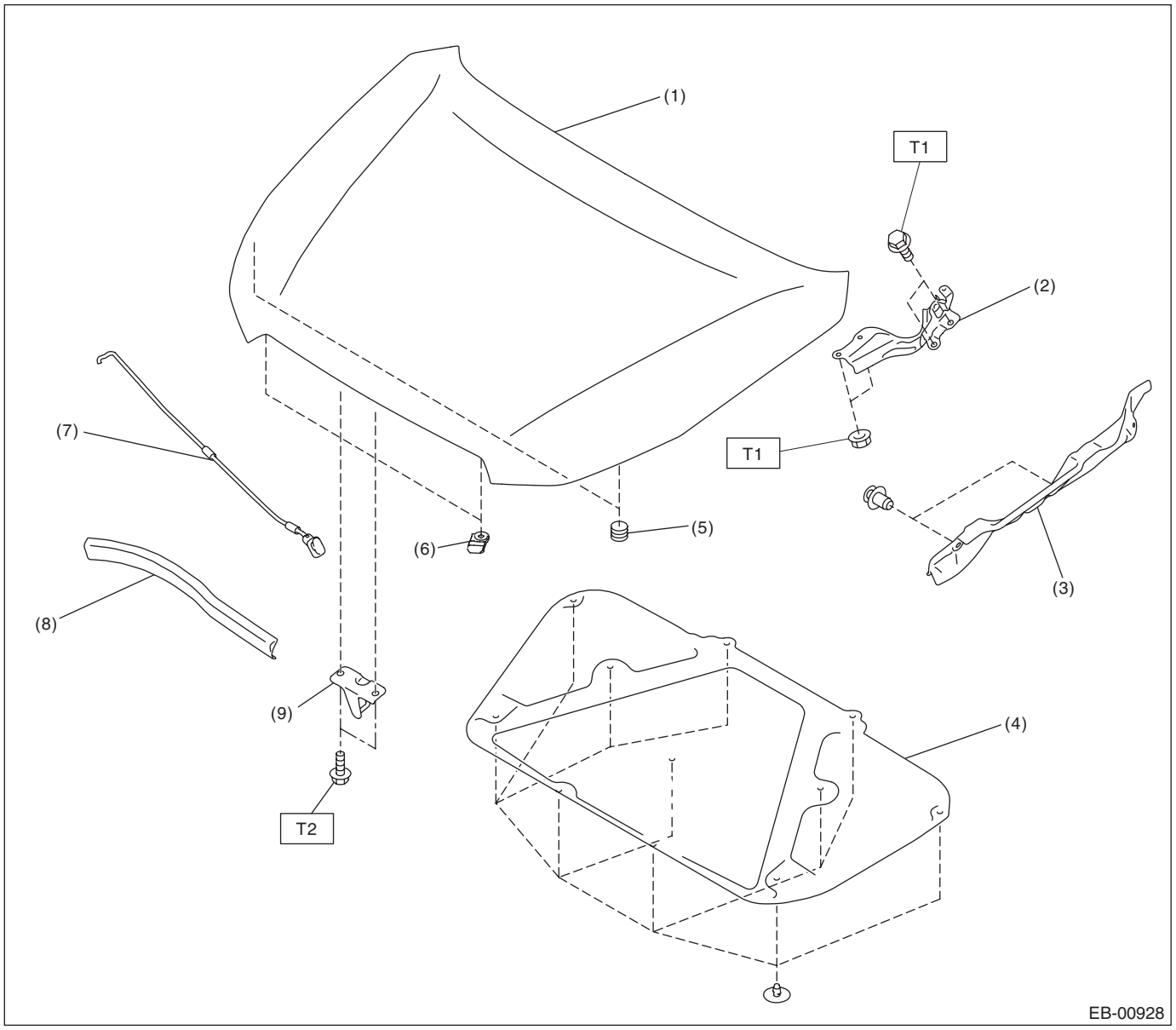
EB

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3.	Front Fender	16
4.	Front Door	19
5.	Front Sealing Cover	26
6.	Rear Door	28
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8.	Door Sash Tape	36
9.	Trunk Lid	47
10.	Rear Gate	52
11.	Protector Tape	60

1. General Description

A: COMPONENT

1. FRONT HOOD

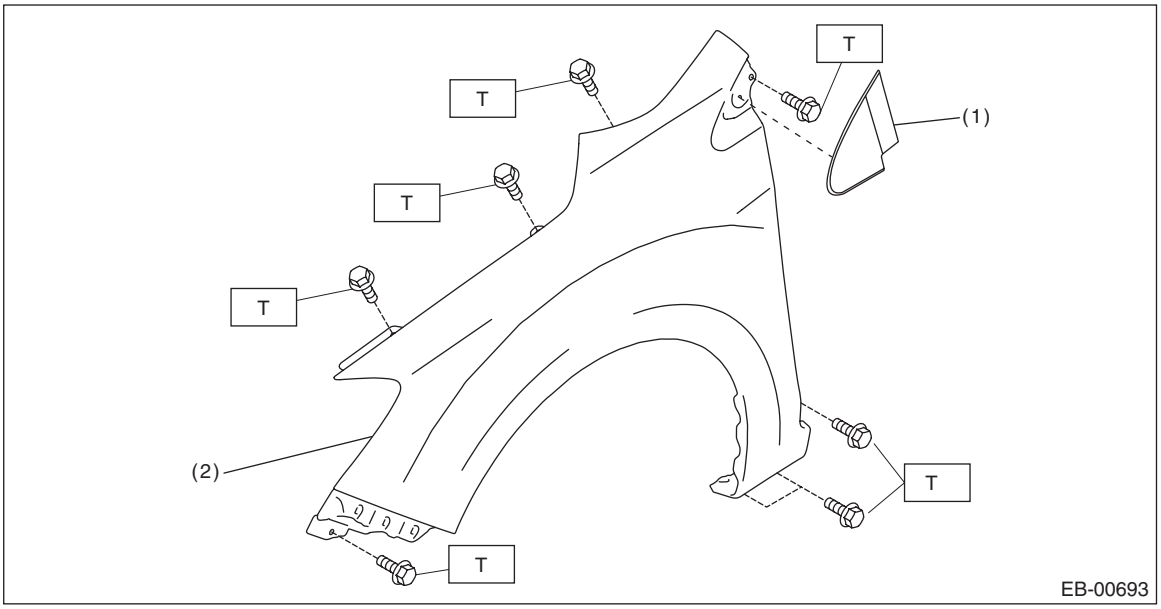


(1) Hood COMPL - front
(2) Hinge COMPL - front hood
(3) Cover - front fender
(4) Insulator - front hood
(5) Buffer - front hood
(6) Stopper - front hood
(7) Stay - hood support
(8) Seal - front duct
(9) Striker - front hood

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.55, 18.4)
T2: 33 (3.36, 24.3)

2. FRONT FENDER

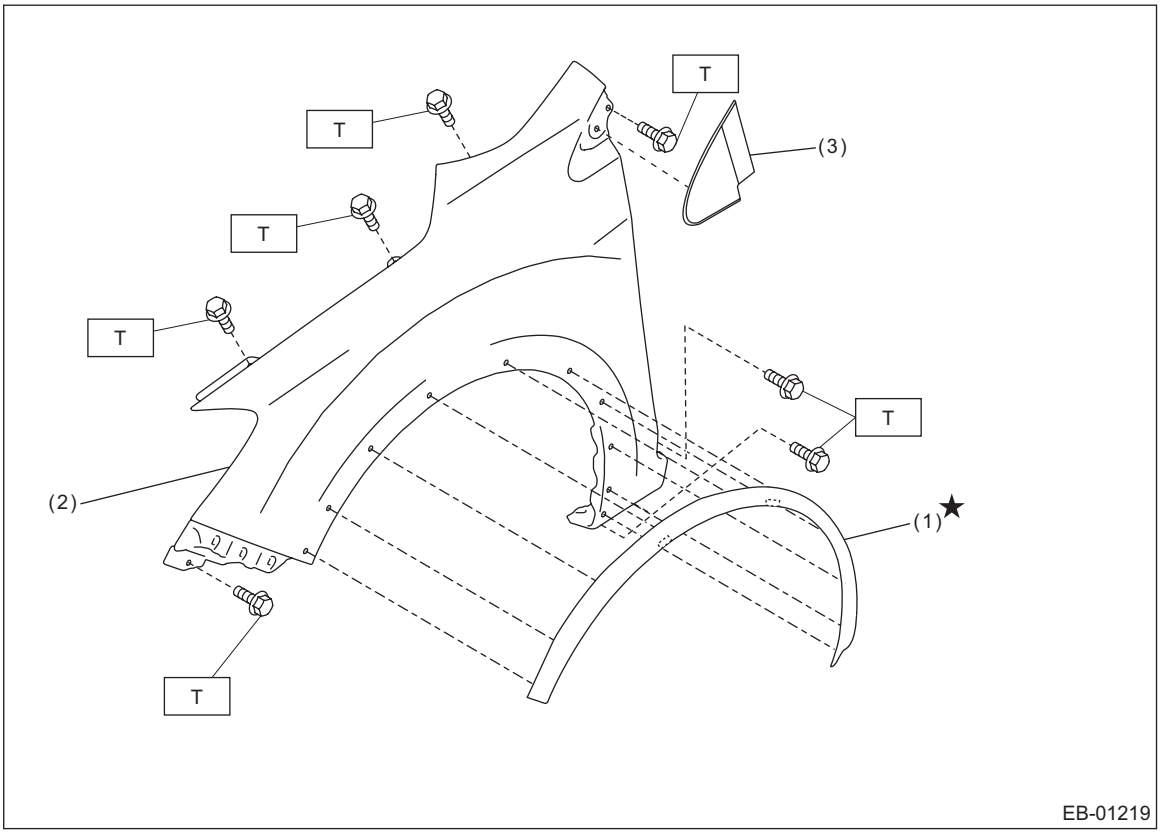
- Impreza model



(1) Cover - A pillar ASSY
(2) Fender COMPL - front

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

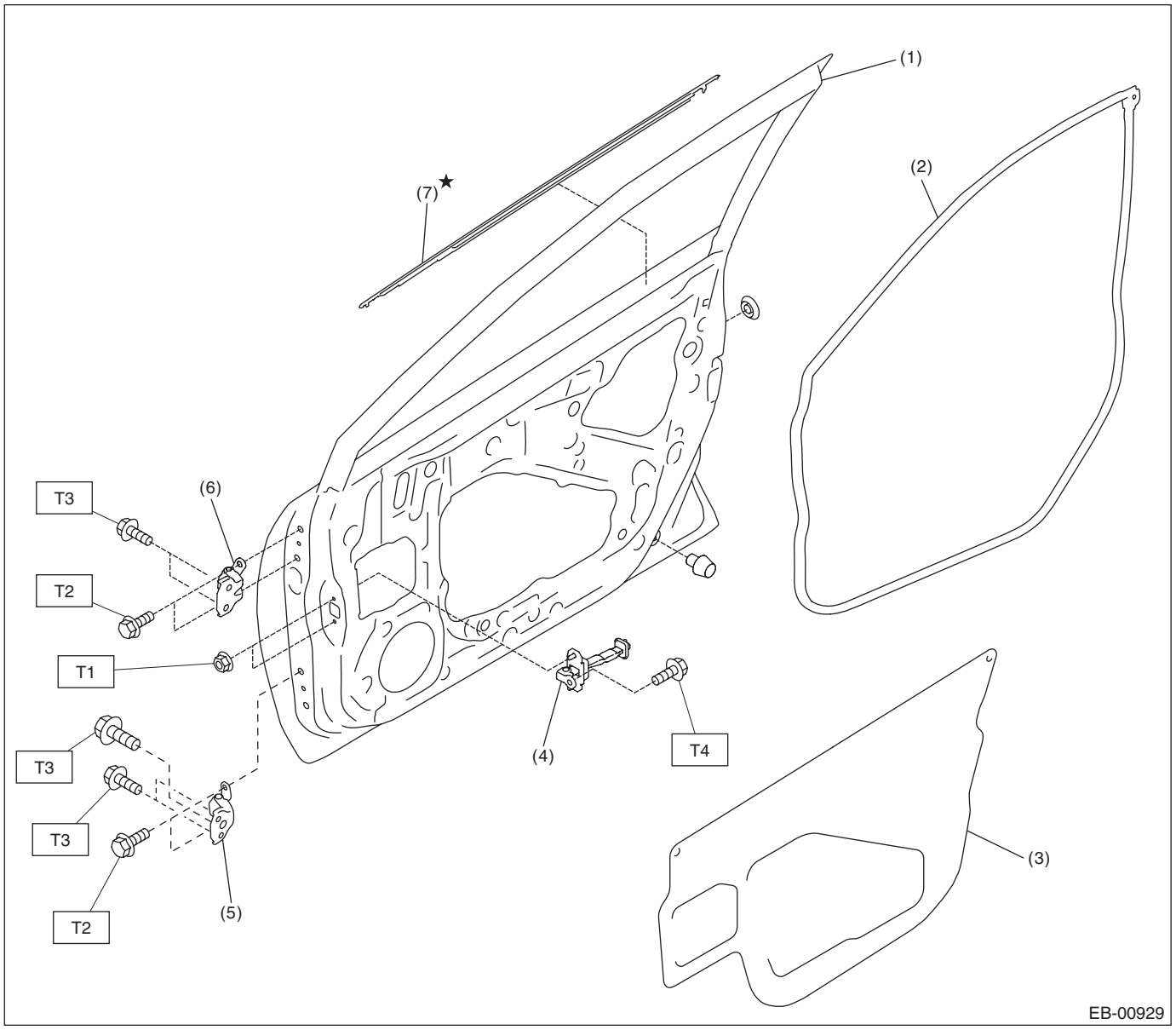
- Crosstrek model



(1) Garnish ASSY - front fender
(2) Fender COMPL - front
(3) Cover - A pillar ASSY

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

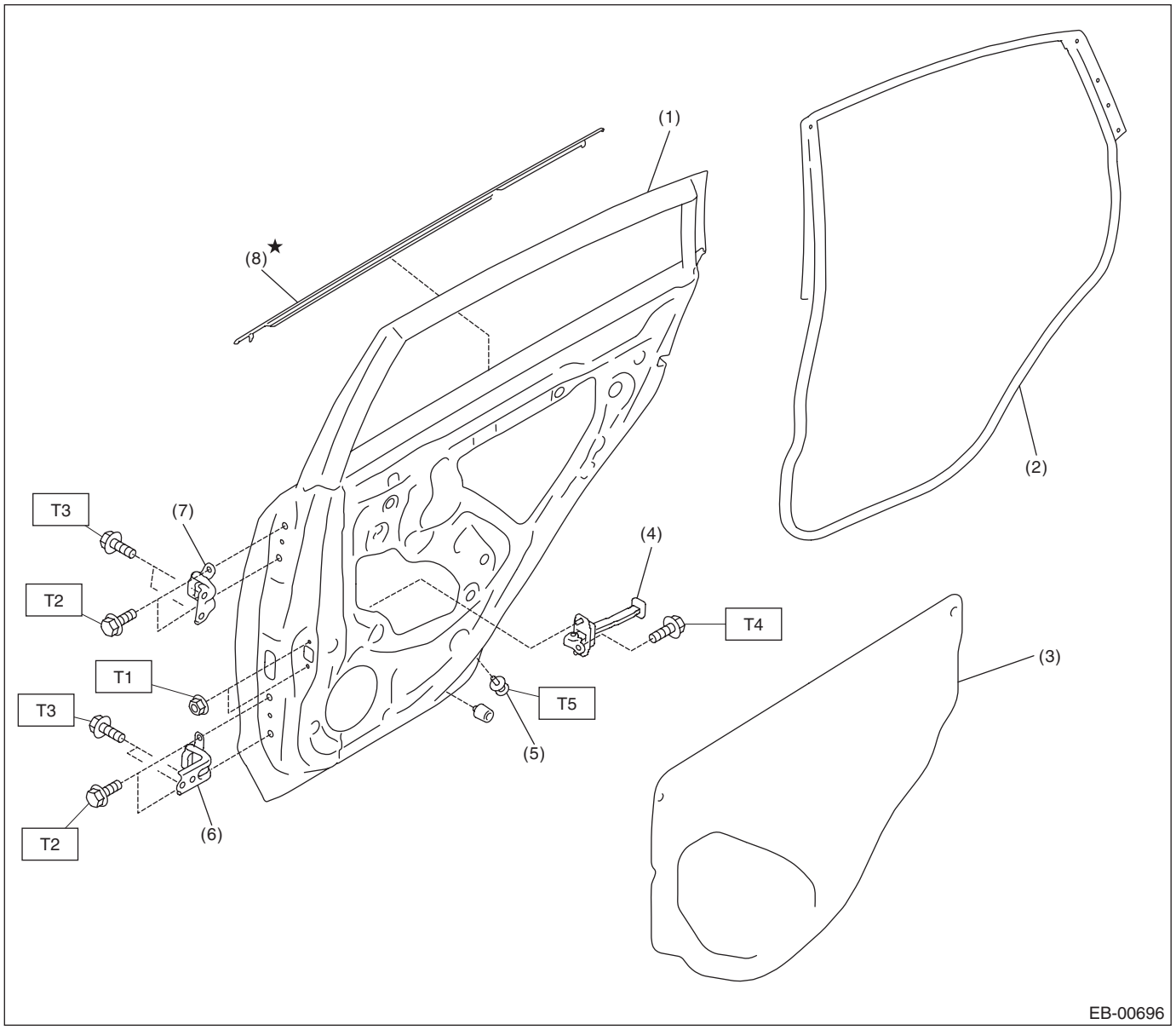
3. FRONT DOOR



(1) Panel ASSY - front door
(2) Weather strip - front door
(3) Sealing cover - front door
(4) Checker ASSY - front door
(5) Lower hinge - front door
(6) Upper hinge - front door
(7) Weather strip outer - front door

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 25 (2.55, 18.4)
T3: 30 (3.06, 22.1)
T4: 33 (3.36, 24.3)

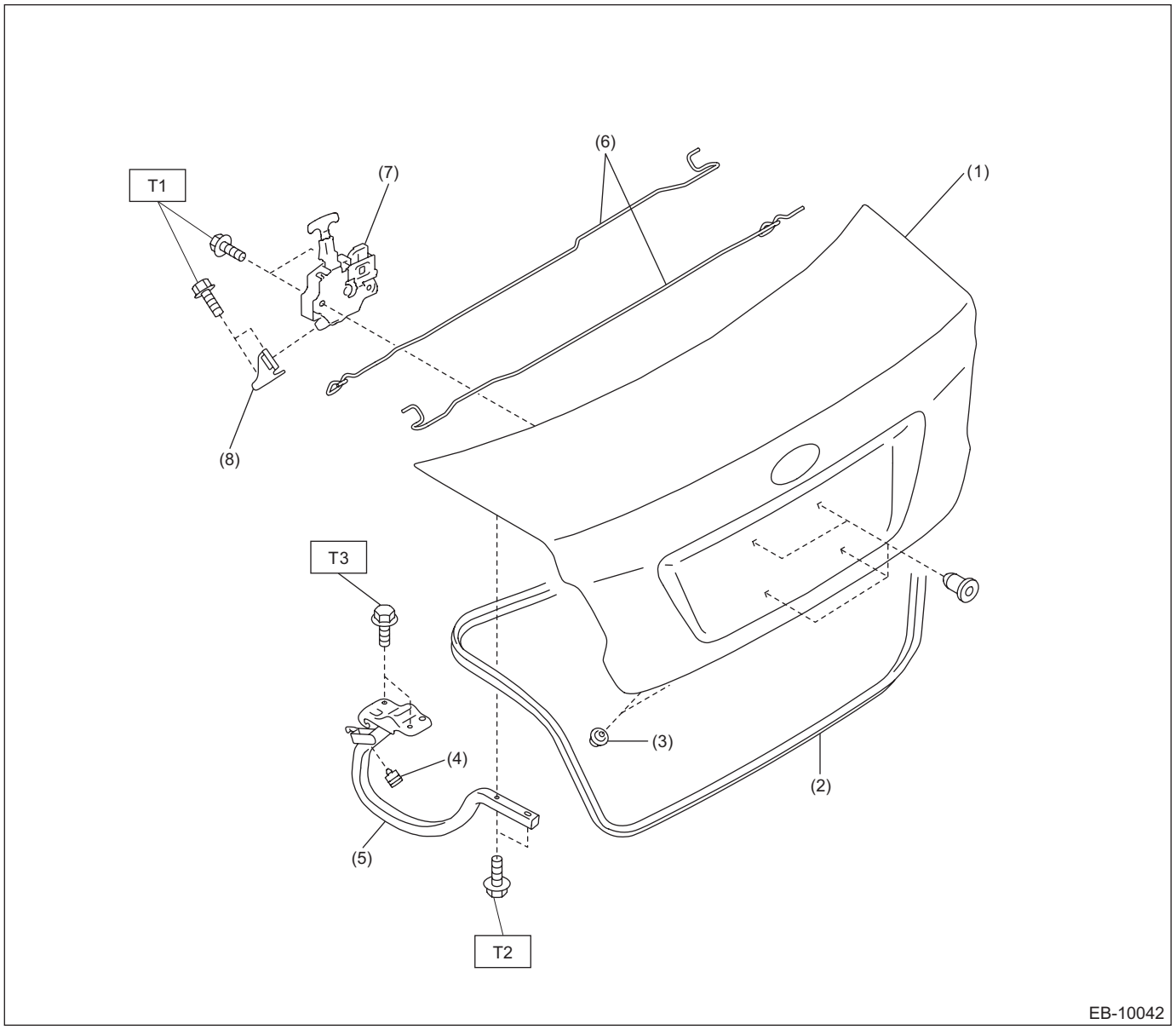
4. REAR DOOR



(1) Panel ASSY - rear door
(2) Weather strip - rear door
(3) Sealing cover - rear door
(4) Checker ASSY - rear door
(5) Catcher - rear door
(6) Lower hinge - rear door
(7) Upper hinge - rear door
(8) Weather strip outer - rear door

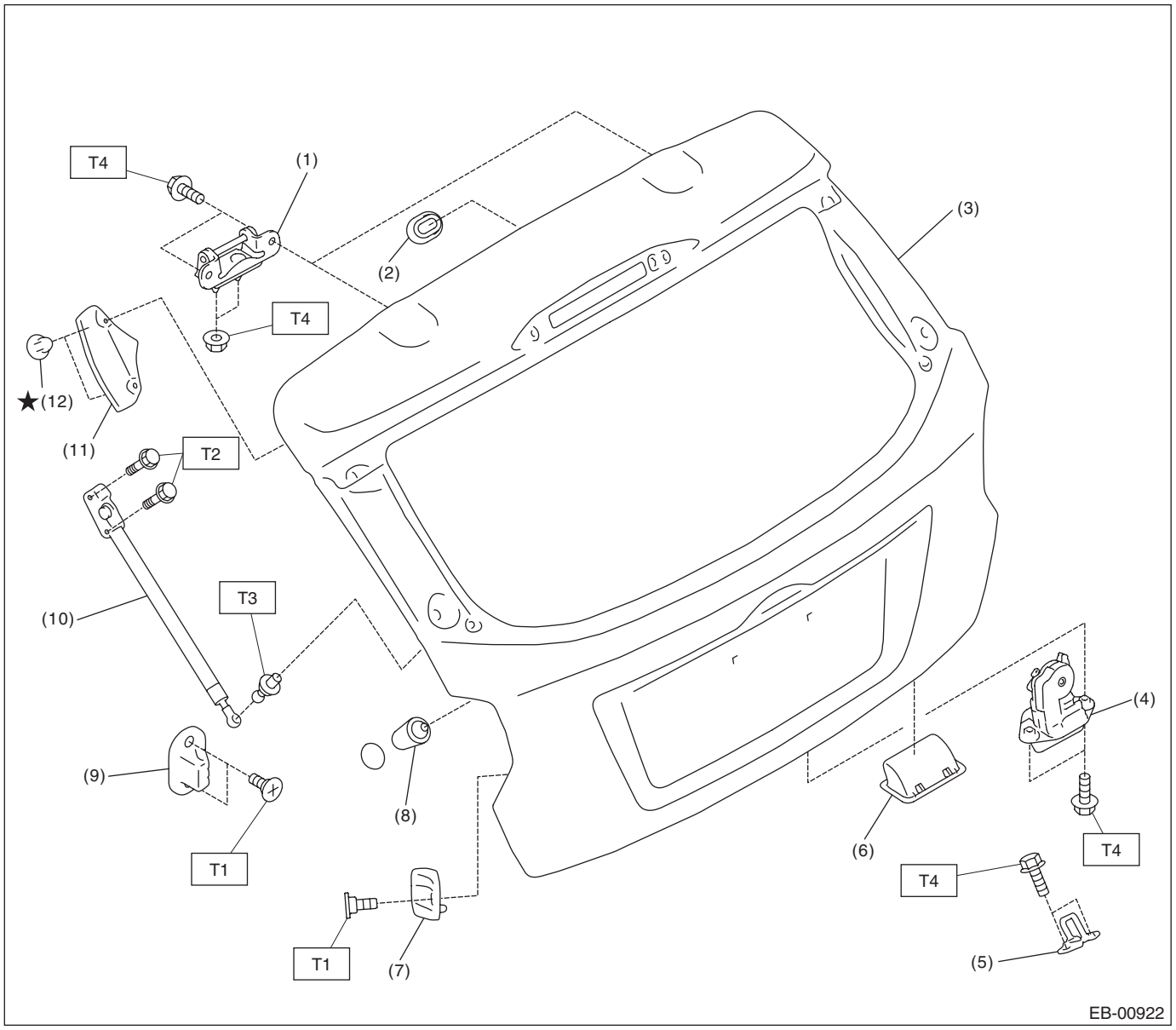
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 25 (2.55, 18.4)
T3: 30 (3.06, 22.1)
T4: 33 (3.36, 24.3)
T5: 38 (3.87, 28.0)

5. TRUNK LID PANEL



(1)	Trunk lid COMPL	(5)	Trunk lid arm ASSY	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Weather strip - trunk lid	(6)	Torsion bar - trunk lid	***T1: 7.5 (0.76, 5.5)***
(3)	Stopper - trunk lid	(7)	Lock ASSY - trunk lid	***T2: 14 (1.43, 10.3)***
(4)	Stopper - trunk	(8)	Striker - trunk	***T3: 18 (1.84, 13.3)***

6. REAR GATE



(1)	Hinge - rear gate	(7)	Buffer - rear gate	
(2)	Plug - hole	(8)	Stopper - rear gate	
(3)	Panel - rear gate	(9)	Buffer - body side	
(4)	Latch & actuator - rear gate	(10)	Stay ASSY - rear gate	
(5)	Striker - rear gate	(11)	Drip - rear gate	
(6)	Handle - rear gate	(12)	Clip	

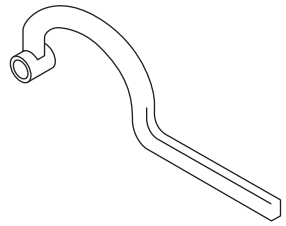
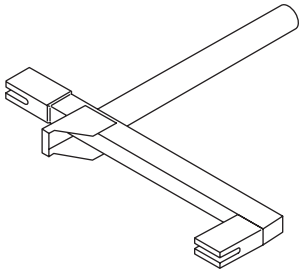
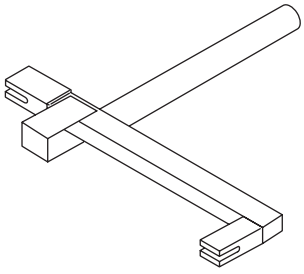
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 13 (1.33, 9.6)
T3: 20 (2.04, 14.8)
T4: 25 (2.55, 18.4)

B: CAUTION

Exterior body panels are heavy. When removing and installing them, do not drop and damage the panels. Also, be careful not to scratch the coated surfaces of the panels.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-925610000	925610000	WRENCH	Used for removing and installing door hinge.
 ST-927780000	927780000	REMOVER	• Used for removing and installing the trunk torsion bar. • REMOVER (99099FJ000) can also be used.
 ST99099FJ000	99099FJ000	REMOVER	• Used for removing and installing the trunk torsion bar. • REMOVER (927780000) can also be used.

2. GENERAL TOOL

TOOL NAME	REMARKS
Support jack	Used for supporting door panel.
Clip remover	Used for removing various types of clips

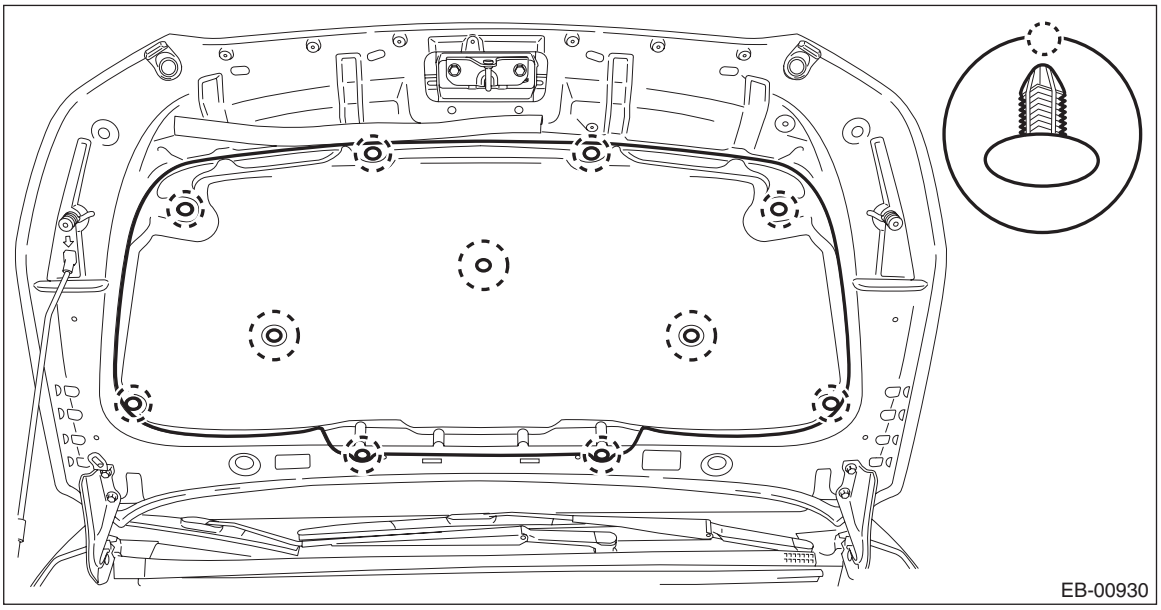
2. Front Hood

A: REMOVAL

1. FRONT HOOD PANEL

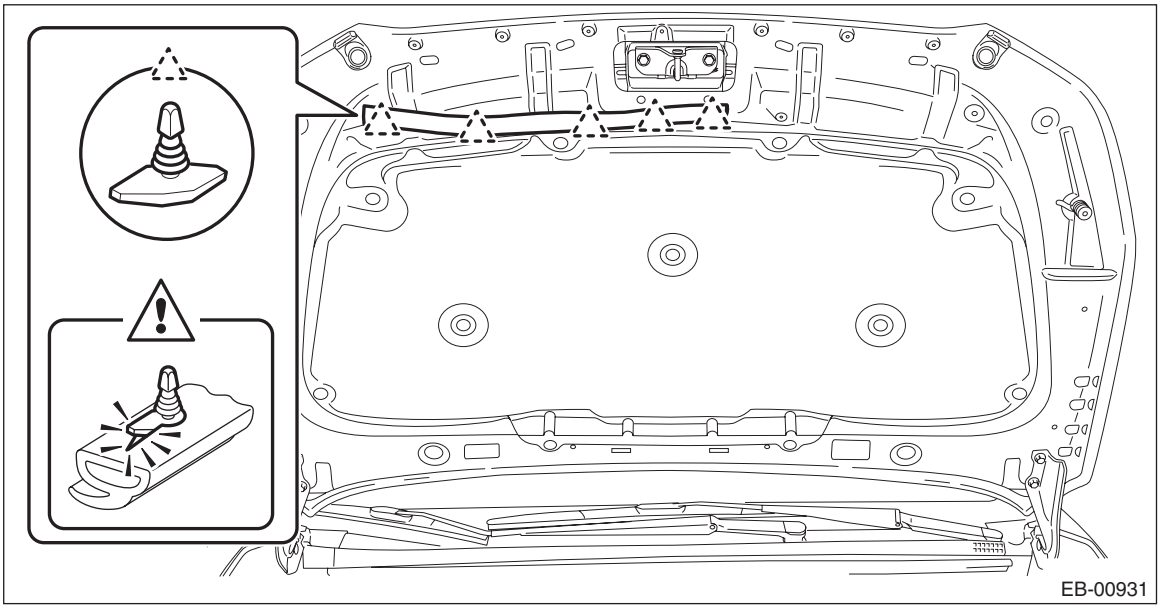
CAUTION:
The hood COMPL - front is heavy. When removing or installing the hinge COMPL - front hood, be sure to work in a group of two or more.

1) Open the hood COMPL - front.
2) Remove the clips, and remove the insulator - front hood.

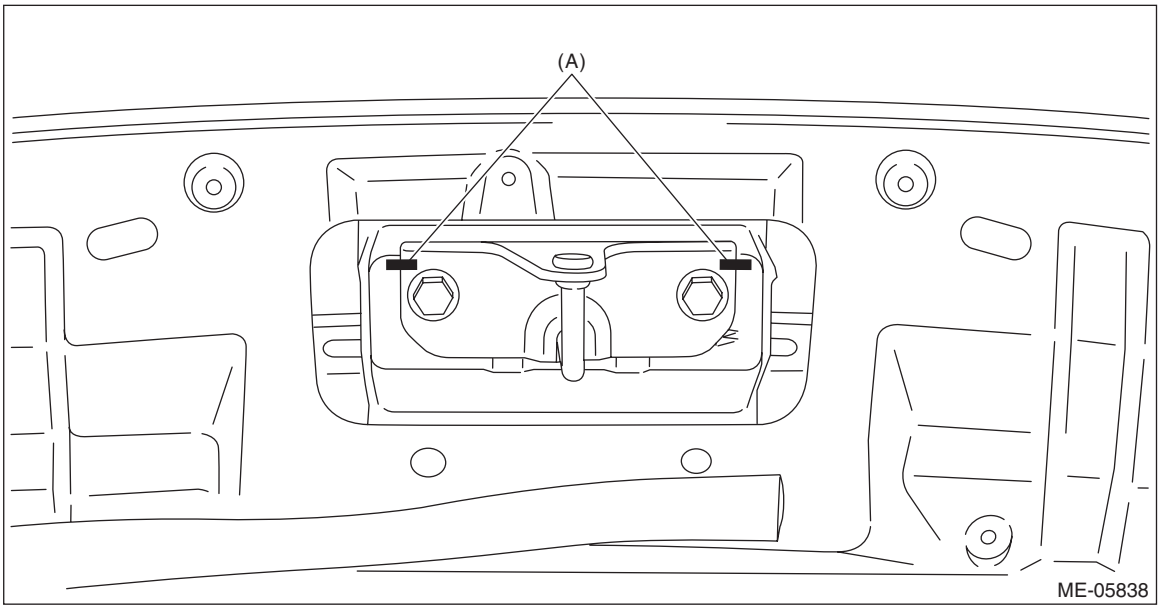


3) Remove the clip, and remove the seal - front duct.

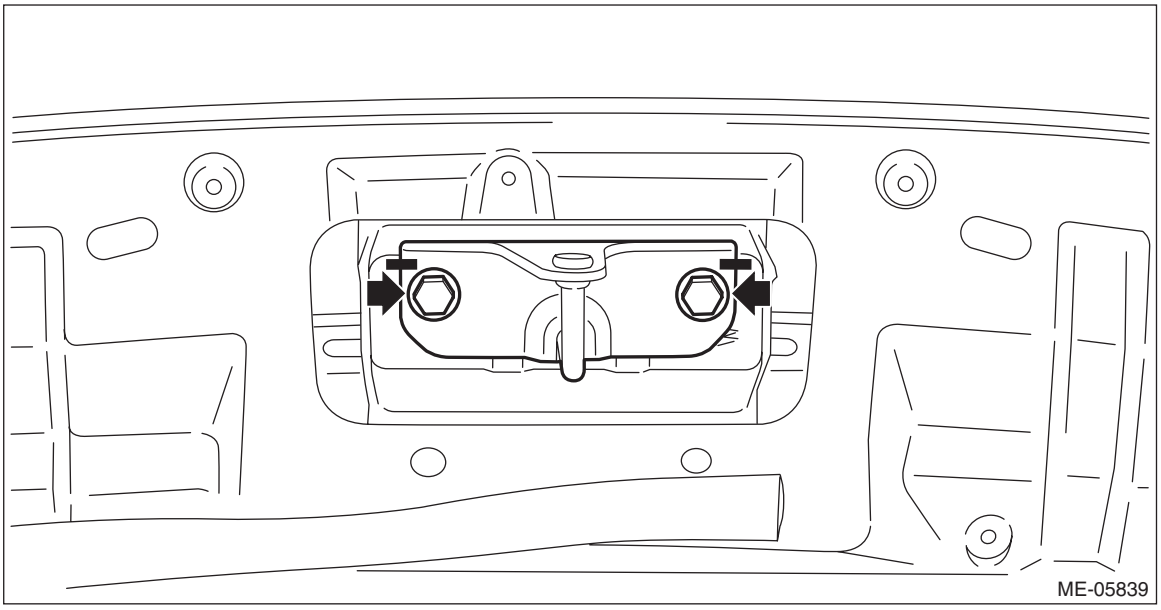
CAUTION:
If the weather strip clip is removed with excessive force, the seal - front duct may be damaged. Be sure to use clip remover, etc. to remove.



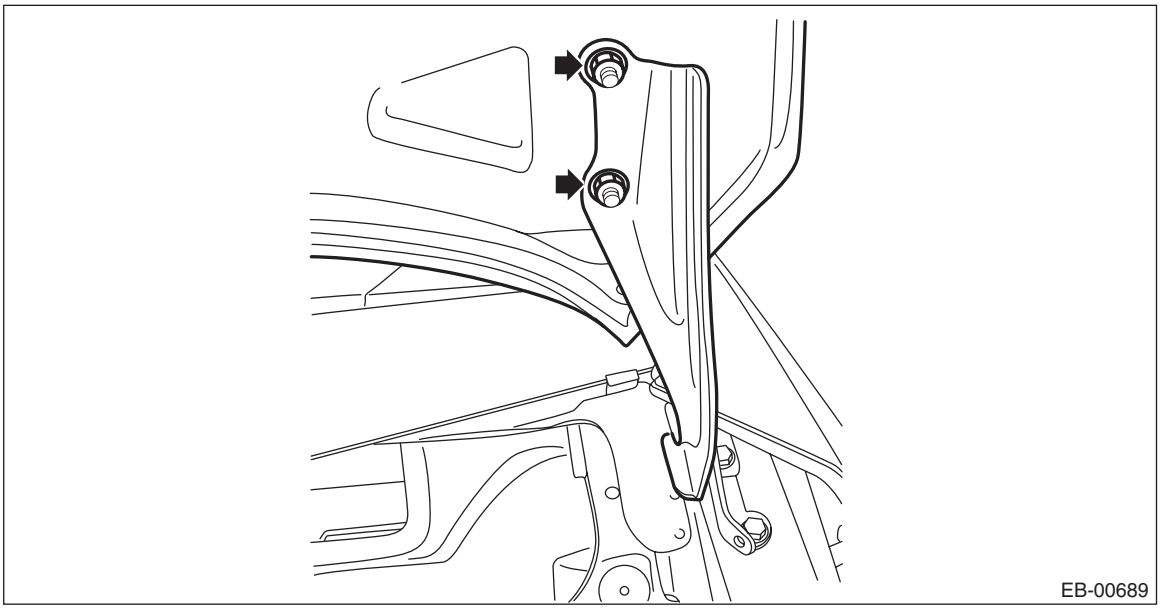
4) Using a marker pen, make alignment marks (A) on the hood COMPL - front and the striker - front hood.



5) Remove the striker - front hood from the hood COMPL - front.



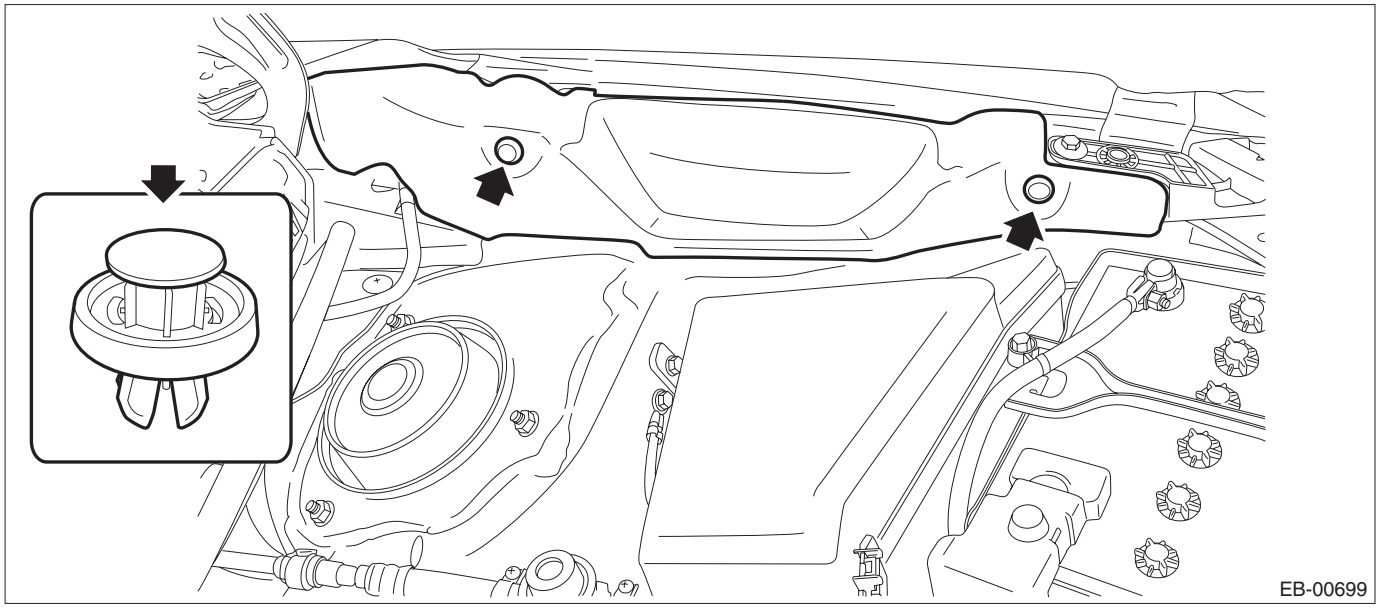
6) Remove the nut on the hood COMPL - front side, and remove the hood COMPL - front.



2. FRONT HOOD HINGE

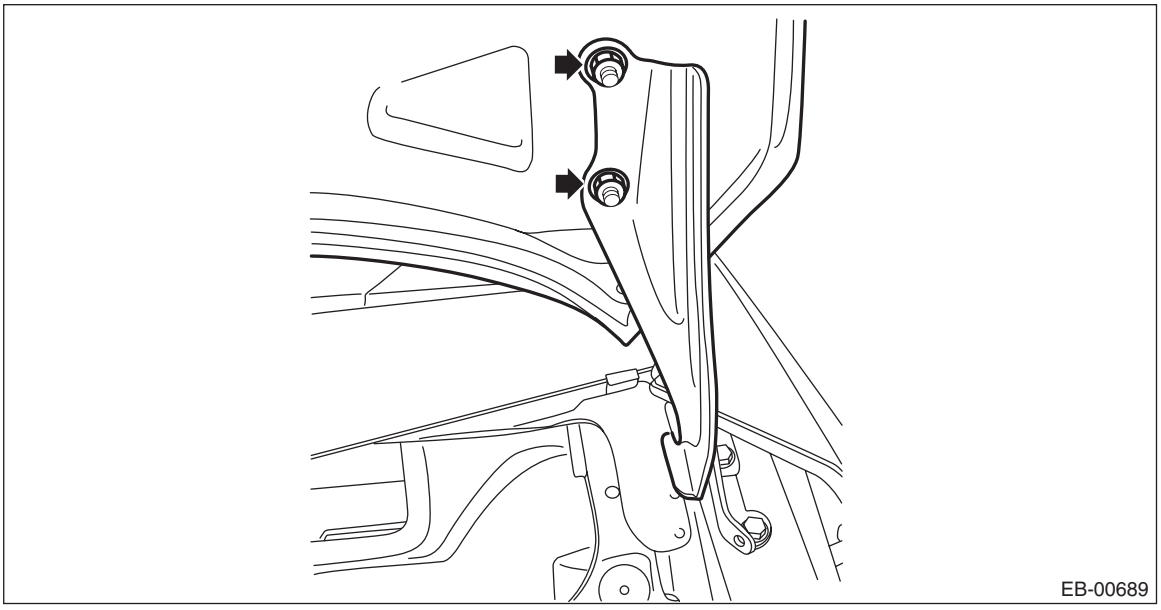
CAUTION:
The hood COMPL - front is heavy. When removing or installing the hinge COMPL - front hood, be sure to work in a group of two or more.

1) Remove the cover - front fender.
   (1) Remove the clip.
   (2) Release the claws by pulling them forward, and remove the cover - front fender.

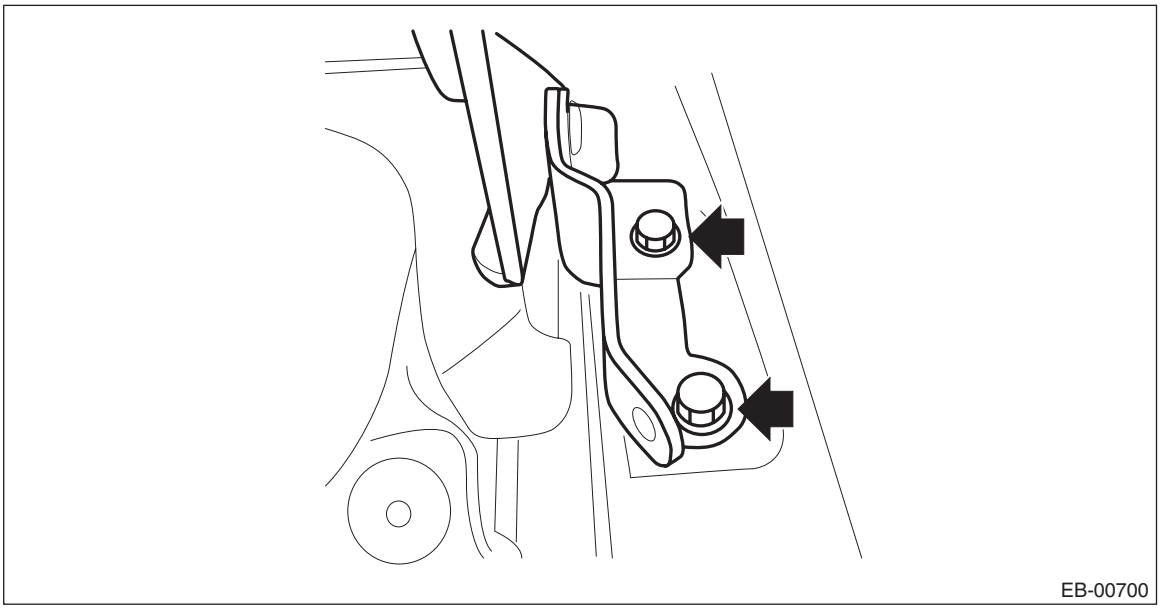


2) Remove the fender COMPL - front. <Ref. to EB-16, REMOVAL, Front Fender.>

3) Remove the hood COMPL - front.
(1) Remove the nuts on the hood panel side, and remove the hood COMPL - front.



4) Remove the bolts, and remove the hinge COMPL - front hood.



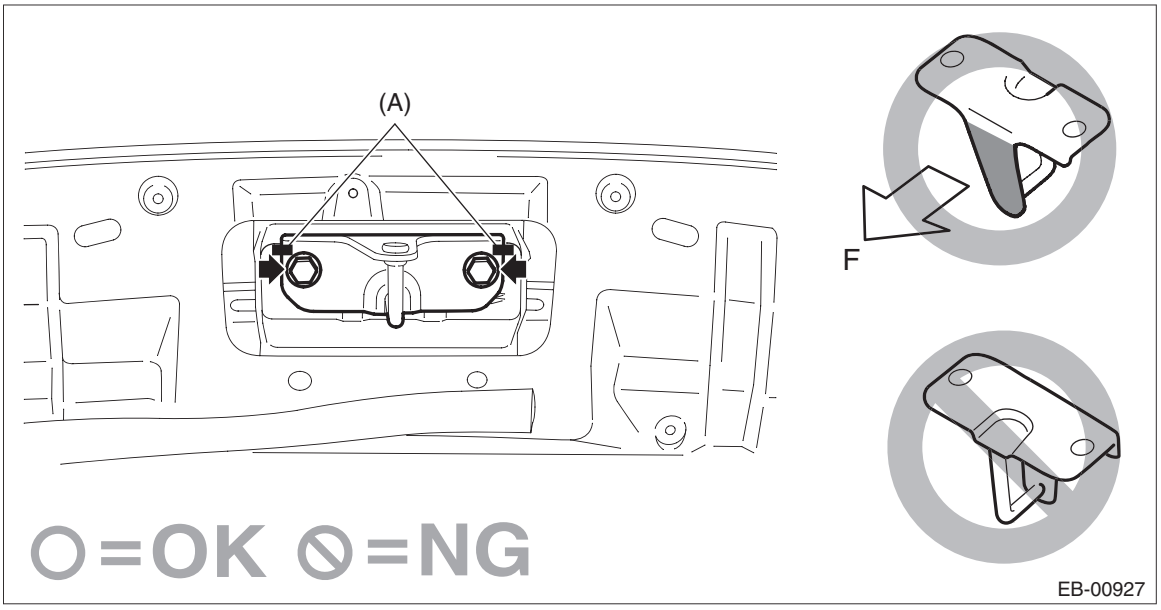
B: INSTALLATION

CAUTION:
The hood COMPL - front is heavy. When removing or installing the hinge COMPL - front hood, be sure to work in a group of two or more.

1) To install the insulator - front hood and the seal - front duct, follow the removal procedure in the reverse order.
2) Align the alignment marks (A), and install the striker - front hood to the hood COMPL - front.

CAUTION:
When installing the striker - front hood, make sure that the front and rear sides are positioned in a correct direction.

Tightening torque:
33 N·m (3.36 kgf-m, 24.3 ft-lb)



(A) Alignment mark F Front side of vehicle

NOTE:
It is not necessary to adjust the striker - front hood because there is no span of adjustable range.

3) Install the hinge COMPL - front hood to the vehicle body. (When the hinge COMPL - front hood is removed)
4) Temporarily install the hood COMPL - front to the hinge COMPL - front hood.

NOTE:
When installing the hood COMPL - front, make sure that a uniform clearance is created around it.

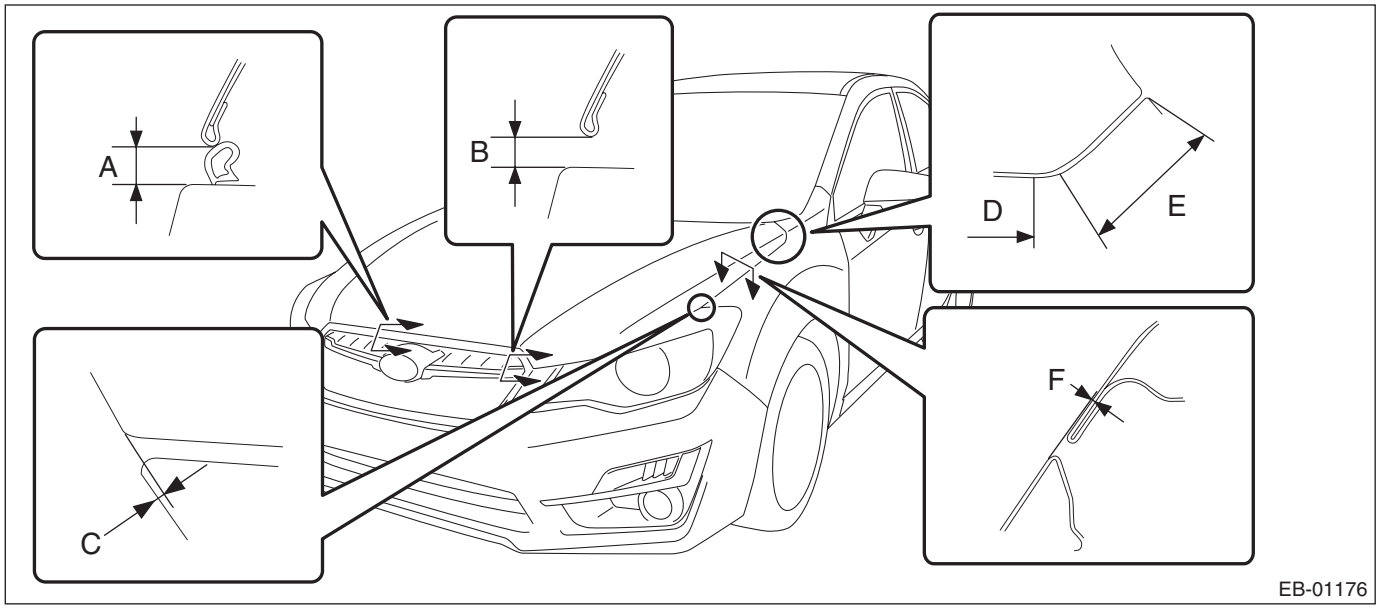
5) Adjust the clearance around the hood COMPL - front. <Ref. to EB-14, ADJUSTMENT, Front Hood.>
6) Tighten the bolts and nuts of the hinge COMPL - front hood.

Tightening torque:
25 N·m (2.55 kgf-m, 18.4 ft-lb)

7) Install each part of the hood COMPL - front in the reverse order of removal.
- Insulator - front hood
- Seal - front duct

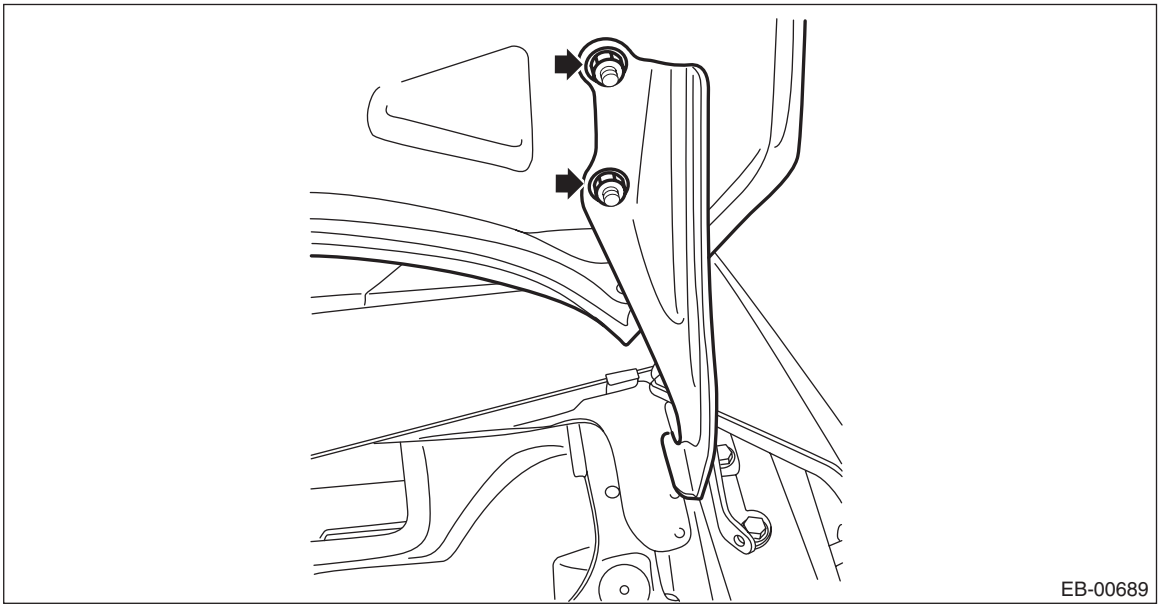
C: ADJUSTMENT

Adjust the clearance around the hood COMPL - front as follows.



Part		Standard
A	Hood COMPL - front to Front grille	7.5±1.0 mm (0.30±0.04 in)
B	Hood COMPL - front to Bumper face - front	6.0+2.0, –1.0 mm (0.24+0.08, –0.04 in)
C	Offset value: Hood COMPL - front to Front end of fender COMPL - front	0+0.5, –1.0 mm (0+0.02, –0.04 in)
D	Hood COMPL - front to Fender COMPL - front (from front end to just before curved portion)	3.5±1.0 mm (0.14±0.04 in)
E	Hood COMPL - front to Fender COMPL - front (from rear end to just before curved portion)	4.5±1.0 mm (0.18±0.04 in)
F	Surface level gap: Hood COMPL - front to Fender COMPL - front	0.5+0.5, –1.0 mm (0.02+0.02, –0.04 in)

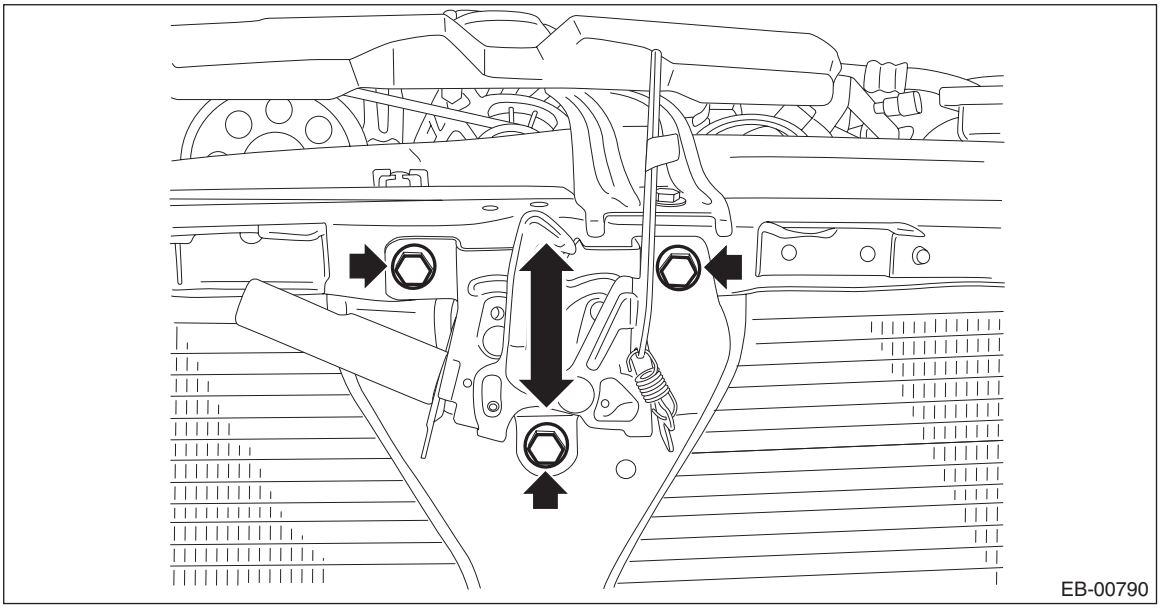
1) Adjust the horizontal position of the hood COMPL - front.
   (1) Loosen the attaching nuts of the hinge COMPL - front hood on the left and right sides.



(2) Adjust the horizontal clearance of the hood COMPL - front, and tighten the attaching nuts of the hinge COMPL - front hood.

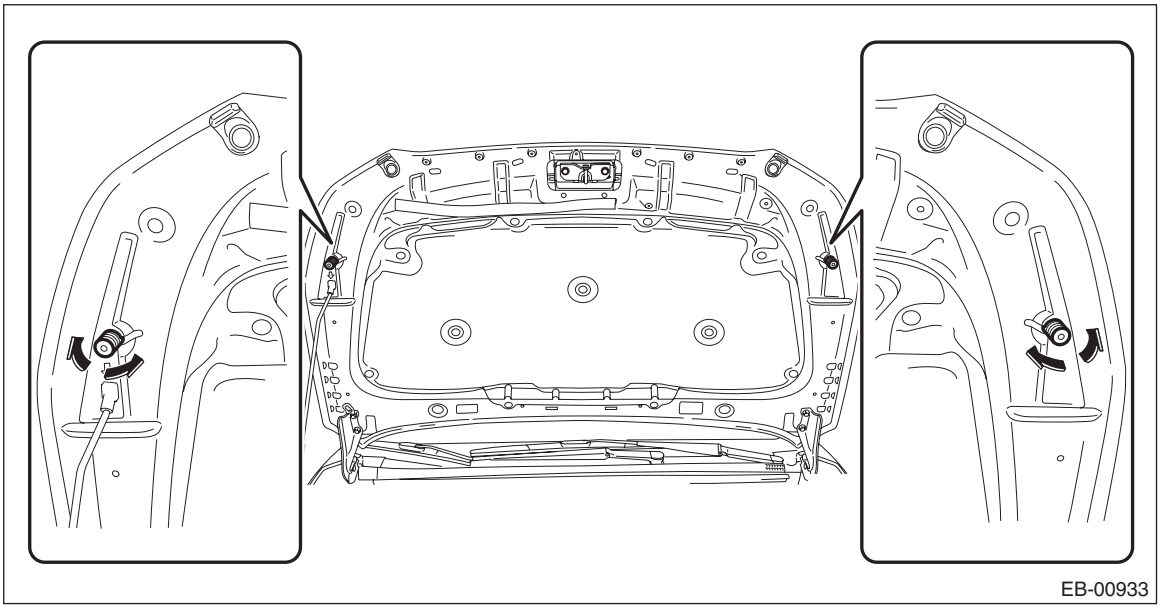
Tightening torque:
25 N·m (2.55 kgf-m, 18.4 ft-lb)

2) Adjust the front end height of the hood COMPL - front.
(1) Loosen the bolts on the lock assembly - front hood.
(2) Adjust the lock assembly - front hood by moving it up and down.


EB-00790

Tightening torque:
33 N·m (3.36 kgf-m, 24.3 ft-lb)

3) Rotate the buffer - front hood of the hood COMPL - front to adjust the height.


EB-00933

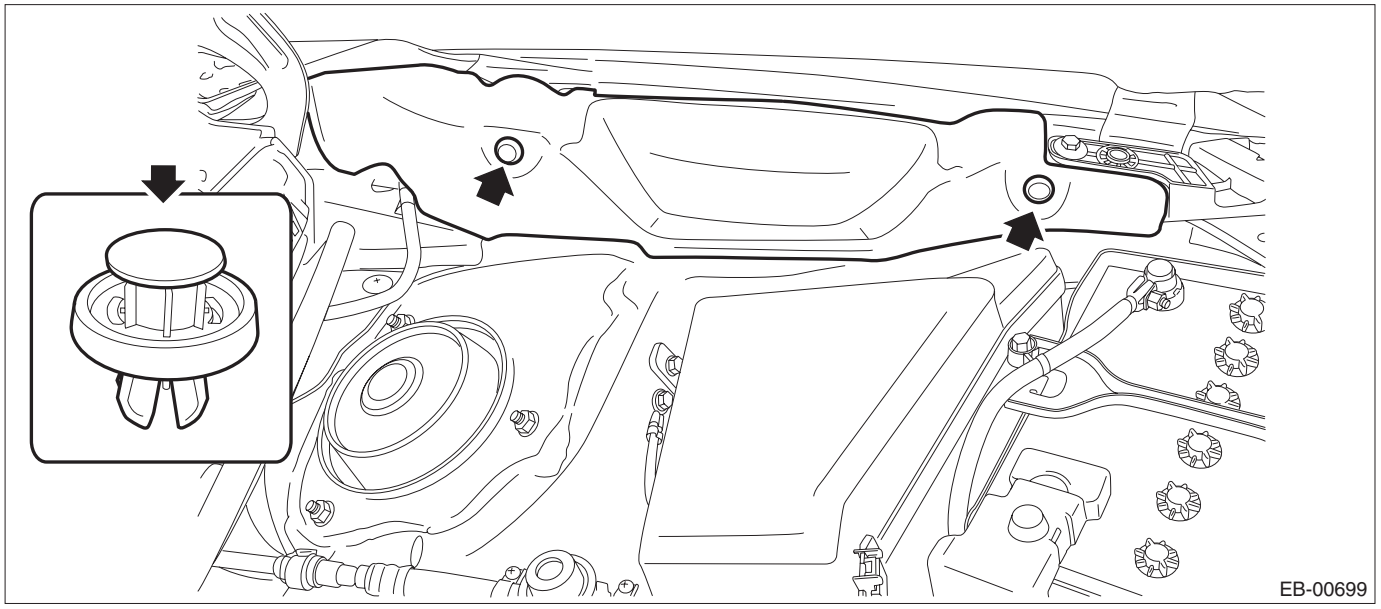
3. Front Fender

A: REMOVAL

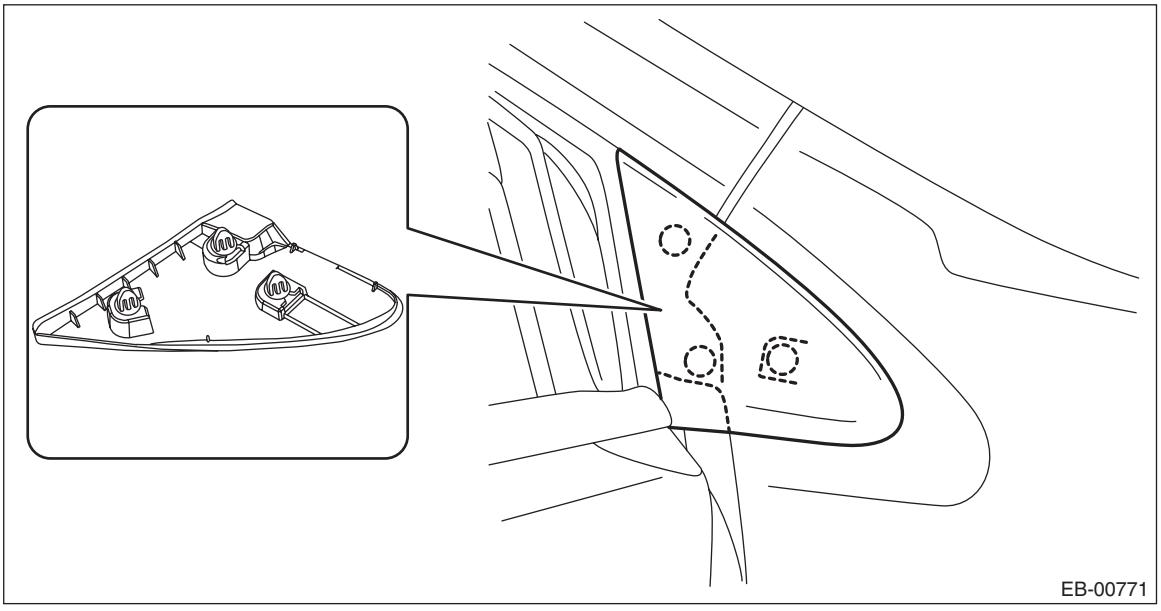
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

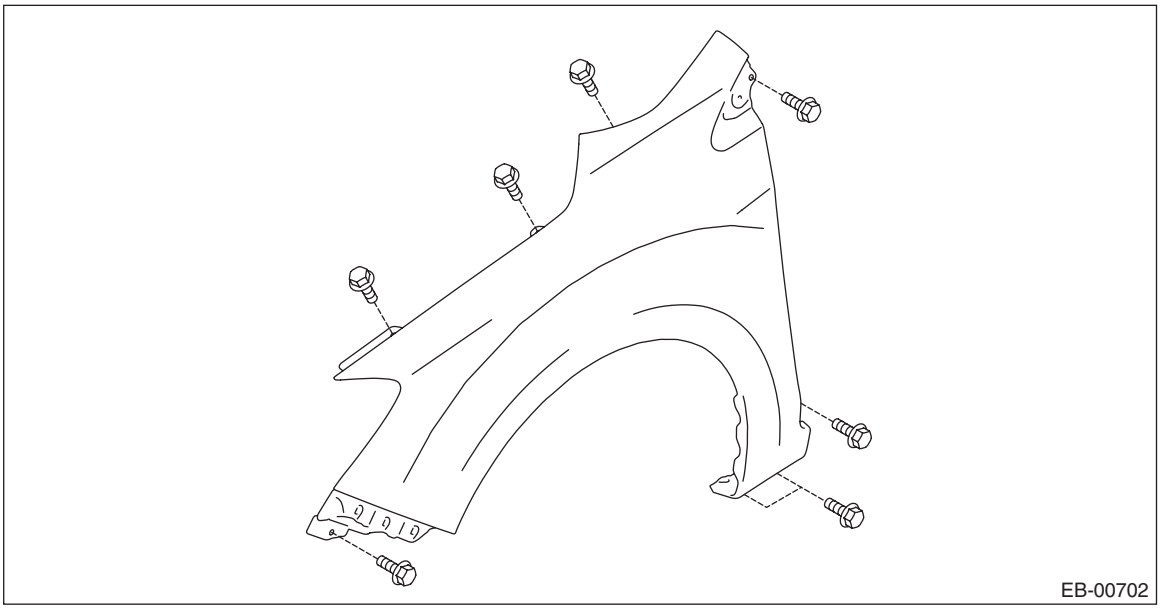
2) Remove the bumper face - front. <Ref. to EI-37, REMOVAL, Front Bumper.>
3) Remove the light assembly - head. <Ref. to LI-25, REMOVAL, Headlight Assembly.>
4) Remove the cover - front fender.
   (1) Remove the clip.
   (2) Release the claws by pulling them forward, and remove the cover - front fender.


EB-00699

5) Remove the clips and detach the side garnish assembly. <Ref. to EI-60, REMOVAL, Side Garnish.>
6) Remove the mud guard - front. <Ref. to EI-32, REMOVAL, Mud Guard.>
7) Remove the cover - A pillar assembly.


EB-00771

8) Remove the fender COMPL - front.

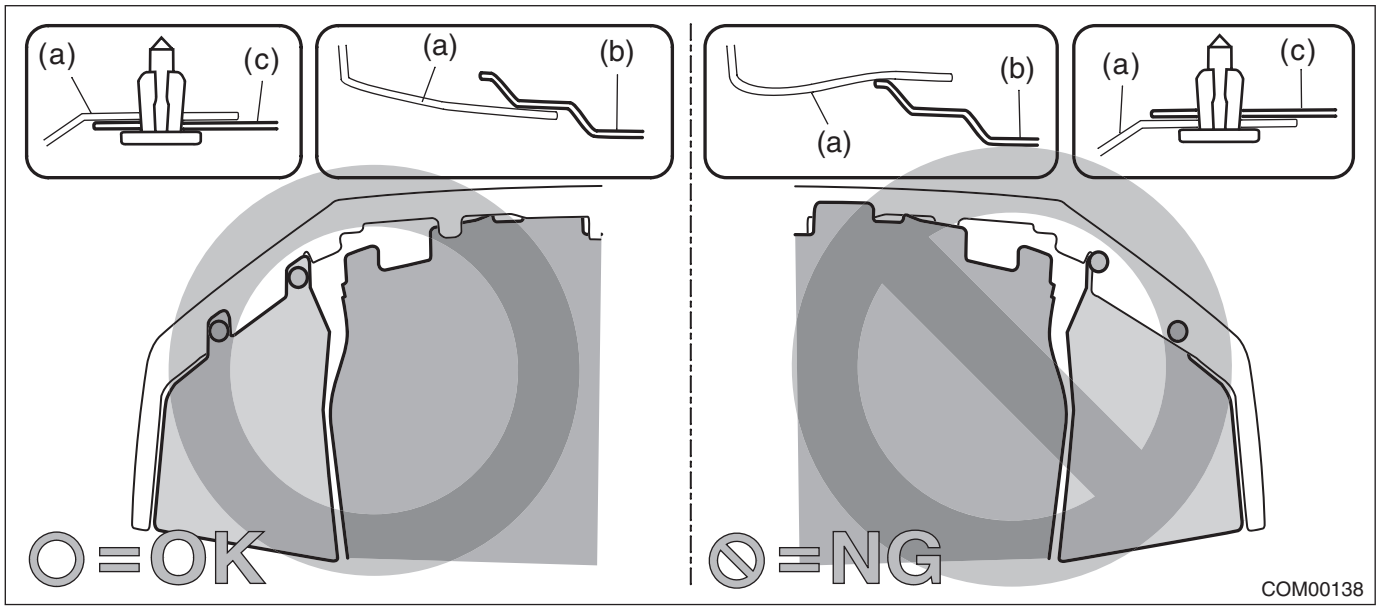


B: INSTALLATION

1) Install each part in the reverse order of removal.

CAUTION:

• Install the bumper face - front so that the front end of the under cover (b) comes inside the bumper face - front (a), and the front end of the mud guard (c) comes outside the bumper face - front (a).



• Before installing the bumper face, match the claws on the bracket - front bumper with the engaging position of flange section on the bumper face side. If the engaging position is not correct, the flange section may be broken or the clearance between fender panel and bumper face may not be uniform.

Tightening torque:

Fender COMPL - front: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

Light assembly - head: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

NOTE:

When installing the fender COMPL - front, make sure that a uniform clearance is created around it.

- Fender COMPL - front to Hood COMPL - front: <Ref. to EB-14, ADJUSTMENT, Front Hood.>
- Fender COMPL - front to Panel assembly - front door: <Ref. to EB-24, ADJUSTMENT, Front Door.>

2) Adjust the headlight beam and fog light beam.

- Adjust the headlight beam. <Ref. to LI-30, HEADLIGHT BEAM ADJUSTMENT, ADJUSTMENT, Headlight Assembly.>
- Adjust the fog light beam. (Model with fog light) <Ref. to LI-52, FOG LIGHT AIMING, ADJUSTMENT, Front Fog Light Assembly.>

4. Front Door

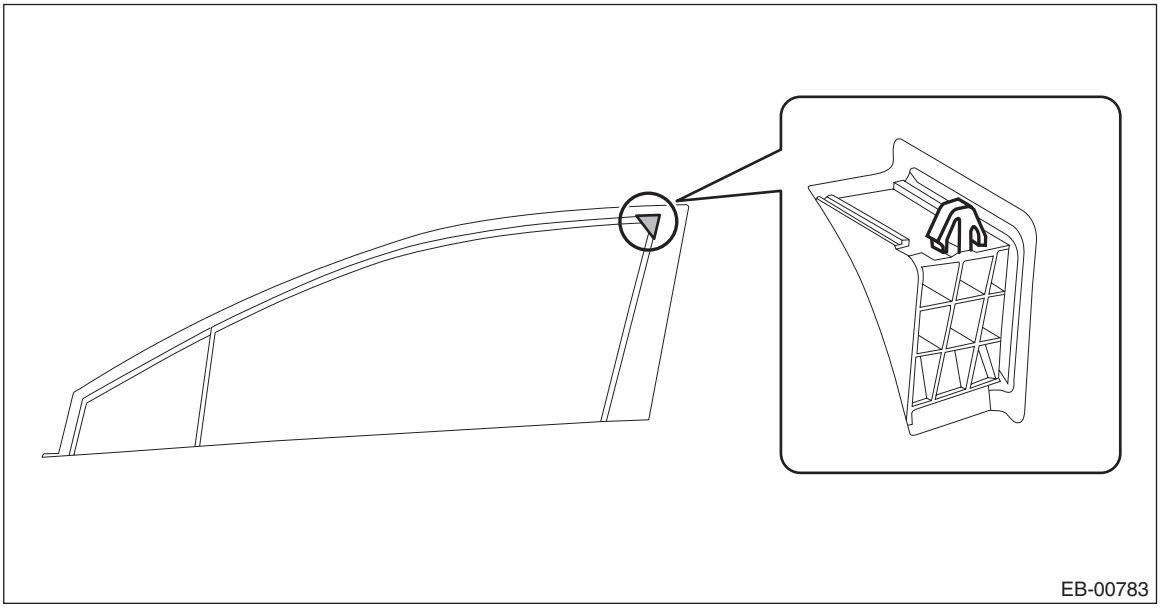
A: REMOVAL

1. FRONT DOOR PANEL

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - front door. <Ref. to EB-26, REMOVAL, Front Sealing Cover.>
4) Remove the outer mirror assembly. <Ref. to GW-25, REMOVAL, Outer Mirror Assembly.>
5) Remove the front door speaker assembly. <Ref. to ET-33, DOOR SPEAKER, REMOVAL, Front Speaker.>
6) Remove the cover B pillar - front door INN.

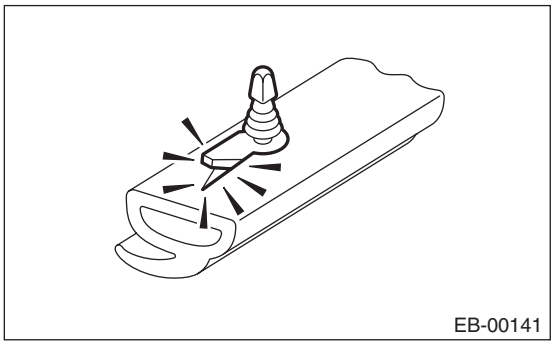
CAUTION:
- **Always replace with a new part, because engagement of the claw weakens.**
- **Do not damage the sash while removing.**



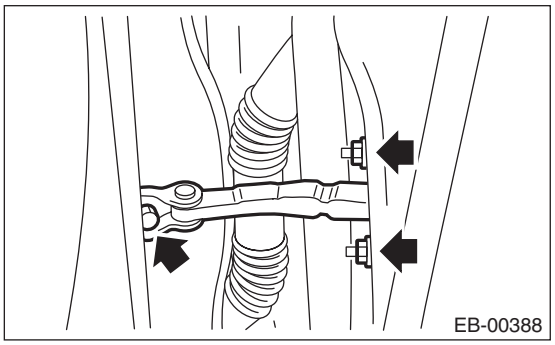
7) Remove the front door impact sensor assembly. <Ref. to AB-59, REMOVAL, Front Door Impact Sensor.>
8) Remove the glass assembly - front door and the glass - front door partition. <Ref. to GW-19, REMOVAL, Front Door Glass.>
9) Remove the regulator & motor assembly - front of the front door. <Ref. to GW-22, REMOVAL, Front Regulator and Motor Assembly.>
10) Remove the latch and actuator assembly - front. <Ref. to SL-39, REMOVAL, Front Door Latch and Door Lock Actuator Assembly.>
11) Remove the handle - door outer and the cover - handle front outer. <Ref. to SL-35, REMOVAL, Front Outer Handle.>

12) Remove the weather strip - front door.

CAUTION:
If the weather strip clip is removed with excessive force, the weather strip may be damaged. Be sure to use clip remover to remove.



13) Remove the bolts and nuts, and then detach the checker assembly - front door.

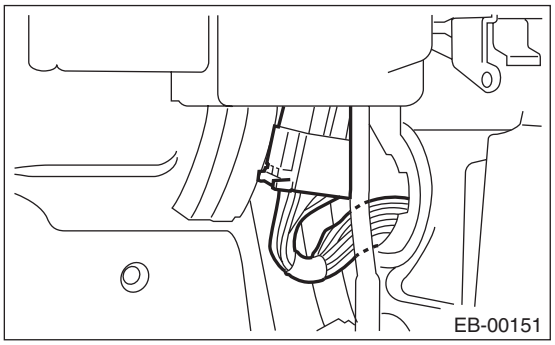


14) Remove the cover side sill - front INN and cover side sill - front. <Ref. to EI-90, REMOVAL, Lower Inner Trim.>

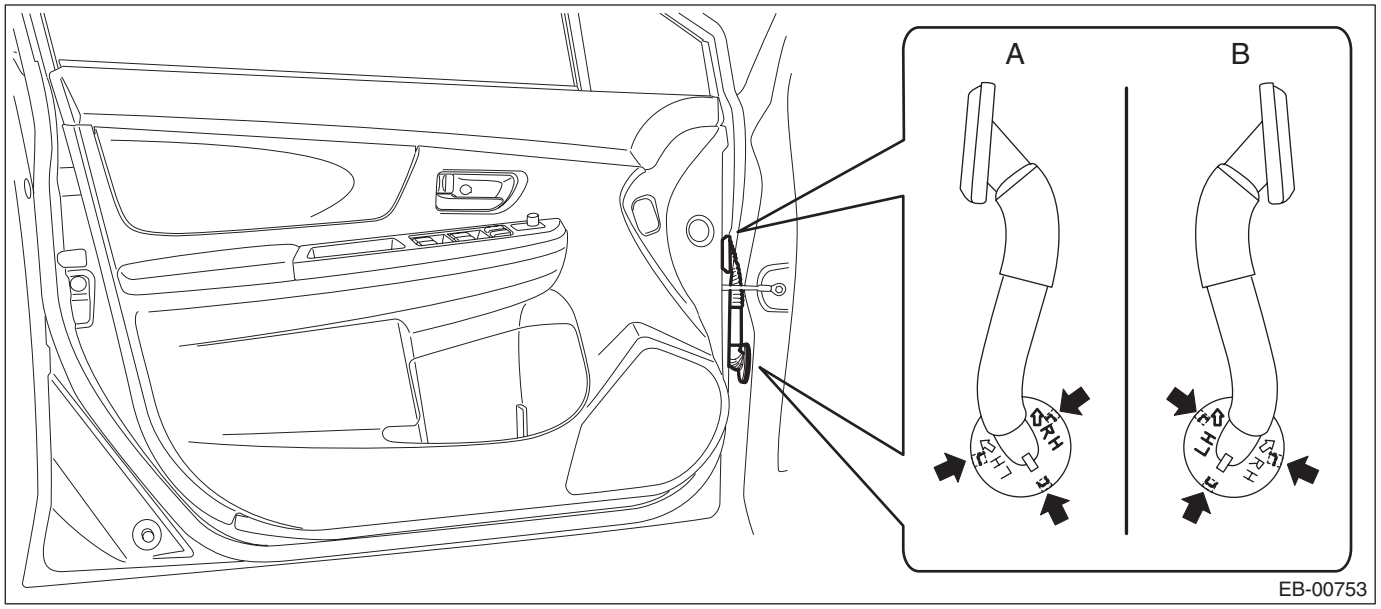
15) Disconnect the front door impact sensor harness connector. <Ref. to AB-25, FRONT DOOR IMPACT SENSOR (BETWEEN AIRBAG REAR HARNESS AND DOOR HARNESS), PROCEDURE, Airbag Connector.>

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>

16) Disconnect the front door harness connectors.
(1) Disconnect the connector of door harness from body harness.

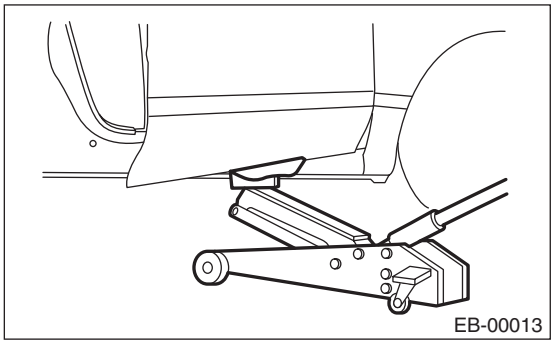


(2) Push in the claws to remove the grommet, and pull out the door harness connector.



A	Driver's side
B	Passenger's side

17) Before removing the panel assembly - front door, make the following preparations.

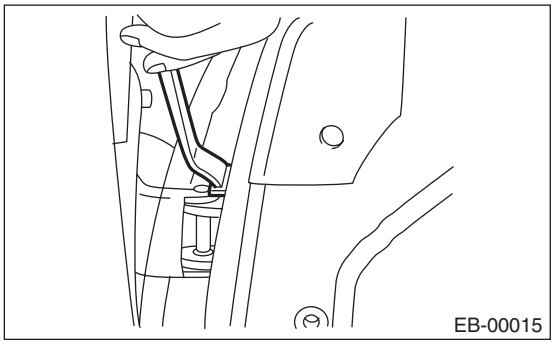


(1) Put a wooden block on a floor jack and place the jack under the panel assembly - front door.
(2) Support the panel assembly - front door with the jack to protect it from damage.

CAUTION:
Do not excessively lift the panel assembly - front door with the floor jack. The door hinges may be damaged.

18) Remove the door-side bolts for the upper hinge - front door and the lower hinge - front door to remove the panel assembly - front door.

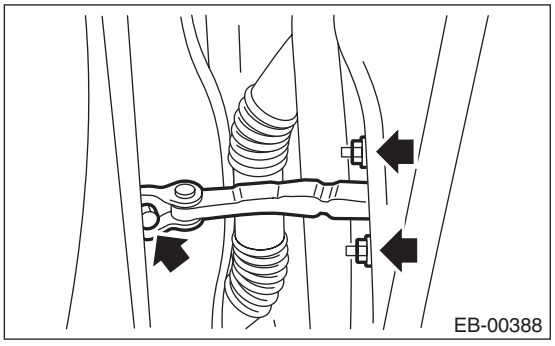
CAUTION:
The panel assembly - front door is heavy. When removing and installing it, always work in a team of two or more persons.



19) Remove the door hinge from vehicle.

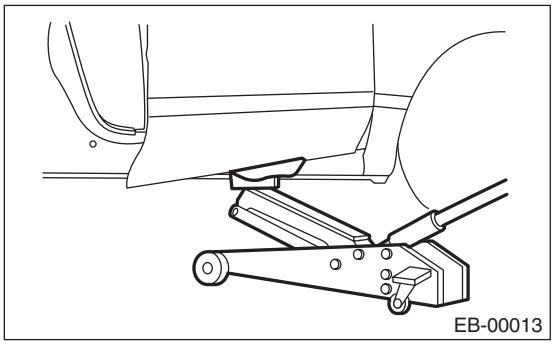
2. FRONT DOOR HINGE

1) Remove the bolts from the vehicle side to disconnect the checker assembly - front door.



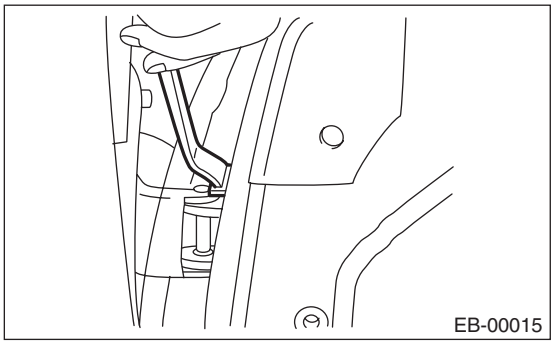
2) Before removing the door hinge, make the following preparations.
   (1) Put a wooden block on a floor jack and place the jack under the panel assembly - front door.
   (2) Support the panel assembly - front door with the jack to protect it from damage.

CAUTION:
Do not excessively lift the panel assembly - front door with the floor jack. The door hinges may be damaged.



3) Remove the bolts of the upper hinge - front door or the lower hinge - front door.

CAUTION:
Do not remove the upper hinge - front door and the lower hinge - front door at the same time.

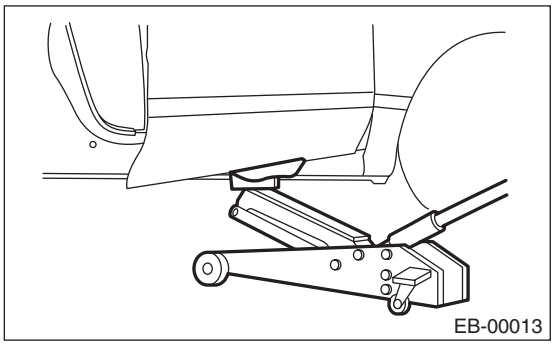


4) Remove the hinge - front door from the vehicle.

B: INSTALLATION

1. FRONT DOOR PANEL

1) Put a wooden block on a jack and place the panel assembly - front door on it.



2) Apply grease to the sliding area of door hinges, and install the door hinge to vehicle.
3) Adjust the height by the jack, and temporarily install the panel assembly - front door to the upper hinge - front door and the lower hinge - front door.

NOTE:
- When installing the panel assembly - front door, make sure that a uniform clearance is created around the panel.
- Perform installation while paying attention to the assembly direction of the grommet.

4) Adjust the clearance around the panel assembly - front door. <Ref. to EB-24, ADJUSTMENT, Front Door.>
5) Tighten the bolts and nuts of the door hinge and the checker assembly - front door.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to EB-4, FRONT DOOR, COMPONENT, General Description.>

6) Install door internal parts in the reverse order of removal.

NOTE:
Before installation, check the following items.
- Rod of the latch and actuator assembly - front is free from deformation.
- Grease is applied sufficiently to the rod joints of the latch and actuator assembly - front.
- Cable of the latch and actuator assembly - front is free from deformation such as fray.
- Grease is applied sufficiently to the cable joints of the latch and actuator assembly - front.

7) Connect door harness connector, and install the cover side sill - front.

2. FRONT DOOR HINGE

1) Apply grease to the sliding area of door hinges, and install the door hinge to vehicle.
2) Adjust the height by the jack, and temporarily install the panel assembly - front door to the upper hinge - front door and the lower hinge - front door.

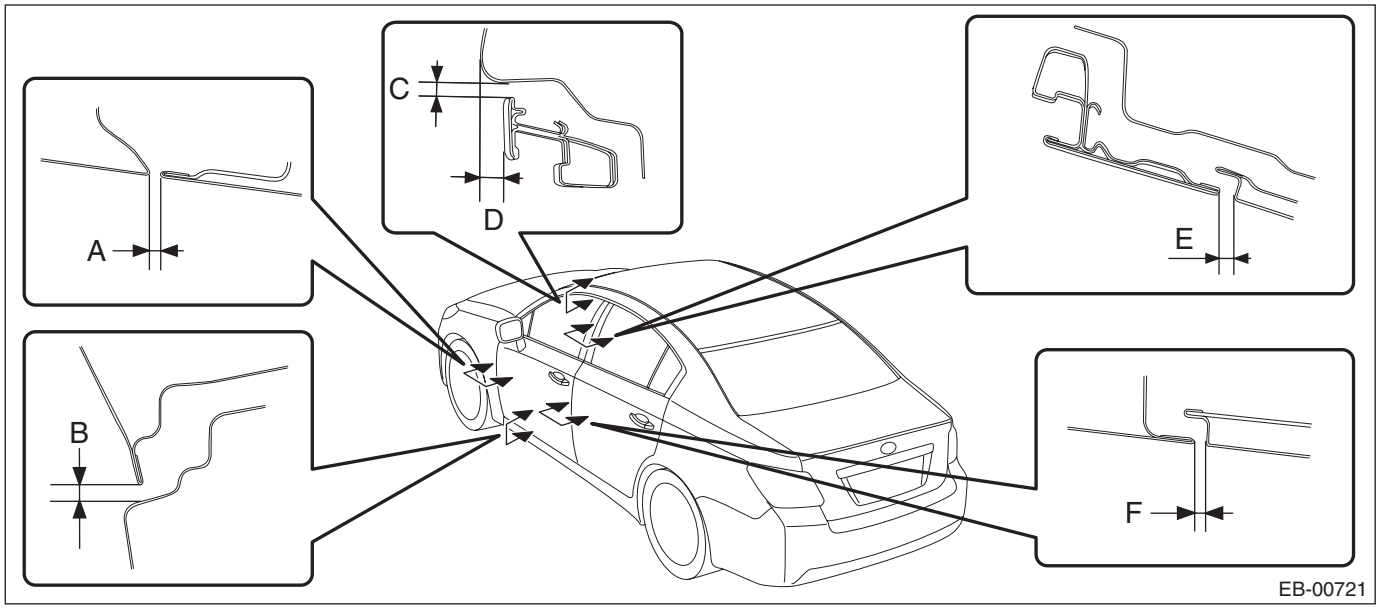
NOTE:
When installing the panel assembly - front door, make sure that a uniform clearance is created around the panel.

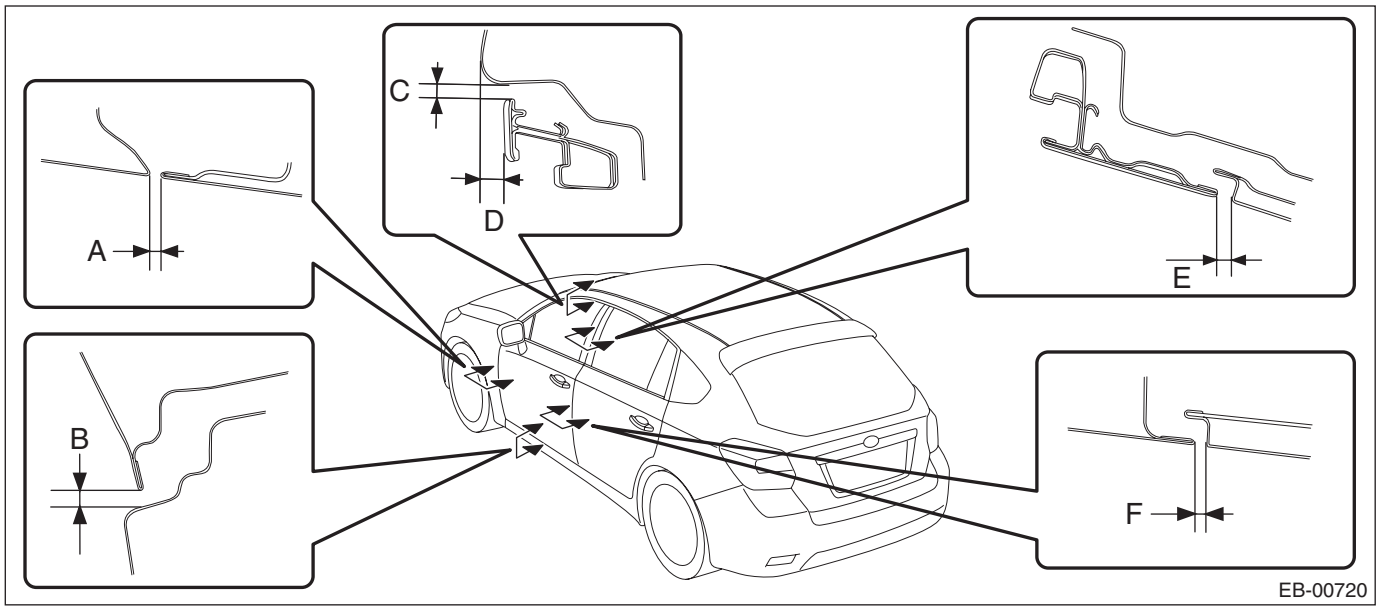
3) Adjust the clearance around the panel assembly - front door. <Ref. to EB-24, ADJUSTMENT, Front Door.>
4) Tighten the bolts and nuts of the door hinge and the checker assembly - front door.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to EB-4, FRONT DOOR, COMPONENT, General Description.>

C: ADJUSTMENT

Adjust the clearance around the panel assembly - front door as follows.

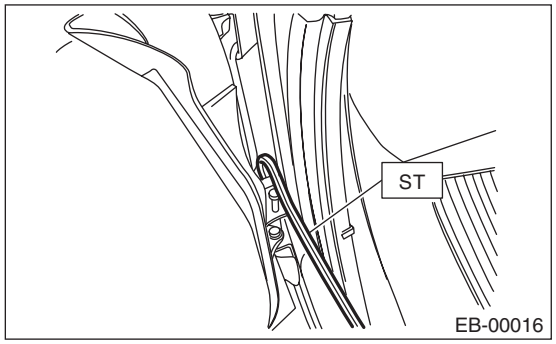




Part		Standard
A	Fender COMPL - front to Panel assembly - front door	4.5±1.0 mm (0.18±0.04 in)
B	Panel assembly - front door to Side sill	6.0+1.5, –1.0 mm (0.24+0.06, -0.04 in)
C	Roof panel to Front door sash	5.1+1.5, –1.0 mm (0.20+0.06, -0.04 in)
D	Surface level gap between roof panel and front door sash	7±1.5 mm (0.28±0.06 in)
E	Front door sash to Rear door sash	5.5+1.5, –1.0 mm (0.22+0.06, -0.04 in)
F	Panel assembly - front door to Panel assembly - rear door	4.5±1.0 mm (0.18±0.04 in)

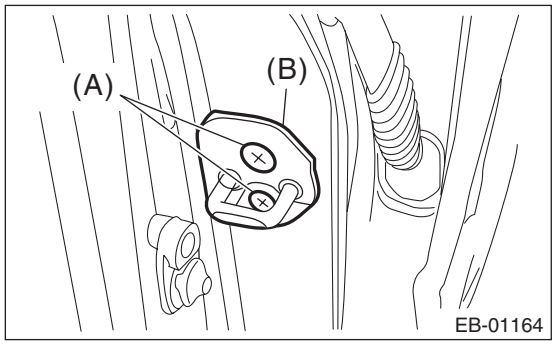
NOTE:
Common to 4 door model and 5 door model/Crosstrek model
1) Adjust the vertical and horizontal positions of the panel assembly - front door.

Preparation tool:
ST: WRENCH (925610000)



(1) Using ST, loosen the body side bolts of the upper hinge - front door and the lower hinge - front door.
(2) Adjust the vertical and horizontal clearance of the panel assembly - front door.
2) Adjust the surface level gap between the panel assembly - front door and the panel assembly - rear door.

CAUTION:
Do not use an impact wrench. Welding area on the striker nut plate is easily broken.



(1) Loosen the screws (A).
(2) Tap the striker - front door (B) using a plastic hammer to adjust the surface level gap between the rear end of the panel assembly - front door and the front end of the panel assembly - rear door.

5. Front Sealing Cover

A: REMOVAL

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>

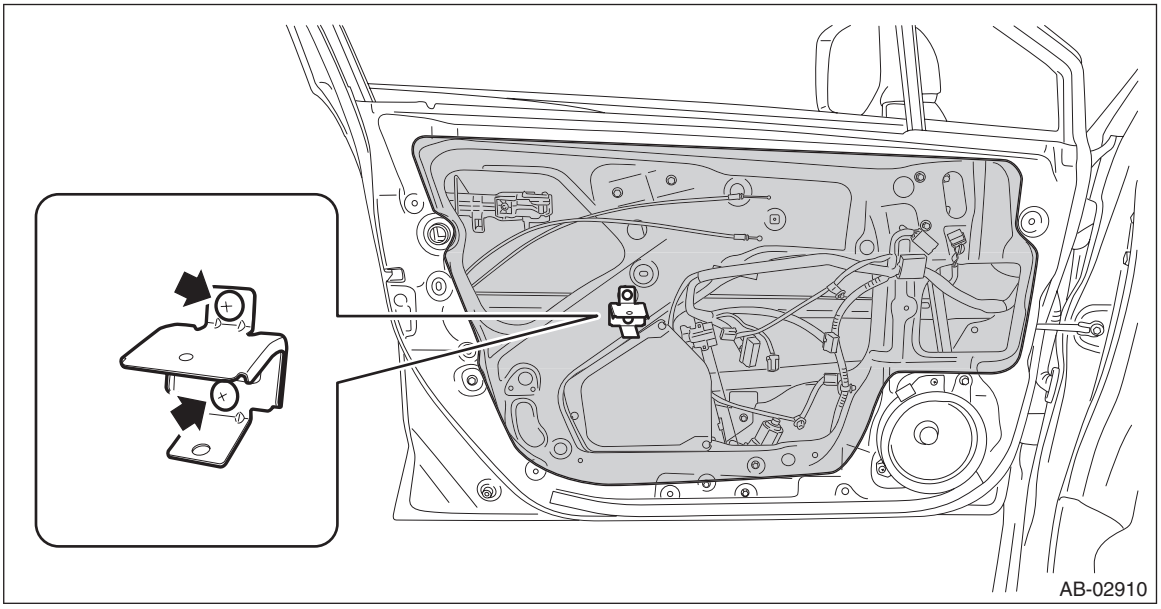
3) Remove the sealing cover - front door.

CAUTION:

- **Carefully remove the butyl tape. Excessive force will easily break the cover.**
- **If the sealing cover - front door gets broken, replace it with a new part.**
- **Be careful not to allow the butyl tape to contact any trims and seats because the butyl tape, which has a strong adhesive force, is difficult to remove once it adhered.**

(1) Remove the screw to remove the bracket - door trim front.

(2) Carefully remove the butyl tape to remove the sealing cover - front door.



B: INSTALLATION

CAUTION:
- **If the sealing cover - front door gets broken, replace it with a new part.**
- **Apply a uniform bead of butyl tape.**
- **Attach the sealing cover - front door, keeping it from becoming wrinkled.**
- **Breaks in the bead will allow water leakage and contamination.**

1) Install the sealing cover - front door.
   (1) Forcefully push the butyl tape portion to prevent any floating on surface.
   (2) When replacing the sealing cover, use the butyl tape.

Butyl tape:
3M Butyl Rubber 8626 or equivalent

2) Install each part in the reverse order of removal.

NOTE:
Before installation, check the following items.
- Rod of the latch and actuator assembly - front is free from deformation.
- Grease is applied sufficiently to the rod joints of the latch and actuator assembly - front.
- Cable of the latch and actuator assembly - front is free from deformation such as fray.
- Grease is applied sufficiently to the cable joints of the latch and actuator assembly - front.

C: INSPECTION

If the sealing cover - front door is broken, replace it with a new part.

6. Rear Door

A: REMOVAL

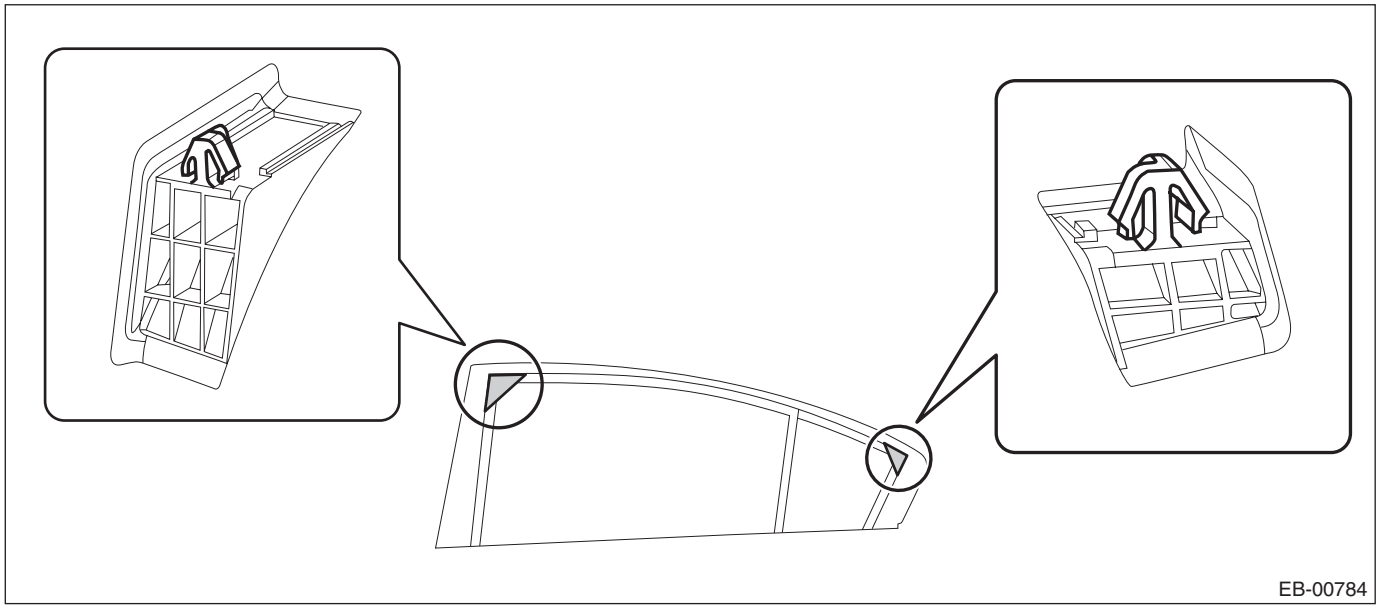
1. REAR DOOR PANEL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

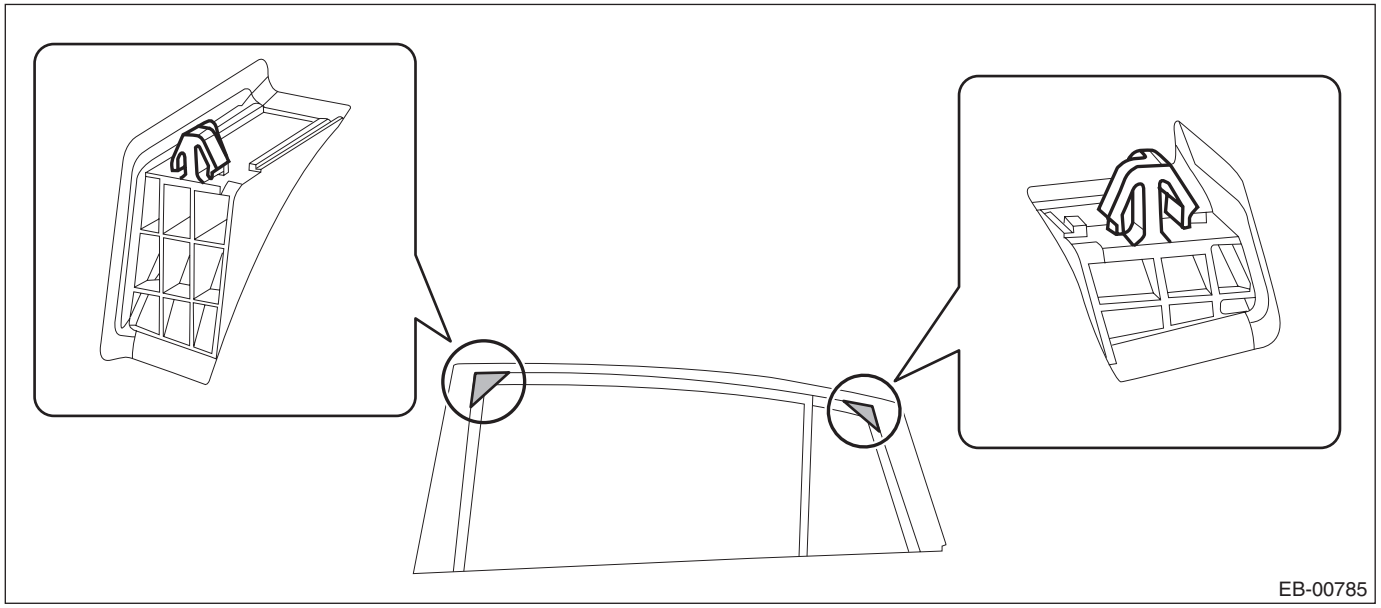
NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - rear door. <Ref. to EB-34, REMOVAL, Rear Sealing Cover.>
4) Remove the cover B pillar - rear door INN and the cover C pillar - rear door INN.

- 4 door model


EB-00784

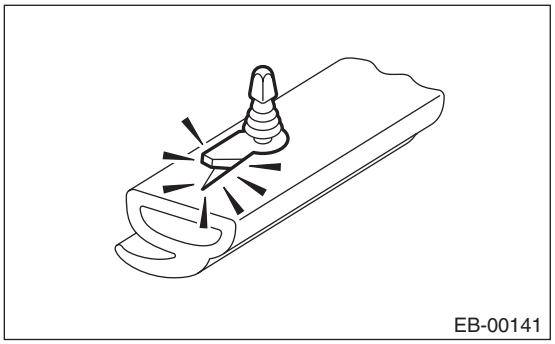
- 5 door model/Crosstrek model


EB-00785

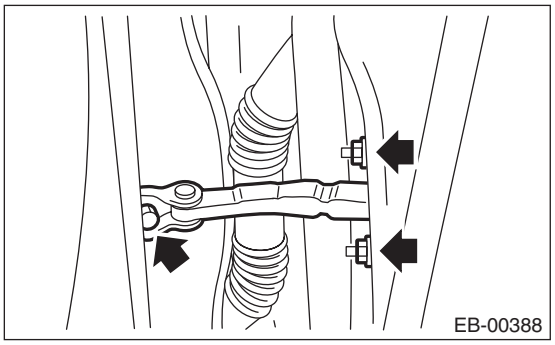
5) Remove the rear door speaker assembly. <Ref. to ET-34, REMOVAL, Rear Speaker.>
6) Remove the sash COMPL - rear partition and the glass assembly - rear door. <Ref. to GW-33, REMOVAL, Rear Door Glass.>
7) Remove the regulator - rear. <Ref. to GW-35, REMOVAL, Rear Regulator and Motor Assembly.>

8) Remove the latch and actuator assembly - rear. <Ref. to SL-47, REMOVAL, Rear Door Latch and Door Lock Actuator Assembly.>
9) Remove the handle - door outer and the cover - handle rear outer. <Ref. to SL-43, REMOVAL, Rear Outer Handle.>
10) Remove the weather strip - rear door.

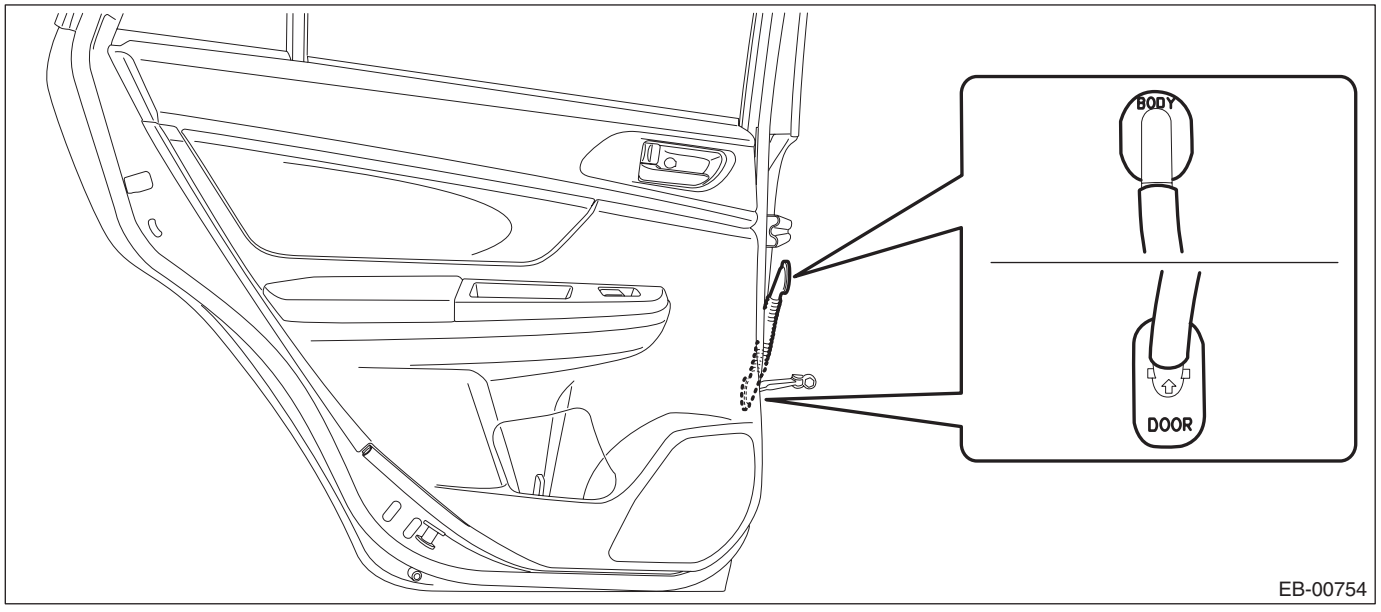
CAUTION:
If the weather strip clip is removed with excessive force, the weather strip may be damaged. Be sure to use clip remover to remove.


EB-00141

11) Remove the bolts and nuts, and then detach the checker assembly - rear door.

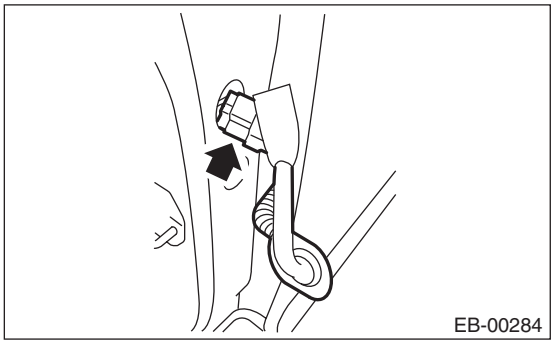

EB-00388

12) Disconnect the rear door harness connectors.
(1) Remove the grommet and pull out the rear door harness connector from inside the center pillar.

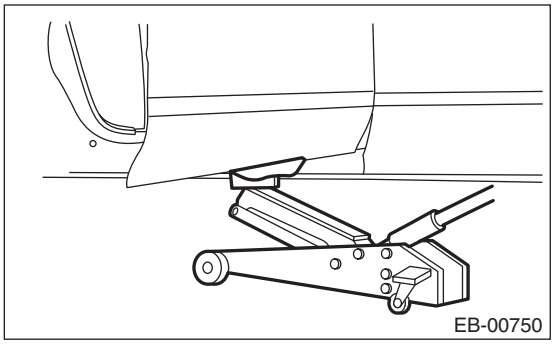


EB-00754

(2) Disconnect the rear door harness connectors.



13) Before removing the panel assembly - rear door, make the following preparations.

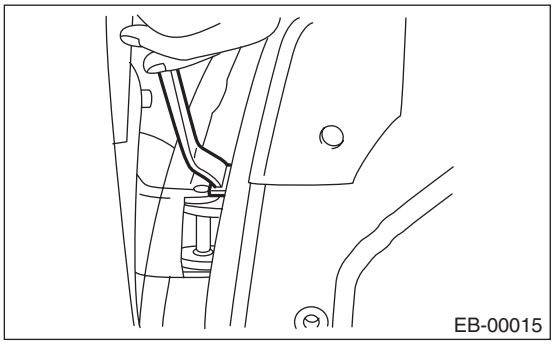


(1) Put a wooden block on a floor jack and place the jack under the panel assembly - rear door.
(2) Support the panel assembly - rear door with the jack to protect it from damage.

CAUTION:
Do not excessively lift the panel assembly - rear door with the floor jack. The door hinges may be damaged.

14) Remove the door-side bolts for the upper hinge - rear door and the lower hinge - rear door to remove the panel assembly - rear door.

CAUTION:
The panel assembly - rear door is heavy. When removing and installing it, always work in a team of two or more persons.



15) Remove the door hinge from vehicle. <Ref. to EB-30, REAR DOOR HINGE, REMOVAL, Rear Door.>

2. REAR DOOR HINGE

1) Open the panel assembly - front door, and remove the bolts of the upper hinge - rear door or the lower hinge - rear door.

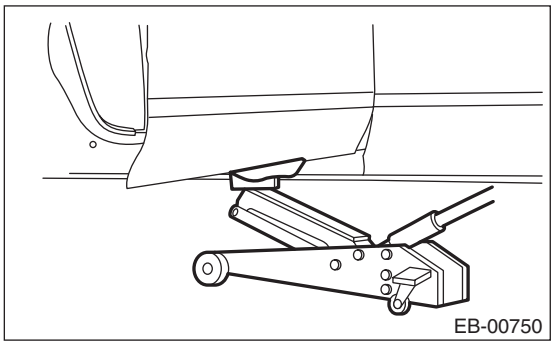
CAUTION:
- **Do not remove the upper hinge - rear door and the lower hinge - rear door at the same time.**
- **Removal and installation of the panel assembly - rear door must be performed with the door closed.**

2) Remove the rear door hinge from vehicle.

B: INSTALLATION

1. REAR DOOR PANEL

1) Put a wooden block on a jack and place the panel assembly - rear door on it.



2) Apply grease to the moving part of door hinges.
3) Adjust the height by the jack, and temporarily install the panel assembly - rear door to the upper hinge - rear door and the lower hinge - rear door.

NOTE:
• When installing the panel assembly - rear door, make sure that a uniform clearance is created around the panel.
• Perform installation while paying attention to the assembly direction of the grommet.

4) Adjust the clearance around the panel assembly - rear door. <Ref. to EB-32, ADJUSTMENT, Rear Door.>
5) Tighten the bolts and nuts of the door hinge and the checker assembly - rear door.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to EB-5, REAR DOOR, COMPONENT, General Description.>

6) Install door internal parts in the reverse order of removal.

NOTE:
Before installation, check the following items.
• Is the lever of the frame assembly - rear door outer is free from deformation?
• Is grease applied sufficiently to the lever joints of the latch and actuator assembly - rear?
• Is the cable of the latch and actuator assembly - rear free from deformation such as fray?
• Is grease applied sufficiently to the cable joints of the latch and actuator assembly - rear?

7) Connect the door harness connector, and install the harness grommet.

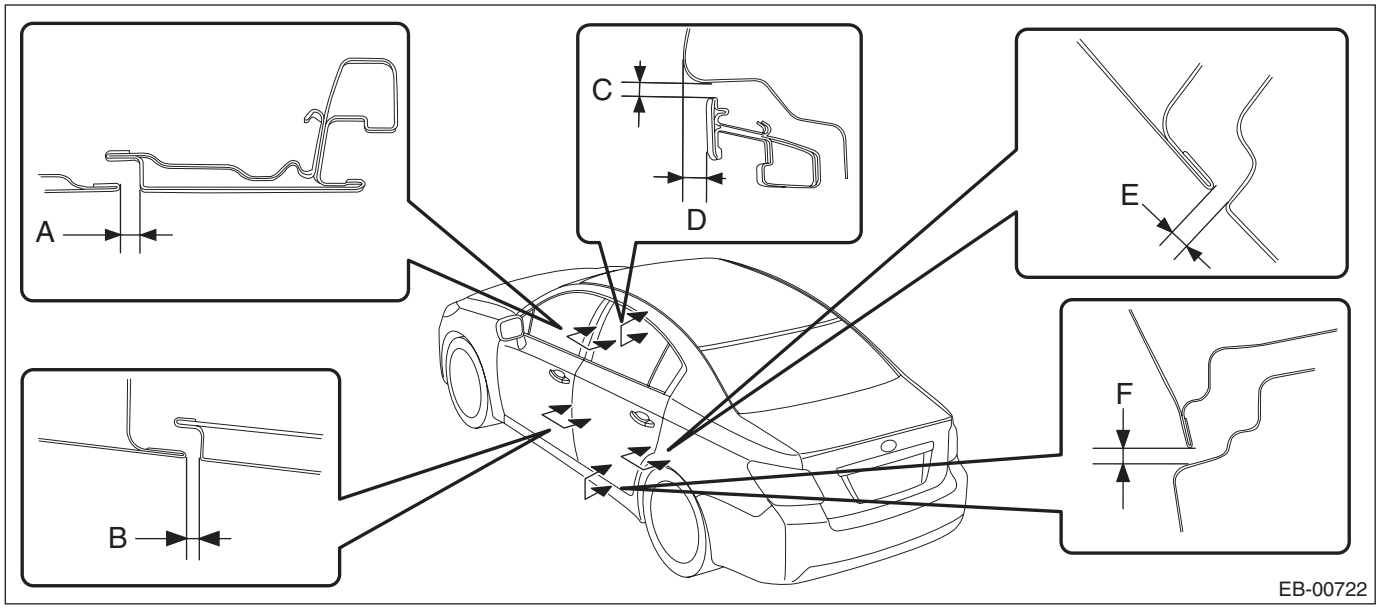
2. REAR DOOR HINGE

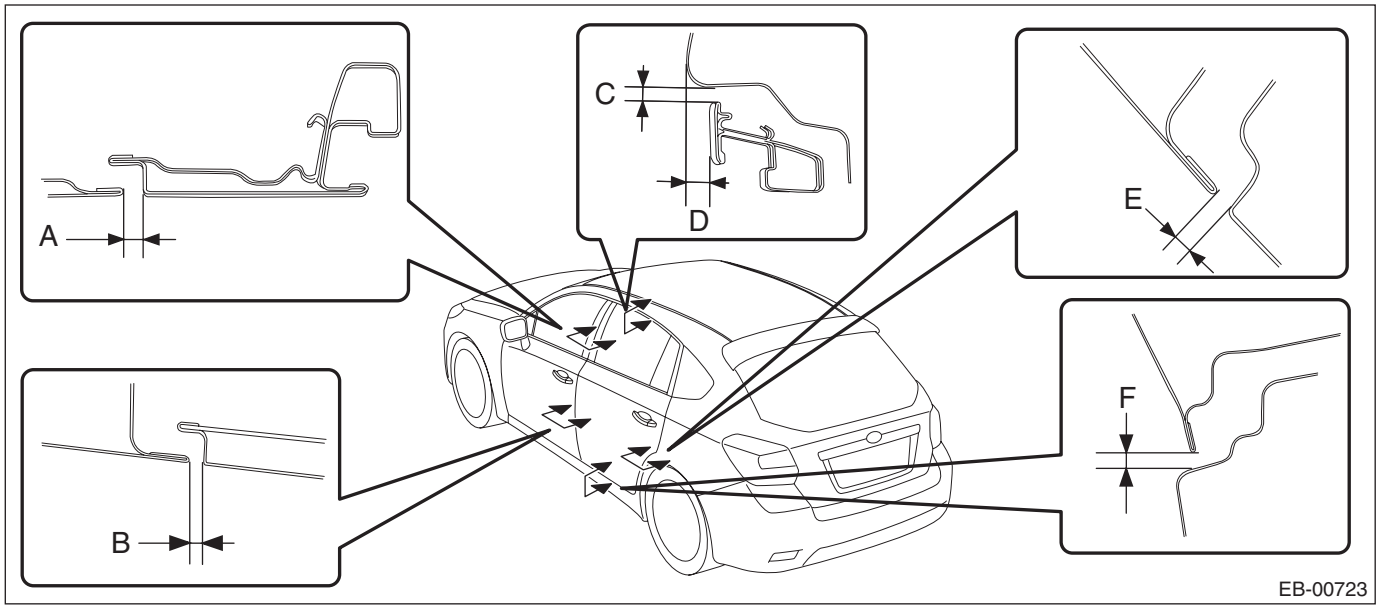
1) Apply grease to the moving part of door hinges.
2) Adjust the clearance around the panel assembly - rear door. <Ref. to EB-32, ADJUSTMENT, Rear Door.>
3) Tighten the door hinge bolts.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to EB-5, REAR DOOR, COMPONENT, General Description.>

C: ADJUSTMENT

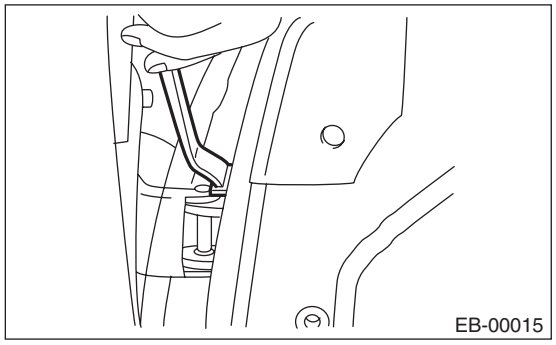
Adjust the clearance around the panel assembly - rear door as follows.





Part		Standard
A	Front door sash to Rear door sash	5.5+1.5, -1.0 mm (0.22+0.06, -0.04 in)
B	Panel assembly - front door to Panel assembly - rear door	4.5±1.0 mm (0.18±0.04 in)
C	Roof panel to Rear door sash	5.1+1.5, -1.0 mm (0.20+0.06, -0.04 in)
D	Surface level gap between roof panel and rear door sash	6.6±1.5 mm (0.26±0.06 in)
E	Panel assembly - rear door to Rear quarter panel	4.1±1.0 mm (0.16±0.04 in)
F	Panel assembly - rear door to Side sill	6.0±1.5 mm (0.24±0.06 in)

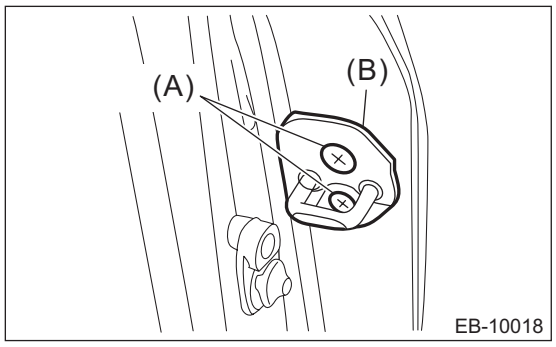
1) Adjust the vertical and horizontal positions of the panel assembly - rear door.



(1) Loosen the body side bolts of the upper hinge - rear door and the lower hinge - rear door.
(2) Adjust the vertical and horizontal clearance of the panel assembly - rear door.

2) Adjust the surface level gap between the panel assembly - rear door and the body.

CAUTION:
Do not use an impact wrench. Welding area on the striker nut plate is easily broken.



(1) Loosen the screws (A).
(2) Tap the striker - rear door (B) using a plastic hammer to adjust the surface level gap between the rear end of the panel assembly - rear door and the rear quarter.

7. Rear Sealing Cover

A: REMOVAL

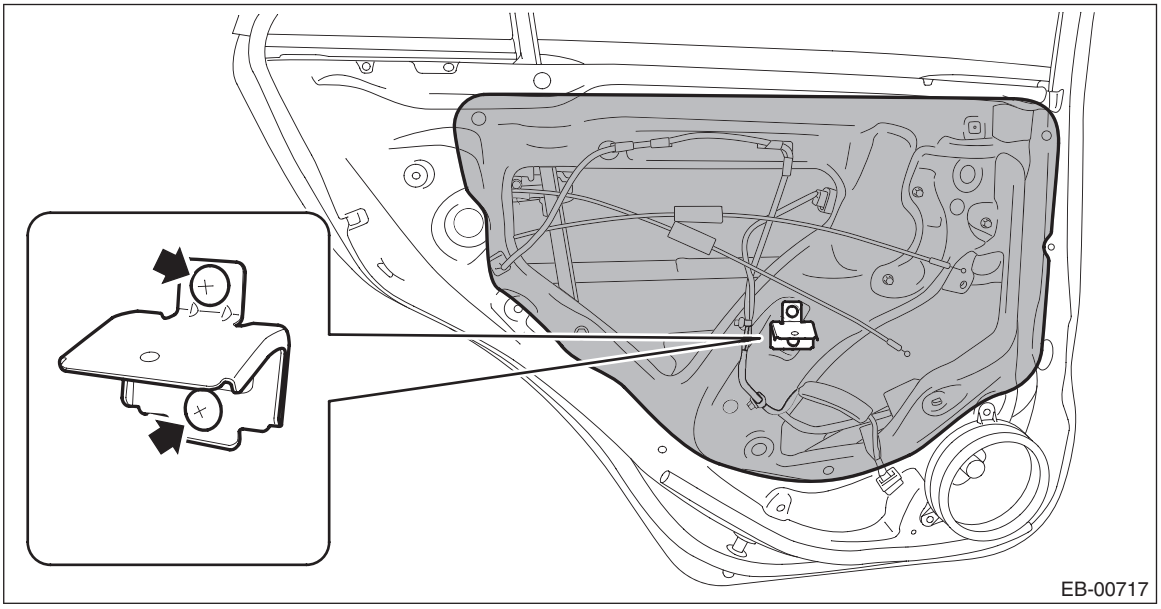
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - rear door.

CAUTION:
- **Carefully remove the butyl tape. Excessive force will easily break the cover.**
- **If the sealing cover - rear door gets broken, replace it with a new part.**
- **Be careful not to allow the butyl tape to contact any trims and seats because the butyl tape, which has a strong adhesive force, is difficult to remove once it adhered.**

(1) Remove the screw to remove the bracket - door trim rear.
(2) Carefully remove the butyl tape to remove the sealing cover - rear door.



B: INSTALLATION

CAUTION:
- **If the sealing cover - rear door gets broken, replace it with a new part.**
- **Apply a butyl tape evenly.**
- **Attach the sealing cover - rear door, keeping it from becoming wrinkled.**
- **If the butyl tape is applied unevenly, it will cause water leakage and soiling.**

1) Install the sealing cover.
(1) Forcefully push the butyl tape portion to prevent any floating on surface.
(2) When replacing the sealing cover, use the butyl tape.

Butyl tape:
3M Butyl Rubber 8626 or equivalent

2) Install each part in the reverse order of removal.

NOTE:
Before installation, check the following items.
- Is the lever of the frame assembly - rear door outer is free from deformation?
- Is grease applied sufficiently to the lever joints of the latch and actuator assembly - rear?
- Is the cable of the latch and actuator assembly - rear free from deformation such as fray?
- Is grease applied sufficiently to the cable joints of the latch and actuator assembly - rear?

C: INSPECTION

If the sealing cover - rear door is broken, replace it with a new part.

8. Door Sash Tape

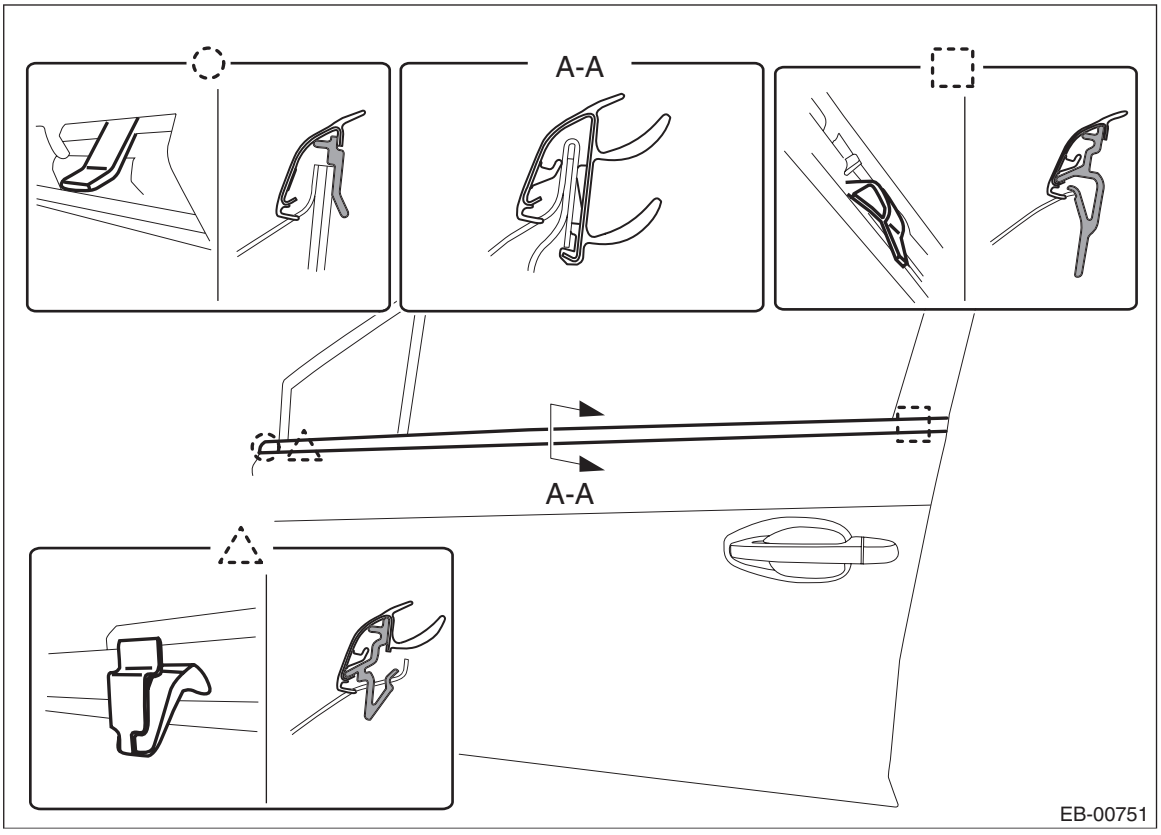
A: REMOVAL

1. FRONT DOOR

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - front door. <Ref. to EI-68, FRONT DOOR, REMOVAL, Door Trim.>
3) Remove the outer mirror assembly. <Ref. to GW-25, REMOVAL, Outer Mirror Assembly.>
4) Remove the sealing cover - front door. <Ref. to EB-26, REMOVAL, Front Sealing Cover.>
5) Remove the glass assembly - front door. <Ref. to GW-19, REMOVAL, Front Door Glass.>
6) Remove the running channel - front door.
7) Remove the weather strip outer - front door.

CAUTION:
- **When removing the weather strip outer, be careful not to damage the vehicle.**
- **Do not reuse the weather strip outer. Always replace with a new part.**



8) Peel the door sash tape from the door sash.

NOTE:
- If the tape is difficult to remove, warm the tape with a hairdryer, etc. to make the removal easier. Use a household hairdryer. Do not use industrial dryers.
- If tape residue is remaining on the door sash, wipe clean.

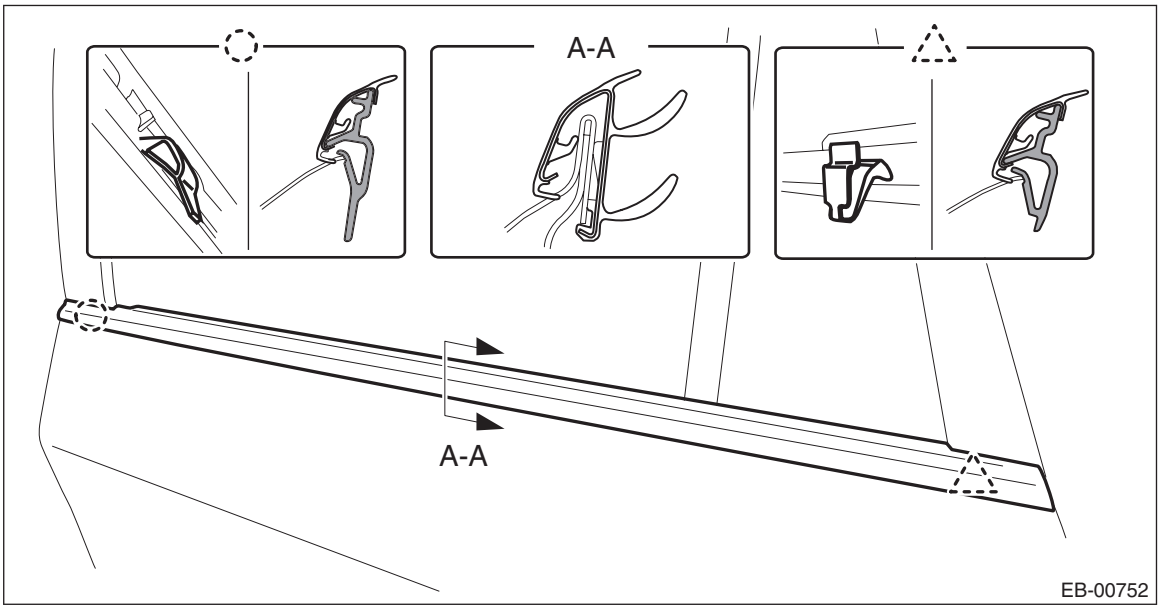
2. REAR DOOR

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the trim panel - rear door. <Ref. to EI-69, REAR DOOR, REMOVAL, Door Trim.>
3) Remove the sealing cover - rear door. <Ref. to EB-34, REMOVAL, Rear Sealing Cover.>
4) Remove the glass assembly - rear door. <Ref. to GW-33, REMOVAL, Rear Door Glass.>
5) Remove the running channel - rear door.
6) Remove the weather strip outer - rear door.

CAUTION:
- **When removing the weather strip outer, be careful not to damage the vehicle.**
- **Do not reuse the weather strip outer. Always replace with a new part.**



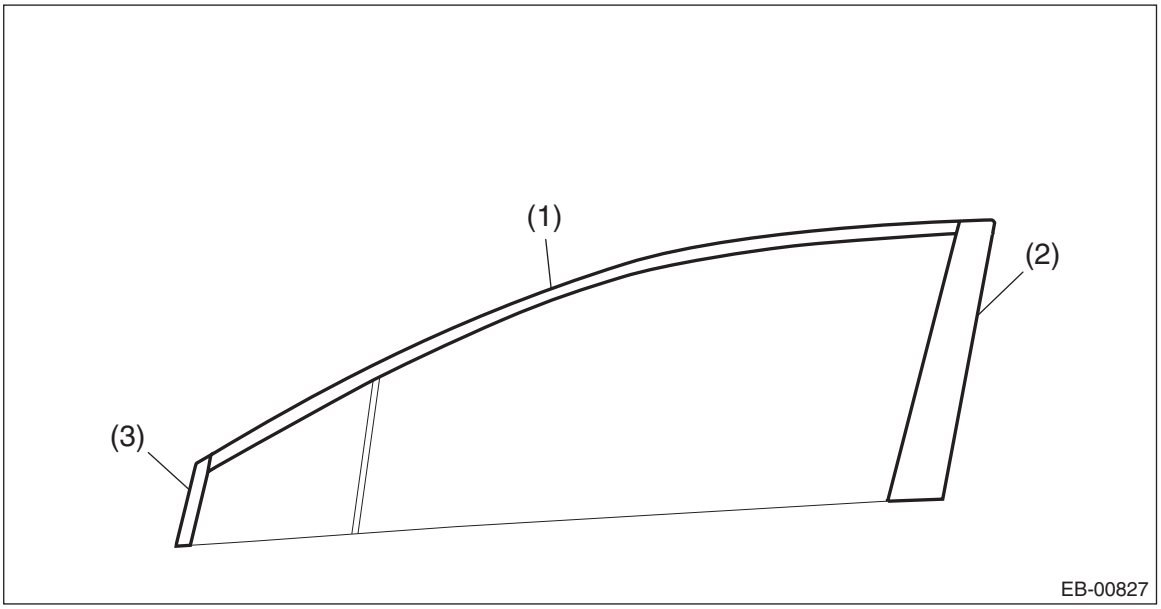
7) Peel the door sash tape from the door sash.

NOTE:
- If the tape is difficult to remove, warm the tape with a hairdryer, etc. to make the removal easier. Use a household hairdryer. Do not use industrial dryers.
- If tape residue is remaining on the door sash, wipe clean.

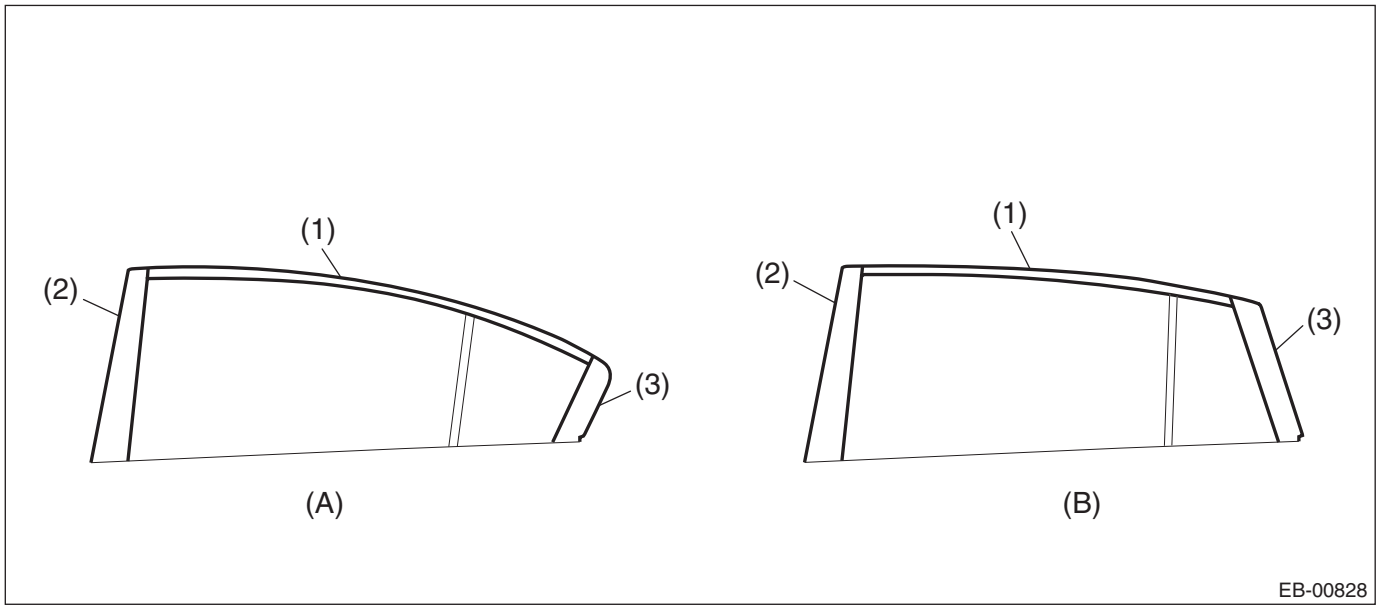
B: INSTALLATION

CAUTION:
- **Do not reuse the removed door sash tape. Replace it with a new tape.**
- **Press evenly along the sash when applying the tape using a spatula or similar object to make sure no bubbles are formed.**

If air bubbles are formed, reapply the tape.
- **If the tape is wrinkled, etc. during application, replace the tape.**
- **Be sure to press the ends of the tape firmly to adhere securely. If the tape comes off at the ends or where folded, the adhesive strength is weakened and the tape may peel off.**
- **There are locations where the tape ends will overlap each other. When applying the tape, be careful of the order of their application.**
  - **Front**



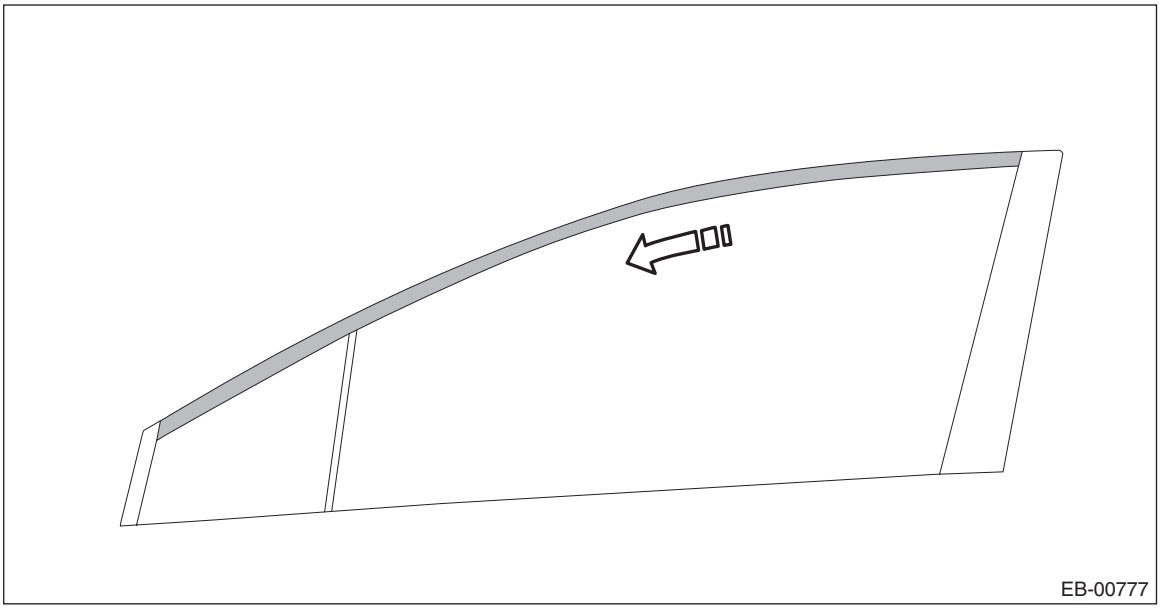
  - **Rear**



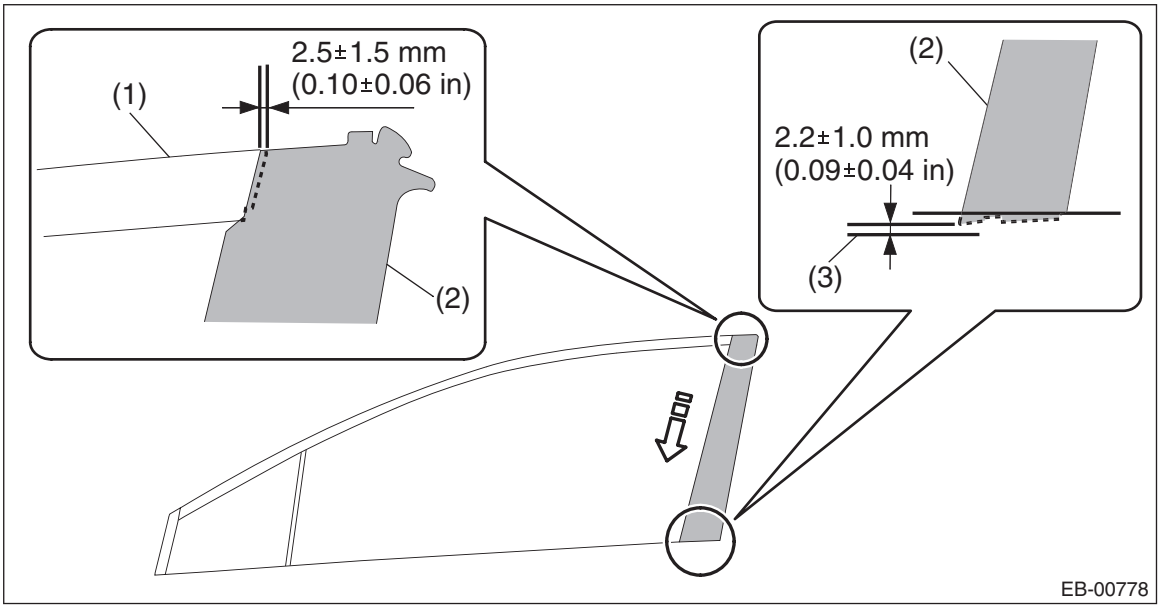
(A) 4 door model (B) 5 door model/Crosstrek model

1. FRONT DOOR

1) Apply the front door sash tape - medium from the rear of the vehicle towards the front.

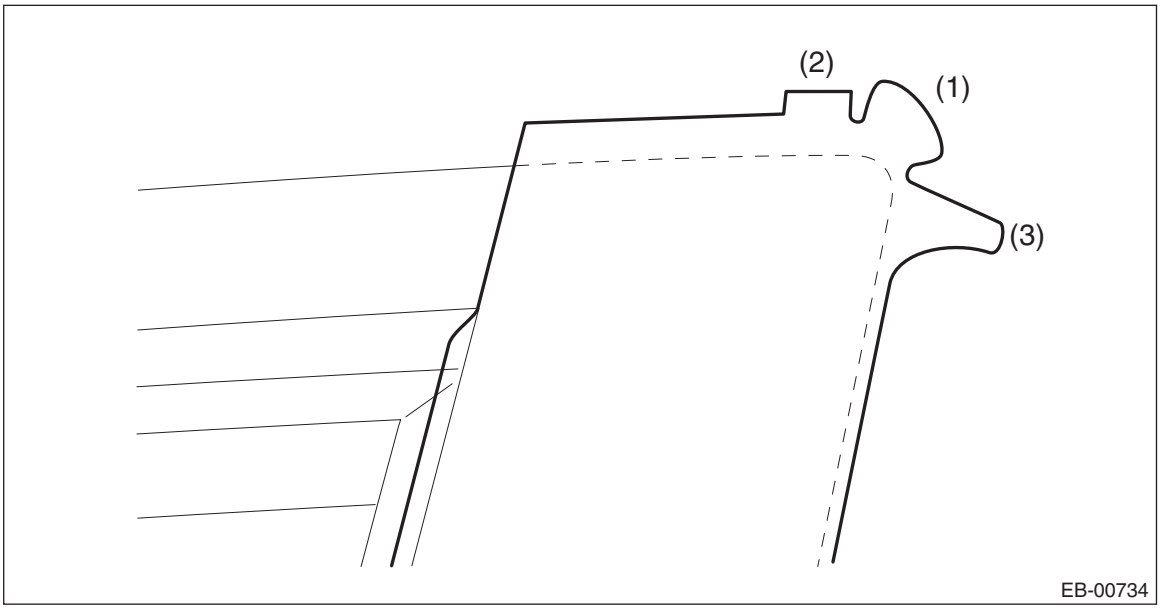


2) Apply the front door sash tape - rear from the top of the vehicle towards the bottom.

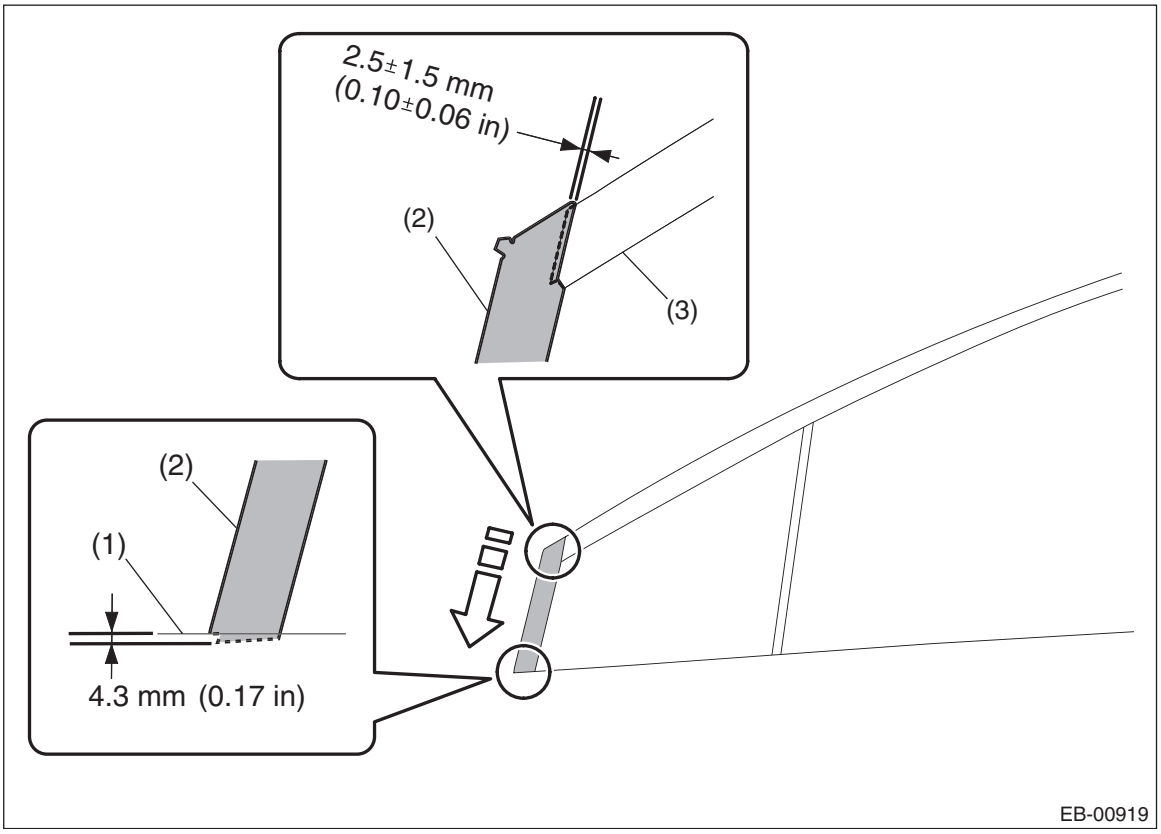


(1) Front door sash tape - medium (2) Front door sash tape - rear (3) End of panel outer

3) Fold the corners at the door upper end area in the order of (1) — (3).

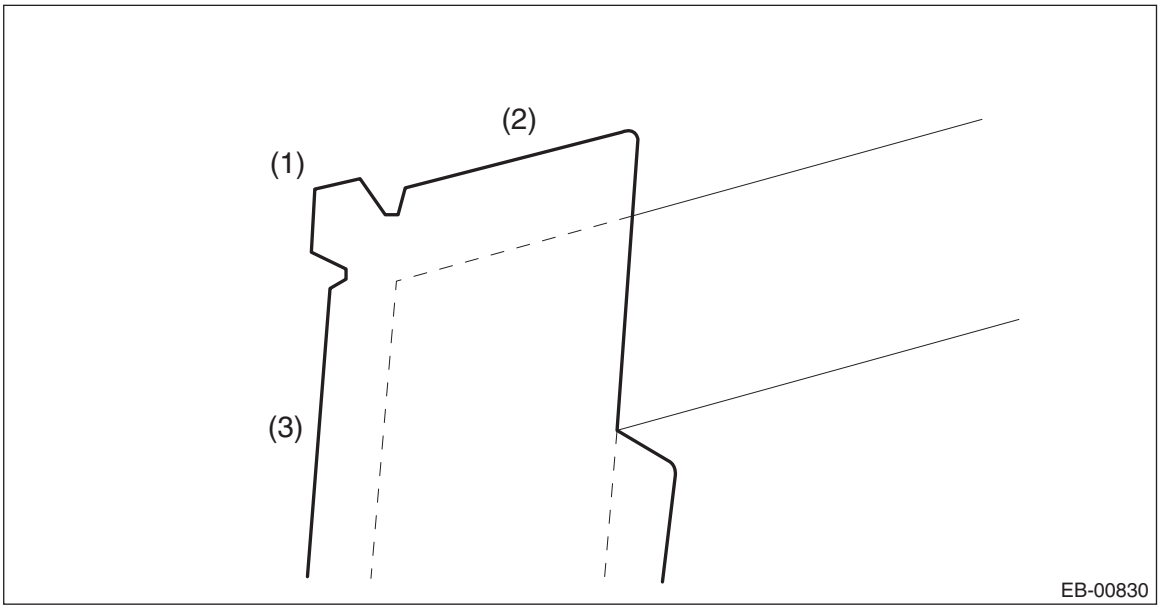


4) Apply the front door sash tape - front from the top of the vehicle towards the bottom.



(1) Upper end of weather strip (2) Front door sash tape - front (3) Front door sash tape - medium

5) Fold the corners at the door upper end area in the order of (1) — (3).



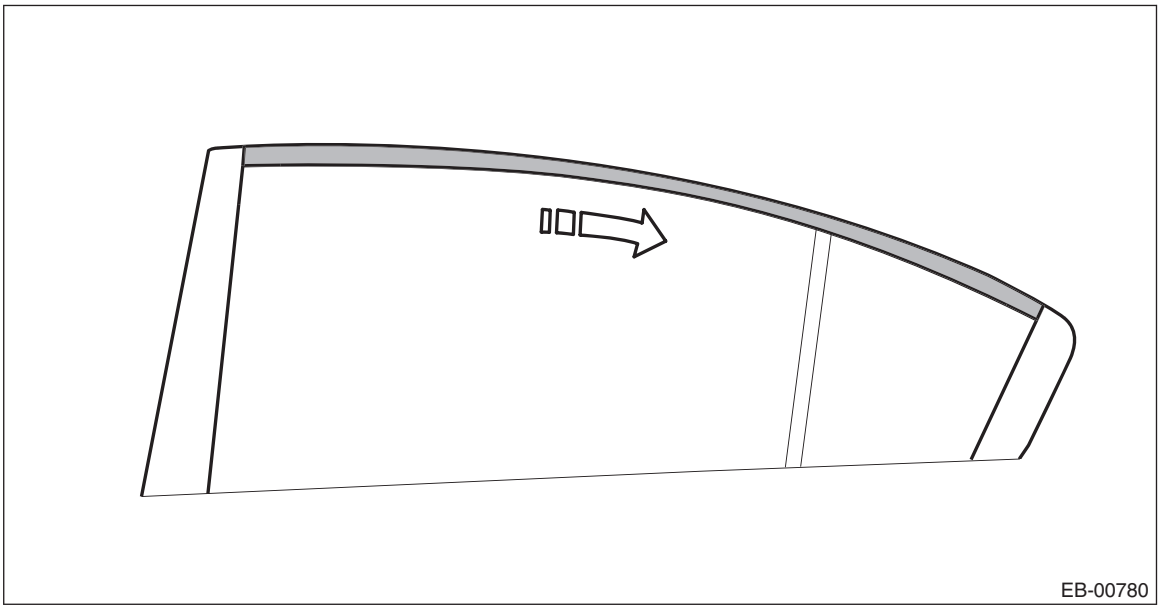
6) Thereafter, install door parts in the reverse order of removal.

NOTE:
Before installation, check the following items.
- Rod of the latch and actuator assembly - front is free from deformation.
- Grease is applied sufficiently to the rod joints of the latch and actuator assembly - front.
- Cable of the latch and actuator assembly - front is free from deformation such as fray.
- Grease is applied sufficiently to the cable joints of the latch and actuator assembly - front.

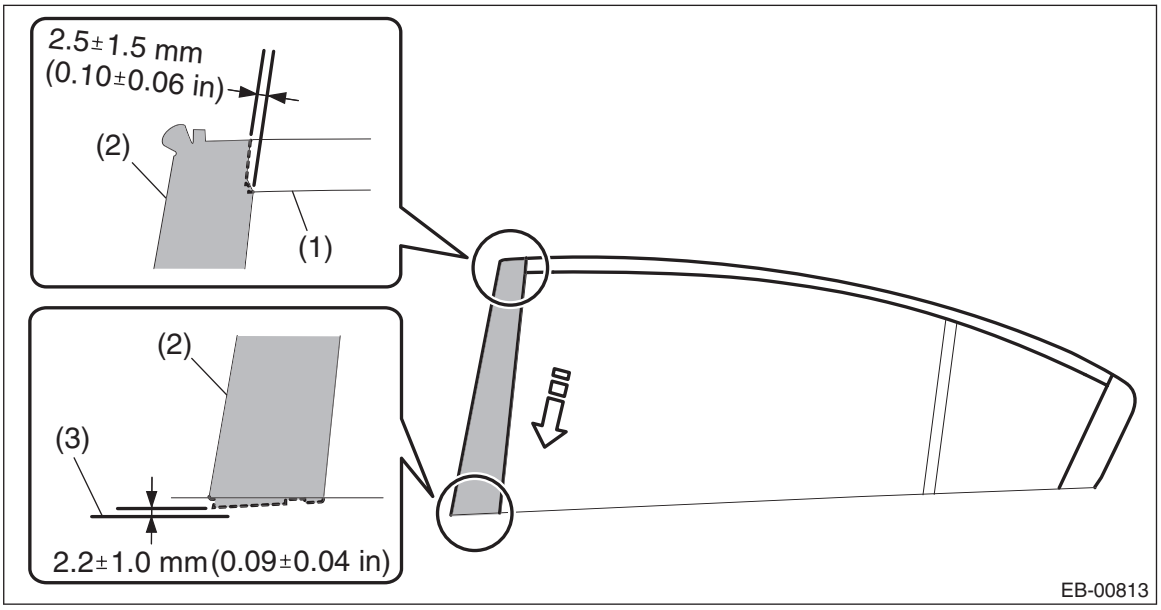
2. REAR DOOR

4 door model

1) Apply the rear door sash tape - medium from the front of the vehicle towards the rear.

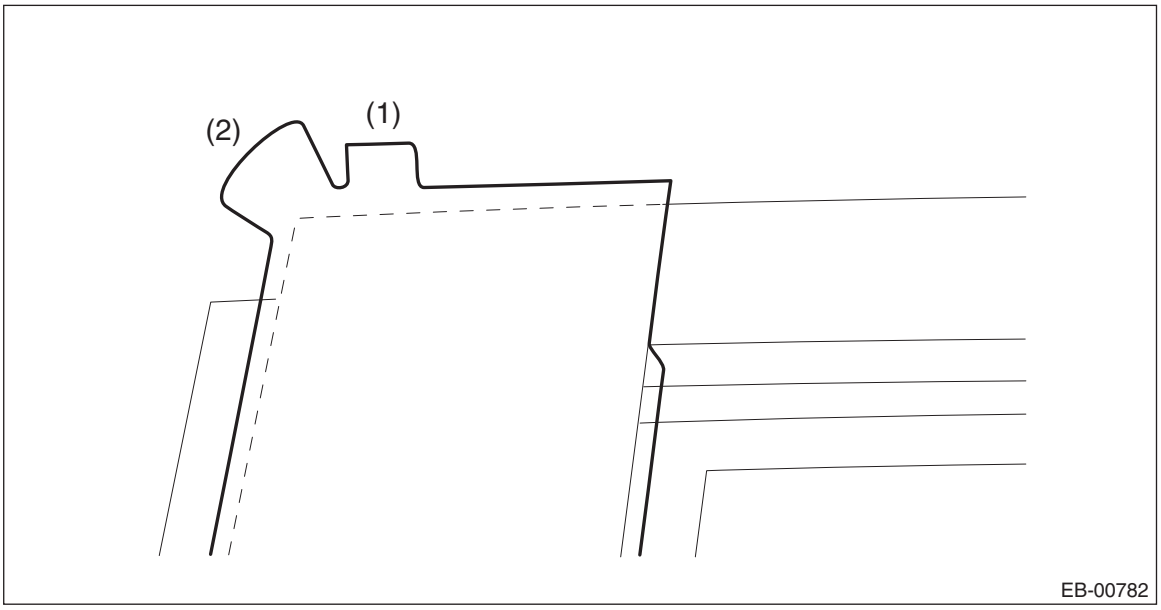


2) Apply the rear door sash tape - front from the top of the vehicle towards the bottom.

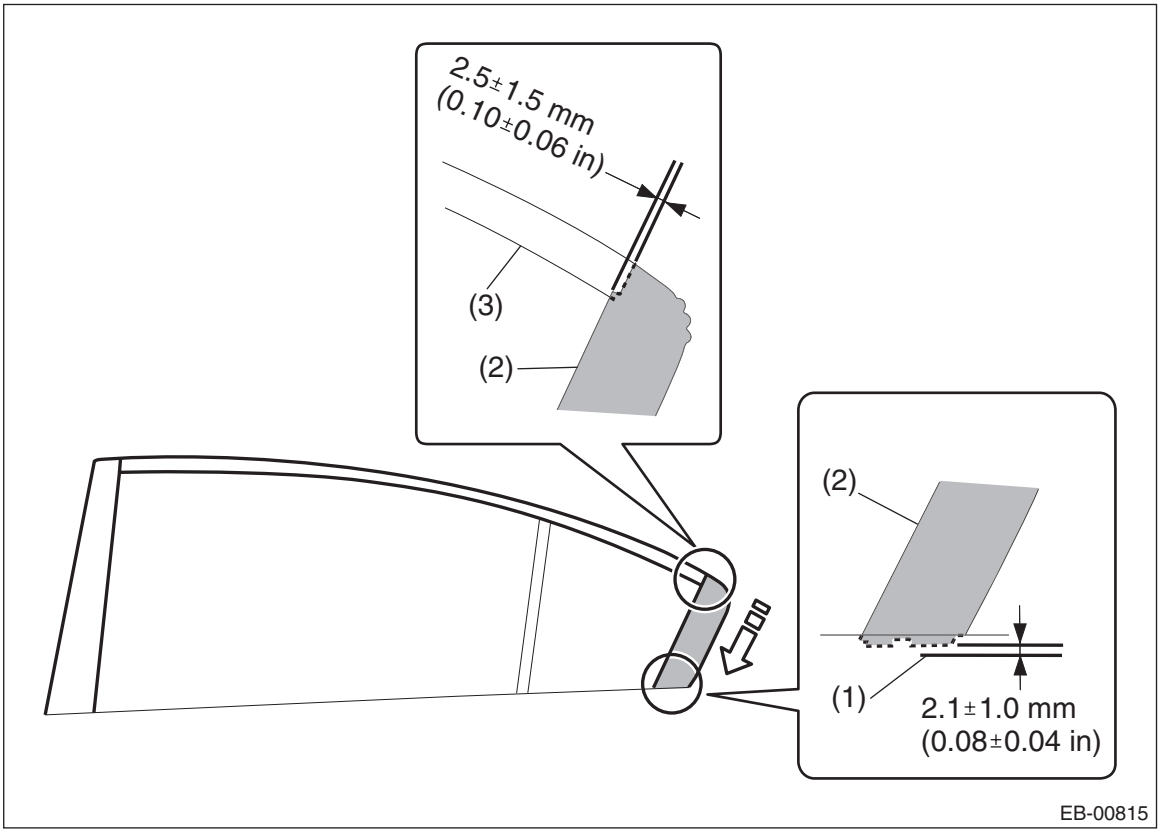


(1) Rear door sash tape - medium (2) Rear door sash tape - front (3) End of panel outer

3) Fold the corners at the door upper end area in the order of (1) — (2).

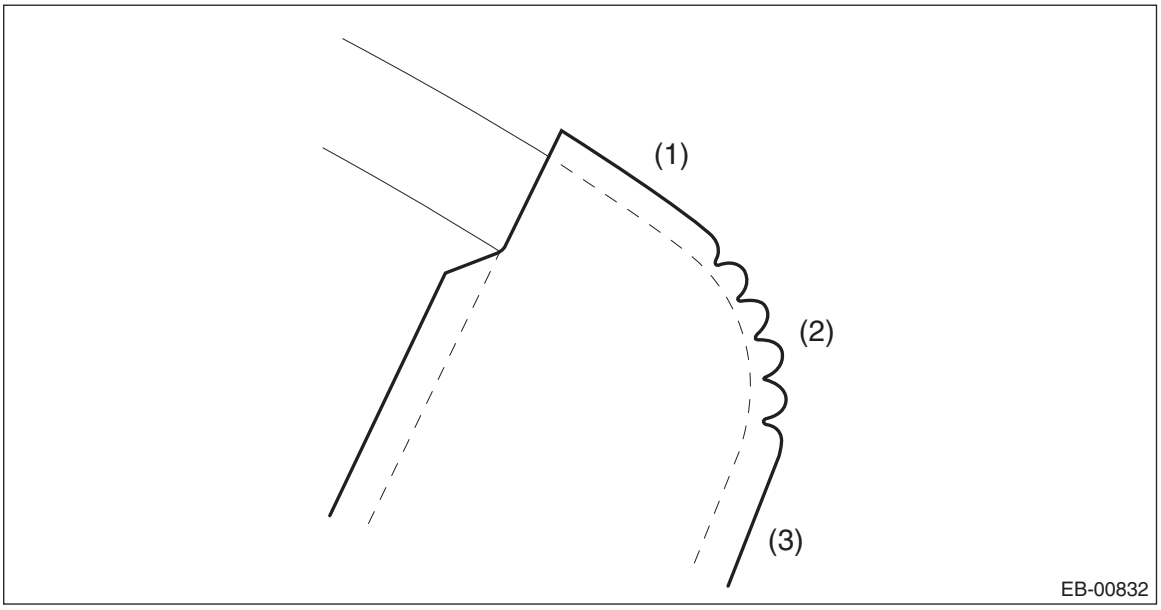


4) Apply the rear door sash tape - rear from the top of the vehicle towards the bottom.



(1) End of panel outer (2) Rear door sash tape - rear (3) Rear door sash tape - medium

5) Fold the corners at the door upper end area in the order of (1) — (3).



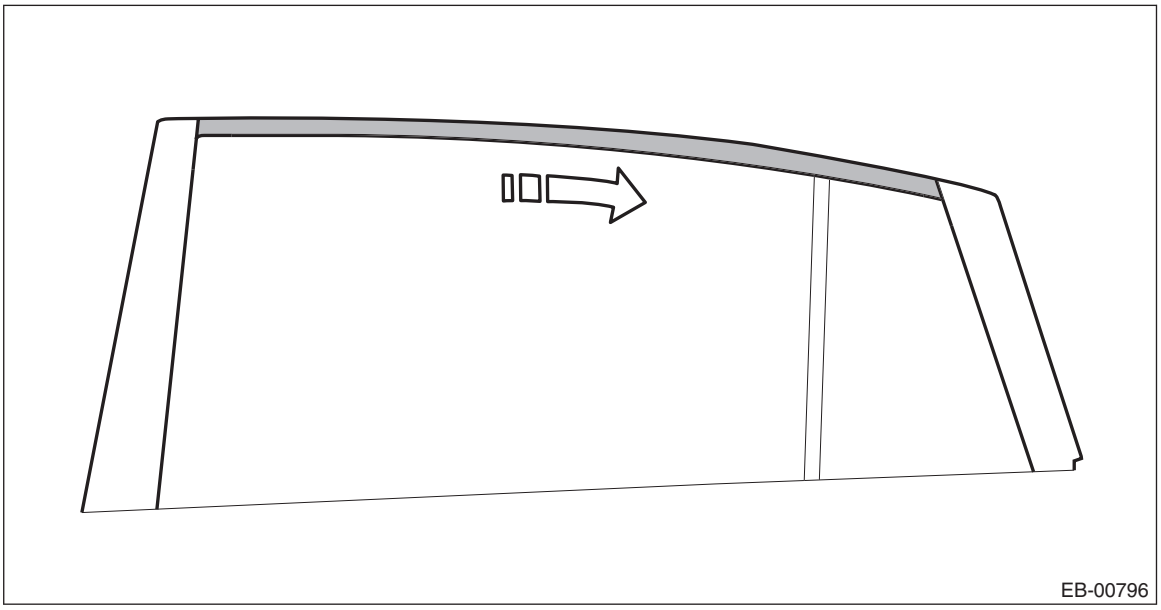
6) Thereafter, install door parts in the reverse order of removal.

NOTE:
Before installation, check the following items.
- Is the lever of the frame assembly - rear door outer is free from deformation?
- Is grease applied sufficiently to the lever joints of the latch and actuator assembly - rear?
- Is the cable of the latch and actuator assembly - rear free from deformation such as fray?
- Is grease applied sufficiently to the cable joints of the latch and actuator assembly - rear?

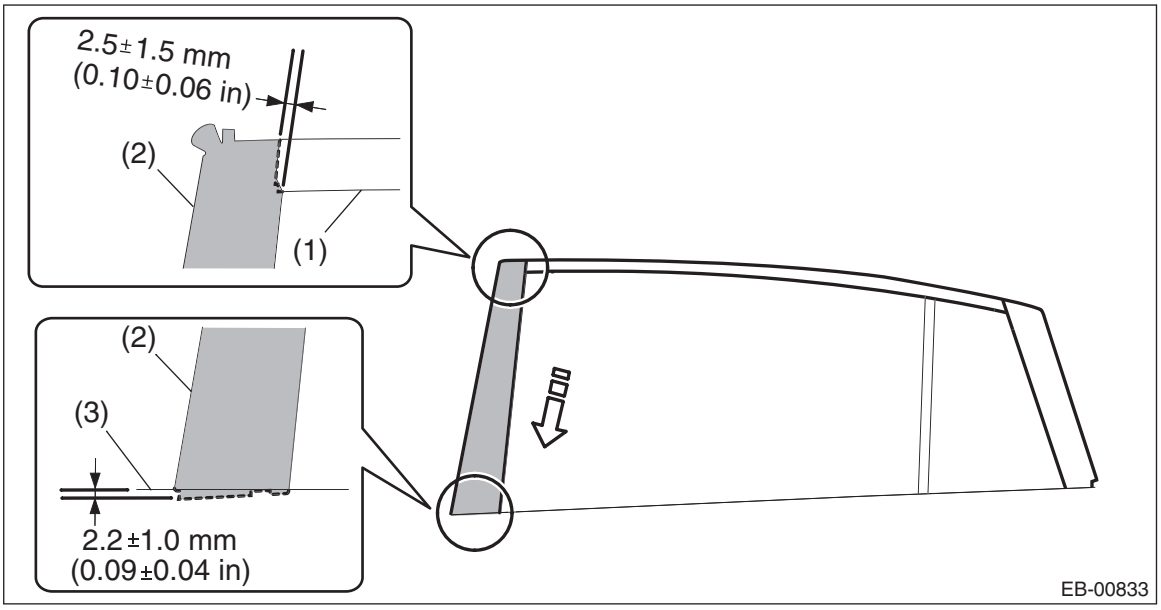
3. REAR DOOR

5 door model/Crosstrek model

1) Apply the rear door sash tape - medium from the front of the vehicle towards the rear.

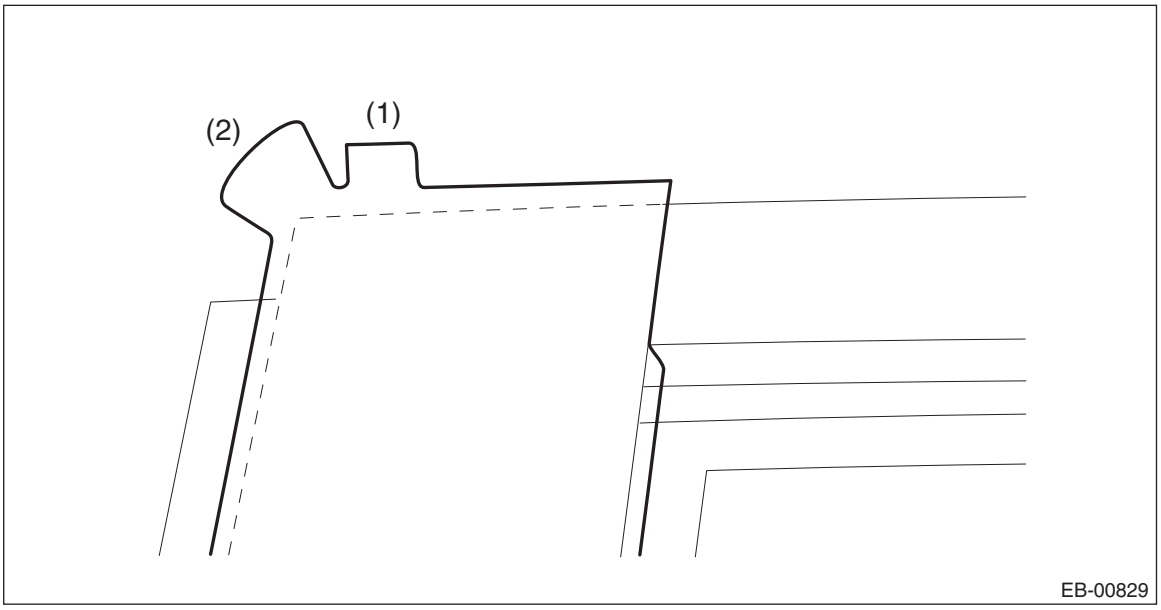


2) Apply the rear door sash tape - front from the top of the vehicle towards the bottom.

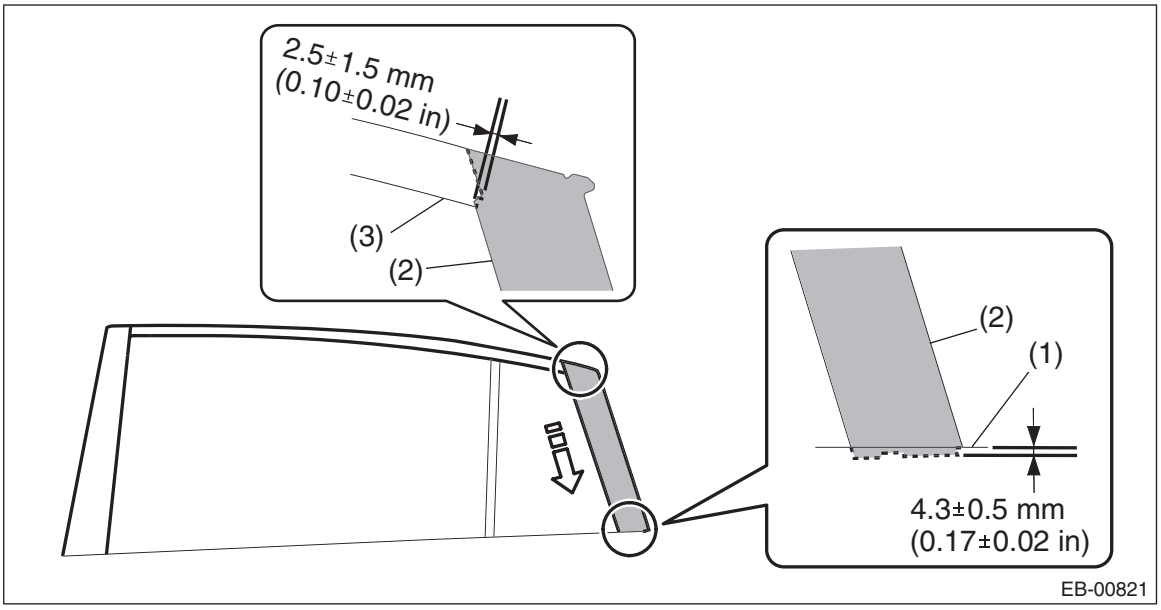


(1) Rear door sash tape - medium (2) Rear door sash tape - front (3) Upper end of weather strip

3) Fold the corners at the door upper end area in the order of (1) — (2).

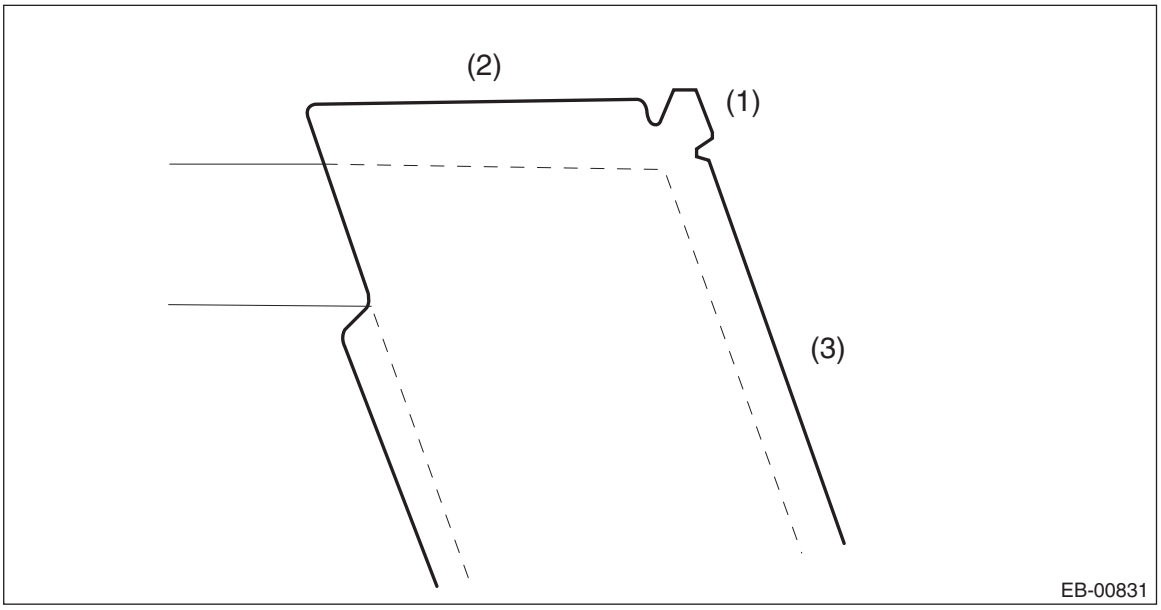


4) Apply the rear door sash tape - rear from the top of the vehicle towards the bottom.



(1) Upper end of weather strip (2) Rear door sash tape - rear (3) Rear door sash tape - medium

5) Fold the corners at the door upper end area in the order of (1) — (3).



6) Thereafter, install door parts in the reverse order of removal.

NOTE:
Before installation, check the following items.
- Is the lever of the frame assembly - rear door outer is free from deformation?
- Is grease applied sufficiently to the lever joints of the latch and actuator assembly - rear?
- Is the cable of the latch and actuator assembly - rear free from deformation such as fray?
- Is grease applied sufficiently to the cable joints of the latch and actuator assembly - rear?

9. Trunk Lid

A: REMOVAL

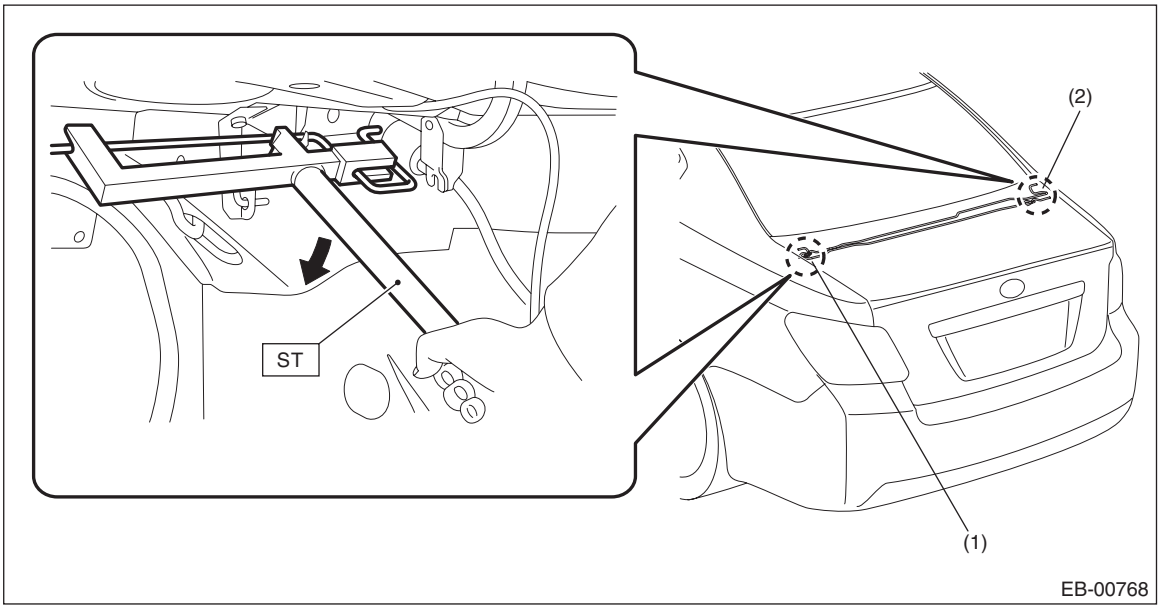
1. TORSION BAR

1) Open the trunk lid COMPL.
2) Using the ST, remove the torsion bar - trunk lid.

CAUTION:
During removal and installation, handle the torsion bar - trunk lid carefully, because it will generate reactive force.

Preparation tool:
ST: REMOVER (99099FJ000) and REMOVER (927780000)

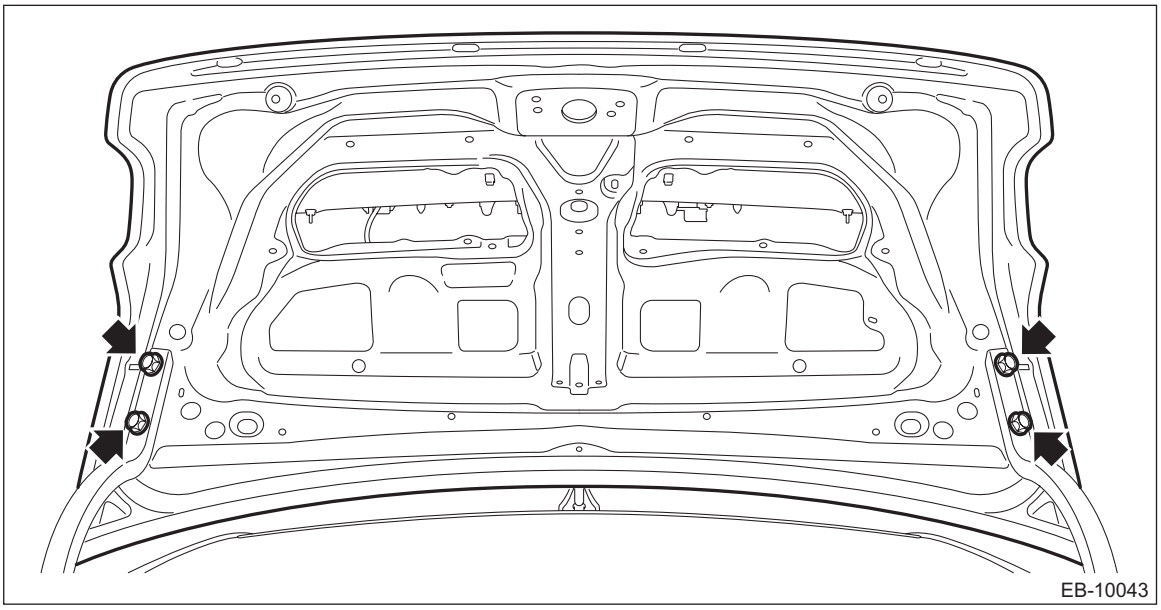
(1) Remove the torsion bar - trunk lid on the LH side from the hinge link.
(2) Remove the torsion bar - trunk lid on the RH side from the hinge link.



2. TRUNK LID PANEL

1) Disconnect the ground cable from battery.
2) Remove the trunk room trim. <Ref. to EI-105, REMOVAL, Trunk Room Trim.>
3) Disconnect the connector to remove the trunk lid harness.
4) Remove the lock assembly - trunk lid. <Ref. to SL-53, REMOVAL, Trunk Lid Latch and Actuator Assembly.>
5) Remove the garnish - trunk. <Ref. to EI-126, REMOVAL, Trunk Lid Garnish.>
6) Remove the rearview camera assembly. <Ref. to ET-49, 4 DOOR MODEL, REMOVAL, Rearview Camera System.>
7) Detach the rear spoiler. <Ref. to EI-66, REMOVAL, Rear Spoiler.>
8) Remove the trunk lid COMPL.
(1) Remove the grommet and pull out the trunk lid harness. (RH side only)

(2) Remove the left and right bolts, and remove the trunk lid COMPL.



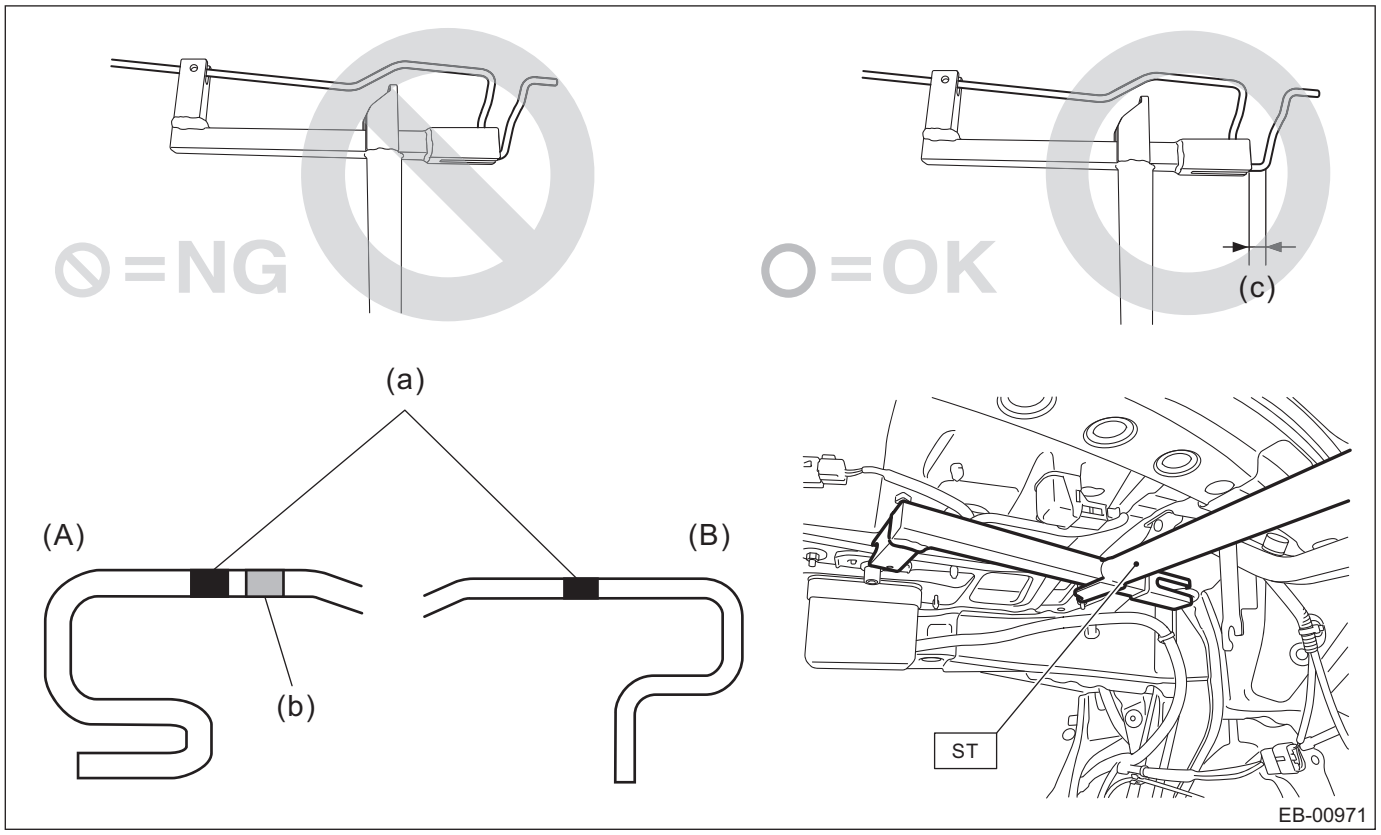
9) Remove the trunk lid arm assembly.
(1) Remove the torsion bar - trunk lid from the trunk lid arm. <Ref. to EB-47, TORSION BAR, REMOVAL, Trunk Lid.>
(2) Remove the trim panel assembly - rear shelf. <Ref. to EI-103, REMOVAL, Rear Shelf Trim.>
(3) Remove the bolts, then remove the trunk lid arm assembly.

B: INSTALLATION

1) Install each part in the reverse order of removal.

CAUTION:
• When installing the torsion bar - trunk lid, pay close attention to the identification marks and the shapes of the torsion bar - trunk lid on the RH and LH sides.
• When installing the remover to the torsion bar - trunk lid, leave a slight clearance (c).

Preparation tool:
ST: REMOVER (99099FJ000) and REMOVER (927780000)



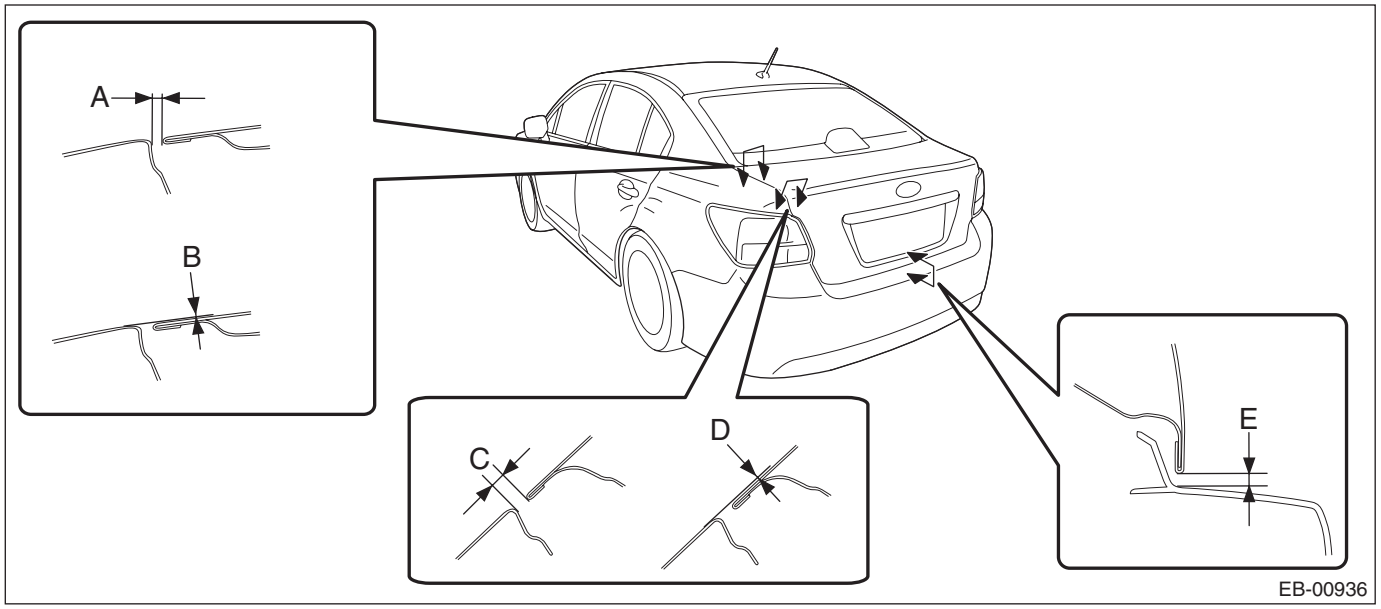
(A) Left Hand
(B) Right Hand
(a) Common marking on the right and left sides
(b) Marking on the left side only
(c) Clearance

2) Apply grease to the rotating area of hinges.
3) Install while paying attention to make a uniform clearance around the trunk lid COMPL. <Ref. to EB-50, ADJUSTMENT, Trunk Lid.>

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to EB-6, TRUNK LID PANEL, COMPONENT, General Description.>

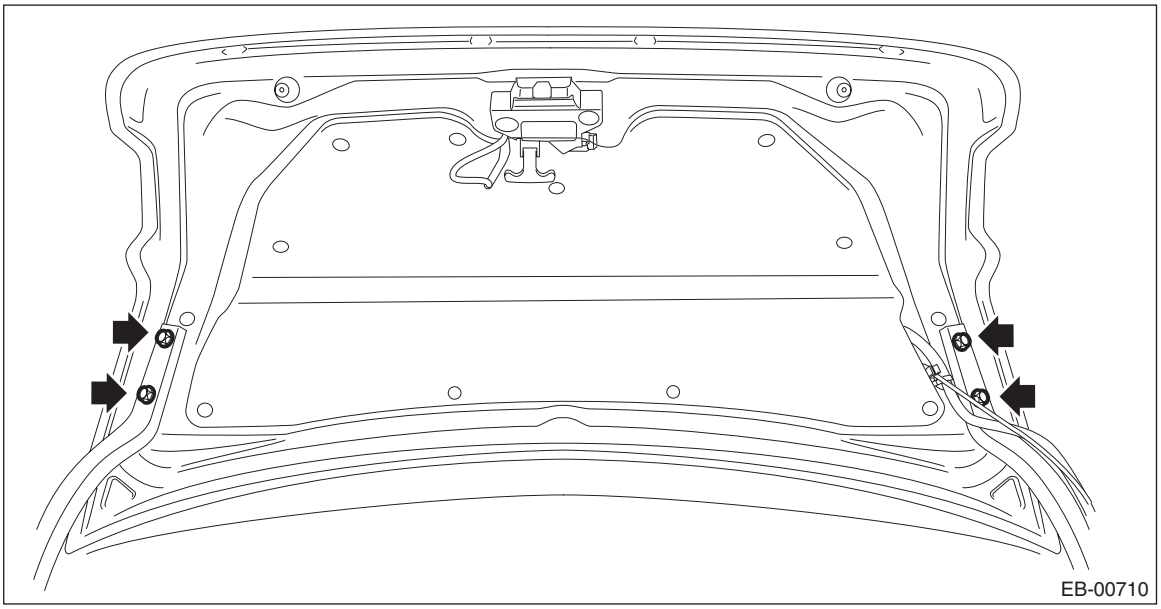
C: ADJUSTMENT

Adjust the clearance around the trunk lid COMPL as follows.

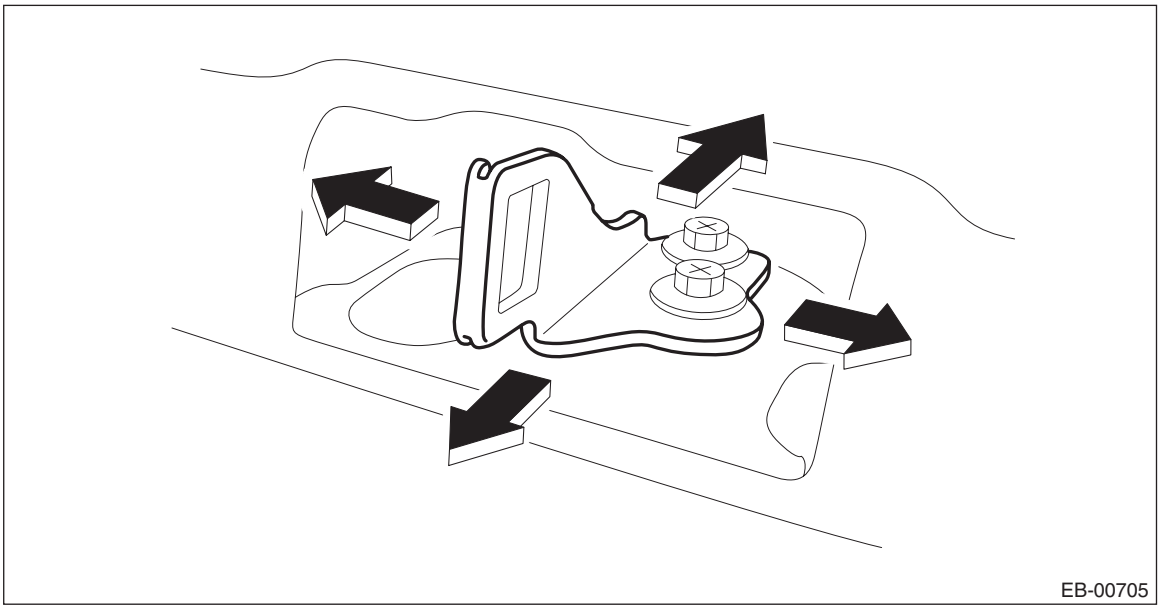


Part		Standard
A	Trunk lid COMPL to Rear quarter panel	3.5±1.0 mm (0.14±0.04 in)
B	Surface level gap between trunk lid COMPL and rear quarter panel	–0.5+1.0, –0.5 mm (–0.02+0.04, –0.02 in)
C	Trunk lid COMPL to Rear quarter panel	3.5±1.0 mm (0.14±0.04 in)
D	Surface level gap between trunk lid COMPL and rear quarter panel	–0.5±0.7 mm (0.02±0.03 in)
E	Trunk lid COMPL to Bumper face - rear	7.5±1.0 mm (0.3±0.04 in)

1) Adjust the horizontal position of the trunk lid COMPL.
   (1) Loosen the mounting bolt.
   (2) Adjust the horizontal clearance of the trunk lid COMPL.



2) Adjust the surface level gap between the trunk lid COMPL and the body.
   (1) Remove the trim panel - trunk rear.
   (2) Loosen the bolt.
   (3) Tap the striker - trunk using a plastic hammer to adjust the surface level gap between the trunk lid COMPL and the body.



10.Rear Gate

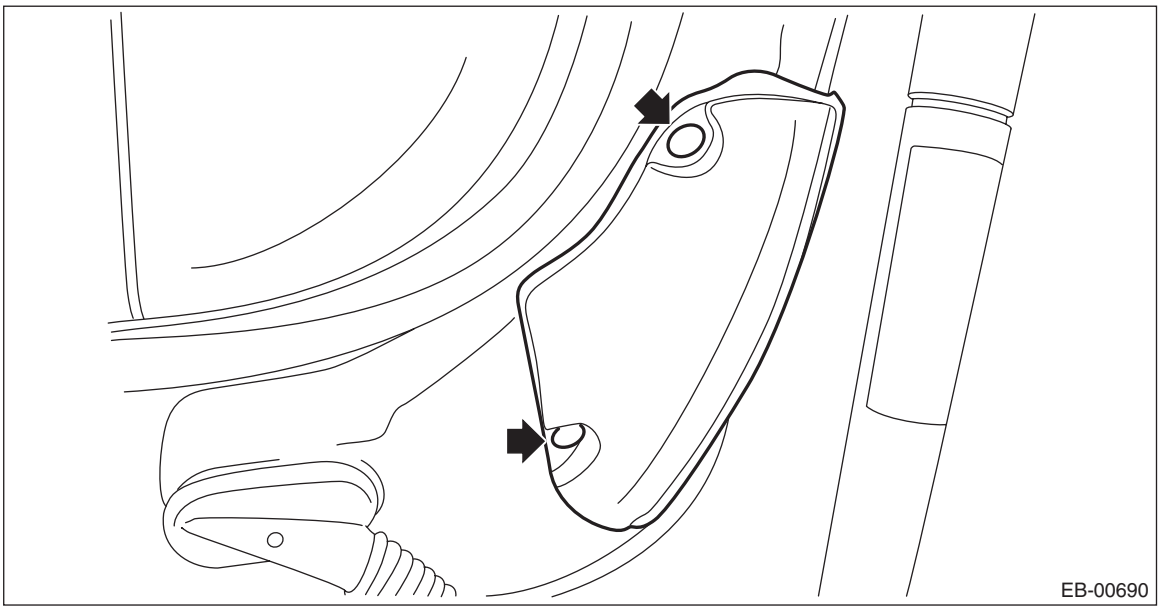
A: REMOVAL

CAUTION:
The panel - rear gate is heavy. When removing and installing it, always work in a team of two or more persons.

1. REAR GATE PANEL

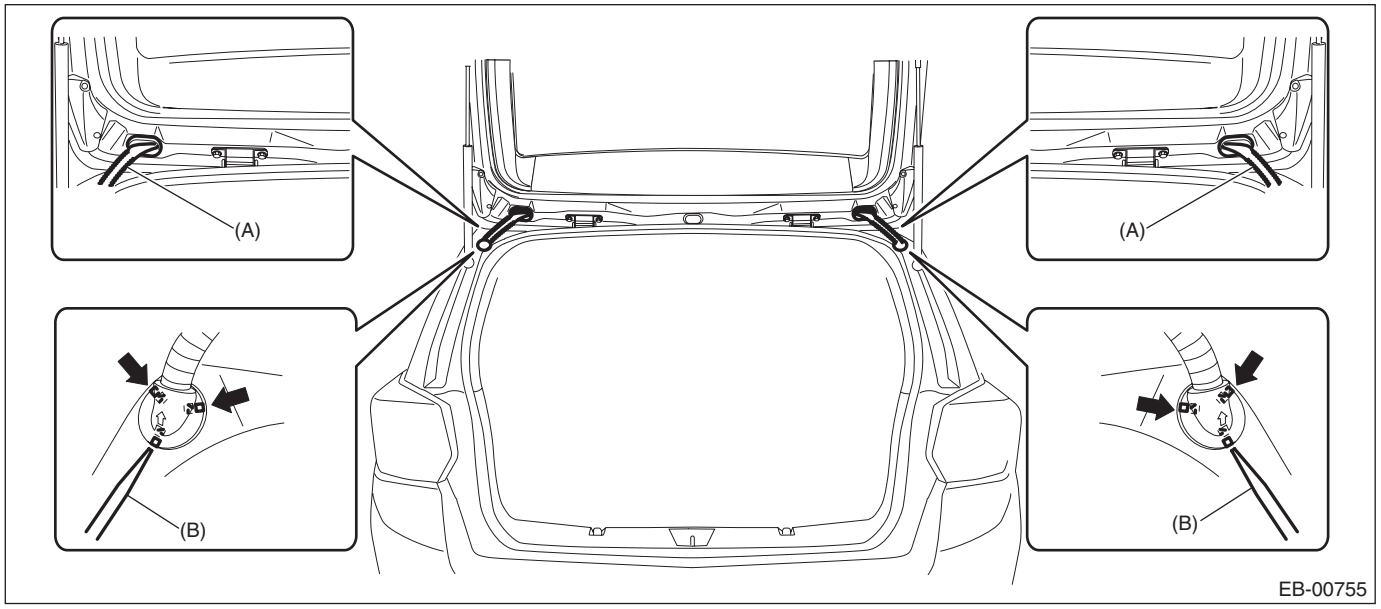
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the trim panel - rear gate. <Ref. to EI-122, REMOVAL, Rear Gate Trim.>
3) Remove the garnish assembly - rear gate. <Ref. to EI-127, REMOVAL, Rear Gate Garnish.>
4) Remove the license plate light. <Ref. to LI-72, REMOVAL, License Plate Light.>
5) Remove the arm assembly - rear wiper and the motor assembly - rear wiper. <Ref. to WW-45, REMOVAL, Rear Wiper Motor.>
6) Remove the roof spoiler. (Crosstrek model) <Ref. to EI-67, REMOVAL, Roof Spoiler.>
7) Remove the light assembly - high-mounted. <Ref. to LI-75, 5 DOOR/CROSSTREK MODEL, REMOVAL, High-mounted Stop Light.>
8) Remove the rear gate latch and actuator - rear gate. <Ref. to SL-51, REMOVAL, Rear Gate Latch and Actuator Assembly.>
9) Remove the clips, and remove the drip - rear gate.



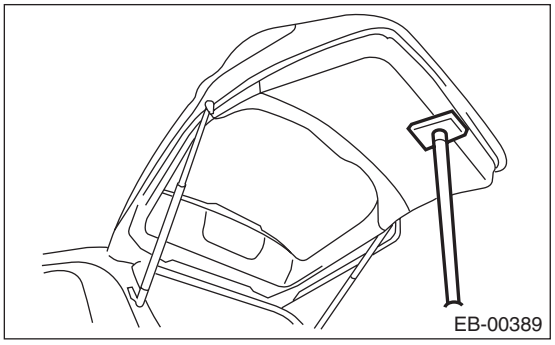
10) Remove the nozzle - rear washer. <Ref. to WW-48, REMOVAL, Rear Washer.>

11) Remove the rubber duct (A).
(1) Pull out the claw while pushing it using a flat tip screwdriver (B) or similar tools.
(2) Remove the rubber duct (A) connection.

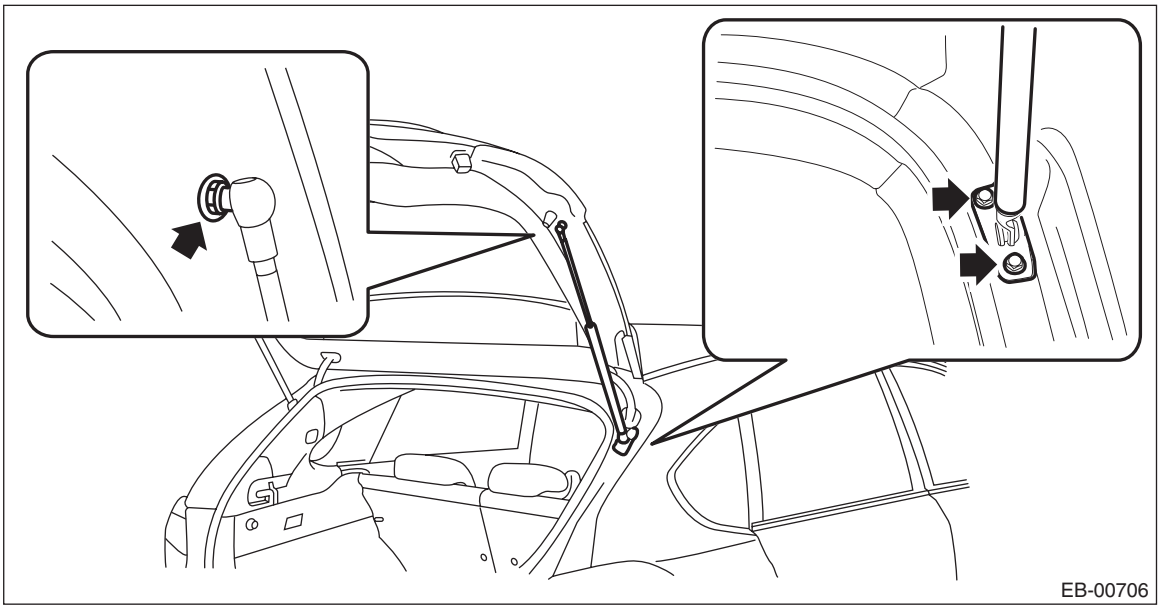


12) Pull out the harness and the hose assembly - rear washer from the panel - rear gate.
13) Remove harness clip of each harness from the panel - rear gate.
14) Before removing the stay assembly - rear gate, prevent the panel - rear gate from closing by using a prop or the like.

CAUTION:
If the prop comes off, operators may get injured and vehicle may get damaged. Make sure to support the panel - rear gate with secure material to prevent injury or damage.

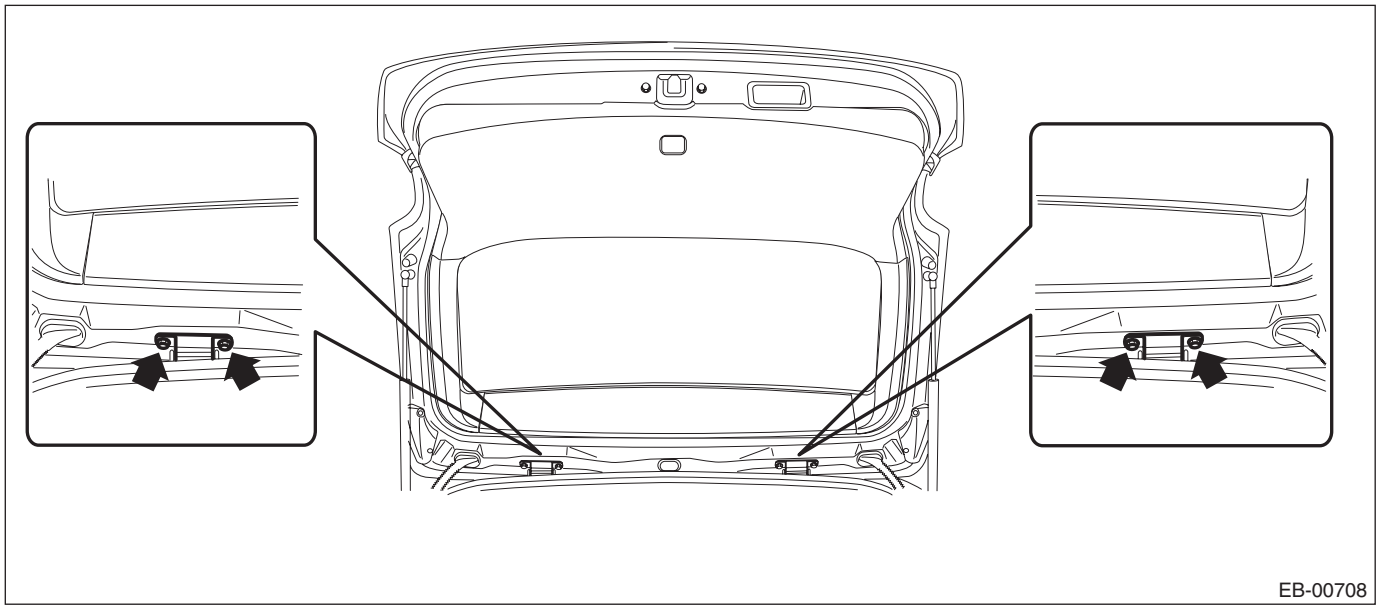


15) Remove the mounting bolts from the stay assembly - rear gate.



16) Remove the bolts of the hinge - rear gate, and remove the panel - rear gate.

CAUTION:
The panel - rear gate is heavy. When removing and installing it, always work in a team of two or more persons.



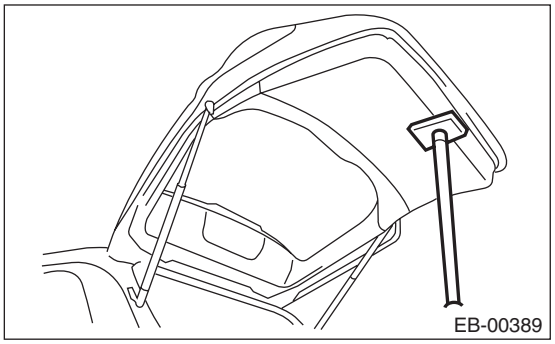
17) Remove the hinge - rear gate from the vehicle.

2. REAR GATE DAMPER STAY

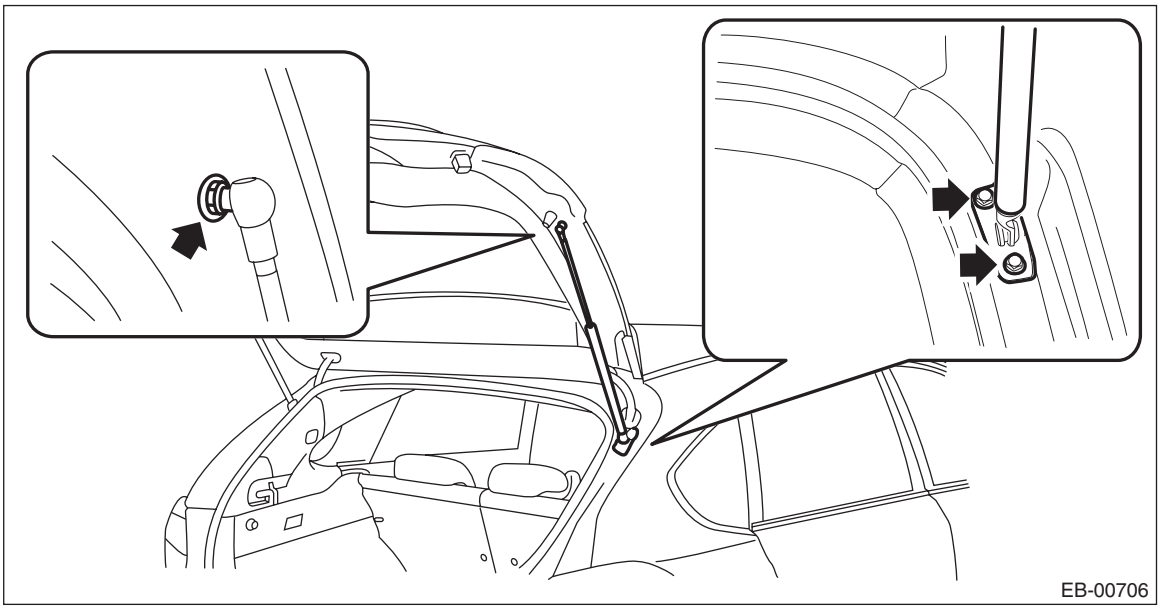
CAUTION:
- **Do not damage piston rods and oil seals.**
- **Never disassemble cylinders: They contain gas.**
- **The panel - rear gate is heavy. When removing and installing it, always work in a team of two or more persons.**

1) Before removing the stay assembly - rear gate, prevent the panel - rear gate from closing by using a prop or the like.

CAUTION:
If the prop comes off, operators may get injured and vehicle may get damaged. Make sure to support the panel - rear gate with secure material to prevent injury or damage.



2) Remove the mounting bolts and remove the stay assembly - rear gate.



B: INSTALLATION

1. REAR GATE PANEL

CAUTION:
The panel - rear gate is heavy. When removing and installing it, always work in a team of two or more persons.

1) Install the hinge - rear gate to the vehicle body.
2) Temporarily install the panel - rear gate to the hinge - rear gate.

NOTE:
When installing, make sure that a uniform clearance is created around the panel - rear gate.

3) Adjust the clearance around the panel - rear gate. <Ref. to EB-57, ADJUSTMENT, Rear Gate.>
4) Tighten the bolts of the hinge - rear gate.

Tightening torque:
25 N·m (2.55 kgf-m, 18.4 ft-lb)

5) Install each part in the reverse order of removal.

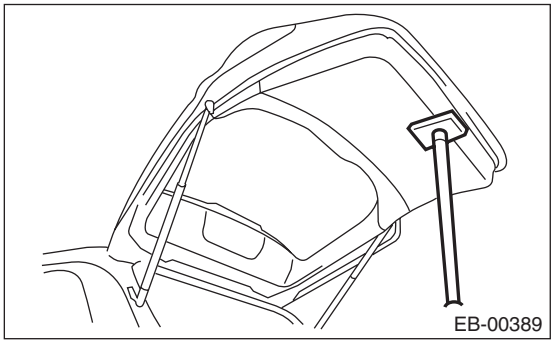
Tightening torque:
Rear gate parts: <Ref. to EB-7, REAR GATE, COMPONENT, General Description.>
Garnish assembly - rear gate: 4.5 N·m (0.46 kgf-m, 3.3 ft-lb)
Arm assembly - rear wiper and motor assembly - rear wiper: <Ref. to WW-4, REAR WIPER, COMPONENT, General Description.>
Roof spoiler (Crosstrek model): 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

2. REAR GATE DAMPER STAY

CAUTION:
The panel - rear gate is heavy. When removing and installing it, always work in a team of two or more persons.

1) Prevent the panel - rear gate from closing using prop or the like.

CAUTION:
If the prop comes off, operators may get injured and vehicle may get damaged. Make sure to support the panel - rear gate with secure material to prevent injury or damage.

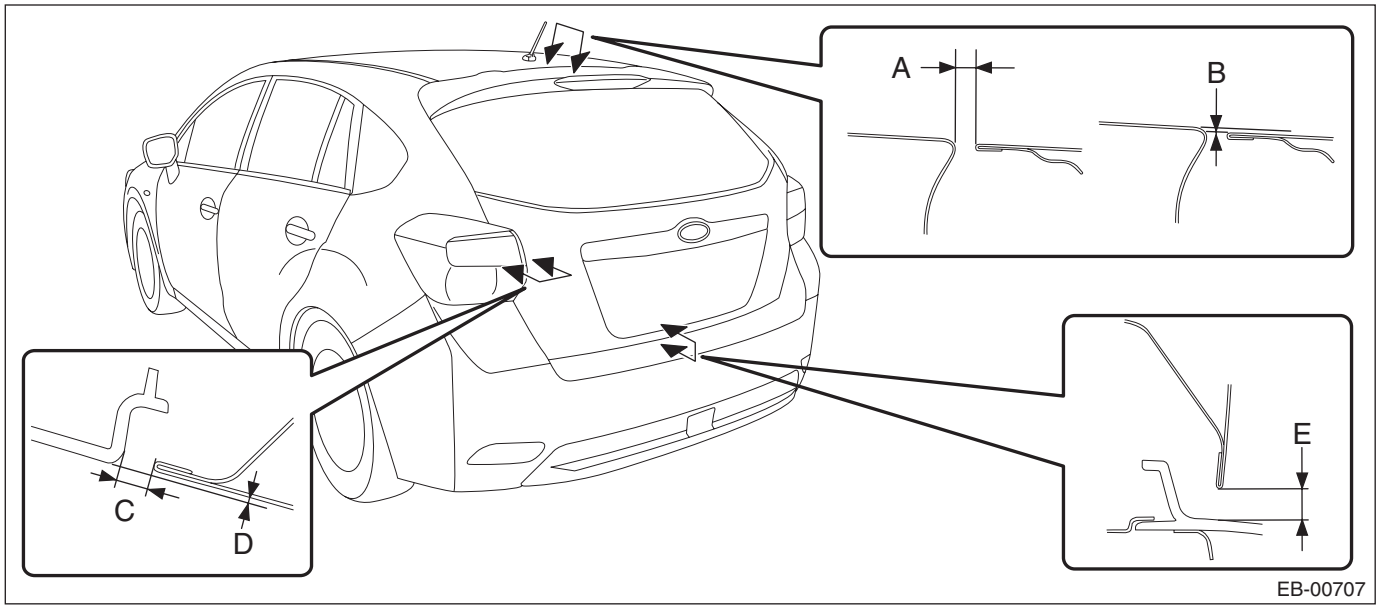


2) Install each part in the reverse order of removal.

Tightening torque:
Refer to "COMPONENT" of "General Description". <Ref. to EB-7, REAR GATE, COMPONENT, General Description.>

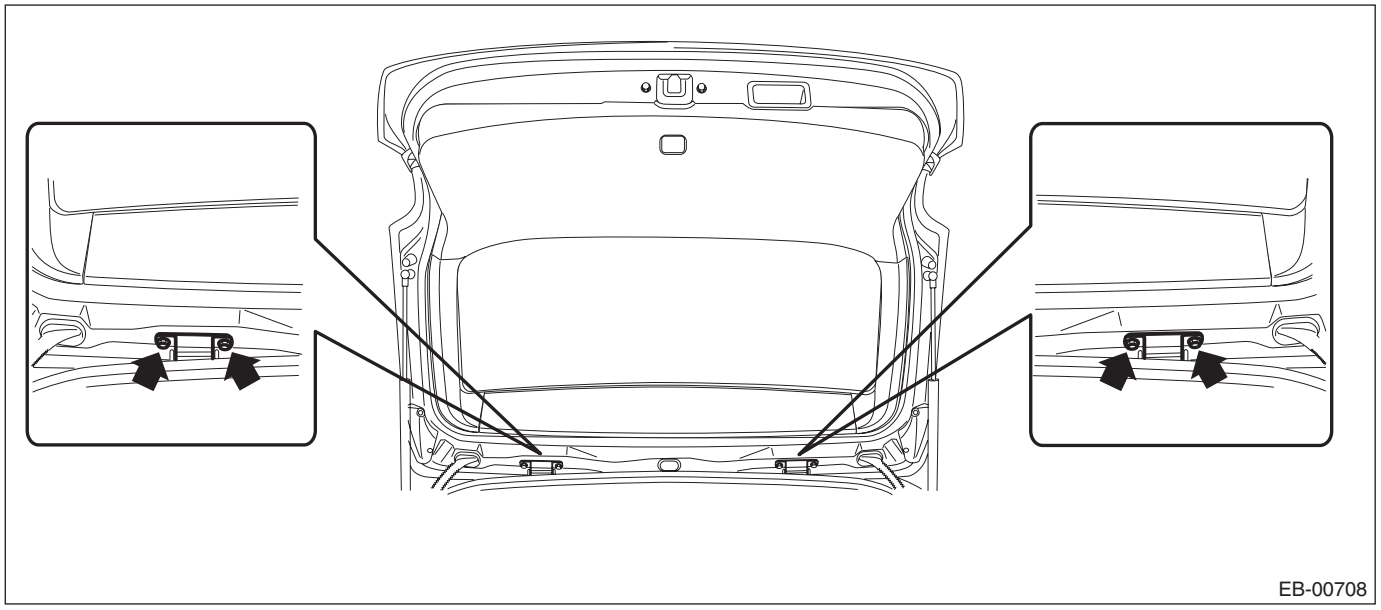
C: ADJUSTMENT

Adjust the clearance around the panel - rear gate as follows.



Part		Standard
A	Panel - rear gate to Roof panel	6.0+1.0, –0.5 mm (0.24+0.04, –0.02 in)
B	Surface level gap: Panel - rear gate to Roof panel	1.0±1.0 mm (0.04±0.04 in)
C	Panel - rear gate to Light assembly - rear combination	6.0±1.0 mm (0.24±0.04 in)
D	Surface level gap: Panel - rear gate to Light assembly - rear combination	1.0±1.0 mm (0.04±0.04 in)
E	Panel - rear gate to Bumper face - rear	8.0±1.5 mm (0.31±0.06 in)

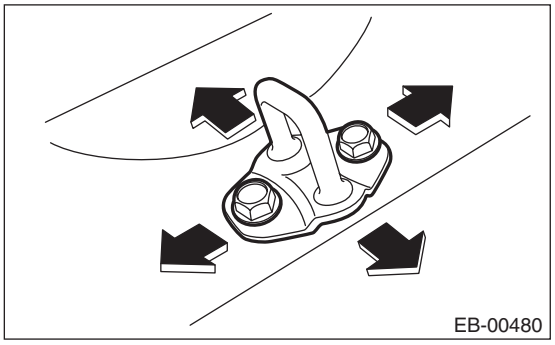
1) Adjust the vertical and horizontal positions of the panel - rear gate.



(1) Loosen the mounting bolts of the hinge - rear gate.
(2) Adjust the vertical and horizontal clearance of the panel - rear gate.

Tightening torque:
25 N·m (2.55 kgf-m, 18.4 ft-lb)

2) Adjust the surface level gap between the panel - rear gate and the body.



(1) Remove the trim panel - rear skirt.
(2) Loosen the bolt.
(3) Tap the striker - rear gate using a plastic hammer to adjust the surface level gap between the panel - rear gate and the body.

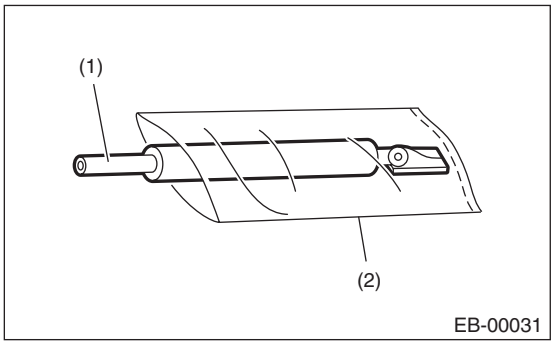
Tightening torque:
25 N·m (2.55 kgf-m, 18.4 ft-lb)

D: DISPOSAL

1. REAR GATE DAMPER STAY

CAUTION:
Gas is colorless, odorless, and harmless. However, gas pressure may spray cutting powder or oil. Be sure to wear dust-resistant goggles.

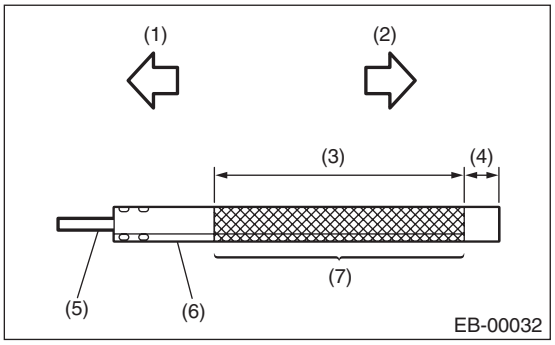
1) Cover with a vinyl sack as shown in the figure.



(1) Stay ASSY - rear gate
(2) Vinyl sack

NOTE:
Prevent the vinyl sack from being caught by drill cutting edge.

2) Lift the body side slightly with piston rods fully extended, and secure the body side with vise.
Drill a hole of 2 to 3 mm (0.08 to 0.12 in) diameter at a point 6 to 196 mm (0.24 to 7.72 in) from the body side, and bleed the gas in the stay assembly - rear gate completely.



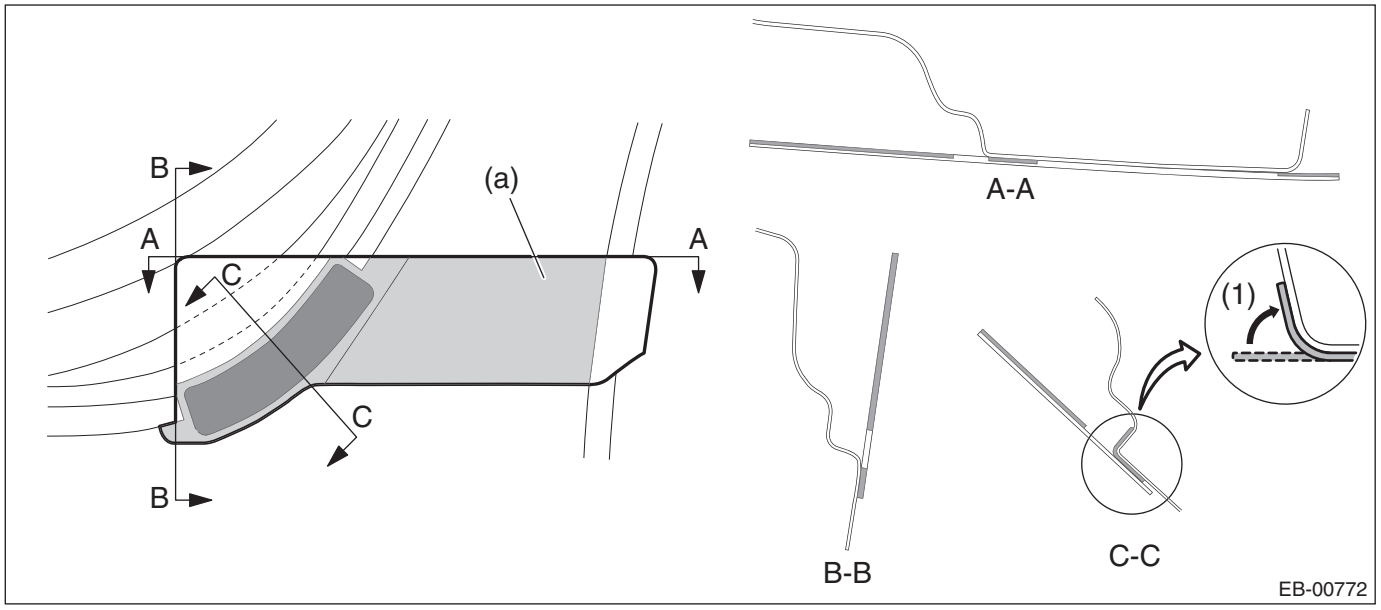
(1) Door side
(2) Body side
(3) 196 mm (7.72 in)
(4) 6 mm (0.24 in)
(5) Piston rod
(6) Cylinder
(7) Portion to be drilled

11.Protector Tape

A: INSTALLATION

Apply the protector tape by the following steps.

1. REAR QUARTER PROTECTOR (MODELS WITHOUT SIDE GARNISH)



(1) Apply the protector tape by aligning it to the rounded edge.

1) Clean the area around applying position to remove any foreign objects on body.
2) Detach the backing paper from the temporary retention area (a) and apply the protector tape after positioning it correctly.
3) Detach the backing papers, and moisten the applying area and the backside of protector tape by spraying liquid (mild detergent solution at 3% concentration).
4) Apply the protector tape to the vehicle body.

CAUTION:
Remove the water or air bubbles out of the protector tape by using the plastic or rubber spatula.
5) Detach the application tape and temporary retention tape.
6) Bend the tack-in end and apply it as shown by (1) in the figure.

CRUISE CONTROL SYSTEM

CC

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1. General Description

A: LOCATION

Refer to “LOCATION” of “CRUISE CONTROL SYSTEM (DIAGNOSTICS)” section.
- Gasoline engine model: <Ref. to CC(w/o HEV)(diag)-6, LOCATION, Electrical Component Location.>
- HEV model: <Ref. to CC(HEV)(diag)-6, LOCATION, Electrical Component Location.>

B: CAUTION

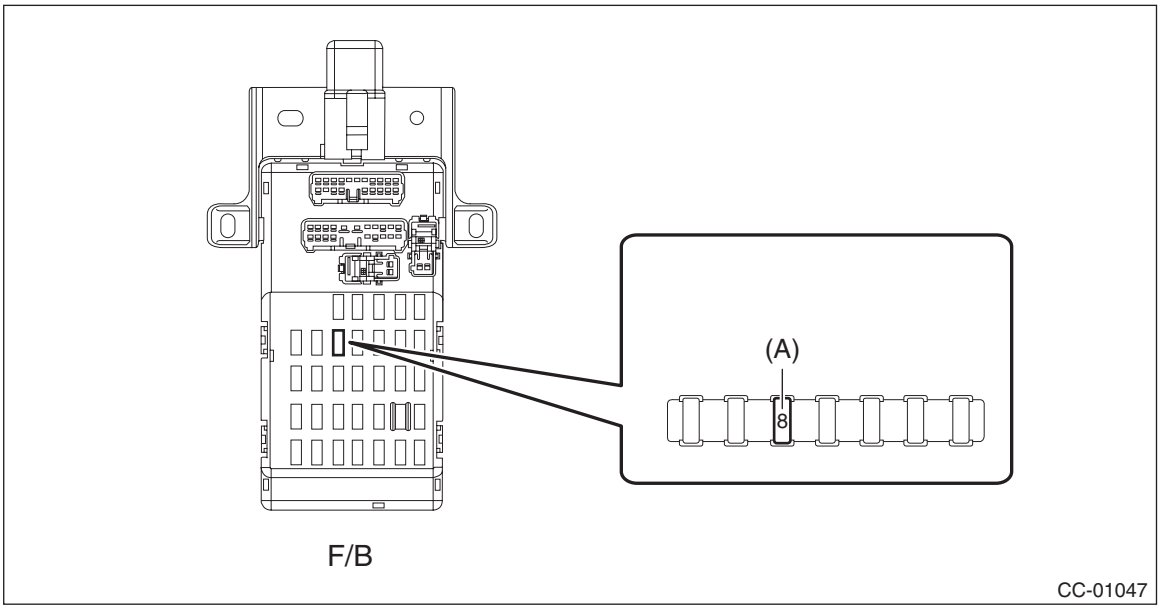
- Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
- Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
- Adjust parts to the given specifications.
- Connect the connectors securely during reassembly.
- After reassembly, make sure that the each component operates normally.
- Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Using a tester above such circuits may cause malfunction of airbag system. Follow the cautions of “AIRBAG SYSTEM” in this case. <Ref. to AB-11, CAUTION, General Description.>
- Be careful not to damage the airbag system wiring harness when servicing electrical parts and switches.
- When removing, installing or replacing the VDCCM&H/U, VDCCM&H/U bracket, steering wheel or steering angle sensor (steering roll connector), perform the VDC setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

C: PREPARATION TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.

2. Relay and Fuse

A: LOCATION



Relay & fuse box	Fuse 10 A (stop light and brake switch) (gasoline engine model)	(A)
	Fuse 15 A (stop light and brake switch) (HEV model)	

NOTE:
For other related fuses, refer to the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>
- HEV model: <Ref. to WI(HEV)-21, Power Supply Circuit.>

B: INSPECTION

1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

3. Cruise Control System

A: WIRING DIAGRAM

Refer to “Cruise Control System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, Cruise Control System.>
- HEV model: <Ref. to WI(HEV)-78, WIRING DIAGRAM, Cruise Control System.>

B: INSPECTION

Refer to “Basic Diagnostic Procedure” of “CRUISE CONTROL SYSTEM (DIAGNOSTICS)”.
- Gasoline engine model: <Ref. to CC(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
- HEV model: <Ref. to CC(HEV)(diag)-2, Basic Diagnostic Procedure.>

C: NOTE

For operation procedures of each component of the cruise control system, refer to the respective section.
- Cruise control module: <Ref. to CC-5, Cruise Control Module.>
- Cruise control command switch: <Ref. to CC-6, Cruise Control Command Switch.>
- Combination meter: <Ref. to CC-9, Combination Meter.>
- Stop light and brake switch: <Ref. to CC-10, Stop Light & Brake Switch.>
- Clutch switch: <Ref. to CC-11, Clutch Switch.>
- Inhibitor switch: <Ref. to CC-12, Inhibitor Switch.>
- Transmission control module (TCM): <Ref. to CC-13, Transmission Control Module (TCM).>
- Neutral position switch: <Ref. to CC-14, Neutral Position Switch.>
- Hybrid powertrain control module (HEV model): <Ref. to CC-15, Hybrid Powertrain Control Module.>
- Brake stroke sensor (HEV model): <Ref. to BR-71, Brake Pedal.>

4. Cruise Control Module

A: NOTE

The control of cruise control system is carried out by each module. For procedure, refer to the following sections.

- Engine control module (ECM)
  - Gasoline engine model: <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
  - HEV model: <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>
- Hybrid powertrain control module (HEV model): <Ref. to HEV-37, NOTE, Hybrid Powertrain Control Module.>

5. Cruise Control Command Switch

A: REMOVAL

CAUTION:
Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
1) Set the tire to the straight-ahead position.
2) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.>
4) Remove the steering wheel. <Ref. to PS-9, REMOVAL, Steering Wheel.>
5) Remove the cruise control command switch assembly. <Ref. to PS-10, DISASSEMBLY, Steering Wheel.>

B: INSTALLATION

CAUTION:
• Before handling the airbag system components, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM". <Ref. to AB-11, CAUTION, General Description.>
• Do not allow harness and connectors to interfere or get tangled up with other parts.
• If the steering wheel has been removed, make sure that the steering roll connector is not turned from the original position.
• If the steering wheel and steering angle sensor (steering roll connector) are removed, perform the VDC setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• Securely install the switch. Improper insertion of the pin or claw of the switch may cause improper installation.
1) Align the center position of the steering roll connector. <Ref. to AB-72, ADJUSTMENT, Roll Connector.>
2) Install each part in the reverse order of removal.

NOTE:
Align the alignment marks on the steering wheel and the column assembly - steering.

Tightening torque:
Steering wheel: 39 N·m (3.98 kgf-m, 28.8 ft-lb)

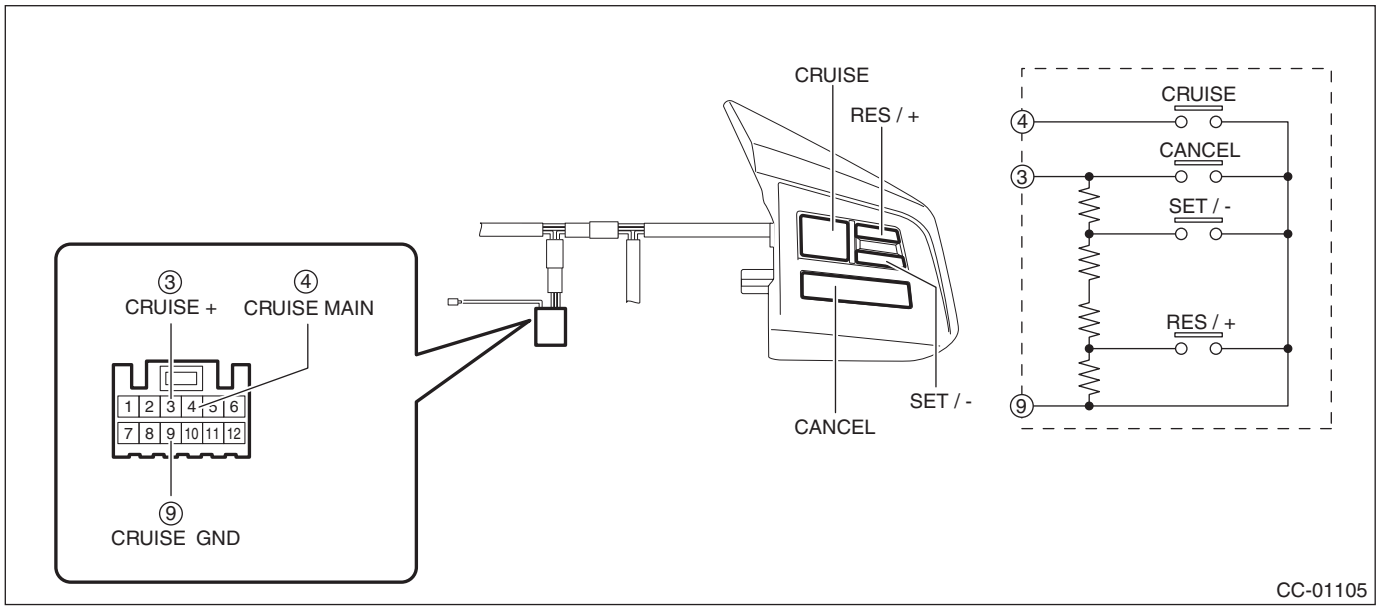
Clearance:
Between cover assembly - column and steering wheel: 4 — 6 mm (0.16 — 0.24 in)

C: INSPECTION

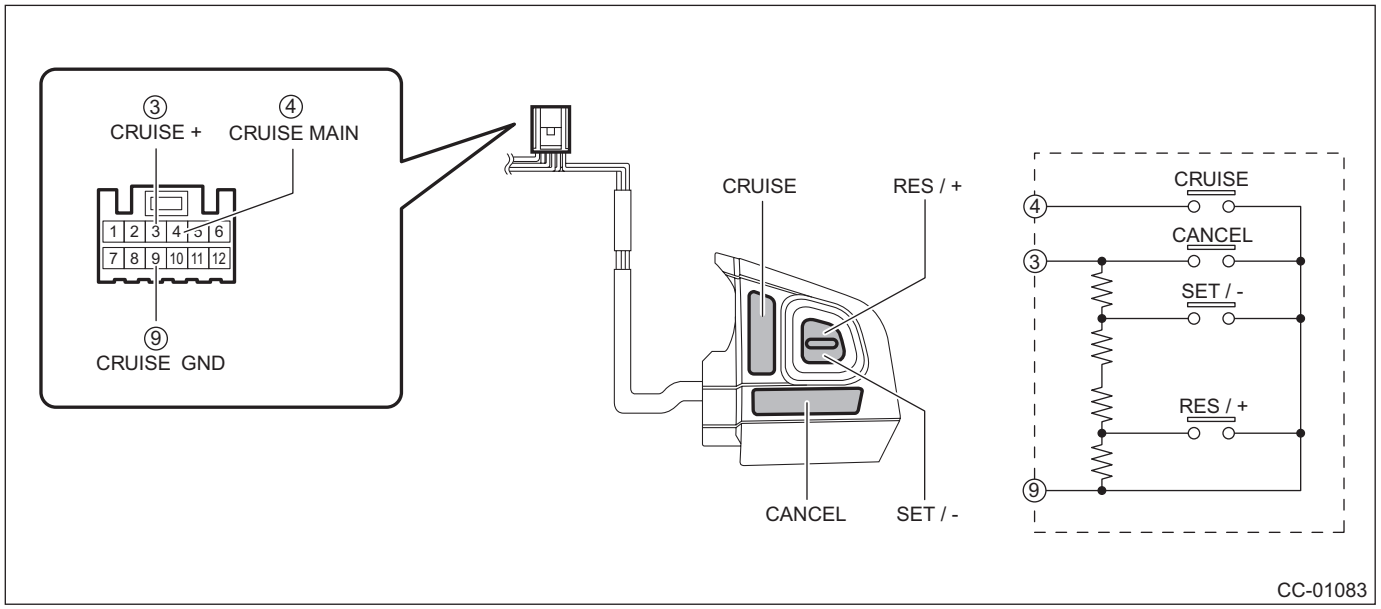
1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester

- Impreza model



- Crosstrek model



Terminal No.	Inspection conditions		Standard
3 — 9	CANCEL SET/– RES/+	All OFF	Approx. 4,020 Ω
	CANCEL	ON	Less than 1 Ω
	SET/–	ON	Approx. 250 Ω
	RES/+	ON	Approx. 1,470 Ω
4 — 9	CRUISE (MAIN)	OFF	1 MΩ or more
		ON	Less than 1 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

Terminal No.	Inspection conditions	Specification
10 (+) — 11 (–)	Apply battery voltage.	Light ON

3) Replace the cruise control command switch assembly if the inspection result is not within the standard.

6. Combination Meter

A: NOTE

For the operation procedures for combination meter, refer to “INSTRUMENTATION/DRIVER INFO” section. <Ref. to IDI-19, Combination Meter.>

7. Stop Light & Brake Switch

A: NOTE

For the operation procedures for stop light and brake switch, refer to “BRAKE” section. <Ref. to BR-75, Stop Light Switch.>

8. Clutch Switch

A: NOTE

For the operation procedures for clutch switch, refer to “CLUTCH SYSTEM” section. <Ref. to CL-30, Clutch Switch.>

9. Inhibitor Switch

A: NOTE

For the operation procedures for inhibitor switch, refer to “CONTINUOUSLY VARIABLE TRANSMISSION” section.

- Gasoline engine model: <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>
- HEV model: <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

10.Transmission Control Module (TCM)

A: NOTE

For the operation procedures for transmission control module (TCM), refer to “CONTINUOUSLY VARIABLE TRANSMISSION” section.

- Gasoline engine model: <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>
- HEV model: <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

11.Neutral Position Switch

A: NOTE

For the operation procedures for neutral position switch, refer to “MANUAL TRANSMISSION AND DIFFERENTIAL” section. <Ref. to 5MT-36, Switches and Harness.>

12.Hybrid Powertrain Control Module

A: NOTE

For the procedure of hybrid powertrain control module, refer to “HYBRID ELECTRIC VEHICLE” section. <Ref. to HEV-37, Hybrid Powertrain Control Module.>

13.Diagnostics with Phenomenon

A: INSPECTION

Refer to “Diagnostics with Phenomenon” of “CRUISE CONTROL SYSTEM (DIAGNOSTICS)” section.

- Gasoline engine model: <Ref. to CC(w/o HEV)(diag)-11, Diagnostics with Phenomenon.>
- HEV model: <Ref. to CC(HEV)(diag)-11, Diagnostics with Phenomenon.>

CRUISE CONTROL SYSTEM (DIAGNOSTICS)

CC(w/o HEV)(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
• Before performing all diagnostics or cruise control diagnostics, always start the engine and make sure that the initial illumination of the ABS/VDC warning light has been ended. (If you start the diagnostics before performing the above procedures, the cancel code "43" is recorded and CRUISE indicator does not illuminate even though the CRUISE switch is pressed.)
• When performing diagnosis, observe the legal speed limit on the road.
• The cancel code will be also appear when cruise control is cancelled by the driver's operation. Do not confuse them.
• Be sure to get an assistant to support the diagnosis while driving, and have him/her operate the select monitor.

	Step	Check	Yes	No
1	**CHECK MALFUNCTION INDICATOR LIGHT.** Make sure the malfunction indicator light illuminates.	Does the malfunction indicator light illuminate?	Go to step **5**.	Go to step **2**.
2	**CHECK CRUISE INDICATOR LIGHT.** Make sure the cruise indicator light blinks.	Does the cruise indicator light blink?	Go to step **7**.	Go to step **3**.
3	**CHECK CRUISE SWITCH OPERATION.** Check the CRUISE switch operation. (Check the illumination of the CRUISE indicator.)	Is the CRUISE switch turned on? (Does the CRUISE indicator illuminate?)	Go to step **4**.	Go to phenomenon 1. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
4	**CHECK CRUISE CONTROL SET OPERATION.** Check the cruise control setting operation.	Can the cruise control be set while driving at 40 km/h (25 MPH) or more?	Go to step **8**.	Go to step **7**.
5	**CHECK DTC.** Read all DTCs using the Subaru Select Monitor.	Is an engine or ABS/VDC related DTC displayed?	Record the DTC. Go to step **6**.	Go to phenomenon 2. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
6	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, check the Freeze Frame Data or Information in Trouble State.	Was the Freeze Frame Data or Information in Trouble State recorded?	Record the data. Perform the diagnosis according to the engine or ABS/VDC related DTC.	Perform the diagnosis according to the engine or ABS/VDC related DTC.
7	**CHECK CANCEL CODE.** Using the Subaru Select Monitor, read the cancel codes. NOTE: • Do not turn the ignition switch to OFF after the cruise control is deactivated. • Do not operate the cruise control command switch after the cruise control is deactivated. If the above is performed, the cancel code will be cleared.	Is it possible to read the cancel codes?	Perform the diagnosis according to the cancel code. <Ref. to CC(w/o HEV)(diag)-13, LIST, List of Cancel Code.>	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK SET INDICATOR.** Check the illumination of the SET indicator.	Does the SET indicator illuminate?	Go to step **9**.	Go to phenomenon 3. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
9	**CHECK VEHICLE SPEED IS HELD WITHIN SET SPEED.** Make sure the vehicle speed is held within set speed.	Is the vehicle speed kept within setting speed ±3 km/h (±2 MPH)? (Make sure that on a level road.)	Go to step **10**.	Go to phenomenon 4. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
10	**CHECK RES/+ OPERATION.** Check the RES/+ switch operation.	Does the vehicle speed increase or return to set speed after RES/+ switch has been pressed?	Go to step **11**.	Go to phenomenon 5. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
11	**CHECK SET/– OPERATION.** Check the SET/– switch operation.	Does the vehicle speed decrease after SET/– switch has been pressed?	Go to step **12**.	Go to phenomenon 6. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
12	**CANCEL OPERATION CHECK.** Check the CANCEL switch operation.	Is the cruise control released after CANCEL switch has been pressed?	Go to step **13**.	Go to phenomenon 7. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
13	**CHECK CRUISE CONTROL RELEASE OPERATION.** Check the cruise control release operation.	Is the cruise control released after brake pedal has been depressed?	Go to step **14**.	Go to phenomenon 8. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

	Step	Check	Yes	No
14	**CHECK CRUISE CONTROL RELEASE OPERATION.** Check the cruise control release operation.	Is the cruise control released after shifting to the neutral position?	Go to step **15**.	Go to phenomenon 9. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
15	**CHECK CRUISE CONTROL RELEASE OPERATION.** Check the cruise control release operation.	Is the cruise control released after depressing the clutch pedal?	Finish the diagnosis.	Go to phenomenon 10. <Ref. to CC(w/o HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

2. General Description

A: CAUTION

Airbag system wiring harness is routed near the cruise control command switch.

CAUTION:
• Do not use the electrical test equipment on the airbag system wiring harnesses and connector circuits.
• Be careful not to damage the airbag system wiring harness when servicing the cruise control command switch. Airbag system wiring harness is routed near the cruise control command switch.

B: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

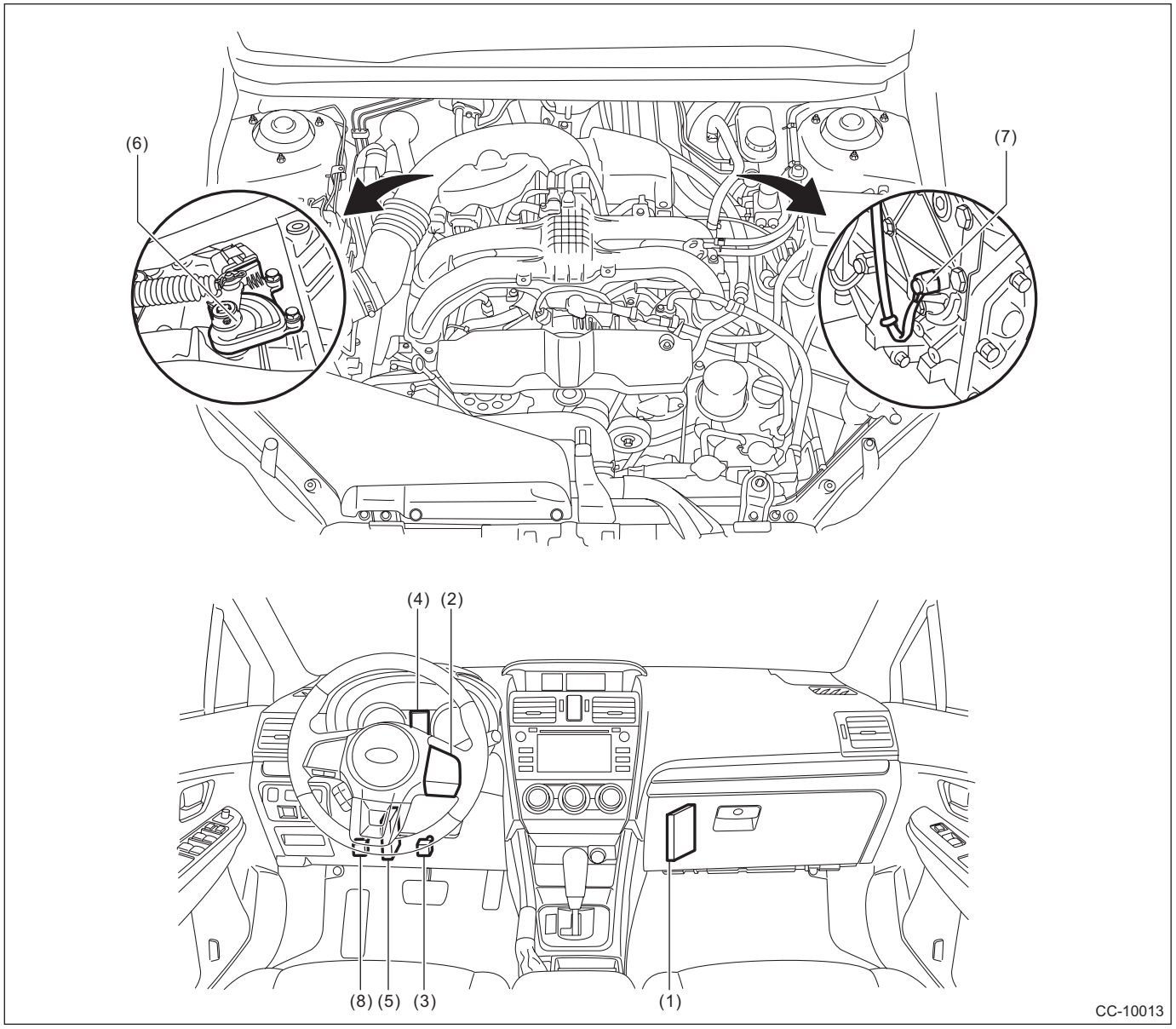
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

C: INSPECTION

Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>

3. Electrical Component Location

A: LOCATION



(1)	Engine control module (ECM)	(4)	Cruise indicator light and cruise set indicator light	(7)	Neutral position switch (MT model)
(2)	Cruise control command switch	(5)	Transmission control module (TCM) (CVT model)	(8)	Clutch switch (MT model)
(3)	Stop light and brake switch	(6)	Inhibitor switch (CVT model)		

4. Engine Control Module (ECM) I/O Signal

A: ELECTRICAL SPECIFICATION

For details on the input/output signals for the engine control module, refer to ENGINE (DIAGNOSTICS). <Ref. to EN(H4DO w/o HEV)(diag)-20, ELECTRICAL SPECIFICATION, Engine Control Module (ECM) I/O Signal.>

B: WIRING DIAGRAM

Refer to “Cruise Control System” in the wiring diagram. <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, Cruise Control System.>

5. Subaru Select Monitor

A: OPERATION

1. GENERAL DESCRIPTION

The on-board diagnosis function of the cruise control system uses Subaru Select Monitor.
The on-board diagnosis function operates in two categories, which are used depending on the type of problems;
1) Cruise Control Cancel Conditions Diagnosis:
(1) This category of diagnosis requires actual vehicle driving in order to determine the cause, as when cruise speed is cancelled during driving although cruise cancel condition is not entered.
(2) Cruise control memory in ECM stores the cancel code which occurred during driving. When there are multiple cancel code, they are shown on the Subaru Select Monitor.

CAUTION:
• The cruise control memory stores not only the cruise "cancel" which occurred (although "cancel" operation is not entered by the driver), but also the "cancel" condition input by the driver.
• The content of the latest memory (the latest code) is cleared when the ignition switch is turned to OFF. However, memory contents set by the diagnosis of faulty switches related to the system and cruise control will remain as trouble history (memory code) after the ignition switch is turned to OFF.
2) Real-time Diagnosis:
Real-time diagnosis function is used to determine whether or not the input signal system is in good order, according to signal emitted from switches, sensors, etc.
(1) Vehicle cannot be driven at cruise speed when the problem occurs in the cruise control system or relevant circuits.
(2) Monitor the signal conditions from switches and sensors.

2. BASIC OPERATION

For detailed operation procedures, refer to "Application help".

6. Read Cancel Code

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System».
5) Drive vehicle at 40 km/h (25 MPH) or more and set the cruise control.

CAUTION:
- **When performing diagnosis, observe the legal speed limit on the road.**
- **The cancel code will also appear when the cruise control is cancelled by the driver's operation. Do not confuse them.**
- **Be sure to get an assistant to support the diagnosis while driving, and have him/her operate the select monitor.**

6) When the set speed is cancelled by itself (when cancelled without a cancel operation such as applying the brake) or if the cruise control could not be set by performing the setting operation, selecting the «Cancel Code» on the engine malfunction diagnosis screen will display the cancel code on the select monitor display.

NOTE:
The «Current» and «The past» are contained in the cancel code. The latest code recognized during current test drive is displayed in «Current». Cancel codes resulting from fault diagnosis of switches relating to the system and cruise control are also displayed in «The past».
7) Perform Engine DTC Clear Memory operation. <Ref. to EN(H4DO w/o HEV)(diag)-67, OPERATION, Clear Memory Mode.>
Cancel codes for switches relating to the system and cruise control are deleted by clearing memory on the engine side.

NOTE:
- The latest code will be cleared by turning ignition switch to OFF.
- For detailed operation procedures, refer to “Application help”.
- For details on cancel codes, refer to List of Cancel Code. <Ref. to CC(w/o HEV)(diag)-13, List of Cancel Code.>

7. Real-time Diagnosis

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then «Enter».
5) On «Select Function» display, select «Data Monitor».
6) Make sure that normal display is shown when operated as follows:

- Depress and release the brake pedal. (Stop light switch and brake switch are turned ON.)
- Turn the “CRUISE” switch to ON.
- Turn the “CANCEL” switch to ON.
- Turn the “SET/–” switch to ON.
- Turn the “RES/+” switch to ON.
- Depress or release the clutch switch.
- Place the shift lever in any position other than neutral.

NOTE:
For detailed operation procedures, refer to “Application help”.

8. Diagnostics with Phenomenon

A: DIAGNOSTIC PROCEDURE WITH PHENOMENON

Phenomenon		Check item	Reference
1	CRUISE switch is not turned ON. (CRUISE indicator does not illuminate.) Or the cruise control is cancelled without CRUISE switch operation.	(1) Perform cruise cancel conditions diagnosis.	Perform the diagnosis according to displayed cancel code.
		(2) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(3) Check the cruise control command switch.	<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
		(4) Check the CRUISE indicator.	<Ref. to CC(w/o HEV)(diag)-12, CHECK CRUISE INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT, Diagnostics with Phenomenon.>
2	Cruise control cannot be set. Or the cruise control is cancelled without canceling operation.	(1) Perform cruise cancel conditions diagnosis.	Perform the diagnosis according to displayed cancel code.
		(2) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(3) Check the cruise control command switch.	<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
		(4) Check stop light switch and brake switch.	<Ref. to BR-75, Stop Light Switch.> <Ref. to CC(w/o HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.>
		(5) Check clutch switch.	<Ref. to CL-30, Clutch Switch.> <Ref. to CC(w/o HEV)(diag)-19, 13, Diagnostic Procedure with Cancel Code.>
		(6) Check the neutral position switch.	<Ref. to CC(w/o HEV)(diag)-20, 14, Diagnostic Procedure with Cancel Code.> <Ref. to CC(w/o HEV)(diag)-24, 62, Diagnostic Procedure with Cancel Code.>
		(7) Check vehicle speed sensor.	<Ref. to CC(w/o HEV)(diag)-23, 22, Diagnostic Procedure with Cancel Code.>
3	SET indicator does not illuminate.	Check the SET indicator.	<Ref. to CC(w/o HEV)(diag)-12, CHECK CRUISE INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT, Diagnostics with Phenomenon.>
4	Vehicle speed is not held within set speed ±3 km/h (±2 MPH).	Check the vehicle speed sensor.	<Ref. to CC(w/o HEV)(diag)-23, 22, Diagnostic Procedure with Cancel Code.>
5	Vehicle speed does not increase or does not return to set speed after RES/+ switch has been pressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check the RES/+ switch.	<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
6	Vehicle speed does not decrease after SET/– switch has been pressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check the SET/– switch.	<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
7	Cruise control is not released after CANCEL switch has been pressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check the CANCEL switch.	<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
8	Cruise control is not released after brake pedal has been depressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check stop light switch and brake switch.	<Ref. to CC(w/o HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.> <Ref. to BR-75, INSTALLATION, Stop Light Switch.>

Phenomenon		Check item	Reference
9	Cruise control is not released after shifting to the neutral position.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check the neutral position switch.	<Ref. to CC(w/o HEV)(diag)-20, 14, Diagnostic Procedure with Cancel Code.> <Ref. to CC-14, Neutral Position Switch.>
10	Cruise control is not released after clutch pedal has been depressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check clutch switch.	<Ref. to CC(w/o HEV)(diag)-19, 13, Diagnostic Procedure with Cancel Code.> <Ref. to CL-30, CLUTCH SWITCH, INSTALLATION, Clutch Switch.>

B: CHECK CRUISE INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT

TROUBLE SYMPTOM:

Cruise control can be set, but the CRUISE indicator and SET indicator do not illuminate.

Step		Check	Yes	No
1	**CHECK CRUISE INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT.** Check the combination meter. <Ref. to IDI-8, OPERATION, Combination Meter System.>	Do the CRUISE & SET indicators illuminate?	Go to step **2**.	Replace the meter case assembly. <Ref. to IDI-19, Combination Meter.>
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is a DTC of the LAN system detected?	Perform the diagnosis according to DTC for LAN system.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>

9. List of Cancel Code

A: LIST

NOTE:
• The cancel code is registered even when cancel is performed intentionally by the driver.
• Cancel codes are cleared if the ignition switch is turned to OFF.
• If a different cancel code is input after a cancel code (latest code) has been input, the latest code is overwritten.
• If the cruise indicator light is flashing, a malfunction is occurring in the system or cruise control related switch. The cancel code at this time is saved even after ignition switch is OFF as a memory code of a past malfunction.
• To display a cancel code, use the Subaru Select Monitor to read the code after the cruise control is deactivated during a driving test.

Cancel code	Item	Contents of diagnosis	Note
11	Main switch	CRUISE switch of cruise control command switch is turned to OFF, and then the cruise control is released.	This code is displayed without operating the CRUISE switch. <Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
12	Stop & brake switch	Stop light switch or brake switch is turned to ON, and then the cruise control is released.	This code is displayed without depressing the brake pedal. <Ref. to CC(w/o HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.>
13	Clutch switch	Clutch switch is turned to ON, and then the cruise control is released.	This code is displayed without depressing the clutch pedal. <Ref. to CC(w/o HEV)(diag)-19, 13, Diagnostic Procedure with Cancel Code.>
14	Neutral switch	Neutral position switch is turned to ON, and then the cruise control is released.	This code is displayed without shifting to neutral position. <Ref. to CC(w/o HEV)(diag)-20, 14, Diagnostic Procedure with Cancel Code.>
15	Cancel switch	Cancel switch is turned to ON, and then the cruise control is released.	This code is displayed without operating the cancel switch. <Ref. to CC(w/o HEV)(diag)-21, 15, Diagnostic Procedure with Cancel Code.>
16	Ignition switch	Ignition switch is turned to OFF, and then the cruise control is released.	This code is displayed without operating the ignition switch. <Ref. to CC(w/o HEV)(diag)-22, 16, Diagnostic Procedure with Cancel Code.>
21	Cruise control switch malfunction when the ignition switch is ON	When the ignition switch is turned to ON, each switch of cruise control command switch is already turned to ON.	This code is displayed when the ignition switch is turned to ON without operating the cruise control command switch. <Ref. to CC(w/o HEV)(diag)-22, 21, Diagnostic Procedure with Cancel Code.>
22	Abnormality of change in vehicle speed	Malfunction of vehicle speed signal variation is detected.	<Ref. to CC(w/o HEV)(diag)-23, 22, Diagnostic Procedure with Cancel Code.>
24	Abnormality of switches related to cruise control	Open circuit of the cruise control switch is detected during cruise driving. (The system is judged as model without cruise control.)	This code is displayed with normal operation. <Ref. to CC(w/o HEV)(diag)-23, 24, Diagnostic Procedure with Cancel Code.>
31	Abnormal engine speed Signal	• Abnormal increase of engine speed is detected. • Gear is placed in Neutral, 1st (MT model only) or Reverse position.	Cruise in 2nd shift position or more. <Ref. to CC(w/o HEV)(diag)-23, 31, Diagnostic Procedure with Cancel Code.>

List of Cancel Code

Cancel code	Item	Contents of diagnosis	Note
32	Cruse Control out of Range	• Controlled vehicle speed decreased under the limit during cruising. • Set operation was performed at vehicle speed unavailable for setting. • RESUME operation was performed without memorized vehicle speed.	This code is displayed, though the vehicle speed is increased to the speed available for cruise set and set operation was performed again. <Ref. to CC(w/o HEV)(diag)-23, 32, Diagnostic Procedure with Cancel Code.>
34	Prohibition of cruise control at continuing big Accel. angle	The vehicle has been driven at higher speed than set vehicle speed for an abnormally long time (approximately 10 minutes) during cruise driving.	This code is displayed when driving for a long period of time at higher speed than appropriate cruise set vehicle speed by operating accelerator pedal. In this case, the cruise setting is deactivated. <Ref. to CC(w/o HEV)(diag)-23, 34, Diagnostic Procedure with Cancel Code.>
35	Prohibition of cruise control at vehicle speed F/B malfunction	Set vehicle speed cannot be kept because of some reasons (steep uphill, parking brake, abnormal decrease of engine output, etc.) during cruise driving.	This code is displayed when driving condition is not suitable for cruise control. Perform cruise set operation again after clearing the possible cause. <Ref. to CC(w/o HEV)(diag)-24, 35, Diagnostic Procedure with Cancel Code.>
41	VDC/TCS/EPB Operating	Vehicle dynamics control (VDC), TCS or EPB is operated during cruise driving or cruise setting.	This code is displayed when driving condition is not suitable for cruise control. Perform cruise set operation again after clearing the possible cause. <Ref. to CC(w/o HEV)(diag)-24, 41, Diagnostic Procedure with Cancel Code.>
43	ABS/VDC Failure	• During cruise driving or cruise setting, the situation that some or all functions for ABS or VDC can not work is detected. • CRUISE indicator does not illuminate even though you pressed the CRUISE switch before starting the engine.	<Ref. to CC(w/o HEV)(diag)-24, 43, Diagnostic Procedure with Cancel Code.>
44	Body Integrated unit Failure	Body integrated unit system malfunction is detected during cruise driving or cruise setting.	<Ref. to CC(w/o HEV)(diag)-24, 44, Diagnostic Procedure with Cancel Code.>
45	Meter Failure	Combination meter malfunction is detected during cruise driving or cruise setting.	<Ref. to CC(w/o HEV)(diag)-24, 45, Diagnostic Procedure with Cancel Code.>
49	TCM Failure	Transmission control module (TCM) malfunction is detected during cruise driving or cruise setting.	<Ref. to CC(w/o HEV)(diag)-24, 49, Diagnostic Procedure with Cancel Code.>
61	Brake switch abnormal	Malfunction in the stop light & brake switch is detected.	<Ref. to CC(w/o HEV)(diag)-24, 61, Diagnostic Procedure with Cancel Code.>
62	Neutral switch abnormal	Neutral position switch malfunction is detected.	<Ref. to CC(w/o HEV)(diag)-24, 62, Diagnostic Procedure with Cancel Code.>
63	Abnormality 1 of change in vehicle speed	Malfunction of vehicle speed signal variation is detected.	<Ref. to CC(w/o HEV)(diag)-25, 63, Diagnostic Procedure with Cancel Code.>
64	Engine Sensor Failure 1	Malfunction related to engine is detected.	<Ref. to CC(w/o HEV)(diag)-25, 64, Diagnostic Procedure with Cancel Code.>
65	Abnormality of switches related to cruise control 1	Cruise control command switch malfunction is detected. (When the switch is pressed ON for a long time (approximately two minutes), stuck ON condition is detected.)	<Ref. to CC(w/o HEV)(diag)-25, 65, Diagnostic Procedure with Cancel Code.>
66	Cruise Control Calculation Error	Cruise control calculation (microcomputer) malfunction is detected.	<Ref. to CC(w/o HEV)(diag)-25, 66, Diagnostic Procedure with Cancel Code.>

10.Diagnostic Procedure with Cancel Code

A: 11

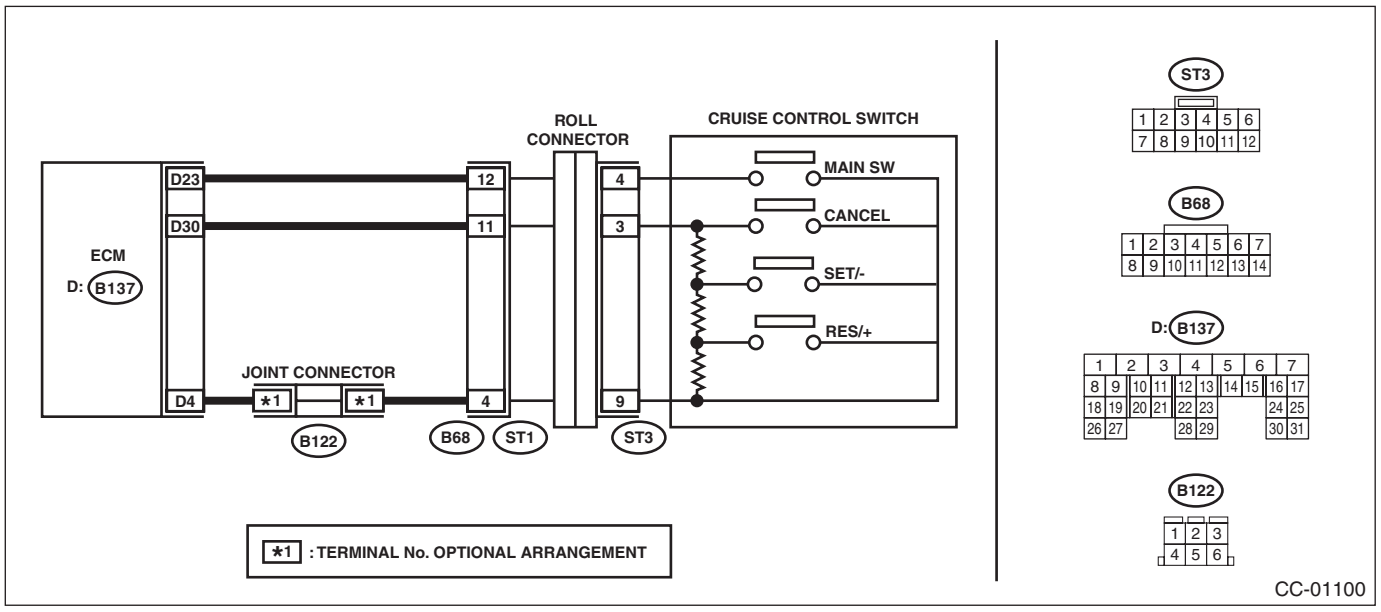
When CRUISE switch is pressed, or a malfunction related to CRUISE switch occurs, this is detected.

TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

WIRING DIAGRAM:

Cruise control system <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, Cruise Control System.>



Step		Check	Yes	No
1	**CHECK CRUISE CONTROL COMMAND SWITCH CIRCUIT.** 1) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.> 2) Disconnect the harness connector of cruise control command switch. 3) Turn the ignition switch to ON. 4) Measure the voltage between harness connector terminal and chassis ground. ***Connector & terminal*** ***(ST3) No. 4 (+) — Chassis ground (–):*** ***(ST3) No. 3 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Go to step **2**.	Check the harness between cruise control command switch and ECM, and the steering roll connector for open or short circuit, or for poor contact.
2	**CHECK CRUISE CONTROL COMMAND SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Remove the cruise control command switch. <Ref. to CC-6, REMOVAL, Cruise Control Command Switch.> 3) Measure the resistance between harness connector terminal and chassis ground. ***Connector & terminal*** ***(ST3) No. 9 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Check for open circuit between cruise control command switch, ECM, and chassis ground and check the ECM.
3	**CHECK CRUISE CONTROL COMMAND SWITCH.** Measure the resistance between switch terminals when the cruise control command switch is not depressed. ***Terminals*** ***No. 3 — No. 9:***	Is the resistance approx. 4 kΩ?	Go to step **4**.	Replace the cruise control command switch. <Ref. to CC-6, Cruise Control Command Switch.>

	Step	Check	Yes	No
4	**CHECK CANCEL SWITCH.** 1) Turn the ignition switch to OFF. 2) Remove the cruise control command switch. <Ref. to CC-6, REMOVAL, Cruise Control Command Switch.> 3) Measure the resistance between switch terminals with the CANCEL switch pressed. ***Terminals*** ***No. 3 — No. 9:***	Is the resistance approx. less than 1 Ω when the CANCEL switch is pressed?	Go to step **5**.	Replace the cruise control command switch. <Ref. to CC-6, Cruise Control Command Switch.>
5	**CHECK SET/– SWITCH.** Measure the resistance between the switch terminals with the SET/– switch pressed. ***Terminals*** ***No. 3 — No. 9:***	Is the resistance approx. 250 Ω when the SET/– switch is pressed?	Go to step **6**.	Replace the cruise control command switch. <Ref. to CC-6, Cruise Control Command Switch.>
6	**CHECK RES/+ SWITCH.** Measure the resistance between the switch terminals with the RES/+ switch pressed. ***Terminals*** ***No. 3 — No. 9:***	Is the resistance approx. 1,500 Ω when the RES/+ switch is pressed?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Replace the cruise control command switch. <Ref. to CC-6, Cruise Control Command Switch.>

B: 12

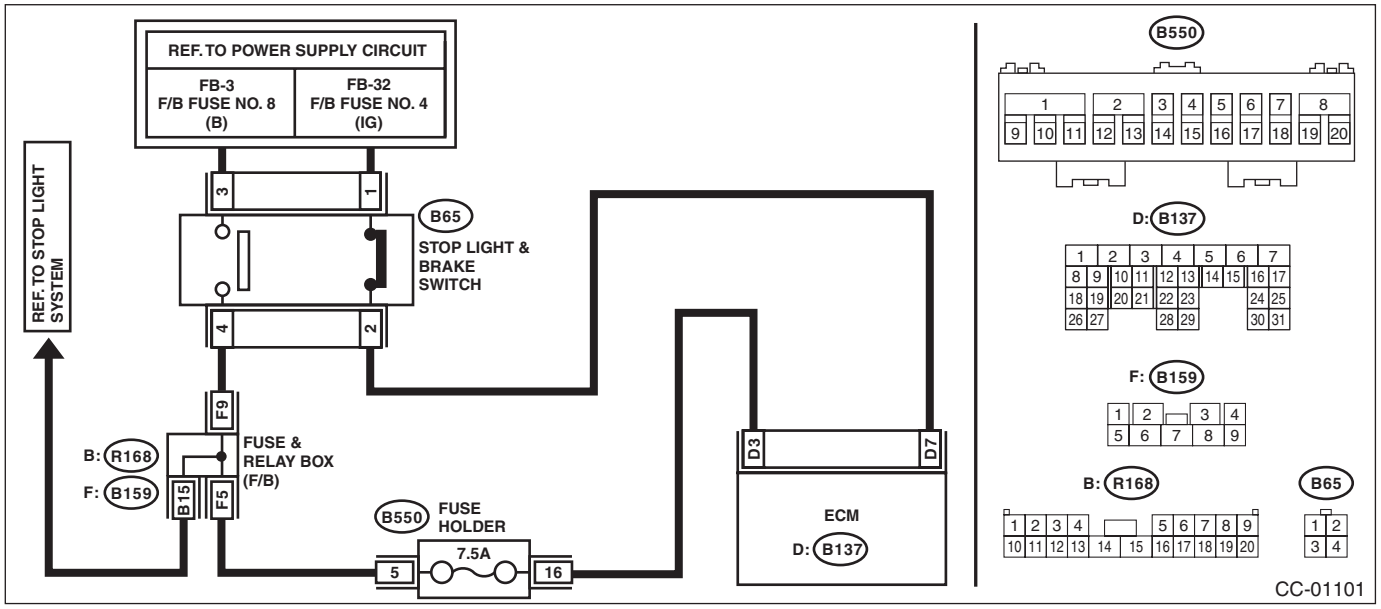
Detected when brake pedal is depressed or malfunction related to stop light & brake switch occurs.

TROUBLE SYMPTOM:

- Cruise control cannot be set.
- Cruise control cannot be released.

WIRING DIAGRAM:

Cruise control system <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, Cruise Control System.>



	Step	Check	Yes	No
1	**CHECK STOP LIGHT & BRAKE SWITCH.** Check the stop light & brake switch. <Ref. to CC-10, Stop Light & Brake Switch.>	Is the stop light & brake switch and installation position OK?	Go to step **2**.	Replace the stop light & brake switch. Or adjust the installation position.
2	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light & brake switch harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between harness connector terminal and chassis ground. ***Connector & terminal*** ***(B65) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	• Check fuse No. 8 (in fuse & relay box). • Check for open or short in the harness between stop light & brake switch and fuse & relay box.
3	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** Measure the voltage between harness connector terminal and chassis ground. ***Connector & terminal*** ***(B65) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	• Check fuse No. 4 (in fuse & relay box). • Check for open or short in the harness between stop light & brake switch and fuse & relay box.

	Step	Check	Yes	No
4	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of ECM. 3) Measure the resistance between ECM harness connector terminal and stop light & brake switch harness connector terminal. ***Connector & terminal*** ***(B137) No. 3 — (B65) No. 4:*** ***(B137) No. 7 — (B65) No. 2:***	Is the resistance less than 10 Ω?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Repair the harness.

C: 13

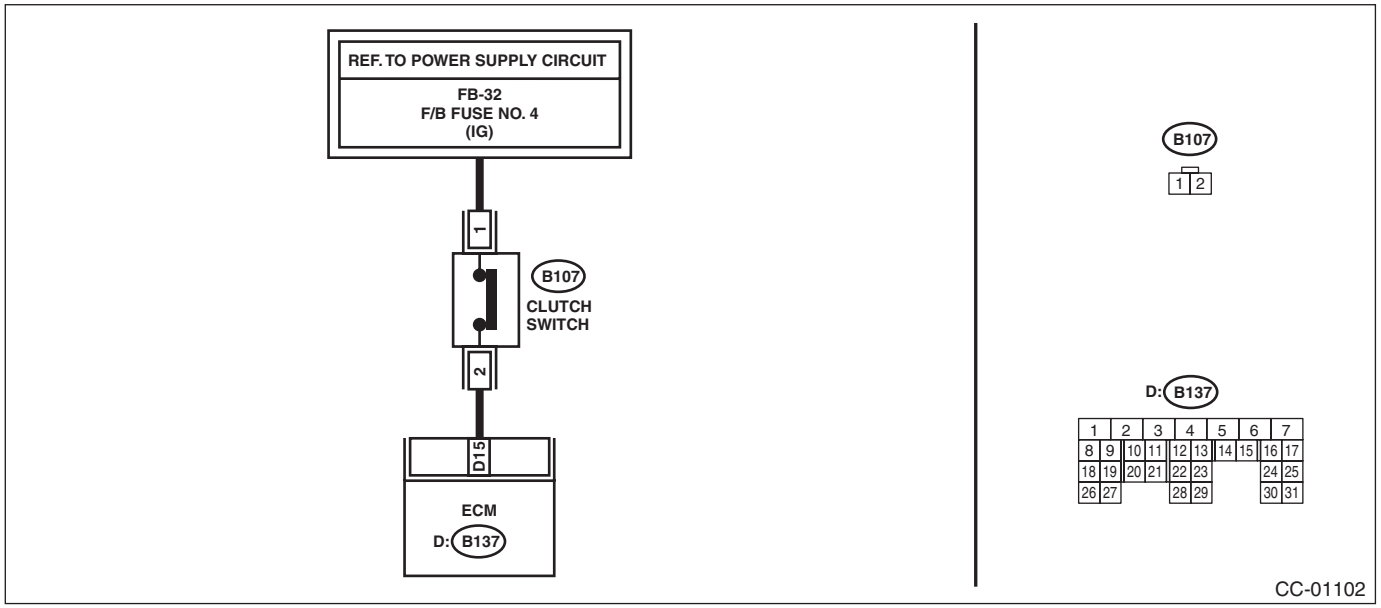
Detected when clutch pedal is depressed or malfunction related to clutch switch occurs.

TROUBLE SYMPTOM:

- Cruise control cannot be set.
- Cruise control cannot be released.

WIRING DIAGRAM:

Cruise control system <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, Cruise Control System.>



Step		Check	Yes	No
1	**CHECK CLUTCH SWITCH.** Check the clutch switch. <Ref. to CC-11, Clutch Switch.>	Is the clutch switch and installation position OK?	Go to step **2**.	Replace the clutch switch. Or adjust the installation position.
2	**CHECK CLUTCH SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the clutch switch harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between harness connector terminal and chassis ground. ***Connector & terminal*** ***(B107) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	• Check fuse No. 4 (in fuse & relay box). • Check open or shorted circuit of harness between clutch switch and fuse & relay box.
3	**CHECK CLUTCH SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of ECM. 3) Measure the resistance between clutch switch harness connector terminal and ECM harness connector terminal. ***Connector & terminal*** ***(B107) No. 2 — (B137) No. 15:***	Is the resistance less than 10 Ω?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Repair the harness.

D: 14

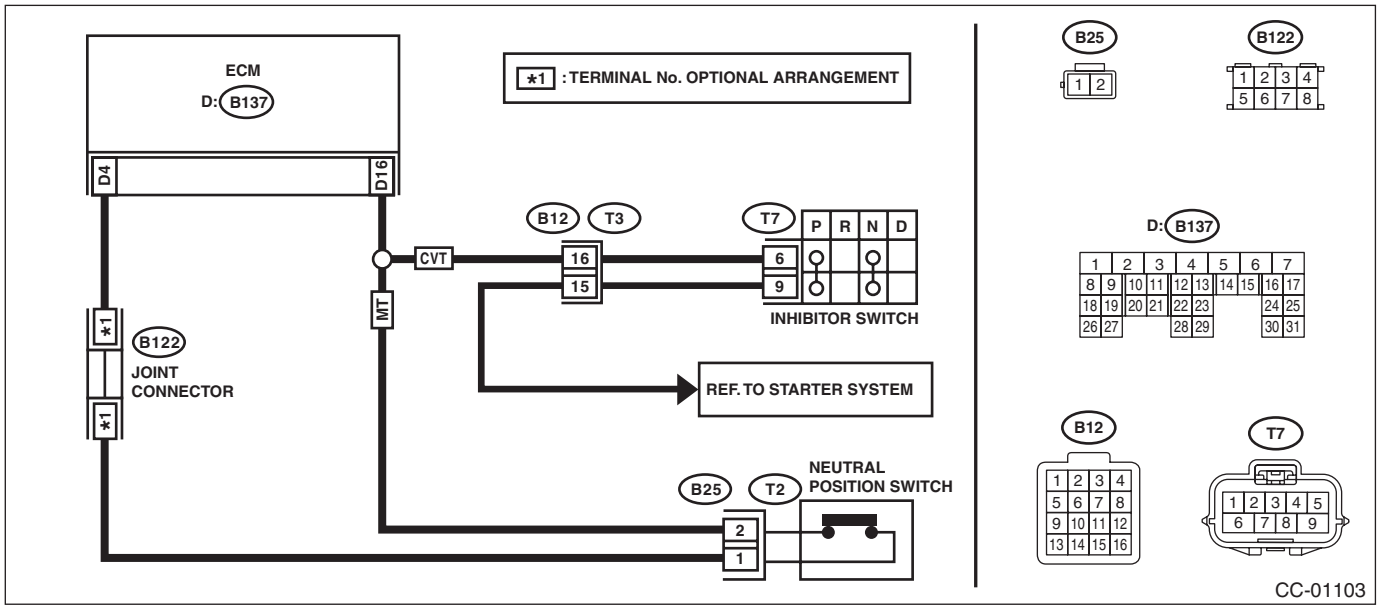
Detected when select lever is set in the neutral position, or when malfunction related to neutral position switch occurs.

TROUBLE SYMPTOM:

Cruise control cannot be set.

WIRING DIAGRAM:

Cruise control system <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, Cruise Control System.>



	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is the transmission type CVT?	Go to step **2**.	Go to step **5**. (MT model)
2	**CHECK INHIBITOR SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the inhibitor switch harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between harness connector terminal and chassis ground. ***Connector & terminal*** ***(T7) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Check for open or short in the harness between inhibitor switch and ECM.
3	**CHECK INHIBITOR SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the starter motor harness connector. 3) Measure the resistance between inhibitor switch harness connector terminal and starter motor. ***Connector & terminal*** ***(T7) No. 9 — Starter motor:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair the harness.
4	**CHECK INHIBITOR SWITCH.** Remove and check the inhibitor switch. <Ref. to CC-12, Inhibitor Switch.>	Is the inhibitor switch working normal?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Replace the inhibitor switch.

	Step	Check	Yes	No
5	**CHECK NEUTRAL POSITION SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the neutral position switch harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between harness connector terminal and chassis ground. ***Connector & terminal*** ***(B25) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Check for open or short in the harness between neutral position switch and ECM.
6	**CHECK NEUTRAL POSITION SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Measure resistance between harness connector terminal of neutral position switch and chassis ground. ***Connector & terminal*** ***(B25) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair the harness.
7	**CHECK NEUTRAL POSITION SWITCH.** Remove and check the neutral position switch. <Ref. to CC-14, Neutral Position Switch.>	Is the neutral position switch OK?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Replace the neutral position switch.

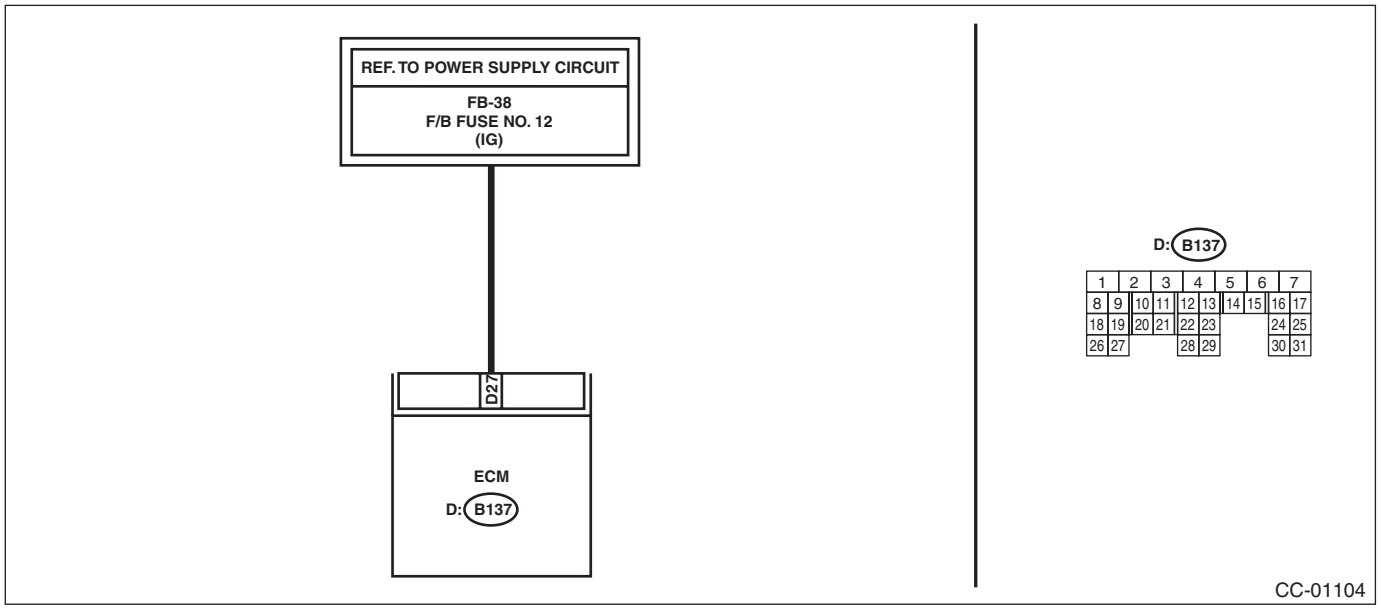
E: 15

Detected when CANCEL switch is pressed or malfunction related to CRUISE switch occurs.
TROUBLE SYMPTOM:
- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

Refer to DTC 11 for diagnostic procedure.
<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>

F: 16

Detected when ignition switch is turned to OFF or malfunction related to the ignition switch occurs.
TROUBLE SYMPTOM:
Cruise control cannot be set.
WIRING DIAGRAM:
Cruise control system <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, Cruise Control System.>



Step		Check	Yes	No
1	**CHECK IGNITION SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between harness connector terminal and chassis ground. ***Connector & terminal*** ***(B137) No. 27 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Check for poor contact of ECM connector.	• Check fuse No. 12 (in fuse & relay box). • Check the harness for open or short circuit between ignition switch and ECM.

G: 21

Cruise control command switch malfunction is detected.
TROUBLE SYMPTOM:
- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

Refer to DTC 11 for diagnostic procedure.
<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>

H: 22

Malfunction related to vehicle speed sensor is detected.
DIAGNOSIS:
Open or shorted circuit in vehicle speed sensor system.
TROUBLE SYMPTOM:
Cruise control cannot be set. (Cancelled immediately.)

	Step	Check	Yes	No
1	**CHECK ABS OR VDC WARNING LIGHT.** 1) Turn the ignition switch to ON. 2) After the initial operation of combination meter is completed, check if ABS or VDC warning light continues to illuminate.	Does the warning light continue to illuminate?	Check the VDCCM. <Ref. to VDC(diag)-2, Basic Diagnostic Procedure.>	Go to step **2**.
2	**CHECK DTC OF LAN COMMUNICATION CIRCUIT.** Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform inspection according to DTC.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>

I: 24

Malfunction in cruise control-related switch is detected.
TROUBLE SYMPTOM:
- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

Refer to DTC 11 for diagnostic procedure.
<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>

J: 31

Engine speed signal malfunction is detected.
Abnormal increase of engine speed is detected.
Gear is placed in 1st or Reverse position.
After driving at the 2nd gear position or higher, perform the cruise setting again. If a cancel code is not detected, it is normal.

K: 32

This DTC is detected out of vehicle speed range.
Increase vehicle speed high enough to allow the cruise control to function, and then perform setting operation again.
If cancel code is still detected after setting cruise again, perform the diagnosis for DTC 22.
Refer to DTC 22 for diagnostic procedure.
<Ref. to CC(w/o HEV)(diag)-23, 22, Diagnostic Procedure with Cancel Code.>

L: 34

The vehicle has been driven at a speed higher than set speed for a long time (approximately 10 minutes) during cruise driving.
This cancel code is detected when driving for a long period of time at a speed higher than appropriate for cruise control setting by operating the accelerator pedal.
Perform the cruise control setting operation again. If the cancel code is not detected, it is normal.

M: 35

Detected when it is impossible to perform the vehicle speed feedback.
Set vehicle speed cannot be kept for some reasons (steep uphill, unreleased parking brake, etc.) during cruise driving.
Cancel code is detected when driving conditions are not suitable for cruise control.
Perform cruise set operation again after clearing the possible cause.

N: 41

VDC/TCS/EPB is operated.
Vehicle dynamics control (VDC) or TCS/EPB is operated during cruise driving or cruise setting.
<Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

O: 43

- The situation that some or all functions for ABS/VDC can not work is detected.

During cruise driving or cruise setting, the situation that some or all functions for ABS/VDC can not work is detected.
<Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

- CRUISE indicator does not illuminate even though you pressed the CRUISE switch before starting the engine.

Detected when the CRUISE switch is pressed during the initial diagnosis of ABS/VDC. It is normal if the CRUISE indicator illuminates when you press the CRUISE switch again after starting the engine and confirming that the initial illumination of the ABS/VDC warning light has been ended.

P: 44

Body integrated unit malfunction is detected.
Body integrated unit system malfunction is detected during cruise driving or cruise setting.
<Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

Q: 45

Malfunction of the combination meter is detected.
Combination meter malfunction is detected during cruise driving or cruise setting.
<Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

R: 49

Automatic transmission malfunction is detected.
Automatic transmission malfunction is detected during cruise driving or cruise control setting.
<Ref. to CVT(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

S: 61

Malfunction in the stop light & brake switch is detected.
TROUBLE SYMPTOM:

- Cruise control cannot be set.
- Cruise control cannot be released.

Refer to DTC 12 for diagnostic procedure.
<Ref. to CC(w/o HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.>

T: 62

Neutral position switch malfunction is detected.
TROUBLE SYMPTOM:
Cruise control cannot be set.
Refer to DTC 14 for diagnostic procedure.
<Ref. to CC(w/o HEV)(diag)-20, 14, Diagnostic Procedure with Cancel Code.>

U: 63

Malfunction of vehicle speed signal variation is detected.
TROUBLE SYMPTOM:
Cruise control cannot be set. (Cancelled immediately.)
Refer to DTC 22 for diagnostic procedure.
<Ref. to CC(w/o HEV)(diag)-23, 22, Diagnostic Procedure with Cancel Code.>

NOTE:
When the vehicle was suddenly accelerated on low μ road surface while VDC is OFF, this cancel code may be stored. In this case, restart the engine and perform the cruise control setting operation again. If the cancel code is not detected, it is normal.

V: 64

Malfunction related to engine is detected.
Refer to the Engine Diagnostic Procedure for diagnostic procedure.
<Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

W: 65

Cruise control command switch malfunction is detected.
While the command switch is pressed ON for a long time (approximately two minutes), stuck ON condition is detected.
TROUBLE SYMPTOM:
- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

Refer to DTC 11 for diagnostic procedure.
<Ref. to CC(w/o HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>

X: 66

Cruise control calculation malfunction is detected.
Refer to the Engine Diagnostic Procedure for diagnostic procedure.
<Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

CRUISE CONTROL SYSTEM (DIAGNOSTICS)

CC(HEV)(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
• When performing the entire diagnosis or cruise control diagnosis, first start the engine and wait until initial illumination of the ABS/VDC warning light completes. (If you start the diagnostics before performing the above procedures, the cancel code "43" is recorded and CRUISE indicator does not illuminate even though the CRUISE switch is pressed.)
• When performing diagnosis, observe the legal speed limit on the road.
• The cancel code will also appear when the cruise control is cancelled by the driver's operation. Do not confuse them.
• Be sure to get an assistant to support the diagnosis while driving, and have him/her operate the select monitor.

	Step	Check	Yes	No
1	**CHECK HYBRID FAIL LAMP.** Make sure the hybrid fail lamp illuminates.	Does the hybrid fail lamp illuminate?	Go to step **6**.	Go to step **2**.
2	**CHECK MALFUNCTION INDICATOR LIGHT.** Make sure the malfunction indicator light illuminates.	Does the malfunction indicator light illuminate?	Go to step **6**.	Go to step **3**.
3	**CHECK CRUISE INDICATOR LIGHT.** Make sure the cruise indicator light blinks.	Does the cruise indicator light blink?	Go to step **8**.	Go to step **4**.
4	**CHECK CRUISE SWITCH OPERATION.** Check the CRUISE switch operation. (Check the illumination of the CRUISE indicator.)	Is the CRUISE switch turned on? (Does the CRUISE indicator illuminate?)	Go to step **5**.	Go to phenomenon 1. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
5	**CHECK CRUISE CONTROL SET OPERATION.** Check the cruise control setting operation.	Can the cruise control be set while driving at 40 km/h (25 MPH) or more?	Go to step **9**.	Go to step **8**.
6	**CHECK DTC.** Read all DTCs using the Subaru Select Monitor.	Is engine, HEV or VDC related DTC displayed?	Record the DTC. Go to step **7**.	Go to phenomenon 2. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
7	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, check the Freeze Frame Data or Information in Trouble State.	Was the Freeze Frame Data or Information in Trouble State recorded?	Record the data. Perform the diagnosis according to the engine, HEV, or VDC related DTC.	Perform the diagnosis according to the engine, HEV, or VDC related DTC.
8	**CHECK CANCEL CODE.** Using the Subaru Select Monitor, read the cancel codes of the hybrid powertrain control. <Ref. to CC(HEV)(diag)-9, Read Cancel Code.> NOTE: • Do not turn the ignition switch to OFF after the cruise control is deactivated. • Do not operate the cruise control command switch after the cruise control is deactivated. If the above is performed, the cancel code will be cleared.	Is it possible to read the cancel codes?	Perform the diagnosis according to the cancel code. <Ref. to CC(HEV)(diag)-13, LIST, List of Cancel Code.>	Go to step **9**.

	Step	Check	Yes	No
9	**CHECK SET INDICATOR.** Check the illumination of the SET indicator.	Does the SET indicator illuminate?	Go to step **10**.	Go to phenomenon 3. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
10	**CHECK VEHICLE SPEED IS HELD WITHIN SET SPEED.** Make sure the vehicle speed is held within set speed.	Is the vehicle speed kept within setting speed ±3 km/h (±2 MPH)? (Make sure that on a level road.)	Go to step **11**.	Go to phenomenon 4. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
11	**CHECK RES/+ OPERATION.** Check the RES/+ switch operation.	Does the vehicle speed increase or return to set speed after RES/+ switch has been pressed?	Go to step **12**.	Go to phenomenon 5. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
12	**CHECK SET/– OPERATION.** Check the SET/– switch operation.	Does the vehicle speed decrease after SET/– switch has been pressed?	Go to step **13**.	Go to phenomenon 6. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
13	**CANCEL OPERATION CHECK.** Check the CANCEL switch operation.	Is the cruise control released after CANCEL switch has been pressed?	Go to step **14**.	Go to phenomenon 7. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>
14	**CHECK CRUISE CONTROL RELEASE OPERATION.** Check the cruise control release operation.	Is the cruise control released after brake pedal has been depressed?	Go to step **15**.	Go to phenomenon 8. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

Step		Check	Yes	No
15	**CHECK CRUISE CONTROL RELEASE OPERATION.** Check the cruise control release operation.	Is the cruise control released after shifting to the neutral position?	Finish the diagnosis.	Go to phenomenon 9. <Ref. to CC(HEV)(diag)-11, DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.>

2. General Description

A: CAUTION

Airbag system wiring harness is routed near the cruise control command switch.

CAUTION:
• Do not use the electrical test equipment on the airbag system wiring harnesses and connector circuits.
• Be careful not to damage the airbag system wiring harness when servicing the cruise control command switch. Airbag system wiring harness is routed near the cruise control command switch.

B: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

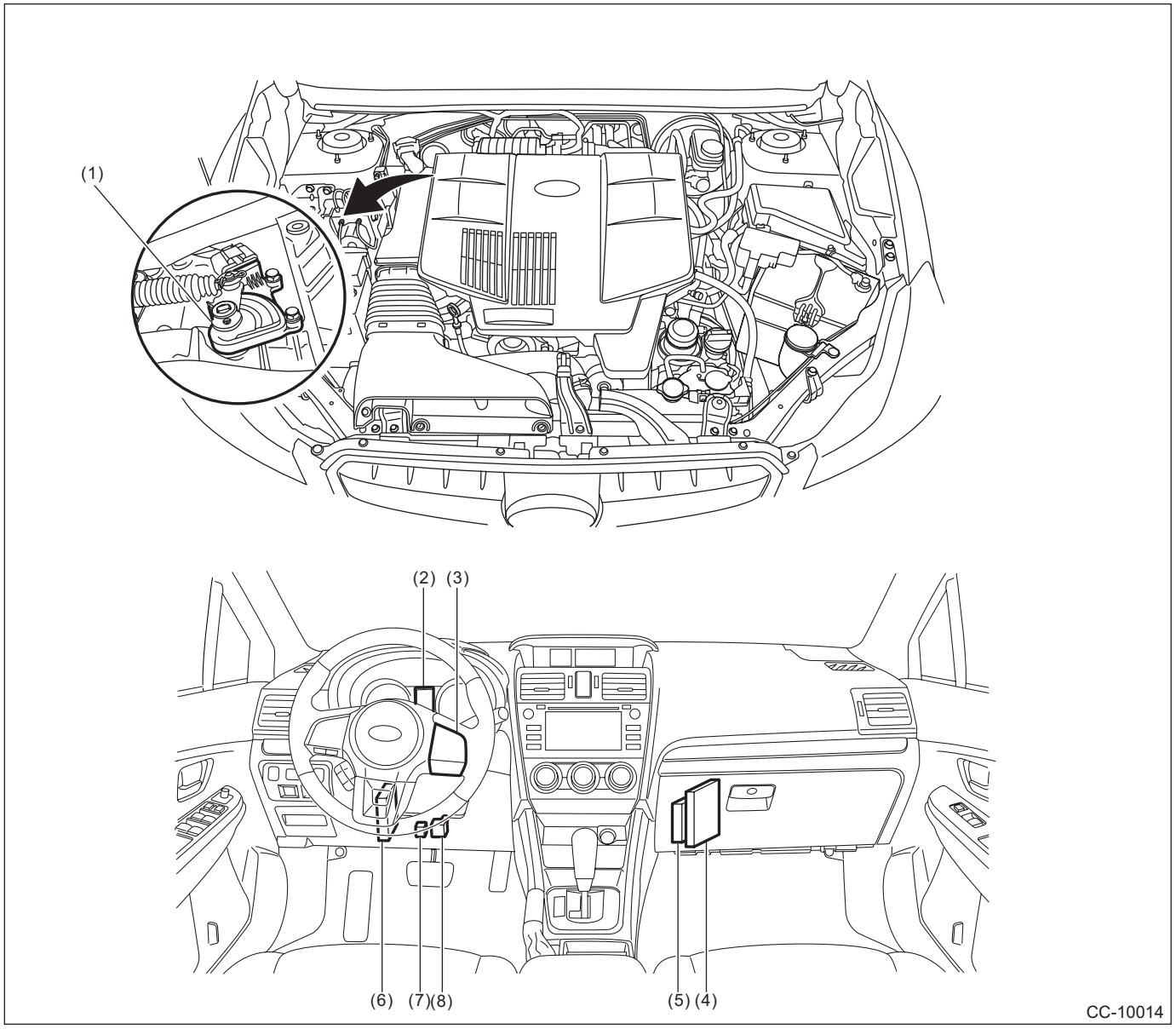
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

C: INSPECTION

Check 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>

3. Electrical Component Location

A: LOCATION



(1)	Inhibitor switch	(4)	Engine control module (ECM)	(7)	Brake stroke sensor (brake pedal ASSY)
(2)	Cruise indicator light and cruise set indicator light	(5)	Hybrid powertrain control module (HPCM)	(8)	Stop light and brake switch
(3)	Cruise control command switch	(6)	Transmission control module (TCM)		

NOTE:
Brake stroke sensor cannot be disassembled from the brake pedal assembly.

4. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

1. ENGINE CONTROL MODULE (ECM)

For details on the input/output signals for the engine control module, refer to ENGINE (DIAGNOSTICS). <Ref. to EN(H4DO HEV)(diag)-21, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

2. HYBRID POWERTRAIN CONTROL MODULE (HPCM)

For details on the input/output signals of the hybrid powertrain control module, refer to HEV (DIAGNOSTICS). <Ref. to HEV(diag)-10, HYBRID POWERTRAIN CONTROL MODULE (HPCM), ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

B: WIRING DIAGRAM

Refer to “Cruise Control System” in the wiring diagram. <Ref. to WI(HEV)-78, WIRING DIAGRAM, Cruise Control System.>

5. Subaru Select Monitor

A: OPERATION

1. GENERAL DESCRIPTION

The on-board diagnosis function of the cruise control system uses Subaru Select Monitor.
The on-board diagnosis function operates in two categories, which are used depending on the type of problems;
1) Cruise Control Cancel Conditions Diagnosis:
(1) This category of diagnosis requires actual vehicle driving in order to determine the cause, as when cruise speed is cancelled during driving although cruise cancel condition is not entered.
(2) Cruise control memory in the hybrid powertrain control stores the cancel code which occurred during driving. When there are multiple cancel code, they are shown on the Subaru Select Monitor.

CAUTION:
• In the cruise control memory, not only the cruise control "cancel" occurred (although the "cancel" operation is not entered by the driver), but also the "cancel" condition input by the driver is stored.
• The latest memory content (latest code) is cleared when ignition switch is turned to OFF. However, memory contents set by the diagnosis of faulty switches related to the system and cruise control will remain as trouble history (memory code) after the ignition switch is turned to OFF.
2) Real-time Diagnosis:
Real-time diagnosis function is used to determine whether or not the input signal system is in good order, according to signal emitted from switches, sensors, etc.
(1) Vehicle cannot be driven at cruise speed when the problem occurs in the cruise control system or relevant circuits.
(2) Monitor the signal conditions from switches and sensors.

2. BASIC OPERATION

For detailed operation procedures, refer to "Application help".

6. Read Cancel Code

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control».
5) Drive vehicle at 40 km/h (25 MPH) or more and set the cruise control.

CAUTION:
- **When performing diagnosis, observe the legal speed limit on the road.**
- **The cancel code will also appear when the cruise control is cancelled by the driver's operation. Do not confuse them.**
- **Be sure to get an assistant to support the diagnosis while driving, and have him/her operate the select monitor.**

6) When the set speed is cancelled by itself (when cancelled without a cancel operation such as applying the brake) or if the cruise control could not be set by performing the setting operation, selecting the «Cancel Code» on the hybrid powertrain control malfunction diagnosis screen will display the cancel code on the select monitor display.

NOTE:
The «Current» and «The past» are contained in the cancel code. The latest code recognized during current test drive is displayed in «Current». Cancel codes resulting from fault diagnosis of switches relating to the system and cruise control are also displayed in «The past».
7) Perform DTC clear memory operation for hybrid powertrain control.
Cancel codes for switches relating to the system and cruise control are deleted by clearing memory on the hybrid powertrain control side. <Ref. to HEV(diag)-24, Clear Memory Mode.>

NOTE:
- The latest code will be cleared by turning ignition switch to OFF.
- For detailed operation procedures, refer to "Application help".
- For details on cancel codes, refer to List of Cancel Code. <Ref. to CC(HEV)(diag)-13, List of Cancel Code.>

7. Real-time Diagnosis

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».
6) Make sure that normal display is shown when operated as follows:
- Turn the “CRUISE” switch to ON.
- Turn the “CANCEL” switch to ON.
- Turn the “SET/–” switch to ON.
- Turn the “RES/+” switch to ON.
- Depress and release the brake pedal. (The stop light switch and brake switch are turned on, and accordingly the brake stroke sensor value changes.)
- Place the shift lever in any position other than neutral.

If normal display will not appear, go to the next step.
7) On «Select System» display, select «Engine Control System» and then «Enter».
8) On «Select Function» display, select «Data Monitor». <Ref. to EN(H4DO HEV)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>
9) Make sure that normal display is shown when operated as follows:
- Depress and release the brake pedal. (Stop light switch and brake switch are turned ON.)
- Turn the “CRUISE” switch to ON.
- Turn the “CANCEL” switch to ON.
- Turn the “SET/–” switch to ON.
- Turn the “RES/+” switch to ON.
- Place the shift lever in any position other than neutral.

NOTE:
For detailed operation procedures, refer to “Application help”.

8. Diagnostics with Phenomenon

A: DIAGNOSTIC PROCEDURE WITH PHENOMENON

Phenomenon		Check Item	Note
1	CRUISE switch is not turned ON. (CRUISE indicator does not illuminate.) Or the cruise control is cancelled without CRUISE switch operation.	(1) Perform cruise cancel conditions diagnosis.	Perform the diagnosis according to displayed cancel code.
		(2) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(3) Check the cruise control command switch.	<Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
		(4) Check the CRUISE indicator.	<Ref. to CC(HEV)(diag)-12, CHECK CRUISE INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT, Diagnostics with Phenomenon.>
2	Cruise control cannot be set. Or cruise control is cancelled without releasing operation.	(1) Perform cruise cancel conditions diagnosis.	Perform the diagnosis according to displayed cancel code.
		(2) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(3) Check the cruise control command switch.	<Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
		(4) Check stop light switch and brake switch. Check the brake stroke sensor.	<Ref. to BR-75, Stop Light Switch.> <Ref. to CC(HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.> <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
		(5) Check the neutral position switch.	<Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
		(6) Check vehicle speed sensor.	<Ref. to CC(HEV)(diag)-20, 22, Diagnostic Procedure with Cancel Code.>
3	SET indicator does not illuminate.	Check the SET indicator.	<Ref. to CC(HEV)(diag)-12, CHECK CRUISE INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT, Diagnostics with Phenomenon.>
4	Vehicle speed is not held within set speed ±3 km/h (±2 MPH).	Check the vehicle speed sensor.	<Ref. to CC(HEV)(diag)-20, 22, Diagnostic Procedure with Cancel Code.>
5	Vehicle speed does not increase or does not return to set speed after RES/+ switch has been pressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check the RES/+ switch.	<Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
6	Vehicle speed does not decrease after SET/– switch has been pressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check the SET/– switch.	<Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
7	Cruise control is not released after CANCEL switch has been pressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check the CANCEL switch.	<Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
8	Cruise control is not released after brake pedal has been depressed.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check stop light switch and brake switch. Check the brake stroke sensor.	<Ref. to CC(HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.> <Ref. to BR-75, INSTALLATION, Stop Light Switch.> <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
9	Cruise control is not released after shifting to the neutral position.	(1) Perform the real-time diagnosis.	Check the input signal of cruise control system.
		(2) Check the neutral position switch.	<Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: CHECK CRUISE INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT

TROUBLE SYMPTOM:

Cruise control can be set, but the CRUISE indicator and SET indicator do not illuminate.

	Step	Check	Yes	No
1	**CHECK CRUISE INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT.** Perform the combination meter operation check. <Ref. to IDI(diag)-20, OPERATION, System Operation Check Mode.>	Do the CRUISE & SET indicators illuminate?	Go to step **2**.	Replace the meter case assembly. <Ref. to IDI-19, Combination Meter.>
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is a DTC of the LAN system detected?	Perform the diagnosis according to DTC for LAN system.	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>

9. List of Cancel Code

A: LIST

NOTE:
• The cancel code is registered even when cancel is performed intentionally by the driver.
• Cancel codes are cleared if the ignition switch is turned to OFF.
• If a different cancel code is input after a cancel code (latest code) has been input, the latest code is overwritten.
• If the cruise indicator light is flashing, a malfunction is occurring in the system or cruise control related switch. The cancel code at this time is saved even after ignition switch is OFF as a memory code of a past malfunction.
• To display a cancel code, use the Subaru Select Monitor to read the code after the cruise control is deactivated during a driving test.

Cancel code	Item	Contents of diagnosis	Note
11	Main switch	CRUISE switch of cruise control command switch is turned to OFF, and then the cruise control is released.	This code is displayed without operating the CRUISE switch. <Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>
12	Stop & Brake switch	Stop light switch or brake switch is turned to ON, and then the cruise control is released. The cruise control is released by brake stroke sensor.	This code is displayed without depressing the brake pedal. <Ref. to CC(HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.>
14	Neutral switch	Neutral position switch is turned to ON, and then the cruise control is released.	This code is displayed without shifting to neutral position. <Ref. to CC(HEV)(diag)-18, 14, Diagnostic Procedure with Cancel Code.>
15	Cancel switch	Cancel switch is turned to ON, and then the cruise control is released.	This code is displayed without operating the cancel switch. <Ref. to CC(HEV)(diag)-18, 15, Diagnostic Procedure with Cancel Code.>
16	Ignition switch	Ignition switch is turned to OFF, and then the cruise control is released.	This code is displayed without operating the ignition switch. <Ref. to CC(HEV)(diag)-19, 16, Diagnostic Procedure with Cancel Code.>
22	Abnormality of change in vehicle speed	Malfunction of vehicle speed signal variation is detected.	<Ref. to CC(HEV)(diag)-20, 22, Diagnostic Procedure with Cancel Code.>
24	Abnormality of switches related to cruise control	Open circuit of the cruise control switch is detected during cruise driving. (The system is judged as model without cruise control.)	This code is displayed with normal operation. <Ref. to CC(HEV)(diag)-20, 24, Diagnostic Procedure with Cancel Code.>
31	Engine Speed	• Abnormal increase of engine speed is detected. • Gear is placed in Neutral, 1st or Reverse position.	Cruise in 2nd shift position or more. <Ref. to CC(HEV)(diag)-20, 31, Diagnostic Procedure with Cancel Code.>
32	Out of Cruise Control Operation Vehicle Speed Range	• Controlled vehicle speed decreased under the limit during cruising. • Set operation was performed at vehicle speed unavailable for setting. • RESUME operation was performed without memorized vehicle speed.	This code is displayed, though the vehicle speed is increased to the speed available for cruise set and set operation was performed again. <Ref. to CC(HEV)(diag)-20, 32, Diagnostic Procedure with Cancel Code.>
34	Prohibition of cruise control at continuing big Accel. angle	The vehicle has been driven at higher speed than set vehicle speed for an abnormally long time (approximately 10 minutes) during cruise driving.	<Ref. to CC(HEV)(diag)-20, 34, Diagnostic Procedure with Cancel Code.>

List of Cancel Code

Cancel code	Item	Contents of diagnosis	Note
35	Prohibition of cruise control at vehicle speed F/B malfunction	Set vehicle speed cannot be kept because of some reasons (steep uphill, parking brake, abnormal decrease of engine output, etc.) during cruise driving.	This code is displayed when driving condition is not suitable for cruise control. Perform cruise set operation again after clearing the possible cause. <Ref. to CC(HEV)(diag)-20, 35, Diagnostic Procedure with Cancel Code.>
41	VDC/TCS Operation	VDC or TCS is activated during cruise driving or cruise setting.	This code is displayed when driving condition is not suitable for cruise control. Perform cruise set operation again after clearing the possible cause. <Ref. to CC(HEV)(diag)-21, 41, Diagnostic Procedure with Cancel Code.>
43	ABS/VDC Failure	• Detected the situation that some or all functions of ABS or VDC can not be activated during cruise driving or cruise setting. • The CRUISE switch was pressed before starting the engine, but the CRUISE indicator did not illuminate.	<Ref. to CC(HEV)(diag)-21, 43, Diagnostic Procedure with Cancel Code.>
44	Integrated Unit Failure	Body integrated unit system malfunction is detected during cruise driving or cruise setting.	<Ref. to CC(HEV)(diag)-21, 44, Diagnostic Procedure with Cancel Code.>
45	Meter Failure	Combination meter malfunction is detected during cruise driving or cruise setting.	<Ref. to CC(HEV)(diag)-21, 45, Diagnostic Procedure with Cancel Code.>
49	TCM Failure	Transmission control module (TCM) malfunction is detected during cruise driving or cruise setting.	<Ref. to CC(HEV)(diag)-21, 49, Diagnostic Procedure with Cancel Code.>
50	HEV System Failure	Hybrid system malfunction is detected during cruise driving or cruise setting.	<Ref. to CC(HEV)(diag)-21, 50, Diagnostic Procedure with Cancel Code.>
61	Brake Switch Failure	Malfunction in the stop light & brake switch is detected.	<Ref. to CC(HEV)(diag)-21, 61, Diagnostic Procedure with Cancel Code.>
63	Abnormality 1 of change in vehicle speed	Malfunction of vehicle speed signal variation is detected.	<Ref. to CC(HEV)(diag)-21, 63, Diagnostic Procedure with Cancel Code.>
64	Engine Sensor Failure 1	Malfunction related to engine is detected.	<Ref. to CC(HEV)(diag)-22, 64, Diagnostic Procedure with Cancel Code.>
65	Abnormality 1 of switches related to cruise control	Cruise control command switch malfunction is detected. (When the switch is pressed ON for a long time (approximately two minutes), stuck ON condition is detected.)	<Ref. to CC(HEV)(diag)-22, 65, Diagnostic Procedure with Cancel Code.>

10.Diagnostic Procedure with Cancel Code

A: 11

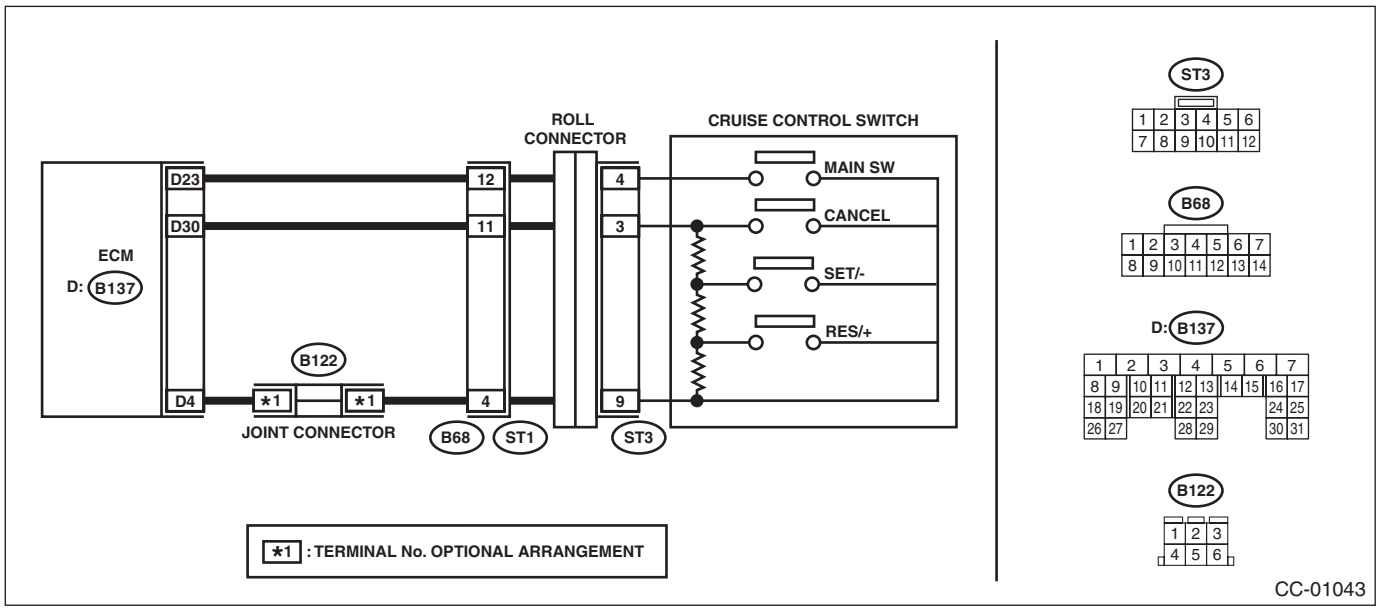
When CRUISE switch is pressed, or a malfunction related to CRUISE switch occurs, this is detected.

TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

WIRING DIAGRAM:

Cruise control system <Ref. to WI(HEV)-78, WIRING DIAGRAM, Cruise Control System.>



Step		Check	Yes	No
1	**CHECK CRUISE CONTROL COMMAND SWITCH CIRCUIT.** 1) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.> 2) Disconnect the cruise control command switch connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between cruise control command switch connector and chassis ground. ***Connector & terminal*** ***(ST3) No. 4 (+) — Chassis ground (–):*** ***(ST3) No. 3 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Go to step **2**.	Check the harness between cruise control command switch and ECM, and the steering roll connector for open or short circuit, or for poor contact.
2	**CHECK CRUISE CONTROL COMMAND SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Remove the cruise control command switch. <Ref. to CC-6, REMOVAL, Cruise Control Command Switch.> 3) Measure the resistance between cruise control command switch connector and chassis ground. ***Connector & terminal*** ***(ST3) No. 9 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Check for open circuit between cruise control command switch, ECM, and chassis ground and check the ECM.

	Step	Check	Yes	No
3	**CHECK CRUISE CONTROL COMMAND SWITCH.** Measure the resistance between switch terminals when the cruise control command switch is not depressed. ***Terminals*** ***No. 3 — No. 9:***	Is the resistance approx. 4 kΩ?	Go to step **4**.	Replace the cruise control command switch. <Ref. to CC-6, Cruise Control Command Switch.>
4	**CHECK CANCEL SWITCH.** 1) Turn the ignition switch to OFF. 2) Remove the cruise control command switch. <Ref. to CC-6, REMOVAL, Cruise Control Command Switch.> 3) Measure the resistance between switch terminals with the CANCEL switch pressed. ***Terminals*** ***No. 3 — No. 9:***	Is the resistance approx. less than 1 Ω when the CANCEL switch is pressed?	Go to step **5**.	Replace the cruise control command switch. <Ref. to CC-6, Cruise Control Command Switch.>
5	**CHECK SET/– SWITCH.** Measure the resistance between the switch terminals with the SET/– switch pressed. ***Terminals*** ***No. 3 — No. 9:***	Is the resistance approx. 250 Ω when the SET/– switch is pressed?	Go to step **6**.	Replace the cruise control command switch. <Ref. to CC-6, Cruise Control Command Switch.>
6	**CHECK RES/+ SWITCH.** Measure the resistance between the switch terminals with the RES/+ switch pressed. ***Terminals*** ***No. 3 — No. 9:***	Is the resistance approx. 1,500 Ω when the RES/+ switch is pressed?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Replace the cruise control command switch. <Ref. to CC-6, Cruise Control Command Switch.>

B: 12

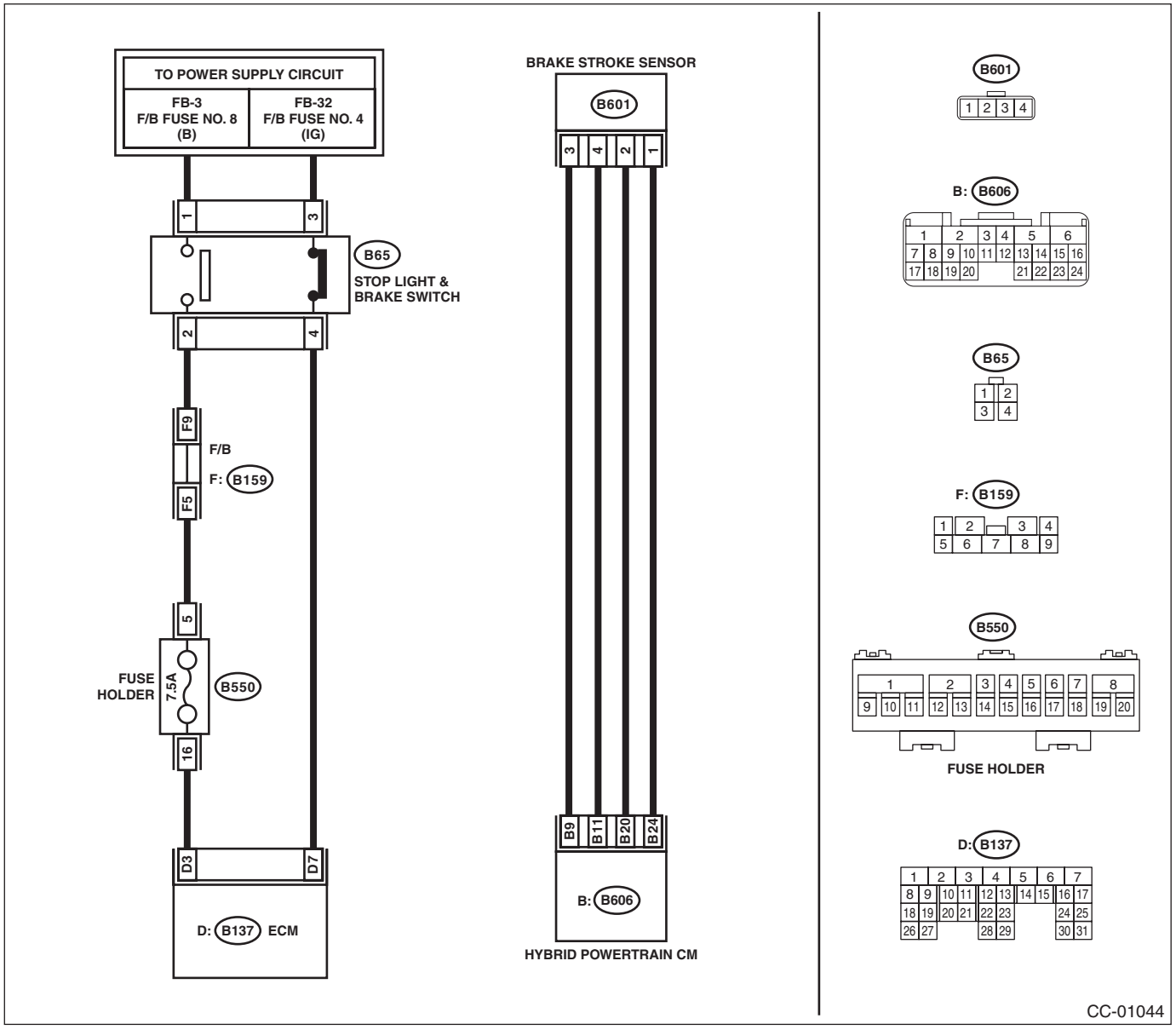
Detected when brake pedal is depressed or malfunction related to stop light & brake switch and brake stroke sensor occurs.

TROUBLE SYMPTOM:

- Cruise control cannot be set.
- Cruise control cannot be released.

WIRING DIAGRAM:

Cruise control system <Ref. to WI(HEV)-78, WIRING DIAGRAM, Cruise Control System.>
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK BRAKE STROKE SENSOR.** Check the brake stroke sensor. (Check the hybrid system.) <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Perform the inspection according to the diagnosis for hybrid system.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK STOP LIGHT & BRAKE SWITCH.** Check the stop light & brake switch. <Ref. to CC-10, Stop Light & Brake Switch.>	Is the stop light & brake switch and installation position OK?	Go to step **3**.	Replace the stop light & brake switch. Or adjust the installation position.
3	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light & brake switch connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the stop light & brake switch connector and chassis ground. ***Connector & terminal*** ***(B65) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	• Check fuse No. 8 (in fuse & relay box). • Check for open or short in the harness between stop light & brake switch and fuse & relay box.
4	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** Measure the voltage between the stop light & brake switch connector and chassis ground. ***Connector & terminal*** ***(B65) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	• Check fuse No. 4 (in fuse & relay box). • Check for open or short in the harness between stop light & brake switch and fuse & relay box.
5	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance between the ECM connector and stop light & brake switch connector. ***Connector & terminal*** ***(B137) No. 7 — (B65) No. 4:*** ***(B137) No. 3 — (B65) No. 2:***	Is the resistance less than 10 Ω?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Repair the harness.

C: 14

Detected when select lever is set in the neutral position, or when malfunction related to neutral position switch occurs.

TROUBLE SYMPTOM:

Cruise control cannot be set.

For diagnostic procedures, check the hybrid system. <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

D: 15

Detected when CANCEL switch is pressed or malfunction related to CRUISE switch occurs.

TROUBLE SYMPTOM:

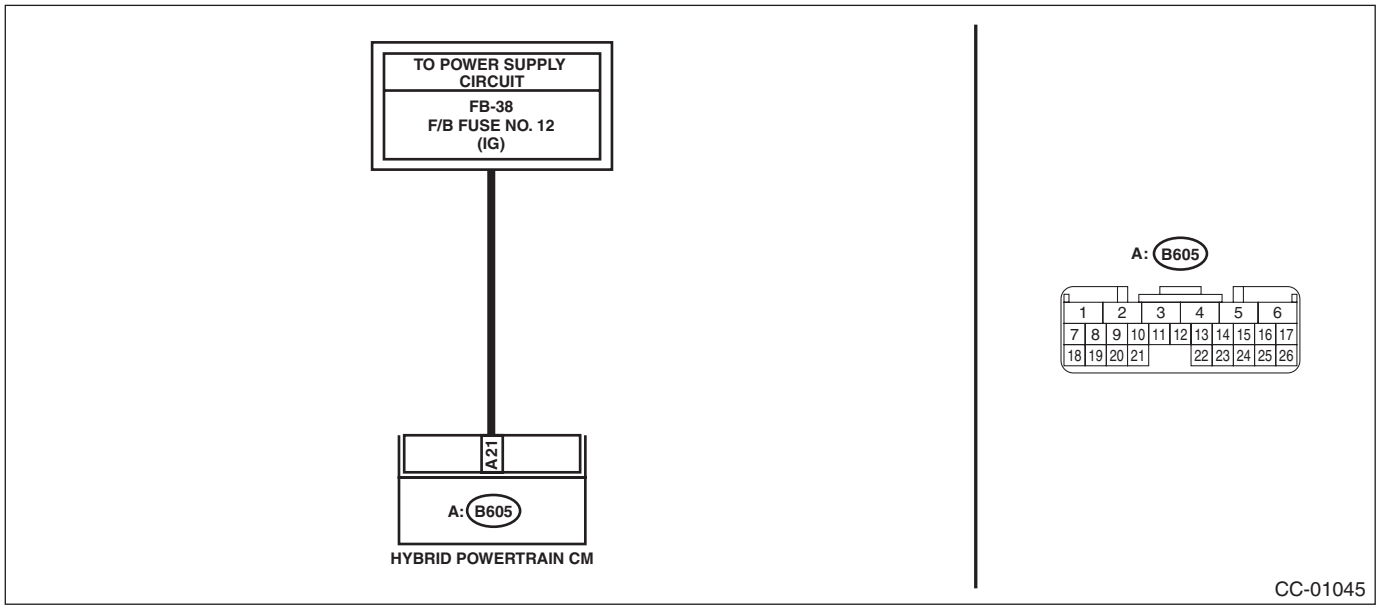
- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

Refer to DTC 11 for diagnostic procedure.

<Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>

E: 16

Detected when ignition switch is turned to OFF or malfunction related to the ignition switch occurs.
TROUBLE SYMPTOM:
Cruise control cannot be set.
WIRING DIAGRAM:
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK IGNITION SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the hybrid powertrain CM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the hybrid powertrain CM connector and chassis ground. ***Connector & terminal*** ***(B605) No. 21 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Check the hybrid powertrain CM connector for poor contact.	• Check fuse No. 12 (in fuse & relay box). • Check the harness for open or short circuit between ignition switch and hybrid powertrain CM.

F: 22

Malfunction related to vehicle speed sensor is detected.
DIAGNOSIS:
Open or shorted circuit in vehicle speed sensor system.
TROUBLE SYMPTOM:
Cruise control cannot be set. (Cancelled immediately.)

	Step	Check	Yes	No
1	**CHECK ABS OR VDC WARNING LIGHT.** 1) Turn the ignition switch to ON. 2) After the initial operation of combination meter is completed, check if ABS or VDC warning light continues to illuminate.	Does the warning light continue to illuminate?	Check the VDCCM. <Ref. to VDC(diag)-2, Basic Diagnostic Procedure.>	Go to step **2**.
2	**CHECK DTC OF LAN COMMUNICATION CIRCUIT.** Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform inspection according to DTC.	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>

G: 24

Malfunction in cruise control-related switch is detected.
TROUBLE SYMPTOM:
- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

Refer to DTC 11 for diagnostic procedure.
<Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>

H: 31

Engine speed signal malfunction is detected.
Abnormal increase of engine speed is detected.
Gear is placed in 1st or Reverse position.
After driving at the 2nd gear position or higher, perform the cruise setting again. If a cancel code is not detected, it is normal.

I: 32

Detected when the vehicle speed is out of the system controllable range.
Increase vehicle speed high enough to allow the cruise control to function, and then perform setting operation again.
If cancel code is still detected after setting cruise again, perform the diagnosis for DTC 22.
Refer to DTC 22 for diagnostic procedure.
<Ref. to CC(HEV)(diag)-20, 22, Diagnostic Procedure with Cancel Code.>

J: 34

The vehicle has been driven at a speed higher than set speed for a long time (approximately 10 minutes) during cruise driving.
Perform the cruise control setting operation again. If the cancel code is not detected, it is normal.

K: 35

Detected when it is impossible to perform the vehicle speed feedback.
Set vehicle speed cannot be kept for some reasons (steep uphill, unreleased parking brake, etc.) during cruise driving.
Cancel code is detected when driving condition is not suitable for cruise control.
Perform cruise set operation again after clearing the possible cause.

L: 41

VDC/TCS has operated.
Vehicle dynamics control (VDC) or TCS is operated during cruise driving or cruise setting.
<Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

M: 43

- The situation that some or all functions for ABS/VDC can not work is detected.

During cruise driving or cruise setting, the situation that some or all functions for ABS/VDC can not work is detected. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

- CRUISE indicator does not illuminate even though you pressed the CRUISE switch before starting the engine.

Detected when the CRUISE switch is pressed during the initial diagnosis of ABS/VDC.
It is normal if the CRUISE indicator illuminates when you press the CRUISE switch again after starting the engine and confirming that the initial illumination of the ABS/VDC warning light has been ended.

N: 44

Body integrated unit malfunction is detected.
Body integrated unit system malfunction is detected during cruise driving or cruise setting.
<Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

O: 45

Combination meter malfunction is detected.
Combination meter malfunction is detected during cruise driving or cruise setting.
<Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

P: 49

Automatic transmission malfunction is detected.
Automatic transmission malfunction is detected during cruise driving or cruise control setting.
<Ref. to CVT(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

Q: 50

Hybrid system malfunction is detected.
Hybrid system malfunction is detected during cruise driving or cruise setting.
<Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

R: 61

Malfunction in the stop light & brake switch is detected.
TROUBLE SYMPTOM:

- Cruise control cannot be set.
- Cruise control cannot be released.

Refer to DTC 12 for diagnostic procedure.
<Ref. to CC(HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.>

S: 63

Malfunction of vehicle speed signal variation is detected.
TROUBLE SYMPTOM:
Cruise control cannot be set. (Cancelled immediately.)
Refer to DTC 22 for diagnostic procedure.
<Ref. to CC(HEV)(diag)-20, 22, Diagnostic Procedure with Cancel Code.>

NOTE:
When the vehicle was suddenly accelerated on low μ road surface while VDC is OFF, this cancel code may be stored. In this case, restart the engine and perform the cruise control setting operation again. If the cancel code is not detected, it is normal.

T: 64

Malfunction related to engine is detected.
Refer to the Engine Diagnostic Procedure for diagnostic procedure.
<Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

U: 65

Cruise control command switch malfunction is detected.
While the command switch is pressed ON for a long time (approximately two minutes), stuck ON condition is detected.
TROUBLE SYMPTOM:
- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

Refer to DTC 11 for diagnostic procedure.
<Ref. to CC(HEV)(diag)-15, 11, Diagnostic Procedure with Cancel Code.>

IMMOBILIZER (DIAGNOSTICS)

IM(diag)

Page

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2. General Description 4
3. Electrical Component Location 6
4. Immobilizer Control Module I/O Signal 7
5. Subaru Select Monitor 8
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7. Clear Memory Mode 10
8. Diagnostics Chart for Security Indicator Light 11
9. List of Diagnostic Trouble Code (DTC) 14
10. Diagnostic Procedure with Diagnostic Trouble Code (DTC) 16

1. Basic Diagnostic Procedure

A: PROCEDURE

1. MODEL WITHOUT KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM

CAUTION:
When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CONFIRM NUMBER OF REGISTERED IMMOBILIZER KEY.** Confirm the number of registered immobilizer key. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is the number of registration 0?	Register the immobilizer system.	Go to step **2**.
2	**CHECK SECURITY INDICATOR LIGHT.** 1) Remove the ignition key from ignition switch. 2) Wait at least 60 seconds.	Does the security indicator light blink?	Go to step **3**.	Check the security indicator light circuit. <Ref. to IM(diag)-11, CHECK SECURITY INDICATOR LIGHT CIRCUIT, INSPECTION, Diagnostics Chart for Security Indicator Light.>
3	**CHECK KEY SWITCH.** Insert the ignition key in the ignition switch. (OFF or ACC)	Does the security indicator light remain blinking?	Check the key switch circuit. <Ref. to IM(diag)-13, CHECK KEY SWITCH CIRCUIT, INSPECTION, Diagnostics Chart for Security Indicator Light.>	Go to step **4**.
4	**CHECK SECURITY INDICATOR LIGHT.** Check the security indicator light status in the condition of step 3.	Does the security indicator light go off?	Go to step **7**.	Go to step **5**.
5	**CHECK SECURITY INDICATOR LIGHT.** Turn the ignition switch to ON.	Does the security indicator light go off?	Go to step **7**.	Go to step **6**.
6	**CHECK ENGINE START.** Turn the ignition switch to START.	Does the starter operate?	Check the LAN communication system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **8**.
7	**CHECK ENGINE START.** Turn the ignition switch to START.	Does the engine start?	Immobilizer system is normal.	Go to step **9**.
8	**CHECK DTC.** Read the DTC of body integrated unit and ECM and time stamp using Subaru Select Monitor. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).> NOTE: For time stamp, refer to "LAN SYSTEM". <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Is the DTC displayed on screen?	Go to step **10**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

Step		Check	Yes	No
9	**CHECK DTC.** Read the DTC of body integrated unit and ECM and time stamp using Subaru Select Monitor. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).> NOTE: For time stamp, refer to “LAN SYSTEM”. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Is the DTC displayed on screen?	Go to step **10**.	Perform the diagnosis for engine system. <Ref. to EN(H4DO w/o HEV)(diag)-75, PROCEDURE, Diagnostics for Engine Starting Failure.>
10	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, check the Freeze Frame Data.	Are the data recorded?	Record the data. Go to step **11**.	Go to step **11**.
11	**CHECK DTC.** Check the displayed DTC.	Are DTCs irrelevant to the immobilizer displayed?	Perform the diagnosis according to DTCs irrelevant to the immobilizer first.	Go to step **12**.
12	**PERFORM DIAGNOSIS.** 1) Inspect using the “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to IM(diag)-16, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> 2) Repair the trouble cause. 3) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 4) Read DTCs again. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is the DTC displayed on screen?	Inspect using the “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to IM(diag)-16, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

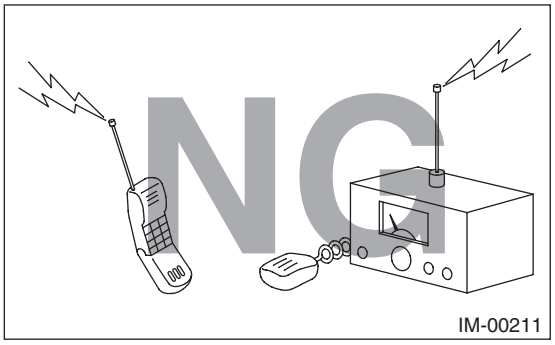
2. MODEL WITH KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM

NOTE:
For immobilizer diagnosis of model with the keyless access with push button start system, refer to “Keyless Access with Push Button Start System”. <Ref. to KPS(diag)-2, Basic Diagnostic Procedure.>

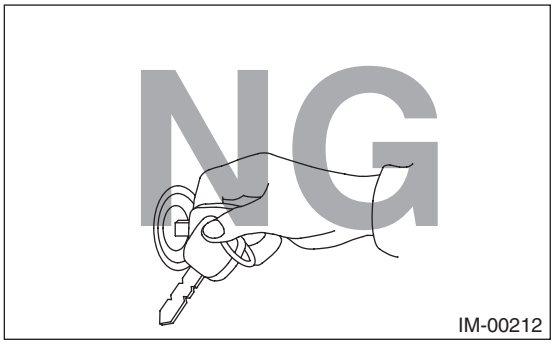
2. General Description

A: CAUTION

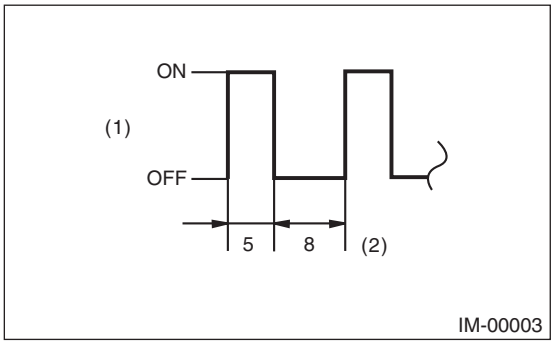
CAUTION:
• Do not use the electrical test equipment on the airbag system wiring harnesses and connector circuits.
• Be careful not to damage the airbag system wiring harness.
• While diagnostic items are being checked, do not operate radios, portable telephones, etc. which emit electromagnetic waves near or inside the vehicle.



• When turning the ignition switch to ON or OFF while diagnostic items are being checked, do not allow keys with different ID codes close to the ignition switch. If the ignition key is on a key holder, remove it from the key holder before performing diagnoses.



• When repeatedly turning the ignition switch to ON or OFF while diagnostic items are being checked, it should be switched in cycles of "ON" for at least 5 seconds → "OFF" for at least 8 seconds.



(1) Ignition switch position
(2) Sec.

• If the engine fails to start with a registered ignition key, detach the ignition key from ignition switch and wait for approx. 1 second until security indicator light begins to flash. And then start the engine again.
• Before performing the diagnostics, obtain all keys for the vehicle from the owner.
• Do not register a body integrated unit already registered to another vehicle to diagnose failures or inspect functions.

B: PREPARATION TOOL

1. SPECIAL TOOL

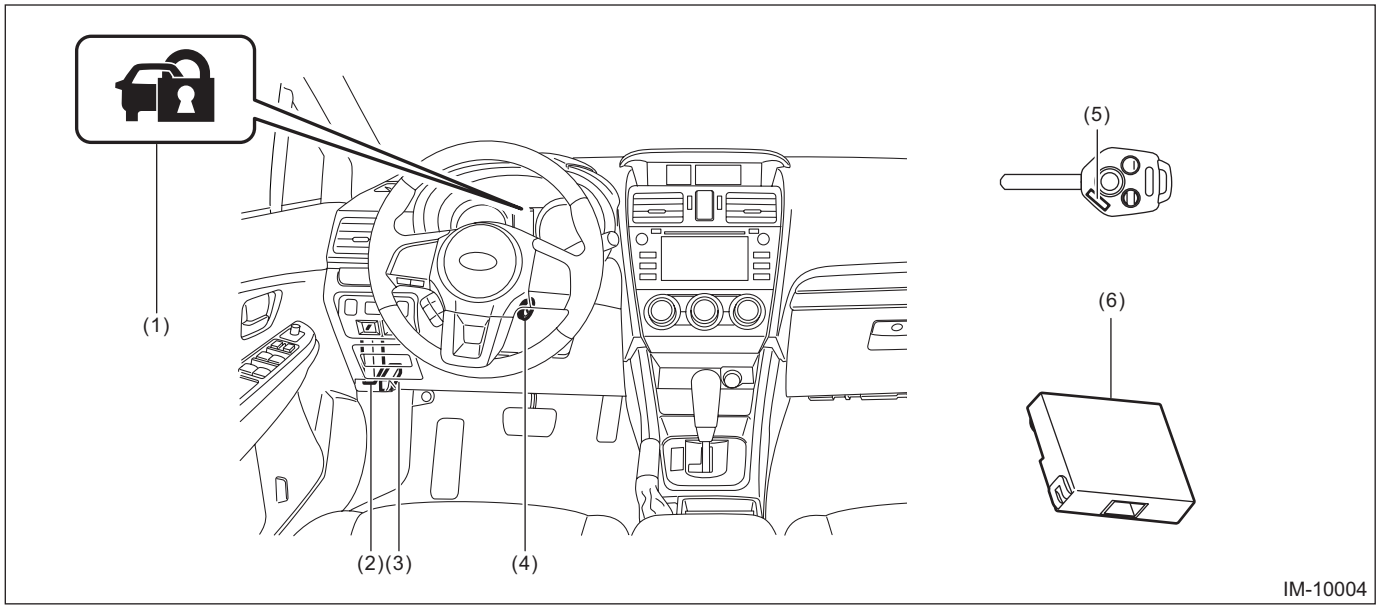
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

3. Electrical Component Location

A: LOCATION



(1) Security indicator light (LED bulb)
(2) Body integrated unit
(3) Data link connector
(4) Antenna
(5) Transponder
(6) Security control module (for C5 model only)

4. Immobilizer Control Module I/O Signal

A: WIRING DIAGRAM

1. IMMOBILIZER

Refer to “Immobilizer System” in the wiring diagram. <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.>

5. Subaru Select Monitor

A: OPERATION

1. HOW TO USE THE SUBARU SELECT MONITOR

For detailed operation procedures, refer to “Application help”.

2. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE AND BODY INTEGRATED UNIT

Refer to “Read Diagnostic Trouble Code (DTC)” for information about how to indicate DTC. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>

NOTE:
If a problem is detected, repair the trouble cause. <Ref. to IM(diag)-19, DTC B1572 IMM CIRCUIT EXCEPT ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

6. Read Diagnostic Trouble Code (DTC)

A: OPERATION

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC). <Ref. to IM(diag)-14, List of Diagnostic Trouble Code (DTC).>

1. ECM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then select «Enter».
5) On «Engine Control System» display, select «DTC».

2. BODY INTEGRATED UNIT

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Body Control» display, select «DTC».

7. Clear Memory Mode

A: OPERATION

NOTE:
For detailed operation procedures, refer to “Application help”.

1. ECM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Engine Control System» and then select «Enter».
5) On «Engine Control System» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.

2. BODY INTEGRATED UNIT

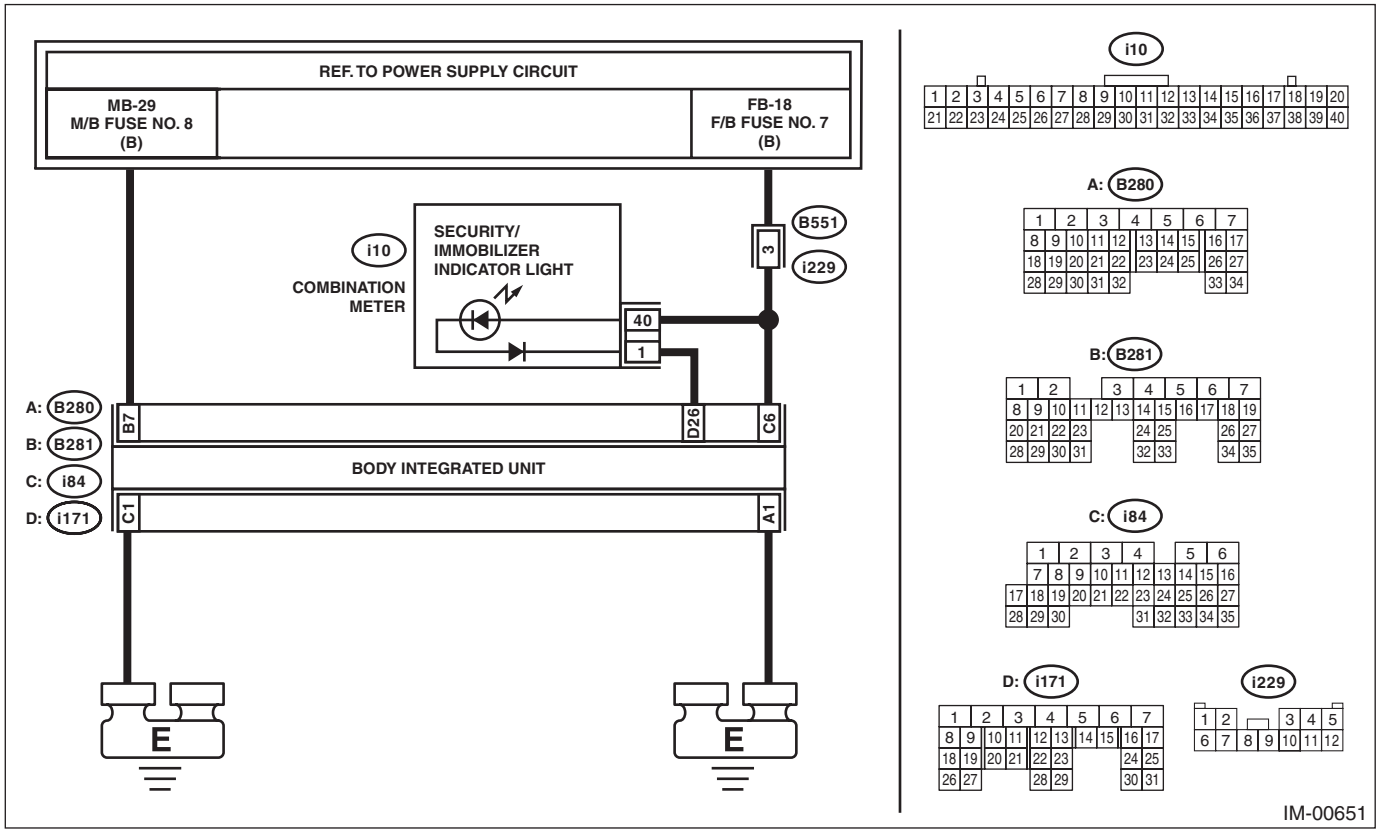
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Body Control» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

8. Diagnostics Chart for Security Indicator Light

A: INSPECTION

1. CHECK SECURITY INDICATOR LIGHT CIRCUIT

CAUTION:
When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.>



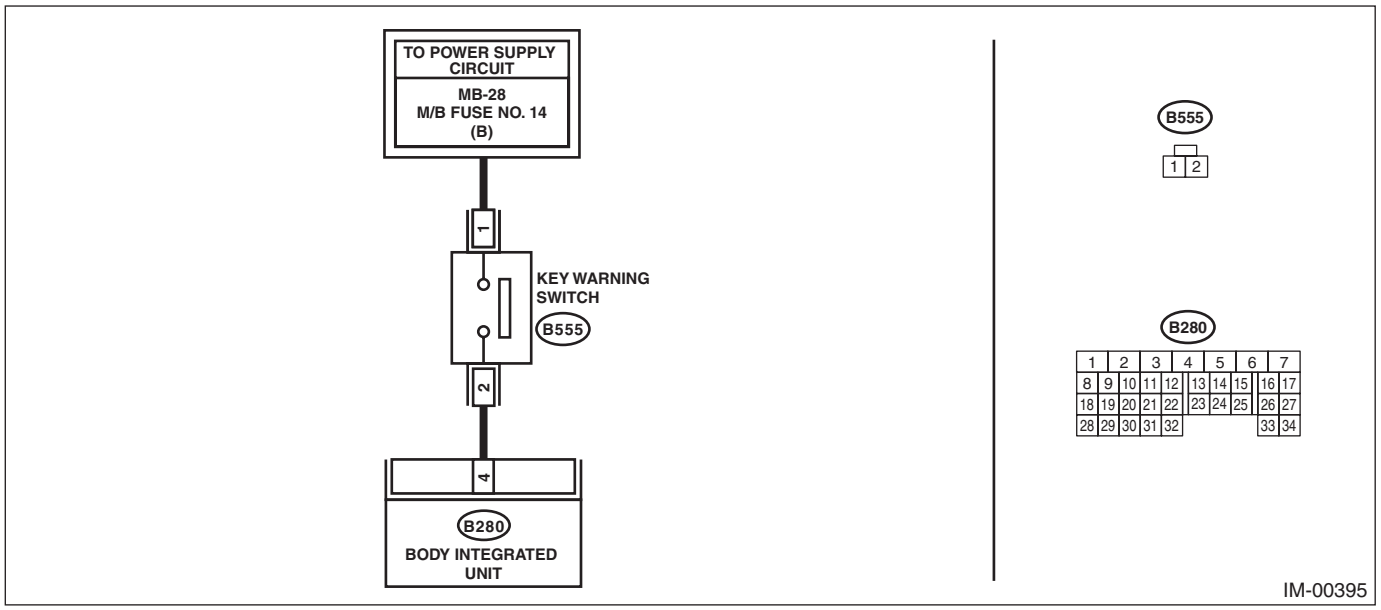
Step		Check	Yes	No
1	**CHECK FUSE.** 1) Remove the ignition key from ignition switch. Or, turn off the power. 2) Check the fuse (M/B No. 8).	Is the fuse OK?	Go to step **2**.	Replace the fuse. If the replaced fuse blows out easily, repair the short circuit in the harness between the fuse and body integrated unit.
2	**CHECK SECURITY INDICATOR LIGHT.** 1) Disconnect the connector from body integrated unit. 2) Connect the resistor (100 Ω) between the body integrated unit connector terminal (i171) No. 26 and chassis ground.	Does the security indicator light illuminate?	Go to step **3**.	Go to step **5**.

Diagnostics Chart for Security Indicator Light

	Step	Check	Yes	No
3	**CHECK BODY INTEGRATED UNIT GROUND CIRCUIT (OPEN CIRCUIT).** Measure the resistance between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(B280) No. 1 — Chassis ground:*** ***(i84) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair the open circuit of the body integrated unit ground circuit.
4	**CHECK BODY INTEGRATED UNIT POWER SUPPLY CIRCUIT.** Measure the voltage between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(B281) No. 7 (+) — Chassis ground (–):*** ***(i84) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Check the harness for open or short circuit between body integrated unit and fuse.
5	**CHECK COMBINATION METER CIRCUIT.** 1) Remove the combination meter. <Ref. to IDI-19, Combination Meter.> 2) Measure the voltage between combination meter connector terminal and chassis ground. ***Connector & terminal*** ***(i10) No. 40 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Check for an open or short circuit in the harness between the combination meter and fuse.
6	**CHECK COMBINATION METER CIRCUIT (OPEN).** Measure the resistance between the body integrated unit connector terminal and combination meter connector terminal. ***Connector & terminal*** ***(i171) No. 26 — (i10) No. 1:***	Is the resistance less than 10 Ω?	LED bulb is defective. Replace the combination meter case assembly. <Ref. to IDI-21, DISASSEMBLY, Combination Meter.>	Repair the harness or connector.

2. CHECK KEY SWITCH CIRCUIT

CAUTION:
When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.>



Step		Check	Yes	No
1	**CHECK POWER SUPPLY CIRCUIT.** 1) Disconnect the connector from key warning switch. 2) Measure the voltage between key warning switch connector terminal and chassis ground. ***Connector & terminal*** ***(B555) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Check the harness for an open or short between the key warning switch and fuse.
2	**CHECK KEY WARNING SWITCH.** 1) Insert the ignition key in the ignition switch. (OFF or ACC) 2) Measure the resistance between key warning switch connector terminals. ***Connector & terminal*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Replace the key warning switch. <Ref. to SL-67, Key Lock Cylinders.>
3	**CHECK KEY WARNING SWITCH.** 1) Remove the ignition key from ignition switch. 2) Measure the resistance between key warning switch connector terminals. ***Connector & terminal*** ***No. 1 — No. 2:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the key warning switch. <Ref. to SL-67, Key Lock Cylinders.>
4	**CHECK HARNESS BETWEEN KEY WARNING SWITCH AND BODY INTEGRATED UNIT (OPEN).** 1) Disconnect the connector from body integrated unit. 2) Measure the resistance between key warning switch connector terminal and body integrated unit connector terminal. ***Connector & terminal*** ***(B555) No. 2 — (B280) No. 4:***	Is the resistance less than 10 Ω?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair the harness between key warning switch and body integrated unit.

9. List of Diagnostic Trouble Code (DTC)

A: LIST

NOTE:
If DTCs irrelevant to the immobilizer are detected, perform diagnosis according to the DTCs irrelevant to the immobilizer first.

1. ECM

DTC	Item	Contents of diagnosis	Index No.
B1570	ANTENNA	Faulty antenna	<Ref. to IM(diag)-16, DTC B1570 ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1571	REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM)	Reference code incompatibility between body integrated unit and ECM	<Ref. to IM(diag)-18, DTC B1571 REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1572	IMM CIRCUIT EXCEPT ANTENNA CIRCUIT	Communication failure between body integrated unit and ECM	<Ref. to IM(diag)-19, DTC B1572 IMM CIRCUIT EXCEPT ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1574	KEY COMMUNICATION	Communication failure between key and body integrated unit	<Ref. to IM(diag)-22, DTC B1574 KEY COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1575	INCORRECT IMMOBILIZER KEY	Incorrect immobilizer key (use of unregistered key in body integrated unit)	<Ref. to IM(diag)-23, DTC B1575 INCORRECT IMMOBILIZER KEY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1576	EGI CONTROL MODULE EEPROM	ECM malfunctioning	<Ref. to IM(diag)-23, DTC B1576 EGI CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1577	IMM CONTROL MODULE EEPROM	Body integrated unit malfunctioning	<Ref. to IM(diag)-24, DTC B1577 IMM CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1578	METER	Except for C5 model • Reference code incompatibility between combination meter and body integrated unit • Communication failure between body integrated unit and ECM	<Ref. to IM(diag)-24, DTC B1578 METER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
		C5 model • Reference code incompatibility between body integrated unit and security control module • Communication failure between body integrated unit and ECM	

2. BODY INTEGRATED UNIT

DTC	Item	Contents of diagnosis	Index No.	Relation between ECM and DTC
B1401	METER COLLATION	Reference code incompatibility between combination meter and body integrated unit	<Ref. to IM(diag)-25, DTC B1401 METER COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	B1578
B1402	IMMOBILIZER KEY COLLATION	• Incorrect immobilizer key (use of unregistered key in body integrated unit) • Faulty antenna • Communication failure between key and body integrated unit	<Ref. to IM(diag)-25, DTC B1402 IMMOBILIZER KEY COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	• B1575 • B1570 • B1574
B1405	SCU COLLATION	Reference code incompatibility between body integrated unit and security control module	<Ref. to IM(diag)-26, DTC B1405 SCU COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	B1578
B1406	SCU_EEPROM	Malfunction of security control module	<Ref. to IM(diag)-26, DTC B1406 SCU_EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	B1578
B1407	MET COMMUNICATION	Communication failure between body integrated unit and combination meter	<Ref. to IM(diag)-27, DTC B1407 MET COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	B1578
B1408	METER NON-VOLATILE MEMORY	Combination meter malfunction	<Ref. to IM(diag)-27, DTC B1408 METER NON-VOLATILE MEMORY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	B1578
B1409	SCU COMMUNICATION	Communication failure between body integrated unit and security control module	<Ref. to IM(diag)-28, DTC B1409 SCU COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	B1578
B1410	TRANSPONDER COMMUNICATION	Communication failure between key and body integrated unit	<Ref. to IM(diag)-30, DTC B1410 TRANSPONDER COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	B1574
B1411	IMMOBILIZER ANTENNA	Faulty antenna	<Ref. to IM(diag)-30, DTC B1411 IMMOBILIZER ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	B1570

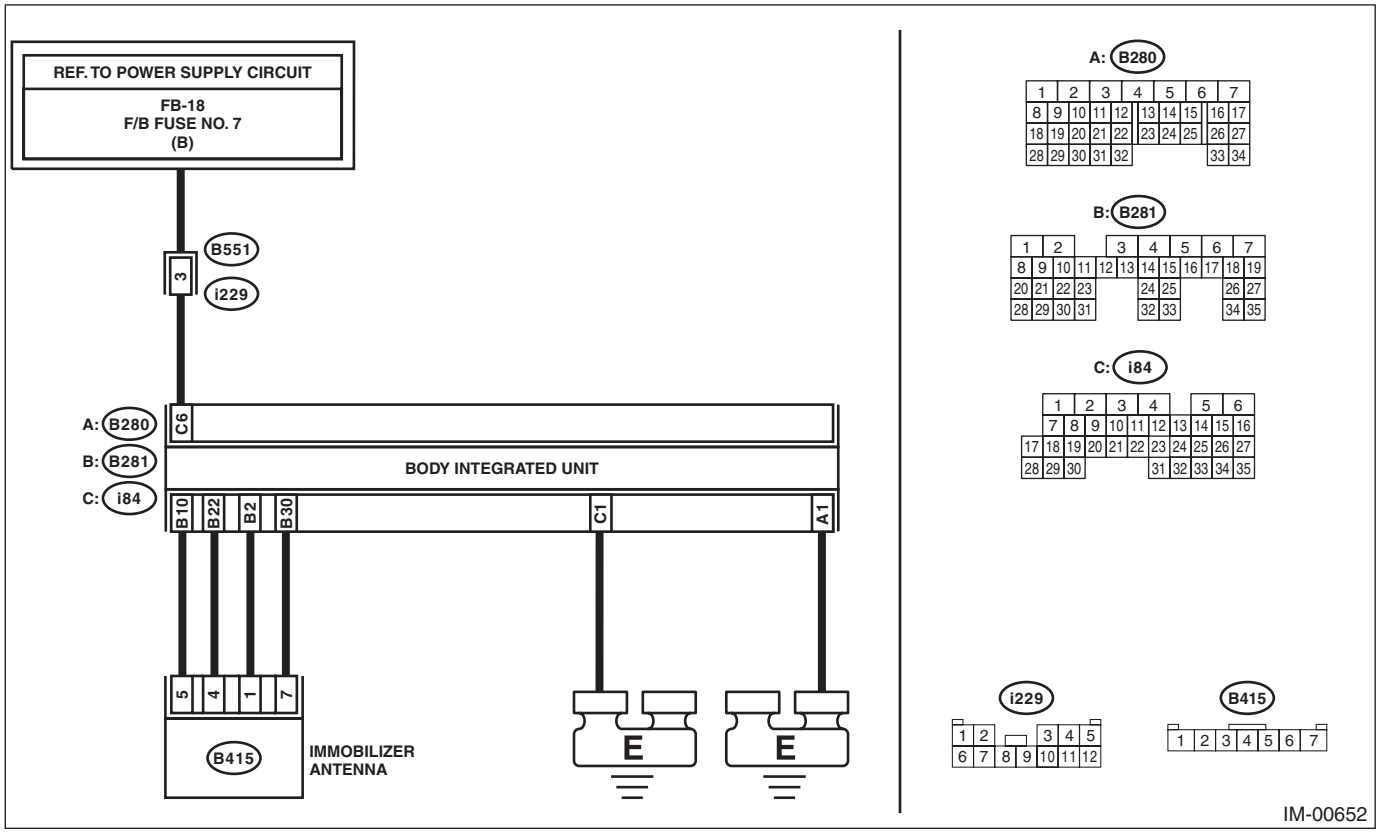
NOTE:
The starter relay control is performed in immobilizer system. When the body integrated unit detects a nonconformity of reference code, it immediately outputs a starter relay cut signal to ECM, and then ECM stops the starter relay operation. In this case, engine does not start, and DTC is not recorded in ECM. Check that the engine does not start on the DTC of body integrated unit.

10.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC B1570 ANTENNA

DTC DETECTING CONDITION:
Faulty antenna

CAUTION:
When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.>



Step		Check	Yes	No
1	**CHECK BODY INTEGRATED UNIT POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from body integrated unit. 3) Measure the voltage between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(i84) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Check the harness for open or short circuit between body integrated unit and fuse.
2	**CHECK BODY INTEGRATED UNIT GROUND CIRCUIT (OPEN CIRCUIT).** Measure the resistance between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(B280) No. 1 — Chassis ground:*** ***(i84) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair the open circuit of the body integrated unit ground circuit.

	Step	Check	Yes	No
3	**CHECK ANTENNA POWER SUPPLY CIRCUIT.** 1) Connect the connector to body integrated unit. 2) Disconnect the connector from the antenna. 3) Insert the ignition key into the key cylinder, then measure the voltage between the antenna connector terminal and the chassis ground. ***Connector & terminal*** ***(B415) No. 1 (+) — Chassis ground (–):***	Is the voltage 5±0.5 V approx. 200 ms after inserting the ignition key into the key cylinder? And then, does the voltage return to 0 V within 2 s?	Go to step **5**.	Go to step **4**.
4	**CHECK ANTENNA POWER SUPPLY CIRCUIT (OPEN).** 1) Disconnect the connector from body integrated unit. 2) Measure the resistance of body integrated unit connector terminal and antenna connector terminal. ***Connector & terminal*** ***(B281) No. 2 — (B415) No. 1:***	Is the resistance less than 10 Ω?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair the harness or connector between body integrated unit and antenna.
5	**CHECK ANTENNA GROUND CIRCUIT (SHORT CIRCUIT TO GROUND).** Measure the resistance between antenna connector terminal and chassis ground. ***Connector & terminal*** ***(B417) No. 7 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **7**.	Go to step **6**.
6	**CHECK ANTENNA GROUND CIRCUIT (OPEN).** 1) Disconnect the connector from body integrated unit. 2) Measure the resistance between antenna connector terminal and chassis ground. ***Connector & terminal*** ***(B281) No. 30 — (B415) No. 7:***	Is the resistance less than 10 Ω?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair the harness or connector between body integrated unit and antenna.
7	**CHECK ANTENNA COMMUNICATION CIRCUIT (OPEN).** Measure the resistance of body integrated unit connector terminal and antenna connector terminal. ***Connector & terminal*** ***(B281) No. 10 — (B415) No. 5:*** ***(B281) No. 22 — (B415) No. 4:***	Is the resistance less than 10 Ω?	Go to step **8**.	Repair the harness or connector between body integrated unit and antenna.
8	**CHECK ANTENNA.** 1) Replace the immobilizer antenna. <Ref. to SL-88, Immobilizer Antenna.> 2) Insert the ignition key in the ignition switch. (OFF or ACC) 3) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 4) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC B1411 detected?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Antenna has a failure.

B: DTC B1571 REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM)

DTC DETECTING CONDITION:
Reference code incompatibility between body integrated unit and ECM

CAUTION:
When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CONFIRM NUMBER OF REGISTERED IMMOBILIZER KEY.** Confirm the number of registered immobilizer key. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is the number of registration 0?	Go to step **2**.	Go to step **3**.
2	**PERFORM IMMOBILIZER SYSTEM REGISTRATION.** Register the immobilizer system. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Finish the diagnosis.	Go to step **4**.
3	**PERFORM ECM REGISTRATION.** Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Finish the diagnosis.	Go to step **4**.
4	**CHECK FOR ANY OTHER DTC ON DISPLAY.** 1) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 2) Read the DTC of the ECM. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Go to step **5**.
5	**PERFORM ECM REGISTRATION.** 1) Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).> 2) Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Finish the diagnosis.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

C: DTC B1572 IMM CIRCUIT EXCEPT ANTENNA CIRCUIT

DTC DETECTING CONDITION:

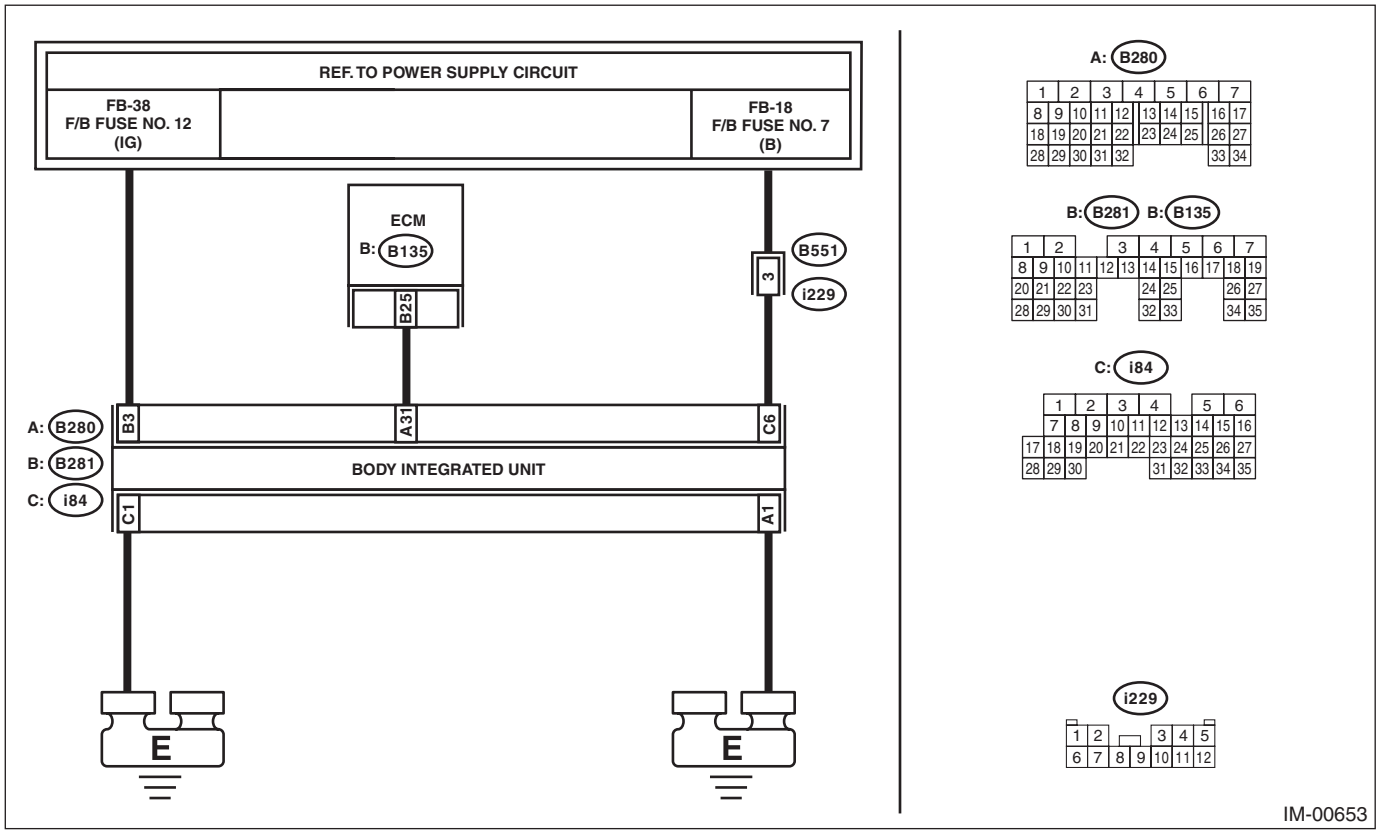
Communication failure between body integrated unit and ECM

CAUTION:

When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.>



Step		Check	Yes	No
1	**CHECK GROUNDING POINT.** Check the grounding point of the engine ground and chassis ground.	Are there any loose connections, any foreign objects caught in the ground lines or contact surface, or any fluid stains?	Remove the foreign matters, and tighten to the specified torque. Then start the engine, and check that the fault was removed. Check DTC <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>, and when DTC B1572 is still displayed, Go to step **2**.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse.	Is there any fault?	Replace the fuse. If the fuse blows out easily, repair the short circuit to power supply in harness between the battery and body integrated unit.	Go to step **3**.
3	**CHECK CURRENT DATA.** Confirm the current data «BATT voltage (control)» display of body integrated unit. <Ref. to BC(diag)-12, Read Current Data.>	Is the voltage 10 V or more?	Go to step **4**.	Go to step **5**.
4	**CHECK CURRENT DATA.** Check the current data «Voltage of IGN» display of body integrated unit. <Ref. to BC(diag)-12, Read Current Data.>	Is the voltage 10 V or more?	Go to step **7**.	Go to step **6**.
5	**CHECK BODY INTEGRATED UNIT BATTERY POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector. 3) Measure the voltage between body integrated unit connector and chassis ground. ***Connector & terminal*** ***(i84) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Repair the open or short circuit of harness between the body integrated unit connector and fuse.
6	**CHECK BODY INTEGRATED UNIT IGN POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. 2) Measure the voltage between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(B281) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **7**.	Repair the open or short circuit of harness between the body integrated unit connector and ignition switch.
7	**CHECK BODY INTEGRATED UNIT GROUND CIRCUIT (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between body integrated unit connector and chassis ground. ***Connector & terminal*** ***(B280) No. 1 — Chassis ground:*** ***(i84) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **8**.	Repair the open circuit of harness between the body integrated unit connector and chassis ground.
8	**CHECK GROUND CIRCUIT FOR ECM (OPEN CIRCUIT).** 1) Disconnect the ECM connector. 2) Measure the resistance between the ECM connector and engine ground. ***Connector & terminal*** ***(B134) No. 3 — Engine ground:*** ***(B134) No. 4 — Engine ground:*** ***(B136) No. 1 — Engine ground:*** ***(B136) No. 2 — Engine ground:*** ***(B136) No. 3 — Engine ground:***	Is the resistance less than 10 Ω?	Go to step **9**.	Repair the open circuit in harness between ECM connector and chassis ground.

	Step	Check	Yes	No
9	**CHECK HARNESS (OPEN CIRCUIT) BETWEEN BODY INTEGRATED UNIT AND ECM.** 1) Disconnect the ECM connector. 2) Measure the resistance between the body integrated unit connector and ECM. ***Connector & terminal*** ***(B280) No. 31 — (B135) No. 25:***	Is the resistance less than 10 Ω?	Go to step **10**.	Repair the open circuit of harness between the body integrated unit connector and ECM.
10	**CHECK COMMUNICATION LINE HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Disconnect the body integrated unit connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and engine ground. ***Connector & terminal*** ***(B135) No. 25 (+) — Engine ground (–):***	Is the voltage 6 V or more?	Repair the short circuit to power supply in harness between body integrated unit connector and ECM connector.	Go to step **11**.
11	**CHECK COMMUNICATION CIRCUIT HARNESS (SHORT CIRCUIT TO GROUND).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between the ECM connector and engine ground. ***Connector & terminal*** ***(B135) No. 25 — Engine ground:***	Is the resistance less than 10 Ω?	Repair the ground short circuit of harness between body integrated unit connector and ECM connector.	Go to step **12**.
12	**CHECK ECM.** 1) Replace the ECM. (Do not perform ECM registration.) <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).> 2) Connect all connectors. 3) Turn the ignition switch to ON. 4) Wait for 5 seconds. 5) Read DTC of engine. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC B1572 displayed?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Register the ECM. Refer to the “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume.

D: DTC B1574 KEY COMMUNICATION

DTC DETECTING CONDITION:
Communication failure between key and body integrated unit

CAUTION:
When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK IGNITION KEY.** 1) Remove the ignition key from the ignition switch. 2) Insert the ignition key into the ignition switch, and then turn the ignition switch to ON. 3) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 4) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC B1410 detected?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK IGNITION KEY.** 1) Prepare a spare ignition key that is already registered. 2) Insert the ignition key into the ignition switch, and then turn the ignition switch to ON. 3) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 4) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC B1410 detected?	Go to step **3**.	Ignition key unit was defective.
3	**CHECK IMMOBILIZER ANTENNA.** 1) Replace the immobilizer antenna. <Ref. to SL-88, Immobilizer Antenna.> 2) Insert the ignition key into the ignition switch, and then turn the ignition switch to ON. 3) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 4) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC B1410 detected?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Immobilizer antenna was defective.

E: DTC B1575 INCORRECT IMMOBILIZER KEY

DTC DETECTING CONDITION:
Incorrect immobilizer key (use of unregistered key in body integrated unit)

CAUTION:
When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CONFIRM NUMBER OF REGISTERED IGNITION KEY.** Using the Subaru Select Monitor, check the number of registered ignition keys. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is one or more ignition key(s) registered?	Go to step **2**.	Register the immobilizer.
2	**CHECK IGNITION KEY.** 1) Prepare another ignition key that is already registered. 2) Insert the ignition key in the ignition switch. 3) Turn the ignition switch to ON. 4) Read the DTC of the body integrated unit. Perform the procedure with all registered ignition keys.	Is DTC B1402 displayed for all ignition keys?	Refer to "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume, and perform the actions for the case that all keys are faulty/lost.	Ignition key unit was defective, or ignition key was not registered.

F: DTC B1576 EGI CONTROL MODULE EEPROM

DTC DETECTING CONDITION:
- ECM malfunctioning
- Failed to access ROM in ECM during key registration.

CAUTION:
When the ECM is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**PERFORM ECM REGISTRATION.** Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Finish the diagnosis.	Go to step **2**.
2	**PERFORM ECM REGISTRATION.** Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Finish the diagnosis.	Go to step **3**.
3	**PERFORM ECM REGISTRATION.** Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Finish the diagnosis.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>

G: DTC B1577 IMM CONTROL MODULE EEPROM

DTC DETECTING CONDITION:

- Body integrated unit malfunctioning
- Failed to access ROM inside the body integrated unit.

CAUTION:
When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**PERFORM ECM REGISTRATION.** Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Finish the diagnosis.	Go to step **2**.
2	**PERFORM ECM REGISTRATION.** 1) Perform the Clear Memory Mode. (ECM and body integrated unit) <Ref. to IM(diag)-10, Clear Memory Mode.> 2) Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

H: DTC B1578 METER

DTC DETECTING CONDITION:

- Except for C5 model

Reference code incompatibility between combination meter and body integrated unit or communication failure between body integrated unit and ECM

- C5 model

Reference code incompatibility between security control module and body integrated unit or communication failure between body integrated unit and ECM

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1401, B1405, B1406, B1407, B1408 or B1409 detected?	Perform the diagnosis according to the DTC.	<Ref. to IM(diag)-19, DTC B1572 IMM CIRCUIT EXCEPT ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

I: DTC B1401 METER COLLATION

DTC DETECTING CONDITION:
Reference code incompatibility between combination meter and body integrated unit

CAUTION:
When the combination meter is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1407 or B1408 detected?	Perform the diagnosis according to the DTC.	Go to step **2**.
2	**CHECK COMBINATION METER REGISTRATION.** Perform registration of combination meter. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Currently, it is normal. (Combination meter registration is not complete.)	Go to step **3**.
3	**CHECK DTC.** 1) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 2) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1407 or B1408 detected?	Perform the diagnosis according to the DTC.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

J: DTC B1402 IMMOBILIZER KEY COLLATION

DTC DETECTING CONDITION:
- Incorrect immobilizer key (use of unregistered key in body integrated unit)
- Faulty antenna
- Communication failure between key and body integrated unit

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1410 or B1411 detected?	Perform the diagnosis according to the DTC.	<Ref. to IM(diag)-23, DTC B1575 INCORRECT IMMOBILIZER KEY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

K: DTC B1405 SCU COLLATION

DTC DETECTING CONDITION:
Reference code incompatibility between security control module and body integrated unit

CAUTION:
When the security control module is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1406 or B1409 detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**PERFORM SECURITY CONTROL MODULE REGISTRATION.** Perform security control module registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is registration complete?	Currently, it is normal. (Security control module registration is not complete.)	Go to step **3**.
3	**CHECK DTC.** 1) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 2) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1406 or B1409 detected?	Perform the diagnosis according to DTC.	Replace the security control module. <Ref. to SL-73, Security Control Module.>

L: DTC B1406 SCU_EEPROM

DTC DETECTING CONDITION:
- Defective security control module
- ROM of security control module cannot be accessed

CAUTION:
When the security control module is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**PERFORM SECURITY CONTROL MODULE REGISTRATION.** 1) Perform security control module registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume. 2) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 3) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC B1406 detected?	Replace the security control module. <Ref. to SL-73, Security Control Module.>	Finish the diagnosis.

M: DTC B1407 MET COMMUNICATION

DTC DETECTING CONDITION:
Communication failure between body integrated unit and combination meter

CAUTION:
When the combination meter is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC of the body integrated unit except for DTC B1407 displayed?	Perform the diagnosis according to the DTC.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

N: DTC B1408 METER NON-VOLATILE MEMORY

DTC DETECTING CONDITION:
Defective combination meter

CAUTION:
When the combination meter is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK COMBINATION METER REGISTRATION.** 1) Perform the Clear Memory Mode. (Combination meter <Ref. to IDI(diag)-15, Clear Memory Mode.> and body integrated unit <Ref. to IM(diag)-10, Clear Memory Mode.>) 2) Perform registration of combination meter. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume. 3) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 4) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC B1408 detected?	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

O: DTC B1409 SCU COMMUNICATION

DTC DETECTING CONDITION:

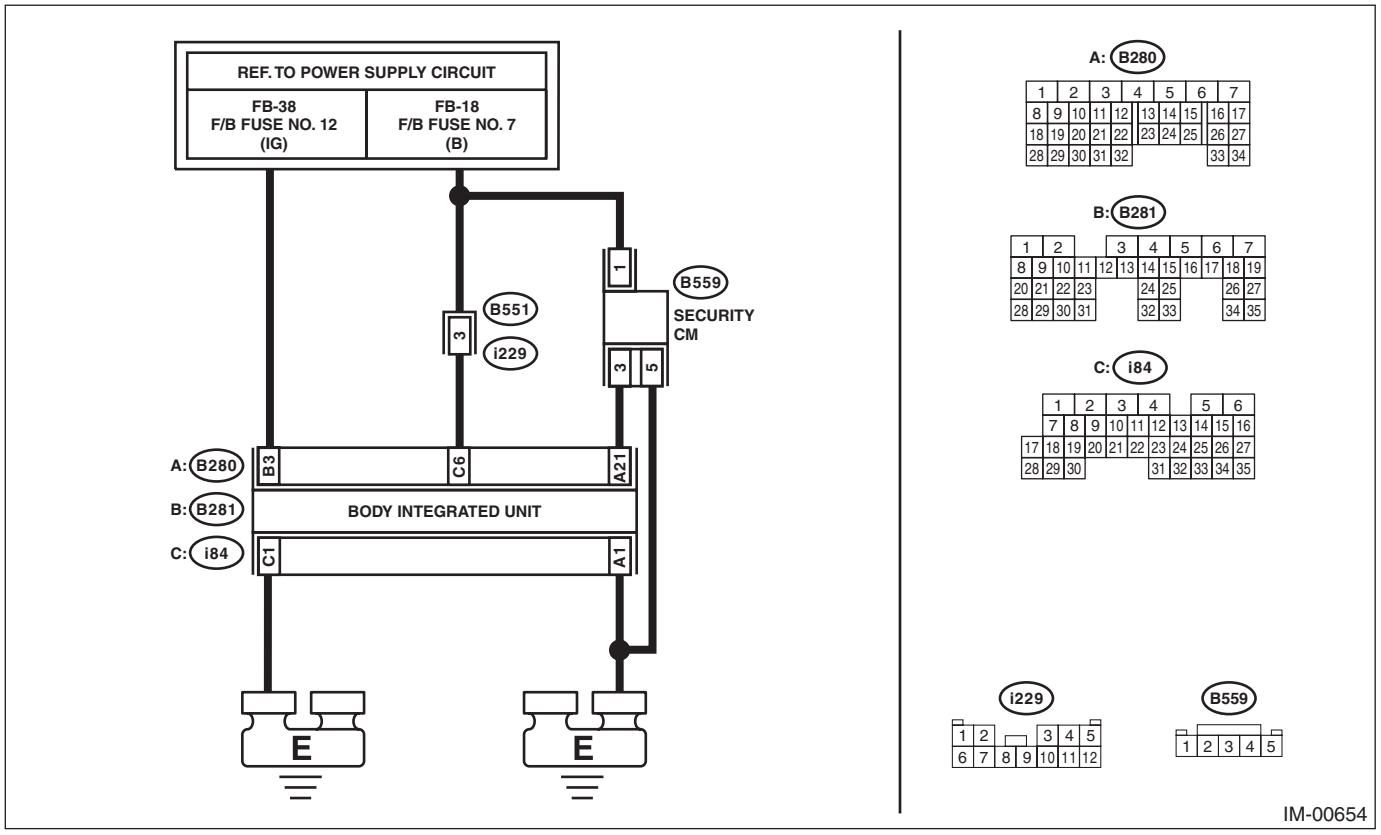
Communication failure between body integrated unit and security control module

CAUTION:

When the body integrated unit is replaced, registration of the immobilizer system is required. For details, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.>



Step		Check	Yes	No
1	**CHECK GROUNDING POINT.** Check the ground point of the chassis ground.	Are there any loose connections, any foreign objects caught in the ground lines or contact surface, or any fluid stains?	Remove the foreign matters, and tighten to the specified torque. Then start the engine, and check that the fault was removed. Check DTC <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>, and when DTC B1572 is still displayed, Go to step **2**.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK BODY INTEGRATED UNIT POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from body integrated unit. 3) Measure the voltage between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(i84) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Check the harness for open or short circuit between body integrated unit and fuse.
3	**CHECK BODY INTEGRATED UNIT POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. 2) Measure the voltage between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(B281) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Check the harness for open or short circuit between the body integrated unit and ignition switch.
4	**CHECK BODY INTEGRATED UNIT GROUND CIRCUIT (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(B280) No. 1 — Chassis ground:*** ***(i84) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair the open circuit of the body integrated unit ground circuit.
5	**CHECK SECURITY CONTROL MODULE POWER SUPPLY CIRCUIT.** 1) Disconnect the connector from the security control module. 2) Measure the power supply between security control module connector terminal and chassis ground. ***Connector & terminal*** ***(B559) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Check for an open or short circuit in the harness between security control module and fuse.
6	**CHECK SECURITY CONTROL MODULE GROUND CIRCUIT (OPEN).** Measure the resistance between security control module connector terminal and chassis ground. ***Connector & terminal*** ***(B559) No. 5 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair the open circuit of the security control module ground circuit.
7	**CHECK HARNESS (OPEN CIRCUIT) BETWEEN BODY INTEGRATED UNIT AND SECURITY CONTROL MODULE.** Measure the resistance between the body integrated unit connector terminal and security control module connector terminal. ***Connector & terminal*** ***(B280) No. 21 — (B559) No. 3:***	Is the resistance less than 10 Ω?	Go to step **8**.	Repair the harness between body integrated unit and security control module.
8	**CHECK COMMUNICATION LINE HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Measure the voltage between security control module connector terminal and chassis ground. ***Connector & terminal*** ***(B559) No. 3 (+) — Chassis ground (–):***	Is the voltage 6 V or more?	Repair the harness between body integrated unit and security control module.	Go to step **9**.

	Step	Check	Yes	No
9	**CHECK COMMUNICATION CIRCUIT HARNESS (SHORT CIRCUIT TO GROUND).** 1) Turn the ignition switch to OFF. 2) Measure the resistance between security control module connector terminal and chassis ground. ***Connector & terminal*** ***(B559) No. 3 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair the harness between body integrated unit and ECM.	Go to step **10**.
10	**CHECK SECURITY CONTROL MODULE.** 1) Replace the security control module. (Do not perform security control module registration.) 2) Turn the ignition switch to ON. 3) Perform the Clear Memory Mode. <Ref. to IM(diag)-10, Clear Memory Mode.> 4) Read the DTC of the body integrated unit. <Ref. to IM(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is DTC B1409 detected?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Security control module was defective. Perform security control module registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

P: DTC B1410 TRANSPONDER COMMUNICATION

NOTE:
Refer to DTC B1574 for diagnostic procedure. <Ref. to IM(diag)-22, DTC B1574 KEY COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Q: DTC B1411 IMMOBILIZER ANTENNA

NOTE:
Refer to DTC B1570 for diagnostic procedure. <Ref. to IM(diag)-16, DTC B1570 ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EyeSight

ES

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11.	VDC Control Module and Hydraulic Control Unit (VDCCM&H/U)	39
12.	Multi-function Display (MFD)	40
13.	Roll Connector	41
14.	Body Integrated Unit	42
15.	Diagnostics with Phenomenon	43

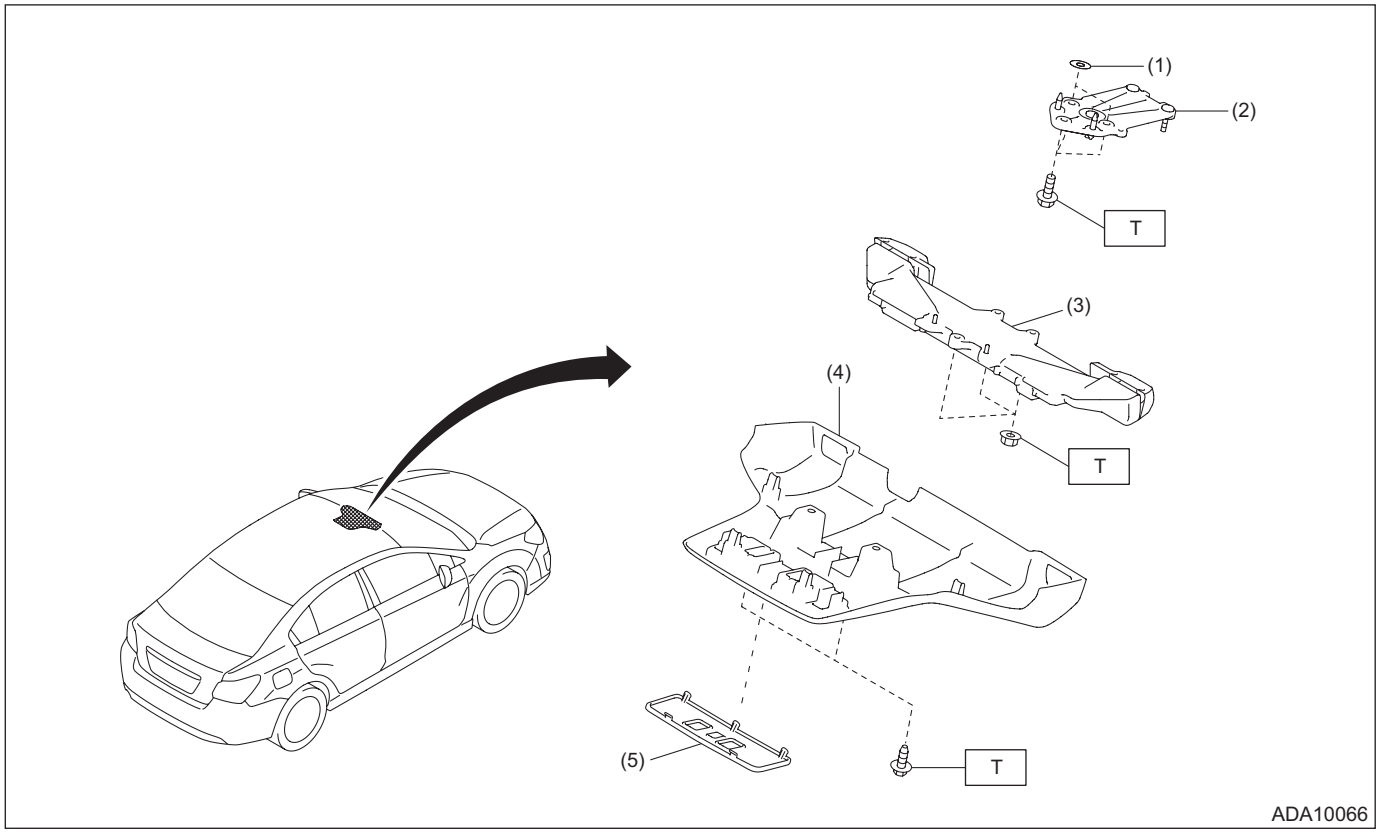
1. General Description

A: LOCATION

Refer to “LOCATION” of “EyeSight (DIAGNOSTICS)” section. <Ref. to ES(diag)-14, LOCATION, Electrical Component Location.>

B: COMPONENT

1. STEREO CAMERA



(1) Shim (washer)
(2) Camera plate
(3) Stereo camera
(4) Stereo camera cover ASSY
(5) Cap

Tightening torque: N·m (kgf-m, ft-lb)
T: 5.5±1.0 (0.56±0.10, 4.1±0.7)

C: CAUTION

• Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery. When replacing the electrical parts provided with memory functions that store contents specified by a customer, record the memory contents before disconnecting the battery ground cable.
• Be careful of the following items. Failing to do so may cause the airbag system malfunction.
  – Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. When using a tester on these circuits, follow the cautions of “AIRBAG SYSTEM”. <Ref. to AB-11, CAUTION, General Description.>
  – Be careful not to damage the airbag system wiring harness when servicing the electrical parts around the steering column.
• When removing, installing or replacing the VDCCM&H/U, VDCCM&H/U bracket, steering wheel or steering angle sensor (steering roll connector), perform the VDC setting mode. <Ref. to VDC-25, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
• If the damage is found in the glass repair prohibited area, always replace the glass. <Ref. to ES(diag)-7, WINDSHIELD GLASS AND DASHBOARD, INSPECTION, General Description.>
Damage in the prohibited area can affect the recognition of the stereo camera even if it is repaired, and thereby EyeSight function may not operate properly.

D: PREPARATION TOOL

1. SPECIAL TOOL

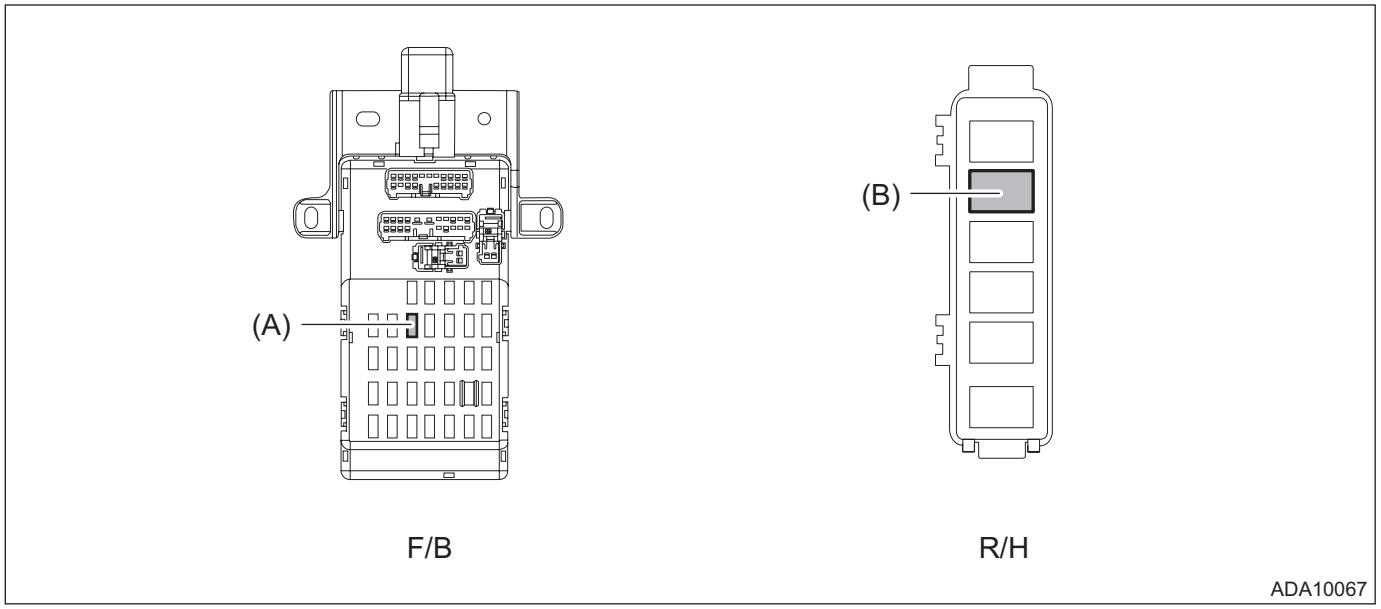
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST87599VA000	87599VA000	RANDOM CHART	Used for adjusting stereo camera.
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.
Measure (5 m (16 ft) or more)	Used for adjusting stereo camera.
Leveling line	
Plumb bob	
Packing tape	

2. Relay and Fuse

A: LOCATION



Relay & fuse box	Fuse 10 A (stop light and brake switch, brake light relay)	(A)
Relay holder	Brake light relay	(B)

NOTE:
For other related fuses, refer to the wiring diagram. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>

B: INSPECTION

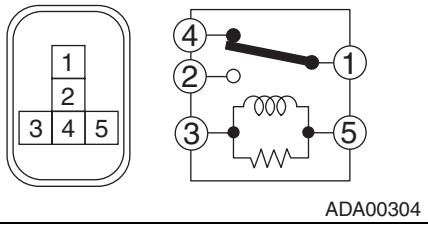
1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

2. CHECK RELAY

1) Measure the resistance between relay terminals.

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	
1 — 4	Always	Less than 1 Ω	
1 — 2	Apply battery voltage between terminals 3 and 5.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard value.

3. EyeSight System

A: WIRING DIAGRAM

Refer to “EyeSight System” in the wiring diagram. <Ref. to WI(w/o HEV)-130, WIRING DIAGRAM, EyeSight System.>

B: INSPECTION

Refer to “Basic Diagnostic Procedure” of “EyeSight (DIAGNOSTICS)” section. <Ref. to ES(diag)-2, Basic Diagnostic Procedure.>

C: NOTE

For procedure of each component in the EyeSight system, refer to the respective section.

- Control module: <Ref. to ES-6, Control Unit.>
- Stereo camera: <Ref. to ES-7, Stereo Camera.>
- Combination meter: <Ref. to ES-36, Combination Meter.>
- Transmission control module (TCM): <Ref. to ES-37, Transmission Control Module (TCM).>
- Stop light and brake switch: <Ref. to ES-38, Stop Light & Brake Switch.>
- VDC control module & hydraulic control unit (VDCCM&H/U): <Ref. to ES-39, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
- Multi-function display (MFD): <Ref. to ES-40, Multi-function Display (MFD).>
- Switches and harness: <Ref. to ES-33, Switches and Harness.>
- Roll connector (steering angle sensor): <Ref. to ES-41, Roll Connector.>
- Body integrated unit: <Ref. to ES-42, Body Integrated Unit.>

4. Control Unit

A: NOTE

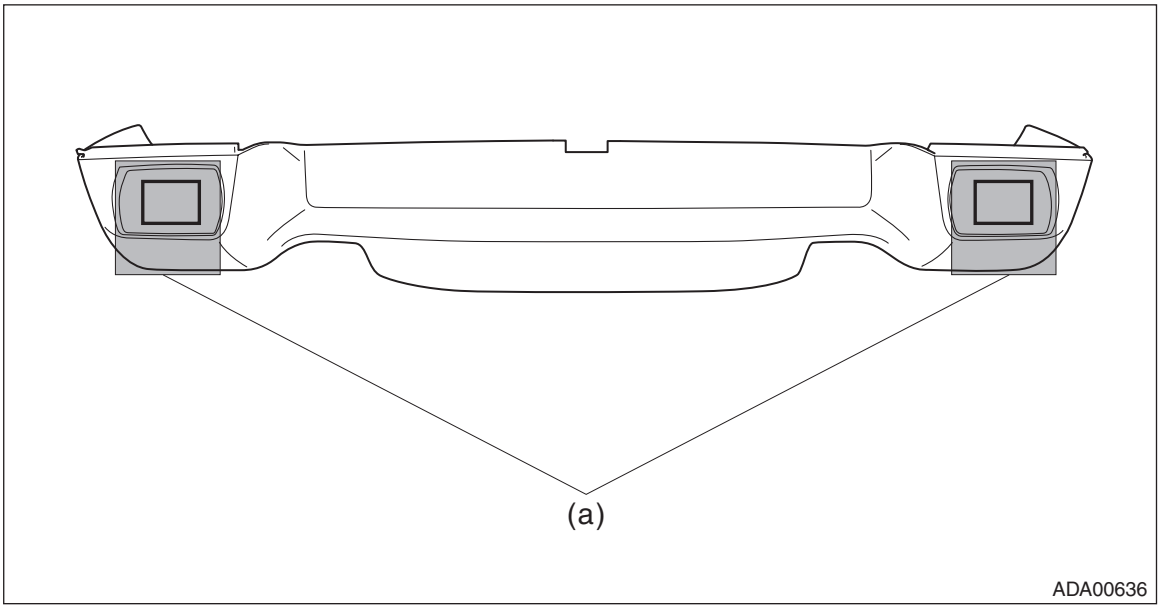
System control of the EyeSight is performed by each module. For procedure, refer to the following sections.

- Engine control module (ECM): <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>
- Transmission control module (TCM): <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>
- VDC control module (VDC CM): <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDC-CM&H/U).>
- Stereo camera: <Ref. to ES-7, Stereo Camera.>

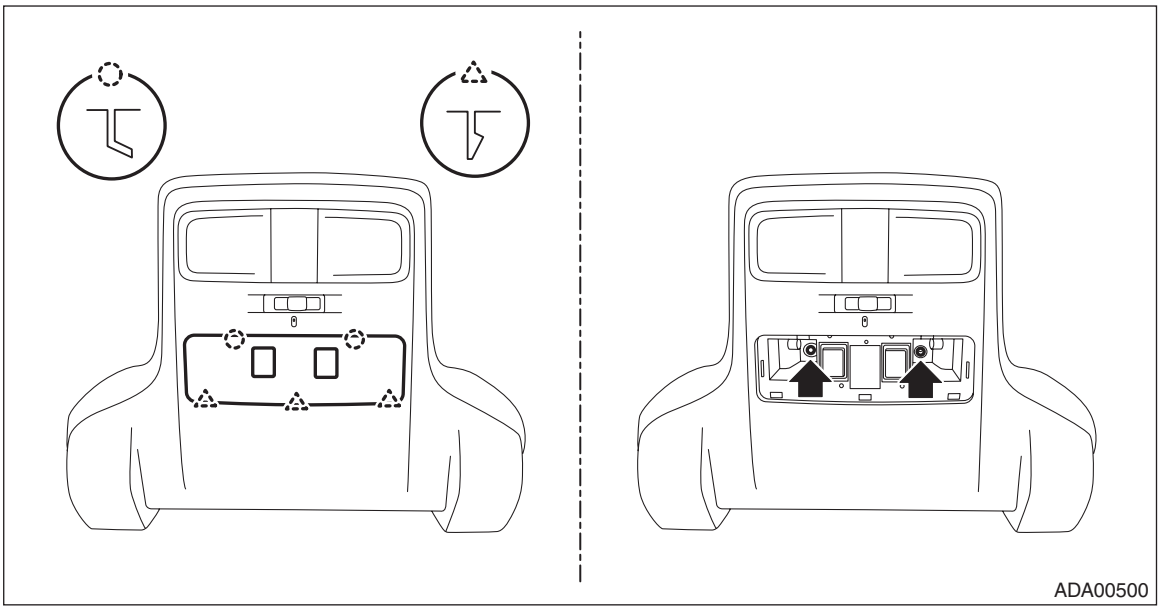
5. Stereo Camera

A: REMOVAL

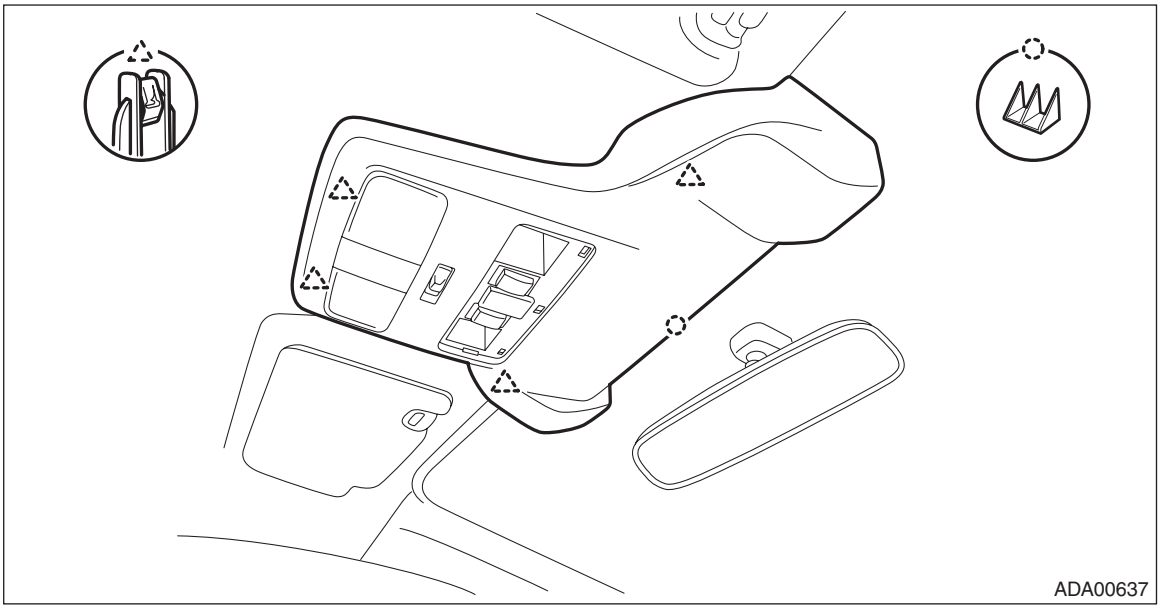
CAUTION:
• When the stereo camera or windshield glass has been replaced, removed or installed, always perform the adjustment and inspection of the camera. (When the stereo camera has been replaced with a new part, the camera remains in a failed state until adjustment and inspection are performed.)
• Since the stereo camera is a precision equipment, install the protective cover before handling it. (New stereo camera is equipped with a protective cover as a service part.)
• During removal, do not hold at the left and right cameras.
• Do not apply any impact to the stereo camera. (Even the slightest shock will deviate the optical axis of the camera, resulting in the loss of normal operation of the camera.)
• Do not disassemble the stereo camera.
• Attach the protective cover to the replacement part, put it into the box in the same way as the other parts and return it. Cover the replaced stereo camera with a protective cover.
• Do not touch the lens filter on the stereo camera. If touched, replace the stereo camera.
• When removing the stereo camera cover assembly, cover with dust-free paper such as copy paper to avoid interference with the camera lens, and attach the paper using tape while being careful not to let the adhesive surface contact the glass surface. Be sure to remove the paper after the procedure.
1) Disconnect the ground cable from battery.
2) Attach dust-free paper (a) such as copy paper to the stereo camera cover assembly.



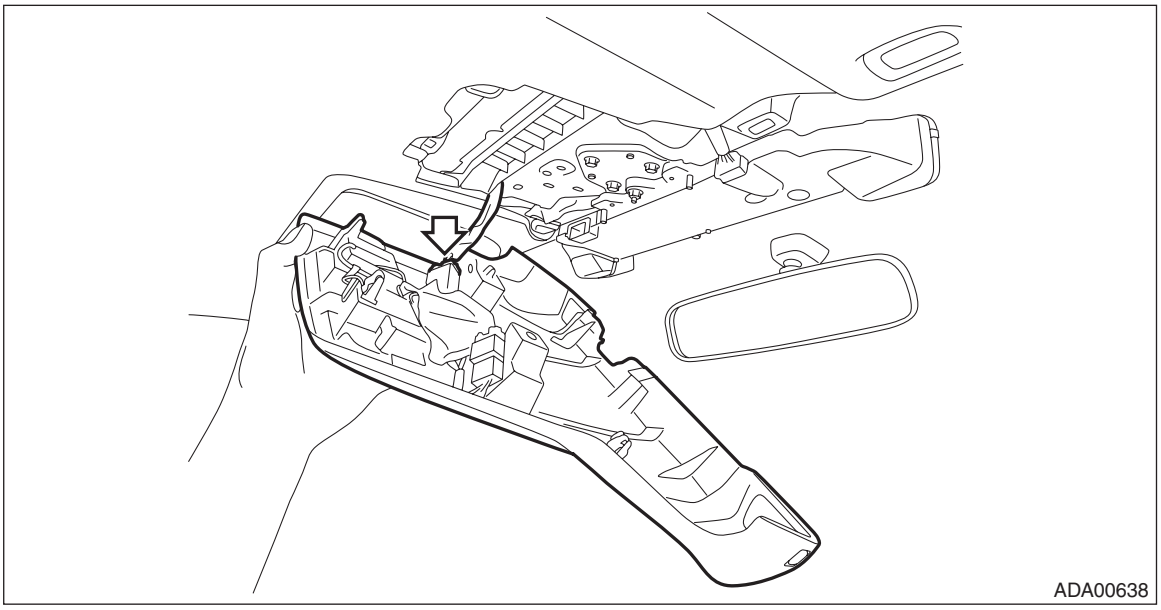
3) Remove the stereo camera cover assembly.
(1) Disconnect the claws and hooks and remove the cap.
(2) Remove the bolt.



(3) Pull down the rear of the stereo camera cover assembly, and then release the clips.
(4) Release the hook on the front side of stereo camera cover assembly.

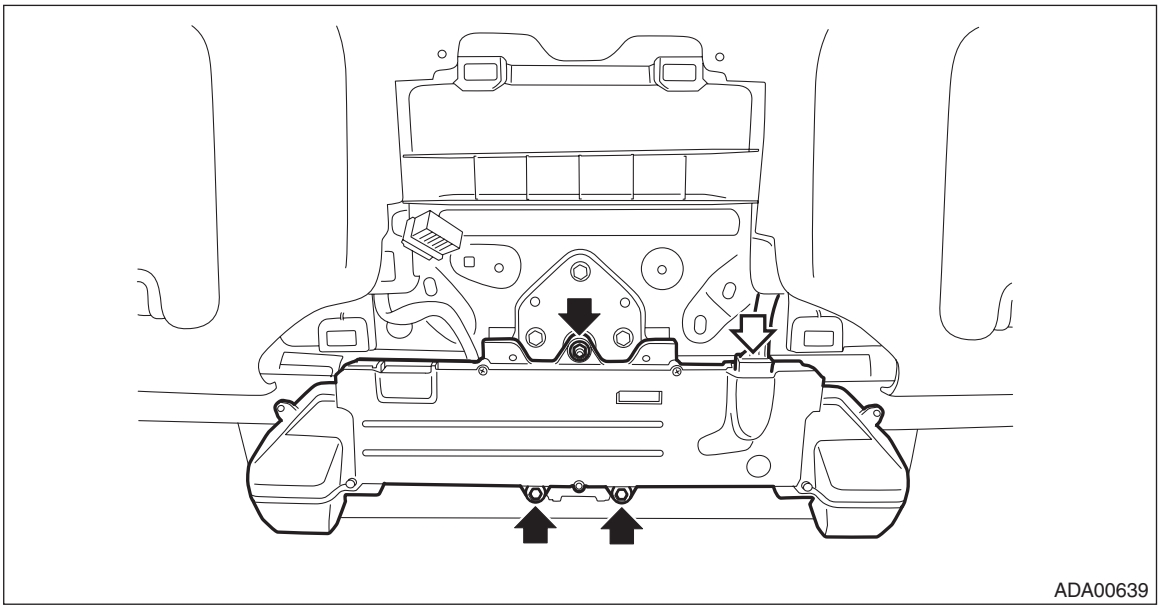


(5) Disconnect the connectors, and remove the stereo camera cover assembly.

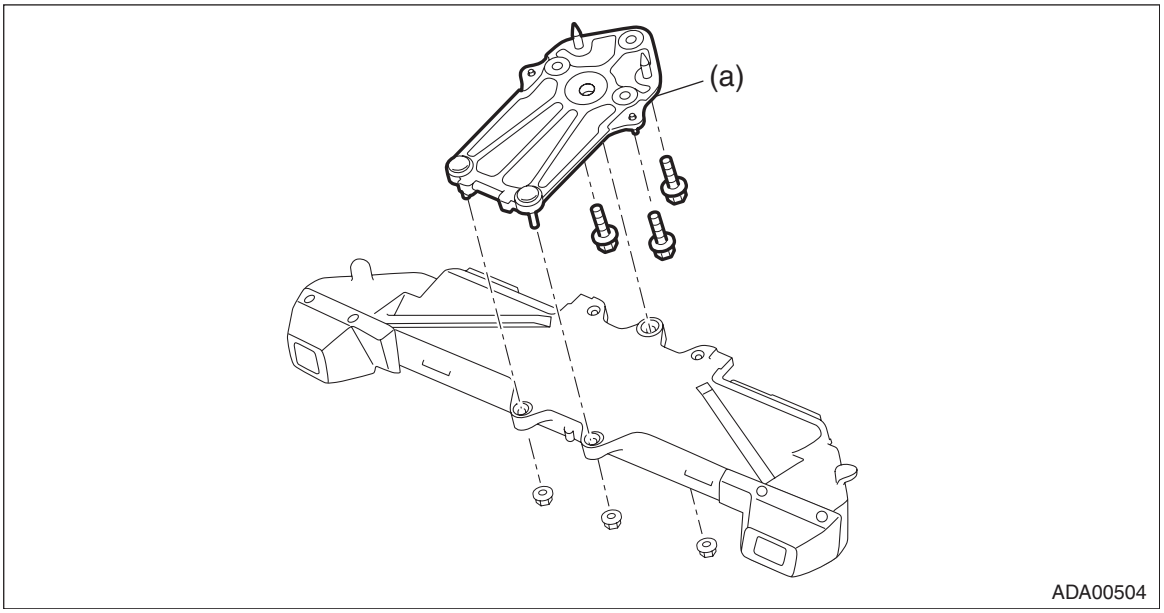


NOTE:
For models with sunroof, disconnect the sunroof switch connector.

4) Remove the stereo camera.
(1) Disconnect the connector.
(2) Remove the nuts, and then remove the stereo camera.



NOTE:
Remove the camera plate (a) as required.



B: INSTALLATION

CAUTION:
• Do not remove the protective cover until just before installing the stereo camera cover assembly. Using the bolt and nut, install the stereo camera with the protective cover attached, connect the connectors, and then remove the protective cover.
• Do not apply any impact to the stereo camera. (Even the slightest shock will deviate the optical axis of the camera, resulting in the loss of normal operation of the camera.)
• During installation, do not hold at the left and right cameras.
• Do not change the installation position of the stereo camera or do not modify the surrounding structure.
• Remove the protective cover, install the stereo camera cover assembly, and then perform adjustment and inspection of the stereo camera. <Ref. to ES-12, Camera Adjustment, Inspection.>
• Do not touch the lens filter on the stereo camera. If touched, replace the stereo camera.
• When installing the stereo camera cover assembly, cover with dust-free paper such as copy paper to avoid interference with the lens filter, and attach the paper using tape while being careful not to let the adhesive surface contact the glass surface. Be sure to remove the paper after the procedure.
• When installing the stereo camera cover assembly, take care so that the harness does not interfere with the stereo camera or does not get caught.
• Do not allow the stereo camera cover assembly to come in contact with the stereo camera. Install the stereo camera cover assembly precisely so that it will not block the visibility of the camera.
• Because the stereo camera is incompatible, be sure to check the part number before installation.

1) Attach the camera plate.

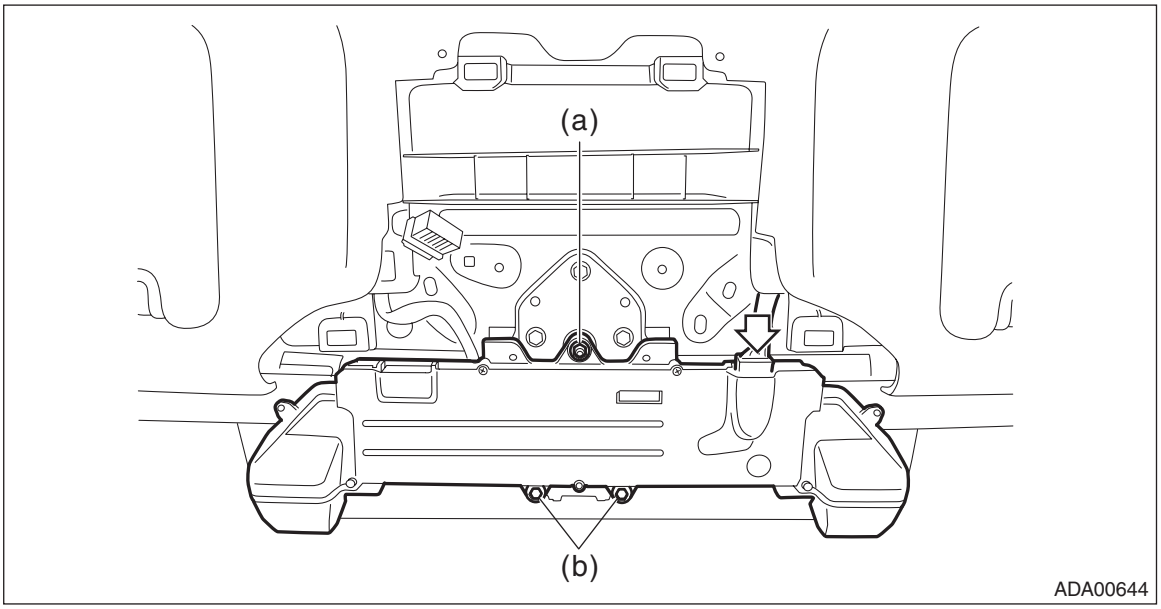
NOTE:
Align the positioning pins of camera plate to the positioning holes of front rail.

Tightening torque:
5.5±1.0 N·m (0.56±0.10 kgf-m, 4.1±0.7 ft-lb)

2) Install the stereo camera.

Tightening torque:
5.5±1.0 N·m (0.56±0.10 kgf-m, 4.1±0.7 ft-lb)

NOTE:
- Align the positioning holes of stereo camera to the positioning pins of camera plate.
- When installing the stereo camera, install the nuts (a) and (b).



3) Install the stereo camera cover assembly.
4) Connect the battery ground terminal.
5) Perform the adjustment or inspection of the stereo camera. <Ref. to ES-12, Camera Adjustment, Inspection.>

6. Camera Adjustment, Inspection

A: PROCEDURE

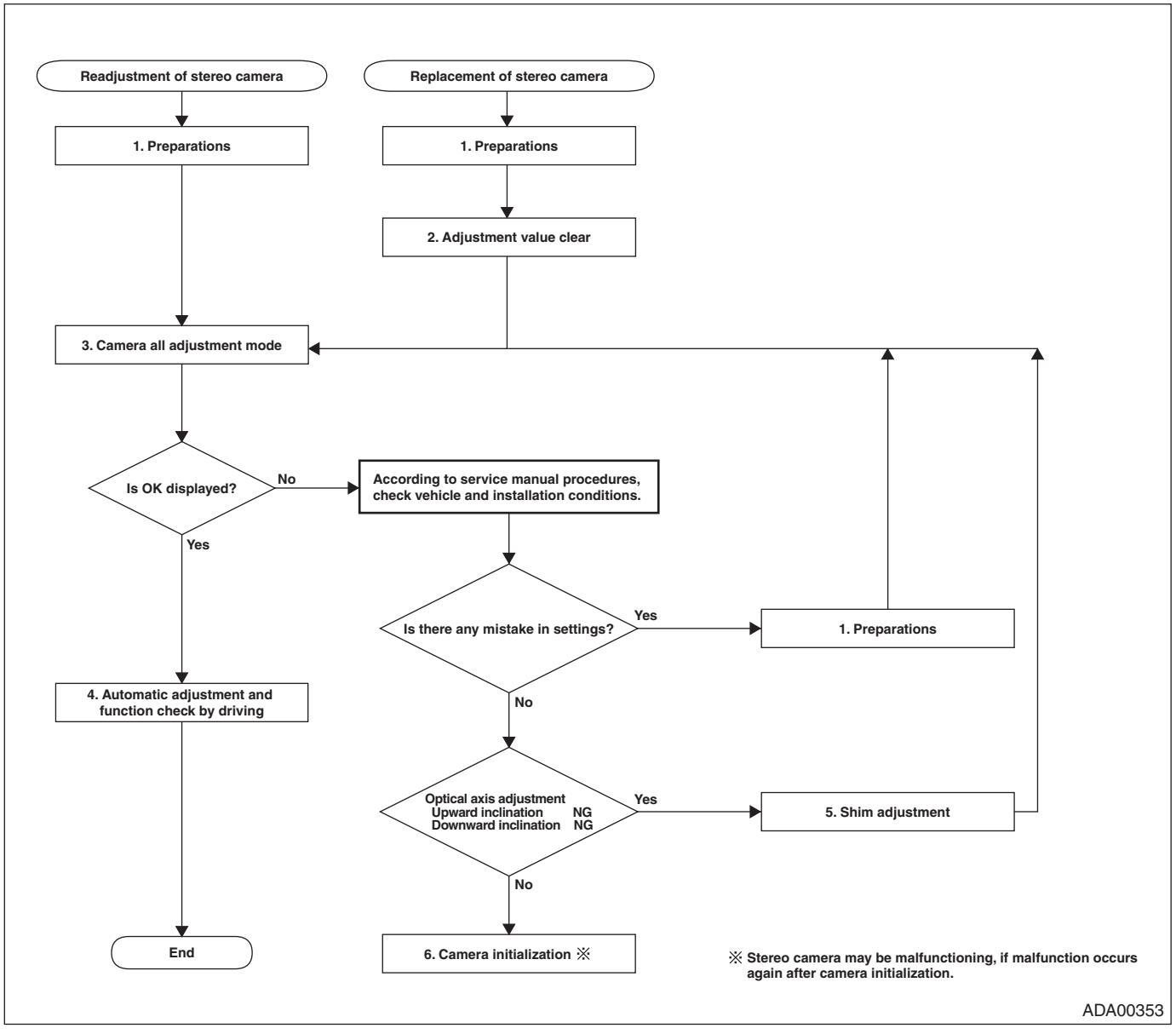
CAUTION:
- **Perform the camera adjustment and inspection at curb weight without passengers.**
- **Handle RANDOM CHART (ST: 87599VA000) carefully so as not to break it with the adhesive force of the tape.**

Perform inspection or adjustment according to the following procedures.
- Readjustment of stereo camera

Perform the adjustment in the following order: [1. Preparations] → [3. Camera all adjustment mode (replacement/removal)] → [4. Automatic adjustment and function check by driving].
- Replacement of stereo camera

Perform the replacement in the following order: [1. Preparations] → [2. Adjustment value clear] → [3. Camera all adjustment mode (replacement/removal)] → [4. Automatic adjustment and function check by driving].

NOTE:
When the stereo camera or windshield glass has been removed or installed, always perform readjustment of the stereo camera.



1. PREPARATIONS

Perform the preparation of the adjustment and inspection for the stereo camera.

- **When performing adjustment or inspection by affixing RANDOM CHART onto partition**

1) Before preparation, check the following items.
   (1) The headlight is off.
   (2) The vehicle is parked on a level surface.
   (3) The inflation pressure of tires is correct.
   (4) The vehicle does not have load.
   (5) The front wheels are directed to the straight ahead position, when the steering wheel is set to the center position.

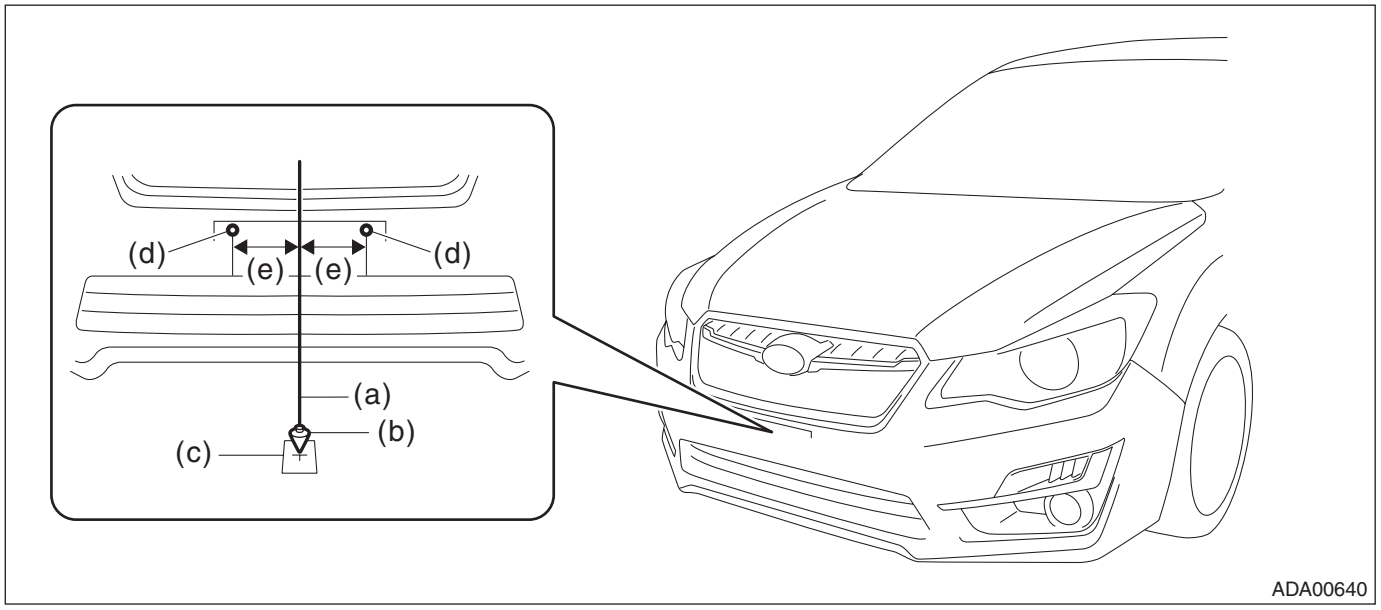
NOTE:
When the front wheels are not directed to the straight ahead position, adjust the alignment. <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

2) Prepare the Subaru Select Monitor, measure, plumb bob, leveling line and RANDOM CHART (ST).

Preparation tool:
ST: RANDOM CHART (87599VA000)

3) Stop the vehicle on a level surface where approximately 5 m (16.41 ft) space can be secured in front of the vehicle.

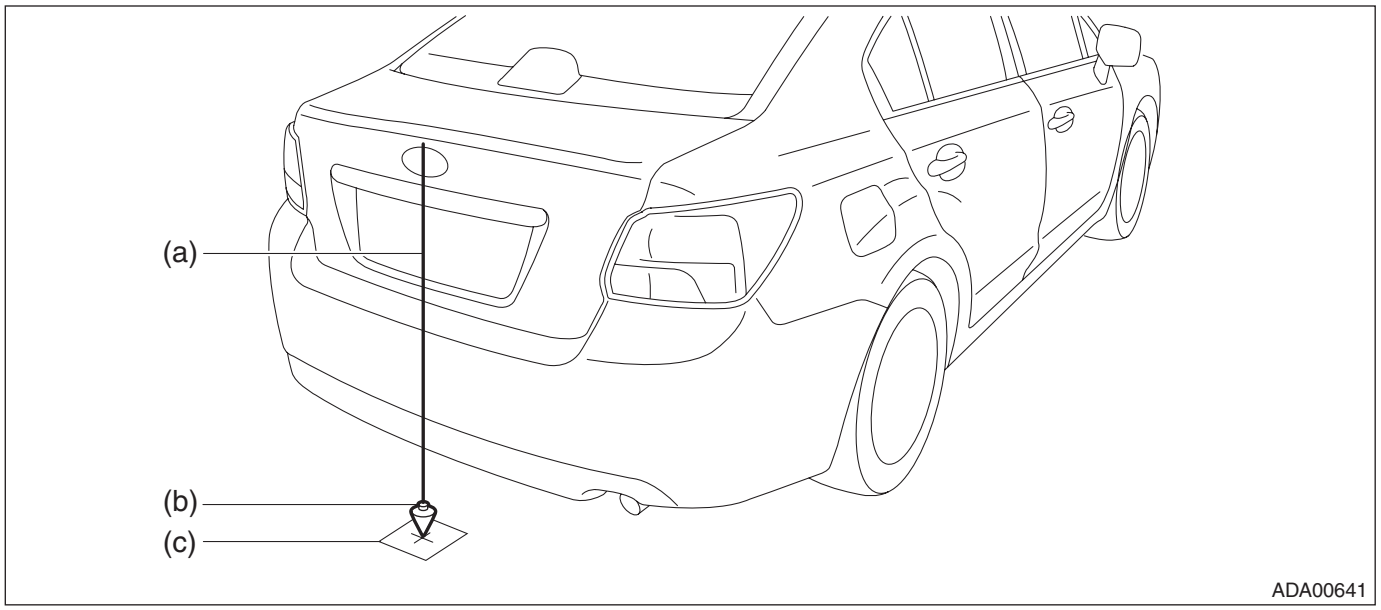
4) Suspend the plumb bob with leveling line from front center position of vehicle (center of the license plate base), and mark the position where the plumb bob touches the ground. (Point A)



(a) Leveling line
(b) Plumb bob
(c) Point A
(d) License plate base
(e) Same distance

NOTE:
Stick the packing tape etc. on the floor, then make a marking on the tape.

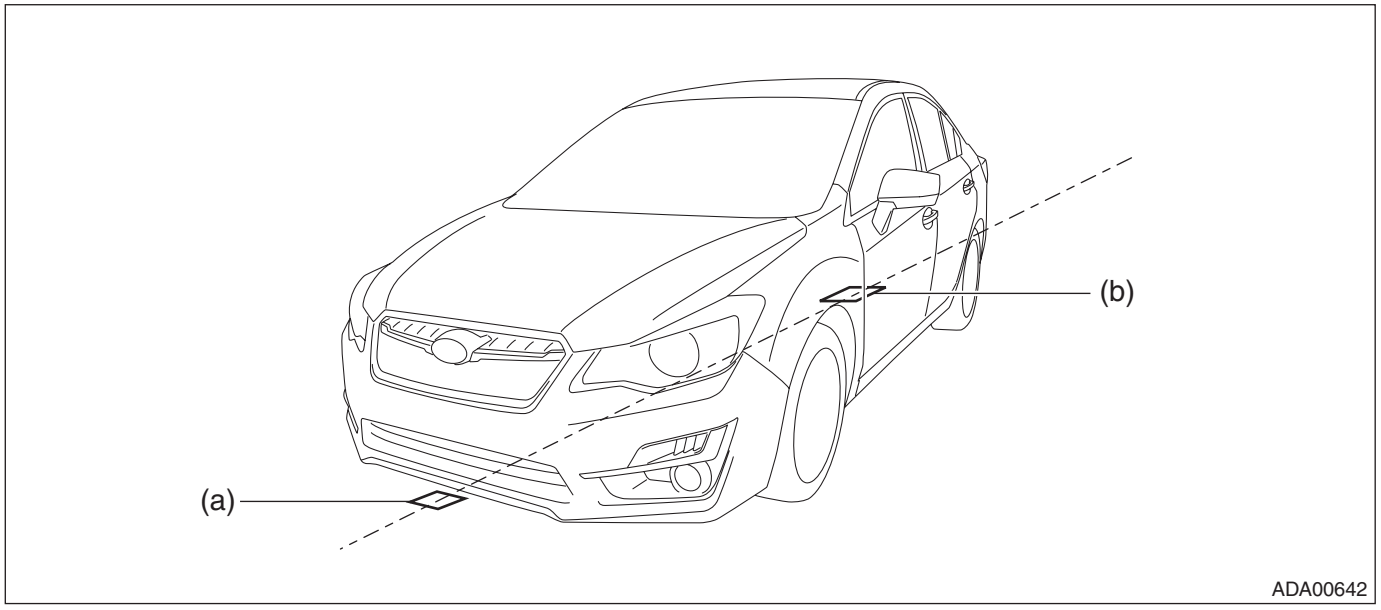
5) Suspend the plumb bob with leveling line from rear center position of vehicle (center of rear bumper), and mark the position where the plumb bob touches the ground. (Point B)



(a) Leveling line (b) Plumb bob (c) Point B

NOTE:
Stick the packing tape etc. on the floor, then make a marking on the tape.

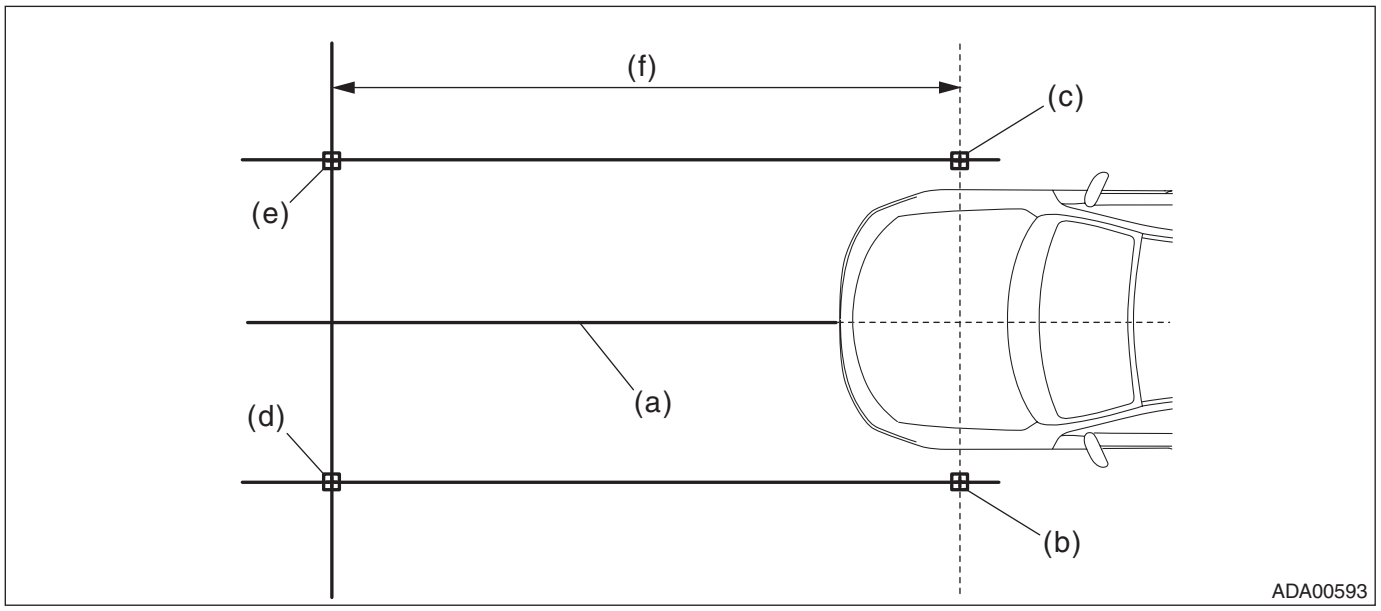
6) Strain approximately 5 m (16.41 ft) leveling line from the marking point B through the marking point A toward front of the vehicle, and fix it with packing tape. (A-B line)



(a) Point A (b) Point B

NOTE:
Confirm that there is no wet condition or unevenness on the floor, to strain the leveling line correctly.

7) Mark the installation position of the partition.
(1) Suspend the plumb bob from the center of each front wheel, and mark the point C and point D.
(2) Strain the leveling line from the point C and point D toward the front of vehicle parallel to the vehicle body center line (A-B line), and fix the leveling line with packing tape.
(3) Make markings at the points 4,000 mm (13 ft, 1 1/2 in) ahead of the vehicle from the point C and point D. (Point E and point F)
(4) Strain the leveling line so that it passes through the point E and point F. (E-F line)

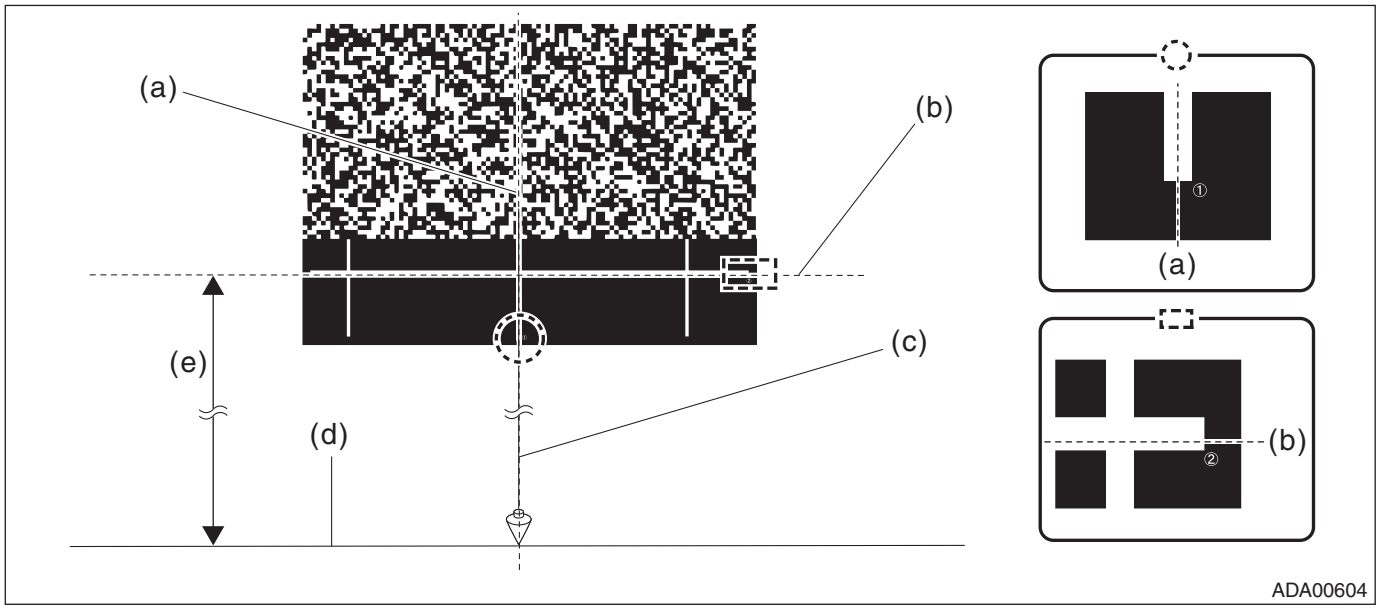


(a) Vehicle body center line (A-B line)
(b) Point C
(c) Point D
(d) Point E
(e) Point F
(f) 4,000 mm (13 ft, 1 1/2 in)

8) Place the partition and RANDOM CHART.

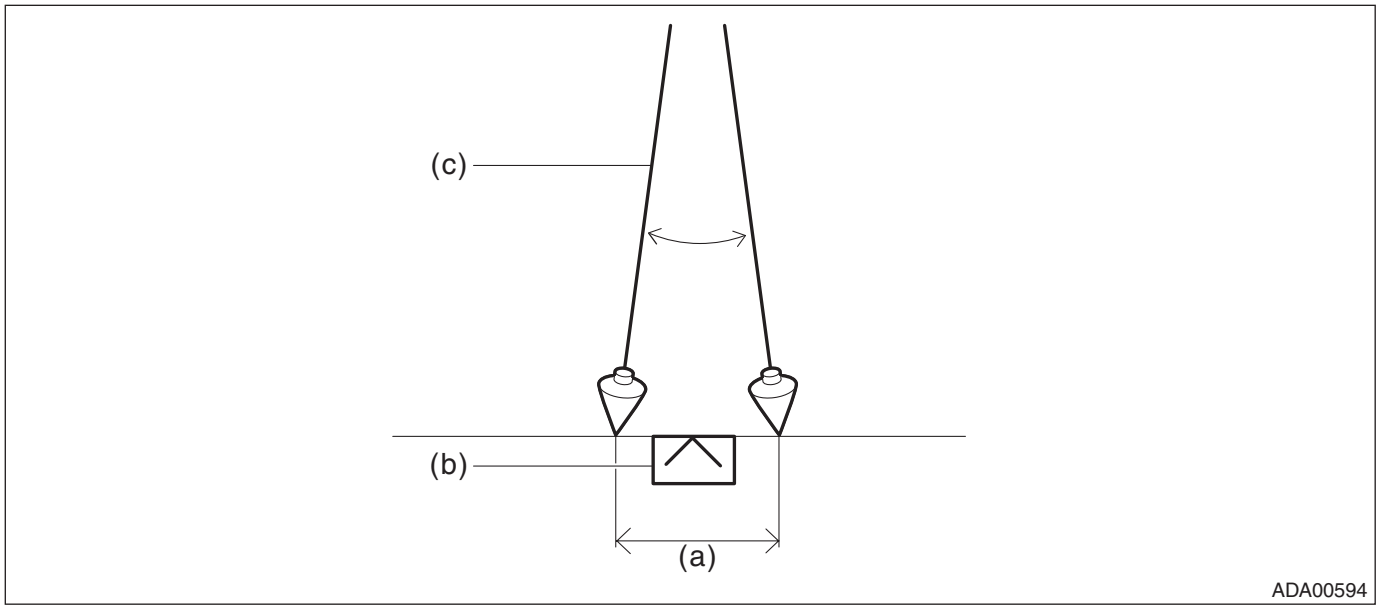
CAUTION:
• Affix the RANDOM CHART onto the vertical partition with flat surface.
• When affixing the RANDOM CHART using tape, place the tape within 10 mm (0.39 in) from the edge of the CHART. In this case, do not affix with lustrous tapes which may reflect the light.
• Perform the adjustment work at lighted places. If the lighting is not enough, adjustment cannot be done, and accuracy rate may not be acquired.
• The adjustment in the outdoors cannot be recommended. Note the sun position, when adjusting it in outdoor by necessity. (It is not acceptable when the sunlight comes from front or rear of the vehicle)

(1) Using the plumb bob, attach the RANDOM CHART on the partition, so that the setting reference (vertical line) center is aligned with the vehicle body center line (leveling line) and the height of the setting reference (horizontal line) center from the floor is 1,000 mm (3 ft, 3 3/8 in).
(2) Adjust the partition so that it is parallel to E-F line.



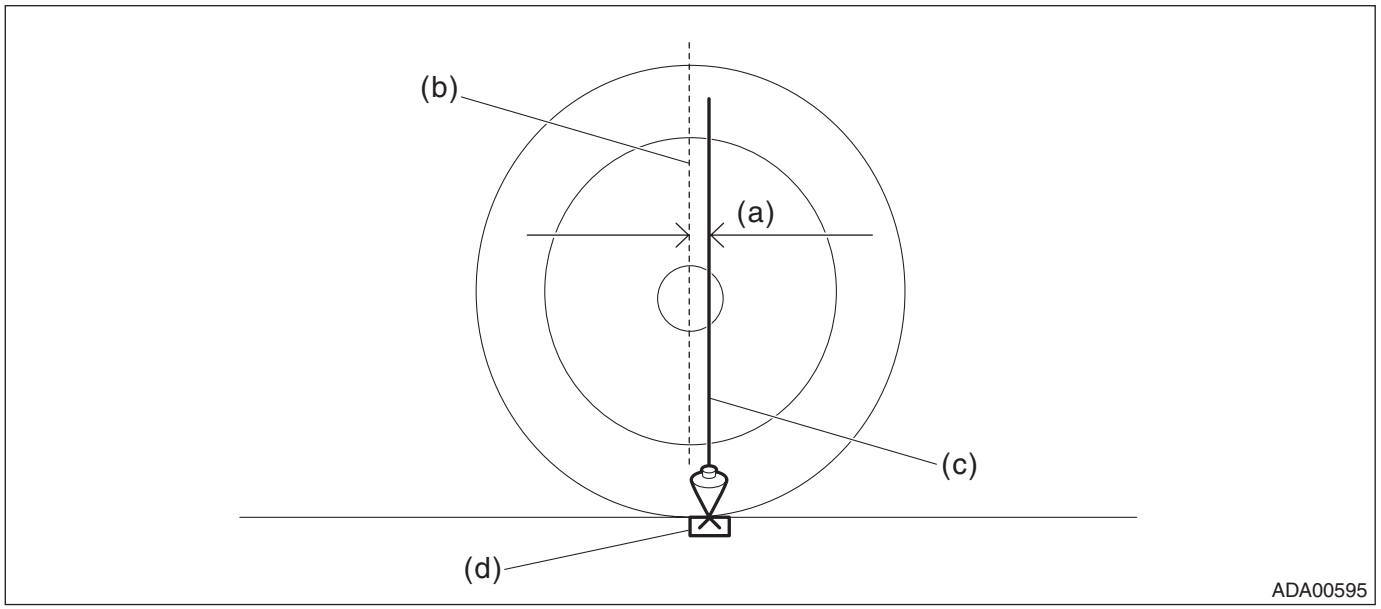
(a) ① = Setting reference (vertical line) and vehicle body center line (A-B line)
(b) ② = Setting reference (horizontal line)
(c) Plumb bob
(d) E-F line
(e) 1,000 mm (3 ft, 3 3/8 in)

CAUTION:
- **Centering accuracy of the plumb bob shall be ±4.0 mm (±0.16 in) or less.**



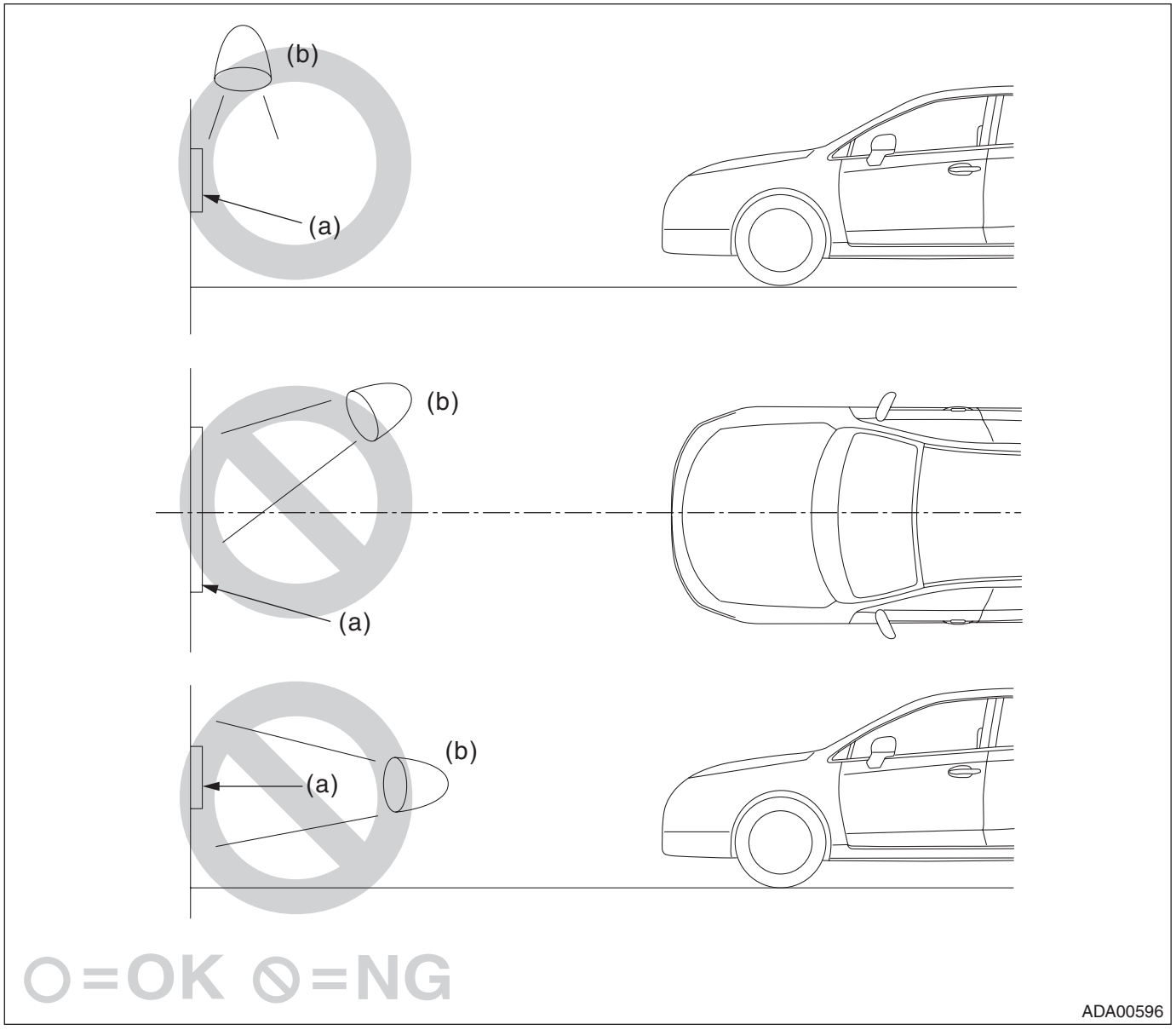
(a) ±4.0 mm (±0.16 in) (b) Marking (c) Plumb bob

- **Positioning accuracy of the measure shall be ±2.0 mm (±0.08 in) or less.**
- **Centering accuracy of the tire shall be ±4.0 mm (±0.16 in) or less.**



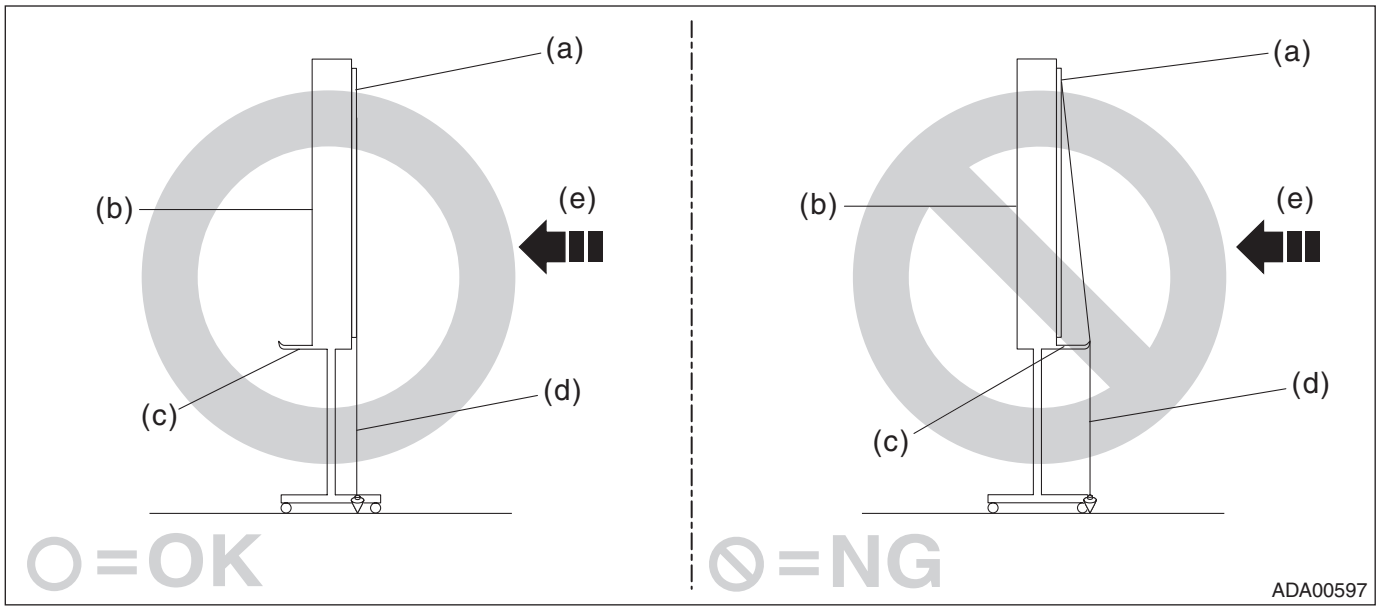
(a) ±4.0 mm (±0.16 in) (c) Plumb bob (d) Marking
(b) Tire center line

• Apply the lighting from the upper direction of RANDOM CHART, and make adjustment so that brightness is even in the CHART. (If the lighting is applied from the position where light reflects at RANDOM CHART, the adjustment cannot be done, because the reflected light enters the camera.)



(a) RANDOM CHART (b) Lighting

• When using a white board as a partition, affix the RANDOM CHART on the flat surface without protrusion such as penholder. When suspending the plumb bob, suspend it vertically from the RANDOM CHART by avoiding protrusion.



(a) RANDOM CHART
(b) White board
(c) Protrusion (penholder, etc.)
(d) Plumb bob
(e) Vehicle travel direction

9) Turn the ignition switch to OFF.
10) Check the windshield glass and the dashboard. <Ref. to ES(diag)-7, WINDSHIELD GLASS AND DASHBOARD, INSPECTION, General Description.>

CAUTION:
If there are any dirt, object or reflection from dashboard within the visibility of stereo camera, the correct adjustment and inspection can not be performed. Especially, do not put paper etc. on the dashboard.
11) Connect the Subaru Select Monitor.

NOTE:
- Use the Subaru Select Monitor equipped with the latest version of the software.
- For detailed operation procedures, refer to “Application help”.

12) Turn the ignition switch to ON.
13) Wait for 10 seconds.
14) On «Start» display, select «Diagnosis».
15) On «Vehicle selection» display, enter vehicle information and select «Confirmed».
16) On «Main Menu» display, select «Each System».
17) Select «EyeSight» on «Select System» display while pressing the stereo camera cover assembly mounted pre-collision brake OFF switch and lane departure warning OFF switch at the same time.

NOTE:
If «EyeSight» is selected without pressing two switches at the same time, the camera adjustment item is not displayed in «Work Support». (for preventing misoperation)
Also, the message is not displayed, when the camera does not finish the start-up (approx. 10 seconds after ignition switch ON). In this case, repeat from the selection of «EyeSight».
18) On «Select Function» display, select «Work Support».

19) From the work support item list, select and perform camera adjustment or other inspections.

NOTE:
• When performing {Camera adjustment, inspection}, pre-collision brake OFF indicator light, lane departure warning OFF indicator light in the meter will illuminate, and the normal function will be disabled.
• After camera adjustment, the function will be enabled, when the ignition switch is turned to OFF and system is restarted.

• When performing adjustment or inspection by affixing RANDOM CHART onto wall.

1) Before preparation, check the following items.
(1) The headlight is off.
(2) The vehicle is parked on a level surface.
(3) The inflation pressure of tires is correct.
(4) The vehicle does not have load.
(5) The front wheels are directed to the straight ahead position, when the steering wheel is set to the center position.

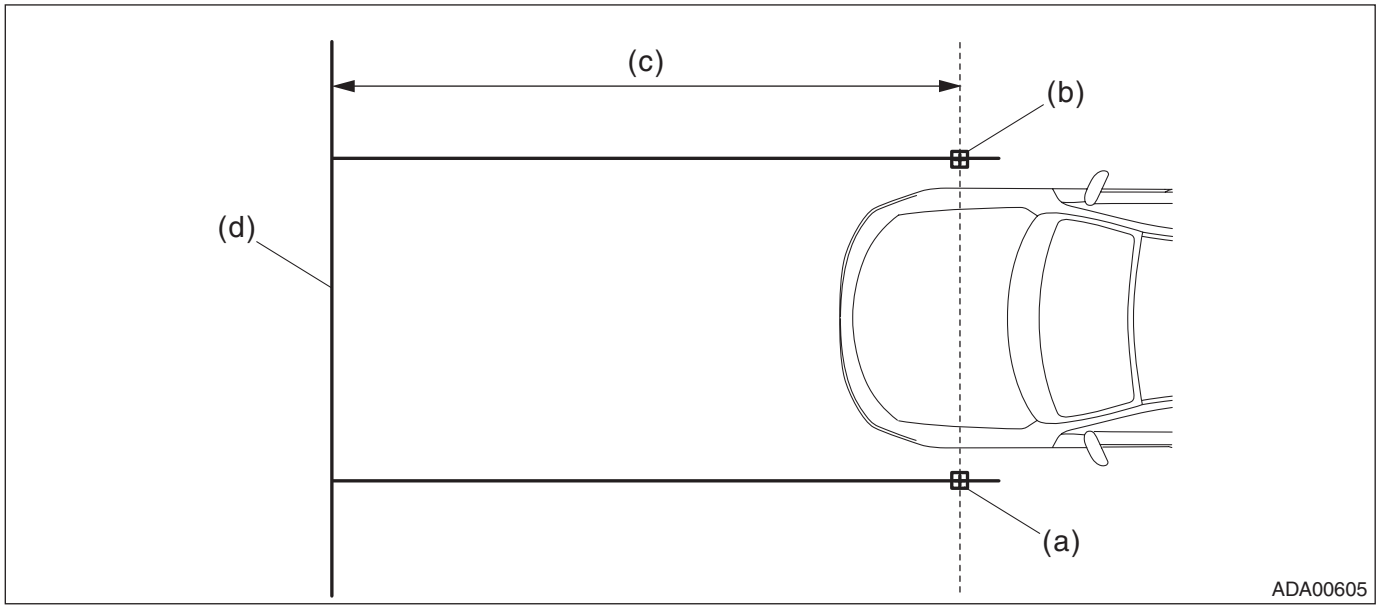
NOTE:
When the front wheels are not directed to the straight ahead position, adjust the alignment. <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

2) Prepare the Subaru Select Monitor, measure, plumb bob, leveling line and RANDOM CHART (ST).

Preparation tool:
ST: RANDOM CHART (87599VA000)

3) Mark the park position of the vehicle.
(1) Strain the leveling line so that it is at right angles to wall on which the RANDOM CHART is affixed, and fix the leveling line with packing tape.
(2) Make a marking 4,000 mm (13 ft, 1 1/2 in) away from the wall where the leveling line is fixed. (Point A and point B)

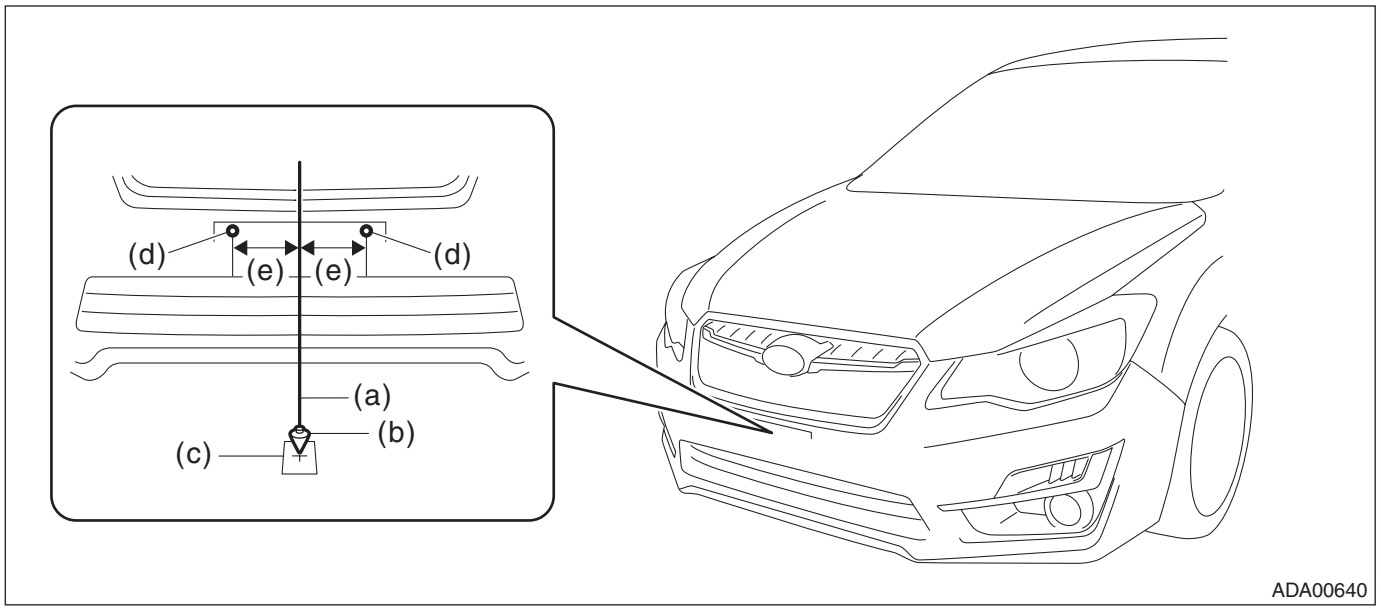
NOTE:
Stick the packing tape etc. on the floor, then make a marking on the tape.
(3) Strain the leveling line so that it passes through the point A and point B. (A-B line)



(a) Point A
(b) Point B
(c) 4,000 mm (13 ft, 1 1/2 in)
(d) Wall

4) Suspend the plumb bob from the center of each front wheel of the vehicle, and place the vehicle so that it is aligned with the leveling line (A-B line).

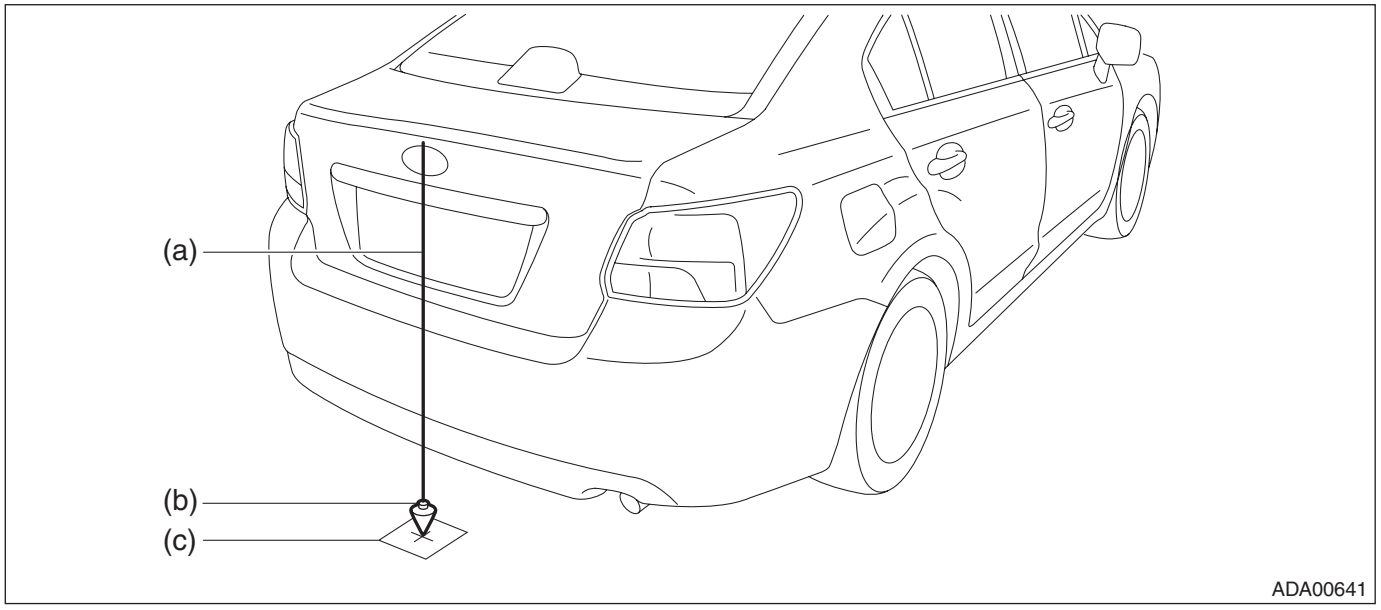
5) Suspend the plumb bob with leveling line from front center position of vehicle (center of the license plate base), and mark the position where the plumb bob touches the ground. (Point C)



(a) Leveling line
(b) Plumb bob
(c) Point C
(d) License plate base
(e) Same distance

NOTE:
Stick the packing tape etc. on the floor, then make a marking on the tape.

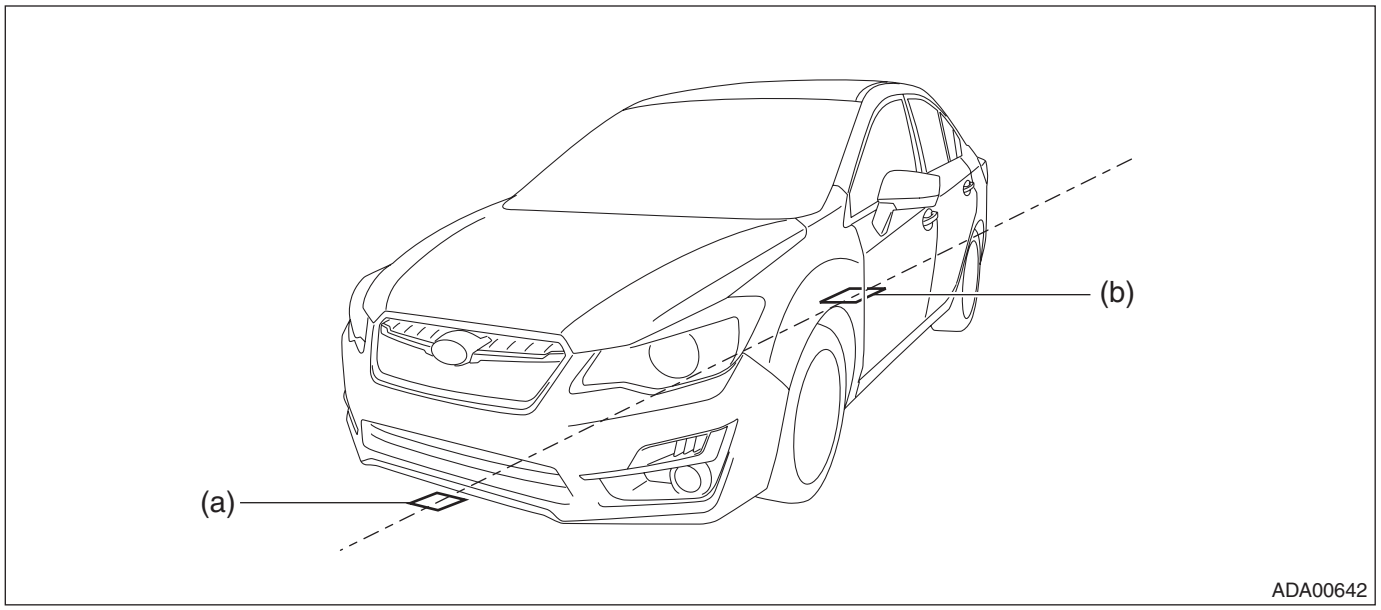
6) Suspend the plumb bob with leveling line from rear center position of vehicle (center of rear bumper), and mark the position where the plumb bob touches the ground. (Point D)



(a) Leveling line
(b) Plumb bob
(c) Point D

NOTE:
Stick the packing tape etc. on the floor, then make a marking on the tape.

7) Strain the leveling line from the making point D through the marking point C to the wall, and fix it with packing tape. (C-D line)

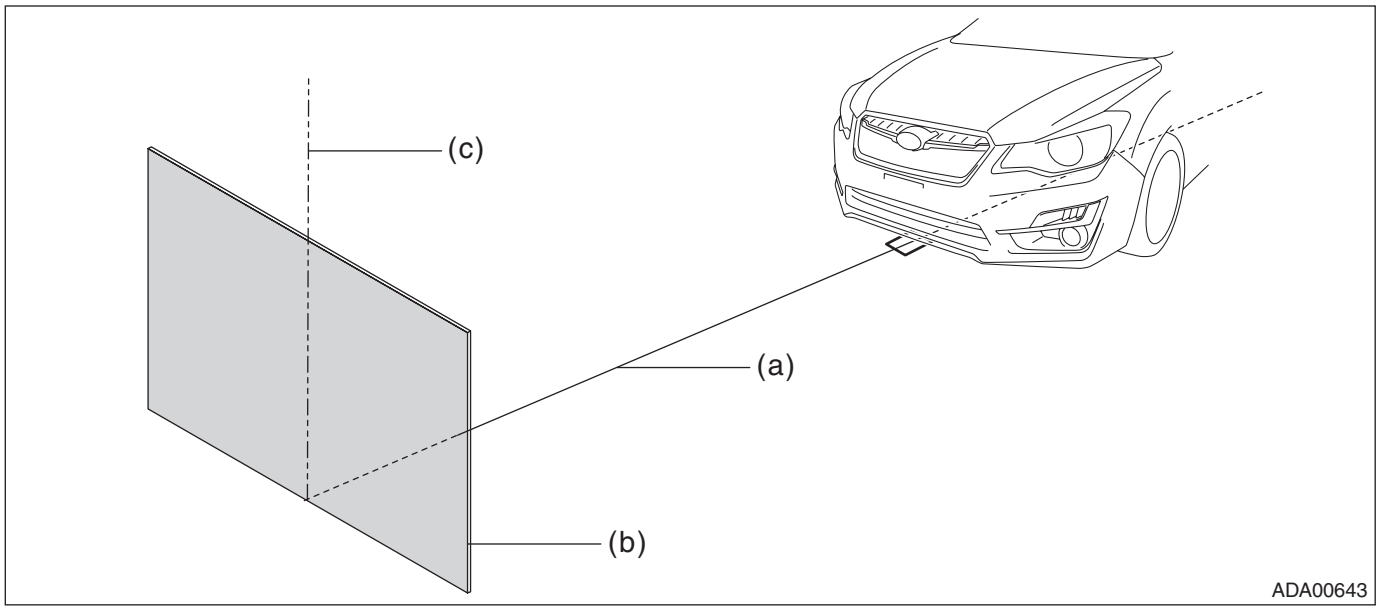


(a) Point C (b) Point D

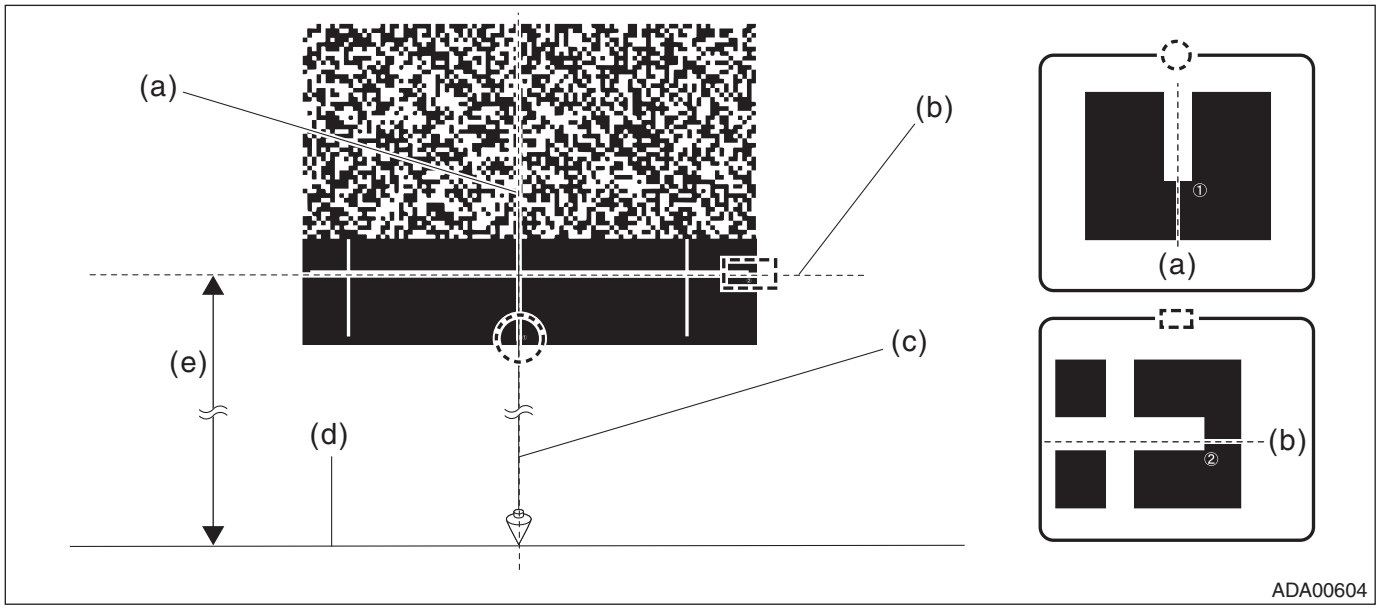
8) Place the RANDOM CHART.

CAUTION:
• Affix the RANDOM CHART onto the vertical wall, etc. with flat surface.
• When affixing the RANDOM CHART using tape, place the tape within 10 mm (0.39 in) from the edge of the CHART. In this case, do not affix with lustrous tapes which may reflect the light.
• Perform the adjustment work at lighted places. If the lighting is not enough, adjustment cannot be done, and accuracy rate may not be acquired.
• The adjustment in the outdoors cannot be recommended. Note the sun position, when adjusting it in outdoor by necessity. (It is not acceptable when the sunlight comes from front or rear of the vehicle)

(1) Using the plumb bob, attach the RANDOM CHART on a wall, so that the setting reference (vertical line) center is aligned with the vehicle body center line (leveling line) and the height of the setting reference (horizontal line) center from the floor is 1,000 mm (3 ft, 3 3/8 in).

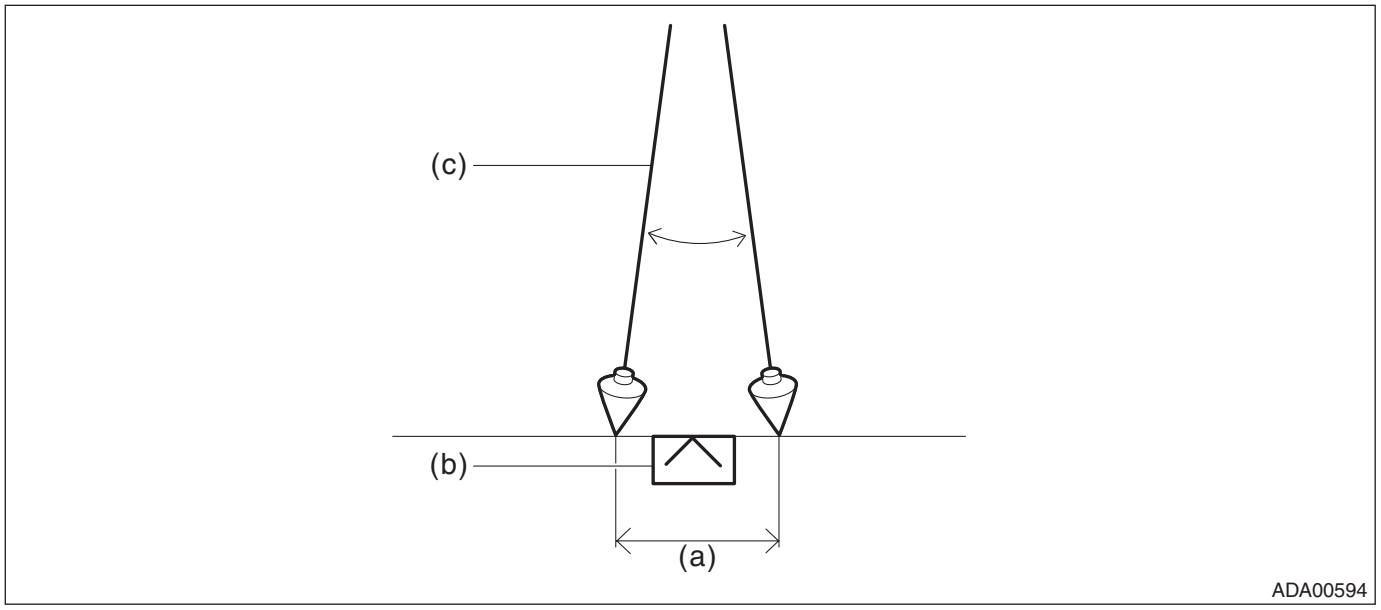


(a) Vehicle body center line (C-D line)
(b) Wall
(c) Setting reference (vertical line)



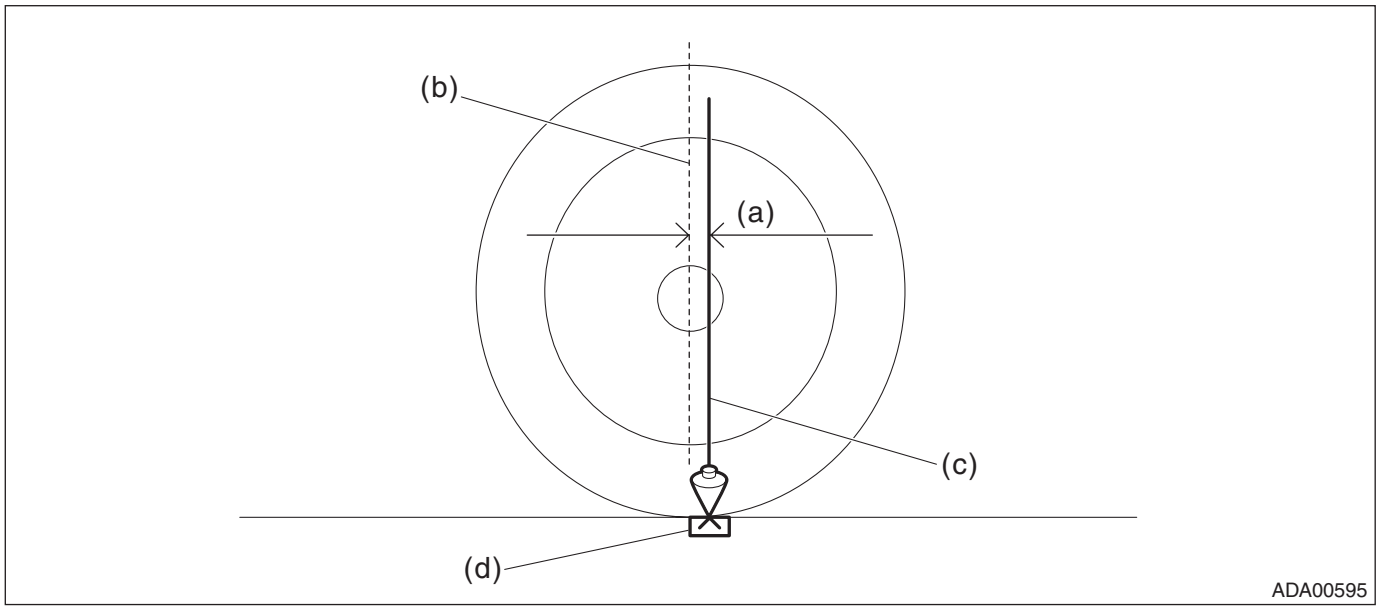
(a) ① = Setting reference (vertical line) and vehicle body center line (C-D line)
(b) ② = Setting reference (horizontal line)
(c) Plumb bob
(d) Floor
(e) 1,000 mm (3 ft, 3 3/8 in)

CAUTION:
- **Centering accuracy of the plumb bob shall be ±4.0 mm (±0.16 in) or less.**



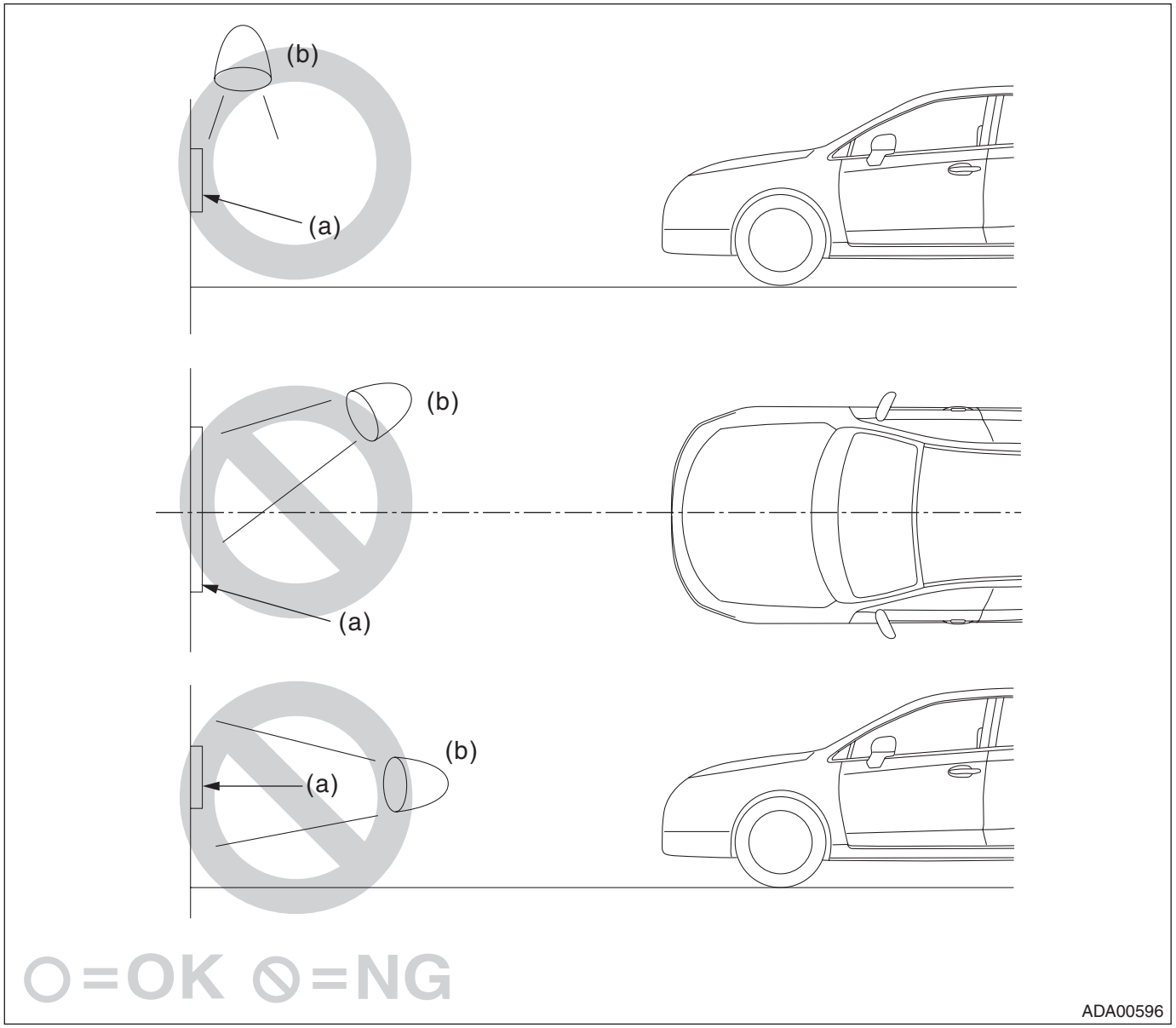
(a) ±4.0 mm (±0.16 in) (b) Marking (c) Plumb bob

- **Positioning accuracy of the measure shall be ±2.0 mm (±0.08 in) or less.**
- **Centering accuracy of the tire shall be ±4.0 mm (±0.16 in) or less.**



(a) ±4.0 mm (±0.16 in) (c) Plumb bob (d) Marking
(b) Tire center line

• Apply the lighting from the upper direction of RANDOM CHART, and make adjustment so that brightness is even in the CHART. (If the lighting is applied from the position where light reflects at RANDOM CHART, the adjustment cannot be done, because the reflected light enters the camera.)



(a) RANDOM CHART (b) Lighting

9) Turn the ignition switch to OFF.
10) Check the windshield glass and the dashboard. <Ref. to ES(diag)-7, WINDSHIELD GLASS AND DASHBOARD, INSPECTION, General Description.>

CAUTION:
If there are any dirt, object or reflection from dashboard within the visibility of stereo camera, the correct adjustment and inspection can not be performed. Especially, do not put paper etc. on the dashboard.
11) Connect the Subaru Select Monitor.

NOTE:
- Use the Subaru Select Monitor equipped with the latest version of the software.
- For detailed operation procedures, refer to “Application help”.

12) Turn the ignition switch to ON.
13) Wait for 10 seconds.

14) On «Start» display, select «Diagnosis».
15) On «Vehicle selection» display, enter vehicle information and select «Confirmed».
16) On «Main Menu» display, select «Each System».
17) Select «EyeSight» on «Select System» display while pressing the stereo camera cover assembly mounted pre-collision brake OFF switch and lane departure warning OFF switch at the same time.

NOTE:
If «EyeSight» is selected without pressing two switches at the same time, the camera adjustment item is not displayed in «Work Support». (for preventing misoperation)
Also, the message is not displayed, when the camera does not finish the start-up (approx. 10 seconds after ignition switch ON). In this case, repeat from the selection of «EyeSight».
18) On «Select Function» display, select «Work Support».
19) From the work support item list, select and perform camera adjustment or other inspections.

NOTE:
• When performing {Camera adjustment, inspection}, pre-collision brake OFF indicator light, lane departure warning OFF indicator light in the meter will illuminate, and the normal function will be disabled.
• After camera adjustment, the function will be enabled, when the ignition switch is turned to OFF and system is restarted.

2. ADJUSTMENT VALUE CLEAR

Perform when replacing stereo camera. (Do not perform when performing stereo camera re-adjustment and inspection)
1) From the work support item list, select «Clear adjustment value».
2) When «Make the following adjustment/inspection. Please push OK if ready.» is displayed, if preparation is ready, select «OK».
3) When «Clear the adjustment value.» is displayed, select «OK».
4) When «Clearing adjustment value...» is displayed, wait until process finishes.
5) When the adjustment value clear is finished correctly, and «Adjustment value cleared OK!» is displayed, select «OK» to finish.
6) Turn the ignition switch to OFF and wait for approx. 5 seconds or more.

CAUTION:
If the ignition switch OFF period is short, the adjustment value clear can not be performed correctly.
7) Next, perform the camera all adjustment mode (replacement/removal). <Ref. to ES-27, CAMERA ALL ADJUSTMENT MODE (REPLACEMENT/REMOVAL), PROCEDURE, Camera Adjustment, Inspection.>

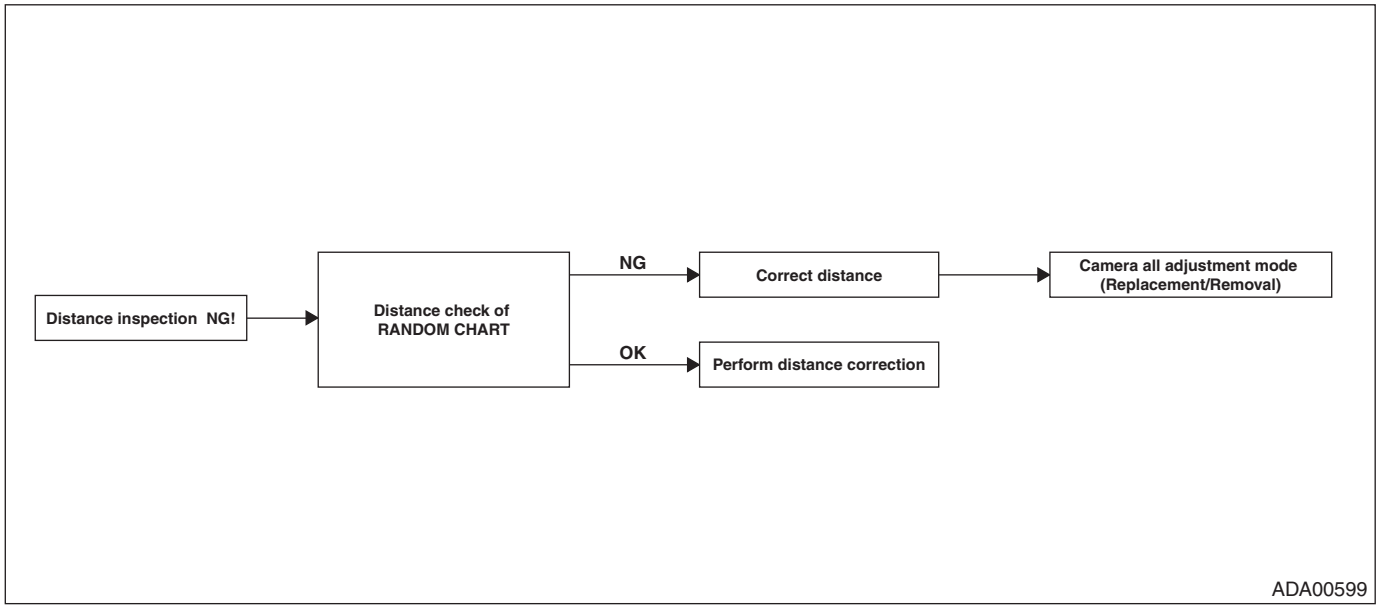
3. CAMERA ALL ADJUSTMENT MODE (REPLACEMENT/REMOVAL)

Perform this procedure when the stereo camera is replaced or re-adjustment is necessary (when stereo camera malfunctioning, when stereo camera reinstalled, when windshield glass replaced).

CAUTION:

- **When the stereo camera is replaced, be sure to perform the «Clear adjustment value» first. When {Clear adjustment value} was skipped, restart the procedure from {Clear adjustment value} again. <Ref. to ES-26, ADJUSTMENT VALUE CLEAR, PROCEDURE, Camera Adjustment, Inspection.>**
- **Perform the camera adjustment and inspection at curb weight without passengers.**
- **When the camera all adjustment mode is performed, if the procedures are not completed correctly to the end, the warning light illuminates, when the vehicle moves.**

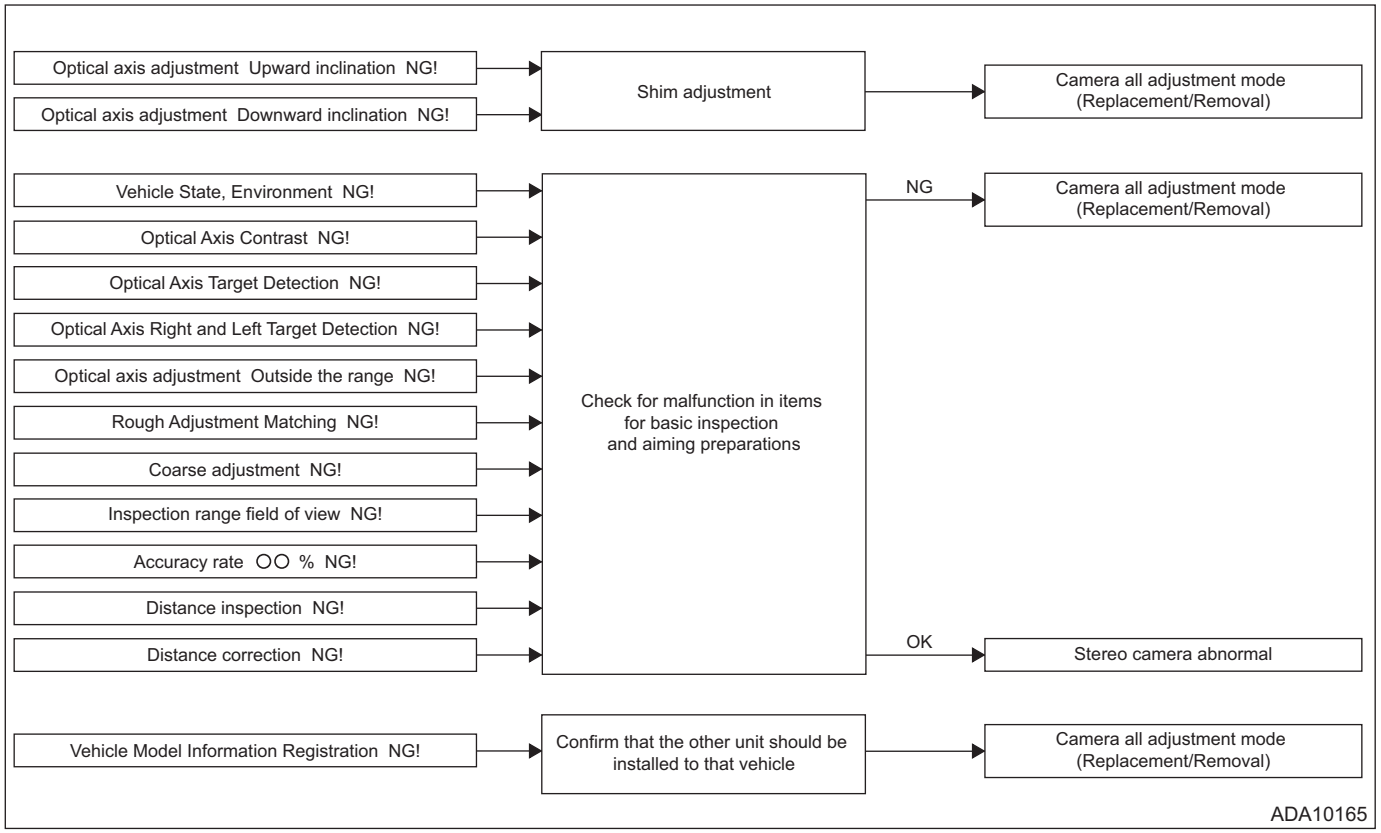
1) From the work support item list, select «Camera all adjustment mode (replacement/removal)».
2) When «Make the following adjustment/inspection. Please push OK if ready.» is displayed, if preparation is ready, select «OK».
3) When «In process...» is displayed, wait until inspection finishes.
4) When the accuracy rate inspection is finished correctly, and «Accuracy rate ○○% OK!» is displayed, select «OK» to go to step 9).
5) When «Distance inspection NG!» is displayed, refer to the NOTE below.



NOTE:
Distance check and adjustment of RANDOM CHART <Ref. to ES-13, PREPARATIONS, PROCEDURE, Camera Adjustment, Inspection.>
6) When «Perform distance correction.» is displayed, select «OK». When the distance correction is finished correctly, and «Distance correction OK!» is displayed, select «OK» and proceed to the accuracy rate inspection.
7) When «Perform accuracy rate inspection.» is displayed, select «OK». When the accuracy rate inspection is finished correctly, and «Accuracy rate ○○% OK!» is displayed, select «OK» to go to next.

8) When «○○ NG!» is displayed during adjustment, refer to the NOTE below.

CAUTION:
For details on the displayed items, refer to the following list. Check the list items, and if the same NG item is displayed even when aiming is performed again, replace the stereo camera.



LIST

Error code	Display	Check items on error	Remarks
1401	«Vehicle State, Environment NG!»	Check body integrated unit.	—
1402	«Vehicle Model Information Registration NG!»	Confirm the part numbers of EyeSight system components, and reconfirm that the unit should be installed to that vehicle. To confirm the components, check each item.	—
1403	«Optical Axis Contrast NG!»	1. Make sure that the stereo camera cover is installed correctly. 2. There should be no obstacles that blocks the stereo camera. 3. Stereo camera and camera plate are assembled with no gap. 4. Random chart for ver. 3 must be used. 5. There should be no obstacles that blocks the random chart. 6. Random chart must be set correctly for the vehicle. 7. Grid pattern of random chart should not be dirty or damaged. 8. Lighting circumstance for random chart should be normal. 9. Make sure that the headlight is off. 10.There should be no objects (reflection) on the instrument panel. 11.Dirt should not adhere to the windshield or the lens filter of the stereo camera. 12.There should be no crack on the windshield. NOTE: Detecting measures for the error codes 1403, 1404, 1405, 1406 and 1407 are different. Check items on error with high relevance are shown in the remarks.	Highly relevant with the check items 1 to 12.
1404	«Optical Axis Target Detection NG!»		Highly relevant with the check items 4, 6, 7, 8, 9, 10, 11 and 12.
1405	«Optical Axis Target Detection NG!»		Highly relevant with the check items 4, 6, 7, 8, 9, 10, 11 and 12.
1406	«Optical Axis Right and Left Target Detection NG!»		Highly relevant with the check items 1 to 12.
1407	«Out of the Optical Axis Adjustment Range NG!»		Highly relevant with the check items 3 and 6.

Error code	Display	Check items on error	Remarks
1408	«Optical axis adjustment Upward inclination NG!»	1. Random chart must be set correctly for the vehicle. 2. Aiming is performed with the vehicle at curb weight. 3. There should be no malfunction in the suspension. If there are no problems above, perform shim adjustment so that optical axis turns downward.	—
1409	«Optical axis adjustment Downward inclination NG!»	1. Random chart must be set correctly for the vehicle. 2. Aiming is performed with the vehicle at curb weight. 3. There should be no malfunction in the suspension. If there are no problems above, perform shim adjustment so that optical axis turns upward.	—
140A	«Rough Adjustment Matching NG!»	1. Make sure that the stereo camera cover is installed correctly. 2. There should be no obstacles that blocks the stereo camera. 3. Stereo camera and camera plate are assembled with no gap. 4. There should be no obstacles that blocks the random chart. 5. Random pattern of random chart should not be dirty or damaged. 6. Lighting circumstance for random chart should be normal. 7. There should be no objects (reflection) on the instrument panel. 8. Dirt should not adhere to the windshield or the lens filter of the stereo camera. 9. There should be no crack on the windshield. NOTE: Detecting measures for the error codes 140A, 140B and 140C are different. Check items on error with high relevance are shown in the remarks.	Highly relevant with the check items 1 to 9.
140B	«Coarse adjustment NG!»		Highly relevant with the check items 3, 5, 7 and 9.
140C	«Coarse adjustment NG!»		Highly relevant with the check items 3, 5, 7 and 9.
140E	«Inspection range field of view NG!»	1. Make sure that the stereo camera cover is installed correctly. 2. There should be no obstacles that blocks the random chart. 3. Random pattern of random chart should not be dirty or damaged. 4. Lighting circumstance for random chart should be normal. 5. There should be no objects (reflection) on the instrument panel. 6. Dirt should not adhere to the windshield or the lens filter of the stereo camera. 7. There should be no crack on the windshield. 8. Windshield for EyeSight should be assembled.	—
140F	«Distance inspection NG!»	1. Distance from random chart to wheel center of the vehicle should be 4,000 mm (13.12 ft). 2. Lighting circumstance for random chart should be normal.	—
1410	«Accuracy rate 00% NG !»	1. Lighting circumstance for random chart should be normal. 2. Random pattern of random chart should not be dirty or damaged. 3. There should be no objects (reflection) on the instrument panel. 4. Dirt should not adhere to the windshield or the lens filter of the stereo camera. 5. There should be no crack on the windshield.	—
1501	«Distance correction NG!»	When «Distance inspection NG!» is displayed and distance correction is performed without inspection, check the following. 1. Distance from random chart to wheel center of the vehicle should be 4,000 mm (13.12 ft). 2. Lighting circumstance for random chart should be normal.	—

NOTE:

- Shim adjustment: <Ref. to ES-31, SHIM ADJUSTMENT, PROCEDURE, Camera Adjustment, Inspection.>
- Basic inspection items: <Ref. to ES(diag)-7, INSPECTION, General Description.>
- Aiming preparation items: <Ref. to ES-13, PREPARATIONS, PROCEDURE, Camera Adjustment, Inspection.>

9) Turn the ignition switch to OFF and wait for 5 seconds. (time necessary to save adjustment and inspection result)

CAUTION:
• If the ignition switch OFF period after adjustment and inspection finished is short, the adjustment and inspection result cannot be saved correctly. The warning is displayed on the meter LCD, when the vehicle moves.
• When aiming begins, normal recognition process stops and the warning is displayed on the meter LCD. The warning display will be cleared by turning the ignition switch OFF → ON.
10) Turn the ignition switch to ON. Make sure the «Aiming Completion Status» of «Data monitor» is «Exit» using Subaru Select Monitor. (Note that it is different from «Initial Aiming Completion Status»)
11) Perform the {Clear Memory}, and turn the ignition switch to OFF.
12) Subsequently perform the automatic adjustment and function check by a test driving. <Ref. to ES-30, AUTOMATIC ADJUSTMENT AND FUNCTION CHECK BY DRIVING, PROCEDURE, Camera Adjustment, Inspection.>

4. AUTOMATIC ADJUSTMENT AND FUNCTION CHECK BY DRIVING

NOTE:
• Perform the automatic adjustment and function check by driving to improve the recognition accuracy of stereo camera, when the stereo camera is replaced or re-adjusted, or the EyeSight function does not operate correctly.
• The automatic adjustment and function check by driving adjust the stereo camera more in detail, based on the stereo camera adjustment using RANDOM CHART.
1) Perform this procedure after finishing stereo camera adjustment and inspection.
2) Connect the Subaru Select Monitor.

NOTE:
For detailed operation procedures, refer to “Application help”.
3) On «Start» display, select «Diagnosis».
4) On «Vehicle selection» display, enter vehicle information and select «Confirmed».
5) On «Main Menu» display, select «Each System».
6) On «Select System» display, select «EyeSight».
7) On «Select Function» display, select «Data Monitor».
8) From the data monitor item list, display «Automatic Adjustment Status». <Ref. to ES(diag)-24, OPERATION, Read Current Data.>

9) Drive the vehicle until «Automatic adjustment status» displays «0F» or «1F».

CAUTION:
• For the automatic adjustment, drive the vehicle on straight road with white lines on both sides at a speed of 40 km/h (25 MPH) or more for at least five minutes, while maintaining distance from the preceding vehicle 40 m (132 ft) or more.
• Maintain the following conditions until «Automatic adjustment status» displays «0F» or «1F».
– Turn the active lane keep and cruise main to OFF.
– Hold down the pre-collision brake OFF switch for two seconds to turn OFF the pre-collision brake function.

Display	Content	Unit of measure	Note (at idling)
Automatic adjustment status	Index for automatic adjustment operation performed by the driving test after the completion of the optical axis adjustment	—	«0F» or «1F» is displayed when completed.

NOTE:
• How long time will be needed until «0F» or «1F» is displayed depends on the road condition etc.
• For new vehicles, «00» may be displayed. A test-drive is not necessary before delivery because high-accuracy aiming setting has been performed at the factory.
10) From the data monitor item list, display «Lane recognition status» to check if any of the following appears.

NOTE:
When driving did not continue until «0F» or «1F» was displayed, it may take a while before recognition completes.
• Recognizing white lines on both sides during driving at 40 km/h (25 MPH) or more: «03»
• Recognizing white lines on both sides with lane width 3 m (10 ft) or more during driving at 65 km/h (40 MPH) or more: «05»

Display	Content	Unit of measure	Note (at idling)
Lane recognition status	Display of lane recognition status	—	Recognized when vehicle lane can be seen by 20 m (66 ft) or more.

11) From the data monitor item list, display «Preceding vehicle distance» to check if the distance from the preceding vehicle is approximately the same.

5. SHIM ADJUSTMENT

1) Turn the ignition switch to OFF.
2) Detach the stereo camera cover, and remove the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>
3) Remove the stereo camera plate, and insert the shim into the vehicle body and camera plate.

Shim (washer):
Part No. 031105000

NOTE:
• Inserting the shim into the vehicle front side makes camera downward.
• Inserting the shim into the vehicle rear side makes camera upward.
• There is a case that the shim may be inserted at the production line, but it is not abnormal.
4) Install the stereo camera plate.

Tightening torque:
5.5±1.0 N·m (0.56±0.10 kgf-m, 4.1±0.7 ft-lb)
5) Install the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>
6) Perform the camera all adjustment mode (replacement/removal). <Ref. to ES-27, CAMERA ALL ADJUSTMENT MODE (REPLACEMENT/REMOVAL), PROCEDURE, Camera Adjustment, Inspection.>

6. CAMERA INITIALIZATION

This is a recovery measures prepared for the data failure caused by the low battery voltage during data storage to inside the stereo camera.

CAUTION:
Do not usually perform camera initialization because it will clear the aiming data and/or DTCs.
Perform the camera initialization only when the aiming result is NG even if the vehicle is placed correctly as shown in the flowchart described in “A: Procedure”. After camera initialization, perform the aiming in the same procedure as for camera replacement.
1) Connect the Subaru Select Monitor.

NOTE:
For detailed operation procedures, refer to “Application help”.
2) Turn the ignition switch to ON.
3) Wait for 10 seconds.
4) On «Start» display, select «Diagnosis».
5) On «Vehicle selection» display, enter vehicle information and select «Confirmed».
6) On «Main Menu» display, select «Each System».
7) On «Select System» display, select «EyeSight».
8) On «Select Function» display, select «DTC».
9) Select «Clear Memory» while pressing the stereo camera cover mounted pre-collision brake OFF switch and lane departure warning OFF switch at the same time.
10) Turn the ignition switch to OFF and wait for 5 seconds.
11) Next, perform the clear adjustment value. <Ref. to ES-26, ADJUSTMENT VALUE CLEAR, PROCEDURE, Camera Adjustment, Inspection.>

7. Switches and Harness

A: NOTE

1. PRE-COLLISION BRAKE OFF SWITCH & LANE DEPARTURE WARNING OFF SWITCH

The pre-collision brake OFF & lane departure warning OFF switch is integrated in the stereo camera cover assembly.
If the pre-collision brake OFF & lane departure warning OFF switch is faulty, replace the stereo camera cover assembly. <Ref. to ES-7, Stereo Camera.>

2. EyeSight STEERING SWITCH

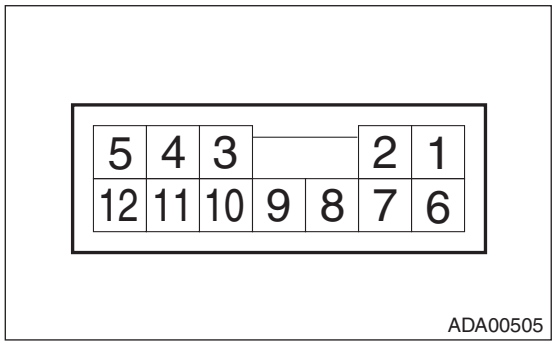
For the operation procedures for the EyeSight steering switch, refer to “CRUISE CONTROL SYSTEM” section. <Ref. to CC-6, Cruise Control Command Switch.>

B: INSPECTION

1. PRE-COLLISION BRAKE OFF SWITCH AND LANE DEPARTURE WARNING OFF SWITCH

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



- Pre-collision brake OFF switch

Terminal No.	Inspection conditions	Standard
10 — 8	OFF	Approx. 1 kΩ
	ON	Less than 1 Ω

- Lane departure warning OFF switch

Terminal No.	Inspection conditions	Standard
9 — 8	OFF	Approx. 1 kΩ
	ON	Less than 1 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

Terminal No.	Inspection conditions	Specification
1 (+) — 2 (–)	Apply battery voltage.	Light ON

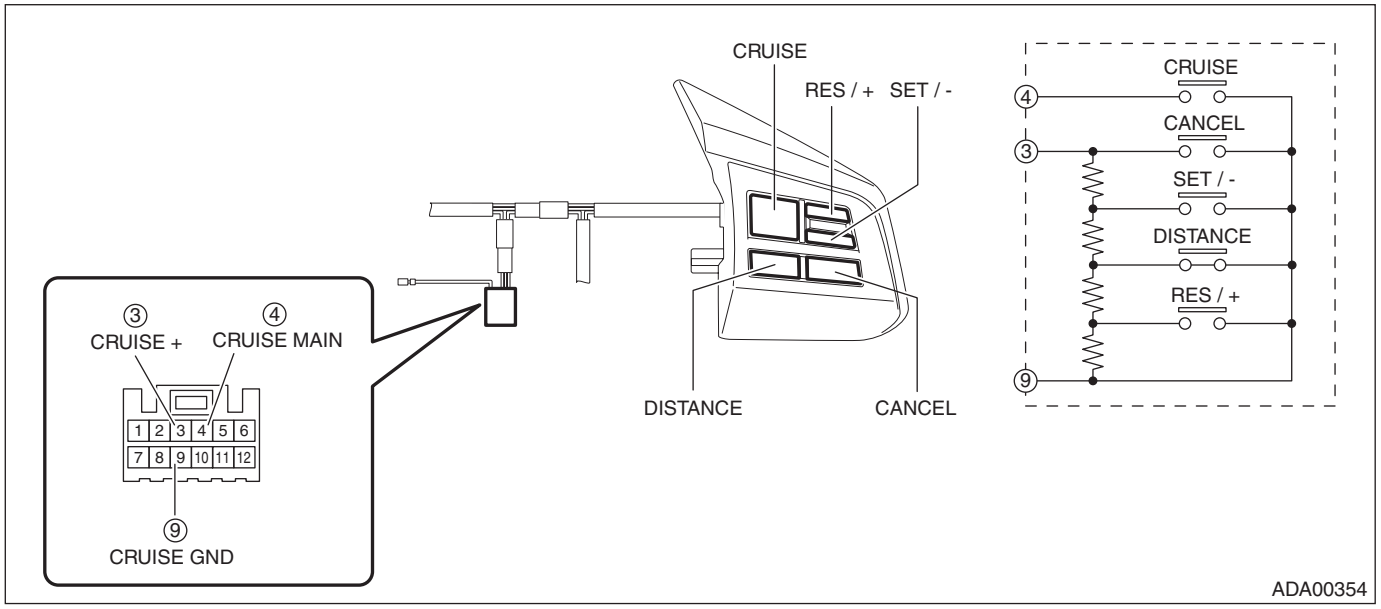
3) If the result of the inspection is not within the standard value, replace the stereo camera cover assembly.

2. EyeSight STEERING SWITCH

Impreza model

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions		Standard
3 — 9	CANCEL SET/– DISTANCE RES/+	All OFF	Approx. 4,020 Ω
	CANCEL	ON	Less than 1 Ω
	SET/–	ON	Approx. 250 Ω
	DISTANCE	ON	Approx. 680 Ω
	RES/+	ON	Approx. 1,470 Ω
4 — 9	CRUISE (MAIN)	OFF	1 MΩ or more
		ON	Less than 1 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

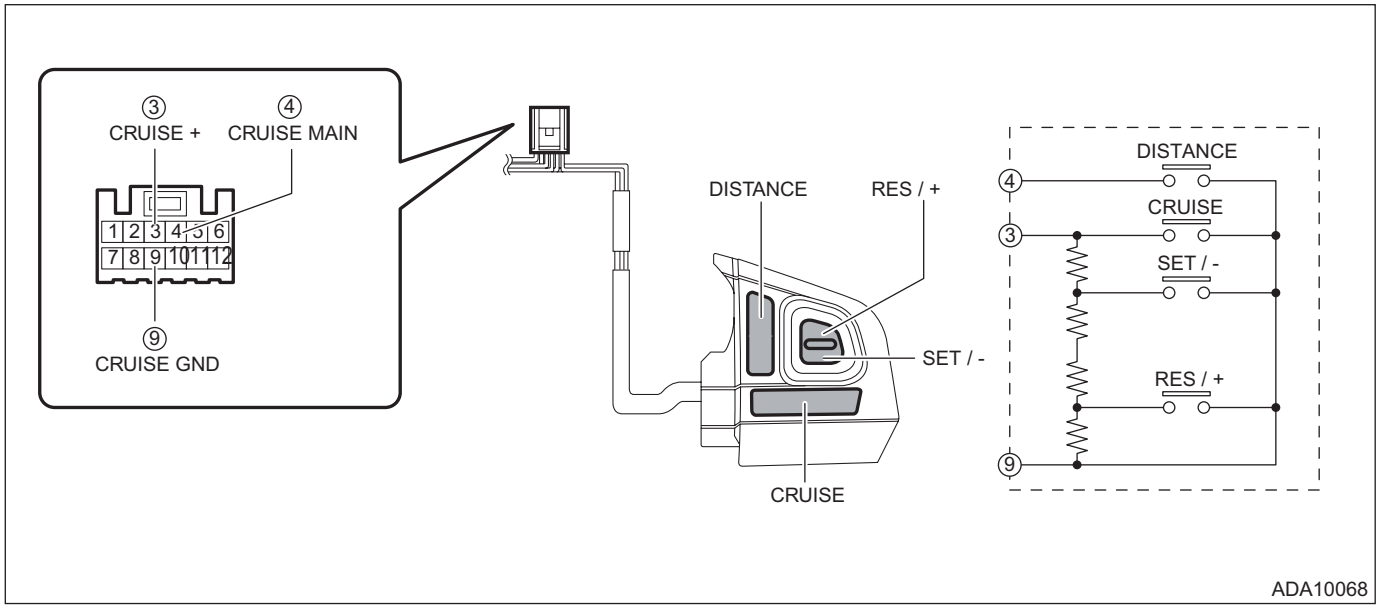
Terminal No.	Inspection conditions	Specification
10 (+) — 11 (–)	Apply battery voltage.	Light ON

3) Replace the EyeSight steering switch if the inspection result is not within the standard.

Crosstrek model

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions		Standard
3 — 9	CRUISE (MAIN) SET/– RES/+	All OFF	Approx. 4,020 Ω
	CRUISE (MAIN)	ON	Less than 1 Ω
	SET/–	ON	Approx. 250 Ω
	RES/+	ON	Approx. 1,470 Ω
4 — 9	DISTANCE	OFF	1 MΩ or more
		ON	Less than 1 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

Terminal No.	Inspection conditions	Specification
10 (+) — 11 (–)	Apply battery voltage.	Light ON

3) Replace the EyeSight steering switch if the inspection result is not within the standard.

8. Combination Meter

A: NOTE

For the operation procedures for combination meter, refer to “INSTRUMENTATION/DRIVER INFO” section. <Ref. to IDI-19, Combination Meter.>

9. Transmission Control Module (TCM)

A: NOTE

For the operation procedures for transmission control module (TCM), refer to “CONTINUOUSLY VARIABLE TRANSMISSION” section. <Ref. to CVT(TR580)-150, Transmission Control Module (TCM).>

10.Stop Light & Brake Switch

A: NOTE

For the operation procedures for stop light and brake switch, refer to “BRAKE” section. <Ref. to BR-75, Stop Light Switch.>

11.VDC Control Module and Hydraulic Control Unit (VDCCM&H/U)

A: NOTE

For the operation procedures for VDC control module & hydraulic control module (VDCCM&H/U), refer to “VEHICLE DYNAMICS CONTROL (VDC)” section. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

12.Multi-function Display (MFD)

A: NOTE

For the operation procedures for Multi-Function Display (MFD), refer to “INSTRUMENTATION/DRIVER INFO” section. <Ref. to IDI-26, Multi-function Display (MFD).>

13.Roll Connector

A: NOTE

For the operation procedures for roll connector (steering angle sensor), refer to “AIRBAG SYSTEM” section. <Ref. to AB-69, Roll Connector.>

14.Body Integrated Unit

A: NOTE

For the operation procedures for body integrated unit, refer to “STARTING/CHARGING SYSTEMS” section. <Ref. to SL-80, Body Integrated Unit.>

15.Diagnostics with Phenomenon

A: INSPECTION

Refer to “Diagnostics with Phenomenon” of “EyeSight (DIAGNOSTICS)” section. <Ref. to ES(diag)-46, Diagnostics with Phenomenon.>

EyeSight (DIAGNOSTICS)

ES(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
• Start the diagnosis after the engine has started. (Cruise control main switch does not turn on even if it is pressed before the engine starts.)
• When performing diagnosis, observe the legal speed limit on the road.
• ECM cancel code and ACC cancel code are not the diagnostic trouble code (DTC). These codes will also appear when the cruise control is cancelled by the driver's operation. Do not confuse them.
• Be sure to get an assistant to support the diagnosis while driving, and have him/her operate the select monitor.
• Be sure to record the following data before performing the Clear Memory. (Data must be obtained before inspection because the Clear Memory operation deletes previous faults and temporary stop history.)
– All diagnostic trouble codes (DTCs)
– DTC of stereo camera (current malfunction, past malfunction)
– Freeze frame data of stereo camera
– ACC cancel code of stereo camera
– EyeSight temporary stop code of stereo camera
– Current data of stereo camera
(To obtain the data concerning camera adjustment information, previous trouble or temporary stop history, all data must be measured for a few seconds after the engine has started.)
• When a temporary stop occurs, stereo camera may be affected by a small amount of dirt that would not be perceived by the driver. In this case, cleaning the windshield glass is effective. <Ref. to ES(diag)-7, WINDSHIELD GLASS AND DASHBOARD, INSPECTION, General Description.>

	Step	Check	Yes	No
1	**PREPARATION BEFORE INSPECTION.** Using the Check List for Interview, confirm the condition of the malfunction occurrence from the user. <Ref. to ES(diag)-3, CHECK, Check List for Interview.>	Is there any component that obviously seems to affect the malfunction?	Repair or replace the component that seems to affect the malfunction.	Go to step **2**.
2	**CHECK DTC.** Read the DTC using Subaru Select Monitor. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.> NOTE: When communication with the stereo camera could not be established, check the circuit. <Ref. to ES(diag)-22, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>	Is DTC displayed on Subaru Select Monitor?	Perform the diagnosis according to DTC and freeze frame data. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.> <Ref. to ES(diag)-44, Freeze Frame Data Display.> If the diagnostic codes other than the stereo camera are displayed, refer to the diagnosis for the relevant codes.	Go to step **3**.
3	**PERFORM DIAGNOSTICS WITH PHENOMENON.** Using the diagnostics with phenomenon, perform inspection. <Ref. to ES(diag)-46, Diagnostics with Phenomenon.>	Is the vehicle free from any problem described in the diagnostics with phenomenon? / Are indicators normal?	Finish the diagnosis.	Perform the diagnosis according to the diagnostics with phenomenon.

2. Check List for Interview

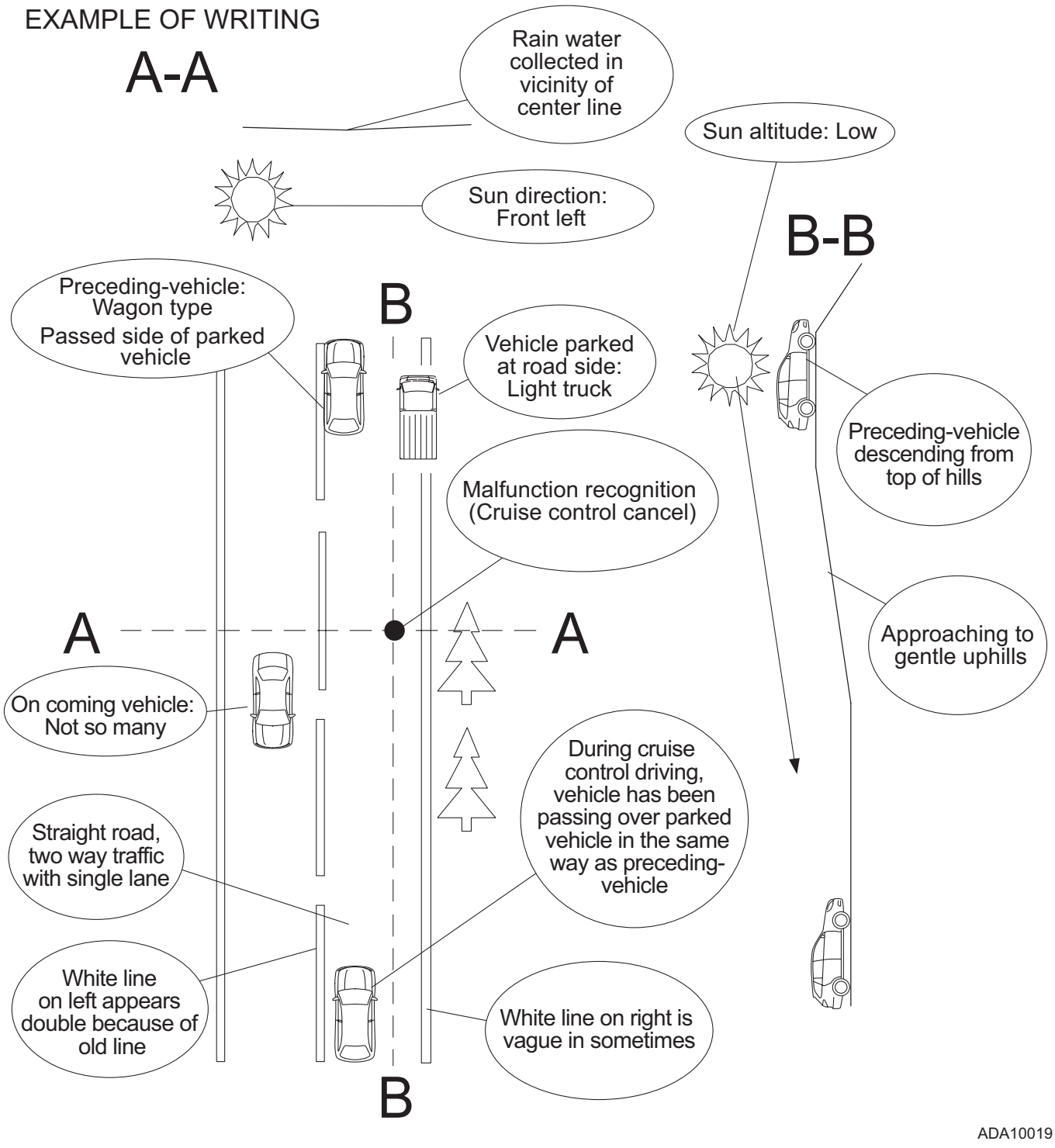
A: CHECK

Inspect the following items regarding the vehicle's state.

Writer/ Inspector	Writer's name		
	Inspector's Name		
Vehicle information	Car accessory equipment condition	Car accessory is installed to the windshield glass.	No/Yes (Position:)
		Other	No/Yes (Accessory's name:)
	Is there any modification for the following items?	Suspension?	Not changed / Changed (Specifically:)
		Headlight?	Not changed / Changed (Specifically:)
		Tire size?	Not changed / Changed (Specifically:)
		Front wiper?	Not changed / Changed (Specifically:)
	How is the condition around camera?	Is there any scratch or damage on the windshield glass?	No/Yes (Specifically:)
		Are antennas, etc. attached on the prohibited area?	No/Yes (Specifically:)
		Is wide mirror or accessory attached?	No/Yes (Specifically:)
	How is the surface condition of the windshield glass?	Presence of oil film, fogging, dirt and/or glass coating	No/Yes (Specifically:)
	How is the condition of the dashboard?	Is there anything that can be easily reflected against the windshield glass on the dashboard?	No/Yes (Specifically:)
	How is the deterioration of the wiper?	Does any streak or uneven wiping area remain in front of the camera?	No/Yes (Specifically:)
	How is the condition of the tire?	Is there any wear? Is there any excessive wear difference?	No/Yes (Specifically:)
		Is the air pressure proper?	Proper/Improper (Specifically:)
	How is the condition of the camera lens filter?	Is there finger print adhesion or cracks on the lens filter?	No/Yes (Specifically:)
Description of malfunction	What kind of malfunction has been detected?	Failure / temporary stop / faulty operation of adaptive cruise control / faulty operation of pre-collision brake / other faulty operations	
	What kind of DTC and/or cancel code is displayed?		
	How is the meter display?	EyeSight warning light	Off/On/Blink
		Pre-collision brake OFF indicator light	Off/On
		Lane departure warning OFF indicator light	Off/On
		Multi-information display	• EyeSight Disabled No Camera View • EyeSight Disabled Temp Range • EyeSight Disabled Check Manual

Check List for Interview

Occurrence conditions	Occurrence date		Occurrence location	
	Vehicle speed at occurrence	Approx. km/h (MPH)	Occurrence timing	During driving / during stopping / continues after engine has started
	Road type	Express way / limited highway / main highway / general road	Weather	Fine/cloudy/rainy/snowy/other
	Road condition ①	Dry/slippery (Rainy • compacted snow • icy road)	Ambient temperature	Approx. ° C(°F)
	Road condition ②	Asphalt / gravel / earth and sand / other	Position of solar radiation	Described in the detailed chart when the weather is fine.
	Road shape	Uphill / downhill / bank / roll / uneven surface	Time elapsed after engine start	Immediately after engine start / within 5 minutes after engine start / more than 5 minutes after engine start
	Wiper operation status	OFF/INT/LO/HI/AUTO	Light on status	Off / LO On / HI On
	Vehicle weight	Number of passengers: ( ), Did the vehicle carry heavy load? (No/Yes (Approx. kg))		
	Detailed chart (Refer to the example of description.)			
	In case of malfunction caused by temporary stop or faulty operation, describe the details by referring to the example below so that the following conditions can be recognized. (Images taken with a digital camera, etc. are acceptable.) • Road shape (straight, curve, tunnel, number of lane, etc.) • Road grade and it's change • Presence of white line, guardrails and/or side wall (degree of clarity) • Position of the sun • Presence and shape of preceding vehicle, oncoming vehicle, vehicle running on the next lane or pedestrian • Presence and shape of surrounding building or structure • Traveled course of own vehicle and preceding vehicle			


EXAMPLE OF WRITING
A-A
Rain water collected in vicinity of center line
Sun direction: Front left
Sun altitude: Low
B-B
Preceding-vehicle: Wagon type
Passed side of parked vehicle
B
Vehicle parked at road side: Light truck
Preceding-vehicle descending from top of hills
Malfunction recognition (Cruise control cancel)
A
A
Approaching to gentle uphills
On coming vehicle: Not so many
During cruise control driving, vehicle has been passing over parked vehicle in the same way as preceding-vehicle
Straight road, two way traffic with single lane
White line on left appears double because of old line
White line on right is vague in sometimes
B
ADA10019

3. General Description

A: CAUTION

1. AIRBAG SYSTEM

Airbag system wiring harness is routed near the cruise control command switch.

CAUTION:
• Do not use the electrical test equipment on the airbag system wiring harnesses and connector circuits.
• Be careful not to damage the airbag system wiring harness when servicing the cruise control command switch.

2. EyeSight

CAUTION:
• Do not hold the camera unit of the stereo camera.
• Do not touch the lens on the stereo camera.
• Do not clean the lens of the stereo camera.
• When cleaning the windshield glass, use care so that the glass cleaner, etc. does not come in contact with the lens of the stereo camera.
• Do not make an impact or apply excessive force to the stereo camera.
• Do not disassemble the stereo camera.
• Do not change the installation position of the stereo camera or do not modify the surrounding structure.
• If the stereo camera or windshield glass is removed or replaced, always adjust or check the stereo camera.
• When lifting up the vehicle to rotate the tires, turn off the pre-crash function.
• Stereo camera axis may be displaced even in a minor collision. So be sure to adjust the stereo camera even when the EyeSight warning light is not illuminated or when the "Stereo Camera Temporary Stop" is not displayed on the multi-information display.
• When removing the stereo camera cover assembly, cover it with a copy paper or similar dust-free paper to avoid any interference to the camera lens, and tape the paper while being careful not to let the adhesive surface contact the glass surface. Be sure to remove the paper after the procedure. <Ref. to ES-7, REMOVAL, Stereo Camera.>

B: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	Subaru Select Monitor 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to "Application help".

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Masking tape	Used for removing and installing stereo camera cover assembly.
DST-i	Used with Subaru Select Monitor 4.

C: INSPECTION

1. BATTERY

Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>

2. WINDSHIELD GLASS AND DASHBOARD

Remove the windshield glass and dashboard in front of the stereo camera.

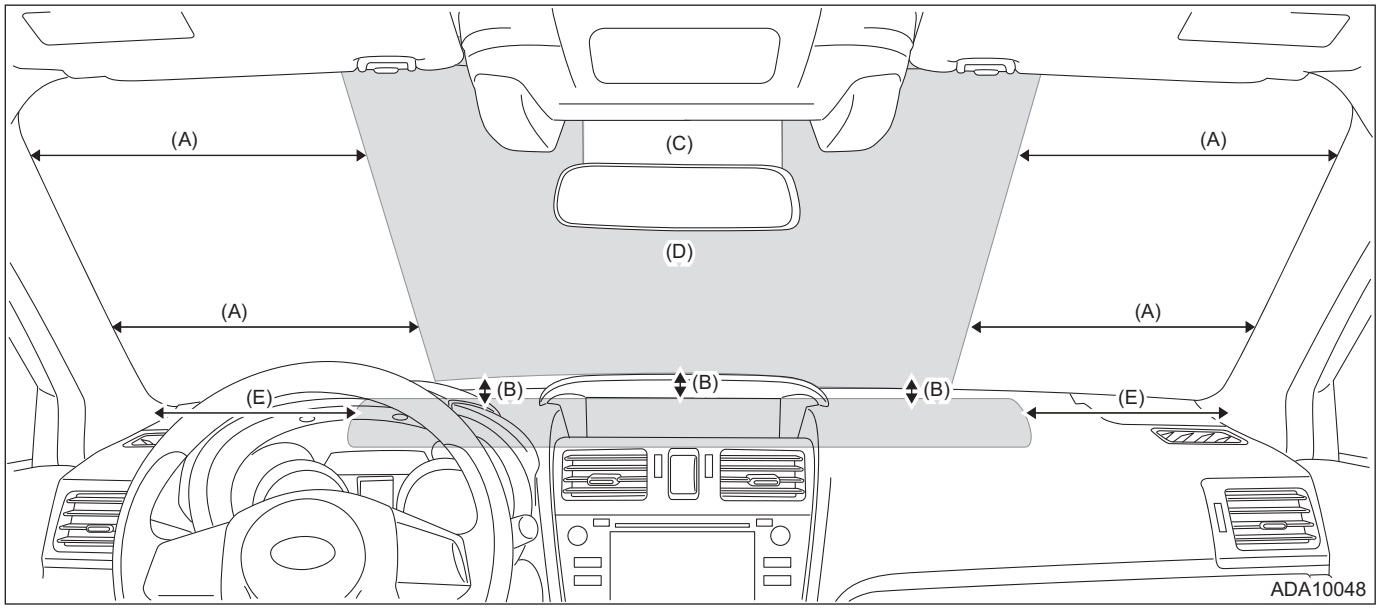
Standard:

There must be no oil film, dirt, scratch or fogging that obstructs the forward visibility of the stereo camera.

Do not stick or attach the aftermarket parts on the prohibited area (D) shown in the figure below. Even outside the prohibited area, if the abnormal operation occurs due to the reflection of the light or the reflection on the glass, change the adhering position or installation position.

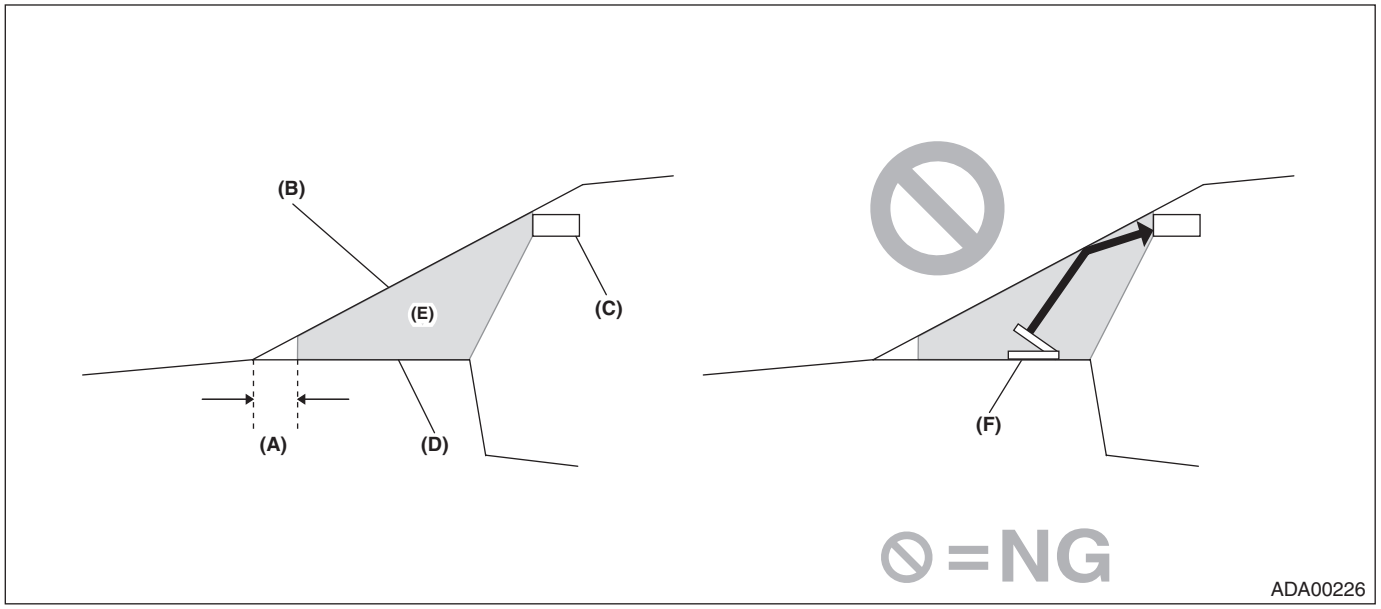
- ***Application of stickers or antennas, installation of wide-type mirror***
  - ***This will affect the visibility of the stereo camera, causing the function not to operate correctly.***
- ***Placement of navigation unit, ETC or other things on the dashboard***
  - ***These things will be reflected on the windshield glass, affecting the recognition of the stereo camera, thus causing the function not to operate correctly.***

- Front view



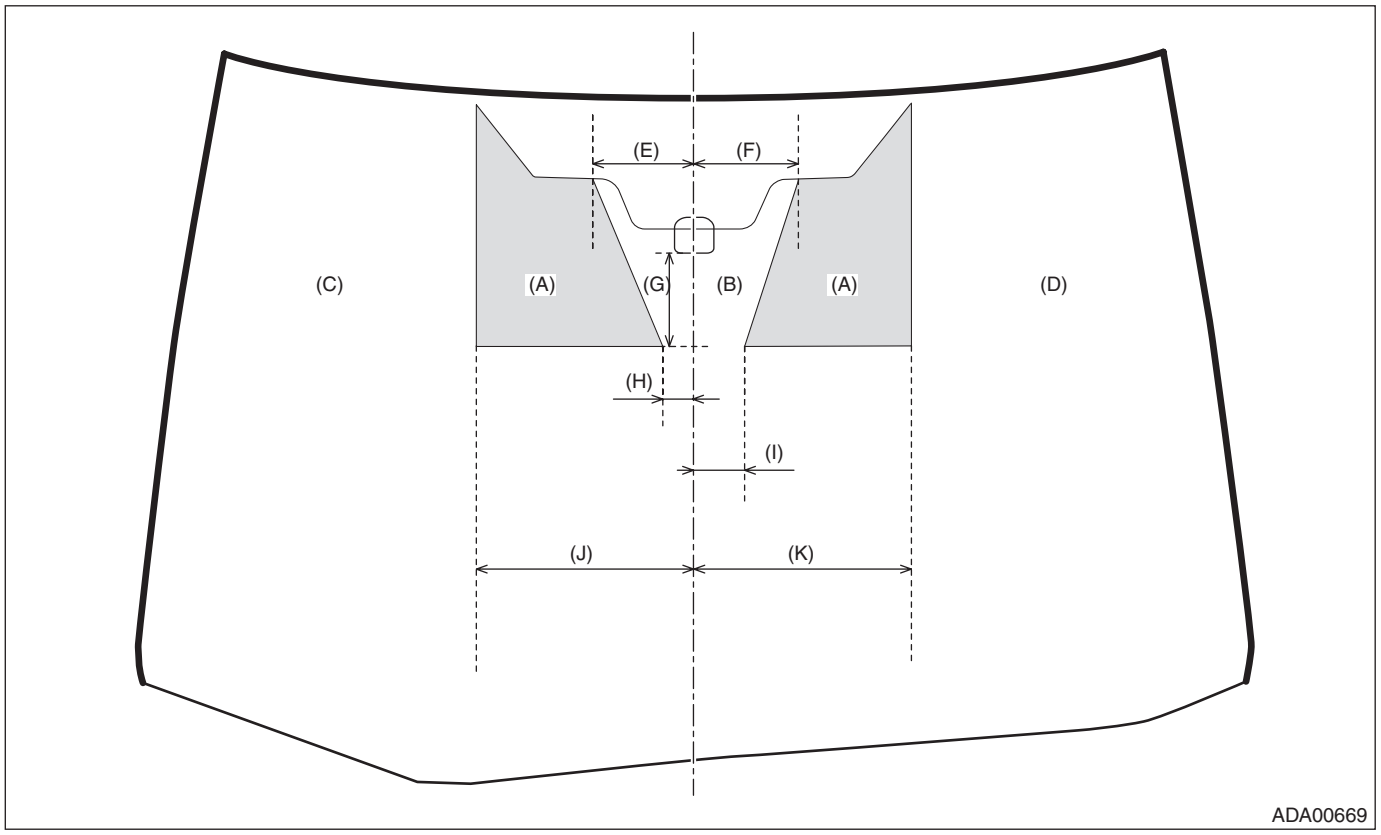
(A) 300 mm (11.8 in)
(B) 120 mm (4.7 in)
(C) Ceramic area
(D) Prohibited area
(E) 200 mm (7.9 in)

- Side view



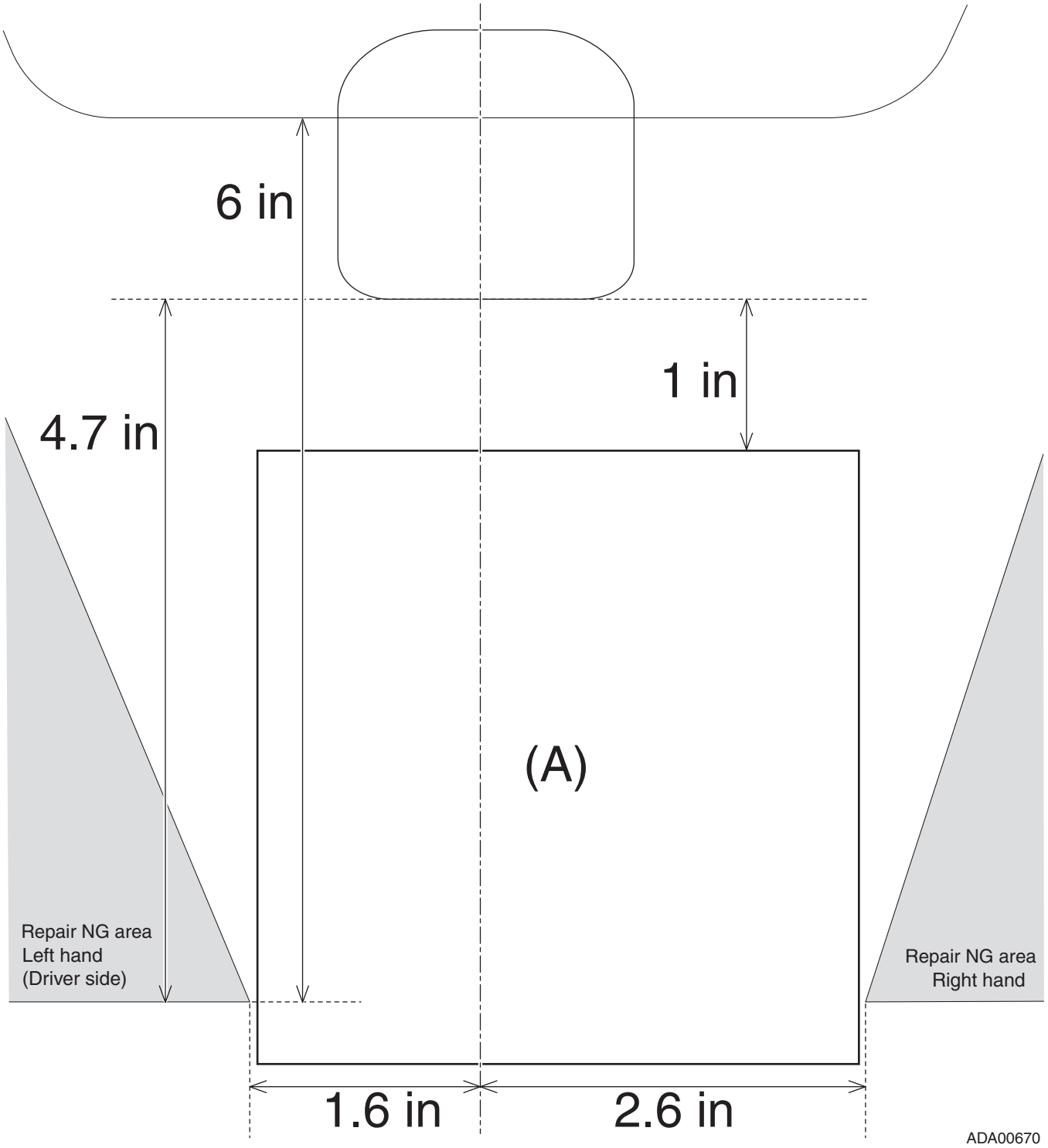
(A)	120 mm (4.7 in)	(C)	Stereo camera cover	(E)	Prohibited area
(B)	Windshield glass	(D)	Dashboard	(F)	External monitor etc.

NOTE:
- Clean the windshield glass if dirt or fogging is found on the glass. Repair or replace the glass if damage is found.
  – When cleaning the inner side of the windshield glass, be careful not to touch the lens of the stereo camera. Take care so that the glass cleaner is not applied to the lens. (As with the removal procedure of the stereo camera, cover the opening of camera cover with a copy paper or similar dust-free paper before the procedure, in order to avoid any interference to the camera lens, and tape the paper while being careful not to let the adhesive surface contact the glass surface. Be sure to remove the paper after the procedure. <Ref. to ES-7, REMOVAL, Stereo Camera.>
  – When replacing the windshield glass, be sure to replace the part for the EyeSight.
  – If the glass is removed or replaced, always perform the stereo camera adjustment and inspection.
- If the damage is found in the glass repair prohibited area shown in the figure below, replace the glass.
  – Damage in the prohibited area can affect the recognition of the stereo camera even if it is repaired, and thereby EyeSight function may not operate properly.



(A)	Glass repair prohibited area	(E)	130 mm (5.1 in)	(I)	65 mm (2.6 in)
(B)	Glass repairable area	(F)	135 mm (5.3 in)	(J)	280 mm (11.0 in)
(C)	Glass repairable area (LHD side)	(G)	120 mm (4.7 in)	(K)	280 mm (11.0 in)
(D)	Glass repairable area (RHD side)	(H)	40 mm (1.6 in)		

– Install the ETC transponder inside the area (A) shown in the figure below.
Before installing, attach a full-scale copy of the following figure onto the windshield glass surface to install the parts to correct positions.
  – Align the position with respect to the end of the ceramic area.
  – Prepare a full-scale copy in which the reference dimension on the upper part of the figure actually has 4 inches long.
  – Only the transponder with a thickness of 1.5 inches or less can be used.



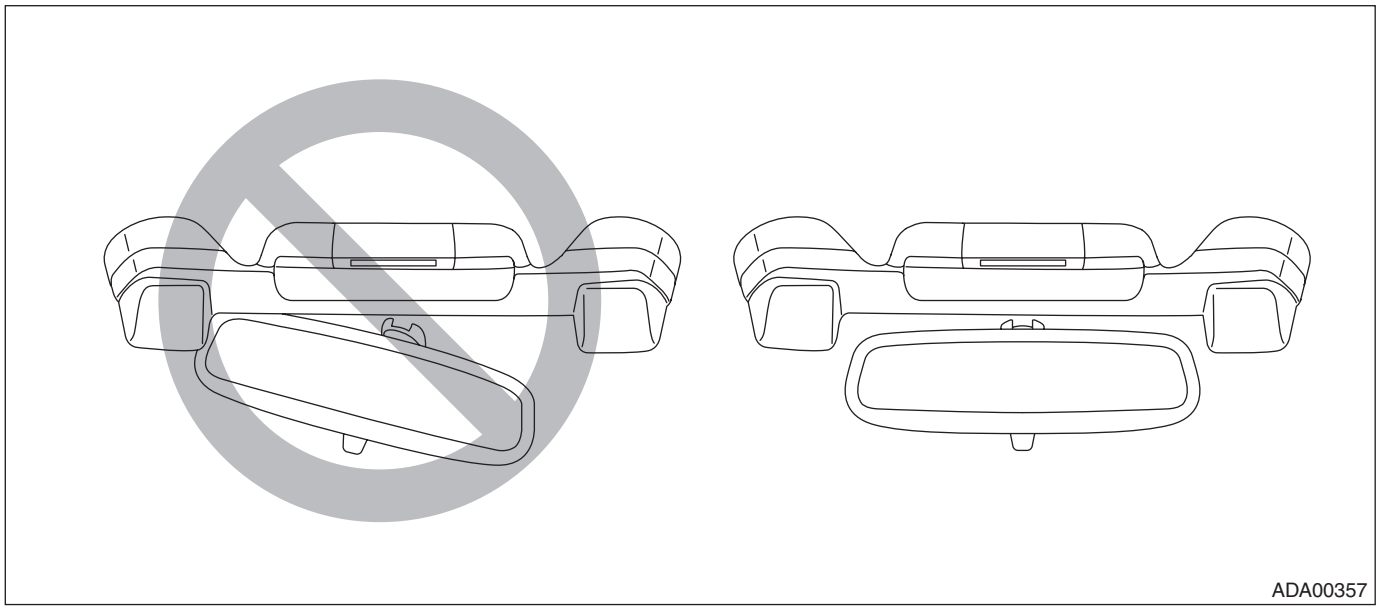
- Relocate any aftermarket parts out of the prohibited area.
- Do not touch the lens on the stereo camera. Do not clean the lens of the stereo camera. (If the lens surface is touched, the stereo camera must be replaced as it is impossible to clean the lens surface for ensuring quality.)

3. REAR VIEW MIRROR

Check the rear view mirror condition.

Standard:

The rear view mirror other than genuine parts shall not be used. (Wide mirrors shall not be used)
The visibility of the stereo camera shall not be blocked.
— This will affect the visibility of the stereo camera, causing the system not to operate correctly.



4. FRONT WIPER

Check the wiping condition of windshield glass.

Standard:

Use Subaru genuine part only for wiper blade body and blade rubber.
— Using the part other than genuine part will affect the recognition of the stereo camera, which may cause the function not to operate correctly.
Do not continue using the damaged blade rubber.
— The glass may be damaged. If the wiping performance decreases, or if the distinct streak is found, replace it as soon as possible.

NOTE:
Clean the windshield glass if there is an oil film or any dirt on the surface.

5. TIRE INFLATION PRESSURE

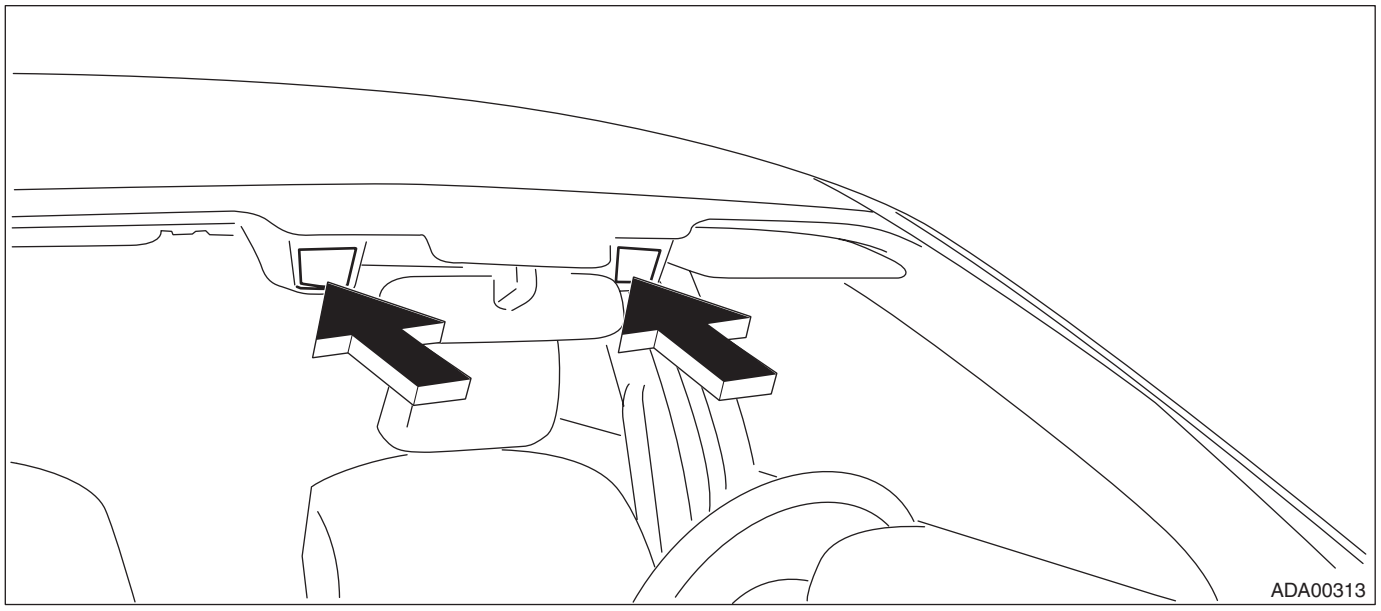
Check the tire air pressure.

Standard:

Adjust to the specified air pressure. <Ref. to WT-2, SPECIFICATION, General Description.>
Do not install worn tire or tires with excessive wear difference.
Install tires with specified size.

6. STEREO CAMERA

Through the windshield glass, check if there are any fingerprints or faults such as crack found on lens filters at the left and right camera lenses of the stereo camera.



NOTE:

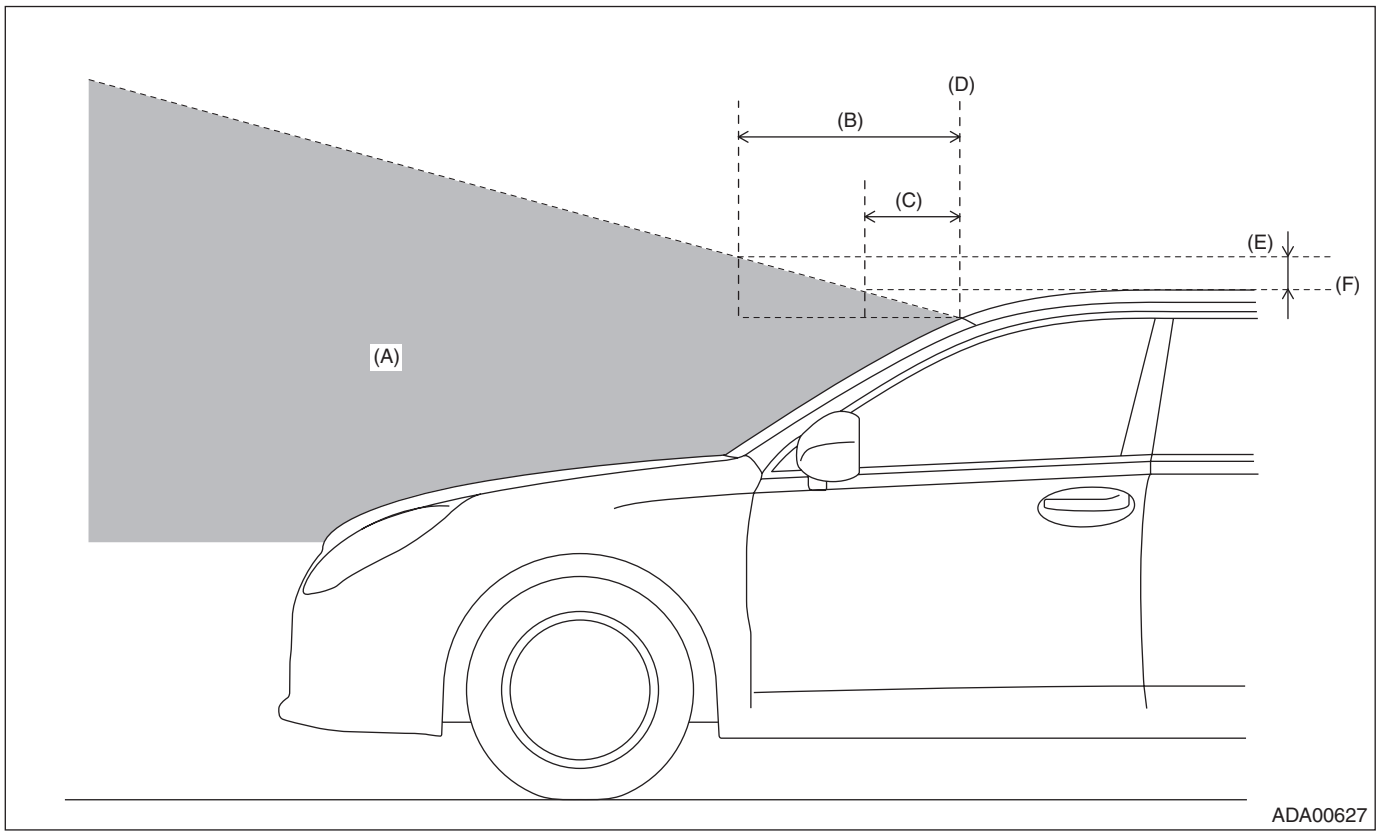
- Do not remove the camera or camera cover to check the lens.
- When spider's web or insects are found within the camera view or inside the lens hood, remove it by blowing air etc. while taking care not to touch the lens surface. Do not use a hand or a cloth.
- Thin and uniform adhesion of dust, dirt or tobacco stains to the lens filter surface resulting from normal use will not be an obstacle. Do not attempt to clean in such cases.
- If an oil film such as a fingerprint or any excessive dirt adheres, or if the lens filter cracks, replace the stereo camera. <Ref. to ES-7, Stereo Camera.>
- If the fingerprint adhesions or cracks occur on the lens filter, the following failures may arise.
  – The vehicle may not be able to detect the preceding vehicle or obstacle due to the effects of the headlight of the oncoming vehicle.
  – The vehicle may not be able to detect the preceding vehicle or obstacle due to the effects of the brake light operation of the preceding vehicle.
  – All the functions of the EyeSight may be suspended by the self-diagnosis function equipped with the camera.
  – When the lens filter is broken, the vehicle may not be able to detect the preceding vehicle or obstacle all day and all night.
- Do not clean the lens filter with any cleaner. It is quite difficult to uniformly clean both of the right and left lenses, and such an attempt just ends up spreading dirt and will cause problems as same as those from oil film.

7. LOAD ON THE ROOF

Check that load on the roof is not sticking out to the front of the stereo camera.

Standard:

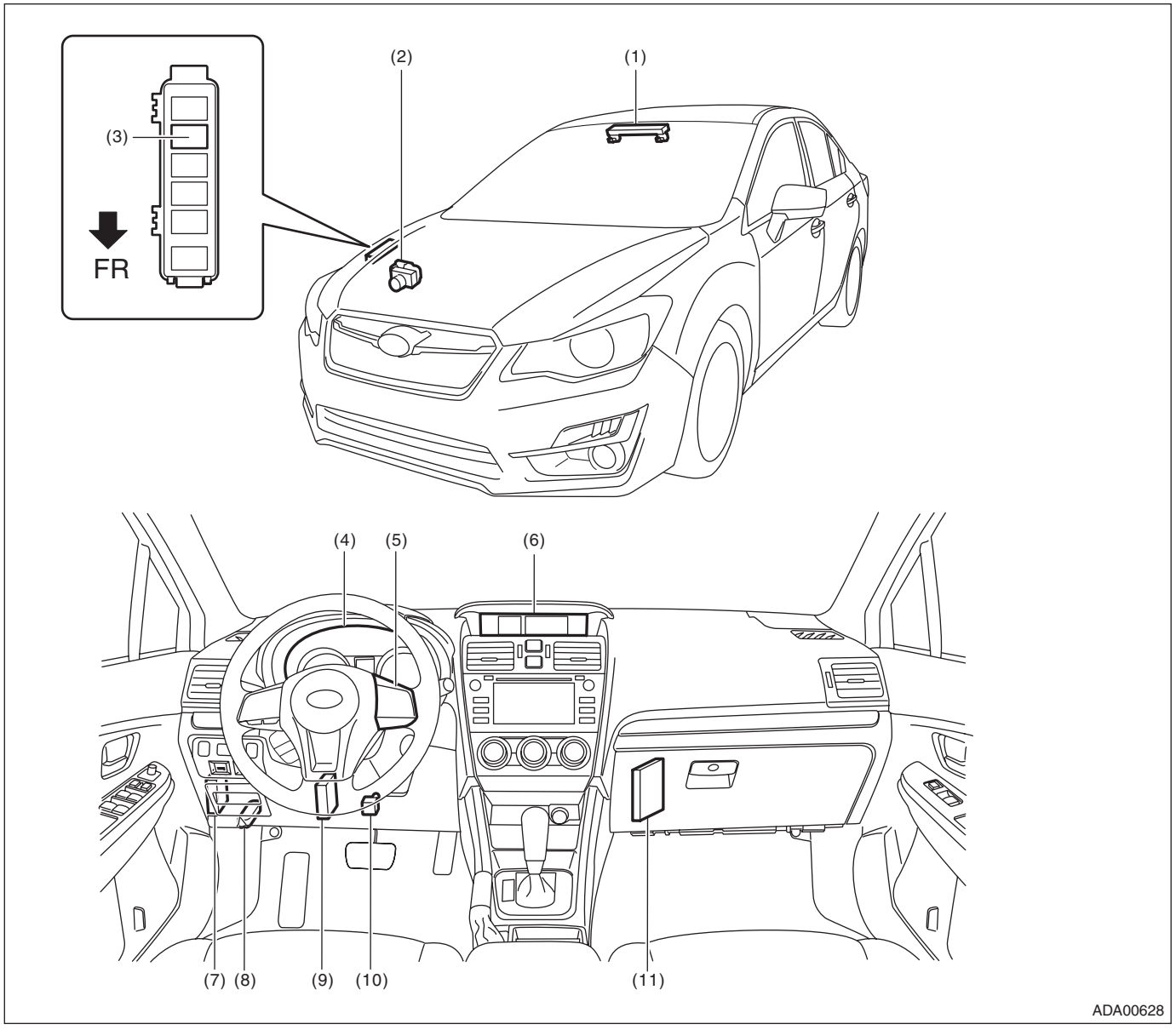
The load on the roof is placed outside the prohibited area (A) shown in the figure below.



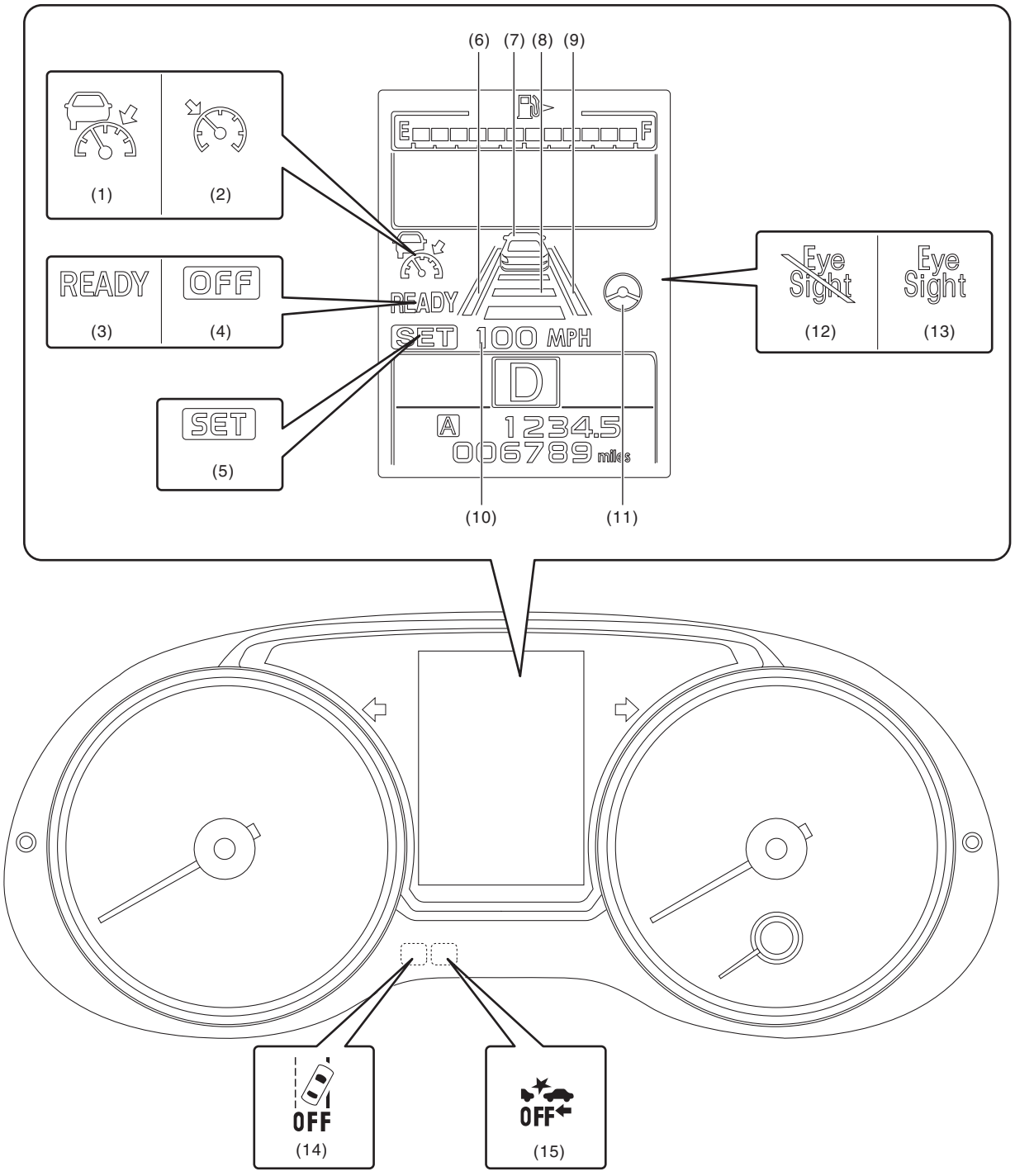
(A) Prohibited area
(B) 880 mm (34.6 in)
(C) 520 mm (20.5 in)
(D) Windshield glass upper end
(E) 100 mm (3.9 in)
(F) Highest surface of the roof

4. Electrical Component Location

A: LOCATION



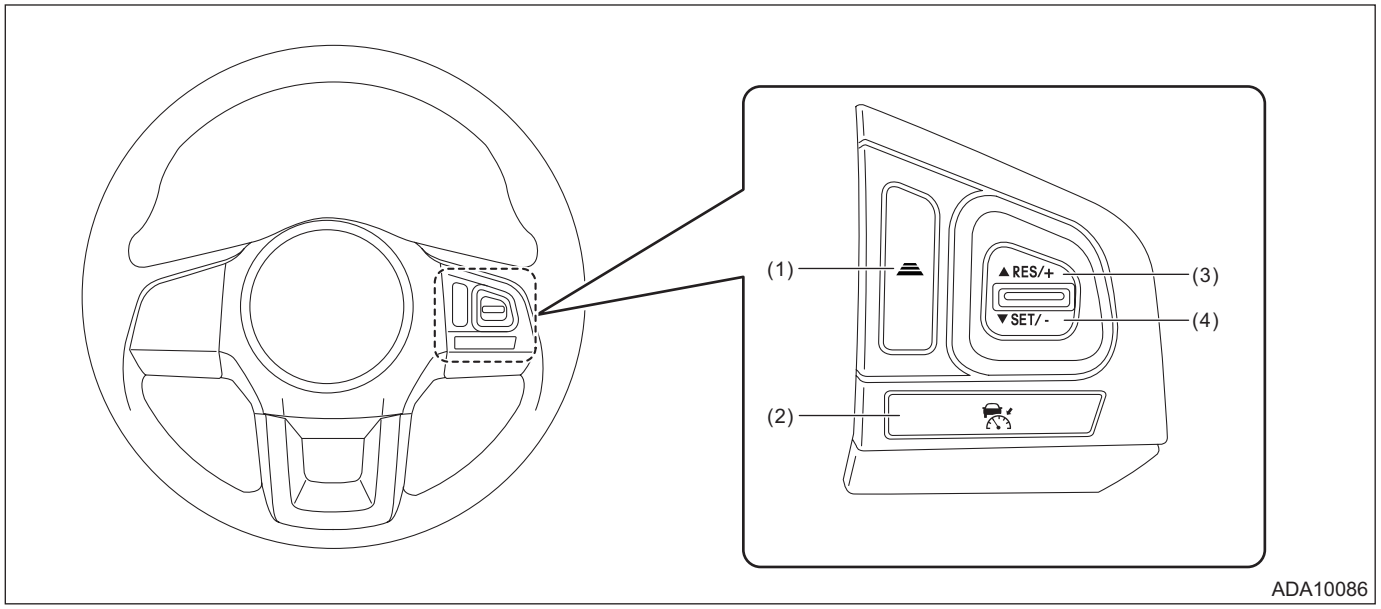
(1) Stereo camera
(2) VDC control module (VDCCM)
(3) Brake light relay
(4) Combination meter
(5) EyeSight steering switch
(6) MFD (multi-function display)
(7) Body integrated unit
(8) Data link connector
(9) Transmission control module (TCM)
(10) Stop light and brake switch
(11) ECM



ADA00629

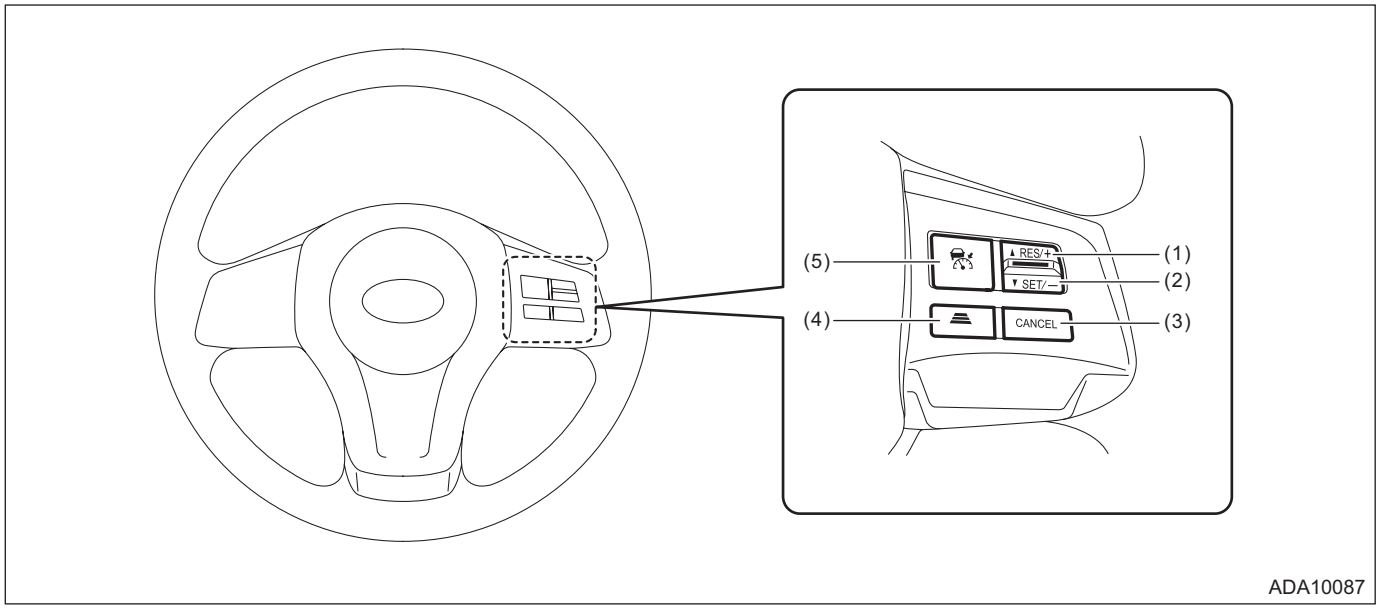
(1) Adaptive cruise display
(2) Conventional cruise display
(3) READY indicator
(4) OFF indicator
(5) SET indicator
(6) Lane indicator (left)
(7) Preceding vehicle indicator
(8) Following distance setting indicator
(9) Lane indicator (right)
(10) Set vehicle speed display
(11) Steering wheel indicator
(12) EyeSight temporary stop indicator
(13) EyeSight warning indicator
(14) Lane departure warning OFF indicator light
(15) Pre-collision brake OFF indicator light

- Crosstrek model



(1) Following distance setting switch
(2) CRUISE switch
(3) RES/+ (resume/plus) switch
(4) SET/– (set/minus) switch

- Except for Crosstrek model

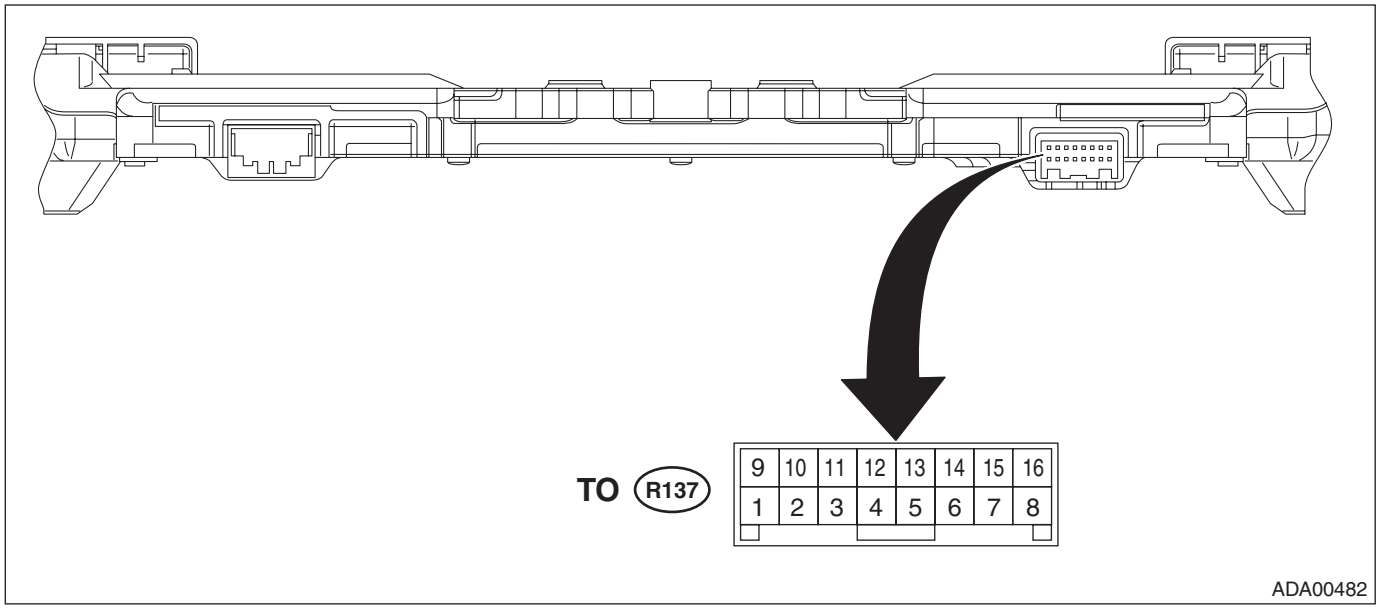


(1) RES/+ (resume/plus) switch
(2) SET/– (set/minus) switch
(3) CANCEL switch
(4) Following distance setting switch
(5) CRUISE switch

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

1. STEREO CAMERA



Terminal No.	Content	Measuring condition	Standard
(R137) No. 1	—	—	—
(R137) No. 2	—	—	—
(R137) No. 3	—	—	—
(R137) No. 4	—	—	—
(R137) No. 5	—	—	—
(R137) No. 6 ←→ Chassis ground	Ignition power supply	Ignition switch OFF → ON	Less than 1 V → 9 — 16 V
(R137) No. 7 ←→ Chassis ground	GND	Always	Less than 1 Ω
(R137) No. 8 ←→ Chassis ground	Battery power supply	Always	9 — 16 V
(R137) No. 9 ←→ Chassis ground	CAN L	Always	1 kΩ or more
(R137) No. 10 ←→ Chassis ground	CAN H	Always	1 kΩ or more
(R137) No. 11	—	—	—
(R137) No. 12 ←→ Chassis ground	Pre-collision brake OFF switch input	Pre-collision brake OFF switch OFF → ON	Approx. 1 kΩ → less than 1 Ω
(R137) No. 13 ←→ Chassis ground	Lane departure warning OFF switch input	Lane departure warning OFF switch OFF → ON	Approx. 1 kΩ → less than 1 Ω
(R137) No. 14 ←→ (R137) No. 15	EyeSight steering switch input (except for Crosstrek model)	ALL OFF (no switch operation)	3.6 V — 4.5 V
		ALL OFF → RES/+ ON	2.6 V — 3.5 V
		ALL OFF → following distance ON	1.6 V — 2.5 V
		ALL OFF → SET/– ON	0.6 V — 1.5 V
		ALL OFF → CRUISE ON	3.6 V — 4.5 V
		ALL OFF → CANCEL ON	0.0 V — 0.5 V
	EyeSight steering switch input (Crosstrek model)	ALL OFF (no switch operation)	3.6 V — 4.5 V
		ALL OFF → RES/+ ON	2.6 V — 3.5 V
		ALL OFF → following distance ON	3.6 V — 4.5 V
		ALL OFF → SET/– ON	0.6 V — 1.5 V
		ALL OFF → CRUISE ON	0.0 V — 0.5 V
(R137) No. 15 ←→ Chassis ground	EyeSight steering switch GND	Always	Less than 1 Ω
(R137) No. 16 ←→ (R137) No. 15	EyeSight steering switch input (except for Crosstrek model)	ALL OFF (no switch operation)	2.6 V — 5.0 V
		ALL OFF → RES/+ ON	2.6 V — 5.0 V
		ALL OFF → following distance ON	2.6 V — 5.0 V
		ALL OFF → SET/– ON	2.6 V — 5.0 V
		ALL OFF → CRUISE ON	0.0 V — 2.5 V
		ALL OFF → CANCEL ON	2.6 V — 5.0 V
	EyeSight steering switch input (Crosstrek model)	ALL OFF (no switch operation)	2.6 V — 5.0 V
		ALL OFF → RES/+ ON	2.6 V — 5.0 V
		ALL OFF → following distance ON	0.0 V — 2.5 V
		ALL OFF → SET/– ON	2.6 V — 5.0 V
		ALL OFF → CRUISE ON	2.6 V — 5.0 V

2. ENGINE CONTROL MODULE (ECM)

For details on the input/output signals for the engine control module, refer to ENGINE (DIAGNOSTICS). <Ref. to EN(H4DO w/o HEV)(diag)-20, Engine Control Module (ECM) I/O Signal.>

3. VDC CONTROL MODULE (VDCCM)

For details on the input/output signals for VDC control module, refer to VDC (DIAGNOSTICS). <Ref. to VDC(diag)-12, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

4. TRANSMISSION CONTROL MODULE (TCM)

For details on the input/output signals for the transmission control module, refer to AUTOMATIC TRANSMISSION (DIAGNOSTICS). <Ref. to CVT(w/o HEV)(diag)-11, Transmission Control Module (TCM) I/O Signal.>

5. BODY INTEGRATED UNIT

Refer to the BODY CONTROL SYSTEM (DIAGNOSTICS) for the I/O Signal of the body integrated unit. <Ref. to BC(diag)-6, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

6. COMBINATION METER

For details on the input/output signals for the combination meter, refer to INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS). <Ref. to IDI(diag)-7, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

7. MFD

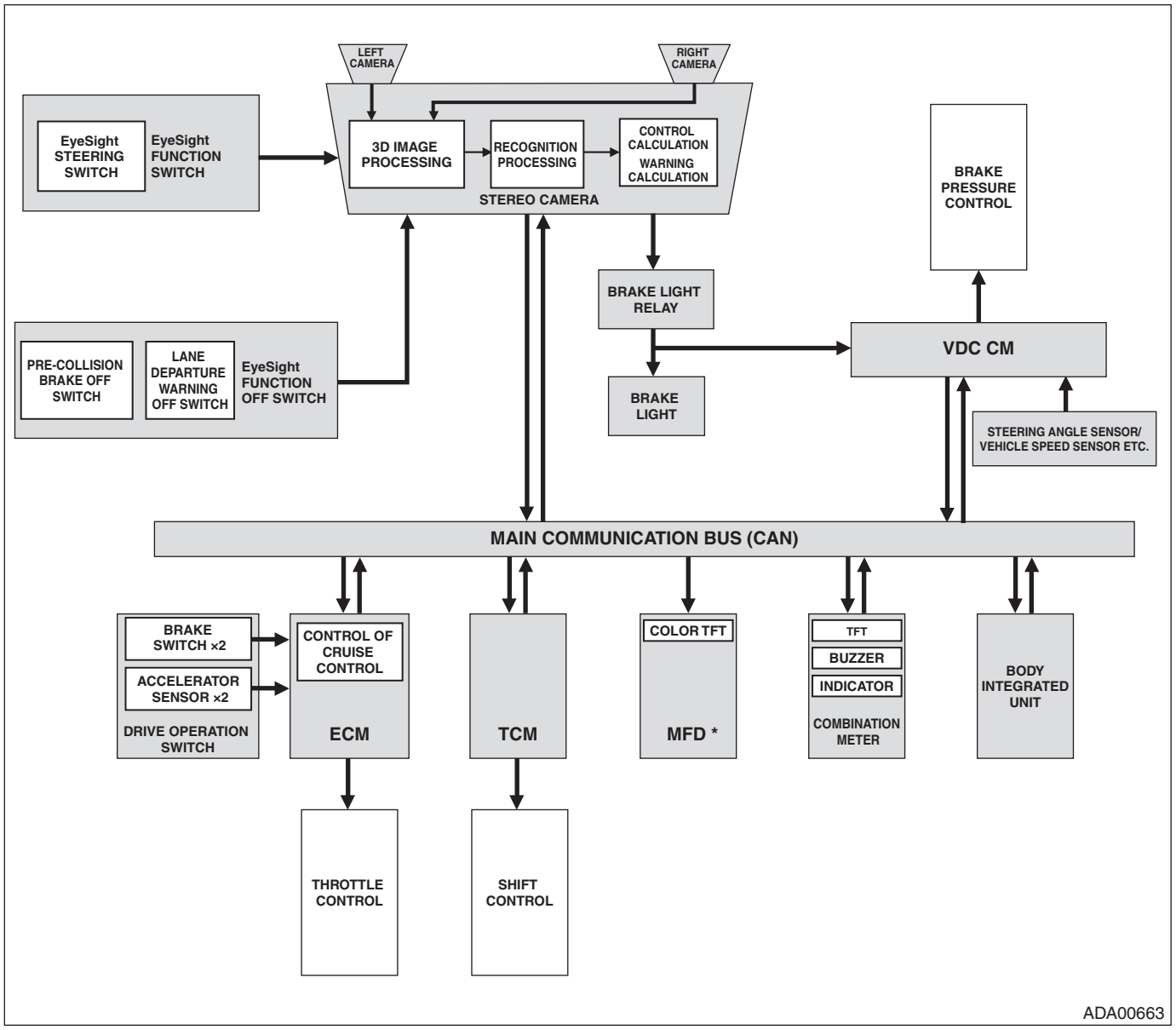
For details on the input/output signals for MFD, refer to INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS). <Ref. to IDI(diag)-7, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

B: WIRING DIAGRAM

Refer to “EyeSight System” in the wiring diagram. <Ref. to WI(w/o HEV)-130, EyeSight System.>

C: SYSTEM BLOCK DIAGRAM

Main signals used between stereo camera and relevant CM



*: Only for models with high-grade MFD

6. Subaru Select Monitor

A: OPERATION

1. GENERAL DESCRIPTION

For on-board diagnosis function of the EyeSight, use the Subaru Select Monitor.
The on-board diagnosis function operates in three categories, which are used depending on the type of problems.
1) Diagnosis with diagnostic trouble code (DTC):
When the electrical failure occurs in the EyeSight, DTC is detected from the stereo camera. If the DTC is detected, the relevant DTC is displayed by illuminating or blinking the EyeSight warning light. To check the details concerning the DTC, use the Subaru Select Monitor.
2) Diagnosis with cancel code:
(1) This category of diagnosis requires actual driving of the vehicle in order to determine the cause in such a case when the set speed is cancelled during cruise control driving although cruise cancel condition is not entered.
(2) With ECM cancel code and stereo camera ACC cancel code, cancel condition (Code No.) is stored when detected during cruise control driving.

CAUTION:
• With ECM cancel code, not only the cruise control "cancel" occurred (although the driver does not input the "cancel" operation), but also the "cancel" condition input by the driver is stored.
• The latest memory contents of the ECM cancel code (latest code) is cleared when the ignition switch is turned to OFF. However, memory contents created by the diagnosis of switches related to system and cruise control will be kept as the trouble history (memory code) after turning the ignition switch to OFF.
3) Real-time diagnosis:
Real-time diagnosis function is used to determine whether or not the input signal system is in good order, according to signal emitted from switches, sensors, etc.
(1) Vehicle cannot be driven at cruise speed when the problem occurs in the cruise control system or relevant circuits.
(2) Monitor the signal conditions from switches and sensors.

2. BASIC OPERATION

For detailed operation procedures, refer to "Application help".

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

- Communication error with stereo camera

DETECTING CONDITION:

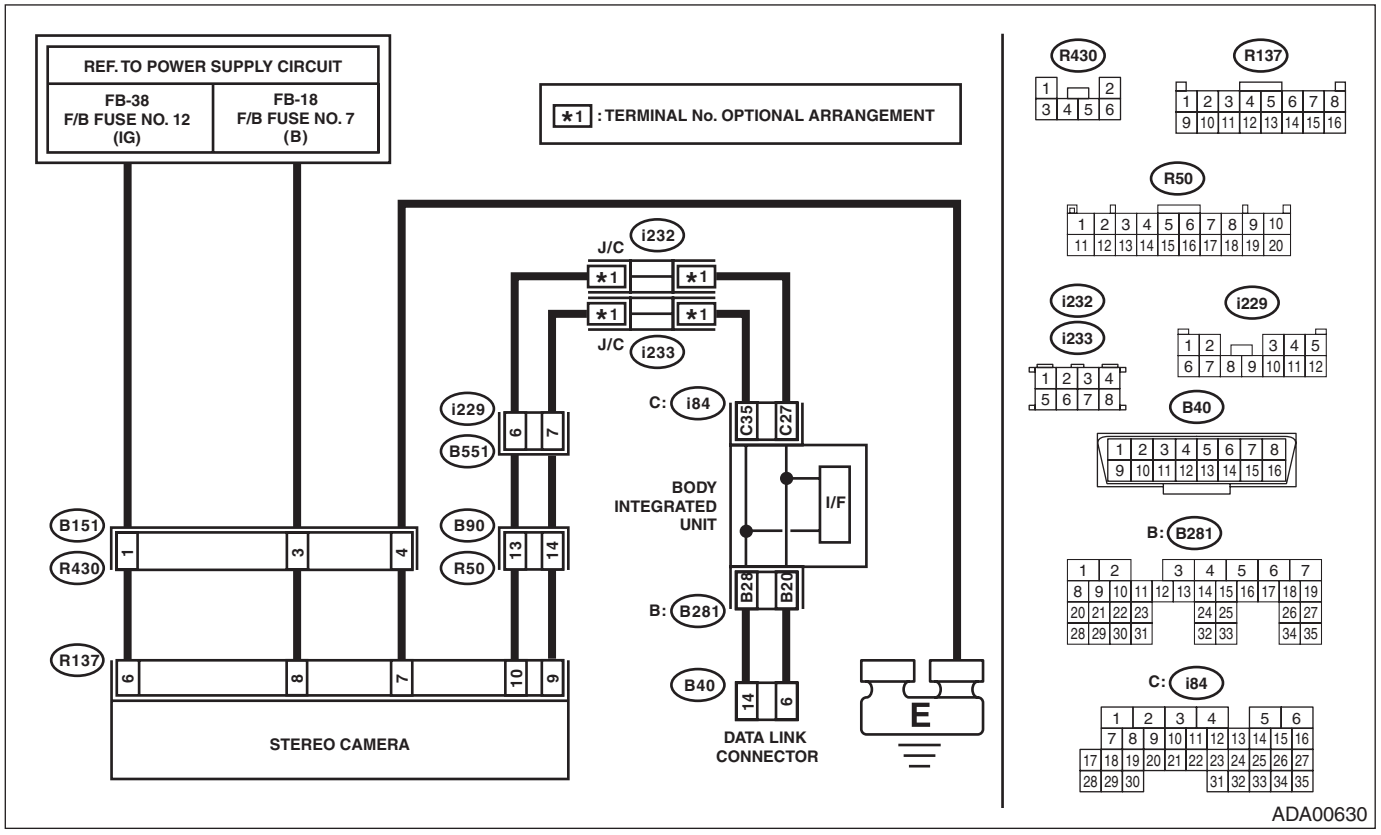
- Defective harness connector
- Power supply circuit malfunction
- Defective stereo camera
- Defective CAN system
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

- EyeSight warning light blinks.

WIRING DIAGRAM:

EyeSight System <Ref. to WI(w/o HEV)-130, WIRING DIAGRAM, EyeSight System.>



Step		Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select «EyeSight» using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 10 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.**	Is the battery terminal contact proper?	Go to step **4**.	Connect the battery terminal securely or replace it.

	Step	Check	Yes	No
4	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether the communication can be executed normally.	Is the communication between Subaru Select Monitor and body integrated unit normal?	Go to step **5**.	Check the connection of the Subaru Select Monitor, and perform communication with the body integrated unit again.
5	**READ DTC OF BODY INTEGRATED UNIT.** Select «Body Control», and check DTC.	Is any DTC other than "Lost Communication With EyeSight" detected?	Perform the diagnosis according to DTC.	Go to step **6**.
6	**CHECK HARNESS CONNECTOR BETWEEN STEREO CAMERA AND DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the stereo camera connector. 3) Measure the resistance between the stereo camera and the data link connector. ***Connector & terminal*** ***(R137) No. 10 — (B40) No. 6:*** ***(R137) No. 9 — (B40) No. 14:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair or replace the harness and connectors between the stereo camera and data link connector.
7	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. 2) Measure the voltage between stereo camera and chassis ground. ***Connector & terminal*** ***(R137) No. 6 (+) — Chassis ground (–):*** ***(R137) No. 8 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **8**.	Repair or replace the harness and connectors between the stereo camera and fuse.
8	**CHECK GROUND CIRCUIT.** 1) Turn the ignition switch to OFF, then disconnect the ground cable from battery. 2) Measure the resistance between harness connector of stereo camera and chassis ground. ***Connector & terminal*** ***(R137) No. 7 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **9**.	Check the harness from stereo camera to chassis ground.
9	**CHECK CONNECTOR.**	Is there poor contact of stereo camera connector?	Repair the connector, or replace harness.	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

7. Read Current Data

A: OPERATION

1. STEREO CAMERA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «EyeSight» and select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

• LIST

Display	Content	Unit of measure	Reference
Camera ID	Display of serial No. inside the stereo camera	—	—
Control Software Version	Control software version	—	—
Recognition Software Version	Recognition software version	—	—
Model registration information	Display of displacement and vehicle model	—	—
ECU Power Supply Voltage (IG)	Display of input voltage of stereo camera	V	—
Initial Aiming Completion Status	Initial aiming completion flag	—	Finished (After factory shipping, when stereo camera is replaced or adjusted, «Not Finish» is displayed.)
Aiming Completion Status	Aiming completion flag	—	Not Finish (After factory shipping, when stereo camera is replaced or adjusted, «Finished» is displayed.)
Ignition SW ON Count	Total count of ignition switch ON	times	—
Trip Meter	Odometer value	•km •mile	—
Front Axle Wheel Average Speed	Front axle average wheel speed	km/h	—
Engine Speed	Engine speed	rpm	—
Accel opening angle	Acceleration opening angle signal	%	—
ETC Throttle Angle Signal	Electronic throttle control opening angle signal	%	—
Steering Angle Sensor Value (Right +) (Left -)	Steering angle sensor value signal	deg	—
Longitudinal G Sensor Value (Deceleration +) (Acceleration -)	Longitudinal acceleration	m/s^2	—
Brake Fluid Target Pressure	Target value of brake fluid pressure	MPa	—
Master Cylinder Actual Fluid Pressure	Brake pressure	MPa	—
Target Torque	Target torque command signal	Nm	—
Engine Torque	Actual engine shaft torque value	Nm	—
AT rapid start prevention, engine torque down command value	AT false start prevention control, engine torque down command value	Nm	—

Display	Content	Unit of measure	Reference
Warning Code	Warning code signal	—	• No alarm • HALT • Brake More or Following Distance or Pre-Collision Brake(1st) • ACC Cancel • Pre-Collision Brake (2nd Braking) • Lane Departure Warning (Left) Lane Departure Warning (Right) • Lane Sway Warning • Detection/Lost Beep • Lead Vehicle Start Alert • Pre-Collision Throttle Management
Brake SW Input	Brake switch signal status	—	• OFF • ON
Brake Lamp SW (BIU)	Brake light switch signal status	—	• OFF • ON
Brake Lamp SW (VDC)	Brake light switch status	—	• OFF • ON
Current Gear Position	Current gear position signal	—	• P • R • Auto Neutral • 6 • 5 • 4 • 3 • 2 • 1 • N
SI Drive Mode	SI-DRIVE mode (display)	—	• OFF • S# • I • S
Trip Count	Number of ignition ON	times	—
Count	Original counts identification information	—	—
Time Count [msec]	Elapsed time after ignition switch ON	ms	—
Automatic Adjustment Status	Automatic adjustment status	—	—
Lane Recognition Status	Display of lane recognition status	—	• Other than follows: 00 • Both lanes are recognized at 40 km/h (25 MPH) or more: 03 • Both lanes are recognized at 65 km/h (40 MPH) or more: 05 • 11 (when right and left lanes are recognized)
Distance from Leading Vehicle	Display of distance from preceding vehicle	m	—
EyeSight Temporary 0 Count	Occurrence count of EyeSight temporary stop 0	times	Refer to “List of contents for camera temporary stop”. <Ref. to ES(diag)-68, LIST OF CONTENTS FOR CAMERA TEMPORARY STOP, LIST, EyeSight Temporary Code(s) Display.>
EyeSight Temporary 1 Count	Occurrence count of EyeSight temporary stop 1	times	
EyeSight Temporary 2 Count	Occurrence count of EyeSight temporary stop 2	times	
EyeSight Temporary 3 Count	Occurrence count of EyeSight temporary stop 3	times	
EyeSight Temporary 4 Count	Occurrence count of EyeSight temporary stop 4	times	
EyeSight Temporary 5 Count	Occurrence count of EyeSight temporary stop 5	times	
EyeSight Temporary 6 Count	Occurrence count of EyeSight temporary stop 6	times	
EyeSight Temporary 7 Count	Occurrence count of EyeSight temporary stop 7	times	
EyeSight Temporary 8 Count	Occurrence count of EyeSight temporary stop 8	times	

Display	Content	Unit of measure	Reference
EyeSight Temporary 9 Count	Occurrence count of EyeSight temporary stop 9	times	Refer to “List of contents for camera temporary stop”. <Ref. to ES(diag)-68, LIST OF CONTENTS FOR CAMERA TEMPORARY STOP, LIST, EyeSight Temporary Code(s) Display.>
EyeSight Temporary 10 Count	Occurrence count of EyeSight temporary stop 10	times	
EyeSight Temporary 11 Count	Occurrence count of EyeSight temporary stop 11	times	
EyeSight Temporary 12 Count	Occurrence count of EyeSight temporary stop 12	times	
EyeSight Temporary 13 Count	Occurrence count of EyeSight temporary stop 13	times	
EyeSight Temporary 14 Count	Occurrence count of EyeSight temporary stop 14	times	
EyeSight Temporary 15 Count	Occurrence count of EyeSight temporary stop 15	times	
EyeSight Temporary 16 Count	Occurrence count of EyeSight temporary stop 16	times	
EyeSight Temporary 17 Count	Occurrence count of EyeSight temporary stop 17	times	
EyeSight Temporary 18 Count	Occurrence count of EyeSight temporary stop 18	times	
EyeSight Temporary 19 Count	Occurrence count of EyeSight temporary stop 19	times	
EyeSight Temporary 20 Count	Occurrence count of EyeSight temporary stop 20	times	
EyeSight Temporary 21 Count	Occurrence count of EyeSight temporary stop 21	times	
EyeSight Temporary 22 Count	Occurrence count of EyeSight temporary stop 22	times	
EyeSight Temporary 23 Count	Occurrence count of EyeSight temporary stop 23	times	
EyeSight Temporary 24 Count	Occurrence count of EyeSight temporary stop 24	times	
EyeSight Temporary 25 Count	Occurrence count of EyeSight temporary stop 25	times	
EyeSight Temporary 26 Count	Occurrence count of EyeSight temporary stop 26	times	
EyeSight Temporary 27 Count	Occurrence count of EyeSight temporary stop 27	times	
EyeSight Temporary 28 Count	Occurrence count of EyeSight temporary stop 28	times	
EyeSight Temporary 29 Count	Occurrence count of EyeSight temporary stop 29	times	
EyeSight Temporary 30 Count	Occurrence count of EyeSight temporary stop 30	times	
EyeSight Temporary 31 Count	Occurrence count of EyeSight temporary stop 31	times	
Camera Failure Check 1	Camera failure supplementary information	—	—
Camera Failure Check 2			
Camera Failure Check 3			
Camera Failure Check 4			
Camera Failure Check 5			
Cruise Control Main Status (ECM → EyeSight)	Cruise switch status	—	• OFF • ON
Cruise Control Indicator (EyeSight → Combination Meter)	CRUISE indicator ON signal	—	• OFF • ON
Cruise Control Main Display (ECM → EyeSight)	CRUISE indicator ON request signal	—	• OFF • ON
Cruise Control SW (EyeSight → ECM)	Status of the EyeSight steering switch (EyeSight → ECM)	—	• OFF • Main ON • SET/- (Shallow) ON • SET/- (Deep) ON • RES/+ (Shallow) ON • RES/+ (Deep) ON • Cancel ON • Open

Display	Content	Unit of measure	Reference
Cruise Control SW Voltage (Port14)	Cruise control switch input voltage on the port 14 side	V	Normal voltage range at each switch operation <Except for Crosstrek model> • No operation (all SW operation OFF): 3.6 — 4.5 • CRUISE ON: 3.6 — 4.5 • CANCEL ON: 0.0 — 0.5 • SET/- ON: 0.6 — 1.5 • F.D. ON: 1.6 — 2.5 • RES+ ON: 2.6 — 3.5 <Crosstrek model> • No operation (all SW operation OFF): 3.6 — 4.5 • F.D. ON: 3.6 — 4.5 • CRUISE ON: 0.0 — 0.5 • SET/- ON: 0.6 — 1.5 • RES+ ON: 2.6 — 3.5
Cruise Control SW Voltage (Port16)	Cruise control switch input voltage on the port 16 side	V	Normal voltage range at each switch operation <Except for Crosstrek model> • No operation (all SW operation OFF): 2.6 — 5.0 • CRUISE ON: 0.0 — 2.5 • CANCEL ON: 2.6 — 5.0 • SET/- ON: 2.6 — 5.0 • F.D. ON: 2.6 — 5.0 • RES+ ON: 2.6 — 5.0 <Crosstrek model> • No operation (all SW operation OFF): 2.6 — 5.0 • F.D. ON: 0.0 — 2.5 • CRUISE ON: 2.6 — 5.0 • SET/- ON: 2.6 — 5.0 • RES+ ON: 2.6 — 5.0
Cruise Control Set Status (ECM → EyeSight)	Status of the cruise control set status	—	• Released • Set
Cruise Control Set ON (EyeSight → Combination Meter)	SET indicator illumination signal	—	• OFF • ON
Cruise Control Set Display (ECM → EyeSight)	Request signal for SET indicator illumination	—	• OFF • ON
Cruise Control Mode	Cruise control mode signal	—	• ACC Mode • CC Mode
Pre-Collision Brake OFF Display Signal	Pre-collision brake OFF indicator light illumination command signal	—	• OFF • ON
Pre-Collision Brake OFF SW Status (BIU)	Pre-collision brake OFF switch status	—	• OFF • ON • Disconnected
Pre-Collision Brake Function	ON/OFF status of pre-collision brake function	—	• OFF • ON
Lane Departure Warning OFF Indicator	Lane departure warning OFF indicator light illumination command signal	—	• OFF • ON
Lane Departure Warning Function	ON/OFF status of the lane departure warning function	—	• OFF • ON
Lane Departure Warning OFF SW	Lane departure warning OFF switch status	—	• OFF • ON • Disconnected

Display	Content	Unit of measure	Reference
Vehicle Speed Set Display	Cruise control set vehicle speed set value	•km/h •MPH	—
Cruise Control Set Speed	Set vehicle speed value for cruise control	•km/h •MPH	—
Drive Wheel Average Speed	Average wheel speed signal	km/h	—
Front Left Wheel Speed	Front left wheel speed signal	km/h	—
Front Right Wheel Speed	Front right wheel speed signal	km/h	—
Rear Left Wheel Speed	Rear left wheel speed signal	km/h	—
Rear Right Wheel Speed	Rear right wheel speed signal	km/h	—
Wheel Speed (Pulse)	Wheel speed pulse counter signal	—	—
CVT Target Revolution Speed Control Signal	CVT target revolution speed command signal	—	• OFF • ON
CVT Target Revolution Speed Value	CVT target revolution speed	rpm	—
Transmission Turbine Speed	AT turbine speed signal	rpm	—
Driver Torque Request	Torque value requested by driver	Nm	—
Accelerator wide opening judgment status	Signal that judges the accelerator opening angle to be “wide”	—	• Not established • Established
Intake Manifold Pressure Absolute	Engine intake manifold pressure	mmHg	—
Gear Ratio	Current total reduction ratio signal	—	—
Atmosphere Pressure	Atmospheric pressure signal	mmHg	—
Adaptive Cruise Control Brake Control Status	Brake control permission signal for adaptive cruise control	—	• OFF • ON
Adaptive Cruise Control Braking Signal	Actuation signal of brake control	—	• Not performed • Perform
Adaptive Cruise Control Braking (ACC or Driver) Status (for CVT)	Adaptive cruise control braking (driver or control) signal (for CVT)	—	• No Braking • Braking applied
Hill Down Mode	Hill down mode signal	—	• Releasing • Going Down Grade
READY Display	READY indicator illumination signal	—	• OFF • ON
Vehicle Distance Setting Display	Vehicle distance setting indicator signal	—	• Follow Far Distance • Follow Medium Distance • Follow Close Distance • Conventional Cruise Control
Preceding vehicle indication	Preceding vehicle indicator signal	—	• OFF • ON • Blink
Distance from Leading Vehicle	Preceding vehicle distance signal	m	• $0 \leq x < 5$ • $5 \leq x < 10$ • $10 \leq x < 15$ • $15 \leq x < 20$ • $20 \leq x < 25$ • $25 \leq x < 30$ • $30 \leq x < 35$ • $35 \leq x < 40$ • $40 \leq x < 45$ • $45 \leq x < 50$ • $50 \leq x < 55$ • $55 \leq x < 60$ • $60 \leq x < 65$ • $65 \leq x < 70$ • $70 \leq x < 75$ • $75 \leq x$

Display	Content	Unit of measure	Reference
Adaptive Cruise Control OFF Display	OFF indicator signal	—	• OFF • ON • Blink
Adaptive Cruise Control Stop Hold Status	Signal of stop and hold status before reservation	—	• OFF • ON (stop holding and before reserve)
EPB Hill Hold Prohibited	Hill hold prohibition signal	—	• ON • OFF
Idling Stop Brake Input Status	Auto Start Stop brake cooperation signal	—	• Disengaged • Engaged
Fuel Cut Control Status	Fuel cut control permission signal	—	• ON • OFF
All Cylinder Fuel Cut Status	Fuel cut signal	—	• Normal • Cut
Low Speed Following	Low speed following mode signal	—	• No • Yes
Display for Adaptive Cruise Control Cancel Reason	Display for adaptive cruise control cancel reason	—	• Not Cancel • No Manual Mode or No D Position • Door Open • Driver Seat Belt Unfastened • Parking Brake Operation • Steering Operation • High Speed • ABS Operation • VDC Operation • Road Surface Steep Slope • Other
Adaptive Cruise Control Forced Cancel	Adaptive cruise control forced cancel signal	—	• No • Yes
EyeSight Deceleration Request (VDC)	Deceleration request reception status signal from stereo camera	—	• Not yet received • Receive
Parking Brake SW	Parking brake switch signal status	—	• OFF • ON
Driver Brake Detection	Driver brake detection signal	—	• OFF • ON
Driver Door Status	Driver's door switch signal status	—	• Close • Open
Passenger Door Front Status	Passenger's door switch signal status	—	• Close • Open
Right Rear Door Status	Right rear door switch signal status	—	• Close • Open
Left Rear Door Status	Left rear door switch signal status	—	• Close • Open
Rear Gate Status	Rear gate door switch signal status	—	• Close • Open
Driver Seat Belt Status	Status of driver's seat belt	—	• OFF • ON
VDC Over Steer Control	VDC operating status signal 1	—	• Not Controlling • Controlling
VDC Under Steer Control	VDC operating status signal 2	—	• Not Controlling • Controlling
ABS Operation	Operating status signal of ABS	—	• Not Operating • Operating

Display	Content	Unit of measure	Reference
TCS Operation	Operating status signal of TCS	—	• Not Operating • Operating
Brake Control Actuation	Brake operation permission signal	—	• Not performed • Perform
Ignition SW ON Count When Pre-Collision Throttle Management at The Latest	Ignition switch ON count when AT false start prevention control is activated (the latest)	times	—
Ignition SW ON Count When Pre-Collision Throttle Management at The 1 Time before	Ignition switch ON count when AT false start prevention control is activated (1 time before)	times	—
Ignition SW ON Count When Pre-Collision Throttle Management at The 2 Time before	Ignition switch ON count when AT false start prevention control is activated (2 times before)	times	—
Ignition SW ON Count When Following Distance Warning at The Latest	Ignition switch ON count when the vehicle distance alarm is activated (the latest)	times	—
Ignition SW ON Count When Following Distance Warning at The 1 Time before	Ignition switch ON count when the vehicle distance alarm is activated (1 time before)	times	—
Ignition SW ON Count When Following Distance Warning at The 2 Time before	Ignition switch ON count when the vehicle distance alarm is activated (2 times before)	times	—
Ignition SW ON Count When Pre-Collision 1st Braking at The Latest	Ignition switch ON count when the pre-collision 1st braking is operated (at the latest)	times	—
Ignition SW ON Count When Pre-Collision 1st Braking at The 1 Time before	Ignition switch ON count when the pre-collision 1st braking is operated (1 time before)	times	—
Ignition SW ON Count When Pre-Collision 1st Braking at The 2 Time before	Ignition switch ON count when the pre-collision 1st braking is operated (2 times before)	times	—
Ignition SW ON Count When Pre-Collision 1st Braking at The 3 Time before	Ignition switch ON count when the pre-collision 1st braking is operated (3 times before)	times	—
Ignition SW ON Count When Pre-Collision 2nd Braking at The Latest	Ignition switch ON count when the pre-collision 2nd braking is operated (at the latest)	times	—
Ignition SW ON Count When Pre-Collision 2nd Braking at The 1 Time before	Ignition switch ON count when the pre-collision 2nd braking is operated (1 time before)	times	—
Ignition SW ON Count When Pre-Collision 2nd Braking at The 2 Time before	Ignition switch ON count when the pre-collision 2nd braking is operated (2 times before)	times	—
Ignition SW ON Count When Pre-Collision 2nd Braking at The 3 Time before	Ignition switch ON count when the pre-collision 2nd braking is operated (3 times before)	times	—
Pre-Collision Brake Assist Command	Pre-collision brake assist command signal	—	• OFF • ON
Pre-Collision Brake Assist Operation	Pre-collision brake assist request reception status	—	• Not Operating • Operating
Pre-Collision Brake Action	Pre-collision brake command signal	—	• OFF • ON
Pre-Collision Brake Operation	Pre-collision brake operation status	—	• Not Operating • Operating

Display	Content	Unit of measure	Reference
Pre-Collision Brake Assist Threshold	Pre-collision brake threshold	—	• Normal • Threshold 1 • Threshold 2 • No Request
Rear Wheel Slip Control Operation	Rear wheel slip detection signal	—	• Not Operating • Operating
Steering Responsive Fog Lamps Function	Presence/absence signal of the steering-interlocked fog light function	—	• OFF • ON
Steering Responsive Fog Lamps "OFF" Indicator	Status of the steering-interlocked fog light OFF display	—	• OFF • ON • Blink
Steering Responsive Fog Lamp(R) Status	Illumination status of the steering-interlocked right fog light	—	• OFF • ON
Steering Responsive Fog Lamp(L) Status	Illumination status of the steering-interlocked left fog light	—	• OFF • ON
Active Lane Keep System	Presence/absence signal of the lane keep assist function	—	• OFF • ON
Lane Blink	Request signal for lane (solid line) blinking	—	• OFF • ON • Flashing1 • Flashing2
Steering Wheel Display	Lane deviation warning light (steering wheel icon) illumination signal	—	• OFF • ON • Flashing1 • Flashing2
Turn SW (Left)	Operation status of left turn switch	—	• OFF • ON
Turn SW (Right)	Operation status of right turn switch	—	• OFF • ON
Yaw Rate Value (Right -) (Left +)	Yaw rate value signal	rad/sec	—
Lateral G Sensor Value (Right -) (Left +)	Lateral acceleration signal	m/s^2	—
Driver Throttle Input Override Control	Instruction signal of AT false start prevention control	—	• OFF • ON
Warning Code (Sub)	Warning code signal for EyeSight	—	• No alarm • Limit Speed Warning • Rear View Alarm • Red Traffic Light Warning
Adaptive Cruise Control Torque Down	Torque down prohibition signal of stereo camera	—	• ON • OFF
Initial Inspection Distance Accuracy Rate	Accuracy rate of initial inspection distance	%	—
Initial inspection distance	Initial inspection distance	—	—
Initial Optical Axis (X-Axis)	Initial optical axis (X-axis)	pix	—
Initial Optical Axis (X-Axis2)	Initial optical axis (X-axis 2)	pix	—
Initial Optical Axis (Y-Axis)	Initial optical axis (Y-axis)	pix	—
Initial Left Image Rotation Deviation Correction Value	Initial left image, rotation deviation correction value	—	—
Initial Left Image Vertical Deviation Correction Value	Initial left image, vertical deviation correction value	—	—
Initial Right Image Rotation Deviation Correction Value	Initial right image, rotation deviation correction value	—	—
Initial Distance Correction Value	Initial distance correction value	—	—
Initial Invalid Distance Data Count	Number of initial invalid distance data	—	—

Display	Content	Unit of measure	Reference
Initial Other Inspection	Another initial inspection	—	—
Initial Error Code	Initial error code	—	—
DC-Ratio	Accuracy rate of inspection distance	%	—
Distance	Inspection distance	—	—
Optical Axis (X-Axis)	Optical axis (X-axis)	pix	—
Optical Axis (X-Axis2)	Optical axis (X-axis 2)	pix	—
Optical Axis (Y-Axis)	Optical axis (Y-axis)	pix	—
Left Image Rotation Deviation Correction Value	Left image, rotation deviation correction value	—	—
Left Image Vertical Deviation Correction Value	Left image, vertical deviation correction value	—	—
Right Image Rotation Deviation Correction Value	Right image, rotation deviation correction value	—	—
Distance Correction Value	Distance correction value	—	—
Invalid Distance Data Count	Number of invalid distance data	—	—
Other Inspection	Other inspection	—	—
Error Code	Error code detailed information	—	—
Camera Battery Open Status (+B)	Display of stereo camera battery (+B circuit) status	—	• Connect • Disconnected
Image ON/OFF status	ON/OFF status of present image sensor	—	• OFF • ON
Camera Temperature (Current)	Current temperature display of stereo camera internal circuit	°C	—
Camera temperature, operation status	Camera temperature and operation status	—	• Normal • High Temp. • Low Temp.
Camera Temperature (Previous Maximum Value)	Display of stereo camera internal circuit temperature (past MAX value)	°C	—
Ignition SW ON Count When Camera Temperature (Previous Maximum Value)	Ignition switch ON count when stereo camera internal circuit temperature is displayed (past MAX value)	times	—
Camera Temperature (Previous Minimum Value)	Display of stereo camera internal circuit temperature (past MIN value)	°C	—
Ignition SW ON Count When Camera Temperature (Previous Minimum Value)	Ignition switch ON count when stereo camera internal circuit temperature is displayed (past MIN value)	times	—
EyeSight Temporary 0 Continuation Count	Continuation count of EyeSight temporary stop 0	times	—
EyeSight Temporary 1 Continuation Count	Continuation count of EyeSight temporary stop 1	times	—
EyeSight Temporary 2 Continuation Count	Continuation count of EyeSight temporary stop 2	times	—
EyeSight Temporary 3 Continuation Count	Continuation count of EyeSight temporary stop 3	times	—
EyeSight Temporary 4 Continuation Count	Continuation count of EyeSight temporary stop 4	times	—
EyeSight Temporary 5 Continuation Count	Continuation count of EyeSight temporary stop 5	times	—
EyeSight Temporary 6 Continuation Count	Continuation count of EyeSight temporary stop 6	times	—
EyeSight Temporary 7 Continuation Count	Continuation count of EyeSight temporary stop 7	times	—

Display	Content	Unit of measure	Reference
EyeSight HALT Code	EyeSight halt code signal	—	• No HALT • E1(No Camera View) • E2(Out of Temp. Range) • E3(Other)
Ambient Air Temperature(Indication)	Ambient air temperature signal	°C	—
Ambient Air Temperature(Control)	Outside temperature for control signal	°C	—
Head lamp : small	Headlight small signal status	—	• OFF • ON
Headlight SW (LO)	Headlight LO switch operation status	—	• OFF • ON
Head Lamp High Beam	Headlight Hi beam signal status	—	• OFF • ON
Wiper SW (Front)	Front wiper switch operation status	—	• OFF • ON
VDC OFF SW	VDC OFF signal	—	• OFF • ON
VDC "OFF" Indicator Status	VDC OFF indicator status	—	• OFF • ON
Camera Failure Real-Time Check (At The Time of Failure)	Camera failure real-time information at the time of failure	—	—
Camera Temperature (At The Time of Failure)	Camera temperature sensor at the time of failure	°C	—
Image ON/OFF Status/Sensor Ready Status (At The Time of Failure)	Image ON/OFF status at the time of failure	—	• OFF • ON
Adaptive Cruise Control Failure (EyeSight → Combination Meter)	Stereo camera failure signal for meter	—	• Normal • Abnormal
VDC Sensor Failure	VDC sensor failure signal	—	• Normal • Abnormal
ABS System Failure	ABS system failure signal	—	• Normal • Abnormal
Vehicle Speed Sensor Failure	Vehicle speed sensor failure signal	—	• Normal • Abnormal
Adaptive Cruise Control Failure (EyeSight → VDC)	Failure signal of stereo camera to VDC control module	—	• Normal • Abnormal
EyeSight Reception (VDC)	Failure signal of stereo camera	—	• Not yet received • Receive
Hill Start Assist Operation Status	Hill start assist operation status signal	—	• Not Operating • Operating
EyeSight Failure	EyeSight failure signal	—	• Normal • Abnormal
Engine Failure	Engine failure signal	—	• Normal • Abnormal
Transmission Failure	TCM failure signal	—	• Normal • Abnormal
Adaptive Cruise Control Failure (EyeSight → EPS)	Stereo camera failure signal for EPS control module	—	• Normal • Abnormal
ETC Failure	Electronic throttle control failure signal	—	• Normal • Abnormal
EEPROM Failure	Failure signal of combination meter	—	• Normal • Abnormal
Brake Lamp SW Fail Status	Brake light switch failure signal	—	• Normal • Abnormal

Display	Content	Unit of measure	Reference
EyeSight Communication Error (VDC)	Stereo camera communication failure signal	—	• Normal • Abnormal
Judgment of Lost Communication with Adaptive Cruise Control ECM CAN	No-receive signal of EyeSight CAN data	—	• Normal • Not Receive
EyeSight Received Data (ECM)	NG signal of stereo camera data	—	• Normal • Abnormal
EyeSight Customization Change Request (Combination Meter → EyeSight)	EyeSight customization change request signal	—	• OFF • ON
EyeSight Customization Reset Request (Combination Meter → EyeSight)	EyeSight customization reset request signal	—	• OFF • ON
Target Gear Position	Target gear position signal	—	• P • R • Auto Neutral • 6 • 5 • 4 • 3 • 2 • 1 • N
Transmission Shift Control Mode	TCM shift control mode signal	—	• Position Fixed Mode • Gear Fixed Mode • Position Fixed Temporary • Gear Fixed Temporary • M Position • D Range • Display ”–”
Shift Position	Shift position information	—	• Error • P • R • N • D • D-S • 3 • 2 • 1
CVT 8-speed Mode Control	CVT multi-stage speed control signal when EyeSight operates	—	• Not Operating • Operating
Lock Up Status	Lock up information	—	• Converter • Slip Lock Up • Lock Up
Adaptive Cruise Control Specification	Adaptive cruise control judgment signal	—	• No • Yes
EyeSight Specification	EyeSight judgment signal Support: Model with adaptive cruise control Not Support: Other than the model with adaptive cruise control (such as models with constant speed cruise control)	—	• No • Yes
Brake System Specification	Brake system judgment signal	—	• VDC • Active Booster
Vehicle Height	Vehicle height information	—	• Unclear • OBK • Standard

Display	Content	Unit of measure	Reference
Fuel Type	Fuel type	—	• Gasoline • Diesel
Engine Displacement	Engine displacement	—	• 1500 cc • 2000 cc • 2500 cc • 3000 cc • 3600 cc • 1600 cc
Camshaft Type	Engine type	—	• SOHC • DOHC
Number of Cylinders	Number of cylinder for engine	—	• 4 Cylinder • 6 Cylinder
Turbo	Presence or absence of turbo	—	• Turbo • NA
Vehicle Type	Vehicle type information signal	—	• Impreza Type • Forester Type • Exiga Type • Legacy/Outback Type • WRX Type
Destination Code	Destination code signal	—	• Japan • U.S(U4,U5,U6) • Canada(C0) • EURO(Left) (EC,EA,E2,EL) • General(Left)(K4) & Latin America(C4) • Middle & Near East(KS) • U.K(EK) • Thailand/Singapore(ER,EN) • Australia(KA,KC) • China(EH) • South Korea(C6)
Tire Diameter	Tire diameter judgment signal	—	• Standard • Special
WGN/SDN	Vehicle type signal	—	• SEDAN • WAGON
Drive System	Driving method of AWD	—	• AWD • VTD • 2WD
AT Type	AT type	—	• CVT(TR58) • 4AT • 5AT • 6AT • CVT(TR690)
Idling Stop Specification	Auto Start Stop judgment signal	—	• No • Yes
Camera Battery Voltage (At The Time of EyeSight Temporary)	ECM power supply voltage (at an EyeSight temporary stop)	V	—
Camera Temperature Sensor (At The Time of EyeSight Temporary)	Camera temperature (at an EyeSight temporary stop)	°C	—
Automatic Adjustment Status Check (At The Time of EyeSight Temporary)	Automatic adjustment status (at an EyeSight temporary stop)	—	—
Camera Adjustment Value 1 (At The Time of EyeSight Temporary)	Camera adjustment value detailed information 1 (at an EyeSight temporary stop)	—	—
Camera Adjustment Value 2 (At The Time of EyeSight Temporary)	Camera adjustment value detailed information 2 (at an EyeSight temporary stop)	—	—

Display	Content	Unit of measure	Reference
Camera Adjustment Value 3 (At The Time of EyeSight Temporary)	Camera adjustment value detailed information 3 (at an EyeSight temporary stop)	—	—
EyeSight Temporary Detail Check 1	EyeSight temporary stop, detailed information 1	—	—
EyeSight Temporary Detail Check 2	EyeSight temporary stop, detailed information 2	—	—
EyeSight Temporary Detail Check 3	EyeSight temporary stop, detailed information 3	—	—
EyeSight Temporary Detail Check 4	EyeSight temporary stop, detailed information 4	—	—
Details Check 1 (At The Time of EyeSight Temporary)	Detailed information 1 at the time of EyeSight temporary stop	—	—
Details Check 2 (At The Time of EyeSight Temporary)	Detailed information 2 at the time of EyeSight temporary stop	—	—
Details Check 3 (At The Time of EyeSight Temporary)	Detailed information 3 at the time of EyeSight temporary stop	—	—
Details Check 4 (At The Time of EyeSight Temporary)	Detailed information 4 at the time of EyeSight temporary stop	—	—
Camera Temperature Operation Status (At The Time of EyeSight Temporary)	Stereo camera operation status at the time of EyeSight temporary stop	—	• Normal • High Temp. • Low Temp.
Camera Failure Real-Time Check	Current camera failure information	—	—
Camera Failure Details Cumulative Check 1	Camera failure details, cumulative information 1	—	—
Camera Failure Details Cumulative Check 2	Camera failure details, cumulative information 2	—	—
Camera Failure Details Cumulative Check 3	Camera failure details, cumulative information 3	—	—
Camera Failure Details Cumulative Check 4	Camera failure details, cumulative information 4	—	—
Camera Failure Details Cumulative Check 5	Camera failure details, cumulative information 5	—	—
Camera Failure Details Cumulative Check 6	Camera failure details, cumulative information 6	—	—
Camera Failure Details Cumulative Check 7	Camera failure details, cumulative information 7	—	—
Camera Failure Details Cumulative Check 8	Camera failure details, cumulative information 8	—	—
Camera Failure Details Cumulative Check 9	Camera failure details, cumulative information 9	—	—
Camera Failure Details Cumulative Check 10	Camera failure details, cumulative information 10	—	—
Camera Failure Details Cumulative Check 11	Camera failure details, cumulative information 11	—	—
Camera Failure Details Cumulative Check 12	Camera failure details, cumulative information 12	—	—
Camera Failure Details Cumulative Check 13	Camera failure details, cumulative information 13	—	—
Camera Failure Details Cumulative Check 14	Camera failure details, cumulative information 14	—	—
Camera Temperature Abnormality Ignition SW ON Count Check 1	Camera temperature abnormal IG ON count 1	times	—
Camera Temperature Abnormality Ignition SW ON Count Check 2	Camera temperature abnormal IG ON count 2	times	—
Camera Temperature Abnormality Ignition SW ON Count Check 3	Camera temperature abnormal IG ON count 3	times	—
Camera Temperature Abnormality Ignition SW ON Count Check 4	Camera temperature abnormal IG ON count 4	times	—

Display	Content	Unit of measure	Reference
Camera Temperature Abnormality Ignition SW ON Count Check 5	Camera temperature abnormal IG ON count 5	times	—
Camera Adjustment Value 1	Camera adjustment value detailed information 1	—	—
Camera Adjustment Value 2	Camera adjustment value detailed information 2	—	—
Camera Adjustment Value 3	Camera adjustment value detailed information 3	—	—
Camera Status Check 1	Camera status detailed information 1	—	—
Camera Status Check 2	Camera status detailed information 2	—	—
Camera Status Check 3	Camera status detailed information 3	—	—
Camera Status Check 4	Camera status detailed information 4	—	—
Camera Status Check 5	Camera status detailed information 5	—	—
Camera Status Check 6	Camera status detailed information 6	—	—
Camera Status Check 7	Camera status detailed information 7	—	—
Camera Status Check 8	Camera status detailed information 8	—	—
Camera Status Check 9	Camera status detailed information 9	—	—
Camera Status Check 10	Camera status detailed information 10	—	—
Camera Status Check 11	Camera status detailed information 11	—	—
Camera Status Check 12	Camera status detailed information 12	—	—
Camera Status Check 13	Camera status detailed information 13	—	—
Camera Status Check 14	Camera status detailed information 14	—	—
Camera Status Check 15	Camera status detailed information 15	—	—
Camera Status Check 16	Camera status detailed information 16	—	—
Camera Status Check 17	Camera status detailed information 17	—	—
Camera Status Check 18	Camera status detailed information 18	—	—
Camera Status Check 19	Camera status detailed information 19	—	—
Camera Status Check 20	Camera status detailed information 20	—	—
Camera Status Check 21	Camera status detailed information 21	—	—
Camera Status Check 22	Camera status detailed information 22	—	—
Camera Status Check 23	Camera status detailed information 23	—	—
Camera Status Check 24	Camera status detailed information 24	—	—
Camera Status Check 25	Camera status detailed information 25	—	—
Front Axle Average Wheel Speed (At The Time of EyeSight Temporary)	Front axle wheel average speed at the time of EyeSight temporary stop	km/h	—
Ignition SW ON Count (At The Time of EyeSight Temporary)	IG ON count at the time of EyeSight temporary stop	times	—
Lead Vehicle Detected	Preceding vehicle follow signal	—	• Not Operating • Operating
Target Torque Command	Target torque command signal	—	• Vehicle Speed • Torque
Right Front Wheel W/C Actual Fluid Pressure	Right front wheel cylinder actual fluid pressure	Mpa	—
Left Front Wheel W/C Actual Fluid Pressure	Left front wheel cylinder actual fluid pressure	Mpa	—

2. ENGINE CONTROL MODULE (ECM)

For current data of engine control module, refer to ENGINE (DIAGNOSTICS). <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>

3. VDC CONTROL MODULE (VDCCM)

For current data of VDC control module, refer to VDC (DIAGNOSTICS). <Ref. to VDC(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>

4. TRANSMISSION CONTROL MODULE (TCM)

For current data of transmission control module, refer to CVT (DIAGNOSTICS). <Ref. to CVT(w/o HEV)(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>

5. BODY INTEGRATED UNIT

For current data of body integrated unit, refer to BODY CONTROL (DIAGNOSTICS). <Ref. to BC(diag)-12, LIST, Read Current Data.>

6. COMBINATION METER

For current data of the combination meter, refer to COMBINATION METER (DIAGNOSTICS). <Ref. to IDI(diag)-16, LIST, Read Current Data.>

8. Real-time Diagnosis

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «EyeSight» and select «Enter».
5) On «Select Function» display, select «Data Monitor».
6) Check that the display changes and the contents are correct when performing the operations as follows.

- Depress and release the brake pedal. (Stop light switch and brake switch are turned ON.)
  - Item «Brake Lamp SW (BIU)» «Brake SW Input» «Brake Lamp SW (VDC)»
- Turn the main switch to ON.
  - Item «Cruise Control SW Voltage (Port14)» and «Cruise Control SW Voltage (Port16)»
- Turn the “SET/–” switch to ON.
  - Item «Cruise Control SW Voltage (Port14)» and «Cruise Control SW Voltage (Port16)»
- Turn the “RES/+” switch to ON.
  - Item «Cruise Control SW Voltage (Port14)» and «Cruise Control SW Voltage (Port16)»
- Turn the “Vehicle distance” switch to ON.
  - Item «Cruise Control SW Voltage (Port14)» and «Cruise Control SW Voltage (Port16)»
- Turn the “CANCEL” switch to ON. (Except for Crosstrek model)
  - Item «Cruise Control SW Voltage (Port14)» and «Cruise Control SW Voltage (Port16)»
- Operate the shift lever.
  - Item «Current gear position»
- Press and hold the pre-collision brake OFF switch.
  - Item «Pre-Collision Brake OFF Indicator»
- Press and hold the lane departure warning OFF switch.
  - Item «Lane Departure Warning OFF Indicator»

NOTE:
For detailed operation procedures, refer to “Application help”.

9. Diagnostic Code(s) Display

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «EyeSight» and select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to ES(diag)-40, LIST, Diagnostic Code(s) Display.>
- Up to ten codes can be stored. When more than ten codes are output, they will not be stored.
- The same code is stored only once, and even when the same code occurs several times, information will not be updated.

B: LIST

- List of Diagnostic Trouble Code (DTC)

DTC	Item	Contents of diagnosis	Reference
U0073	CONTROL MODULE COMMUNICATION BUS OFF	Detected when bus off status (the stereo camera detects the failure and is disconnected from CAN line) occurs.	<Ref. to ES(diag)-75, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	Detected when CAN data from ECM is not transmitted to stereo camera.	<Ref. to ES(diag)-75, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	Detected when CAN data from TCM is not transmitted to stereo camera.	<Ref. to ES(diag)-75, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Detected when CAN data from VDC is not transmitted to stereo camera.	<Ref. to ES(diag)-75, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Detected when CAN data from body integrated unit is not transmitted to stereo camera.	<Ref. to ES(diag)-75, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	Detected when CAN data from combination meter is not transmitted to stereo camera.	<Ref. to ES(diag)-75, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	Failure counter diagnosis of engine control module (ECM)	<Ref. to ES(diag)-75, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	Failure counter diagnosis of automatic transmission control module (TCM)	<Ref. to ES(diag)-75, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	Failure counter diagnosis of VDC control module (VDC CM)	<Ref. to ES(diag)-76, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Contents of diagnosis	Reference
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	Failure counter diagnosis of body integrated unit	<Ref. to ES(diag)-76, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	Failure counter diagnosis of combination meter	<Ref. to ES(diag)-76, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2801	TCM ABNORMAL	Detected when error occurs in the automatic transmission.	<Ref. to ES(diag)-76, DTC B2801 TCM ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2802	ETC ABNORMAL	Detected when error occurs in the electronic throttle control.	<Ref. to ES(diag)-76, DTC B2802 ETC ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2806	ECM ABNORMAL	Detected when error occurs in the engine control module (ECM).	<Ref. to ES(diag)-76, DTC B2806 ECM ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2807		Detected when cruise indicator illumination request from ECM and ON/OFF information of cruise function do not match.	<Ref. to ES(diag)-76, DTC B2807 ECM ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2809	VDC MALFUNCTION	Detected when error occurs in the VDC. (VDC failure)	<Ref. to ES(diag)-76, DTC B2809 VDC MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B280A	VDC ECHO BACK DISAGREEMENT	Detected when error occurs in the VDC. (VDC brake control malfunction 1)	<Ref. to ES(diag)-77, DTC B280A VDC ECHO BACK DISAGREEMENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B280B	VDC BRAKE FLUID PRESSURE	Detected when error occurs in the VDC. (VDC brake control malfunction 2)	<Ref. to ES(diag)-77, DTC B280B VDC BRAKE FLUID PRESSURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B280F	COMBINATION METER MALFUNCTION	Detected when error occurs in the CAN communication with combination meter.	<Ref. to ES(diag)-77, DTC B280F COMBINATION METER MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2810	INCOMPATIBLE WITH EyeSight (COMBINATION METER)	Detected when different (undesignated) type of combination meter is installed.	<Ref. to ES(diag)-77, DTC B2810 INCOMPATIBLE WITH EyeSight (COMBINATION METER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2814	POWER SUPPLY LOW VOLTAGE	Detected when battery voltage is below specified value or when the +B harness of the stereo camera is broken.	<Ref. to ES(diag)-78, DTC B2814 POWER SUPPLY LOW VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2815	POWER SUPPLY HIGH VOLTAGE	Detected when battery voltage exceeds the specified value.	<Ref. to ES(diag)-79, DTC B2815 POWER SUPPLY HIGH VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2817	BRAKE LAMP	Detected when error occurs in the brake light illumination circuit.	<Ref. to ES(diag)-79, DTC B2817 BRAKE LAMP, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28A0	VEHICLE MODEL JUDGMENT	Detected when the model code stored in EEPROM and the model code used for CAN data are different, or when +B harness of the stereo camera is broken at aiming completion.	<Ref. to ES(diag)-80, DTC B28A0 VEHICLE MODEL JUDGMENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28A1	EyeSight COMMUNICATION(ECM)	Abnormal judgment for stereo camera by ECM Or detected when the stereo camera or ECM is assembled incorrectly.	<Ref. to ES(diag)-82, DTC B28A1 EyeSight COMMUNICATION(ECM), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28A2	EyeSight COMMUNICATION(VDC)	Abnormal judgment for stereo camera data by VDC	<Ref. to ES(diag)-83, DTC B28A2 EyeSight COMMUNICATION(VDC), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Contents of diagnosis	Reference
B28A3	EyeSight COMMUNICATION(METER)	Abnormal judgment for stereo camera data by combination meter	<Ref. to ES(diag)-84, DTC B28A3 EyeSight COMMUNICATION(METER), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28A5	ENGINE TORQUE LIMITER CONTROL PROHIBIT	Detected when error occurs in the transmission data from stereo camera to ECM.	<Ref. to ES(diag)-85, DTC B28A5 ENGINE TORQUE LIMITER CONTROL PROHIBIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28A6	INTERNAL STEREO CAMERA COMMUNICATION 1	Detected when communication error occurs inside the stereo camera.	<Ref. to ES(diag)-86, DTC B28A6 INTERNAL STEREO CAMERA COMMUNICATION 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28A7	STEREO CAMERA RECOGNITION(TARGET)	Detected when error occurs in the communication data inside the control module due to external factors such as noises.	<Ref. to ES(diag)-86, DTC B28A7 STEREO CAMERA RECOGNITION(TARGET), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28A8	INTERNAL STEREO CAMERA COMMUNICATION 2		<Ref. to ES(diag)-86, DTC B28A8 INTERNAL STEREO CAMERA COMMUNICATION 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28A9	STEREO CAMERA SYNCHRONIZED RECOGNITION DATA		<Ref. to ES(diag)-86, DTC B28A9 STEREO CAMERA SYNCHRONIZED RECOGNITION DATA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28AA	STEREO CAMERA MICROCOMPUTER 1	Detected when error occurs in the communication with microcomputer 1 system inside the stereo camera.	<Ref. to ES(diag)-86, DTC B28AA STEREO CAMERA MICROCOMPUTER 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28AB	STEREO CAMERA MICROCOMPUTER 2	Detected when error occurs in the communication with microcomputer 2 system inside the stereo camera.	<Ref. to ES(diag)-87, DTC B28AB STEREO CAMERA MICROCOMPUTER 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28AC	STEREO CAMERA ASIC	Detected when error occurs in the ASIC system inside the stereo camera.	<Ref. to ES(diag)-87, DTC B28AC STEREO CAMERA ASIC, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28AD	STEREO CAMERA IMAGE RECOGNITION	Detected when error occurs in the stereo camera image system.	<Ref. to ES(diag)-87, DTC B28AD STEREO CAMERA IMAGE RECOGNITION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28AE	INTERNAL STEREO CAMERA POWER SUPPLY	Detected when error occurs in the internal power supply system of stereo camera.	<Ref. to ES(diag)-87, DTC B28AE INTERNAL STEREO CAMERA POWER SUPPLY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28AF	STEREO CAMERA ADJUSTMENT INCOMPLETE	Detected when adjustment/inspection of camera has not been completed normally.	<Ref. to ES(diag)-87, DTC B28AF STEREO CAMERA ADJUSTMENT INCOMPLETE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28B1	STEREO CAMERA AUTOMATIC ADJUSTMENT	Detected when the optical axis of stereo camera is deviated in lateral direction or when the fluctuation range of automatic adjustment value has been enlarged.	<Ref. to ES(diag)-87, DTC B28B1 STEREO CAMERA AUTOMATIC ADJUSTMENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28B2	STEREO CAMERA HIGH TEMPERATURE	Detected when the temperature of the stereo camera excessively increases. (When this DTC is detected, the camera will not return to the normal state after performing adjustment or inspection. In this case, always replace the stereo camera.)	<Ref. to ES(diag)-88, DTC B28B2 STEREO CAMERA HIGH TEMPERATURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Contents of diagnosis	Reference
B28B3	STEREO CAMERA LOW TEMPERATURE	Detected when the temperature of the stereo camera excessively decreases. (When this DTC is detected, the camera will not return to the normal state after performing adjustment or inspection. In this case, always replace the stereo camera.)	<Ref. to ES(diag)-88, DTC B28B3 STEREO CAMERA LOW TEMPERATURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28B5	+B CIRCUIT ABNORMAL	Detected when there is an open circuit in power supply line of the stereo camera.	<Ref. to ES(diag)-88, DTC B28B5 +B CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28B6	PRE-COLLISION OFF SWITCH	Pre-collision brake switch or harness is faulty. Detected also when the switch is held down for over 45 seconds.	<Ref. to ES(diag)-89, DTC B28B6 PRE-COLLISION OFF SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28B7	LDP OFF SWITCH	Lane departure warning OFF switch or harness is faulty. Detected also when the switch is held down for over 45 seconds.	<Ref. to ES(diag)-91, DTC B28B7 LDP OFF SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28B8	EyeSight STEERING SWITCH 1	Detected when the EyeSight steering switch is not installed, when the switch is faulty, or when the harness is abnormal, open or stuck to ON.	<Ref. to ES(diag)-93, DTC B28B8 EyeSight STEERING SWITCH 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B28B9	EyeSight STEERING SWITCH 2		<Ref. to ES(diag)-94, DTC B28B9 EyeSight STEERING SWITCH 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

10.Freeze Frame Data Display

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «EyeSight» and select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- Freeze frame data is stored for three DTCs. Allocation of the three DTCs are as follows:
  – DTC that occurred first.
  – DTC that occurred first during the latest driving cycle (from IGN ON to IGN OFF).
  – DTC that occurred first during the second latest driving cycle.
  – However, DTCs will be stored in order of occurrence until these three DTCs are stored.
- For details on freeze frame data, refer to List of freeze frame data. <Ref. to ES(diag)-44, LIST, Freeze Frame Data Display.>
- Freeze frame data is cleared in Clear Memory Mode. <Ref. to ES(diag)-45, Clear Memory Mode.>

B: LIST

- List of freeze frame data

Display	Content	Unit
ECU Power Supply Voltage (IG)	Display of input voltage of stereo camera	V
Engine Speed	Engine speed	rpm
Accel opening angle	Acceleration opening angle signal	%
Brake Fluid Target Pressure	Target value of brake fluid pressure	MPa
Master Cylinder Actual Fluid Pressure	Brake pressure	MPa
Right Front Wheel W/C Actual Fluid Pressure	Right front wheel cylinder fluid pressure	MPa
Left Front Wheel W/C Actual Fluid Pressure	Left front wheel cylinder fluid pressure	MPa
Brake SW Input	Brake switch signal status	—
Brake Lamp SW (BIU)	Brake light switch signal status	—
Brake Lamp SW (VDC)	Brake light switch status	—
Trip Count	Timestamp information_Trip counter	times
Count	Timestamp information_original count identification information	—
Time Count	Timestamp information_time counter	ms
Drive Wheel Average Speed	Average wheel speed signal	km/h
Brake Lamp Command	Brake lamp light up command signal	—
Driver Brake Detection	Driver brake detection signal	—
Brake Control Actuation	Brake operation permission signal	—
Pre-Collision Brake Assist Command	Pre-collision brake assist command signal	—
Pre-Collision Brake Action	Pre-collision brake command signal	—
Adaptive Cruise Control Torque Down	Torque down prohibition signal of stereo camera	—
Engine Failure	Engine failure signal	—
Brake Lamp SW Fail Status	Brake light switch failure signal	—

11.Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «EyeSight» and select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

12.Diagnostics with Phenomenon

A: DIAGNOSTIC PROCEDURE WITH PHENOMENON

1. TEMPORARY STOP OF EyeSight

Phenomenon		Check Item	Reference
1	Temporary stop occurs frequently. EyeSight temporary stop indicator illuminates frequently.	(1) Check EyeSight temporary stop code. <Ref. to ES(diag)-63, EyeSight Temporary Code(s) Display.>	For details on temporary stop codes, refer to CHECK LIST (CAMERA TEMPORARY STOP). Check list (camera temporary stop) <Ref. to ES(diag)-66, CHECK LIST (CAMERA TEMPORARY STOP), LIST, EyeSight Temporary Code(s) Display.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.

2. ADAPTIVE CRUISE CONTROL, CONVENTIONAL CRUISE CONTROL

Phenomenon		Check Item	Reference
1	Cruise control switch is not turned to ON. (CRUISE indicator light does not illuminate) Or cruise control was cancelled without operating the cruise switch.	(1) Check the ECM cruise control cancel code.	Perform the diagnosis according to displayed cancel code. <Ref. to ES(diag)-70, ECM Cancel Code(s) Display.> If not displayed, go to (2).
		(2) Perform the real-time diagnosis. Check the input signal of cruise control system.	Real-time Diagnosis <Ref. to ES(diag)-39, Real-time Diagnosis.> When normal, go to (4). When abnormal, go to (3).
		(3) Check the EyeSight steering switch.	Check EyeSight steering switch <Ref. to ES(diag)-61, CHECK EyeSight STEERING SWITCH, Diagnostics with Phenomenon.>
		(4) Check the CRUISE indicator.	Inspection of cruise indicator <Ref. to ES(diag)-60, CHECK ADAPTIVE CRUISE CONTROL INDICATOR LIGHT/CONSTANT SPEED CRUISE CONTROL INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT, Diagnostics with Phenomenon.>
2	Cruise control cannot be set. Or cruise control is cancelled without releasing operation. NOTE: • Do not turn the ignition switch to OFF after the cruise control is deactivated. • Do not operate the EyeSight steering switch after the cruise control is deactivated. If the above is performed, the cancel code the ECM will be cleared.	(1) Check the ECM cruise control cancel code.	Perform the diagnosis according to displayed cancel code. <Ref. to ES(diag)-70, ECM Cancel Code(s) Display.> If not displayed, go to (2).
		(2) Perform the real-time diagnosis. Check the input signal of cruise control system.	Real-time Diagnosis <Ref. to ES(diag)-39, Real-time Diagnosis.> When normal, go to (6). When abnormal, go to the relevant items for (3), (4), (5).
		(3) Check the EyeSight steering switch.	Check EyeSight steering switch <Ref. to ES(diag)-61, CHECK EyeSight STEERING SWITCH, Diagnostics with Phenomenon.>
		(4) Check stop light switch and brake switch.	Inspection of stop light switch and brake switch <Ref. to BR-71, Brake Pedal.> <Ref. to CC(w/o HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.>
		(5) Check the neutral position switch.	Inspection of neutral position switch <Ref. to CC(w/o HEV)(diag)-20, 14, Diagnostic Procedure with Cancel Code.> <Ref. to CC(w/o HEV)(diag)-24, 62, Diagnostic Procedure with Cancel Code.>
		(6) Check vehicle speed sensor.	Inspection of vehicle speed sensor <Ref. to CC(w/o HEV)(diag)-23, 22, Diagnostic Procedure with Cancel Code.>

Phenomenon		Check Item	Reference
3	SET indicator does not illuminate.	Check the SET indicator.	Inspection of SET indicator <Ref. to ES(diag)-60, CHECK ADAPTIVE CRUISE CONTROL INDICATOR LIGHT/ CONSTANT SPEED CRUISE CONTROL INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT, Diagnostics with Phenomenon.>
4	Vehicle speed is not held within set speed ±3 km/h (±2 MPH) on a level road.	Check the vehicle speed sensor.	Inspection of vehicle speed sensor <Ref. to CC(w/o HEV)(diag)-23, 22, Diagnostic Procedure with Cancel Code.>
5	Vehicle speed does not increase or does not return to set speed after RES/+ switch has been pressed.	(1) Perform the real-time diagnosis. Check the input signal of cruise control system.	Real-time Diagnosis <Ref. to ES(diag)-39, Real-time Diagnosis.> When abnormal, go to (2).
		(2) Check the RES/+ switch.	Inspection of RES/+ switch <Ref. to ES(diag)-61, CHECK EyeSight STEERING SWITCH, Diagnostics with Phenomenon.>
6	Vehicle speed does not decrease after SET/– switch has been pressed.	(1) Perform the real-time diagnosis. Check the input signal of cruise control system.	Real-time Diagnosis <Ref. to ES(diag)-39, Real-time Diagnosis.> When abnormal, go to (2).
		(2) Check the SET/– switch.	Inspection of SET/– switch <Ref. to ES(diag)-61, CHECK EyeSight STEERING SWITCH, Diagnostics with Phenomenon.>
7	Cruise control is not deactivated after the cruise switch is pressed.	(1) Perform the real-time diagnosis. Check the input signal of cruise control system.	Real-time Diagnosis <Ref. to ES(diag)-39, Real-time Diagnosis.> When abnormal, go to (2).
		(2) Check the cruise switch.	Inspection of cruise switch <Ref. to ES(diag)-61, CHECK EyeSight STEERING SWITCH, Diagnostics with Phenomenon.>
8	Following distance does not change, even after the following distance switch is pressed.	(1) Perform the real-time diagnosis. Check the input signal of cruise control system.	Real-time Diagnosis <Ref. to ES(diag)-39, Real-time Diagnosis.> When abnormal, go to (2).
		(2) Check the following distance switch.	Inspection of following distance switch <Ref. to ES(diag)-61, CHECK EyeSight STEERING SWITCH, Diagnostics with Phenomenon.>
9	Cruise control is not released after brake pedal has been depressed.	(1) Perform the real-time diagnosis. Check the input signal of cruise control system.	Real-time Diagnosis <Ref. to ES(diag)-39, Real-time Diagnosis.> When abnormal, go to (2).
		(2) Check stop light switch and brake switch.	Inspection of stop light switch and brake switch <Ref. to CC(w/o HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.> <Ref. to BR-75, INSTALLATION, Stop Light Switch.>
10	Cruise control is not released after shifting to the neutral position.	(1) Perform the real-time diagnosis. Check the input signal of cruise control system.	Real-time Diagnosis <Ref. to ES(diag)-39, Real-time Diagnosis.> When abnormal, go to (2).
		(2) Check the neutral position switch.	Inspection of neutral position switch <Ref. to CC(w/o HEV)(diag)-20, 14, Diagnostic Procedure with Cancel Code.>

Phenomenon		Check Item	Reference
11	Acceleration or deceleration does not occur according to the preceding vehicle. The preceding vehicle is difficult to be detected. Braking force is weaker than usual. Alarm for requiring more brake pedal force does not sound.	(1) Using CHECK LIST (ADAPTIVE CRUISE CONTROL), check the condition and respond to it. 1) Does it apply to the condition that the use of adaptive cruise control is not desired? 2) Does it apply to the condition or the object that is hard to be recognized by the stereo camera? 3) Does it apply to the driving condition that the preceding vehicle cannot be recognized or the vehicle on the next lane or the object on the roadside may be recognized by mistake? 4) Does it apply to the condition that brake force may become poor? 5) Does it apply to the condition that the alarm for requiring more brake pedal force does not sound even in a short vehicle distance?	Check list (adaptive cruise control) <Ref. to ES(diag)-53, CHECK LIST (ADAPTIVE CRUISE CONTROL), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, go to (2).
		(2) Check the windshield glass and dashboard.	Inspection of windshield glass and dashboard <Ref. to ES(diag)-7, WINDSHIELD GLASS AND DASHBOARD, INSPECTION, General Description.> When normal, go to (3).
		(3) Check the front wiper.	Inspection of front wiper <Ref. to ES(diag)-11, FRONT WIPER, INSPECTION, General Description.> When normal, go to (4).
		(4) Check the stereo camera.	Check the stereo camera. <Ref. to ES(diag)-12, STEREO CAMERA, INSPECTION, General Description.> When normal, go to (5).
		(5) Bleed air from brake system.	Air bleeding from brake system <Ref. to BR-65, BRAKE LINE, PROCEDURE, Air Bleeding.> Go to (6).
		(6) Check the optical axis of the stereo camera.	Adjust the optical axis of the stereo camera. <Ref. to ES-12, PROCEDURE, Camera Adjustment, Inspection.>

3. PRE-COLLISION BRAKE, AT RAPID START PREVENTION CONTROL

Phenomenon		Check Item	Reference
1	Pre-collision brake does not operate. Or the pre-collision brake operates, but the vehicle cannot stop safely before collision. Or the pre-collision brake is released automatically. Or the pre-collision brake assist does not operate.	(1) Check that the pre-collision brake OFF indicator light goes off.	If this indicator light illuminates, the operation is not performed.
		(2) Using CHECK LIST (PRE-COLLISION BRAKE), check the following and respond to it. 1) Does it apply to the condition that the pre-collision brake does not operate, or there is a high possibility that the vehicle cannot stop safely before collision with the pre-collision brake? 2) Does it apply to the condition that there is a high possibility that the pre-collision brake does not operate due to the recognition status of the stereo camera? 3) Does it apply to the condition that the system does not operate correctly and the turning OFF of the pre-collision brake is desired? 4) Does it apply to the condition that the pre-collision brake OFF indicator light illuminates?	Check list (pre-collision brake) <Ref. to ES(diag)-55, CHECK LIST (PRE-COLLISION BRAKE), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.
2	Pre-collision brake operates improperly. Or the pre-collision brake is not released. Or the pre-collision brake assist operates improperly.	(1) Using CHECK LIST (PRE-COLLISION BRAKE), check the following and respond to it. 1) Does it apply to the condition that turning OFF of the pre-collision brake is desired? 2) Does it apply to the condition that the pre-collision brake may operate?	Check list (pre-collision brake) <Ref. to ES(diag)-55, CHECK LIST (PRE-COLLISION BRAKE), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.
3	Pre-collision brake OFF indicator light does not go off. Or the pre-collision brake OFF indicator light illuminates automatically.	(1) Check that this failure occurs during engine start.	Light illumination for a while after the engine start is a normal.
		(2) Check EyeSight temporary stop code to see if temporary stop has occurred.	If the EyeSight temporary stop code is displayed, check the diagnosis from the List of EyeSight temporary stop code, and perform the corresponding operations. <Ref. to ES(diag)-63, EyeSight Temporary Code(s) Display.> If the cancel code is not displayed, go to (3).
		(3) Check the pre-collision brake OFF switch.	Inspection of pre-collision brake OFF switch <Ref. to ES(diag)-89, DTC B28B6 PRE-COLLISION OFF SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	Pre-collision brake OFF indicator light does not illuminate. Or the pre-collision brake OFF indicator light goes off automatically.	(1) Check that this failure occurs during engine start.	Even if the pre-collision brake is turned off, it is turned on again when the engine switch is turned off and the engine has restarted.
		(2) Check the pre-collision brake OFF switch.	Inspection of pre-collision brake OFF switch <Ref. to ES(diag)-89, DTC B28B6 PRE-COLLISION OFF SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Phenomenon		Check Item	Reference
5	AT rapid start prevention control does not operate. Or the AT rapid start prevention control is released automatically.	(1) Check that the pre-collision brake OFF indicator light goes off.	If this indicator light illuminates, the operation is not performed.
		(2) Using CHECK LIST (AT RAPID START PREVENTION CONTROL), check the following and respond to it. 1) Does it apply to the condition that the AT rapid start prevention control may not operate? 2) Does it apply to the condition that the pre-collision brake OFF indicator light illuminates?	Check list (AT rapid start prevention control) <Ref. to ES(diag)-57, CHECK LIST (AT RAPID START PREVENTION CONTROL), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.
6	AT rapid start prevention control operates improperly. Or the AT rapid start prevention control is not released.	(1) Using CHECK LIST (AT RAPID START PREVENTION CONTROL), check the following and respond to it. 1) Does it apply to the condition that turning OFF of the AT rapid start prevention control is desired? 2) Does it apply to the condition that the AT rapid start prevention control may operate?	Check list (AT rapid start prevention control) <Ref. to ES(diag)-57, CHECK LIST (AT RAPID START PREVENTION CONTROL), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.

4. LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION

	Phenomenon	Check Item	Reference
1	Lane departure warning does not operate. Or the lane departure warning is released automatically.	(1) Check that the lane departure warning OFF indicator light goes off.	If this indicator light illuminates, the operation is not performed.
		(2) Using CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), check the following and respond to it. 1) Does it apply to the condition that the lane departure warning does not operate or is difficult to operate? 2) Does it apply to the condition that the lane departure warning OFF indicator light illuminates?	Check list (lane departure warning, sway warning, forward vehicle's start monitoring function) <Ref. to ES(diag)-58, CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.
2	Lane departure warning operates improperly. Or the lane departure warning is not released.	(1) Using CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), check the following and respond to it. 1) Does it apply to the condition that the vehicle lane is recognized erroneously and the lane departure warning may operate?	Check list (lane departure warning, sway warning, forward vehicle's start monitoring function) <Ref. to ES(diag)-58, CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.
3	Lane departure warning OFF indicator light does not go off. Or the lane departure warning OFF indicator light illuminates automatically.	(1) Check that this failure occurs during engine start.	Light illumination for a while after the engine start is a normal. Even if the engine switch is turned off and the engine is restarted, the status before the engine switch off is maintained.
		(2) Check EyeSight temporary stop code to see if temporary stop has occurred.	If the EyeSight temporary stop code is displayed, check the diagnosis from the List of EyeSight temporary stop code, and perform the corresponding operations. <Ref. to ES(diag)-63, EyeSight Temporary Code(s) Display.> If the cancel code is not displayed, go to (3).
		(3) Check the lane departure warning OFF indicator light.	Inspection of lane departure warning OFF indicator light <Ref. to ES(diag)-91, DTC B28B7 LDP OFF SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	Lane departure warning OFF indicator light does not illuminate. Or the lane departure warning OFF indicator light goes off automatically.	(1) Check the lane departure warning OFF indicator light.	Inspection of lane departure warning OFF indicator light <Ref. to ES(diag)-91, DTC B28B7 LDP OFF SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Phenomenon		Check Item	Reference
5	Sway warning does not operate. Or the sway warning is released automatically.	(1) Check that the lane departure warning OFF indicator light goes off.	If this indicator light illuminates, the operation is not performed.
		(2) Using CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), check the following and respond to it. 1) Does it apply to the condition that the sway warning may not operate? 2) Does it apply to the condition that the lane departure warning OFF indicator light illuminates?	Check list (lane departure warning, sway warning, forward vehicle's start monitoring function) <Ref. to ES(diag)-58, CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.
6	Sway warning operates improperly. Or the sway warning is not released.	(1) Using CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), check the following and respond to it. 1) Does it apply to the condition that the sway warning may operate improperly?	Check list (lane departure warning, sway warning, forward vehicle's start monitoring function) <Ref. to ES(diag)-58, CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.
7	Forward vehicle's start monitoring function does not operate. Or the forward vehicle's start monitoring function is released automatically.	(1) Using CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), check the following and respond to it. 1) Does it apply to the condition that the forward vehicle's start monitoring function does not operate even when the preceding vehicle has already started?	Check list (lane departure warning, sway warning, forward vehicle's start monitoring function) <Ref. to ES(diag)-58, CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.
8	Forward vehicle's start monitoring function operates improperly. Or the forward vehicle's start monitoring function is not released.	(1) Using CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), check the following and respond to it. 1) Does it apply to the condition that the forward vehicle's start monitoring function operates even when the preceding vehicle has not yet started?	Check list (lane departure warning, sway warning, forward vehicle's start monitoring function) <Ref. to ES(diag)-58, CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION), DIAGNOSTIC PROCEDURE WITH PHENOMENON, Diagnostics with Phenomenon.> When there is a relevant item in the check list, it can be the cause of malfunction. Eliminate the cause, and check that the malfunction has been improved. If not solved, the stereo camera may be malfunctioning.

5. CHECK LIST (ADAPTIVE CRUISE CONTROL)

Item name			Yes/No	
[1]: When the vehicle does not accelerate or decelerate according to the preceding vehicle, or when it is difficult to detect the preceding vehicle.				
1	Check that the current status applies to the condition that the use of adaptive cruise control is not desired.			
	1	Tire pressure is not correct.	Yes	No
	2	The vehicle is equipped with the temporary spare tire.	Yes	No
	3	The vehicle is equipped with worn tire or tires with excessive wear difference.	Yes	No
	4	The vehicle is equipped with the tires out of specification.	Yes	No
	5	The suspension has been modified.	Yes	No
	6	The vehicle is equipped with the tire chain.	Yes	No
	7	Headlight is dirty or the optical axis is deviated. (The vehicle cannot correctly emit the headlight beam against the object and recognize it.)	Yes	No
	8	The driving of own vehicle is unstable due to an accident or failure.	Yes	No
	9	The brake warning light illuminates.	Yes	No
	10	Vehicle is tilted by the heavy load.	Yes	No
	11	Passenger capacity is exceeded.	Yes	No
	12	The vehicle is towing the trailer or other vehicle.	Yes	No
	13	The vehicle drives on the general road (other than limited highway). (Depending on the road environment (complicated roads etc.), the vehicle may not be able to drive according to the traffic condition, which may lead to the traffic accident.)	Yes	No
	14	The vehicle drives on the sharp bend.	Yes	No
	15	The vehicle drives on the slippery roads such as icy road or snow-covered road. (Tires can spin, losing the vehicle control.)	Yes	No
	16	The vehicle drives under the traffic condition that the certain vehicle distance is difficult to be maintained due to frequent acceleration and deceleration. (The vehicle may not be able to drive according to the traffic condition.)	Yes	No
	17	There is a steep downhill. (The vehicle may drive at higher speed than the set vehicle speed.)	Yes	No
	18	The vehicle performs adaptive driving while recognizing the preceding vehicle on the steep downhills. (Brake can be overheated.)	Yes	No
	19	The vehicle drives on the road with repeated steep uphills and downhills or crossover. (The vehicle may not be able to recognize the preceding vehicle or may recognize the road surface, and appropriate control may not be performed.)	Yes	No
	20	The vehicle is entering the interchange, service area, parking area, junction or tollgate. (The vehicle may not be able to recognize the preceding vehicle.)	Yes	No
	21	When the surrounding brightness (such as inlet and outlet of a tunnel) suddenly changes.	Yes	No
	22	There are water, snow or sandy dust raised by the preceding vehicle or oncoming vehicle, or sand or smoke blown in the wind, or moisture in front of own vehicle. (The vehicle may not be able to recognize the preceding vehicle or may recognize the water, and appropriate control may not be performed.)	Yes	No
	23	The windshield glass is covered with fog, snow, dirt, frost or sandy dust.	Yes	No
	24	The raindrops, water drops or dirt on the windshield glass are not wiped off sufficiently. (The vehicle may not be able to recognize the preceding vehicle, and appropriate control may not be performed.)	Yes	No
	25	Canoes etc. loaded on the roof block the visibility of the stereo camera.	Yes	No

		Item name	Yes/No	
2	Check that the current status applies to the condition or the object that is hard to be recognized by the stereo camera.			
	1	That was a vehicle with large speed difference (low-speed driving vehicle, stopping vehicle, oncoming vehicle).	Yes	No
	2	That was a cutting-in vehicle.	Yes	No
	3	That was a motorcycle, bicycle, pedestrian or animal, etc.	Yes	No
	4	It was dim in the evening or in the morning.	Yes	No
	5	The headlight did not illuminate during nighttime hours or inside the tunnel.	Yes	No
	6	The tail light of the preceding vehicle did not illuminate during nighttime hours or inside the tunnel.	Yes	No
	7	The vehicle was exposed to the intense light (backlight such as sunlight or headlight high-beam light) from the front of the vehicle.	Yes	No
	8	The rearmost surface of the preceding vehicle was small, low or uneven. That was a truck equipped with an unloaded platform without gate, a vehicle that the luggage was protruding from the rear end of the vehicle, a vehicle of special shape (carrier car, side car, etc.) or a vehicle with low vehicle height.	Yes	No
	9	There was an object extremely close to the bumper of the own vehicle.	Yes	No
3	Check that the current status applies to the driving condition that the preceding vehicle cannot be recognized or the vehicle on the next lane or the object on the roadside may be recognized by mistake.			
	1	The vehicle began adaptive cruise control from the condition that the vehicle distance was short immediately after the preceding vehicle was cut in.	Yes	No
	2	The vehicle drives on the curve, outlet and inlet of the curve, or the road with many curves in succession. (Recognition may not be performed properly, because the preceding vehicle is out of recognition area.)	Yes	No
	3	The position against the preceding vehicle deviated laterally.	Yes	No
	4	There were some objects just near the road side.		
	5	The speed difference against the preceding vehicle was large.	Yes	No
	6	Other vehicle cut ahead of the own vehicle.	Yes	No
	7	The vehicle distance was extremely short.	Yes	No
	8	The own vehicle swayed in the vehicle lane.	Yes	No
	9	The road surface was uneven due to roll or unpaved track.	Yes	No
	10	The vehicle drove on the narrow lane because of the lane closure or construction work.	Yes	No
	11	The driving of own vehicle was unstable due to an accident or failure.	Yes	No
	12	The own vehicle was loaded with the extremely heavy load in the luggage compartment or on the rear seat.	Yes	No
[2]: When braking force is weaker than usual.				
1	Check that the current status applies to the condition that brake force may become poor.			
	1	The vehicle status (loading amount, passenger, etc.) was inappropriate.	Yes	No
	2	The road surface was very steep, slippery, sharp turn, or uneven.	Yes	No
	3	The service maintenance condition of the vehicle (brake system, tire wear, tire pressure, spare tire, etc.) was inappropriate.	Yes	No
	4	The brake was cold at low ambient temperature or immediately after the driving had started.	Yes	No
	5	The symptom occurred between immediately after engine started and after a while the vehicle started driving (Completion of warming up operation can be used as an indication.).	Yes	No
	6	The brake force becomes poor due to the overheating of the brake on the downhills.	Yes	No
	7	The brake force becomes poor because of the wet brake after driving onto the puddle or washing the vehicle.	Yes	No
[3]: When the alarm for requiring more brake pedal force does not sound.				
1	Check that the current status applies to the condition that the alarm for requiring more brake pedal force does not sound even in a short vehicle distance.			
	1	The speed difference between own vehicle and preceding vehicle (when the vehicle speed of the own vehicle was approximately the same as that of the preceding vehicle) was small.	Yes	No
	2	The vehicle speed of the preceding vehicle was faster than that of the own vehicle (when the vehicle distance was getting longer).	Yes	No
	3	Other vehicle cut in extremely close to the own vehicle.	Yes	No
	4	The preceding vehicle decelerated abruptly.	Yes	No
	5	There are many continuous uphills and downhills.	Yes	No

6. CHECK LIST (PRE-COLLISION BRAKE)

Item name			Yes/No	
[1]: When pre-collision brake did not operate, or when vehicle could not stop safely before collision in spite of pre-collision brake operation.				
1	Check that the current status applies to the condition that the pre-collision brake does not operate, or there is a high possibility that the vehicle cannot stop safely before collision in spite of pre-collision brake operation.			
	1	Conditions such as the followings occurred: 1) Vehicle speed difference with the preceding vehicle is small. 2) Distance from the preceding vehicle is long. 3) Lateral deviation (offset amount) is large.	Yes	No
	2	The vehicle status (loading amount, number of passenger, etc.) was inappropriate.	Yes	No
	3	The road surface was very steep, slippery, sharp turn, or uneven.	Yes	No
	4	There was problem for the frontal visibility (rain, snow, fog, smoke, etc.).	Yes	No
	5	The objects were livestock, animals, guardrail, telephone pole, tree, fence, wall, etc.	Yes	No
	6	The object was motorcycle, bicycle, or pedestrian. However, the system could not recognize the object due to surrounding brightness, motion, posture, and/or angle.	Yes	No
	7	Crash avoidance operation (accelerator pedal, brake pedal, steering wheel, etc.) was performed.	Yes	No
	8	The service maintenance condition of the vehicle (brake system, tire wear, tire pressure, spare tire, etc.) was inappropriate.	Yes	No
	9	The vehicle is towing the trailer or other vehicle.	Yes	No
	10	The brake was cold at low ambient temperature or immediately after the driving had started.	Yes	No
	11	The brake force becomes poor due to the overheating of the brake on the downhills.	Yes	No
	12	The brake force becomes poor because of the wet brake after driving onto the puddle or washing the vehicle.	Yes	No
2	Check that the current status applies to the condition that there is a high possibility that the pre-collision brake does not operate depending on the recognition status of the stereo camera.			
	1	It was bad weather (heavy rain, snowstorm, dense fog).	Yes	No
	2	The field of view was insufficient due to water, snow or sandy dust raised by the preceding vehicle or oncoming vehicle, or the moisture, sand or smoke blown in the wind.	Yes	No
	3	The headlight did not illuminate during nighttime hours or inside the tunnel.	Yes	No
	4	The tail light of the preceding vehicle did not illuminate during nighttime hours or inside the tunnel.	Yes	No
	5	The vehicle approached the motorcycle, bicycle or pedestrian in the night.	Yes	No
	6	It was dark in the evening or in the morning.	Yes	No
	7	The rearmost surface of the preceding vehicle was small, low or uneven. That was a truck equipped with an unloaded platform without gate, a vehicle that the luggage was protruding from the rear end of the vehicle, a vehicle of special shape (carrier car, side car, etc.) or a vehicle with low vehicle height.	Yes	No
	8	There was a wall in front of the stopping vehicle.	Yes	No
	9	There was an object close to the vehicle.	Yes	No
	10	That was a vehicle stopped sideways.	Yes	No
	11	That was a vehicle which was oncoming or driving in reverse.	Yes	No
	12	The object was small seen from the stereo camera. (small animals, infants, person squatting down or lying down)	Yes	No
	13	The preceding vehicle made a sharp turn, or performed abrupt acceleration or deceleration.	Yes	No
	14	Other vehicle, motorcycle, bicycle or pedestrian existed extremely close to the bumper of the own vehicle.	Yes	No
	15	The speed difference was 5 km/h (3.1 MPH) or less. (The control is performed in close distance. Depending on the objects shape and size, the rear end surface may be outside the camera visibility area.)	Yes	No
	16	Other vehicle, motorcycle, bicycle or pedestrian cut in from the side or jumped in front of the own vehicle.	Yes	No
	17	The own vehicle changed the vehicle lane, and followed the preceding vehicle right behind.	Yes	No
	18	The vehicle was exposed to the intense light (backlight such as sunlight or headlight high-beam light) from the front of the vehicle.	Yes	No
	19	The windshield glass was covered with fog, snow, dirt, frost or sandy dust.	Yes	No
	20	The windshield glass has not yet been wiped off sufficiently during or after the use of the window washer.	Yes	No
	21	The recognition of the object was imperfect due to the raindrop or droplet of the window washer or the wiper blade blocking the visibility of the stereo camera.	Yes	No
	22	Canoes etc. loaded on the roof blocked the visibility of the stereo camera.	Yes	No

Item name			Yes/No	
2	23	Other vehicle, motorcycle, bicycle or pedestrian existed out of the illuminating area of the headlight.	Yes	No
	24	The vehicle drove on the sharp turn, steep uphills or steep downhills.	Yes	No
	25	The road surface was uneven due to roll or unpaved track.	Yes	No
	26	The vehicle passed through the outlet or inlet of a tunnel.	Yes	No
	27	The object was fence or wall.	Yes	No
	28	The object was a plate of glass, mirror wall or door.	Yes	No
3	Check that the current status applies to the condition that the system does not operate correctly and the turning OFF of the pre-collision brake is desired.			
	1	Tire pressure is not correct.	Yes	No
	2	The vehicle is equipped with the temporary spare tire.	Yes	No
	3	The vehicle is equipped with worn tire or tires with excessive wear difference.	Yes	No
	4	The vehicle is equipped with the tires out of specification.	Yes	No
	5	The suspension has been modified.	Yes	No
	6	The vehicle is equipped with the tire chain.	Yes	No
	7	Headlight is dirty or the optical axis is deviated. (The vehicle cannot correctly emit the headlight beam against the object and recognize it.)	Yes	No
	8	The driving status of own vehicle is unstable due to an accident or failure.	Yes	No
	9	The brake warning light illuminates.	Yes	No
	10	Vehicle is tilted by the heavy load. Or, passenger capacity is exceeded.	Yes	No
4	Check that the current status applies to the condition that the pre-collision brake OFF indicator light illuminates. (When the pre-collision brake OFF indicator light illuminates, the pre-collision brake does not operate.)			
	1	The pre-collision brake is turned off, using the pre-collision brake OFF switch.	Yes	No
	2	Approximately for 7 seconds after the engine has started.	Yes	No
	3	EyeSight is malfunctioning.	Yes	No
	4	EyeSight is stopped temporarily.	Yes	No
[2]: When pre-collision brake operated improperly.				
1	Check that the current status applies to the condition that turning OFF of the pre-collision brake is desired.			
	1	The vehicle is towed.	Yes	No
	2	The vehicle is loaded on the carrier car.	Yes	No
	3	The chassis dynamometer or free roller is used.	Yes	No
	4	The vehicle is lifted up, engine is started and the tire is spun.	Yes	No
	5	The vehicle passes through the banners, flags, drooping branches or grass while making contact with them.	Yes	No
	6	The vehicle performs sporty driving on the circuit.	Yes	No
	7	When the vehicle uses the movable type car wash machine.	Yes	No
2	Check that the current status applies to the condition that the pre-collision brake may operate.			
	1	The vehicle passes through the ETC gate at a speed exceeding the specification.	Yes	No
	2	The vehicle drives close to the preceding vehicle.	Yes	No
	3	The vehicle drives on the place where the road surface gradient changed suddenly.	Yes	No
	4	The vehicle passes through the moisture or mass of smoke.	Yes	No
	5	When the exhaust gas emitted from the preceding vehicle is visible clearly at cold weather.	Yes	No
	6	There is an obstacle on the curve or crossing.	Yes	No
	7	The vehicle passes through close to other vehicle or obstacle.	Yes	No
	8	The vehicle parks close to the wall in front or to other vehicle.	Yes	No

7. CHECK LIST (AT RAPID START PREVENTION CONTROL)

		Item name	Yes/No	
[1]: When AT rapid start prevention control did not operate.				
1	Check that the current status applies to the condition that the AT rapid start prevention control may not operate.			
	1	Conditions such as the followings occurred: 1) Distance from the front object is long. 2) Vehicle speed difference is small. 3) Lateral deviation (offset amount) is large.	Yes	No
	2	It was bad weather (heavy rain, snowstorm, dense fog).	Yes	No
	3	The visibility was insufficient due to sand or smoke blown in the air.	Yes	No
	4	The vehicle approached the object in the evening, in the morning or in the night.	Yes	No
	5	The vehicle approached the object in the dark place (e.g. closed-in parking lot).	Yes	No
	6	The height of the object was low. (low wall, low guardrail, vehicle with low height etc.)	Yes	No
	7	The object was small seen from the stereo camera. (Small animals, infants, person squatting down or lying down)	Yes	No
	8	The object or rearmost area of the preceding vehicle (trailer, etc.) was small. Or the vehicle approached them too close. (The system triggers the operation by recognizing the area other than the rearmost section, resulting in insufficient control.)	Yes	No
	9	The object such as other vehicle, motorcycle, bicycle or pedestrian cut in from the side or jumped in front of the own vehicle.	Yes	No
	10	The own vehicle changed the vehicle lane when it started, and approached right behind the object.	Yes	No
	11	The vehicle was exposed to the intense light (backlight such as sunlight or headlight high-beam light) from the front of the vehicle.	Yes	No
	12	The windshield glass was covered with fog, snow, dirt, frost or sandy dust.	Yes	No
	13	The windshield glass has not yet been wiped off sufficiently during or after the use of the window washer.	Yes	No
	14	The recognition of the object was imperfect due to the raindrop or droplet of the window washer or the wiper blade blocking the visibility of the stereo camera.	Yes	No
	15	Canoes etc. loaded on the roof blocked the visibility of the stereo camera.	Yes	No
	16	The object existed out of the illuminating area of the headlight.	Yes	No
	17	The vehicle drove on the sharp turn, steep uphills or steep downhills.	Yes	No
	18	The object was a fence or wall with even pattern (striped pattern or bricks) or unpatterned surface.	Yes	No
	19	The object was a plate of glass, mirror wall or door.	Yes	No
	20	Crash avoidance operation (accelerator pedal, brake pedal, steering wheel, etc.) was performed.	Yes	No
2	Check that the current status applies to the condition that the pre-collision brake OFF indicator light illuminates. (When the pre-collision brake OFF indicator light illuminates, the AT rapid start prevention control does not operate.)			
	1	The pre-collision brake was turned off, using the pre-collision brake OFF switch.	Yes	No
	2	Approximately for 7 seconds after the engine has started.	Yes	No
	3	EyeSight is malfunctioning.	Yes	No
	4	EyeSight is stopped temporarily.	Yes	No
[2]: When AT rapid start prevention control operated improperly.				
1	Check that the current status applies to the condition that the releasing of the AT rapid start prevention control is desired.			
	1	The vehicle is towed.	Yes	No
	2	The vehicle is loaded on the carrier car.	Yes	No
	3	The chassis dynamometer or free roller is used.	Yes	No
	4	The vehicle is lifted up, engine is started and the tire is spun.	Yes	No
	5	The vehicle passes through the banners, flags, drooping branches or grass while making contact with them.	Yes	No
	6	The vehicle performs sporty driving on the circuit.	Yes	No

		Item name	Yes/No	
2	Check that the current status applies to the condition that the AT rapid start prevention control may operate.			
	1	The vehicle passes through the ETC gate at a speed exceeding the specification.	Yes	No
	2	The vehicle drives close to the preceding vehicle.	Yes	No
	3	The vehicle drives on the place where the road surface gradient changed suddenly.	Yes	No
	4	The vehicle passes through the moisture or mass of smoke.	Yes	No
	5	There is an obstacle on the curve or crossing.	Yes	No
	6	The vehicle passes through close to other vehicle or obstacle.	Yes	No
	7	The vehicle parks close to the wall in front or to other vehicle.	Yes	No

8. CHECK LIST (LANE DEPARTURE WARNING, SWAY WARNING, FORWARD VEHICLE'S START MONITORING FUNCTION)

		Item name	Yes/No	
[1]: When the lane departure warning did not operate.				
1	Check that the current status applies to the condition that the lane departure warning does not operate or is difficult to operate.			
	1	The lane departure warning is turned off.	Yes	No
	2	The vehicle speed of the own vehicle is approximately less than 50 km/h (31 MPH).	Yes	No
	3	That was approximately 7 seconds period after the lane departure warning had occurred once.	Yes	No
	4	The steering wheel was turned fully or rapidly.	Yes	No
	5	The brake pedal is depressed.	Yes	No
	6	The vehicle is accelerated by depressing the accelerator pedal.	Yes	No
	7	The vehicle distance from the preceding vehicle is short.	Yes	No
	8	That was approximately 7 seconds period while the turn signal indicator was operating or after the lever was returned.	Yes	No
	9	The vehicle has not returned inside the vehicle lane after the operation of the lane departure warning.	Yes	No
	10	The width of the vehicle lane is narrow.	Yes	No
	11	The vehicle lane is difficult to be recognized seen from the stereo camera. (Lane line (white line, etc.) does not exist or is fading out. Or the color of the lane line is very similar to that of the road surface, and difficult to be seen. Or the width of the lane line is very thin.)	Yes	No
	12	The preceding vehicle performed crash avoidance action to avoid the obstacle, and the own vehicle performed steering operation after the preceding vehicle.	Yes	No
2	Check that the current status applies to the condition that the lane departure warning OFF indicator light illuminates. (When the lane departure warning OFF indicator light illuminates, the lane departure warning does not operate.)			
	1	The lane departure warning is turned off, using the lane departure warning OFF switch.	Yes	No
	2	Approximately for 7 seconds after the engine has started.	Yes	No
	3	EyeSight is malfunctioning.	Yes	No
	4	EyeSight is stopped temporarily.	Yes	No
[2]: When the lane departure warning malfunctioned.				
1	Check that the current status applies to the condition that the vehicle lane is recognized erroneously and the lane departure warning may operate.			
	1	There was the tire track on the wet road or snow-covered road.	Yes	No
	2	There was the boundary line between snow-covered area and asphalt or on the trace of road repair.	Yes	No
	3	There was the double vehicle lane.	Yes	No
	4	The shadow of the guardrail was detected by mistake.	Yes	No
[3]: When the sway warning did not operate.				

		Item name	Yes/No	
1	Check that the current status applies to the condition that the sway warning may not operate.			
	1	The vehicle drove on the road with many curves in succession.	Yes	No
	2	The vehicle speed changed greatly.	Yes	No
	3	That was immediately after the vehicle lane had changed.	Yes	No
	4	The vehicle lane was difficult to be recognized seen from the stereo camera. (Lane line (white line, etc.) does not exist or is fading out. Or the color of the lane line is very similar to that of the road surface, and difficult to be seen. Or the width of the lane line is very thin.)	Yes	No
	5	That was immediately after the sway had begun.	Yes	No
2	Check that the current status applies to the condition that the lane departure warning OFF indicator light illuminates. (When the lane departure warning OFF indicator light illuminates, the sway warning does not operate.)			
	1	The lane departure warning is turned off, using the lane departure warning OFF switch.	Yes	No
	2	Approximately for 7 seconds after the engine has started.	Yes	No
	3	EyeSight is malfunctioning.	Yes	No
	4	EyeSight is stopped temporarily.	Yes	No
[4]: When the sway warning malfunctioned.				
1	Check that the current status applies to the condition that the sway warning may operate.			
	1	That was after the sway had stopped.	Yes	No
	2	The driver lost concentration on driving the vehicle due to fatigue or looking away.	Yes	No
[5]: When the forward vehicle's start monitoring function did not operate or when it malfunctioned.				
1	Check that the current status applies to the condition that the forward vehicle's start monitoring function does not operate even when the preceding vehicle has already started, or that the forward vehicle's start monitoring function operates even when the preceding vehicle has not yet started.			
	1	The motorcycle cut in the space between the own vehicle and the stopped preceding vehicle.	Yes	No
	2	The vehicle could not recognize the preceding vehicle properly due to the weather condition or road shape.	Yes	No
	3	The stereo camera lost sight of the preceding vehicle.	Yes	No
	4	The driver did not depress the brake pedal with select lever in D, M or N range. (At this time, forward vehicle's start monitoring function does not operate.)	Yes	No
	5	The forward vehicle's start monitoring function was turned OFF via the customization function.	Yes	No

B: CHECK ADAPTIVE CRUISE CONTROL INDICATOR LIGHT/CONSTANT SPEED CRUISE CONTROL INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT

TROUBLE SYMPTOM:
Adaptive cruise control or conventional cruise control can be set, but adaptive cruise control indicator light/constant speed cruise control indicator light and cruise SET indicator light do not illuminate.

	Step	Check	Yes	No
1	**CHECK ADAPTIVE CRUISE CONTROL INDICATOR LIGHT/CONSTANT SPEED CRUISE CONTROL INDICATOR LIGHT AND CRUISE SET INDICATOR LIGHT.** Check the combination meter. <Ref. to IDI(diag)-20, OPERATION, System Operation Check Mode.>	Does adaptive cruise control indicator light/constant speed cruise control indicator light and cruise SET indicator light illuminate?	Go to step **2**.	Replace the meter case assembly. <Ref. to IDI-19, Combination Meter.>
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault?	Perform the diagnosis according to diagnosis for LAN system.	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

C: CHECK EyeSight STEERING SWITCH

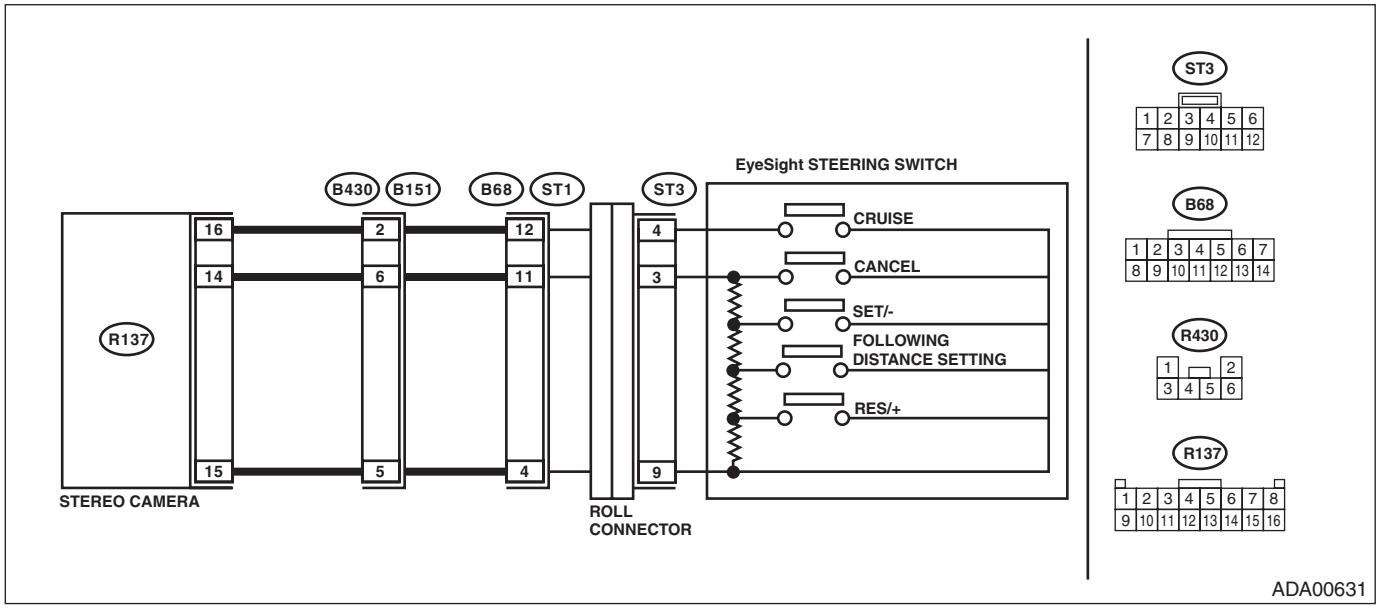
TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)
- Cruise control cannot be released.

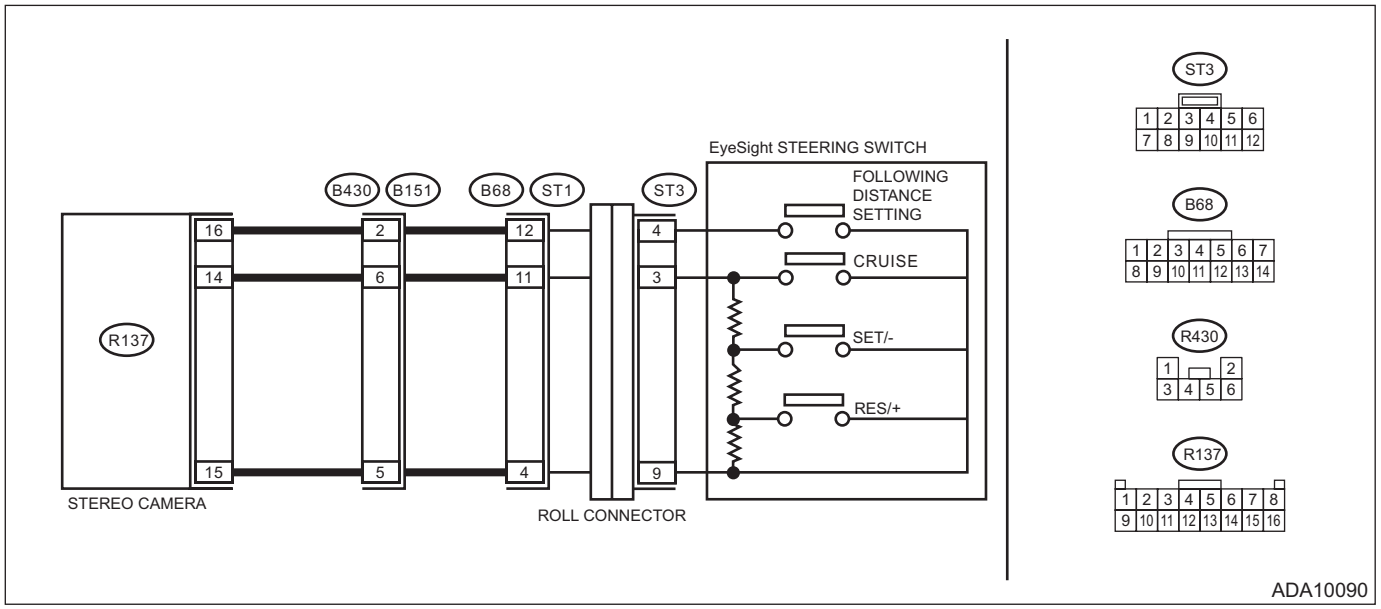
WIRING DIAGRAM:

EyeSight System <Ref. to WI(w/o HEV)-130, WIRING DIAGRAM, EyeSight System.>

- Except for Crosstrek model



- Crosstrek model



	Step	Check	Yes	No
1	**CHECK EyeSight STEERING SWITCH CIRCUIT.** 1) Remove the driver's airbag module. <Ref. to AB-38, REMOVAL, Driver's Airbag Module.> 2) Disconnect the EyeSight steering switch harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between harness connector terminal and chassis ground. ***Connector & terminal*** ***(ST3) No. 3 (+) — Chassis ground (–):*** ***(ST3) No. 4 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Go to step **2**.	Check for open/short circuit or poor contact in the harness between EyeSight steering switch and ECM and in the steering roll connector.
2	**CHECK EyeSight STEERING SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Remove the EyeSight steering switch. <Ref. to ES-33, Switches and Harness.> 3) Measure the resistance between harness connector terminal and chassis ground. ***Connector & terminal*** ***(ST3) No. 9 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **3**.	Check for open circuit between EyeSight steering switch and chassis ground.
3	**CHECK EyeSight STEERING SWITCH.** Check EyeSight steering switch. <Ref. to ES-33, Switches and Harness.>	Is the EyeSight steering switch normal?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).>	Replace the EyeSight steering switch. <Ref. to ES-33, Switches and Harness.>

13.EyeSight Temporary Code(s) Display

A: OPERATION

If the EyeSight pause code is detected from the stereo camera, all the functions of the EyeSight excluding the conventional cruise control stop temporarily and cannot be used. When the failure is resolved, the function starts operating.

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «EyeSight» and select «Enter».
5) On «Select Function» display, select «Cancel Code».
6) On «Cancel Code» display, select «EyeSight Pause Code».

NOTE:

- For detailed operation procedures, refer to “Application help”.
- Temporary stop is not released even if the lane departure warning OFF switch or pre-collision brake OFF switch is pressed.
- Depending on the situation, temporary stop may not be released even if the ignition switch is turned off.
- Up to 20 codes can be stored.
- Stored codes will be cleared by Clear Memory.
- For details on EyeSight temporary stop codes, refer to List of EyeSight temporary stop code. <Ref. to ES(diag)-63, LIST, EyeSight Temporary Code(s) Display.>

B: LIST

- List of EyeSight temporary stop code

EyeSight pause code	Item	Contents of diagnosis	Reference
E5	Stereo Camera Temporary Stop	The operation stopped temporarily due to vertical deviation of the optical axis of the stereo camera. (During CRUISE MAIN ON, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)	Perform inspection concerning the item for E5 of the “CHECK LIST (CAMERA TEMPORARY STOP)”. <Ref. to ES(diag)-66, CHECK LIST (CAMERA TEMPORARY STOP), LIST, EyeSight Temporary Code(s) Display.> This code may be displayed when the rear of the vehicle is lowered by the overload. When the failure is resolved, and the operation returns from the temporary stop status after driving for a while, it is normal. If this item is displayed in an ordinary use under which the vehicle is not tilted, readjust the stereo camera. <Ref. to ES-12, PROCEDURE, Camera Adjustment, Inspection.> If the same cancel code is still detected after readjustment, replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

EyeSight Temporary Code(s) Display

EyeSight pause code	Item	Contents of diagnosis	Reference
CC CD	Stereo Camera Temporary Stop	Temporary stop was performed due to the bad weather, backlight, fogged window or dirty window interfering with the recognition function of the stereo camera. And this code may be displayed also when the front of the camera is blocked by the hand or when it is very dark around the vehicle or when the vehicle is surrounded by the blanket of snow and nothing can be seen from the stereo camera. (During CRUISE MAIN ON, “EyeSight Disabled No Camera View” is displayed in the multi-information display.)	Investigate the following items No. 1 and No. 2, and check that the possible cause of the temporary stop is applied either to No. 1 or No. 2. 1. Perform inspection concerning the item for CC and CD of the “CHECK LIST (CAMERA TEMPORARY STOP)”. <Ref. to ES(diag)-66, CHECK LIST (CAMERA TEMPORARY STOP), LIST, EyeSight Temporary Code(s) Display.> When there is a relevant item in the check list, it can be the cause of malfunction. 2. Read the temporary stop count stored in the temporary stop count of current data, and check the cause of the temporary stop occurred in the past from “LIST OF CONTENTS FOR CAMERA TEMPORARY STOP: 0 — 23 COUNTS”. <Ref. to ES(diag)-68, LIST OF CONTENTS FOR CAMERA TEMPORARY STOP, LIST, EyeSight Temporary Code(s) Display.> When the causes of the temporary stop for No. 1 and No. 2 correspond, drive the vehicle for a while after the cause of the temporary stop has been eliminated. If the operation returns from the temporary stop status, it is normal. (However, when the temporary stop takes place and is cancelled repeatedly, the temporary stop status is kept for a while to delay the return of the operation, which prevents the irritation.) When this is not the case, check the stereo camera and its periphery. <Ref. to ES(diag)-7, WINDSHIELD GLASS AND DASHBOARD, INSPECTION, General Description.> <Ref. to ES(diag)-11, FRONT WIPER, INSPECTION, General Description.> <Ref. to ES(diag)-12, STEREO CAMERA, INSPECTION, General Description.>
CE		The temperature of the stereo camera became excessively high or low, and the operation stopped temporarily. (During CRUISE MAIN ON, “EyeSight Disabled Temp Range” is displayed in the multi-information display.)	Perform inspection concerning the item for CE of the “CHECK LIST (CAMERA TEMPORARY STOP)”. <Ref. to ES(diag)-66, CHECK LIST (CAMERA TEMPORARY STOP), LIST, EyeSight Temporary Code(s) Display.> When the failure is resolved, and the operation returns from the temporary stop status, it is normal. When the operation does not return from the temporary status even if driving the vehicle for a while after the failure has been resolved, replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>
33		Detected when engine speed is 300 rpm or less. (Not detected at an initial ignition switch ON.) (During CRUISE MAIN ON, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)	Detected when the engine speed drops below 300 rpm after the engine has started once. (except during Auto Start Stop operation) However, this code is detected when the seat belt is unfastened during Auto Start Stop operation or when the door is opened. If the same EyeSight temporary stop code is detected again when the engine is restarted, check the ECM. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

EyeSight Temporary Code(s) Display

EyeSight pause code	Item	Contents of diagnosis	Reference
C0	Pre-Collision Second Braking Activation	Because the pre-collision secondary brake operated three times between engine starting and stopping, the temporary stop is performed. (This is not a normal driving operation, or the system may be malfunctioning.) (During CRUISE MAIN ON, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)	This code may be displayed when the pre-collision brake is operated intentionally. Turn the ignition switch to OFF, and restart after a while. If the operation returns from the temporary stop status, it is normal. When temporary stop status continues with a code other than C0 after restart, perform diagnosis according to the code. When temporary stop status continues with the code of C0 after restart, the stereo camera may be malfunctioning. Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>
A0	CAN Diagnosis	The voltage dropped below 10 V immediately after IGN ON. (During CRUISE MAIN ON, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)	This code may be displayed when the engine is not started for a while with the ignition switch ON and when the engine has started after that. This is a normal operation. If this is not the case, the supply voltage may be malfunctioning. <Ref. to ES(diag)-78, DTC B2814 POWER SUPPLY LOW VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
A1	ECM Reprogramming	Because the control module (CM) is being reprogrammed, temporary stop is performed. (During CRUISE MAIN ON, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)	After the completion of the reprogramming operation, turn the ignition to OFF and restart. If the operation returns from the temporary stop status, it is normal.

1. CHECK LIST (CAMERA TEMPORARY STOP)

Even when the set status of the adaptive cruise control is canceled or when a temporary stop status occurs, the EyeSight temporary stop code will not be retained for the following conditions.

- When the lane departure warning is stopped by pressing the lane departure warning OFF switch
- Immediately after the engine start

When these cases does not apply but the EyeSight temporary stop code is displayed, perform the inspection according to the following items.

			Item name	Yes/No	
[1]: EyeSight temporary stop code [CC, CD] (At this time, “EyeSight Disabled No Camera View” is displayed in the multi-information display.)					
1	Check that the current status applies to the condition that are difficult to be recognized by the stereo camera.				
	1	It was bad weather (heavy rain, snowstorm, dense fog; especially when the oil film adheres to the windshield glass, the glass coating agent is used, or when the old wiper is used).		Yes	No
	2	The vehicle was exposed to the intense light (backlight such as sunlight or headlight high-beam light) from the front of the vehicle.		Yes	No
	3	The raindrops, water drops or dirt on the windshield glass are not wiped off sufficiently.		Yes	No
	4	The windshield glass is covered with fog, snow, dirt, frost or sandy dust, and either of them blocks the visibility of the stereo camera.		Yes	No
	5	The vehicle was tilted excessively by the heavy load.		Yes	No
	6	Canoes etc. loaded on the roof blocked the visibility of the stereo camera.		Yes	No
	7	The field of view was insufficient due to water or snow raised by the preceding vehicle or oncoming vehicle, or the moisture, sand, smoke or sandy dust blown in the wind.		Yes	No
	8	The vehicle passed through the outlet or inlet of a tunnel.		Yes	No
	9	The rearmost area of preceding vehicle was small (trailer, etc.), low or uneven.		Yes	No
	10	The object was a fence or wall with even pattern (striped pattern or bricks) or unpatterned surface.		Yes	No
	11	The object was a plate of glass, mirror wall or door.		Yes	No
	12	The tail light of the preceding vehicle did not illuminate during nighttime hours or inside the tunnel.		Yes	No
	13	The vehicle passed through the banners, flags, drooping branches or grass.		Yes	No
	14	The vehicle drove on the steep uphills or steep downhills.		Yes	No
	15	Front of the camera was blocked by the hand.		Yes	No
	16	It was very dark and there was no obstacle around the vehicle.		Yes	No
	17	The surrounding ground surface was similarly colored. (There is snow as far as the eye can see.)		Yes	No
	18	Dirt such as fingerprint adhered to the lens portion of the stereo camera.		Yes	No
	19	Stable recognition was difficult because of reflection to the windshield glass.		Yes	No
	20	The stereo camera was subject to impact, and the displacement or distortion occurred.		Yes	No
[2]: EyeSight temporary stop code [CE] (At this time, “EyeSight Disabled Temp Range” is displayed in the multi-information display.)					
1	Check that the current status applies to the condition that the temperature of the stereo camera becomes excessively high or low.				
	1	The compartment temperature was high. (For example: The vehicle was left under the scorching sun.) Or the compartment temperature was low. (For example: The vehicle was left under the frigid environment.)		Yes	No
[3]: EyeSight temporary stop code [E5] (At this time, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)					
1	Check that the current status applies to the condition that the vertical deviation occurs on the stereo camera optical axis.				
	1	The vehicle was tilted excessively by the heavy load.		Yes	No
	2	The vehicle drove on the steep uphills or steep downhills.		Yes	No
	3	The stereo camera was subject to impact, and the displacement or distortion occurred.		Yes	No
[4]: EyeSight temporary stop code [33] (At this time, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)					
1	Check that the current status applies to the condition that the engine speed drops to 300 rpm or below.			Yes	No
[5]: EyeSight temporary stop code [C0] (At this time, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)					
1	Check that the current status applies to the condition that the pre-collision secondary brake operated three times between starting and stopping of engine.			Yes	No

EyeSight Temporary Code(s) Display

	Item name	Yes/No	
[6]: EyeSight temporary stop code [A0] (At this time, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)			
1	Check that the current status applies to the condition that the voltage dropped below 10 V immediately after the ignition ON.	Yes	No
[7]: EyeSight temporary stop code [A1] (At this time, “EyeSight Disabled Check Manual” is displayed in the multi-information display.)			
1	Check that the control module (CM) is currently being reprogrammed.	Yes	No

2. LIST OF CONTENTS FOR CAMERA TEMPORARY STOP

Read the camera temporary stop count from Current Data Display & Save of Subaru Select Monitor, estimate the possible cause of the temporary stop according to the chart below. (After clearing the memory, the number of occurrences for each temporary stop is accumulated.)

Displayed item	Main causes	Possible conditions for temporary stop (including events occurring less frequently)
Camera temporary stop 0 count	Front of the camera is blocked by hand, dirty window glass	Backlight, dirty window glass, fogged window glass, frost on the window glass, oil film on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens, deteriorated wiper, front of the camera is blocked by hand, bad weather (heavy rain, snowstorm, dense fog), unpatterned wall, water or snow raised by preceding vehicle
Camera temporary stop 1 count	Front of the camera is blocked by hand, dirty window glass	Backlight, dirty window glass, fogged window glass, frost on the window glass, oil film on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens, deteriorated wiper, front of the camera is blocked by hand, bad weather (heavy rain, snowstorm, dense fog), water or snow raised by preceding vehicle, very dark and no obstacle around the vehicle, unpatterned wall, blanket of snow around the vehicle and no obstacle is found
Camera temporary stop 2 count	Fogged window glass, frost on the window glass	Dirty window glass, fogged window glass, frost on the window glass, oil film on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens, deteriorated wiper, front of the camera is blocked by hand, bad weather (heavy rain, snowstorm, dense fog), unpatterned wall, water or snow raised by preceding vehicle
Camera temporary stop 3 count	Backlight	Backlight, dirty window glass, fogged window glass, frost on the window glass, oil film on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens, deteriorated wiper, bad weather (heavy rain, snowstorm, dense fog), unpatterned wall, water or snow raised by preceding vehicle
Camera temporary stop 4 count	Water raised by preceding vehicle	Backlight, dirty window glass, fogged window glass, frost on the window glass, oil film on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens, deteriorated wiper, front of the camera is blocked by hand, bad weather (heavy rain, snowstorm, dense fog), unpatterned wall, water or snow raised by preceding vehicle, use of the window washer
Camera temporary stop 5 count	Dirty window glass, fogged window glass, oil film on the window glass	Dirty window glass, fogged window glass, frost on the window glass, oil film on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens, deteriorated wiper, bad weather (heavy rain, snowstorm, dense fog), water or snow raised by preceding vehicle
Camera temporary stop 6 count	Storm of rain	Dirty window glass, fogged window glass, frost on the window glass, oil film on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens, deteriorated wiper, bad weather (heavy rain, snowstorm, dense fog), water or snow raised by preceding vehicle, use of the window washer
Camera temporary stop 7 count	Object on the dashboard reflected against the windshield glass	Object on the dashboard reflected against the windshield glass, snowstorm
Camera temporary stop 8 count	Dirty window glass, bad weather	Backlight, dirty window glass, fogged window glass, frost on the window glass, oil film on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens, deteriorated wiper, front of the camera is blocked by hand, object on the dashboard reflected against the windshield glass, bad weather (heavy rain, snowstorm, dense fog), unpatterned wall, water drop raised by preceding vehicle, steep slope, continuous sharp curve, banner, grass, preceding vehicle with large uneven surface (trailer, etc.), preceding vehicle driving in the night without illuminating the tail light, preceding vehicle with snow adhered, use of the window washer
Camera temporary stop 9 count	Not used	—
Camera temporary stop 10 count	Not used	—

EyeSight Temporary Code(s) Display

Displayed item	Main causes	Possible conditions for temporary stop (including events occurring less frequently)
Camera temporary stop 11 count	Not used	—
Camera temporary stop 12 count	Camera has been deformed by hitting it.	The stereo camera was subject to impact, and the displacement or distortion occurred.
Camera temporary stop 13 count	Not used	—
Camera temporary stop 14 count	Not used	—
Camera temporary stop 15 count	Not used	—
Camera temporary stop 16 count	Not used	—
Camera temporary stop 17 count	Not used	—
Camera temporary stop 18 count	Not used	—
Camera temporary stop 19 count	Not used	—
Camera temporary stop 20 count	Not used	—
Camera temporary stop 21 count	The vehicle is tilted excessively by the heavy load.	• The vehicle is tilted excessively by the heavy load. • The vehicle drives on the steep uphills or steep downhills. • The stereo camera was subject to impact, and the displacement or distortion occurred.
Camera temporary stop 22 count	Camera has been deformed by hitting it.	The stereo camera was subject to impact, and the displacement or distortion occurred.
Camera temporary stop 23 count	Camera has been deformed by hitting it.	The stereo camera was subject to impact, and the displacement or distortion occurred.
Camera temporary stop 24 count	Camera has been deformed by hitting it.	The stereo camera was subject to impact, and the displacement or distortion occurred.
Camera temporary stop 25 count	Camera has been deformed by hitting it.	The stereo camera was subject to impact, and the displacement or distortion occurred.
Camera temporary stop 26 count	Dirty window glass left for a long time	Dirty window glass, fogged window glass, frost on the window glass, raindrop adhering to the window glass, fingerprint adhering to the lens
Camera temporary stop 27 count	Not used	—
Camera temporary stop 28 count	Can't see anything in a complete darkness.	The vehicle drove in a complete darkness with the headlight turned off. Or, the camera was blinded when driving.
Camera temporary stop 29 count	Not used	—
Camera temporary stop 30 count	Not used	—
Camera temporary stop 31 count	In a high temperature of 70°C (158°F) or more or in a low temperature of -10°C (14°F) or less	—

14.ECM Cancel Code(s) Display

A: OPERATION

1) On «Main Menu» display, select «Each System».
On «Select System» display, select «Engine Control System».
2) Drive vehicle at 40 km/h (25 MPH) or more and set the cruise control.

CAUTION:
• When performing diagnosis, observe the legal speed limit on the road.
• The cancel code will also appear when the cruise control is cancelled by the driver's operation. Do not confuse them.
• Be sure to get an assistant to support the diagnosis while driving, and have him/her operate the select monitor.
3) When the set speed is cancelled by itself (without any cancel operations such as applying brake) or when the cruise control could not be set by performing the setting operation, select the «Cancel Code(s) Display» on the engine malfunction diagnosis screen.

NOTE:
The «Current» and «The past» are contained in the cancel code. The latest code recognized during current test drive is displayed in «Current». Cancel codes resulting from fault diagnosis of switches relating to the system and cruise control are also displayed in «The past».
4) Perform Engine DTC Clear Memory operation. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.>
Cancel codes for switches relating to the system and cruise control are deleted by clearing memory on the engine side.

NOTE:
• For detailed operation procedures, refer to "Application help".
• The latest code will be cleared by turning ignition switch to OFF.
• For details on cancel codes, refer to List of ECM cruise control cancel code. <Ref. to ES(diag)-70, LIST, ECM Cancel Code(s) Display.>

B: LIST

• List of ECM cruise control cancel code(s)
When the cruise control is cancelled, the ECM outputs the following cancel codes.

Cancel code	Item	Contents of diagnosis	Reference
11	Main switch	Main switch of the EyeSight steering switch is turned to OFF, and the cruise control is released.	This DTC is displayed without operating the main switch. <Ref. to ES(diag)-61, CHECK EyeSight STEERING SWITCH, Diagnostics with Phenomenon.>
12	Stop & Brake switch	Stop light switch or brake switch is turned to ON, and then the cruise control is released.	This DTC is displayed without depressing the brake pedal. <Ref. to CC(w/o HEV)(diag)-17, 12, Diagnostic Procedure with Cancel Code.>
14	Neutral switch	Neutral position switch is turned to ON, and then the cruise control is released.	This DTC is displayed without shifting to neutral position. <Ref. to CC(w/o HEV)(diag)-20, 14, Diagnostic Procedure with Cancel Code.>
15	Cancel switch	Cancel switch is turned to ON, and then the cruise control is released.	This DTC is displayed without operating the cancel switch. <Ref. to CC(w/o HEV)(diag)-21, 15, Diagnostic Procedure with Cancel Code.>

Cancel code	Item	Contents of diagnosis	Reference
16	Ignition switch	Ignition switch is turned to OFF, and then the cruise control is released.	This DTC is displayed without operating the ignition switch. <Ref. to CC(w/o HEV)(diag)-22, 16, Diagnostic Procedure with Cancel Code.>
21	Abnormality of switches when Ignition switch on	When the ignition switch is turned to ON, each switch of the EyeSight steering switch is already turned ON.	This DTC is displayed when turning ignition switch to ON without operating the EyeSight steering switch. <Ref. to CC(w/o HEV)(diag)-22, 21, Diagnostic Procedure with Cancel Code.>
22	Abnormality of change in vehicle speed	Malfunction of vehicle speed signal variation is detected.	<Ref. to CC(w/o HEV)(diag)-23, 22, Diagnostic Procedure with Cancel Code.>
24	Abnormality of switches related to cruise control	Open circuit of the EyeSight steering switch is detected during cruise driving. (The system is judged as model without cruise control.)	This DTC is displayed with normal operation. <Ref. to CC(w/o HEV)(diag)-23, 24, Diagnostic Procedure with Cancel Code.>
31	Engine Speed	• Abnormal increase of engine speed is detected. • Gear is placed in Neutral, 1st or Reverse position.	Cruise in 2nd shift position or more. <Ref. to CC(w/o HEV)(diag)-23, 31, Diagnostic Procedure with Cancel Code.>
32	Cruse Control out of Range	• Vehicle speed exceeds the controllable range during cruising. • Set operation was performed at vehicle speed unavailable for setting. • RESUME operation was performed without memorized vehicle speed.	This DTC is displayed, though the vehicle speed is increased to the speed available for cruise set and set operation was performed again. <Ref. to CC(w/o HEV)(diag)-23, 32, Diagnostic Procedure with Cancel Code.>
34	Prohibition of cruise control at continuing big Accel. angle	The vehicle has been driven at higher speed than set vehicle speed for an abnormally long time (approximately 10 minutes) during cruise driving.	<Ref. to CC(w/o HEV)(diag)-23, 34, Diagnostic Procedure with Cancel Code.>
35	Prohibition of cruise control at vehicle speed F/B malfunction	Set vehicle speed cannot be kept because of some reasons (steep uphill, parking brake, abnormal decrease of engine output, etc.) during cruise driving.	<Ref. to CC(w/o HEV)(diag)-24, 35, Diagnostic Procedure with Cancel Code.>
41	VDC/TCS/EPB Operating	Vehicle dynamics control (VDC), TCS or EPB is operated during cruise driving or cruise setting.	<Ref. to CC(w/o HEV)(diag)-24, 41, Diagnostic Procedure with Cancel Code.>
43	ABS/VDC Failure	When the cruise switch is ON, ABS or vehicle dynamics control (VDC) system malfunction is detected.	<Ref. to CC(w/o HEV)(diag)-24, 43, Diagnostic Procedure with Cancel Code.>
44	Body Integrated unit Failure	When the cruise switch is ON, body integrated unit system malfunction is detected.	<Ref. to CC(w/o HEV)(diag)-24, 44, Diagnostic Procedure with Cancel Code.>
45	Meter Failure	When the cruise switch is ON, combination meter malfunction is detected.	<Ref. to CC(w/o HEV)(diag)-24, 45, Diagnostic Procedure with Cancel Code.>
47	Adaptive cruise control ECM abnormal	When the cruise switch is ON, stereo camera malfunction is detected.	Check the DTCs related to stereo camera.
49	TCM Failure	Transmission control module (TCM) malfunction is detected during cruise driving or cruise setting.	<Ref. to CC(w/o HEV)(diag)-24, 49, Diagnostic Procedure with Cancel Code.>
53	Adaptive Cruise Control Forced Cancel	Stereo camera detects the release command of the cruise control during cruise driving or cruise setting operation.	Check the stereo camera. Check the ACC cancel code. <Ref. to ES(diag)-73, ACC Cancel Code(s) Display.>

Cancel code	Item	Contents of diagnosis	Reference
54	Release SW	Brake control module detects the brake pedal operation by the driver during cruise driving or cruise setting operation.	If this code is detected when the brake pedal is not depressed intentionally, check the release switch.
55	Adaptive cruise control reception data abnormal	When the cruise switch is ON, malfunction is detected in the reception data from the stereo camera.	Check the cancel code of stereo camera.
61	Brake Switch Failure	Malfunction in the stop light & brake switch is detected.	<Ref. to CC(w/o HEV)(diag)-24, 61, Diagnostic Procedure with Cancel Code.>
62	Neutral Switch Failure	Neutral position switch malfunction is detected.	<Ref. to CC(w/o HEV)(diag)-24, 62, Diagnostic Procedure with Cancel Code.>
63	Abnormality 1 of change in vehicle speed	Malfunction of vehicle speed signal variation is detected. This code may be displayed by a sudden starting of the vehicle on a road with low μ and with the VDC OFF. In this case, restart the engine and perform the cruise setting again. If the cancel code is not displayed, the vehicle is in normal status.	<Ref. to CC(w/o HEV)(diag)-25, 63, Diagnostic Procedure with Cancel Code.>
64	Engine Sensor Failure 1	Malfunction related to engine is detected.	<Ref. to CC(w/o HEV)(diag)-25, 64, Diagnostic Procedure with Cancel Code.>
65	Abnormality 1 of switches related to cruise control	Malfunction of the EyeSight steering switch is detected. (When the switch is pressed ON for a long time (approximately two minutes), stuck ON condition is detected.)	<Ref. to CC(w/o HEV)(diag)-25, 65, Diagnostic Procedure with Cancel Code.>
66	Cruise Control Calculation Error	Malfunction of the cruise control calculation (microcomputer) is detected.	<Ref. to CC(w/o HEV)(diag)-25, 66, Diagnostic Procedure with Cancel Code.>

15.ACC Cancel Code(s) Display

A: OPERATION

When the ACC cancel code is detected from the stereo camera, the cruise control will be cancelled.
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «EyeSight» and select «Enter».
5) On «Select Function» display, select «Cancel Code».
6) On «Cancel Code» display, select «Cancel Code of ACC Cruise Control».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- Up to 8 codes can be stored. When more than eight codes are output, the oldest code will be deleted to store the latest code.
- Stored codes will be cleared by Clear Memory.
- For details on ACC cancel codes, refer to List of ACC cancel code. <Ref. to ES(diag)-73, LIST, ACC Cancel Code(s) Display.>

B: LIST

- List of ACC cancel code(s)

ACC cancel code	Item	Contents of diagnosis
02	ACC Mode:Maintaining Standstill Position	Displayed when the cruise control is cancelled after the own vehicle stops following the preceding vehicle.
04	ACC Mode:Stereo Camera Temporary	Displayed when the cruise control is canceled by the EyeSight temporarily stop while driving in the adaptive cruise mode.
08	Common:Vehicle Speed Sensor Abnormal	Displayed when the cruise control is canceled due to a wheel speed sensor malfunction.
09	Common:Depress The Brake Pedal	Displayed when the cruise control is canceled by the brake operation of the driver.
0A	Common:Pre-Collision Braking	Displayed when the cruise control is canceled because the pre-collision brake function is activated.
0B	Common:AT Manual Mode	Displayed when the cruise control is canceled because the AT manual mode is selected or paddle operation is performed.
0D	Common:Any Doors is Opened	Displayed when the cruise control is canceled because either of the driver’s door, passenger’s door, or rear doors is opened.
0E	Common:Unfastened The Driver’s Seatbelt	Displayed when the cruise control is canceled because the driver’s seat belt is unfastened.
12	Common:AT Gear Range	Displayed in the following situations: The driver performed the SET or RES operation to drive the vehicle either in the adaptive cruise mode or in the constant speed mode, but that operation was not accepted because it was done immediately after shifting into D range.
13	Common:Steep Sloping Road	Displayed when the road surface was judged to be too steep and therefore the cruise control is canceled.
14	Common:ABS Activation	Displayed when the cruise control is canceled because the ABS is activated.
15	Common:Steering Angle Excessive	Displayed when the cruise control is canceled because the steering wheel is fully turned.
16	ACC Mode:Vehicle Stop Judge	Displayed when the cruise control is cancelled after the own vehicle stops following the preceding vehicle while driving in the adaptive cruise control mode.
17	Common:Parking Brake Activation	Displayed when the cruise control is cancelled because the parking brake is applied.
18	ACC Mode:Automatic Cancellation	Displayed when the cruise control is cancelled under the following situations: The own vehicle stops following the preceding vehicle while driving in the adaptive cruise control mode, and the driver repeats the SET or RES operation and the automatic brake control continues for 120 seconds.

ACC Cancel Code(s) Display

ACC cancel code	Item	Contents of diagnosis
1B	VDC actuation	Displayed when the cruise control is canceled because the VDC is activated.
1C	Common:Cancel SW Operation	Displayed when the cruise control is canceled because the cruise switch was operated while the cruise control is set.
1D	Common:Cruise SW OFF	Displayed when the cruise control is canceled (turned OFF) because the cruise switch was operated while the cruise control is not set.
1E	CC Mode:Max Speed Exceeded	Displayed when the cruise control is canceled because the own vehicle speed exceeds the controllable range while driving in the constant speed mode.
1F	ACC Mode:Max Speed Exceeded	Displayed when the cruise control is canceled because the own vehicle speed exceeds the controllable range while driving in the adaptive cruise mode.

NOTE:

- “Adaptive cruise mode”: Adaptive cruise control
- “Constant speed mode”: Conventional cruise control
- “Common”: Adaptive cruise control and conventional cruise control

16.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

Detected when an error occurs in the CAN line. (Bus off)

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

Detected when CAN data from engine control module (ECM) is not transmitted to stereo camera.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

C: DTC U0101 LOST COMMUNICATION WITH TCM

Detected when CAN data from TCM is not transmitted to stereo camera.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

D: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

Detected when CAN data from VDC is not transmitted to stereo camera.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

E: DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

Detected when CAN data from body integrated unit is not transmitted to stereo camera.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

F: DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

Detected when CAN data from combination meter is not transmitted to stereo camera.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

G: DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

Failure counter diagnosis of engine control module (ECM)

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

H: DTC U0402 INVALID DATA RECEIVED FROM TCM

Failure counter diagnosis of automatic transmission control module (TCM)

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

I: DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

Failure counter diagnosis of VDC control module (VDC CM)

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

J: DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

Failure counter diagnosis of body integrated unit

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

K: DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

Failure counter diagnosis of combination meter

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

L: DTC B2801 TCM ABNORMAL

Detected when error occurs in the automatic transmission.

NOTE:
Check the automatic transmission. <Ref. to CVT(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

M: DTC B2802 ETC ABNORMAL

Detected when error occurs in the electronic throttle control.

NOTE:
Check the electronic throttle control. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

N: DTC B2806 ECM ABNORMAL

Detected when error occurs in the engine control module (ECM).

NOTE:
Perform check of the ECM. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

O: DTC B2807 ECM ABNORMAL

Detected when cruise indicator illumination request from ECM and ON/OFF information of cruise function do not match.

NOTE:
- Perform check of the ECM. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
- Check the ECM cruise control cancel code. <Ref. to ES(diag)-70, ECM Cancel Code(s) Display.>

P: DTC B2809 VDC MALFUNCTION

Detected when error occurs in the VDC. (VDC failure)

NOTE:
Check the VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

Q: DTC B280A VDC ECHO BACK DISAGREEMENT

Detected when error occurs in the VDC. (VDC brake control malfunction 1)

NOTE:
Check the VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

R: DTC B280B VDC BRAKE FLUID PRESSURE

Detected when error occurs in the VDC. (VDC brake control malfunction 2)

NOTE:
Check the VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

S: DTC B280F COMBINATION METER MALFUNCTION

Malfunction is detected in the combination meter.
DTC DETECTING CONDITION:
Defective combination meter
TROUBLE SYMPTOM:
- All functions of EyeSight system do not operate.
- EyeSight warning light blinks or illuminates.
- Combination meter does not illuminate.

NOTE:
Check the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>

T: DTC B2810 INCOMPATIBLE WITH EyeSight (COMBINATION METER)

Detected when the combination meter, which is not designed exclusively for EyeSight is installed.
DTC DETECTING CONDITION:
Incorrect specifications of combination meter
TROUBLE SYMPTOM:
All functions of EyeSight system do not operate.

NOTE:
Replace the combination meter with the one designed for EyeSight. <Ref. to IDI-19, Combination Meter.>

U: DTC B2814 POWER SUPPLY LOW VOLTAGE

Detected when the status of 7.0 V or less continues approximately for 5 seconds and is judged to be low-voltage malfunction, or when the +B harness of the stereo camera is broken.

DTC DETECTING CONDITION:

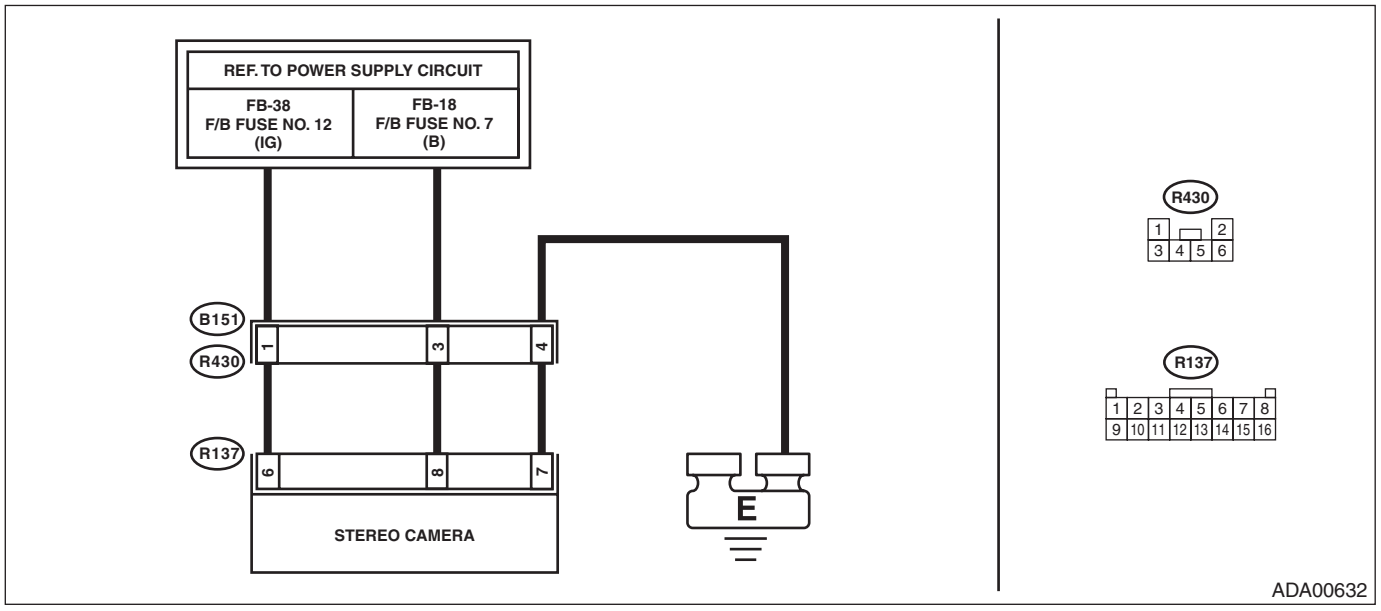
- Input voltage to stereo camera is out of specifications.
- Defective stereo camera control harness (open circuit in +B harness)
- Defective stereo camera

TROUBLE SYMPTOM:

- All functions of EyeSight system do not operate.
- EyeSight warning light blinks or illuminates.
- Cruise indicator light blinks.
- Malfunction indicator light illuminates.
- VDC warning light illuminates.
- ATF temperature warning light illuminates.

WIRING DIAGRAM:

EyeSight System <Ref. to WI(w/o HEV)-130, WIRING DIAGRAM, EyeSight System.>



Step		Check	Yes	No
1	**CHECK GENERATOR.** 1) Start the engine and idle for a while. 2) Measure the voltage between generator terminal B and chassis ground. ***Connector & terminal*** ***Generator terminal B (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **2**.	Check the generator. <Ref. to SC(H4DO(w/o HEV))-33, Generator.>
2	**CHECK BATTERY TERMINAL.** Turn the ignition switch to OFF.	Is the battery terminal connected securely?	Go to step **3**.	Tighten the battery terminal securely.
3	**CHECK FUSE.** Check fuses No. 7 and No. 12 in the fuse & relay box. <Ref. to ES-4, Relay and Fuse.>	Is the fuse OK?	Go to step **4**.	Replace the faulty fuse. When the replaced fuse blows out easily, check the short circuit in harness.

	Step	Check	Yes	No
4	**CHECK HARNESS (POWER SUPPLY CIRCUIT).** 1) Disconnect the stereo camera. 2) Turn the ignition switch to ON. 3) Measure the voltage between harness connector of stereo camera and chassis ground. ***Connector & terminal*** ***(R137) No. 6 (+) — Chassis ground (–):*** ***(R137) No. 8 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Check the power supply system circuit, and if any fault is found, repair the defective parts or replace the harness.
5	**CHECK HARNESS (GROUND CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable from battery. 3) Measure the resistance between stereo camera and chassis ground. ***Connector & terminal*** ***(R137) No. 7 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **6**.	Check the ground system circuit, and if any fault is found, repair the defective parts or replace the harness.
6	**CHECK POOR CONTACT OF CONNECTORS.** Check stereo camera connector.	Is there poor contact of the connector?	Repair the connector.	Go to step **7**.
7	**CHECK STEREO CAMERA.** 1) Connect all connectors and battery terminals securely. 2) Start the engine, drive the vehicle at 40 km/h (24.9 MPH) or more, stop the vehicle and then stop the engine. 3) After 3 seconds or more have elapsed, restart the engine. 4) Clear the memory. <Ref. to ES(diag)-45, Clear Memory Mode.> 5) Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is the same DTC (DTC B2814 or B2815) displayed?	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.

V: DTC B2815 POWER SUPPLY HIGH VOLTAGE

Detected when the status for the battery voltage of 16 V or more continues approximately for 5 seconds and is judged to be abnormally high voltage.
Refer to DTC B2814 for DTC detecting condition, trouble symptom and diagnostic procedure. <Ref. to ES(diag)-78, DTC B2814 POWER SUPPLY LOW VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

W: DTC B2817 BRAKE LAMP

DTC DETECTING CONDITION:

- Defective brake light relay
- Defective brake light switch
- Defective VDC

TROUBLE SYMPTOM:

- All functions of EyeSight system do not operate.
- EyeSight warning light illuminates.
- Brake light does not go off or illuminate.

NOTE:
When this DTC is detected, check VDC system. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

X: DTC B28A0 VEHICLE MODEL JUDGMENT

Detected when the model code for stereo camera and the model code used for CAN data are different.

DTC DETECTING CONDITION:

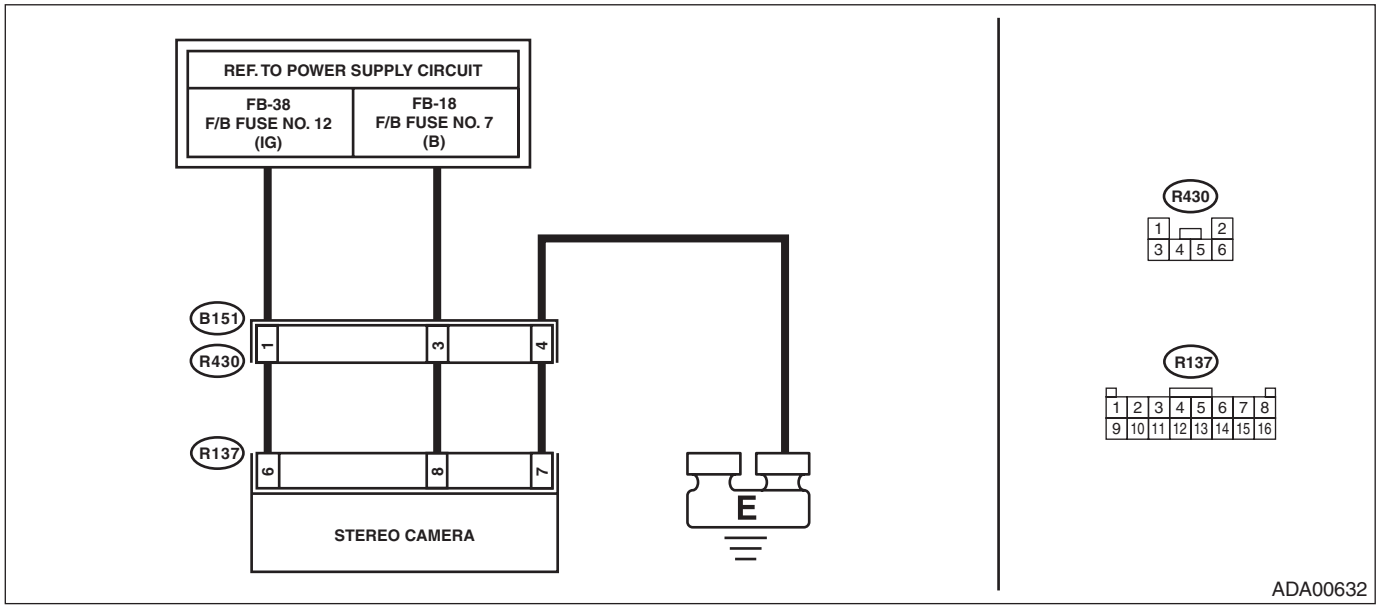
- Defective CAN system
- Defective stereo camera
- In the aiming operation, there is an open circuit in the +B harness of the stereo camera.
- In the completion of the aiming operation, the switching from IGN OFF to IGN ON takes place too early, and the recording of the model information has not yet been finished.
- Incorrect assembly of stereo camera (when the stereo camera designed for A-type vehicle is installed to the B-type vehicle, etc.)

TROUBLE SYMPTOM:

- All functions of EyeSight system do not operate.
- EyeSight warning light illuminates.

WIRING DIAGRAM:

EyeSight System <Ref. to WI(w/o HEV)-130, WIRING DIAGRAM, EyeSight System.>



Step		Check	Yes	No
1	**CHECK RELATED CM.** Check the part number of the ECM, TCM, VDC CM and combination meter.	Is each CM a genuine part?	Go to step **2**.	Replace the non-genuine CM with a genuine one.
2	**CHECK STEREO CAMERA.** 1) Remove the camera cover. 2) Check the part number of the stereo camera.	Is the stereo camera genuine?	Go to step **3**.	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>
3	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK MODEL REGISTRATION INFORMATION.** Check the model registration information from the current data of stereo camera. <Ref. to ES(diag)-24, Read Current Data.>	Does vehicle and data correspond?	Perform the adjustment or inspection of the camera. <Ref. to ES-12, Camera Adjustment, Inspection.>	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK FUSE.** Check fuses No. 7 and No. 12 in the fuse & relay box. <Ref. to ES-4, Relay and Fuse.>	Is the fuse OK?	Go to step **6**.	Replace the faulty fuse. When the replaced fuse blows out easily, check the short circuit in harness.
6	**CHECK HARNESS (POWER SUPPLY CIRCUIT).** 1) Disconnect the stereo camera. 2) Turn the ignition switch to ON. 3) Measure the voltage between harness connector of stereo camera and chassis ground. ***Connector & terminal*** ***(R137) No. 6 (+) — Chassis ground (–):*** ***(R137) No. 8 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **7**.	Check the power supply system circuit, and if any fault is found, repair the defective parts or replace the harness.
7	**CHECK HARNESS (GROUND CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable from battery. 3) Measure the resistance between stereo camera and chassis ground. ***Connector & terminal*** ***(R137) No. 7 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **8**.	Check the ground system circuit, and if any fault is found, repair the defective parts or replace the harness.
8	**CHECK POOR CONTACT OF CONNECTORS.** Check stereo camera connector.	Is there poor contact of the connector?	Repair the connector.	Go to step **9**.
9	**CHECK STEREO CAMERA.** 1) Connect all connectors and battery terminals securely. 2) Clear the memory. <Ref. to ES(diag)-45, Clear Memory Mode.> 3) Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is the same DTC (DTC B28A0) displayed?	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.

Y: DTC B28A1 EyeSight COMMUNICATION(ECM)

Detected when the engine control module (ECM) detects the malfunction of stereo camera, or when the stereo camera or ECM is assembled incorrectly.

DTC DETECTING CONDITION:

- Defective CAN system
- Defective engine control module (ECM)
- Defective stereo camera
- Incorrect assembly of stereo camera (when the stereo camera designed for A-type vehicle is installed to the B-type vehicle, etc.)
- Incorrect assembly of ECM (when the ECM designed for another model is installed, etc.)

TROUBLE SYMPTOM:

- All functions of EyeSight system do not operate.
- EyeSight warning light illuminates.

	Step	Check	Yes	No
1	**CHECK ECM.** Check the part number of the ECM.	Is the ECM genuine?	Go to step **2**.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).>
2	**CHECK STEREO CAMERA.** 1) Remove the camera cover. 2) Check the part number of the stereo camera.	Is the stereo camera genuine?	Go to step **3**.	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>
3	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK ECM.** Perform the diagnosis for the engine. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **5**.
5	**CHECK CONNECTOR.** Check the ECM connector and the stereo camera connector.	Is the connector OK?	Go to step **6**.	Repair or replace the connector.
6	**CHECK STEREO CAMERA.** Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is another DTC displayed?	Perform the diagnosis according to DTC.	Go to step **7**.
7	**CHECK STEREO CAMERA.** 1) Clear the memory. <Ref. to ES(diag)-45, Clear Memory Mode.> 2) Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is the same DTC displayed?	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.

Z: DTC B28A2 EyeSight COMMUNICATION(VDC)

Detected when the VDC control module (VDCCM) detects the malfunction of stereo camera.

DTC DETECTING CONDITION:

- Defective CAN system
- Defective VDC control module (VDCCM)
- Defective stereo camera

TROUBLE SYMPTOM:

- All functions of EyeSight system do not operate.
- EyeSight warning light illuminates.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK VDC.** Perform the diagnosis for VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK CONNECTOR.** Check the VDC connector and the stereo camera connector.	Is the connector OK?	Go to step **4**.	Repair or replace the connector.
4	**CHECK STEREO CAMERA.** Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is another DTC displayed?	Perform the diagnosis according to DTC.	Go to step **5**.
5	**CHECK STEREO CAMERA.** 1) Clear the memory. <Ref. to ES(diag)-45, Clear Memory Mode.> 2) Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is the same DTC displayed?	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.

AA:DTC B28A3 EyeSight COMMUNICATION(METER)

Detected when the combination meter detects the malfunction of stereo camera.

DTC DETECTING CONDITION:

- Defective CAN system
- Defective combination meter
- Defective stereo camera

TROUBLE SYMPTOM:

- All functions of EyeSight system do not operate.
- EyeSight warning light illuminates.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is the DTC displayed in the LAN system?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK COMBINATION METER.** Check the combination meter. <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>	Is combination meter OK?	Go to step **3**.	Perform the diagnosis for combination meter.
3	**CHECK CONNECTOR.** Check the combination meter connector and the stereo camera connector.	Is the connector OK?	Go to step **4**.	Repair or replace the connector.
4	**CHECK STEREO CAMERA.** Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is another DTC displayed?	Perform the diagnosis according to DTC.	Go to step **5**.
5	**CHECK STEREO CAMERA.** 1) Clear the memory. <Ref. to ES(diag)-45, Clear Memory Mode.> 2) Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is the same DTC displayed?	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.

AB:DTC B28A5 ENGINE TORQUE LIMITER CONTROL PROHIBIT

Detected when abnormal data is transmitted from stereo camera to engine control module (ECM) and the engine control module (ECM) prohibits the AT rapid start prevention control, or when the engine control module (ECM) prohibits the AT rapid start prevention control.

DTC DETECTING CONDITION:

- Defective CAN system
- Defective engine control module (ECM)
- Defective stereo camera
- Defective combination meter
- Incorrect assembly of combination meter (when the combination meter that is not for EyeSight is installed.)

TROUBLE SYMPTOM:

- All functions of EyeSight system do not operate.
- EyeSight warning light illuminates.

	Step	Check	Yes	No
1	**CHECK COMBINATION METER.** Check the part number of the combination meter.	Is the combination meter genuine?	Go to step **2**.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK ECM.** Perform the diagnosis for the engine. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK CONNECTOR.** Check the ECM connector and the stereo camera connector.	Is the connector OK?	Go to step **5**.	Repair or replace the connector.
5	**CHECK STEREO CAMERA.** Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is another DTC displayed?	Perform the diagnosis according to DTC.	Go to step **6**.
6	**CHECK STEREO CAMERA.** 1) Clear the memory. <Ref. to ES(diag)-45, Clear Memory Mode.> 2) Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is the same DTC displayed?	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.

AC:DTC B28A6 INTERNAL STEREO CAMERA COMMUNICATION 1

Detected when communication error occurs inside the stereo camera.
DTC DETECTING CONDITION:
Communication error occurs inside the stereo camera.
TROUBLE SYMPTOM:
All functions of EyeSight system do not operate.

	Step	Check	Yes	No
1	**CHECK RESTARTING.** 1) Turn the ignition switch to OFF. 2) Start the engine. 3) Read the DTC. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>	Is DTC displayed after restarting the engine?*1	Replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>	Clear the memory, in which temporary communication failure occurs and complete the step. <Ref. to ES(diag)-45, Clear Memory Mode.>

*1: When malfunction is detected after restarting the engine, 0 is registered in IG counter. Other values can be regarded as DTCs detected in the past.

AD:DTC B28A7 STEREO CAMERA RECOGNITION(TARGET)

Detected when error occurs in the communication data inside the control module caused by external factors such as noises.

NOTE:
If the same DTC is still detected after the engine has restarted, replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

AE:DTC B28A8 INTERNAL STEREO CAMERA COMMUNICATION 2

Detected when error occurs in the communication data inside the control module caused by external factors such as noises.

NOTE:
If the same DTC is still detected after the engine has restarted, replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

AF:DTC B28A9 STEREO CAMERA SYNCHRONIZED RECOGNITION DATA

Detected when error occurs in the communication data inside the control module caused by external factors such as noises.

NOTE:
If the same DTC is still detected after the engine has restarted, replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

AG:DTC B28AA STEREO CAMERA MICROCOMPUTER 1

Detected when communication error occurs due to malfunction of microcomputer inside the stereo camera.
DTC DETECTING CONDITION:
Communication error occurs due to malfunction of microcomputer inside the stereo camera.
TROUBLE SYMPTOM:
All functions of EyeSight system do not operate.
Refer to DTC B28A6 for diagnostic procedure. <Ref. to ES(diag)-86, DTC B28A6 INTERNAL STEREO CAMERA COMMUNICATION 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AH:DTC B28AB STEREO CAMERA MICROCOMPUTER 2

Detected when communication error occurs due to malfunction of microcomputer inside the stereo camera.
DTC DETECTING CONDITION:
Communication error occurs due to malfunction of microcomputer inside the stereo camera.
TROUBLE SYMPTOM:
All functions of EyeSight system do not operate.
Refer to DTC B28A6 for diagnostic procedure. <Ref. to ES(diag)-86, DTC B28A6 INTERNAL STEREO CAMERA COMMUNICATION 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AI: DTC B28AC STEREO CAMERA ASIC

Detected when communication error occurs due to malfunction of ASIC.
DTC DETECTING CONDITION:
Communication error occurs due to malfunction of ASIC.
TROUBLE SYMPTOM:
All functions of EyeSight system do not operate.
Refer to DTC B28A6 for diagnostic procedure. <Ref. to ES(diag)-86, DTC B28A6 INTERNAL STEREO CAMERA COMMUNICATION 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AJ:DTC B28AD STEREO CAMERA IMAGE RECOGNITION

Detected when improper image recognition occurs in the microcomputer inside the stereo camera.
DTC DETECTING CONDITION:
Improper image recognition occurs in the microcomputer inside the stereo camera.
TROUBLE SYMPTOM:
All functions of EyeSight system do not operate.
Refer to DTC B28A6 for diagnostic procedure. <Ref. to ES(diag)-86, DTC B28A6 INTERNAL STEREO CAMERA COMMUNICATION 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AK:DTC B28AE INTERNAL STEREO CAMERA POWER SUPPLY

Detected when improper power supply inside the stereo camera occurs.
DTC DETECTING CONDITION:
Improper power supply inside the stereo camera occurs.
TROUBLE SYMPTOM:
All functions of EyeSight system do not operate.
Refer to DTC B28A6 for diagnostic procedure. <Ref. to ES(diag)-86, DTC B28A6 INTERNAL STEREO CAMERA COMMUNICATION 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AL:DTC B28AF STEREO CAMERA ADJUSTMENT INCOMPLETE

Detected when adjustment or inspection of stereo camera has not been completed normally.
DTC DETECTING CONDITION:
- Operation is aborted during adjustment or inspection of the stereo camera.
- After the replacement of the stereo camera, adjustment or inspection of camera has not yet been performed.

TROUBLE SYMPTOM:
All functions of EyeSight system do not operate.
For diagnostic procedure, perform adjustment/inspection of camera. When the adjustment or inspection of camera is performed, and if it is not completed successfully, replace the camera.

AM:DTC B28B1 STEREO CAMERA AUTOMATIC ADJUSTMENT

Detected when the optical axis of stereo camera is deviated in lateral direction or when the fluctuation range of automatic adjustment value has expanded.

NOTE:
Readjust the stereo camera. <Ref. to ES-12, PROCEDURE, Camera Adjustment, Inspection.>
If the same DTC is still detected after readjustment, replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

AN:DTC B28B2 STEREO CAMERA HIGH TEMPERATURE

Detected when the temperature of the stereo camera excessively increases.

NOTE:
When this DTC is detected, performing adjustment or inspection of the camera will not return to the normal state. In this case, always replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

AO:DTC B28B3 STEREO CAMERA LOW TEMPERATURE

Detected when the temperature of the stereo camera excessively decreases.

NOTE:
When this DTC is detected, performing adjustment or inspection of the camera will not return to the normal state. In this case, always replace the stereo camera. <Ref. to ES-7, REMOVAL, Stereo Camera.>

AP:DTC B28B5 +B CIRCUIT OPEN

Detected when there is an open circuit in power supply line.

NOTE:
Refer to DTC B2814 for diagnostic procedure. <Ref. to ES(diag)-78, DTC B2814 POWER SUPPLY LOW VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AQ:DTC B28B6 PRE-COLLISION OFF SWITCH

Detected when pre-collision brake OFF switch circuit is not installed, open-circuited or is stuck to ON.

DTC DETECTING CONDITION:

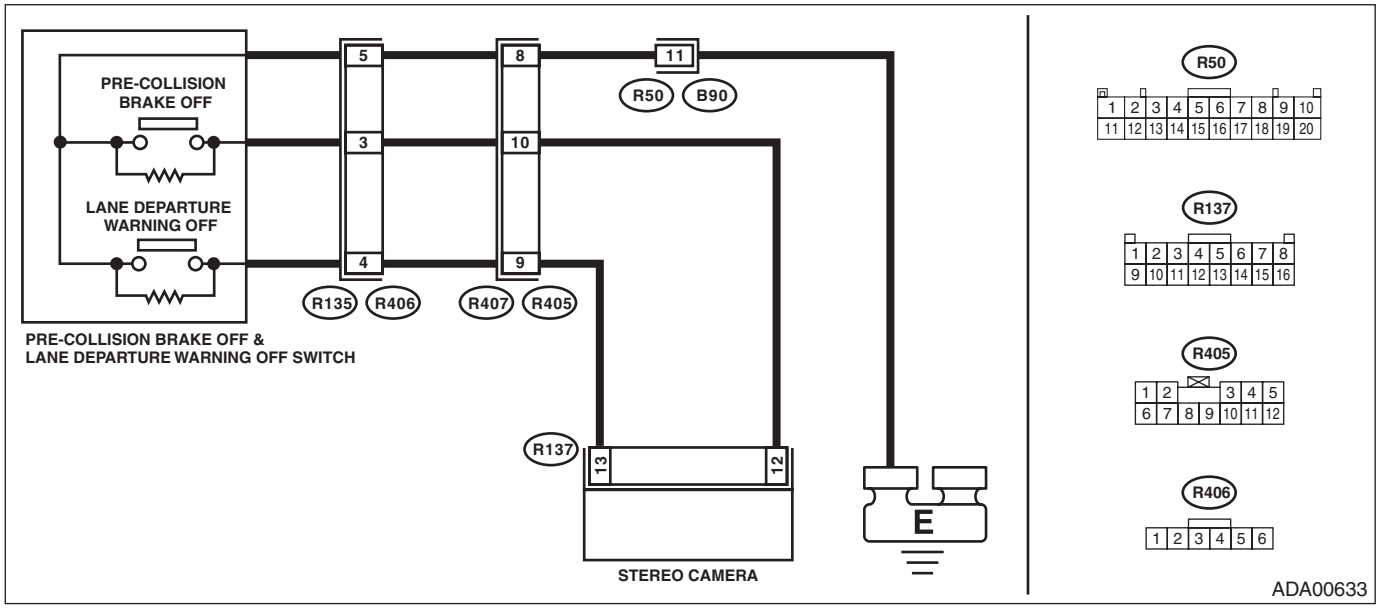
- Wiring of pre-collision brake OFF switch is not connected.
- Pre-collision brake OFF switch circuit is open.
- Pre-collision brake OFF switch circuit stays ON for 45 seconds or more.

TROUBLE SYMPTOM:

All functions of EyeSight system do not operate.

WIRING DIAGRAM:

EyeSight System <Ref. to WI(w/o HEV)-130, WIRING DIAGRAM, EyeSight System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** Confirm the current data «Pre-Collision Brake OFF SW Status (BIU)» of EyeSight using Subaru Select Monitor. <Ref. to ES(diag)-24, Read Current Data.>	Does the display change according to ON/OFF operation of the pre-collision brake OFF switch?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS.** 1) Disconnect the stereo camera connector and the pre-collision brake OFF switch connector. 2) Using the tester, measure the resistance between the stereo camera connector and pre-collision brake OFF switch connector as well as chassis ground. ***Connector & terminal*** ***(R406) No. 3 — (R137) No. 12:*** ***(R406) No. 5 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace an open circuit in harness between the stereo camera connector and pre-collision brake OFF switch connector.
3	**CHECK HARNESS.** Using the tester, measure the resistance between the pre-collision brake OFF switch connector and chassis ground. ***Connector & terminal*** ***(R406) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Check the pre-collision brake OFF switch. <Ref. to ES-33, INSPECTION, Switches and Harness.>	Repair or replace the short circuit to ground in harness between the stereo camera connector and pre-collision brake OFF switch connector.

AR:DTC B28B7 LDP OFF SWITCH

Detected when lane departure warning OFF switch circuit is not installed, open-circuited, or is stuck to ON.

DTC DETECTING CONDITION:

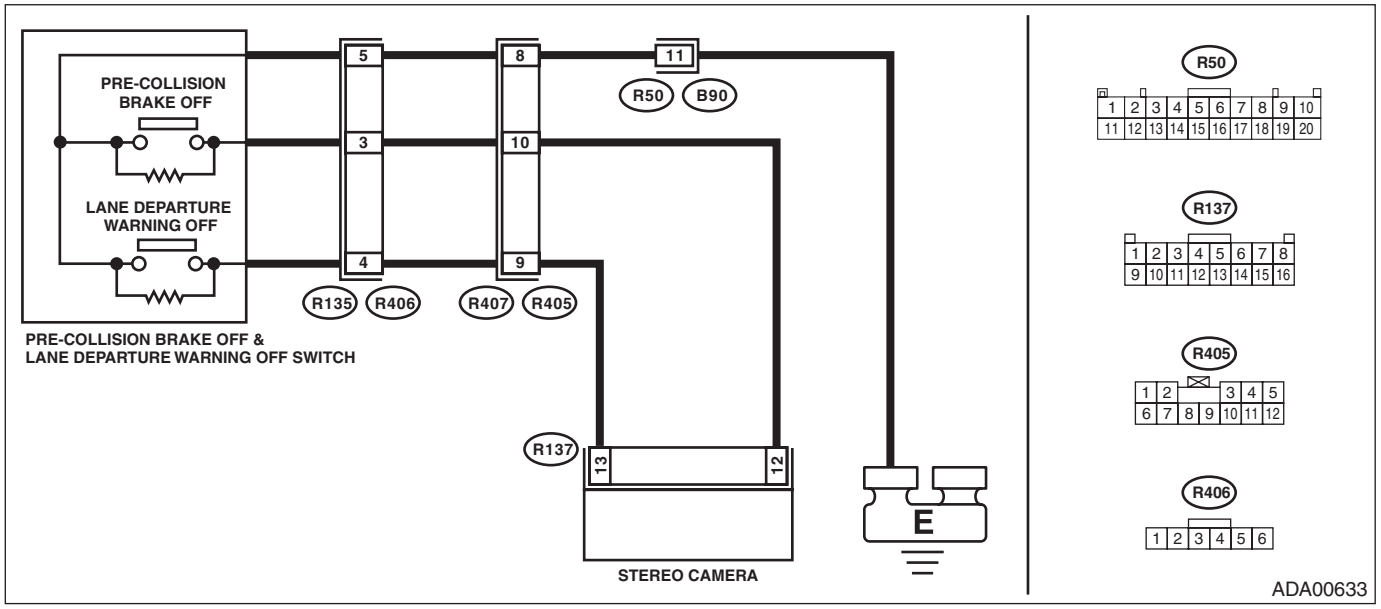
- Wiring of lane departure warning OFF switch is not connected.
- Lane departure warning OFF switch circuit is open.
- Lane departure warning OFF switch circuit stays ON for 45 seconds or more.

TROUBLE SYMPTOM:

All functions of EyeSight system do not operate.

WIRING DIAGRAM:

EyeSight System <Ref. to WI(w/o HEV)-130, WIRING DIAGRAM, EyeSight System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Confirm the current data «Lane Departure OFF SW (BIU)» of EyeSight using Subaru Select Monitor. <Ref. to ES(diag)-24, Read Current Data.>	Does the display change according to the lane departure warning OFF switch ON/OFF operation?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the stereo camera connector and the lane departure warning OFF switch connector. 2) Using the tester, measure the resistance between the stereo camera connector and lane departure warning OFF switch connector. ***Connector & terminal*** ***(R406) No. 4 — (R137) No. 13:*** ***(R406) No. 5 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace an open circuit in harness between the stereo camera connector and lane departure warning OFF switch connector.

Step		Check	Yes	No
3	**CHECK HARNESS.** Using the tester, measure the resistance between the lane departure warning OFF switch connector and chassis ground. ***Connector & terminal*** ***(R406) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Check the lane departure warning OFF switch. <Ref. to ES-33, INSPECTION, Switches and Harness.>	Repair or replace the short circuit to ground in harness between the stereo camera connector and lane departure warning OFF switch connector.

AS:DTC B28B8 EyeSight STEERING SWITCH 1

Detected when EyeSight steering switch is not installed or has malfunction, or when the harness is faulty or open-circuited or in stuck ON condition.

DTC DETECTING CONDITION:

- Wiring of the EyeSight steering switch is not connected.
- EyeSight steering switch circuit is open.
- EyeSight steering switch circuit stays ON.

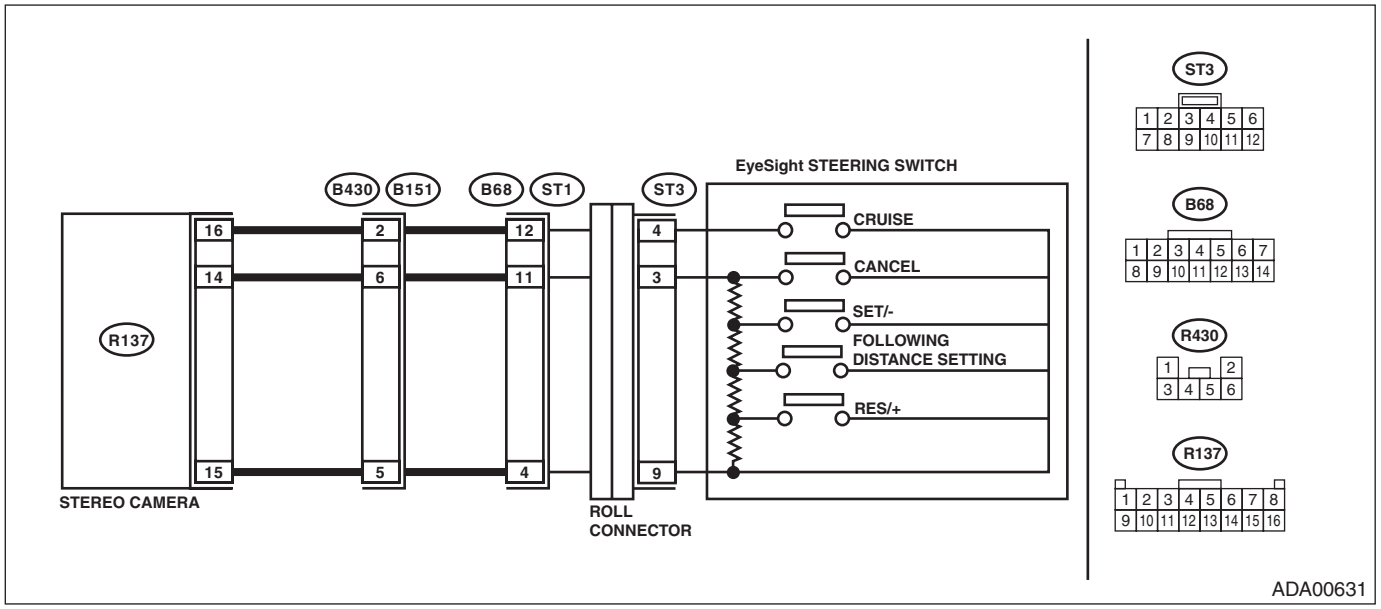
TROUBLE SYMPTOM:

All functions of EyeSight system do not operate.

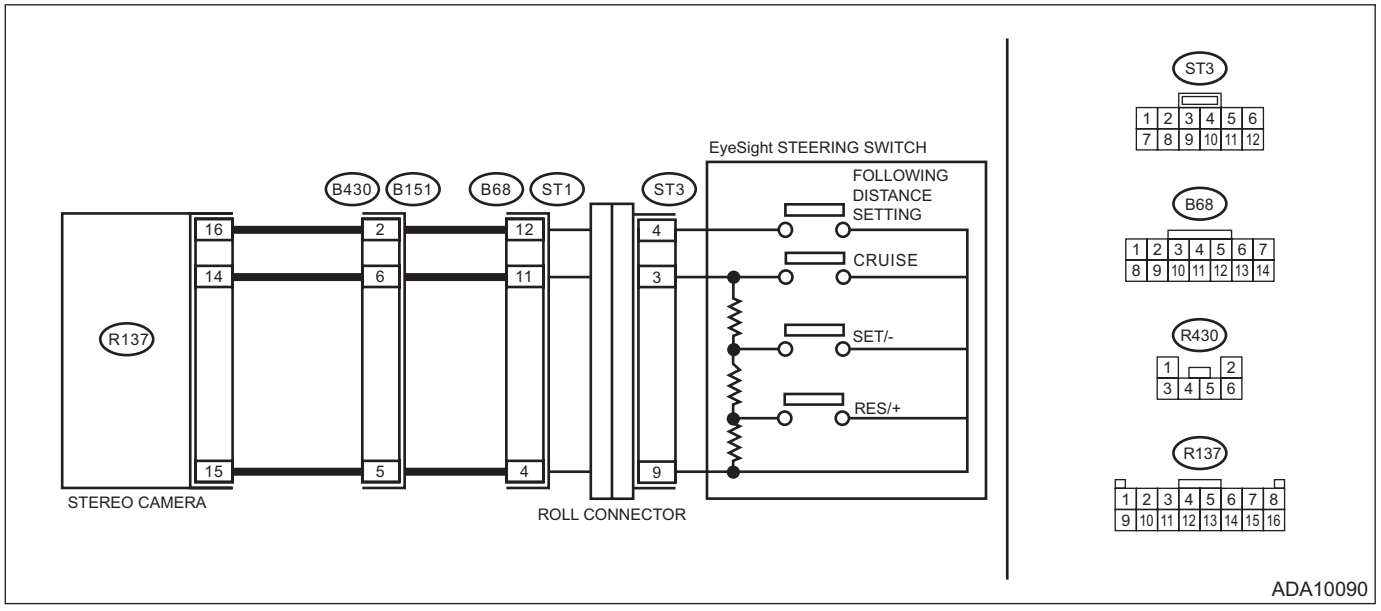
WIRING DIAGRAM:

EyeSight System <Ref. to WI(w/o HEV)-130, WIRING DIAGRAM, EyeSight System.>

- Except for Crosstrek model



- Crosstrek model



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Confirm the current data «Cruise Control SW Voltage (Port14)» and «Cruise Control SW Voltage (Port16)» of EyeSight using Subaru Select Monitor. <Ref. to ES(diag)-24, Read Current Data.>	Does the display change according to the EyeSight steering switch operation?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, or temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the stereo camera connector and EyeSight steering switch connector. 2) Using the tester, measure the resistance between stereo camera connector and EyeSight steering switch connector. ***Connector & terminal*** ***(ST3) No. 4 — (R137) No. 16:*** ***(ST3) No. 3 — (R137) No. 14:*** ***(ST3) No. 9 — (R137) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace an open circuit in harness between the stereo camera connector and the EyeSight steering switch connector.
3	**CHECK HARNESS.** Using the tester, measure the resistance between EyeSight steering switch connector and chassis ground. ***Connector & terminal*** ***(ST3) No. 4 — Chassis ground:*** ***(ST3) No. 3 — Chassis ground:*** ***(ST3) No. 9 — Chassis ground:***	Is the resistance 1 MΩ or more?	Check the EyeSight steering switch. <Ref. to ES-33, Switches and Harness.>	Repair or replace the short circuit to ground in harness between the stereo camera connector and the EyeSight steering switch connector.

AT:DTC B28B9 EyeSight STEERING SWITCH 2

Detected when steering switch for EyeSight is not installed, is open-circuited or is stuck to ON.
Refer to DTC B28B8 for diagnostic procedure. <Ref. to ES(diag)-93, DTC B28B8 EyeSight STEERING SWITCH 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Blind Spot Detection/Rear Cross Traffic Alert

RVD

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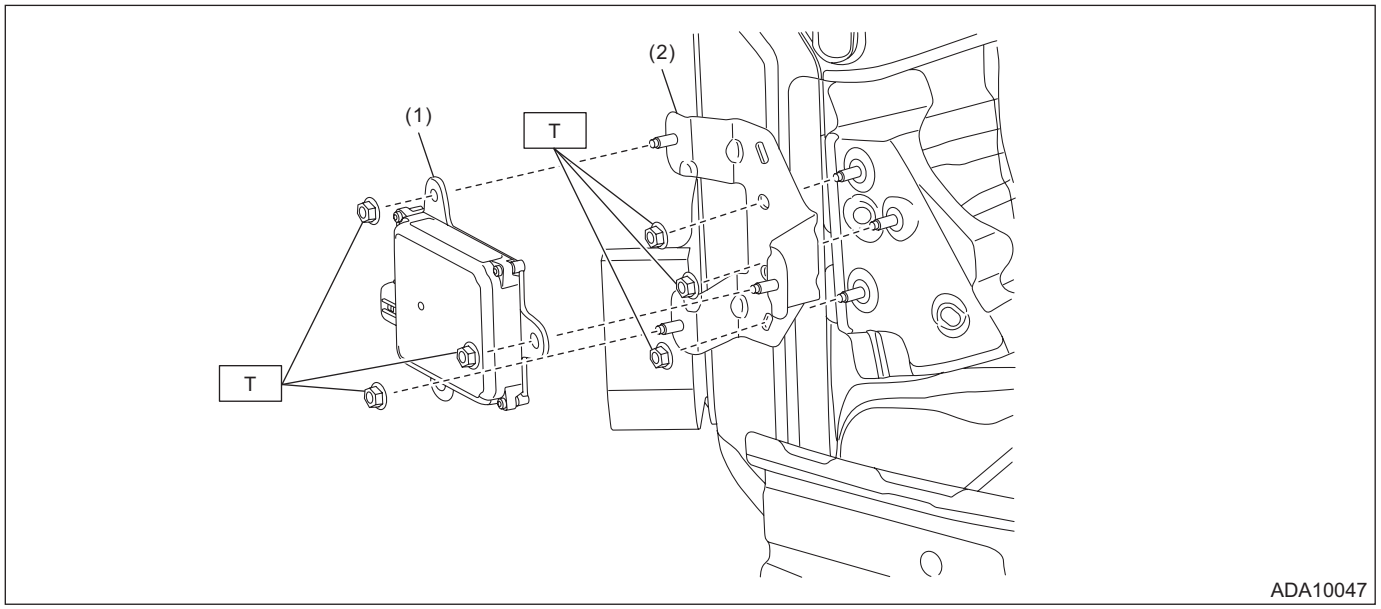
1. General Description

A: LOCATION

Refer to “LOCATION” of “Blind Spot Detection/Rear Cross Traffic Alert (DIAGNOSTICS)” section. <Ref. to RVD(diag)-7, LOCATION, Electrical Component Location.>

B: COMPONENT

1. RADAR SENSOR



(1) Radar sensor (master & slave) (2) Radar bracket

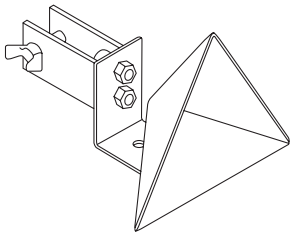
Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.8, 5.5)

C: CAUTION

• Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery. When replacing the electrical parts provided with memory functions that store contents specified by a customer, record the memory contents before disconnecting the battery ground cable.
• For precautions for rear vehicle detection function, refer to “CAUTION” in “Blind Spot Detection/Rear Cross Traffic Alert (DIAGNOSTICS)” section. <Ref. to RVD(diag)-4, CAUTION, General Description.>

D: PREPARATION TOOL

1. SPECIAL TOOL

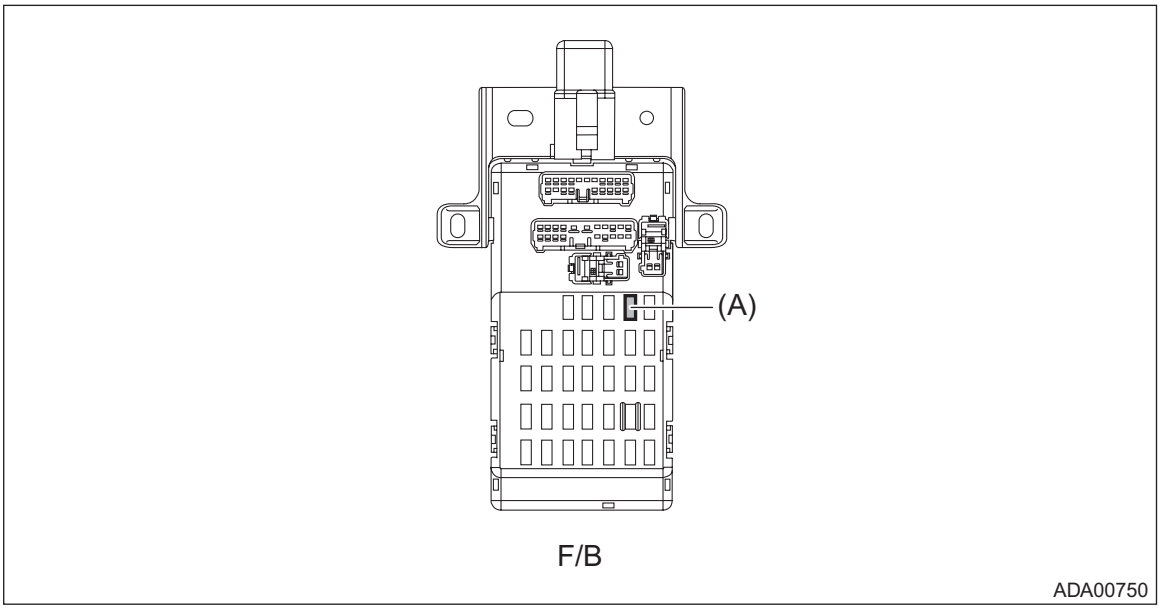
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST87699AL00A	87699AL00A	RADAR REFLECTOR	Used for adjusting the radar axis of the radar sensor. NOTE: Attach the radar reflector to a round pole with a diameter of approx. 20 mm (0.79 in) or a 20-mm (0.79-in) square pole.
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.
Measure (5 m (16 ft) or more)	Used for adjusting the radar axis of the radar sensor.
Leveling line	
Plumb bob	
Packing tape	
Stand, tripod, etc.	

2. Relay and Fuse

A: LOCATION



Fuse & Relay Box	Fuse 10 A (radar sensor LH (master), radar sensor RH (slave), BSD/RCTA OFF switch)	(A)

NOTE:
For other related fuses, refer to the wiring diagram. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.>

B: INSPECTION

1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

3. Blind Spot Detection/Rear Cross Traffic Alert

A: WIRING DIAGRAM

Refer to “Subaru Rear Vehicle Detection system” in the wiring diagram.

- Gasoline engine model: <Ref. to WI(w/o HEV)-66, WIRING DIAGRAM, Blind Spot Detection/Rear Cross Traffic Alert.>
- HEV model: <Ref. to WI(HEV)-57, WIRING DIAGRAM, Blind Spot Detection/Rear Cross Traffic Alert.>

B: INSPECTION

Refer to “Basic Diagnostic Procedure” of “Blind Spot Detection/Rear Cross Traffic Alert (DIAGNOSTICS)” section. <Ref. to RVD(diag)-2, Basic Diagnostic Procedure.>

C: NOTE

For procedure of each component in the Subaru Rear Vehicle Detection system, refer to the respective sections.

- Radar sensor: <Ref. to RVD-6, Radar Sensor.>
- BSD/RCTA OFF switch: <Ref. to RVD-12, Switches and Harness.>
- Combination meter: <Ref. to RVD-14, Combination Meter.>
- Outer mirror assembly: <Ref. to RVD-15, Outer Mirror Assembly.>

4. Radar Sensor

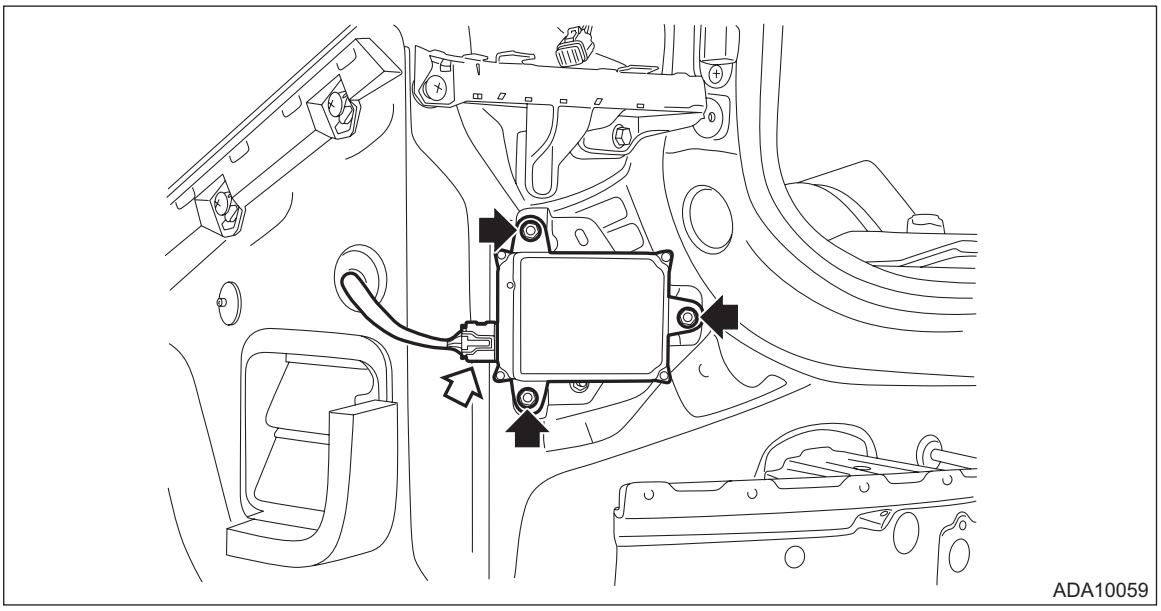
A: REMOVAL

1. RADAR SENSOR LH (MASTER)

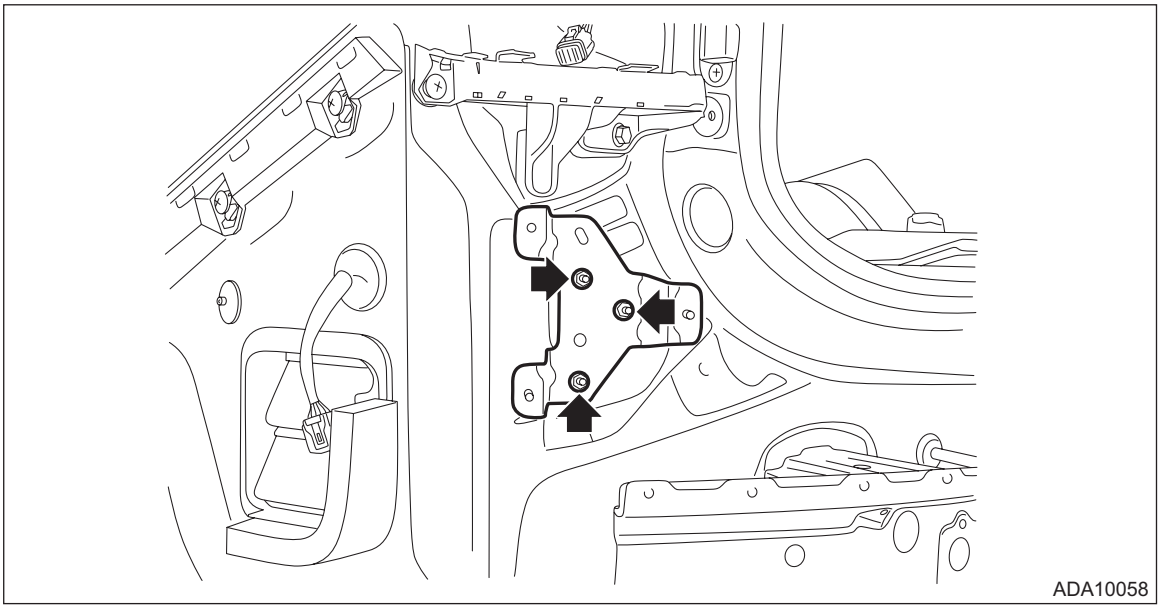
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the bumper face - rear. <Ref. to EI-49, REMOVAL, Rear Bumper.>
3) Remove the radar sensor LH (master).
   (1) Disconnect the connector.
   (2) Remove the nut and remove the radar sensor LH.


ADA10059

4) Remove the nut and remove the radar bracket.


ADA10058

2. RADAR SENSOR RH (SLAVE)

NOTE:
For the procedure of radar sensor RH (slave), refer to “RADAR SENSOR LH (MASTER)”.

B: INSTALLATION

1) Install each part in the reverse order of removal.

Tightening torque:
Radar sensor and radar bracket: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
2) Perform the adjustment of the radar sensor radar axis. <Ref. to RVD-7, RADAR AXIS ADJUSTMENT, ADJUSTMENT, Radar Sensor.>

C: ADJUSTMENT

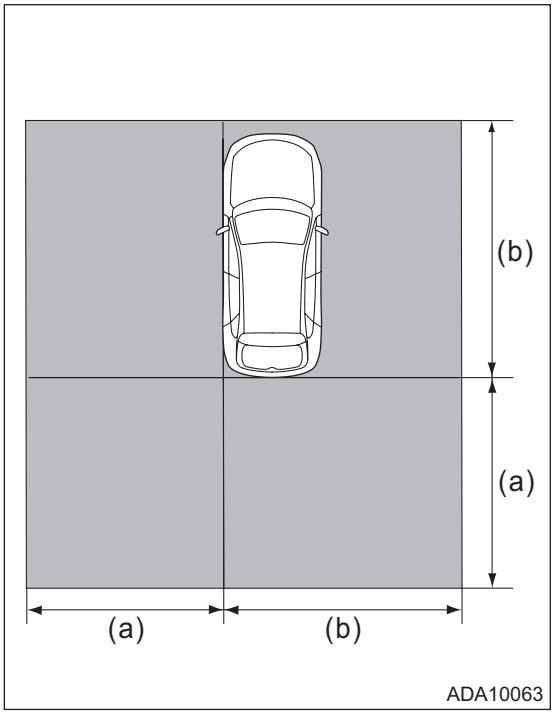
1. RADAR AXIS ADJUSTMENT

CAUTION:
• After removal/installation or replacement of the radar sensor, perform the radar axis adjustment.
• The procedure for the master is only shown here. However the procedure for the slave can also be done in the same way as the master.
1) Before performing the inspection, check the following items.
- The inflation pressure of tires is correct.
- The vehicle does not have load.
- Vehicle's fuel tank is fully filled.

2) Place the vehicle on a level surface, where approximately 5 square meters (16.41 square ft) area can be secured behind the vehicle.

CAUTION:
• No metallic objects around the vehicle and on the floor in the area.
• Do not let in objects other than the radar reflector (ST), persons and metallic objects inside the area.

NOTE:
The illustration shows the secured area for adjusting the radar axis on the master side.



(a) Approx. 4 m (13.12 ft)
(b) Approx. 5 m (16.41 ft)

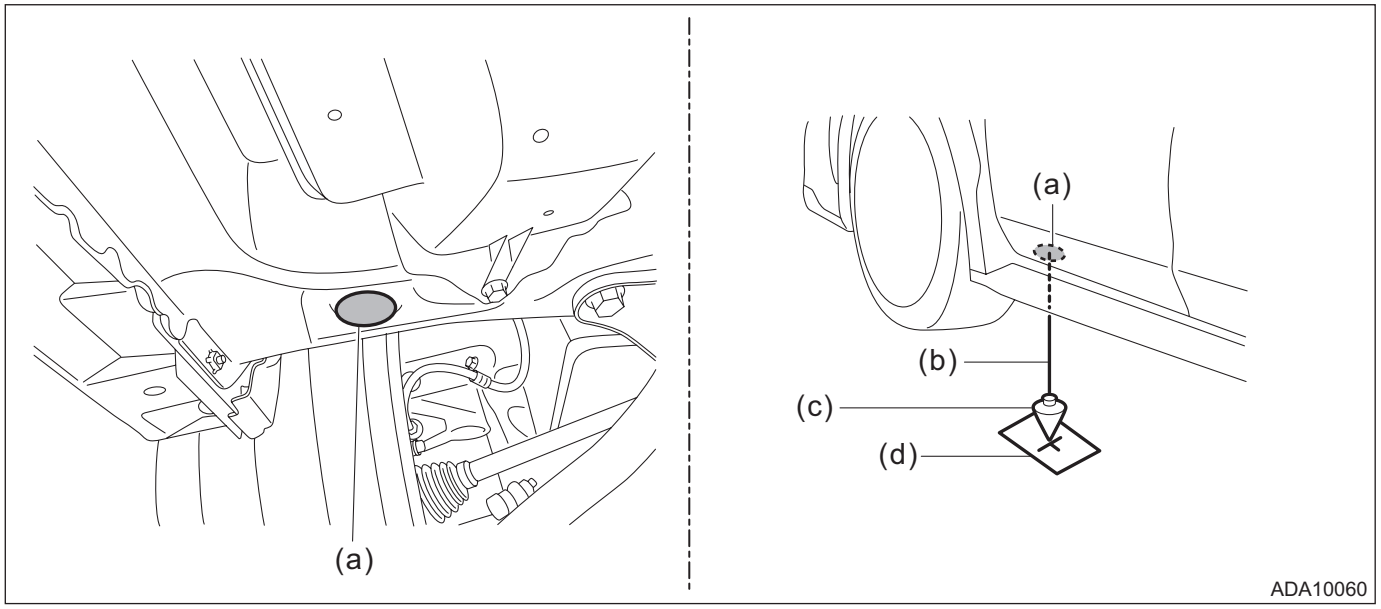
3) Prepare the Subaru Select Monitor, measure, leveling line, plumb bob, packing tape, RADAR REFLECTOR (ST), and stand or tripod for fixing the RADAR REFLECTOR.

Preparation tool:
ST: RADAR REFLECTOR (87699AL00A)

4) Set up the radar reflector.

NOTE:
The following procedure explains the method of setting the radar reflector so that the distance between radar reflector and radar sensor is 1,500 mm (4.92 ft) and the radar is positioned at an angle of 50 degree.

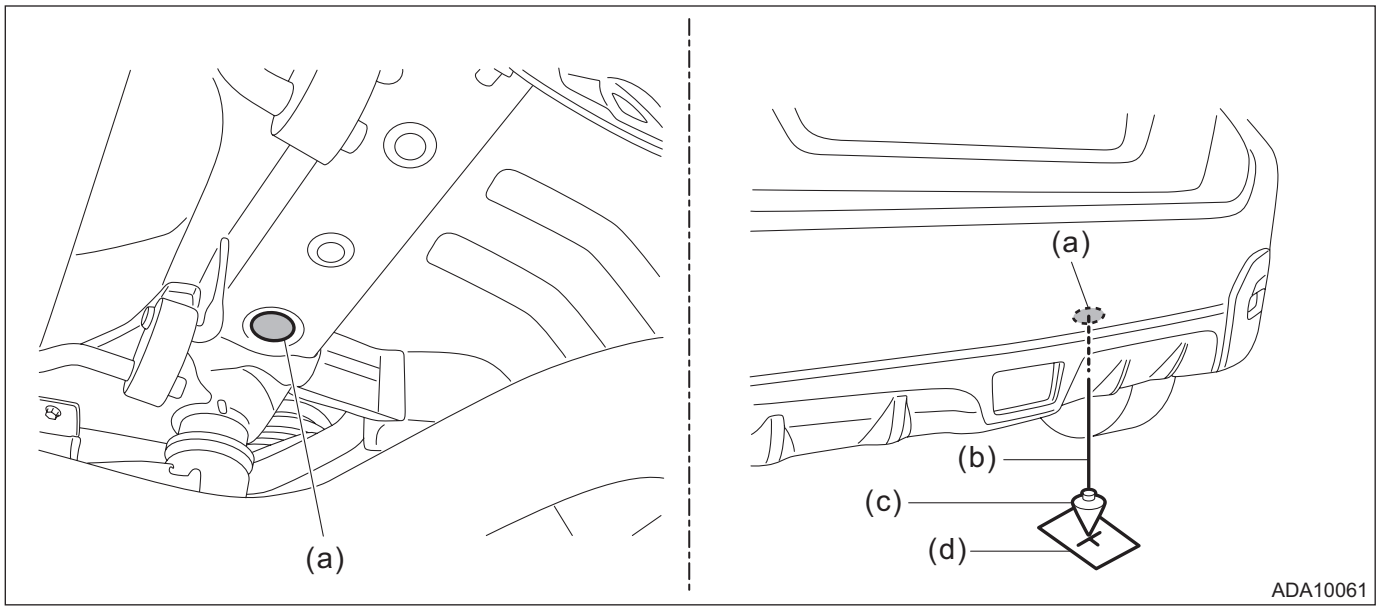
(1) Suspend the plumb bob from the center of the front hole cap, and mark the position where the plumb bob touches the ground. (Point A)



(a) Front hole cap
(b) Leveling line
(c) Plumb bob
(d) Point A

NOTE:
Stick the packing tape etc. on the floor, then make a marking on the tape.

(2) Suspend the plumb bob from the center of the rear hole cap, and mark the position where the plumb bob touches the ground. (Point B)

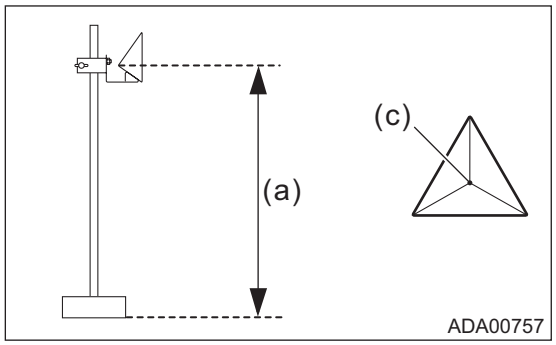


(a) Rear hole cap
(b) Leveling line
(c) Plumb bob
(d) Point B

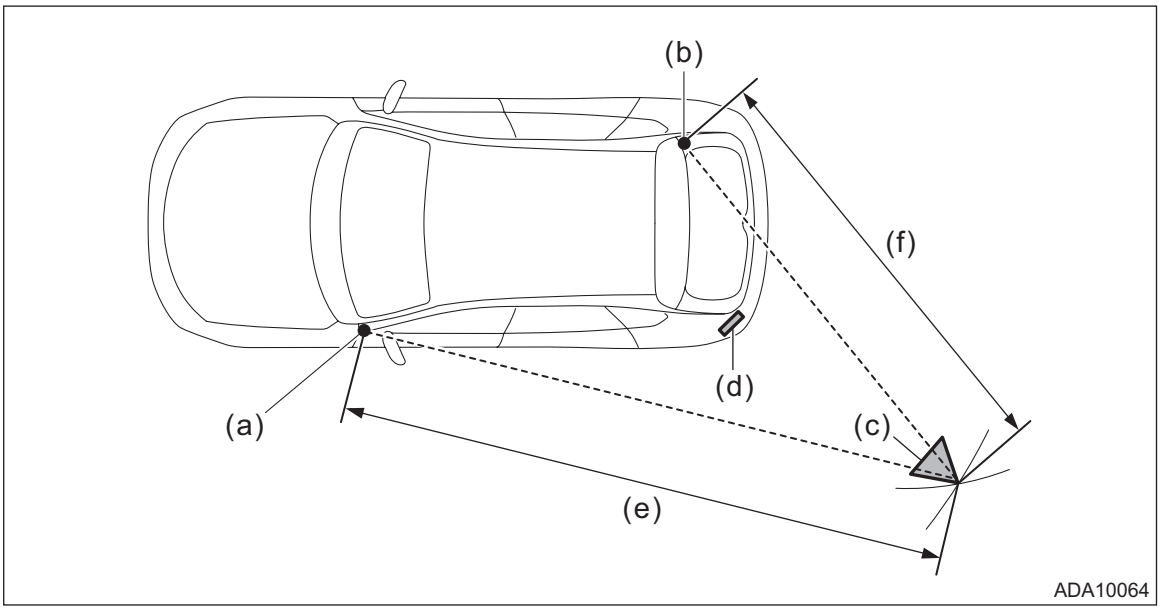
NOTE:
Stick the packing tape etc. on the floor, then make a marking on the tape.

(3) Stretch a leveling line to draw an arc with the marked point A as a pivot.
(4) Stretch a leveling line to draw an arc with the marked point B as a pivot.
(5) Set up the radar reflector at the cross point.

CAUTION:
When setting up the radar reflector, adjust the height so that the center of the pyramid points at the radar sensor as shown in the figure.



(a) 751±10 mm (29.57±0.39 in)
(b) Center of pyramid



(a) Point A
(b) Point B
(c) Radar reflector
(d) Radar sensor
(e) 4,109 mm (13.48 ft)
(f) 2,522 mm (8.27 ft)

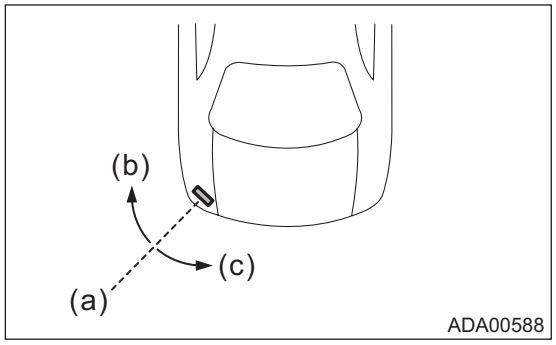
5) Connect the Subaru Select Monitor.

NOTE:
- Use the Subaru Select Monitor equipped with the latest version of the software.
- For detailed operation procedures, refer to “Application help”.

6) Turn the ignition switch to ON and wait for 10 seconds.

7) Perform radar axis adjustment.
(1) On «Start» display, select «Diagnosis».
(2) On «Vehicle selection» display, enter vehicle information and select «Confirmed».
(3) On «Main Menu» display, select «Each System».
(4) On «Select System» display, select «Subaru Rear Vehicle Detection(LH)» or «Subaru Rear Vehicle Detection(RH)».
(5) On «Select Function» display, select «Work Support».
(6) From the work support item list, select «RADAR Alignment».
(7) Follow the messages displayed on the Subaru Select Monitor screen when working.

NOTE:
Deviation of radar axis direction is indicated by + (plus) or – (minus).



(a) Center of radar
(b) + (plus)
(c) – (minus)

(8) If the result is out of permissive range, it is assumed that the radar reflector position may be incorrect or the radar bracket or its installation location on the vehicle may be deformed. Check the set position of the radar reflector, radar bracket and other attachment, and perform the radar axis adjustment again.

5. Switches and Harness

A: REMOVAL

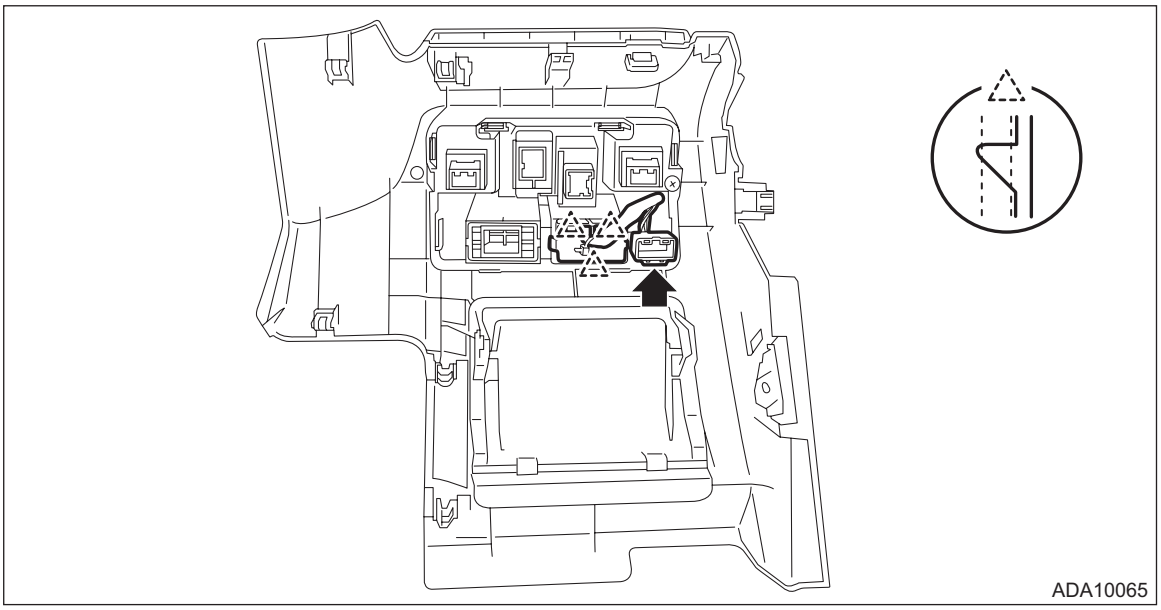
BSD/RCTA OFF switch

1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the cover assembly - instrument panel LWR driver OUT. <Ref. to EI-72, REMOVAL, Instrument Panel Lower Cover.>

3) Release the connector lock and claws, and remove the BSD/RCTA OFF switch.



B: INSTALLATION

BSD/RCTA OFF switch

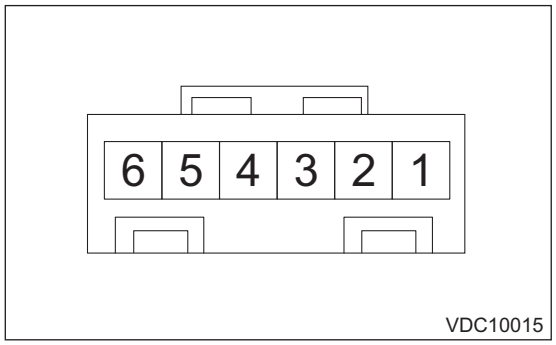
Install each part in the reverse order of removal.

C: INSPECTION

BSD/RCTA OFF switch

1) Measure the resistance between connector terminals.

Preparation tool:
Circuit tester



Terminal No.	Inspection conditions	Standard
5 — 6	Switch OFF	1 MΩ or more
	Switch ON	Less than 1 Ω

2) Apply battery voltage between the connector terminals to check lighting condition of illumination inside the switch.

Terminal No.	Inspection conditions	Specification
3 (+) — 4 (–)	Apply battery voltage.	Light ON

3) Replace the BSD/RCTA OFF switch if the inspection result is not within the standard value.

6. Combination Meter

A: NOTE

For the operation procedures for combination meter, refer to “INSTRUMENTATION/DRIVER INFO” section. <Ref. to IDI-19, Combination Meter.>

7. Outer Mirror Assembly

A: NOTE

For the operation procedures for the outer mirror assembly, refer to “GLASS/WINDOWS/MIRRORS” section. <Ref. to GW-25, Outer Mirror Assembly.>

8. Diagnostics with Phenomenon

A: INSPECTION

Refer to “Diagnostics with Phenomenon” of “Blind Spot Detection/Rear Cross Traffic Alert (DIAGNOSTICS)” section. <Ref. to RVD(diag)-42, Diagnostics with Phenomenon.>

Blind Spot Detection/Rear Cross Traffic Alert (DIAGNOSTICS)

RVD(diag)

		Page
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2.	Check List for Interview	3
3.	General Description	4
4.	Electrical Component Location	7
5.	Control Module I/O Signal	8
6.	Subaru Select Monitor	10
7.	Read Diagnostic Trouble Code (DTC)	13
8.	Clear Memory Mode	14
9.	Read Cancel Code	15
10.	Inspection Mode	16
11.	Read Current Data	18
12.	System Operation Check Mode	20
13.	List of Diagnostic Trouble Code (DTC)	21
14.	List of Cancel Code	22
15.	Diagnostic Procedure with Diagnostic Trouble Code (DTC)	23
16.	Diagnostic Procedure with Cancel Code	41
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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**PERFORM CUSTOMER INTERVIEW.** Using the Check List for Interview, ask the customer the condition of how trouble occurs.	Did you interview the customer?	Go to step **2**.	Interview the customer. <Ref. to RVD(diag)-3, Check List for Interview.>
2	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** Check for communication with the radar sensor. NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to RVD(diag)-11, INSPECTION, Subaru Select Monitor.>	Is communication possible?	Go to step **3**.	Check the communication circuit.
3	**CHECK RADAR SENSOR.** Read the DTC and cancel code of the radar sensors LH and RH using the Subaru Select Monitor. <Ref. to RVD(diag)-13, Read Diagnostic Trouble Code (DTC).> <Ref. to RVD(diag)-15, Read Cancel Code.>	Is DTC displayed?	Perform the diagnosis according to DTC and cancel code. (Perform the diagnosis to the side that displayed the DTC.) <Ref. to RVD(diag)-21, List of Diagnostic Trouble Code (DTC).> <Ref. to RVD(diag)-15, Read Cancel Code.> After diagnosis, Go to step **6**.	Go to step **4**.
4	**PERFORM DIAGNOSTICS WITH PHENOMENON.** Check the list of Diagnostics with Phenomenon. <Ref. to RVD(diag)-42, Diagnostics with Phenomenon.>	Does the symptom apply?	Perform diagnosis according to the procedures in the diagnostics with phenomenon.	Go to step **5**.
5	**CHECK TROUBLE PHENOMENON.** 1) Perform the basic inspection. <Ref. to RVD(diag)-6, INSPECTION, General Description.> 2) Check the radar sensor. <Ref. to RVD(diag)-8, Control Module I/O Signal.> 3) Perform check of current data. <Ref. to RVD(diag)-18, Read Current Data.>	Was the trouble cause found?	Perform the Clear Memory after repairing or replacing the cause of trouble.	System is normal.
6	**PERFORM DIAGNOSIS.** 1) Perform the Clear Memory Mode. <Ref. to RVD(diag)-14, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to RVD(diag)-16, Inspection Mode.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to RVD(diag)-21, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

2. Check List for Interview

A: CHECK

- Inspect the following items regarding the vehicle's state.
- Print out this page for interviewing customers.

<table>
<tr><td colspan="2">Blind Spot Detection/Rear Cross Traffic Alert Check List for Interview</td><td colspan="2">Received Year Month Date</td></tr>
<tr><td colspan="2" rowspan="2">Customer's name</td><td>Registration No.</td><td>Initial year of registration
Year Month Date</td></tr>
<tr><td>Vehicle model</td><td>Frame number</td></tr>
<tr><td>Interviewer</td><td>Inspector</td><td>Engine type</td><td>Odometer reading</td></tr>
<tr><td colspan="4">Customer specified content
•
•
•</td></tr>
<tr><td>Date when problem occurred</td><td>Year Month Date</td><td>Frequency of trouble occurrence</td><td>Always occurs
Sometimes occurs (times per day, times per month)</td></tr>
<tr><td rowspan="2">Condition of trouble occurrence
(How the trouble occurs)</td><td rowspan="2"></td><td>Weather</td><td>Fine • Cloudy • Rainy • Snowy • Others
( )</td></tr>
<tr><td>Temperature</td><td>°C (°F) — °C (°F)</td></tr>
<tr><td>Road conditions</td><td></td><td>Occurrence location</td><td></td></tr>
<tr><td>Accessory installation condition</td><td colspan="3"></td></tr>
<tr><td>Confirmation of trouble condition</td><td colspan="3"></td></tr>
<tr><td>Diagnostic Trouble Code</td><td colspan="3"></td></tr>
</table>

3. General Description

A: CAUTION

1. BSD/RCTA

1. In some cases, BSD/RCTA may not work correctly under the following conditions.
   - In bad weather such as heavy rain, fog, snow, sand storm, etc.
   - When ice, snow, dirt, etc. cover the rear bumper.
   - When the rear bumper has scratches or deformation in the area of the radar sensor.
   - When a difference of vehicle speeds between your own vehicle and another vehicle within the detection range is too large.
   - When there is another vehicle remaining within the detection range while your own vehicle starts from stationary state.
   - While driving on a steep slope with a series of uphills and downhills.
   - While driving on a wet road with such as puddles.
   - When more than one vehicle is approaching one after another with a short distance.
   - When vehicle speed of your own vehicle is almost the same as that of the vehicle within the detection range.
   - When a difference of the vehicle heights between your own vehicle and another vehicle in the next lane is too large.
   - Immediately after operating the BSD/RCTA OFF switch.
   - On wide lanes, when another vehicle of the next lane drives along the opposite edge so the distance is too large for the detection.
2. BSD/RCTA does not detect the following type of vehicles as well as objects other than vehicles.
   - Oncoming vehicle
   - Small motorcycle, bike, pedestrian, etc. *
   - Vehicle following behind on the same lane *
   - Stationary objects such as guardrail, wall, sign and parked vehicle*
   - Another vehicle driving on two lanes away*

NOTE:
*: Detection may be successful depending on circumstances.

3. BSD/RCTA may perform unnecessary detection in the following conditions.
   - When guardrails or walls are close enough to be within the detection range.
   - When distance from the vehicle behind is short.
   - On narrow lanes, when another vehicle driving on two lanes away enters the detection range.

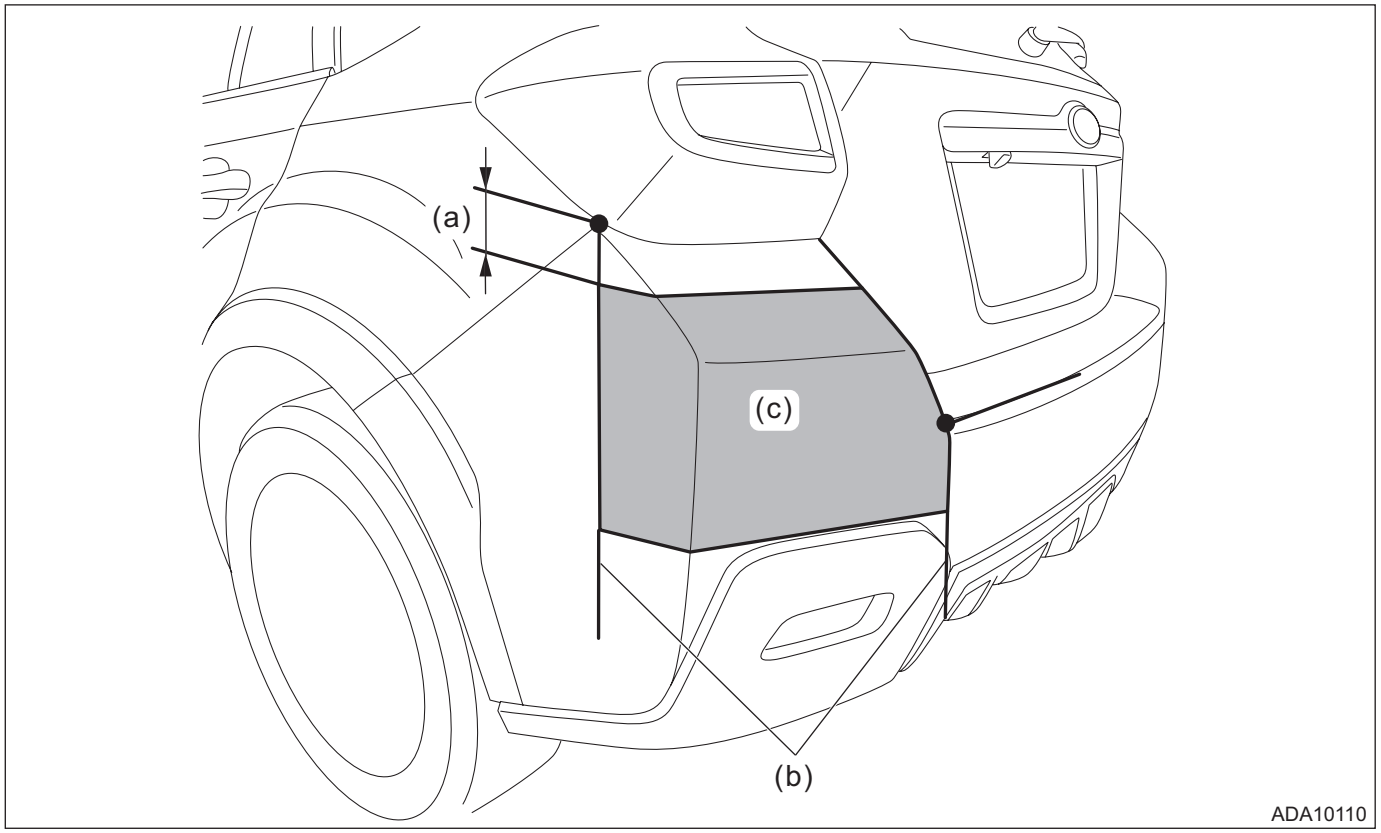
4. Radar sensors of BSD/RCTA are each located on LH and RH sides. Always observe the followings for proper operation of the system.

- Always clean the vicinity of radar sensors.
- Do not give a strong impact to the radar sensor areas. Displacement of the radar sensors may result in improper operation of the system such that it may not detect the vehicle entering the detection range.
- Do not disassemble the radar sensors.
- Do not scratch or deform the bumper areas with the radar sensors.

NOTE:
Replace the rear bumper in the following cases.

– When there is any collision trace or dent inside the radar projection area.
– When there is any scuffed (chipped off) section inside the radar projection area on the resin bumper.
– When there is any crack inside the radar projection area.

NOTE:
Radar projection area



(a) 70 mm (2.8 in) (b) Vertical line (c) Radar projection area

For other flaws, perform the sensor readjustment. If no problem is found, replacement is unnecessary.

- Do not put a sticker, etc. on/around the radar sensors.
- Do not retrofit the radar sensors or the bumper close to the radar sensors.
- Do not repaint the radar sensors or the bumper close to the radar sensors.

NOTE:
If there is any painting defect inside the radar projection area, replace the rear bumper without trying to repair it.

- Do not give a strong impact, force or drop-off to the radar sensors because they are precision devices.
- Do not reuse the radar sensors that were affected by strong impact, force, or fell off.

B: INSPECTION

1. BASIC INSPECTION

Before performing diagnosis, check the following items that might provoke the problems related to BSD/RCTA.
1) Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
2) Check the relay and fuse condition. <Ref. to RVD-4, Relay and Fuse.>
3) Check the connecting condition of harness and connector.

C: PREPARATION TOOL

1. SPECIAL TOOL

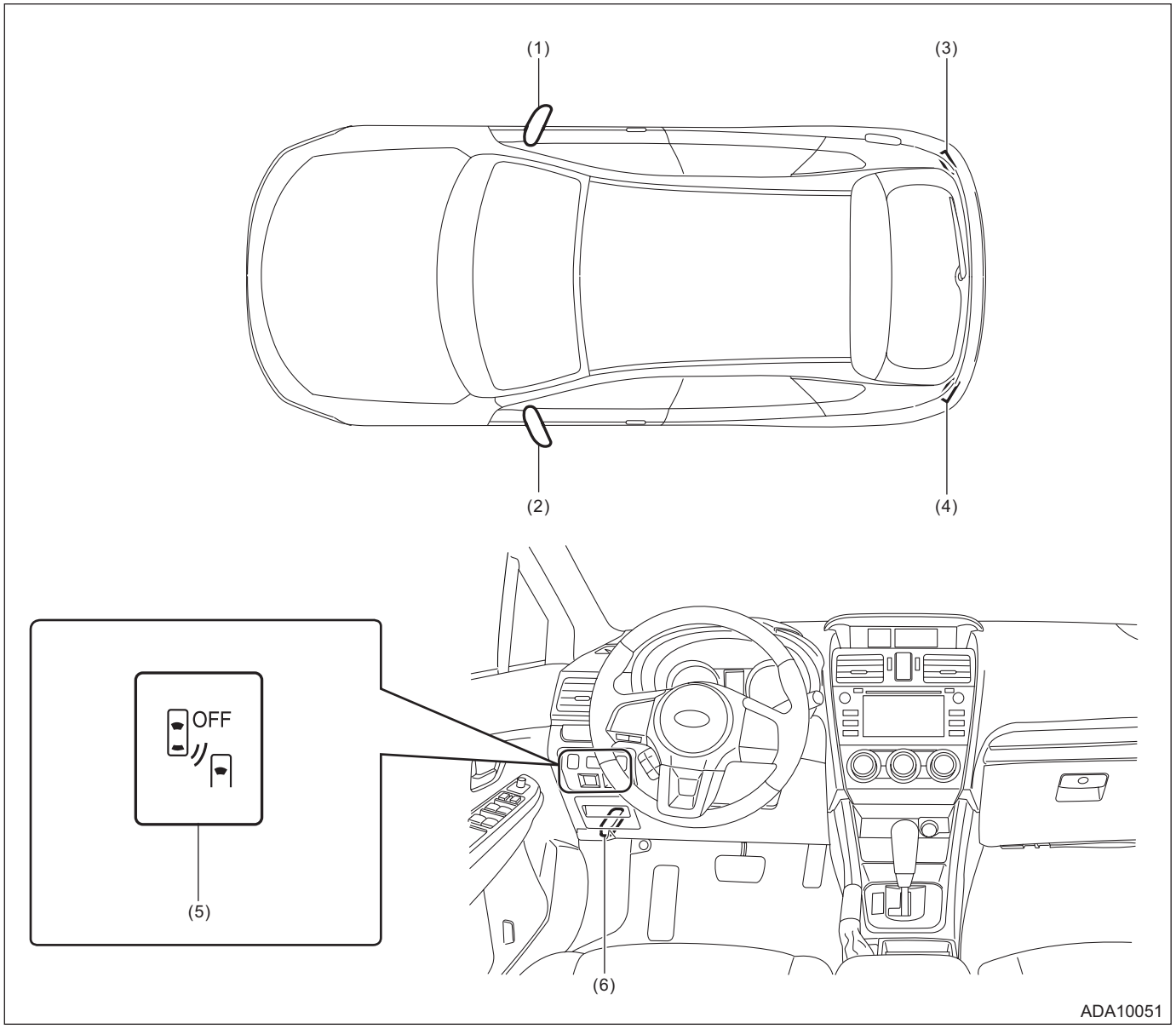
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

A: LOCATION

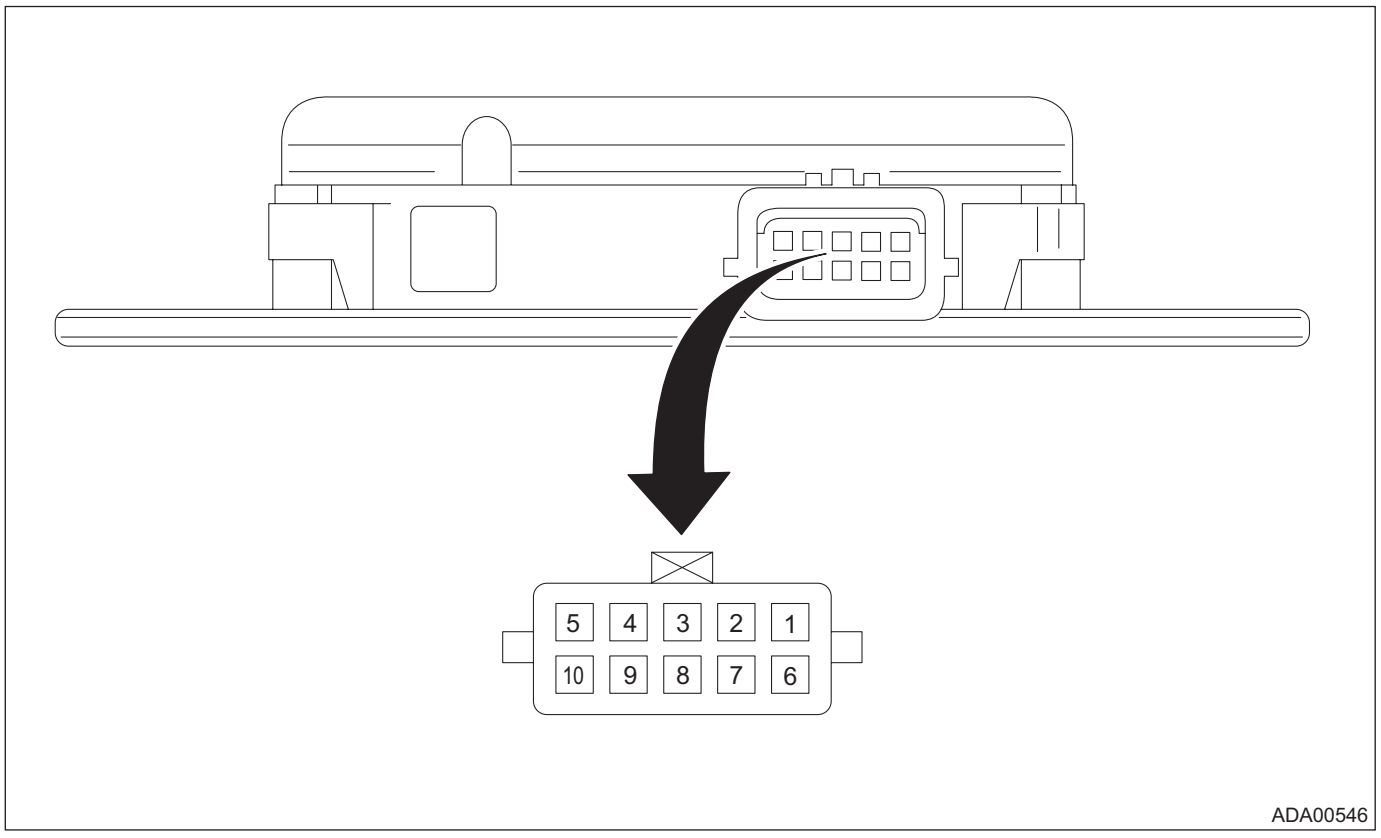


(1) Outer mirror assembly RH
(2) Outer mirror assembly LH
(3) Radar sensor RH (slave)
(4) Radar sensor LH (master)
(5) BSD/RCTA OFF switch
(6) Data link connector

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

1. RADAR SENSOR



Terminal No.	Content		Measuring condition	Standard
	Radar sensor LH (master)	Radar sensor RH (slave)		
1 ←→ Chassis ground	Private CAN H	Private CAN H	Always	1 MΩ or more
2 ←→ Chassis ground	Master CAN H	—	Always	1 MΩ or more
3 ←→ Chassis ground	—	—	—	—
4 ←→ Chassis ground	Left mirror LED output	Right mirror LED output	• Ignition switch OFF → ON • BSD/RCTA OFF switch OFF → ON	• When indicator is ON: 2.5 — 10.5 V • When indicator is blinking: 0 ←→ 2.5 — 10.5 V • When indicator is OFF: Less than 1 V
5 ←→ Chassis ground	Ignition power supply	Ignition power supply	Ignition switch OFF → ON	Less than 1 V → 9 — 16 V
6 ←→ Chassis ground	Private CAN L	Private CAN L	Always	1 MΩ or more
7 ←→ Chassis ground	Master CAN L	—	Always	1 MΩ or more
8 ←→ Chassis ground	BSD/RCTA OFF switch	—	• Ignition switch ON • BSD/RCTA OFF switch OFF → ON (while pressing and holding the switch)	Less than 1 V → 9 — 16 V
9 ←→ Chassis ground	—	—	—	—
10 ←→ Chassis ground	GND	GND	Always	Less than 1 Ω

B: WIRING DIAGRAM

Refer to “BSD/RCTA System” in the wiring diagram. <Ref. to WI(w/o HEV)-66, WIRING DIAGRAM, Blind Spot Detection/Rear Cross Traffic Alert.>

6. Subaru Select Monitor

A: OPERATION

- For detailed operation procedures, refer to “Application help”.
- When the radar sensor cannot communicate with Subaru Select Monitor, perform “COMMUNICATION FOR INITIALIZING IMPOSSIBLE”. <Ref. to RVD(diag)-11, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

When communication with the radar sensor is impossible

DETECTING CONDITION:

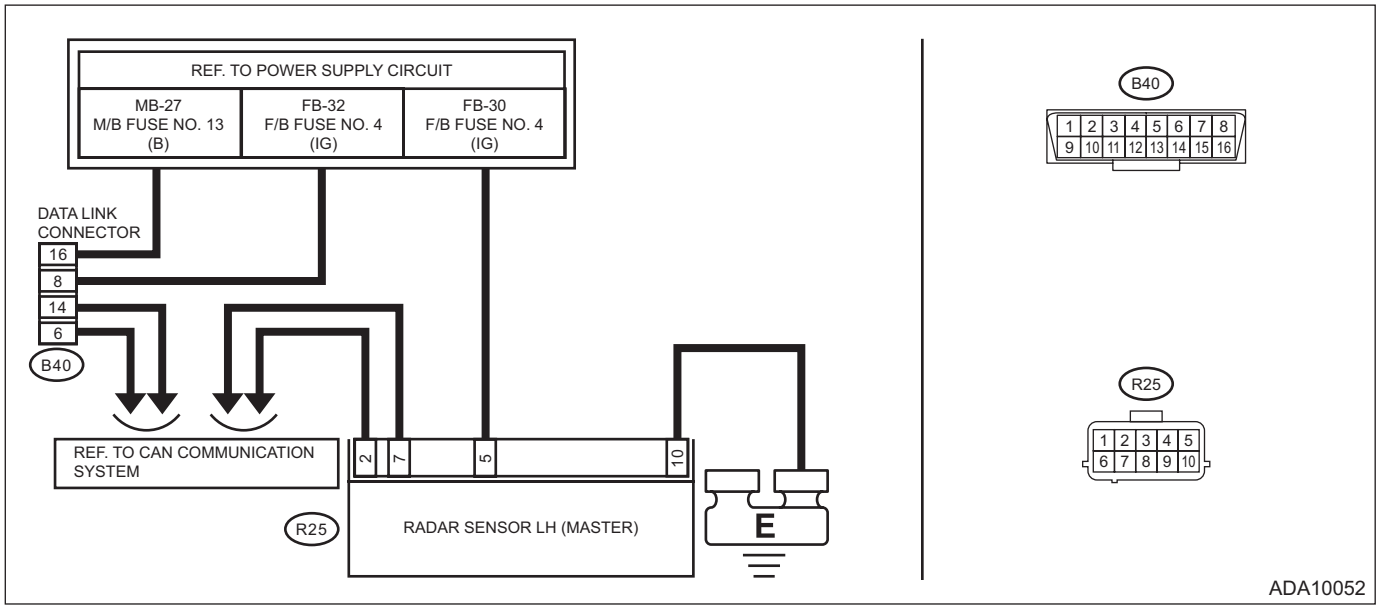
- Defective harness connector
- Power supply circuit malfunction
- Defective radar sensor
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Communication is impossible between radar sensor and Subaru Select Monitor.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
BSD/RCTA system <Ref. to WI(w/o HEV)-66, WIRING DIAGRAM, Blind Spot Detection/Rear Cross Traffic Alert.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse for radar sensor LH. <Ref. to RVD-4, Relay and Fuse.>	Is it normal?	Go to step **2**.	Replace the fuse. If the replaced fuse has blown out immediately, repair the short circuit to ground in harness between fuse and radar sensor LH.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the radar sensor LH connector. 2) Turn the ignition switch to ON. 3) Using a tester, measure the voltage between radar sensor LH connector (harness side) and chassis ground. ***Connector & terminal*** ***(R25) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the open circuit of harness between fuse and radar sensor LH connector.

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Using a tester, measure the resistance between radar sensor LH connector (harness side) and chassis ground. ***Connector & terminal*** ***(R25) No. 10 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit in harness between radar sensor and chassis ground.
4	**CHECK LAN SYSTEM.** 1) Connect the radar sensor LH connector. 2) Inspect LAN system. <Ref. to RVD(diag)-2, Basic Diagnostic Procedure.>	Is it normal?	Go to step **5**.	Perform the inspection according to the diagnosis for LAN system.
5	**CHECK RADAR SENSOR.** Communicate with the radar sensor.	Is communication possible?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the radar sensor LH. <Ref. to RVD-6, Radar Sensor.>

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Subaru Rear Vehicle Detection(RH)» or «Subaru Rear Vehicle Detection(LH)» and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For operation procedures, refer to “Application help”.
- For details concerning DTC, refer to the List of Diagnostic Trouble Codes (DTC). <Ref. to RVD(diag)-21, List of Diagnostic Trouble Code (DTC).>
- Check and replace the side that displayed the DTC.

8. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Subaru Rear Vehicle Detection(RH)» or «Subaru Rear Vehicle Detection(LH)» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For operation procedures, refer to “Application help”.

9. Read Cancel Code

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Subaru Rear Vehicle Detection(RH)» or «Subaru Rear Vehicle Detection(LH)» and then select «Enter».
5) On «Select Function» display, select «Cancel Code».

NOTE:
- For operation procedures, refer to “Application help”.
- For details concerning cancel codes, refer to the List of Cancel Codes. <Ref. to RVD(diag)-22, List of Cancel Code.>

10.Inspection Mode

A: OPERATION

It is possible to diagnose the DTC by performing the indicated inspection mode. After correcting the DTC, perform a necessary inspection mode and make sure that the function is resumed correctly and the DTC is recorded.

1. INSPECTION MODE 1

DTC	Item	Note
U0073	CONTROL MODULE COMMUNICATION BUS OFF	—
U0101	LOST COMMUNICATION WITH TCM	—
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	—
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	—
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	—
U0402	INVALID DATA RECEIVED FROM TCM	—
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	—
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	—
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	—
B2304	REAR RADAR ON-OFF SWITCH STUCK	—
B2311	REAR RADAR DETECT TCM	—
B2313	REAR RADAR DETECT VDC	—
B2327	REAR RADAR INTERNAL FAILURE (INTERNAL ELECTRIC CIRCUIT)	—
B2350	REAR RADAR COMMUNICATION ERROR BETWEEN MASTER AND SLAVE	—

1) Perform the Clear Memory Mode. <Ref. to RVD(diag)-14, Clear Memory Mode.>
2) Read the DTC and check that the DTC is not displayed. <Ref. to RVD(diag)-13, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. After solving the DTC, repeat from step 1).
3) Start the engine and wait for 30 seconds or more.
4) Read the DTC and check that the DTC is not displayed. <Ref. to RVD(diag)-13, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to RVD(diag)-21, List of Diagnostic Trouble Code (DTC).>

2. INSPECTION MODE 2

DTC	Item	Note
B2300	REAR RADAR CIRCUIT LOW	—
B2301	REAR RADAR CIRCUIT HIGH	—

1) Perform the Clear Memory Mode. <Ref. to RVD(diag)-14, Clear Memory Mode.>
2) Read the DTC and check that the DTC is not displayed. <Ref. to RVD(diag)-13, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. After solving the DTC, repeat from step 1).
3) Start the engine.
4) Perform the System Operation Check Mode «Door mirror indicator active test». <Ref. to RVD(diag)-20, System Operation Check Mode.>
5) Read the DTC and check that the DTC is not displayed. <Ref. to RVD(diag)-13, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to RVD(diag)-21, List of Diagnostic Trouble Code (DTC).>

3. INSPECTION MODE 3

DTC	Item	Note
B2329	REAR RADAR AXIS ALIGNMENT INCOMPLETE	—

1) Perform the Clear Memory Mode. <Ref. to RVD(diag)-14, Clear Memory Mode.>
2) Read the DTC and check that the DTC is not displayed. <Ref. to RVD(diag)-13, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. After solving the DTC, repeat from step 1).
3) Perform the adjustment of radar axis.
4) Read the DTC and check that the DTC is not displayed. <Ref. to RVD(diag)-13, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to RVD(diag)-21, List of Diagnostic Trouble Code (DTC).>

11.Read Current Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Subaru Rear Vehicle Detection(RH)» or «Subaru Rear Vehicle Detection(LH)» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

- «Subaru Rear Vehicle Detection(LH)»

Display	Content	Reference value	Note
SRVD System fail flag	Current failure status of BSD/RCTA system is displayed.	• Normal • Fail	—
SRVD System HALT flag	Current temporary stop status of BSD/RCTA system is displayed. Temporary stop: Temporarily stops when reception of radar sensor waves failed due to some obstacles or when the temperature is not within the range of –40°C (–40°F) — 85°C (185°F).	• Normal • Halt	—
SRVD System ON-OFF flag	ON/OFF status of BSD/RCTA system is displayed. If this flag is set to «OFF» while the values of «SRVD System fail flag» and «SRVD System HALT flag» are «Normal», the BSD/RCTA system is set to OFF by the BSD/RCTA OFF switch.	• OFF • ON	—
LH-Side Target detection flag	Detection status of the control target vehicle on the rear left side is displayed. Detection is possible if the target vehicle is moving when the own vehicle drives forward at 12 km/h (8 MPH) or more or backward at 0 km/h (0 MPH) or more.	• Un-detect • Detect	—
LH-Side BSD caution 1st flag	ON is displayed when the 1st stage BSD warning on the left side is activated (when the outer mirror assembly illuminates).	• OFF • ON	—
LH-Side LCA caution 1st flag	ON is displayed when the 1st stage LCA warning on the left side is activated (when the outer mirror assembly illuminates).	• OFF • ON	—
LH-Side RCTA caution flag	ON is displayed when the RCTA warning on the left side is activated (when the outer mirror assembly illuminates and buzzer sounds).	• OFF • ON	—
LH-Side Radar Voltage value	Power supply voltage of the radar sensor LH is displayed.	0 — 25.5 V	—
LH-Side Temperature value	Ambient temperature of the radar sensor LH is displayed.	–128 — 127°C	—
Trip Count	Time stamp information <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	—	—
Count		—	—
Time Count		—	—

- «Subaru Rear Vehicle Detection(RH)»

Display	Content	Reference value	Note
SRVD System fail flag	Current failure status of BSD/RCTA system is displayed.	• Normal • Fail	—
SRVD System HALT flag	Current temporary stop status of BSD/RCTA system is displayed. Temporary stop: Temporarily stops when reception of radar sensor waves failed due to some obstacles or when the temperature is not within the range of –40°C (–40°F) — 85°C (185°F).	• Normal • Halt	—
SRVD System ON-OFF flag	ON/OFF status of BSD/RCTA system is displayed. If this flag is set to «OFF» while the values of «SRVD System fail flag» and «SRVD System HALT flag» are «Normal», the BSD/RCTA system is set to OFF by the BSD/RCTA OFF switch.	• OFF • ON	—
RH-Side Target detection flag	Detection status of the control target vehicle on the rear right side is displayed. Detection is possible if the target vehicle is moving when the own vehicle drives forward at 12 km/h (8 MPH) or more or backward at 0 km/h (0 MPH) or more.	• Un-detect • Detect	—
RH-Side BSD caution 1st flag	ON is displayed when the 1st stage BSD warning on the right side is activated (outer mirror assembly illuminates).	• OFF • ON	—
RH-Side LCA caution 1st flag	ON is displayed when the 1st stage LCA warning on the right side is activated (outer mirror assembly illuminates).	• OFF • ON	—
RH-Side RCTA caution flag	ON is displayed when the RCTA warning on the right side is activated (when the outer mirror assembly illuminates and buzzer sounds).	• OFF • ON	—
RH-Side Radar Voltage value	Power supply voltage of the radar sensor RH is displayed.	0 — 25.5 V	—
RH-Side Temperature value	Ambient temperature of the radar sensor RH is displayed.	–128 — 127°C	—
Trip Count	Time stamp information <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	—	—
Count		—	—
Time Count		—	—

12.System Operation Check Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Subaru Rear Vehicle Detection(RH)» or «Subaru Rear Vehicle Detection(LH)» and then select «Enter».
5) On «Select Function» display, select «Active Test».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

Data	Note
Door mirror indicator active test	Outer mirror assembly indicator is illuminated.

13.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Reference
B2300	REAR RADAR CIRCUIT LOW	<Ref. to RVD(diag)-23, DTC B2300 REAR RADAR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2301	REAR RADAR CIRCUIT HIGH	<Ref. to RVD(diag)-26, DTC B2301 REAR RADAR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2304	REAR RADAR ON-OFF SWITCH STUCK	<Ref. to RVD(diag)-30, DTC B2304 REAR RADAR ON-OFF SWITCH STUCK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: Only radar sensor LH (master) is detected.
B2311	REAR RADAR DETECT TCM	<Ref. to RVD(diag)-33, DTC B2311 REAR RADAR DETECT TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2313	REAR RADAR DETECT VDC	<Ref. to RVD(diag)-34, DTC B2313 REAR RADAR DETECT VDC, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2327	REAR RADAR INTERNAL FAILURE (INTERNAL ELECTRIC CIRCUIT)	<Ref. to RVD(diag)-35, DTC B2327 REAR RADAR INTERNAL FAILURE (INTERNAL ELECTRIC CIRCUIT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2329	REAR RADAR AXIS ALIGNMENT INCOMPLETE	<Ref. to RVD(diag)-36, DTC B2329 REAR RADAR AXIS ALIGNMENT INCOMPLETE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2350	REAR RADAR COMMUNICATION ERROR BETWEEN MASTER AND SLAVE	<Ref. to RVD(diag)-37, DTC B2350 REAR RADAR COMMUNICATION ERROR BETWEEN MASTER AND SLAVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	<Ref. to RVD(diag)-39, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	<Ref. to RVD(diag)-39, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	<Ref. to RVD(diag)-39, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	<Ref. to RVD(diag)-39, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	<Ref. to RVD(diag)-39, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	<Ref. to RVD(diag)-39, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	<Ref. to RVD(diag)-39, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	<Ref. to RVD(diag)-39, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	<Ref. to RVD(diag)-40, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

14.List of Cancel Code

A: LIST

Code	Item	Contents of diagnosis
B2320	REAR RADAR LOW VOLTAGE (LESS THAN 9V)	Temporarily stops because the voltage supplied to radar drops to or below 9 V. Returns to normal when the voltage becomes normal.
B2321	REAR RADAR HIGH VOLTAGE (MORE THAN 16V)	Temporarily stops because the voltage supplied to radar rises to or above 16 V. Returns to normal when the voltage becomes normal.
B2328	REAR RADAR INTERNAL FAILURE (RADAR MISALIGNMENT)	Deviation of the radar axis prevents normal detection. Returns to normal when the radar axis becomes normal. When B2328 is frequently detected, perform “Diagnostic Procedure with Cancel Code”. <Ref. to RVD(diag)-41, DTC B2328 REAR RADAR INTERNAL FAILURE (RADAR MISALIGNMENT), Diagnostic Procedure with Cancel Code.>
B2340	RADAR ASSY B&S OUT OF OPERATION TEMPERATURE RANGE	Temporarily stops because the temperature is outside the operative range (–40°C (–40°F) — 85°C (185°F)). Returns to normal when the ambient temperature falls within the operative range.
B2341	REAR RADAR DEGRADATION OF DETECTING PERFORMANCE	Temporarily stops because some obstacles blocked radar waves of the back and side radar. Returns to normal when the transmission and reception of radar signals becomes normal.

15.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC B2300 REAR RADAR CIRCUIT LOW

DTC DETECTING CONDITION:

- Short circuit to ground in the harness between radar sensor and outer mirror assembly
- Ground short circuit of the harness in outer mirror assembly module (Malfunction of the outer mirror assembly)
- Defective radar sensor

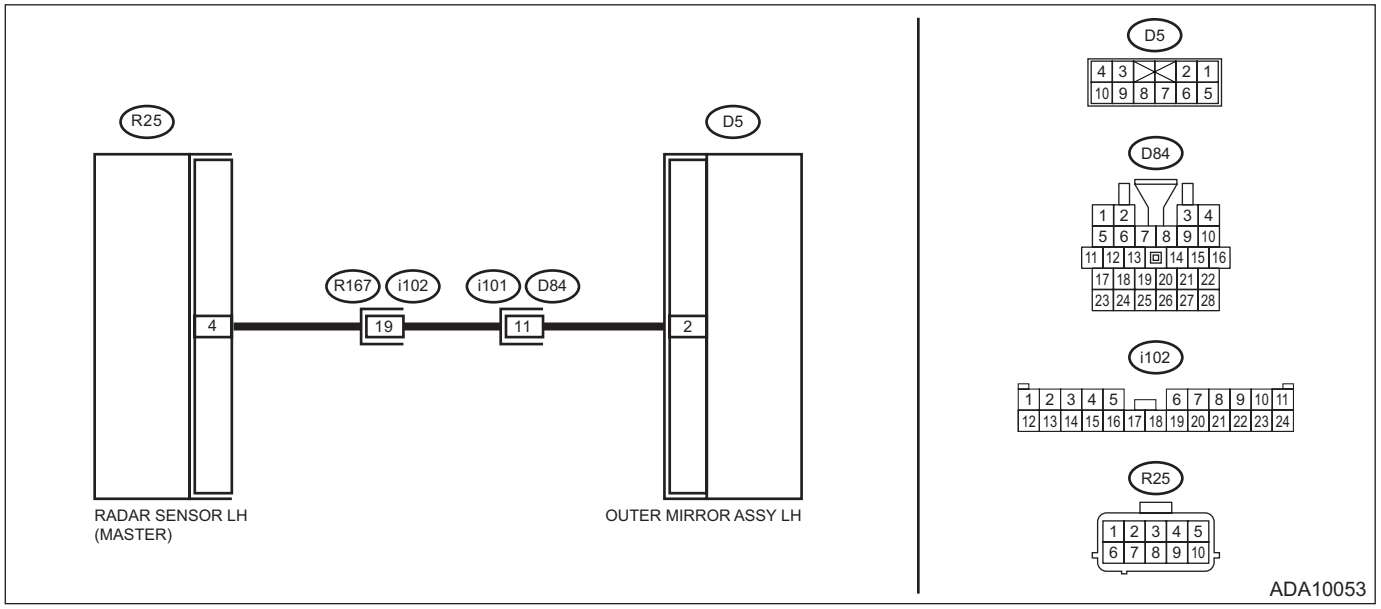
TROUBLE SYMPTOM:

- All functions of BSD/RCTA stop.
- Fail icon is displayed in the combination meter LCD display.
- Failure-related notification is displayed for approx. two seconds on LCD display in the combination meter.

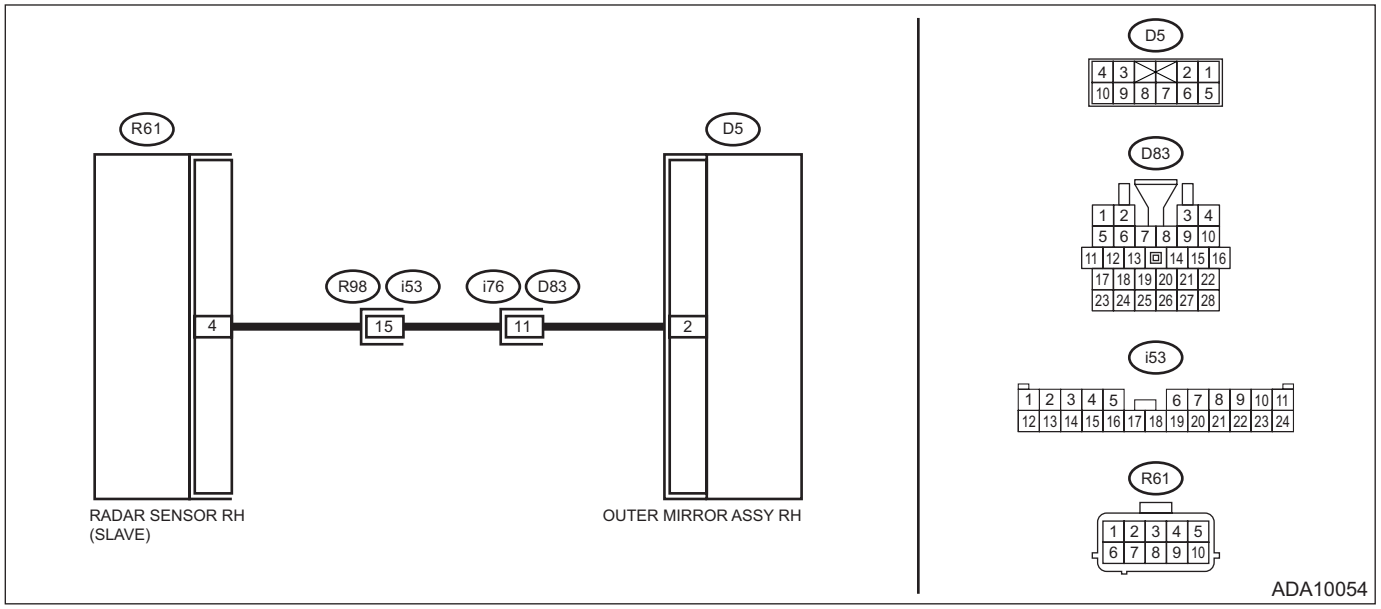
WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
BSD/RCTA system <Ref. to WI(w/o HEV)-66, WIRING DIAGRAM, Blind Spot Detection/Rear Cross Traffic Alert.>

- Radar sensor LH



- Radar sensor RH



NOTE:
Check and replace the side that displayed the DTC.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to RVD(diag)-13, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC B2327 displayed? (Current malfunction)	Perform the diagnosis according to DTC. <Ref. to RVD(diag)-35, DTC B2327 REAR RADAR INTERNAL FAILURE (INTERNAL ELECTRIC CIRCUIT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK DTC.** Read the DTC. <Ref. to RVD(diag)-13, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC B2300 displayed? (Current malfunction)	Go to step **3**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
3	**CHECK OPERATION CHECK MODE.** Perform the system operation check mode «Door mirror indicator active test» from «Subaru Rear Vehicle Detection(RH)» or «Subaru Rear Vehicle Detection(LH)». <Ref. to RVD(diag)-20, System Operation Check Mode.>	Does the indicator illuminate?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Disconnect the radar sensor connector. 2) Disconnect the outer mirror assembly connector. 3) Using a tester, measure the resistance between radar sensor connector (harness side) and the chassis ground. ***Connector & terminal*** ***Radar sensor LH*** ***(R25) No. 4 — Chassis ground:*** ***Radar sensor RH*** ***(R61) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short to ground in harness between radar sensor connector and outer mirror assembly connector.
5	**CHECK CONNECTOR.** Check the radar sensor connector and the outer mirror assembly connector.	Is there any fault? (Insecure connection, poor contact, etc.)	Repair the connector.	Go to step **6**.
6	**CHECK OUTER MIRROR ASSEMBLY.** Perform unit-check for the outer mirror assembly. <Ref. to GW-25, Outer Mirror Assembly.>	Is there any fault?	Replace the outer mirror assembly. <Ref. to GW-25, Outer Mirror Assembly.>	Go to step **7**.
7	**CHECK BSD/RCTA.** 1) Restore the vehicle to its original state. 2) Perform the Inspection Mode. <Ref. to RVD(diag)-16, Inspection Mode.>	Is DTC B2300 displayed? (Current malfunction)	Replace the radar sensor. <Ref. to RVD-6, Radar Sensor.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

B: DTC B2301 REAR RADAR CIRCUIT HIGH

DTC DETECTING CONDITION:

- Open circuit or short circuit to power supply in harness between radar sensor and outer mirror assembly.
- Open circuit or short circuit to power supply of harness in the outer mirror assembly module. (Malfunction of the outer mirror assembly)
- Open circuit or short circuit to power supply of harness between outer mirror assembly and ground.
- Defective radar sensor

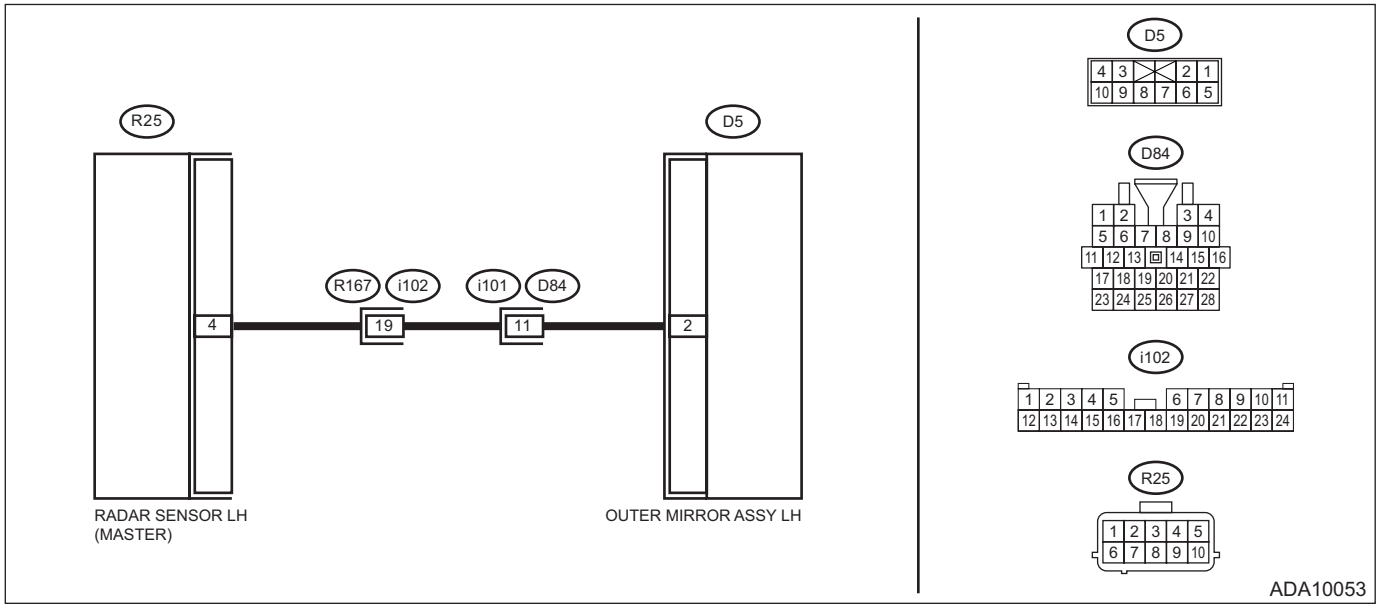
TROUBLE SYMPTOM:

- All functions of BSD/RCTA stop.
- Fail icon is displayed in the combination meter LCD display.
- Failure-related notification is displayed for approx. two seconds on LCD display in the combination meter.

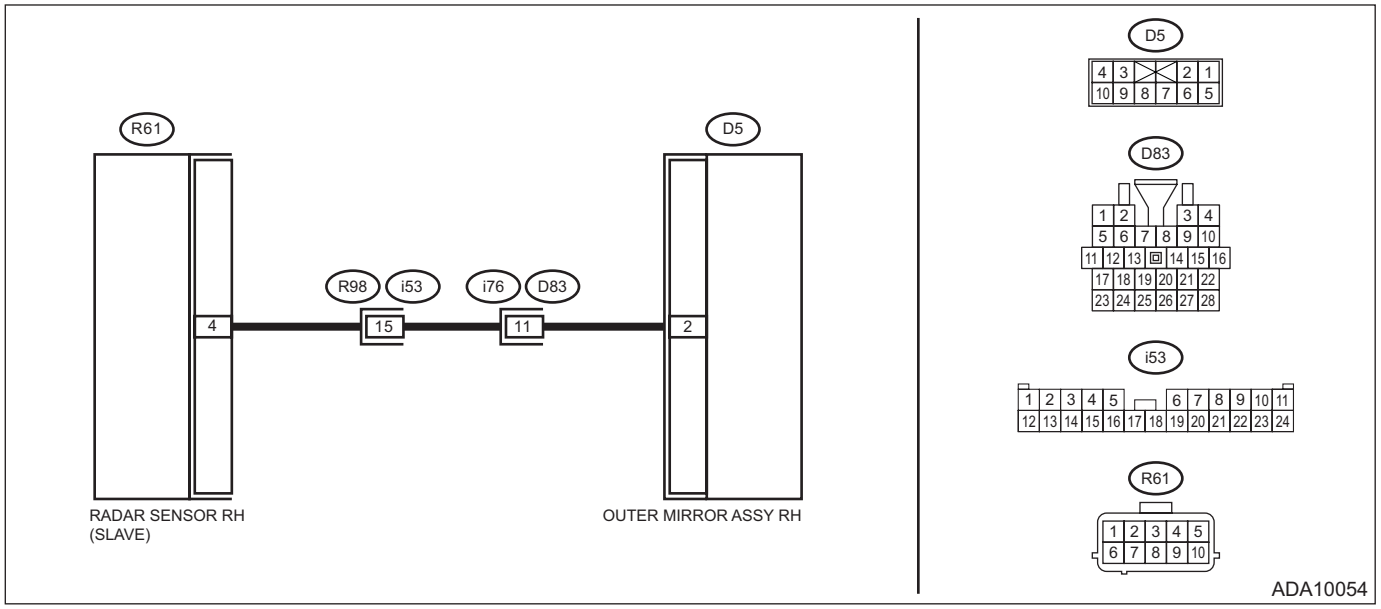
WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
BSD/RCTA system <Ref. to WI(w/o HEV)-66, WIRING DIAGRAM, Blind Spot Detection/Rear Cross Traffic Alert.>

- Radar sensor LH



- Radar sensor RH



NOTE:
Check and replace the side that displayed the DTC.

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to RVD(diag)-13, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC B2327 displayed? (Current malfunction)	Perform the diagnosis according to DTC. <Ref. to RVD(diag)-35, DTC B2327 REAR RADAR INTERNAL FAILURE (INTERNAL ELECTRIC CIRCUIT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK DTC.** Read the DTC. <Ref. to RVD(diag)-13, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC B2301 displayed? (Current malfunction)	Go to step **3**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
3	**CHECK OPERATION CHECK MODE.** Perform the system operation check mode «Door mirror indicator active test» from «Subaru Rear Vehicle Detection(RH)» or «Subaru Rear Vehicle Detection(LH)». <Ref. to RVD(diag)-20, System Operation Check Mode.>	Does the indicator illuminate?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the radar sensor connector. 2) Disconnect the outer mirror assembly connector. 3) Using a tester, measure the resistance between radar sensor connector (harness side) and outer mirror assembly connector (harness side). ***Connector & terminal*** ***Radar sensor LH*** ***(R25) No. 4 — (D5) No. 2:*** ***Radar sensor RH*** ***(R61) No. 4 — (D15) No. 2:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness between radar sensor connector and outer mirror assembly connector.
5	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between radar sensor connector (harness side) and the chassis ground. ***Connector & terminal*** ***Radar sensor LH*** ***(R25) No. 4 (+) — Chassis ground (–):*** ***Radar sensor RH*** ***(R61) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair the short circuit to power supply in harness between radar sensor connector and outer mirror assembly connector.
6	**CHECK CONNECTOR.** Check the radar sensor connector and the outer mirror assembly connector.	Is there any fault? (Insecure connection, poor contact, etc.)	Repair the connector.	Go to step **7**.
7	**CHECK OUTER MIRROR ASSEMBLY.** Perform unit-check for the outer mirror assembly. <Ref. to GW-25, Outer Mirror Assembly.>	Is there any fault?	Replace the outer mirror assembly. <Ref. to GW-25, Outer Mirror Assembly.>	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK BSD/RCTA.** 1) Restore the vehicle to its original state. 2) Perform the Inspection Mode. <Ref. to RVD(diag)-16, Inspection Mode.>	Is DTC B2301 displayed? (Current malfunction)	Replace the radar sensor. <Ref. to RVD-6, Radar Sensor.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

C: DTC B2304 REAR RADAR ON-OFF SWITCH STUCK

DTC DETECTING CONDITION:

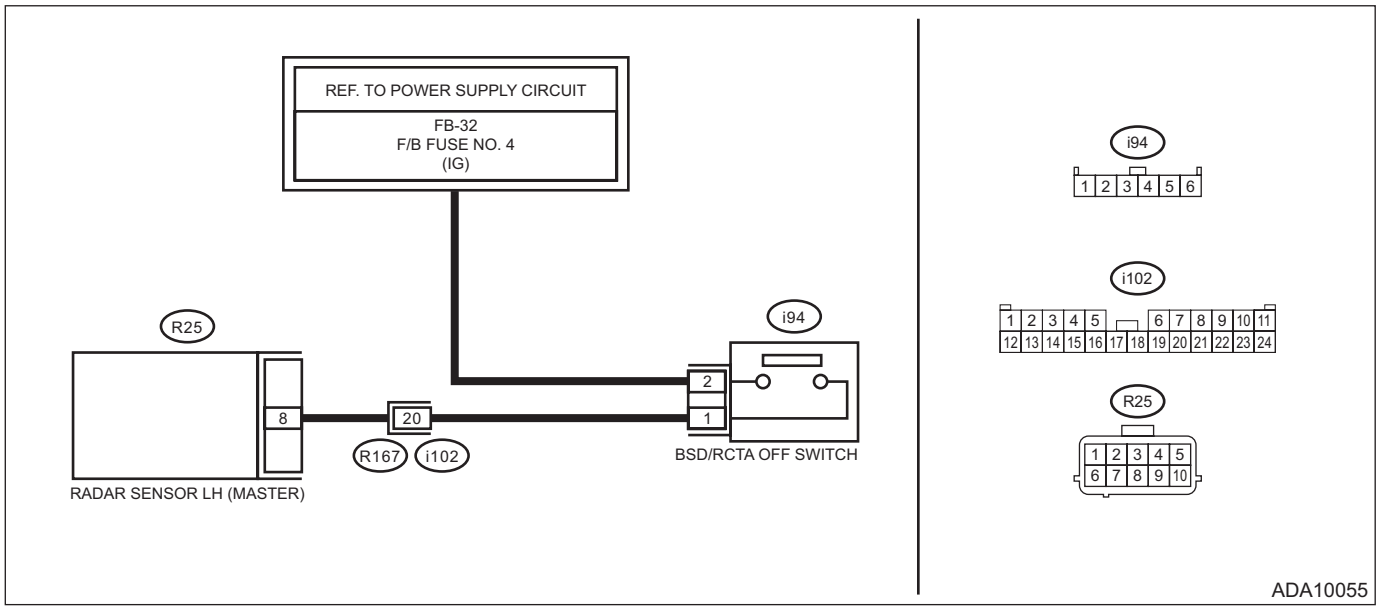
- BSD/RCTA OFF switch is stuck to ON. (Switch malfunction)
- Switch was left pressed for a prolonged time.
- Defective radar sensor

TROUBLE SYMPTOM:

- All functions of BSD/RCTA stop.
- Fail icon is displayed in the combination meter LCD display.
- Failure-related notification is displayed for approx. two seconds on LCD display in the combination meter.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
BSD/RCTA system <Ref. to WI(w/o HEV)-66, WIRING DIAGRAM, Blind Spot Detection/Rear Cross Traffic Alert.>



Step		Check	Yes	No
1	**CHECK METER DISPLAY.** 1) Turn the ignition switch to ON. 2) Check the display of OFF indicator in the combination meter LCD display.	Does the display change according to operation of BSD/RCTA OFF switch?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: • Temporary poor contact of connector, temporary open or short circuit of harness may be the cause. • User may have kept pressing the switch for 30 seconds or more.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** Check the current data «SRVD System ON-OFF flag» of «Subaru Rear Vehicle Detection(RH)» or «Subaru Rear Vehicle Detection(LH)». <Ref. to RVD(diag)-18, Read Current Data.>	Does the display change according to operation of BSD/RCTA OFF switch?	Check the combination meter. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>	Go to step **3**.
3	**INSPECTION OF SWITCH UNIT.** Perform unit inspection of the BSD/RCTA OFF switch. <Ref. to RVD-12, Switches and Harness.>	Is it normal?	Go to step **4**.	Replace the BSD/RCTA OFF switch. <Ref. to RVD-12, Switches and Harness.>
4	**CHECK BATTERY.** Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.> <Ref. to SC(H4DO(HEV))-40, Battery.>	Is it normal?	Go to step **5**.	Charge or replace the battery.
5	**CHECK FUSE.** Check the fuse of BSD/RCTA OFF switch. <Ref. to RVD-4, Relay and Fuse.>	Is it normal?	Go to step **6**.	Replace the fuse. If the replaced fuse blows out easily, repair the ground short circuit in harness between the fuse and the BSD/RCTA OFF switch.
6	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the BSD/RCTA OFF switch connector. 2) Turn the ignition switch to ON. 3) Using a tester, measure the voltage between BSD/RCTA OFF switch connector and chassis ground. ***Connector & terminal*** ***(i94) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **7**.	Repair the open circuit of harness between the fuse and the BSD/RCTA OFF switch.
7	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the radar sensor LH connector. 3) Using a tester, measure the resistance between BSD/RCTA OFF switch connector and radar sensor LH connector (harness side). ***Connector & terminal*** ***(i94) No. 1 — (R25) No. 8:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair the open circuit of harness between BSD/RCTA OFF switch and radar sensor LH.
8	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the BSD/RCTA OFF switch connector (harness side) and the chassis ground. ***Connector & terminal*** ***(i94) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **9**.	Repair the short circuit to ground in harness between BSD/RCTA OFF switch and radar sensor LH.
9	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between the BSD/RCTA OFF switch connector (harness side) and the chassis ground. ***Connector & terminal*** ***(i94) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **10**.	Repair the short circuit to power supply in harness between BSD/RCTA OFF switch and radar sensor LH.
10	**CHECK CONNECTOR.** Check the radar sensor LH connector.	Is there any fault? (Insecure connection, poor contact, etc.)	Repair the connector.	Go to step **11**.

Step		Check	Yes	No
11	**CHECK BSD/RCTA.** 1) Restore the vehicle to its original state. 2) Perform the Inspection Mode. <Ref. to RVD(diag)-16, Inspection Mode.>	Is DTC B2304 displayed? (Current malfunction)	Replace the radar sensor LH. <Ref. to RVD-6, Radar Sensor.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

D: DTC B2311 REAR RADAR DETECT TCM

DTC DETECTING CONDITION:
Automatic transmission fails.
TROUBLE SYMPTOM:

- All functions of BSD/RCTA stop.
- Fail icon is displayed in the combination meter LCD display.
- Failure-related notification is displayed for approx. two seconds on LCD display in the combination meter.
- AT OIL TEMP light blinks in the combination meter.

NOTE:
Check and replace the side that displayed the DTC.

	Step	Check	Yes	No
1	**CHECK TRANSMISSION.** Check the transmission. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault?	Perform the inspection according to the diagnosis of the transmission.	Go to step **2**.
2	**CHECK BSD/RCTA.** 1) Restore the vehicle to its original state. 2) Perform the Inspection Mode. <Ref. to RVD(diag)-16, Inspection Mode.>	Is DTC B2311 displayed? (Current malfunction)	Replace the radar sensor. <Ref. to RVD-6, Radar Sensor.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

E: DTC B2313 REAR RADAR DETECT VDC

DTC DETECTING CONDITION:
Vehicle dynamics control (VDC) fails.
TROUBLE SYMPTOM:

- All functions of BSD/RCTA stop.
- Fail icon is displayed in the combination meter LCD display.
- Failure-related notification is displayed for approx. two seconds on LCD display in the combination meter.
- VDC warning light illuminates in the combination meter.

NOTE:
Check and replace the side that displayed the DTC.

	Step	Check	Yes	No
1	**CHECK VDC.** Check the VDC. <Ref. to VDC(diag)-2, Basic Diagnostic Procedure.>	Is there any fault?	Perform the inspection according to the VDC diagnosis.	Go to step **2**.
2	**CHECK BSD/RCTA.** 1) Restore the vehicle to its original state. 2) Perform the Inspection Mode. <Ref. to RVD(diag)-16, Inspection Mode.>	Is DTC B2313 displayed? (Current malfunction)	Replace the radar sensor. <Ref. to RVD-6, Radar Sensor.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

F: DTC B2327 REAR RADAR INTERNAL FAILURE (INTERNAL ELECTRIC CIRCUIT)

DTC DETECTING CONDITION:
Defective radar sensor
TROUBLE SYMPTOM:
- All functions of BSD/RCTA stop.
- Fail icon is displayed in the combination meter LCD display.
- Failure-related notification is displayed for approx. two seconds on LCD display in the combination meter.

NOTE:
Check and replace the side that displayed the DTC.

	Step	Check	Yes	No
1	**CHECK BSD/RCTA.** 1) Perform the Clear Memory Mode. <Ref. to RVD(diag)-14, Clear Memory Mode.> 2) Read the DTC again. <Ref. to RVD(diag)-13, Read Diagnostic Trouble Code (DTC).>	Is DTC B2327 displayed? (Current malfunction)	Replace the radar sensor. <Ref. to RVD-6, Radar Sensor.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

G: DTC B2329 REAR RADAR AXIS ALIGNMENT INCOMPLETE

DTC DETECTING CONDITION:

Axis adjustment of the radar sensor has failed.
(Forced termination of the Subaru Select Monitor, improper location of the target reflector, or deviation of the radar sensor due to impact.)

TROUBLE SYMPTOM:

- All functions of BSD/RCTA stop.
- Fail icon is displayed in the combination meter LCD display.
- Failure-related notification is displayed for approx. two seconds on LCD display in the combination meter.

NOTE:
Check and replace the side that displayed the DTC.

	Step	Check	Yes	No
1	**CHECK REAR BUMPER.** Check the rear bumper.	Is there any fault? (Stickered, trace of repainting, etc.)	Replace or repair the bumper. <Ref. to EI-49, Rear Bumper.> Go to step **2**.	Go to step **2**.
2	**CHECK RADAR SENSOR BRACKET.** 1) Remove the rear bumper. <Ref. to EI-49, Rear Bumper.> 2) Check the mounting bracket of the radar sensor as well as its installation position. <Ref. to RVD-6, Radar Sensor.>	Is there any fault? (Visible damage, deformation, etc.)	Replace the mounting bracket of the radar sensor, or repair the installation position. <Ref. to RVD-6, Radar Sensor.> Go to step **3**.	Go to step **3**.
3	**ADJUSTMENT OF RADAR SENSOR AXIS.** 1) Install the rear bumper. 2) Perform the adjustment of radar axis. <Ref. to RVD-7, ADJUSTMENT, Radar Sensor.> 3) Perform the Inspection Mode. <Ref. to RVD(diag)-16, Inspection Mode.>	Is DTC B2329 displayed? (Current malfunction)	Replace the radar sensor. <Ref. to RVD-6, Radar Sensor.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

H: DTC B2350 REAR RADAR COMMUNICATION ERROR BETWEEN MASTER AND SLAVE

DTC DETECTING CONDITION:

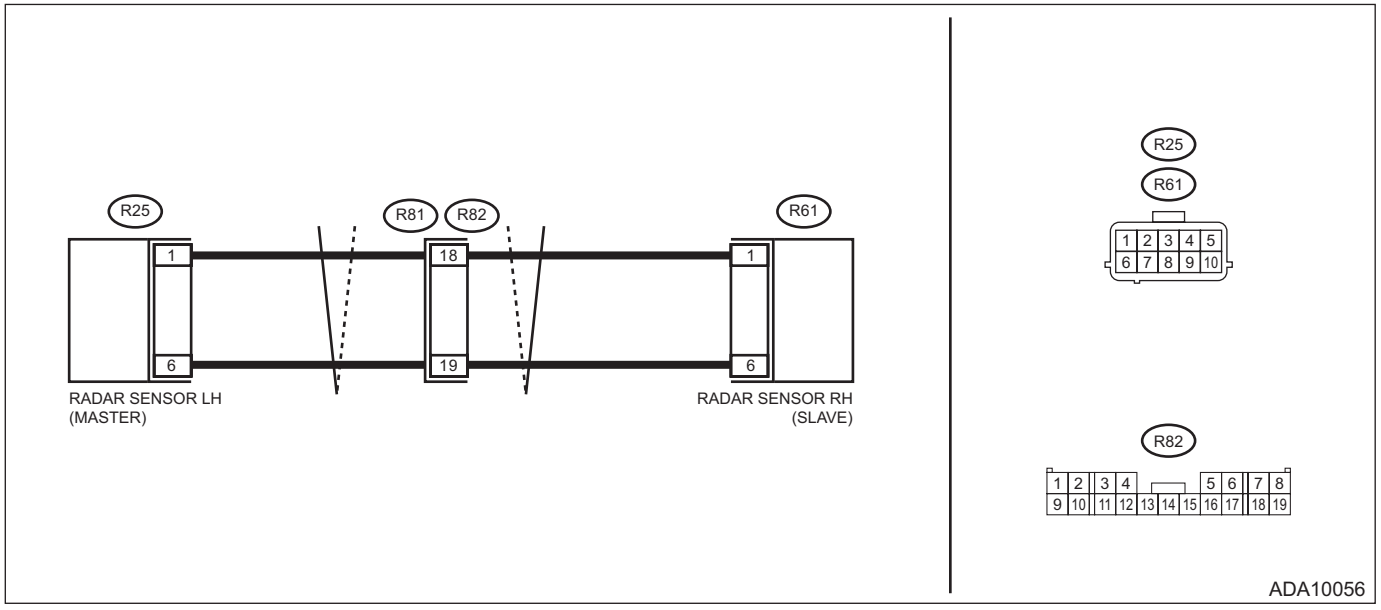
- Defective harness for CAN communication between radar sensor LH and radar sensor RH
- Defective radar sensor

TROUBLE SYMPTOM:

- All functions of BSD/RCTA stop.
- Fail icon is displayed in the combination meter LCD display.
- Failure-related notification is displayed for approx. two seconds on LCD display in the combination meter.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
BSD/RCTA system <Ref. to WI(w/o HEV)-66, WIRING DIAGRAM, Blind Spot Detection/Rear Cross Traffic Alert.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to RVD(diag)-13, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC B2350 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the radar sensor connectors LH and RH. 2) Using a tester, measure the resistance between radar sensor RH connector (harness side) and radar sensor LH connector (harness side). ***Connector & terminal*** ***(R25) No. 1 — (R61) No. 1:*** ***(R25) No. 6 — (R61) No. 6:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness between radar sensor RH connector and radar sensor LH connector.
3	**CHECK HARNESS (SHORT BETWEEN LINES, GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between radar sensor LH connectors (harness side) and the resistance between radar sensor LH connector (harness side) and chassis ground. ***Connector & terminal*** ***(R25) No. 1 — (R25) No. 6:*** ***(R25) No. 1 — Chassis ground:*** ***(R25) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness between radar sensor RH connector and radar sensor LH connector.
4	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between radar sensor LH connector (harness side) and chassis ground. ***Connector & terminal*** ***(R25) No. 1 (+) — Chassis ground (–):*** ***(R25) No. 6 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Repair the short to power supply in harness between radar sensor RH connector and radar sensor LH connector.
5	**CHECK RADAR SENSOR. (INTERNAL IMPEDANCE).** Using a tester, measure the resistance between radar sensor LH connectors (module side) and the resistance between radar sensor RH connectors (module side). ***Connector & terminal*** ***(R25) No. 1 — (R25) No. 6:*** ***(R61) No. 1 — (R61) No. 6:***	Is the resistance approximately 120 Ω?	Go to step **6**.	Replace the radar sensor RH or radar sensor LH. <Ref. to RVD-6, Radar Sensor.>
6	**CHECK BSD/RCTA.** 1) Restore the vehicle to its original state. 2) Perform the Clear Memory Mode. <Ref. to RVD(diag)-14, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to RVD(diag)-16, Inspection Mode.>	Is DTC B2350 displayed? (Current malfunction)	Replace the radar sensor on the side that displayed the DTC. <Ref. to RVD-6, Radar Sensor.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

I: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

Detected when CAN line abnormality is detected.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

J: DTC U0101 LOST COMMUNICATION WITH TCM

Detected when CAN data from TCM does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

K: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

Detected when CAN data from VDC CM does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

L: DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

Detected when CAN data from BIU does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

M: DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

Detected when CAN data from combination meter does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

N: DTC U0402 INVALID DATA RECEIVED FROM TCM

Received error data from TCM.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

O: DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

Received error data from VDC CM.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

P: DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

Received error data from BIU.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

Q: DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

Received error data from combination meter.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

16.Diagnostic Procedure with Cancel Code

A: DTC B2328 REAR RADAR INTERNAL FAILURE (RADAR MISALIGNMENT)

DETECTING CONDITION:

- Excessive impact was given to the installation area of the radar sensor, which resulted in deviation of the radar sensor axis.
- Mounting bracket for the radar sensor is deformed.
- Defective radar sensor

TROUBLE SYMPTOMS:

- All functions of BSD/RCTA are temporarily suspended.
- The icon indicating function suspended will be displayed in the combination meter LCD display.
- Function-suspended confirmation will be displayed for approx. two seconds on LCD display in the combination meter.

NOTE:
If DTC B2328 is detected repeatedly, check or replace the part corresponding to the cancel code.

	Step	Check	Yes	No
1	**CHECK REAR BUMPER.** Check the rear bumper.	Is there any fault? (Stickered, trace of repainting, etc.)	Replace or repair the bumper. <Ref. to EI-49, Rear Bumper.> Go to step **2**.	Go to step **2**.
2	**CHECK RADAR SENSOR BRACKET.** 1) Remove the rear bumper. <Ref. to EI-49, Rear Bumper.> 2) Check the mounting bracket of the radar sensor as well as its installation position. <Ref. to RVD-6, Radar Sensor.>	Is there any fault? (Visible damage, deformation, etc.)	Replace the mounting bracket of the radar sensor, or repair the installation position. <Ref. to RVD-6, Radar Sensor.> Go to step **3**.	Go to step **3**.
3	**ADJUSTMENT OF RADAR SENSOR AXIS.** 1) Install the rear bumper. 2) Perform the adjustment of radar axis. <Ref. to RVD-7, ADJUSTMENT, Radar Sensor.> 3) Read the cancel code. <Ref. to RVD(diag)-15, Read Cancel Code.>	Is B2328 displayed?	Replace the radar sensor. <Ref. to RVD-6, Radar Sensor.>	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

17.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Maintenance parts
BSD/RCTA does not operate.	Fuse
	LAN system <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
	Body control system <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>
	Radar sensor LH
	Radar sensor RH
BSD/RCTA cannot be turned OFF.	BSD/RCTA OFF switch
	LAN system <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
	Body control system <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>
	Radar sensor LH
Error message appears in the combination meter.	CHECK CANCEL CODE. <Ref. to RVD(diag)-15, Read Cancel Code.>
	Radar sensor LH
	Radar sensor RH
	Combination meter <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>
Outer mirror assembly (LH) indicator does not illuminate.	Outer mirror assembly <Ref. to GW-25, Outer Mirror Assembly.>
	Radar sensor LH
Outer mirror assembly (RH) indicator does not illuminate.	Outer mirror assembly <Ref. to GW-25, Outer Mirror Assembly.>
	Radar sensor RH
Outer mirror assembly (LH) indicator remains on.	Radar sensor LH
Outer mirror assembly (RH) indicator remains on.	Radar sensor RH
Outer mirror assembly (LH) indicator does not blink.	Radar sensor LH
Outer mirror assembly (RH) indicator does not blink.	Radar sensor RH
Outer mirror assembly (LH) indicator keeps blinking.	Radar sensor LH
Outer mirror assembly (RH) indicator keeps blinking.	Radar sensor RH

LAN SYSTEM (DIAGNOSTICS)

LAN(w/o HEV)(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
• Subaru Select Monitor is required for reading DTC, performing diagnosis, reading current data, customizing and active test (compulsory drive).
• Remove foreign matter (dust, water, oil, etc.) from each control module connector during removal and installation.
• Registration of immobilizer may be needed after the replacement of controller modules, etc. For detailed procedure, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

NOTE:
• To check harness for open or short circuits, shake the suspected trouble spot or connector.
• Check List for Interview <Ref. to LAN(w/o HEV)(diag)-4, Check List for Interview.>

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** Ask the customer when and how the trouble occurred using the interview check list. <Ref. to LAN(w/o HEV)(diag)-4, Check List for Interview.>	Did you interview the customer?	Go to step **2**.	Interview the customer.
2	**BASIC INSPECTION (CAN DIAGNOSTIC IS NOT USED).** Check components which might affect CAN communication problem. <Ref. to LAN(w/o HEV)(diag)-7, INSPECTION WITHOUT USING CAN DIAGNOSTIC, INSPECTION, General Description.>	Is the component that might affect CAN communication problem normal?	Go to step **3**.	Repair or replace each component.
3	**CHECK COMMUNICATION FOR INITIALIZING.** Communicate with the all systems by connecting the Subaru Select Monitor.	Is the communication for initializing finished for all modules?	Go to step **4**.	Check the error of communication for initializing. <Ref. to LAN(w/o HEV)(diag)-11, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
4	**BASIC INSPECTION (CAN DIAGNOSTIC IS USED).** Check components which might affect CAN communication problem. <Ref. to LAN(w/o HEV)(diag)-7, INSPECTION USING CAN DIAGNOSTIC, INSPECTION, General Description.>	Is the component that might affect CAN communication problem normal?	Go to step **5**.	Repair or replace each component.

Step		Check	Yes	No
5	**CHECK DTC.** 1) Start the engine and read all DTCs. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).> NOTE: When the engine does not start, perform the diagnosis for the engine start malfunction. <Ref. to EN(H4DO w/o HEV)(diag)-75, Diagnostics for Engine Starting Failure.> 2) Record all DTCs, time stamp and freeze frame data. NOTE: For time stamp, refer to "TIME STAMP" of General Description. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Is DTC U**** displayed on Subaru Select Monitor?	Go to step **6**.	Go to step **7**.
6	**CHECK DTC.** 1) Perform the inspection using the DTC check sheet. <Ref. to LAN(w/o HEV)(diag)-96, CHECK USING THE DTC CHECK SHEET, LIST, List of Diagnostic Trouble Code (DTC).> 2) Using the Subaru Select Monitor, read all DTCs. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is DTC U**** displayed on Subaru Select Monitor?	Go to step **8**.	Go to step **7**.
7	**PERFORM GENERAL DIAGNOSTICS.** Inspect using the "General Diagnostic Table". <Ref. to LAN(w/o HEV)(diag)-130, General Diagnostic Table.>	Is result of inspection OK?	LAN system is normal.	Go to step **8**.
8	**PERFORM DIAGNOSIS.** 1) Correct the cause of trouble. 2) Perform the Clear Memory Mode. <Ref. to LAN(w/o HEV)(diag)-33, Clear Memory Mode.> 3) Read the DTC. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed on Subaru Select Monitor?	Repeat step 8 until DTC is not shown.	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Inspect the following item about the vehicle's state.

1. DISPLAY STATUS IN THE COMBINATION METER

Display status in the combination meter	Engine coolant temperature gauge display	❑ OK / ❑ NG
	Fuel gauge display	❑ OK / ❑ NG
	Tachometer display	❑ OK / ❑ NG (0 rpm at idling etc.)
Display of other indicators	Malfunction indicator light	❑ ON / ❑ Blink / ❑ OFF
	Sport indicator light (AT warning light)	❑ ON / ❑ Blink / ❑ OFF
	ABS warning light	❑ ON / ❑ Blink / ❑ OFF
	VDC warning light	❑ ON / ❑ Blink / ❑ OFF
	Immobilizer indicator light	❑ ON / ❑ Blink / ❑ OFF
	AT OIL TEMP warning light	❑ ON / ❑ Blink / ❑ OFF
	Tire pressure warning light	❑ ON / ❑ Blink / ❑ OFF
	Engine coolant temperature warning light	❑ Blue light ON / ❑ Red light ON / ❑ Red light blinks / ❑ Blue and red lights blink
	CRUISE indicator	❑ ON / ❑ Blink / ❑ OFF
	Shift indicator	❑ OK / ❑ NG
	Fuel level warning light	❑ ON / ❑ Blink / ❑ OFF
	Airbag warning light	❑ ON / ❑ OFF
	VDC OFF indicator	❑ ON / ❑ OFF
	Brake warning light	❑ ON / ❑ OFF
	Headlight beam leveler indicator	❑ ON / ❑ OFF

2. CONDITIONS UNDER WHICH TROUBLE OCCURS

Driving condition	❑ At standstill (While idling) ❑ When the vehicle is running Vehicle speed km/h (MPH) ❑ While accelerating Acceleration km/h (MPH) to km/h (MPH) ❑ Decelerating (With braking) Deceleration km/h (MPH) to km/h (MPH) ❑ Decelerating (Without braking) Deceleration km/h (MPH) to km/h (MPH)
	❑ Flat road ❑ Uphill ❑ Downhill ❑ Gravel road ❑ Bumpy road ❑ Snowy road
	Does it occur when operating any part? Operated part: **TROUBLE SYMPTOM:**
	Are there any other troubles occurred? From where: **TROUBLE SYMPTOM:**

3. General Description

A: CAUTION

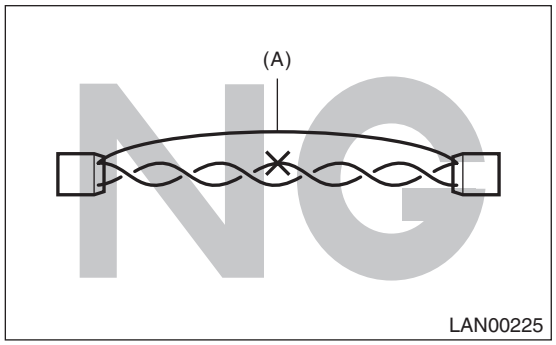
1. SUPPLEMENTAL RESTRAINT SYSTEM "AIRBAG"

Airbag system wiring harness is routed near the body integrated unit and twisted pair line.

CAUTION:
- **Do not use the electrical test equipment on all airbag system wiring harnesses and connectors.**
- **Be careful not to damage the airbag system wiring harness when servicing the body integrated unit and LAN system.**

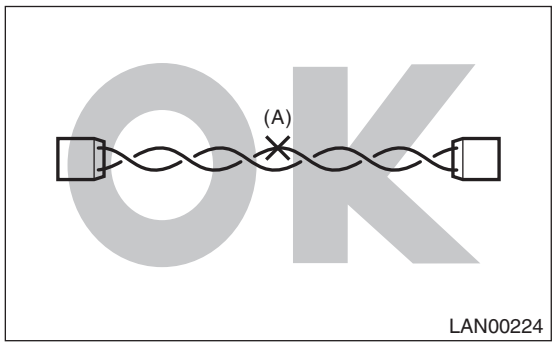
2. LAN SYSTEM

- Bus line of LAN system is twisted pair line. Be careful not to by-pass or partly unbind the twisted pair line.
- Do not make clearance between bus lines (CAN High, CAN Low).
- Difference of bus line length should be within 10 cm (3.94 in).
- Fray near the connector should be within 8 cm (3.14 in).



(A) Bypass wire connection

- If the characteristics of the twisted pair line are changed, it may extremely weaken against noise.
- When repairing the harness, connect the wires using soldering and protect it with insulating tape etc.



(A) Soldering and protection with insulating tape

3. TIME STAMP

There are three types of record data for the information of time stamp, and they are stored together with diagnostic codes.

NOTE:
Depending on DTCs, time stamp may not be stored.

a. **«Trip Count»**

This indicates the number of times that the ignition has been turned to ON since the vehicle was manufactured. The ignition ON count of when the diagnostic code is stored is displayed on the diagnostic code check screen.

NOTE:
Subaru Select Monitor 4 screen (A/C system diagnostic code and time stamp)

Code	Description & trouble position	Trouble occurrence record	**«Trip Count»**	«Time Count»	«Category»
B14E1	Air mix door actuator stepping motor circuit wire break (driver's seat)	Detected on the first time	**983**	18000	Common
B14E7	Heater core rear sensor circuit wire break	Detected on the 2nd time	**984**	117800	Common

The current Trip Count can be checked at "Current Data Display & Save" in "Integ. unit mode".
By comparing the current Trip Count and the Trip Count of when the diagnostic code was stored, it is possible to determine that it is how many ignition-ON operations ago that DTC was stored.

b. **«Time Count»**

The elapsed time from when the ignition is turned to ON to when the diagnostic code is stored is displayed on the diagnostic code check screen. It is possible to determine the length of time that passed between when the user started driving and when the diagnostic code was stored. Therefore, if Trip Count until the vehicle-received-date is determined by interviewing the user, it is possible to estimate where the user was driving when the diagnostic code was stored, using the information such as Trip Count and Time Count. This estimate is useful information to perform diagnosis including checking of repeatability.

NOTE:
Subaru Select Monitor 4 screen (A/C system diagnostic code and time stamp)

Code	Description & trouble position	Trouble occurrence record	«Trip Count»	**«Time Count»**	«Category»
B14E1	Air mix door actuator stepping motor circuit wire break (driver's seat)	Detected on the first time	983	**18000**	Common
B14E7	Heater core rear sensor circuit wire break	Detected on the 2nd time	984	**117800**	Common

When multiple diagnostic codes are recorded for one trouble, it is extremely important to determine the diagnostic code that was stored first. (It is important to perform the diagnosis for the first recorded diagnostic code.) In this case, it is also possible to immediately determine which diagnostic code was recorded first, using the information such as Trip Count and Time Count.

c. **«Category»**
Each unit individually counts the elapsed time since the ignition is turned to ON. However, these time counts may have some errors, and therefore, the control modules need to be adjusted to the time carried by the master-time unit (the body integrated unit). When the count is set as common, it means that each control module is already adjusted to the master time, and the display for the master integrated unit is always indicated as “Common”. When the count is indicated as “Originally”, it means that the time is not synchronized with the master time. In this case, check the communication between the corresponding control module and integrated unit. When all controls other than the body integrated unit is indicated as “Originally”, perform the basic inspection for the body integrated unit. <Ref. to BC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

NOTE:
Subaru Select Monitor 4 screen (A/C system diagnostic code and time stamp)

Code	Description & trouble position	Trouble occurrence record	«Trip Count»	«Time Count»	**«Category»**
B14E1	Air mix door actuator stepping motor circuit wire break (driver’s seat)	Detected on the first time	983	18000	**Common**
B14E7	Heater core rear sensor circuit wire break	Detected on the 2nd time	984	117800	**Common**

Even when multiple diagnostic codes are stored in multiple control modules, it is possible to determine the code stored first through the categorizing feature.

NOTE:
Troubleshooting for CAN system U-code occurrence
When the first stored diagnostic code is a U-code for CAN system, perform the troubleshooting as a U code combination, instead of a U code alone. In addition, when CAN open circuit occurs, communication of the diagnostic device itself becomes impossible beyond the particular areas. However, trouble positions can also be determined by the combination of initial communication success/failure. Thus, by performing the basic diagnostic procedure in LAN system, trouble positions can be determined efficiently on the principle above. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: INSPECTION

1. INSPECTION WITHOUT USING CAN DIAGNOSTIC

Before performing diagnosis, check the following items that might affect troubles of each module.
1) Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>
2) Check the fuse condition.
Make sure that ampere of the fuse is setting value, and it is not blown out.
3) Check the connecting condition of harness and harness connector.

2. INSPECTION USING CAN DIAGNOSTIC

Before performing diagnostics, check the following item which might affect body integrated unit malfunctions.
1) Confirm settings of body integrated unit are corresponded to vehicle equipment. <Ref. to BC(diag)-20, OPERATION, Registration Body Integrated Unit.>
2) Make sure that the User Customizing of the body integrated unit matches the vehicle equipment. <Ref. to BC(diag)-17, OPERATION, User Customizing.>
3) Confirm “Factory initial setting” of body integrated unit registrations is set to “Market”.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

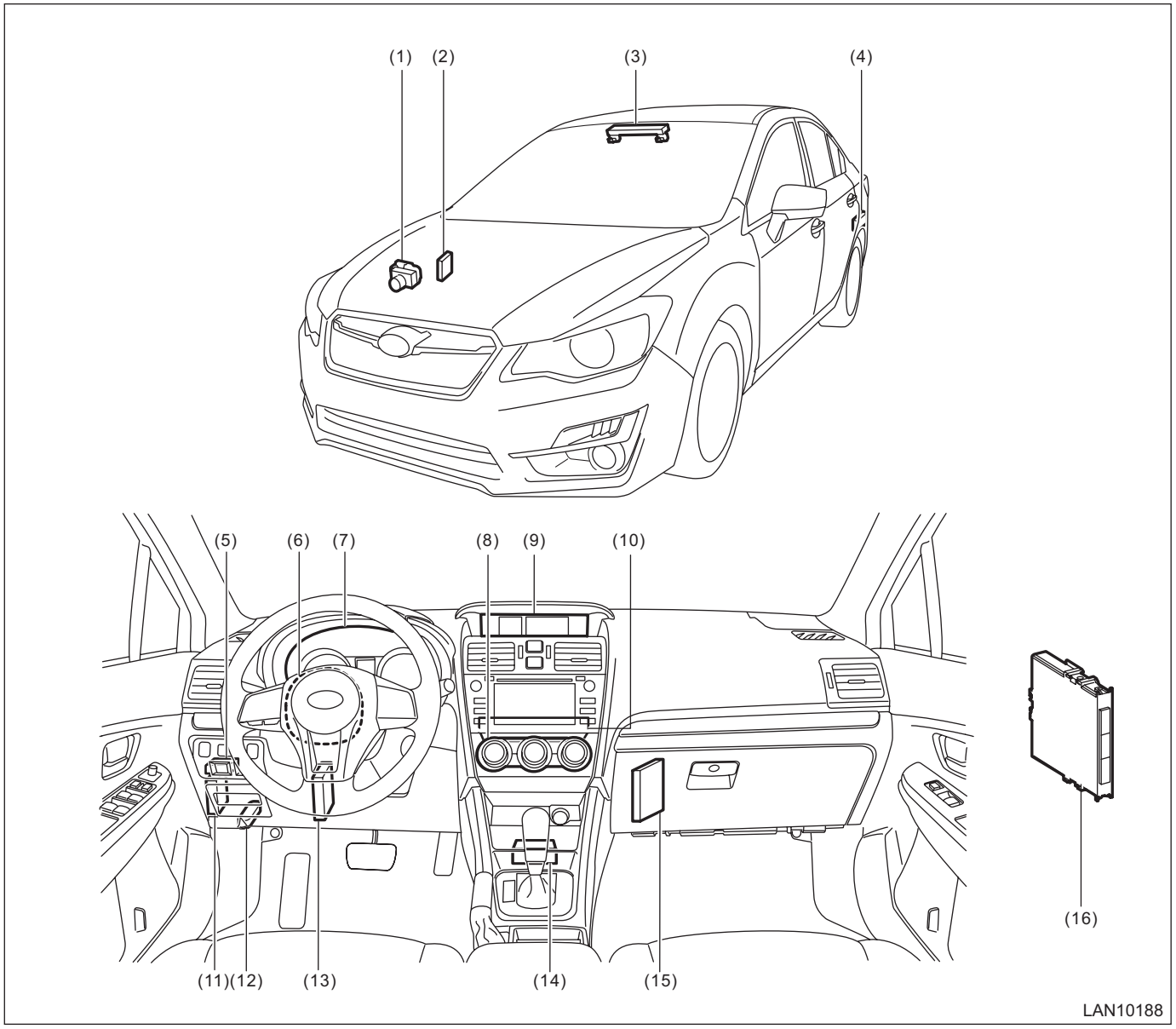
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

3. PREPARATION ITEMS

ITEM NAME	REMARKS
120 Ω resistance element (1/4 W or more)	Used as an alternative to end resistance.

4. Electrical Component Location

A: LOCATION



(1) VDC CM
(2) Power steering CM
(3) Stereo camera
(4) Radar sensor LH
(5) Auto headlight beam leveler CM
(6) Steering angle sensor
(7) Combination meter
(8) A/C control panel
(9) MFD
(10) Data communication module (DCM)
(11) Body integrated unit
(12) Data link connector
(13) Transmission CM
(14) Airbag CM
(15) Engine CM
(16) Keyless access CM

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

- Body integrated unit

For I/O signals of the body integrated unit, refer to BODY CONTROL SYSTEM (DIAGNOSTICS). <Ref. to BC(diag)-6, Control Module I/O Signal.>

- Engine CM

For I/O signals of ECM, refer to ENGINE (DIAGNOSTICS). <Ref. to EN(H4DO w/o HEV)(diag)-20, Engine Control Module (ECM) I/O Signal.>

- Transmission CM

For I/O signals of TCM, refer to AUTOMATIC TRANSMISSION (DIAGNOSTICS). <Ref. to CVT(w/o HEV)(diag)-11, Transmission Control Module (TCM) I/O Signal.>

- VDC CM, steering angle sensor

For I/O signals of VDC CM and steering angle sensor, refer to VEHICLE DYNAMICS CONTROL (VDC) (DIAGNOSTICS). <Ref. to VDC(diag)-12, Control Module I/O Signal.>

- Power steering CM

For unit I/O signals of power steering CM, refer to POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS). <Ref. to PS(diag)-10, Control Module I/O Signal.>

- A/C control panel

For unit I/O signals of A/C control panel, refer to HVAC SYSTEM (DIAGNOSTICS). <Ref. to AC(diag)-6, Auto A/C Control Module I/O Signal.>

- Combination meter

For I/O signals of combination meter, refer to INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS). <Ref. to IDI(diag)-7, Control Module I/O Signal.>

- Airbag CM

For I/O signals of the airbag CM, refer to AIRBAG SYSTEM (DIAGNOSTICS). <Ref. to AB(diag)-21, Airbag Control Module I/O Signal.>

- High grade MFD

For I/O signals of high grade MFD, refer to INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS). <Ref. to IDI(diag)-7, Control Module I/O Signal.>

- Auto headlight beam leveler CM

For I/O signals of auto headlight beam leveler CM, refer to INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS). <Ref. to AL(diag)-6, Control Module I/O Signal.>

- Keyless access CM

For I/O signals of keyless access CM, refer to KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS). <Ref. to KPS(diag)-15, Control Module I/O Signal.>

- Stereo camera

For I/O signals of stereo camera, refer to EyeSight (Diagnostics). <Ref. to ES(diag)-17, Control Module I/O Signal.>

- Radar sensor

For I/O signals of the radar sensor, refer to BSD/RCTA (DIAGNOSTICS). <Ref. to RVD(diag)-8, Control Module I/O Signal.>

- Data communication module

For I/O signals of data communication module, refer to TELEMATICS (DIAGNOSTICS). <Ref. to TEL(diag)-8, Control Module I/O Signal.>

- Data link connector

For I/O signals of data link connector, refer to ENGINE (DIAGNOSTICS). <Ref. to EN(H4DO w/o HEV)(diag)-31, Data Link Connector.>

* CAN sleep state:

Hold on for approx. one minute with ignition OFF and the doors, trunk, rear gate all closed.

B: WIRING DIAGRAM

Refer to “CAN Communication System” in the wiring diagram. <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

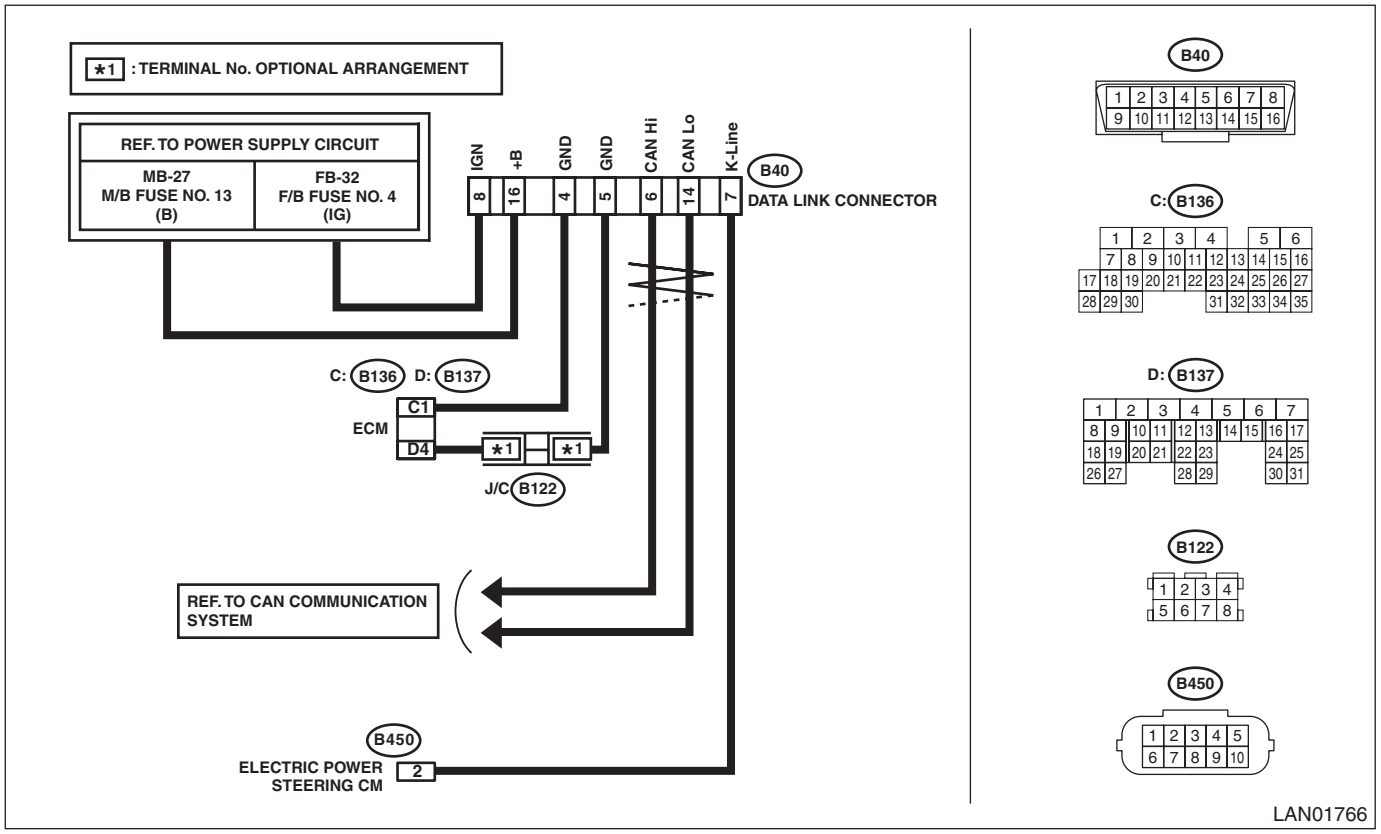
6. Subaru Select Monitor

A: OPERATION

For detailed operation procedures, refer to “Application help”.

B: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Subaru Select Monitor communication line is open or shorted.
TROUBLE SYMPTOM:
Not communicable with Subaru Select Monitor.
WIRING DIAGRAM:
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

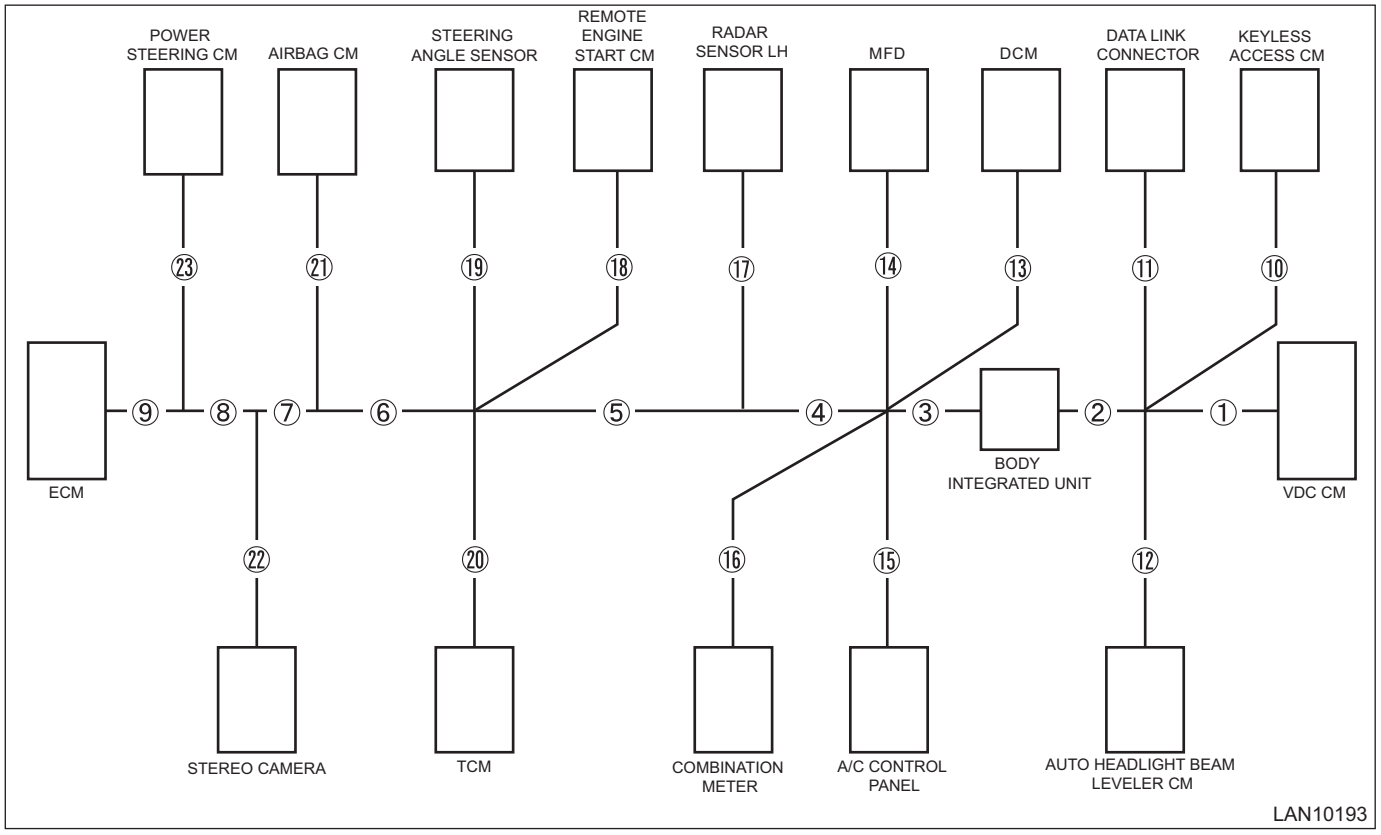


Step		Check	Yes	No
1	**CHECK SUBARU SELECT MONITOR.** 1) Connect the Subaru Select Monitor to another vehicle. 2) Check communication condition between Subaru Select Monitor and vehicle.	Is communication performed normally?	Go to step **2**.	Subaru Select Monitor unit or diagnosis cable is faulty. Or check the fuse on the vehicle side.

	Step	Check	Yes	No
2	**CHECK COMMUNICATION FOR INITIALIZING ERROR.** Perform the communication for initializing with each module by connecting the Subaru Select Monitor. (For systems whose module can communicate with diagnostic devices)	Is the communication possible with all modules?	Go to step **3**.	Perform the inspection using the check sheet of communication for initializing. <Ref. to LAN(w/o HEV)(diag)-13, CHECK USING THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
3	**CHECK K-LINE.** 1) Establish the communication between Select Monitor and K-Line communication module. 2) Using a tester, check continuity between the modules that did not communicate with Select Monitor. ***Connector & terminal*** ***(B40) No. 7 — (B450) No. 2 (electric power steering):***	Is there continuity?	Go to step **4**.	Repair or replace the open circuit.
4	**CHECK K-LINE.** Using a tester, check continuity between K-line and chassis ground. ***Connector & terminal*** ***(B40) No. 7 — Chassis ground:***	Is there continuity?	Repair or replace the short circuit portion.	Go to step **5**.
5	**CHECK K-LINE.** Using a tester, check voltage between K-line and chassis ground. ***Connector & terminal*** ***(B40) No. 7 (+) — Chassis ground (–):***	Is the voltage 5 V or more with IG ON?	Repair or replace the short circuit portion.	Go to step **6**.
6	**CHECK K-LINE.** Use a tester to check for continuity in the ground circuit. ***Connector & terminal*** ***(B40) No. 4 — Chassis ground:*** ***(B40) No. 5 — Chassis ground:***	Is there continuity?	Go to step **8**.	Go to step **7**.
7	**CHECK K-LINE.** 1) Disconnect the ECM connector. 2) Use a tester to check for continuity in the ground circuit. ***Connector & terminal*** ***(B40) No. 4 — (B136) No. 1:*** ***(B40) No. 5 — (B137) No. 4:***	Is there continuity?	Check ECM ground.	Repair or replace the open circuit.
8	**CHECK K-LINE.** 1) Turn the ignition switch to ON. 2) Using a tester, check the power supply of data link connector. ***Connector & terminal*** ***(B40) No. 8 (+) — Chassis ground (–):*** ***(B40) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	K-Line is normal. Check the power supply circuit of each module.	Check the power supply circuits to the data link connector.

1. CHECK USING THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING

- **Network diagram**



- **Check sheet of communication for initializing**

	(A)	(B)		(E)																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)																							
VDC		-			-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
KPS		-		-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-
AHL		-		-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-
BIU		-		-		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
DCM		-		-			-	-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-
MFD		-		-			-	-	-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-
A/C		-		-			-	-	-	-	-	-	-		-	-	-		-	-	-	-	-	-	-	-
MET		-		-			-	-	-	-	-	-	-		-	-	-	-		-	-	-	-	-	-	-
RDR		-		-				-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-	-
RST		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM		-		-					-	-	-	-	-		-	-	-	-	-	-	-	-		-	-	-
A/B		-		-						-	-	-	-		-	-	-	-	-	-	-	-	-		-	-
EYE		-		-							-	-	-		-	-	-	-	-	-	-	-	-	-		-
EPS			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM		-		-									-		-	-	-	-	-	-	-	-	-	-	-	-

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(A) Installation check
(B) Communication initialization
(C) K-Line
(D) CAN
(E) Wiring location

VDC: VDC CM
KPS: Keyless access CM
AHL: Auto headlight beam leveler CM
BIU: Body integrated unit
MFD: High grade MFD
A/C: A/C control panel
MET: Combination meter
DCM: Data communication module

RST: Remote engine starter CM
STA: Steering angle sensor
TCM: Transmission CM
A/B: Airbag CM
EPS: Power steering CM
EYE: Stereo camera
ECM: Engine CM
RDR: Radar sensor

1) Module installation check
(1) Write "-" marks in the field for installation check if the vehicle to be inspected does not have relevant module.
(2) Write "-" marks in all blank fields on the same row that the "-" mark has filled in.

NOTE:
Example of writing <Ref. to LAN(w/o HEV)(diag)-16, EXAMPLE OF WRITING FOR THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>

2) Subaru Select Monitor communication initialization check
(1) Write "○" marks in the field for communication initialization if the module succeeded in the communication for initializing with Select Monitor.
If the communication with all modules is not possible, go to 3).
(2) Write "○" marks in all blank fields on the same row that the "○" mark has filled in.
(3) When at least one field in a column of wiring location is filled with the "○" mark, then the wiring for that location is normal. Write "○" marks in all blank fields on the same column that the "○" mark has filled in under the circled number.
(4) Check the open circuit of the modules which have no "○" mark in their columns of the wiring location in ascending order. (only for installed modules)
(5) If the communication is not possible after checking all harnesses, check the module power supply line.
(6) Replace the module if the power supply line is normal.

NOTE:
• Example of writing <Ref. to LAN(w/o HEV)(diag)-16, EXAMPLE OF WRITING FOR THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
• Inspection using the communication for initializing of Subaru Select Monitor cannot be used to diagnose the wiring location marked with "-". Example of DTC data not received <Ref. to LAN(w/o HEV)(diag)-97, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).> should be used to identify the faulty portion.

3) Subaru Select Monitor communication initialization check (impossible to communicate with all modules)

NOTE:
If at least one module becomes possible to communicate, return to 2).
(1) Check for the short circuit to ground. <Ref. to LAN(w/o HEV)(diag)-40, GROUND SHORT INSPECTION, INSPECTION, CAN Communication Circuit Check.> If it is normal, go to the next.
(2) Check for the short circuit to battery. <Ref. to LAN(w/o HEV)(diag)-43, BATTERY SHORT INSPECTION, INSPECTION, CAN Communication Circuit Check.> If it is normal, go to the next.
(3) Perform the inspection for the resistance of 52 Ω or less (short between wires). <Ref. to LAN(w/o HEV)(diag)-49, 52 Ω OR LESS, INSPECTION, CAN Communication Circuit Check.> If it is normal, go to the next.
(4) Check for the open circuit of network diagram No. 10 (data link connector).

2. EXAMPLE OF WRITING FOR THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING

When ① is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	-
VDC	○	-	×		-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

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When ② is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○									○	○	○						-	-				-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	×	-		-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	×	-			-	-	-	-	-	-	-	○	-		-	-	-	-	-	-	-	-	-	-
MFD	○	-	×	-			-	-	-	-	-	-	-	○	-	-		-	-	-	-	-	-	-	-	-
A/C	○	-	×	-			-	-	-	-	-	-	-	○	-	-	-		-	-	-	-	-	-	-	-
MET	○	-	×	-			-	-	-	-	-	-	-	○	-	-	-	-		-	-	-	-	-	-	-
RDR	○	-	×	-				-	-	-	-	-	-	○	-	-	-	-	-		-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	×	-					-	-	-	-	-	○	-	-	-	-	-	-	-	-		-	-	-
A/B	○	-	×	-						-	-	-	-	○	-	-	-	-	-	-	-	-	-		-	-
EYE	○	-	×	-							-	-	-	○	-	-	-	-	-	-	-	-	-	-		-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-									-	○	-	-	-	-	-	-	-	-	-	-	-	-

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When ③ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○								○	○	○						-	-				-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	×	-	○		-	-	-	-	-	-	-	○	-		-	-	-	-	-	-	-	-	-	-
MFD	○	-	×	-	○		-	-	-	-	-	-	-	○	-	-		-	-	-	-	-	-	-	-	-
A/C	○	-	×	-	○		-	-	-	-	-	-	-	○	-	-	-		-	-	-	-	-	-	-	-
MET	○	-	×	-	○		-	-	-	-	-	-	-	○	-	-	-	-		-	-	-	-	-	-	-
RDR	○	-	×	-	○			-	-	-	-	-	-	○	-	-	-	-	-		-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	×	-	○				-	-	-	-	-	○	-	-	-	-	-	-	-	-		-	-	-
A/B	○	-	×	-	○					-	-	-	-	○	-	-	-	-	-	-	-	-			-	-
EYE	○	-	×	-	○						-	-	-	○	-	-	-	-	-	-	-	-	-			-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-	○								-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10197

When ④ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○							○	○	○	○	○	○	○		-	-				-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	×	-	○	○		-	-	-	-	-	-	○	-	-	-	-	-		-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	×	-	○	○			-	-	-	-	-	○	-	-	-	-	-	-	-	-		-	-	-
A/B	○	-	×	-	○	○				-	-	-	-	○	-	-	-	-	-	-	-	-	-		-	-
EYE	○	-	×	-	○	○					-	-	-	○	-	-	-	-	-	-	-	-	-	-		-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-	○	○							-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10198

When ⑤ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○						○	○	○	○	○	○	○	○	-	-				-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	×	-	○	○	○		-	-	-	-	-	○	-	-	-	-	-	-	-	-		-	-	-
A/B	○	-	×	-	○	○	○			-	-	-	-	○	-	-	-	-	-	-	-	-			-	-
EYE	○	-	×	-	○	○	○				-	-	-	○	-	-	-	-	-	-	-	-	-			-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-	○	○	○						-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10199

When ⑥ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○					○	○	○	○	○	○	○	○	-	-	○			-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	×	-	○	○	○	○		-	-	-	-	○	-	-	-	-	-	-	-	-	-		-	-
EYE	○	-	×	-	○	○	○	○			-	-	-	○	-	-	-	-	-	-	-	-	-	-		-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-	○	○	○	○					-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10200

When ⑦ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○				○	○	○	○	○	○	○	○	-	-	○	○		-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	×	-	○	○	○	○	○		-	-	-	○	-	-	-	-	-	-	-	-	-	-		-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-	○	○	○	○	○				-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10201

When ⑧ is open

NOTE:
It is the same as in the case of open circuit at No. 9. However, determination is possible through the difference in the data no-receive detection condition of each module. <Ref. to LAN(w/o HEV)(diag)-97, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).>

	(A)	(B)		(E)																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-	○	○	○	○	○	○			-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10202

When ⑨ is open

NOTE:
It is the same as in the case of open circuit at No. 8. However, determination is possible through the difference in the data no-receive detection condition of each module. <Ref. to LAN(w/o HEV)(diag)-97, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).>

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○		○	○	○	○	○	○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-	○	○	○	○	○	○	○		-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10203

When ⑩ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○		○	○	○	○	○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	×	-	-	-	-	-	-	-	-	-		○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10204

When ⑪ is open

NOTE:
Perform inspection by referring to 3) communication initialization check (impossible to communicate with all modules). (There may be a malfunction other than open circuit at No. 11)

	(A)	(B)		(E)																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)																		-	-				-
VDC	○	-	×		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	×	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	×	-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	×	-		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	×	-			-	-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-
MFD	○	-	×	-			-	-	-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-
A/C	○	-	×	-			-	-	-	-	-	-	-		-	-	-		-	-	-	-	-	-	-	-
MET	○	-	×	-			-	-	-	-	-	-	-		-	-	-	-		-	-	-	-	-	-	-
RDR	○	-	×	-				-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	×	-					-	-	-	-	-		-	-	-	-	-	-	-	-		-	-	-
A/B	○	-	×	-						-	-	-	-		-	-	-	-	-	-	-	-	-		-	-
EYE	○	-	×	-							-	-	-		-	-	-	-	-	-	-	-	-	-		-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	×	-									-		-	-	-	-	-	-	-	-	-	-	-	-

LAN10205

When ⑫ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○		○	○	○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	×	-	-	-	-	-	-	-	-	-	-	○		-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10206

When ⑬ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○		○	○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	×	-	○	○	-	-	-	-	-	-	-	○	-		-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10207

When ⑭ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○		○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	×	-	○	○	-	-	-	-	-	-	-	○	-	-		-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10208

When ⑮ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	×	-	○	○	-	-	-	-	-	-	-	○	-	-	-		-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10209

When ⑯ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	×	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-		-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10210

When ⑰ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	×	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-		-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10211

When ⑱ is open

NOTE:
It is the same as in the case of open circuit at No. 19 and/or No. 23. However, determination is possible through the difference in the data no-receive detection condition of each module. <Ref. to LAN(w/o HEV)(diag)-97, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).>

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10212

When ⑲ is open

NOTE:
It is the same as in the case of open circuit at No. 18 and/or No. 23. However, determination is possible through the difference in the data no-receive detection condition of each module. <Ref. to LAN(w/o HEV)(diag)-97, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).>

	(A)	(B)		(E)																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10212

When ⑳ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-		○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	×	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-		-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10213

When ㉑ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○		○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	×	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-		-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10214

When ㉒ is open

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○		-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	×	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-		-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10215

When ㉓ is open

NOTE:
It is the same as in the case of open circuit at No. 18 and/or No. 19. However, determination is possible through the difference in the data no-receive detection condition of each module. <Ref. to LAN(w/o HEV)(diag)-97, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).>

	(A)	(B)		(E)																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		(C)	(D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	-
VDC	○	-	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	-	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-
BIU	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-
MFD	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-
A/C	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-
MET	○	-	○	-	○	○	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-
RDR	○	-	○	-	○	○	○	-	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	-	○	-	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	○	-	-	-
A/B	○	-	○	-	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-
EYE	○	-	○	-	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-
EPS	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	-	○	-	○	○	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-

LAN10212

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «All diagnosis code».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC). <Ref. to LAN(w/o HEV)(diag)-94, List of Diagnostic Trouble Code (DTC).>

8. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «All diagnosis code».
On «All diagnosis code» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

9. CAN Communication Circuit Check

A: PROCEDURE

NOTE:
- When measuring the resistance of CAN communication circuit, measure it in sleep status.

To enter sleep status
  – With ignition switch OFF and key or switch operation stopped, keep the doors, trunk, and rear gate all closed for one minute or more.
  – On models with keyless access function, keep the access key 2 m or more away from the vehicle.

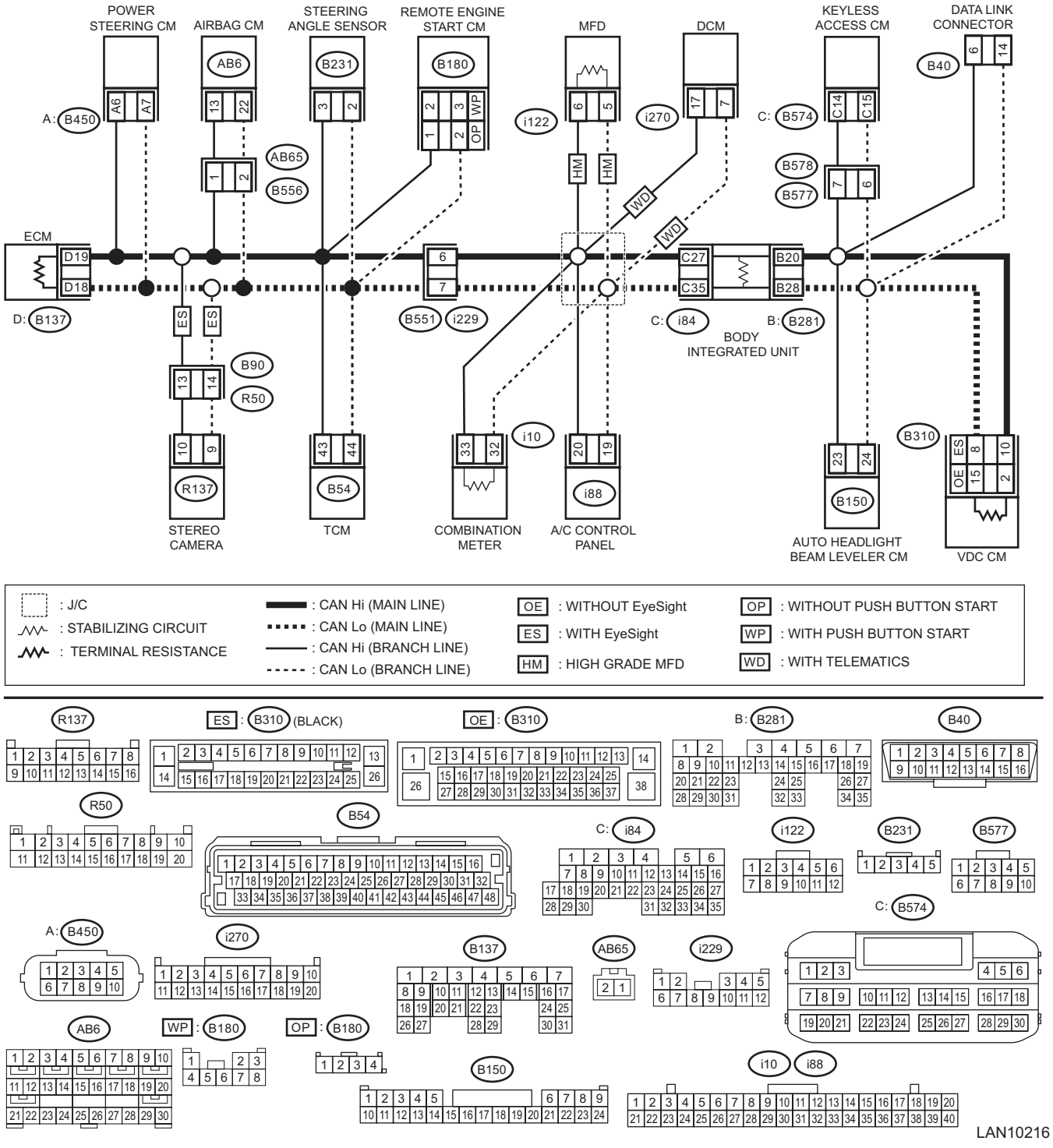
- When the bus line is measured, combined resistance of the end resistance (120 Ω) in ECM and the end resistance (120 Ω) in VDC CM can be measured. The combined resistance is supposed to be approximately 53 — 61 Ω with the stabilizing circuit included. If the measured resistance value becomes 52 Ω or less, main wiring harness or related lines may be shorted. Or, the combined resistance may have changed because of a resistance other than the end resistance created on the circuit. If the measured value is 62 Ω or more, there may be a malfunction such as open circuit in one of the end resistances, in the stabilizing circuit, or in the main wiring harness.

Also, even when the resistance value falls within approx. 53 — 61 Ω, related lines may be open if an error of communication for initializing or a CAN system U-code has occurred. (The resistance cannot be between approx. 53 — 61 Ω if the main wiring harness is open.)

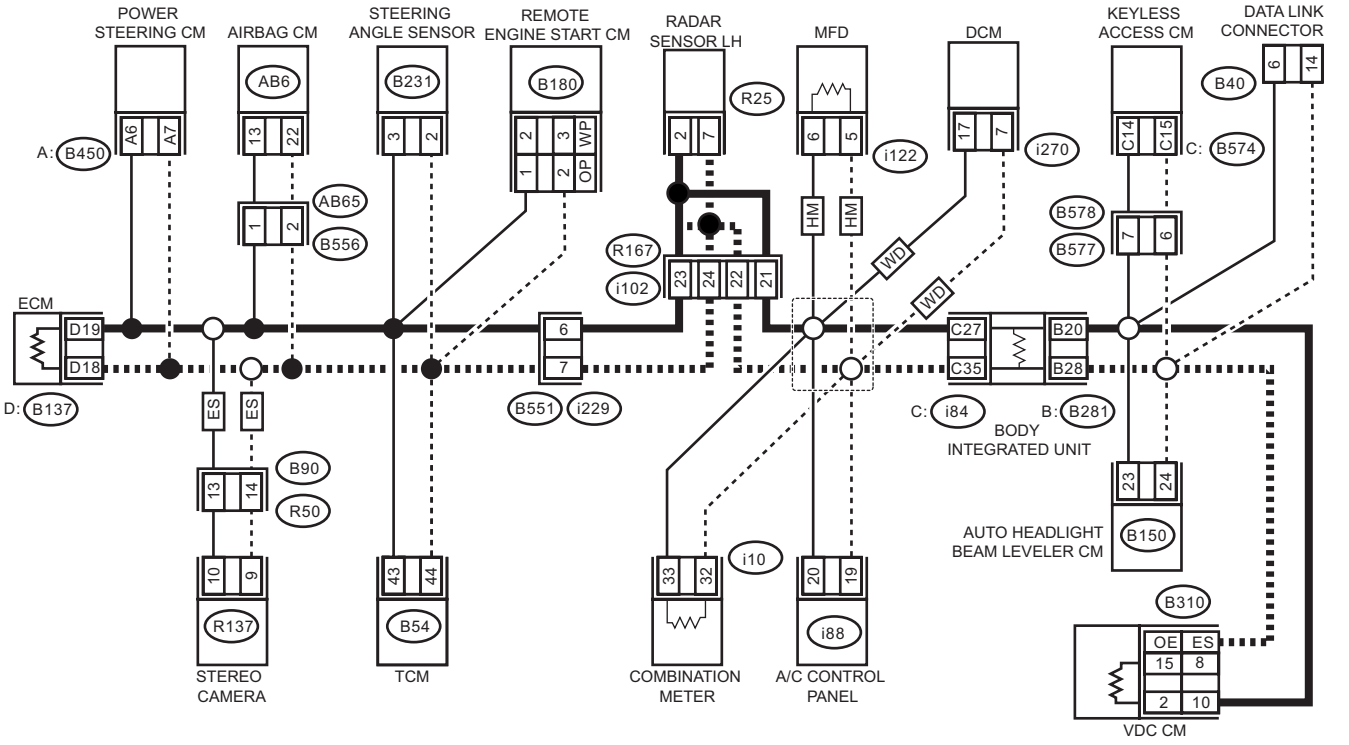
WIRING DIAGRAM:

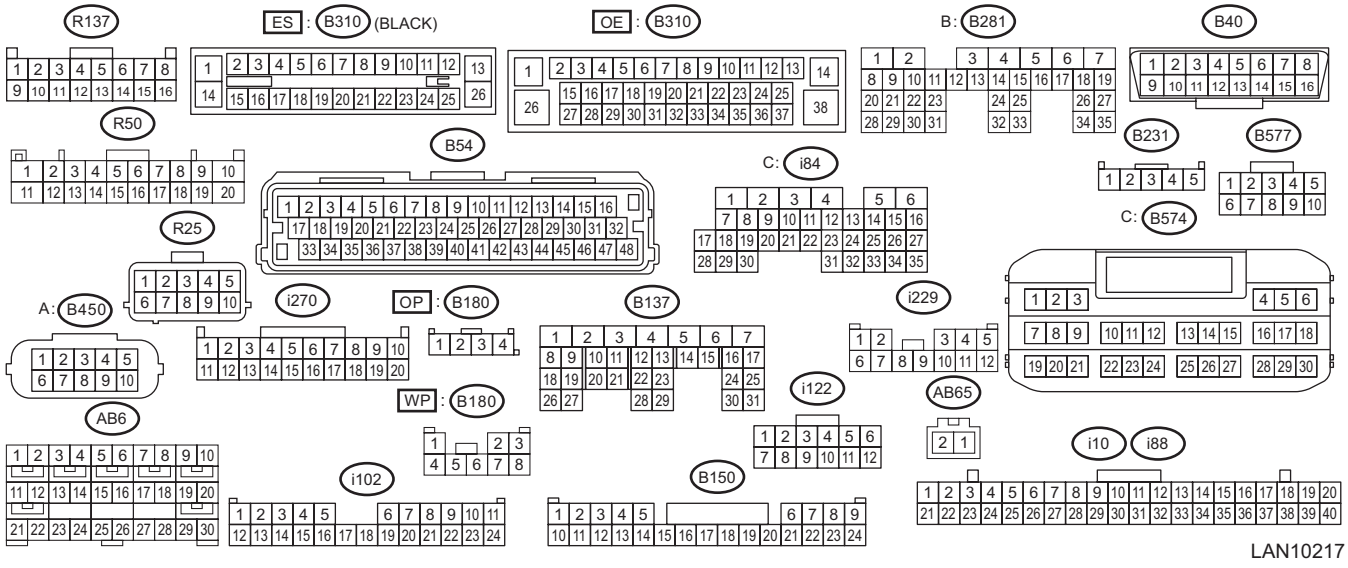
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA



- With BSD/RCTA





	Step	Check	Yes	No
1	**CHECK BASIC DIAGNOSTIC PROCEDURE.** Check that the basic diagnosis has been performed up to STEP 3. NOTE: Possible defective parts can be narrowed easily by inspection using Subaru Select Monitor before performing "CHECK CAN COMMUNICATION CIRCUIT" using a tester.	Was the basic diagnostic procedure performed?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
2	**CHECK FROM DATA LINK CONNECTOR.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the resistance 10 Ω or less?	Check for ground short. <Ref. to LAN(w/o HEV)(diag)-40, GROUND SHORT INSPECTION, INSPECTION, CAN Communication Circuit Check.>	Go to step **3**.
3	**CHECK FROM DATA LINK CONNECTOR.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the voltage 5 V or less?	Go to step **4**.	Check for battery short. <Ref. to LAN(w/o HEV)(diag)-43, BATTERY SHORT INSPECTION, INSPECTION, CAN Communication Circuit Check.>
4	**CHECK FROM DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — No. 14:***	Is the resistance 52 Ω or less?	Perform the inspection for resistance of 52 Ω or less. <Ref. to LAN(w/o HEV)(diag)-49, 52 Ω OR LESS, INSPECTION, CAN Communication Circuit Check.>	Go to step **5**.
5	**CHECK FROM DATA LINK CONNECTOR.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — No. 14:***	Is the resistance 62 Ω or more?	Perform the inspection for resistance of 62 Ω or more. <Ref. to LAN(w/o HEV)(diag)-53, 62 Ω OR MORE, INSPECTION, CAN Communication Circuit Check.>	If the display of CAN system U-code disappears from the current malfunction, the CAN network is currently normal. If the U-code has detected as current malfunction, related lines may be open. Perform the inspection for the related line corresponding to the detected DTC. <Ref. to LAN(w/o HEV)(diag)-38, LIST, CAN Communication Circuit Check.>

B: LIST

Resistance value between CAN Hi and Lo	Contents of inspection	Remarks
Ground short inspection	<Ref. to LAN(w/o HEV)(diag)-40, GROUND SHORT INSPECTION, INSPECTION, CAN Communication Circuit Check.>	Shorted to ground in the communication circuit or control module.
Battery short inspection	<Ref. to LAN(w/o HEV)(diag)-43, BATTERY SHORT INSPECTION, INSPECTION, CAN Communication Circuit Check.>	Shorted to battery power supply in the communication circuit or control module.
53 — 61 Ω	<Ref. to LAN(w/o HEV)(diag)-46, 53 — 61 Ω, INSPECTION, CAN Communication Circuit Check.>	Combined resistance of end resistance does not have malfunction; short to ground or +B short of the CAN communication circuit is possible, however.
52 Ω or less	<Ref. to LAN(w/o HEV)(diag)-49, 52 Ω OR LESS, INSPECTION, CAN Communication Circuit Check.>	Resistance is lower than combined resistance of end resistance. Short to CAN Hi and CAN Lo on the CAN communication circuit is possible.
62 Ω or more	<Ref. to LAN(w/o HEV)(diag)-53, 62 Ω OR MORE, INSPECTION, CAN Communication Circuit Check.>	Resistance is higher than combined resistance of end resistance. Open circuit of CAN communication circuit is possible.
Related lines 53 — 61 Ω (TCM)	<Ref. to LAN(w/o HEV)(diag)-56, RELATED LINES 53 — 61 Ω (TCM), INSPECTION, CAN Communication Circuit Check.>	No TCM data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (steering angle sensor)	<Ref. to LAN(w/o HEV)(diag)-59, RELATED LINES 53 — 61 Ω (STEERING ANGLE SENSOR), INSPECTION, CAN Communication Circuit Check.>	No steering angle sensor data is received. Perform inspection when faulty is detected.
Related line 53 — 61 Ω (A/C control panel)	<Ref. to LAN(w/o HEV)(diag)-62, RELATED LINE 53 — 61 Ω (A/C CONTROL PANEL), INSPECTION, CAN Communication Circuit Check.>	No A/C data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (power steering)	<Ref. to LAN(w/o HEV)(diag)-65, RELATED LINES 53 — 61 Ω (POWER STEERING), INSPECTION, CAN Communication Circuit Check.>	No power steering data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (combination meter)	<Ref. to LAN(w/o HEV)(diag)-68, RELATED LINES 53 — 61 Ω (COMBINATION METER), INSPECTION, CAN Communication Circuit Check.>	No meter data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (MFD)	<Ref. to LAN(w/o HEV)(diag)-71, RELATED LINES 53 — 61 Ω (MFD), INSPECTION, CAN Communication Circuit Check.>	No MFD data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (airbags)	<Ref. to LAN(w/o HEV)(diag)-74, RELATED LINES 53 — 61 Ω (AIRBAG CM SYSTEM), INSPECTION, CAN Communication Circuit Check.>	No airbag data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (headlight beam leveler)	<Ref. to LAN(w/o HEV)(diag)-83, RELATED LINES 53 — 61 Ω (HEADLIGHT BEAM LEVELER), INSPECTION, CAN Communication Circuit Check.>	No headlight beam leveler data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (remote engine starter)	<Ref. to LAN(w/o HEV)(diag)-86, RELATED LINES 53 — 61 Ω (REMOTE ENGINE STARTER), INSPECTION, CAN Communication Circuit Check.>	Perform inspection when the remote engine starter does not operate, while the mobile key side operates normally.

Resistance value between CAN Hi and Lo	Contents of inspection	Remarks
Related lines 53 — 61 Ω (keyless access system)	<Ref. to LAN(w/o HEV)(diag)-77, RELATED LINES 53 — 61 Ω (KEYLESS ACCESS SYSTEM), INSPECTION, CAN Communication Circuit Check.>	No keyless access CM data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (stereo camera)	<Ref. to LAN(w/o HEV)(diag)-80, RELATED LINES 53 — 61 Ω (STEREO CAMERA), INSPECTION, CAN Communication Circuit Check.>	No stereo camera data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (telematics)	<Ref. to LAN(w/o HEV)(diag)-89, RELATED LINES 53 — 61 Ω (TELEMATICS), INSPECTION, CAN Communication Circuit Check.>	No telematics data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (radar sensor)	<Ref. to LAN(w/o HEV)(diag)-92, RELATED LINES 53 — 61 Ω (RADAR SENSOR), INSPECTION, CAN Communication Circuit Check.>	No radar sensor data is received. Perform inspection when faulty is detected.

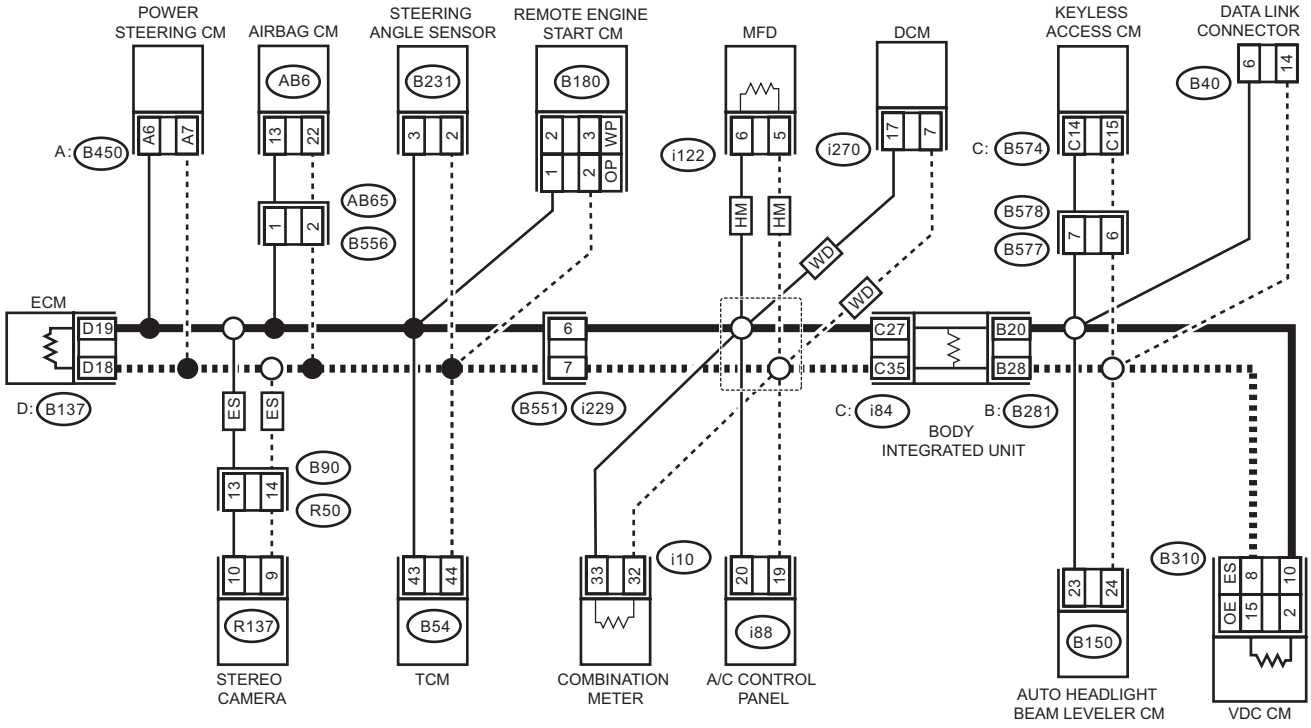
C: INSPECTION

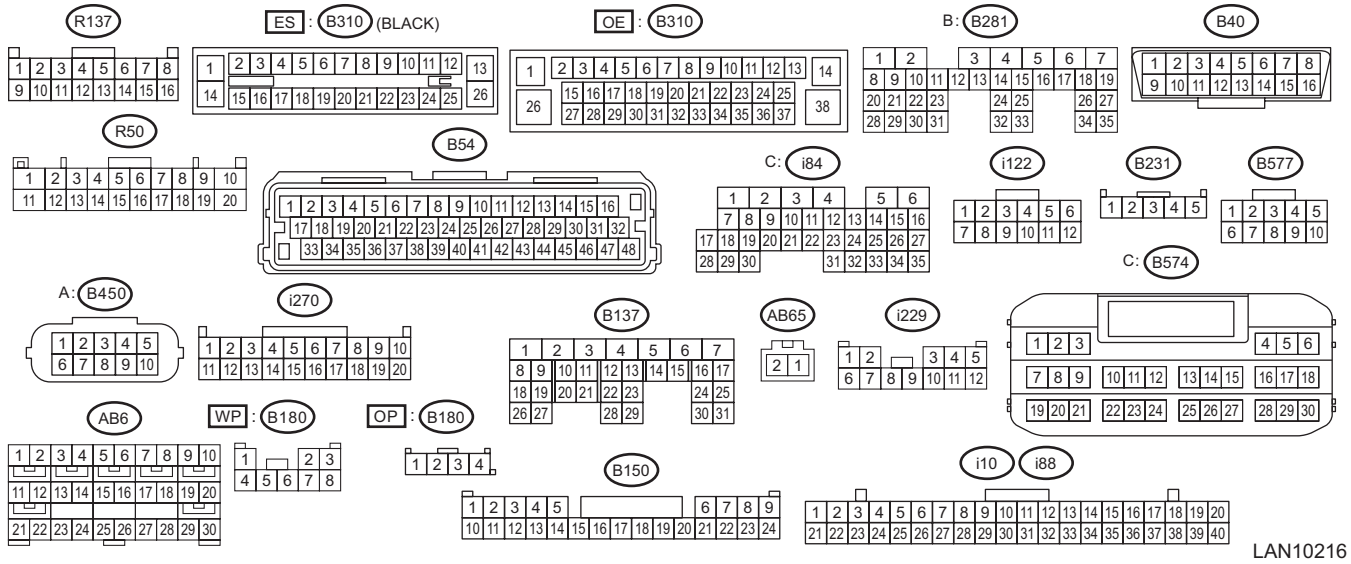
1. GROUND SHORT INSPECTION

WIRING DIAGRAM:

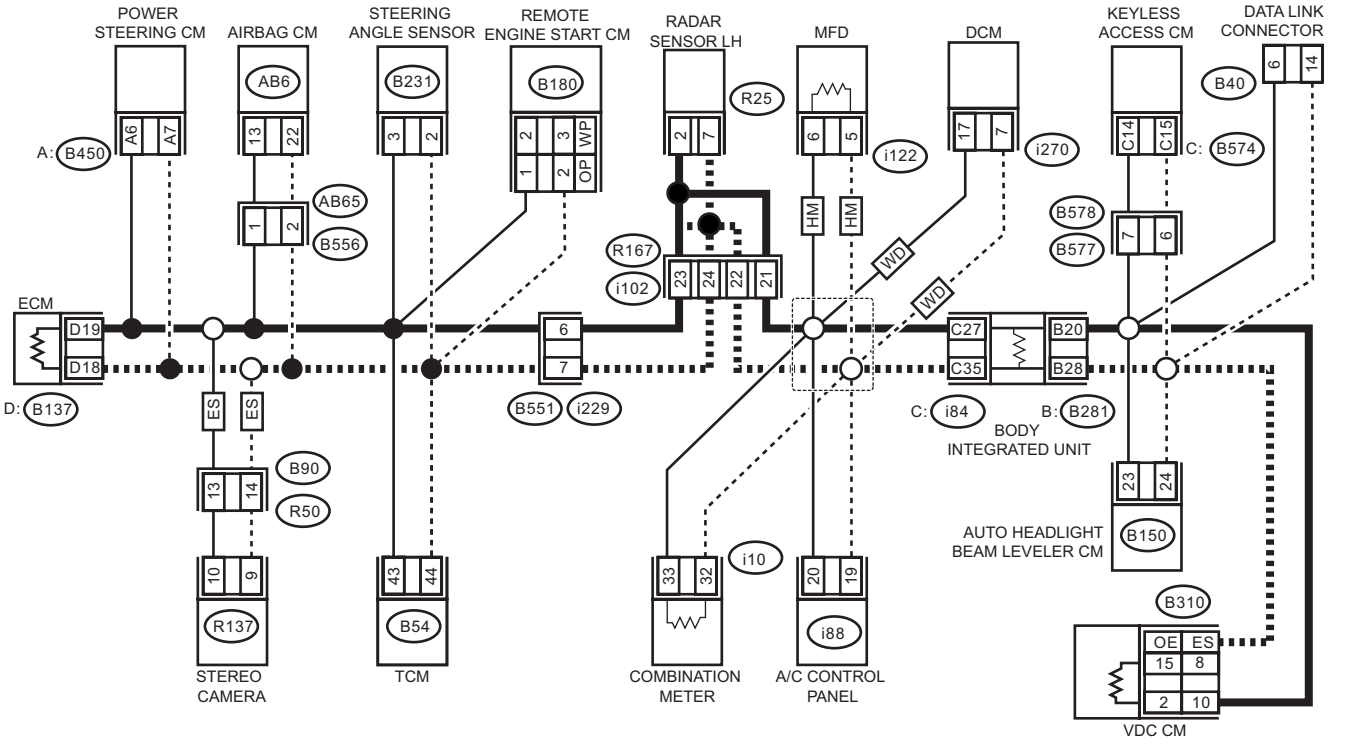
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

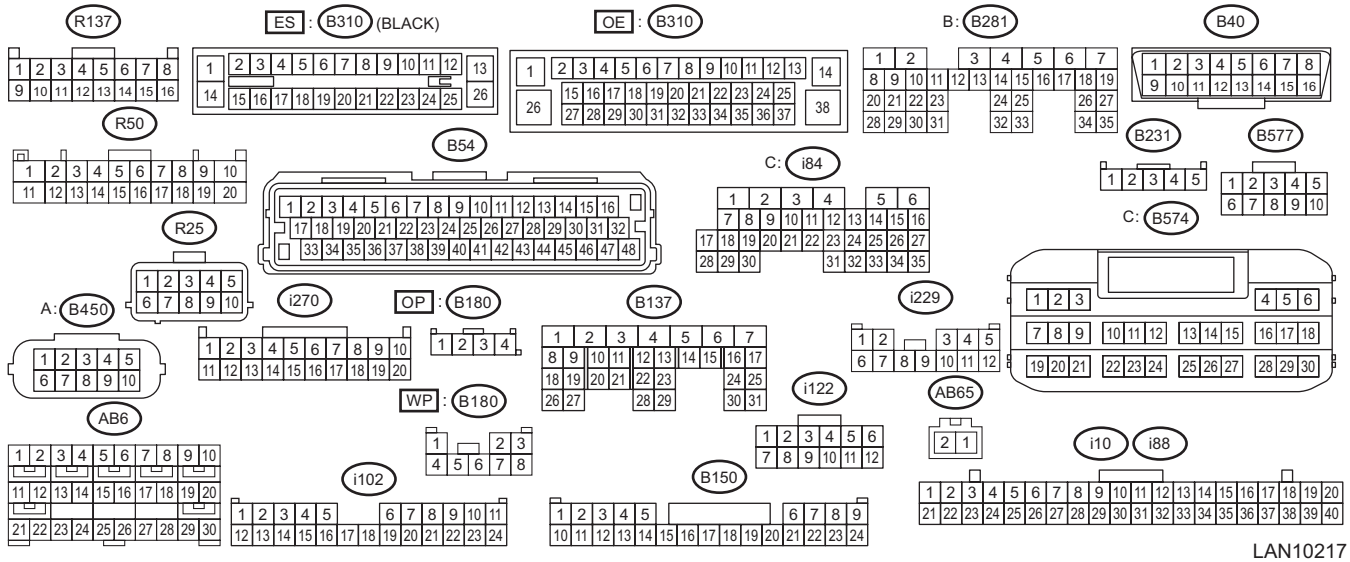
- Without BSD/RCTA





- With BSD/RCTA





CAN Communication Circuit Check

NOTE:
Main wiring harness or related lines may be shorted to ground, or shorted to ground in one of the control modules.

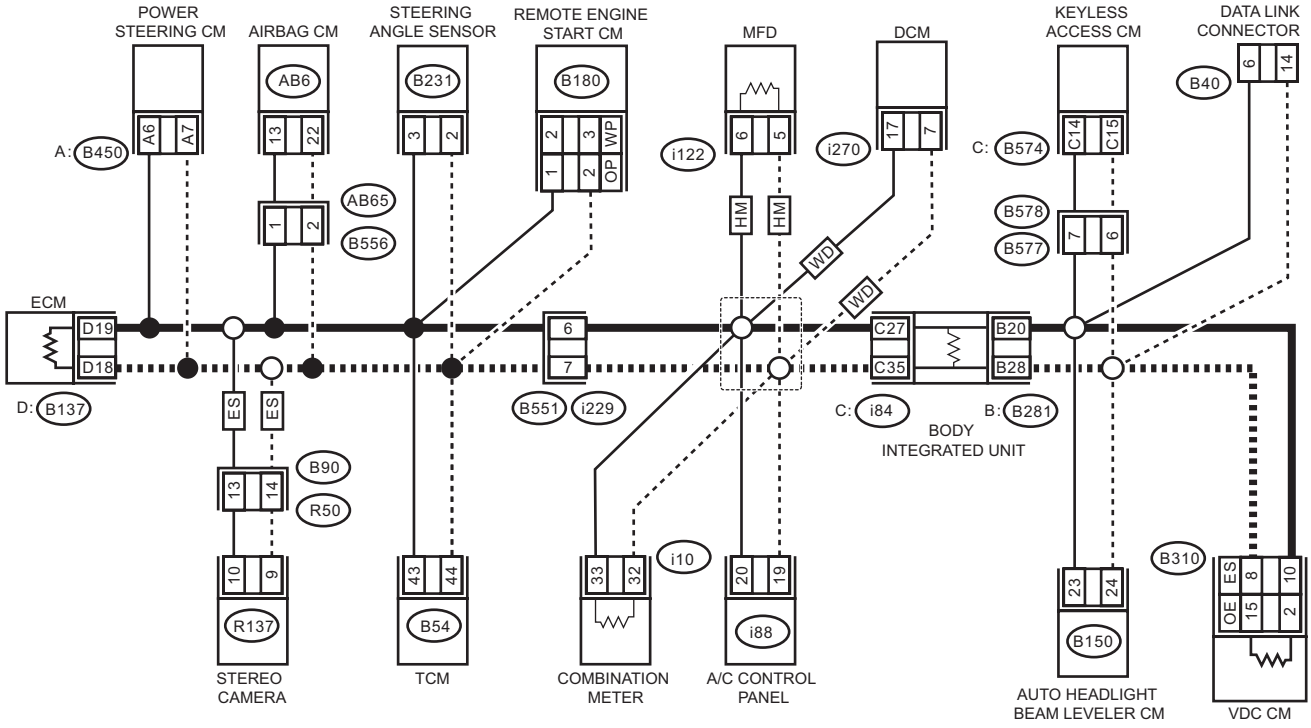
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **2**.	Currently, it is normal.
2	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Did the resistance change to 10 Ω or more?	Replace the control module whose resistance has changed. When the value changed at disconnecting the body integrated unit, Go to step **3**.	Repair or replace the short circuit of the main wiring harness and related lines between body integrated unit and VDC CM.
3	**CHECK BETWEEN MAIN WIRING HARNESSES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i84) No. 27 — Chassis ground:*** ***(i84) No. 35 — Chassis ground:***	Is the resistance 10 Ω or less?	Repair or replace the short circuit of the main wiring harness and related lines between ECM and body integrated unit.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

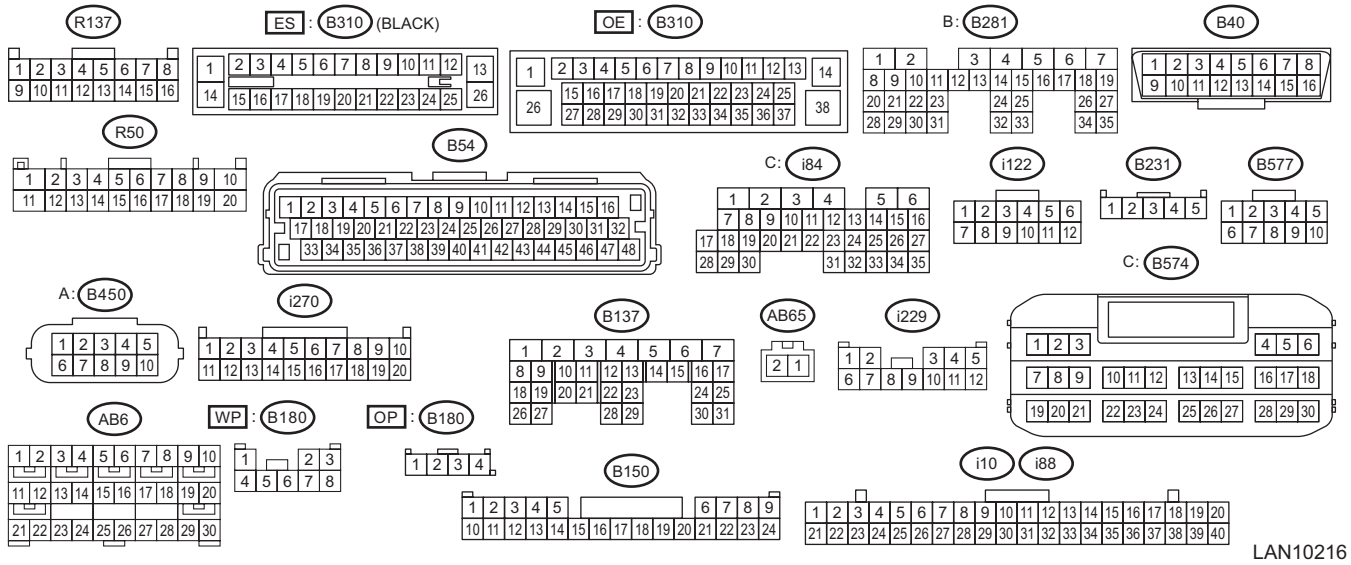
2. BATTERY SHORT INSPECTION

WIRING DIAGRAM:

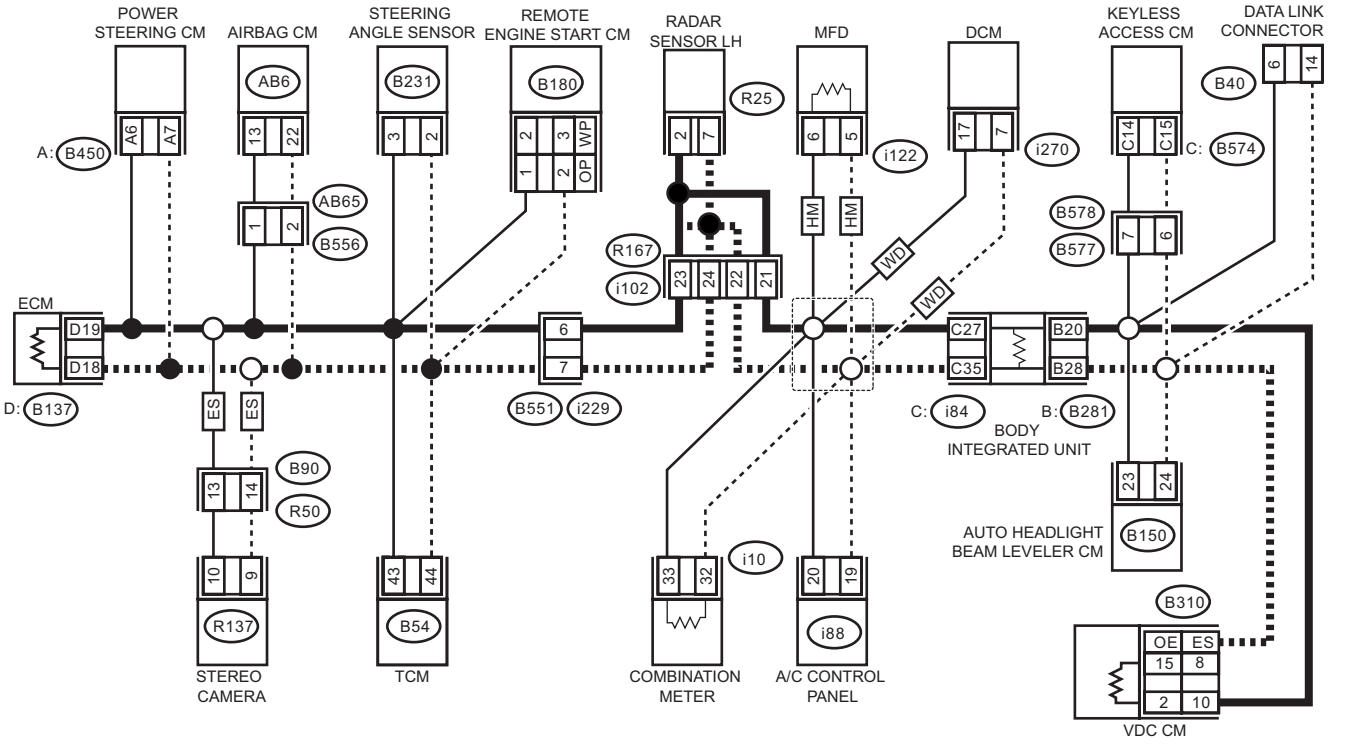
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

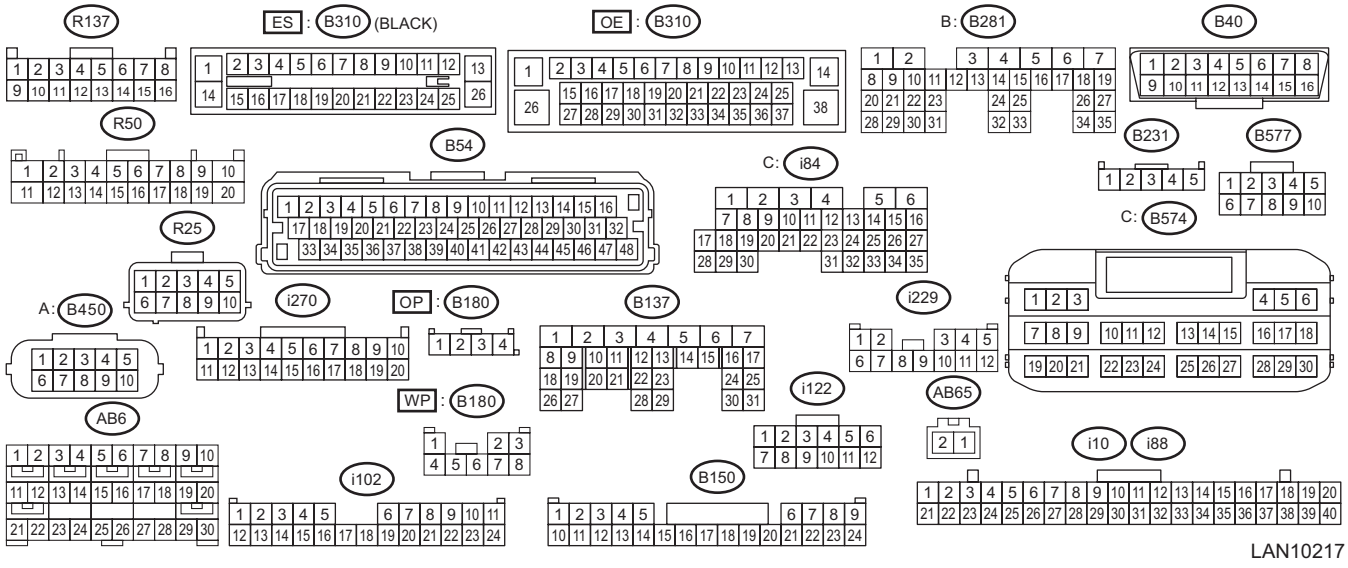
- Without BSD/RCTA





- With BSD/RCTA





NOTE:
Main wiring harness or related lines may be shorted to battery circuit, or shorted to battery circuit in one of the control modules.

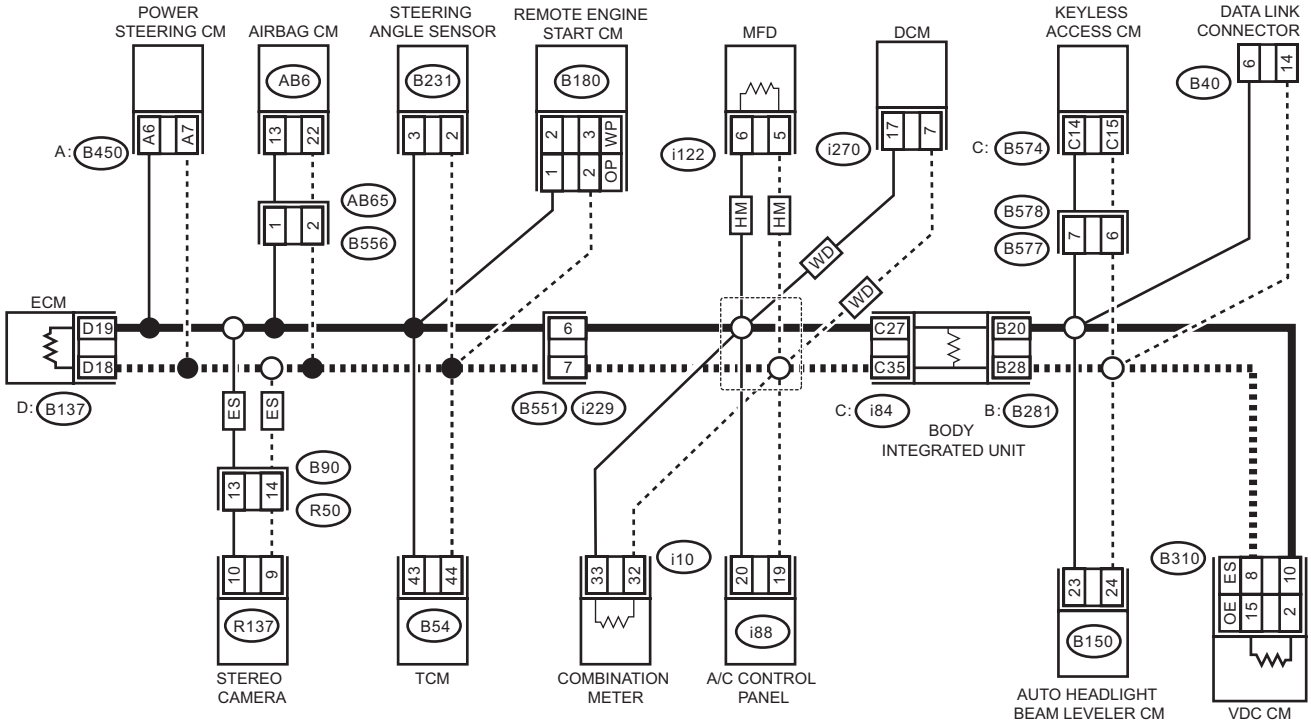
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the voltage 5 V or less?	Currently, it is normal.	Go to step **2**.
2	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Did the voltage change to 5 V or less?	Replace the control module whose voltage has changed. When the value changed at disconnecting the body integrated unit, Go to step **3**.	Repair or replace the short circuit of the harness between body integrated unit and VDC CM.
3	**CHECK BETWEEN MAIN WIRING HARNESSES.** Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i84) No. 27 — Chassis ground:*** ***(i84) No. 35 — Chassis ground:***	Is the voltage 5 V or less?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the short circuit of the harness between ECM and body integrated unit.

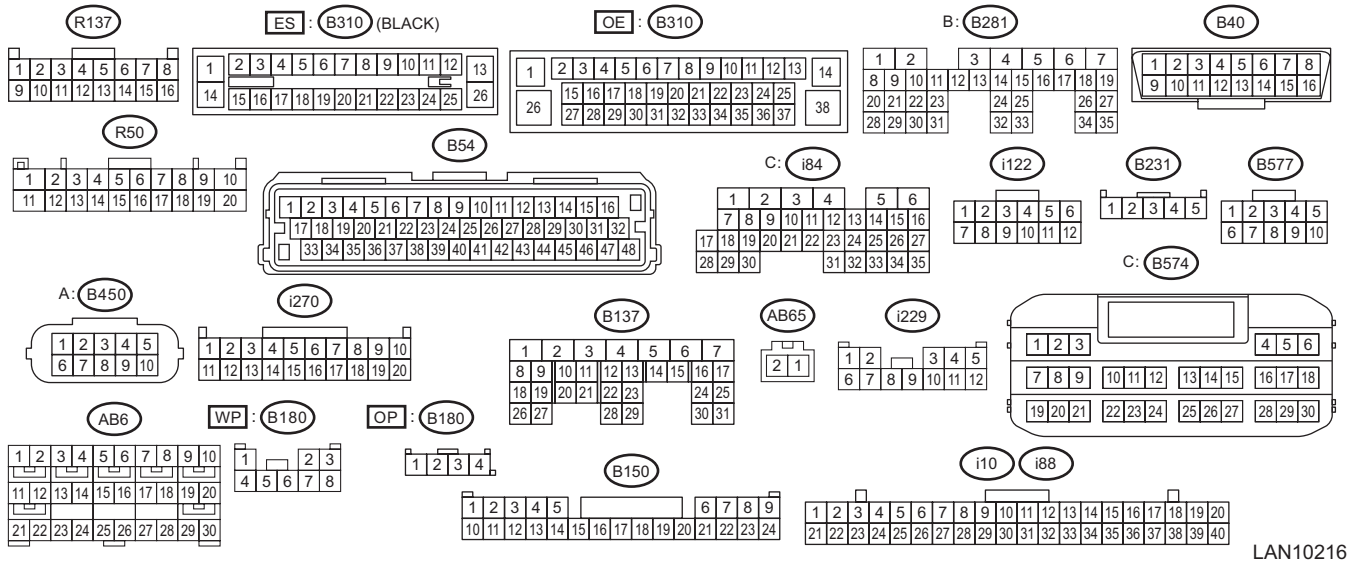
3. 53 — 61 Ω

WIRING DIAGRAM:

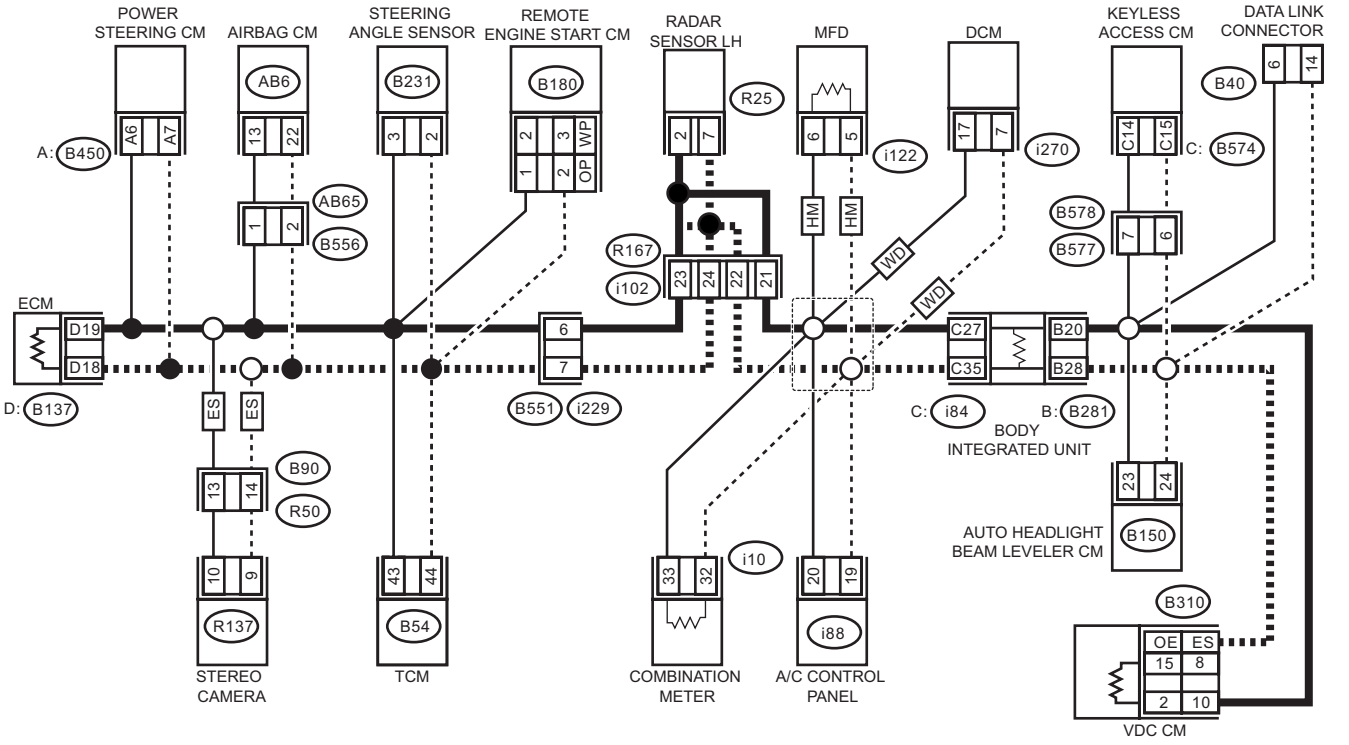
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

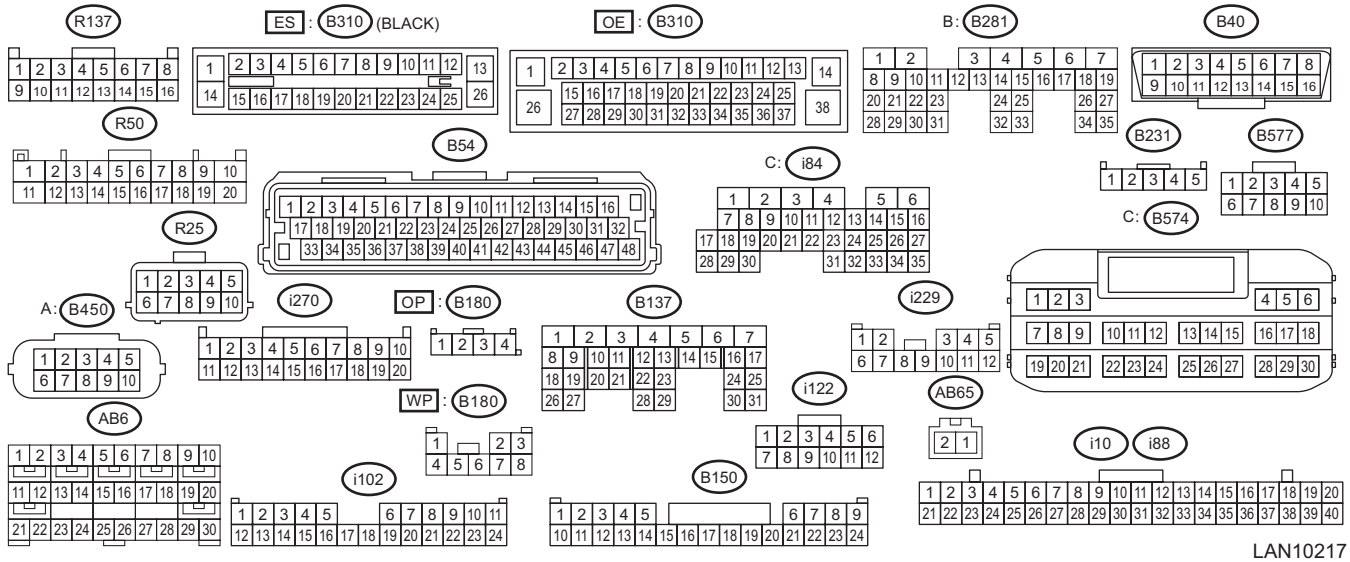
- Without BSD/RCTA





- With BSD/RCTA





NOTE:
When the measured resistance value is 53 — 61 Ω, main wiring harness or related lines may be shorted to ground, or shorted to power supply line, or related line may be open.

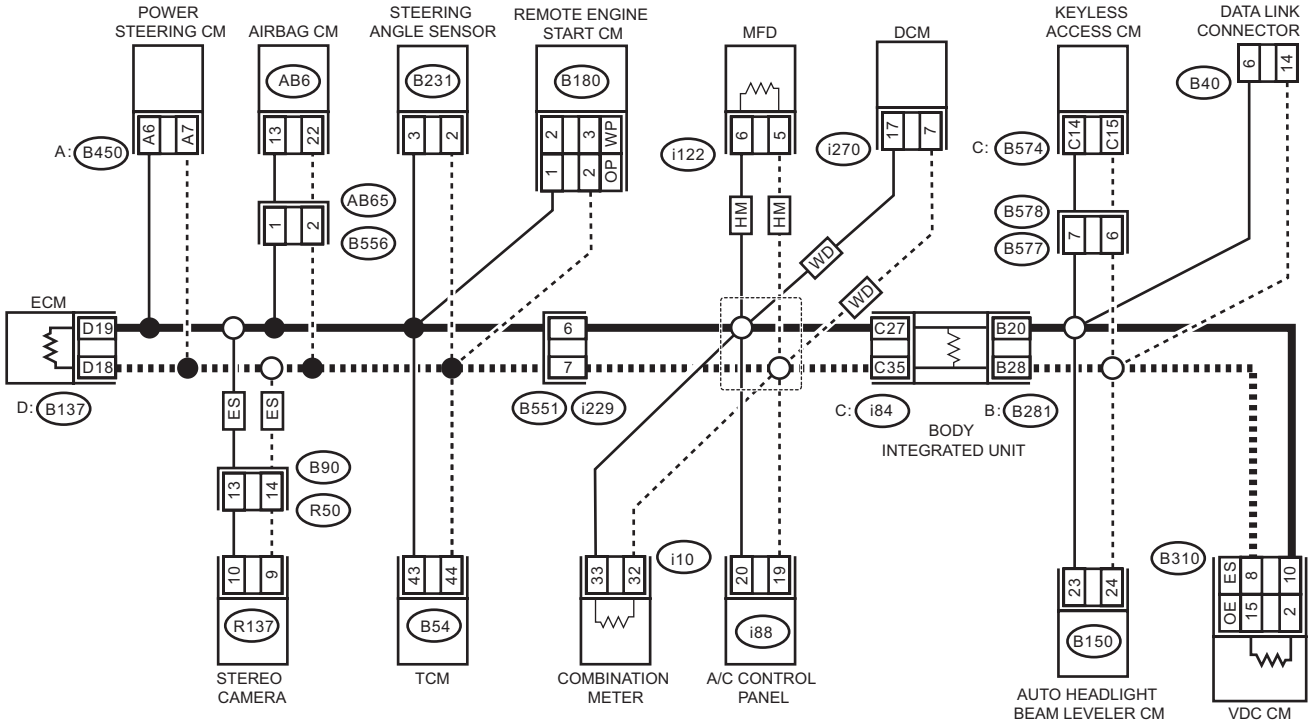
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **2**.	Go to step **4**.
2	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Did the resistance change to 10 Ω or more?	Replace the control module whose resistance has changed. When the value changed at disconnecting the body integrated unit, Go to step **3**.	Repair or replace the short circuit of the harness between body integrated unit and VDC CM.
3	**CHECK MAIN WIRING HARNESS AND RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i84) No. 27 — Chassis ground:*** ***(i84) No. 35 — Chassis ground:***	Is the resistance 10 Ω or less?	Repair or replace the short circuit of the harness between ECM and body integrated unit.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
4	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the voltage 5 V or less?	CAN communication circuit is normal.	Go to step **5**.
5	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Did the voltage change to 5 V or less?	Replace the control module whose voltage has changed. When the value changed at disconnecting the body integrated unit, Go to step **6**.	Repair or replace the short circuit of the harness between body integrated unit and VDC CM.
6	**CHECK HARNESS.** Using a tester, measure the voltage between terminals and chassis ground. ***Connector & terminal*** ***(i84) No. 27 — Chassis ground:*** ***(i84) No. 35 — Chassis ground:***	Is the voltage 5 V or less?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the short circuit of the harness between ECM and body integrated unit.

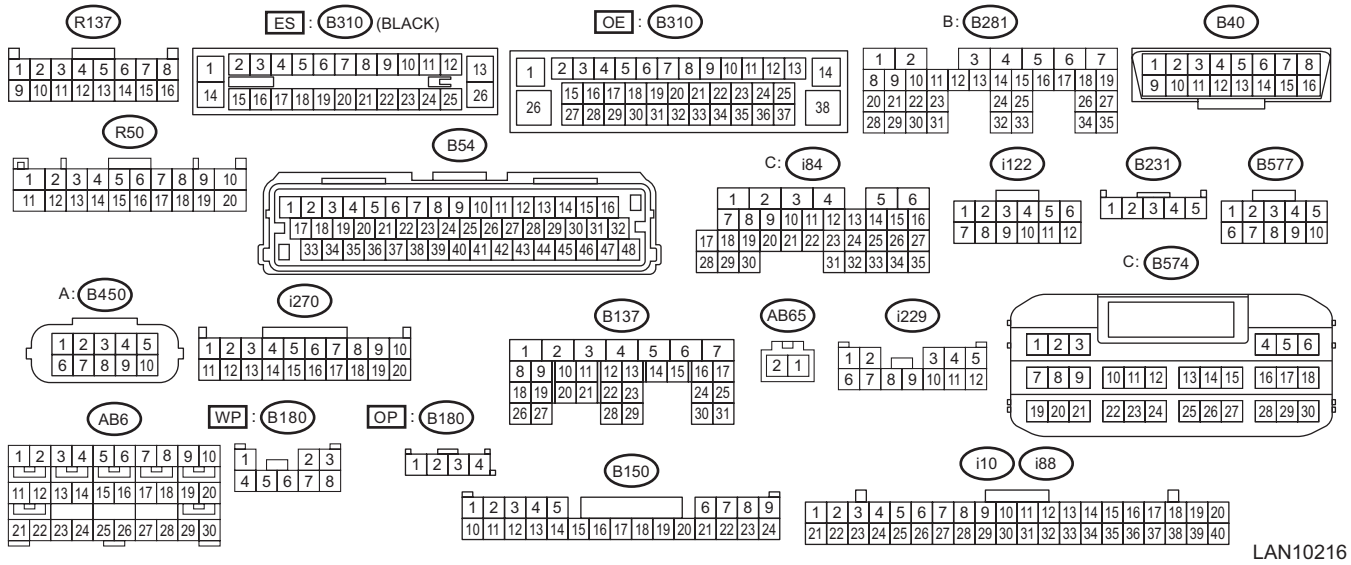
4. 52 Ω OR LESS

WIRING DIAGRAM:

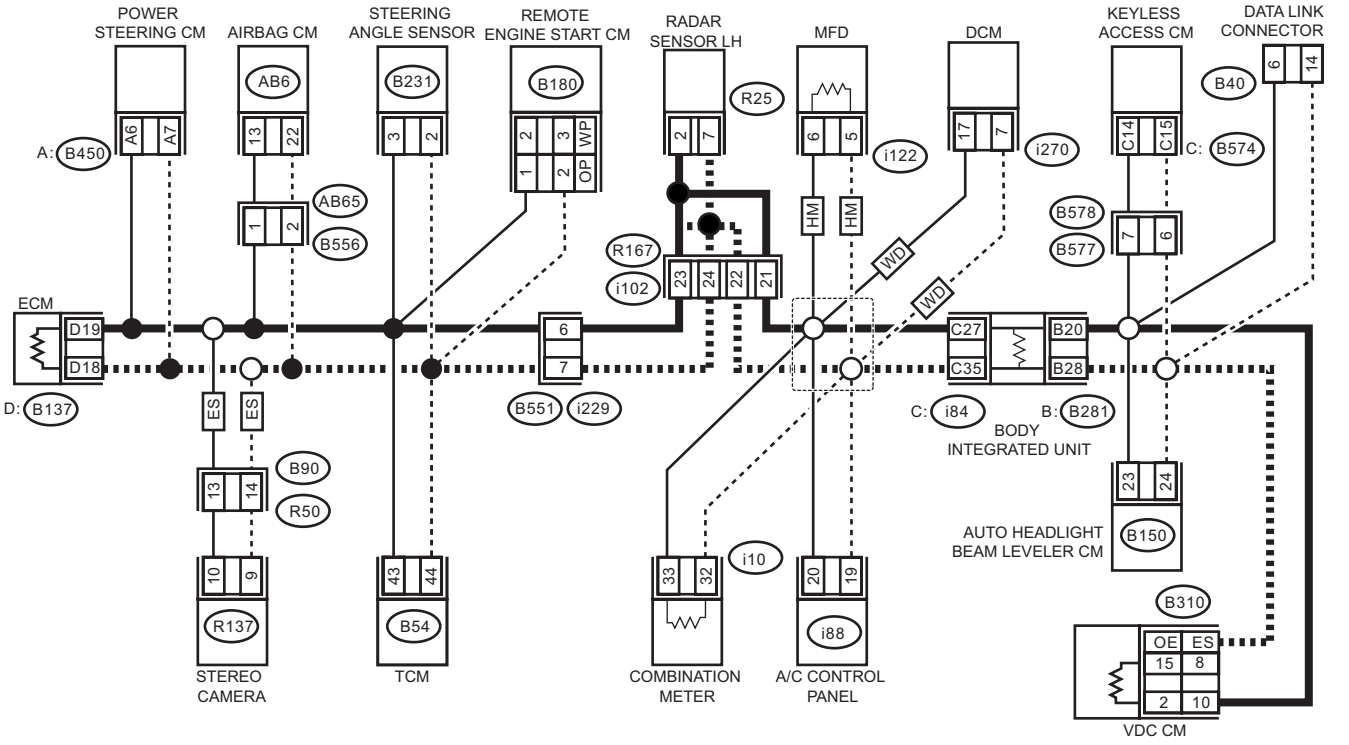
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

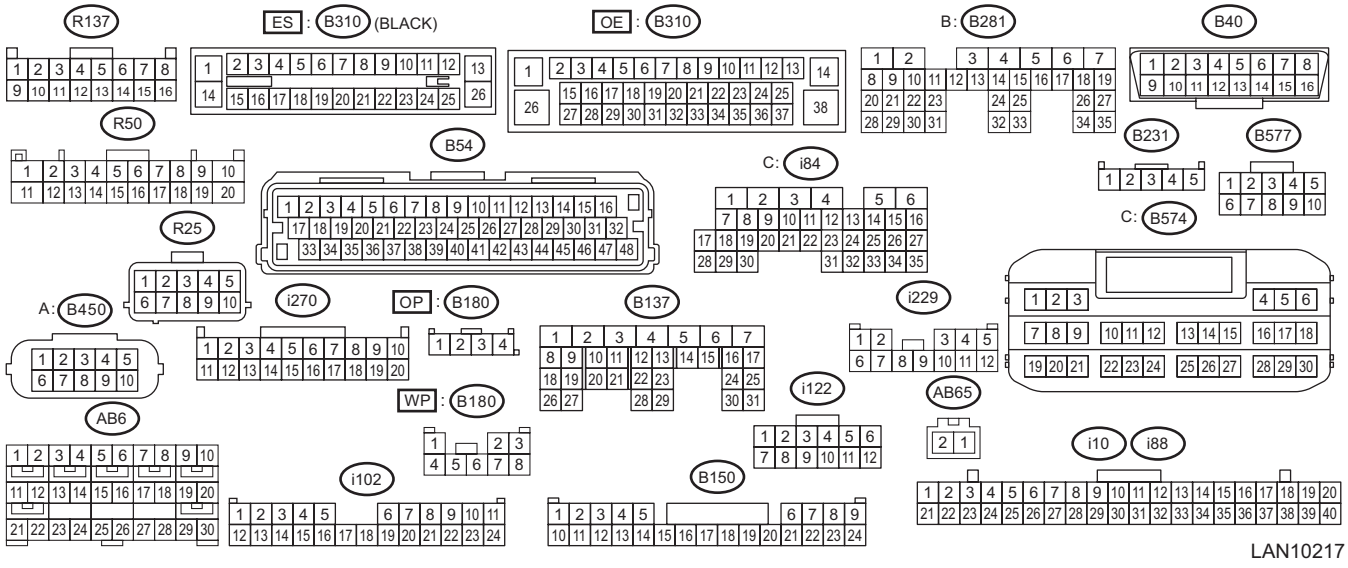
- Without BSD/RCTA





- With BSD/RCTA





NOTE:
When the bus line is measured, combined resistance of end resistance (120 Ω) in ECM and end resistance (120 Ω) in VDC CM can be measured. The combined resistance is approximately 53 — 61 Ω with the stabilizing circuit included. When the measured resistance value is 52 Ω or less, main wiring harness or related lines may be shorted, or combined resistance may have changed because resistance other than end resistance is created on the circuit.

	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — No. 14:***	Is the resistance 10 Ω or less?	Go to step **2**.	Go to step **4**.
2	**CHECK MAIN WIRING HARNESS AND RELATED LINES.** With a tester connected, disconnect control module connectors in order. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — No. 14:***	Is there any control module whose condition has changed from short state?	Replace the control module whose resistance has changed. When the value changed at disconnecting the body integrated unit, Go to step **3**.	Repair or replace the short circuit of the harness between body integrated unit and VDC CM.
3	**CHECK BETWEEN MAIN WIRING HARNESSES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i84) No. 27 — No. 35:***	Is the resistance 10 Ω or less?	Repair or replace the short circuit of the harness between ECM and body integrated unit.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
4	**CHECK CONTROL MODULE.** 1) Disconnect ECM and VDC CM connectors. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B137) No. 18 — No. 19:*** ***(B310) No. 2 — No. 15 (without EyeSight):*** ***(B310) No. 10 — No. 8 (with EyeSight):***	Is the resistance 114 — 126 Ω?	Go to step **5**.	Replace the control module whose end resistance value is out of the specified range.
5	**CHECK CONTROL MODULE.** 1) Disconnect the connector of body integrated unit. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B281) No. 28 — (i84) No. 27:*** ***(B281) No. 20 — (i84) No. 35:***	Is the resistance 2850 — 3150 Ω?	Go to step **6**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
6	**CHECK CONTROL MODULE.** Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B281) No. 28 — (i84) No. 35:*** ***(B281) No. 20 — (i84) No. 27:***	Is the resistance less than 1 Ω?	Go to step **7**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
7	**CHECK CONTROL MODULE.** 1) Disconnect the combination meter connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(i10) No. 32 — No. 33:***	Is the resistance 2850 — 3150 Ω?	Go to step **8**.	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>

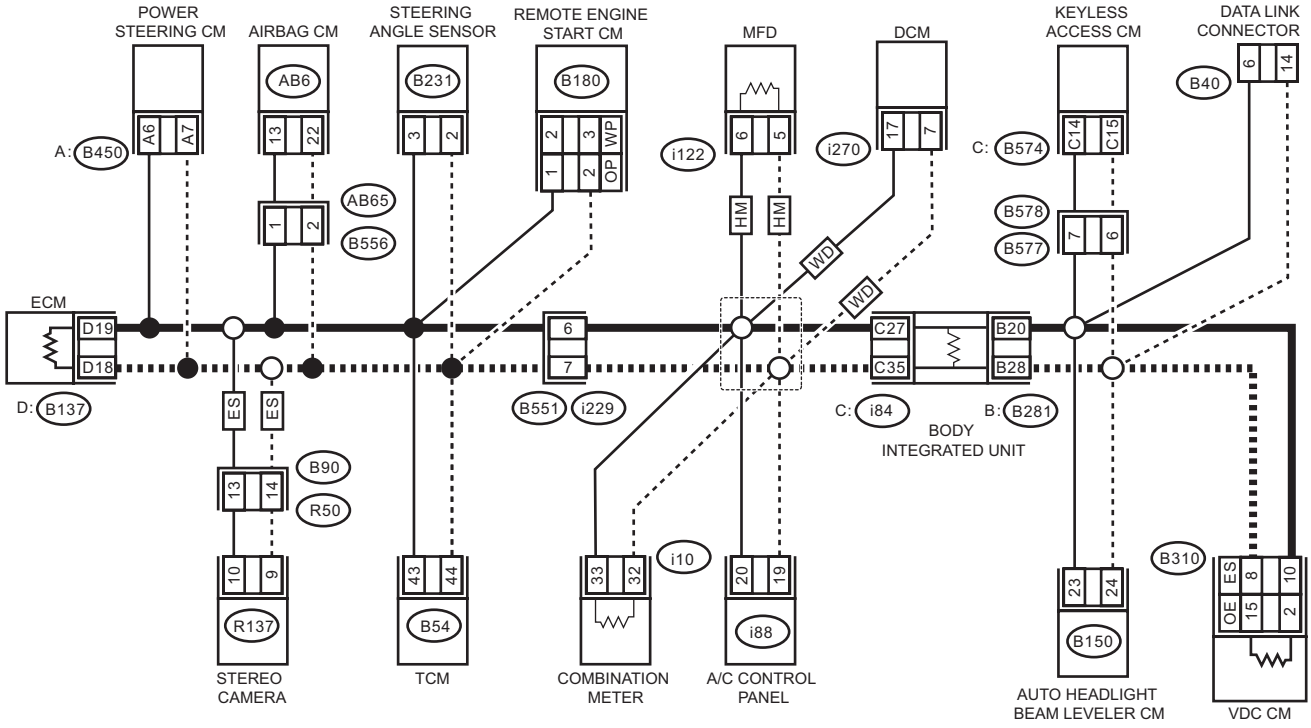
	Step	Check	Yes	No
8	**CHECK CONTROL MODULE (ONLY FOR MODELS WITH HIGH GRADE MFD).** 1) Disconnect the MFD connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(i122) No. 5 — No. 6:***	Is the resistance 2850 — 3150 Ω?	Go to step **9**.	Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>
9	**CHECK HARNESS.** Using the tester, check the short circuit of each harness. ***Connector & terminal*** ***(B281) No. 28 — No. 20:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Go to step **10**.
10	**CHECK CONTROL MODULE.** With a tester connected, disconnect control modules in order. ***Connector & terminal*** ***(B281) No. 28 — No. 20:***	Are there any control modules whose resistance changed to 1 MΩ or more?	Replace the control module that has changed.	Repair or replace the harness part which has resistance component.
11	**CHECK CONTROL MODULE.** With a tester connected, disconnect control modules in order. ***Connector & terminal*** ***(i84) No. 27 — No. 35:***	Is there any control module whose resistance has changed to 1 MΩ or more?	Replace the control module that has changed.	Repair or replace the harness part which has resistance component.

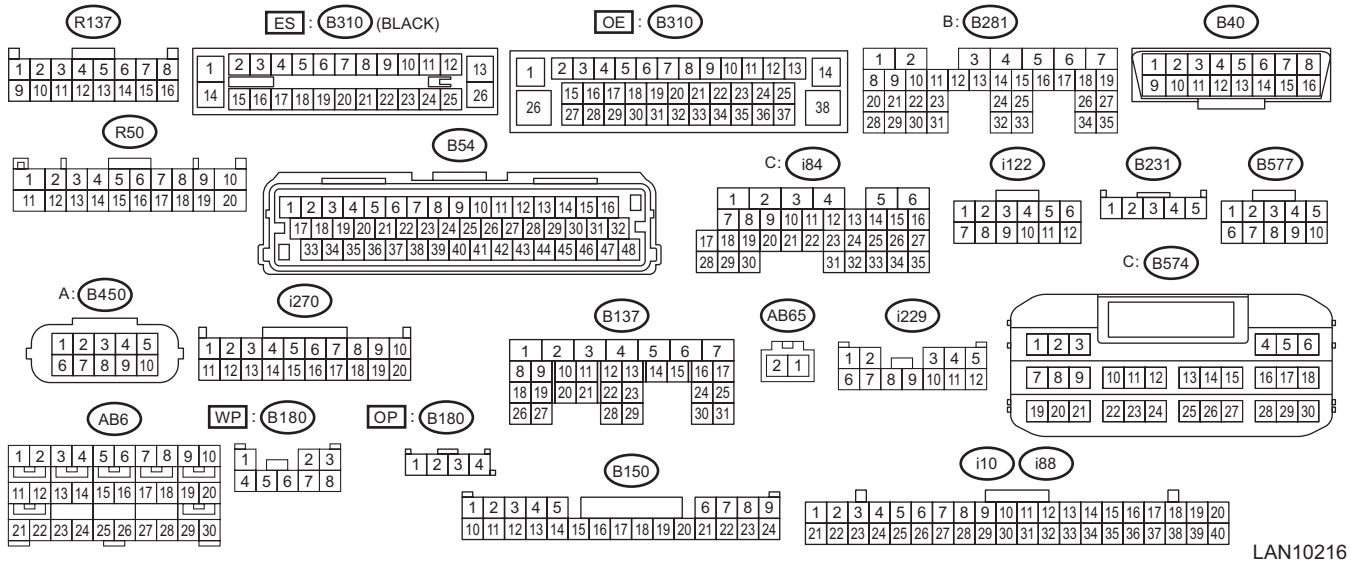
5. 62 Ω OR MORE

WIRING DIAGRAM:

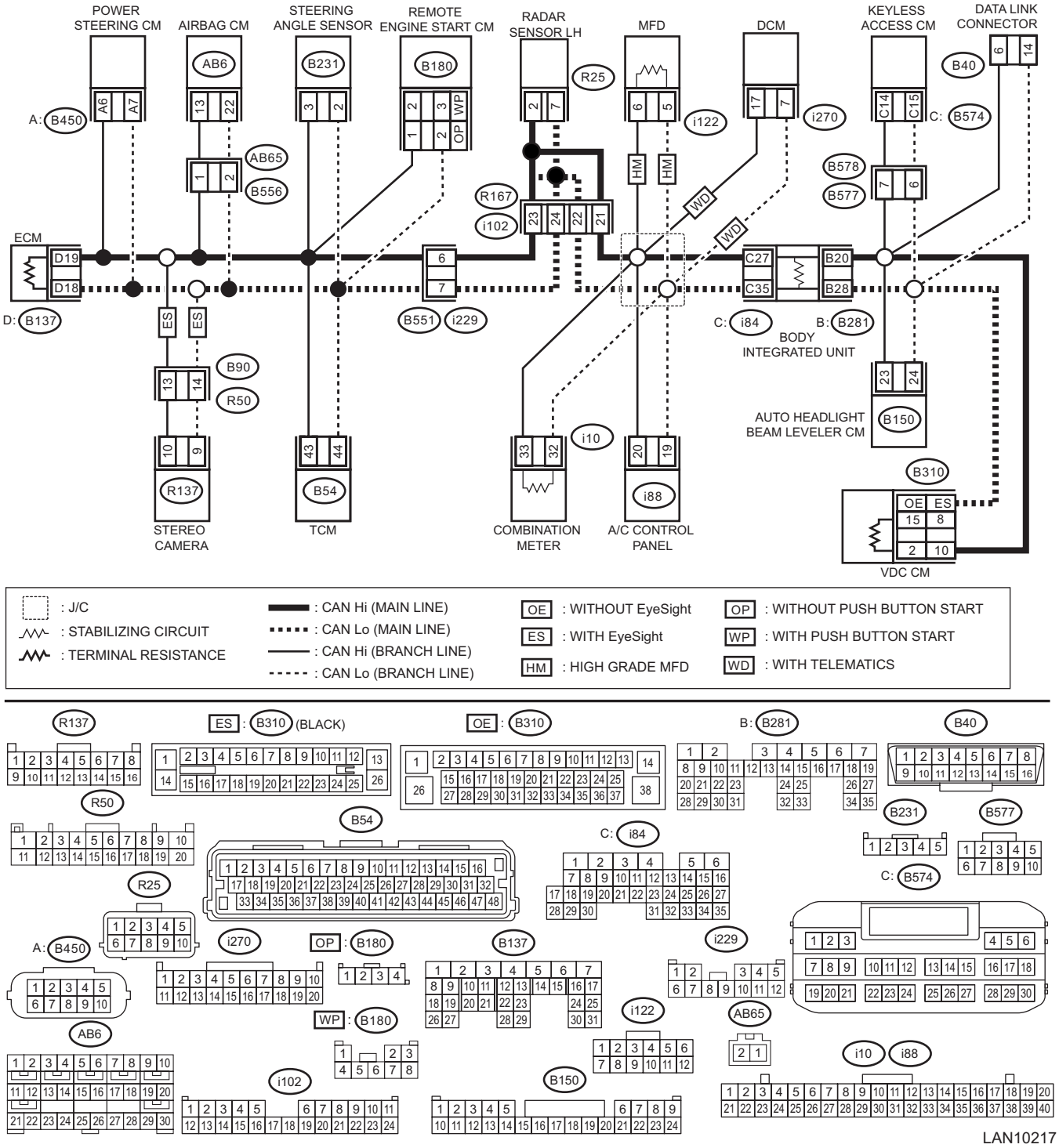
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA





- With BSD/RCTA



NOTE:
When CAN communication circuit is measured, combined resistance of end resistance (120 Ω) in ECM and end resistance (120 Ω) in VDC CM can be measured. The combined resistance is approximately 53 — 61 Ω with the stabilizing circuit included. When the measured resistance value is 62 Ω or more, either one of the end resistances, or stabilizing circuit, or main wiring harness may have malfunction such as open circuit.

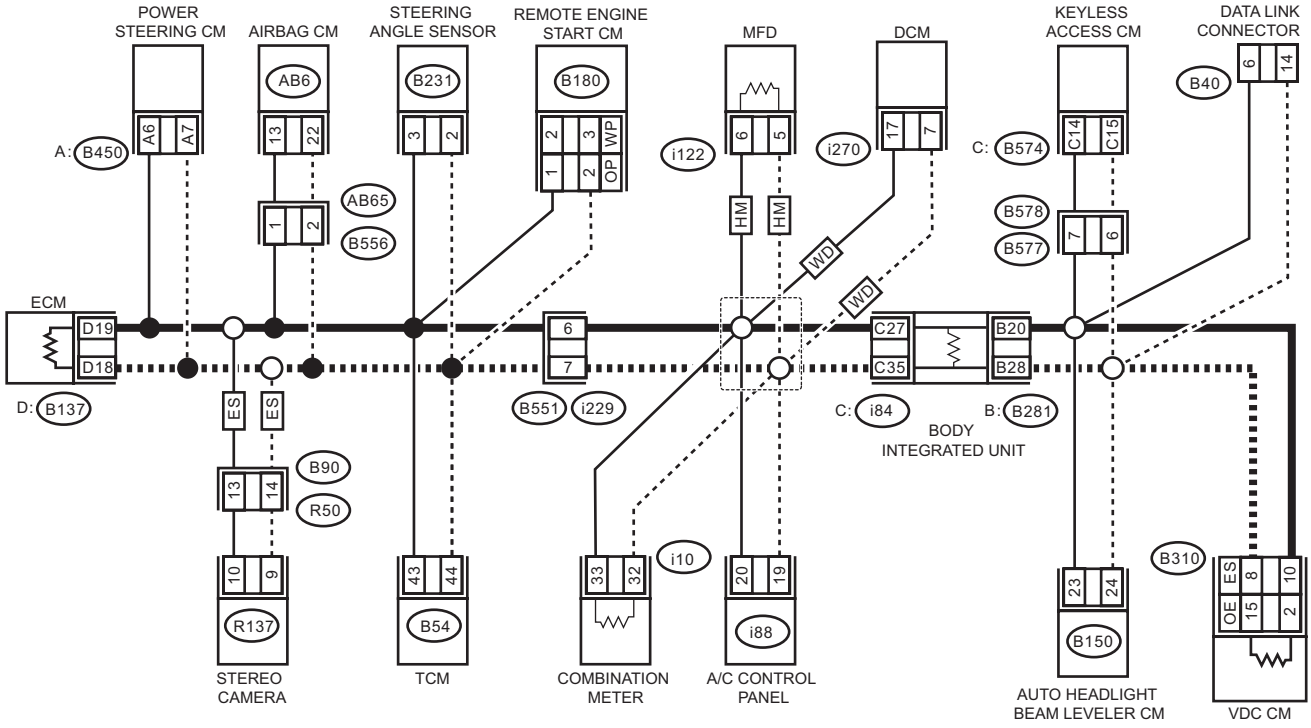
	Step	Check	Yes	No
1	**CHECK CONTROL MODULE.** 1) Disconnect ECM and VDC CM connectors. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B137) No. 18 — No. 19:*** ***(B310) No. 2 — No. 15 (without EyeSight):*** ***(B310) No. 10 — No. 8 (with EyeSight):***	Is the resistance 114 — 126 Ω?	Go to step **2**.	Replace the control module whose value is out of the specification.
2	**CHECK CONTROL MODULE.** 1) Disconnect the connector of body control module. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B281) No. 28 — (i84) No. 27:*** ***(B281) No. 20 — (i84) No. 35:***	Is the resistance 2850 — 3150 Ω?	Go to step **3**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
3	**CHECK CONTROL MODULE.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B281) No. 28 — (i84) No. 35:*** ***(B281) No. 20 — (i84) No. 27:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>
4	**CHECK CONTROL MODULE.** 1) Disconnect the combination meter connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(i10) No. 32 — No. 33:***	Is the resistance 2850 — 3150 Ω?	Go to step **5**.	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>
5	**CHECK CONTROL MODULE (ONLY FOR MODELS WITH HIGH GRADE MFD).** 1) Disconnect the MFD connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(i122) No. 5 — No. 6:***	Is the resistance 2850 — 3150 Ω?	Go to step **6**.	Replace the MFD. <Ref. to IDI-26, REMOVAL, Multi-function Display (MFD).>
6	**CHECK HARNESS.** Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B40) No. 6 — (B310) No. 2 (without EyeSight):*** ***(B40) No. 14 — (B310) No. 15 (without EyeSight):*** ***(B40) No. 6 — (B310) No. 10 (with EyeSight):*** ***(B40) No. 14 — (B310) No. 8 (with EyeSight):*** ***(B40) No. 6 — (B281) No. 20:*** ***(B40) No. 14 — (B281) No. 28:***	Is there continuity?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK HARNESS.** 1) Disconnect the ECM connector. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(i84) No. 27 — (B137) No. 19:*** ***(i84) No. 35 — (B137) No. 18:***	Is there continuity?	It is possible that temporary poor communication occurs.	Repair or replace the open circuit of harness.

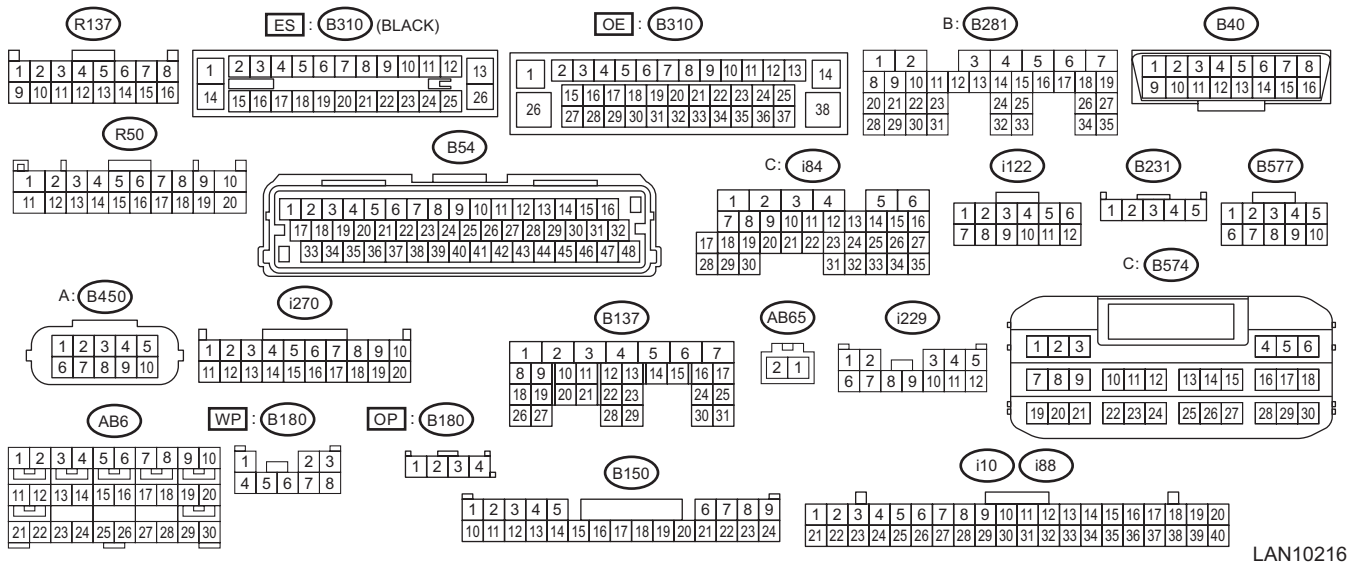
6. RELATED LINES 53 — 61 Ω (TCM)

WIRING DIAGRAM:

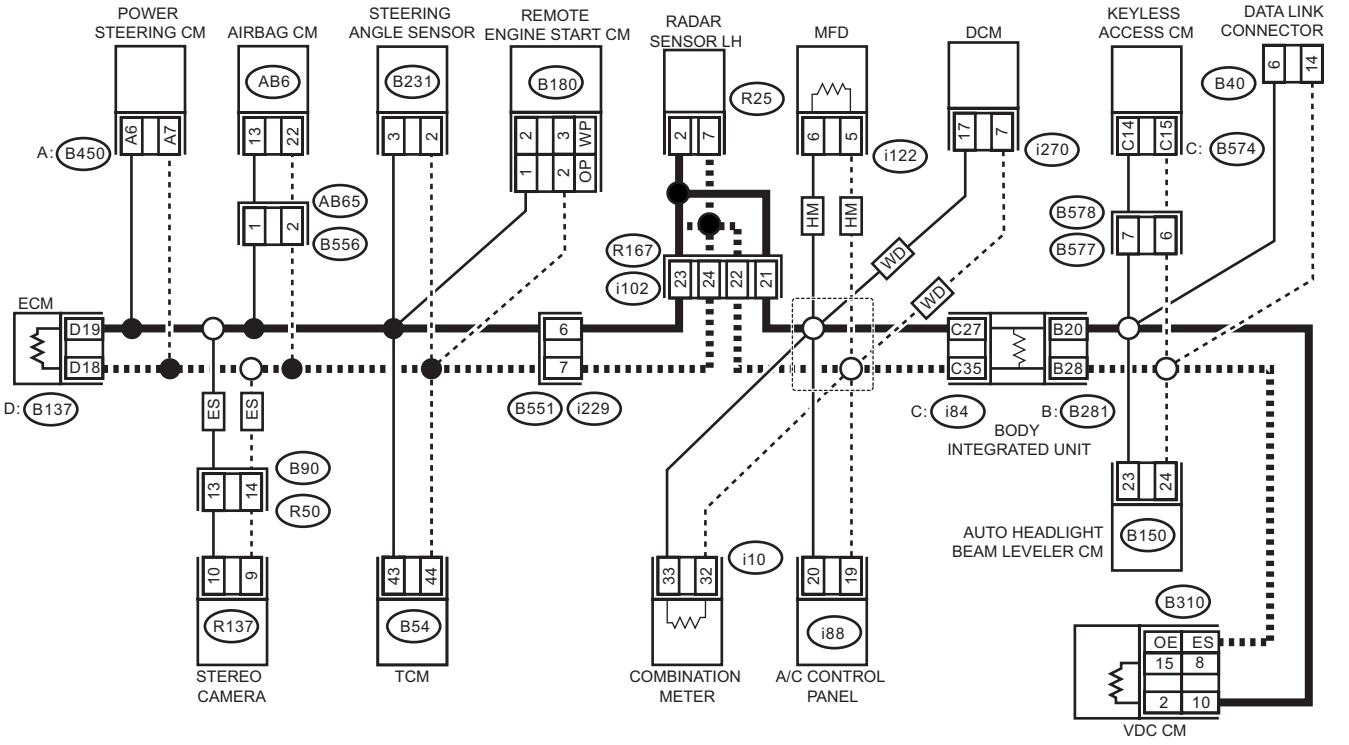
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

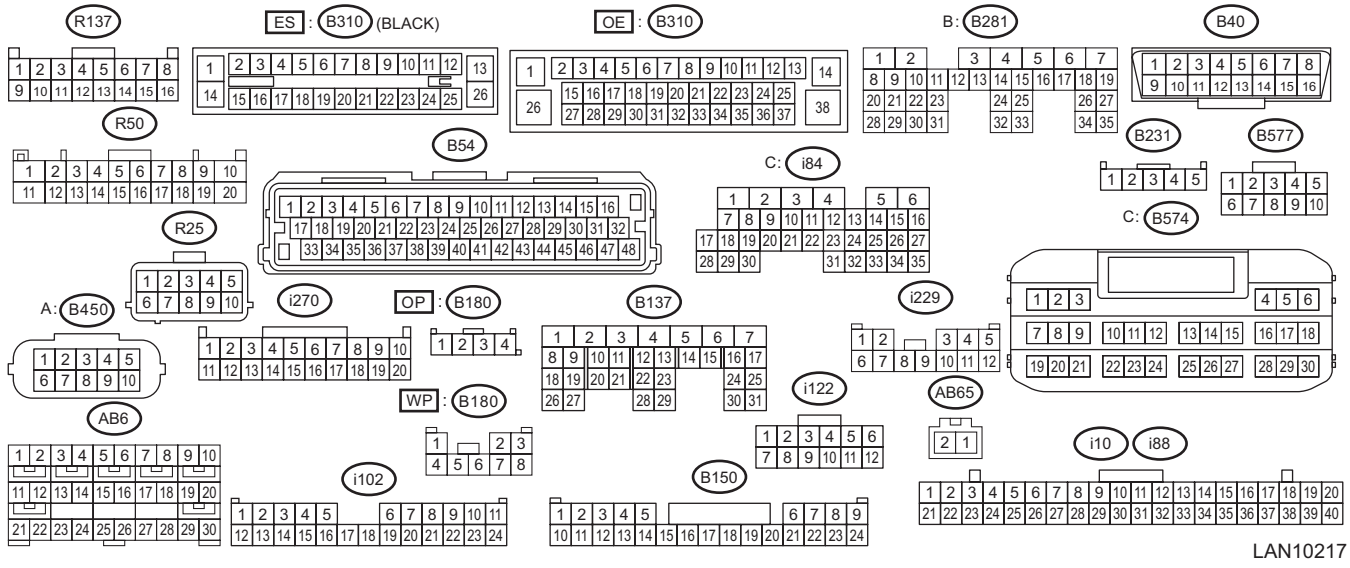
- Without BSD/RCTA





- With BSD/RCTA





CAN Communication Circuit Check

NOTE:
Perform inspection when no data is received, or faulty is detected. This is different from power supply shorted or ground shorted.

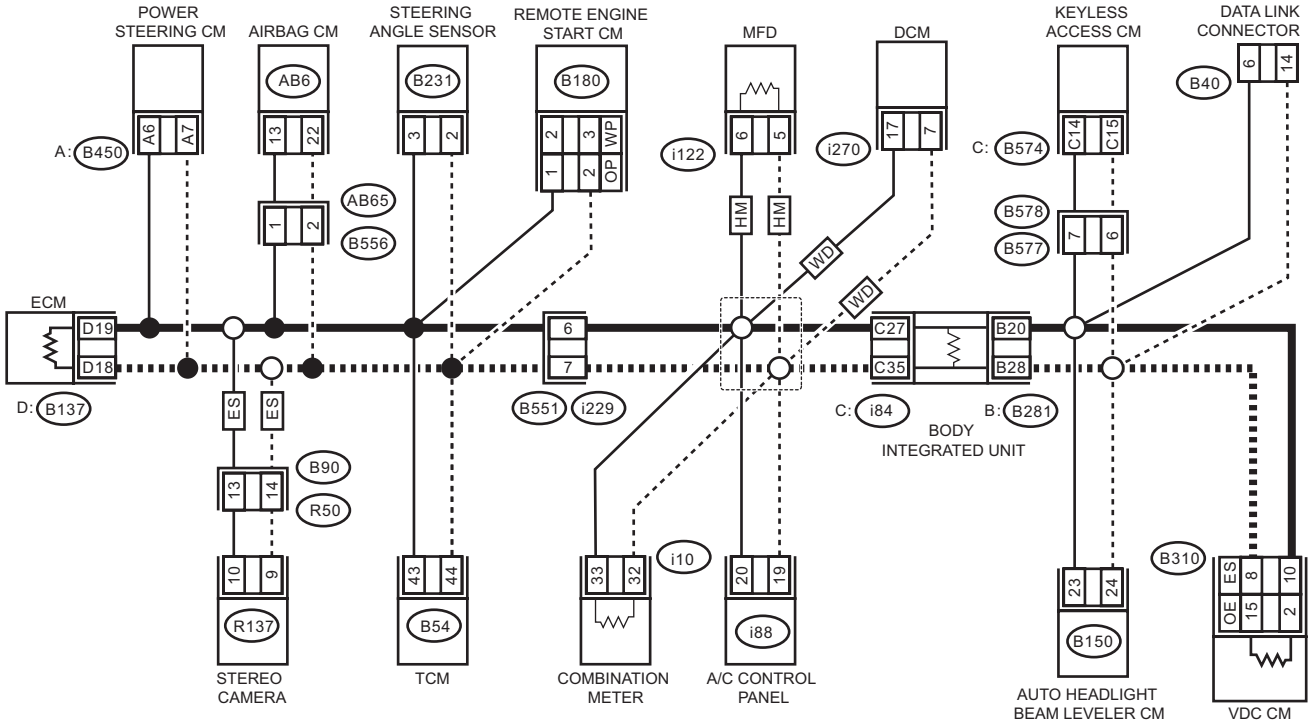
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the TCM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B54) No. 43 — No. 44:***	Is the resistance 400 Ω or more?	Related lines between TCM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B54) No. 44 — (B40) No. 14:*** ***(B54) No. 43 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of TCM related lines.	Check DTC of TCM. <Ref. to CVT(w/o HEV)(diag)-18, OPERATION, Read Diagnostic Trouble Code (DTC).>

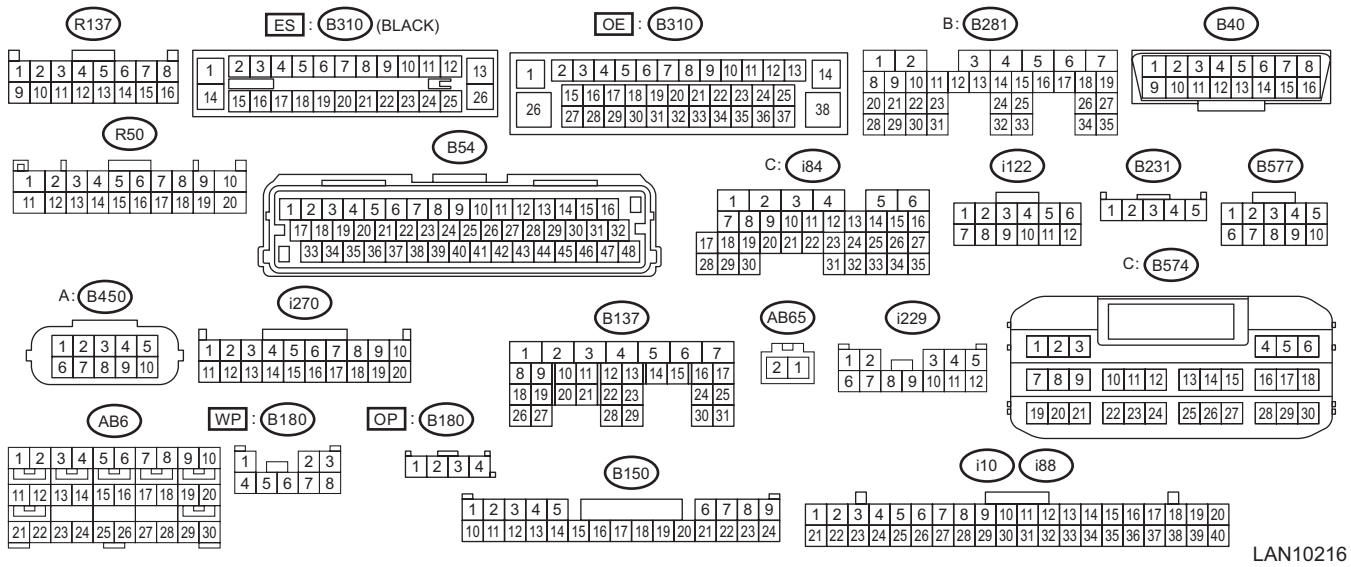
7. RELATED LINES 53 — 61 Ω (STEERING ANGLE SENSOR)

WIRING DIAGRAM:

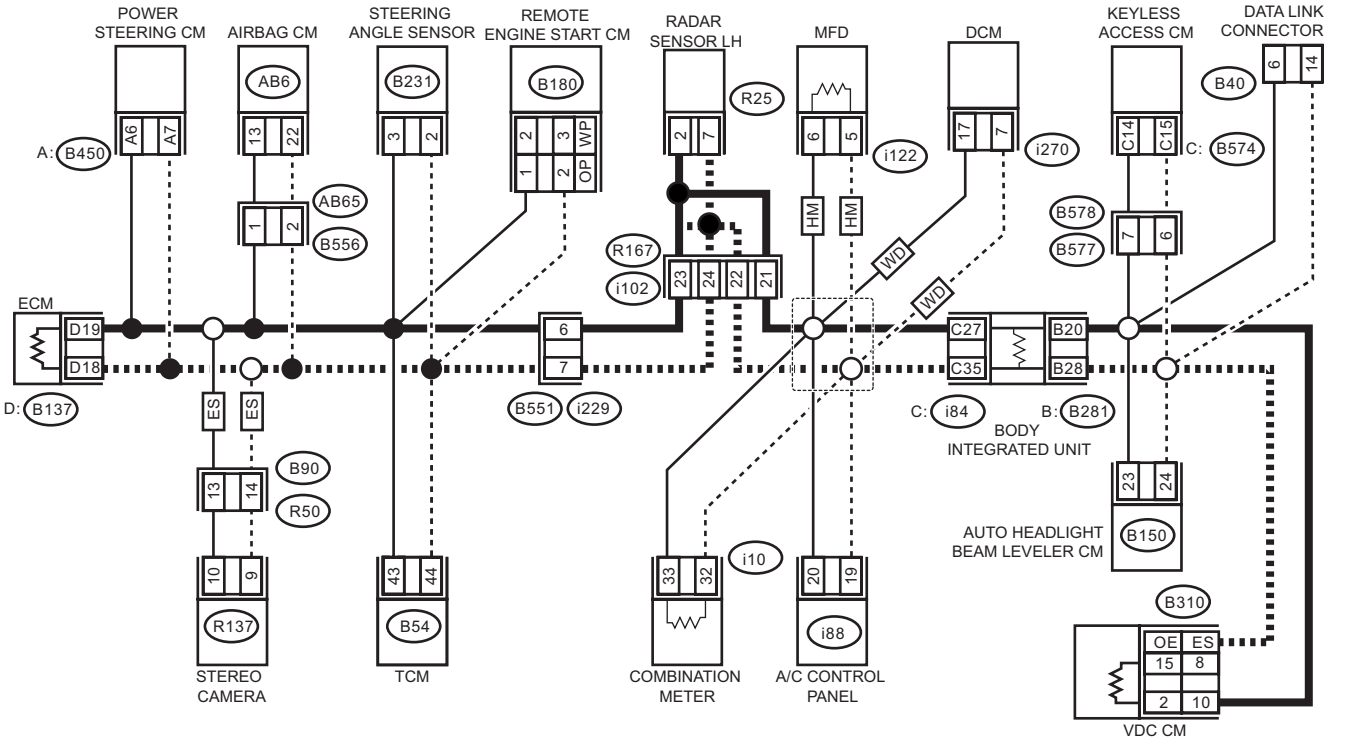
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

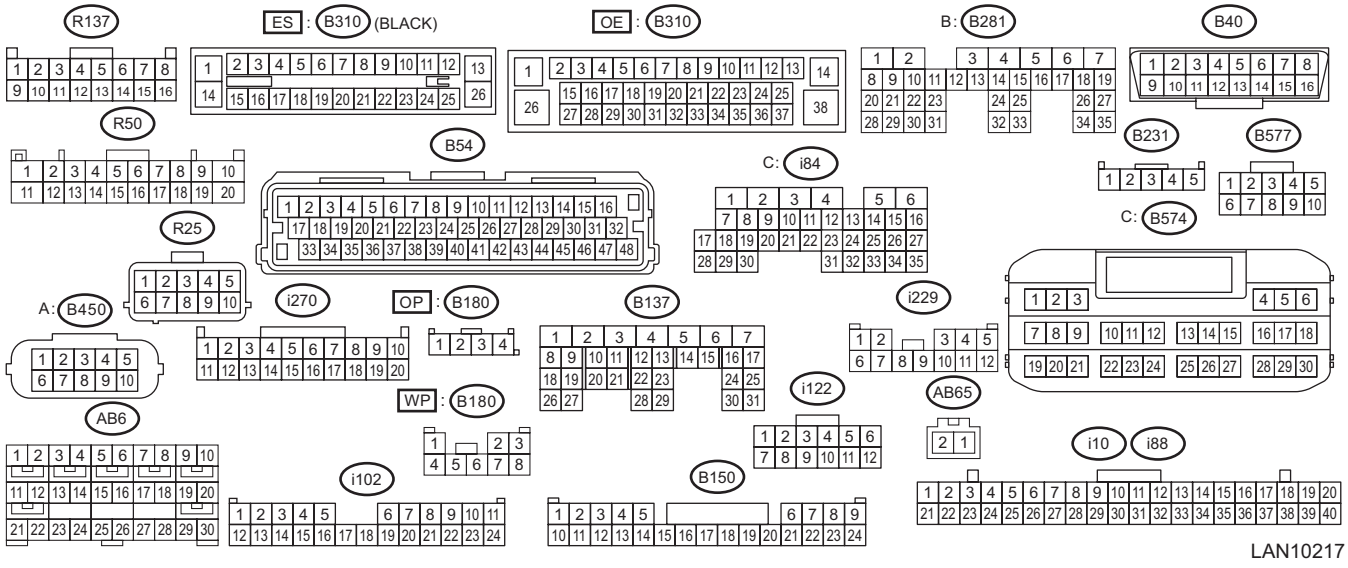
- Without BSD/RCTA





- With BSD/RCTA





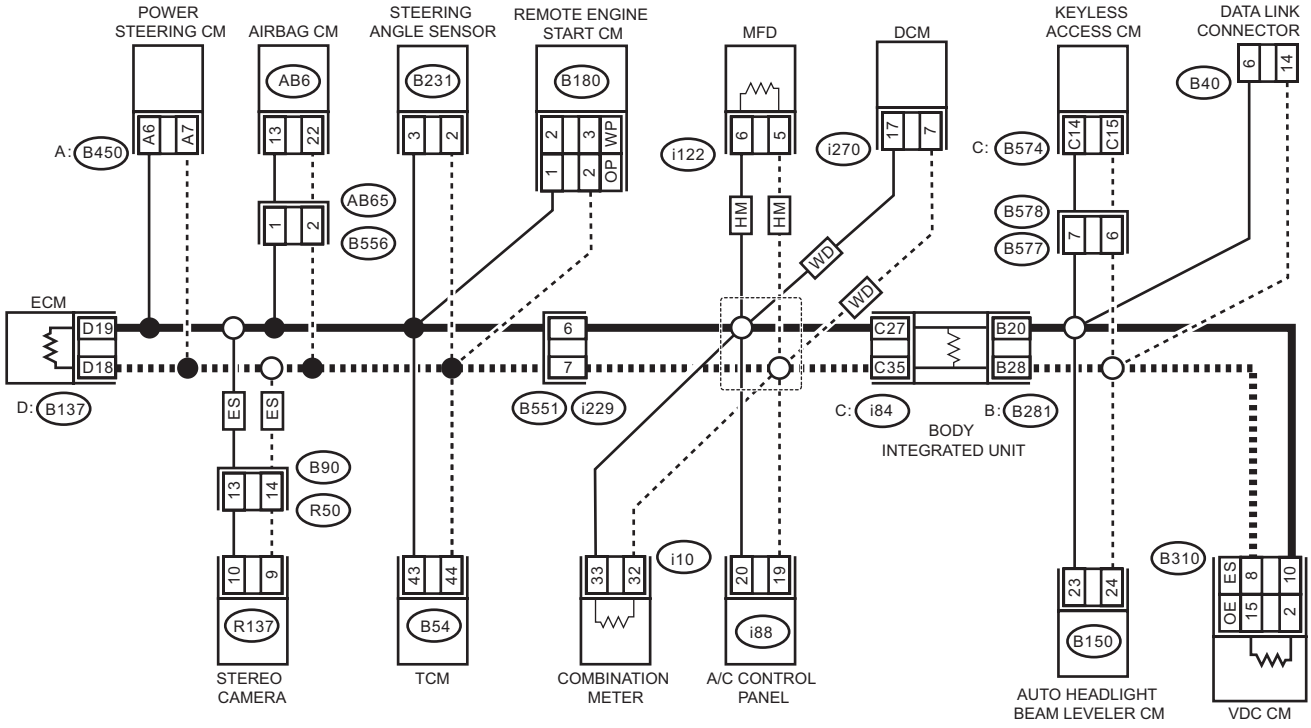
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the steering angle sensor connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B231) No. 2 — No. 3:***	Is the resistance 400 Ω or more?	Related lines between steering angle sensor and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B231) No. 2 — (B40) No. 14:*** ***(B231) No. 3 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of steering angle sensor related lines.	Check DTC of VDC CM. <Ref. to VDC(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>

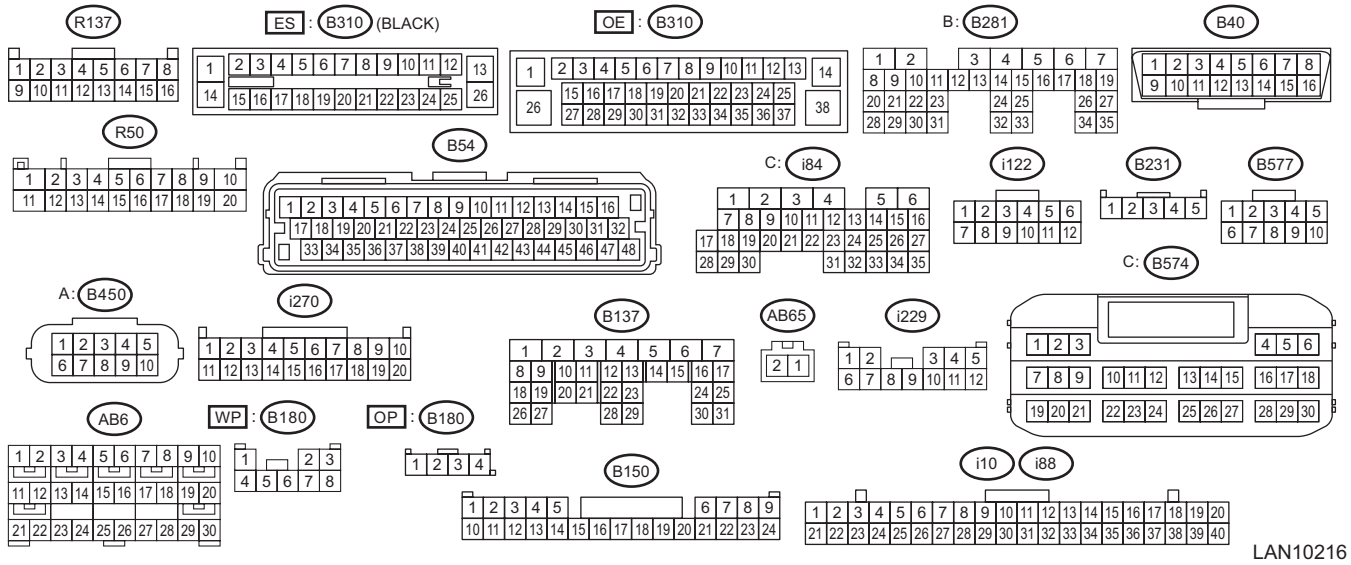
8. RELATED LINE 53 — 61 Ω (A/C CONTROL PANEL)

WIRING DIAGRAM:

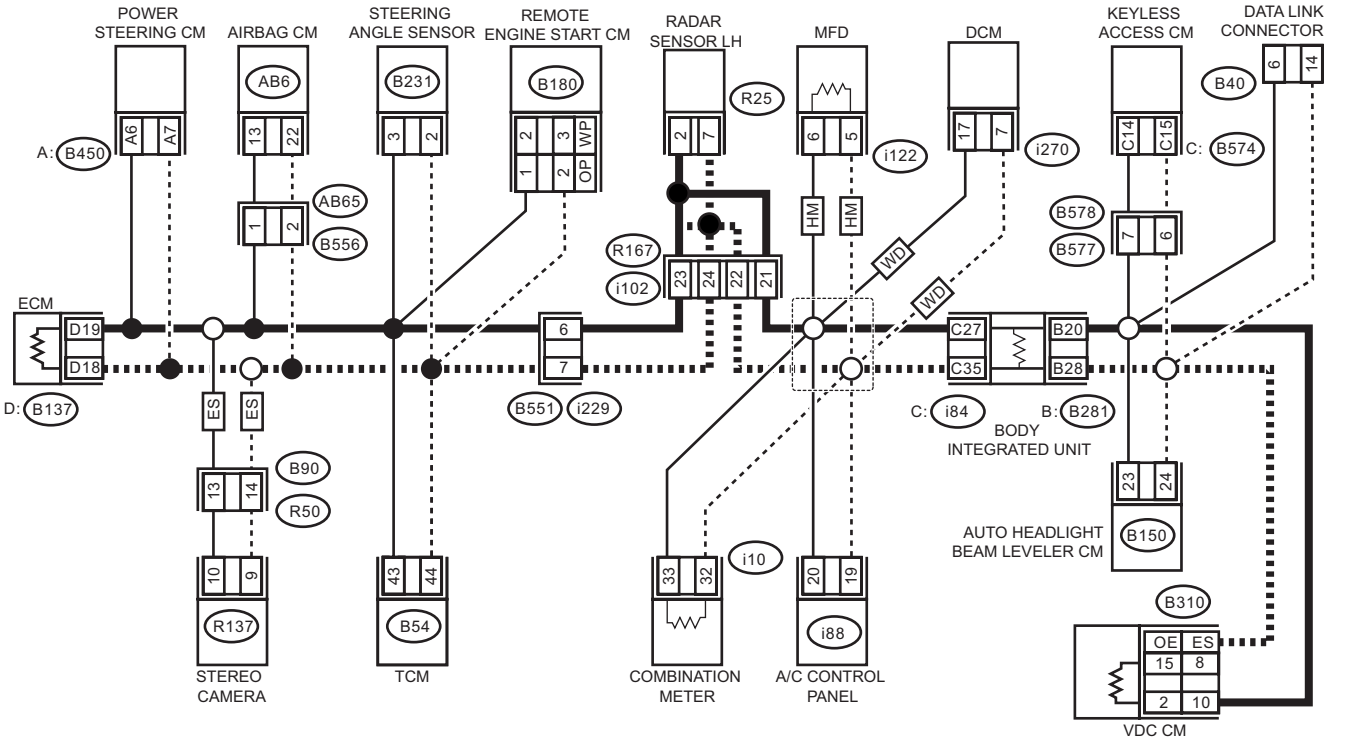
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

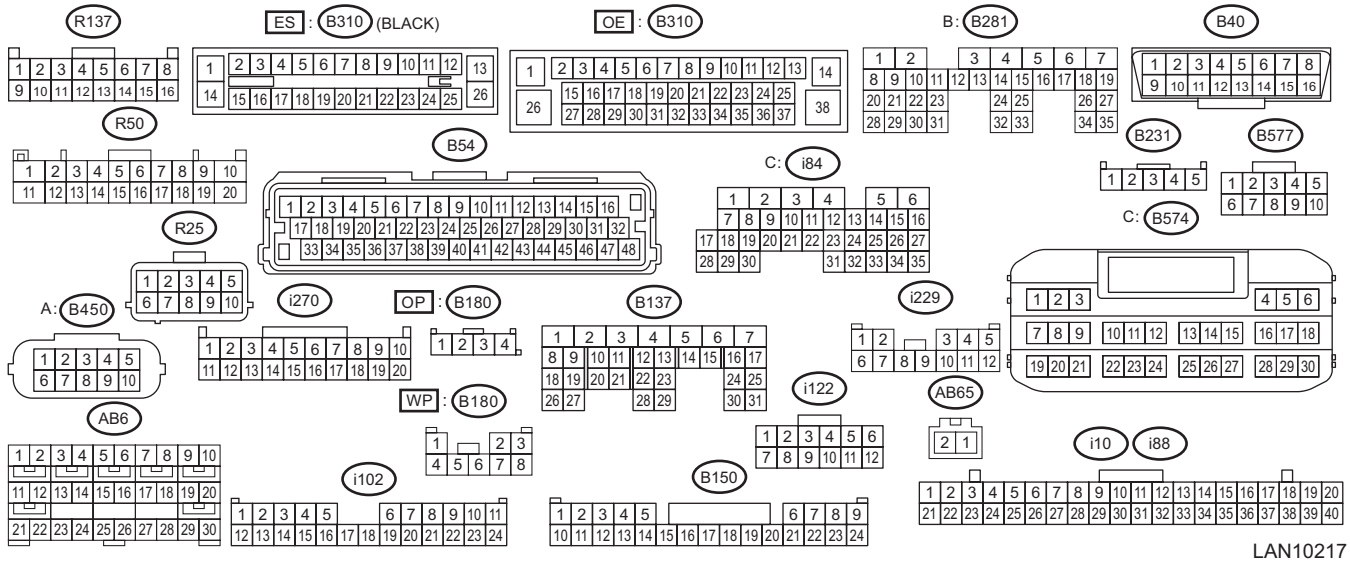
- Without BSD/RCTA





- With BSD/RCTA





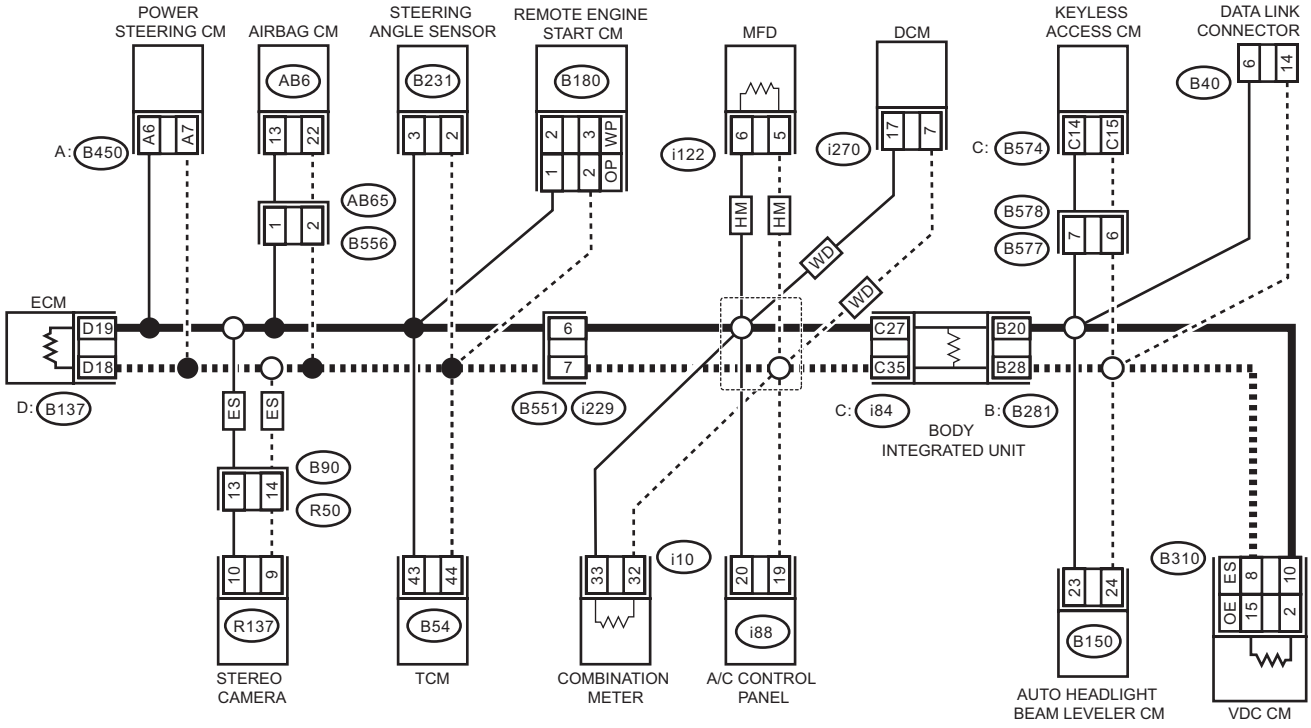
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the A/C control panel connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i88) No. 19 — No. 20:***	Is the resistance 400 Ω or more?	Related lines between A/C control panel and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i88) No. 19 — (B40) No. 14:*** ***(i88) No. 20 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of A/C control panel related lines.	Check the DTC of A/C control panel. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>

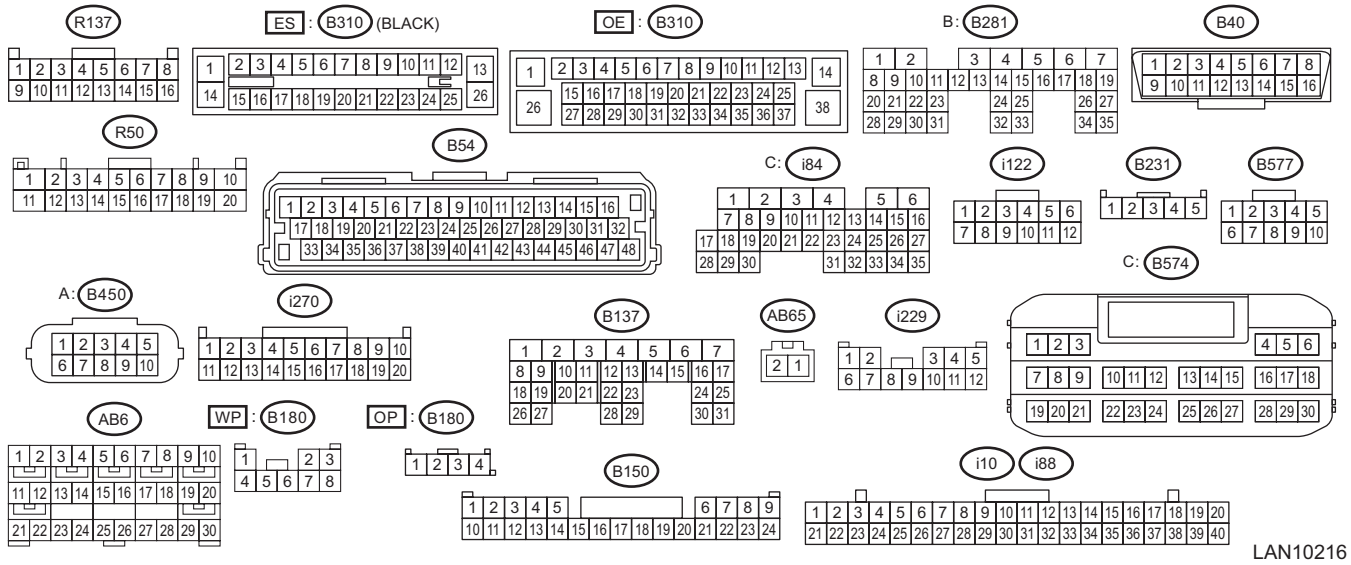
9. RELATED LINES 53 — 61 Ω (POWER STEERING)

WIRING DIAGRAM:

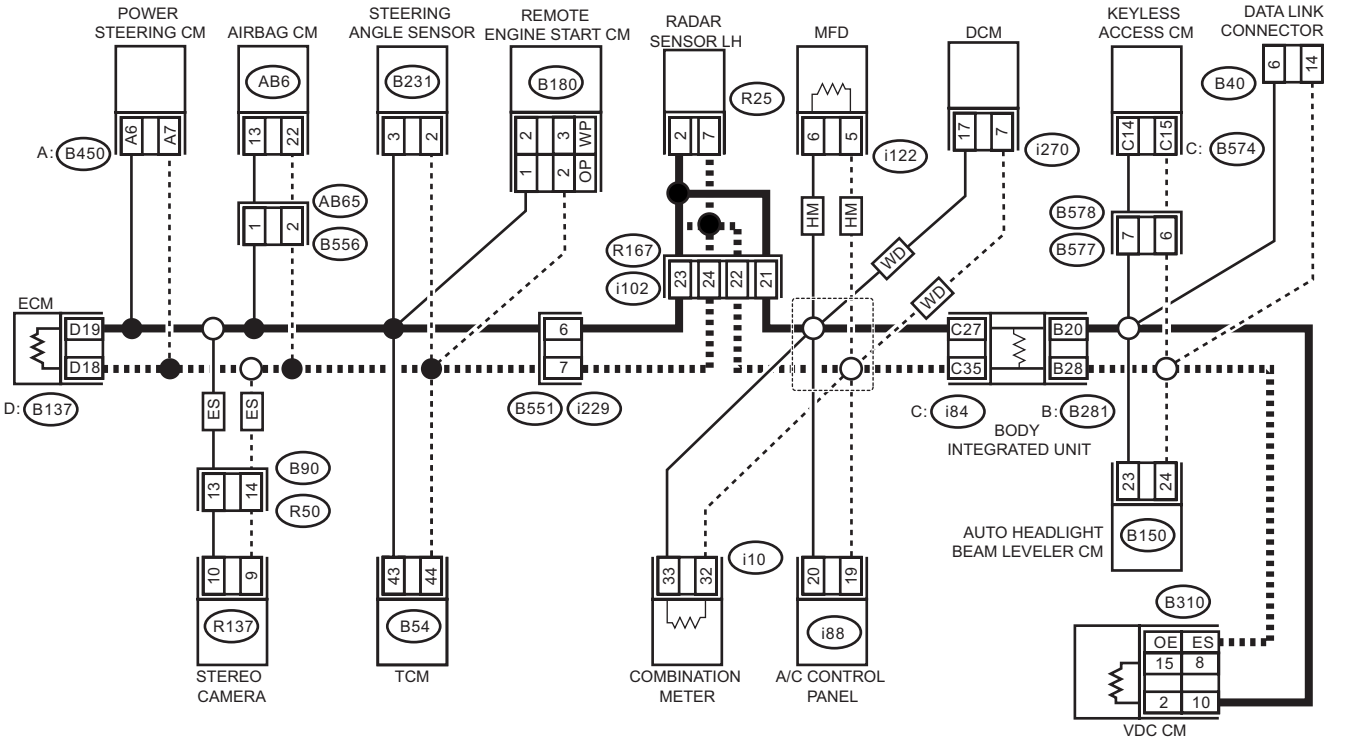
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

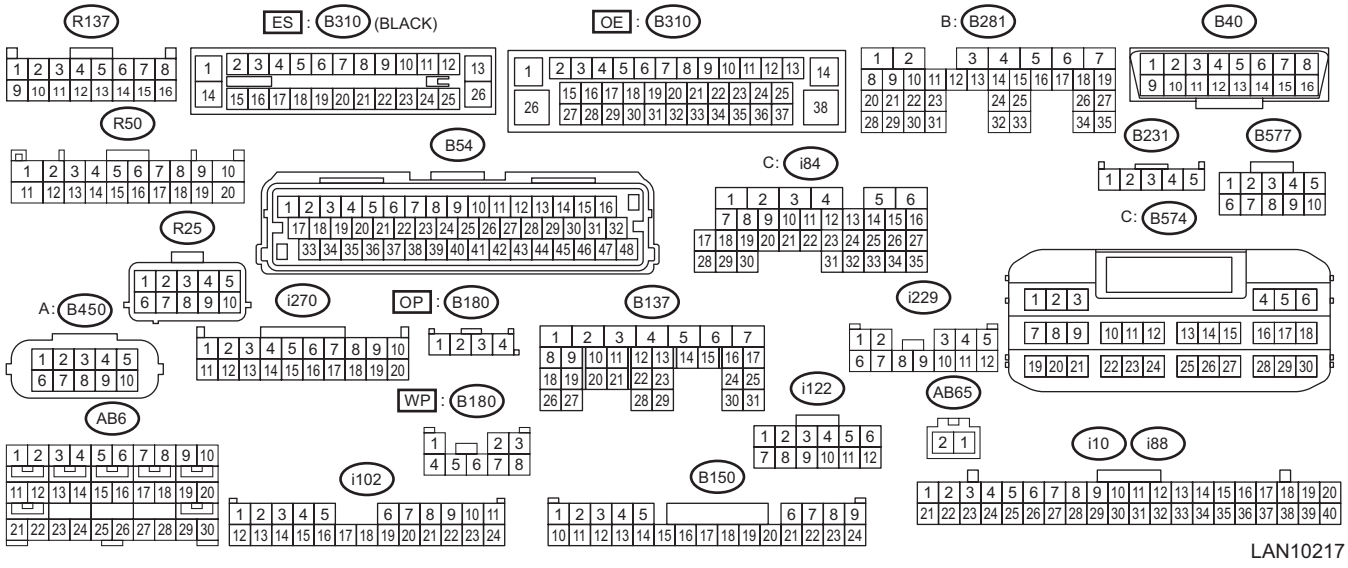
- Without BSD/RCTA





- With BSD/RCTA





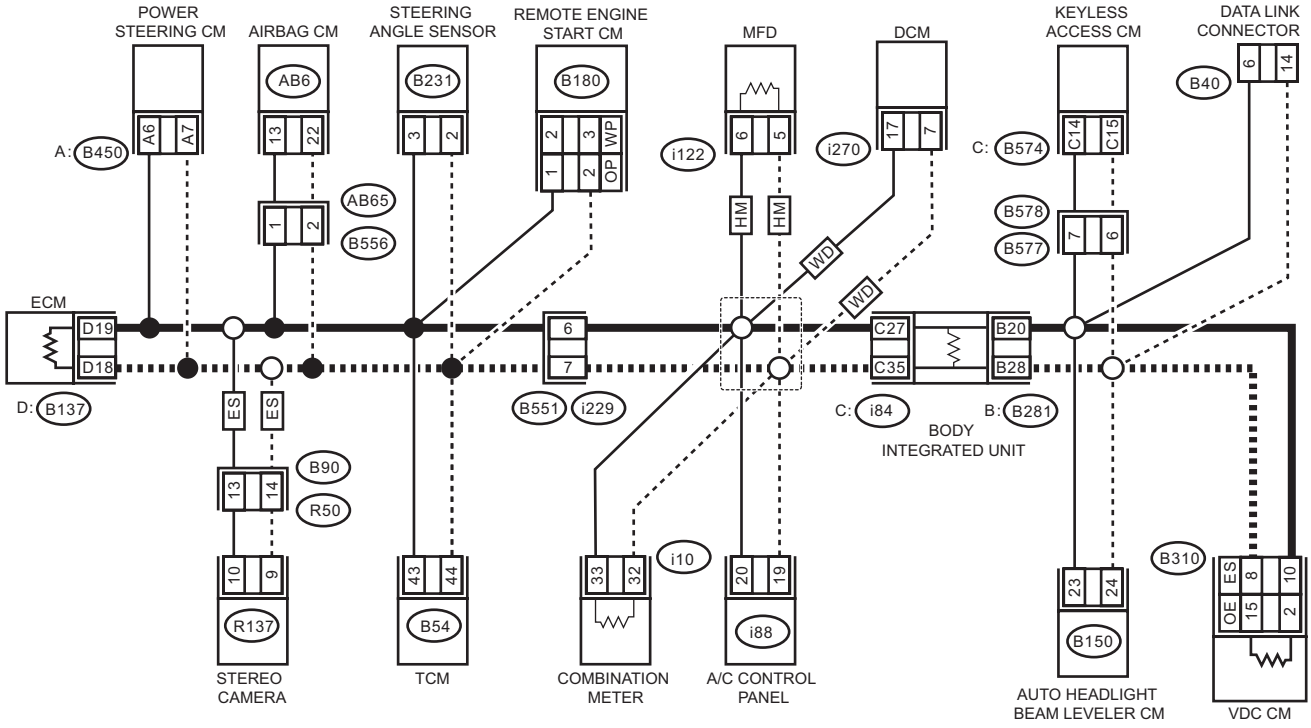
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the power steering CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B450) No. 6 — No. 7:***	Is the resistance 400 Ω or more?	Related lines or main wiring harness between power steering CM and main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B450) No. 6 — (B40) No. 6:*** ***(B450) No. 7 — (B40) No. 14:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit portion of power steering CM related lines.	Check DTC of power steering CM. <Ref. to PS(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).>

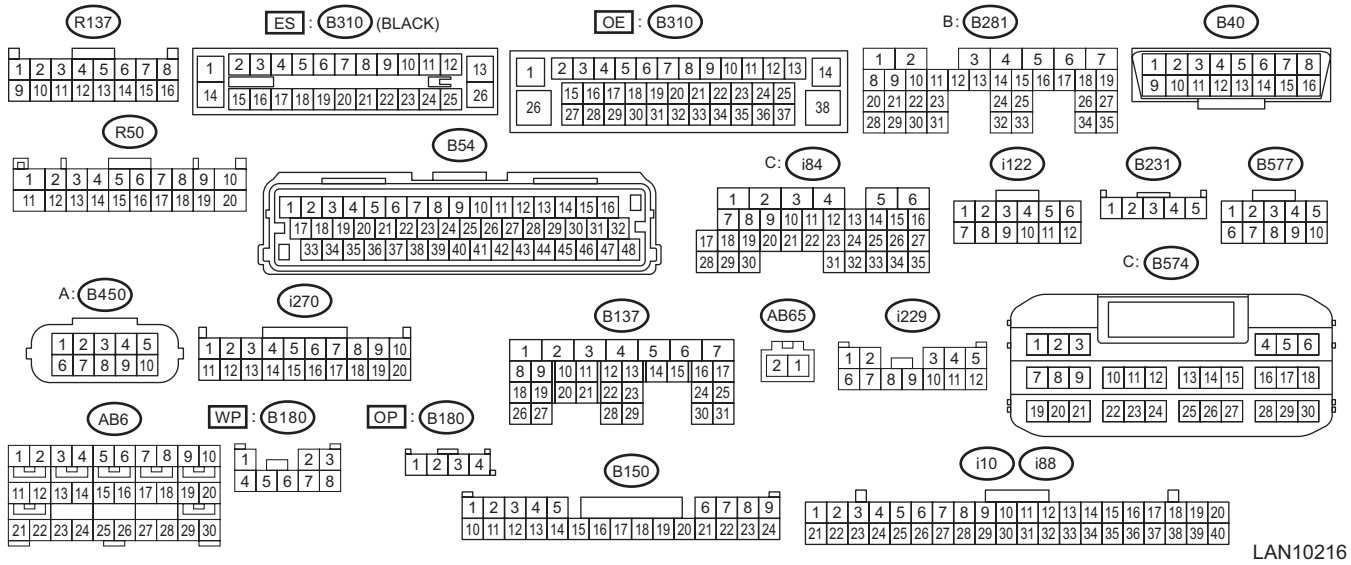
10.RELATED LINES 53 — 61 Ω (COMBINATION METER)

WIRING DIAGRAM:

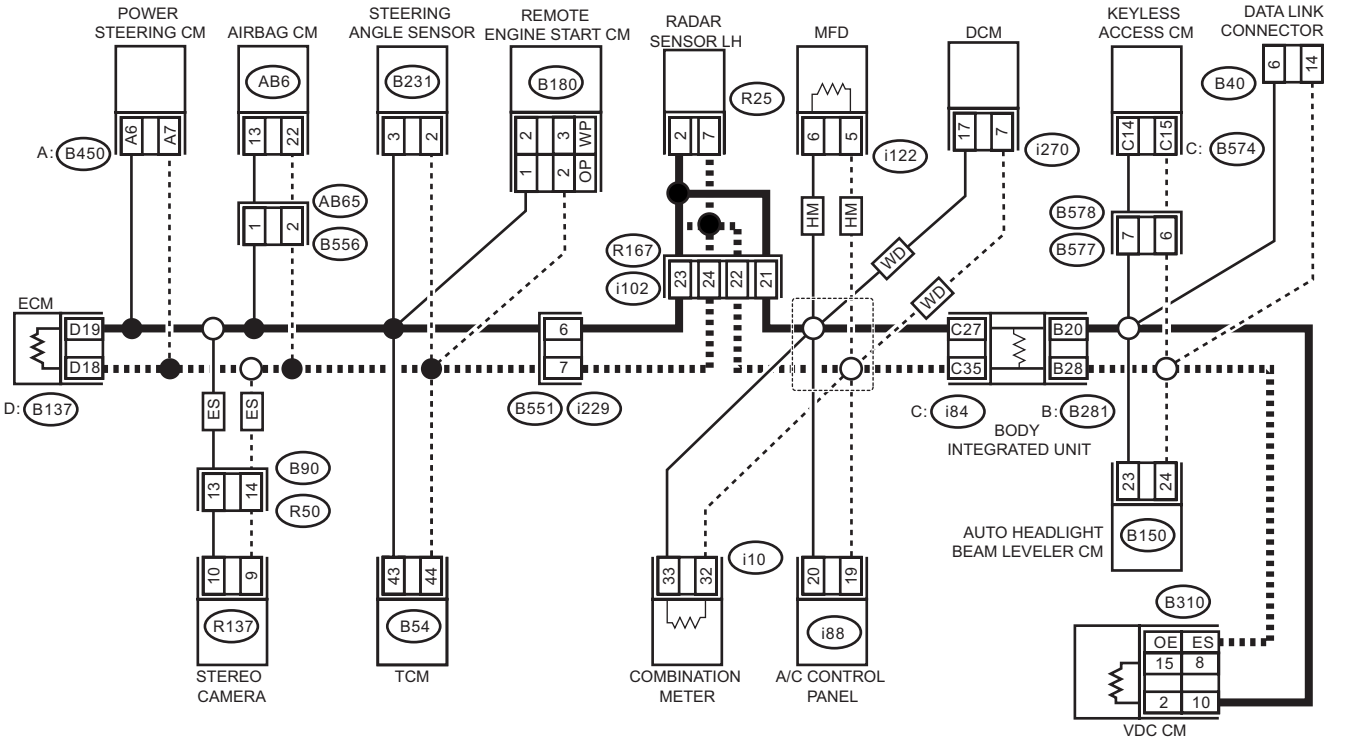
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

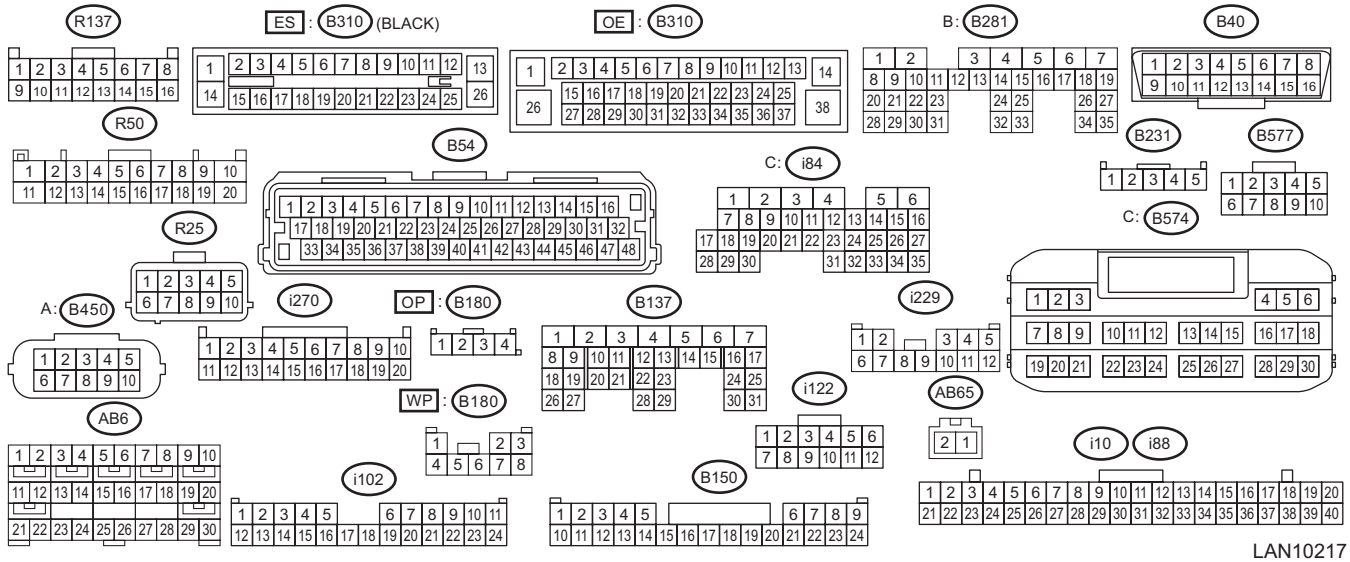
- Without BSD/RCTA





- With BSD/RCTA





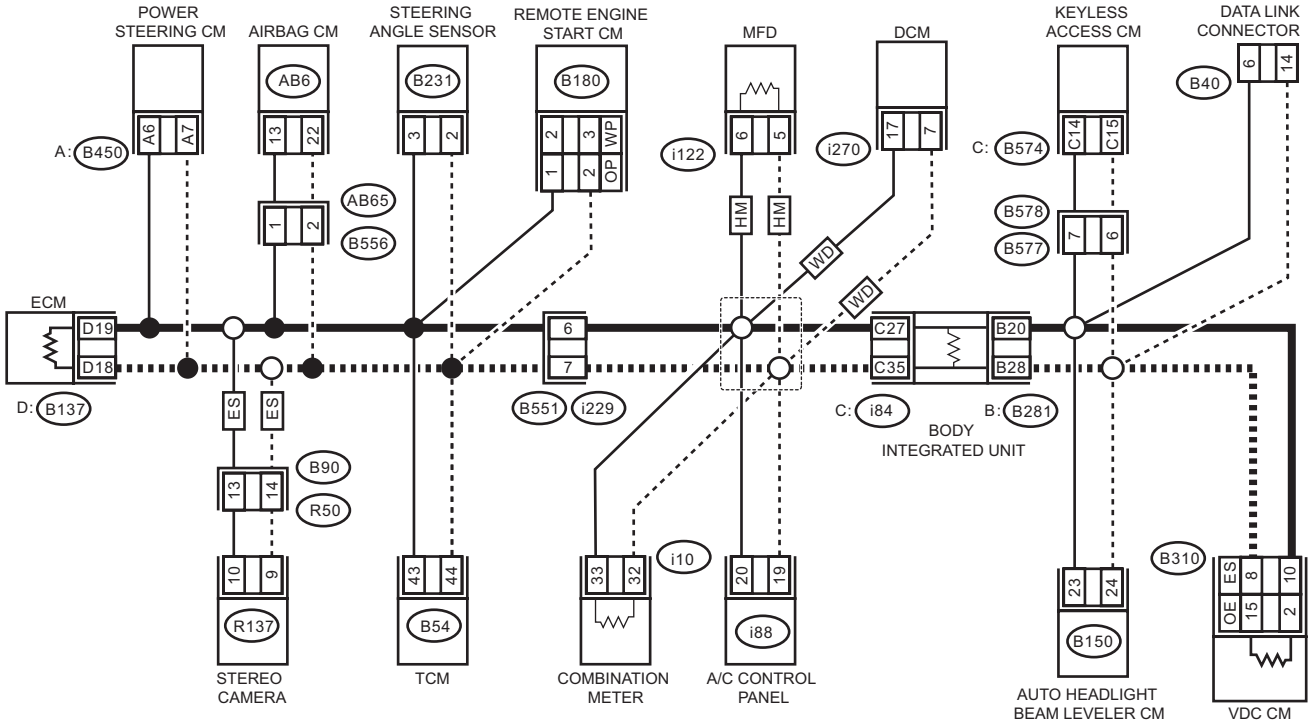
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the combination meter connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i10) No. 32 — No. 33:***	Is the resistance 400 Ω or more?	Related lines between combination meter and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i10) No. 32 — (B40) No. 14:*** ***(i10) No. 33 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of combination meter related lines.	Check DTC of combination meter. <Ref. to IDI(diag)-14, OPERATION, Read Diagnostic Trouble Code (DTC).>

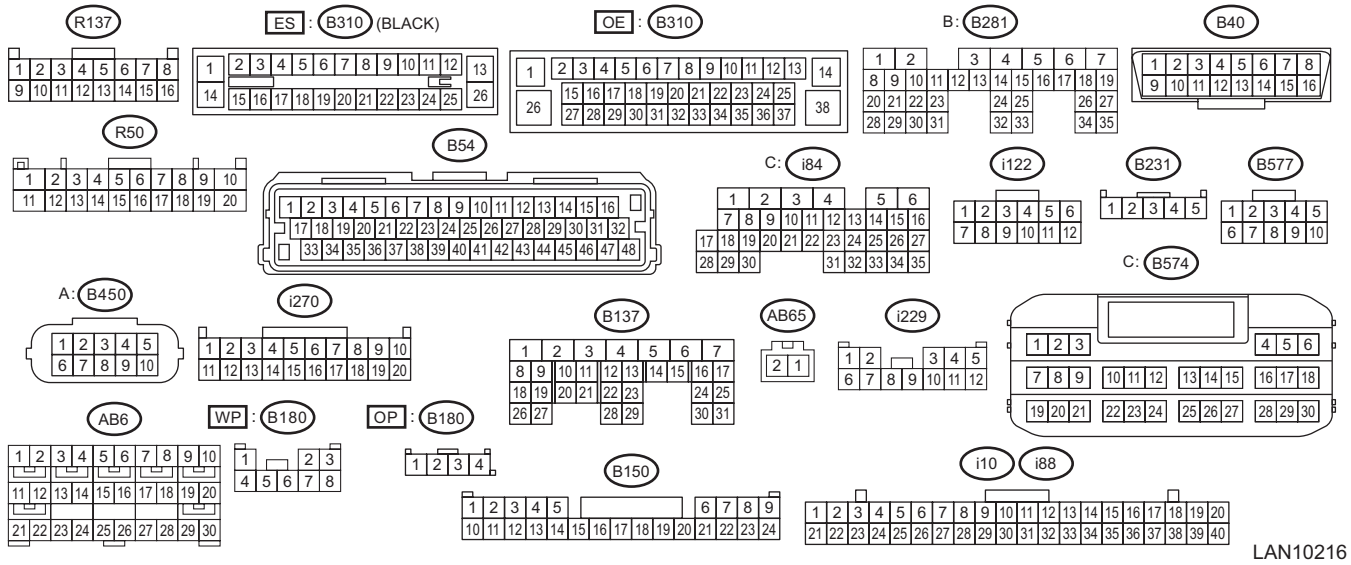
11.RELATED LINES 53 — 61 Ω (MFD)

WIRING DIAGRAM:

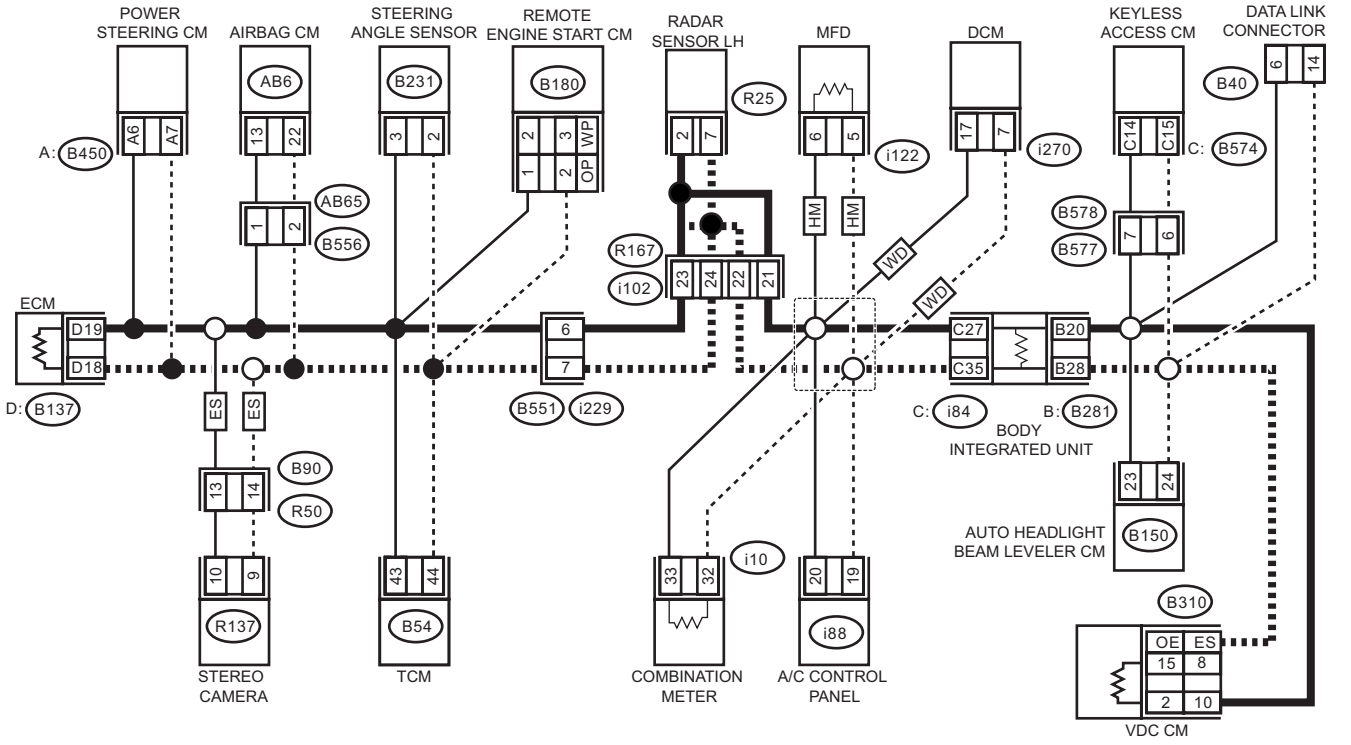
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

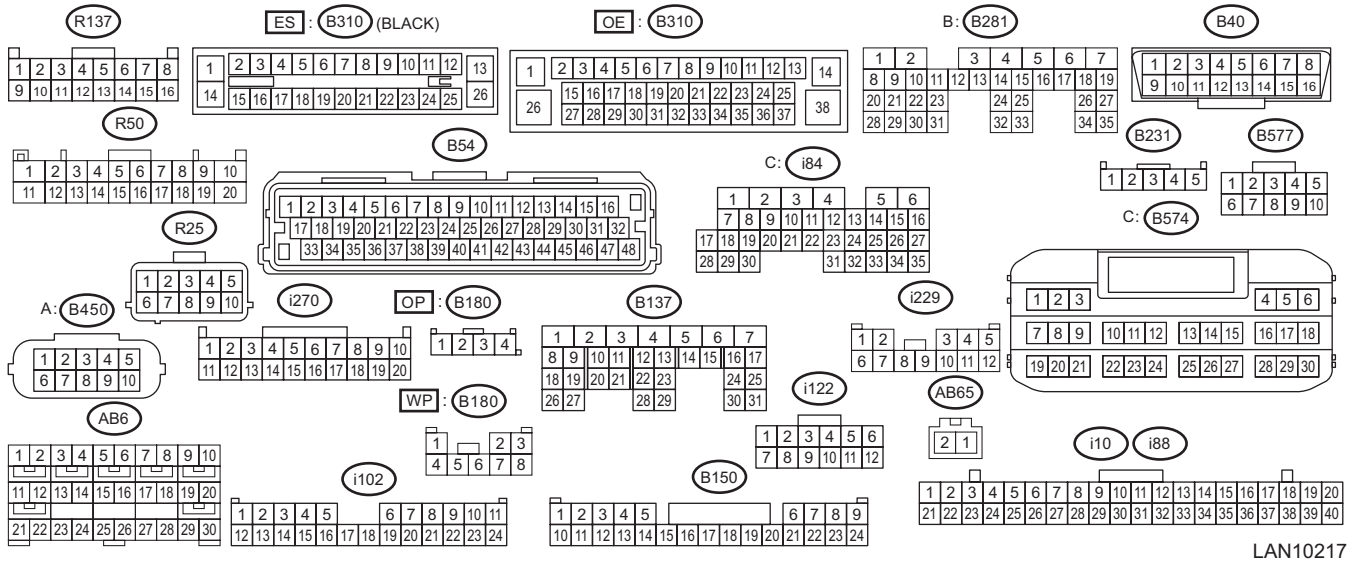
- Without BSD/RCTA





- With BSD/RCTA





Step		Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the MFD connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal (i122) No. 5 — No. 6:***	Is the resistance 400 Ω or more?	Related lines between MFD and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.

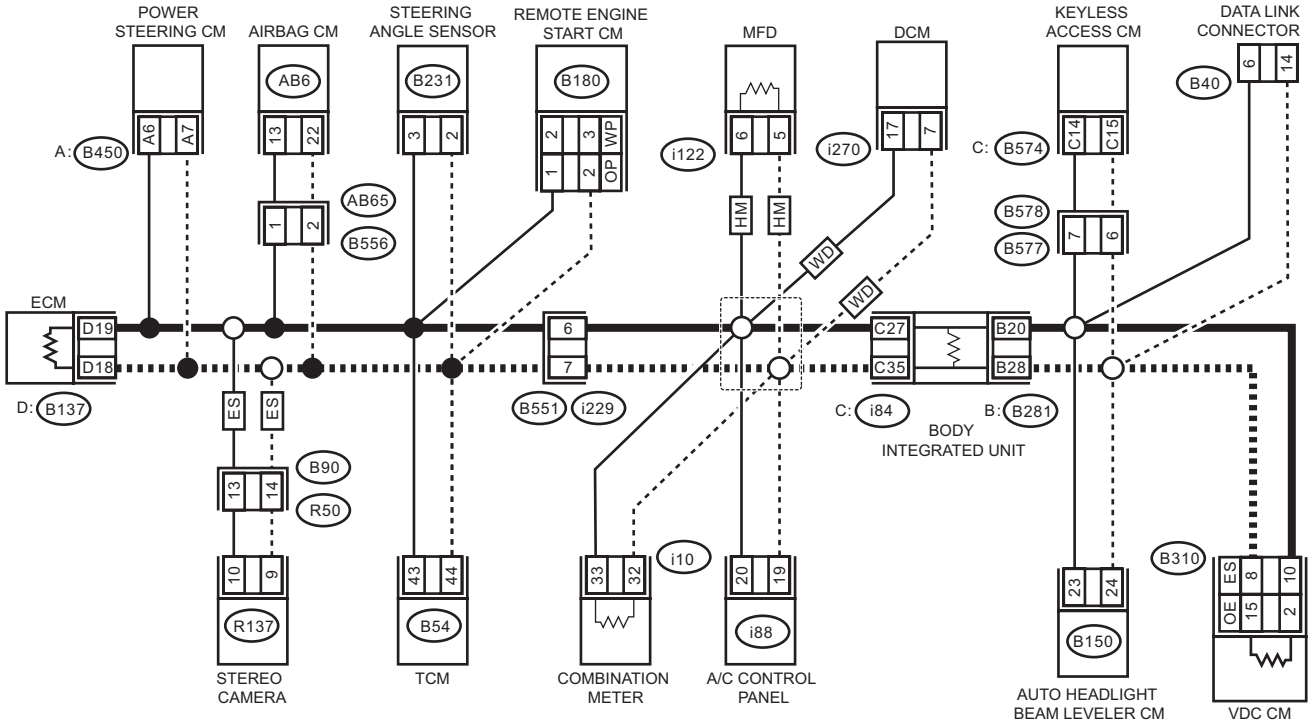
Step		Check	Yes	No
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i122) No. 5 — (B40) No. 14:*** ***(i122) No. 6 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of MFD related lines.	Check DTC of MFD. <Ref. to IDI(diag)-14, OPERATION, Read Diagnostic Trouble Code (DTC).>

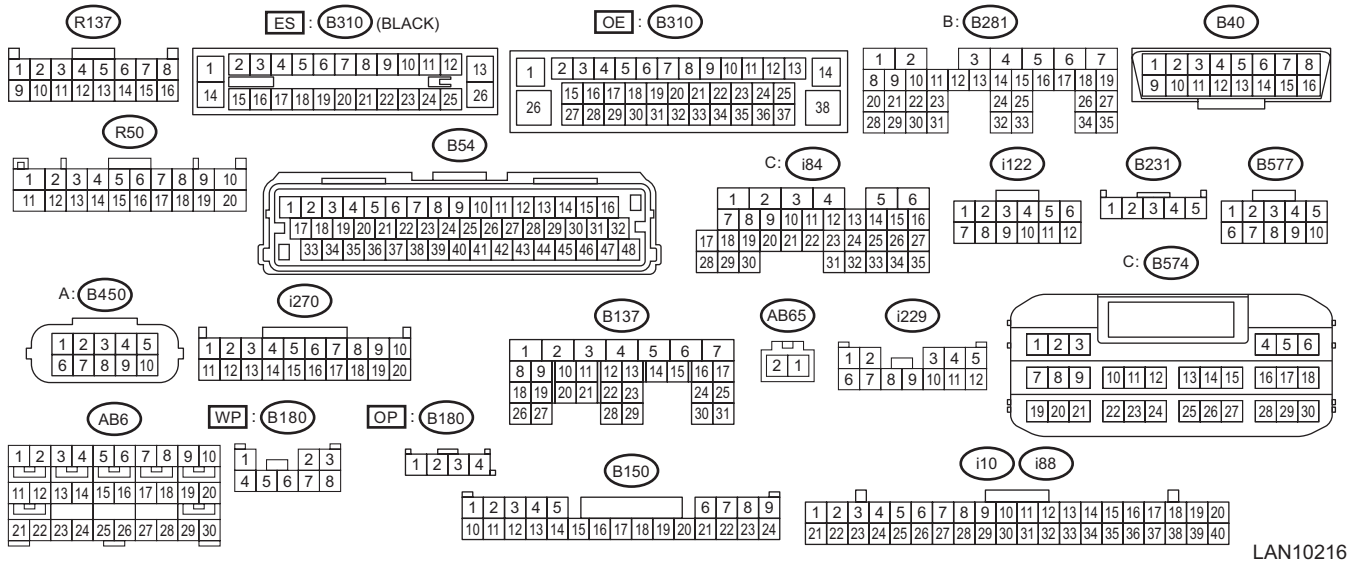
12.RELATED LINES 53 — 61 Ω (AIRBAG CM SYSTEM)

WIRING DIAGRAM:

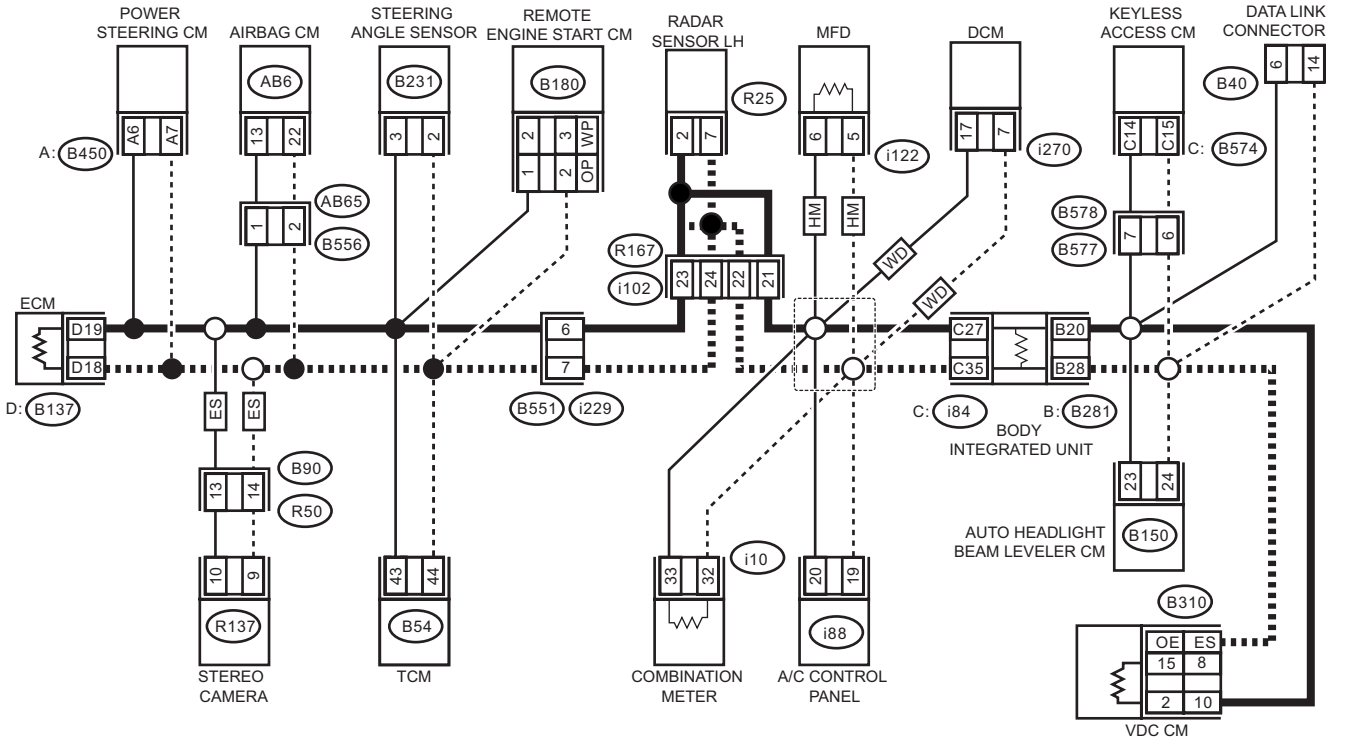
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

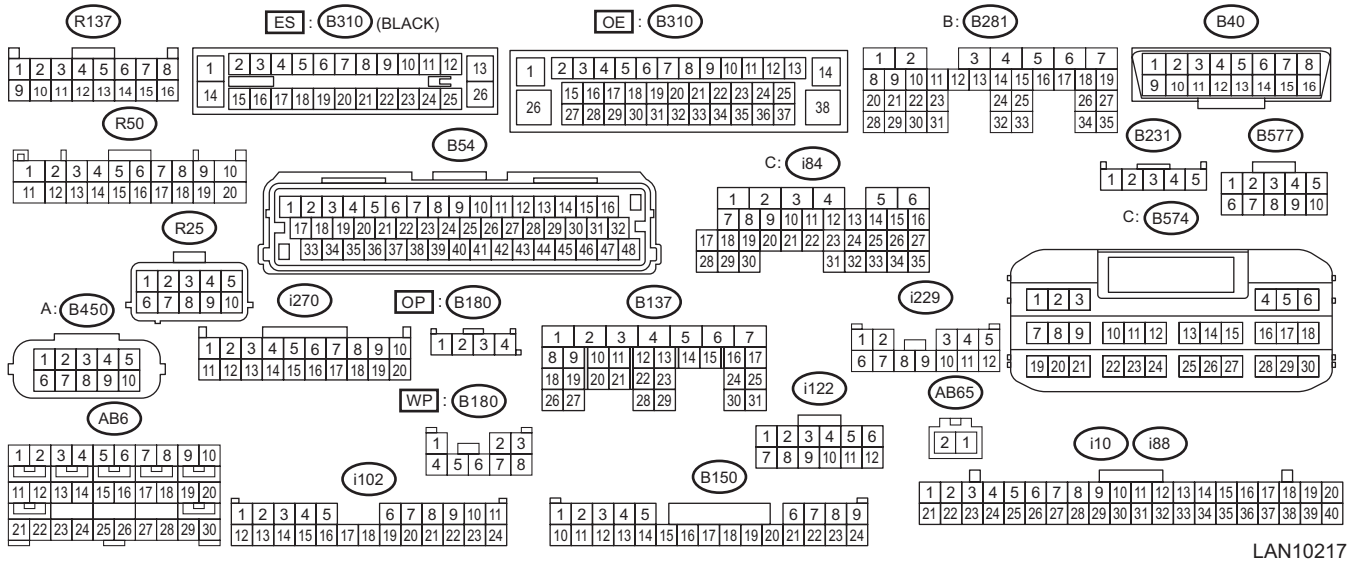
- Without BSD/RCTA





- With BSD/RCTA





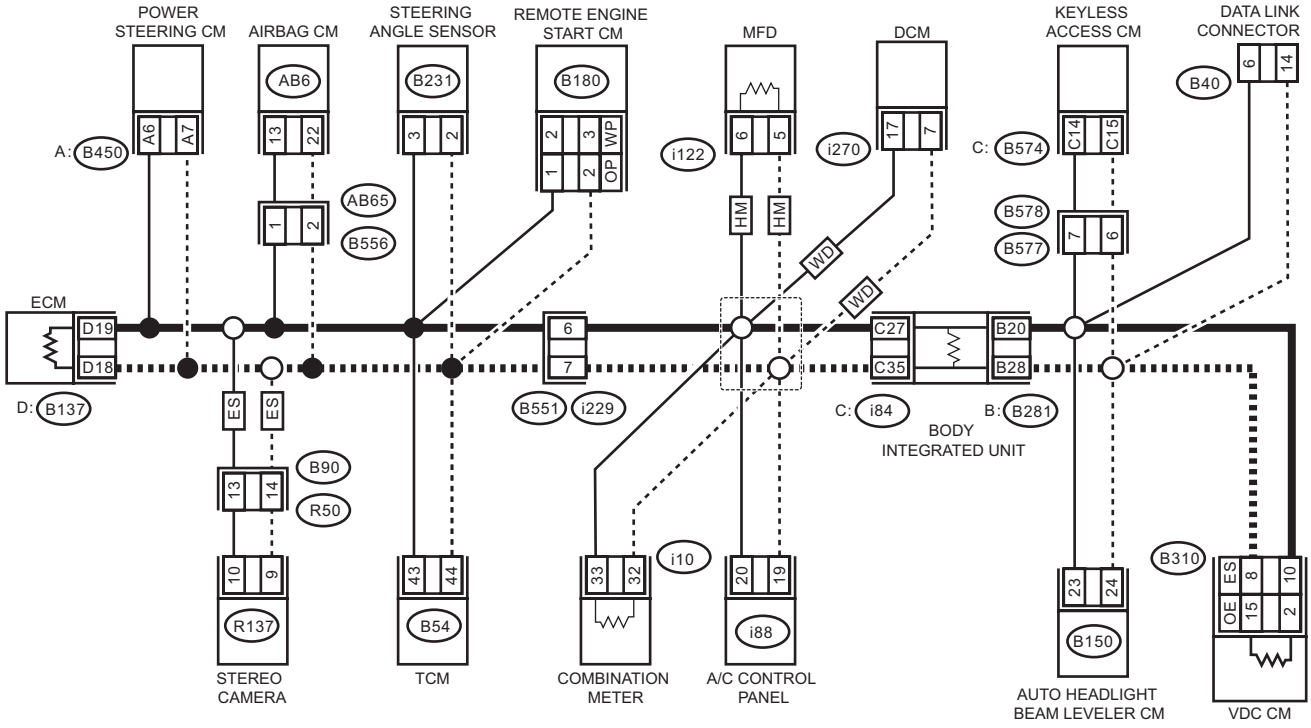
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the airbag CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(AB6) No. 13 — No. 22:***	Is the resistance 400 Ω or more?	Related lines between airbag CM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(AB6) No. 22 — (B40) No. 14:*** ***(AB6) No. 13 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit portion of airbag CM related lines.	Check DTC of airbag CM. <Ref. to AB(diag)-27, OPERATION, Read Diagnostic Trouble Code (DTC).>

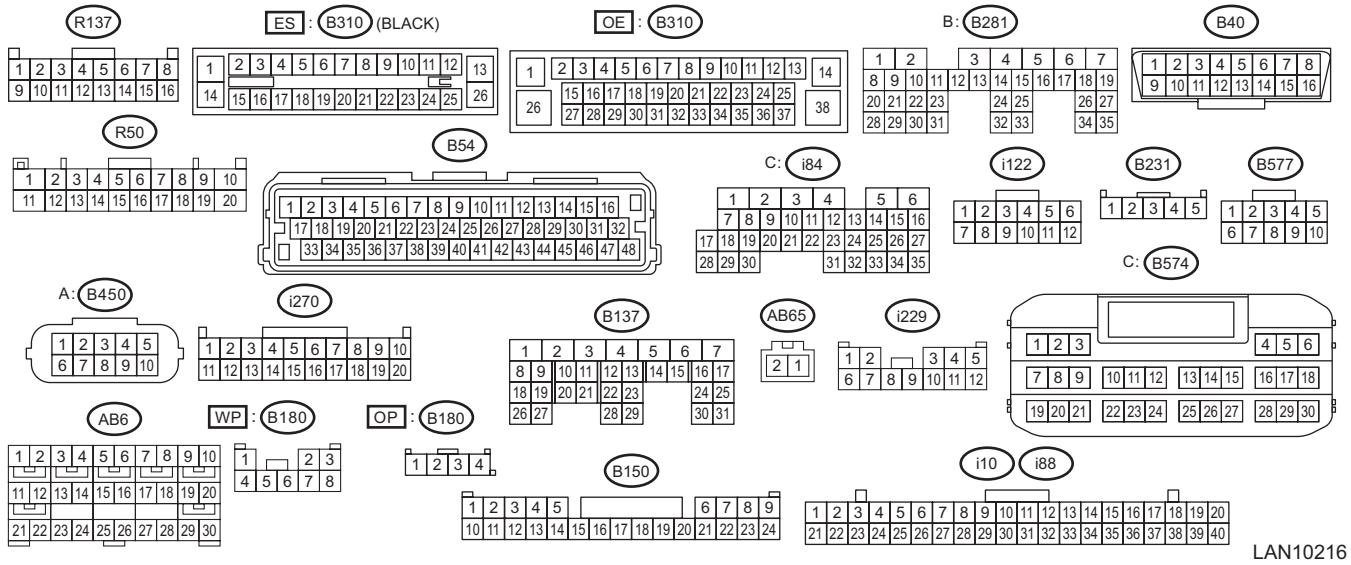
13.RELATED LINES 53 — 61 Ω (KEYLESS ACCESS SYSTEM)

WIRING DIAGRAM:

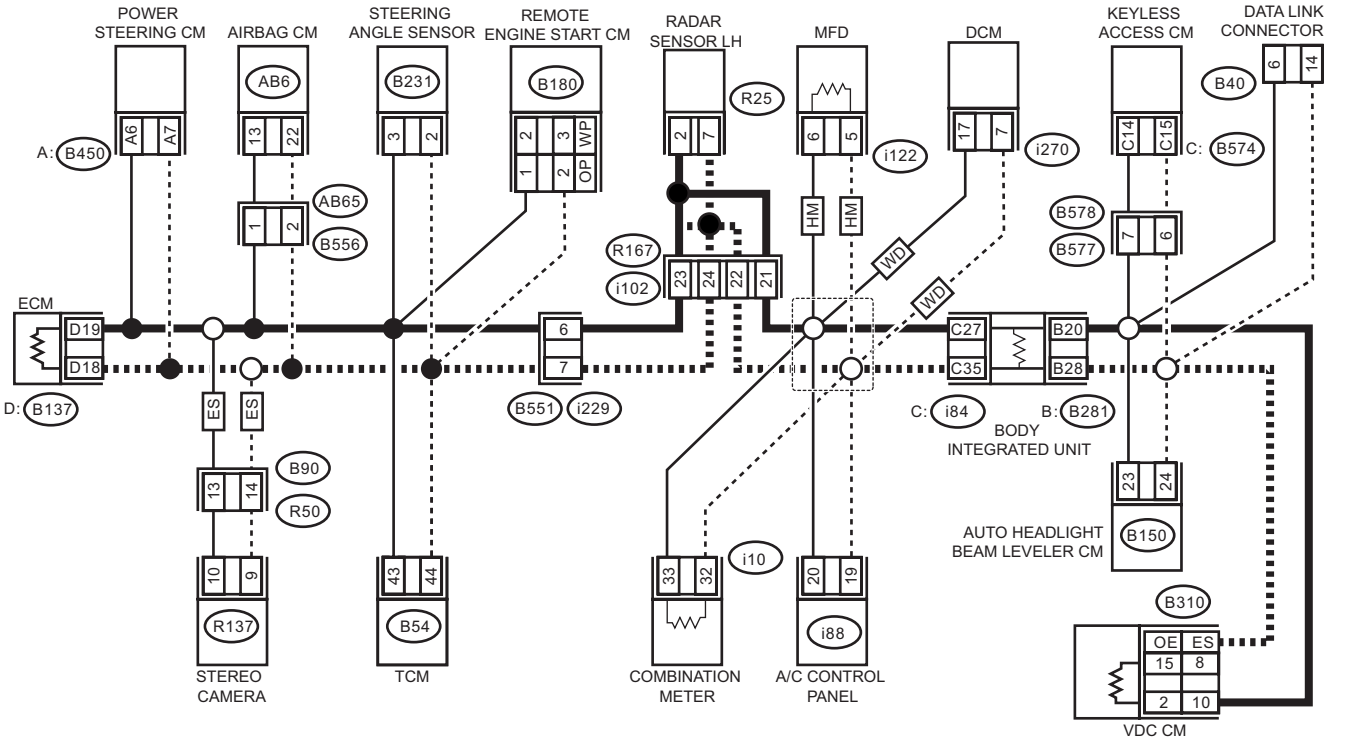
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

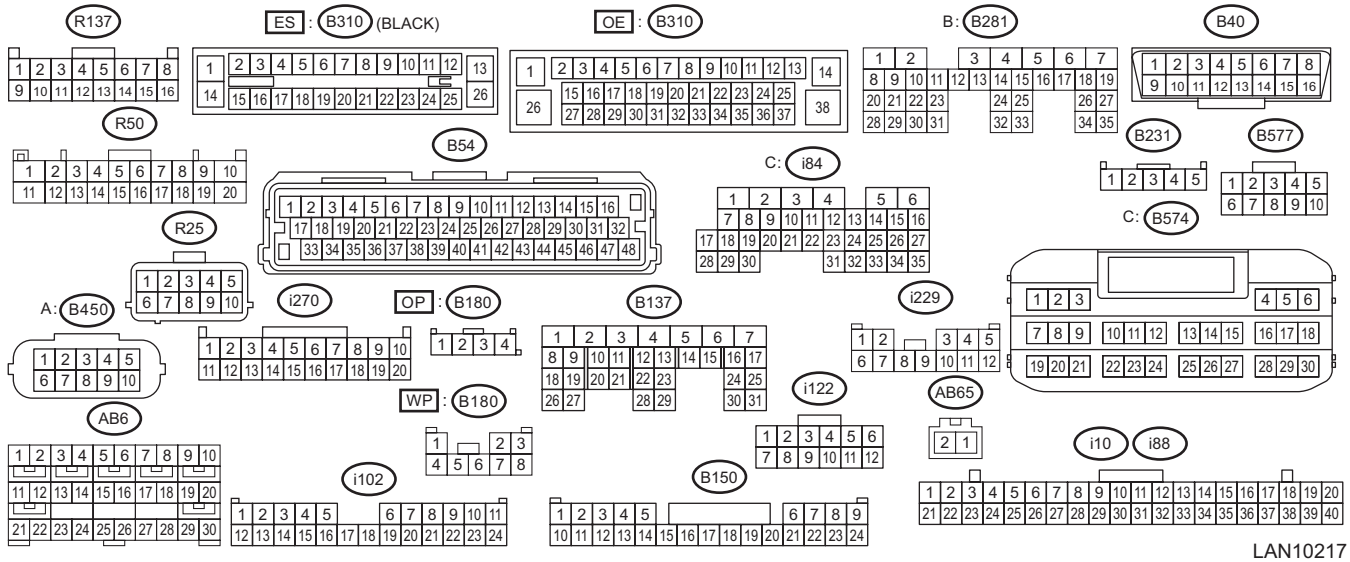
- Without BSD/RCTA





- With BSD/RCTA





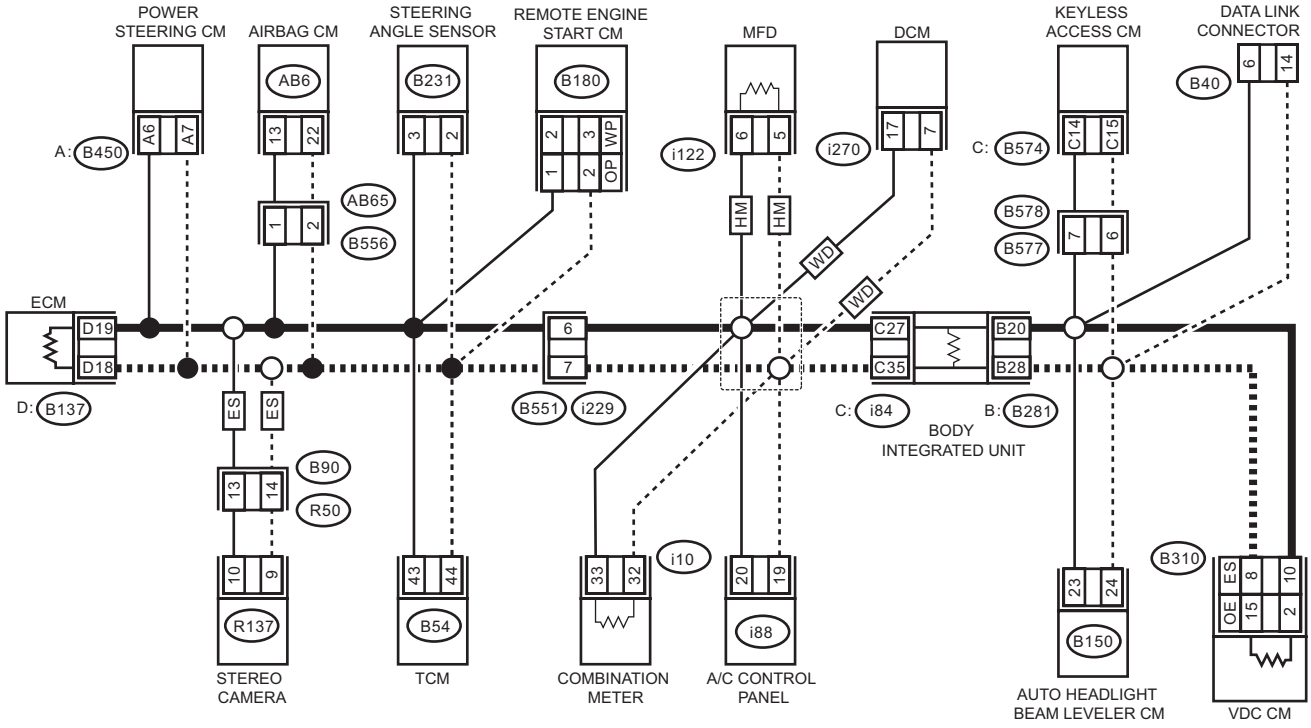
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B574) No. 14 — No. 15:***	Is the resistance 400 Ω or more?	Related lines between keyless access CM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B574) No. 15 — (B40) No. 14:*** ***(B574) No. 14 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of keyless access CM related lines.	Check DTC of keyless access CM. <Ref. to KPS(diag)-28, OPERATION, Read Diagnostic Trouble Code (DTC).>

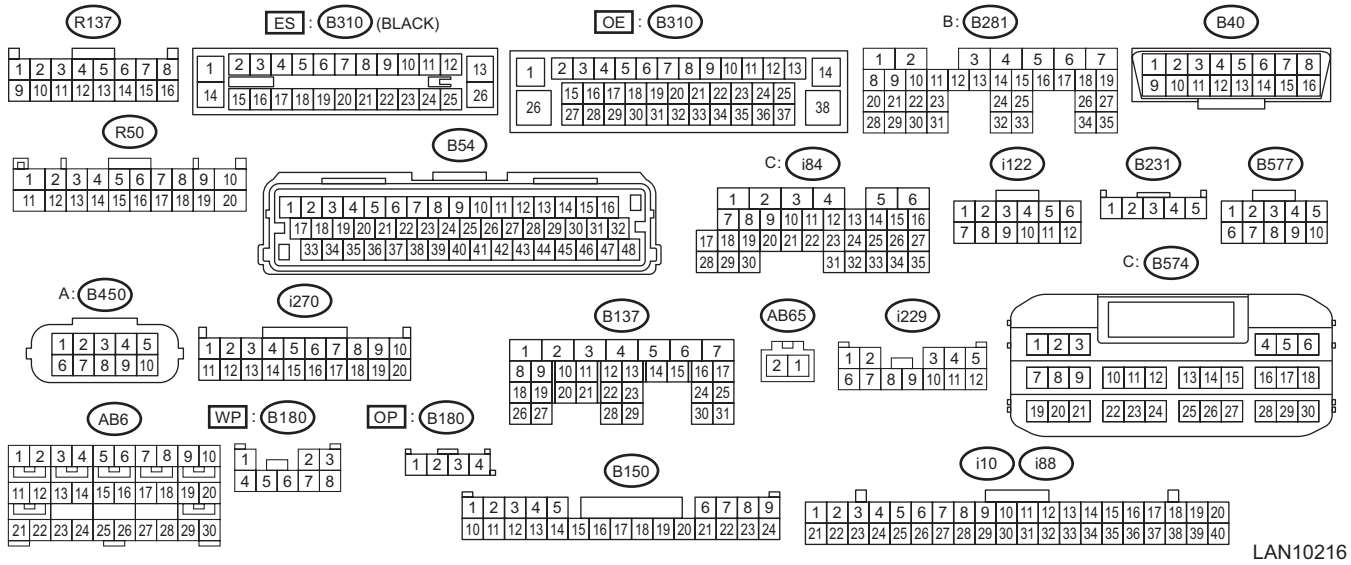
14.RELATED LINES 53 — 61 Ω (STEREO CAMERA)

WIRING DIAGRAM:

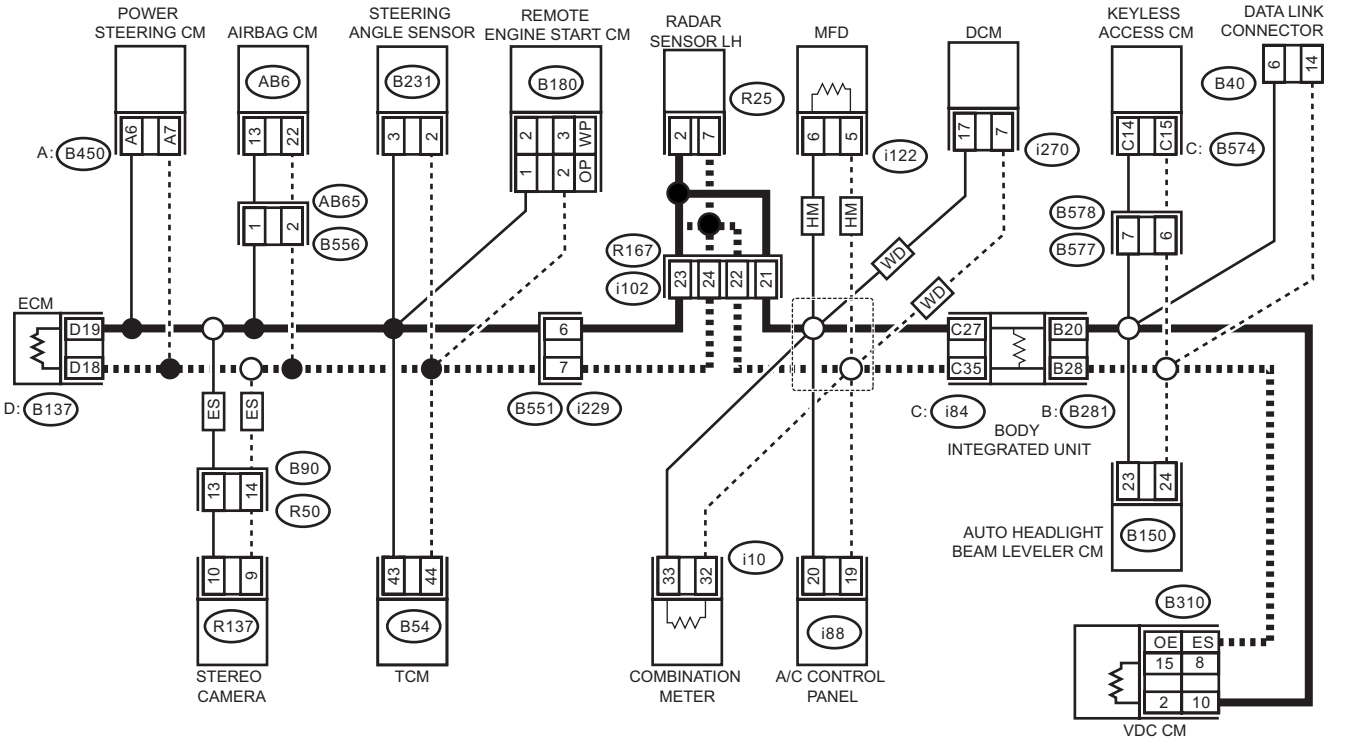
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

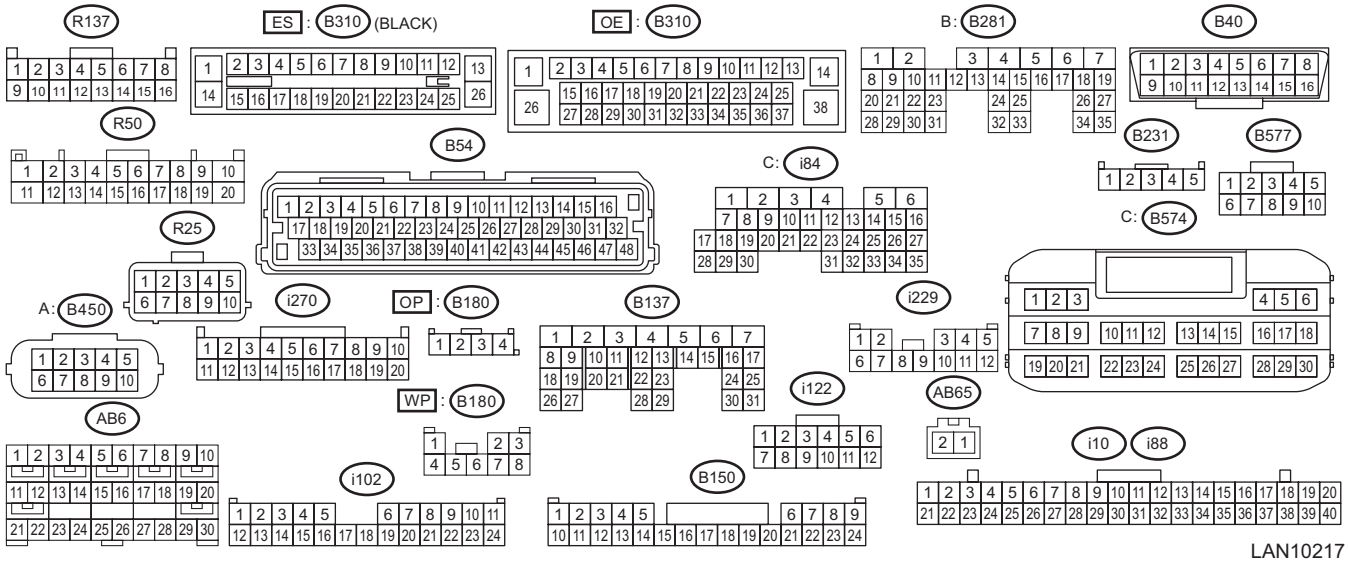
- Without BSD/RCTA





- With BSD/RCTA





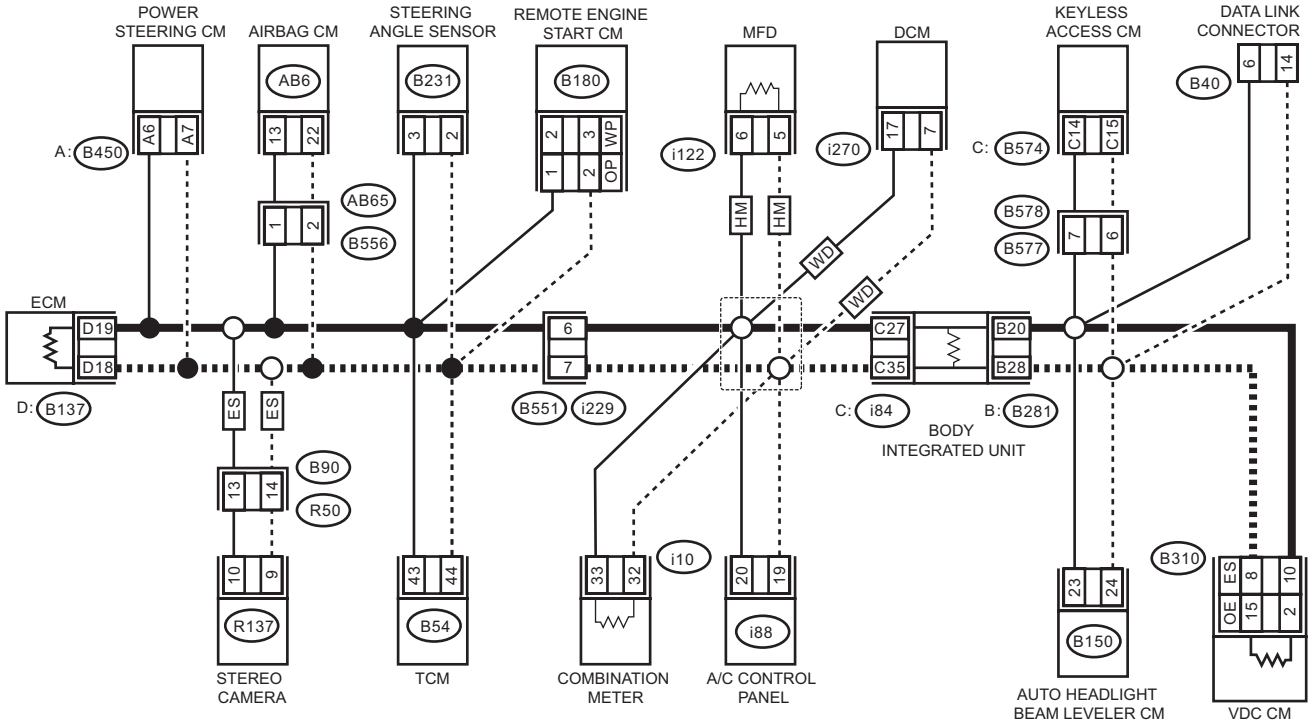
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the stereo camera connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(R137) No. 10 — No. 9:***	Is the resistance 400 Ω or more?	Related lines between stereo camera and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(R137) No. 9 — (B40) No. 14:*** ***(R137) No. 10 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of stereo camera related lines.	Check DTC of stereo camera. <Ref. to ES(diag)-40, Diagnostic Code(s) Display.>

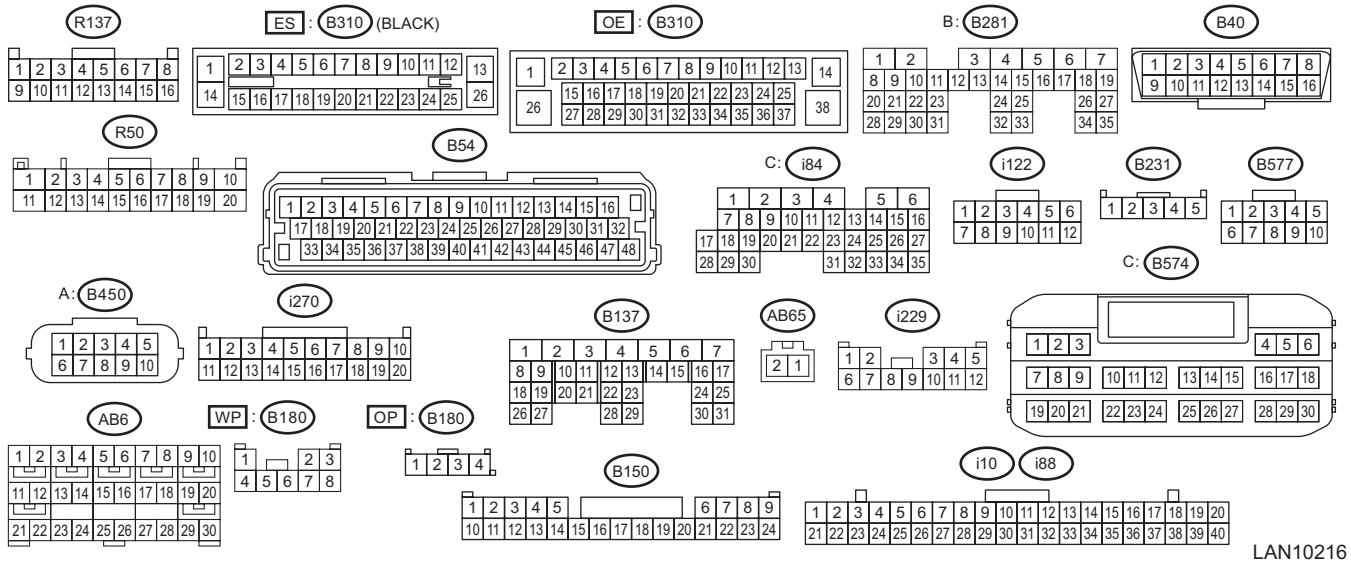
15.RELATED LINES 53 — 61 Ω (HEADLIGHT BEAM LEVELER)

WIRING DIAGRAM:

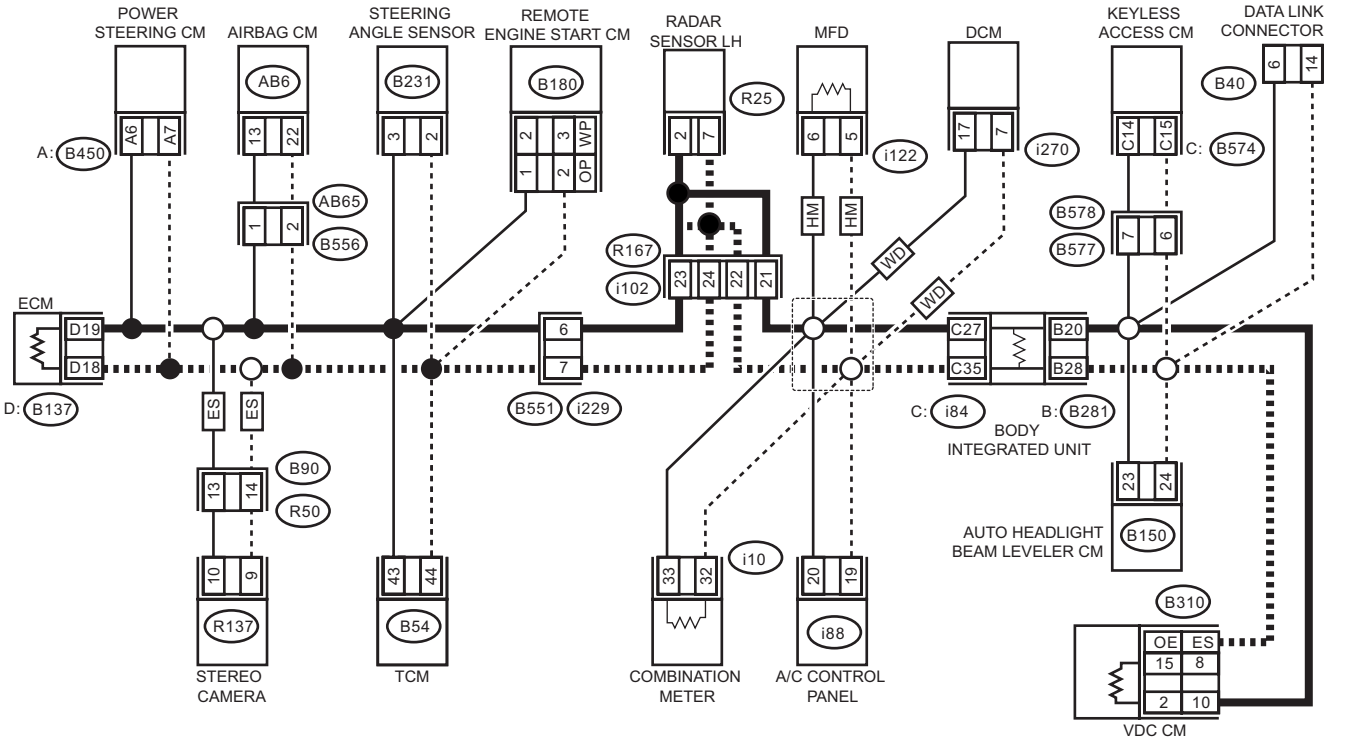
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

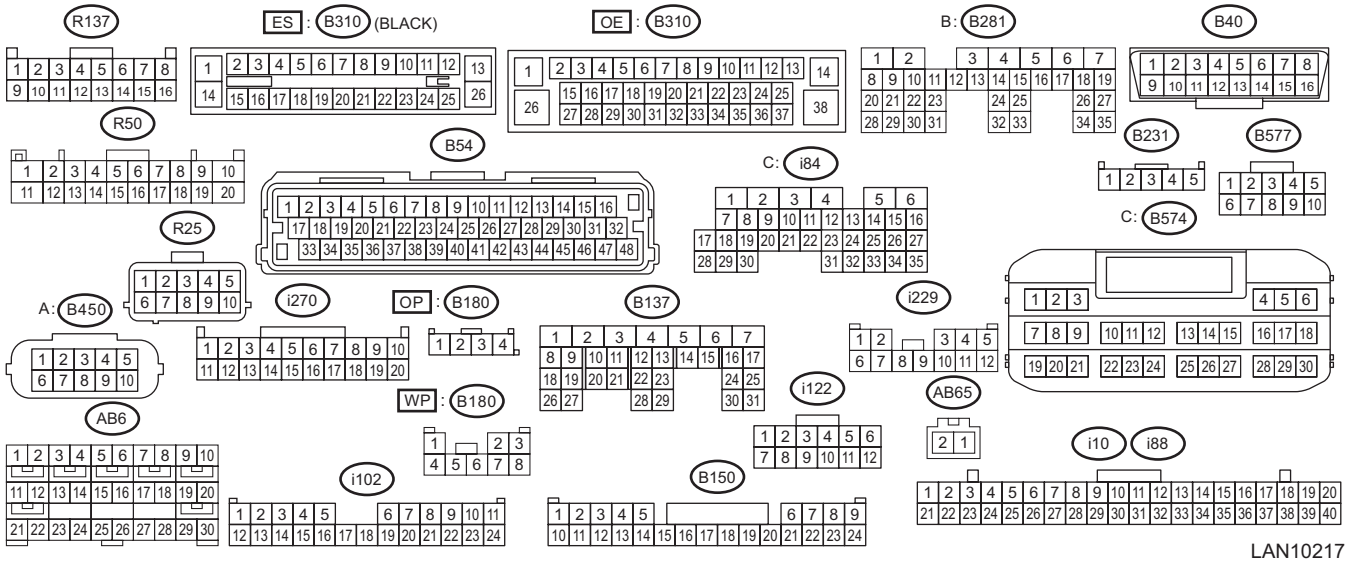
- Without BSD/RCTA





- With BSD/RCTA





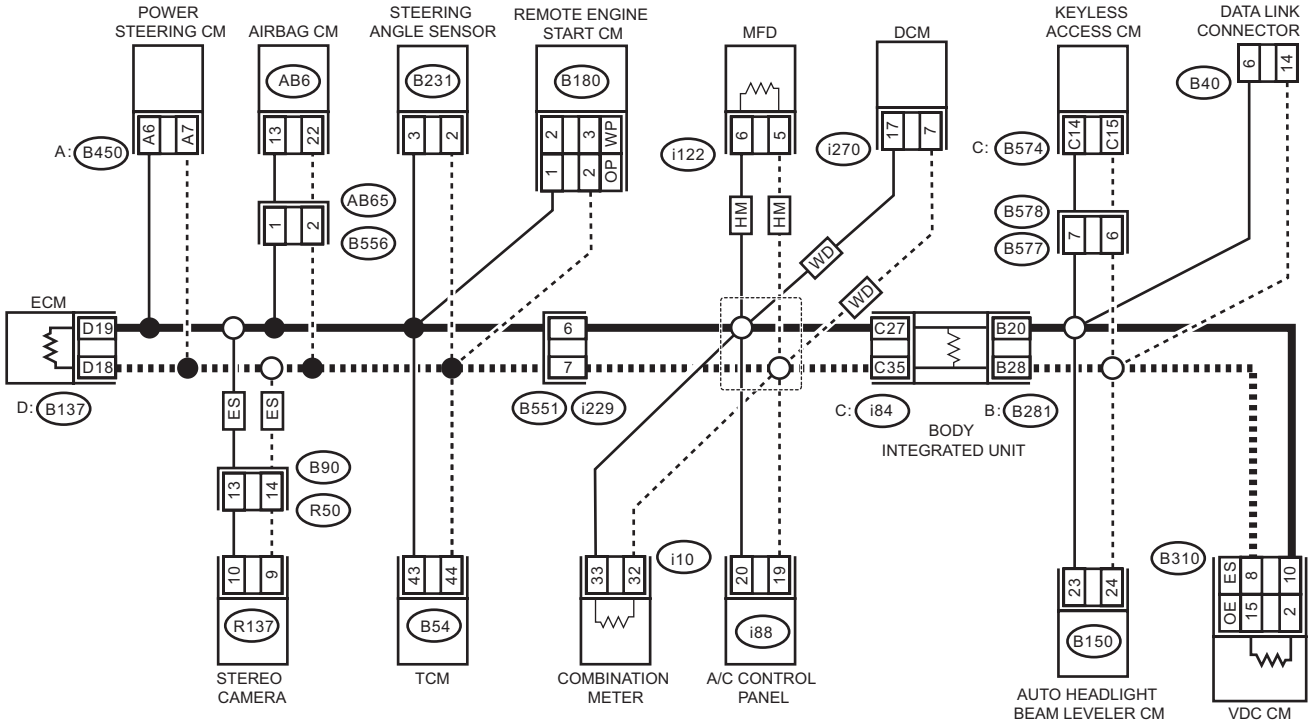
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the headlight beam leveler CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B150) No. 23 — No. 24:***	Is the resistance 400 Ω or more?	Related lines between headlight beam leveler CM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B150) No. 24 — (B40) No. 14:*** ***(B150) No. 23 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit portion of headlight beam leveler CM related lines.	Check DTC of headlight beam leveler system.

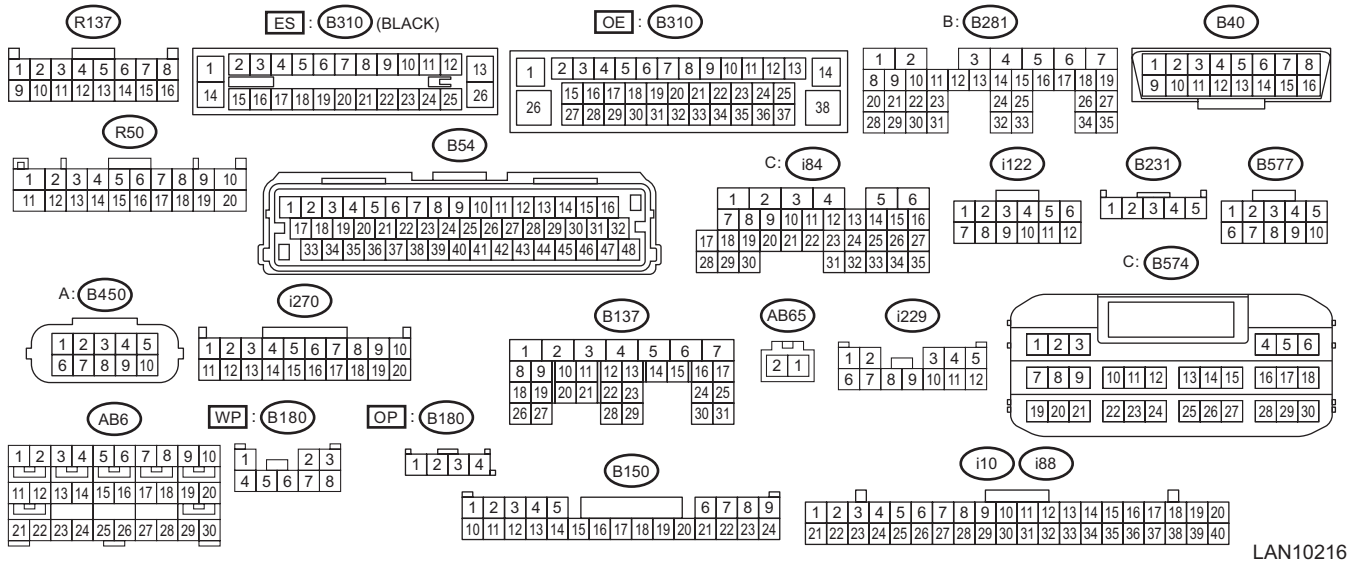
16.RELATED LINES 53 — 61 Ω (REMOTE ENGINE STARTER)

WIRING DIAGRAM:

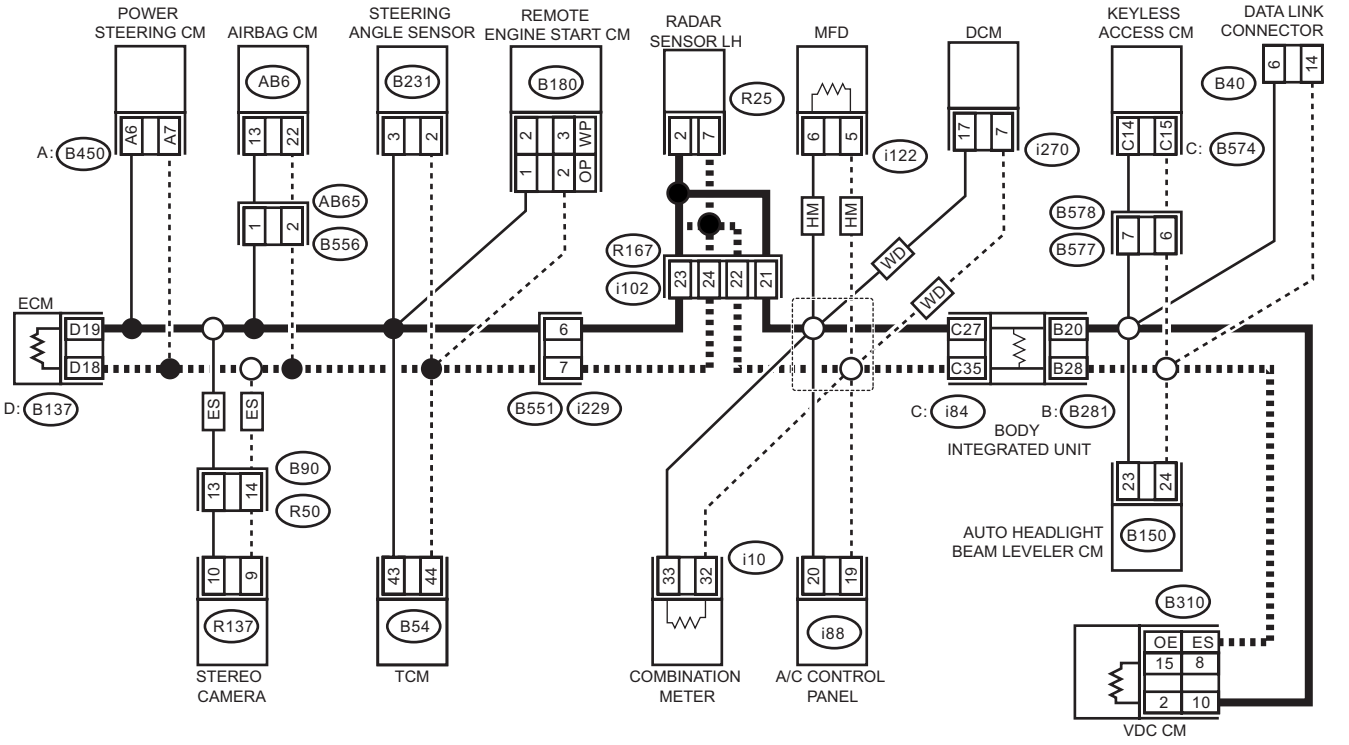
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

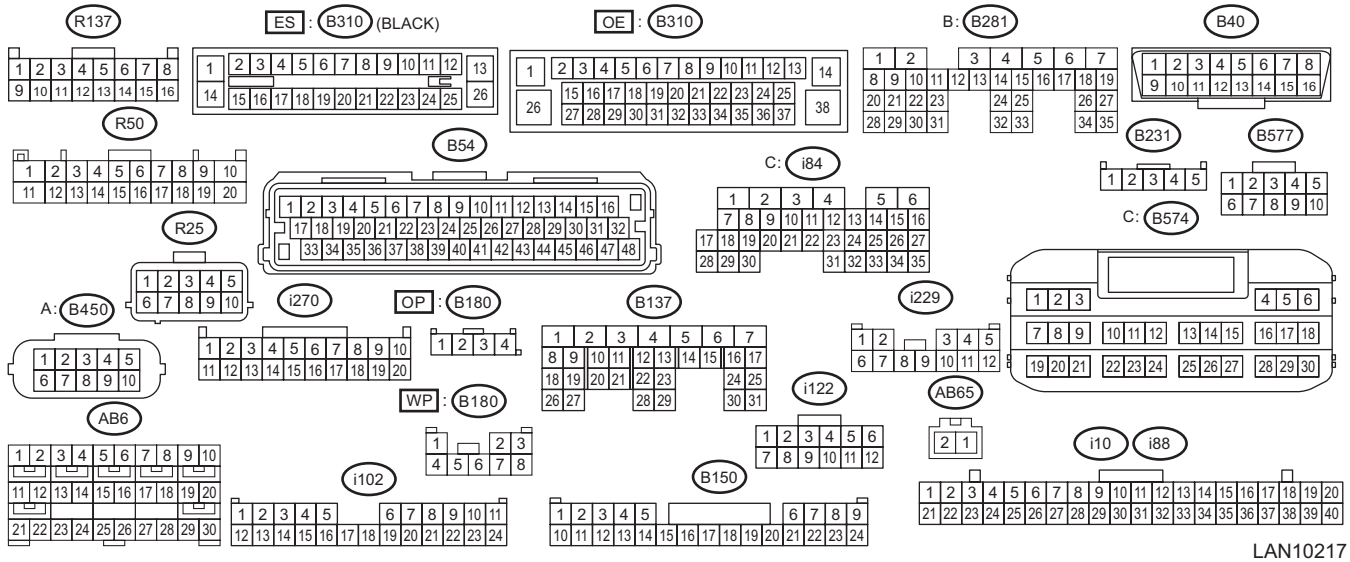
- Without BSD/RCTA





- With BSD/RCTA





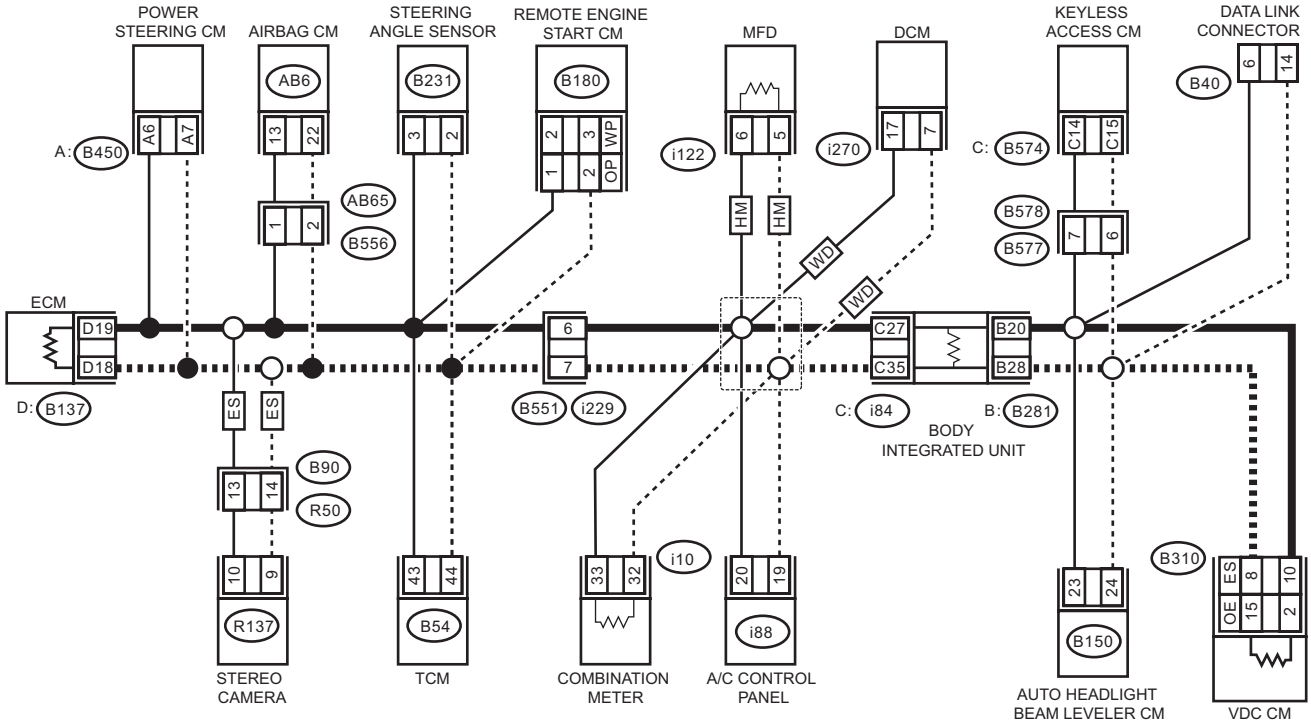
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the remote engine start CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***Without push button start*** ***(B180) No. 1 — No. 2:*** ***With push button start*** ***(B180) No. 2 — No. 3:***	Is the resistance 400 Ω or more?	Related lines between remote engine start CM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***Without push button start*** ***(B180) No. 1 — (B40) No. 6:*** ***(B180) No. 2 — (B40) No. 14:*** ***With push button start*** ***(B180) No. 2 — (B40) No. 6:*** ***(B180) No. 3 — (B40) No. 14:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of remote engine start CM related lines.	The communication harness is normal. Check the remote engine starter CM or the mobile key.

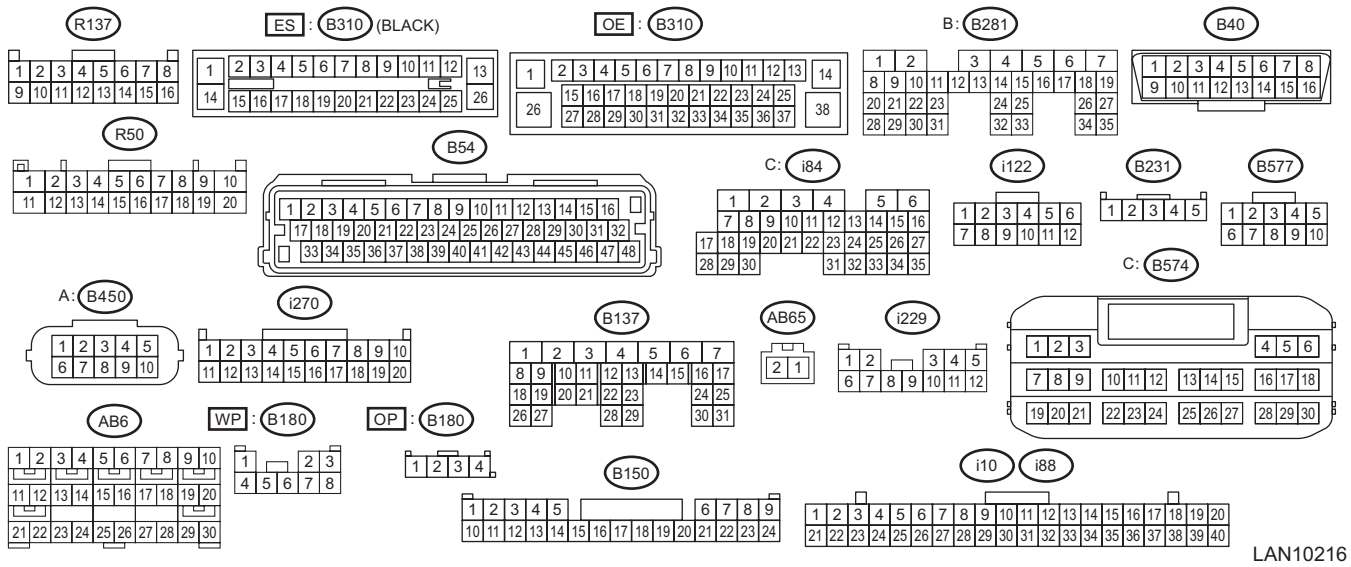
17.RELATED LINES 53 — 61 Ω (TELEMATICS)

WIRING DIAGRAM:

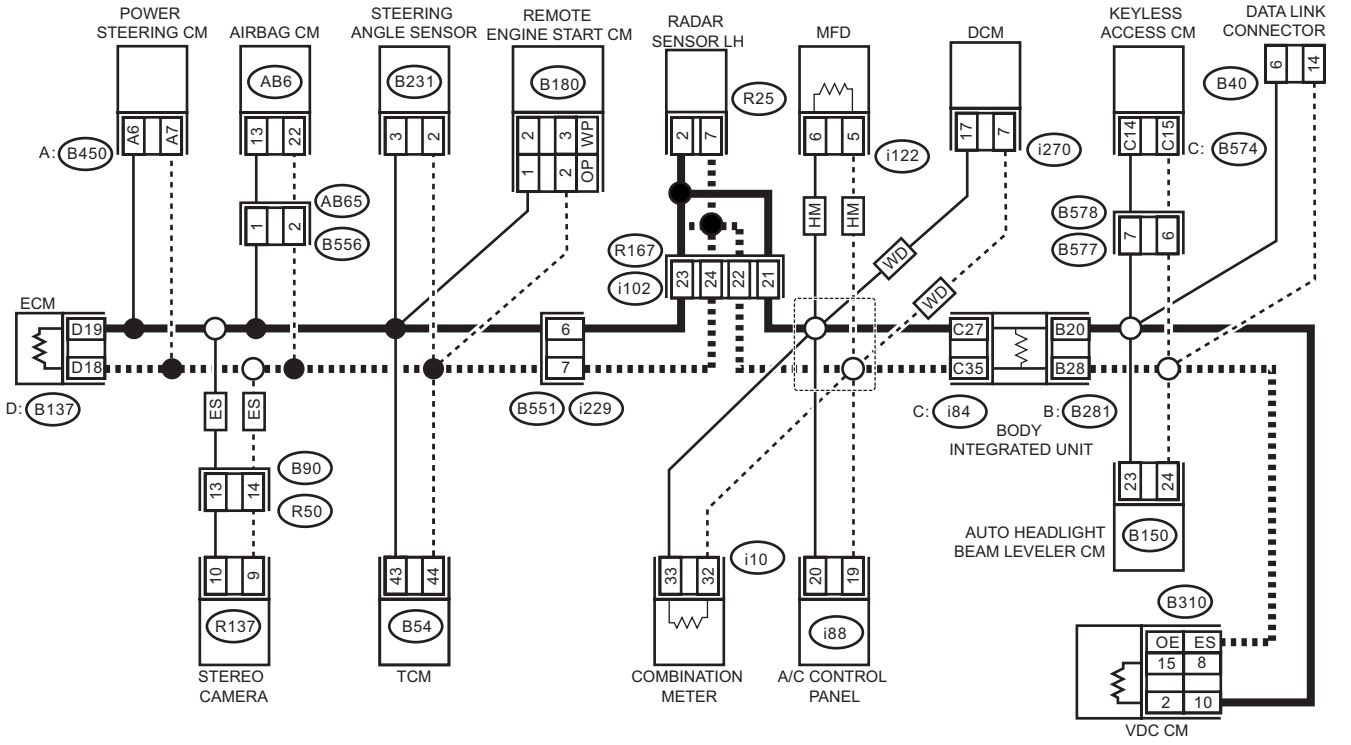
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

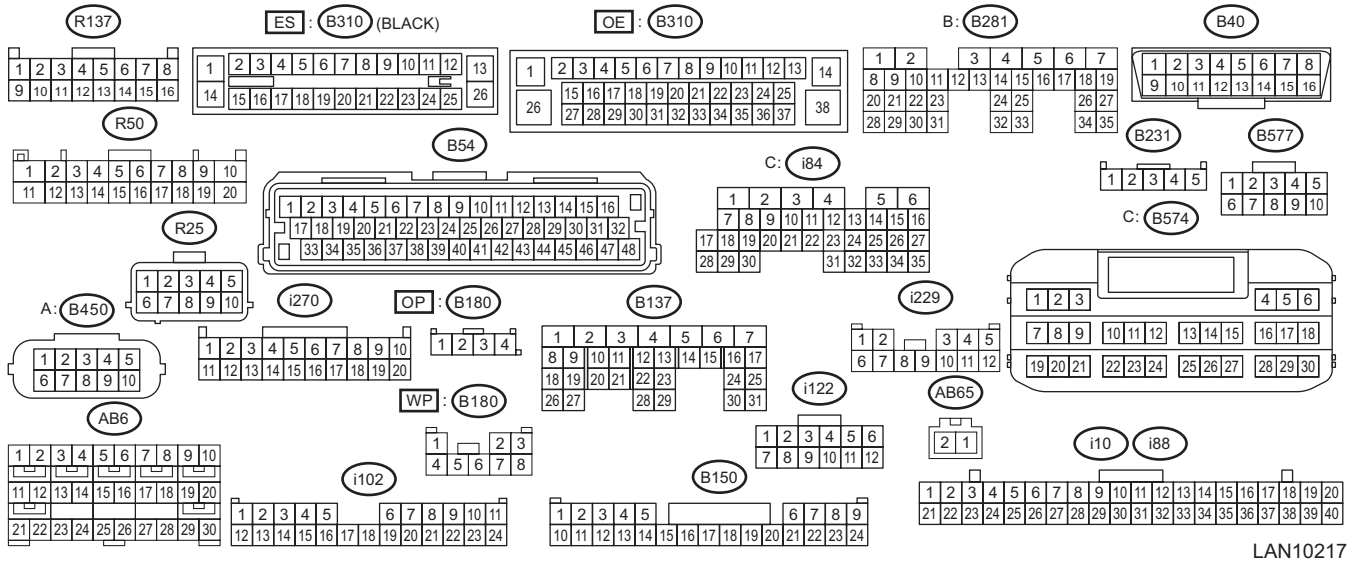
- Without BSD/RCTA





- With BSD/RCTA





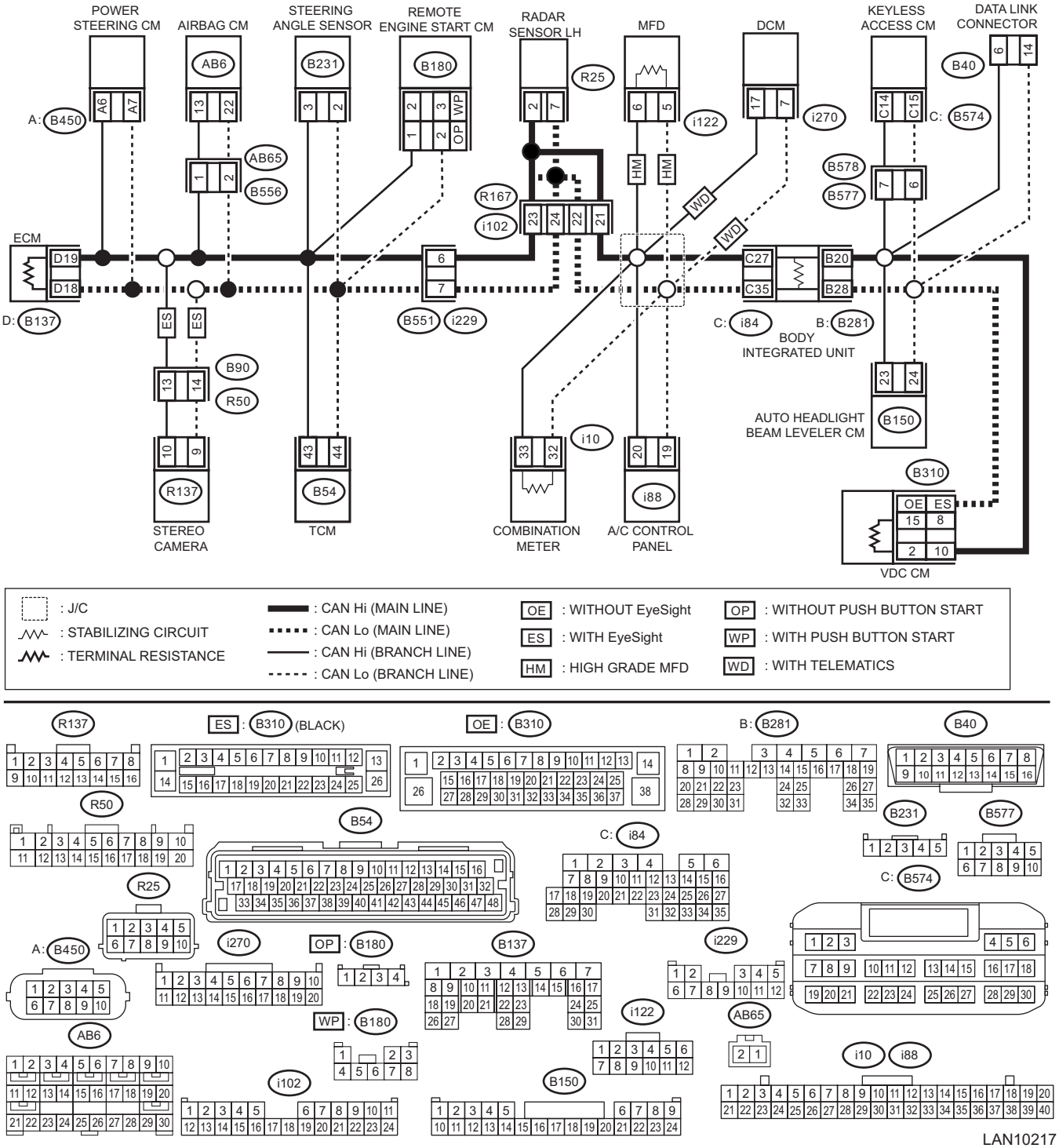
Step		Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the DCM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal (i270) No. 7 — No. 17:***	Is the resistance 400 Ω or more?	Related lines between DCM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.

Step		Check	Yes	No
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i270) No. 17 — (B40) No. 6:*** ***(i270) No. 7 — (B40) No. 14:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of telematics system related lines.	The communication harness is normal. Check DTC of the telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>

18.RELATED LINES 53 — 61 Ω (RADAR SENSOR)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>



	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the radar sensor LH connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(R25) No. 2 — No. 7:***	Is the resistance 400 Ω or more?	Related lines between radar sensor LH and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B25) No. 2 — (B40) No. 6:*** ***(R25) No. 7 — (B40) No. 14:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of the Subaru Rear Vehicle Detection related lines.	The communication harness is normal. Check DTC of radar sensor. <Ref. to RVD(diag)-13, OPERATION, Read Diagnostic Trouble Code (DTC).>

10.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Note
U1201	CAN-HS COUNTER ABNORMAL	High speed CAN communication error	<Ref. to LAN(w/o HEV)(diag)-100, DTC U1201 CAN-HS COUNTER ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	Communication of some module is shut down.	<Ref. to LAN(w/o HEV)(diag)-101, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	Error data is received from ECM.	<Ref. to LAN(w/o HEV)(diag)-102, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	Error data is received from TCM.	<Ref. to LAN(w/o HEV)(diag)-103, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	Error data is received from VDC module.	<Ref. to LAN(w/o HEV)(diag)-104, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0420	INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE	Error data is received from EPS module.	<Ref. to LAN(w/o HEV)(diag)-106, DTC U0420 INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	Error data is received from body integrated unit.	<Ref. to LAN(w/o HEV)(diag)-107, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	Error data is received from combination meter.	<Ref. to LAN(w/o HEV)(diag)-108, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0424	INVALID DATA RECEIVED FROM HVAC CONTROL MODULE	Error data is received from A/C control panel.	<Ref. to LAN(w/o HEV)(diag)-110, DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0427	INVALID DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE	Error data is received from keyless access CM.	<Ref. to LAN(w/o HEV)(diag)-111, DTC U0427 INVALID DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0428	INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE	Error data is received from steering angle sensor.	<Ref. to LAN(w/o HEV)(diag)-113, DTC U0428 INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0452	INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE	Error data is received from airbag module	<Ref. to LAN(w/o HEV)(diag)-114, DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	Data does not arrive from ECM.	<Ref. to LAN(w/o HEV)(diag)-116, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Note
U0101	LOST COMMUNICATION WITH TCM	Data does not arrive from TCM.	<Ref. to LAN(w/o HEV)(diag)-117, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Data does not arrive from VDC module.	<Ref. to LAN(w/o HEV)(diag)-118, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0126	LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE	Data does not arrive from steering angle sensor.	<Ref. to LAN(w/o HEV)(diag)-119, DTC U0126 LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0131	LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE	Data does not arrive from EPS module.	<Ref. to LAN(w/o HEV)(diag)-120, DTC U0131 LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Data does not arrive from body integrated unit.	<Ref. to LAN(w/o HEV)(diag)-121, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0151	LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE	Data does not arrive from airbag module.	<Ref. to LAN(w/o HEV)(diag)-122, DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	Data does not arrive from combination meter.	<Ref. to LAN(w/o HEV)(diag)-123, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0156	LOST COMMUNICATION WITH INFORMATION CENTER "A"	Data does not arrive from MFD.	<Ref. to LAN(w/o HEV)(diag)-124, DTC U0156 LOST COMMUNICATION WITH INFORMATION CENTER "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE	Data does not arrive from A/C control panel.	<Ref. to LAN(w/o HEV)(diag)-125, DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0327	SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE	Data does not arrive from keyless access CM.	<Ref. to LAN(w/o HEV)(diag)-126, DTC U0327 SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1120	LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE	Data does not arrive from combination meter.	<Ref. to LAN(w/o HEV)(diag)-127, DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1232	LOST COMMUNICATION WITH REAR/SIDE RADAR CONTROL MODULE	Data does not arrive from radar sensor.	<Ref. to LAN(w/o HEV)(diag)-128, DTC U1232 LOST COMMUNICATION WITH REAR/SIDE RADAR CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1235	LOST COMMUNICATION WITH EyeSight	Data does not arrive from stereo camera.	<Ref. to LAN(w/o HEV)(diag)-129, DTC U1235 LOST COMMUNICATION WITH EyeSight, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1433	INVALID DATA RECEIVED FROM EyeSight	Error data is received from stereo camera.	<Ref. to LAN(w/o HEV)(diag)-115, DTC U1433 INVALID DATA RECEIVED FROM EyeSight, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. CHECK USING THE DTC CHECK SHEET

DTC check sheet

	(A)	(B)	(C)													(D)									
			ECM	TCM	VDC	STA	EPS	BIU	A/B	MET	MFD	A/C	KPS	RDR	EYE	ECM	TCM	VDC	BIU	MET	A/C	KPS	STA	A/B	EYE
		U0073	U0100	U0101	U0122	U0126	U0131	U0140	U0151	U0155	U0156	U0164	U0327	U1232	U1235	U0401	U0402	U0416	U0422	U0423	U0424	U0427	U0428	U0452	U1433
VDC					-		-		-	-	-	-	-	-				-		-	-	-		-	
KPS						-	-		-		-	-	-	-	-		-	-		-	-	-	-	-	-
AHL			-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU						-		-			-			-					-				-	-	
DCM				-		-	-				-	-	-	-	-		-		-	-	-	-	-		-
MFD											-			-		-	-	-	-	-	-	-	-	-	-
A/C						-	-		-		-	-	-	-	-						-	-	-	-	-
MET						-				-						-	-	-	-	-	-	-	-	-	-
RDR						-	-		-		-	-	-	-	-						-	-	-	-	
TCM				-		-	-		-		-		-	-			-					-	-	-	
A/B			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EYE						-	-		-		-	-	-	-	-			-	-		-	-	-	-	-
EPS			-	-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
ECM			-			-	-	-	-		-	-	-	-	-	-			-		-	-	-	-	-

LAN10218

(A) Installation check
(B) Bus off detection
(C) Data no-receive detection
(D) Data abnormal detection

VDC: VDC CM
KPS: Keyless access CM
AHL: Auto headlight beam leveler CM
BIU: Body integrated unit
MFD: High grade MFD
A/C: A/C control panel
MET: Combination meter
DCM: Data communication module

STA: Steering angle sensor
TCM: Transmission CM
EYE: Stereo camera
A/B: Airbag CM
EPS: Power steering CM
ECM: Engine CM
RDR: Radar sensor

1) Module installation check
   (1) Write "-" marks in the field for installation check if the vehicle to be inspected does not have relevant module.
   (2) Write "-" marks in all blank fields on the same row that the "-" mark has filled in.
2) Bus off detection / data not received

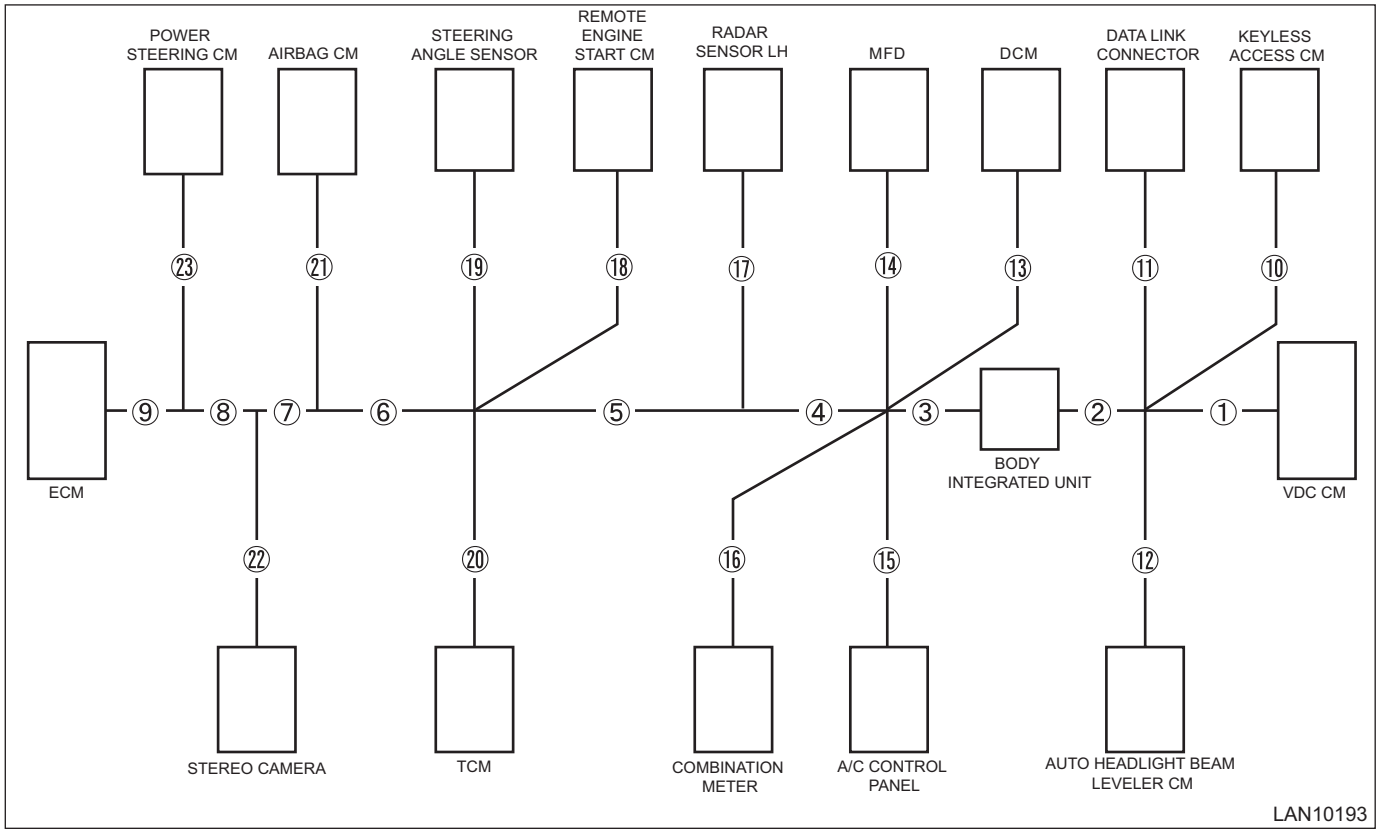
NOTE:
It becomes impossible for CAN diagnostic module to read DTC, if there is a current malfunction of open harness (data not received). If this occurs, perform the "Check using the check sheet of communication for initializing" <Ref. to LAN(w/o HEV)(diag)-13, CHECK USING THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>, and use this sheet to confirm that the corresponding part becomes the past malfunction.
   (1) Mark "X" in the field corresponding to the DTCs that has been detected by each module in the check sheet.
   (2) Identify and repair the faulty part by referring to the example of DTC data not received. <Ref. to LAN(w/o HEV)(diag)-97, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).>

3) Data abnormal detection

NOTE:
If any “BUS OFF” or “NO-RECEIVE DATA” condition is detected, perform the diagnosis for these problems first.

(1) If several modules detect the DTC for the same module, replace the detected module.
(2) If one module detects the DTC, replace the module of the detected side.
(3) If it does not return to the normal operation, re-install the module which has been replaced, and replace the module of the detected side.
(4) If it does not return to the normal operation, replace both modules.

2. EXAMPLE OF DTC DATA NOT RECEIVED



When ⑱ (remote engine start CM vicinity) is open

NOTE:
No DTC remains, and the remote engine starter does not function.

	(A)	(B)	(C)														(D)									
			ECM	TCM	VDC	STA	EPS	BIU	A/B	MET	MFD	A/C	KPS	RDR	EYE	ECM	TCM	VDC	BIU	MET	A/C	KPS	STA	A/B	EYE
		U0073	U0100	U0101	U0122	U0126	U0131	U0140	U0151	U0155	U0156	U0164	U0327	U1232	U1235	U0401	U0402	U0416	U0422	U0423	U0424	U0427	U0428	U0452	U1433
VDC					-		-		-	-	-	-	-	-				-		-	-	-		-	
KPS						-	-		-		-	-	-	-	-		-	-		-	-	-	-	-	-
AHL			-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU						-		-			-			-					-				-	-	
DCM				-		-	-				-	-	-	-	-		-		-	-	-	-	-		-
MFD											-			-		-	-	-	-	-	-	-	-	-	-
A/C						-	-		-		-	-	-	-	-						-	-	-	-	-
MET						-				-						-	-	-	-	-	-	-	-	-	-
RDR						-	-		-		-	-	-	-	-						-	-	-	-	
TCM				-		-	-		-		-		-	-			-					-	-	-	
A/B			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EYE						-	-		-		-	-	-	-	-			-	-		-	-	-	-	-
EPS			-	-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
ECM			-			-	-	-	-		-	-	-	-	-	-			-		-	-	-	-	-

LAN10218

When ⑲ (steering angle sensor vicinity) is open

	(A)	(B)	(C)														(D)									
			ECM	TCM	VDC	STA	EPS	BIU	A/B	MET	MFD	A/C	KPS	RDR	EYE	ECM	TCM	VDC	BIU	MET	A/C	KPS	STA	A/B	EYE
		U0073	U0100	U0101	U0122	U0126	U0131	U0140	U0151	U0155	U0156	U0164	U0327	U1232	U1235	U0401	U0402	U0416	U0422	U0423	U0424	U0427	U0428	U0452	U1433
VDC					-	×	-		-	-	-	-	-	-				-		-	-	-		-	
KPS						-	-		-		-	-	-	-	-		-	-		-	-	-	-	-	-
AHL			-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU						-		-			-			-					-				-	-	
DCM				-		-	-				-	-	-	-	-		-		-	-	-	-	-		-
MFD						×					-			-		-	-	-	-	-	-	-	-	-	-
A/C						-	-		-		-	-	-	-	-						-	-	-	-	-
MET						-				-						-	-	-	-	-	-	-	-	-	-
RDR						-	-		-		-	-	-	-	-						-	-	-	-	
TCM				-		-	-		-		-		-	-			-					-	-	-	
A/B			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EYE						-	-		-		-	-	-	-	-			-	-		-	-	-	-	-
EPS			-	-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
ECM			-			-	-	-	-		-	-	-	-	-	-			-		-	-	-	-	-

LAN10219

When ㉓ (power steering CM vicinity) is open

NOTE:
Power steering CM may display U1120 (Auto Start Stop COMMUNICATION LOST).

	(A)	(B)	(C)														(D)										
			ECM	TCM	VDC	STA	EPS	BIU	A/B	MET	MFD	A/C	KPS	RDR	EYE	ECM	TCM	VDC	BIU	MET	A/C	KPS	STA	A/B	EYE
		U0073	U0100	U0101	U0122	U0126	U0131	U0140	U0151	U0155	U0156	U0164	U0327	U1232	U1235	U0401	U0402	U0416	U0422	U0423	U0424	U0427	U0428	U0452	U1433
VDC					-		-		-	-	-	-	-	-				-		-	-	-		-	
KPS						-	-		-		-	-	-	-	-		-	-		-	-	-	-	-	-
AHL			-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU						-	×	-			-			-					-				-	-	
DCM				-		-	-				-	-	-	-	-		-		-	-	-	-	-		-
MFD							×				-			-		-	-	-	-	-	-	-	-	-	-
A/C						-	-		-		-	-	-	-	-						-	-	-	-	-
MET						-	×			-						-	-	-	-	-	-	-	-	-	-
RDR						-	-		-		-	-	-	-	-						-	-	-	-	
TCM				-		-	-		-		-		-	-			-					-	-	-	
A/B			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EYE						-	-		-		-	-	-	-	-			-	-		-	-	-	-	-
EPS			-	-	×	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
ECM			-			-	-	-	-		-	-	-	-	-	-			-		-	-	-	-	-

LAN10220

11.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC U1201 CAN-HS COUNTER ABNORMAL

DTC DETECTING CONDITION:
Communication is unstable because of high speed CAN communication error.
TROUBLE SYMPTOM:
- Display of combination meter indicates faulty.
- Control faulty may occur due to CAN communication error.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** 1) Start the engine. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0073 a current malfunction?	Perform the diagnosis of U0073. <Ref. to LAN(w/o HEV)(diag)-101, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U1201 a current malfunction?	Go to step **4**.	It is possible that temporary poor communication occurs. Perform the clear memory. <Ref. to LAN(w/o HEV)(diag)-33, Clear Memory Mode.>
4	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1201 a current malfunction?	Go to step **5**.	It is possible that temporary poor communication occurs. Perform the clear memory. <Ref. to LAN(w/o HEV)(diag)-33, Clear Memory Mode.>
5	**CHECK CONTROL MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect the control modules other than body integrated unit in order. NOTE: When disconnecting ECM or VDC CM, connect resistance of 120 Ω between CAN Hi and CAN Lo as an alternative of end resistance. 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is there any control module that U1201 is not detected as current malfunction?	Replace the control module.	Repeat 1) to 4) in step 5 until U1201 is not detected.

B: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

DTC DETECTING CONDITION:
Integrated unit communication is shut down because of high speed CAN error.
TROUBLE SYMPTOM:
CAN communication is not normal.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** 1) Start the engine. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0073 a current malfunction?	Go to step **3**.	It may be a temporary poor contact. Perform the clear memory. <Ref. to LAN(w/o HEV)(diag)-33, Clear Memory Mode.>
3	**CHECK CAN COMMUNICATION CIRCUIT.** Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, PROCEDURE, CAN Communication Circuit Check.>	Is CAN communication circuit faulty?	Repair the faulty portion, following the diagnosis procedure.	Go to step **4**.
4	**CHECK DTC.** 1) Perform the inspection using the DTC check sheet. <Ref. to LAN(w/o HEV)(diag)-96, CHECK USING THE DTC CHECK SHEET, LIST, List of Diagnostic Trouble Code (DTC).> 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0073 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK CONTROL MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect the control modules other than body integrated unit in order. NOTE: When disconnecting ECM or VDC CM, connect resistance of 120 Ω between CAN Hi and CAN Lo as an alternative of end resistance. 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is there any control module that U0073 is not detected as current malfunction?	Replace the control module.	Repeat 1) to 4) in step 3 until U0073 is not detected.

C: DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM "A"

DTC DETECTING CONDITION:
Defective data from ECM.
TROUBLE SYMPTOM:
Defective data on CAN communication occurs.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0401 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0401 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the engine data abnormal detected in several modules?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the ECM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0401 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the ECM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0401 a current malfunction?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0401 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

D: DTC U0402 INVALID DATA RECEIVED FROM TCM

DTC DETECTING CONDITION:
Received error data from TCM.
TROUBLE SYMPTOM:
Sport indicator light blinks.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0402 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0402 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the transmission data abnormal detected in several modules?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the TCM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0402 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the TCM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0402 a current malfunction?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0402 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

E: DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

DTC DETECTING CONDITION:
Data from VDCCM is faulty.
TROUBLE SYMPTOM:
ABS warning light and VDC warning light illuminate.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0416 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the VDC CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0416 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the VDC data abnormal detected in several modules?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the VDC CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0416 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the VDC CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0416 a current malfunction?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0416 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

F: DTC U0420 INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from EPS CM.
TROUBLE SYMPTOM:
Cooperation control with EPS CM does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0420 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the power steering CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0420 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the electric power steering data abnormal detected in several modules?	Replace the power steering CM. <Ref. to PS-40, Power Steering Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the power steering CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0420 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the power steering CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0420 a current malfunction?	Replace the power steering CM. <Ref. to PS-40, Power Steering Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0420 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

G: DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from body integrated unit.
TROUBLE SYMPTOM:
Cooperation control with body integrated unit does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0422 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0422 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the body integrated data abnormal detected in several modules?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the body integrated unit. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0422 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the body integrated unit. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0422 a current malfunction?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0422 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

H: DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from combination meter.
TROUBLE SYMPTOM:
Display of combination meter does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0423 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the combination meter connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0423 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the meter data abnormal detected in several modules?	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the combination meter. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0423 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Replace the current combination meter with the original combination meter. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0423 a current malfunction?	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0423 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

I: DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from A/C control panel.
TROUBLE SYMPTOM:
Cooperation control of air conditioner does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0424 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the A/C control panel connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0424 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the air conditioner data abnormal detected in several modules?	Replace the A/C control panel. <Ref. to AC-47, Control Panel.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the A/C control panel. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0424 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Restore the A/C control panel. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0424 a current malfunction?	Replace the A/C control panel. <Ref. to AC-47, Control Panel.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0424 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

J: DTC U0427 INVALID DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from keyless access CM.
TROUBLE SYMPTOM:
Cooperation control of keyless access does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0427 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the keyless access CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0427 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the smart data abnormal detected in several modules?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the keyless access CM. NOTE: Do not register the keyless access CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0427 a current malfunction?	Go to step **8**.	System is normal. NOTE: Be sure to perform keyless access CM registration.
8	**CHECK MODULE.** 1) Reinstall the keyless access CM. 2) Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.> 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0427 a current malfunction?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0427 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

K: DTC U0428 INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from steering angle sensor.
TROUBLE SYMPTOM:
VDC CM does not operate normally.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0428 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the steering angle sensor connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0428 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the steering angle sensor data abnormal detected in several modules?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the steering angle sensor. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0428 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the steering angle sensor. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0428 a current malfunction?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0428 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

L: DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE

DTC DETECTING CONDITION:
Invalid data was transmitted from airbag CM.
TROUBLE SYMPTOM:
Cooperation control with airbag does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0452 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the airbag CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0452 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the airbag data abnormal detected in several modules?	Replace the airbag CM. <Ref. to AB-55, Airbag Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the airbag CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0452 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the airbag CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0452 a current malfunction?	Replace the airbag CM. <Ref. to AB-55, Airbag Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0452 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

M: DTC U1433 INVALID DATA RECEIVED FROM EyeSight

DTC DETECTING CONDITION:
Defective data was transmitted from stereo camera.
TROUBLE SYMPTOM:
Cooperation control of EyeSight does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U1433 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the stereo camera connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1433 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the EyeSight data abnormal detected in several modules?	Replace the stereo camera. <Ref. to ES-7, Stereo Camera.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the stereo camera. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1433 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the stereo camera. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1433 a current malfunction?	Replace the stereo camera. <Ref. to ES-7, Stereo Camera.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1433 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

N: DTC U0100 LOST COMMUNICATION WITH ECM/PCM "A"

DTC DETECTING CONDITION:
No data is received from ECM.
TROUBLE SYMPTOM:
Cooperation control of transmission may not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0100 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0100 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the engine data no-receive detected in several modules?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the ECM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0100 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the ECM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0100 a current malfunction?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0100 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

O: DTC U0101 LOST COMMUNICATION WITH TCM

DTC DETECTING CONDITION:
No data is received from TCM.
TROUBLE SYMPTOM:
Cooperation control with transmission is not performed.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0101 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0101 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the transmission data no-receive detected in several modules?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the TCM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0101 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the TCM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0101 a current malfunction?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0101 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

P: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

DTC DETECTING CONDITION:
No data from VDCCM is received.
TROUBLE SYMPTOM:
ABS warning light and VDC warning light illuminate.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0122 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0122 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the VDC data no-receive detected in several modules?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the VDC CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0122 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the VDC CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0122 a current malfunction?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0122 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

Q: DTC U0126 LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE

DTC DETECTING CONDITION:
No data is received from steering angle sensor.
TROUBLE SYMPTOM:
VDC CM does not operate normally.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0126 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0126 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the steering angle sensor data no-receive detected in several modules?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the steering angle sensor. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0126 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the steering angle sensor. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0126 a current malfunction?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0126 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

R: DTC U0131 LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from power steering CM.
TROUBLE SYMPTOM:
Cooperation control with power steering CM does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0131 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0131 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the electric power steering data no-receive detected in several modules?	Replace the power steering CM. <Ref. to PS-40, Power Steering Control Module.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the power steering CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0131 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the power steering CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0131 a current malfunction?	Replace the power steering CM. <Ref. to PS-40, Power Steering Control Module.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0131 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

S: DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from body integrated unit.
TROUBLE SYMPTOM:
Cooperation control with body integrated unit does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0140 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0140 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the body integrated data no-receive detected in several modules?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the body integrated unit. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0140 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the body integrated unit. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0140 a current malfunction?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0140 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

T: DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from airbag CM.
TROUBLE SYMPTOM:
Cooperation control with airbag CM does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0151 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0151 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the airbag data no-receive detected in several modules?	Replace the airbag CM. <Ref. to AB-55, Airbag Control Module.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the airbag CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0151 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the airbag CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0151 a current malfunction?	Replace the airbag CM. <Ref. to AB-55, Airbag Control Module.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0151 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

U: DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from combination meter.
TROUBLE SYMPTOM:
Display of combination meter does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0155 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0155 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the meter data no-receive detected in several modules?	Replace the meter. <Ref. to IDI-19, Combination Meter.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the combination meter. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0155 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Replace the current combination meter with the original combination meter. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0155 a current malfunction?	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0155 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

V: DTC U0156 LOST COMMUNICATION WITH INFORMATION CENTER "A"

DTC DETECTING CONDITION:
No data is received from MFD.
TROUBLE SYMPTOM:
Display of MFD does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0156 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0156 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the data no-receive detected in several modules?	Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0156 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the MFD. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0156 a current malfunction?	Replace the MFD. <Ref. to IDI-26, Multi-function Display (MFD).>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0156 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

W: DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from A/C control panel.
TROUBLE SYMPTOM:
Cooperation control of air conditioner does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0164 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0164 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the air conditioner data no-receive detected in several modules?	Replace the A/C control panel. <Ref. to AC-47, Control Panel.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the A/C control panel. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0164 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Restore the A/C control panel. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0164 a current malfunction?	Replace the A/C control panel. <Ref. to AC-47, Control Panel.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0164 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

X: DTC U0327 SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from keyless access CM.
TROUBLE SYMPTOM:
Cooperation control of keyless access does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0327 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0327 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the smart data no-receive detected in several modules?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the keyless access CM. NOTE: Do not register the keyless access CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0327 a current malfunction?	Go to step **7**.	System is normal. NOTE: Be sure to perform keyless access CM registration.
7	**CHECK MODULE.** 1) Reinstall the keyless access CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0327 a current malfunction?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U0327 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

Y: DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE

NOTE:
The electric power steering CM identifies whether the Auto Start Stop function is provided or not using information from the combination meter. Therefore, this DTC may be detected if lost communication with the combination meter occurs.
For the diagnostic procedure, refer to DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE. <Ref. to LAN(w/o HEV)(diag)-123, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Z: DTC U1232 LOST COMMUNICATION WITH REAR/SIDE RADAR CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from radar sensor.
TROUBLE SYMPTOM:
Radar sensor does not operate normally.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 8?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U1232 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1232 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the radar data no-receive detected in several modules?	Replace the radar sensor LH. <Ref. to RVD-6, Radar Sensor.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the radar sensor LH. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1232 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the radar sensor LH. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1232 a current malfunction?	Replace the radar sensor LH. <Ref. to RVD-6, Radar Sensor.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1232 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(w/o HEV)(diag)-33, Clear Memory Mode.>

AA:DTC U1235 LOST COMMUNICATION WITH EyeSight

DTC DETECTING CONDITION:
No data from stereo camera is received.
TROUBLE SYMPTOM:
Cooperation control of EyeSight does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U1235 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(w/o HEV)(diag)-34, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1235 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is the EyeSight data no-receive detected in several modules?	Replace the stereo camera. <Ref. to ES-7, Stereo Camera.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the stereo camera. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1235 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the stereo camera. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1235 a current malfunction?	Replace the stereo camera. <Ref. to ES-7, Stereo Camera.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-32, Read Diagnostic Trouble Code (DTC).>	Is U1235 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

12.General Diagnostic Table

A: INSPECTION

Item	Operation	Specifications		Note
		YES	NO	
Diagnostic code	DTC is displayed when inspecting all DTCs.	Perform the diagnosis according to DTC.	System is normal.	—
Speedometer	Faster vehicle speed than the actual speed is displayed.	VDC CM data may not be received.	System is normal.	Also, check vehicle speed pulse circuit.
Fuel gauge	Fuel is present, but displayed less than actual amount.	Communication error may be present.	System is normal.	Also, check the fuel gauge.
Fuel level warning light	Fuel is present, but the light illuminates.	Communication error may be present.	System is normal.	Also, check the fuel gauge.
Engine coolant temperature light	Engine coolant temperature light blinks in red and blue alternately.	Communication error may be present.	System is normal.	Check the engine coolant light related items.
[S], [I] or [S#] indicator	Blinking.	Communication error may be present.	System is normal.	Check the intelligent switch.
VDC indicator	Illuminating.	Communication error may be present.	System is normal.	Check that VDC is not operating.
VDC OFF indicator	Illuminating.	Communication error may be present.	System is normal.	Check that VDC is not OFF.
Brake warning, etc.	Illuminating.	Brake fluid may be low in amount, or communication error may be present.	System is normal.	Check brake related items.
Shift position	Not displayed.	Communication error may be present.	System is normal.	Also, check AT system.
AT temperature light	Blinking.	Communication error may be present.	System is normal.	Also, check AT system.
Door indicator	Not displayed.	Communication error may be present.	System is normal.	Check the door switch.
Clearance indicator	Not illuminating.	Communication error may be present.	System is normal.	Check the combination switch.
Hi beam indicator	Not illuminating.	Communication error may be present.	System is normal.	Check the combination switch.
Front fog indicator	Not illuminating.	Communication error may be present.	System is normal.	Check the combination switch.
Illumination	Illuminating at the maximum brightness.	Communication error may be present.	System is normal.	Also, check the illumination switch.
Cruise control indicator	Not illuminating.	Communication error may be present.	System is normal.	Check the cruise control system.
AWD indicator	Not illuminating.	Communication error may be present.	System is normal.	Check TCM.
Hill hold indicator	Not illuminating.	Communication error may be present.	System is normal.	Also, check VDC CM.

LAN SYSTEM (DIAGNOSTICS)

LAN(HEV)(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
• Subaru Select Monitor is required for reading DTC, performing diagnosis, reading current data, customizing and active test (compulsory drive).
• Remove foreign matter (dust, water, oil, etc.) from each control module connector during removal and installation.
• Registration of immobilizer may be needed after the replacement of control modules, etc. For detailed procedure, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

NOTE:
• To check harness for open or short circuits, shake the suspected trouble spot or connector.
• Check List for Interview <Ref. to LAN(HEV)(diag)-4, Check List for Interview.>

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** Ask the customer when and how the trouble occurred using the interview check list. <Ref. to LAN(HEV)(diag)-4, Check List for Interview.>	Did you interview the customer?	Go to step **2**.	Interview the customer.
2	**BASIC INSPECTION (CAN DIAGNOSTIC IS NOT USED).** Check components which might affect CAN communication problem. <Ref. to LAN(HEV)(diag)-7, INSPECTION WITHOUT USING CAN DIAGNOSTIC, INSPECTION, General Description.>	Is the component that might affect CAN communication problem normal?	Go to step **3**.	Repair or replace each component.
3	**CHECK COMMUNICATION FOR INITIALIZING.** Communicate with the all systems by connecting the Subaru Select Monitor.	Is the communication for initializing finished for all modules?	Go to step **4**.	Check the error of communication for initializing. <Ref. to LAN(HEV)(diag)-12, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
4	**BASIC INSPECTION (CAN DIAGNOSTIC IS USED).** Check components which might affect CAN communication problem. <Ref. to LAN(HEV)(diag)-7, INSPECTION USING CAN DIAGNOSTIC, INSPECTION, General Description.>	Is the component that might affect CAN communication problem normal?	Go to step **5**.	Repair or replace each component.
5	**CHECK DTC.** 1) Start the engine and read all DTCs. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).> NOTE: • When the engine does not start, perform the diagnosis for the engine start malfunction. <Ref. to EN(H4DO HEV)(diag)-72, Diagnostics for Engine Starting Failure.> 2) Record all DTCs, time stamp and freeze frame data. NOTE: For time stamp, <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Is DTC U**** displayed on Subaru Select Monitor?	Go to step **6**.	Go to step **7**.

	Step	Check	Yes	No
6	**CHECK DTC.** 1) Perform the inspection using the DTC check sheet. <Ref. to LAN(HEV)(diag)-116, CHECK USING THE DTC CHECK SHEET, LIST, List of Diagnostic Trouble Code (DTC).> 2) Using the Subaru Select Monitor, read all DTCs. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is DTC U**** displayed on Subaru Select Monitor?	Go to step **8**.	Go to step **7**.
7	**PERFORM GENERAL DIAGNOSTICS.** Inspect using the “General Diagnostic Table”. <Ref. to LAN(HEV)(diag)-180, General Diagnostic Table.>	Is result of inspection OK?	LAN system is normal.	Go to step **8**.
8	**PERFORM DIAGNOSIS.** 1) Correct the cause of trouble. 2) Perform the Clear Memory Mode. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.> 3) Read the DTC. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed on Subaru Select Monitor?	Repeat step 8 until DTC is not shown.	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Inspect the following items regarding the vehicle's state.

1. DISPLAY STATUS IN THE COMBINATION METER

Display status in the combination meter	Engine coolant temperature gauge display	❑ OK / ❑ NG
	Fuel gauge display	❑ OK / ❑ NG
	Tachometer display	❑ OK / ❑ NG (0 rpm at idling etc.)
Display of other indicators	Malfunction indicator light	❑ ON / ❑ Blink / ❑ OFF
	Sport indicator light (AT warning light)	❑ ON / ❑ Blink / ❑ OFF
	ABS warning light	❑ ON / ❑ Blink / ❑ OFF
	VDC warning light	❑ ON / ❑ Blink / ❑ OFF
	Immobilizer indicator light	❑ ON / ❑ Blink / ❑ OFF
	AT OIL TEMP warning light	❑ ON / ❑ Blink / ❑ OFF
	Engine coolant temperature warning light	❑ Blue light ON / ❑ Red light ON / ❑ Red light blinks / ❑ Blue and red lights blink
	CRUISE indicator	❑ ON / ❑ Blink / ❑ OFF
	Shift indicator	❑ OK / ❑ NG
	Fuel level warning light	❑ ON / ❑ Blink / ❑ OFF
	Airbag warning light	❑ ON / ❑ OFF
	VDC OFF indicator	❑ ON / ❑ OFF
	Brake warning light	❑ ON / ❑ OFF
	Headlight beam leveler indicator	❑ ON / ❑ OFF
	Hybrid READY indicator light	❑ ON / ❑ OFF
	Hybrid fail lamp	❑ ON / ❑ OFF

2. CONDITIONS UNDER WHICH TROUBLE OCCURS

Driving condition	❑ At standstill (while idling) ❑ When the vehicle is running Vehicle speed km/h (MPH) ❑ While accelerating Acceleration km/h (MPH) to km/h (MPH) ❑ Decelerating (with braking) Deceleration km/h (MPH) to km/h (MPH) ❑ Decelerating (without braking) Deceleration km/h (MPH) to km/h (MPH)
	❑ Flat road ❑ Uphill ❑ Downhill ❑ Gravel road ❑ Bumpy road ❑ Snowy road
	Does it occur when operating any part? Operated part: **TROUBLE SYMPTOM:**
	Are there any other troubles occurred? From where: **TROUBLE SYMPTOM:**

3. General Description

A: CAUTION

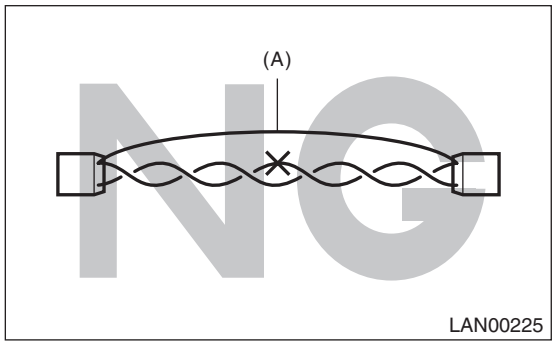
1. SRS AIRBAG SYSTEM

Airbag system wiring harness is routed near the body integrated unit and twisted pair line.

CAUTION:
- **Do not use the electrical test equipment on all airbag system wiring harnesses and connectors.**
- **Be careful not to damage the airbag system wiring harness when servicing the body integrated unit and LAN system.**

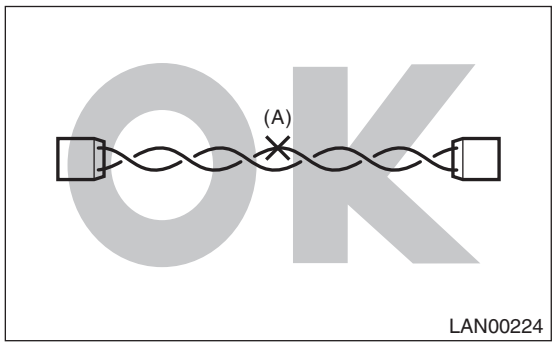
2. LAN SYSTEM

- Bus line of LAN system is twisted pair line. Be careful not to by-pass or partly unbind the twisted pair line.
- Do not make clearance between bus lines (CAN High, CAN Low).
- Difference of bus line length should be within 10 cm (3.94 in).
- Fray near the connector should be within 8 cm (3.14 in).



(A) Bypass wire connection

- If the characteristics of the twisted pair line are changed, it may extremely weaken against noise.
- When repairing the harness, connect the wires using soldering and protect it with insulating tape etc.



(A) Soldering and protection with insulating tape

3. TIME STAMP

There are three types of record data for the information of time stamp, and they are stored together with diagnostic codes.

NOTE:
Depending on DTCs, time stamp may not be stored.

a. **«Trip Count»**

This indicates the number of times that the ignition has been turned to ON since the vehicle was manufactured. The ignition ON count of when the diagnostic code is stored is displayed on the diagnostic code check screen.

NOTE:
Subaru Select Monitor 4 screen (A/C system diagnostic code and time stamp)

Code	Description & trouble position	Trouble occurrence record	**«Trip Count»**	«Time Count»	«Category»
B14E1	Air mix door actuator stepping motor circuit wire break (driver's seat)	Detected on the first time	**983**	18000	Common
B14E7	Heater core rear sensor circuit wire break	Detected on the 2nd time	**984**	117800	Common

The current Trip Count can be checked at "Current Data Display & Save" in "Integ. unit mode".
By comparing the current Trip Count and the Trip Count of when the diagnostic code was stored, it is possible to determine that it is how many ignition-ON operations ago that DTC was stored.

b. **«Time Count»**

The elapsed time from when the ignition is turned to ON to when the diagnostic code is stored is displayed on the diagnostic code check screen. It is possible to determine the length of time that passed between when the user started driving and when the diagnostic code was stored. Therefore, if Trip Count until the vehicle-received-date is determined by interviewing the user, it is possible to estimate where the user was driving when the diagnostic code was stored, using the information such as Trip Count and Time Count. This estimate is useful information to perform diagnosis including checking of repeatability.

NOTE:
Subaru Select Monitor 4 screen (A/C system diagnostic code and time stamp)

Code	Description & trouble position	Trouble occurrence record	«Trip Count»	**«Time Count»**	«Category»
B14E1	Air mix door actuator stepping motor circuit wire break (driver's seat)	Detected on the first time	983	**18000**	Common
B14E7	Heater core rear sensor circuit wire break	Detected on the 2nd time	984	**117800**	Common

When multiple diagnostic codes are recorded for one trouble, it is extremely important to determine the diagnostic code that was stored first. (It is important to perform the diagnosis for the first recorded diagnostic code.) In this case, it is also possible to immediately determine which diagnostic code was recorded first, using the information such as Trip Count and Time Count.

c. **«Category»**
Each unit individually counts the elapsed time since the ignition is turned to ON. However, these time counts may have some errors, and therefore, the control modules need to be adjusted to the time carried by the master-time unit (the body integrated unit). When the count is set as common, it means that each control module is already adjusted to the master time, and the display for the master integrated unit is always indicated as “Common”. When the count is indicated as “Originally”, it means that the time is not synchronized with the master time. In this case, check the communication between the corresponding control module and integrated unit. When all controls other than the body integrated unit is indicated as “Originally”, perform the basic inspection for the body integrated unit. <Ref. to BC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

NOTE:
Subaru Select Monitor 4 screen (A/C system diagnostic code and time stamp)

Code	Description & trouble position	Trouble occurrence record	«Trip Count»	«Time Count»	**«Category»**
B14E1	Air mix door actuator stepping motor circuit wire break (driver’s seat)	Detected on the first time	983	18000	**Common**
B14E7	Heater core rear sensor circuit wire break	Detected on the 2nd time	984	117800	**Common**

Even when multiple diagnostic codes are stored in multiple control modules, it is possible to determine the code stored first through the categorizing feature.

NOTE:
Troubleshooting for CAN system U-code occurrence
When the first stored diagnostic code is a U-code for CAN system, perform the troubleshooting as a U code combination, instead of a U code alone. In addition, when CAN open circuit occurs, communication of the diagnostic device itself becomes impossible beyond the particular areas. However, trouble positions can also be determined by the combination of initial communication success/failure. Thus, by performing the basic diagnostic procedure in LAN system, trouble positions can be determined efficiently on the principle above. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: INSPECTION

1. INSPECTION WITHOUT USING CAN DIAGNOSTIC

Before performing diagnosis, check the following items that might affect troubles of each module.
1) Check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
2) Check the fuse condition.
Make sure that ampere of the fuse is setting value, and it is not blown out.
3) Check the connecting condition of harness and harness connector.

2. INSPECTION USING CAN DIAGNOSTIC

Before performing diagnostics, check the following item which might affect body integrated unit malfunctions.
1) Confirm settings of body integrated unit are corresponded to vehicle equipment. <Ref. to BC(diag)-20, OPERATION, Registration Body Integrated Unit.>
2) Make sure that the User Customizing of the body integrated unit matches the vehicle equipment. <Ref. to BC(diag)-17, OPERATION, User Customizing.>
3) Confirm “Factory initial setting” of body integrated unit registrations is set to “Market”.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

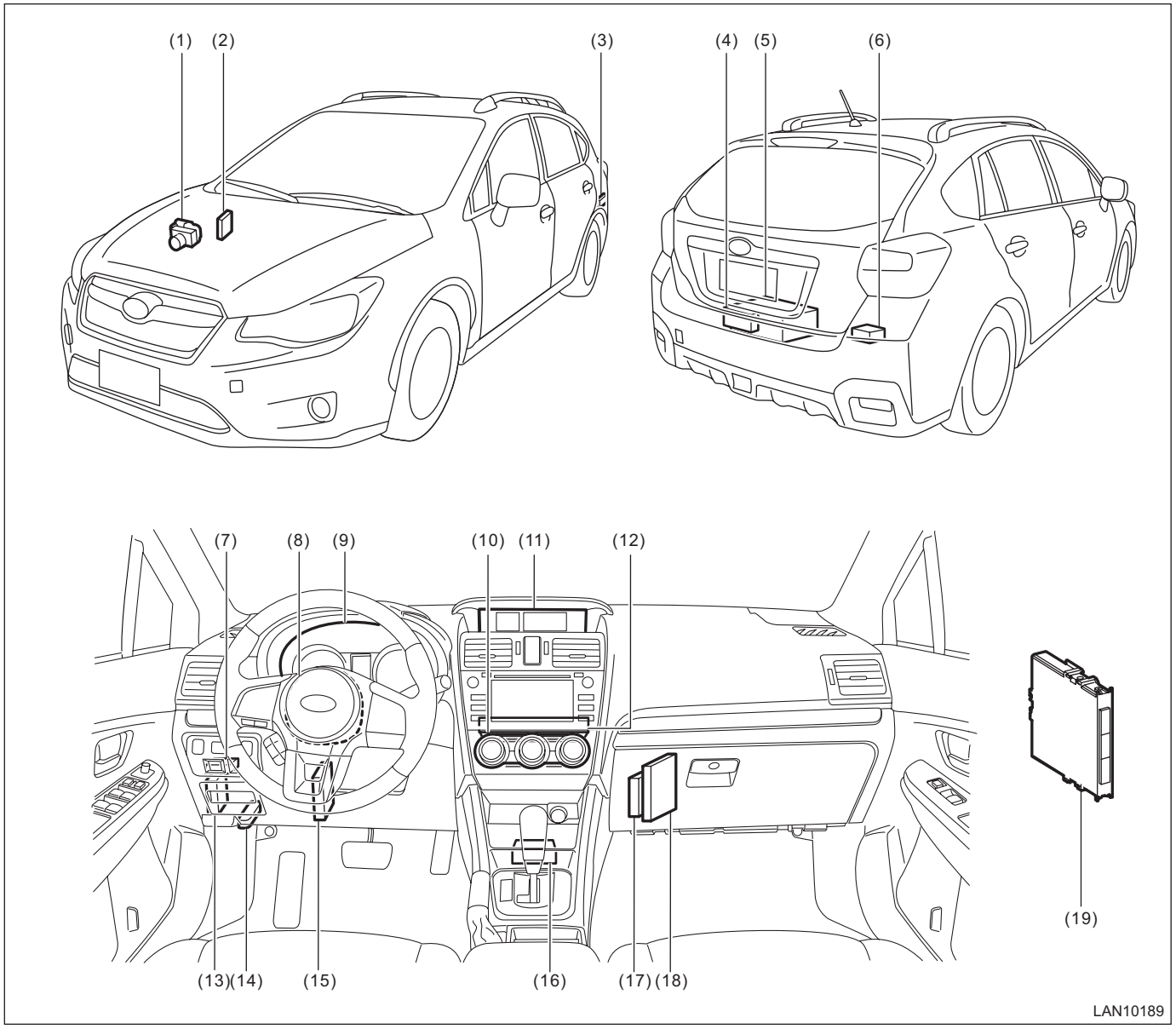
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

3. PREPARATION ITEMS

ITEM NAME	REMARKS
120 Ω resistance element (1/4 W or more)	Used as an alternative to end resistance.

4. Electrical Component Location

A: LOCATION



(1) VDC CM
(2) Power steering CM
(3) Radar sensor LH
(4) Drive motor CM
(5) High voltage battery (battery energy CM)
(6) Electric oil pump inverter
(7) Auto headlight beam leveler CM
(8) Steering angle sensor
(9) Combination meter
(10) A/C control panel
(11) MFD
(12) Data communication module (DCM)
(13) Body integrated unit
(14) Data link connector
(15) Transmission CM
(16) Airbag CM
(17) Hybrid powertrain CM
(18) Engine CM
(19) Keyless access CM

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

- Body integrated unit

For I/O signals of the body integrated unit, refer to BODY CONTROL SYSTEM (DIAGNOSTICS). <Ref. to BC(diag)-6, Control Module I/O Signal.>

- Engine CM

For I/O signals of ECM, refer to ENGINE (DIAGNOSTICS). <Ref. to EN(H4DO HEV)(diag)-21, ENGINE CONTROL MODULE (ECM), ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

- Transmission CM

For I/O signals of TCM, refer to AUTOMATIC TRANSMISSION (DIAGNOSTICS). <Ref. to CVT(HEV)(diag)-11, Transmission Control Module (TCM) I/O Signal.>

- VDC CM, steering angle sensor, yaw rate & G sensor

For the module I/O signals of VDC CM, steering angle sensor, and yaw rate & G sensor, refer to VEHICLE DYNAMICS CONTROL (VDC) (DIAGNOSTICS). <Ref. to VDC(diag)-12, Control Module I/O Signal.>

- Power steering CM

For unit I/O signals of power steering CM, refer to POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS). <Ref. to PS(diag)-10, Control Module I/O Signal.>

- A/C control panel

For unit I/O signals of A/C control panel, refer to HVAC SYSTEM (DIAGNOSTICS). <Ref. to AC(diag)-6, Auto A/C Control Module I/O Signal.>

- Combination meter

For I/O signals of combination meter, refer to INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS). <Ref. to IDI(diag)-7, Control Module I/O Signal.>

- Airbag CM

For I/O signals of the airbag CM, refer to AIRBAG SYSTEM (DIAGNOSTICS). <Ref. to AB(diag)-21, Airbag Control Module I/O Signal.>

- High grade MFD

For I/O signals of high grade MFD, refer to INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS). <Ref. to IDI(diag)-7, Control Module I/O Signal.>

- Keyless access CM

For I/O signals of keyless access CM, refer to KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS). <Ref. to KPS(diag)-15, Control Module I/O Signal.>

- Auto headlight beam leveler CM

For I/O signals of auto headlight beam leveler CM, refer to AUTO HEADLIGHT BEAM LEVELER SYSTEM (DIAGNOSTICS). <Ref. to AL(diag)-6, AUTO HEADLIGHT BEAM LEVELER CM, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

- Hybrid powertrain control module (HPCM)

For I/O signals of HPCM, refer to HEV (DIAGNOSTICS). <Ref. to HEV(diag)-10, HYBRID POWERTRAIN CONTROL MODULE (HPCM), ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

- Drive motor control module (DMCM)

For I/O signals of DMCM, refer to HEV (DIAGNOSTICS). <Ref. to HEV(diag)-12, DRIVE MOTOR CONTROL MODULE (DMCM), ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

- High voltage battery (battery energy control module (BECM))

For I/O signals of BECM, refer to HEV (DIAGNOSTICS). <Ref. to HEV(diag)-13, HIGH VOLTAGE BATTERY, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

- Radar sensor

For I/O signals of the radar sensor, refer to BSD/RCTA (DIAGNOSTICS). <Ref. to RVD(diag)-8, Control Module I/O Signal.>

- Data communication module

For I/O signals of data communication module, refer to TELEMATICS (DIAGNOSTICS). <Ref. to TEL(diag)-8, Control Module I/O Signal.>

- Data link connector

For I/O signals of data link connector, refer to ENGINE (DIAGNOSTICS). <Ref. to EN(H4DO HEV)(diag)-31, Data Link Connector.>

* CAN sleep state:
Hold on for approx. one minute with ignition OFF and the doors, trunk, rear gate all closed.

B: WIRING DIAGRAM

Refer to “CAN Communication System” in the wiring diagram. <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

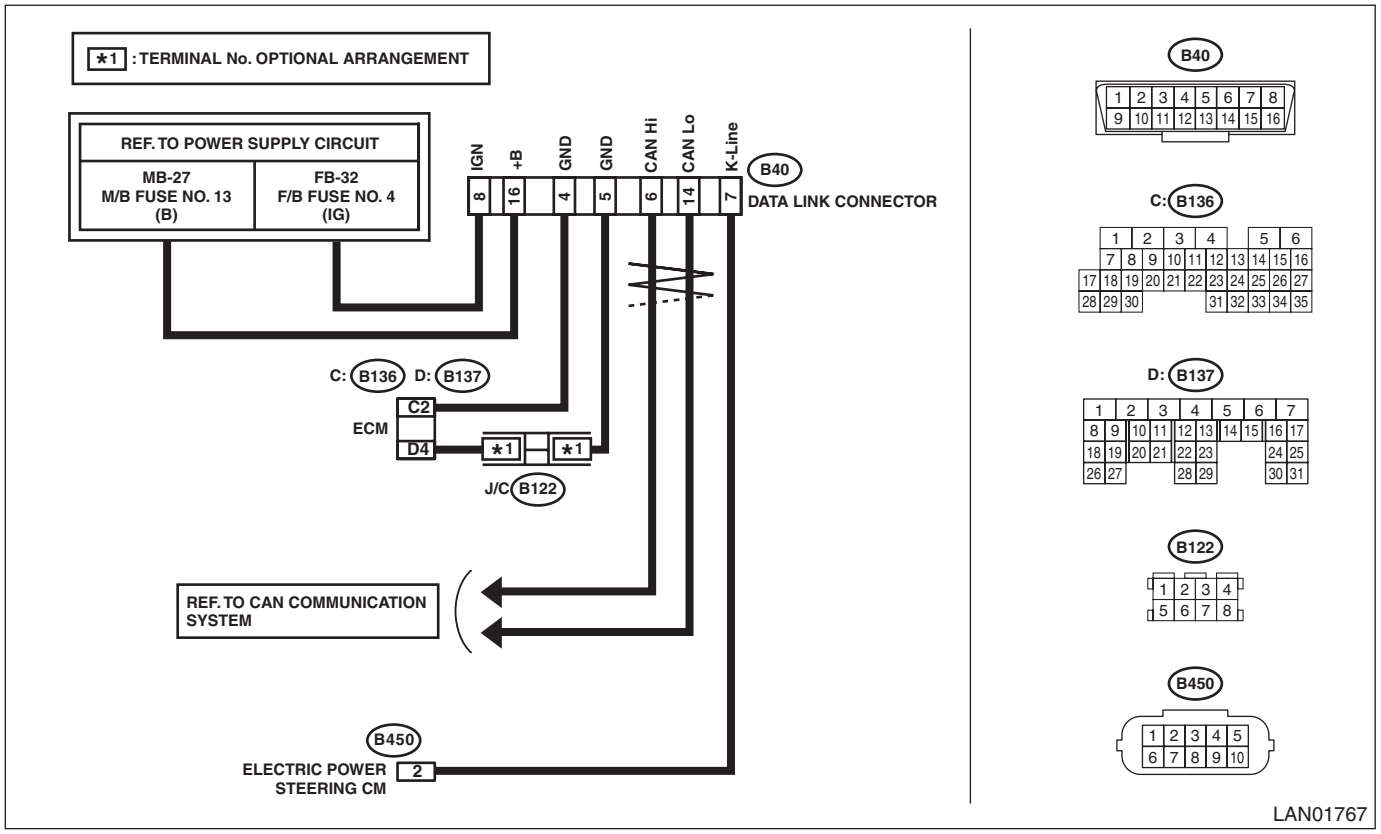
6. Subaru Select Monitor

A: OPERATION

For detailed operation procedures, refer to “Application help”.

B: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Subaru Select Monitor communication line is open or shorted.
TROUBLE SYMPTOM:
Not communicable with Subaru Select Monitor.
WIRING DIAGRAM:
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

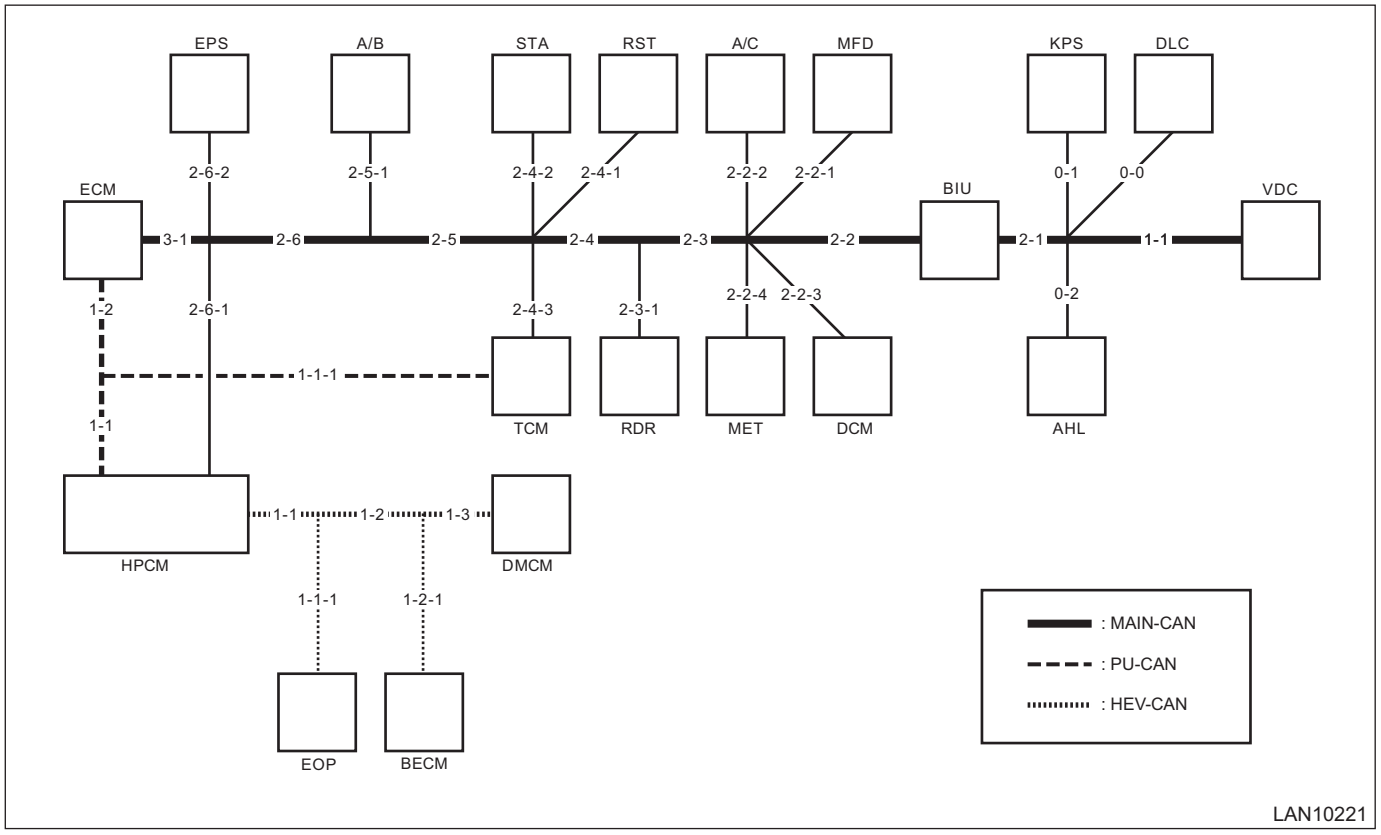


Step		Check	Yes	No
1	**CHECK SUBARU SELECT MONITOR.** 1) Connect the Subaru Select Monitor to another vehicle. 2) Check communication condition between Subaru Select Monitor and vehicle.	Is communication performed normally?	Go to step **2**.	Subaru Select Monitor unit or diagnosis cable is faulty. Or check the fuse on the vehicle side.

	Step	Check	Yes	No
2	**CHECK COMMUNICATION FOR INITIALIZING ERROR.** Perform the communication for initializing with each module by connecting the Subaru Select Monitor. (For systems whose module can communicate with diagnostic devices)	Is the communication possible with all modules?	Go to step **3**.	Perform the inspection using the check sheet of communication for initializing. <Ref. to LAN(HEV)(diag)-14, CHECK USING THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
3	**CHECK K-LINE.** 1) Establish the communication between Select Monitor and K-Line communication module. 2) Using a tester, check continuity between the modules that did not communicate with Select Monitor. ***Connector & terminal*** ***(B40) No. 7 — (B450) No. 2 (electric power steering):***	Is there continuity?	Go to step **4**.	Repair or replace the open circuit.
4	**CHECK K-LINE.** Using a tester, check continuity between K-line and chassis ground. ***Connector & terminal*** ***(B40) No. 7 — Chassis ground:***	Is there continuity?	Repair or replace the short circuit.	Go to step **5**.
5	**CHECK K-LINE.** Using a tester, check voltage between K-line and chassis ground. ***Connector & terminal*** ***(B40) No. 7 (+) — Chassis ground (–):***	Is the voltage 5 V or more with IG ON?	Repair or replace the short circuit.	Go to step **6**.
6	**CHECK K-LINE.** Use a tester to check for continuity in the ground circuit. ***Connector & terminal*** ***(B40) No. 4 — Chassis ground:*** ***(B40) No. 5 — Chassis ground:***	Is there continuity?	Go to step **8**.	Go to step **7**.
7	**CHECK K-LINE.** 1) Disconnect the ECM connector. 2) Use a tester to check for continuity in the ground circuit. ***Connector & terminal*** ***(B40) No. 4 — (B136) No. 2:*** ***(B40) No. 5 — (B137) No. 4:***	Is there continuity?	Check ECM ground.	Repair or replace the open circuit.
8	**CHECK K-LINE.** 1) Turn the ignition switch to ON. 2) Using a tester, check the power supply of data link connector. ***Connector & terminal*** ***(B40) No. 8 (+) — Chassis ground (–):*** ***(B40) No. 16 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	K-Line is normal. Check the power supply circuit of each module.	Check the power supply circuits to the data link connector.

1. CHECK USING THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING

- **Network diagram**



- **Check sheet of communication for initializing**

	(A)	(B)	(C)																													
			MAIN-CAN																							PU-CAN			HEV-CAN				
			1	2						3	0			2												1	1	1			1	
			1	1	2	3	4	5	6	1				2			3	4		5	6				1	2	1	1	2	3	1	2
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1
																			-	-					-	-	-					
VDC				-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU			-		-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD			-			-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C			-			-	-	-	-	-		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM			-			-	-	-	-	-		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET			-			-	-	-	-	-		-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR			-				-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM			-					-	-	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
A/B			-						-	-		-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
HPCM			-							-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
EPS		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM			-									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS			-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL			-	-	-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP			-							-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-		-
BECM			-							-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-			-	-	
DMCM			-							-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-				-	-

LAN10222

(A) Installation check

(B) Communication initialization

(C) Wiring location

VDC: VDC CM

BIU: Body integrated unit

MFD: High grade MFD

A/C: A/C control panel

MET: Combination meter

RST: Remote engine starter CM

STA: Steering angle sensor

TCM: Transmission CM

A/B: Airbag CM

DCM: Data communication module

HPCM: Hybrid powertrain CM

EPS: Power steering CM

ECM: Engine CM

KPS: Keyless access CM

AHL: Auto headlight beam leveler CM

EOP: Electric oil pump

BECM: Battery energy CM (high voltage battery)

DMCM: Drive motor CM

DLC: Data link connector

RDR: Radar sensor

1) Module installation check
(1) Write "-" marks in the field for installation check if the vehicle to be inspected does not have relevant module.
(2) Write "-" marks in all blank fields on the same row that the "-" mark has filled in.

NOTE:
Example of writing <Ref. to LAN(HEV)(diag)-17, EXAMPLE OF WRITING FOR THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>

2) Subaru Select Monitor communication initialization check
(1) Write "○" marks in the field for communication initialization if the module succeeded in the communication for initializing with Select Monitor.
If the communication with all modules is not possible, go to 3).
(2) Write "○" marks in all blank fields on the same row that the "○" mark has filled in.
(3) When at least one field in a column of wiring location is filled with the "○" mark, then the wiring for that location is normal. Write "○" marks in all blank fields on the same column that the "○" mark has filled in under the circled number.
(4) Check the open circuit of the modules which have no "○" mark in their columns of the wiring location in ascending order (closest to the data link connector first). (only for installed modules)
(5) If the communication is not possible after checking all harnesses, check the module power supply line.
(6) Perform the basic diagnostic procedure of the system if the power supply line is normal.
(7) Replace the module if the communication is not possible even after performing the basic diagnostic procedure.

NOTE:
• Example of writing <Ref. to LAN(HEV)(diag)-17, EXAMPLE OF WRITING FOR THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
• Inspection using the communication for initializing of Subaru Select Monitor cannot be used to diagnose the wiring location marked with "-". Example of DTC data not received <Ref. to LAN(HEV)(diag)-118, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).> should be used to identify the faulty portion.

3) Subaru Select Monitor communication initialization check (impossible to communicate with all modules)

NOTE:
Perform inspection regarding the trouble mode indicating that all CAN modules do not communicate. If at least one module becomes possible to communicate, return to 2).
(1) Check for the short circuit to ground. <Ref. to LAN(HEV)(diag)-44, GROUND SHORT INSPECTION (MAIN-CAN), INSPECTION, CAN Communication Circuit Check.> If it is normal, go to the next.
(2) Check for the short circuit to battery. <Ref. to LAN(HEV)(diag)-47, BATTERY SHORT INSPECTION (MAIN-CAN), INSPECTION, CAN Communication Circuit Check.> If it is normal, go to the next.
(3) Perform the inspection for the resistance of 52 Ω or less (short between wires). <Ref. to LAN(HEV)(diag)-53, 52 Ω OR LESS, INSPECTION, CAN Communication Circuit Check.> If it is normal, go to the next.
(4) Check for the open circuit of data link connector (No. 0 — 0) in network diagram.

2. EXAMPLE OF WRITING FOR THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING

- When MAIN-CAN 0-0 is open

NOTE:
Perform inspection by referring to the SSM communication initialization check (impossible to communicate with all modules).

	(A)	(B)	(C)																													
			MAIN-CAN																						PU-CAN			HEV-CAN					
			1	2						3	0			2											1		1	1			1	
			1	1	2	3	4	5	6	1				2			3	4		5	6				1	2	1	1	2	3	1	2
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1
																			-	-					-	-	-					
VDC	○	×		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	×	-		-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	×	-			-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	×	-			-	-	-	-	-		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	×	-			-	-	-	-	-		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	×	-			-	-	-	-	-		-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	×	-				-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	×	-					-	-	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
A/B	○	×	-						-	-		-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
HPCM	○	×	-							-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	×	-									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	×	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	×	-	-	-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	×	-							-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-		-
BECM	○	×	-							-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-			-	-	
DMCM	○	×	-							-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-				-	-

LAN10223

- When MAIN-CAN 0-1 is open

	(A)	(B)	(C)																																			
			MAIN-CAN																												PU-CAN		HEV-CAN							
			1	2						3	0			2																	1	1	1			1		
			1	1	2	3	4	5	6	1				2				3		4			5	6							1	2	1	1	2	3	1	2
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1
			○	○	○	○	○	○	○	○	○		○	○	○	○	○	○	-	-	○	○	○	○	-	-	-	○	○	○	○	○
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	×	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-
BECM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-	○
DMCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-

LAN10224

- When MAIN-CAN 0-2 is open

	(A)	(B)	(C)																																			
			MAIN-CAN																												PU-CAN		HEV-CAN							
			1	2						3	0			2																	1	1	1			1		
			1	1	2	3	4	5	6	1				2				3		4			5	6							1	2	1	1	2	3	1	2
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1
			○	○	○	○	○	○	○	○	○	○		○	○	○	○	○	-	-	○	○	○	○	-	-	-	○	○	○	○	○
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	×	-	-	-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-
BECM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-	○
DMCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-

LAN10225

- When MAIN-CAN 1-1 is open

| | (A) | (B) | (C) | | |

- When MAIN-CAN 2-2 is open

	(A)	(B)	(C)																																
			MAIN-CAN																								PU-CAN			HEV-CAN						
			1	2						3	0			2													1	1	1				1		
			1	1	2	3	4	5	6	1				2			3	4		5	6						1	2	1	1	2	3	1	2	
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2				-	-	1	-	-	-	1	1	
			○	○							○	○	○						-	-								-	-	-						
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	×	-	○		-	-	-	-	-	○	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	×	-	○		-	-	-	-	-	○	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	×	-	○		-	-	-	-	-	○	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	×	-	○		-	-	-	-	-	○	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	×	-	○			-	-	-	-	○	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	×	-	○				-	-	-	○	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/B	○	×	-	○					-	-	○	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM	○	×	-	○						-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	×	-	○							○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	×	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	×	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	×	-	○						-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-
BECM	○	×	-	○						-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-			-	-		-	-		
DMCM	○	×	-	○						-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-				-	-	-	-	-	-

LAN10228

- When MAIN-CAN 2-2-1 is open

	(A)	(B)	(C)																																
			MAIN-CAN																								PU-CAN			HEV-CAN						
			1	2						3	0			2													1	1	1				1		
			1	1	2	3	4	5	6	1				2			3	4		5	6						1	2	1	1	2	3	1	2	
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2				-	-	1	-	-	-	1	1	
			○	○	○	○	○	○	○	○	○	○	○		○	○	○	○	-	-	○	○	○	○				-	-	-	○	○	○	○	○	
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	×	-	○	○	-	-	-	-	-	○	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-	-	-	-
BECM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-	○	-	-	-
DMCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-	-	-	-

LAN10229

- When MAIN-CAN 2-2-2 is open

| | (A) | (B) | (C) | | |

- When MAIN-CAN 2-2-4 is open

| | (A) | (B) | (C) | | |

- When MAIN-CAN 2-3-1 is open

	(A)	(B)	(C)																																			
			MAIN-CAN																												PU-CAN		HEV-CAN							
			1	2						3	0			2																	1	1	1				1	
			1	1	2	3	4	5	6	1				2				3	4		5	6									1	2	1	1	2	3	1	2
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1
			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		-	-	○	○	○	○	-	-	-	○	○	○	○	○
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	×	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-
BECM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-	○
DMCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-

LAN10234

- When MAIN-CAN 2-4 is open

	(A)	(B)	(C)																																			
			MAIN-CAN																												PU-CAN		HEV-CAN							
			1	2						3	0			2																	1	1	1				1	
			1	1	2	3	4	5	6	1				2				3	4		5	6									1	2	1	1	2	3	1	2
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1
			○	○	○	○					○	○	○	○	○	○	○	○	-	-					-	-	-					
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	×	-	○	○	○		-	-	-	○	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
A/B	○	×	-	○	○	○			-	-	○	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
HPCM	○	×	-	○	○	○				-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	×	-	○	○	○					○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	×	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	×	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	×	-	○	○	○				-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-		-
BECM	○	×	-	○	○	○				-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-			-	-	
DMCM	○	×	-	○	○	○				-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-				-	-

LAN10235

- When MAIN-CAN 2-4-1/2-4-2/2-6-2 is open

NOTE:

- Locations can be identified by the difference of data no-receive conditions between modules. <Ref. to LAN(HEV)(diag)-118, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).>
- If the remote engine starter does not operate even though no DTC has been detected, check the lines of the remote engine starter.

	(A)	(B)	(C)																													
			MAIN-CAN																						PU-CAN			HEV-CAN					
			1	2						3	0			2											1	1	1			1		
			1	1	2	3	4	5	6	1				2				3	4			5	6										
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1
			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	○	-	-	-	○	○	○	○	○
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-
BECM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-	○
DMCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-

LAN10236

- When MAIN-CAN 2-4-3 is open

| | (A) | (B) | (C) | | |

- When MAIN-CAN 2-5-1 is open

	(A)	(B)	(C)																																		
			MAIN-CAN																										PU-CAN		HEV-CAN							
			1	2						3	0			2															1	1	1			1				
			1	1	2	3	4	5	6	1				2				3	4			5	6						1	2	1	1	2	3	1	2		
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1						
			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○		○	○	-	-	-	○	○	○	○	○						
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-						
A/B	○	✕	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-						
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-						
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-						
BECM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-	○						
DMCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-						

LAN10239

- When MAIN-CAN 2-6 is open

	(A)	(B)	(C)																																		
			MAIN-CAN																										PU-CAN		HEV-CAN							
			1	2						3	0			2															1	1	1			1				
			1	1	2	3	4	5	6	1				2				3	4			5	6						1	2	1	1	2	3	1	2		
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1						
			○	○	○	○	○				○	○	○	○	○	○	○	○	-	-	○	○			-	-	-											
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-						
A/B	○	○	-	○	○	○	○		-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-						
HPCM	○	✕	-	○	○	○	○			-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-						
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
ECM	○	✕	-	○	○	○	○				○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
KPS	○	✕	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
AHL	○	✕	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
EOP	○	✕	-	○	○	○	○			-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-		-					
BECM	○	✕	-	○	○	○	○			-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-			-	-						
DMCM	○	✕	-	○	○	○	○			-	○	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-				-	-					

LAN10240

- When MAIN-CAN 2-6-1 is open

| | (A) | (B) | (C) | | |

- When HEV-CAN 1-1 is open

	(A)	(B)	(C)																																		
			MAIN-CAN																										PU-CAN		HEV-CAN							
			1	2						3	0			2															1	1	1			1				
			1	1	2	3	4	5	6	1				2				3	4			5	6						1	2	1	1	2	3	1	2		
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1						
			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	○	-	-	-											
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	×	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-		-	-		-						
BECM	○	×	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-			-	-							
DMCM	○	×	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-				-	-						

LAN10243

- When HEV-CAN 1-1-1 is open

	(A)	(B)	(C)																																		
			MAIN-CAN																										PU-CAN		HEV-CAN							
			1	2						3	0			2															1	1	1			1				
			1	1	2	3	4	5	6	1				2				3	4			5	6						1	2	1	1	2	3	1	2		
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1						
			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	○	-	-	-	○	○	○		○						
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	×	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-		-						
BECM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-	○						
DMCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-						

LAN10244

- When HEV-CAN 1-2 is open

	(A)	(B)	(C)																																			
			MAIN-CAN																										PU-CAN		HEV-CAN							
			1	2						3	0			2															1	1	1			1				
			1	1	2	3	4	5	6	1				2				3	4			5	6						1	2	1	1	2	3	1	2		
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1						
			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	○	-	-	-	○			○							
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-
BECM	○	×	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○		-	-							
DMCM	○	×	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○			-	-						

LAN10245

- When HEV-CAN 1-2-1 is open

	(A)	(B)	(C)																																			
			MAIN-CAN																										PU-CAN		HEV-CAN							
			1	2						3	0			2															1	1	1			1				
			1	1	2	3	4	5	6	1				2				3	4			5	6						1	2	1	1	2	3	1	2		
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1						
			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	○	-	-	-	○	○	○	○							
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-
BECM	○	×	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-							
DMCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-						

LAN10246

- When HEV-CAN 1-3 is open

	(A)	(B)	(C)																													
			MAIN-CAN																							PU-CAN			HEV-CAN				
			1	2						3	0			2												1	1	1			1	
			1	1	2	3	4	5	6	1				2				3	4		5	6				1	2	1	1	2	3	1	2
			-	-	-	-	-	-	-	-	0	1	2	1	2	3	4	1	1	2	3	1	1	2	-	-	1	-	-	-	1	1
			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	○	○	○	○	-	-	-	○	○	○	○	
VDC	○	○	○	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIU	○	○	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFD	○	○	-	○	○	-	-	-	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/C	○	○	-	○	○	-	-	-	-	-	○	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCM	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET	○	○	-	○	○	-	-	-	-	-	○	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDR	○	○	-	○	○	○	-	-	-	-	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RST	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STA	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCM	○	○	-	○	○	○	○	-	-	-	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-	-
A/B	○	○	-	○	○	○	○	○	-	-	○	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-
HPCM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-
EPS	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM	○	○	-	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS	○	○	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AHL	○	○	-	-	-	-	-	-	-	-	○	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EOP	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	-	-	○	-
BECM	○	○	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	-	-	
DMCM	○	×	-	○	○	○	○	○	○	-	○	-	-	-	-	-	-	-	-	-	-	-	○	-	-	-	-	○	○	○	-	-

LAN10247

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «All diagnosis code».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC). <Ref. to LAN(HEV)(diag)-113, List of Diagnostic Trouble Code (DTC).>

8. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «All diagnosis code».
On «All diagnosis code» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

9. CAN Communication Circuit Check

A: PROCEDURE

1. MAIN-CAN

NOTE:
- When measuring the resistance of CAN communication circuit, measure it in sleep status.

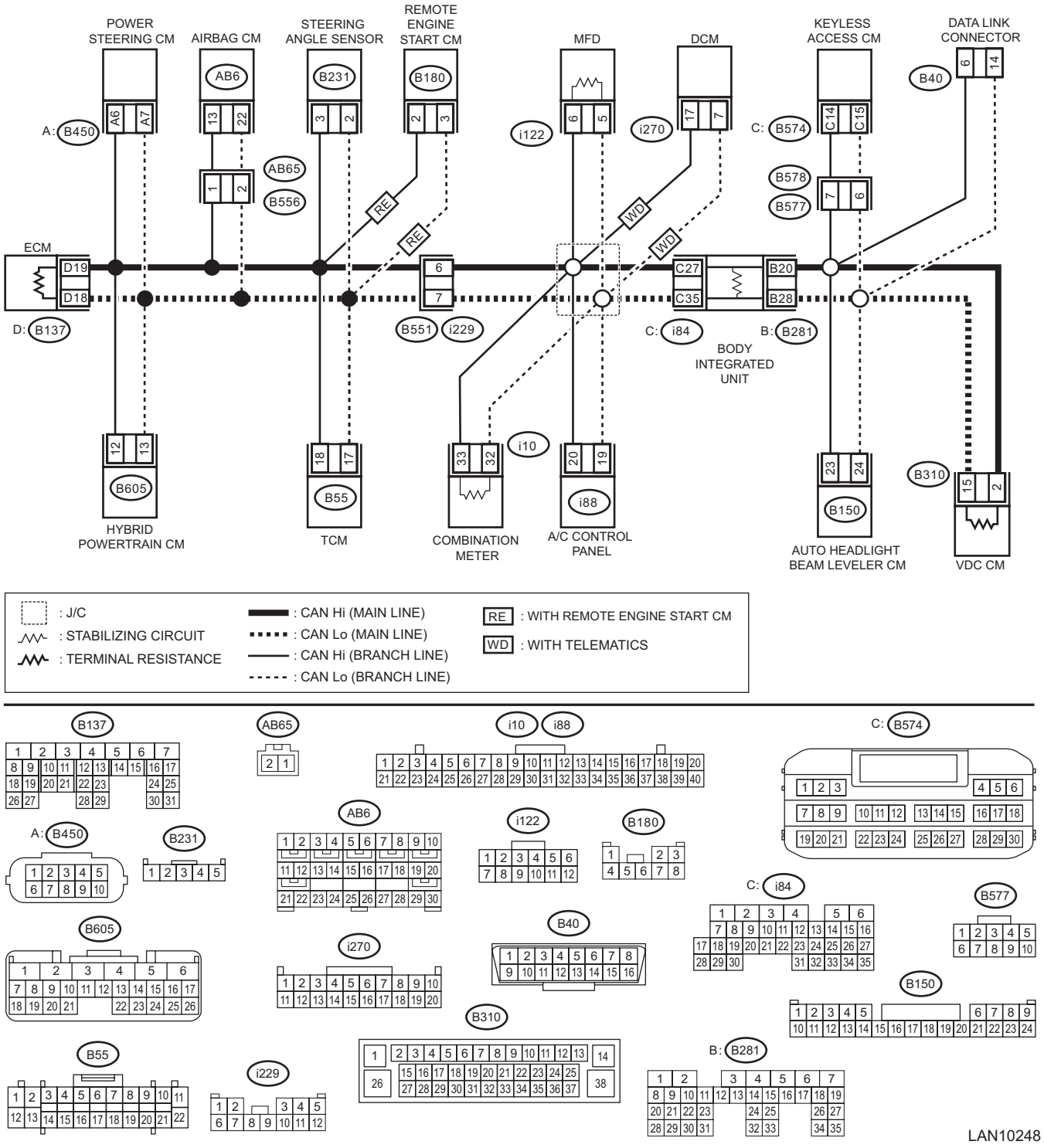
To enter sleep status
  – With ignition switch OFF and key or switch operation stopped, keep the doors, trunk, and rear gate all closed for one minute or more.
  – On models with keyless access function, keep the access key 2 m or more away from the vehicle.
- When the bus line is measured, combined resistance of the end resistance (120 Ω) in ECM and the end resistance (120 Ω) in VDC CM can be measured. The combined resistance is supposed to be approximately 53 — 61 Ω with the stabilizing circuit included. If the measured resistance value becomes 52 Ω or less, main wiring harness or related lines may be shorted. Or, the combined resistance may have changed because of a resistance other than the end resistance created on the circuit. If the measured value is 62 Ω or more, there may be a malfunction such as open circuit in one of the end resistances, in the stabilizing circuit, or in the main wiring harness.

Also, even when the resistance value falls within approx. 53 — 61 Ω, related lines may be open if an error of communication for initializing or a CAN system U-code has occurred. (The resistance cannot be between approx. 53 — 61 Ω if the main wiring harness is open.)

WIRING DIAGRAM:

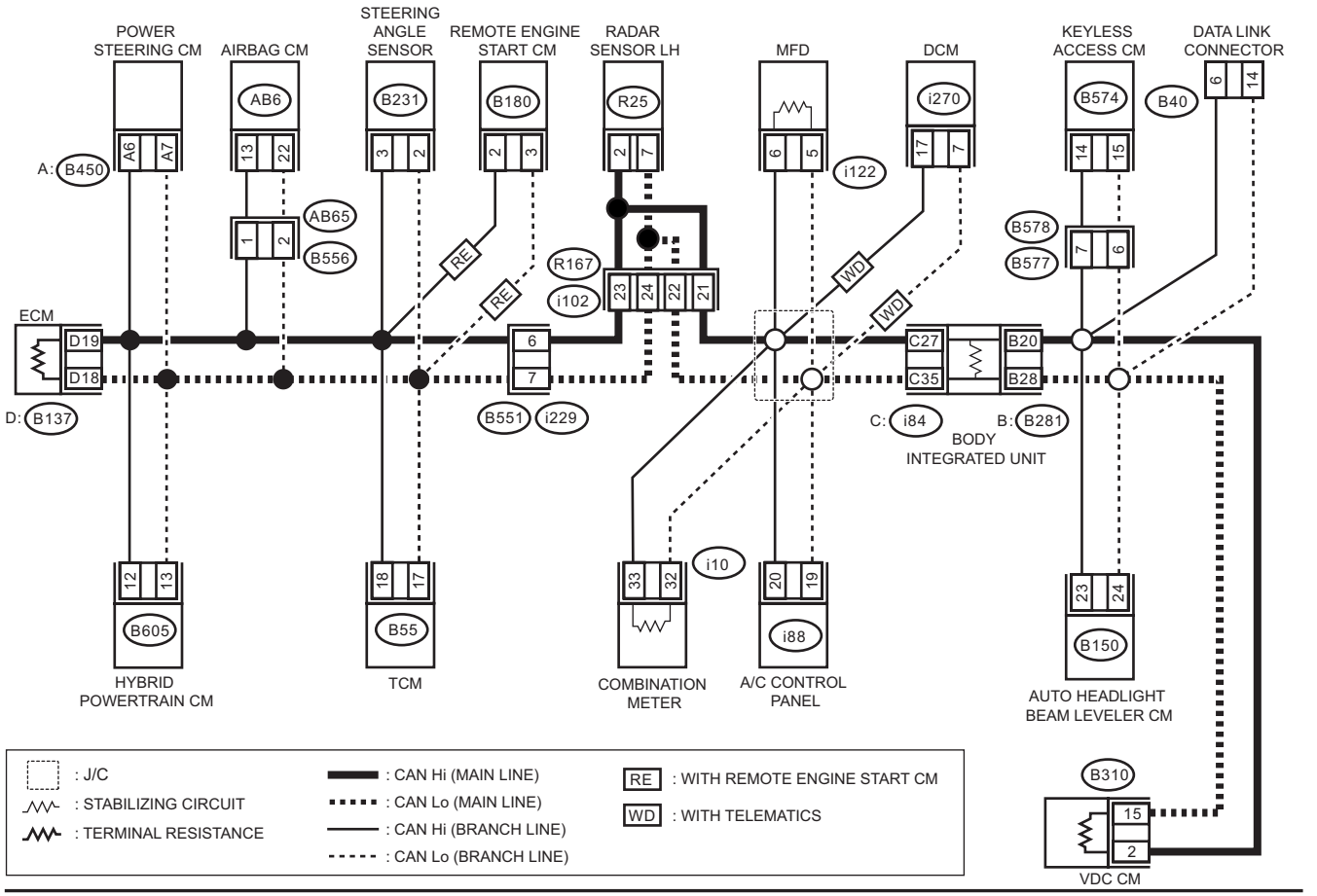
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

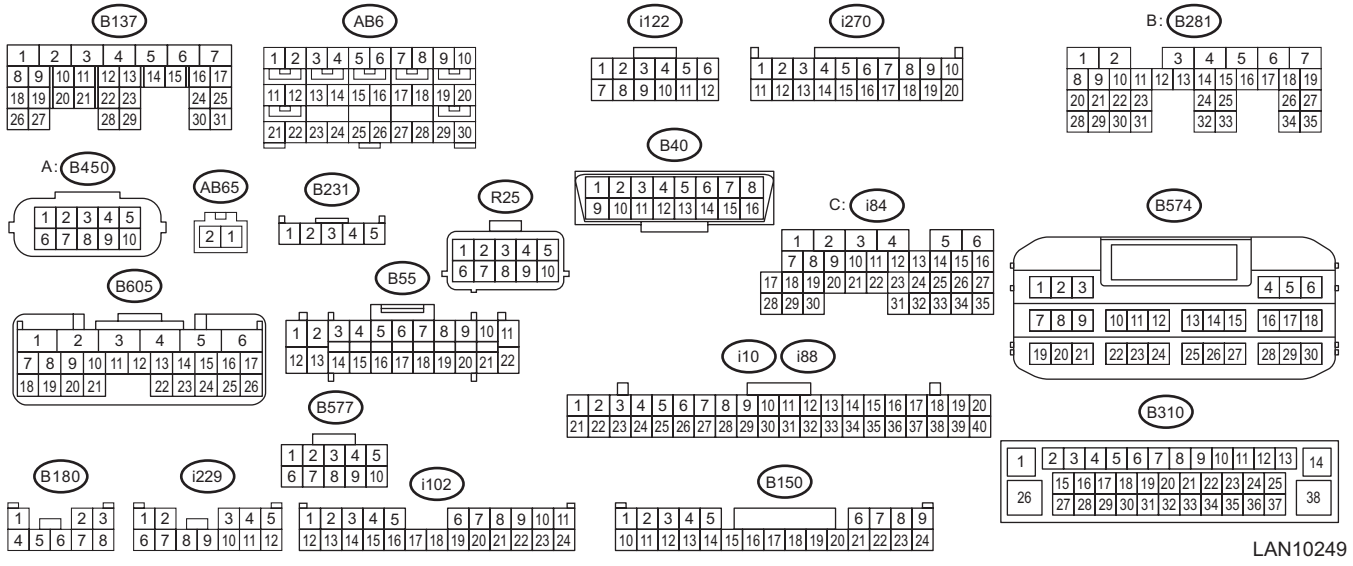
- Without BSD/RCTA



LAN10248

- With BSD/RCTA



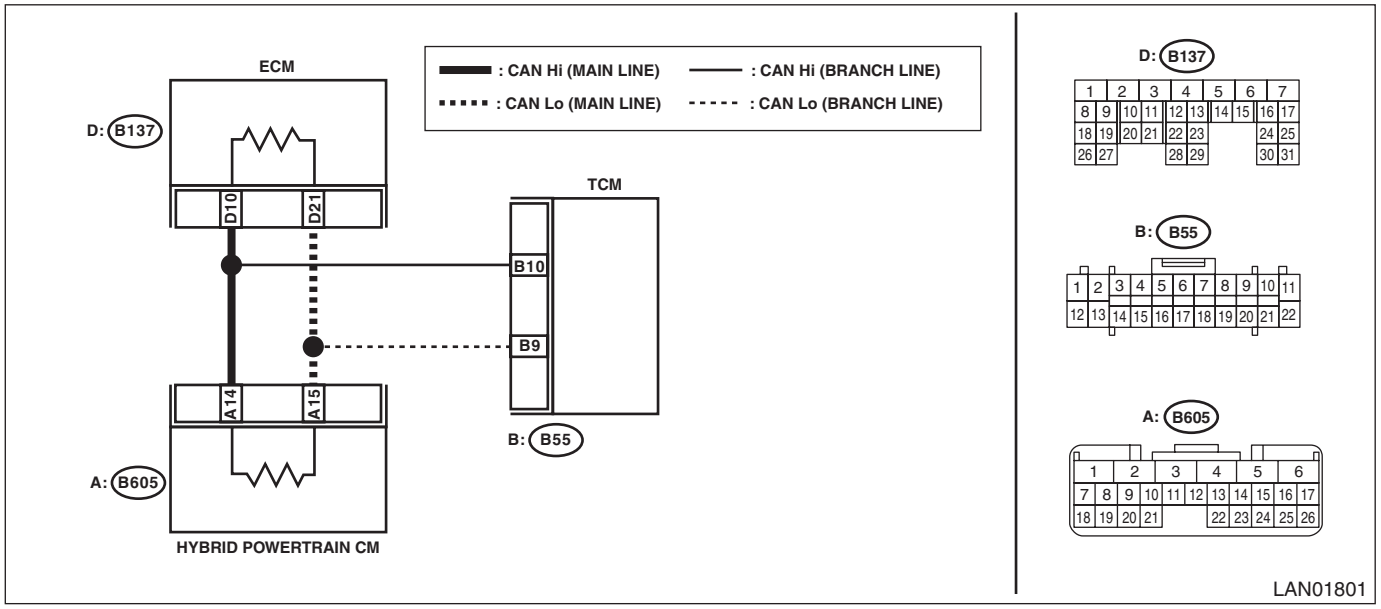


	Step	Check	Yes	No
1	**CHECK BASIC DIAGNOSTIC PROCEDURE.** Check that the basic diagnosis has been performed up to STEP 3. NOTE: Possible defective parts can be narrowed easily by inspection using Subaru Select Monitor before performing "CHECK CAN COMMUNICATION CIRCUIT" using a tester.	Was the basic diagnostic procedure performed?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
2	**CHECK FROM DATA LINK CONNECTOR.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the resistance 10 Ω or less?	Check for ground short. <Ref. to LAN(HEV)(diag)-44, GROUND SHORT INSPECTION (MAIN-CAN), INSPECTION, CAN Communication Circuit Check.>	Go to step **3**.
3	**CHECK FROM DATA LINK CONNECTOR.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the voltage 5 V or less?	Go to step **4**.	Check for battery short. <Ref. to LAN(HEV)(diag)-47, BATTERY SHORT INSPECTION (MAIN-CAN), INSPECTION, CAN Communication Circuit Check.>
4	**CHECK FROM DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — No. 14:***	Is the resistance 52 Ω or less?	Perform the inspection for resistance of 52 Ω or less. <Ref. to LAN(HEV)(diag)-53, 52 Ω OR LESS, INSPECTION, CAN Communication Circuit Check.>	Go to step **5**.
5	**CHECK FROM DATA LINK CONNECTOR.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — No. 14:***	Is the resistance 62 Ω or more?	Perform the inspection for resistance of 62 Ω or more. <Ref. to LAN(HEV)(diag)-57, 62 Ω OR MORE, INSPECTION, CAN Communication Circuit Check.>	If the display of CAN system U-code disappears from the current malfunction, the CAN network is currently normal. If the U-code has detected as current malfunction, related lines may be open. Perform the inspection for the related line corresponding to the detected DTC. <Ref. to LAN(HEV)(diag)-41, MAIN-CAN, LIST, CAN Communication Circuit Check.>

2. PU-CAN

NOTE:
• When measuring the resistance of CAN communication circuit, measure it in sleep status.
To enter sleep status
– With ignition switch OFF and key or switch operation stopped, keep the doors, trunk, and rear gate all closed for one minute or more.
– On models with keyless access function, keep the access key 2 m or more away from the vehicle.
• When the bus line is measured, combined resistance of the end resistance (120 Ω) in ECM and the end resistance (120 Ω) in HPCM can be measured. The combined resistance is approximately 57 — 63 Ω. If the measured resistance value becomes 56 Ω or less, main wiring harness or related lines may be shorted. Or, the combined resistance may have changed because of a resistance other than the end resistance created on the circuit. If the measured value is 64 Ω or more, there may be a malfunction such as open circuit in one of the end resistances, in the stabilizing circuit, or in the main wiring harness.
Also, even when the resistance value falls within approx. 57 — 63 Ω, related lines may be open if an error of communication for initializing or a CAN system U-code has occurred. (The resistance won't be between approx. 57 — 63 Ω if the main wiring harness is open.)

WIRING DIAGRAM:
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



	Step	Check	Yes	No
1	**CHECK BASIC DIAGNOSTIC PROCEDURE.** Confirm that the basic diagnostic procedure was performed up to STEP 3. NOTE: Inspection using Subaru Select Monitor helps to find faulty portion easily before “CAN Communication Circuit Check” using the tester.	Was the basic diagnostic procedure performed?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
2	**CHECK FROM ECM CONNECTOR.** 1) Disconnect the ECM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B137) No. 21 — Chassis ground:*** ***(B137) No. 10 — Chassis ground:***	Is the resistance 10 Ω or less?	Check for ground short. <Ref. to LAN(HEV)(diag)-98, GROUND SHORT INSPECTION (PU-CAN), INSPECTION, CAN Communication Circuit Check.>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK FROM ECM CONNECTOR.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B137) No. 21 (+) — Chassis ground (–):*** ***(B137) No. 10 (+) — Chassis ground (–):***	Is the voltage 5 V or less?	Go to step **4**.	Check for battery short. <Ref. to LAN(HEV)(diag)-99, BATTERY SHORT INSPECTION (PU-CAN), INSPECTION, CAN Communication Circuit Check.>
4	**CHECK FROM ECM CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B137) No. 21 — No. 10:***	Is the resistance 56 Ω or less?	Perform the inspection for the resistance of 56 Ω or less. <Ref. to LAN(HEV)(diag)-101, 56 Ω OR LESS (PU-CAN), INSPECTION, CAN Communication Circuit Check.>	Go to step **5**.
5	**CHECK FROM ECM CONNECTOR.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B137) No. 21 — No. 10:***	Is the resistance 64 Ω or more?	Perform the inspection for the resistance of 64 Ω or more. <Ref. to LAN(HEV)(diag)-102, 64 Ω OR MORE (PU-CAN), INSPECTION, CAN Communication Circuit Check.>	If the display of CAN system U-code disappears from the current malfunction, the CAN network is currently normal. If the U-code has detected as current malfunction, related lines may be open. Perform the inspection for the related line corresponding to the detected DTC. <Ref. to LAN(HEV)(diag)-42, PU-CAN, LIST, CAN Communication Circuit Check.>

3. HEV-CAN

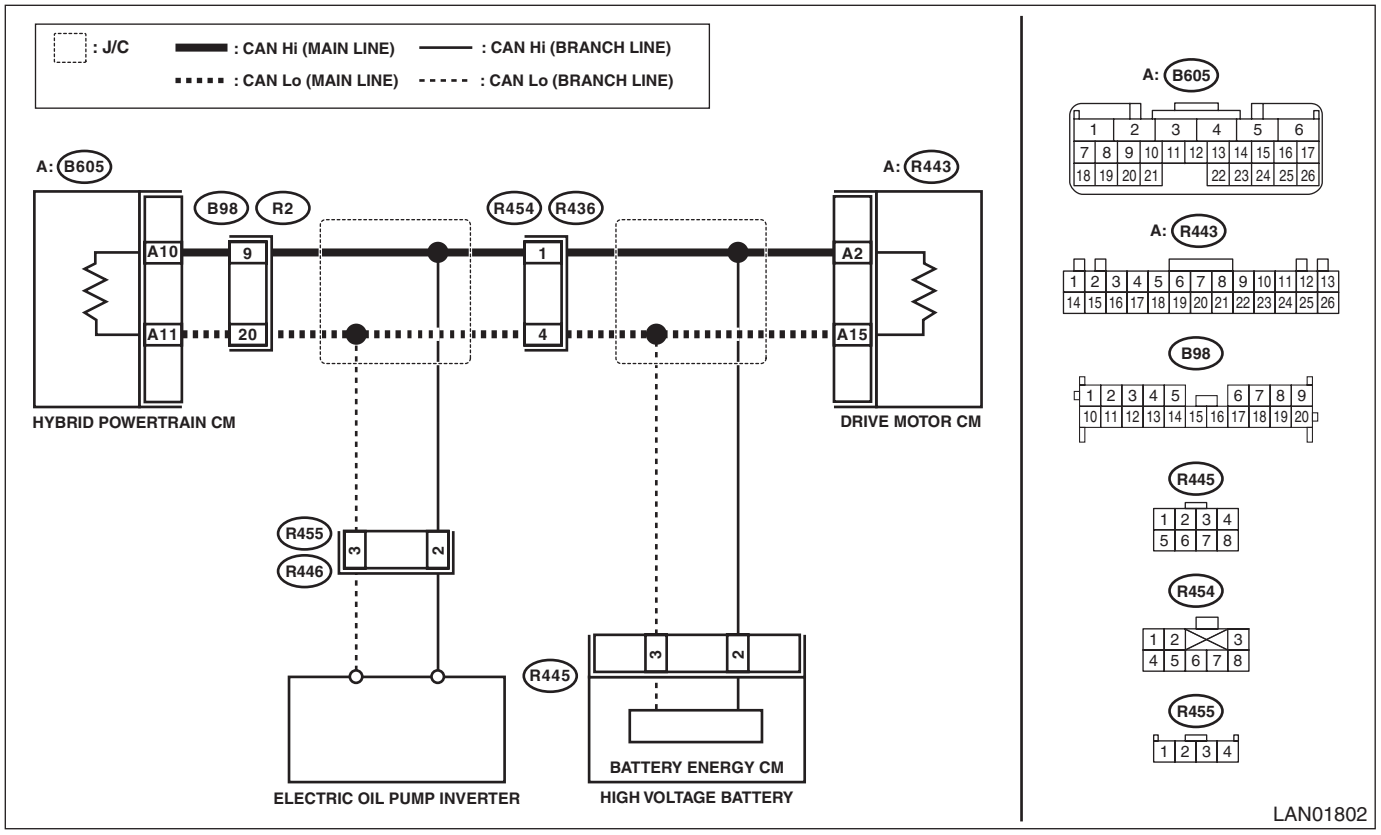
NOTE:
- When measuring the resistance of CAN communication circuit, measure it in sleep status.

To enter sleep status
  – With ignition switch OFF and key or switch operation stopped, keep the doors, trunk, and rear gate all closed for one minute or more.
  – On models with keyless access function, keep the access key 2 m or more away from the vehicle.
- When the bus line is measured, combined resistance of the end resistance (120 Ω) in HPCM and the end resistance (120 Ω) in DMCM can be measured. The combined resistance is approximately 57 — 63 Ω. If the measured resistance value becomes 56 Ω or less, main wiring harness or related lines may be shorted. Or, the combined resistance may have changed because of a resistance other than the end resistance created on the circuit. If the measured value is 64 Ω or more, there may be a malfunction such as open circuit in one of the end resistances, in the stabilizing circuit, or in the main wiring harness.

Also, even when the resistance value falls within approx. 57 — 63 Ω, related lines may be open if an error of communication for initializing or a CAN system U-code has occurred. (The resistance won't be between approx. 57 — 63 Ω if the main wiring harness is open.)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



Step		Check	Yes	No
1	**CHECK BASIC DIAGNOSTIC PROCEDURE.** Confirm that the basic diagnostic procedure was performed up to STEP 3. NOTE: Inspection using Subaru Select Monitor helps to find faulty portion easily before “CAN Communication Circuit Check” using the tester.	Was the basic diagnostic procedure performed?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

	Step	Check	Yes	No
2	**CHECK FROM HPCM CONNECTOR.** 1) Disconnect the HPCM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 10 — Chassis ground:*** ***(B605) No. 11 — Chassis ground:***	Is the resistance 10 Ω or less?	Check for ground short. <Ref. to LAN(HEV)(diag)-104, GROUND SHORT INSPECTION (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>	Go to step **3**.
3	**CHECK FROM HPCM CONNECTOR.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B605) No. 10 (+) — Chassis ground (–):*** ***(B605) No. 11 (+) — Chassis ground (–):***	Is the voltage 5 V or less?	Go to step **4**.	Check for battery short. <Ref. to LAN(HEV)(diag)-105, BATTERY SHORT INSPECTION (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>
4	**CHECK FROM HPCM CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 10 — No. 11:***	Is the resistance 56 Ω or less?	Perform the inspection for the resistance of 56 Ω or less. <Ref. to LAN(HEV)(diag)-108, 56 Ω OR LESS (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>	Go to step **5**.
5	**CHECK FROM HPCM CONNECTOR.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 10 — No. 11:***	Is the resistance 64 Ω or more?	Perform the inspection for the resistance of 64 Ω or more. <Ref. to LAN(HEV)(diag)-110, 64 Ω OR MORE (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>	If the display of CAN system U-code disappears from the current malfunction, the CAN network is currently normal. If the U-code has detected as current malfunction, related lines may be open. Perform the inspection for the related line corresponding to the detected DTC. <Ref. to LAN(HEV)(diag)-43, HEV-CAN, LIST, CAN Communication Circuit Check.>

B: LIST

1. MAIN-CAN

Resistance value between CAN Hi and Lo	Contents of inspection	Remarks
Ground short inspection	<Ref. to LAN(HEV)(diag)-44, GROUND SHORT INSPECTION (MAIN-CAN), INSPECTION, CAN Communication Circuit Check.>	Shorted to ground in the communication circuit or control module.
Battery short inspection	<Ref. to LAN(HEV)(diag)-47, BATTERY SHORT INSPECTION (MAIN-CAN), INSPECTION, CAN Communication Circuit Check.>	Shorted to battery power supply in the communication circuit or control module.
53 — 61 Ω	<Ref. to LAN(HEV)(diag)-50, 53 — 61 Ω, INSPECTION, CAN Communication Circuit Check.>	Combined resistance of end resistance does not have malfunction; short to ground or +B short of the CAN communication circuit is possible, however.
52 Ω or less	<Ref. to LAN(HEV)(diag)-53, 52 Ω OR LESS, INSPECTION, CAN Communication Circuit Check.>	Resistance is lower than combined resistance of end resistance. Short to CAN Hi and CAN Lo on the CAN communication circuit is possible.
62 Ω or more	<Ref. to LAN(HEV)(diag)-57, 62 Ω OR MORE, INSPECTION, CAN Communication Circuit Check.>	Resistance is higher than combined resistance of end resistance. Open circuit of CAN communication circuit is possible.
Related lines 53 — 61 Ω (TCM)	<Ref. to LAN(HEV)(diag)-60, RELATED LINES 53 — 61 Ω (TCM), INSPECTION, CAN Communication Circuit Check.>	No TCM data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (steering angle sensor)	<Ref. to LAN(HEV)(diag)-63, RELATED LINES 53 — 61 Ω (STEERING ANGLE SENSOR), INSPECTION, CAN Communication Circuit Check.>	No steering angle sensor data is received. Perform inspection when faulty is detected.
Related line 53 — 61 Ω (A/C control panel)	<Ref. to LAN(HEV)(diag)-66, RELATED LINE 53 — 61 Ω (A/C CONTROL PANEL), INSPECTION, CAN Communication Circuit Check.>	No A/C data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (power steering CM)	<Ref. to LAN(HEV)(diag)-69, RELATED LINES 53 — 61 Ω (POWER STEERING CM), INSPECTION, CAN Communication Circuit Check.>	No electric power steering data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (combination meter)	<Ref. to LAN(HEV)(diag)-72, RELATED LINES 53 — 61 Ω (COMBINATION METER), INSPECTION, CAN Communication Circuit Check.>	No meter data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (MFD)	<Ref. to LAN(HEV)(diag)-75, RELATED LINES 53 — 61 Ω (MFD), INSPECTION, CAN Communication Circuit Check.>	No MFD data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (airbag CM system)	<Ref. to LAN(HEV)(diag)-78, RELATED LINES 53 — 61 Ω (AIRBAG CM SYSTEM), INSPECTION, CAN Communication Circuit Check.>	No airbag data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (keyless access system)	<Ref. to LAN(HEV)(diag)-81, RELATED LINES 53 — 61 Ω (KEYLESS ACCESS SYSTEM), INSPECTION, CAN Communication Circuit Check.>	No keyless access CM data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (remote engine starter)	<Ref. to LAN(HEV)(diag)-84, RELATED LINES 53 — 61 Ω (REMOTE ENGINE STARTER), INSPECTION, CAN Communication Circuit Check.>	Perform inspection when the remote engine starter does not operate, while the mobile key side operates normally.
Related line 53 — 61 Ω (headlight beam leveler)	<Ref. to LAN(HEV)(diag)-87, RELATED LINES 53 — 61 Ω (HEADLIGHT BEAM LEVELER), INSPECTION, CAN Communication Circuit Check.>	No headlight beam leveler data is received. Perform inspection when faulty is detected.

Resistance value between CAN Hi and Lo	Contents of inspection	Remarks
Related lines 53 — 61 Ω (HPCM)	<Ref. to LAN(HEV)(diag)-90, RELATED LINES 53 — 61 Ω (HPCM), INSPECTION, CAN Communication Circuit Check.>	No hybrid data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (telematics)	<Ref. to LAN(HEV)(diag)-93, RELATED LINES 53 — 61 Ω (TELEMATICS), INSPECTION, CAN Communication Circuit Check.>	No telematics data is received. Perform inspection when faulty is detected.
Related lines 53 — 61 Ω (radar sensor)	<Ref. to LAN(HEV)(diag)-96, RELATED LINES 53 — 61 Ω (RADAR SENSOR), INSPECTION, CAN Communication Circuit Check.>	No radar sensor data is received. Perform inspection when faulty is detected.

2. PU-CAN

Resistance value between CAN Hi and Lo	Contents of inspection	Remarks
Ground short inspection	<Ref. to LAN(HEV)(diag)-98, GROUND SHORT INSPECTION (PU-CAN), INSPECTION, CAN Communication Circuit Check.>	Shorted to ground in the communication circuit or control module.
Battery short inspection	<Ref. to LAN(HEV)(diag)-99, BATTERY SHORT INSPECTION (PU-CAN), INSPECTION, CAN Communication Circuit Check.>	Shorted to battery power supply in the communication circuit or control module.
57 — 63 Ω	<Ref. to LAN(HEV)(diag)-100, 57 — 63 Ω (PU-CAN), INSPECTION, CAN Communication Circuit Check.>	Combined resistance of end resistance does not have malfunction; short to ground or +B short of the CAN communication circuit is possible, however.
56 Ω or less	<Ref. to LAN(HEV)(diag)-101, 56 Ω OR LESS (PU-CAN), INSPECTION, CAN Communication Circuit Check.>	Resistance is lower than combined resistance of end resistance. Short to CAN Hi and CAN Lo on the CAN communication circuit is possible.
64 Ω or more	<Ref. to LAN(HEV)(diag)-102, 64 Ω OR MORE (PU-CAN), INSPECTION, CAN Communication Circuit Check.>	Resistance is higher than combined resistance of end resistance. Open circuit of CAN communication circuit is possible.
Related lines 57 — 63 Ω (TCM)	<Ref. to LAN(HEV)(diag)-103, 57 — 63 Ω (PU-CAN_TCM), INSPECTION, CAN Communication Circuit Check.>	No TCM data is received. Perform inspection when faulty is detected.

3. HEV-CAN

Resistance value between CAN Hi and Lo	Contents of inspection	Remarks
Ground short inspection	<Ref. to LAN(HEV)(diag)-104, GROUND SHORT INSPECTION (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>	Shorted to ground in the communication circuit or control module.
Battery short inspection	<Ref. to LAN(HEV)(diag)-105, BATTERY SHORT INSPECTION (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>	Shorted to battery power supply in the communication circuit or control module.
57 — 63 Ω	<Ref. to LAN(HEV)(diag)-106, 57 — 63 Ω (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>	Combined resistance of end resistance does not have malfunction; short to ground or +B short of the CAN communication circuit is possible, however.
56 Ω or less	<Ref. to LAN(HEV)(diag)-108, 56 Ω OR LESS (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>	Resistance is lower than combined resistance of end resistance. Short to CAN Hi and CAN Lo on the CAN communication circuit is possible.
64 Ω or more	<Ref. to LAN(HEV)(diag)-110, 64 Ω OR MORE (HEV-CAN), INSPECTION, CAN Communication Circuit Check.>	Resistance is higher than combined resistance of end resistance. Open circuit of CAN communication circuit is possible.
Related lines 57 — 63 Ω (BECM)	<Ref. to LAN(HEV)(diag)-111, 57 — 63 Ω (HEV-CAN_BECM), INSPECTION, CAN Communication Circuit Check.>	No BECM data is received. Perform inspection when faulty is detected.
Related lines 57 — 63 Ω (electric oil pump)	<Ref. to LAN(HEV)(diag)-112, 57 — 63 Ω (HEV-CAN_ELECTRIC OIL PUMP), INSPECTION, CAN Communication Circuit Check.>	No electric oil pump data is received. Perform inspection when faulty is detected.

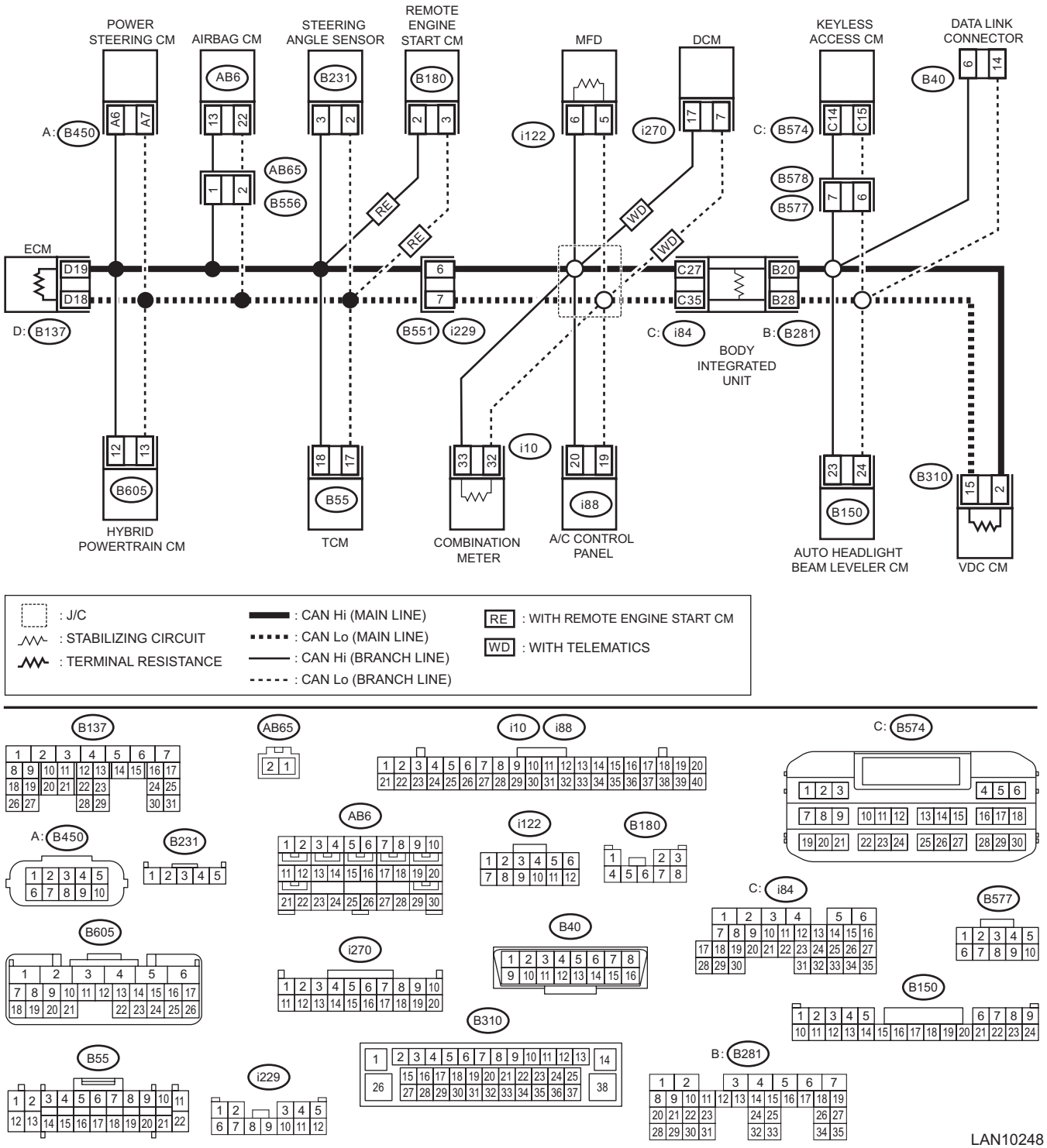
C: INSPECTION

1. GROUND SHORT INSPECTION (MAIN-CAN)

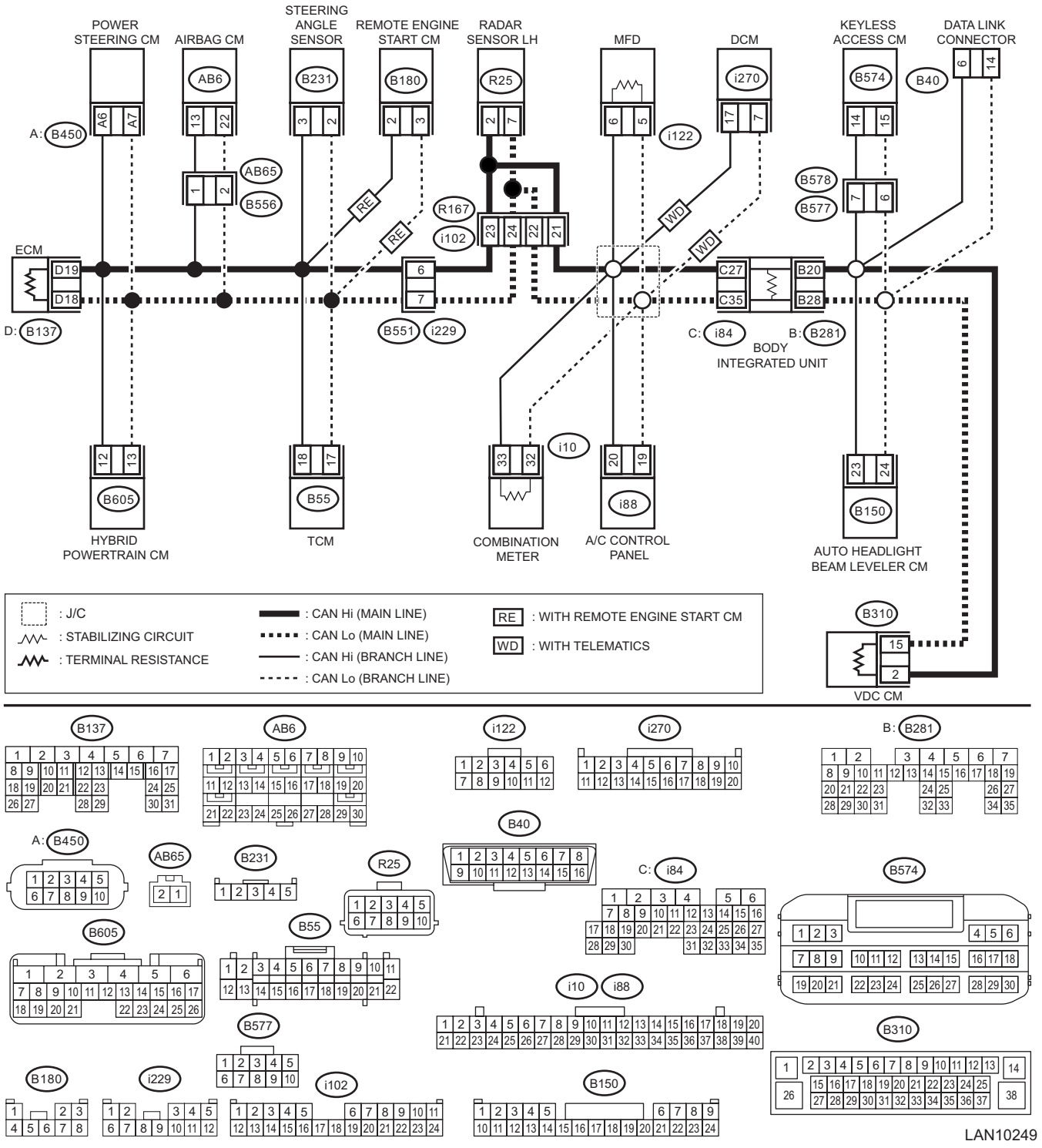
WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA



- With BSD/RCTA



LAN10249

NOTE:
Main wiring harness or related lines may be shorted to ground, or shorted to ground in one of the control modules.

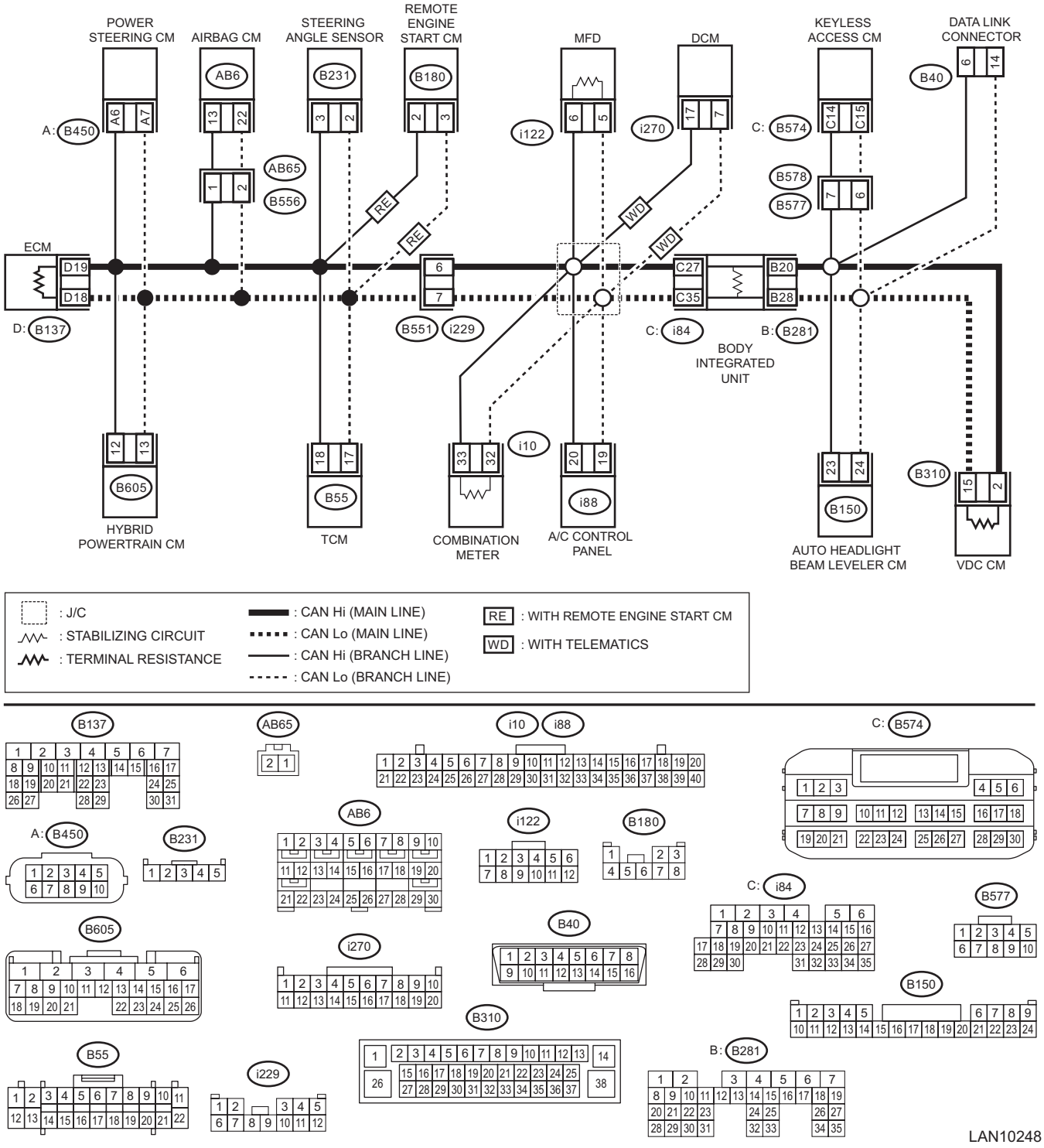
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **2**.	Currently, it is normal.
2	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Did the resistance change to 10 Ω or more?	Replace the control module whose resistance has changed. When the value changed at disconnecting the body integrated unit, Go to step **3**.	Repair or replace the short circuit of the main wiring harness and related lines between body integrated unit and VDC CM.
3	**CHECK BETWEEN MAIN WIRING HARNESSES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i84) No. 27 — Chassis ground:*** ***(i84) No. 35 — Chassis ground:***	Is the resistance 10 Ω or less?	Repair or replace the short circuit of the main wiring harness and related lines between ECM and body integrated unit.	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>

2. BATTERY SHORT INSPECTION (MAIN-CAN)

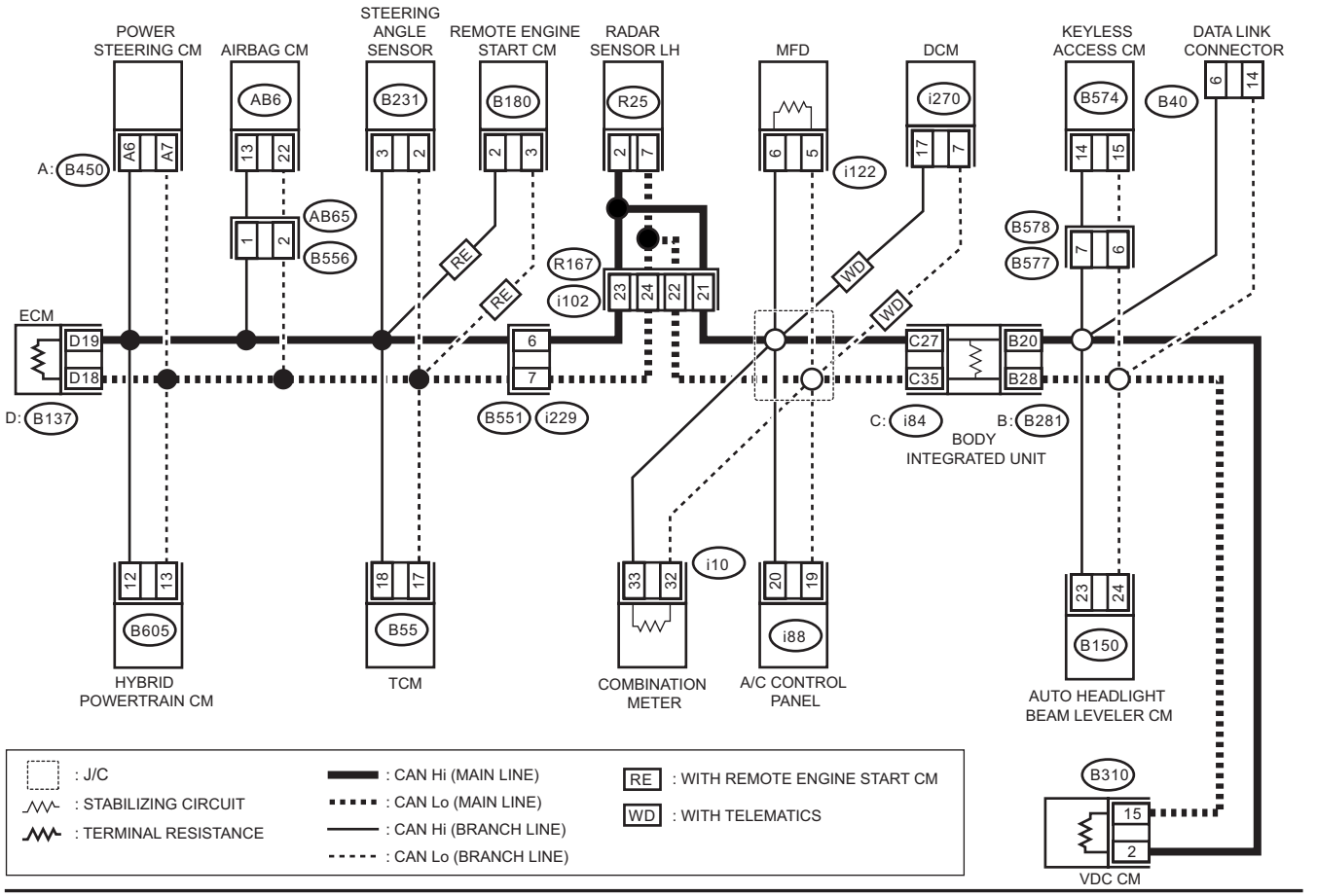
WIRING DIAGRAM:

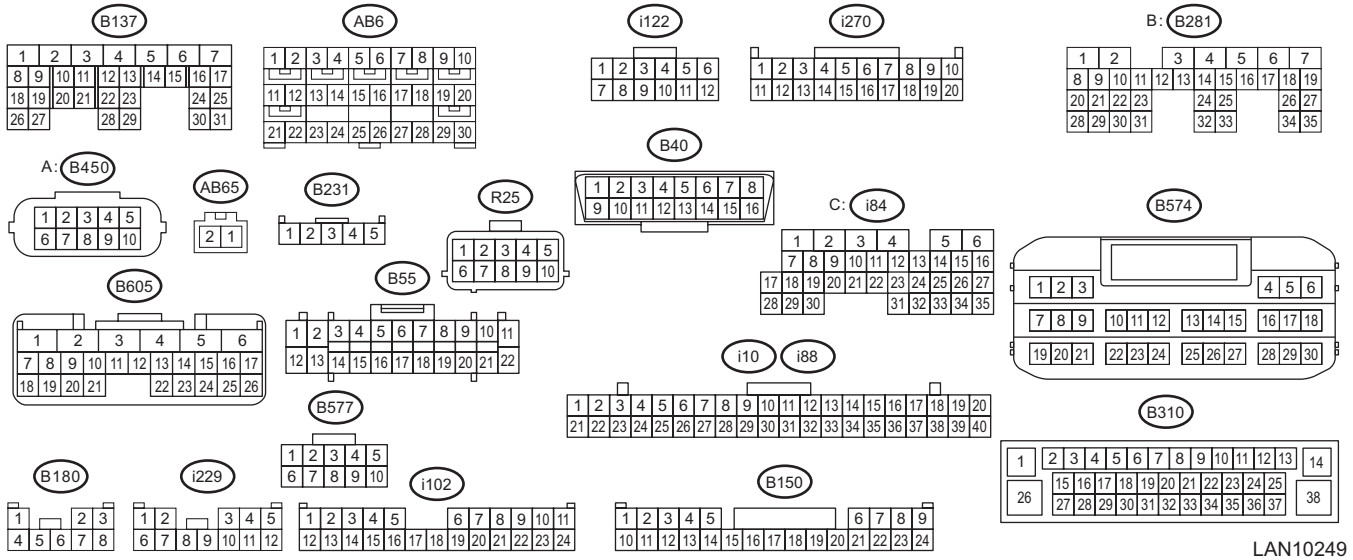
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA



- With BSD/RCTA





NOTE:
Main wiring harness or related lines may be shorted to battery circuit, or shorted to battery circuit in one of the control modules.

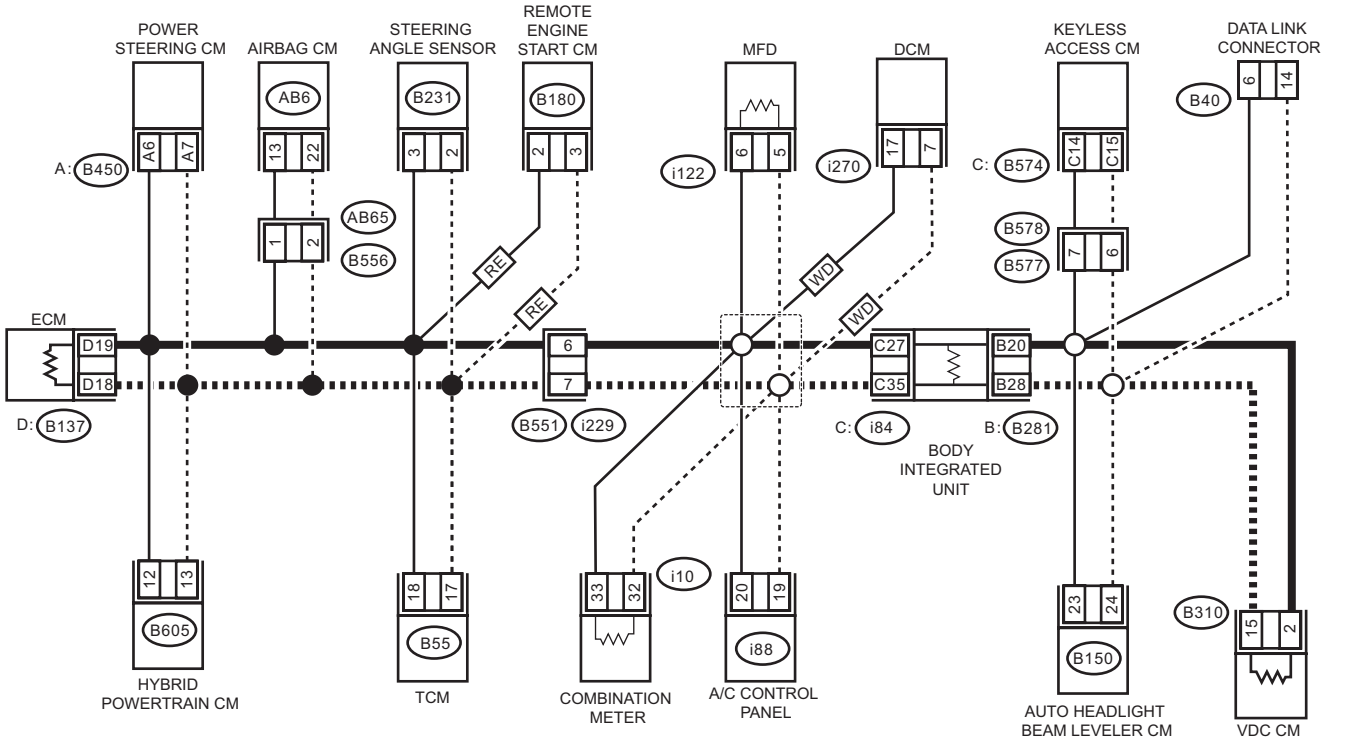
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the voltage 5 V or less?	Currently, it is normal.	Go to step **2**.
2	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Did the voltage change to 5 V or less?	Replace the control module whose voltage has changed. When the value changed at disconnecting the body integrated unit, Go to step **3**.	Repair or replace the short circuit of the harness between body integrated unit and VDC CM.
3	**CHECK BETWEEN MAIN WIRING HARNESSES.** Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i84) No. 27 — Chassis ground:*** ***(i84) No. 35 — Chassis ground:***	Is the voltage 5 V or less?	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>	Repair or replace the short circuit of the harness between ECM and body integrated unit.

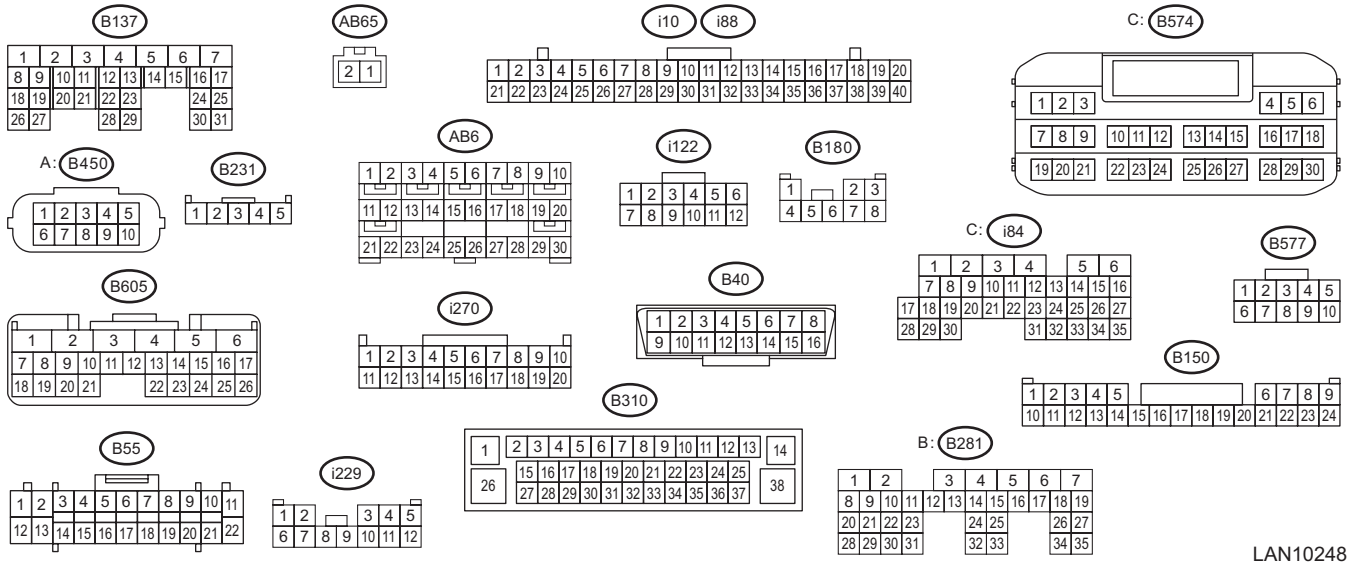
3. 53 — 61 Ω

WIRING DIAGRAM:

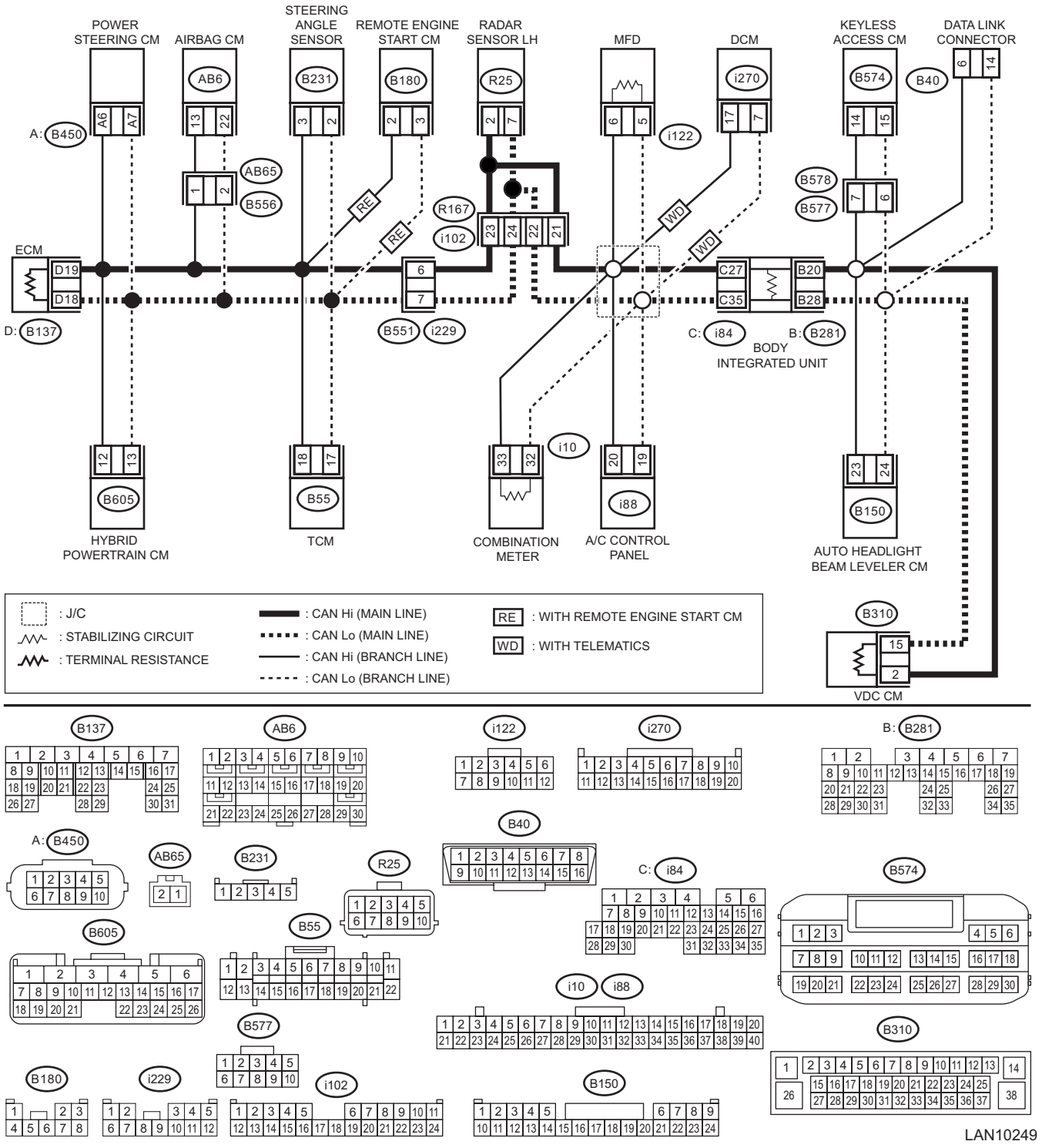
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA





- With BSD/RCTA



LAN10249

NOTE:
When the measured resistance value is 53 — 61 Ω, main wiring harness or related lines may be shorted to ground, or shorted to power supply line, or related line may be open.

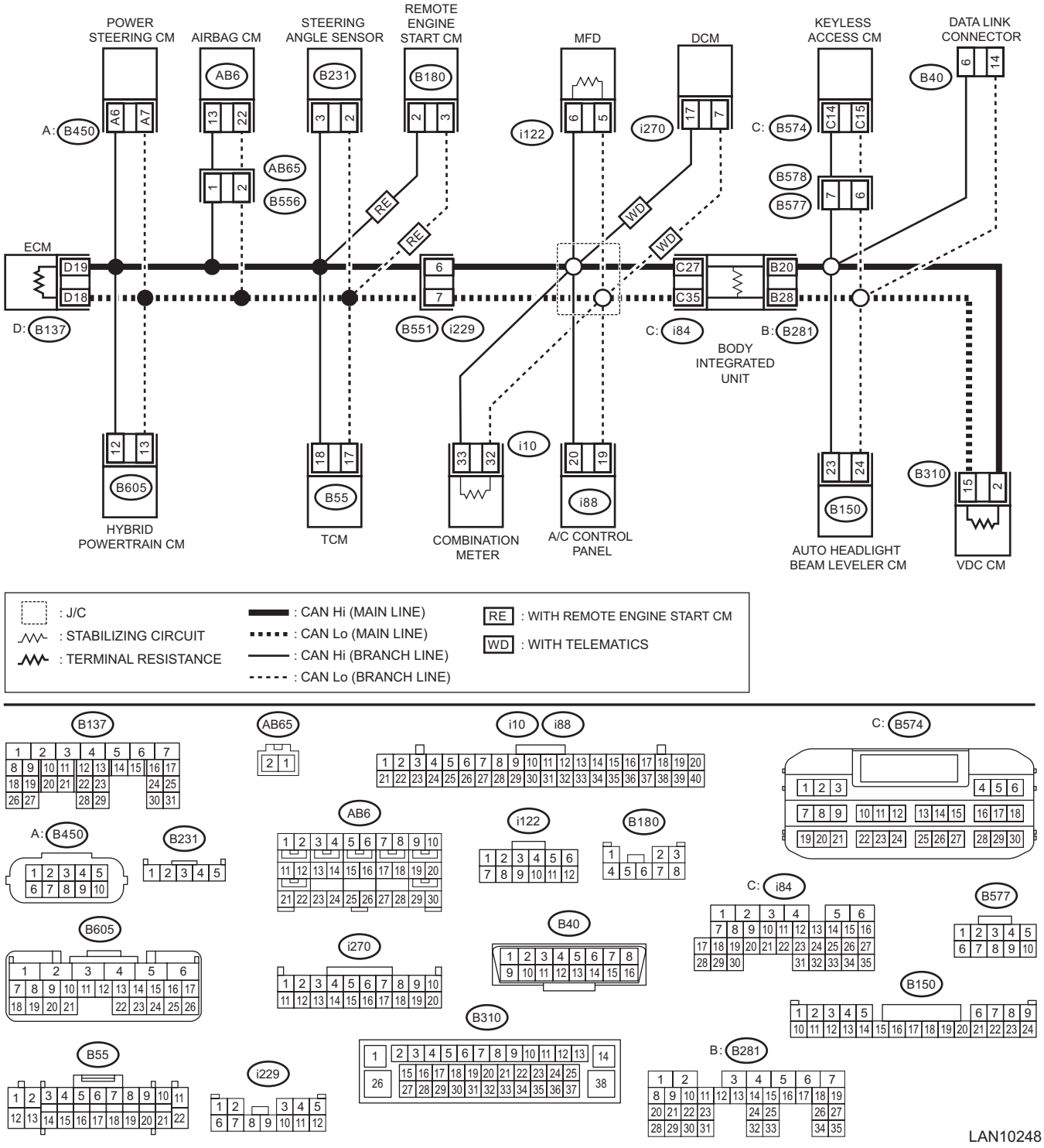
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **2**.	Go to step **4**.
2	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Did the resistance change to 10 Ω or more?	Replace the control module whose resistance has changed. When the value changed at disconnecting the body integrated unit, Go to step **3**.	Repair or replace the short circuit of the harness between body integrated unit and VDC CM.
3	**CHECK MAIN WIRING HARNESS AND RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i84) No. 27 — Chassis ground:*** ***(i84) No. 35 — Chassis ground:***	Is the resistance 10 Ω or less?	Repair or replace the short circuit of the harness between ECM and body integrated unit.	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>
4	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Is the voltage 5 V or less?	CAN communication circuit is normal.	Go to step **5**.
5	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — Chassis ground:*** ***(B40) No. 14 — Chassis ground:***	Did the voltage change to 5 V or less?	Replace the control module whose voltage has changed. When the value changed at disconnecting the body integrated unit, Go to step **6**.	Repair or replace the short circuit of the harness between body integrated unit and VDC CM.
6	**CHECK HARNESS.** Using a tester, measure the voltage between terminals and chassis ground. ***Connector & terminal*** ***(i84) No. 27 — Chassis ground:*** ***(i84) No. 35 — Chassis ground:***	Is the voltage 5 V or less?	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>	Repair or replace the short circuit of the harness between ECM and body integrated unit.

4. 52 Ω OR LESS

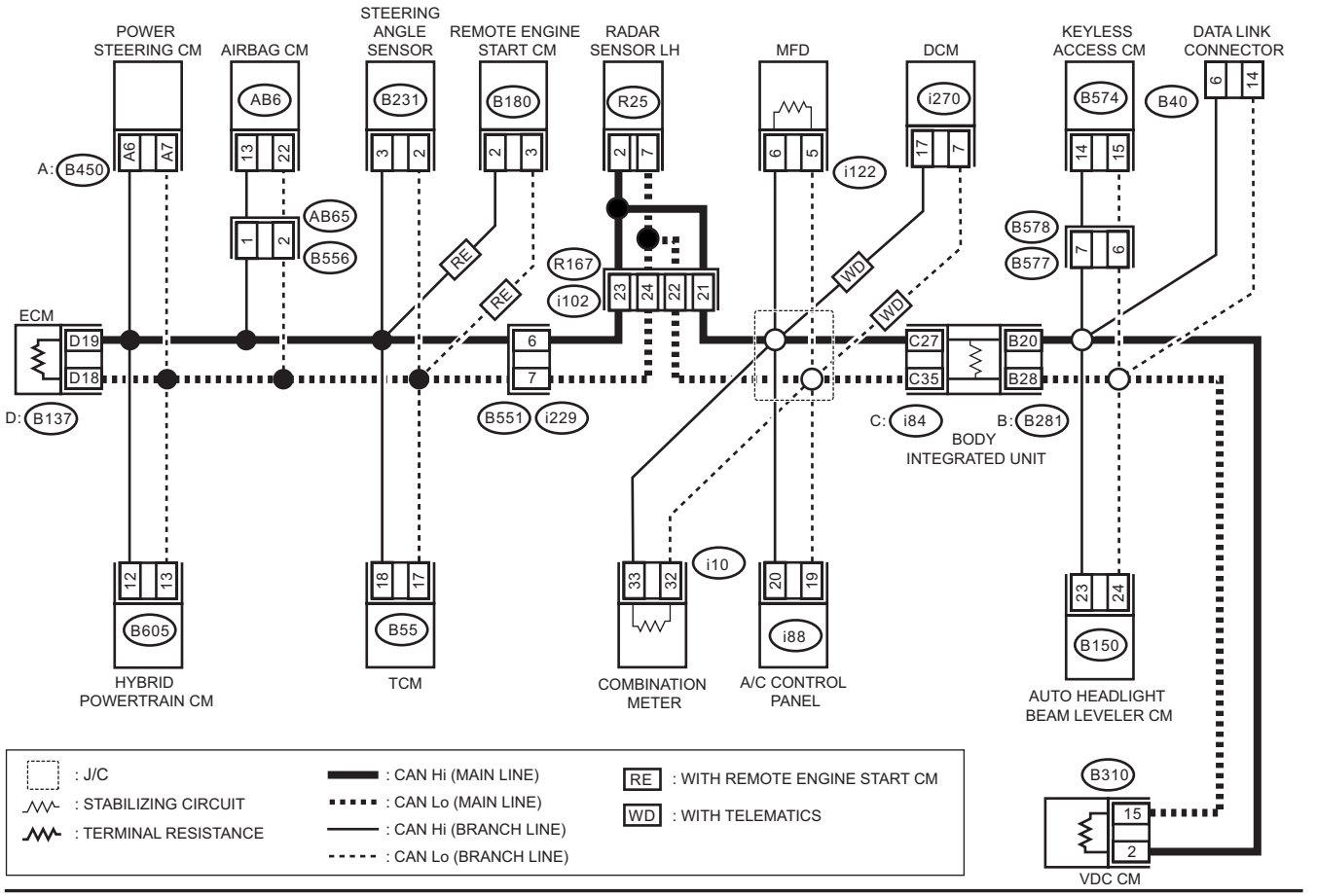
WIRING DIAGRAM:

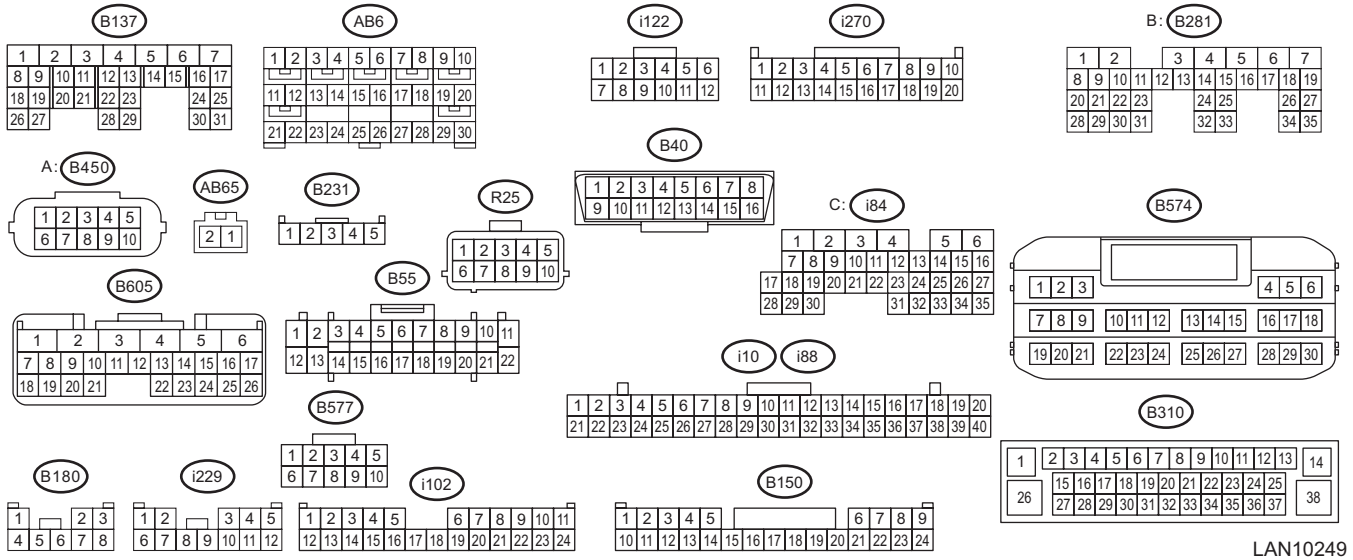
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA



- With BSD/RCTA





NOTE:
When the bus line is measured, combined resistance of end resistance (120 Ω) in ECM and end resistance (120 Ω) in VDC CM can be measured. The combined resistance is approximately 53 — 61 Ω with the stabilizing circuit included. When the measured resistance value is 52 Ω or less, main wiring harness or related lines may be shorted, or combined resistance may have changed because resistance other than end resistance is created on the circuit.

	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B40) No. 6 — No. 14:***	Is the resistance 10 Ω or less?	Go to step **2**.	Go to step **4**.
2	**CHECK MAIN WIRING HARNESS AND RELATED LINES.** With a tester connected, disconnect control module connectors in order. NOTE: Disconnect the body integrated unit at the end. ***Connector & terminal*** ***(B40) No. 6 — No. 14:***	Is there any control module whose condition has changed from short state?	Replace the control module whose resistance has changed. When the value changed at disconnecting the body integrated unit, Go to step **3**.	Repair or replace the short circuit of the harness between body integrated unit and VDC CM.
3	**CHECK BETWEEN MAIN WIRING HARNESSES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i84) No. 27 — No. 35:***	Is the resistance 10 Ω or less?	Repair or replace the short circuit of the harness between ECM and body integrated unit.	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>
4	**CHECK CONTROL MODULE.** 1) Disconnect ECM and VDC CM connectors. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B137) No. 19 — No. 18:*** ***(B310) No. 2 — No. 15:***	Is the resistance 114 — 126 Ω?	Go to step **5**.	Replace the control module whose end resistance value is out of the specified range.
5	**CHECK CONTROL MODULE.** 1) Disconnect the connector of body integrated unit. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B281) No. 28 — (i84) No. 27:*** ***(B281) No. 20 — (i84) No. 35:***	Is the resistance 2850 — 3150 Ω?	Go to step **6**.	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>
6	**CHECK CONTROL MODULE.** Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B281) No. 28 — (i84) No. 35:*** ***(B281) No. 20 — (i84) No. 27:***	Is the resistance less than 1 Ω?	Go to step **7**.	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>
7	**CHECK CONTROL MODULE.** 1) Disconnect the combination meter connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(i10) No. 32 — No. 33:***	Is the resistance 2850 — 3150 Ω?	Go to step **8**.	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

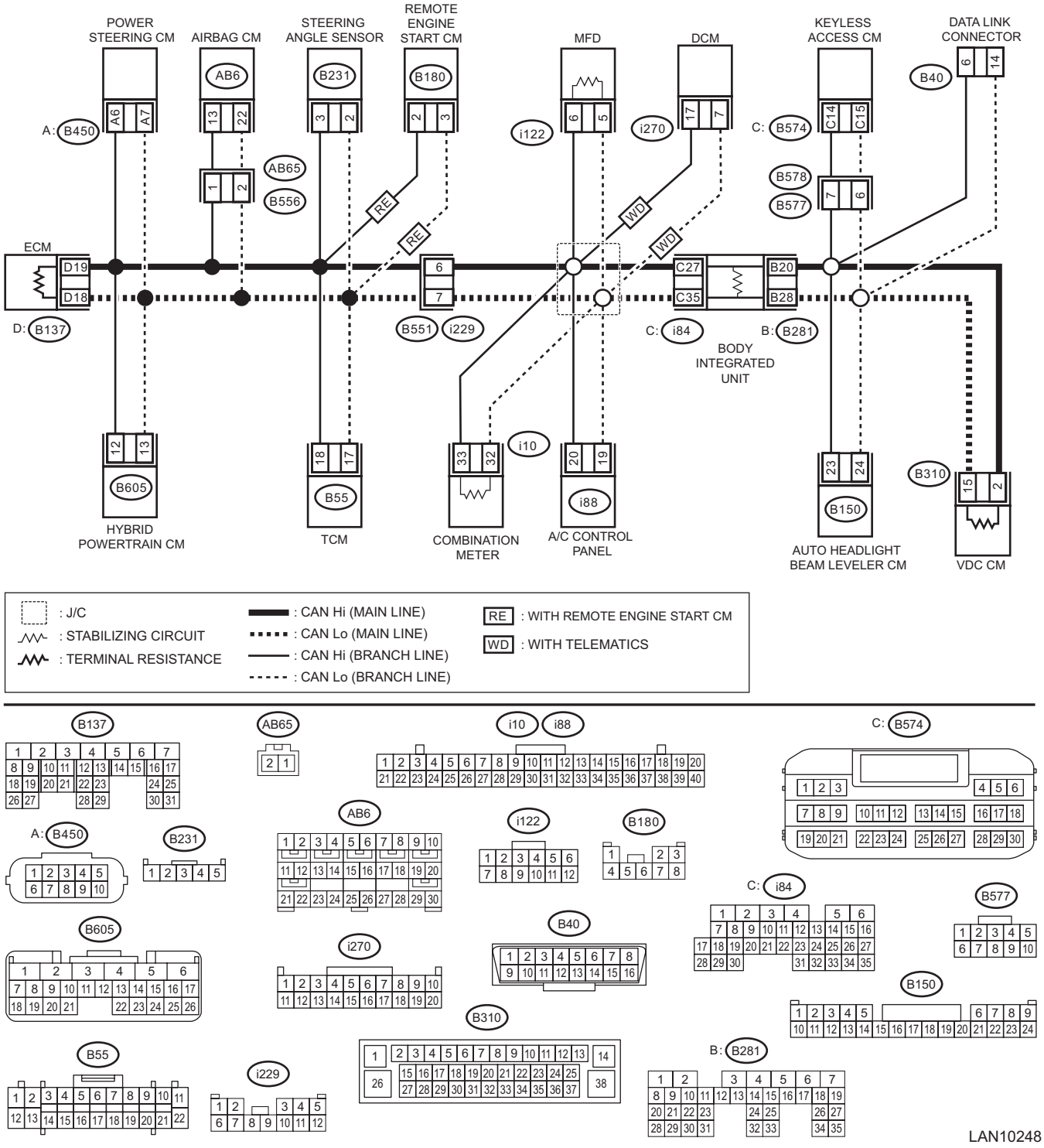
	Step	Check	Yes	No
8	**CHECK CONTROL MODULE.** 1) Disconnect the MFD connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(i122) No. 5 — No. 6:***	Is the resistance 2850 — 3150 Ω?	Go to step **9**.	Replace the MFD. <Ref. to IDI-26, REMOVAL, Multi-function Display (MFD).>
9	**CHECK HARNESS.** Using the tester, check the short circuit of each harness. ***Connector & terminal*** ***(B281) No. 28 — No. 20:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Go to step **10**.
10	**CHECK CONTROL MODULE.** With a tester connected, disconnect control modules in order. ***Connector & terminal*** ***(B281) No. 28 — No. 20:***	Is there any control module whose resistance has changed to 1 MΩ or more?	Replace the control module that has changed.	Repair or replace the harness part which has resistance component.
11	**CHECK CONTROL MODULE.** With a tester connected, disconnect control modules in order. ***Connector & terminal*** ***(i84) No. 27 — No. 35:***	Is there any control module whose resistance has changed to 1 MΩ or more?	Replace the control module that has changed.	Repair or replace the harness part which has resistance component.

5. 62 Ω OR MORE

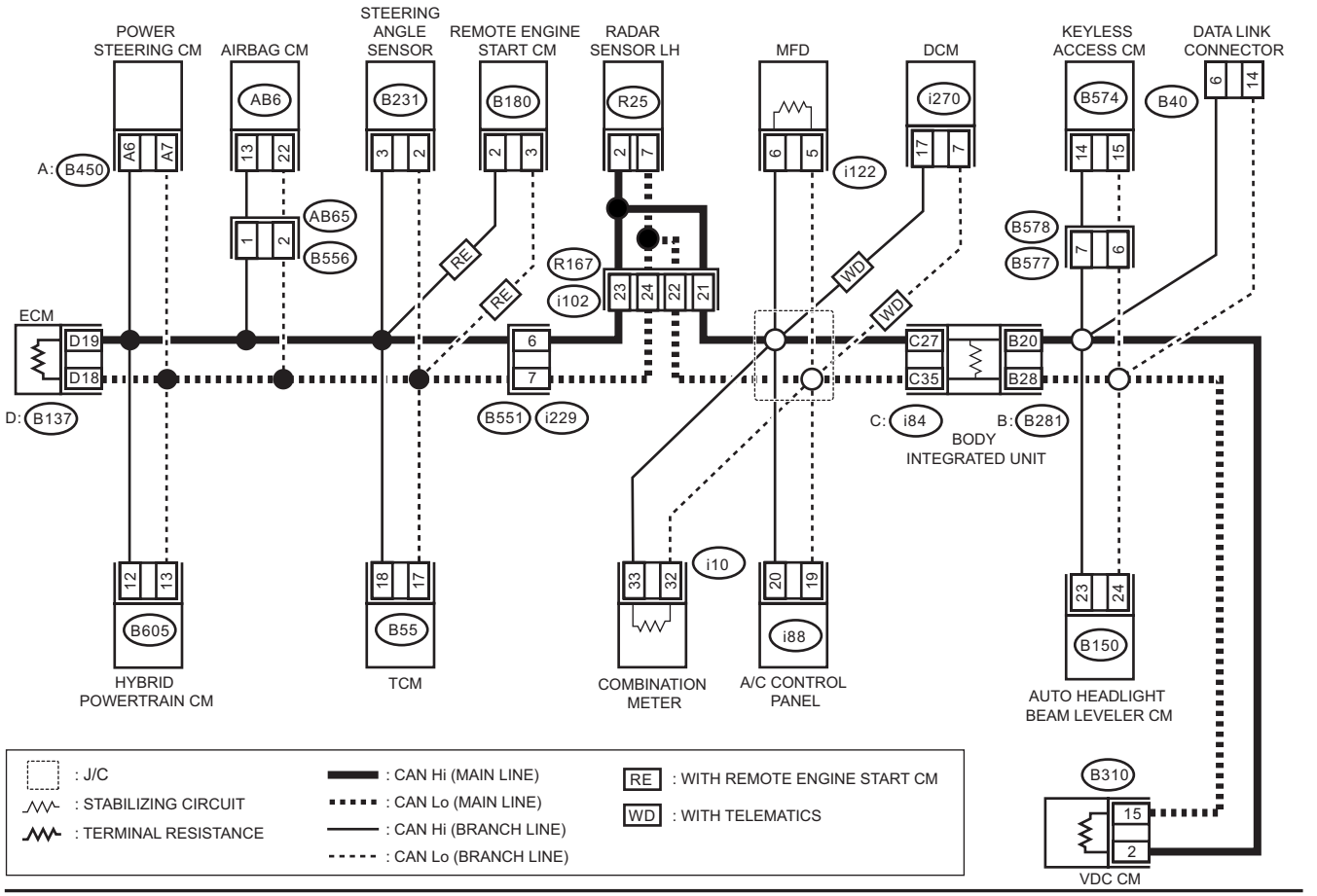
WIRING DIAGRAM:

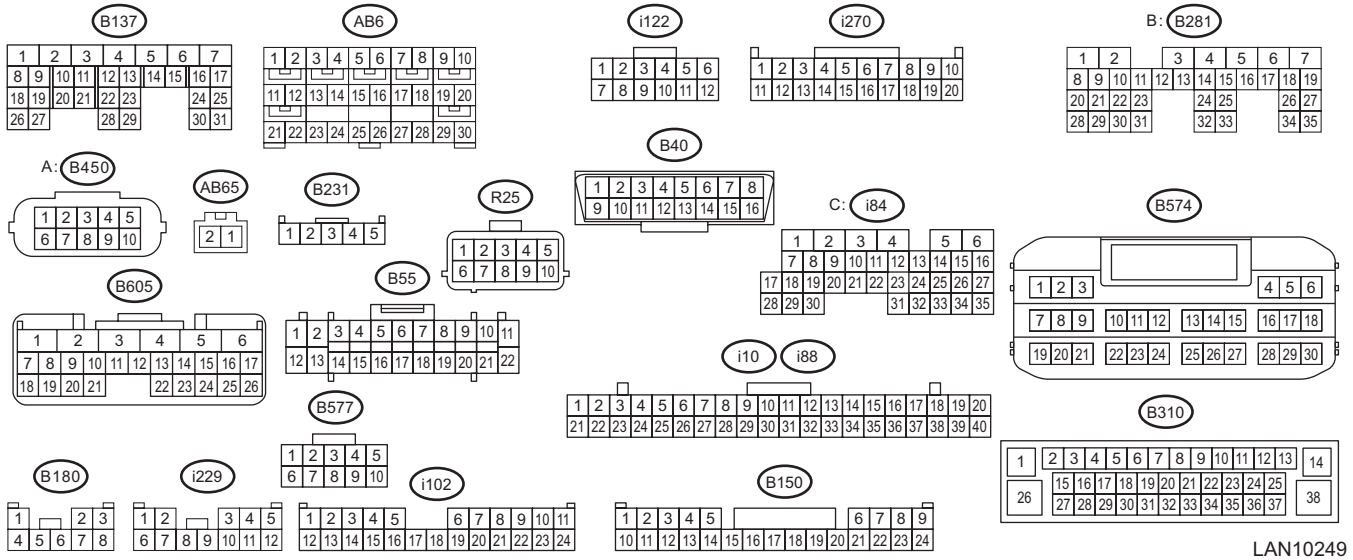
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA



- With BSD/RCTA





NOTE:
When CAN communication circuit is measured, combined resistance of end resistance (120 Ω) in ECM and end resistance (120 Ω) in VDC CM can be measured. The combined resistance is approximately 53 — 61 Ω with the stabilizing circuit included. When the measured resistance value is 62 Ω or more, either one of the end resistances, or stabilizing circuit, or main wiring harness may have malfunction such as open circuit.

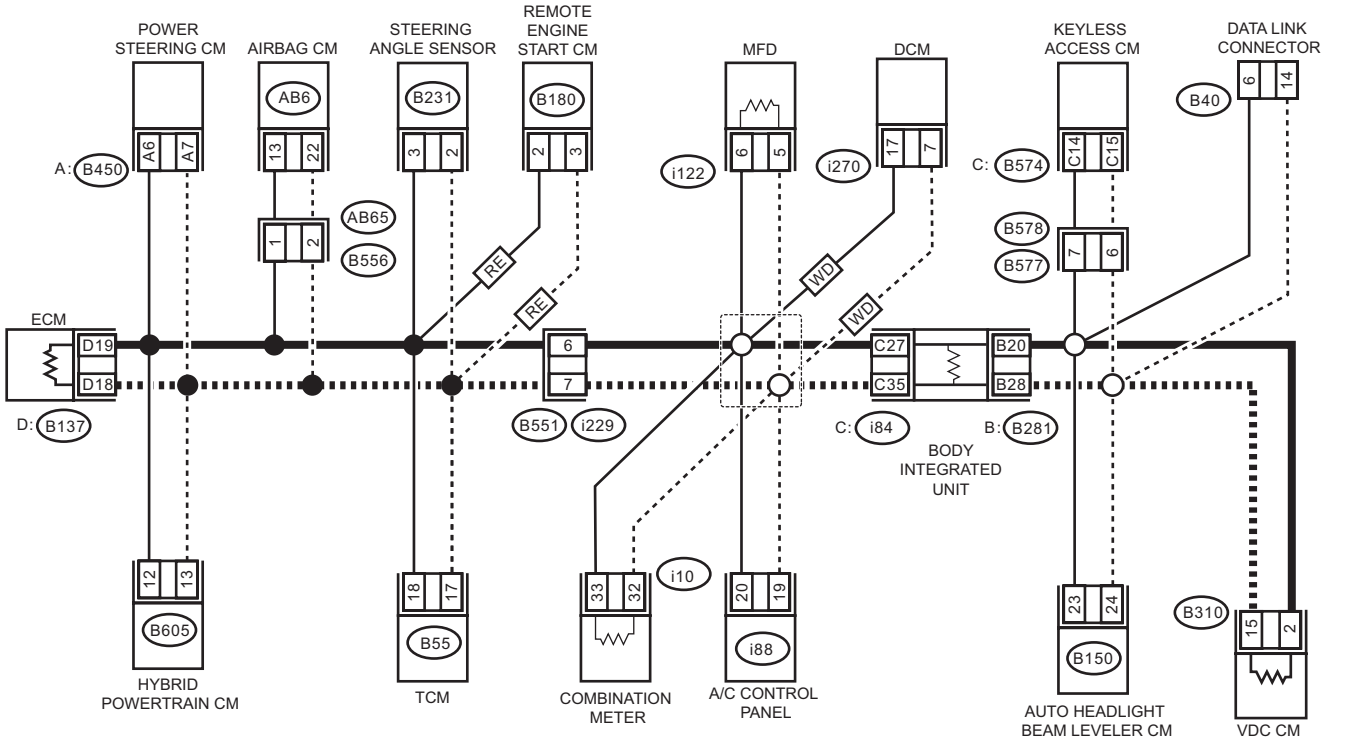
	Step	Check	Yes	No
1	**CHECK CONTROL MODULE.** 1) Disconnect ECM and VDC CM connectors. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B137) No. 19 — No. 18:*** ***(B310) No. 2 — No. 15:***	Is the resistance 114 — 126 Ω?	Go to step **2**.	Replace the control module whose value is out of the specification.
2	**CHECK CONTROL MODULE.** 1) Disconnect the connector of body control module. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B281) No. 28 — (i84) No. 27:*** ***(B281) No. 20 — (i84) No. 35:***	Is the resistance 2850 — 3150 Ω?	Go to step **3**.	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>
3	**CHECK CONTROL MODULE.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B281) No. 28 — (i84) No. 35:*** ***(B281) No. 20 — (i84) No. 27:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>
4	**CHECK CONTROL MODULE.** 1) Disconnect the combination meter connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(i10) No. 32 — No. 33:***	Is the resistance 2850 — 3150 Ω?	Go to step **5**.	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>
5	**CHECK CONTROL MODULE.** 1) Disconnect the MFD connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(i122) No. 5 — No. 6:***	Is the resistance 2850 — 3150 Ω?	Go to step **6**.	Replace the MFD. <Ref. to IDI-26, REMOVAL, Multi-function Display (MFD).>
6	**CHECK HARNESS.** Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B40) No. 6 — (B137) No. 19:*** ***(B40) No. 14 — (B137) No. 18:*** ***(B40) No. 6 — (i84) No. 27:*** ***(B40) No. 14 — (i84) No. 35:***	Is there continuity?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK HARNESS.** Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B281) No. 20 — (B310) No. 2:*** ***(B281) No. 28 — (B310) No. 15:***	Is there continuity?	It is possible that temporary poor communication occurs.	Repair or replace the open circuit of harness.

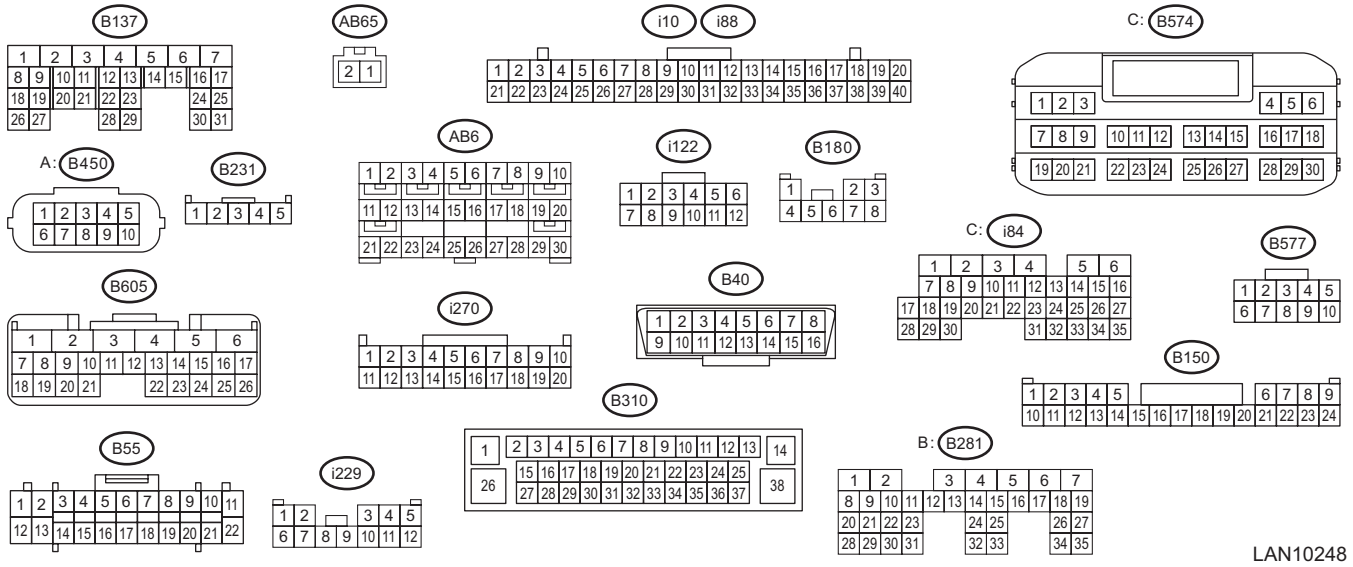
6. RELATED LINES 53 — 61 Ω (TCM)

WIRING DIAGRAM:

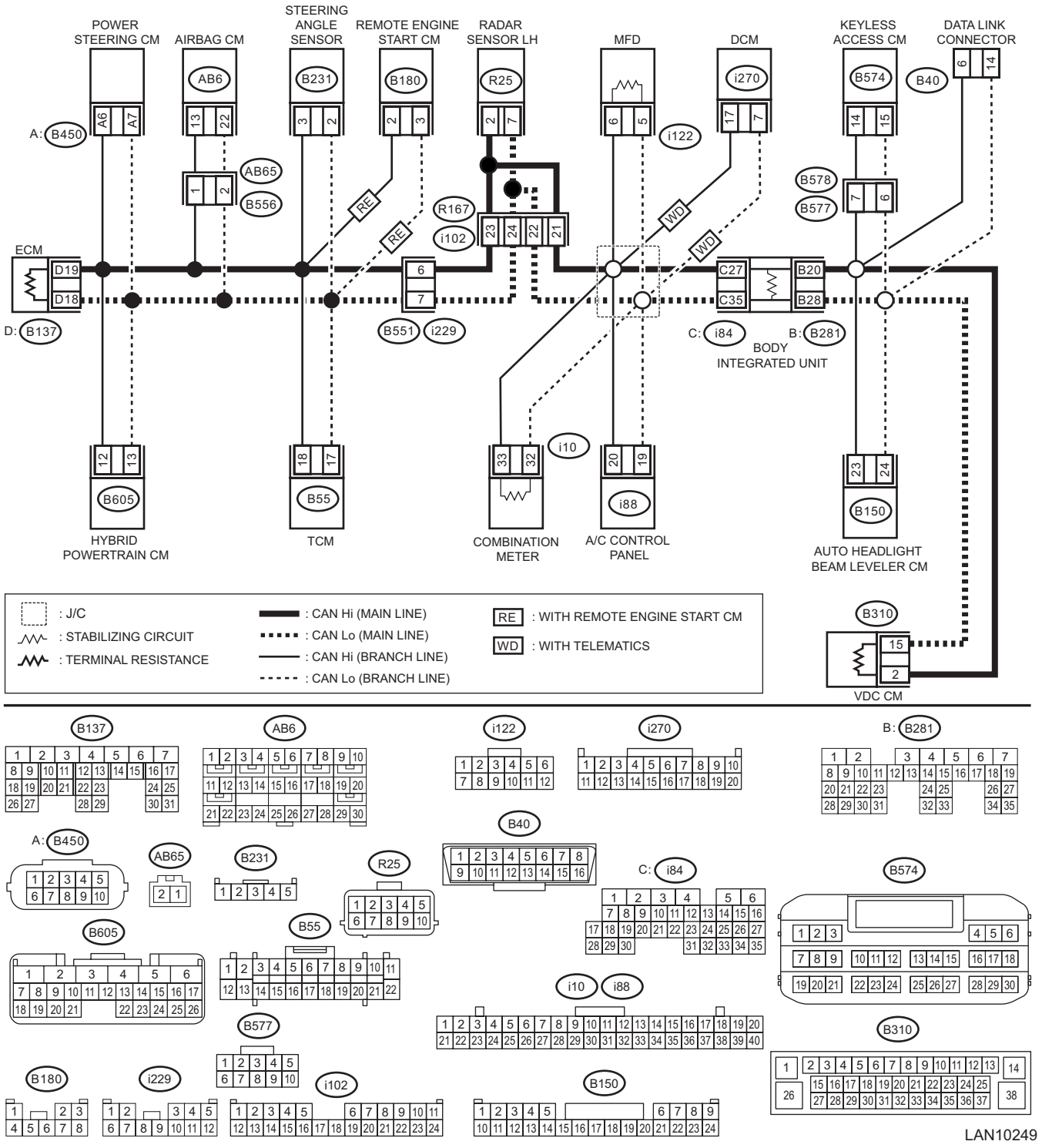
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA





- With BSD/RCTA



LAN10249

CAN Communication Circuit Check

NOTE:
Perform inspection when no data is received, or faulty is detected. This is different from power supply shorted or ground shorted.

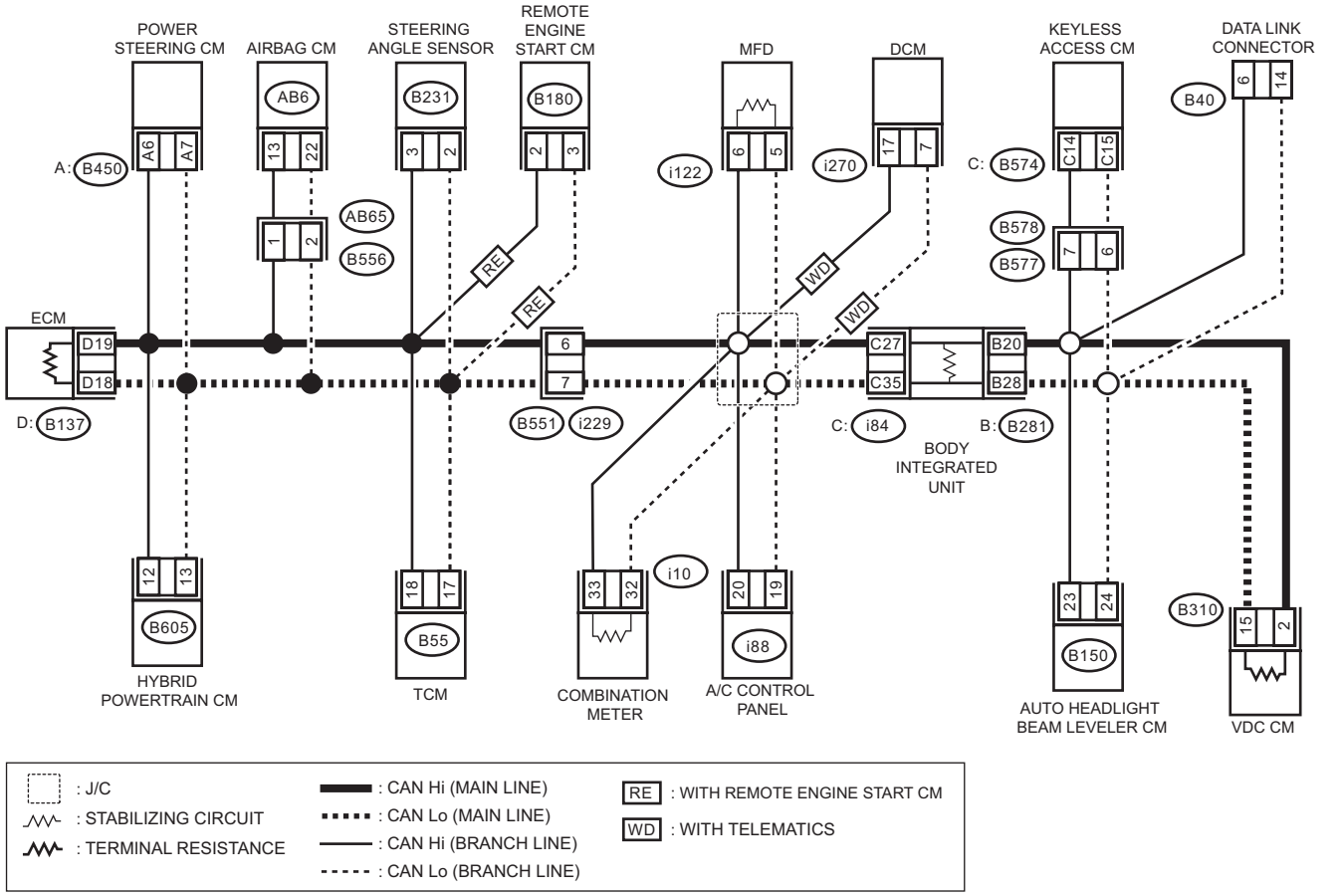
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the TCM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B55) No. 17 — No. 18:***	Is the resistance 400 Ω or more?	Related lines between TCM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B55) No. 17 — (B40) No. 14:*** ***(B55) No. 18 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of TCM related lines.	Check DTC of TCM. <Ref. to CVT(HEV)(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).>

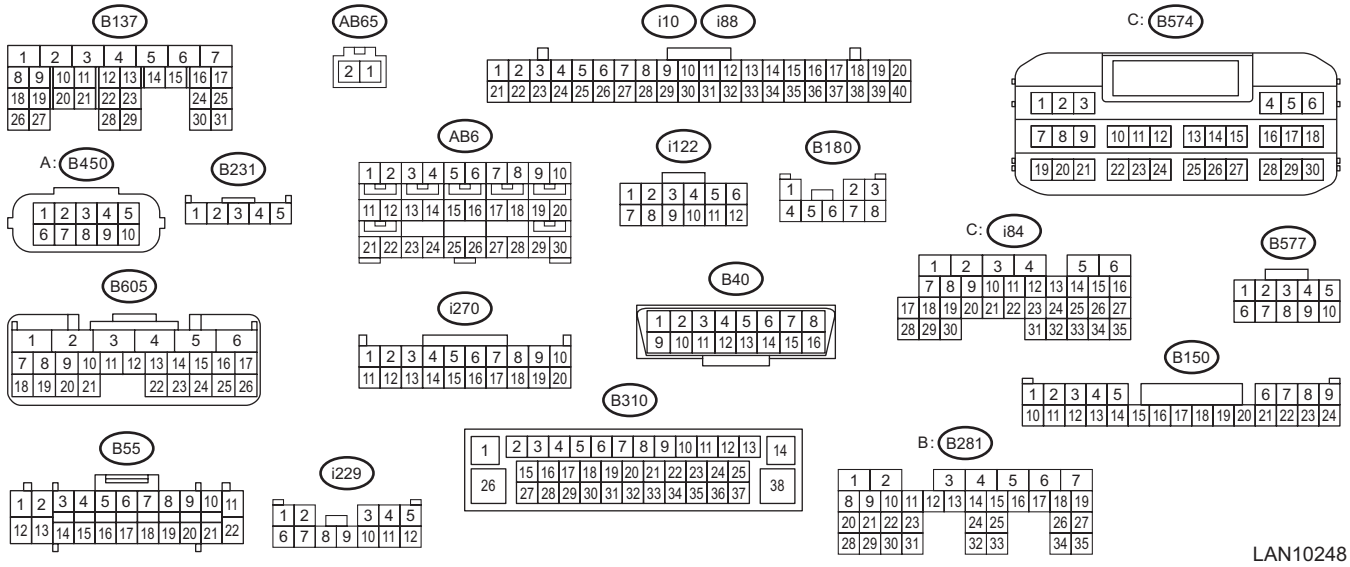
7. RELATED LINES 53 — 61 Ω (STEERING ANGLE SENSOR)

WIRING DIAGRAM:

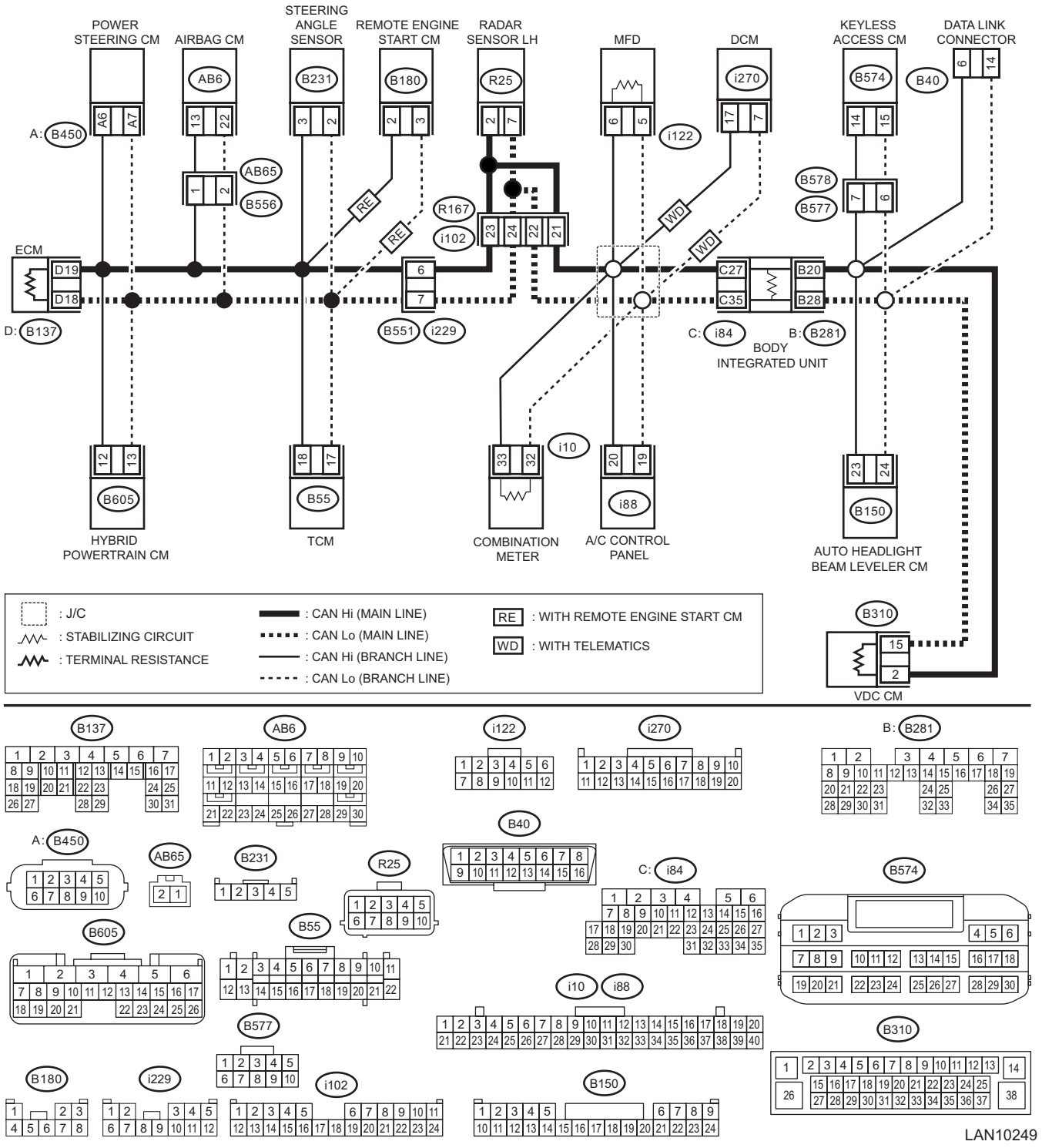
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA





- With BSD/RCTA



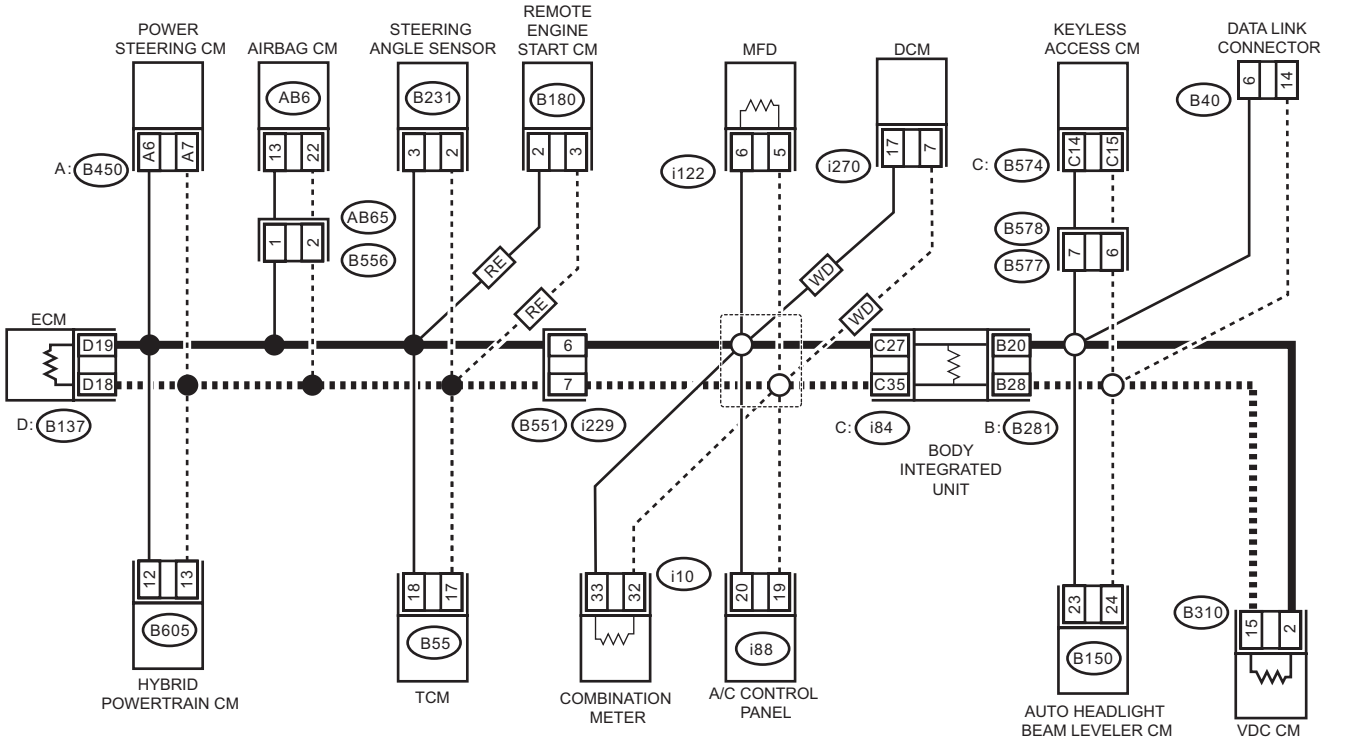
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the steering angle sensor connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B231) No. 2 — No. 3:***	Is the resistance 400 Ω or more?	Related lines between steering angle sensor and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B231) No. 2 — (B40) No. 14:*** ***(B231) No. 3 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of steering angle sensor related lines.	Check DTC of VDC CM. <Ref. to VDC(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>

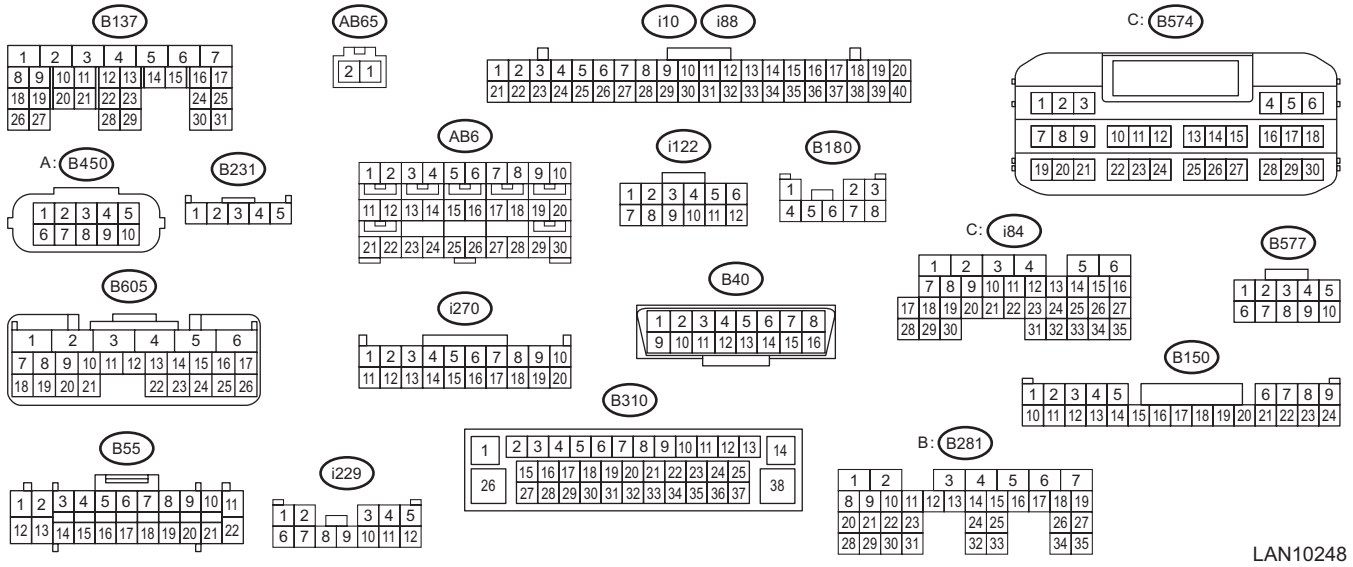
8. RELATED LINE 53 — 61 Ω (A/C CONTROL PANEL)

WIRING DIAGRAM:

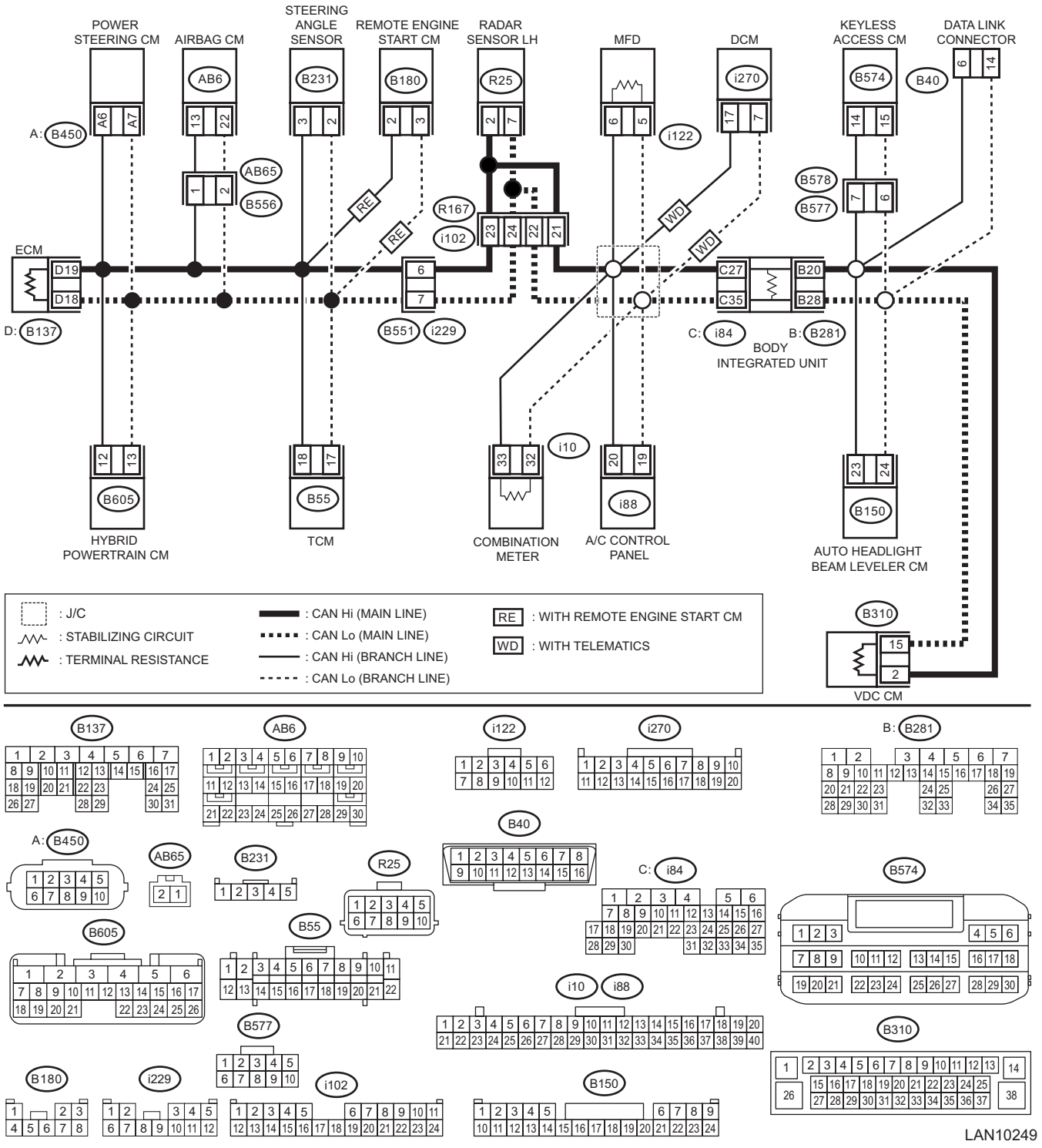
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA





- With BSD/RCTA



LAN10249

CAN Communication Circuit Check

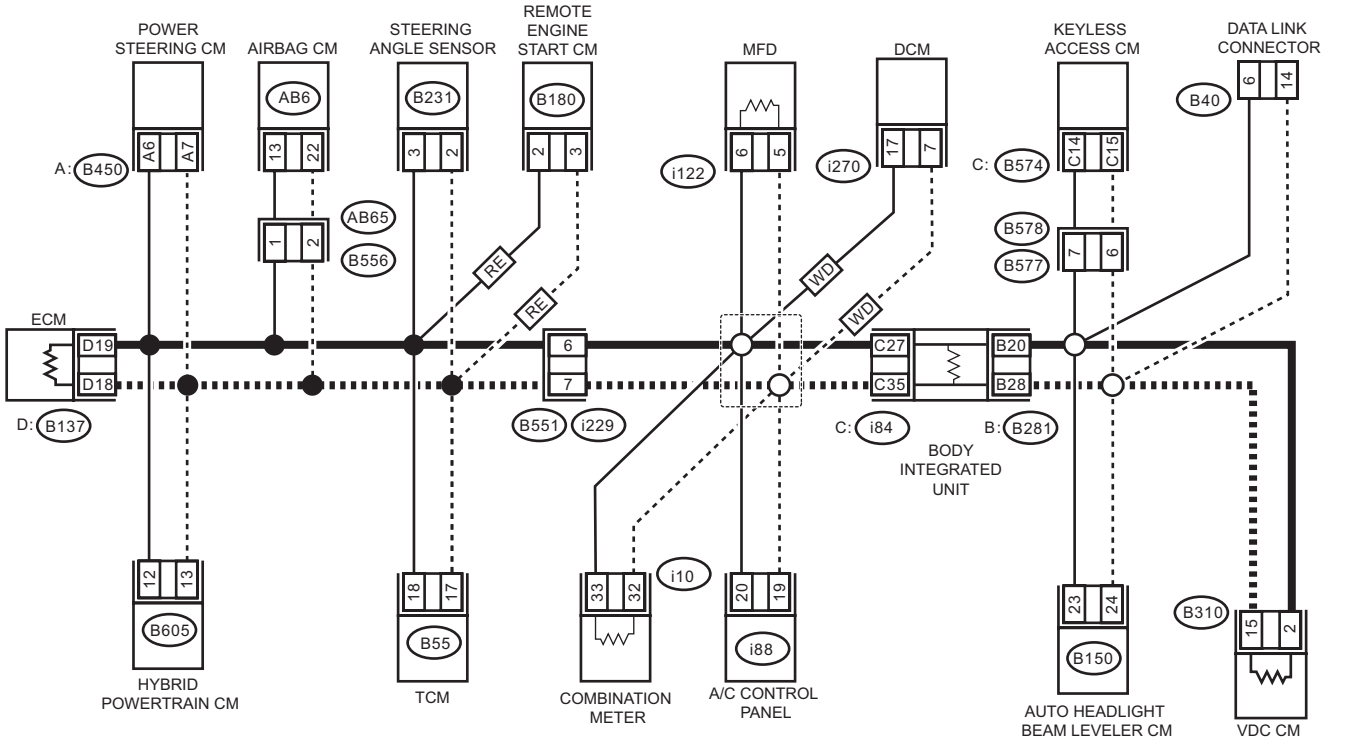
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the A/C control panel connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i88) No. 19 — No. 20:***	Is the resistance 400 Ω or more?	Related lines between A/C control panel and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i88) No. 19 — (B40) No. 14:*** ***(i88) No. 20 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of A/C control panel related lines.	Check the DTC of A/C control panel. <Ref. to AC(diag)-34, Read Diagnostic Trouble Code (DTC).>

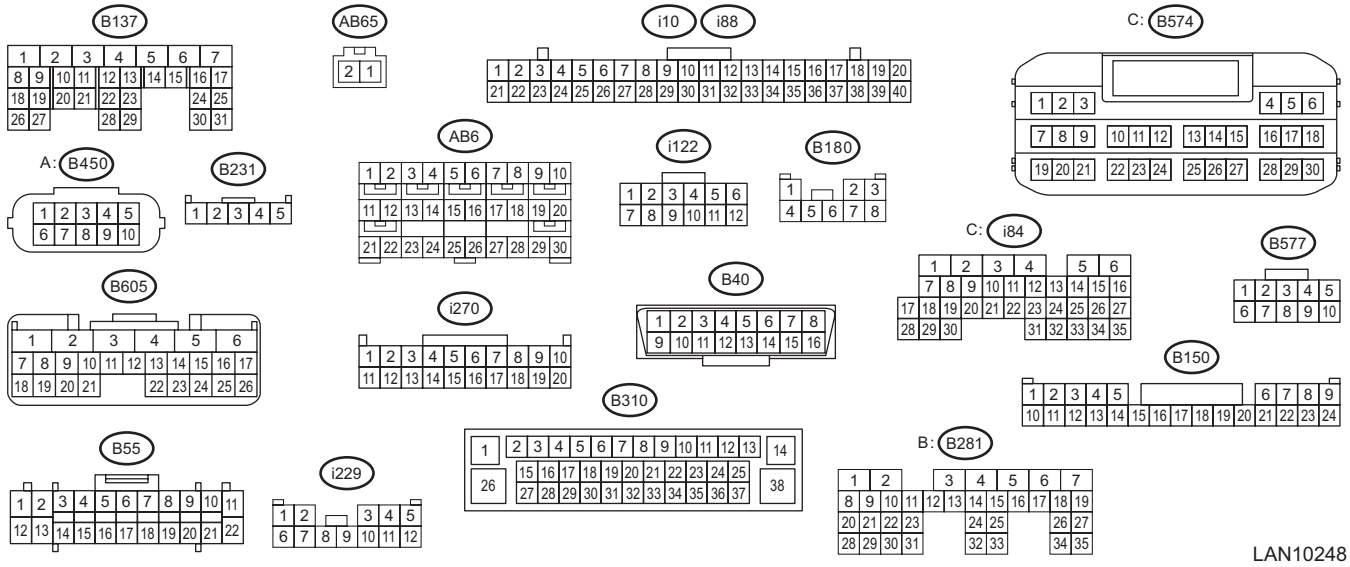
9. RELATED LINES 53 — 61 Ω (POWER STEERING CM)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

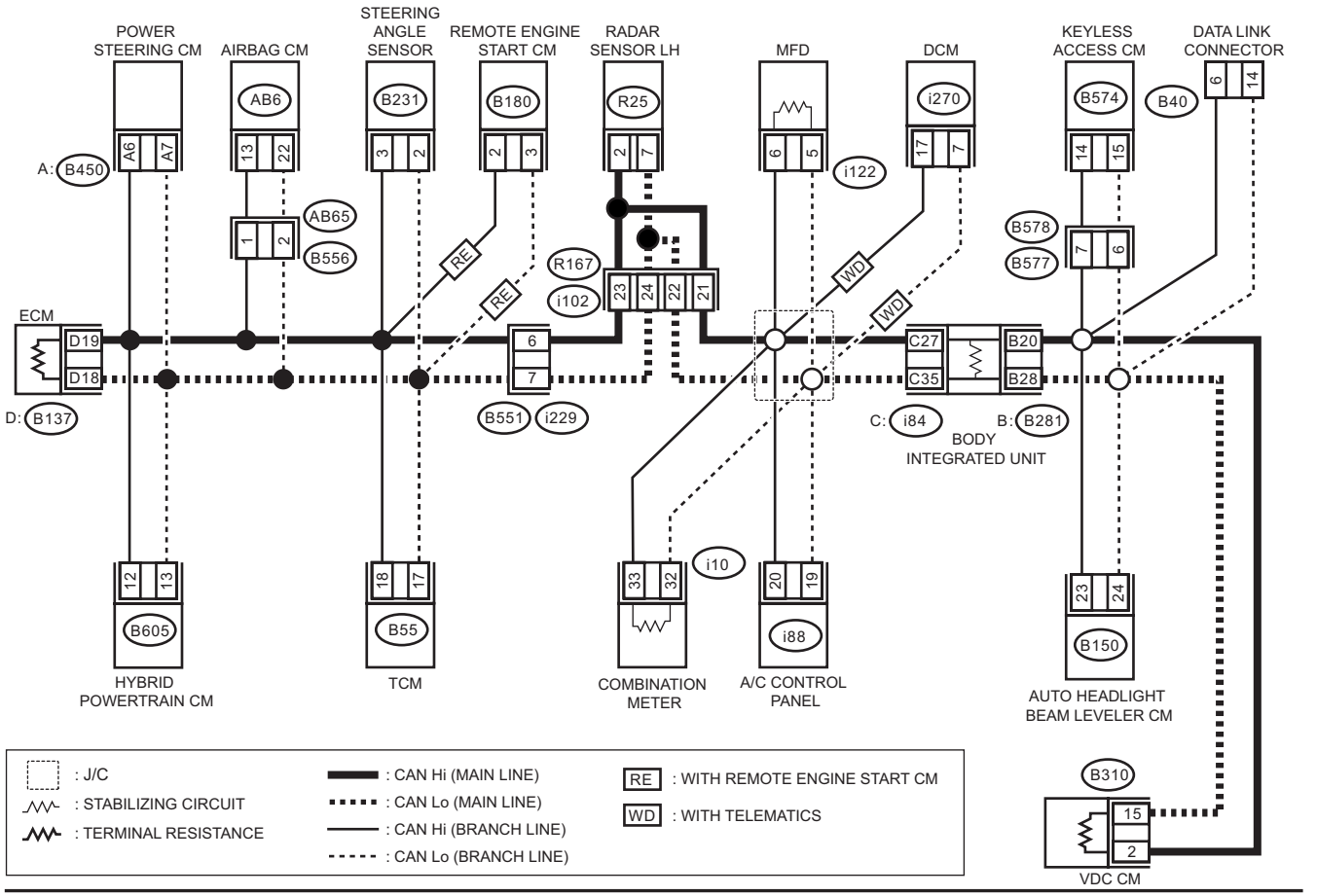
- Without BSD/RCTA

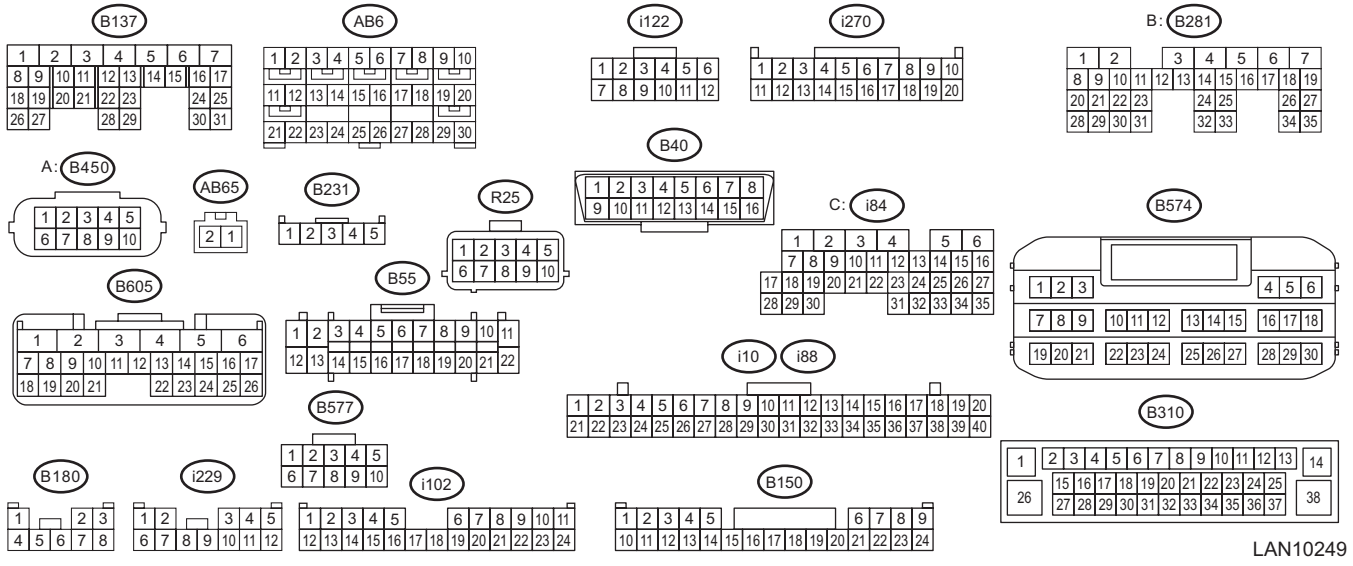




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- With BSD/RCTA





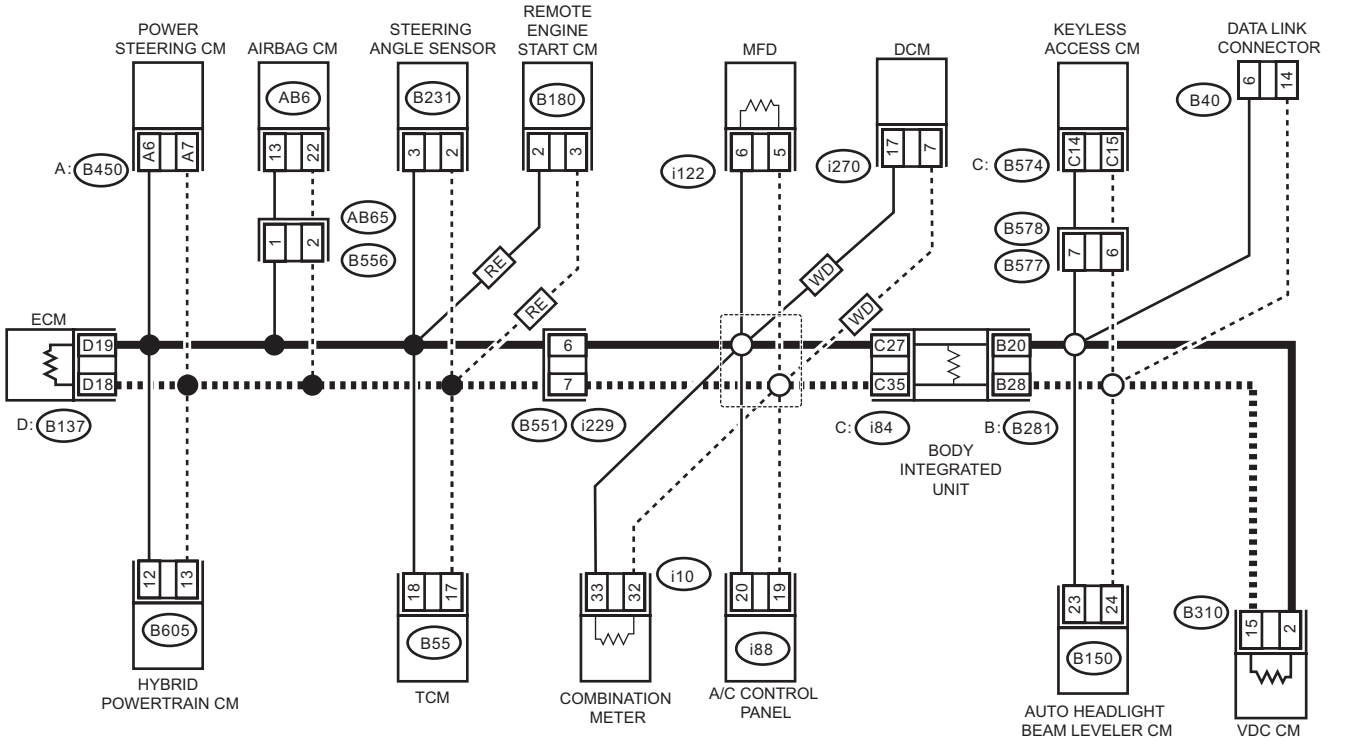
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the power steering CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B450) No. 6 — No. 7:***	Is the resistance 400 Ω or more?	Related lines or main wiring harness between power steering CM and main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B450) No. 6 — (B40) No. 6:*** ***(B450) No. 7 — (B40) No. 14:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit portion of power steering CM related lines.	Check DTC of power steering CM. <Ref. to PS(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).>

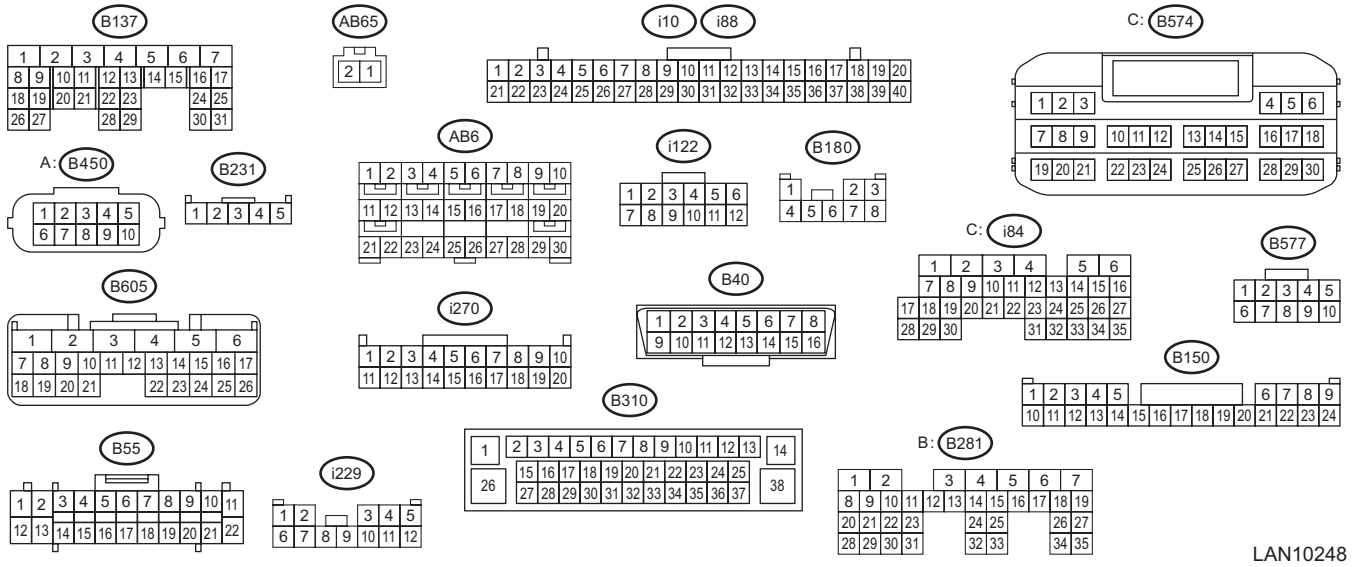
10.RELATED LINES 53 — 61 Ω (COMBINATION METER)

WIRING DIAGRAM:

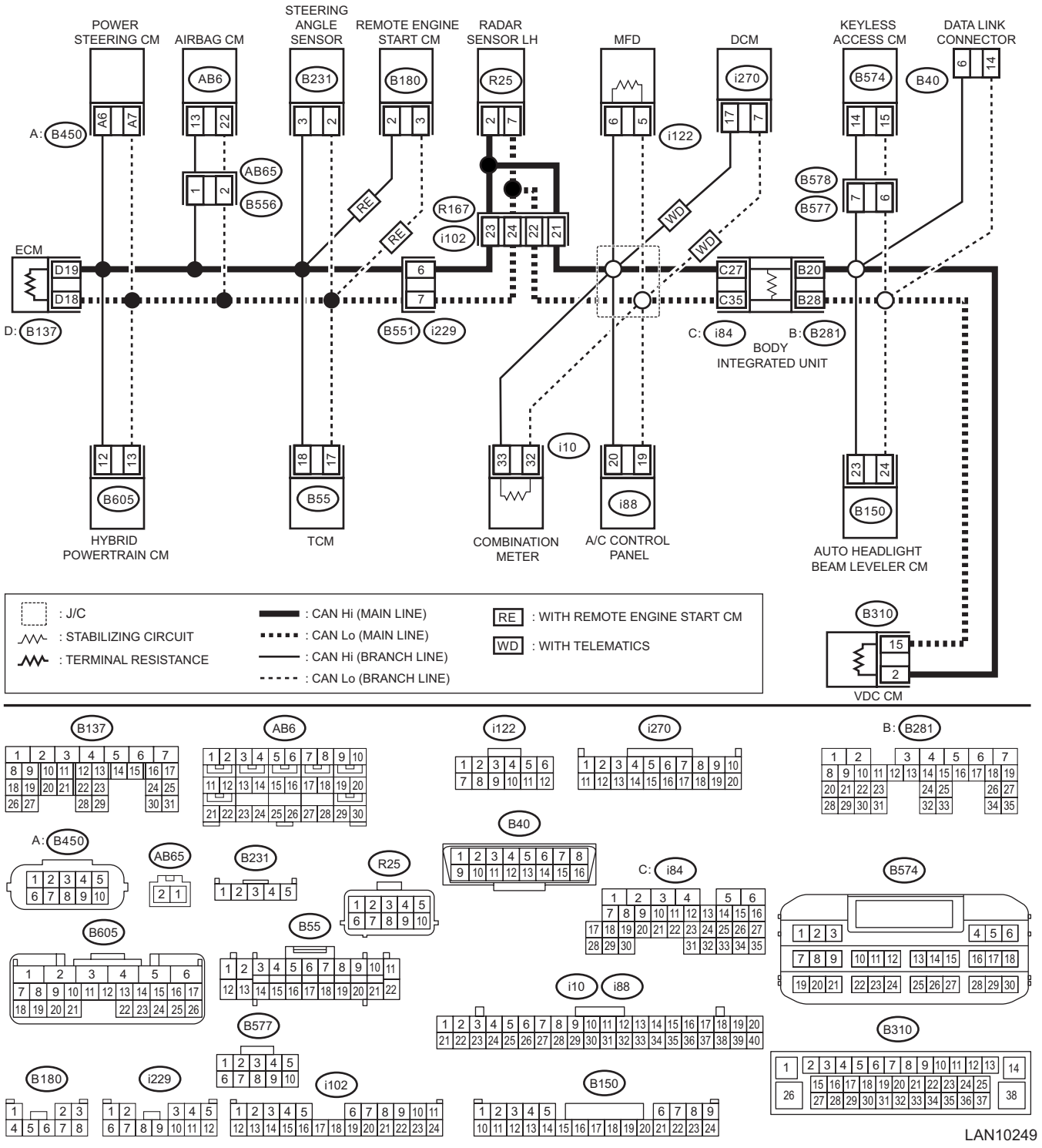
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA





- With BSD/RCTA



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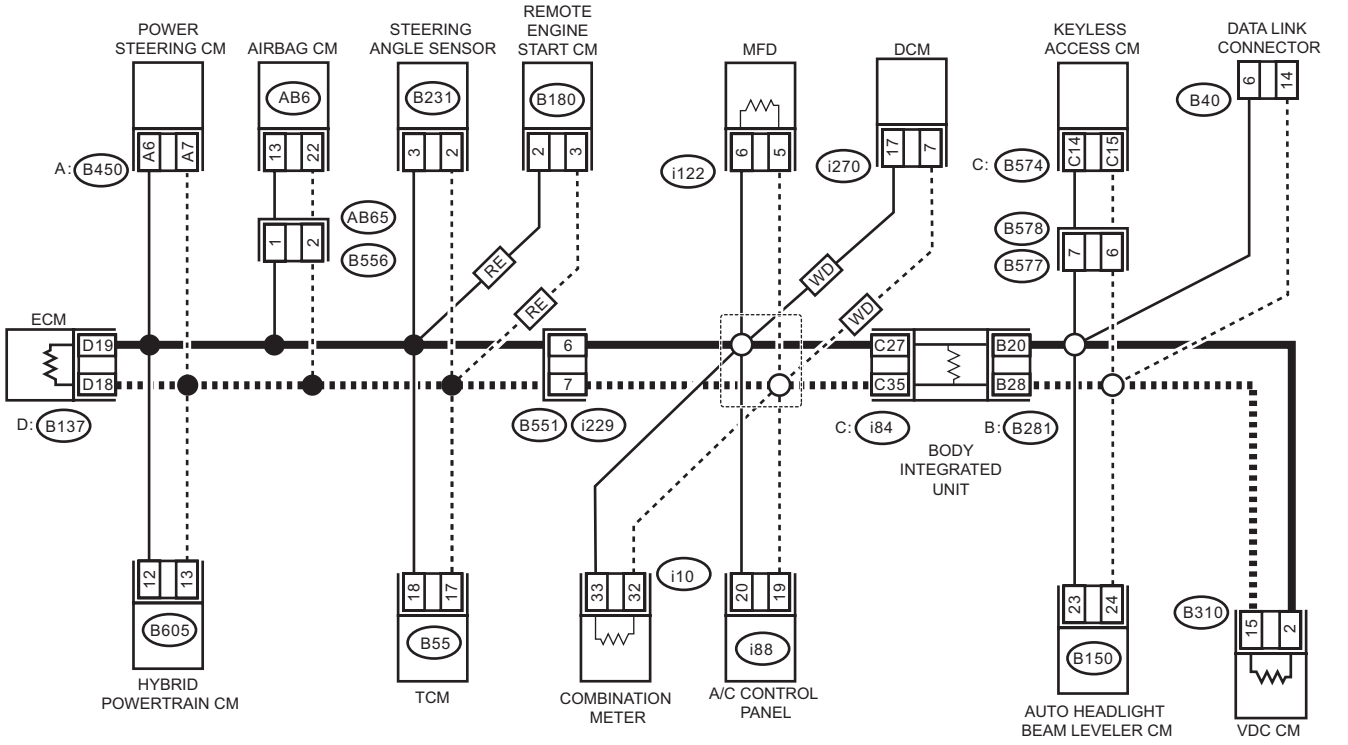
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the combination meter connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i10) No. 32 — No. 33:***	Is the resistance 400 Ω or more?	Related lines between combination meter and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i10) No. 32 — (B40) No. 14:*** ***(i10) No. 33 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of combination meter related lines.	Check DTC of combination meter. <Ref. to IDI(diag)-14, OPERATION, Read Diagnostic Trouble Code (DTC).>

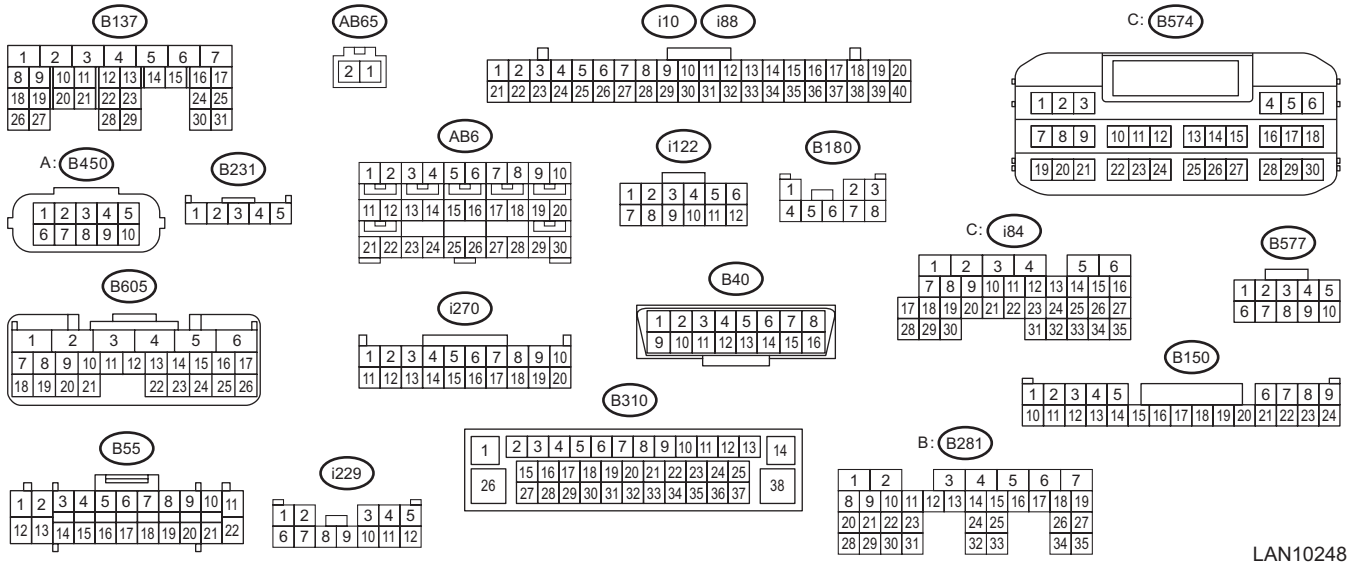
11.RELATED LINES 53 — 61 Ω (MFD)

WIRING DIAGRAM:

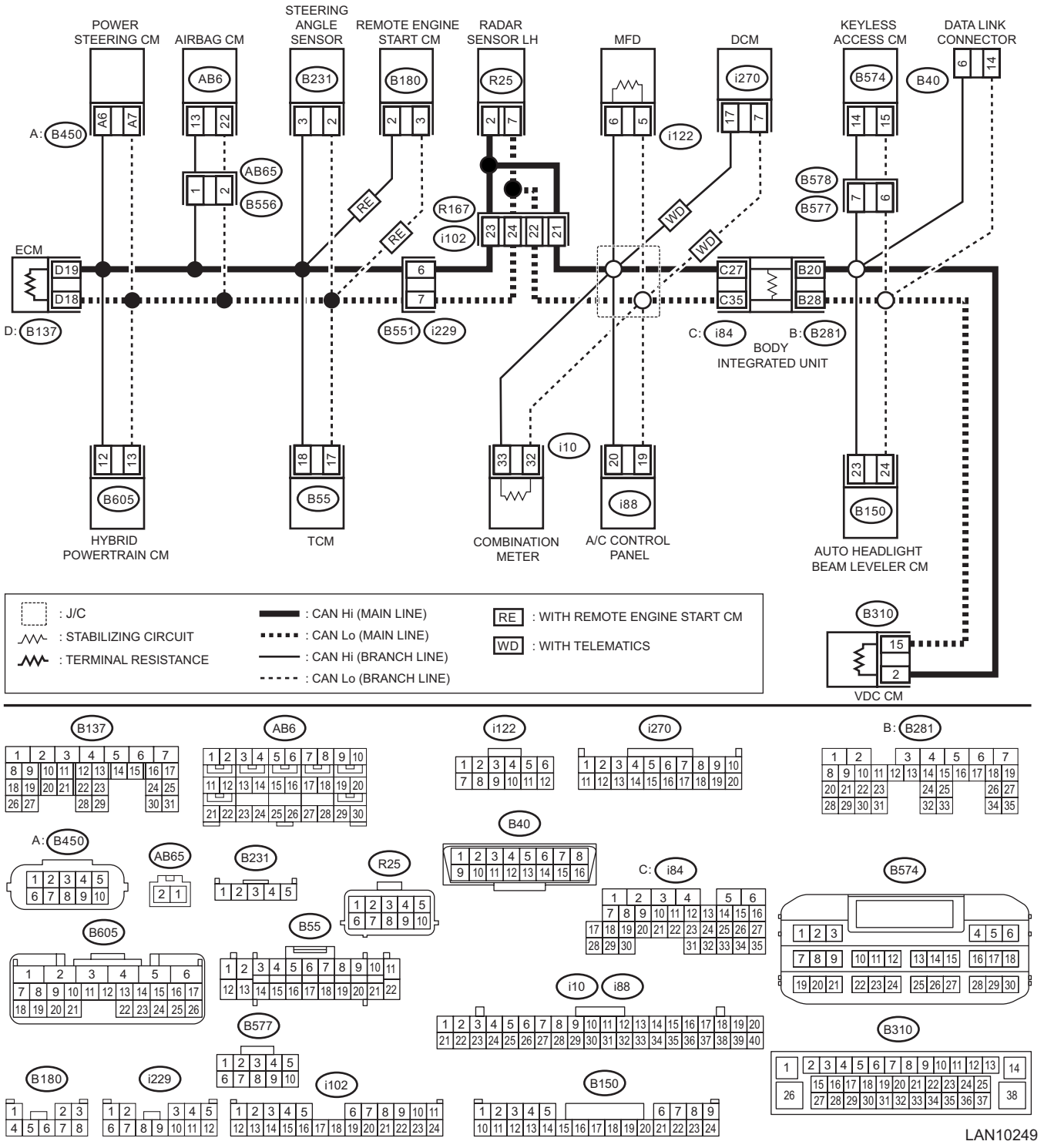
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA





- With BSD/RCTA



LAN10249

Step		Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the MFD connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal (i122) No. 5 — No. 6:***	Is the resistance 400 Ω or more?	Related lines between MFD and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.

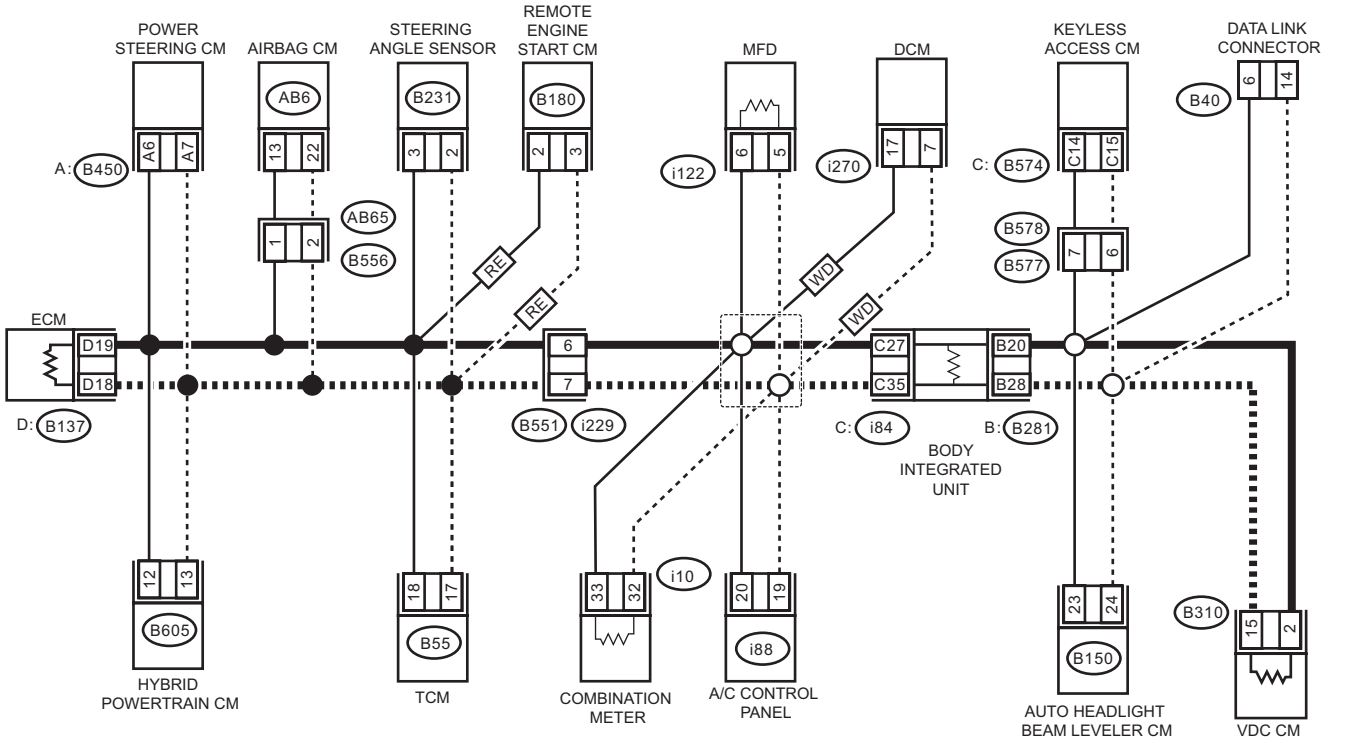
Step		Check	Yes	No
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i122) No. 5 — (B40) No. 14:*** ***(i122) No. 6 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of MFD related lines.	Check DTC of MFD. <Ref. to IDI(diag)-14, OPERATION, Read Diagnostic Trouble Code (DTC).>

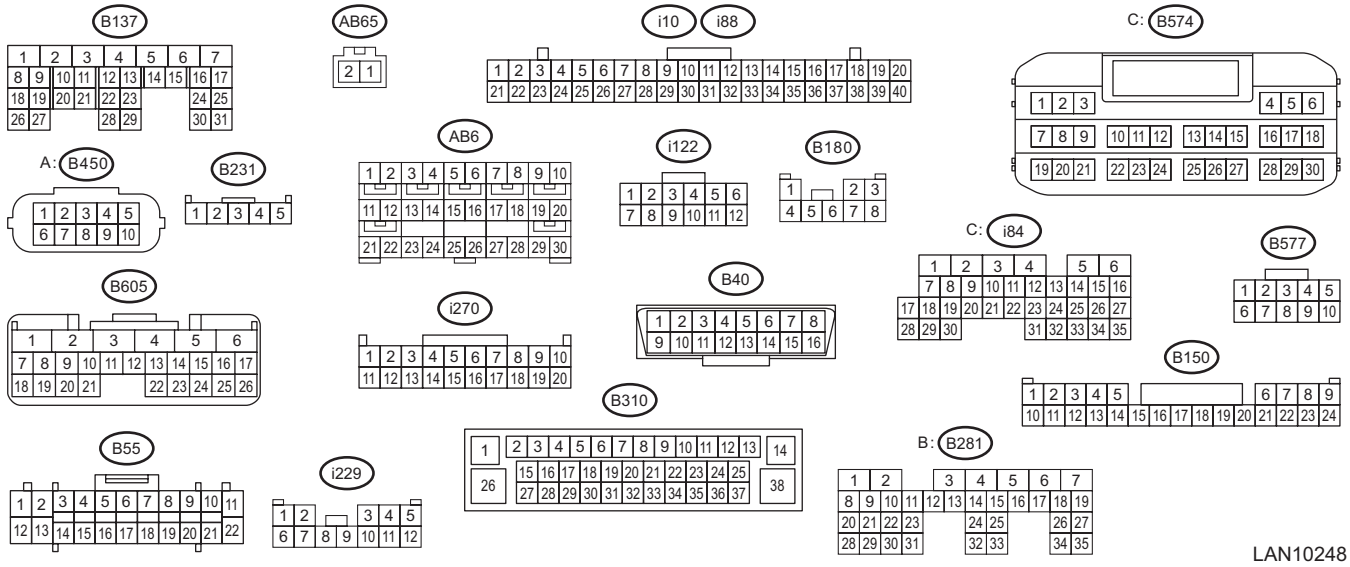
12.RELATED LINES 53 — 61 Ω (AIRBAG CM SYSTEM)

WIRING DIAGRAM:

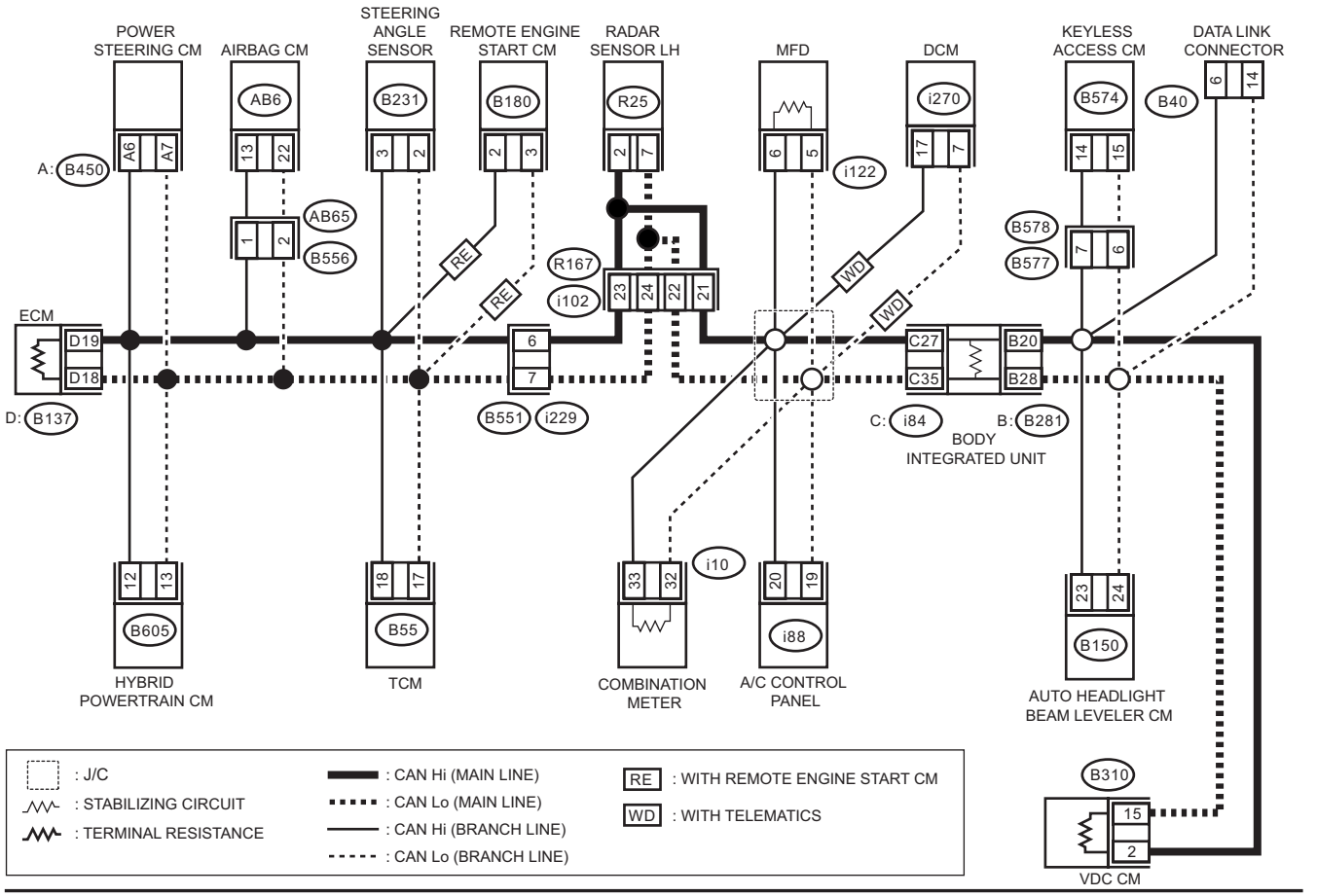
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

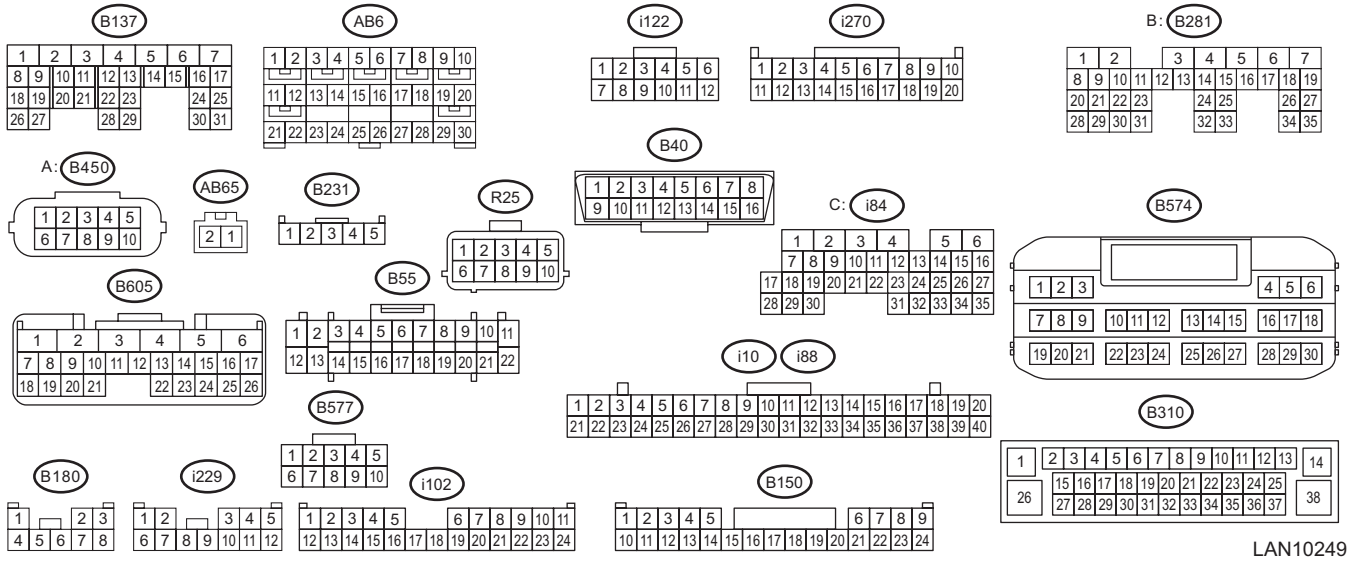
- Without BSD/RCTA





- With BSD/RCTA





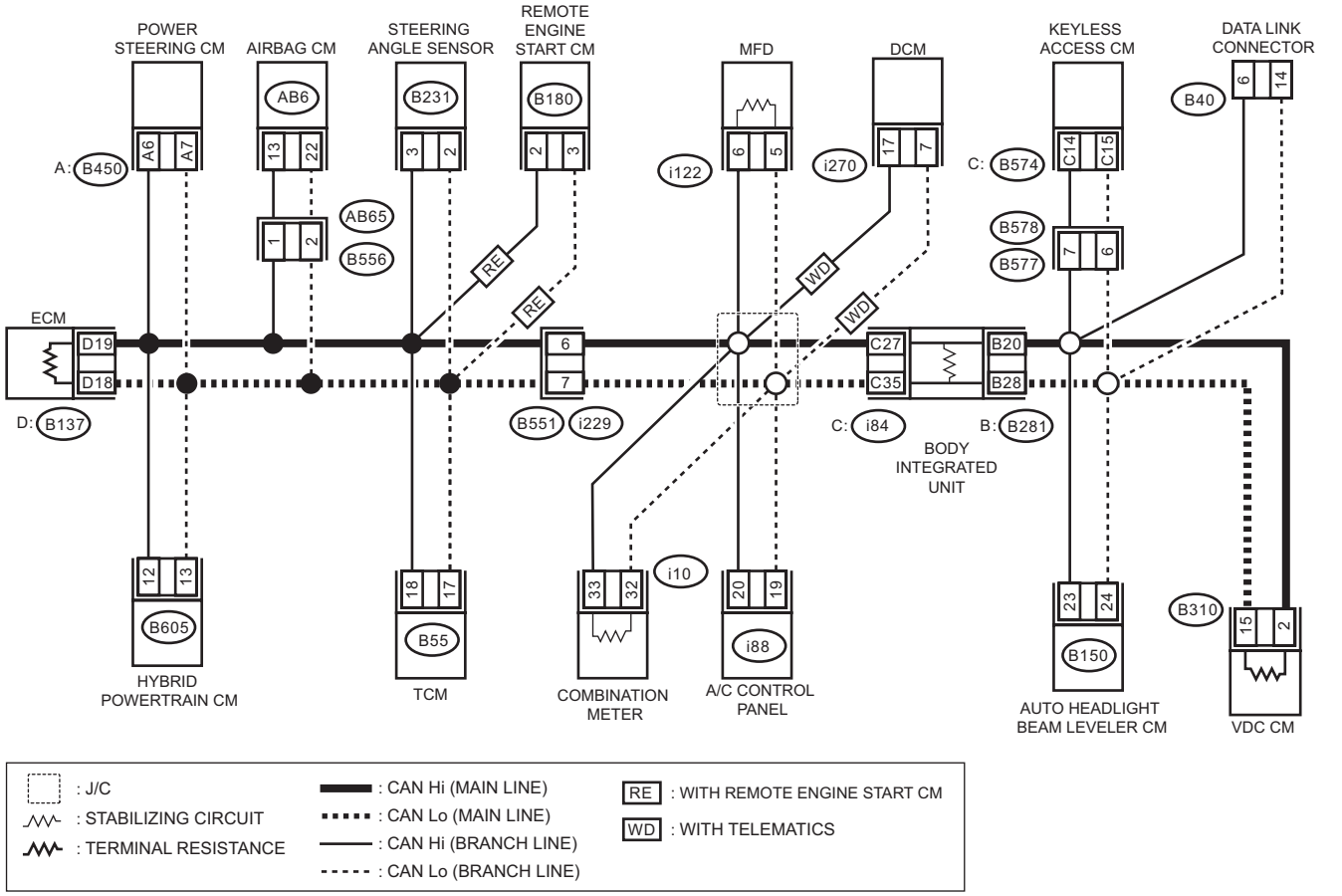
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** NOTE: For test harness, refer to AIRBAG SYSTEM (DIAGNOSTICS). <Ref. to AB(diag)-5, PREPARATION TOOL, General Description.> 1) Turn the ignition switch to OFF. Disconnect the ground cable from the 12 volt auxiliary battery and disconnect the ground cable from the 12V engine restart battery sensor of the 12 volt engine restart battery, and then wait for 60 seconds or more. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the instrument panel lower cover and column cover, and disconnect the connectors (AB7) and (AB2). 3) Remove the console front panel and disconnect the connector (AB9). 4) Disconnect the connectors (AB6, AB17, AB18) from airbag control module. 5) Connect the connector (1AH) in the test harness AH to the connectors (AB6, AB17, AB18). 6) Connect the connector (2AH) in the test harness AH and the connector (1AG) in the test harness AG. 7) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(2AG) No. 2 — (4AG) No. 2:***	Is the resistance 400 Ω or more?	Related lines between airbag CM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(2AG) No. 2 — (B40) No. 14:*** ***(4AG) No. 2 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit portion of airbag CM related lines.	Check DTC of airbag CM. <Ref. to AB(diag)-27, OPERATION, Read Diagnostic Trouble Code (DTC).>

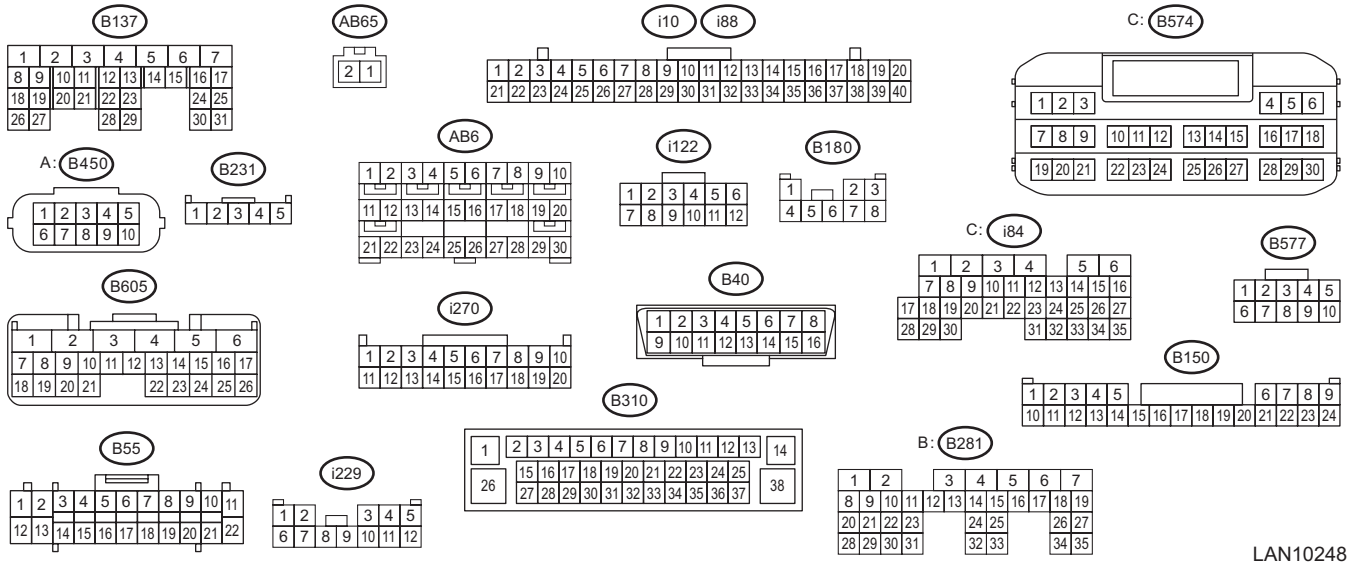
13.RELATED LINES 53 — 61 Ω (KEYLESS ACCESS SYSTEM)

WIRING DIAGRAM:

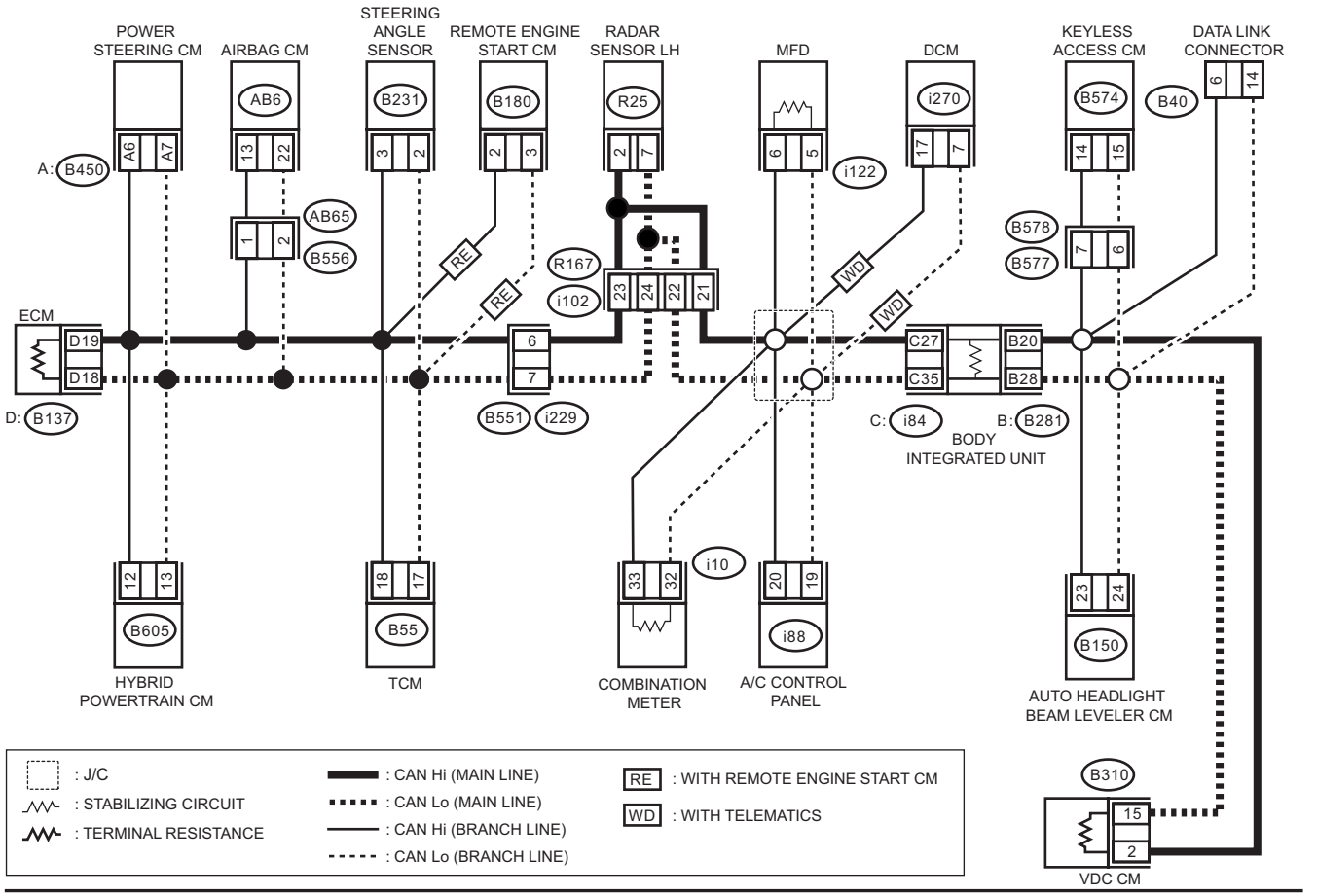
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

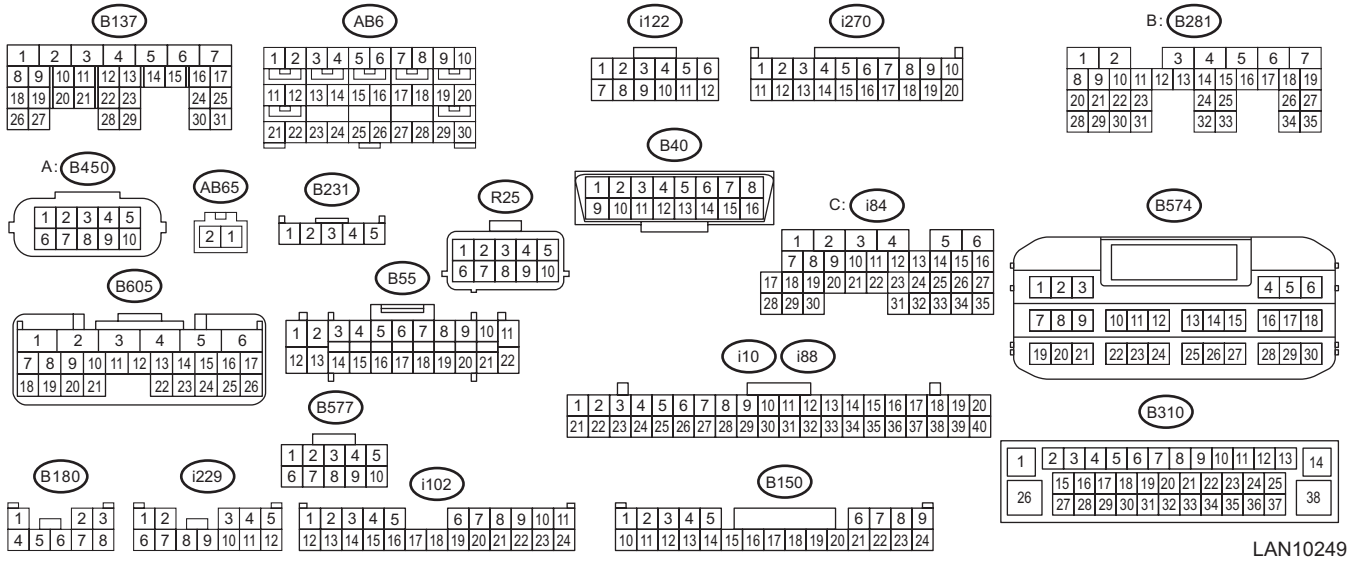
- Without BSD/RCTA





- With BSD/RCTA





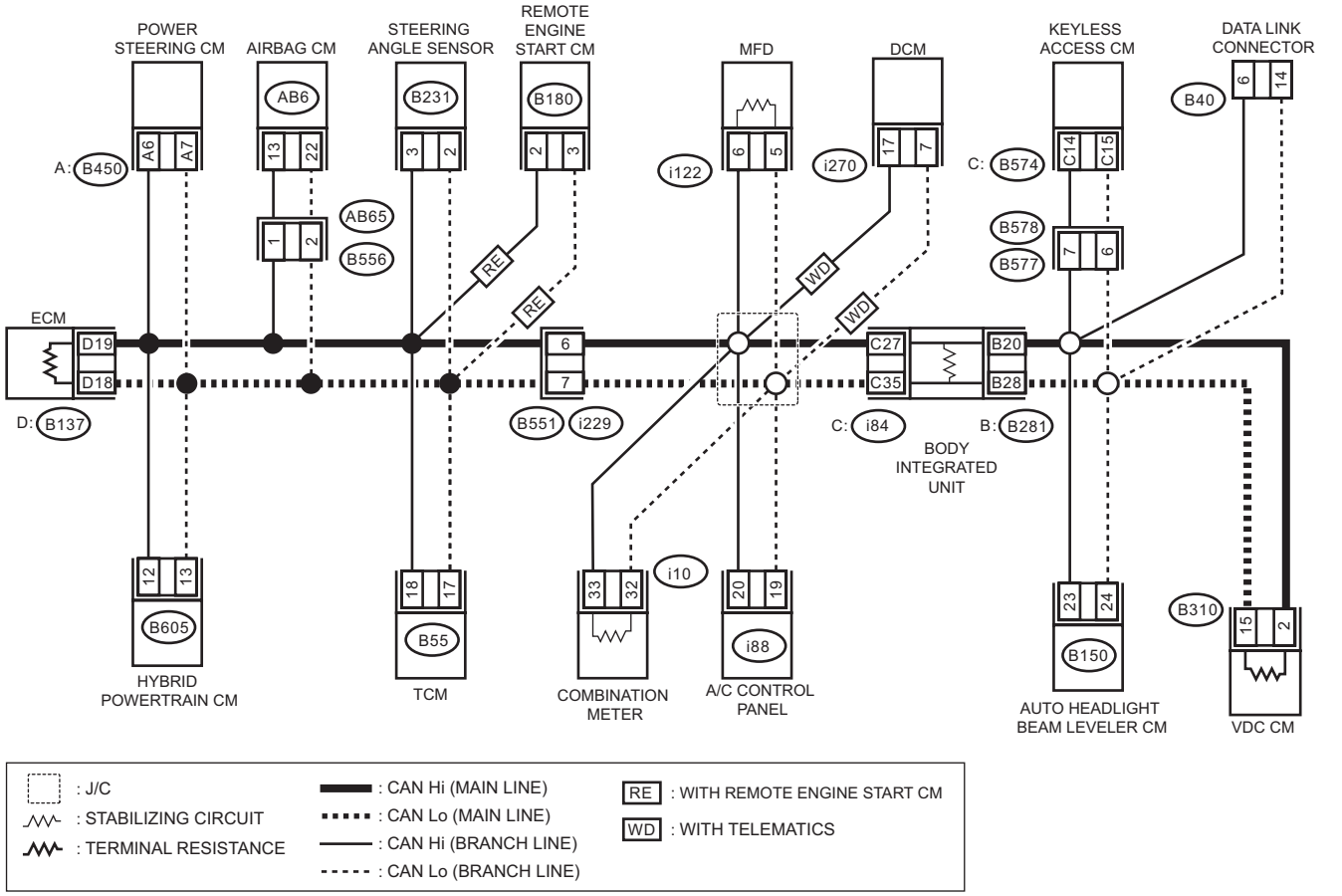
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B574) No. 14 — No. 15:***	Is the resistance 400 Ω or more?	Related lines between keyless access CM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B574) No. 15 — (B40) No. 14:*** ***(B574) No. 14 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of keyless access CM related lines.	Check DTC of keyless access CM. <Ref. to KPS(diag)-28, OPERATION, Read Diagnostic Trouble Code (DTC).>

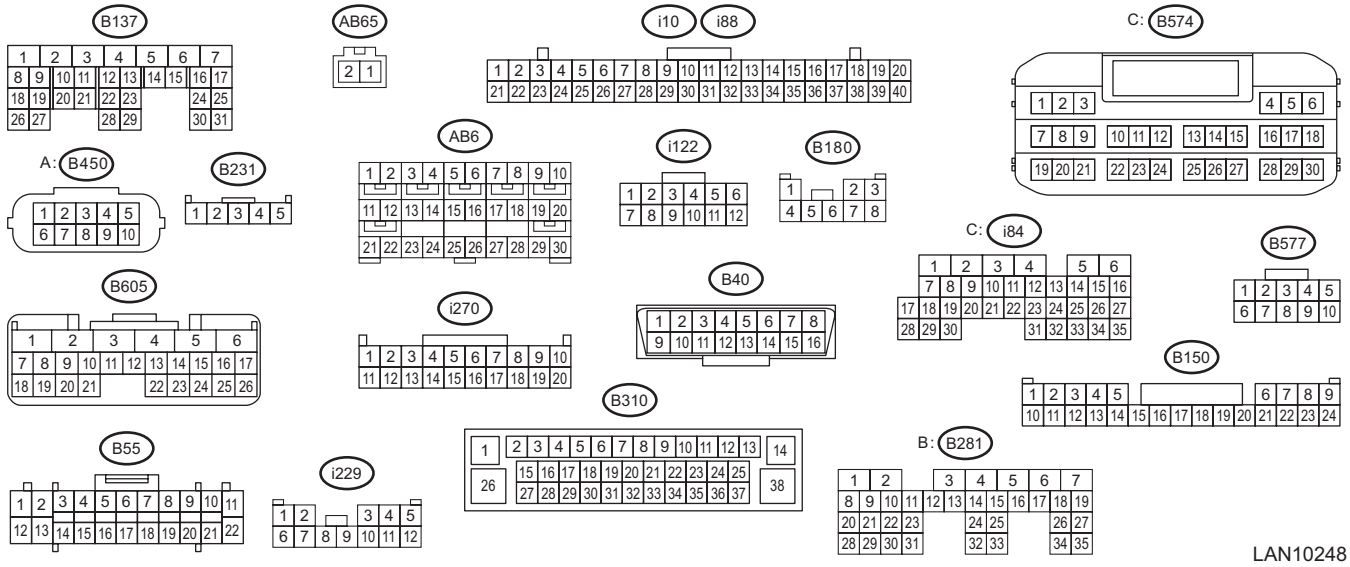
14.RELATED LINES 53 — 61 Ω (REMOTE ENGINE STARTER)

WIRING DIAGRAM:

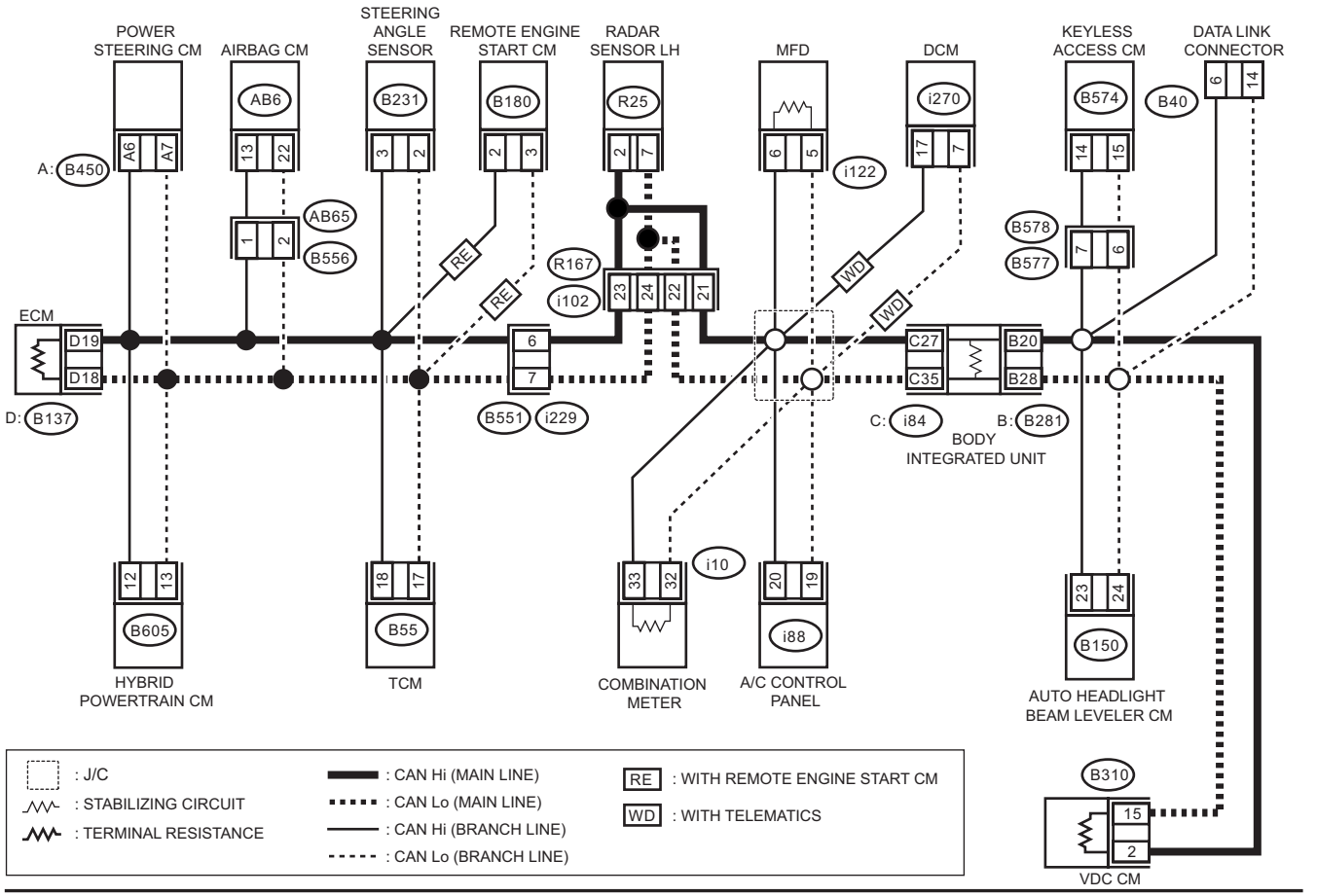
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

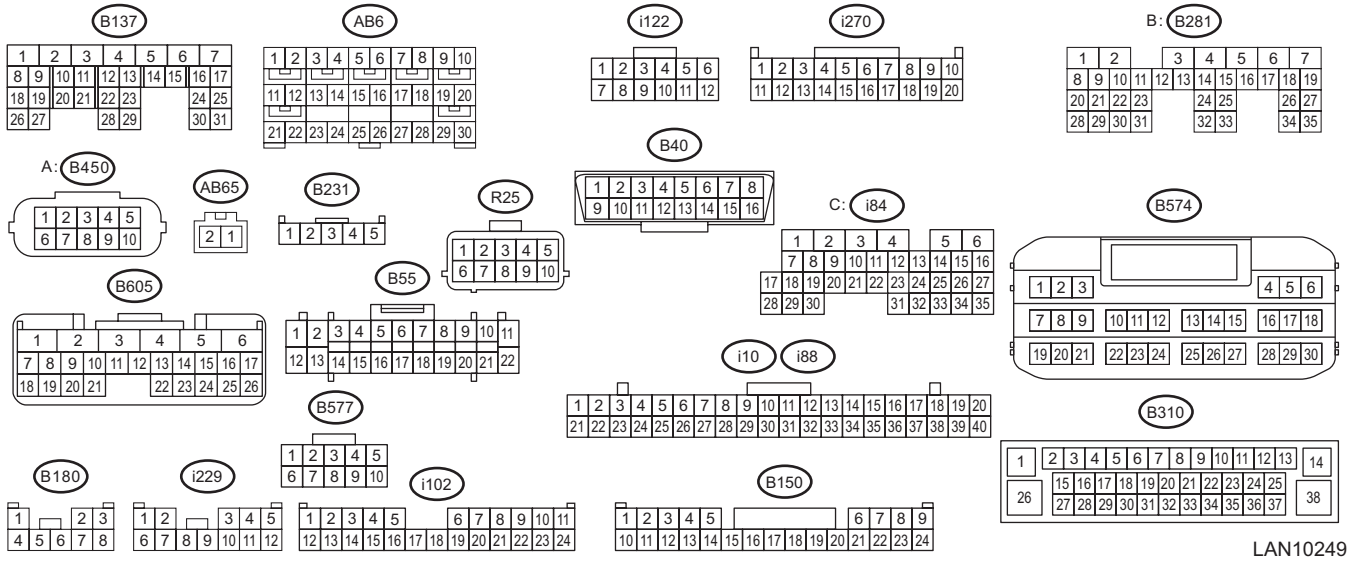
- Without BSD/RCTA





- With BSD/RCTA





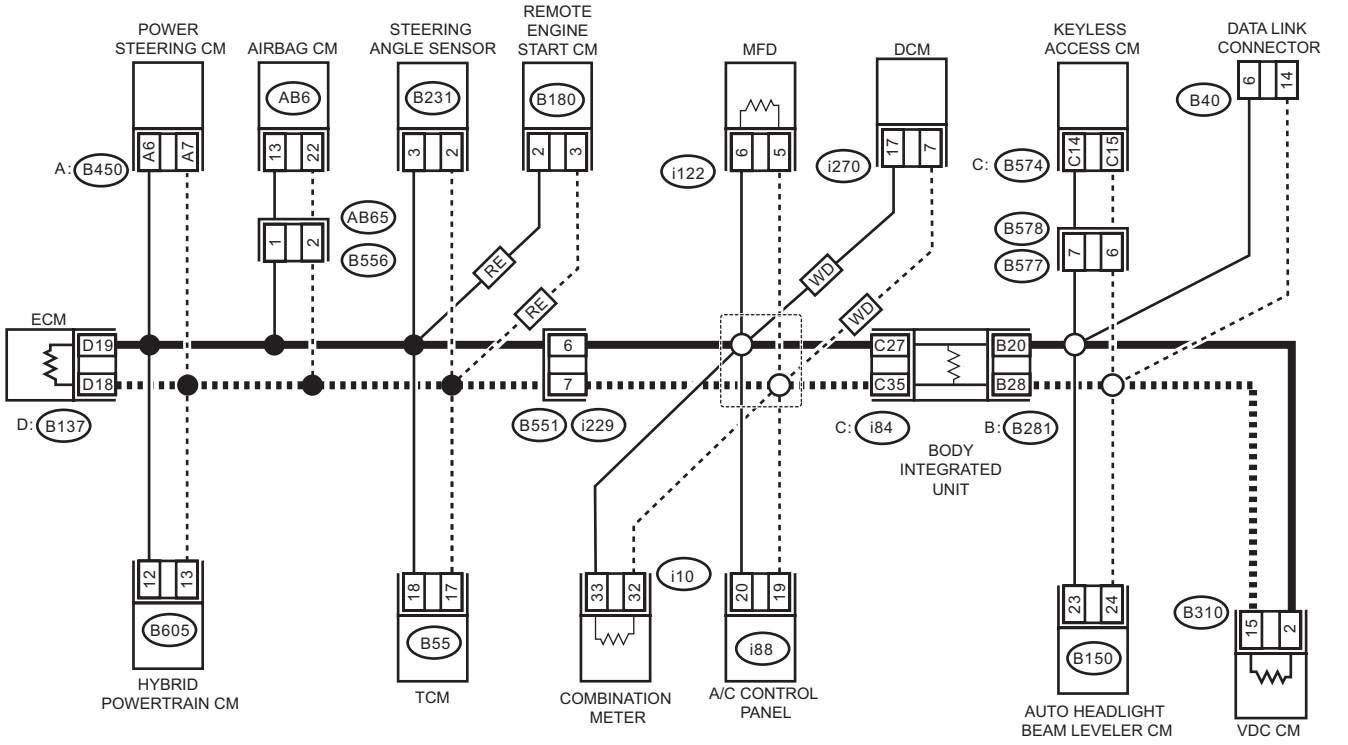
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the remote engine start CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B180) No. 2 — (B180) No. 3:***	Is the resistance 400 Ω or more?	Related lines between remote engine start CM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B180) No. 2 — (B40) No. 6:*** ***(B180) No. 3 — (B40) No. 14:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of remote engine start CM related lines.	The communication harness is normal. Check the remote engine starter CM or the mobile key.

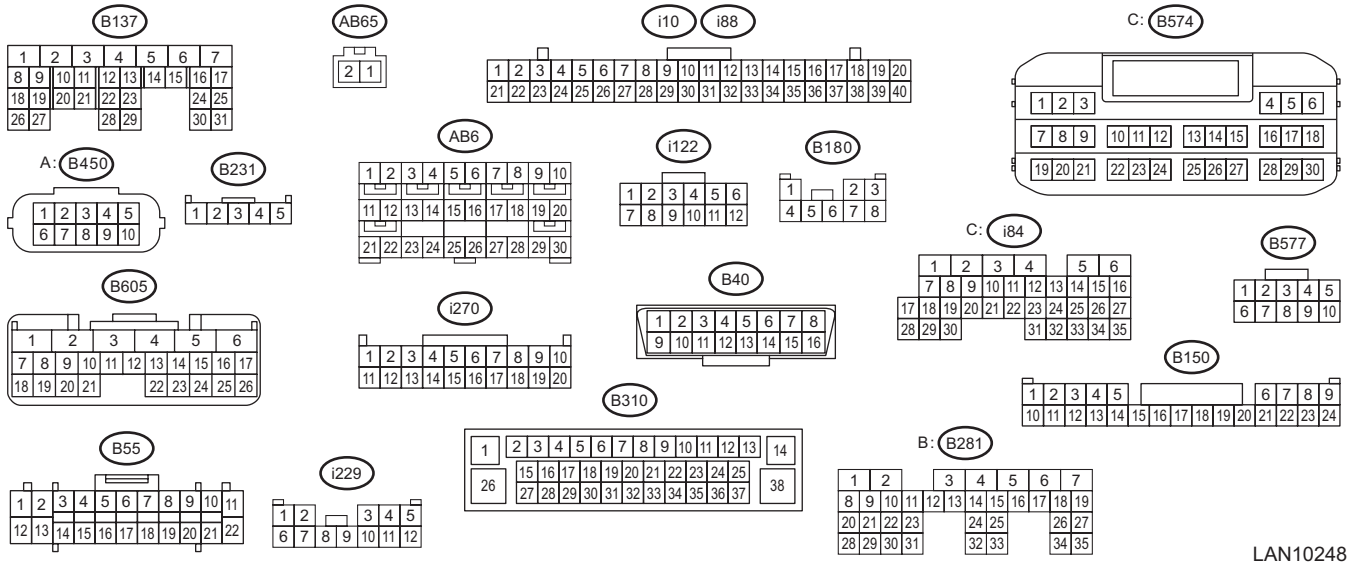
15.RELATED LINES 53 — 61 Ω (HEADLIGHT BEAM LEVELER)

WIRING DIAGRAM:

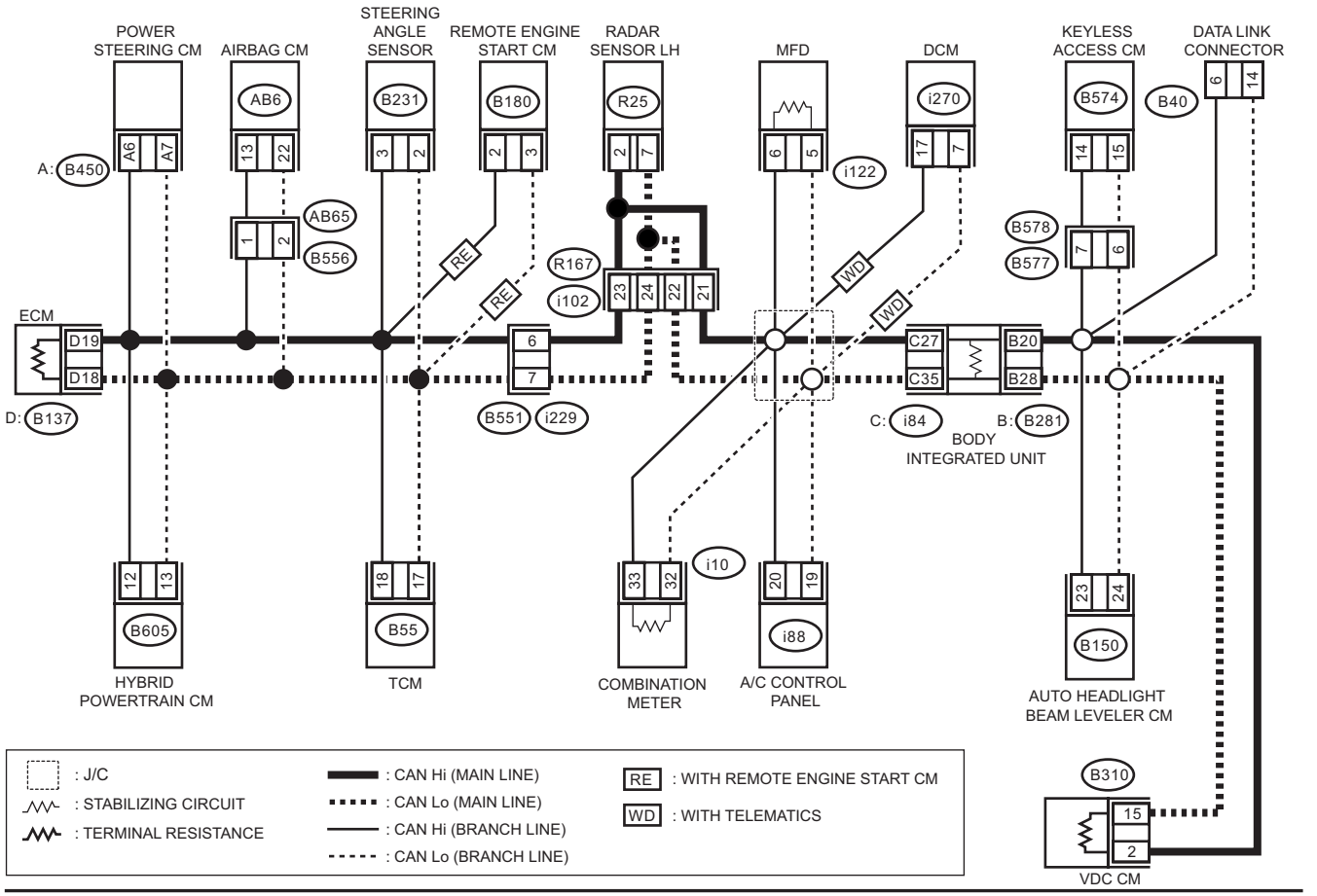
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

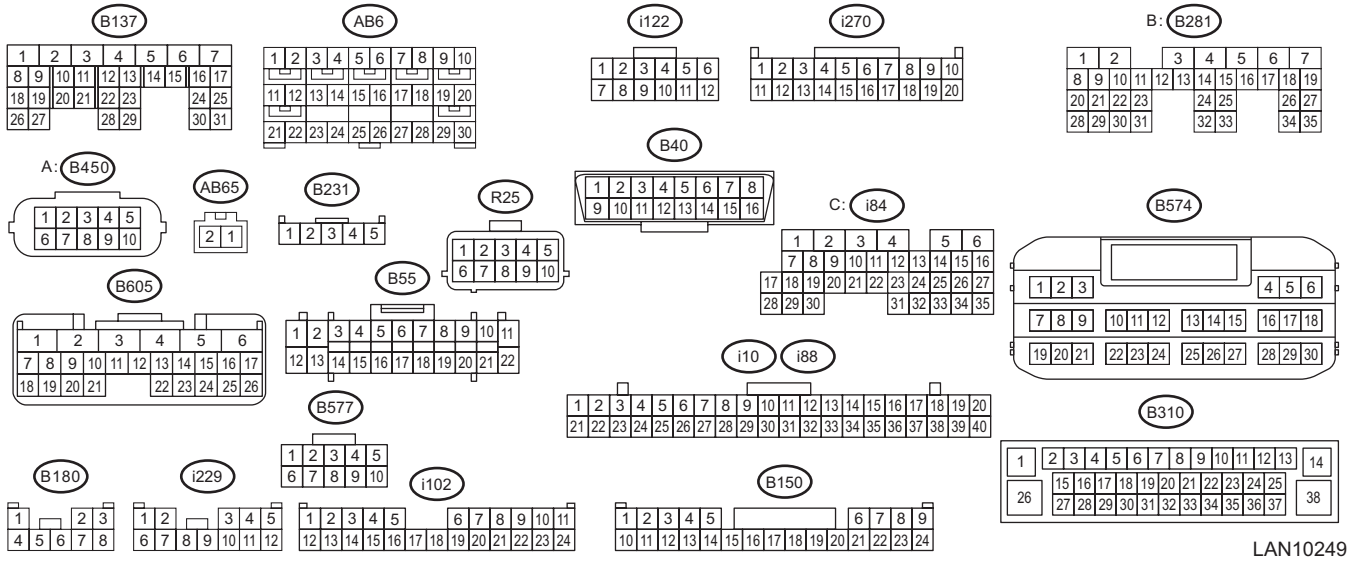
- Without BSD/RCTA





- With BSD/RCTA





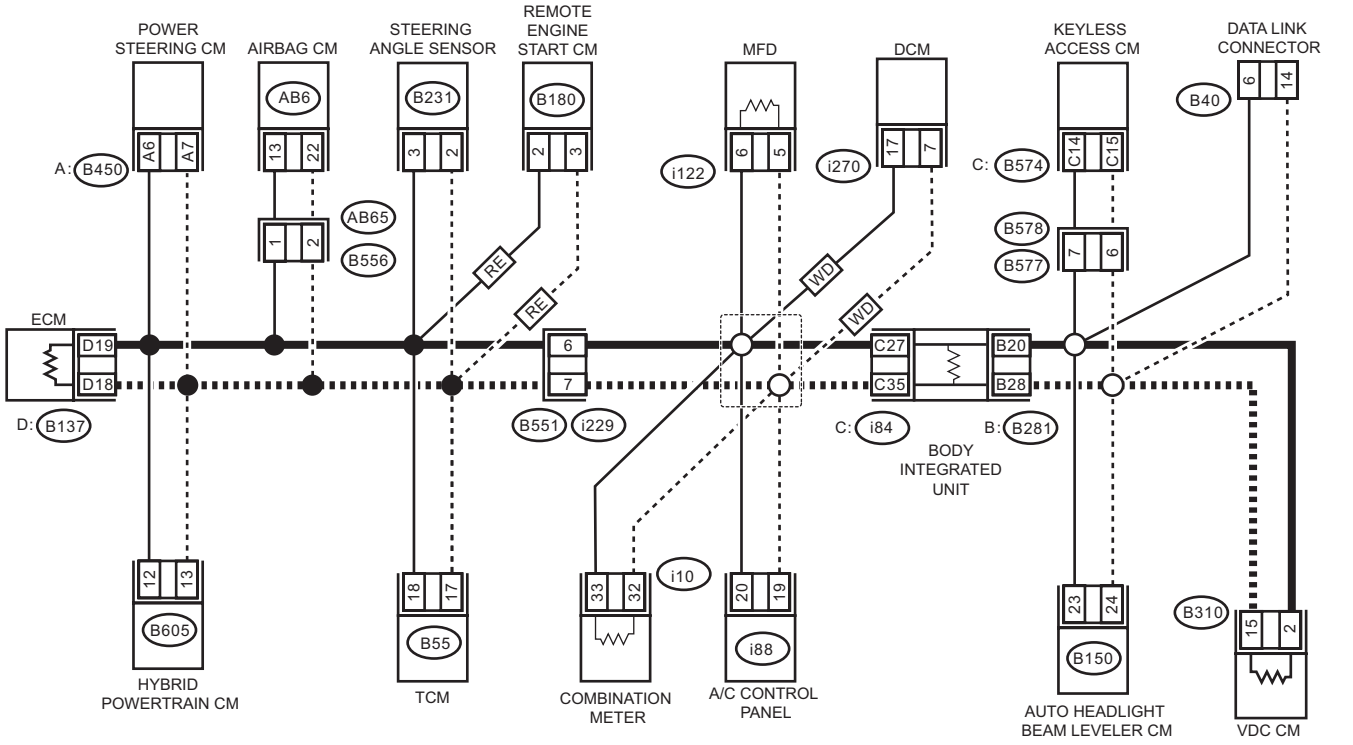
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the headlight beam leveler CM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B150) No. 23 — No. 24:***	Is the resistance 400 Ω or more?	Related lines between headlight beam leveler CM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B150) No. 24 — (B40) No. 14:*** ***(B150) No. 23 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit portion of headlight beam leveler CM related lines.	Check DTC of headlight beam leveler system. <Ref. to AL(diag)-10, OPERATION, Read Diagnostic Trouble Code (DTC).>

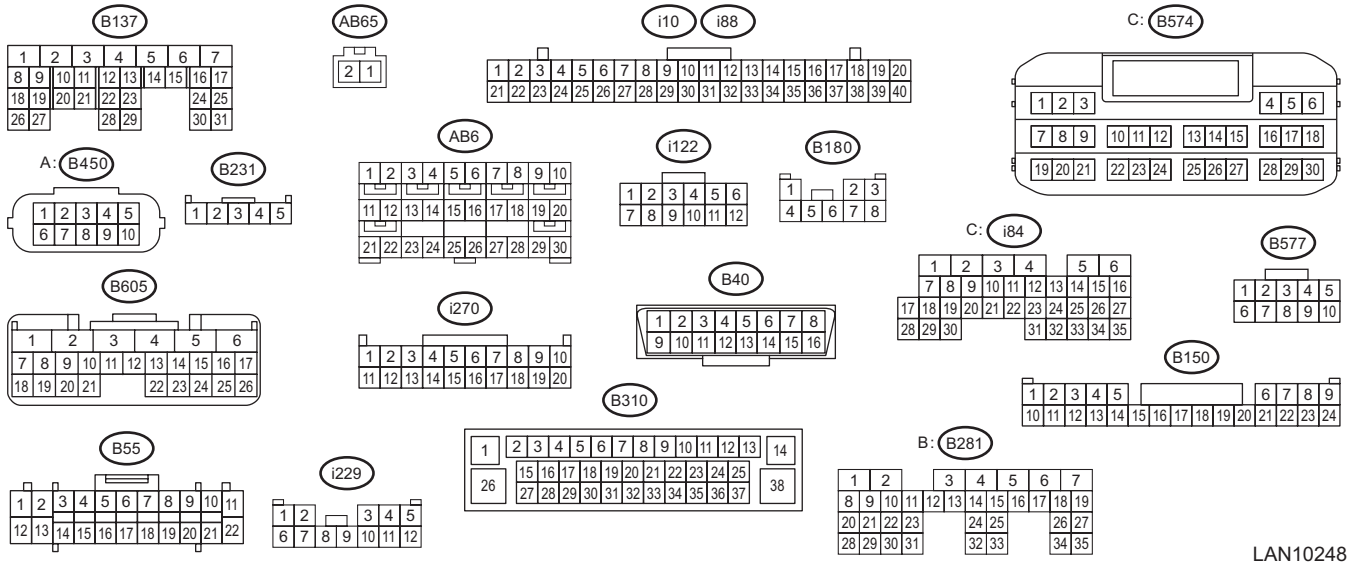
16.RELATED LINES 53 — 61 Ω (HPCM)

WIRING DIAGRAM:

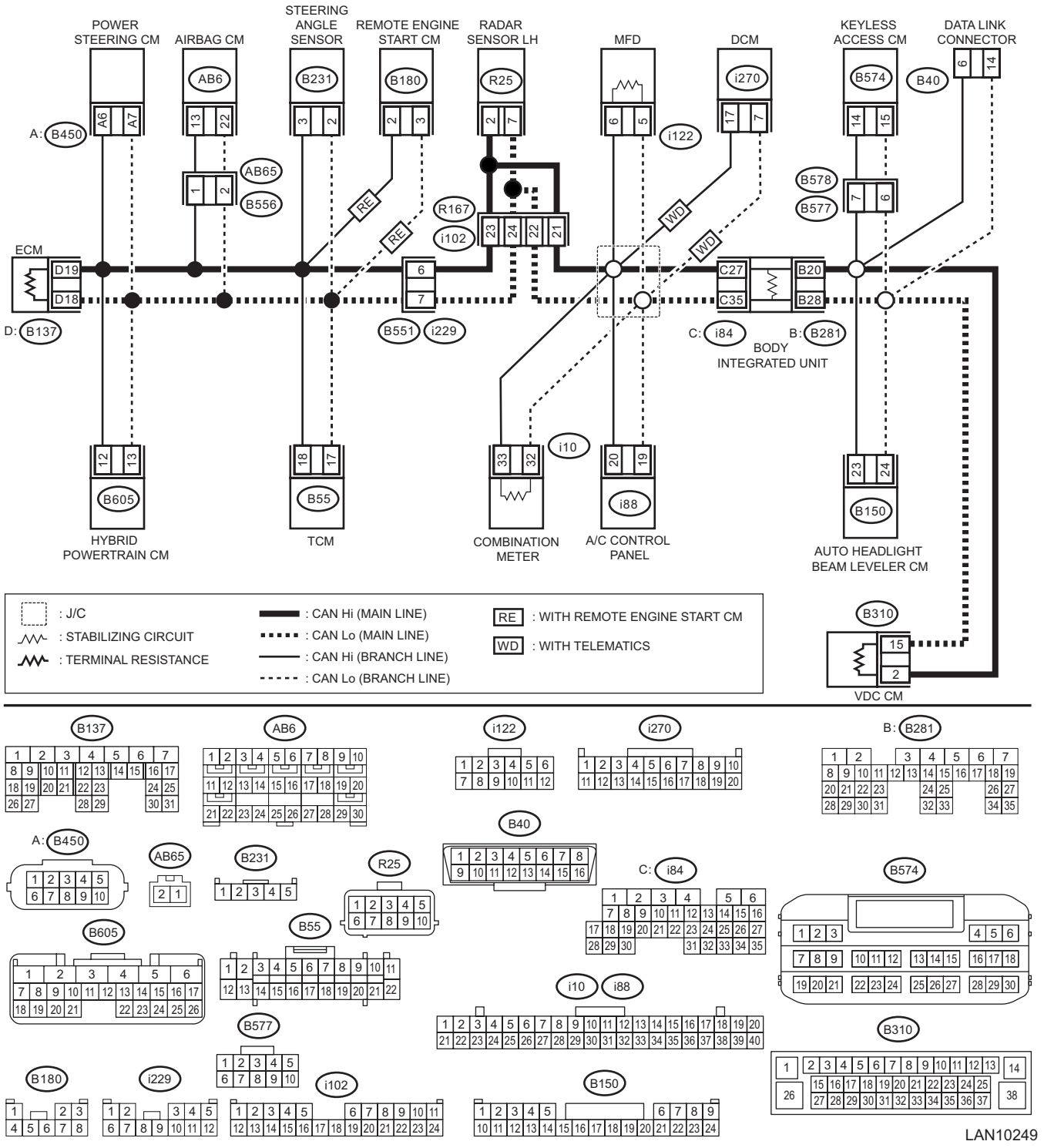
CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA





- With BSD/RCTA



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Step		Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the HPCM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal (B605) No. 12 — No. 13:***	Is the resistance 400 Ω or more?	Related lines between HPCM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.

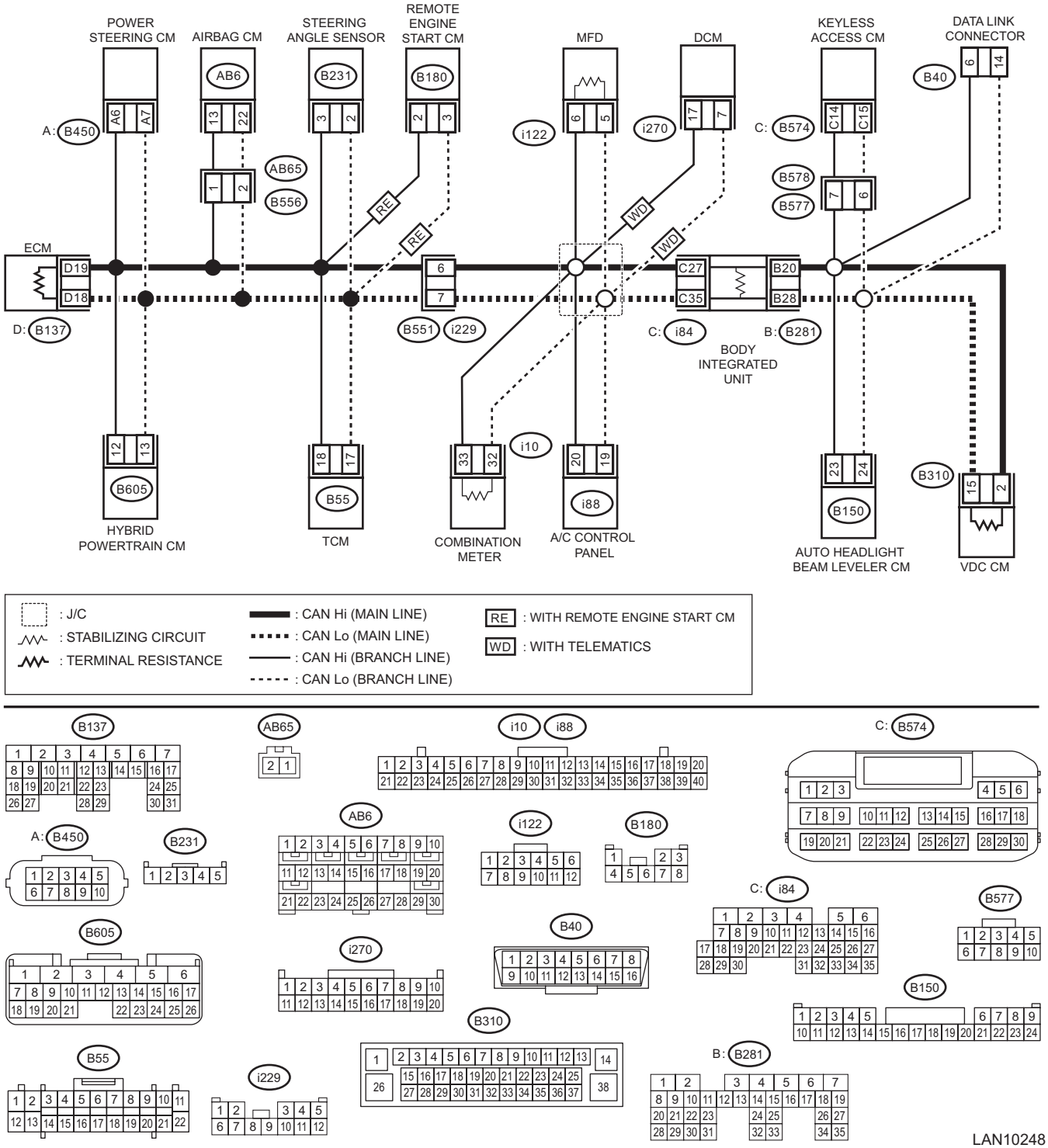
Step		Check	Yes	No
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 13 — (B40) No. 14:*** ***(B605) No. 12 — (B40) No. 6:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of HPCM related lines.	The communication harness is normal. Check the impact sensor.

17.RELATED LINES 53 — 61 Ω (TELEMATICS)

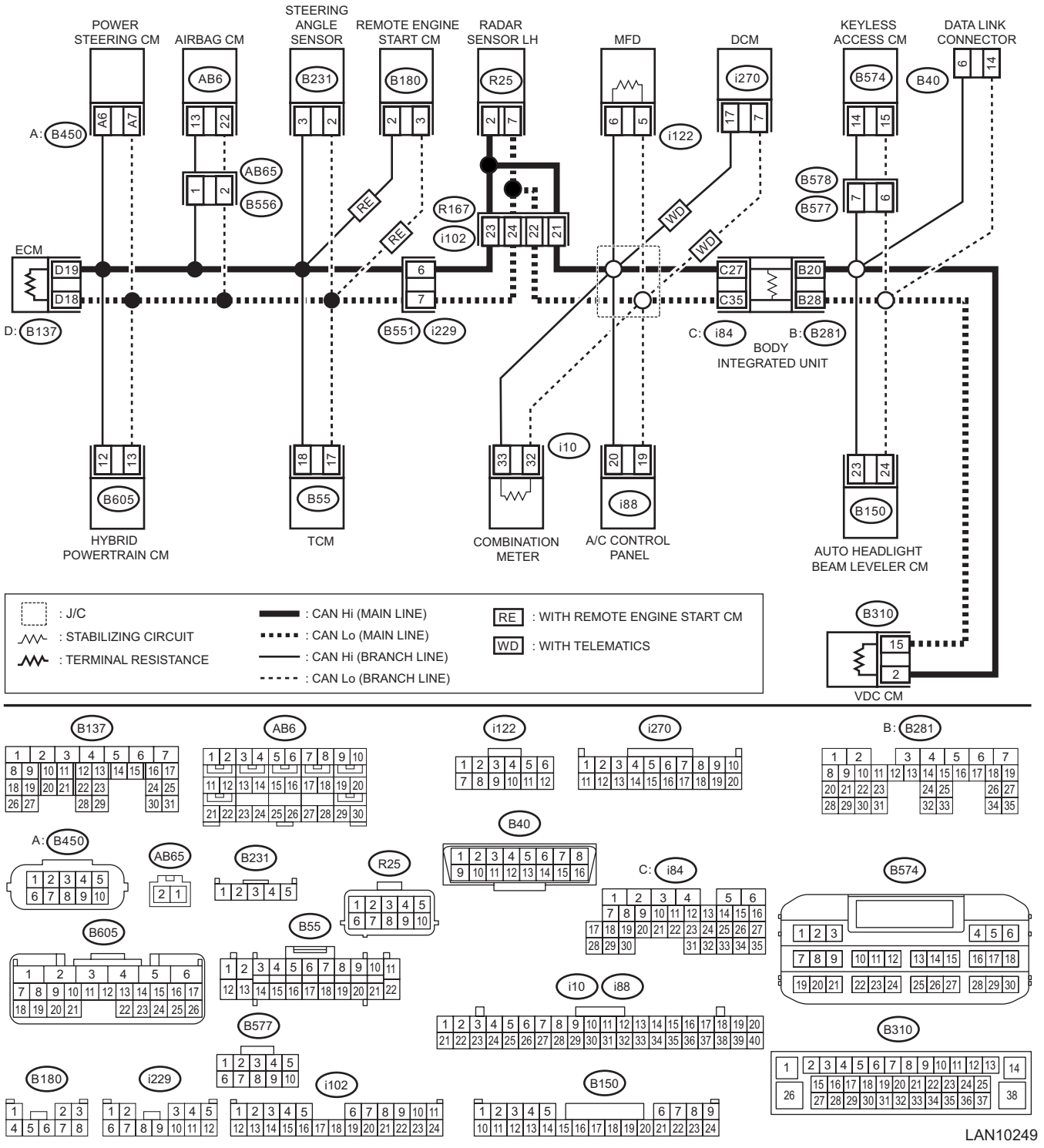
WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

- Without BSD/RCTA



- With BSD/RCTA



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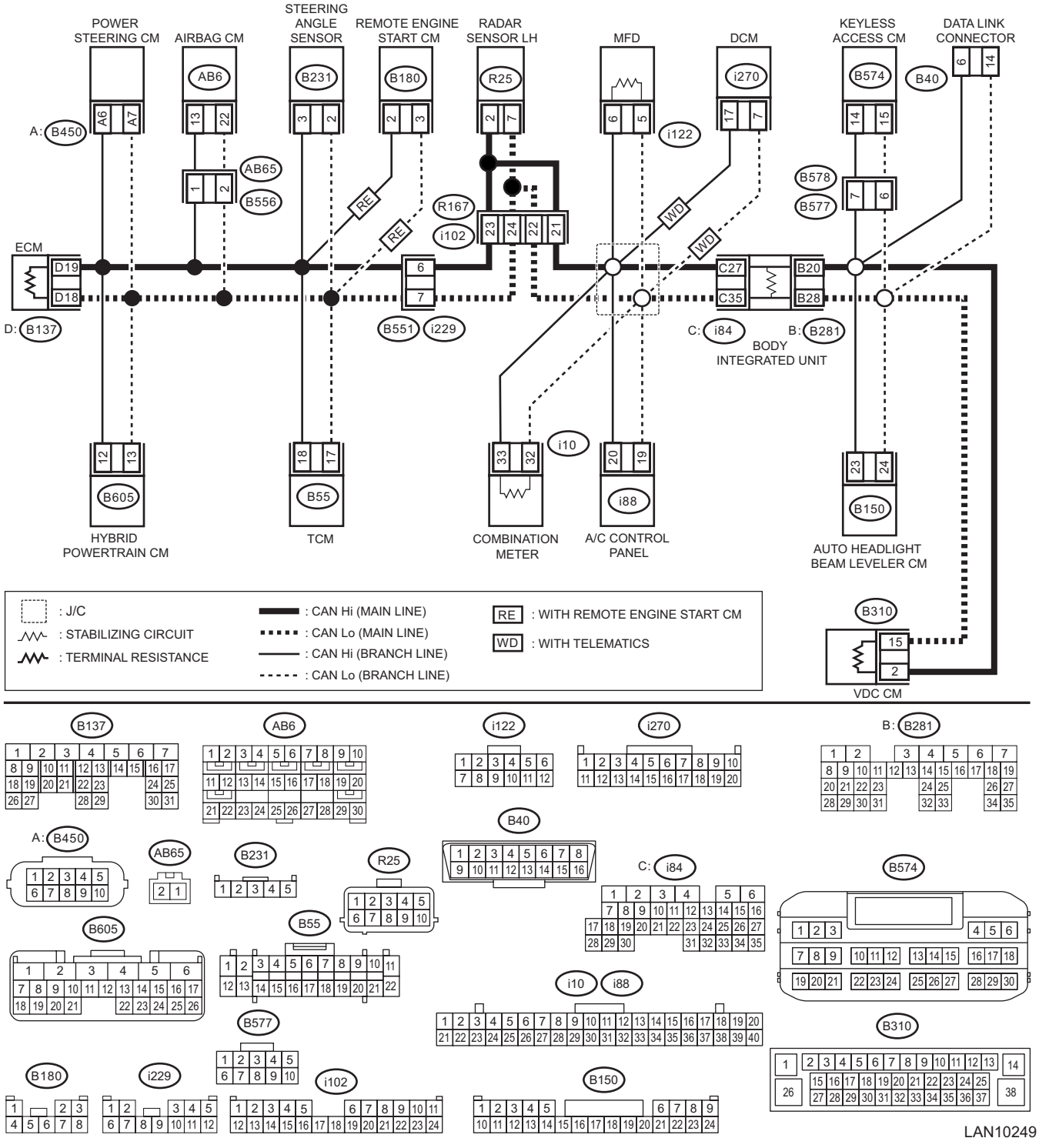
Step		Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the DCM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal (i270) No. 7 — No. 17:***	Is the resistance 400 Ω or more?	Related lines between DCM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.

Step		Check	Yes	No
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i270) No. 17 — (B40) No. 6:*** ***(i270) No. 7 — (B40) No. 14:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of telematics system related lines.	The communication harness is normal. Check DTC of the telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>

18.RELATED LINES 53 — 61 Ω (RADAR SENSOR)

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.>

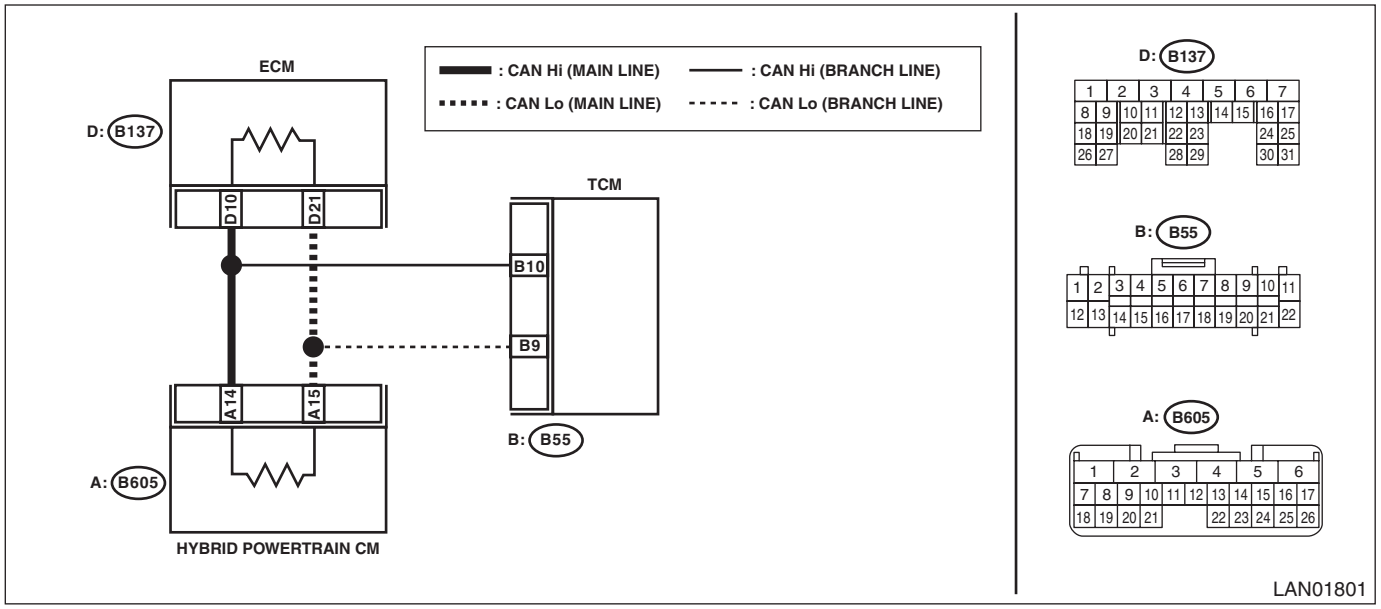


	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the radar sensor LH connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(R25) No. 2 — No. 7:***	Is the resistance 400 Ω or more?	Related lines between radar sensor LH and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B25) No. 2 — (B40) No. 6:*** ***(R25) No. 7 — (B40) No. 14:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of the Subaru Rear Vehicle Detection related lines.	The communication harness is normal. Check DTC of radar sensor. <Ref. to RVD(diag)-13, OPERATION, Read Diagnostic Trouble Code (DTC).>

19.GROUND SHORT INSPECTION (PU-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



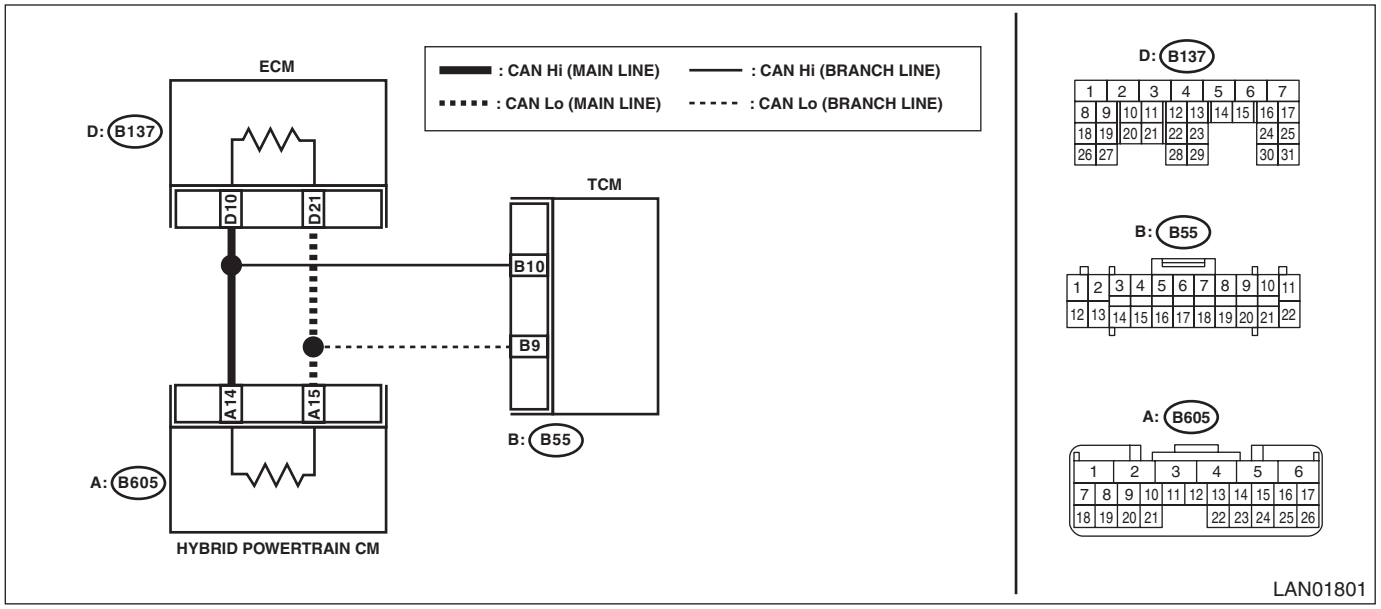
NOTE:
Main wiring harness or related lines may be shorted to ground, or shorted to ground in one of the control modules.

	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the ECM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B137) No. 21 — Chassis ground:*** ***(B137) No. 10 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **2**.	Currently, it is normal.
2	**CHECK CONTROL MODULE.** 1) With the tester connected, disconnect control module. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B137) No. 21 — Chassis ground:*** ***(B137) No. 10 — Chassis ground:***	Did the resistance change to 10 Ω or more?	Replace the control module whose resistance has changed.	Repair or replace the short circuit of the main wiring harness and related lines between ECM and HPCM.

20.BATTERY SHORT INSPECTION (PU-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



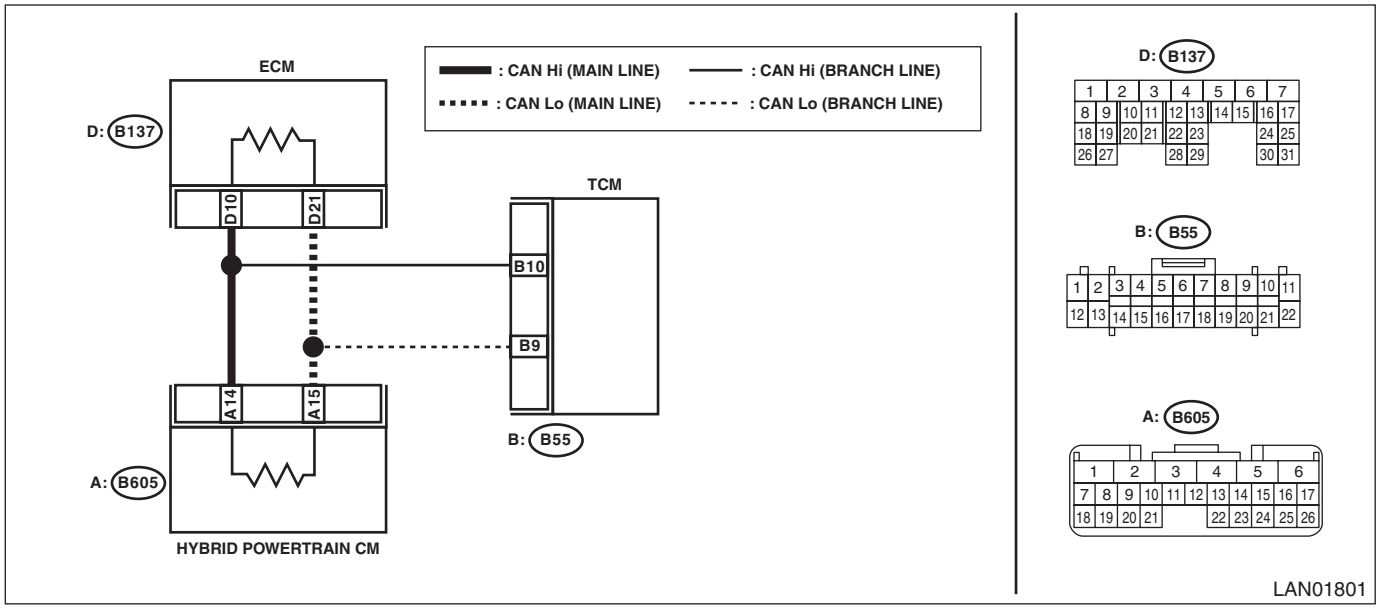
NOTE:
Main wiring harness or related lines may be shorted to battery circuit, or shorted to battery circuit in one of the control modules.

	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B137) No. 21 (+) — Chassis ground (–):*** ***(B137) No. 10 (+) — Chassis ground (–):***	Is the voltage 5 V or less?	Currently, it is normal.	Go to step **2**.
2	**CHECK CONTROL MODULE.** 1) With the tester connected, disconnect control module. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B137) No. 21 (+) — Chassis ground (–):*** ***(B137) No. 10 (+) — Chassis ground (–):***	Did the voltage change to 5 V or less?	Replace the control module whose voltage has changed.	Repair or replace the short circuit of the main wiring harness and related lines between ECM and HPCM.

21.57 — 63 Ω (PU-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



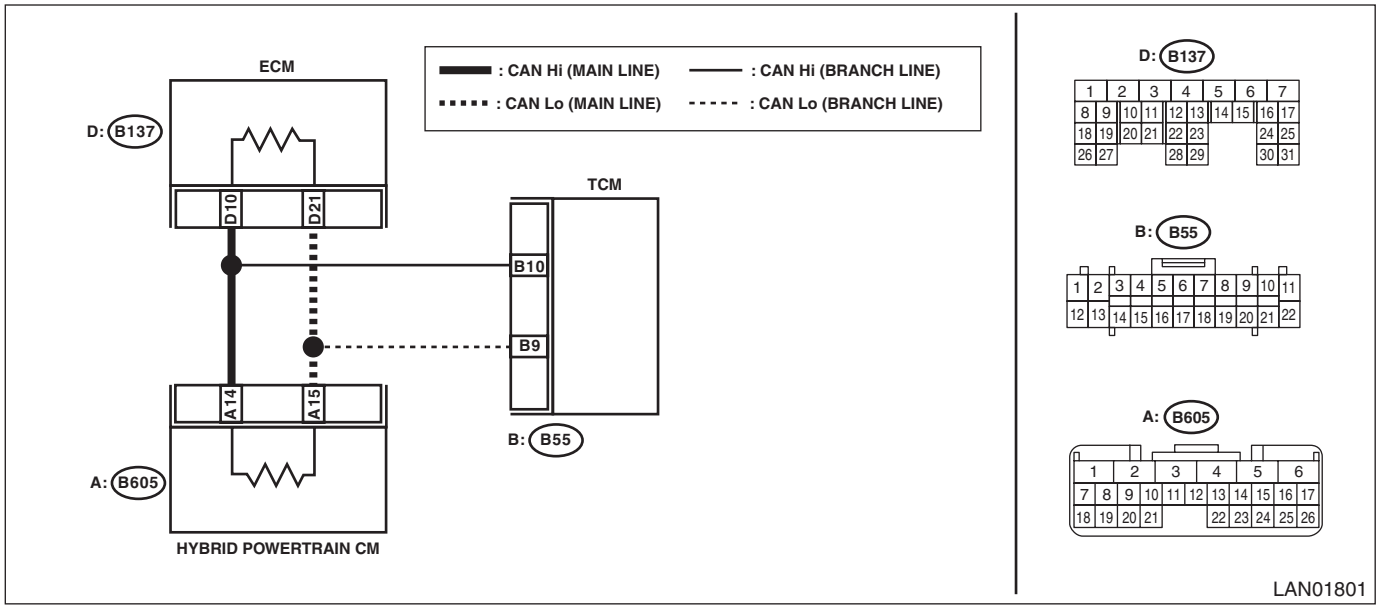
NOTE:
When the measured resistance value is 57 — 63 Ω, main wiring harness or related lines may be shorted to ground, or shorted to power supply line, or related line may be open.

	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B137) No. 21 — Chassis ground:*** ***(B137) No. 10 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **2**.	Go to step **4**.
2	**CHECK CONTROL MODULE.** With the tester connected, disconnect control module. ***Connector & terminal*** ***(B137) No. 21 — Chassis ground:*** ***(B137) No. 10 — Chassis ground:***	Did the resistance change to 10 Ω or more?	Replace the control module whose resistance has changed.	Repair or replace the short circuit of the main wiring harness and related lines between ECM and HPCM.
3	**CHECK MAIN WIRING HARNESS AND RELATED LINES.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B137) No. 21 (+) — Chassis ground (–):*** ***(B137) No. 10 (+) — Chassis ground (–):***	Is the voltage 5 V or less?	Currently, it is normal.	Go to step **4**.
4	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) With the tester connected, disconnect control module. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B137) No. 21 (+) — Chassis ground (–):*** ***(B137) No. 10 (+) — Chassis ground (–):***	Did the voltage change to 5 V or less?	Replace the control module whose voltage has changed.	Repair or replace the short circuit of the main wiring harness and related lines between ECM and HPCM.

22.56 Ω OR LESS (PU-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



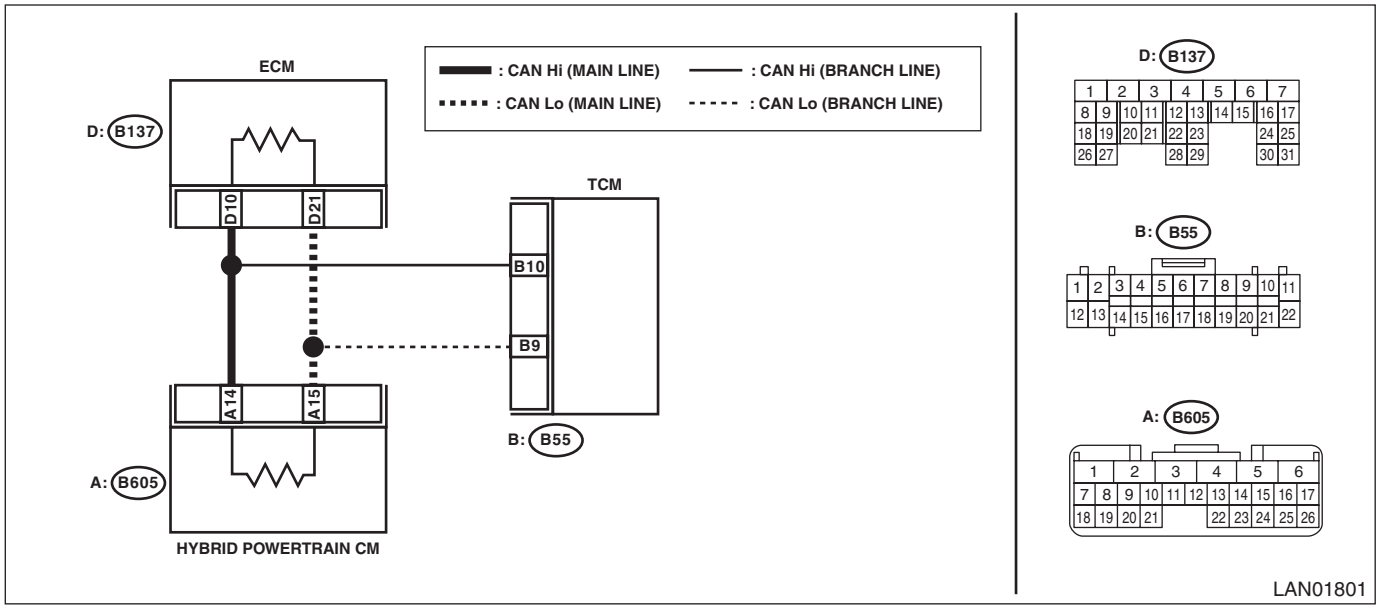
NOTE:
When the bus line is measured, combined resistance of the end resistance (120 Ω) in ECM and the end resistance (120 Ω) in HPCM can be measured. The combined resistance is approximately 57 — 63 Ω. When the measured resistance value is 56 Ω or less, main wiring harness or related lines may be shorted, or combined resistance may have changed because resistance other than end resistance is created on the circuit.

	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the ECM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B137) No. 21 — (B137) No. 10:***	Is the resistance 10 Ω or less?	Go to step **2**.	Go to step **3**.
2	**CHECK MAIN WIRING HARNESS AND RELATED LINES.** With a tester connected, disconnect control module connectors in order. ***Connector & terminal*** ***(B137) No. 21 — (B137) No. 10:***	Is there any control module whose condition has changed from short state?	Replace the control module whose resistance has changed.	Repair or replace the short circuit of the main wiring harness and related lines between ECM and HPCM.
3	**CHECK CONTROL MODULE.** 1) Disconnect the ECM and HPCM connectors. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B137) No. 21 — (B137) No. 10:*** ***(B605) No. 15 — (B605) No. 14:***	Is the resistance 114 — 126 Ω?	Go to step **4**.	Replace the control module whose end resistance value is out of the specified range.
4	**CHECK CONTROL MODULE.** With the tester connected, disconnect TCM. ***Connector & terminal*** ***(B137) No. 21 — (B137) No. 10:***	Is there any control module whose resistance has changed to 1 MΩ or more?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Repair or replace the harness due to resistance component.

23.64 Ω OR MORE (PU-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



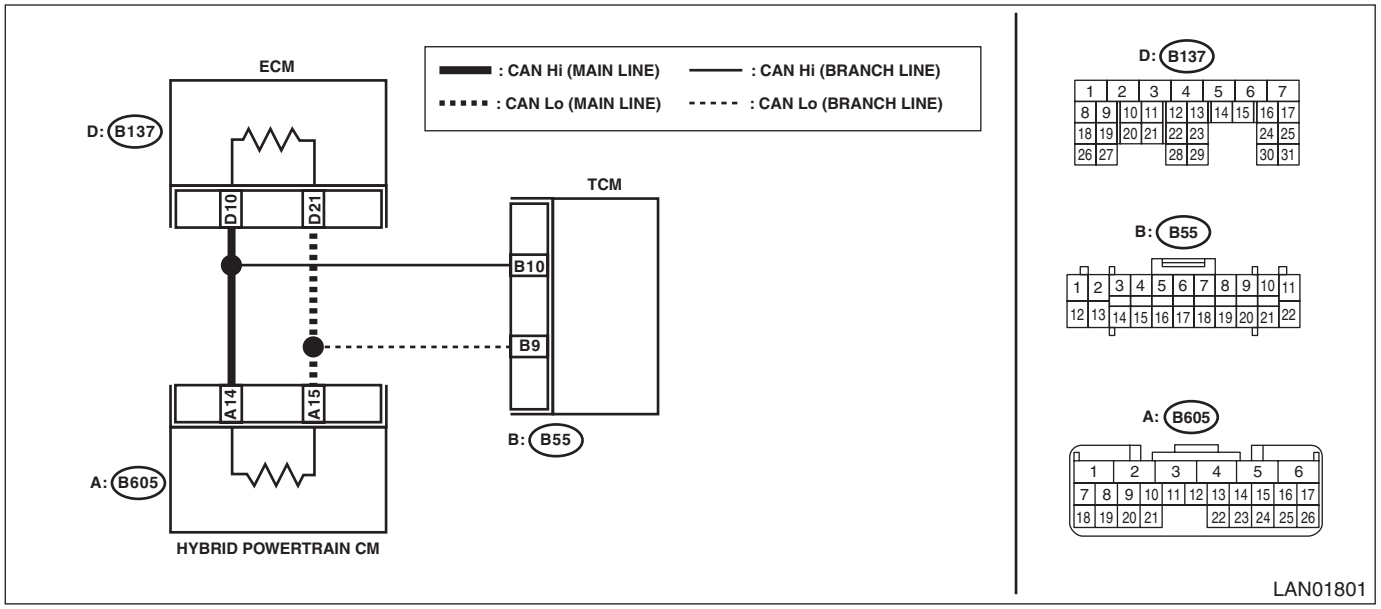
NOTE:
When the bus line is measured, combined resistance of the end resistance (120 Ω) in ECM and the end resistance (120 Ω) in HPCM can be measured. The combined resistance is approximately 57 — 63 Ω. When the measured resistance value is 64 Ω or more, either of end resistance or main wiring harness may have malfunction such as open circuit.

	Step	Check	Yes	No
1	**CHECK CONTROL MODULE.** 1) Disconnect the ECM and HPCM connectors. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B137) No. 21 — (B137) No. 10:*** ***(B605) No. 15 — (B605) No. 14:***	Is the resistance 114 — 126 Ω?	Go to step **2**.	Replace the control module whose value is out of the specification.
2	**CHECK HARNESS.** Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B137) No. 21 — (B605) No. 15:*** ***(B137) No. 10 — (B605) No. 14:***	Is there continuity?	It is possible that temporary poor communication occurs.	Repair or replace the open circuit of harness.

24.57 — 63 Ω (PU-CAN_TCM)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



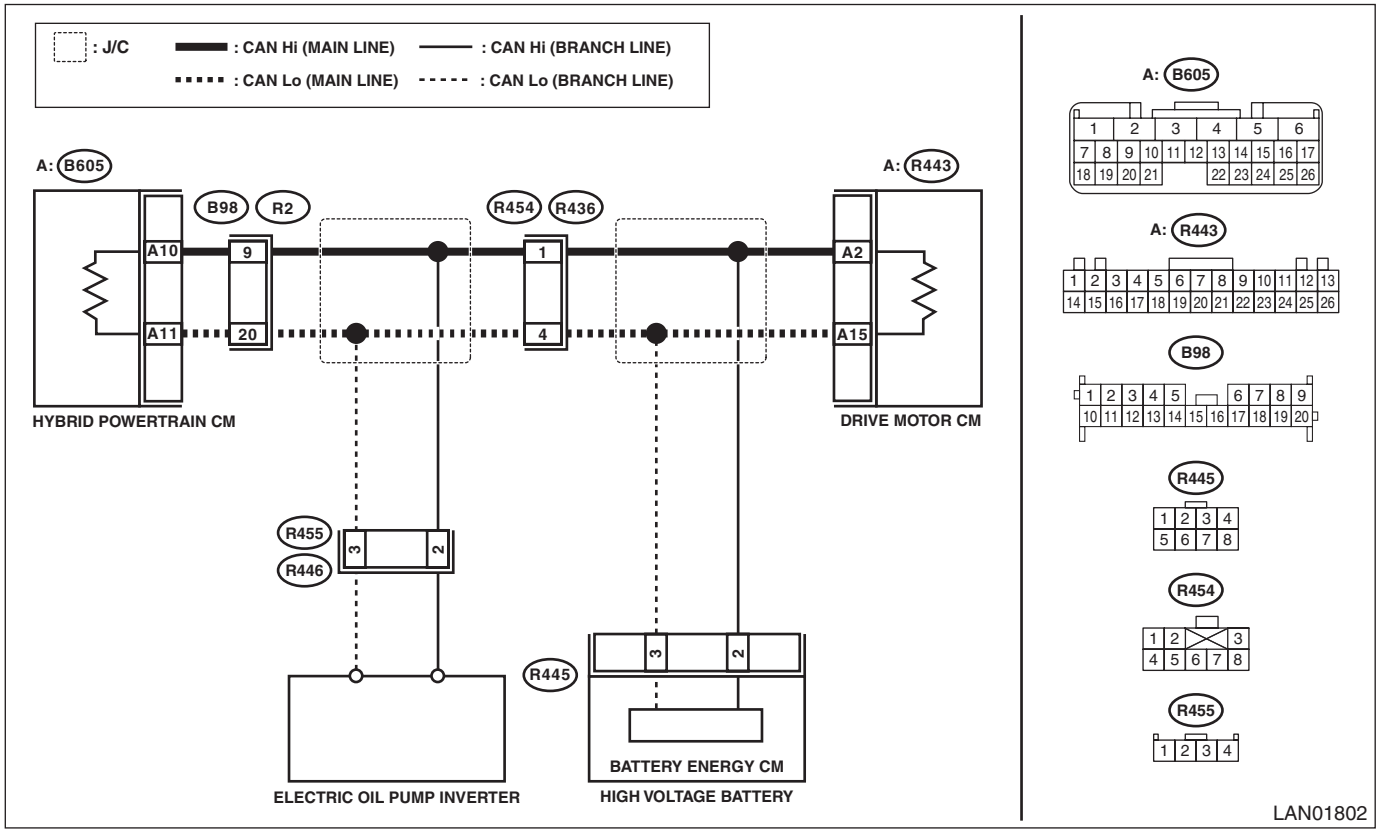
NOTE:
When the measured resistance value is 57 — 63 Ω, main wiring harness or related lines may be shorted to ground, or shorted to power supply line, or related line may be open.

	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the TCM connector. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B55) No. 9 — No. 10:***	Is the resistance 400 Ω or more?	Related lines between TCM and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** 1) Disconnect the ECM connector. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B55) No. 9 — (B137) No. 21:*** ***(B55) No. 10 — (B137) No. 10:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit portion of TCM related lines.	Check the TCM. <Ref. to CVT(HEV)(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).>

25.GROUND SHORT INSPECTION (HEV-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



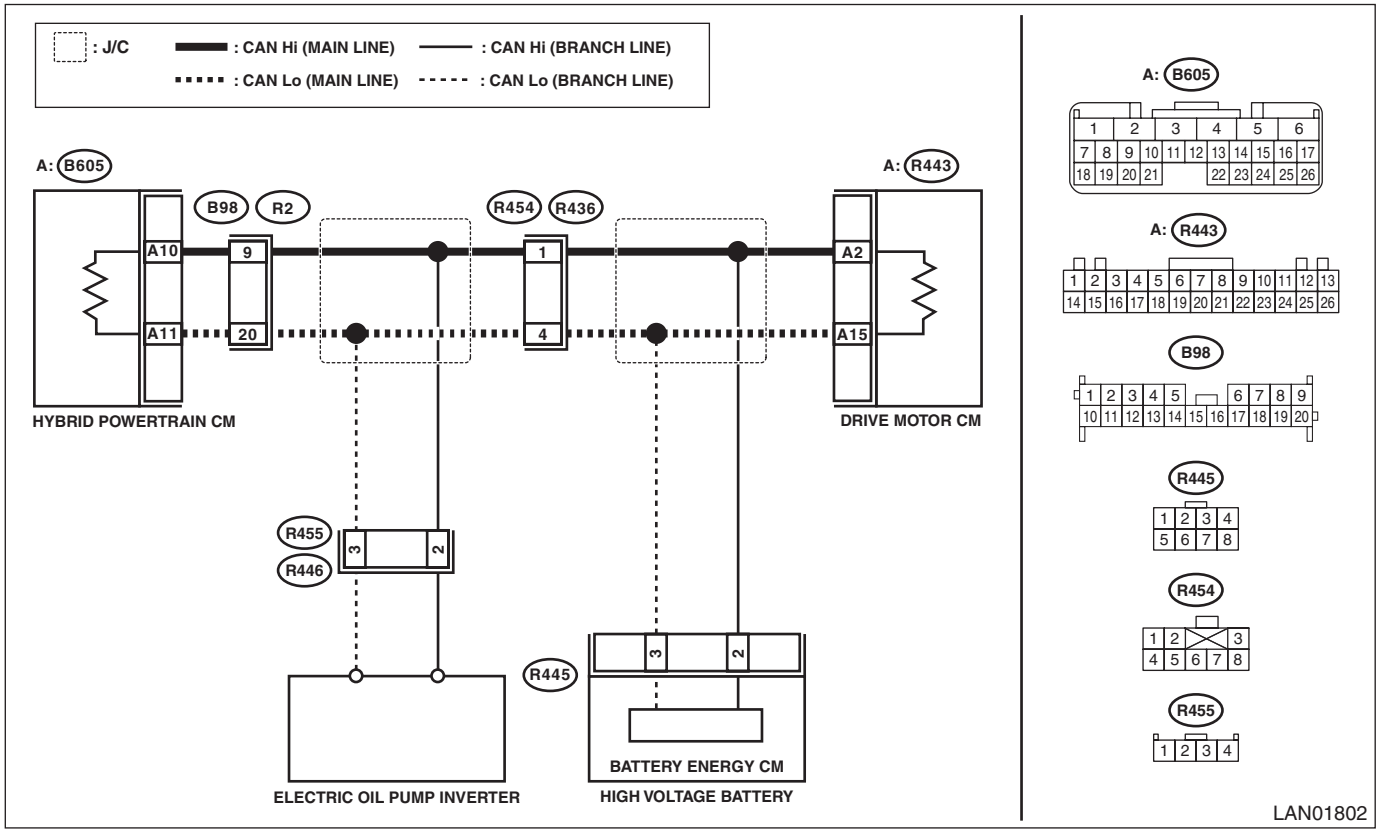
NOTE:
Main wiring harness or related lines may be shorted to ground, or shorted to ground in one of the control modules.

Step		Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the HPCM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 10 — Chassis ground:*** ***(B605) No. 11 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **2**.	Currently, it is normal.
2	**CHECK CONTROL MODULE.** 1) With the tester connected, disconnect control module. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 10 — Chassis ground:*** ***(B605) No. 11 — Chassis ground:***	Did the resistance change to 10 Ω or more?	Replace the control module whose resistance has changed.	Repair or replace the short circuit of the main wiring harness and related lines between HPCM and DMCM.

26.BATTERY SHORT INSPECTION (HEV-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



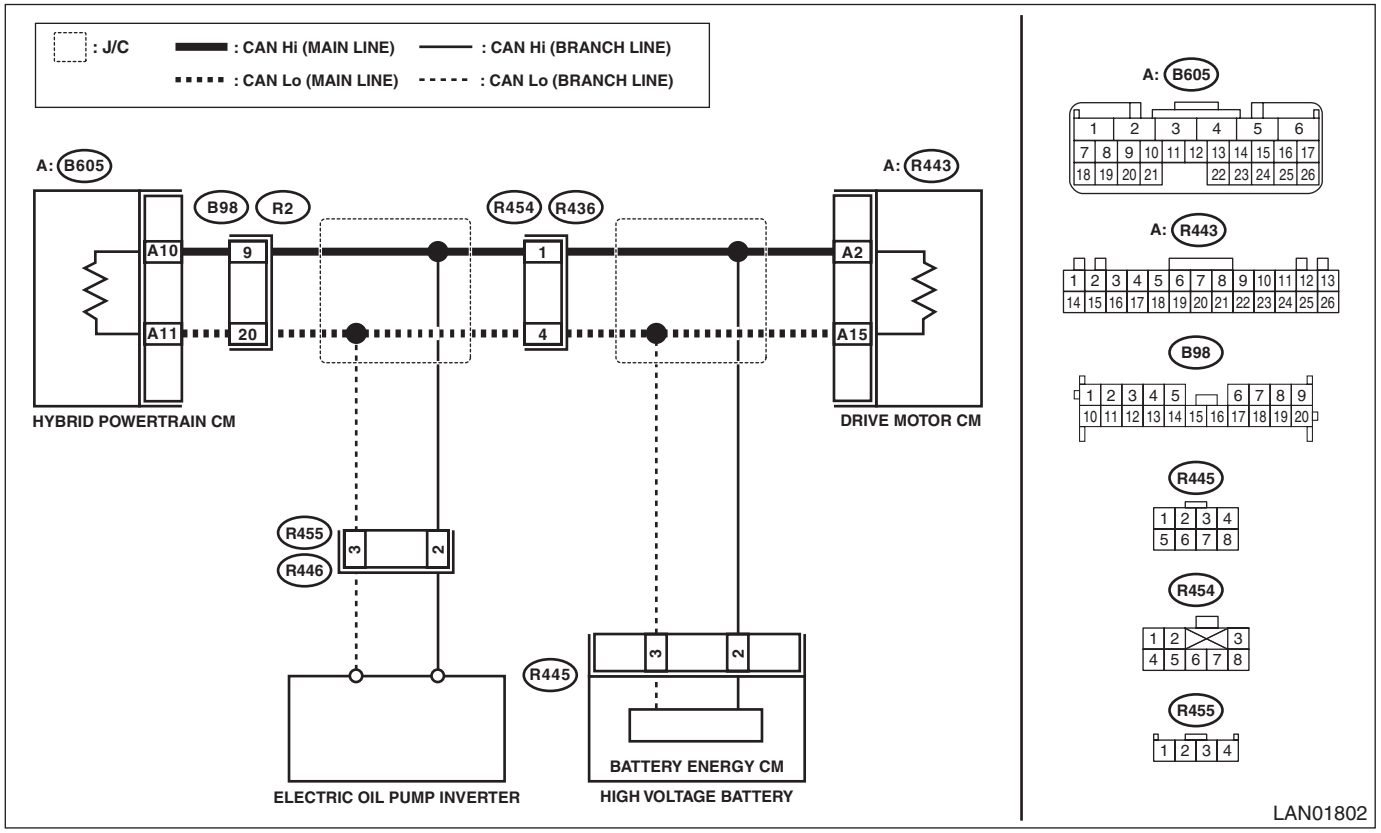
NOTE:
Main wiring harness or related lines may be shorted to battery circuit, or shorted to battery circuit in one of the control modules.

	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B605) No. 10 (+) — Chassis ground (–):*** ***(B605) No. 11 (+) — Chassis ground (–):***	Is the voltage 5 V or less?	Currently, it is normal.	Go to step **2**.
2	**CHECK CONTROL MODULE.** 1) With the tester connected, disconnect control module. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B605) No. 10 (+) — Chassis ground (–):*** ***(B605) No. 11 (+) — Chassis ground (–):***	Did the voltage change to 5 V or less?	Replace the control module whose voltage has changed.	Repair or replace the short circuit of the main wiring harness and related lines between HPCM and DMCM.

27.57 — 63 Ω (HEV-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



NOTE:
When the measured resistance value is 57 — 63 Ω, main wiring harness or related lines may be shorted to ground, or shorted to power supply line, or related line may be open.

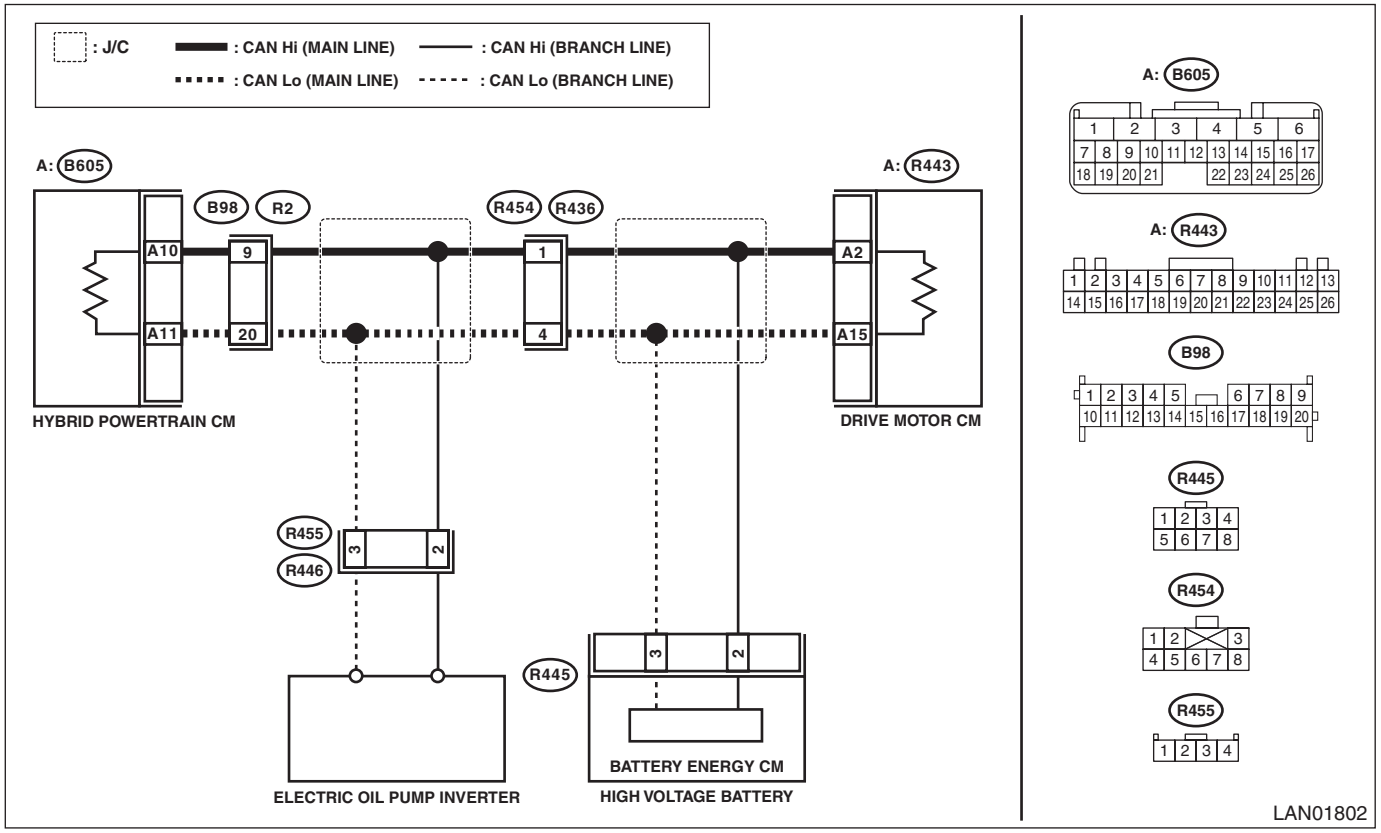
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 10 — Chassis ground:*** ***(B605) No. 11 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **2**.	Go to step **4**.
2	**CHECK CONTROL MODULE.** 1) With the tester connected, disconnect control module. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 10 — Chassis ground:*** ***(B605) No. 11 — Chassis ground:***	Did the resistance change to 10 Ω or more?	Replace the control module whose resistance has changed.	Repair or replace the short circuit of the main wiring harness and related lines between HPCM and DMCM.
3	**CHECK MAIN WIRING HARNESS AND RELATED LINES.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B605) No. 10 (+) — Chassis ground (–):*** ***(B605) No. 11 (+) — Chassis ground (–):***	Is the voltage 5 V or less?	Currently, it is normal.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) With the tester connected, disconnect control module. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B605) No. 10 (+) — Chassis ground (–):*** ***(B605) No. 11 (+) — Chassis ground (–):***	Did the voltage change to 5 V or less?	Replace the control module whose voltage has changed.	Repair or replace the short circuit of the main wiring harness and related lines between HPCM and DMCM.

28.56 Ω OR LESS (HEV-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



NOTE:
When the bus line is measured, combined resistance of the end resistance (120 Ω) in HPCM and the end resistance (120 Ω) in DMCM can be measured. The combined resistance is approximately 57 — 63 Ω. When the measured resistance value is 56 Ω or less, main wiring harness or related lines may be shorted, or combined resistance may have changed because resistance other than end resistance is created on the circuit.

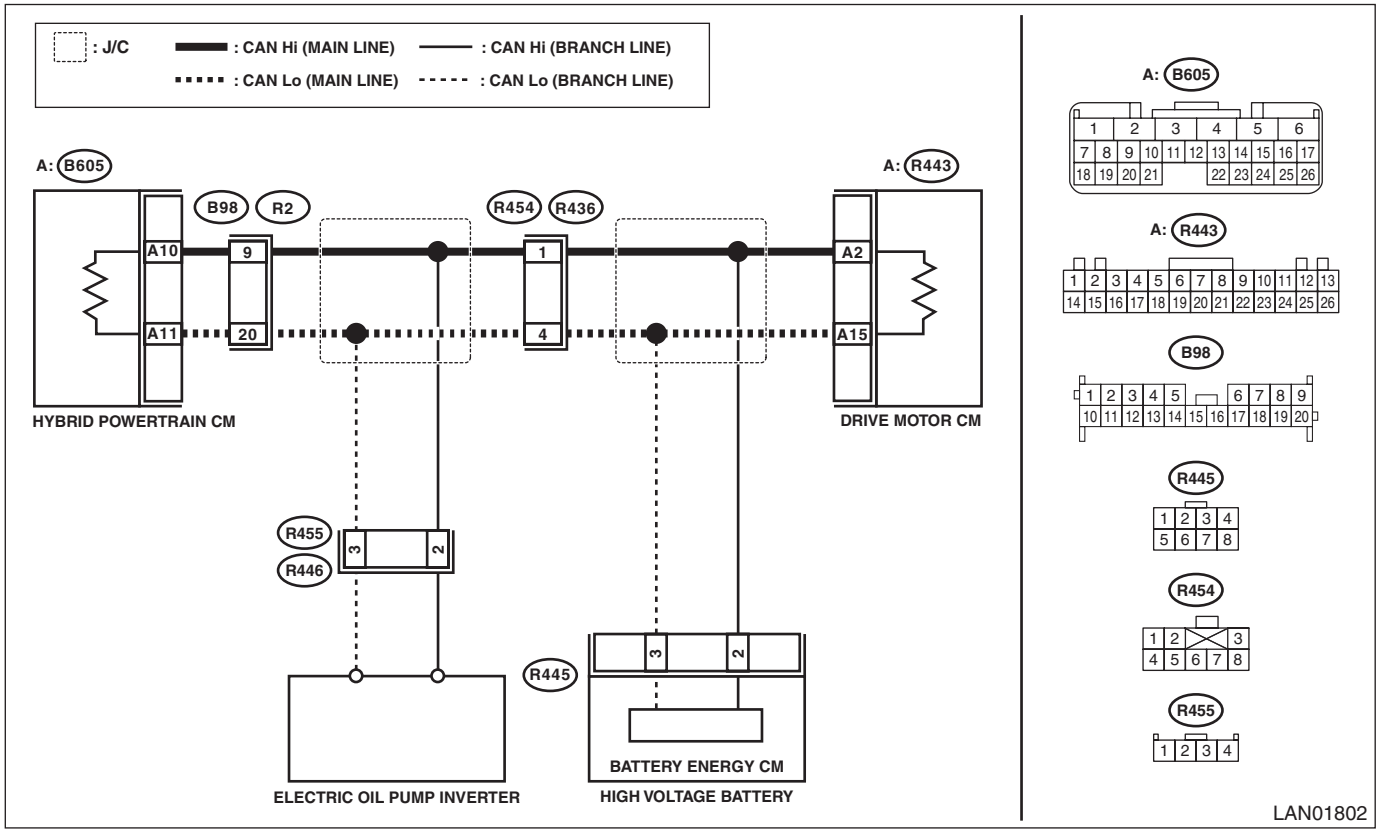
	Step	Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the HPCM connector. 2) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B605) No. 10 — (B605) No. 11:***	Is the resistance 10 Ω or less?	Go to step **2**.	Go to step **3**.
2	**CHECK MAIN WIRING HARNESS AND RELATED LINES.** With a tester connected, disconnect control module connectors in order. ***Connector & terminal*** ***(B605) No. 10 — (B605) No. 11:***	Is there any control module whose condition has changed from short state?	Replace the control module whose resistance has changed.	Repair or replace the short circuit of the main wiring harness and related lines between HPCM and DMCM.
3	**CHECK CONTROL MODULE.** 1) Disconnect the ECM and DMCM connectors. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B605) No. 10 — (B605) No. 11:*** ***(R443) No. 2 — (R443) No. 15:***	Is the resistance 114 — 126 Ω?	Go to step **4**.	Replace the control module whose end resistance value is out of the specified range.

Step		Check	Yes	No
4	**CHECK CONTROL MODULE.** With a tester connected, disconnect control modules in order. ***Connector & terminal*** ***(B605) No. 10 — (B605) No. 11:***	Are there any control modules whose resistance changed to 1 MΩ or more?	Replace the control module that has changed.	Repair or replace the harness due to resistance component.

29.64 Ω OR MORE (HEV-CAN)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



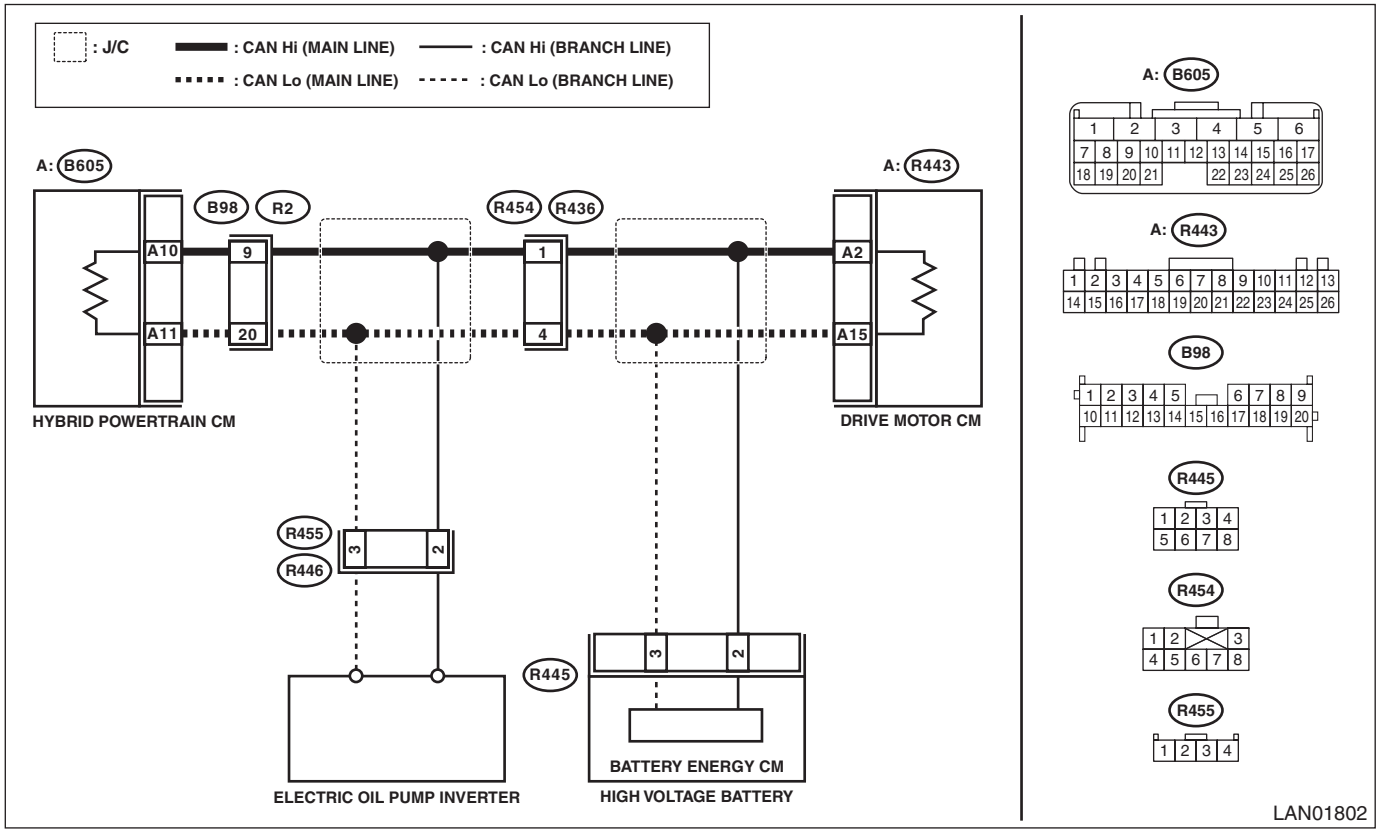
NOTE:
When the bus line is measured, combined resistance of the end resistance (120 Ω) in HPCM and the end resistance (120 Ω) in DMCM can be measured. The combined resistance is approximately 57 — 63 Ω. When the measured resistance value is 64 Ω or more, either of end resistance or main wiring harness may have malfunction such as open circuit.

	Step	Check	Yes	No
1	**CHECK CONTROL MODULE.** 1) Disconnect the DMCM and HPCM connectors. 2) Using a tester, measure the resistance between control module terminals. ***Connector & terminal*** ***(B605) No. 10 — (B605) No. 11:*** ***(R443) No. 2 — (R443) No. 15:***	Is the resistance 114 — 126 Ω?	Go to step **2**.	Replace the control module whose value is out of the specification.
2	**CHECK HARNESS.** Using a tester, check continuity between terminals. ***Connector & terminal*** ***(B605) No. 10 — (R443) No. 2:*** ***(B605) No. 11 — (R443) No. 15:***	Is there continuity?	It is possible that temporary poor communication occurs.	Repair or replace the open circuit of harness.

30.57 — 63 Ω (HEV-CAN_BECM)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



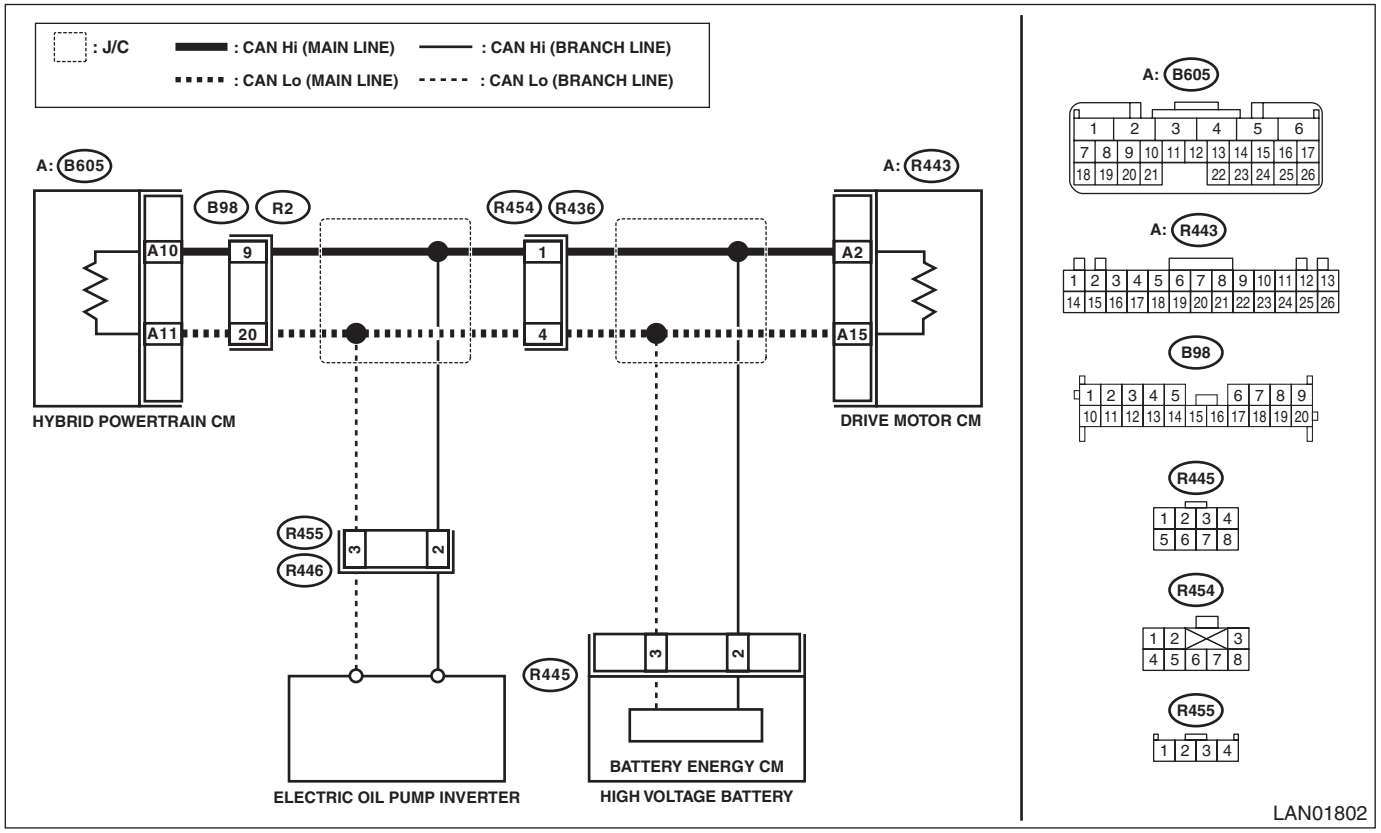
NOTE:
When the measured resistance value is 57 — 63 Ω, main wiring harness or related lines may be shorted to ground, or shorted to power supply line, or related line may be open.

Step		Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the high voltage battery connector. 2) Using the tester, measure the resistance between high voltage battery terminals. ***Connector & terminal*** ***(R445) No. 2 — No. 3:***	Is the resistance 400 Ω or more?	Related lines between high voltage battery and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** 1) Disconnect the HPCM connector. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(R445) No. 2 — (B605) No. 10:*** ***(R445) No. 3 — (B605) No. 11:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit portion of high voltage battery related lines.	Check the BECM (high voltage battery). <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>

31.57 — 63 Ω (HEV-CAN_ELECTRIC OIL PUMP)

WIRING DIAGRAM:

CAN communication system <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



NOTE:
When the measured resistance value is 57 — 63 Ω, main wiring harness or related lines may be shorted to ground, or shorted to power supply line, or related line may be open.

Step		Check	Yes	No
1	**CHECK BETWEEN RELATED LINES AND MAIN WIRING HARNESS.** 1) Disconnect the electric oil pump inverter connector. 2) Using the tester, measure the resistance between electric oil pump inverter terminals. ***Connector & terminal*** ***(R455) No. 2 — No. 3:***	Is the resistance 400 Ω or more?	Related lines between electric oil pump inverter and main wiring harness is open, or main wiring harness is open at two places or more.	Go to step **2**.
2	**CHECK RELATED LINES.** 1) Disconnect the HPCM connector. 2) Using a tester, check continuity between terminals. ***Connector & terminal*** ***(R455) No. 2 — (B605) No. 10:*** ***(R455) No. 3 — (B605) No. 11:***	Is the resistance 10 Ω or more?	Repair or replace the open circuit of electric oil pump inverter related lines.	Check the HPCM. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>

10.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Note
U0073	CONTROL MODULE COMMUNICATION BUS OFF	Communication of some module is shut down.	<Ref. to LAN(HEV)(diag)-122, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0075	CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF	Communication of some module is shut down.	<Ref. to LAN(HEV)(diag)-123, DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	Communication of some module is shut down.	<Ref. to LAN(HEV)(diag)-124, DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	Data does not arrive from ECM.	<Ref. to LAN(HEV)(diag)-159, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	Data does not arrive from TCM.	<Ref. to LAN(HEV)(diag)-160, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0110	LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"	Data does not arrive from DMCM.	<Ref. to LAN(HEV)(diag)-161, DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0111	LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE	Data does not arrive from BECM (high voltage battery).	<Ref. to LAN(HEV)(diag)-162, DTC U0111 LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Data does not arrive from VDC module.	<Ref. to LAN(HEV)(diag)-163, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0126	LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE	Data does not arrive from steering angle sensor.	<Ref. to LAN(HEV)(diag)-164, DTC U0126 LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0131	LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE	Data does not arrive from EPS module.	<Ref. to LAN(HEV)(diag)-165, DTC U0131 LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Data does not arrive from body integrated unit.	<Ref. to LAN(HEV)(diag)-166, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0151	LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE	Data does not arrive from airbag module.	<Ref. to LAN(HEV)(diag)-167, DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	Data does not arrive from meter.	<Ref. to LAN(HEV)(diag)-168, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0156	LOST COMMUNICATION WITH INFORMATION CENTER "A"	Data does not arrive from MFD.	<Ref. to LAN(HEV)(diag)-169, DTC U0156 LOST COMMUNICATION WITH INFORMATION CENTER "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Note
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE	Data does not arrive from A/C control panel.	<Ref. to LAN(HEV)(diag)-170, DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0287	LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE	Data does not arrive from electric oil pump.	<Ref. to LAN(HEV)(diag)-171, DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE	Data does not arrive from HPCM.	<Ref. to LAN(HEV)(diag)-172, DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0327	SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE	Data does not arrive from keyless access CM.	<Ref. to LAN(HEV)(diag)-173, DTC U0327 SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	Error data is received from ECM.	<Ref. to LAN(HEV)(diag)-125, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	Error data is received from TCM.	<Ref. to LAN(HEV)(diag)-126, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0411	INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"	Error data is received from DMCM.	<Ref. to LAN(HEV)(diag)-128, DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0412	INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE	Error data is received from BECM (high voltage battery).	<Ref. to LAN(HEV)(diag)-130, DTC U0412 INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	Error data is received from VDC module.	<Ref. to LAN(HEV)(diag)-132, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0420	INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE	Error data is received from EPS module.	<Ref. to LAN(HEV)(diag)-134, DTC U0420 INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	Error data is received from body integrated unit.	<Ref. to LAN(HEV)(diag)-136, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	Error data is received from combination meter.	<Ref. to LAN(HEV)(diag)-137, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0424	INVALID DATA RECEIVED FROM HVAC CONTROL MODULE	Error data is received from A/C control panel.	<Ref. to LAN(HEV)(diag)-139, DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0427	INVALID DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE	Error data is received from keyless access CM.	<Ref. to LAN(HEV)(diag)-140, DTC U0427 INVALID DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0428	INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE	Error data is received from steering angle sensor.	<Ref. to LAN(HEV)(diag)-142, DTC U0428 INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Note
U0452	INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE	Error data is received from airbag module.	<Ref. to LAN(HEV)(diag)-144, DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0588	INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE	Error data is received from electric oil pump.	<Ref. to LAN(HEV)(diag)-145, DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE	Error data is received from HPCM.	<Ref. to LAN(HEV)(diag)-147, DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1100	LOST COMMUNICATION WITH ECM/PCM PU-CAN	Data does not arrive from ECM.	<Ref. to LAN(HEV)(diag)-174, DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1101	LOST COMMUNICATION WITH TCM PU-CAN	Data does not arrive from TCM.	<Ref. to LAN(HEV)(diag)-175, DTC U1101 LOST COMMUNICATION WITH TCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1120	LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE	Data does not arrive from HPCM.	<Ref. to LAN(HEV)(diag)-176, DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1201	CAN-HS COUNTER ABNORMAL	CAN communication error	<Ref. to LAN(HEV)(diag)-121, DTC U1201 CAN-HS COUNTER ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1232	LOST COMMUNICATION WITH REAR/SIDE RADAR CONTROL MODULE	Data does not arrive from radar sensor.	<Ref. to LAN(HEV)(diag)-177, DTC U1232 LOST COMMUNICATION WITH REAR/SIDE RADAR CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1290	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	Data does not arrive from HPCM.	<Ref. to LAN(HEV)(diag)-178, DTC U1290 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1293	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN	Data does not arrive from HPCM.	<Ref. to LAN(HEV)(diag)-179, DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1401	INVALID DATA RECEIVED FROM ECM/PCM PU-CAN	Error data is received from ECM.	<Ref. to LAN(HEV)(diag)-149, DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1402	INVALID DATA RECEIVED FROM TCM PU-CAN	Error data is received from TCM.	<Ref. to LAN(HEV)(diag)-151, DTC U1402 INVALID DATA RECEIVED FROM TCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1469	INVALID DATA RECEIVED FROM AUTOSTART STOP CONTROL MODULE	Error data is received from HPCM.	<Ref. to LAN(HEV)(diag)-153, DTC U1469 INVALID DATA RECEIVED FROM AUTOSTART STOP CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1591	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	Error data is received from HPCM.	<Ref. to LAN(HEV)(diag)-155, DTC U1591 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1594	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN	Error data is received from HPCM.	<Ref. to LAN(HEV)(diag)-157, DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. CHECK USING THE DTC CHECK SHEET

DTC check sheet

- Bus off detection / data not received

	(A)	(B)			(C)																							
		MAIN-CAN	PU-CAN	HEV-CAN	ECM		TCM		DMCM	BECM	VDC	STA	EPS	BIU	A/B	MET	MFD	A/C	EOP	HPCM			KPS	RDR
					MAIN	PU	MAIN	PU												MAIN	HEV	PU		
		U0073	U0075	U0076	U0100	U1100	U0101	U1101	U0110	U0111	U0122	U0126	U0131	U0140	U0151	U0155	U0156	U0164	U0287	U0293 U1120	U1290	U1293	U0327	U1232
VDC			-	-		-		-	-	-	-		-		-	-	-	-	-		-	-	-	-
BIU			-	-		-		-	-	-		-	-	-	-		-		-	-	-	-		-
MFD			-	-		-		-	-	-							-		-	-	-	-		-
A/C			-	-		-		-	-	-		-	-		-		-	-	-		-	-	-	-
DCM			-	-		-	-	-	-	-		-	-				-	-	-	-	-	-	-	-
MET			-	-		-		-	-	-		-				-			-		-	-		
RDR			-	-		-		-	-	-		-	-		-		-	-	-	-	-	-	-	-
TCM				-			-	-		-		-	-		-		-	-			-		-	-
A/B			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM												-					-			-	-	-	-	-
EPS			-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
ECM				-	-	-			-	-		-	-	-	-		-	-	-		-		-	-
KPS			-	-		-		-	-	-		-	-		-		-	-	-		-	-	-	-
AHL			-	-	-	-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-	-
EOP		-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BECM		-	-		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-		-	-	-
DMCM		-	-		-	-	-	-	-		-	-	-	-	-	-	-	-	-	-		-	-	-

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- Data abnormal detection

	(D)																
	ECM	TCM	DMCM	BECM	VDC	STA	EPS	BIU	A/B	MET	A/C	EOP	HPCM			KPS
													MAIN		HEV	PU	
	U0401	U0402	U0411	U0412	U0416	U0428	U0420	U0422	U0452	U0423	U0424	U0588	U0594 U1469		U1591	U1594	U0427
VDC			-	-	-		-		-	-	-	-			-	-	-
BIU			-	-		-	-	-	-			-	-		-	-	
A/C			-	-		-	-		-		-	-			-	-	-
DCM		-	-	-		-	-	-		-	-	-	-		-	-	-
RDR			-	-		-	-		-		-	-	-		-	-	-
TCM		-		-		-	-		-		-				-		-
HPCM						-							-		-	-	-
EPS	-	-	-	-		-	-	-	-	-	-	-	-		-	-	-
ECM	-		-	-		-	-	-	-		-	-			-		-
KPS		-	-	-	-	-	-		-	-	-	-	-		-	-	-
EOP	-		-	-	-	-	-	-	-	-	-	-	-		-	-	-
BECM	-	-		-	-	-	-	-	-	-	-	-	-			-	-
DMCM	-	-	-		-	-	-	-	-	-	-	-	-			-	-

LAN10251

(A) Installation check
(B) Bus off detection
(C) Data no-receive detection
(D) Data abnormal detection

VDC: VDC CM
BIU: Body integrated unit
MFD: High grade MFD
A/C: A/C control panel
MET: Combination meter
RST: Remote engine starter CM
STA: Steering angle sensor
TCM: Transmission CM
A/B: Airbag CM
DCM: Data communication module

HPCM: Hybrid powertrain CM
EPS: Power steering CM
ECM: Engine CM
KPS: Keyless access CM
AHL: Auto headlight beam leveler CM
EOP: Electric oil pump
BECM: Battery energy CM (high voltage battery)
DMCM: Drive motor CM
RDR: Radar sensor

1) Module installation check
   (1) Write "-" marks in the field for installation check if the vehicle to be inspected does not have relevant module.
   (2) Write "-" marks in all blank fields on the same row that the "-" mark has filled in.
2) Bus off detection / data not received

NOTE:
It becomes impossible for CAN diagnostic module to read DTC, if there is a current malfunction of open harness (data not received). If this occurs, perform the "Check using the check sheet of communication for initializing" <Ref. to LAN(HEV)(diag)-14, CHECK USING THE CHECK SHEET OF COMMUNICATION FOR INITIALIZING, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>, and use this sheet to confirm that the corresponding part becomes the past malfunction.
   (1) Mark "X" in the field corresponding to the DTCs that has been detected by each module in the check sheet.
   (2) Identify and repair the faulty part by referring to the example of DTC data not received. <Ref. to LAN(HEV)(diag)-118, EXAMPLE OF DTC DATA NOT RECEIVED, LIST, List of Diagnostic Trouble Code (DTC).>

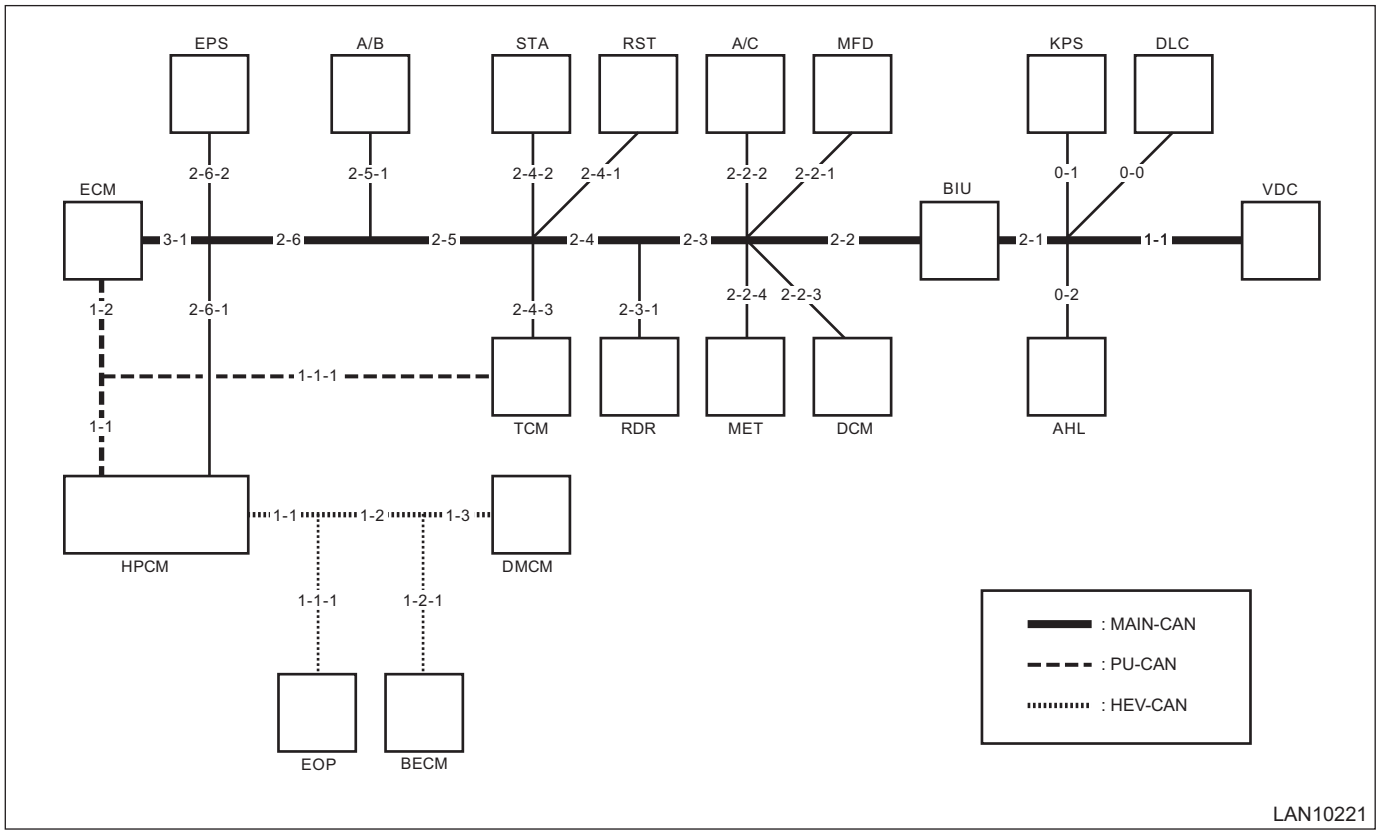
3) Data abnormal detection

NOTE:
If any DTC code that starts with P, B or C is detected after restarting the engine, perform the diagnosis for that code first. If any “BUS OFF” or “NO-RECEIVE DATA” condition is detected, perform the diagnosis for these problems first.

(1) If several modules detect the DTC for the same module, replace the detected module.
(2) If one module detects the DTC, replace the module of the detected side.
(3) If it does not return to the normal operation, re-install the module which has been replaced, and replace the module of the detected side.
(4) If it does not return to the normal operation, replace both modules.

2. EXAMPLE OF DTC DATA NOT RECEIVED

NOTE:
Only the sheet for bus off, data no-receive entry is shown.
(This is because, when data error occurs at the bus off, data no-receive condition, the diagnosis for these problems is performed first.)



When 2-4-1 (remote engine start CM vicinity) is open

NOTE:
The remote engine starter does not operate while no DTC is detected.

	(A)	(B)			(C)																							
		MAIN-CAN	PU-CAN	HEV-CAN	ECM		TCM		DMCM	BECM	VDC	STA	EPS	BIU	A/B	MET	MFD	A/C	EOP	HPCM			KPS	RDR
					MAIN	PU	MAIN	PU												MAIN	HEV	PU		
		U0073	U0075	U0076	U0100	U1100	U0101	U1101	U0110	U0111	U0122	U0126	U0131	U0140	U0151	U0155	U0156	U0164	U0287	U0293 U1120	U1290	U1293	U0327	U1232
VDC			-	-		-		-	-	-	-		-		-	-	-	-	-		-	-	-	-
BIU			-	-		-		-	-	-		-	-	-	-		-		-	-	-	-		-
MFD			-	-		-		-	-	-							-		-	-	-	-		-
A/C			-	-		-		-	-	-		-	-		-		-	-	-		-	-	-	-
DCM			-	-		-	-	-	-	-		-	-				-	-	-	-	-	-	-	-
MET			-	-		-		-	-	-		-				-			-		-	-		
RDR			-	-		-		-	-	-		-	-		-		-	-	-	-	-	-	-	-
TCM				-			-	-		-		-	-		-		-	-			-		-	-
A/B			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM												-					-			-	-	-	-	-
EPS			-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
ECM				-	-	-			-	-		-	-	-	-		-	-	-		-		-	-
KPS			-	-		-		-	-	-		-	-		-		-	-	-		-	-	-	-
AHL			-	-	-	-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-	-
EOP		-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BECM		-	-		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-		-	-	-
DMCM		-	-		-	-	-	-	-		-	-	-	-	-	-	-	-	-	-		-	-	-

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When 2-4-2 (steering angle sensor vicinity) is open

	(A)	(B)			(C)																							
		MAIN-CAN	PU-CAN	HEV-CAN	ECM		TCM		DMCM	BECM	VDC	STA	EPS	BIU	A/B	MET	MFD	A/C	EOP	HPCM			KPS	RDR
					MAIN	PU	MAIN	PU												MAIN	HEV	PU		
		U0073	U0075	U0076	U0100	U1100	U0101	U1101	U0110	U0111	U0122	U0126	U0131	U0140	U0151	U0155	U0156	U0164	U0287	U0293 U1120	U1290	U1293	U0327	U1232
VDC			-	-		-		-	-	-	-	X	-		-	-	-	-	-		-	-	-	-
BIU			-	-		-		-	-	-		-	-	-	-		-		-	-	-	-		-
MFD			-	-		-		-	-	-		X					-		-	-	-	-		-
A/C			-	-		-		-	-	-		-	-		-		-	-	-		-	-	-	-
DCM			-	-		-	-	-	-	-		-	-				-	-	-	-	-	-	-	-
MET			-	-		-		-	-	-		-				-			-		-	-		
RDR			-	-		-		-	-	-		-	-		-		-	-	-	-	-	-	-	-
TCM				-			-	-		-		-	-		-		-	-			-		-	-
A/B			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM												-					-			-	-	-	-	-
EPS			-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
ECM				-	-	-			-	-		-	-	-	-		-	-	-		-		-	-
KPS			-	-		-		-	-	-		-	-		-		-	-	-		-	-	-	-
AHL			-	-	-	-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-	-
EOP		-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BECM		-	-		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-		-	-	-
DMCM		-	-		-	-	-	-	-		-	-	-	-	-	-	-	-	-	-		-	-	-

LAN10252

When 2-6-2 (power steering CM vicinity) is open

	(A)	(B)			(C)																							
		MAIN-CAN	PU-CAN	HEV-CAN	ECM		TCM		DMCM	BECM	VDC	STA	EPS	BIU	A/B	MET	MFD	A/C	EOP	HPCM			KPS	RDR
					MAIN	PU	MAIN	PU												MAIN	HEV	PU		
		U0073	U0075	U0076	U0100	U1100	U0101	U1101	U0110	U0111	U0122	U0126	U0131	U0140	U0151	U0155	U0156	U0164	U0287	U0293 U1120	U1290	U1293	U0327	U1232
VDC			-	-		-		-	-	-	-		-		-	-	-	-	-		-	-	-	-
BIU			-	-		-		-	-	-		-	-	-	-		-		-	-	-	-		-
MFD			-	-		-		-	-	-			X				-		-	-	-	-		-
A/C			-	-		-		-	-	-		-	-		-		-	-	-		-	-	-	-
DCM			-	-		-	-	-	-	-		-	-				-	-	-	-	-	-	-	-
MET			-	-		-		-	-	-		-	X			-			-		-	-		
RDR			-	-		-		-	-	-		-	-		-		-	-	-	-	-	-	-	-
TCM				-			-	-		-		-	-		-		-	-			-		-	-
A/B			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCM												-	X				-			-	-	-	-	-
EPS			-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
ECM				-	-	-			-	-		-	-	-	-		-	-	-		-		-	-
KPS			-	-		-		-	-	-		-	-		-		-	-	-		-	-	-	-
AHL			-	-	-	-	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-	-
EOP		-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BECM		-	-		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-		-	-	-
DMCM		-	-		-	-	-	-	-		-	-	-	-	-	-	-	-	-	-		-	-	-

LAN10253

11.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC U1201 CAN-HS COUNTER ABNORMAL

DTC DETECTING CONDITION:
Communication is unstable because of high speed CAN communication error.
TROUBLE SYMPTOM:
- Display of combination meter indicates faulty.
- Control faulty may occur due to CAN communication error.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** 1) Start the engine. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0073 a current malfunction?	Perform the diagnosis of U0073. <Ref. to LAN(HEV)(diag)-122, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U1201 a current malfunction?	Go to step **4**.	It is possible that temporary poor communication occurs. Perform the clear memory. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>
4	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1201 a current malfunction?	Go to step **5**.	It is possible that temporary poor communication occurs. Perform the clear memory. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>
5	**CHECK CONTROL MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect the control modules other than body integrated unit in order. NOTE: When disconnecting ECM or VDC CM, connect resistance of 120 Ω between CAN Hi and CAN Lo as an alternative of end resistance. 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is there any control module that U1201 is not detected as current malfunction?	Replace the control module.	Repeat 1) to 4) in step 5 until U1201 is not detected.

B: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

DTC DETECTING CONDITION:
Integrated unit communication is shut down because of high speed CAN error.
TROUBLE SYMPTOM:
CAN communication is not normal.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** 1) Start the engine. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0073 a current malfunction?	Go to step **3**.	It may be a temporary poor contact. Perform the clear memory. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>
3	**CHECK CAN COMMUNICATION CIRCUIT.** Check CAN communication circuit. <Ref. to LAN(HEV)(diag)-33, PROCEDURE, CAN Communication Circuit Check.>	Is CAN communication circuit faulty?	Repair the faulty portion, following the diagnosis procedure.	Go to step **4**.
4	**CHECK DTC.** 1) Perform the inspection using the DTC check sheet. <Ref. to LAN(HEV)(diag)-116, CHECK USING THE DTC CHECK SHEET, LIST, List of Diagnostic Trouble Code (DTC).> 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0073 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK CONTROL MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect the control modules other than body integrated unit in order. NOTE: When disconnecting ECM or VDC CM, connect resistance of 120 Ω between CAN Hi and CAN Lo as an alternative of end resistance. 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is there any control module that U0073 is not detected as current malfunction?	Replace the control module.	Repeat 1) to 4) in step 5 until U0073 is not detected.

C: DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF

DTC DETECTING CONDITION:
PU-CAN communication is shut down.
TROUBLE SYMPTOM:
PU-CAN communication is not normal.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** 1) Start the engine. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0075 a current malfunction?	Go to step **3**.	It may be a temporary poor contact. Perform the clear memory. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>
3	**CHECK CAN COMMUNICATION CIRCUIT.** Check CAN communication circuit. <Ref. to LAN(HEV)(diag)-33, PROCEDURE, CAN Communication Circuit Check.>	Is CAN communication circuit faulty?	Repair the faulty portion, following the diagnosis procedure.	Go to step **4**.
4	**CHECK DTC.** 1) Perform the inspection using the DTC check sheet. <Ref. to LAN(HEV)(diag)-116, CHECK USING THE DTC CHECK SHEET, LIST, List of Diagnostic Trouble Code (DTC).> 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0075 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK CONTROL MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect HPCM, TCM, ECM in order. NOTE: When disconnecting ECM or HPCM, connect resistance of 120 Ω between CAN Hi and CAN Lo as an alternative of end resistance. 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is there any control module that U0075 is not detected as current malfunction?	Replace the control module.	Repeat 1) to 4) in step 5 until U0075 is not detected.

D: DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF

DTC DETECTING CONDITION:
HEV-CAN communication is shut down.
TROUBLE SYMPTOM:
HEV-CAN communication is not normal.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** 1) Start the engine. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0076 a current malfunction?	Go to step **3**.	It may be a temporary poor contact. Perform the clear memory. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>
3	**CHECK CAN COMMUNICATION CIRCUIT.** Check CAN communication circuit. <Ref. to LAN(HEV)(diag)-33, PROCEDURE, CAN Communication Circuit Check.>	Is CAN communication circuit faulty?	Repair the faulty portion, following the diagnosis procedure.	Go to step **4**.
4	**CHECK DTC.** 1) Perform the inspection using the DTC check sheet. <Ref. to LAN(HEV)(diag)-116, CHECK USING THE DTC CHECK SHEET, LIST, List of Diagnostic Trouble Code (DTC).> 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0076 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK CONTROL MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect HPCM, DMCM, electric oil pump, BECM (high voltage battery) in order. NOTE: When disconnecting HPCM or DMCM, connect resistance of 120 Ω between CAN Hi and CAN Lo as an alternative of end resistance. 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is there any control module that U0076 is not detected as current malfunction?	Replace the control module.	Repeat 1) to 4) in step 5 until U0076 is not detected.

E: DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM "A"

DTC DETECTING CONDITION:
Defective data from ECM.
TROUBLE SYMPTOM:
Defective data on CAN communication occurs.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0401 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0401 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the engine data abnormal detected in several modules?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the ECM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0401 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the ECM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0401 a current malfunction?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0401 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

F: DTC U0402 INVALID DATA RECEIVED FROM TCM

DTC DETECTING CONDITION:
Received error data from TCM.
TROUBLE SYMPTOM:
Sport indicator light blinks.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0402 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0402 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the transmission data abnormal detected in several modules?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0402 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the TCM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0402 a current malfunction?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0402 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

G: DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"

DTC DETECTING CONDITION:
Received error data from drive motor control module.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0411 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the drive motor control module connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0411 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the motor control module data abnormal detected in several modules?	Replace the drive motor control module. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the drive motor control module. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0411 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the drive motor control module. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0411 a current malfunction?	Replace the drive motor control module. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0411 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

H: DTC U0412 INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE

DTC DETECTING CONDITION:
Received error data from battery energy control module.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0412 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the high voltage battery connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0412 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the battery energy control module data abnormal detected in several modules?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0412 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the high voltage battery. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0412 a current malfunction?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0412 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

I: DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

DTC DETECTING CONDITION:
Data from VDCCM is faulty.
TROUBLE SYMPTOM:
ABS warning light and VDC warning light illuminate.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0416 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the VDC CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0416 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the VDC data abnormal detected in several modules?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the VDC CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0416 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the VDC CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0416 a current malfunction?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0416 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

J: DTC U0420 INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from EPS CM.
TROUBLE SYMPTOM:
Cooperation control with EPS CM does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0420 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the power steering CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0420 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the electric power steering data abnormal detected in several modules?	Replace the power steering CM. <Ref. to PS-40, Power Steering Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the power steering CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0420 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the power steering CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0420 a current malfunction?	Replace the power steering CM. <Ref. to PS-40, Power Steering Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0420 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

K: DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from body integrated unit.
TROUBLE SYMPTOM:
Cooperation control with body integrated unit does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0422 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0422 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the body integrated data abnormal detected in several modules?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the body integrated unit. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0422 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the body integrated unit. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0422 a current malfunction?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0422 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

L: DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from combination meter.
TROUBLE SYMPTOM:
Display of combination meter does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0423 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the combination meter connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0423 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the meter data abnormal detected in several modules?	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the combination meter. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0423 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Replace the current combination meter with the original combination meter. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0423 a current malfunction?	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0423 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

M: DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from A/C control panel.
TROUBLE SYMPTOM:
Cooperation control of air conditioner does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0424 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the A/C control panel connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0424 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the air conditioner data abnormal detected in several modules?	Replace the A/C control panel. <Ref. to AC-47, Control Panel.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the A/C control panel. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0424 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Restore the A/C control panel. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0424 a current malfunction?	Replace the A/C control panel. <Ref. to AC-47, Control Panel.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0424 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

N: DTC U0427 INVALID DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from keyless access CM.
TROUBLE SYMPTOM:
Cooperation control of keyless access does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0427 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the keyless access CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0427 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the smart data abnormal detected in several modules?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the keyless access CM. NOTE: Do not register the keyless access CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0427 a current malfunction?	Go to step **8**.	System is normal. NOTE: Be sure to perform keyless access CM registration.
8	**CHECK MODULE.** 1) Reinstall the keyless access CM. 2) Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.> 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0427 a current malfunction?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0427 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

O: DTC U0428 INVALID DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE

DTC DETECTING CONDITION:
Defective data was transmitted from steering angle sensor.
TROUBLE SYMPTOM:
VDC CM does not operate normally.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0428 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the steering angle sensor connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0428 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the steering angle sensor data abnormal detected in several modules?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the steering angle sensor. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0428 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the steering angle sensor. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0428 a current malfunction?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0428 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

P: DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE

DTC DETECTING CONDITION:
Invalid data was transmitted from airbag CM.
TROUBLE SYMPTOM:
Cooperation control with airbag does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0452 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the airbag CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0452 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the airbag data abnormal detected in several modules?	Replace the airbag CM. <Ref. to AB-55, Airbag Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the airbag CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0452 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the airbag CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0452 a current malfunction?	Replace the airbag CM. <Ref. to AB-55, Airbag Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0452 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

Q: DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE

DTC DETECTING CONDITION:
Received error data from electric oil pump inverter.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0588 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the electric oil pump inverter connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0588 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the electric oil pump data abnormal detected in several modules?	Replace the electric oil pump inverter. <Ref. to HEV-42, Inverter.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the electric oil pump inverter. <Ref. to HEV-42, Inverter.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0588 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the electric oil pump inverter. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0588 a current malfunction?	Replace the electric oil pump inverter. <Ref. to HEV-42, Inverter.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0588 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

R: DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE

DTC DETECTING CONDITION:
Received error data from hybrid powertrain CM.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U0594 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the hybrid powertrain CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0594 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the hybrid data abnormal or Auto Start Stop data abnormal detected in several modules?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0594 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the hybrid powertrain CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0594 a current malfunction?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0594 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

S: DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN

DTC DETECTING CONDITION:
Received error data from ECM.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U1401 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1401 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the engine PU-CAN data abnormal detected in several modules?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1401 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the ECM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1401 a current malfunction?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1401 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

T: DTC U1402 INVALID DATA RECEIVED FROM TCM PU-CAN

DTC DETECTING CONDITION:
Received error data from TCM.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U1402 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1402 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the transmission PU-CAN data abnormal detected in several modules?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1402 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the TCM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1402 a current malfunction?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1402 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

U: DTC U1469 INVALID DATA RECEIVED FROM AUTOSTART STOP CONTROL MODULE

DTC DETECTING CONDITION:
Received error data from hybrid powertrain CM.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U1469 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the hybrid powertrain CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1469 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the hybrid data abnormal or Auto Start Stop data abnormal detected in several modules?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1469 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the hybrid powertrain CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1469 a current malfunction?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1469 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

V: DTC U1591 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN

DTC DETECTING CONDITION:
Received error data from hybrid powertrain CM.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U1591 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the hybrid powertrain CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1591 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the hybrid powertrain control module HEV-CAN data abnormal detected in several modules?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1591 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the hybrid powertrain CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1591 a current malfunction?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1591 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

Step		Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

W: DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN

DTC DETECTING CONDITION:
Received error data from hybrid powertrain CM.
TROUBLE SYMPTOM:
Hybrid fail lamp illuminates.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is DTC for the bus off or the data no-receive displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK DTC.** Check the displayed DTC.	Is U1594 a current malfunction?	Go to step **5**.	Go to step **9**.
5	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the hybrid powertrain CM connector. 3) Connect the disconnected connectors. 4) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1594 a current malfunction?	Go to step **6**.	Go to step **9**.
6	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the hybrid powertrain control module PU-CAN data abnormal detected in several modules?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Go to step **7**.
7	**REPLACE MODULE.** 1) Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1594 a current malfunction?	Go to step **8**.	System is normal.
8	**CHECK MODULE.** 1) Reinstall the hybrid powertrain CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1594 a current malfunction?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	System is normal.
9	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Using the Subaru Select Monitor, read DTC of CAN system. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1594 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

X: DTC U0100 LOST COMMUNICATION WITH ECM/PCM "A"

DTC DETECTING CONDITION:
No data is received from ECM.
TROUBLE SYMPTOM:
Cooperation control of transmission may not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0100 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the engine data no-receive detected in several modules?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0100 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the ECM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0100 a current malfunction?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0100 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

Y: DTC U0101 LOST COMMUNICATION WITH TCM

DTC DETECTING CONDITION:
No data is received from TCM.
TROUBLE SYMPTOM:
Cooperation control with transmission is not performed.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0101 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the transmission data no-receive detected in several modules?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0101 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the TCM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0101 a current malfunction?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0101 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

Z: DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"

DTC DETECTING CONDITION:
Not received data from drive motor CM.
TROUBLE SYMPTOM:
Cooperation control with hybrid system is not performed.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0110 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the motor control module data no-receive detected in several modules?	Replace the drive motor CM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the drive motor CM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0110 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the drive motor CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0110 a current malfunction?	Replace the drive motor CM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0110 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AA:DTC U0111 LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE

DTC DETECTING CONDITION:
Not received data from battery energy CM (high voltage battery).
TROUBLE SYMPTOM:
Cooperation control with hybrid system is not performed.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0111 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the battery energy control module data no-receive detected in several modules?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0111 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the high voltage battery. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0111 a current malfunction?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0111 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AB:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

DTC DETECTING CONDITION:
No data from VDCCM is received.
TROUBLE SYMPTOM:
ABS warning light and VDC warning light illuminate.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0122 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the VDC data no-receive detected in several modules?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the VDC CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0122 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the VDC CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0122 a current malfunction?	Replace the VDC CM. <Ref. to VDC-10, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0122 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AC:DTC U0126 LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE

DTC DETECTING CONDITION:
No data is received from steering angle sensor.
TROUBLE SYMPTOM:
VDC CM does not operate normally.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0126 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the steering angle sensor data no-receive detected in several modules?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the steering angle sensor. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0126 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the steering angle sensor. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0126 a current malfunction?	Replace the steering angle sensor. <Ref. to VDC-34, Steering Angle Sensor.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0126 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AD:DTC U0131 LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from power steering CM.
TROUBLE SYMPTOM:
Cooperation control with power steering CM does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0131 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the electric power steering data no-receive detected in several modules?	Replace the power steering CM. <Ref. to PS-40, Power Steering Control Module.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the power steering CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0131 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the power steering CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0131 a current malfunction?	Replace the power steering CM. <Ref. to PS-40, Power Steering Control Module.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0131 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AE:DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from body integrated unit.
TROUBLE SYMPTOM:
Cooperation control with body integrated unit does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0140 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the body integrated data no-receive detected in several modules?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the body integrated unit. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0140 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the body integrated unit. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0140 a current malfunction?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0140 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AF:DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from airbag CM.
TROUBLE SYMPTOM:
Cooperation control with airbag CM does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0151 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the airbag data no-receive detected in several modules?	Replace the airbag CM. <Ref. to AB-55, Airbag Control Module.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the airbag CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0151 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the airbag CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0151 a current malfunction?	Replace the airbag CM. <Ref. to AB-55, Airbag Control Module.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0151 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AG:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from combination meter.
TROUBLE SYMPTOM:
Display of combination meter does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0155 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the meter data no-receive detected in several modules?	Replace the meter. <Ref. to IDI-19, Combination Meter.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the combination meter. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0155 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Replace the current combination meter with the original combination meter. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0155 a current malfunction?	Replace the combination meter. <Ref. to IDI-19, Combination Meter.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0155 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AH:DTC U0156 LOST COMMUNICATION WITH INFORMATION CENTER "A"

DTC DETECTING CONDITION:
No data is received from MFD.
TROUBLE SYMPTOM:
Display of MFD does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 8?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U0156 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(HEV)(diag)-33, PROCEDURE, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor.	Is U0156 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems.	Is the MFD data no-receive detected in several modules?	Replace the MFD. <Ref. to IDI-19, Combination Meter.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the MFD. <Ref. to IDI-13, Multi-function Display (MFD) System.> 2) Read the DTC using Subaru Select Monitor.	Is U0156 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the MFD. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor.	Is U0156 a current malfunction?	Replace the MFD. <Ref. to IDI-13, Multi-function Display (MFD) System.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor.	Is U0156 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC.

AI: DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from A/C control panel.
TROUBLE SYMPTOM:
Cooperation control of air conditioner does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0164 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the air conditioner data no-receive detected in several modules?	Replace the A/C control panel. <Ref. to AC-47, Control Panel.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the A/C control panel. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0164 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Restore the A/C control panel. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0164 a current malfunction?	Replace the A/C control panel. <Ref. to AC-47, Control Panel.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0164 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AJ:DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE

DTC DETECTING CONDITION:
No data is received from electric oil pump inverter.
TROUBLE SYMPTOM:
Electric oil pump does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0287 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the electric oil pump data no-receive detected in several modules?	Replace the electric oil pump inverter. <Ref. to HEV-42, Inverter.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the electric oil pump inverter. <Ref. to HEV-42, Inverter.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0287 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the electric oil pump inverter. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0287 a current malfunction?	Replace the electric oil pump inverter. <Ref. to HEV-42, Inverter.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0287 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AK:DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from hybrid powertrain CM.
TROUBLE SYMPTOM:
Cooperation control of hybrid system does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0293 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the hybrid data no-receive or Auto Start Stop data no-receive detected in several modules?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0293 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the hybrid powertrain CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0293 a current malfunction?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0293 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AL:DTC U0327 SOFTWARE INCOMPATIBILITY WITH VEHICLE SECURITY CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from keyless access CM.
TROUBLE SYMPTOM:
Cooperation control of keyless access does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U0327 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the smart data no-receive detected in several modules?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the keyless access CM. NOTE: Do not register the keyless access CM. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0327 a current malfunction?	Go to step **5**.	System is normal. NOTE: Be sure to perform keyless access CM registration.
5	**CHECK MODULE.** 1) Reinstall the keyless access CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0327 a current malfunction?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U0327 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AM:DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN

DTC DETECTING CONDITION:
Not received data from ECM.
TROUBLE SYMPTOM:
Cooperation control of hybrid system does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U1100 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the engine PU-CAN data no-receive detected in several modules?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1100 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the ECM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1100 a current malfunction?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1100 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AN:DTC U1101 LOST COMMUNICATION WITH TCM PU-CAN

DTC DETECTING CONDITION:
Not received data from TCM.
TROUBLE SYMPTOM:
Cooperation control of hybrid system does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U1101 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the transmission PU-CAN data no-receive detected in several modules?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1101 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the TCM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1101 a current malfunction?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1101 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AO:DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from hybrid powertrain CM.
TROUBLE SYMPTOM:
Cooperation control of hybrid system does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U1120 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the hybrid data no-receive or Auto Start Stop data no-receive detected in several modules?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1120 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the hybrid powertrain CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1120 a current malfunction?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1120 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AP:DTC U1232 LOST COMMUNICATION WITH REAR/SIDE RADAR CONTROL MODULE

DTC DETECTING CONDITION:
No data is received from radar sensor.
TROUBLE SYMPTOM:
Radar sensor does not operate normally.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 8?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Are DTCs other than U*** displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Check the displayed DTC.	Is U1232 a current malfunction?	Go to step **4**.	Go to step **8**.
4	**CHECK DTC.** 1) Check CAN communication circuit. <Ref. to LAN(HEV)(diag)-33, PROCEDURE, CAN Communication Circuit Check.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1232 a current malfunction?	Go to step **5**.	Go to step **8**.
5	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the radar data no-receive detected in several modules?	Replace the radar sensor LH. <Ref. to RVD-6, Radar Sensor.>	Go to step **6**.
6	**REPLACE MODULE.** 1) Replace the radar sensor LH. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1232 a current malfunction?	Go to step **7**.	System is normal.
7	**CHECK MODULE.** 1) Reinstall the radar sensor LH. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1232 a current malfunction?	Replace the radar sensor LH. <Ref. to RVD-6, Radar Sensor.>	System is normal.
8	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1232 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **9**.
9	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AQ:DTC U1290 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN

DTC DETECTING CONDITION:
No data is received from hybrid powertrain CM.
TROUBLE SYMPTOM:
Cooperation control of hybrid system does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U1290 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the hybrid powertrain control module HEV-CAN data no-receive detected in several modules?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1290 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the hybrid powertrain CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1290 a current malfunction?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1290 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

AR:DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN

DTC DETECTING CONDITION:
No data is received from hybrid powertrain CM.
TROUBLE SYMPTOM:
Cooperation control of hybrid system does not operate properly.

	Step	Check	Yes	No
1	**CHECK PERFORMING OF BASIC DIAGNOSTIC PROCEDURE.**	Was the basic diagnostic procedure performed up to STEP 3?	Go to step **2**.	Perform the basic diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK DTC.** Check the displayed DTC.	Is U1293 a current malfunction?	Go to step **3**.	Go to step **6**.
3	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of all the systems. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is the hybrid powertrain control module PU-CAN data no-receive detected in several modules?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Go to step **4**.
4	**REPLACE MODULE.** 1) Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.> 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1293 a current malfunction?	Go to step **5**.	System is normal.
5	**CHECK MODULE.** 1) Reinstall the hybrid powertrain CM. 2) Replace the module that the DTC has been detected. 3) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1293 a current malfunction?	Replace the hybrid powertrain CM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	System is normal.
6	**CHECK HARNESS.** 1) Shake the harness, and check for poor contact. 2) Read the DTC using Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is U1293 a current malfunction?	Repair the poor contact of harness, or replace the harness.	Go to step **7**.
7	**CHECK CONNECTOR.** Check the connector used for high speed CAN for poor contact.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	It is possible that temporary poor communication occurs. Delete the DTC. <Ref. to LAN(HEV)(diag)-32, Clear Memory Mode.>

12.General Diagnostic Table

A: INSPECTION

Item	Operation	Specifications		Note
		YES	NO	
Diagnostic code	DTC is displayed when inspecting all DTCs.	Perform the diagnosis according to DTC.	System is normal.	—
Speedometer	Faster vehicle speed than the actual speed is displayed.	VDC CM data may not be received.	System is normal.	Also, check vehicle speed pulse circuit.
Fuel gauge	Fuel is present, but displayed less than actual amount.	Communication error may be present.	System is normal.	Also, check the fuel gauge.
Fuel level warning light	Fuel is present, but the light illuminates.	Communication error may be present.	System is normal.	Also, check the fuel gauge.
Engine coolant temperature light	Engine coolant temperature light blinks in red and blue alternately.	Communication error may be present.	System is normal.	Check the engine coolant light related items.
[S], [I] or [S#] indicator	Blinking.	Communication error may be present.	System is normal.	Check the intelligent switch.
VDC indicator	Illuminating.	Communication error may be present.	System is normal.	Check that VDC is not operating.
VDC OFF indicator	Illuminating.	Communication error may be present.	System is normal.	Check that VDC is not OFF.
Brake warning, etc.	Illuminating.	Brake fluid may be low in amount, or communication error may be present.	System is normal.	Check brake related items.
Shift position	Not displayed.	Communication error may be present.	System is normal.	Also, check AT system.
AT temperature light	Blinking.	Communication error may be present.	System is normal.	Also, check AT system.
Door indicator	Not displayed when the door is opened. Otherwise, not turn off when the door is closed.	Communication error may be present.	System is normal.	Check the door switch.
Clearance indicator	Not illuminating.	Communication error may be present.	System is normal.	Check the combination switch.
Hi beam indicator	Not illuminating.	Communication error may be present.	System is normal.	Check the combination switch.
Front fog indicator	Not illuminating.	Communication error may be present.	System is normal.	Check the combination switch.
Illumination	Illuminating at the maximum brightness.	Communication error may be present.	System is normal.	Also, check the illumination switch.
Cruise control indicator	Not illuminating.	Communication error may be present.	System is normal.	Check the cruise control system.
AWD indicator	Not illuminating.	Communication error may be present.	System is normal.	Check TCM.
Hill hold indicator	Not illuminating.	Communication error may be present.	System is normal.	Also, check VDC CM.

HYBRID ELECTRIC VEHICLE

HEV

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1. General Description

A: SPECIFICATION

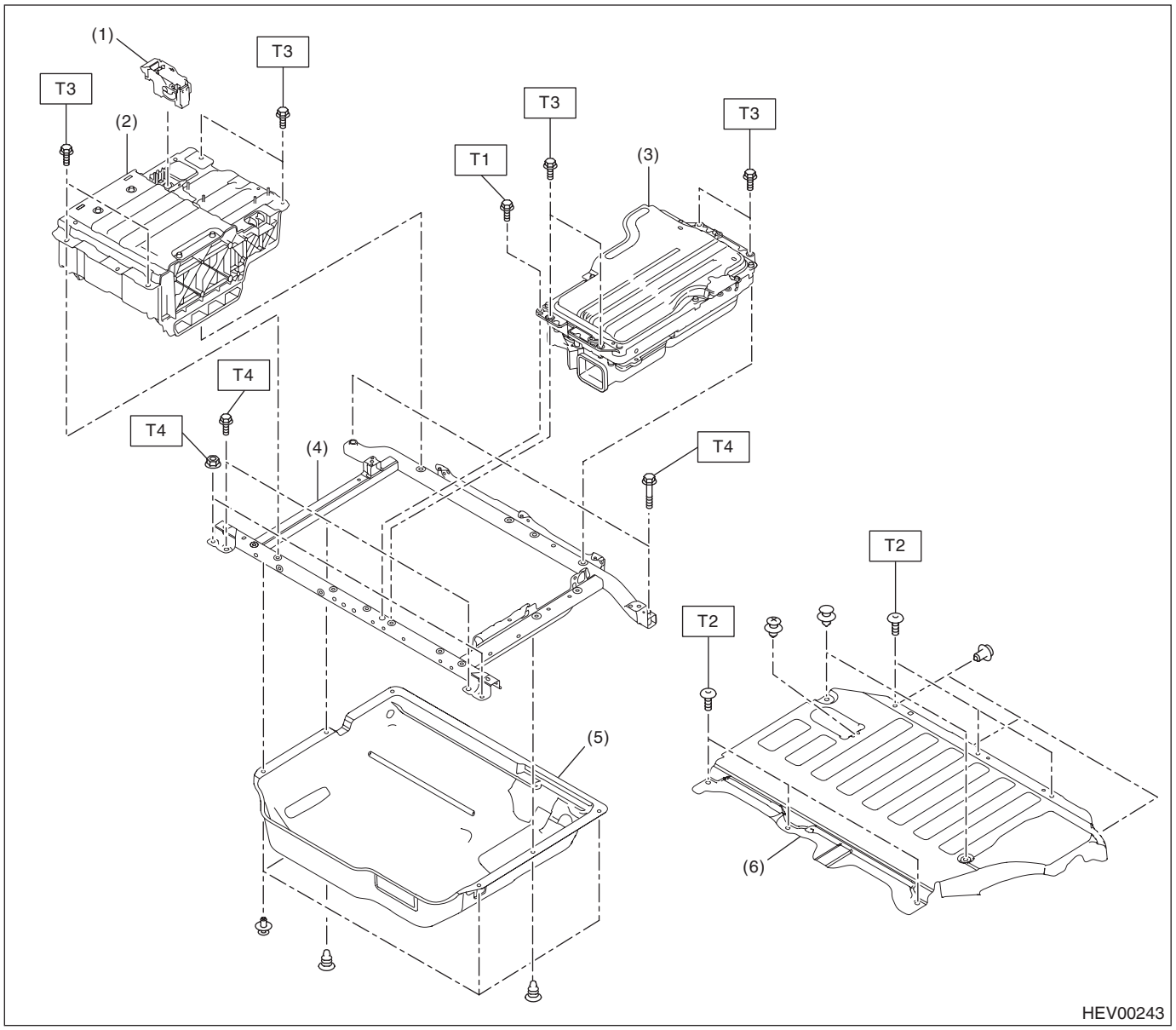
High voltage battery	Type	Ni - MH (nickel metal hydride) battery
	Total voltage	100.8 V
	Rated capacity	5.5 Ah
	Maximum output	13.5 kW
Drive motor inverter	Type	Pulse width modulation
	Maximum output	15 kW
DC/DC converter	Type	Pulse width modulation
	Rated output	12 V - 130 A
Cooling fan assembly	Type	Plastic flange integrated brushless motor
	Rated voltage	12 V
	Maximum output	72 W
	Fan diameter (diameter × width)	130 × 43.7 mm (5.12 × 1.72 in)

B: LOCATION

Refer to “LOCATION” of “HYBRID ELECTRIC VEHICLE (DIAGNOSTICS)” section. <Ref. to HEV(diag)-9, LOCATION, Electrical Component Location.>

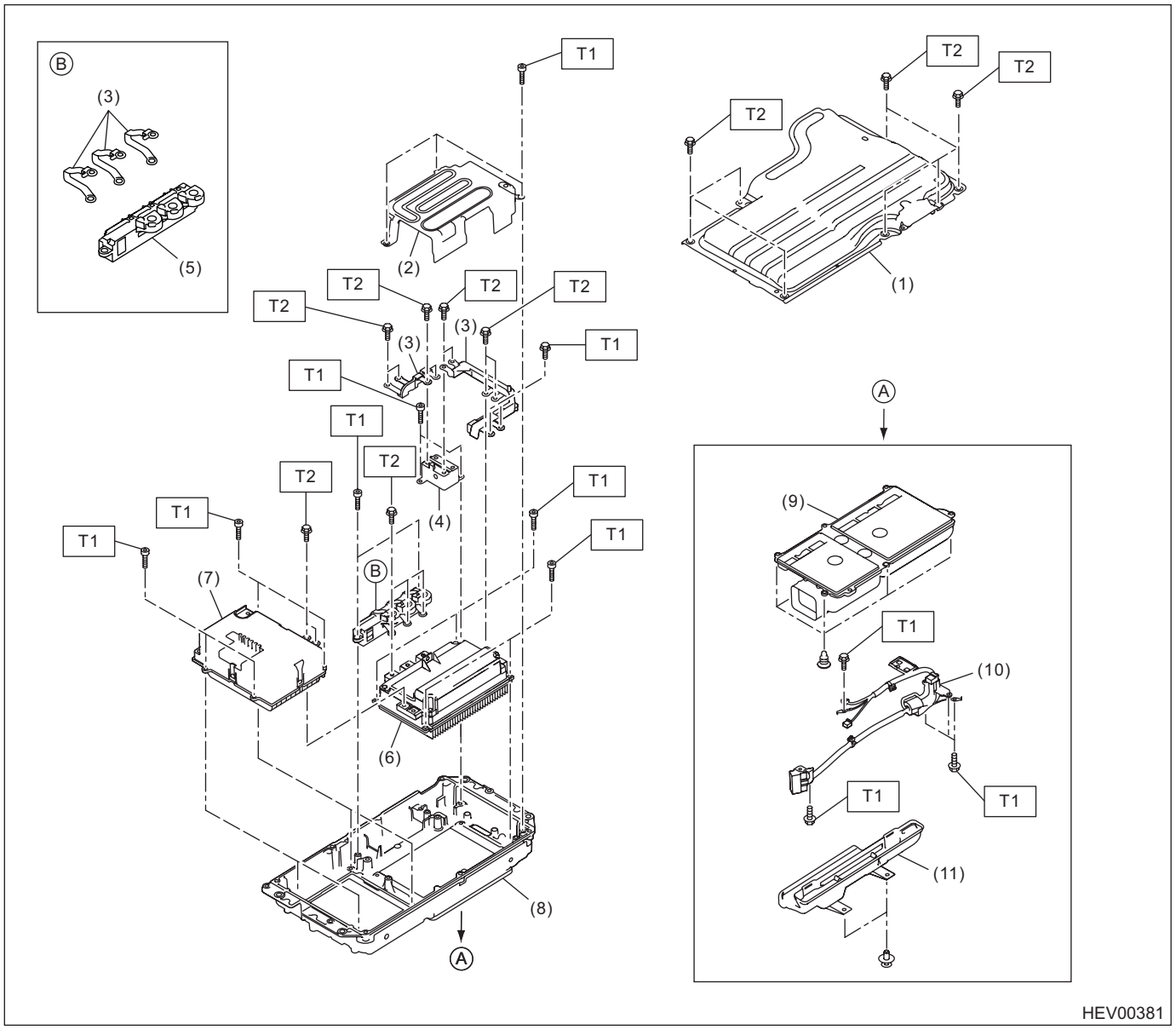
C: COMPONENT

1. HIGH VOLTAGE BATTERY



(1)	Service disconnect plug	(4)	High voltage battery frame ASSY	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	High voltage battery (including battery energy control module (BECM))	(5)	Cover - battery LWR	***T1: 6.5 (0.7, 4.8)***
(3)	Inverter ASSY	(6)	Battery cover	***T2: 7.5 (0.8, 5.5)***
				T3: 22 (2.2, 16.2)
				T4: 24.5 (2.5, 18.1)

2. INVERTER ASSEMBLY

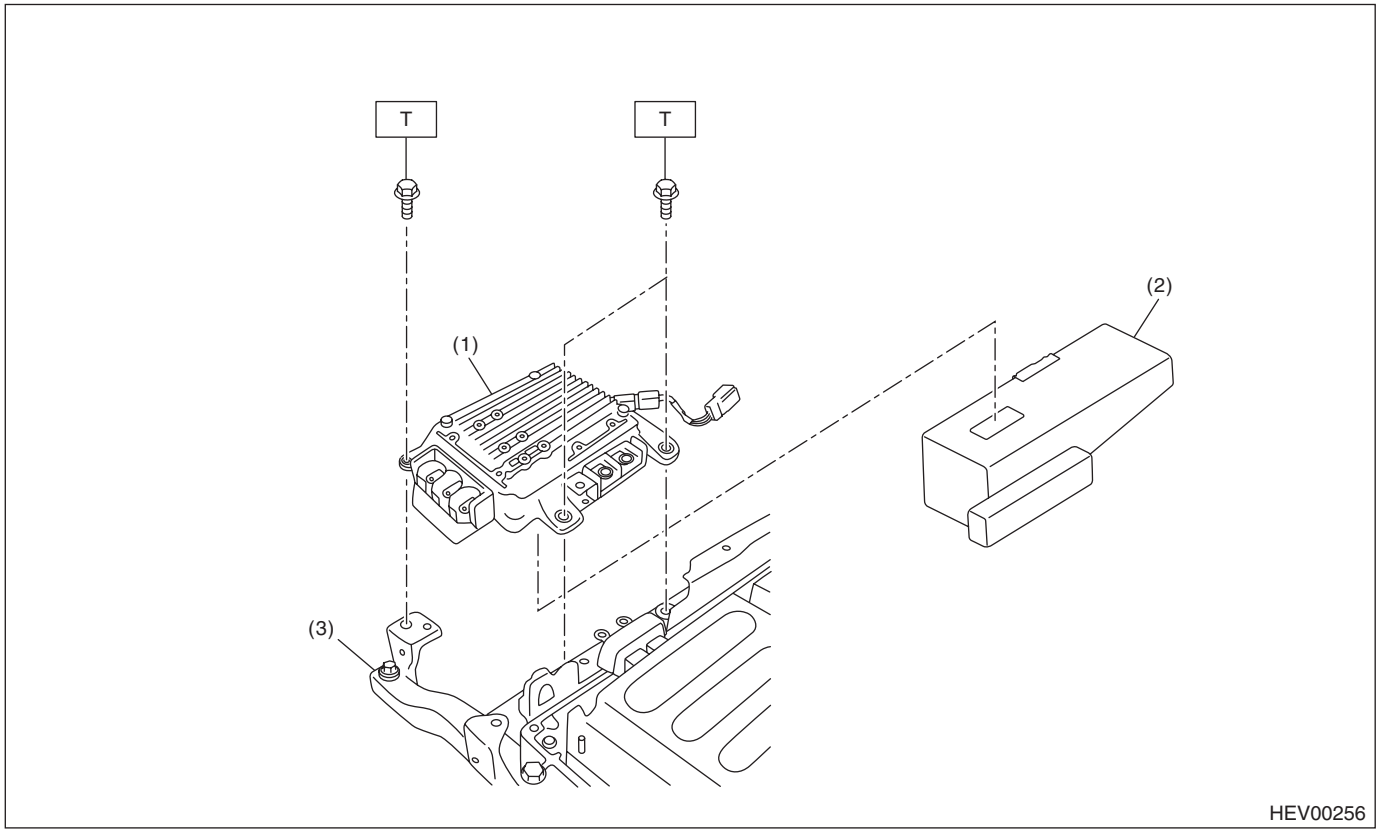


HEV00381

(1) Inverter cover
(2) Inverter shield
(3) Bus bar
(4) Electric noise filter
(5) Drive motor inverter amperage sensor
(6) Drive motor inverter
(7) DC/DC converter
(8) Inverter frame ASSY
(9) Duct inverter OUT
(10) Inverter harness
(11) Duct inverter IN

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.5 (0.7, 4.8)
T2: 7.5 (0.8, 5.5)

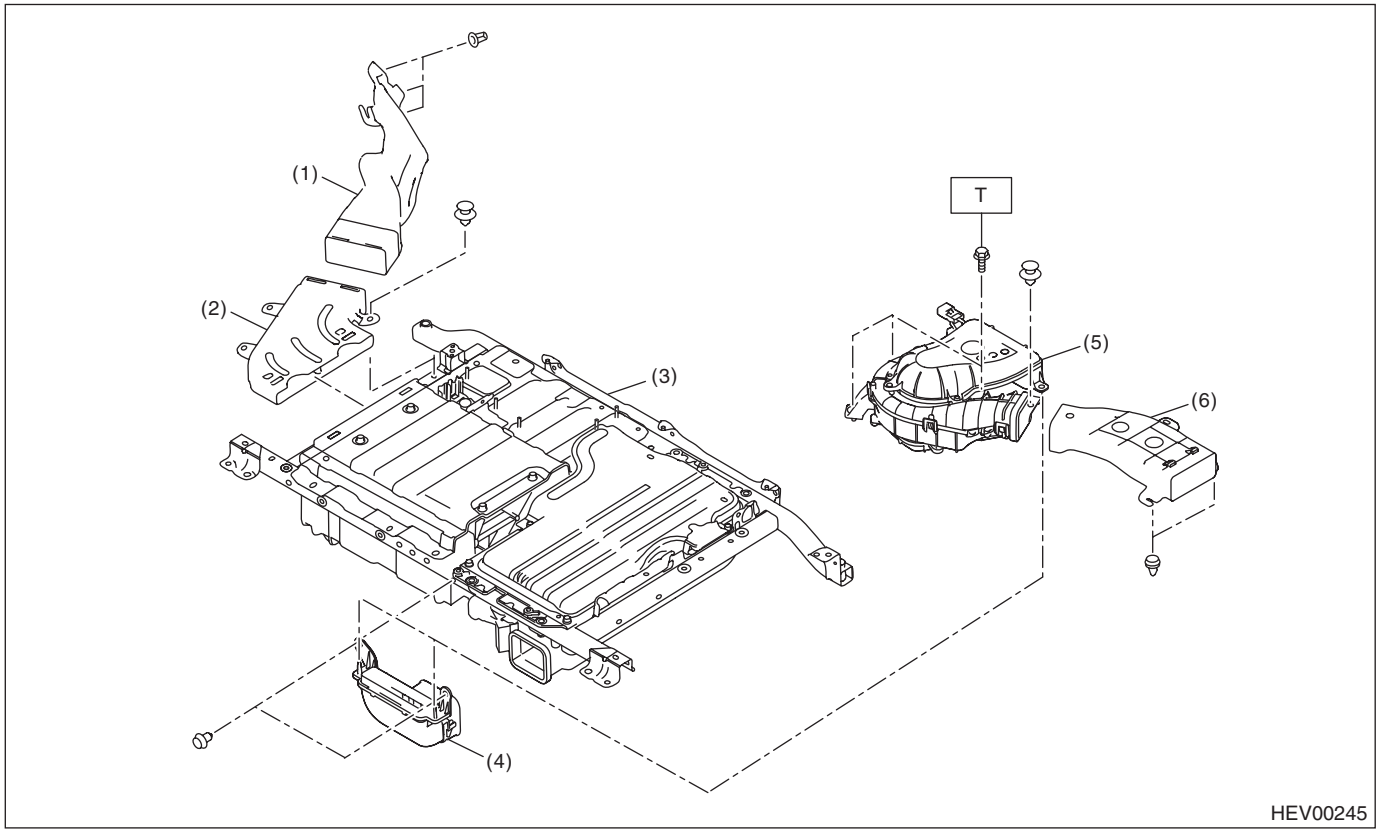
3. ELECTRIC OIL PUMP INVERTER



(1) Electric oil pump inverter
(2) Inverter spacer
(3) High voltage battery frame ASSY

Tightening torque: N·m (kgf-m, ft-lb)
T: 22 (2.2, 16.2)

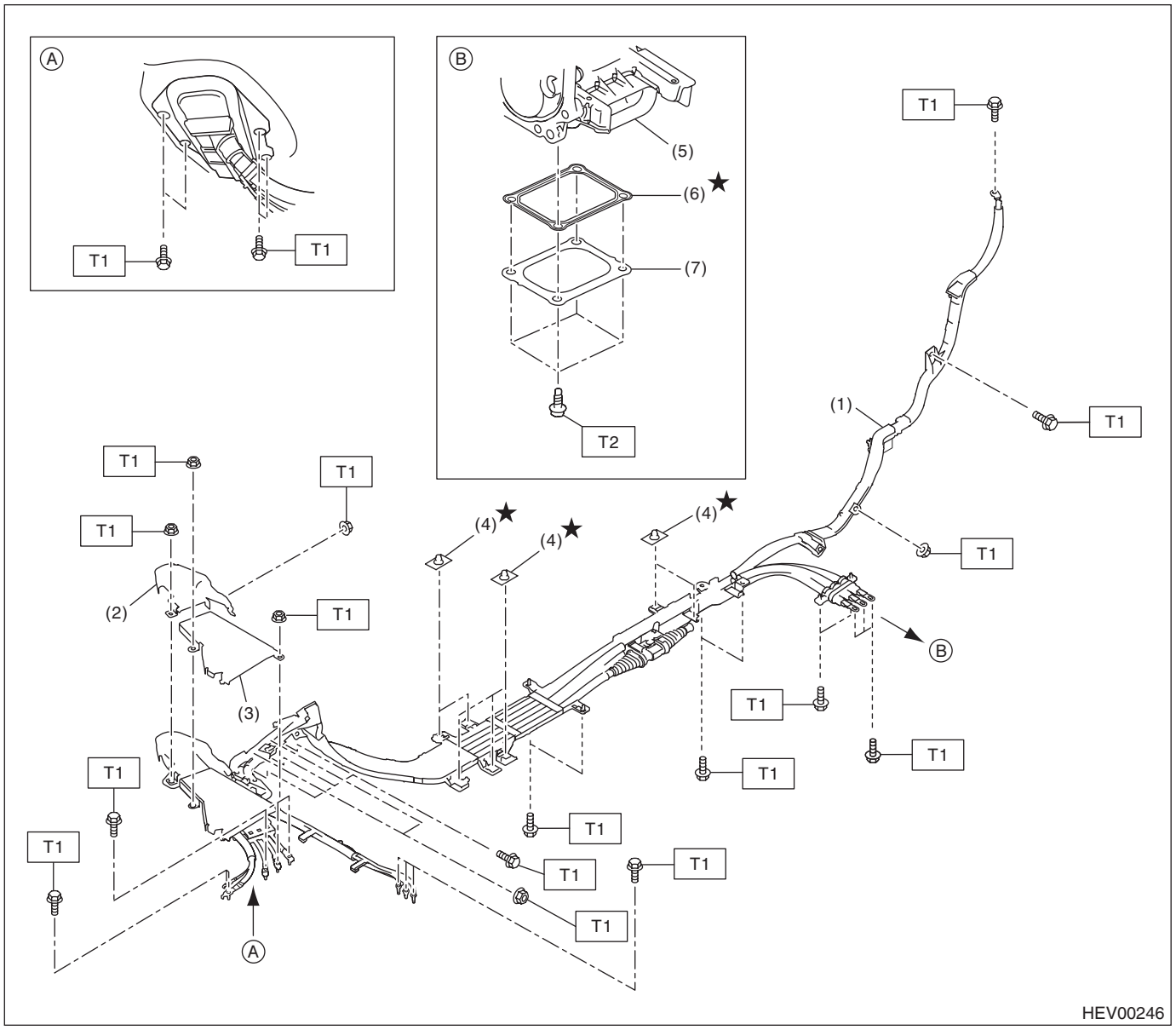
4. HIGH VOLTAGE BATTERY COOLING SYSTEM



(1) Cooling duct front (front)
(2) Cooling duct front (rear)
(3) Hybrid system SUB-ASSY
(4) Cooling fan duct
(5) Cooling fan ASSY
(6) Cooling duct rear

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.8, 5.5)

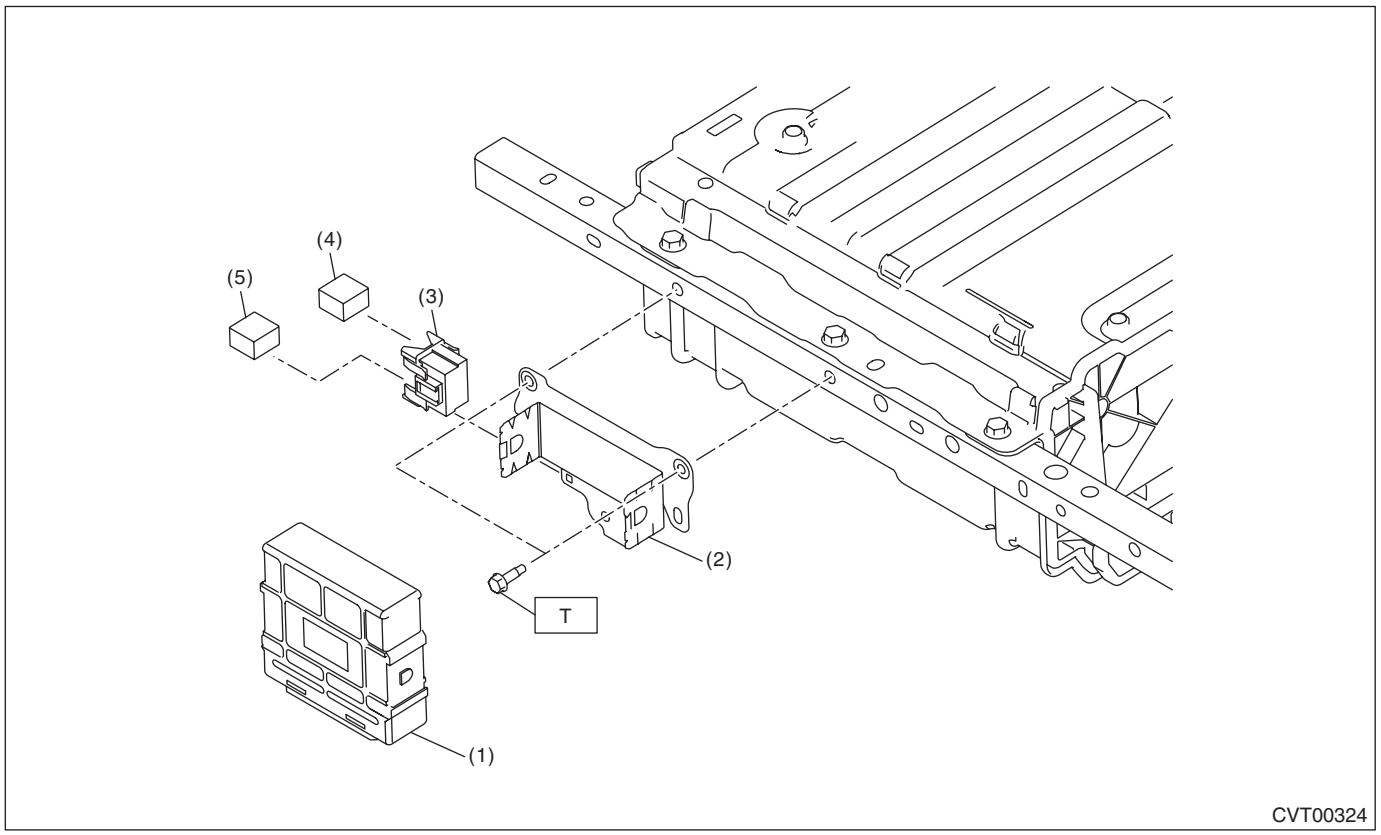
5. POWER CABLE



(1) Power cable
(2) Cover - shield seat
(3) Cover - shield battery
(4) Clip
(5) Drive motor case ASSY
(6) Gasket
(7) Power connect cover

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.8, 5.5)
T2: 25 (2.5, 18.4)

6. DRIVE MOTOR CONTROL MODULE & RELAY

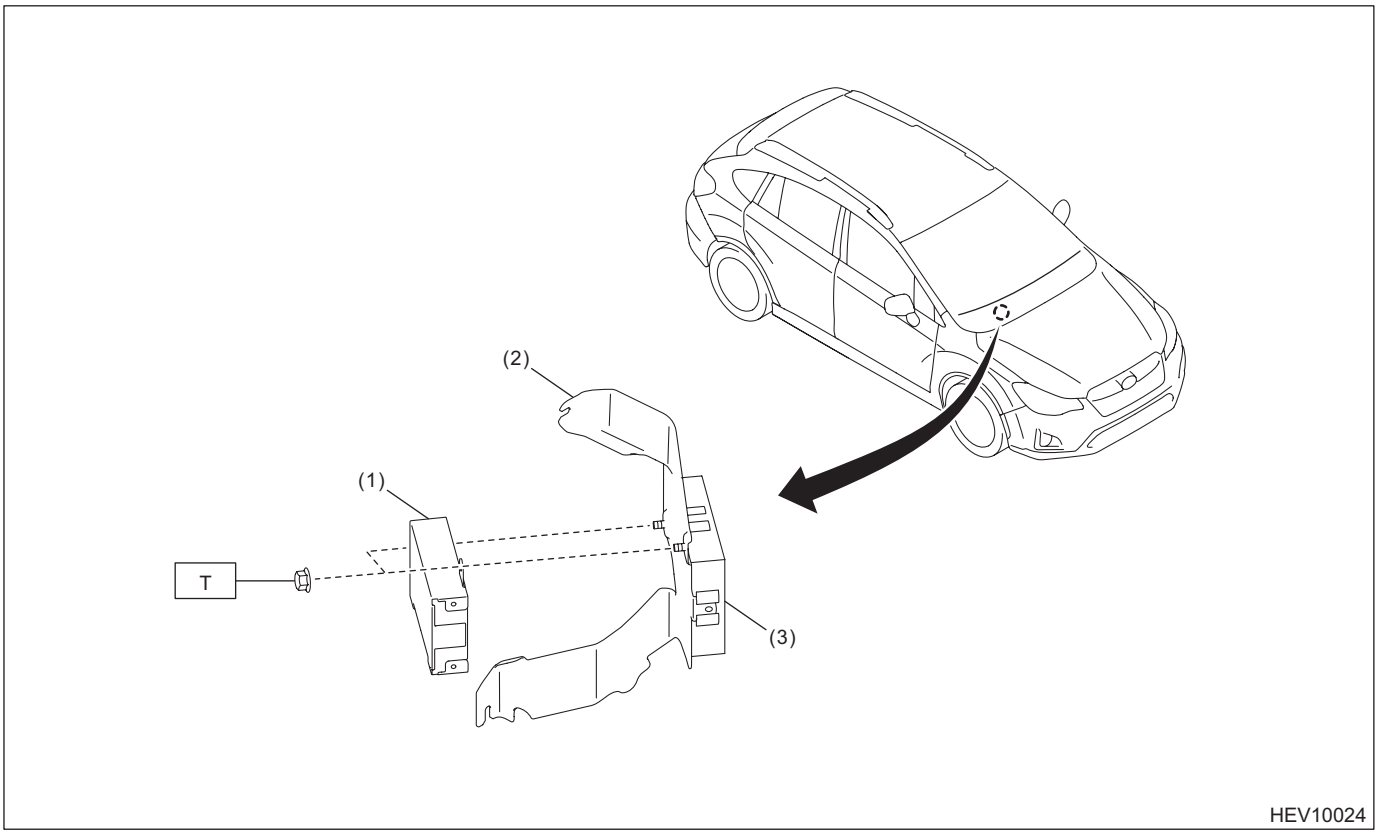


(1) Drive motor control module (DMCM)
(2) DMCM bracket
(3) Relay holder
(4) DMCM power relay
(5) Cooling fan / drive motor inverter power supply relay

Tightening torque: N·m (kgf-m, ft-lb)

T: 6.5 (0.7, 4.8)

7. HYBRID POWERTRAIN CONTROL MODULE

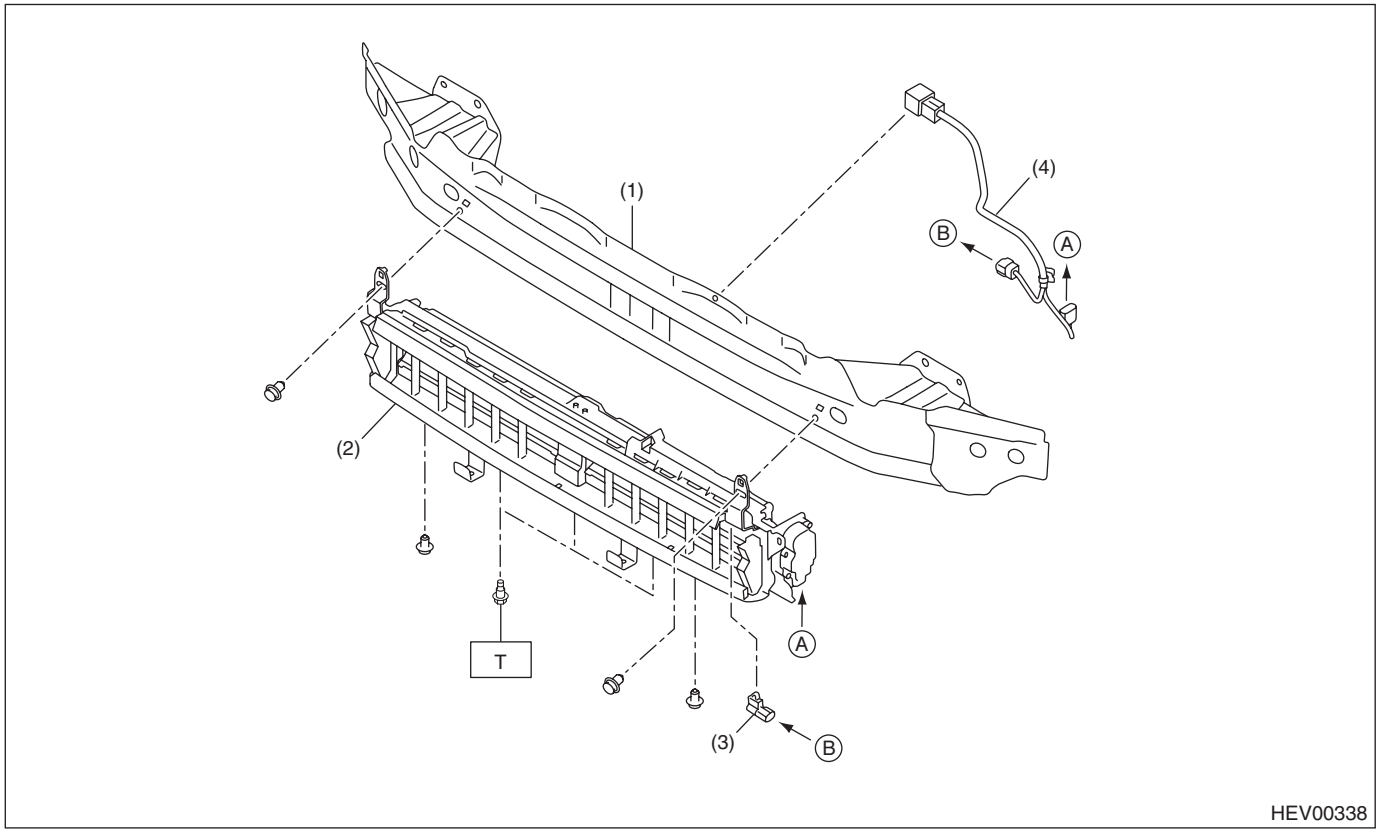


(1) Hybrid powertrain control module (HPCM)
(2) Bracket
(3) Engine control module (ECM)

Tightening torque: N·m (kgf-m, ft-lb)

T: 7.5 (0.8, 5.5)

8. ACTIVE GRILLE SHUTTER



(1)	Bumper beam COMPL - front	(3)	Ambient sensor	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Active grille shutter (ACTGS)	(4)	Harness - ACTGS	***T: 7.5 (0.8, 5.5)***

D: CAUTION

• The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

• When replacing the parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that the functional parts operate normally.

E: PREPARATION TOOL

1. SPECIAL TOOL

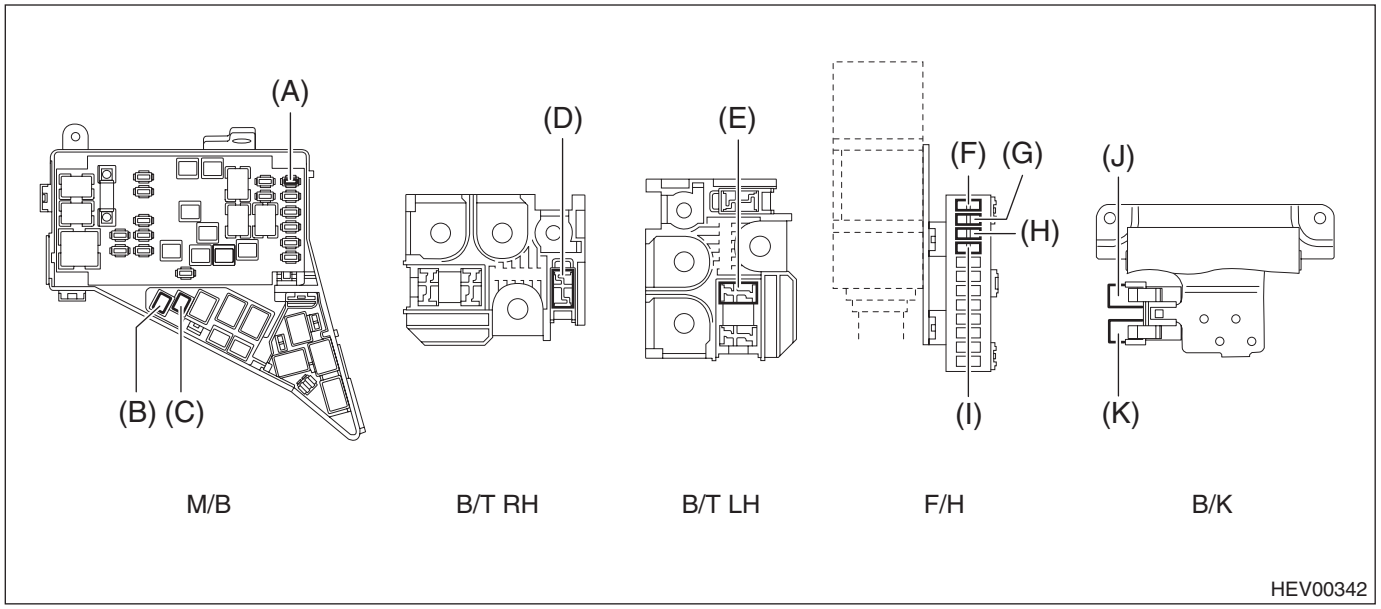
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and troubleshooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to "Application help".

2. GENERAL TOOL

TOOL NAME	REMARKS
Personal Protective Equipment (PPE)	Used for removing and installing high voltage components.
Insulation multimeter	Used for measuring resistance and voltage of high voltage components.
Insulating tape	Used for power cable terminals and high voltage battery terminals.
TORX® bit T30	Used to remove and install the battery cover.
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

2. Relay and Fuse

A: LOCATION



Main fuse box	Fuse 7.5 A (HPCM)	(A)
	SBF fuse 30 A (cooling fan ASSY / drive motor inverter power supply relay)	(B)
	SBF fuse 30 A (BECM / DMCM power supply relay / HPCM)	(C)
Battery terminal RH	SBF fuse 60 A (12V engine restart battery sensor)	(D)
Battery terminal LH	SBF fuse 200 A (DC/DC converter)	(E)
Fuse holder	Fuse 15 A (cooling fan ASSY / drive motor inverter power supply relay)	(F)
	Fuse 7.5 A (HPCM)	(G)
	Fuse 7.5 A (BECM)	(H)
	Fuse 15 A (DMCM)	(I)
DMCM bracket	DMCM power relay	(J)
	Cooling fan ASSY / drive motor inverter power supply relay	(K)

NOTE:
For other related fuses, refer to the wiring diagram. <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>

B: INSPECTION

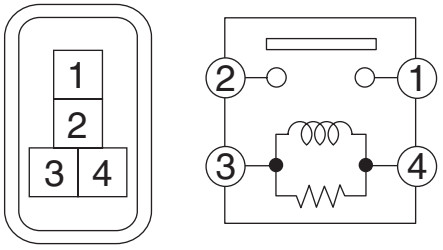
1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

2. CHECK RELAY

1) Check the resistance between relay terminals.

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01273
1 — 2	Apply 12 volt engine restart battery between terminals 4 and 3.	Less than 1 Ω	

2) Replace the relay if the inspection result is not within the standard value.

3. Hybrid Electric Vehicle System

A: WIRING DIAGRAM

Refer to “Hybrid Electric Vehicle System” in WI section. <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>

B: INSPECTION

Refer to “Basic Diagnostic Procedure” of “HYBRID ELECTRIC VEHICLE (DIAGNOSTICS)” section. <Ref. to HEV(diag)-2, Basic Diagnostic Procedure.>

C: NOTE

For procedure of each component in the hybrid system, refer to the respective sections.

- Service disconnect plug: <Ref. to HEV-15, Service Plug.>
- High voltage battery: <Ref. to HEV-17, High Voltage Battery.>
- Battery energy control module: <Ref. to HEV-26, Battery Energy Control Module.>
- Drive motor inverter amperage sensor: <Ref. to HEV-27, Drive Motor Inverter Current Sensor.>
- Electric noise filter: <Ref. to HEV-31, Noise Filter.>
- Hybrid powertrain control module: <Ref. to HEV-37, Hybrid Powertrain Control Module.>
- DC/DC converter: <Ref. to HEV-38, DC/DC Converter.>
- Inverter: <Ref. to HEV-42, Inverter.>
- Power cable: <Ref. to HEV-51, Power Cable.>
- High voltage battery cooling system: <Ref. to HEV-59, High Voltage Battery Cooling System.>
- Drive motor control module: <Ref. to HEV-74, Drive Motor Control Module.>
- Drive motor assembly: <Ref. to HEV-76, Drive Motor Assembly.>

4. Service Plug

A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

CAUTION:
Take the ignition key or access key out of the vehicle to avoid malfunctions of hybrid system.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the mat - rear floor CTR.
3) Remove the service disconnect plug.

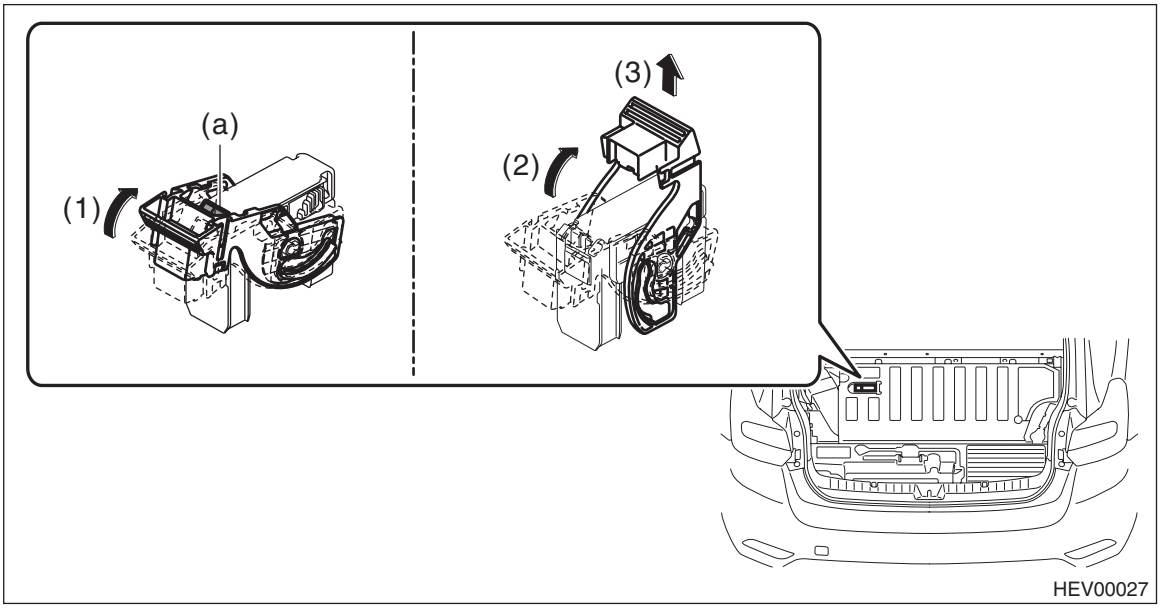
WARNING:
• Carry the removed service disconnect plug in your pocket in order to prevent other engineers from accidentally installing the plug during work.
• After removal of the service disconnect plug, the condenser inside the inverter still have been charged to a high voltage. Wait for at least 10 minutes before handling the high voltage components, wiring, terminals or connectors.

(1) Pull up the lever until it touches the stopper.
(2) Move the lever upwards while pressing the claw (a).

NOTE:
The lever locks in the vertical position.

(3) Pull out the service disconnect plug from high voltage battery.

CAUTION:
After removing the service disconnect plug, cover the connection with a tape to protect from intrusion of foreign matter such as water or dusts.



B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

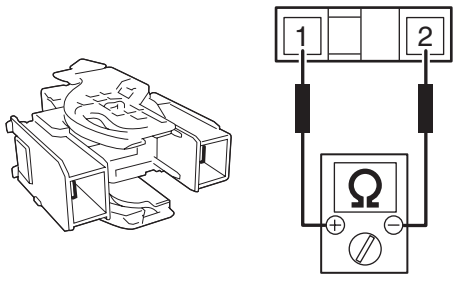
CAUTION:
• Before attaching the service disconnect plug, make sure there are no tools left inside and also double check that the high voltage terminal is tight and the connectors are properly connected.
• Always replace faulty service disconnect plug with a new part.
• Always use the original service disconnect plug to install. Never use a service disconnect plug removed from another vehicle.
Install each part in the reverse order of removal.

NOTE:
Move the lever to the horizontal position and push it until a click is heard and securely locked.

C: INSPECTION

1) Measure the resistance between service disconnect plug terminals.

Preparation tool:
Circuit tester

Terminal No.	Inspection conditions	Standard	Connection diagram
1 — 2	Always	Less than 1 Ω	 HEV00028

2) If the service result is different from the standard value, replace the service disconnect plug.

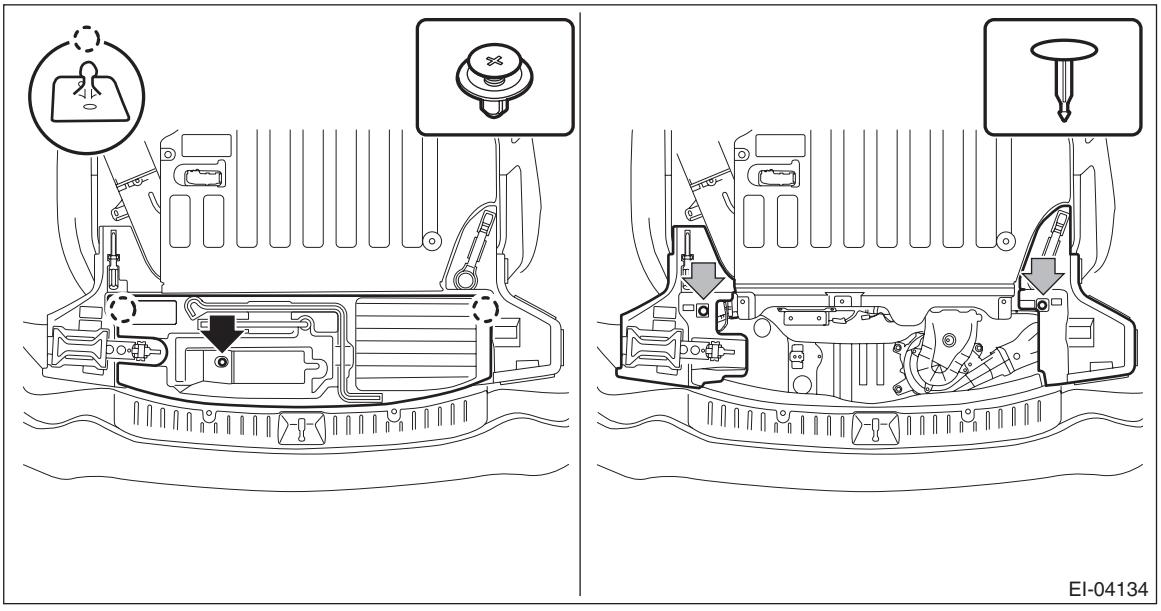
5. High Voltage Battery

A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

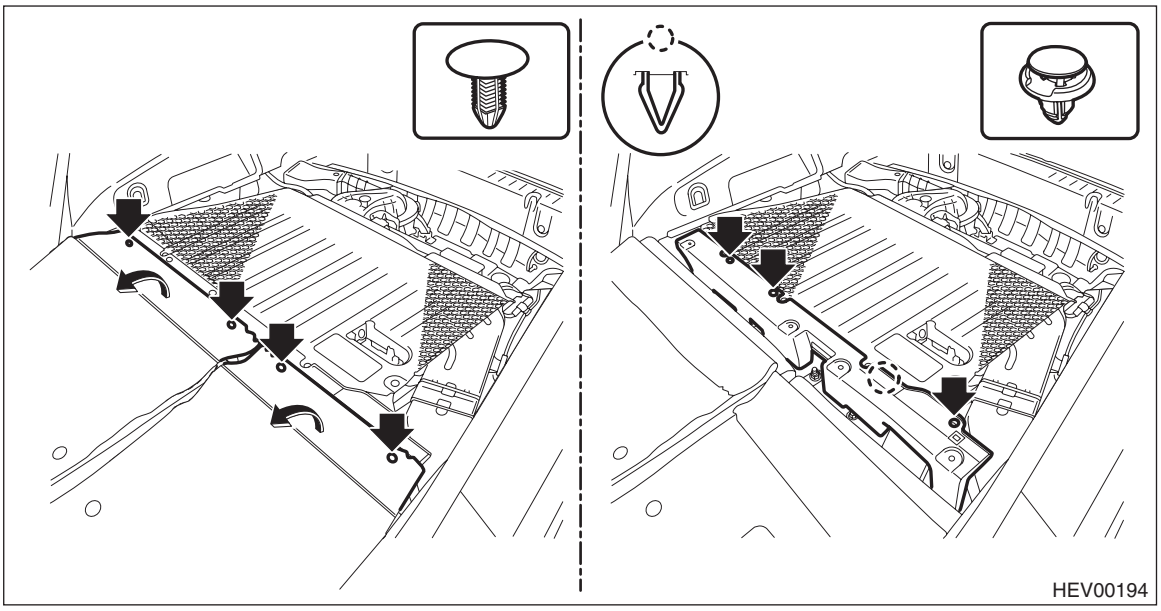
CAUTION:
• Return the replaced high voltage battery to a qualified collection service for safety reasons. If you use manufacturer's designated channel, the battery will be handled properly and safely by a qualified collection service.
• If high voltage battery is not properly processed and disposed of or left unprocessed, it could cause electrical shock accidents. Always have the high voltage battery collected by the manufacturer.
• Do not leave the removed high voltage batteries in a place where water may splash. It could cause fire accidents.

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.



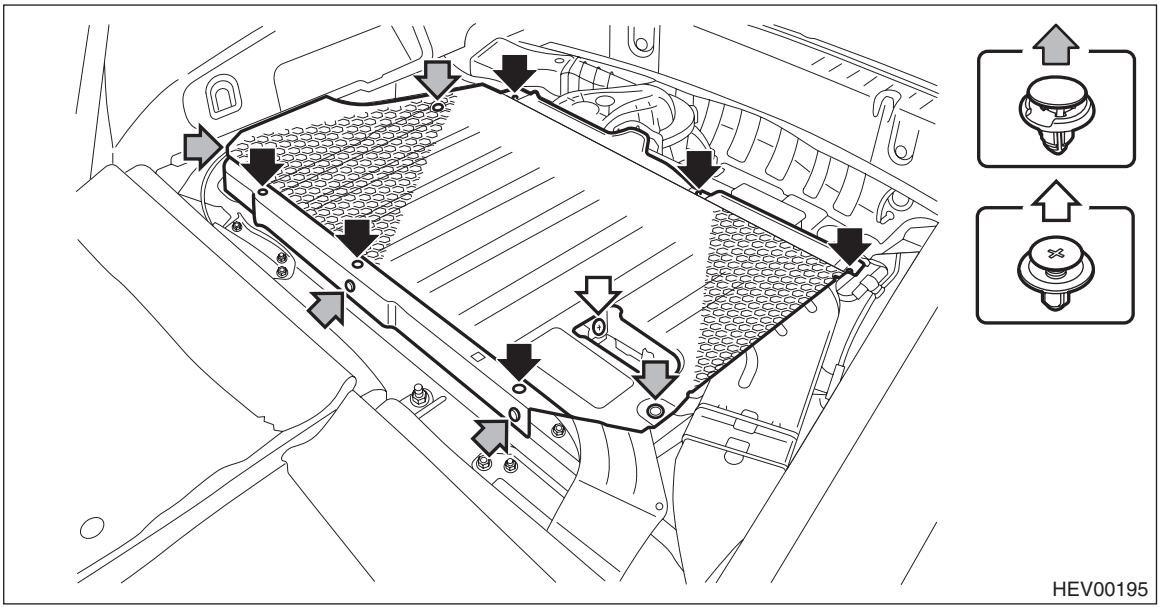
3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>

4) Remove the spacer - rear floor front.
(1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
(2) Release the clips and claws, then detach the spacer - rear floor front.

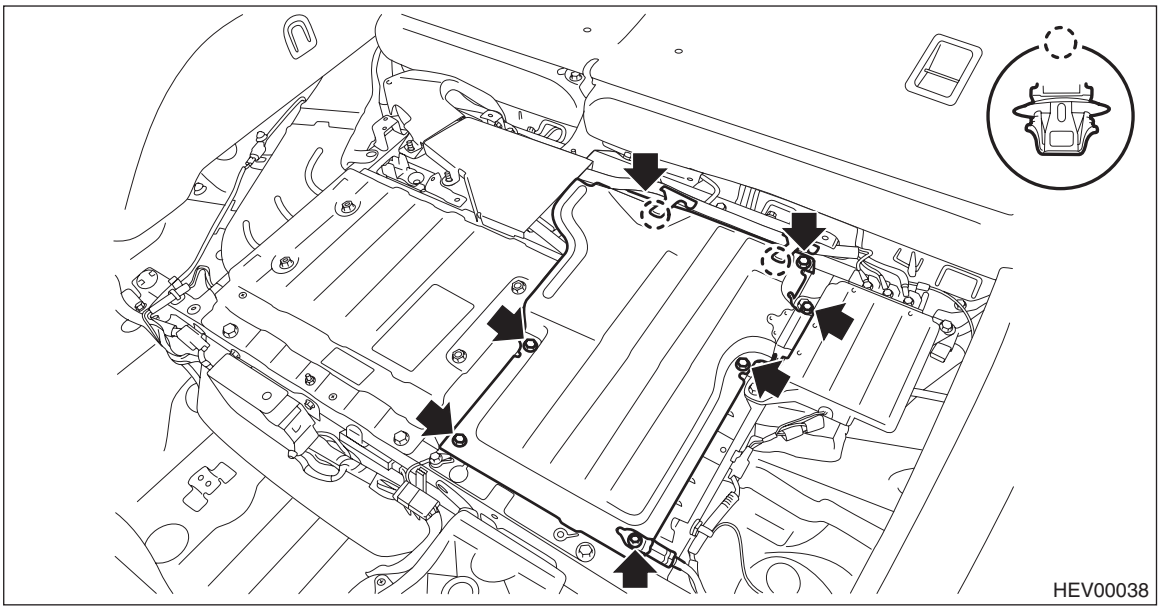


5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30



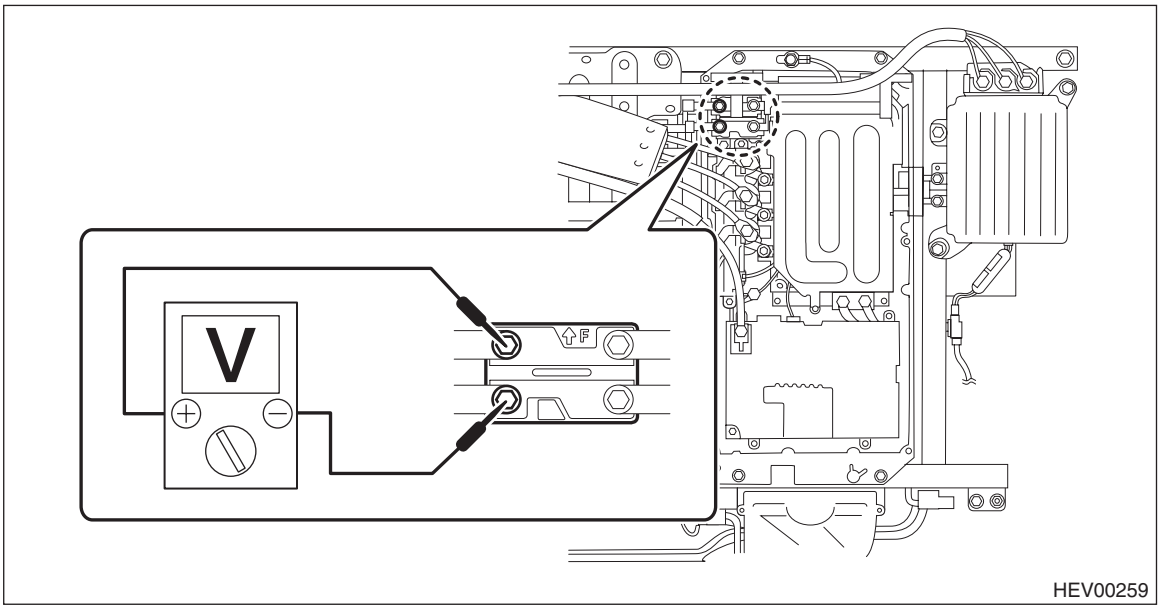
6) Remove the inverter cover.
   (1) Remove the bolts and ground terminal.
   (2) Release the cable clips, and remove the inverter cover.



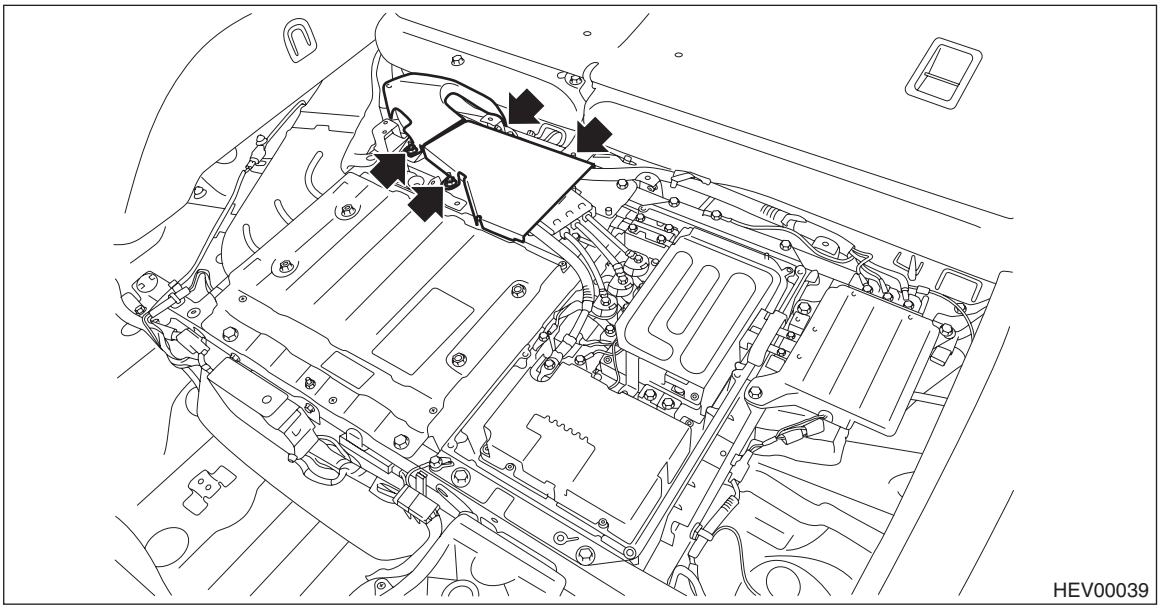
7) Perform zero-voltage test.
   (1) Measure the voltage of the high voltage DC line at the high voltage battery side of the electric noise filter.

Preparation tool:
Insulation multimeter

Standard: 0 V

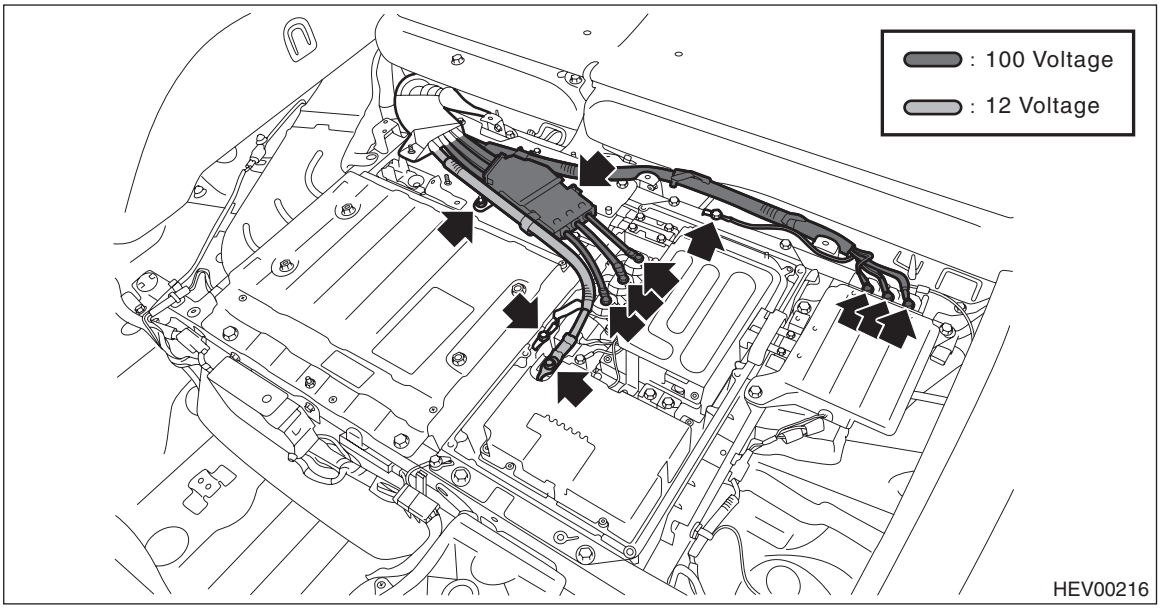


8) Remove the nut and remove the cover - shield battery and the cover - shield seat.



9) Remove the bolts and nuts and disconnect the ground terminal and the power cable.

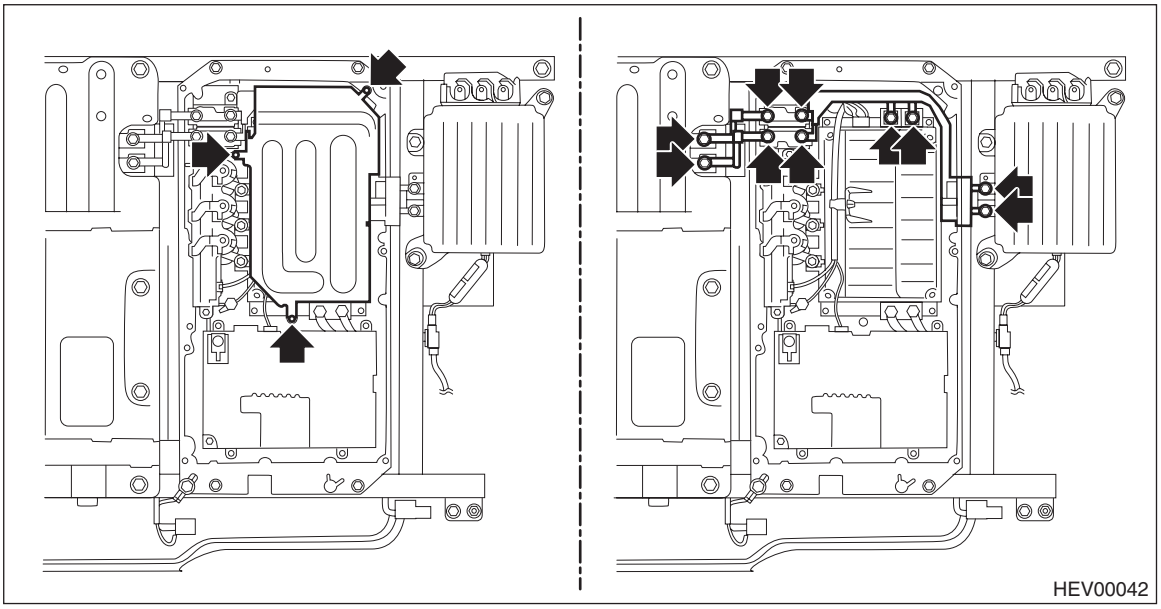
CAUTION:
- **Be careful not to use excessive force when disconnecting the power cable to avoid any damage.**
- **Always wrap the disconnected power cable terminals with insulating tape.**



10) Remove the cooling duct front (rear). <Ref. to HEV-62, COOLING DUCT FRONT (REAR), REMOVAL, High Voltage Battery Cooling System.>
11) Remove the cooling fan assembly. <Ref. to HEV-70, COOLING FAN ASSEMBLY, REMOVAL, High Voltage Battery Cooling System.>

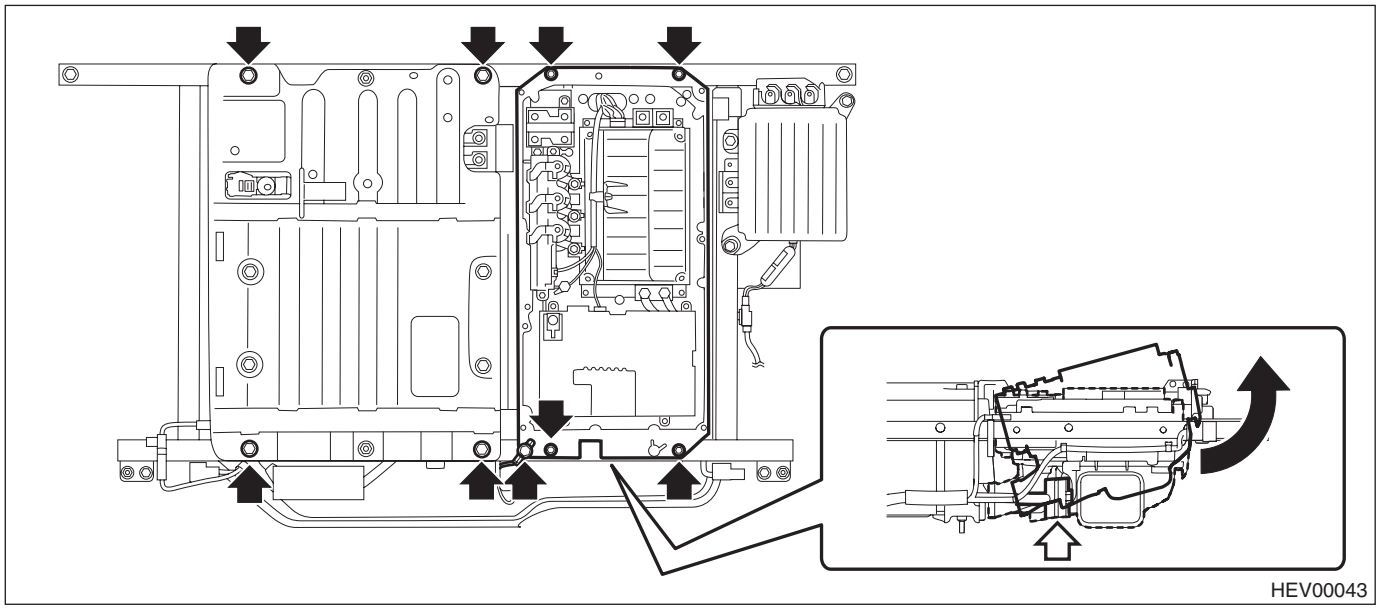
12) Remove the inverter assembly.
(1) Remove the bolts to remove the inverter shield.
(2) Remove the bolts and disconnect the bus bars between the high voltage battery and electric noise filter and between the electric noise filter and electric oil pump inverter respectively.

CAUTION:
Always wrap the high voltage battery terminal with insulating tape.



(3) Disconnect the connector.
(4) Remove all the mounting bolts of the high voltage battery to make the battery free.
(5) Remove the bolts, and then detach the ground terminal and the inverter assembly.

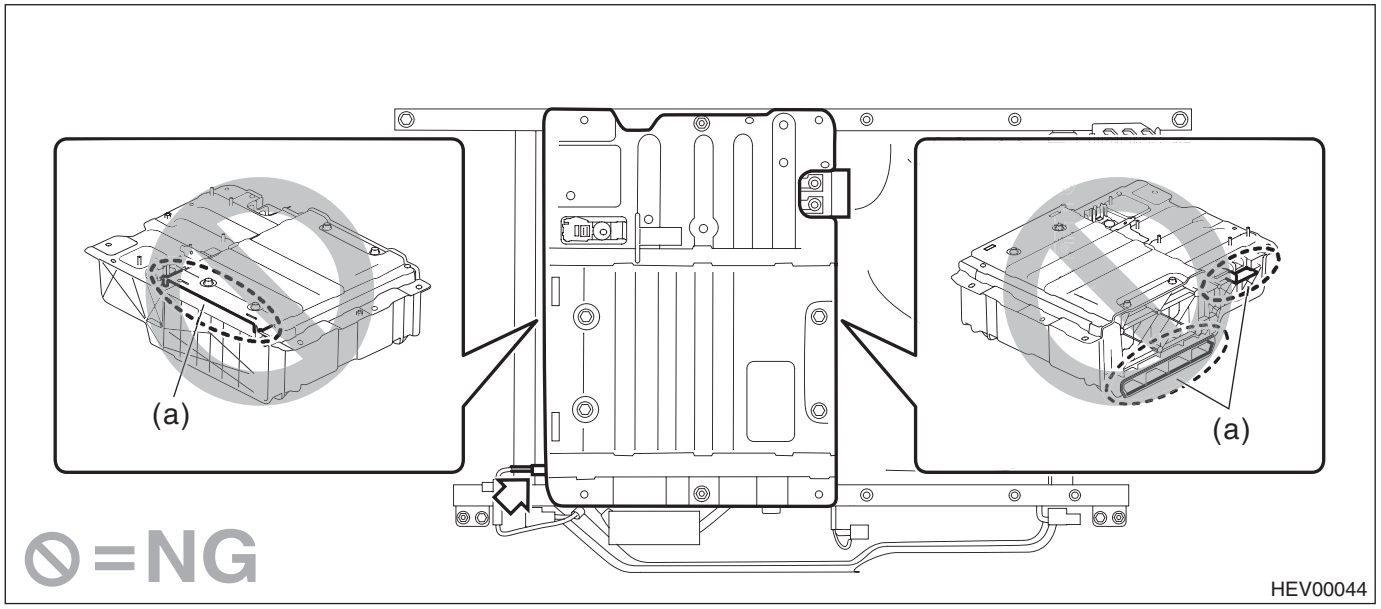
CAUTION:
Be careful not to damage the duct seal located underneath the high voltage battery.



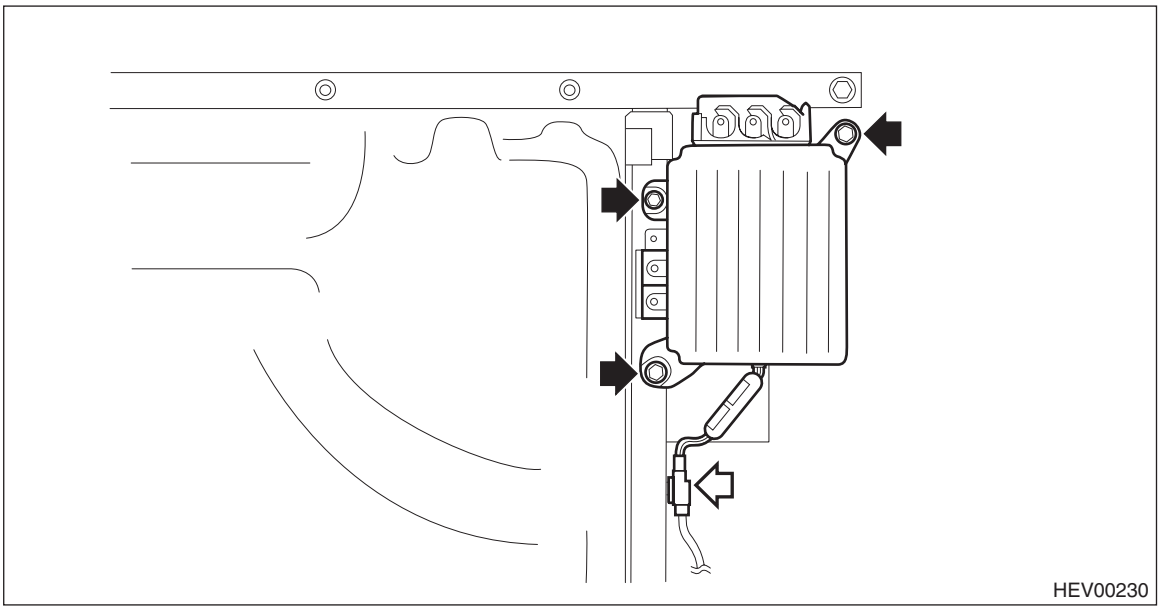
13) Remove the high voltage battery.

CAUTION:
• Since the high voltage battery weighs a lot, do not hold it by the area (a). Otherwise it may break or deform. Also, two persons must work together when removing the high voltage battery.
• The high voltage battery is a non-disassembly part. Do not try to remove the cover or other parts for disassembly.

(1) Disconnect the connector.
(2) Remove the high voltage battery from the high voltage battery frame assembly.

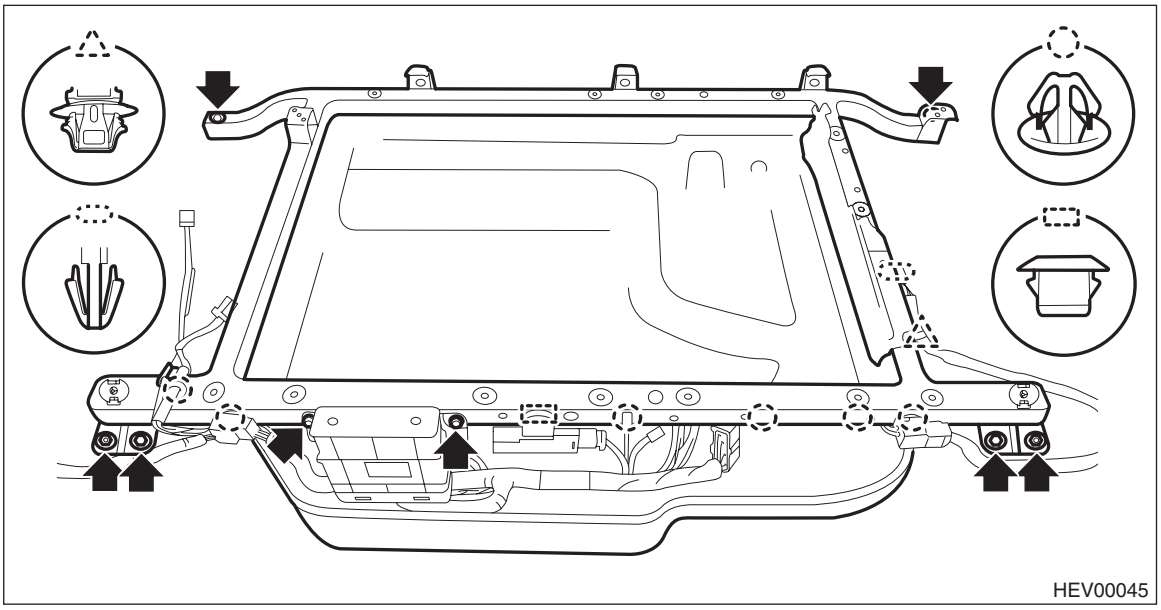


14) Remove the high voltage battery frame assembly.
(1) Remove the connectors and bolts, and remove the electric oil pump inverter.

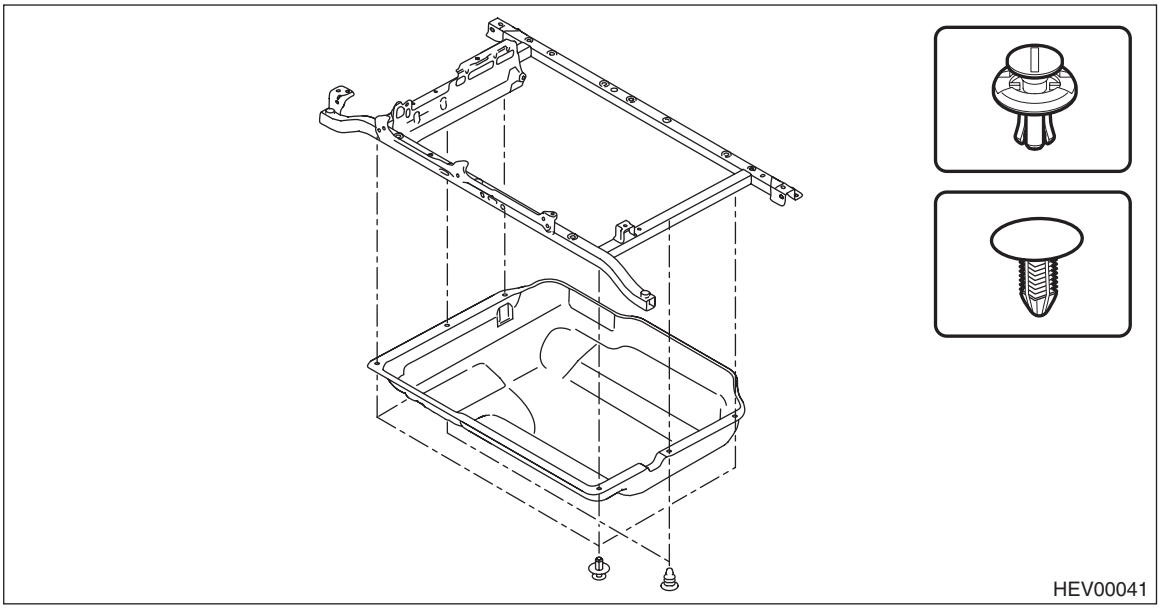


(2) Remove the connector clip and release the harness clip.

(3) Remove the bolts and nuts to remove the high voltage battery frame assembly from the vehicle.



(4) Release the clips, and remove the cover - battery LWR from the high voltage battery frame assembly.



B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

CAUTION:
When replacing the high voltage battery with a new part, be sure to use the service disconnect plug bundled with the new battery. Also, never use the service disconnect plug from the old high voltage battery for another vehicle.

1) Install the cover - battery LWR.
2) Install the high voltage battery frame assembly.

Tightening torque:
24.5 N·m (2.5 kgf-m, 18.1 ft-lb)

3) Install the electric oil pump inverter.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

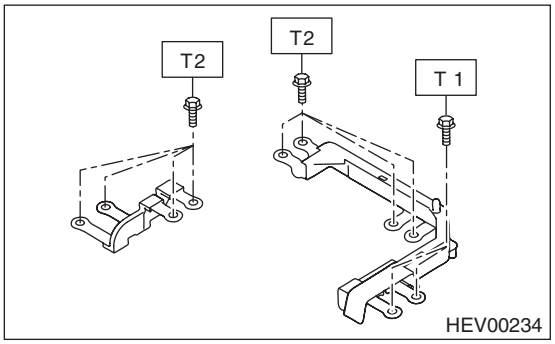
4) Mount the high voltage battery on the high voltage battery frame assembly, then install the inverter assembly.

CAUTION:
- **If the duct seal is damaged, replace it with a new part.**
- **Be sure that the high voltage battery is securely attached to the cooling duct inverter duct.**

Tightening torque:
High voltage battery and inverter assembly: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
Ground terminal: 6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

5) Connect the bus bar.

Tightening torque:
T1: 6.5 N·m (0.7 kgf-m, 4.8 ft-lb)
T2: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



6) Install the inverter shield.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

7) Install the cooling fan assembly. <Ref. to HEV-73, COOLING FAN ASSEMBLY, INSTALLATION, High Voltage Battery Cooling System.>
8) Install the cooling duct front (rear). <Ref. to HEV-71, COOLING DUCT FRONT (REAR), INSTALLATION, High Voltage Battery Cooling System.>

9) Connect the ground terminal and the power cable.

CAUTION:
• When connecting the power cable, pay attention to the letters (U, V, and W) imprinted on the drive motor inverter amperage sensor body as well as on the protector of the power cable.
• Connect the power cable properly referring to the letters (U, V, and W) imprinted on the electric oil pump inverter body. The power cable with the identification tape is connected to (U) and the power cable with a claw is connected to (V).
• Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
10) Install the cover - shield battery and the cover - shield seat.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
11) Install the ground terminal and inverter cover.

CAUTION:
Check that the sound proofing material on the inverter cover is not detached or damaged.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
12) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
13) Install the spacer - rear floor front.
14) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
15) Install the sub-trunk assembly and the spacer - rear floor side.
16) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

C: INSPECTION

1) Check that the high voltage battery has no deformation, cracks or other damages. <Ref. to PC-14, PRECAUTION FOR HIGH VOLTAGE BATTERY, CAUTION (HYBRID SYSTEM), Precaution.>
2) Connect the Subaru Select Monitor, and read the Diagnostic Trouble Code (DTC). If any diagnosis code (DTC) is displayed, refer to “List of Diagnostic Trouble Code (DTC)” in “HYBRID ELECTRIC VEHICLE (DIAGNOSTICS)” section. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).>

6. Battery Energy Control Module

A: NOTE

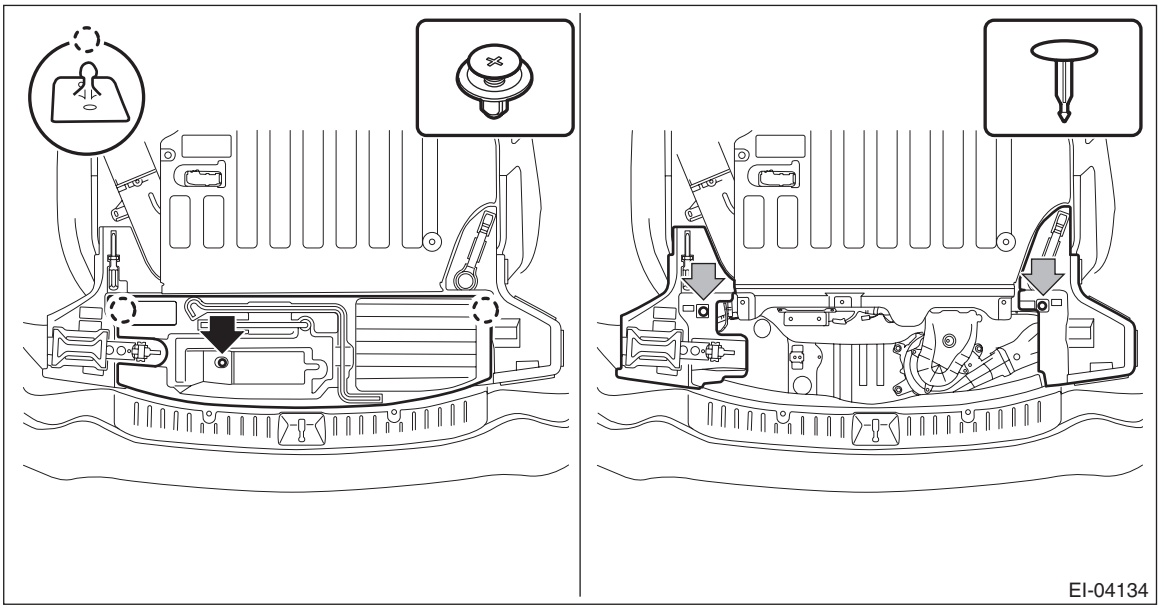
The battery energy control module is integral part of the high voltage battery. Refer to “High Voltage Battery” section for the work procedures. <Ref. to HEV-17, High Voltage Battery.>

7. Drive Motor Inverter Current Sensor

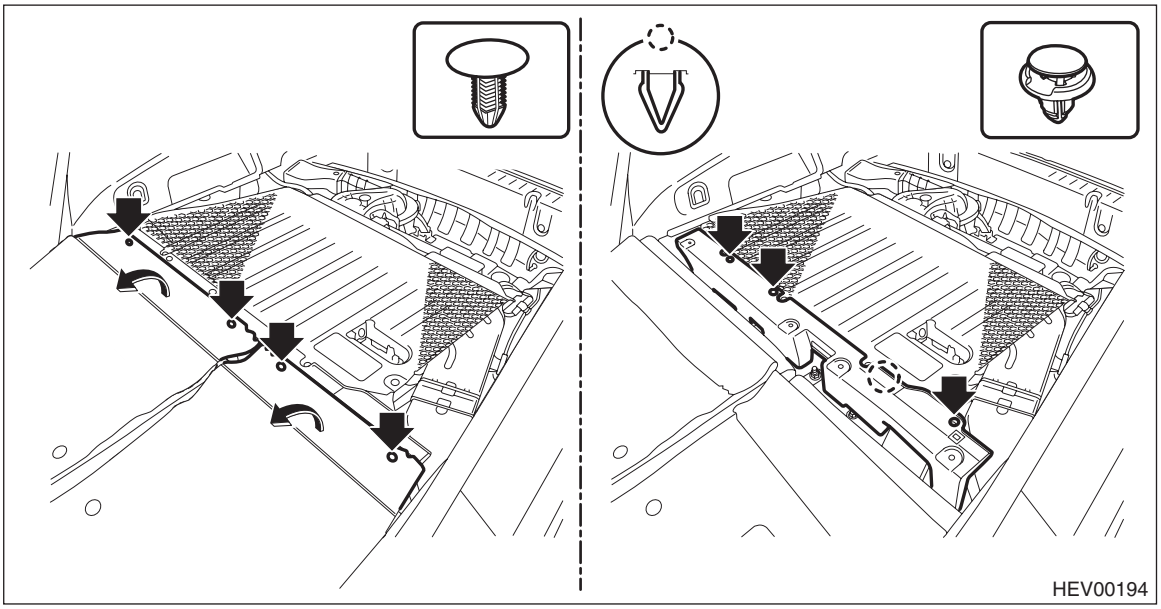
A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.

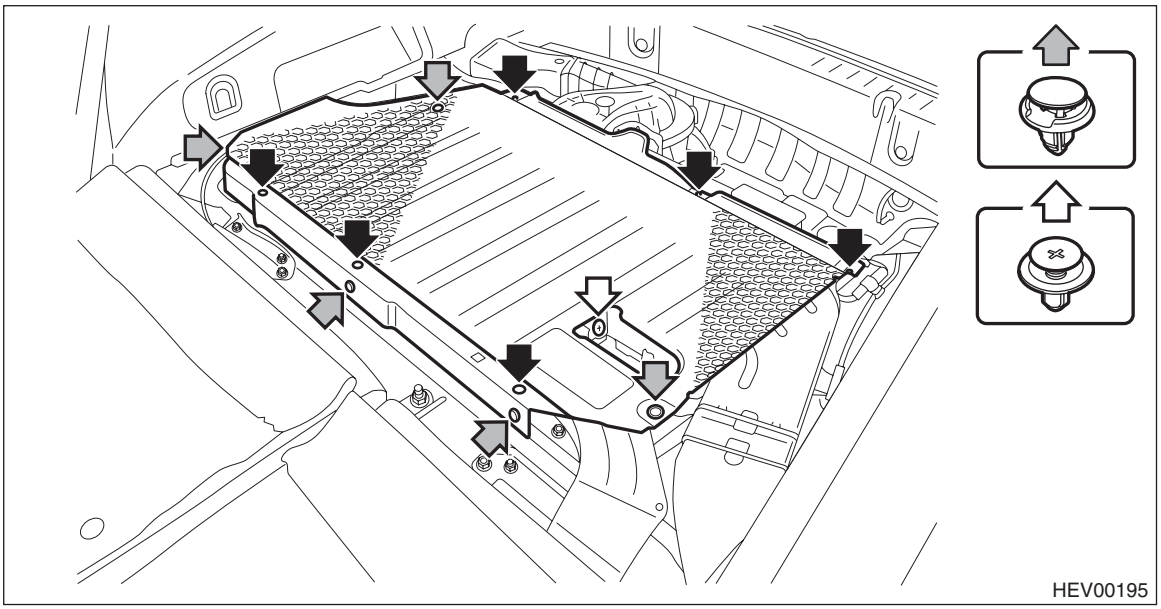


3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the spacer - rear floor front.
   (1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
   (2) Release the clips and claws, then detach the spacer - rear floor front.

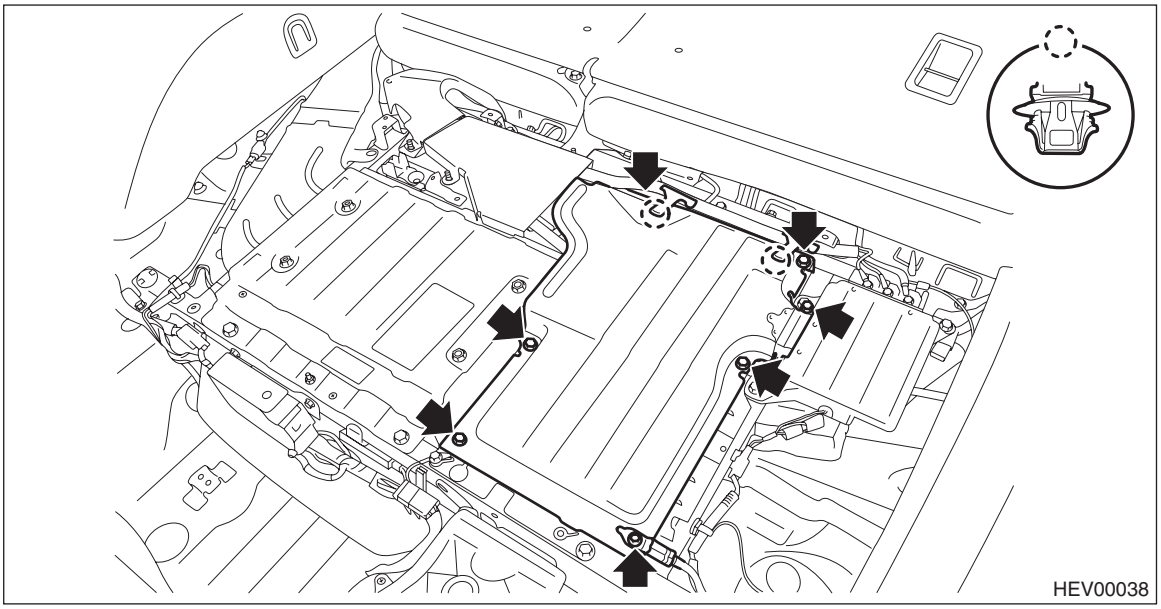


5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30



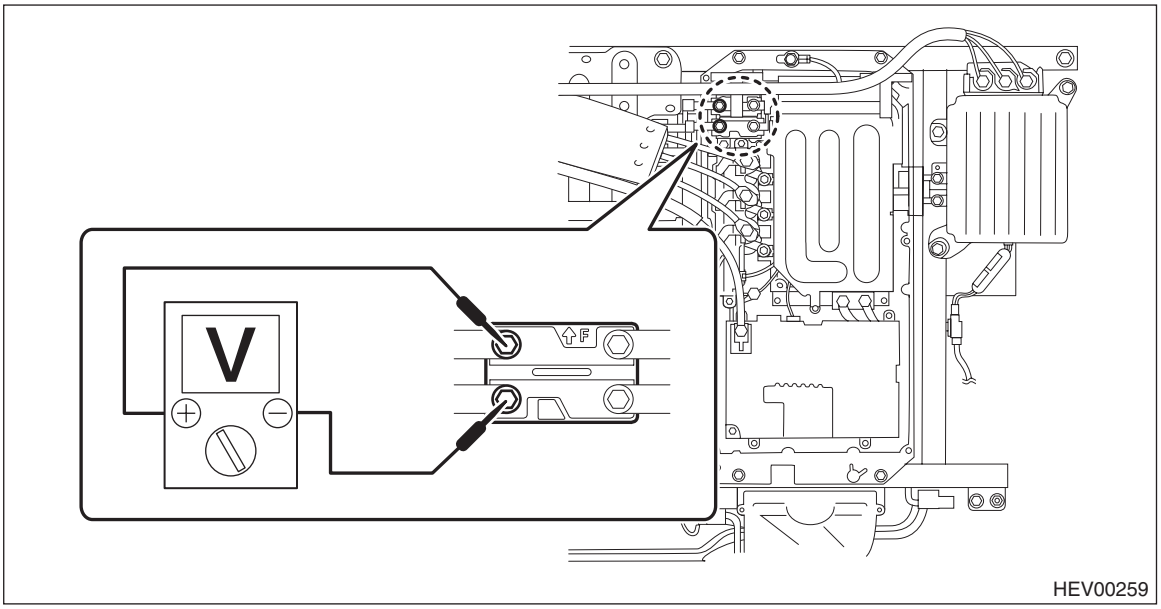
6) Remove the inverter cover.
(1) Remove the bolts and ground terminal.
(2) Release the cable clips, and remove the inverter cover.



7) Perform zero-voltage test.
(1) Measure the voltage of the high voltage DC line at the high voltage battery side of the electric noise filter.

Preparation tool:
Insulation multimeter

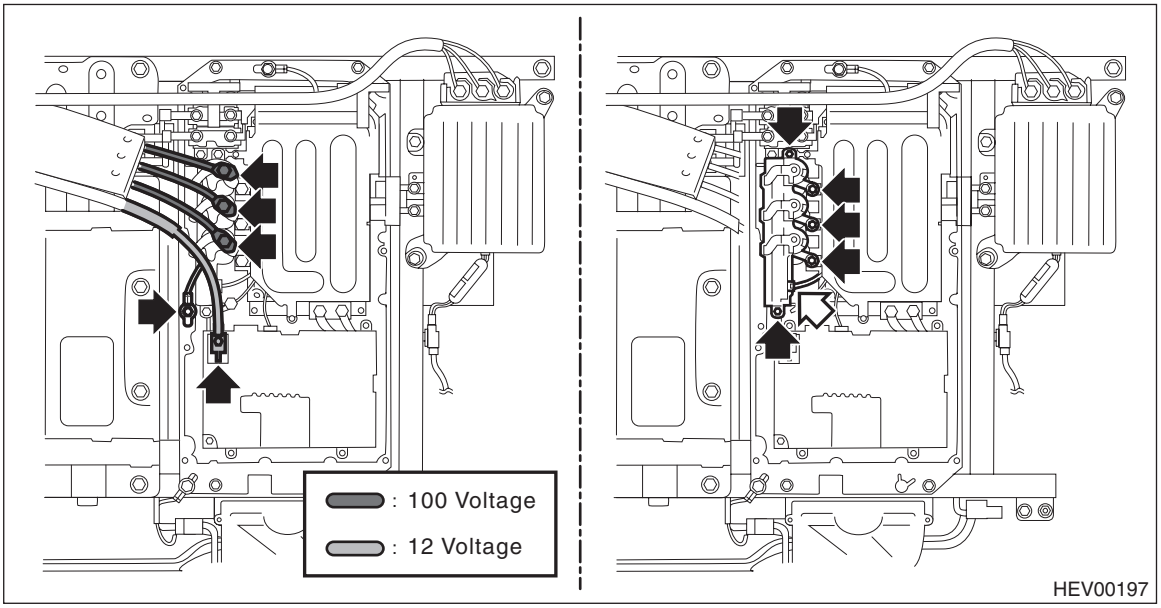
Standard: 0 V



8) Remove the drive motor inverter amperage sensor.

CAUTION:
- **Be careful not to use excessive force when disconnecting the power cable to avoid any damage.**
- **Always wrap the disconnected power cable terminals with insulating tape.**

(1) Remove the bolts and disconnect the ground terminal and the power cable.
(2) Remove the connectors and bolts, and remove the drive motor inverter amperage sensor.



(3) Remove the bus bar from the drive motor inverter amperage sensor.

B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Install the drive motor inverter amperage sensor.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

2) Connect the ground terminal and the power cable.

CAUTION:
• When connecting the power cable, pay attention to the letters (U, V, and W) imprinted on the drive motor inverter amperage sensor body as well as on the protector of the power cable.
• Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

3) Install the ground terminal and inverter cover.

CAUTION:
Check that the sound proofing material on the inverter cover is not detached or damaged.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

4) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

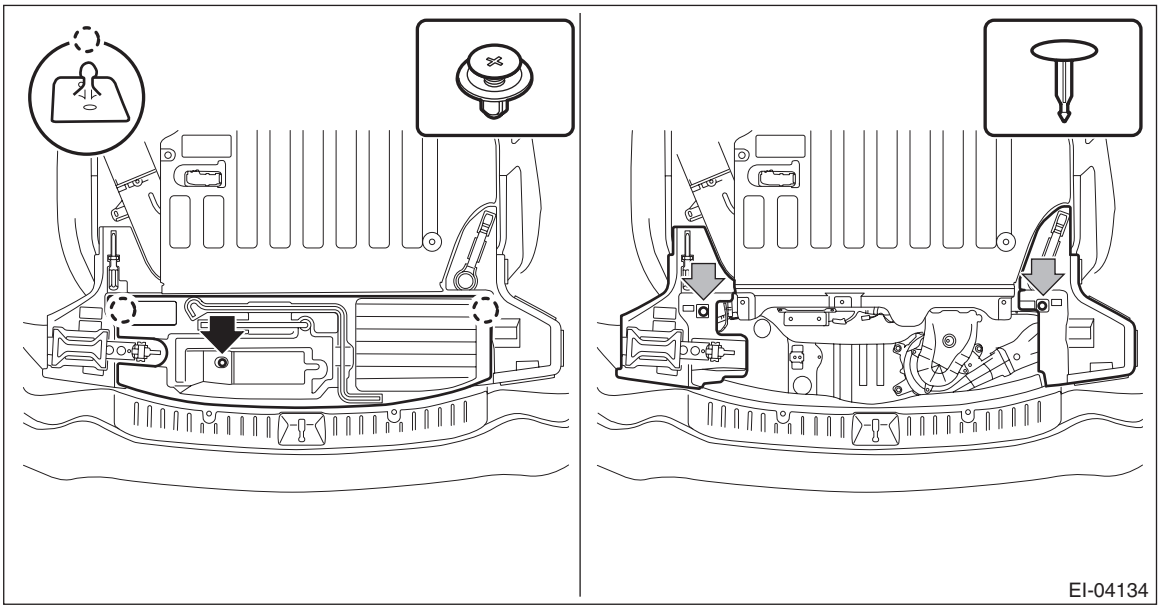
5) Install the spacer - rear floor front.
6) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
7) Install the sub-trunk assembly and the spacer - rear floor side.
8) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

8. Noise Filter

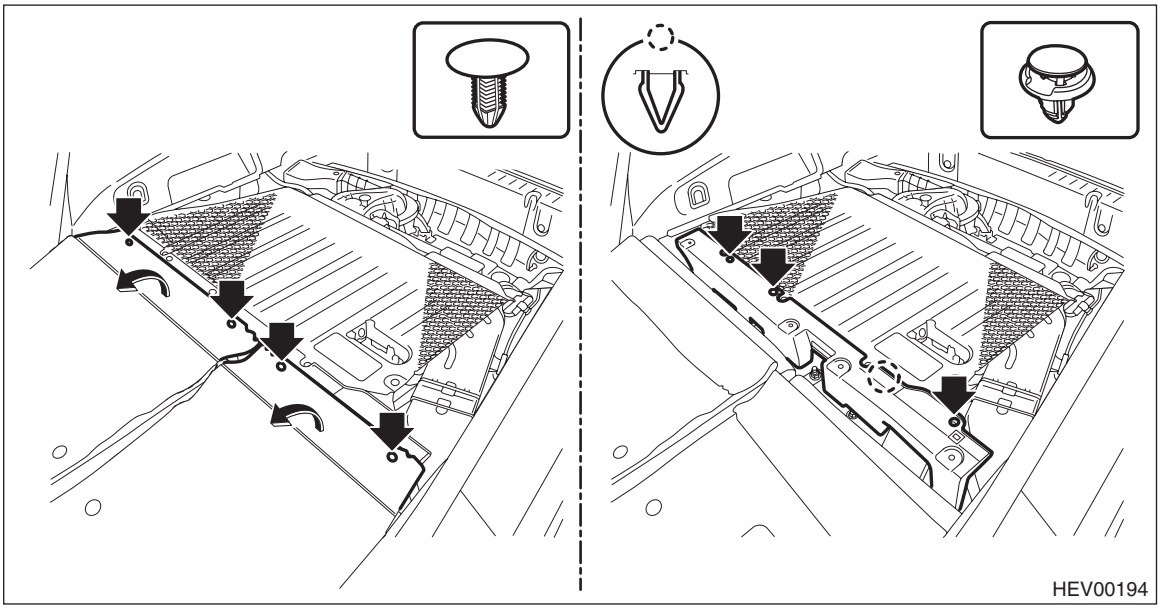
A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.

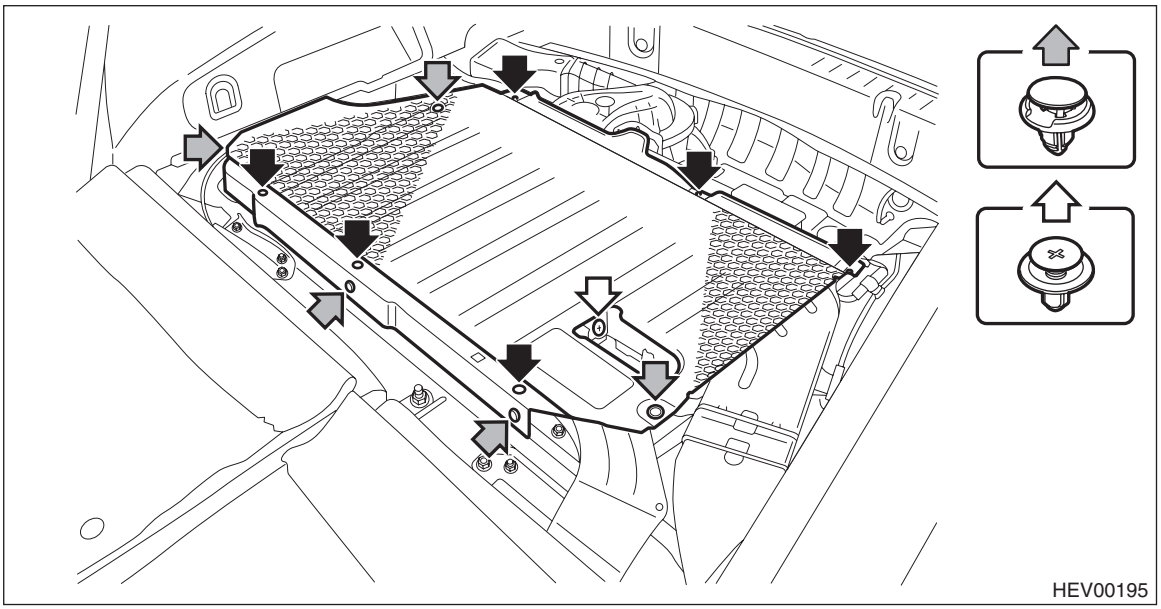


3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the spacer - rear floor front.
   (1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
   (2) Release the clips and claws, then detach the spacer - rear floor front.

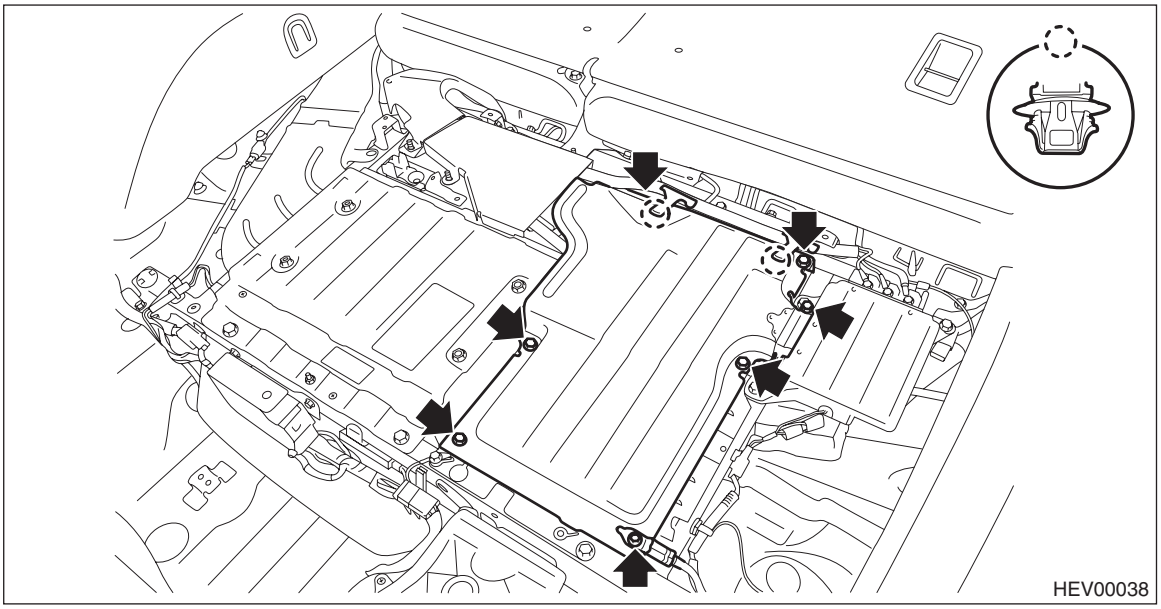


5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30



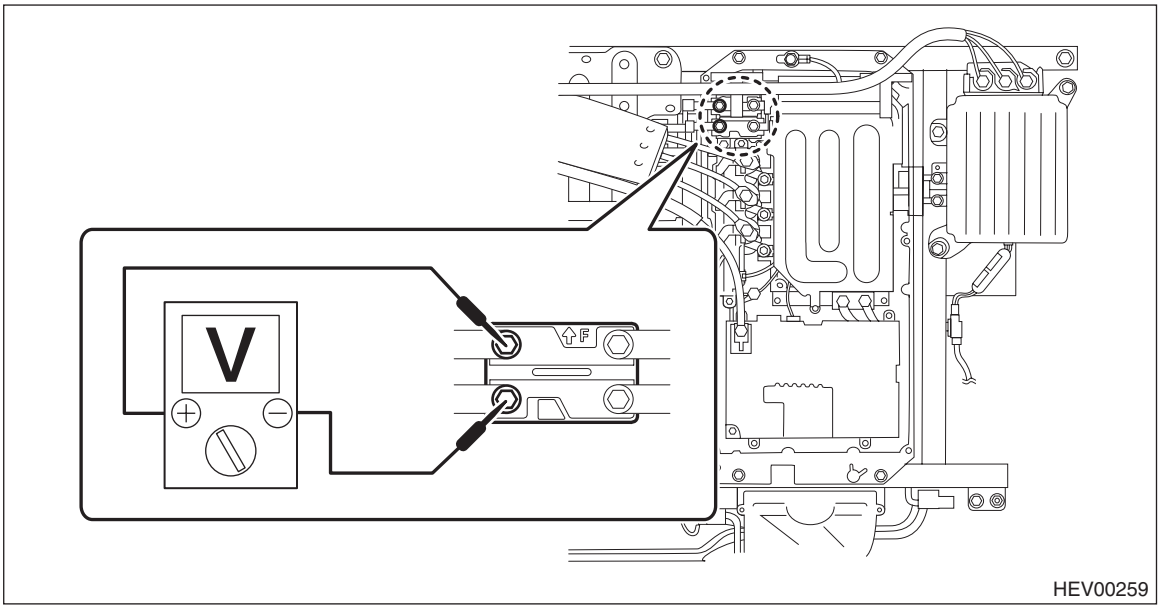
6) Remove the inverter cover.
(1) Remove the bolts and ground terminal.
(2) Release the cable clips, and remove the inverter cover.



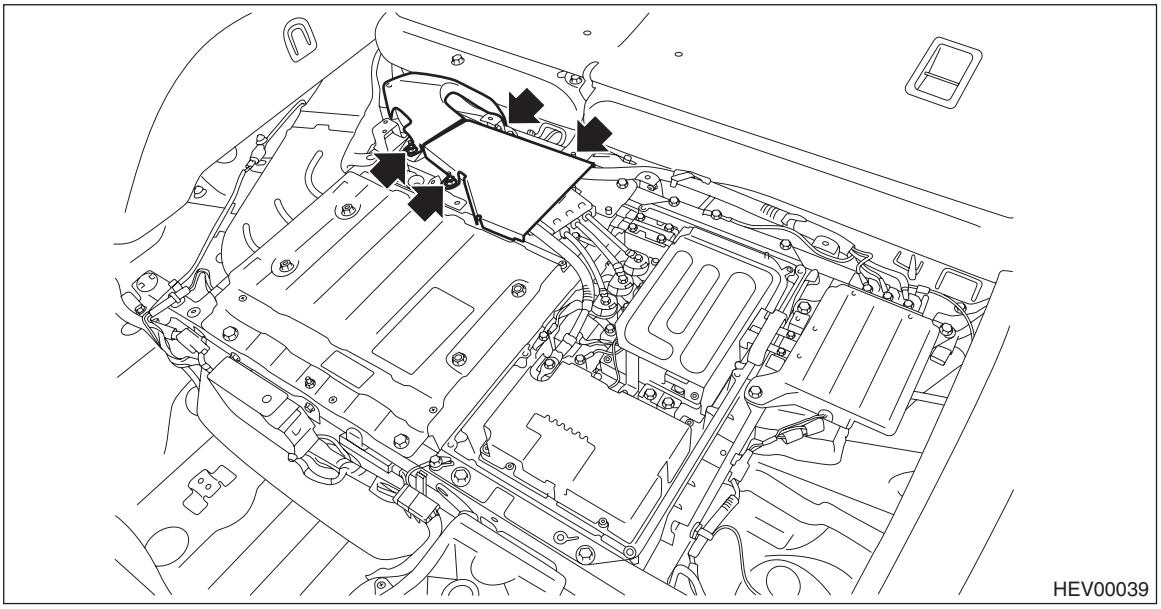
7) Perform zero-voltage test.
(1) Measure the voltage of the high voltage DC line at the high voltage battery side of the electric noise filter.

Preparation tool:
Insulation multimeter

Standard: 0 V

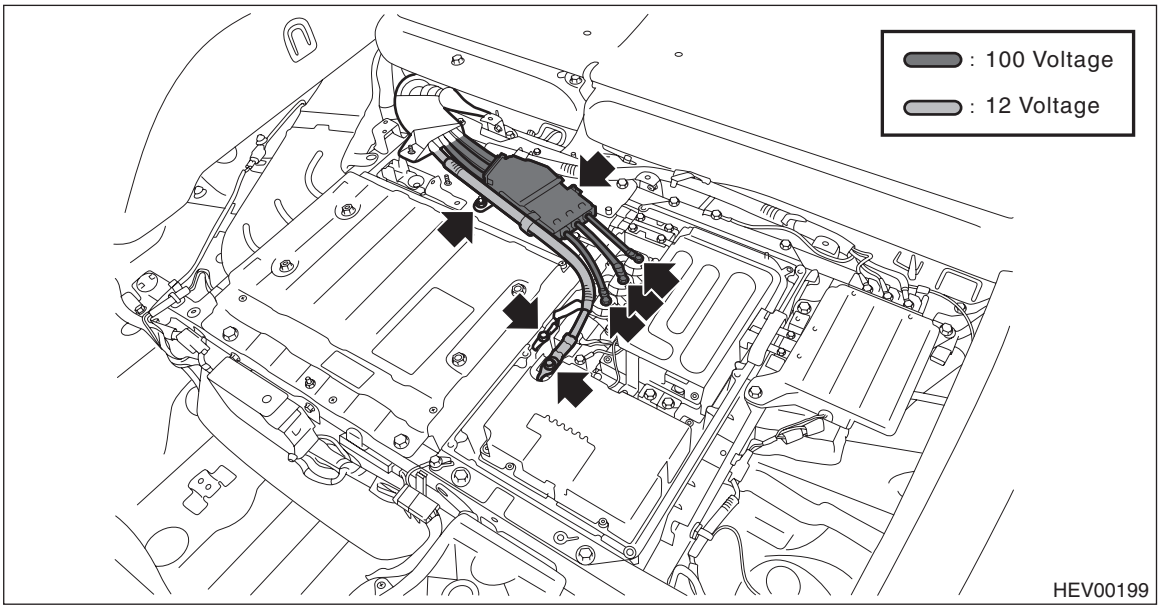


8) Remove the nut and remove the cover - shield battery and the cover - shield seat.



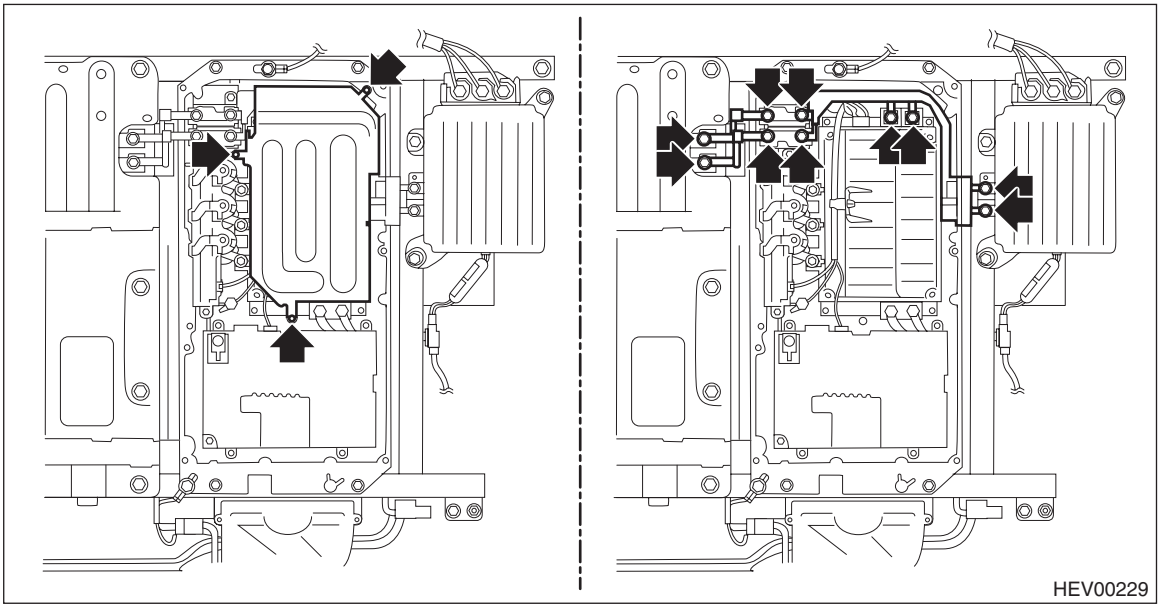
9) Remove the bolts and nuts and disconnect the ground terminal and the power cable.

CAUTION:
- **Be careful not to use excessive force when disconnecting the power cable to avoid any damage.**
- **Always wrap the disconnected power cable terminals with insulating tape.**

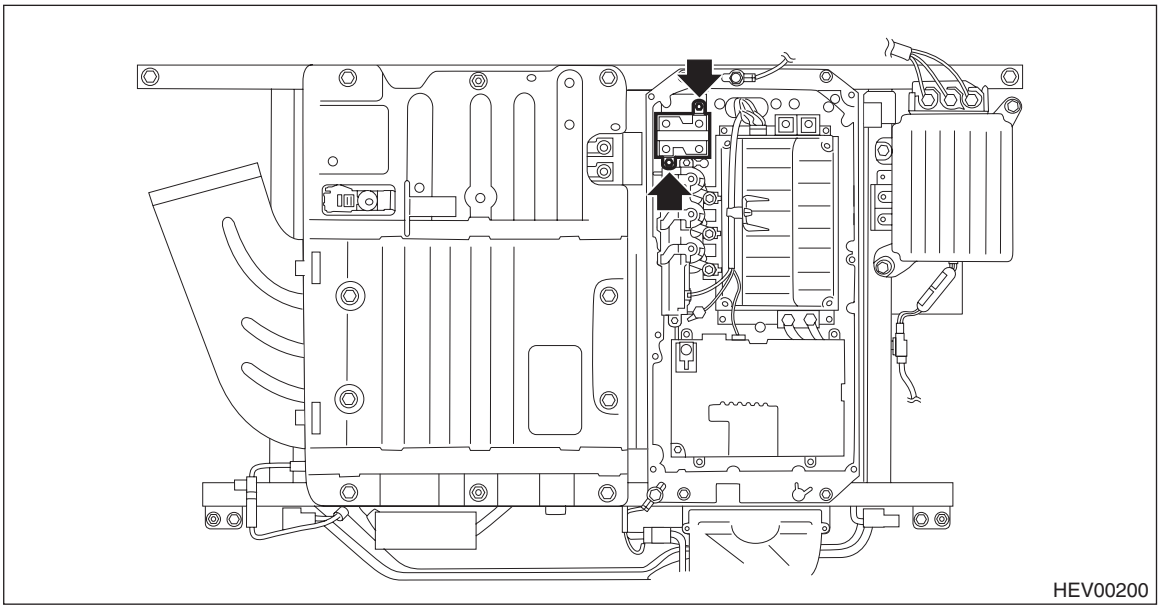


10) Remove the electric noise filter.
(1) Remove the bolts to remove the inverter shield.
(2) Remove the bolts and disconnect the bus bars between the high voltage battery and electric noise filter and between the electric noise filter and electric oil pump inverter respectively.

CAUTION:
Always wrap the high voltage battery terminal with insulating tape.



(3) Remove the bolts, and then remove the electric noise filter.



B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

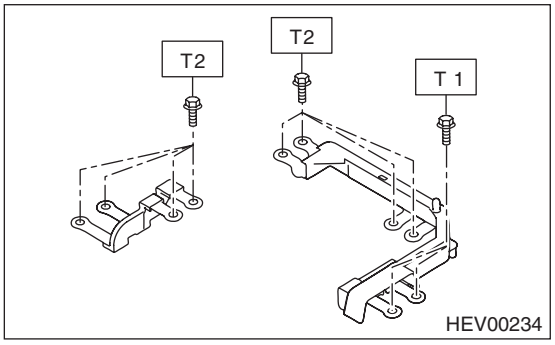
1) Install the electric noise filter.

NOTE:
The "F" mark of the electric noise filter should face toward the front of the vehicle when installed.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

2) Connect the bus bar.

Tightening torque:
T1: 6.5 N·m (0.7 kgf-m, 4.8 ft-lb)
T2: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



3) Install the inverter shield.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

4) Connect the ground terminal and the power cable.

CAUTION:
• When connecting the power cable, pay attention to the letters (U, V, and W) imprinted on the drive motor inverter amperage sensor body as well as on the protector of the power cable.
• Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
5) Install the cover - shield battery and the cover - shield seat.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
6) Install the ground terminal and inverter cover.

CAUTION:
Check that the sound proofing material on the inverter cover is not detached or damaged.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
7) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
8) Install the spacer - rear floor front.
9) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
10) Install the sub-trunk assembly and the spacer - rear floor side.
11) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

9. Hybrid Powertrain Control Module

A: NOTE

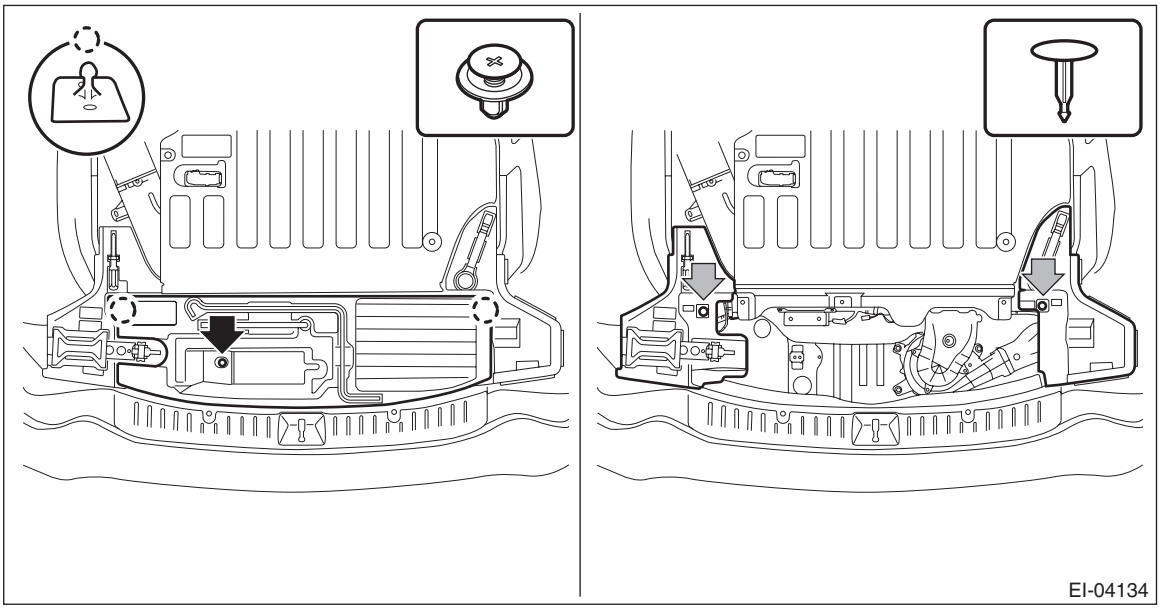
The hybrid powertrain control module is fixed to the engine control module (ECM) bracket. For operation procedures, refer to “FUEL INJECTION (FUEL SYSTEMS)” section. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>

10.DC/DC Converter

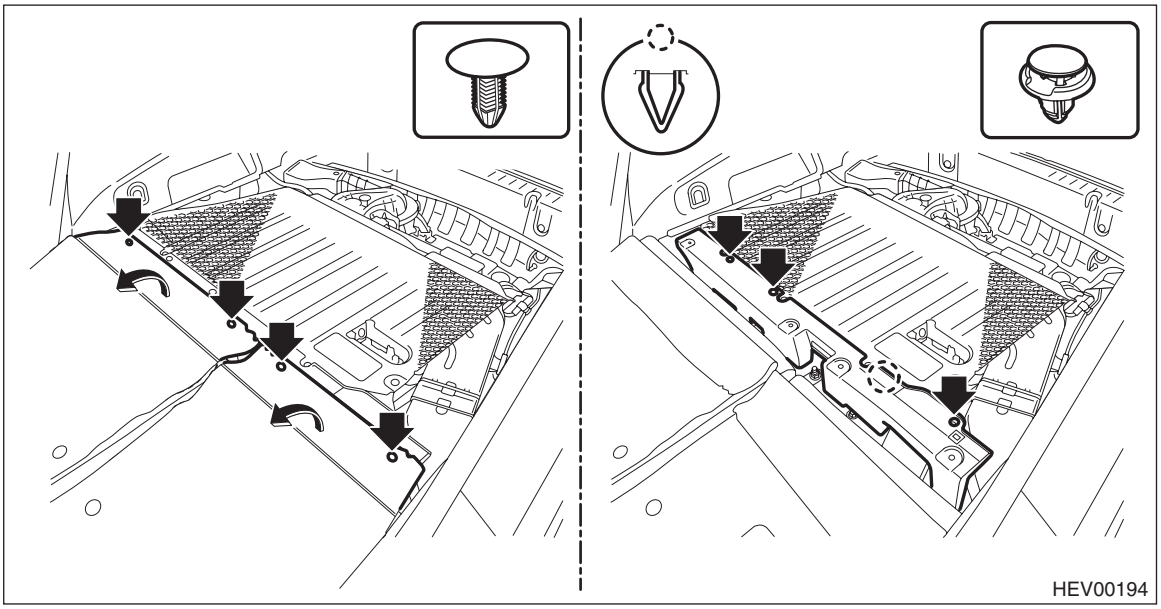
A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.

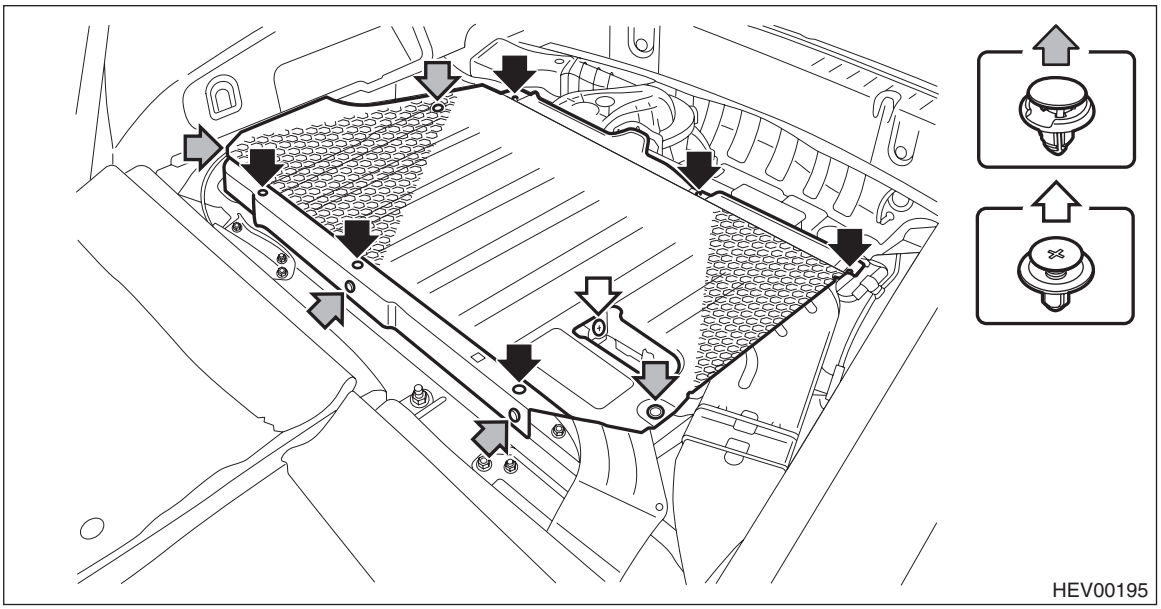


3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the spacer - rear floor front.
   (1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
   (2) Release the clips and claws, then detach the spacer - rear floor front.

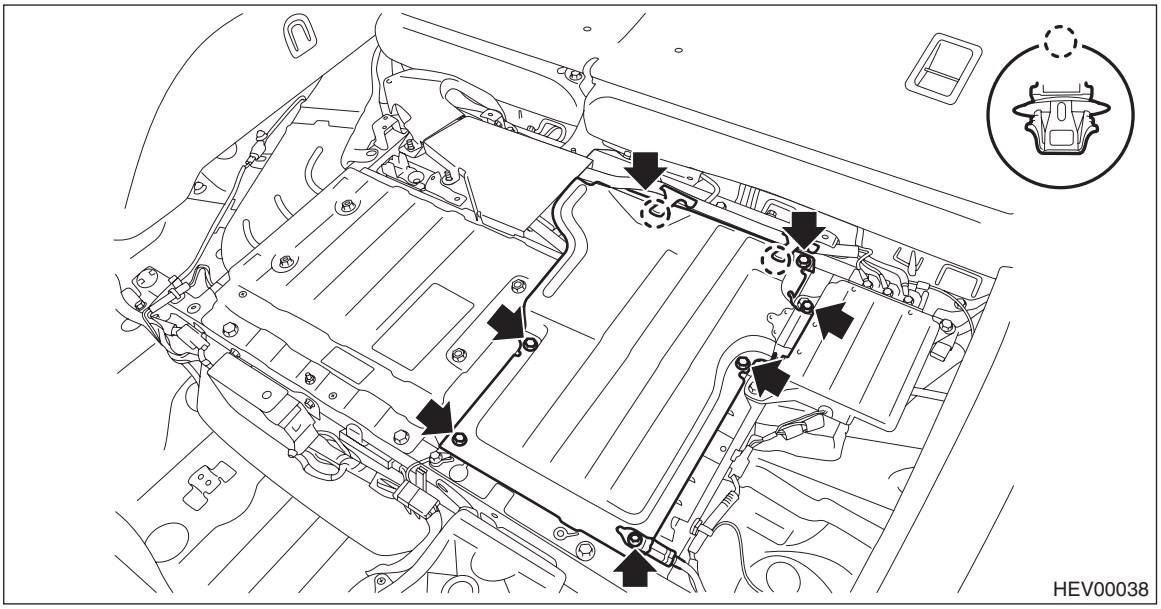


5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30



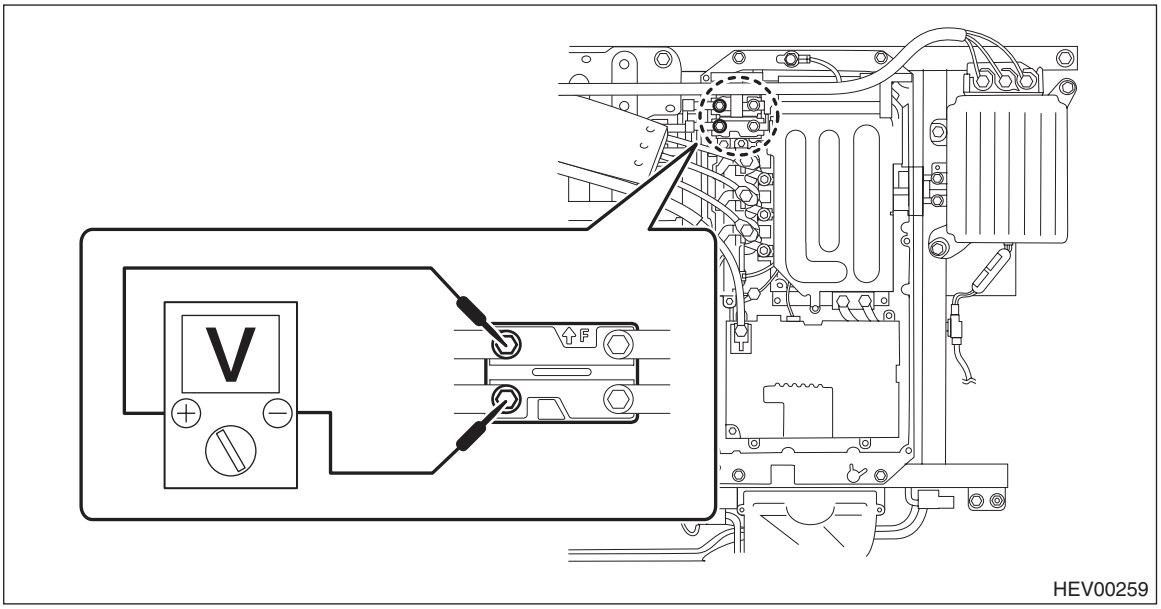
6) Remove the inverter cover.
(1) Remove the bolts and ground terminal.
(2) Release the cable clips, and remove the inverter cover.



7) Perform zero-voltage test.
(1) Measure the voltage of the high voltage DC line at the high voltage battery side of the electric noise filter.

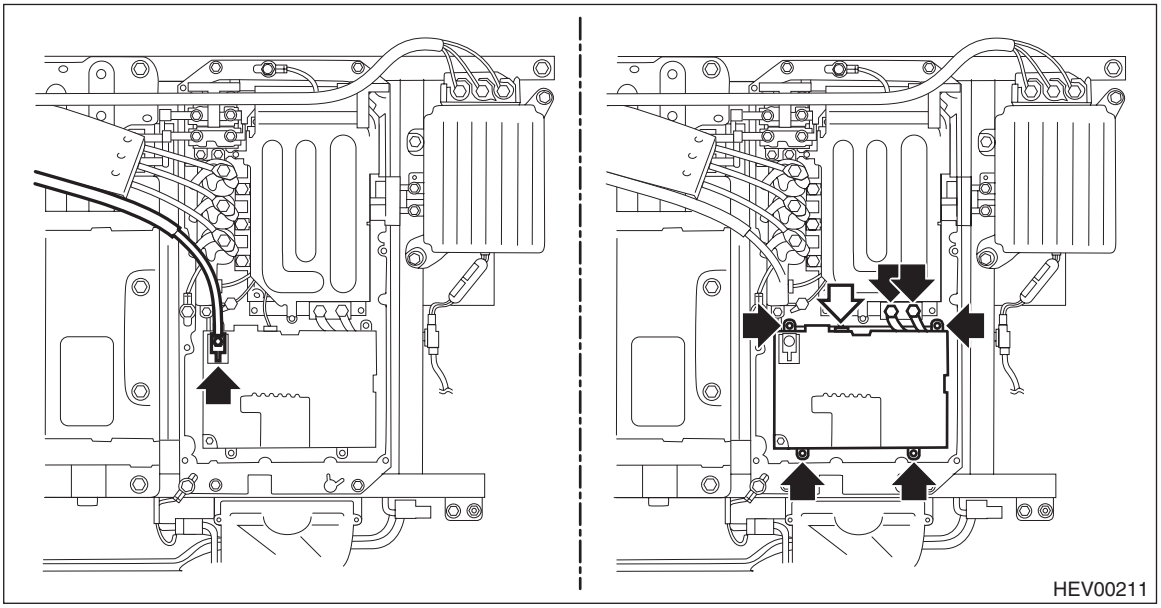
Preparation tool:
Insulation multimeter

Standard: 0 V



8) Remove the DC/DC converter.
(1) Remove the bolt and disconnect the power cable (12 V).

CAUTION:
Be careful not to use excessive force when disconnecting the power cable to avoid any damage.
(2) Remove the bolts, then disconnect the bus bar.
(3) Remove the connectors and bolts, and remove the DC/DC converter.



B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Install the DC/DC converter.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

2) Connect the bus bar.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

3) Connect the power cable (12 V).

CAUTION:
Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

4) Install the ground terminal and inverter cover.

CAUTION:
Check that the sound proofing material on the inverter cover is not detached or damaged.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

5) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

6) Install the spacer - rear floor front.
7) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
8) Install the sub-trunk assembly and the spacer - rear floor side.
9) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

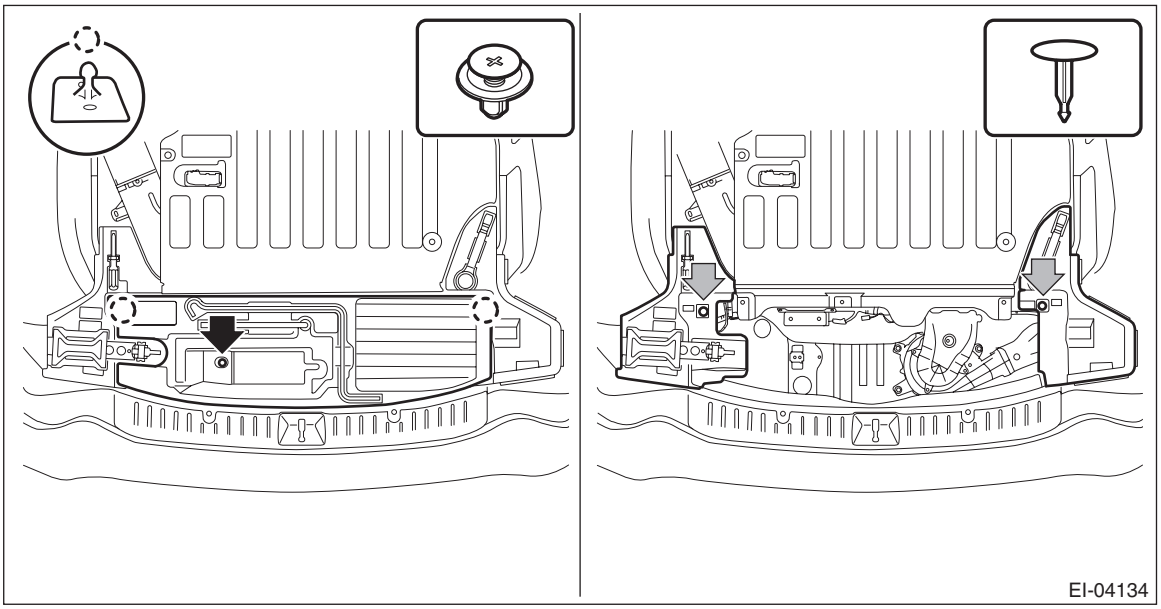
11.Inverter

A: REMOVAL

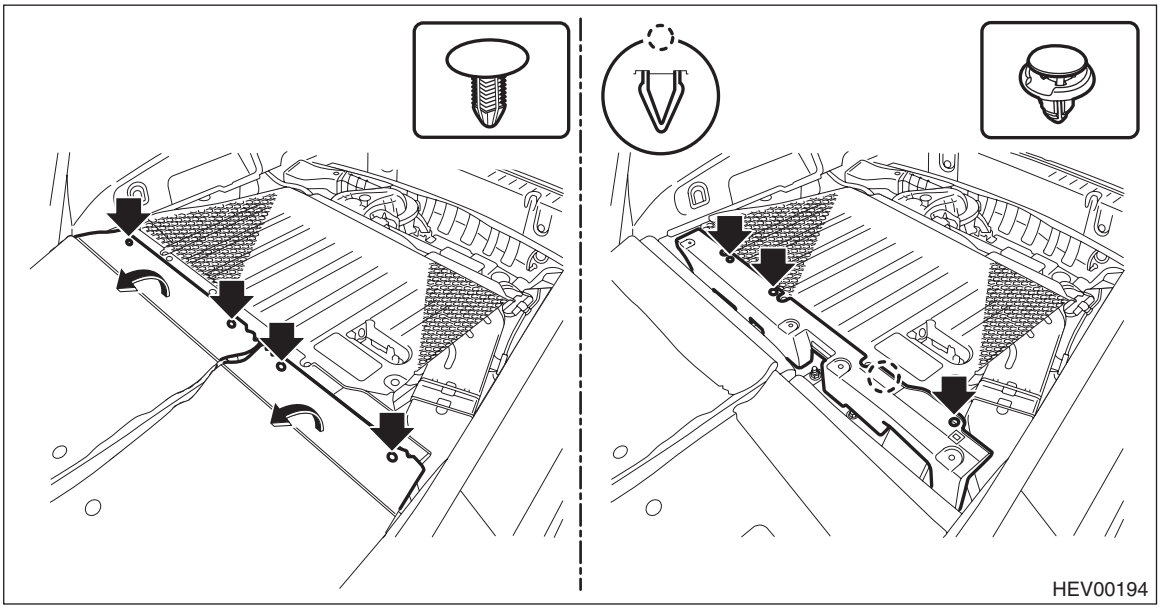
1. DRIVE MOTOR INVERTER

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.

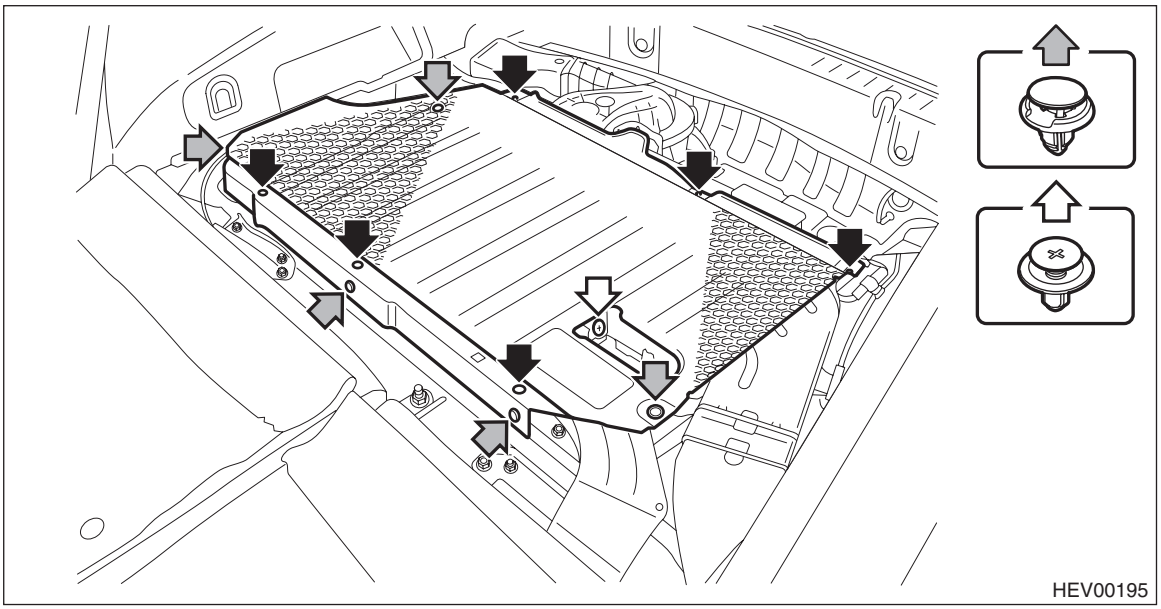


3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the spacer - rear floor front.
   (1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
   (2) Release the clips and claws, then detach the spacer - rear floor front.

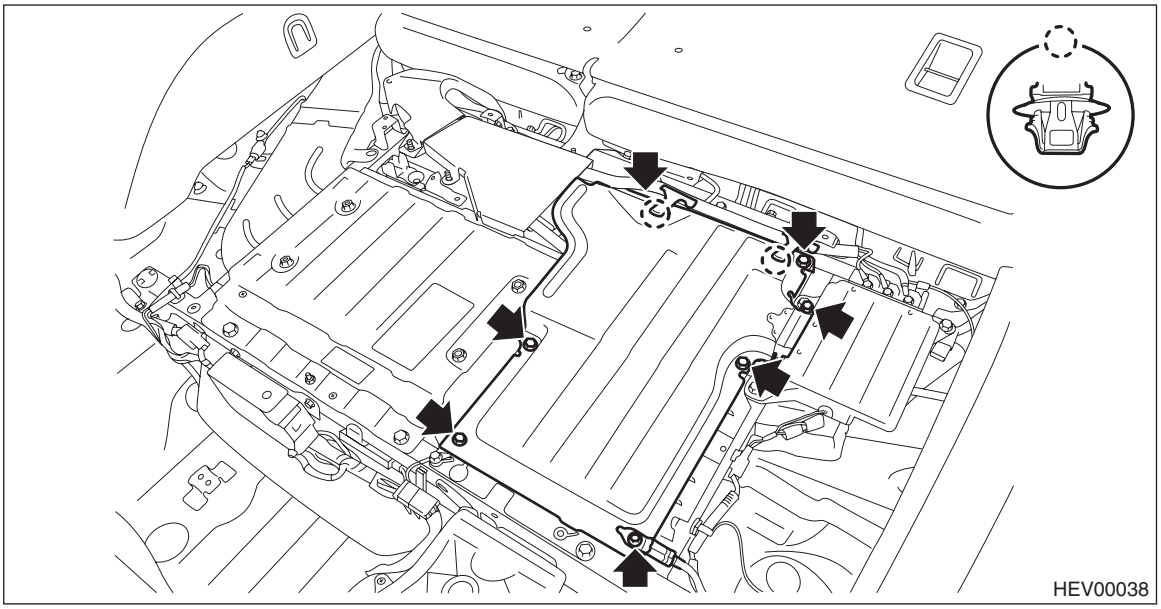


5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30



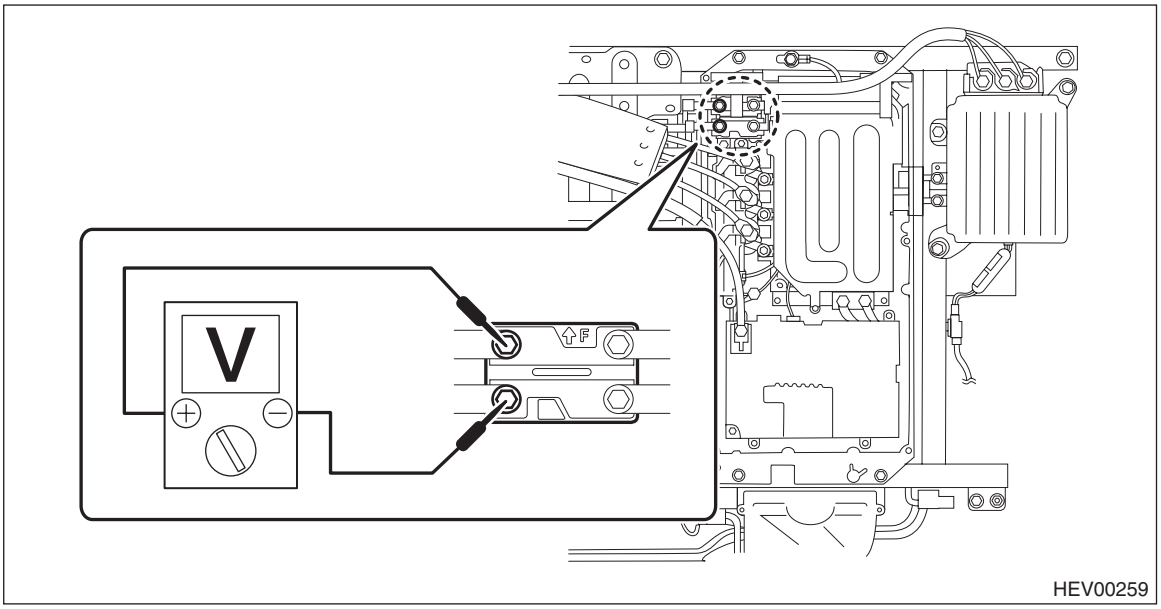
6) Remove the inverter cover.
(1) Remove the bolts and ground terminal.
(2) Release the cable clips, and remove the inverter cover.



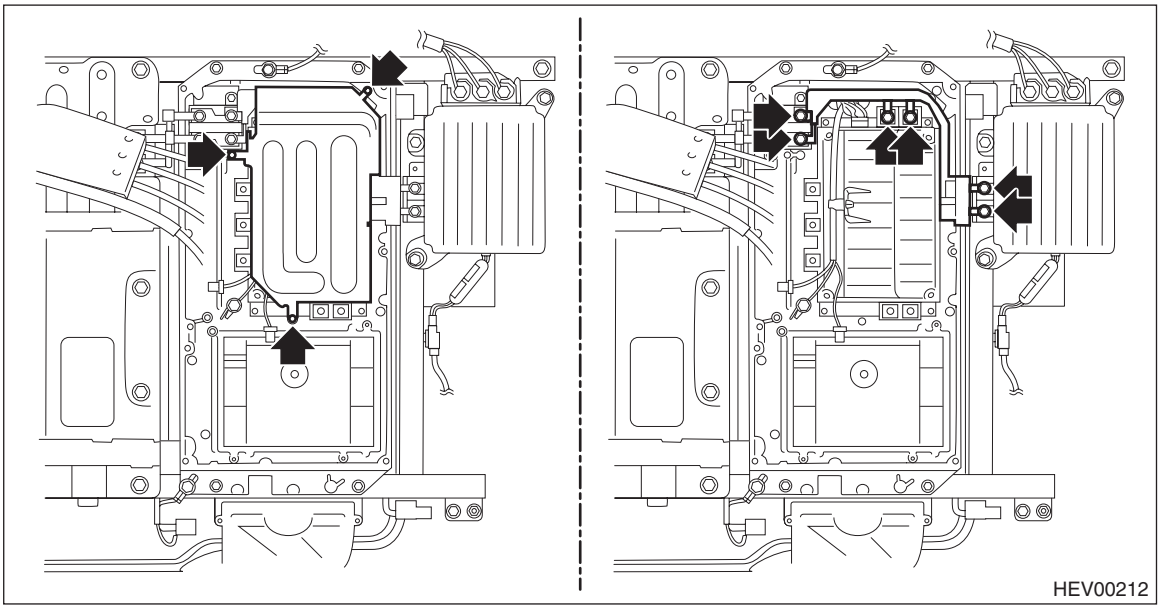
7) Perform zero-voltage test.
(1) Measure the voltage of the high voltage DC line at the high voltage battery side of the electric noise filter.

Preparation tool:
Insulation multimeter

Standard: 0 V

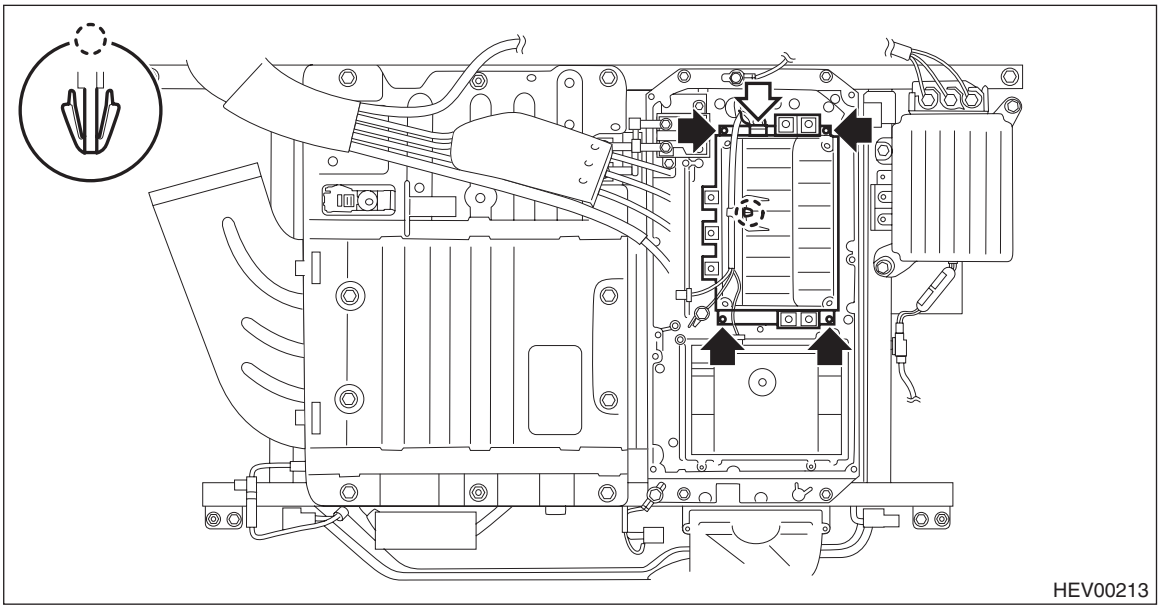


8) Remove the DC/DC converter. <Ref. to HEV-38, REMOVAL, DC/DC Converter.>
9) Remove the drive motor inverter amperage sensor. <Ref. to HEV-27, REMOVAL, Drive Motor Inverter Current Sensor.>
10) Remove the drive motor inverter.
(1) Remove the bolts to remove the inverter shield.
(2) Remove the bolts, then disconnect the bus bar between the electric noise filter and the electric oil pump inverter.



(3) Release the connector and the harness clip.

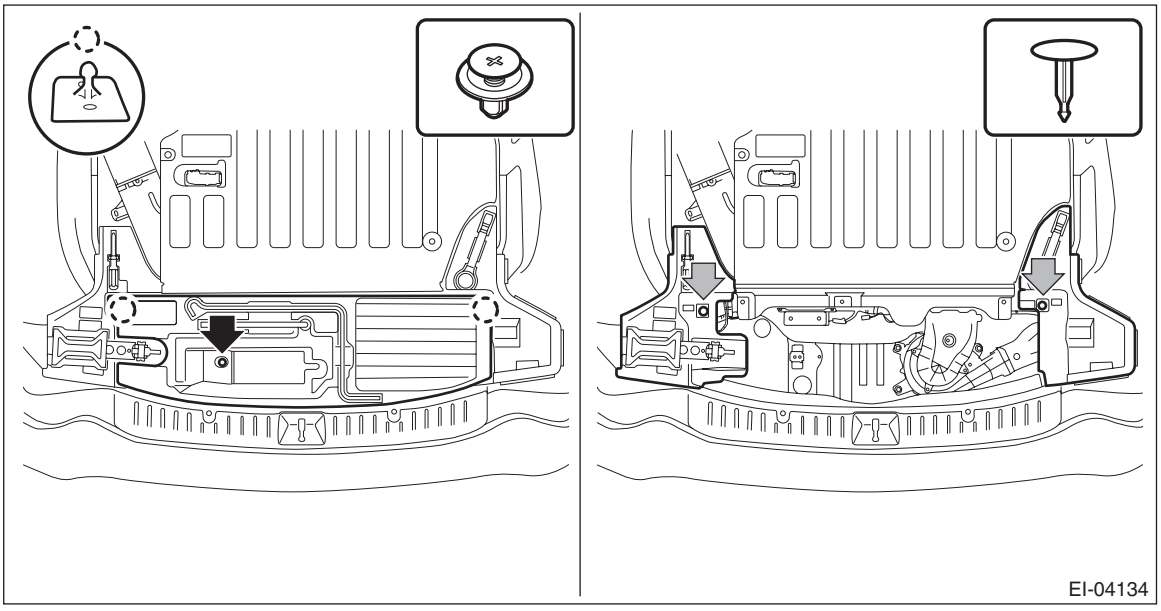
(4) Remove the bolts, and then remove the drive motor inverter.



2. ELECTRIC OIL PUMP INVERTER

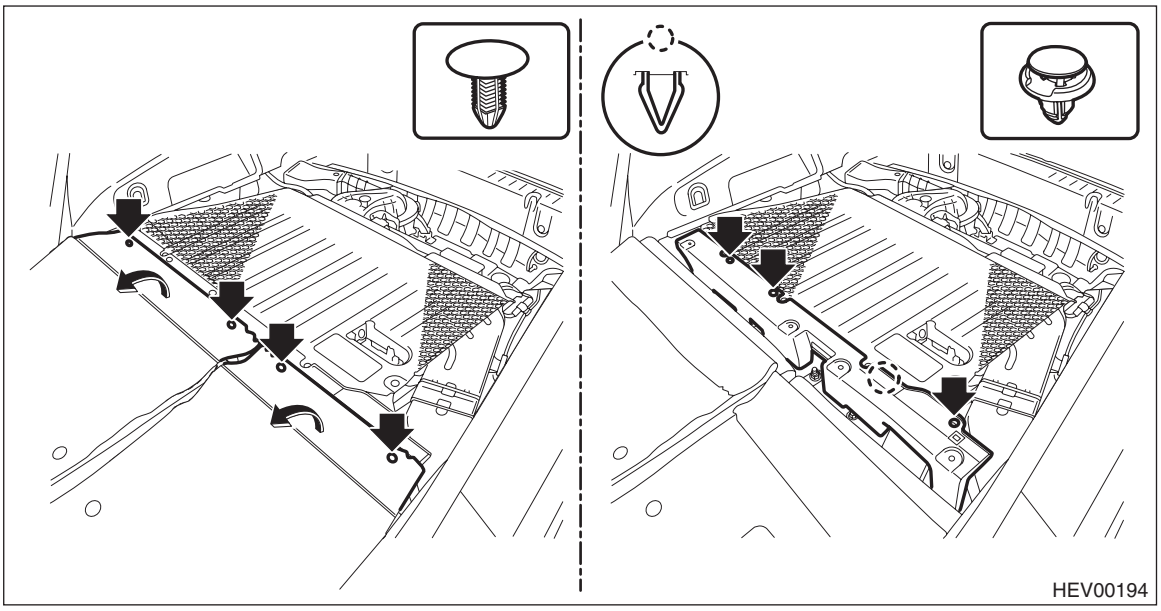
WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.



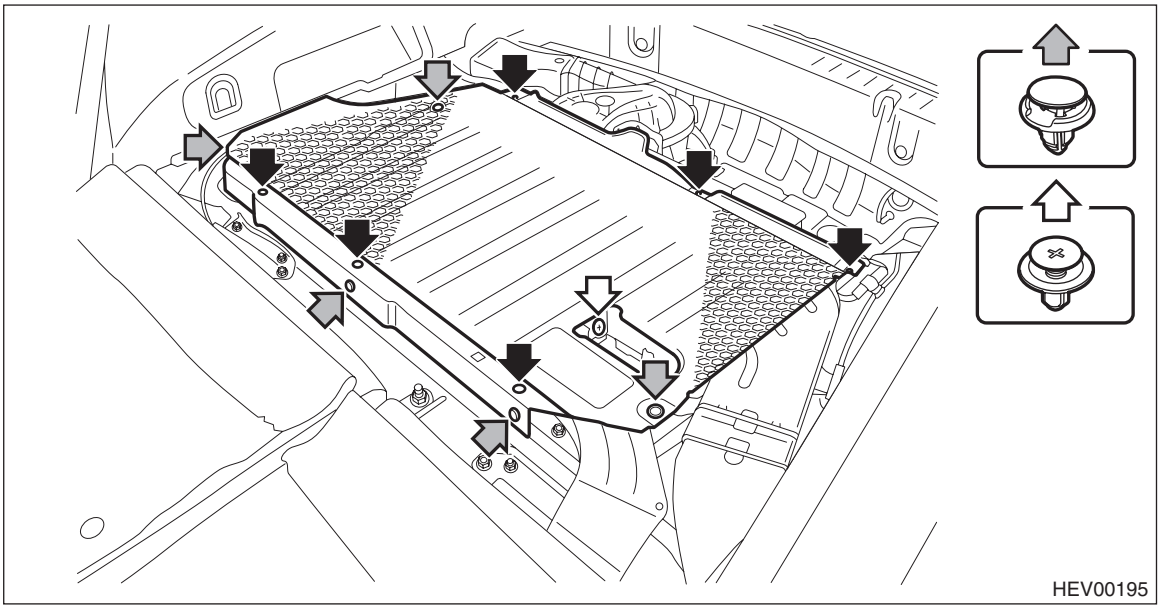
3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>

4) Remove the spacer - rear floor front.
(1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
(2) Release the clips and claws, then detach the spacer - rear floor front.

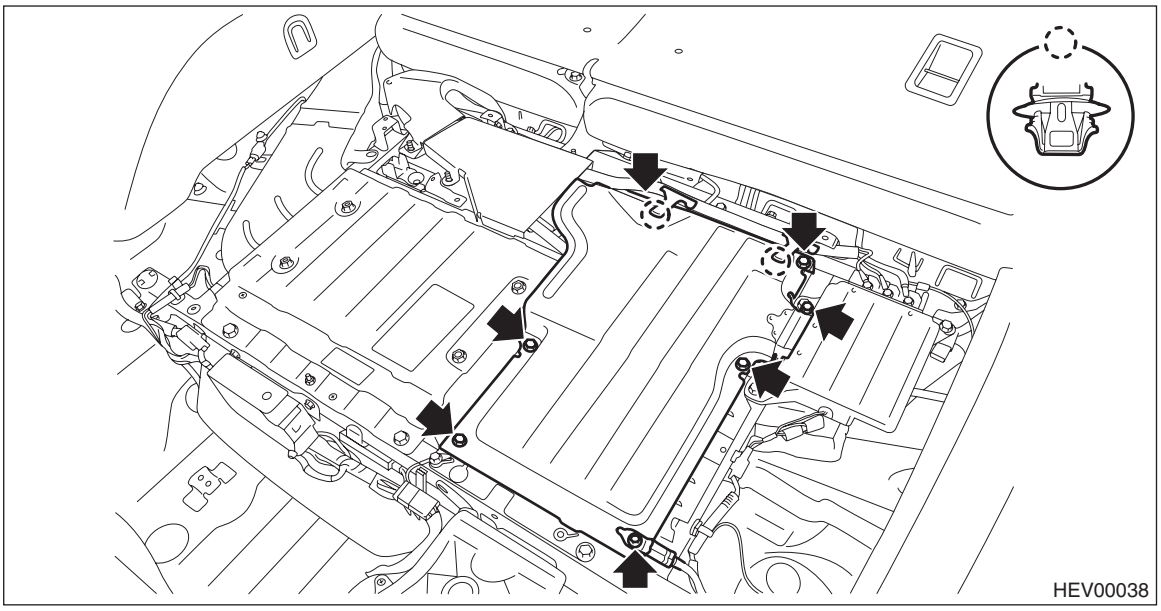


5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30



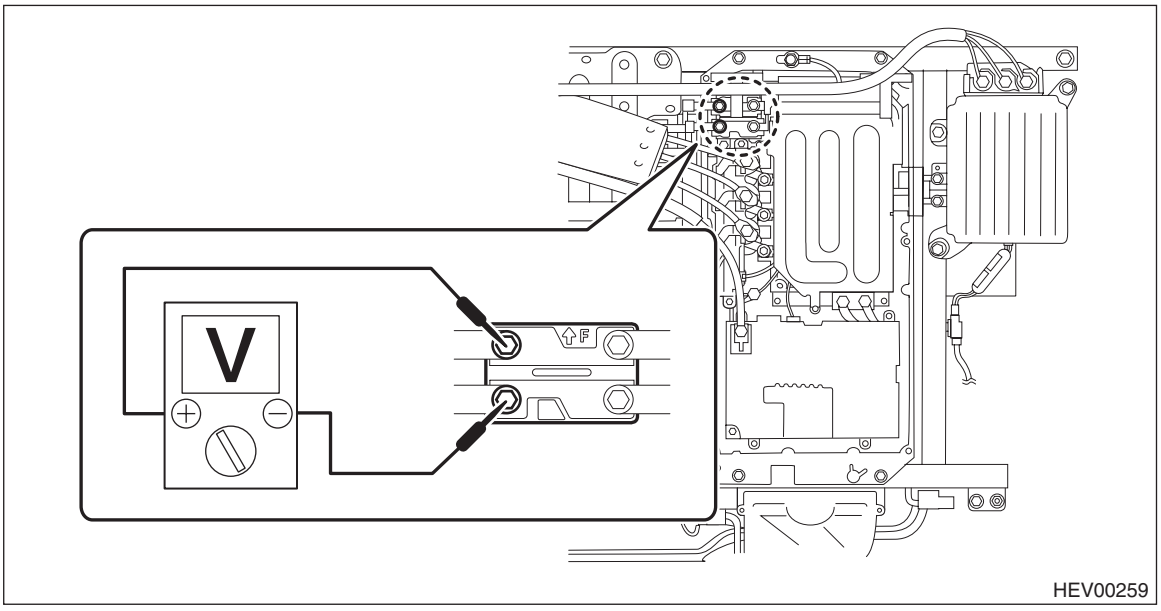
6) Remove the inverter cover.
   (1) Remove the bolts and ground terminal.
   (2) Release the cable clips, and remove the inverter cover.



7) Perform zero-voltage test.
   (1) Measure the voltage of the high voltage DC line at the high voltage battery side of the electric noise filter.

Preparation tool:
Insulation multimeter

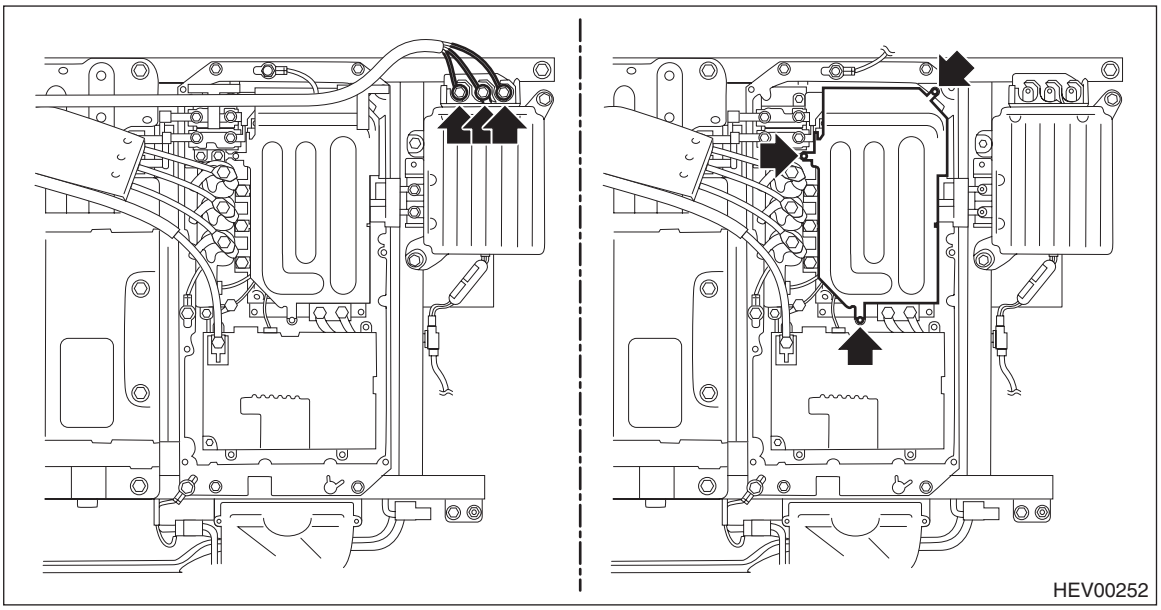
Standard: 0 V



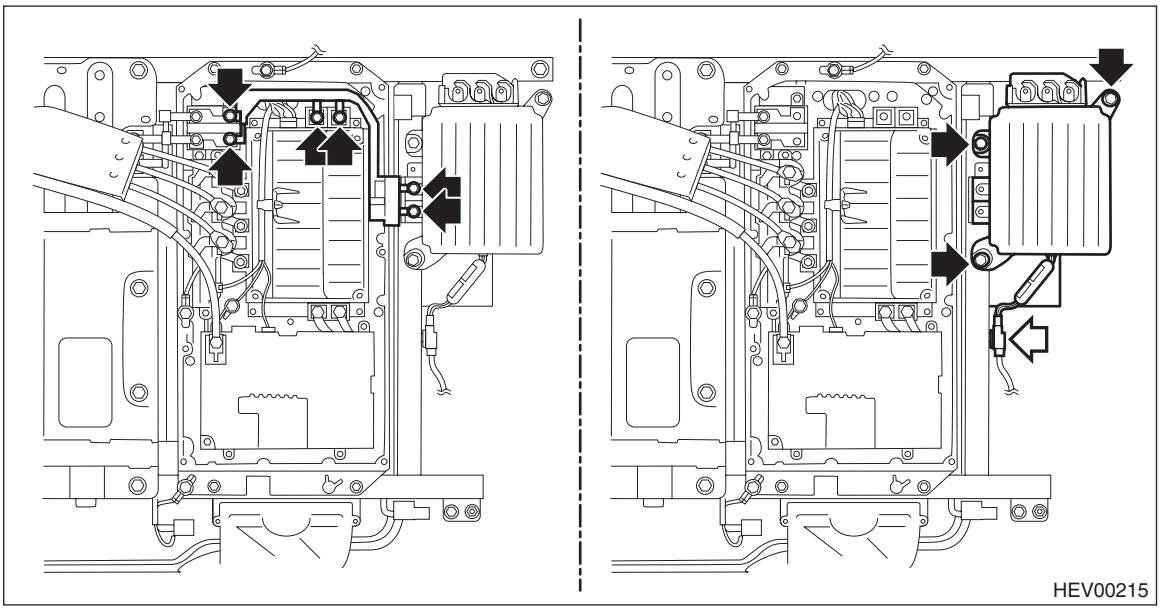
8) Remove the electric oil pump inverter.
(1) Remove the bolt and disconnect the power cable (100 V).

CAUTION:
- **Be careful not to use excessive force when disconnecting the power cable to avoid any damage.**
- **Always wrap the disconnected power cable terminals with insulating tape.**

(2) Remove the bolts to remove the inverter shield.



(3) Remove the bolts, then disconnect the bus bar between the electric noise filter and the electric oil pump inverter.
(4) Remove the connectors and bolts, and remove the electric oil pump inverter.



(5) Remove the inverter spacer from the electric oil pump inverter as necessary.

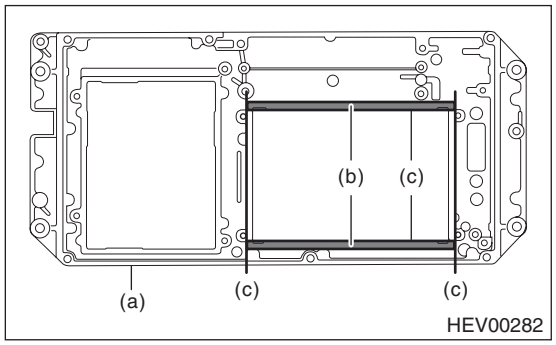
B: INSTALLATION

1. DRIVE MOTOR INVERTER

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Install the drive motor inverter.

CAUTION:
Replace the EPT sealer attached to the inverter frame assembly with a new part.

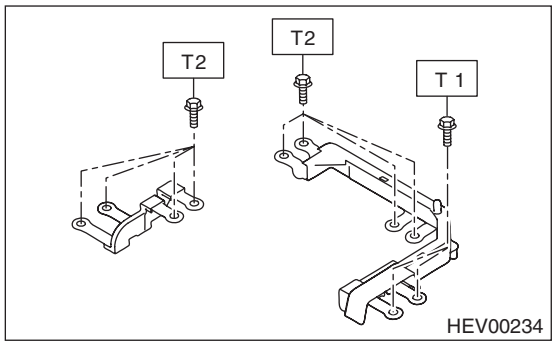


(a) Inverter frame ASSY
(b) EPT sealer
(c) Reference line for attachment

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

2) Connect the bus bar.

Tightening torque:
T1: 6.5 N·m (0.7 kgf-m, 4.8 ft-lb)
T2: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



3) Install the inverter shield.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

4) Install the drive motor inverter amperage sensor. <Ref. to HEV-30, INSTALLATION, Drive Motor Inverter Current Sensor.>
5) Install the DC/DC converter. <Ref. to HEV-41, INSTALLATION, DC/DC Converter.>
6) Install the ground terminal and inverter cover.

CAUTION:
Check that the sound proofing material on the inverter cover is not detached or damaged before installing the inverter cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

7) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

8) Install the spacer - rear floor front.
9) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
10) Install the sub-trunk assembly and the spacer - rear floor side.
11) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

2. ELECTRIC OIL PUMP INVERTER

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

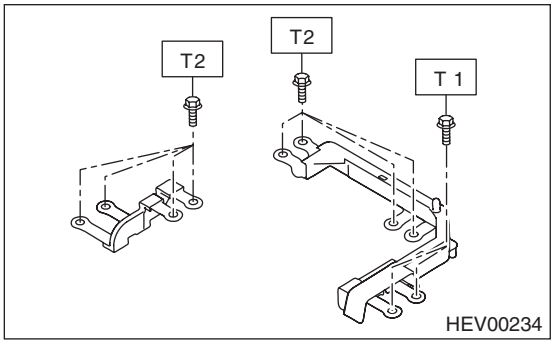
1) Install the electric oil pump inverter.

NOTE:
If the inverter spacer has been removed, install it to the electric oil pump inverter.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

2) Connect the bus bar.

Tightening torque:
T1: 6.5 N·m (0.7 kgf-m, 4.8 ft-lb)
T2: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



3) Install the inverter shield.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

4) Connect the power cable (100 V).

CAUTION:
• Connect the power cable properly referring to the letters (U, V, and W) imprinted on the electric oil pump inverter body. The power cable with the identification tape is connected to (U) and the power cable with a claw is connected to (V).
• Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

5) Install the ground terminal and inverter cover.

CAUTION:
Check that the sound proofing material on the inverter cover is not detached or damaged.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

6) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

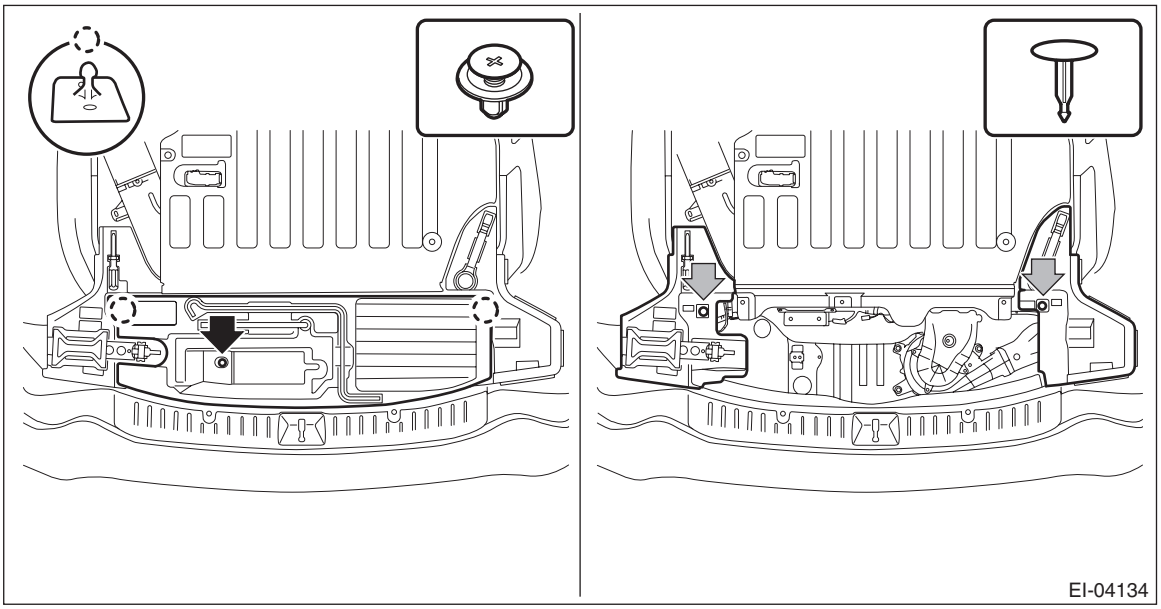
7) Install the spacer - rear floor front.
8) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
9) Install the sub-trunk assembly and the spacer - rear floor side.
10) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

12.Power Cable

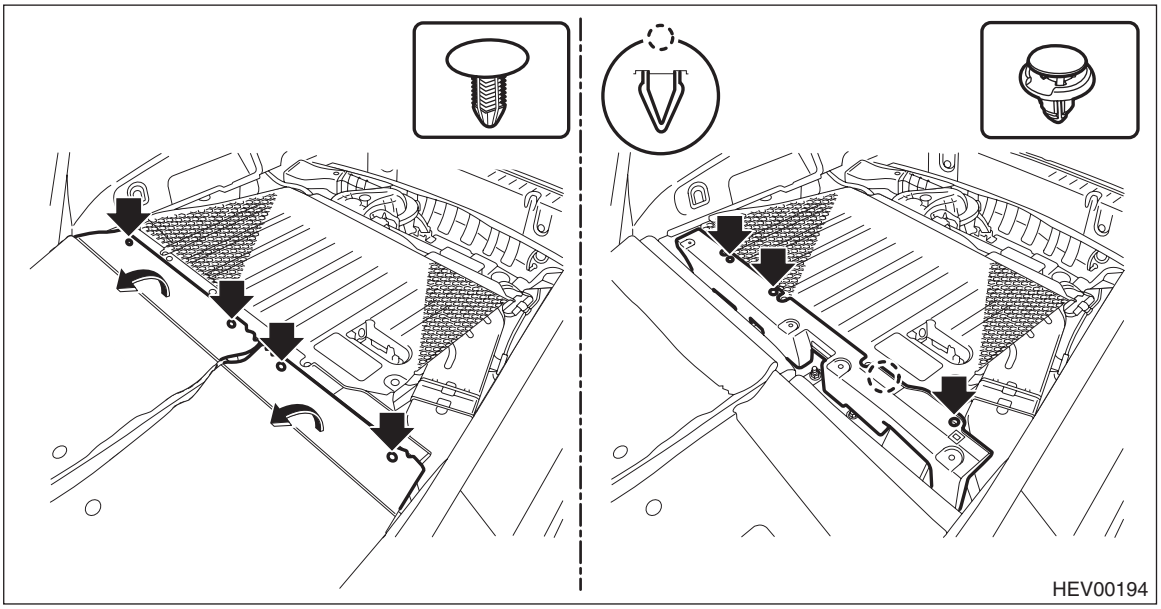
A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.

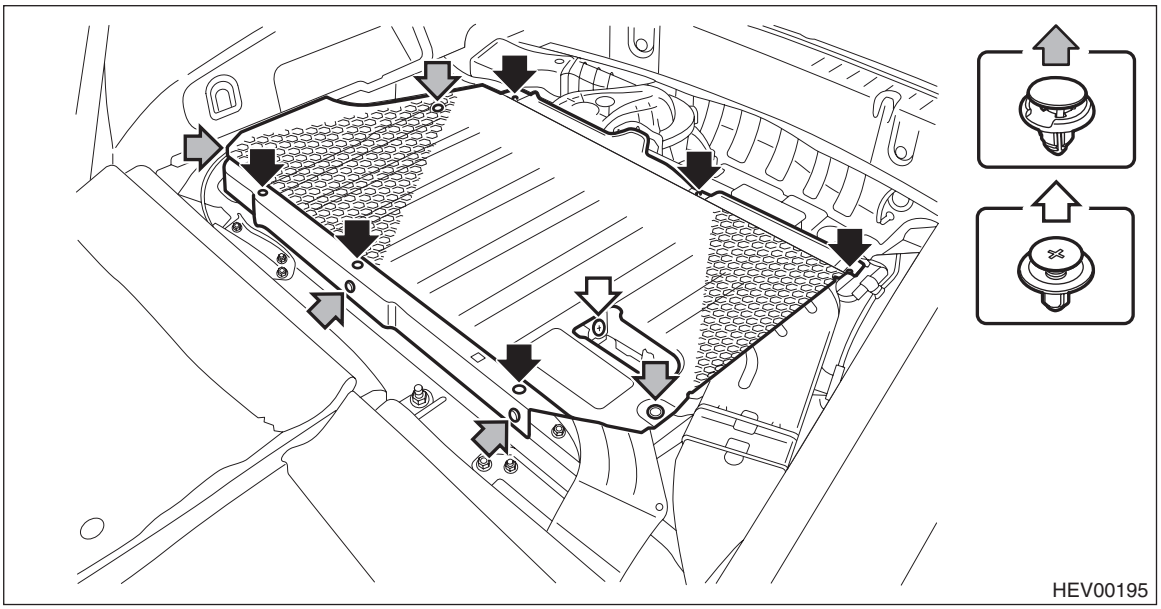


3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the spacer - rear floor front.
   (1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
   (2) Release the clips and claws, then detach the spacer - rear floor front.

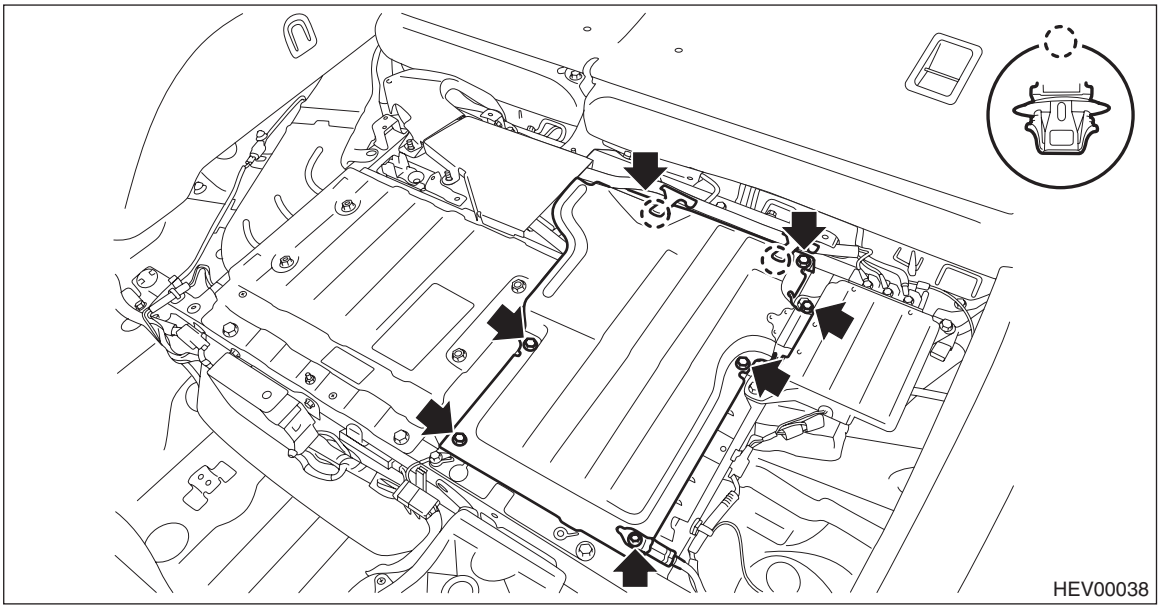


5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30



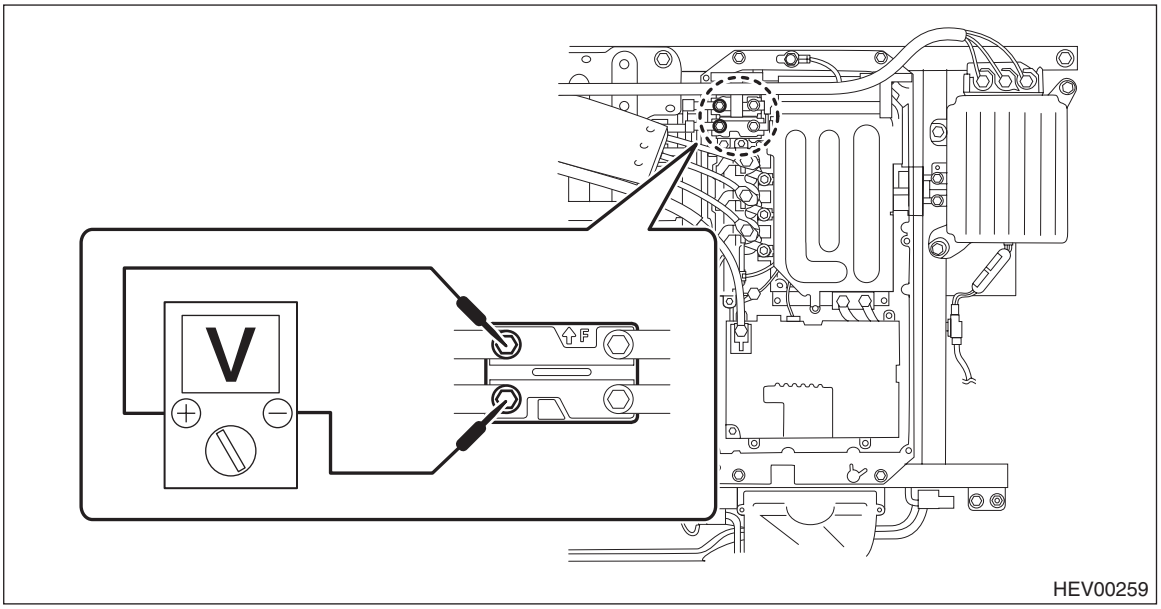
6) Remove the inverter cover.
(1) Remove the bolts and ground terminal.
(2) Release the cable clips, and remove the inverter cover.



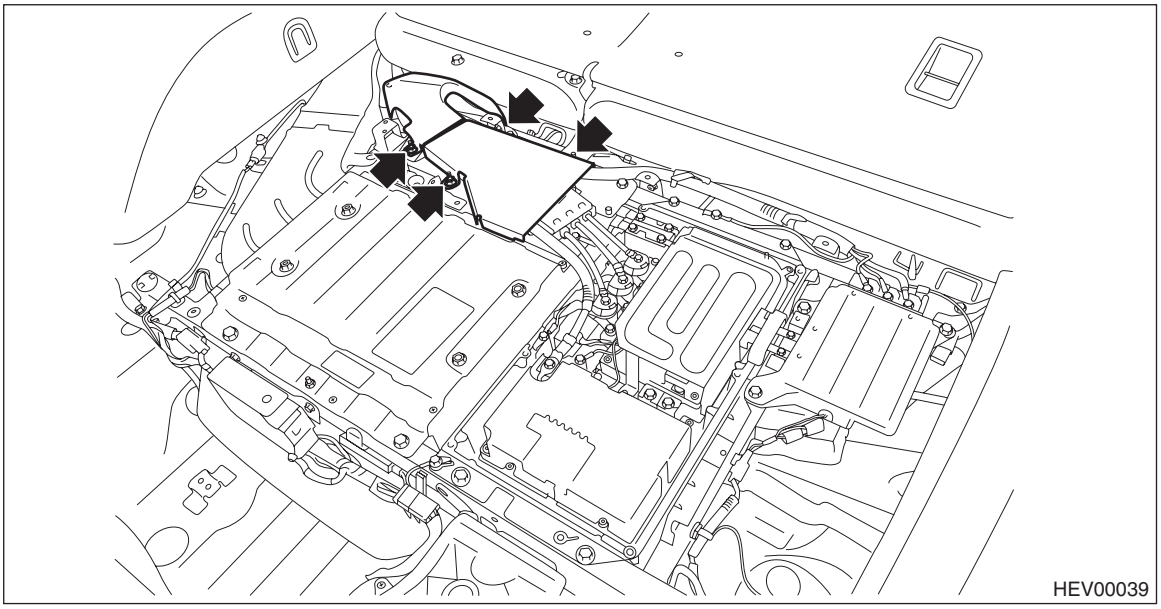
7) Perform zero-voltage test.
(1) Measure the voltage of the high voltage DC line at the high voltage battery side of the electric noise filter.

Preparation tool:
Insulation multimeter

Standard: 0 V

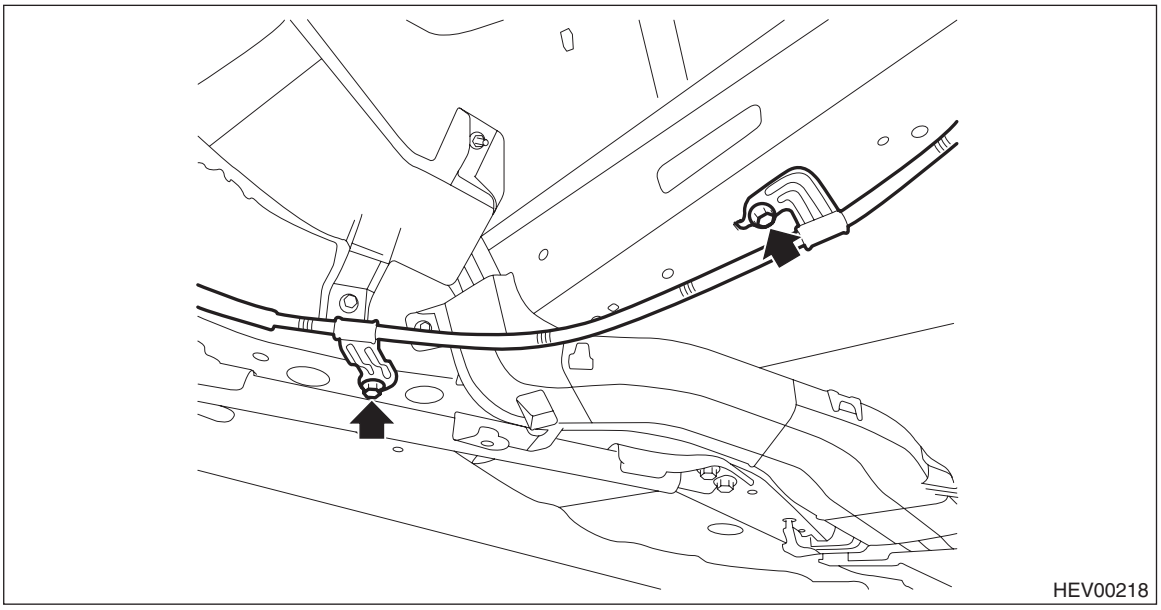


8) Remove the nut and remove the cover - shield battery and the cover - shield seat.



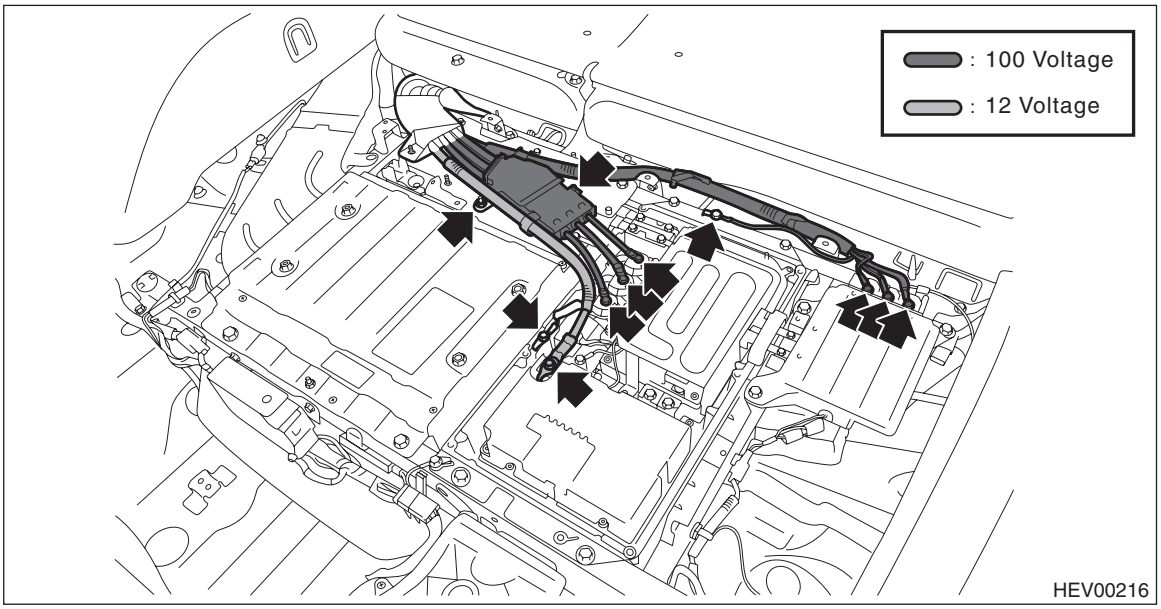
9) Remove the front under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
10) Remove the floor under protector. <Ref. to EI-33, REMOVAL, Floor Under Protector.>
11) Remove the fuel tank. <Ref. to FU(H4DO(HEV))-106, REMOVAL, Fuel Tank.>

12) Remove the bolt securing the cable assembly - parking brake.

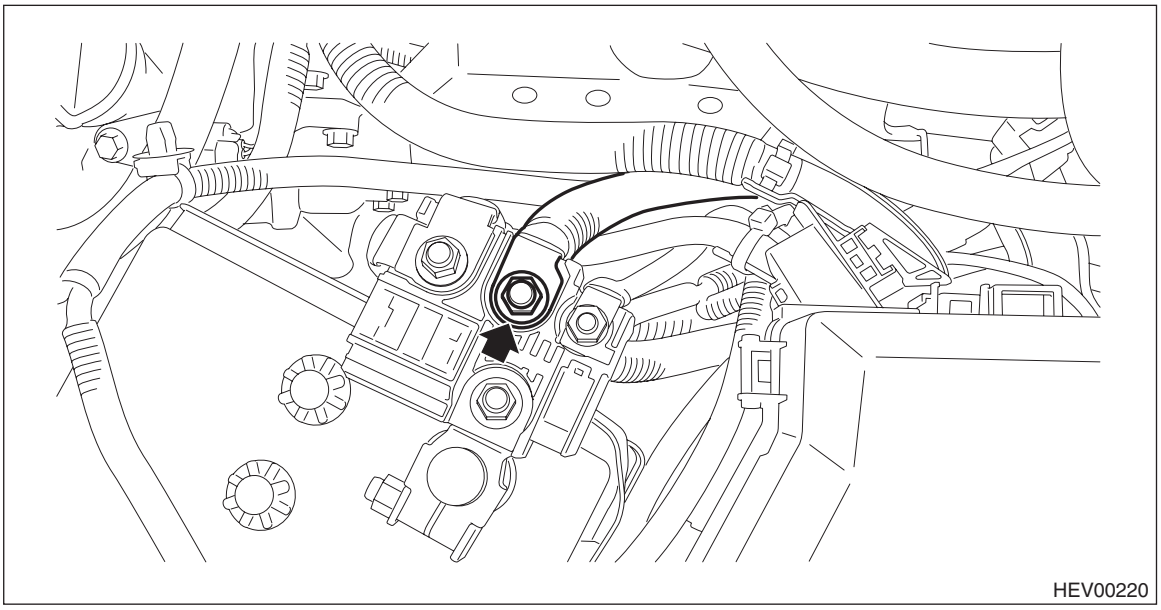


13) Remove the power cable.
(1) Remove the bolts and nuts and disconnect the ground terminal and the power cable.

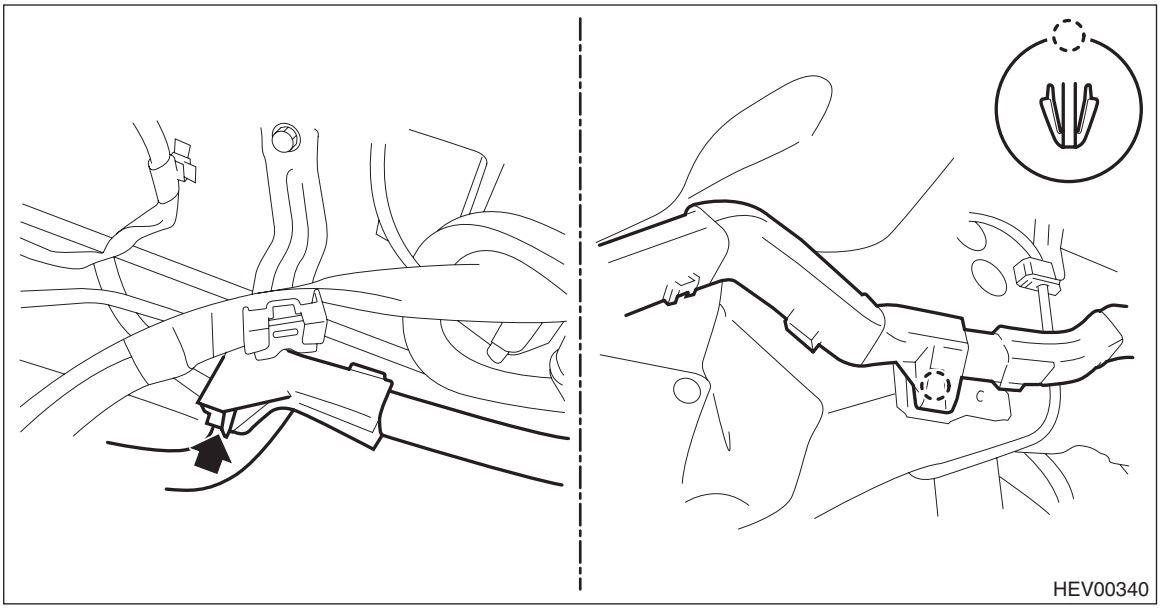
CAUTION:
- **Be careful not to use excessive force when disconnecting the power cable to avoid any damage.**
- **Always wrap the disconnected power cable terminals with insulating tape.**



(2) Remove the nut and disconnect the power cable positive terminal from the 12 volt auxiliary battery.



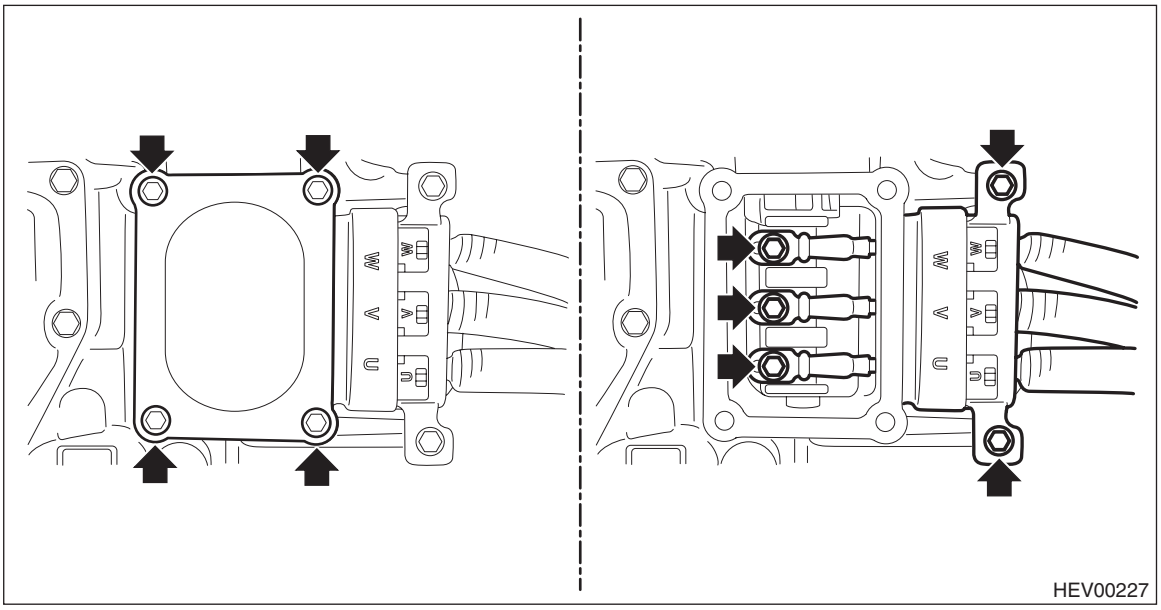
(3) Release the power cable clamp and the power cable clip.



(4) Remove the bolt, then remove the power connect cover and the gasket.

(5) Remove the bolts and nuts to pull out the terminal box assembly.

CAUTION:
- **Be sure to insulate the power cable terminal by wrapping it with insulating tape.**
- **Be careful not to use excessive force or damage the power cable during removal.**

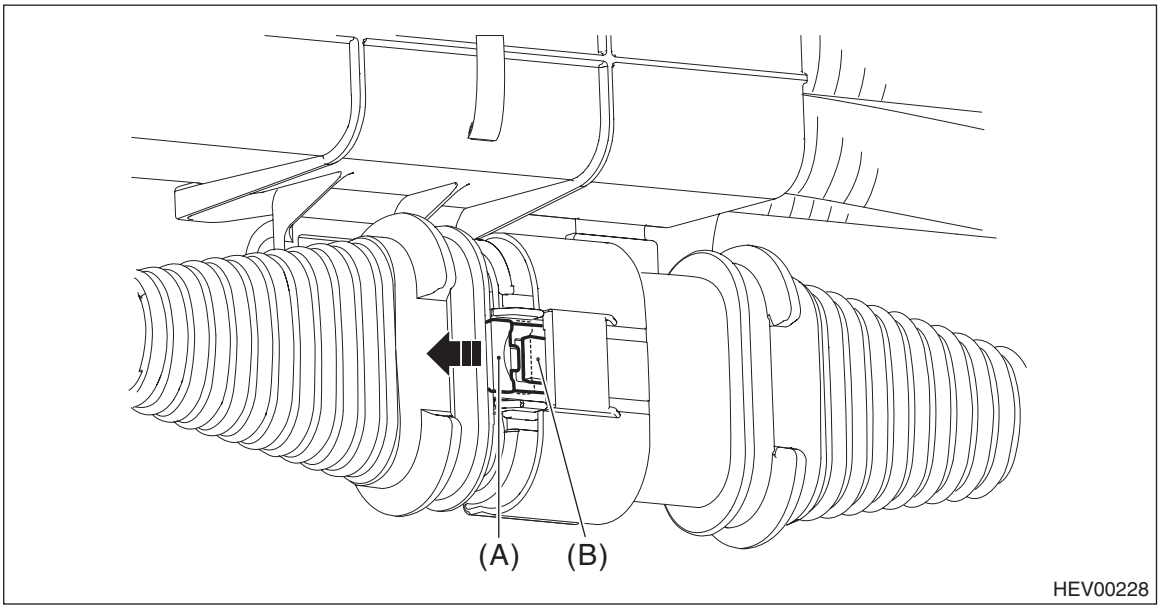


HEV00227

NOTE:
To prevent intrusion of foreign matter such as oil, water and dirt after removal, install the power connect cover and cover the terminal box assembly with tape.

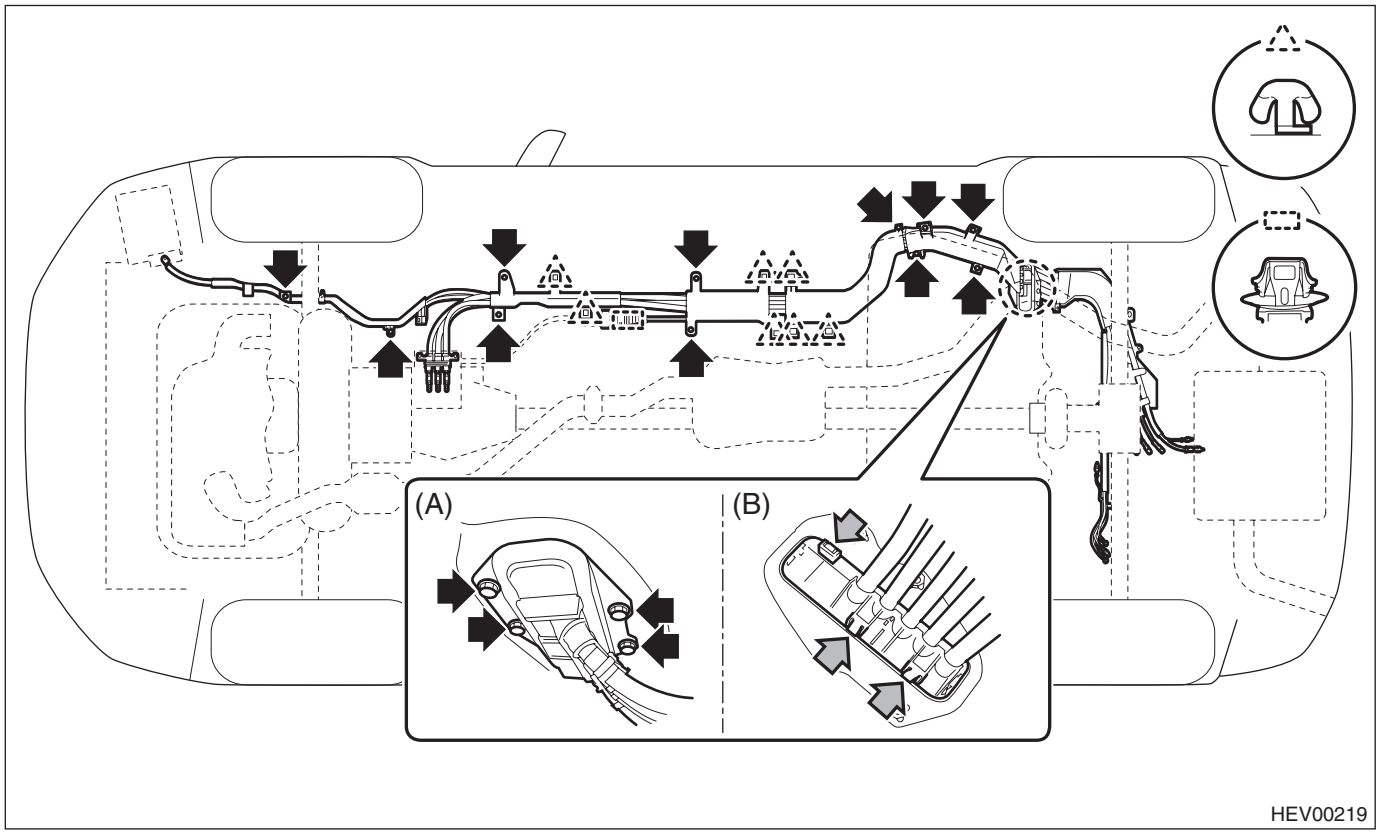
(6) Push the claw (B) while pulling the slide lock (A) in the direction of the arrow, and then disconnect the electric oil pump harness connector.

CAUTION:
- **After disconnecting the connectors, cover the female side connector with a clean cloth or plastic bag to protect from intrusion of foreign matter such as oil, water, or dusts. Also, cover the male side connector using insulating tape.**
- **If any foreign matter is found, remove them carefully so that the electrodes in the connector are not damaged. If there is any moisture, make it dry completely.**
- **Be careful not to use excessive force when removing the electric oil pump harness connector to avoid any damage.**



HEV00228

(7) Remove the bolts and nuts, release the clips and claws, and disconnect the power cable from the vehicle.



(A) Outside passenger room (B) Passenger room side

B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Install the power cable.

CAUTION:
• When connecting the power cable, pay attention to the letters (U, V, and W) imprinted on the drive motor inverter amperage sensor body as well as on the protector of the power cable.
• Connect the power cable properly referring to the letters (U, V, and W) imprinted on the electric oil pump inverter body. The power cable with the identification tape is connected to (U) and the power cable with a claw is connected to (V).
• Match the letters (U, V, and W) imprinted on both the power cable and the transmission body, then insert the cable to the transmission and fix securely.
• Insert the electric oil pump connector into the mating connector until a click is heard and lock it securely.
• Be careful not to allow foreign matter from entering the drive motor case assembly. If any foreign matter is found, remove them carefully so that the electrodes are not damaged.
• If there is any moisture in the drive motor case assembly, dry it completely before continuing work.
• Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.
• Replace the power cable clip with a new part.
• Replace power connect cover gasket with a new part.

Tightening torque:
Power cable: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
Power connect cover: 25 N·m (2.5 kgf-m, 18.4 ft-lb)

2) Install the cable assembly - parking brake bolt.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

3) Install the fuel tank. <Ref. to FU(H4DO(HEV))-112, INSTALLATION, Fuel Tank.>
4) Install the front under protector. <Ref. to EI-33, INSTALLATION, Floor Under Protector.>
5) Install the front under cover. <Ref. to EI-31, INSTALLATION, Front Under Cover.>
6) Install the cover - shield battery and the cover - shield seat.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

7) Install the ground terminal and inverter cover.

CAUTION:
Check that the sound proofing material on the inverter cover is not detached or damaged.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

8) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

9) Install the spacer - rear floor front.
10) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
11) Install the sub-trunk assembly and the spacer - rear floor side.
12) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

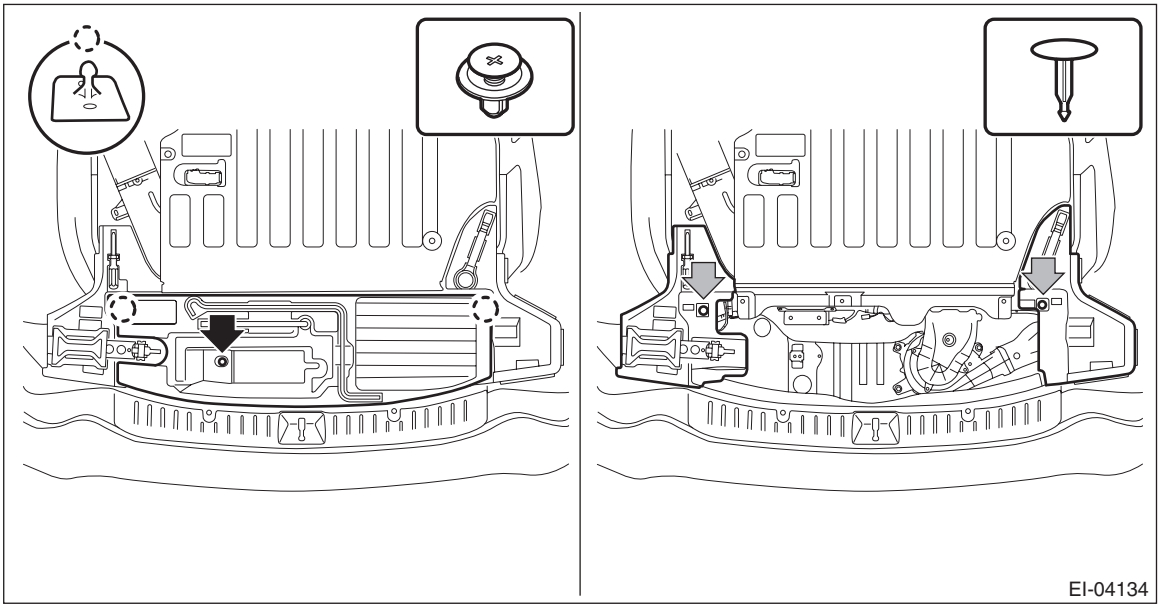
13.High Voltage Battery Cooling System

A: REMOVAL

1. COOLING DUCT FRONT (FRONT)

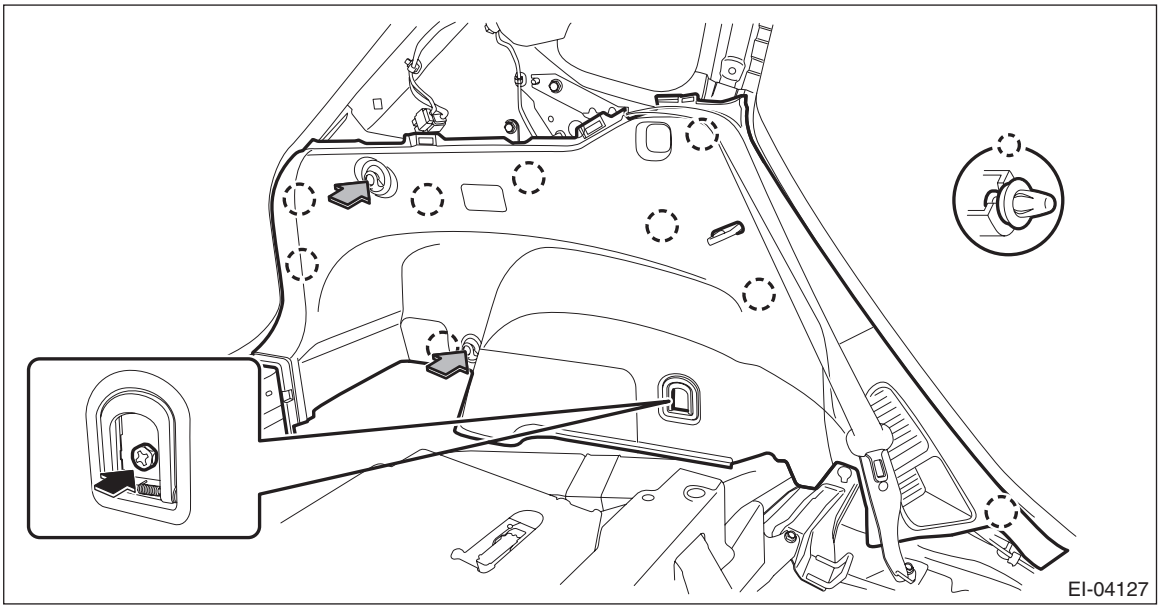
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the mat - rear floor CTR.
3) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side LH.

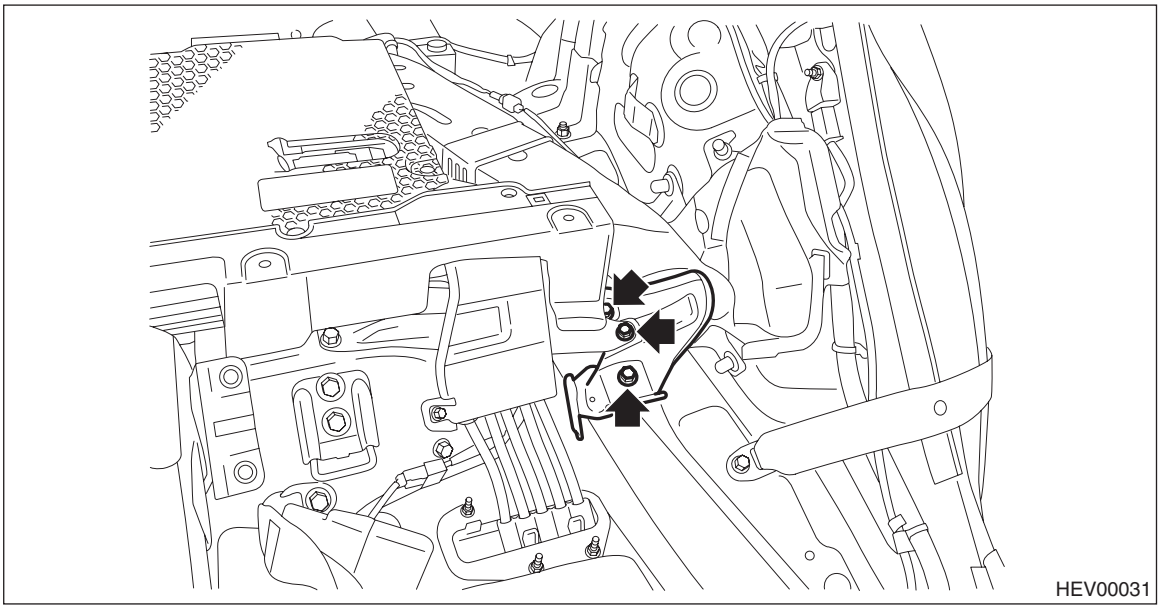


4) Remove the rear seat cushion assembly. <Ref. to SE-24, REMOVAL, Rear Seat.>
5) Remove the trim panel - rear apron LH.
   (1) Remove the following parts. Refer to “Rear Quarter Trim” of “EXTERIOR/INTERIOR TRIM” section for the work procedures. <Ref. to EI-97, REMOVAL, Rear Quarter Trim.>
   - Trim panel - rear quarter pillar UPR LH
   - Cover side sill - rear INN LH
   - Trim panel - rear skirt

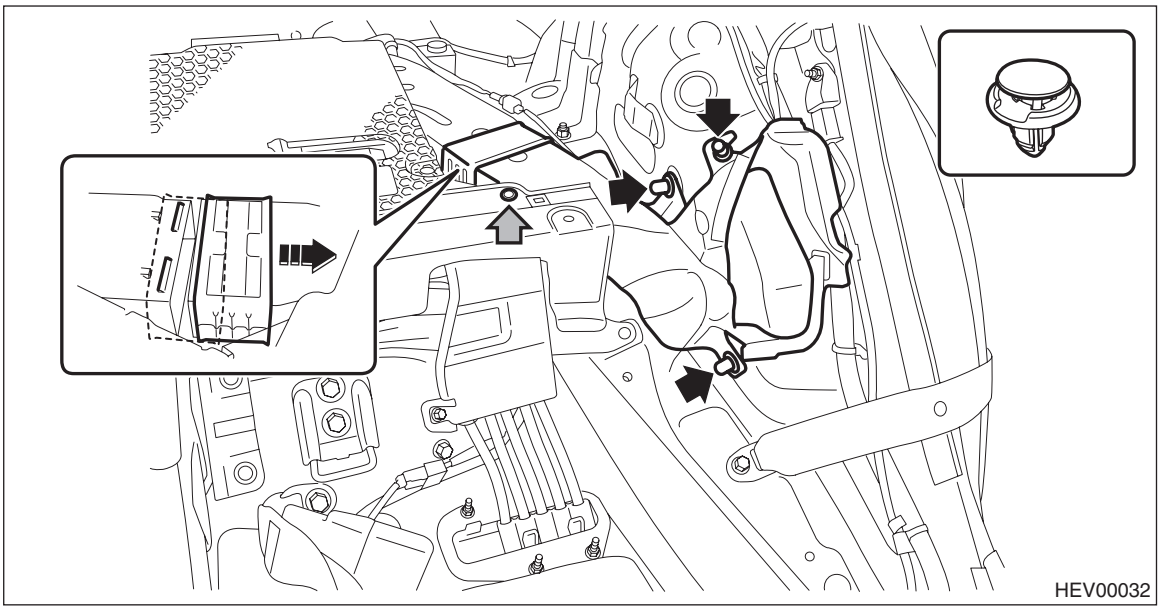
   (2) Remove the caps, and remove the bolts.
   (3) Remove the screws, and release the clips.
   (4) Disconnect the connectors and remove the trim panel - rear apron LH.



6) Remove the backrest assembly LH. <Ref. to SE-24, REMOVAL, Rear Seat.>
7) Remove the bolts, and remove the hinge assembly - rear backrest.



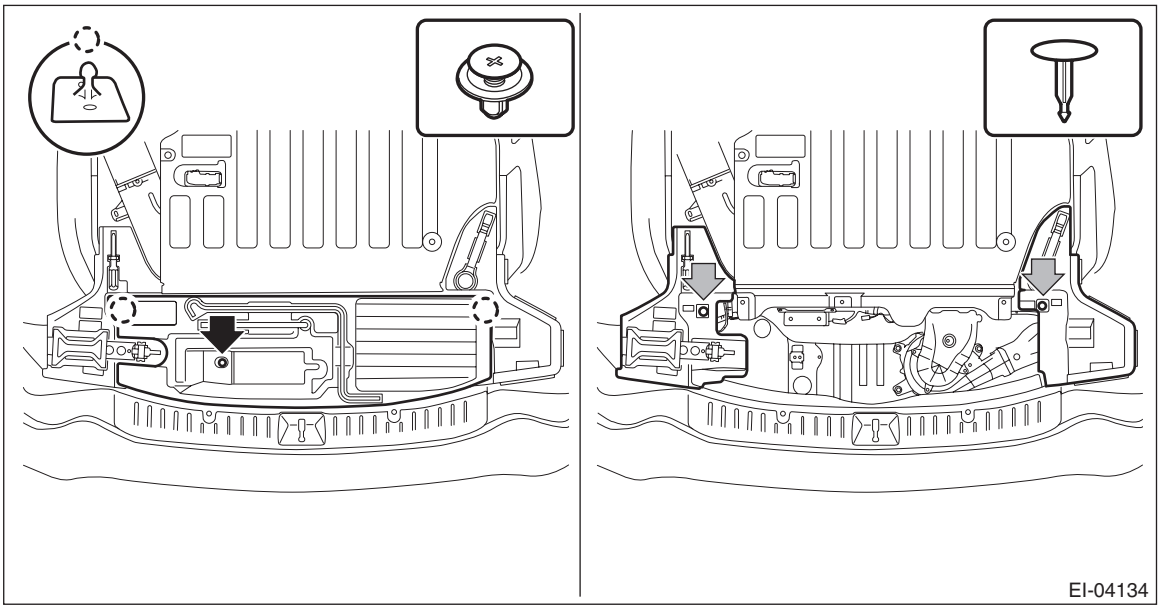
8) Remove the cooling duct front (front).
   (1) Release the clip of the spacer - rear floor front.
   (2) Release the plastic nut and slide lock, and remove the cooling duct front (front).



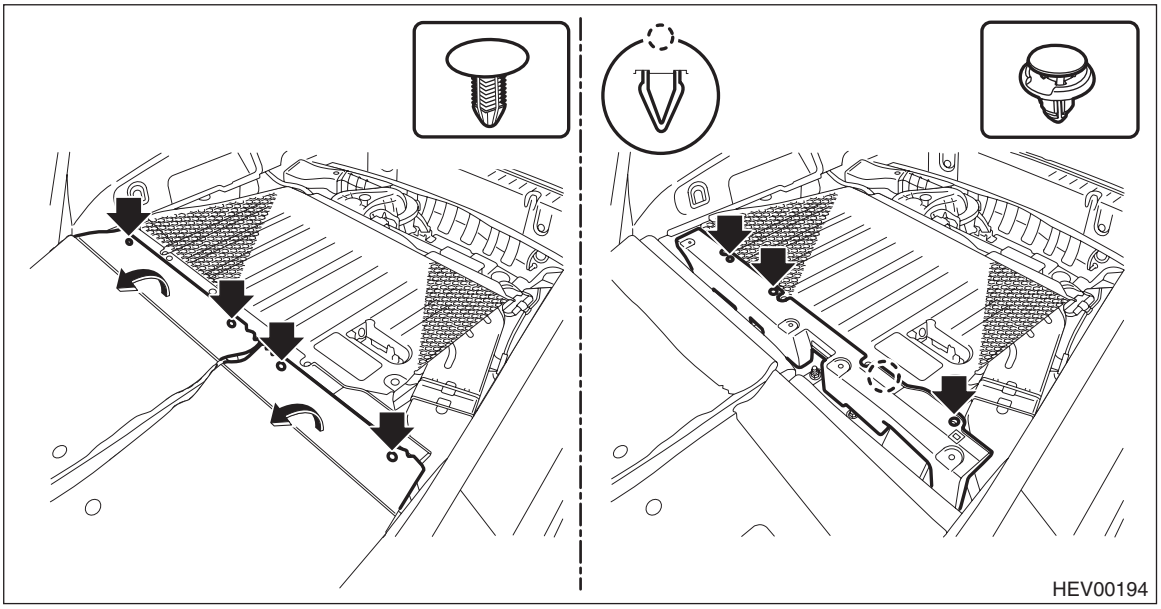
2. COOLING DUCT FRONT (REAR)

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.

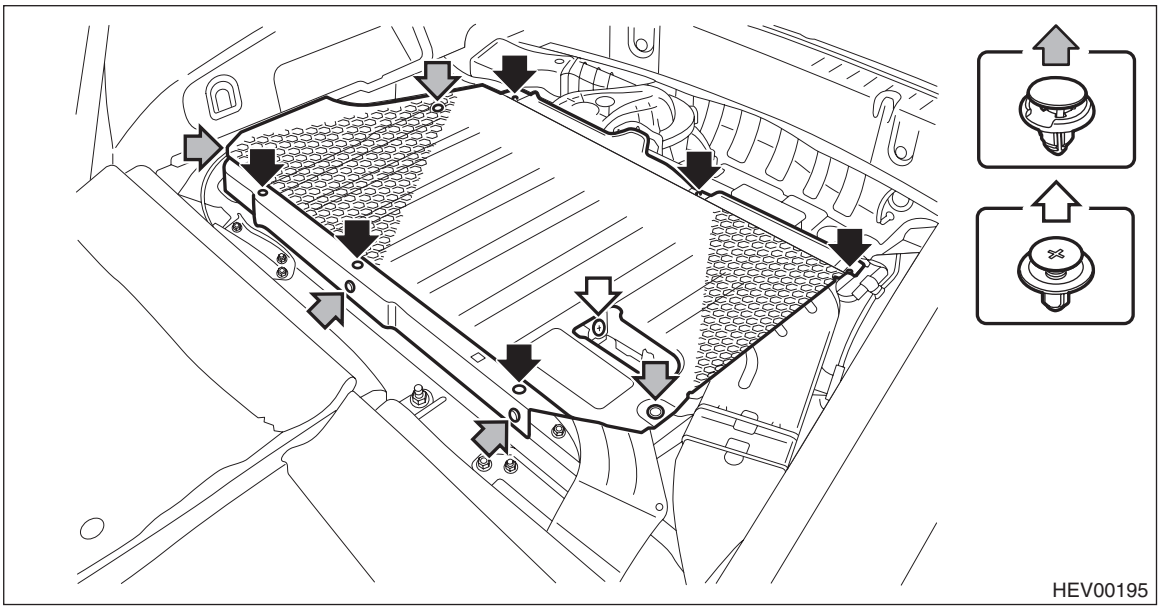


3) Remove the spacer - rear floor front.
   (1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
   (2) Release the clips and claws, then detach the spacer - rear floor front.

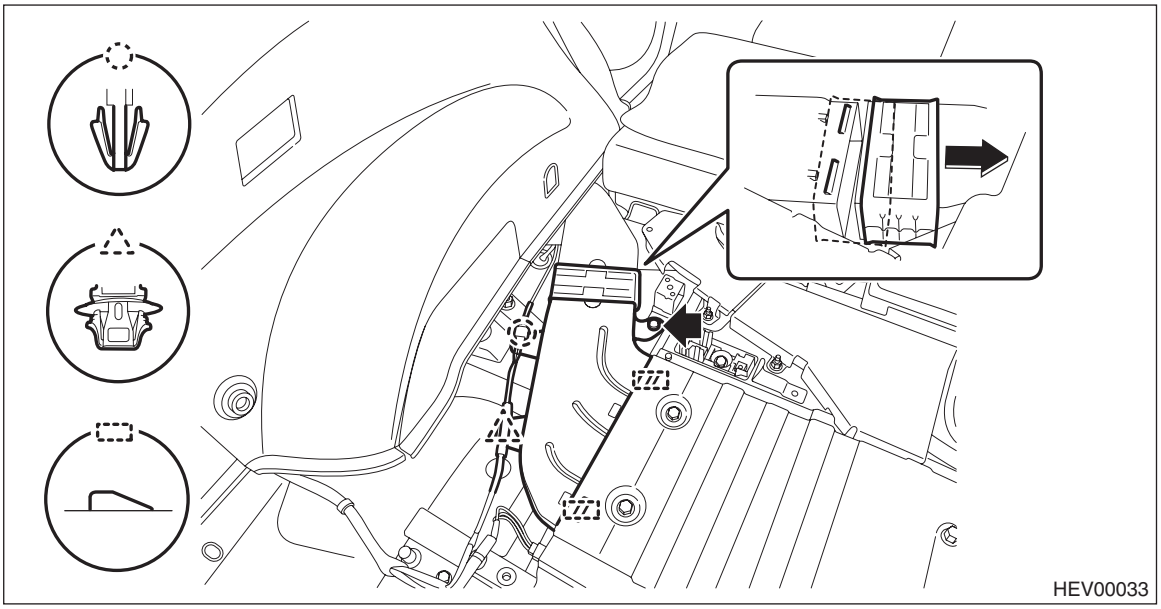


4) Remove the TORX® bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30

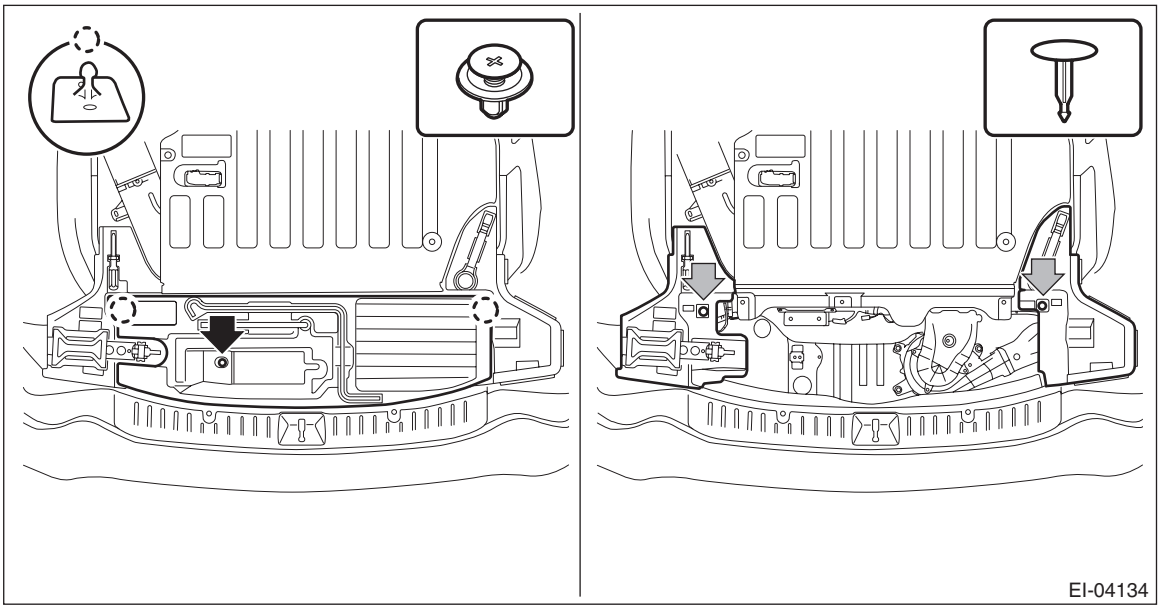


5) Remove the cooling duct front (rear).
(1) Release the slide lock, clip, and harness clip.
(2) Release the claws, and remove the cooling duct front (rear).

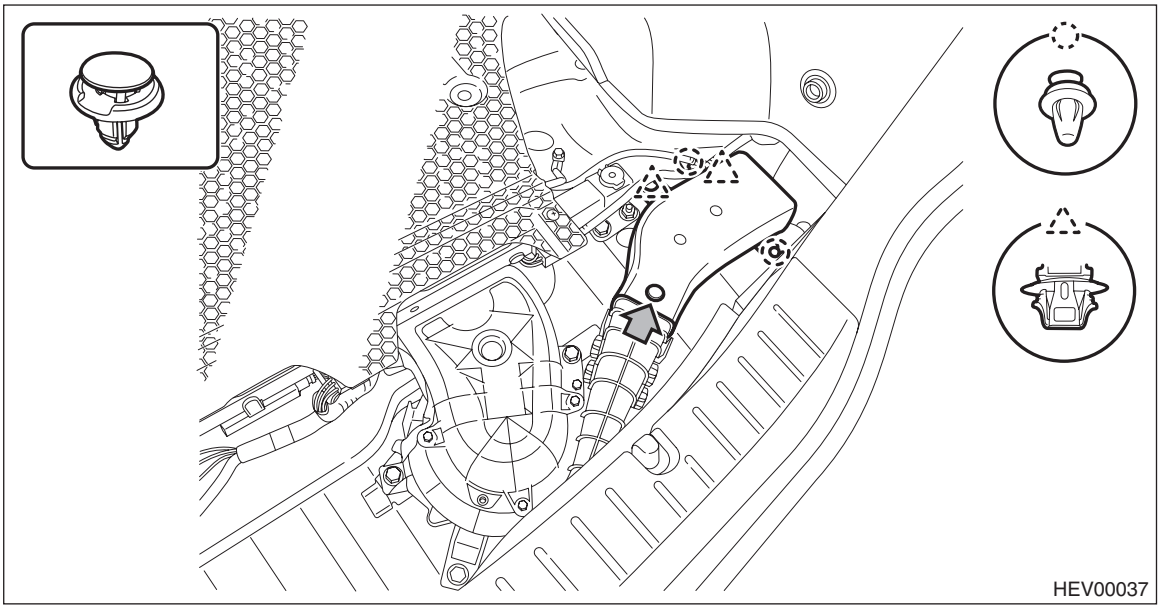


3. COOLING DUCT REAR

1) Remove the mat - rear floor CTR.
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side RH.



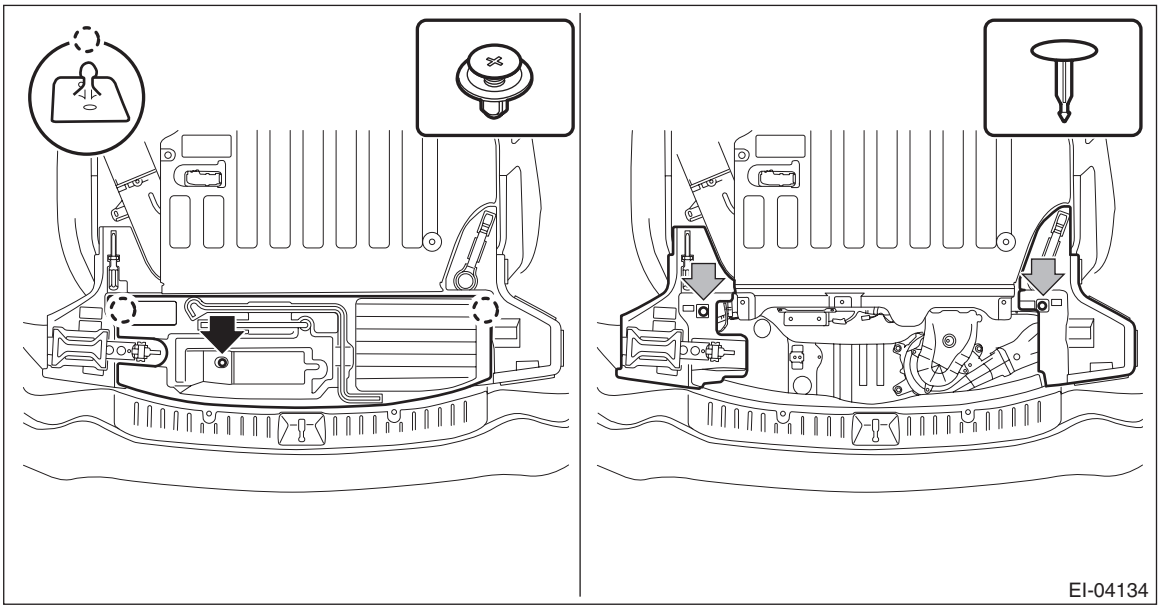
3) Release the clips and harness clips, then detach the cooling duct rear.



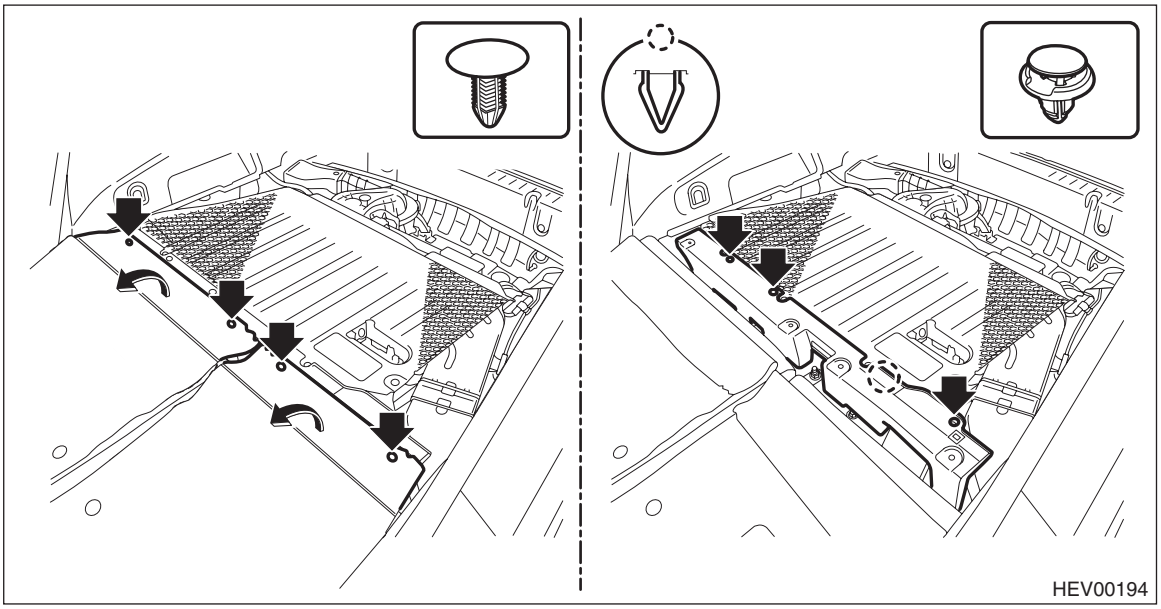
4. COOLING DUCT INVERTER ASSEMBLY

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>
2) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side.

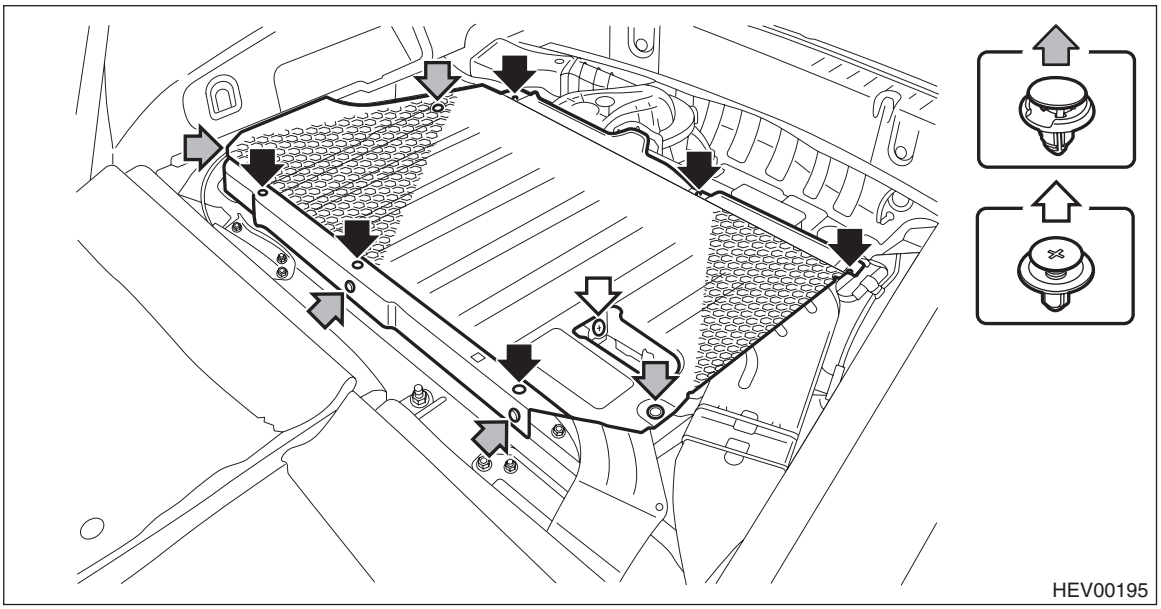


3) Remove the rear seat cushion and fold the backrest assemblies LH and RH. <Ref. to SE-24, REMOVAL, Rear Seat.>
4) Remove the spacer - rear floor front.
   (1) Release the clips, and fold back the bottom of the cover COMPL - rear backrest LH and RH of the rear seat back.
   (2) Release the clips and claws, then detach the spacer - rear floor front.

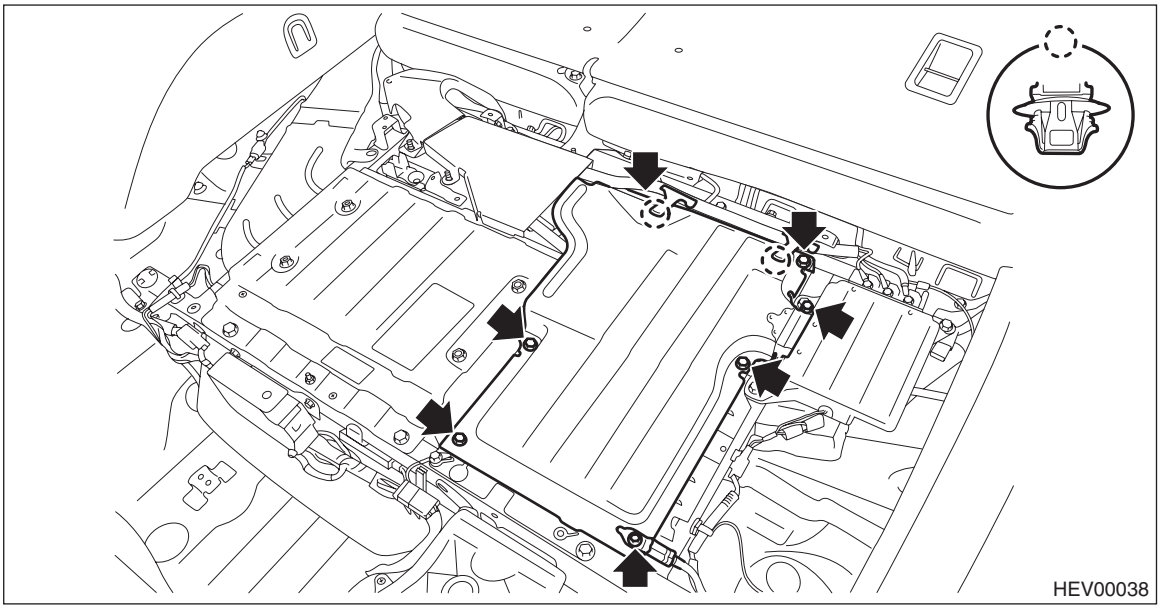


5) Remove the TORX®bolts, release the clips, and then remove the battery cover.

Preparation tool:
TORX® T30



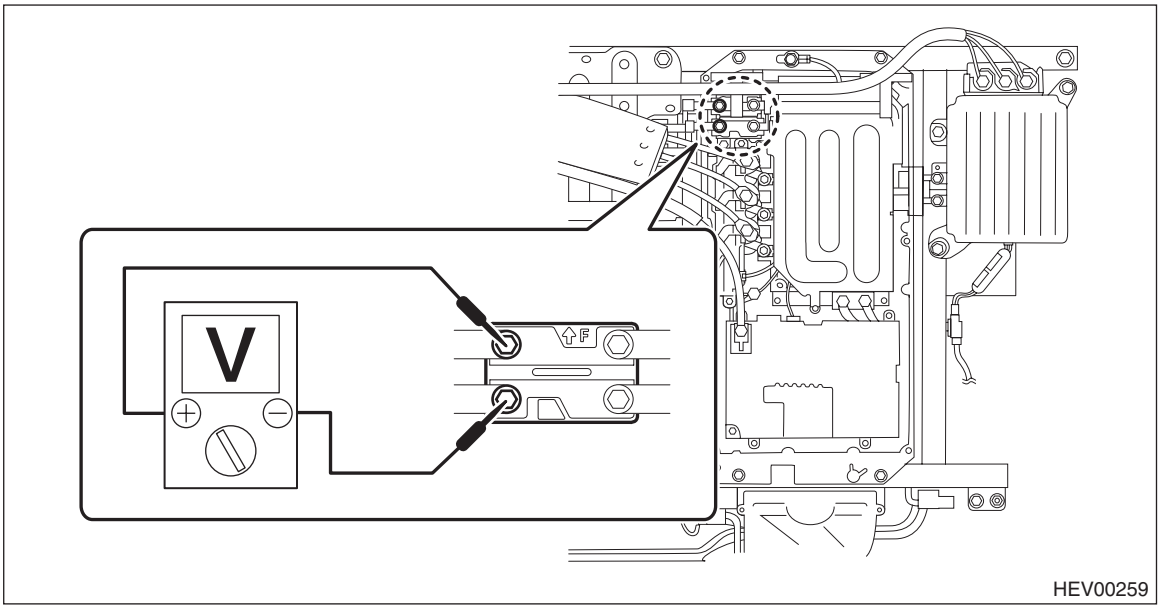
6) Remove the inverter cover.
(1) Remove the bolts and ground terminal.
(2) Release the cable clips, and remove the inverter cover.



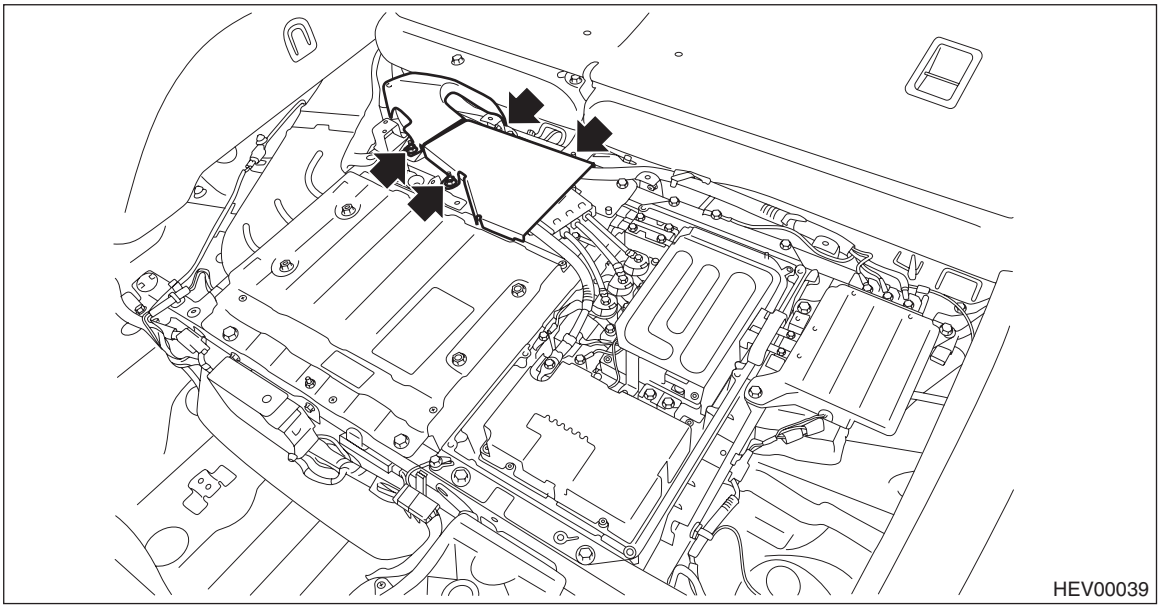
7) Perform zero-voltage test.
(1) Measure the voltage of the high voltage DC line at the high voltage battery side of the electric noise filter.

Preparation tool:
Insulation multimeter

Standard: 0 V

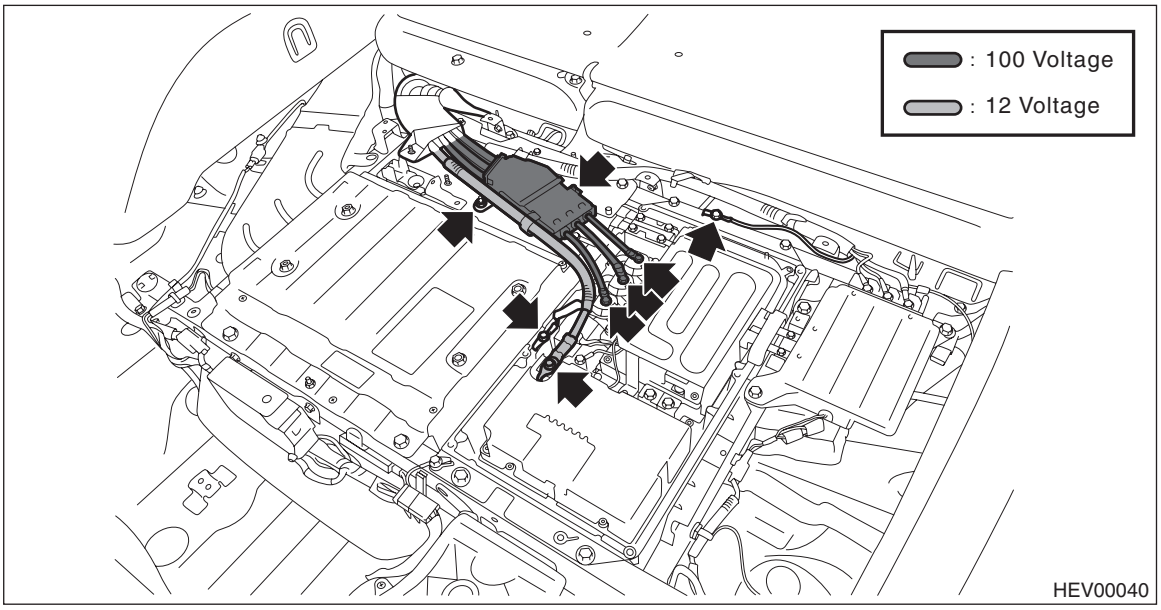


8) Remove the nut and remove the cover - shield battery and the cover - shield seat.



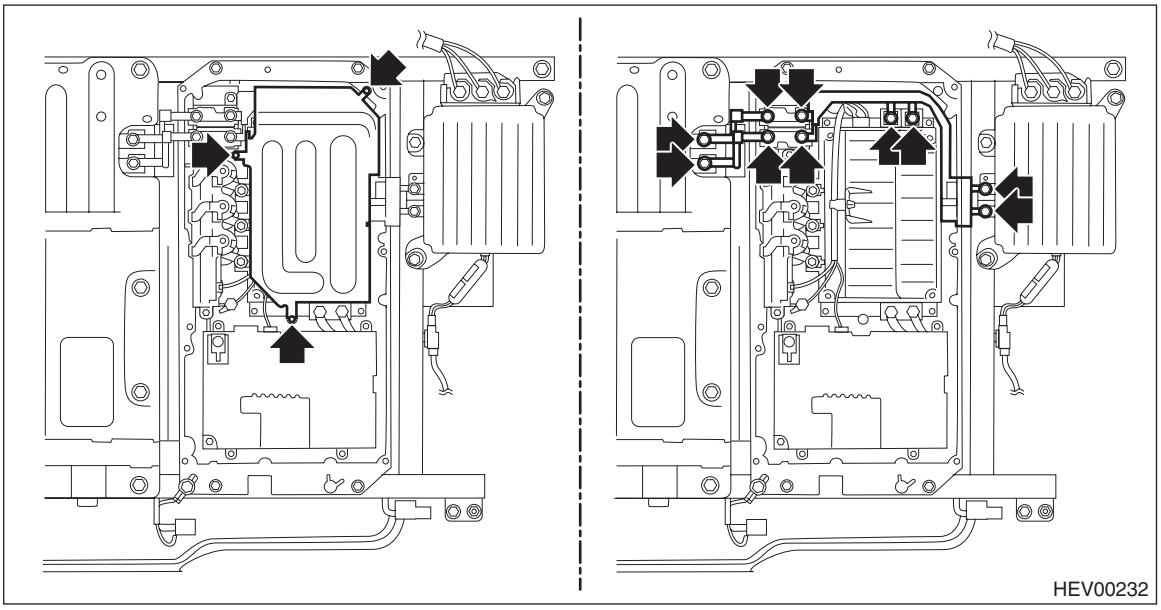
9) Remove the bolts and nuts and disconnect the ground terminal and the power cable.

CAUTION:
- **Be careful not to use excessive force when disconnecting the power cable to avoid any damage.**
- **Always wrap the disconnected power cable terminals with insulating tape.**



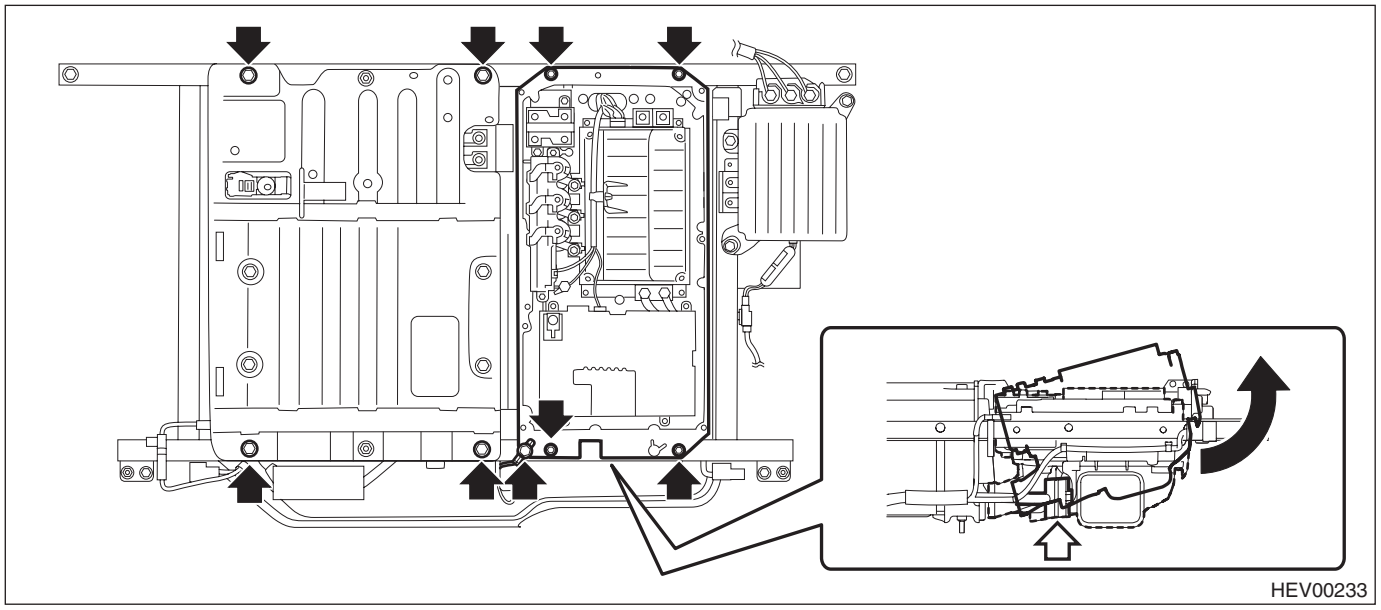
10) Remove the cooling duct front (rear). <Ref. to HEV-62, COOLING DUCT FRONT (REAR), REMOVAL, High Voltage Battery Cooling System.>
11) Remove the cooling fan assembly. <Ref. to HEV-70, COOLING FAN ASSEMBLY, REMOVAL, High Voltage Battery Cooling System.>
12) Remove the inverter assembly.
(1) Remove the bolts to remove the inverter shield.
(2) Remove the bolts and disconnect the bus bars between the high voltage battery and electric noise filter and between the electric noise filter and electric oil pump inverter respectively.

CAUTION:
Always wrap the high voltage battery terminal with insulating tape.

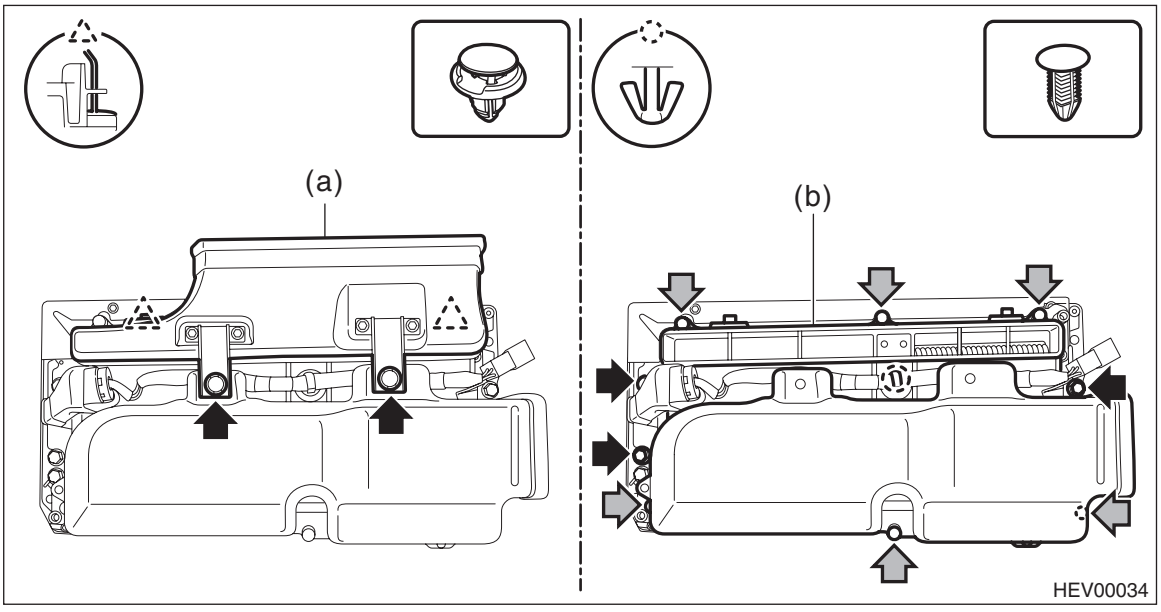


(3) Disconnect the connector.
(4) Remove all the mounting bolts of the high voltage battery to make the battery free.
(5) Remove the bolts, and then detach the ground terminal and the inverter assembly.

CAUTION:
Be careful not to damage the duct seal located underneath the high voltage battery.



13) Remove the cooling duct inverter assembly.
(1) Release the clips and hooks, then remove the duct inverter IN (a).
(2) Remove the bolt.
(3) Release the clips and harness clips, then remove the duct inverter OUT (b).

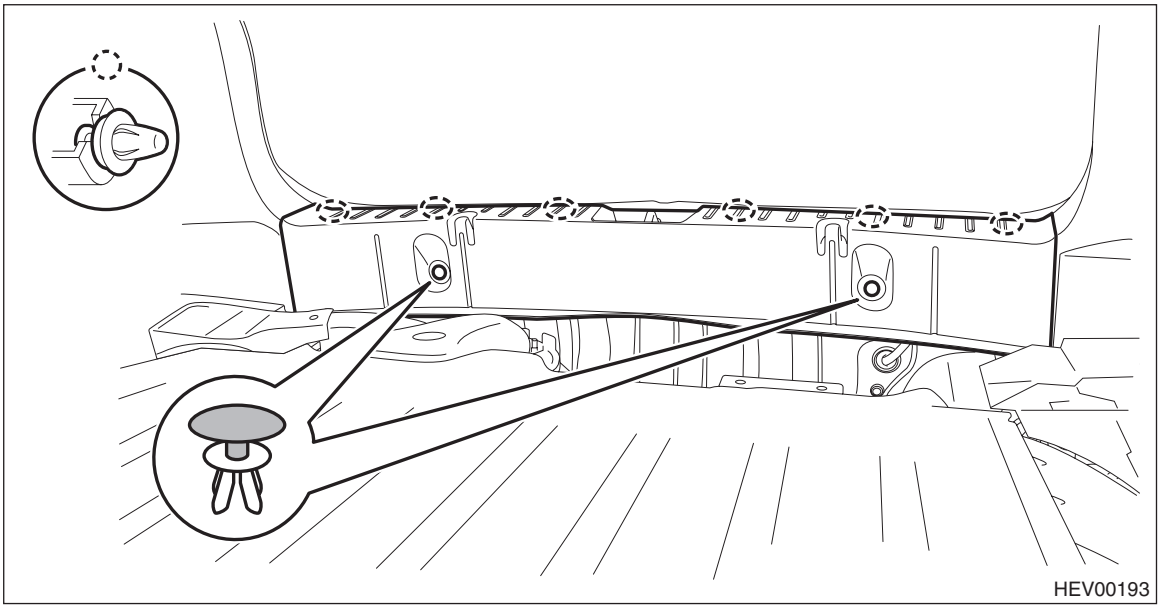


NOTE:
Leave the harness on the inverter frame assembly side.

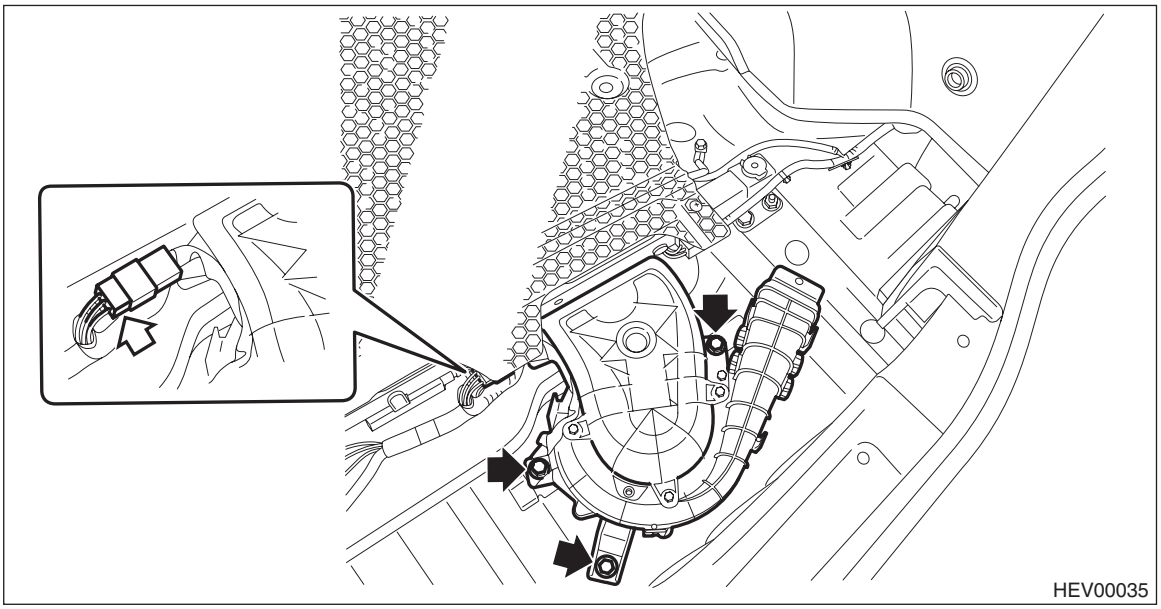
5. COOLING FAN ASSEMBLY

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

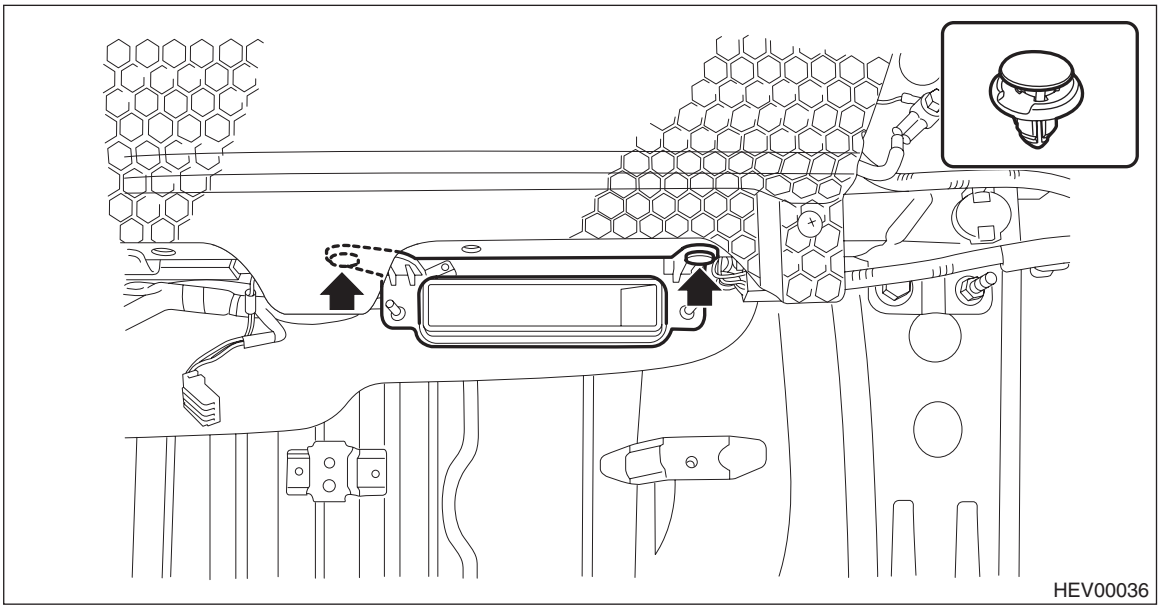
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the mat - rear floor CTR.
3) Release the clips and claws, then detach the sub-trunk assembly and the spacer - rear floor side RH.
4) Release the clips, then remove the trim panel - rear skirt.



5) Remove the cooling duct rear. <Ref. to HEV-64, COOLING DUCT REAR, REMOVAL, High Voltage Battery Cooling System.>
6) Remove the cooling fan assembly.
   (1) Release the connector and the clip.
   (2) Remove the bolts, then remove the cooling fan assembly.



7) Release the clips, and remove the cooling fan duct from the cooling duct inverter assembly.



B: INSTALLATION

1. COOLING DUCT FRONT (FRONT)

Install each part in the reverse order of removal.

Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)

2. COOLING DUCT FRONT (REAR)

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Install the cooling duct front (rear).
2) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

3) Install the spacer - rear floor front.
4) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
5) Install the sub-trunk assembly and the spacer - rear floor side LH.
6) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

3. COOLING DUCT REAR

Install each part in the reverse order of removal.

4. COOLING DUCT INVERTER ASSEMBLY

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Install the cooling duct inverter assembly.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

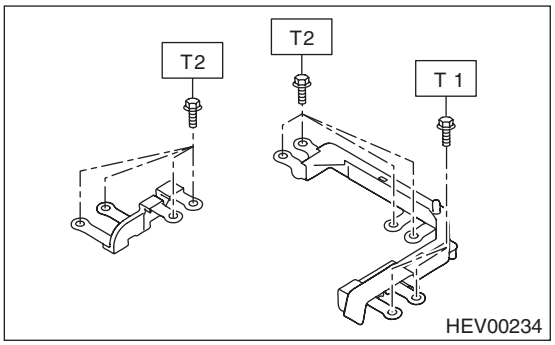
2) Mount the high voltage battery on the high voltage battery frame assembly, then install the inverter assembly.

CAUTION:
- **If the duct seal is damaged, replace it with a new part.**
- **Be sure that the high voltage battery is securely attached to the cooling duct inverter duct.**

Tightening torque:
High voltage battery and inverter assembly: 22 N·m (2.2 kgf-m, 16.2 ft-lb)
Ground terminal: 6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

3) Connect the bus bar.

Tightening torque:
T1: 6.5 N·m (0.7 kgf-m, 4.8 ft-lb)
T2: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



4) Install the inverter shield.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

5) Install the cooling fan assembly. <Ref. to HEV-73, COOLING FAN ASSEMBLY, INSTALLATION, High Voltage Battery Cooling System.>
6) Install the cooling duct front (rear). <Ref. to HEV-71, COOLING DUCT FRONT (REAR), INSTALLATION, High Voltage Battery Cooling System.>
7) Connect the ground terminal and the power cable.

CAUTION:
- **When connecting the power cable, pay attention to the letters (U, V, and W) imprinted on the drive motor inverter amperage sensor body as well as on the protector of the power cable.**
- **Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.**

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

8) Install the cover - shield battery and the cover - shield seat.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

9) Install the ground terminal and inverter cover.

CAUTION:
Check that the sound proofing material on the inverter cover is not detached or damaged.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
10) Install the battery cover.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
11) Install the spacer - rear floor front.
12) Install the rear seat cushion. <Ref. to SE-27, INSTALLATION, Rear Seat.>
13) Install the sub-trunk assembly and the spacer - rear floor side.
14) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>

5. COOLING FAN ASSEMBLY

Install each part in the reverse order of removal.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

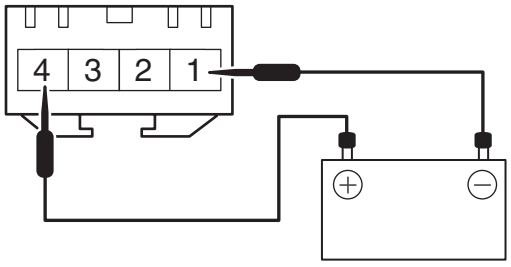
C: INSPECTION

1. DUCT

Check the duct for clogging, crack, or deformation. If defective, replace the duct.

2. FAN MOTOR

1) Check the motor operation when battery voltage is applied between the terminals of motor.

Terminal No.	Inspection conditions	Specification	Connection diagram
4 (+) — 1 (–)	Connect battery to the terminals	Rotation	 HEV00192

2) If it does not operate normally, replace the cooling fan assembly.

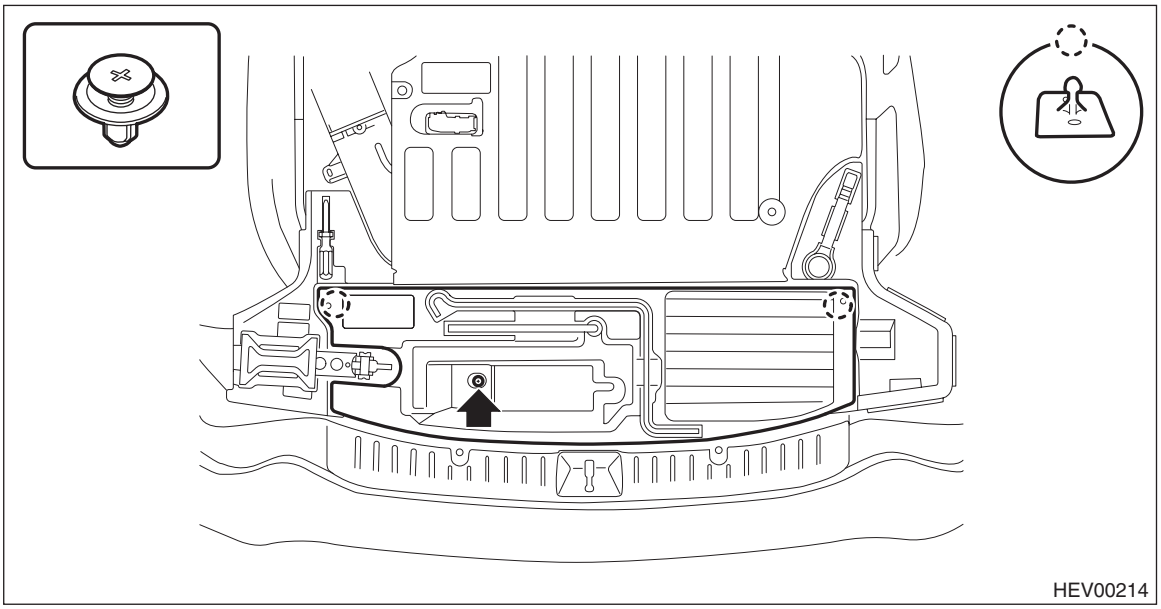
14.Drive Motor Control Module

A: REMOVAL

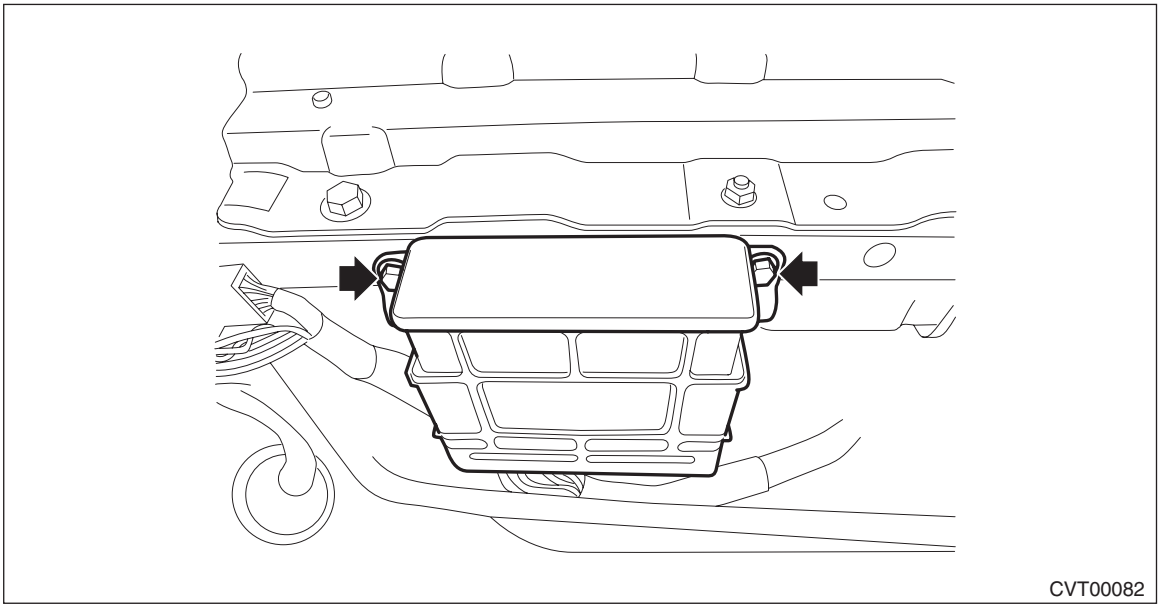
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the mat - rear floor CTR.
3) Release the clips and claws, then remove the sub-trunk box.



4) Remove the drive motor control module.
   (1) Remove the drive motor control module mounting bolts.



   (2) Disconnect the connector from the drive motor control module.
   (3) Release the relay holder, ground terminal, and harness clip.

NOTE:
Replace the drive motor control module and the bracket as a set.

B: INSTALLATION

CAUTION:
- **If replaced with a new one, install the drive motor control module on the bracket.**
- **To avoid the damage to bracket and the drive motor control module, do not remove module once installed on the bracket. If installed by mistake, the part must be replaced with a new part.**

Install each part in the reverse order of removal.

Tightening torque:
6.5 N·m (0.7 kgf-m, 4.8 ft-lb)

15.Drive Motor Assembly

A: NOTE

For the operation procedures for drive motor assembly, refer to “CONTINUOUSLY VARIABLE TRANSMISSION” section. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

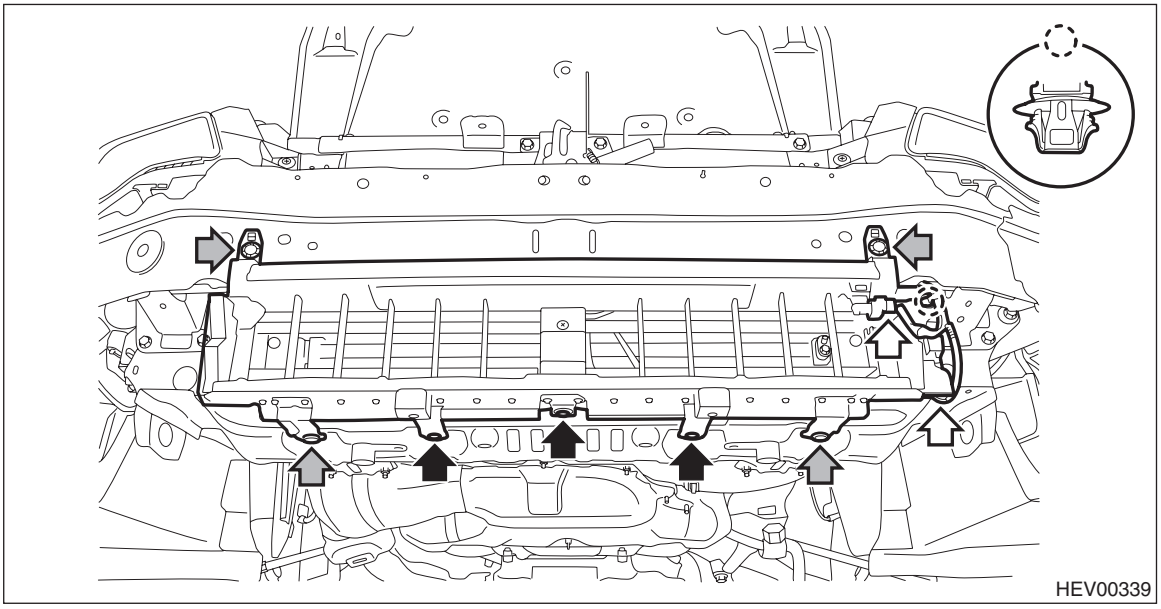
16.Active Grille Shutter

A: REMOVAL

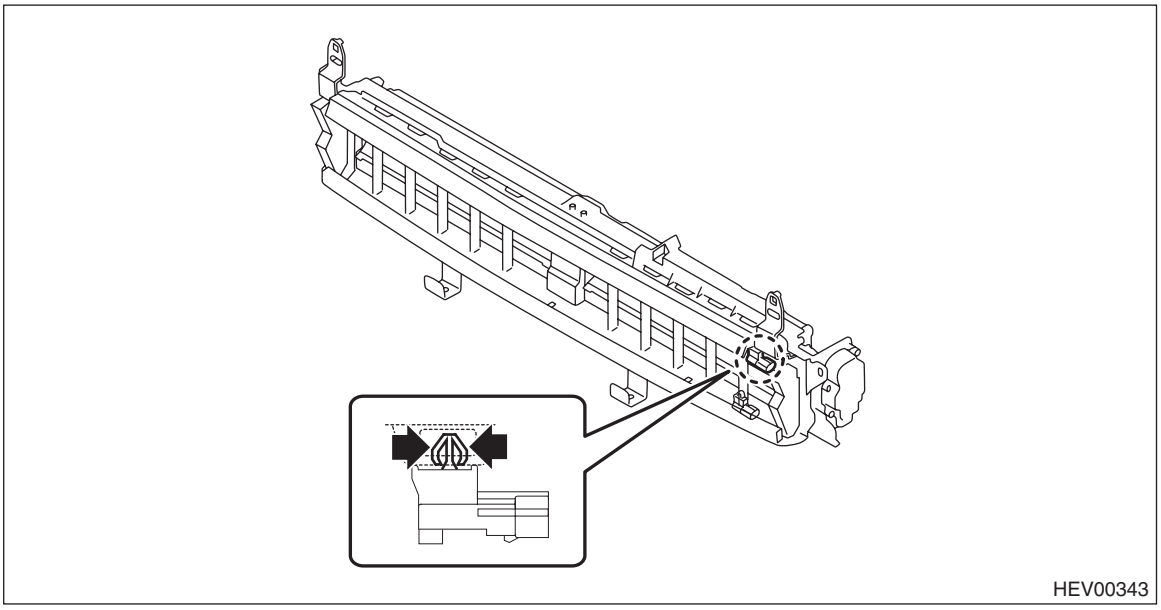
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery side, disconnect the ground terminal from the 12V engine restart battery sensor.

2) Remove the front under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
3) Remove the bumper face - front. <Ref. to EI-37, REMOVAL, Front Bumper.>
4) Remove the active grille shutter.
   (1) Disconnect each connector and release the harness clip.
   (2) Remove the bolts, release the clips, and then remove the active grille shutter.


HEV00339

(3) Release the claws and then remove the ambient sensor.


HEV00343

B: INSTALLATION

1) Install each part in the reverse order of removal.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

2) When the active grille shutter has been replaced, perform the calibration (active test for ACTGS control). <Ref. to EN(H4DO HEV)(diag)-69, OPERATION, Active Test.>

17.Diagnostics with Phenomenon

A: INSPECTION

Refer to “Diagnostics with Phenomenon” in the “HYBRID ELECTRIC VEHICLE (DIAGNOSTICS)” section. <Ref. to HEV(diag)-488, Diagnostics with Phenomenon.>

HYBRID ELECTRIC VEHICLE (DIAGNOSTICS)

HEV(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** Ask the customer when and how the trouble occurred using the interview check list. <Ref. to HEV(diag)-5, Check List for Interview.>	Was the customer interview performed?	Go to step **2**.	Perform the interview.
2	**CHECK HYBRID FAIL LAMP.** Check the hybrid fail lamp.	Does the hybrid fail lamp illuminate after starting the engine?	Go to step **3**.	Perform appropriate inspection using Diagnostics with Phenomenon. <Ref. to HEV(diag)-488, Diagnostics with Phenomenon.>
3	**CHECK COMBINATION METER.** Using the Subaru Select Monitor, read DTC of combination meter.	Is either DTC U0073, U0293, or U0594 detected? (current malfunction)	Perform the inspection according to the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Go to step **4**.
4	**CHECK DTC.** Using the Subaru Select Monitor, read DTC of the hybrid powertrain control module. NOTE: • Refer to “Read Diagnostic Trouble Code (DTC)” for detailed operation procedure. <Ref. to HEV(diag)-23, OPERATION, Read Diagnostic Trouble Code (DTC).> • If the communication function of the Subaru Select Monitor does not operate properly, check the communication circuit. <Ref. to HEV(diag)-17, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>	Is DTC detected? (current malfunction)	Record DTC, time stamp, and freeze frame data, then perform inspection using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After the repair, Go to step **10**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Go to step **5**.
5	**CHECK CURRENT DATA.** Confirm the current data of hybrid powertrain control system, the value of «Hybrid Fail Lamp Signal (DMCM)» using the Subaru Select Monitor. <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value show «ON»?	Go to step **6**.	Go to step **7**.

	Step	Check	Yes	No
6	**CHECK DTC.** Read the DTC of the drive motor control system using the Subaru Select Monitor. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).> NOTE: • Refer to “Read Diagnostic Trouble Code (DTC)” for detailed operation procedure. <Ref. to HEV(diag)-23, OPERATION, Read Diagnostic Trouble Code (DTC).> • If the communication function of the Subaru Select Monitor does not operate properly, check the communication circuit. <Ref. to HEV(diag)-17, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>	Is DTC detected? (current malfunction)	Record DTC, time stamp, and freeze frame data, then perform inspection using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After the repair, Go to step **10**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>
7	**CHECK CURRENT DATA.** Confirm the current data of hybrid powertrain control system, the value of «Hybrid Fail Lamp Signal (BECM)» using the Subaru Select Monitor. <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value show «ON»?	Go to step **8**.	Go to step **9**.
8	**CHECK DTC.** Read DTC of the battery energy control system using the Subaru Select Monitor. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).> NOTE: • Refer to “Read Diagnostic Trouble Code (DTC)” for detailed operation procedure. <Ref. to HEV(diag)-23, OPERATION, Read Diagnostic Trouble Code (DTC).> • If the communication function of the Subaru Select Monitor does not operate properly, check the communication circuit. <Ref. to HEV(diag)-17, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>	Is DTC detected? (current malfunction)	Record DTC, time stamp, and freeze frame data, then perform inspection using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After the repair, Go to step **10**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

	Step	Check	Yes	No
9	**CHECK HYBRID FAIL LAMP.** 1) Turn the ignition switch to OFF. 2) Wait for at least 30 seconds. 3) Turn the ignition switch to ON.	Does the hybrid fail lamp illuminate?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	It is possible that temporary poor communication occurs.
10	**PERFORM DIAGNOSIS.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, Clear Memory Mode.> 2) Perform the Inspection Mode or Drive Cycle. <Ref. to HEV(diag)-26, Inspection Mode.> <Ref. to HEV(diag)-32, Drive Cycle.>	Is DTC displayed on Subaru Select Monitor?	Inspect using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

2. Check List for Interview

A: CHECK

1. CHECK LIST NO. 1

When a problem occurs, perform the following customer interview.

Customer's name	
Date of purchase	
Date of repair	
V.I.N.	
Engine No.	
Fuel type	
Transmission model	
Odometer reading	km (miles)
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy
	❑ Others:
Ambient air temperature	°C (°F)
	❑ Hot ❑ Warm ❑ Cool ❑ Cold
Place	❑ Highway ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Downhill ❑ Rough road
	❑ Others:
Engine temperature	❑ Cold ❑ During warming-up ❑ After warming-up ❑ Temp. of either of them
	❑ Others:
Engine speed	rpm
Vehicle speed	km/h (MPH)
Driving conditions	❑ No effect ❑ Start-up ❑ Restart ❑ Idling ❑ Racing ❑ Accelerating ❑ Cruising ❑ Decelerating ❑ Cornering (right/left turn) ❑ Cruise control ❑ Other
Vehicle conditions	❑ EV traveling ❑ Auto Start Stop active
Select lever position	❑ P ❑ R ❑ N ❑ D ❑ Manual mode
Hybrid READY indicator light	❑ ON❑ OFF
EV mode lamp	❑ ON❑ OFF
Remaining high voltage battery level of MFD	
Manual mode	❑ ON ❑ OFF
Headlight	❑ ON ❑ OFF
Rear defogger	❑ ON ❑ OFF
Blower	❑ ON ❑ OFF
Audio	❑ ON ❑ OFF
A/C compressor	❑ ON ❑ OFF
Rear entertainment system	❑ ON ❑ OFF
Radiator fan	❑ ON ❑ OFF
Car phone	❑ ON ❑ OFF
Front wiper	❑ ON ❑ OFF
Rear wiper	❑ ON ❑ OFF
Wireless device	❑ ON ❑ OFF

2. CHECK LIST NO. 2

If any indicator lights illuminate, perform the following additional customer interview.

a) Warning lights or indicators illuminate.	❑ Yes ❑ No
❑ ABS warning light ❑ Steering control warning light ❑ AT oil temperature warning light ❑ AWD warning light ❑ VDC warning light/VDC indicator light ❑ Fuel level warning light ❑ Malfunction Indicator Light ❑ SRS airbag warning light ❑ Water temperature warning light (red) ❑ Oil pressure warning light ❑ Charge warning Light ❑ Security indicator light ❑ Brake warning light ❑ Vacuum pump fail lamp ❑ Hybrid fail lamp ❑ Others:	
b) 12 volt auxiliary battery	
Manufacturer's genuine battery is equipped	❑ Yes ❑ No
Battery voltage	V
Battery replacement	❑ Yes ❑ No
Travel distance at replacement	km (miles)
c) 12 volt engine restart battery	
Manufacturer's genuine battery is equipped	❑ Yes ❑ No
Battery voltage	V
Battery replacement	❑ Yes ❑ No
Travel distance at replacement	km (miles)
d) Starter	
Start count (refer to current data)	
Starter has ever been replaced	❑ Yes ❑ No
e) Fuel level	
Lack of fuel	❑ Yes ❑ No
Indicator position of fuel gauge	❑ FULL ❑ 3/4 ❑ 1/2 ❑ 1/4 ❑ Other
Experienced running out of fuel	❑ Yes ❑ No
f) Intentional connecting or disconnecting of vehicle harness connectors	❑ Yes ❑ No
Name of parts or points of disconnection	
g) Intentional connecting or disconnecting of vehicle hoses	❑ Yes ❑ No
Name of parts or points of disconnection	
h) Installing parts other than genuine parts	❑ Yes ❑ No
Parts	
Where	
i) Occurrence of noise	❑ Yes ❑ No
From where	
What kind	
j) Occurrence of smell	❑ Yes ❑ No
From where	
What kind	
k) Ingress of water into engine compartment	❑ Yes ❑ No
l) Ingress of water into luggage room	❑ Yes ❑ No
m) Ingress of water into passenger compartment	❑ Yes ❑ No

n) Troubles occurred

❑Engine speed drops ❑Engine speed does not drop ❑Rough idling ❑Slow acceleration
❑Back fire ❑After fire ❑Shifting is wrong (specifically:) ❑ Excessive shift shock
❑Shock or judder during driving ❑Engine speed increases abruptly during driving ❑Shock or judder during standing start
❑Unable to switch to EV traveling ❑READY ON does not occur ❑Batteries (12 volt auxiliary battery and high voltage battery) are not charged
❑Auto Start Stop does not operate ❑Engine does not restart after Auto Start Stop/EV traveling
❑ Buzzer sounds (intermittently or continuously) during Auto Start Stop
❑When restarting, the audio/navigation system is reset (initialized).
❑When restarting, the combination meter and MFD blink.
❑ Electrical equipment such as automatic air conditioner, audio, navigation system, or combination meter does not operate.
❑ Others:

3. General Description

A: CAUTION

1. AIRBAG SYSTEM

Refer to “CAUTION” in “General Description” in AIRBAG SYSTEM. <Ref. to AB-11, CAUTION, General Description.>

2. HYBRID SYSTEM

Refer to “CAUTION (HYBRID SYSTEM)”. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

B: INSPECTION

Before performing diagnostics, check the following item which might affect hybrid system problems.
1) Check 12 volt auxiliary battery and 12 volt engine restart battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding. <Ref. to HEV-12, Relay and Fuse.>

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

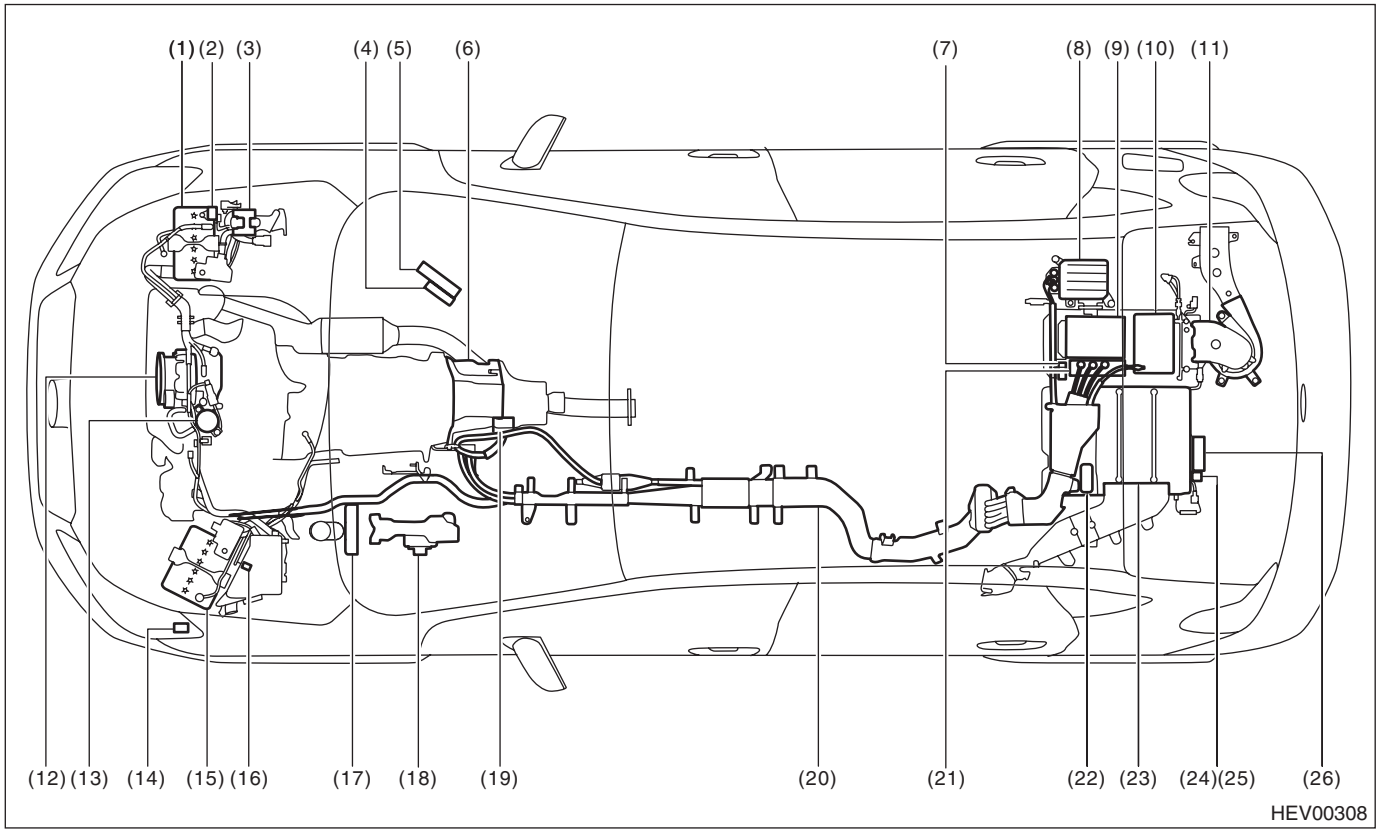
2. GENERAL TOOL

TOOL NAME	REMARKS
Personal Protective Equipment (PPE)	Used for removing and installing high voltage components.
Insulation multimeter	Used for measuring resistance and voltage of high voltage components.
Insulating tape	Used for power cable terminals and high voltage battery terminals.
TORX® bit T30	Used to remove and install the battery cover.
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

A: LOCATION

1. HYBRID SYSTEM

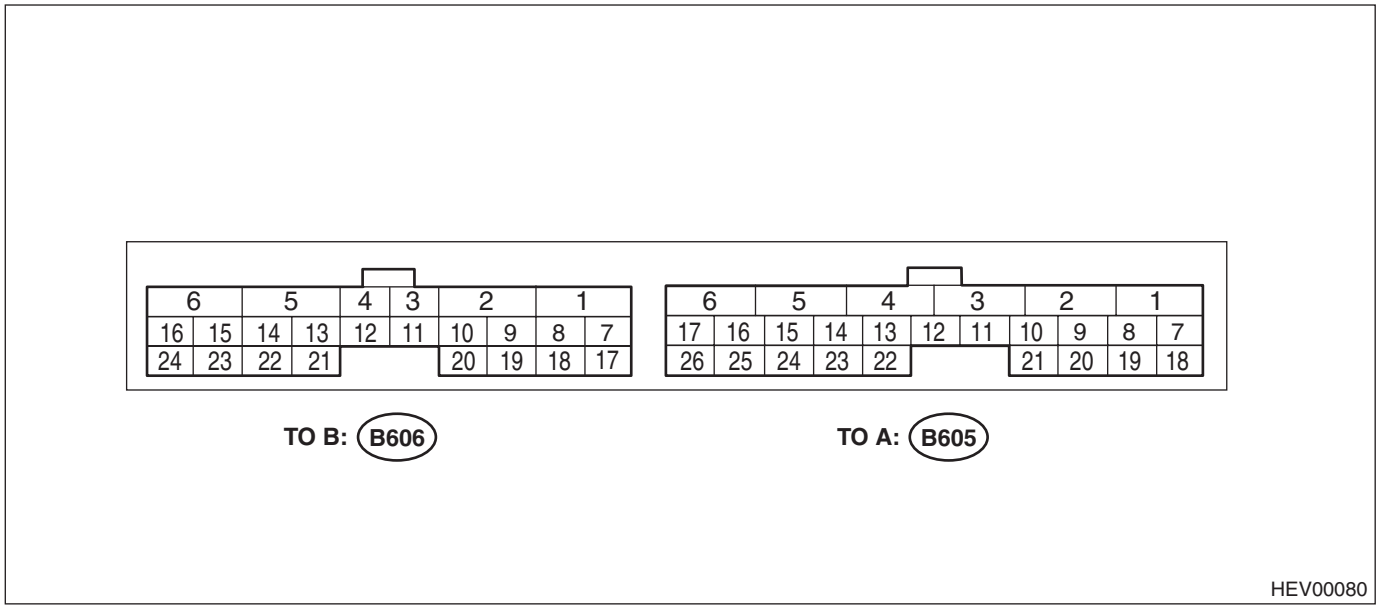


(1)	12 volt engine restart battery	(10)	DC/DC converter	(19)	Electric oil pump
(2)	12V engine restart battery sensor	(11)	High voltage battery cooling fan	(20)	Power cable
(3)	12V battery relay	(12)	Integrated starter generator (ISG)	(21)	Drive motor inverter amperage sensor
(4)	Hybrid powertrain control module (HPCM)	(13)	Brake vacuum pump	(22)	Service disconnect plug
(5)	Engine control module (ECM)	(14)	Battery temperature sensor	(23)	High voltage battery (including battery energy control module (BECM))
(6)	Drive motor ASSY	(15)	12 volt auxiliary battery	(24)	DMCM power relay
(7)	Electric noise filter	(16)	Brake vacuum pump relay	(25)	High voltage battery cooling fan/ drive motor inverter power supply relay
(8)	Electric oil pump inverter	(17)	Brake booster (including brake booster pressure sensor)	(26)	Drive motor control module (DMCM)
(9)	Drive motor inverter	(18)	Brake pedal ASSY (including brake stroke sensor)		

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

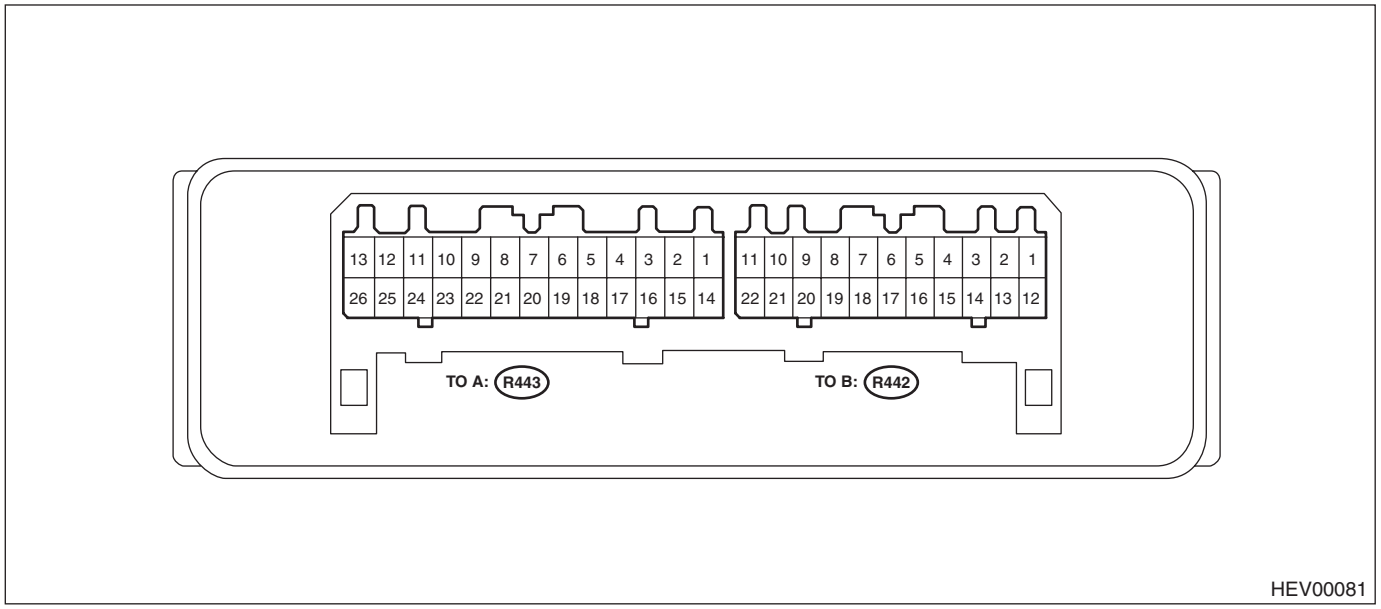
1. HYBRID POWERTRAIN CONTROL MODULE (HPCM)



Terminal No. (terminal symbol)	Item	Measuring condition	Measurement value	Note
(B605) No. 1	Linear solenoid output	—	Cannot be measured	—
(B605) No. 2	Main power supply 1	Always	11 — 15 V	—
(B605) No. 3	Main power supply 2	Always	11 — 15 V	—
(B605) No. 4	LIN communication	—	Cannot be measured	LIN communication line
(B605) No. 5	GND1	Always	0 V	—
(B605) No. 6	GND2	Always	0 V	—
(B605) No. 7	(Not used)	—	—	—
(B605) No. 8	(Not used)	—	—	—
(B605) No. 9	(Not used)	—	—	—
(B605) No. 10	HEV CAN H	—	Cannot be measured	CAN communication line
(B605) No. 11	HEV CAN L	—	Cannot be measured	CAN communication line
(B605) No. 12	MAIN CAN H	—	Cannot be measured	CAN communication line
(B605) No. 13	MAIN CAN L	—	Cannot be measured	CAN communication line
(B605) No. 14	PU CAN H	—	Cannot be measured	CAN communication line
(B605) No. 15	PU CAN L	—	Cannot be measured	CAN communication line
(B605) No. 16	(Not used)	—	—	—
(B605) No. 17	(Not used)	—	—	—
(B605) No. 18	Oil pressure SW input	Engine running	11 — 15 V	—
		When ignition switch is ON	0 V	—
(B605) No. 19	(Not used)	—	—	—
(B605) No. 20	(Not used)	—	—	—
(B605) No. 21	IG SW input	Ignition switch ON	11 — 15 V	—
(B605) No. 22	Starter drive request signal	Model without push button start at cranking	8 — 14 V	—
		Model with push button start at cranking	Waveform	—
(B605) No. 23	P range SW input	P range	Less than 1 V	—
		Except for P range	8 V or more	—

Terminal No. (terminal symbol)	Item	Measuring condition	Measurement value	Note
(B605) No. 24	R range SW input	R range	Less than 1 V	—
		Except for R range	8 V or more	—
(B605) No. 25	N range SW input	N range	Less than 1 V	—
		Except for N range	8 V or more	—
(B605) No. 26	D range SW input	D range	Less than 1 V	—
		Except for D range	8 V or more	—
(B606) No. 1	GND1 for sensors	Always	0 V	—
(B606) No. 2	GND2 for sensors	Always	0 V	—
(B606) No. 3	Brake booster pressure sensor input 1	Always	0.5 — 4.5 V	—
(B606) No. 4	Brake booster pressure sensor input 2	Always	0.5 — 4.5 V	—
(B606) No. 5	(Not used)	—	—	—
(B606) No. 6	(Not used)	—	—	
(B606) No. 7	Sensor power supply output 1	When ignition switch is ON	4.5 V or more	—
(B606) No. 8	(Not used)	—	—	—
(B606) No. 9	Sensor power supply output 3	When ignition switch is ON	4.5 V or more	—
(B606) No. 10	(Not used)	—	—	—
(B606) No. 11	Brake stroke sensor input 1	When brake pedal is depressed	Approx. 1 V or more	—
		When brake is not depressed	Approx. 1 V	—
(B606) No. 12	(Not used)	—	—	—
(B606) No. 13	(Not used)	—	—	—
(B606) No. 14	ISG CRK output	When ignition switch is ON	Less than 1 V	—
(B606) No. 15	ISG INH output	When ignition switch is ON	Less than 2 V	—
(B606) No. 16	Brake vacuum pump relay output	When brake vacuum pump operates	9 V or more	—
		When brake vacuum pump not activated	0 V	—
(B606) No. 17	Sensor power supply output 2	When ignition switch is ON	4.5 V or more	—
(B606) No. 18	Battery voltage 2 monitor input	Always	11 — 15 V	—
(B606) No. 19	Vacuum pump relay monitor input	When brake vacuum pump operates	9 V or more	—
		When brake vacuum pump not activated	0 V	—
(B606) No. 20	Brake stroke sensor input 2	When brake pedal is depressed	Approx. 4 V or less	—
		When brake is not depressed	Approx. 4 V	—
(B606) No. 21	(Not used)	—	—	—
(B606) No. 22	Battery relay CLOSE output	—	—	—
(B606) No. 23	Battery relay OPEN output	—	—	—
(B606) No. 24	GND3 for sensors	Always	0 V	—

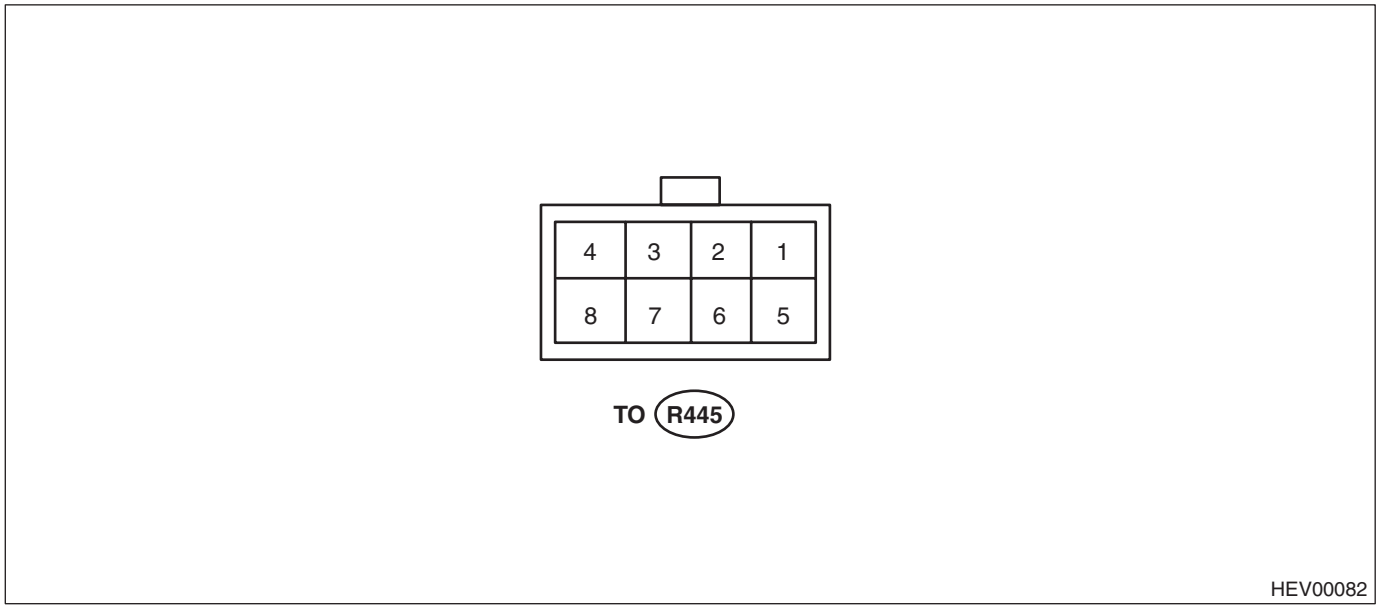
2. DRIVE MOTOR CONTROL MODULE (DMCM)



Terminal No. (terminal symbol)	Item	Measuring condition	Measurement value	Note
(R443) No. 1	(Not used)	—	—	—
(R443) No. 2	HEVCAN H	—	Cannot be measured	CAN communication line
(R443) No. 3	CT W	When ignition switch is ON	2.45 — 2.55 V	—
(R443) No. 4	(Not used)	—	—	—
(R443) No. 5	CT V	When ignition switch is ON	2.45 — 2.55 V	—
(R443) No. 6	SVCC2	When ignition switch is ON	4.9 — 5.1 V	—
(R443) No. 7	CT U	When ignition switch is ON	2.45 — 2.55 V	—
(R443) No. 8	SVCC1	When ignition switch is ON	4.9 — 5.1 V	—
(R443) No. 9	(Not used)	—	—	—
(R443) No. 10	IG	When ignition switch is ON	11 — 15 V	—
(R443) No. 11	SS RY	When ignition switch is ON	0 V	—
(R443) No. 12	GND1	Always	0 V	—
(R443) No. 13	IG SS1	When ignition switch is ON	11 — 15 V	—
(R443) No. 14	(Not used)	—	—	—
(R443) No. 15	HEVCAN L	—	Cannot be measured	CAN communication line
(R443) No. 16	(Not used)	—	—	—
(R443) No. 17	SGND2	When ignition switch is ON	0 V	—
(R443) No. 18	SGND1	When ignition switch is ON	0 V	—
(R443) No. 19	SCIMOCO	—	Cannot be measured	SCI communication line
(R443) No. 20	SCICOMO	—	Cannot be measured	SCI communication line
(R443) No. 21	FANPIN	When ignition switch is ON	11 — 15 V	—
(R443) No. 22	FANPOUT	When ignition switch is ON	11 — 15 V	—
(R443) No. 23	(Not used)	—	—	—
(R443) No. 24	IPUPWR RY	When ignition switch is ON	0 V	—
(R443) No. 25	GND2	Always	0 V	—
(R443) No. 26	IG SS2	When ignition switch is ON	11 — 15 V	—
(R442) No. 1	UN	—	Cannot be measured	—
(R442) No. 2	UP	—	Cannot be measured	—
(R442) No. 3	TMP B	When ignition switch is ON	0.23 V — 4.6 V	—
(R442) No. 4	TMP A	When ignition switch is ON	0.23 V — 4.6 V	—

Terminal No. (terminal symbol)	Item	Measuring condition	Measurement value	Note
(R442) No. 5	AGND1	Always	0 V	—
(R442) No. 6	R1	—	Cannot be measured	—
(R442) No. 7	S4	—	Cannot be measured	—
(R442) No. 8	S3	—	Cannot be measured	—
(R442) No. 9	S2	—	Cannot be measured	—
(R442) No. 10	S1	—	Cannot be measured	—
(R442) No. 11	(Not used)	—	—	—
(R442) No. 12	WN	—	Cannot be measured	—
(R442) No. 13	WP	—	Cannot be measured	—
(R442) No. 14	VN	—	Cannot be measured	—
(R442) No. 15	VP	—	Cannot be measured	—
(R442) No. 16	(Not used)	—	—	—
(R442) No. 17	R2	—	Cannot be measured	—
(R442) No. 18	(Not used)	—	—	—
(R442) No. 19	(Not used)	—	—	—
(R442) No. 20	(Not used)	—	—	—
(R442) No. 21	(Not used)	—	—	—
(R442) No. 22	SCIIPU	—	Cannot be measured	SCI communication line

3. HIGH VOLTAGE BATTERY



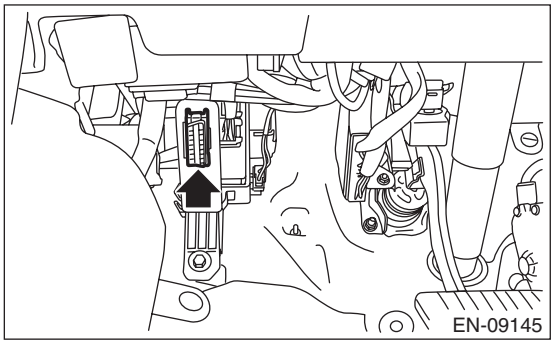
Terminal No. (terminal symbol)	Item	Measuring condition	Measurement value	Note
(R445) No. 1	Main power supply 1	Always	11 — 15 V	—
(R445) No. 2	HEVCAN H	—	Cannot be measured	CAN communication line
(R445) No. 3	HEVCAN L	—	Cannot be measured	CAN communication line
(R445) No. 4	GND	Always	0 V	—
(R445) No. 5	Main power supply 2	Always	11 — 15 V	—
(R445) No. 6	IG power supply	When ignition switch is ON	11 — 15 V	—
(R445) No. 7	(Not used)	—	—	—
(R445) No. 8	GND	Always	0 V	—

6. General Scan Tool

A: OPERATION

1. HOW TO USE GENERAL SCAN TOOL

1) Prepare a scan tool (general scan tool) required by SAE J1978.
2) Connect the general scan tool to data link connector located in the lower portion of the instrument panel (on the driver's side).



3) Using the general scan tool, call up each data. General scan tool functions consist of:
   (1) MODE $01: Current diagnostic data
   (2) MODE $02: Freeze frame data
   (3) MODE $03: Emission-related DTC
   (4) MODE $04: Clear/Reset emission-related diagnostic information
   (5) MODE $07: Request on-board monitoring test results for continuously monitored systems
   (6) MODE $09: Request vehicle information
   (7) MODE $0A: Emission-related DTC (with Permanent Status)
4) Read out the data according to repair procedures. (For detailed operation procedure, refer to the general scan tool operation manual.)

NOTE:
For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).>

2. MODE $01: (CURRENT DIAGNOSTIC DATA)

Refer to data denoting the current operating condition of analog input/output, digital input/output or the powertrain system.
A list of the support data and PID (Parameter Identification) codes are shown in the following table.

- Hybrid powertrain control system

PID	Data	Unit of measure
$01	Number of emission-related DTC, and malfunction indicator light status and diagnosis support information	—
$51	Fuel used at present	—

- Drive motor control system

PID	Data	Unit of measure
$01	Number of emission-related DTC, and malfunction indicator light status and diagnosis support information	—

- Battery energy control system

PID	Data	Unit of measure
$01	Number of emission-related DTC, and malfunction indicator light status and diagnosis support information	—
$5B	Hybrid/EV battery pack level	%

NOTE:
Refer to general scan tool manufacturer's operation manual to access current diagnostic data (MODE $01).

3. MODE $02 (FREEZE FRAME DATA)

Refer to data denoting the operating condition when trouble is detected by on-board diagnosis system.
A list of the support data and PID (Parameter Identification) codes are shown in the following table.

- Hybrid powertrain control system

PID	Data	Unit of measure
$02	DTC that caused freeze frame data to be stored	—
$51	Fuel used at present	—

- Battery energy control system

PID	Data	Unit of measure
$02	DTC that caused freeze frame data to be stored	—
$5B	Hybrid/EV battery pack level	%

NOTE:
Refer to general scan tool manufacturer's instruction manual to access current freeze frame data (MODE $02).

4. MODE $03 (EMISSION-RELATED DTC)

Refer to “List of Diagnostic Trouble Code (DTC)” for information about data denoting emission-related DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).>

5. MODE $04 (CLEAR/RESET EMISSION-RELATED DIAGNOSTIC INFORMATION)

Refer to the mode used to clear or reset emission-related diagnostic information.

NOTE:
Refer to general scan tool manufacturer’s instruction manual to clear the emission-related diagnostic information (MODE $04).

6. MODE $07 (REQUEST ON-BOARD MONITORING TEST RESULTS FOR CONTINUOUSLY MONITORED SYSTEMS)

Refer to the data of DTC (pending code) for troubleshooting result about emission in the first time.

7. MODE $09 (REQUEST VEHICLE INFORMATION)

Refer to the data of the vehicle specification.

8. MODE $0A (EMISSION-RELATED DTC (WITH PERMANENT STATUS))

Refer to “List of Diagnostic Trouble Code (DTC)” for information about data denoting emission-related DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).>

7. Subaru Select Monitor

A: OPERATION

- For detailed operation procedures, refer to “Application help”.
- When communication with Subaru Select Monitor is not possible, perform “COMMUNICATION FOR INITIALIZING IMPOSSIBLE”. <Ref. to HEV(diag)-17, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>

B: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

Subaru Select Monitor communication line is open or shorted.

1. HYBRID POWERTRAIN CONTROL SYSTEM

DIAGNOSIS:

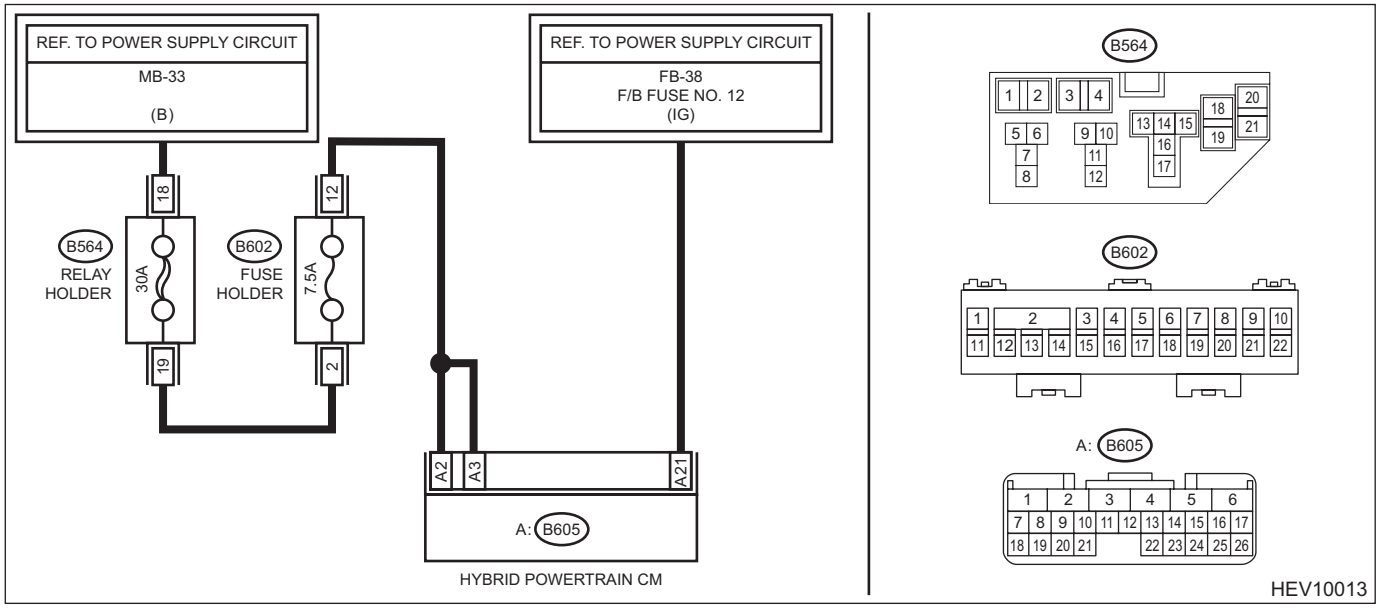
- Defective harness
- Power supply circuit malfunction
- Defective HPCM
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Not communicable with Subaru Select Monitor.

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Check HPCM fuse. <Ref. to HEV-12, Relay and Fuse.>	Is it normal?	Go to step **2**.	Replace the fuse. When the replaced fuse is blown immediately, repair ground short circuit of harness between 12 volt auxiliary battery and HPCM.

	Step	Check	Yes	No
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector. 3) Turn the ignition switch to ON. 4) Using a tester, measure the voltage between the HPCM connector and chassis ground. ***Connector & terminal*** ***(B605) No. 2 (+) — Chassis ground (–):*** ***(B605) No. 3 (+) — Chassis ground (–):*** ***(B605) No. 21 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **3**.	Repair the open circuit of the harness between the HPCM connector and the fuse.
3	**CHECK OTHER COMMUNICATION.** Communicate with the system other than the hybrid powertrain control module using the Subaru Select Monitor.	Is the communication to other control module possible?	Go to step **4**.	Perform the "Communication for Initializing Impossible" of LAN system. <Ref. to LAN(HEV)(diag)-12, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
4	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Perform the inspection according to the diagnosis for LAN system.	Go to step **5**.
5	**CHECK HPCM.** 1) Turn the ignition switch to OFF. 2) Connect the HPCM connector. 3) Communicate with the hybrid powertrain control system using the Subaru Select Monitor.	Is communication possible?	It is possible that temporary poor communication occurs.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>

2. DRIVE MOTOR CONTROL SYSTEM

DIAGNOSIS:

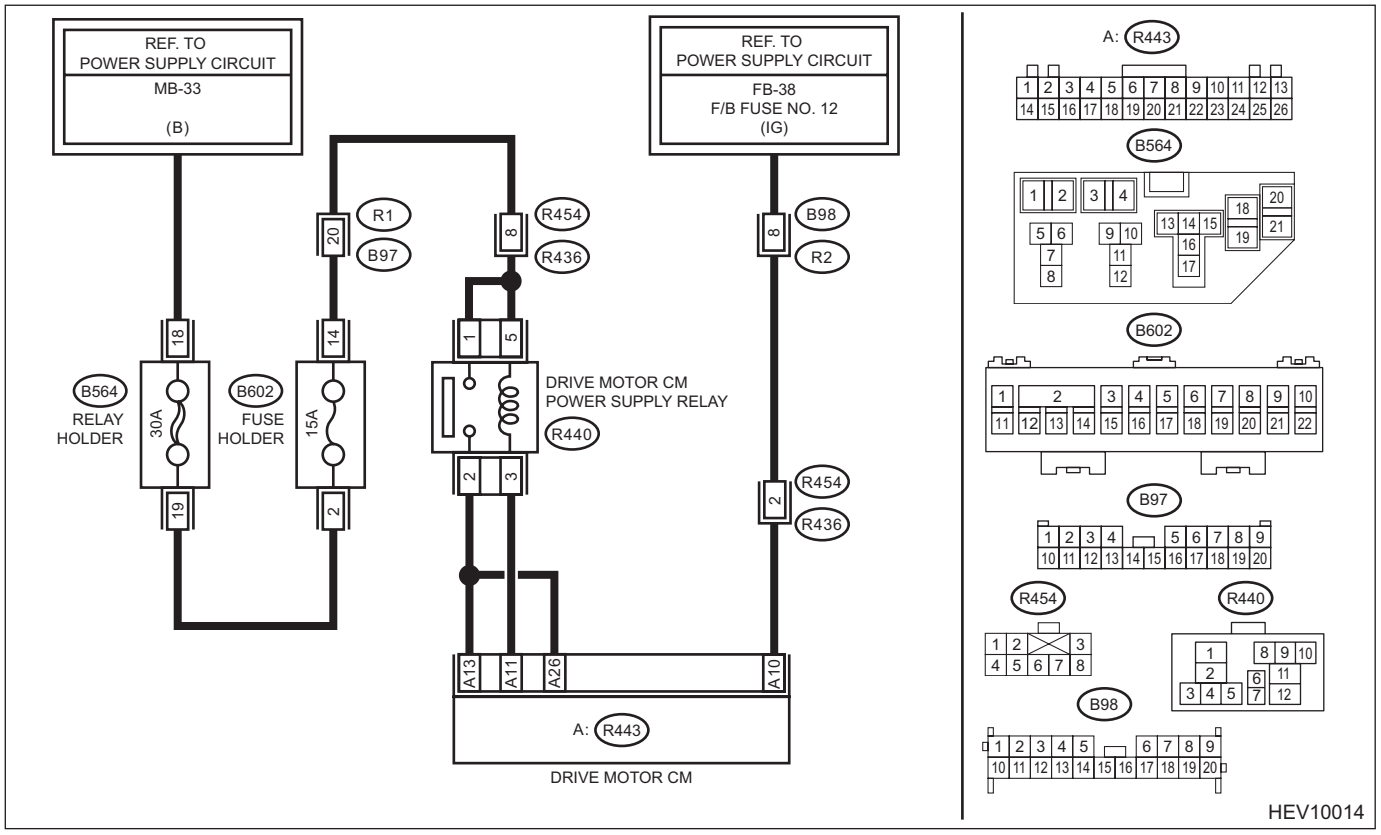
- Defective harness
- Power supply circuit malfunction
- Defective DMCM
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Not communicable with Subaru Select Monitor.

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Check DMCM fuse. <Ref. to HEV-12, Relay and Fuse.>	Is it normal?	Go to step **2**.	Replace the fuse. When the replaced fuse is blown immediately, repair ground short circuit of harness between 12 volt auxiliary battery and HPCM.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector. 3) Turn the ignition switch to ON. 4) Using a tester, measure the voltage between the DMCM connector and chassis ground. ***Connector & terminal*** ***(B443) No. 11 (+) — Chassis ground (–):*** ***(B443) No. 10 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **3**.	Repair the open circuit of the harness between the DMCM connector and the fuse.

	Step	Check	Yes	No
3	**CHECK OTHER COMMUNICATION.** Communicate with the system other than the drive motor control system using the Subaru Select Monitor.	Is the communication to other control module possible?	Go to step **4**.	Perform the "Communication for Initializing Impossible" of LAN system. <Ref. to LAN(HEV)(diag)-12, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>
4	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Perform the inspection according to the diagnosis for LAN system.	Go to step **5**.
5	**CHECK DMCM.** 1) Turn the ignition switch to OFF. 2) Connect the DMCM connector. 3) Communicate with the drive motor control system using the Subaru Select Monitor.	Is communication possible?	It is possible that temporary poor communication occurs.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

3. BATTERY ENERGY CONTROL SYSTEM

DIAGNOSIS:

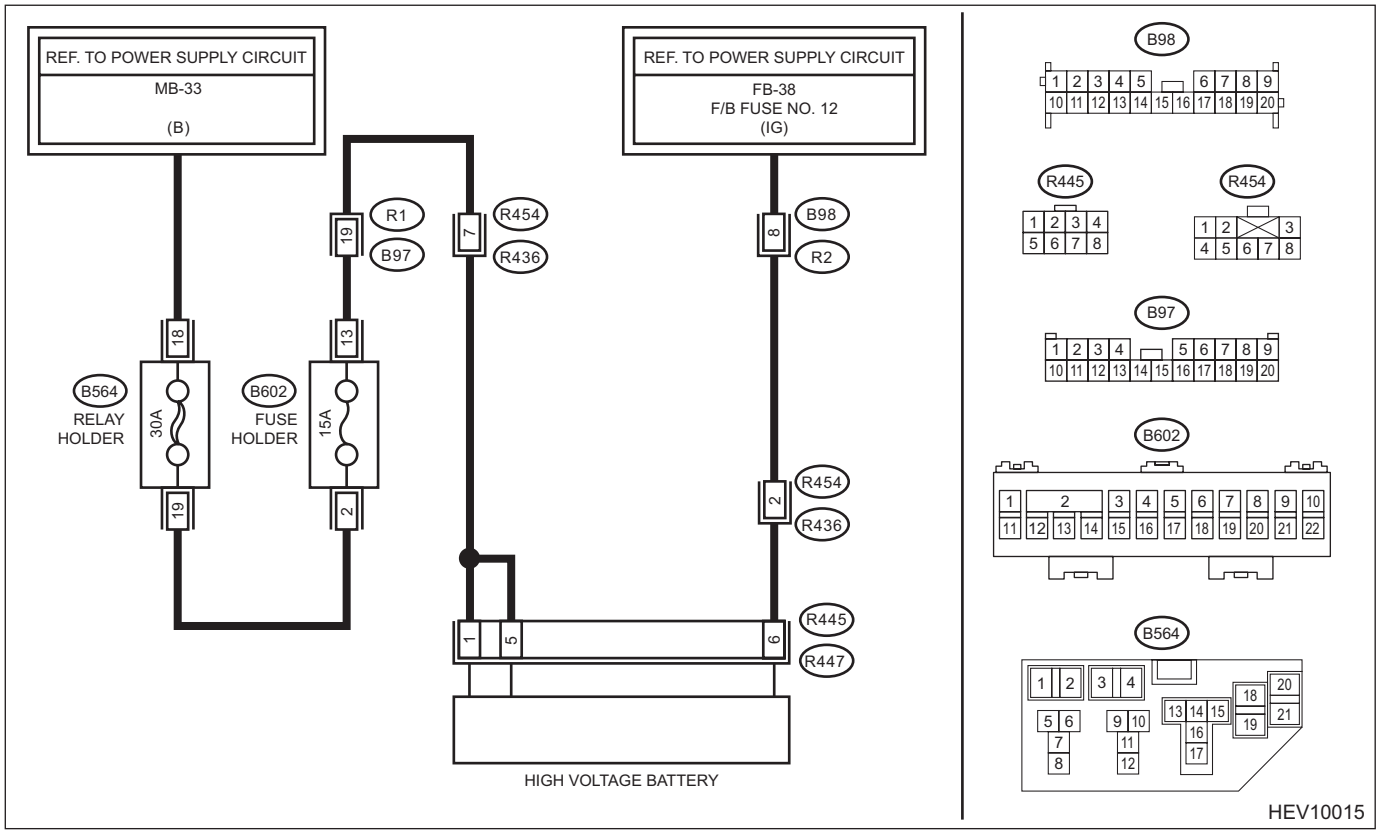
- Defective harness
- Power supply circuit malfunction
- Defective high voltage battery
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Not communicable with Subaru Select Monitor.

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Check High voltage battery fuse. <Ref. to HEV-12, Relay and Fuse.>	Is it normal?	Go to step **2**.	Replace the fuse. When the replaced fuse is blown immediately, repair ground short circuit of harness between 12 volt auxiliary battery and the high voltage battery.

	Step	Check	Yes	No
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the high voltage battery connector. 3) Turn the ignition switch to ON. 4) Using a tester, measure the voltage between the BECM connector and chassis ground. ***Connector & terminal*** ***(B445) No. 6 (+) — Chassis ground (–):*** ***(B445) No. 1 (+) — Chassis ground (–):*** ***(B445) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **3**.	Repair the open circuit of the harness between the high voltage battery connector and the fuse.
3	**CHECK OTHER COMMUNICATION.** Communicate with the system other than the battery energy control system using the Subaru Select Monitor.	Is the communication to other control module possible?	Go to step **4**.	Perform the “Communication for Initializing Impossible” of LAN system.
4	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is there any fault?	Perform the inspection according to the diagnosis for LAN system.	Go to step **5**.
5	**CHECK HIGH VOLTAGE BATTERY.** 1) Turn the ignition switch to OFF. 2) Disconnect the high voltage battery connector. 3) Connect the disconnected connectors. 4) Communicate with the battery energy control system using the Subaru Select Monitor.	Is communication possible?	It is possible that temporary poor communication occurs.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

8. Read Diagnostic Trouble Code (DTC)

A: OPERATION

- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).>

1. HYBRID POWERTRAIN CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control» and then select «Enter».
5) On «Select Function» display, select «DTC».

2. DRIVE MOTOR CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Drive Motor» and then select «Enter».
5) On «Select Function» display, select «DTC».

3. BATTERY ENERGY CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «High Voltage Battery» and then select «Enter».
5) On «Select Function» display, select «DTC».

9. Clear Memory Mode

A: OPERATION

For detailed operation procedures, refer to “Application help”.

1. HYBRID POWERTRAIN CONTROL SYSTEM

NOTE:
After memory is cleared, turn the ignition switch to OFF, and wait for 30 seconds or more before turning the ignition switch to ON.
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

2. DRIVE MOTOR CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Drive Motor» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

3. BATTERY ENERGY CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «High Voltage Battery» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

10.All Readiness Diagnostic Code(s)

A: OPERATION

NOTE:
• “Readiness code” denotes a self-diagnosis state in relation to DTC in each control module.
The DTCs displayed here are either not yet self-diagnosed or self-diagnosed but not completed. They will disappear once are diagnosed as normal or abnormal.
• When a diagnostic trouble code is set and the problem is addressed, the readiness code is used to check whether the repair has been properly completed.
When Clear Memory Mode is run after the repair, either Inspection Mode <Ref. to HEV(diag)-26, Inspection Mode.> or the drive cycle <Ref. to HEV(diag)-32, Drive Cycle.> is run against the concerned diagnostic trouble code (DTC), then the readiness code is checked. If the DTC is not displayed, the self-diagnosis for the DTC is considered complete.
Following this, the DTC is read. If the concerned DTC is not set as a current malfunction, the repair is considered complete.
• For detailed operation procedures, refer to “Application help”.
• Sometimes after the self-diagnosis is complete and the readiness code disappears, cycling the ignition switch OFF then ON may cause the readiness code reappear. This happens because the self-diagnosis for each DTC is run every time the ignition switch is turned ON.

1. HYBRID POWERTRAIN CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «All Readiness Diagnostic Code(s)».

2. DRIVE MOTOR CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Drive Motor» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «All Readiness Diagnostic Code(s)».

3. BATTERY ENERGY CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «High Voltage Battery» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «All Readiness Diagnostic Code(s)».

11.Inspection Mode

A: PROCEDURE

Perform the diagnosis shown in the following DTC table.
When performing the diagnosis not listed in “List of Diagnostic Trouble Code (DTC)”, refer to the item on the drive cycle. <Ref. to HEV(diag)-32, Drive Cycle.>

- Hybrid powertrain control system

DTC	Item	Condition
P0516	BATTERY TEMPERATURE SENSOR CIRCUIT LOW	—
P0517	BATTERY TEMPERATURE SENSOR CIRCUIT HIGH	—
P0556	BRAKE BOOSTER PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE	After idling, operate the brake pedal as ON ←→ OFF.
P0572	BRAKE SWITCH "A" CIRCUIT LOW	After idling, operate the brake pedal as ON ←→ OFF.
P0573	BRAKE SWITCH "A" CIRCUIT HIGH	After idling, operate the brake pedal as ON ←→ OFF.
P057B	BRAKE PEDAL POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE	After idling, operate the brake pedal as ON ←→ OFF.
P057C	BRAKE PEDAL POSITION SENSOR "A" CIRCUIT LOW	—
P057D	BRAKE PEDAL POSITION SENSOR "A" CIRCUIT HIGH	—
P058D	BATTERY MONITOR MODULE VOLTAGE MONITORING PERFORMANCE	—
P05DD	BRAKE PEDAL POSITION SENSOR "B" CIRCUIT LOW	—
P05DE	BRAKE PEDAL POSITION SENSOR "B" CIRCUIT HIGH	—
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	—
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	—
P0719	BRAKE SWITCH "B" CIRCUIT LOW	After idling, operate the brake pedal as ON ←→ OFF.
P0724	BRAKE SWITCH "B" CIRCUIT HIGH	After idling, operate the brake pedal as ON ←→ OFF.
P0A1D	HYBRID/EV POWERTRAIN CONTROL MODULE "A"	—
P1C00	BATTERY MONITOR MODULE "A" PERFORMANCE	—
P1C04	OUTPUT CLUTCH LINEAR SOLENOID HPCM CONTROL CIRCUIT LOW	After idling, turn the ignition switch to OFF and read the readiness code. (Because diagnosis is performed when the ignition switch is OFF.)
P1C05	OUTPUT CLUTCH LINEAR SOLENOID HPCM CONTROL CIRCUIT HIGH	After idling, turn the ignition switch to OFF and read the readiness code. (Because diagnosis is performed when the ignition switch is OFF.)
P1C11	VACUUM PUMP POWER SUPPLY CIRCUIT LOW	—
P1C12	VACUUM PUMP POWER SUPPLY CIRCUIT HIGH	—
P1C14	ISG PERFORMANCE	—
P1C1E	AUTODISCONNECT HISTORY	Inspection is impossible. (Inspection using the drive cycle is also impossible.)
U0073	CONTROL MODULE COMMUNICATION BUS OFF	—
U0075	CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF	—
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	—
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	—
U0101	LOST COMMUNICATION WITH TCM	—
U0110	LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"	—
U0111	LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE	—

DTC	Item	Condition
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	—
U0131	LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE	—
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	—
U0151	LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE	—
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	—
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE	—
U0287	LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE	—
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	—
U0402	INVALID DATA RECEIVED FROM TCM	—
U0411	INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"	—
U0412	INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE	—
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	—
U0420	INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE	—
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	—
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	—
U0424	INVALID DATA RECEIVED FROM HVAC CONTROL MODULE	—
U0452	INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE	—
U0588	INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE	—
U1100	LOST COMMUNICATION WITH ECM/PCM PU-CAN	—
U1101	LOST COMMUNICATION WITH TCM PU-CAN	—
U1401	INVALID DATA RECEIVED FROM ECM/PCM PU-CAN	—
U1402	INVALID DATA RECEIVED FROM TCM PU-CAN	—
U1676	LIN COMMUNICATION BUS ERROR HYBRID POWERTRAIN CONTROL MODULE	—
U1711	LOST COMMUNICATION WITH BATTERY "2" MONITOR MODULE	—
U1720	LOST COMMUNICATION WITH INTEGRATED STARTER GENERATOR	—

- Drive motor control system

DTC	Item	Condition
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	—
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	—
P06B1	SENSOR POWER SUPPLY "A" CIRCUIT LOW	—
P06B2	SENSOR POWER SUPPLY "A" CIRCUIT HIGH	—
P0A1B	DRIVE MOTOR "A" CONTROL MODULE	—
P0A2C	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT LOW	—
P0A2D	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT HIGH	—
P0A3C	DRIVE MOTOR "A" INVERTER OVER TEMPERATURE	—
P0A40	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT RANGE/PERFORMANCE	—
P0A43	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT INTERMITTENT	—
P0A44	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT OVERSPEED	—
P0A94	DC/DC CONVERTER PERFORMANCE	—
P0AED	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT	—
P0AF2	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT	—
P0BD1	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT	—
P0BE6	DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE	—
P0BE7	DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT LOW	—
P0BE8	DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT HIGH	—
P0BEA	DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE	—
P0BEB	DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT LOW	—
P0BEC	DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT HIGH	—
P0BEE	DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE	—
P0BEF	DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT LOW	—
P0BF0	DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT HIGH	—
P0BFD	DRIVE MOTOR "A" PHASE U-V-W CURRENT SENSOR CORRELATION	—
P0C0C	DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT LOW	—
P0C0D	DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT HIGH	—
P0C52	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "A" LOW	—
P0C5C	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "B" LOW	—
P0C79	DRIVE MOTOR "A" INVERTER VOLTAGE TOO HIGH	—
P0CDC	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" LOW	—
P0CDD	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" HIGH	—
P0DA8	HYBRID/EV BATTERY VOLTAGE/DRIVE MOTOR "A" INVERTER VOLTAGE CORRELATION	—
P1C20	DRIVE MOTOR "A" INVERTER VOLTAGE TOO LOW	—
P1C22	12V AUXILIARY BATTERY VOLTAGE TOO LOW	—
P1C25	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" LOW	—
P1C26	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" HIGH	—
P1C30	LOST COMMUNICATION WITH DRIVE MOTOR "A" INVERTER	—
P1C31	INVALID DATA RECEIVED FROM DRIVE MOTOR "A" INVERTER	—
P1C34	LOST COMMUNICATION WITH DC/DC CONVERTER	—
P1C35	INVALID DATA RECEIVED FROM DC/DC CONVERTER	—
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	—
U0111	LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE	—
U0412	INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE	—
U1290	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	—
U1591	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	—

- Battery energy control system

DTC	Item	Condition
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	—
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	—
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	—
P0A1F	BATTERY ENERGY CONTROL MODULE	—
P0A7D	HYBRID/EV BATTERY PACK STATE OF CHARGE LOW	—
P0A7E	HYBRID/EV BATTERY PACK OVER TEMPERATURE	—
P0A95	HIGH VOLTAGE FUSE "A"	—
P0A9C	HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—
P0A9D	HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT LOW	—
P0A9E	HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT HIGH	—
P0AA4	HYBRID/EV BATTERY NEGATIVE CONTACTOR CIRCUIT STUCK CLOSED	—
P0AA7	HYBRID/EV BATTERY VOLTAGE ISOLATION SENSOR CIRCUIT	—
P0AAE	HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT LOW	—
P0AAF	HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT HIGH	—
P0AC0	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—
P0AC1	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT LOW	—
P0AC2	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT HIGH	—
P0AC3	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT INTERMITTENT/ERRATIC	—
P0AC6	HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE	—
P0AC7	HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT LOW	—
P0AC8	HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT HIGH	—
P0ACB	HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE	—
P0ACC	HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT LOW	—
P0ACD	HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT HIGH	—
P0AD9	HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT/OPEN	—
P0ADB	HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT LOW	—
P0ADD	HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT/OPEN	—
P0ADF	HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT LOW	—
P0AE4	HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT/OPEN	—
P0AE6	HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT LOW	—
P0B25	HYBRID/EV BATTERY "A" VOLTAGE LOW	—
P0B26	HYBRID/EV BATTERY "A" VOLTAGE HIGH	—
P0B37	HIGH VOLTAGE SERVICE DISCONNECT OPEN	—
P0B3C	HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT RANGE/PERFORMANCE	—
P0B3D	HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT LOW	—
P0B3E	HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT HIGH	—
P0B41	HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT RANGE/PERFORMANCE	—
P0B42	HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT LOW	—
P0B43	HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT HIGH	—
P0B46	HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT RANGE/PERFORMANCE	—
P0B47	HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT LOW	—
P0B48	HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT HIGH	—
P0B4A	HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT	—
P0B4B	HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT RANGE/PERFORMANCE	—
P0B4C	HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT LOW	—

DTC	Item	Condition
P0B4D	HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT HIGH	—
P0B50	HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT RANGE/PERFORMANCE	—
P0B51	HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT LOW	—
P0B52	HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT HIGH	—
P0B55	HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT RANGE/PERFORMANCE	—
P0B56	HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT LOW	—
P0B57	HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT HIGH	—
P0B5A	HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT RANGE/PERFORMANCE	—
P0B5B	HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT LOW	—
P0B5C	HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT HIGH	—
P0BB8	HYBRID/EV BATTERY VOLTAGE SENSE "Z" CIRCUIT	—
P0C78	HYBRID/EV BATTERY SYSTEM PRECHARGE TIME TOO LONG	—
P0CA6	HYBRID/EV BATTERY CHARGING CURRENT HIGH	—
P0CA7	HYBRID/EV BATTERY DISCHARGING CURRENT HIGH	—
P1C40	HYBRID/EV BATTERY POSITIVE CONTACTOR OR PRE-CHARGE CONTACTOR CIRCUIT STUCK CLOSED	After idling, turn the ignition switch to OFF and read the readiness code. (Because diagnosis is performed when the ignition switch is OFF.)
P1C41	HIGH VOLTAGE CIRCUIT LOW	—
P1C42	HIGH VOLTAGE CIRCUIT/OPEN	—
P1C43	HYBRID/EV BATTERY CONTACTOR POWER SUPPLY CIRCUIT	—
P1C44	SUB CPU IN BECM	—
P1C45	HYBRID/EV BATTERY BLOCK 1 BALANCING PERFORMANCE	—
P1C46	HYBRID/EV BATTERY BLOCK 2 BALANCING PERFORMANCE	—
P1C47	HYBRID/EV BATTERY BLOCK 3 BALANCING PERFORMANCE	—
P1C48	HYBRID/EV BATTERY BLOCK 4 BALANCING PERFORMANCE	—
P1C49	HYBRID/EV BATTERY BLOCK 5 BALANCING PERFORMANCE	—
P1C4A	HYBRID/EV BATTERY BLOCK 6 BALANCING PERFORMANCE	—
P1C5E	HYBRID/EV BATTERY OPEN CIRCUIT VOLTAGE TOO LOW	—
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	—
U0110	LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"	—
U0411	INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"	—
U1290	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	—
U1591	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	—

PROCEDURE
1) Check that the 12 volt auxiliary battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, Clear Memory Mode.>
3) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After solving the DTC, repeat from step 2).
4) Start the engine, and run the engine at idle for 10 seconds or more.
5) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 4).
6) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After solving the DTC, repeat from step 2).

12.Drive Cycle

A: PROCEDURE

It is necessary to perform the drive cycle listed below if DTC is not found in the Inspection Mode. It is possible to complete diagnosis of the DTC by performing the indicated drive cycle. After the repair for the DTC, perform a necessary drive cycle and make sure the function recovers and the DTC is recorded.

1. PREPARATION FOR DRIVE CYCLE

1) Check that the 12 volt auxiliary battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, Clear Memory Mode.>
3) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
• If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After solving the DTC, repeat from step 2).
• Perform the drive cycle after warming up the engine except when any conditions such as oil temperature at starting are specified.

2. DRIVE CYCLE A

• Hybrid powertrain control system

DTC	Item	Condition
P1C10	VACUUM SYSTEM PERFORMANCE	Perform the drive cycle A during EV traveling to activate the vacuum pump. If the vacuum pump is not activated while the vacuum pressure is sufficient, perform the work support «Brake Vacuum Pump System Check» for the hybrid powertrain control system with ignition switch ON. <Ref. to HEV(diag)-71, OPERATION, Work Support.>
P2158	VEHICLE SPEED SENSOR "B" CIRCUIT	—

• Drive motor control system

DTC	Item	Condition
P0A2A	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT	When the ignition switch is ON and when the values of «Drive Motor Inverter Temperature A», «Drive Motor Inverter Temperature B», «Drive Motor Inverter Temperature C» and «High Voltage Battery Temperature (MIN)» in current data of drive motor control system are 30°C (86°F) or more, idle the engine for 1 minute and then start the drive cycle A. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>
P0A3F	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT	—
P0A5D	DRIVE MOTOR "A" PHASE U CURRENT	—
P0A60	DRIVE MOTOR "A" PHASE V CURRENT	—
P0A63	DRIVE MOTOR "A" PHASE W CURRENT	—
P0A78	DRIVE MOTOR "A" INVERTER PERFORMANCE	—
P0C05	DRIVE MOTOR "A" PHASE U-V-W CIRCUIT/OPEN	—
P1C24	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B"	When the ignition switch is ON and when the values of «Drive Motor Inverter Temperature A», «Drive Motor Inverter Temperature B», «Drive Motor Inverter Temperature C» and «High Voltage Battery Temperature (MIN)» in current data of drive motor control system are 30°C (86°F) or more, idle the engine for 1 minute and then start the drive cycle A. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>
P1C2A	DRIVE MOTOR "A" INVERTER CIRCUIT	—

- Battery energy control system

DTC	Item	Condition
U1591	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	—

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) Drive at 10 km/h (6.2 MPH) or more.
3) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).
4) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

3. DRIVE CYCLE B

- Drive motor control system

DTC	Item	Condition
P0A90	DRIVE MOTOR "A" PERFORMANCE	—
P0AEE	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	When the ignition switch is ON and when the values of «Drive Motor Inverter Temperature A», «Drive Motor Inverter Temperature B» and °Drive Motor Inverter Temperature C» in current data of drive motor control system are 30 — 50°C (86 — 122°F), idle the engine for 5 minutes and then start the drive cycle B. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>
P0AF3	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE	When the ignition switch is ON and when the values of «Drive Motor Inverter Temperature A», «Drive Motor Inverter Temperature B» and °Drive Motor Inverter Temperature C» in current data of drive motor control system are 30 — 50°C (86 — 122°F), idle the engine for 5 minutes and then start the drive cycle B. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>
P0BD2	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE	When the ignition switch is ON and when the values of «Drive Motor Inverter Temperature A», «Drive Motor Inverter Temperature B» and °Drive Motor Inverter Temperature C» in current data of drive motor control system are 30 — 50°C (86 — 122°F), idle the engine for 5 minutes and then start the drive cycle B. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>
P1C27	DRIVE MOTOR "A" TEMPERATURE SENSOR CORRELATION	When the ignition switch is ON and when the values of «Drive Motor Temperature A» and «Drive Motor Temperature B° in current data of drive motor control system are 30 — 50°C (86 — 122°F), idle the engine for 5 minutes and then start the drive cycle B. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>

- Battery energy control system

DTC	Item	Condition
P0A7F	HYBRID/EV BATTERY PACK DETERIORATION	Before starting the drive cycle, make sure that the values of «High Voltage Battery Temperature 1», «High Voltage Battery Temperature 2» and «High Voltage Battery Temperature 3» in current data of battery energy control system are 25°C (77°F) or more. <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>
P0AA6	HYBRID/EV BATTERY VOLTAGE SYSTEM ISOLATION FAULT	—
P0ABF	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT	Before starting the drive cycle, make sure that the values of «High Voltage Battery Temperature 1», «High Voltage Battery Temperature 2» and «High Voltage Battery Temperature 3» in current data of battery energy control system are 25°C (77°F) or more. <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) Drive for 10 minutes or more at a speed of 30 km/h (18.6 MPH) or more.
3) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).

4) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

4. DRIVE CYCLE C

- Hybrid powertrain control system

DTC	Item	Condition
P065A	GENERATOR/ALTERNATOR SYSTEM PERFORMANCE	—
P1C18	GENERATOR SYSTEM "B" PERFORMANCE	—

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) Set the shift lever to “P” range.
3) Check that «Open» is displayed for the current data «12V Battery Relay Mode Target» of the hybrid powertrain control system. <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>
4) Race the engine at 2000 rpm for 3 minutes.
5) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).
6) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

5. DRIVE CYCLE D

- Hybrid powertrain control system

DTC	Item	Condition
P0620	GENERATOR/ALTERNATOR CONTROL CIRCUIT	—
P06EF	ENGINE RESTART PERFORMANCE	—

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) Set the shift lever to “D” range.
3) At standing still (vehicle speed is at 0 km/h (0 MPH)), depress the brake pedal several times ON ←→ OFF from Auto Start Stop, then start the engine.
4) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).
5) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

6. DRIVE CYCLE E

- Hybrid powertrain control system

DTC	Item	Condition
P1C06	12V BATTERY RELAY CLOSE CIRCUIT PERFORMANCE	—
P1C07	12V BATTERY RELAY OPEN CIRCUIT PERFORMANCE	—
P1C08	12V BATTERY RELAY STUCK OPEN	—
P1C09	12V BATTERY RELAY STUCK CLOSED	—

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) Set the shift lever to “P” range.
3) Increase electrical load of auxiliary devices, wait until the value of current data «High Voltage Battery SOC» of the hybrid powertrain control system drops below 37% and the display for «12V Battery Relay Mode Target» turns to «Close». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>
4) Drive for 10 minutes or more at a speed of 30 km/h (18.6 MPH) or more.
5) Check that the value of current data «High Voltage Battery SOC» of the hybrid powertrain control system increases to 42% or more and the display for «12V Battery Relay Mode Target» turns to «Open». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>
6) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).
7) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

7. DRIVE CYCLE F

- Battery energy control system

DTC	Item	Condition
P0C30	HYBRID/EV BATTERY PACK STATE OF CHARGE HIGH	—

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) Start the engine, and run the engine at idle for 60 seconds or more.
3) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).
4) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

8. DRIVE CYCLE G

- Battery energy control system

DTC	Item	Condition
P0AAD	HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	—

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) After leaving the vehicle unattended for 6 hours or longer, start the engine and run at idling speed for 20 seconds.
3) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).
4) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

9. DRIVE CYCLE H

- Drive motor control system

DTC	Item	Condition
P0A82	HYBRID/EV BATTERY PACK COOLING FAN 1 PERFORMANCE/STUCK OFF	—
P0A83	HYBRID/EV BATTERY PACK COOLING FAN 1 STUCK ON	—

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) Select the System Operation Check Mode «High Voltage Battery Cooling Fan» of the drive motor control system. <Ref. to HEV(diag)-70, DRIVE MOTOR CONTROL SYSTEM, OPERATION, System Operation Check Mode.>
3) On «High Voltage Battery Cooling Fan» display, select {Step1}.
4) On «High Voltage Battery Cooling Fan» display, select {Stop}.
5) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).
6) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

10.DRIVE CYCLE I

- Hybrid powertrain control system

DTC	Item	Condition
P0506	IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED	—
P0507	IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED	—
P1C16	HPCM IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED	—
P1C17	HPCM IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED	—

Diagnostic procedure:
1) Prepare for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>
2) Drive at 10 km/h (6.2 MPH) or more.
3) Increase electrical load of auxiliary devices, wait until the value of current data «High Voltage Battery SOC» of the hybrid powertrain control system falls between 37% and below 40%.
4) Depress the brake pedal, set the shift lever to “D” range, and wait for 30 seconds. (Perform the power generation at stand still.)
5) Read the readiness code and check that the concerned DTC is not displayed. <Ref. to HEV(diag)-25, All Readiness Diagnostic Code(s).>

NOTE:
If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 1).
6) Read the DTC and check that the DTC is not displayed. <Ref. to HEV(diag)-23, Read Diagnostic Trouble Code (DTC).>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, List of Diagnostic Trouble Code (DTC).> After repairing the cause of setting DTC, repeat from preparation for drive cycle. <Ref. to HEV(diag)-32, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

13.Read Current Data

A: OPERATION

NOTE:
For detailed operation procedures, refer to “Application help”.

1. HYBRID POWERTRAIN CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

Display	Contents	Note (when normal)	Unit of measure
Vehicle Speed	Vehicle speed calculated by VDC CM (CAN communication data)	0 — 210	km/h
Vehicle Speed (Control)	Vehicle speed for control	0 — 255	km/h
Ambient Temperature	Ambient temperature calculated by combination meter (CAN communication data)	–40 — 80	°C
Target Power	Target drive power	–2100 — 9650	N
Target Acceleration (Cruise Control)	Target acceleration during the cruise control	–5.5 — 5.5	m/s^2
Acceleration by Driver Request	Target acceleration calculated from an accelerator opening angle and a vehicle speed for control	–5.5 — 5.5	m/s^2
Engine Torque	Engine axle torque calculated by ECM (CAN communication data)	–1000 — 2276.7	Nm
Engine Torque Target	Target engine axle torque	–70 — 191	Nm
Engine Torque Upper (ECM)	Upper limit of target engine torque calculated by ECM (CAN communication data)	0 — 408	Nm
Engine Speed	Engine speed calculated by ECM (CAN communication data)	0 — 6400	rpm
Engine Coolant Temperature	Engine coolant temperature calculated by ECM (CAN communication data)	–40 — 214	°C
Conventional Starter ON Permit Signal	Status of permission from HPCM for starting engine by starter	OFF ON	—
CVT Input Torque Upper (TCM)	Upper limit of input torque to transmission calculated by TCM (CAN communication data)	0 — 510	Nm
Gear Ratio Target	Target gear ratio	0 — 3.99	—
Gear Ratio	Gear ratio calculated by TCM (CAN communication data)	0 — 3.99	—
Input Clutch Target	Target status of input clutch	No Request Req.Engaged Req.Disengage	—
Input Clutch Actual	Input clutch status judged by TCM (CAN communication data)	Engaging2 Engaged Disengaged Engaging1 Disengaging	—
Output Clutch Target	Target status of output clutch	No Request Req.Engaged Req.Disengage	—
Output Clutch Actual	Output clutch status judged by TCM (CAN communication data)	Engaging Engaged Disengaged Disengaging	—
Transmission Turbine Speed	Transmission turbine speed calculated by TCM (CAN communication data)	0 — 6600	rpm

Display	Contents	Note (when normal)	Unit of measure
Output Shaft Speed	Transmission output axle speed calculated by TCM (CAN communication data)	0 — 12300	rpm
ATF Temperature	ATF temperature calculated by TCM (CAN communication data)	–50 — 205	°C
Trip Count [count]	Number of IG ON judged by the body integrated unit (CAN communication data)	—	times
Count	Number of IG ON, synchronous/asynchronous identification information of the elapsed time after IG ON	Common Originally	—
Time Count [msec]	Detailed time elapsed after IG ON calculated by body integrated unit (CAN communication data)	—	ms
Ignition switch	Ignition switch status	OFF ON	—
Starter Switch	Starter switch status	OFF ON	—
P Range	Parking range status judged by TCM (CAN communication data)	OFF ON	—
R Range	Reverse range status judged by TCM (CAN communication data)	OFF ON	—
N Range	Neutral range status judged by TCM (CAN communication data)	OFF ON	—
D Range	Drive range status judged by TCM (CAN communication data)	OFF ON	—
Accel opening angle	Accelerator opening angle ratio calculated by ECM (CAN communication data)	0 — 100	%
Master Cylinder Pressure	Brake fluid pressure calculated by VDC CM (CAN communication data)	0 — 29.3	MPa
ECU ACC	Voltage supplied to HPCM	10 — 15	V
Main Brake Pedal Stroke	Brake stroke calculated from main brake stroke sensor voltage	0 — 100	%
Main Brake Pedal Position Sensor Voltage	Voltage detected by main brake stroke sensor	0 — 5.16	V
Sub Brake Pedal Stroke	Brake stroke calculated from sub brake stroke sensor voltage	0 — 100	%
Sub Brake Pedal Position Sensor Voltage	Voltage detected by sub brake stroke sensor	0 — 5.16	V
Brake Booster Pressure 1	Vacuum pressure calculated from brake vacuum sensor voltage 1	13.3 — 106.7	kPa
Brake Booster Pressure Sensor Voltage 1	Voltage detected by brake vacuum sensor 1	0 — 5.16	V
Brake Booster Pressure 2	Vacuum pressure calculated from brake vacuum sensor voltage 2	13.3 — 106.7	kPa
Brake Booster Pressure Sensor Voltage 2	Voltage detected by brake vacuum sensor 2	0 — 5.16	V
Atmosphere Pressure	Atmospheric pressure calculated by ECM (CAN communication data)	13 — 115	kPa
12V Battery Relay Target Mode	12V battery relay commanded status	Close Open	—
12V Battery Relay Close Signal	12V battery relay close operation request status	OFF ON (regularly ON for 100 ms every 10 seconds while Close)	—
12V Battery Relay Open Signal	12V battery relay open operation request status	OFF ON (regularly ON for 100 ms every 10 seconds while Open)	—
Vacuum Pump Relay ON Signal	Brake vacuum pump relay operation request status	OFF ON	—

Display	Contents	Note (when normal)	Unit of measure
Vacuum Pump Relay Actual	Voltage applied to brake vacuum pump relay	0 — 20	V
Clutch Solenoid Control Signal	Output clutch solenoid operation request status	OFF ON	—
Power Sensor Voltage 1	Voltage supplied to main brake stroke sensor	5	V
Power Sensor Voltage 2	Voltage supplied to sub brake stroke sensor	5	V
Power Sensor Voltage 3	Voltage supplied to brake vacuum sensors 1 and 2	5	V
HPCM Target Control Mode	Target control mode of HPCM	00 01 02 03 04 06 09	—
HPCM Current Control Mode	Current control mode of HPCM	00 01 02 03 04 06 09	—
Auto Start Stop Function Permit Signal	Permission status of Auto Start Stop	OFF ON	—
Auto Start Stop or EV Status	Auto Start Stop/EV traveling status	OFF Auto Start Stop or EV Status	—
Ready Status	HEV-READY status	OFF Ready Status	—
Drive Motor Inverter Operation Signal	Drive motor inverter operation request status	OFF ON	—
Drive Motor Inverter Input Voltage	Drive motor inverter input voltage calculated by DMCM (CAN communication data)	9 — 155	V
Drive Motor Inverter Temperature (MAX)	The highest temperature among values of drive motor inverter temperature detected through multiple sensors by DMCM (CAN communication data)	–50 — 150	°C
Drive Motor Output Torque Actual	Drive motor output torque calculated by DMCM (CAN communication data)	–65 — 65	Nm
Drive Motor Torque Target	Target torque of drive motor	–65 — 65	Nm
Drive Motor Torque Upper Limit (DMCM)	Upper limit of drive motor torque calculated by DMCM (CAN communication data)	0 — 65	Nm
Drive Motor Torque Lower Limit (DMCM)	Lower limit of drive motor torque calculated by DMCM (CAN communication data)	–65 — 0	Nm
Drive Motor Speed	Drive motor speed calculated by DMCM (CAN communication data)	–7000 — 7000	rpm
Drive Motor Speed Target	Target speed of drive motor	—	rpm
Drive Motor Inverter Control Mode Target	Target control mode of drive motor inverter	—	—
Drive Motor Temperature A	Drive motor temperature A calculated by DMCM (CAN communication data)	–55 — 140	°C
Drive Motor Temperature B	Drive motor temperature B calculated by DMCM (CAN communication data)	–55 — 140	°C
ISG Cranking Signal	Integrated starter generator cranking request status	OFF ON	—
ISG Inhibiting Signal	Integrated starter generator drive prohibition request status	OFF ON	—

Display	Contents	Note (when normal)	Unit of measure
ISG Terminal Voltage	Terminal voltage calculated by integrated starter generator (LIN communication data)	10.6 — 16.975	V
ISG cranking Status	Cranking demand acceptance status judged by integrated starter generator (LIN communication data)	W/O Request Request	—
ISG Control Mode Actual	Current control mode judged by integrated starter generator (LIN communication data)	Neutral GeneratePower Restart First Start Assist Stop	—
ISG Control Mode Target	Target control mode of integrated starter generator	Neutral GeneratePower Start Start Ant. PreExcitation Assist Stop	—
ISG Cranking Permit Signal	Cranking permission status judged by integrated starter generator (LIN communication data)	OFF ON	—
ISG Excitation Current Actual	Excitation current calculated by integrated starter generator (LIN communication data)	0 — 25.5	A
ISG Excitation Current Upper Target	Excitation current upper limit of integrated starter generator	0 — 16	A
ISG Rotor Speed	Rotor speed calculated by integrated starter generator (LIN communication data)	0 — 19125	rpm
ISG Temperature	Temperature calculated by integrated starter generator (LIN communication data)	–42 — 210	°C
ISG Voltage Target	Target generated voltage of integrated starter generator	10.6 — 16	V
DCDC Converter Status	Operating condition of DC/DC converter judged by DMCM (CAN communication data)	Inactive Active	—
DCDC Converter Output Permit Signal	Output permission status of DC/DC converter	OFF ON	—
DCDC Converter Output Voltage Actual	DC/DC converter output voltage calculated by DMCM (CAN communication data)	10 — 15.5	V
DCDC Converter Output Voltage Target	DC/DC converter target output indicate voltage	0 — 25.5	V
DCDC Converter Output Amperage	DC/DC converter output current calculated by DMCM (CAN communication data)	0 — 130	A
DCDC Converter Temperature	DC/DC converter temperature calculated by DMCM (CAN communication data)	–50 — 160	°C
Electric Oil Pump Output Current	Output current calculated by electric oil pump (CAN communication data)	0 — 15.9375	A
Electric Oil Pump Motor Speed	Motor speed calculated by electric oil pump (CAN communication data)	0 — 4095	rpm
Service Plug Status	Service disconnect plug lock status judged by BECM (CAN communication data)	OFF ON	—
High Voltage Battery SOC	High voltage battery residual quantity calculated by BECM (CAN communication data)	5 — 95	%
High Voltage Battery SOH	Battery status auxiliary parameter of high voltage battery calculated by BECM (CAN communication data)	25 — 100	%
High Voltage Battery Total Voltage	High voltage battery voltage calculated by BECM (CAN communication data)	70 — 140	V
High Voltage Battery Amperage	High voltage battery current calculated by BECM (CAN communication data)	–110 — 180	A
High Voltage Battery Discharge Power Limit 1	High voltage battery discharge power limit calculated by BECM (CAN communication data)	0 — 14.0	kW

Display	Contents	Note (when normal)	Unit of measure
High Voltage Battery Charge Power Limit 1	High voltage battery charge power limit calculated by BECM (CAN communication data)	0 — 14.0	kW
High Voltage Battery SOC Subservience Parameter (MIN)	SOC auxiliary parameter of high voltage battery calculated by BECM (CAN communication data)	0 — 100	%
High Voltage Battery Temperature (MAX)	The highest temperature among values of high voltage battery temperature detected through multiple sensors by BECM (CAN communication data)	–40 — 63	°C
High Voltage Battery Temperature (MIN)	The lowest temperature among values of high voltage battery temperature detected through multiple sensors by BECM (CAN communication data)	–40 — 63	°C
High Voltage Battery Intake Air Temperature	High voltage battery intake air temperature calculated by BECM (CAN communication data)	–40 — 86.5	°C
High Voltage Battery Cooling Fan Speed	High voltage battery cooling fan speed calculated by DMCM (CAN communication data)	0 — 6000	rpm
High Voltage Battery Cooling Fan Duty Target	High voltage battery cooling fan target duty request	0 — 100 (20 — 70%: normal, 100%: failure, 0 — 20%: dead zone)	%
Blower Fan Level	Blower fan level judged by auto A/C CM (CAN communication data)	OFF LO M1 M2 M3 M4 M5 Hi	—
BECM Control Status	BECM control mode judged by BECM (CAN communication data)	Init. Normal ErrLimitPerf. Open Request Forced Open NG OFF Signal	—
Contactor Close Status	Contactor close status judged by BECM (CAN communication data)	Non Close	—
Contactor Open Status	Contactor open status judged by BECM (CAN communication data)	Non Open	—
Contactor Signal	Contactor operation request status	OFF ON Abnormal OFF	—
12V Engine Restart Battery Voltage	12 volt engine restart battery voltage calculated by 12 volt engine restart battery sensor (LIN communication data)	0 — 50	V
12V Engine Restart Battery Amperage	12 volt engine restart battery current calculated by 12 volt engine restart battery sensor (LIN communication data)	–200 — 200	A
12V Engine Restart Battery SOC	12 volt engine restart battery capacity calculated by 12 volt engine restart battery sensor (LIN communication data)	0 — 100	%
12V Engine Restart Battery SOC Control	12 volt engine restart battery control capacity	0 — 100	%
12V Engine Restart Battery SOC Validity	Validity of 12 volt engine restart battery capacity judged by 12 volt engine restart battery sensor (LIN communication data)	Invalid Valid	—
12V Engine Restart Battery Temperature	12 volt engine restart battery temperature calculated by 12 volt engine restart battery sensor (LIN communication data)	–40 — 125	°C
12V Auxiliary Battery Voltage	12 volt auxiliary battery voltage	0 — 25.5	V
12V Auxiliary Battery Temperature	12 volt auxiliary battery temperature	–40 — 100	°C

Display	Contents	Note (when normal)	Unit of measure
12V Auxiliary Battery Temperature Sensor Voltage	Voltage detected by 12 volt auxiliary battery temperature sensor, calculated by ECM (CAN communication data)	0 — 5	V
OBD Test Status	Diagnosis status of emission-related diagnosis	Test Not Comp Normal Abnormal	—
ECM Fail Safe Request Status	On/off status of fail safe request from ECM	Req.Now Req.Cur.Dri. Req.LastDri. Req.Past No Request	—
ECM Fail Safe Request Check	Fail safe request detailed information from ECM	00 — FF	—
TCM Fail Safe Request Status	On/off status of fail safe request from TCM	Req.Now Req.Cur.Dri. Req.LastDri. Req.Past No Request	—
TCM Fail Safe Request Check	Fail safe request detailed information from TCM	00 — FF	—
DMCM Fail Safe Request Status	On/off status of fail safe request from DMCM	Req.Now Req.Cur.Dri. Req.LastDri. Req.Past No Request	—
DMCM Fail Safe Request Check	Fail safe request detailed information from DMCM	00 — FF	—
BECM Fail Safe Request Status	On/off status of fail safe request from BECM	Req.Now Req.Cur.Dri. Req.LastDri. Req.Past No Request	—
BECM Fail Safe Request Check	Fail safe request detailed information from BECM	00 — FF	—
VDCM Fail Safe Request Status	On/off status of fail safe request from VDC CM	Req.Now Req.Cur.Dri. Req.LastDri. Req.Past No Request	—
Hybrid Fail Lamp Signal	Illumination request status of hybrid fail lamp	OFF ON Blink	—
Hybrid Fail Lamp Signal (DMCM)	Hybrid fail lamp illumination request from DMCM (CAN communication data)	OFF ON	—
Hybrid Fail Lamp Signal (BECM)	Hybrid fail lamp illumination request from BECM (CAN communication data)	OFF ON	—
CHARGE Lamp Signal	Illumination request status of charge warning light	OFF ON	—
Vacuum Pump Fail Lamp Signal	Illumination request status of brake vacuum pump warning light	OFF ON	—

Display	Contents	Note (when normal)	Unit of measure
A/C Request for Cooperation Mode	Requested engine speed change operation mode judged by auto A/C CM (CAN communication data)	W/O Request Cooling H Heating H Cooling L Heating L Heating M Heating LL	—
SI Drive Mode	SI-DRIVE mode judged by ECM (CAN communication data)	I S ECO-C	—
AUTO/MANUAL Mode Switch	Manual mode switch status judged by TCM (CAN communication data)	OFF ON	—
Up Switch	Manual mode up switch status judged by TCM (CAN communication data)	OFF ON	—
Down Switch	Manual mode down switch status judged by TCM (CAN communication data)	OFF ON	—
Oil Pressure Switch	Oil pressure switch status	OFF ON	—
Oil Pressure Lamp	Illumination request status of oil pressure waning light	OFF ON	—
EV Mode Lamp	Illumination request status of EV mode lamp	OFF ON	—
High Voltage Battery SOC (MFD Display)	High voltage battery capacity indicated in multi-function display	0 — 100	%
Energy Flow (MFD Display)	Energy flow request status indicated in multi-function display	Idling Auto Start Stop Motor Assist EV Powering EV Regenerate Engine Drive MotorGenerate EngBrakeRegen DGenerate Engine Stop	—
Interrupt Information (MFD Display)	Interrupt information request status indicated in multi-function display	No Display Alarm General AlarmSpec.1 AlarmSpec.2 Protect Mode EV Door Open AutoOffCrash AutoOffPast Maintenance	—
Fuel Saving Amount (MFD Display)	Fuel saving amount indicated by multi-function display	0 — 2.55	cc/sec
Fuel Saving Amount Sign (MFD Display)	Fuel saving amount sign indicated by multi-function display	+ –	—
Auto Start Stop Buzzer Signal	Buzzer beeping request status of Auto Start Stop	No Sound Continue	—
Manual Mode Gear Position (MFD Display)	Gear shift position indication request status of the select indicator/shift position indicator light (in manual mode)	OFF 1 2 3 4 5 6	—

Display	Contents	Note (when normal)	Unit of measure
Up (MFD Display)	Upshifting possible indicator light illumination request status (in manual mode)	OFF ON	—
Down (MFD Display)	Downshifting possible indicator light illumination request status (in manual mode)	OFF ON	—
Buzzer Signal	Buzzer beeping request status (in manual mode)	No Sound Pattern 2	—
Memorized Cruise Speed	Set vehicle speed during the cruise control	40 — 145	km/h
Main switch	Cruise switch status judged by ECM (CAN communication data)	OFF ON	—
SET/COAST Switch	SET/– switch status judged by ECM (CAN communication data)	OFF ON	—
RESUME/ACCEL Switch	RES/+ switch status judged by ECM (CAN communication data)	OFF ON	—
distance change SW	Distance setting switch status judged by ECM (CAN communication data)	OFF ON	—
Cruise Control Cancel Switch Signal	CANCEL switch status judged by ECM (CAN communication data)	OFF ON	—
Neutral switch	Neutral switch status judged by cruise control	Other than Neutral Neutral	—
Brake Switch	Brake switch status judged by ECM (CAN communication data)	OFF ON	—
Judgment of Main Brake Pedal Position Sensor	Judgment of brake by main brake stroke sensor	OFF ON	—
Judgment of Sub Brake Pedal Position Sensor	Judgment of brake by sub brake stroke sensor	OFF ON	—
Stop Light Switch	Stop light status judged by body integrated unit (CAN communication data)	OFF ON	—
Brake Pedal Position Learning Status	Brake stroke sensor learning status	Incomplete Complete	—
Main Brake Pedal Position Sensor Learning Value	Main brake stroke sensor learning value	–12.8 — 10.4	deg
Sub Brake Pedal Position Sensor Learning Value	Sub brake stroke sensor learning value	–12.8 — 10.4	deg
HPCM Check 1	Detailed information of control	—	—
HPCM Check 2	Detailed information of control	—	—
HPCM Check 3	Detailed information of control	—	—
HPCM Check 4	Detailed information of control	—	—
HPCM Check 5	Total number of 12V battery relay operation	—	times
HPCM Check 6	Total number of brake vacuum pump operation	—	times
HPCM Check 7	Total hours of brake vacuum pump operation	—	sec.
HPCM Check 9	Detailed information of control	—	—
HPCM Check 10	Detailed information of control	—	—
HPCM Check 11	Detailed information of control	—	—
HPCM Check 20	Detailed information of control	—	—
HPCM Check 21	Detailed information of control	—	—
HPCM Check 22	Detailed information of control	—	—
HPCM Check 23	Detailed information of control	—	—
HPCM Check 24	Detailed information of control	—	—
HPCM Check 25	Detailed information of control	—	—
HPCM Check 40	Detailed information of control	—	mΩ
HPCM Check 41	Detailed information of control	—	mΩ
HPCM Check 75	Detailed information of control	—	%

Display	Contents	Note (when normal)	Unit of measure
HPCM Check 76	Detailed information of control	—	%
HPCM Check 77	Detailed information of control	—	—
HPCM Check 80	Detailed information of control	—	—
HPCM Check 81	Detailed information of control	—	—
HPCM Check 82	Detailed information of control	—	—
HPCM Check 85	Detailed information of control	—	—
HPCM Check 86	Detailed information of control	—	—
HPCM Check 87	Detailed information of control	—	—
HPCM Check 90	Detailed information of control	—	—
HPCM Check 92	Detailed information of control	—	—
HPCM Check 100	Detailed information of control	—	—
HPCM Check 103	Detailed information of control	—	—
HPCM Check 104	Detailed information of control	—	—
HPCM Check 114	Detailed information of control	—	—
HPCM Check 117	Detailed information of control	—	—
HPCM Check 125	Detailed information of control	—	—
HPCM Check 126	Detailed information of control	—	—
HPCM Check 131	Detailed information of control	—	—
HPCM Check 132	Detailed information of control	—	—
HPCM Check 137	Detailed information of control	—	—
HPCM Check 138	Detailed information of control	—	—
HPCM Check 139	Detailed information of control	—	—
HPCM Check 140	Detailed information of control	—	—
HPCM Check 141	Detailed information of control	—	—
HPCM Check 142	Detailed information of control	—	—
HPCM Check 143	Detailed information of control	—	—
HPCM Check 144	Detailed information of control	—	—
HPCM Check 145	Detailed information of control	—	—
HPCM Check 146	Detailed information of control	—	—
HPCM Check 147	Detailed information of control	—	—
HPCM Check 148	Detailed information of control	—	—
HPCM Check 149	Detailed information of control	—	—
HPCM Check 151	Detailed information of control	—	—
HPCM Check 153	Detailed information of control	—	—
HPCM Check 154	Detailed information of control	—	—
HPCM Check 155	Detailed information of control	—	—
HPCM Check 156	Detailed information of control	—	—
HPCM Check 157	Detailed information of control	—	—
HPCM Check 158	Detailed information of control	—	—
HPCM Check 159	Detailed information of control	—	—
HPCM Check 160	Detailed information of control	—	—
HPCM Check 161	Detailed information of control	—	—
HPCM Check 162	Detailed information of control	—	—
HPCM Check 163	Detailed information of control	—	—
HPCM Check 164	Detailed information of control	—	—
HPCM Check 165	Detailed information of control	—	—
HPCM Check 166	Detailed information of control	—	—
HPCM Check 167	Detailed information of control	—	—
HPCM Check 168	Detailed information of control	—	—

2. HYBRID POWERTRAIN CONTROL SYSTEM (Auto Start Stop AND EV TRAVELING CONDITIONS)

NOTE:
For Auto Start Stop and EV traveling conditions of hybrid powertrain control system, refer to the table below.

Display	Auto Start Stop		EV traveling		Note
	Condition for permission	Condition for cancel	Condition for permission	Condition for cancel	
Brake Booster Pressure 1	< 63.83 kPa	> 69.83 kPa	< 63.83 kPa	> 69.83 kPa	Those values change depending on vehicle speed or atmospheric pressure. As a reference, values shown in upper row expects that atmospheric pressure is 1 bar and vehicle speed is 0 km/h (0 MPH). Values shown in lower row expects that atmospheric pressure is 1 bar and vehicle speed is 50 km/h (31.1 MPH).
Brake Booster Pressure 2	< 51.33 kPa	> 55.33 kPa	< 51.33 kPa	> 55.33 kPa	
12V Engine Restart Battery SOC Control	≥ 70.0%	< 60.0%	≥ 70.0%	< 60.0%	When the level decreases below 60%, the operation is not permitted until the level increases to at 70%. Also, when the level is recovered to 70%, the operation is permitted until the level decreases to 60%.
12V Engine Restart Battery Voltage	≥ 12.6 V	≤ 11.4 V	≥ 12.6 V	≤ 11.4 V	—
12V Engine Restart Battery Temperature	≥ –10°C (14°F) and ≤ 78°C (172.4°F)	< –12°C (10.4°F) or ≥ 80°C (176°F)	≥ –10°C (14°F) and ≤ 78°C (172.4°F)	< –12°C (10.4°F) or ≥ 80°C (176°F)	—
HPCM Check 40	< 10 mΩ	≥ 15 mΩ	< 10 mΩ	≥ 15 mΩ	—
HPCM Check 41	< 10 mΩ	≥ 15 mΩ	< 10 mΩ	≥ 15 mΩ	—
Engine Coolant Temperature	≥ 60°C (140.0°F)	≤ 57°C (134.6°F)	≥ 60°C (140.0°F)	≤ 57°C (134.6°F)	—
D Range	ON	OFF	ON	OFF	• Although the initial shift range for Auto Start Stop is “D range” only, the control operation continues even if the shifter moves to one of the following ranges. Shifting positions: P range, R range, N range • Although the initial shift range for EV traveling is “D range” only, operation continues in R range as well. Also, EV traveling may continue when shifter is transitionally moving through N range or P range.

Display	Auto Start Stop		EV traveling		Note
	Condition for permission	Condition for cancel	Condition for permission	Condition for cancel	
High Voltage Battery SOC	≥ 35.0%	≤ 33.5%	≥ 38.0% and < 73.0%	≤ 35.0% or > 76.0%	—
ISG Temperature	< 100°C (212°F)	≥ 140°C (284°F)	< 100°C (212°F)	≥ 140°C (284°F)	Canceled when the temperature increases above 140°C (284°F), and the operation is not permitted until the temperature decreases to 100°C (212°F). Also, when the temperature decreases to 100°C (212°F), the operation is permitted until the temperature increases to 140°C (284°F).
Vehicle Speed (Control)	≤ 0.1 km/h (0.1 MPH)	> 8 km/h (5 MPH)	—	—	Vehicle speed range suitable for EV traveling is 20 — 60 km/h (12 — 37 MPH).
HPCM Check 76	≤ | 0 — ±8 | %	> | ±8 | %	< 5 — 20%	≥ 15 — 100%	—
Accel opening angle	≤ 0.5%	≥ 0.7%	—	> 19.9%	—
Main Brake Pedal Stroke	≥ 10.6%	≤ 9.0%	< 11.8 — 23.5%	≥ 11.8 — 23.5%	Brake stroke for permitting/canceling the EV traveling depends on vehicle speed. However, threshold values for both permission and prohibition are the same.
DCDC Converter Status	Active	Inactive	Active	Inactive	—

3. DRIVE MOTOR CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Drive Motor» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

Display	Contents	Note (when normal)	Unit of measure
ECU ACC	Voltage supplied to DMCM	10 — 15	V
Ignition switch	Ignition switch status	OFF ON	—
Ignition Switch Signal (CAN receive)	Ignition switch status detected by HPCM (CAN communication data)	OFF ON	—
Accel opening angle	Accelerator opening angle ratio detected by ECM (CAN communication data)	0 — 100	%
Judgment of Idling	Idle switch status detected by ECM (CAN communication data)	OFF ON	—
Main Brake Pedal Stroke	Main brake stroke sensor status calculated by HPCM (CAN communication data)	0 — 100	%
Engine Speed	Engine speed detected by ECM (CAN communication data)	0 — 6400	rpm
Vehicle Speed	Vehicle speed calculated by VDC CM (CAN communication data)	0 — 210	km/h
Engine Coolant Temperature	Engine coolant temperature calculated by ECM (CAN communication data)	–40 — 214	°C
ATF Temperature	ATF temperature calculated by TCM (CAN communication data)	–50 — 205	°C
D Range	Drive range status judged by TCM (CAN communication data)	OFF ON	—
N Range	Neutral range status judged by TCM (CAN communication data)	OFF ON	—
R Range	Reverse range status judged by TCM (CAN communication data)	OFF ON	—
P Range	Parking range status judged by TCM (CAN communication data)	OFF ON	—
Trip Count [count]	Number of IG ON judged by the body integrated unit (CAN communication data)	—	times
Time Count [msec]	Detailed time elapsed after IG ON calculated by body integrated unit (CAN communication data)	—	ms
Detailed Time Counter	Calculated detailed time elapsed after IG ON	0 — 100	ms
Count	Number of IG ON, synchronous/asynchronous identification information of the elapsed time after IG ON	Common Originally	—
Drive Motor Torque Target (HPCM)	Drive motor target torque calculated by HPCM (CAN communication data)	–65 — 65	Nm
Drive Motor Output Torque Actual	Drive motor torque	–65 — 65	Nm
Drive Motor Torque Upper Limit	Upper limit of drive motor torque	0 — 65	Nm
Drive Motor Torque Lower Limit	Lower limit of drive motor torque	–65 — 0	Nm
Drive Motor Speed Target (HPCM)	Target drive motor speed calculated by HPCM (CAN communication data)	—	rpm
Drive Motor Speed	Drive motor speed	–7000 — 7000	rpm
Drive Motor Inverter Input High Voltage Sensor (Serial)	Drive motor inverter input high voltage (serial reception value)	9 — 155	V
High Voltage Battery Total Voltage	High voltage battery voltage calculated by BECM (CAN communication data)	70 — 140	V

Display	Contents	Note (when normal)	Unit of measure
High Voltage Battery Amperage	High voltage battery current calculated by BECM (CAN communication data)	–110 — 180	A
Phase U Voltage Target	DMCM output value	0 — 100	%
Phase V Voltage Target	DMCM output value	0 — 100	%
Phase W Voltage Target	DMCM output value	0 — 100	%
Phase U Amperage	Drive motor current	–350 — 350	A
Phase U Amperage Sensor Voltage	Current sensor voltage	0.5 — 4.5	V
Phase V Amperage	Drive motor current	–350 — 350	A
Phase V Amperage Sensor Voltage	Current sensor voltage	0.5 — 4.5	V
Phase W Amperage	Drive motor current	–350 — 350	A
Phase W Amperage Sensor Voltage	Current sensor voltage	0.5 — 4.5	V
Drive Motor Amperage Sensor Power Supply Voltage	Current sensor power supply voltage	4.9 — 5.1	V
Drive Motor Output Power Actual	Drive motor output	—	W
High Voltage Battery Temperature (MIN)	The lowest temperature among values of high voltage battery temperature detected through multiple sensors by BECM (CAN communication data)	–40 — 63	°C
Drive Motor Inverter Temperature A	Drive motor inverter temperature (serial reception value)	–50 — 150	°C
Drive Motor Inverter Temperature B	Drive motor inverter temperature (serial reception value)	–50 — 150	°C
Drive Motor Inverter Temperature C	Drive motor inverter temperature (serial reception value)	–50 — 150	°C
Drive Motor Temperature A	Drive motor temperature	–55 — 140	°C
Drive Motor Temperature A Sensor Voltage	Drive motor temperature sensor voltage	0.23 — 4.5	V
Drive Motor Temperature B	Drive motor temperature	–55 — 140	°C
Drive Motor Temperature B Sensor Voltage	Drive motor temperature sensor voltage	0.23 — 4.5	V
Drive Motor Inverter Operation Signal(HPCM)	Drive motor inverter operation request of HPCM (CAN communication data)	OFF ON	—
Drive Motor Inverter Operation Status	Drive motor inverter drive status	OFF ON	—
Drive Motor Inverter Operation Update Signal Count (Serial)	Drive motor inverter operation counter	0 — 255	Count
Drive Motor Inverter Power Supply Relay Output Signal	Drive motor inverter power supply relay operation signal	OFF ON	—
Drive Motor Inverter Power Supply Relay Output Actual	Monitor signal for drive motor inverter power supply relay operation signal	OFF ON	—
Contactor Signal(HPCM)	Contactor operation request status of HPCM (CAN communication data)	OFF ON Abnormal OFF	—
Contactor Weld Diagnosis Status	Contactor adhesion status judged by BECM (CAN communication data)	OFF Processing	—
Contactor Close Status	Contactor close status judged by BECM (CAN communication data)	Non Close	—
Contactor Close Sequence Status	Contactor status judged by BECM (CAN communication data)	OFF Processing	—
Contactor Open Status	Contactor status judged by BECM (CAN communication data)	Non Open	—

Display	Contents	Note (when normal)	Unit of measure
High Voltage Battery Cooling Fan Duty Target (HPCM)	High voltage battery cooling fan duty request calculated by HPCM (CAN communication data)	0 — 100 (20 — 70%: normal, 100%: failure, 0 — 20%: dead zone)	%
High Voltage Battery Cooling Fan Duty Output	High voltage battery cooling fan duty	0 — 90	%
High Voltage Battery Cooling Fan Speed	High voltage battery cooling fan speed	0 — 6000	rpm
DCDC Converter Output Permit Signal (HPCM)	DC/DC converter output permission status calculated by HPCM (CAN communication data)	OFF ON	—
DCDC Converter Output Voltage Target (HPCM)	DC/DC converter output indicate voltage calculated by HPCM (CAN communication data)	—	V
DCDC Converter Output Voltage Actual	Voltage output at DC/DC converter	10 — 15.5	V
DCDC Converter Output Amperage	Current output at DC/DC converter	0 — 130	A
DCDC Converter Output Limit Amperage	DC/DC converter set value	130	A
DCDC Converter Input Voltage	Input high voltage detected at DC/DC converter	30 — 160	V
DCDC Converter Temperature	Temperature calculated at DC/DC converter	–50 — 160	°C
DCDC Converter Status Check	DC/DC converter control value	0/8/24	—
DCDC Converter Check 1	DC/DC converter control value	0	—
DCDC Converter Check 2	DC/DC converter control value	0	—
DCDC Converter Operation Update Signal Count (Serial)	DC/DC converter operation counter	0 — 255	Count
DCDC Converter Output Permit Signal (Serial)	DC/DC converter output permission Serial transmission data (DMCM)	OFF ON	—
DCDC Converter Output Voltage Target (Serial)	DC/DC converter output indicate voltage Serial transmission data (DMCM)	—	V
DCDC Converter Output Voltage (Serial)	DC/DC converter output voltage Serial reception data (DC/DC)	10 — 15.5	V
DCDC Converter Output Amperage (Serial)	DC/DC converter output current Serial reception data (DC/DC)	0 — 130	A
DCDC Converter Output Limit Amperage (Serial)	DC/DC converter output limit Serial reception data (DC/DC)	130	A
DCDC Converter Input Voltage (Serial)	DC/DC converter input voltage Serial reception data (DC/DC)	30 — 160	V
DCDC Converter Temperature (Serial)	DC/DC converter temperature Serial reception data (DC/DC)	–50 — 160	°C
DCDC Converter Status Check (Serial)	DC/DC converter status information Serial reception data (DC/DC)	0/8/24	—
DCDC Converter Check 1 (Serial)	DC/DC converter protection information Serial reception data (DC/DC)	0	—
DCDC Converter Check 2 (Serial)	DC/DC converter trouble information Serial reception data (DC/DC)	0	—
DCDC Converter Initialize Completion	DC/DC converter initialize completion status	Incomplete Complete	—
DCDC Converter Serial Check	DC/DC converter serial communication failure	0	—
Hybrid Fail Lamp Signal	Hybrid fail lamp illumination request	OFF ON	—
OBD Test Status	OBD related diagnosis result	Test Not Comp Normal Abnormal	—
Drive Motor Inverter Control Mode Target(HPCM)	Target control mode of drive motor inverter calculated by HPCM	—	—

Display	Contents	Note (when normal)	Unit of measure
Sequence Status Check	DMCM set value	—	—
Drive Motor Inverter Check	DMCM input value	0	—
Drive Motor Torque Limit Check	DMCM output value	0	—
Drive Motor Torque Limit Status	DMCM output value	Normal Limitation	—
Drive Motor Mechanical Angle Pulse	Drive motor mechanical angle	0 — 4095	Pulse
Drive Motor Electrical Angle	Calculated drive motor electrical angle	0 — 2π	rad
d-axis Current Value	DMCM control value	—	A
q-axis Current Value	DMCM control value	—	A
Carrier Period	DMCM set value	—	us
Drive Motor Inverter Temperature Estimated	Drive motor inverter temperature	—	°C
Allow Drive Motor Position Sensor Diagnosis	DMCM control value	OFF ON	—
Allow 14V Condition Diagnosis	DMCM control value	OFF ON	—
Delivery Mode Connector	Delivery mode terminal information detected by ECM	—	—
Drive Motor Inverter Serial Check	Drive motor inverter serial communication failure	—	—
P0A3F-Detail Code 0300	P0A3F - detail code 0300	—	—
P0A3F-Detail Code 0301	P0A3F - detail code 0301	—	—
P0A3F-Detail Code 0302	P0A3F - detail code 0302	—	—
P0A3F-Detail Code 0303	P0A3F - detail code 0303	—	—
P0A3F-Detail Code 0304	P0A3F - detail code 0304	—	—
P0A3F-Detail Code 0305	P0A3F - detail code 0305	—	—
P0A3F-Detail Code 0306	P0A3F - detail code 0306	—	—
P0A3F-Detail Code 0307	P0A3F - detail code 0307	—	—
P0A3F-Detail Code 030A	P0A3F - detail code 030A	—	—
P0A78-Detail Code 0500	P0A78 - detail code 0500	—	—
P0A78-Detail Code 0501	P0A78 - detail code 0501	—	—
P0A78-Detail Code 0502	P0A78 - detail code 0502	—	—
P0A78-Detail Code 0503	P0A78 - detail code 0503	—	—
P0A78-Detail Code 0504	P0A78 - detail code 0504	—	—
P0A78-Detail Code 0505	P0A78 - detail code 0505	—	—
P0A78-Detail Code 0506	P0A78 - detail code 0506	—	—
P0A78-Detail Code 0507	P0A78 - detail code 0507	—	—
P0A78-Detail Code 0508	P0A78 - detail code 0508	—	—
P0A94-Detail Code 0800	P0A94 - detail code 0800	—	—
P0A94-Detail Code 0801	P0A94 - detail code 0801	—	—
P0A94-Detail Code 0802	P0A94 - detail code 0802	—	—
P0A94-Detail Code 0803	P0A94 - detail code 0803	—	—
P0A94-Detail Code 0804	P0A94 - detail code 0804	—	—
P0A94-Detail Code 0805	P0A94 - detail code 0805	—	—
P0A94-Detail Code 0806	P0A94 - detail code 0806	—	—
DMCU Check A	DMCM detailed information A	—	—
DMCU Check B	DMCM detailed information B	—	—
DMCU Check C	DMCM detailed information C	—	—
DMCU Check D	DMCM detailed information D	—	—
CAN Received Check 1	CAN received counter 1	—	Count
CAN Received Check 2	CAN received counter 2	—	Count

Display	Contents	Note (when normal)	Unit of measure
CAN Received Check 3	CAN received counter 3	—	Count
CAN Received Check 4	CAN received counter 4	—	Count
CAN Received Check 5	CAN received counter 5	—	Count
DMCM Detail Check A-0	DMCM detailed information A-0	—	—
DMCM Detail Check A-1	DMCM detailed information A-1	—	—
DMCM Detail Check A-2	DMCM detailed information A-2	—	—
DMCM Detail Check A-3	DMCM detailed information A-3	—	—
DMCM Detail Check A-4	DMCM detailed information A-4	—	—
DMCM Detail Check A-5	DMCM detailed information A-5	—	—
DMCM Detail Check A-6	DMCM detailed information A-6	—	—
DMCM Detail Check A-7	DMCM detailed information A-7	—	—
DMCM Detail Check A-8	DMCM detailed information A-8	—	—
DMCM Detail Check A-9	DMCM detailed information A-9	—	—
DMCM Detail Check A-10	DMCM detailed information A-10	—	—
DMCM Detail Check A-11	DMCM detailed information A-11	—	—
DMCM Detail Check A-12	DMCM detailed information A-12	—	—
DMCM Detail Check A-13	DMCM detailed information A-13	—	—
DMCM Detail Check A-14	DMCM detailed information A-14	—	—
DMCM Detail Check A-15	DMCM detailed information A-15	—	—
DMCM Detail Check A-16	DMCM detailed information A-16	—	—
DMCM Detail Check A-17	DMCM detailed information A-17	—	—
DMCM Detail Check B-0	DMCM detailed information B-0	—	—
DMCM Detail Check B-1	DMCM detailed information B-1	—	—
DMCM Detail Check B-2	DMCM detailed information B-2	—	—
DMCM Detail Check B-3	DMCM detailed information B-3	—	—
DMCM Detail Check C-8	DMCM detailed information C-8	—	—
DMCM Detail Check C-9	DMCM detailed information C-9	—	—
DMCM Detail Check D-0	DMCM detailed information D-0	—	—
DMCM Detail Check D-1	DMCM detailed information D-1	—	—
DMCM Detail Check D-2	DMCM detailed information D-2	—	—
DMCM Detail Check D-3	DMCM detailed information D-3	—	—
DMCM Detail Check D-4	DMCM detailed information D-4	—	—
DMCM Detail Check D-5	DMCM detailed information D-5	—	—
DMCM Detail Check D-6	DMCM detailed information D-6	—	—
DMCM Detail Check E-9	DMCM detailed information D-9	—	—
DMCM Detail Check E-10	DMCM detailed information D-10	—	—
DMCM Detail Check E-11	DMCM detailed information D-11	—	—
DMCM Detail Check E-12	DMCM detailed information D-12	—	—
DMCM Detail Check E-13	DMCM detailed information D-13	—	—
DMCM Detail Check F-0	DMCM detailed information F-0	—	—
DMCM Detail Check F-1	DMCM detailed information F-1	—	—
DMCM Detail Check G-0	DMCM detailed information G-0	—	—
DMCM Detail Check G-1	DMCM detailed information G-1	—	—
DMCM Detail Check I-0	DMCM detailed information I-0	—	—
DMCM Detail Check I-1	DMCM detailed information I-1	—	—
DMCM Detail Check I-2	DMCM detailed information I-2	—	—
DMCM Detail Check I-3	DMCM detailed information I-3	—	—
DMCM Detail Check I-4	DMCM detailed information I-4	—	—
DMCM Detail Check I-5	DMCM detailed information I-5	—	—

Display	Contents	Note (when normal)	Unit of measure
DMCM Detail Check I-6	DMCM detailed information I-6	—	—
DMCM Detail Check I-7	DMCM detailed information I-7	—	—
DMCM Detail Check I-8	DMCM detailed information I-8	—	—
DMCM Detail Check I-9	DMCM detailed information I-9	—	—
DMCM Detail Check I-10	DMCM detailed information I-10	—	—
DMCM Detail Check I-11	DMCM detailed information I-11	—	—
DMCM Detail Check I-12	DMCM detailed information I-12	—	—
DMCM Detail Check I-13	DMCM detailed information I-13	—	—
DMCM Detail Check I-14	DMCM detailed information I-14	—	—
DMCM Detail Check I-15	DMCM detailed information I-15	—	—
DMCM Detail Check J-0	DMCM detailed information J-0	—	—
DMCM Detail Check J-1	DMCM detailed information J-1	—	—
DMCM Detail Check J-2	DMCM detailed information J-2	—	—
DMCM Detail Check J-3	DMCM detailed information J-3	—	—
DMCM Detail Check J-4	DMCM detailed information J-4	—	—
DMCM Detail Check J-5	DMCM detailed information J-5	—	—
DMCM Detail Check J-6	DMCM detailed information J-6	—	—
DMCM Detail Check J-7	DMCM detailed information J-7	—	—
DMCM Detail Check J-8	DMCM detailed information J-8	—	—
DMCM Detail Check J-9	DMCM detailed information J-9	—	—
DMCM Detail Check -10	DMCM detailed information J-10	—	—
DMCM Detail Check -11	DMCM detailed information J-11	—	—
DMCM Detail Check J-12	DMCM detailed information J-12	—	—
DMCM Detail Check J-13	DMCM detailed information J-13	—	—
DMCM Detail Check J-14	DMCM detailed information J-14	—	—
DMCM Detail Check J-15	DMCM detailed information J-15	—	—
DMCM Detail Check J-16	DMCM detailed information J-16	—	—
DMCM Detail Check K-0	DMCM detailed information K-0	—	—
DMCM Detail Check K-1	DMCM detailed information K-1	—	—
DMCM Detail Check K-2	DMCM detailed information K-2	—	—
DMCM Detail Check K-3	DMCM detailed information K-3	—	—
DMCM Detail Check K-4	DMCM detailed information K-4	—	—
DMCM Detail Check K-5	DMCM detailed information K-5	—	—
DMCM Detail Check K-6	DMCM detailed information K-6	—	—
DMCM Detail Check L-0	DMCM detailed information L-0	—	—
System Check 1	Detailed information 1	—	—
System Check 2	Detailed information 2	—	—
System Check 8	Detailed information 8	—	—
System Check 9	Detailed information 9	—	—
System Check 11	Detailed information 11	—	—
System Check 12	Detailed information 12	—	—
Drive Motor Control Mode Check 1	DMCM control information 1	—	—
Drive Motor Control Mode Check 4	DMCM control information 4	—	—
Drive Motor Control Mode Check 5	DMCM control information 5	—	—
Drive Motor Control Mode Check 6	DMCM control information 6	—	—

4. BATTERY ENERGY CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «High Voltage Battery» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

Display	Contents	Note (when normal)	Unit of measure
High Voltage Battery Control Status	BECM control mode	01 — 06	—
High Voltage Battery SOC	High voltage battery residual quantity	5 — 95	%
High Voltage Battery SOH	Battery status auxiliary parameter of high voltage battery	25 — 100	%
High Voltage Battery Total Voltage	High voltage battery voltage	70 — 140	V
High Voltage Battery Amperage	High voltage battery current	–110 — 180	A
High Voltage Battery Charge Power Limit 1	High voltage battery charge control power value	0 — 14.0	kw
High Voltage Battery Discharge Power Limit 1	High voltage battery discharge control power value	0 — 14.0	kw
High Voltage Battery Temperature 1	High voltage battery temperature 1	–40 — 63	Deg.c
High Voltage Battery Temperature 2	High voltage battery temperature 2	–40 — 63	Deg.c
High Voltage Battery Temperature 3	High voltage battery temperature 3	–40 — 63	Deg.c
Intake Air Temperature	High voltage battery intake temperature	–40 — 86.5	Deg.c
High Voltage Battery Internal Resistance	High voltage battery internal resistance	0 — 4.0	ohm
HEV System Leakage Resistance (+)	Entire hybrid system leakage resistance on + side	1000	kohm
High Voltage Battery Pack Leakage Resistance (+)	High voltage battery internal leakage resistance on + side	1000	kohm
HEV System Leakage Resistance (-)	Entire hybrid system leakage resistance on – side	1000	kohm
High Voltage Battery Pack Leakage Resistance (-)	High voltage battery internal leakage resistance on – side	1000	kohm
OBD Test Status	Diagnosis status of emission-related diagnosis	Test Not Comp Normal Abnormal	—
Hybrid Fail Lamp Signal	Hybrid fail lamp illumination request by BECM	OFF ON	—
Trip Count [count]	Number of IG ON judged by the body integrated unit (CAN communication data)	—	times
Time Count [msec]	Detailed time elapsed after IG ON calculated by body integrated unit (CAN communication data)	—	ms
Count	Number of IG ON, synchronous/asynchronous identification information of the elapsed time after IG ON	Common Originally	—
Ignition switch	Ignition switch condition	OFF ON	—
Service Plug Status	Service disconnect plug lock status	OFF ON	—
High Voltage Battery Fuse Condition	High voltage battery fuse status	Normal Blowout	—
Positive Contactor Status	+ side contactor open/close status	Open Close	—

Display	Contents	Note (when normal)	Unit of measure
Negative Contactor Status	– side contactor open/close status	Open Close	—
Pre-Charge Contactor Status	Precharge contactor open/close status	Open Close	—
BECM Control Check 22	Detailed information of control	—	—
BECM Control Check 23	Detailed information of control	—	—
High Voltage Battery Block 1 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 2 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 3 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 4 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 5 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 6 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 7 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 8 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 9 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 10 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block 11 SOC	High voltage battery block SOC	5 — 95	%
High Voltage Battery Block Voltage 1	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 2	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 3	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 4	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 5	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 6	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 7	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 8	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 9	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 10	High voltage battery block voltage	8 — 14	V
High Voltage Battery Block Voltage 11	High voltage battery block voltage	8 — 14	V
High Voltage Battery Voltage 0	High voltage battery block voltage (voltage sensor value)	9.6 — 96	V
High Voltage Battery Voltage 1	High voltage battery block voltage (voltage sensor value)	6.4 — 64	V
High Voltage Battery Voltage 2	High voltage battery block voltage (voltage sensor value)	3.2 — 32	V
High Voltage Battery Voltage 3	High voltage battery block voltage (voltage sensor value)	–2.1 — 2.1	V
High Voltage Battery Voltage 4	High voltage battery block voltage (voltage sensor value)	–16 — –1.6	V
High Voltage Battery Voltage 5	High voltage battery block voltage (voltage sensor value)	–48 — –4.8	V
High Voltage Battery Voltage 6	High voltage battery block voltage (voltage sensor value)	–72 — –7.2	V
BECM Control Check 24	Detailed information of control	—	—
BECM Control Check 25	Detailed information of control	—	—
High Voltage Battery Amperage Sensor Output	High voltage battery current sensor value	–110 — 180	A

Display	Contents	Note (when normal)	Unit of measure
High Voltage Battery Amperage Offset Value	High voltage battery current sensor offset value	0 — 1	A
ECU ACC	Voltage supplied to BECM	10 — 15	V
Drive Motor Inverter Input Voltage	Drive motor inverter input voltage calculated by DMCM (CAN communication data)	9 — 155	V
Contactor Signal (HPCM)	Contactor operation request status judged by HPCM (CAN communication data)	OFF ON Abnormal OFF	—
Engine Speed	Engine speed calculated by ECM (CAN communication data)	0 — 6400	rpm
P Range	Parking range status judged by TCM (CAN communication data)	OFF ON	—
Vehicle Speed	Vehicle speed calculated by VDC (CAN communication data)	0 — 210	km/h
Drive Motor Inverter Operation Status	Drive motor inverter operation status calculated by DMCM (CAN communication data)	OFF ON	—
Drive Motor Torque Target (HPCM)	Target drive motor torque calculated by HPCM (CAN communication data)	–65 — 65	Nm
Drive Motor Output Torque Actual	Drive motor output torque calculated by DMCM (CAN communication data)	–65 — 65	Nm
Drive Motor Speed Target (HPCM)	Target drive motor speed calculated by HPCM (CAN communication data)	—	rpm
Drive Motor Speed	Drive motor speed calculated by DMCM (CAN communication data)	–7000 — 7000	rpm
High Voltage Battery Cooling Fan Duty Target (HPCM)	High voltage battery cooling fan duty request calculated by HPCM (CAN communication data)	0 — 100 (20 — 70%: normal, 100%: failure, 0 — 20%: dead zone)	%
High Voltage Battery Cooling Fan Speed	High voltage battery cooling fan speed calculated by DMCM (CAN communication data)	0 — 6000	rpm
High Voltage Battery Charge Power Limit 2	High voltage battery charge control power value (assist)	—	—
High Voltage Battery Discharge Power Limit 2	High voltage battery discharge control power value (assist)	—	—
BECM Control Check 26	Detailed information of control	—	—
BECM Control Check 27	Detailed information of control	—	—
BECM Control Check 28	Detailed information of control	—	—
BECM Control Check 29	Detailed information of control	—	—
BECM Control Check 15	Detailed information of control	—	—
BECM Control Check 16	Detailed information of control	—	—
BECM Control Check 30	Detailed information of control	—	—
BECM Control Check 32	Detailed information of control	—	—
High Voltage Battery SOC Subservience Parameter 1	Detailed information of control	—	—
High Voltage Battery SOC Subservience Parameter 2	Detailed information of control	—	—
High Voltage Battery SOC Subservience Parameter 3	Detailed information of control	—	—
High Voltage Battery SOC Subservience Parameter 4	Detailed information of control	—	—
High Voltage Battery SOC Subservience Parameter 5	Detailed information of control	—	—
High Voltage Battery SOC Subservience Parameter 6	Detailed information of control	—	—

Display	Contents	Note (when normal)	Unit of measure
High Voltage Battery SOC Sub-servience Parameter 7	Detailed information of control	—	—
High Voltage Battery SOC Sub-servience Parameter 8	Detailed information of control	—	—
High Voltage Battery SOC Sub-servience Parameter 9	Detailed information of control	—	—
High Voltage Battery SOC Sub-servience Parameter 10	Detailed information of control	—	—
High Voltage Battery SOC Sub-servience Parameter 11	Detailed information of control	—	—
BECM Check 1	Detailed information of control	—	—
BECM Check 2	Detailed information of control	—	—
BECM Check 3	Detailed information of control	—	—
BECM Check 4	Detailed information of control	—	—
BECM Control Check 1	Detailed information of control	—	—
BECM Control Check 2	Detailed information of control	—	—
BECM Control Check 3	Detailed information of control	—	—
BECM Control Check 4	Detailed information of control	—	—
BECM Control Check 5	Detailed information of control	—	—
BECM Control Check 6	Detailed information of control	—	—
BECM Control Check 7	Detailed information of control	—	—
BECM Control Check 8	Detailed information of control	—	—
BECM Control Check 9	Detailed information of control	—	—
BECM Control Check 10	Detailed information of control	—	—
BECM Control Check 11	Detailed information of control	—	—
BECM Control Check 12	Detailed information of control	—	—
BECM Control Check 13	Detailed information of control	—	—
BECM Control Check 14	Detailed information of control	—	—
BECM Control Check 17	Detailed information of control	—	—
BECM Control Check 18	Detailed information of control	—	—
BECM Control Check 19	Detailed information of control	—	—
BECM Control Check 20	Detailed information of control	—	—
BECM Control Check 21	Detailed information of control	—	—
High Voltage Battery Temp. Info 1(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 2(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 3(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 4(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 5(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 6(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 7(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 8(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 9(IGON)	Detailed information of control	—	—

Display	Contents	Note (when normal)	Unit of measure
High Voltage Battery Temp. Info 10(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 11(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 12(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 13(IGON)	Detailed information of control	—	—
High Voltage Battery Temp. Info 1(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 2(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 3(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 4(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 5(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 6(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 7(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 8(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 9(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 10(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 11(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 12(IGOFF)	Detailed information of control	—	—
High Voltage Battery Temp. Info 13(IGOFF)	Detailed information of control	—	—

14.Freeze Frame Data Display

A: OPERATION

NOTE:
For detailed operation procedures, refer to “Application help”.

1. HYBRID POWERTRAIN CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

Display	Contents	Unit of measure
Vehicle Speed	Vehicle speed calculated by VDC CM (CAN communication data)	km/h
Ambient Temperature	Ambient temperature calculated by combination meter (CAN communication data)	°C
Engine Speed	Engine speed calculated by ECM (CAN communication data)	rpm
Engine Coolant Temperature	Engine coolant temperature calculated by ECM (CAN communication data)	°C
Gear Ratio	Gear ratio calculated by TCM (CAN communication data)	—
ATF Temperature	ATF temperature calculated by TCM (CAN communication data)	°C
Trip Count [count]	Number of IG ON judged by the body integrated unit (CAN communication data)	times
Count	Number of IG ON, synchronous/asynchronous identification information of the elapsed time after IG ON	—
Time Count [msec]	Detailed time elapsed after IG ON calculated by body integrated unit (CAN communication data)	ms
Ignition switch	Ignition switch status	—
Starter Switch	Starter switch status	—
P Range	Parking range status judged by TCM (CAN communication data)	—
R Range	Reverse range status judged by TCM (CAN communication data)	—
N Range	Neutral range status judged by TCM (CAN communication data)	—
D Range	Drive range status judged by TCM (CAN communication data)	—
Accel opening angle	Accelerator opening angle ratio calculated by ECM (CAN communication data)	%
Main Brake Pedal Stroke	Brake stroke calculated from main brake stroke sensor voltage	%
Sub Brake Pedal Stroke	Brake stroke calculated from sub brake stroke sensor voltage	%
Brake Booster Pressure 1	Vacuum pressure calculated from brake vacuum sensor voltage 1	kPa
Brake Booster Pressure 2	Vacuum pressure calculated from brake vacuum sensor voltage 2	kPa
Atmosphere Pressure	Atmospheric pressure calculated by ECM (CAN communication data)	kPa
12V Battery Relay Target Mode	12V battery relay commanded status	—
Vacuum Pump Relay Actual	Voltage applied to brake vacuum pump relay	V
HPCM Target Control Mode	Target control mode of HPCM	—
HPCM Current Control Mode	Current control mode of HPCM	—
Drive Motor Inverter Input Voltage	Drive motor inverter input voltage calculated by DMCM (CAN communication data)	V
Drive Motor Output Torque Actual	Drive motor output torque calculated by DMCM (CAN communication data)	Nm
Drive Motor Speed	Drive motor speed calculated by DMCM (CAN communication data)	rpm
ISG Terminal Voltage	Terminal voltage calculated by integrated starter generator (LIN communication data)	V
ISG cranking Status	Cranking demand acceptance status judged by integrated starter generator (LIN communication data)	—
ISG Control Mode Actual	Current control mode judged by integrated starter generator (LIN communication data)	—
DCDC Converter Output Voltage Actual	DC/DC converter output voltage calculated by DMCM (CAN communication data)	V

Display	Contents	Unit of measure
Electric Oil Pump Motor Speed	Motor speed calculated by electric oil pump (CAN communication data)	rpm
High Voltage Battery SOC	High voltage battery residual quantity calculated by BECM (CAN communication data)	%
High Voltage Battery Total Voltage	High voltage battery voltage calculated by BECM (CAN communication data)	V
High Voltage Battery Discharge Power Limit 1	High voltage battery discharge power limit calculated by BECM (CAN communication data)	kW
High Voltage Battery Charge Power Limit 1	High voltage battery charge power limit calculated by BECM (CAN communication data)	kW
High Voltage Battery Cooling Fan Speed	High voltage battery cooling fan speed calculated by DMCM (CAN communication data)	rpm
BECM Control Status	BECM control mode judged by BECM (CAN communication data)	—
Contactor Close Status	Contactor close status judged by BECM (CAN communication data)	—
12V Engine Restart Battery Voltage	12 volt engine restart battery voltage calculated by 12 volt engine restart battery sensor (LIN communication data)	V
12V Engine Restart Battery SOC	12 volt engine restart battery capacity calculated by 12 volt engine restart battery sensor (LIN communication data)	%
12V Auxiliary Battery Voltage	12 volt auxiliary battery voltage	V
OBD Test Status	Diagnosis status of emission-related diagnosis	—
ECM Fail Safe Request Check	Fail safe request detailed information from ECM	—
TCM Fail Safe Request Check	Fail safe request detailed information from TCM	—
DMCM Fail Safe Request Check	Fail safe request detailed information from DMCM	—
BECM Fail Safe Request Check	Fail safe request detailed information from BECM	—
AUTO/MANUAL Mode Switch	Manual mode switch status judged by TCM (CAN communication data)	—
Brake Pedal Position Learning Status	Brake stroke sensor learning status	—
HPCM Check 9	Detailed information of control	—
HPCM Check 20	Detailed information of control	—
HPCM Check 21	Detailed information of control	—
HPCM Check 22	Detailed information of control	—
HPCM Check 23	Detailed information of control	—
HPCM Check 24	Detailed information of control	—
HPCM Check 25	Detailed information of control	—
HPCM Check 40	Detailed information of control	mΩ
HPCM Check 78	Detailed information of control	—
HPCM Check 82	Detailed information of control	—
HPCM Check 125	Detailed information of control	—
HPCM Check 126	Detailed information of control	—
HPCM Check 127	Detailed information of control	—
HPCM Check 128	Detailed information of control	—
HPCM Check 129	Detailed information of control	—
HPCM Check 130	Detailed information of control	—
HPCM Check 133	Detailed information of control	—
HPCM Check 134	Detailed information of control	—
HPCM Check 135	Detailed information of control	—
HPCM Check 136	Detailed information of control	—
HPCM Check 159	Detailed information of control	—
HPCM Check 171	Detailed information of control	—

2. DRIVE MOTOR CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Drive Motor» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

Display	Contents	Unit of measure
ECU ACC	Voltage supplied to DMCM	V
Ignition switch	Ignition switch status	—
Ignition Switch Signal (CAN receive)	Ignition switch status detected by HPCM (CAN communication data)	—
Accel opening angle	Accelerator opening angle ratio detected by ECM (CAN communication data)	%
Judgment of Idling	Idle switch status detected by ECM (CAN communication data)	—
Main Brake Pedal Stroke	Main brake stroke sensor status calculated by HPCM (CAN communication data)	%
Engine Speed	Engine speed detected by ECM (CAN communication data)	rpm
Vehicle Speed	Vehicle speed calculated by VDC CM (CAN communication data)	km/h
Engine Coolant Temperature	Engine coolant temperature calculated by ECM (CAN communication data)	°C
ATF Temperature	ATF temperature calculated by TCM (CAN communication data)	°C
D Range	Drive range status judged by TCM (CAN communication data)	—
N Range	Neutral range status judged by TCM (CAN communication data)	—
R Range	Reverse range status judged by TCM (CAN communication data)	—
P Range	Parking range status judged by TCM (CAN communication data)	—
Trip Count [count]	Number of IG ON judged by the body integrated unit (CAN communication data)	times
Time Count [msec]	Detailed time elapsed after IG ON calculated by body integrated unit (CAN communication data)	ms
Detailed Time Counter	Calculated detailed time elapsed after IG ON	ms
DMCM Check Detailed Code	—	—
Count	Number of IG ON, synchronous/asynchronous identification information of the elapsed time after IG ON	—
Drive Motor Torque Target (HPCM)	Drive motor target torque calculated by HPCM (CAN communication data)	Nm
Drive Motor Output Torque Actual	Drive motor torque	Nm
Drive Motor Torque Upper Limit	DMCM set value	Nm
Drive Motor Torque Lower Limit	DMCM set value	Nm
Drive Motor Speed Target (HPCM)	Target drive motor speed calculated by HPCM (CAN communication data)	rpm
Drive Motor Speed	Drive motor speed	rpm
Drive Motor Inverter Input High Voltage Sensor (Serial)	Drive motor inverter input high voltage (serial reception value)	V
High Voltage Battery Total Voltage	High voltage battery voltage calculated by BECM (CAN communication data)	V
High Voltage Battery Amperage	High voltage battery current calculated by BECM (CAN communication data)	A
Phase U Voltage Target	DMCM output value	%
Phase V Voltage Target	DMCM output value	%
Phase W Voltage Target	DMCM output value	%
Phase U Amperage	Drive motor current	A

Display	Contents	Unit of measure
Phase U Amperage Sensor Voltage	Current sensor voltage	V
Phase V Amperage	Drive motor current	A
Phase V Amperage Sensor Voltage	Current sensor voltage	V
Phase W Amperage	Drive motor current	A
Phase W Amperage Sensor Voltage	Current sensor voltage	V
Drive Motor Amperage Sensor Power Supply Voltage	Current sensor power supply voltage	V
Drive Motor Output Power Actual	Drive motor output	W
High Voltage Battery Temperature (MIN)	The lowest temperature among values of high voltage battery temperature detected through multiple sensors by BECM (CAN communication data)	°C
Drive Motor Inverter Temperature A	Drive motor inverter temperature (serial reception value)	°C
Drive Motor Inverter Temperature B	Drive motor inverter temperature (serial reception value)	°C
Drive Motor Inverter Temperature C	Drive motor inverter temperature (serial reception value)	°C
Drive Motor Temperature A	Drive motor temperature	°C
Drive Motor Temperature A Sensor Voltage	Drive motor temperature sensor voltage	V
Drive Motor Temperature B	Drive motor temperature	°C
Drive Motor Temperature B Sensor Voltage	Drive motor temperature sensor voltage	V
Drive Motor Inverter Operation Signal(HPCM)	Drive motor inverter operation request of HPCM (CAN communication data)	—
Drive Motor Inverter Operation Status	Drive motor inverter drive status	—
Drive Motor Inverter Power Supply Relay Output Signal	Drive motor inverter power supply relay operation signal	—
Drive Motor Inverter Power Supply Relay Output Actual	Monitor signal for drive motor inverter power supply relay operation signal	—
Contactor Signal(HPCM)	Contactor operation request status of HPCM (CAN communication data)	—
Contactor Weld Diagnosis Status	Contactor stuck closed status judged by BECM (CAN communication data)	—
Contactor Close Status	Contactor close status judged by BECM (CAN communication data)	—
Contactor Close Sequence Status	Contactor status judged by BECM (CAN communication data)	—
Contactor Open Status	Contactor status judged by BECM (CAN communication data)	—
High Voltage Battery Cooling Fan Duty Target (HPCM)	High voltage battery cooling fan duty request calculated by HPCM (CAN communication data)	%
High Voltage Battery Cooling Fan Duty Output	High voltage battery cooling fan duty	%
High Voltage Battery Cooling Fan Speed	High voltage battery cooling fan speed	rpm
DCDC Converter Output Permit Signal (HPCM)	DC/DC converter output permission status calculated by HPCM (CAN communication data)	—
DCDC Converter Output Voltage Target (HPCM)	DC/DC converter output indicate voltage calculated by HPCM (CAN communication data)	V
DCDC Converter Output Voltage Actual	Voltage output at DC/DC converter	V

Display	Contents	Unit of measure
DCDC Converter Output Amperage	Current output at DC/DC converter	A
DCDC Converter Output Limit Amperage	DC/DC converter set value	A
DCDC Converter Input Voltage	Input high voltage detected at DC/DC converter	V
DCDC Converter Temperature	Temperature calculated at DC/DC converter	°C
DCDC Converter Status Check	DC/DC converter control value	—
DCDC Converter Check 1	DC/DC converter control value	—
DCDC Converter Check 2	DC/DC converter control value	—
DCDC Converter Operation Update Signal Count (Serial)	DC/DC converter operation counter	Count
DCDC Converter Output Permit Signal (Serial)	DC/DC converter output permission Serial transmission data (DMCM)	—
DCDC Converter Output Voltage Target (Serial)	DC/DC converter output indicate voltage Serial transmission data (DMCM)	V
DCDC Converter Initialize Completion	DC/DC converter initialize completion status	—
DCDC Converter Serial Check	DC/DC converter serial communication failure	—
Drive Motor Inverter Control Mode Target(HPCM)	Target control mode of drive motor inverter calculated by HPCM	—
Sequence Status Check	DMCM set value	—
Drive Motor Inverter Check	DMCM input value	—
Drive Motor Torque Limit Check	DMCM output value	—
Drive Motor Torque Limit Status	DMCM output value	—
Drive Motor Mechanical Angle Pulse	Drive motor mechanical angle	Pulse
DMCU Check A	DMCM detailed information A	—
DMCU Check B	DMCM detailed information B	—
DMCU Check C	DMCM detailed information C	—
DMCU Check D	DMCM detailed information D	—
System Check 1	Detailed information 1	—
System Check 2	Detailed information 2	—
Drive Motor Control Mode Check 1	DMCM control information 1	—

3. BATTERY ENERGY CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «High Voltage Battery» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

Display	Contents	Unit of measure
High Voltage Battery Control Status	BECM control mode	—
High Voltage Battery SOC	High voltage battery residual quantity	%
High Voltage Battery SOH	Battery status auxiliary parameter of high voltage battery	%
High Voltage Battery Total Voltage	High voltage battery voltage	V
High Voltage Battery Amperage	High voltage battery current	A
High Voltage Battery Charge Power Limit 1	High voltage battery charge control power value	kw
High Voltage Battery Discharge Power Limit 1	High voltage battery discharge control power value	kw
High Voltage Battery Temperature 1	High voltage battery temperature 1	Deg.c
High Voltage Battery Temperature 2	High voltage battery temperature 2	Deg.c
High Voltage Battery Temperature 3	High voltage battery temperature 3	Deg.c
Intake Air Temperature	High voltage battery intake temperature	Deg.c
High Voltage Battery Internal Resistance	High voltage battery internal resistance	ohm
HEV System Leakage Resistance (+)	Entire hybrid system leakage resistance on + side	kohm
High Voltage Battery Pack Leakage Resistance (+)	High voltage battery internal leakage resistance on + side	kohm
HEV System Leakage Resistance (-)	Entire hybrid system leakage resistance on – side	kohm
High Voltage Battery Pack Leakage Resistance (-)	High voltage battery internal leakage resistance on – side	kohm
Trip Count [count]	Number of IG ON judged by the body integrated unit (CAN communication data)	times
Time Count [msec]	Detailed time elapsed after IG ON calculated by body integrated unit (CAN communication data)	ms
Count	Number of IG ON, synchronous/asynchronous identification information of the elapsed time after IG ON	—
Ignition switch	Ignition switch condition	—
Positive Contactor Status	+ side contactor open/close status	—
Negative Contactor Status	– side contactor open/close status	—
Pre-Charge Contactor Status	Precharge contactor open/close status	—
High Voltage Battery Block 1 SOC	High voltage battery block SOC	%
High Voltage Battery Block 2 SOC	High voltage battery block SOC	%
High Voltage Battery Block 3 SOC	High voltage battery block SOC	%
High Voltage Battery Block 4 SOC	High voltage battery block SOC	%

Display	Contents	Unit of measure
High Voltage Battery Block 5 SOC	High voltage battery block SOC	%
High Voltage Battery Block 6 SOC	High voltage battery block SOC	%
High Voltage Battery Block 7 SOC	High voltage battery block SOC	%
High Voltage Battery Block 8 SOC	High voltage battery block SOC	%
High Voltage Battery Block 9 SOC	High voltage battery block SOC	%
High Voltage Battery Block 10 SOC	High voltage battery block SOC	%
High Voltage Battery Block 11 SOC	High voltage battery block SOC	%
High Voltage Battery Block Voltage 1	High voltage battery block voltage	V
High Voltage Battery Block Voltage 2	High voltage battery block voltage	V
High Voltage Battery Block Voltage 3	High voltage battery block voltage	V
High Voltage Battery Block Voltage 4	High voltage battery block voltage	V
High Voltage Battery Block Voltage 5	High voltage battery block voltage	V
High Voltage Battery Block Voltage 6	High voltage battery block voltage	V
High Voltage Battery Block Voltage 7	High voltage battery block voltage	V
High Voltage Battery Block Voltage 8	High voltage battery block voltage	V
High Voltage Battery Block Voltage 9	High voltage battery block voltage	V
High Voltage Battery Block Voltage 10	High voltage battery block voltage	V
High Voltage Battery Block Voltage 11	High voltage battery block voltage	V
High Voltage Battery Voltage 0	High voltage battery block voltage (voltage sensor value)	V
High Voltage Battery Voltage 1	High voltage battery block voltage (voltage sensor value)	V
High Voltage Battery Voltage 2	High voltage battery block voltage (voltage sensor value)	V
High Voltage Battery Voltage 3	High voltage battery block voltage (voltage sensor value)	V
High Voltage Battery Voltage 4	High voltage battery block voltage (voltage sensor value)	V
High Voltage Battery Voltage 5	High voltage battery block voltage (voltage sensor value)	V
High Voltage Battery Voltage 6	High voltage battery block voltage (voltage sensor value)	V
BECM Control Check 24	Detailed information of control	V
BECM Control Check 25	Detailed information of control	V
High Voltage Battery Amperage Sensor Output	High voltage battery current sensor value	A
ECU ACC	Voltage supplied to BECM	V
Drive Motor Inverter Input Voltage	Drive motor inverter input voltage calculated by DMCM (CAN communication data)	V
Contactor Signal (HPCM)	Contactor operation request status judged by HPCM (CAN communication data)	—
Engine Speed	Engine speed calculated by ECM (CAN communication data)	rpm
P Range	Parking range status judged by TCM (CAN communication data)	—

Freeze Frame Data Display

Display	Contents	Unit of measure
Vehicle Speed	Vehicle speed calculated by VDC (CAN communication data)	km/h
Drive Motor Inverter Operation Status	Drive motor inverter operation status calculated by DMCM (CAN communication data)	—
Drive Motor Torque Target (HPCM)	Target drive motor torque calculated by HPCM (CAN communication data)	Nm
Drive Motor Output Torque Actual	Drive motor output torque calculated by DMCM (CAN communication data)	Nm
Drive Motor Speed Target (HPCM)	Target drive motor speed calculated by HPCM (CAN communication data)	rpm
Drive Motor Speed	Drive motor speed calculated by DMCM (CAN communication data)	rpm
High Voltage Battery Cooling Fan Duty Target (HPCM)	High voltage battery cooling fan duty request calculated by HPCM (CAN communication data)	%
High Voltage Battery Cooling Fan Speed	High voltage battery cooling fan speed calculated by DMCM (CAN communication data)	rpm
High Voltage Battery Charge Power Limit 2	High voltage battery charge control power value (assist)	—
High Voltage Battery Discharge Power Limit 2	High voltage battery discharge control power value (assist)	—
High Voltage Battery SOC Subservience Parameter 1	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 2	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 3	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 4	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 5	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 6	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 7	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 8	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 9	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 10	Detailed information of control	—
High Voltage Battery SOC Subservience Parameter 11	Detailed information of control	—
BECM Check 1	Detailed information of control	—
BECM Check 2	Detailed information of control	—
BECM Check 3	Detailed information of control	—
BECM Check 4	Detailed information of control	—
BECM Control Check 1	Detailed information of control	—

15.System Operation Check Mode

A: OPERATION

CAUTION:
After executing the system operation check mode, execute the Clear Memory Mode.

NOTE:
For detailed operation procedures, refer to “Application help”.

1. HYBRID POWERTRAIN CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control» and then select «Enter».
5) On «Select Function» display, select «Active Test».

NOTE:
A communication error will be displayed if any other modes are performed while performing «Active Test».

System operation check mode item	Display	Note
ISG Cranking Operation	—	Perform engine cranking with integrated starter generator (ISG). Example of use: Used to check engine start with integrated starter generator (ISG).
ISG Voltage Control	Mid High ExtraHigh	Perform generated voltage control with the integrated starter generator (ISG). Example of use: Used to check electrical charge with integrated starter generator (ISG).
12V Battery Relay Operation	—	Switch the 12V battery relay on/off. Example of use: Used to check operation of the 12V battery relay.
DCDC Converter Output Voltage Control	Mid High	Perform DC/DC converter output voltage control. Example of use: Used to check DC/DC converter as a single unit.
Engine only Drive Mode*	—	Drive vehicle without motor operation. Example of use: Used to check influence by motor for diagnosing noise or vibration problem.
Auto Start Stop Cancel Drive Mode (Engine only or Engine + Motor)*	—	Drive vehicle without operating Auto Start Stop or motor. (Transition of mode is possible in the operation described in Notes in the margin.) Example of use: Used to check influence by engine and motor for diagnosing noise or vibration problem. It is also used to drive vehicle or perform inspection with Auto Start Stop deactivated.

*: During this mode, the hybrid fail lamp blinks and the message “Hybrid system service mode is active” is displayed in MFD. The maintenance mode will end after 30 seconds or more have passed since the ignition switch is OFF.

NOTE:
In «Auto Start Stop Cancel Drive Mode (Engine only or Engine + Motor)», transition of mode is enabled by performing the following operation.
1. Turn the ignition switch to ON and perform the following procedures while depressing the brake pedal before starting the engine.
2. Set the shift lever to “N” and depress the accelerator pedal twice. (Fully closed → Fully open → Fully closed → Fully open)
3. Set the shift lever to “P” and depress the accelerator pedal twice. (Fully closed → Fully open → Fully closed → Fully open)
4. Set the shift lever to “N” and depress the accelerator pedal twice. (Fully closed → Fully open → Fully closed → Fully open)
5. Shift into P range.
(The hybrid fail lamp in the combination meter blinks, indicating that the service mode is active in MFD.)
6. Start the engine.
7. The maintenance mode will end after 30 seconds or more have passed since the ignition switch is OFF.
   *: This operation must be performed within 60 seconds after the ignition is turned ON.
   *: If the accelerator pedal is operated too fast, the operation may not be accepted.
   *: If any procedures are performed improperly, they are not accepted until the ignition switch is turned OFF.
   *: If any abnormal conditions are detected, cancel the procedure.

2. DRIVE MOTOR CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Drive Motor» and then select «Enter».
5) On «Select Function» display, select «Active Test».

System operation check mode item	Display		Note
High voltage battery cooling fan	Target Output Mode	Stop Step1 Step2 Step3	Perform high voltage battery cooling fan compulsory drive. Example of use: Used to check high voltage battery cooling fan circuits.
	High Voltage Battery Cooling Fan Speed	0 — 6000 rpm	
Drive motor inverter power supply relay	Target Output Mode	OFF ON	Perform high voltage battery cooling fan/drive motor inverter power supply relay compulsory drive. Example of use: Used to check operation of high voltage battery cooling fan/drive motor inverter power supply relay.
	Drive Motor Inverter Operation Update Signal Count (Serial)	0 — 255 Count	

NOTE:
The conditions listed below must be met to perform the mode.

Display of current data	Value
Ignition switch	ON
ECU ACC	11.0 V or more
Drive Motor Inverter Operation Signal(HPCM)	OFF
Contactor Open Status	Open
High Voltage Battery Cooling Fan Duty Target (HPCM)	0%

16.Work Support

A: OPERATION

CAUTION:
After executing the work support, execute the Clear Memory Mode.

NOTE:
For detailed operation procedures, refer to “Application help”.

1. HYBRID POWERTRAIN CONTROL SYSTEM

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Hybrid Powertrain Control» and then select «Enter».
5) On «Select Function» display, select «Work Support».

NOTE:
A communication error will be displayed if any other modes are performed while performing «Work Support».

Work support item	Display	Note
Brake Vacuum Pump System Check	—	Brake vacuum pump operates. Example of use: Used to check brake vacuum pump as a single unit.

17.List of Diagnostic Trouble Code (DTC)

A: LIST

1. HYBRID POWERTRAIN CONTROL SYSTEM

DTC	Item	Note
P0506	IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED	<Ref. to HEV(diag)-91, DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0507	IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED	<Ref. to HEV(diag)-93, DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0516	BATTERY TEMPERATURE SENSOR CIRCUIT LOW	<Ref. to HEV(diag)-95, DTC P0516 BATTERY TEMPERATURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0517	BATTERY TEMPERATURE SENSOR CIRCUIT HIGH	<Ref. to HEV(diag)-97, DTC P0517 BATTERY TEMPERATURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0556	BRAKE BOOSTER PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-99, DTC P0556 BRAKE BOOSTER PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0572	BRAKE SWITCH "A" CIRCUIT LOW	<Ref. to HEV(diag)-102, DTC P0572 BRAKE SWITCH "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0573	BRAKE SWITCH "A" CIRCUIT HIGH	<Ref. to HEV(diag)-104, DTC P0573 BRAKE SWITCH "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P057B	BRAKE PEDAL POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-106, DTC P057B BRAKE PEDAL POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P057C	BRAKE PEDAL POSITION SENSOR "A" CIRCUIT LOW	<Ref. to HEV(diag)-109, DTC P057C BRAKE PEDAL POSITION SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P057D	BRAKE PEDAL POSITION SENSOR "A" CIRCUIT HIGH	<Ref. to HEV(diag)-112, DTC P057D BRAKE PEDAL POSITION SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P058D	BATTERY MONITOR MODULE VOLTAGE MONITORING PERFORMANCE	<Ref. to HEV(diag)-114, DTC P058D BATTERY MONITOR MODULE VOLTAGE MONITORING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P05DD	BRAKE PEDAL POSITION SENSOR "B" CIRCUIT LOW	<Ref. to HEV(diag)-116, DTC P05DD BRAKE PEDAL POSITION SENSOR "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P05DE	BRAKE PEDAL POSITION SENSOR "B" CIRCUIT HIGH	<Ref. to HEV(diag)-119, DTC P05DE BRAKE PEDAL POSITION SENSOR "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	<Ref. to HEV(diag)-121, HYBRID POWERTRAIN CONTROL SYSTEM, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	<Ref. to HEV(diag)-125, HYBRID POWERTRAIN CONTROL SYSTEM, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0620	GENERATOR/ALTERNATOR CONTROL CIRCUIT	<Ref. to HEV(diag)-129, DTC P0620 GENERATOR/ALTERNATOR CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P065A	GENERATOR/ALTERNATOR SYSTEM PERFORMANCE	<Ref. to HEV(diag)-131, DTC P065A GENERATOR/ALTERNATOR SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P06EF	ENGINE RESTART PERFORMANCE	<Ref. to HEV(diag)-134, DTC P06EF ENGINE RESTART PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0719	BRAKE SWITCH "B" CIRCUIT LOW	<Ref. to HEV(diag)-136, DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0724	BRAKE SWITCH "B" CIRCUIT HIGH	<Ref. to HEV(diag)-138, DTC P0724 BRAKE SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A1D	HYBRID/EV POWERTRAIN CONTROL MODULE "A"	<Ref. to HEV(diag)-139, DTC P0A1D HYBRID/EV POWERTRAIN CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C00	BATTERY MONITOR MODULE "A" PERFORMANCE	<Ref. to HEV(diag)-141, DTC P1C00 BATTERY MONITOR MODULE "A" PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C04	OUTPUT CLUTCH LINEAR SOLENOID HPCM CONTROL CIRCUIT LOW	<Ref. to HEV(diag)-142, DTC P1C04 OUTPUT CLUTCH LINEAR SOLENOID HPCM CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C05	OUTPUT CLUTCH LINEAR SOLENOID HPCM CONTROL CIRCUIT HIGH	<Ref. to HEV(diag)-144, DTC P1C05 OUTPUT CLUTCH LINEAR SOLENOID HPCM CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C06	12V BATTERY RELAY CLOSE CIRCUIT PERFORMANCE	<Ref. to HEV(diag)-146, DTC P1C06 12V BATTERY RELAY CLOSE CIRCUIT PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C07	12V BATTERY RELAY OPEN CIRCUIT PERFORMANCE	<Ref. to HEV(diag)-148, DTC P1C07 12V BATTERY RELAY OPEN CIRCUIT PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C08	12V BATTERY RELAY STUCK OPEN	<Ref. to HEV(diag)-150, DTC P1C08 12V BATTERY RELAY STUCK OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C09	12V BATTERY RELAY STUCK CLOSED	<Ref. to HEV(diag)-152, DTC P1C09 12V BATTERY RELAY STUCK CLOSED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C10	VACUUM SYSTEM PERFORMANCE	<Ref. to HEV(diag)-153, DTC P1C10 VACUUM SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C11	VACUUM PUMP POWER SUPPLY CIRCUIT LOW	<Ref. to HEV(diag)-154, DTC P1C11 VACUUM PUMP POWER SUPPLY CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C12	VACUUM PUMP POWER SUPPLY CIRCUIT HIGH	<Ref. to HEV(diag)-156, DTC P1C12 VACUUM PUMP POWER SUPPLY CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C14	ISG PERFORMANCE	<Ref. to HEV(diag)-158, DTC P1C14 ISG PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C16	HPCM IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED	<Ref. to HEV(diag)-160, DTC P1C16 HPCM IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C17	HPCM IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED	<Ref. to HEV(diag)-160, DTC P1C17 HPCM IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C18	GENERATOR SYSTEM "B" PERFORMANCE	<Ref. to HEV(diag)-161, DTC P1C18 GENERATOR SYSTEM "B" PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C1E	AUTODISCONNECT HISTORY	<Ref. to HEV(diag)-163, DTC P1C1E AUTODISCONNECT HISTORY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2158	VEHICLE SPEED SENSOR "B" CIRCUIT	<Ref. to HEV(diag)-164, DTC P2158 VEHICLE SPEED SENSOR "B" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CONTROL MODULE COMMUNICATION BUS OFF	<Ref. to HEV(diag)-452, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
U0075	CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF	<Ref. to HEV(diag)-453, DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	<Ref. to HEV(diag)-454, DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	<Ref. to HEV(diag)-456, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	<Ref. to HEV(diag)-457, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0110	LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"	<Ref. to HEV(diag)-458, DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0111	LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE	<Ref. to LAN(HEV)(diag)-162, DTC U0111 LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	<Ref. to HEV(diag)-462, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0131	LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE	<Ref. to HEV(diag)-462, DTC U0131 LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	<Ref. to HEV(diag)-463, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0151	LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE	<Ref. to HEV(diag)-463, DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	<Ref. to HEV(diag)-463, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE	<Ref. to HEV(diag)-463, DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0287	LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE	<Ref. to HEV(diag)-463, DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	<Ref. to HEV(diag)-464, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	INVALID DATA RECEIVED FROM TCM	<Ref. to HEV(diag)-465, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0411	INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"	<Ref. to HEV(diag)-466, DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0412	INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE	<Ref. to HEV(diag)-468, DTC U0412 INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	<Ref. to HEV(diag)-470, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0420	INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE	<Ref. to HEV(diag)-471, DTC U0420 INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	<Ref. to HEV(diag)-471, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE	<Ref. to HEV(diag)-471, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0424	INVALID DATA RECEIVED FROM HVAC CONTROL MODULE	<Ref. to HEV(diag)-471, DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0452	INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE	<Ref. to HEV(diag)-471, DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0588	INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE	<Ref. to HEV(diag)-472, DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1100	LOST COMMUNICATION WITH ECM/PCM PU-CAN	<Ref. to HEV(diag)-473, DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1101	LOST COMMUNICATION WITH TCM PU-CAN	<Ref. to HEV(diag)-474, DTC U1101 LOST COMMUNICATION WITH TCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1401	INVALID DATA RECEIVED FROM ECM/PCM PU-CAN	<Ref. to HEV(diag)-477, DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1402	INVALID DATA RECEIVED FROM TCM PU-CAN	<Ref. to HEV(diag)-478, DTC U1402 INVALID DATA RECEIVED FROM TCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1676	LIN COMMUNICATION BUS ERROR HYBRID POWERTRAIN CONTROL MODULE	<Ref. to HEV(diag)-482, DTC U1676 LIN COMMUNICATION BUS ERROR HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1711	LOST COMMUNICATION WITH BATTERY "2" MONITOR MODULE	<Ref. to HEV(diag)-484, DTC U1711 LOST COMMUNICATION WITH BATTERY "2" MONITOR MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1720	LOST COMMUNICATION WITH INTEGRATED STARTER GENERATOR	<Ref. to HEV(diag)-486, DTC U1720 LOST COMMUNICATION WITH INTEGRATED STARTER GENERATOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

2. DRIVE MOTOR CONTROL SYSTEM

DTC	Item	Note
P0A2A	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT	<Ref. to HEV(diag)-165, DTC P0A2A DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A2C	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT LOW	<Ref. to HEV(diag)-170, DTC P0A2C DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A2D	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT HIGH	<Ref. to HEV(diag)-175, DTC P0A2D DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A3C	DRIVE MOTOR "A" INVERTER OVER TEMPERATURE	<Ref. to HEV(diag)-178, DTC P0A3C DRIVE MOTOR "A" INVERTER OVER TEMPERATURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A3F	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT	<Ref. to HEV(diag)-180, DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A40	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-185, DTC P0A40 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A43	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT INTERMITTENT	<Ref. to HEV(diag)-186, DTC P0A43 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT INTERMITTENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A44	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT OVERSPEED	<Ref. to HEV(diag)-190, DTC P0A44 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT OVERSPEED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C52	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "A" LOW	<Ref. to HEV(diag)-194, DTC P0C52 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "A" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C5C	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "B" LOW	<Ref. to HEV(diag)-195, DTC P0C5C DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "B" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0CDC	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" LOW	<Ref. to HEV(diag)-196, DTC P0CDC DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0CDD	DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" HIGH	<Ref. to HEV(diag)-197, DTC P0CDD DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A5D	DRIVE MOTOR "A" PHASE U CURRENT	<Ref. to HEV(diag)-198, DTC P0A5D DRIVE MOTOR "A" PHASE U CURRENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A60	DRIVE MOTOR "A" PHASE V CURRENT	<Ref. to HEV(diag)-208, DTC P0A60 DRIVE MOTOR "A" PHASE V CURRENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A63	DRIVE MOTOR "A" PHASE W CURRENT	<Ref. to HEV(diag)-218, DTC P0A63 DRIVE MOTOR "A" PHASE W CURRENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A78	DRIVE MOTOR "A" INVERTER PERFORMANCE	<Ref. to HEV(diag)-228, DTC P0A78 DRIVE MOTOR "A" INVERTER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A82	HYBRID/EV BATTERY PACK COOLING FAN 1 PERFORMANCE/STUCK OFF	<Ref. to HEV(diag)-240, DTC P0A82 HYBRID/EV BATTERY PACK COOLING FAN 1 PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A83	HYBRID/EV BATTERY PACK COOLING FAN 1 STUCK ON	<Ref. to HEV(diag)-243, DTC P0A83 HYBRID/EV BATTERY PACK COOLING FAN 1 STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0A90	DRIVE MOTOR "A" PERFORMANCE	<Ref. to HEV(diag)-246, DTC P0A90 DRIVE MOTOR "A" PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A94	DC/DC CONVERTER PERFORMANCE	<Ref. to HEV(diag)-253, DTC P0A94 DC/DC CONVERTER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AED	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT	<Ref. to HEV(diag)-255, DTC P0AED DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AEE	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-257, DTC P0AEE DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AF2	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT	<Ref. to HEV(diag)-260, DTC P0AF2 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AF3	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-262, DTC P0AF3 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BD1	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT	<Ref. to HEV(diag)-264, DTC P0BD1 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BD2	DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-266, DTC P0BD2 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BE6	DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-268, DTC P0BE6 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BE7	DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT LOW	<Ref. to HEV(diag)-272, DTC P0BE7 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BE8	DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT HIGH	<Ref. to HEV(diag)-276, DTC P0BE8 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BEA	DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-279, DTC P0BEA DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BEB	DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT LOW	<Ref. to HEV(diag)-280, DTC P0BEB DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BEC	DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT HIGH	<Ref. to HEV(diag)-281, DTC P0BEC DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BEE	DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-282, DTC P0BEE DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BEF	DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT LOW	<Ref. to HEV(diag)-283, DTC P0BEF DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BF0	DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT HIGH	<Ref. to HEV(diag)-284, DTC P0BF0 DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BFD	DRIVE MOTOR "A" PHASE U-V-W CURRENT SENSOR CORRELATION	<Ref. to HEV(diag)-285, DTC P0BFD DRIVE MOTOR "A" PHASE U-V-W CURRENT SENSOR CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C05	DRIVE MOTOR "A" PHASE U-V-W CIRCUIT/OPEN	<Ref. to HEV(diag)-289, DTC P0C05 DRIVE MOTOR "A" PHASE U-V-W CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0C0C	DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT LOW	<Ref. to HEV(diag)-293, DTC P0C0C DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C0D	DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT HIGH	<Ref. to HEV(diag)-296, DTC P0C0D DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C79	DRIVE MOTOR "A" INVERTER VOLTAGE TOO HIGH	<Ref. to HEV(diag)-299, DTC P0C79 DRIVE MOTOR "A" INVERTER VOLTAGE TOO HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0DA8	HYBRID/EV BATTERY VOLTAGE/DRIVE MOTOR "A" INVERTER VOLTAGE CORRELATION	<Ref. to HEV(diag)-301, DTC P0DA8 HYBRID/EV BATTERY VOLTAGE/DRIVE MOTOR "A" INVERTER VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C20	DRIVE MOTOR "A" INVERTER VOLTAGE TOO LOW	<Ref. to HEV(diag)-304, DTC P1C20 DRIVE MOTOR "A" INVERTER VOLTAGE TOO LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C22	12V AUXILIARY BATTERY VOLTAGE TOO LOW	<Ref. to HEV(diag)-307, DTC P1C22 12V AUXILIARY BATTERY VOLTAGE TOO LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C24	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B"	<Ref. to HEV(diag)-309, DTC P1C24 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C25	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" LOW	<Ref. to HEV(diag)-311, DTC P1C25 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C26	DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" HIGH	<Ref. to HEV(diag)-312, DTC P1C26 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C27	DRIVE MOTOR "A" TEMPERATURE SENSOR CORRELATION	<Ref. to HEV(diag)-313, DTC P1C27 DRIVE MOTOR "A" TEMPERATURE SENSOR CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C2A	DRIVE MOTOR "A" INVERTER CIRCUIT	<Ref. to HEV(diag)-317, DTC P1C2A DRIVE MOTOR "A" INVERTER CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C30	LOST COMMUNICATION WITH DRIVE MOTOR "A" INVERTER	<Ref. to HEV(diag)-318, DTC P1C30 LOST COMMUNICATION WITH DRIVE MOTOR "A" INVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C31	INVALID DATA RECEIVED FROM DRIVE MOTOR "A" INVERTER	<Ref. to HEV(diag)-321, DTC P1C31 INVALID DATA RECEIVED FROM DRIVE MOTOR "A" INVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C34	LOST COMMUNICATION WITH DC/DC CONVERTER	<Ref. to HEV(diag)-324, DTC P1C34 LOST COMMUNICATION WITH DC/DC CONVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C35	INVALID DATA RECEIVED FROM DC/DC CONVERTER	<Ref. to HEV(diag)-326, DTC P1C35 INVALID DATA RECEIVED FROM DC/DC CONVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	<Ref. to HEV(diag)-122, DRIVE MOTOR CONTROL SYSTEM, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	<Ref. to HEV(diag)-126, DRIVE MOTOR CONTROL SYSTEM, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A1B	DRIVE MOTOR "A" CONTROL MODULE	<Ref. to HEV(diag)-328, DTC P0A1B DRIVE MOTOR "A" CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P06B1	SENSOR POWER SUPPLY "A" CIRCUIT LOW	<Ref. to HEV(diag)-329, DTC P06B1 SENSOR POWER SUPPLY "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P06B2	SENSOR POWER SUPPLY "A" CIRCUIT HIGH	<Ref. to HEV(diag)-332, DTC P06B2 SENSOR POWER SUPPLY "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	<Ref. to HEV(diag)-454, DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0111	LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE	<Ref. to HEV(diag)-460, DTC U0111 LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0412	INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE	<Ref. to HEV(diag)-468, DTC U0412 INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1290	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	<Ref. to HEV(diag)-475, DTC U1290 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1591	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	<Ref. to HEV(diag)-479, DTC U1591 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

3. BATTERY ENERGY CONTROL SYSTEM

DTC	Item	Note
P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR	<Ref. to HEV(diag)-123, BATTERY ENERGY CONTROL SYSTEM, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0605	INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR	<Ref. to HEV(diag)-127, BATTERY ENERGY CONTROL SYSTEM, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	INTERNAL CONTROL MODULE EEPROM ERROR	<Ref. to HEV(diag)-335, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A1F	BATTERY ENERGY CONTROL MODULE	<Ref. to HEV(diag)-337, DTC P0A1F BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A7D	HYBRID/EV BATTERY PACK STATE OF CHARGE LOW	<Ref. to HEV(diag)-339, DTC P0A7D HYBRID/EV BATTERY PACK STATE OF CHARGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A7E	HYBRID/EV BATTERY PACK OVER TEMPERATURE	<Ref. to HEV(diag)-341, DTC P0A7E HYBRID/EV BATTERY PACK OVER TEMPERATURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A7F	HYBRID/EV BATTERY PACK DETERIORATION	<Ref. to HEV(diag)-344, DTC P0A7F HYBRID/EV BATTERY PACK DETERIORATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A95	HIGH VOLTAGE FUSE "A"	<Ref. to HEV(diag)-347, DTC P0A95 HIGH VOLTAGE FUSE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A9C	HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-349, DTC P0A9C HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A9D	HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT LOW	<Ref. to HEV(diag)-350, DTC P0A9D HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0A9E	HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT HIGH	<Ref. to HEV(diag)-351, DTC P0A9E HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AA4	HYBRID/EV BATTERY NEGATIVE CONTACTOR CIRCUIT STUCK CLOSED	<Ref. to HEV(diag)-352, DTC P0AA4 HYBRID/EV BATTERY NEGATIVE CONTACTOR CIRCUIT STUCK CLOSED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AA6	HYBRID/EV BATTERY VOLTAGE SYSTEM ISOLATION FAULT	<Ref. to HEV(diag)-353, DTC P0AA6 HYBRID/EV BATTERY VOLTAGE SYSTEM ISOLATION FAULT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AA7	HYBRID/EV BATTERY VOLTAGE ISOLATION SENSOR CIRCUIT	<Ref. to HEV(diag)-357, DTC P0AA7 HYBRID/EV BATTERY VOLTAGE ISOLATION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AAD	HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-358, DTC P0AAD HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AAE	HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT LOW	<Ref. to HEV(diag)-359, DTC P0AAE HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AAF	HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT HIGH	<Ref. to HEV(diag)-360, DTC P0AAF HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0ABF	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT	<Ref. to HEV(diag)-361, DTC P0ABF HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0AC0	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-362, DTC P0AC0 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AC1	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT LOW	<Ref. to HEV(diag)-363, DTC P0AC1 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AC2	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT HIGH	<Ref. to HEV(diag)-364, DTC P0AC2 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AC3	HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT INTERMITTENT/ERRATIC	<Ref. to HEV(diag)-365, DTC P0AC3 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT INTERMITTENT/ERRATIC, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AC6	HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-367, DTC P0AC6 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AC7	HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT LOW	<Ref. to HEV(diag)-368, DTC P0AC7 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AC8	HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT HIGH	<Ref. to HEV(diag)-369, DTC P0AC8 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0ACB	HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-370, DTC P0ACB HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0ACC	HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT LOW	<Ref. to HEV(diag)-371, DTC P0ACC HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0ACD	HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT HIGH	<Ref. to HEV(diag)-372, DTC P0ACD HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AD9	HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT/OPEN	<Ref. to HEV(diag)-373, DTC P0AD9 HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0ADB	HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT LOW	<Ref. to HEV(diag)-374, DTC P0ADB HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0ADD	HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT/OPEN	<Ref. to HEV(diag)-376, DTC P0ADD HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0ADF	HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT LOW	<Ref. to HEV(diag)-377, DTC P0ADF HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AE4	HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT/OPEN	<Ref. to HEV(diag)-378, DTC P0AE4 HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0AE6	HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT LOW	<Ref. to HEV(diag)-379, DTC P0AE6 HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B25	HYBRID/EV BATTERY "A" VOLTAGE LOW	<Ref. to HEV(diag)-380, DTC P0B25 HYBRID/EV BATTERY "A" VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B26	HYBRID/EV BATTERY "A" VOLTAGE HIGH	<Ref. to HEV(diag)-383, DTC P0B26 HYBRID/EV BATTERY "A" VOLTAGE HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B37	HIGH VOLTAGE SERVICE DISCONNECT OPEN	<Ref. to HEV(diag)-386, DTC P0B37 HIGH VOLTAGE SERVICE DISCONNECT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0B3C	HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-388, DTC P0B3C HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B3D	HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT LOW	<Ref. to HEV(diag)-390, DTC P0B3D HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B3E	HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT HIGH	<Ref. to HEV(diag)-391, DTC P0B3E HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B41	HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-392, DTC P0B41 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B42	HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT LOW	<Ref. to HEV(diag)-394, DTC P0B42 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B43	HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT HIGH	<Ref. to HEV(diag)-395, DTC P0B43 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B46	HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-396, DTC P0B46 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B47	HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT LOW	<Ref. to HEV(diag)-398, DTC P0B47 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B48	HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT HIGH	<Ref. to HEV(diag)-399, DTC P0B48 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B4A	HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT	<Ref. to HEV(diag)-400, DTC P0B4A HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B4B	HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-401, DTC P0B4B HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B4C	HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT LOW	<Ref. to HEV(diag)-403, DTC P0B4C HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B4D	HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT HIGH	<Ref. to HEV(diag)-404, DTC P0B4D HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B50	HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-405, DTC P0B50 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B51	HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT LOW	<Ref. to HEV(diag)-407, DTC P0B51 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B52	HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT HIGH	<Ref. to HEV(diag)-408, DTC P0B52 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B55	HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-409, DTC P0B55 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B56	HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT LOW	<Ref. to HEV(diag)-411, DTC P0B56 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B57	HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT HIGH	<Ref. to HEV(diag)-412, DTC P0B57 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P0B5A	HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT RANGE/PERFORMANCE	<Ref. to HEV(diag)-413, DTC P0B5A HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B5B	HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT LOW	<Ref. to HEV(diag)-415, DTC P0B5B HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B5C	HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT HIGH	<Ref. to HEV(diag)-416, DTC P0B5C HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0BB8	HYBRID/EV BATTERY VOLTAGE SENSE "Z" CIRCUIT	<Ref. to HEV(diag)-417, DTC P0BB8 HYBRID/EV BATTERY VOLTAGE SENSE "Z" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C30	HYBRID/EV BATTERY PACK STATE OF CHARGE HIGH	<Ref. to HEV(diag)-418, DTC P0C30 HYBRID/EV BATTERY PACK STATE OF CHARGE HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C78	HYBRID/EV BATTERY SYSTEM PRECHARGE TIME TOO LONG	<Ref. to HEV(diag)-420, DTC P0C78 HYBRID/EV BATTERY SYSTEM PRECHARGE TIME TOO LONG, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0CA6	HYBRID/EV BATTERY CHARGING CURRENT HIGH	<Ref. to HEV(diag)-424, DTC P0CA6 HYBRID/EV BATTERY CHARGING CURRENT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0CA7	HYBRID/EV BATTERY DISCHARGING CURRENT HIGH	<Ref. to HEV(diag)-427, DTC P0CA7 HYBRID/EV BATTERY DISCHARGING CURRENT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C40	HYBRID/EV BATTERY POSITIVE CONTACTOR OR PRE-CHARGE CONTACTOR CIRCUIT STUCK CLOSED	<Ref. to HEV(diag)-430, DTC P1C40 HYBRID/EV BATTERY POSITIVE CONTACTOR OR PRE-CHARGE CONTACTOR CIRCUIT STUCK CLOSED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C41	HIGH VOLTAGE CIRCUIT LOW	<Ref. to HEV(diag)-433, DTC P1C41 HIGH VOLTAGE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C42	HIGH VOLTAGE CIRCUIT/OPEN	<Ref. to HEV(diag)-437, DTC P1C42 HIGH VOLTAGE CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C43	HYBRID/EV BATTERY CONTACTOR POWER SUPPLY CIRCUIT	<Ref. to HEV(diag)-441, DTC P1C43 HYBRID/EV BATTERY CONTACTOR POWER SUPPLY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C44	SUB CPU IN BECM	<Ref. to HEV(diag)-443, DTC P1C44 SUB CPU IN BECM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C45	HYBRID/EV BATTERY BLOCK 1 BALANCING PERFORMANCE	<Ref. to HEV(diag)-445, DTC P1C45 HYBRID/EV BATTERY BLOCK 1 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C46	HYBRID/EV BATTERY BLOCK 2 BALANCING PERFORMANCE	<Ref. to HEV(diag)-446, DTC P1C46 HYBRID/EV BATTERY BLOCK 2 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C47	HYBRID/EV BATTERY BLOCK 3 BALANCING PERFORMANCE	<Ref. to HEV(diag)-447, DTC P1C47 HYBRID/EV BATTERY BLOCK 3 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C48	HYBRID/EV BATTERY BLOCK 4 BALANCING PERFORMANCE	<Ref. to HEV(diag)-448, DTC P1C48 HYBRID/EV BATTERY BLOCK 4 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C49	HYBRID/EV BATTERY BLOCK 5 BALANCING PERFORMANCE	<Ref. to HEV(diag)-449, DTC P1C49 HYBRID/EV BATTERY BLOCK 5 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1C4A	HYBRID/EV BATTERY BLOCK 6 BALANCING PERFORMANCE	<Ref. to HEV(diag)-450, DTC P1C4A HYBRID/EV BATTERY BLOCK 6 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
P1C5E	HYBRID/EV BATTERY OPEN CIRCUIT VOLTAGE TOO LOW	<Ref. to HEV(diag)-451, DTC P1C5E HYBRID/EV BATTERY OPEN CIRCUIT VOLTAGE TOO LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0076	CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF	<Ref. to HEV(diag)-454, DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0110	LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"	<Ref. to HEV(diag)-458, DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0411	INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"	<Ref. to HEV(diag)-466, DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1290	LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	<Ref. to HEV(diag)-475, DTC U1290 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1591	INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN	<Ref. to HEV(diag)-479, DTC U1591 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

18.Fail-Safe Chart

A: LIST

1. HYBRID POWERTRAIN CONTROL SYSTEM

If any of the following DTCs are stored in the hybrid powertrain control system, the vehicle enter the appropriate fail safe pattern.

DTC	Fail safe pattern	Prohibited concurrent controls	Availability of system operation check mode
P0506	Fail safe pattern 1: Illuminates the hybrid fail lamp.	—	*2
P0507		—	*2
P0516		—	*2
P0517		—	*2
P0572		—	*2
P0573		—	*2
P058D		—	*4
P0719		—	*2
P0724		—	*2
P1C04		—	*2
P1C05		—	*2
P1C16		—	*2
P1C17		—	*2
U0131		—	*1
U0140		—	*1
U0151		—	*1
U0155		—	*1
U0287		—	*1
U0420		—	*1
U0422		—	*1
U0423		—	*1
U0452		—	*1
U0588		—	*1
P0556	Fail safe pattern 2: Prohibits EV traveling and Auto Start Stop. If EV traveling or Auto Start Stop is in process, the engine is restarted. Illuminates the hybrid fail lamp.	—	*2
P057B		Prohibits regeneration control by brake system.	*2
P057C		Prohibits regeneration control by brake system.	*2
P057D		Prohibits regeneration control by brake system.	*2
P05DD		Prohibits regeneration control by brake system.	*2
P05DE		Prohibits regeneration control by brake system.	*2
P065A		—	*2
P1C00		—	*4
P1C08		—	*2
P1C10		—	*2
P1C11		—	*2
P1C12		—	*2
P2158		Prohibits regeneration control by brake system.	*2
U0164		—	*1
U0122		—	*1
U0416		—	*1
U0424		—	*1
U1711		—	*1

Fail-Safe Chart

DTC	Fail safe pattern	Prohibited concurrent controls	Availability of system operation check mode
P0620	Fail safe pattern 3: Prohibits EV traveling and Auto Start Stop. If EV traveling or Auto Start Stop is in process, the engine is not restarted. Illuminates the hybrid fail lamp.	—	*2
P6EF		—	*2
P1C06		—	*2
P1C07		—	*2
P1C09		—	*2
P1C14		—	*3
P1C18		—	*2
U1676		—	*1
U1720		—	*1
U0111	Fail safe pattern 4: Deactivates the hybrid system. Illuminates the hybrid fail lamp.	—	*1
U0412		—	*1
P1C1E		Prohibits reconnection of the High voltage battery until the condition is restored.	*2
P0604	Fail safe pattern 5: Deactivates the hybrid system. Also, driving power and shifting commands by the hybrid powertrain CM are stopped, and instead they are controlled by ECM and TCM respectively. Illuminates the hybrid fail lamp.	—	*2
P0605		—	*2
P0A1D		—	*2
U0073		—	*1
U0075		—	*1
U0076		—	*1
U0100		—	*1
U0101		—	*1
U0110		—	*1
U0401		—	*1
U0402		—	*1
U0411		—	*1
U1100		—	*1
U1101		—	*1
U1401		—	*1
U1402		—	*1

*1: Prohibits all «System Operation Check Modes».
*2: Prohibits «Engine only Drive Mode» and «Auto Start Stop Cancel Drive Mode (Engine only or Engine + Motor)».
*3: Prohibits «Engine only Drive Mode», «Auto Start Stop Cancel Drive Mode (Engine only or Engine + Motor)», and «ISG Voltage Control».
*4: Prohibits «Engine only Drive Mode», «Auto Start Stop Cancel Drive Mode (Engine only or Engine + Motor)», and «12V Battery Relay Operation».

2. DRIVE MOTOR CONTROL SYSTEM

If any of the following DTCs are stored in the drive motor control system, the vehicle enter the appropriate fail safe pattern.

DTC	Fail safe pattern	Prohibited concurrent controls	Availability of system operation check mode
P0A90	Fail safe pattern 1: Illuminates the hybrid fail lamp.	—	—
P0C0D		—	—
P0A94	Fail safe pattern 2: Prohibits EV traveling and Auto Start Stop. If EV traveling or Auto Start Stop is in process, the engine is restarted. Illuminates the hybrid fail lamp.	—	—
P1C34		—	—
P1C35		—	—
P0604	Fail safe pattern 3: Deactivates the hybrid system. Illuminates the hybrid fail lamp.	—	—
P0605		—	—
P06B1		—	—
P06B2		—	—
P0A1B		—	*1
P0A2A		—	—
P0A2C		—	—
P0A2D		—	—
P0A3C		—	—
P0A44		—	—
P0A5D		—	—
P0A60		—	—
P0A63		—	—
P0A78		—	—
P0AED		—	—
P0AEE		—	—
P0AF2		—	—
P0AF3		—	—
P0BD1		—	—
P0BD2		—	—
P0BE6		—	—
P0BE7		—	—
P0BE8		—	—
P0BEA		—	—
P0BEB		—	—
P0BEC		—	—
P0BEE		—	—
P0BEF		—	—
P0BF0		—	—
P0BFD		—	—
P0C05		—	—
P0C0C		—	—
P0C79		—	—
P0DA8		—	—
P1C20		—	—
P1C22		—	*1
P1C24		—	—
P1C25		—	—
P1C26		—	—

Fail-Safe Chart

DTC	Fail safe pattern	Prohibited concurrent controls	Availability of system operation check mode
P1C27	Fail safe pattern 3: Deactivates the hybrid system. Illuminates the hybrid fail lamp.	—	—
P1C2A		—	—
P1C30		—	—
P1C31		—	—
U0076		—	*1
U0111		—	*1
U0412		—	*1
U1290		—	*1
U1591		—	*1
P0A82		—	—
P0A83		—	—
P0A3F	Fail safe pattern 4: Deactivates the hybrid system. Also, driving power and shifting commands by the hybrid powertrain CM are stopped, and instead they are controlled by ECM and TCM respectively. Illuminates the hybrid fail lamp.	—	—
P0A43		—	—
P0A40		—	—
P0C52		—	—
P0C5C		—	—
P0CDC		—	—
P0CDD		—	—

*1: Prohibits all «System Operation Check Modes».

3. BATTERY ENERGY CONTROL SYSTEM

If any of the following DTCs are stored in the battery energy control system, the vehicle enter the appropriate fail safe pattern.

DTC	Fail safe pattern
P0AA4	Fail safe pattern 1: Illuminates the hybrid fail lamp.
P0A7F	
P0AA6	
P0AA7	
P0AAD	
P0AAE	
P0AAF	
P0ADF	
P0AE6	
P0B4A	
U0110	
U0411	
P0A9C	Fail safe pattern 2: Prohibits EV traveling and Auto Start Stop. If EV traveling or Auto Start Stop is in process, the engine is not restarted. Illuminates the hybrid fail lamp.
P0A9D	
P0A9E	
P0ABF	
P0AC0	
P0AC1	
P0AC2	
P0AC3	
P0AC6	
P0AC7	
P0AC8	
P0ACB	
P0ACC	
P0ACD	
P0B3C	
P0B3D	
P0B3E	
P0B41	
P0B42	
P0B43	
P0B46	
P0B47	
P0B48	
P0B4B	
P0B4C	
P0B4D	
P0B50	
P0B51	
P0B52	
P0B55	
P0B56	
P0B57	
P0B5A	
P0B5B	
P0B5C	

Fail-Safe Chart

DTC	Fail safe pattern
P0604	Fail safe pattern 3: Deactivates the hybrid system. Illuminates the hybrid fail lamp.
P0605	
P062F	
P0A1F	
P0A7D	
P0A7E	
P0A95	
P0AD9	
P0ADB	
P0ADD	
P0AE4	
P0B25	
P0B26	
P0B37	
P0BB8	
P0C30	
P0C78	
P0CA6	
P0CA7	
P1C40	
P1C41	
P1C42	
P1C43	
P1C44	
P1C45	
P1C46	
P1C47	
P1C48	
P1C49	
P1C4A	
P1C5E	
U0076	
U1290	
U1591	

19.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED

DIAGNOSIS:

• Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)

• GENERAL DESCRIPTION <Ref. to HEV(diag)-94, OUTLINE OF DIAGNOSIS, DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read DTCs of the following system. • Engine <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).> • Hybrid powertrain control system <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	First perform the diagnosis according to other DTCs.	Go to step **2**.
2	**CHECK AIR CLEANER ELEMENT.** 1) Turn the ignition switch to OFF. 2) Check the air cleaner element.	Is there excessive clogging on air cleaner element?	Replace the air cleaner element. <Ref. to IN(H4DO(w/o HEV))-4, Air Cleaner Element.>	Go to step **3**.
3	**CHECK ELECTRONIC THROTTLE CONTROL.** 1) Remove the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.> 2) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101 of engine. <Ref. to EN(H4DO HEV)(diag)-456, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ISC.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V
Measured lambda	≥ 0.85 and < 1.151
Vehicle speed	= 0 MPH
Engine Auto Stop command by HPCM	False
SOC of hybrid battery	≤ 44%
CVT secondary pulley shaft speed	≥ 100 rpm
Accelerator pedal position	= 0%

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
(Actual engine speed) – (Target engine speed)	< – 100 rpm

Time Needed for Diagnosis: 15 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
(Actual engine speed) – (Target engine speed)	≥ – 100 rpm

Time Needed for Diagnosis: 15 seconds

B: DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED

DIAGNOSIS:

• Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)

• GENERAL DESCRIPTION <Ref. to HEV(diag)-94, OUTLINE OF DIAGNOSIS, DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read DTCs of the following system. • Engine <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).> • Hybrid powertrain control system <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	First perform the diagnosis according to other DTCs.	Go to step **2**.
2	**CHECK AIR INTAKE SYSTEM.** 1) Start and idle the engine. 2) Check the following items. • Loose installation of intake manifold and throttle body • Cracks of intake manifold gasket and throttle body gasket • Disconnection of vacuum hoses	Is there any fault in air intake system?	Repair air suction and leaks.	Go to step **3**.
3	**CHECK ELECTRONIC THROTTLE CONTROL.** 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control. <Ref. to FU(H4DO(w/o HEV))-15, REMOVAL, Throttle Body.> 3) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101 of engine. <Ref. to EN(H4DO HEV)(diag)-456, DTC P2101 THROTTLE ACTUATOR "A" CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ISC.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
12 V battery system voltage	≥ 10.9 V
Measured lambda	≥ 0.85 and < 1.151
Vehicle speed	= 0 MPH
Engine Auto Stop command by HPCM	False
SOC of hybrid battery	≤ 44%
CVT secondary pulley shaft speed	≥ 100 rpm
Accelerator pedal position	= 0%

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
(Actual engine speed) – (Target engine speed)	> 200 rpm

Time Needed for Diagnosis: 15 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
(Actual engine speed) – (Target engine speed)	≤ 200 rpm

Time Needed for Diagnosis: 15 seconds

C: DTC P0516 BATTERY TEMPERATURE SENSOR CIRCUIT LOW

DIAGNOSIS:

- Detects short circuit to ground of 12 volt auxiliary battery temperature sensor harness.
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

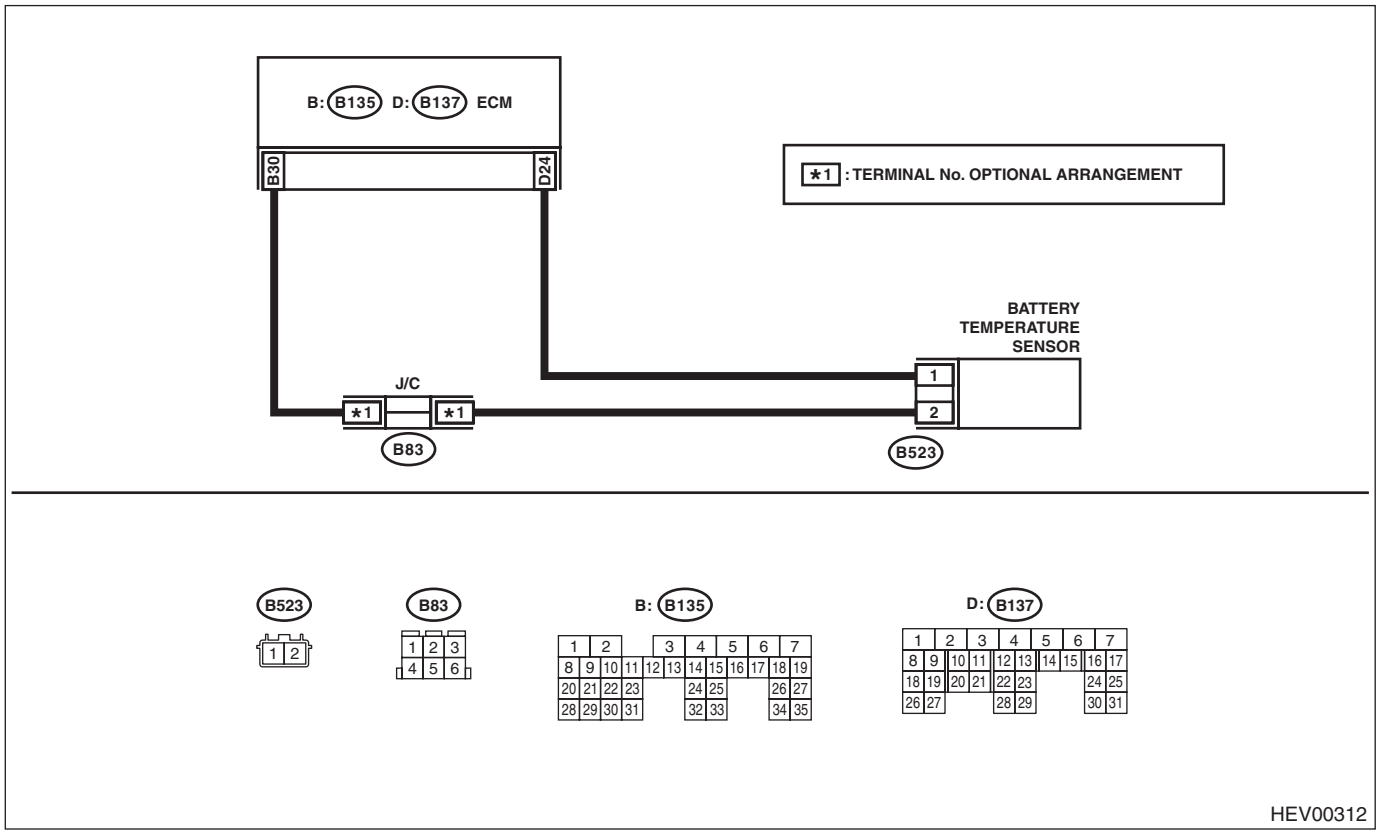
Normal control

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «12V Auxiliary Battery Temperature». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 100°C (212°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

Step		Check	Yes	No
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector and battery temperature sensor connector. 3) Using a tester, measure the resistance between the ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 24 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the battery temperature sensor. <Ref. to SC(H4DO(HEV))-63, Battery Temperature Sensor.>	Repair the short circuit to ground in the harness between the ECM connector and battery temperature sensor connector.

D: DTC P0517 BATTERY TEMPERATURE SENSOR CIRCUIT HIGH

DIAGNOSIS:

- Detects open circuit and short circuit of 12 volt auxiliary battery temperature sensor harness.
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

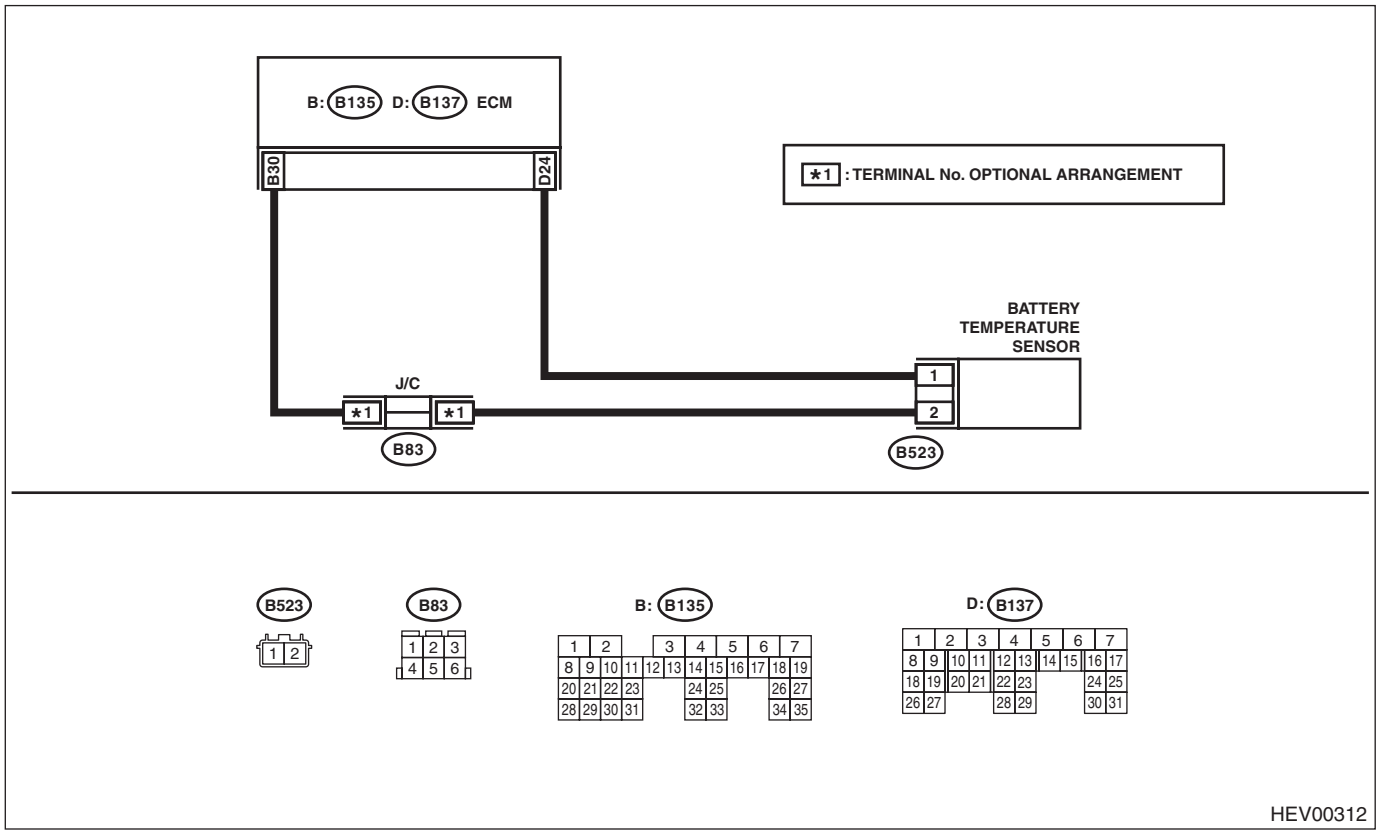
Normal control

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Engine electrical system <Ref. to WI(HEV)-96, WIRING DIAGRAM, Engine Electrical System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «12V Auxiliary Battery Temperature». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and battery temperature sensor. 3) Using a tester, measure the resistance of harness between ECM connector and battery temperature sensor connector. ***Connector & terminal*** ***(B137) No. 24 — (B523) No. 1:*** ***(B135) No. 30 — (B523) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit in the harness between the ECM connector and battery temperature sensor connector.
3	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 24 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and battery temperature sensor connector.	Replace the battery temperature sensor. <Ref. to SC(H4DO(HEV))-63, Battery Temperature Sensor.>

E: DTC P0556 BRAKE BOOSTER PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Detects abnormal conditions of brake booster pressure sensor range/performance.
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

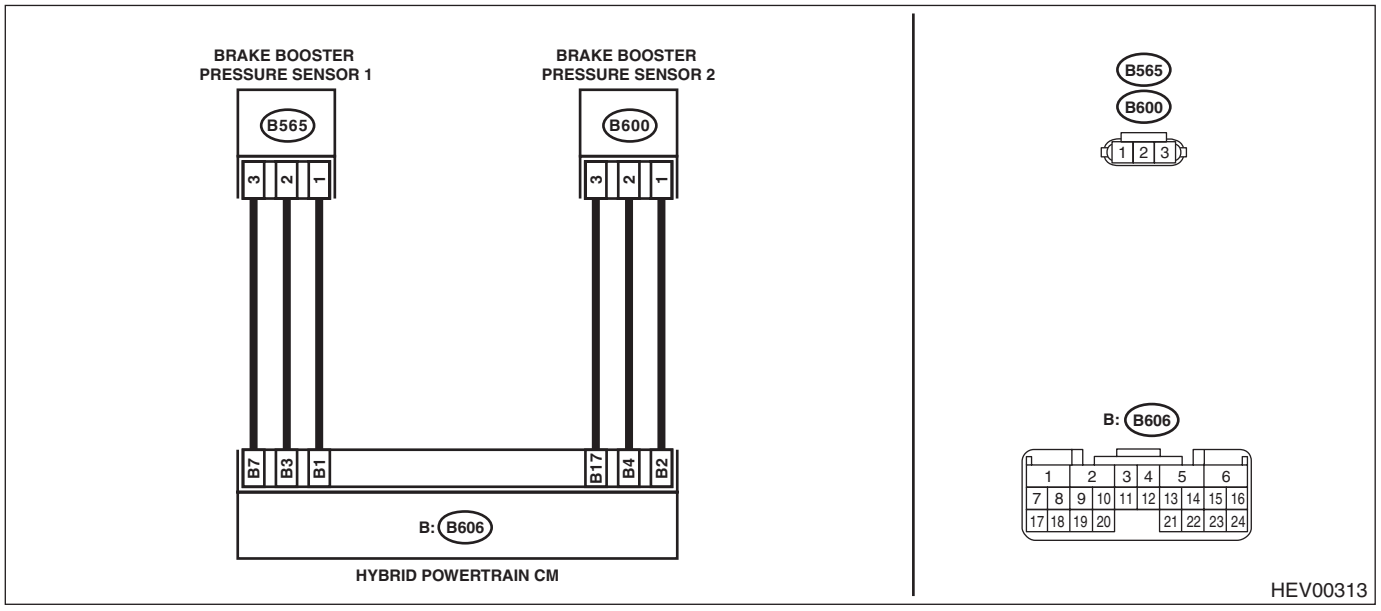
- EV traveling/Auto Start Stop does not operate.
- Vacuum pump fail lamp illuminates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs (brake booster pressure sensor related) detected? (current malfunction)	First diagnose other DTCs.	Go to step **2**.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Power Sensor Voltage 1» «Power Sensor Voltage 2». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value approx. 5 V?	Go to step **3**.	Go to step **9**.

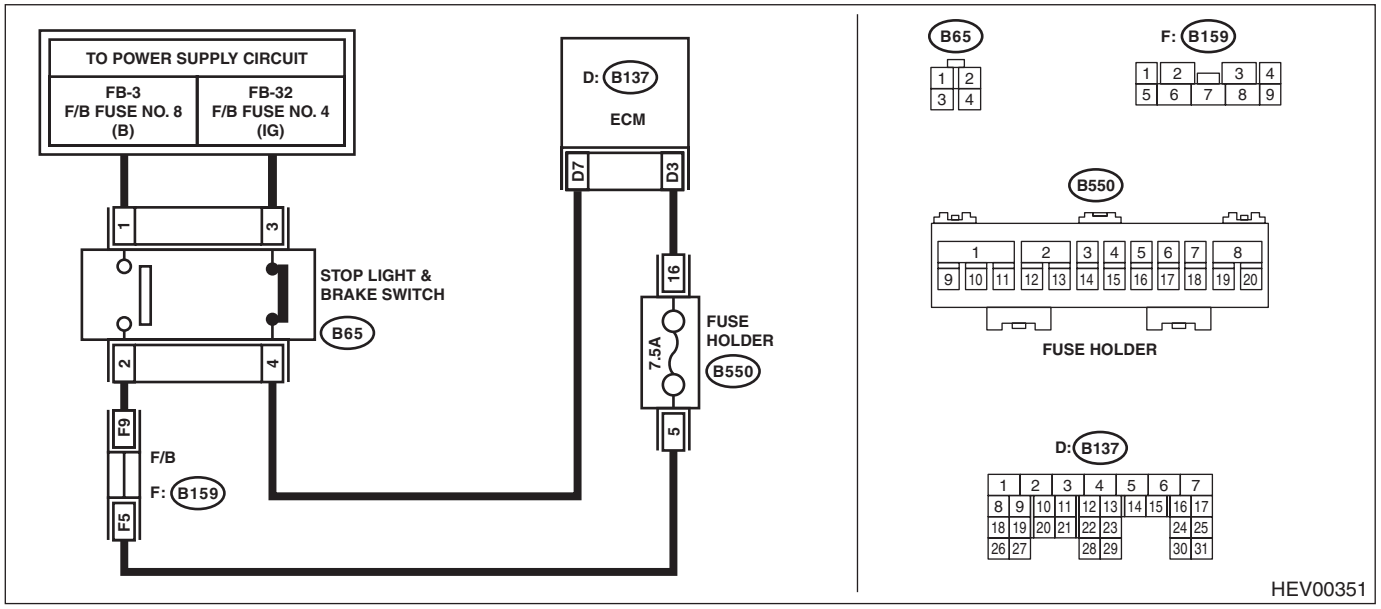
	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Depress the brake pedal 10 times. 3) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Brake Booster Pressure 1» «Brake Booster Pressure 2» «Atmosphere Pressure». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Do «Brake Booster Pressure 1» «Brake Booster Pressure 2» «Atmosphere Pressure» match?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK SENSORS.** 1) Interchange brake booster pressure sensor 1 and brake booster pressure sensor 2. 2) Turn the ignition switch to ON. 3) Depress the brake pedal 10 times. 4) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Brake Booster Pressure 1» «Brake Booster Pressure 2». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Did those two values interchange each other?	Replace the brake booster. <Ref. to BR-51, Brake Booster.>	Go to step **5**.
5	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Brake Booster Pressure Sensor Voltage 1» «Brake Booster Pressure Sensor Voltage 2». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value between 0.3 — 4.7 V?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	If 0.3 V or less Go to step **6**. If 4.7 V or more Go to step **7**.
6	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Disconnect the connectors of brake booster pressure sensor 1 and brake booster pressure sensor 2 and the HPCM connector. 2) Using a tester, measure the resistance between brake booster pressure sensor 1 and brake booster pressure sensor 2 connectors and chassis ground. ***Connector & terminal*** ***(B565) No. 2 — Chassis ground:*** ***(B600) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair the ground short circuit of harness between HPCM connector and brake booster pressure sensor connector.

	Step	Check	Yes	No
7	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connectors of brake booster pressure sensor 1 and brake booster pressure sensor 2. 2) Using a tester, measure the resistance between brake booster pressure sensor 1 and brake booster pressure sensor 2 connectors and the HPCM connector. ***Connector & terminal*** ***(B565) No. 2 — (B606) No. 3:*** ***(B600) No. 2 — (B606) No. 4:***	Is the resistance 1 Ω or less?	Go to step **8**.	Repair the open circuit of harness between HPCM connector and brake booster pressure sensor connector.
8	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between brake booster pressure sensor 1 and brake booster pressure sensor 2 connectors and chassis ground. ***Connector & terminal*** ***(B565) No. 2 (+) — Chassis ground (–):*** ***(B600) No. 2 (+) — Chassis ground (–):***	Is the voltage 5 V or less?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair short circuit to power in harness between HPCM connector and brake booster pressure sensor connector.
9	**CHECK CURRENT DATA.** 1) Disconnect the HPCM connector (B606). 2) Turn the ignition switch to ON. 3) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Power Sensor Voltage 1» «Power Sensor Voltage 2».	Is the value approx. 5 V?	Go to step **10**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
10	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the connectors of brake booster pressure sensor 1 and brake booster pressure sensor 2. 2) Using a tester, measure the resistance between brake booster pressure sensor 1 and brake booster pressure sensor 2 connectors and the HPCM connector. ***Connector & terminal*** ***(B565) No. 3 — (B606) No. 7:*** ***(B600) No. 3 — (B606) No. 17:***	Is the resistance 1 Ω or less?	Go to step **11**.	Repair the open circuit of harness between HPCM connector and brake booster pressure sensor connector.
11	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Disconnect the connectors of brake booster pressure sensor 1 and brake booster pressure sensor 2. 2) Using a tester, measure the resistance between brake booster pressure sensor 1 and brake booster pressure sensor 2 connectors and chassis ground. ***Connector & terminal*** ***(B565) No. 3 — Chassis ground:*** ***(B600) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair the ground short circuit of harness between HPCM connector and brake booster pressure sensor connector.

F: DTC P0572 BRAKE SWITCH "A" CIRCUIT LOW

DIAGNOSIS:
GENERAL DESCRIPTION <Ref. to HEV(diag)-103, OUTLINE OF DIAGNOSIS, DTC P0572 BRAKE SWITCH "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>
WIRING DIAGRAM:
Stop light system <Ref. to WI(HEV)-191, WIRING DIAGRAM, Stop Light System.>



Step		Check	Yes	No
1	**CHECK STOP LIGHT & BRAKE SWITCH.** Check the stop light & brake switch. <Ref. to CC-10, Stop Light & Brake Switch.>	Is the stop light & brake switch and installation position OK?	Go to step **2**.	Replace the stop light & brake switch. Or adjust the installation position.
2	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop lamp & brake switch connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the stop lamp & brake switch connector and chassis ground. ***Connector & terminal*** ***(B65) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	• Check fuse No. 8 (in fuse & relay box). • Check for open or short in the harness between stop light & brake switch and fuse & relay box.
3	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance between the ECM connector and stop light & brake switch connector. ***Connector & terminal*** ***(B137) No. 7 — (B65) No. 4:***	Is the resistance less than 10 Ω?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Repair the open circuit of harness between ECM connector and stop light & brake switch connector.

1. OUTLINE OF DIAGNOSIS

Detect brake pedal SW-A ON/OFF stuck.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Brake switch B signal from ECM	OFF
(Brake pedal)	(Not Pressed)
(Current BPP sensor 1 angle) – (BPP sensor 1 angle that was stored when the brake switch B status has been changed from ON to OFF)	≤ –0.69 deg
(Brake pedal)	(Not Pressed)

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch A signal from ECM	OFF
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch B will go from ON to OFF immediately, and from switch B OFF, switch A will go OFF to ON after 0.69 degrees of travel in the direction of decreasing the value of the brake pedal angle.	

Time Needed for Diagnosis: 1 s x 5 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK.
Do not clear NG during hybrid system activated.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch A signal from ECM	ON
(Brake pedal)	Not Pressed
NOTE: For a normal system, when applying the brakes switch B will go from ON to OFF immediately, and from switch B OFF, switch A will go OFF to ON after 0.69 degrees of travel in the direction of decreasing the value of the brake pedal angle.	

Time Needed for Diagnosis: 1 second

G: DTC P0573 BRAKE SWITCH "A" CIRCUIT HIGH

DIAGNOSIS:

GENERAL DESCRIPTION <Ref. to HEV(diag)-104, OUTLINE OF DIAGNOSIS, DTC P0573 BRAKE SWITCH "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:

For the diagnostic procedure, refer to DTC P0572. <Ref. to HEV(diag)-102, DTC P0572 BRAKE SWITCH "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect brake pedal SW-A ON/OFF stuck.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Brake switch B signal from ECM	ON
(Brake pedal)	(Pressed)
(Current BPP sensor 1 angle) – (BPP sensor 1 angle that was stored when the brake switch B status has been changed from OFF to ON)	≥ +0.69 deg
(Brake pedal)	(Pressed)
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
(Current BPP sensor 1 angle) – (Minimum BPP sensor 1 angle that has experienced from ignition switch: ON)	≥ +3.5 deg
(Brake pedal)	(Pressed)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch A signal from ECM (Brake pedal) NOTE: For a normal system, when applying the brakes switch B will go from OFF to ON immediately, and from switch B ON, switch A will go ON to OFF after 0.69 degrees of travel in the direction of increasing the value of the brake pedal angle. NOTE: For a normal system, switch A will go ON to OFF within 3.5 degrees of travel in the direction of increasing the value of the brake pedal angle from initial brake pedal position.	ON Not pressed

Time Needed for Diagnosis: 1 s x 5 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK. Do not clear NG during hybrid system activated.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch A signal from ECM (Brake pedal) NOTE: For a normal system, when applying the brakes switch B will go from OFF to ON immediately, and from switch B ON, switch A will go ON to OFF after 0.69 degrees of travel in the direction of increasing the value of the brake pedal angle. NOTE: For a normal system, switch A will go ON to OFF within 3.5 degrees of travel in the direction of increasing the value of the brake pedal angle from initial brake pedal position.	OFF Pressed

Time Needed for Diagnosis: 1 second

H: DTC P057B BRAKE PEDAL POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-107, OUTLINE OF DIAGNOSIS, DTC P057B BRAKE PEDAL POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

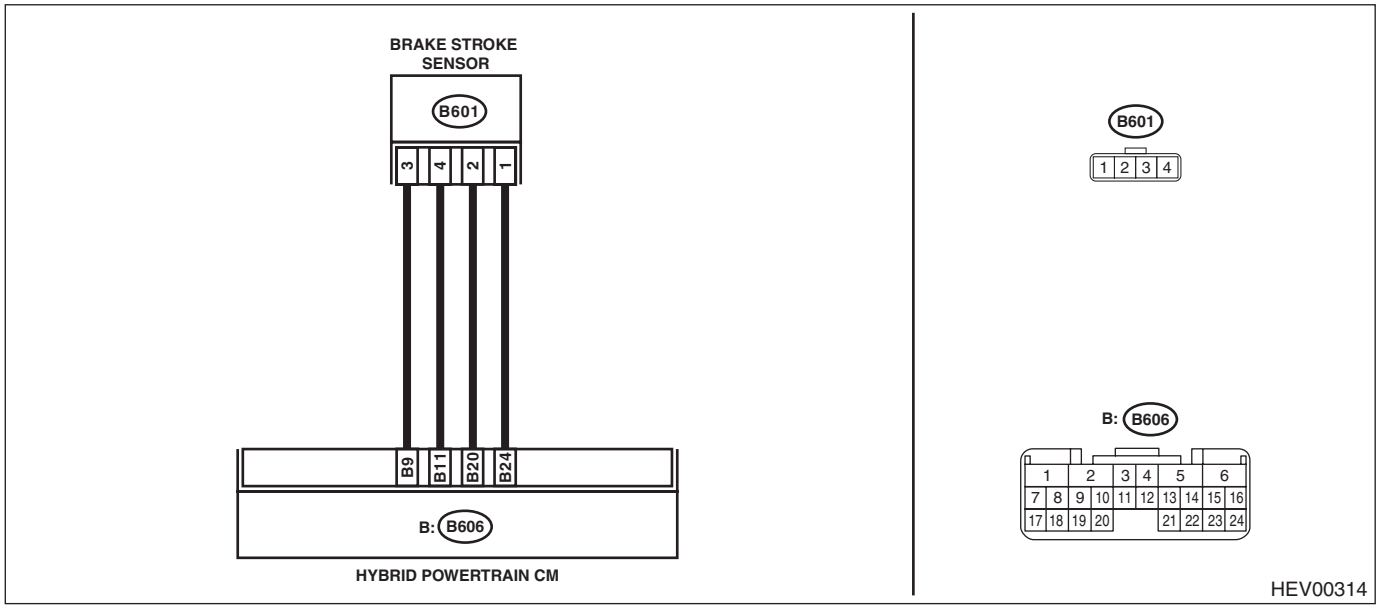
EV traveling/Auto Start Stop does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Main Brake Pedal Position Sensor Voltage» «Sub Brake Pedal Position Sensor Voltage». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value «Main Brake Pedal Position Sensor Voltage» become approx. 1 V, and the value «Sub Brake Pedal Position Sensor Voltage» approx. 4 V when the pedal is not depressed? Also, do the values «Main Brake Pedal Position Sensor Voltage» and «Sub Brake Pedal Position Sensor Voltage» change when the pedal is depressed?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector (B606). 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Power Sensor Voltage 3». <Ref. to HEV(diag)-39, HYBRID POWER-TRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value approx. 5 V?	Go to step **3**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the brake stroke sensor connector. 3) Using a tester, measure the resistance between the HPCM connector and brake stroke sensor connector. ***Connector & terminal*** ***(B601) No. 2 — (B606) No. 20:*** ***(B601) No. 4 — (B606) No. 11:*** ***(B601) No. 1 — (B606) No. 24:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of the harness between the HPCM connector and the brake stroke sensor connector.
4	**CHECK HARNESS (GROUND SHORT CIR-CUIT).** Using a tester, measure the resistance between brake stroke sensor connector and chassis ground. ***Connector & terminal*** ***(B601) No. 2 — Chassis ground:*** ***(B601) No. 4 — Chassis ground:*** ***(B601) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair ground short circuit of harness between the HPCM connector and the brake stroke sensor connector.
5	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Disconnect the brake stroke sensor connector. 2) Turn the ignition switch to ON. 3) Using a tester, measure the voltage between brake stroke sensor connector and chassis ground. ***Connector & terminal*** ***(B601) No. 2 (+) — Chassis ground (–):*** ***(B601) No. 4 (+) — Chassis ground (–):*** ***(B601) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Replace the brake pedal assembly. <Ref. to BR-71, Brake Pedal.>	Repair the short circuit to power in harness between the HPCM connector and the brake stroke sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of brake stroke sensor 1 and 2.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Current BPP sensor 1 angle – Min (BPP sensor 1 angle)	≥ 1 deg or
Current BPP sensor 2 angle – Min (BPP sensor 2 angle)	≥ 1 deg

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Max (BPP sensor 1 angle) – Current BPP sensor 1 angle	< 0.5 deg and
Max (BPP sensor 2 angle) – Current BPP sensor 2 angle	≥ 2 deg or
Max (BPP sensor 1 angle) – Current BPP sensor 1angle	≥ 2 deg and
Max (BPP sensor 2 angle) – Current BPP sensor 2 angle	< 0.5 deg
Diagnosis 2	
BPP sensor 1 voltage + BPP sensor 2 voltage	≤ 3.5 V
NOTE: The sum should be 5 V for typical sensors	or ≥ 6.5 V

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear NG when continuous time when the following conditions are met is predetermined time or more (diagnosis 1 and diagnosis 2).

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Max (BPP sensor 1 angle) – Current BPP sensor 1 angle	≥ 0.5 deg
Max (BPP sensor 2 angle) – Current BPP sensor 2 angle	≥ 2 deg
Max (BPP sensor 1 angle) – Current BPP sensor 1angle	≥ 2 deg
Max (BPP sensor 2 angle) – Current BPP sensor 2 angle	≥ 0.5 deg
Diagnosis 2	
BPP sensor 1 voltage + BPP sensor 2 voltage	> 3.5 V
NOTE: The sum should be 5 V for typical sensors	or < 6.5 V

Time Needed for Diagnosis: 0.2 seconds

I: DTC P057C BRAKE PEDAL POSITION SENSOR "A" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-111, OUTLINE OF DIAGNOSIS, DTC P057C BRAKE PEDAL POSITION SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

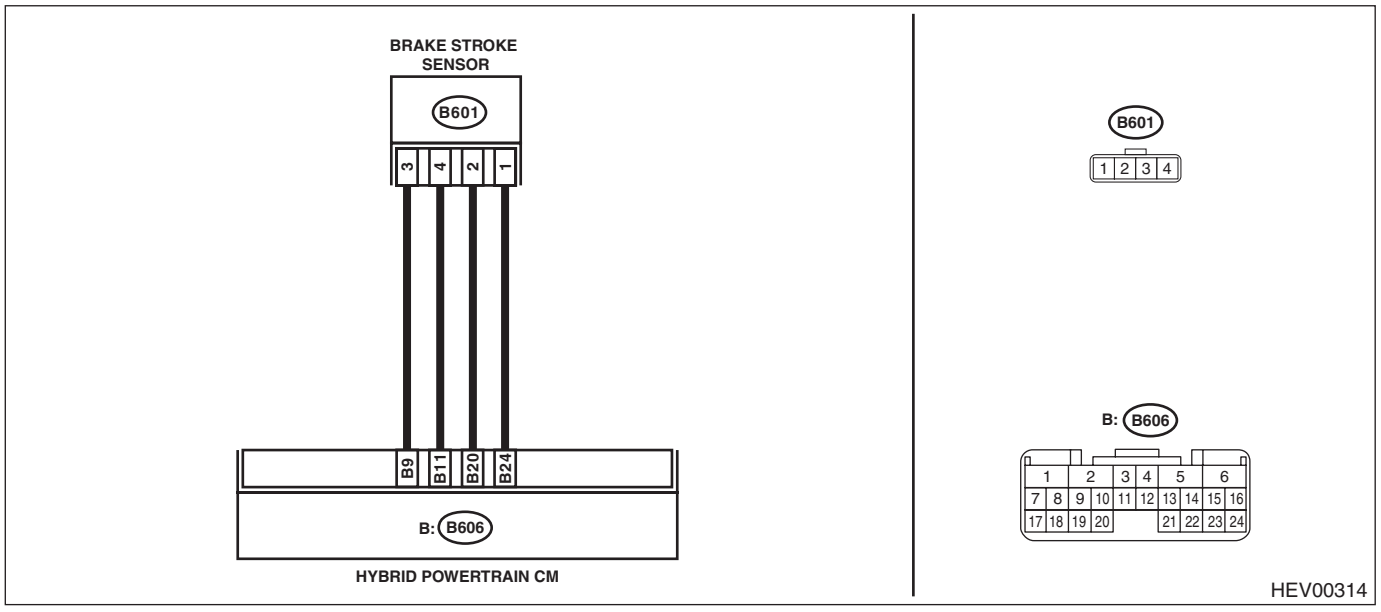
EV traveling/Auto Start Stop does not operate.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P05DD detected? (current malfunction)	Go to step **6**.	Go to step **2**.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Main Brake Pedal Position Sensor Voltage» «Sub Brake Pedal Position Sensor Voltage». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value «Main Brake Pedal Position Sensor Voltage» become approx. 1 V, and the value «Sub Brake Pedal Position Sensor Voltage» approx. 4 V when the pedal is not depressed? Also, do the values «Main Brake Pedal Position Sensor Voltage» and «Sub Brake Pedal Position Sensor Voltage» change when the pedal is depressed?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector (B606). 3) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Power Sensor Voltage 3». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value approx. 5 V?	Go to step **4**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the brake stroke sensor connector. 3) Using a tester, measure the resistance between the brake stroke sensor connector and the HPCM connector. ***Connector & terminal*** ***(B601) No. 2 — (B606) No. 20:*** ***(B601) No. 1 — (B606) No. 24:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of the harness between the HPCM connector and the brake stroke sensor connector.
5	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between brake stroke sensor connector and chassis ground. ***Connector & terminal*** ***(B601) No. 2 — Chassis ground:*** ***(B601) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the brake pedal assembly. <Ref. to BR-71, Brake Pedal.>	Repair ground short circuit of harness between the HPCM connector and the brake stroke sensor connector.
6	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the brake stroke sensor connector and the HPCM connector. 3) Using a tester, measure the resistance between the brake stroke sensor connector and the HPCM connector. ***Connector & terminal*** ***(B601) No. 3 — (B606) No. 9:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair the open circuit of the harness between the HPCM connector and the brake stroke sensor connector.
7	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between brake stroke sensor connector and chassis ground. ***Connector & terminal*** ***(B601) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the brake pedal assembly. <Ref. to BR-71, Brake Pedal.>	Repair ground short circuit of harness between the HPCM connector and the brake stroke sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of brake stroke sensor 1 and ground short.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1 (Mechanical pedal angle)	≤ 0.25 V (≤ –11.25 deg)

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1 (Mechanical pedal angle)	> 0.25 V (> –11.25 deg)

Time Needed for Diagnosis: 0.2 seconds

J: DTC P057D BRAKE PEDAL POSITION SENSOR "A" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-113, OUTLINE OF DIAGNOSIS, DTC P057D BRAKE PEDAL POSITION SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

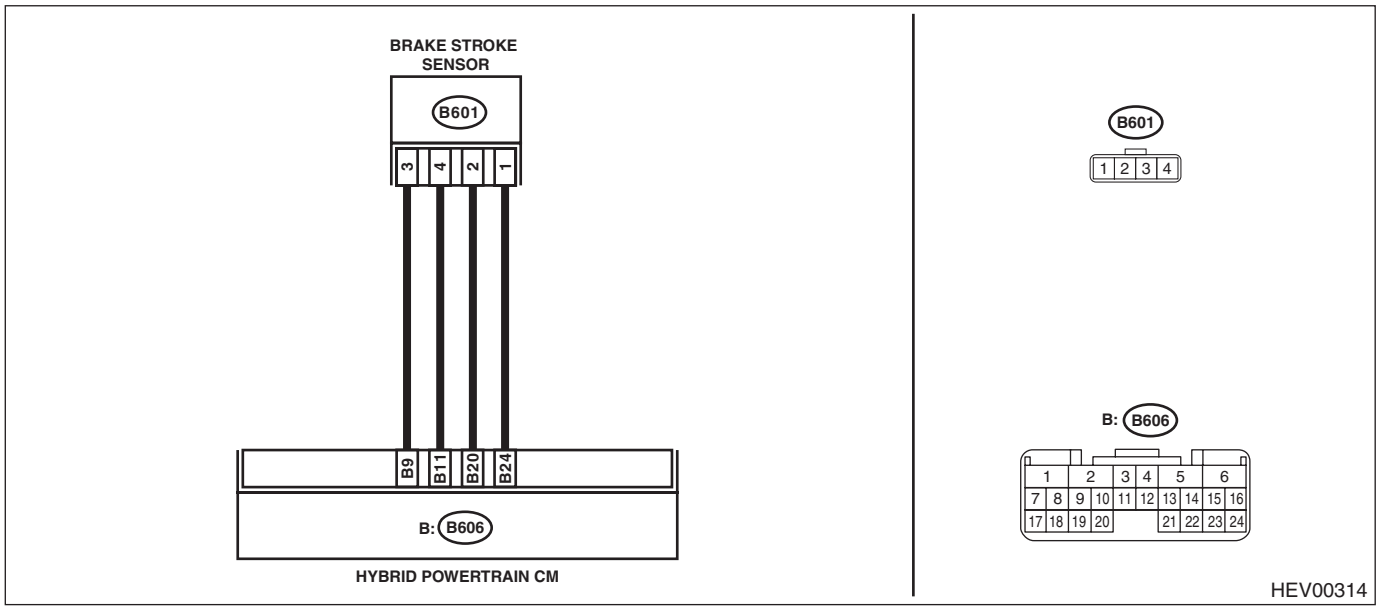
EV traveling/Auto Start Stop does not operate.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Main Brake Pedal Position Sensor Voltage» «Sub Brake Pedal Position Sensor Voltage». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value of «Main Brake Pedal Position Sensor Voltage» approximately 1 V, and the value of «Sub Brake Pedal Position Sensor Voltage» approximately 4 V when the pedal is not depressed? Also, do values of «Main Brake Pedal Position Sensor Voltage» and «Sub Brake Pedal Position Sensor Voltage» change when the pedal is depressed?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.

Step		Check	Yes	No
2	**CHECK CURRENT DATA.** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector (B606). 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Power Sensor Voltage 3». <Ref. to HEV(diag)-39, HYBRID POWER-TRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value approx. 5 V?	Go to step **3**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
3	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between brake stroke sensor connector and chassis ground. ***Connector & terminal*** ***(B601) No. 2 (+) — Chassis ground (–):*** ***(B601) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Replace the brake pedal assembly. <Ref. to BR-71, Brake Pedal.>	Repair the short circuit to power in harness between the HPCM connector and the brake stroke sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the power supply short of brake stroke sensor 1.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1 (Mechanical pedal angle)	≥ 3.4 V (≥ 36 deg)

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1 (Mechanical pedal angle)	< 3.4 V (< 36 deg)

Time Needed for Diagnosis: 0.2 seconds

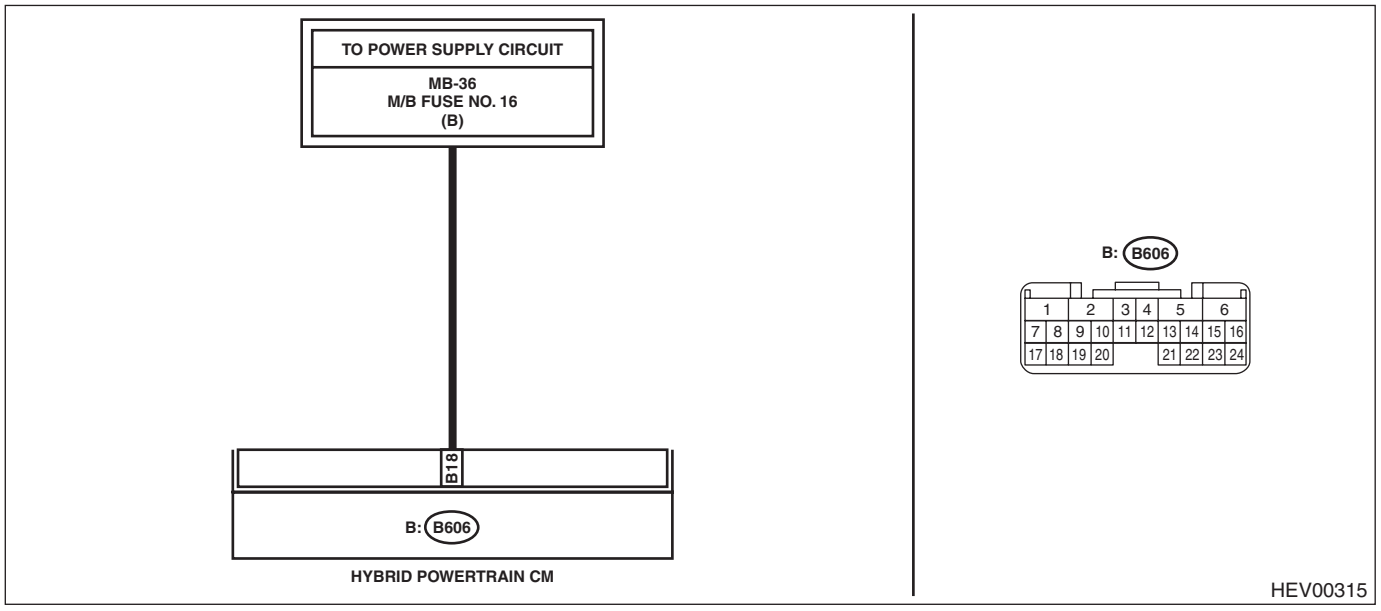
K: DTC P058D BATTERY MONITOR MODULE VOLTAGE MONITORING PERFORMANCE

DIAGNOSIS:
- Detects open circuit and short circuit to ground of 12 volt auxiliary battery sensor.
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:
- Normal control
- System operation check mode is prohibited. <Ref. to HEV(diag)-85, Fail-Safe Chart.>

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Check the fuse. <Ref. to HEV-12, Relay and Fuse.>	Is it normal?	Go to step **2**.	Replace the fuse. When the replaced fuse is blown immediately, repair ground short circuit of harness between HPCM connector and the battery.

	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «12V Auxiliary Battery Voltage». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 6 V or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector. 3) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 4) Disconnect the positive cable from the 12 volt auxiliary battery. 5) Using a tester, measure the resistance between the positive terminal of the 12 volt auxiliary battery and HPCM connector. ***Connector & terminal*** ***M/B fuse No. 16 — (B606) No. 18:***	Is the resistance 1 Ω or less?	Go to step **4**.	Repair the open circuit of the harness between the HPCM connector and the positive terminal of the 12 volt auxiliary battery.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the positive terminal of the 12 volt auxiliary battery and chassis ground. ***Connector & terminal*** ***M/B fuse No. 16 — chassis ground:***	Is the resistance 1 MΩ or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair short circuit to ground in harness between the HPCM connector and the positive terminal of the 12 volt auxiliary battery.

L: DTC P05DD BRAKE PEDAL POSITION SENSOR "B" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-118, OUTLINE OF DIAGNOSIS, DTC P05DD BRAKE PEDAL POSITION SENSOR "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

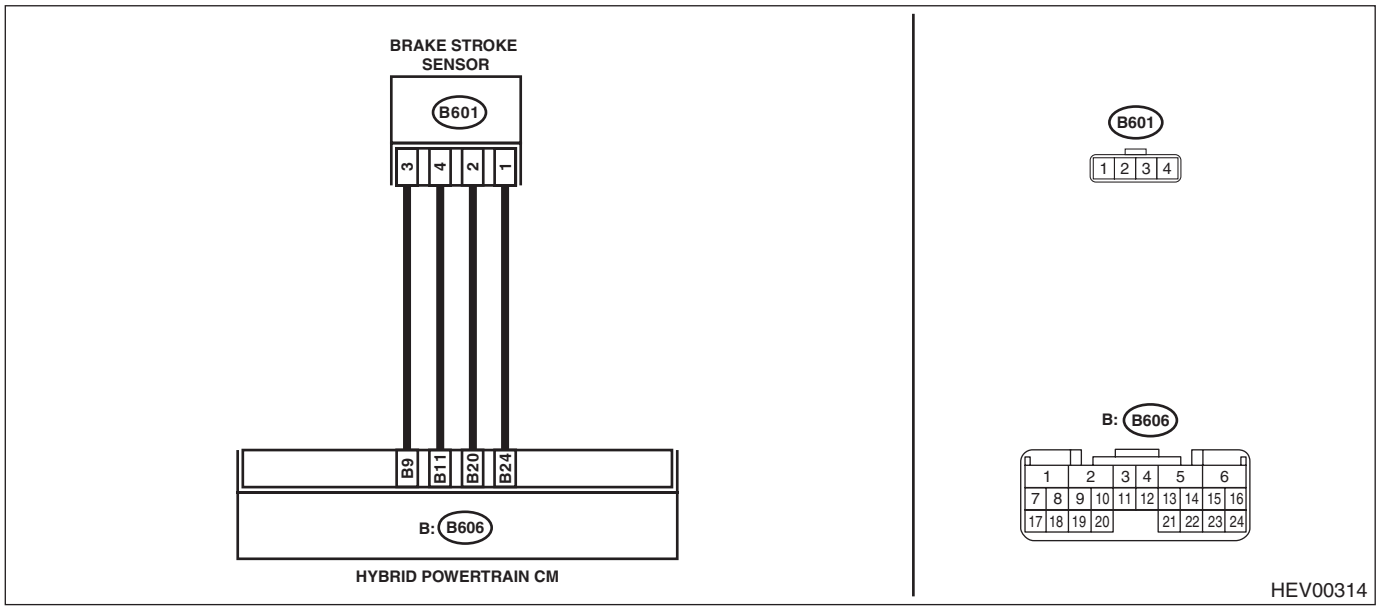
EV traveling/Auto Start Stop does not operate.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P057C detected? (current malfunction)	Go to step **6**.	Go to step **2**.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Main Brake Pedal Position Sensor Voltage» «Sub Brake Pedal Position Sensor Voltage». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value of «Main Brake Pedal Position Sensor Voltage» approximately 1 V, and the value of «Sub Brake Pedal Position Sensor Voltage» approximately 4 V when the pedal is not depressed? Also, do values of «Main Brake Pedal Position Sensor Voltage» and «Sub Brake Pedal Position Sensor Voltage» change when the pedal is depressed?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector (B606). 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Power Sensor Voltage 3». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value approx. 5 V?	Go to step **4**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the brake stroke sensor connector. 3) Using a tester, measure the resistance between the brake stroke sensor connector and the HPCM connector. ***Connector & terminal*** ***(B601) No. 4 — (B606) No. 11:*** ***(B601) No. 1 — (B606) No. 24:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of the harness between the HPCM connector and the brake stroke sensor connector.
5	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between brake stroke sensor connector and chassis ground. ***Connector & terminal*** ***(B601) No. 4 — Chassis ground:*** ***(B601) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the brake pedal assembly. <Ref. to BR-71, Brake Pedal.>	Repair ground short circuit of harness between the HPCM connector and the brake stroke sensor connector.
6	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the brake stroke sensor connector. 3) Using a tester, measure the resistance between the brake stroke sensor connector and the HPCM connector. ***Connector & terminal*** ***(B601) No. 3 — (B606) No. 9:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair the open circuit of the harness between the HPCM connector and the brake stroke sensor connector.
7	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between brake stroke sensor connector and chassis ground. ***Connector & terminal*** ***(B601) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the brake pedal assembly. <Ref. to BR-71, Brake Pedal.>	Repair ground short circuit of harness between the HPCM connector and the brake stroke sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of brake stroke sensor 2 and ground short.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 2 (Mechanical pedal angle)	≤ 1.5 V (≥ 37.5 deg)

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1 (Mechanical pedal angle)	> 1.5 V (< 37.5 deg)

Time Needed for Diagnosis: 0.2 seconds

M: DTC P05DE BRAKE PEDAL POSITION SENSOR "B" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-120, OUTLINE OF DIAGNOSIS, DTC P05DE BRAKE PEDAL POSITION SENSOR "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

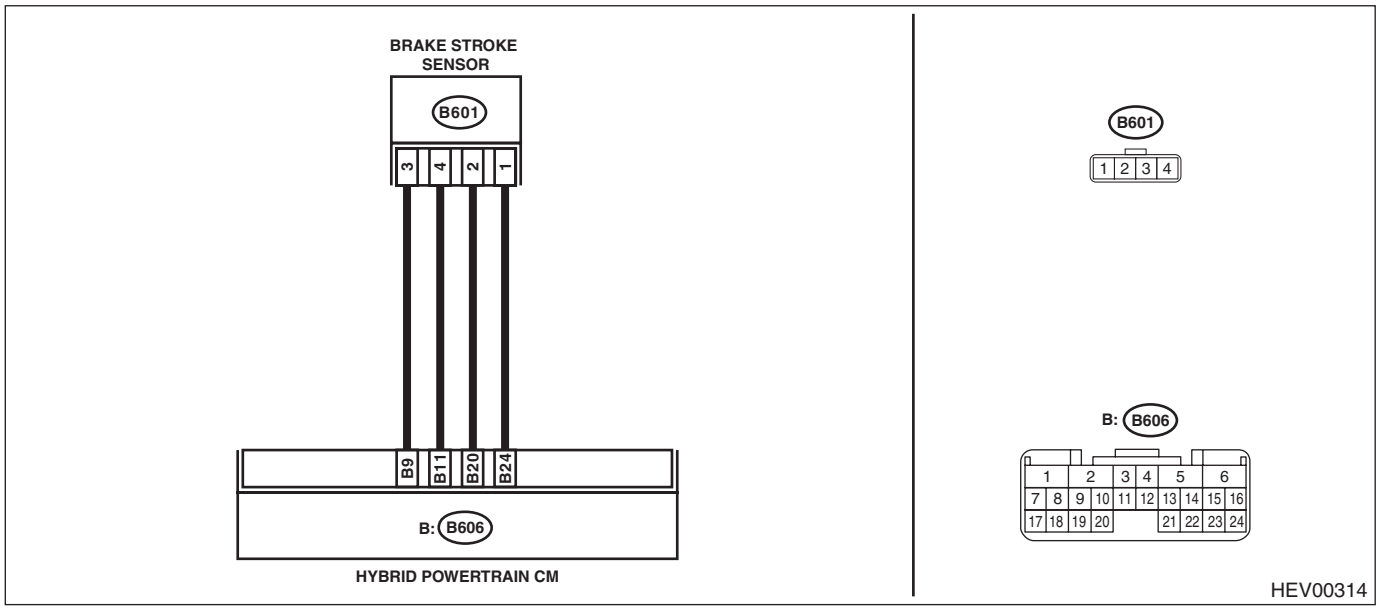
EV traveling/Auto Start Stop does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Main Brake Pedal Position Sensor Voltage» «Sub Brake Pedal Position Sensor Voltage». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value of «Main Brake Pedal Position Sensor Voltage» approximately 1 V, and the value of «Sub Brake Pedal Position Sensor Voltage» approximately 4 V when the pedal is not depressed? Also, do values of «Main Brake Pedal Position Sensor Voltage» and «Sub Brake Pedal Position Sensor Voltage» change when the pedal is depressed?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector (B606). 3) Turn the ignition switch to ON. 4) Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «Power Sensor Voltage 3». <Ref. to HEV(diag)-39, HYBRID POWER-TRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value approx. 5 V?	Go to step **3**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
3	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between brake stroke sensor connector and chassis ground. ***Connector & terminal*** ***(B601) No. 4 — Chassis ground:*** ***(B601) No. 1 — Chassis ground:***	Is the voltage less than 1 V?	Replace the brake pedal assembly. <Ref. to BR-71, Brake Pedal.>	Repair the short circuit to power in harness between the HPCM connector and the brake stroke sensor connector.

1. OUTLINE OF DIAGNOSIS

Detect the power supply short of brake stroke sensor 2.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 2 (Mechanical pedal angle)	≥ 4.7 V (≤ –10.5 deg)

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1 (Mechanical pedal angle)	< 4.7 V (> –10.5 deg)

Time Needed for Diagnosis: 0.2 seconds

N: DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

1. HYBRID POWERTRAIN CONTROL SYSTEM

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-121, OUTLINE OF DIAGNOSIS, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK HPCM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Turn the ignition switch to OFF → ON. 3) Read the DTC again. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0604 detected? (current malfunction)	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

2. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer RAM.
Judge as NG when the detection result is out of specification.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
The written data in the whole area of RAM	≠ The read data

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
The written data in the whole area of RAM	The read data

Time Needed for Diagnosis: Immediately

5. DRIVE MOTOR CONTROL SYSTEM

DIAGNOSIS:
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-123, OUTLINE OF DIAGNOSIS, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DMCM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Read the DTC again. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0604 detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

6. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor control module.
Judge as NG when the malfunction is detected at the peripheral function of drive motor control module microcomputer.

7. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	OFF to ON (ON = Run or crank) (OFF ≠ Run or crank)

8. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Written data in RAM	≠ The read data

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Written data in RAM	Read data

Time Needed for Diagnosis: Immediately

9. BATTERY ENERGY CONTROL SYSTEM

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-124, OUTLINE OF DIAGNOSIS, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK BECM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Turn the ignition switch to OFF → ON. 3) Read the DTC again. <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC detected? (current malfunction)	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

10.OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer RAM.

11.EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Open

12.DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Inconsistency between the write and read to RAM within the BECM Main CPU	Detected

Time Needed for Diagnosis: Less than 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Inconsistency between the write and read to RAM within the BECM Main CPU	Not Detected

Time Needed for Diagnosis: Less than 0.01 second

O: DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR

1. HYBRID POWERTRAIN CONTROL SYSTEM

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-125, OUTLINE OF DIAGNOSIS, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK HPCM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Turn the ignition switch to OFF → ON. 3) Read the DTC again. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0605 detected? (current malfunction)	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

2. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer ROM.
Judge as NG when the detection result is out of specification.

3. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	≠ Error

Time Needed for Diagnosis: Immediately

5. DRIVE MOTOR CONTROL SYSTEM

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-126, OUTLINE OF DIAGNOSIS, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DMCM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Read the DTC again. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0605 detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

6. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor control module.
Judge as NG when the malfunction is detected at the peripheral function of drive motor control module microcomputer.

7. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	OFF to ON (ON = Run or crank)

8. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	≠ Error

Time Needed for Diagnosis: Less than 1 second

9. BATTERY ENERGY CONTROL SYSTEM

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-128, OUTLINE OF DIAGNOSIS, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK BECM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Wait for 30 seconds. 4) Turn the ignition switch to ON. 5) Read the DTC again. <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC detected? (current malfunction)	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

10.OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer FlashROM.

11.EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
BECM precharge contactor command	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

12.DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum error of Flash EEPROM within the BECM Main CPU (Program area)	Detected

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum error of Flash EEPROM within the BECM Main CPU (Program area)	Not Detected

Time Needed for Diagnosis: Less than 2 seconds

P: DTC P0620 GENERATOR/ALTERNATOR CONTROL CIRCUIT

DIAGNOSIS:

- Detects open circuit, short circuit to ground, and short circuit to power in ISG INHCRK line.
- Immediately at fault recognition

TROUBLE SYMPTOM:

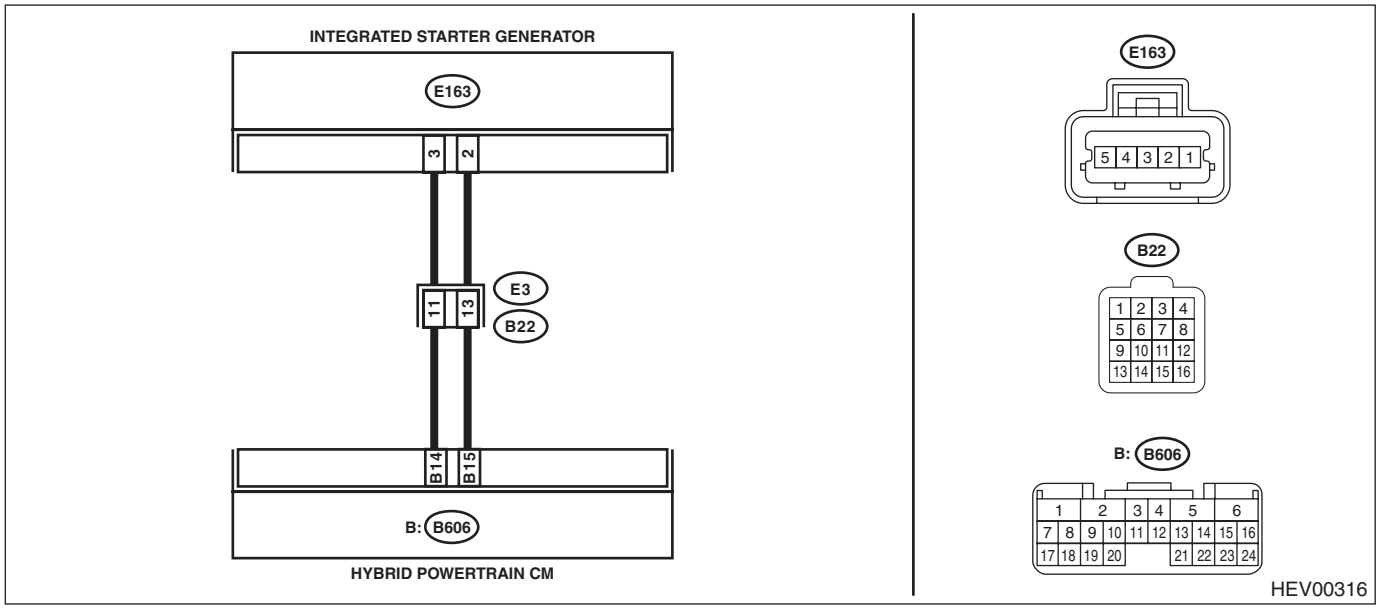
EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the HPCM connector. 2) Disconnect the integrated starter generator connector. 3) Disconnect the 12V engine restart battery sensor connector. 4) Using a tester, measure the resistance between the HPCM connector and integrated starter generator connector. ***Connector & terminal*** ***(B606) No. 14 — (E163) No. 3:*** ***(B606) No. 15 — (E163) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of the harness between the HPCM connector and integrated starter generator connector, or repair the intermediate connector.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between HPCM connector and chassis ground. ***Connector & terminal*** ***(B606) No. 14 — Chassis ground:*** ***(B606) No. 15 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in the harness between the HPCM connector and integrated starter generator connector, or repair the intermediate connector.

Step		Check	Yes	No
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between the HPCM connector and chassis ground. ***Connector & terminal*** ***(B606) No. 14 (+) — Chassis ground (–):*** ***(B606) No. 15 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Replace the integrated starter generator. <Ref. to SC(H4DO(HEV))-33, Integrated Starter Generator (ISG).>	Repair the short circuit to power in the harness between the HPCM connector and integrated starter generator connector, or repair the intermediate connector.

Q: DTC P065A GENERATOR/ALTERNATOR SYSTEM PERFORMANCE

DIAGNOSIS:

- Detects abnormal conditions in battery charging functions.
- Immediately at fault recognition

TROUBLE SYMPTOM:

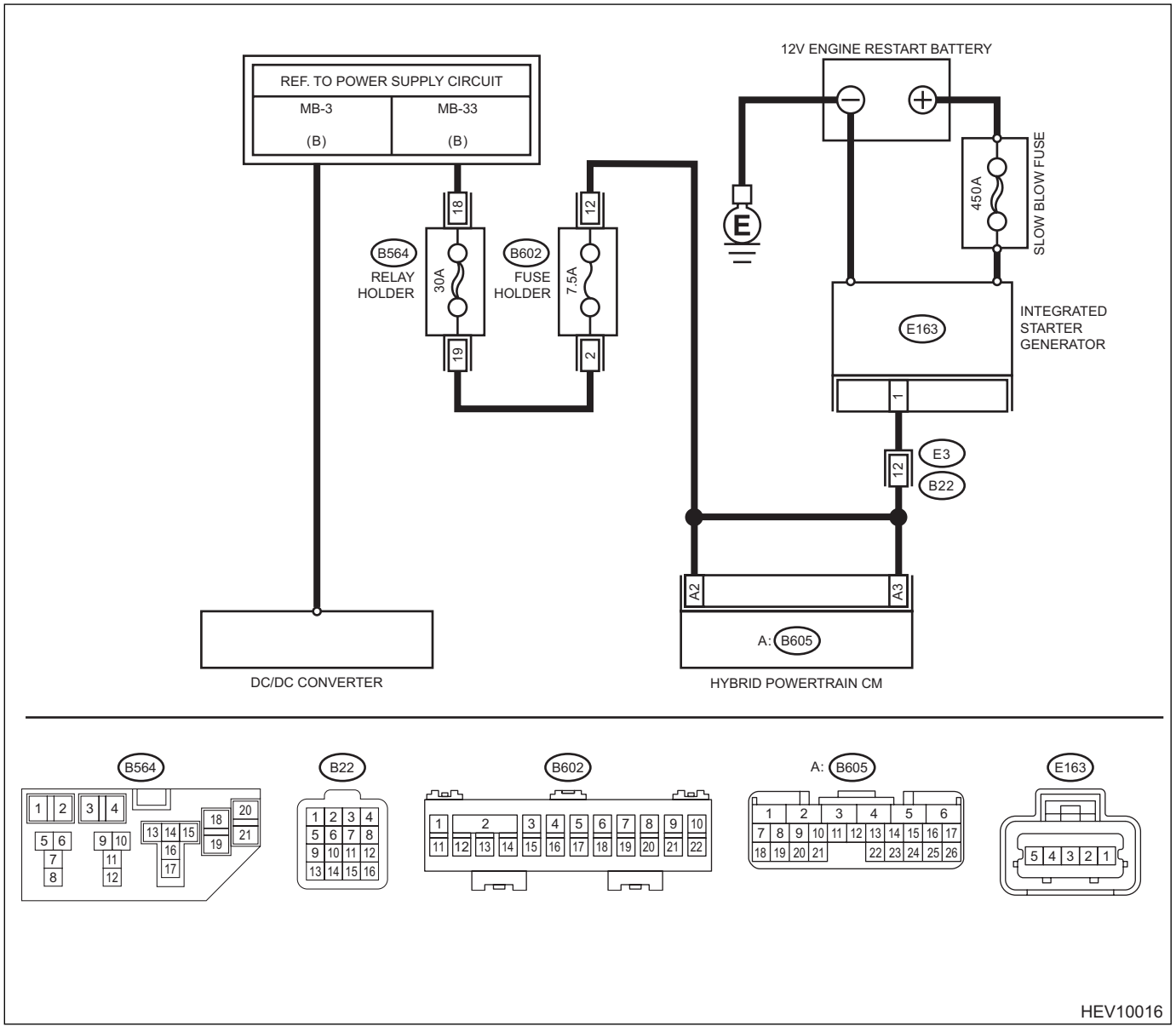
- EV traveling/Auto Start Stop does not operate.
- Charge warning light illuminates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>
Power supply circuit <Ref. to WI(HEV)-21, WIRING DIAGRAM, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK FUSE.** Check the slow blow fuse of the 12 volt auxiliary battery.	Is it normal?	Go to step **2**.	Replace the fuse. When the replaced fuse blows out easily, repair short circuit to ground in harness between DC/DC converter and the battery.
2	**CHECK DC/DC CONVERTER FASTENING AREA.** 1) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the positive cable from the 12 volt auxiliary battery. 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the fastening areas of the DC/DC converter 12 volt cable.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **3**.	Retighten the bolts.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the 12 volt cable of the DC/DC converter. 2) Using a tester, measure the resistance between the positive terminal of the 12 volt auxiliary battery and the fastening area of the DC/DC converter power cable. ***Connector & terminal*** ***12 volt auxiliary battery — DC/DC converter:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of the power cable between the DC/DC converter and the positive terminal of the 12 volt auxiliary battery.
4	**CHECK BATTERY.** Check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.> NOTE: Check for conditions such as loose terminals.	Is it normal?	Go to step **5**.	Charge or replace the battery.
5	**CHECK DCDC.** Using the Subaru Select Monitor, perform «DCDC Converter Output Voltage Control» of System Operation Check Mode for the hybrid powertrain control system. <Ref. to HEV(diag)-69, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, System Operation Check Mode.>	Is it normal?	Go to step **6**.	Perform the diagnosis of DTC P0A94. <Ref. to HEV(diag)-253, DTC P0A94 DC/DC CONVERTER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
6	**CHECK FUSE.** Check the fuse. <Ref. to HEV-12, Relay and Fuse.>	Is it normal?	Go to step **7**.	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.
7	**CHECK BELTS.** Check the belt. <Ref. to ME(H4DO(w/o HEV))-124, V-belt.>	Is it normal?	Go to step **8**.	Adjust or replace the belt.

	Step	Check	Yes	No
8	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «ISG Control Mode Actual» «12V Engine Restart Battery Voltage» «ISG Terminal Voltage». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is «12V Engine Restart Battery Voltage» «ISG Terminal Voltage» 12 — 15 V when the engine speed is at 2000 rpm or more and «ISG Control Mode Actual» is generating power?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **9**.
9	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «HPCM Check 40». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 30 m Ω or more?	Check for poor contact of 12 volt engine restart battery terminals. <Ref. to NT-6, BATTERY, NOTE, Note.>	Go to step **10**.
10	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector. 3) Disconnect the integrated starter generator connector. 4) Using a tester, measure the resistance between the HPCM connector and integrated starter generator connector. ***Connector & terminal*** ***(B605) No. 2 — (E163) No. 1:*** ***(B605) No. 3 — (E163) No. 1:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of the harness between the HPCM connector and the integrated starter generator terminal.
11	**CHECK BATTERY.** Check the 12 volt engine restart battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is it normal?	Replace the integrated starter generator. <Ref. to SC(H4DO(HEV))-33, Integrated Starter Generator (ISG).>	Charge or replace the 12 volt engine restart battery.

R: DTC P06EF ENGINE RESTART PERFORMANCE

DIAGNOSIS:

- Detects communication error, open harness, engine restart system error due to trouble in starting devices.
- Immediately at fault recognition

TROUBLE SYMPTOM:

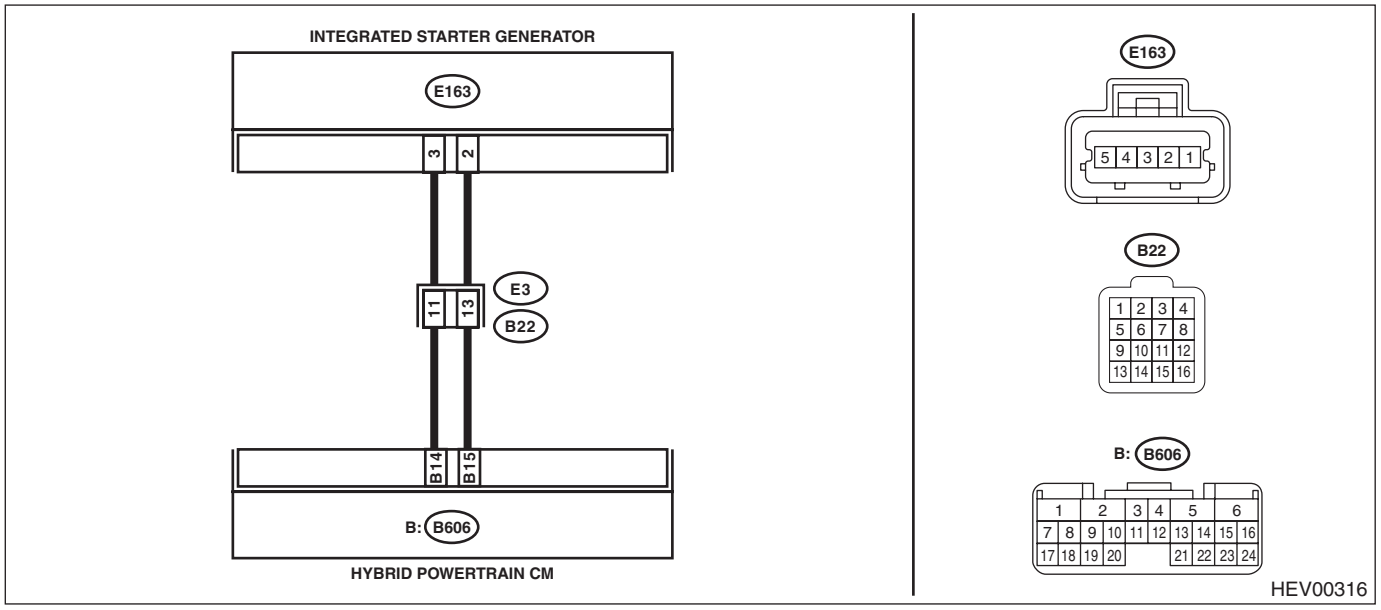
EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



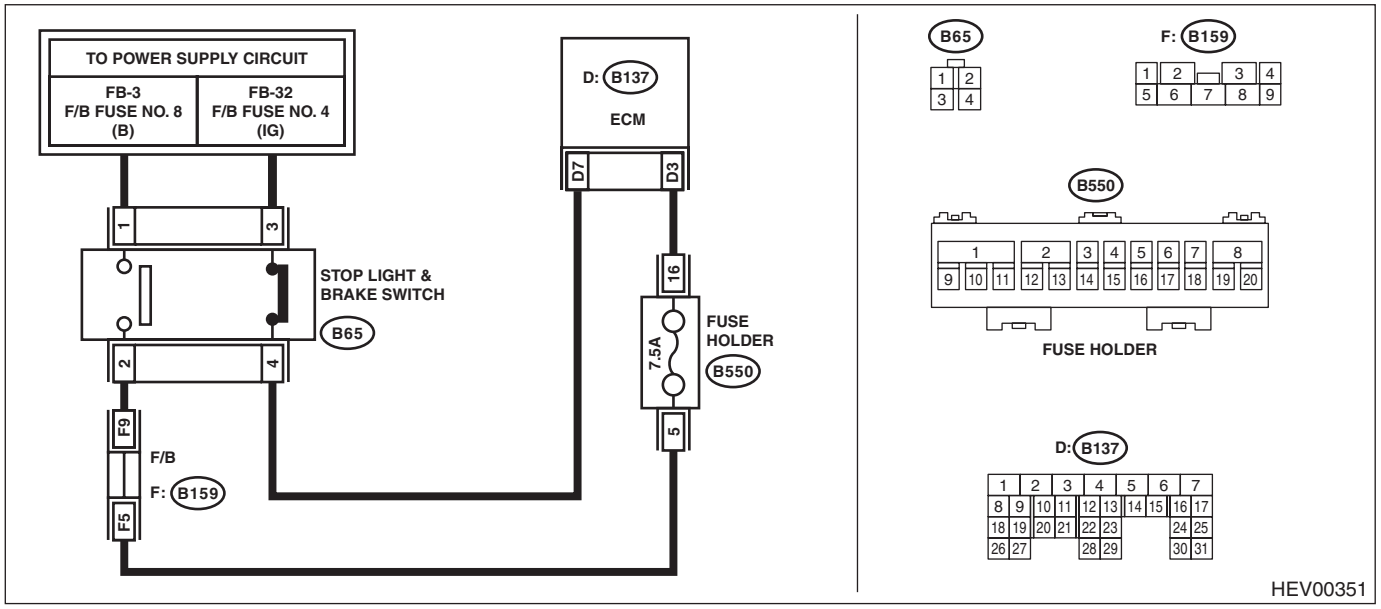
Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, HYBRID POWERTRAIN CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK INTEGRATED STARTER GENERATOR (SHORT TO GROUND).** 1) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Check the installation condition of integrated starter generator. <Ref. to SC(H4DO(HEV))-33, Integrated Starter Generator (ISG).>	Is it normal?	Go to step **3**.	Attach the integrated starter generator securely.

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the HPCM connector. 2) Disconnect the integrated starter generator connector. 3) Disconnect the 12V engine restart battery sensor connector. 4) Using a tester, measure the resistance between the HPCM connector and integrated starter generator connector. ***Connector & terminal*** ***(B606) No. 15 — (E162) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of the harness between the HPCM connector and the integrated starter generator connector.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between HPCM connector and chassis ground. ***Connector & terminal*** ***(B606) No. 15 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair ground short circuit of harness between the HPCM connector and the integrated starter generator connector.
5	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Connect the disconnected battery. 2) Turn the ignition switch to ON. 3) Using a tester, measure the voltage between the HPCM connector and chassis ground. ***Connector & terminal*** ***(B606) No. 15 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair the short circuit to power in harness between the HPCM connector and the integrated starter generator connector.
6	**INSPECTION OF INTEGRATED STARTER GENERATOR UNIT.** Check the integrated starter generator as a single part. <Ref. to SC(H4DO(HEV))-33, Integrated Starter Generator (ISG).>	Is it normal?	Go to step **7**.	Replace the integrated starter generator.
7	**CHECK BATTERY.** Check the 12 volt engine restart battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is it normal?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Charge or replace the battery.

S: DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW

DIAGNOSIS:
GENERAL DESCRIPTION <Ref. to HEV(diag)-137, OUTLINE OF DIAGNOSIS, DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>
WIRING DIAGRAM:
Stop light system <Ref. to WI(HEV)-191, WIRING DIAGRAM, Stop Light System.>



Step		Check	Yes	No
1	**CHECK STOP LIGHT & BRAKE SWITCH.** Check the stop light & brake switch. <Ref. to CC-10, Stop Light & Brake Switch.>	Is the stop light & brake switch and installation position OK?	Go to step **2**.	Replace the stop light & brake switch. Or adjust the installation position.
2	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop lamp & brake switch connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between the stop lamp & brake switch connector and chassis ground. ***Connector & terminal*** ***(B65) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	• Check fuse No. 8 (in fuse & relay box). • Check for open or short in the harness between stop light & brake switch and fuse & relay box.
3	**CHECK STOP LIGHT & BRAKE SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance between the ECM connector and stop light & brake switch connector. ***Connector & terminal*** ***(B137) No. 3 — (B65) No. 2:***	Is the resistance less than 10 Ω?	Replace the ECM. <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>	Repair the open circuit of harness between ECM connector and stop light & brake switch connector.

1. OUTLINE OF DIAGNOSIS

Detect brake pedal SW-B ON/OFF stuck.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Brake switch B signal from ECM	OFF
(Brake pedal)	(Pressed)
(Current BPP sensor 1 angle) – (BPP sensor 1 angle that was stored when the brake switch A status has been changed from ON to OFF)	≥ +0.69 deg
(Brake pedal)	(Pressed)
(Current BPP sensor 1 angle) – (Minimum BPP sensor 1 value that has experienced from ignition switch: ON)	≥ +3.5 deg
(Brake pedal)	(Pressed)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch B signal from ECM	OFF
(Brake pedal)	Not pressed
NOTE: For a normal system, when applying the brakes switch A will go from ON to OFF immediately, and from switch A OFF, switch B will go OFF to ON after 0.69 degrees of travel in the direction of increasing the value of the brake pedal angle.	
NOTE: For a normal system, switch B will go OFF to ON within 3.5 degrees of travel in the direction of increasing the value of the brake pedal angle from initial brake pedal position.	

Time Needed for Diagnosis: 1 s x 5 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK. Do not clear NG during hybrid system activated.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch B signal from ECM	ON
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch A will go from ON to OFF immediately, and from switch A OFF, switch B will go OFF to ON after 0.69 degrees of travel in the direction of increasing the value of the brake pedal angle.	
NOTE: For a normal system, switch B will go OFF to ON within 3.5 degrees of travel in the direction of increasing the value of the brake pedal angle from initial brake pedal position.	

Time Needed for Diagnosis: 1 second

T: DTC P0724 BRAKE SWITCH "B" CIRCUIT HIGH

DIAGNOSIS:
GENERAL DESCRIPTION <Ref. to HEV(diag)-138, OUTLINE OF DIAGNOSIS, DTC P0724 BRAKE SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0719. <Ref. to HEV(diag)-136, DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect brake pedal SW-B ON/OFF stuck.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Brake switch B signal from ECM	ON
(Brake pedal)	(Not pressed)
(Current BPP sensor 1 angle) – (BPP sensor 1 angle that was stored when the brake switch A status has been changed from OFF to ON)	≤ –0.69 deg
(Brake pedal)	(Not pressed)

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch B signal from ECM	ON
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch A will go from OFF to ON immediately, and from switch A ON, switch B will go ON to OFF after 0.69 degrees of travel in the direction of decreasing the value of the brake pedal angle.	

Time Needed for Diagnosis: 1 s x 5 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK.
Do not clear NG during hybrid system activated.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch B signal from ECM	OFF
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch A will go from OFF to ON immediately, and from switch A ON, switch B will go ON to OFF after 0.69 degrees of travel in the direction of decreasing the value of the brake pedal angle.	

Time Needed for Diagnosis: 1 second

U: DTC P0A1D HYBRID/EV POWERTRAIN CONTROL MODULE "A"

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-140, OUTLINE OF DIAGNOSIS, DTC P0A1D HYBRID/EV POWERTRAIN CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK HPCM.** 1) Turn the ignition switch to OFF. 2) Wait for 30 seconds. 3) Turn the ignition switch to ON. 4) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 5) Read the DTC again. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0A1D detected? (current malfunction)	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of hybrid powertrain control module.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Internal Hardware module error Exception interrupt by the HPCM CPU	Detected or Detected

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Internal Hardware module error Exception interrupt by the HPCM CPU	≠ Detected and ≠ Detected

Time Needed for Diagnosis: Immediately

V: DTC P1C00 BATTERY MONITOR MODULE "A" PERFORMANCE

DIAGNOSIS:
- Detects functional errors of the 12 volt engine restart battery sensor.
- Immediately at fault recognition

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.
- System operation check mode is prohibited. <Ref. to HEV(diag)-85, Fail-Safe Chart.>
- Charge warning light illuminates.

CAUTION:
Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P1C00 detected? (current malfunction)	Replace the 12V engine restart battery sensor. <Ref. to SC(H4DO(HEV))-61, Battery Sensor.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

W: DTC P1C04 OUTPUT CLUTCH LINEAR SOLENOID HPCM CONTROL CIRCUIT LOW

DIAGNOSIS:

- Detects short circuit to ground of output clutch linear solenoid HPCM side circuit (LOW).
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

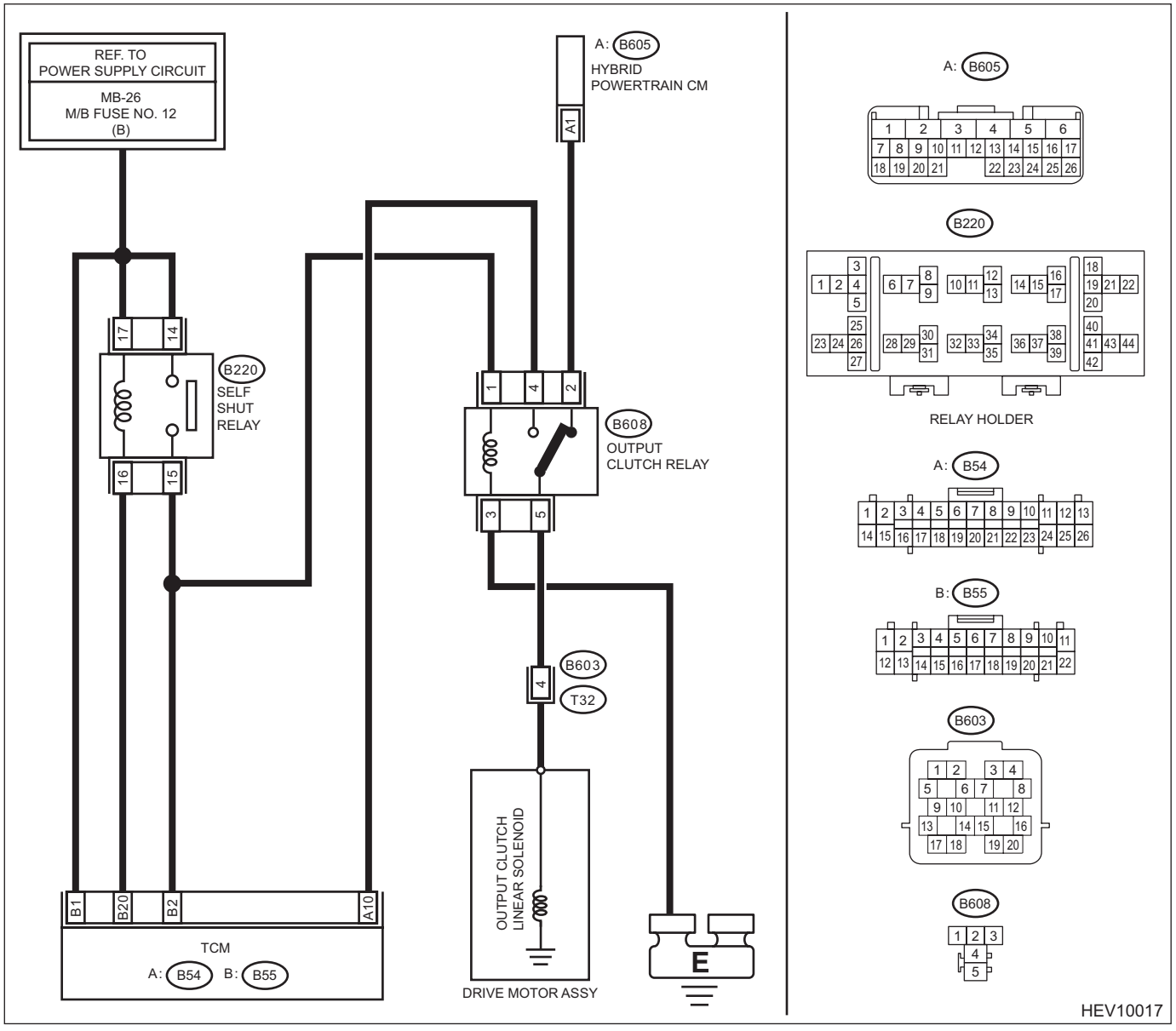
Normal control

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read DTCs of the following system. • Transmission <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Is either DTC P2719, P2720, or P2721 detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to CVT(HEV)(diag)-35, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the HPCM connector. 2) Remove the output clutch relay. 3) Using a tester, measure the resistance between the HPCM connector and output clutch relay connector. ***Connector & terminal*** ***(B605) No. 1 — (B608) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of the harness between the HPCM connector and the output clutch relay connector.
3	**CHECK RELAY.** Check the output clutch relay. <Ref. to CVT(TH58A)-160, Relay and Fuse.>	Is the output clutch relay OK?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Replace the output clutch relay.

X: DTC P1C05 OUTPUT CLUTCH LINEAR SOLENOID HPCM CONTROL CIRCUIT HIGH

DIAGNOSIS:

- Detects open circuit and short circuit to power in output clutch linear solenoid HPCM side circuit (LOW).
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

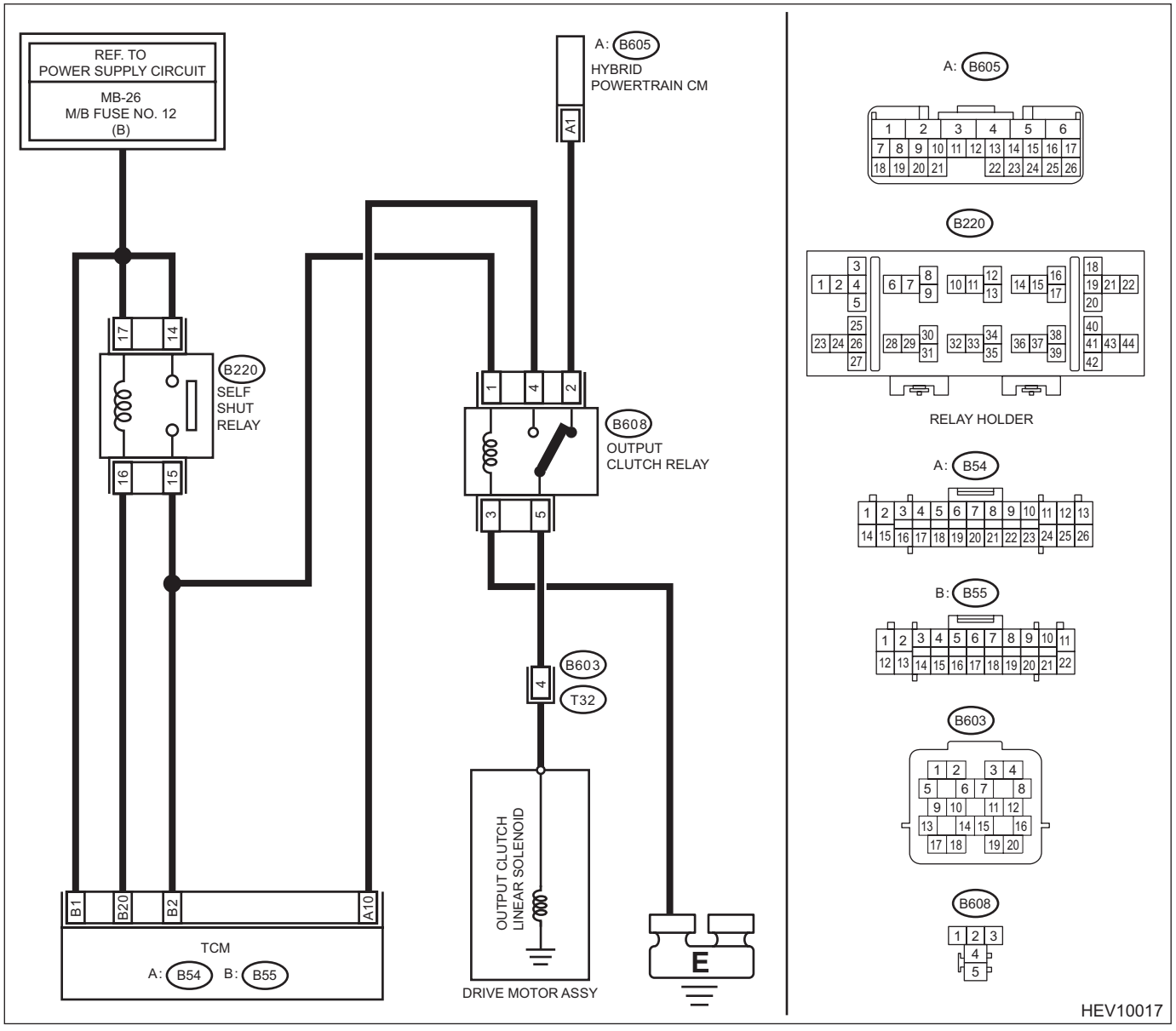
Normal control

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read DTCs of the following system. • Transmission <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Is either DTC P2719, P2720, or P2721 detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to CVT(HEV)(diag)-35, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Disconnect the HPCM connector. 2) Remove the output clutch relay. 3) Using a tester, measure the resistance between the output clutch connector and chassis ground. ***Connector & terminal*** ***(B608) No. 2 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in harness between output clutch relay connector and chassis ground.
3	**CHECK RELAY.** Check the output clutch relay. <Ref. to CVT(TH58A)-160, Relay and Fuse.>	Is the output clutch relay OK?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Replace the output clutch relay.

Y: DTC P1C06 12V BATTERY RELAY CLOSE CIRCUIT PERFORMANCE

DIAGNOSIS:

- Detects open circuit, short circuit to ground, and short circuit to power in the harness of 12V battery relay close circuit.
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.

(Engine does not restart under EV traveling/Auto Start Stop condition.)

- Charge warning light illuminates.

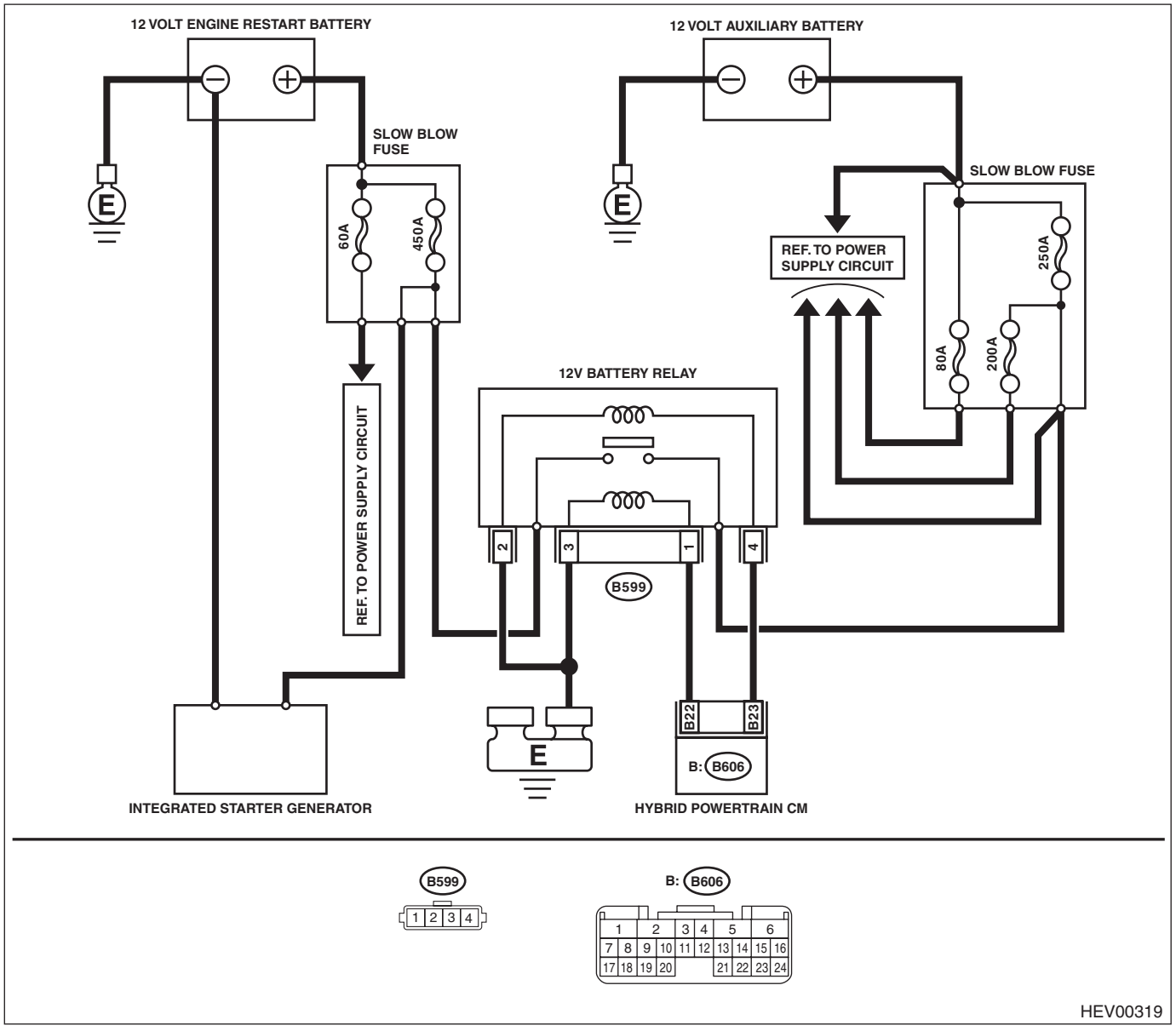
CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

NOTE:
If those trouble occurs, the 12 volt auxiliary battery may run out.

WIRING DIAGRAM:

Power supply circuit <Ref. to WI(HEV)-21, WIRING DIAGRAM, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the battery relay connector. 2) Disconnect the HPCM connector. 3) Using a tester, measure the resistance between the 12V battery relay connector and the HPCM connector and the resistance between 12V battery relay connector and chassis ground. ***Connector & terminal*** ***(B599) No. 1 — (B606) No. 22:*** ***(B606) No. 3 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair open circuit in harness between the 12V battery relay connector and the HPCM connector and the harness between 12V battery relay connector and chassis ground.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between 12V battery relay connector and chassis ground. ***Connector & terminal*** ***(B606) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in the harness between the 12V battery relay connector and the HPCM connector.
3	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between 12V battery relay connector and chassis ground. ***Connector & terminal*** ***(B599) No. 1 — Chassis ground:*** ***(B606) No. 22 — Chassis ground:***	Is the voltage less than 1 V?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair the short circuit to power in the harness between the 12V battery relay connector and the HPCM connector.

Z: DTC P1C07 12V BATTERY RELAY OPEN CIRCUIT PERFORMANCE

DIAGNOSIS:

- Detects open circuit, short circuit to ground, and short circuit to power in the harness of 12V battery relay open circuit.
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.

(Engine does not restart under EV traveling/Auto Start Stop condition.)

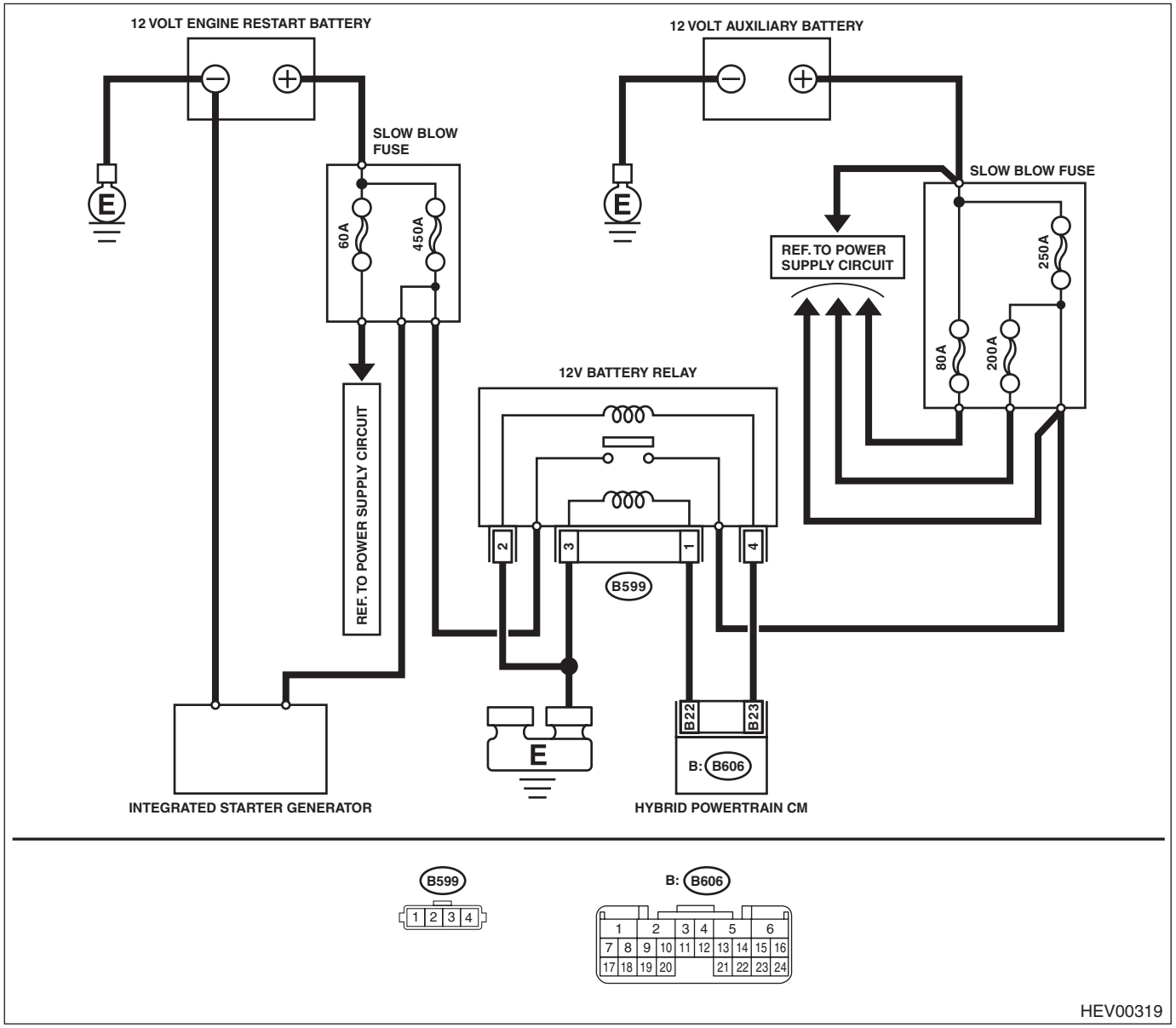
- Charge warning light illuminates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Power supply circuit <Ref. to WI(HEV)-21, WIRING DIAGRAM, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the 12V battery relay connector. 2) Disconnect the HPCM connector. 3) Using a tester, measure the resistance between the 12V battery relay connector and the HPCM connector and the resistance between 12V battery relay connector and chassis ground. ***Connector & terminal*** ***(B599) No. 4 — (B606) No. 23:*** ***(B599) No. 3 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair open circuit in harness between the 12V battery relay connector and the HPCM connector and the harness between 12V battery relay connector and chassis ground.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between 12V battery relay connector and chassis ground. ***Connector & terminal*** ***(B599) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit to ground in the harness between the 12V battery relay connector and the HPCM connector.
3	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between 12V battery relay connector and chassis ground. ***Connector & terminal*** ***(B599) No. 4 — Chassis ground:*** ***(B599) No. 3 — Chassis ground:***	Is the voltage less than 1 V?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair the short circuit to power in the harness between the 12V battery relay connector and the HPCM connector.

AA:DTC P1C08 12V BATTERY RELAY STUCK OPEN

DIAGNOSIS:

- Detects a stuck condition in 12V battery relay open circuit.
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Charge warning light illuminates.

CAUTION:

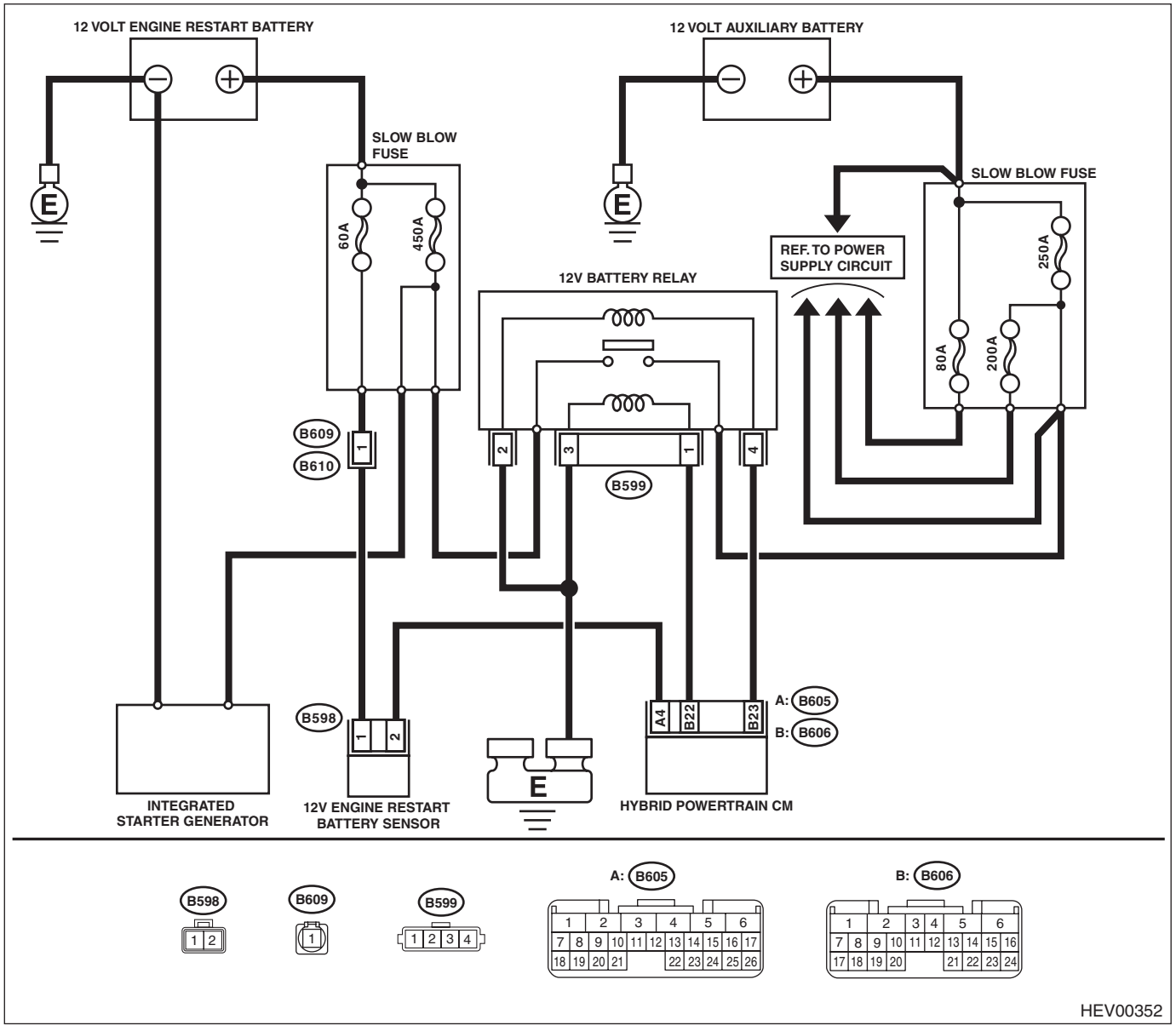
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

NOTE:

If those trouble occurs, the 12 volt auxiliary battery may run out.

WIRING DIAGRAM:

Power supply circuit <Ref. to WI(HEV)-21, WIRING DIAGRAM, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK CONNECTOR.** Check the connector (B598) of 12V engine restart battery sensor.	Is there looseness or poor contact of connector?	Repair the connector.	Go to step **2**.
2	**CHECK FUSE.** Check the slow blow fuse of the 12 volt auxiliary battery and 12 volt engine restart battery.	Is it normal?	Go to step **3**.	Replace the fuse. When the replaced fuse is blown immediately, repair ground short circuit of harness between 12 volt engine restart battery and the 12 volt battery relay and the harness between 12 volt auxiliary battery and the 12V battery relay.
3	**CHECK RELAY.** Using the Subaru Select Monitor, perform «12V Battery Relay Operation» of System Operation Check Mode for the hybrid powertrain control system. <Ref. to HEV(diag)-69, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, System Operation Check Mode.>	Does the relay operate?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK RELAY.** Check the 12V battery relay. <Ref. to SC(H4DO(HEV))-65, 12V Battery Relay.>	Is the condition normal?	Go to step **5**.	Replace the 12V battery relay.
5	**CHECK TERMINALS.** Check the 12V battery relay for loose bolts or corrosion.	Is the condition normal?	Go to step **6**.	Repair the terminals.
6	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between 12V battery relay connector and each battery. ***Connector & terminal*** ***Positive terminal of 12 volt engine restart battery — 12V battery relay terminal (12 volt engine restart battery side):*** ***Positive terminal of 12 volt auxiliary battery — 12V battery relay terminal (12 volt auxiliary battery side):***	Is the resistance 1 Ω or less?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair the open circuit in harness between the 12V battery relay connector and each battery.

AB:DTC P1C09 12V BATTERY RELAY STUCK CLOSED

DIAGNOSIS:

- Detects a stuck condition in 12V battery relay close circuit.
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
For the diagnostic procedure, refer to DTC P1C08 12V BATTERY RELAY STUCK OPEN. <Ref. to HEV(diag)-150, DTC P1C08 12V BATTERY RELAY STUCK OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AC:DTC P1C10 VACUUM SYSTEM PERFORMANCE

DIAGNOSIS:

- Detects abnormal conditions in vacuum pump system functions.
- Judge as NG when the detection result is out of specification.
- The DTC is set when the condition occurs three times in total.

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Vacuum pump fail lamp illuminates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK VACUUM PRESSURE.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform the work support «Brake Vacuum Pump System Check» for the hybrid powertrain control system. <Ref. to HEV(diag)-71, OPERATION, Work Support.>	Is the result of operation check mode OK?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK BRAKE VACUUM HOSE.** Check the brake vacuum hose. (Check the hose for any external damage and also check that air only flows in one direction, when air is blown into or sucked from the hose.)	Is the condition normal?	Replace the brake vacuum pump. <Ref. to BR-82, Brake Vacuum Pump.>	Replace the brake vacuum hose. <Ref. to BR-82, Brake Vacuum Pump.>

AD:DTC P1C11 VACUUM PUMP POWER SUPPLY CIRCUIT LOW

DIAGNOSIS:

- Detects a stuck condition in the vacuum pump supply voltage circuit (LOW).
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

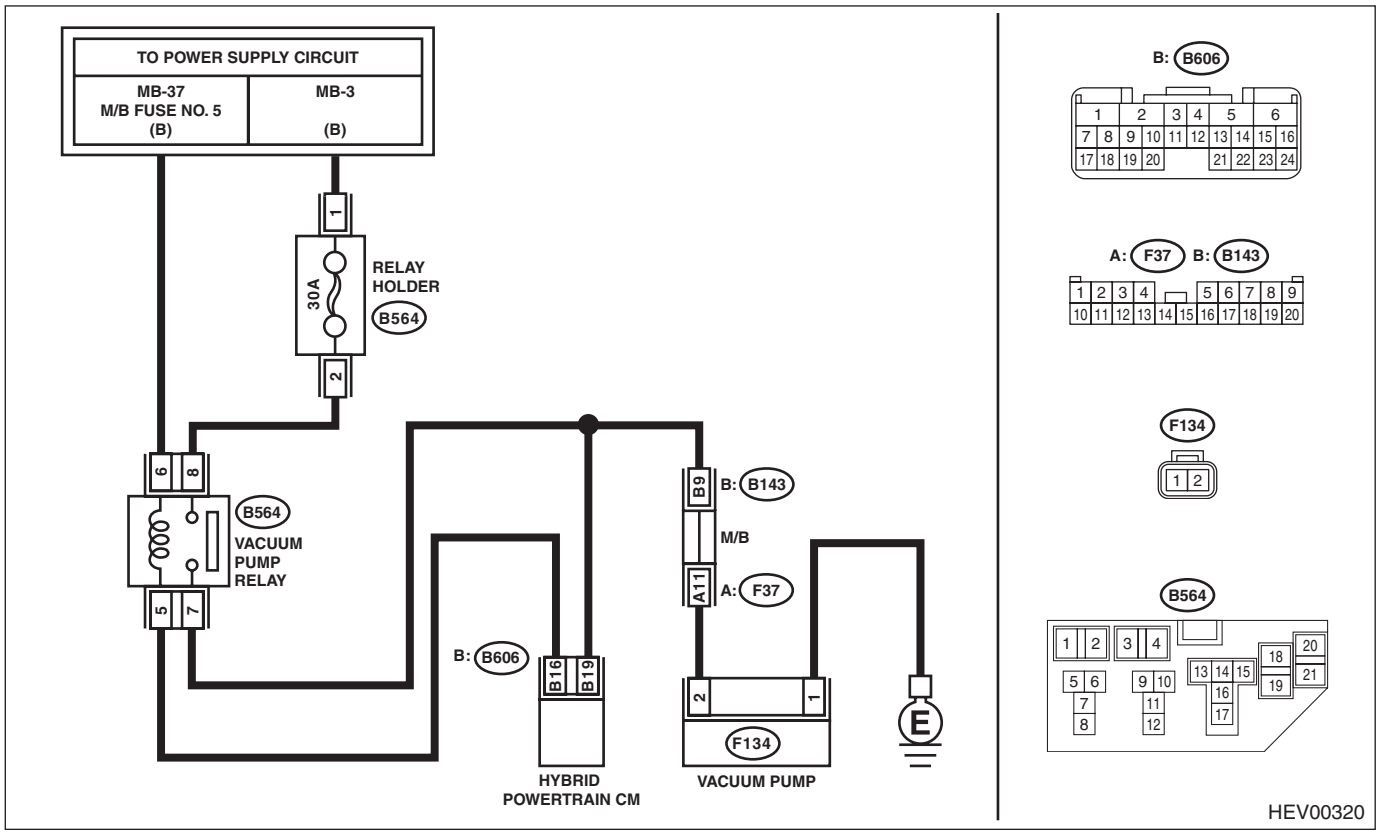
- EV traveling/Auto Start Stop does not operate.
- Vacuum pump fail lamp illuminates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Check the fuse. <Ref. to BR-16, Relay and Fuse.>	Is it normal?	Go to step **2**.	Replace the fuse. When the replaced fuse blows out easily, repair short circuit to power in harness between 12 volt auxiliary battery and the brake vacuum pump relay.
2	**CHECK BRAKE VACUUM PUMP RELAY.** Check the relay. <Ref. to BR-16, Relay and Fuse.>	Is it normal?	Go to step **3**.	Replace the relay. <Ref. to BR-16, Relay and Fuse.>

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector. 3) Remove the brake vacuum pump relay. 4) Using a tester, measure the resistance between HPCM connector and the brake vacuum pump relay connector. ***Connector & terminal (open)*** ***(B564) No. 5 — (B606) No. 16:*** ***(B564) No. 7 — (F134) No. 2:*** ***(F134) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of the harness between the HPCM connector and the brake vacuum pump relay connector.
4	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between the brake vacuum pump relay connector and chassis ground. ***Connector & terminal (open)*** ***(B564) No. 5 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair the short circuit to power in harness between the HP connector and the brake vacuum pump relay connector.

AE:DTC P1C12 VACUUM PUMP POWER SUPPLY CIRCUIT HIGH

DIAGNOSIS:

- Detects a stuck condition in the vacuum pump supply voltage circuit (HIGH).
- Judge as NG when the detection result is out of specification.
- Immediately at fault recognition

TROUBLE SYMPTOM:

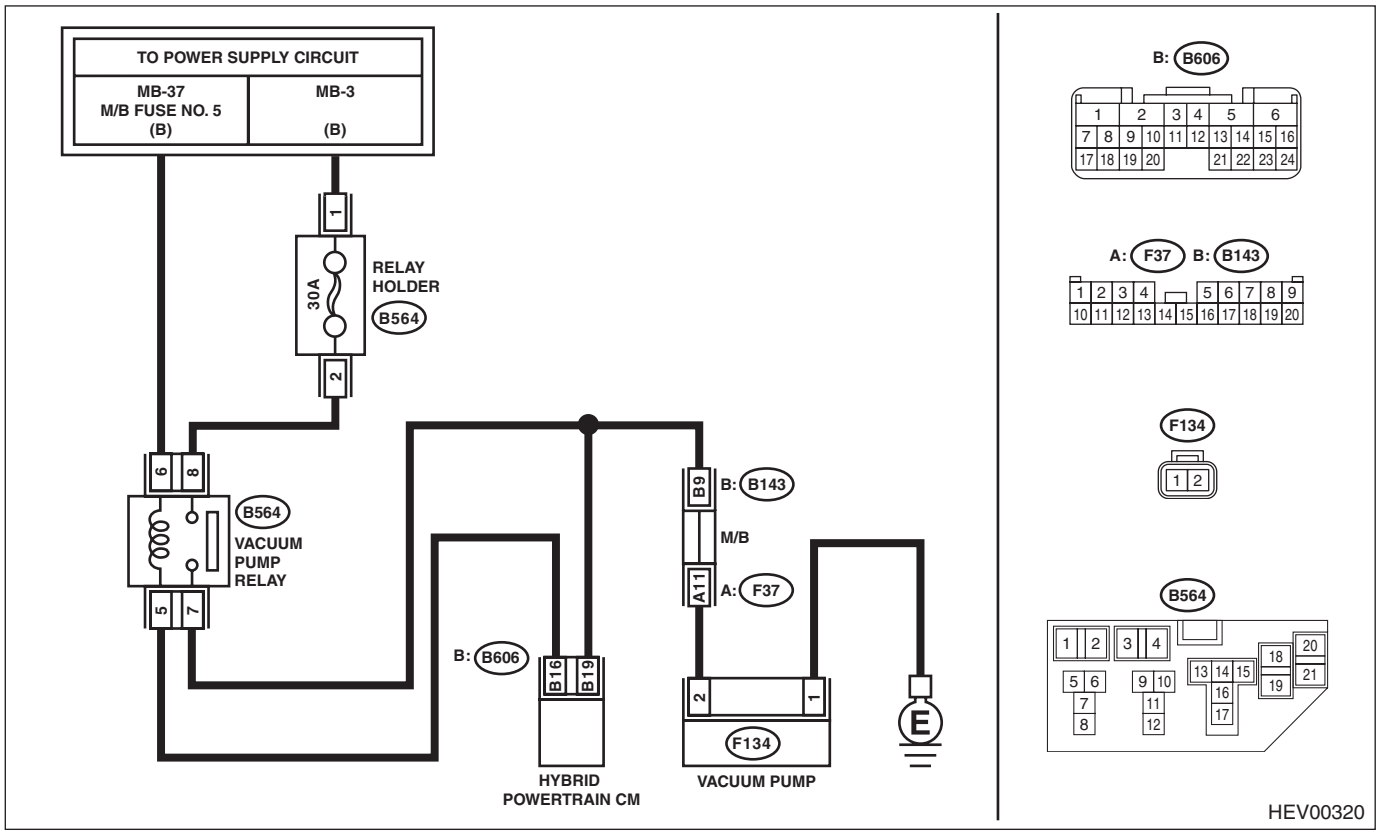
- EV traveling/Auto Start Stop does not operate.
- Vacuum pump fail lamp illuminates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK BRAKE VACUUM PUMP RELAY.** Check the relay. <Ref. to BR-16, Relay and Fuse.>	Is it normal?	Go to step **2**.	Replace the relay.
2	**CHECK HARNESS (SHORT TO GROUND).** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector. 3) Remove the brake vacuum pump relay. 4) Using a tester, measure the resistance between HPCM connector and chassis ground. ***Connector & terminal*** ***(B606) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair short circuit to ground in harness between the HPCM connector and the brake vacuum pump relay connector.

Step		Check	Yes	No
3	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between the brake vacuum pump relay connector and chassis ground. ***Connector & terminal*** ***(B564) No. 7 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair the short circuit to power in harness between the HP connector and the brake vacuum pump relay connector.

AF:DTC P1C14 ISG PERFORMANCE

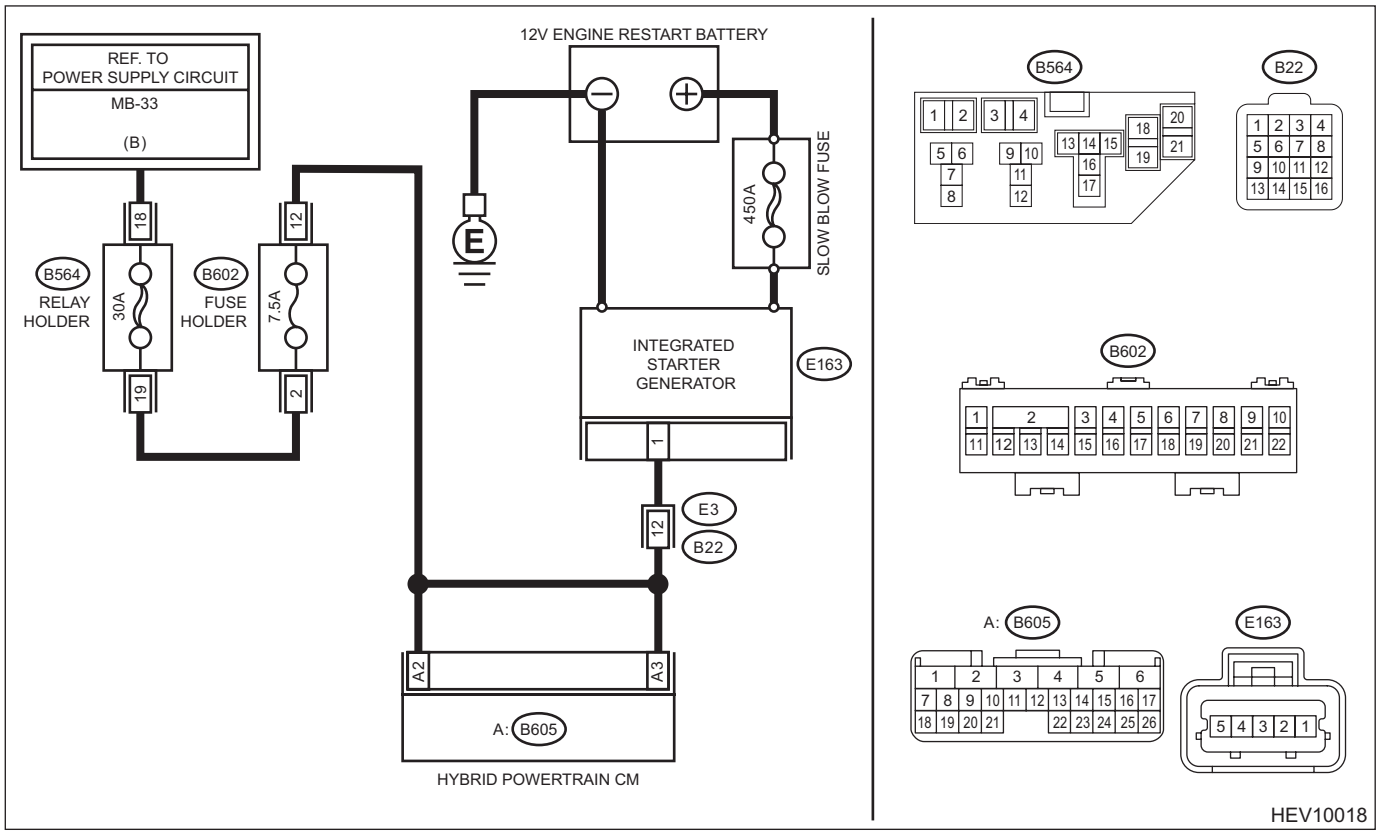
DIAGNOSIS:
- Detects functional errors of the integrated starter generator.
- Immediately at fault recognition

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.

(Engine does not restart under EV traveling/Auto Start Stop condition.)
- Charge warning light illuminates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs (relating to ISG) detected? (current malfunction)	First diagnose other DTCs.	Go to step **2**.
2	**CHECK FUSE.** Check the fuse. <Ref. to HEV-12, Relay and Fuse.>	Is there any fault?	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.	Go to step **3**.
3	**CHECK BATTERY CABLE ASSEMBLY.** Check the battery cable assembly. <Ref. to SC(H4DO(HEV))-51, Battery Cable Assembly.>	Is there any fault?	Repair the battery cable assembly.	Go to step **4**.
4	**CHECK BATTERY.** Check the 12 volt engine restart battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is there any fault?	Charge or replace the 12 volt engine restart battery.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P1C14 detected? (current malfunction)	Replace the integrated starter generator. <Ref. to SC(H4DO(HEV))-33, Integrated Starter Generator (ISG).>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

AG:DTC P1C16 HPCM IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED

DIAGNOSIS:

- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)
- GENERAL DESCRIPTION <Ref. to HEV(diag)-160, OUTLINE OF DIAGNOSIS, DTC P1C16 HPCM IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control.

NOTE:

For the diagnostic procedure, refer to DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED. <Ref. to HEV(diag)-91, DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0506. <Ref. to HEV(diag)-91, DTC P0506 IDLE CONTROL SYSTEM RPM - LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AH:DTC P1C17 HPCM IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED

DIAGNOSIS:

- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)
- GENERAL DESCRIPTION <Ref. to HEV(diag)-160, OUTLINE OF DIAGNOSIS, DTC P1C17 HPCM IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control.

NOTE:

For the diagnostic procedure, refer to DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED. <Ref. to HEV(diag)-93, DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0507. <Ref. to HEV(diag)-93, DTC P0507 IDLE CONTROL SYSTEM RPM - HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AI: DTC P1C18 GENERATOR SYSTEM "B" PERFORMANCE

DIAGNOSIS:

- Detects malfunctions due to open harness or trouble in the charging device.
- Detects abnormal conditions in the charging system for the 12 volt engine restart battery due to the integrated starter generator.
- Immediately at fault recognition

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.

(Engine does not restart under EV traveling/Auto Start Stop condition.)

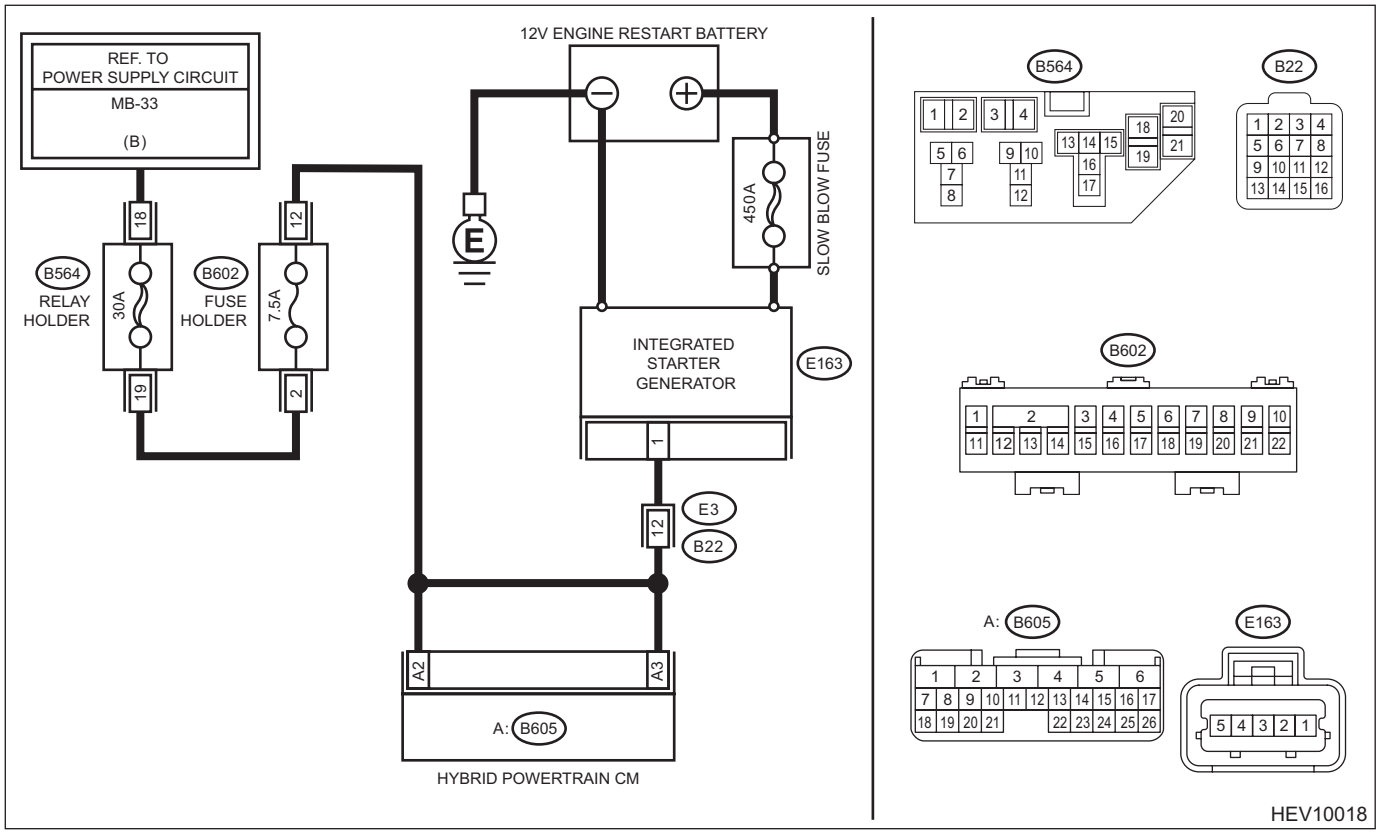
- Charge warning light illuminates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Check the fuse. <Ref. to HEV-12, Relay and Fuse.>	Is it normal?	Go to step **2**.	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.
2	**CHECK BELTS.** Check the belt. <Ref. to ME(H4DO(w/o HEV))-124, V-belt.>	Is it normal?	Go to step **3**.	Adjust or replace the belt.

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «ISG Control Mode Actual» «12V Engine Restart Battery Voltage» «ISG Terminal Voltage». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is «12V Engine Restart Battery Voltage» «ISG Terminal Voltage» 12 — 15 V when the engine speed is at 2000 rpm or more and «ISG Control Mode Actual» is generating power?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of hybrid powertrain control system, the value of «HPCM Check 40». <Ref. to HEV(diag)-39, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 30 m Ω or more?	Check for poor contact of 12 volt engine restart battery terminals. <Ref. to NT-6, BATTERY, NOTE, Note.>	Go to step **5**.
5	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector. 3) Disconnect the integrated starter generator connector. 4) Using a tester, measure the resistance between the HPCM connector and integrated starter generator connector. ***Connector & terminal*** ***(B605) No. 2 — (E163) No. 1:*** ***(B605) No. 3 — (E163) No. 1:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the open circuit of the harness between the HPCM connector and the integrated starter generator terminal.
6	**CHECK BATTERY.** Check the 12 volt engine restart battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is it normal?	Replace the integrated starter generator. <Ref. to SC(H4DO(HEV))-33, Integrated Starter Generator (ISG).>	Charge or replace the 12 volt engine restart battery.

AJ:DTC P1C1E AUTODISCONNECT HISTORY

DIAGNOSIS:
Detects collision history of the vehicle.
TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Vehicle speed is limited to 20 km/h (12.4 MPH) or below.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

NOTE:
- At normal condition, this cannot be deleted from the readiness code.
- The high voltage battery must not be reconnected until the repair is complete.

	Step	Check	Yes	No
1	**CHECK VEHICLE.** Check the vehicle conditions.	Are the vehicle conditions normal? (Check for evidence of collision, etc.)	Go to step **2**.	Repair the problem.
2	**CHECK HPCM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Wait for 30 seconds. 4) Turn the ignition switch to ON. 5) Read the DTC again. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P1C1E detected? (current malfunction)	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

AK:DTC P2158 VEHICLE SPEED SENSOR "B" CIRCUIT

DIAGNOSIS FOR DTC:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-164, OUTLINE OF DIAGNOSIS, DTC P2158 VEHICLE SPEED SENSOR "B" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.

NOTE:
For the diagnostic procedure, refer to the Vehicle Dynamics Control System (VDC) (DIAGNOSTICS). <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the wheel speed of rear wheels.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Vehicle speed (Rear) from Vehicle Dynamics NOTE: The VDC controller detects malfunction if one of the speed sensors does not output a signal and the other vehicle speed sensor output signal is above 7.46 MPH.	≥ 186.4 MPH

Time Needed for Diagnosis: 2.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Wheel speed of rear wheel (either left or right) and Wheel speed of rear wheel (both left and right)	< 186 MPH > 0 MPH

Time Needed for Diagnosis: 2.5 seconds

AL:DTC P0A2A DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-169, OUTLINE OF DIAGNOSIS, DTC P0A2A DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

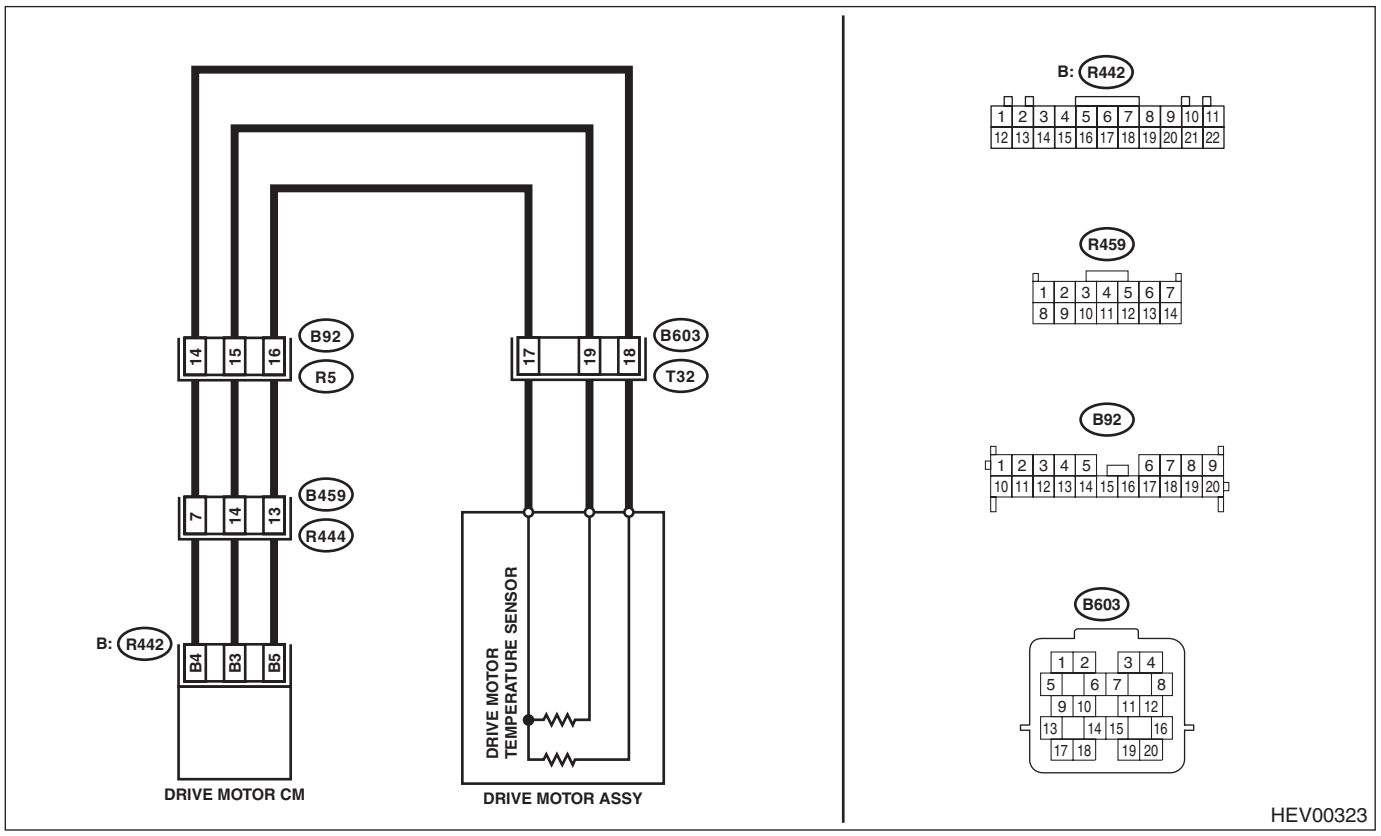
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

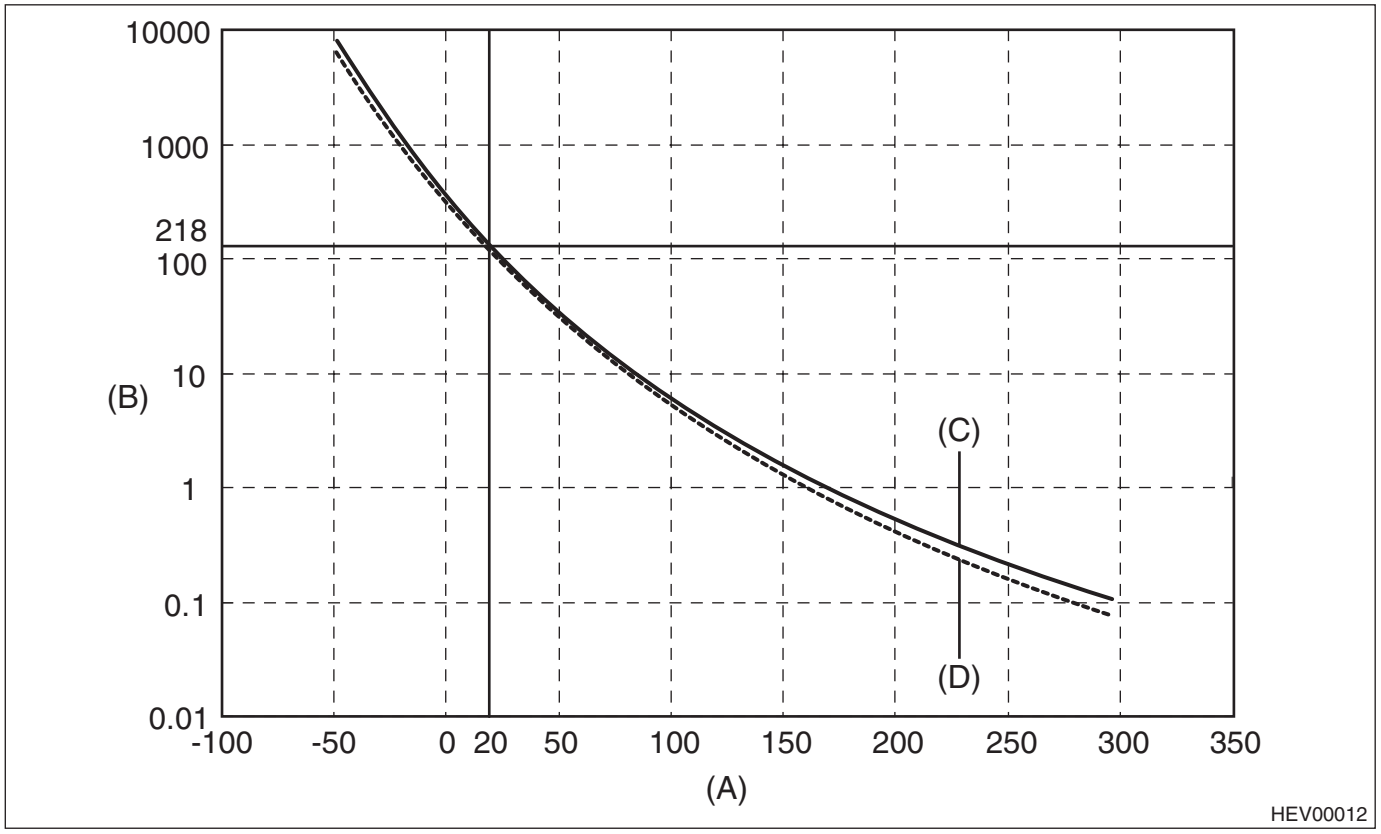
WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Warm up the engine. 2) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Temperature A Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value of «Drive Motor Temperature A Sensor Voltage» 4.5 V or more when «A/T Oil Temperature» is 40°C (104°F) or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS AND DRIVE MOTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector (R442). 3) Using a tester, measure the resistance between terminals in the DMCM connector. ***Connector & terminal*** ***(R442) No. 4 — (R442) No. 5:*** ***(R442) No. 3 — (R442) No. 5:***	Does the resistance between either two points show 218 kΩ or more?	Go to step **3**.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>
3	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector (R603). 2) Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(T32) No. 18 — (T32) No. 17:*** ***(T32) No. 19 — (T32) No. 17:***	Does the resistance between either two points show 218 kΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the open circuit of harness between DMCM connector and drive motor assembly connector, or repair the intermediate connector.

NOTE:
Characteristic curve of temperature sensor



(A) Temperature
(B) Resistance
(C) Standard at Max.
(D) Standard at Min.

Temp. (°C)	Temp. (°F)	Standard at Max. (kΩ)	Standard at Min. (kΩ)
–50	–58	9,847	7,755
–45	–49	6,735	5,383
–40	–40	4,682	3,796
–35	–31	3,282	2,698
–30	–22	2,334	1,945
–25	–13	1,676	1,414
–20	–4	1,219	1,041
–15	5	893.2	772.8
–10	14	662.4	579.8
–5	23	494.8	438.2
0	32	373.7	334.5
5	41	284.1	257
10	50	218.1	199.4
15	59	168.5	155.6
20	68	131.3	122.4
25	77	103	97
30	86	82.12	76.62
35	95	65.86	60.9
40	104	53.2	48.76
45	113	43.17	39.23
50	122	35.26	31.78

Temp. (°C)	Temp. (°F)	Standard at Max. (kΩ)	Standard at Min. (kΩ)
55	131	28.94	25.87
60	140	23.89	21.19
65	149	19.81	17.43
70	158	16.51	14.43
75	167	13.82	11.99
80	176	11.63	10.01
85	185	9.822	8.403
90	194	8.333	7.082
95	203	7.093	5.988
100	212	6.063	5.086
105	221	5.203	4.337
110	230	4.482	3.714
115	239	3.874	3.191
120	248	3.361	2.752
125	257	2.924	2.381
130	266	2.553	2.067
135	275	2.235	1.8
140	284	1.963	1.572
145	293	1.729	1.377
150	302	1.527	1.21
155	311	1.352	1.066
160	320	1.2	0.9427
165	329	1.068	0.835
170	338	0.9535	0.7417
175	347	0.8526	0.6602
180	356	0.7643	0.5892
185	365	0.6866	0.527
190	374	0.6183	0.4725
195	383	0.5578	0.4245
200	392	0.5043	0.3822
205	401	0.4568	0.3448
210	410	0.4147	0.3117
215	419	0.3771	0.2824
220	428	0.3435	0.2563
225	437	0.3135	0.233
230	446	0.2866	0.2122
235	455	0.2624	0.1936
240	464	0.2407	0.177
245	473	0.2212	0.162
250	482	0.2035	0.1486
255	491	0.1876	0.1365
260	500	0.1731	0.1256
265	509	0.16	0.1157
270	518	0.1481	0.1067
275	527	0.1373	0.09867
280	536	0.1274	0.0913
285	545	0.1184	0.0846
290	554	0.1102	0.07849
295	563	0.1027	0.07292
300	572	0.09578	0.06784

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor.
Judge as NG when the value of drive motor temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	ON
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 15 s
Generated energy of drive motor	≥ Map1
Assist energy of drive motor	≥ Map2

Map 1

Hybrid battery temperature and Drive motor inverter temperature either lower temperature (°C (°F))	–30 (–22)	–10 (14)	0 (32)	10 (50)	30 (86)	40 (104)
Generated energy of drive motor (Wh)	630	320	200	130	0	0

Map 2

Hybrid battery temperature and Drive motor inverter temperature either lower temperature (°C (°F))	–30 (–22)	–10 (14)	0 (32)	10 (50)	30 (86)	40 (104)
Assist energy of drive motor (Wh)	270	130	75	50	0	0

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	> 4.5 V
(Temperature equivalent)	< –3.4°C (25.9°F)

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≤ 4.5 V
(Temperature equivalent)	≥ -3.4°C (25.9°F)

Time Needed for Diagnosis: 4 seconds

AM:DTC P0A2C DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-174, OUTLINE OF DIAGNOSIS, DTC P0A2C DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

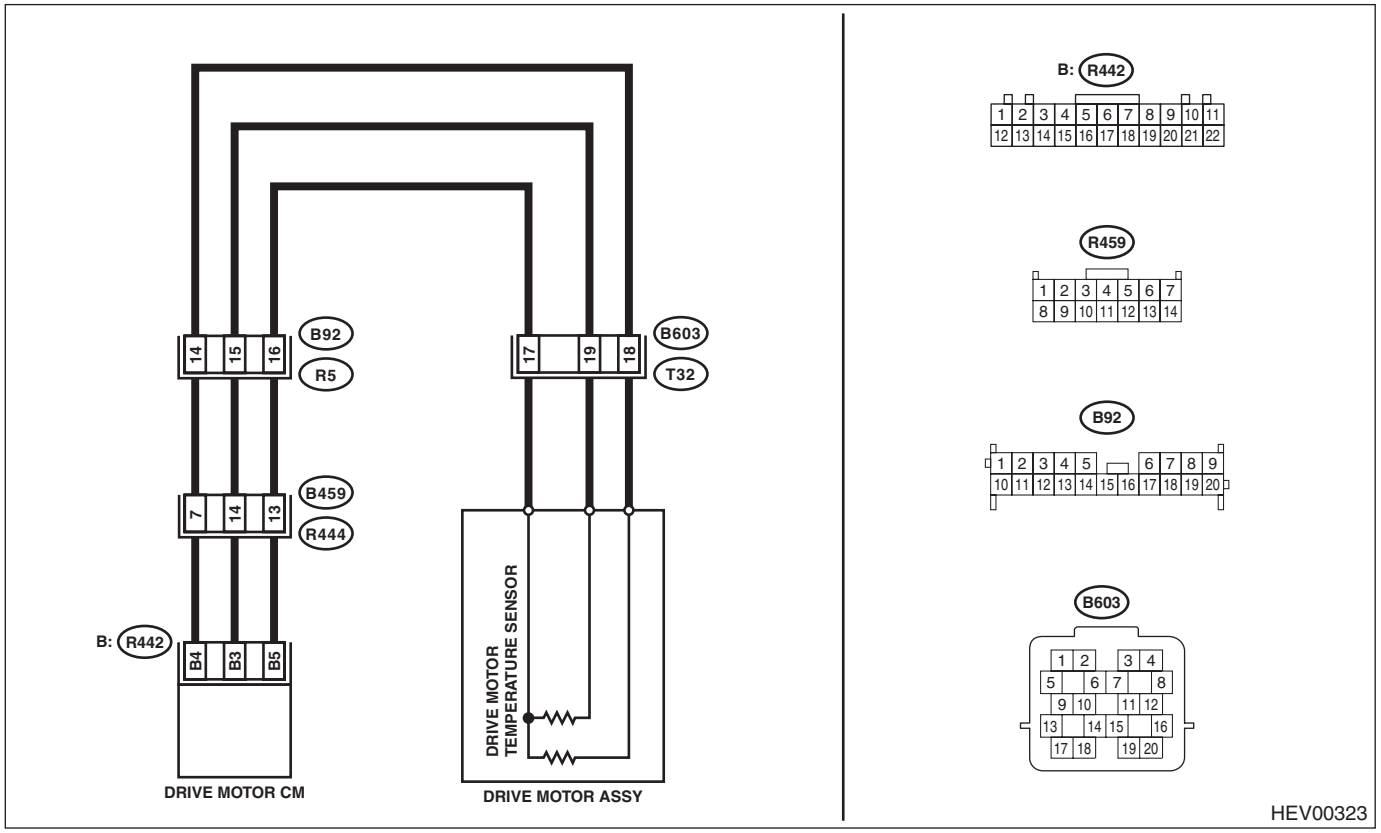
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

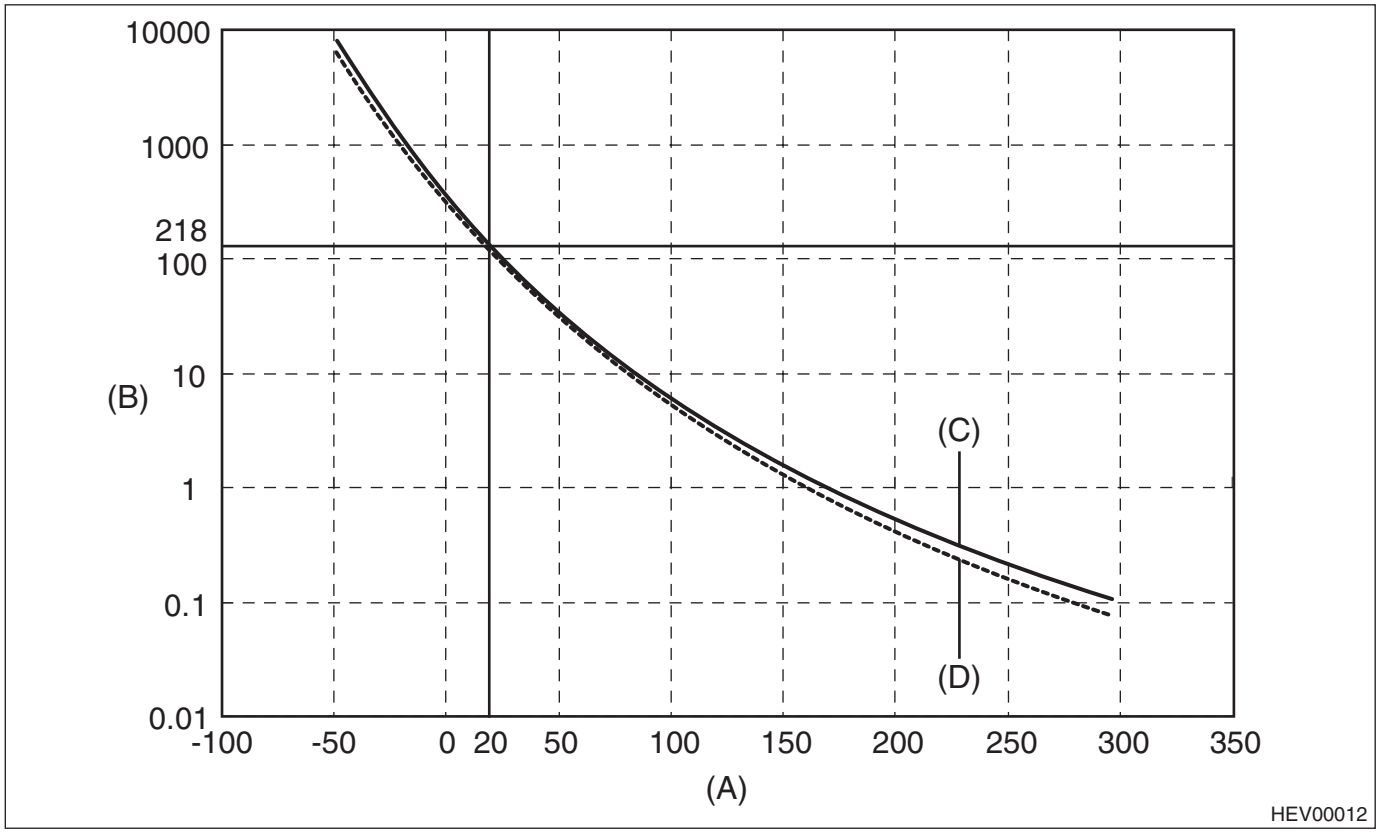
WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Temperature A Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value less than 0.23 V?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS AND DRIVE MOTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector (R442). 3) Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R442) No. 4 — Ground bolt of inverter frame body:*** ***(R442) No. 3 — Ground bolt of inverter frame body:***	Does the resistance between either two points show 256.4 Ω or less?	Go to step **3**.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>
3	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector (B603). 2) Using a tester, measure the resistance between the drive motor assembly connector and chassis ground. ***Connector & terminal*** ***(T32) No. 18 — Chassis ground:*** ***(T32) No. 19 — Chassis ground:***	Does the resistance between either two points show 256.4 Ω or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the short circuit to ground in harness between DMCM connector and drive motor assembly connector.

NOTE:
Characteristic curve of temperature sensor



(A) Temperature
(B) Resistance
(C) Standard at Max.
(D) Standard at Min.

Temp. (°C)	Temp. (°F)	Standard at Max. (kΩ)	Standard at Min. (kΩ)
–50	–58	9,847	7,755
–45	–49	6,735	5,383
–40	–40	4,682	3,796
–35	–31	3,282	2,698
–30	–22	2,334	1,945
–25	–13	1,676	1,414
–20	–4	1,219	1,041
–15	5	893.2	772.8
–10	14	662.4	579.8
–5	23	494.8	438.2
0	32	373.7	334.5
5	41	284.1	257
10	50	218.1	199.4
15	59	168.5	155.6
20	68	131.3	122.4
25	77	103	97
30	86	82.12	76.62
35	95	65.86	60.9
40	104	53.2	48.76
45	113	43.17	39.23
50	122	35.26	31.78

Temp. (°C)	Temp. (°F)	Standard at Max. (kΩ)	Standard at Min. (kΩ)
55	131	28.94	25.87
60	140	23.89	21.19
65	149	19.81	17.43
70	158	16.51	14.43
75	167	13.82	11.99
80	176	11.63	10.01
85	185	9.822	8.403
90	194	8.333	7.082
95	203	7.093	5.988
100	212	6.063	5.086
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140	284	1.963	1.572
145	293	1.729	1.377
150	302	1.527	1.21
155	311	1.352	1.066
160	320	1.2	0.9427
165	329	1.068	0.835
170	338	0.9535	0.7417
175	347	0.8526	0.6602
180	356	0.7643	0.5892
185	365	0.6866	0.527
190	374	0.6183	0.4725
195	383	0.5578	0.4245
200	392	0.5043	0.3822
205	401	0.4568	0.3448
210	410	0.4147	0.3117
215	419	0.3771	0.2824
220	428	0.3435	0.2563
225	437	0.3135	0.233
230	446	0.2866	0.2122
235	455	0.2624	0.1936
240	464	0.2407	0.177
245	473	0.2212	0.162
250	482	0.2035	0.1486
255	491	0.1876	0.1365
260	500	0.1731	0.1256
265	509	0.16	0.1157
270	518	0.1481	0.1067
275	527	0.1373	0.09867
280	536	0.1274	0.0913
285	545	0.1184	0.0846
290	554	0.1102	0.07849
295	563	0.1027	0.07292
300	572	0.09578	0.06784

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor.
Judge as NG when the value of drive motor temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.23 V
(Temperature equivalent)	> 234°C (453.2°F)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.23 V
(Temperature equivalent)	≤ 234°C (453.2°F)

Time Needed for Diagnosis: 2 seconds

AN:DTC P0A2D DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-177, OUTLINE OF DIAGNOSIS, DTC P0A2D DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

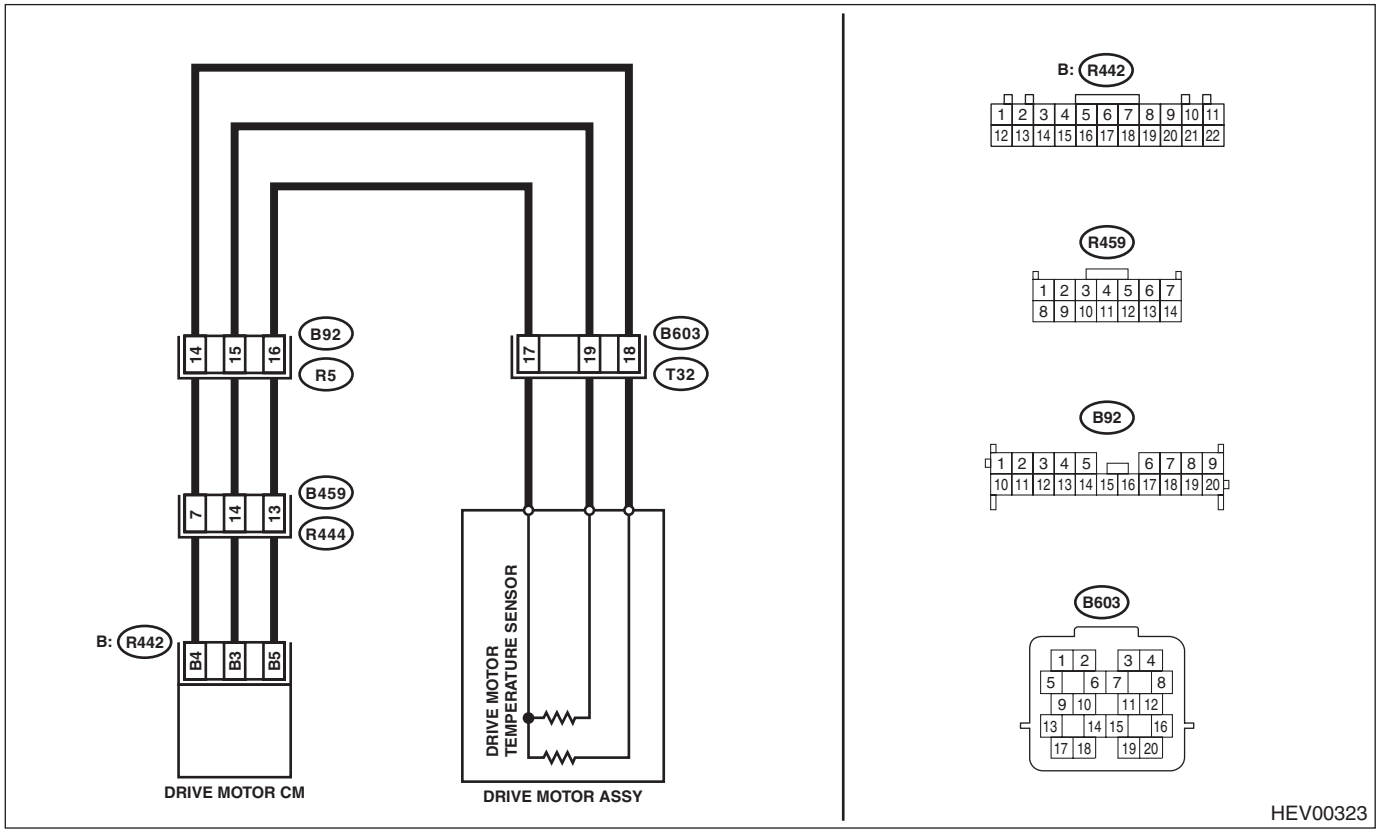
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Temperature A Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 4.6 V or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (SHORT).** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector (R442, R443). 3) Disconnect the drive motor assembly connector (B603). 4) Using a tester, measure the resistance between terminals in the DMCM connector and between the terminals in the drive motor assembly connector. ***Connector & terminal*** ***DMCM side*** ***(R442) No. 3 — (R442) No. 1 — 22 (except No. 5):*** ***(R442) No. 3 — (R443) No. 1 — 26:*** ***(R442) No. 4 — (R442) No. 1 — 22 (except No. 5):*** ***(R442) No. 4 — (R443) No. 1 — 26:*** ***Drive motor side*** ***(B603) No. 18 — (B603) No. 1 — 19 (except No. 17):*** ***(B603) No. 19 — (B603) No. 1 — 19 (except No. 17):***	Does the resistance between either two points show 1 MΩ or more?	Go to step **3**.	Repair the short circuit to power in harness between DMCM connector and drive motor assembly connector, or repair the intermediate connector.
3	**CHECK DRIVE MOTOR.** Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(T32) No. 18 — (T32) No. 1 — 19 (except No. 17):*** ***(T32) No. 19 — (T32) No. 1 — 19 (except No. 17):***	Does the resistance between either two points show 1 MΩ or more?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor.
Judge as NG when the value of drive motor temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage (Temperature equivalent)	> 4.6 V (< –55°C (–67°F))

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage (Temperature equivalent)	≤ 4.6 V (≥ -55°C (–67°F))

Time Needed for Diagnosis: 2 seconds

AO:DTC P0A3C DRIVE MOTOR "A" INVERTER OVER TEMPERATURE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-179, OUTLINE OF DIAGNOSIS, DTC P0A3C DRIVE MOTOR "A" INVERTER OVER TEMPERATURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are DTC P0A5D, P0A60, and P0A63 detected? (current malfunction)	Perform a check according to the DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK HIGH VOLTAGE BATTERY COOLING FAN.** Using the Subaru Select Monitor, perform «High Voltage Battery Cooling Fan» of System Operation Check Mode for the drive motor control system. <Ref. to HEV(diag)-70, DRIVE MOTOR CONTROL SYSTEM, OPERATION, System Operation Check Mode.>	Does the high voltage battery cooling fan operate?	Go to step **3**.	Check the high voltage battery cooling fan as a single part. <Ref. to HEV-59, High Voltage Battery Cooling System.>
3	**CHECK DUCT.** Check the high voltage battery cooling fan ducts. <Ref. to HEV-59, High Voltage Battery Cooling System.>	Are the conditions of ducts normal? (Check for clogging, dislodging of connections, etc.)	Go to step **4**.	Repair the ducts.
4	**CHECK DTC.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 3) Check the freeze frame data and drive the vehicle to reproduce the same conditions. <Ref. to HEV(diag)-63, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.> 4) Read the DTC again. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter temperature.
Judge as NG when the value of drive motor inverter temperature is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal (over temperature) from IC in the drive motor inverter	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal (over temperature) from IC in the drive motor inverter	OFF

Time Needed for Diagnosis: 0.2 seconds

AP:DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-184, OUTLINE OF DIAGNOSIS, DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

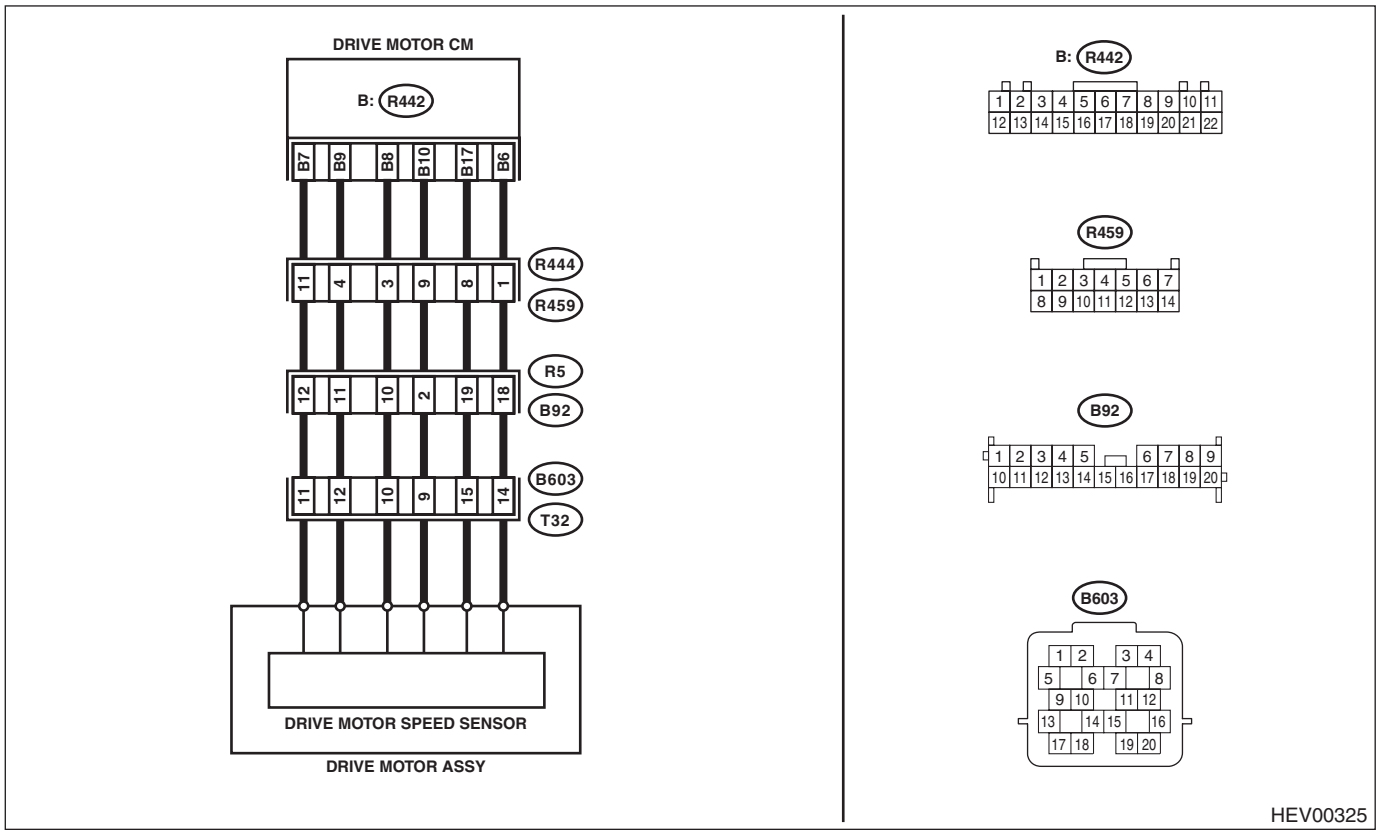
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS AND DRIVE MOTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector (R442). 3) Using a tester, measure the resistance between terminals in DMCM connector. ***Connector & terminal*** ***R1-R2*** ***(R442) No. 6 — (R442) No. 17:*** ***S1-S3*** ***(R442) No. 10 — (R442) No. 8:*** ***S2-S4*** ***(R442) No. 9 — (R442) No. 7:***	Is each resistance value as shown in below? R1-R2: Is the value out of 7 — 23 Ω range? or S1-S3: Is the value out of 10 — 39 Ω range? or S2-S4: Is the value out of 11 — 40 Ω range?	Go to step **2**.	Go to step **3**.

	Step	Check	Yes	No
2	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***R1-R2*** ***(T32) No. 14 — (T32) No. 15:*** ***S1-S3*** ***(T32) No. 9 — (T32) No. 10:*** ***S2-S4*** ***(T32) No. 12 — (T32) No. 11:***	Is each resistance value as shown in below? R1-R2: Is the value out of 7 — 23 Ω range? or S1-S3: Is the value out of 10 — 39 Ω range? or S2-S4: Is the value out of 11 — 40 Ω range?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the open circuit and short circuit to ground in harness between DMCM connector and drive motor assembly connector.
3	**CHECK HARNESS AND DRIVE MOTOR.** Using a tester, check the resistance between DMCM connector terminals and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R442) No. 6 — Ground bolt of inverter frame body:*** ***(R442) No. 10 — Ground bolt of inverter frame body:*** ***(R442) No. 9 — Ground bolt of inverter frame body:***	Does the resistance between either two points show 1 MΩ or less?	Go to step **4**.	Go to step **5**.
4	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between the drive motor assembly connector and chassis ground. ***Connector & terminal*** ***(T32) No. 14 — Chassis ground:*** ***(T32) No. 9 — Chassis ground:*** ***(T32) No. 12 — Chassis ground:***	Does the resistance between either two points show 1 MΩ or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the short circuit to ground in harness between DMCM connector and drive motor assembly connector.

	Step	Check	Yes	No
5	**CHECK HARNESS.** 1) Disconnect the DMCM connector (R443). 2) Disconnect the intermediate connector (R436). 3) Using a tester, measure the resistance between terminals in the DMCM connector and between the terminals in the intermediate connector (R436). ***Connector & terminal*** ***(R442) No. 10 — (R442) No. 1 — 22 (except No. 8):*** ***(R442) No. 10 — (R443) No. 1 — 26:*** ***(R442) No. 10 — (R436) No. 1 — 8:*** ***(R442) No. 8 — (R442) No. 1 — 22 (except No. 10):*** ***(R442) No. 8 — (R443) No. 1 — 26:*** ***(R442) No. 8 — (R436) No. 1 — 8:*** ***(R442) No. 9 — (R442) No. 1 — 22 (except No. 7):*** ***(R442) No. 9 — (R443) No. 1 — 26:*** ***(R442) No. 9 — (R436) No. 1 — 8:*** ***(R442) No. 7 — (R442) No. 1 — 22 (except No. 9):*** ***(R442) No. 7 — (R443) No. 1 — 26:*** ***(R442) No. 7 — (R436) No. 1 — 8:*** ***(R442) No. 6 — (R442) No. 1 — 22 (except No. 17):*** ***(R442) No. 6 — (R443) No. 1 — 26:*** ***(R442) No. 6 — (R436) No. 1 — 8:*** ***(R442) No. 17 — (R442) No. 1 — 22 (except No. 6):*** ***(R442) No. 17 — (R443) No. 1 — 26:*** ***(R442) No. 17 — (R436) No. 1 — 8:***	Does the resistance between either two points show 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness between DMCM connector and drive motor assembly connector, or repair the intermediate connector.
6	**CHECK HARNESS.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(B603) No. 9 — (B603) No. 1 — 20 (except No. 10):*** ***(B603) No. 10 — (B603) No. 1 — 20 (except No. 9):*** ***(B603) No. 12 — (B603) No. 1 — 20 (except No. 11):*** ***(B603) No. 11 — (B603) No. 1 — 20 (except No. 12):*** ***(B603) No. 14 — (B603) No. 1 — 20 (except No. 15):*** ***(B603) No. 15 — (B603) No. 1 — 20 (except No. 14):***	Does the resistance between either two points show 1 MΩ or more?	Go to step **7**.	Repair the short circuit of harness between DMCM connector and drive motor assembly connector, or repair the intermediate connector.

Step		Check	Yes	No
7	**CHECK DRIVE MOTOR.** Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(T32) No. 9 — (T32) No. 1 — 20 (except No. 10):*** ***(T32) No. 10 — (T32) No. 1 — 20 (except No. 9):*** ***(T32) No. 12 — (T32) No. 1 — 20 (except No. 11):*** ***(T32) No. 11 — (T32) No. 1 — 20 (except No. 12):*** ***(T32) No. 14 — (T32) No. 1 — 20 (except No. 15):*** ***(T32) No. 15 — (T32) No. 1 — 20 (except No. 14):***	Does the resistance between either two points show 1 MΩ or more?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the drive motor rotation angle sensor.
Judge as NG when the malfunction of drive motor rotation angle sensor is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
Ignition state	OFF to ON (ON = Run or crank) (OFF ≠ Run or crank)
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from the resolver to digital (R/D) converter	Parity error
Diagnosis 2	
R/D converter error output (Internal tracking error)	Detected

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.0002 s
- **Diagnosis 2:** 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from the resolver to digital (R/D) converter	≠ Parity error
Diagnosis 2	
R/D converter error output (Internal tracking error)	Not detected

Time Needed for Diagnosis:
- **Diagnosis 1:** Immediately
- **Diagnosis 2:** 0.02 s

AQ:DTC P0A40 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-185, OUTLINE OF DIAGNOSIS, DTC P0A40 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0A3F DRIVE MOTOR “A” POSITION SENSOR CIRCUIT. <Ref. to HEV(diag)-180, DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the drive motor rotation angle sensor.
Judge as NG when the detected angle of drive motor rotation angle sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
Resolver initialization	Completed
NOTE: It is defined that "Resolver initialization=Completed", if all of the following conditions are satisfied: 1. The communication between the R/D converter and DMCM is established. 2. The R/D converter succeed to recognize the first motor position (angle) after power-up.	

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured drive motor angle	> 180.5 deg
Diagnosis 2	
Measured drive motor angle (When the reference pulse occurs)	< 179.5 deg
NOTE: Diagnosis will be performed only when the reference pulse is generated	and > 0.5 deg

Time Needed for Diagnosis: 0.0003 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured drive motor angle	≤ 180.5 deg
Diagnosis 2	
Measured drive motor angle (When the reference pulse occurs)	≥ 179.5 deg and ≤ 0.5 deg

Time Needed for Diagnosis: 0.02 seconds

AR:DTC P0A43 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT INTERMITTENT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-189, OUTLINE OF DIAGNOSIS, DTC P0A43 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT INTERMITTENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

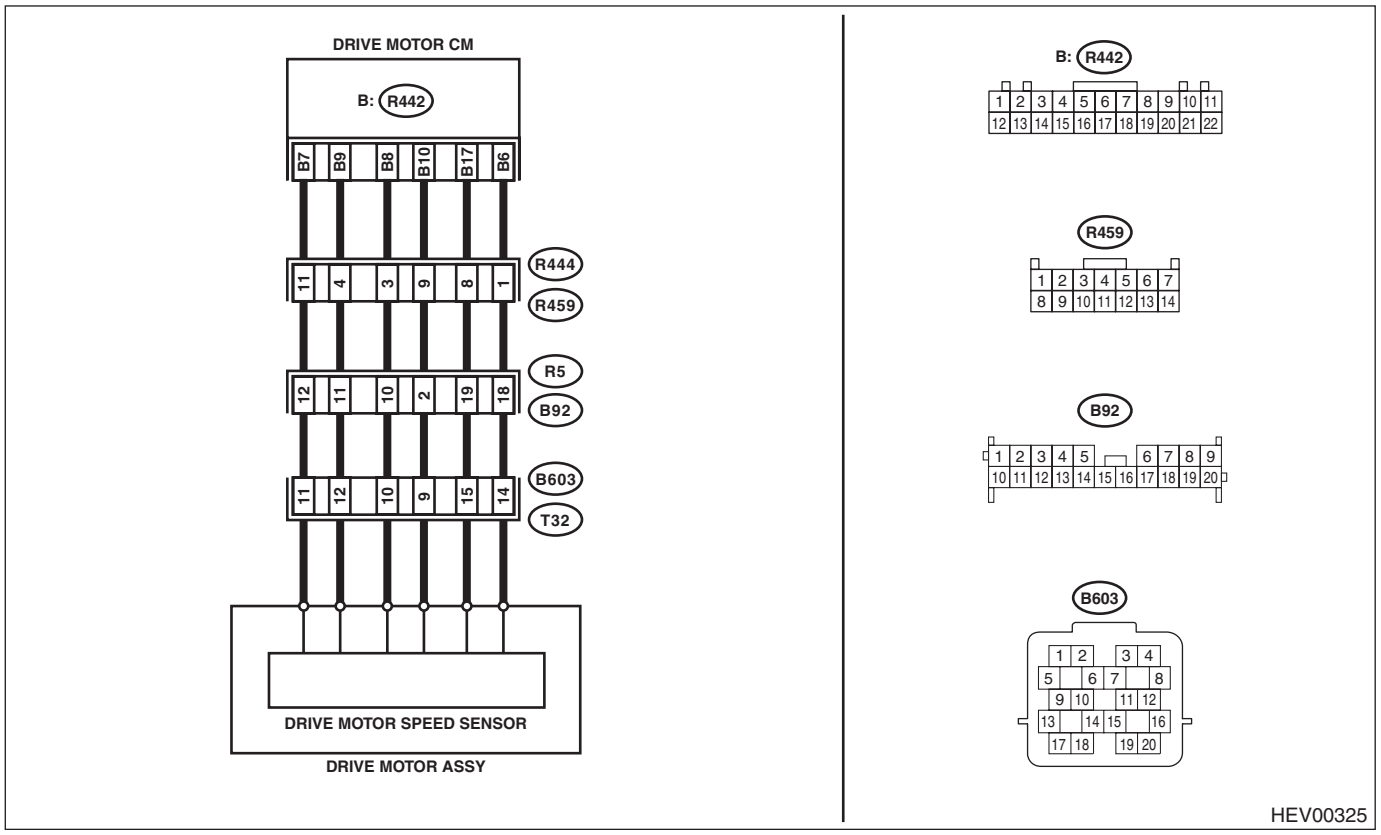
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0A3F detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.

Step		Check	Yes	No
2	**CHECK HARNESS AND DRIVE MOTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector (R442). 3) Using a tester, measure the resistance between terminals in DMCM connector. ***Connector & terminal*** ***R1-R2*** ***(R442) No. 6 — (R442) No. 17:*** ***S1-S3*** ***(R442) No. 10 — (R442) No. 8:*** ***S2-S4*** ***(R442) No. 9 — (R442) No. 7:***	Is each resistance value as shown in below? R1-R2: Is the value out of 7 — 23 Ω range? or S1-S3: Is the value out of 10 — 39 Ω range? or S2-S4: Is the value out of 11 — 40 Ω range?	Go to step **3**.	Go to step **4**.
3	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***R1-R2*** ***(T32) No. 14 — (T32) No. 15:*** ***S1-S3*** ***(T32) No. 9 — (T32) No. 10:*** ***S2-S4*** ***(T32) No. 12 — (T32) No. 11:***	Is each resistance value as shown in below? R1-R2: Is the value out of 7 — 23 Ω range? or S1-S3: Is the value out of 10 — 39 Ω range? or S2-S4: Is the value out of 11 — 40 Ω range?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the open circuit and short circuit to ground in harness between DMCM connector and drive motor assembly connector.
4	**CHECK HARNESS AND DRIVE MOTOR.** Using a tester, measure the resistance between DMCM connector terminals and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R442) No. 6 — Ground bolt of inverter frame body:*** ***(R442) No. 10 — Ground bolt of inverter frame body:*** ***(R442) No. 9 — Ground bolt of inverter frame body:***	Does the resistance between either two points show 1 MΩ or less?	Go to step **5**.	Go to step **6**.
5	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between the drive motor assembly connector and chassis ground. ***Connector & terminal*** ***(T32) No. 14 — Chassis ground:*** ***(T32) No. 9 — Chassis ground:*** ***(T32) No. 12 — Chassis ground:***	Does the resistance between either two points show 1 MΩ or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the short circuit to ground in harness between DMCM connector and drive motor assembly connector.

Step		Check	Yes	No
6	**CHECK HARNESS.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between terminals in the DMCM connector (R442, R443), between the terminals in the intermediate connector (R436), and between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(R442) No. 10 — (R442) No. 1 — 22 (except No. 8):*** ***(R442) No. 10 — (R443) No. 1 — 26:*** ***(R442) No. 10 — (R436) No. 1 — 8:*** ***(R442) No. 8 — (R442) No. 1 — 22 (except No. 10):*** ***(R442) No. 8 — (R443) No. 1 — 26:*** ***(R442) No. 8 — (R436) No. 1 — 8:*** ***(R442) No. 9 — (R442) No. 1 — 22 (except No. 7):*** ***(R442) No. 9 — (R443) No. 1 — 26:*** ***(R442) No. 9 — (R436) No. 1 — 8:*** ***(R442) No. 7 — (R442) No. 1 — 22 (except No. 9):*** ***(R442) No. 7 — (R443) No. 1 — 26:*** ***(R442) No. 7 — (R436) No. 1 — 8:*** ***(R442) No. 6 — (R442) No. 1 — 22 (except No. 17):*** ***(R442) No. 6 — (R443) No. 1 — 26:*** ***(R442) No. 6 — (R436) No. 1 — 8:*** ***(R442) No. 17 — (R442) No. 1 — 22 (except No. 6):*** ***(R442) No. 17 — (R443) No. 1 — 26:*** ***(R442) No. 17 — (R436) No. 1 — 8:***	Does the resistance between either two points show 1 MΩ or more?	Go to step **7**.	Repair the short circuit of harness between DMCM connector and drive motor assembly connector, or repair the intermediate connector.
7	**CHECK HARNESS.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(B603) No. 9 — (B603) No. 1 — 20 (except No. 10):*** ***(B603) No. 10 — (B603) No. 1 — 20 (except No. 9):*** ***(B603) No. 12 — (B603) No. 1 — 20 (except No. 11):*** ***(B603) No. 11 — (B603) No. 1 — 20 (except No. 12):*** ***(B603) No. 14 — (B603) No. 1 — 20 (except No. 15):*** ***(B603) No. 15 — (B603) No. 1 — 20 (except No. 14):***	Does the resistance between either two points show 1 MΩ or more?	Go to step **8**.	Repair the short circuit of harness between DMCM connector and drive motor assembly connector, or repair the intermediate connector.

Step		Check	Yes	No
8	**CHECK DRIVE MOTOR.** Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(T32) No. 9 — (T32) No. 1 — 20 (except No. 10):*** ***(T32) No. 12 — (T32) No. 1 — 20 (except No. 11):*** ***(T32) No. 14 — (T32) No. 1 — 20 (except No. 15):***	Does the resistance between either two points show 1 MΩ or more?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the drive motor rotation angle sensor.
Judge as NG when the angle detected by drive motor rotation angle sensor is not continuous.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Resolver initialization	Completed
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Difference between the current and previous values of Measured drive motor angle) NOTE: • ABS: Absolute value • Sampling time = 0.001 s	> 11.25 deg

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Difference between the current and previous values of Measured drive motor angle)	≤ 11.25 deg

Time Needed for Diagnosis: 0.02 seconds

AS:DTC P0A44 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT OVERSPEED

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-193, OUTLINE OF DIAGNOSIS, DTC P0A44 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT OVERSPEED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

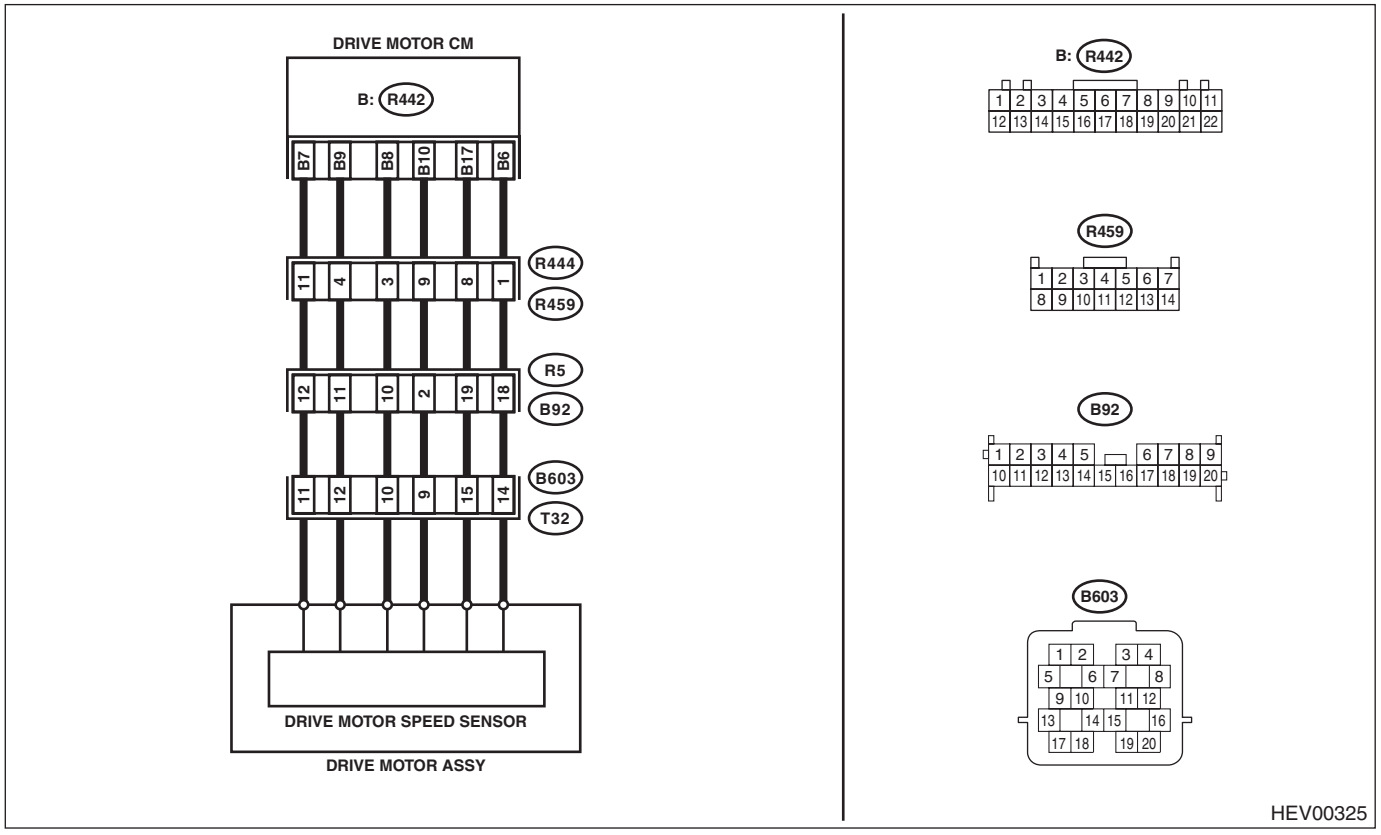
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read DTCs of the following system. • Transmission <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Is DTC detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to CVT(HEV)(diag)-35, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is either DTC P0A3F or P0A43 detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK HARNESS AND DRIVE MOTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector (R442). 3) Using a tester, measure the resistance between terminals in DMCM connector. ***Connector & terminal*** ***R1-R2*** ***(R442) No. 6 — (R442) No. 17:*** ***S1-S3*** ***(R442) No. 10 — (R442) No. 8:*** ***S2-S4*** ***(R442) No. 9 — (R442) No. 7:***	Is each resistance value as shown in below? R1-R2: Is the value out of 7 — 23 Ω range? or S1-S3: Is the value out of 10 — 39 Ω range? or S2-S4: Is the value out of 11 — 40 Ω range?	Go to step **4**.	Go to step **5**.
4	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***R1-R2*** ***(T32) No. 14 — (T32) No. 15:*** ***S1-S3*** ***(T32) No. 9 — (T32) No. 10:*** ***S2-S4*** ***(T32) No. 12 — (T32) No. 11:***	Is each resistance value as shown in below? R1-R2: Is the value out of 7 — 23 Ω range? or S1-S3: Is the value out of 10 — 39 Ω range? or S2-S4: Is the value out of 11 — 40 Ω range?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the open circuit and short circuit to ground in harness between DMCM connector and drive motor assembly connector.
5	**CHECK HARNESS AND DRIVE MOTOR.** Using a tester, measure the resistance between DMCM connector terminals and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R442) No. 6 — Ground bolt of inverter frame body:*** ***(R442) No. 10 — Ground bolt of inverter frame body:*** ***(R442) No. 9 — Ground bolt of inverter frame body:***	Does the resistance between either two points show 1 MΩ or less?	Go to step **6**.	Go to step **7**.
6	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between the drive motor assembly connector and chassis ground. ***Connector & terminal*** ***(T32) No. 14 — Chassis ground:*** ***(T32) No. 9 — Chassis ground:*** ***(T32) No. 12 — Chassis ground:***	Does the resistance between either two points show 1 MΩ or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the short circuit to ground in harness between DMCM connector and drive motor assembly connector.

	Step	Check	Yes	No
7	**CHECK HARNESS.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between terminals in the DMCM connector (R442, R443), between the terminals in the intermediate connector (R436), and between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(R442) No. 10 — (R442) No. 1 — 22 (except No. 8):*** ***(R442) No. 10 — (R443) No. 1 — 26:*** ***(R442) No. 10 — (R436) No. 1 — 8:*** ***(R442) No. 8 — (R442) No. 1 — 22 (except No. 10):*** ***(R442) No. 8 — (R443) No. 1 — 26:*** ***(R442) No. 8 — (R436) No. 1 — 8:*** ***(R442) No. 9 — (R442) No. 1 — 22 (except No. 7):*** ***(R442) No. 9 — (R443) No. 1 — 26:*** ***(R442) No. 9 — (R436) No. 1 — 8:*** ***(R442) No. 7 — (R442) No. 1 — 22 (except No. 9):*** ***(R442) No. 7 — (R443) No. 1 — 26:*** ***(R442) No. 7 — (R436) No. 1 — 8:*** ***(R442) No. 6 — (R442) No. 1 — 22 (except No. 17):*** ***(R442) No. 6 — (R443) No. 1 — 26:*** ***(R442) No. 6 — (R436) No. 1 — 8:*** ***(R442) No. 17 — (R442) No. 1 — 22 (except No. 6):*** ***(R442) No. 17 — (R443) No. 1 — 26:*** ***(R442) No. 17 — (R436) No. 1 — 8:***	Does the resistance between either two points show 1 MΩ or more?	Go to step **8**.	Repair the short circuit of harness between DMCM connector and drive motor assembly connector, or repair the intermediate connector.
8	**CHECK HARNESS.** 1) Disconnect the drive motor assembly connector. 2) Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(B603) No. 9 — (B603) No. 1 — 20 (except No. 10):*** ***(B603) No. 10 — (B603) No. 1 — 20 (except No. 9):*** ***(B603) No. 12 — (B603) No. 1 — 20 (except No. 11):*** ***(B603) No. 11 — (B603) No. 1 — 20 (except No. 12):*** ***(B603) No. 14 — (B603) No. 1 — 20 (except No. 15):*** ***(B603) No. 15 — (B603) No. 1 — 20 (except No. 14):***	Does the resistance between either two points show 1 MΩ or more?	Go to step **9**.	Repair the short circuit of harness between DMCM connector and drive motor assembly connector, or repair the intermediate connector.

Step		Check	Yes	No
9	**CHECK DRIVE MOTOR.** Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***(T32) No. 9 — (T32) No. 1 — 20 (except No. 10):*** ***(T32) No. 12 — (T32) No. 1 — 20 (except No. 11):*** ***(T32) No. 14 — (T32) No. 1 — 20 (except No. 15):***	Does the resistance between either two points show 1 MΩ or more?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor rotation count.
Judge as NG when the rotation count of drive motor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Resolver initialization	Completed
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Motor speed) NOTE: ABS: Absolute value	> 7000 rpm

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Motor speed) NOTE: ABS: Absolute value	≤ 7000 rpm

Time Needed for Diagnosis: 2 seconds

AT:DTC P0C52 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "A" LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-194, OUTLINE OF DIAGNOSIS, DTC P0C52 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "A" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0A3F DRIVE MOTOR “A” POSITION SENSOR CIRCUIT. <Ref. to HEV(diag)-180, DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor rotation angle sensor.
Judge as NG when the voltage of drive motor rotation angle sensor terminal (S1) is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver S13 circuit error	Detected

Time Needed for Diagnosis: 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver S13 circuit error	Not Detected

Time Needed for Diagnosis: 0.01 second

AU:DTC P0C5C DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "B" LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-195, OUTLINE OF DIAGNOSIS, DTC P0C5C DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "B" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0A3F DRIVE MOTOR “A” POSITION SENSOR CIRCUIT. <Ref. to HEV(diag)-180, DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor rotation angle sensor.
Judge as NG when the voltage of drive motor rotation angle sensor terminal (S2) is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver S24 circuit error	Detected

Time Needed for Diagnosis: 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver S24 circuit error	Not Detected

Time Needed for Diagnosis: 0.01 second

AV:DTC P0CDC DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-196, OUTLINE OF DIAGNOSIS, DTC P0CDC DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0A3F DRIVE MOTOR “A” POSITION SENSOR CIRCUIT. <Ref. to HEV(diag)-180, DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor rotation angle sensor.
Judge as NG when the voltage of drive motor rotation angle sensor terminal (R1, R2) is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver R12 circuit error	Detected

Time Needed for Diagnosis: 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver R12 circuit error	Not Detected

Time Needed for Diagnosis: 0.01 second

AW:DTC P0CDD DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-197, OUTLINE OF DIAGNOSIS, DTC P0CDD DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0A3F DRIVE MOTOR “A” POSITION SENSOR CIRCUIT. <Ref. to HEV(diag)-180, DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor rotation angle sensor.
Judge as NG when the voltage of drive motor rotation angle sensor terminal (R1, R2) is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver R12 circuit error	Detected

Time Needed for Diagnosis: 0.05 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver R12 circuit error	Not Detected

Time Needed for Diagnosis: 0.05 seconds

AX:DTC P0A5D DRIVE MOTOR "A" PHASE U CURRENT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-207, OUTLINE OF DIAGNOSIS, DTC P0A5D DRIVE MOTOR "A" PHASE U CURRENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

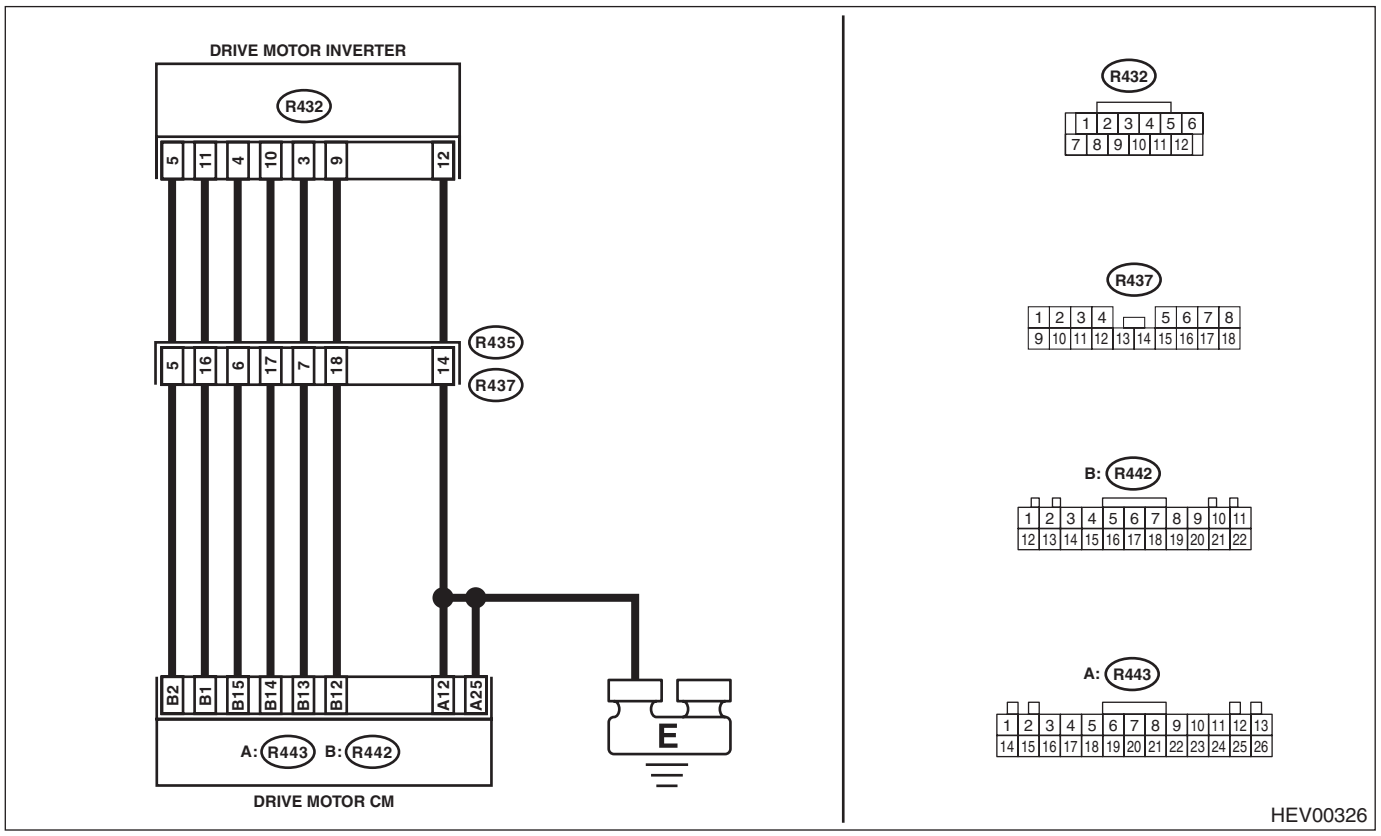
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

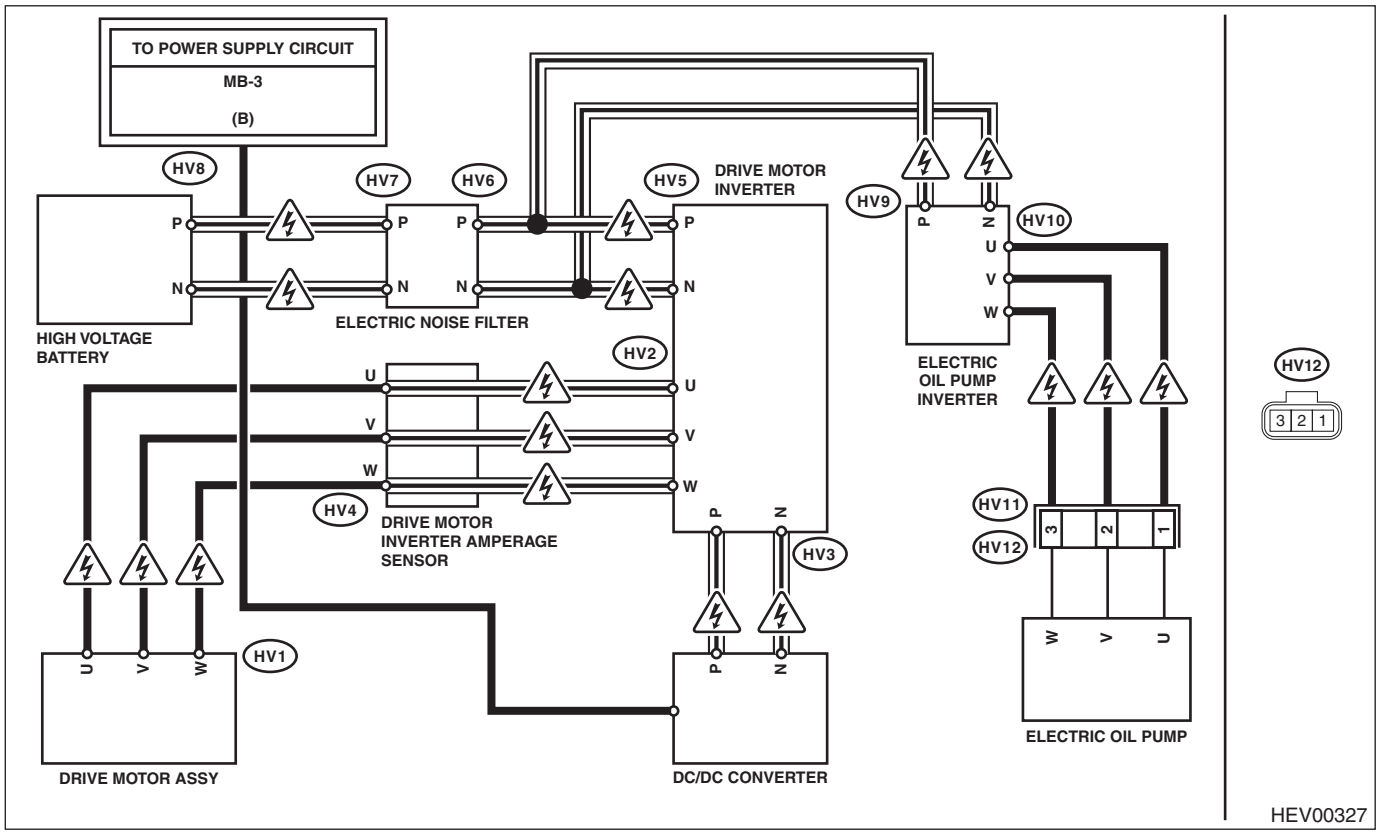
CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>





Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Phase U Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 2.5 V ±0.1 V with IG ON?	Go to step **3**.	Perform the diagnosis according to DTC P0BE6 and P06B1. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>

Step		Check	Yes	No
3	**CHECK HARNESS (GATE SIGNAL SHORT TO POWER AND SHORT IN OTHER SIGNAL LINES).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector (R442, R443). 6) Disconnect the intermediate connector (R436). 7) Disconnect the drive motor inverter connector. 8) Using a tester, measure the resistance between terminals in DMCM connectors (R442, R443) and between each terminal in inverter connector. ***Connector & terminal*** ***(R442) No. 2 — (R442) No. 1 — 22:*** ***(R442) No. 2 — (R443) No. 1 — 26:*** ***(R442) No. 2 — (R436) No. 1 — 8:*** ***(R442) No. 2 — (R432) No. 7:*** ***(R442) No. 1 — (R442) No. 1 — 22:*** ***(R442) No. 1 — (R443) No. 1 — 26:*** ***(R442) No. 1 — (R436) No. 1 — 8:*** ***(R442) No. 1 — (R432) No. 7:*** ***(R442) No. 15 — (R442) No. 1 — 22:*** ***(R442) No. 15 — (R443) No. 1 — 26:*** ***(R442) No. 15 — (R436) No. 1 — 8:*** ***(R442) No. 15 — (R432) No. 7:*** ***(R442) No. 14 — (R442) No. 1 — 22:*** ***(R442) No. 14 — (R443) No. 1 — 26:*** ***(R442) No. 14 — (R436) No. 1 — 8:*** ***(R442) No. 14 — (R432) No. 7:*** ***(R442) No. 13 — (R442) No. 1 — 22:*** ***(R442) No. 13 — (R443) No. 1 — 26:*** ***(R442) No. 13 — (R436) No. 1 — 8:*** ***(R442) No. 13 — (R432) No. 7:*** ***(R442) No. 12 — (R442) No. 1 — 22:*** ***(R442) No. 12 — (R443) No. 1 — 26:*** ***(R442) No. 12 — (R436) No. 1 — 8:*** ***(R442) No. 12 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit in harness between DMCM connector and drive motor inverter, or repair the intermediate connector.

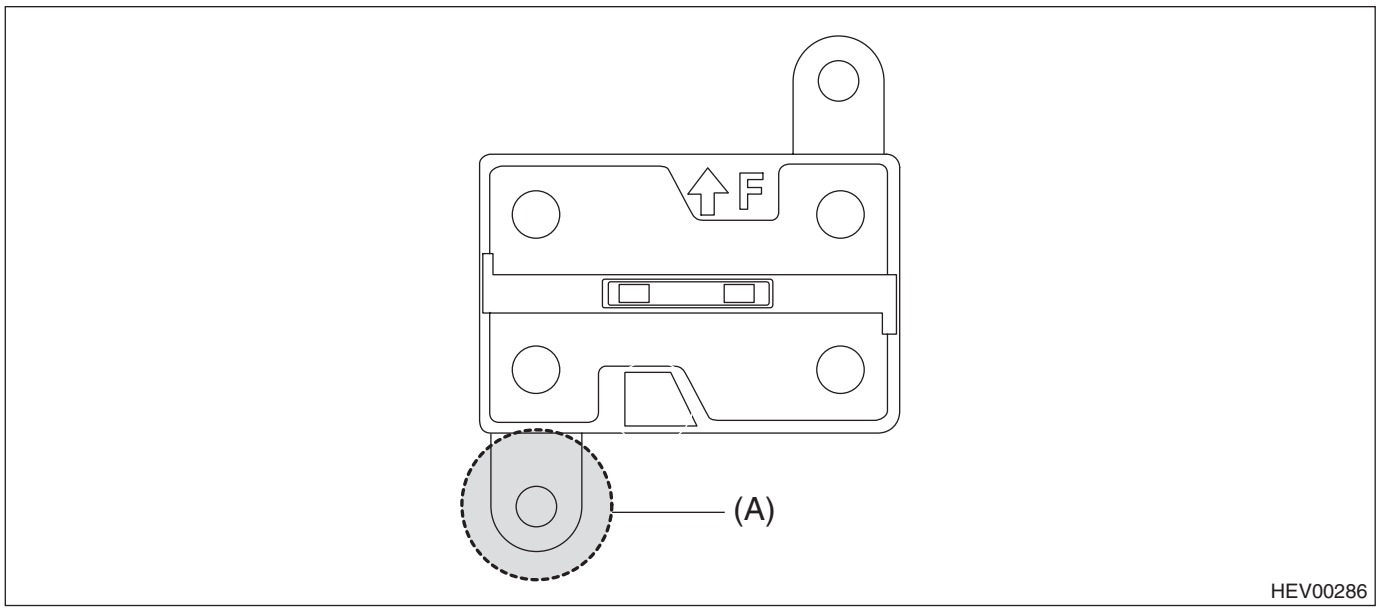
	Step	Check	Yes	No
4	**CHECK DRIVE MOTOR INVERTER (INTERNAL SHORT).** 1) Disconnects power cable terminals (HV2, HV3) of the drive motor inverter and bus bar (HV5). NOTE: Be sure to use insulating tape. 2) Using a tester, check for continuity between drive motor inverter terminals. NOTE: When checking continuity, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. ***Connector & terminal*** ***(HV5) P (+) — (HV2) U (–):*** ***(HV2) U (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV2) V (–):*** ***(HV2) V (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV2) W (–):*** ***(HV2) W (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV5) N (–):*** ***(HV2) U (+) — (HV2) V (–):*** ***(HV2) U (+) — (HV2) W (–):*** ***(HV2) V (+) — (HV2) W (–):*** ***(HV5) P (+) — Chassis ground (–):*** ***(HV5) N (+) — Chassis ground (–):*** ***(HV2) U (+) — Chassis ground (–):*** ***(HV2) V (+) — Chassis ground (–):*** ***(HV2) W (+) — Chassis ground (–):***	Is there continuity?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> Go to step **13**.	Go to step **5**.
5	**CHECK DRIVE MOTOR INVERTER (RELEASED).** Using diode voltage measuring mode on a insulation multimeter, measure the voltage between the terminals of the drive motor inverter. NOTE: When checking voltage values, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. ***Connector & terminal*** ***(HV2) U (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) U (–):*** ***(HV2) V (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) V (–):*** ***(HV2) W (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) W (–):***	Is “O.L” indicated?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> Go to step **13**.	Go to step **6**.

	Step	Check	Yes	No
6	**CHECK HIGH VOLTAGE UNIT (SHORT).** 1) Remove electric noise filter, DC/DC converter, and electric oil pump inverter. 2) Check continuity between each terminal of the unit. NOTE: • When checking continuity, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. • For ground measuring points of electric noise filter, DC/DC converter, and electric oil pump inverter, refer to Notes in the margin. ***Connector & terminal*** ***(HV6) P (+) — (HV7) N (–):*** ***(HV6) P (+) — Electric noise filter ground (–):*** ***(HV6) N (+) — Electric noise filter ground (–):*** ***(HV3) P (+) — (HV3) N (–):*** ***(HV3) P (+) — DC/DC converter ground (–) :*** ***(HV3) N (+) — DC/DC converter ground (–):*** ***(HV9) P (+) — (HV9) N (–):*** ***(HV9) P (+) — (HV10) U (–):*** ***(HV9) P (+) — (HV10) V (–):*** ***(HV9) P (+) — (HV10) W (–):*** ***(HV10) U (+) — (HV9) N (–):*** ***(HV10) V (+) — (HV9) N (–):*** ***(HV10) W (+) — (HV9) N (–):*** ***(HV10) U (+) — (HV10) V (–):*** ***(HV10) U (+) — (HV10) W (–):*** ***(HV10) V (+) — (HV10) W (–):*** ***(HV9) P (+) — Electric oil pump inverter ground (–):*** ***(HV9) N (+) — Electric oil pump inverter ground (–):*** ***(HV10) U (+) — Electric oil pump inverter ground (–):*** ***(HV10) V (+) — Electric oil pump inverter ground (–) :*** ***(HV10) W (+) — Electric oil pump inverter ground (–):*** ***(HV8) P (+) — (HV8) N (–):*** ***(HV8) P (+) — Chassis ground (–):*** ***(HV8) N (+) — Chassis ground (–):***	Is there continuity?	Replace the unit that has continuity. Go to step **13**.	Go to step **7**.
7	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT TO GROUND).** Using an insulation multimeter (250 V range), measure the resistance between power cable terminal (HV2) of the drive motor inverter and the ground bolt of inverter frame body. ***Connector & terminal*** ***(HV2) U — Ground bolt of inverter frame body:*** ***(HV2) V — Ground bolt of inverter frame body:*** ***(HV2) W — Ground bolt of inverter frame body:***	Is the resistance 2 MΩ or more?	If you have a milliohm tester at hand, Go to step **8**. If a milliohm tester is not at hand, Go to step **11**.	Go to step **9**.

	Step	Check	Yes	No
8	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT).** Using a milliohm tester, measure the resistance between terminals of drive motor inverter power cable. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Is resistance between either lines less than 25 mΩ?	Go to step **10**.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>
9	**CHECK DRIVE MOTOR (SHORT TO GROUND).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using a insulation multimeter (250 V range), measure the resistance between each terminal and chassis ground. ***Connector & terminal*** ***(HV1) U — Chassis ground:*** ***(HV1) V — Chassis ground:*** ***(HV1) W — Chassis ground:***	Does the resistance between any points show less than 2 MΩ?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
10	**CHECK DRIVE MOTOR (SHORT).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using a milliohm tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV1) U — (HV1) V:*** ***(HV1) U — (HV1) W:*** ***(HV1) V — (HV1) W:***	Is resistance between either lines less than 20 mΩ?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
11	**CHECK DRIVE MOTOR (SHORT).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to "D" range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Are any of the following statements relevant? • «Drive Motor Inverter Input High Voltage Sensor (Serial)» is out of the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm. • Abnormal noise and changes in rotation speed occur near 600 rpm.	Go to step **12**.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

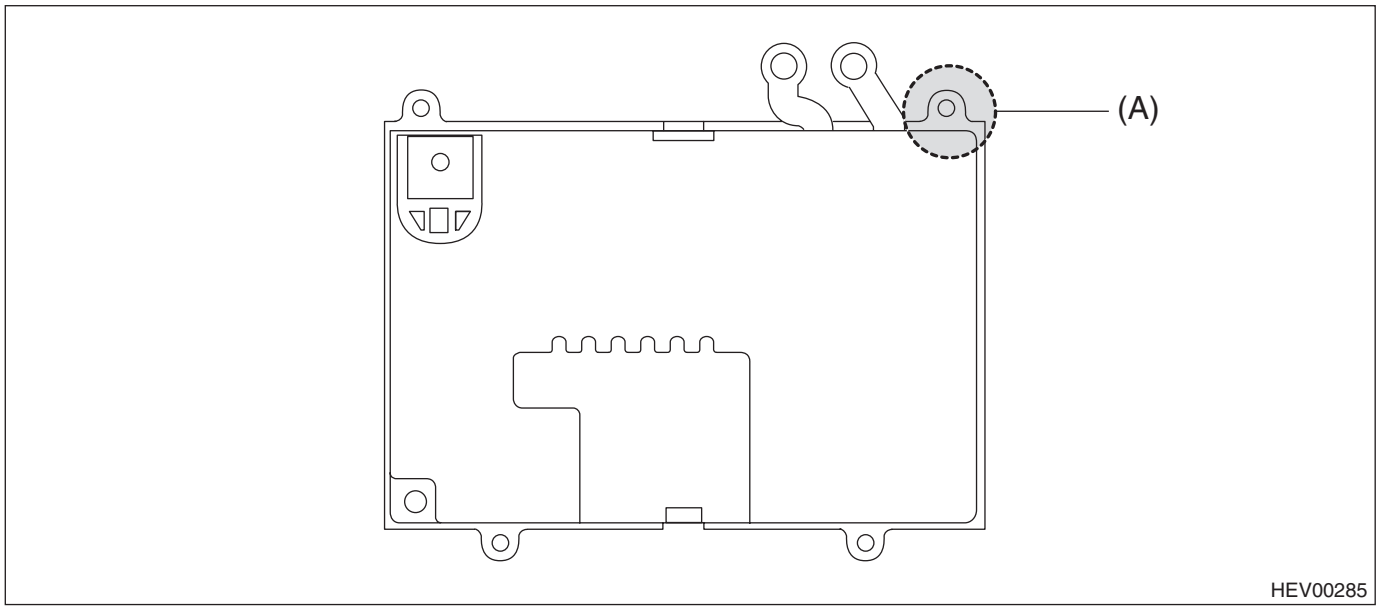
	Step	Check	Yes	No
12	**CHECK POWER CABLE (SHORT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 6) Disconnect the power cable (HV2) of drive motor inverter. 7) Using a insulation multimeter (250 V range), measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Does the resistance between any points show 2 MΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
13	**CHECK OF DRIVE MOTOR (DEMAGNETIZATION).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to "D" range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	«Drive Motor Inverter Input High Voltage Sensor (Serial)» is within the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

NOTE:
Ground measuring points
- Electric noise filter



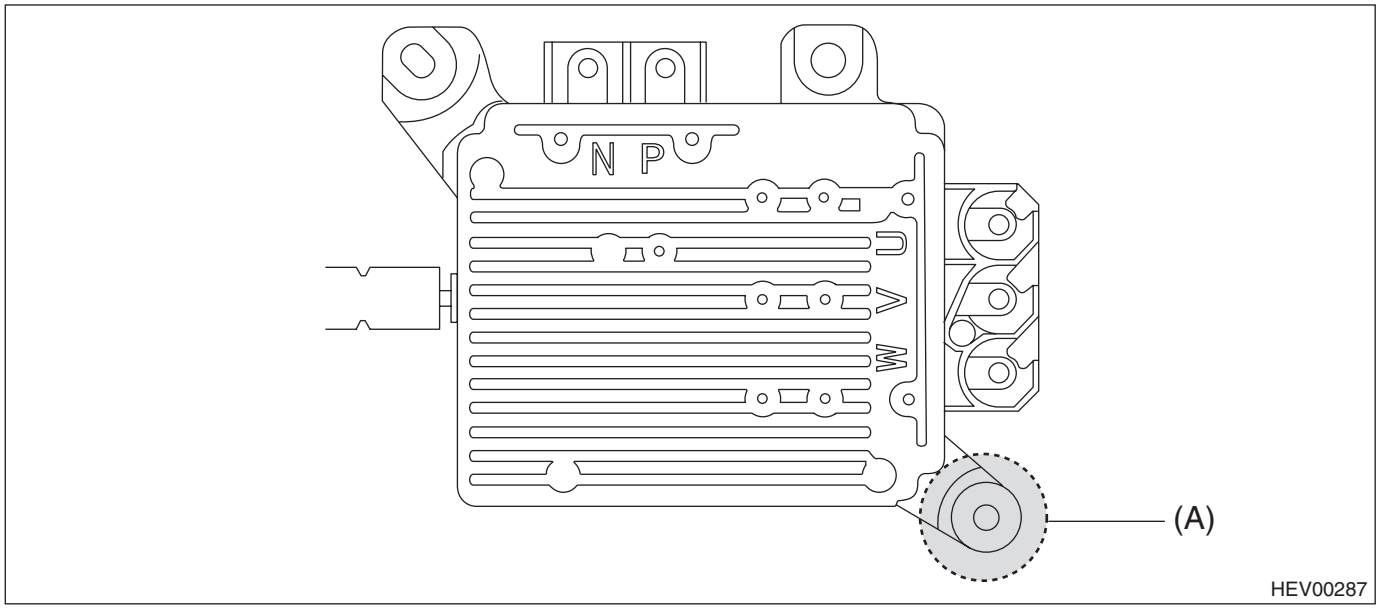
(A) Ground measuring points

- DC/DC converter



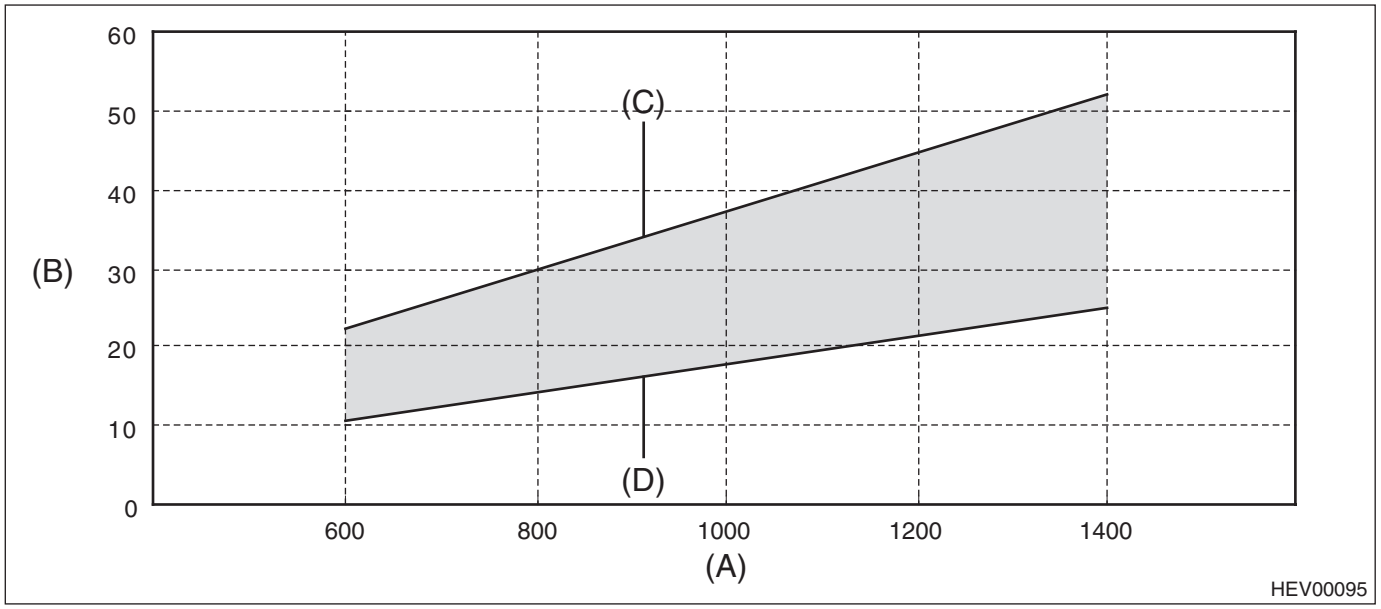
(A) Ground measuring points

- Electric oil pump inverter



(A) Ground measuring points

NOTE:
Value of «Drive Motor Inverter Input High Voltage Sensor (Serial)» is proportional to «Drive Motor Speed».
- 1000 rpm: 18 V — 37 V
- 1400 rpm: 25 V — 52 V



(A) Drive motor speed
(B) Drive Motor Inverter Input High Voltage Sensor (Serial)
(C) Standard at Max.
(D) Standard at Min.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current flowing in drive motor.
Judge as NG when the current flowing in drive motor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	ON

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iu) NOTE: • ABS: Absolute value • Iu: U phase current	> 350 A

Time Needed for Diagnosis: 0.0003 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iu)	≤ 350 A

Time Needed for Diagnosis: 0.0006 seconds

AY:DTC P0A60 DRIVE MOTOR "A" PHASE V CURRENT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-217, OUTLINE OF DIAGNOSIS, DTC P0A60 DRIVE MOTOR "A" PHASE V CURRENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

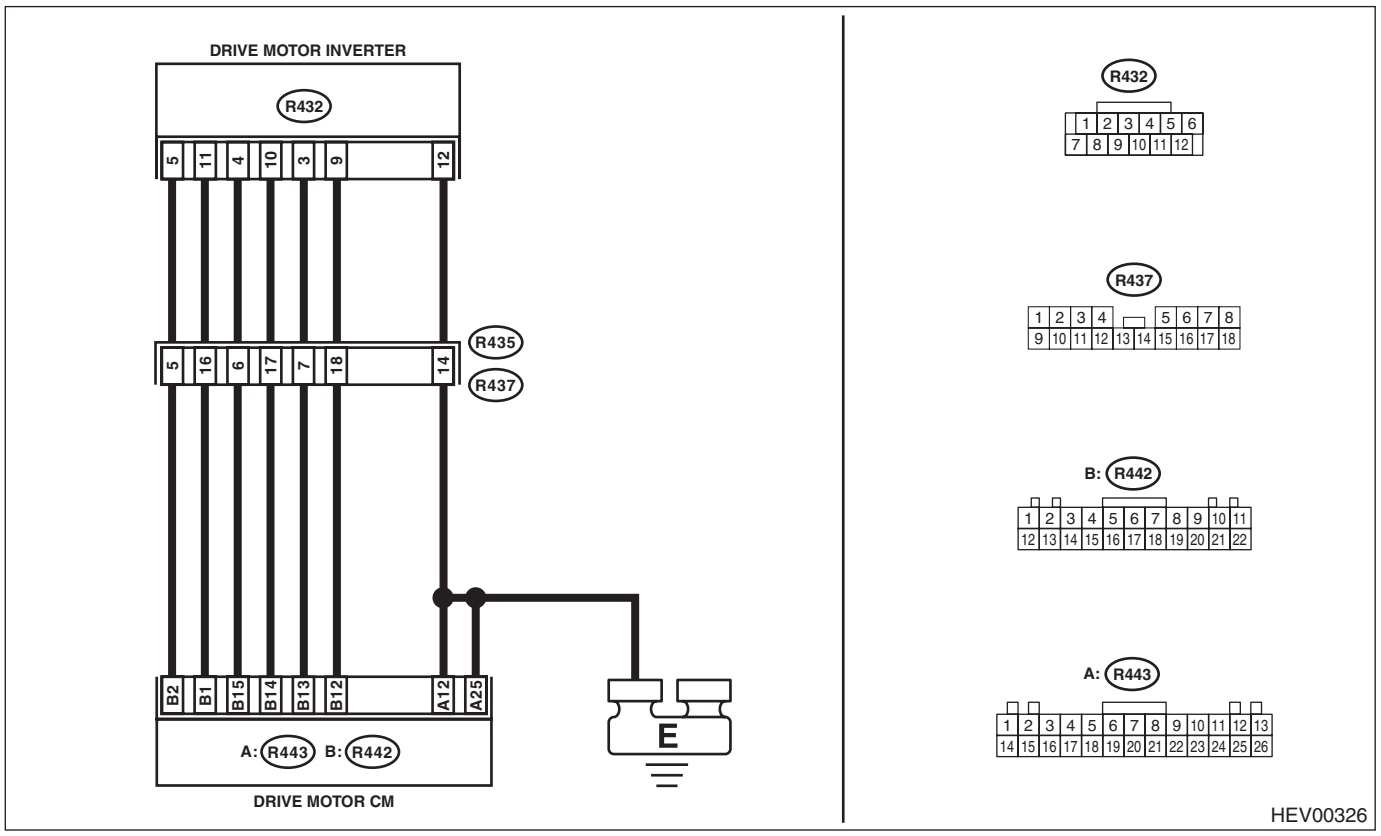
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

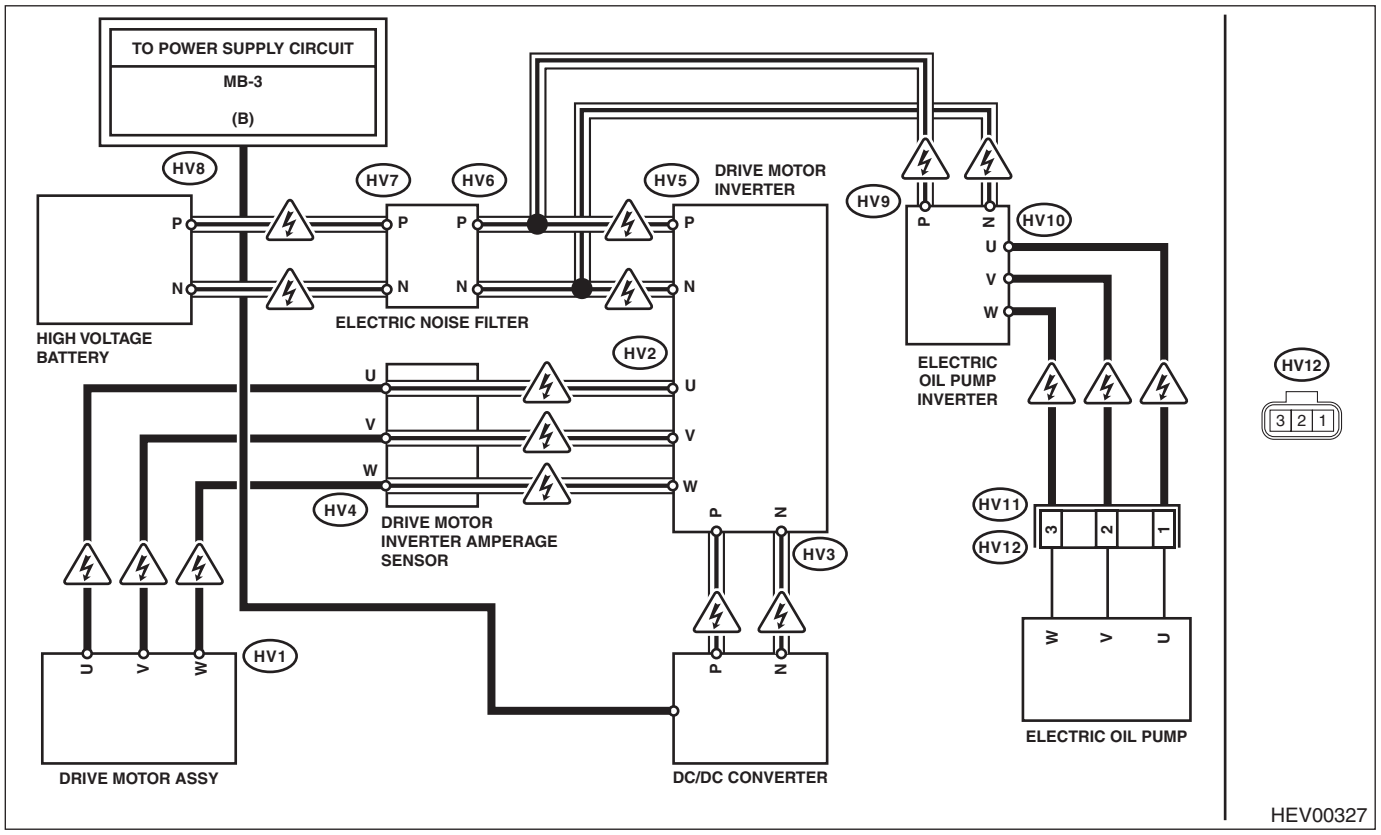
CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>





Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0A78 detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Phase V Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 2.5 V ±0.1 V with IG ON?	Go to step **3**.	Perform the diagnosis according to DTC P0BE6 and P06B1. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>

	Step	Check	Yes	No
3	**CHECK HARNESS (GATE SIGNAL SHORT TO POWER AND SHORT IN OTHER SIGNAL LINES).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector (R442, R443). 6) Disconnect the intermediate connector (R436). 7) Disconnect the drive motor inverter connector. 8) Using a tester, measure the resistance between terminals in DMCM connectors (R442, R443) and between each terminal in inverter connector. ***Connector & terminal*** ***(R442) No. 2 — (R442) No. 1 — 22:*** ***(R442) No. 2 — (R443) No. 1 — 26:*** ***(R442) No. 2 — (R436) No. 1 — 8:*** ***(R442) No. 2 — (R432) No. 7:*** ***(R442) No. 1 — (R442) No. 1 — 22:*** ***(R442) No. 1 — (R443) No. 1 — 26:*** ***(R442) No. 1 — (R436) No. 1 — 8:*** ***(R442) No. 1 — (R432) No. 7:*** ***(R442) No. 15 — (R442) No. 1 — 22:*** ***(R442) No. 15 — (R443) No. 1 — 26:*** ***(R442) No. 15 — (R436) No. 1 — 8:*** ***(R442) No. 15 — (R432) No. 7:*** ***(R442) No. 14 — (R442) No. 1 — 22:*** ***(R442) No. 14 — (R443) No. 1 — 26:*** ***(R442) No. 14 — (R436) No. 1 — 8:*** ***(R442) No. 14 — (R432) No. 7:*** ***(R442) No. 13 — (R442) No. 1 — 22:*** ***(R442) No. 13 — (R443) No. 1 — 26:*** ***(R442) No. 13 — (R436) No. 1 — 8:*** ***(R442) No. 13 — (R432) No. 7:*** ***(R442) No. 12 — (R442) No. 1 — 22:*** ***(R442) No. 12 — (R443) No. 1 — 26:*** ***(R442) No. 12 — (R436) No. 1 — 8:*** ***(R442) No. 12 — (R432) No. 7:***	Does the resistance between either two points show 1 MΩ or more?	Go to step **4**.	Repair short circuit in harness between DMCM connector and drive motor inverter, or repair the intermediate connector.

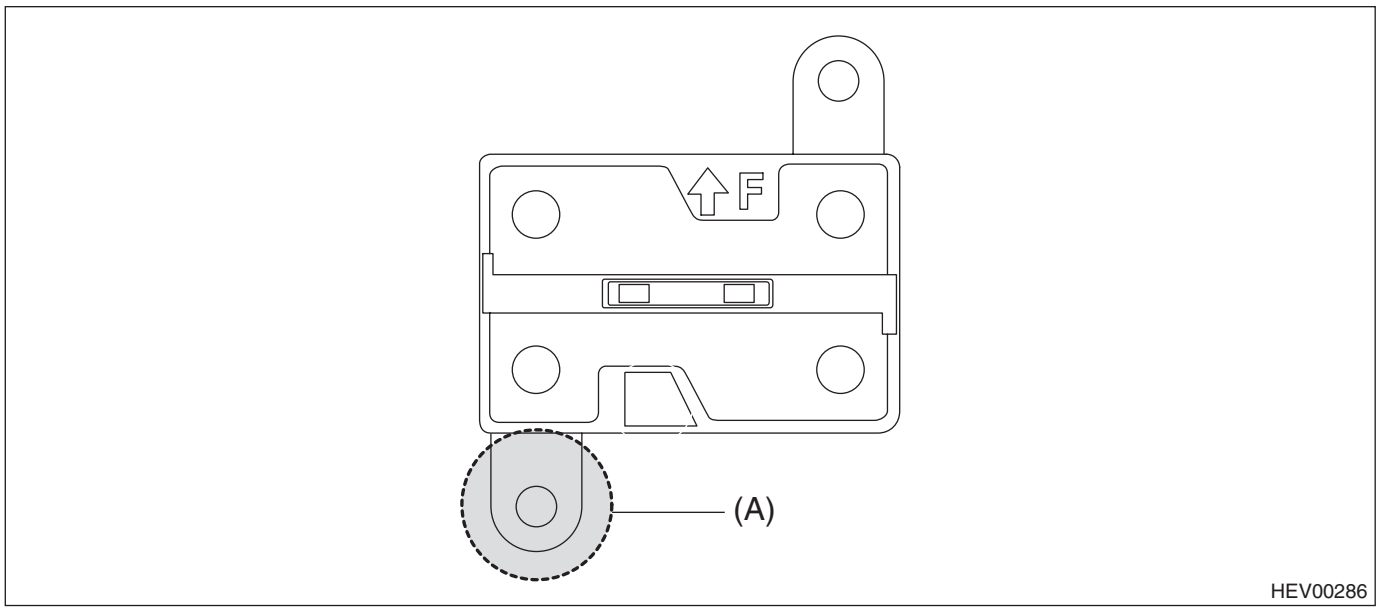
	Step	Check	Yes	No
4	**CHECK DRIVE MOTOR INVERTER (INTERNAL SHORT).** 1) Disconnects power cable terminals (HV2, HV3) of the drive motor inverter and bus bar (HV5). NOTE: Be sure to use insulating tape. 2) Using a tester, check for continuity between drive motor inverter terminals. NOTE: When checking continuity, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. ***Connector & terminal*** ***(HV5) P (+) — (HV2) U (–):*** ***(HV2) U (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV2) V (–):*** ***(HV2) V (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV2) W (–):*** ***(HV2) W (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV5) N (–):*** ***(HV2) U (+) — (HV2) V (–):*** ***(HV2) U (+) — (HV2) W (–):*** ***(HV2) V (+) — (HV2) W (–):*** ***(HV5) P (+) — Chassis ground (–):*** ***(HV5) N (+) — Chassis ground (–):*** ***(HV2) U (+) — Chassis ground (–):*** ***(HV2) V (+) — Chassis ground (–):*** ***(HV2) W (+) — Chassis ground (–):***	Is there continuity?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> Go to step **13**.	Go to step **5**.
5	**CHECK DRIVE MOTOR INVERTER (RELEASED).** Using diode voltage measuring mode on a insulation multimeter, measure the voltage between the terminals of the drive motor inverter. NOTE: When checking voltage values, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. ***Connector & terminal*** ***(HV2) U (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) U (–):*** ***(HV2) V (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) V (–):*** ***(HV2) W (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) W (–):***	Is “O.L” indicated?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> Go to step **13**.	Go to step **6**.

	Step	Check	Yes	No
6	**CHECK HIGH VOLTAGE UNIT (SHORT).** 1) Remove electric noise filter, DC/DC converter, and electric oil pump inverter. 2) Check continuity between each terminal of the unit. NOTE: • When checking continuity, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. • For ground measuring points of electric noise filter, DC/DC converter, and electric oil pump inverter, refer to Notes in the margin. ***Connector & terminal*** ***(HV6) P (+) — (HV7) N (–):*** ***(HV6) P (+) — Electric noise filter ground (–):*** ***(HV6) N (+) — Electric noise filter ground (–):*** ***(HV3) P (+) — (HV3) N (–):*** ***(HV3) P (+) — DC/DC converter ground (–) :*** ***(HV3) N (+) — DC/DC converter ground (–):*** ***(HV9) P (+) — (HV9) N (–):*** ***(HV9) P (+) — (HV10) U (–):*** ***(HV9) P (+) — (HV10) V (–):*** ***(HV9) P (+) — (HV10) W (–):*** ***(HV10) U (+) — (HV9) N (–):*** ***(HV10) V (+) — (HV9) N (–):*** ***(HV10) W (+) — (HV9) N (–):*** ***(HV10) U (+) — (HV10) V (–):*** ***(HV10) U (+) — (HV10) W (–):*** ***(HV10) V (+) — (HV10) W (–):*** ***(HV9) P (+) — Electric oil pump inverter ground (–):*** ***(HV9) N (+) — Electric oil pump inverter ground (–):*** ***(HV10) U (+) — Electric oil pump inverter ground (–):*** ***(HV10) V (+) — Electric oil pump inverter ground (–) :*** ***(HV10) W (+) — Electric oil pump inverter ground (–):*** ***(HV8) P (+) — (HV8) N (–):*** ***(HV8) P (+) — Chassis ground (–):*** ***(HV8) N (+) — Chassis ground (–):***	Is there continuity?	Replace the unit that has continuity. Go to step **13**.	Go to step **7**.
7	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT TO GROUND).** Using an insulation multimeter (250 V range), measure the resistance between power cable terminal (HV2) of the drive motor inverter and the ground bolt of inverter frame body. ***Connector & terminal*** ***(HV2) U — Ground bolt of inverter frame body:*** ***(HV2) V — Ground bolt of inverter frame body:*** ***(HV2) W — Ground bolt of inverter frame body:***	Is the resistance 2 MΩ or more?	If you have a milliohm tester at hand, Go to step **8**. If a milliohm tester is not at hand, Go to step **11**.	Go to step **9**.

	Step	Check	Yes	No
8	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT).** Using a milliohm tester, measure the resistance between terminals of drive motor inverter power cable. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Is resistance between either lines less than 25 mΩ?	Go to step **10**.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>
9	**CHECK DRIVE MOTOR (SHORT TO GROUND).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using a insulation multimeter (250 V range), measure the resistance between each terminal and chassis ground. ***Connector & terminal*** ***(HV1) U — Chassis ground:*** ***(HV1) V — Chassis ground:*** ***(HV1) W — Chassis ground:***	Does the resistance between any points show less than 2 MΩ?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
10	**CHECK DRIVE MOTOR (SHORT).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using a milliohm tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV1) U — (HV1) V:*** ***(HV1) U — (HV1) W:*** ***(HV1) V — (HV1) W:***	Is resistance between either lines less than 20 mΩ?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
11	**CHECK DRIVE MOTOR (SHORT).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to "D" range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Are any of the following statements relevant? • «Drive Motor Inverter Input High Voltage Sensor (Serial)» is out of the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm. • Abnormal noise and changes in rotation speed occur near 600 rpm.	Go to step **12**.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

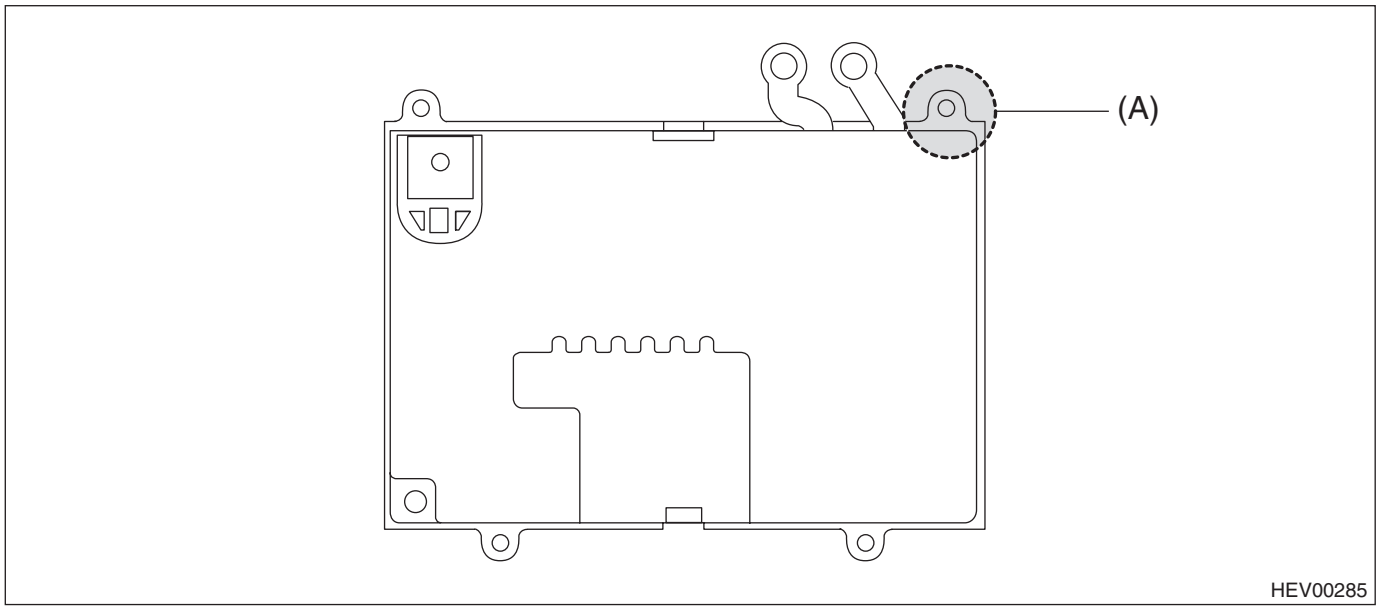
	Step	Check	Yes	No
12	**CHECK POWER CABLE (SHORT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 6) Disconnect the power cable (HV2) of drive motor inverter. 7) Using a insulation multimeter (250 V range), measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Does the resistance between any points show 2 MΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
13	**CHECK OF DRIVE MOTOR (DEMAGNETIZATION).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to "D" range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	«Drive Motor Inverter Input High Voltage Sensor (Serial)» is within the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

NOTE:
Ground measuring points
- Electric noise filter



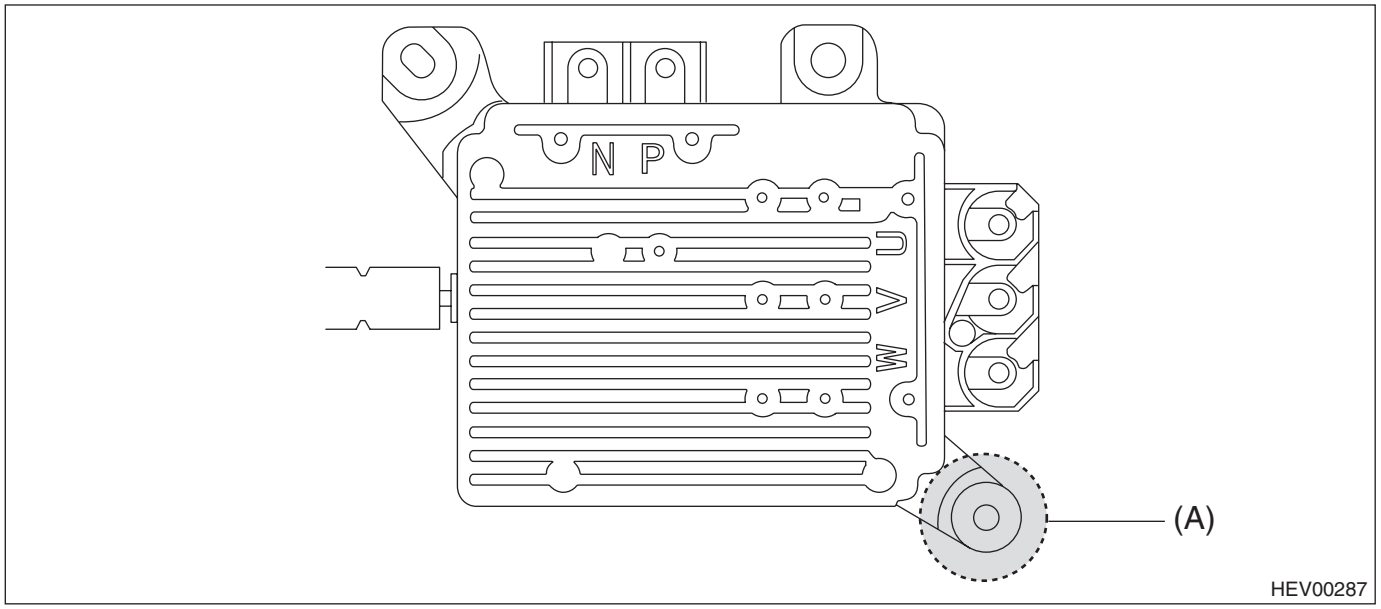
(A) Ground measuring points

- DC/DC converter



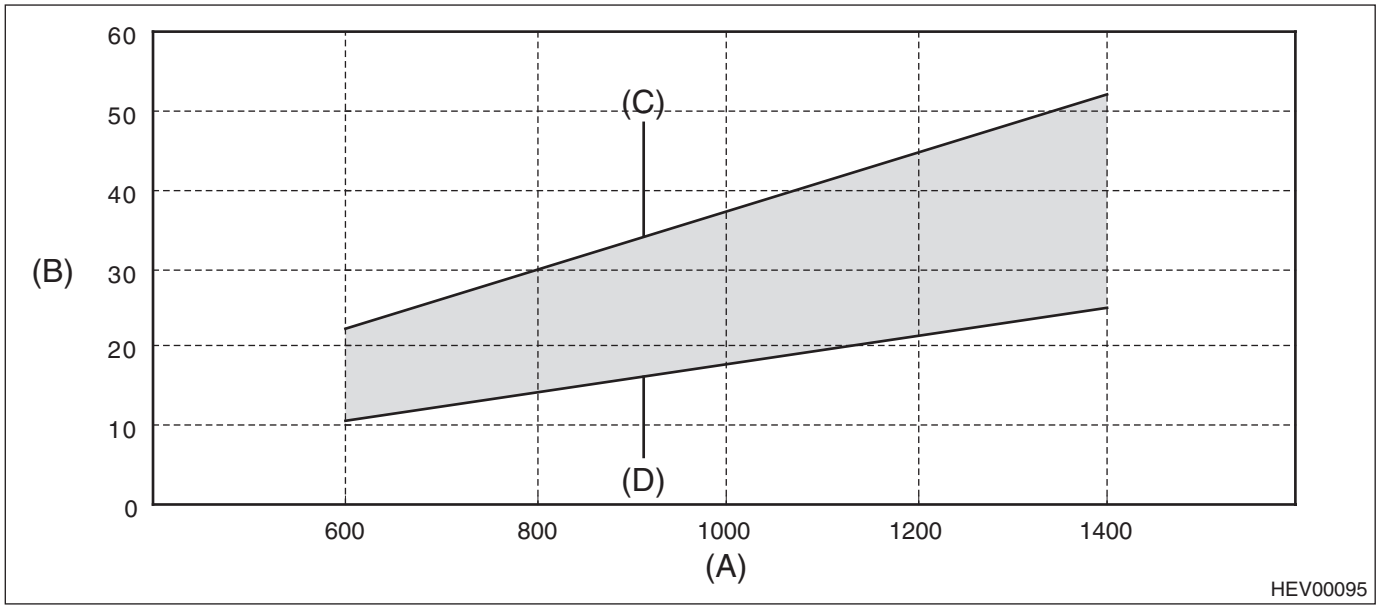
(A) Ground measuring points

- Electric oil pump inverter



(A) Ground measuring points

NOTE:
Value of «Drive Motor Inverter Input High Voltage Sensor (Serial)» is proportional to «Drive Motor Speed».
- 1000 rpm: 18 V — 37 V
- 1400 rpm: 25 V — 52 V



(A) Drive motor speed
(B) Drive Motor Inverter Input High Voltage Sensor (Serial)
(C) Standard at Max.
(D) Standard at Min.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current flowing in drive motor.
Judge as NG when the current flowing in drive motor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	ON

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iv) NOTE: • ABS: Absolute value • Iv: V phase current	> 350 A

Time Needed for Diagnosis: 0.0003 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iv)	≤ 350 A

Time Needed for Diagnosis: 0.0006 seconds

AZ:DTC P0A63 DRIVE MOTOR "A" PHASE W CURRENT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-227, OUTLINE OF DIAGNOSIS, DTC P0A63 DRIVE MOTOR "A" PHASE W CURRENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

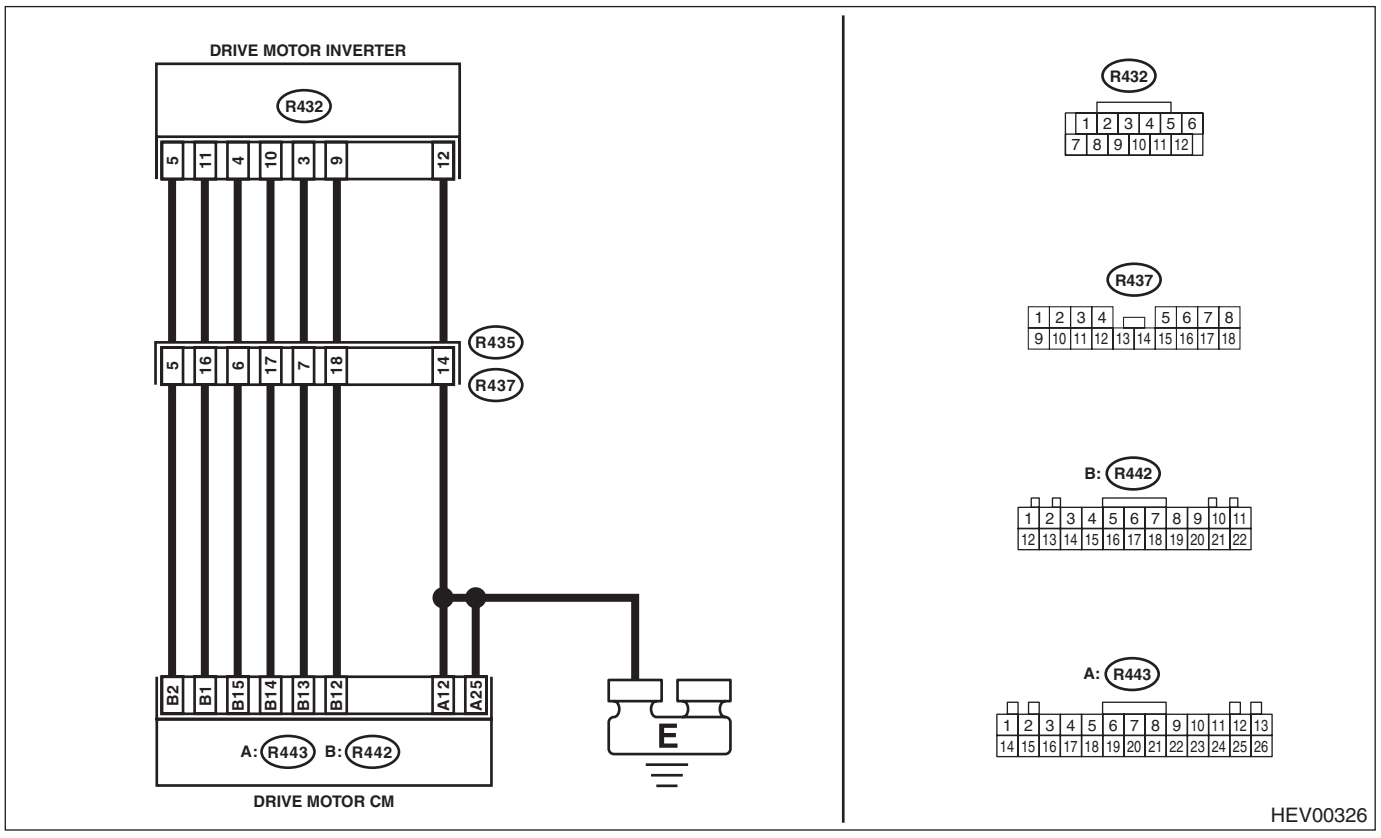
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

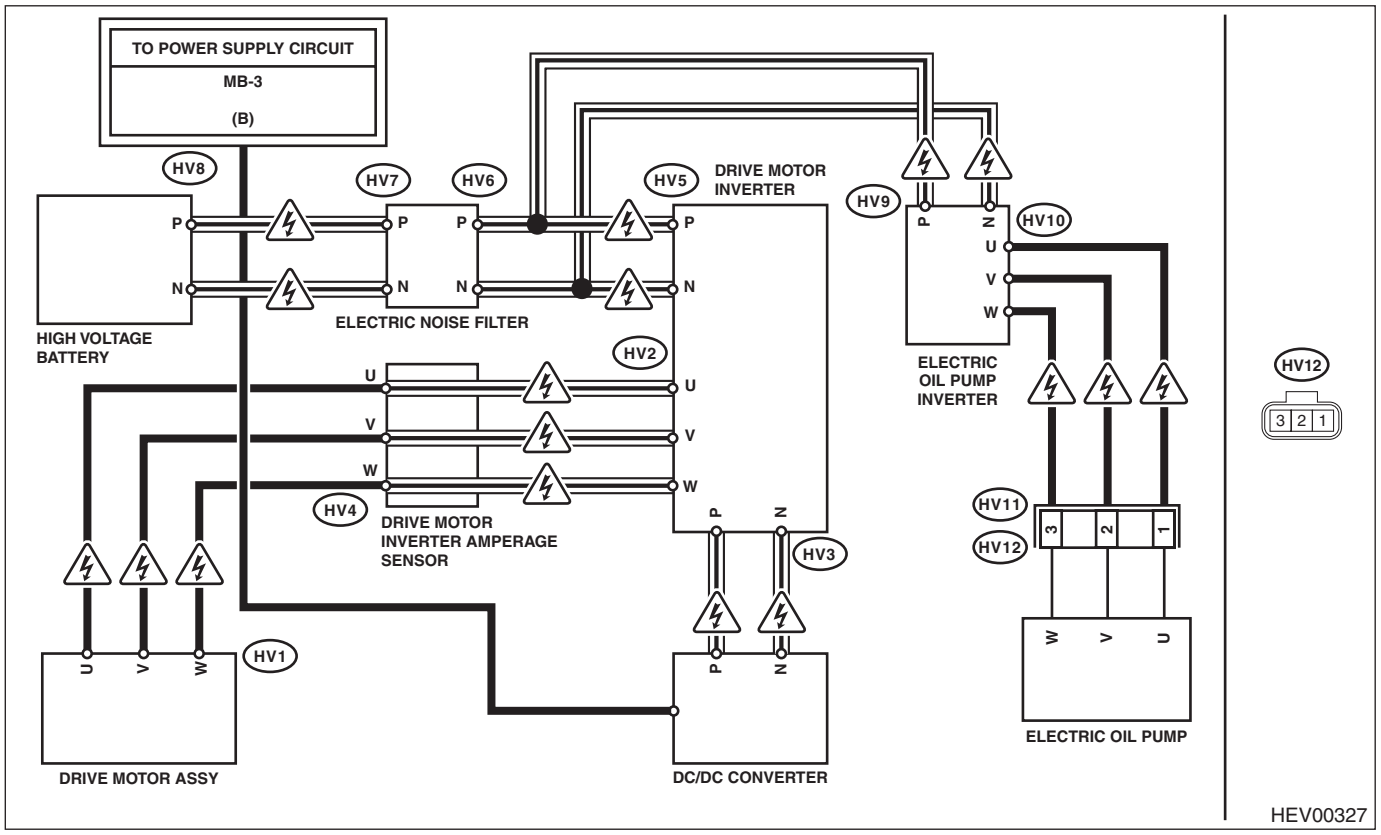
CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>





Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0A78 detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Phase W Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 2.5 V ±0.1 V with IG ON?	Go to step **3**.	Perform the diagnosis according to DTC P0BE6 and P06B1. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>

	Step	Check	Yes	No
3	**CHECK HARNESS (GATE SIGNAL SHORT TO POWER AND SHORT IN OTHER SIGNAL LINES).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector (R442, R443). 6) Disconnect the intermediate connector (R436). 7) Disconnect the drive motor inverter connector. 8) Using a tester, measure the resistance between terminals in DMCM connectors (R442, R443) and between each terminal in inverter connector. ***Connector & terminal*** ***(R442) No. 2 — (R442) No. 1 — 22:*** ***(R442) No. 2 — (R443) No. 1 — 26:*** ***(R442) No. 2 — (R436) No. 1 — 8:*** ***(R442) No. 2 — (R432) No. 7:*** ***(R442) No. 1 — (R442) No. 1 — 22:*** ***(R442) No. 1 — (R443) No. 1 — 26:*** ***(R442) No. 1 — (R436) No. 1 — 8:*** ***(R442) No. 1 — (R432) No. 7:*** ***(R442) No. 15 — (R442) No. 1 — 22:*** ***(R442) No. 15 — (R443) No. 1 — 26:*** ***(R442) No. 15 — (R436) No. 1 — 8:*** ***(R442) No. 15 — (R432) No. 7:*** ***(R442) No. 14 — (R442) No. 1 — 22:*** ***(R442) No. 14 — (R443) No. 1 — 26:*** ***(R442) No. 14 — (R436) No. 1 — 8:*** ***(R442) No. 14 — (R432) No. 7:*** ***(R442) No. 13 — (R442) No. 1 — 22:*** ***(R442) No. 13 — (R443) No. 1 — 26:*** ***(R442) No. 13 — (R436) No. 1 — 8:*** ***(R442) No. 13 — (R432) No. 7:*** ***(R442) No. 12 — (R442) No. 1 — 22:*** ***(R442) No. 12 — (R443) No. 1 — 26:*** ***(R442) No. 12 — (R436) No. 1 — 8:*** ***(R442) No. 12 — (R432) No. 7:***	Does the resistance between either two points show 1 MΩ or more?	Go to step **4**.	Repair short circuit in harness between DMCM connector and drive motor inverter, or repair the intermediate connector.

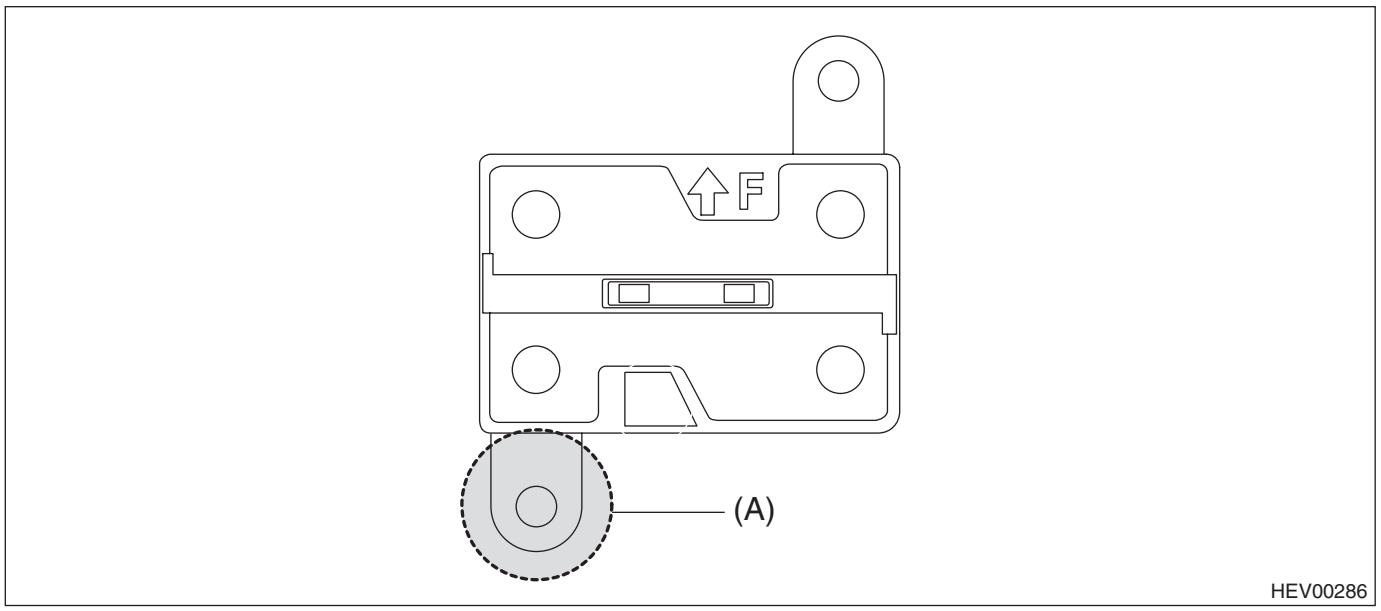
	Step	Check	Yes	No
4	**CHECK DRIVE MOTOR INVERTER (INTERNAL SHORT).** 1) Disconnects power cable terminals (HV2, HV3) of the drive motor inverter and bus bar (HV5). NOTE: Be sure to use insulating tape. 2) Using a tester, check for continuity between drive motor inverter terminals. NOTE: When checking continuity, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. ***Connector & terminal*** ***(HV5) P (+) — (HV2) U (–):*** ***(HV2) U (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV2) V (–):*** ***(HV2) V (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV2) W (–):*** ***(HV2) W (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV5) N (–):*** ***(HV2) U (+) — (HV2) V (–):*** ***(HV2) U (+) — (HV2) W (–):*** ***(HV2) V (+) — (HV2) W (–):*** ***(HV5) P (+) — Chassis ground (–):*** ***(HV5) N (+) — Chassis ground (–):*** ***(HV2) U (+) — Chassis ground (–):*** ***(HV2) V (+) — Chassis ground (–):*** ***(HV2) W (+) — Chassis ground (–):***	Is there continuity?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> Go to step **13**.	Go to step **5**.
5	**CHECK DRIVE MOTOR INVERTER (RELEASED).** Using diode voltage measuring mode on a insulation multimeter, measure the voltage between the terminals of the drive motor inverter. NOTE: When checking voltage values, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. ***Connector & terminal*** ***(HV2) U (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) U (–):*** ***(HV2) V (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) V (–):*** ***(HV2) W (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) W (–):***	Is “O.L” indicated?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> Go to step **13**.	Go to step **6**.

	Step	Check	Yes	No
6	**CHECK HIGH VOLTAGE UNIT (SHORT).** 1) Remove electric noise filter, DC/DC converter, and electric oil pump inverter. 2) Check continuity between each terminal of the unit. NOTE: • When checking continuity, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. • For ground measuring points of electric noise filter, DC/DC converter, and electric oil pump inverter, refer to Notes in the margin. ***Connector & terminal*** ***(HV6) P (+) — (HV7) N (–):*** ***(HV6) P (+) — Electric noise filter ground (–):*** ***(HV6) N (+) — Electric noise filter ground (–):*** ***(HV3) P (+) — (HV3) N (–):*** ***(HV3) P (+) — DC/DC converter ground (–) :*** ***(HV3) N (+) — DC/DC converter ground (–):*** ***(HV9) P (+) — (HV9) N (–):*** ***(HV9) P (+) — (HV10) U (–):*** ***(HV9) P (+) — (HV10) V (–):*** ***(HV9) P (+) — (HV10) W (–):*** ***(HV10) U (+) — (HV9) N (–):*** ***(HV10) V (+) — (HV9) N (–):*** ***(HV10) W (+) — (HV9) N (–):*** ***(HV10) U (+) — (HV10) V (–):*** ***(HV10) U (+) — (HV10) W (–):*** ***(HV10) V (+) — (HV10) W (–):*** ***(HV9) P (+) — Electric oil pump inverter ground (–):*** ***(HV9) N (+) — Electric oil pump inverter ground (–):*** ***(HV10) U (+) — Electric oil pump inverter ground (–):*** ***(HV10) V (+) — Electric oil pump inverter ground (–) :*** ***(HV10) W (+) — Electric oil pump inverter ground (–):*** ***(HV8) P (+) — (HV8) N (–):*** ***(HV8) P (+) — Chassis ground (–):*** ***(HV8) N (+) — Chassis ground (–):***	Is there continuity?	Replace the unit that has continuity. Go to step **13**.	Go to step **7**.
7	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT TO GROUND).** Using an insulation multimeter (250 V range), measure the resistance between power cable terminal (HV2) of the drive motor inverter and the ground bolt of inverter frame body. ***Connector & terminal*** ***(HV2) U — Ground bolt of inverter frame body:*** ***(HV2) V — Ground bolt of inverter frame body:*** ***(HV2) W — Ground bolt of inverter frame body:***	Is the resistance 2 MΩ or more?	If you have a milliohm tester at hand, Go to step **8**. If a milliohm tester is not at hand, Go to step **11**.	Go to step **9**.

	Step	Check	Yes	No
8	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT).** Using a milliohm tester, measure the resistance between terminals of drive motor inverter power cable. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Is resistance between either lines less than 25 mΩ?	Go to step **10**.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>
9	**CHECK DRIVE MOTOR (SHORT TO GROUND).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using a insulation multimeter (250 V range), measure the resistance between each terminal and chassis ground. ***Connector & terminal*** ***(HV1) U — Chassis ground:*** ***(HV1) V — Chassis ground:*** ***(HV1) W — Chassis ground:***	Does the resistance between any points show less than 2 MΩ?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
10	**CHECK DRIVE MOTOR (SHORT).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using a milliohm tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV1) U — (HV1) V:*** ***(HV1) U — (HV1) W:*** ***(HV1) V — (HV1) W:***	Is resistance between either lines less than 20 mΩ?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
11	**CHECK DRIVE MOTOR (SHORT).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to "D" range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Are any of the following statements relevant? • «Drive Motor Inverter Input High Voltage Sensor (Serial)» is out of the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm. • Abnormal noise and changes in rotation speed occur near 600 rpm.	Go to step **12**.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

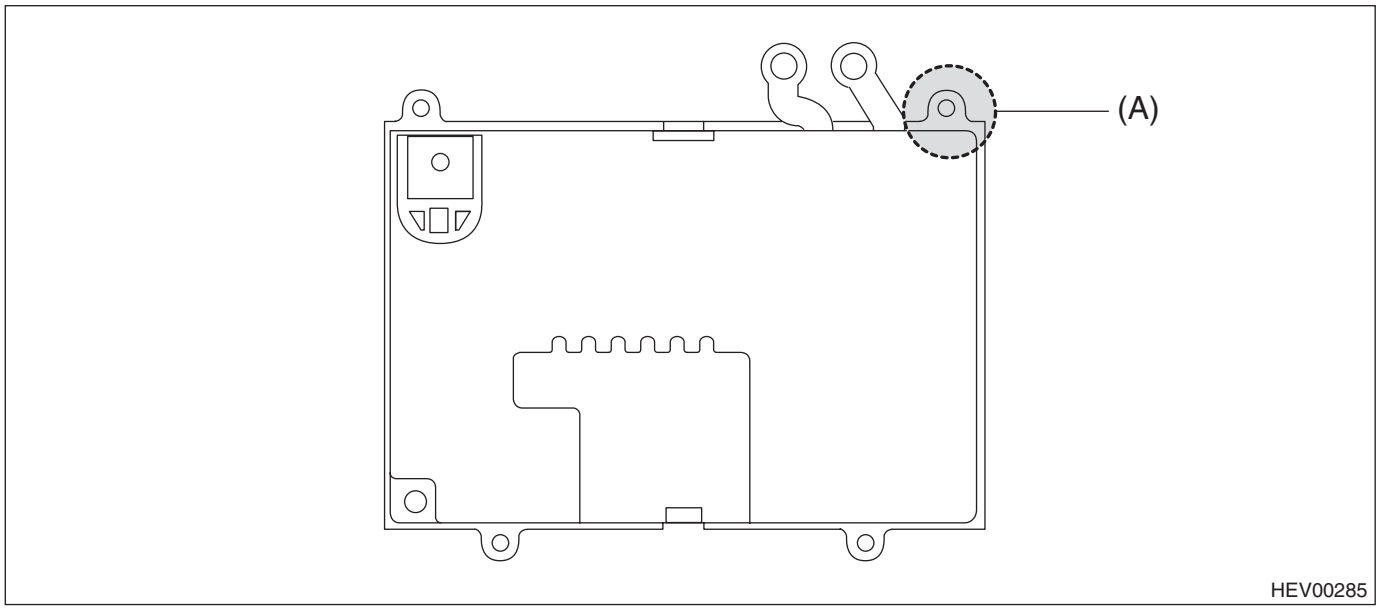
	Step	Check	Yes	No
12	**CHECK POWER CABLE (SHORT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. 4) Wait for 10 minutes. 5) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 6) Disconnect the power cable (HV2) of drive motor inverter. 7) Using a insulation multimeter (250 V range), measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Does the resistance between any points show 2 MΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **13**.
13	**CHECK OF DRIVE MOTOR (DEMAGNETIZATION).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to "D" range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	«Drive Motor Inverter Input High Voltage Sensor (Serial)» is within the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

NOTE:
Ground measuring points
- Electric noise filter



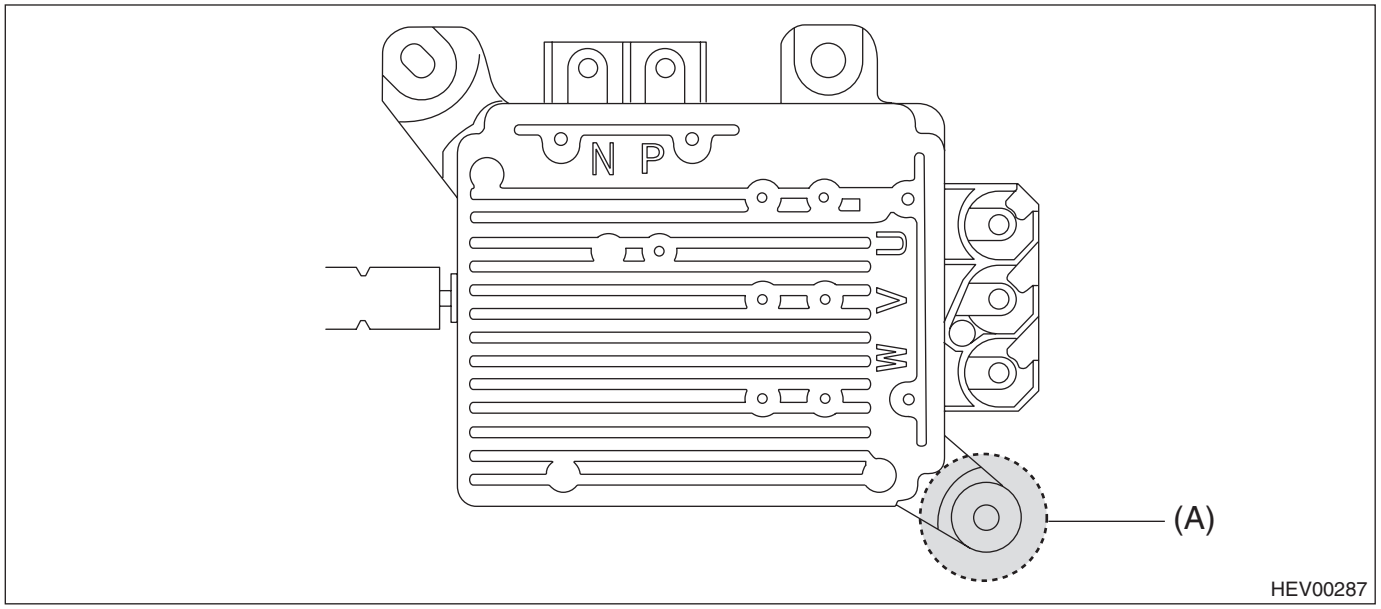
(A) Ground measuring points

- DC/DC converter



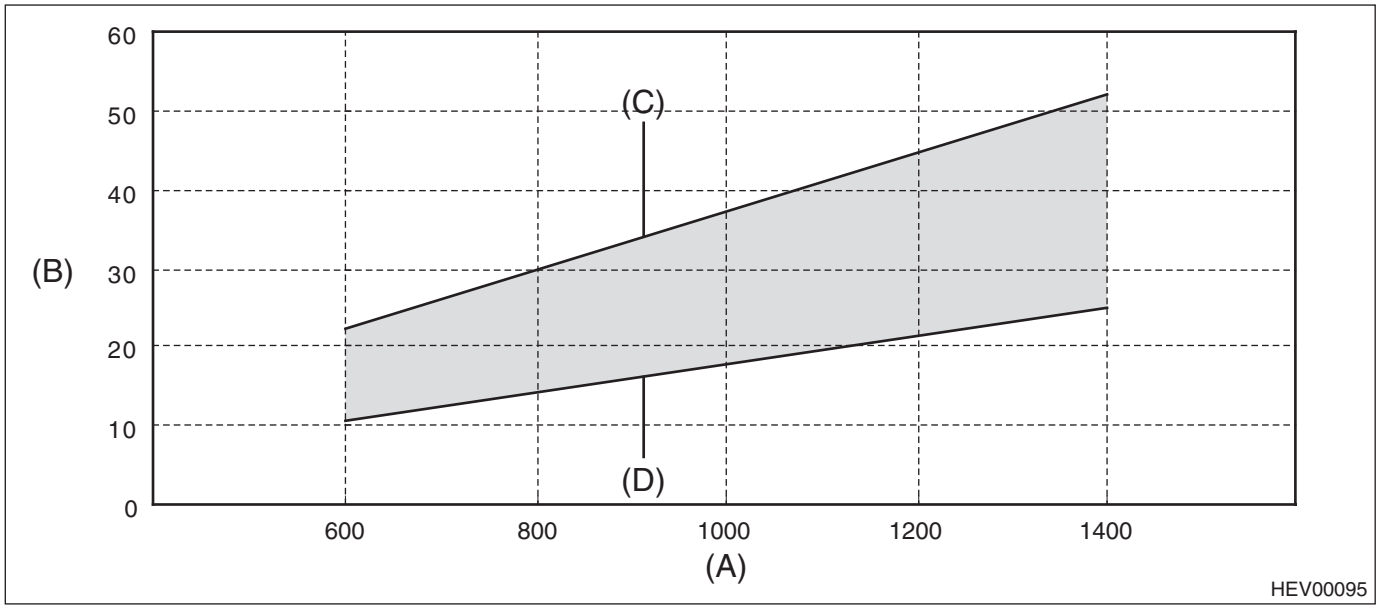
(A) Ground measuring points

- Electric oil pump inverter



(A) Ground measuring points

NOTE:
Value of «Drive Motor Inverter Input High Voltage Sensor (Serial)» is proportional to «Drive Motor Speed».
- 1000 rpm: 18 V — 37 V
- 1400 rpm: 25 V — 52 V



(A) Drive motor speed
(B) Drive Motor Inverter Input High Voltage Sensor (Serial)
(C) Standard at Max.
(D) Standard at Min.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current flowing in drive motor.
Judge as NG when the current flowing in drive motor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	ON

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iw) NOTE: • ABS: Absolute value • Iw: W phase current	> 350 A

Time Needed for Diagnosis: 0.0003 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iw)	≤ 350 A

Time Needed for Diagnosis: 0.0006 seconds

BA:DTC P0A78 DRIVE MOTOR "A" INVERTER PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-239, OUTLINE OF DIAGNOSIS, DTC P0A78 DRIVE MOTOR "A" INVERTER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

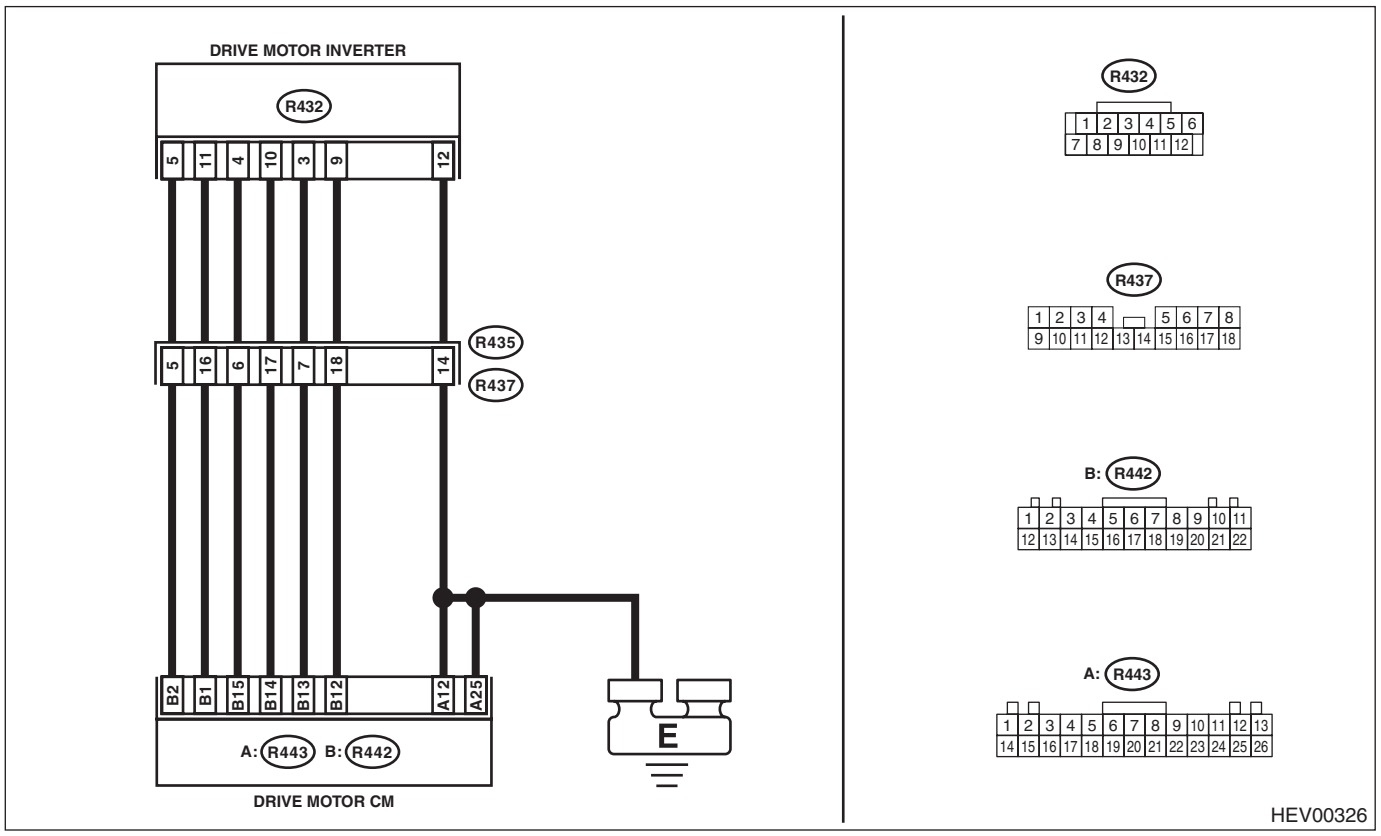
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

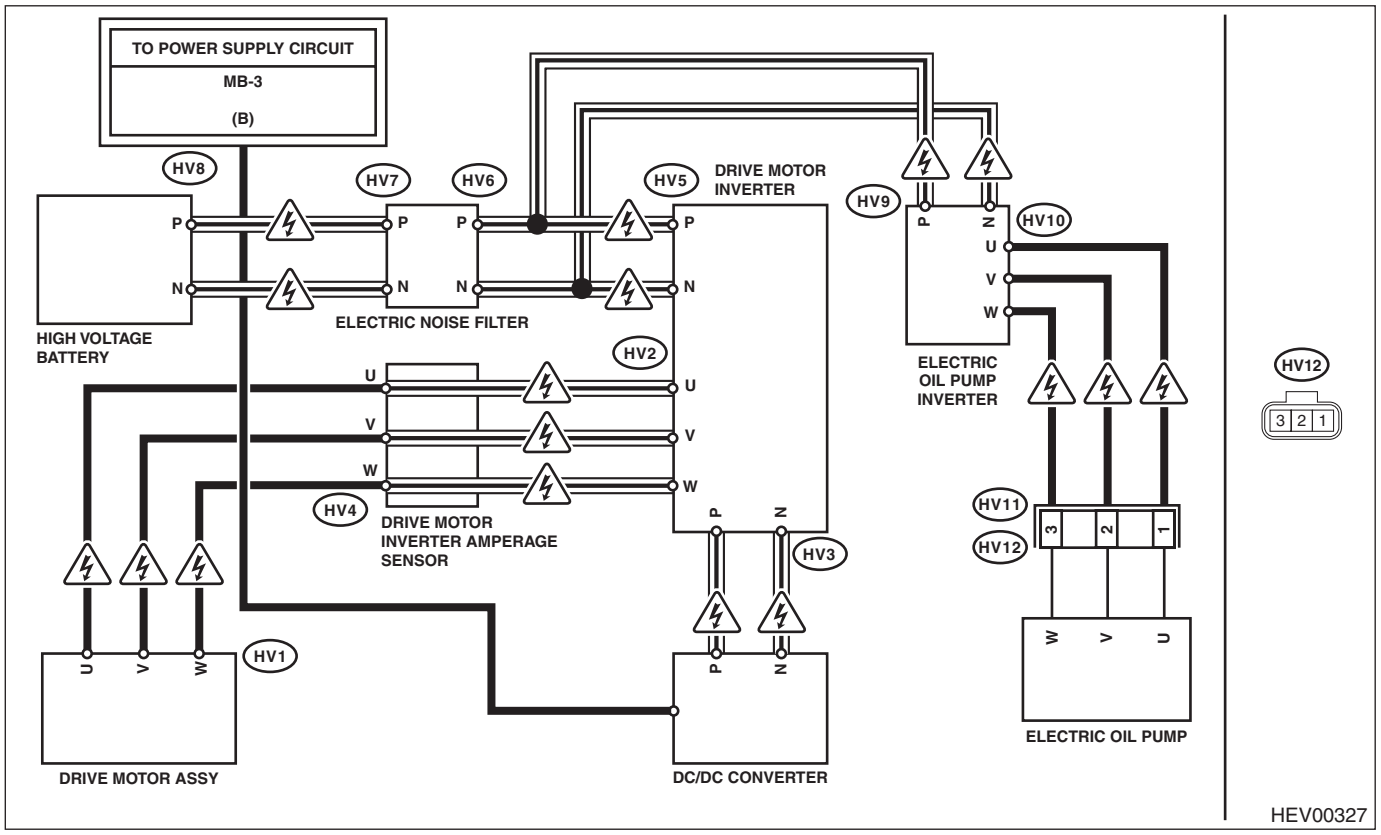
CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>





	Step	Check	Yes	No
1	**CHECK DETAIL CODE.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Detail Code». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is «Detail Code» displayed?	If 500 is displayed, Go to step **2**. If 501, 502 are displayed, Go to step **17**. If 503 — 508 is displayed, Go to step **19**. NOTE: Check all the counting codes.	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Inverter Serial Check». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value show «Abnormal»?	Perform the diagnosis according to DTC P1C30. <Ref. to HEV(diag)-318, DTC P1C30 LOST COMMUNICATION WITH DRIVE MOTOR "A" INVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **4**.
4	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Phase U Amperage Sensor Voltage» «Phase V Amperage Sensor Voltage» «Phase W Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 2.5 V±0.1 V?	Go to step **5**.	Perform the diagnosis according to DTC P0BE6 and P06B1. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>
5	**CHECK HARNESS (GATE SIGNAL SHORT TO POWER AND SHORT IN OTHER SIGNAL LINES).** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector. 3) Disconnect the drive motor inverter connector. 4) Disconnect the intermediate connector (R436). 5) Using a tester, measure the resistance between DMCM connector and individual connectors. ***Connector & terminal*** ***(R442) No. 2 — (R442) No. 1 — 22:*** ***(R442) No. 2 — (R443) No. 1 — 26:*** ***(R442) No. 2 — (R436) No. 1 — 8:*** ***(R442) No. 2 — (R432) No. 7:*** ***(R442) No. 1 — (R442) No. 1 — 22:*** ***(R442) No. 1 — (R443) No. 1 — 26:*** ***(R442) No. 1 — (R436) No. 1 — 8:*** ***(R442) No. 1 — (R432) No. 7:*** ***(R442) No. 15 — (R442) No. 1 — 22:*** ***(R442) No. 15 — (R443) No. 1 — 26:*** ***(R442) No. 15 — (R436) No. 1 — 8:*** ***(R442) No. 15 — (R432) No. 7:*** ***(R442) No. 14 — (R442) No. 1 — 22:*** ***(R442) No. 14 — (R443) No. 1 — 26:*** ***(R442) No. 14 — (R436) No. 1 — 8:*** ***(R442) No. 14 — (R432) No. 7:*** ***(R442) No. 13 — (R442) No. 1 — 22:*** ***(R442) No. 13 — (R443) No. 1 — 26:*** ***(R442) No. 13 — (R436) No. 1 — 8:*** ***(R442) No. 13 — (R432) No. 7:*** ***(R442) No. 12 — (R442) No. 1 — 22:*** ***(R442) No. 12 — (R443) No. 1 — 26:*** ***(R442) No. 12 — (R436) No. 1 — 8:*** ***(R442) No. 12 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair short circuit in harness between DMCM connector and drive motor inverter connector, or repair the intermediate connector.

	Step	Check	Yes	No
6	**CHECK DRIVE MOTOR INVERTER (SHORT).** 1) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 3) Wait for 10 minutes. 4) Disconnects power cable (HV2, HV3) and bus bar (HV5) from the drive motor inverter. NOTE: Be sure to use insulating tape. 5) Using a tester, check continuity between drive motor inverter terminals. NOTE: When checking continuity, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. ***Connector & terminal*** ***(HV5) P (+) — (HV2) U (–):*** ***(HV5) P (+) — (HV2) V (–):*** ***(HV5) P (+) — (HV2) W (–):*** ***(HV2) U (+) — (HV5) N (–):*** ***(HV2) V (+) — (HV5) N (–):*** ***(HV2) W (+) — (HV5) N (–):*** ***(HV5) P (+) — (HV5) N (–):*** ***(HV2) U (+) — (HV2) V (–):*** ***(HV2) U (+) — (HV2) W (–):*** ***(HV2) V (+) — (HV2) W (–):*** ***(HV5) P (+) — Chassis ground (–):*** ***(HV5) N (+) — Chassis ground (–):*** ***(HV2) U (+) — Chassis ground (–):*** ***(HV2) V (+) — Chassis ground (–):*** ***(HV2) W (+) — Chassis ground (–):***	Is there continuity?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> Go to step **15**.	Go to step **7**.
7	**CHECK DRIVE MOTOR INVERTER (RELEASED).** Using diode voltage measuring mode on a insulation multimeter, measure the voltage between the terminals of the drive motor inverter. NOTE: When checking voltage values, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. ***Connector & terminal*** ***(HV2) U (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) U (–):*** ***(HV2) V (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) V (–):*** ***(HV2) W (+) — (HV5) P (–):*** ***(HV5) N (+) — (HV2) W (–):***	Is “O.L” indicated?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> Go to step **15**.	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK HIGH VOLTAGE UNIT (SHORT).** 1) Remove electric noise filter, DC/DC converter, and electric oil pump inverter. 2) Using a tester, check for continuity between terminals of each unit. NOTE: • When checking continuity, always follow the combinations as follows with correct polarities. If polarities are reversed when checking, the trouble may not be accurately diagnosed. • For ground measuring points of electric noise filter, DC/DC converter, and electric oil pump inverter, refer to Notes in the margin. ***Connector & terminal*** ***(HV6) P (+) — (HV7) N (–):*** ***(HV6) P (+) — Electric noise filter ground (–):*** ***(HV6) N (+) — Electric noise filter ground (–):*** ***(HV3) P (+) — (HV3) N (–):*** ***(HV3) P (+) — DC/DC converter ground (–) :*** ***(HV3) N (+) — DC/DC converter ground (–):*** ***(HV9) P (+) — (HV9) N (–):*** ***(HV9) P (+) — (HV10) U (–):*** ***(HV9) P (+) — (HV10) V (–):*** ***(HV9) P (+) — (HV10) W (–):*** ***(HV10) U (+) — (HV9) N (–):*** ***(HV10) V (+) — (HV9) N (–):*** ***(HV10) W (+) — (HV9) N (–):*** ***(HV10) U (+) — (HV10) V (–):*** ***(HV10) U (+) — (HV10) W (–):*** ***(HV10) V (+) — (HV10) W (–):*** ***(HV9) P (+) — Electric oil pump inverter ground (–):*** ***(HV9) N (+) — Electric oil pump inverter ground (–):*** ***(HV10) U (+) — Electric oil pump inverter ground (–):*** ***(HV10) V (+) — Electric oil pump inverter ground (–) :*** ***(HV10) W (+) — Electric oil pump inverter ground (–):*** ***(HV8) P (+) — (HV8) N (–):*** ***(HV8) P (+) — Chassis ground (–):*** ***(HV8) N (+) — Chassis ground (–):***	Is there continuity?	Replace the unit that has continuity. Go to step **14**.	Go to step **9**.
9	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT TO GROUND).** Using an insulation multimeter (250 V range), measure the resistance between power cable terminals and chassis ground. ***Connector & terminal*** ***(HV2) U — Chassis ground:*** ***(HV2) V — Chassis ground:*** ***(HV2) W — Chassis ground:***	Is the resistance 2 MΩ or more?	If you have a milliohm tester at hand, Go to step **10**. If a milliohm tester is not at hand, Go to step **13**.	Go to step **11**.

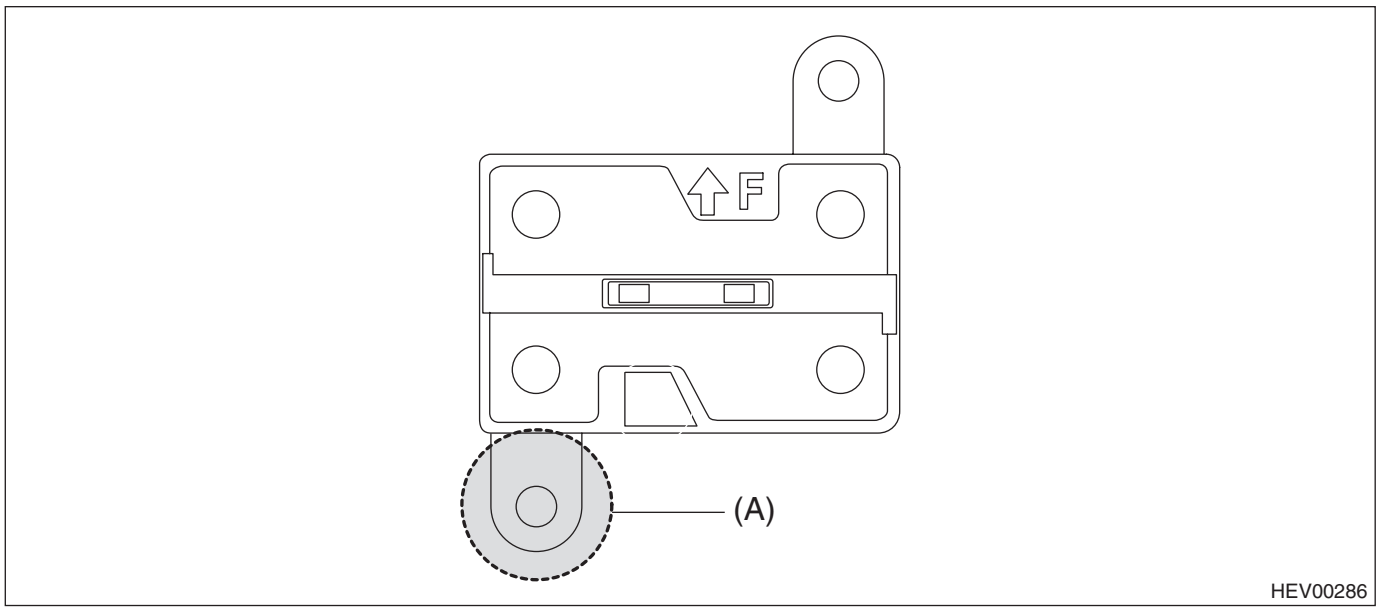
	Step	Check	Yes	No
10	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT).** Using a milliohm tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Is either resistance value less than 25 mΩ?	Go to step **12**.	Go to step **16**.
11	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT TO GROUND).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using an insulation multimeter (250 V range), measure the resistance between power cable terminals and chassis ground. ***Connector & terminal*** ***(HV1) U — Chassis ground:*** ***(HV1) V — Chassis ground:*** ***(HV1) W — Chassis ground:***	Does the resistance between any points show less than 2 MΩ?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **15**.
12	**CHECK POWER CABLE AND DRIVE MOTOR (SHORT).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using a milliohm tester, measure the resistance between power cable terminals and chassis ground. ***Connector & terminal*** ***(HV1) U — Chassis ground:*** ***(HV1) V — Chassis ground:*** ***(HV1) W — Chassis ground:***	Is resistance between either lines less than 20 mΩ?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **15**.
13	**CHECK DRIVE MOTOR (SHORT).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to “D” range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Are any of the following statements relevant? • «Drive Motor Inverter Input High Voltage Sensor (Serial)» is out of the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm. • Abnormal noise and changes in rotation speed occur near 600 rpm.	Go to step **14**.	Go to step **16**.

	Step	Check	Yes	No
14	**CHECK DRIVE MOTOR AND POWER CABLE.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Disconnect the power cable (HV2) of drive motor inverter. 4) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 5) Using a insulation multimeter (250 V range), measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Does the resistance between any points show 2 MΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the short circuit of the power cable. Go to step **15**.
15	**CHECK OF DRIVE MOTOR (DEMAGNETIZATION).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to "D" range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	«Drive Motor Inverter Input High Voltage Sensor (Serial)» is within the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>
16	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform drive cycle A. <Ref. to HEV(diag)-32, DRIVE CYCLE A, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.
17	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Inverter Serial Check». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value show «Abnormal»?	Perform the diagnosis according to DTC P1C30. <Ref. to HEV(diag)-318, DTC P1C30 LOST COMMUNICATION WITH DRIVE MOTOR "A" INVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **18**.

	Step	Check	Yes	No
18	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform drive cycle A. <Ref. to HEV(diag)-32, DRIVE CYCLE A, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.
19	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **20**.
20	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Phase U Amperage Sensor Voltage» «Phase V Amperage Sensor Voltage» «Phase W Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 2.5 V±0.1 V?	Go to step **21**.	Perform the diagnosis according to DTC P0BE6 and P06B1. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>
21	**CHECK DRIVE MOTOR INVERTER (INTERNAL SHORT).** 1) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 3) Wait for 10 minutes. 4) Disconnect the DMCM connector. 5) Disconnect the drive motor inverter connector. 6) Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R442) No. 2 — Ground bolt of inverter frame body:*** ***(R442) No. 1 — Ground bolt of inverter frame body:*** ***(R442) No. 15 — Ground bolt of inverter frame body:*** ***(R442) No. 14 — Ground bolt of inverter frame body:*** ***(R442) No. 13 — Ground bolt of inverter frame body:*** ***(R442) No. 12 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **22**.	Repair short to ground circuit in harness between DMCM connector and drive motor inverter connector, or repair the intermediate connector.

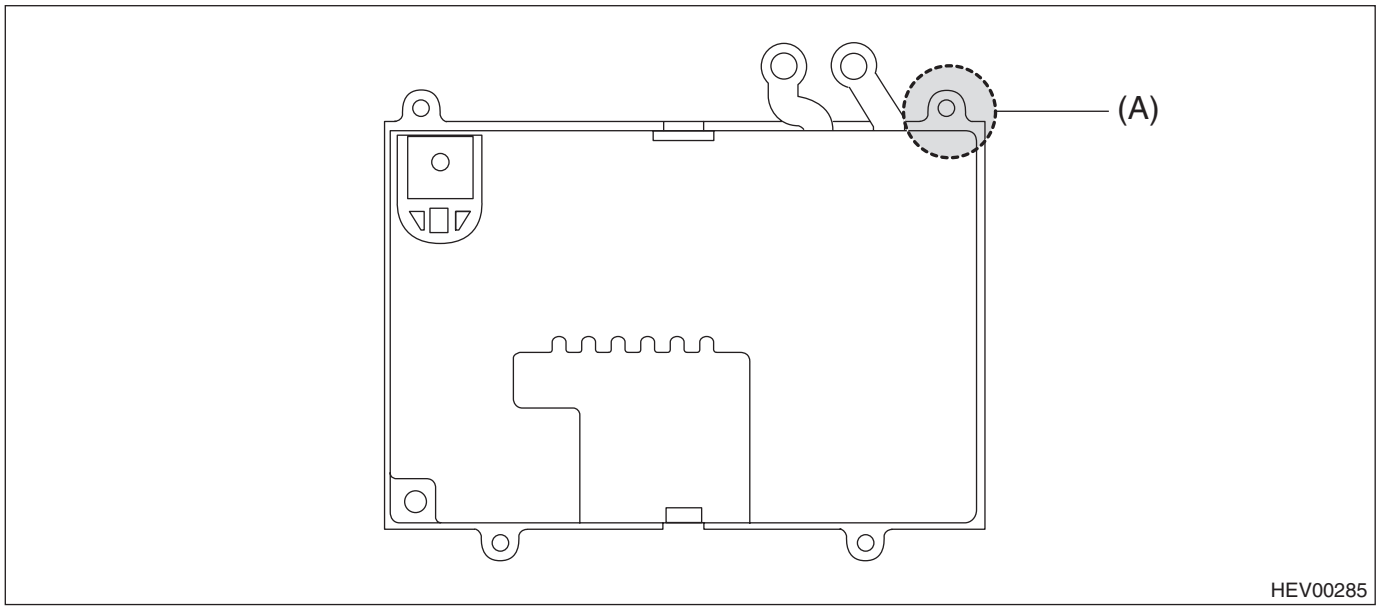
	Step	Check	Yes	No
22	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the drive motor inverter connector and DMCM connector. ***Connector & terminal*** ***(R442) No. 2 — (R432) No. 5:*** ***(R442) No. 1 — (R432) No. 11:*** ***(R442) No. 15 — (R432) No. 4:*** ***(R442) No. 14 — (R432) No. 10:*** ***(R442) No. 13 — (R432) No. 3:*** ***(R442) No. 12 — (R432) No. 9:***	Is the resistance less than 1 Ω?	Go to step **23**.	Repair open circuit in harness between DMCM connector and drive motor inverter connector, or repair the intermediate connector.
23	**CHECK POWER CABLE AND DRIVE MOTOR (OPEN CIRCUIT).** 1) Leave the vehicle for ten minutes under temperature of 40°C (104°F) or less. 2) Disconnect the power cable (HV2) from drive motor inverter. 3) Using a tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Is resistance between either lines 1 Ω or more?	Go to step **24**.	Go to step **25**.
24	**CHECK DRIVE MOTOR (OPEN CIRCUIT).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 3) Using the tester, measure the resistance between drive motor terminals. ***Connector & terminal*** ***(HV1) U — (HV1) V:*** ***(HV1) U — (HV1) W:*** ***(HV1) V — (HV1) W:***	Is resistance between either lines 1 Ω or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair or replace the open circuit of the power cable.
25	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform drive cycle A. <Ref. to HEV(diag)-32, DRIVE CYCLE A, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.

NOTE:
Ground measuring points
- Electric noise filter



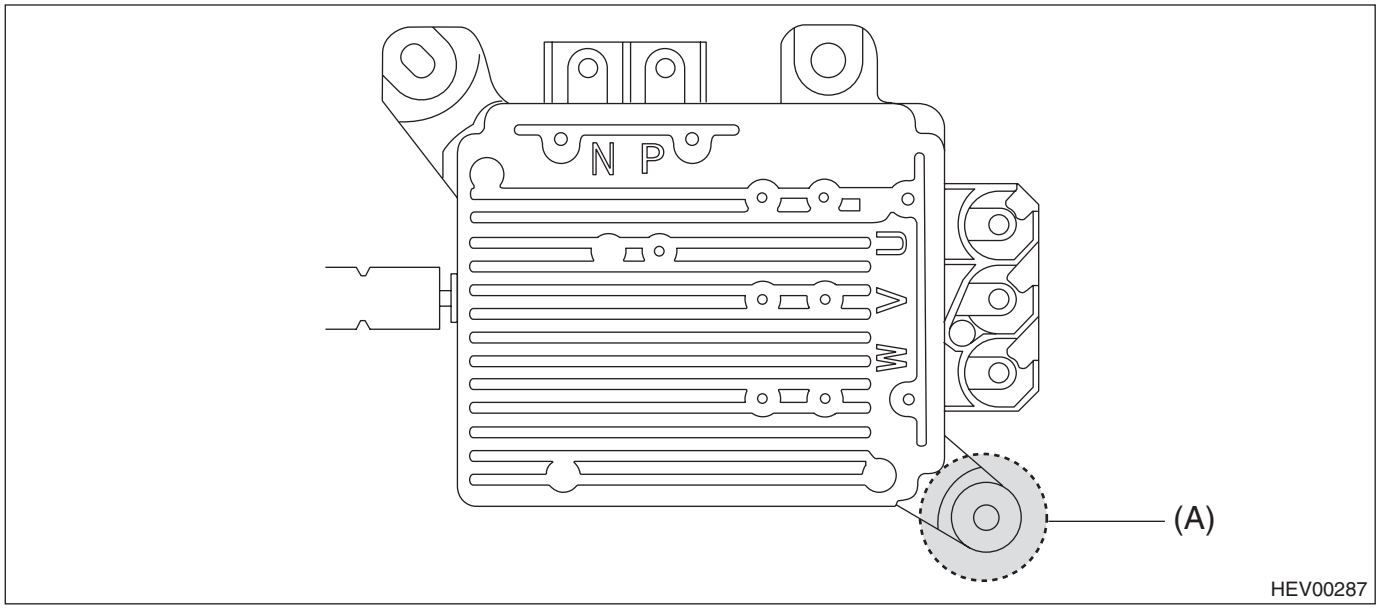
(A) Ground measuring points

- DC/DC converter



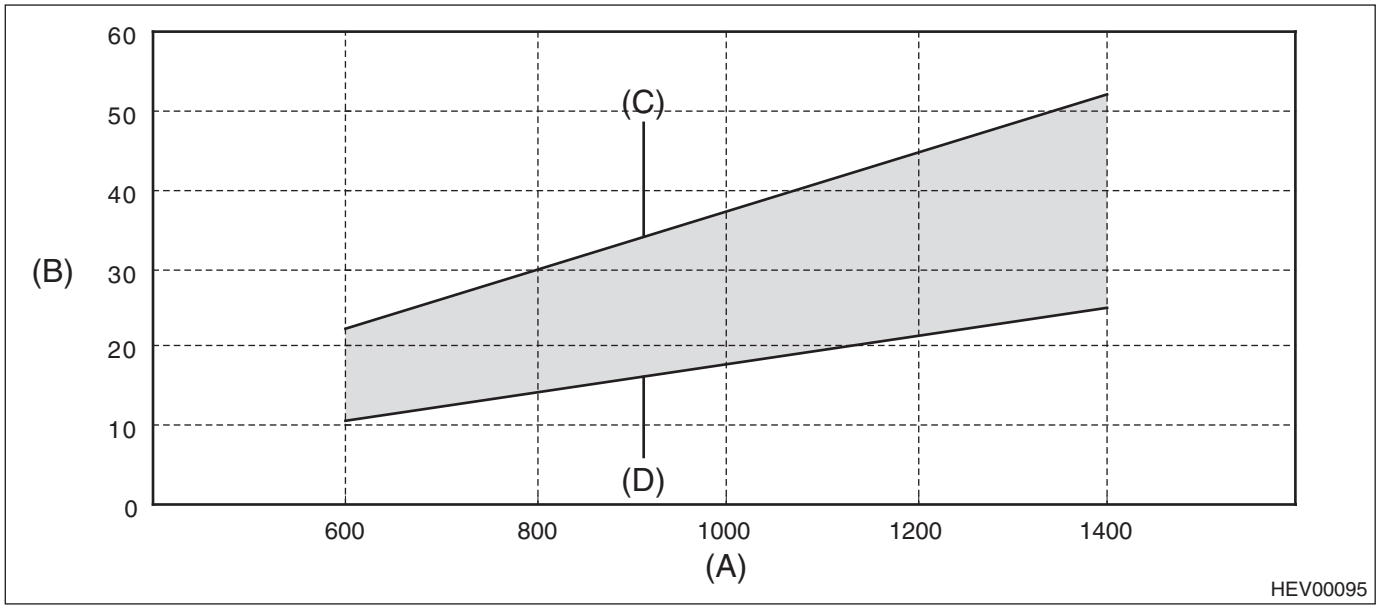
(A) Ground measuring points

- Electric oil pump inverter



(A) Ground measuring points

NOTE:
Value of «Drive Motor Inverter Input High Voltage Sensor (Serial)» is proportional to «Drive Motor Speed».
- 1000 rpm: 18 V — 37 V
- 1400 rpm: 25 V — 52 V



(A) Drive motor speed
(B) Drive Motor Inverter Input High Voltage Sensor (Serial)
(C) Standard at Max.
(D) Standard at Min.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter.
Judge as NG when the malfunction is detected in the internal circuit of drive motor inverter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal (internal data) from IC in the drive motor inverter	ON

Time Needed for Diagnosis: 0.03 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal (internal data) from IC in the drive motor inverter	OFF

Time Needed for Diagnosis: 0.02 seconds

BB:DTC P0A82 HYBRID/EV BATTERY PACK COOLING FAN 1 PERFORMANCE/ STUCK OFF

DIAGNOSIS:

- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)
- GENERAL DESCRIPTION <Ref. to HEV(diag)-242, OUTLINE OF DIAGNOSIS, DTC P0A82 HYBRID/EV BATTERY PACK COOLING FAN 1 PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

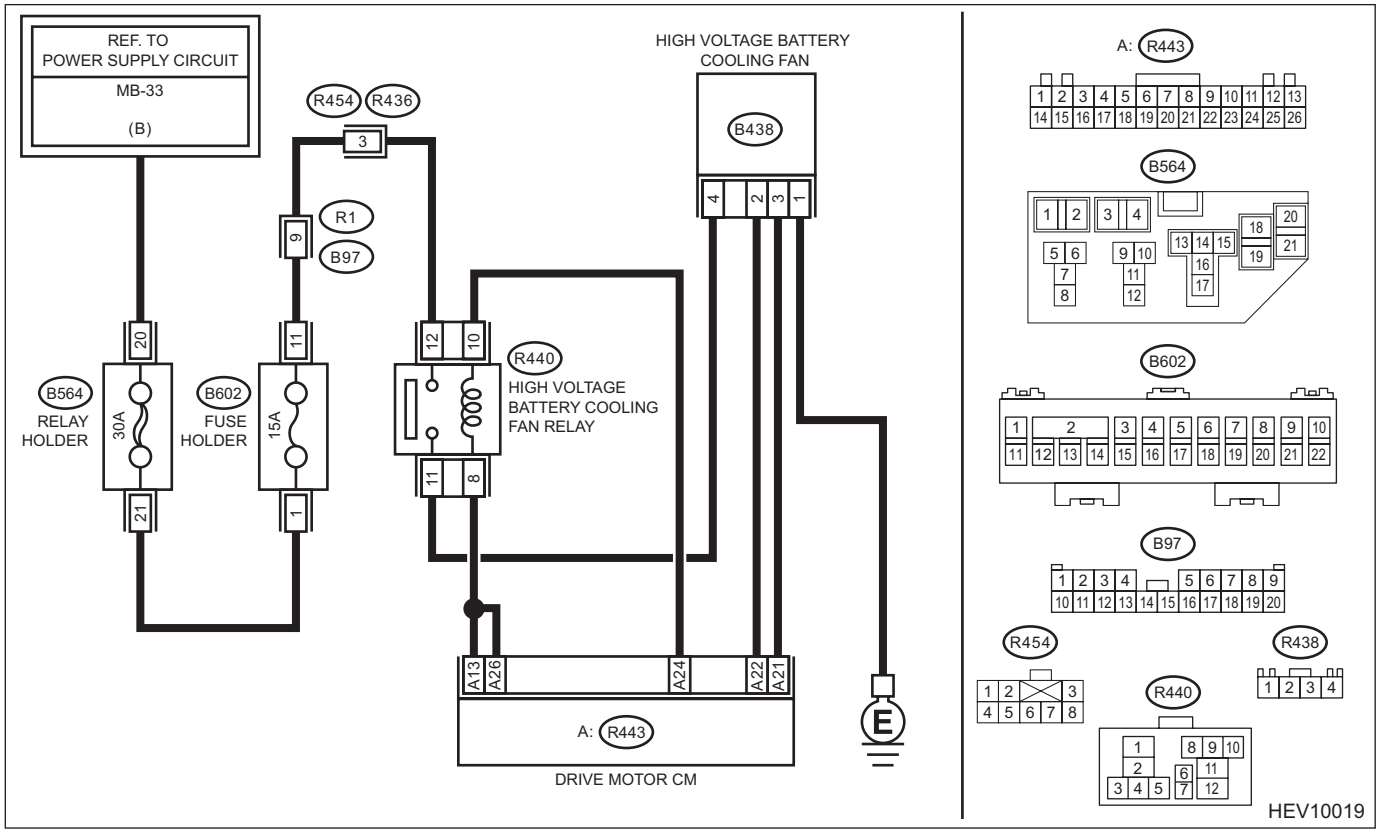
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK HIGH VOLTAGE BATTERY COOLING FAN.** Using the Subaru Select Monitor, perform «High Voltage Battery Cooling Fan» of System Operation Check Mode for the drive motor control system. <Ref. to HEV(diag)-70, DRIVE MOTOR CONTROL SYSTEM, OPERATION, System Operation Check Mode.>	Does the cooling fan speed change when the speed is switched across 4 steps (Stop, Steps 1 — 3)?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector. 3) Disconnect the high voltage battery cooling fan connector. 4) Using a tester, measure the resistance between the high voltage battery cooling fan connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R443) No. 21 — (R438) No. 3:*** ***(R443) No. 22 — (R438) No. 2:*** ***(R438) No. 1 — Ground bolt of inverter frame body:*** ***(R438) No. 4 — (R440) No. 11:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair open circuit in harness between DMCM connector and high voltage battery cooling fan connector, or repair the intermediate connector.
3	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** Using a tester, measure the resistance between the high voltage battery cooling fan connector and other signal lines. ***Connector & terminal*** ***(R443) No. 21 — (R438) No. 4:*** ***(R443) No. 21 — (R443) No. 1 — 26:*** ***(R443) No. 21 — (R442) No. 1 — 22:*** ***(R443) No. 21 — (R436) No. 1 — 8:*** ***(R443) No. 22 — (R438) No. 4:*** ***(R443) No. 22 — (R443) No. 1 — 26:*** ***(R443) No. 22 — (R442) No. 1 — 22:*** ***(R443) No. 22 — (R436) No. 1 — 8:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to power in harness between DMCM connector and high voltage battery cooling fan connector, or repair the intermediate connector.
4	**CHECK DTC.** 1) Replace the high voltage battery cooling fan. <Ref. to HEV-59, High Voltage Battery Cooling System.> 2) Perform drive cycle H. <Ref. to HEV(diag)-38, DRIVE CYCLE H, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	There is an abnormal condition in the high voltage battery cooling fan.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery cooling fan.
Judge as NG when the performance of high voltage battery cooling fan is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Commanded cooling fan duty	≥ 20%
12 V battery system voltage	> 9.3 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured cooling fan speed	< Map

Map

Commanded cooling fan duty (%)	20	40	60	80	100
Measured inverter cooling fan motor speed (rpm)	300	700	1050	1200	1200

Time Needed for Diagnosis: 20 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured cooling fan speed	≥ Map

Time Needed for Diagnosis: 1 second

BC:DTC P0A83 HYBRID/EV BATTERY PACK COOLING FAN 1 STUCK ON

DIAGNOSIS:

- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)
- GENERAL DESCRIPTION <Ref. to HEV(diag)-245, OUTLINE OF DIAGNOSIS, DTC P0A83 HYBRID/EV BATTERY PACK COOLING FAN 1 STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

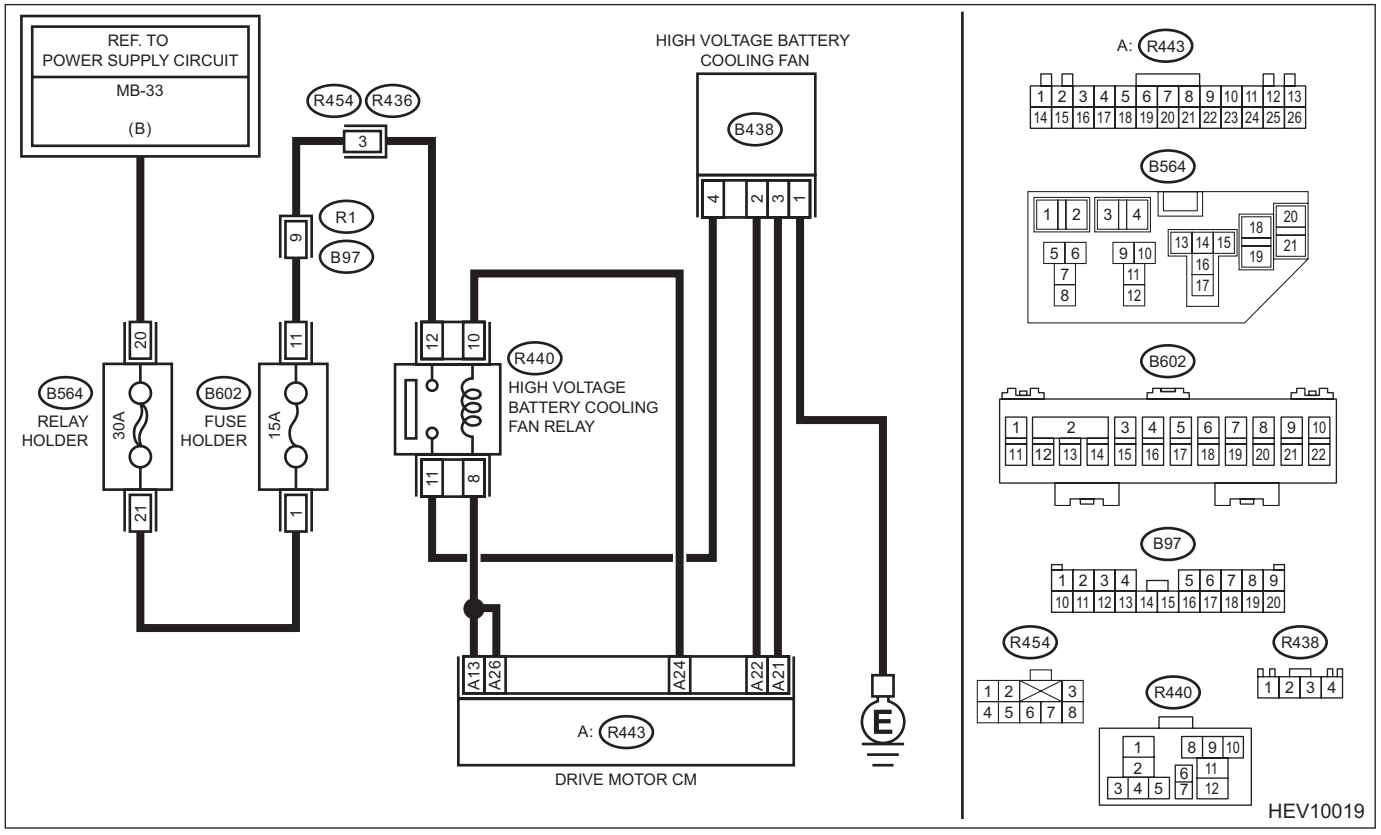
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK HIGH VOLTAGE BATTERY COOLING FAN.** Using the Subaru Select Monitor, perform «High Voltage Battery Cooling Fan» of System Operation Check Mode for the drive motor control system. <Ref. to HEV(diag)-70, DRIVE MOTOR CONTROL SYSTEM, OPERATION, System Operation Check Mode.>	Does the cooling fan speed change when the speed is switched across 4 steps (Stop, Steps 1 — 3)?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the DMCM connector. 3) Disconnect the high voltage battery cooling fan connector. 4) Using a tester, measure the resistance between the high voltage battery cooling fan connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R438) No. 2 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair short to ground circuit in harness between DMCM connector and high voltage battery cooling fan connector, or repair the intermediate connector.
3	**CHECK DTC.** 1) Replace the high voltage battery cooling fan. <Ref. to HEV-59, High Voltage Battery Cooling System.> 2) Perform drive cycle H. <Ref. to HEV(diag)-38, DRIVE CYCLE H, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	There is an abnormal condition in the high voltage battery cooling fan.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery cooling fan.
Judge as NG when the performance of high voltage battery cooling fan is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Commanded cooling fan duty	= 0%
12 V battery system voltage	> 9.3 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured cooling fan speed	> 300 rpm

Time Needed for Diagnosis: 20 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured cooling fan speed	≤ 300 rpm

Time Needed for Diagnosis: 20 seconds

BD:DTC P0A90 DRIVE MOTOR "A" PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-252, OUTLINE OF DIAGNOSIS, DTC P0A90 DRIVE MOTOR "A" PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

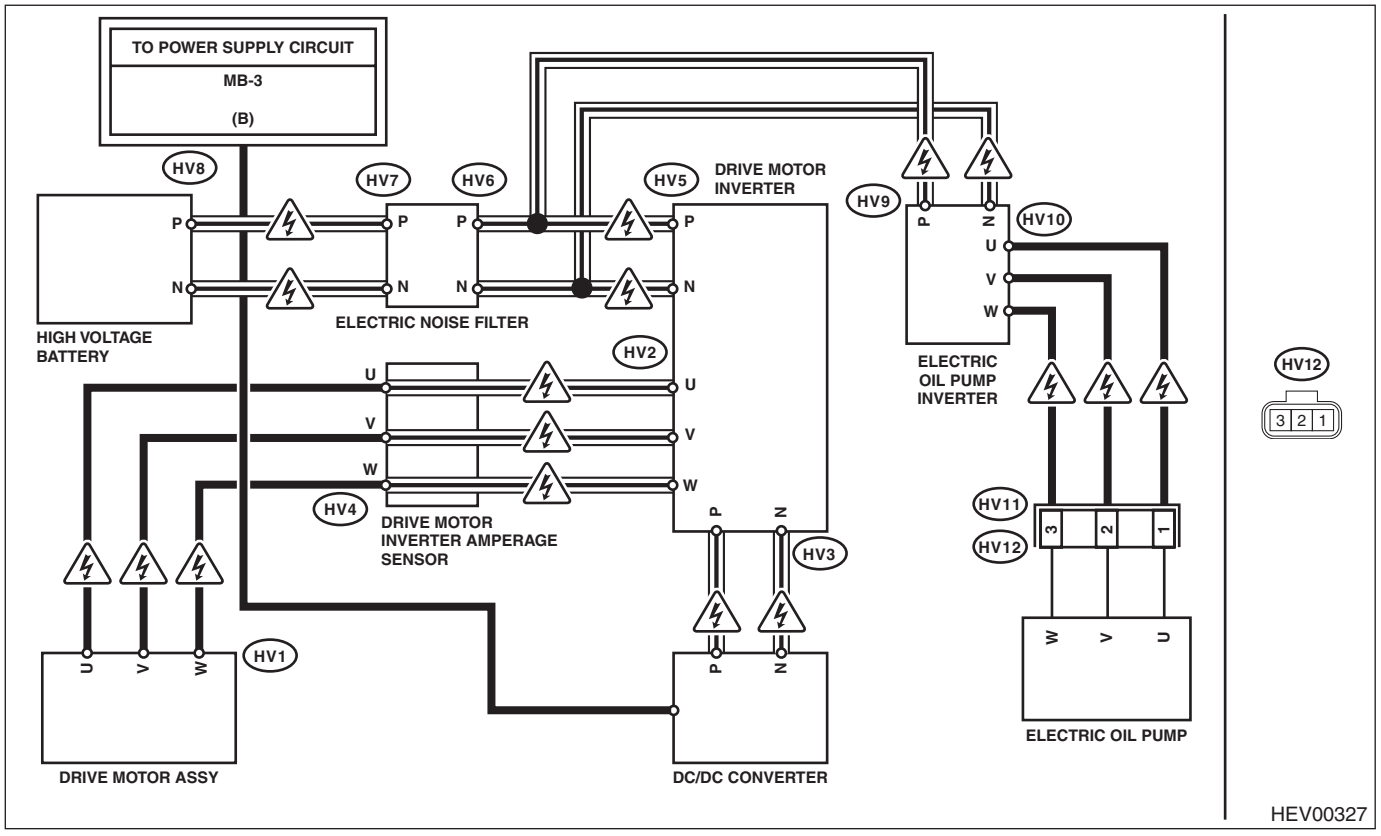
Normal control

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are DTCs (relating to current sensors, speed sensors) detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.

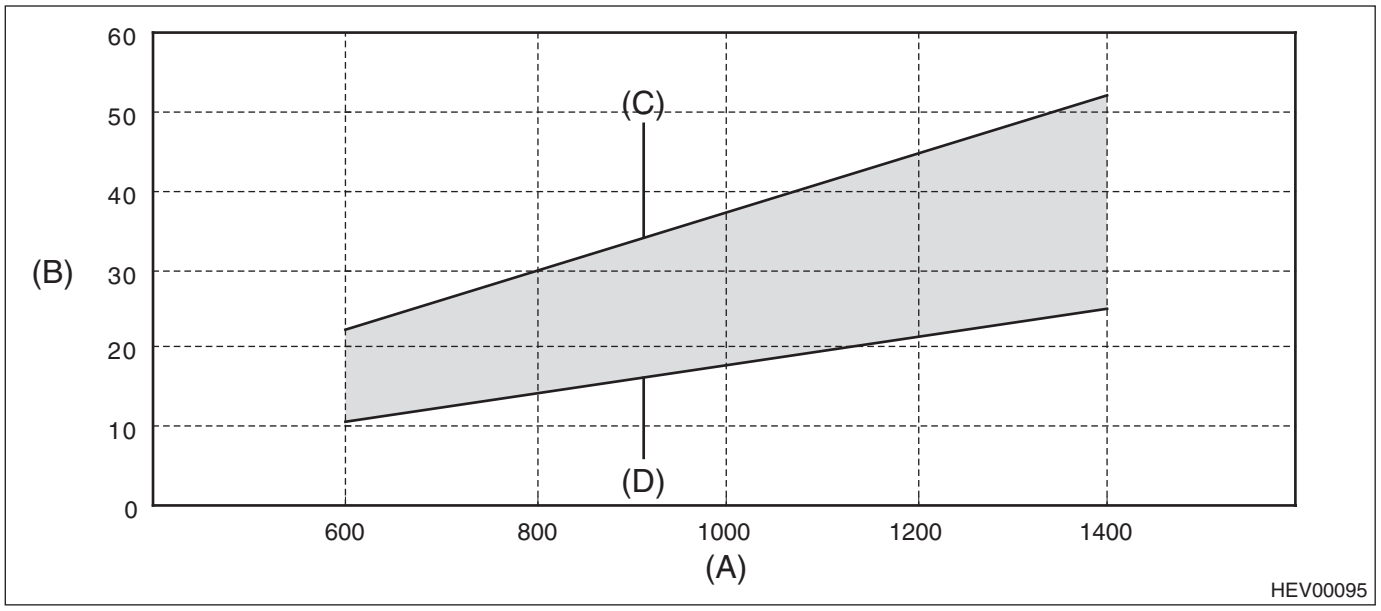
	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Phase U Amperage Sensor Voltage» «Phase V Amperage Sensor Voltage» «Phase W Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 2.5 V±0.1 V?	Go to step **3**.	Perform the diagnosis according to DTC P0BE6. <Ref. to HEV(diag)-268, DTC P0BE6 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
3	**CHECK DRIVE MOTOR AND POWER CABLE (DEMAGNETIZATION, SHORT).** 1) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 2) Lift up the vehicle. 3) Start the engine, and set the shift lever to "D" range. 4) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Are any of the following statements relevant? • «Drive Motor Inverter Input High Voltage Sensor (Serial)» is out of the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm. • Abnormal noise and changes in rotation speed occur near 600 rpm.	If you have a milliohm tester at hand, Go to step **6**. If a milliohm tester is not at hand, Go to step **11**.	If you have a milliohm tester at hand, Go to step **4**. If a milliohm tester is not at hand, Go to step **10**.
4	**CHECK DRIVE MOTOR AND POWER CABLE (SHORT).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Drive Motor Temperature A» «Drive Motor Temperature B» are 40°C (104°F) or less. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.> 3) Turn the ignition switch to OFF. 4) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 5) Disconnect the power cable (HV2) of drive motor inverter. 6) Using a milliohm tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Is either resistance value 25 mΩ or less?	Go to step **5**.	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

	Step	Check	Yes	No
5	**CHECK DRIVE MOTOR (SHORT).** 1) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 2) Using a milliohm tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV1) U — (HV1) V:*** ***(HV1) U — (HV1) W:*** ***(HV1) V — (HV1) W:***	Is either resistance value 20 mΩ or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Replace the power cable. <Ref. to HEV-51, Power Cable.> Go to step **16**.
6	**CHECK BUS BAR.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the bus bar.	Is it normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **7**.	Retighten the bolts. Or replace the bus bar.
7	**CHECK DRIVE MOTOR AND POWER CABLE.** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Drive Motor Temperature A» «Drive Motor Temperature B» are 40°C (104°F) or less. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.> 3) Turn the ignition switch to OFF. 4) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 5) Disconnect the power cable (HV2) of drive motor inverter. 6) Using a milliohm tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Is either resistance value out of 25 — 80 mΩ range?	Go to step **8**.	Go to step **9**.
8	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 2) Using a milliohm tester, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV1) U — (HV1) V:*** ***(HV1) U — (HV1) W:*** ***(HV1) V — (HV1) W:***	Is either resistance value out of 20 — 70 mΩ range?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Replace the power cable. <Ref. to HEV-51, Power Cable.> Go to step **16**.

	Step	Check	Yes	No
9	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Restore the vehicle to its original state. 3) Perform drive cycle B. <Ref. to HEV(diag)-34, DRIVE CYCLE B, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.
10	**CHECK POWER CABLE (SHORT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Disconnect the power cable (HV2) of drive motor inverter. 4) Using a insulation multimeter (250 V range), measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Does the resistance between any points show 2 MΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Replace the power cable. <Ref. to HEV-51, Power Cable.> Go to step **16**.
11	**CHECK BUS BAR.** Check the bus bar.	Is it normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **12**.	Retighten the bolts. Or replace the bus bar.
12	**CHECK DRIVE MOTOR AND POWER CABLE.** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Drive Motor Temperature A» «Drive Motor Temperature B» are 40°C (104°F) or less. <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.> 3) Turn the ignition switch to OFF. 4) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 5) Disconnect the power cable (HV2) of drive motor inverter. 6) Using an insulation multimeter, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV2) U — (HV2) V:*** ***(HV2) U — (HV2) W:*** ***(HV2) V — (HV2) W:***	Is either resistance value 0.3 Ω or more?	Go to step **13**.	Go to step **14**.

	Step	Check	Yes	No
13	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor power cable (HV1). NOTE: The gasket is not reusable. 2) Using an insulation multimeter, measure the resistance between power cable terminals. ***Connector & terminal*** ***(HV1) U — (HV1) V:*** ***(HV1) U — (HV1) W:*** ***(HV1) V — (HV1) W:***	Is either resistance value 0.3 Ω or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Replace the power cable. <Ref. to HEV-51, Power Cable.>
14	**CHECK DRIVE MOTOR AND POWER CABLE.** 1) Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.> 2) Replace the power cable. <Ref. to HEV-51, Power Cable.> 3) Restore the vehicle to its original state. 4) Perform drive cycle B. <Ref. to HEV(diag)-34, DRIVE CYCLE B, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Go to step **15**.	Problem is present in drive motor assembly or power cable.
15	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform drive cycle B. <Ref. to HEV(diag)-34, DRIVE CYCLE B, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.
16	**CHECK OF DRIVE MOTOR (DEMAGNETIZATION).** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to “D” range. 5) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	«Drive Motor Inverter Input High Voltage Sensor (Serial)» is within the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>

NOTE:
Value of «Drive Motor Inverter Input High Voltage Sensor (Serial)» is proportional to «Drive Motor Speed».
- 1000 rpm: 18 V — 37 V
- 1400 rpm: 25 V — 52 V



(A) Drive motor speed
(B) Drive Motor Inverter Input High Voltage Sensor (Serial)
(C) Standard at Max.
(D) Standard at Min.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor.
Judge as NG when the performance of drive motor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: PWM output to the drive motor inverter	ON
b: ABS (Commanded motor output power) NOTE: ABS: Absolute value	> 5 kW
c: Motor speed	> 1000 rpm and < 3500 rpm
Continuous time of a, b and c	> 0.5 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
(Estimated motor output power / Commanded motor output power) × 100 NOTE: • Estimated motor output power = (V × I) • Commanded motor output power = (N × T × 2 × π) / 60 • V: Commanded motor voltage • I: Measured motor current • N: Motor speed • T: Commanded motor torque	< 40%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
(Estimated motor output power / Commanded motor output power) × 100	≥ 40%

Time Needed for Diagnosis: 2 seconds

BE:DTC P0A94 DC/DC CONVERTER PERFORMANCE

DIAGNOSIS:

- Detects abnormal conditions in DC/DC converter.
- If the DC/DC converter detects serial communication errors with the drive motor control module, or internal errors are detected in the DC/DC converter, it is judged as NG.
- Immediately at fault recognition

TROUBLE SYMPTOM:

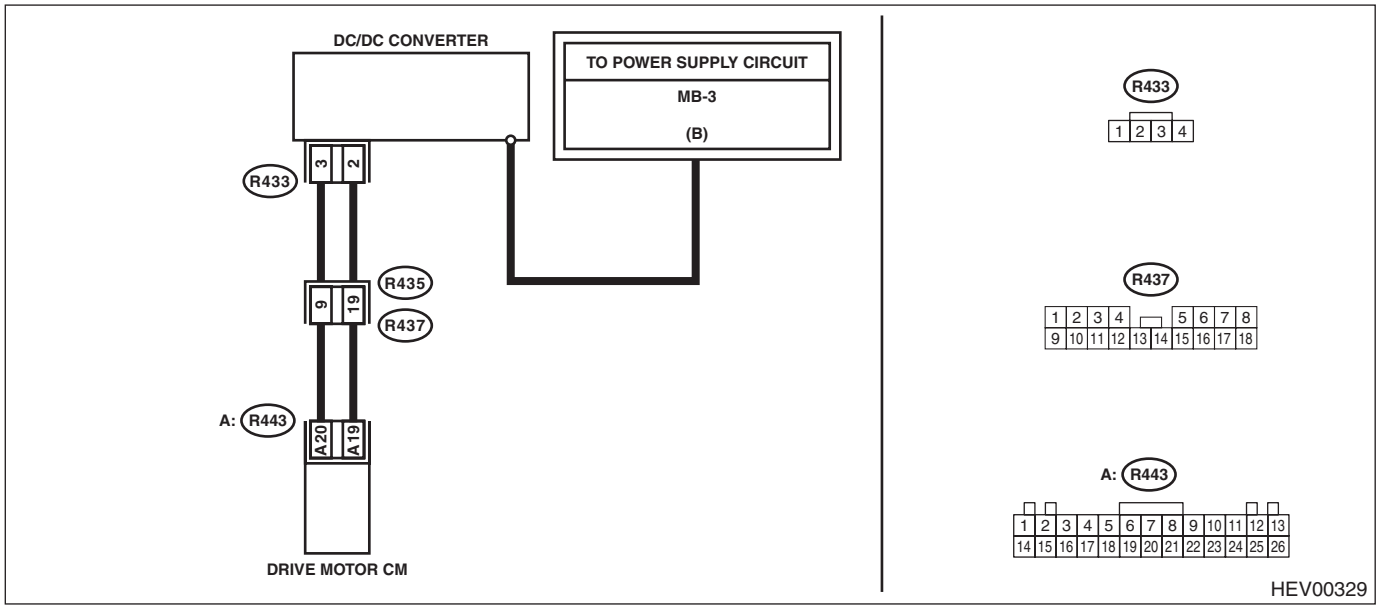
EV traveling/Auto Start Stop does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK DETAIL CODE.** Using the Subaru Select Monitor, confirm «Detail Code» in the freeze frame data of the drive motor control system. <Ref. to HEV(diag)-63, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Is «Detail Code» displayed?	If 0800 is displayed, Go to step **3**. If 0801 — 0806 is displayed, replace the DC/DC converter. <Ref. to HEV-38, DC/DC Converter.>	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

	Step	Check	Yes	No
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Disconnect the DC/DC converter connector. 2) Disconnect the DMCM connector. 3) Using a tester, measure the resistance between DC/DC converter connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R433) No. 2 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short to ground circuit in harness between DC/DC converter connector and DMCM connector, or repair the intermediate connector.
4	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between DC/DC converter connector and DMCM connector. ***Connector & terminal*** ***(R433) No. 2 — (R443) No. 19:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between DC/DC converter connector and DMCM connector, or repair the intermediate connector.
5	**CHECK HARNESS (SHORT TO OTHER SIGNAL).** Using the tester, measure the resistance in the DMCM connector. ***Connector & terminal*** ***(R443) No. 19 — (R442) No. 1 — 22:*** ***(R443) No. 19 — (R443) No. 1 — 26:*** ***(R443) No. 19 — (R436) No. 1 — 8:*** ***(R443) No. 19 — (R432) No. 7:*** ***(R443) No. 19 — DC/DC converter 12 V output line:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair short circuit in harness between DC/DC converter connector and DMCM connector, or repair the intermediate connector.
6	**CHECK DTC.** 1) Replace the DC/DC converter. <Ref. to HEV-38, DC/DC Converter.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in DC/DC converter.

BF:DTC P0AED DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-256, OUTLINE OF DIAGNOSIS, DTC P0AED DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Inverter Temperature A». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 204°C (399°F)?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter temperature sensor.
Judge as NG when the value of drive motor inverter temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Received

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Not received

Time Needed for Diagnosis: 0.02 seconds

BG:DTC P0AEE DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

• Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)

• GENERAL DESCRIPTION <Ref. to HEV(diag)-258, OUTLINE OF DIAGNOSIS, DTC P0AEE DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Turn the ignition switch to OFF and leave the vehicle 10 minutes unattended. 2) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Inverter Operation Update Counter». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Has the value changed (when the ignition is turned to ON)?	Go to step **2**.	Perform the diagnosis according to DTC P0C0C and P1C30. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Drive Motor Inverter Temperature A» «Drive Motor Inverter Temperature B» «Drive Motor Inverter Temperature C». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is either value at 204°C (399°F)?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>	Go to step **3**.
3	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Drive Motor Inverter Temperature A» «Drive Motor Inverter Temperature B» «Drive Motor Inverter Temperature C». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the difference between each temperature 30°C (54°F) or less?	Go to step **4**.	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>
4	**CHECK CURRENT DATA.** 1) With the Subaru Select Monitor connected, drive the vehicle for 10 minutes or more. 2) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Drive Motor Inverter Temperature A» «Drive Motor Inverter Temperature B» «Drive Motor Inverter Temperature C». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Have any of those values changed 10°C (18°F) or more from the temperature before driving the vehicle?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter temperature sensor.
Judge as NG when the characteristic of drive motor inverter temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N·m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N·m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
ABS (Variation of inverter temperature median)	> 20°C (68°F)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 ABS (Inverter temperature A – Inverter temperature median)	> 30°C (54°F)
Diagnosis 2 ABS ((Variation of Inverter temperature A) – (Variation of Inverter temperature median)) NOTE: • Variation of Inverter temperature A = Max (Inverter temperature A) – Min (Inverter temperature A) • Variation of Inverter temperature median = Max (Inverter temperature median) – Min (Inverter temperature median) • Max: The maximum value of the experience in the current driving cycle • Min: The minimum value of the experience in the current driving cycle	> 10°C (18°F)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear NG when continuous time when the following conditions are met is predetermined time or more (diagnosis 1 and diagnosis 2).

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 ABS (Inverter temperature A – Inverter temperature median)	≤ 30°C (54°F)
Diagnosis 2 ABS ((Variation of Inverter temperature A) – (Variation of Inverter temperature median))	≤ 10°C (18°F)

Time Needed for Diagnosis: 20 seconds

BH:DTC P0AF2 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-261, OUTLINE OF DIAGNOSIS, DTC P0AF2 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Inverter Temperature B». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 204°C (399°F)?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter temperature sensor.
Judge as NG when the value of drive motor inverter temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Received

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Not received

Time Needed for Diagnosis: 2 seconds

BI: DTC P0AF3 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)
- GENERAL DESCRIPTION <Ref. to HEV(diag)-262, OUTLINE OF DIAGNOSIS, DTC P0AF3 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0AEE DRIVE MOTOR INVERTER TEMPERATURE SENSOR “A” CIRCUIT RANGE/PERFORMANCE. <Ref. to HEV(diag)-257, DTC P0AEE DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter temperature sensor.
Judge as NG when the characteristic of drive motor inverter temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N·m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N·m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
ABS (Variation of inverter temperature median)	> 20°C (68°F)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 ABS (Inverter temperature B – Inverter temperature median)	> 30°C (54°F)
Diagnosis 2 ABS ((Variation of Inverter temperature B) – (Variation of Inverter temperature median)) NOTE: • Variation of Inverter temperature B = Max (Inverter temperature B) – Min (Inverter temperature B) • Variation of Inverter temperature median = Max (Inverter temperature median) – Min (Inverter temperature median) • Max: The maximum value of the experience in the current driving cycle • Min: The minimum value of the experience in the current driving cycle	> 10°C (18°F)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear NG when continuous time when the following conditions are met is predetermined time or more (diagnosis 1 and diagnosis 2).

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 ABS (Inverter temperature B – Inverter temperature median)	≤ 30°C (54°F)
Diagnosis 2 ABS ((Variation of Inverter temperature B) – (Variation of Inverter temperature median))	≤ 10°C (18°F)

Time Needed for Diagnosis: 20 seconds

BJ:DTC P0BD1 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-265, OUTLINE OF DIAGNOSIS, DTC P0BD1 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Inverter Temperature C». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 204°C (399°F)?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter temperature sensor.
Judge as NG when the value of drive motor inverter temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Received

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Not received

Time Needed for Diagnosis: 2 seconds

BK:DTC P0BD2 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)
- GENERAL DESCRIPTION <Ref. to HEV(diag)-266, OUTLINE OF DIAGNOSIS, DTC P0BD2 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0AEE DRIVE MOTOR INVERTER TEMPERATURE SENSOR “A” CIRCUIT RANGE/PERFORMANCE. <Ref. to HEV(diag)-257, DTC P0AEE DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter temperature sensor.
Judge as NG when the characteristic of drive motor inverter temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N·m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N·m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
ABS (Variation of inverter temperature median)	> 20°C (68°F)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 ABS (Inverter temperature C – Inverter temperature median)	> 30°C (54°F)
Diagnosis 2 ABS ((Variation of Inverter temperature C) – (Variation of Inverter temperature median)) NOTE: • Variation of Inverter temperature C = Max (Inverter temperature C) – Min (Inverter temperature C) • Variation of Inverter temperature median = Max (Inverter temperature median) – Min (Inverter temperature median) • Max: The maximum value of the experience in the current driving cycle • Min: The minimum value of the experience in the current driving cycle	> 10°C (18°F)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear NG when continuous time when the following conditions are met is predetermined time or more (diagnosis 1 and diagnosis 2).

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 ABS (Inverter temperature C – Inverter temperature median)	≤ 30°C (54°F)
Diagnosis 2 ABS ((Variation of Inverter temperature C) – (Variation of Inverter temperature median))	≤ 10°C (18°F)

Time Needed for Diagnosis: 20 seconds

BL:DTC P0BE6 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-271, OUTLINE OF DIAGNOSIS, DTC P0BE6 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

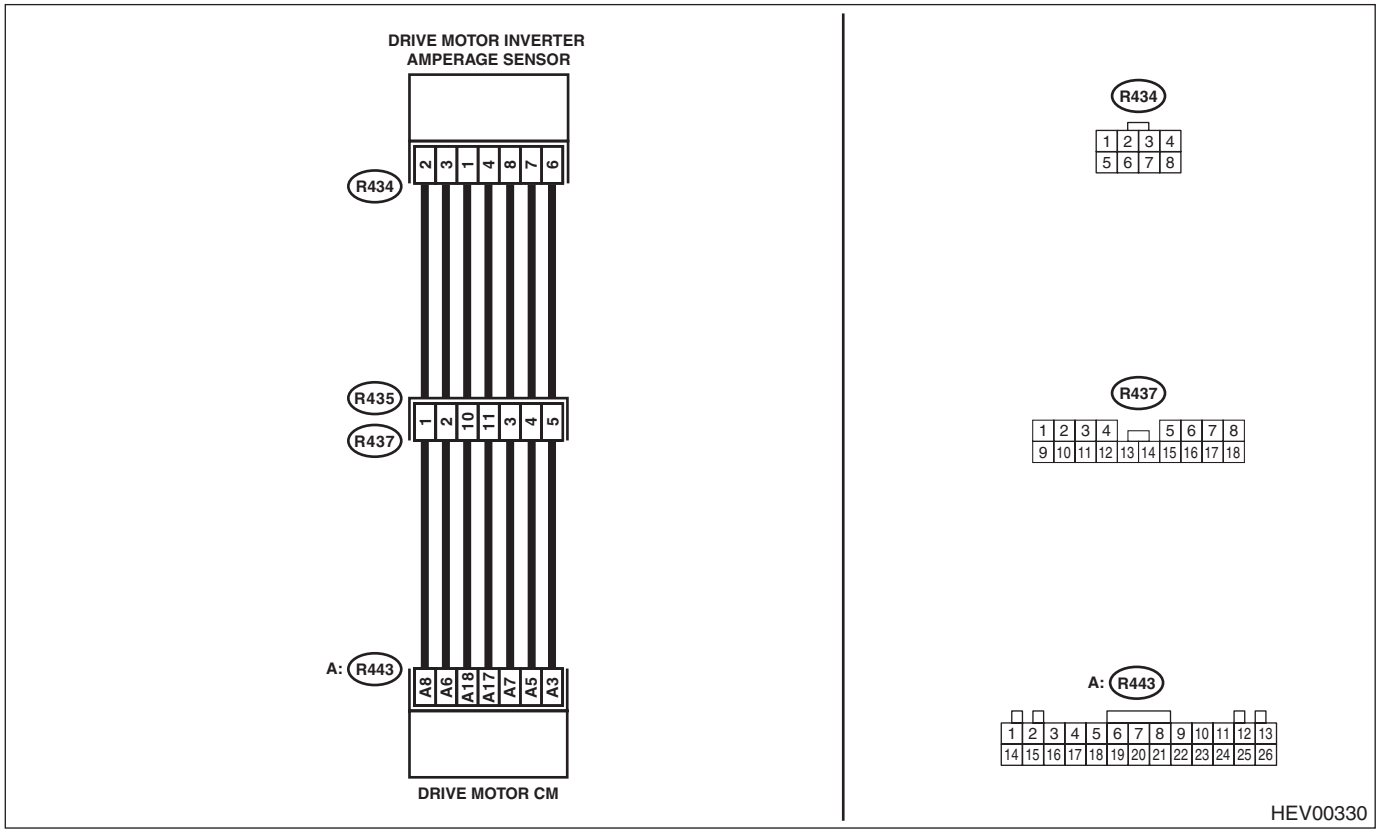
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Phase U Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 2.5 V±0.1 V?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector. 6) Disconnect the drive motor inverter amperage sensor connector. 7) Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R443) No. 7 — Ground bolt of inverter frame body:*** ***(R443) No. 5 — Ground bolt of inverter frame body:*** ***(R443) No. 3 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair short to ground circuit in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between DMCM connector and the drive motor inverter amperage sensor connector. ***Connector & terminal:*** ***(R443) No. 7 — (R434) No. 8:*** ***(R443) No. 5 — (R434) No. 7:*** ***(R443) No. 3 — (R434) No. 6:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair open circuit in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.

	Step	Check	Yes	No
4	**CHECK HARNESS (SHORT TO POWER AND SHORT TO OTHER SIGNAL LINES).** 1) Disconnect the drive motor inverter connector. 2) Disconnect the intermediate connector (R436). 3) Using a tester, measure the resistance within the DMCM connector and between the DMCM connector and the drive motor inverter connector. ***Connector & terminal:*** ***(R443) No. 7 — (R442) No. 1 — 22:*** ***(R443) No. 7 — (R443) No. 1 — 26:*** ***(R443) No. 7 — (R436) No. 1 — 8:*** ***(R443) No. 7 — (R432) No. 7:*** ***(R443) No. 5 — (R442) No. 1 — 22:*** ***(R443) No. 5 — (R443) No. 1 — 26:*** ***(R443) No. 5 — (R436) No. 1 — 8:*** ***(R443) No. 5 — (R432) No. 7:*** ***(R443) No. 3 — (R442) No. 1 — 22:*** ***(R443) No. 3 — (R443) No. 1 — 26:*** ***(R443) No. 3 — (R436) No. 1 — 8:*** ***(R443) No. 3 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair short circuit to power in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.
5	**CHECK DRIVE MOTOR INVERTER AMPERAGE SENSOR.** 1) Replace the drive motor inverter amperage sensor. <Ref. to HEV-27, Drive Motor Inverter Current Sensor.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter amperage sensor.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor circuit.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	OFF

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (U phase average offset current) NOTE: ABS: Absolute value	> 31 A

Time Needed for Diagnosis: 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (U phase average offset current)	≤ 31 A

Time Needed for Diagnosis: 0.01 second

BM:DTC P0BE7 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-275, OUTLINE OF DIAGNOSIS, DTC P0BE7 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

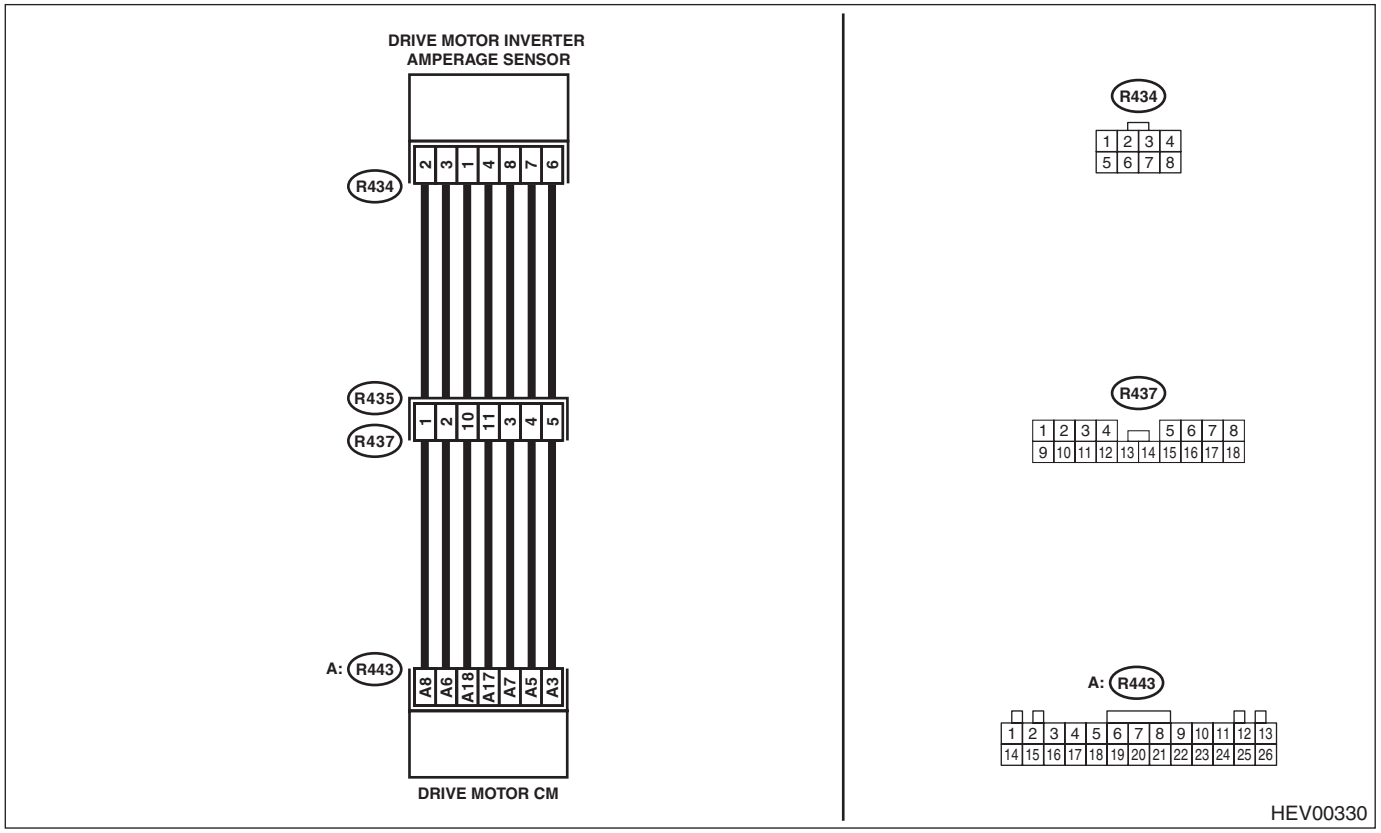
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Phase U Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 0.5 V or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector. 6) Disconnect the drive motor inverter amperage sensor connector. 7) Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R443) No. 7 — Ground bolt of inverter frame body:*** ***(R443) No. 5 — Ground bolt of inverter frame body:*** ***(R443) No. 3 — Ground bolt of inverter frame body:*** ***(R443) No. 8 — Ground bolt of inverter frame body:*** ***(R443) No. 6 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair short to ground circuit in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between DMCM connector and the drive motor inverter amperage sensor connector. ***Connector & terminal:*** ***(R443) No. 7 — (R434) No. 8:*** ***(R443) No. 5 — (R434) No. 7:*** ***(R443) No. 3 — (R434) No. 6:*** ***(R443) No. 8 — (R434) No. 2:*** ***(R443) No. 6 — (R434) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair open circuit in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.

	Step	Check	Yes	No
4	**CHECK HARNESS (SHORT TO POWER AND SHORT TO OTHER SIGNAL LINES).** 1) Disconnect the drive motor inverter connector. 2) Disconnect the intermediate connector (R436). 3) Using a tester, measure the resistance within the DMCM connector and between the DMCM connector and the drive motor inverter connector. ***Connector & terminal:*** ***(R443) No. 7 — (R442) No. 1 — 22:*** ***(R443) No. 7 — (R443) No. 1 — 26:*** ***(R443) No. 7 — (R436) No. 1 — 8:*** ***(R443) No. 7 — (R432) No. 7:*** ***(R443) No. 5 — (R442) No. 1 — 22:*** ***(R443) No. 5 — (R443) No. 1 — 26:*** ***(R443) No. 5 — (R436) No. 1 — 8:*** ***(R443) No. 5 — (R432) No. 7:*** ***(R443) No. 3 — (R442) No. 1 — 22:*** ***(R443) No. 3 — (R443) No. 1 — 26:*** ***(R443) No. 3 — (R436) No. 1 — 8:*** ***(R443) No. 3 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair short circuit to power in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.
5	**CHECK DRIVE MOTOR INVERTER AMPERAGE SENSOR.** 1) Replace the drive motor inverter amperage sensor. <Ref. to HEV-27, Drive Motor Inverter Current Sensor.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter amperage sensor.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
U phase current sensor output voltage	≤ 0.5 V
(Current equivalent)	≤ –400 A

Time Needed for Diagnosis: 0.03 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
U phase current sensor output voltage	> 0.5 V
(Current equivalent)	> –400 A

Time Needed for Diagnosis: 0.06 seconds

BN:DTC P0BE8 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-278, OUTLINE OF DIAGNOSIS, DTC P0BE8 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

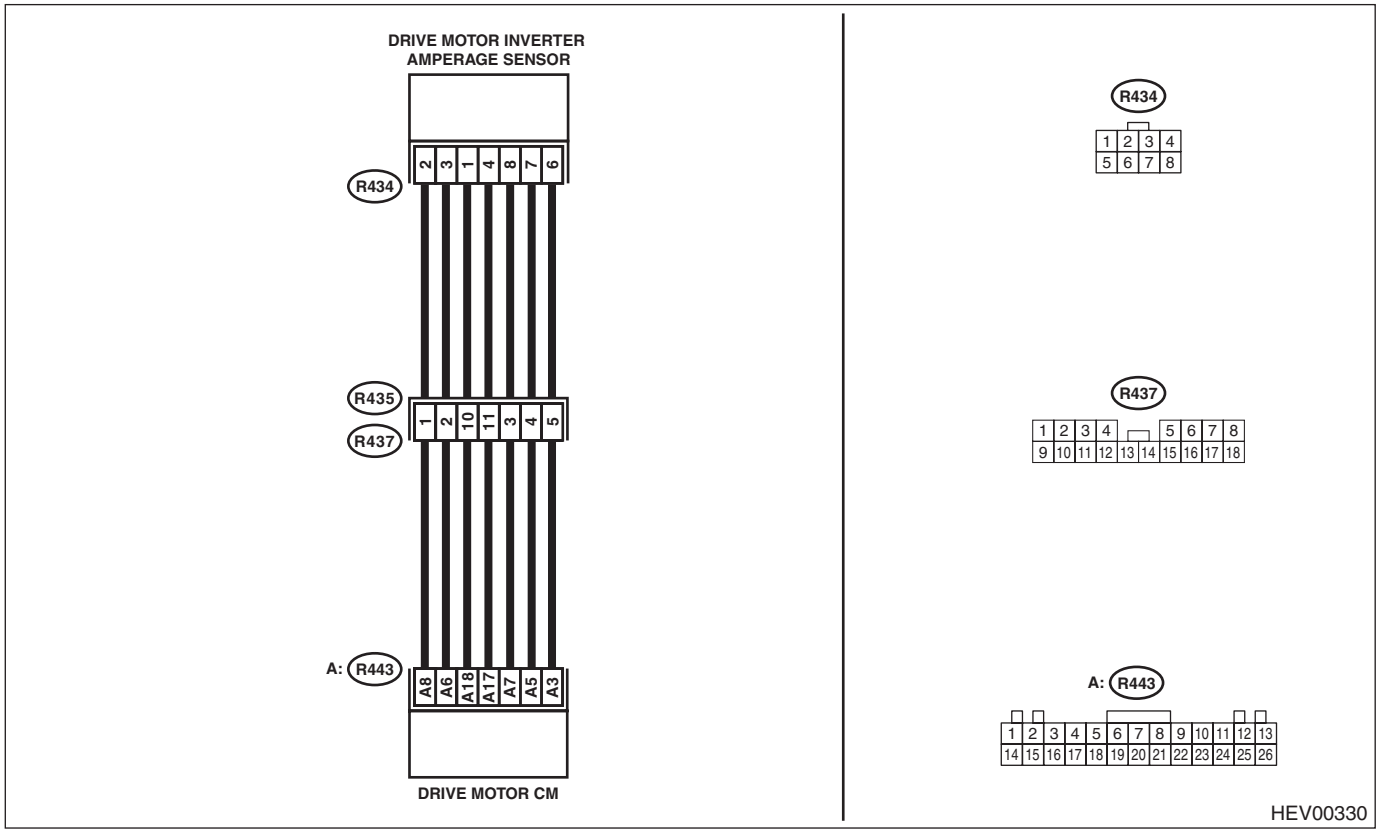
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Phase U Amperage Sensor Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 4.5 V or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector. 6) Disconnect the drive motor inverter amperage sensor connector. 7) Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R443) No. 18 — (R434) No. 1:*** ***(R443) No. 17 — (R434) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair short to ground circuit in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.
3	**CHECK HARNESS (SHORT TO POWER AND SHORT TO OTHER SIGNAL LINES).** 1) Disconnect the drive motor inverter connector. 2) Disconnect the intermediate connector (R436). 3) Using a tester, measure the resistance within the DMCM connector and between the DMCM connector and the drive motor inverter connector. ***Connector & terminal:*** ***(R443) No. 7 — (R442) No. 1 — 22:*** ***(R443) No. 7 — (R443) No. 1 — 26:*** ***(R443) No. 7 — (R436) No. 1 — 8:*** ***(R443) No. 7 — (R432) No. 7:*** ***(R443) No. 5 — (R442) No. 1 — 22:*** ***(R443) No. 5 — (R443) No. 1 — 26:*** ***(R443) No. 5 — (R436) No. 1 — 8:*** ***(R443) No. 5 — (R432) No. 7:*** ***(R443) No. 3 — (R442) No. 1 — 22:*** ***(R443) No. 3 — (R443) No. 1 — 26:*** ***(R443) No. 3 — (R436) No. 1 — 8:*** ***(R443) No. 3 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to power in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.

Step		Check	Yes	No
4	**CHECK DRIVE MOTOR INVERTER AMPERAGE SENSOR.** 1) Replace the drive motor inverter amperage sensor. <Ref. to HEV-27, Drive Motor Inverter Current Sensor.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter amperage sensor.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
U phase current sensor output voltage (Current equivalent)	≥ 4.5 V ≥ 400 A

Time Needed for Diagnosis: 0.03 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
U phase current sensor output voltage (Current equivalent)	< 4.5 V < 400 A

Time Needed for Diagnosis: 0.06 seconds

BO:DTC P0BEA DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-279, OUTLINE OF DIAGNOSIS, DTC P0BEA DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
Refer to DTC P0BE6 DRIVE MOTOR “A” PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE. <Ref. to HEV(diag)-268, DTC P0BE6 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor circuit.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	OFF

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (V phase average offset current) NOTE: ABS: Absolute value	> 31 A

Time Needed for Diagnosis: 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (V phase average offset current)	≤ 31 A

Time Needed for Diagnosis: 0.01 second

BP:DTC P0BEB DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-280, OUTLINE OF DIAGNOSIS, DTC P0BEB DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
Refer to DTC P0BE7 DRIVE MOTOR “A” PHASE U CURRENT SENSOR CIRCUIT LOW. <Ref. to HEV(diag)-272, DTC P0BE7 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
V phase current sensor output voltage	≤ 0.5 V
(Current equivalent)	≤ –400 A

Time Needed for Diagnosis: 0.03 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
V phase current sensor output voltage	> 0.5 V
(Current equivalent)	> –400 A

Time Needed for Diagnosis: 0.06 seconds

BQ:DTC P0BEC DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-281, OUTLINE OF DIAGNOSIS, DTC P0BEC DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
Refer to DTC P0BE8 DRIVE MOTOR “A” PHASE U CURRENT SENSOR CIRCUIT HIGH. <Ref. to HEV(diag)-276, DTC P0BE8 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
V phase current sensor output voltage	≥ 4.5 V
(Current equivalent)	≥ 400 A

Time Needed for Diagnosis: 0.03 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
V phase current sensor output voltage	< 4.5 V
(Current equivalent)	< 400 A

Time Needed for Diagnosis: 0.06 seconds

BR:DTC P0BEE DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-282, OUTLINE OF DIAGNOSIS, DTC P0BEE DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
Refer to DTC P0BE6 DRIVE MOTOR “A” PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE. <Ref. to HEV(diag)-268, DTC P0BE6 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor circuit.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	OFF

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (W phase average offset current) NOTE: ABS: Absolute value	> 31 A

Time Needed for Diagnosis: 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (W phase average offset current)	≤ 31 A

Time Needed for Diagnosis: 0.01 second

BS:DTC P0BEF DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-283, OUTLINE OF DIAGNOSIS, DTC P0BEF DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
Refer to DTC P0BE7 DRIVE MOTOR “A” PHASE U CURRENT SENSOR CIRCUIT LOW. <Ref. to HEV(diag)-272, DTC P0BE7 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
W phase current sensor output voltage	≤ 0.5 V
(Current equivalent)	≤ –400 A

Time Needed for Diagnosis: 0.03 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
W phase current sensor output voltage	> 0.5 V
(Current equivalent)	> –400 A

Time Needed for Diagnosis: 0.06 seconds

BT:DTC P0BF0 DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-284, OUTLINE OF DIAGNOSIS, DTC P0BF0 DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
Refer to DTC P0BE8 DRIVE MOTOR “A” PHASE U CURRENT SENSOR CIRCUIT HIGH. <Ref. to HEV(diag)-276, DTC P0BE8 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
W phase current sensor output voltage	≥ 4.5 V
(Current equivalent)	≥ 400 A

Time Needed for Diagnosis: 0.03 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
W phase current sensor output voltage	< 4.5 V
(Current equivalent)	< 400 A

Time Needed for Diagnosis: 0.06 seconds

BU:DTC P0BFD DRIVE MOTOR "A" PHASE U-V-W CURRENT SENSOR CORRELATION

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-288, OUTLINE OF DIAGNOSIS, DTC P0BFD DRIVE MOTOR "A" PHASE U-V-W CURRENT SENSOR CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

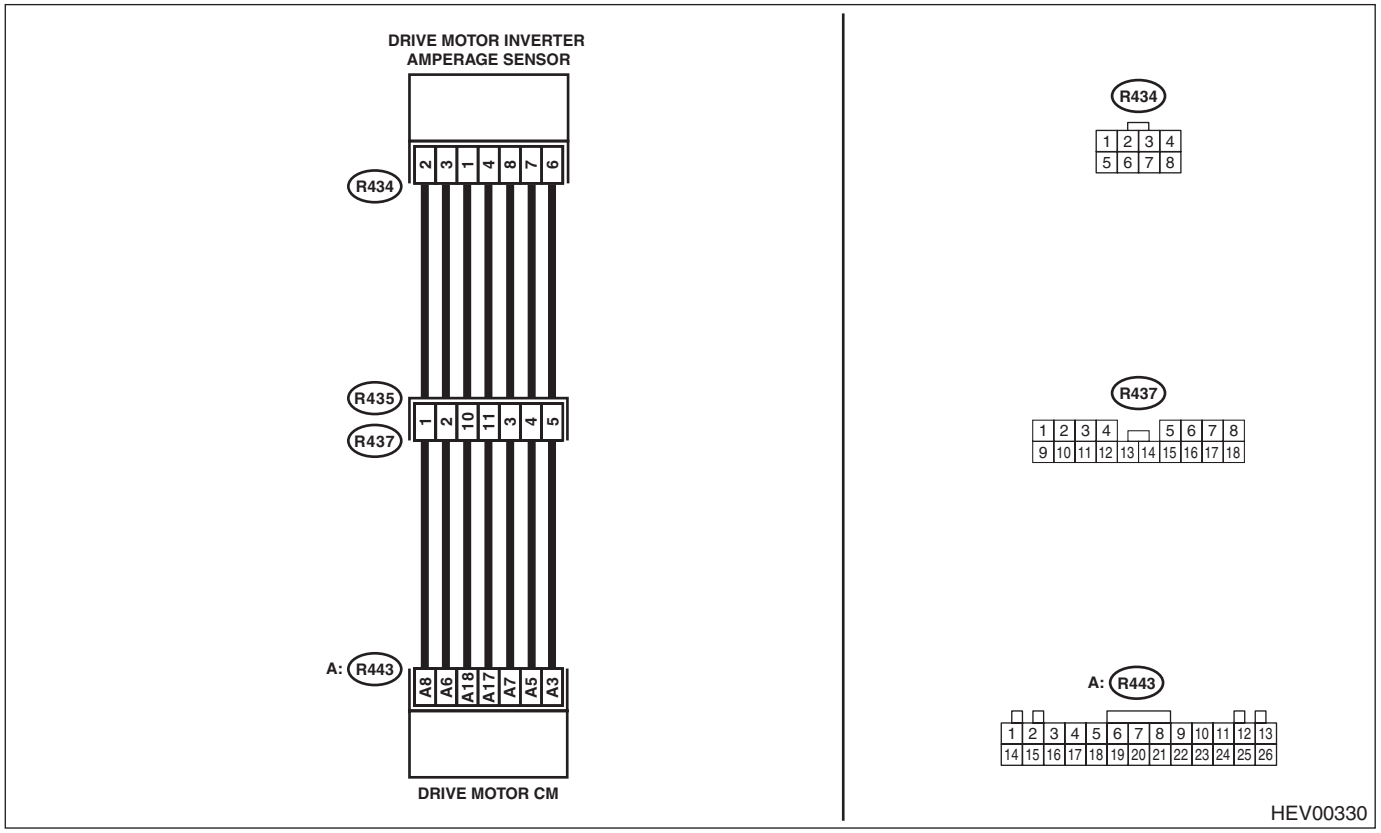
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Phase U Amperage» «Phase V Amperage» «Phase W Amperage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the sum of those three values 45 A or more?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector. 6) Disconnect the drive motor inverter amperage sensor connector. 7) Using a tester, measure the resistance between DMCM connector and the current sensor connector. Connector & terminal ***Connector & terminal:*** ***(R443) No. 7 — (R434) No. 8:*** ***(R443) No. 5 — (R434) No. 7:*** ***(R443) No. 3 — (R434) No. 6:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair open circuit in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal:*** ***(R443) No. 7 — Ground bolt of inverter frame body:*** ***(R443) No. 5 — Ground bolt of inverter frame body:*** ***(R443) No. 3 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short to ground circuit in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.

	Step	Check	Yes	No
4	**CHECK HARNESS (BATTERY SHORT AND SHORT IN OTHER SIGNAL LINES).** 1) Disconnect the drive motor inverter connector. 2) Disconnect the intermediate connector (R436). 3) Using a tester, measure the resistance between the DMCM connector, each signal pin of DMCM, and the inverter connector. ***Connector & terminal:*** ***(R443) No. 7 — (R442) No. 1 — 22:*** ***(R443) No. 7 — (R443) No. 1 — 26:*** ***(R443) No. 7 — (R436) No. 1 — 8:*** ***(R443) No. 7 — (R432) No. 7:*** ***(R443) No. 5 — (R442) No. 1 — 22:*** ***(R443) No. 5 — (R443) No. 1 — 26:*** ***(R443) No. 5 — (R436) No. 1 — 8:*** ***(R443) No. 5 — (R432) No. 7:*** ***(R443) No. 3 — (R442) No. 1 — 22:*** ***(R443) No. 3 — (R443) No. 1 — 26:*** ***(R443) No. 3 — (R436) No. 1 — 8:*** ***(R443) No. 3 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair short circuit to power in harness between DMCM connector and drive motor inverter amperage sensor connector, or repair the intermediate connector.
5	**CHECK DRIVE MOTOR INVERTER AMPERAGE SENSOR.** 1) Replace the drive motor inverter amperage sensor. <Ref. to HEV-27, Drive Motor Inverter Current Sensor.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter amperage sensor.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor circuit.
Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iu + Iv + Iw) NOTE: • ABS: Absolute value • Iu: U phase current • Iv: V phase current • Iw: W phase current	> 45 A

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iu + Iv + Iw)	≤ 45 A

Time Needed for Diagnosis: 2 seconds

BV:DTC P0C05 DRIVE MOTOR "A" PHASE U-V-W CIRCUIT/OPEN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-292, OUTLINE OF DIAGNOSIS, DTC P0C05 DRIVE MOTOR "A" PHASE U-V-W CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

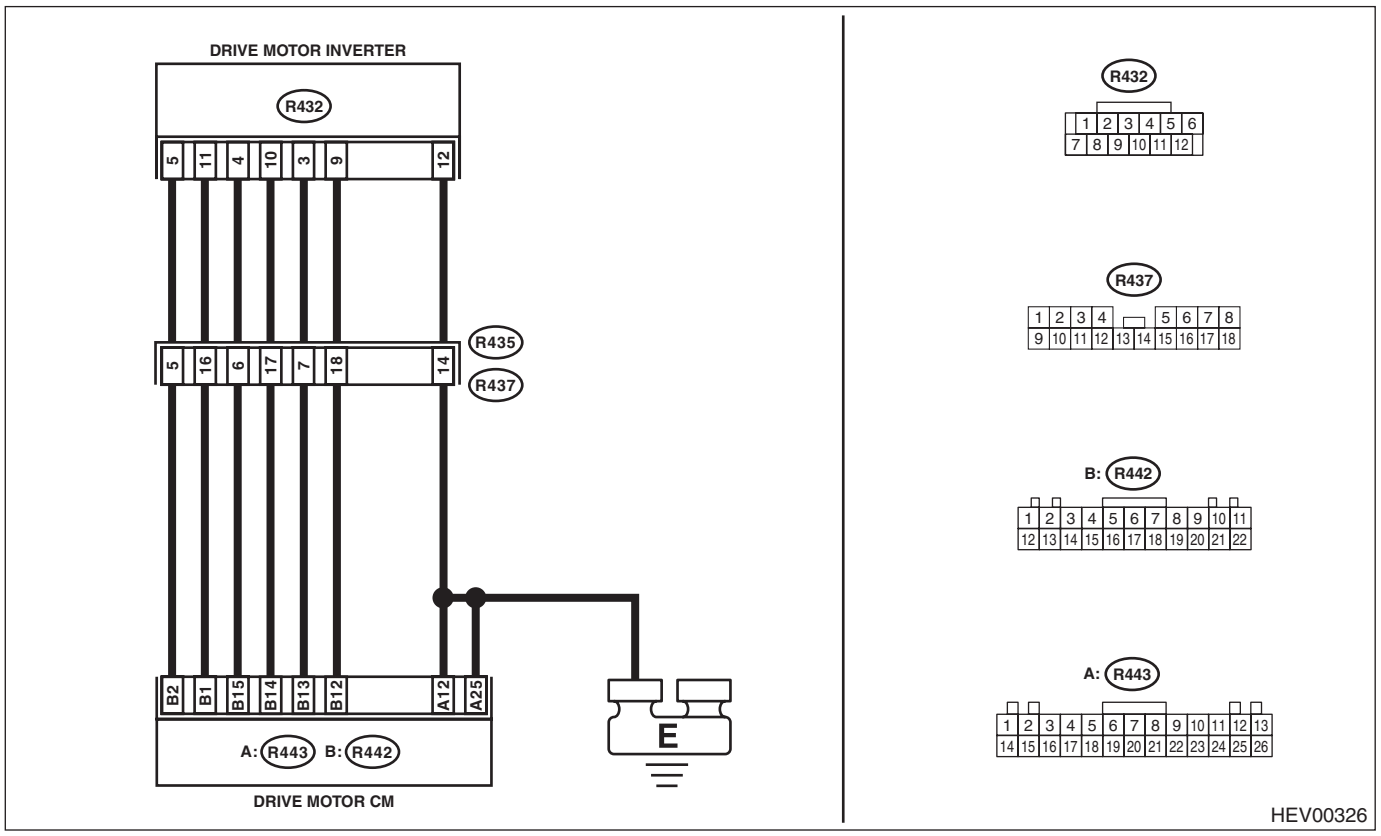
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

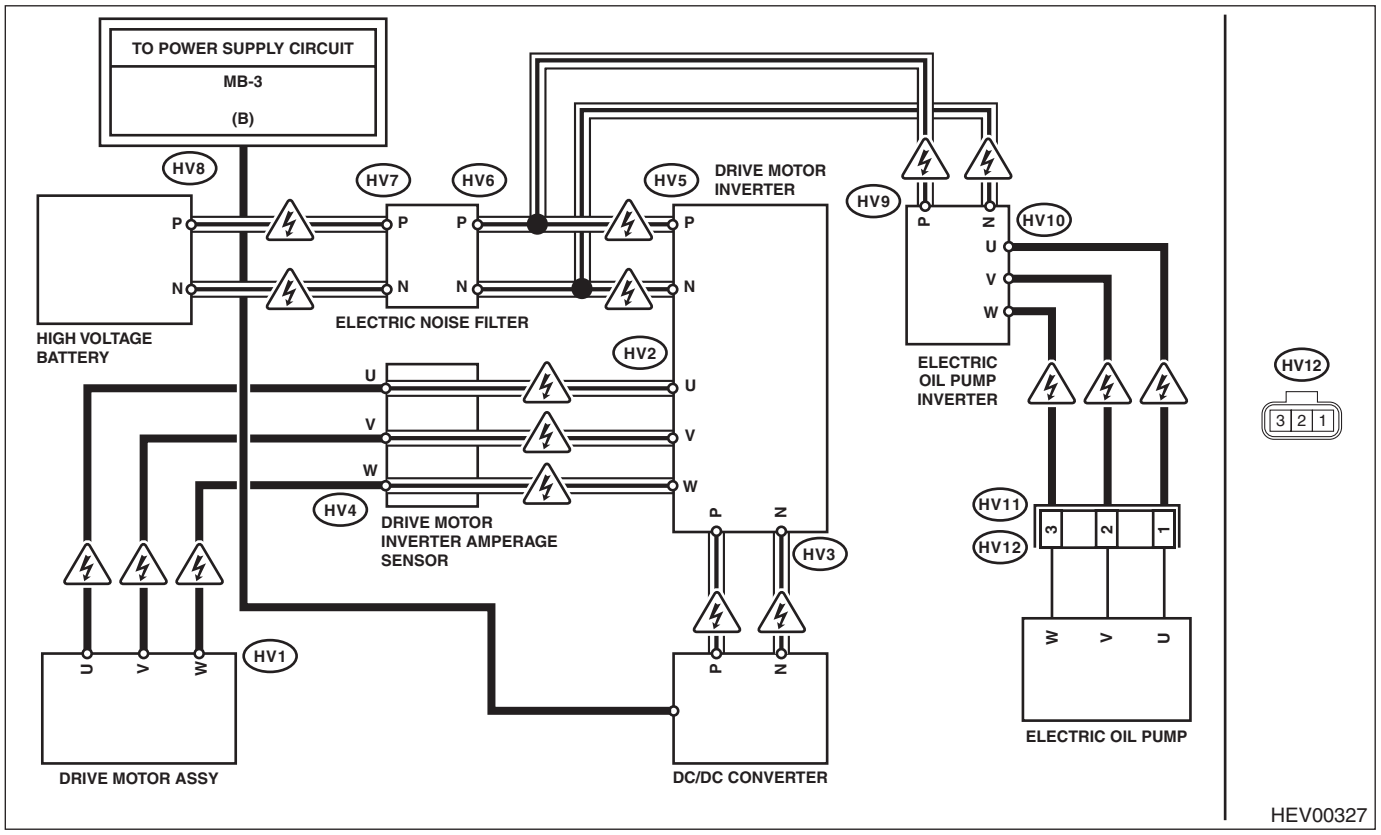
CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>





Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK HARNESS (OPEN CIRCUIT IN INVERTER CONTROL GND).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector. 6) Disconnect the drive motor inverter connector. 7) Using a tester, measure the resistance between the drive motor inverter connector and the ground bolt of inverter frame body. ***Connector & terminal:*** ***(R432) No. 12 — Ground bolt of inverter frame body:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair open circuit in harness between drive motor inverter connector and chassis ground, or repair the intermediate connector.

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the drive motor inverter connector and DMCM connector. ***Connector & terminal:*** ***(R442) No. 2 — (R432) No. 5:*** ***(R442) No. 1 — (R432) No. 11:*** ***(R442) No. 15 — (R432) No. 4:*** ***(R442) No. 14 — (R432) No. 10:*** ***(R442) No. 13 — (R432) No. 3:*** ***(R442) No. 12 — (R432) No. 9:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair open circuit in harness between drive motor inverter connector and DMCM connector, or repair the intermediate connector.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between drive motor inverter connector and chassis ground. ***Connector & terminal:*** ***(R432) No. 5 — Ground bolt of inverter frame body:*** ***(R432) No. 11 — Ground bolt of inverter frame body:*** ***(R432) No. 4 — Ground bolt of inverter frame body:*** ***(R432) No. 10 — Ground bolt of inverter frame body:*** ***(R432) No. 3 — Ground bolt of inverter frame body:*** ***(R432) No. 9 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair or replace the circuit in harness and the intermediate connector.
5	**CHECK DRIVE MOTOR AND POWER CABLE (OPEN CIRCUIT).** 1) Leave the vehicle under temperature of 40°C (104°F) or less for 10 minutes. 2) Disconnect the power cable (HV2) of drive motor inverter. 3) Measure the resistance between each terminal of the power cable. ***(HV2) U — (HV2) V:*** ***(HV2) W — (HV2) U:*** ***(HV2) V — (HV2) W:***	Is resistance between either lines 1 Ω or more?	Go to step **6**.	Go to step **7**.
6	**CHECK DRIVE MOTOR (OPEN CIRCUIT).** 1) Disconnect the drive motor power cable (HV1). NOTE: Supply the gasket because it must be replaced. 2) Measure the resistance between each terminal of the power cable. ***Connector & terminal:*** ***(HV1) U — (HV1) V:*** ***(HV1) W — (HV1) U:*** ***(HV1) V — (HV1) W:***	Is resistance between either lines 1 Ω or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Replace the power cable. <Ref. to HEV-51, Power Cable.>
7	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform drive cycle A. <Ref. to HEV(diag)-32, DRIVE CYCLE A, PROCEDURE, Drive Cycle.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current flowing in drive motor.
Judge as NG when the current flowing in drive motor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	ON
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 1 s
c: ABS (Motor speed)	≥ 125 rpm
NOTE: ABS: Absolute value	and ≤ 1500 rpm
Continuous time of c	≥ 0.12 s
d: ABS (Commanded motor torque)	≥ 7 N·m (0.7 kgf-m, 5.2 ft-lb)
Continuous time of d	≥ 0.13 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tu1 – Tu2 or Tv1 – Tv2 or Tw1 – Tw2 NOTE: • Tu1: Integrated time that ABS (Iu) is less than or equal to 13.5 A • Tu2: Integrated time that ABS (Iu) is greater than 13.5 A • Tv1, Tw1: Similar to Tu1 • Tv2, Tw2: Similar to Tu2 • Iu: U phase current • Iv: V phase current • Iw: W phase current	≥ 0.3 s

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Tu1 – Tu2 and Tv1 – Tv2 and Tw1 – Tw2	< 0.3 s

Time Needed for Diagnosis: 0.6 seconds

BW:DTC P0C0C DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-295, OUTLINE OF DIAGNOSIS, DTC P0C0C DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

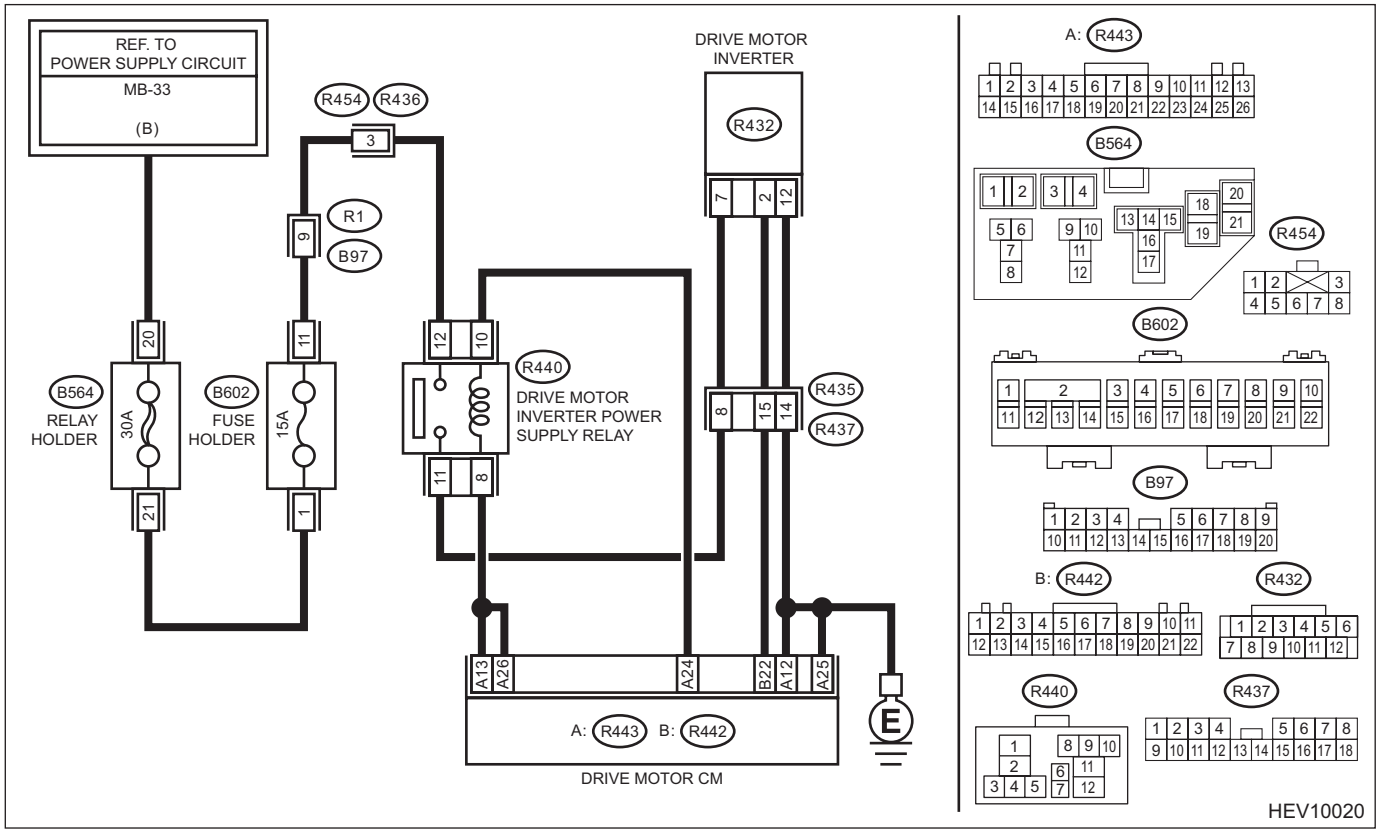
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK RELAY.** Using the Subaru Select Monitor, perform «Drive Motor Inverter power supply relay» of System Operation Check Mode for the drive motor control system. <Ref. to HEV(diag)-70, DRIVE MOTOR CONTROL SYSTEM, OPERATION, System Operation Check Mode.>	Does the relay operate?	Go to step **2**.	Go to step **3**.

	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Inverter Operation Update Counter». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value change?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Perform the diagnosis according to DTC P1C30. <Ref. to HEV(diag)-318, DTC P1C30 LOST COMMUNICATION WITH DRIVE MOTOR "A" INVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
3	**CHECK RELAY.** Check the inverter power supply relay as a single unit. <Ref. to HEV-12, Relay and Fuse.>	Is the condition normal? (Check for continuity between terminals, damage, etc.)	Go to step **4**.	Replace the relay.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector. 6) Remove the inverter power supply relay. 7) Using a tester, measure the resistance between the inverter power supply relay and DMCM connector. ***Connector & terminal*** ***(R440) No. 10 — (R443) No. 24:*** ***(R440) No. 8 — (R443) No. 13:*** ***(R440) No. 8 — (R443) No. 26:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between DMCM connector and inverter power supply relay connector, or repair the intermediate connector.
5	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Using a tester, measure the resistance between the inverter power supply relay and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R440) No. 10 — Ground bolt of inverter frame body:*** ***(R440) No. 8 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Repair short circuit to ground in harness between DMCM connector and inverter power supply relay connector or between inverter power supply relay and inverter connector, or repair the intermediate connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of high voltage battery cooling fan and drive motor inverter power supply relay.
Judge as NG when the drive signal of high voltage battery cooling fan and drive motor inverter power supply relay circuit is abnormal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
a: Ignition state	Run or crank
Continuous time of a	≥ 0.142 s
DMCM commanded inverter power supply relay	Open
b: DMCM measured inverter power supply relay	Closed
Continuous time of b	≥ 0.051 s
Diagnosis 2	
c: 12 V battery system voltage	≥ 8 V
Continuous time of c	≥ 1 s
DMCM commanded inverter power supply relay	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from drive motor Inverter	Not received
Diagnosis 2	
DMCM measured inverter power supply relay	Open

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.0104 s
- **Diagnosis 2:** 0.04 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from drive motor Inverter	Received
Diagnosis 2	
DMCM measured inverter power supply relay	Closed

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.0104 s
- **Diagnosis 2:** 0.08 s

BX:DTC P0C0D DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-298, OUTLINE OF DIAGNOSIS, DTC P0C0D DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

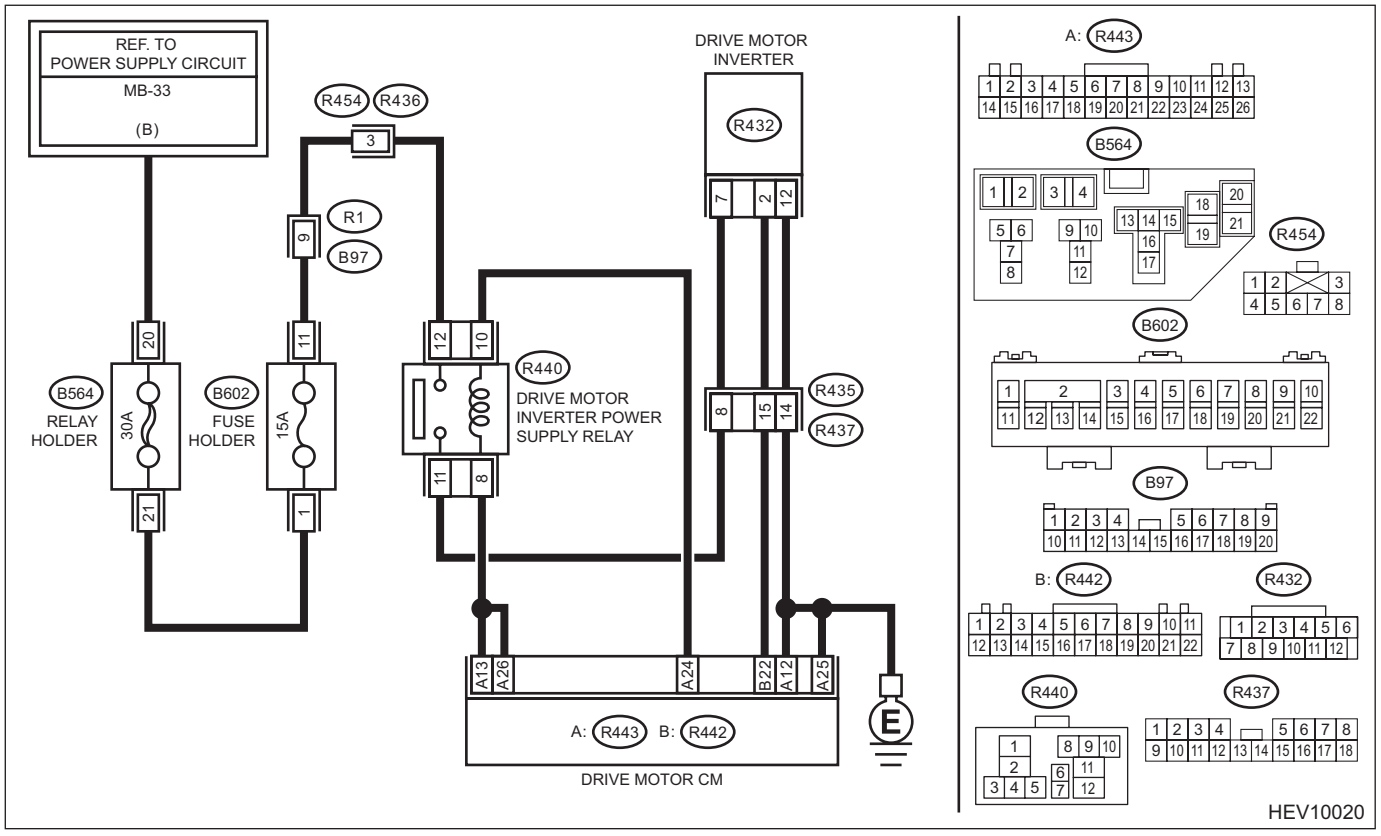
Normal control

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Using the Subaru Select Monitor, perform «Drive Motor Inverter power supply relay» of System Operation Check Mode for the drive motor control system. <Ref. to HEV(diag)-70, DRIVE MOTOR CONTROL SYSTEM, OPERATION, System Operation Check Mode.> 2) Confirm the current data of in System Operation Check Mode, the value of «Drive Motor Inverter Operation Update Counter».	Does «Drive Motor Inverter Operation Update Counter» stop when «Drive Motor Inverter power supply relay» is OFF?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK RELAY.** Check the inverter power supply relay as a single unit. <Ref. to HEV-12, Relay and Fuse.>	Is the condition normal? (Check for continuity between terminals, damage, etc.)	Go to step **3**.	Replace the relay.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Disconnect the DMCM connector. 2) Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R443) No. 24 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between DMCM connector and inverter power supply relay connector, or repair the intermediate connector.
4	**CHECK HARNESS (SHORT TO POWER AND SHORT TO OTHER SIGNAL LINES).** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the drive motor inverter connector. 6) Disconnect the intermediate connector (R436). 7) Remove the inverter power supply relay. 8) Using a tester, measure the resistance between inverter power supply relay connector and all DMCM signal pins. ***Connector & terminal*** ***(R440) No. 12 — (R442) No. 1 — 22:*** ***(R440) No. 12 — (R443) No. 1 — 26:*** ***(R440) No. 12 — (R436) No. 1 — 8 (except No. 3):*** ***(R440) No. 10 — (R442) No. 1 — 22:*** ***(R440) No. 10 — (R443) No. 1 — 26 (except No. 24):*** ***(R440) No. 10 — (R436) No. 1 — 8:*** ***(R440) No. 10 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Repair short circuit in harness between the inverter power supply relay and DMCM, harness between inverter power supply relay and drive motor inverter, or repair the intermediate connector.

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of high voltage battery cooling fan and drive motor inverter power supply relay.
Judge as NG when the drive signal of high voltage battery cooling fan and drive motor inverter power supply relay circuit is abnormal.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
a: Ignition state	Run or crank
Continuous time of a	≥ 0.142 s
DMCM commanded inverter power supply relay	Open
b: DMCM measured inverter power supply relay	Open
Continuous time of b	≥ 0.051 s
Diagnosis 2	
a: Ignition state	Run or crank
Continuous time of a	≥ 0.142 s
DMCM commanded inverter power supply relay	Open
b: DMCM measured inverter power supply relay	Closed
Continuous time of b	≥ 0.051 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
SCI message from the drive motor Inverter	Received

Time Needed for Diagnosis: 0.0104 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
SCI message from the drive motor Inverter	Not received

Time Needed for Diagnosis: 0.0104 seconds

BY:DTC P0C79 DRIVE MOTOR "A" INVERTER VOLTAGE TOO HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-300, OUTLINE OF DIAGNOSIS, DTC P0C79 DRIVE MOTOR "A" INVERTER VOLTAGE TOO HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «Contactor Signal(HPCM)» in the freeze frame data of the drive motor control system. <Ref. to HEV(diag)-63, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Is either «OFF» or «Abnormal OFF» displayed?	Go to step **2**.	Go to step **3**.
2	**CHECK DTC.** Check DTCs in the following systems; • Hybrid powertrain control system <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Battery energy control system <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Drive motor control system <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Engine <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).> • Transmission <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK BUS BAR.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the bus bar.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **4**.	Retighten the bolts. Or replace the bus bar.
4	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter input voltage.
Judge as NG when the input voltage value of drive motor inverter is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage	≥ 155 V

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage	< 155 V

Time Needed for Diagnosis: 0.02 seconds

BZ:DTC P0DA8 HYBRID/EV BATTERY VOLTAGE/DRIVE MOTOR "A" INVERTER VOLTAGE CORRELATION

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-302, OUTLINE OF DIAGNOSIS, DTC P0DA8 HYBRID/EV BATTERY VOLTAGE/DRIVE MOTOR "A" INVERTER VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

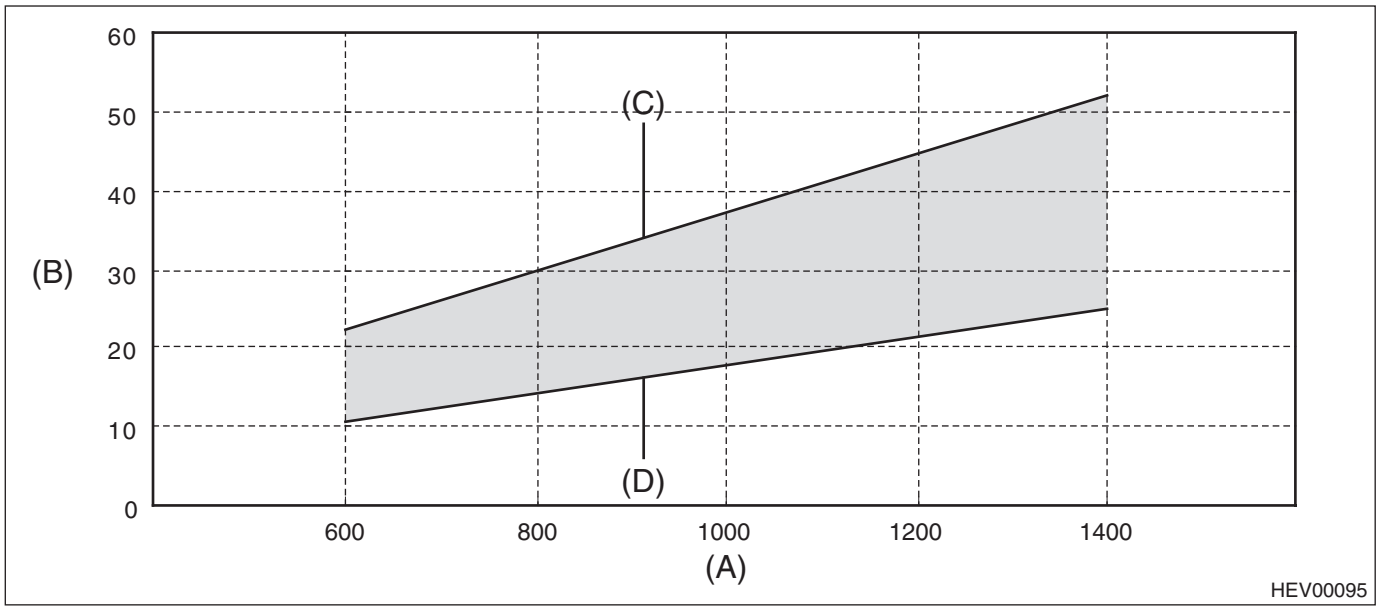
TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK DRIVE MOTOR INVERTER.** 1) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 2) Lift up the vehicle. 3) Start the engine, and set the shift lever to "D" range. 4) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «A/T Oil Temperature» «Drive Motor Speed» «Drive Motor Inverter Input High Voltage Sensor (Serial)». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	«Drive Motor Inverter Input High Voltage Sensor (Serial)» is within the standard specified in Note when «ATF Temperature» is 20 — 60°C (68 — 140°F) and «Drive Motor Speed» is 600 — 1400 rpm.	Go to step **3**.	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>
3	**CHECK BUS BAR.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the bus bar.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **4**.	Retighten the bolts. Or replace the bus bar.
4	**CHECK DMCM.** 1) Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Problem is present in DMCM.

NOTE:
Value of «Drive Motor Inverter Input High Voltage Sensor (Serial)» is proportional to «Drive Motor Speed».
- 1000 rpm: 18 V — 37 V
- 1400 rpm: 25 V — 52 V



(A) Drive motor speed
(B) Drive Motor Inverter Input High Voltage Sensor (Serial)
(C) Standard at Max.
(D) Standard at Min.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter input voltage.
Judge as NG when the difference between the input voltage value of drive motor inverter and the total voltage of high voltage battery is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 1 s
HPCM contactor request	Closed
BECM pre-charge contactor command	Open
BECM positive contactor command	Closed
BECM negative contactor command	Closed
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Inverter voltage – Battery pack voltage) NOTE: ABS: Absolute value	> 20 V

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Inverter voltage – Battery pack voltage)	≤ 20 V

Time Needed for Diagnosis: 4 seconds

CA:DTC P1C20 DRIVE MOTOR "A" INVERTER VOLTAGE TOO LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-306, OUTLINE OF DIAGNOSIS, DTC P1C20 DRIVE MOTOR "A" INVERTER VOLTAGE TOO LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

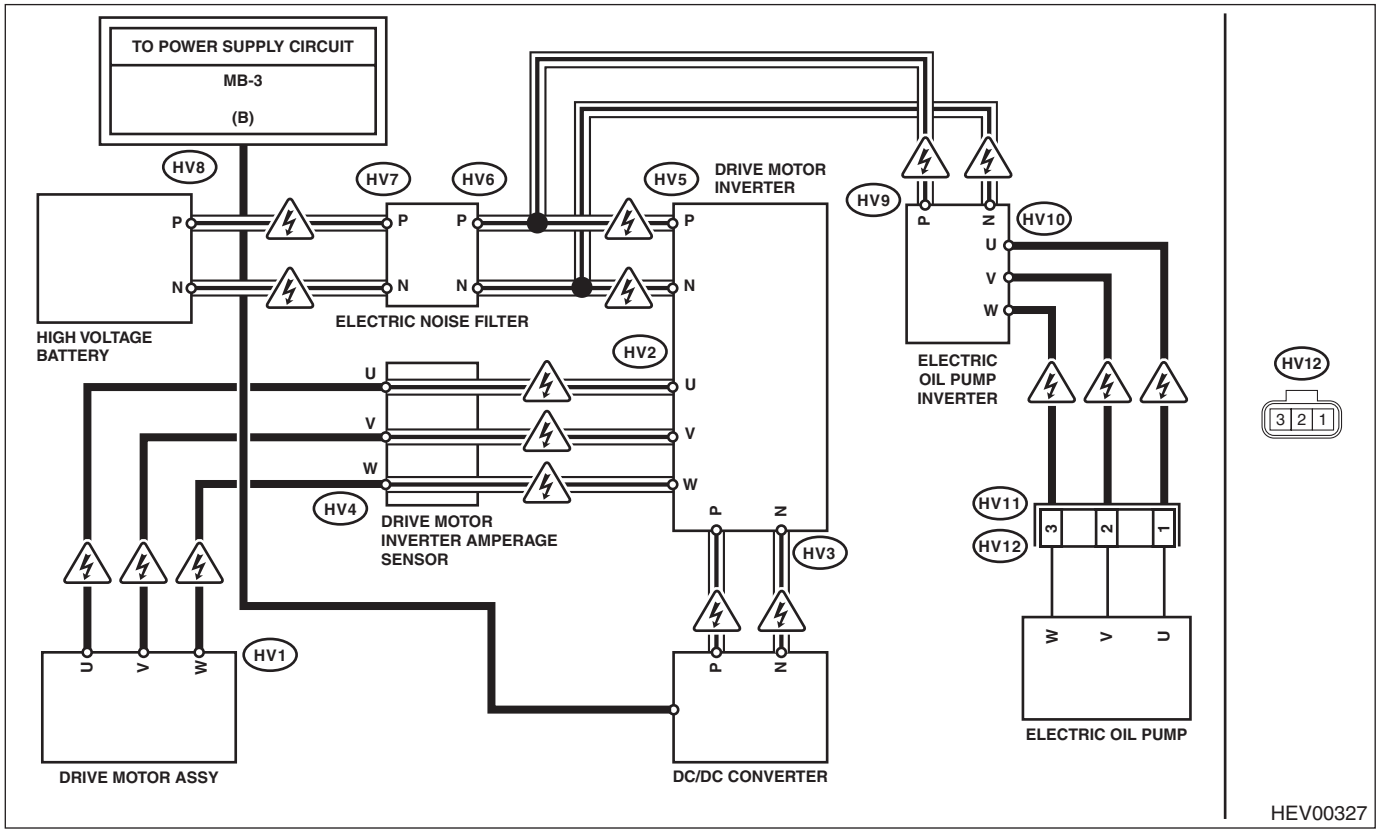
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read DTCs of the following system. • Battery energy control system <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-80, BATTERY ENERGY CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK READY.** Start the engine.	Does READY come on?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.
3	**CHECK DTC.** With engine running, read DTCs of the following system. • Hybrid powertrain control system <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Battery energy control system <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Drive motor control system <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Engine <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).> • Transmission <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Are any DTCs other than DTC P1C20 detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **4**.
4	**CHECK BUS BAR.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the bus bar.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **5**.	Retighten the bolts. Or replace the bus bar.
5	**CHECK ELECTRIC NOISE FILTER (INTERNAL SHORT).** 1) Remove the electric noise filter. 2) Measure the resistance between each terminal of electric noise filter. ***Connector & terminal*** ***(HV6) P — (HV6) N:*** ***(HV6) P — Electric noise filter ground:*** ***(HV6) N — Electric noise filter ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the electric noise filter. <Ref. to HEV-31, Noise Filter.>

Step		Check	Yes	No
6	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter input voltage.
Judge as NG when the input voltage value of drive motor inverter is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received
HPCM contactor request	Closed
BECM pre-charge contactor command	Open
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage	≤ 70 V

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage	> 70 V

Time Needed for Diagnosis: 0.02 seconds

CB:DTC P1C22 12V AUXILIARY BATTERY VOLTAGE TOO LOW

DIAGNOSIS:

- Detects drive motor control module voltage malfunction.
- If the drive motor control module detects that power supply voltage is out of the standard, it is judged as NG.
- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)

TROUBLE SYMPTOM:

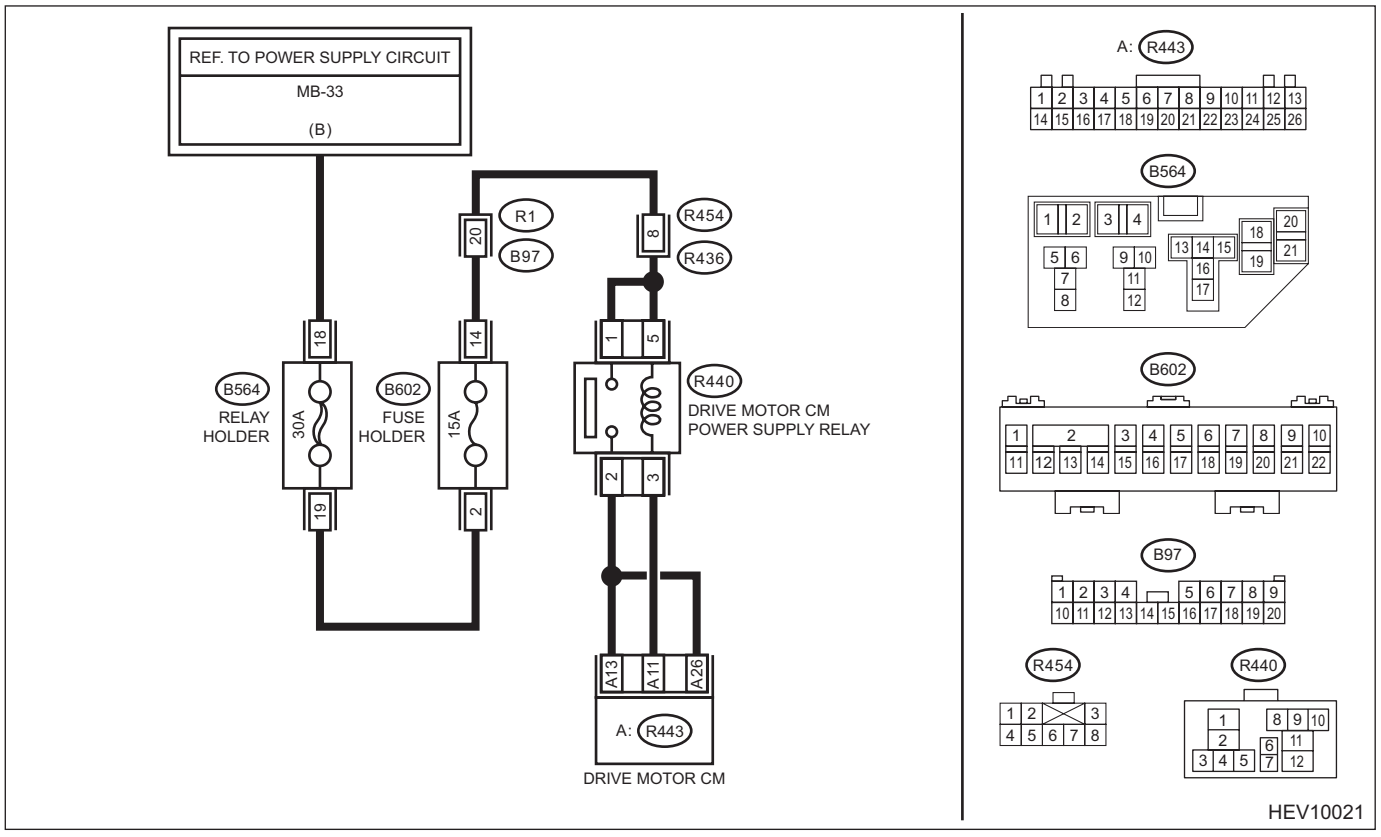
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Control Module Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 9 V or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Disconnect battery terminals. 3) Check the 12 volt auxiliary battery as a single part. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is it normal?	Go to step **3**.	Charge or replace the battery.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Connect the 12 volt auxiliary battery. 2) Using a tester, measure the voltage between the DMCM power relay and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R440) No. 2 (+) — Ground bolt of inverter frame body (–):***	Is the voltage 9 V or less?	Repair open circuit in harness between DMCM power supply relay connector and 12 volt auxiliary battery, or repair the intermediate connector.	Go to step **4**.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Disconnect the DMCM connector. 2) Remove the DMCM power relay. <Ref. to CVT(TH58A)-160, Relay and Fuse.> 3) Using a tester, measure the resistance between DMCM connector terminals and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R443) No. 13 — Ground bolt of inverter frame body:*** ***(R443) No. 26 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Repair short to ground circuit in harness between DMCM power supply relay connector and 12 volt auxiliary battery, or repair the intermediate connector.

CC:DTC P1C24 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B"

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-309, OUTLINE OF DIAGNOSIS, DTC P1C24 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0A2A DRIVE MOTOR “A” TEMPERATURE SENSOR CIRCUIT. <Ref. to HEV(diag)-165, DTC P0A2A DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor.
Judge as NG when the value of drive motor temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
PWM output to the drive motor inverter	ON
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 15 s
Generated energy of drive motor	> Map1
Assist energy of drive motor	> Map2
First SCI data from drive motor inverter	Received

Map 1

Hybrid battery temperature and Drive motor inverter temperature either lower temperature (°C (°F))	–30 (–22)	–10 (14)	0 (32)	10 (50)	30 (86)	40 (104)
Generated energy of drive motor (Wh)	630	320	200	130	0	0

Map 2

Hybrid battery temperature and Drive motor inverter temperature either lower temperature (°C (°F))	–30 (–22)	–10 (14)	0 (32)	10 (50)	30 (86)	40 (104)
Assist energy of drive motor (Wh)	270	130	75	50	0	0

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage (Temperature equivalent)	> 4.5 V < –3.4°C (25.9°F)

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage (Temperature equivalent)	≤ 4.5 V ≥ –3.4°C (25.9°F)

Time Needed for Diagnosis: 4 seconds

CD:DTC P1C25 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-311, OUTLINE OF DIAGNOSIS, DTC P1C25 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0A2C DRIVE MOTOR “A” TEMPERATURE SENSOR CIRCUIT LOW. <Ref. to HEV(diag)-170, DTC P0A2C DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor.
Judge as NG when the value of drive motor temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.23 V
(Temperature equivalent)	> 234°C (453.2°F)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.23 V
(Temperature equivalent)	≤ 234°C (453.2°F)

Time Needed for Diagnosis: 2 seconds

CE:DTC P1C26 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-312, OUTLINE OF DIAGNOSIS, DTC P1C26 DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT "B" HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0A2D DRIVE MOTOR “A” TEMPERATURE SENSOR CIRCUIT HIGH. <Ref. to HEV(diag)-175, DTC P0A2D DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor.
Judge as NG when the value of drive motor temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage (Temperature equivalent)	> 4.6 V < –55°C (–67°F)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage (Temperature equivalent)	≤ 4.6 V ≥ –55°C (–67°F)

Time Needed for Diagnosis: 2 seconds

CF:DTC P1C27 DRIVE MOTOR "A" TEMPERATURE SENSOR CORRELATION

DIAGNOSIS:

- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)
- GENERAL DESCRIPTION <Ref. to HEV(diag)-315, OUTLINE OF DIAGNOSIS, DTC P1C27 DRIVE MOTOR "A" TEMPERATURE SENSOR CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

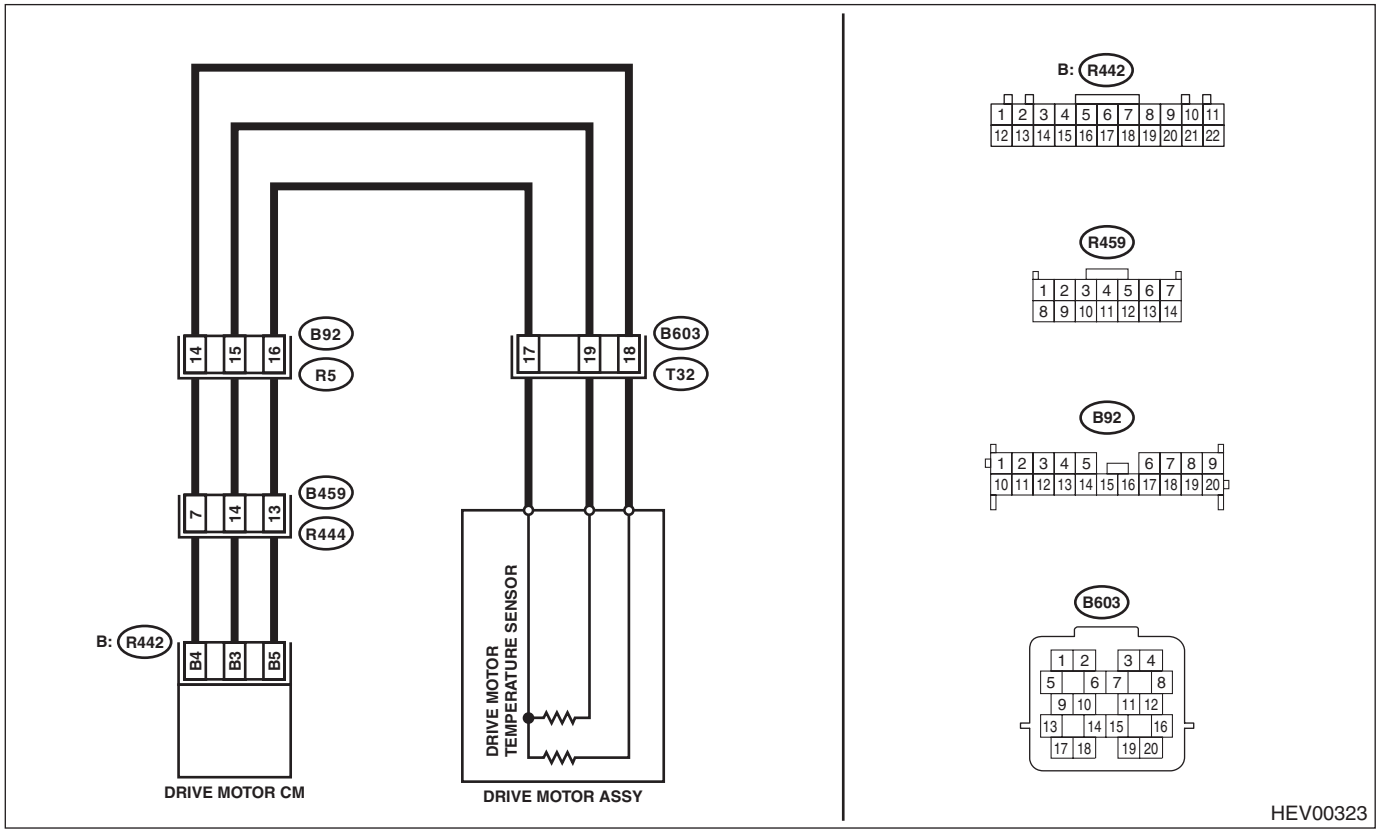
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

CVT control system <Ref. to WI(HEV)-82, WIRING DIAGRAM, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC (current malfunction) using Subaru Select Monitor. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is any one of the following DTCs detected? P0A2A, P0A2C, P0A2D, P1C24, P1C25, P1C26, P0A3F, P0C52, P0C5C, P0CDD, P0CDC, P0CDD, P0CDC, U0076, U0111, U0140, U1290, P0604, P0A1B	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** 1) Warm up the engine. 2) Using the Subaru Select Monitor, confirm the current data of drive motor control system, the values of «Drive Motor Temperature A» and «Drive Motor Temperature B». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	When the temperature of «Drive Motor Temperature A» or «Drive Motor Temperature B» is in the range of 30 — 140°C (86 — 284°F), is the difference in temperature between «Drive Motor Temperature A» and «Drive Motor Temperature B» 20°C (36°F) or more?	Go to step **3**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK HARNESS AND DMCM.** 1) Disconnect the DMCM connector (R442). 2) Using a tester, measure the resistance between terminals in the DMCM connector. ***Connector & terminal*** ***TMPA*** ***(R442) No. 4 — (R442) No. 5:*** ***TMPB*** ***(R442) No. 3 — (R442) No. 5:***	Is the difference in resistance between TMPA and TMPB 136 kΩ or more?	Go to step **4**.	Go to step **5**.
4	**CHECK DRIVE MOTOR.** 1) Disconnect the drive motor assembly connector (B603). 2) Using a tester, measure the resistance between terminals in the drive motor assembly connector. ***Connector & terminal*** ***TMPA*** ***(T32) No. 18 — (T32) No. 17:*** ***TMPB*** ***(T32) No. 10 — (T32) No. 17:***	Is the difference in resistance between TMPA and TMPB 136 kΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Repair the harness between DMCM connector and drive motor assembly connector.
5	**CHECK DMCM AND DRIVE MOTOR.** 1) Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.> 2) Perform driving cycle B. <Ref. to HEV(diag)-34, DRIVE CYCLE B, PROCEDURE, Drive Cycle.> 3) Read the DTC (current malfunction) using Subaru Select Monitor. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P1C27 detected?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>	Problem is present in DMCM.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor temperature sensor.
Judge as NG when the characteristic of drive motor temperature sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N·m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Drive motor temperature A	> 30°C (86°F) and < 140°C (284°F)
or	
Drive motor temperature B	> 30°C (86°F) and < 140°C (284°F)
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N·m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Drive motor temperature A	> 30°C (86°F) and < 140°C (284°F)
or	
Drive motor temperature B	> 30°C (86°F) and < 140°C (284°F)
Variation of motor temperature A or Variation of motor temperature B	> 25°C (77°F)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 ABS (Motor temperature A – Motor temperature B) NOTE: ABS: Absolute value	> 20°C (36°F)
Diagnosis 2 ABS (Variation of motor temperature A – Variation of motor temperature B) NOTE: • Variation of motor temperature A = Max (Motor temperature A) – Min (Motor temperature A) • Variation of motor temperature B = Max (Motor temperature B) – Min (Motor temperature B) • Max: The maximum value of the experience in the current driving cycle • Min: The minimum value of the experience in the current driving cycle	> 20°C (36°F)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 ABS (Motor temperature A – Motor temperature B)	≤ 20°C (36°F)
Diagnosis 2 ABS (Variation of motor temperature A – Variation of motor temperature B)	≤ 20°C (36°F)

Time Needed for Diagnosis: 20 seconds

CG:DTC P1C2A DRIVE MOTOR "A" INVERTER CIRCUIT

DIAGNOSIS:

- Detect the malfunction of drive motor inverter.
- If malfunction is detected in the internal circuit of drive motor inverter, it is judged as NG.
- Immediately at fault recognition

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0A78 detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-228, DTC P0A78 DRIVE MOTOR "A" INVERTER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> Replace the power cable after completing the diagnosis. <Ref. to HEV-51, Power Cable.>	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

CH:DTC P1C30 LOST COMMUNICATION WITH DRIVE MOTOR "A" INVERTER

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-320, OUTLINE OF DIAGNOSIS, DTC P1C30 LOST COMMUNICATION WITH DRIVE MOTOR "A" INVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

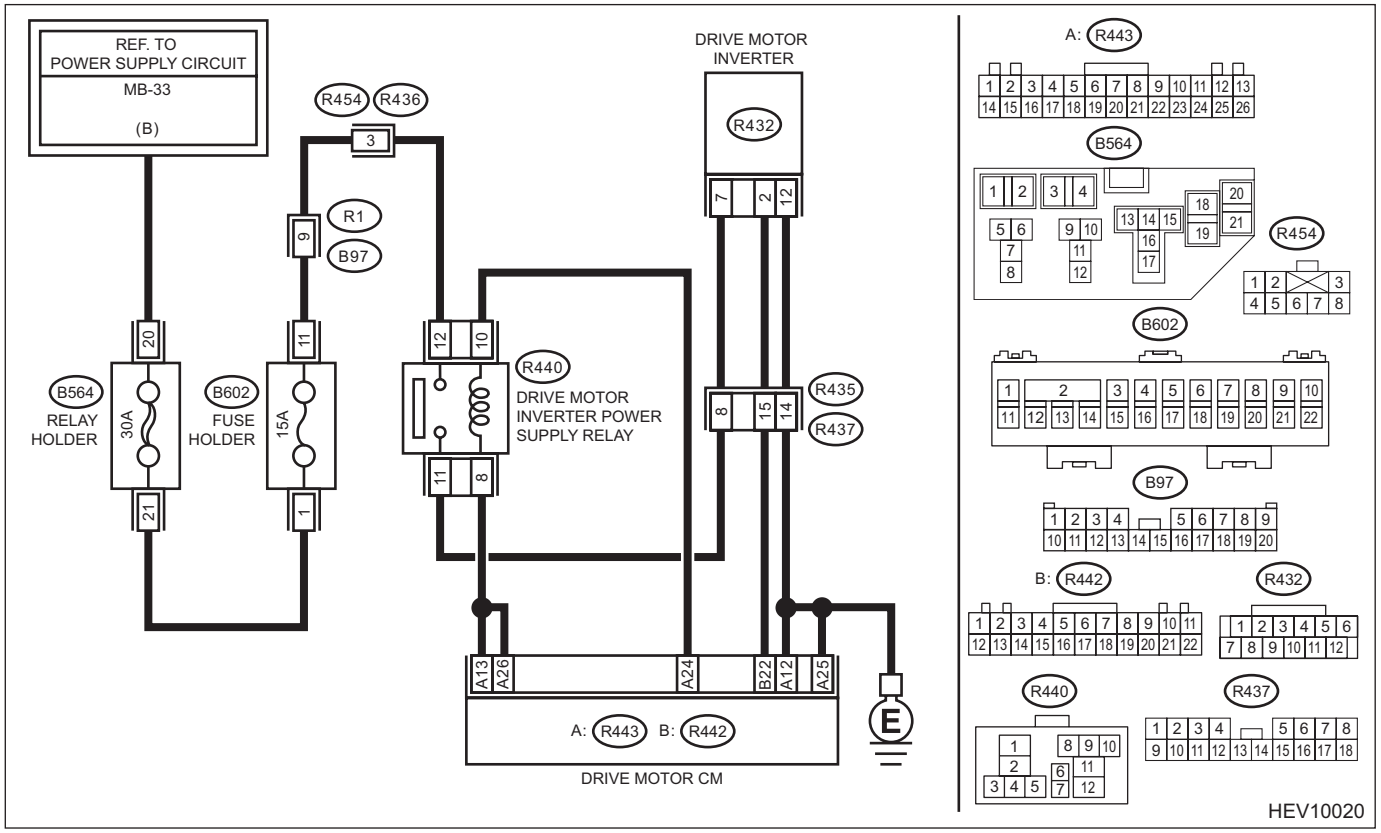
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Using the Subaru Select Monitor, perform «Drive Motor Inverter power supply relay» of System Operation Check Mode for the drive motor control system. <Ref. to HEV(diag)-70, DRIVE MOTOR CONTROL SYSTEM, OPERATION, System Operation Check Mode.> 2) Confirm the current data of in System Operation Check Mode, the value of «Drive Motor Inverter Operation Update Counter».	Does «Drive Motor Inverter Operation Update Counter» stop when «Drive Motor Inverter power supply relay» is OFF?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK RELAY.** Check the inverter power supply relay as a single unit. <Ref. to HEV-12, Relay and Fuse.>	Is the condition normal? (Check for continuity between terminals, damage, etc.)	Go to step **3**.	Replace the relay.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the drive motor inverter connector. 6) Disconnect the DMCM connector. 7) Using a tester, measure the resistance between the drive motor inverter connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R432) No. 2 — Ground bolt of inverter frame body:*** ***(R432) No. 7 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit to ground in harness between drive motor inverter connector and DMCM connector, or repair the intermediate connector.
4	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between drive motor inverter connector and DMCM connector and between the ground bolt of inverter frame body and inverter power supply relay. ***Connector & terminal:*** ***(R442) No. 22 — (R432) No. 2:*** ***(R440) No. 11 — (R432) No. 7:*** ***(R432) No. 12 — Ground bolt of inverter frame body:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between drive motor inverter connector and DMCM connector or between drive motor inverter connector and inverter power supply relay, or repair the intermediate connector.

	Step	Check	Yes	No
5	**CHECK HARNESS (SHORT TO POWER AND SHORT TO OTHER SIGNAL LINES).** 1) Disconnect the intermediate connector (R436). 2) Using a tester, measure the resistance within DMCM connector, between DMCM connector and intermediate connector (R436), and within drive motor inverter connector. ***Connector & terminal:*** ***(R442) No. 22 — (R442) No. 1 — 22:*** ***(R442) No. 22 — (R443) No. 1 — 26:*** ***(R442) No. 22 — (R436) No. 1 — 8:*** ***(R442) No. 22 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair short circuit in harness between drive motor inverter connector and DMCM connector or repair the intermediate connector.
6	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter or relay.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of serial communication with drive motor inverter.
Judge as NG when the serial data from drive motor inverter is not received.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
Inverter power supply relay control signal	ON

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
SCI data from drive motor inverter	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
SCI data from drive motor inverter	Received

Time Needed for Diagnosis: 1 second

CI: DTC P1C31 INVALID DATA RECEIVED FROM DRIVE MOTOR "A" INVERTER

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-322, OUTLINE OF DIAGNOSIS, DTC P1C31 INVALID DATA RECEIVED FROM DRIVE MOTOR "A" INVERTER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

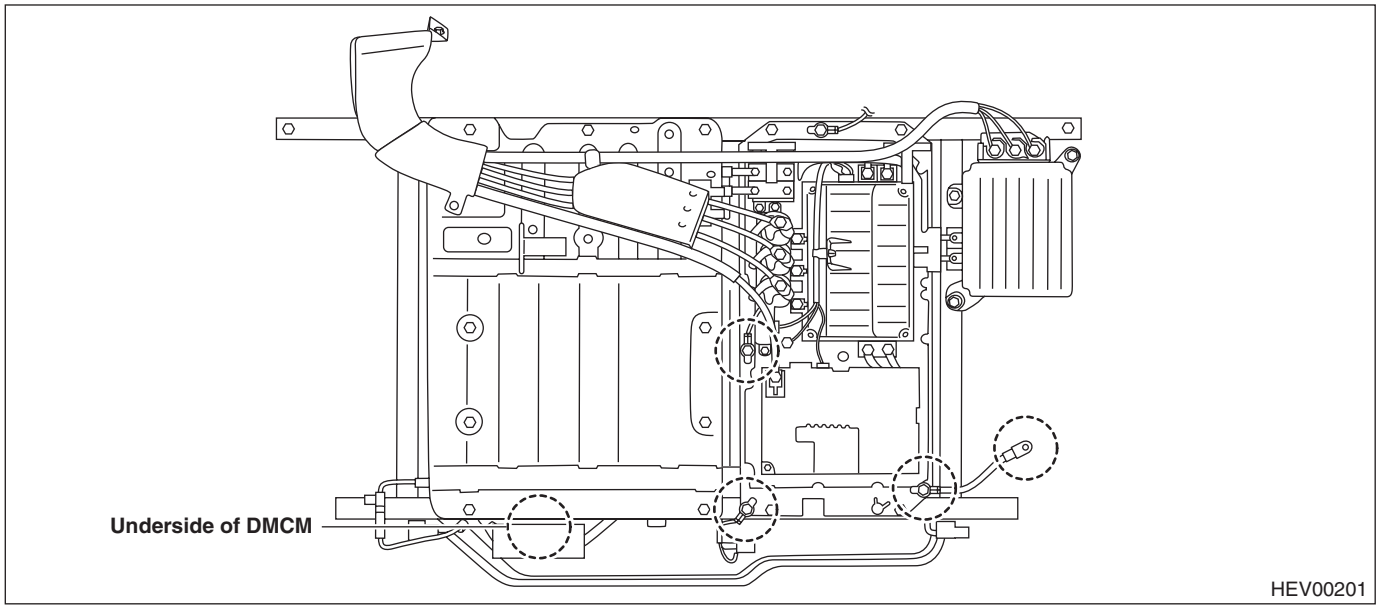
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P1C31 detected? (current malfunction)	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK GROUND WIRE.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the fastening area shown in the margin.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, etc.)	Go to step **3**.	Retighten the bolts. Or replace the harness.
3	**CHECK DRIVE MOTOR INVERTER.** 1) Replace the drive motor inverter. <Ref. to HEV-42, Inverter.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter.

NOTE:



1. OUTLINE OF DIAGNOSIS

Detect the malfunction of serial communication with drive motor inverter.
Judged as NG when incorrect serial data is received from drive motor inverter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1 and 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
SCI data from drive motor inverter	Received
Diagnosis 3	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
SCI data from drive motor inverter	Received
SCI data from drive motor inverter	≠ Parity error
SCI data from drive motor inverter	≠ Framing error

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 SCI data from drive motor inverter	Parity error
Diagnosis 2 SCI data from drive motor inverter	Framing error
Diagnosis 3 SCI data from drive motor inverter	Checksum error

Time Needed for Diagnosis: 0.015 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 SCI data from drive motor inverter	≠ Parity error
Diagnosis 2 SCI data from drive motor inverter	≠ Framing error
Diagnosis 3 SCI data from drive motor inverter	≠ Checksum error

Time Needed for Diagnosis: 0.03 seconds

CJ:DTC P1C34 LOST COMMUNICATION WITH DC/DC CONVERTER

DIAGNOSIS:

- Detects serial communication error with DC/DC converter.
- If serial data from the DC/DC converter is not received, it is judged as NG.
- Immediately at fault recognition

TROUBLE SYMPTOM:

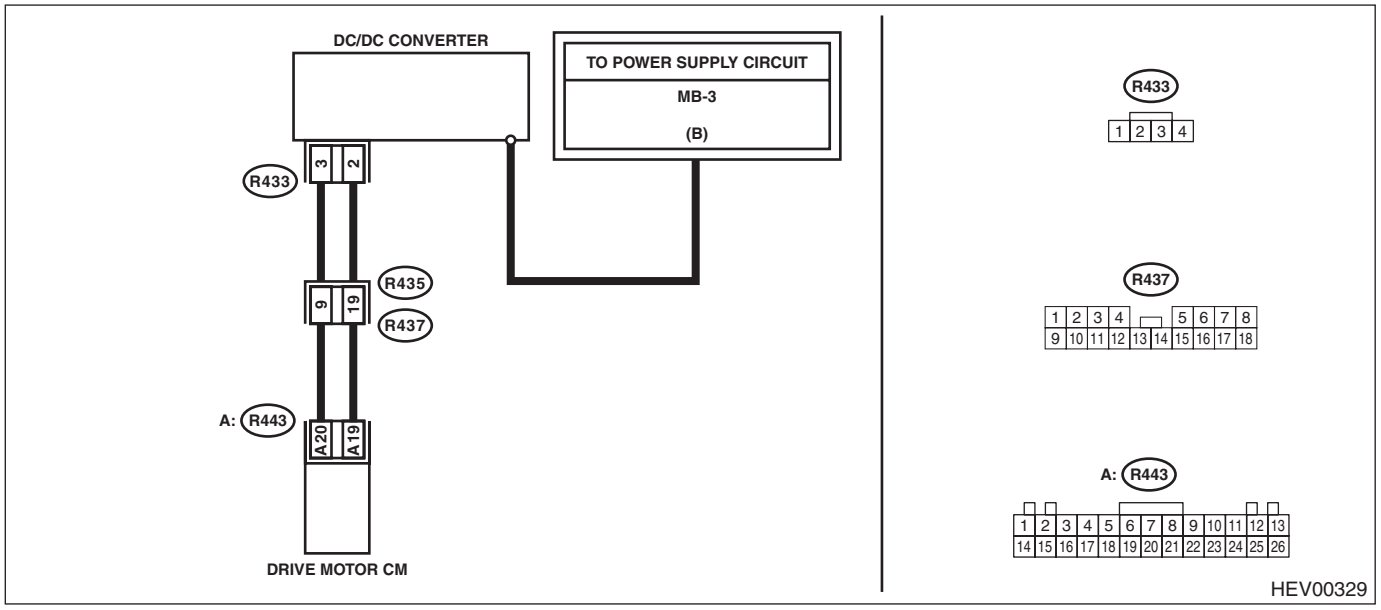
EV traveling/Auto Start Stop does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** 1) Start the engine. 2) Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P1C34 detected? (current malfunction)	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK CONNECTOR.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Visually check each connector and fastening areas of the DC/DC converter.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, etc.)	Go to step **3**.	Repair or replace faulty parts.
3	**CHECK HARNESS.** 1) Disconnect the DC/DC converter connector. 2) Disconnect the DMCM connector. 3) Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R443) No. 20 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short to ground circuit in harness between DMCM connector and DC/DC converter connector, or repair the intermediate connector.
4	**CHECK HARNESS.** Using a tester, measure the resistance between DC/DC converter connector and DMCM connector. ***Connector & terminal*** ***(R443) No. 20 — (R433) No. 3:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between DMCM connector and DC/DC converter connector, or repair the intermediate connector.
5	**CHECK HARNESS (SHORT TO OTHER SIGNAL).** 1) Disconnect the drive motor inverter connector. 2) Disconnect the intermediate connector (R436). 3) Using a tester, measure the resistance between DMCM connector and individual connectors of drive motor inverter. ***Connector & terminal:*** ***(R443) No. 20 — (R442) No. 1 — 22:*** ***(R443) No. 20 — (R443) No. 1 — 26:*** ***(R443) No. 20 — (R436) No. 1 — 8:*** ***(R443) No. 20 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair short circuit in harness between DMCM connector and DC/DC converter connector, or repair the intermediate connector.
6	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** Using a tester, measure the resistance between DC/DC converter connector and DC/DC converter 12 V output line. ***Connector & terminal*** ***(R433) No. 3 — DC/DC converter 12 V output line:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair short circuit in harness between DMCM connector and DC/DC converter 12 V output line or repair the intermediate connector.
7	**CHECK DC/DC CONVERTER.** 1) Replace the DC/DC converter. <Ref. to HEV-38, DC/DC Converter.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in DC/DC converter.

CK:DTC P1C35 INVALID DATA RECEIVED FROM DC/DC CONVERTER

DIAGNOSIS:

- Detects serial communication error with DC/DC converter.
- If an incorrect serial data is received from DC/DC converter, it is judged as NG.
- Immediately at fault recognition

TROUBLE SYMPTOM:

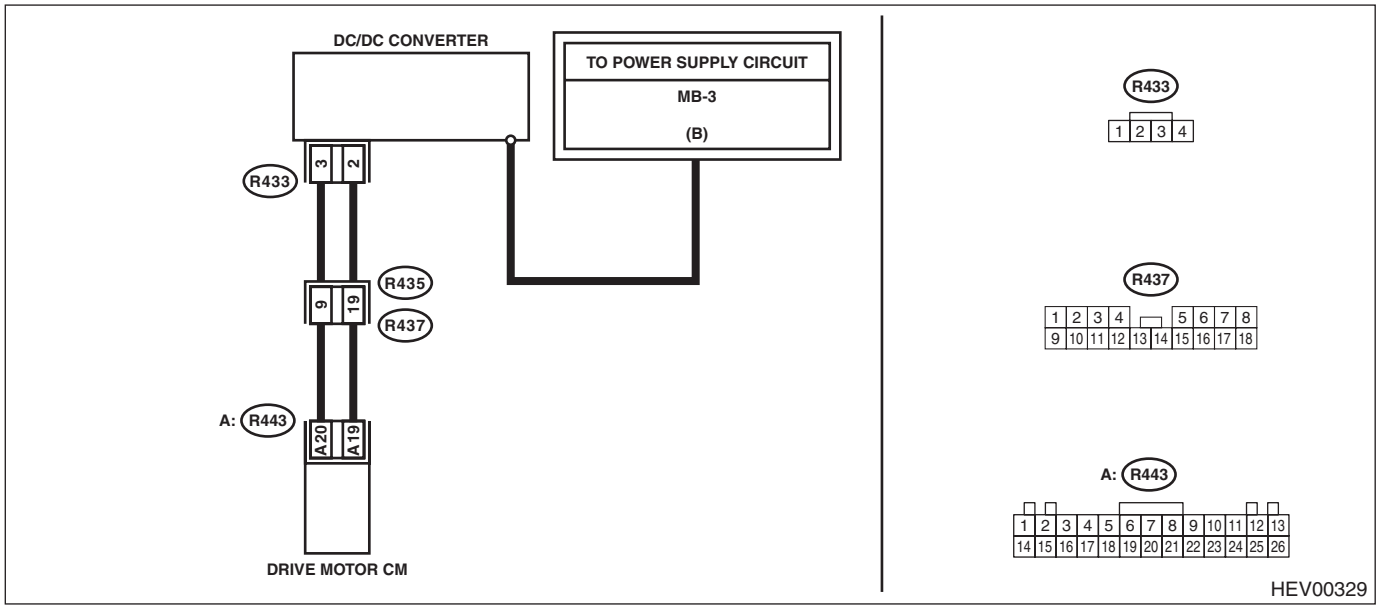
EV traveling/Auto Start Stop does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

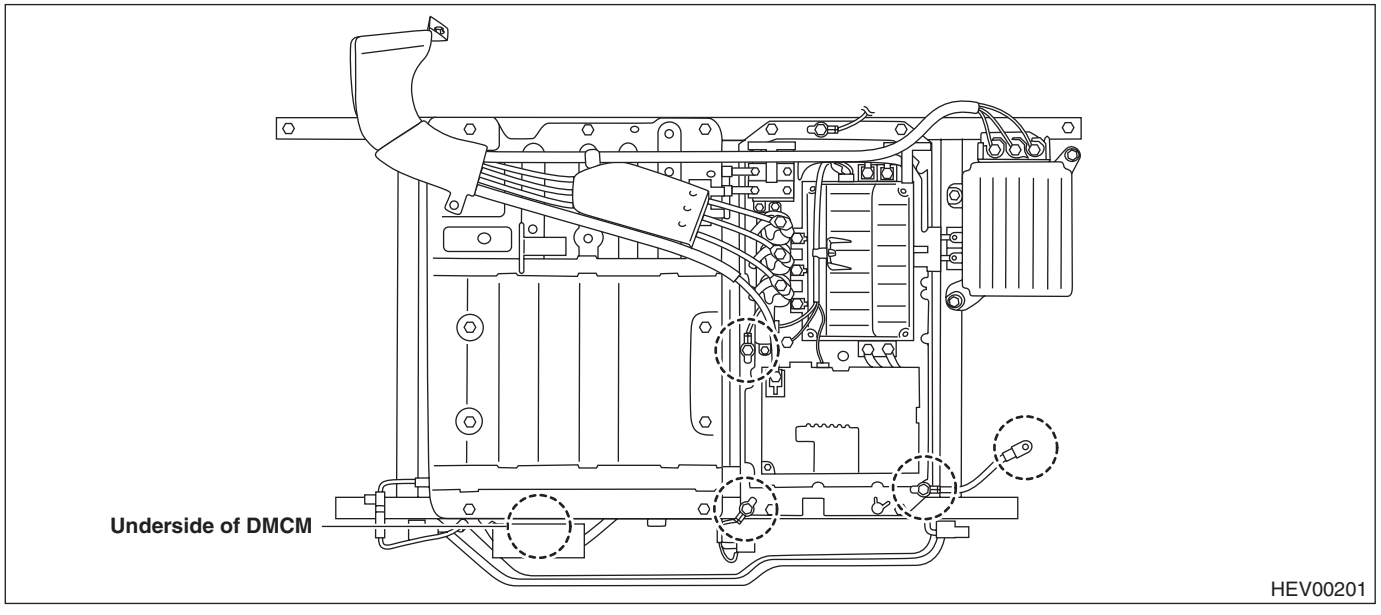
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** 1) Start the engine. 2) Read the DTC. <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P1C35 detected? (current malfunction)	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK GROUND WIRE.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the fastening area shown in the margin.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, etc.)	Go to step **3**.	Retighten the bolts. Or replace the harness.
3	**CHECK HARNESS (SHORT TO OTHER SIGNAL).** 1) Disconnect the drive motor inverter connector. 2) Disconnect the intermediate connector (R436). 3) Using a tester, measure the resistance between DMCM connector and individual connectors of drive motor inverter. ***Connector & terminal:*** ***(R443) No. 20 — (R442) No. 1 — 22:*** ***(R443) No. 20 — (R443) No. 1 — 26:*** ***(R443) No. 20 — (R436) No. 1 — 8:*** ***(R443) No. 20 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair short circuit in harness between DMCM connector and DC/DC converter connector, or repair the intermediate connector.
4	**CHECK DC/DC CONVERTER.** 1) Replace the DC/DC converter. <Ref. to HEV-38, DC/DC Converter.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in DC/DC converter.

NOTE:



CL:DTC P0A1B DRIVE MOTOR "A" CONTROL MODULE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-328, OUTLINE OF DIAGNOSIS, DTC P0A1B DRIVE MOTOR "A" CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

NOTE:
For the diagnostic procedure, refer to DTC P0604. <Ref. to HEV(diag)-122, DRIVE MOTOR CONTROL SYSTEM, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor control module.
Judge as NG when the malfunction is detected at the peripheral function of drive motor control module microcomputer.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 Internal Hardware module error	Detected
Diagnosis 2 Exception interrupt by the DMCM CPU	Detected

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 Internal Hardware module error	Not detected
Diagnosis 2 Exception interrupt by the DMCM CPU	Not detected

Time Needed for Diagnosis: Immediately

CM:DTC P06B1 SENSOR POWER SUPPLY "A" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-331, OUTLINE OF DIAGNOSIS, DTC P06B1 SENSOR POWER SUPPLY "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

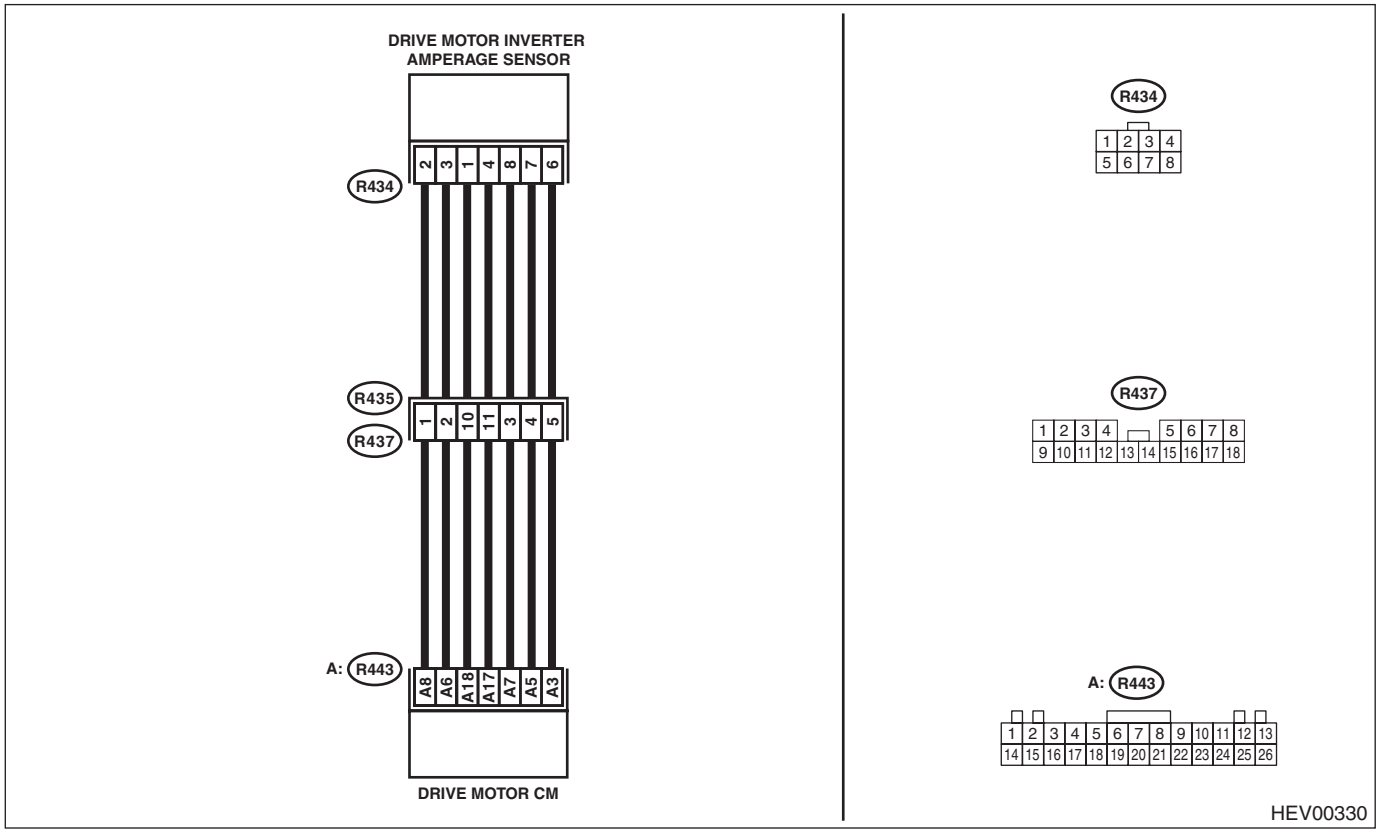
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Amperage Sensor Power Supply Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value less than 4.536 V?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (GROUND SHORT CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the DMCM connector. 6) Disconnect the drive motor inverter amperage sensor connector. 7) Using a tester, measure the resistance between DMCM connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R443) No. 8 — Ground bolt of inverter frame body:*** ***(R443) No. 6 — Ground bolt of inverter frame body:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair short circuit in harness between drive motor inverter amperage sensor connector and DMCM connector or repair the intermediate connector.
3	**CHECK DRIVE MOTOR INVERTER AMPERAGE SENSOR.** 1) Replace the drive motor inverter amperage sensor. <Ref. to HEV-27, Drive Motor Inverter Current Sensor.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter amperage sensor.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor power supply circuit.
Judge as NG when the power supply voltage of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured sensor power supply output voltage at DMCM	≤ 4.536 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured sensor power supply output voltage at DMCM	> 4.536 V

Time Needed for Diagnosis: 2 seconds

CN:DTC P06B2 SENSOR POWER SUPPLY "A" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-334, OUTLINE OF DIAGNOSIS, DTC P06B2 SENSOR POWER SUPPLY "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

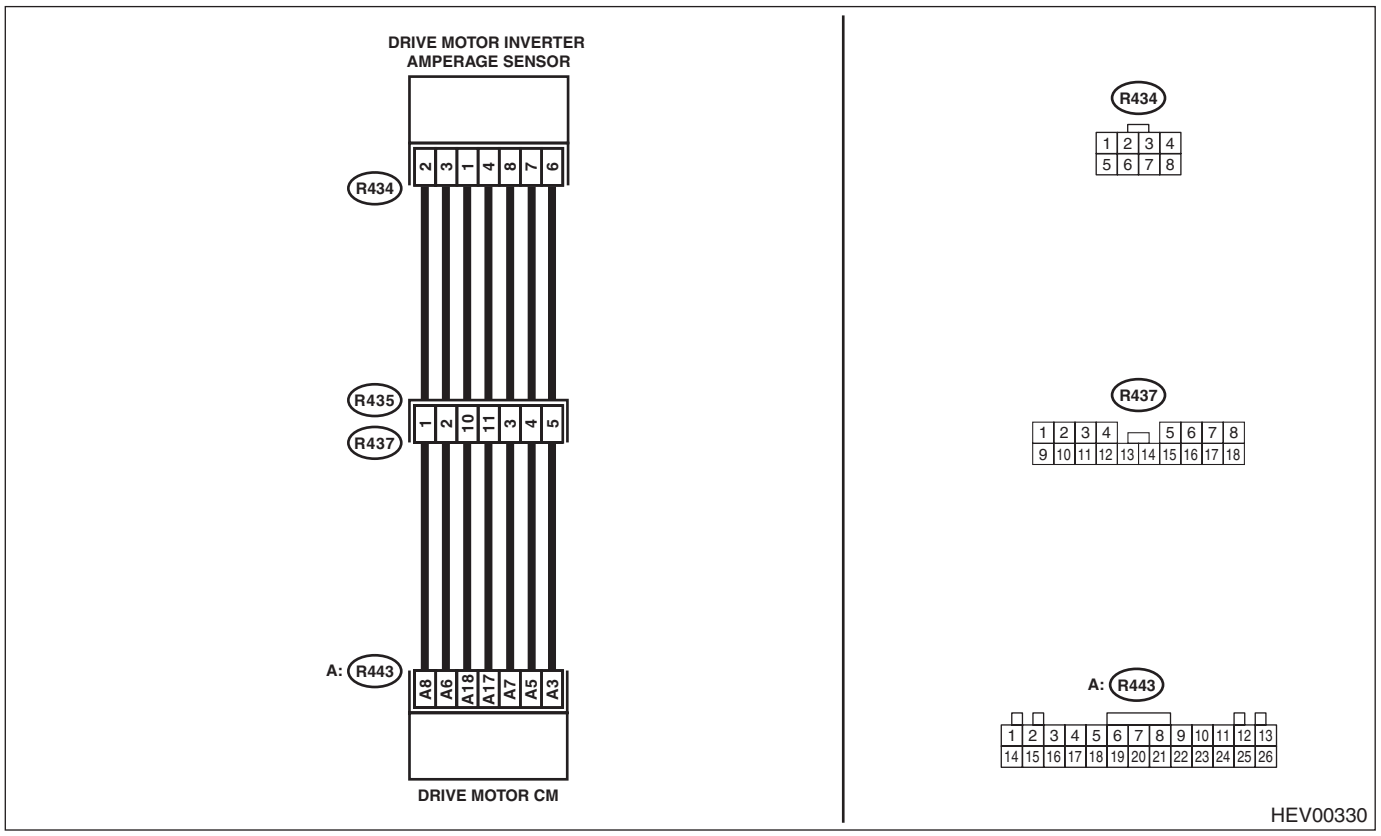
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of drive motor control system, the value of «Drive Motor Amperage Sensor Power Supply Voltage». <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value more than 5.418 V?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (SHORT TO POWER AND SHORT TO OTHER SIGNAL LINES).** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the drive motor inverter amperage sensor connector. 6) Disconnect the DMCM connector. 7) Disconnect the drive motor inverter connector. 8) Disconnect the intermediate connector (R436). 9) Using a tester, measure the resistance between DMCM connector and other signal lines and within inverter connector. ***Connector & terminal*** ***(R443) No. 8 — (R442) No. 1 — 22 (except No. 6):*** ***(R443) No. 8 — (R443) No. 1 — 26:*** ***(R443) No. 8 — (R436) No. 1 — 8:*** ***(R443) No. 8 — (R432) No. 7:*** ***(R443) No. 6 — (R442) No. 1 — 22 (except No. 8):*** ***(R443) No. 6 — (R443) No. 1 — 26:*** ***(R443) No. 6 — (R436) No. 1 — 8:*** ***(R443) No. 6 — (R432) No. 7:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair short circuit in harness between drive motor inverter amperage sensor connector and DMCM connector or repair the intermediate connector.
3	**CHECK DRIVE MOTOR INVERTER AMPERAGE SENSOR.** 1) Replace the drive motor inverter amperage sensor. <Ref. to HEV-27, Drive Motor Inverter Current Sensor.> 2) Perform the Inspection Mode. <Ref. to HEV(diag)-26, Inspection Mode.>	Is the same DTC detected? (current malfunction)	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>	Problem is present in drive motor inverter amperage sensor.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor power supply circuit.
Judge as NG when the power supply voltage of drive motor inverter amperage sensor is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured sensor power supply output voltage at DMCM	> 5.418 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured sensor power supply output voltage at DMCM	≤ 5.418 V

Time Needed for Diagnosis: 2 seconds

CO:DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-336, OUTLINE OF DIAGNOSIS, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK BECM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Wait for 30 seconds. 4) Turn the ignition switch to ON. 5) Read the DTC again. <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC detected? (current malfunction)	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer DataFlashEEPROM.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Open

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum error of Flash EEPROM within the BECM Main CPU (Data area)	Detected

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum error of Flash EEPROM within the BECM Main CPU (Data area)	Not Detected

Time Needed for Diagnosis: Less than 0.01 second

CP:DTC P0A1F BATTERY ENERGY CONTROL MODULE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-338, OUTLINE OF DIAGNOSIS, DTC P0A1F BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK BECM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Wait for 30 seconds. 4) Turn the ignition switch to ON. 5) Read the DTC again. <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC detected? (current malfunction)	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer AD converter.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
Diagnosis 2 and 3	
Ignition state	OFF to ON (Run or crank)
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Open

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Power sustain circuit monitor signal	High (Power ON)
Diagnosis 2	
Power sustain circuit monitor signal	Low (Power OFF)
Diagnosis 3	
Elapsed time of A / D conversion	≤ 0.0002 s

Time Needed for Diagnosis: Less than 0.05 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Power sustain circuit monitor signal	≠ High (Power ON)
Diagnosis 2	
Power sustain circuit monitor signal	≠ Low (Power OFF)
Diagnosis 3	
Elapsed time of A / D conversion	> 0.0002 s

Time Needed for Diagnosis: Less than 0.05 seconds

CQ:DTC P0A7D HYBRID/EV BATTERY PACK STATE OF CHARGE LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-340, OUTLINE OF DIAGNOSIS, DTC P0A7D HYBRID/EV BATTERY PACK STATE OF CHARGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «High Voltage Battery Amperage» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Is the value 1A (discharge) or more?	Go to step **2**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
2	**CHECK DTC.** Using the Subaru Select Monitor, read DTCs of the following system. • Hybrid powertrain control system <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Drive motor control system <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • CVT System <Ref. to CVT(HEV)(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-72, LIST, List of Diagnostic Trouble Code (DTC).> <Ref. to CVT(HEV)(diag)-35, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK CURRENT DATA.** 1) Turn the ignition to OFF. 2) Start the engine. 3) Check illumination of "DRIVING POSSIBLE (READY) INDICATOR" in the meter.	Does it Illuminate?	Go to step **4**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
4	**CHECK CURRENT DATA.** 1) Drive approximately 2 km (1.2 miles) at a speed of 30 km/h (18.6 MPH) or more. 2) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the value of «High Voltage Battery SOC». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 6% or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect high voltage battery SOC low.
Judge as NG when the high voltage battery SOC is at the specified value or less.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
SOC NOTE: SOC: State Of Charge	≤ 5%

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
SOC	> 5%

Time Needed for Diagnosis: 10 seconds

CR:DTC P0A7E HYBRID/EV BATTERY PACK OVER TEMPERATURE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-343, OUTLINE OF DIAGNOSIS, DTC P0A7E HYBRID/EV BATTERY PACK OVER TEMPERATURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

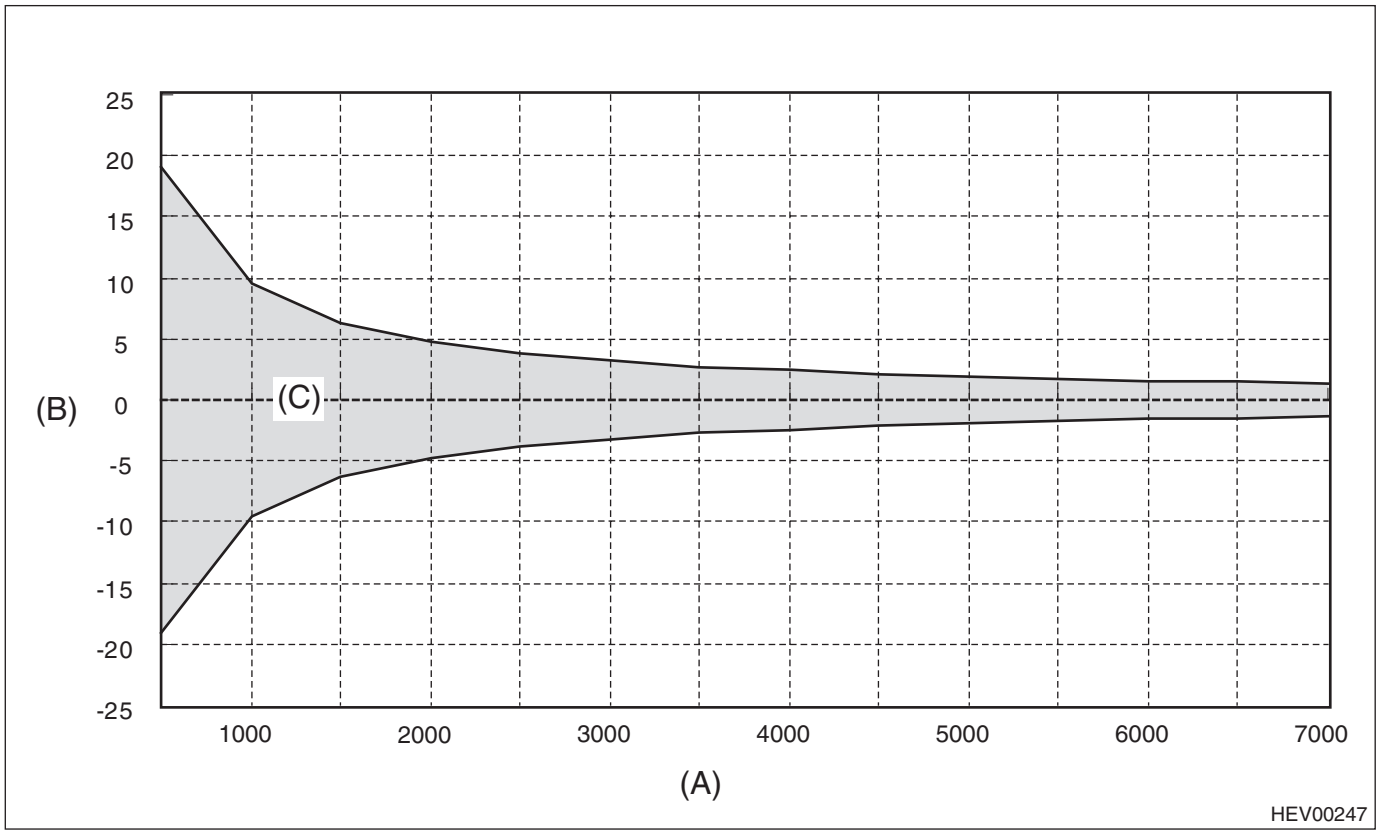
CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, read DTCs of the following system. • Drive motor control system <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is either DTC P0A83 or P0A82 detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «High Voltage Battery Cooling Fan Duty Target (HPCM)» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-13, HIGH VOLTAGE BATTERY, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>	Is the value 20% or more?	Go to step **3**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
3	**CHECK HIGH VOLTAGE BATTERY COOLING FAN.** Using the Subaru Select Monitor, perform «High Voltage Battery Cooling Fan» of System Operation Check Mode for the drive motor control system. <Ref. to HEV(diag)-70, DRIVE MOTOR CONTROL SYSTEM, OPERATION, System Operation Check Mode.>	Does the high voltage battery cooling fan operate?	Go to step **4**.	Check the high voltage battery cooling fan as a single part. <Ref. to HEV-59, High Voltage Battery Cooling System.>
4	**CHECK DUCT.** Check the high voltage battery cooling fan ducts. <Ref. to HEV-59, High Voltage Battery Cooling System.>	Are the conditions of ducts normal? (Check for clogging, dislodging, etc.)	Go to step **5**.	Repair the ducts.
5	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «High Voltage Battery Discharge Power Limit 1» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Is the value 0.5 kw or less?	Go to step **6**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
6	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «High Voltage Battery Charge Power 1» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Is the value 0.5 kw or less?	Go to step **7**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

	Step	Check	Yes	No
7	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Torque Target (HPCM)» «Drive Motor Speed Target(HPCM)» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Torque Target (HPCM)» and «Drive Motor Speed Target(HPCM)» within the standard in the margin?	Go to step **8**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
8	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Output Torque Actual» «Drive Motor Speed» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Output Torque Actual» and «Drive Motor Speed» within the standard in the margin?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

NOTE:



(A) Drive Motor Speed Target (HPCM) or Drive Motor Speed
(B) Drive Motor Torque Target (HPCM) or Drive Motor Output Torque Actual
(C) Standard

1. OUTLINE OF DIAGNOSIS

Detect high temperature abnormality of high voltage battery.
Judge as NG when the high voltage battery temperature is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Maximum temperature of hybrid battery	> 63°C (145.4°F)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Maximum temperature of hybrid battery	≤ 63°C (145.4°F)

Time Needed for Diagnosis: 1 second

CS:DTC P0A7F HYBRID/EV BATTERY PACK DETERIORATION

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-344, OUTLINE OF DIAGNOSIS, DTC P0A7F HYBRID/EV BATTERY PACK DETERIORATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the low output (longevity) of high voltage battery.
Judge as NG when the internal resistance value of high voltage battery is at the specified value or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Condition #1	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
| Hybrid battery current x Hybrid battery voltage | NOTE: Hybrid battery current < 0: Discharge	≥ Map1 ×0.1 kw < Map1 kw
or	
| Hybrid battery current x Hybrid battery voltage | NOTE: Hybrid battery current ≥ 0: Discharge	≥ Map2 ×0.1 kw < Map2 kw
HPCM contactor request	Closed
Condition #2	
NOTE: During a 60 second block the following conditions must be satisfied:	
Number of the Hybrid battery current and the Hybrid battery voltage data that satisfies Condition #1	≥ 50 counts
Number of the Hybrid battery current and Hybrid battery voltage data that satisfies the following:	≥ 1 count
| Hybrid battery current x Hybrid battery voltage |	≥ Map1 ×0.5 kw
Number of the Hybrid battery current and Hybrid battery voltage data that satisfies the following:	≥ 1 count
| Hybrid battery current x Hybrid battery voltage |	≥ Map2 ×0.5 kw
The highest value among the Hybrid battery temperature A, B and C	≥ – 5.0°C (23°F) and ≤ 45°C (113°F)
|Change of the highest value among the Hybrid battery temperature A, B and C|	≤ 2.0°C (35.6°F)/60 s

Map 1

Maximum discharge Power (kW)		SOH (%)		
		100	62.5	25
Battery Temperature (°C (°F))	–10 (14)	4.7	3.3	1.9
	0 (32)	7.0	4.7	2.7
	10 (50)	10.4	6.3	3.6
	15 (59)	11.7	7.2	4.1
	25 (77)	13.5	9.9	5.5
	30 (86)	14.0	9.9	5.5
	45 (113)	14.0	9.9	5.5

Map 2

Maximum charge power (kW)		SOH (%)		
		100	62.5	25
Battery Temperature (°C (°F))	–10 (14)	4.6	3.5	2.2
	0 (32)	7.1	5.0	3.0
	10 (50)	10.1	6.7	4.0
	15 (59)	11.6	7.5	4.4
	25 (77)	13.4	10.5	6.0
	45 (113)	13.4	10.5	6.0

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value (DV) (Hybrid battery internal resistance)	> Map 3 Ω

Map 3

Minimum hybrid battery temperature (°C (°F))	–5 (23)	0 (32)	5 (41)	20 (68)	25 (77)	45 (113)
Hybrid battery internal resistance (Ω)	1.21	0.97	0.79	0.46	0.43	0.36

Time Needed for Diagnosis: 60 s x 10 times

NOTE:
Failure count can increment over multiple driving cycles until cleared by passing result
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value (DV) (Hybrid battery internal resistance)	≤ Map 3 Ω

Time Needed for Diagnosis: depends on driving (charge/discharge amount)

CT:DTC P0A95 HIGH VOLTAGE FUSE "A"

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-348, OUTLINE OF DIAGNOSIS, DTC P0A95 HIGH VOLTAGE FUSE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK SERVICE DISCONNECT PLUG.** Check installation condition of service disconnect plug. <Ref. to HEV-15, Service Plug.>	Is the service disconnect plug securely installed? Is it locked?	Go to step **2**.	Securely install the service disconnect plug.
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of battery energy control system, the value of «High Voltage Battery Fuse Condition». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value show «Blow-out»?	Go to step **3**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK SERVICE DISCONNECT PLUG.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Measure the resistance between service disconnect plug terminals.	Is the resistance less than 1 Ω?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Replace the service disconnect plug.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the fuse.
Judge as NG when the fuse is open.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Any two of following conditions are satisfied	
Hybrid battery voltage “C”	< –25 mV
Hybrid battery voltage “D”	< –25 mV

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Any two of following conditions are satisfied	
Hybrid battery voltage “C”	≥ –25 mV
Hybrid battery voltage “D”	≥ –25 mV

Time Needed for Diagnosis: 0.1 second

CU:DTC P0A9C HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-349, OUTLINE OF DIAGNOSIS, DTC P0A9C HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 1.
Judge as NG when the deviation of high voltage battery temperature is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature A – Hybrid battery temperature B	> 20°C (68°F)
Hybrid battery temperature A – Hybrid battery temperature C	> 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature B – Hybrid battery temperature A	> 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature A	> 20°C (68°F)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature A – Hybrid battery temperature B	≤ 20°C (68°F)
Hybrid battery temperature A – Hybrid battery temperature C	≤ 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature B – Hybrid battery temperature A	≤ 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature A	≤ 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

CV:DTC P0A9D HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-350, OUTLINE OF DIAGNOSIS, DTC P0A9D HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 1.
Judge as NG when the high voltage battery temperature 1 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature A sensor output voltage (temperature equivalent)	< 0.49 V (> 95°C (203°F))

Time Needed for Diagnosis: 8 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature A sensor output voltage (temperature equivalent)	≥ 0.49 V (≤ 95°C (203°F)

Time Needed for Diagnosis: 8 seconds

CW:DTC P0A9E HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-351, OUTLINE OF DIAGNOSIS, DTC P0A9E HYBRID/EV BATTERY TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 1.
Judge as NG when the high voltage battery temperature 1 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature A sensor output voltage (temperature equivalent)	> 4.82 V (< –45°C (–49°F))

Time Needed for Diagnosis: 8 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature A sensor output voltage (temperature equivalent)	≤ 4.82 V (≥ –45°C (–49°F))

Time Needed for Diagnosis: 8 seconds

CX:DTC P0AA4 HYBRID/EV BATTERY NEGATIVE CONTACTOR CIRCUIT STUCK CLOSED

DIAGNOSIS:

- Immediately at fault recognition
- Detects welding in – side contactor and precharge contactor.
- If the difference between the total voltage of the high voltage battery and the inverter voltage is greater than or equal to the standard when the contactor is open, it is judged as NG.

TROUBLE SYMPTOM:

Normal control

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK BECM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Start the engine. 3) Turn the ignition switch to OFF. 4) Wait for 30 seconds. 5) Turn the ignition switch to ON. 6) Read the DTC again. <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC P0AA4 detected? (current malfunction)	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

CY:DTC P0AA6 HYBRID/EV BATTERY VOLTAGE SYSTEM ISOLATION FAULT

DIAGNOSIS:

- Detects leakage in high voltage system circuit.
- If hybrid system leakage resistance, leakage resistance in high voltage battery are smaller than the standard, it is judged as NG.
- Immediately at fault recognition

TROUBLE SYMPTOM:

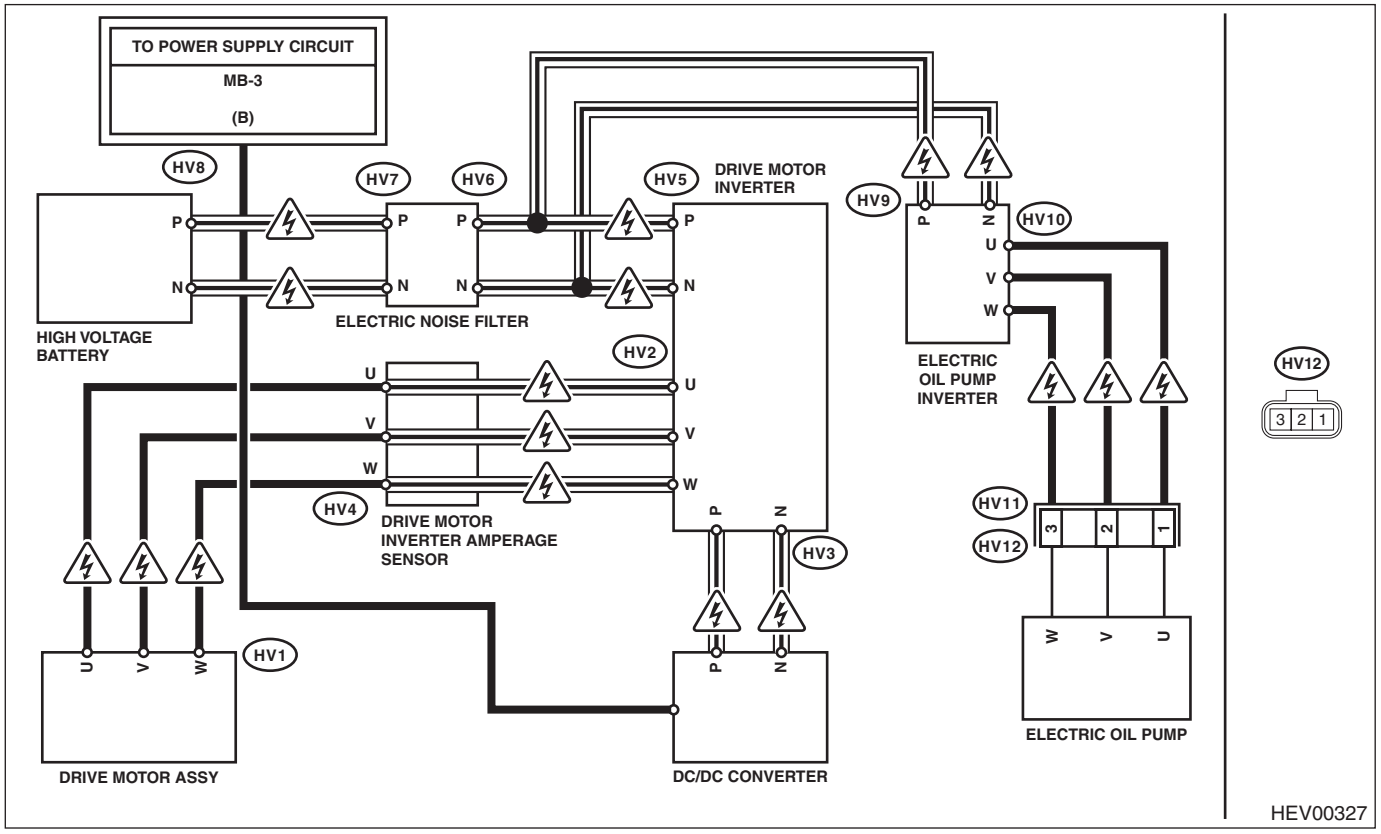
Normal control

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Turn the ignition switch to OFF → ON. 2) Leave the vehicle 1 minute unattended. 3) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the values of «High Voltage Battery Pack Leakage Resistance (+)» «High Voltage Battery Pack Leakage Resistance (–)». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value of «High Voltage Battery Pack Leakage Resistance (+)» or «High Voltage Battery Pack Leakage Resistance (–)» 290 kΩ or less?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** 1) Stop the engine. 2) Start the engine. 3) Using the Subaru Select Monitor, display the current data of battery energy control system, the values of «HEV System Leakage Resistance (+)» «HEV System Leakage Resistance (–)». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.> 4) With the current data displayed, drive the vehicle at 10 km/h (6.2 MPH) or faster at least 1 minute. 5) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the recorded values of «HEV System Leakage Resistance (+)» «HEV System Leakage Resistance (–)». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the minimum value of «HEV System Leakage Resistance (+)» or «HEV System Leakage Resistance (–)» 290 kΩ or less?	Go to step **3**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
3	**CHECK POWER CABLE AND BUS BAR.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Disconnect the power cable (HV4) from drive motor inverter amperage sensor. 6) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Go to step **13**.	Go to step **4**.
4	**CHECK POWER CABLE AND BUS BAR.** 1) Disconnect the power cable (HV10) from electric oil pump. 2) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Go to step **14**.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK BUS BAR.** 1) Check the bus bar between the high voltage battery (HV8) and the electric noise filter (HV7) and the surrounding area for metallic foreign bodies, and if there are any, remove them. 2) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Go to step **6**.
6	**CHECK POWER CABLE AND BUS BAR.** 1) Remove the bus bar between high voltage battery (HV8) and the electric noise filter (HV7). 2) Using an insulation multimeter (250 V range), measure the resistance between High Voltage battery terminals and chassis ground. ***Connector & terminal*** ***(HV8) P — Chassis ground:*** ***(HV8) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Go to step **7**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
7	**CHECK POWER CABLE AND BUS BAR.** 1) Check bus bars between the electric noise filter (HV6), the drive motor inverter (HV5), and electric oil pump inverter (HV9) and the surrounding area for metallic foreign bodies, and if there are any, remove them. 2) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Go to step **8**.
8	**CHECK POWER CABLE AND BUS BAR.** 1) Remove the DC/DC converter (HV3). 2) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Replace the DC/DC converter. <Ref. to HEV-38, DC/DC Converter.>	Go to step **9**.
9	**CHECK POWER CABLE AND BUS BAR.** 1) Remove the electric oil pump inverter (HV9). 2) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Replace the electric oil pump inverter. <Ref. to HEV-42, Inverter.>	Go to step **10**.

Step		Check	Yes	No
10	**CHECK POWER CABLE AND BUS BAR.** 1) Remove the drive motor inverter amperage sensor (HV2) from the drive motor inverter. 2) Check the bus bar of the drive motor inverter amperage sensor (HV2) and the surrounding area for metallic foreign bodies, and remove them if there any, then reinstall the sensor. 3) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Go to step **11**.
11	**CHECK POWER CABLE AND BUS BAR.** 1) Remove the drive motor inverter amperage sensor (HV2) from the drive motor inverter. 2) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Replace the drive motor inverter amperage sensor. <Ref. to HEV-27, Drive Motor Inverter Current Sensor.>	Go to step **12**.
12	**CHECK POWER CABLE AND BUS BAR.** 1) Remove the bus bar between the electric noise filter (HV6) and the drive motor inverter (HV5). 2) Using an insulation multimeter (250 V range), measure the resistance between high voltage battery side terminal and chassis ground of electric noise filter. ***Connector & terminal*** ***(HV7) P — Chassis ground:*** ***(HV7) N — Chassis ground:***	Is the resistance 2 MΩ or more?	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>	Replace the electric noise filter. <Ref. to HEV-31, Noise Filter.>
13	**CHECK POWER CABLE AND DRIVE MOTOR ASSEMBLY.** 1) Disconnect the power cable (HV1) from the drive motor assembly. NOTE: The gasket is not reusable. 2) Using an insulation multimeter (250 V range), measure the resistance between drive motor assembly and chassis ground. ***Connector & terminal*** ***(HV1) U — Chassis ground:*** ***(HV1) V — Chassis ground:*** ***(HV1) W — Chassis ground:***	Is the resistance 2 MΩ or more?	Replace the power cable. <Ref. to HEV-51, Power Cable.>	Replace the drive motor assembly. <Ref. to CVT(TH58A)-219, Drive Motor Assembly.>
14	**CHECK POWER CABLE AND ELECTRIC OIL PUMP.** 1) Disconnect the power cable (HV12) from electric oil pump. 2) Using an insulation multimeter (250 V range), measure the resistance between electric oil pump and chassis ground. ***Connector & terminal*** ***(HV12) U — Chassis ground:*** ***(HV12) V — Chassis ground:*** ***(HV12) W — Chassis ground:***	Is the resistance 2 MΩ or more?	Replace the power cable. <Ref. to HEV-51, Power Cable.>	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>

CZ:DTC P0AA7 HYBRID/EV BATTERY VOLTAGE ISOLATION SENSOR CIRCUIT

DIAGNOSIS:

- Detects a fault in leakage detection circuit.
- Detects open, short conditions in switches within the leakage detection circuit.
- Immediately at fault recognition

TROUBLE SYMPTOM:

Normal control

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

DA:DTC P0AAD HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Detected when two consecutive driving cycles with fault occur. (Single engine startup is counted as one drive cycle.)
- GENERAL DESCRIPTION <Ref. to HEV(diag)-358, OUTLINE OF DIAGNOSIS, DTC P0AAD HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the intake air temperature sensor.
Judge as NG when the deviation of high voltage battery temperature is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
Soak time from ECM	≥ 6.0 h

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value (DV) NOTE: The smallest value among follows |Hybrid Battery Pack Air Temperature – Hybrid battery temperature A| |Hybrid Battery Pack Air Temperature – Hybrid battery temperature B| |Hybrid Battery Pack Air Temperature – Hybrid battery temperature C|	> 16°C (60.8°F)

Time Needed for Diagnosis: 15 seconds
Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value (DV) NOTE: The smallest value among follows |Hybrid Battery Pack Air Temperature – Hybrid battery temperature A| |Hybrid Battery Pack Air Temperature – Hybrid battery temperature B| |Hybrid Battery Pack Air Temperature – Hybrid battery temperature C|	≤ 16°C (60.8°F)

Time Needed for Diagnosis: 15 seconds

DB:DTC P0AAE HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-359, OUTLINE OF DIAGNOSIS, DTC P0AAE HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control

NOTE:

If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the intake air temperature sensor.
Judge as NG when the intake air temperature is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack air temperature sensor output voltage (temperature equivalent)	< 0.49 V (> 95°C (203°F))

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack air temperature sensor output voltage (temperature equivalent)	≥ 0.49 V (≤ 95°C (203°F)

Time Needed for Diagnosis: 10 seconds

DC:DTC P0AAF HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-360, OUTLINE OF DIAGNOSIS, DTC P0AAF HYBRID/EV BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control

NOTE:

If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the intake air temperature sensor.
Judge as NG when the intake air temperature is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack air temperature sensor output voltage (temperature equivalent)	> 4.82 V (< –45°C (–49°F))

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack air temperature sensor output voltage (temperature equivalent)	≤ 4.82 V (≥ –45°C (–49°F))

Time Needed for Diagnosis: 10 seconds

DD:DTC P0ABF HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-361, OUTLINE OF DIAGNOSIS, DTC P0ABF HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current sensor circuit.
Judge as NG when the high voltage battery current value is below the specified value under the condition that the motor operates at overload.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
(Commanded Drive Motor Torque	> 15 Nm
Measured Drive Motor Speed)	> 125 rpm
or	
(Commanded Drive Motor Torque	< –40 Nm
Measured Drive Motor Speed)	> 1700 rpm

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	< 1 A

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	≥ 1 A

Time Needed for Diagnosis: 1 second

DE:DTC P0AC0 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-362, OUTLINE OF DIAGNOSIS, DTC P0AC0 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the offset malfunction of high voltage battery current sensor.
Judge as NG when the high voltage battery current offset is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
Continuous time of a	≤ 0.2 s
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	> 1 A

Time Needed for Diagnosis: 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	≤ 1 A

Time Needed for Diagnosis: 0.01 second

DF:DTC P0AC1 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-363, OUTLINE OF DIAGNOSIS, DTC P0AC1 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery current sensor.
Judge as NG when the high voltage battery current value is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current sensor output voltage (current equivalent)	< –1.91 V (< –240 A)

Time Needed for Diagnosis: 0.4 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current sensor output voltage (current equivalent)	≥ –1.91 V (≥ –240 A)

Time Needed for Diagnosis: 0.4 seconds

DG:DTC P0AC2 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-364, OUTLINE OF DIAGNOSIS, DTC P0AC2 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery current sensor.
Judge as NG when the high voltage battery current value is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current sensor output voltage (current equivalent)	> 1.91 V (> 240 A)

Time Needed for Diagnosis: 0.4 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current sensor output voltage (current equivalent)	≤ 1.91 V (≤ 240 A)

Time Needed for Diagnosis: 0.4 seconds

DH:DTC P0AC3 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT INTERMITTENT/ERRATIC

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-365, OUTLINE OF DIAGNOSIS, DTC P0AC3 HYBRID/EV BATTERY PACK CURRENT SENSOR "A" CIRCUIT INTERMITTENT/ERRATIC, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, read DTCs of the following system. • Drive motor control system <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Start the engine. 3) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the value of «High Voltage Battery Amperage Sensor Output». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the output of value 1 A or more (when the ignition is turned to ON)?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery current sensor.
Judge as NG when the stuck of high voltage battery current sensor value is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
Hybrid battery voltage D (Actual state: discharge)	< –120 mV
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed
Diagnosis 2	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
Hybrid battery voltage D (Actual state: discharge)	> 120 mV
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery pack current (Detected state: charge) NOTE: (The system should be discharging, but a charge condition is detected.)	≥ 10 A ≤ 110 A
Diagnosis 2	
Hybrid battery pack current (Detected state: discharge) NOTE: (The system should be charging, but a discharge condition is detected.)	≤ –10 A ≥ –190 A

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery pack current (Detected state: discharge)	≤ –10 A ≥ –190 A
Diagnosis 2	
Hybrid battery pack current (Detected state: charge)	≥ 10 A ≤ 110 A

Time Needed for Diagnosis: 1 second

DI: DTC P0AC6 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-367, OUTLINE OF DIAGNOSIS, DTC P0AC6 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 2.
Judge as NG when the deviation of high voltage battery temperature is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature B – Hybrid battery temperature A	> 20°C (68°F)
Hybrid battery temperature B – Hybrid battery temperature C	> 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature A – Hybrid battery temperature B	> 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature B	> 20°C (68°F)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature B – Hybrid battery temperature A	≤ 20°C (68°F)
Hybrid battery temperature B – Hybrid battery temperature C	≤ 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature A – Hybrid battery temperature B	≤ 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature B	≤ 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

DJ:DTC P0AC7 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-368, OUTLINE OF DIAGNOSIS, DTC P0AC7 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 2.
Judge as NG when the high voltage battery temperature 2 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature B sensor output voltage (temperature equivalent)	< 0.49 V (> 95°C (203°F))

Time Needed for Diagnosis: 8 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature B sensor output voltage (temperature equivalent)	≥ 0.49 V (≤ 95°C (203°F)

Time Needed for Diagnosis: 8 seconds

DK:DTC P0AC8 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-369, OUTLINE OF DIAGNOSIS, DTC P0AC8 HYBRID/EV BATTERY TEMPERATURE SENSOR "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 2.
Judge as NG when the high voltage battery temperature 2 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature B sensor output voltage (temperature equivalent)	> 4.82 V (< –45°C (–49°F))

Time Needed for Diagnosis: 8 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature B sensor output voltage (temperature equivalent)	≤ 4.82 V (≥ –45°C (–49°F))

Time Needed for Diagnosis: 8 seconds

DL:DTC P0ACB HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-370, OUTLINE OF DIAGNOSIS, DTC P0ACB HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 3.
Judge as NG when the deviation of high voltage battery temperature is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature C – Hybrid battery temperature B	> 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature A	> 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature A – Hybrid battery temperature C	> 20°C (68°F)
Hybrid battery temperature B – Hybrid battery temperature C	> 20°C (68°F)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature C – Hybrid battery temperature B	≤ 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature A	≤ 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature A – Hybrid battery temperature C	≤ 20°C (68°F)
Hybrid battery temperature B – Hybrid battery temperature C	≤ 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

DM:DTC P0ACC HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-371, DTC P0ACC HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 3.
Judge as NG when the high voltage battery temperature 3 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature C sensor output voltage (temperature equivalent)	< 0.49 V (> 95°C (203°F))

Time Needed for Diagnosis: 8 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature C sensor output voltage (temperature equivalent)	≥ 0.49 V (≤ 95°C (203°F)

Time Needed for Diagnosis: 8 seconds

DN:DTC P0ACD HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-372, OUTLINE OF DIAGNOSIS, DTC P0ACD HYBRID/EV BATTERY TEMPERATURE SENSOR "C" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 3.
Judge as NG when the high voltage battery temperature 3 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature C sensor output voltage (temperature equivalent)	> 4.82 V (< –45°C (–49°F))

Time Needed for Diagnosis: 8 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature C sensor output voltage (temperature equivalent)	≤ 4.82 V (≥ –45°C (–49°F))

Time Needed for Diagnosis: 8 seconds

DO:DTC P0AD9 HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT/OPEN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-373, OUTLINE OF DIAGNOSIS, DTC P0AD9 HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of +side contactor drive signal line.
Judge as NG when the open circuit of +side contactor drive signal line is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
Measured Positive contactor control signal (BECM main CPU output)	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Positive contactor control signal (BECM output)	Open

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Positive contactor control signal (BECM output)	Closed

Time Needed for Diagnosis: 0.5 seconds

DP:DTC P0ADB HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-374, OUTLINE OF DIAGNOSIS, DTC P0ADB HYBRID/EV BATTERY POSITIVE CONTACTOR CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the short circuit of +side contactor drive signal line.
Judge as NG when the short circuit of +side contactor drive signal line is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Open
BECM positive contactor command	Open
Measured Positive contactor control signal (BECM main CPU output)	Open
Diagnosis 2	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Open
BECM positive contactor command	Open

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 Measured Positive contactor control signal (BECM output)	Closed
Diagnosis 2 Measured Positive contactor control signal	Closed

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 Measured Positive contactor control signal (BECM output)	Open
Diagnosis 2 Measured Positive contactor control signal	Open

Time Needed for Diagnosis: 0.1 second

DQ:DTC P0ADD HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT/OPEN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-376, OUTLINE OF DIAGNOSIS, DTC P0ADD HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of –side contactor drive signal line.
Judge as NG when the open circuit of –side contactor drive signal line is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM negative contactor command	Closed
Measured negative contactor control signal (BECM main CPU output)	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Negative contactor control signal (BECM output)	Open

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Negative contactor control signal (BECM output)	Closed

Time Needed for Diagnosis: 0.5 seconds

DR:DTC P0ADF HYBRID/EV BATTERY NEGATIVE CONTACTOR CONTROL CIRCUIT LOW

DIAGNOSIS:

- Detects short conditions in – side contactor control signal line.
- If short conditions are detected in – side contactor control signal line, it is judged as NG.
- Immediately at fault recognition

TROUBLE SYMPTOM:

Normal control

NOTE:

If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

DS:DTC P0AE4 HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT/OPEN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-378, OUTLINE OF DIAGNOSIS, DTC P0AE4 HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of precharge contactor drive signal line.
Judge as NG when the open circuit of precharge contactor drive signal line is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
Request contractors from HPCM	Closed
Precharge contactor command	Closed
Precharge contactor control circuit monitor signal (Drive control circuit output)	High (Closed)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Precharge contactor control signal (BECM main CPU output)	High (Open)

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Precharge contactor control signal (BECM main CPU output)	Low (Close)

Time Needed for Diagnosis: 0.5 seconds

DT:DTC P0AE6 HYBRID/EV BATTERY PRECHARGE CONTACTOR CONTROL CIRCUIT LOW

DIAGNOSIS:

- Detects short conditions in precharge contactor control signal line.
- If short conditions are detected in precharge contactor control signal line, it is judged as NG.
- Immediately at fault recognition

TROUBLE SYMPTOM:

Normal control

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

DU:DTC P0B25 HYBRID/EV BATTERY "A" VOLTAGE LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-382, OUTLINE OF DIAGNOSIS, DTC P0B25 HYBRID/EV BATTERY "A" VOLTAGE LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

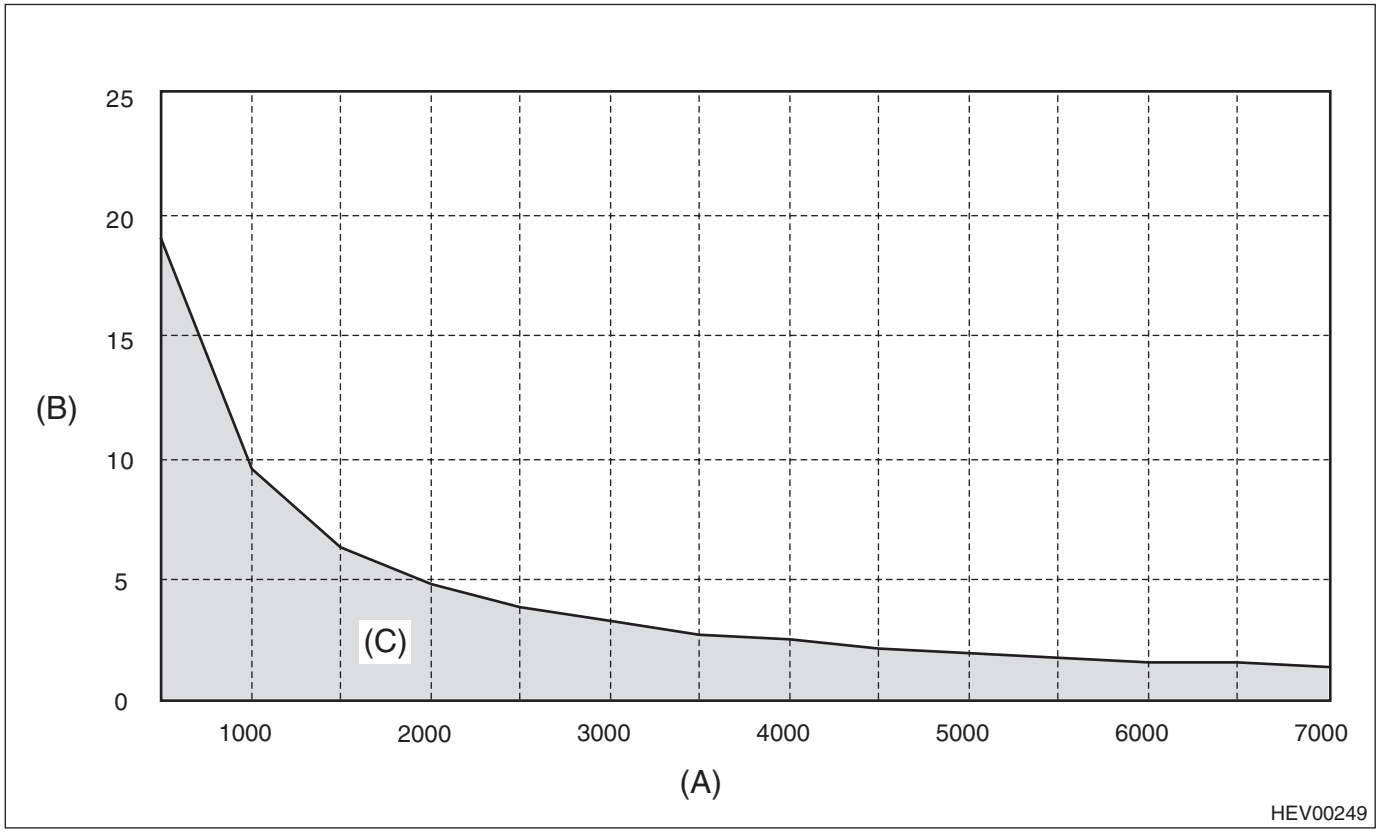
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «High Voltage Battery Discharge Power Limit 1» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Does the value show 0 kw?	Go to step **2**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
2	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Torque Target (HPCM)» «Drive Motor Speed Target(HPCM)» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Torque Target (HPCM)» and «Drive Motor Speed Target(HPCM)» within the standard in the margin?	Go to step **3**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
3	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Output Torque Actual» «Drive Motor Speed» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Output Torque Actual» and «Drive Motor Speed» within the standard in the margin?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

NOTE:



(A) Drive Motor Speed Target (HPCM) or Drive Motor Speed
(B) Drive Motor Torque Target (HPCM) or Drive Motor Output Torque Actual
(C) Standard

1. OUTLINE OF DIAGNOSIS

Detect that the high voltage battery voltage is below the lowest voltage.
Judge as NG when the high voltage battery voltage value is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack voltage	< 73.6 V

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack voltage	≥ 73.6 V

Time Needed for Diagnosis: 5 seconds

DV:DTC P0B26 HYBRID/EV BATTERY "A" VOLTAGE HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-385, OUTLINE OF DIAGNOSIS, DTC P0B26 HYBRID/EV BATTERY "A" VOLTAGE HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

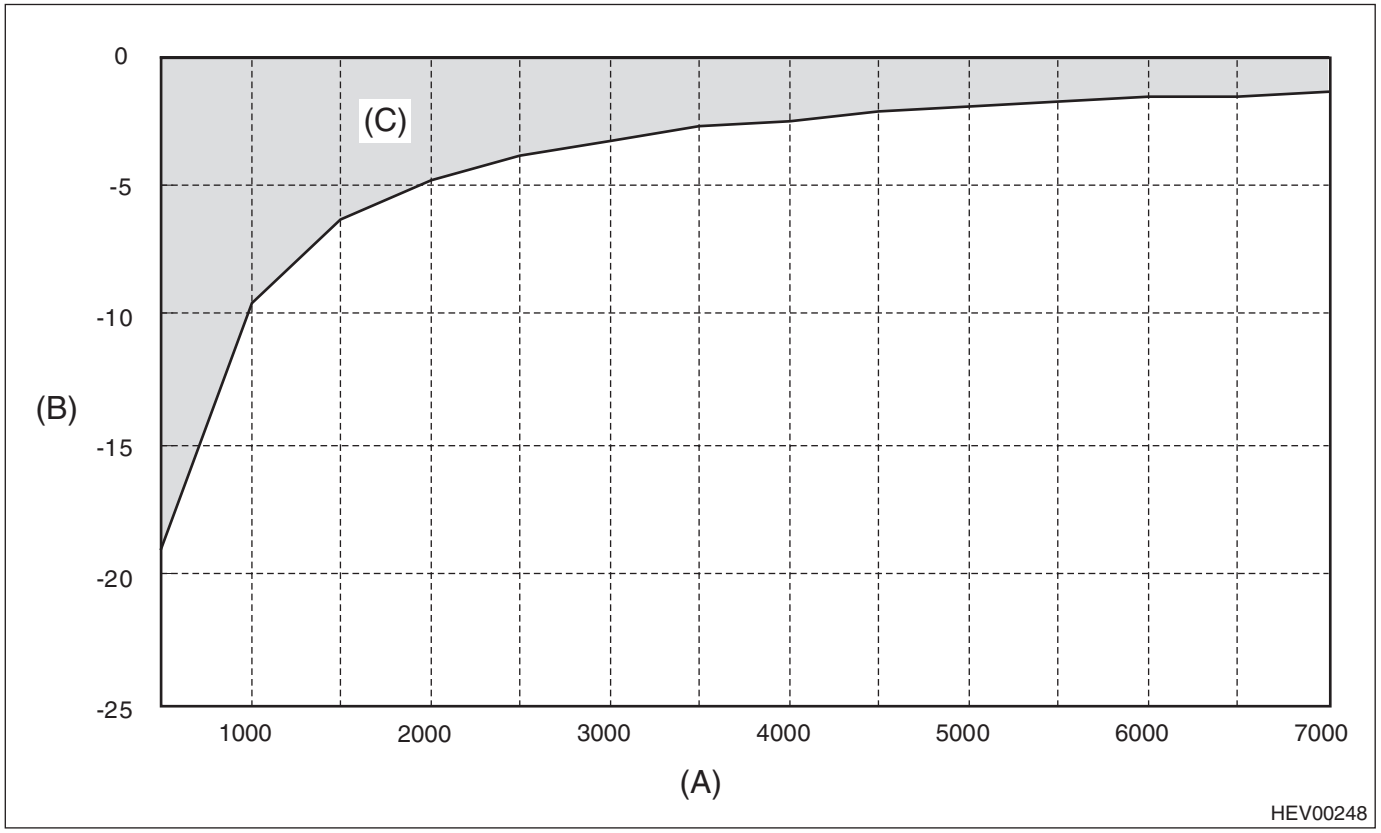
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «High Voltage Battery Charge Power 1» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Does the value show 0 kw?	Go to step **2**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
2	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Torque Target (HPCM)» «Drive Motor Speed Target(HPCM)» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Torque Target (HPCM)» and «Drive Motor Speed Target(HPCM)» within the standard in the margin?	Go to step **3**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
3	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Output Torque Actual» «Drive Motor Speed» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Output Torque Actual» and «Drive Motor Speed» within the standard in the margin?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

NOTE:



(A) Drive Motor Speed Target (HPCM) or Drive Motor Speed
(B) Drive Motor Torque Target (HPCM) or Drive Motor Output Torque Actual
(C) Standard

1. OUTLINE OF DIAGNOSIS

Detect that the high voltage battery voltage exceeds the highest voltage.
Judge as NG when the voltage value of high voltage battery is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack voltage	> 136.4 V

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack voltage	≤ 136.4 V

Time Needed for Diagnosis: 5 seconds

DW:DTC P0B37 HIGH VOLTAGE SERVICE DISCONNECT OPEN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-387, OUTLINE OF DIAGNOSIS, DTC P0B37 HIGH VOLTAGE SERVICE DISCONNECT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK SERVICE DISCONNECT PLUG.** Check installation condition of service disconnect plug. <Ref. to HEV-15, Service Plug.>	Is the service disconnect plug securely installed? Is it locked?	Go to step **2**.	Securely install the service disconnect plug.
2	**CHECK SERVICE DISCONNECT PLUG.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.>	Is the condition of service disconnect plug normal? (Check for defective lock, rust or contamination in terminals, etc.)	Go to step **3**.	Replace the service disconnect plug.
3	**CHECK CURRENT DATA.** 1) Install the service disconnect plug. 2) Turn the ignition switch to ON. 3) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the value of «Service Plug Status». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value show «OFF»?	Go to step **4**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

Step		Check	Yes	No
4	**CHECK CURRENT DATA.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Install the service disconnect plug. 5) Turn the ignition switch to OFF. 6) Wait for 30 seconds. 7) Turn the ignition switch to ON. 8) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the value of «Service Plug Status». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Does the value show «OFF»?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of service disconnect plug.
Judge as NG when service disconnect plug unplugs or service disconnect plug SW is open.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Interlock switch signal	Open

Time Needed for Diagnosis: 0.05 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Interlock switch signal	Closed

Time Needed for Diagnosis: 0.05 seconds

DX:DTC P0B3C HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT RANGE/ PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-388, OUTLINE OF DIAGNOSIS, DTC P0B3C HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 0.
Judge as NG when the stuck of high voltage battery voltage 0 is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage A	> 96.0 V ≤ 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage A	≥ –98.54 V < 9.60 V (Low side)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage A	≤ 96.0 V > 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage A	< –98.54 V ≥ 9.60 V (Low side)

Time Needed for Diagnosis: 1 second

DY:DTC P0B3D HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-390, OUTLINE OF DIAGNOSIS, DTC P0B3D HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 0.
Judge as NG when the high voltage battery voltage 0 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage A	< –98.54 V

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage A	≥ –98.54 V

Time Needed for Diagnosis: 0.1 second

DZ:DTC P0B3E HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-391, OUTLINE OF DIAGNOSIS, DTC P0B3E HYBRID/EV BATTERY VOLTAGE SENSE "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 0.
Judge as NG when the high voltage battery voltage 0 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage A	> 98.54 V

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage A	≤ 98.54 V

Time Needed for Diagnosis: 0.1 second

EA:DTC P0B41 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT RANGE/ PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-392, OUTLINE OF DIAGNOSIS, DTC P0B41 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 1.
Judge as NG when the stuck of high voltage battery voltage 1 is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage B	> 64.0 V ≤ 66.27 V (High side)
Diagnosis 2	
Hybrid battery voltage B	≥ –66.27 V < 6.40 V (Low side)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage B	≤ 64.0 V > 66.27 V (High side)
Diagnosis 2	
Hybrid battery voltage B	< –66.27 V ≥ 6.40 V (Low side)

Time Needed for Diagnosis: 1 second

EB:DTC P0B42 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-394, OUTLINE OF DIAGNOSIS, DTC P0B42 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 1.
Judge as NG when the high voltage battery voltage 1 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage B	< –66.27 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage B	≥ –66.27 V

Time Needed for Diagnosis: 1 second

EC:DTC P0B43 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-395, OUTLINE OF DIAGNOSIS, DTC P0B43 HYBRID/EV BATTERY VOLTAGE SENSE "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 1.
Judge as NG when the high voltage battery voltage 1 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage B	> 66.27 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage B	≤ 66.27 V

Time Needed for Diagnosis: 1 second

ED:DTC P0B46 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT RANGE/ PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-396, OUTLINE OF DIAGNOSIS, DTC P0B46 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 2.
Judge as NG when the stuck of high voltage battery voltage 2 is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage C	> 32.0 V ≤ 56.34 V (High side)
Diagnosis 2	
Hybrid battery voltage C	≥ –56.34 V < 3.20 V (Low side)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage C	≤ 32.0 V > 56.34 V (High side)
Diagnosis 2	
Hybrid battery voltage C	< –56.34 V ≥ 3.20 V (Low side)

Time Needed for Diagnosis: 1 second

EE:DTC P0B47 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-398, OUTLINE OF DIAGNOSIS, DTC P0B47 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 2.
Judge as NG when the high voltage battery voltage 2 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage C	< –56.34 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage C	≥ –56.34 V

Time Needed for Diagnosis: 1 second

EF:DTC P0B48 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-399, OUTLINE OF DIAGNOSIS, DTC P0B48 HYBRID/EV BATTERY VOLTAGE SENSE "C" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 2.
Judge as NG when the high voltage battery voltage 2 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage C	> 56.34 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage C	≤ 56.34 V

Time Needed for Diagnosis: 1 second

EG:DTC P0B4A HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-400, OUTLINE OF DIAGNOSIS, DTC P0B4A HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

Normal control

NOTE:

If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 3.
Judge as NG when the open circuit of high voltage battery voltage sensor 3 is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
Elapsed time of a	≤ 0.2 s
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Status fault flag for 'Voltage Sense "D" Circuit' as determined by the BECM Sub CPU	Open

Time Needed for Diagnosis: 0.01 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Status fault flag for 'Voltage Sense "D" Circuit' as determined by the BECM Sub CPU	Close

Time Needed for Diagnosis: 0.01 second

EH:DTC P0B4B HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT RANGE/ PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-401, OUTLINE OF DIAGNOSIS, DTC P0B4B HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 3.
Judge as NG when the stuck of high voltage battery voltage 3 is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage D	> 2.10 V ≤ 76.2 V (High side)
Diagnosis 2	
Hybrid battery voltage C	≥ –76.2 V < –2.10 V (Low side)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage C	≤ 2.10 V > 76.2 V (High side)
Diagnosis 2	
Hybrid battery voltage C	< –76.2 V ≥ –2.10 V (Low side)

Time Needed for Diagnosis: 10 seconds

EI: DTC P0B4C HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-403, OUTLINE OF DIAGNOSIS, DTC P0B4C HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 3.
Judge as NG when the high voltage battery voltage 3 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage D	< –76.20 V

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage D	> –76.20 V

Time Needed for Diagnosis: 0.1 second

EJ: DTC P0B4D HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-404, OUTLINE OF DIAGNOSIS, DTC P0B4D HYBRID/EV BATTERY VOLTAGE SENSE "D" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 3.
Judge as NG when the high voltage battery voltage 3 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage D	> 76.20 V

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage D	≤ 76.20 V

Time Needed for Diagnosis: 0.1 second

EK:DTC P0B50 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT RANGE/ PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-405, OUTLINE OF DIAGNOSIS, DTC P0B50 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 4.
Judge as NG when the stuck of high voltage battery voltage 4 is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage E	> –1.60 V ≤ 23.03 V (High side)
Diagnosis 2	
Hybrid battery voltage E	≥ –23.03 V < –16.00 V (Low side)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage E	≤ –1.60 V > 23.03 V (High side)
Diagnosis 2	
Hybrid battery voltage E	< –23.03 V ≥ –16.00 V (Low side)

Time Needed for Diagnosis: 1 second

EL:DTC P0B51 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-407, OUTLINE OF DIAGNOSIS, DTC P0B51 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 4.
Judge as NG when the high voltage battery voltage 4 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage E	< –23.03 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage E	≥ –23.03 V

Time Needed for Diagnosis: 1 second

EM:DTC P0B52 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-408, OUTLINE OF DIAGNOSIS, DTC P0B52 HYBRID/EV BATTERY VOLTAGE SENSE "E" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 4.
Judge as NG when the high voltage battery voltage 4 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage E	> 23.03 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage E	≤ 23.03 V

Time Needed for Diagnosis: 1 second

EN:DTC P0B55 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT RANGE/ PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-409, OUTLINE OF DIAGNOSIS, DTC P0B55 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 5.
Judge as NG when the stuck of high voltage battery voltage 5 is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage F	> –4.80 V ≤ 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage F	≥ –98.54 V < –48.00 V (Low side)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage F	≤ –4.80 V > 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage F	< –98.54 V ≥ –48.00 V (Low side)

Time Needed for Diagnosis: 1 second

EO:DTC P0B56 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-411, OUTLINE OF DIAGNOSIS, DTC P0B56 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 5.
Judge as NG when the high voltage battery voltage 5 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage F	< –98.54 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage F	≥ –98.54 V

Time Needed for Diagnosis: 1 second

EP:DTC P0B57 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-412, OUTLINE OF DIAGNOSIS, DTC P0B57 HYBRID/EV BATTERY VOLTAGE SENSE "F" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 5.
Judge as NG when the high voltage battery voltage 5 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage F	> 98.54 V

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage F	≤ 98.54 V

Time Needed for Diagnosis: 1 second

EQ:DTC P0B5A HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT RANGE/ PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-413, OUTLINE OF DIAGNOSIS, DTC P0B5A HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 6.
Judge as NG when the stuck of high voltage battery voltage 6 is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage G	> –7.20 V ≤ 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage G	≥ –98.54 V < –72.00 V (Low side)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage G	≤ –7.20 V > 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage G	< –98.54 V ≥ –72.00 V (Low side)

Time Needed for Diagnosis: 1 second

ER:DTC P0B5B HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-415, OUTLINE OF DIAGNOSIS, DTC P0B5B HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 6.
Judge as NG when the high voltage battery voltage 6 is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage G	< –98.54 V

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage G	≥ –98.54 V

Time Needed for Diagnosis: 0.1 second

ES:DTC P0B5C HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-416, OUTLINE OF DIAGNOSIS, DTC P0B5C HYBRID/EV BATTERY VOLTAGE SENSE "G" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

EV traveling/Auto Start Stop does not operate.
(Engine does not restart under EV traveling/Auto Start Stop condition.)

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 6.
Judge as NG when the high voltage battery voltage 6 is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage G	> 98.54 V

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage G	≤ 98.54 V

Time Needed for Diagnosis: 0.1 second

ET:DTC P0BB8 HYBRID/EV BATTERY VOLTAGE SENSE "Z" CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-417, OUTLINE OF DIAGNOSIS, DTC P0BB8 HYBRID/EV BATTERY VOLTAGE SENSE "Z" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery GND.
Judge as NG when the high voltage battery GND is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Status fault flag for 'Voltage Sense "Z" Circuit' as determined by the BECM Sub CPU	Open

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Status fault flag for 'Voltage Sense "Z" Circuit' as determined by the BECM Sub CPU	Close

Time Needed for Diagnosis: 0.1 second

EU:DTC P0C30 HYBRID/EV BATTERY PACK STATE OF CHARGE HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-419, OUTLINE OF DIAGNOSIS, DTC P0C30 HYBRID/EV BATTERY PACK STATE OF CHARGE HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «High Voltage Battery Amperage» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Is the value –1A or less?	Go to step **2**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
2	**CHECK INDICATOR.** 1) Turn the ignition switch to OFF. 2) Start the engine. 3) Check illumination of "DRIVING POSSIBLE (READY) INDICATOR" in the meter.	Does it Illuminate?	Go to step **3**.	Replace HPCM and the high voltage battery. <Ref. to HEV-37, Hybrid Powertrain Control Module.> <Ref. to HEV-17, High Voltage Battery.>
3	**CHECK CURRENT DATA.** 1) Drive approximately 2 km (1.2 miles) at a speed of 30 km/h (18.6 MPH) or more. 2) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the value of «High Voltage Battery SOC». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 94% or less?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect high voltage battery SOC high.
Judge as NG when the high voltage battery SOC is at the specified value or more.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
SOC NOTE: SOC: State Of Charge	≥ 95%

Time Needed for Diagnosis: 60 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
SOC	< 95%

Time Needed for Diagnosis: 60 seconds

EV:DTC P0C78 HYBRID/EV BATTERY SYSTEM PRECHARGE TIME TOO LONG

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-423, OUTLINE OF DIAGNOSIS, DTC P0C78 HYBRID/EV BATTERY SYSTEM PRECHARGE TIME TOO LONG, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

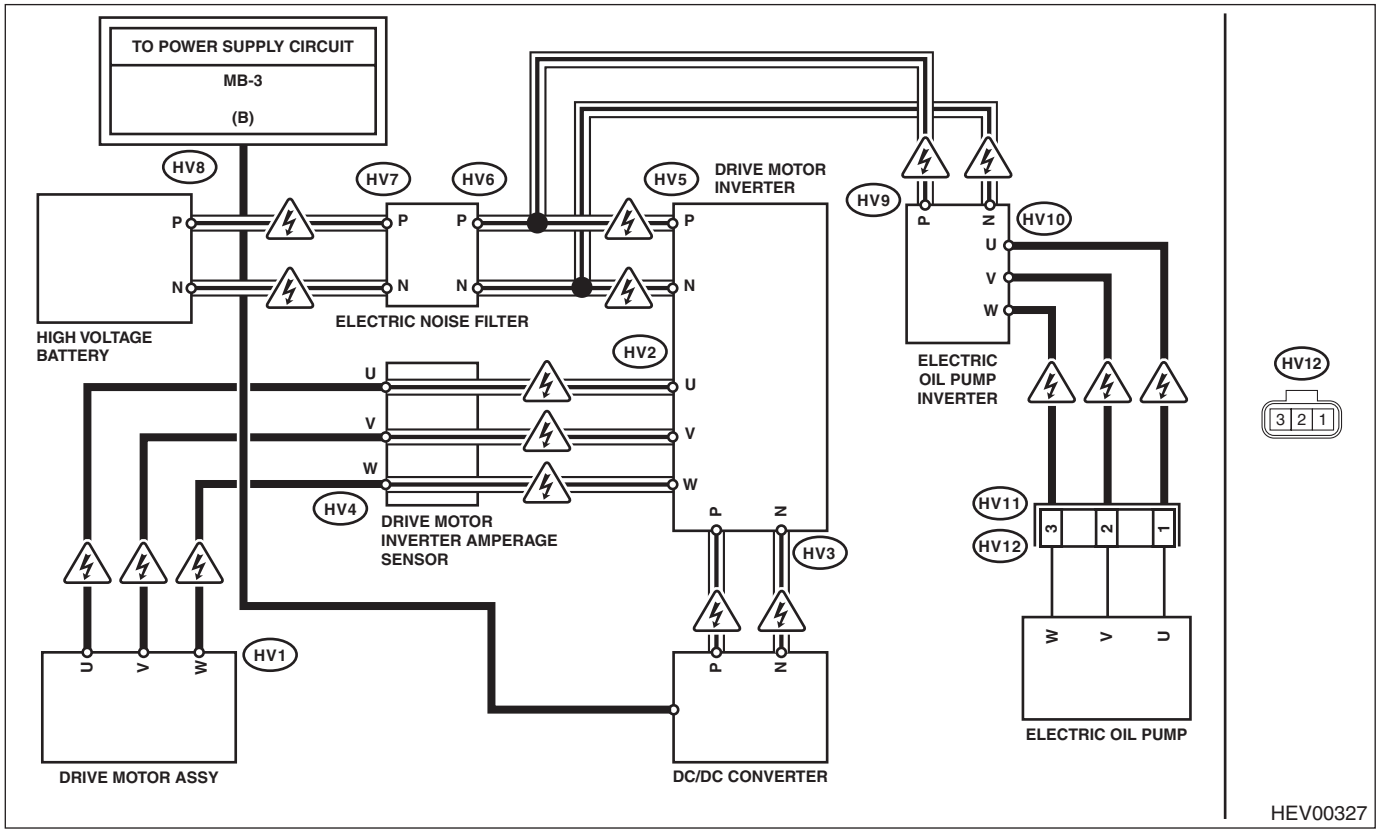
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

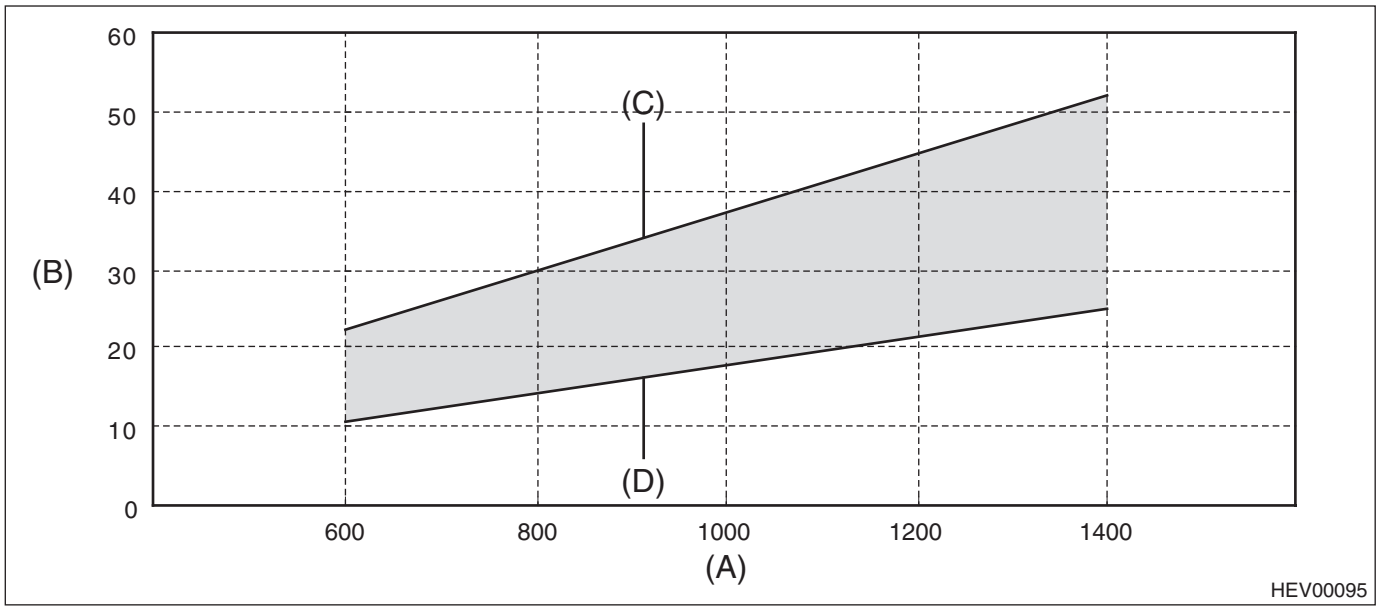
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, read DTCs of the following system. • Drive motor control system <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, confirm the current data of battery energy control system, the value of «High voltage Battery Total Voltage». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.>	Is the value 75 V or more?	Go to step **3**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
3	**CHECK DRIVE MOTOR.** 1) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 2) Lift up the vehicle. 3) Start the engine, and set the shift lever to "D" range. 4) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the values of «Drive Motor Speed» «Drive Motor Inverter Input Voltage». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.> NOTE: When current data of the drive motor control system, «ATF Temperature» is 20 — 60°C (68 — 140°F). <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is «Drive Motor Inverter Input Voltage» within the standard in the margin when «Drive Motor Speed» is 600 — 1400 rpm?	Go to step **4**.	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>
4	**CHECK BUS BAR.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. 4) Wait for 10 minutes. 5) Check the bus bar.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **5**.	Retighten the bolts. Or replace the bus bar.
5	**CHECK BUS BAR.** 1) Remove the bus bar. 2) Using the tester, measure the resistance between bus bar terminals. ***Connector & terminal*** ***(HV5) P — (HV6) P:*** ***(HV5) N — (HV6) N:*** ***(HV5) P — (HV9) P:*** ***(HV5) N — (HV9) N:*** ***(HV7) P — (HV8) P:*** ***(HV7) N — (HV8) N:***	Is the resistance less than 1 Ω?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Replace the bus bar.

NOTE:
Value of «Drive Motor Inverter Input Voltage» is proportional to «Drive Motor Speed».
- 1000 rpm: 18 V — 37 V
- 1400 rpm: 25 V — 52 V



(A) Drive motor speed
(B) Drive Motor Inverter Input Voltage
(C) Standard at Max.
(D) Standard at Min.

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage circuit open and precharge resistance.
Judge as NG when the difference between the total voltage value of high voltage battery when contactor is close and the inverter voltage is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM precharge contactor command	Closed
BECM positive contactor command	Open
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Hybrid battery pack voltage – Inverter voltage) NOTE: ABS: Absolute value	> 20 V

Time Needed for Diagnosis: 0.6 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Hybrid battery pack voltage – Inverter voltage) NOTE: ABS: Absolute value	≤ 20 V

Time Needed for Diagnosis: 0.6 seconds

EW:DTC P0CA6 HYBRID/EV BATTERY CHARGING CURRENT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-426, OUTLINE OF DIAGNOSIS, DTC P0CA6 HYBRID/EV BATTERY CHARGING CURRENT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

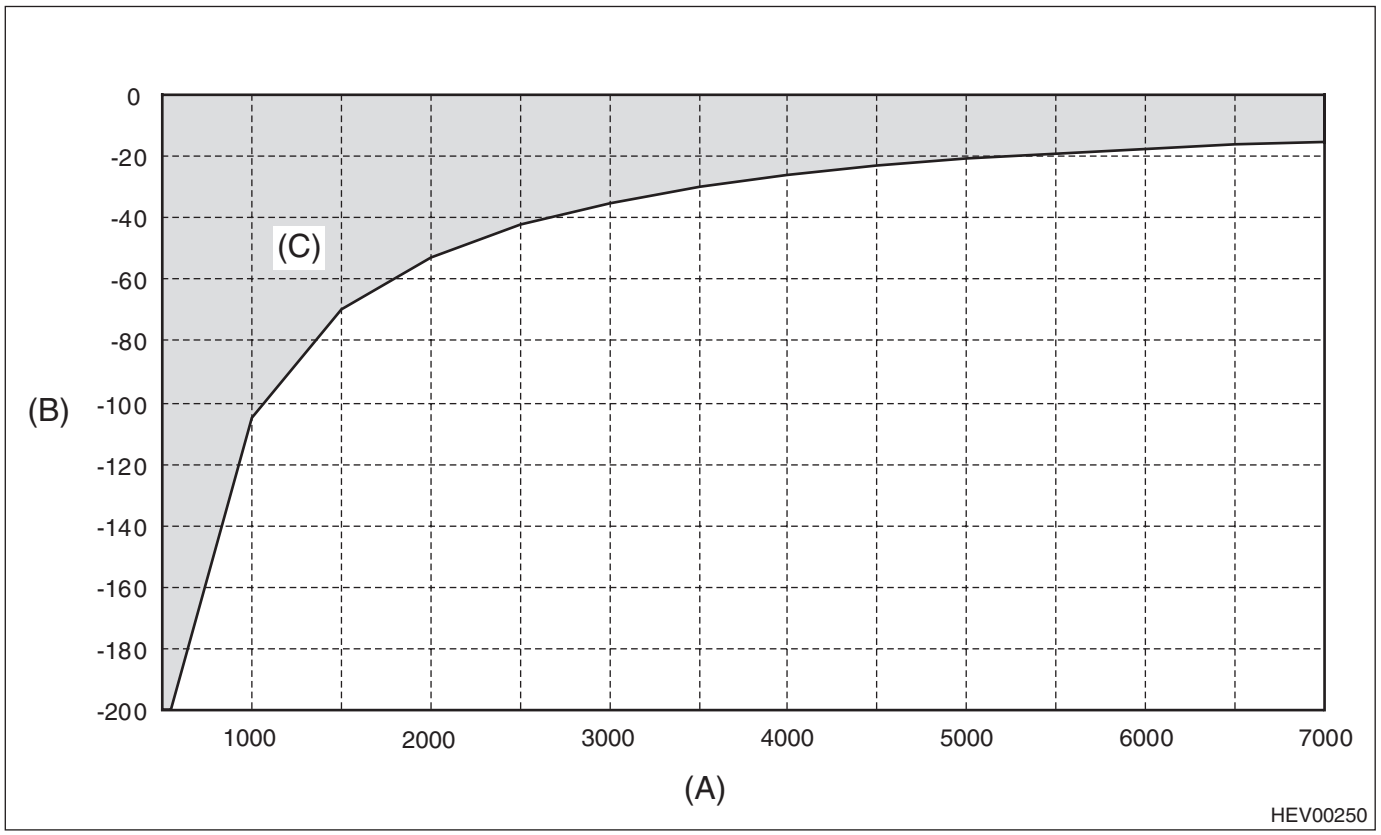
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read DTCs of the following system. • Drive motor control system <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «Drive Motor Torque Target (HPCM)» in the freeze frame data of the battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Does the value show 0 N or less?	Go to step **3**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
3	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Torque Target (HPCM)» «Drive Motor Speed Target(HPCM)» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Torque Target (HPCM)» and «Drive Motor Speed Target(HPCM)» within the standard in the margin?	Go to step **4**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
4	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Output Torque Actual» «Drive Motor Speed» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Output Torque Actual» and «Drive Motor Speed» within the standard in the margin?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

NOTE:



(A) Drive Motor Speed Target (HPCM) or Drive Motor Speed
(B) Drive Motor Torque Target (HPCM) or Drive Motor Output Torque Actual
(C) Standard

1. OUTLINE OF DIAGNOSIS

Detect that the high voltage battery current exceeds the rated charging current.
Judge as NG when the current value (charging) is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current (Detected state: charge) NOTE: (Detected state: charge)	> 110 A

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current (Detected state: charge) NOTE: (Detected state: charge)	≤ 110 A

Time Needed for Diagnosis: 2 seconds

EX:DTC P0CA7 HYBRID/EV BATTERY DISCHARGING CURRENT HIGH

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-429, OUTLINE OF DIAGNOSIS, DTC P0CA7 HYBRID/EV BATTERY DISCHARGING CURRENT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

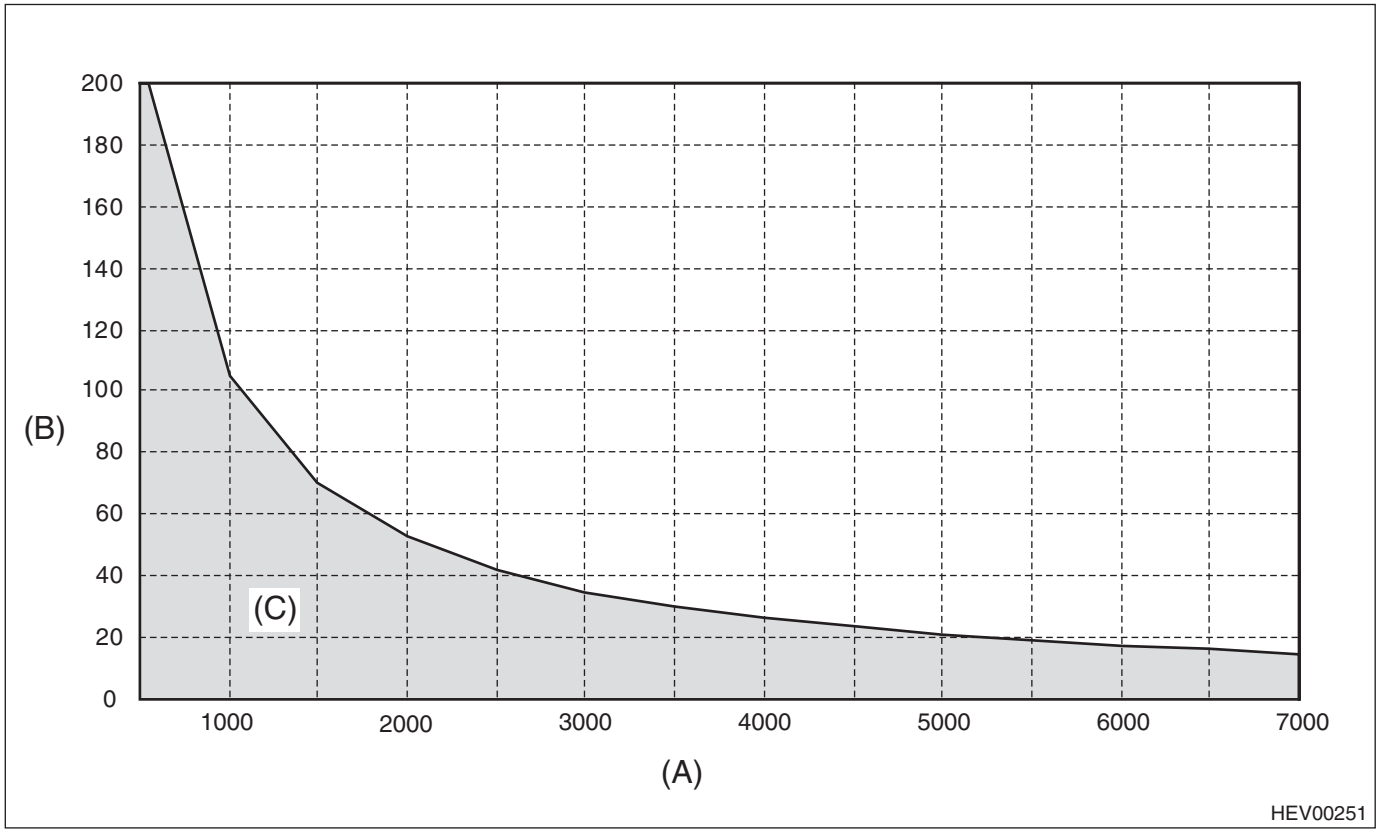
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read DTCs of the following system. • Drive motor control system <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	Perform the diagnosis according to DTC. <Ref. to HEV(diag)-76, DRIVE MOTOR CONTROL SYSTEM, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the value of «Drive Motor Output Torque Actual» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Does the value show 0 N or more?	Go to step **3**.	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>
3	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Torque Target (HPCM)» «Drive Motor Speed Target(HPCM)» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Torque Target (HPCM)» and «Drive Motor Speed Target(HPCM)» within the standard in the margin?	Go to step **4**.	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>
4	**CHECK FREEZE FRAME DATA.** Using the Subaru Select Monitor, confirm the values of «Drive Motor Output Torque Actual» and «Drive Motor Speed» in the freeze frame data of battery energy control system. <Ref. to HEV(diag)-66, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Freeze Frame Data Display.>	Are the values of «Drive Motor Output Torque Actual» and «Drive Motor Speed» within the standard in the margin?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Replace DMCM. <Ref. to CVT(TH58A)-157, Drive Motor Control Module.>

NOTE:



(A) Drive Motor Speed Target (HPCM) or Drive Motor Speed
(B) Drive Motor Torque Target (HPCM) or Drive Motor Output Torque Actual
(C) Standard

1. OUTLINE OF DIAGNOSIS

Detect that the high voltage battery current exceeds the rated charging current.
Judge as NG when the current value (discharging) is above the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current (Detected state: discharge)	< –190 A

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current (Detected state: discharge)	≥ –190 A

Time Needed for Diagnosis: 2 seconds

EY:DTC P1C40 HYBRID/EV BATTERY POSITIVE CONTACTOR OR PRE-CHARGE CONTACTOR CIRCUIT STUCK CLOSED

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-432, OUTLINE OF DIAGNOSIS, DTC P1C40 HYBRID/EV BATTERY POSITIVE CONTACTOR OR PRE-CHARGE CONTACTOR CIRCUIT STUCK CLOSED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

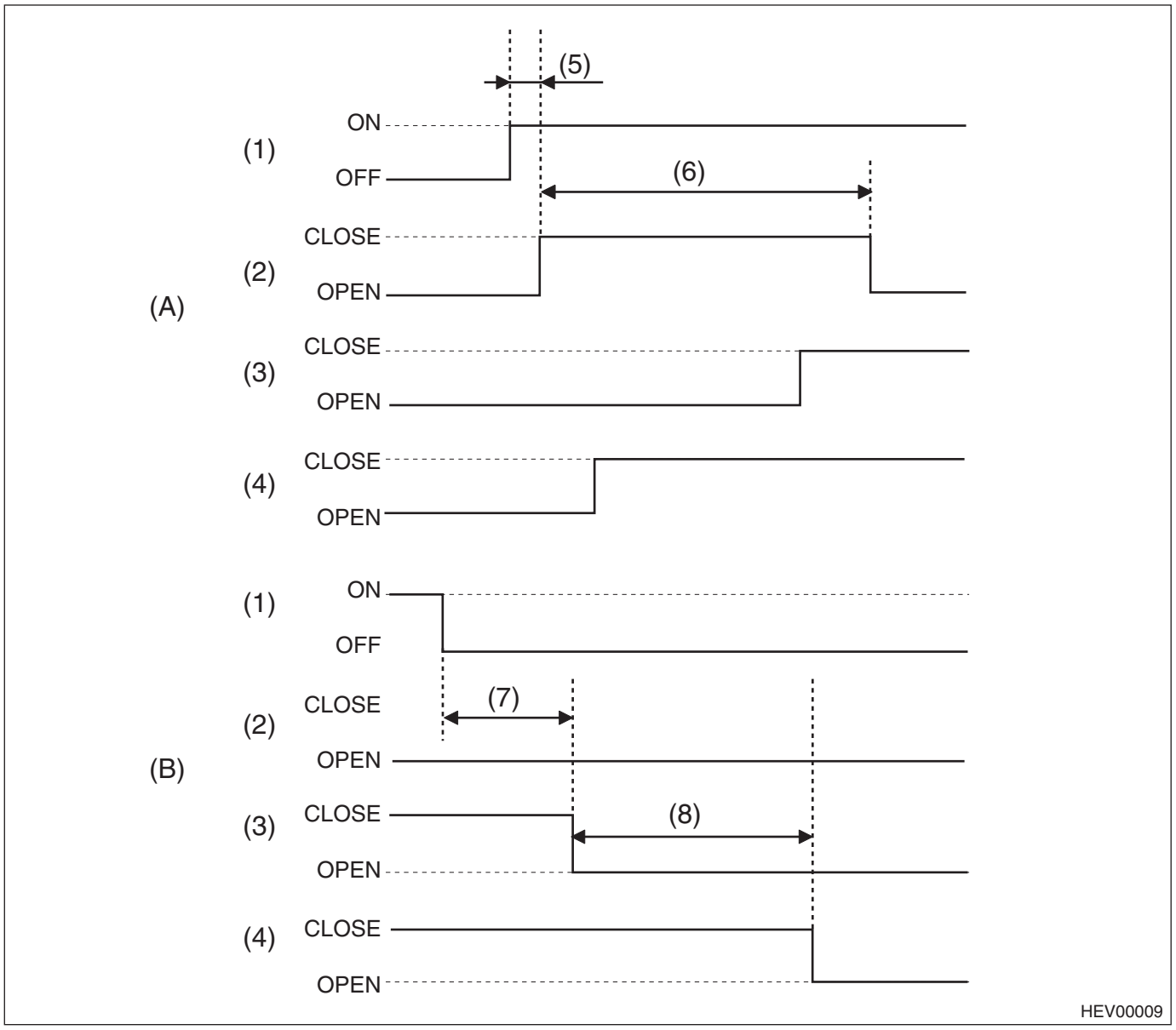
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Check DTCs in the following systems; • Engine <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).> • Transmission <Ref. to CVT(HEV)(diag)-19, OPERATION, Read Diagnostic Trouble Code (DTC).> • Hybrid powertrain control system <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Drive motor control system <Ref. to HEV(diag)-23, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).> • Airbag system <Ref. to AB(diag)-27, OPERATION, Read Diagnostic Trouble Code (DTC).>	Are any other DTCs detected? (current malfunction)	First perform the diagnosis according to other DTCs.	Go to step **2**.
2	**CHECK BECM.** 1) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 2) Start the engine. 3) Turn the ignition switch to OFF. 4) Wait for 30 seconds. 5) Turn the ignition switch to ON. 6) Read the DTC again. <Ref. to HEV(diag)-23, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC detected? (current malfunction)	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

NOTE:
Operation of contactor relay under the normal condition.



(A) Contactor relay closing sequence
(B) Contactor relay opening sequence

(1) Contactor command
(2) Precharge contactor status
(3) Positive contactor status
(4) Negative contactor status
(5) 10 seconds
(6) 0.8 seconds maximum
(7) 2.0 seconds maximum
(8) 1.3 seconds maximum

1. OUTLINE OF DIAGNOSIS

Detect the adhesion of +side contactor and precharge contactor.
If the difference between the total voltage of the high voltage battery and the inverter voltage is greater than or equal to the standard when the contactor is open, it is judged as NG.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Open
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage / Hybrid battery pack voltage	≥ 0.8 V

Time Needed for Diagnosis: 1.3 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage / Hybrid battery pack voltage	< 0.8 V

Time Needed for Diagnosis: 1.3 seconds

EZ:DTC P1C41 HIGH VOLTAGE CIRCUIT LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-436, OUTLINE OF DIAGNOSIS, DTC P1C41 HIGH VOLTAGE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

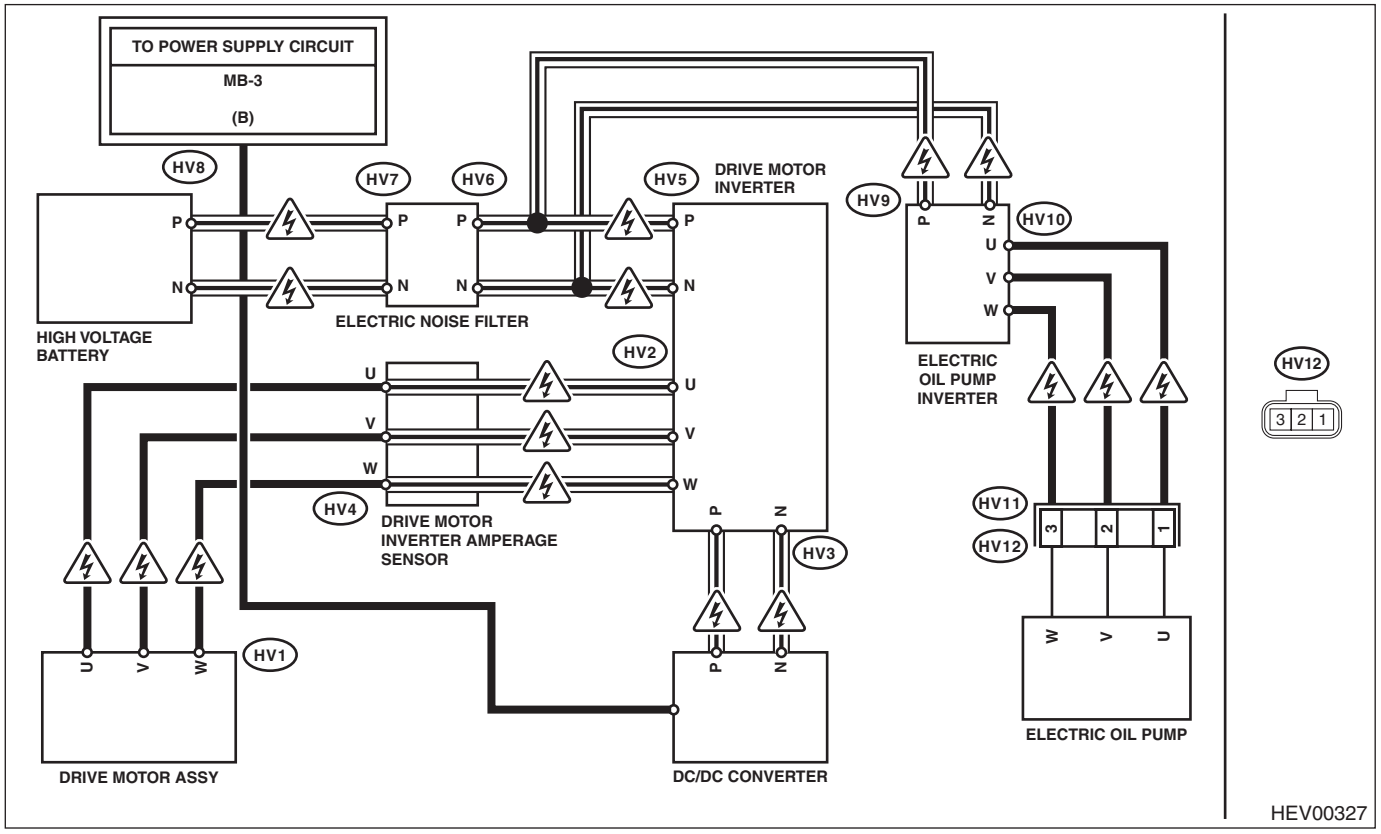
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC.	Are any other DTCs detected? (current malfunction)	First perform the diagnosis according to other DTCs.	Go to step **2**.
2	**CHECK BUS BAR.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Visually check the bus bar.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **3**.	Retighten the bolts. Or replace the bus bar.

	Step	Check	Yes	No
3	**CHECK POWER CABLE.** Visually check the power cable.	Is the condition normal? (Check for loose bolts, insecure connection, foreign matter caught, trace of arc (burnt terminals) etc.)	Go to step **4**.	Retighten the bolts. Or replace the power cable. <Ref. to HEV-51, Power Cable.>
4	**CHECK EACH MODULE.** Using a tester, measure the resistance between electric noise filter terminals on the high voltage battery side. ***Connector & terminal*** ***(HV7) P — (HV7) N:***	Is the resistance 1 Ω or more?	Go to step **7**.	Go to step **5**.
5	**CHECK DC/DC CONVERTER.** 1) Remove the DC/DC converter. 2) Using a tester, measure the resistance between electric noise filter terminals on the high voltage battery side. ***Connector & terminal*** ***(HV7) P — (HV7) N:***	Is the resistance 1 Ω or more?	Replace the DC/DC converter. <Ref. to HEV-38, DC/DC Converter.>	Go to step **6**.
6	**CHECK EACH MODULE.** 1) Disconnect the power cable (HV4) from drive motor inverter amperage sensor. 2) Remove the drive motor inverter amperage sensor (HV2). 3) Remove bus bars (HV5, HV6, HV7, HV8, HV9). 4) Using a tester, measure the resistance between terminals of each module. ***Connector & terminal*** ***Drive motor inverter*** ***(HV5) P — (HV5) N:*** ***Electric noise filter*** ***(HV7) P — (HV7) N:*** ***High voltage battery*** ***(HV8) P — (HV8) N:*** ***Electric oil pump inverter*** ***(HV9) P — (HV9) N:***	Is the resistance 1 Ω or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Replace the unit that has short circuits.
7	**CHECK EACH MODULE.** Using a tester, measure the resistance between drive motor inverter amperage sensor terminals on the power cable side. ***Connector & terminal*** ***(HV4) W — (HV4) V:*** ***(HV4) W — (HV4) U:*** ***(HV4) V — (HV4) U:***	Is the resistance 1 Ω or more?	Go to step **9**.	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK EACH MODULE.** 1) Disconnect the power cable (HV4) from drive motor inverter amperage sensor. 2) Remove the drive motor inverter amperage sensor (HV2). 3) Disconnect the power cable (HV1) from the drive motor assembly. NOTE: The gasket is not reusable. 4) Using a tester, measure the resistance between each module and power cable terminals. ***Connector & terminal*** ***Drive motor assembly*** ***(HV1) W — (HV1) V:*** ***(HV1) W — (HV1) U:*** ***(HV1) V — (HV1) U:*** ***Drive motor inverter*** ***(HV2) W — (HV2) V:*** ***(HV2) W — (HV2) U:*** ***(HV2) V — (HV2) U:*** ***Drive motor inverter amperage sensor*** ***(HV4) W — (HV4) V:*** ***(HV4) W — (HV4) U:*** ***(HV4) V — (HV4) U:*** ***Power cable*** ***(HV4) W — (HV4) V:*** ***(HV4) W — (HV4) U:*** ***(HV4) V — (HV4) U:***	Is the resistance 1 Ω or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Replace the unit that has short circuits.
9	**CHECK EACH MODULE.** 1) Disconnect the power cable (HV10) from electric oil pump inverter. 2) Disconnect the power cable (HV12) from electric oil pump. 3) Using a tester, measure the resistance between each module and power cable terminals. ***Connector & terminal*** ***Electric oil pump inverter*** ***(HV10) W — (HV10) V:*** ***(HV10) W — (HV10) U:*** ***(HV10) V — (HV10) U:*** ***Electric oil pump*** ***(HV12) W — (HV12) V:*** ***(HV12) W — (HV12) U:*** ***(HV12) V — (HV12) U:*** ***Power cable*** ***(HV10) W — (HV10) V:*** ***(HV10) W — (HV10) U:*** ***(HV10) V — (HV10) U:***	Is the resistance 1 Ω or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.	Replace the unit that has short circuits.

1. OUTLINE OF DIAGNOSIS

Detect the short circuit of high voltage line + and –.
Judge as NG when the current at contactor close is at the specified value or more.
Judge as NG when the high voltage battery voltage value at close is below the specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM precharge contactor command	Closed
BECM positive contactor command	Open
BECM negative contactor command	Closed
Diagnosis 2	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
BECM precharge contactor command	Open
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery pack discharge current	> 1.75 A
Diagnosis 2	
Hybrid battery pack voltage	< 48 V

Time Needed for Diagnosis:
- **Diagnosis 1:** less than 0.6 s
- **Diagnosis 2:** 0.1 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery pack discharge current	≤ 1.75 A
Diagnosis 2	
Hybrid battery pack voltage	≥ 48 V

Time Needed for Diagnosis: 0.6 s after engine start

FA:DTC P1C42 HIGH VOLTAGE CIRCUIT/OPEN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-440, OUTLINE OF DIAGNOSIS, DTC P1C42 HIGH VOLTAGE CIRCUIT/OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

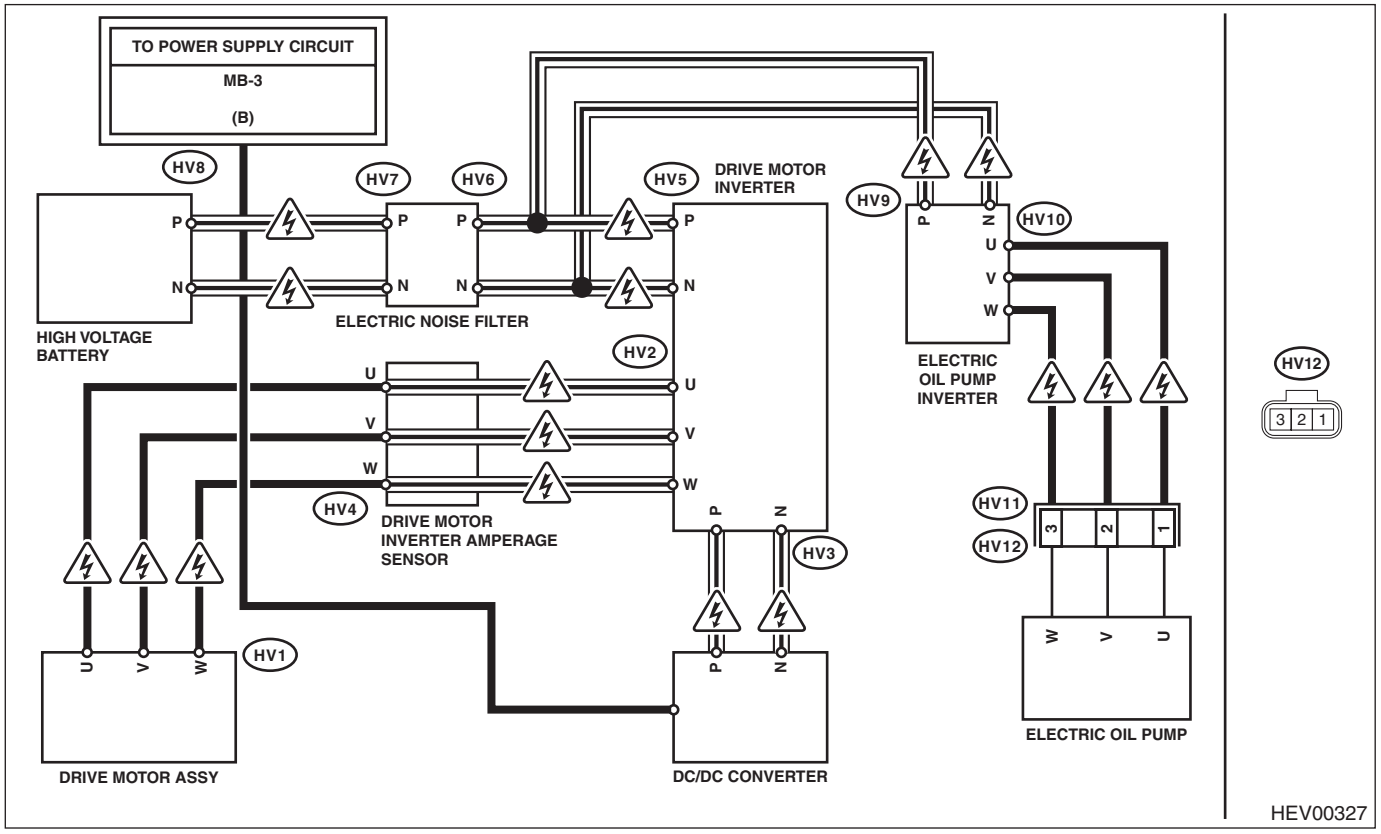
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM:

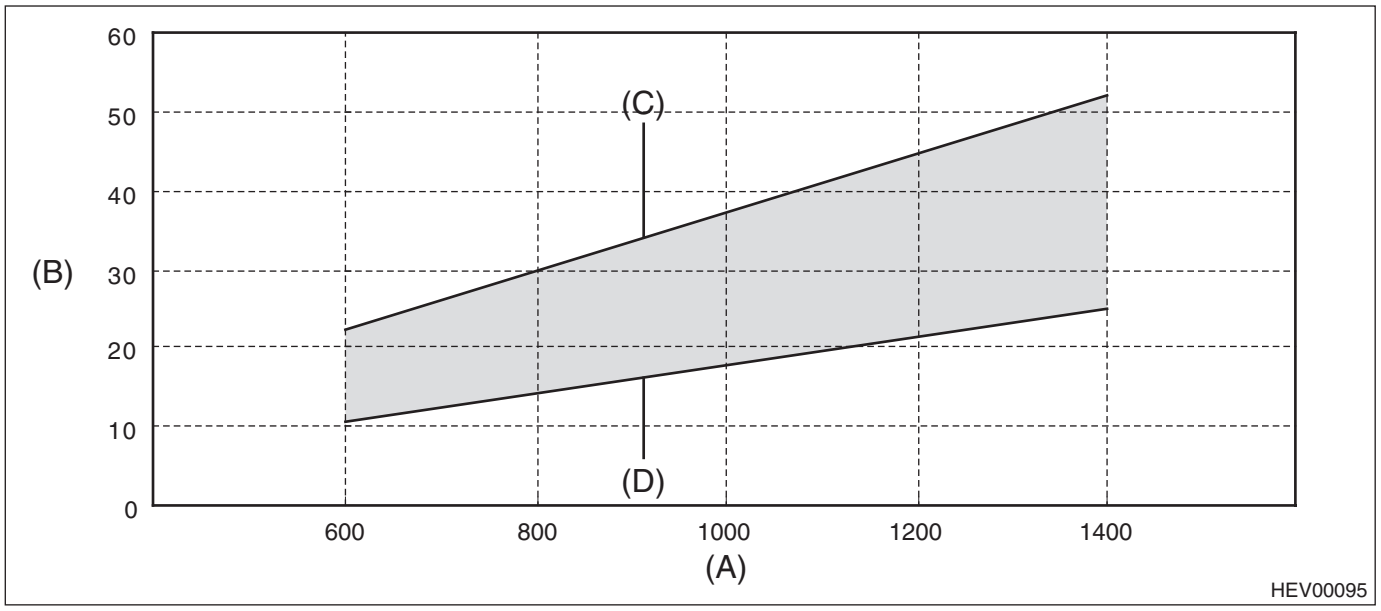
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK BUS BAR.** 1) Turn the ignition to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-6, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Visually check the bus bar.	Is the condition normal? (Check for loose bolts, etc.)	Go to step **2**.	Retighten the bolts. Or replace the bus bar.

	Step	Check	Yes	No
2	**CHECK BUS BAR.** 1) Remove the bus bar. 2) Using the tester, measure the resistance between bus bar terminals. ***Connector & terminal*** ***(HV5) P — (HV6) P:*** ***(HV5) N — (HV6) N:***	Is the resistance less than 1 Ω?	Go to step **3**.	Replace the bus bar. (Between electric noise filter and drive motor inverter.)
3	**CHECK ELECTRIC NOISE FILTER.** Using a tester, measure the resistance between electric noise filter terminals. ***Connector & terminal*** ***(HV6) P — (HV7) P:*** ***(HV6) N — (HV7) N:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the electric noise filter. <Ref. to HEV-31, Noise Filter.>
4	**CHECK BUS BAR.** Using the tester, measure the resistance between bus bar terminals. ***Connector & terminal*** ***(HV7) P — (HV8) P:*** ***(HV7) N — (HV8) N:***	Is the resistance less than 1 Ω?	Go to step **5**.	Replace the bus bar. (Between high voltage battery and electric noise filter.)
5	**CHECK DRIVE MOTOR.** 1) Restore the vehicle to its original state. 2) With the 12 V battery connected, remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> **CAUTION:** **Watch for an electrical short at each harness because the 12 V battery is connected.** 3) Lift up the vehicle. 4) Start the engine, and set the shift lever to “D” range. 5) Using the Subaru Select Monitor, confirm the current data of battery energy control system, the values of «Drive Motor Speed» «Drive Motor Inverter Input Voltage». <Ref. to HEV(diag)-56, BATTERY ENERGY CONTROL SYSTEM, OPERATION, Read Current Data.> NOTE: When current data of the drive motor control system, «ATF Temperature» is 20 — 60°C (68 — 140°F). <Ref. to HEV(diag)-50, DRIVE MOTOR CONTROL SYSTEM, OPERATION, Read Current Data.>	Is «Drive Motor Inverter Input Voltage» within the standard in the margin when «Drive Motor Speed» is 600 — 1400 rpm?	Replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>	Replace the drive motor inverter. <Ref. to HEV-42, Inverter.>

NOTE:
Value of «Drive Motor Inverter Input Voltage» is proportional to «Drive Motor Speed».
- 1000 rpm: 18 V — 37 V
- 1400 rpm: 25 V — 52 V



(A) Drive motor speed
(B) Drive Motor Inverter Input Voltage
(C) Standard at Max.
(D) Standard at Min.

1. OUTLINE OF DIAGNOSIS

Detect the high voltage circuit open at driving.
Judge as NG both when the difference between the high voltage battery voltage value and the inverter voltage value is at the specified value or more, and when the high voltage battery current value is within specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Closed
Measured Positive contactor control signal (BECM main CPU output)	Closed
Measured Positive contactor control signal (BECM output)	Closed
Measured Negative contactor control signal (BECM main CPU output)	Closed
Measured Negative contactor control signal (BECM output)	Closed
Measured contactor power supply control signal	ON
Measured contactor power supply voltage	≥ 4 V

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	≤ 1 A
Inverter voltage / Hybrid battery voltage	≤ 0.8

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	> 1 A
Inverter voltage / Hybrid battery voltage	> 0.8

Time Needed for Diagnosis: 1 second

FB:DTC P1C43 HYBRID/EV BATTERY CONTACTOR POWER SUPPLY CIRCUIT

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-441, OUTLINE OF DIAGNOSIS, DTC P1C43 HYBRID/EV BATTERY CONTACTOR POWER SUPPLY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of power supply instantaneous interruption detection circuit and power supply circuit of contactor.
Judge as NG when the open circuit of power supply instantaneous interruption detection circuit and power supply circuit of contactor is detected.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
BECM positive contactor command	Closed or
BECM negative contactor command	Closed or
BECM precharge contactor command	Closed
Diagnosis 2	
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
Measured Contactor power supply monitoring signal	Power on

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 Measured Contactor power supply monitoring signal	Power off
Diagnosis 2 Measured contactor power supply voltage dropped signal	ON

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 Measured contactor power supply monitoring signal	Power on
Diagnosis 2 Measured contactor power supply voltage dropped signal	Off

Time Needed for Diagnosis: 0.5 seconds

FC:DTC P1C44 SUB CPU IN BECM

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-443, OUTLINE OF DIAGNOSIS, DTC P1C44 SUB CPU IN BECM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the communication failure of MAINCPU and SubCPU.
Judge as NG when data is not received from SubCPU.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 Serial communication between BECM Main CPU and BECM Sub CPU is lost (no message received)	Detected
Diagnosis 2 Hybrid Battery voltage input circuit error for BECM Sub CPU	Detected
Diagnosis 3 A/D Converter failure for BECM Sub CPU	Detected
Diagnosis 4 Multiplex connection error for BECM Sub CPU	Detected

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 Serial communication between BECM Main CPU and BECM Sub CPU is lost (no message received)	Not detected
Diagnosis 2 Hybrid Battery voltage input circuit error for BECM Sub CPU	Not detected
Diagnosis 3 A/D Converter failure for BECM Sub CPU	Not detected
Diagnosis 4 Multiplex connection error for BECM Sub CPU	Not detected

Time Needed for Diagnosis: 10 seconds

FD:DTC P1C45 HYBRID/EV BATTERY BLOCK 1 BALANCING PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-445, OUTLINE OF DIAGNOSIS, DTC P1C45 HYBRID/EV BATTERY BLOCK 1 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the cell malfunction of high voltage battery block 1.
Judge as NG when the deviation of high voltage battery block voltage is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 1.	> 1.2 V

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 1.	≤ 1.2 V

Time Needed for Diagnosis: 10 seconds

FE:DTC P1C46 HYBRID/EV BATTERY BLOCK 2 BALANCING PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-446, OUTLINE OF DIAGNOSIS, DTC P1C46 HYBRID/EV BATTERY BLOCK 2 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the cell malfunction of high voltage battery block 2.
Judge as NG when the deviation of high voltage battery block voltage is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 2.	> 1.2 V

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 2.	≤ 1.2 V

Time Needed for Diagnosis: 10 seconds

FF: DTC P1C47 HYBRID/EV BATTERY BLOCK 3 BALANCING PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-447, OUTLINE OF DIAGNOSIS, DTC P1C47 HYBRID/EV BATTERY BLOCK 3 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of voltage deviation between high voltage battery cells.
Judge as NG when the deviation of high voltage battery block voltage is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 3.	> 1.2 V

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 3.	≤ 1.2 V

Time Needed for Diagnosis: 10 seconds

FG:DTC P1C48 HYBRID/EV BATTERY BLOCK 4 BALANCING PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-448, OUTLINE OF DIAGNOSIS, DTC P1C48 HYBRID/EV BATTERY BLOCK 4 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of voltage deviation between high voltage battery cells.
Judge as NG when the deviation of high voltage battery block voltage is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=2 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 4.	> 1.2 V

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=2 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 4.	≤ 1.2 V

Time Needed for Diagnosis: 10 seconds

FH:DTC P1C49 HYBRID/EV BATTERY BLOCK 5 BALANCING PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-449, OUTLINE OF DIAGNOSIS, DTC P1C49 HYBRID/EV BATTERY BLOCK 5 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of voltage deviation between high voltage battery cells.
Judge as NG when the deviation of high voltage battery block voltage is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 5.	> 1.2 V

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 5.	≤ 1.2 V

Time Needed for Diagnosis: 10 seconds

FI: DTC P1C4A HYBRID/EV BATTERY BLOCK 6 BALANCING PERFORMANCE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-450, OUTLINE OF DIAGNOSIS, DTC P1C4A HYBRID/EV BATTERY BLOCK 6 BALANCING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of voltage deviation between high voltage battery cells.
Judge as NG when the deviation of high voltage battery block voltage is large.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=3 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 6.	> 1.2 V

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=3 NOTE: This DTC will be stored only if the “Min. module voltage” equal to the average module voltage of Block 6.	≤ 1.2 V

Time Needed for Diagnosis: 10 seconds

FJ: DTC P1C5E HYBRID/EV BATTERY OPEN CIRCUIT VOLTAGE TOO LOW

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-451, OUTLINE OF DIAGNOSIS, DTC P1C5E HYBRID/EV BATTERY OPEN CIRCUIT VOLTAGE TOO LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
If this DTC is detected, replace the high voltage battery. <Ref. to HEV-17, High Voltage Battery.>

1. OUTLINE OF DIAGNOSIS

Detect high voltage battery block voltage low.
Judge as NG when the high voltage battery block voltage is less than specified value.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
Ignition state	Run or crank
12 V battery system voltage	≥ 6.5 V and ≤ 17 V
HPCM contactor request	Open
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Open

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Minimum average module voltage of block	< Map4

Map 4

Minimum Hybrid battery temperature (°C (°F))	–40 (–40)	–20 (–4)	–10 (14)	0 (32)	10 (50)	25 (77)	35 (95)	45 (113)	50 (122)
Minimum average module voltage of block (V)	4.485	4.365	4.340	4.320	4.290	4.230	4.195	4.170	4.170

Time Needed for Diagnosis: 0.1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Minimum average module voltage of block	≥ Map4

Time Needed for Diagnosis: 0.1 second

FK:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-452, OUTLINE OF DIAGNOSIS, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the bus error of CAN channel 1.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9 V
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 0.48 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

Time Needed for Diagnosis: 0 seconds

FL: DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-453, OUTLINE OF DIAGNOSIS, DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the bus error of CAN channel 2.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 0.48 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

Time Needed for Diagnosis: 0 seconds

FM:DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION (Hybrid powertrain control system) <Ref. to HEV(diag)-454, OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM), DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- GENERAL DESCRIPTION (Drive motor control system) <Ref. to HEV(diag)-454, OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL SYSTEM), DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- GENERAL DESCRIPTION (Battery energy control system) <Ref. to HEV(diag)-455, OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL SYSTEM), DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM)

Detect the CAN failure and bus error of HEV-CAN.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION (HYBRID POWERTRAIN CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD (HYBRID POWERTRAIN CONTROL SYSTEM)

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: Less than 0.48 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

Time Needed for Diagnosis: 0 seconds

4. OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL SYSTEM)

Detect the serial communication failure with inverter.
Judge as NG when the data from inverter is not received correctly.

5. EXECUTION CONDITION (DRIVE MOTOR CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s

6. DIAGNOSTIC METHOD (DRIVE MOTOR CONTROL SYSTEM)

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

Time Needed for Diagnosis: Immediately

7. OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL SYSTEM)

Detect CAN bus off error.

8. EXECUTION CONDITION (BATTERY ENERGY CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: (Ignition state	Run or crank
12 V battery system voltage)	≥ 9 V and ≤ 17 V
Continuous time of a	≥ 1 s

9. DIAGNOSTIC METHOD (BATTERY ENERGY CONTROL SYSTEM)

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

Time Needed for Diagnosis: 0.2 seconds

FN:DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-456, OUTLINE OF DIAGNOSIS, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the engine data not received.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	≠ Lost

Time Needed for Diagnosis: 0 seconds

FO:DTC U0101 LOST COMMUNICATION WITH TCM

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-457, OUTLINE OF DIAGNOSIS, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the transmission data not received.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	≠ Lost

Time Needed for Diagnosis: 0 seconds

FP:DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION (Hybrid powertrain control system) <Ref. to HEV(diag)-458, OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM), DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- GENERAL DESCRIPTION (Battery energy control system) <Ref. to HEV(diag)-458, OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL SYSTEM), DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM)

Detect the motor control module data not received.

2. EXECUTION CONDITION (HYBRID POWERTRAIN CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD (HYBRID POWERTRAIN CONTROL SYSTEM)

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from DMCM	Lost

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Lost

Time Needed for Diagnosis: 0 seconds

4. OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL SYSTEM)

Detect the malfunction of CAN data not received from drive motor control module.

5. EXECUTION CONDITION (BATTERY ENERGY CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: (Ignition state 12 V battery system voltage) Continuous time of a	Run or crank ≥ 9 V and ≤ 17 V ≥ 1 s

6. DIAGNOSTIC METHOD (BATTERY ENERGY CONTROL SYSTEM)

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from DMCM	Lost

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Received

Time Needed for Diagnosis: 1 second

FQ:DTC U0111 LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION (Hybrid powertrain control system) <Ref. to HEV(diag)-460, OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM), DTC U0111 LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- GENERAL DESCRIPTION (Drive motor control system) <Ref. to HEV(diag)-460, OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL SYSTEM), DTC U0111 LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM)

Detect the battery energy control module data not received.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION (HYBRID POWERTRAIN CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD (HYBRID POWERTRAIN CONTROL SYSTEM)

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BECM	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BECM	≠ Lost

Time Needed for Diagnosis: 0 seconds

4. OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL SYSTEM)

Detect the serial communication failure with inverter.
Judge as NG when the data from inverter is not received correctly.

5. EXECUTION CONDITION (DRIVE MOTOR CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s

6. DIAGNOSTIC METHOD (DRIVE MOTOR CONTROL SYSTEM)

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BECM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BECM	Received

Time Needed for Diagnosis: 8 seconds

FR:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

DIAGNOSIS:
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-462, OUTLINE OF DIAGNOSIS, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:
EV traveling/Auto Start Stop does not operate.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the VDC data not received.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	≠ Lost

Time Needed for Diagnosis: 0 seconds

FS:DTC U0131 LOST COMMUNICATION WITH POWER STEERING CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with electric power steering system.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

FT:DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with body integrated unit.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

FU:DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with airbag system.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

FV:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with combination meter.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

FW:DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with air conditioner.
- Immediately at fault recognition

TROUBLE SYMPTOM:
EV traveling/Auto Start Stop does not operate.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

FX:DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE

DIAGNOSIS:
- Detects CAN communication error with electric oil pump.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

FY:DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-464, OUTLINE OF DIAGNOSIS, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the engine data error.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	Parity error
Diagnosis 2	
CAN data from ECM	Did not change

Time Needed for Diagnosis:

- **Diagnosis 1:** 0.15 s
- **Diagnosis 2:** 2.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	≠ Parity error
Diagnosis 2	
CAN data from ECM	≠ Did not change

Time Needed for Diagnosis: 0 seconds

FZ: DTC U0402 INVALID DATA RECEIVED FROM TCM

DIAGNOSIS:
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-465, OUTLINE OF DIAGNOSIS, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the transmission data error.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from TCM	Parity error
Diagnosis 2	
CAN data from TCM	Did not change

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.15 s
- **Diagnosis 2:** 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from TCM	≠ Parity error
Diagnosis 2	
CAN data from TCM	≠ Did not change

Time Needed for Diagnosis: 0 seconds

GA:DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"

DIAGNOSIS:
- Immediately at fault recognition
- GENERAL DESCRIPTION (Hybrid powertrain control system) <Ref. to HEV(diag)-466, OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM), DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- GENERAL DESCRIPTION (Battery energy control system) <Ref. to HEV(diag)-467, OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL SYSTEM), DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM)

Detect the data error of drive motor control module.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 CAN data from DMCM	Checksum error
Diagnosis 2 CAN data from DMCM	Did not change

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.3 s
- **Diagnosis 2:** 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 CAN data from DMCM	≠ Checksum error
Diagnosis 2 CAN data from DMCM	≠ Did not change

Time Needed for Diagnosis: 0 seconds

4. OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL SYSTEM)

Detect the CAN data stuck failure from drive motor control module.

5. EXECUTION CONDITION

Secondary Parameters	Execution condition
Diagnosis 1	
a: (Ignition state	Run or crank
12 V battery system voltage)	≥ 9 V and ≤ 17 V
Continuous time of a	≥ 1 s
Diagnosis 2	
a: (Ignition state	Run or crank
12 V battery system voltage)	≥ 9 V and ≤ 17 V
Continuous time of a	≥ 1 s
CAN data from DMCM	Changed

6. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from DMCM	Did not change
Diagnosis 2	
CAN data from DMCM	Checksum error

Time Needed for Diagnosis:

- **Diagnosis 1:** 0.5 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from DMCM	change
Diagnosis 2	
CAN data from DMCM	≠ Checksum error

Time Needed for Diagnosis: 0.5 seconds

GB:DTC U0412 INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE

DIAGNOSIS:
- Immediately at fault recognition
- GENERAL DESCRIPTION (Hybrid powertrain control system) <Ref. to HEV(diag)-468, OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM), DTC U0412 INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- GENERAL DESCRIPTION (Drive motor control system) <Ref. to HEV(diag)-469, OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL SYSTEM), DTC U0412 INVALID DATA RECEIVED FROM BATTERY ENERGY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS (HYBRID POWERTRAIN CONTROL SYSTEM)

Detect the data error of battery energy control module.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION (HYBRID POWERTRAIN CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD (HYBRID POWERTRAIN CONTROL SYSTEM)

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 CAN data from BECM	Checksum error
Diagnosis 2 CAN data from BECM	Did not change

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.3 s
- **Diagnosis 2:** 20 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 CAN data from BECM	≠ Checksum error
Diagnosis 2 CAN data from BECM	Changed

Time Needed for Diagnosis: 0 seconds

4. OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL SYSTEM)

Detect the communication error with battery energy control module.
Judge as NG when the data from battery energy control module is not received correctly.

5. EXECUTION CONDITION (DRIVE MOTOR CONTROL SYSTEM)

Secondary Parameters	Execution condition
Diagnosis 1	
CAN data from BECM	Received
CAN data from BECM	≠ Checksum error
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s
Diagnosis 2	
CAN data from BECM	Received
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s

6. DIAGNOSTIC METHOD (DRIVE MOTOR CONTROL SYSTEM)

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from BECM	Did not change
Diagnosis 2	
CAN data from BECM	Checksum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.6 s
- **Diagnosis 2:** 0.03 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from BECM	Changed
Diagnosis 2	
CAN data from BECM	≠ Checksum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 2.2 s
- **Diagnosis 2:** 0.6 s

GC:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

DIAGNOSIS:
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-470, OUTLINE OF DIAGNOSIS, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:
EV traveling/Auto Start Stop does not operate.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the VDC data error.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 CAN data from Vehicle Dynamics Control Module	Parity error
Diagnosis 2 CAN data from Vehicle Dynamics Control Module	Did not change

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.06 s
- **Diagnosis 2:** 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 CAN data from Vehicle Dynamics Control Module	≠ Parity error
Diagnosis 2 CAN data from Vehicle Dynamics Control Module	≠ Did not change

Time Needed for Diagnosis: 0 seconds

GD:DTC U0420 INVALID DATA RECEIVED FROM POWER STEERING CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with electric power steering system.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

GE:DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with body integrated unit.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

GF:DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with combination meter.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

GG:DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with air conditioner.
- Immediately at fault recognition

TROUBLE SYMPTOM:
EV traveling/Auto Start Stop does not operate.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

GH:DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE

DIAGNOSIS:
- Detects CAN communication error with airbag system.
- Immediately at fault recognition

TROUBLE SYMPTOM:
Normal control

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

GI: DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE

DIAGNOSIS:

- Detects CAN communication error with electric oil pump.
- Immediately at fault recognition

TROUBLE SYMPTOM:

Normal control

NOTE:

Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

GJ:DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-473, OUTLINE OF DIAGNOSIS, DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the engine PU-CAN data not received.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	≠ Lost

Time Needed for Diagnosis: 0 seconds

GK:DTC U1101 LOST COMMUNICATION WITH TCM PU-CAN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-474, OUTLINE OF DIAGNOSIS, DTC U1101 LOST COMMUNICATION WITH TCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the transmission PU-CAN data not received.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	≠ Lost

Time Needed for Diagnosis: 0 seconds

GL:DTC U1290 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION (Drive motor control system) <Ref. to HEV(diag)-475, OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL SYSTEM), DTC U1290 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- GENERAL DESCRIPTION (Battery energy control system) <Ref. to HEV(diag)-475, OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL SYSTEM), DTC U1290 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL SYSTEM)

Detect the communication error with hybrid powertrain control module.
Judge as NG when the data from hybrid powertrain control module is not received correctly.

2. EXECUTION CONDITION (DRIVE MOTOR CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s

3. DIAGNOSTIC METHOD (DRIVE MOTOR CONTROL SYSTEM)

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Received

Time Needed for Diagnosis: 2 seconds

4. OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL SYSTEM)

Detect the malfunction of CAN data not received from hybrid powertrain control module.

5. EXECUTION CONDITION (BATTERY ENERGY CONTROL SYSTEM)

Secondary Parameters	Execution condition
a: (Ignition state	Run or crank
12 V battery system voltage)	≥ 9 V and ≤ 17 V
Continuous time of a	≥ 1 s

6. DIAGNOSTIC METHOD (BATTERY ENERGY CONTROL SYSTEM)

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Received

Time Needed for Diagnosis: 0.5 seconds

GM:DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-477, OUTLINE OF DIAGNOSIS, DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the engine PU-CAN data error.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	Checksum error
Diagnosis 2	
CAN data from ECM	Did not change

Time Needed for Diagnosis:

- **Diagnosis 1:** 0.03 s
- **Diagnosis 2:** 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	≠ Checksum error
Diagnosis 2	
CAN data from ECM	≠ Did not change

Time Needed for Diagnosis: 0 seconds

GN:DTC U1402 INVALID DATA RECEIVED FROM TCM PU-CAN

DIAGNOSIS:
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to HEV(diag)-478, OUTLINE OF DIAGNOSIS, DTC U1402 INVALID DATA RECEIVED FROM TCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.
- Sometimes driving power and shifting behavior are different from the normal states.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS

Detect the transmission PU-CAN data error.
Judge as NG when the detection result is out of specification.

2. EXECUTION CONDITION

Secondary Parameters	Execution condition
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from TCM	Checksum error
Diagnosis 2	
CAN data from TCM	Did not change

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.03 s
- **Diagnosis 2:** 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from TCM	≠ Checksum error
Diagnosis 2	
CAN data from TCM	≠ Did not change

Time Needed for Diagnosis: 0 seconds

GO:DTC U1591 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN

DIAGNOSIS:

- Immediately at fault recognition
- GENERAL DESCRIPTION (Drive motor control module) <Ref. to HEV(diag)-479, OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL MODULE), DTC U1591 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
- GENERAL DESCRIPTION (Battery energy control module) <Ref. to HEV(diag)-480, OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL MODULE), DTC U1591 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE HEV-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

TROUBLE SYMPTOM:

- EV traveling/Auto Start Stop does not operate.
- Motor assist does not regenerates.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. OUTLINE OF DIAGNOSIS (DRIVE MOTOR CONTROL MODULE)

Detect the CAN communication error with hybrid powertrain control module.
Judge as NG when the data from hybrid powertrain control module is not received correctly.

2. EXECUTION CONDITION (DRIVE MOTOR CONTROL MODULE)

Secondary Parameters	Execution condition
Diagnosis 1	
CAN data from HPCM	Received
CAN data from HPCM	≠ Checksum error
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s
Diagnosis 2	
CAN data from HPCM	Received
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s

3. DIAGNOSTIC METHOD (DRIVE MOTOR CONTROL MODULE)

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from HPCM	Did not change
Diagnosis 2	
CAN data from HPCM	Checksum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.6 s
- **Diagnosis 2:** 0.03 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from HPCM	Changed
Diagnosis 2	
CAN data from HPCM	≠ Checksum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 2.2 s
- **Diagnosis 2:** 0.3 s

4. OUTLINE OF DIAGNOSIS (BATTERY ENERGY CONTROL MODULE)

Detect the CAN data stuck failure from hybrid powertrain control module.

5. EXECUTION CONDITION (BATTERY ENERGY CONTROL MODULE)

Secondary Parameters	Execution condition
Diagnosis 1	
a: (Ignition state	Run or crank
12 V battery system voltage)	≥ 9 V
	and
	≤ 17 V
Continuous time of a	≥ 1 s
Diagnosis 2	
a: (Ignition state	Run or crank
12 V battery system voltage)	≥ 9 V
	and
	≤ 17 V
Continuous time of a	≥ 1 s
CAN data from HPCM	Changed

6. DIAGNOSTIC METHOD (BATTERY ENERGY CONTROL MODULE)

- **Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 CAN data from HPCM	Did not change
Diagnosis 2 CAN data from HPCM	Checksum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.5 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

- **Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1 CAN data from HPCM	Changed
Diagnosis 2 CAN data from HPCM	≠ Checksum error

Time Needed for Diagnosis:
- **Diagnosis 1:** 0.5 s
- **Diagnosis 2:** 0.5 s

GP:DTC U1676 LIN COMMUNICATION BUS ERROR HYBRID POWERTRAIN CONTROL MODULE

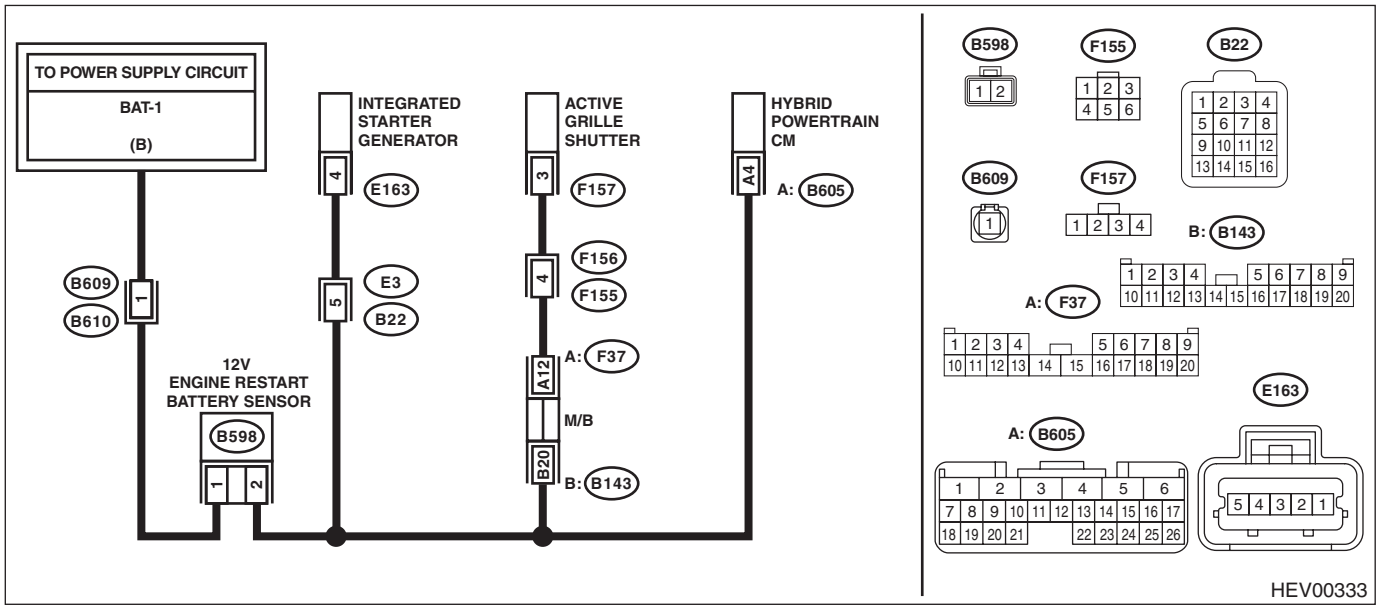
DIAGNOSIS:
- Detects LIN communication error.
- Immediately at fault recognition

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.

(Engine does not restart under EV traveling/Auto Start Stop condition.)
- Charge warning light illuminates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

WIRING DIAGRAM
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK BATTERY.** Check the 12 volt engine restart battery.	Is the condition normal?	Go to step **2**.	Charge or replace the 12 volt engine restart battery.
2	**CHECK MODULES.** 1) Disconnect the integrated starter generator connector. 2) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 3) Read the DTC again. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC U1676 detected? (current malfunction)	Go to step **3**.	Replace the integrated starter generator. <Ref. to SC(H4DO(HEV))-33, Integrated Starter Generator (ISG).>

	Step	Check	Yes	No
3	**CHECK MODULES.** 1) Turn the ignition switch to OFF. 2) Disconnect the 12V engine restart battery sensor connector. 3) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 4) Read the DTC again. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC U1676 detected? (current malfunction)	Go to step **4**.	Replace the 12V engine restart battery sensor. <Ref. to SC(H4DO(HEV))-61, Battery Sensor.>
4	**CHECK MODULES.** 1) Turn the ignition switch to OFF. 2) Disconnect the active grille shutter connector. 3) Perform the Clear Memory Mode. <Ref. to HEV(diag)-24, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Clear Memory Mode.> 4) Read the DTC again. <Ref. to HEV(diag)-23, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC U1676 detected? (current malfunction)	Go to step **5**.	Replace the active grille shutter.
5	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector. 3) Using a tester, measure the resistance between the HPCM connector and connector of each unit. ***Connector & terminal*** ***(B605) No. 4 — (F157) No. 3:*** ***(B605) No. 4 — (B598) No. 2:*** ***(B605) No. 4 — (E163) No. 4:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair open circuit of the harness between HPCM connector and connector of each unit.
6	**CHECK HARNESS (SHORT TO GROUND).** Using a tester, measure the resistance between HPCM connector and chassis ground. ***Connector & terminal*** ***(B605) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair ground short circuit of harness between the HPCM connector and the integrated starter generator connector.
7	**CHECK HARNESS (SHORT TO POWER).** Using a tester, measure the voltage between the HPCM connector and chassis ground. ***Connector & terminal*** ***(B605) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Replace the HPCM. <Ref. to HEV-37, Hybrid Powertrain Control Module.>	Repair the short circuit to power in harness between the HPCM connector and the integrated starter generator connector.

GQ:DTC U1711 LOST COMMUNICATION WITH BATTERY "2" MONITOR MODULE

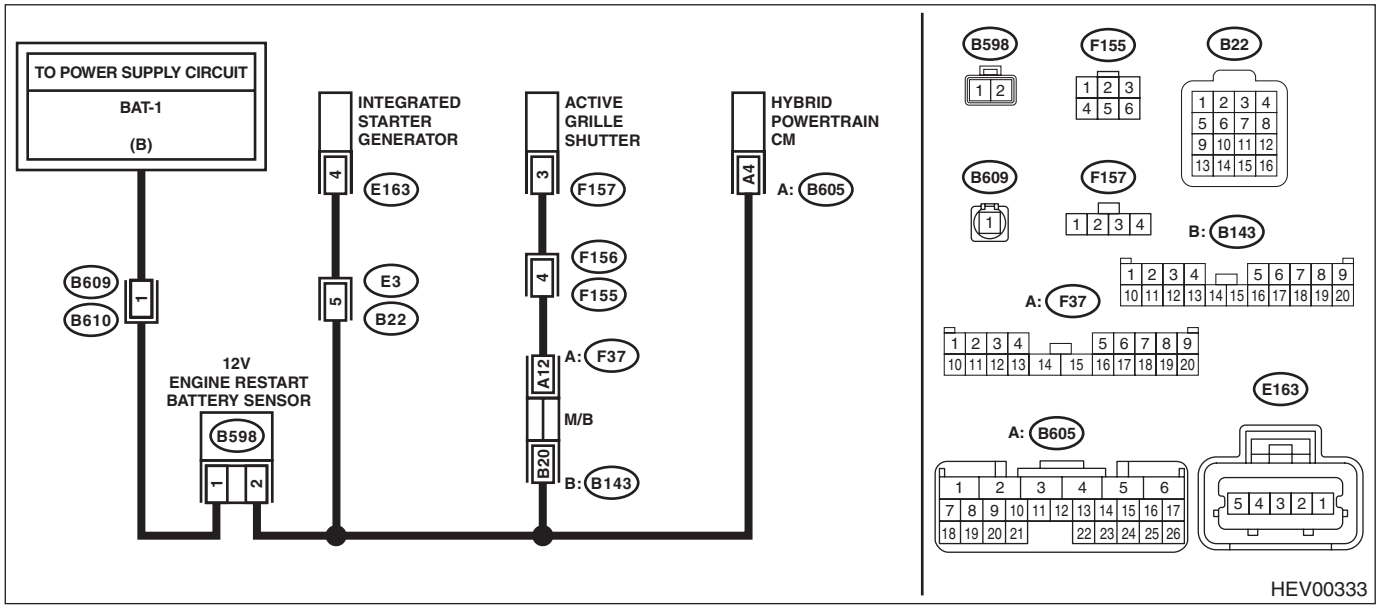
DIAGNOSIS:
- Detects LIN communication error with 12V engine restart battery sensor.
- Immediately at fault recognition

TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.
- Charge warning light illuminates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

NOTE:
This DTC may be set when terminals of the 12 volt engine restart battery are disconnected.

WIRING DIAGRAM
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK CONNECTOR.** Check the connector (B598) of 12V engine restart battery sensor.	Is there looseness or poor contact of connector?	Repair the connector.	Go to step **2**.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the HPCM connector. 2) Disconnect the 12V engine restart battery sensor connector. 3) Using a tester, measure the resistance between the HPCM connector and 12V engine restart battery sensor connector. ***Connector & terminal*** ***(B605) No. 4 — (B598) No. 2:*** ***(B598) No. 1 — 12 volt engine restart battery positive terminal:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of the harness between the HPCM connector and the 12 volt engine restart battery and the 12V engine restart battery sensor connector or replace fuses.

	Step	Check	Yes	No
3	**CHECK HARNESS (SHORT TO GROUND).** 1) Disconnect the integrated starter generator connector. 2) Using a tester, measure the resistance between HPCM connector and chassis ground. ***Connector & terminal*** ***(B605) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair ground short circuit of harness between the HPCM connector and the 12V engine restart battery sensor connector.
4	**CHECK HARNESS (SHORT TO POWER).** Using a tester, measure the voltage between the HPCM connector and chassis ground. ***Connector & terminal*** ***(B605) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Repair the short circuit to power in harness between the HPCM connector and the 12V engine restart battery sensor connector.
5	**CHECK BATTERY.** Check the 12 volt engine restart battery. <Ref. to SC(H4DO(HEV))-40, Battery.>	Is the condition normal?	Replace the 12V engine restart battery sensor. <Ref. to SC(H4DO(HEV))-61, Battery Sensor.>	Replace or charge the battery.

GR:DTC U1720 LOST COMMUNICATION WITH INTEGRATED STARTER GENERATOR

DIAGNOSIS:
- Detects LIN communication error with integrated starter generator.
- Immediately at fault recognition

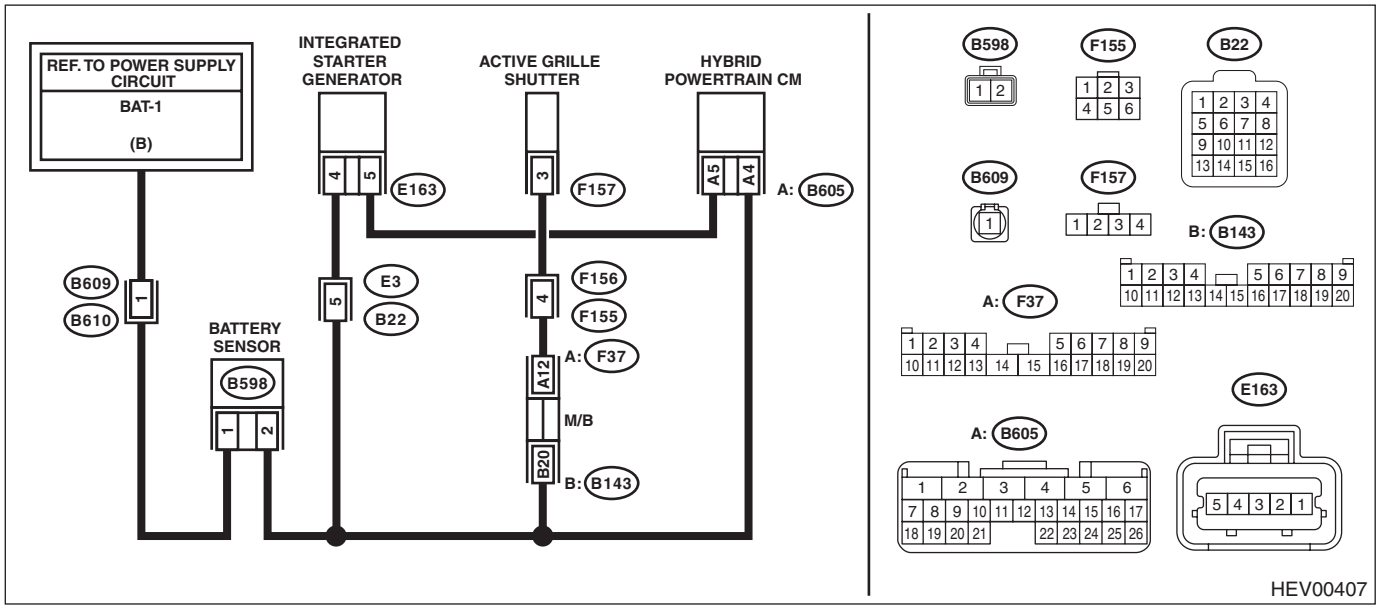
TROUBLE SYMPTOM:
- EV traveling/Auto Start Stop does not operate.

(Engine does not restart under EV traveling/Auto Start Stop condition.)
- Charge warning light illuminates.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to HEV(diag)-8, CAUTION, General Description.>

NOTE:
This DTC may be set when terminals of the 12 volt engine restart battery are disconnected.

WIRING DIAGRAM
Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK BATTERY.** Check the 12 volt engine restart battery.	Is the condition normal?	Go to step **2**.	Replace or charge the battery.
2	**CHECK CONNECTOR.** Check the integrated starter generator connector (E163).	Is there looseness or poor contact of connector?	Repair the connector.	Go to step **3**.
3	**CHECK HARNESS (SHORT TO GROUND).** 1) Turn the ignition switch to OFF. 2) Disconnect the HPCM connector. 3) Disconnect the integrated starter generator connector. 4) Disconnect the 12V engine restart battery sensor connector. 5) Using a tester, measure the resistance between HPCM connector and chassis ground. ***Connector & terminal*** ***(B605) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair ground short circuit of harness between the HPCM connector and the integrated starter generator connector.

	Step	Check	Yes	No
4	**CHECK HARNESS (SHORT TO POWER).** Using a tester, measure the voltage between the HPCM connector and chassis ground. ***Connector & terminal*** ***(B605) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Repair the short circuit to power in harness between the HPCM connector and the integrated starter generator connector.
5	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the HPCM connector and integrated starter generator connector. ***Connector & terminal*** ***(B605) No. 4 — (E163) No. 4:*** ***(B605) No. 5 — (E163) No. 5:***	Is the resistance less than 1 Ω?	Replace the integrated starter generator. <Ref. to SC(H4DO(HEV))-33, Integrated Starter Generator (ISG).>	Repair the open circuit of the harness between the HPCM connector and the integrated starter generator connector.

20.Diagnostics with Phenomenon

A: INSPECTION

1. SYMPTOM TABLE

Symptoms	Maintenance parts	Note
Hybrid fail lamp does not illuminate.	CAN communication	Perform the basic inspection for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Combination meter assembly	Perform the basic inspection for meter system. <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>
Hybrid fail lamp remains ON. (If DTCs are detected, perform inspection according to those DTC diagnostic procedures.)	CAN communication	Perform the basic inspection for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Combination meter assembly	Perform the basic inspection for meter system. <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>
Charge warning light illuminates.	Integrated starter generator	Check the charge warning light. <Ref. to SC(H4DO(HEV))-39, CHECK CHARGE WARNING LIGHT, INSPECTION, Integrated Starter Generator (ISG).>
Unable to switch to EV traveling.	CAN communication	Perform the basic inspection for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Combination meter assembly	Perform the basic inspection for meter system. <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>
	Check EV traveling conditions. <Ref. to HEV(diag)-48, HYBRID POWERTRAIN CONTROL SYSTEM (Auto Start Stop AND EV TRAVELING CONDITIONS), OPERATION, Read Current Data.>	The brake vacuum pressure must be sufficient. (The vacuum pressure may decrease at high altitude or repetitive brake operation.)
		The 12 volt engine restart battery must not have abnormality.
		Engine coolant temperature must not be too low. (60°C (140°F) or more)
		The shift lever must be in “D” range.
		Battery pack must not have abnormality.
		Integrated starter generator must not have abnormality.
		ABS must not be operating.
		There must not be a steep incline in uphill.
		Accelerator pedal must not be depressed.
		Brake pedal must not be depressed.
		Warning lights are not illuminating.
		DC/DC converter must be operating normally.
		Drive motor must not have abnormality.
		System Operation Check Mode must not be active.

Symptoms	Maintenance parts	Note
EV MODE indicator light does not illuminate.	CAN communication	Perform the basic inspection for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Combination meter assembly	Perform the basic inspection for meter system. <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>
EV MODE indicator light remains on.	CAN communication	Perform the basic inspection for LAN system. <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Combination meter assembly	Perform the basic inspection for meter system. <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>
Poor acceleration	Hybrid system	Perform the basic inspection for hybrid system. <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Engine system	Perform the basic inspection for engine system. <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	CVT System	Perform the basic inspection for CVT system. <Ref. to CVT(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
READY ON does not occur. (Models without keyless access system)	Ignition switch assembly	Perform unit check for the ignition switch.
	IG relay	Perform unit check for the ignition relay.
	ECM power supply system	Perform the basic inspection for engine system. <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Check READY mode conditions	The current data «Contactor Close Status» must be «close». (The ignition switch is OFF, battery runout prevention control is active, no fault conditions.)
		Current data «Engine Speed» must have input.
		Drive motor must not have abnormality.
	Combination meter assembly	Perform the basic inspection for meter system. <Ref. to IDI(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Hybrid system	Perform the basic inspection for hybrid system. <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Engine system	Perform the basic inspection for engine system. <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

Symptoms	Maintenance parts	Note
READY ON does not occur. (Models with keyless access system)	Keyless access system	Perform the basic inspection for keyless access system. <Ref. to KPS(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	ECM power supply system	Perform the basic inspection for engine system. <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Check READY mode conditions	The current data «Contactor Close Status» must be «close». (The ignition switch is OFF, battery runout prevention control is active, no fault conditions.)
		Current data «Engine Speed» must have input.
		Drive motor must not have abnormality.
	Combination meter assembly	Perform the basic inspection for meter system. <Ref. to IDI(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Hybrid system	Perform the basic inspection for hybrid system. <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Engine system	Perform the basic inspection for engine system. <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
Defective operation of Auto Start Stop	Check Auto Start Stop mode conditions. <Ref. to HEV(diag)-48, HYBRID POWERTRAIN CONTROL SYSTEM (Auto Start Stop AND EV TRAVELING CONDITIONS), OPERATION, Read Current Data.>	The brake vacuum pressure must be sufficient. (The vacuum pressure may decrease at high altitude or repetitive brake operation.)
		The 12 volt engine restart battery must not have abnormality.
		Engine coolant temperature must not be too low. (60°C (140°F) or more)
		The shift lever must be in “D” range.
		Battery pack must not have abnormality.
		Drive motor must not have abnormality.
		Integrated starter generator must not have abnormality.
		The vehicle must not be moving. (0.1 km/h (0.1 MPH) or less)
		ABS must not be operating.
		There must not be a steep incline in uphill.
		Accelerator pedal must not be depressed.
		Defroster must not be on.
		Warning lights are not illuminating.
		DC/DC converter must be operating normally.
		System Operation Check Mode must not be active.

Symptoms	Maintenance parts	Note
The braking force is weak.	VDC system	Perform the basic inspection for VDC system. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Hybrid system (brake vacuum pump)	Perform the basic inspection for hybrid system. <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
Engine does not restart under Auto Start Stop or EV traveling.	Engine system	Perform the basic inspection for engine system. <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
	Hybrid system	Perform the basic inspection for hybrid system. <Ref. to HEV(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> NOTE: Restarting the engine may be temporarily prohibited due to certain voltage or temperature condition. In such case, the engine may be restarted when normal voltage or temperature condition is restored.

PEDESTRIAN ALERT SYSTEM

PA

Page

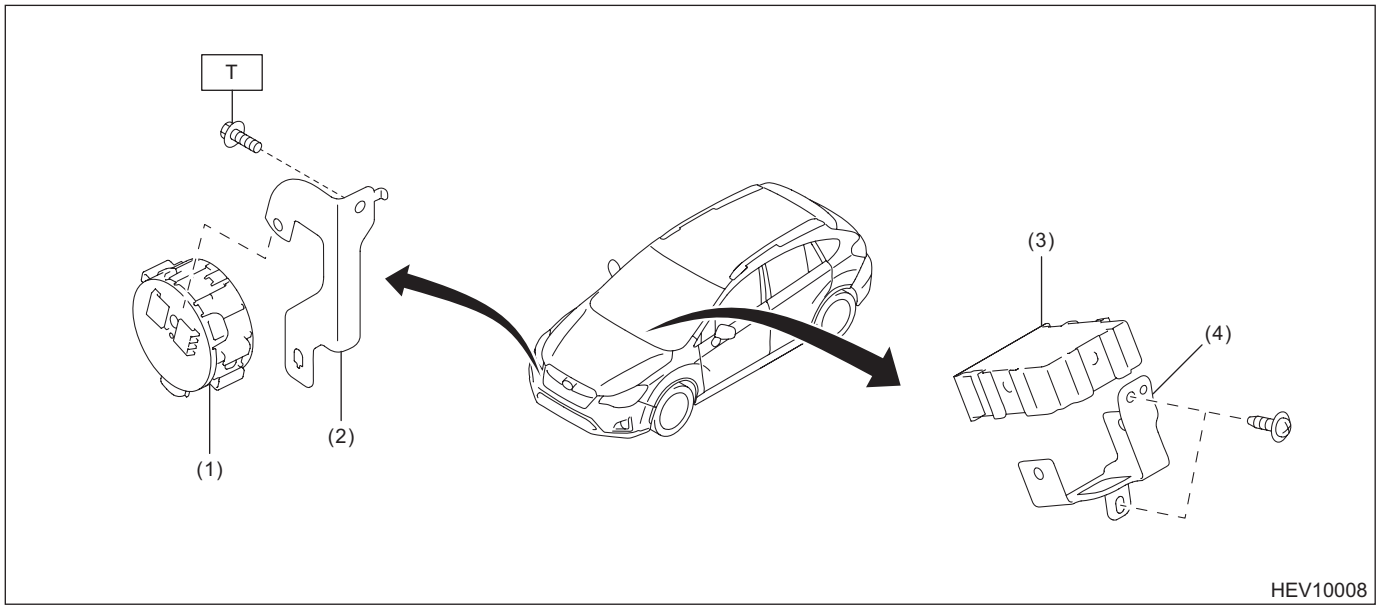
1. General Description 2
2. Relay and Fuse 4
3. Pedestrian Alert System 5
4. Pedestrian Alert Control Unit 6
5. Pedestrian Alert Speaker 7
6. Combination Meter 9
7. Stop Light & Brake Switch 10
8. Diagnostics with Phenomenon 11

1. General Description

A: LOCATION

Refer to “LOCATION” of “PEDESTRIAN ALERT SYSTEM (DIAGNOSTICS)” section. <Ref. to PA(diag)-5, LOCATION, Electrical Component Location.>

B: COMPONENT



(1)	Pedestrian alert speaker	(3)	Pedestrian alert control unit
(2)	Pedestrian alert speaker bracket	(4)	Pedestrian alert control unit bracket

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

C: CAUTION

• Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
• Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
• Connect the connectors securely during reassembly.
• After reassembly, make sure that the each component operates normally.
• Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Use great care to protect the connector or wiring harness from being damaged. Otherwise, malfunction may occur in the airbag system.
• The report sound may not be heard well in loud ambient sound, or to people behind the vehicle.
• When the front of speaker is covered with foreign matter such as mud and snow, it may change the tone of report sound.

D: PREPARATION TOOL

1. SPECIAL TOOL

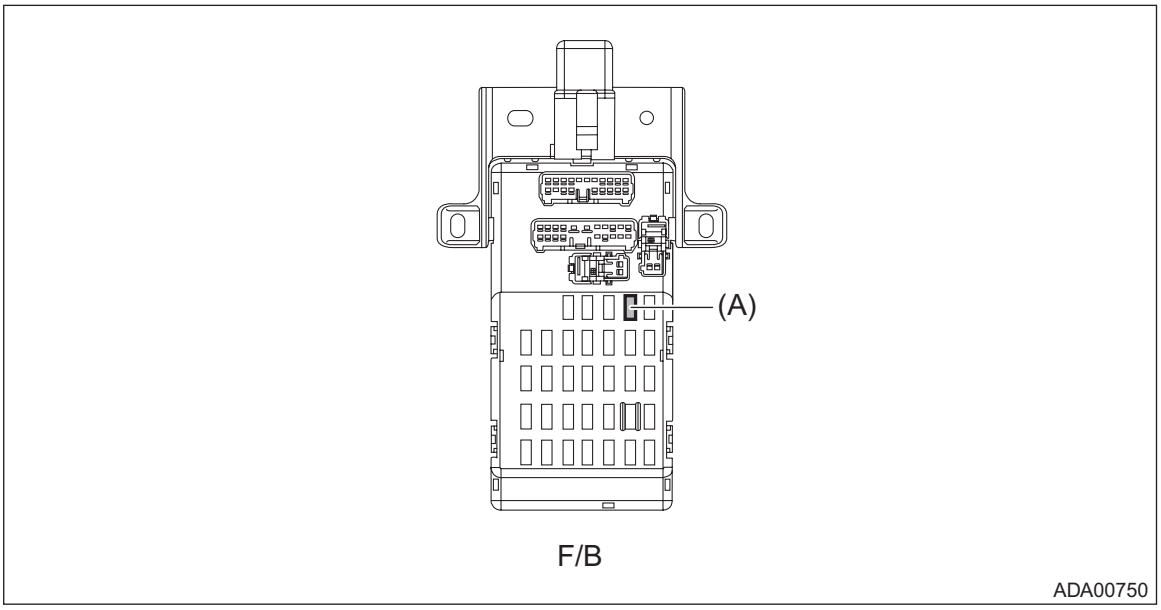
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

2. Relay and Fuse

A: LOCATION



Relay & fuse box	Fuse 10 A (pedestrian alert control unit)	(A)

NOTE:
For other related fuses, refer to the wiring diagram. <Ref. to WI(HEV)-21, Power Supply Circuit.>

B: INSPECTION

1. CHECK FUSE

1) Remove the fuse and inspect visually.
2) If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system wiring harness.

3. Pedestrian Alert System

A: WIRING DIAGRAM

Refer to “Pedestrian Alert System” in the wiring diagram. <Ref. to WI(HEV)-201, WIRING DIAGRAM, Pedestrian Alert System.>

B: INSPECTION

Refer to “Basic Diagnostic Procedure” of “PEDESTRIAN ALERT SYSTEM (DIAGNOSTICS)” section. <Ref. to PA(diag)-2, Basic Diagnostic Procedure.>

C: NOTE

For procedure of each component in the pedestrian alert system, refer to the respective section.

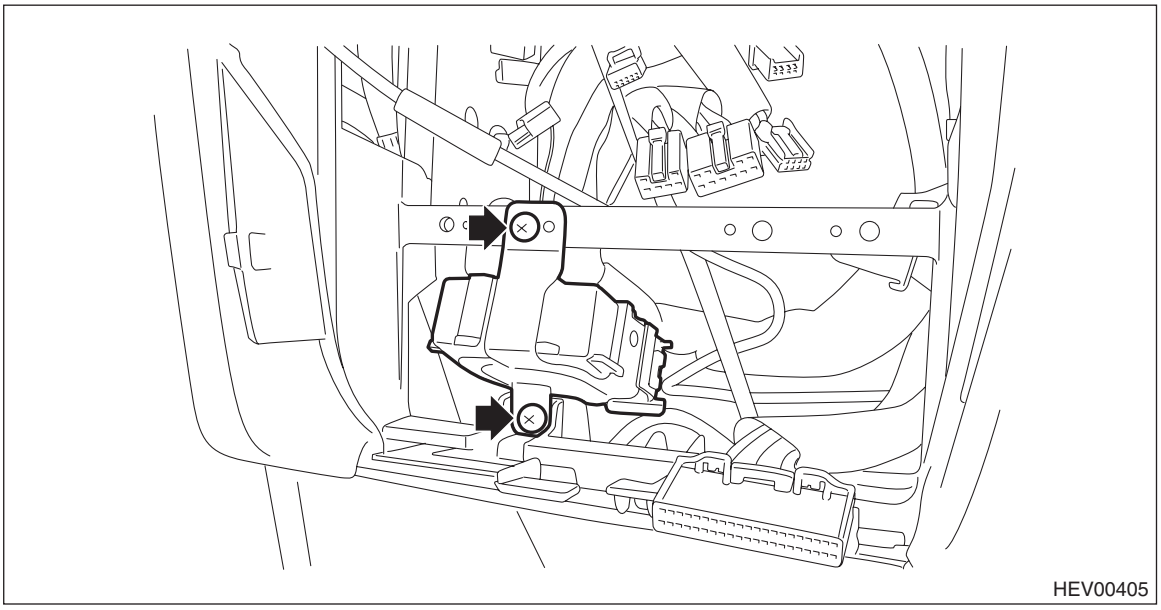
- Pedestrian alert control unit: <Ref. to PA-6, Pedestrian Alert Control Unit.>
- Pedestrian alert speaker: <Ref. to PA-7, Pedestrian Alert Speaker.>

4. Pedestrian Alert Control Unit

A: REMOVAL

CAUTION:
Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the cover assembly - instrument panel LWR driver and the knee airbag module. <Ref. to AB-41, REMOVAL, Knee Airbag Module.>
3) Remove the glove box. <Ref. to EI-74, REMOVAL, Glove Box.>
4) Remove the center grille assembly. <Ref. to AC-100, CENTER GRILLE ASSEMBLY, REMOVAL, Air Vent Grille.>
5) Remove the audio assembly or navigation assembly. <Ref. to ET-29, REMOVAL, Audio.>
6) Remove the pedestrian alert control unit.
   (1) Remove the screws.
   (2) Pull out the pedestrian alert control unit toward you, and disconnect the connector.


HEV00405

B: INSTALLATION

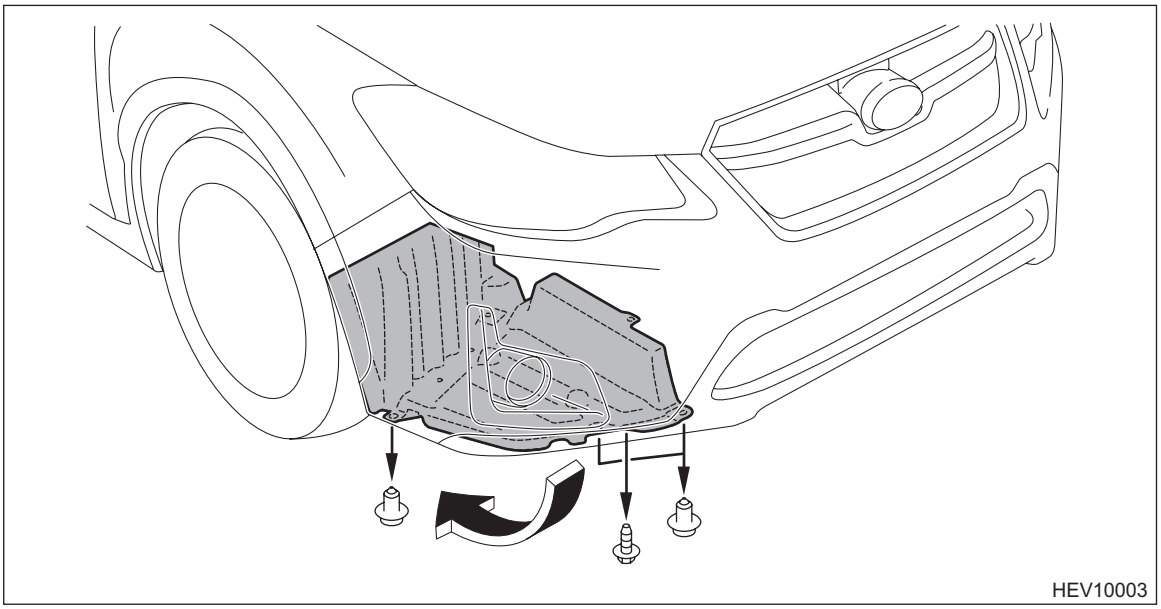
CAUTION:
• After installing the center grille assembly, check that the air vent grille of the center grille assembly is inserted correctly into the air vent duct.
• Before handling the airbag system components, always refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM".
Install each part in the reverse order of removal.

5. Pedestrian Alert Speaker

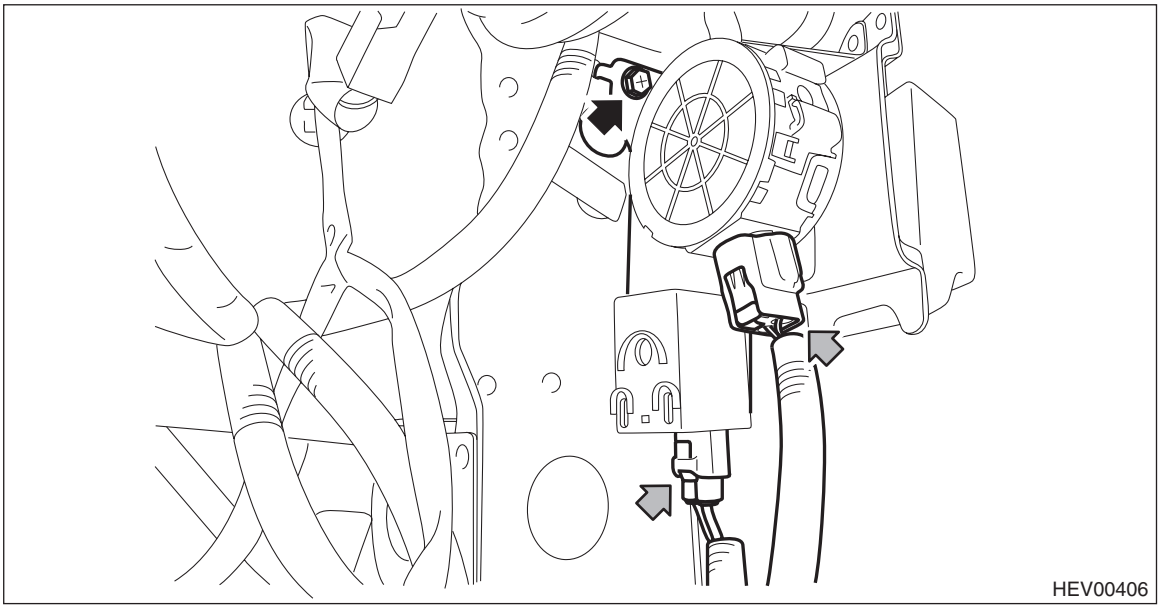
A: REMOVAL

1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the screw and clips, and turn over the front side of the mud guard - front.



4) Remove the pedestrian alert speaker.
   (1) Disconnect connectors.
   (2) Remove the bolt, and remove the pedestrian alert speaker and the keyless buzzer together with the bracket.



   (3) Release the lock, and remove the pedestrian alert speaker from the bracket.

B: INSTALLATION

Install each part in the reverse order of removal.

Tightening torque:
Pedestrian alert speaker: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

Using the Subaru Select Monitor, perform the compulsory sound generation of the speaker. <Ref. to PA(diag)-12, System Operation Check Mode.>
When a malfunction is detected for the speaker, refer to “Diagnostics with Phenomenon” of “PEDESTRIAN ALERT SYSTEM (DIAGNOSTICS)” section. <Ref. to PA(diag)-16, Diagnostics with Phenomenon.>

6. Combination Meter

A: NOTE

For the operation procedures for combination meter, refer to “INSTRUMENTATION/DRIVER INFO” section. <Ref. to IDI-19, Combination Meter.>

7. Stop Light & Brake Switch

A: NOTE

For the operation procedures for stop light and brake switch, refer to “BRAKE” section. <Ref. to BR-77, INSPECTION, Stop Light Switch.>

8. Diagnostics with Phenomenon

A: INSPECTION

Refer to “Diagnostics with Phenomenon” of “PEDESTRIAN ALERT SYSTEM (DIAGNOSTICS)” section. <Ref. to PA(diag)-16, Diagnostics with Phenomenon.>

PEDESTRIAN ALERT SYSTEM (DIAGNOSTICS)

PA(diag)

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1.	Basic Diagnostic Procedure	2
2.	Check List for Interview	3
3.	General Description	4
4.	Electrical Component Location	5
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6.	Subaru Select Monitor	7
7.	Read Diagnostic Trouble Code (DTC)	9
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10.	System Operation Check Mode	12
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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**PERFORM CUSTOMER INTERVIEW.** Using the Check List for Interview, ask the customer the condition of how trouble occurs.	Did you interview the customer?	Go to step **2**.	Interview the customer. <Ref. to PA(diag)-3, CHECK, Check List for Interview.>
2	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** Using Subaru Select Monitor, check that it can normally communicate with the pedestrian alert system. NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to PA(diag)-7, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>	Is communication possible?	Go to step **3**.	Check the communication circuit. <Ref. to PA(diag)-7, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>
3	**CHECK PEDESTRIAN ALERT SYSTEM.** Read the DTC of the pedestrian alert system using the Subaru Select Monitor. <Ref. to PA(diag)-9, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC detected?	Perform the diagnosis according to DTC. <Ref. to PA(diag)-13, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **4**.
4	**PERFORM DIAGNOSTICS WITH PHENOMENON.** Check the list for diagnostics with phenomenon. <Ref. to PA(diag)-16, INSPECTION, Diagnostics with Phenomenon.>	Does the symptom apply?	Perform diagnosis according to the procedures in the diagnostics with phenomenon.	Go to step **5**.
5	**CHECK TROUBLE PHENOMENON.** 1) Perform the basic inspection. <Ref. to PA(diag)-4, General Description.> 2) Check the pedestrian alert CM. <Ref. to PA(diag)-6, Control Module I/O Signal.> 3) Perform check of current data. <Ref. to PA(diag)-11, Read Current Data.> 4) Perform a unit check.	Was the trouble cause found?	Correct or repair the cause of trouble, and then clear the memory. <Ref. to PA(diag)-10, OPERATION, Clear Memory Mode.>	System is normal.

2. Check List for Interview

A: CHECK

- Inspect the following items regarding the vehicle's state.
- Print out this page for interviewing customers.

<table>
<tr><td colspan="2">Pedestrian alert system check list for interview</td><td colspan="2">Date of Vehicle Bring-in Year Month Date</td></tr>
<tr><td colspan="2" rowspan="2">Customer's name</td><td>Registration No.</td><td>Initial year of registration
Year Month Date</td></tr>
<tr><td>Vehicle model</td><td>Frame number</td></tr>
<tr><td>Interviewer</td><td>Inspector</td><td>Engine type</td><td>Odometer reading</td></tr>
<tr><td colspan="4">Customer specified content
•
•
•</td></tr>
<tr><td>Date when problem occurred</td><td>Year Month Date</td><td>Frequency of trouble occurrence</td><td>Always occurs
Sometimes occurs (times per day, times per month)</td></tr>
<tr><td rowspan="2">Condition of trouble occurrence
(How the trouble occurs)</td><td rowspan="2"></td><td>Weather</td><td>Fine • Cloudy • Rainy • Snowy • Others
( )</td></tr>
<tr><td>Temperature</td><td>°C (°F) — °C (°F)</td></tr>
<tr><td>Road conditions</td><td></td><td>Occurrence location</td><td></td></tr>
<tr><td>Accessory installation condition</td><td colspan="3"></td></tr>
<tr><td rowspan="2">Confirmation of trouble condition</td><td colspan="3">❑ No sound comes out from the pedestrian alert speaker.</td></tr>
<tr><td colspan="3">❑ Other</td></tr>
<tr><td>Diagnostic code</td><td colspan="3"></td></tr>
</table>

3. General Description

A: CAUTION

1. PEDESTRIAN ALERT SYSTEM

a. The sound pressure or tone of the pedestrian alert system may change in the following cases:
• When the vehicle is parked under the scorching sun or in snow-covered areas for a prolonged time. (Over time, the symptom is recovered.)
• When pedestrian alert speaker is directly subject to high-pressure water sprayer from under the vehicle.
• When front of pedestrian alert speaker is covered with foreign matters such as mud, snow, or ice.
• When whole of pedestrian alert speaker is frozen.
b. Warning sound may be difficult to be heard in the following cases:
• When the ambient noise is too loud. (In the very crowded crossing or when emergency vehicle is approaching.)
• When there is a person at the rear of the vehicle, he or she cannot hear the warning sound.

B: INSPECTION

1. BASIC INSPECTION

Before performing diagnosis, check the following items which might affect pedestrian alert system related problems.
1) Check 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-44, INSPECTION, Battery.>
2) Check the relay and fuse condition. <Ref. to PA-4, Relay and Fuse.>
3) Check the connecting condition of harness and harness connector.

C: PREPARATION TOOL

1. SPECIAL TOOL

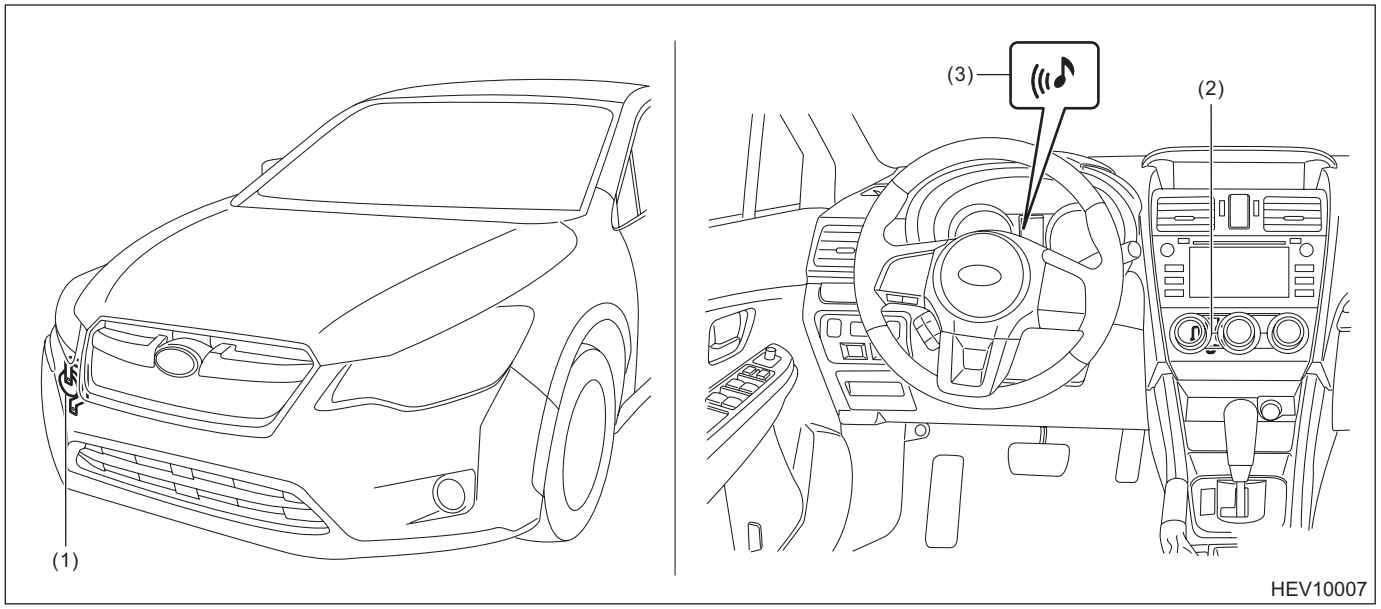
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

A: LOCATION

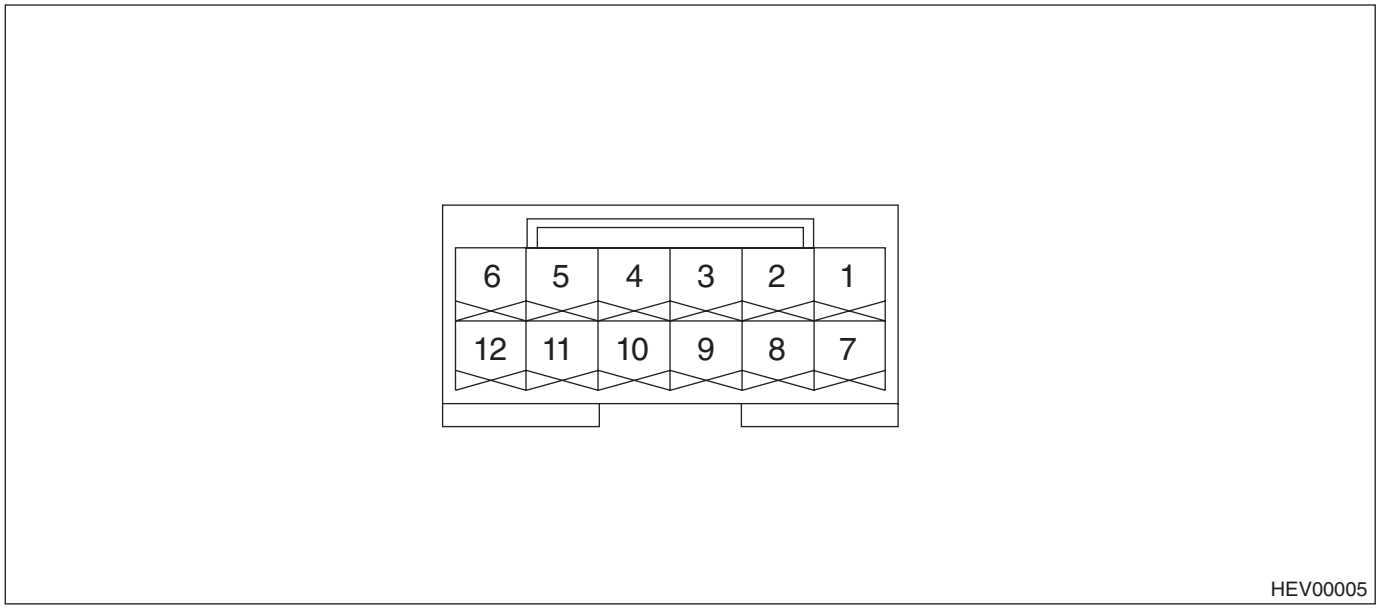


(1) Pedestrian alert speaker
(2) Pedestrian alert control unit
(3) Pedestrian alert warning light

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

1. PEDESTRIAN ALERT CONTROL UNIT



Item	Terminal No. (terminal symbol)	Measuring condition	Measurement value	Note
Operational power supply	1 (IG)	IG ON	10 V or more	—
STOP light signal	2 (STP)	Brake pedal ON → OFF	8 V or more → less than 1 V	—
Pedestrian alert speaker output (+)	3 (SP+)	—	—	Pulse output
Vehicle speed signal	6 (SPD)	—	—	Pulse output
GND	7 (GND)	Always	0 V	—
Pedestrian alert speaker output (–)	8 (SP–)	—	—	Pulse output
K-line	9 (PRST)	—	—	Communication line
IND output	10 (IND)	OFF	8 V or more	—
Shift position signal	11 (SFTP)	Except for P range	8 V or more	—
Oil pressure signal	12 (OPSW)	Engine running	8 V or more	—

B: WIRING DIAGRAM

Refer to “Pedestrian Alert System” in the wiring diagram. <Ref. to WI(HEV)-201, WIRING DIAGRAM, Pedestrian Alert System.>

6. Subaru Select Monitor

A: OPERATION

- For detailed operation procedures, refer to “Application help”.
- When the pedestrian alert system cannot communicate with Subaru Select Monitor, perform “COMMUNICATION FOR INITIALIZING IMPOSSIBLE”.

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

Communication error with pedestrian alert CM

DETECTING CONDITION:

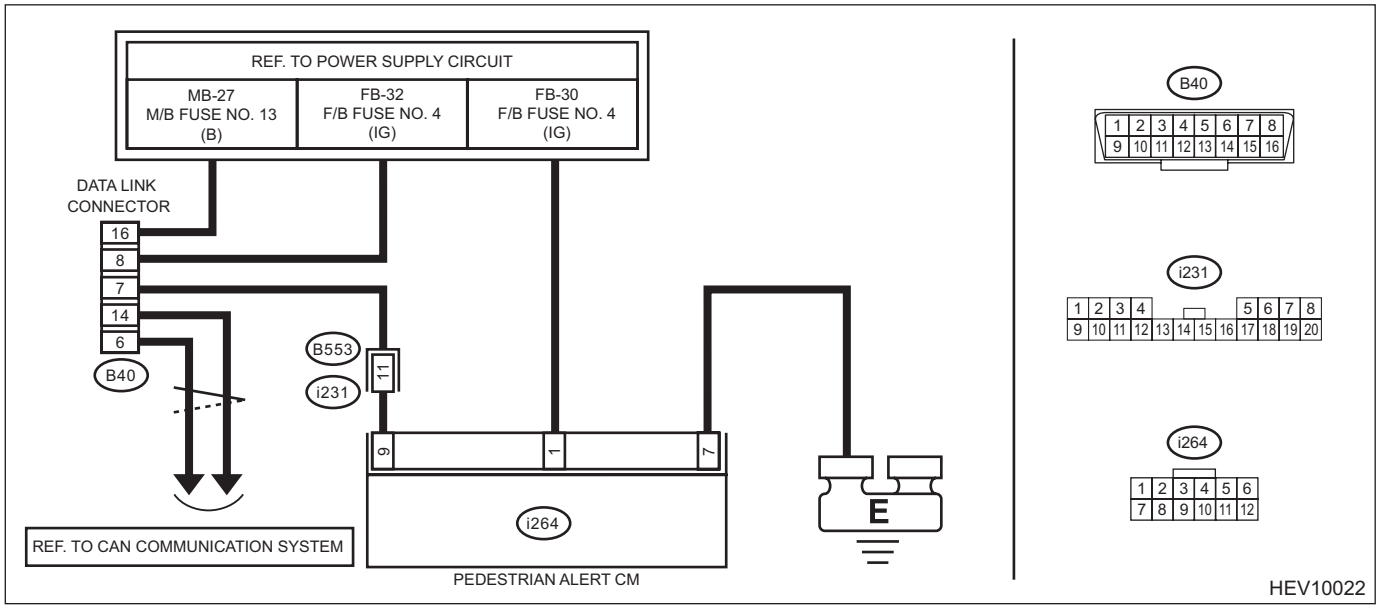
- Defective harness connector
- Power supply circuit malfunction
- Defective pedestrian alert CM
- Defective K-line communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Communication is impossible between the pedestrian alert control unit and Subaru Select Monitor.

WIRING DIAGRAM:

Pedestrian alert system <Ref. to WI(HEV)-201, WIRING DIAGRAM, Pedestrian Alert System.>



Step		Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select the pedestrian alert system using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the voltage for 12 volt auxiliary battery.	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.** Check the terminal for 12 volt auxiliary battery.	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK COMMUNICATION OF SUBARU SELECT MONITOR.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to other systems can be executed normally.	Is the system name displayed?	Go to step **8**.	Go to step **5**.
5	**CHECK DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Using the tester, measure the resistance between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK DATA LINK CONNECTOR.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between data link connector and chassis ground. ***Connector & terminal*** ***(B40) No. 7 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **7**.	Repair or replace the short circuit of the harness.
7	**CHECK DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the pedestrian alert CM connector. 3) Using the tester, measure the resistance between data link connector and pedestrian alert CM (harness side). ***Connector & terminal*** ***(B40) No. 7 — (i264) No. 9:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair or replace the open circuit of harness.
8	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. 2) Using the tester, measure the voltage between pedestrian alert CM (harness side) and chassis ground. ***Connector & terminal*** ***(i264) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **9**.	Repair or replace the open circuit of harness.
9	**CHECK GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Using the tester, measure the resistance between pedestrian alert CM (harness side) and chassis ground. ***Connector & terminal*** ***(i264) No. 7 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair or replace the open circuit of harness.
10	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of pedestrian alert CM connector and data link connector?	Repair the poor contact of connector.	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Pedestrian Alert» and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC). <Ref. to PA(diag)-13, List of Diagnostic Trouble Code (DTC).>

8. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Pedestrian Alert» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

9. Read Current Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Pedestrian Alert» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

Display	Description	Note (when normal)	Unit of measure
P-Range SW	Gear shift position	P range: when in P range Other than P range: when in other than P range	—
OIL Pressure SW	Status of oil pressure switch	Engine RUN: during engine start	—
Foot Brakes SW	Status of stop light switch	ON: when brake pedal is ON	—
Vehicle speed	Vehicle speed	Show vehicle speed	MPH
Voltage of IGN	Value of IGN power supply voltage	0 — 20.4 V	V
Speaker Terminal voltage	Value of vehicle approach information speaker voltage	0 — 4.998 V	V
P-Range SW voltage	Value of shift switch voltage	0 — 4.998 V	V
OIL Pressure SW voltage	Value of oil pressure switch voltage	0 — 4.998 V	V

10.System Operation Check Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Pedestrian Alert» and then select «Enter».
5) On «Select Function» display, select «Active Test».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

Data	Customize setting	Note
Speaker Check	320 Hz	Make a single sound at a frequency of 320 Hz.
	1 kHz	Make a single sound at a frequency of 1 kHz.
	3.2 kHz	Make a single sound at a frequency of 3.2 kHz.

11.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Note
B1700	Approach Information Speaker Abnormal	Vehicle approach information speaker harness is open or shorted.	<Ref. to PA(diag)-14, DTC B1700 APPROACH INFORMATION SPEAKER ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

12.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC B1700 APPROACH INFORMATION SPEAKER ABNORMAL

DTC DETECTING CONDITION:

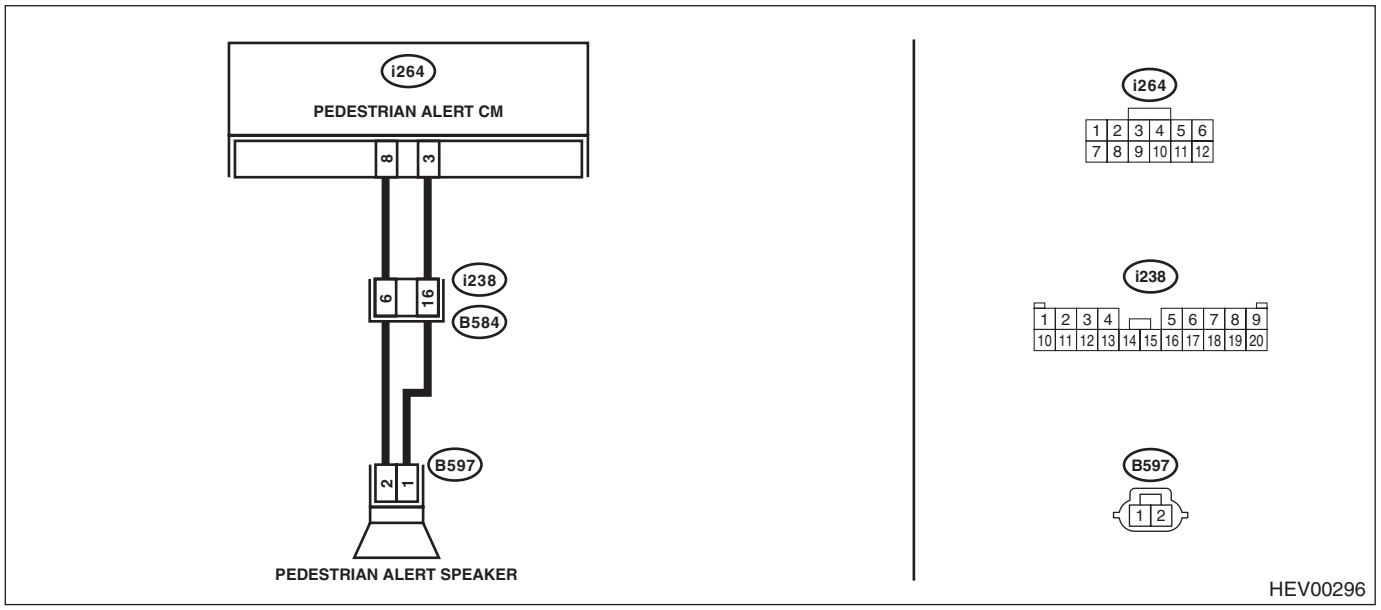
Detected when harness between pedestrian alert CM and pedestrian alert speaker is open or shorted, or when internal voice coil of pedestrian alert speaker is open or shorted.

TROUBLE SYMPTOM:

- No sound comes out from the pedestrian alert speaker during EV mode driving.
- After turning to IGN-ON, the light illuminates → blinks → illuminates.

WIRING DIAGRAM:

Pedestrian alert system <Ref. to WI(HEV)-201, WIRING DIAGRAM, Pedestrian Alert System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read DTCs of the pedestrian alert CM using the Subaru Select Monitor. <Ref. to PA(diag)-9, Read Diagnostic Trouble Code (DTC).>	Is B1700 displayed?	Go to step **2**.	Go to step **4**.
2	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the pedestrian alert CM connector. 3) Check the pedestrian alert CM connector.	Is the connector OK?	Go to step **3**.	Repair or replace the connector.
3	**CHECK HARNESS (SHORT).** Using the tester, measure the resistance between pedestrian alert CM connector (harness side). ***Connector & terminal*** ***(i264) No. 3 — (i264) No. 8:***	Is the resistance less than 2 Ω?	Repair the pedestrian alert speaker or the short circuit of the harness. Go to step **5**.	Go to step **4**.
4	**CHECK HARNESS (OPEN CIRCUIT).** Using the tester, measure the resistance between pedestrian alert CM connector (harness side). ***Connector & terminal*** ***(i264) No. 3 — (i264) No. 8:***	Is the resistance 20 Ω or more?	Repair the pedestrian alert speaker or the open circuit of the harness. Go to step **5**.	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>

	Step	Check	Yes	No
5	**CHECK PEDESTRIAN ALERT SYSTEM.** 1) Connect the disconnected connectors. 2) Using the Subaru Select Monitor, perform «Speaker Check» of the system operation check mode. <Ref. to PA(diag)-12, System Operation Check Mode.>	Does any sound come out from the pedestrian alert speaker?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>

13.Diagnostics with Phenomenon

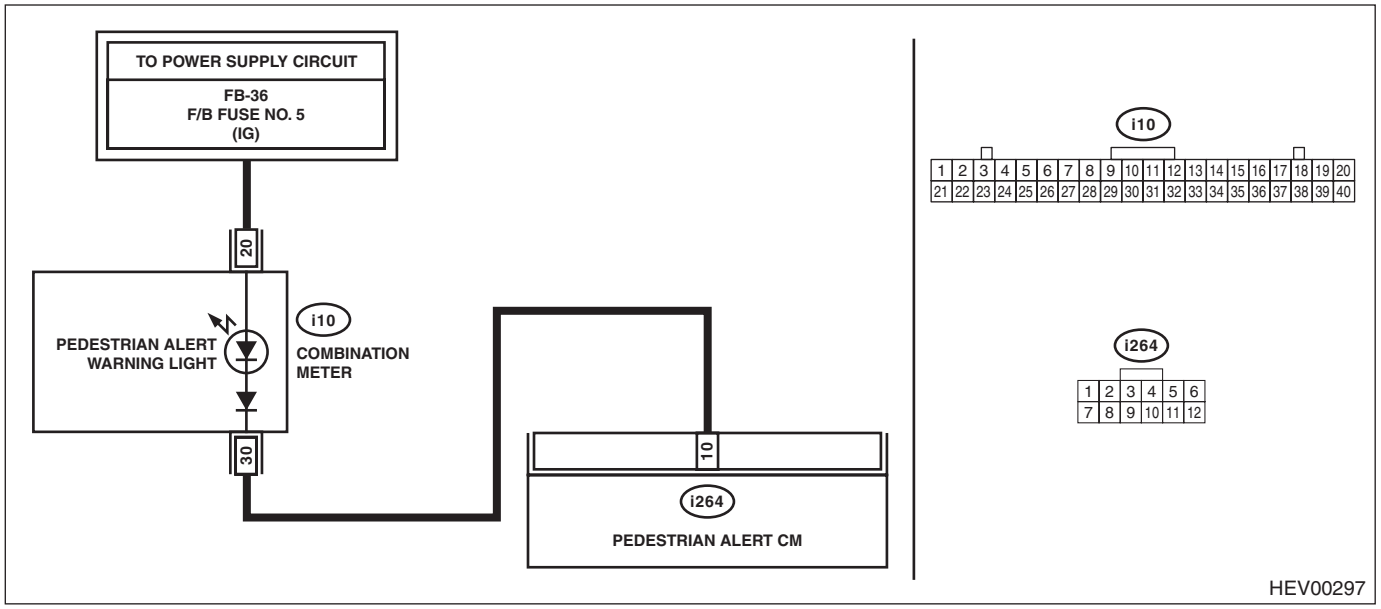
A: INSPECTION

Symptoms	Reference
When the ignition switch is turned on, the pedestrian alert warning light on the combination meter does not illuminate.	<Ref. to PA(diag)-17, PEDESTRIAN ALERT WARNING LIGHT DOES NOT ILLUMINATE, INSPECTION, Diagnostics with Phenomenon.>
No sound comes out immediately after the brake pedal is released when the vehicle stops.	<Ref. to PA(diag)-20, CHECK STOP LIGHT SWITCH CIRCUIT, INSPECTION, Diagnostics with Phenomenon.>
No sound comes out during EV mode driving (at 24 km/h (15 MPH) or less). Or speaker sound is very small. (Perform steps listed on the right column in numerical order.)	1. <Ref. to PA(diag)-18, CHECK POWER SUPPLY CIRCUIT, INSPECTION, Diagnostics with Phenomenon.>
	2. <Ref. to PA(diag)-21, CHECK P RANGE SWITCH CIRCUIT, INSPECTION, Diagnostics with Phenomenon.>
	3. <Ref. to PA(diag)-22, CHECK OIL PRESSURE SWITCH CIRCUIT, INSPECTION, Diagnostics with Phenomenon.>
	4. <Ref. to PA(diag)-23, CHECK VEHICLE SPEED SIGNAL CIRCUIT, INSPECTION, Diagnostics with Phenomenon.>
	5. Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>

1. PEDESTRIAN ALERT WARNING LIGHT DOES NOT ILLUMINATE

WIRING DIAGRAM:

Pedestrian alert system <Ref. to WI(HEV)-201, WIRING DIAGRAM, Pedestrian Alert System.>

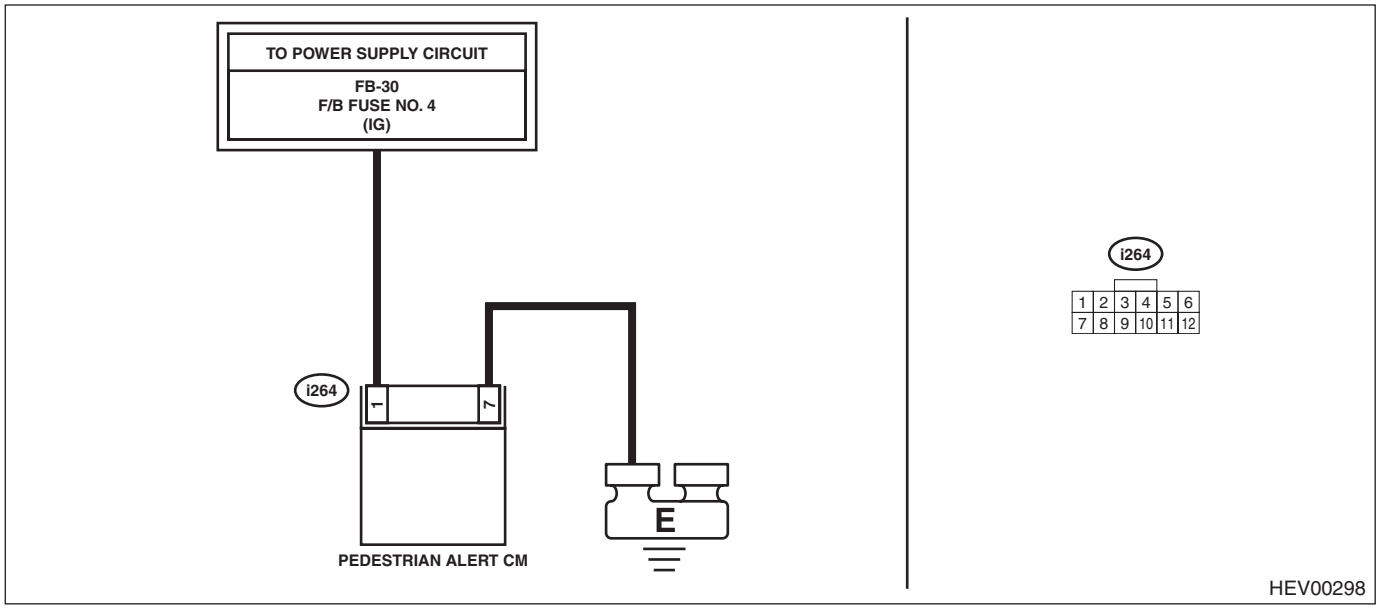


	Step	Check	Yes	No
1	**CHECK FUSE.** Check the fuse for the combination meter. <Ref. to IDI-7, Relay and Fuse.>	Is the fuse OK?	Go to step **2**.	Replace the fuse. When the replaced fuse is blown immediately, repair or replace the short-circuited portion of the harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the pedestrian alert CM connector. 3) Turn the ignition switch to ON. 4) Using the tester, measure the voltage between pedestrian alert CM connector (harness side) and chassis ground. ***Connector & terminal*** ***(i264) No. 10 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>	Repair or replace the open circuit of harness. Or, repair it according to combination meter inspection.

2. CHECK POWER SUPPLY CIRCUIT

WIRING DIAGRAM:

Pedestrian alert system <Ref. to WI(HEV)-201, WIRING DIAGRAM, Pedestrian Alert System.>



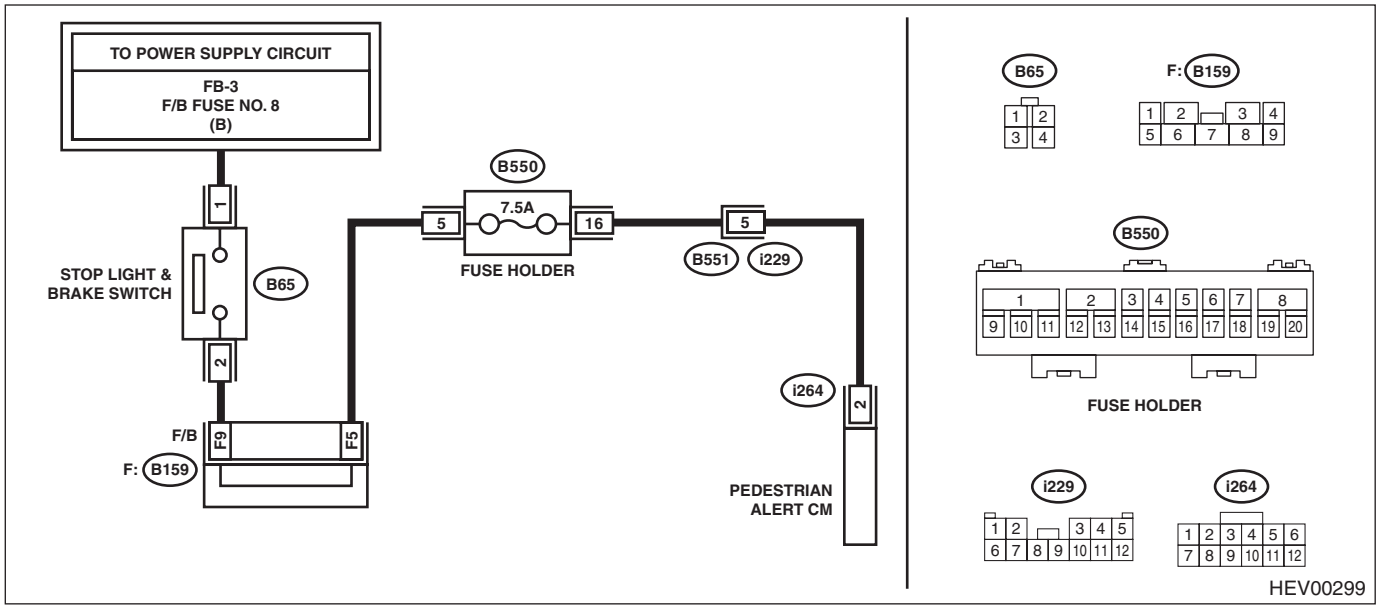
Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse. <Ref. to PA-4, Relay and Fuse.>	Is the fuse OK?	Go to step **2**.	Replace the defective fuse. When the fuse is blown immediately, repair the short circuit.
2	**CHECK HARNESS.** 1) Disconnect the pedestrian alert CM connector. 2) Using the tester, measure the voltage between pedestrian alert CM connector (harness side) and chassis ground. ***Connector & terminal*** ***(i264) No. 1 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS.** Using the tester, measure the resistance between pedestrian alert CM connector (harness side) and chassis ground. ***Connector & terminal*** ***(i264) No. 7 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **4**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK CURRENT DATA.** Check «Voltage of IGN» using the Subaru Select Monitor. <Ref. to PA(diag)-11, Read Current Data.>	Is the voltage 10 V or more when the ignition switch is ON?	Even if abnormality is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>

3. CHECK STOP LIGHT SWITCH CIRCUIT

WIRING DIAGRAM:

Stop light system <Ref. to WI(HEV)-191, WIRING DIAGRAM, Stop Light System.>

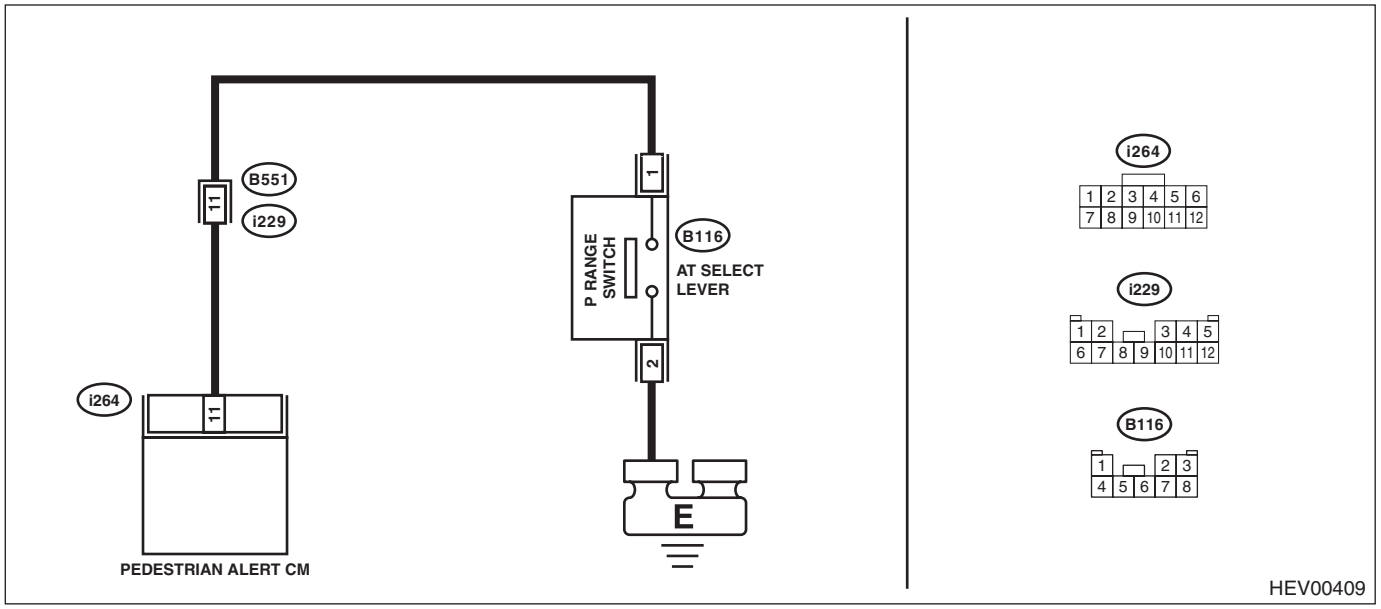


Step		Check	Yes	No
1	**CHECK STOP LIGHT.** Check the illumination status of the stop light.	Do all stop lights illuminate?	Go to step **2**.	Repair the stop lights. Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the pedestrian alert CM connector. 2) Using the tester, measure the voltage between pedestrian alert CM connector (harness side) and chassis ground. ***Connector & terminal*** ***(i264) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more when the brake pedal is depressed and less than 1 V when not depressed?	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>	Repair the stop light circuit. Go to step **3**.
3	**CHECK HARNESS.** 1) Connect the disconnected connectors. 2) Apply parking brake. 3) Turn the ignition switch to ON. 4) Set the select lever from P to N while depressing the brake pedal. 5) Check that sound comes out from the pedestrian alert speaker immediately after the brake pedal is released. (For 3 seconds)	Does any sound come out?	Even if abnormality is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>

4. CHECK P RANGE SWITCH CIRCUIT

WIRING DIAGRAM:

Pedestrian alert system <Ref. to WI(HEV)-201, WIRING DIAGRAM, Pedestrian Alert System.>

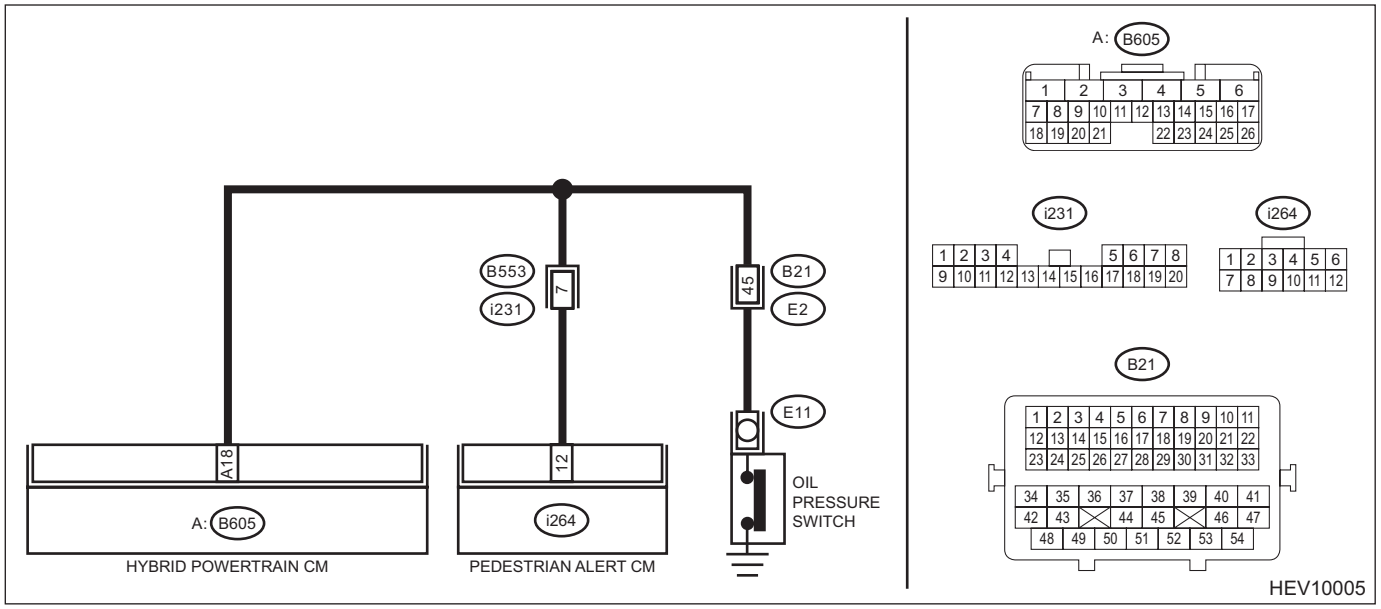


Step		Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Check «P-Range SW» using the Subaru Select Monitor. <Ref. to PA(diag)-11, Read Current Data.> 3) Move the select lever to P range ←→ other than P range.	Is the display normal?	Even if abnormality is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK P RANGE SWITCH.** 1) Disconnect the ground terminal from the 12 volt auxiliary battery. 2) Disconnect the pedestrian alert CM connector. 3) Using the tester, measure the resistance between pedestrian alert CM connector (harness side) and chassis ground. ***Connector & terminal*** ***(i264) No. 11 — Chassis ground:***	Is the resistance 1 Ω or less when the shift lever is in P range and 1 kΩ or more when the shift lever is in other than P range?	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>	Repair or replace the P range switch circuit.

5. CHECK OIL PRESSURE SWITCH CIRCUIT

WIRING DIAGRAM:

Hybrid system <Ref. to WI(HEV)-122, WIRING DIAGRAM, Hybrid Electric Vehicle System.>

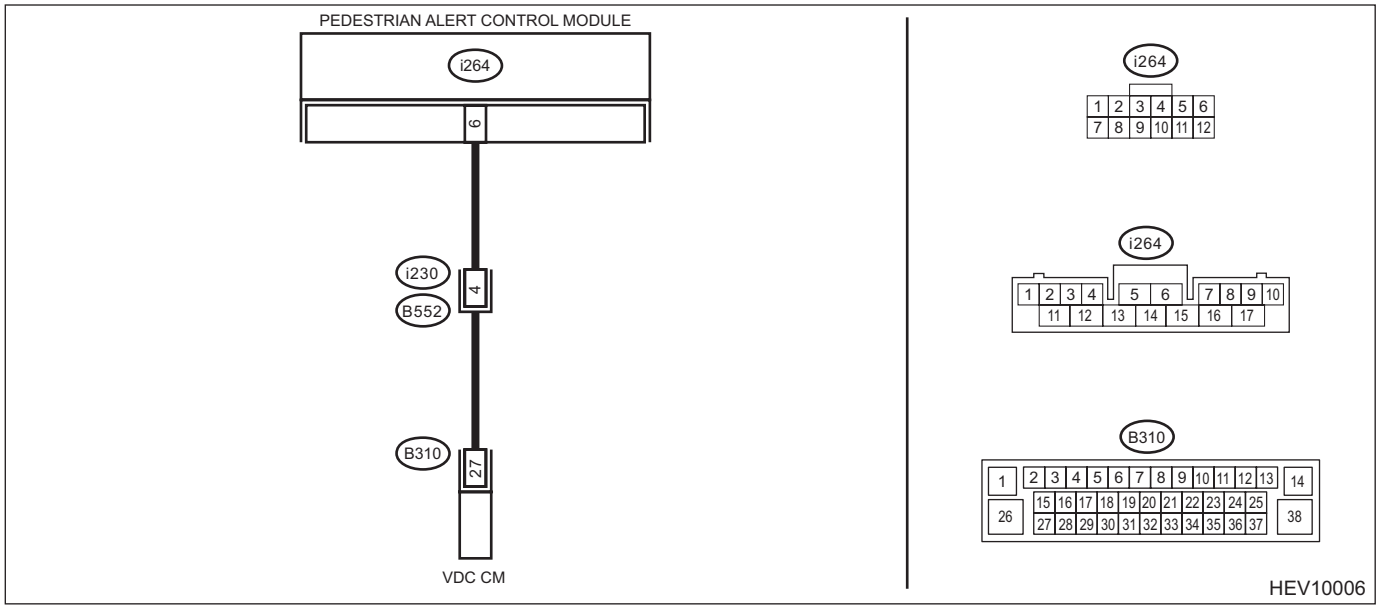


Step		Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Using the Subaru Select Monitor, check «OIL Pressure SW». <Ref. to PA(diag)-11, Read Current Data.> 2) Apply the parking brake. 3) Move the select lever in P range. 4) Start the engine.	Is the display normal?	Even if abnormality is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK SWITCH CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the pedestrian alert CM connector. 3) Using the tester, measure the voltage between pedestrian alert CM connector (harness side) and chassis ground. ***Connector & terminal*** ***(i264) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 1 V when the ignition switch is turned to ON and 8 V or more while the engine is starting?	Replace the pedestrian alert CM. <Ref. to PA-6, Pedestrian Alert Control Unit.>	Repair the oil pressure switch or the short circuit portion of the harness.

6. CHECK VEHICLE SPEED SIGNAL CIRCUIT

WIRING DIAGRAM:

Pedestrian alert system <Ref. to WI(HEV)-201, WIRING DIAGRAM, Pedestrian Alert System.>



Step		Check	Yes	No
1	**CHECK CURRENT DATA.** Check «Vehicle Speed» using Subaru Select Monitor. <Ref. to PA(diag)-11, Read Current Data.>	Is the display normal?	Even if abnormality is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **2**.
2	**CHECK VDC.** Check the VDC system. <Ref. to VDC(diag)-2, Basic Diagnostic Procedure.>	Is the VDC system normal?	Go to step **3**.	Perform the diagnosis according to inspection for the VDC system.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the pedestrian alert CM connector. 3) Disconnect the VDC CM connector. 4) Using the tester, measure the resistance between pedestrian alert CM connector (harness side) and VDC CM connector (harness side). ***Connector & terminal*** ***(i264) No. 6 — (B310) No. 27:***	Is the resistance 1 Ω or less?	Even if abnormality is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair or replace the open circuit of harness.

KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)

KPS(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
• Subaru Select Monitor kit is required for reading DTC, performing diagnosis and reading current data.
• Before removal or installation, be sure to remove any foreign matter (dust, moisture, oil, etc.).
• Registration of immobilizer may be needed after the replacement of control modules, etc. For detailed procedure, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

NOTE:
• Using the Function Setting (Customize), check that the keyless access system is not in a cancelled state. <Ref. to SL-121, OPERATION, Function Setting (Customize).>
• Check List for Interview <Ref. to KPS(diag)-4, Check List for Interview.>

	Step	Check	Yes	No
1	**CHECK BATTERY.** Using a tester, measure the voltage of the 12 volt auxiliary battery.	Is the voltage 11 V or more?	Go to step **2**.	Charge or replace the battery and perform check pre-inspection. Go to step **2**.
2	**CHECK PRE-INSPECTION.** Use the interview check list to interview the user. <Ref. to KPS(diag)-4, Check List for Interview.>	Was the symptoms of the trouble recorded in the interview?	Go to step **3**.	Interview the user again.
3	**BASIC INSPECTION.** Perform the inspection for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **4**.	Check it according to DTC of LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
4	**CHECK TROUBLE SYMPTOM.** 1) Read DTC for «Keyless Access with Push Button Start». <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to KPS(diag)-25, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.> 2) Record all DTCs, time stamp and freeze frame data. NOTE: For time stamp, refer to "LAN SYSTEM". <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Does the Subaru Select Monitor display DTC?	Perform diagnosis according to the DTC.	Go to step **5**.
5	**CHECK PHENOMENON LIST.** Check the "Phenomenon List". <Ref. to KPS(diag)-107, General Diagnostic Table.>	Is there a symptom that corresponds in the phenomenon list?	Perform diagnosis according to the procedures in the phenomenon list.	Go to step **6**.

Step		Check	Yes	No
6	**CHECK TROUBLE PHENOMENON.** 1) Perform check of current data. <Ref. to KPS(diag)-29, Read Current Data.> 2) Perform a function check. <Ref. to KPS(diag)-5, KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM, CAUTION, General Description.> 3) Perform a unit check.	Was the trouble cause found?	Repair the cause of trouble.	Repeat a basic check again.

2. Check List for Interview

A: CHECK

Inspect the following items regarding the vehicle's state.

<table>
<tr><td colspan="2">Keyless Access with Push Button Start System Trouble Check List for Interview Received Year Month Date</td><td colspan="2"></td></tr>
<tr><td colspan="2" rowspan="2">Customer's name</td><td>Registration No.</td><td>Initial year of registration
Year Month Date</td></tr>
<tr><td>Vehicle model</td><td>Frame number</td></tr>
<tr><td>Interviewer</td><td>Inspector</td><td>Engine type</td><td>Odometer reading</td></tr>
<tr><td colspan="4">Customer specified content</td></tr>
<tr><td>Date and time when the trouble occurred</td><td></td><td>Frequency of trouble occurrence</td><td></td></tr>
<tr><td>Condition of trouble occurrence</td><td></td><td>Weather</td><td></td></tr>
<tr><td>Road conditions</td><td></td><td>Occurrence location</td><td></td></tr>
<tr><td>Accessory installation condition</td><td colspan="3"></td></tr>
<tr><td colspan="4">Trouble condition</td></tr>
<tr><td colspan="2">❑ Diagnostic code</td><td colspan="2">❑( )</td></tr>
<tr><td rowspan="2">❑ Immobilizer system</td><td colspan="2">Engine does not start</td><td>❑ Starter does not operate
❑ Starter operates but engine does not start
❑ Engine starts but stops immediately</td></tr>
<tr><td colspan="3">Does not start with remote engine starter</td></tr>
<tr><td rowspan="2">❑ Steering lock system</td><td colspan="3">The steering lock is not released</td></tr>
<tr><td colspan="3">The steering lock does not lock</td></tr>
<tr><td rowspan="7">❑ Keyless access system</td><td colspan="3">Can not lock/unlock using the touch sensor (lock), touch sensor (unlock), trunk opener button or rear gate opener button and rear lock button</td></tr>
<tr><td colspan="2">Cannot lock with the touch sensor (lock)
Cannot unlock with the touch sensor (unlock)
Cannot lock nor unlock with the touch sensor (lock), touch sensor (unlock)
Trunk does not open with the trunk opener button.
Rear gate can not be locked with the rear lock button</td><td>❑ Driver's side door
❑ Passenger's side door
❑ Rear gate door</td></tr>
<tr><td colspan="3">Cannot unlock with the rear gate opener button</td></tr>
<tr><td colspan="2">The access key lockout prevention feature does not function</td><td>❑ Passenger room
❑ Luggage room</td></tr>
<tr><td colspan="3">The LED does not illuminate when the access key button is pressed</td></tr>
<tr><td colspan="3">The external buzzer does not beep</td></tr>
<tr><td colspan="3">The passenger room buzzer does not sound</td></tr>
<tr><td>❑ Other</td><td colspan="3">The room light or map light does not illuminate
( )</td></tr>
</table>

NOTE:
- Perform the diagnostics according to the basic diagnostic procedure.
- If the room light or map light does not illuminate and the keyless access does not function at the same time, the back-up fuse may be loose or blown.

3. General Description

A: CAUTION

1. SRS AIRBAG SYSTEM

The airbag system wiring harness is routed near the keyless access with push button start system.

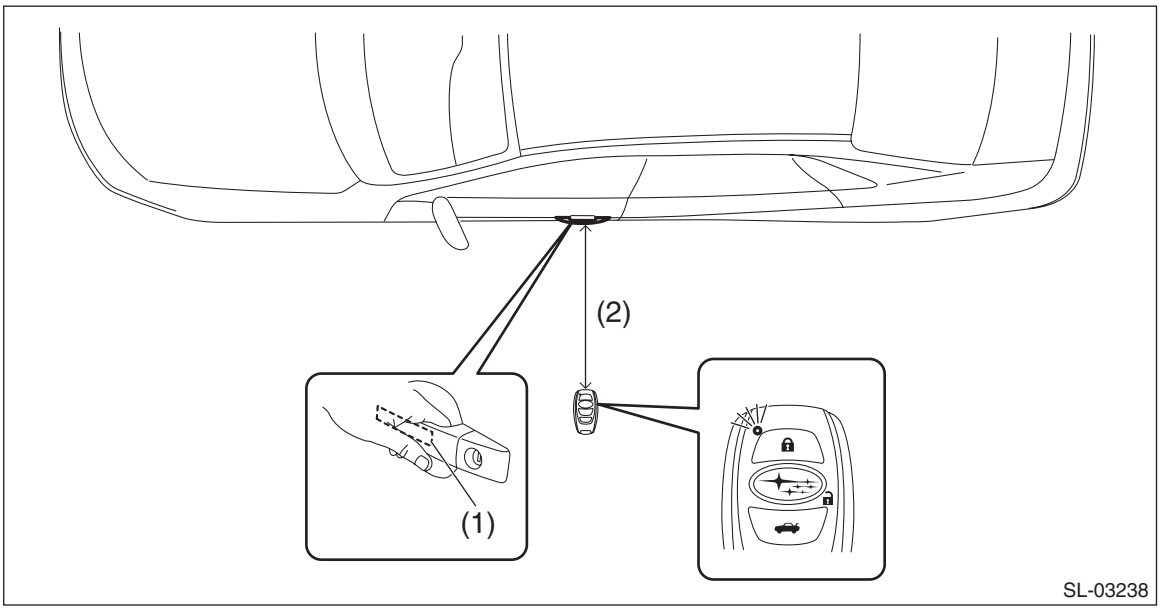
CAUTION:
- **Do not use electrical test equipment on any wiring harnesses and connectors in the airbag system.**
- **Be careful not to damage the wiring harness of the airbag system when servicing the keyless access with push button start system.**

2. KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM

NOTE:
- Using the function setting (ECM customizing), check that the keyless access system is not OFF. <Ref. to SL-121, OPERATION, Function Setting (Customize).>
- The dark current is approx. 400 mA if there is communication between the vehicle and access key.
- The dark current is approx. 40 mA if there is no communication between the vehicle and access key.*

* No communication with the vehicle means that the keyless access function has been cancelled or that the access key has not been near the vehicle for 15 minutes or more after door locking.

1) Keyless access door unlock function check



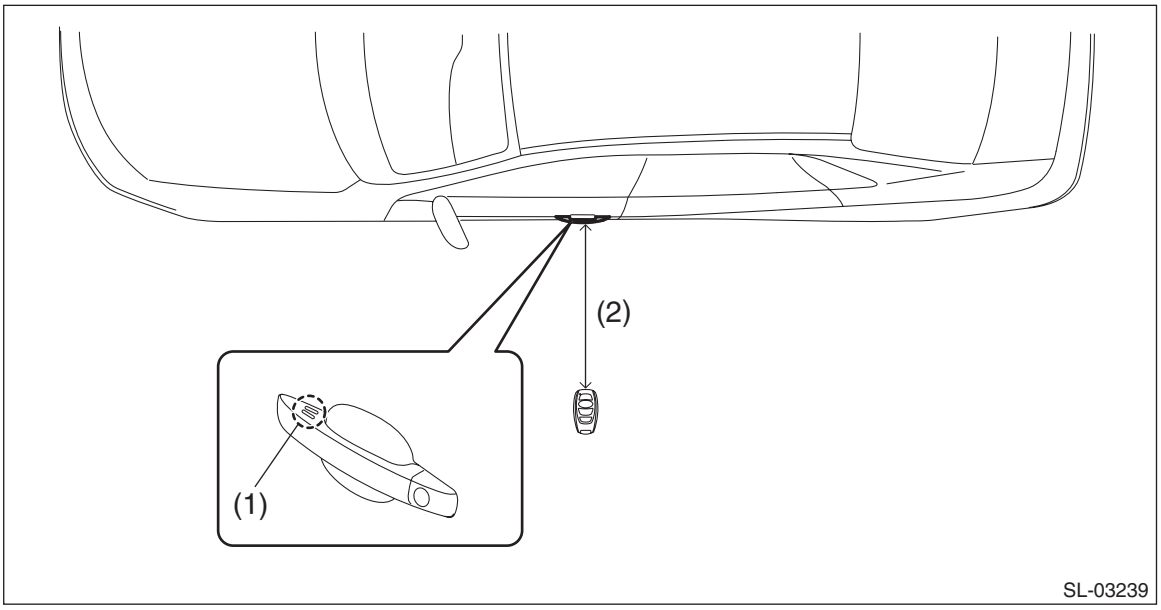
(1) Touch sensor (unlock) (2) 40 — 80 cm

(1) When carrying the access key with all doors locked by keyless lock operation, check that when the touch sensor (unlock) built in to the back side surface of door outer handle of front door is touched, the driver's door will unlock (when touched on the driver's side) or all doors will unlock (when touched on the passenger's side) and the answer-back function operates (hazard light blinks twice, access buzzer sounds twice).

(2) In the keyless access door unlock detection area, hold the access key at the same height as the outer handle (approx. 80 cm from the ground) and in the direction shown in the figure, and check that the vehicle becomes unlock mode [access key LED (red) blinks] at 40 to 80 cm from the vehicle.

NOTE:
Check the access key battery if the LED (red) does not illuminates when the access key button is pressed. <Ref. to SL-86, INSPECTION, Access Key.>

2) Keyless access door lock function check



(1) Touch sensor (lock) (2) Approx. 30 cm

(1) When carrying the access key outside of the vehicle with all doors closed and unlocked, check that when the touch sensor (lock) on the surface of door outer handle of front door is touched, all doors will lock and the answer-back function operates (hazard light blinks once, access buzzer sounds once).

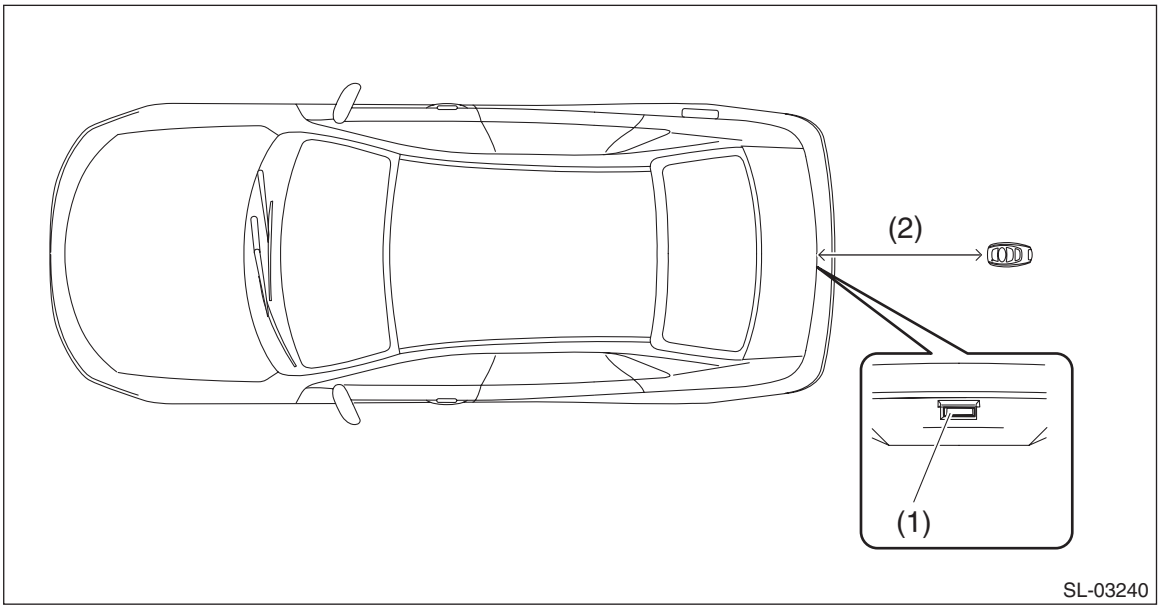
CAUTION:
If the access key is within the vehicle but not within the detection area (in the instrument panel, on the rear tray, in the glove box, on the floor, or in the door trim pocket), then lockout protection will not function when the doors are locked and the access key will be locked into the vehicle.

(2) To check the keyless access door lock operation range, hold the access key at a height of 10 cm under the bottom edge of the door glass (approx. 80 cm from the ground), point it in the direction shown in the figure at a distance of approx. 30 cm from the vehicle, and check that all doors lock and the answer-back function operates (hazard light blinks once, access buzzer sounds once) when you touch the touch sensor (lock).

(3) Check the passenger's side door in the same manner.

NOTE:
- When the door cannot lock if the touch sensor (lock) is touched, touch the touch sensor (lock) with palm.
- Since communication is not possible within close range (20 cm or less) of the door outer handle, the access key may not operate if you touch the touch sensor (lock) with the same hand you are holding the access key.
- If the lockout prevention buzzer sounds, it is possible that the interior transmitter has radio wave leakage.

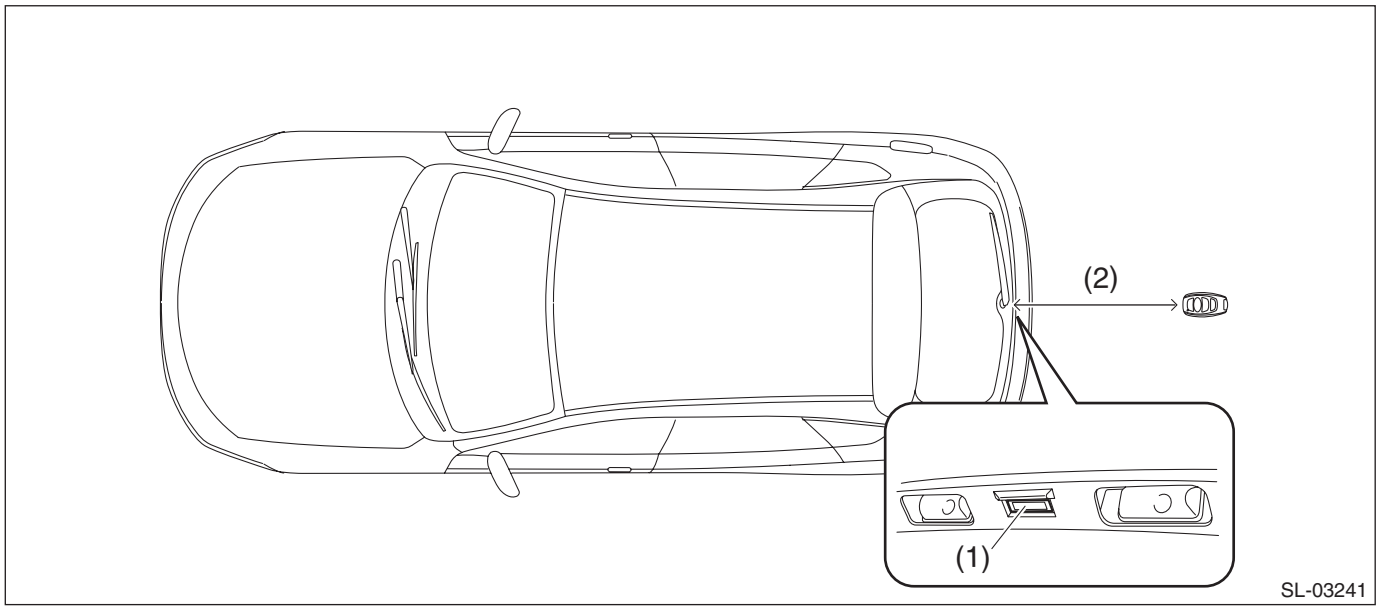
3) Check of the keyless access trunk open function



(1) Trunk opener button (2) 40 — 80 cm

(1) With the trunk closed, check that the trunk opens and the answer-back function operates (hazard light blinks twice, access buzzer sounds twice) when you press the trunk opener button while carrying the access key.
(2) To check the keyless access trunk open operation range, hold the access key behind and in the center of the vehicle at the same height as the trunk opener button (90 cm from the ground), point it in the direction shown in the figure at a distance of 40 to 80 cm from the vehicle, and check that the trunk opens and the answer-back function operates (hazard light blinks twice, access buzzer sounds twice) when the trunk opener button is pressed.

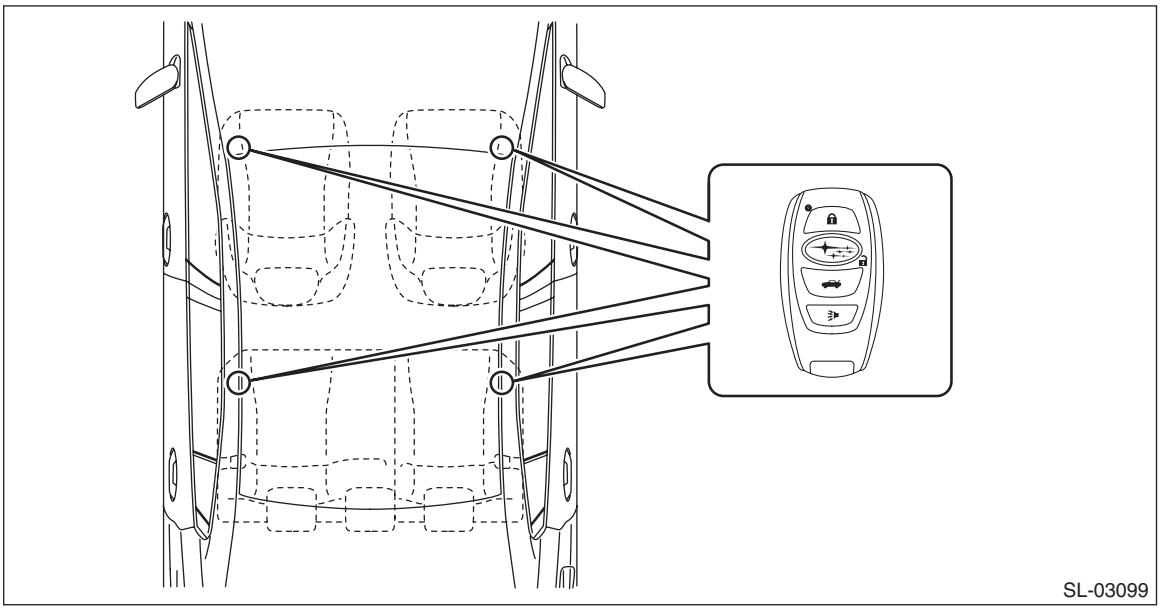
4) Check of the keyless access rear gate function



(1) Rear gate opener button (2) 40 — 80 cm

(1) With the rear gate locked, the all doors unlocks and the rear gate opens simultaneously and the answer-back function operates (hazard light blinks twice, external buzzer sounds twice) when you press the rear gate opener button while carrying the access key.
(2) To check the range for keyless access rear gate open operation, hold the access key behind and in the center of the vehicle at the same height as the rear gate opener button (90 cm from the ground), point it in the direction shown in the figure at a distance of 40 to 80 cm from the vehicle, and check that the all doors unlocks and the rear gate opens simultaneously and the answer-back function operates (hazard light blinks twice, external buzzer sounds twice) when the rear gate opener button is pressed.
(3) With the rear gate unlock, check that the all doors lock and the answer-back function operates (hazard light blinks once, external buzzer sounds once) when rear lock button is pressed while carrying the access key.

5) Keyless access ignition switching function check
(1) With the ignition OFF, enter the vehicle while carrying the access key. With the shift lever in the P range, check that the push button ignition switch indicator illuminates in green when you depress the brake pedal, then check that the engine starts when you press the push button ignition switch while the indicator green light is on.
(2) While carrying the access key, check that the status changes as follows each time you press the push button ignition switch without depressing the brake pedal: 'Ignition OFF' → 'ACC ON' → 'Ignition ON' → 'Ignition OFF'. However, if the shift lever is a range other than the P range and the push button ignition switch is pressed from ignition ON, then the status does not change to ignition OFF and instead will change to ACC ON.
(3) After the vehicle has stopped, press the push button ignition switch and ignition is turned OFF (engine stopped · all power supplies OFF). However, if the shift lever is in any range except for the P range and the push button ignition switch is pressed with the vehicle stopped, then the ignition is not turned OFF and instead the power supplies changes to ACC ON. Check that the steering lock operates if you open the door in the ignition OFF state (the shift lever must be in P range).
(4) To check the range of the keyless access ignition operation, check that the engine can start when you set the access key at the check position on the seat in the direction indicated in the figure.


SL-03099

CAUTION:
The access key may not be correctly detected even though it is within the detection area within the passenger room, if it is on the instrument panel, on the rear tray, in the glove box, on the floor, or in the door trim pocket.

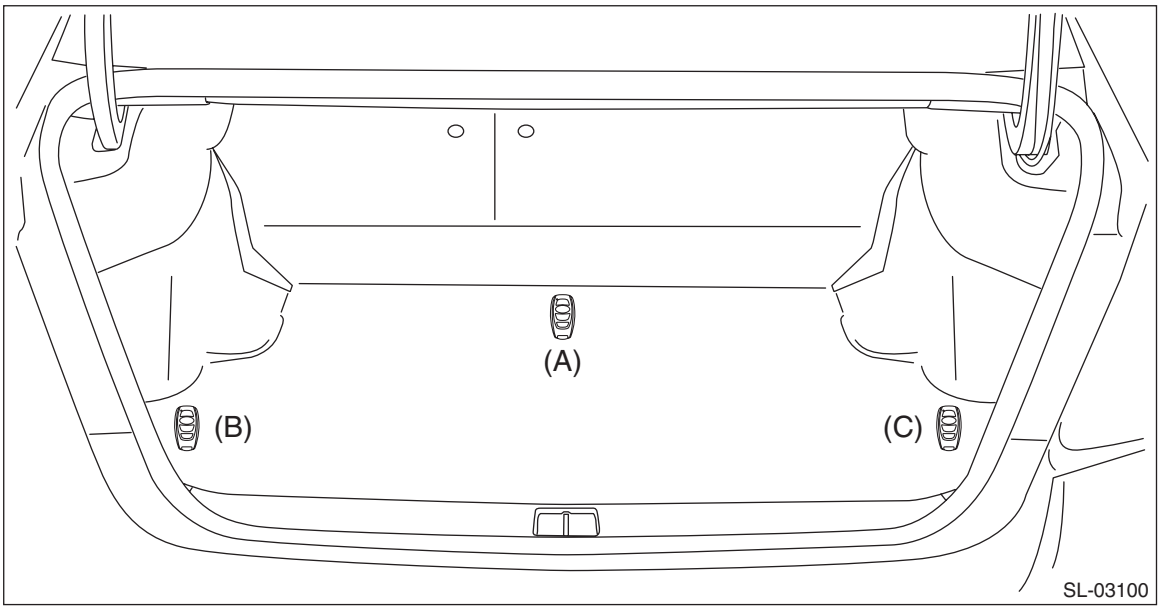
NOTE:
Perform the check multiple times, once each with the access key positioned on the driver's seat, on the passenger's seat, and on the rear seat in 2 locations.

6) Lockout protection function check with the access key in the trunk

CAUTION:
Open one of the windows before performing this check in order to prevent the key from being locked inside the vehicle.

(1) With all doors closed and locked, and with the access key in the trunk room and the trunk closed, check that the access buzzer sounds (approx. 2 seconds). Also check that the trunk opens when you press the trunk opener button.

(2) To check the detection range of the lockout protection function with the access key in the trunk, position the access key in the direction shown in the figure, and check that the lockout protection function operates normally when you check the lockout protection function for the access key locked in the trunk.



CAUTION:
The lockout protection function will not operate if the access key is any of the locations described below.

- Near the spare tire or on the edge of the trunk room.
- Inside a bag made of metallic material or near metal objects.

NOTE:
Check the trunk in two locations or more.

7) Lockout protection function check (in the passenger room)

CAUTION:
Open one of the windows before performing this check in order to prevent the key from being locked inside the vehicle.

(1) Position the access key on the driver's or passenger's seat.

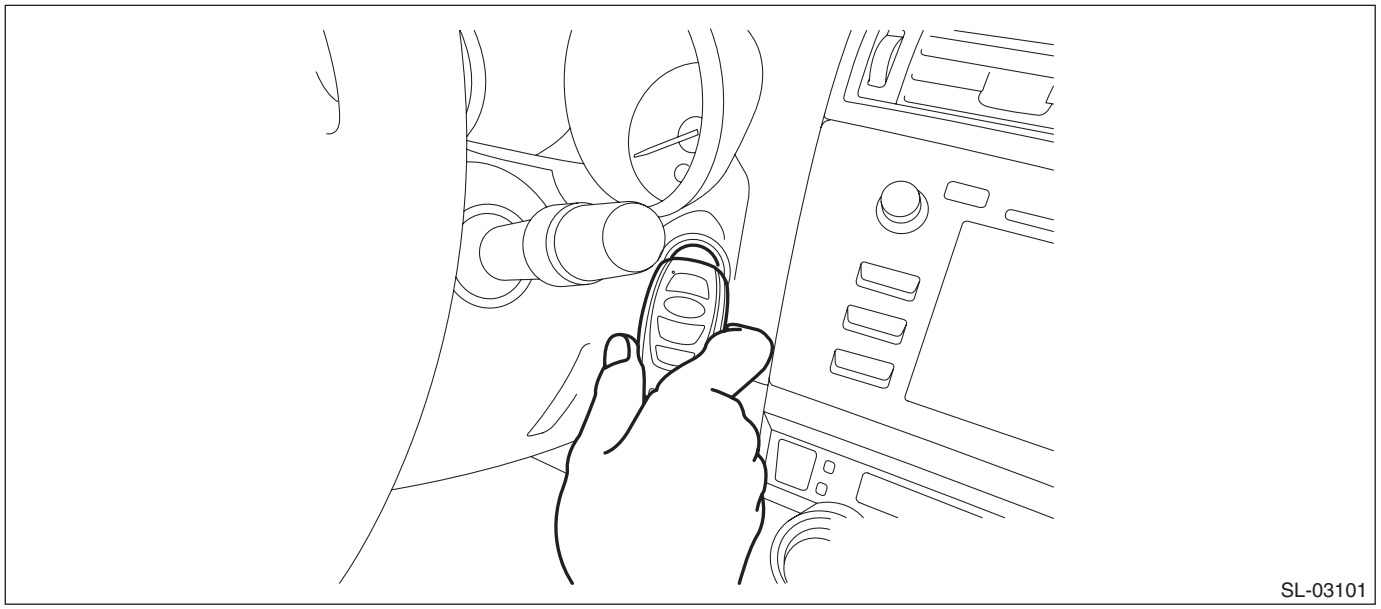
(2) Close all doors. (with all doors unlocked)

(3) Check that the doors do not lock and the lockout protection buzzer (exterior) sounds for 2 seconds when you touch the touch sensor (lock) of either the driver's or passenger's door.

8) Keyless access cancel function check

(1) After setting the keyless access cancel function, check that all keyless access and start system (keyless access) functions are inoperable. (For cancel setting, refer to <Ref. to SL-121, OPERATION, Function Setting (Customize).>)

NOTE:
When keyless access is cancelled, door lock and unlock can be operated by access key button operation and the starter system can be operated by passing the access key over the push button ignition switch with the access key button toward you.



9) Access key diagnostic mode
(1) Connect to the Subaru Select Monitor, and select «Diagnosis» on the «Start» display.
(2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
(3) On «Main Menu» display, select «Each System».
(4) On «Select System» display, select «Keyless Access with Push Button Start» and then select «Enter».
(5) On «Select Function» display, select «Work Support».
(6) From «Work Support», select «Keyless access system check».
(7) Select the transmitter to check from the items.
(8) Check that the door lock buzzer sounds (short blips, a continuous beeping sound for the center room antenna) when the access key is near the selected transmitter or antenna.

B: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

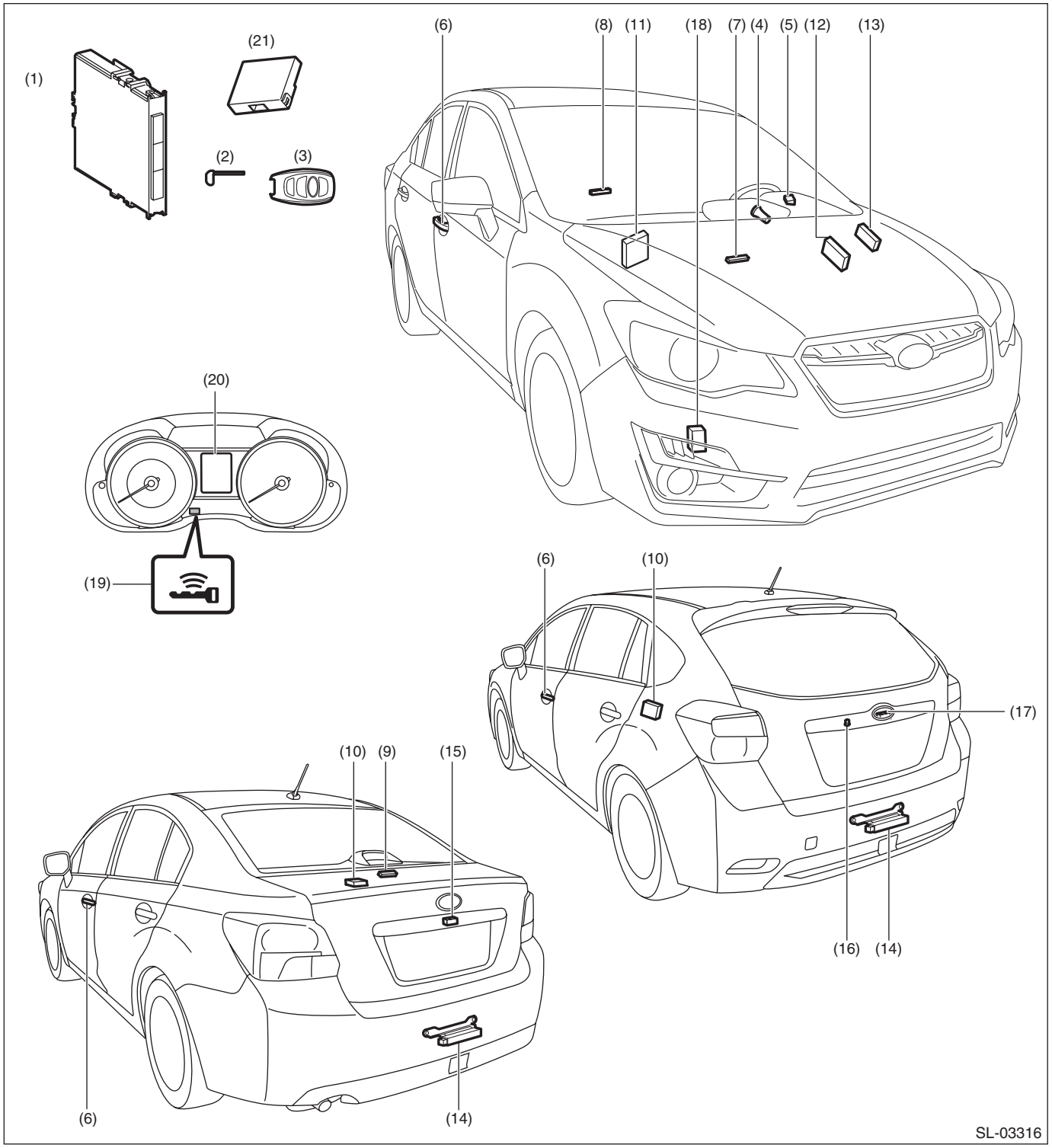
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

A: LOCATION

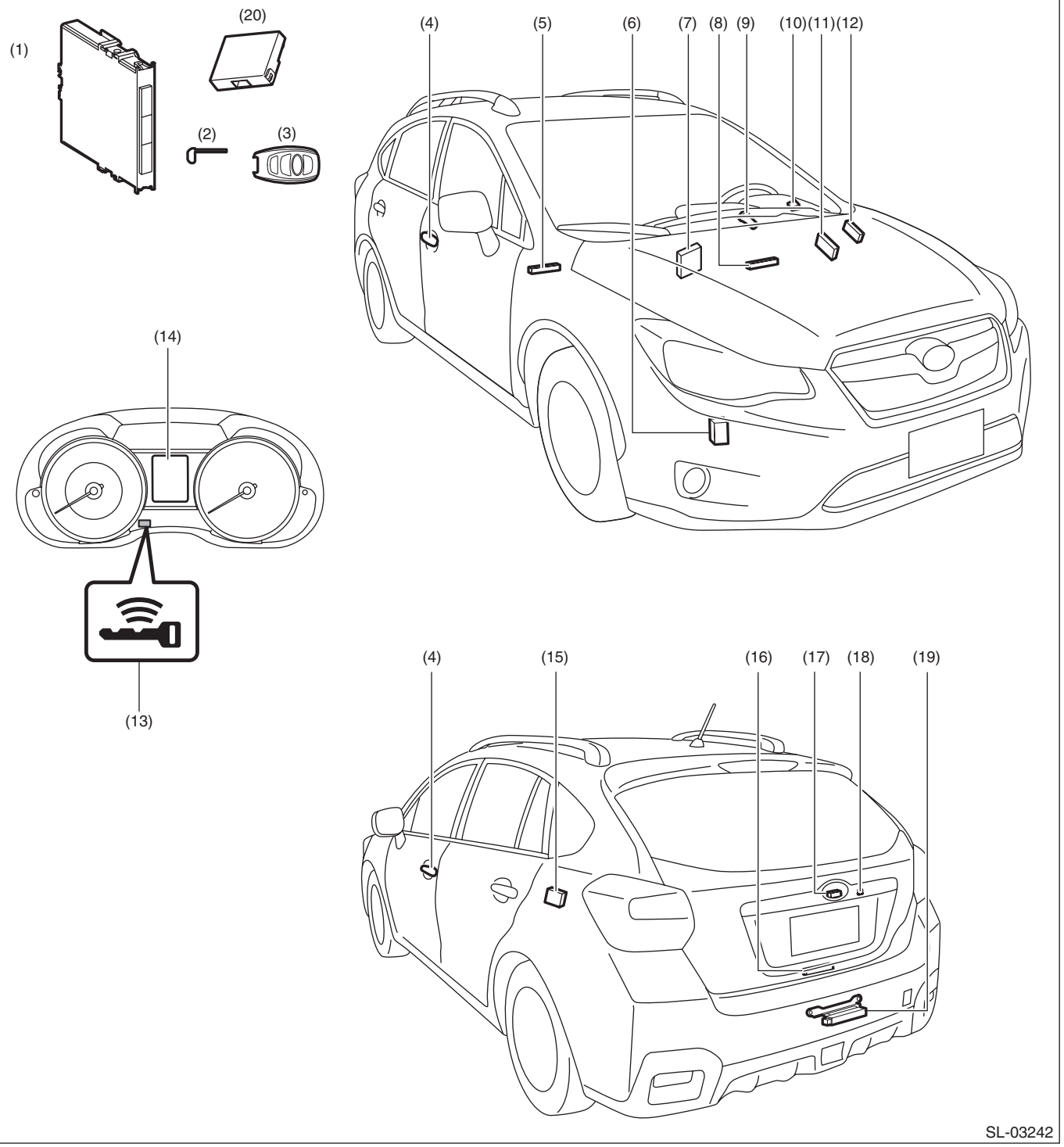
- Gasoline engine model



(1) Keyless access CM
(2) Mechanical key
(3) Access key
(4) Push button ignition switch
(5) Steering lock CM
(6) Front outer handle (front exterior antenna)
– Touch sensor (lock)
– Touch sensor (unlock)
(7) Front interior antenna
(8) Center interior antenna*1 or rear interior antenna*2
(9) Rear interior antenna*1
(10) Receiver
(11) ECM
(12) TCM
(13) Body integrated unit
(14) Rear exterior antenna
(15) Trunk opener button*1
(16) Rear lock button*2
(17) Rear gate opener button*2
(18) Access buzzer
(19) Access key warning light
(20) Multi-information display
(21) ID code box (For C0 and C5 models only)

*1: 4 door model
*2: 5 door model

- HEV model

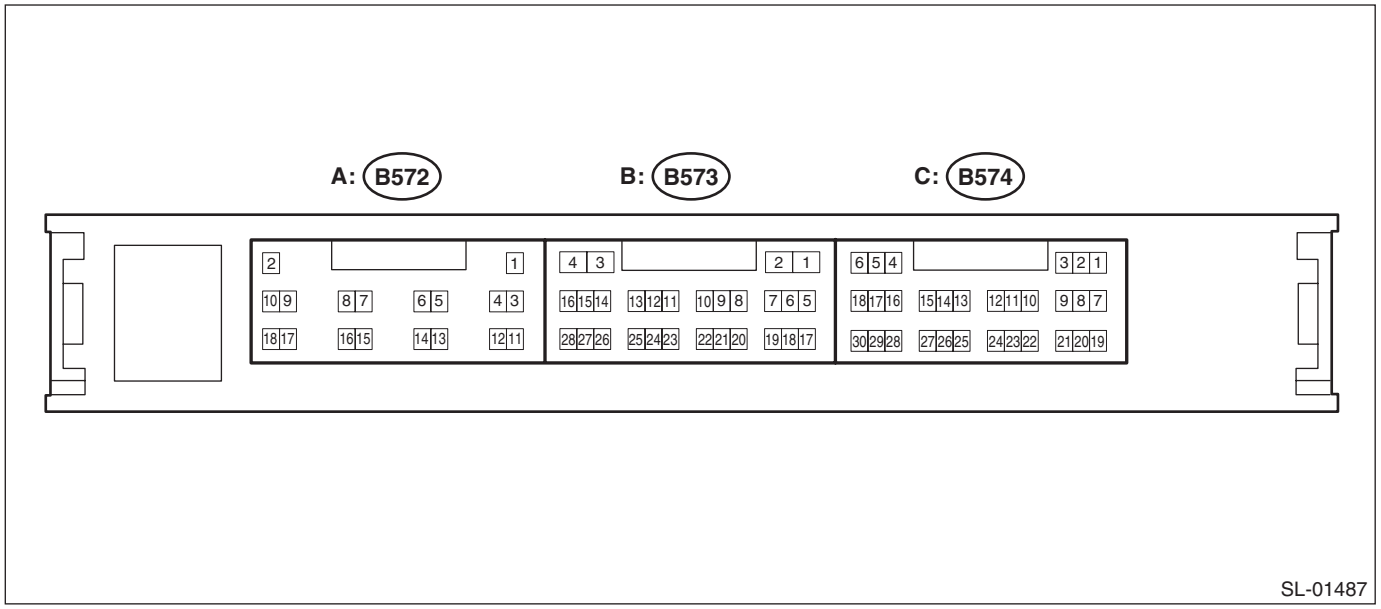


(1) Keyless access CM
(2) Mechanical key
(3) Access key
(4) Front outer handle (front exterior antenna)
– Touch sensor (lock)
– Touch sensor (unlock)
(5) Center interior antenna
(6) Access buzzer
(7) ECM
(8) Front interior antenna
(9) Push button ignition switch
(10) Steering lock CM
(11) TCM
(12) Body integrated unit
(13) Access key warning light
(14) Multi-information display
(15) Receiver
(16) Rear interior antenna
(17) Rear gate opener button
(18) Rear lock button
(19) Rear exterior antenna
(20) ID code box
(For C0 and C5 model only)

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION

1. KEYLESS ACCESS CM



Terminal No.	Terminal symbol	Contents
(B572) No. 2	+B	+B
(B572) No. 3	INDS	Start switch indicator (green) output
(B572) No. 5	N-SW	Neutral switch input
(B572) No. 7	STSW	STSW output
(B572) No. 9	IG2D	IG2 relay drive output
(B572) No. 10	CLUT	Clutch switch input
(B572) No. 11	GND	GND
(B572) No. 13	EGIO	Immobilizer communication 1
(B572) No. 17	TACH	Engine speed input
(B572) No. 18	STPI	Stop light switch input
(B573) No. 1	CG8B	Outside rear antenna output –
(B573) No. 2	CLG8	Outside rear antenna output +
(B573) No. 5	RCO	Tuner power supply
(B573) No. 8	CG7B	Inside rear antenna output –
(B573) No. 9	CLG7	Inside rear antenna output +
(B573) No. 10	CG6B	Inside center antenna output –
(B573) No. 11	CLG6	Inside center antenna output +
(B573) No. 15	IDW	ID code box presence judgment terminal
(B573) No. 17	RDA	Tuner reception data input
(B573) No. 19	RSSI	Tuner reception start signal input
(B573) No. 27	TSW5	Rear gate lock request SW input / trunk opener button input
(B573) No. 28	ACCR	ACC cutoff input
(B574) No. 1	VC5	Immobilizer amplifier power supply (start switch)
(B574) No. 2	CG5B	Inside front antenna output –
(B574) No. 3	CLG5	Inside front antenna output +
(B574) No. 4	ACCD	ACC relay drive output
(B574) No. 5	IG	IGN power supply
(B574) No. 6	IG1D	IG1 relay drive output

Terminal No.	Terminal symbol	Contents
(B574) No. 7	CODE	Immobilizer signal reception (start switch)
(B574) No. 8	TSW2	Passenger's lock sensor signal input
(B574) No. 9	TXCT	Immobilizer signal transmission (start switch)
(B574) No. 10	CG2B	Passenger's antenna output –
(B574) No. 11	CLG2	Passenger's antenna output +
(B574) No. 12	CLG1	Driver's antenna output +
(B574) No. 13	CG1B	Driver's antenna output –
(B574) No. 14	CANH	HS-CAN H
(B574) No. 15	CANL	HS-CAN L
(B574) No. 16	SWIL	Start switch character illumination output
(B574) No. 17	LIN	LIN communication
(B574) No. 18	INDW	Start switch indicator (orange) output
(B574) No. 19	POS1	Driver's sensor drive power supply
(B574) No. 20	TSW1	Driver's lock sensor signal input
(B574) No. 21	POS2	Passenger's sensor drive power supply
(B574) No. 22	SEN1	Driver's unlock sensor signal input
(B574) No. 23	SEN2	Passenger's unlock sensor signal input
(B574) No. 24	AGND	Immobilizer amplifier GND (start switch)
(B574) No. 25	P	Parking position switch input
(B574) No. 26	SLP	Steering lock position input
(B574) No. 27	SPD	Vehicle speed signal input
(B574) No. 28	SSW1	Start switch input 1
(B574) No. 29	SLR+	Steering motor power supply signal output
(B574) No. 30	SSW2	Start switch input 2

Disconnect the control module connector (B572) before checking the following items.

NOTE:
If the measured value is out of standard, it is possible that the vehicle has a fault.

Terminal No.	Item	Measuring condition	Standard
(B572) No. 2 (+B) ←→ (B572) No. 11 (GND)	Voltage	Always	9.5 — 16 V
(B572) No. 11 (GND) ←→ Chassis ground	Resistance	Always	Less than 1 Ω

NOTE:
If the measured value is out of standard, it is possible that the vehicle has a fault.

Terminal No.	Item	Measuring condition	Standard
(B573) No. 15 (IDW) ←→ Chassis ground (For EK, ER, EN models only)	Continuity	Always	Continuity exists

Disconnect the control module connectors (B574) and (B572) before checking the following items.

NOTE:
If the measured value is out of standard, it is possible that the vehicle has a fault.

Terminal No.	Item	Measuring condition	Standard
(B574) No. 4 (ACCD) ←→ Chassis ground	Resistance	Always (20°C)	152.61 — 216.5 Ω
(B572) No. 9 (IG2D) ←→ Chassis ground	Resistance	Always (20°C)	74.15 — 460.88 Ω
(B574) No. 6 (IG1D) ←→ Chassis ground	Resistance	Always (20°C)	50.87 — 72.17 Ω
(B572) No. 18 (STP1) ←→ Chassis ground (AT model only)	Voltage	Brake pedal depressed → released	11 — 14 V → 1 V or less
(B574) No. 25 (P) ←→ Chassis ground (AT model only)	Resistance	Except for shift positions P → Shift position P	40 kΩ or more → 200 Ω or less
(B574) No. 27 (SPD) ←→ Chassis ground	Resistance	Always	30 kΩ or more
(B574) No. 28 (SSW1) ←→ Chassis ground	Resistance	Push button ignition switch pressed → released	Less than 1 Ω → 10 kΩ or more
(B574) No. 29 (SLR+) ←→ Chassis ground	Resistance	Always	10 kΩ or more
(B574) No. 30 (SSW2) ←→ Chassis ground	Resistance	Push button ignition switch pressed → released	Less than 1 Ω → 10 kΩ or more
(B574) No. 17 (LIN) ←→ Chassis ground	Continuity	Always	Continuity does not exist
(B574) No. 14 (CANH) ←→ Chassis ground	Pulse	ACC ON or IGN ON	Pulse generation
(B574) No. 15 (CANL) ←→ Chassis ground	Pulse	ACC ON or IGN ON	Pulse generation

Connect the control module connector before checking the following items.

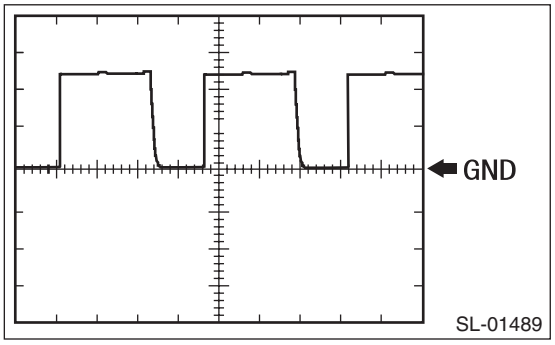
NOTE:
If the measured value is out of standard, it is possible that the keyless access CM has a fault.

Terminal No.	Item	Measuring condition	Standard
(B574) No. 1 (VC5) ←→ (B574) No. 24 (AGND)	Voltage	30 seconds or more have passed after the door was opened or closed with IG OFF and the brake pedal released.	1 V or less
	Waveform	Within 30 seconds after the push button ignition switch is pressed with IG OFF and access key not in the passenger room	Waveform 1
(B574) No. 2 (CG5B) ←→ (B572) No. 11 (GND)	Pulse	All doors closed, ACC and IG OFF, access key not in passenger room, touch sensor (lock) OFF → ON	No pulse output → Pulse output detected
(B574) No. 3 (CLG5) ←→ (B572) No. 11 (GND)	Pulse	All doors closed, ACC and IG OFF, access key not in passenger room, touch sensor (lock) OFF → ON	No pulse output → Pulse output detected
(B574) No. 4 (ACCD) ←→ (B572) No. 11 (GND)	Voltage	IG OFF → ACC ON	1 V or less → 9 — 14 V
(B574) No. 6 (IG1D) ←→ (B572) No. 11 (GND)	Voltage	ACC ON → IG ON	1 V or less → 9 — 14 V
(B574) No. 7 (CODE) ←→ (B574) No. 24 (AGND)	Voltage	30 seconds or more have passed after the door was opened or closed with IG OFF and the brake pedal released.	1 V or less
	Waveform	Turn the ignition switch to OFF and with the access key near the push button ignition switch, press the push button ignition switch*1	Waveform 2
(B574) No. 9 (TXCT) ←→ (B574) No. 24 (AGND)	Voltage	30 seconds or more have passed after the door was opened or closed with IG OFF and the brake pedal released.	1 V or less
	Waveform	Turn the ignition switch to OFF and with the access key near the push button ignition switch, press the push button ignition switch*1	Waveform 3
(B574) No. 10 (CG2B) ←→ (B572) No. 11 (GND)	Pulse	ACC and IG OFF, all doors closed, all doors locked by lock operation with wireless remote control, access key not in passenger room	No pulse output → Pulse output detected
(B574) No. 11 (CLG2) ←→ (B572) No. 11 (GND)	Pulse	ACC and IG OFF, all doors closed, all doors locked by lock operation with wireless remote control, access key not in passenger room	No pulse output → Pulse output detected
(B574) No. 12 (CLG1) ←→ (B572) No. 11 (GND)	Pulse	ACC and IG OFF, all doors closed, all doors locked by lock operation with wireless remote control, access key not in passenger room	No pulse output → Pulse output detected
(B574) No. 13 (CG1B) ←→ (B572) No. 11 (GND)	Pulse	ACC and IG OFF, all doors closed, all doors locked by lock operation with wireless remote control, access key not in passenger room	No pulse output → Pulse output detected
(B574) No. 19 (POS1) ←→ (B572) No. 11 (GND)	Voltage	ACC and IG OFF → ACC or IG ON	9 — 14 V → less than 2 V
(B574) No. 21 (POS2) ←→ (B572) No. 11 (GND)	Voltage	ACC and IG OFF → ACC or IG ON	9 — 14 V → less than 2 V
(B574) No. 24 (AGND) ←→ Chassis ground	Resistance	Always	Less than 1 Ω
(B574) No. 25 (P) ←→ (B572) No. 11 (GND) (AT model only)	Voltage	Except for shift positions P → Shift position P	9 — 14 V or more → 1.5 V or less
(B574) No. 26 (SLP) ←→ (B572) No. 11 (GND)	Voltage	With ignition switch OFF and shift position P, Steering lock → Steering unlock	11 — 14 V → 1.2 V or less

Terminal No.	Item	Measuring condition	Standard
(B574) No. 27 (SPD) ←→ Chassis ground	Pulse	Driving at approx. 5 km/h	Pulse generation according to vehicle speed (approx. 5 km/h: 3.54 Hz)
(B574) No. 28 (SSW1) ←→ (B572) No. 11 (GND)	Voltage	Push button ignition switch released → pressed	11 — 14 V → 1 V or less
(B574) No. 29 (SLR+) ←→ (B572) No. 11 (GND)	Voltage	When the following conditions are met, the doors are closed → opened, and steering lock motor is driven • Steering lock is unlocked • IG OFF • Shift position P	11 — 14 V (Steering lock motor is stopped) → 1 V or less (Steering lock motor is driven)
(B574) No. 30 (SSW2) ←→ (B572) No. 11 (GND)	Voltage	Push button ignition switch released → pressed	11 — 14 V → 1 V or less
(B573) No. 1 (CG8B) ←→ (B572) No. 11 (GND)	Pulse	ACC and IG OFF, all doors closed, all doors locked, trunk opener button or rear gate opener button OFF → ON	No pulse output → Pulse output detected
(B573) No. 2 (CLG8) ←→ (B572) No. 11 (GND)	Pulse	ACC and IG OFF, all doors closed, all doors locked, trunk opener button or rear gate opener button OFF → ON	No pulse output → Pulse output detected
(B573) No. 5 (RCO) ←→ (B572) No. 11 (GND)	Voltage	ACC and IG OFF, access key is locked or unlock switch OFF → ON	1 V or less → 4.5 — 5.5 V
(B573) No. 8 (CG7B) ←→ (B572) No. 11 (GND) (5 door model)	Pulse	All doors closed, ACC and IG OFF, access key not in passenger room, touch sensor (lock) OFF → ON	No pulse output → Pulse output detected
(B573) No. 8 (CG7B) ←→ (B572) No. 11 (GND) (4 door model)	Pulse	All doors closed, all doors locked, trunk opened → closed	No pulse output → Pulse output detected
(B573) No. 9 (CLG7) ←→ (B572) No. 11 (GND) (5 door model)	Pulse	All doors closed, ACC and IG OFF, access key not in passenger room, touch sensor (lock) OFF → ON	No pulse output → Pulse output detected
(B573) No. 9 (CLG7) ←→ (B572) No. 11 (GND) (4 door model)	Pulse	All doors closed, all doors locked, trunk opened → closed	No pulse output → Pulse output detected
(B573) No. 19 (RSSI) ←→ (B572) No. 11 (GND)	Voltage	All doors closed, all doors locked, access key is locked or unlock switch OFF → ON	11 — 14 V → 2 V or less
(B573) No. 27 (TSW5) ←→ (B572) No. 11 (GND)	Pulse/voltage	ACC and IG OFF, all doors locked, trunk opener button or rear gate lock button OFF → ON	9 V or more → less than 2 V
(B572) No. 9 (IG2D) ←→ (B572) No. 11 (GND)	Voltage	ACC ON → IG ON	1 V or less → 9 — 14 V
(B572) No. 13 (EGIO) ←→ (B574) No. 24 (AGND)	Voltage/pulse	Within 3 seconds after engine has been initially ignited or within 3 seconds after initial IG ON following battery removal and installation	11 — 14 V → pulse generation (waveform 4)
(B574) No. 8 (TSW2) ←→ (B572) No. 11 (GND)	Voltage	ACC and IG OFF, all doors closed, all doors locked, access key carried, passenger's seat touch sensor (lock) OFF → ON	9 V or more → less than 2 V (→ 9 V or more)
(B574) No. 20 (TSW1) ←→ (B572) No. 11 (GND)	Voltage	ACC and IG OFF, all doors closed, all doors locked, access key carried, driver's seat touch sensor (lock) OFF → ON	9 V or more → less than 2 V (→ 9 V or more)
(B574) No. 23 (SEN2) ←→ (B572) No. 11 (GND)	Voltage	ACC and IG OFF, all doors closed, all doors locked, access key carried, passenger's seat touch sensor (unlock) OFF → ON	9 V or more → less than 2 V (→ 9 V or more)
(B574) No. 22 (SEN1) ←→ (B572) No. 11 (GND)	Voltage	ACC and IG OFF, all doors closed, all doors locked, access key carried, driver's seat touch sensor (unlock) OFF → ON	9 V or more → less than 2 V (→ 9 V or more)
(B574) No. 16 (SWIL) ←→ (B572) No. 11 (GND)	Voltage	When illumination of start switch goes off, headlight goes OFF → ON	Less than 2 V → 9 V or more

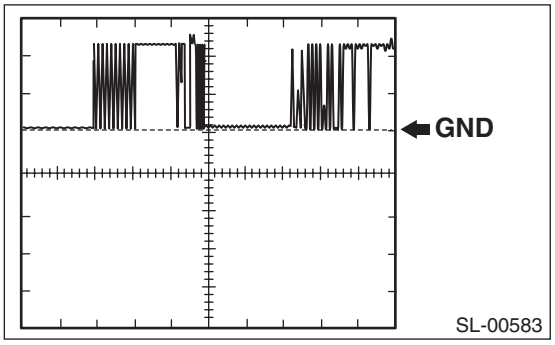
Terminal No.	Item	Measuring condition	Standard
(B572) No. 17 (TACH) ←→ Chassis ground	Waveform	While engine idling	Pulse generation (waveform 5)
(B573) No. 28 (ACCR) ←→ (B572) No. 11 (GND)	Voltage	Brake pedal depressed, push button ignition switch pressed (while cranking) → Except when cranking	Less than 2 V → 9 V or more
(B572) No. 5 (N-SW) ←→ (B572) No. 11 (GND)	Voltage	ACC ON → IG ON	Less than 2 V → 9 V or more
(B573) No. 10 (CG6B) ←→ (B572) No. 11 (GND) (4 door models only)	Pulse	All doors closed, ACC and IG OFF, access key not in passenger room, touch sensor (lock) OFF → ON	No pulse output → Pulse output detected
(B573) No. 11 (CG6G) ←→ (B572) No. 11 (GND) (4 door models only)	Pulse	All doors closed, ACC and IG OFF, access key not in passenger room, touch sensor (lock) OFF → ON	No pulse output → Pulse output detected
(B573) No. 17 (RDA) ←→ (B572) No. 11 (GND)	Pulse	All doors closed, ACC and IG OFF, access key not in passenger room, touch sensor (lock) OFF → ON	2 V or less → 11 — 14 V → 2 V or less
(B572) No. 7 (STSW) ←→ (B572) No. 11 (GND)	Voltage	Shift lever is in position P or position N and access key is in passenger room. While depressing the brake pedal, press the push button ignition switch. (Engine start)	Less than 2 V → 9 V or more
(B572) No. 3 (INDS) ←→ (B572) No. 11 (GND)	Voltage	Depress the brake pedal.	9 V or more
(B574) No. 18 (INDW) ←→ (B572) No. 11 (GND)	Voltage	With ACC ON or IG ON, brake pedal not depressed.	9 V or more

NOTE:
*1: Remove the access key battery before checking.
1. Waveform 1



Item	Contents
Measured terminal	(B574) No. 1 (VC5) ←→ (B574) No. 24 (AGND)
Equipment setting	2 V/DIV, 200 ms/DIV
Measuring condition	Within 30 seconds after the push button ignition switch is pressed with IG OFF and access key not in the passenger room

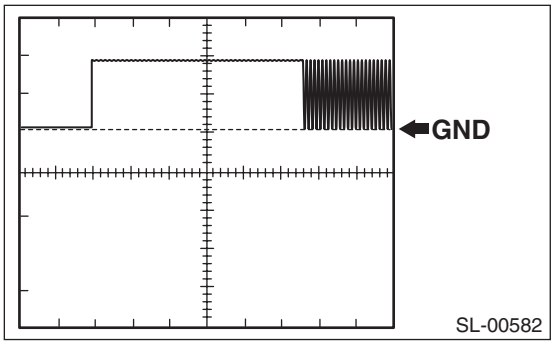
2. Waveform 2



Item	Contents
Measured terminal	(B574) No. 7 (CODE) ←→ (B574) No. 24 (AGND)
Equipment setting	2 V/DIV, 20 ms/DIV
Measuring condition	Turn the ignition switch to OFF and with the access key near the push button ignition switch, press the push button ignition switch. *1

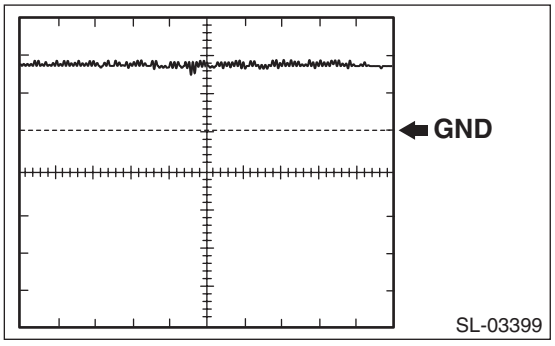
NOTE:
*1: Remove the access key battery before checking.

3. Waveform 3



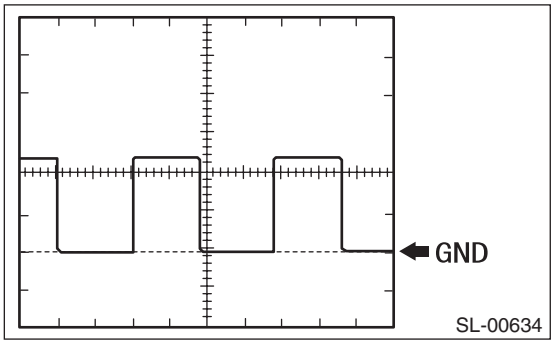
Item	Contents
Measured terminal	(B574) No. 9 (TXCT) ←→ (B574) No. 24 (AGND)
Equipment setting	2 V/DIV, 20 ms/DIV
Measuring condition	Within 30 seconds after the push button ignition switch is pressed with IG OFF and access key not in the passenger room

4. Waveform 4



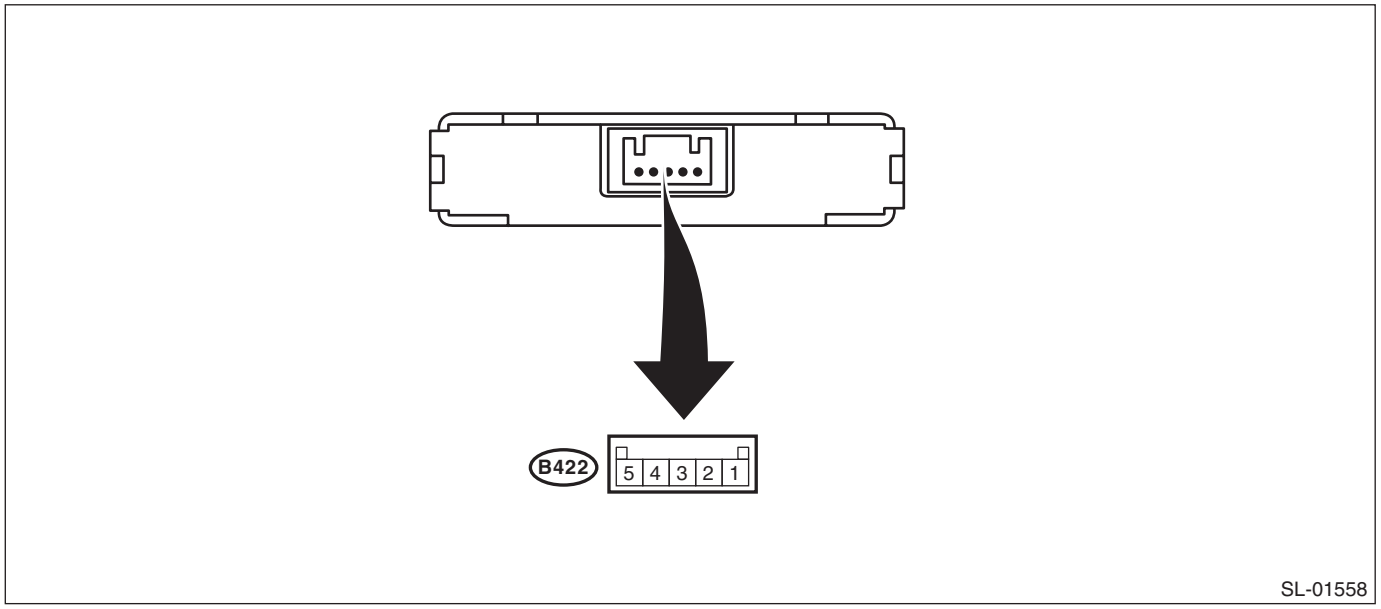
Item	Contents
Measured terminal	(B572) No. 13 (EGIO) ←→ (B572) No. 11 (GND)
Equipment setting	5 V/DIV, 100 ms/DIV
Measuring condition	Within 3 seconds after engine has been initially ignited or within 3 seconds after initial IG ON following battery removal and installation

5. Waveform 5



Item	Contents
Equipment setting	5 V/DIV, 100 ms/DIV

2. ID CODE BOX



Terminal No.	Terminal symbol	Contents
(B422) No. 1	+B	+B
(B422) No. 2	LIN	LIN communication
(B422) No. 4	IMO1	Immobilizer communication 1
(B422) No. 5	GND	GND

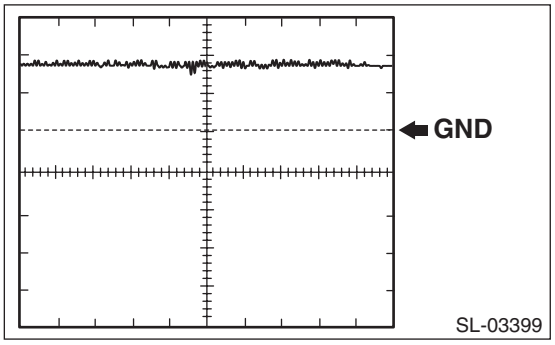
NOTE:
Disconnect the control module connector before checking the following items.

Terminal No.	Standard	Measuring condition	Item
1 (+B) ←→ 5 (GND)	10 — 14 V	Always	Voltage
4 (IMO1) ←→ 5 (GND)	0 V	Ignition OFF	Voltage
5 (GND) ←→ Chassis ground	Continuity exists	Always	Continuity

NOTE:
Connect the control module connector before checking the following items.

Terminal No.	Standard	Measuring condition	Item
4 (IMO1) ←→ 5 (GND)	0 V	Ignition OFF	Voltage
4 (IMO1) ←→ 5 (GND)	Waveform 1	Ignition ON	Voltage

Waveform 1

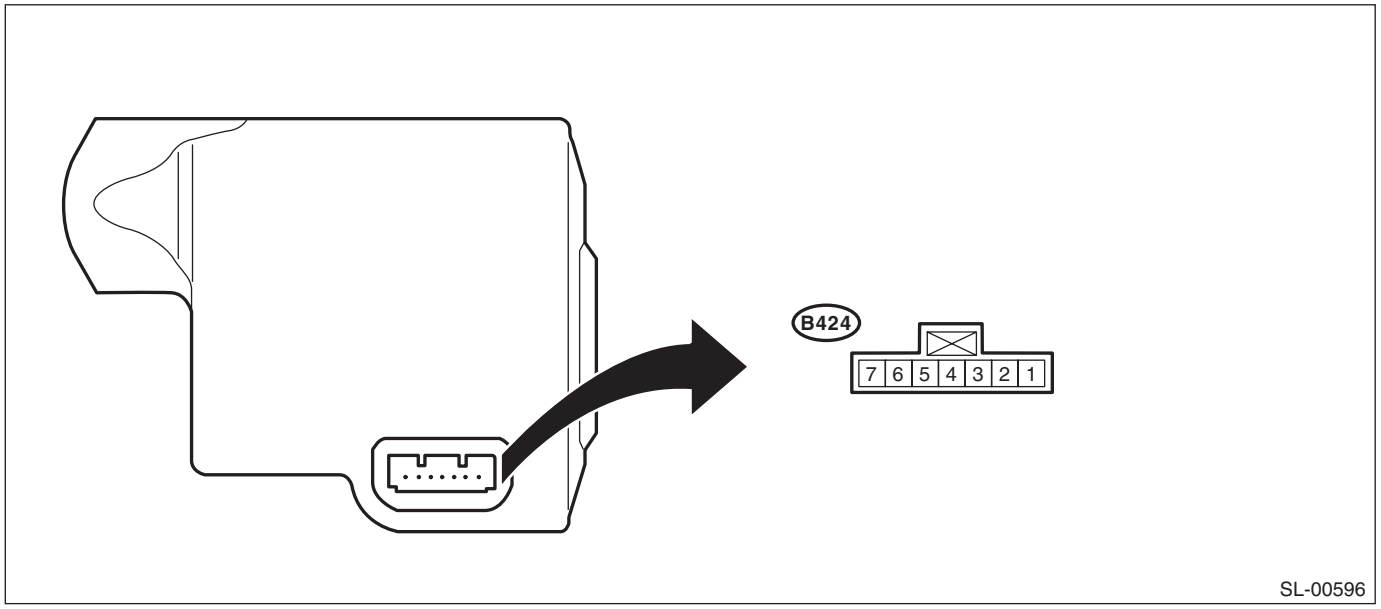


Item	Contents
Measured terminal	4 (IMO1) ←→ 5 (GND)
Equipment setting	5 V/DIV, 100 ms/DIV
Measuring condition	Ignition ON

3. BODY INTEGRATED UNIT

Refer to the BODY CONTROL SYSTEM (DIAGNOSTICS) for the I/O Signal of the body integrated unit. <Ref. to BC(diag)-6, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

4. STEERING LOCK CM



Terminal No.	Terminal symbol	Contents
(B424) No. 1	GND	GND
(B424) No. 3	SLR+	Steering lock motor drive power supply
(B424) No. 4	SLP	Unlock position output
(B424) No. 5	LIN	LIN communication
(B424) No. 6	IG2	IGN power supply
(B424) No. 7	B	+B

NOTE:
Perform the following check from the back side of the connector, with the connector of the control module connected.
If the measured value is out of standard, it is possible that the vehicle has a fault.

Terminal No.	Standard	Measuring condition	Item
1 (GND) ←→ Chassis ground	Continuity exists	Always	Continuity
—	—	—	—
3 (SLR+) ←→ Chassis ground	10 — 14 V → 1 V or less	Motor not operating → Motor operating	Voltage
4 (SLP) ←→ Chassis ground	10 — 14 V → 1 V or less	Lock → Unlock	Voltage
5 (LIN)	Input/output signal	—	—
6 (IG2) ←→ Chassis ground	10 — 14 V	Ignition ON	Voltage
7 (B) ←→ Chassis ground	10 — 14 V	Always	Voltage

B: WIRING DIAGRAM

- Refer to “Keyless Access System” in the wiring diagram. <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.> <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>
- Refer to “Push Button Start System” in WI section. <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>

6. Subaru Select Monitor

A: OPERATION

For detailed operation procedures, refer to “Application help”.

B: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

NOTE:
Confirm that the LAN system is working properly before the diagnosis.
Subaru Select Monitor communication line is open or shorted.

DETECTING CONDITION:

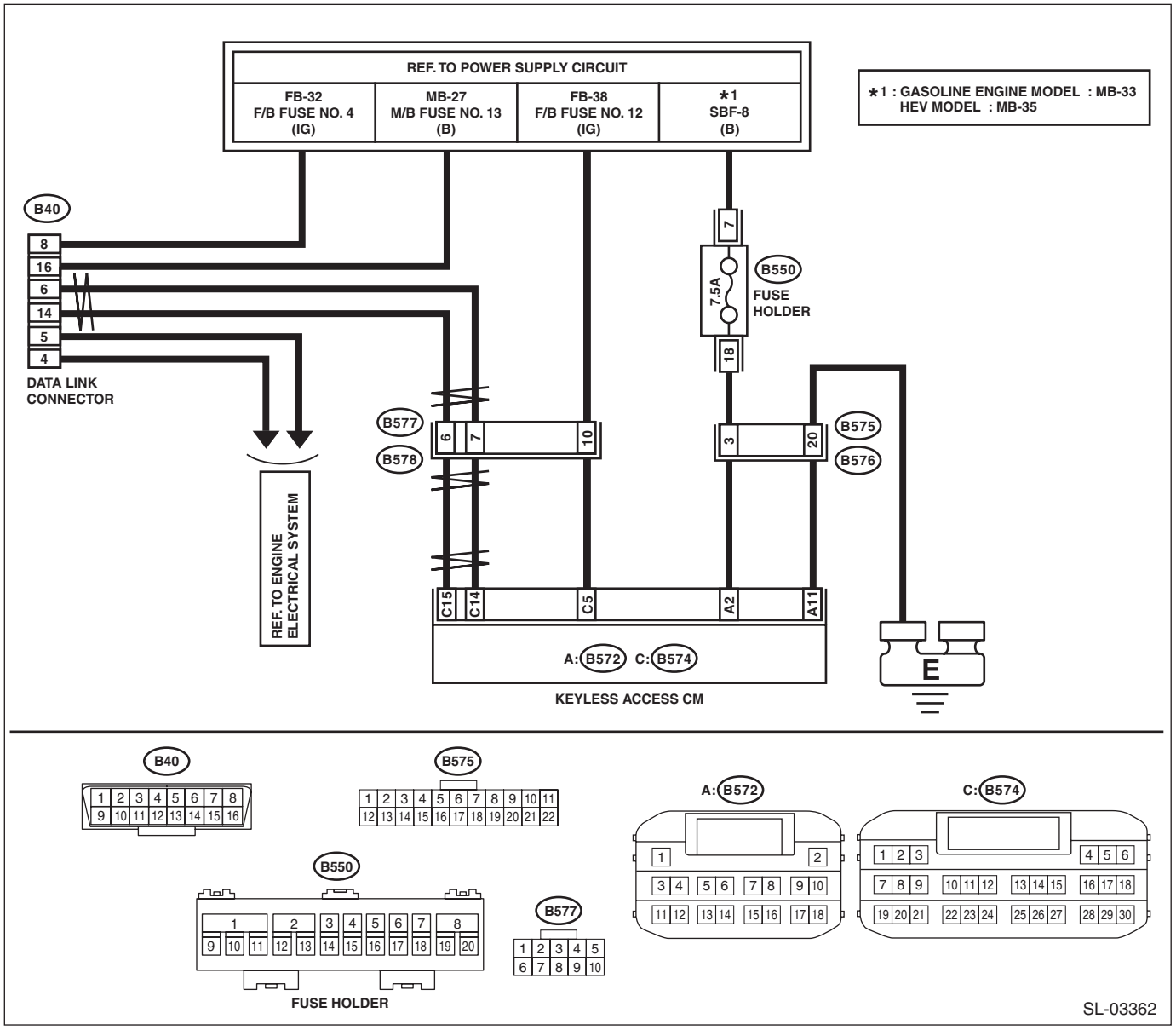
- Defective harness
- Power supply circuit malfunction
- Defective keyless access CM
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Not communicable with Subaru Select Monitor.

WIRING DIAGRAM:

- Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>
- CAN communication system <Ref. to WI(w/o HEV)-69, WIRING DIAGRAM, CAN Communication System.> <Ref. to WI(HEV)-60, WIRING DIAGRAM, CAN Communication System.>



Step		Check	Yes	No
1	**CHECK OTHER COMMUNICATION.** Communicate with the system other than the keyless access system using the Subaru Select Monitor.	Is the communication to other control module possible?	Go to step **2**.	Perform the "Communication for Initializing Impossible" of LAN system. <Ref. to LAN(HEV)(diag)-12, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.>

Step		Check	Yes	No
2	**CHECK DTC.** Read the DTC of the LAN system using the Subaru Select Monitor. <Ref. to LAN(HEV)(diag)-31, Read Diagnostic Trouble Code (DTC).>	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK KEYLESS ACCESS CM.** 1) Turn the ignition switch to OFF. 2) Disconnect the keyless access CM connector. 3) Connect the disconnected connectors. 4) Perform communication with the keyless access system using the Subaru Select Monitor.	Is communication possible?	It is possible that temporary poor communication occurs.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

CAUTION:
For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Keyless Access with Push Button Start» and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to KPS(diag)-38, List of Diagnostic Trouble Code (DTC).>

8. Read Current Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Keyless Access with Push Button Start» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

1. Keyless access system

Items to be displayed	Unit of measure	Contents	Note
Driver’s unlock touch sensor switch	ON/OFF	Keyless access CM input value	ON when the touch sensor (unlock) built on the back surface of the driver’s door outer handle is touched
Passenger’s unlock touch sensor switch	ON/OFF	Keyless access CM input value	ON when the touch sensor (unlock) built on the back surface of the passenger’s door outer handle is touched
Driver's lock touch sensor SW	ON/OFF	Keyless access CM input value	ON when the touch sensor (lock) built on the surface of the driver’s door outer handle is touched
Passenger's lock touch sensor SW	ON/OFF	Keyless access CM input value	ON when the touch sensor (lock) built on the surface of the passenger’s door outer handle is touched
Rear Gate Request SW	ON/OFF	Keyless access CM input value	ON when rear lock button is pressed (5 door models only)
Trunk Request SW	ON/OFF	Keyless access CM input value	ON when the trunk opener button is pressed (4 door models only)
Secret code Keyless registration	Unregistered/Registered	Keyless access CM input value	Registered when secret code keyless registration
IGN SW	ON/OFF	Keyless access CM input value	ON when ignition is ON
B/up fuse	Connecting/Not connected	Keyless access CM internal value	When backup fuse is connected/connecting
ACC SW	ON/OFF	Keyless access CM input value	ON when accessory or ignition is ON
Incorrect vehicle ID	Yes/No	Keyless access CM internal value	Yes when the access key is different when keyless access is performed
No response	Yes/No	Keyless access CM internal value	Yes when there is no response from the access key when keyless access is performed
Incorrect response code, format	Yes/No	Keyless access CM internal value	Yes if the response from the access key differs when keyless access is performed
Battery consumption	Yes/No	Keyless access CM internal value	Yes if the access key battery is depleted
Incorrect response code, ID code	Yes/No	Keyless access CM internal value	Yes if the response from the access key differs when keyless access is performed
Incorrect response code, collation result	Yes/No	Keyless access CM internal value	Yes if the response from the access key differs when keyless access is performed
Incorrect ID code	Yes/No	Keyless access CM internal value	Yes if the response from the access key differs when keyless access is performed
Incorrect rolling code	Yes/No	Keyless access CM internal value	Yes if the response from the access key differs when keyless access is performed

Items to be displayed	Unit of measure	Contents	Note
Smart Cancel	Cancel/Normal	Keyless access CM internal value	Cancel in the keyless access function stopped condition
Simple Smart system cancel	Cancel/Normal	Keyless access CM internal value	Cancel in the simple cancel function set condition
ID Code Box W/H Connection State	Connecting/Not connected	Keyless access CM internal value	Connecting status of the terminal (B573) No. 15
ID Code Box Existence Judging	ON/OFF/Existence Judging	Keyless access CM internal value	Normal «Existence Judging»
Immobilizer	Set/Unset	Keyless access CM internal value	Set when the immobilizer is set
Remote engine starter communication ID confirmation	Collation NG/Collation OK	Keyless access CM internal value	Collation OK when using a registered remote control engine starter
Remote engine starter code registration confirmation	Unregistered/Registered	Keyless access CM internal value	Registered when the code is registered
STLC sleep possible status	Possible/Impossible	Steering lock CM internal value	Possible when sleep is possible
STLC wake-up transmission status	Transmission/No transmission	Steering lock CM internal value	Transmission when the wake-up signal is transmitted
Lock side sensor status	ON/OFF	Steering lock CM internal value	OFF in an unlocked status
Unlock side sensor status	ON/OFF	Steering lock CM internal value	OFF in an unlocked status
Lock confirmation	Confirmed/Unconfirmed	Steering lock CM internal value	Confirmed when steering lock is locked
Unlock confirmation	Confirmed/Unconfirmed	Steering lock CM internal value	Confirmed when steering lock is unlocked
Sensor initialization	complete/incomplete	Steering lock CM internal value	Completed when sensor initial operation is completed
Motor protection control status	Rejected range/Permitted range	Steering lock CM internal value	Rejected range when motor protection control is not activated
Motor operation prohibition voltage evaluation	ON/OFF	Steering lock CM internal value	Prohibition when motor operation is prohibited
Diagnosis response	Normal/response	Steering lock CM internal value	Response when diagnostic communication is in progress
Sensor abnormal	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
Motor power supply short-circuit abnormal	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
Motor driver short-circuit abnormal	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
Lock bar engagement abnormal	Normal/Abnormal	Steering lock CM internal value	ON when the steering lock bar has experienced interference
Push start abnormal	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
Lock side relay operation	Stopped/Operating	Steering lock CM internal value	Operating in an unlock → lock status
Unlock side relay operation	Stopped/Operating	Steering lock CM internal value	Operating in an lock → unlock status
Motor drive FET drive	Stopped/Operating	Steering lock CM internal value	Operating when motor drive FET is operating
Motor reversal protection control	Stopped/Operating	Steering lock CM internal value	Operating when motor drive FET is operating
Engine start	Engine start permission/Engine start prohibition	Steering lock CM internal value	Permission when ignition ON

Items to be displayed	Unit of measure	Contents	Note
Sensor abnormal (past)	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
Motor power supply short-circuit abnormal (past)	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
Motor driver short-circuit abnormal (past)	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
Steering lock lock/unlock command reception history	ON (keep 10 sec)/OFF	Steering lock CM internal value	ON when steering lock is locked → unlocked, unlocked → locked
Lock bar engagement abnormal (past)	ON/OFF	Steering lock CM internal value	ON when the steering lock bar has experienced interference in the past
Push start abnormal (past)	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
STLC Abnormal EEPROM access	Normal/Abnormal	Steering lock CM internal value	Abnormal when a trouble occurs in steering lock CM
ID code BOX sleep possible status	Impossible/Possible	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Possible when sleep is possible
ID code BOX wake-up transmission status	No transmission/Transmission	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Transmission when the wake-up signal is transmitted
ID code BOX Abnormal EEPROM access (now)	Normal/Abnormal	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Abnormal when the ID code box is malfunctioning
EGI code reception status	Receive/Not yet received	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Reception at engine start operation
Engine start permission request reception status	Receive/Not yet received	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Reception at ignition ON
Provisional injection request reception status	Receive/Not yet received	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Reception at ignition ON
Code collation result between smart ECM and ID code box	Normal/Abnormal	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Normal when engine start is allowed
Code collation result between steering locked ECM and ID code box	Normal/Abnormal	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Normal when steering lock operation allowed

Items to be displayed	Unit of measure	Contents	Note
Steering lock unlock request reception status	Reception (keep 10 sec)/Not yet received	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Reception when steering lock is performing unlock
Steering lock lock request reception status	Reception (keep 10 sec)/Not yet received	Keyless access CM internal value (models without ID code box) or ID code box internal value (models with ID code box)	Reception when steering lock is performing lock
Driver's external transmitter output circuit abnormal	Normal/Abnormal	Keyless access CM internal value	Abnormal when a trouble occurs in transmitter output circuit
Passenger's external transmitter output circuit abnormal	Normal/Abnormal	Keyless access CM internal value	Abnormal when a trouble occurs in transmitter output circuit
Driver's external transmitter output circuit abnormal (past)	Normal/Abnormal	Keyless access CM internal value	Abnormal when a trouble occurs in transmitter output circuit in the past
Passenger's external transmitter output circuit abnormal (past)	Normal/Abnormal	Keyless access CM internal value	Abnormal when a trouble occurs in transmitter output circuit in the past
ID code registration mode status	Normal/Register/Deletion	—	For immobilizer registration
Smart related ECM code registration mode status	On mode/Normal		
ID code collation completion confirmation	complete/Normal		
ID code registration completion confirmation	complete/Normal		
Smart related ECM code registration completion confirmation	complete/Normal		
Registered smart key confirmation status	Confirming/Normal		
Smart related ECM code confirmation status	Confirming/Normal		
ID code registration status	Registering/Normal		
ID code collation status	Normal/Collating the immobilizer/Collating the smart		
All registered keys confirmation status	Confirming/Normal		
Confirmed number of all registered keys	0 — 7		
Number of required registrations (smart)	0 — 7		
Number of collation completed (smart)	0 — 7		
Number of registration completed (smart)	0 — 7	Keyless access CM internal value	Number of recognized keyless access CM
ID Code Box	Connecting/Not connected	Keyless access CM internal value	Connecting with ID code box normal connection
Steering Lock ECM	Connecting/Not connected	Keyless access CM internal value	Connecting with steering lock CM normal connection

Items to be displayed	Unit of measure	Contents	Note
Driver's lock request SW/touch sensor switch ON edge record	ON/OFF	Keyless access CM internal value	The display is continued when the collation is once established by the combination indicated on the left. NOTE: When confirming the data on the left, confirm after performing Keyless access system check. <Ref. to KPS(diag)-36, Keyless Access System Check.>
Passenger's unlock request SW/touch sensor switch ON edge record	ON/OFF	Keyless access CM internal value	
Rear gate lock request SW ON edge history	ON/OFF	Keyless access CM internal value	
Driver's unlock touch sensor switch ON edge record	ON/OFF	Keyless access CM internal value	
Passenger's unlock touch sensor switch ON edge record	ON/OFF	Keyless access CM internal value	
Trunk unlock request SW ON edge history	ON/OFF	Keyless access CM internal value	
Collation OK result history (driver's external transmitter + interior tuner)	ON/OFF	Keyless access CM internal value	
Collation OK result history (passenger's external transmitter + interior tuner)	ON/OFF	Keyless access CM internal value	
Collation OK result history (front interior transmitter + interior tuner)	ON/OFF	Keyless access CM internal value	
Collation OK result history (rear interior transmitter + interior tuner)	ON/OFF	Keyless access CM internal value	
Collation OK result history (trunk internal transmitter + interior tuner)	ON/OFF	Keyless access CM internal value	
Collation OK result history (trunk external transmitter + interior tuner)	ON/OFF	Keyless access CM internal value	
Collation OK result history (rear gate internal transmitter + interior tuner)	ON/OFF	Keyless access CM internal value	
Collation OK result history (rear gate external transmitter + interior tuner)	ON/OFF	Keyless access CM internal value	
Collation OK result history (immobilizer amplifier + immobilizer amplifier)	ON/OFF	Keyless access CM internal value	
Push start SW 1	ON/OFF	Keyless access CM input value	ON when push button start is pressed
Push start SW 2	ON/OFF	Keyless access CM input value	ON when push button start is pressed
Stop Light Switch	ON/OFF	Keyless access CM input value	ON when brake pedal is depressed
Steering unlock SW	ON/OFF	Keyless access CM input value	OFF when steering locked
Shift P signal(AT only)	ON/OFF	Keyless access CM input value	ON when the shift position is "P"
Neutral SW/Clutch SW	ON/OFF	Keyless access CM output value	ON when the shift position is at "P" or "N"
Shift N signal(AT only)	ON/OFF	Keyless access CM input value	ON when the shift position is "N"
Delivery mode signal(AT only)	ON/OFF	Keyless access CM input value	OFF when in other than the delivery mode

Items to be displayed	Unit of measure	Contents	Note
IGN2 relay monitor (drive output)	ON/OFF	Keyless access CM output value	ON during IG relay 2 (push button start) drive output
IGN1 relay monitor (drive output)	ON/OFF	Keyless access CM output value	ON during IG relay 1 (push button start) drive output
ACC relay monitor	ON/OFF	Keyless access CM output value	ON during accessory relay (push button start) drive output
IGN2 relay monitor (coil voltage)	ON/OFF	Keyless access CM output value	ON during IG relay 2 (push button start) drive output
IGN1 relay monitor (coil voltage)	ON/OFF	Keyless access CM output value	ON during IG relay 1 (push button start) drive output
IGN latch monitor	ON/OFF	Keyless access CM output value	ON during IG relay 2 (push button start) drive output
STSW signal monitor	ON/OFF	Keyless access CM output value	ON when brake pedal is depressed and push button ignition switch is pressed
ACCR signal	ON/OFF	Keyless access CM input value	ON during starter relay drive output
Vehicle Speed Signal	Drive status/Stop status	Keyless access CM input value	Driving status when vehicle speed is input
Engine Speed	Rotating/Stopped	Keyless access CM input value	Rotating while the engine is running
Power Supply Condition	All OFF status	Keyless access CM output value	Displayed when IG relay 1 (push button start), IG relay 2 (push button start), and accessory relay (push button start) are all OFF
	ACC relay ON status	Keyless access CM output value	Displayed when accessory ON
	IGN1 relay ON status	Keyless access CM output value	Displayed when ignition ON
	IGN2 relay ON status	Keyless access CM output value	Displayed when ignition ON
	STSW Condition	Keyless access CM output value	Displayed when brake pedal is depressed, and push button ignition switch is pressed
Vehicle identification	GAS MT/GAS AT/HEV AT/Auto Start Stop MT/Auto Start Stop AT	Keyless access CM output value	Equipped vehicle is displayed.
IGN1 external circuit abnormal	Not Detect/Detect	Keyless access CM output value	Detect when IGN1 external circuit is faulty
IGN2 external circuit abnormal	Not Detect/Detect	Keyless access CM output value	Detect when IGN2 external circuit is faulty
Start SW trouble	Not Detect/Detect	Keyless access CM output value	Detect when start SW is faulty
P signal mismatch	Not Detect/Detect	Keyless access CM output value	Detect when shift P signal is abnormal
Steering lock unlock waiting time out	Not Detect/Detect	Keyless access CM output value	Detect when the steering lock release time out occurred
Key collation waiting time out	Not Detect/Detect	Keyless access CM output value	Detect when the key collation time out occurred

2. Body integrated unit

Refer to the BODY CONTROL SYSTEM (DIAGNOSTICS) for the current data of the body integrated unit. <Ref. to BC(diag)-12, LIST, Read Current Data.>

9. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Keyless Access with Push Button Start» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.

10.Keyless Access System Check

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Keyless Access with Push Button Start» and then select «Enter».
5) On «Select Function» display, select «Work Support».
6) On «Work Support» display, select «Keyless access system check».
7) Select a transmitter to be checked.

Data	Customize setting	Remarks
Keyless access system check	Driver side external transmitter - internal tuner	When the setting content on the left is selected, the access key is neared to the selected transmitter (access antenna) and collation matches, the buzzer will sound.
	Passenger side external transmitter - internal tuner	
	Fr internal transmitter - internal tuner	
	Rr internal transmitter - internal tuner	
	Trunk-internal transmitter - trunk-internal tuner	
	Trunk-external transmitter - trunk-internal tuner	
	R gate internal transmitter - internal tuner	
	R gate external transmitter - internal tuner	
	Immobilizer amplifier transmission	
Collation result history Clear	Operate	
	—	

NOTE:
For detailed operation procedures, refer to “Application help”.

11.System Operation Check Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Keyless Access with Push Button Start» and then select «Enter».
5) On «Select Function» display, select «Active Test».
6) Select a location to be inspected.

NOTE:
Each output check continues to run for five seconds before stopping automatically.

Data	Keyless access CM output check	Remarks
Tuner power supply ON (indoor tuner)	Output	Perform the power supply check for the receiver.
	Stop	
Driver's external transmitter	Output	Perform the output check for the driver's side door outside antenna.
	Stop	
Passenger's external transmitter	Output	Perform the output check for the passenger's side door outside antenna.
	Stop	
STSW	Output	Turn on the STSW. *2
	Stop	
IGN2	Output	Turn on the IGN2.
	Stop	
IGN1	Output	Turn on the IGN1.
	Stop	
ACC	Output	Turn on the ACC.
	Stop	
Start SW character illumination lighted	Output	Perform ON output of the push button ignition switch back-up light. *1
	Stop	
Start SW indicator lighted (green)	Output	Perform ON output of the push button ignition switch back-up light. *1
	Stop	
Start SW indicator lighted (orange)	Output	Perform ON output of the push button ignition switch back-up light. *1
	Stop	
Steering lock power supply	Output	Output power supply signal from power supply CM to steering lock CM.
	Stop	

*1: When lit by a condition other than for a system operation check mode, it will not become unlit even when set to OFF or no output.
*2: When performed with ignition switch ON, engine will start. Therefore, great care must be exercised.

NOTE:
For detailed operation procedures, refer to “Application help”.

12.List of Diagnostic Trouble Code (DTC)

A: LIST

1. Keyless access system

DTC	Item	Content of diagnosis	Note
U0073	CONTROL MODULE COMMUNICATION BUS OFF	Detected when CAN line abnormality is detected.	<Ref. to KPS(diag)-43, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	Detected when CAN data from the engine control module (ECM) does not arrive.	<Ref. to KPS(diag)-43, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	LOST COMMUNICATION WITH TCM	Detected when CAN data from TCM does not arrive.	<Ref. to KPS(diag)-43, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	Detected when CAN data from VDC does not arrive.	<Ref. to KPS(diag)-43, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	Detected when CAN data from BIU does not arrive.	<Ref. to KPS(diag)-43, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	Detected when CAN data from meter does not arrive.	<Ref. to KPS(diag)-43, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	Detected when there is malfunction in CAN data from the engine control module (ECM).	<Ref. to KPS(diag)-43, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	INVALID DATA RECEIVED FROM BODY CONTROL MODULE	Detected when CAN data from BIU is abnormal.	<Ref. to KPS(diag)-43, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1120	LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE	Detected when CAN data from hybrid system or from Auto Start Stop system does not arrive.	<Ref. to KPS(diag)-44, DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1242	WIRELESS TUNER	When short circuit occurs in harness between keyless access CM and receiver.	<Ref. to KPS(diag)-45, DTC B1242 WIRELESS TUNER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2271	IGN RELAY CONTROL CIRCUIT	• When malfunction is detected in IG1 and IG2 drive circuits in the keyless access CM. • When malfunction is detected in IG hold circuit in the keyless access CM.	<Ref. to KPS(diag)-47, DTC B2271 IGN RELAY CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2274	ACC RELAY CONTROL CIRCUIT	When malfunction is detected in ACC relay drive circuit in the keyless access CM or external circuit.	<Ref. to KPS(diag)-49, DTC B2274 ACC RELAY CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Note
B2275	ENGINE START REQUEST CONTROL CIRCUIT	• When malfunction is detected in engine start permission signal output circuit in the keyless access CM. • When malfunction is detected in external engine start permission signal circuit.	<Ref. to KPS(diag)-51, DTC B2275 ENGINE START REQUEST CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2276	ACC RELAY OFF SIGNAL	When input error occurs in accessory relay cut input signal of keyless access CM.	<Ref. to KPS(diag)-53, DTC B2276 ACC RELAY OFF SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2277	SUBMERGING CIRCUIT	When the water-submersion detection circuit integrated into the keyless access CM detects the water submersion.	<Ref. to KPS(diag)-55, DTC B2277 SUBMERGING CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2282	VEHICLE SPEED SIGNAL CORRELATION	When the vehicle speed signal transmitted from VDC via solid line and the vehicle speed signal transmitted via CAN communication line do not match.)	<Ref. to KPS(diag)-56, DTC B2282 VEHICLE SPEED SIGNAL CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2283	VEHICLE SPEED SENSOR	Either of the following malfunctions is detected. (Vehicle speed sensor failure is detected.) • Vehicle speed signal failure detection 1: Excessive deceleration detection • Vehicle speed signal failure detection 2: Engine speed interlock detection	<Ref. to KPS(diag)-58, DTC B2283 VEHICLE SPEED SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2284	BRAKE SIGNAL CORRELATION	When the brake signal transmitted via solid line and the brake signal transmitted via CAN communication line do not match.	<Ref. to KPS(diag)-60, DTC B2284 BRAKE SIGNAL CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2285	STEERING LOCK POSITION SIGNAL CORRELATION	When the steering lock position signal transmitted from the steering lock CM via solid line and the steering lock position signal transmitted via LIN communication system do not match.	<Ref. to KPS(diag)-63, DTC B2285 STEERING LOCK POSITION SIGNAL CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2286	ENGINE SPEED SIGNAL(WITHOUT Auto Start Stop)	When the engine speed signal transmitted from the ECM via solid line and the engine speed signal transmitted via CAN communication line do not match.	<Ref. to KPS(diag)-66, DTC B2286 ENGINE SPEED SIGNAL(WITHOUT Auto Start Stop), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Note
B228A	ENGINE SPEED SIGNAL(WITH Auto Start Stop)	When the engine speed signal transmitted from the ECM via solid line and the engine speed signal transmitted via CAN communication line do not match.	<Ref. to KPS(diag)-68, DTC B228A ENGINE SPEED SIGNAL(WITH Auto Start Stop), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2779	REMOTE CONTROL ENGINE STARTER COLLATION	When the keyless access CM does not respond to engine start even when the remote control engine starter is ON, or when there is a code mismatch.	<Ref. to KPS(diag)-70, DTC B2779 REMOTE CONTROL ENGINE STARTER COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2781	STEERING LOCK CM CONTROL CIRCUIT	• When malfunction is detected in lock/unlock position detection sensor. • When the open or short circuit in the steering lock motor drive circuit is detected.	<Ref. to KPS(diag)-70, DTC B2781 STEERING LOCK CM CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2782	STEERING LOCK DRIVE REQUEST SIGNAL CORRELATION	When the open or short circuit in the steering lock motor power supply circuit is detected.	<Ref. to KPS(diag)-71, DTC B2782 STEERING LOCK DRIVE REQUEST SIGNAL CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2784	ANTENNA CIRCUIT (PUSH ENGINE SWITCH)	When open or short circuit occurs in the antenna coil.	<Ref. to KPS(diag)-73, DTC B2784 ANTENNA CIRCUIT (PUSH ENGINE SWITCH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2785	LIN COMMUNICATION	When the keyless access CM detects the collation system LIN bus communication error three times in a row.	<Ref. to KPS(diag)-75, DTC B2785 LIN COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2786	STEERING LOCK CM COMMUNICATION	When communication between keyless access CM and steering lock CM is interrupted for a set amount of time.	<Ref. to KPS(diag)-77, DTC B2786 STEERING LOCK CM COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2788	IGN SIGNAL CORRELATION (STEERING LOCK CM)	When mismatch occurs in the IG1 input of the steering lock CM between LIN communication line input and solid line input.	<Ref. to KPS(diag)-79, DTC B2788 IGN SIGNAL CORRELATION (STEERING LOCK CM), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2789	ID CODE BOX COMMUNICATION	• When communication between keyless access CM and ID code box is interrupted for a set amount of time. • Open or short circuit in the wiring harness between keyless access CM and ID code box.	<Ref. to KPS(diag)-81, DTC B2789 ID CODE BOX COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B278A	PUSH ENGINE SWITCH POWER SUPPLY CIRCUIT	When the power supply circuit of the push button ignition switch is shorted to ground.	<Ref. to KPS(diag)-83, DTC B278A PUSH ENGINE SWITCH POWER SUPPLY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Note
B278D	ID CODE BOX JUDGMENT CIRCUIT	• When ID code box ON input is detected while the ID code box setting is set to OFF. • When ID code box LIN signal is received while the ID code box setting is set to OFF.	<Ref. to KPS(diag)-85, DTC B278D ID CODE BOX JUDGMENT CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2790	ID CODE BOX CIRCUIT	An error has occurred inside the ID code box.	<Ref. to KPS(diag)-86, DTC B2790 ID CODE BOX CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B27A1	DRIVER SIDE EXTERNAL ANTENNA OPEN	When open circuit occurs in the harness between keyless access CM and driver's side front door outer handle.	<Ref. to KPS(diag)-87, DTC B27A1 DRIVER SIDE EXTERNAL ANTENNA OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B27A2	PASSENGER SIDE EXTERNAL ANTENNA OPEN	When open circuit occurs in the harness between keyless access CM and passenger's side front door outer handle.	<Ref. to KPS(diag)-89, DTC B27A2 PASSENGER SIDE EXTERNAL ANTENNA OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B27A5	FRONT INTERNAL ANTENNA OPEN	When open circuit occurs in the harness between keyless access CM and front interior antenna.	<Ref. to KPS(diag)-91, DTC B27A5 FRONT INTERNAL ANTENNA OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B27A6	REAR INTERNAL ANTENNA OPEN	When open circuit occurs in the harness between keyless access CM and rear interior antenna.	<Ref. to KPS(diag)-93, DTC B27A6 REAR INTERNAL ANTENNA OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B27A7	TRUNK/REAR GATE INTERNAL ANTENNA OPEN	When open circuit occurs in the harness between keyless access CM and rear interior antenna.	<Ref. to KPS(diag)-95, DTC B27A7 TRUNK/REAR GATE INTERNAL ANTENNA OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B27A8	TRUNK/REAR GATE EXTERNAL ANTENNA OPEN	When open circuit occurs in the harness between keyless access CM and rear exterior antenna.	<Ref. to KPS(diag)-98, DTC B27A8 TRUNK/REAR GATE EXTERNAL ANTENNA OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

2. Immobilizer (ECM)

DTC	Item	Content of diagnosis	Note
B1571	REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM)	Reference code mismatch occurs between keyless access CM (model without ID code box) or ID code box (model with ID code box) and ECM.	<Ref. to KPS(diag)-100, DTC B1571 REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1572	IMM CIRCUIT EXCEPT ANTENNA CIRCUIT	Communication error occurs between keyless access CM (model without ID code box) or ID code box (model with ID code box) and ECM.	<Ref. to KPS(diag)-101, DTC B1572 IMM CIRCUIT EXCEPT ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1576	EGI CONTROL MODULE EEPROM	ECM malfunctioning	<Ref. to KPS(diag)-105, DTC B1576 EGI CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1577	IMM CONTROL MODULE EEPROM	Malfunction occurs between keyless access CM (model without ID code box) or ID code box (model with ID code box) and ECM.	<Ref. to KPS(diag)-106, DTC B1577 IMM CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

13.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

Detected when CAN line abnormality is detected.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

Detected when CAN data from the engine control module (ECM) does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

C: DTC U0101 LOST COMMUNICATION WITH TCM

Detected when CAN data from TCM does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

D: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

Detected when CAN data from VDC does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

E: DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

Detected when CAN data from BIU does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

F: DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

Detected when CAN data from meter does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

G: DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

Detected when there is malfunction in CAN data from the engine control module (ECM).

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

H: DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

Detected when CAN data from BIU is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

I: DTC U1120 LOST COMMUNICATION WITH AUTOSTART STOP CONTROL MODULE

Detected when CAN data from hybrid system or from Auto Start Stop system is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

J: DTC B1242 WIRELESS TUNER

DTC DETECTING CONDITION:

When short circuit occurs in harness between keyless access CM and receiver.

TROUBLE SYMPTOM:

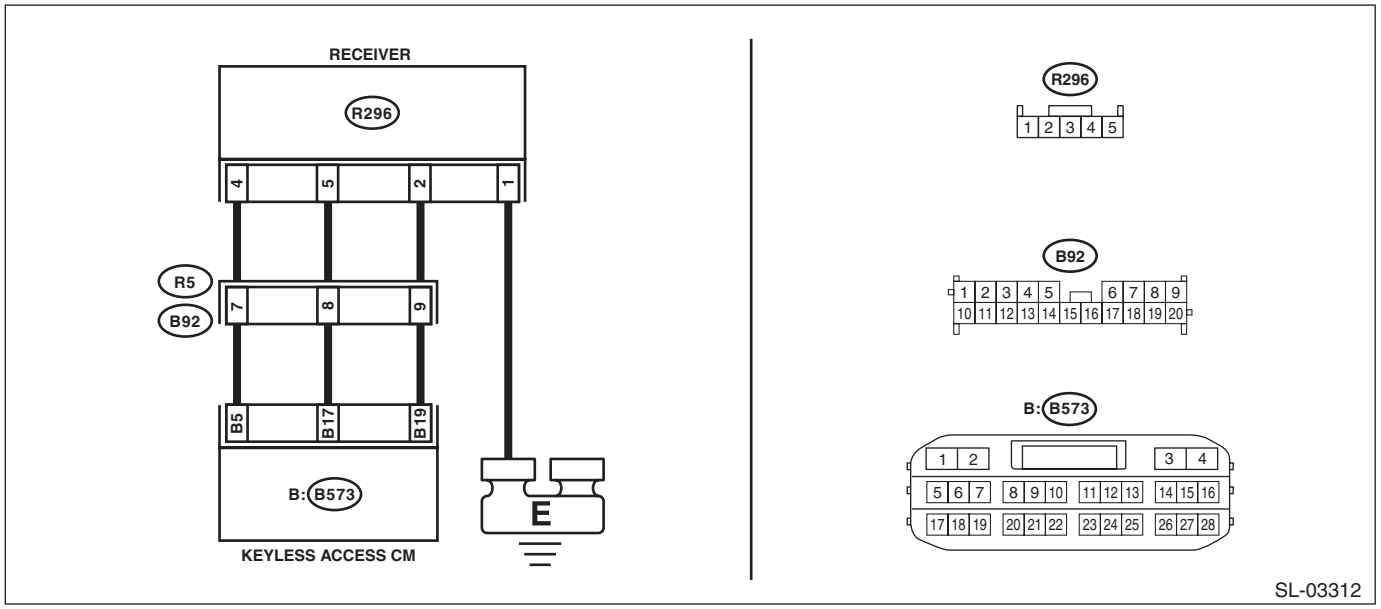
- The keyless access with push button start function (except for emergency function) does not operate properly.
- Operation by the access key button does not function.

CAUTION:

- **For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.**
- **When the harness comes close to the receiver, the performance of keyless access system operation and wireless operation may reduce. So, when replacing or inspecting the receiver and harness, do not change the route and length of the surrounding harnesses.**

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Disconnect the receiver connector. 3) Using the tester, measure the resistance between terminals of keyless access CM connector and receiver connector, and keyless access CM and chassis ground. ***Connector & terminal*** ***(B573) No. 19 — (R296) No. 2:*** ***(B573) No. 17 — (R296) No. 5:*** ***(B573) No. 5 — (R296) No. 4:*** ***(R296) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B573) No. 19 — Chassis ground:*** ***(B573) No. 17 — Chassis ground:*** ***(B573) No. 5 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK RECEIVER.** 1) Replace the receiver, and then connect it. <Ref. to SL-100, Receiver.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B1242 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Receiver has a malfunction.

K: DTC B2271 IGN RELAY CONTROL CIRCUIT

DTC DETECTING CONDITION:

- When malfunction is detected in IG1 and IG2 drive circuits in the keyless access CM.
- When malfunction is detected in IG hold circuit in the keyless access CM.

TROUBLE SYMPTOM:

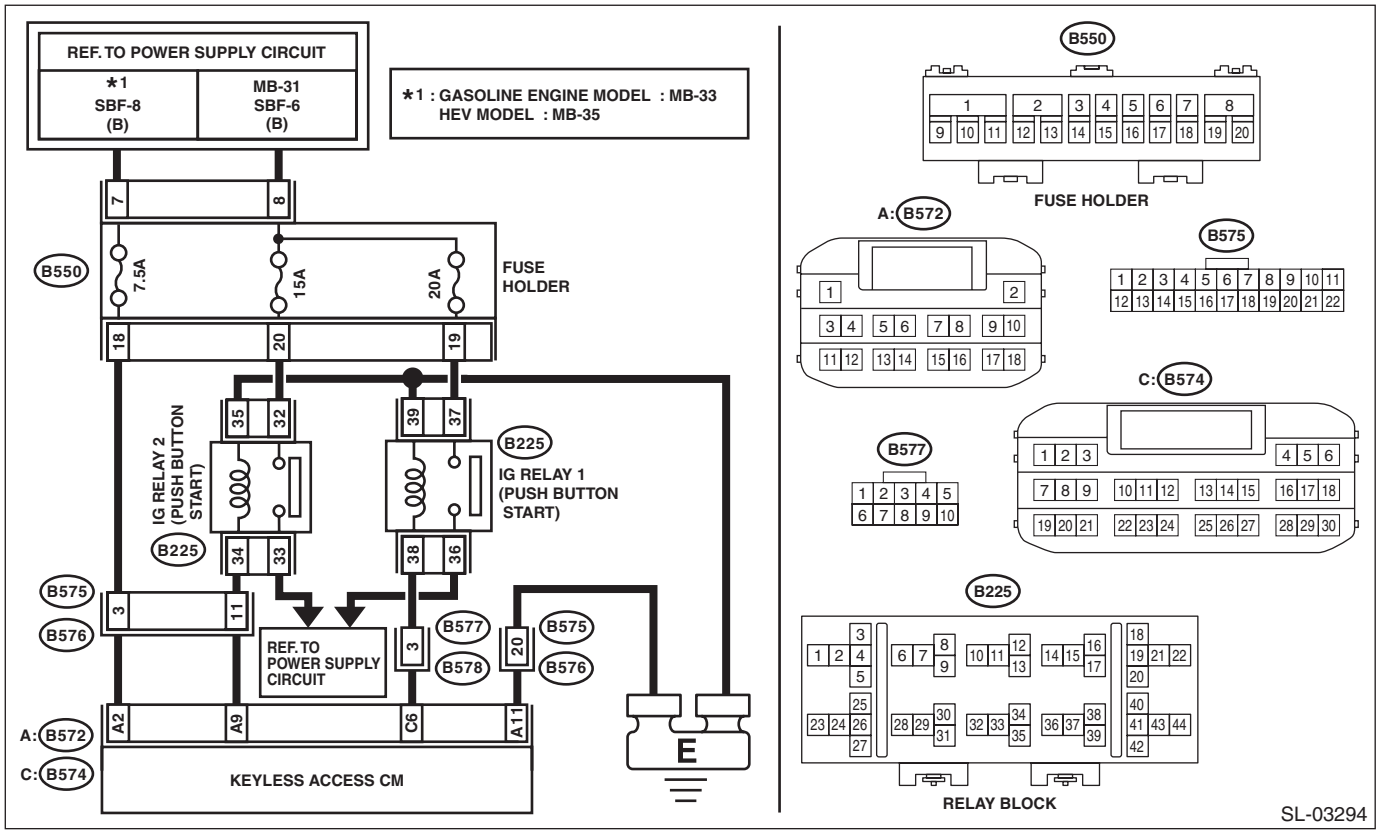
Not all functions operate at IGN ON.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



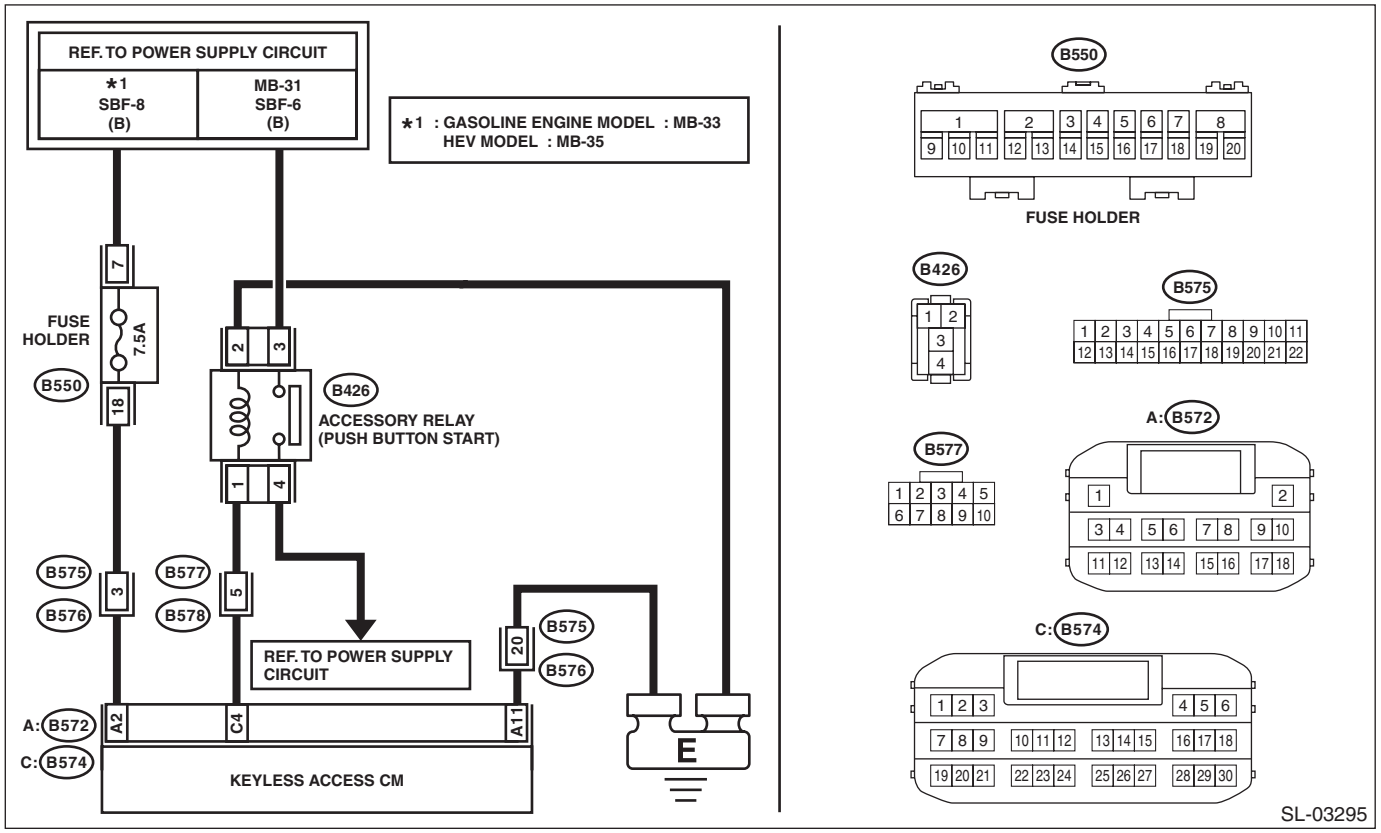
Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK FUSE.** Check the fuse. <Ref. to SL-10, Relay and Fuse.>	Is the fuse OK?	Go to step **3**.	Replace the fuse. When the replaced fuse is blown immediately, check the power supply circuit for short-circuited.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the voltage between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 2 (+) — Chassis ground (–):***	Is the voltage 9.5 — 16 V?	Go to step **4**.	Check the power supply circuit.
4	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 9 — Chassis ground:***	Is resistance 74.15 — 460.88 Ω? (20°C)	Go to step **6**.	Check IG relay 2. Go to step **7**.
6	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 6 — Chassis ground:***	Is resistance 50.87 — 72.17 Ω? (20°C)	Go to step **8**.	Check IG relay 1. Go to step **7**.
7	**CHECK RELAY.** Perform unit inspection of IG relay 1 and IG relay 2. <Ref. to SL-11, CHECK RELAY, INSPECTION, Relay and Fuse.>	Is the relay OK?	Go to step **8**.	Replace the relay. <Ref. to SL-111, REMOVAL, IG Relay1 (Push Button Start).> <Ref. to SL-113, REMOVAL, IG Relay2 (Push Button Start).>
8	**CHECK KEYLESS ACCESS CM.** 1) Connect the keyless access CM connector. 2) Using a tester, measure the voltage between the terminals of keyless access CM connector. ***Connector & terminal*** ***(B574) No. 6 (+) — Chassis ground (–):*** ***(B572) No. 9 (+) — Chassis ground (–):***	Is the voltage 1 V or less → 9.5 — 16 V when ACC → IGN ON?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>

L: DTC B2274 ACC RELAY CONTROL CIRCUIT

DTC DETECTING CONDITION:
When malfunction is detected in ACC relay drive circuit in the keyless access CM or external circuit.
TROUBLE SYMPTOM:
Each function does not operate at the ACC position.

CAUTION:
For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK FUSE.** Check the fuse. <Ref. to SL-10, Relay and Fuse.>	Is the fuse OK?	Go to step **3**.	Replace the fuse. When the replaced fuse is blown immediately, check the power supply circuit for short-circuited.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 2 (+) — Chassis ground (–):***	Is the voltage 9.5 — 16 V?	Go to step **4**.	Check the power supply circuit.
4	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 4 — Chassis ground:***	Is resistance 152.61 — 216.5 Ω? (20°C)	Go to step **7**.	Go to step **6**.
6	**CHECK RELAY.** Perform inspection of ACC relay unit. <Ref. to SL-115, Accessory Relay (Push Button Start).>	Is the relay OK?	Go to step **7**.	Replace the relay.
7	**CHECK HARNESS.** Using a tester, measure the resistance between keyless access CM connectors. ***Connector & terminal*** ***(B574) No. 4 — (B426) No. 2:*** ***(B426) No. 3 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair or replace the open circuit of harness.
8	**CHECK KEYLESS ACCESS CM.** 1) Connect the keyless access CM connector. 2) Using a tester, measure the voltage between keyless access CM connectors. ***Connector & terminal*** ***(B574) No. 4 (+) — Chassis ground (–):***	Is the voltage 1 V or less → 9.5 — 16 V when OFF → ACC ON?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

M: DTC B2275 ENGINE START REQUEST CONTROL CIRCUIT

DTC DETECTING CONDITION:

- When malfunction is detected in engine start permission signal output circuit in the keyless access CM.
- When malfunction is detected in external engine start permission signal circuit.

TROUBLE SYMPTOM:

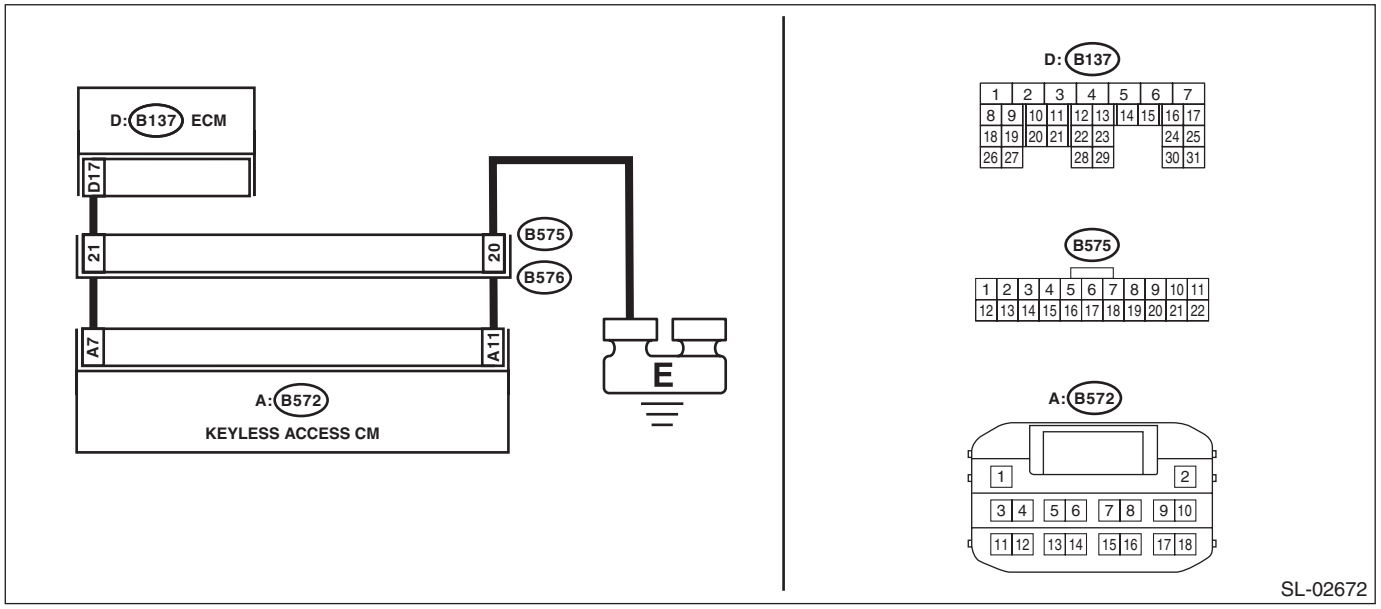
Engine will not start.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK FUSE.** Check the fuse. <Ref. to SL-10, Relay and Fuse.>	Is the fuse OK?	Go to step **3**.	Replace the fuse. When the replaced fuse is blown immediately, check the power supply circuit for short-circuited.
3	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector and ECM connector. 2) Using a tester, measure the resistance between the keyless access CM connector and ECM. ***Connector & terminal*** ***(B572) No. 7 — (B137) No. 17:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 7 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK KEYLESS ACCESS CM.** 1) Connect the keyless access CM connector and ECM connector. 2) Using a tester, measure the voltage between the terminals of keyless access CM connector. ***Connector & terminal*** ***(B572) No. 7 (+) — (B572) No. 11 (–):***	Is the voltage 2 V or less → 9 V or more when the push button ignition switch is turned on while depressing the brake pedal with the shift position in P or N?	Perform inspection according to the diagnosis of engine. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

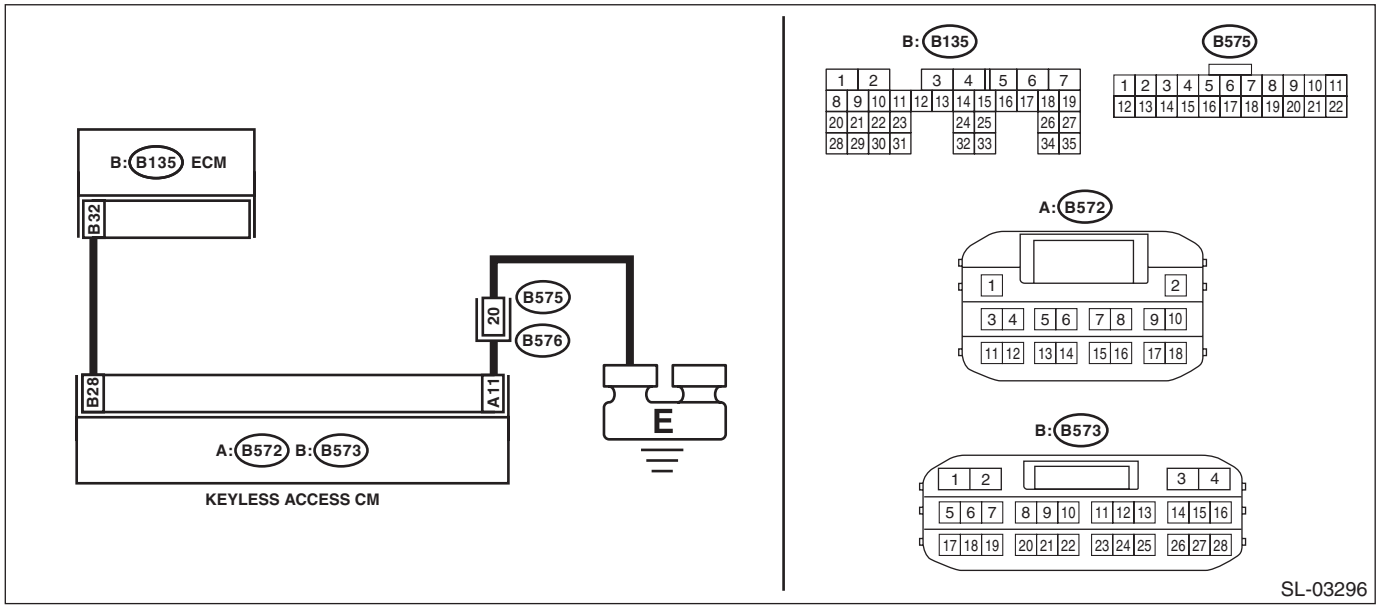
N: DTC B2276 ACC RELAY OFF SIGNAL

DTC DETECTING CONDITION:
When input error occurs in accessory relay cut input signal of keyless access CM.

TROUBLE SYMPTOM:
- The accessory power supply is not cut during engine start.
- Starter rotation is slow.

CAUTION:
For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:
Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector and ECM connector. 2) Using a tester, measure the resistance between the keyless access CM connector and ECM. ***Connector & terminal*** ***(B573) No. 28 — (B135) No. 32:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B573) No. 28 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
5	**CHECK KEYLESS ACCESS CM.** 1) Connect the keyless access CM connector and ECM connector. 2) Using a tester, measure the voltage between terminals of the keyless access CM connector when the push button ignition switch is pressed, while depressing the brake pedal with the shift lever in the “P” range. ***Connector & terminal*** ***(B573) No. 28 (+) — (B572) No. 11 (–):***	Is the voltage 9.5 — 16 V → 1 V or less?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).>

O: DTC B2277 SUBMERGING CIRCUIT

DTC DETECTING CONDITION:

When the water-submersion detection circuit integrated into the keyless access CM detects the water submersion.

TROUBLE SYMPTOM:

- The ignition can be turned ON, but cannot be turned OFF.
- Engine will not start.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK SUBMERSION CONDITION.** Check the keyless access CM and environment of equipment, and check the harness for any trace of water submersion.	Is there any trace of water submersion?	Take necessary measures against water submersion and replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

P: DTC B2282 VEHICLE SPEED SIGNAL CORRELATION

DTC DETECTING CONDITION:

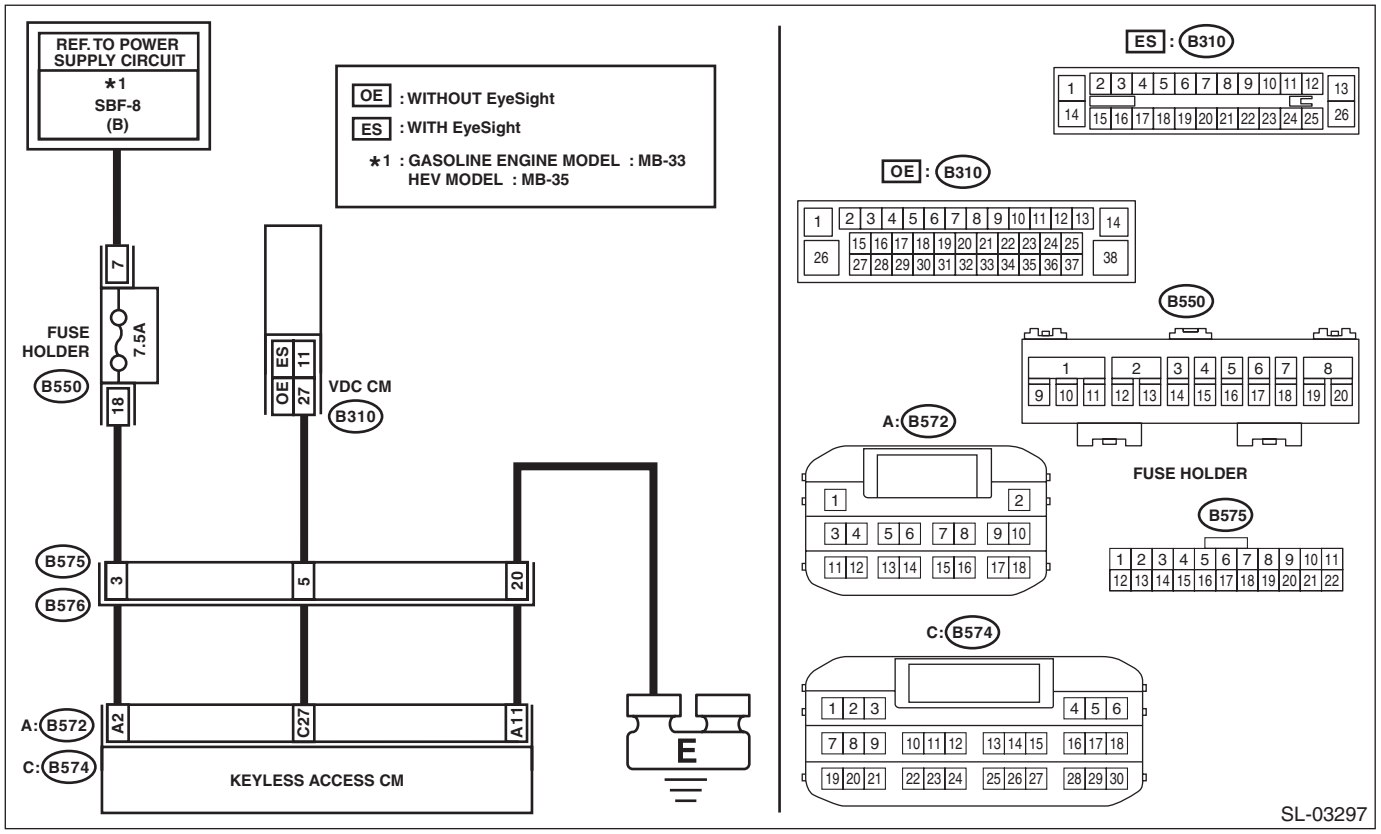
When the vehicle speed signal transmitted from VDC via solid line and the vehicle speed signal transmitted via CAN communication line do not match.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK COMBINATION METER.** Check that the speedometer is displayed normally.	Is the meter display normal?	Go to step **3**.	Check the VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> • «Vehicle speed signal»	Is the display normal according to the parked state or driving state?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the combination meter connector. 3) Using a tester, measure the resistance between the keyless access CM connector and VDC CM connector. ***Connector & terminal*** ***Without EyeSight*** ***(B574) No. 27 — (B310) No. 27:*** ***With EyeSight*** ***(B574) No. 27 — (B310) No. 11:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 27 — Chassis ground:***	Is the resistance 30 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK KEYLESS ACCESS CM.** 1) Connect each connector. 2) Using the Subaru Select Monitor, measure the waveform between the terminals of keyless access CM. ***Connector & terminal*** ***(B574) No. 27 — Chassis ground:***	Is 3.54 Hz displayed when the vehicle is driven at approx. 5 km/h? Or does the value change from 3.54 Hz when the vehicle stops?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Check the VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

Q: DTC B2283 VEHICLE SPEED SENSOR

DTC DETECTING CONDITION:

Either of the following malfunctions is detected. (Vehicle speed sensor failure is detected.)

- Vehicle speed signal failure detection 1: Excessive deceleration detection
- Vehicle speed signal failure detection 2: Engine speed interlock detection

TROUBLE SYMPTOM:

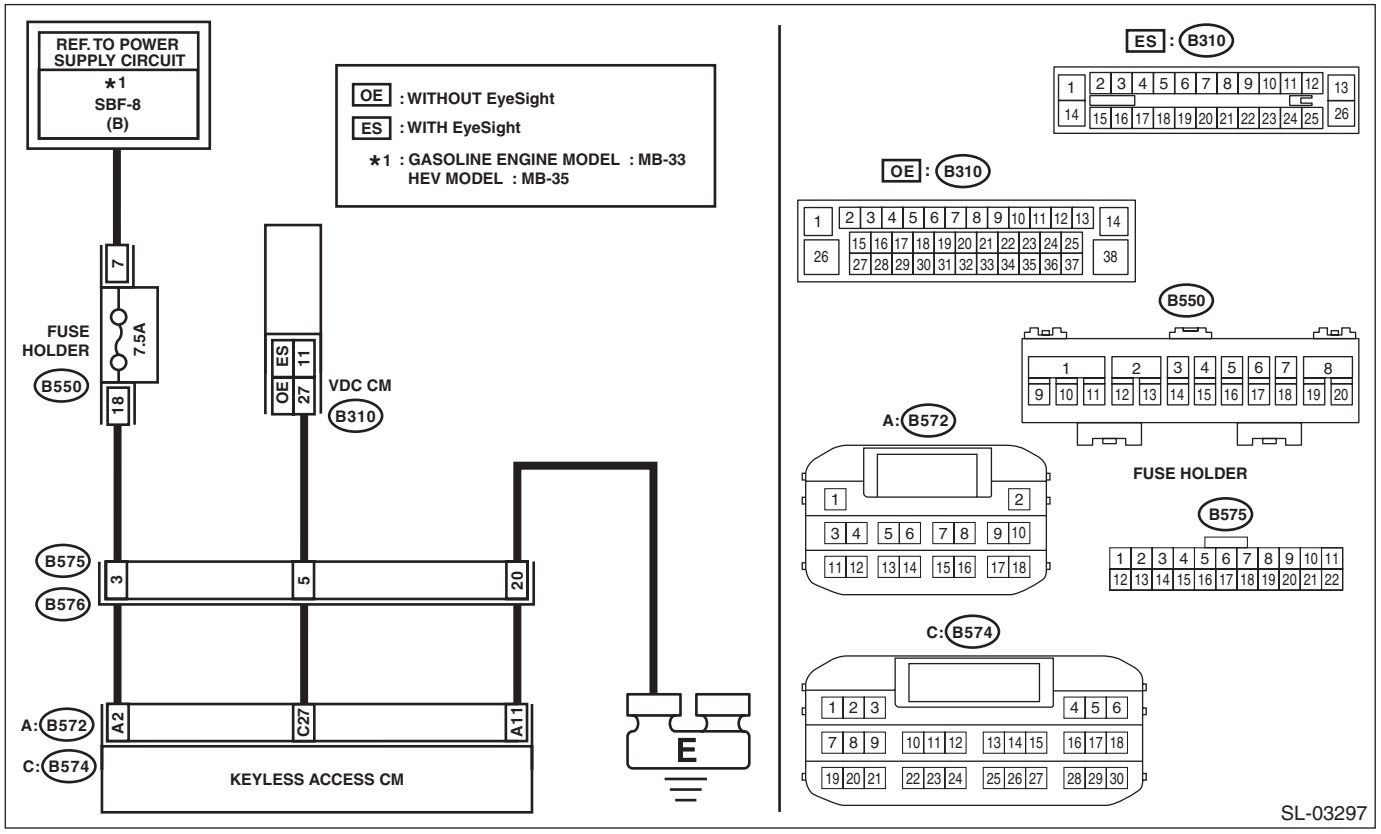
The steering lock cannot be released.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK COMBINATION METER.** Check that the speedometer is displayed normally.	Is the meter display normal?	Go to step **3**.	Check the VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> • «Vehicle speed signal»	Is the display normal according to the parked state or driving state?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the combination meter connector. 3) Using a tester, measure the resistance between the keyless access CM connector and VDC CM connector. ***Connector & terminal*** ***Without EyeSight*** ***(B574) No. 27 — (B310) No. 27:*** ***With EyeSight*** ***(B574) No. 27 — (B310) No. 11:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 27 — Chassis ground:***	Is the resistance 30 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK KEYLESS ACCESS CM.** 1) Connect each connector. 2) Using the Subaru Select Monitor, measure the waveform between the terminals of keyless access CM. ***Connector & terminal*** ***(B574) No. 27 — Chassis ground:***	Is 3.54 Hz displayed when the vehicle is driven at approx. 5 km/h? Or does the value change from 3.54 Hz when the vehicle stops?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Check the VDC. <Ref. to VDC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

R: DTC B2284 BRAKE SIGNAL CORRELATION

DTC DETECTING CONDITION:

When the brake signal transmitted via the hard wire and the brake signal transmitted from body integrated unit via CAN communication line do not match.

TROUBLE SYMPTOM:

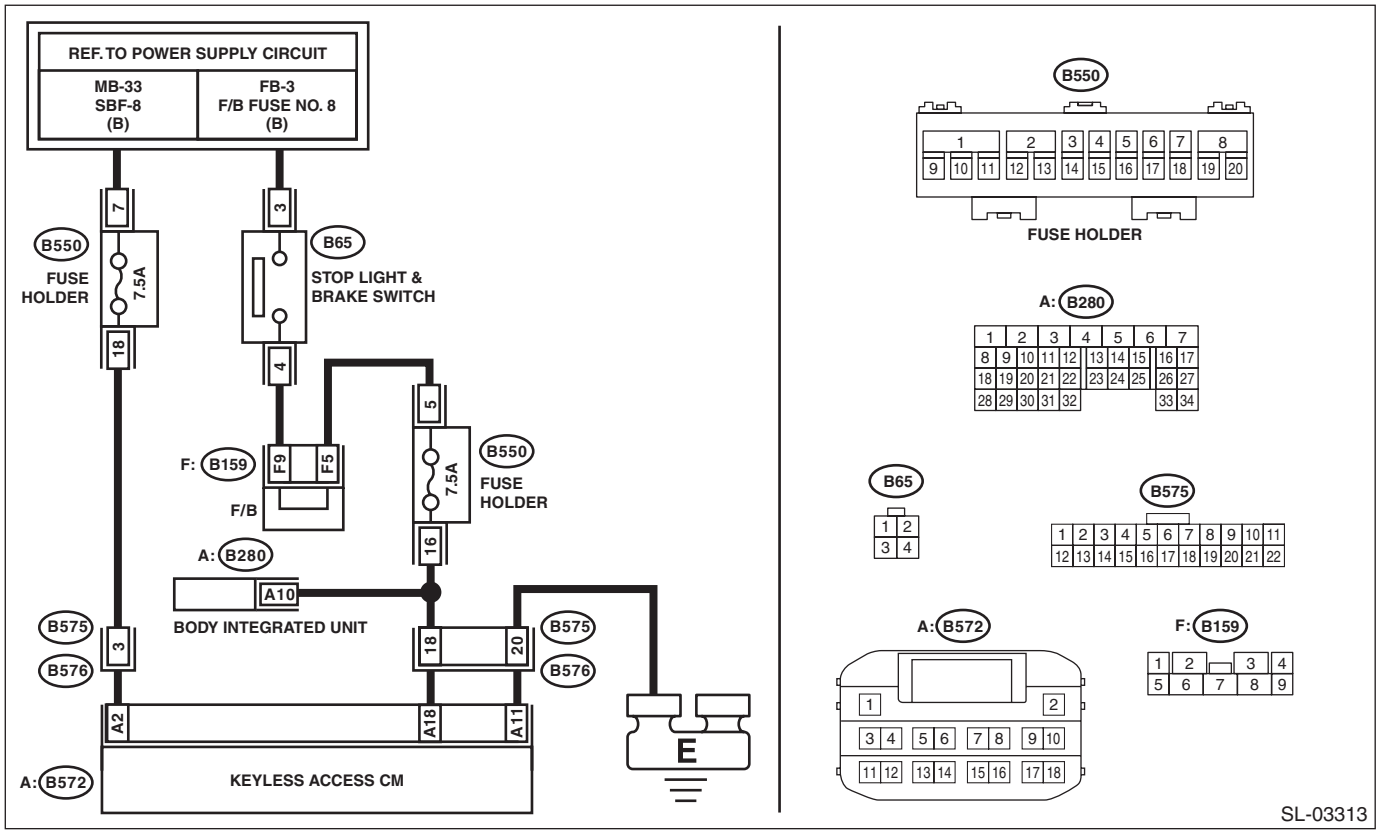
CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

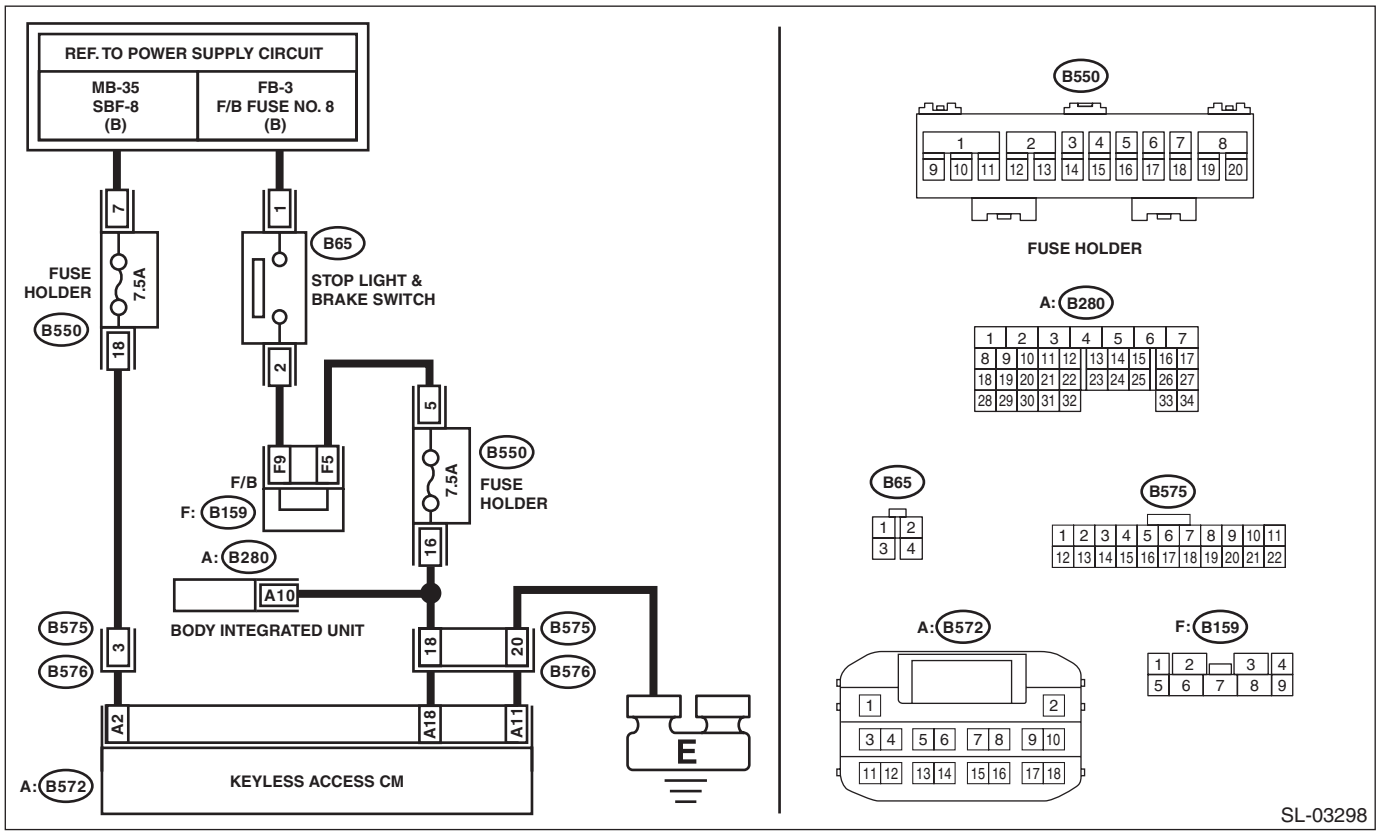
- Gasoline engine model

Stop light system <Ref. to WI(w/o HEV)-219, WIRING DIAGRAM, Stop Light System.>
Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.>



- HEV model

Stop light system <Ref. to WI(HEV)-191, WIRING DIAGRAM, Stop Light System.>
Push button start system <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK CURRENT DATA.** Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> • «Stop light SW»	Is DTC displayed normally according to the brake pedal operation?	Go to step **3**.	Check the stop light system.
3	**CHECK CURRENT DATA.** Confirm the current data display of «Body Control» using Subaru Select Monitor. <Ref. to BC(diag)-12, Read Current Data.> • «Stop light SW»	Is DTC displayed normally according to the brake pedal operation?	Go to step **4**.	Check body integrated unit <Ref. to BC(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> and the stop light switch circuit.
4	**CHECK FUSE.** Check the fuse. <Ref. to SL-10, Relay and Fuse.>	Is the fuse OK?	Go to step **5**.	Replace the fuse. When the replaced fuse is blown immediately, check the power supply circuit for short-circuited.

	Step	Check	Yes	No
5	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the voltage between keyless access CM connectors. ***Connector & terminal*** ***(B572) No. 2 (+) — Chassis ground (–):***	Is the voltage 9.5 — 16 V?	Go to step **6**.	Check the power supply circuit.
6	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK HARNESS.** 1) Disconnect the stop light switch connector. 2) Using a tester, measure the resistance between the keyless access CM connector and stop light switch connector. ***Connector & terminal*** ***Gasoline engine model*** ***(B572) No. 18 — (B65) No. 4:*** ***HEV model*** ***(B572) No. 18 — (B65) No. 2:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair or replace the open circuit of harness.
8	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 18 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **9**.	Repair or replace the short circuit of the harness.
9	**CHECK HARNESS.** Using a tester, measure the voltage between the keyless access CM connector and chassis ground when the brake pedal is depressed. ***Connector & terminal*** ***(B572) No. 18 (+) — Chassis ground (–):***	Does the voltage change as follows? Brake pedal not depressed: 1 V or less → Brake pedal depressed: 11 — 14 V	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>	Check the power supply circuit of stop light switch.

S: DTC B2285 STEERING LOCK POSITION SIGNAL CORRELATION

DTC DETECTING CONDITION:

When the steering lock position signal transmitted from the steering lock CM via solid line and the steering lock position signal transmitted via LIN communication system do not match.

TROUBLE SYMPTOM:

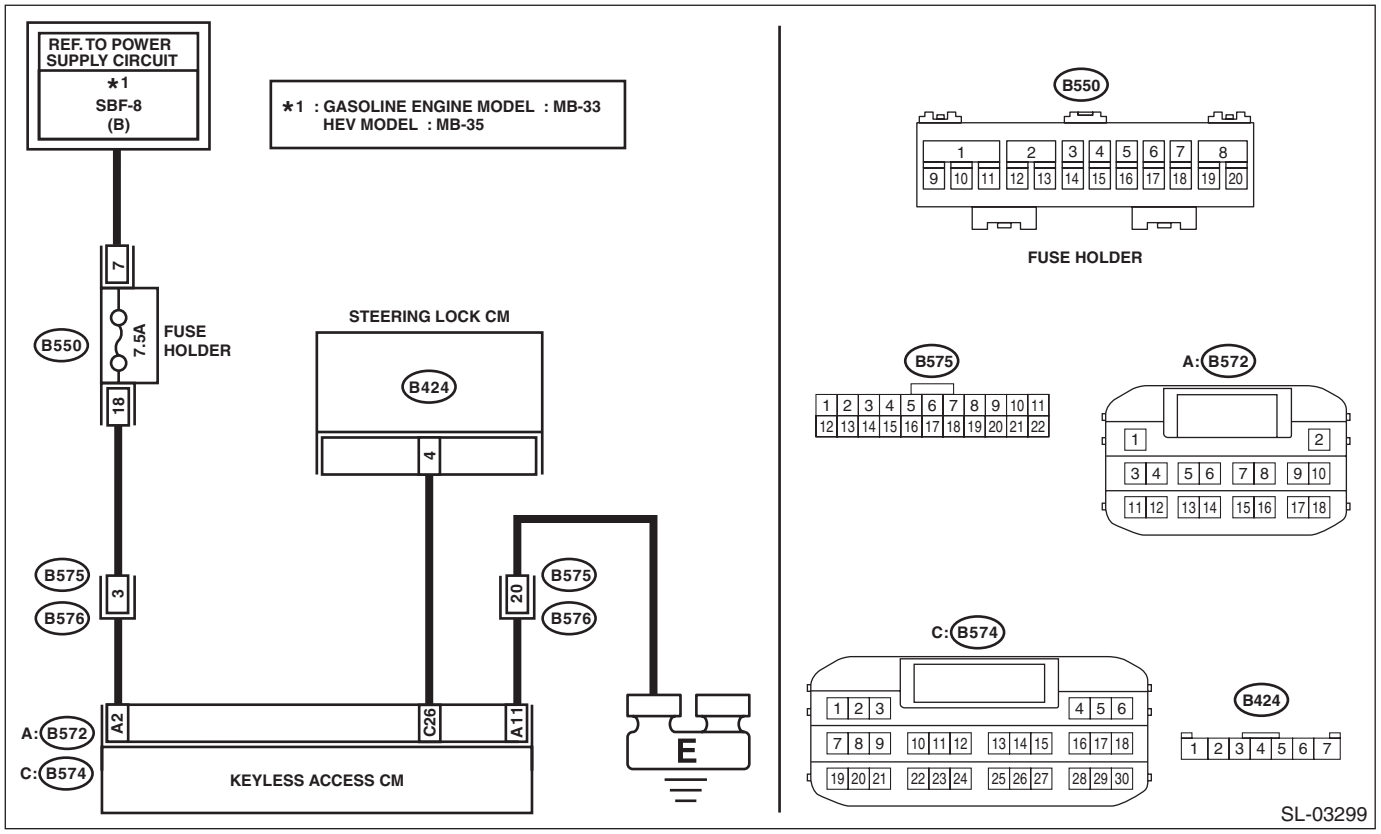
- There are conditions when the steering lock is not released.
- Engine will not start.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK DTC.** Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2785 displayed?	Perform the inspection according to DTC B2785. <Ref. to KPS(diag)-75, DTC B2785 LIN COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> When locked: • Lock side sensor status: ON • Unlock side sensor status: OFF • Lock confirmation: Confirmed • Unlock confirmation: Not confirmed When unlocked: • Lock side sensor status: OFF • Unlock side sensor status: ON • Lock confirmation: Not confirmed • Unlock confirmation: Confirmed NOTE: To lock the steering lock, turn off the power, and open → close, or close → open the driver's door. To unlock the steering lock, turn the ignition switch to ACC ON or IGN ON.	Are the readings as shown on the left according to the steering lock status?	Go to step **4**.	Replace the steering lock CM. <Ref. to SL-105, REMOVAL, Steering Lock CM.>
4	**CHECK CURRENT DATA.** Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> When locked: • Steering unlock switch: OFF When unlocked: • Steering unlock switch: ON NOTE: To lock the steering lock, turn off the power, and open → close, or close → open the driver's door. To unlock the steering lock, turn the ignition switch to ACC ON or IGN ON.	Are the readings as shown on the left according to the steering lock status?	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>	Go to step **5**.
5	**CHECK FUSE.** Check the fuse. <Ref. to SL-10, Relay and Fuse.>	Is the fuse OK?	Go to step **6**.	Replace the fuse. When the replaced fuse is blown immediately, check the power supply circuit for short-circuited.
6	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the voltage between keyless access CM connectors. ***Connector & terminal*** ***(B572) No. 2 (+) — Chassis ground (–):***	Is the voltage 9.5 — 16 V?	Go to step **7**.	Check the power supply circuit.
7	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair or replace the open circuit of harness.
8	**CHECK HARNESS.** Using a tester, measure the resistance between the steering lock CM connector and chassis ground. ***Connector & terminal*** ***(B424) No. 4 — Chassis ground:***	Does the following occur? Steering lock: 10 kΩ or more → Steering unlock: less than 1 Ω	Go to step **9**.	Replace the steering lock CM. <Ref. to SL-105, REMOVAL, Steering Lock CM.>

	Step	Check	Yes	No
9	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the steering lock CM connector. 3) Using a tester, measure the resistance between the keyless access CM connector and steering lock CM. ***Connector & terminal*** ***(B574) No. 26 — (B424) No. 4:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair or replace the open circuit of harness.
10	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 26 — Chassis ground:***	Is the resistance 10 kΩ or more?	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>	Repair or replace the short circuit of the harness.

T: DTC B2286 ENGINE SPEED SIGNAL(WITHOUT Auto Start Stop)

DTC DETECTING CONDITION:

When the engine speed signal transmitted from the ECM via solid line and the engine speed signal transmitted from the ECM via CAN communication line do not match.

TROUBLE SYMPTOM:

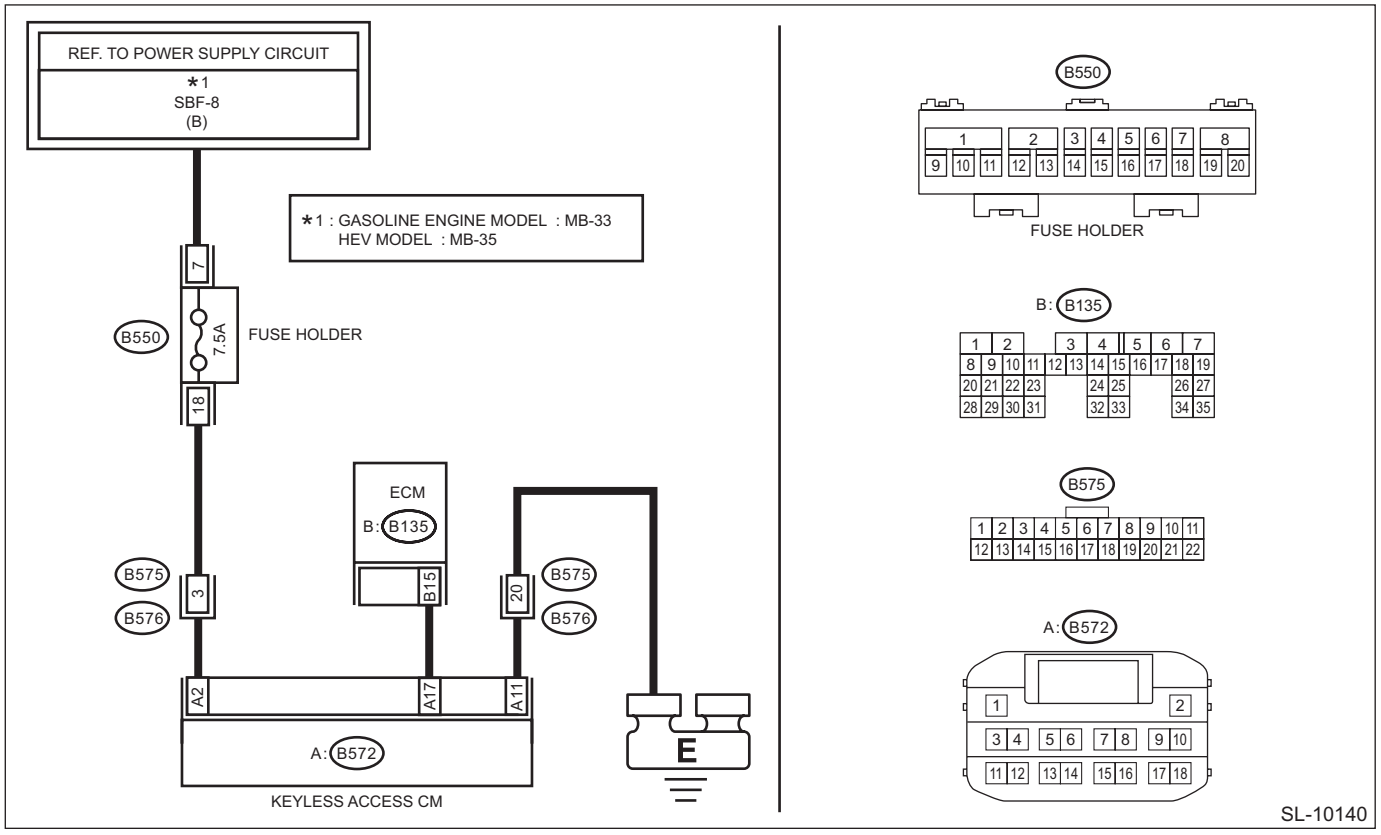
Cannot start the engine, or the engine stops after starting.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.

	Step	Check	Yes	No
2	**CHECK COMBINATION METER.** Confirm that the speedometer is displayed normally.	Is the meter display normal?	Go to step **3**.	Perform the diagnosis for the engine. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
3	**CHECK CURRENT DATA.** Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> • «Engine speed»	Can the data be read normally?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the ECM connector. 3) Using a tester, measure the resistance between the keyless access CM connector and ECM connector. ***Connector & terminal*** ***(B572) No. 17 — (B135) No. 15:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 17 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK HARNESS.** 1) Connect the keyless access CM connector and ECM connector. 2) Using the Subaru Select Monitor, measure the waveform between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 17 — Chassis ground:***	Does the pulse stop when the engine is stopped, and does the pulse generate when the engine is started?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Perform the diagnosis for the engine. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

U: DTC B228A ENGINE SPEED SIGNAL(WITH Auto Start Stop)

DTC DETECTING CONDITION:

When the engine speed signal transmitted from the ECM via solid line and the engine speed signal transmitted from the ECM via CAN communication line do not match.

TROUBLE SYMPTOM:

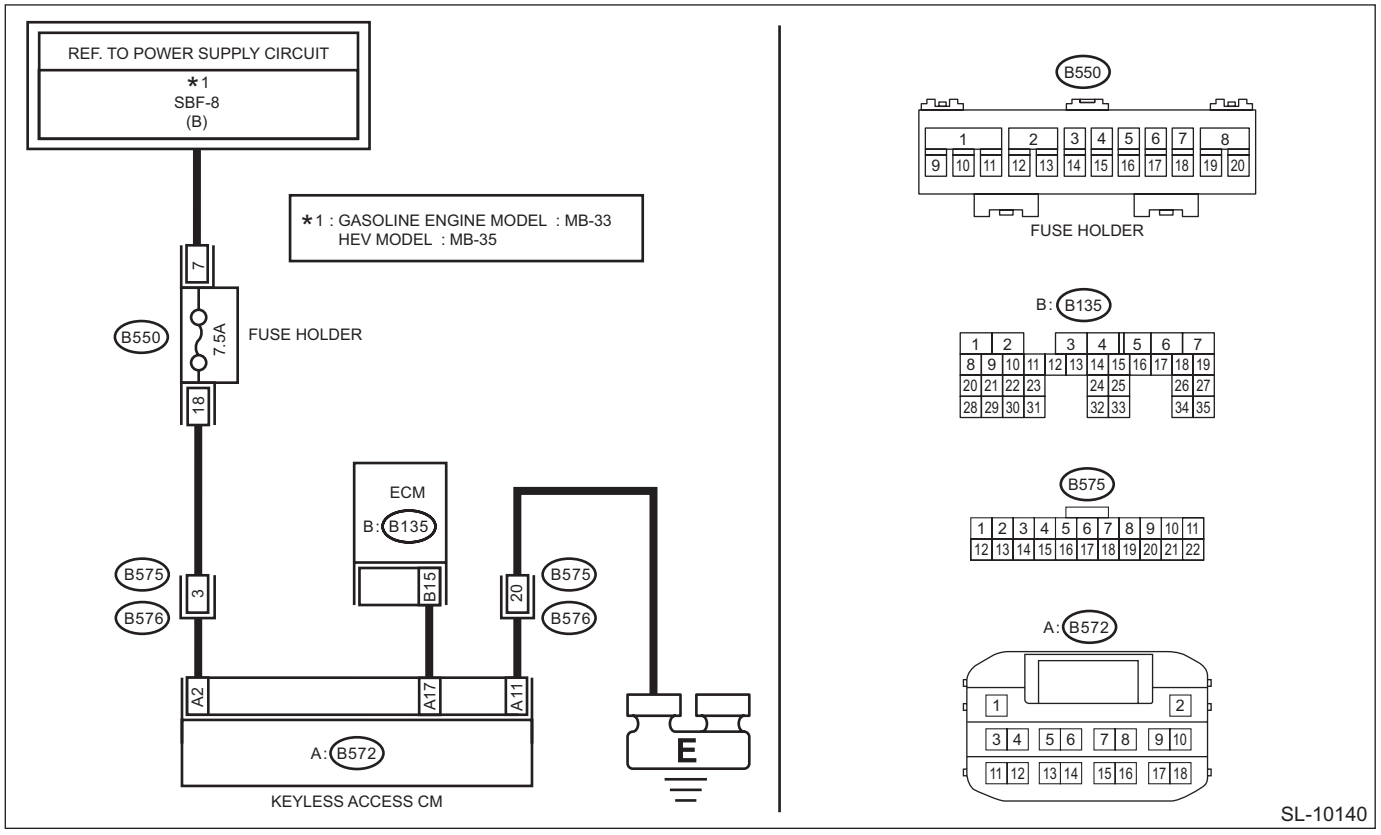
Cannot start the engine, or the engine stops after starting.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.

	Step	Check	Yes	No
2	**CHECK COMBINATION METER.** Confirm that the speedometer is displayed normally.	Is the meter display normal?	Go to step **3**.	Perform the diagnosis for the engine. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
3	**CHECK CURRENT DATA.** Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> • «Engine speed»	Can the data be read normally?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **4**.
4	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the ECM connector. 3) Using a tester, measure the resistance between the keyless access CM connector and ECM connector. ***Connector & terminal*** ***(B572) No. 17 — (B135) No. 15:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 17 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK HARNESS.** 1) Connect the keyless access CM connector and ECM connector. 2) Using the Subaru Select Monitor, measure the waveform between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 17 — Chassis ground:***	Does the pulse stop when the engine is stopped, and does the pulse generate when the engine is started?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Perform the diagnosis for the engine. <Ref. to EN(H4DO w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to EN(H4DO HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

V: DTC B2779 REMOTE CONTROL ENGINE STARTER COLLATION

DTC DETECTING CONDITION:
When the keyless access CM does not respond to engine start even when the remote control engine starter is ON, or when there is a code mismatch.
TROUBLE SYMPTOM:
Remote engine starter does not function.

Step		Check	Yes	No
1	**REGISTER THE REMOTE ENGINE STARTER.** 1) Clear the DTC. <Ref. to KPS(diag)-35, Clear Memory Mode.> 2) Register the remote engine starter using the Subaru Select Monitor. (Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.) NOTE: When the registration failed, refer to "Correspondence table when registration is not possible" in the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume. 3) Read the DTC again. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2779 displayed?	Replace the remote engine starter.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

W: DTC B2781 STEERING LOCK CM CONTROL CIRCUIT

DTC DETECTING CONDITION:
- When malfunction is detected in lock/unlock position detection sensor.
- When the open or short circuit in the steering lock motor drive circuit is detected.

TROUBLE SYMPTOM:
- The steering lock cannot be released.
- Engine will not start.

CAUTION:
For replacement procedure of steering lock CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

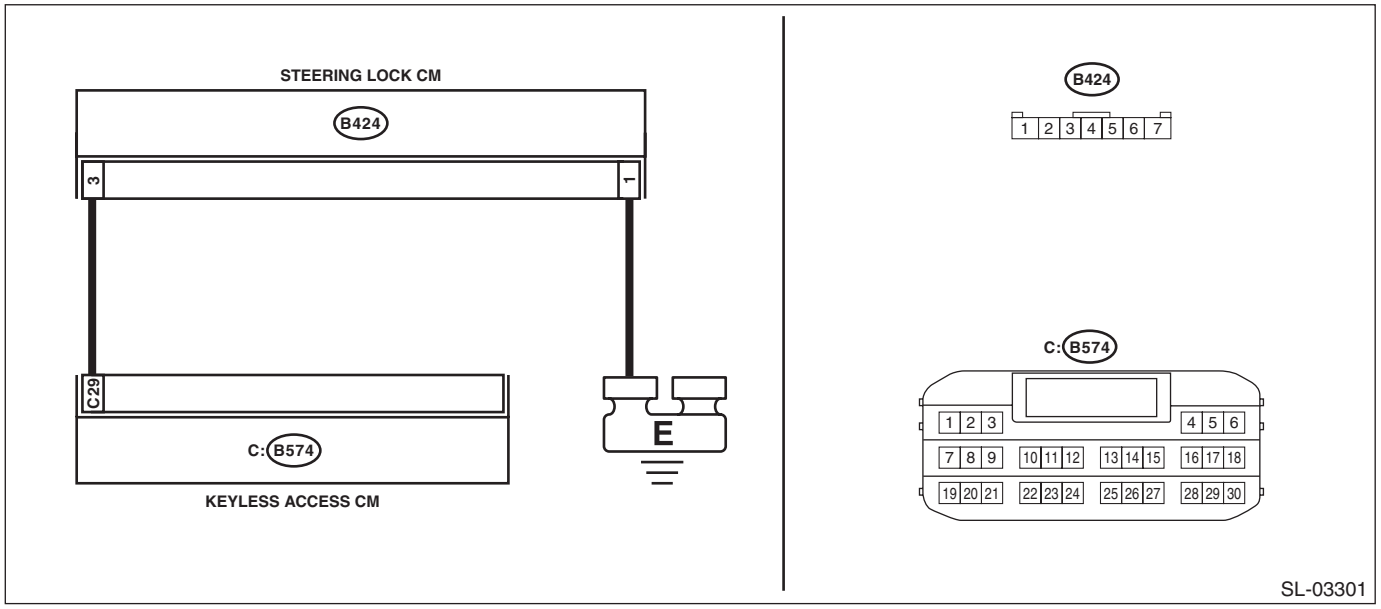
NOTE:
When all ECMs connected to collation system LIN bus cannot communicate with the keyless access CM, DTC B2785 is output.

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2785 displayed?	Perform the diagnosis according to DTC. <Ref. to KPS(diag)-75, DTC B2785 LIN COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Replace the steering lock CM. <Ref. to SL-105, Steering Lock CM.>

X: DTC B2782 STEERING LOCK DRIVE REQUEST SIGNAL CORRELATION

DTC DETECTING CONDITION:
When the open or short circuit in the steering lock motor power supply circuit is detected.
TROUBLE SYMPTOM:
- The steering lock cannot be released.
- Engine will not start.

CAUTION:
For replacement procedure of keyless access CM and steering lock CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



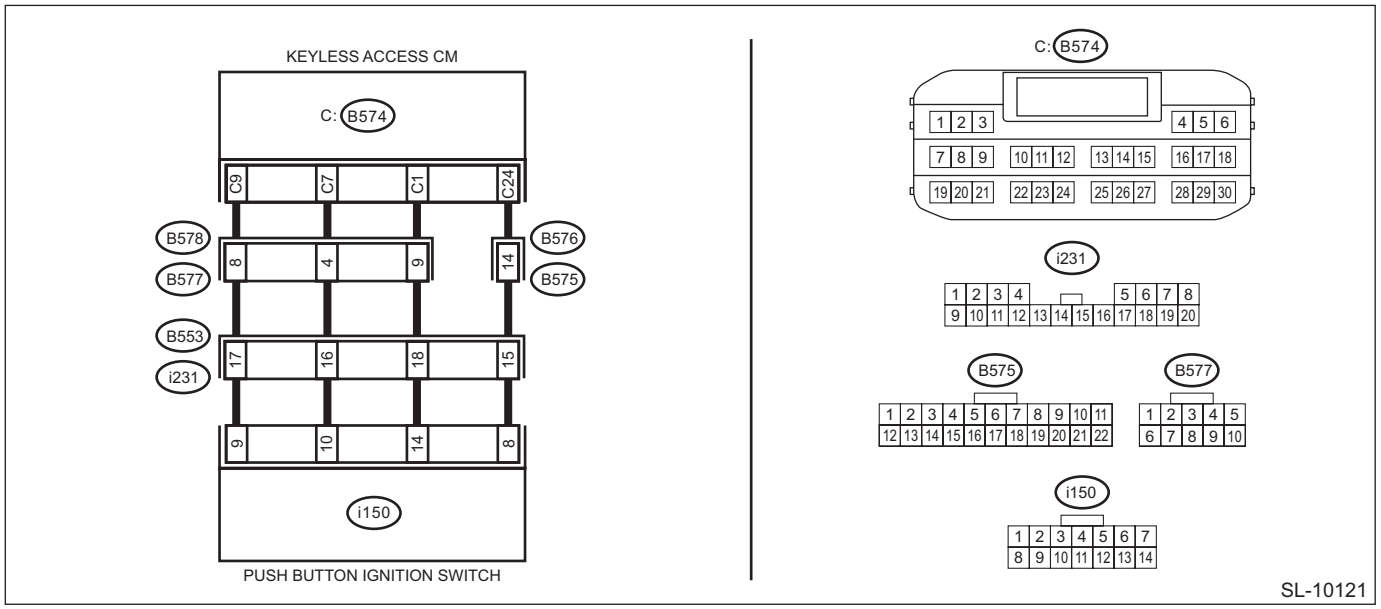
	Step	Check	Yes	No
1	**CHECK STEERING LOCK CM.** 1) Disconnect the steering lock CM connector. 2) Using a tester, measure the resistance between the steering lock CM connector and chassis ground. ***Connector & terminal*** ***(B424) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair or replace the open circuit of harness.
2	**CHECK STEERING LOCK CM.** 1) Connect the steering lock CM connector. 2) Set to ACC OFF, IGN OFF, and shift position P. 3) Using a tester, open the door, and measure the voltage between terminals of steering CM connector when the steering lock motor is driven. ***Connector & terminal*** ***(B424) No. 3 (+) — (B424) No. 1 (–):***	Does the voltage change as follows? Steering lock motor in operation: 1 V or less → Steering lock motor is stopped: 11 — 14 V	Go to step **3**.	Go to step **4**.

	Step	Check	Yes	No
3	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Turn the ignition switch to OFF. 4) Disconnect the battery ground cable and reconnect it, and then clear the abnormal information displayed on the data monitor. 5) Turn the ignition switch to ON. 6) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2782 displayed?	Replace the steering lock CM. <Ref. to SL-105, Steering Lock CM.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
4	**CHECK CONNECTOR.** 1) Disconnect the steering lock CM connector. 2) Disconnect the keyless access CM connector.	Are connectors normal?	Go to step **5**.	Repair or replace the connector.
5	**CHECK HARNESS.** Using a tester, measure the resistance between steering lock CM connector and keyless access CM connector. ***Connector & terminal*** ***(B574) No. 29 — (B424) No. 3:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK HARNESS.** Using a tester, measure the resistance between steering lock CM connector and chassis ground, and between keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B424) No. 3 — Chassis ground:*** ***(B574) No. 29 — Chassis ground:***	Is the resistance 10 kΩ or more?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Repair or replace the short circuit of the harness.

Y: DTC B2784 ANTENNA CIRCUIT (PUSH ENGINE SWITCH)

DTC DETECTING CONDITION:
When open or short circuit occurs in the antenna coil.
TROUBLE SYMPTOM:
The keyless access function may not be operable.

CAUTION:
For replacement procedure of keyless access CM and steering lock CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.> <Ref. to WI(HEV)-133, WIRING DIAGRAM, Immobilizer System.>



	Step	Check	Yes	No
1	**CHECK STEERING LOCK CM.** 1) Disconnect the push button ignition switch connector. 2) Disconnect the keyless access CM connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i150) No. 14 — (B574) No. 1:*** ***(i150) No. 9 — (B574) No. 9:*** ***(i150) No. 10 — (B574) No. 7:*** ***(i150) No. 8 — (B574) No. 24:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair or replace the open circuit of harness.
2	**CHECK HARNESS.** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i150) No. 14 — Chassis ground:*** ***(i150) No. 9 — Chassis ground:*** ***(i150) No. 10 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **3**.	Repair or replace the short circuit of the harness.

	Step	Check	Yes	No
3	**CHECK PUSH BUTTON IGNITION SWITCH.** 1) Replace the push button ignition switch. <Ref. to SL-107, Push Button Ignition Switch.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2784 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Malfunction occurred in the push button ignition switch.

Z: DTC B2785 LIN COMMUNICATION

DTC DETECTING CONDITION:

When the keyless access CM detected the collation system LIN bus communication error three times in a row.

TROUBLE SYMPTOM:

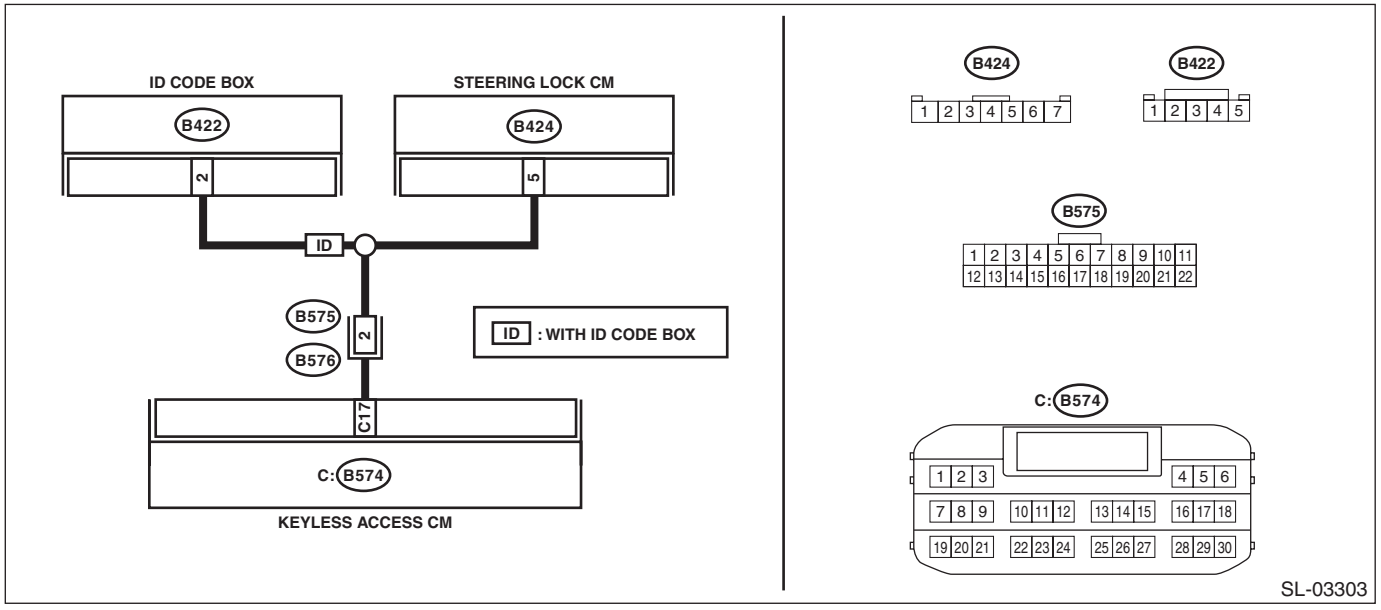
The keyless access function may not be operable.

CAUTION:

For replacement procedure of keyless access CM and steering lock CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK DTC.** 1) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 2) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2785 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the steering lock CM connector. 3) Disconnect the ID code box connector. (With ID code box) 4) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B574) No. 17 — (B424) No. 5:*** ***(B574) No. 17 — (B422) No. 2: (with ID code box)***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B424) No. 5 — Chassis ground:*** ***(B574) No. 17 — Chassis ground:*** ***(B422) No. 5 — Chassis ground: (with ID code box)***	Is the resistance 10 kΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK HARNESS.** 1) Connect the keyless access CM connector only. 2) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2785 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **5**.
5	**CHECK ID CODE BOX.** NOTE: For model without ID code box, go to the next step. 1) Connect the ID code box. 2) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2785 displayed?	Replace the ID code box. <Ref. to SL-104, ID Code Box.>	Go to step **6**.
6	**CHECK STEERING LOCK CM.** 1) Connect the steering lock CM. <Ref. to SL-105, Steering Lock CM.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2785 displayed?	Replace the steering lock CM. <Ref. to SL-105, Steering Lock CM.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

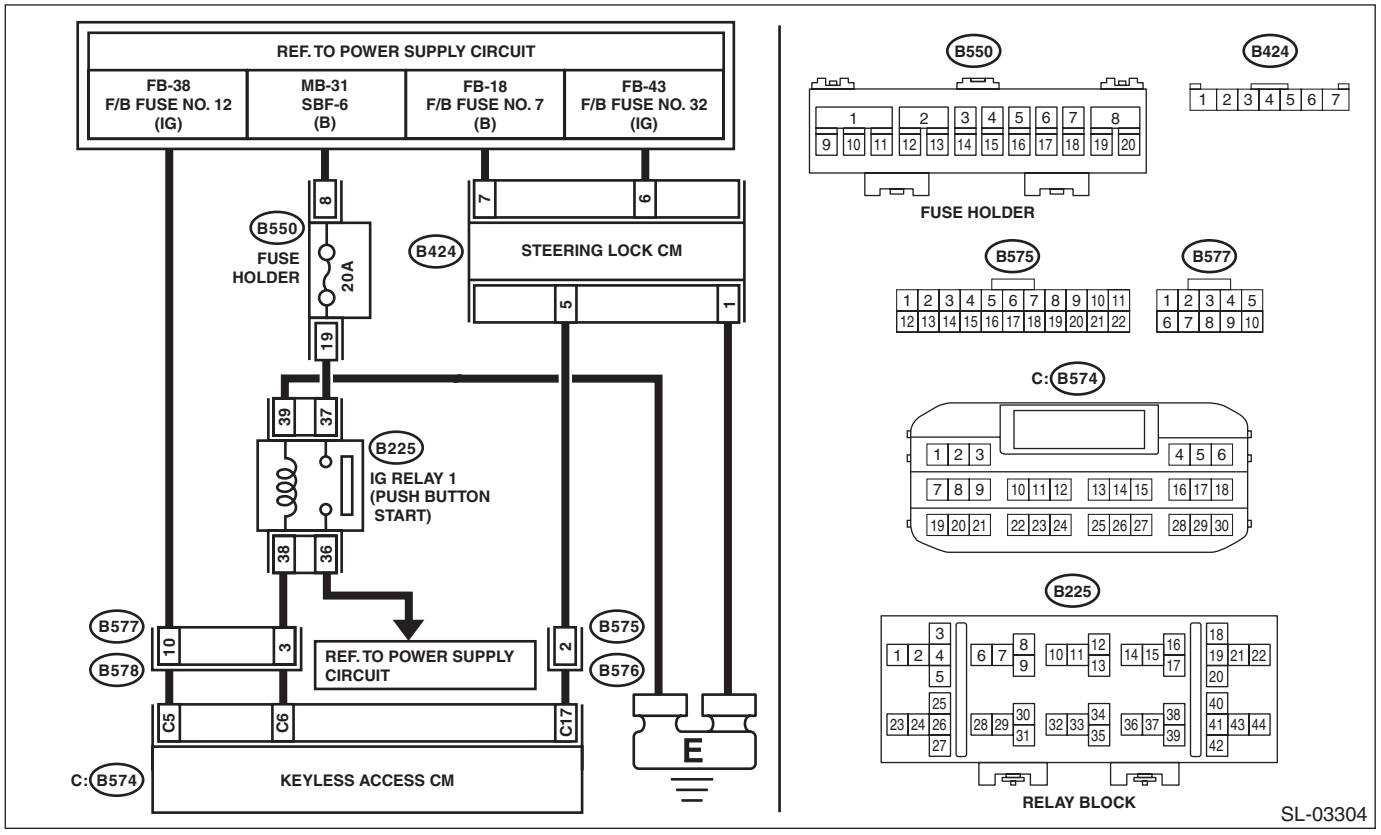
AA:DTC B2786 STEERING LOCK CM COMMUNICATION

DTC DETECTING CONDITION:
When communication between keyless access CM and steering lock CM is interrupted for a set amount of time.

TROUBLE SYMPTOM:
The steering lock cannot be released.

CAUTION:
For replacement procedure of keyless access CM and steering lock CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:
Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is a DTC other than DTC B2786 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the steering lock CM connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B574) No. 17 — (B424) No. 5:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B574) No. 17 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the steering lock CM connector and chassis ground. ***Connector & terminal*** ***(B424) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Using a tester, measure the voltage between the steering lock CM connector and chassis ground. ***Connector & terminal*** ***(B424) No. 6 (+) — Chassis ground (–):*** ***(B424) No. 7 (+) — Chassis ground (–):***	Is the voltage 11 — 14 V?	Go to step **6**.	Repair or replace the faulty portion of the power supply circuit.
6	**CHECK STEERING LOCK CM.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2785 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **7**.
7	**CHECK STEERING LOCK CM.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2786 displayed?	Replace the steering lock CM. <Ref. to SL-105, Steering Lock CM.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

AB:DTC B2788 IGN SIGNAL CORRELATION (STEERING LOCK CM)

DTC DETECTING CONDITION:

When mismatch occurs in the IG1 input of the steering lock CM for both LIN communication line input (IG1 input value of keyless access CM) and solid line input.

TROUBLE SYMPTOM:

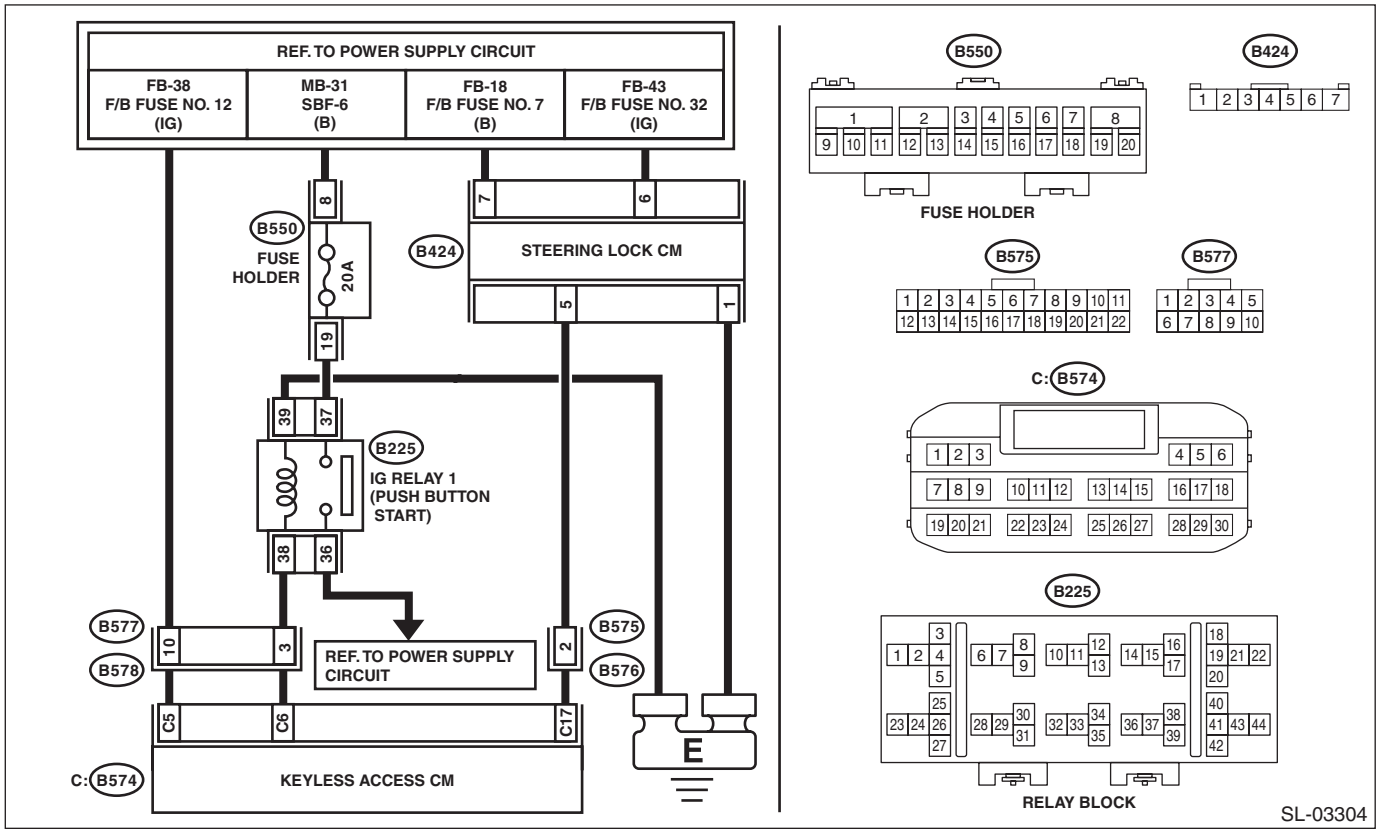
The steering lock cannot be released.

CAUTION:

For replacement procedure of steering lock CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Check the fuse. <Ref. to SL-10, Relay and Fuse.>	Is the fuse OK?	Go to step **2**.	Replace the fuse. When the replaced fuse is blown immediately, check the power supply circuit for short-circuited.
2	**CHECK CURRENT DATA.** Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> • «IGN SW»	Is the display normal according to the ignition switch operation?	Go to step **3**.	Go to step **5**.

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the steering lock CM connector. 2) Using a tester, measure the resistance between the steering lock CM connector and chassis ground. ***Connector & terminal*** ***(B424) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS.** 1) Connect the steering lock CM connector. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B424) No. 6 (+) — (B424) No. 1 (–):***	Is the voltage 11 — 14 V with IG ON? Is the voltage less than 1 V with IG OFF?	Replace the steering lock CM. <Ref. to SL-105, REMOVAL, Steering Lock CM.>	Check the DC power supply circuit.
5	**CHECK DTC.** Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2271 displayed?	Perform the diagnosis according to DTC B2271. <Ref. to KPS(diag)-47, DTC B2271 IGN RELAY CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>

AC:DTC B2789 ID CODE BOX COMMUNICATION

DTC DETECTING CONDITION:

- When communication between keyless access CM and ID code box is interrupted for a set amount of time.
- Open or short circuit in the wiring harness between keyless access CM and ID code box

TROUBLE SYMPTOM:

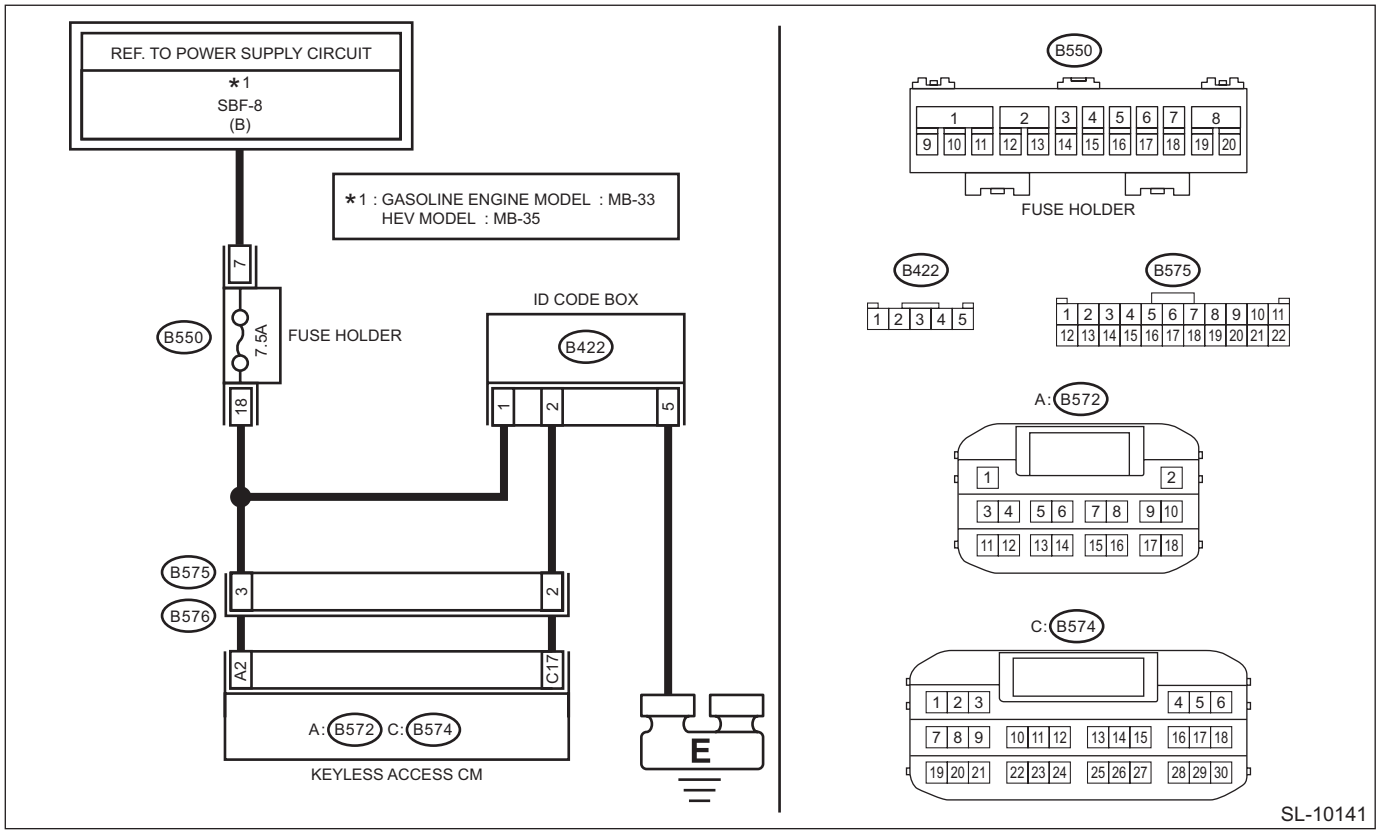
Engine will not start.

CAUTION:

For replacement procedure of keyless access CM and ID code box, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK DTC.** 1) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 2) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2789 displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the ID code box connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B574) No. 17 — (B422) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground, and between ID code box connector and chassis ground. ***Connector & terminal*** ***(B574) No. 17 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between ID code box connector and chassis ground. ***Connector & terminal*** ***(B422) No. 5 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** Using a tester, measure the voltage between ID code box connector and chassis ground. ***Connector & terminal*** ***(B422) No. 1 (+) — Chassis ground (–):***	Is the voltage 11 — 14 V?	Go to step **6**.	Repair or replace the faulty portion of the power supply circuit.
6	**CHECK ID CODE BOX.** 1) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 2) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2785 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **7**.
7	**CHECK STEERING LOCK CM.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2789 displayed?	Replace the ID code box. <Ref. to SL-104, ID Code Box.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

AD:DTC B278A PUSH ENGINE SWITCH POWER SUPPLY CIRCUIT

DTC DETECTING CONDITION:

When the power supply circuit of the push button ignition switch is shorted to ground.

TROUBLE SYMPTOM:

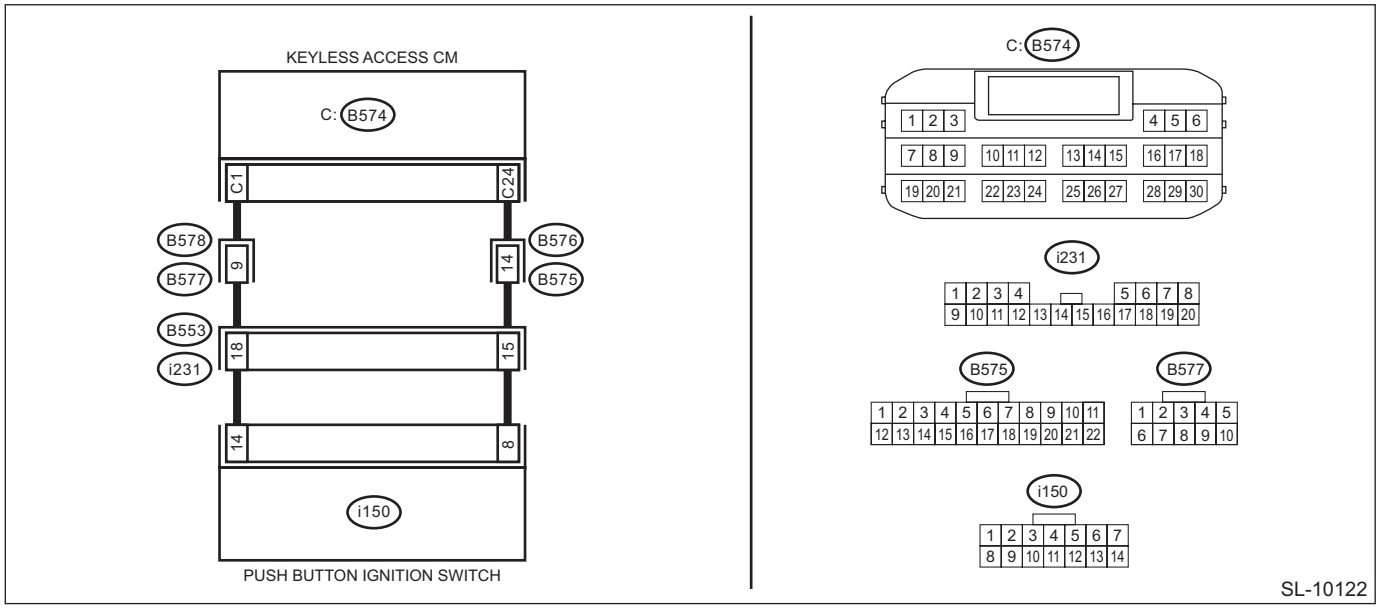
- Engine will not start.
- The keyless access system function does not operate.

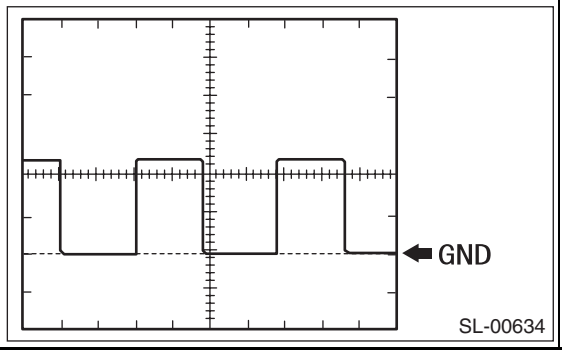
CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.> <Ref. to WI(HEV)-133, WIRING DIAGRAM, Immobilizer System.>



Step		Check	Yes	No
1	**CHECK KEYLESS ACCESS CM.** 1) Turn the ignition switch to OFF. 2) Take the access key out of the passenger room. 3) Push the push button ignition switch. Within 30 seconds, use oscilloscope to measure the waveform between connectors. ***Connector & terminal*** ***(i150) No. 14 — (i150) No. 8:*** 	Is the waveform shown in the left column displayed?	Replace the push button ignition switch. <Ref. to SL-107, Push Button Ignition Switch.>	Go to step **2**.

	Step	Check	Yes	No
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the keyless access CM connector. 2) Disconnect the push button ignition switch connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i150) No. 14 — (B574) No. 1:*** ***(i150) No. 8 — (B574) No. 24:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 1 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 24 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **5**.	Repair or replace the harness.
5	**CHECK DTC.** 1) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 2) Read the DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B278A displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

AE:DTC B278D ID CODE BOX JUDGMENT CIRCUIT

DTC DETECTING CONDITION:

- When ID code box setting is set to OFF, ID code box ON input is detected.
- When ID code box setting is set to OFF, ID code box LIN signal is received.

TROUBLE SYMPTOM:

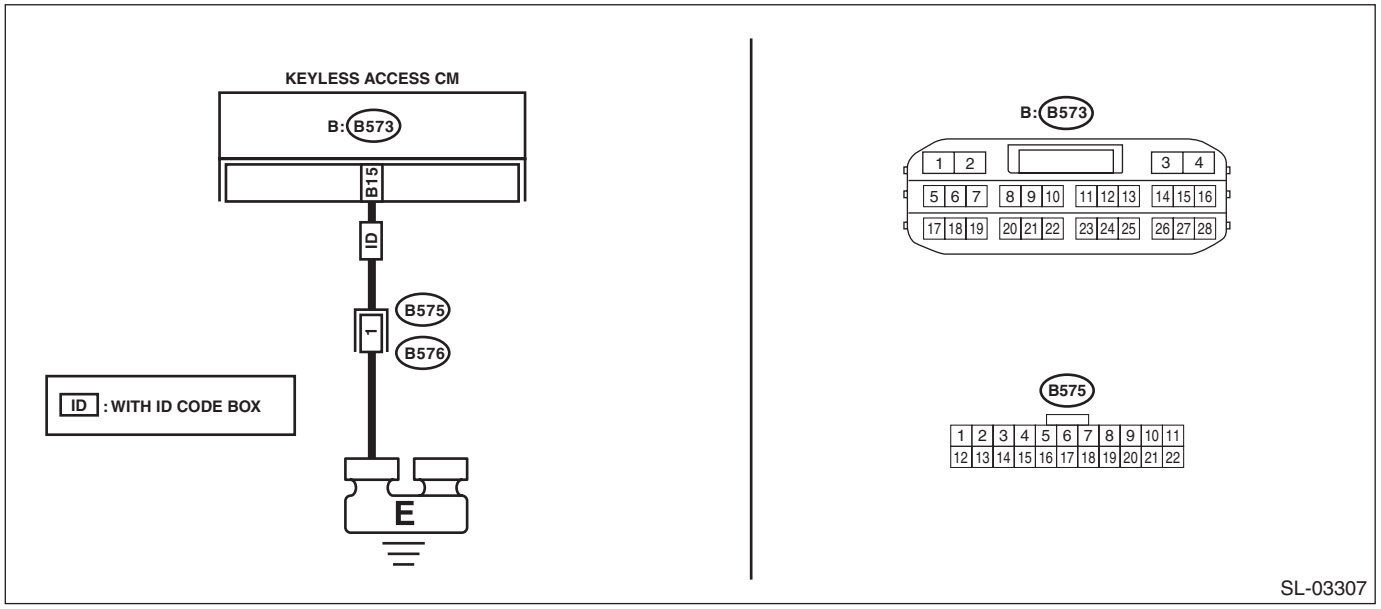
Engine will not start.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



	Step	Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Using the Subaru Select Monitor, clear the memory of «Keyless Access with Push Button Start». <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Turn the ignition switch to OFF → ON. 4) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B278D displayed?	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Measure the resistance between keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B573) No. 15 — Chassis ground:***	Is the resistance 10 kΩ or more?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Repair or replace the short circuit of the harness.

AF:DTC B2790 ID CODE BOX CIRCUIT

DTC DETECTING CONDITION:
An error has occurred inside the ID code box.
TROUBLE SYMPTOM:
Engine will not start.

CAUTION:
For replacement procedure of ID code box, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Using the Subaru Select Monitor, clear the memory of «Keyless Access with Push Button Start». <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Turn the ignition switch to OFF → ON. 4) Register the ID code box. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume. 5) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B2790 displayed?	Replace the ID code box. <Ref. to SL-104, ID Code Box.>	ID code box registration was not performed properly.

AG:DTC B27A1 DRIVER SIDE EXTERNAL ANTENNA OPEN

DTC DETECTING CONDITION:

When open circuit occurs in the harness between keyless access CM and driver's side front door outer handle.

TROUBLE SYMPTOM:

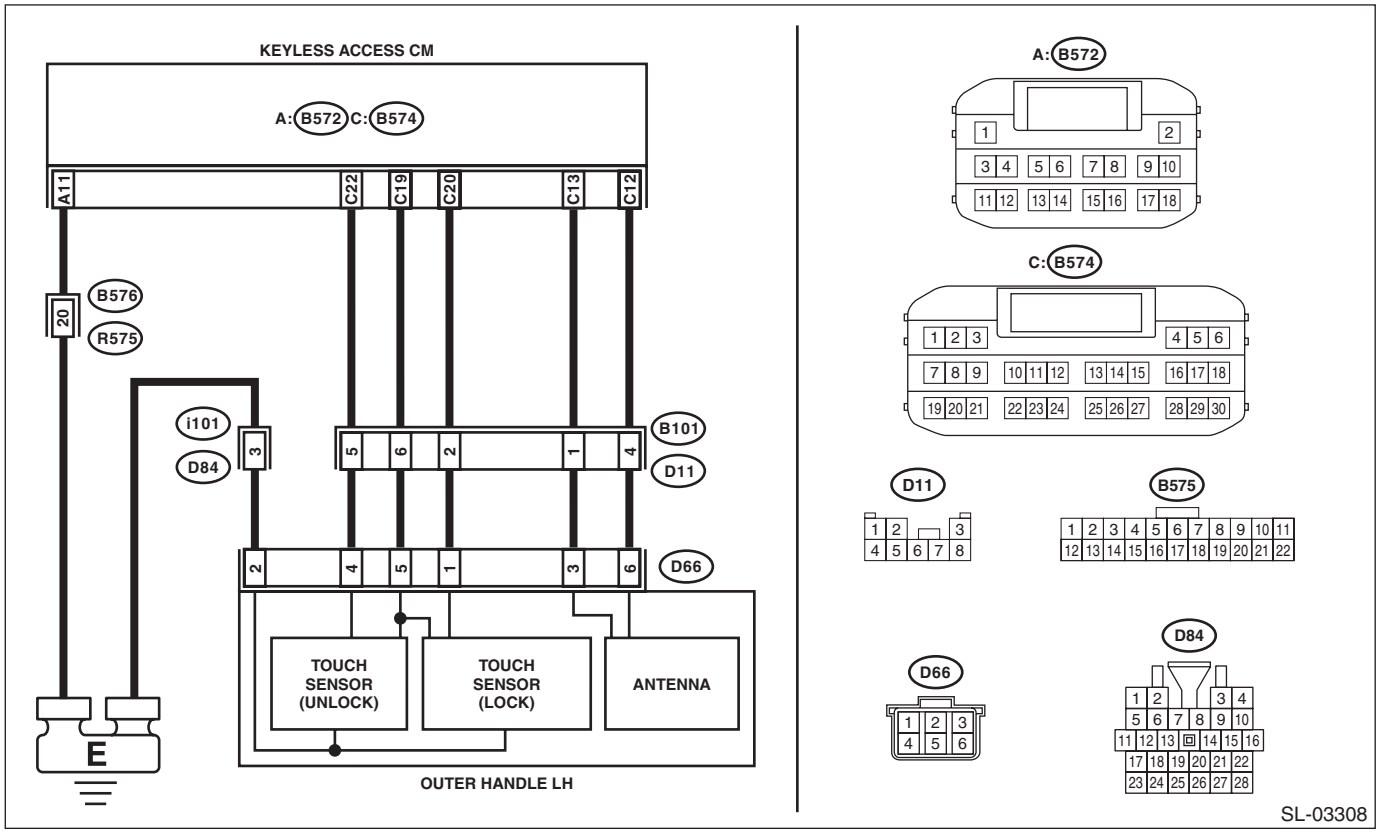
Keyless access system does not function.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Keyless access system <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.> <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK CONNECTOR.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front door outer handle connector.	Is the connector OK?	Go to step **3**.	Repair or replace the connector.

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and front door outer handle connector, and between front door outer handle connector, keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 12 — (D66) No. 6:*** ***(B574) No. 13 — (D66) No. 3:*** ***(D66) No. 2 — Chassis ground:*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 12 — Chassis ground:*** ***(B574) No. 13 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK DTC.** 1) Connect the keyless access CM connector. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A1 displayed?	Go to step **6**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
6	**CHECK FRONT DOOR OUTER HANDLE.** 1) Replace the driver's front door outer handle with the passenger's front door outer handle. <Ref. to SL-35, Front Outer Handle.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A1 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Replace the driver's front door outer handle. <Ref. to SL-35, Front Outer Handle.>

AH:DTC B27A2 PASSENGER SIDE EXTERNAL ANTENNA OPEN

DTC DETECTING CONDITION:

When open circuit occurs in the harness between keyless access CM and passenger's side front door outer handle.

TROUBLE SYMPTOM:

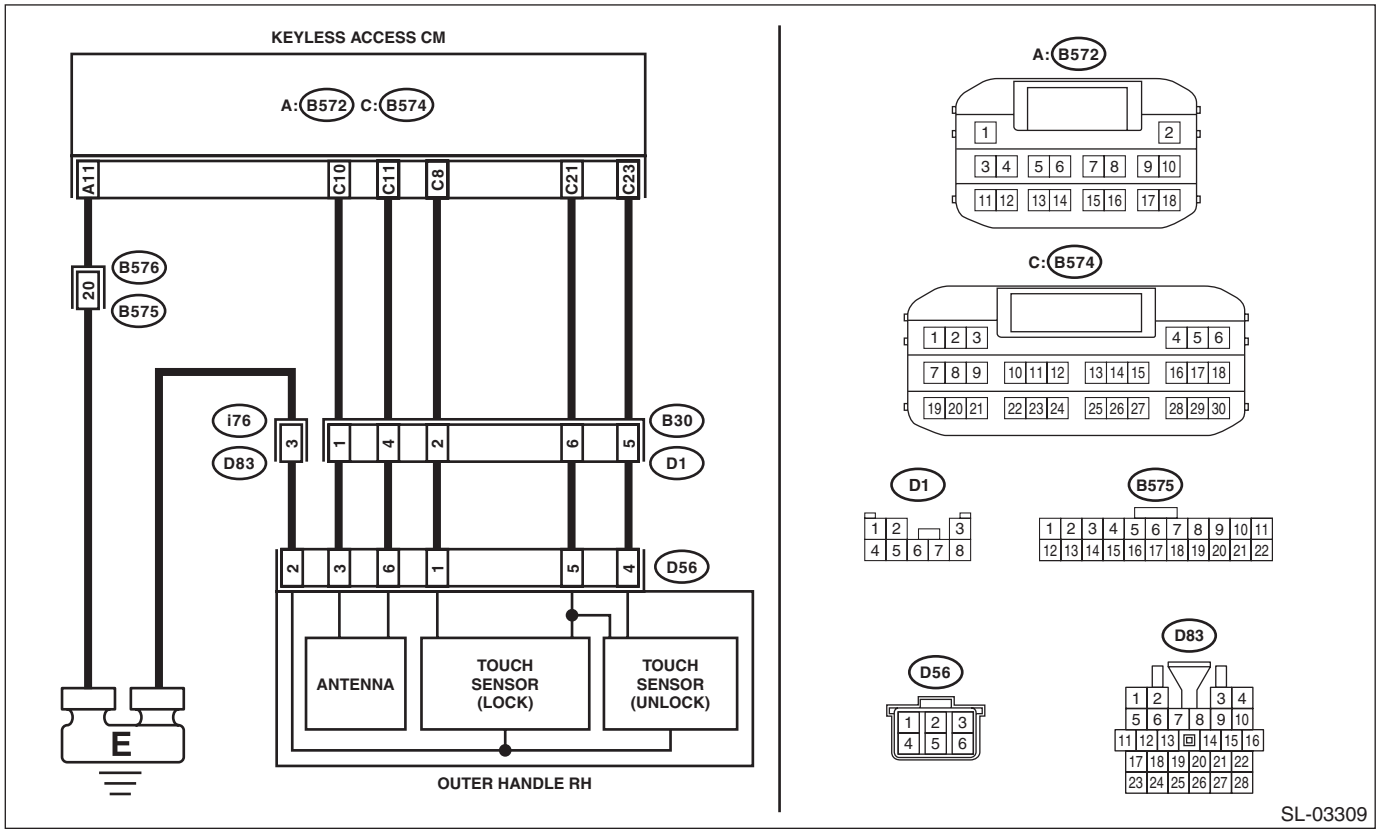
Keyless access system does not function.

CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

Keyless access system <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.> <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>



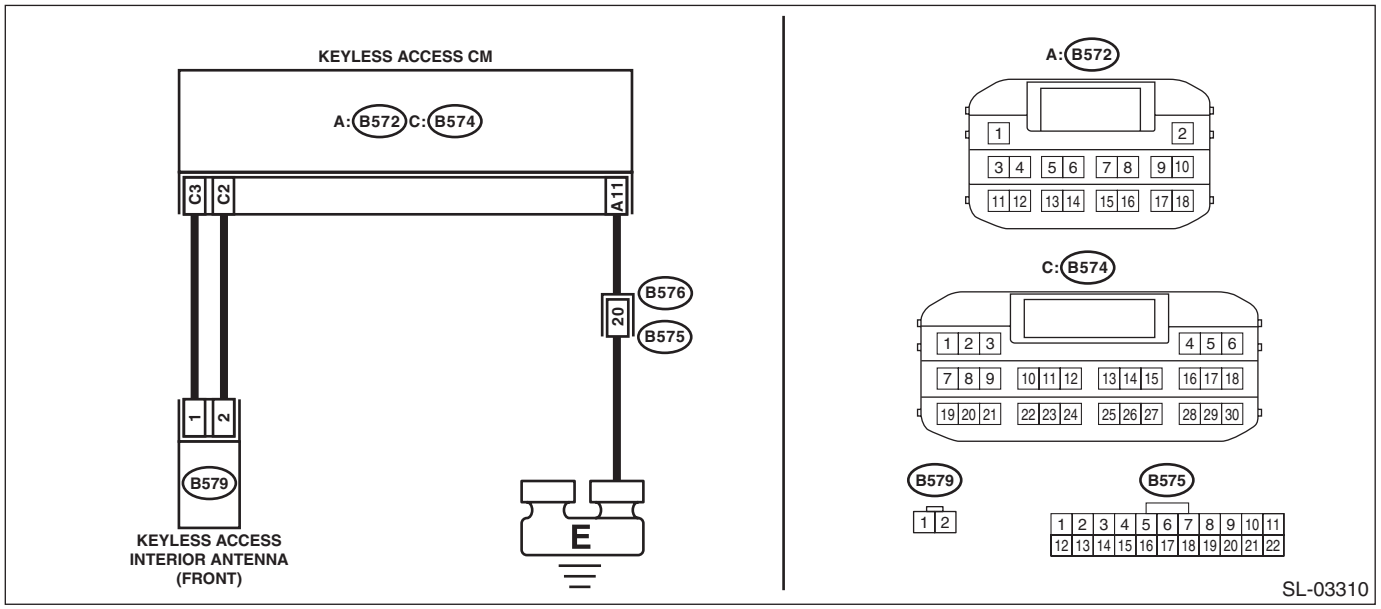
Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK CONNECTOR.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front door outer handle connector.	Is the connector OK?	Go to step **3**.	Repair or replace the connector.

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and front door outer handle connector, and between front door outer handle connector, keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 11 — (D56) No. 6:*** ***(B574) No. 10 — (D56) No. 3:*** ***(D56) No. 2 — Chassis ground:*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 11 — Chassis ground:*** ***(B574) No. 10 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK DTC.** 1) Connect the keyless access CM connector. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A2 displayed?	Go to step **6**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
6	**CHECK FRONT DOOR OUTER HANDLE.** 1) Replace the passenger's front door outer handle with the driver's front door outer handle. <Ref. to SL-35, Front Outer Handle.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A2 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Replace the passenger's front door outer handle. <Ref. to SL-35, Front Outer Handle.>

AI: DTC B27A5 FRONT INTERNAL ANTENNA OPEN

DTC DETECTING CONDITION:
When open circuit occurs in the harness between keyless access CM and front interior antenna.
TROUBLE SYMPTOM:
Keyless access system does not function. (When the access key is in the front area of the passenger room)

CAUTION:
For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
Keyless access system <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.> <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>



	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK CONNECTOR.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front interior antenna connector.	Is the connector OK?	Go to step **3**.	Repair or replace the connector.
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and front interior antenna connector, and between front interior antenna connector, keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 3 — (B579) No. 1:*** ***(B574) No. 2 — (B579) No. 2:*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.

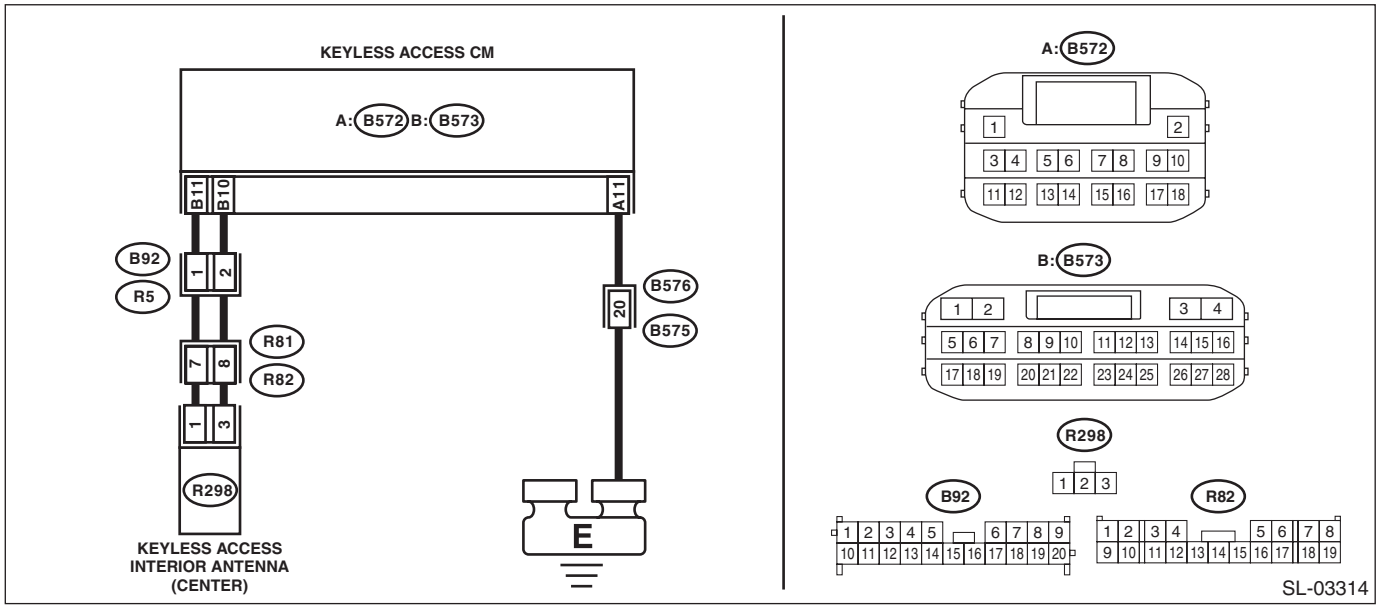
	Step	Check	Yes	No
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 3 — Chassis ground:*** ***(B574) No. 2 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK DTC.** 1) Connect the keyless access CM connector. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A5 displayed?	Go to step **6**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
6	**CHECK FRONT INTERIOR ANTENNA.** 1) Replace the rear interior antenna with the front interior antenna. <Ref. to SL-91, Keyless Access Indoor Antenna.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A5 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Malfunction occurred in the front interior antenna.

AJ:DTC B27A6 REAR INTERNAL ANTENNA OPEN

DTC DETECTING CONDITION:
When open circuit occurs in the harness between keyless access CM and center interior antenna.
TROUBLE SYMPTOM:
Keyless access system does not function. (When the access key is in the rear area of the passenger room (near the seat))

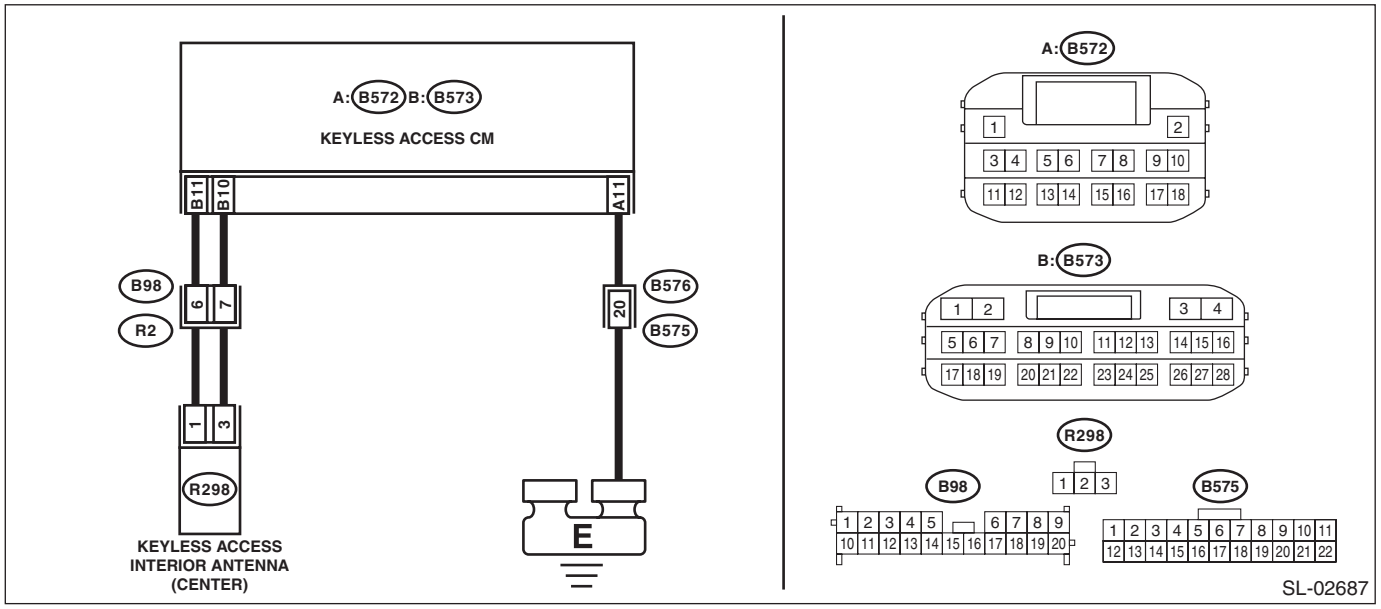
CAUTION:
For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
- Gasoline engine model

Keyless access system <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.>



- HEV model

Keyless access system <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>



	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK CONNECTOR.** 1) Disconnect the keyless access CM connector. 2) Disconnect the center interior antenna connector.	Is the connector OK?	Go to step **3**.	Repair or replace the connector.
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and center interior antenna connector, and between center interior antenna connector, keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B573) No. 10 — (R298) No. 3:*** ***(B573) No. 11 — (R298) No. 1:*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B573) No. 10 — Chassis ground:*** ***(B573) No. 11 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK DTC.** 1) Connect the keyless access CM connector. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A6 displayed?	Go to step **6**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
6	**CHECK CENTER INTERIOR ANTENNA.** 1) Replace the center interior antenna with the front interior antenna. <Ref. to SL-91, Keyless Access Indoor Antenna.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A6 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Malfunction occurred in the center interior antenna.

AK:DTC B27A7 TRUNK/REAR GATE INTERNAL ANTENNA OPEN

DTC DETECTING CONDITION:

When open circuit occurs in the harness between keyless access CM and rear interior antenna.

TROUBLE SYMPTOM:

Keyless access system does not function. (When the access key is in the rear area of the passenger room (in the luggage room or trunk))

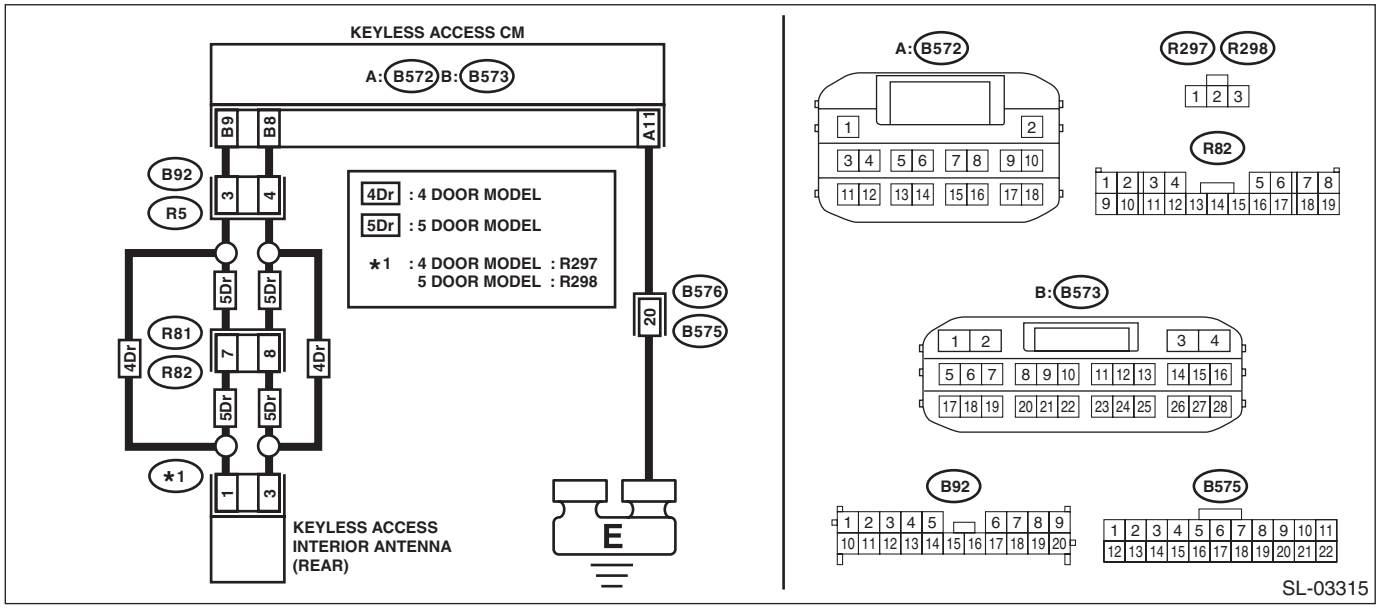
CAUTION:

For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

WIRING DIAGRAM:

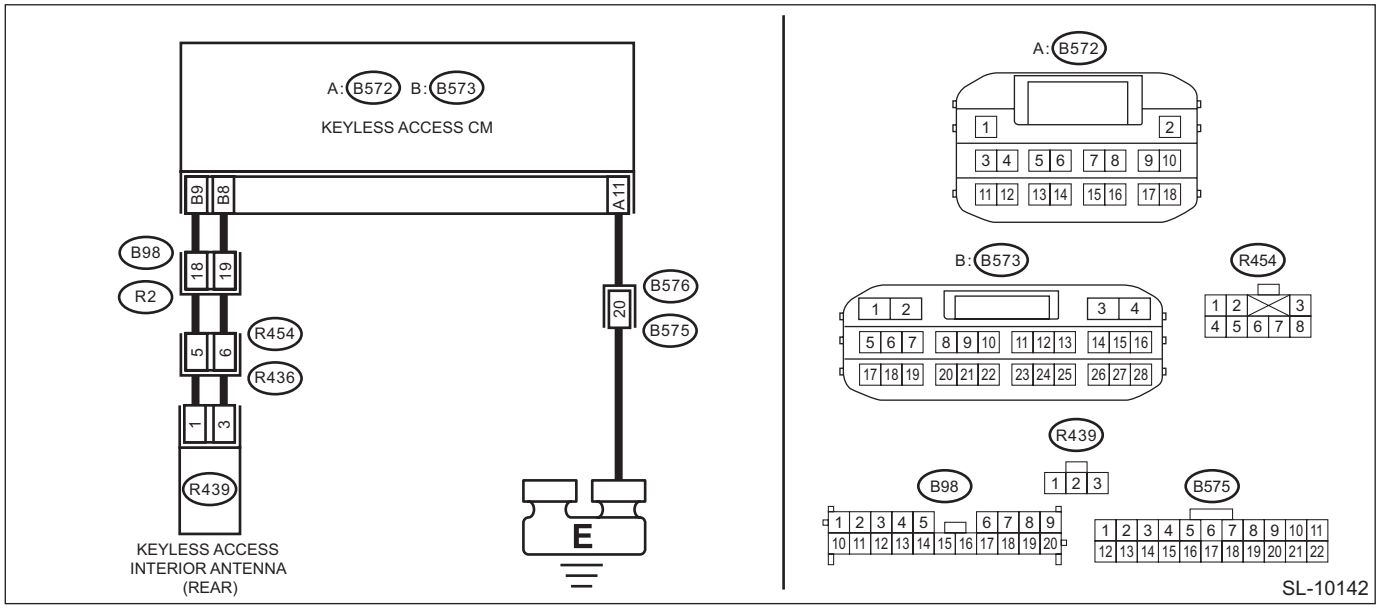
- Gasoline engine model

Keyless access system <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.>



- HEV model

Keyless access system <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>



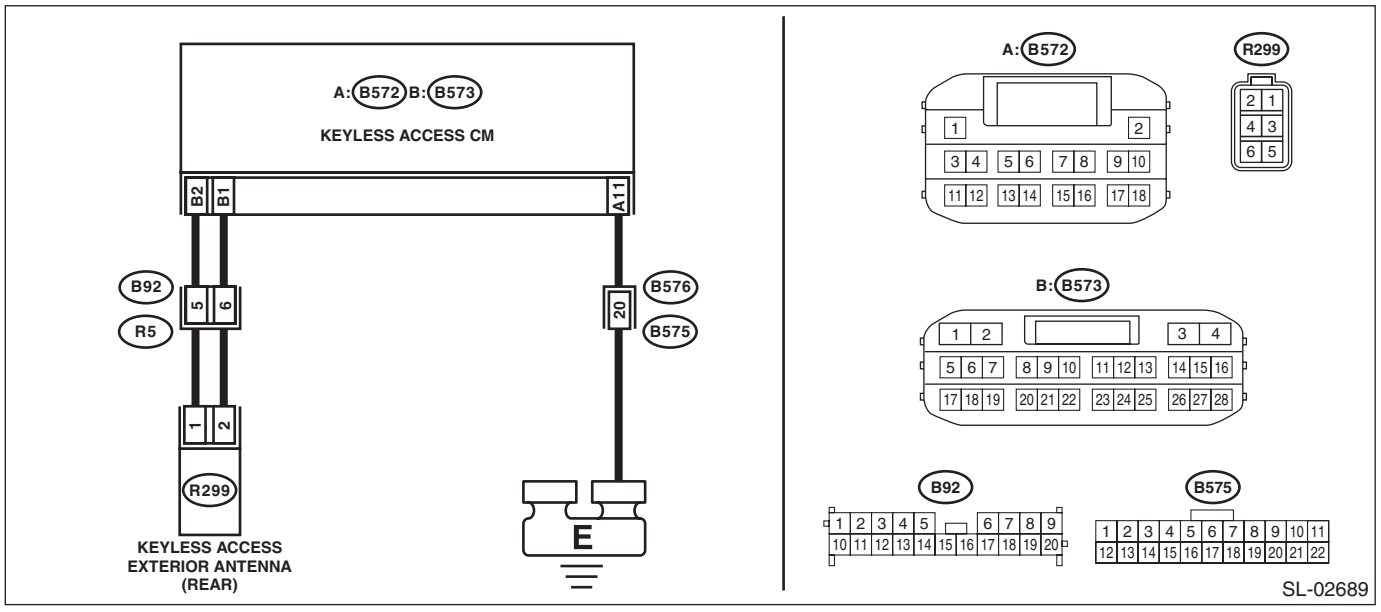
	Step	Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK CONNECTOR.** 1) Disconnect the keyless access CM connector. 2) Disconnect the rear interior antenna connector.	Is the connector OK?	Go to step **3**.	Repair or replace the connector.
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and rear interior antenna connector, and between rear interior antenna connector, keyless access CM connector and chassis ground. ***Connector & terminal*** ***Gasoline engine model (4 door model)*** ***(B573) No. 9 — (R297) No. 1:*** ***(B573) No. 8 — (R297) No. 3:*** ***(B572) No. 11 — Chassis ground:*** ***Gasoline engine model (5 door model)*** ***(B573) No. 9 — (R298) No. 1:*** ***(B573) No. 8 — (R298) No. 3:*** ***(B572) No. 11 — Chassis ground:*** ***HEV model*** ***(B573) No. 9 — (R439) No. 1:*** ***(B573) No. 8 — (R439) No. 3:*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B573) No. 9 — Chassis ground:*** ***(B573) No. 8 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK DTC.** 1) Connect the keyless access CM connector. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A7 displayed?	Go to step **6**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
6	**CHECK REAR INTERIOR ANTENNA.** 1) Replace the rear interior antenna with the front interior antenna. <Ref. to SL-91, Keyless Access Indoor Antenna.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A7 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Malfunction occurred in the rear interior antenna.

AL:DTC B27A8 TRUNK/REAR GATE EXTERNAL ANTENNA OPEN

DTC DETECTING CONDITION:
When open circuit occurs in the harness between keyless access CM and rear exterior antenna.
TROUBLE SYMPTOM:
Keyless access system does not function.
(Unable to unlock with the rear gate opener button, unable to lock with the rear lock button, or unable to open/close the trunk with the trunk opener button.)

CAUTION:
For replacement procedure of keyless access CM, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.
WIRING DIAGRAM:
Keyless access system <Ref. to WI(w/o HEV)-157, WIRING DIAGRAM, Keyless Access System.> <Ref. to WI(HEV)-139, WIRING DIAGRAM, Keyless Access System.>



Step		Check	Yes	No
1	**CHECK LAN SYSTEM.** Inspect LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>	Is LAN system normal?	Go to step **2**.	Perform the inspection according to the diagnosis for LAN system.
2	**CHECK CONNECTOR.** 1) Disconnect the keyless access CM connector. 2) Disconnect the rear exterior antenna connector.	Is the connector OK?	Go to step **3**.	Repair or replace the connector.
3	**CHECK HARNESS (OPEN CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and rear exterior antenna connector, and between rear exterior antenna connector and chassis ground. ***Connector & terminal*** ***(B573) No. 2 — (R299) No. 1:*** ***(B573) No. 1 — (R299) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B573) No. 2 — Chassis ground:*** ***(B573) No. 1 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK DTC.** 1) Connect the keyless access CM connector. 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read DTC using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A8 displayed?	Go to step **6**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
6	**CHECK KEYLESS ACCESS CM.** 1) Replace the rear exterior antenna with the rear interior antenna. <Ref. to SL-91, Keyless Access Indoor Antenna.> <Ref. to SL-95, Keyless Access Outdoor Antenna.> 2) Using the Subaru Select Monitor, clear the memory. <Ref. to KPS(diag)-35, Clear Memory Mode.> 3) Read the DTC using Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC B27A8 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Malfunction occurred in the rear external antenna.

AM:DTC B1571 REFERENCE CODE INCOMPATIBILITY (IMMOBILIZER CM TO ECM)

DTC DETECTING CONDITION:

Incompatibility of reference code between keyless access CM (model without ID code box) or ID code box (model with ID code box) and ECM occurs.

TROUBLE SYMPTOM:

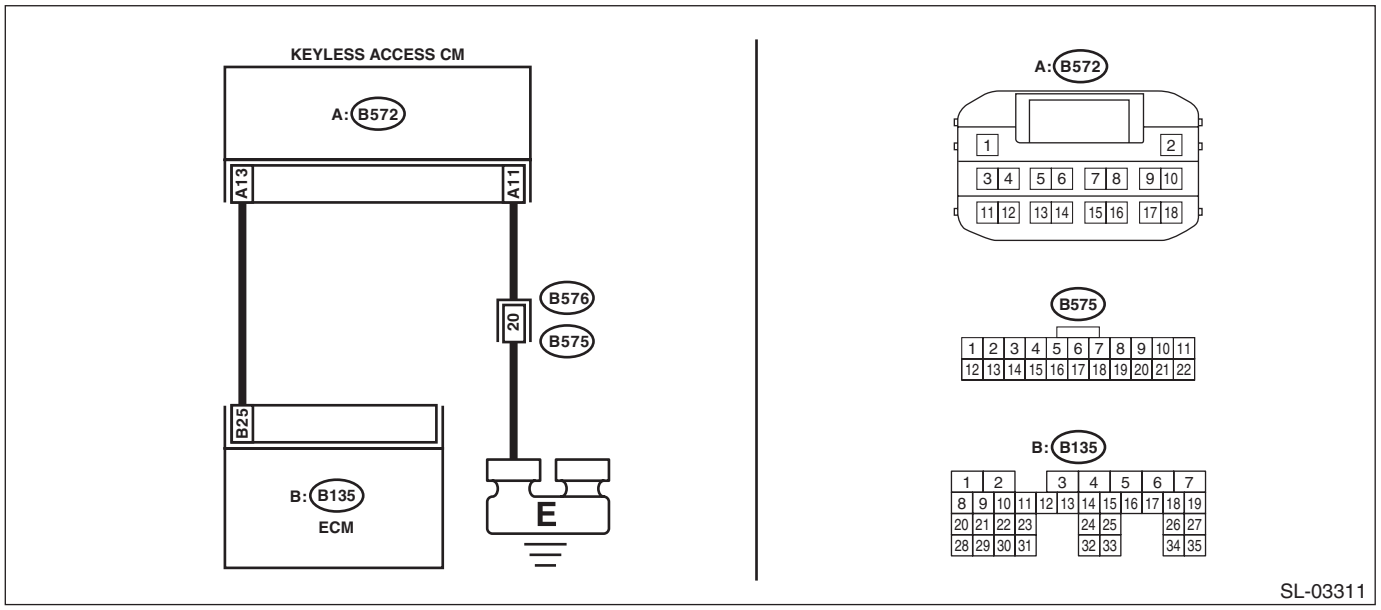
Engine will not start.

	Step	Check	Yes	No
1	**CHECK ECM.** Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is ECM registration finished? And does the engine start?	ECM registration was not performed properly.	Go to step **2**.
2	**REPLACE ECM.** 1) Install the ECM from other normal operating vehicle (with push button start) which use same ECM to the vehicle to be diagnosed. 2) Perform ECM registration. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.	Is ECM registration finished? And does the engine start?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).> Install the ECM from other vehicle to the original vehicle.	Replace Keyless access CM (model without ID code box), <Ref. to SL-102, Keyless Access CM.> or replace ID code box (model with ID code box). <Ref. to SL-104, ID Code Box.>

AN:DTC B1572 IMM CIRCUIT EXCEPT ANTENNA CIRCUIT

1. EXCEPT FOR C0 AND C5 MODELS

DTC DETECTING CONDITION:
Communication error between keyless access CM and ECM
TROUBLE SYMPTOM:
Engine will not start.
WIRING DIAGRAM:
Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



	Step	Check	Yes	No
1	**CHECK GROUNDING POINT.** Check the grounding point of the engine ground and chassis ground.	Are there any loose connections, any foreign objects caught in the ground lines or contact surface, or any fluid stains?	Remove the foreign matters, and tighten to the specified torque. Then start the engine, and check that the fault was removed. Check DTC <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>, and when DTC B1572 is still displayed, Go to step **2**.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 3) Display the next data. “Immobilizer” “Engine start” “Unlock confirmation” ***Data*** ***Immobilizer = Unset:*** ***Engine start = Engine start permission:*** ***Unlock confirmation = Confirmed:***	Is the data displayed as described above?	Go to step **3**.	Perform diagnostics with phenomenon. <Ref. to KPS(diag)-141, ENGINE DOES NOT START, INSPECTION, Diagnostics with Phenomenon.>

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** Use the Subaru Select Monitor to check the current data of «Keyless Access with Push Button Start» when holding down the push button ignition switch while depressing on the brake pedal. <Ref. to KPS(diag)-29, Read Current Data.> ***Data*** ***EGI code reception status = Reception:*** NOTE: If “Reception” is displayed, the status changes to “Not yet received” in 10 seconds. When performing the check again, perform the check after turning the ignition to OFF.	Is the data displayed as described above?	Go to step **4**.	Repair or replace the harness between keyless access CM and ECM.
4	**CHECK WIRING HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the keyless access CM connector and ECM connector. 3) Using a tester, measure the resistance between the keyless access CM connector and ECM. ***Connector & terminal*** ***(B572) No. 13 — (B135) No. 25:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK WIRING HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK ECM.** 1) Install the ECM from other normal operating vehicle (with push button start) which use same ECM to the vehicle to be diagnosed. 2) Perform ECM registration. Refer to the “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume.	Is ECM registration finished? And does the engine start?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).> Install the ECM from other vehicle to the original vehicle.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

2. FOR C0 AND C5 MODELS

DTC DETECTING CONDITION:

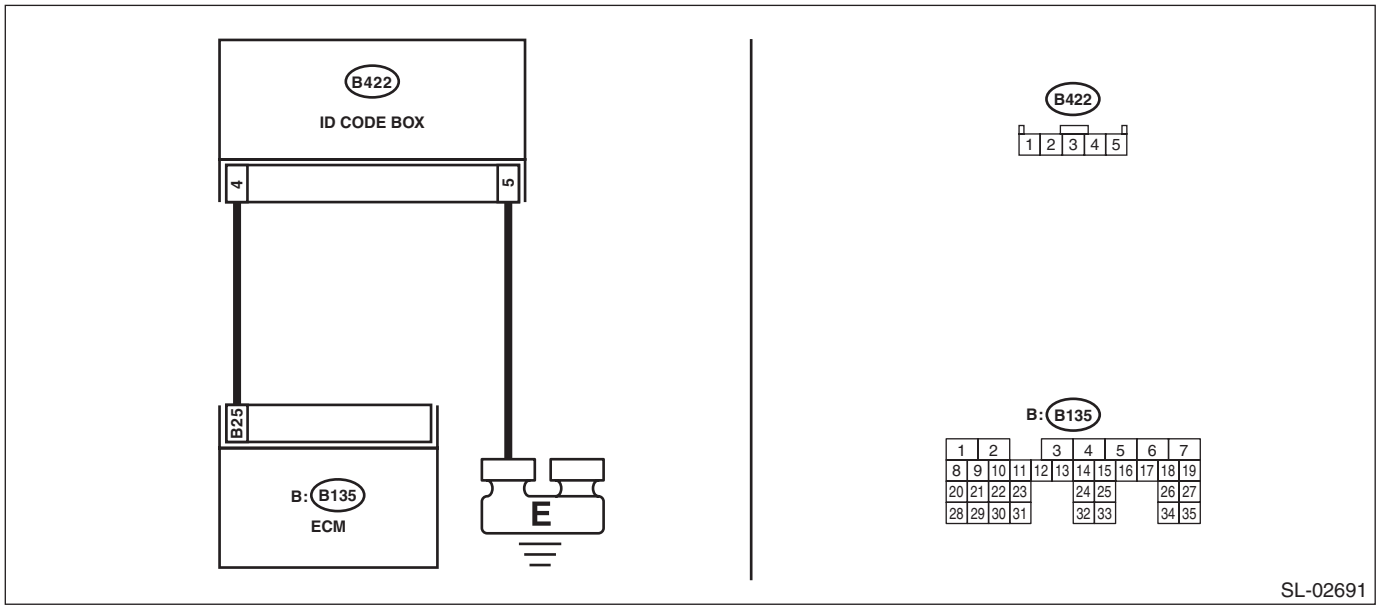
Communication error between ID code box and ECM

TROUBLE SYMPTOM:

Engine will not start.

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



	Step	Check	Yes	No
1	**CHECK GROUNDING POINT.** Check the grounding point of the engine ground and chassis ground.	Are there any loose connections, any foreign objects caught in the ground lines or contact surface, or any fluid stains?	Remove the foreign matters, and tighten to the specified torque. Then start the engine, and check that the fault was removed. Check DTC <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>, and when DTC B1572 is still displayed, Go to step **2**.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Check the current data display of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 3) Display the next data. “Immobilizer” “Engine start” “Unlock confirmation” ***Data*** ***Immobilizer = Unset:*** ***Engine start = Engine start permission:*** ***Unlock confirmation = Confirmed:***	Is the data displayed as described above?	Go to step **3**.	Perform diagnostics with phenomenon. <Ref. to KPS(diag)-141, ENGINE DOES NOT START, INSPECTION, Diagnostics with Phenomenon.>

	Step	Check	Yes	No
3	**CHECK CURRENT DATA.** Use the Subaru Select Monitor to check the current data of «Keyless Access with Push Button Start» when holding down the push button ignition switch while depressing on the brake pedal. <Ref. to KPS(diag)-29, Read Current Data.> ***Data*** ***EGI code reception status = Reception:*** NOTE: If “Reception” is displayed, the status changes to “Not yet received” in 10 seconds. When performing the check again, perform the check after turning the ignition to OFF.	Is the data displayed as described above?	Go to step **4**.	Repair or replace the harness between ID code box and ECM.
4	**CHECK WIRING HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the ID code box connector and the ECM connector. 3) Using a tester, measure the resistance between ID code box connector and ECM. ***Connector & terminal*** ***(B422) No. 4 — (B135) No. 25:***	Is the resistance less than 10 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK WIRING HARNESS.** Using a tester, measure the resistance between ID code box connector and chassis ground. ***Connector & terminal*** ***(B422) No. 5 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK ECM.** 1) Install the ECM from other normal operating vehicle (with push button start) which use same ECM to the vehicle to be diagnosed. 2) Perform ECM registration. Refer to the “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume.	Is ECM registration finished? And does the engine start?	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).> Install the ECM from other vehicle to the original vehicle.	Replace the ID code box. <Ref. to SL-104, ID Code Box.>

AO:DTC B1576 EGI CONTROL MODULE EEPROM

DTC DETECTING CONDITION:

- ECM malfunctioning
- When the ROM in ECM was inaccessible during registration.

Step		Check	Yes	No
1	**PERFORM ECM REGISTRATION.** Perform ECM registration. Refer to the “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume.	Is ECM registration complete?	Make sure that the engine can start. This completes the work.	Go to step **2**.
2	**PERFORM ECM REGISTRATION.** Perform ECM registration. Refer to the “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume.	Is ECM registration complete?	Make sure that the engine can start. This completes the work.	Go to step **3**.
3	**PERFORM ECM REGISTRATION.** Perform ECM registration. Refer to the “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume.	Is ECM registration complete?	Make sure that the engine can start. This completes the work.	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, REMOVAL, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, REMOVAL, Engine Control Module (ECM).>

AP:DTC B1577 IMM CONTROL MODULE EEPROM

1. EXCEPT FOR C0 AND C5 MODELS

DTC DETECTING CONDITION:

- Defective keyless access CM
- When inaccessible to ROM in keyless access CM.

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Perform the clear memory operation of ECM. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 3) Turn the ignition switch to OFF. 4) Remove and install the battery. 5) Turn the ignition switch to ON. 6) After 5 seconds or more, read DTC. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is DTC B1577 displayed?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

2. FOR C0 AND C5 MODELS

DTC DETECTING CONDITION:

- ID code box malfunction
- When inaccessible to ROM in ID code box.

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Perform the clear memory operation of ECM. <Ref. to EN(H4DO w/o HEV)(diag)-67, Clear Memory Mode.> <Ref. to EN(H4DO HEV)(diag)-68, Clear Memory Mode.> 3) Turn the ignition switch to OFF. 4) Register the ID code box. 5) Read the DTC again. <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is DTC B1577 displayed?	Replace the ID code box. <Ref. to SL-104, ID Code Box.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

14.General Diagnostic Table

A: INSPECTION

1. IMMOBILIZER SYSTEM

Symptoms	Note
Engine does not start	<Ref. to KPS(diag)-141, ENGINE DOES NOT START, INSPECTION, Diagnostics with Phenomenon.>
	<Ref. to KPS(diag)-73, DTC B2784 ANTENNA CIRCUIT (PUSH ENGINE SWITCH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	<Ref. to KPS(diag)-83, DTC B278A PUSH ENGINE SWITCH POWER SUPPLY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	<Ref. to KPS(diag)-75, DTC B2785 LIN COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	<Ref. to KPS(diag)-81, DTC B2789 ID CODE BOX COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	<Ref. to KPS(diag)-86, DTC B2790 ID CODE BOX CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	Check the brake switch. <Ref. to BR-77, INSPECTION, Stop Light Switch.>
	Check the parking switch signal. <Ref. to CS-61, INSPECTION, AT Shift Lock Solenoid and “P” Range Switch.>
	Check the DTC of the ECM.
Cannot register the immobilizer.	Refer to the “REGISTRATION MANUAL FOR IMMOBILIZER”.
Engine does not start with the remote engine starter.	<Ref. to KPS(diag)-70, DTC B2779 REMOTE CONTROL ENGINE STARTER COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

2. KEYLESS ACCESS SYSTEM

Symptoms	Reference
All doors cannot be locked/unlocked with keyless access.	<Ref. to KPS(diag)-109, KEYLESS ACCESS LOCK/UNLOCK CANNOT BE PERFORMED FROM ANY OF THE DOORS, INSPECTION, Diagnostics with Phenomenon.>
Cannot lock with keyless access from the driver's door.	<Ref. to KPS(diag)-111, CANNOT LOCK WITH KEYLESS ACCESS FROM THE DRIVER'S DOOR, INSPECTION, Diagnostics with Phenomenon.>
Cannot lock/unlock from the driver's door with keyless access.	<Ref. to KPS(diag)-112, CANNOT LOCK/UNLOCK WITH KEYLESS ACCESS FROM THE DRIVER'S DOOR, INSPECTION, Diagnostics with Phenomenon.>
Cannot unlock from the driver's door with keyless access.	<Ref. to KPS(diag)-113, CANNOT UNLOCK WITH KEYLESS ACCESS FROM THE DRIVER'S DOOR, INSPECTION, Diagnostics with Phenomenon.>
Cannot unlock from the passenger's door with keyless access.	<Ref. to KPS(diag)-116, CANNOT UNLOCK WITH KEYLESS ACCESS FROM THE PASSENGER'S DOOR, INSPECTION, Diagnostics with Phenomenon.>
Cannot lock/unlock from the passenger's door with keyless access.	<Ref. to KPS(diag)-115, CANNOT LOCK/UNLOCK WITH KEYLESS ACCESS FROM THE PASSENGER'S DOOR, INSPECTION, Diagnostics with Phenomenon.>
Cannot lock from the passenger's door with keyless access.	<Ref. to KPS(diag)-114, CANNOT LOCK WITH KEYLESS ACCESS FROM THE PASSENGER'S DOOR, INSPECTION, Diagnostics with Phenomenon.>
Trunk does not open with the trunk opener button.	<Ref. to KPS(diag)-117, TRUNK WILL NOT OPEN WITH KEYLESS ACCESS, INSPECTION, Diagnostics with Phenomenon.>
Access key lockout protection function in the trunk does not operate.	<Ref. to KPS(diag)-119, ACCESS KEY LOCKOUT PROTECTION FUNCTION IN THE TRUNK DOES NOT OPERATE, INSPECTION, Diagnostics with Phenomenon.>
Keyless access passenger room buzzer does not sound.	<Ref. to KPS(diag)-120, THE KEYLESS ACCESS PASSENGER ROOM BUZZER DOES NOT SOUND, INSPECTION, Diagnostics with Phenomenon.>
Keyless access external buzzer does not beep.	<Ref. to KPS(diag)-121, THE KEYLESS ACCESS EXTERNAL BUZZER DOES NOT BEEP, INSPECTION, Diagnostics with Phenomenon.>
Interior collation does not function.	<Ref. to KPS(diag)-123, INTERNAL COLLATION DOES NOT FUNCTION, INSPECTION, Diagnostics with Phenomenon.>
Rear gate cannot be unlocked with the rear gate opener button.	<Ref. to KPS(diag)-126, CAN NOT UNLOCK WHEN USING THE REAR GATE OPENER BUTTON, INSPECTION, Diagnostics with Phenomenon.>
Rear gate can not be locked when using the rear lock button.	<Ref. to KPS(diag)-128, CAN NOT LOCK WHEN USING THE REAR LOCK BUTTON, INSPECTION, Diagnostics with Phenomenon.>

3. STEERING LOCK SYSTEM

Symptoms	Index
The steering lock cannot be released (cannot start the engine)	<Ref. to KPS(diag)-130, THE STEERING LOCK IS NOT RELEASED, INSPECTION, Diagnostics with Phenomenon.>
The steering lock does not operate	<Ref. to KPS(diag)-132, THE STEERING LOCK DOES NOT OPERATE, INSPECTION, Diagnostics with Phenomenon.>

4. POWER SUPPLY SWITCHING SYSTEM

Symptoms	Index
Power will not turn ON (both accessory and ignition)	<Ref. to KPS(diag)-134, POWER WILL NOT TURN ON (BOTH ACCESSORY AND IGNITION), INSPECTION, Diagnostics with Phenomenon.>
Power will not turn ON (accessory only)	<Ref. to KPS(diag)-137, POWER WILL NOT TURN ON (ACCESSORY DOES NOT TURN ON, BUT IGNITION TURNS ON), INSPECTION, Diagnostics with Phenomenon.>
Power will not turn ON (ignition only)	<Ref. to KPS(diag)-139, POWER WILL NOT TURN ON (ACCESSORY TURNS ON, BUT IGNITION DOES NOT TURN ON), INSPECTION, Diagnostics with Phenomenon.>

15.Diagnostics with Phenomenon

A: INSPECTION

1. KEYLESS ACCESS LOCK/UNLOCK CANNOT BE PERFORMED FROM ANY OF THE DOORS

CAUTION:
• Check that there are no other registered access keys inside the vehicle.
• Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.
• Check that the keyless access function is not stopped.
• When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK OPERATION OF KEYLESS DOOR LOCK.** Using the keyless function of the access key, check the operation of the door lock.	Does it lock/unlock normally?	Check the exterior antenna, oscillator, touch sensor, lock/unlock buttons.	Go to step **2**.
2	**CHECK ACCESS KEY.** Check for whether lock and unlock is possible with the registered access key.	Is there any access key which can lock/unlock when the touch sensor is operated?	Check the access key that does not operate. Go to step **3**.	Go to step **4**.
3	**CHECK ACCESS KEY.** Measure the battery voltage of the access key that does not operate.	Is the voltage 2.5 — 3.2 V?	Replace the access key.	Replace the battery.
4	**CHECK DOOR LOCK.** Operate the driver's center door lock switch.	Does the door lock operate?	Go to step **5**.	Check the door lock control system. <Ref. to SL-12, INSPECTION, Door Lock Control System.>
5	**CHECK HARNESS.** 1) Disconnect the receiver connector (R296). 2) Using a tester, measure the resistance between receiver and chassis ground. ***Connector & terminal*** ***(R296) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the resistance between receiver and keyless access CM. ***Connector & terminal*** ***(R296) No. 4 — (B573) No. 5:*** ***(R296) No. 5 — (B573) No. 17:*** ***(R296) No. 2 — (B573) No. 19:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK RECEIVER.** Replace with a receiver that is operating normally. <Ref. to SL-100, REMOVAL, Receiver.>	When the front unlock sensor and the rear gate opener button are operated, does it lock/unlock?	Malfunction occurred in receiver.	Go to step **8**.
8	**CHECK HARNESS.** Using a tester, measure the voltage between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more when the ignition switch is turned to ON?	Go to step **9**.	Check the keyless access CM power supply circuit.

Step		Check	Yes	No
9	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is the resistance less than 10 Ω?	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>	Repair or replace the open circuit of harness.

2. CANNOT LOCK WITH KEYLESS ACCESS FROM THE DRIVER'S DOOR

CAUTION:
• Check that there are no other registered access keys inside the vehicle.
• Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.
• Check that the keyless access function is not stopped.
• When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DOOR LOCK SWITCH.** Check that the lock/unlock operates with the driver's door lock switch.	Does it lock/unlock normally?	Go to step **2**.	Check the door lock circuit. <Ref. to SL-12, SYMPTOM CHART, INSPECTION, Door Lock Control System.>
2	**CHECK CURRENT DATA.** 1) Display the current data «Driver's seat lock status SW input» of «Body Control» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when locking/unlocking the driver's side lock actuator.	Does the data change from ON/OFF?	Go to step **3**.	Check the door lock switch circuit.
3	**CHECK CURRENT DATA.** 1) Display the current data «Driver's lock touch sensor SW» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when operating the touch sensor (lock) of the door outer handle.	Does the data change from ON/OFF according to the sensor operation?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **4**.
4	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front outer handle connector. 3) Using a tester, measure the resistance between the keyless access CM connector and front outer handle connector. ***Connector & terminal*** ***(B574) No. 20 — (D66) No. 1:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground, and between front outer handle connector and chassis ground. ***Connector & terminal*** ***(B574) No. 20 — Chassis ground:*** ***(D66) No. 1 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**REPLACE FRONT DOOR OUTER HANDLE.** Replace the driver's side front outer handle with the passenger's side front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Does it operate properly?	Replace the driver's front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

3. CANNOT LOCK/UNLOCK WITH KEYLESS ACCESS FROM THE DRIVER'S DOOR

CAUTION:
- **Check that there are no other registered access keys inside the vehicle.**
- **Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.**
- **Check that the keyless access function is not stopped.**
- **When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.**

	Step	Check	Yes	No
1	**CHECK DOOR LOCK SWITCH.** Check that the lock/unlock operates with the driver's door lock switch.	Does it lock/unlock normally?	Go to step **2**.	Check the door lock circuit. <Ref. to SL-12, SYMPTOM CHART, INSPECTION, Door Lock Control System.>
2	**CHECK FUSE.** Check the fuse.	Is the fuse OK?	Go to step **3**.	Replace the fuse.
3	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front outer handle connector. 3) Using a tester, measure the resistance between the keyless access CM connector and front outer handle connector, and between front outer handle connector and chassis ground. ***Connector & terminal*** ***(B574) No. 12 — (D66) No. 6:*** ***(B574) No. 13 — (D66) No. 3:*** ***(B574) No. 19 — (D66) No. 5:*** ***(D66) No. 2 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground, and between front outer handle connector and chassis ground. ***Connector & terminal*** ***(B574) No. 12 — Chassis ground:*** ***(D66) No. 6 — Chassis ground:*** ***(B574) No. 13 — Chassis ground:*** ***(D66) No. 3 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK KEYLESS ACCESS CM.** 1) Connect the keyless access CM connector. 2) Turn the ignition switch to OFF, close all doors and take the access key out of passenger room. 3) Use the Subaru Select Monitor, measure the waveform between the keyless access CM connectors. ***Connector & terminal*** ***(D66) No. 6 — (D66) No. 3:***	Does pulse output change from pulse output OFF → pulse output ON by the lock operation using access key?	Go to step **6**.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
6	**REPLACE FRONT DOOR OUTER HANDLE.** Replace the driver's side front outer handle with the passenger's side front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Does it operate properly?	Replace the driver's front outer handle. <Ref. to SL-35, Front Outer Handle.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

4. CANNOT UNLOCK WITH KEYLESS ACCESS FROM THE DRIVER'S DOOR

CAUTION:
• Check that there are no other registered access keys inside the vehicle.
• Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.
• Check that the keyless access function is not stopped.
• When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DOOR LOCK SWITCH.** Check that the lock/unlock operates with the driver's door lock switch.	Does it lock/unlock normally?	Go to step **2**.	Check the door lock circuit. <Ref. to SL-12, SYMPTOM CHART, INSPECTION, Door Lock Control System.>
2	**CHECK CURRENT DATA.** 1) Display the current data «Driver's seat lock status SW input» of «Body Control» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when locking/unlocking the driver's side lock actuator.	Does the data change from ON/OFF?	Go to step **3**.	Check the door lock switch circuit.
3	**CHECK CURRENT DATA.** 1) Display the current data «Driver's unlock touch sensor switch» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when operating the touch sensor (unlock) of the door outer handle.	Does the data change from ON/OFF according to the sensor operation?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **4**.
4	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front outer handle connector. 3) Using a tester, measure the resistance between the keyless access CM connector and front outer handle connector. ***Connector & terminal*** ***(B574) No. 22 — (D66) No. 4:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground, and between front outer handle connector and chassis ground. ***Connector & terminal*** ***(B574) No. 22 — Chassis ground:*** ***(D66) No. 4 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**REPLACE FRONT DOOR OUTER HANDLE.** Replace the driver's side front outer handle with the passenger's side front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Does it operate properly?	Replace the driver's front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

5. CANNOT LOCK WITH KEYLESS ACCESS FROM THE PASSENGER'S DOOR

CAUTION:
• Check that there are no other registered access keys inside the vehicle.
• Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.
• Check that the keyless access function is not stopped.
• When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DOOR LOCK SWITCH.** Check that the lock/unlock operates with the driver's door lock switch.	Does it lock/unlock normally?	Go to step **2**.	Check the door lock circuit. <Ref. to SL-12, SYMPTOM CHART, INSPECTION, Door Lock Control System.>
2	**CHECK CURRENT DATA.** 1) Display the current data «Passenger's seat lock status SW input» of «Body Control» using Subaru Select Monitor. <Ref. to BC(diag)-12, Read Current Data.> 2) Read the data when locking/unlocking the passenger's side lock actuator.	Does the data change from ON/OFF?	Go to step **3**.	Check the door lock switch circuit.
3	**CHECK CURRENT DATA.** 1) Display the current data «Passenger's lock touch sensor SW» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when operating the touch sensor (lock) of the door outer handle.	Does the data change from ON/OFF according to the sensor operation?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **4**.
4	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front outer handle connector. 3) Using a tester, measure the resistance between the keyless access CM connector and front outer handle connector. ***Connector & terminal*** ***(B574) No. 8 — (D56) No. 1:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground, and between front outer handle connector and chassis ground. ***Connector & terminal*** ***(B574) No. 8 — Chassis ground:*** ***(D56) No. 1 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**REPLACE FRONT DOOR OUTER HANDLE.** Replace the passenger's side front outer handle with the driver's side front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Does it operate properly?	Replace the passenger's front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

6. CANNOT LOCK/UNLOCK WITH KEYLESS ACCESS FROM THE PASSENGER'S DOOR

CAUTION:
- **Check that there are no other registered access keys inside the vehicle.**
- **Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.**
- **Check that the keyless access function is not stopped.**
- **When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.**

	Step	Check	Yes	No
1	**CHECK DOOR LOCK SWITCH.** Check that the lock/unlock operates with the driver's door lock switch.	Does it lock/unlock normally?	Go to step **2**.	Check the door lock circuit. <Ref. to SL-12, SYMPTOM CHART, INSPECTION, Door Lock Control System.>
2	**CHECK FUSE.** Check the fuse.	Is the fuse OK?	Go to step **3**.	Replace the fuse.
3	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front outer handle connector. 3) Using a tester, measure the resistance between the keyless access CM connector and front outer handle connector, and between front outer handle connector and chassis ground. ***Connector & terminal*** ***(B574) No. 11 — (D56) No. 6:*** ***(B574) No. 10 — (D56) No. 3:*** ***(B574) No. 21 — (D56) No. 5:*** ***(D56) No. 2 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground, and between front outer handle connector and chassis ground. ***Connector & terminal*** ***(B574) No. 11 — Chassis ground:*** ***(D56) No. 6 — Chassis ground:*** ***(B574) No. 10 — Chassis ground:*** ***(D56) No. 3 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK KEYLESS ACCESS CM.** 1) Connect the keyless access CM connector. 2) Turn the ignition switch to OFF, close all doors and take the access key out of passenger room. 3) Use the Subaru Select Monitor, measure the waveform between the keyless access CM connectors. ***Connector & terminal*** ***(D56) No. 6 — (D66) No. 3:***	Does pulse output change from pulse output OFF → pulse output ON by the lock operation using access key?	Go to step **6**.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
6	**REPLACE FRONT DOOR OUTER HANDLE.** Replace the passenger's side front outer handle with the driver's side front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Does it operate properly?	Replace the passenger's front outer handle. <Ref. to SL-35, Front Outer Handle.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

7. CANNOT UNLOCK WITH KEYLESS ACCESS FROM THE PASSENGER'S DOOR

CAUTION:
• Check that there are no other registered access keys inside the vehicle.
• Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.
• Check that the keyless access function is not stopped.
• When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DOOR LOCK SWITCH.** Check that the lock/unlock operates with the driver's door lock switch.	Does it lock/unlock normally?	Go to step **2**.	Check the door lock circuit. <Ref. to SL-12, SYMPTOM CHART, INSPECTION, Door Lock Control System.>
2	**CHECK CURRENT DATA.** 1) Display the current data «Passenger's seat lock status SW input» of «Body Control» using Subaru Select Monitor. <Ref. to BC(diag)-12, Read Current Data.> 2) Read the data when locking/unlocking the passenger's side lock actuator.	Does the data change from ON/OFF?	Go to step **3**.	Check the door lock switch circuit.
3	**CHECK CURRENT DATA.** 1) Display the current data «Passenger's unlock touch sensor switch» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when operating the touch sensor (unlock) of the door outer handle.	Does the data change from ON/OFF according to the sensor operation?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Go to step **4**.
4	**CHECK HARNESS.** 1) Disconnect the keyless access CM connector. 2) Disconnect the front outer handle connector. 3) Using a tester, measure the resistance between the keyless access CM connector and front outer handle connector. ***Connector & terminal*** ***(B574) No. 23 — (D56) No. 4:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK HARNESS.** Using a tester, measure the resistance between the keyless access CM connector and chassis ground, and between front outer handle connector and chassis ground. ***Connector & terminal*** ***(B574) No. 23 — Chassis ground:*** ***(D56) No. 4 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**REPLACE FRONT DOOR OUTER HANDLE.** Replace the passenger's side front outer handle with the driver's side front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Does it operate properly?	Replace the passenger's front outer handle. <Ref. to SL-35, REMOVAL, Front Outer Handle.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

8. TRUNK WILL NOT OPEN WITH KEYLESS ACCESS

CAUTION:
• Check that there are no other registered access keys inside the trunk.
• Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.
• Check that the keyless access function is not stopped.
• When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK TRUNK OPENER BUTTON.** Check that the trunk opens with the driver's seat trunk opener button.	Does it open normally?	Go to step **2**.	Check the door lock circuit. <Ref. to SL-12, SYMPTOM CHART, INSPECTION, Door Lock Control System.>
2	**CHECK KEYLESS OPERATION.** Check that the trunk opens when the trunk opener button of the access key is operated.	Does it open normally?	Go to step **7**.	Go to step **3**.
3	**CHECK TRUNK UNLOCK OPERATION.** 1) Using the Subaru Select Monitor, select the function check «R gate/trunk UNLK output» of «Body Control». <Ref. to BC(diag)-24, Function Check.> 2) Check that the trunk opens when the R gate/trunk UNLK signal is output.	Does it open normally?	Go to step **7**.	Go to step **4**.
4	**CHECK WIRING HARNESS.** 1) Disconnect the body integrated unit connector and trunk lid lock actuator connector. 2) Check the continuity between body integrated unit connector and trunk lid lock actuator connector. ***Connector & terminal*** ***(i171) No. 7 — (R186) No. 1:***	Is there continuity?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK WIRING HARNESS.** Check the continuity between the trunk lid lock actuator connector and chassis ground. ***Connector & terminal*** ***(R186) No. 2 — Chassis ground:***	Is there continuity?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK TRUNK LID LOCK ACTUATOR.** Check the trunk lid lock actuator. <Ref. to SL-53, Trunk Lid Latch and Actuator Assembly.>	Is trunk lid actuator normal?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the trunk lid latch & actuator assembly. <Ref. to SL-53, Trunk Lid Latch and Actuator Assembly.>
7	**CHECK ACCESS KEY.** Check the access key LED when the trunk opener button of the access key is operated.	Does the access key LED illuminate?	Go to step **8**.	Replace the access key. <Ref. to SL-86, REPLACEMENT, Access Key.>
8	**CHECK ACCESS KEY.** 1) Prepare all access keys registered to the vehicle. 2) Check that the trunk opens with each access key.	Does it open normally?	Go to step **9**.	Replace the access key. <Ref. to SL-86, REPLACEMENT, Access Key.>

	Step	Check	Yes	No
9	**CHECK CURRENT DATA.** 1) Display the current data «Trunk Request SW» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when pressing the trunk opener button.	Does the data display ON?	Go to step **13**.	Go to step **10**.
10	**CHECK WIRING HARNESS.** 1) Disconnect the trunk opener button connector and the keyless access CM connector. 2) Using a tester, check continuity between the trunk opener button connector and keyless access CM connector. ***Connector & terminal*** ***(R294) No. 1 — (B573) No. 27:***	Is there continuity?	Go to step **11**.	Repair or replace the open circuit of harness.
11	**CHECK WIRING HARNESS.** 1) Using a tester, check the continuity between the trunk opener button connector and chassis ground. ***Connector & terminal*** ***(R294) No. 2 — Chassis ground:***	Is there continuity?	Go to step **12**.	Repair or replace the open circuit of harness.
12	**CHECK TRUNK OPENER BUTTON.** Using a tester, check the continuity between trunk opener button connector terminals. ***Connector & terminal*** ***(R294) No. 1 — No. 2:***	Is there continuity when pressing the switch?	Go to step **13**.	Replace the trunk opener button. <Ref. to SL-99, Trunk Opener Button.>
13	**CHECK WIRING HARNESS.** 1) Disconnect the exterior rear antenna connector and the keyless access CM connector. 2) Using a tester, check continuity between the exterior rear antenna connector and keyless access CM connector. ***Connector & terminal*** ***(R299) No. 1 — (B573) No. 2:*** ***(R299) No. 2 — (B573) No. 1:***	Is there continuity?	Go to step **14**.	Repair or replace the open circuit of harness.
14	**CHECK OUTSIDE REAR ANTENNA.** Replace the outside rear antenna with new or properly working parts.	Does it operate properly?	Replace the outside rear antenna. <Ref. to SL-95, REMOVAL, Keyless Access Outdoor Antenna.>	Go to step **15**.
15	**CHECK KEYLESS ACCESS SYSTEM CHECK.** 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Trunk external transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Hold the access key 1 m or more away from the trunk, then come closer to within 0.8 m.	Does the outside buzzer sound?	System is normal.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

9. ACCESS KEY LOCKOUT PROTECTION FUNCTION IN THE TRUNK DOES NOT OPERATE

CAUTION:
• Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.
• Check that the keyless access function is not stopped.
• When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK TRUNK OPENER BUTTON.** Check that the trunk opens with the driver's seat trunk opener button.	Does it open normally?	Go to step **2**.	Check the door lock circuit. <Ref. to SL-12, INSPECTION, Door Lock Control System.>
2	**CHECK KEYLESS OPERATION.** Check that the trunk opens when the trunk opener button of the access key is operated.	Does it open normally?	Go to step **7**.	Go to step **3**.
3	**CHECK TRUNK UNLOCK OPERATION.** 1) Using the Subaru Select Monitor, select the function check «R gate/trunk UNLK output» of «Body Control». <Ref. to BC(diag)-24, Function Check.> 2) Check that the trunk opens when the R gate/trunk UNLK signal is output.	Does it open normally?	Go to step **7**.	Go to step **4**.
4	**CHECK WIRING HARNESS.** 1) Disconnect the body integrated unit connector and trunk lid lock actuator connector. 2) Check the continuity between body integrated unit connector and trunk lid lock actuator connector. ***Connector & terminal*** ***(i171) No. 7 — (R186) No. 1:***	Is there continuity?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK WIRING HARNESS.** Check the continuity between the trunk lid lock actuator connector and chassis ground. ***Connector & terminal*** ***(R186) No. 2 — Chassis ground:***	Is there continuity?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK TRUNK LID LOCK ACTUATOR.** Check the trunk lid lock actuator. <Ref. to SL-53, Trunk Lid Latch and Actuator Assembly.>	Is trunk lid lock actuator normal?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the trunk lid latch & actuator assembly. <Ref. to SL-53, Trunk Lid Latch and Actuator Assembly.>
7	**CHECK ACCESS KEY.** 1) Prepare all access keys registered to the vehicle. 2) Check that the trunk opens with each access key.	Does it open normally?	Go to step **8**.	Replace the access key. <Ref. to SL-86, REPLACEMENT, Access Key.>
8	**CHECK WIRING HARNESS.** 1) Disconnect the interior rear antenna connector and the keyless access CM connector. 2) Using a tester, check continuity between the interior rear antenna connector and keyless access CM connector. ***Connector & terminal*** ***(R297) No. 1 — (B573) No. 9:*** ***(R297) No. 3 — (B573) No. 8:***	Is there continuity?	Go to step **9**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
9	**CHECK PASSENGER ROOM REAR ANTENNA.** Replace the passenger room rear antenna with a new or properly functioning part.	Does it operate properly?	Replace the passenger room rear antenna. <Ref. to SL-91, REMOVAL, Keyless Access Indoor Antenna.>	Go to step **10**.
10	**CHECK RECEIVER.** Replace the receiver with a new or properly functioning part.	Does it operate properly?	Replace the receiver. <Ref. to SL-100, REMOVAL, Receiver.>	Go to step **11**.
11	**CHECK WIRING HARNESS.** 1) Disconnect the receiver connector and the keyless access CM connector. 2) Using a tester, check continuity between the receiver connector and keyless access CM connector. ***Connector & terminal*** ***(R296) No. 4 — (B573) No. 5:*** ***(R296) No. 5 — (B573) No. 17:*** ***(R296) No. 2 — (B573) No. 19:***	Is there continuity?	Go to step **12**.	Repair or replace the open circuit of harness.
12	**CHECK KEYLESS ACCESS SYSTEM CHECK.** 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Trunk internal transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Hold the access key 1 m or more away from the center of inside the trunk, then come closer to within 0.8 m.	Does the outside buzzer sound?	System is normal.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

10.THE KEYLESS ACCESS PASSENGER ROOM BUZZER DOES NOT SOUND

CAUTION:
• Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.
• Check that the keyless access function is not stopped.
• When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK COMBINATION METER.** Check the combination meter. <Ref. to IDI(diag)-2, COMBINATION METER, PROCEDURE, Basic Diagnostic Procedure.>	Is combination meter OK?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Replace the combination meter. <Ref. to IDI-19, REMOVAL, Combination Meter.>

11.THE KEYLESS ACCESS EXTERNAL BUZZER DOES NOT BEEP

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED UNIT SETTING.** Using the Subaru Select Monitor, check the data of «Answer-back Buzzer» of «Body Control». <Ref. to BC(diag)-12, Read Current Data.>	Is the setting "ON"?	Go to step **2**.	Change the setting to "ON".
2	**CHECK BUZZER OPERATION.** Use the Subaru Select Monitor to perform «Body Control» function check «Keyless Buzzer Output». <Ref. to BC(diag)-24, Function Check.>	Does the buzzer sound?	Go to step **3**.	Go to step **5**.
3	**CHECK KEYLESS ACCESS SYSTEM.** 1) Turn to IGN ON. 2) With all doors closed and the access key carried, touch the touch sensor (lock) on the driver's door handle.	Does the door lock?	Go to step **4**.	Refer to "CANNOT LOCK WITH KEYLESS ACCESS FROM THE DRIVER'S DOOR" and perform inspection. <Ref. to KPS(diag)-111, CANNOT LOCK WITH KEYLESS ACCESS FROM THE DRIVER'S DOOR, INSPECTION, Diagnostics with Phenomenon.>
4	**CHECK KEYLESS ACCESS SYSTEM.** 1) Open the door glass. 2) Place the access key on the driver's seat, and close the door. 3) Touch the touch sensor (lock) on the driver's door handle.	Does the buzzer sound? (Lock-out protection warning)	System is normal.	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>
5	**CHECK HARNESS.** 1) Turn to IGN OFF. 2) Disconnect the connectors of the body integrated unit and keyless buzzer. 3) Measure the resistance between body integrated unit connector and keyless buzzer connector. ***Connector & terminal*** ***(B280) No. 20 — (B164) No. 1:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK HARNESS.** Measure the resistance between keyless buzzer connector and chassis ground. ***Connector & terminal*** ***(B164) No. 1 — Chassis ground:***	Is the resistance 10 kΩ or more?	Go to step **7**.	Repair or replace the short circuit of the harness.
7	**CHECK HARNESS.** Measure the resistance between keyless buzzer connector and chassis ground. ***Connector & terminal*** ***(B164) No. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **8**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
8	**CHECK BODY INTEGRATED UNIT.** 1) Connect the connector of body integrated unit. 2) Use the Subaru Select Monitor to perform «Body Control» function check «Keyless Buzzer Output». <Ref. to BC(diag)-24, Function Check.> 3) Measure the voltage between body integrated unit connector and chassis ground using an oscilloscope. ***Connector & terminal*** ***(B280) No. 20 (+) — Chassis ground (–):***	Is the frequency 2kHz, voltage 9 V or more?	Replace the keyless buzzer. <Ref. to SL-78, REMOVAL, Keyless Buzzer.>	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

12.INTERNAL COLLATION DOES NOT FUNCTION

CAUTION:
When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK ACCESS KEY.** Check the access key. <Ref. to SL-86, INSPECTION, Access Key.>	Is the battery OK?	Go to step **2**.	Replace the battery.
2	**CHECK INTERIOR ANTENNA.** 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Front interior transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Using a tester, check the output between keyless access CM connector terminals while performing the Keyless access system check. ***Connector & terminal*** ***(B574) No. 2 — No. 3:***	Is a pulse output?	Go to step **3**.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
3	**CHECK INTERIOR ANTENNA.** NOTE: For gasoline engine model (5 door model), go to the next step. 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Rear interior transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Using a tester, check the output between keyless access CM connector terminals while performing the Keyless access system check. ***Connector & terminal*** ***(B573) No. 10 — No. 11:***	Is a pulse output?	Go to step **4**.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
4	**CHECK INTERIOR ANTENNA.** 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Trunk internal transmitter + interior tuner» or «Rear gate internal transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Using a tester, check the output between keyless access CM connector terminals while performing the Keyless access system check. ***Connector & terminal*** ***(B573) No. 8 — No. 9:***	Is a pulse output?	Go to step **5**.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
5	**CHECK WIRING HARNESS.** 1) Disconnect the front interior antenna connector and the keyless access CM connector. 2) Using a tester, check continuity between the front interior antenna connector and the keyless access CM connector. ***Connector & terminal*** ***(B579) No. 1 — (B574) No. 3:*** ***(B579) No. 2 — (B574) No. 2:***	Is there continuity?	Go to step **6**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
6	**CHECK WIRING HARNESS.** NOTE: For gasoline engine model (5 door model), go to the next step. 1) Disconnect the center interior antenna connector and the keyless access CM connector. 2) Using a tester, check continuity between the center interior antenna connector and the keyless access CM connector. ***Connector & terminal*** ***(R298) No. 1 — (B573) No. 11:*** ***(R298) No. 3 — (B573) No. 10:***	Is there continuity?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK WIRING HARNESS.** 1) Disconnect the rear interior antenna connector and the keyless access CM connector. 2) Using a tester, check continuity between the rear interior antenna connector and the keyless access CM connector. ***Connector & terminal*** ***Gasoline engine model (4 door model)*** ***(B573) No. 9 — (R297) No. 1:*** ***(B573) No. 8 — (R297) No. 3:*** ***Gasoline engine model (5 door model)*** ***(B573) No. 9 — (R298) No. 1:*** ***(B573) No. 8 — (R298) No. 3:*** ***HEV model*** ***(B573) No. 9 — (R439) No. 1:*** ***(B573) No. 8 — (R439) No. 3:***	Is there continuity?	Go to step **8**.	Repair or replace the open circuit of harness.
8	**CHECK ANTENNA.** Replace the front interior antenna with a new or properly functioning part.	Does it operate properly?	Replace the front interior antenna. <Ref. to SL-91, REMOVAL, Keyless Access Indoor Antenna.>	Go to step **9**.
9	**CHECK ANTENNA.** NOTE: For gasoline engine model (5 door model), go to the next step. Replace the center interior antenna with a new or properly functioning part.	Does it operate properly?	Replace the center interior antenna. <Ref. to SL-91, REMOVAL, Keyless Access Indoor Antenna.>	Go to step **10**.
10	**CHECK ANTENNA.** Replace the rear interior antenna with a new or properly functioning part.	Does it operate properly?	Replace the rear interior antenna. <Ref. to SL-91, REMOVAL, Keyless Access Indoor Antenna.>	Go to step **11**.
11	**CHECK WIRING HARNESS.** 1) Disconnect the receiver connector and the keyless access CM connector. 2) Using a tester, check continuity between the receiver connector and keyless access CM connector. ***Connector & terminal*** ***(R296) No. 4 — (B573) No. 5:*** ***(R296) No. 5 — (B573) No. 17:*** ***(R296) No. 2 — (B573) No. 19:***	Is there continuity?	Go to step **12**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
12	**CHECK RECEIVER.** Replace the receiver with a new or properly functioning part.	Does it operate properly?	Replace the receiver. <Ref. to SL-100, REMOVAL, Receiver.>	Go to step **13**.
13	**CHECK KEYLESS ACCESS SYSTEM CHECK.** 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Front interior transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Hold the access key 1 m or more away from the audio panel, then come closer to within 0.8 m.	Does the buzzer sound?	Go to step **14**.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
14	**CHECK KEYLESS ACCESS SYSTEM CHECK.** NOTE: For gasoline engine model (5 door model), go to the next step. 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Rear interior transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Hold the access key 1 m or more away from the center of the second row seats, then come closer to within 0.8 m.	Does the buzzer sound?	Go to step **15**.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
15	**CHECK KEYLESS ACCESS SYSTEM CHECK.** 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Trunk internal transmitter + interior tuner» or «Rear gate internal transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Hold the access key 1 m or more away from the back of the rear seat, then come closer to within 0.8 m.	Does the buzzer sound?	System is normal.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

13.CAN NOT UNLOCK WHEN USING THE REAR GATE OPENER BUTTON

CAUTION:
- **Check that there are no other registered access keys inside the rear gate.**
- **Inspect LAN system according to the basic diagnostic procedure, and make sure that there is no fault.**
- **Check that the keyless access function is not stopped.**
- **When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.**

	Step	Check	Yes	No
1	**CHECK KEYLESS OPERATION.** Check that the rear gate unlocks when the trunk open button of the access key is pressed.	Does it operate properly?	Go to step **6**.	Go to step **2**.
2	**CHECK REAR GATE UNLOCK OPERATION.** 1) Using the Subaru Select Monitor, select the function check «R gate/trunk UNLK output» of «Body Control». <Ref. to BC(diag)-24, Function Check.> 2) Check that the rear gate unlocks when the R gate/trunk UNLK signal is output.	Does it operate properly?	Go to step **6**.	Go to step **3**.
3	**CHECK HARNESS.** 1) Disconnect the body integrated unit connector and rear gate lock actuator connector. 2) Check the continuity between body integrated unit connector and rear gate lock actuator connector. ***Connector & terminal*** ***(i171) No. 7 — (D46) No. 1:***	Is there continuity?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS.** 1) Check the continuity between the rear gate lock actuator connector and chassis ground. ***Connector & terminal*** ***(D47) No. 2 — Chassis ground:***	Is there continuity?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK REAR GATE LOCK ACTUATOR.** 1) Check the rear gate lock actuator. <Ref. to SL-52, INSPECTION, Rear Gate Latch and Actuator Assembly.>	Is the rear gate lock actuator normal?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the rear gate latch and actuator assembly. <Ref. to SL-51, Rear Gate Latch and Actuator Assembly.>
6	**CHECK ACCESS KEY.** 1) Prepare all access keys registered to the vehicle. 2) Check that the rear gate lock can be unlocked with each access key.	Does it operate properly?	Go to step **7**.	Replace the access key. <Ref. to SL-86, REPLACEMENT, Access Key.>
7	**CHECK CURRENT DATA.** 1) Display the current data «R Gate Release SW input» of «Body Control» using Subaru Select Monitor. <Ref. to BC(diag)-12, Read Current Data.> 2) Read the data when pressing the rear gate opener button.	Does the data display ON?	Go to step **14**.	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK WIRING HARNESS.** 1) Disconnect the rear gate opener button connector and body integrated unit connector. 2) Using a tester, check the continuity between the rear gate opener button connector and body integrated unit connector. ***Connector & terminal*** ***(D77) No. 1 — (i84) No. 10:***	Is there continuity?	Go to step **9**.	Repair or replace the open circuit of harness.
9	**CHECK WIRING HARNESS.** 1) Using a tester, check the continuity between the rear gate opener button connector and chassis ground. ***Connector & terminal*** ***(D77) No. 2 — Chassis ground:***	Is there continuity?	Go to step **10**.	Repair or replace the open circuit of harness.
10	**CHECK REAR GATE OPENER BUTTON.** Using a tester, check the continuity between rear gate opener button switch terminals. ***Connector & terminal*** ***(D77) No. 1 — (D77) No. 2:***	Is there continuity when pressing the switch?	Go to step **11**.	Replace the rear gate opener button. <Ref. to SL-49, Rear Gate Opener Button.>
11	**CHECK WIRING HARNESS.** 1) Disconnect the exterior rear antenna connector and the keyless access CM connector. 2) Using a tester, check continuity between the exterior rear antenna connector and keyless access CM connector. ***Connector & terminal*** ***(R299) No. 1 — (B573) No. 2:*** ***(R299) No. 2 — (B573) No. 1:***	Is there continuity?	Go to step **12**.	Repair or replace the open circuit of harness.
12	**CHECK OUTSIDE REAR ANTENNA.** Replace the outside rear antenna with new or properly working parts.	Does it operate properly?	The outside rear antenna has a failure.	Go to step **13**.
13	**CHECK CURRENT DATA.** 1) Display the current data «R gate lock status SW input» of «Body Control» using Subaru Select Monitor. <Ref. to BC(diag)-12, Read Current Data.> 2) Read the data when locking/unlocking the rear gate lock actuator.	Does the data change from ON ←→ OFF?	Go to step **14**.	Check body integrated unit. <Ref. to SL-80, REMOVAL, Body Integrated Unit.>
14	**CHECK KEYLESS ACCESS SYSTEM CHECK.** 1) Using the Subaru Select Monitor, select System check of «Keyless Access with Push Button Start»: «Rear gate external transmitter + interior tuner». <Ref. to KPS(diag)-36, Keyless Access System Check.> 2) Hold the access key 1 m or more away from the trunk, then come closer to within 0.8 m.	Does the outside buzzer sound?	System is normal.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

14.CAN NOT LOCK WHEN USING THE REAR LOCK BUTTON

CAUTION:
- **Check that there are no other registered access keys inside the vehicle.**
- **Check that the keyless access function is not stopped.**
- **Inspect LAN system or keyless access system according to the basic diagnostic procedure, and make sure that DTC is not input.**
- **When the access key or keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.**

	Step	Check	Yes	No
1	**CHECK REAR GATE ACTUATOR.** While carrying the access key, operate the touch sensor (lock) and touch sensor (unlock).	When the switch is operated, does the rear gate lock/unlock?	Go to step **2**.	Go to step **10**.
2	**CHECK REAR LOCK BUTTON.** 1) Display the current data «Rear Gate Request SW» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when operating the rear lock button.	Does the data change between ON/OFF?	Go to step **8**.	Go to step **3**.
3	**CHECK HARNESS.** 1) Disconnect the rear lock button connector and the keyless access CM connector. 2) Using a tester, measure the resistance between harness. ***Connector & terminal*** ***(D77) No. 3 — (B573) No. 27:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair or replace the open circuit of the harness.
4	**CHECK HARNESS.** Using a tester, measure the resistance between harness and chassis ground. ***Connector & terminal*** ***(D77) No. 3 — Chassis ground:***	Is the resistance 10 MΩ or more?	Go to step **5**.	Repair or replace the short of harness.
5	**CHECK HARNESS.** Using a tester, measure the resistance between harness and chassis ground. ***Connector & terminal*** ***(D77) No. 4 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the open circuit of the harness.
6	**CHECK REAR LOCK BUTTON.** Measure the resistance when the rear lock button is operated using the tester. ***Connector & terminal*** ***(D77) No. 3 — No. 4:***	Did the resistance change from 1 MΩ or more to less than 10 Ω?	Go to step **7**.	Replace the rear lock button. <Ref. to SL-97, REMOVAL, Rear Lock Button.>
7	**CHECK REAR LOCK BUTTON.** 1) Display the current data «Rear Gate Request SW» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when operating the rear lock button.	Does the data change between ON/OFF?	Go to step **8**.	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>
8	**CHECK WIRING HARNESS.** 1) Disconnect the exterior rear antenna connector and the keyless access CM connector. 2) Using a tester, check continuity between the exterior rear antenna connector and keyless access CM connector. ***Connector & terminal*** ***(R299) No. 1 — (B573) No. 2:*** ***(R299) No. 2 — (B573) No. 1:***	Is there continuity?	Go to step **9**.	Repair or replace the open circuit of harness.

Step		Check	Yes	No
9	**CHECK OUTSIDE REAR ANTENNA.** Replace the outside rear antenna with new or properly working parts. <Ref. to SL-95, REMOVAL, Keyless Access Outdoor Antenna.>	Does it operate properly?	The outside rear antenna has a failure.	Go to step **10**.
10	**CHECK BODY INTEGRATED UNIT.** 1) Connect the disconnected connectors. 2) Use the Subaru Select Monitor to perform «Body Control» function check. <Ref. to BC(diag)-24, Function Check.> 3) Actuate the door lock actuator LOCK output.	Does the rear gate lock actuator lock?	It is possible that temporary poor communication occurs.	Go to step **11**.
11	**CHECK HARNESS.** 1) Disconnect the body integrated unit connector and rear gate lock actuator connector. 2) Check the continuity between body integrated unit connector and rear gate lock actuator connector. ***Connector & terminal*** ***(i171) No. 7 — (D46) No. 1:***	Is there continuity?	Go to step **12**.	Repair or replace the open circuit of harness.
12	**CHECK HARNESS.** 1) Check the continuity between the rear gate lock actuator connector and chassis ground. ***Connector & terminal*** ***(D46) No. 2 — Chassis ground:***	Is there continuity?	Go to step **13**.	Repair or replace the open circuit of harness.
13	**CHECK REAR GATE LOCK ACTUATOR.** 1) Check the rear gate lock actuator. <Ref. to SL-52, INSPECTION, Rear Gate Latch and Actuator Assembly.>	Is the rear gate lock actuator normal?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the rear gate latch and actuator assembly. <Ref. to SL-51, Rear Gate Latch and Actuator Assembly.>

15.THE STEERING LOCK IS NOT RELEASED

CAUTION:
When the steering lock CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK OPERATION.** 1) Depress the brake pedal. 2) While turning the steering wheel lightly to the left and right, press the push button ignition switch. 3) Confirm that the steering lock is released and the engine start.	Does the engine fail to start with the steering lock released?	Perform the diagnosis for engine system. <Ref. to EN(H4DO w/o HEV)(diag)-75, Diagnostics for Engine Starting Failure.> <Ref. to EN(H4DO HEV)(diag)-72, Diagnostics for Engine Starting Failure.>	Go to step **2**.
2	**CHECK DTC.** Read keyless access CM DTCs using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is a DTC displayed?	Perform the diagnosis according to the corresponding procedures of DTC.	Go to step **3**.
3	**CHECK CURRENT DATA.** 1) Using the Subaru Select Monitor, display the current data of «Keyless Access with Push Button Start»: «Steering lock unlock request reception status» and «Steering lock lock/unlock command reception history». <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when the push button ignition switch is pressed while in possession of the access key. (Maintain for 10 seconds after switch operation)	Does the data change from «Not yet received» to «Reception», and from «OFF» to «ON»?	Go to step **4**.	Go to step **7**.
4	**CHECK STEERING LOCK CM.** 1) Disconnect the steering lock CM connector. 2) Using a tester, measure the voltage between the steering lock CM connector and chassis ground. ***Connector & terminal*** ***(B424) No. 7 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK STEERING LOCK CM.** Using a tester, check continuity between the steering lock CM connector and chassis ground. ***Connector & terminal*** ***(B424) No. 1 — Chassis ground:***	Is there continuity?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK STEERING LOCK CM.** 1) Connect the disconnected connectors. 2) Using a tester, measure the voltage between steering lock CM terminals right after the ignition switch is turned to ON. ***Connector & terminal*** ***(B424) No. 3 (+) — (B424) No. 1 (–):***	Is the voltage 1 V or less right after the ignition ON?	Replace the steering lock CM. <Ref. to SL-105, REMOVAL, Steering Lock CM.>	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
7	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, display the current data of «Keyless Access with Push Button Start»: «Code collation result between smart ECM and ID code box». <Ref. to KPS(diag)-29, Read Current Data.>	Is data displayed as being normal?	Go to step **9**.	Go to step **8**.
8	**CHECK CURRENT DATA.** 1) Replace with a properly functioning or new ID code box. <Ref. to SL-104, ID Code Box.> 2) Using the Subaru Select Monitor, display the current data of «Keyless Access with Push Button Start»: «Code collation result between smart ECM and ID code box». <Ref. to KPS(diag)-29, Read Current Data.>	Is data displayed as being normal?	System is normal.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
9	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, display the current data of «Keyless Access with Push Button Start»: «Code collation result between steering locked ECM and ID code box». <Ref. to KPS(diag)-29, Read Current Data.>	Is data displayed as being normal?	System is normal.	Go to step **10**.
10	**CHECK ID CODE BOX.** 1) Replace with a properly functioning or new ID code box. <Ref. to SL-104, ID Code Box.> 2) Using the Subaru Select Monitor, display the current data of «Keyless Access with Push Button Start»: «Code collation result between steering locked ECM and ID code box». <Ref. to KPS(diag)-29, Read Current Data.>	Is data displayed as being normal?	System is normal.	Go to step **11**.
11	**CHECK STEERING LOCK CM.** 1) Replace with a properly functioning or new steering lock CM. <Ref. to SL-105, REMOVAL, Steering Lock CM.> 2) After registering, the steering lock operates when the ignition is turned to OFF and the driver's door is opened and closed. 3) Turn the ignition to ON. 4) Operate the steering and check for whether the steering lock is released.	Is the steering lock released, and does the engine start?	Replace the steering lock CM. <Ref. to SL-105, REMOVAL, Steering Lock CM.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

16.THE STEERING LOCK DOES NOT OPERATE

CAUTION:
When the keyless access CM or steering lock CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK DTC.** Read DTCs of «Keyless Access with Push Button Start» using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is a DTC displayed?	Perform the diagnosis according to the corresponding DTC.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Display the current data «Driver's door SW input» of «Body Control» using Subaru Select Monitor. <Ref. to BC(diag)-12, Read Current Data.> 2) Read the data when opening and closing the driver's door.	Does the data change from ON to OFF according to the opening and closing?	Go to step **3**.	Inspect door switch circuit.
3	**CHECK CURRENT DATA.** Display the current data «Shift P Signal» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.>	Is the status displayed correctly when the shift lever is shifted from P to other than P?	Go to step **4**.	Check the P range switch and harness.
4	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, display the current data of «Keyless Access with Push Button Start»: «Code collation result between smart ECM and ID code box». <Ref. to KPS(diag)-29, Read Current Data.>	Is the status normal?	Go to step **5**.	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>
5	**CHECK CURRENT DATA.** Using the Subaru Select Monitor, display the current data of «Keyless Access with Push Button Start»: «Code collation result between steering locked ECM and ID code box». <Ref. to KPS(diag)-29, Read Current Data.>	Is the status normal?	Go to step **6**.	Replace the steering lock CM. <Ref. to SL-105, REMOVAL, Steering Lock CM.>
6	**CHECK CURRENT DATA.** 1) Display the current data «Steering lock lock/unlock command reception history» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) While in possession of the access key, perform engine start operations, and read data within 10 seconds after starting.	Is data displayed as ON?	Go to step **7**.	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>
7	**CHECK STEERING LOCK CM.** Using a tester, measure the waveform between steering lock CM terminals immediately after the following operations. Perform ignition ON, driver's side door close → shift lever "P" range, ignition OFF, and close → open the driver's side door. ***Connector & terminal*** ***(B424) No. 3 — (B424) No. 1:***	Is the waveform immediately after opening the driver's side door abnormal?	Replace the steering lock CM. <Ref. to SL-105, REMOVAL, Steering Lock CM.>	Go to step **8**.

	Step	Check	Yes	No
8	**CHECK WIRING HARNESS.** 1) Disconnect the keyless access CM connector and the steering lock CM connector. 2) Using a tester, check continuity between the keyless access CM connector and steering lock CM connector. ***Connector & terminal*** ***(B424) No. 3 — (B574) No. 29:***	Is there continuity?	Go to step **9**.	Repair or replace the open circuit of harness.
9	**CHECK WIRING HARNESS.** Using a tester, check continuity between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is there continuity?	Replace the keyless access CM. <Ref. to SL-102, REMOVAL, Keyless Access CM.>	Repair or replace the open circuit of harness.

17.POWER WILL NOT TURN ON (BOTH ACCESSORY AND IGNITION)

CAUTION:
• When the keyless access CM is replaced with a new unit, and the battery ground terminal is connected, it will become ignition ON. Also, if the battery is disconnected, it will resume to a condition with the battery cut off.
• When the keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**CHECK FUSE.** Check the fuse.	Is the fuse OK?	Go to step **2**.	Replace the fuse.
2	**CHECK POWER SUPPLY.** 1) Remove IG relay 1 (push button start), IG relay 2 (push button start) and accessory relay (push button start). 2) Using a tester, measure the voltage between the relay block connector and chassis ground.	Is the voltage 10 V or more?	Go to step **3**.	Check the DC power supply circuit.
3	**CHECK CONNECTOR.** Check the engagement of each connector and for any deformation or looseness.	Are the connectors and terminals normal?	Go to step **4**.	Repair the connector, or replace harness.
4	**CHECK WIRING HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the voltage between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 2 (+) — Chassis ground (–):***	Is the voltage between 8 V and 16 V?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK WIRING HARNESS.** Using a tester, check continuity between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is there continuity?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK DTC.** 1) Connect the keyless access CM connector. 2) While in possession of the access key, depress the brake pedal, and push the push button ignition switch. 3) Read keyless access CM DTCs using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is a DTC output?	Perform diagnosis according to the DTC.	Go to step **7**.
7	**CHECK CURRENT DATA.** 1) Display the current data «Push start SW 1» and «Push start SW 2» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.> 2) Read the data when pressing the push button ignition switch.	Does it change from OFF to ON along with the operation?	Go to step **8**.	Go to step **15**.
8	**CHECK RELAY (PUSH BUTTON START).** Check IG relay 1 and 2 (push button start), and accessory relay (push button start). <Ref. to SL-112, INSPECTION, IG Relay1 (Push Button Start).>	Is each relay normal?	Go to step **9**.	Replace the faulty relay.

	Step	Check	Yes	No
9	**CHECK WIRING HARNESS.** 1) Disconnect the keyless access CM connector, IG relay 1 (push button start), IG relay 2 (push button start) and accessory relay (push button start). 2) Using a tester, check continuity between terminals of keyless access CM connector, IG relay 1 (push button start), IG relay 2 (push button start) and accessory relay (push button start). ***Connector & terminal*** ***(B574) No. 6 — (B225) No. 38:*** ***(B572) No. 9 — (B225) No. 34:*** ***(B574) No. 4 — (B426) No. 1:***	Is there continuity?	Go to step **10**.	Repair or replace the open circuit of harness.
10	**CHECK WIRING HARNESS.** Using a tester, check continuity between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 9 — Chassis ground:*** ***(B574) No. 4 — Chassis ground:*** ***(B574) No. 6 — Chassis ground:***	Is there continuity?	Repair or replace the short circuit of the harness.	Go to step **11**.
11	**CHECK WIRING HARNESS.** Using a tester, check the continuity between the IG relay 2 (push button start) connector and chassis ground. ***Connector & terminal*** ***(B225) No. 39 — Chassis ground:***	Is there continuity?	Go to step **12**.	Repair or replace the open circuit of harness.
12	**CHECK WIRING HARNESS.** Using a tester, check the continuity between the IG relay 1 connector and chassis ground. ***Connector & terminal*** ***(B225) No. 35 — Chassis ground:***	Is there continuity?	Go to step **13**.	Repair or replace the open circuit of harness.
13	**CHECK WIRING HARNESS.** Using a tester, check the continuity between the accessory relay connector and chassis ground. ***Connector & terminal*** ***(B426) No. 2 — Chassis ground:***	Is there continuity?	Go to step **14**.	Repair or replace the open circuit of harness.
14	**CHECK KEYLESS ACCESS CM.** 1) Connect all the disconnected connectors. 2) Using a tester, measure the voltage between the keyless access CM connector and chassis ground when the ignition is turned from OFF to ON. ***Connector & terminal*** ***(B572) No. 9 (+) — Chassis ground (–):*** ***(B574) No. 4 (+) — Chassis ground (–):*** ***(B574) No. 6 (+) — Chassis ground (–):***	Did the voltage change from 1 V or less to +B-2 V or more?	Go to step **15**.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
15	**CHECK PUSH BUTTON IGNITION SWITCH.** 1) Disconnect the push button ignition switch. 2) Using a tester, check the continuity between terminals. ***Connector & terminal*** ***(i150) No. 7 — (i150) No. 5:*** ***(i150) No. 2 — (i150) No. 5:***	When the button was pressed, did it change to continuity exists? (No continuity when button is released)	Go to step **16**.	Replace the push button ignition switch. <Ref. to SL-107, REMOVAL, Push Button Ignition Switch.>

	Step	Check	Yes	No
16	**CHECK WIRING HARNESS.** Using a tester, check the continuity between the push button ignition switch connector and chassis ground. ***Connector & terminal*** ***(i150) No. 4 — Chassis ground:*** ***(i150) No. 5 — Chassis ground:***	Is there continuity?	Go to step **17**.	Repair or replace the open circuit of harness.
17	**CHECK WIRING HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, check continuity between the keyless access CM connector and push button ignition switch. ***Connector & terminal*** ***(i150) No. 7 — (B574) No. 28:*** ***(i150) No. 2 — (B574) No. 30:***	Is there continuity?	System is normal.	Repair or replace the open circuit of harness.

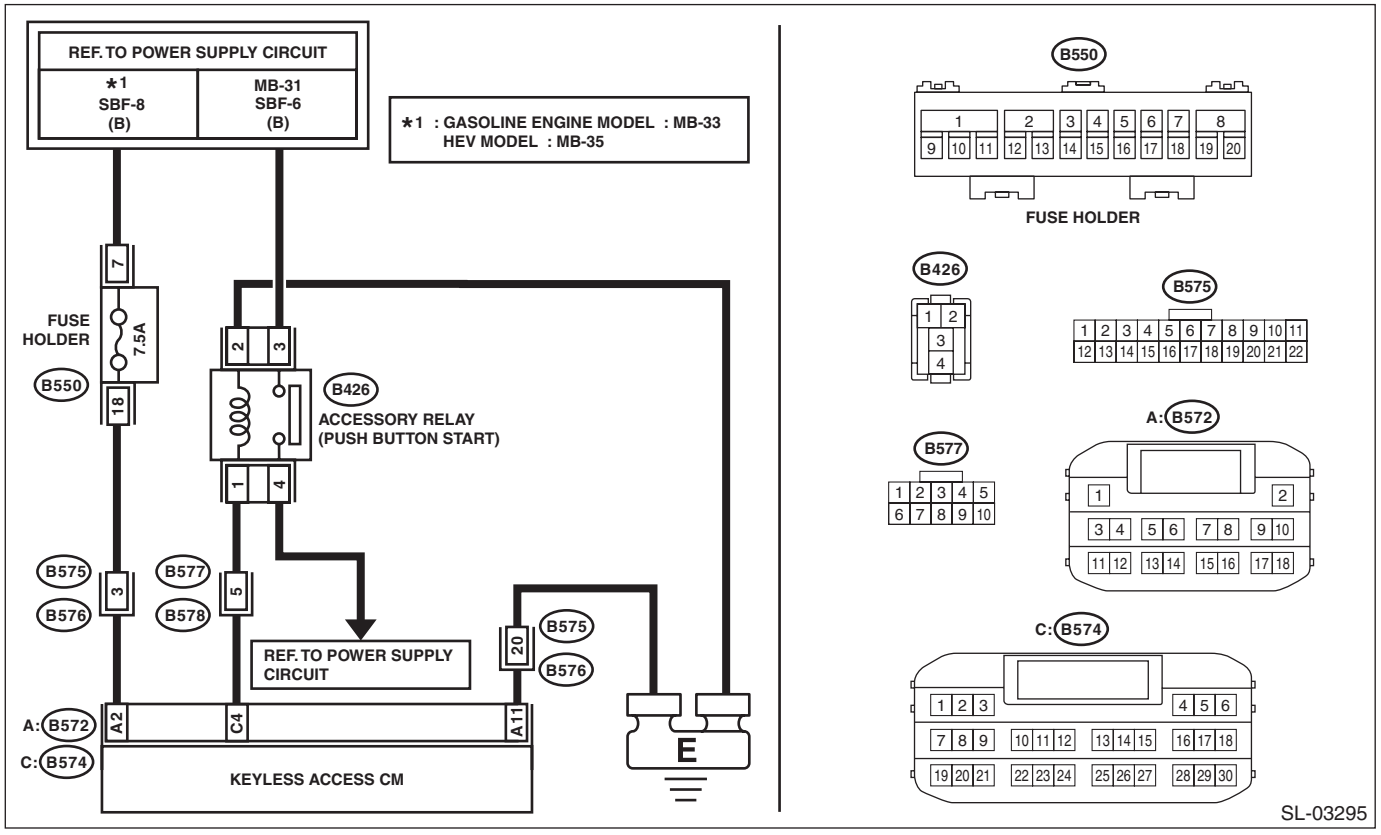
18.POWER WILL NOT TURN ON (ACCESSORY DOES NOT TURN ON, BUT IGNITION TURNS ON)

CAUTION:

- **When the keyless access CM is replaced with a new unit, and the battery ground terminal is connected, it will become ignition ON. Also, if the battery is disconnected, it will resume to a condition with the battery cut off.**
- **When the keyless access CM is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.**

WIRING DIAGRAM:

Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



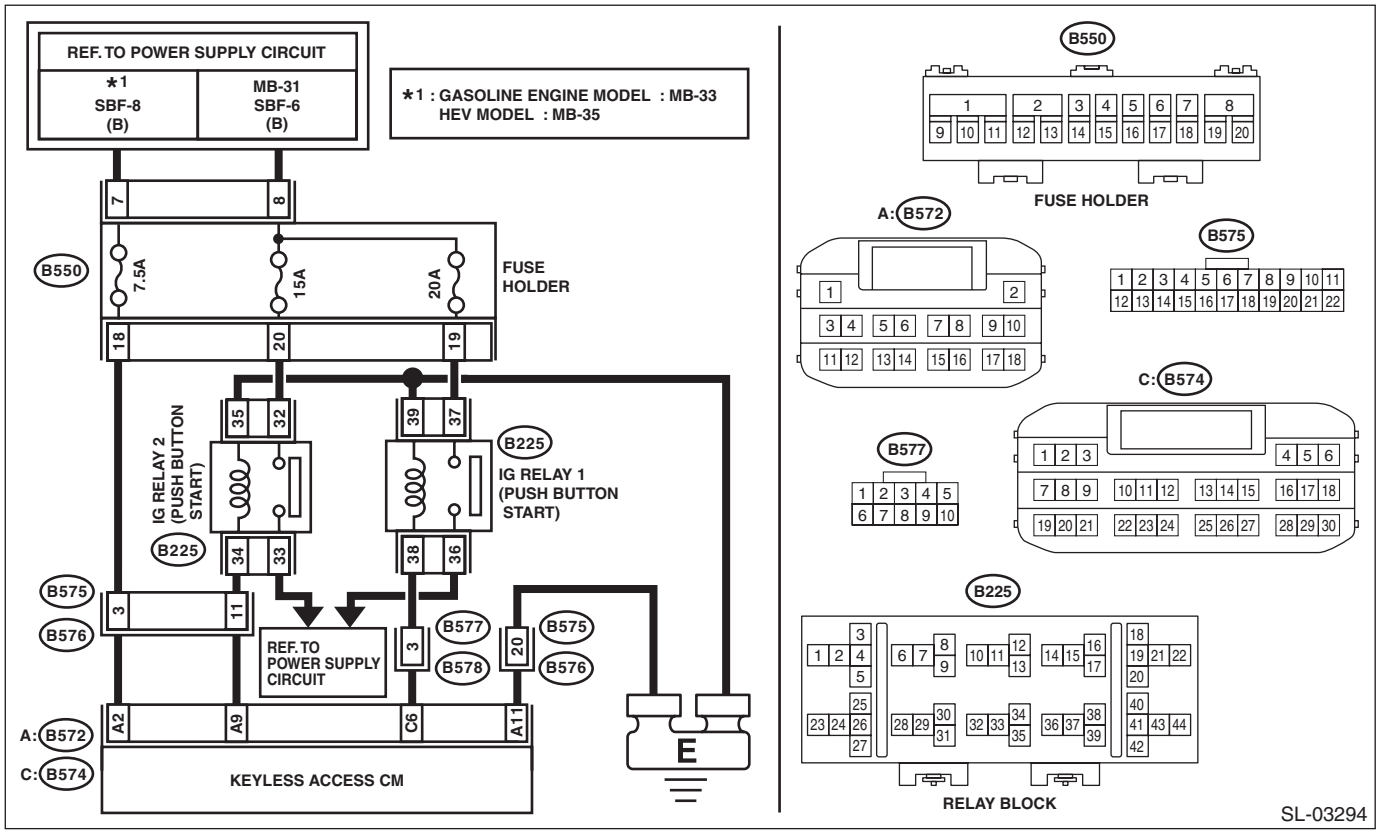
Step		Check	Yes	No
1	**CHECK FUSE.** Check the fuse.	Is the fuse OK?	Go to step **2**.	Replace the fuse.
2	**CHECK CONNECTOR.** Check the engagement of each connector and for any deformation or looseness.	Are the connectors and terminals normal?	Go to step **3**.	Repair the connector, or replace harness.
3	**CHECK WIRING HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the voltage between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 2 (+) — Chassis ground (–):***	Is the voltage between 8 V and 16 V?	Go to step **4**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK WIRING HARNESS.** Using a tester, check continuity between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is there continuity?	Go to step **5**.	Repair or replace the open circuit of harness.
5	**CHECK ACCESSORY RELAY (PUSH BUTTON START).** Check the accessory relay (push button start). <Ref. to SL-116, INSPECTION, Accessory Relay (Push Button Start).>	Is the relay OK?	Go to step **6**.	Replace the relay.
6	**CHECK WIRING HARNESS.** 1) Disconnect the keyless access CM connector and the accessory relay (push button start). 2) Using a tester, check continuity between the keyless access CM connector and accessory relay (push button start). ***Connector & terminal*** ***(B574) No. 4 — (B426) No. 1:***	Is there continuity?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK WIRING HARNESS.** Using a tester, check continuity between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B574) No. 4 — Chassis ground:***	Is there continuity?	Repair or replace the short circuit of the harness.	Go to step **8**.
8	**CHECK KEYLESS ACCESS CM.** 1) Connect the keyless access CM connector. 2) Using a tester, measure the voltage between the keyless access CM connector and chassis ground when the ignition is turned from OFF to ON. ***Connector & terminal*** ***(B574) No. 4 (+) — Chassis ground (–):***	Did the voltage change from 1 V or less → +B-2 V or more?	System is normal.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

19.POWER WILL NOT TURN ON (ACCESSORY TURNS ON, BUT IGNITION DOES NOT TURN ON)

CAUTION:
When the keyless access CM is replaced with a new unit, and the battery ground terminal is connected, it will become ignition ON. Also, if the battery is disconnected, it will resume to a condition with the battery cut off.

WIRING DIAGRAM:
Push button start system <Ref. to WI(w/o HEV)-186, WIRING DIAGRAM, Push Button Start System.> <Ref. to WI(HEV)-165, WIRING DIAGRAM, Push Button Start System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Check the fuse.	Is the fuse OK?	Go to step **2**.	Replace the fuse.
2	**CHECK CONNECTOR.** Check the engagement of each connector and for any deformation or looseness.	Are the connectors and terminals normal?	Go to step **3**.	Repair the connector, or replace harness.
3	**CHECK WIRING HARNESS.** 1) Disconnect the keyless access CM connector. 2) Using a tester, measure the voltage between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 2 (+) — Chassis ground (–):***	Is the voltage between 8 V and 16 V?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK WIRING HARNESS.** Using a tester, check continuity between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 11 — Chassis ground:***	Is there continuity?	Go to step **5**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
5	**CHECK IG RELAY 1 AND 2 (PUSH BUTTON START).** Check IG relay 1 (push button start) and IG relay 2 (push button start). <Ref. to SL-112, INSPECTION, IG Relay1 (Push Button Start).>	Is the relay OK?	Go to step **6**.	Replace the relay.
6	**CHECK WIRING HARNESS.** 1) Disconnect the keyless access CM connector and the IG relay 1 and 2 (push button start). 2) Using a tester, check continuity between keyless access CM connector and IG relay 1 (push button start) or IG relay 2 (push button start). ***Connector & terminal*** ***(B572) No. 9 — (B225) No. 34:*** ***(B574) No. 6 — (B225) No. 38:***	Is there continuity?	Go to step **7**.	Repair or replace the open circuit of harness.
7	**CHECK WIRING HARNESS.** Using a tester, check continuity between the keyless access CM connector and chassis ground. ***Connector & terminal*** ***(B572) No. 9 — Chassis ground:*** ***(B574) No. 6 — Chassis ground:***	Is there continuity?	Repair or replace the short circuit of the harness.	Go to step **8**.
8	**CHECK KEYLESS ACCESS CM.** 1) Connect the keyless access CM connector. 2) Using a tester, measure the voltage between the keyless access CM connector and chassis ground when the ignition is turned from OFF to ON. ***Connector & terminal*** ***(B572) No. 9 (+) — Chassis ground (–):*** ***(B574) No. 6 (+) — Chassis ground (–):***	Did the voltage change from 1 V or less → +B-2 V or more?	System is normal.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>

20.ENGINE DOES NOT START

CAUTION:
• When the keyless access CM is replaced with a new unit, and the battery ground terminal is connected, it will become ignition ON. Also, if the battery is disconnected, it will resume to a condition with the battery cut off.
• When the keyless access CM or ID code box is replaced, registration of the immobilizer is required. For the relevant procedures, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

	Step	Check	Yes	No
1	**INITIALIZE STEERING LOCK.** 1) Place the shift lever in the Parking range. 2) Operate the driver's door switch ON/OFF with the ignition switch OFF. 3) Wait for 10 seconds. 4) Place the access key on the driver's seat. 5) Press the push button ignition switch while depressing the brake pedal.	Can the engine start?	System is normal.	Go to step **2**.
2	**CHECK DTC.** Read DTCs of «Keyless Access with Push Button Start» using the Subaru Select Monitor. <Ref. to KPS(diag)-28, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to the DTC. <Ref. to KPS(diag)-38, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK POWER SUPPLY SWITCHING.** 1) Place the access key on the driver's seat. 2) Press the push button ignition switch without depressing the brake pedal.	When the switch is operated, does the <IG-OFF> → <ACC-ON> → <IG-ON> → <IG-OFF> change occur?	Go to step **4**.	Perform the diagnostics according to the symptom for power supply switching system in General Diagnostic Table. <Ref. to KPS(diag)-108, POWER SUPPLY SWITCHING SYSTEM, INSPECTION, General Diagnostic Table.>
4	**CHECK CURRENT DATA.** 1) Place the access key on the driver's seat. 2) Press the push button ignition switch while depressing the brake pedal. 3) Using the Subaru Select Monitor, confirm the current data «STSW signal monitor» of «Keyless Access with Push Button Start», when pressing the push button ignition switch. <Ref. to KPS(diag)-29, Read Current Data.> NOTE: If it is difficult to confirm, press the push button ignition switch for approximately five seconds longer.	Does the data change from OFF → ON?	Go to step **10**.	Go to step **5**.
5	**CHECK CURRENT DATA.** Check the current data «Shift P Signal» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.>	Is ON displayed in parking position, and OFF displayed in other positions?	Go to step **6**.	Go to step **11**.

	Step	Check	Yes	No
6	**CHECK CURRENT DATA.** Display the current data «Stop Light Switch» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.>	Is ON displayed when brake pedal depressed, and OFF displayed when brake pedal not depressed?	Go to step **7**.	Go to step **13**.
7	**CHECK CURRENT DATA.** Display the current data «Neutral SW/Clutch SW» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.>	Is ON displayed in parking and neutral positions, and OFF displayed in other positions?	Go to step **8**.	Go to step **15**.
8	**CHECK STEERING LOCK.** Operate the push button ignition switch to perform the power supply switching and check steering lock condition during ACC-ON condition.	Is the steering lock in unlocked condition?	Go to step **9**.	Perform the diagnostics according to the symptom for steering lock system in General Diagnostic Table. <Ref. to KPS(diag)-108, STEERING LOCK SYSTEM, INSPECTION, General Diagnostic Table.>
9	**CHECK KEYLESS ACCESS CM.** 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Using a tester, measure the battery voltage in following procedures. 1. Press the push button ignition switch with the brake pedal depressed. (Measure within 10 seconds.) 2. Release the push button ignition switch from the condition of step 1. above. ***Connector & terminal*** ***(B572) No. 13 (+) — Chassis ground (–):***	Does the value change from 1 V or less to +B-2 V or more in the step 1, and return to 1 V or less in the step 2?	Perform the diagnosis for engine system. <Ref. to EN(H4DO w/o HEV)(diag)-75, Diagnostics for Engine Starting Failure.> <Ref. to EN(H4DO HEV)(diag)-72, Diagnostics for Engine Starting Failure.>	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
10	**CHECK CURRENT DATA.** 1) Connect the disconnected connectors. 2) Display the current data «Engine start permission request reception status» of «Keyless Access with Push Button Start» using Subaru Select Monitor. <Ref. to KPS(diag)-29, Read Current Data.>	Is “Reception” displayed with ignition switch ON, and “Not yet received” displayed in other positions?	Perform the diagnosis for engine system.	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>
11	**CHECK “P” RANGE SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the AT shift lever connector. 3) Using a tester, check the continuity of “P” range switch. ***Connector & terminal*** ***(B116) No. 1 — (B116) No. 2:***	Does it change from Continuity ←→ No continuity according to shift lever operation?	Go to step **12**.	Replace the “P” range switch. <Ref. to CS-59, REMOVAL, AT Shift Lock Solenoid and “P” Range Switch.>
12	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the keyless access CM connector. 3) Using a tester, check continuity between the keyless access CM and AT select lever. ***Connector & terminal*** ***(B116) No. 1 — (B574) No. 25:*** ***(B116) No. 2 — Chassis ground:***	Is there continuity?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Repair or replace the harness.

Step		Check	Yes	No
13	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light switch connector. 3) Using a tester, check the continuity of the stop light switch. ***Connector & terminal*** ***Gasoline engine model*** ***(B65) No. 3 — No. 4:*** ***HEV model*** ***(B65) No. 1 — No. 2:***	Does it change from Continuity ←→ No continuity according to brake pedal operation?	Go to step **14**.	Replace the stop light switch. <Ref. to BR-75, REMOVAL, Stop Light Switch.>
14	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Using a tester, check continuity between the keyless access CM and stop light switch. ***Connector & terminal*** ***Gasoline engine model*** ***(B572) No. 18 — (B65) No. 4:*** ***(B65) No. 3 — F/B fuse No. 8:*** ***HEV model*** ***(B572) No. 18 — (B65) No. 2:*** ***(B65) No. 1 — F/B fuse No. 8:***	Is there continuity?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Repair or replace the harness.
15	**CHECK INHIBITOR SWITCH.** Check the inhibitor switch. <Ref. to CVT(TH58A)-97, INSPECTION, Inhibitor Switch.>	Is the inhibitor switch working normal?	Go to step **16**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-100, REMOVAL, Inhibitor Switch.>
16	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the inhibitor switch connector. 3) Using a tester, check continuity between the keyless access CM connector and inhibitor switch connector. ***Connector & terminal*** ***(B572) No. 5 — (B12) No. 16:*** ***(B12) No. 15 — Starter motor:***	Is there continuity?	Replace the keyless access CM. <Ref. to SL-102, Keyless Access CM.>	Repair or replace the harness.

BODY CONTROL SYSTEM (DIAGNOSTICS)

BC(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:
• Subaru Select Monitor is required for reading DTC, performing diagnosis and reading current data.
• Remove foreign matter (dust, water, oil, etc.) from the body integrated unit connector during removal and installation.
• Registration of immobilizer may be needed after the replacement of control modules, etc. For detailed procedure, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume.

NOTE:
• To check harness for open or short circuits, shake the suspected trouble spot or connector.
• Check List for Interview <Ref. to BC(diag)-3, Check List for Interview.>

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** Ask the customer when and how the trouble occurred using the interview check list. <Ref. to BC(diag)-3, Check List for Interview.>	Did you interview the customer?	Go to step **2**.	Interview the customer.
2	**BASIC INSPECTION.** Check components which might affect body control. <Ref. to BC(diag)-4, INSPECTION, General Description.>	Is the component that might influence the body control problem normal?	Go to step **3**.	Repair or replace each component.
3	**CHECK DTC.** 1) Read the DTC. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. <Ref. to LAN(w/o HEV)(diag)-11, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.> <Ref. to LAN(HEV)(diag)-12, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Subaru Select Monitor.> 2) Record all DTCs, time stamp and freeze frame data. NOTE: For time stamp, refer to "LAN SYSTEM". <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	Is DTC displayed on Subaru Select Monitor?	Go to step **5**.	Go to step **4**.
4	**PERFORM GENERAL DIAGNOSTICS.** Inspect using the "General Diagnostic Table". <Ref. to BC(diag)-45, General Diagnostic Table.>	Is result of inspection OK?	The body control system is normal.	Go to step **5**.
5	**PERFORM DIAGNOSIS.** 1) Correct the cause of trouble. 2) Perform the Clear Memory Mode. <Ref. to BC(diag)-11, Clear Memory Mode.> 3) Read the DTC. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed on Subaru Select Monitor?	Repeat step 5 until DTC is not shown.	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Inspect the following items regarding the vehicle's state.

Body Control System Check List for Interview		Date of Vehicle Bring-in Year Month Day	
Customer's name		Registration No.	Initial year of registration Year Month Date
		Vehicle model	Frame number
Interviewer	Inspector	Engine type	Odometer reading
Customer specified content			
Date and time when the trouble occurred		Frequency of trouble occurrence	
Condition of trouble occurrence		Weather	
Road conditions		Occurrence location	
Accessory installation condition			
Trouble condition			
❑ Diagnostic code		❑ ( )	

3. General Description

A: CAUTION

1. SRS AIRBAG SYSTEM

Airbag system wiring harness is routed near the body integrated unit and body control circuits.

CAUTION:
- **Do not use the electrical test equipment on all airbag system wiring harnesses and connectors.**
- **Be careful not to damage the airbag system wiring harness, when servicing the body control system.**

B: INSPECTION

Before performing diagnosis, check the following items which might affect body control system problems.
1) Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
2) Check the fuse condition.
Make sure that ampere of the fuse is setting value, and it is not blown out.
3) Check the connecting condition of harness and harness connector.
4) Confirm settings of body integrated unit are corresponded to vehicle equipment. <Ref. to BC(diag)-20, OPERATION, Registration Body Integrated Unit.>
5) Make sure that the User Customizing of the body integrated unit matches the vehicle equipment. <Ref. to BC(diag)-17, OPERATION, User Customizing.>
6) Confirm “Factory initial setting” of body integrated unit registrations is “Market”.

C: PREPARATION TOOL

1. SPECIAL TOOL

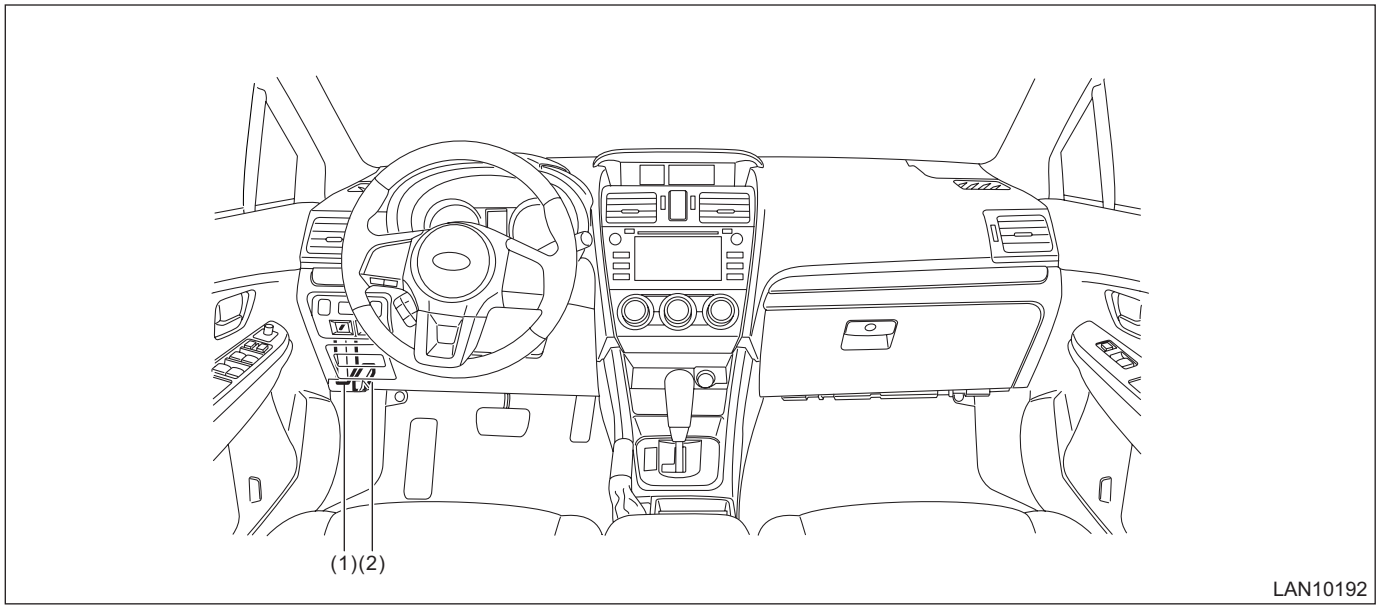
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

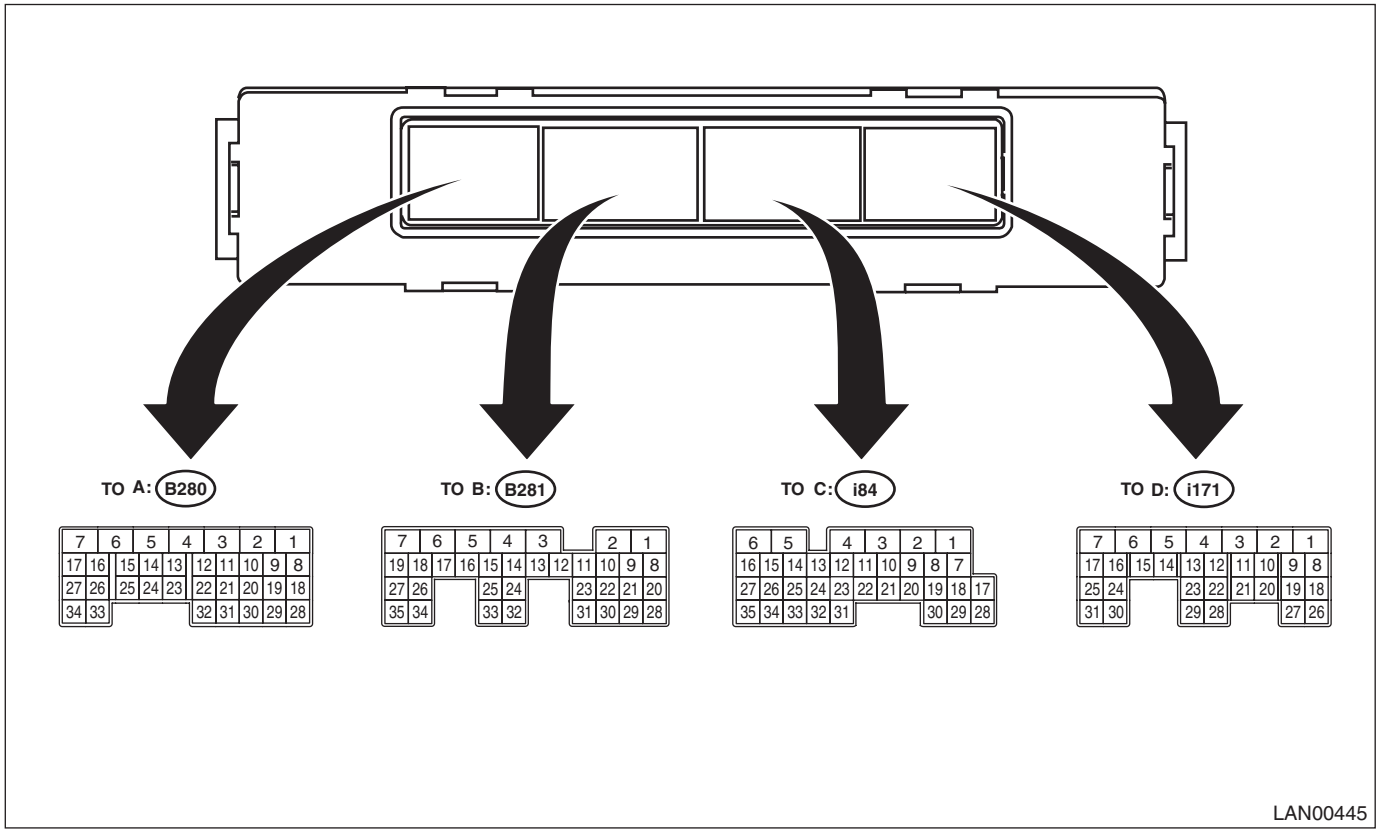
A: LOCATION



(1) Body integrated unit (2) Data link connector

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION



Description	Terminal No.	Signal (V or Ω)	Note
		Ignition switch ON (Engine OFF)	
Ignition power supply (rear wiper)	A5 ←→ Chassis ground	Less than 1.5 V → 10 — 13 V	Ignition switch OFF → ON
Battery power supply (shift lock/key lock)	B6 ←→ Chassis ground	10 — 13 V	Always
Battery power supply (door lock)	D1 ←→ Chassis ground	10 — 13 V	Always
Battery power supply (control)	C6 ←→ Chassis ground	10 — 13 V	Always
Ground	A1 ←→ Chassis ground	Less than 1.5 V	Always
	C1 ←→ Chassis ground		
Battery power supply (back-up)	B7 ←→ Chassis ground	10 — 13 V	Always
Ignition power supply	B3 ←→ Chassis ground	Less than 1.5 V → 10 — 13 V	Ignition switch OFF → ON
ACC power supply	A32 ←→ Chassis ground	Less than 1.5 V → 10 — 13 V	Ignition switch OFF → Accessory ON
Key-in switch	A4 ←→ Chassis ground	Less than 1.5 V → 10 — 13 V	Key insertion (model without the keyless access with push button start system)
ACC input	A4 ←→ Chassis ground	Less than 1.5 V → 10 — 13 V	ACC ON (model with the keyless access with push button start system)
P range SW	B18 ←→ Chassis ground	Less than 1.5 V → 8 V or more	P range to other than P range
Stop light SW	A10 ←→ Chassis ground	Less than 1.5 V → 8 V or more	Stop light switch OFF → ON
Door SW (driver's)	C14 ←→ Chassis ground	8 V or more → less than 1.5 V	Front right door closed → open
Door SW (passenger's)	C13 ←→ Chassis ground	8 V or more → less than 1.5 V	Front left door closed → open

Description	Terminal No.	Signal (V or Ω)	Note
		Ignition switch ON (Engine OFF)	
Door SW (rear right)	C25 ←→ Chassis ground	8 V or more → less than 1.5 V	Rear right door closed → open
Door SW (rear left)	C24 ←→ Chassis ground	8 V or more → less than 1.5 V	Rear left door closed → open
Rear gate SW/trunk SW	C33 ←→ Chassis ground	8 V or more → less than 1.5 V	Rear gate/trunk closed → open
Opener SW (trunk/rear gate)	C10 ←→ Chassis ground	8 V or more → less than 1.5 V	Rear gate/trunk opener switch ON
Manual switch (LOCK)	C9 ←→ Chassis ground	8 V or more → less than 1.5 V	Door lock switch ON
Manual switch (UNLOCK)	C20 ←→ Chassis ground	8 V or more → less than 1.5 V	Door unlock switch ON
Lighting AUTO	B16 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at AUTO position
Lighting II	A34 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at II position
	B34 ←→ Chassis ground		
Lighting I	B17 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at I position
Dimmer passing	B25 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at passing position
Dimmer Hi beam	B15 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at Hi beam position
Front fog light SW	B26 ←→ Chassis ground	8 V or more → less than 1.5 V	Front fog light switch ON
Illumination sensor power supply	B1 ←→ A29	Less than 1.5 V → 4.5 V or more	Ignition switch OFF → ON
Illumination sensor signal	A19	0.2 — 4.5 V	Ignition switch OFF → ON
Ground (illumination sensor)	A29 ←→ Chassis ground	Less than 1.5 V	Always
Rear wiper SW ON	A12 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at ON position
Rear wiper SW INT	A22 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at INT position
Rear washer SW	A30 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at ON position
Illumination SW (Vi1)	D12 ←→ Chassis ground	Approx. 5 V	While clearance light illuminates
Illumination SW (Vi2)	D22 ←→ Chassis ground	0.5 — 4.8 V	
Illumination SW (Vi3)	D28 ←→ Chassis ground	Less than 1.5 V	Always
Bright SW	C21 ←→ Chassis ground	8 V or more → less than 1.5 V	Switch at ON position
Reverse SW (MT)	B12 ←→ Chassis ground	Less than 1.5 V → 8 V or more	Reverse SW ON
Impact sensor	A11 ←→ Chassis ground	8 V or more	Apply an impact
Hi-speed CAN communication circuit 1 (Hi)	B20	Serial communication	Except for sleep status*1
Hi-speed CAN communication circuit 1 (Lo)	B28		
Hi-speed CAN communication circuit 2 (Hi)	C27	Serial communication	Except for sleep status*1
Hi-speed CAN communication circuit 2 (Lo)	C35		
Immobilizer antenna (B)	B22	Serial communication	Communication with ignition key in progress (Without keyless access with push button start system)
Immobilizer antenna (A)	B10		
Immobilizer antenna amplifier GND	B30 ←→ Chassis ground	Less than 1.5 V	Always (Without keyless access with push button start system)
Immobilizer antenna amplifier power supply	B2 ←→ B30	4.5 — 5.5 V	Communication with ignition key in progress (Without keyless access with push button start system)
Security UART	A21	Serial communication	Always (Without keyless access with push button start system)

Description	Terminal No.	Signal (V or Ω)	Note
		Ignition switch ON (Engine OFF)	
Front wiper return	A2 ←→ Chassis ground	8 V	When front wiper is operated
Door UNLOCK (driver's seat) output	D4 ←→ Chassis ground	Less than 0.5 V → 8 V or more	When driver's side door unlock is output
Keyless entry / TPMS communication circuit	D11	Serial communication	When door lock/unlock is operated with the keyless transmitter, or when TPMS is operated
Rear defogger switch	C18 ←→ Chassis ground	Less than 1.5 V → 8 V or more	When the rear defogger switch is ON
Parking brake switch	C32 ←→ Chassis ground	8 V or more → less than 1.5 V	When parking brake is ON
Shift lock solenoid	B5 ←→ Chassis ground	Less than 1.5 V → 8 V or more	When shift lock is operating (AT models)
Key lock solenoid	B4 ←→ Chassis ground	Less than 1.5 V → 8 V or more	LOCK status is ON (AT model without the keyless access with push button start system)
Rear wiper ON output	A7 ←→ Chassis ground	Less than 0.5 V → 8 V or more	Rear wiper operation in progress
Rear wiper return	A6 ←→ Chassis ground	Less than 0.5 V → 8 V or more	Rear wiper operation in progress
Door LOCK output	D2 ←→ Chassis ground	Less than 0.5 V → 8 V or more	When LOCK signal is output
Door UNLOCK output	D3 ←→ Chassis ground	Less than 0.5 V → 8 V or more	When UNLOCK signal is output
Rear gate/trunk UNLOCK output	D7 ←→ Chassis ground	Less than 0.5 V → 8 V or more	When UNLOCK signal is output
Lighting relay power supply	A3 ←→ Chassis ground	10 — 13 V	ACC or key-in SW ON
	B19 ←→ Chassis ground	10 — 13 V	ACC or key-in SW ON
Lighting relay Hi output	A17 ←→ Chassis ground	8 V or more → less than 1.0 V	Dimmer SW at Hi position
Lighting relay Lo output	B35 ←→ Chassis ground	8 V or more → less than 1.0 V	Lighting II SW at ON position
Lighting Lo relay output 2	A27 ←→ Chassis ground	8 V or more → less than 1.0 V	Lighting II SW at ON position
Lighting relay I output	A16 ←→ Chassis ground	8 V or more → less than 1.0 V	Lighting I SW at ON position
Front fog light output	A15 ←→ Chassis ground	8 V or more → less than 1.0 V	Front fog light SW at ON position
DRL cancel output	D10 ←→ Chassis ground	8 V or more → less than 1.0 V	Headlight switch ON or Hi beam ON, passing switch ON
Illumination output	B8	Pulse output	Illumination ON
	C16	Pulse output	Illumination ON
Key ring illumination	A25	Pulse output	Illumination ON (Without keyless access with push button start system)
Room light output	C4	Pulse output	Room light ON (doors interlocked)
Map light output	D8	Pulse output	Map light ON (keyless answer-back, etc.)
Luggage/trunk light output	C3	Pulse output	Luggage/trunk at open state
Rear defogger relay output	A26 ←→ Chassis ground	8 V or more → less than 1.0 V	Rear defogger SW ON
Wiper deicer relay output	D9 ←→ Chassis ground	8 V or more → less than 1.0 V	Wiper deicer SW ON
Turn/hazard output	D18 ←→ Chassis ground	8 V or more → less than 1.0 V	When answer-back is output
Security horn output	A24 ←→ Chassis ground	8 V or more → less than 1.0 V	When security is operating
Security light	D26	Pulse control	When security light is illuminating
Answer-back buzzer output	A20 ←→ Chassis ground	8 V or more → less than 1.0 V	When answer-back operates

Description	Terminal No.	Signal (V or Ω)	Note
		Ignition switch ON (Engine OFF)	
Immobilizer communication	A31	Serial communication	(Models without the keyless access with push button start system)
Turn signal RH	B9 ←→ Chassis ground	8 V or more → less than 1.5 V	When turn signal switch RH is ON
Drive mode SW (economy/X mode)	B14 ←→ Chassis ground	8 V or more → less than 1.5 V	Mode SW OFF → ON
Turn signal LH	B21 ←→ Chassis ground	8 V or more → less than 1.5 V	When turn signal switch LH is ON
Accessory connector	B29 ←→ Chassis ground	8 V or more → less than 1.5 V	Rear gate/trunk closed → open
Door lock state SW driver's	C12 ←→ Chassis ground	8 V or more → less than 1.5 V	Driver's inner remote lock → unlock
Door lock state SW passenger's	C23 ←→ Chassis ground	8 V or more → less than 1.5 V	Passenger's inner remote lock → unlock
SRF OFF SW input	D14 ←→ Chassis ground	8 V or more → less than 1.5 V	When SRF OFF SW is pressed
LIN communication line	D16	Serial communication	Except for sleep status*1
SRF relay output (R)	D20 ←→ Chassis ground	Less than 1.5 V → 8 V or more	When SRF RH FOG is operating
SRF relay output (L)	D21 ←→ Chassis ground	Less than 1.5 V → 8 V or more	When SRF LH FOG is operating

*1: For CAN sleep state, hold on for approx. one minute with ignition OFF and the doors, trunk, and rear gate all closed.

6. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC). <Ref. to BC(diag)-25, List of Diagnostic Trouble Code (DTC).>

7. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

8. Read Current Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

Items to be displayed	Unit of measure	Contents	Note
BATT voltage (control)	10 — 15 V	Body integrated unit input value	Always
BATT voltage (BACKUP)	10 — 15 V	Body integrated unit input value	Always
IGN voltage	10 — 15 V	Body integrated unit input value	Ignition switch ON
ACC voltage	10 — 15 V	Body integrated unit input value	Ignition switch ACC
Illumination VR Voltage	0 — 5 V	Body integrated unit input value	Input value from illumination volume
Illumination output d-ratio	0 — 100%	Body integrated unit output value	Small light ON Illumination volume is other than bright.
number of regist.	0 — 4	Number of keyless key registered	
Front Wheel Speed	km/h	CAN data input value	Reception from VDC module
Fuel consumption	cc/s	CAN data input value	Reception from ECM
Engine Coolant Temperature	–40 — 215°C	CAN data input value	Reception from ECM
Shift Position	1 — 3, D-S, D, N, R, P	CAN data input value	Reception from TCM
Buzzer beeping request	Status for ’beeping deactivated’ Reverse warning Key warning buzzer Light Remained Buzzer Customize 1 Customize 2 Registration completed 1 Registration completed 2 Registered Registration NG	CAN data output value	Reception from body integrated unit
Destination Code	JPN U4, U5, U6 C0 EC, EA, E2, EL K4, C4, C6 KS EK ER, EN KA, KC EH C6	CAN data input value	—
Illumination Sensor Output	0 — 5 V	CAN data input value	—
Off delay time	OFF 10 Sec 20 Sec 30 Sec	Body integrated unit setting value	Customize setting

Items to be displayed	Unit of measure	Contents	Note
Auto Light Sensitivity Adjustment	Dull Normal Sensitive Very sensitive	Body integrated unit setting value	Customize setting
key-lock warning SW Input	ON/OFF	Body integrated unit input value	ON when ignition key inserted
Stop Light Switch	ON/OFF	Body integrated unit input value	ON when brake pedal is depressed
Front fog lamp SW input	ON/OFF	Body integrated unit input value	When front fog light switch is ON
Rear fog lamp SW input	ON/OFF	Body integrated unit input value	When rear fog light switch is ON
Driver's door SW input	ON/OFF	Body integrated unit input value	ON when driver's door is open
P-door SW input	ON/OFF	Body integrated unit input value	ON when passenger's door is open
Rear right door SW input	ON/OFF	Body integrated unit input value	ON when rear right door is open
Rear left door SW input	ON/OFF	Body integrated unit input value	ON when rear left door is open
R Gate SW input	ON/OFF	Body integrated unit input value	ON when rear gate/trunk open
Manual lock SW input	ON/OFF	Body integrated unit input value	Manual lock switch ON
Manual unlock SW input	ON/OFF	Body integrated unit input value	Manual unlock switch ON
Bright SW input	ON/OFF	Body integrated unit input value	Bright switch ON
P SW	ON/OFF	Body integrated unit input value	ON when shift range is in parking Shift lever P switch signal
MT Reverse Switch	ON/OFF	Body integrated unit input value	Reverse switch ON (for MT vehicle only)
R wiper ON SW input	ON/OFF	Body integrated unit input value	Rear wiper switch ON
R wiper INT SW input	ON/OFF	Body integrated unit input value	Rear wiper switch (INT ON)
R washer SW input	ON/OFF	Body integrated unit input value	Rear washer switch ON
Rr Defogger SW	ON/OFF	Body integrated unit input value	Rear defogger switch ON
Fr wiper input	ON/OFF	Body integrated unit input value	ON when front wiper is operating
Parking Brake SW	ON/OFF	Body integrated unit input value	Parking brake ON
Driver's seat lock status SW input	ON/OFF	Body integrated unit input value	Displays latch state, ON when locked
Passenger's seat lock status SW input	ON/OFF	Body integrated unit input value	Displays latch state, ON when locked
R gate lock status SW input	ON/OFF	Body integrated unit input value	Displays latch state, ON when locked
R Gate Release SW input	ON/OFF	Body integrated unit input value	Rear gate release switch ON
Rr Defogger output	ON/OFF	Body integrated unit output value	ON when rear defogger relay is operating
lock actuator LOCK output	ON/OFF	Body integrated unit output value	ON when LOCK signal is output
All seat UNLOCK output	ON/OFF	Body integrated unit output value	ON when unlock signal is output
D-seat UNLOCK output	ON/OFF	Body integrated unit output value	ON when unlock signal is output
R gate/trunk UNLK output	ON/OFF	Body integrated unit output value	ON when rear gate/trunk unlock signal is output
Rear Wiper Output	ON/OFF	Body integrated unit output value	ON when rear wiper motor is operating
Shift Lock Solenoid	ON/OFF	Body integrated unit output value	ON when shift lock solenoid is operating (only AT)
Key lock solenoid output	ON/OFF	Body integrated unit output value	ON when key-lock status
wiper deicer output	ON/OFF	Body integrated unit output value	ON when wiper deicer relay is operating
Hazard Output	ON/OFF	Body integrated unit output value	ON when answer-back signal is received or when hazard is operating

Items to be displayed	Unit of measure	Contents	Note
Keyless Buzzer Output	ON/OFF	Body integrated unit output value	ON when lock/unlock signal is received
Horn Output	ON/OFF	Body integrated unit output value	ON when security warning is operating
Illumination lamp O/P	ON/OFF	Body integrated unit output value	ON when illumination is illuminated
Room lamp output	ON/OFF	Body integrated unit output value	ON when keyless lock/unlock signal is received, or when opening or closing the door
key illumination lamp o/p	ON/OFF	Body integrated unit output value	ON when key illumination light is illuminated
R fog lamp output	ON/OFF	Body integrated unit output value	ON when rear fog light is ON
Immobilizer lamp output	ON/OFF	Body integrated unit output value	ON when immobilizer pilot light blinks
Keyless operation 1	Register/Normal	Body integrated unit input value	When keyless ID is registered
Keyless operation 2	Deletion/Normal	Body integrated unit input value	When keyless ID is deleted
Small Light SW	ON/OFF	Body integrated unit input value	ON when small light is illuminated
Headlamp	ON/OFF	Body integrated unit input value	ON when headlight Lo is illuminated
High Beam	ON/OFF	Body integrated unit input value	ON when headlight Hi is illuminated
Blower fan information	ON/OFF	CAN data input value	Reception from ECM
Power rear gate setting	ON/OFF	Body integrated unit setting value	Not applicable (OFF fixed)
Lane change signal setting	ON/OFF	Body integrated unit setting value	Customize setting
Rear wiper auto setting	ON/OFF	Body integrated unit setting value	Customize setting
Xmode SW setting	ON/OFF	Body integrated unit setting value	Not applicable (OFF fixed)
Left turn signal input	ON/OFF	Body integrated unit input value	ON when turn signal switch is ON
Right turn signal input	ON/OFF	Body integrated unit input value	ON when turn signal switch is ON
Left turn signal output	ON/OFF	Body integrated unit output value	ON when turn signal is output
Right turn signal output	ON/OFF	Body integrated unit output value	ON when turn signal is output
XmodeSW input	ON/OFF	Body integrated unit input value	Not applicable (OFF fixed)
XmodeSW output	ON/OFF	Body integrated unit output value	Not applicable (OFF fixed)
TPMS Setting	TPMS/No TPMS	Body integrated unit setting value	Customize setting
Driver's Door Unlock Setting	Selection/ALL	Body integrated unit setting value	Customize setting
Rear Gate Unlock Setting	Selection/ALL	Body integrated unit setting value	Customize setting
One-touch Turn Signal System Setup	ON/OFF	Body integrated unit setting value	Customize setting
Auto Wiper System (Rear) Setup	ON/OFF	Body integrated unit setting value	Customize setting
Steering Responsive Fog Lamp Setting	ON/OFF	Body integrated unit setting value	Customize setting
Steering Responsive Fog Lamp OFF SW Input	ON/OFF	Body integrated unit input value	ON when SRF OFF switch is ON
Steering Angle Sensor	-3276.8 — 3276.8deg	CAN data input value	Reception from VDC module

Items to be displayed	Unit of measure	Contents	Note
Steering Responsive Fog Lamp Mode	OFF/ON/Fail	SRF status	OFF in SRF OFF mode ON in SRF ON mode Fail at the time of SRF failure
Steering Responsive Fog Lamp (Right) Output	ON/OFF	Body integrated unit output value	ON when SRF (R) is illuminated
Steering Responsive Fog Lamp (Left) Output	ON/OFF	Body integrated unit output value	ON when SRF (L) is illuminated
Steering Responsive Fog Lamp (Right) CAN Output	ON/OFF	CAN data output value	ON when SRF (R) is illuminated
Steering Responsive Fog Lamp (Left) CAN Output	ON/OFF	CAN data output value	ON when SRF (L) is illuminated
Steering Responsive Fog Lamp Indicator Signal	OFF/ON/BLINK	CAN data output value	Lights off in SRF ON mode Lights on in SRF OFF mode Blinks at the time of SRF failure
Lighting I Switch Input	ON/OFF	Body integrated unit input value	Small light switch ON
Lighting II Switch Input	ON/OFF	Body integrated unit input value	Headlight switch ON
Lighting AUTO input	ON/OFF	Body integrated unit input value	Headlight AUTO switch ON
Dimmer Hi Switch Input	ON/OFF	Body integrated unit input value	Dimmer Hi switch ON
Dimmer Passing Switch Input	ON/OFF	Body integrated unit input value	Dimmer Pass switch ON
Illumination sensor flag	ON/OFF	Body integrated unit setting value	Shows the existence of illumination sensor
Lighting I Lamp Output	ON/OFF	Relay drive	ON when small light is illuminated
Lighting II Lamp Output	ON/OFF	Relay drive	ON when headlight is illuminated
Lighting Hi Light Output	ON/OFF	Relay drive	ON when headlight Hi is illuminated
Front Fog Lamp Output	ON/OFF	Relay drive	When front fog light relay ON output
DRL Cancel Output	ON/OFF	Relay drive	When DRL cancel relay ON output
Power Supply Tr	ON/OFF	Inner Tr drive	Headlight auxiliary power supply ON
Map lamp output	ON/OFF	Body integrated unit output value	ON when map light is illuminated
Luggage/Trunk lamp output	ON/OFF	Body integrated unit output value	ON when luggage/trunk light is illuminated
Front wiper Low switch input	ON/OFF	Body integrated unit input value	Front wiper Lo switch ON
Front wiper High switch input	ON/OFF	Body integrated unit input value	Front wiper Hi switch ON
Front washer switch input	ON/OFF	Body integrated unit input value	Front wiper washer switch ON
Front wiper Low output	ON/OFF	Body integrated unit output value	ON when front wiper Lo is operating
Front wiper High output	ON/OFF	Body integrated unit output value	ON when front wiper Hi is operating
Rear defogger operation mode	Continuous/Normal	Body integrated unit setting value	Customize setting
Security Alarm Setup	ON/OFF	Body integrated unit setting value	Customize setting
Impact Sensor Setup	ON/OFF	Body integrated unit setting value	Customize setting
Alarm delay setup	ON/OFF	Body integrated unit setting value	Customize setting
Lockout prevention	ON/OFF	Body integrated unit setting value	Customize setting
Impact sensor	ON/OFF	Body integrated unit setting value	Customize setting
Buzzer sounding setting	ON/OFF	Body integrated unit setting value	Customize setting
Abnormal warning lamp flashing setting	ON/OFF	Body integrated unit setting value	Customize setting

Items to be displayed	Unit of measure	Contents	Note
Answer-back Buzzer	ON/OFF	Body integrated unit setting value	Fixed to ON
Passive Alarm	ON/OFF	Body integrated unit setting value	Customize setting
Door open warning	ON/OFF	Body integrated unit setting value	Customize setting
Dome Light Alarm Setting	ON/OFF	Body integrated unit setting value	Customize setting
Auto A/C ECU Setting	ON/OFF	Body integrated unit setting value	Customize setting
Wiper Deicer setting	ON/OFF	Body integrated unit setting value	Customize setting
Illumination Control On/Off	ON/OFF	Body integrated unit setting value	Customize setting
Sedan/Wagon Setting	SEDAN/WAGON	Body integrated unit setting value	Customize setting
MT/AT Setting	MT/AT	Body integrated unit setting value	Customize setting
Destination Setting	JPN KA, KC KS EU LHD Other than KS C0,C5 U4, U5, U6, C6 EK, ER	Body integrated unit setting value	Displays body integrated unit customizing
Illumination Sensor Setting	ON/OFF	Body integrated unit setting value	Customize setting
Factory initial setting	Market/Factory	Body integrated unit setting value	Displays body integrated unit customizing
Ambient temperature sensor trouble	Abnormal/Normal	Body integrated unit input value	—
Welcome Light (Exit)	OFF/30 Sec/60 Sec/90 Sec	Body integrated unit setting value	Customize setting
Welcome Light Off Delay Time(Approaching)	OFF/30 Sec/60 Sec/90 Sec	Body integrated unit setting value	Customize setting
Keyless Buzzer Volume	1 — 7	Body integrated unit setting value	Customize setting

9. User Customizing

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Select Function» display, select «Customize».

NOTE:
• If not equipped (depending on destination area or vehicle equipment condition), customizing is not possible.
• For detailed operation procedures, refer to “Application help”.
List of User Customizing item

Data	Initial setting value	Customize setting	Remarks
Off delay time	30 Sec	OFF	Room light off delay time can be selected.
		10 Sec	
		20 Sec	
		30 Sec	
Auto Light Sensitivity Adjustment	Normal	Dull	Slow response
		Normal	Standard
		Sensitive	Quick response
		Very sensitive	Fairly quick response
Power rear gate setting	— (*1)	ON	Fixed at OFF because this is not applicable.
		OFF	
Lane change signal setting	ON	ON	One-touch blinker control is performed.
		OFF	One-touch blinker control is not performed.
Rear wiper auto setting	—	ON	Existence of rear wiper linked with reverse operation can be set.
		OFF	
TPMS Setting	— (*1)	TPMS	Set to “ON” for model with TPMS.
		No TPMS	
Driver’s Door Unlock Setting	Selection	Selection	The door to be unlocked when you touch the driver’s door can be set.
		ALL	
Rear Gate Unlock Setting	Selection	Selection	The door to be unlocked when you touch the rear gate switch can be set.
		ALL	
One-touch Turn Signal System Setup	ON	ON	ON/OFF of the one-touch blinker can be set.
		OFF	
Auto Wiper System (Rear) Setup	OFF	ON	ON/OFF of the rear wiper linked with reverse operation can be set.
		OFF	
Steering Responsive Fog Lamp Setting	OFF	ON	SRF control is performed.
		OFF	SRF control is not performed.
Rear defogger operation mode	Normal	Normal	Automatically stops in 15 minutes after the switch is turned to ON.
		Continuous	Repeats activated for 15 minutes and deactivated for 2 minutes until the switch is turned to OFF.
Security Alarm Setup	ON	ON	Security alarm (hazard, horn or siren) becomes activated.
		OFF	Security alarm becomes deactivated.
Impact Sensor Setup	OFF	ON	Workable when the Impact Sensor Setup is set to “ON”. Impact sensor function becomes activated.
		OFF	Impact sensor function becomes deactivated. (Be sure to set to “OFF” for models without sensors.)

Data	Initial setting value	Customize setting	Remarks
Alarm delay setup	ON		After the keyless lock operation, the alarm monitor starts after the following delay time has passed.
		ON	Delay time is 30 seconds.
		OFF	Delay time is 0 second.
Lockout prevention	ON	ON	key lockout prevention function is activated. (The function does not operate if safety knob is locked by hand.)
		OFF	Key lockout prevention function is deactivated.
Impact sensor (OP)	OFF	ON	Vehicle is controlled in impact sensor equipped mode. (Make sure to set to “OFF” for models without the impact sensor. When “ON”, hazard, horn or siren become activated by keyless lock (alarm monitor start).)
		OFF	Vehicle is controlled in impact sensor non-equipped mode.
Buzzer sounding setting	ON	ON	Buzzer operates when lock/unlock is selected by keyless entry system operation.
		OFF	Buzzer does not operate when lock/unlock is selected by keyless entry system operation.
Abnormal warning lamp flashing setting	ON	ON	Hazard blinks when lock/unlock is selected by keyless entry system operation.
		OFF	Hazard is not interlocked when lock/unlock is selected by keyless entry system operation.
Passive Alarm	OFF	ON	
		OFF	
Door open warning	ON	ON	
		OFF	
Dome Light Alarm Setting	OFF	ON	Room light illuminates interlocking with alarm.
		OFF	Room light does not illuminate interlocking with alarm.
Auto A/C ECU Setting	— (*1)	ON	Diagnoses with auto A/C CM.
		OFF	Diagnoses without auto A/C CM.
Wiper Deicer setting	— (*1)	ON	Wiper deicer control is performed.
		OFF	Wiper deicer control is not performed.
Illumination Control On/Off	ON	ON	
		OFF	
Sedan/Wagon Setting	— (*1)	SEDAN	Body control is performed for Sedan.
		WAGON	Body control is performed for Wagon.
MT/AT Setting	— (*1)	MT	Body control is performed for MT.
		AT	Body control is performed for AT.
6MT Setting	— (*1)	6MT	Body control is performed for 6MT.
		Other than 6MT	Body control is performed for other than 6MT.
Illumination Sensor Setting	— (*1)	ON	Set to “ON” for model with auto light.
		OFF	
Factory initial setting	Market	Market	Customize setting is reset when mode is switched from Market to Factory.
		Factory	
Welcome Light (Exit)	30 Sec	OFF	Length of the lighting time can be set.
		30 Sec	
		60 Sec	
		90 Sec	
Welcome Light Off Delay Time(Approaching)	30 Sec	OFF	Length of the lighting time can be set.
		30 Sec	
		60 Sec	
		90 Sec	
Keyless Buzzer Volume	5	1 — 7	Buzzer volume can be set.

NOTE:
*1: Customization item according to the actual vehicle equipment
6) When the setting is complete, see «Data monitor» to make sure that the alterations are consistent with the actual equipment on the vehicle.

CAUTION:
- **the above settings must match the actual vehicle equipment.**
- **Do not change settings except for setting above while setting the functions.**
- **Be sure not to change Factory initial setting except when installing a new body integrated unit.**

10.Registration Body Integrated Unit

A: OPERATION

1. CONFIRM CURRENT SETTING

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Select Function» display, select «Customize».
6) Save the setting.

Required items for new registration. (Except for system not equipped)

Item	Item to confirm				Remarks
number of regist.	1	2	3	4	Number of registered ID
Off delay time	OFF	10 Sec	20 Sec	30 Sec	Setting for lighting off time
Auto Light Sensitivity Adjustment	Dull	Normal (Standard)	Sensitive	Very sensitive	1st (slow) — 4th (fairly quick)
Power rear gate setting	ON		OFF		N/A
Lane change signal setting	ON		OFF		—
Rear wiper auto setting	ON		OFF		—
TPMS Setting	TPMS		No TPMS		—
Driver's Door Unlock Setting	ALL		Selection		—
Rear Gate Unlock Setting	ALL		Selection		—
One-touch Turn Signal System Setup	ON		OFF		—
Auto Wiper System (Rear) Setup	ON		OFF		—
Steering Responsive Fog Lamp Setting	ON		OFF		—
Rear defogger operation mode	Normal		Continuous		—
Security Alarm Setup	ON		OFF		—
Impact Sensor Setup	ON		OFF		Option setting
Alarm delay setup	ON		OFF		—
Lockout prevention	ON		OFF		—
Impact sensor	ON		OFF		Option setting
Buzzer sounding setting	ON		OFF		—
Abnormal warning lamp flashing setting	ON		OFF		—
Passive Alarm	ON		OFF		—
Door open warning	ON		OFF		—
Dome Light Alarm Setting	ON		OFF		—
Auto A/C ECU Setting	ON		OFF		—
Wiper Deicer setting	ON		OFF		Option setting
Illumination Control On/Off	ON		OFF		—
Sedan/Wagon Setting	WAGON		SEDAN		—
MT/AT Setting	MT		AT		—
Illumination Sensor Setting	ON		OFF		—
Factory initial setting	Factory		Market		Do not change to factory mode.
Welcome Light (Exit)	OFF	30 Sec	60 Sec	90 Sec	—
Welcome Light Off Delay Time(Approaching)	OFF	30 Sec	60 Sec	90 Sec	—
Keyless Buzzer Volume	1 2 3 4 5 6 7				—

2. REGISTRATION BODY INTEGRATED UNIT (FUNCTION SETTING)

CAUTION:
For the body integrated unit, function selection is available to control the entire vehicle systems. It is possible to control the original functions of vehicle when registrations of body integrated unit and function setting are corresponded to vehicle equipment.
If registrations and function setting are different from vehicle equipment, vehicle system does not operate normally and diagnosis cannot be performed correctly. Pay attention to following item.
- **Be sure to correspond registrations, or User Customizing settings to vehicle equipment.**
- **Do not change the settings of vehicle improperly.**
- **Make sure that the key illumination does not blink with ignition switch ON, or that the body integrated unit registration item "Factory initial setting" is set to "Market". If "Factory initial setting" is set to "Factory", key illumination blinks when the ignition switch is turned ON, to notify that the settings are not confirmed. (Except for model with the keyless access with push button start system)**
- **Key illumination does not blink with ignition switch turned to ON and go off with door closed. (Except for model with the keyless access with push button start system)**
- **Be sure to register immobilizer if body integrated unit is replaced with a new part. (Except for model with the keyless access with push button start system)**
- **Make a registration of immobilizer when the parts related to immobilizer have been replaced. Refer to the "REGISTRATION MANUAL FOR IMMOBILIZER" provided as a separate volume. (Except for model with the keyless access with push button start system)**

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Select Function» display, select «Customize».

NOTE:
For the vehicle requiring the destination setting, if the destination setting is not finished, display can not be shifted into customizing screen. <Ref. to BC(diag)-22, DESTINATION SETTING, OPERATION, Registration Body Integrated Unit.>
6) Change the setting to the contents saved at confirmation of current setting.

CAUTION:
- **To perform normal operation of vehicle and diagnosis, the above settings must match the actual vehicle equipment.**
- **When the body integrated unit is new or in Factory mode, the key illumination blinks, and user customizing is incomplete. Check the user customizing settings. (For models with keyless access with push button start system, the room light illuminates.)**
- **Be sure not to change Factory initial setting except when installing a new body integrated unit.**

NOTE:
"Factory" mode:
- Body integrated unit has not been set yet. It can be recognized by key illumination blinking with ignition switch turned to ON. For model with keyless access with push button start system, it can be recognized by room light blinking with ignition switch turned to ON.
- All replacement body integrated units are set to "Factory" mode. When replacing a body integrated unit, be sure to perform the registration operation.

"Market" mode:
- Each settings have been set. It can be recognized by key ring illumination coming on in concocting with room light and going off with ignition switch turned to ON. For model with keyless access with push button start system, it can be recognized by room light not blinking with ignition switch turned to ON.

7) Perform the Factory initial setting. On the «Customize» display screen of Subaru Select Monitor, select the «Factory initial setting».
8) Change the mode from Factory to Market.
9) Turn the ignition switch to OFF to settle the setting.
10) Change the system selection to «Immobilizer» on Subaru Select Monitor, and perform registration of immobilizer. (Except for model with the keyless access with push button start system)

11) Follow the procedure of the “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume. (Except for model with the keyless access with push button start system)
12) For vehicles with remote engine starter, refer to “REGISTRATION MANUAL FOR IMMOBILIZER” provided as a separate volume and perform registration of the remote engine starter. (Except for model with the keyless access with push button start system)
13) Perform the User Customizing. <Ref. to BC(diag)-17, OPERATION, User Customizing.>

NOTE:
For detailed operation procedures, refer to “Application help”.

3. DESTINATION SETTING

NOTE:
For the vehicle requiring the destination setting, if the destination setting is not finished, display can not be shifted into customizing screen.

	Step	Check	Yes	No
1	**CONFIRM CURRENT SETTING.** Always perform confirmation of current setting before replacing the module. Record the contents of the “Destination Setting”. NOTE: Refer to the “Read Current Data” and “CONFIRMATION OF CURRENT SETTING” to confirm the current setting. <Ref. to BC(diag)-20, CONFIRM CURRENT SETTING, OPERATION, Registration Body Integrated Unit.> <Ref. to BC(diag)-12, OPERATION, Read Current Data.>	Is the current setting recorded?	Go to step **2**.	Confirm the current setting. Go to step **1**.
2	**CONFIRM DESTINATION SETTING.** 1) Connect the Subaru Select Monitor, and run the application. 2) On «Start» display, select «Diagnosis». 3) On «Vehicle selection» display, input the target vehicle information and select «Confirmed». 4) On «Main Menu» display, select «Each System». 5) On «Select System» display, select «Body Control» and then select «Enter». 6) On «Select Function» display, select «Customize». 7) The vehicle destination screen is displayed.	Is the vehicle destination setting screen displayed?	Go to step **3**.	Go to step **4**.
3	**CONFIRM DESTINATION SETTING.** Confirm the screen displayed on Subaru Select Monitor and the actual vehicle destination.	Is it necessary to change the destination setting?	Select [Yes], Go to step **4**.	Select [No], Go to step **5**.
4	**ENTER DESTINATION CODE.** Enter the appropriate code in the screen. JPN: JP00 KA, KC: KA00 KS: KS00 U4, U5, U6, C6 and C0, C5 (with the keyless access with push button start system): U400 C0, C5 (without the keyless access with push button start system): C000 EK, ER: EK00 Except above: EC00	Is the appropriate code entered?	Select [OK]. Go to step **5**.	Enter the destination code. Go to step **5**.

	Step	Check	Yes	No
5	**REGISTER VEHICLE EQUIPMENT.** Customizing screen is displayed. NOTE: Match the each item setting of body integrated unit registration item list with the vehicle equipment.	Do all setting contents match with the vehicle equipment specification?	Go to step **6**.	Change the items until each content setting match with the vehicle equipment specification. Go to step **6**.
6	**CONFIRM MARKET MODE.** 1) Customizing screen, select the {Factory initial setting} to change the setting from "Factory" mode to "Market" mode. 2) Turn the ignition switch to OFF. NOTE: When the setting is changed from "Factory" mode to "Market" mode, turning the ignition switch from ON → OFF confirms the setting. 3) Turn the ignition switch to ON, and check the contents of settings.	Is the mode changed to "Market" mode?	Go to step **7**.	Perform the destination setting from the first step. Go to step **1**.
7	**CONFIRM MARKET MODE.** Check the following. Make sure that the "Destination Setting" in the current data display is the same as the one you confirmed in step 1.	Is the display the same as indicated?	Registration of body integrated unit is finished.	It is possible that harness malfunction may occur. Perform the diagnosis.

11.Function Check

A: OPERATION

NOTE:
In order to check the body integrated unit function, inspect the body integrated unit and actuator using Subaru Select Monitor without operating switches.
1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Body Control» and then select «Enter».
5) On «Select Function» display, select «Active Test».

NOTE:
- If not equipped (depending on destination area or vehicle equipment condition), process will not go on.
- The operation is disabled for the models with keyless access with push button start system because the key lock solenoid is not installed.
- For detailed operation procedures, refer to “Application help”.

12.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Note
B1010	BODY CONTROL SYSTEM (BIU) MALFUNCTION	Body integrated unit internal error	<Ref. to BC(diag)-26, DTC B1010 BODY CONTROL SYSTEM (BIU) MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1011	BATTERY CONTROL POWER SUPPLY	Voltage malfunction caused by poor contact of battery power supply control circuits	<Ref. to BC(diag)-27, DTC B1011 BATTERY CONTROL POWER SUPPLY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1012	BATTERY BACKUP POWER SUPPLY	Voltage malfunction caused by poor contact of battery power supply backup circuits	<Ref. to BC(diag)-29, DTC B1012 BATTERY BACKUP POWER SUPPLY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1013	IGNITION POWER	Voltage malfunction caused by poor contact of IGN power supply circuits	<Ref. to BC(diag)-31, DTC B1013 IGNITION POWER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1014	ACC POWER	Voltage malfunction caused by poor contact of ACC power supply circuits	<Ref. to BC(diag)-33, DTC B1014 ACC POWER, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1015	KEY INTERLOCK CIRCUIT	GND-output short of key interlock circuit	<Ref. to BC(diag)-35, DTC B1015 KEY INTERLOCK CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1016	SHIFT LOCK CIRCUIT	Voltage malfunction caused by poor contact of shift lock circuits	<Ref. to BC(diag)-38, DTC B1016 SHIFT LOCK CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1401	METER COLLATION	Malfunction related immobilizer	<Ref. to BC(diag)-40, DTC B1401 METER COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1402	IMMOBILIZER KEY COLLATION	Malfunction related immobilizer	<Ref. to BC(diag)-40, DTC B1402 IMMOBILIZER KEY COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1405	SCU COLLATION	Malfunction related immobilizer	<Ref. to BC(diag)-40, DTC B1405 SCU COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1406	SCU_EEPROM	Malfunction of security control module	<Ref. to BC(diag)-40, DTC B1406 SCU_EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1407	MET COMMUNICATION	Communication failure between body integrated unit and combination meter	<Ref. to BC(diag)-40, DTC B1407 MET COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1408	METER NON-VOLATILE MEMORY	Combination meter malfunction	<Ref. to BC(diag)-40, DTC B1408 METER NON-VOLATILE MEMORY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1409	SCU COMMUNICATION	Communication failure between body integrated unit and security control module	<Ref. to BC(diag)-40, DTC B1409 SCU COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1410	TRANSPONDER COMMUNICATION	Communication failure between key and body integrated unit	<Ref. to BC(diag)-40, DTC B1410 TRANSPONDER COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1411	IMMOBILIZER ANTENNA	Faulty antenna	<Ref. to BC(diag)-40, DTC B1411 IMMOBILIZER ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1500	KEYLESS UART COM. MALFUNCTION	Open or short circuit in keyless UART circuit	<Ref. to BC(diag)-41, DTC U1500 KEYLESS UART COM. MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

13.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC B1010 BODY CONTROL SYSTEM (BIU) MALFUNCTION

DTC DETECTING CONDITION:
System error in body integrated unit
TROUBLE SYMPTOM:
LAN communication immobilizer function may not be executed normally.

Step		Check	Yes	No
1	**CHECK DTC.** Check DTC indicated by body integrated unit. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1010 current malfunction?	Go to step **2**.	Temporary EEPROM access error occurred.
2	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector. 3) Connect the disconnected connectors. 4) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1010 current malfunction?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Temporary EEPROM access error occurred.

B: DTC B1011 BATTERY CONTROL POWER SUPPLY

DTC DETECTING CONDITION:

- Voltage failure caused by poor contact of battery power supply control circuit
- Battery voltage of body integrated unit is not within the 8.5 — 16.5 V range.

TROUBLE SYMPTOM:

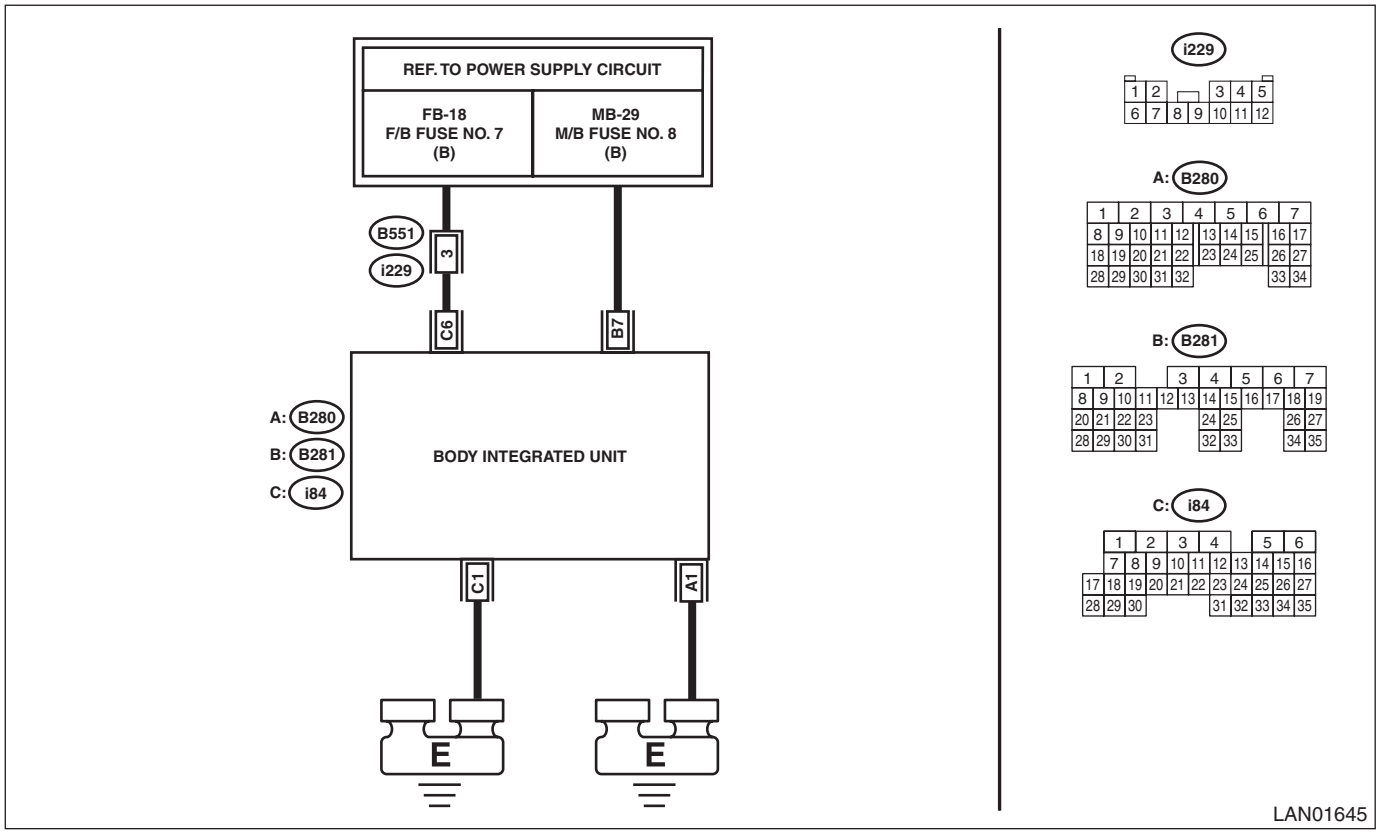
Functions of body integrated unit stop.

NOTE:

When DTC B1012 BATTERY BACKUP POWER SUPPLY is output at the same time, all the function of body integrated unit may not operate.

WIRING DIAGRAM:

Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.> <Ref. to WI(HEV)-133, WIRING DIAGRAM, Immobilizer System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1011 current malfunction?	Go to step **2**.	Go to step **5**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect and then connect the body integrated unit connector. 3) Wait approx. 2 minutes. 4) Turn the ignition switch to ON. 5) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1011 current malfunction?	Go to step **3**.	Go to step **5**.
3	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse.	Is the fuse OK?	Go to step **4**.	Replace the defective fuse.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the body integrated unit connector. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(i84) No. 6 (+) — Chassis ground (–):***	Is the voltage 8.5 — 16.5 V?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair the harness between body integrated unit and fuse.
5	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector.	Is there poor contact of connector?	Repair or replace the poor contact of connector.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

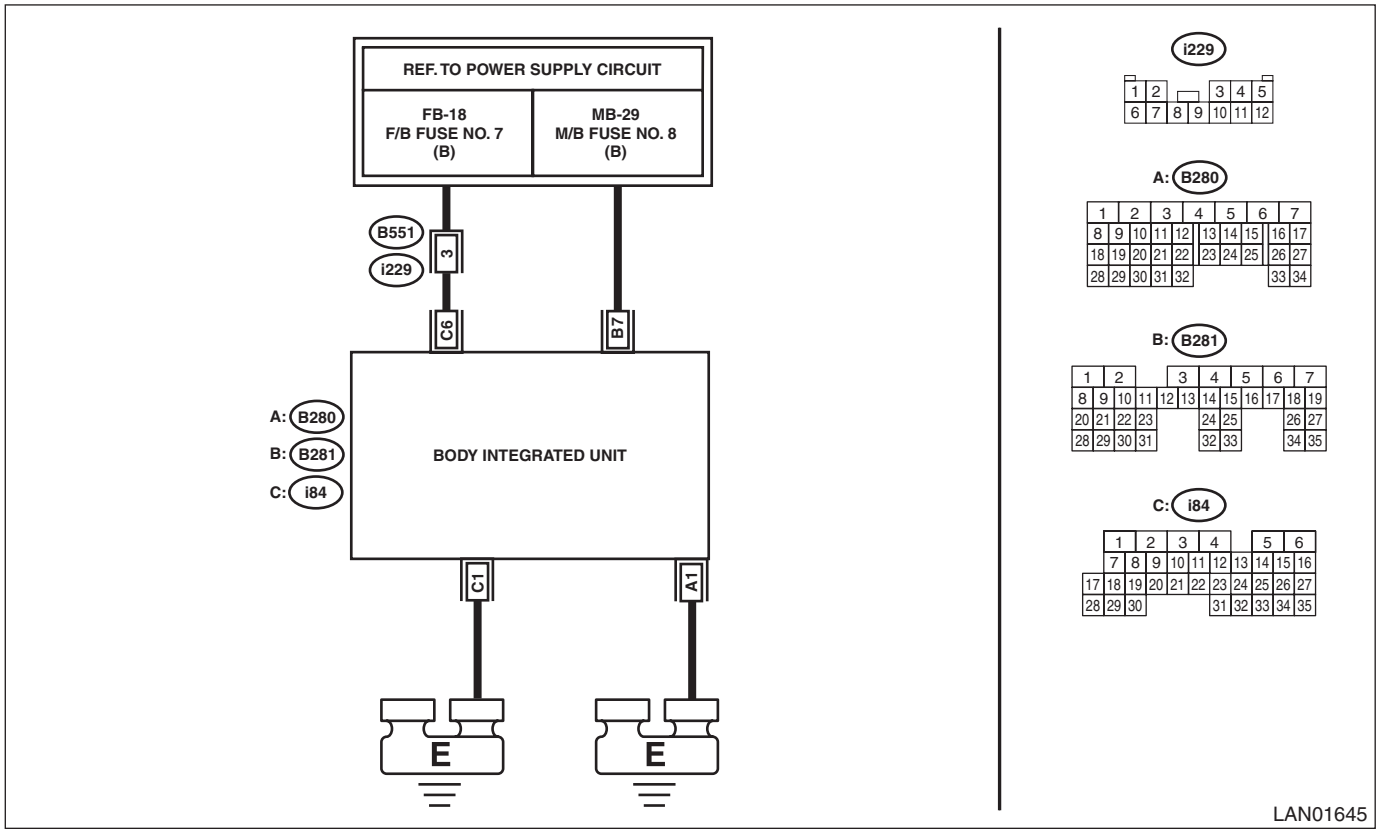
C: DTC B1012 BATTERY BACKUP POWER SUPPLY

DTC DETECTING CONDITION:
Voltage failure caused by poor contact of battery power supply backup circuits

TROUBLE SYMPTOM:
Illuminations for the keyless entry, map light, luggage light, trunk light, room light, and ignition switch do not turn on.

NOTE:
When B1011 BATTERY CONTROL POWER SUPPLY is output at the same time, all the function of body integrated unit may not operate.

WIRING DIAGRAM:
Immobilizer system <Ref. to WI(w/o HEV)-147, WIRING DIAGRAM, Immobilizer System.> <Ref. to WI(HEV)-133, WIRING DIAGRAM, Immobilizer System.>

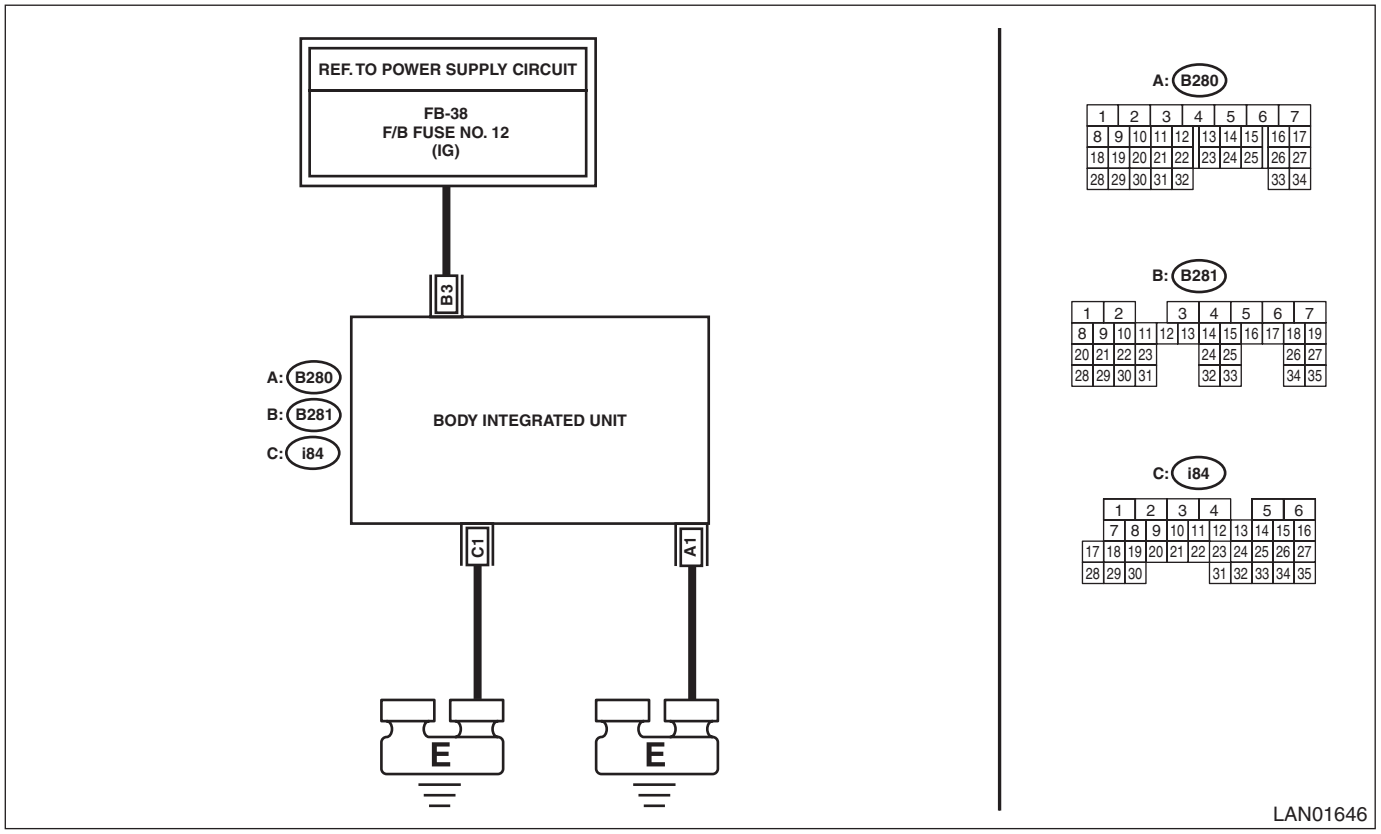


Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1012 current malfunction?	Go to step **2**.	Go to step **5**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect and then connect the body integrated unit connector. 3) Wait approx. 2 minutes. 4) Turn the ignition switch to ON. 5) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1012 current malfunction?	Go to step **3**.	Go to step **5**.
3	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse.	Is the fuse OK?	Go to step **4**.	Replace the defective fuse.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the body integrated unit connector. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B281) No. 7 (+) — Chassis ground (–):***	Is the voltage 8.5 — 16.5 V?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair the harness between body integrated unit and fuse.
5	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector.	Is there poor contact of connector?	Repair or replace the poor contact of connector.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

D: DTC B1013 IGNITION POWER

DTC DETECTING CONDITION:
Voltage failure caused by poor contact of IGN power supply circuits
TROUBLE SYMPTOM:
Symptoms such as shift lock or wiper not operating may occur.
WIRING DIAGRAM:
Shift lock control system <Ref. to WI(w/o HEV)-215, WIRING DIAGRAM, Shift Lock Control System.> <Ref. to WI(HEV)-188, WIRING DIAGRAM, Shift Lock Control System.>

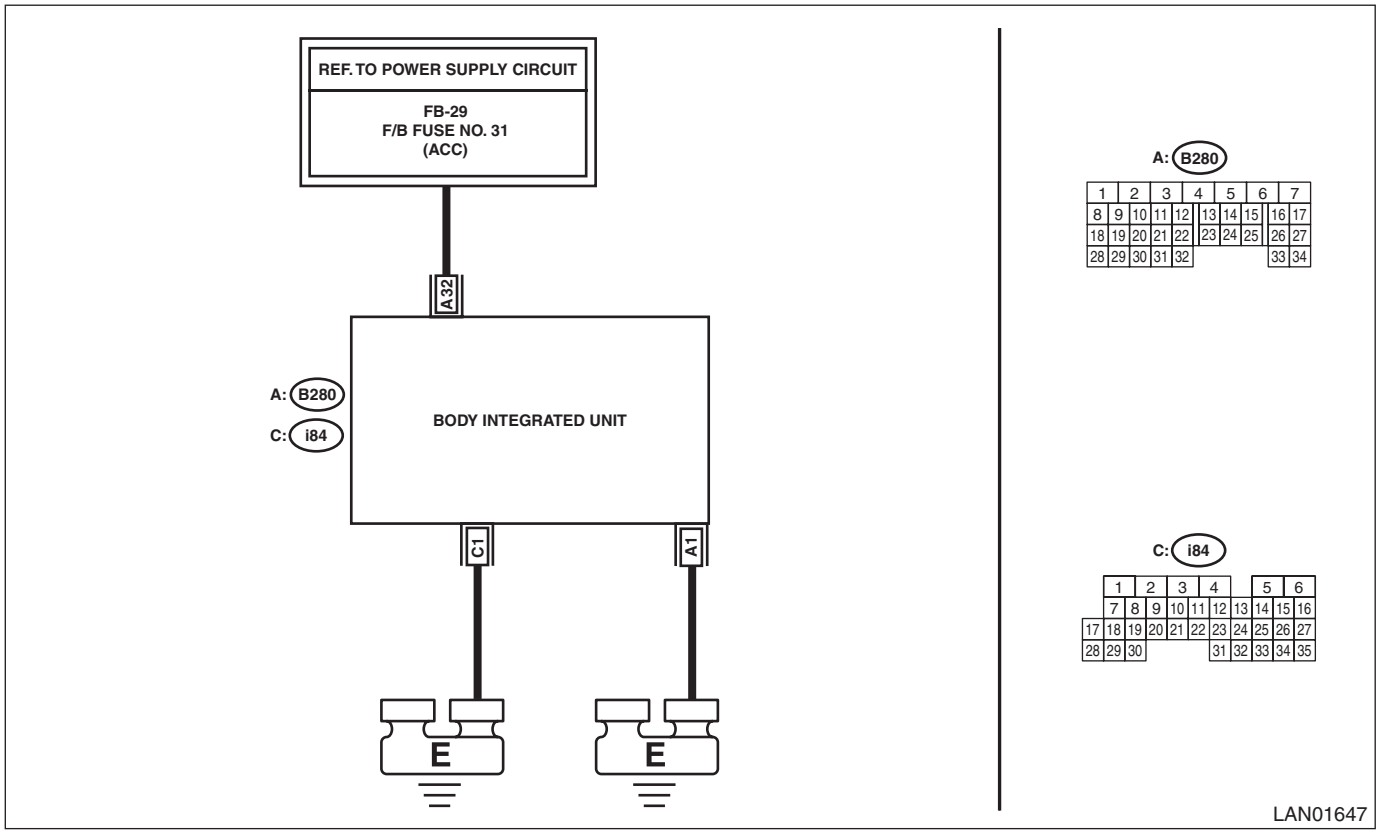


Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1013 current malfunction?	Go to step **2**.	Go to step **5**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect and then connect the body integrated unit connector. 3) Wait approx. 2 minutes. 4) Turn the ignition switch to ON. 5) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1013 current malfunction?	Go to step **3**.	Go to step **5**.
3	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse.	Is the fuse OK?	Go to step **4**.	Replace the defective fuse.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the body integrated unit connector. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B281) No. 3 (+) — Chassis ground (–):***	Is the voltage 8.5 — 16.5 V?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair the harness between body integrated unit and fuse.
5	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector.	Is there poor contact of connector?	Repair or replace the poor contact of connector.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

E: DTC B1014 ACC POWER

DTC DETECTING CONDITION:
Voltage failure caused by poor contact of ACC power supply circuit
TROUBLE SYMPTOM:
DRL may not illuminate.
WIRING DIAGRAM:
Shift lock control system <Ref. to WI(w/o HEV)-215, WIRING DIAGRAM, Shift Lock Control System.> <Ref. to WI(HEV)-188, WIRING DIAGRAM, Shift Lock Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1014 current malfunction?	Go to step **2**.	Go to step **5**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect and then connect the body integrated unit connector. 3) Wait approx. 2 minutes. 4) Turn the ignition switch to ON. 5) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1014 current malfunction?	Go to step **3**.	Go to step **5**.
3	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse.	Is the fuse OK?	Go to step **4**.	Replace the defective fuse.

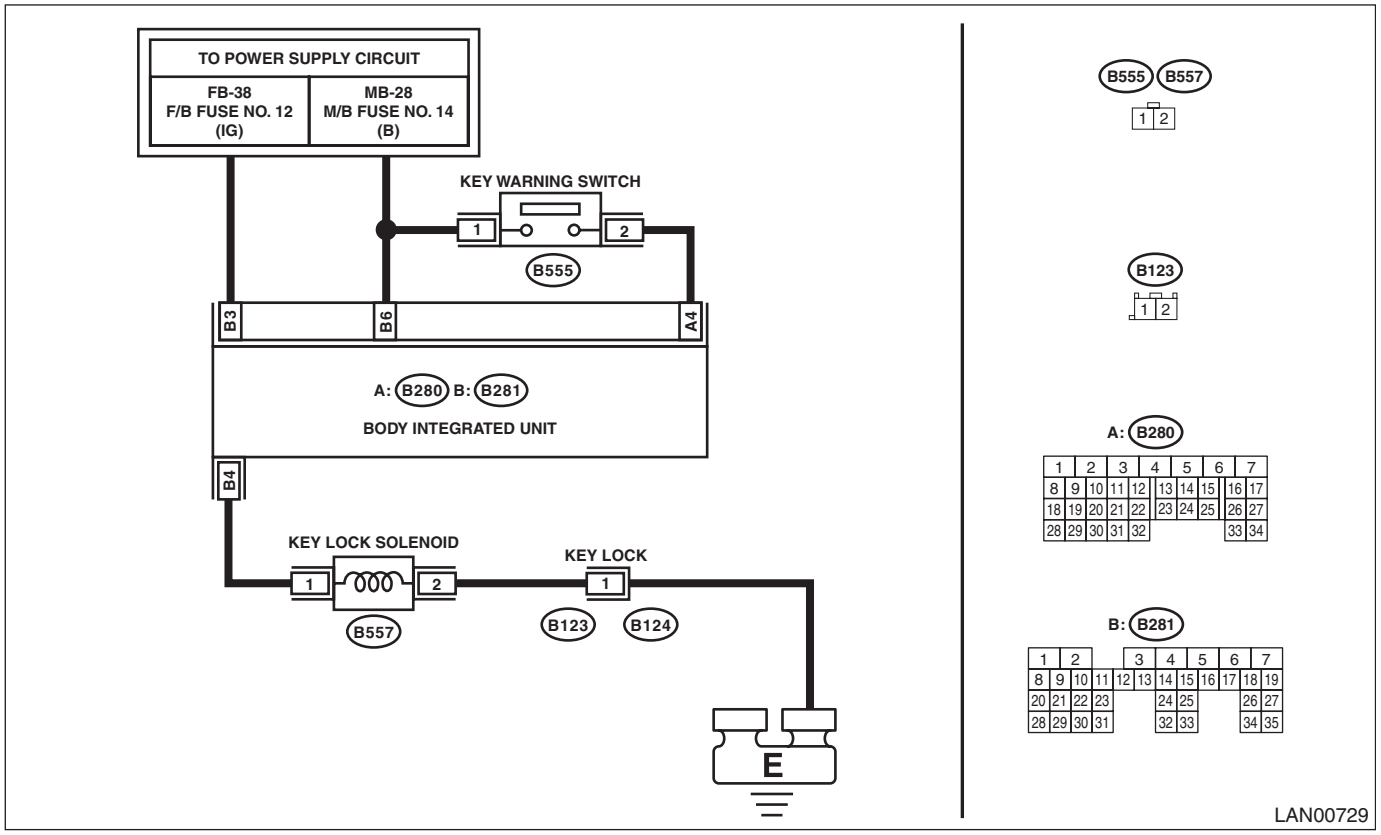
	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the body integrated unit connector. 2) Using the tester, measure the voltage between terminals. ***Connector & terminal*** ***(B280) No. 32 (+) — Chassis ground (–):***	Is the voltage 8.5 — 16.5 V?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair the harness between body integrated unit and fuse.
5	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector.	Is there poor contact of connector?	Repair or replace the poor contact of connector.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

F: DTC B1015 KEY INTERLOCK CIRCUIT

DTC DETECTING CONDITION:
Ground short of key interlock circuit

TROUBLE SYMPTOM:
Key interlock does not keep lock condition.

WIRING DIAGRAM:
Shift lock control system <Ref. to WI(w/o HEV)-215, WIRING DIAGRAM, Shift Lock Control System.>



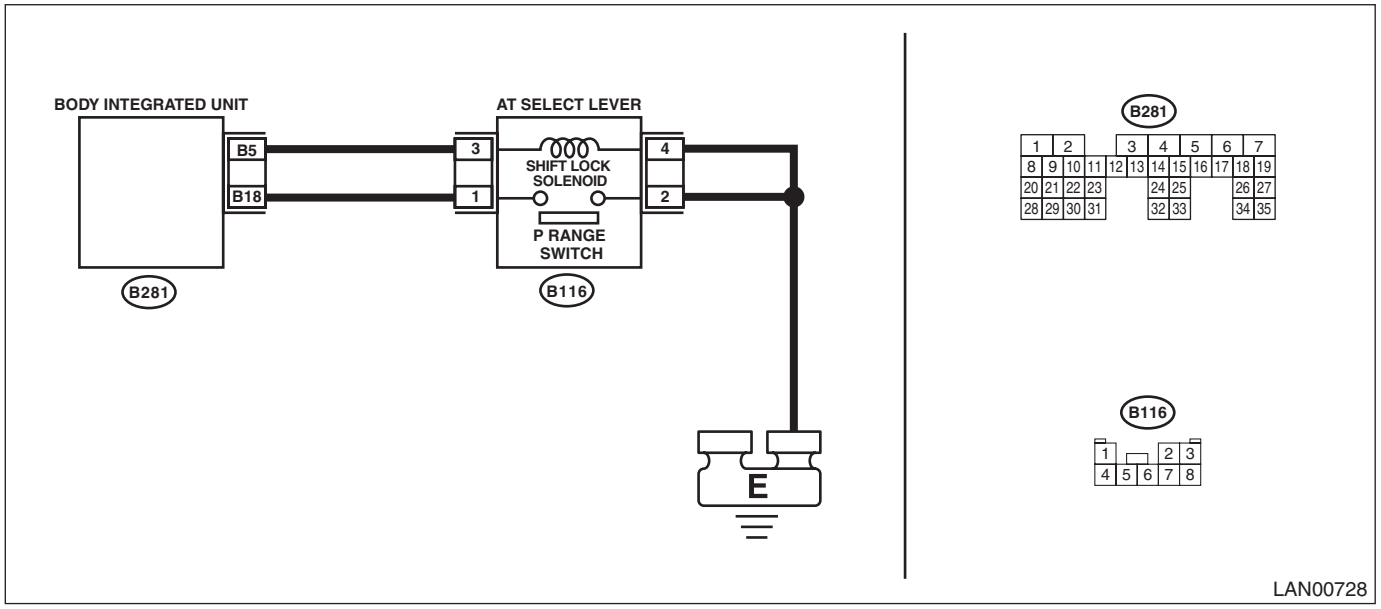
Step		Check	Yes	No
1	**CHECK DTC.** 1) Insert the ignition key. 2) Turn the ignition switch to ON. 3) Shift to the Neutral range. 4) Shift into P range. 5) Shift to the Neutral range. 6) Shift into P range. 7) Shift to the Neutral range. 8) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1015 current malfunction?	Go to step **2**.	Go to step **8**.

	Step	Check	Yes	No
2	**CHECK DTC.** 1) Shift the select lever to P range. 2) Remove the ignition key. 3) Disconnect the key actuator connector (B557) and body integrated unit connector (B281). 4) Connect the disconnected connectors. 5) Insert the ignition key. 6) Turn the ignition switch to ON and shift into Neutral. 7) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1015 current malfunction?	Go to step **3**.	Go to step **8**.
3	**CHECK KEY ACTUATOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the key actuator connector (B557). 3) Measure the resistance between key actuator connectors. ***Connector & terminal*** ***(B557) No. 1 — No. 2:***	Is the resistance 103 — 115 Ω?	Go to step **4**.	Replace the key actuator. <Ref. to SL-67, Key Lock Cylinders.>
4	**CHECK KEY ACTUATOR.** Connect the battery terminals to the key actuator. ***Terminals*** ***(B557) No. 2 — positive terminal:*** ***(B557) No. 1 — ground terminal:***	Is the actuator activated and then key locked?	Go to step **5**.	Replace the key actuator. <Ref. to SL-67, Key Lock Cylinders.>
5	**CHECK HARNESS.** 1) Disconnect the body integrated unit connector (B281). 2) Measure the resistance between body integrated unit and key actuator using tester. ***Connector & terminal*** ***(B557) No. 1 — (B281) No. 4:***	Is the resistance less than 10 Ω?	Go to step **6**.	Repair or replace the open circuit of harness.
6	**CHECK HARNESS.** Measure the resistance between body integrated unit and chassis ground using tester. ***Connector & terminal*** ***(B281) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair or replace the short circuit of the harness.
7	**CHECK HARNESS.** 1) Connect the body integrated unit. 2) Turn the ignition switch to ON. 3) Measure the voltage between body integrated unit and chassis ground using tester. ***Connector & terminal*** ***(B281) No. 4 (+) — Chassis ground (–):***	Is the voltage 6 V or more?	Go to step **8**.	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>

	Step	Check	Yes	No
8	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector (B281) and key actuator connector (B557).	Is there poor contact at disconnected connector terminal?	Repair the terminal where poor contact exists, or replace harness.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

G: DTC B1016 SHIFT LOCK CIRCUIT

DTC DETECTING CONDITION:
Open or power supply-output short, GND-output short in shift lock circuit.
TROUBLE SYMPTOM:
Shift lock does not be released or remain locked.
WIRING DIAGRAM:
Shift lock control system <Ref. to WI(w/o HEV)-215, WIRING DIAGRAM, Shift Lock Control System.> <Ref. to WI(HEV)-188, WIRING DIAGRAM, Shift Lock Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** 1) Turn the ignition switch to ON. 2) Keep the Parking range for approx. 5 seconds. 3) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1016 current malfunction?	Go to step **6**.	Go to step **2**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the shift lock solenoid connector. 3) Connect the disconnected connectors. 4) Turn the ignition switch to ON, then keep the Parking range for approx. 5 seconds. 5) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1016 current malfunction?	Go to step **3**.	Go to step **7**.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the shift lock solenoid connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(B116) No. 4 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **4**.	Repair or replace the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK SHIFT LOCK SOLENOID.** Using a tester, measure the resistance between shift lock solenoid terminals. ***Connector & terminal*** ***(B116) No. 4 — No. 3:***	Is the resistance between 27 — 31 Ω?	Go to step **5**.	Replace the shift lock solenoid. <Ref. to CS-59, REMOVAL, AT Shift Lock Solenoid and "P" Range Switch.>
5	**CHECK SHIFT LOCK SOLENOID.** Connect the battery terminal to shift lock solenoid. ***Connector & terminal*** ***(B116) No. 3 — positive terminal:*** ***(B116) No. 4 — ground terminal:***	Does the shift lock solenoid operate and then release the lock?	Go to step **6**.	Replace the shift lock solenoid. <Ref. to CS-59, REMOVAL, AT Shift Lock Solenoid and "P" Range Switch.>
6	**CHECK HARNESS (OPEN CIRCUIT).** Use a tester to measure the resistance between harness terminals. ***Connector & terminal*** ***(B116) No. 3 — (B281) No. 5:*** NOTE: If body integrated unit and shift lock connector are not disconnected, disconnect them first and then perform measurement.	Is the resistance less than 10 Ω?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Repair or replace the open circuit of harness.
7	**CHECK DTC.** 1) Depress the brake pedal at the parking range. 2) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1016 current malfunction?	Go to step **8**.	Go to step **9**.
8	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector and shift lock connector. 3) Connect the disconnected connectors. 4) Turn the ignition switch to ON. 5) Depress the brake pedal at the parking range. 6) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is B1016 current malfunction?	Go to step **4**.	Go to step **9**.
9	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit connector and shift lock connector.	Is there poor contact of connector terminal?	Repair or replace the poor contact of terminal.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

H: DTC B1401 METER COLLATION

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-25, DTC B1401 METER COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

I: DTC B1402 IMMOBILIZER KEY COLLATION

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-25, DTC B1402 IMMOBILIZER KEY COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

J: DTC B1405 SCU COLLATION

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-26, DTC B1405 SCU COLLATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

K: DTC B1406 SCU_EEPROM

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-26, DTC B1406 SCU_EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

L: DTC B1407 MET COMMUNICATION

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-27, DTC B1407 MET COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

M: DTC B1408 METER NON-VOLATILE MEMORY

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-27, DTC B1408 METER NON-VOLATILE MEMORY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

N: DTC B1409 SCU COMMUNICATION

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-28, DTC B1409 SCU COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

O: DTC B1410 TRANSPONDER COMMUNICATION

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-30, DTC B1410 TRANSPONDER COMMUNICATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

P: DTC B1411 IMMOBILIZER ANTENNA

For detailed diagnosis procedure, refer to IMMOBILIZER (DIAG). <Ref. to IM(diag)-30, DTC B1411 IMMOBILIZER ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Q: DTC U1500 KEYLESS UART COM. MALFUNCTION

1. MODEL WITHOUT KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM

DTC DETECTING CONDITION:

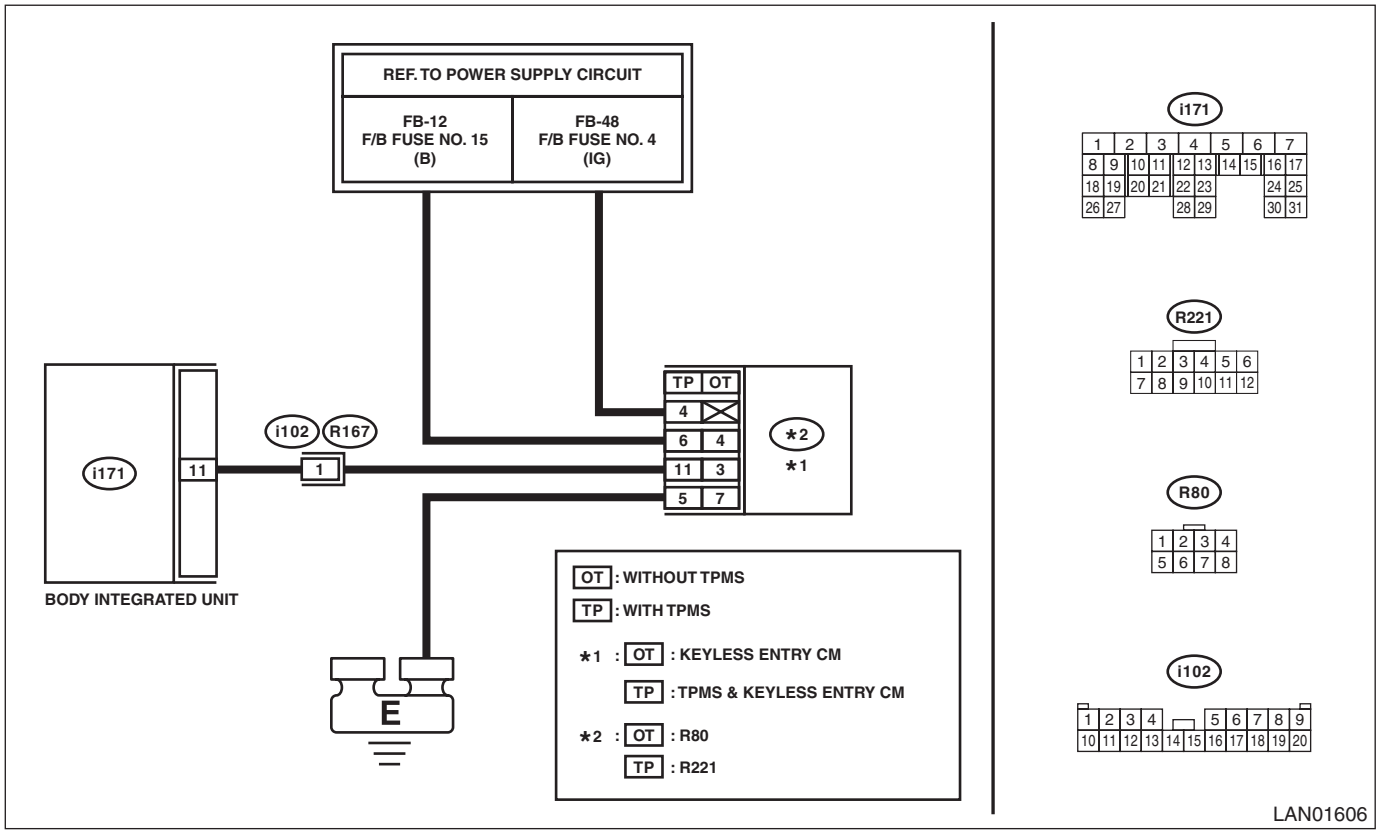
UART between the TPMS & keyless control module or keyless entry CM and the body integrated unit is open or shorted, or has communication failure.

TROUBLE SYMPTOM:

Door lock does not operate with keyless.

WIRING DIAGRAM:

Keyless entry system <Ref. to WI(w/o HEV)-164, WIRING DIAGRAM, Keyless Entry System.>



	Step	Check	Yes	No
1	**CHECK DTC.** 1) Insert the ignition key to the ignition key cylinder and remove. 2) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is U1500 a current malfunction?	Go to step **2**.	Go to step **7**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit and the TPMS & keyless control module or keyless entry CM connector. 3) Connect the disconnected connectors. 4) Insert the ignition key to the ignition key cylinder and remove. 5) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is U1500 a current malfunction?	Go to step **3**.	Go to step **7**.

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit and the TPMS & keyless control module or keyless entry CM connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***With TPMS*** ***(i171) No. 11 — (R221) No. 11:*** ***Without TPMS*** ***(i171) No. 11 — (R80) No. 3:***	Is the resistance 10 Ω or less?	Go to step **4**.	Repair the open circuit of harness or replace harness.
4	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. 2) Use a tester to measure the voltage between the terminals. ***Connector & terminal*** ***With TPMS*** ***(R221) No. 6 (+) — Chassis ground (–):*** ***(R221) No. 4 (+) — Chassis ground (–):*** ***Without TPMS*** ***(R80) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the power supply circuit.
5	**CHECK HARNESS (OPEN CIRCUIT).** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***With TPMS*** ***(R221) No. 5 — Chassis ground:*** ***Without TPMS*** ***(R80) No. 7 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **6**.	Repair the ground circuit.
6	**CHECK DTC.** 1) Connect all the disconnected connectors. 2) Turn the ignition switch to ON. 3) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is any DTC other than U1500 displayed?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the TPMS & keyless control module or keyless entry CM. <Ref. to SL-76, REMOVAL, Keyless Entry Control Module.> <Ref. to WT-10, REMOVAL, Tire Pressure Monitoring System.>
7	**CHECK CONNECTOR.** Check for a poor contact between the body integrated unit and the TPMS & keyless control module or keyless entry CM connector.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

2. MODEL WITH KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM

DTC DETECTING CONDITION:

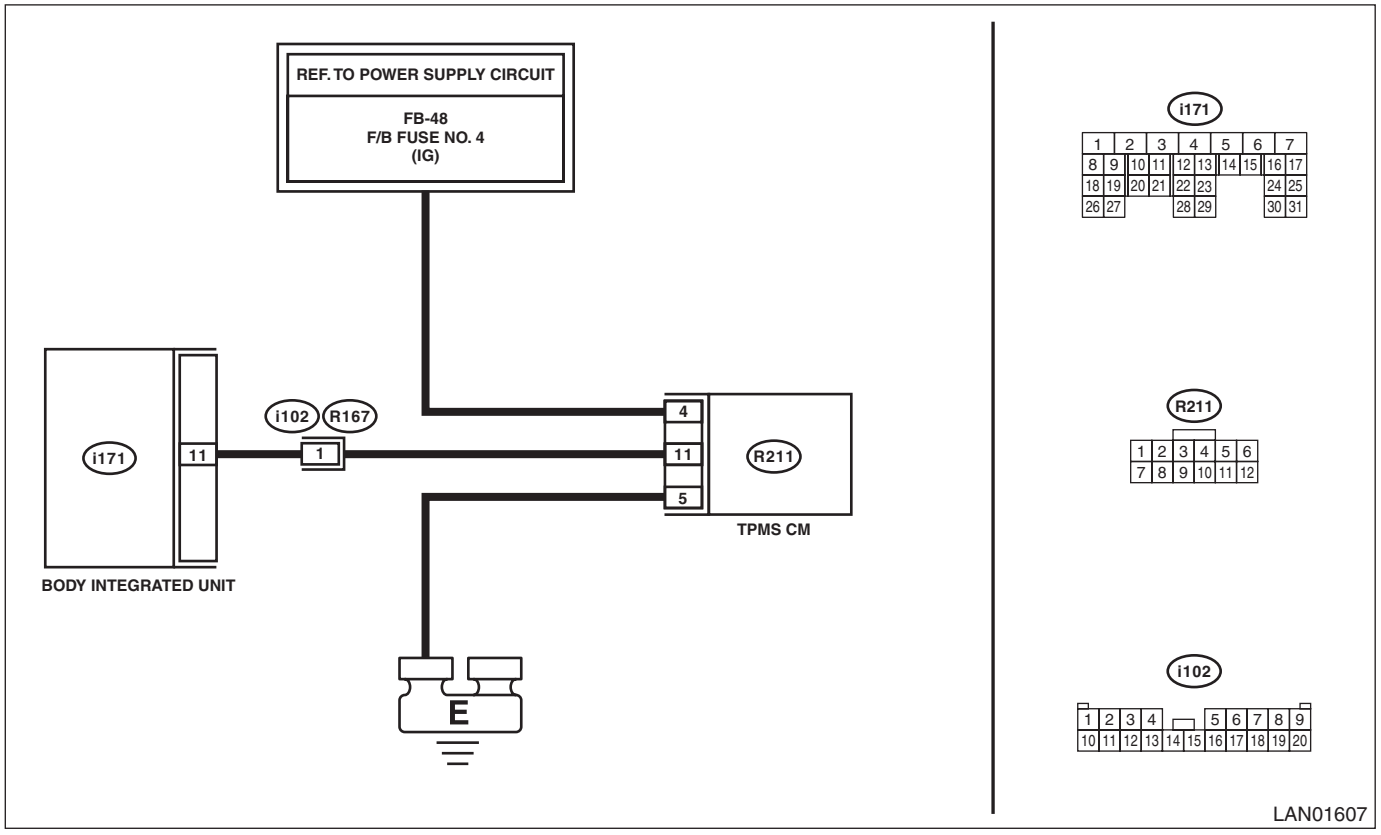
UART between the TPMS CM and the body integrated unit is open or shorted, or has communication failure.

TROUBLE SYMPTOM:

Cannot communicate with TPMS CM.

WIRING DIAGRAM:

Tire Pressure Monitoring System <Ref. to WI(w/o HEV)-229, WIRING DIAGRAM, Tire Pressure Monitoring System.>



Step		Check	Yes	No
1	**CHECK DTC.** 1) With the access key in the vehicle, press the push button ignition switch twice without depressing the brake to turn the ignition switch to ON. 2) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is U1500 a current malfunction?	Go to step **2**.	Go to step **7**.
2	**CHECK DTC.** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit and the TPMS CM connector. 3) Connect the disconnected connectors. 4) With the access key in the vehicle, press the push button ignition switch twice without depressing the brake to turn the ignition switch to ON. 5) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is U1500 a current malfunction?	Go to step **3**.	Go to step **7**.

	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit and the TPMS CM connector. 3) Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(i171) No. 11 — (R211) No. 11:***	Is the resistance 10 Ω or less?	Go to step **4**.	Repair the open circuit of harness or replace harness.
4	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. 2) Use a tester to measure the voltage between the terminals. ***Connector & terminal*** ***(R211) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the power supply circuit.
5	**CHECK HARNESS (OPEN CIRCUIT).** Using the tester, measure the resistance between terminals. ***Connector & terminal*** ***(R211) No. 5 — Chassis ground:***	Is the resistance 10 Ω or less?	Go to step **6**.	Repair the ground circuit.
6	**CHECK DTC.** 1) Connect all the disconnected connectors. 2) Turn the ignition switch to ON. 3) Read the DTC of body integrated unit using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is any DTC other than U1500 displayed?	Replace the body integrated unit. <Ref. to SL-80, Body Integrated Unit.>	Replace the TPMS CM. <Ref. to WT-10, REMOVAL, Tire Pressure Monitoring System.>
7	**CHECK CONNECTOR.** Check for a poor contact between the body integrated unit and the TPMS CM connector.	Is there poor contact of connector?	Repair the connector that has poor contact, or replace harness.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

14.General Diagnostic Table

A: INSPECTION

Read the DTC using Subaru Select Monitor. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).> Or check the following data under the current data display screen. <Ref. to BC(diag)-12, Read Current Data.>

Item	Operation	Specifications		Note
		YES	NO	
Diagnostic code	DTC is not displayed when inspecting all DTCs.	DTC is not displayed.	Perform the diagnosis according to DTC.	—
Clearance light (Low beam) (High beam)	Clearance light and low/high beams illuminate normally when the switch is operated. Indicator in the meter illuminates at the same time.	System is normal.	Check the lighting system, combination meter system and LAN system.	—
Auto light	When the area around the light control sensor is darkened after the ignition switch and the lighting switch (AUTO) are turned to ON, the clearance light and the low beam illuminate after 5 seconds. Indicator in the combination meter illuminates at the same time.	System is normal.	Check the lighting system, combination meter system and LAN system.	—
	When the ignition switch and the lighting switch (AUTO) are turned to ON after the area around the light control sensor is darkened, the clearance light and the low beam illuminate immediately. Indicator in the combination meter illuminates at the same time.			—
Fog light	Front and rear fog lights illuminate when the switch is operated. Indicator in the meter illuminates at the same time.	System is normal.	Check the lighting system, combination meter system and LAN system.	Rear fog light operates when “Rear fog light setting” of the body integrated unit is set to on.
Rear defogger	Rear defogger operates when the switch is operated. The indicator illuminates at the same time.	System is normal.	Check the rear window defogger system and A/C system.	—
Wiper deicer	Wiper deicer operates by operating the switch. The indicator illuminates at the same time. When the ambient temperature is 5°C (41°F) or higher, press the switch 3 seconds or more to forcibly activate the system.	System is normal.	Check the wiper deicer system and A/C system.	Wiper deicer operates when “Wiper deicer setting” of the body integrated unit is set to on.
DRL	After starting the engine and releasing the parking brake, the DRL illuminates.	System is normal.	Check the lighting system and LAN system.	—
Rear wiper	Rear wiper operates when the switch is operated.	System is normal.	Check wiper or washer system.	Depending on user customizing “Sedan/Wagon Setting” of the body integrated unit, vehicle sensory time varies.
Key interlock	• Key cannot be removed in other than P range. • Key can be removed in other than P range.	System is normal.	Check the body control system.	—

General Diagnostic Table

Item	Operation	Specifications		Note
		YES	NO	
Shift lock	The select lever can be moved from the P range to other ranges only when the brake pedal is depressed with IG ON.	System is normal.	Check the body control system.	—
Key warning switch alarm	When the driver's door is open without the key removed, the buzzer sounds.	System is normal.	Check the combination meter and body control system.	—
Door lock	The doors lock/unlock when the door switch is operated. Rear gate/ trunk opens when the rear gate/ trunk release switch is operated.	System is normal.	Check the security & lock and body control system.	If user customizing "Sedan/Wagon Setting" is different, trunk and rear gate do not open.
Keyless entry	The lock locks/unlocks when the keyless transmitter is operated. Trunk/rear gate unlocks when trunk/ rear gate unlock button is operated.	System is normal.	Check the keyless entry and body control system.	—
Keyless access with push button start system	The lock locks/unlocks when the access key is operated. With the access key held, the touch sensor (lock) operation locks/touch sensor (unlock) operation unlocks. Rear gate unlocks by operating the rear gate unlock button.	System is normal.	Check the keyless access with push button start system and the body control system.	—
Answer back	Answer-back operates when the keyless entry / keyless access with push button start system locks/ unlocks.	System is normal.	Check the security & lock, keyless access with push button start system, and LAN system.	—
Room light	Turns ON/OFF according to the door open/close operation, the lock/ unlock operation with the keyless entry/keyless access with push button start system, and the ignition operation.	System is normal.	Check the room light system, security & lock, keyless access with push button start system, and LAN system.	For vehicle with the keyless access with push button start system, the room light blinks when "Factory mode" is selected. For vehicles with the keyless entry, the room light blinks when the keyless registration mode connector is connected.
Map light	Turns ON/OFF according to the door open/close operation, the lock/ unlock operation with the keyless entry/keyless access with push button start system, and the ignition operation. (Except for rear gate)	System is normal.	Check the spot map light, security & lock, keyless access with push button start system, and LAN system.	For vehicle with the keyless access with push button start system, the map light blinks when "Factory mode" is selected. For vehicles with the keyless entry, the map light blinks when the keyless registration mode connector is connected.

Item	Operation	Specifications		Note
		YES	NO	
Luggage/trunk light	The light illuminates/goes off according to the rear gate open/close. The light goes off when the doors are locked with the keyless entry/keyless access with push button start system and the ignition is turned ON while the luggage light is dimming after the rear gate is closed.	System is normal.	Check the luggage/trunk light, security & lock, keyless access with push button start system, and LAN system.	For vehicles with the keyless access with push button start system, the luggage/trunk light blinks when “Factory” mode is selected. For vehicles with the keyless entry, the luggage/trunk light blinks when the keyless registration mode connector is connected.
Key illumination	The light illuminates/goes off according to the driver’s door open/close. The light goes off, when the doors are locked with the keyless entry/keyless access with push button start system and the ignition is turned ON while illuminating.	System is normal.	Check the ignition switch illumination, security & lock, and LAN system.	For vehicles with keyless entry, the key illumination blinks when “Factory” mode is selected.
Illumination control	Illumination volume control is available.	System is normal.	Check the illumination control switch, combination meter, and body control system.	Illumination volume control is not available when user customizing “Illumination Control On/Off” of the body integrated unit is set to off.
Engine start	Engine starts.	System is normal.	Check the engine system, immobilizer, and LAN system.	—
Vehicle security	Security monitoring/security canceling can be performed by operating the keyless entry/keyless access with push button start system.	System is normal.	Check the security & lock, keyless access with push button start system, and LAN system.	Security monitoring starts and at the same time the warning buzzer sounds, when impact sensor is not connected and user customizing “Impact Sensor” of the body integrated unit is set to on.
Welcome lighting (enter)	When dimming out around the light control sensor after turning the lighting switch (AUTO) to ON, use keyless transmitter or access key to unlock. At this time, the clearance light and headlight low beam illuminates for the preset time. And, use keyless transmitter or access key to lock. At this time, the clearance light and headlight low beam go off.	System is normal.	Check the lighting system (auto light), security & lock (keyless entry) or keyless access with push button start system.	Operates when user customization item “Illumination Sensor Setting” in body integrated unit is set to ON and “Welcome Light Off Delay Time(Approaching)” is set to other than OFF.

Item	Operation	Specifications		Note
		YES	NO	
Welcome lighting (exit)	The clearance light and headlight low beam continues to illuminate, when the ignition switch is OFF (or when the key is removed for vehicles without keyless access with push button start system) while the auto light function is operating. Use keyless transmitter or access key to lock two consecutive times. At this time, the clearance light and headlight low beam go off.	System is normal.	Check the lighting system (auto light), security & lock (keyless entry) or keyless access with push button start system.	Operates when user customization item “Illumination Sensor Setting” in body integrated unit is set to ON and “Welcome Light Off Delay Time(Exiting)” is set to other than OFF.

TELEMATICS SYSTEM (DIAGNOSTICS)

TEL(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**PERFORM CUSTOMER INTERVIEW.** Using the Check List for Interview, ask the customer the condition of how the trouble occurred. <Ref. to TEL(diag)-3, CHECK, Check List for Interview.>	Did you interview the customer?	Go to step **2**.	Interview the customer. <Ref. to TEL(diag)-3, CHECK, Check List for Interview.>
2	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** Using the Subaru Select Monitor, check whether communication to the telematics system can be executed. NOTE: If the communication function of the Subaru Select Monitor cannot be executed properly, check the communication circuit. (Refer to "Communication for initializing impossible".) <Ref. to TEL(diag)-10, INSPECTION, Subaru Select Monitor.>	Is communication possible?	Go to step **3**.	Check the communication circuit.
3	**CHECK TELEMATICS.** Using the Subaru Select Monitor, read DTC of the telematics system. <Ref. to TEL(diag)-17, OPERATION, Diagnostic Code(s) Display.> NOTE: If DTC is detected, only RED LED will illuminate. For details, refer to "LED operation status list". <Ref. to TEL(diag)-4, LED ILLUMINATION STATUS LIST, CHECK, Check List for Interview.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>	Go to step **4**.
4	**CHECK DIAGNOSTICS WITH PHENOMENON.** Check the list of Diagnostics with Phenomenon. <Ref. to TEL(diag)-57, Diagnostics with Phenomenon.>	Does the symptom apply?	Perform diagnosis according to the procedures in the diagnostics with phenomenon.	Go to step **5**.
5	**CHECK TROUBLE PHENOMENON.** 1) Perform the basic inspection and function check. <Ref. to TEL(diag)-5, INSPECTION, General Description.> 2) Check the data communication module. <Ref. to TEL(diag)-8, Control Module I/O Signal.> 3) Perform check of current data. <Ref. to TEL(diag)-13, Read Current Data.> 4) Perform a unit check.	Was the trouble cause found?	Perform the Clear Memory after repairing or replacing the cause of trouble. <Ref. to TEL(diag)-19, Clear Memory Mode.>	System is normal.

2. Check List for Interview

A: CHECK

1. CHECK LIST FOR INTERVIEW

- Inspect the following items regarding the vehicle's state.
- Print out this page for interviewing customers.

<table>
<tr><td colspan="2">Telematics Check List for Interview</td><td colspan="2">Received Year Month Date</td></tr>
<tr><td colspan="2" rowspan="2">Customer's name</td><td>Registration No.</td><td>Initial year of registration
Year Month Date</td></tr>
<tr><td>Vehicle model</td><td>Frame number</td></tr>
<tr><td>Interviewer
( )</td><td>Inspector
( )</td><td>Engine type
( )</td><td>Odometer reading
( )</td></tr>
<tr><td colspan="4">Customer specified content
•
•
•</td></tr>
<tr><td>Date when problem occurred</td><td>Year Month Date</td><td>Frequency of trouble occurrence</td><td>Always occurs
Sometimes occurs (times per day, times per month)</td></tr>
<tr><td rowspan="4">Conditions at event</td><td colspan="3">Weather ❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Others ( )</td></tr>
<tr><td colspan="3">Temperature °C (°F)</td></tr>
<tr><td colspan="3">How often ❑ Always ❑ Once before
❑ Sometimes (times a day / times a week / times a month)</td></tr>
<tr><td colspan="3">When and how</td></tr>
<tr><td rowspan="2">Situations at event</td><td colspan="3">In what situations did it occur?
❑ Fast Driving ❑ Rough Roads ❑ Parked ❑ Unknown ❑ Other</td></tr>
<tr><td colspan="3">In what operations did it occur?
❑ ACC On ❑ Press i-button or SOS button
❑ Operating door lock function with mobile phone
❑ Operating door unlock function with mobile phone
❑ Operating horn and hazard function with mobile phone
❑ Operating own vehicle positioning function
❑ Unknown ❑ Other</td></tr>
<tr><td>Situations at restoration</td><td colspan="3">What helped the status return to normal?
❑ Recover on its own ❑ ACC Off and On ❑ Does not recover ❑ Other</td></tr>
<tr><td>Location at event</td><td colspan="3">❑ Unknown ❑ Any Place
❑ Driving around open areas like in the country
❑ Driving around hills or mountains
❑ Driving around cities with large buildings
❑ Driving around residential areas or no large buildings
❑ Driving around areas with power lines
❑ Driving around rough roads or railway tracks</td></tr>
<tr><td>Error message</td><td colspan="3">Error message displayed</td></tr>
<tr><td rowspan="3">Mobile phone</td><td colspan="3">Mobile phone carrier (example: Docomo)</td></tr>
<tr><td colspan="3">Mobile phone model (example: Apple iPhone 6)</td></tr>
<tr><td colspan="3">Mobile phone OS version (software version information)</td></tr>
</table>

Check List for Interview

Telematics subscription status	❑ Subscription (Year Month Date) ❑ Non-contract
LED illumination status <Ref. to TEL(diag)-4, LED ILLUMINATION STATUS LIST, CHECK, Check List for Interview.>	RED LED ❑ OFF ❑ ON ❑ Blink
	GREEN LED ❑ OFF ❑ ON ❑ Blink
Check result	Reproductivity ❑ Reproduced ❑ Always ❑ Sometimes ❑ Cannot be reproduced Condition ❑ Cold ❑ Warm ❑ At starting ❑ Immediately after starting ❑ During warm-up ❑ At idle ❑ When start driving ❑ While driving ❑ At acceleration ❑ At deceleration ❑ When applying brake
MSISDN No. of SIM	* Confirm on data monitor. <Ref. to TEL(diag)-13, Read Current Data.>
Diagnostic code	

2. LED ILLUMINATION STATUS LIST

LED	Light OFF	Blink	Light ON
RED	Communication with the server and DCM are operating normally (communication failure with the STARLINK server. DTCs are not found within the vehicle unit.)	It is possible that communication with the server/DCM are malfunctioning.	It is possible that communication with the server/DCM are malfunctioning.
GREEN	—	Connection to the server is being attempted and in progress.	Communication status with the server is READY.
RED and GREEN	Telematics function is not activated.	Collation with the server is in progress.	Collation with the server failed. It is possible that the server/DCM are malfunctioning.

3. General Description

A: CAUTION

1. AIRBAG SYSTEM

CAUTION:
- **Do not use the electrical test equipment on all airbag harnesses and connector circuits.**
- **Be careful not to damage the airbag harness.**

B: INSPECTION

1. BASIC INSPECTION

Before performing the diagnosis, check the following items which may affect the problems relating to the telematics system.
1) Check the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.>

NOTE:
For HEV model, check the 12 volt auxiliary battery. <Ref. to SC(H4DO(HEV))-40, Battery.>
2) Check the relay and fuse condition. <Ref. to ET-9, Relay and Fuse.>
3) Check the connecting condition of harness and harness connector.

C: PREPARATION TOOL

1. SPECIAL TOOL

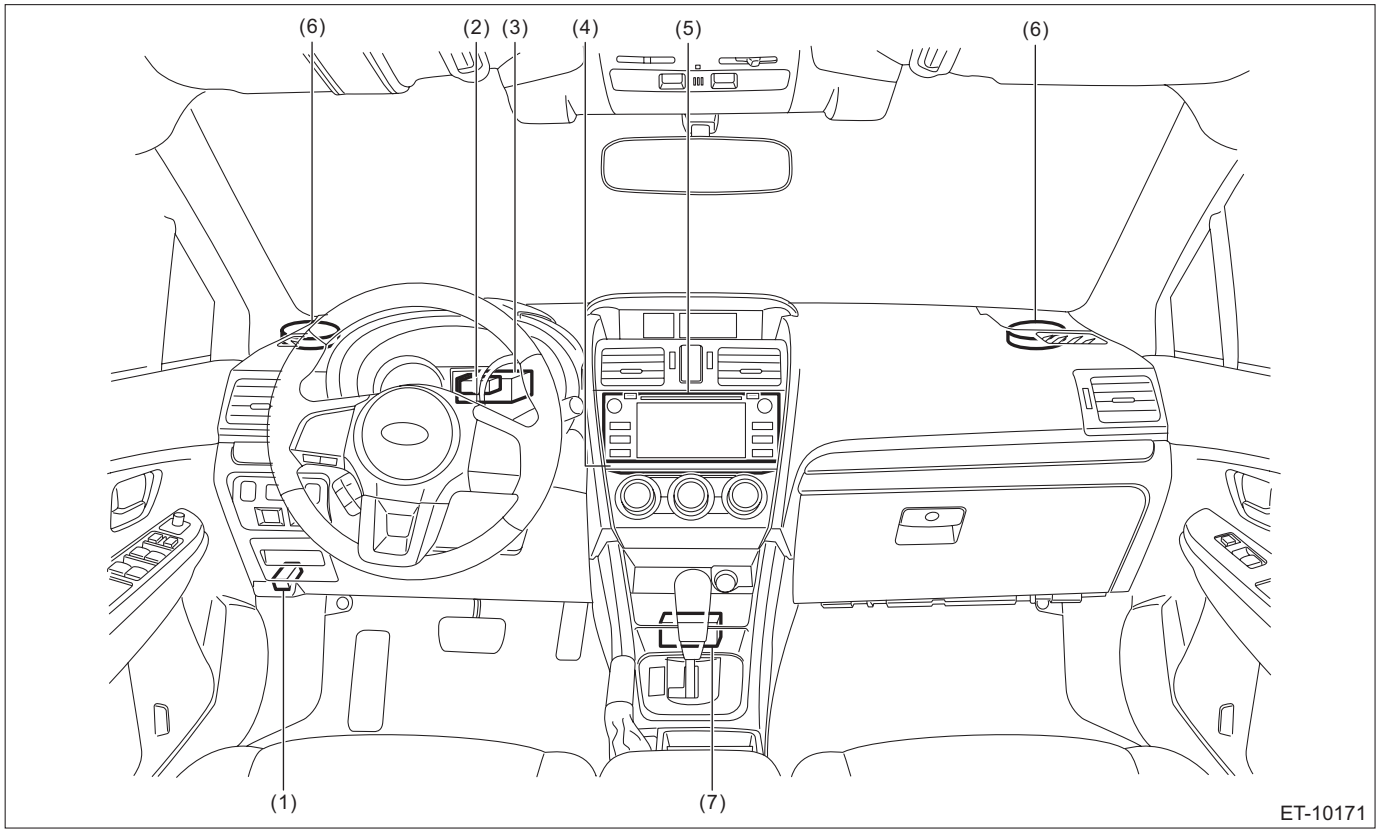
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.

2. GENERAL TOOL

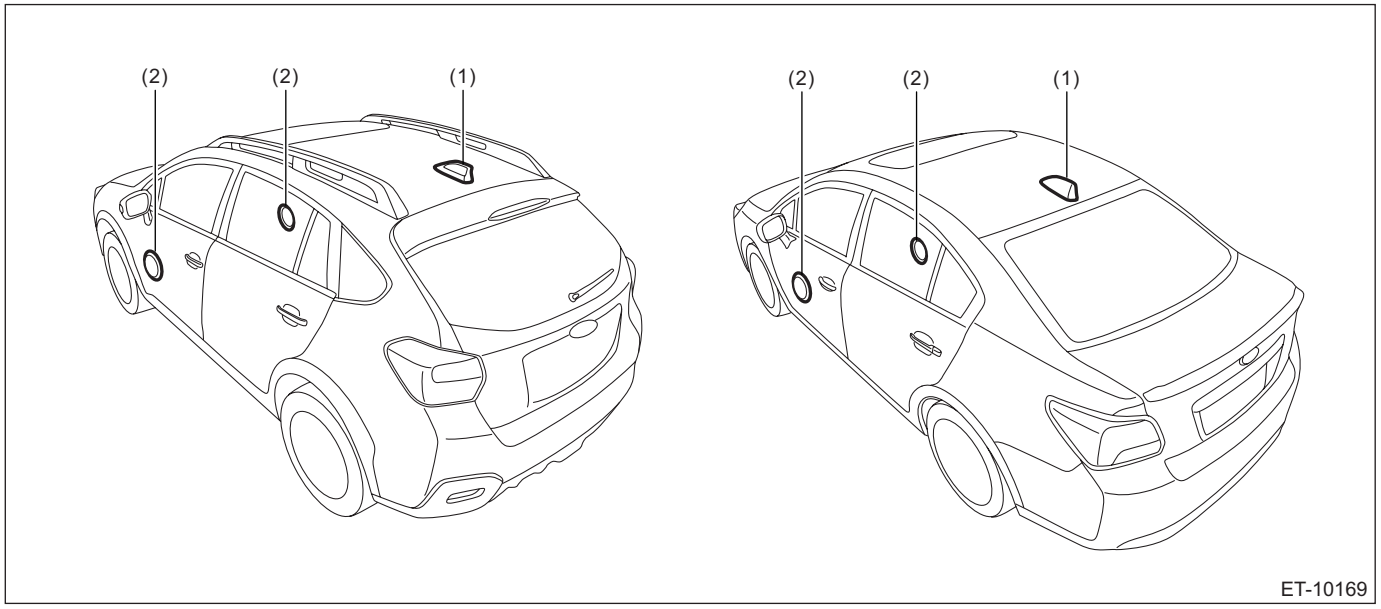
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.

4. Electrical Component Location

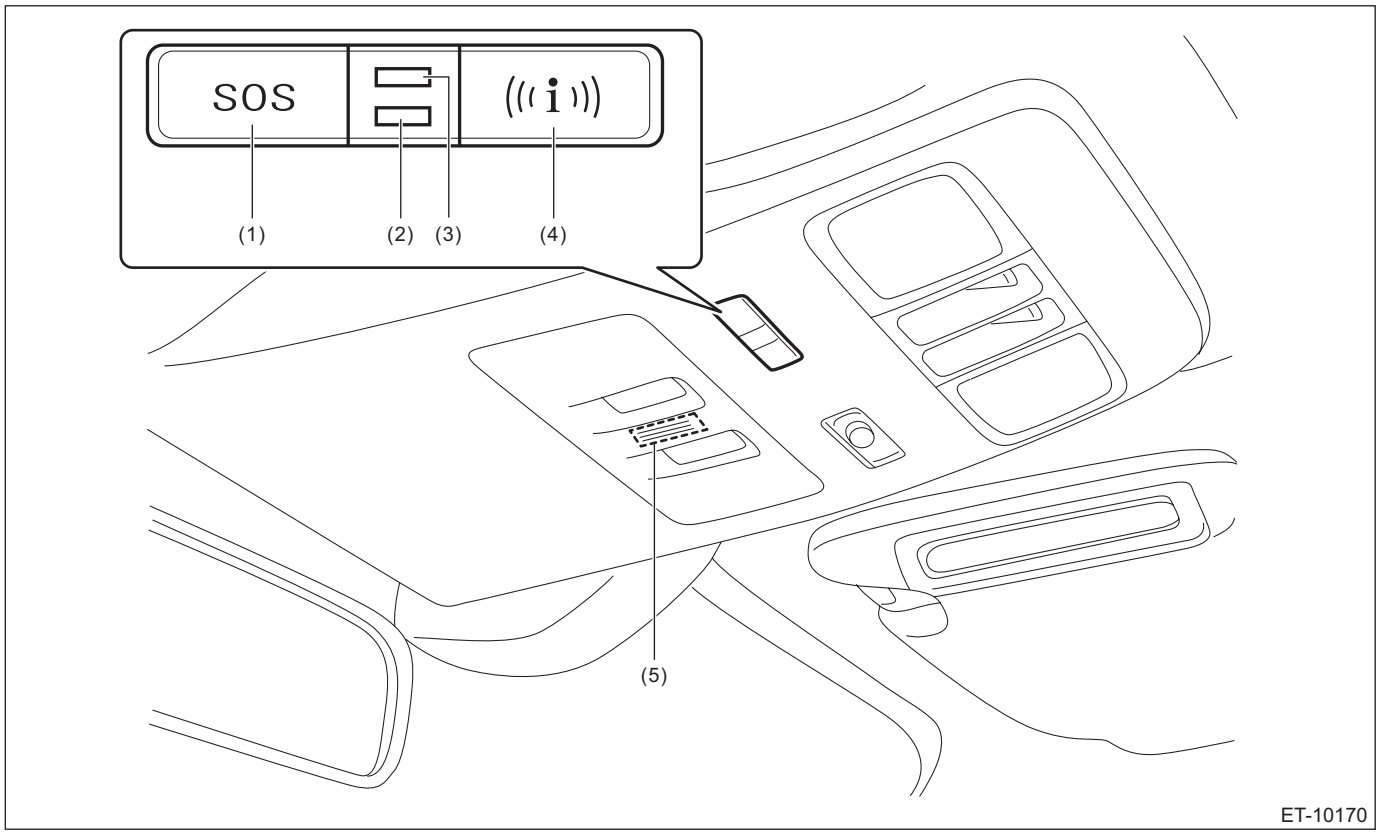
A: LOCATION



(1) Data link connector
(2) GPS antenna
(3) Telematics sub antenna
(4) Data communication module (DCM)
(5) Audio or navigation
(6) Instrument panel speaker
(7) Airbag CM



(1) Telematics antenna
(2) Door speaker (standard specification)



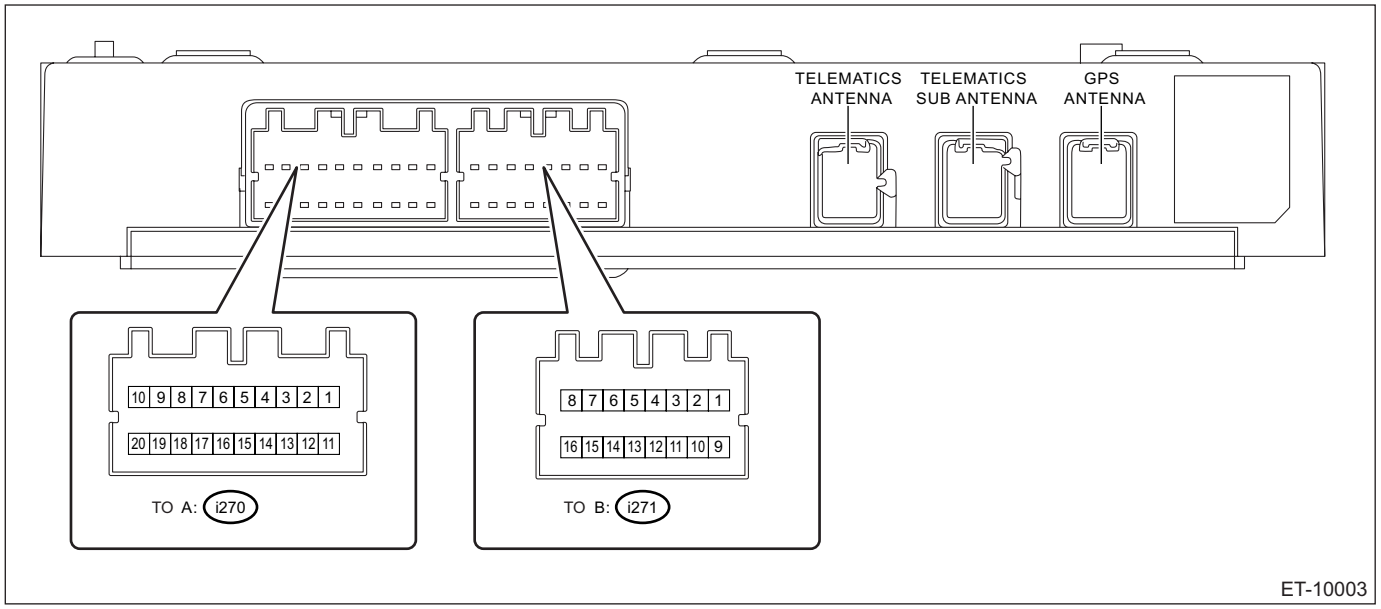
(1) SOS button
(2) RED LED
(3) GREEN LED
(4) i-button
(5) Microphone

NOTE:
For the LED operation condition, refer to "LED operation condition" in "Check List for Interview". <Ref. to TEL(diag)-4, LED ILLUMINATION STATUS LIST, CHECK, Check List for Interview.>

5. Control Module I/O Signal

A: SPECIFICATION

1. DATA COMMUNICATION MODULE (DCM)



Terminal No.	Contents	Measuring condition	Standard
A1	—	—	—
A2	—	—	—
A3	LED GREEN	—	—
A4 ←→ Chassis ground	i-button	i-button OFF → ON	1 MΩ or more → less than 1 Ω
A5 ←→ Chassis ground	SOS button	SOS button OFF → ON	1 MΩ or more → less than 1 Ω
A6	—	—	—
A7	CAN L	—	—
A8	Ignition power supply	Ignition switch OFF → ON	Less than 1 V → 9 — 16 V
A9	—	—	—
A10	Battery power supply	Always	9 — 16 V
A11	—	—	—
A12	—	—	—
A13	LED RED	—	—
A14 ←→ Chassis ground	GND	Always	Less than 1 Ω
A15	—	—	—
A16	—	—	—
A17	CAN H	—	—
A18	Airbag communication line	—	—
A19	MUTE	—	—
A20 ←→ Chassis ground	ACC	Ignition switch OFF → ACC ON	Less than 1 V → 9 — 16 V
B1	Front speaker input LH –	—	—
B2	Front speaker output LH –	—	—
B3	Front speaker input RH –	—	—
B4	Front speaker output RH –	—	—
B5	MIC signal OUT	—	—
B6	MIC signal	—	—
B7	MIC DET	—	—
B8	MIC 5 V	—	—

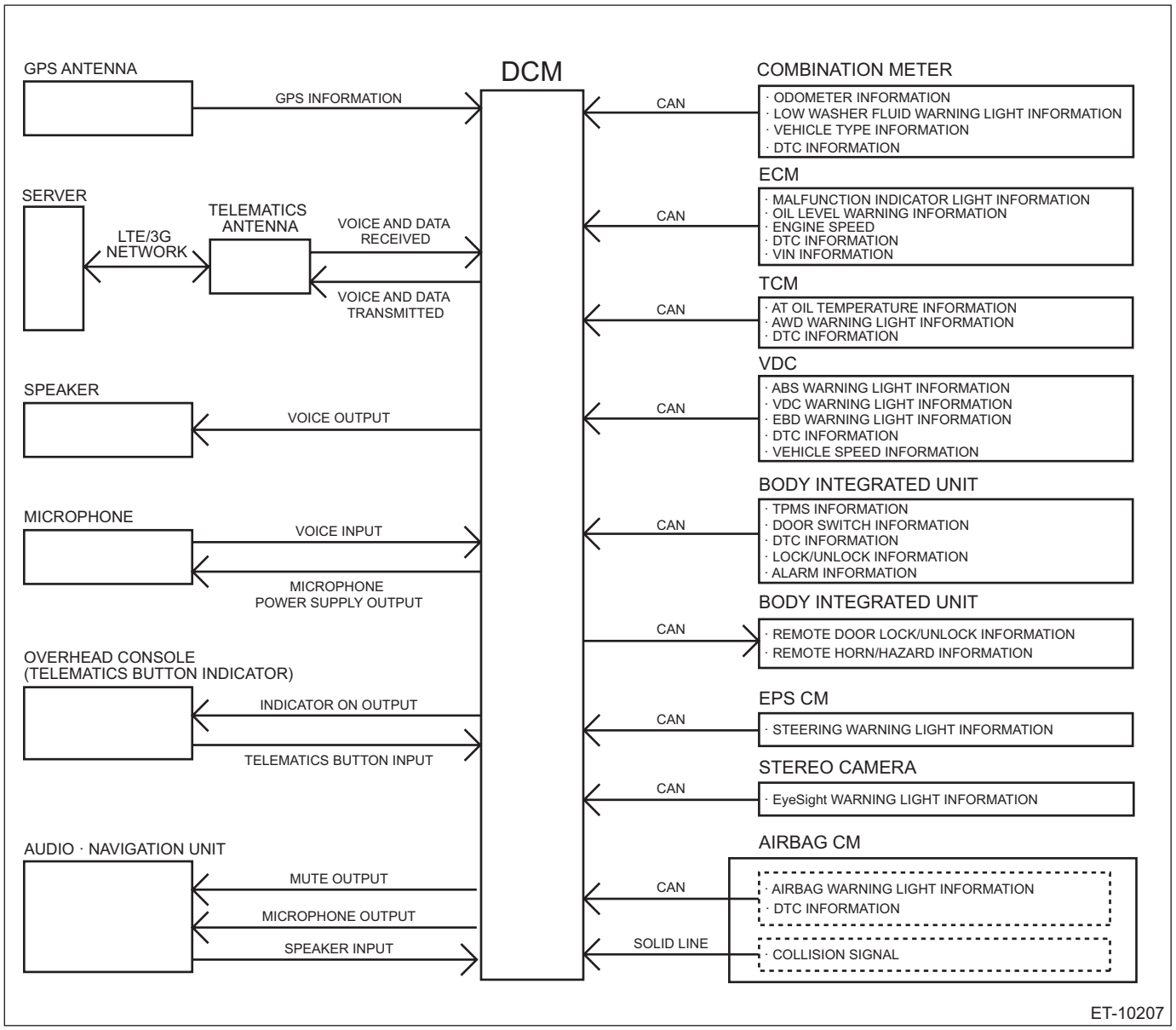
Terminal No.	Contents	Measuring condition	Standard
B9	Front speaker input LH +	—	—
B10	Front speaker output LH +	—	—
B11	Front speaker input RH +	—	—
B12	Front speaker output RH +	—	—
B13 ←→ Chassis ground	MIC GND OUT	Always	Less than 1 Ω
B14	MIC GND IN	—	—
B15	—	—	—
B16	—	—	—

B: WIRING DIAGRAM

Refer to “TELEMATICS SYSTEM” in the wiring diagram. <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>

C: SYSTEM BLOCK DIAGRAM

Main signals used between DCM and relevant CM



6. Subaru Select Monitor

A: OPERATION

- For detailed operation procedures, refer to “Application help”.
- When DCM cannot establish communication with Subaru Select Monitor, perform “COMMUNICATION FOR INITIALIZING IMPOSSIBLE”. <Ref. to TEL(diag)-10, INSPECTION, Subaru Select Monitor.>

B: INSPECTION

1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

When communication with DCM is impossible

DETECTING CONDITION:

- Defective harness connector
- Power supply circuit malfunction
- Defective DCM
- Defective CAN communication circuit
- Defective Subaru Select Monitor

TROUBLE SYMPTOM:

Communication is impossible between DCM and Subaru Select Monitor.

CAUTION:

CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

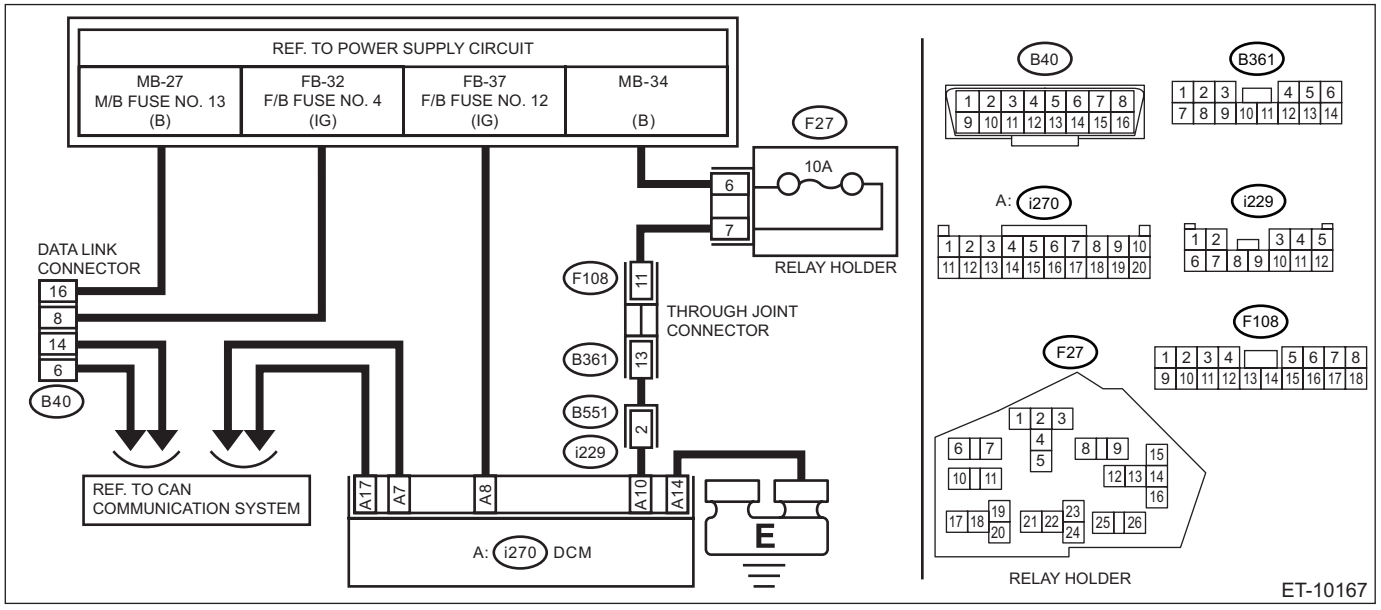
WIRING DIAGRAM:

NOTE:

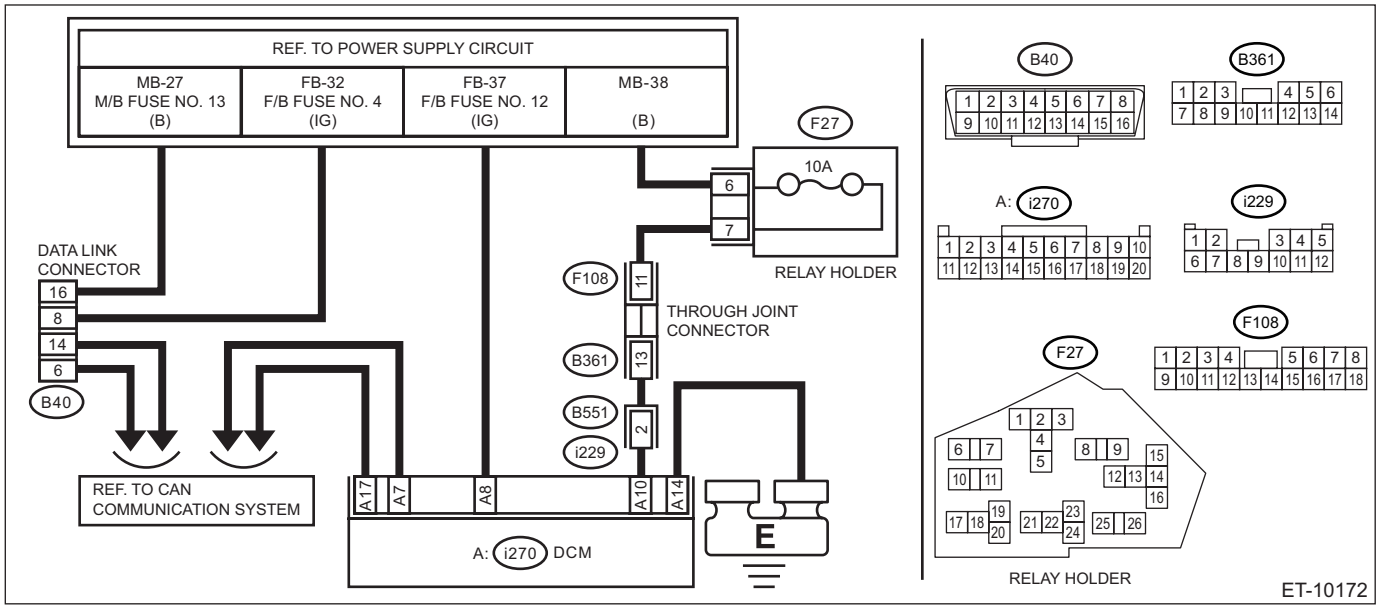
For the coupling connector, refer to “WIRING SYSTEM”.

Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>

- Except for HEV model



- HEV model



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Check the fuse of the DCM.	Is there any fault?	Replace the fuse. If the replaced fuse blows out easily, repair the ground short circuit in harness between the fuse — DCM connector.	Go to step **2**.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Disconnect the DCM connector. 2) Turn the ignition switch to ON. 3) Using a tester, measure the voltage between DCM connector (harness side) and the chassis ground. ***Connector & terminal*** ***(i270) No. 8 (+) — Chassis ground (–):*** ***(i270) No. 10 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the open circuit in the wiring harness between fuse and DCM connector.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Using a tester, measure the resistance between DCM connector (harness side) and the chassis ground. ***Connector & terminal*** ***(i270) No. 14 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **4**.	Repair the open circuit in the wiring harness between fuse and DCM connector.
4	**CHECK LAN SYSTEM.** 1) Inspect LAN system.	Is there any fault?	Perform the inspection according to the diagnosis for LAN system.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK TELEMATICS.** Using the Subaru Select Monitor, communicate with the telematics system.	Is communication possible?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>

7. Read Current Data

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Telematics» and then select «Enter».
5) On «Select Function» display, select «Data Monitor».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

Display	Contents	Reference value	Unit
Trip Count [count]	Refer to “LAN SYSTEM (DIAGNOSTICS)”. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.>	—	—
Count		—	—
Time Count [msec]		—	—
Current GPS Data	Current GPS information	—	—
Signal Strength	Current signal strength	—	—
MSISDN	Phone number of DCM built-in SIM	—	—
GPS Data at ACN Event	GPS information at ACN event occurrence	—	—
TimeStamp at ACN Event	Time stamp information at ACN event occurrence	NOTE: The time stamp is displayed in the Coordinated Universal Time (UTC), which is different from actual time at each location. Therefore, time difference needs to be corrected for use. Example: [12/22 01:30 in UTC time] is corrected as [12/21 20:30 in New York time].	—
Call Type at ACN Event	Information of ACN event occurrence	No Attempt ACN	—
RSSI at ACN Event	Signal strength at ACN event occurrence	—	%
Call Status at ACN Event	Result of call connection at ACN event occurrence	call not started service not provisioned no network service call ended by Agero call ended by driver call ended by exhausted retry call started call connected	—
ACN Active	Subscription information on ACN function	FALSE TRUE	—
SOS Active	Subscription information on SOS function	FALSE TRUE	—
ICALL Active	Subscription information on I-CALL function	FALSE TRUE	—
Security Alarm Active	Subscription information on Security Alarm function	FALSE TRUE	—

Display	Contents	Reference value	Unit
Maintenance Alert Active	Subscription information on Maintenance Alert function	FALSE TRUE	—
MVR Active	Subscription information on MVR function	FALSE TRUE	—
Diagnostic Alert Active	Subscription information on Diagnostic Alert function	FALSE TRUE	—
Account Status	Basic subscription information	FALSE TRUE	—
Power Source Status	Operation power supply information (main battery or DCM built-in BUB)	DCM currently running on BUB DCM currently running on VBATT	—
Subscription Status	DCM mode information	Factory Mode Comm Check Unsubscribed subscribed	—
Battery Voltage	Voltage information on main battery	—	V
Stored VIN	VIN information stored in DCM	—	—
GPS Data at Time of Button Push(1)	GPS information at SOS/I-CALL event occurrence (latest record)	—	—
Timestamp at Time of Button Push(1)	Time stamp information at SOS/I-CALL event occurrence (latest record)	NOTE: The time stamp is displayed in the Coordinated Universal Time (UTC), which is different from actual time at each location. Therefore, time difference needs to be corrected for use. Example: [12/22 01:30 in UTC time] is corrected as [12/21 20:30 in New York time].	—
Call Type at SOS/ICALL Event(1)	Information of SOS/I-CALL event occurrence (latest record)	no call SOS I-Call	—
RSSI at SOS/ICALL(1)	Signal strength at SOS/I-CALL event occurrence (latest record)	—	%
Call status at SOS/ICALL Event(1)	Result of call connection at SOS/I-CALL event occurrence (latest record)	call not started service not provisioned no network service call ended by Agero call ended by driver call ended by exhausted retry call started call connected	—
GPS Data at Time of Button Push(2)	GPS information at SOS/I-CALL event occurrence (second last record)	—	—

Display	Contents	Reference value	Unit
Timestamp at Time of Button Push(2)	Time stamp information at SOS/I-CALL event occurrence (second last record)	NOTE: The time stamp is displayed in the Coordinated Universal Time (UTC), which is different from actual time at each location. Therefore, time difference needs to be corrected for use. Example: [12/22 01:30 in UTC time] is corrected as [12/21 20:30 in New York time].	—
Call Type at SOS/ICALL Event(2)	Information of SOS/I-CALL event occurrence (second last record)	no call SOS I-Call	—
RSSI at SOS/ICALL(2)	Signal strength at SOS/I-CALL event occurrence (second last record)	—	%
Call status at SOS/ICALL Event(3)	Result of call connection at SOS/I-CALL event occurrence (second last record)	call not started service not provisioned no network service call ended by Agero call ended by driver call ended by exhausted retry call started call connected	—
GPS Data at Time of Button Push(3)	GPS information at SOS/I-CALL event occurrence (third last record)	—	—
Timestamp at Time of Button Push(3)	Time stamp information at SOS/I-CALL event occurrence (third last record)	NOTE: The time stamp is displayed in the Coordinated Universal Time (UTC), which is different from actual time at each location. Therefore, time difference needs to be corrected for use. Example: [12/22 01:30 in UTC time] is corrected as [12/21 20:30 in New York time].	—
Call Type at SOS/ICALL Event(3)	Information of SOS/I-CALL event occurrence (third last record)	no call SOS I-Call	—
RSSI at SOS/ICALL(3)	Signal strength at SOS/I-CALL event occurrence (third last record)	—	%

Display	Contents	Reference value	Unit
Call status at SOS/ICALL Event(3)	Result of call connection at SOS/I-CALL event occurrence (third last record)	call not started service not provisioned no network service call ended by Agero call ended by driver call ended by exhausted retry call started call connected	—
Speaker Gain Level	Speaker specification information (standard or H/K)	standard radio/2 speakers premium radio/4 speakers	—
GREEN LED Voltage	GREEN LED voltage information	—	V
RED LED Voltage	RED LED voltage information	—	V
Left Speaker Status	Left speaker connection status	No Speaker Diagnostic Faults Detected (Default) Output Short to PVDD is Present Output Short to Ground is Present Open Load is Present Shorted Load is Present Fault Condition Present Load Dioagnostics in Present Speaker Muted Speaker in Play Mode	—
Right Speaker Status	Right speaker connection status	No Speaker Diagnostic Faults Detected (Default) Output Short to PVDD is Present Output Short to Ground is Present Open Load is Present Shorted Load is Present Fault Condition Present Load Dioagnostics in Present Speaker Muted Speaker in Play Mode	—

8. Diagnostic Code(s) Display

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Telematics» and then select «Enter».
5) On «Select Function» display, select «DTC».

NOTE:
- For detailed operation procedures, refer to “Application help”.
- For details concerning DTC, refer to the List of Diagnostic Trouble Codes (DTC). <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>

B: LIST

DTC	Item	Note
U0073	CONTROL MODULE COMMUNICATION BUS OFF	<Ref. to TEL(diag)-23, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0074	CONTROL MODULE COMMUNICATION BUS "BODY-CAN" OFF	<Ref. to TEL(diag)-23, DTC U0074 CONTROL MODULE COMMUNICATION BUS "BODY-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	<Ref. to TEL(diag)-23, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	<Ref. to TEL(diag)-23, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	<Ref. to TEL(diag)-23, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0151	LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE	<Ref. to TEL(diag)-23, DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	<Ref. to TEL(diag)-23, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	<Ref. to TEL(diag)-23, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	<Ref. to TEL(diag)-24, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0452	INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE	<Ref. to TEL(diag)-24, DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A00	VIN READING	<Ref. to TEL(diag)-25, DTC B2A00 VIN READING, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A01	TEL1 ANTENNA CIRCUIT	<Ref. to TEL(diag)-26, DTC B2A01 TEL1 ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
B2A02	TEL2 ANTENNA CIRCUIT	<Ref. to TEL(diag)-28, DTC B2A02 TEL2 ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A03	GPS ANTENNA CIRCUIT	<Ref. to TEL(diag)-29, DTC B2A03 GPS ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A04	MIC CIRCUIT	<Ref. to TEL(diag)-30, DTC B2A04 MIC CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A05	LEFT SPEAKER/AUDIO CIRCUIT	<Ref. to TEL(diag)-33, DTC B2A05 LEFT SPEAKER/AUDIO CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A06	RIGHT SPEAKER/AUDIO CIRCUIT	<Ref. to TEL(diag)-36, DTC B2A06 RIGHT SPEAKER/AUDIO CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A07	BACKUP BATTERY CHARGE SYSTEM PERFORMANCE	<Ref. to TEL(diag)-39, DTC B2A07 BACKUP BATTERY CHARGE SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A08	SOS BUTTON CIRCUIT	<Ref. to TEL(diag)-40, DTC B2A08 SOS BUTTON CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A09	I-CALL BUTTON CIRCUIT	<Ref. to TEL(diag)-42, DTC B2A09 I-CALL BUTTON CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0A	RED LED CIRCUIT	<Ref. to TEL(diag)-44, DTC B2A0A RED LED CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0B	GREEN LED CIRCUIT	<Ref. to TEL(diag)-47, DTC B2A0B GREEN LED CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0C	DCM INTERNAL FAULT	<Ref. to TEL(diag)-50, DTC B2A0C DCM INTERNAL FAULT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0D	AIRBAG SIGNAL	<Ref. to TEL(diag)-51, DTC B2A0D AIRBAG SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0E	MUTE LINE CIRCUIT	<Ref. to TEL(diag)-53, DTC B2A0E MUTE LINE CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0F	BACKUP BATTERY DEGRADATION	<Ref. to TEL(diag)-55, DTC B2A0F BACKUP BATTERY DEGRADATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A10	BATTERY VOLTAGE HIGH	<Ref. to TEL(diag)-56, DTC B2A10 BATTERY VOLTAGE HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

9. Clear Memory Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Telematics» and then select «Enter».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «Clear Memory».

NOTE:
For detailed operation procedures, refer to “Application help”.

10.Inspection Mode

A: PROCEDURE

It is possible to diagnose the DTC by performing the indicated inspection mode.
After correcting the DTC, perform a necessary inspection mode and make sure that the function is resumed correctly and the DTC is recorded.

1. INSPECTION MODE 1

DTC	Item	Note
U0073	CONTROL MODULE COMMUNICATION BUS OFF	<Ref. to TEL(diag)-23, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0074	CONTROL MODULE COMMUNICATION BUS "BODY-CAN" OFF	<Ref. to TEL(diag)-23, DTC U0074 CONTROL MODULE COMMUNICATION BUS "BODY-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	LOST COMMUNICATION WITH ECM/PCM “A”	<Ref. to TEL(diag)-23, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE	<Ref. to TEL(diag)-23, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE	<Ref. to TEL(diag)-23, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0151	LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE	<Ref. to TEL(diag)-23, DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE	<Ref. to TEL(diag)-23, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	INVALID DATA RECEIVED FROM ECM/PCM “A”	<Ref. to TEL(diag)-23, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE	<Ref. to TEL(diag)-24, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0452	INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE	<Ref. to TEL(diag)-24, DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A00	VIN READING	<Ref. to TEL(diag)-25, DTC B2A00 VIN READING, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A01	TEL1 ANTENNA CIRCUIT	<Ref. to TEL(diag)-26, DTC B2A01 TEL1 ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A02	TEL2 ANTENNA CIRCUIT	<Ref. to TEL(diag)-28, DTC B2A02 TEL2 ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A03	GPS ANTENNA CIRCUIT	<Ref. to TEL(diag)-29, DTC B2A03 GPS ANTENNA CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A07	BACKUP BATTERY CHARGE SYSTEM PERFORMANCE	<Ref. to TEL(diag)-39, DTC B2A07 BACKUP BATTERY CHARGE SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A08	SOS BUTTON CIRCUIT	<Ref. to TEL(diag)-40, DTC B2A08 SOS BUTTON CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A09	I-CALL BUTTON CIRCUIT	<Ref. to TEL(diag)-42, DTC B2A09 I-CALL BUTTON CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0C	DCM INTERNAL FAULT	<Ref. to TEL(diag)-50, DTC B2A0C DCM INTERNAL FAULT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Note
B2A0D	AIRBAG SIGNAL	<Ref. to TEL(diag)-51, DTC B2A0D AIRBAG SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0E	MUTE LINE CIRCUIT	<Ref. to TEL(diag)-53, DTC B2A0E MUTE LINE CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0F	BACKUP BATTERY DEGRADATION	<Ref. to TEL(diag)-55, DTC B2A0F BACKUP BATTERY DEGRADATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A10	BATTERY VOLTAGE HIGH	<Ref. to TEL(diag)-56, DTC B2A10 BATTERY VOLTAGE HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Inspection steps:
1) Perform the Clear Memory Mode. <Ref. to TEL(diag)-19, Clear Memory Mode.>
2) Read the DTC and check that the DTC is not displayed. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. After solving the DTC, repeat from step 1).
3) Turn the ignition switch to OFF.
4) Turn the ignition switch to ON, and wait for 5 seconds or more.
5) Read the DTC and check that the DTC is not displayed.

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC.

2. INSPECTION MODE 2

DTC	Item	Note
B2A04	MIC CIRCUIT	<Ref. to TEL(diag)-30, DTC B2A04 MIC CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A05	LEFT SPEAKER/AUDIO CIRCUIT	<Ref. to TEL(diag)-33, DTC B2A05 LEFT SPEAKER/AUDIO CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A06	RIGHT SPEAKER/AUDIO CIRCUIT	<Ref. to TEL(diag)-36, DTC B2A06 RIGHT SPEAKER/AUDIO CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0A	RED LED CIRCUIT	<Ref. to TEL(diag)-44, DTC B2A0A RED LED CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2A0B	GREEN LED CIRCUIT	<Ref. to TEL(diag)-47, DTC B2A0B GREEN LED CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Inspection steps:
1) Perform the Clear Memory Mode. <Ref. to TEL(diag)-19, Clear Memory Mode.>
2) Read the DTC and check that the DTC is not displayed. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC. After solving the DTC, repeat from step 1).
3) Turn the ignition switch to OFF.
4) Close all doors. (The vehicle enters CAN sleep state.)
5) Wait for approx. 1 minute. After the indicator goes off, wait for another 1 minute. (DCM standby mode)
6) Turn the ignition switch to ON, and wait for 5 seconds or more.
7) Read the DTC and check that the DTC is not displayed.

NOTE:
If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis according to DTC.

11.System Operation Check Mode

A: OPERATION

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the target vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Telematics» and then select «Enter».
5) On «Select Function» display, select «Active Test».

NOTE:
For detailed operation procedures, refer to “Application help”.

B: LIST

System operation check mode	Note
GREEN LED Lighting	GREEN LED illuminates/flashes/goes off.
GREEN LED Flashing	
GREEN LED OFF	
RED LED Lighting	RED LED illuminates/flashes/goes off.
RED LED Flashing	
RED LED OFF	
Speaker ON	Outputs to speaker.

12.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

Detected when CAN line abnormality is detected.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

B: DTC U0074 CONTROL MODULE COMMUNICATION BUS "BODY-CAN" OFF

Detected when CAN line abnormality is detected.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

C: DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

Detected when CAN data from ECM does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

D: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

Detected when CAN data from VDC does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

E: DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

Detected when CAN data is not received from body integrated unit.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

F: DTC U0151 LOST COMMUNICATION WITH RESTRAINTS CONTROL MODULE

Detected when CAN data is not received from airbag CM.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

G: DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

Detected when CAN data from combination meter does not arrive.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

H: DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

Detected when CAN data from ECM is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

I: DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

This is detected when CAN data from VDC is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

J: DTC U0452 INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE

Detected when CAN data from airbag CM is abnormal.

NOTE:
Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

K: DTC B2A00 VIN READING

DIAGNOSIS START CONDITION:
When ignition switch is ON.
TROUBLE SYMPTOM:
When ignition switch is ON, VIN information (CAN) sent from ECM cannot be read.
DTC DETECTING CONDITION:
- Telematics function cannot be used.
- RED LED illuminates.

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A00 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK DTC.** Check DTCs in the following systems; • Telematics <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.> • Engine <Ref. to EN(H4DO w/o HEV)(diag)-49, Read Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO HEV)(diag)-51, Read Diagnostic Trouble Code (DTC).>	Is DTC U**** displayed? (Current malfunction)	Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **3**.
3	**CHECK CURRENT DATA.** Confirm VIN information from the engine OBD mode. <Ref. to EN(H4DO w/o HEV)(diag)-36, MODE $09 (REQUEST VEHICLE INFORMATION), OPERATION, General Scan Tool.> <Ref. to EN(H4DO HEV)(diag)-36, MODE $08 (REQUEST CONTROL FOR ON-BOARD SYSTEM, TEST, AND COMPONENT), OPERATION, General Scan Tool.>	Is VIN information displayed?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the ECM. <Ref. to FU(H4DO(w/o HEV))-100, Engine Control Module (ECM).> <Ref. to FU(H4DO(HEV))-86, Engine Control Module (ECM).>

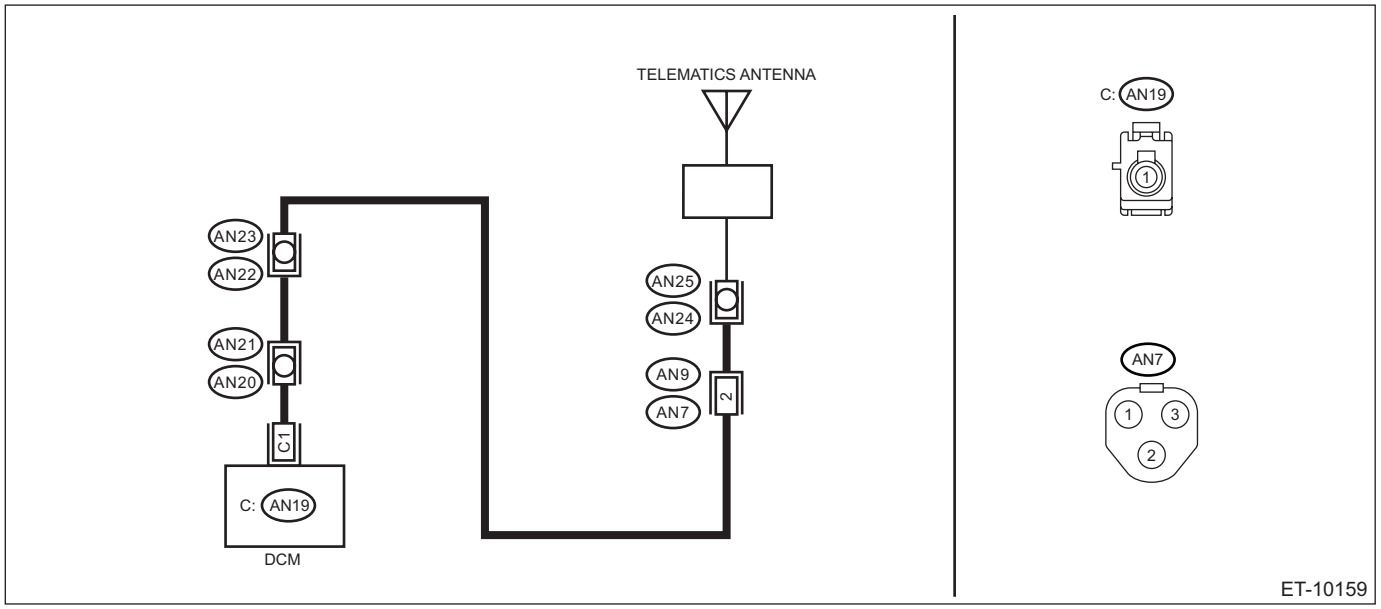
L: DTC B2A01 TEL1 ANTENNA CIRCUIT

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
Any of the followings continues for 5 seconds or more.
- TEL1 impedance is more than 1 MΩ. (Detached antenna, etc.)
- TEL1 impedance is less than 1 kΩ. (Short-circuited antenna, etc.)

TROUBLE SYMPTOM:
- Telematics function cannot be used.
- RED LED illuminates.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A01 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the antenna connector. 3) Disconnect the DCM connector. 4) Disconnect the PRG DU connector. 5) Measure the resistance between antenna connector and DCM connector. ***Connector & terminal*** ***(AN19) No. 1 — (AN24) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(AN19) No. 1 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK HARNESS (SHORT CIRCUIT TO POWER SUPPLY).** 1) Turn the ignition switch to ON. 2) Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***(AN19) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK ANTENNA.** Check the telematics antenna. <Ref. to ET-35, Antenna.>	Is the telematics antenna OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the telematics antenna. <Ref. to ET-35, Antenna.>

M: DTC B2A02 TEL2 ANTENNA CIRCUIT

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
Any of the followings continues for 5 seconds or more.
- TEL2 impedance is more than 1 MΩ. (Detached antenna, etc.)
- TEL2 impedance is less than 1 kΩ. (Short-circuited antenna, etc.)

TROUBLE SYMPTOM:
- Telematics function cannot be used.
- RED LED illuminates.

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A01 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK ANTENNA.** Visually check the telematics sub antenna. <Ref. to ET-35, Antenna.>	Is the telematics sub antenna OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the telematics sub antenna. <Ref. to ET-35, Antenna.>

N: DTC B2A03 GPS ANTENNA CIRCUIT

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
Any of the followings continues for 5 seconds or more.
- GPS antenna impedance is more than 1 MΩ. (Detached antenna, etc.)
- GPS antenna impedance is less than 1 kΩ. (Short-circuited antenna, etc.)

TROUBLE SYMPTOM:
- Telematics function cannot be used.
- RED LED illuminates.

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A01 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK GPS ANTENNA.** Visually check the GPS antenna. <Ref. to ET-43, GPS Antenna.>	Is the GPS antenna OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the GPS antenna. <Ref. to ET-43, GPS Antenna.>

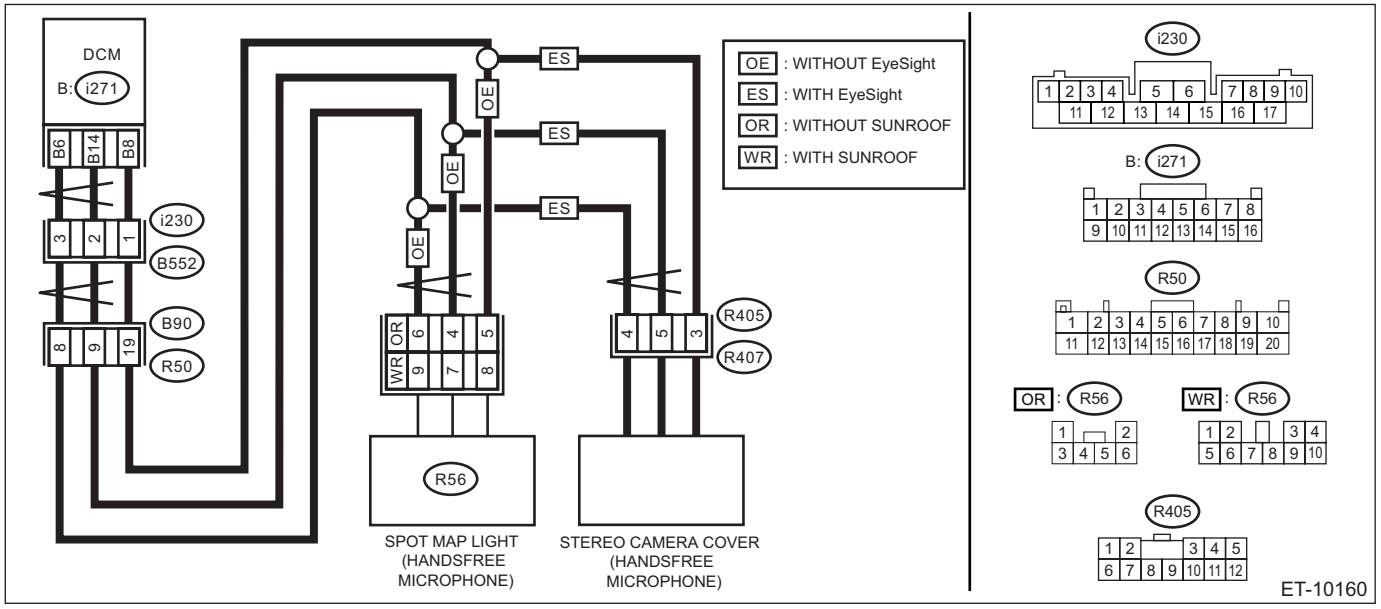
O: DTC B2A04 MIC CIRCUIT

DIAGNOSIS START CONDITION:
When ACC is ON.
DTC DETECTING CONDITION:
Any of the followings continues for 5 seconds or more.
- MIC impedance is more than 1 MΩ. (Detached MIC, etc.)
- MIC impedance is less than 1 kΩ. (Short-circuited MIC, etc.)

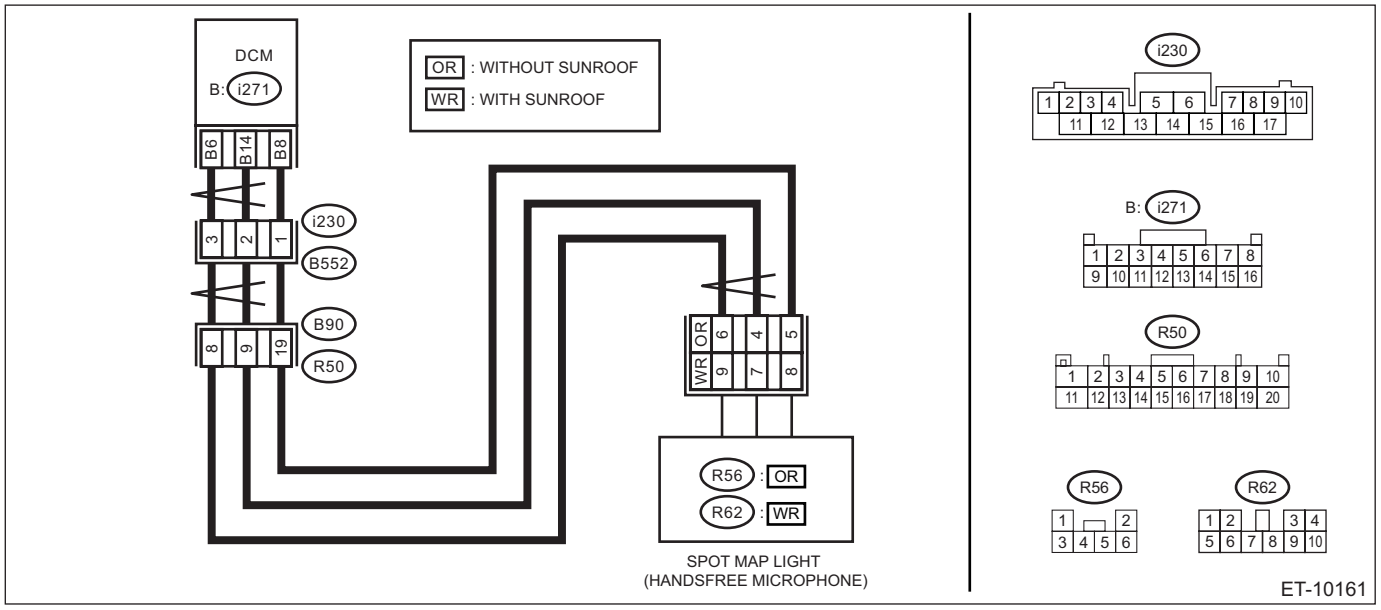
TROUBLE SYMPTOM:
- Call function cannot be used.
- RED LED illuminates.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>
- Except for HEV model



- HEV model



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A04 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the microphone connector. 3) Disconnect the DCM connector. 4) Measure the resistance between microphone connector and DCM connector. ***Connector & terminal*** ***Except for HEV model (with sunroof and without EyeSight)*** ***(R56) No. 7 — (i271) No. 14:*** ***(R56) No. 8 — (i271) No. 8:*** ***(R56) No. 9 — (i271) No. 6:*** ***Except for HEV model (without sunroof and without EyeSight)*** ***(R56) No. 4 — (i271) No. 14:*** ***(R56) No. 5 — (i271) No. 8:*** ***(R56) No. 6 — (i271) No. 6:*** ***Except for HEV model (with EyeSight)*** ***(R405) No. 4 — (i271) No. 6:*** ***(R405) No. 3 — (i271) No. 8:*** ***(R405) No. 5 — (i271) No. 14:*** ***HEV model (with sunroof)*** ***(R56) No. 4 — (i271) No. 14:*** ***(R56) No. 5 — (i271) No. 8:*** ***(R56) No. 6 — (i271) No. 6:*** ***HEV model (without sunroof)*** ***(R62) No. 7 — (i271) No. 14:*** ***(R62) No. 8 — (i271) No. 8:*** ***(R62) No. 9 — (i271) No. 6:***	Is the resistance 1 Ω or less?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i271) No. 8 — Chassis ground:*** ***(i271) No. 14 — Chassis ground:*** ***(i271) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.

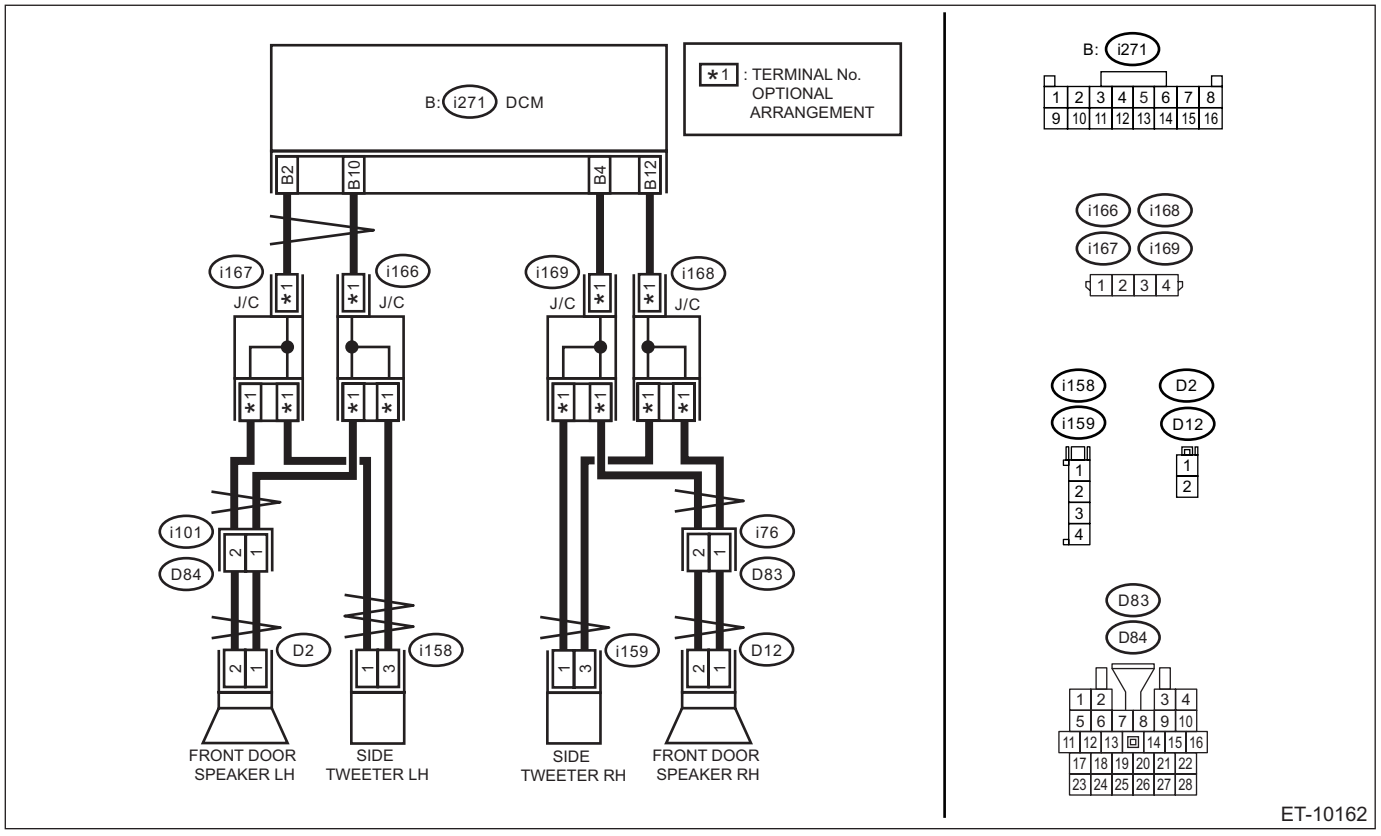
	Step	Check	Yes	No
4	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***(i271) No. 8 (+) — Chassis ground (–):*** ***(i271) No. 14 (+) — Chassis ground (–):*** ***(i271) No. 6 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK MICROPHONE.** Confirm the microphone voice input.	Is the voice input OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the microphone. <Ref. to ET-41, Microphone.>

P: DTC B2A05 LEFT SPEAKER/AUDIO CIRCUIT

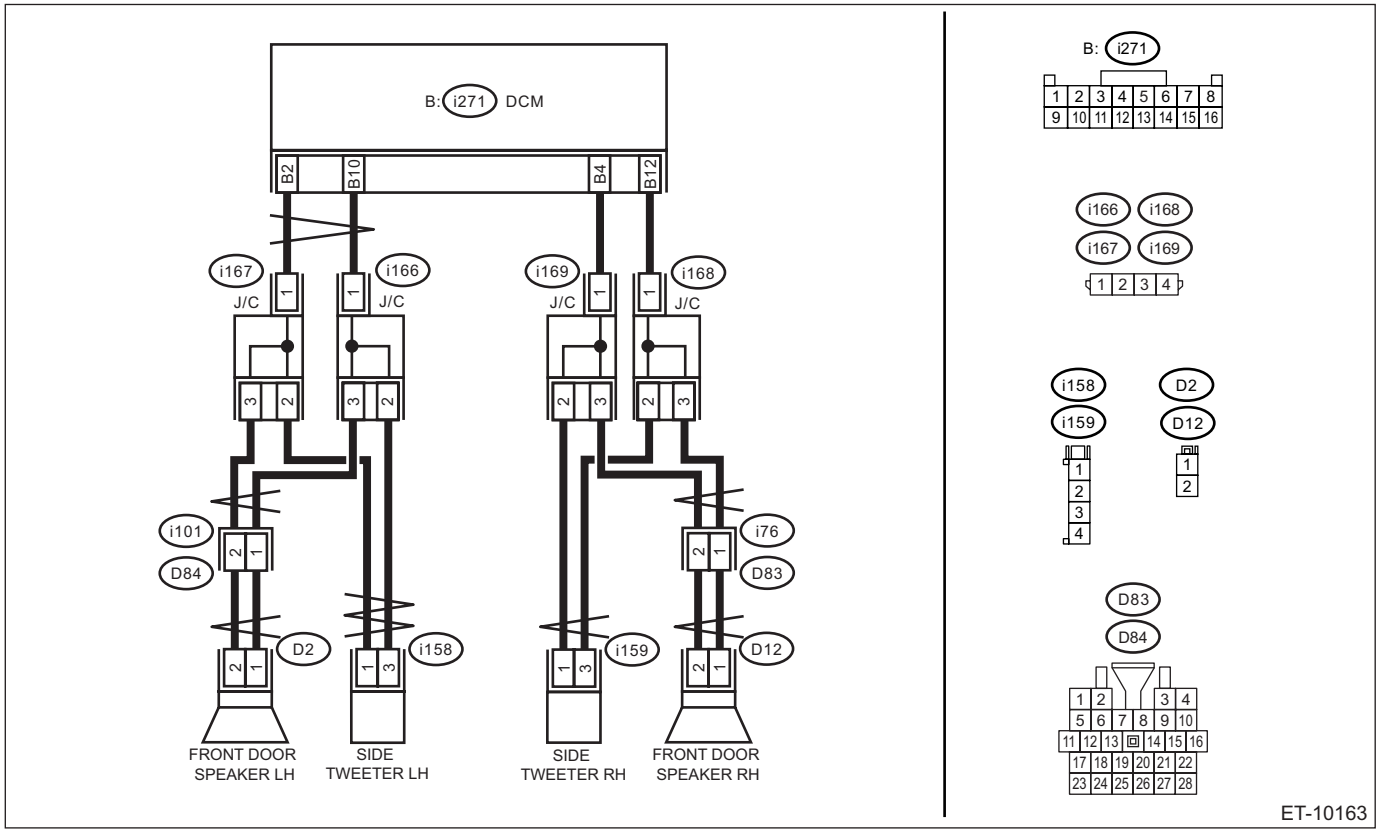
DIAGNOSIS START CONDITION:
When ACC is ON.
DTC DETECTING CONDITION:
Speaker impedance is more than 10 kΩ for 100 mS. (Detached speaker connection, etc.)
TROUBLE SYMPTOM:
- Call function cannot be used.
- RED LED illuminates.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>
- Except for HEV model



- HEV model



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A05 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

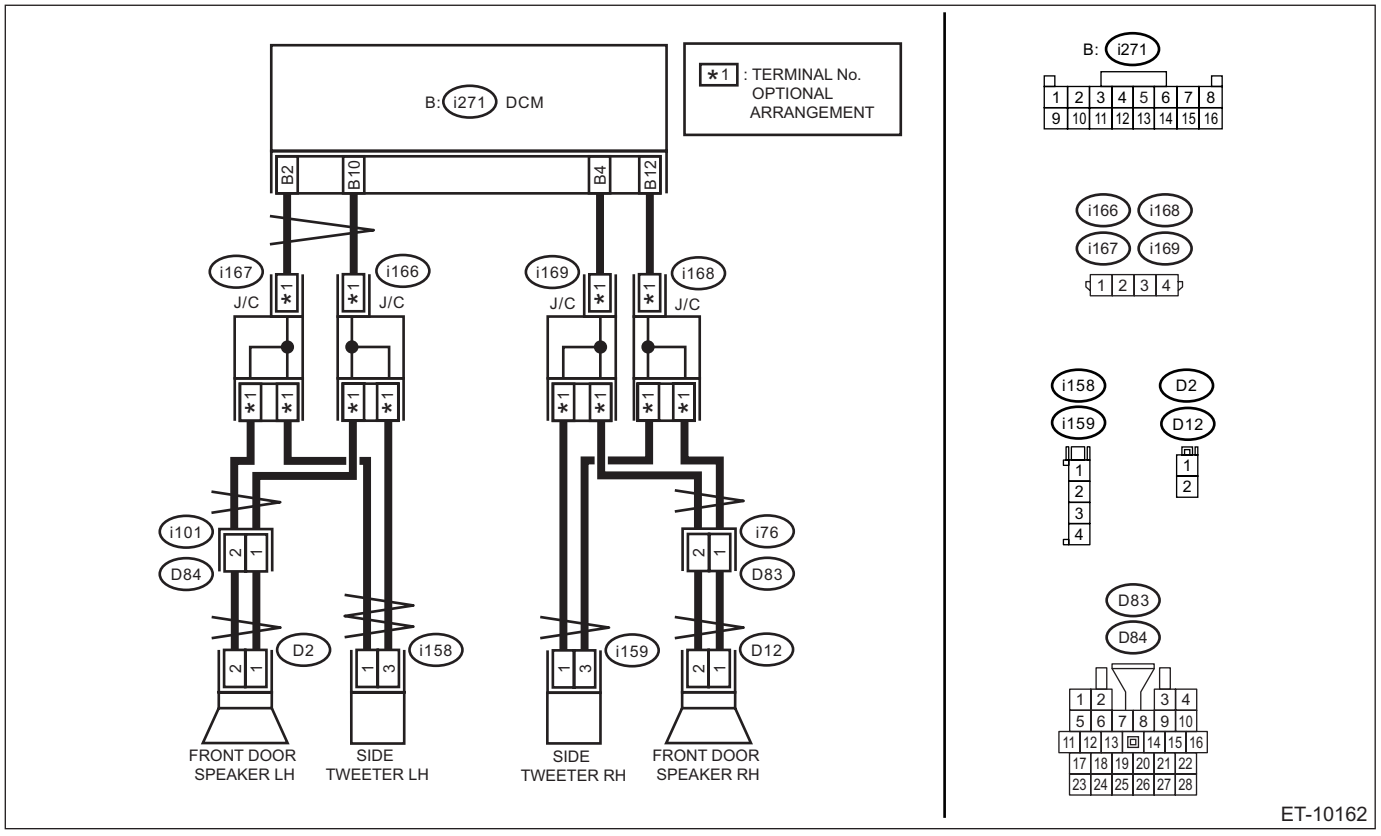
	Step	Check	Yes	No
2	**PERFORM THE SYSTEM OPERATION CHECK.** Perform [Speaker ON] in the system operation check mode. <Ref. to TEL(diag)-22, System Operation Check Mode.>	Does it sound?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the speaker connector and tweeter connector. 3) Disconnect the DCM connector. 4) Measure the resistance between speaker connector and tweeter connector and DCM connector. ***Connector & terminal*** ***(i271) No. 2 — (D2) No. 2:*** ***(i271) No. 2 — (i158) No. 1:*** ***(i271) No. 10 — (D2) No. 1:*** ***(i271) No. 10 — (i158) No. 3:***	Is the resistance 1 Ω or less?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i271) No. 2 — Chassis ground:*** ***(i271) No. 10 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***(i271) No. 2 (+) — Chassis ground (–):*** ***(i271) No. 10 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK SPEAKER.** Perform the inspection of speaker unit and tweeter unit. <Ref. to ET-32, Front Speaker.>	Are the speaker and tweeter OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the speaker and tweeter. <Ref. to ET-32, Front Speaker.>

Q: DTC B2A06 RIGHT SPEAKER/AUDIO CIRCUIT

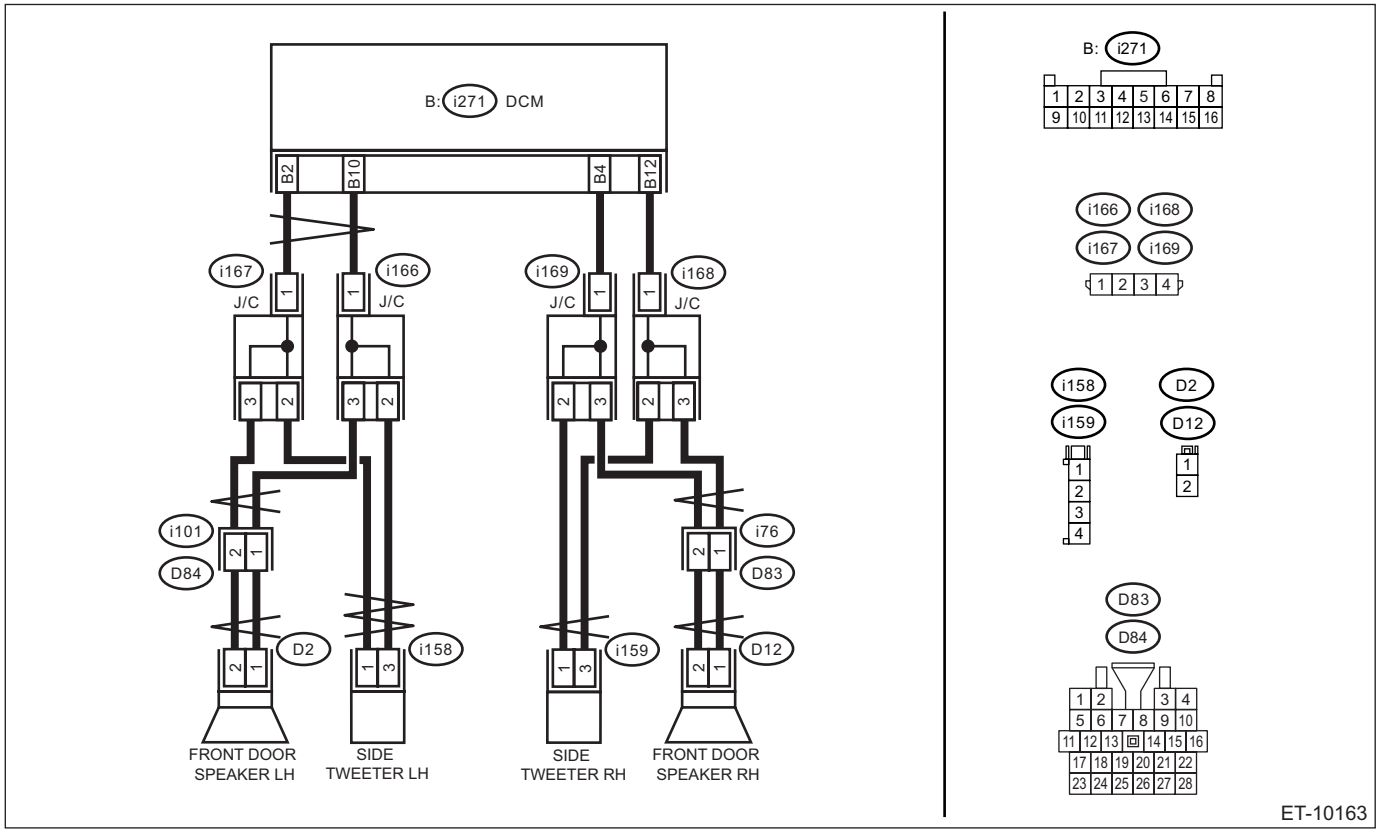
DIAGNOSIS START CONDITION:
When ACC is ON.
DTC DETECTING CONDITION:
Speaker impedance is more than 10 kΩ for 100 mS. (Detached speaker connection, etc.)
TROUBLE SYMPTOM:
- Call function cannot be used.
- RED LED illuminates.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>
- Except for HEV model



- HEV model



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A06 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**PERFORM THE SYSTEM OPERATION CHECK.** Perform [Speaker ON] in the system operation check mode. <Ref. to TEL(diag)-22, System Operation Check Mode.>	Does it sound?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the speaker connector and tweeter connector. 3) Disconnect the DCM connector. 4) Measure the resistance between speaker connector and tweeter connector and DCM connector. ***Connector & terminal*** ***(i271) No. 4 — (D12) No. 2:*** ***(i271) No. 4 — (i159) No. 1:*** ***(i271) No. 12 — (D12) No. 1:*** ***(i271) No. 12 — (i159) No. 3:***	Is the resistance 1 Ω or less?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i271) No. 4 — Chassis ground:*** ***(i271) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***(i271) No. 4 (+) — Chassis ground (–):*** ***(i271) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK SPEAKER.** Perform the inspection of speaker unit and tweeter unit. <Ref. to ET-32, Front Speaker.>	Are the speaker and tweeter OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the speaker and tweeter. <Ref. to ET-32, Front Speaker.>

R: DTC B2A07 BACKUP BATTERY CHARGE SYSTEM PERFORMANCE

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
Backup battery is disconnected for at least 5 seconds when the ignition switch is turned ON. (Detached back-up battery connection, etc.)
TROUBLE SYMPTOM:
- ACN/SOS function cannot be used when the main battery is disconnected.
- RED LED illuminates.

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A07 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK BACKUP BATTERY.** 1) Remove the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.> 2) Remove the backup battery cover. 3) Disconnect the backup battery connector. 4) Measure the backup battery voltage.	Is the voltage 2.0 V or more?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the backup battery. <Ref. to ET-45, DATA COMMUNICATION MODULE.>

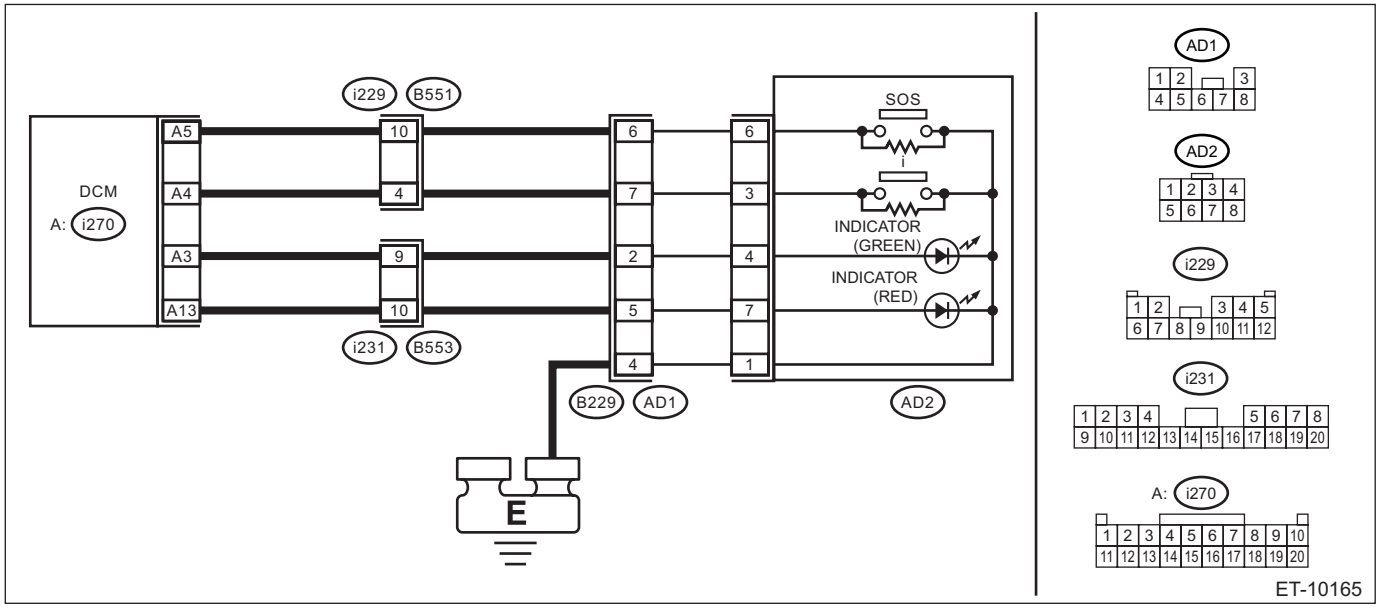
S: DTC B2A08 SOS BUTTON CIRCUIT

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
The following conditions occur for at least 50 ms.
- SOS button impedance is more than 10 kΩ.
- SOS button is stuck for at least 60 seconds.

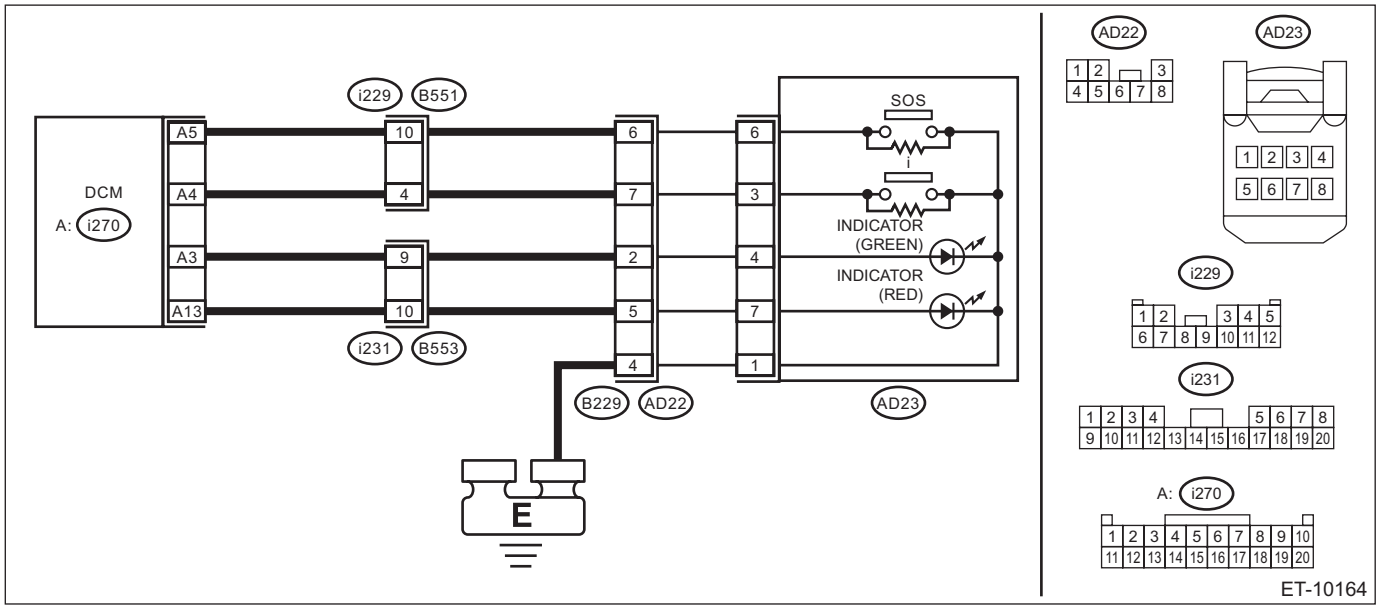
TROUBLE SYMPTOM:
- SOS function cannot be used.
- RED LED illuminates.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>
- Except for HEV model



- HEV model



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A08 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the telematics button connector. 3) Disconnect the DCM connector. 4) Measure the resistance between telematics button connector and DCM connector. ***Connector & terminal*** ***Except for HEV model*** ***(i270) No. 5 — (AD2) No. 6:*** ***(AD2) No. 1 — Chassis ground:*** ***HEV model*** ***(i270) No. 5 — (AD23) No. 6:*** ***(AD23) No. 1 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 5 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 5 (+) — Chassis ground (–):*** ***Except for HEV model*** ***(AD2) No. 1 (+) — Chassis ground (–):*** ***HEV model*** ***(AD23) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK SOS BUTTON UNIT.** Measure the resistance of the SOS button unit. ***Connector & terminal*** ***Except for HEV model*** ***(AD2) No. 6 — (AD2) No. 1*** ***HEV model*** ***(AD23) No. 6 — (AD23) No. 1***	Is the resistance 1 Ω or less when SOS button is ON, and 1.6 (±5%) kΩ or more when SOS button is OFF?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the telematics button. <Ref. to ET-38, Switches and Harness.>

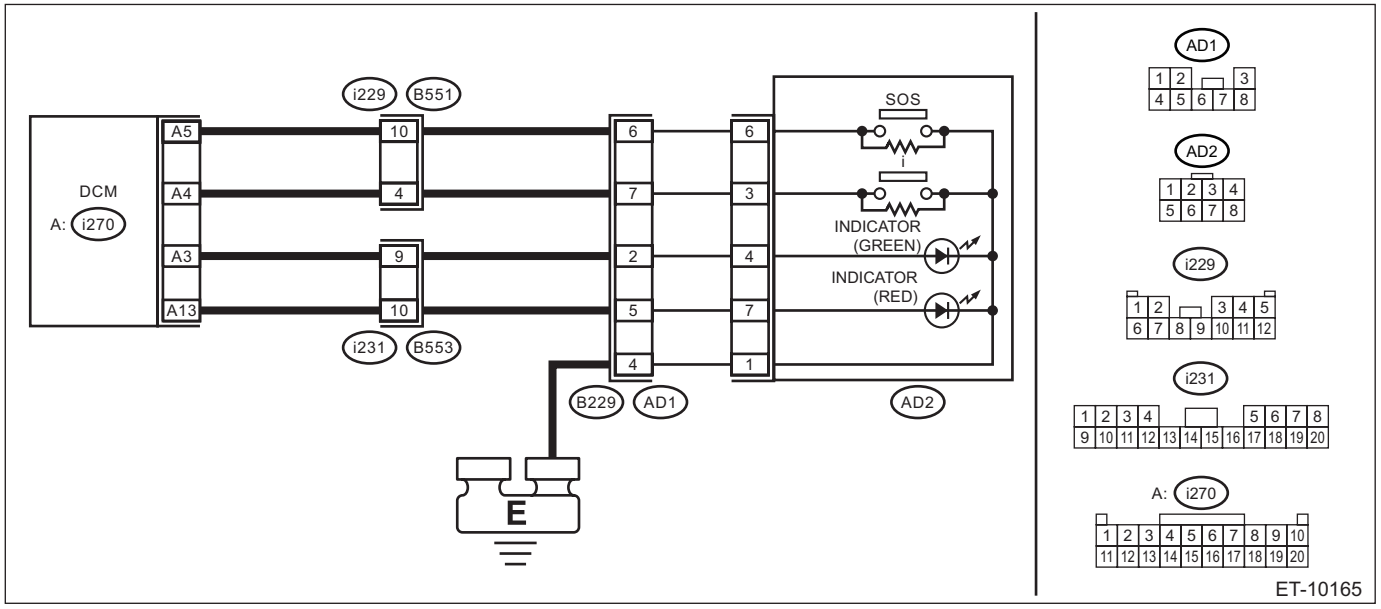
T: DTC B2A09 I-CALL BUTTON CIRCUIT

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
The following conditions occur for at least 50 ms.
- i-button impedance is more than 10 kΩ.
- i-button is stuck for at least 60 seconds.

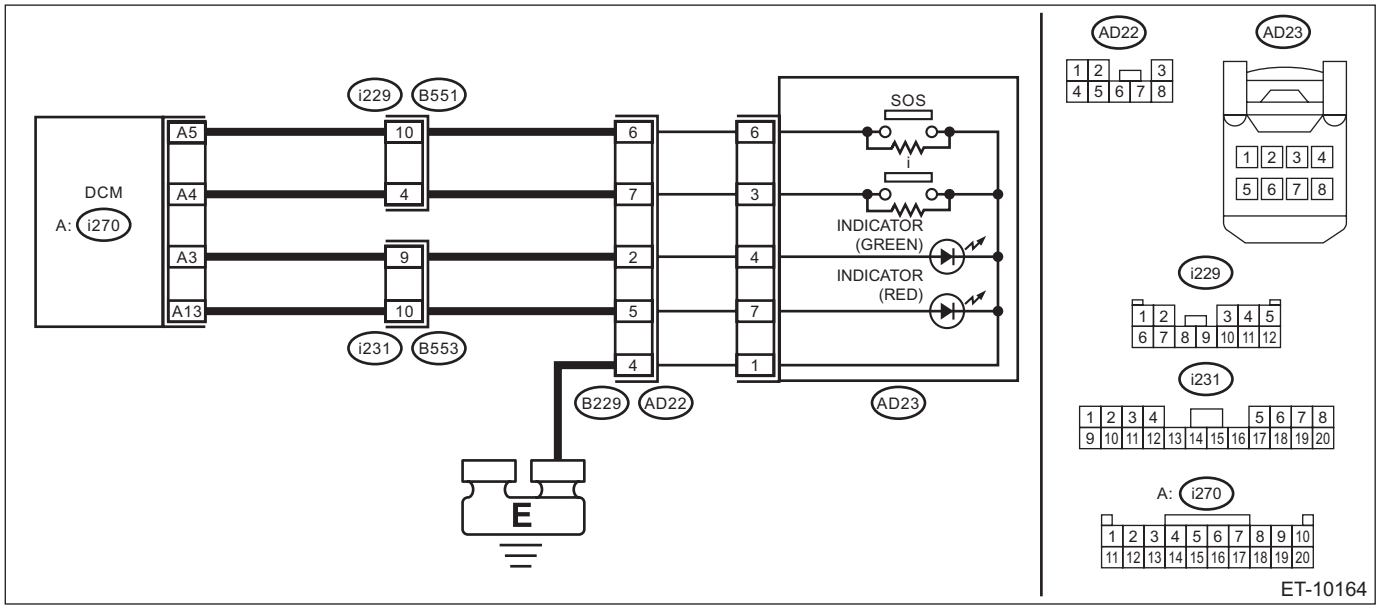
TROUBLE SYMPTOM:
- i-Call function cannot be used.
- RED LED illuminates.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>
- Except for HEV model



- HEV model



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

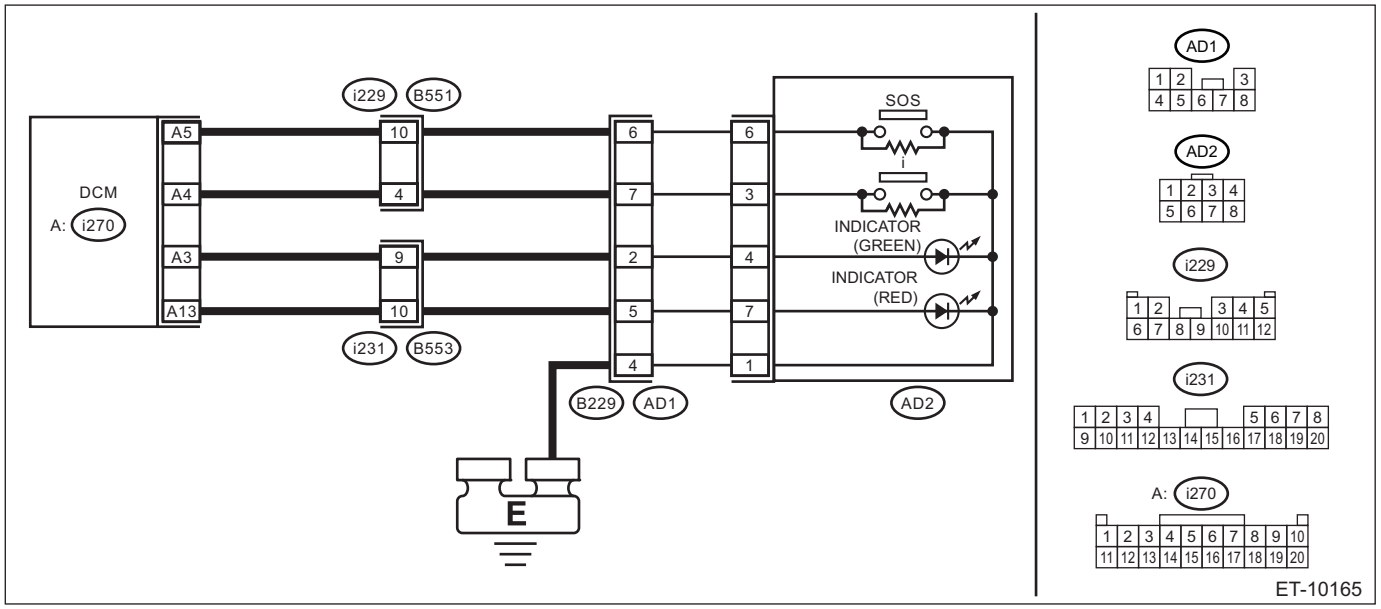
	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A09 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the telematics button connector. 3) Disconnect the DCM connector. 4) Measure the resistance between telematics button connector and DCM connector. ***Connector & terminal*** ***Except for HEV model*** ***(i270) No. 4 — (AD2) No. 3:*** ***(AD2) No. 1 — Chassis ground:*** ***HEV model*** ***(i270) No. 4 — (AD23) No. 3:*** ***(AD23) No. 1 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***Except for HEV model*** ***(i270) No. 4 (+) — Chassis ground (–):*** ***(AD2) No. 1 (+) — Chassis ground (–):*** ***HEV model*** ***(i270) No. 4 (+) — Chassis ground (–):*** ***(AD23) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK I-BUTTON.** Measure the resistance of the i-button unit. ***Connector & terminal*** ***Except for HEV model*** ***(AD2) No. 3 — (AD2) No. 1:*** ***HEV model*** ***(AD23) No. 3 — (AD23) No. 1:***	Is the resistance 1 Ω or less when i-button is ON, and 1.6 (±5%) kΩ or more when i-button is OFF?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the telematics button. <Ref. to ET-38, Switches and Harness.>

U: DTC B2A0A RED LED CIRCUIT

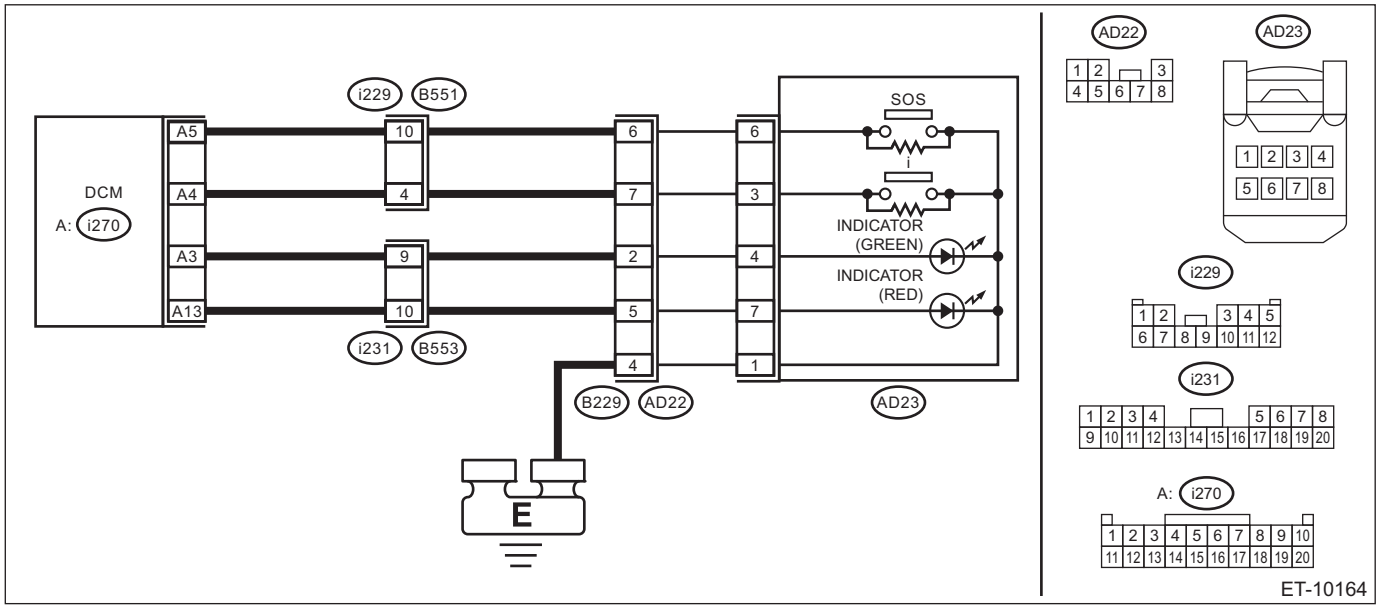
DIAGNOSIS START CONDITION:
When ACC is ON.
DTC DETECTING CONDITION:
The following conditions occur for at least 50 ms.
- Current in LED is less than 1 mA. (Improper LED connection, etc.)
- Current in LED is more than 200 mA. (Short-circuited LED, etc.)

TROUBLE SYMPTOM:
LED does not illuminate.
WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>
- Except for HEV model



- HEV model



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A0A displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**PERFORM THE SYSTEM OPERATION CHECK.** Perform [RED LED Lighting] in the system operation check mode. <Ref. to TEL(diag)-22, System Operation Check Mode.>	Does the RED LED illuminate?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the telematics button connector. 3) Disconnect the DCM connector. 4) Measure the resistance between telematics button connector and DCM connector. ***Connector & terminal*** ***Except for HEV model*** ***(i270) No. 13 — (AD2) No. 7:*** ***(AD2) No. 1 — Chassis ground:*** ***HEV model*** ***(i270) No. 13 — (AD23) No. 7:*** ***(AD23) No. 1 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 13 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.

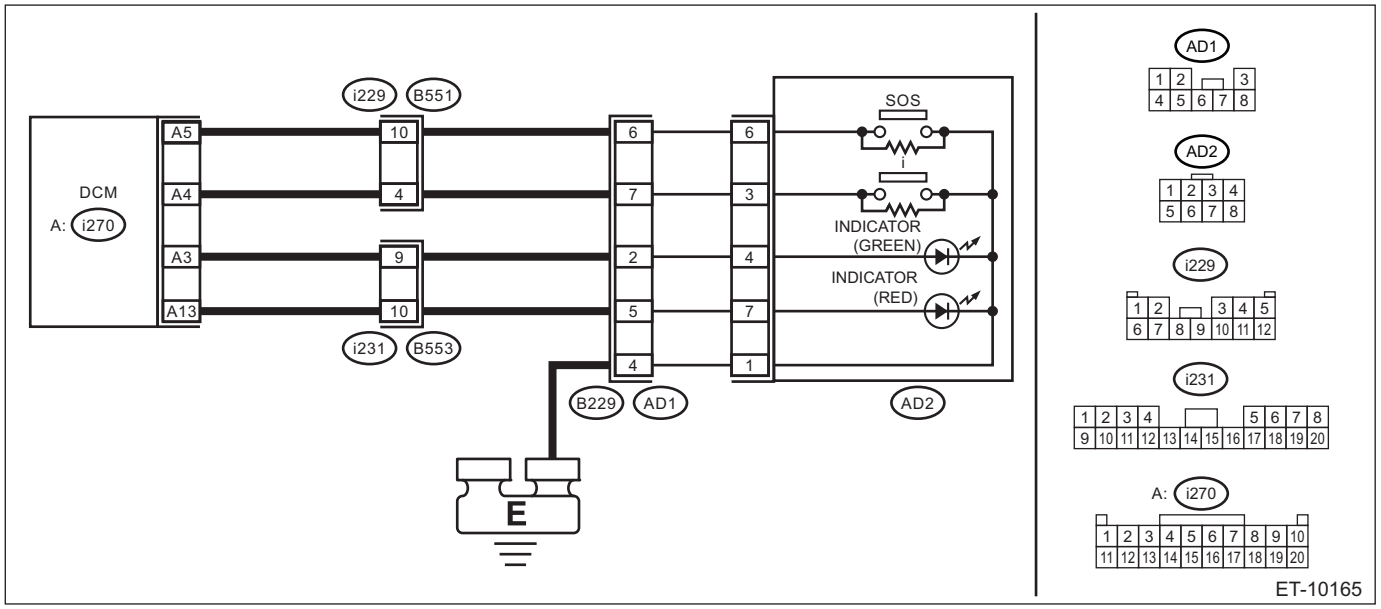
Step		Check	Yes	No
5	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***Except for HEV model*** ***(i270) No. 13 (+) — Chassis ground (–):*** ***(AD2) No. 1 (+) — Chassis ground (–):*** ***HEV model*** ***(i270) No. 13 (+) — Chassis ground (–):*** ***(AD23) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK TELEMATICS BUTTON (LED) UNIT.** Measure the resistance of the telematics button (LED) unit. ***Connector & terminal*** ***Except for HEV model*** ***(AD2) No. 7 — (AD2) No. 1:*** ***HEV model*** ***(AD23) No. 7 — (AD23) No. 1:***	Is there continuity?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the telematics button. <Ref. to ET-38, Switches and Harness.>

V: DTC B2A0B GREEN LED CIRCUIT

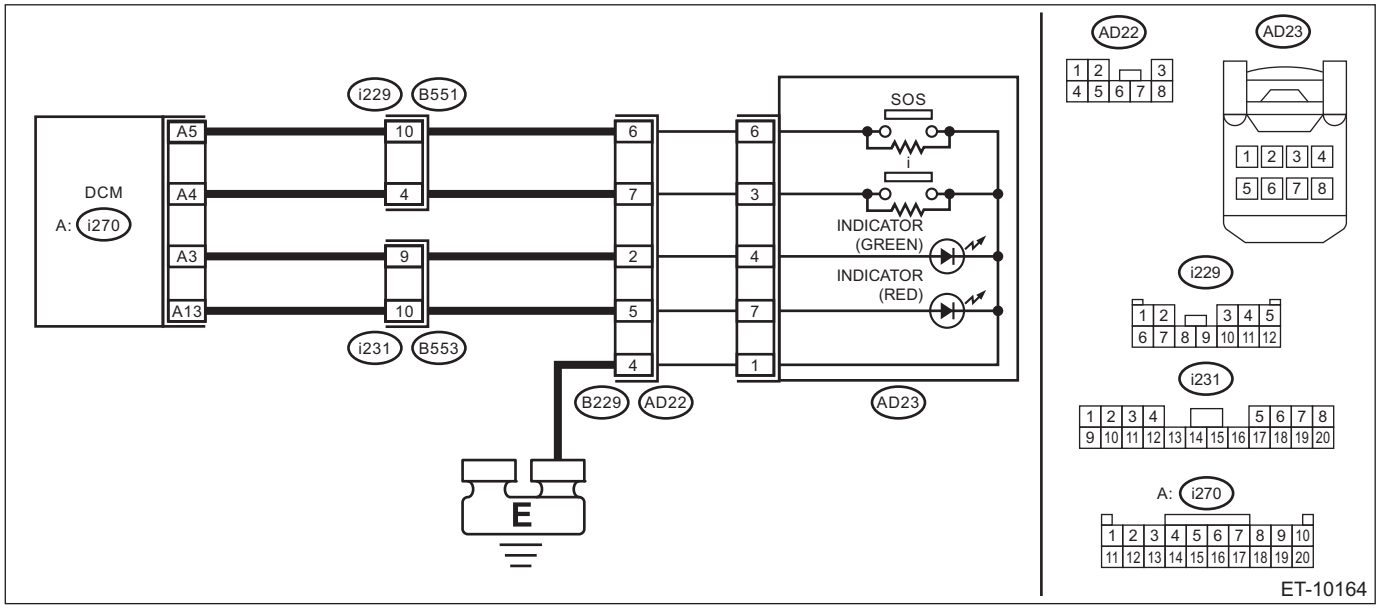
DIAGNOSIS START CONDITION:
When ACC is ON.
DTC DETECTING CONDITION:
The following conditions occur for at least 50 ms.
- Current in LED is less than 1 mA. (Improper LED connection, etc.)
- Current in LED is more than 200 mA. (Short-circuited LED, etc.)

TROUBLE SYMPTOM:
RED LED illuminates.
WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>
- Except for HEV model



- HEV model



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A0B displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**PERFORM THE SYSTEM OPERATION CHECK.** Perform [GREEN LED Lighting] in the system operation check mode. <Ref. to TEL(diag)-22, System Operation Check Mode.>	Does the GREEN LED illuminate?	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the telematics button connector. 3) Disconnect the DCM connector. 4) Measure the resistance between telematics button connector and DCM connector. ***Connector & terminal*** ***Except for HEV model*** ***(i270) No. 3 — (AD2) No. 4:*** ***(AD2) No. 1 — Chassis ground:*** ***HEV model*** ***(i270) No. 3 — (AD23) No. 4:*** ***(AD23) No. 1 — Chassis ground:***	Is the resistance 1 Ω or less?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 3 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.

	Step	Check	Yes	No
5	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***Except for HEV model*** ***(i270) No. 3 (+) — Chassis ground (–):*** ***(AD2) No. 1 (+) — Chassis ground (–):*** ***HEV model*** ***(i270) No. 3 (+) — Chassis ground (–):*** ***(AD23) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair or replace the short circuit of the harness.
6	**CHECK TELEMATICS BUTTON (LED) UNIT.** Measure the resistance of the telematics button (LED) unit. ***Connector & terminal*** ***Except for HEV model*** ***(AD2) No. 4 — (AD2) No. 1:*** ***HEV model*** ***(AD23) No. 4 — (AD23) No. 1:***	Is there continuity?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the telematics button. <Ref. to ET-38, Switches and Harness.>

W: DTC B2A0C DCM INTERNAL FAULT

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
- Main microcomputer and communication circuit IC cannot communicate. (Defective IPC)
- SIM (communication chip) cannot be read. (Defective SIM)

TROUBLE SYMPTOM:
- Telematics function cannot be used.
- RED LED illuminates.

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

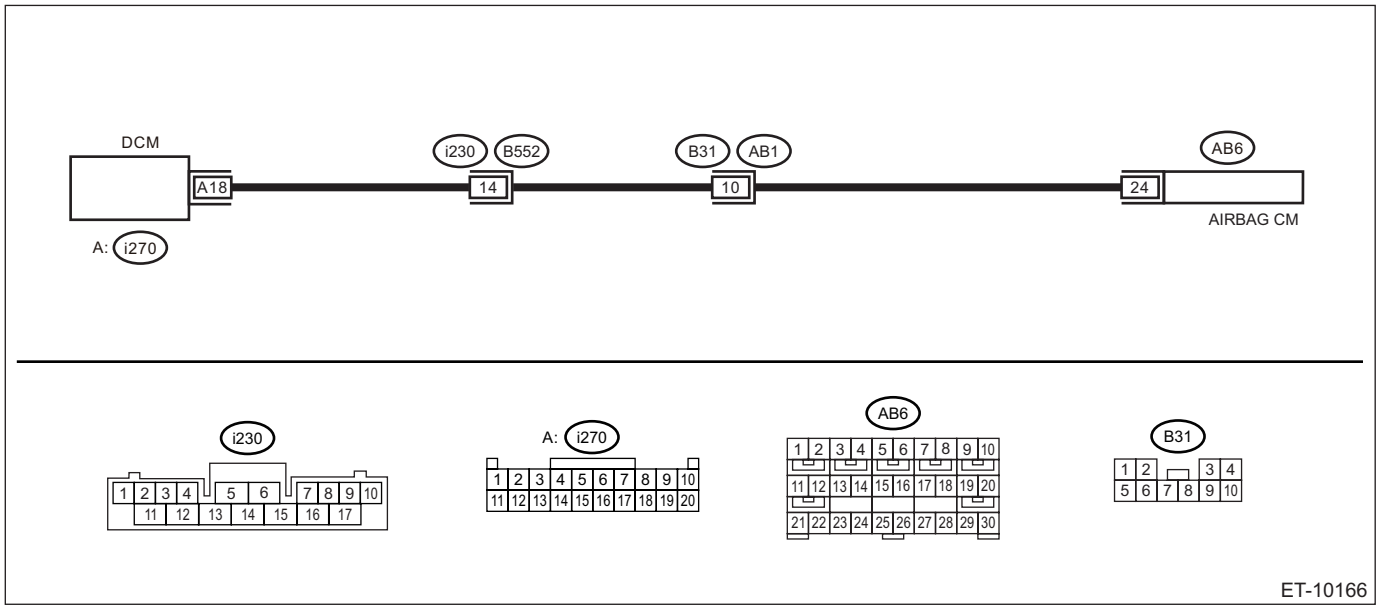
	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A0C displayed? (Current malfunction)	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

X: DTC B2A0D AIRBAG SIGNAL

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
Either the regular signal or collision signal cannot be detected from the airbag CM for at least 2 seconds.
TROUBLE SYMPTOM:
- ACN function does not operate.
- RED LED illuminates.

WIRING DIAGRAM:

NOTE:
For the coupling connector, refer to “WIRING SYSTEM”.
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>



CAUTION:
• CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>
• Before performing diagnosis, refer to “CAUTION” in “General Description” in AIRBAG SYSTEM. <Ref. to AB-11, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A0D displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK DTC.** Read DTC of the airbag. <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed? (Current malfunction)	Perform the diagnosis according to DTC.	Go to step **3**.

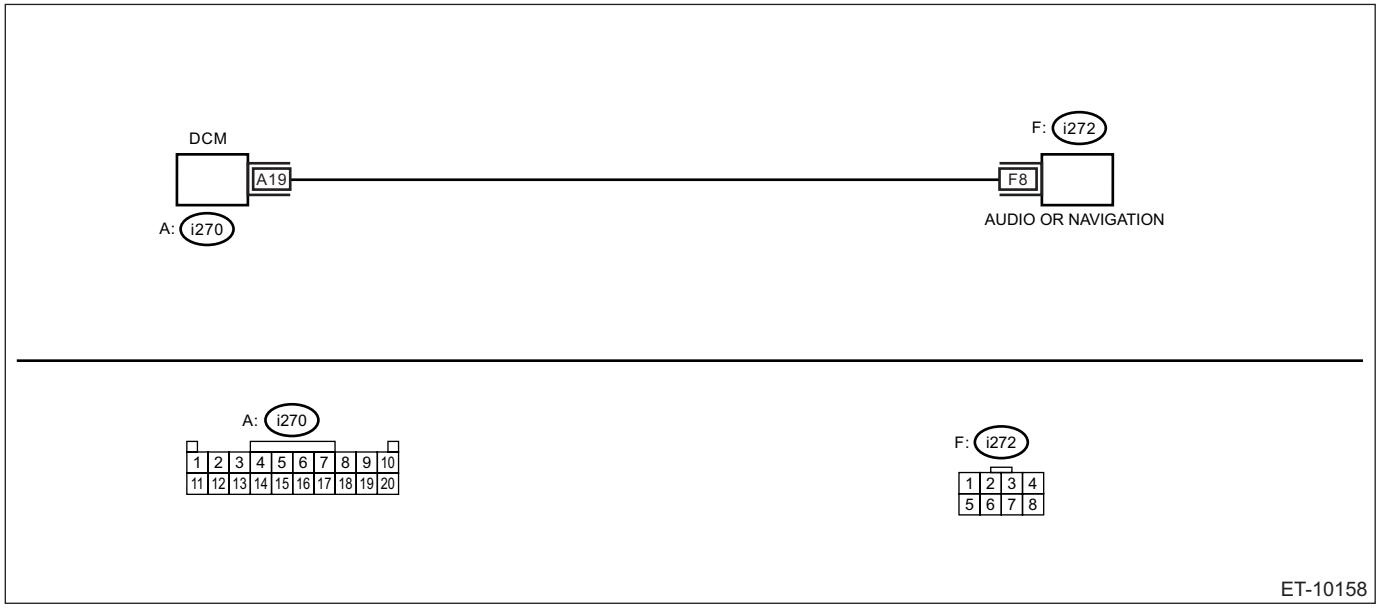
	Step	Check	Yes	No
3	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF, disconnect the battery ground cable, and wait for 60 seconds or more. NOTE: For HEV model, disconnect the negative terminal from 12 volt auxiliary battery, and disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery. <Ref. to NT-6, BATTERY, NOTE, Note.> 2) Disconnect the airbag CM connector. 3) Disconnect the DCM connector. 4) Measure the resistance between airbag CM connector and DCM connector. **CAUTION:** **To measure the voltage and resistance of airbag system component, be sure to use the specified test harness. <Ref. to AB(diag)-4, General Description.>** ***Connector & terminal*** ***(i270) No. 18 — (AB6) No. 24:***	Is the resistance 1 Ω or less?	Go to step **4**.	Repair or replace the open circuit of harness.
4	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 18 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair or replace the short circuit of the harness.
5	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 18 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Repair or replace the short circuit of the harness.

Y: DTC B2A0E MUTE LINE CIRCUIT

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
The following conditions occur continuously after the ignition switch is turned to ON when DCM does not mute the audio or navigation system.
- Current in the mute line is less than 1 mA. (Improper line connection, etc.)
- Current is more than 50 mA for at least 50 ms. (Short-circuited line, etc.)

TROUBLE SYMPTOM:
- The mute function of audio or navigation system does not operate.
- RED LED illuminates.

WIRING DIAGRAM:
Telematics <Ref. to WI(w/o HEV)-226, WIRING DIAGRAM, TELEMATICS SYSTEM.>



CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A0E displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

	Step	Check	Yes	No
2	**CHECK HARNESS (OPEN CIRCUIT).** 1) Turn the ignition switch to OFF. 2) Disconnect the audio or navigation connector. 3) Disconnect the DCM connector. 4) Measure the resistance between audio or navigation connector and DCM connector. ***Connector & terminal*** ***(i270) No. 19 — (i272) No. 8:***	Is the resistance 1 Ω or less?	Go to step **3**.	Repair or replace the open circuit of harness.
3	**CHECK HARNESS (GROUND SHORT CIRCUIT).** Measure the resistance between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 19 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair or replace the short circuit of the harness.
4	**CHECK CONNECTOR (SHORT CIRCUIT TO POWER SUPPLY).** Measure the voltage between DCM connector and chassis ground. ***Connector & terminal*** ***(i270) No. 19 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Repair or replace the short circuit of the harness.

Z: DTC B2A0F BACKUP BATTERY DEGRADATION

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
- Backup battery voltage of charger is low.
- Charging attempt of 2 V or more fails after the backup battery has been charged for 1 hour continuously.
- Full charging is not achieved after the backup battery is charged for 7 hours in total (not continuously).

TROUBLE SYMPTOM:
RED LED illuminates.

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A0F displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK THE BACKUP BATTERY.** Check the backup battery unit. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Is the backup battery OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the backup battery. <Ref. to ET-45, DATA COMMUNICATION MODULE.>

AA:DTC B2A10 BATTERY VOLTAGE HIGH

DIAGNOSIS START CONDITION:
When ignition switch is ON.
DTC DETECTING CONDITION:
DCM battery power supply input of 16 V or more continues for 5 seconds.
TROUBLE SYMPTOM:
RED LED illuminates.

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A10 displayed? (Current malfunction)	Go to step **2**.	Even if DTC is displayed, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK CURRENT DATA.** Check «Battery Voltage» in «Data monitor». <Ref. to TEL(diag)-13, Read Current Data.>	Is «Battery Voltage» OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Go to step **3**.
3	**CHECK BATTERY.** Check the battery unit. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.> <Ref. to SC(H4DO(HEV))-2, SPECIFICATION, General Description.>	Is the battery OK?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the battery. <Ref. to SC(H4DO(w/o HEV))-52, Battery.> <Ref. to SC(H4DO(HEV))-2, General Description.>

13.Diagnostics with Phenomenon

A: LIST

No.	Symptoms	Reference
1	The system does not notify the Telematics Service Provider Center automatically after collision.	<Ref. to TEL(diag)-58, THE SYSTEM DOES NOT NOTIFY THE TELEMATICS SERVICE PROVIDER CENTER AUTOMATICALLY AFTER COLLISION, INSPECTION, Diagnostics with Phenomenon.>
2	The system does not notify the center even if the SOS button is pressed.	<Ref. to TEL(diag)-60, THE SYSTEM DOES NOT NOTIFY THE CENTER EVEN IF THE SOS BUTTON IS PRESSED, INSPECTION, Diagnostics with Phenomenon.>
3	The system places an SOS call unintentionally during driving.	<Ref. to TEL(diag)-61, THE SYSTEM PLACES AN SOS CALL UNINTENTIONALLY DURING DRIVING, INSPECTION, Diagnostics with Phenomenon.>
4	The system places an I-CALL unintentionally during driving.	<Ref. to TEL(diag)-61, THE SYSTEM PLACES AN I-CALL UNINTENTIONALLY DURING DRIVING, INSPECTION, Diagnostics with Phenomenon.>
5	The system does not notify the center even if the i-button is pressed upon vehicle malfunction.	<Ref. to TEL(diag)-61, THE SYSTEM DOES NOT NOTIFY THE CENTER EVEN IF THE I-BUTTON IS PRESSED UPON VEHICLE MALFUNCTION, INSPECTION, Diagnostics with Phenomenon.>
6	Remote Vehicle Locator cannot locate the vehicle.	<Ref. to TEL(diag)-63, REMOTE VEHICLE LOCATOR CANNOT LOCATE THE VEHICLE, INSPECTION, Diagnostics with Phenomenon.>
7	Remote Vehicle Locator indicates an incorrect location and therefore the vehicle cannot be located.	<Ref. to TEL(diag)-64, REMOTE VEHICLE LOCATOR INDICATES AN INCORRECT LOCATION FOR THE VEHICLE, INSPECTION, Diagnostics with Phenomenon.>
8	Remote Door Lock does not lock the doors of the vehicle.	<Ref. to TEL(diag)-64, REMOTE DOOR LOCK DOES NOT LOCK THE DOORS OF THE VEHICLE, INSPECTION, Diagnostics with Phenomenon.>
9	The doors lock unintentionally.	<Ref. to TEL(diag)-66, THE DOORS LOCK UNINTENTIONALLY, INSPECTION, Diagnostics with Phenomenon.>
10	The doors unlock unintentionally.	<Ref. to TEL(diag)-66, THE DOORS UNLOCK UNINTENTIONALLY, INSPECTION, Diagnostics with Phenomenon.>
11	Remote Horn & HAZARD Lights do not operate upon request.	<Ref. to TEL(diag)-67, REMOTE HORN & HAZARD LIGHTS DO NOT OPERATE UPON REQUEST, INSPECTION, Diagnostics with Phenomenon.>
12	When the Vehicle Security Alarm is activated, notification is not sent.	<Ref. to TEL(diag)-69, WHEN THE VEHICLE SECURITY ALARM IS ACTIVATED, NOTIFICATION IS NOT SENT, INSPECTION, Diagnostics with Phenomenon.>
13	When a Malfunction indicator light/warning light is lit, notification is not sent.	<Ref. to TEL(diag)-70, WHEN A MALFUNCTION INDICATOR LIGHT/WARNING LIGHT IS LIT, NOTIFICATION IS NOT SENT, INSPECTION, Diagnostics with Phenomenon.>
14	Maintenance Notifications are not sent.	<Ref. to TEL(diag)-71, MAINTENANCE NOTIFICATIONS ARE NOT SENT, INSPECTION, Diagnostics with Phenomenon.>
15	The LED does not display the status. (LED malfunction)	<Ref. to TEL(diag)-72, THE LED DOES NOT DISPLAY THE STATUS. (LED MALFUNCTION), INSPECTION, Diagnostics with Phenomenon.>
16	Phone conversation is not possible. (The microphone does not respond to a voice. No sound is heard from the speaker.)	<Ref. to TEL(diag)-74, PHONE CONVERSATION IS NOT POSSIBLE. (THE MICROPHONE DOES NOT RESPOND TO A VOICE. NO SOUND IS HEARD FROM THE SPEAKER.), INSPECTION, Diagnostics with Phenomenon.>

B: INSPECTION

1. THE SYSTEM DOES NOT NOTIFY THE TELEMATICS SERVICE PROVIDER CENTER AUTOMATICALLY AFTER COLLISION

NOTE:
Perform the diagnostics for "Phone conversation is not possible. (The microphone does not respond to a voice. No sound is heard from the speaker.)". <Ref. to TEL(diag)-74, PHONE CONVERSATION IS NOT POSSIBLE. (THE MICROPHONE DOES NOT RESPOND TO A VOICE. NO SOUND IS HEARD FROM THE SPEAKER.), INSPECTION, Diagnostics with Phenomenon.>

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK COLLISION TYPE.** Check the collision type of the vehicle.	Is it any of a head-on collision, rear-end collision, or rollover?	Go to step **2**.	If it is a rear-end collision, Go to step **4**.
2	**CHECK AIRBAG WARNING LIGHT.** Check the airbag warning light.	Does the airbag warning light always illuminate?	Go to step **3**.	The airbag system is normal. If it is a minor collision, the airbag CM does not transmit a collision detection signal. Therefore, it is normal that the automatic notification function does not operate.
3	**CHECK DTCS.** Read DTC of the airbag. <Ref. to AB(diag)-27, Read Diagnostic Trouble Code (DTC).>	Is DTC any of «Front Impact Deployment»«Side Impact Deployment»«Rollover Deployment History»?	The airbag system is normal. Go to step **7**.	Perform the diagnosis of the airbag system. <Ref. to AB(diag)-2, Basic Diagnostic Procedure.>
4	**CHECK RECEPTION STATUS OF COLLISION DETECTION SIGNAL.** Display the current data «TimeStamp at ACN Event» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Are the time stamps recorded?	Go to step **7**. (A rear-end collision was detected.)	Go to step **5**.
5	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>	Go to step **6**.
6	**CHECK AIRBAG WARNING LIGHT.** Check the airbag warning light.	Does the airbag warning light always illuminate?	Perform the diagnosis of the airbag system. <Ref. to AB(diag)-2, Basic Diagnostic Procedure.>	The airbag system is normal. If it is a minor collision, the airbag CM does not transmit a collision detection signal. Therefore, it is normal that the automatic notification function does not operate.

	Step	Check	Yes	No
7	**CHECK SUBSCRIPTION STATUS.** Display the current data «ACN Active» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data «TRUE»?	Go to step **8**.	The user does not have a service subscription; therefore, it is not a failure.
8	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>	Go to step **9**.
9	**CHECK RECEIVED SIGNAL STRENGTH AT TIME OF ACCIDENT (CHECK CURRENT DATA).** Display the current data «RSSI at ACN Event» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data 26% or more?	Go to step **11**.	Go to step **10**.
10	**CHECK AT&T CELLULAR COVERAGE AREA.** 1) Check whether the collision occurred within the cellular coverage area. 2) Display the current data «GPS Data at ACN Event» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the displayed location data indicated within the AT&T cellular coverage area? (For the AT&T cellular coverage area, refer to the AT&T website. The system operates only on 3G and 4G technology.)	Go to step **11**.	The collision occurred outside the cellular coverage area.
11	**CHECK COMMUNICATION STATUS AT TIME OF ACCIDENT (CHECK CURRENT DATA).** Display the current data «Call Status at ACN Event» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	If the data shows «Call Started» or «Call Connected»; Go to A. If the data shows «Call Not Started»; Go to B. If the data shows «No Network Service»; Go to C. If the data shows «Call Ended by SXM»; Go to D.	A: Go to step **12**. B: Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.> C: Replace the antenna. <Ref. to ET-35, Antenna.> D: The connection ended due to a server-side reason; therefore, there is no failure on the vehicle.	—
12	**CHECK TIME OF ACCIDENT (CHECK CURRENT DATA).** Display the current data «TimeStamp at ACN Event» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.> NOTE: The time stamp is displayed in the Coordinated Universal Time (UTC), which is different from actual time at each location. Therefore, time difference needs to be corrected for use. Example: [12/22 01:30 in UTC time] is corrected as [12/21 20:30 in New York time].	Does the time of the accident match with the data?	Replace the antenna. <Ref. to ET-35, Antenna.>	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>

2. THE SYSTEM DOES NOT NOTIFY THE CENTER EVEN IF THE SOS BUTTON IS PRESSED

NOTE:
Perform the diagnostics for "Phone conversation is not possible. (The microphone does not respond to a voice. No sound is heard from the speaker.)". <Ref. to TEL(diag)-74, PHONE CONVERSATION IS NOT POSSIBLE. (THE MICROPHONE DOES NOT RESPOND TO A VOICE. NO SOUND IS HEARD FROM THE SPEAKER.), INSPECTION, Diagnostics with Phenomenon.>

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «SOS Active» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure.
2	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK RECEIVED SIGNAL STRENGTH WHEN SOS BUTTON WAS PRESSED (CHECK CURRENT DATA).** Display the current data «RSSI at SOS/ICALL(1)» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data 26% or more?	Go to step **5**.	Go to step **4**.
4	**CHECK AT&T CELLULAR COVERAGE AREA.** 1) Check whether the SOS button was pressed within the cellular coverage area. 2) Display the current data «GPS Data at Time of Button Push(1)» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the displayed location data indicated within the AT&T cellular coverage area? (For the AT&T cellular coverage area, refer to the AT&T website. The system operates only on 3G and 4G technology.)	Go to step **5**.	The SOS button was pressed outside the cellular coverage area.
5	**CHECK COMMUNICATION STATUS OF WHEN SOS BUTTON WAS PRESSED (CHECK CURRENT DATA).** Display the current data «Call status at SOS/ICALL Event(1)» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	If the data shows «Call Started» or «Call Connected»; Go to A. If the data shows «Call Not Started»; Go to B. If the data shows «No Network Service»; Go to C. If the data shows «Call Ended by SXM»; Go to D.	A: Go to step **6**. B: Go to step **7**. C: Replace the antenna. <Ref. to ET-35, Antenna.> D: The connection ended due to a server-side reason; therefore, there is no failure on the vehicle.	—
6	**CHECK TIME OF WHEN SOS BUTTON WAS PRESSED (CHECK CURRENT DATA).** Display the current data «Timestamp at Time of Button Push(1)» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.> NOTE: The time stamp is displayed in the Coordinated Universal Time (UTC), which is different from actual time at each location. Therefore, time difference needs to be corrected for use. Example: [12/22 01:30 in UTC time] is corrected as [12/21 20:30 in New York time].	Does the time of the SOS button operation match with the data?	Go to step **7**.	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>

	Step	Check	Yes	No
7	**CHECK SOS BUTTON.** Check the SOS button. <Ref. to TEL(diag)-40, DTC B2A08 SOS BUTTON CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is there any fault?	Replace the SOS button. <Ref. to ET-38, Switches and Harness.>	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>

3. THE SYSTEM PLACES AN SOS CALL UNINTENTIONALLY DURING DRIVING

	Step	Check	Yes	No
1	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Check the SOS button. <Ref. to ET-38, Switches and Harness.>

4. THE SYSTEM PLACES AN I-CALL UNINTENTIONALLY DURING DRIVING

	Step	Check	Yes	No
1	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Check the i-button. <Ref. to ET-38, Switches and Harness.>

5. THE SYSTEM DOES NOT NOTIFY THE CENTER EVEN IF THE I-BUTTON IS PRESSED UPON VEHICLE MALFUNCTION

NOTE:
Perform the diagnostics for "Phone conversation is not possible. (The microphone does not respond to a voice. No sound is heard from the speaker.)".

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «ICALL Active» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure.
2	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK RECEIVED SIGNAL STRENGTH WHEN I-BUTTON WAS PRESSED (CHECK CURRENT DATA).** Display the current data «RSSI at SOS/ICALL(1)» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data 26% or more?	Go to step **5**.	Go to step **4**.
4	**CHECK AT&T CELLULAR COVERAGE AREA.** 1) Check whether the i-button was pressed within the cellular coverage area. 2) Display the current data «GPS Data at Time of Button Push(1)» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the displayed location data indicated within the AT&T cellular coverage area? (For the AT&T cellular coverage area, refer to the AT&T website. The system operates only on 3G and 4G technology.)	Go to step **5**.	The i-button was pressed outside the cellular coverage area.

	Step	Check	Yes	No
5	**CHECK COMMUNICATION STATUS OF WHEN I-BUTTON WAS PRESSED (CHECK CURRENT DATA).** Display the current data «Call status at SOS/ICALL Event(1)» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	If the data shows «Call Started» or «Call Connected»; Go to A. If the data shows «Call Not Started»; Go to B. If the data shows «No Network Service»; Go to C. If the data shows «Call Ended by SXM»; Go to D.	A: Go to step **6**. B: Go to step **7**. C: Replace the antenna. <Ref. to ET-35, Antenna.> D: The connection ended due to a server-side reason; therefore, there is no failure on the vehicle.	—
6	**CHECK COMMUNICATION STATUS OF WHEN I-BUTTON WAS PRESSED (CHECK CURRENT DATA).** Display the current data «Timestamp at Time of Button Push(1)» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.> NOTE: The time stamp is displayed in the Coordinated Universal Time (UTC), which is different from actual time at each location. Therefore, time difference needs to be corrected for use. Example: [12/22 01:30 in UTC time] is corrected as [12/21 20:30 in New York time].	Does the time of the i-button operation match with the data?	Go to step **7**.	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>
7	**CHECK I-BUTTON.** Check the i-button. <Ref. to TEL(diag)-42, DTC B2A09 I-CALL BUTTON CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is there any fault?	Replace the i-button. <Ref. to ET-38, Switches and Harness.>	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>

6. REMOTE VEHICLE LOCATOR CANNOT LOCATE THE VEHICLE

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «Account Status» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure.
2	**CHECK CURRENT COMMUNICATION ENVIRONMENT OF USER'S SMARTPHONE.** Check that the user's smartphone can be connected to the Internet.	Can it be connected to the Internet?	Go to step **3**.	The user's smartphone or the Internet environment has a problem.
3	**CHECK CURRENT COMMUNICATION ENVIRONMENT OF USER'S SMARTPHONE.** Check that the user's smartphone can display the current location.	Is the current location displayed?	Currently no failure is found. If the current location is not displayed, the user's Internet environment (radio waves, etc.) possibly had a problem.	Go to step **4**.
4	**CHECK CURRENT RECEIVED SIGNAL STRENGTH (CHECK CURRENT DATA).** Display the current data «Signal Strength» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data 26% or more?	Go to step **6**.	Go to step **5**.
5	**CHECK AT&T CELLULAR COVERAGE AREA.** Ask the user where he/she operated the remote control.	Is the location of the remote control operation within the AT&T cellular coverage area? (For the AT&T cellular coverage area, refer to the AT&T website. The system operates only on 3G and 4G technology.)	Go to step **6**.	The location of the remote control operation was outside the cellular coverage area.
6	**CHECK DTCS.** Check DTCs in the following systems; • Body control <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).> • Telematics <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to BC(diag)-25, LIST, List of Diagnostic Trouble Code (DTC).> <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>	Check the Starlink Server report to verify that there was no server outage that coincides with the day/time the customer reported that the issue occurred. (Refer to STARLINK Server Maintenance/Down Report under Reports and Starlink section in Subarunet.) If no outage exists for that time frame, it is possible that there was environmental interference (radio waves, etc.) when the user performed the operation. No further actions are recommended.

7. REMOTE VEHICLE LOCATOR INDICATES AN INCORRECT LOCATION FOR THE VEHICLE

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK CURRENT COMMUNICATION ENVIRONMENT OF USER'S SMARTPHONE.** Check that the user's smartphone can display the current location.	Is it displayed correctly? (Is there a deviation of 100 m (328 ft) or more?)	Currently no failure is found. When the user had a problem, there was a failure with the GPS antenna reception environment, etc.	Go to step **3**.
3	**CHECK CURRENT COMMUNICATION ENVIRONMENT OF USER'S SMARTPHONE.** Check again that the user's smartphone can display the current location in a place where the sky is open.	Is it displayed correctly? (Is there a deviation of 100 m (328 ft) or more?)	Currently no failure is found. When the user had a problem, there was a failure with the GPS antenna reception environment, etc.	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>

8. REMOTE DOOR LOCK DOES NOT LOCK THE DOORS OF THE VEHICLE

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «Account Status» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure.
2	**CHECK CURRENT COMMUNICATION ENVIRONMENT OF USER'S SMARTPHONE.** Check that the user's smartphone can be connected to the Internet.	Can it be connected to the Internet?	Go to step **3**.	The user's smartphone or the Internet environment has a problem.
3	**CHECK DOOR LOCK FUNCTION.** Check that the user' smartphone can lock the doors in the current situation.	Are the doors locked?	Currently no failure is found. When the user had a problem, there was a failure with the Internet connection environment, etc.	Go to step **4**.
4	**CHECK CURRENT RECEIVED SIGNAL STRENGTH (CHECK CURRENT DATA).** Display the current data «Signal Strength» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data 26% or more?	Go to step **6**.	Go to step **5**.
5	**CHECK AT&T CELLULAR COVERAGE AREA.** Ask the user where he/she operated the remote control.	Is the location of the remote control operation within the AT&T cellular coverage area? (For the AT&T cellular coverage area, refer to the AT&T website. The system operates only on 3G and 4G technology.)	Go to step **6**.	The location of the remote control operation was outside the cellular coverage area.

	Step	Check	Yes	No
6	**CHECK DOOR LOCK FUNCTION.** Check that the keyless transmitter can lock the doors of the vehicle.	Are the doors locked?	Go to step **7**.	Perform the diagnosis according to the inspection for the door lock control system. <Ref. to SL-12, INSPECTION, Door Lock Control System.>
7	**CHECK DTCS.** Check DTCs in the following systems; • Body control <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).> • Telematics <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to BC(diag)-25, LIST, List of Diagnostic Trouble Code (DTC).> <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>	Check the Starlink Server report to verify that there was no server outage that coincides with the day/time the customer reported that the issue occurred. (Refer to STARLINK Server Maintenance/Down Report under Reports and Starlink section in Subarunet.) If no outage exists for that time frame, it is possible that there was environmental interference (radio waves, etc.) when the user performed the operation. No further actions are recommended.

9. THE DOORS LOCK UNINTENTIONALLY

	Step	Check	Yes	No
1	**CHECK DOOR LOCK SWITCH.** Check the door lock switch. <Ref. to SL-12, INSPECTION, Door Lock Control System.>	Is the door lock switch OK?	Check the Starlink Server report to verify that there was no server outage that coincides with the day/time the customer reported that the issue occurred. (Refer to STARLINK Server Maintenance/Down Report under Reports and Starlink section in Subarunet.) If no outage exists for that time frame, it is possible that there was environmental interference (radio waves, etc.) when the user performed the operation. No further actions are recommended.	Perform the diagnosis according to the inspection for the door lock switch. <Ref. to SL-12, INSPECTION, Door Lock Control System.>

10.THE DOORS UNLOCK UNINTENTIONALLY

	Step	Check	Yes	No
1	**CHECK DOOR LOCK SWITCH.** Check the door unlock switch. <Ref. to SL-12, INSPECTION, Door Lock Control System.>	Is the door lock switch OK?	Check the Starlink Server report to verify that there was no server outage that coincides with the day/time the customer reported that the issue occurred. (Refer to STARLINK Server Maintenance/Down Report under Reports and Starlink section in Subarunet.) If no outage exists for that time frame, it is possible that there was environmental interference (radio waves, etc.) when the user performed the operation. No further actions are recommended.	Perform the diagnosis according to the inspection for the door lock switch. <Ref. to SL-12, INSPECTION, Door Lock Control System.>

11.REMOTE HORN & HAZARD LIGHTS DO NOT OPERATE UPON REQUEST

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «Account Status» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Does the data display «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure.
2	**CHECK CURRENT COMMUNICATION ENVIRONMENT OF USER'S SMARTPHONE.** Check that the user's smartphone can be connected to the Internet.	Can it be connected to the Internet?	Go to step **3**.	The user's smartphone or the Internet environment has a problem.
3	**CHECK HORN AND HAZARD LIGHT FUNCTIONS.** Check that the horn and hazard light currently operate by the user's smartphone.	Do the horn and hazard light operate?	Currently no failure is found. When the user had a problem, there was a failure with the Internet connection environment, etc.	Go to step **4**.
4	**CHECK CURRENT RECEIVED SIGNAL STRENGTH (CHECK CURRENT DATA).** Display the current data «Signal Strength» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Does the data indicate 26% or more?	Go to step **6**.	Go to step **5**.
5	**CHECK AT&T CELLULAR COVERAGE AREA.** Ask the user where he/she operated the remote control.	Is the location of the remote control operation within the AT&T cellular coverage area? (For the AT&T cellular coverage area, refer to the AT&T website. The system operates only on 3G and 4G technology.)	Go to step **6**.	The location of the remote control operation was outside the cellular coverage area.
6	**CHECK HORN AND HAZARD LIGHT FUNCTIONS.** Check that the horn and hazard light operate by the keyless transmitter. (Press the lock button three times.)	Do the horn and hazard light operate?	Go to step **8**.	Go to step **7**.
7	**CHECK HORN OPERATION.** Activate the function check «Horn Output» of the body integrated unit. <Ref. to BC(diag)-24, Function Check.>	Does the horn sound?	Check the keyless transmitter. <Ref. to SL-83, Keyless Transmitter.><Ref. to SL-85, Access Key.>	Check the horn circuit. <Ref. to WI(w/o HEV)-146, Horn System.>

Step		Check	Yes	No
8	**CHECK DTCS.** Check DTCs in the following systems; • Body control <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).> • Telematics <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to BC(diag)-25, LIST, List of Diagnostic Trouble Code (DTC).> <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>	Check the Starlink Server report to verify that there was no server outage that coincides with the day/time the customer reported that the issue occurred. (Refer to STARLINK Server Maintenance/Down Report under Reports and Starlink section in Subarunet.) If no outage exists for that time frame, it is possible that there was environmental interference (radio waves, etc.) when the user performed the operation. No further actions are recommended.

12.WHEN THE VEHICLE SECURITY ALARM IS ACTIVATED, NOTIFICATION IS NOT SENT

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «Account Status» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Does the data display «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure.
2	**CHECK CURRENT COMMUNICATION ENVIRONMENT OF USER'S SMARTPHONE.** Check that the user's smartphone can be connected to the Internet.	Can it be connected to the Internet?	Go to step **3**.	The user's smartphone or the Internet environment has a problem.
3	**CHECK SECURITY ALERT SYSTEM.** Operate the security alert system.	Does it operate?	Go to step **4**.	Check the security alert system. <Ref. to SL-30, INSPECTION, Security System.>
4	**CHECK CURRENT COMMUNICATION ENVIRONMENT OF USER'S SMARTPHONE.** Check that a notification is sent to the user's smartphone after the security alert is activated.	Does the smartphone receive a notification?	Currently no failure is found.	Go to step **5**.
5	**CHECK CURRENT RECEIVED SIGNAL STRENGTH (CHECK CURRENT DATA).** Display the current data «Signal Strength» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Does the data indicate 26% or more?	Go to step **7**.	Go to step **6**.
6	**CHECK AT&T CELLULAR COVERAGE AREA.** Ask the user where he/she operated the remote control.	Is the location of the remote control operation within the AT&T cellular coverage area? (For the AT&T cellular coverage area, refer to the AT&T website. The system operates only on 3G and 4G technology.)	Go to step **7**.	The location of the remote control operation was outside the cellular coverage area.
7	**CHECK DTCS.** Check DTCs in the following systems; • Body control <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).> • Telematics <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to BC(diag)-25, LIST, List of Diagnostic Trouble Code (DTC).> <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>	Check the Starlink Server report to verify that there was no server outage that coincides with the day/time the customer reported that the issue occurred. (Refer to STARLINK Server Maintenance/Down Report under Reports and Starlink section in Subarunet.) If no outage exists for that time frame, it is possible that there was environmental interference (radio waves, etc.) when the user performed the operation. No further actions are recommended.

13.WHEN A MALFUNCTION INDICATOR LIGHT/WARNING LIGHT IS LIT, NOTIFICATION IS NOT SENT

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «Diagnostic Alert Active» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Does the data display «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure.
2	**CHECK WARNING LIGHT.** Check if the warning light illuminates.	Does it Illuminate?	Go to step **3**.	Currently no failure is found. Since the warning light is not lit, notification is not sent.
3	**CHECK DTCS.** Check the DTC of telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK AT&T CELLULAR COVERAGE AREA.** Ask the user where he/she turned the ignition switch to OFF after the warning light was lit.	Is the location, where the ignition switch was turned to OFF after the warning light was lit, within the AT&T cellular coverage area? (For the AT&T cellular coverage area, refer to the AT&T website. The system operates only on 3G and 4G technology.)	Check the Starlink Server report to verify that there was no server outage that coincides with the day/time the customer reported that the issue occurred. (Refer to STARLINK Server Maintenance/Down Report under Reports and Starlink section in Subarunet.) If no outage exists for that time frame, it is possible that there was environmental interference (radio waves, etc.) when the user performed the operation. No further actions are recommended.	The location where the ignition switch was turned to OFF (where warning light illumination information was sent) was outside the cellular coverage area.

14.MAINTENANCE NOTIFICATIONS ARE NOT SENT

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «Maintenance Alert Active» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Does the data display «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure.
2	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to TEL(diag)-17, LIST, Diagnostic Code(s) Display.>	Check the Starlink Server report to verify that there was no server outage that coincides with the day/time the customer reported that the issue occurred. (Refer to STARLINK Server Maintenance/Down Report under Reports and Starlink section in Subarunet.) If no outage exists for that time frame, it is possible that there was environmental interference (radio waves, etc.) when the user performed the operation. No further actions are recommended.

15.THE LED DOES NOT DISPLAY THE STATUS. (LED MALFUNCTION)

CAUTION:
CommCheck is required after replacing the DCM. <Ref. to ET-28, REGISTRATION (COMM CHECK), OPERATION, TELEMATICS SYSTEM.>

	Step	Check	Yes	No
1	**CHECK SUBSCRIPTION STATUS.** Display the current data «Account Status» of the Telematics. <Ref. to TEL(diag)-13, Read Current Data.>	Is the data «TRUE»?	Go to step **2**.	The user does not have a service subscription; therefore, it is not a failure. (Both LEDs are turned off.)
2	**CHECK LED.** 1) Turn the ignition switch to ON. 2) Check the LED condition.	Does the RED LED go off and the GREEN LED illuminate?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step **3**.
3	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A0A or B2A0B displayed?	Perform the diagnosis according to DTC. <Ref. to TEL(diag)-44, DTC B2A0A RED LED CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> <Ref. to TEL(diag)-47, DTC B2A0B GREEN LED CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **4**.
4	**CHECK LED ILLUMINATION CONDITION.** Perform the telematics system operation check. <Ref. to TEL(diag)-22, System Operation Check Mode.>	Is the LED turned on or off?	Go to step **5**.	Go to step **6**.

	Step	Check	Yes	No
5	**CHECK LED.** 1) Turn the ignition switch to ON. 2) Check the LED condition.	Does the RED LED go off and the GREEN LED illuminate?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>
6	**CHECK LED.** Measure the continuity of the telematics button (LED) unit. ***Connector & terminal*** ***(AD1) No. 7 — (AD1) No. 1:*** ***(AD1) No. 4 — (AD1) No. 1:***	Is there continuity?	Replace the DCM. <Ref. to ET-45, DATA COMMUNICATION MODULE.>	Replace the telematics button. <Ref. to ET-38, Switches and Harness.>

16.PHONE CONVERSATION IS NOT POSSIBLE. (THE MICROPHONE DOES NOT RESPOND TO A VOICE. NO SOUND IS HEARD FROM THE SPEAKER.)

Step		Check	Yes	No
1	**CHECK DTCS.** Read DTCs of the Telematics. <Ref. to TEL(diag)-17, Diagnostic Code(s) Display.>	Is DTC B2A04, B2A05 or B2A06 displayed?	Perform the diagnosis according to DTC. <Ref. to TEL(diag)-30, DTC B2A04 MIC CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> <Ref. to TEL(diag)-33, DTC B2A05 LEFT SPEAKER/AUDIO CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> <Ref. to TEL(diag)-36, DTC B2A06 RIGHT SPEAKER/AUDIO CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK SPEAKER OPERATION.** Perform [Speaker ON] in the telematics system operation check. <Ref. to TEL(diag)-22, System Operation Check Mode.>	Does it sound?	Go to step **3**.	Go to step **4**.
3	**CHECK MICROPHONE.** Perform the microphone voice input.	Is the voice recognized?	Go to step **4**.	Replace the microphone.
4	**CHECK SPEAKER.** Check the speaker.	Is there any fault?	Replace the speaker.	Go to step **5**.
5	**CHECK TELEPHONE CALL.** 1) Place the mobile phone in the vehicle. 2) Establish a Bluetooth connection between the mobile phone in the vehicle and the vehicle unit. 3) Make a call from outside to the mobile phone in the vehicle. 4) Check that a telephone call is available through the in-vehicle microphone with the hands-free function.	Is a telephone call successful?	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Perform the diagnosis according to inspection for DTC B2A04 MIC CIRCUIT. <Ref. to TEL(diag)-30, DTC B2A04 MIC CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

WIRING SYSTEM SECTION

WIRING SYSTEM	WI(w/o HEV)
WIRING SYSTEM	WI(HEV)

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

WIRING SYSTEM

WI(w/o HEV)

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1. Basic Diagnostic Procedure

A: BASIC PROCEDURES

1. GENERAL DESCRIPTION

The most important purpose of diagnostics is to quickly determine which part is malfunctioning, to save time and labor.

2. IDENTIFICATION OF TROUBLE SYMPTOM

Determine what the problem is based on the symptom.

3. PROBABLE CAUSE OF TROUBLE

Look at the wiring diagram and check the system's circuit. Then check the switch, relay, fuse, ground, etc.

4. LOCATION AND REPAIR OF TROUBLE

1) Using the diagnostics, narrow down the causes.
2) If necessary, use a voltmeter, ohmmeter, etc.
3) Before replacing certain component parts (switch, relay, etc.), check the power supply, ground, for open wiring harness, poor connectors, etc. If no problem is encountered, check the component parts.

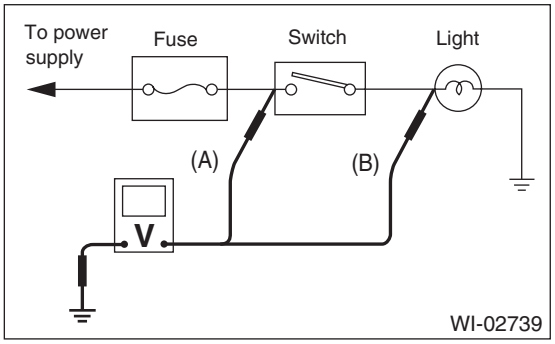
5. SYSTEM OPERATION CHECK

After repairing, ensure that the system operates properly.

B: BASIC INSPECTION

1. VOLTAGE MEASUREMENT

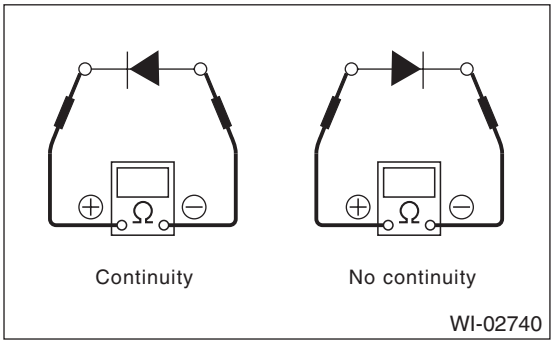
1) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal and the positive lead to the connector or component terminal.
2) Contact the positive lead of the voltmeter on connector (A). The voltmeter will indicate a voltage.
3) Touch connector (B) with the positive probe. The voltmeter will indicate no voltage.



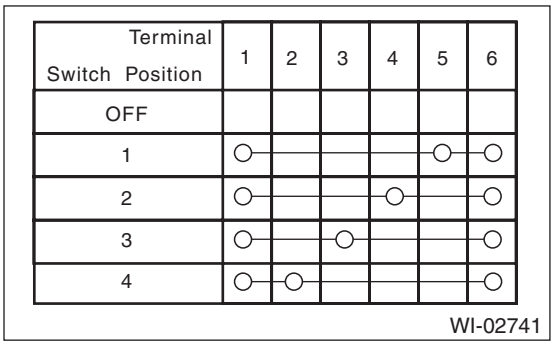
4) With the test set-up held as it is, turn the switch to ON. The voltmeter will indicate a voltage and, at the same time, the light will illuminate.
5) The circuit is in good order. If a problem such as a light failing to illuminate occurs, use the procedures outlined above to track down the malfunction.

2. CIRCUIT CONTINUITY CHECKS

1) Disconnect the battery terminal or connector so there is no voltage between the check points.
Contact the two leads of an ohmmeter to each of the check points.
If the circuit has diodes, reverse the two leads and check again.
2) Use an ohmmeter to check for diode continuity.
When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity.
When contacting the two leads in reverse, there should be no continuity.



3) The symbol "❍ — ❍" indicates that continuity exists between two points or terminals. For example, when a switch position is at "3", continuity exists among terminals 1, 3 and 6, as shown in the table below.

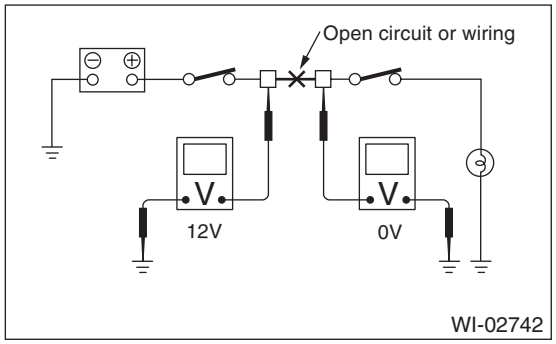


Terminal / Switch Position	1	2	3	4	5	6
OFF						
1	○				○	○
2	○			○		○
3	○		○			○
4	○	○				○

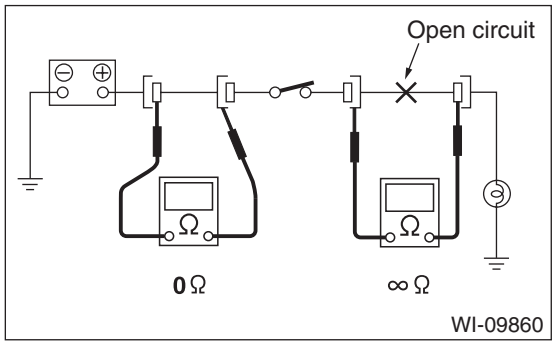
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3. HOW TO DETERMINE AN OPEN CIRCUIT

1) WITH VOLTMETER:
An open circuit is determined by measuring the voltage between respective connectors and ground using a voltmeter, starting with the connector closest to the power supply. The power supply must be turned ON so that current flows in the circuit. If voltage is not present between a particular connector and ground, the circuit between that connector and the previous connector is open.

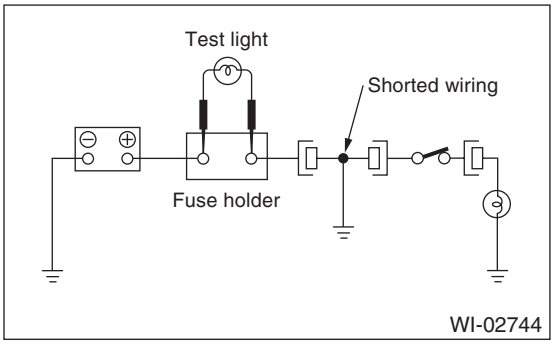


2) WITH OHMMETER:
Disconnect all connectors affected, and check continuity in the wiring between adjacent connectors. When the ohmmeter indicates “infinite”, the wiring is open.

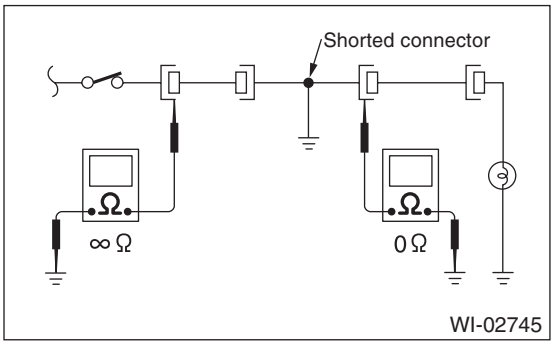


4. HOW TO DETERMINE A SHORT CIRCUIT

1) WITH TEST LIGHT:
Connect a test light (rated at approx. 3 watts) in place of the blown fuse and allow current to flow through the circuit. Disconnect one connector at a time from the circuit. Starting with the one located farthest from the power supply. If the test light goes out when a connector is disconnected, the wiring between that connector and the next connector (farther from the power supply) is shorted.



2) WITH OHMMETER:
Disconnect all affected connectors, and check continuity between each connector and ground. When the ohmmeter indicates continuity between a particular connector and a ground, that connector is shorted.

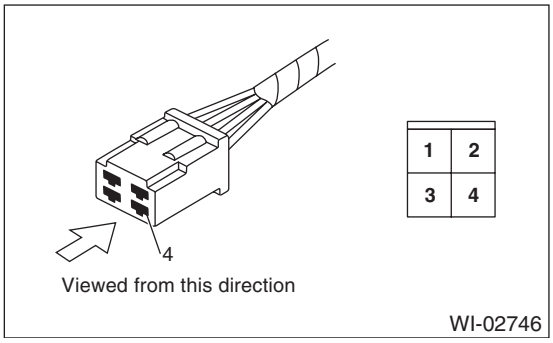


C: HOW TO READ WIRING DIAGRAMS

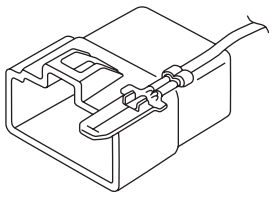
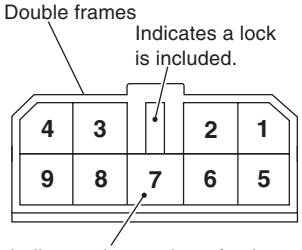
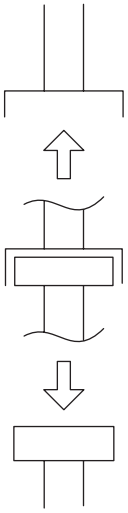
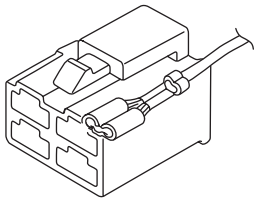
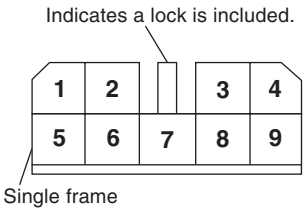
1. WIRING DIAGRAM

The wiring diagram of each system is illustrated so that you can understand the path through which the electric current flows from the battery.
Sketches and codes are used in the diagrams. They should read as follows:

- Each connector and its terminal position are indicated by a sketch of the connector in a disconnected state which is viewed from the front.

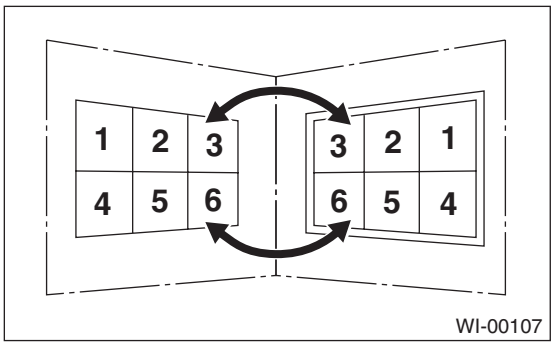


- The number of poles or pins, presence of a lock are indicated in the sketch of each connector. In the sketch, the highest pole number refers to the number of poles which the connector has. For example, the sketch of the connector shown in figure indicates the connector has 9 poles.

Connector used in vehicle	Connector shown in wiring diagram		
	Sketch	Symbol	Number of poles
			Numbered in order from upper right to lower left.
			Numbered in order from upper left to lower right.

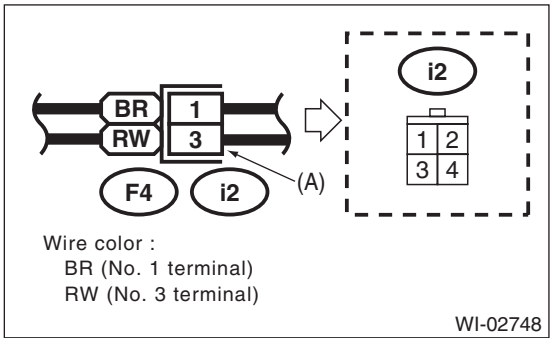
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• When one set of connectors is viewed from the front side, the pole numbers of one connector are symmetrical to those of the other. When these two connectors are connected as a unit, the poles which have the same number are joined.

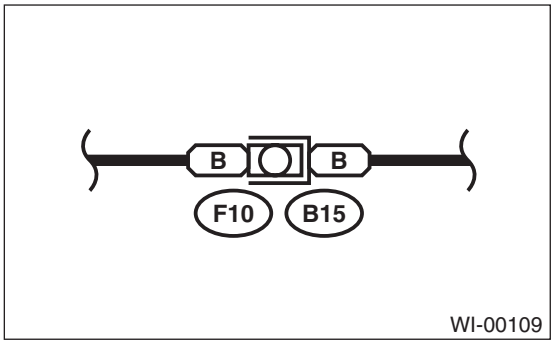


• WIRING DIAGRAM:
The connectors are numbered along with the number of poles, external colors, and mating connections in the accompanying list.
• The sketch of each connector in the wiring diagram usually shows the (A) side of the connector. The relationship between the wire color, terminal number and connector is described in the figure.

NOTE:
A wire which runs in one direction from a connector terminal sometimes may have a different color from that which runs in the other direction from that terminal.

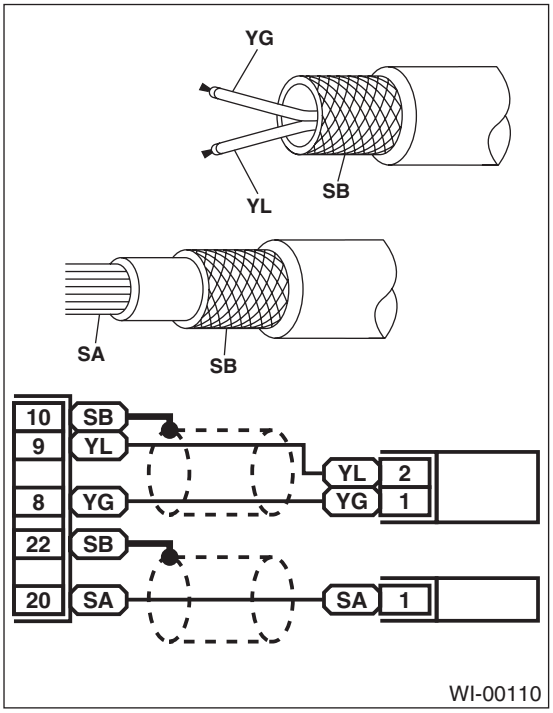


• In the wiring diagram, connectors which have no terminal number refer to one-pole types. Sketches of these connectors are omitted intentionally.

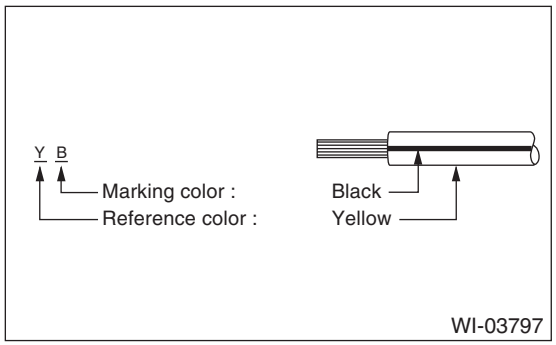


• The following color codes are used to indicate the colors of the wires.

Color code	Color
L	Blue
B	Black
Y	Yellow
G	Green
R	Red
W	White
Br	Brown
Lg	Light green
Gr	Gray
P	Pink
Or	Orange
Sb	Light blue
V	Violet
SA	Sealed (inner)
SB	Sealed (outer)



• The wire color code, which consists of two letters (or three letters including Br or Lg), indicates the standard color (base color of the wire covering) by its first letter and the stripe marking by its second letter.



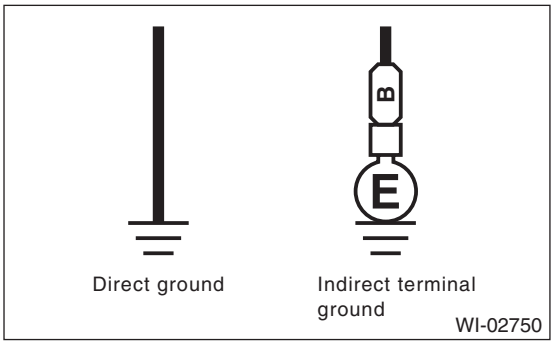
• The table lists the nominal sectional areas and allowable currents of the wires.

CAUTION:
When replacing or repairing a wire, be sure to use the same size and type of the wire which was originally used.

NOTE:
• The allowable current in the table indicates the tolerable amperage of each wire at an ambient temperature of 40°C (104°F).
• The allowable current changes with ambient temperature. Also, it changes if a bundle of more than two wires is used.

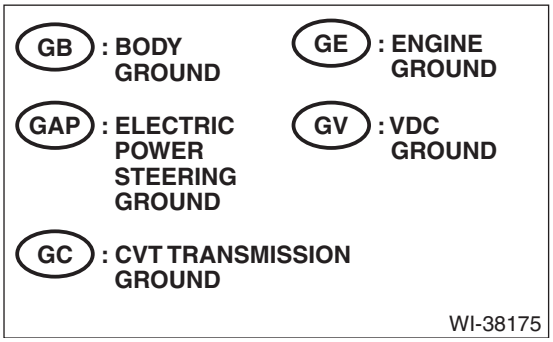
Nominal sectional area mm^2	No. of strands/ strand diameter	Outside diameter of wiring mm	Allowable current Amps/ 40°C (104°F)
0.3	7/0.26	1.8	7
0.5	7/0.32	2.2 (or 2.0)	12
0.75	30/0.18	2.6 (or 2.4)	16
0.85	11/0.32	2.4 (or 2.2)	16
1.25	16/0.32	2.7 (or 2.5)	21
2	26/0.32	3.1 (or 2.9)	28
3	41/0.32	3.8 (or 3.6)	38
5	65/0.32	4.6 (or 4.4)	51
8	50/0.45	5.5	67

• Each unit is either directly grounded to the body or indirectly grounds through a harness ground terminal. Different symbols are used in the wiring diagram to identify the two grounding systems.



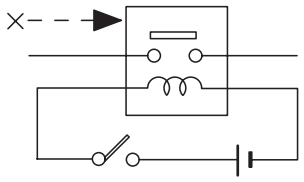
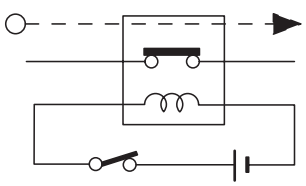
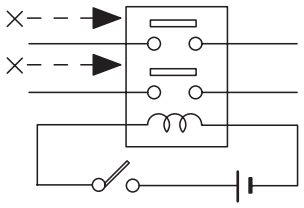
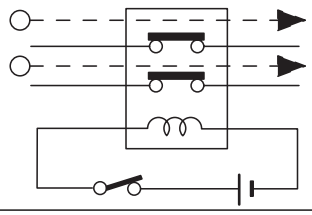
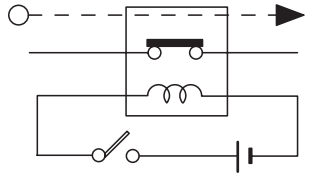
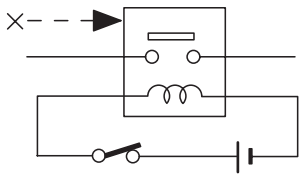
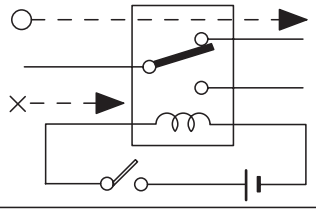
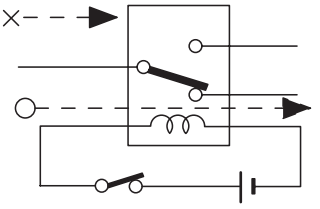
• The ground points shown in the wiring diagram refer to the following:

NOTE:
All wiring harnesses are provided with a ground point which must be securely connected.



- Relays are classified as normally-open or normally-closed.

The normally-closed relay has one or more contacts. The wiring diagram shows the relay mode when the energizing circuit is OFF.

Relay type		Energizing circuit OFF	Energizing circuit ON
Normally-open type	4-pole		
	6-pole		
Normally-closed type	4-pole		
Mixed type	6-pole		

Key to symbols:

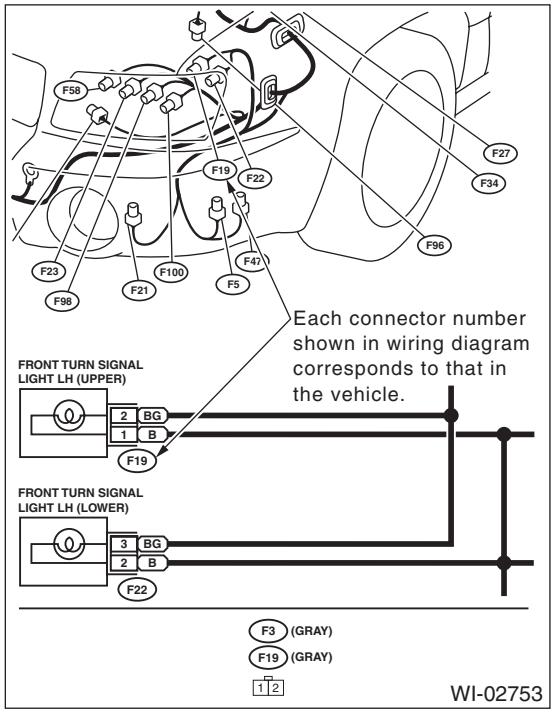
○ ⟶ : Current flows.

× ⟶ : Current does not flow.

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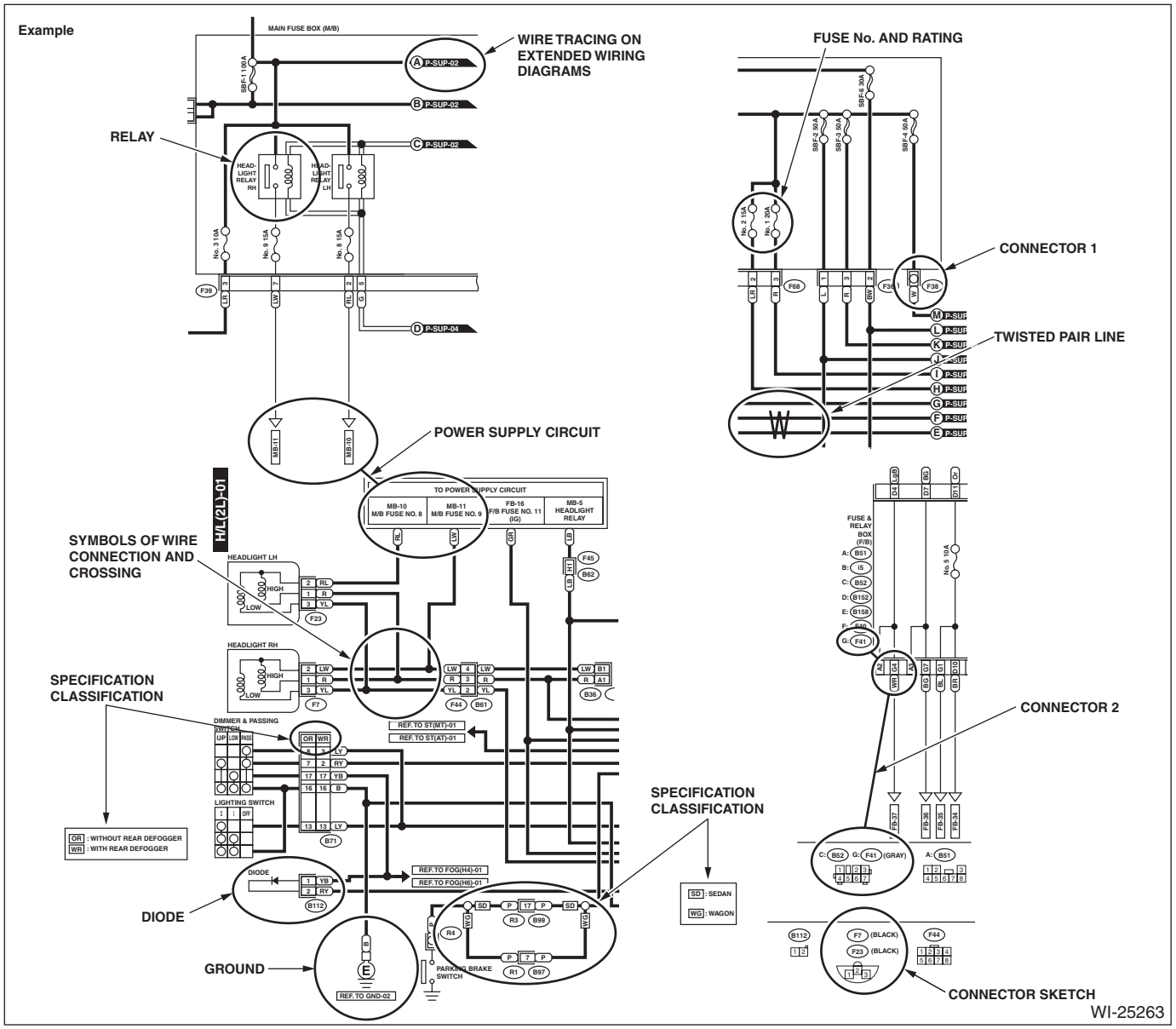
• Each connector number shown in the wiring diagram corresponds to that in the wiring harness. The location of each connector in the actual vehicle is determined by reading the first character of the connector (for example, a “F” for F8, “i” for i16, etc.) and the type of wiring harness. The first character of each connector number corresponds to the area or system of the vehicle.

Symbol	Wiring harness and cord
F	Front wiring harness
B	Bulkhead wiring harness
E	Engine wiring harness
T	Transmission cord
D	Door cord LH & RH, Rear gate cord Rear door cord LH & RH, Rear defogger cord
i	Instrument panel wiring harness
R	Rear wiring harness, Fuel tank cord, Roof cord, Rear gate cord
AB	Airbag wiring harness



D: SYMBOLS IN WIRING DIAGRAMS

A number of symbols are used in each wiring diagram to easily identify parts or circuits.



1. RELAY

A symbol used to indicate a relay.

2. CONNECTOR 1

The sketch of the connector indicates the one-pole types.

3. WIRING CONNECTION

Some wiring diagrams are indicated in foldouts for convenience. Wiring destinations are indicated where necessary by corresponding symbols. (When two pages are needed for clear indication)

4. FUSE NO. & RATING

The “FUSE No. & RATING” corresponds with that used in the fuse box (main fuse box, fuse and joint box).

5. CONNECTOR 2

- Each connector is indicated by a symbol.
- Each terminal number is indicated in the corresponding wiring diagram in an abbreviated form.
- For example, terminal number “G4” refers to No. 4 terminal of connector (G: F41) shown in the connector sketch.

6. CONNECTOR SKETCH

- Each connector sketch clearly identifies the shape and color of a connector as well as terminal locations. Non-colored connectors are indicated in natural color.
- When more than two types of connector number are indicated in a connector sketch, it means that the same type connectors are used.

7. GROUND

Each grounding point can be located easily by referring to the corresponding wiring harness.

8. DIODE

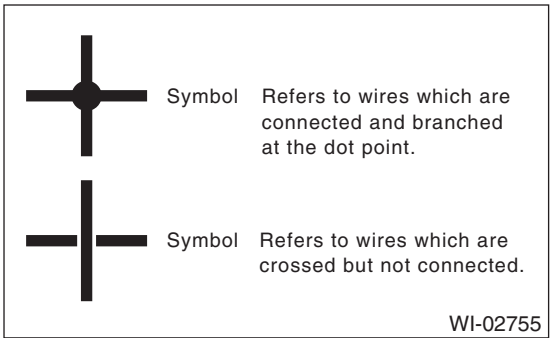
A symbol is used to indicate a diode.

9. WIRE TRACING ON EXTENDED WIRING DIAGRAMS

For a wiring diagram extending over at least two pages, a symbol (consisting of the same characters with arrows), facilitates wire tracing from one page to the next.

A ←→ A, B ←→ B

10.SYMBOLS OF WIRE CONNECTION AND CROSSING



11.POWER SUPPLY CIRCUIT

A symbol is used to indicate the power supply in each wiring diagram.

“MB – 5”, “MB – 6”, etc., which are used as power-supply symbols throughout the text, correspond with those shown in the “DC POWER SUPPLY CIRCUIT” in the wiring diagram.

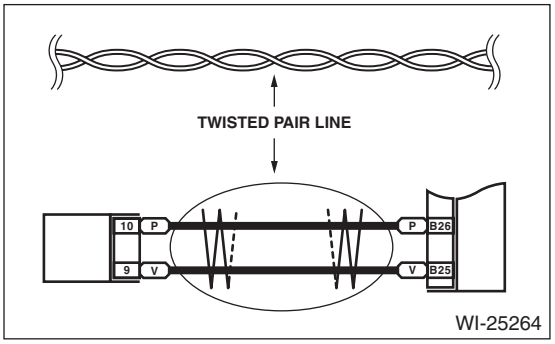
Accordingly, using the “DC POWER SUPPLY CIRCUIT” and wiring diagrams permits service personnel to understand the entire electrical arrangement of a system.

12.CLASSIFICATION BY SPECIFICATION

When the wiring diagram differ according to vehicle specifications, the specification difference is described by using abbreviations.

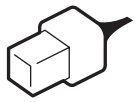
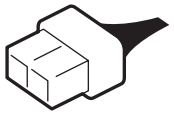
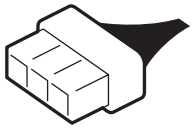
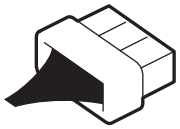
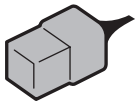
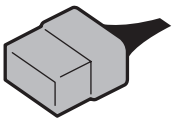
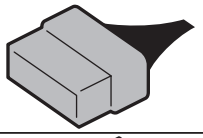
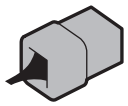
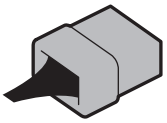
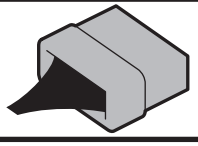
13.TWISTED PAIR LINE

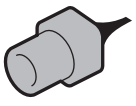
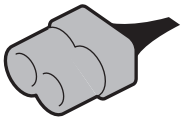
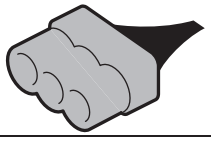
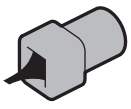
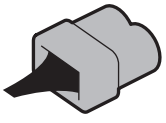
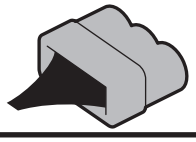
The twisted pair line is indicated by a symbol in the wiring diagrams.



E: CONNECTOR SYMBOL IN WIRING HARNESS

A number of connector symbols are used in each wiring diagram to easily identify the wiring harness connectors.

Standard type: Female		
Pole: From 1 to 8	Pole: From 9 to 20	Pole: More than 21
		
		
Standard type: Male		
		
		

Water proof type: Female		
Pole: From 1 to 8	Pole: From 9 to 20	Pole: More than 21
		
		
Water proof type: Male		
		
		

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F: ABBREVIATION IN WIRING DIAGRAMS

Abbr.	Full name
ABS	Anti-lock Brake System
ACC	Accessory
A/C	Air Conditioner
ASSY	Assembly
AT	Automatic Transmission
A/F	Air/Fuel (air fuel ratio sensor)
ATF	Automatic Transmission Fluid
AUX	Auxiliary Audio Input Terminal
AWD	All Wheel Drive
B, BAT	Battery
BSD/RCTA	Blind Spot Detection/Rear Cross Traffic Alert
CAN	Controller Area Network
CM	Control Module
CVT	Continuously Variable Transmission
D	Drive range or Down
DN	Down
E	Ground
ELCM	Evaporative Leak Check Module
ECO	Economy
ECM	Engine Control Module
EEPROM	Electrically Erasable Programmable Read-Only Memory
EGR	Exhaust Gas Recirculation
F/B	Fuse & Relay Box
FL	Front Left
FR	Front Right
G	Gravity (G sensor)
H/L	Headlight
HI	High
I/F	Interface
IG	Ignition
INT	Intermittent
ISO	International Organization for Standardization
J/C	Joint Connector
LCD	Liquid Crystal Display
LH	Left Hand
LO	Low
LWR	Lower
M	Motor
M/B	Main Fuse Box
MFD	Multi Function Display
MT	Manual Transmission
N	Neutral Range
NAVI	Navigation
OP	Open or Optional Parts
P	Parking or Parking range
PASS	Passing

Abbr.	Full name
PCV	Positive Crankcase Ventilation Valve
R	Reverse Range
RH	Right Hand
RL	Rear Left
RR	Rear Right
SBF	Slow Blow Fuse
SRF	Steering responsive fog light
ST	Starter
SW	Switch
TCM	Transmission Control Module
TEL	Telephone
TFT	Thin Film Transistor
TPMS	Tire Pressure Monitor System
UPR	Upper
VDC	Vehicle Dynamics Control
WASH	Washer

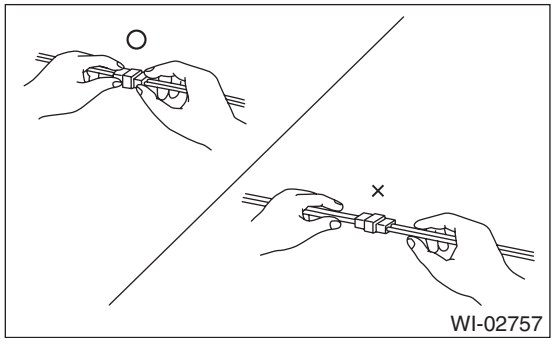
2. Working Precautions

A: PRECAUTIONS WHEN WORKING WITH THE PARTS MOUNTED ON THE VEHICLE

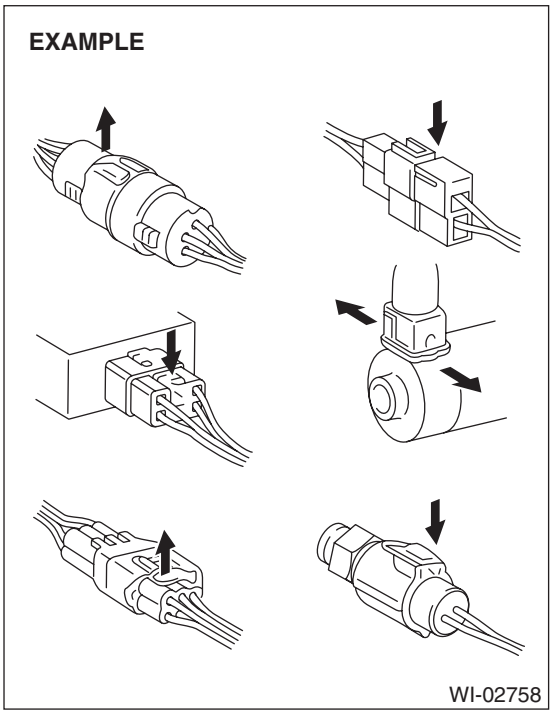
1) When working under a vehicle which is jacked-up, always be sure to use rigid rack.
2) The parking brake must always be applied during working. Also, in automatic transmission vehicles, keep the select lever set to the P (Parking) range.
3) Be sure the workshop is properly ventilated when running the engine. Further, be careful not to touch the belt or fan while the engine is operating.
4) Be careful not to touch hot metal parts, especially the radiator and exhaust system immediately after the engine has been turned off.

B: PRECAUTIONS IN TROUBLE DIAGNOSIS AND REPAIR OF ELECTRIC PARTS

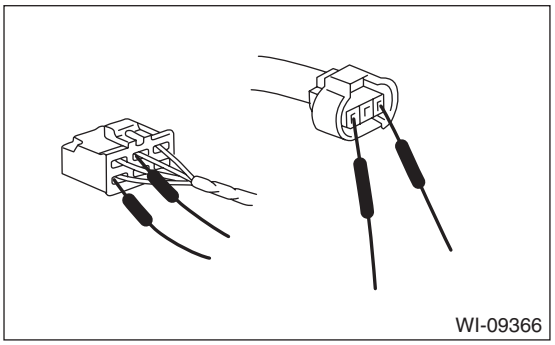
1) The battery cable must be disconnected from the battery's (–) terminal, and the ignition switch must be set to the OFF position, unless otherwise required by the diagnostics.
2) Securely fasten the wiring harness with clamps and clips so that the harness does not interfere with the body end parts, edges, bolts or screws.
3) When installing parts, be careful not to catch them on the wiring harness.
4) When disconnecting a connector, do not pull the wires, but pull while holding the connector body.



5) Some connectors are provided with a lock. One type of such a connector is disconnected by pushing the lock, and the other, by moving the lock up. In either type the lock shape must be identified before attempting to disconnect the connector.
To connect, insert the connector until it snaps and confirm that it is connected securely.



6) When checking continuity between connector terminals, or measuring voltage across the terminal and ground, always touch tester probe(s) to terminals from the wiring connection side. If the probe is too thick to gain access to the terminal, use "mini" test leads.
To check water-proof connectors (which are not measurable from the wiring side), touch test probes on the terminal side and be careful not to bend or damage the terminals.



7) When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal. Never insert the tapered pin into the terminal at this time. Doing so may cause internal deformation and a malfunction can occur.
8) Sensors, relays, electrical unit, etc., are sensitive to strong impacts.
Handle them with care so that they are not dropped or mishandled.

3. Power Supply Circuit

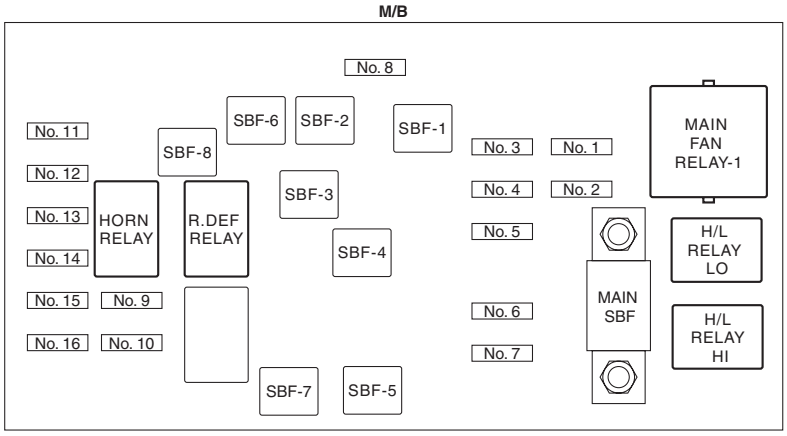
A: WIRING DIAGRAM

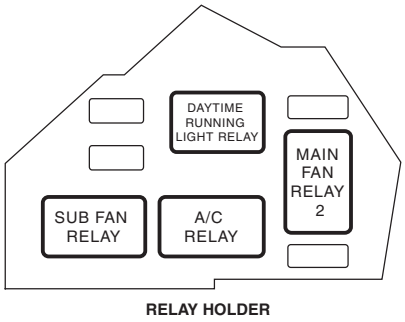
1. WITHOUT PUSH BUTTON START

- **Engine room side**

P-SUP-01

P-SUP-01



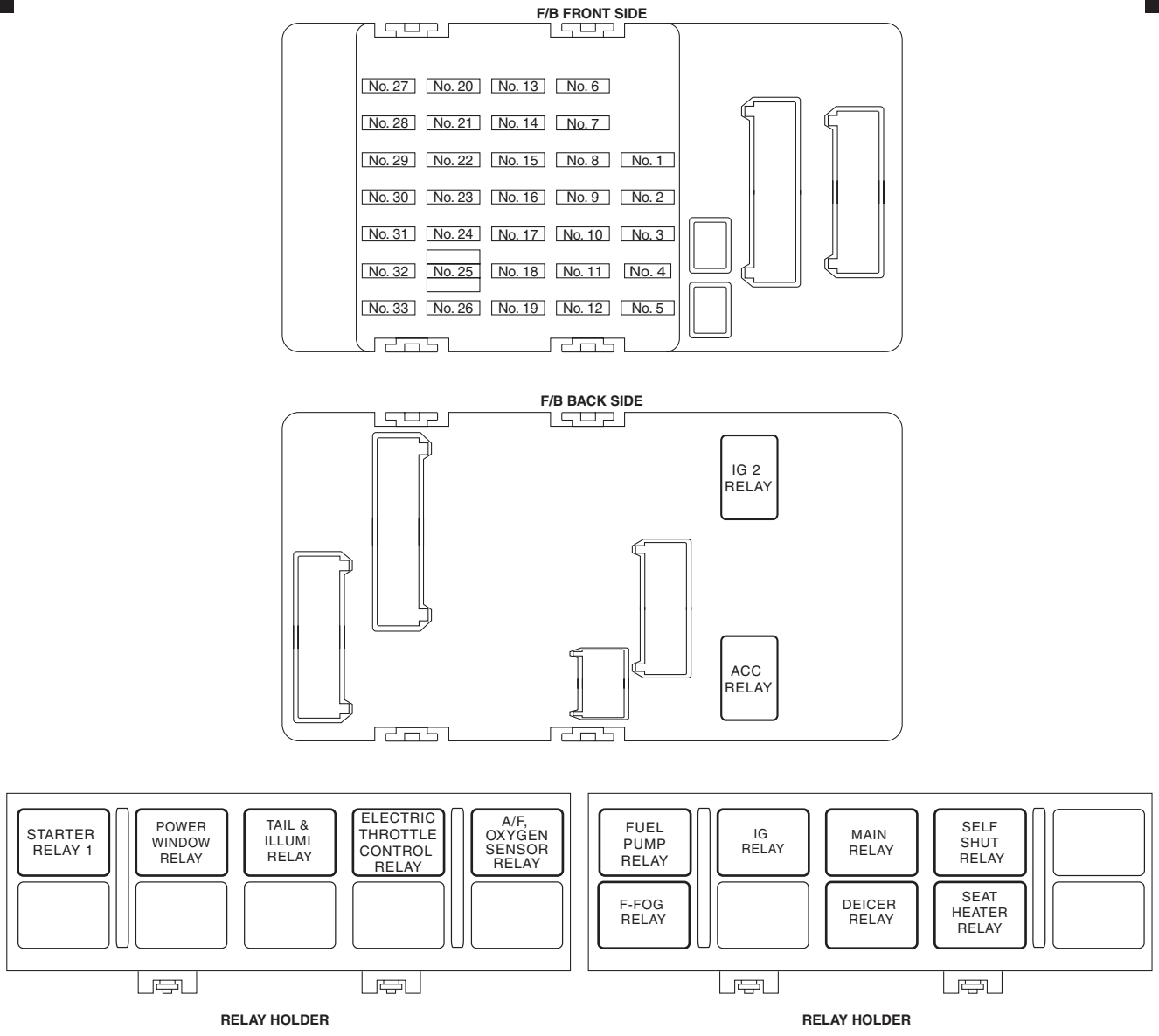


WI-34134

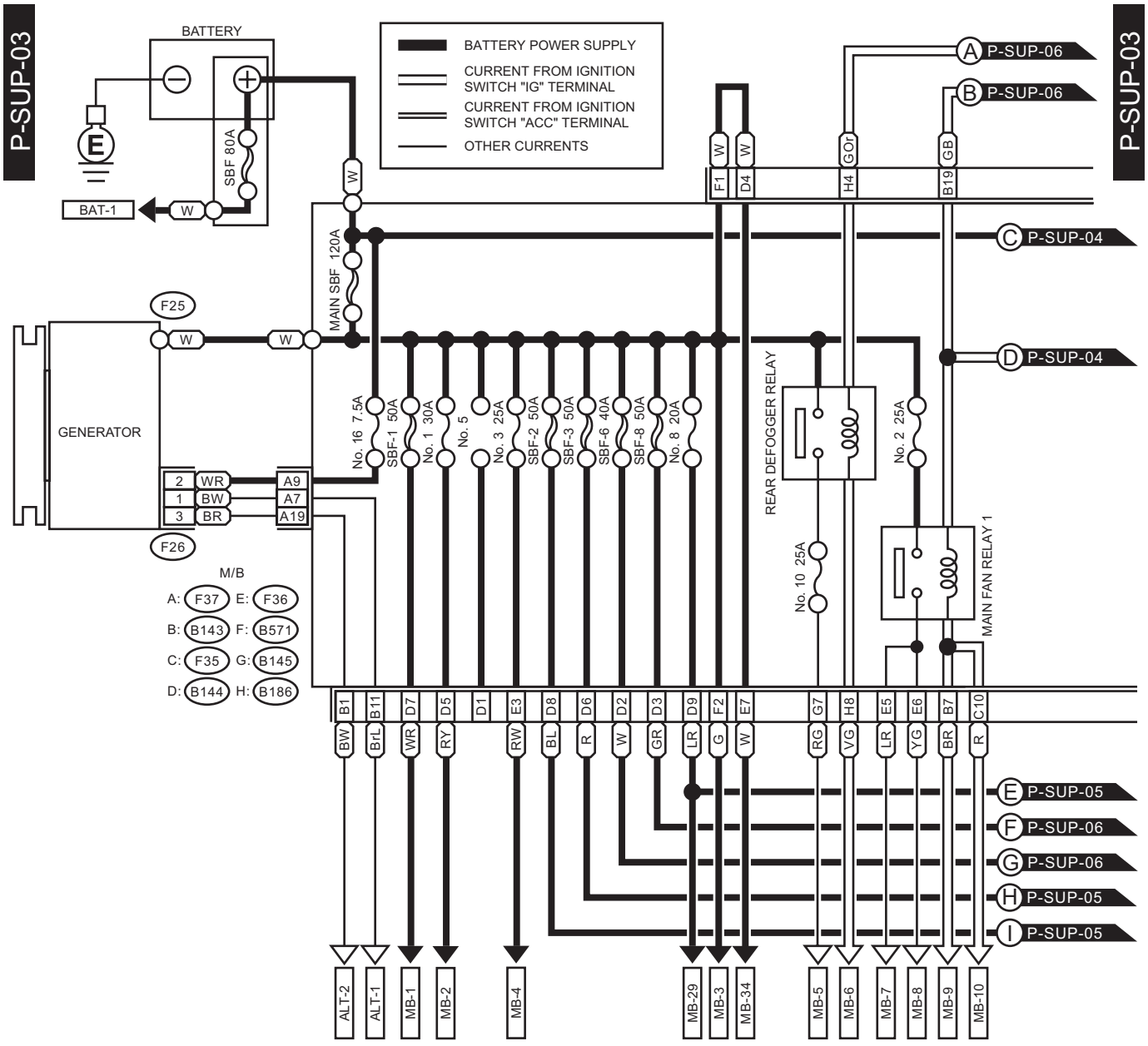
- **Passenger room side**

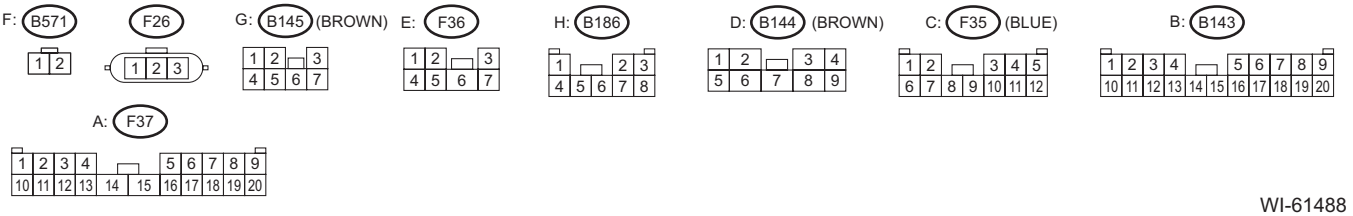
P-SUP-02

P-SUP-02



WI-34135

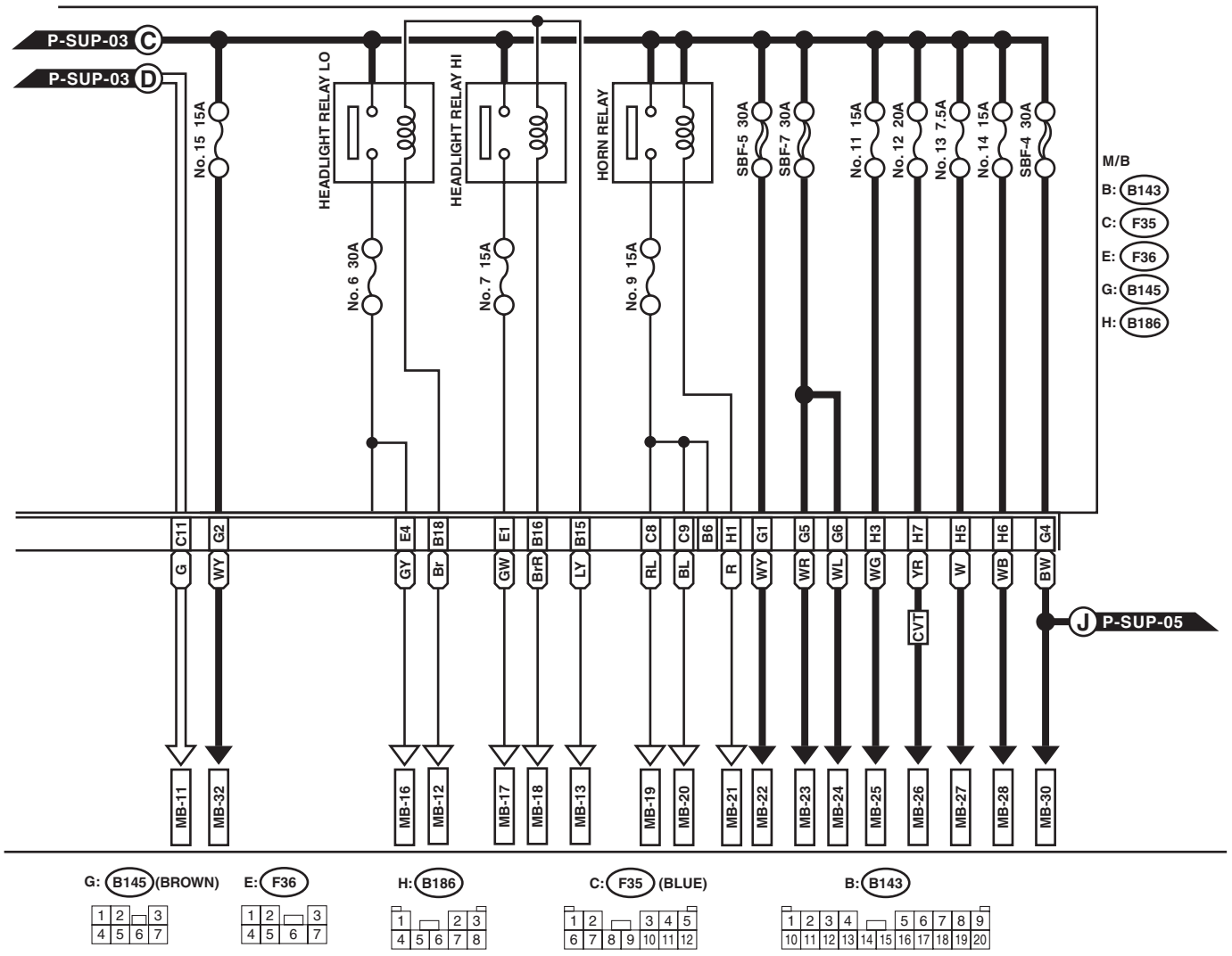

P-SUP-03
P-SUP-03
BATTERY
BATTERY POWER SUPPLY
CURRENT FROM IGNITION SWITCH "IG" TERMINAL
CURRENT FROM IGNITION SWITCH "ACC" TERMINAL
OTHER CURRENTS
SBF 80A
BAT-1
W
MAIN SBF 120A
F25
F26
GENERATOR
2 WR
1 BW
3 BR
A9
A7
A19
M/B
A: F37 E: F36
B: B143 F: B571
C: F35 G: B145
D: B144 H: B186
No. 16 7.5A
SBF-1 50A
No. 1 30A
No. 5
No. 3 25A
SBF-2 50A
SBF-3 50A
SBF-6 40A
SBF-8 50A
No. 8 20A
REAR DEFOGGER RELAY
No. 10 25A
No. 2 25A
MAIN FAN RELAY 1
F1 W
D4 W
H4 GOr
B19 GB
A P-SUP-06
B P-SUP-06
C P-SUP-04
D P-SUP-04
E P-SUP-05
F P-SUP-06
G P-SUP-06
H P-SUP-05
I P-SUP-05
B1 BW
B11 BrL
D7 WR
D5 RY
D1
E3 RW
D8 BL
D6 R
D2 W
D3 GR
D9 LR
F2 G
E7 W
G7 RG
H8 VG
E5 LR
E6 YG
B7 BR
C10 R
ALT-2
ALT-1
MB-1
MB-2
MB-4
MB-29
MB-3
MB-34
MB-5
MB-6
MB-7
MB-8
MB-9
MB-10


F: B571
F26
G: B145 (BROWN)
E: F36
H: B186
D: B144 (BROWN)
C: F35 (BLUE)
B: B143
A: F37

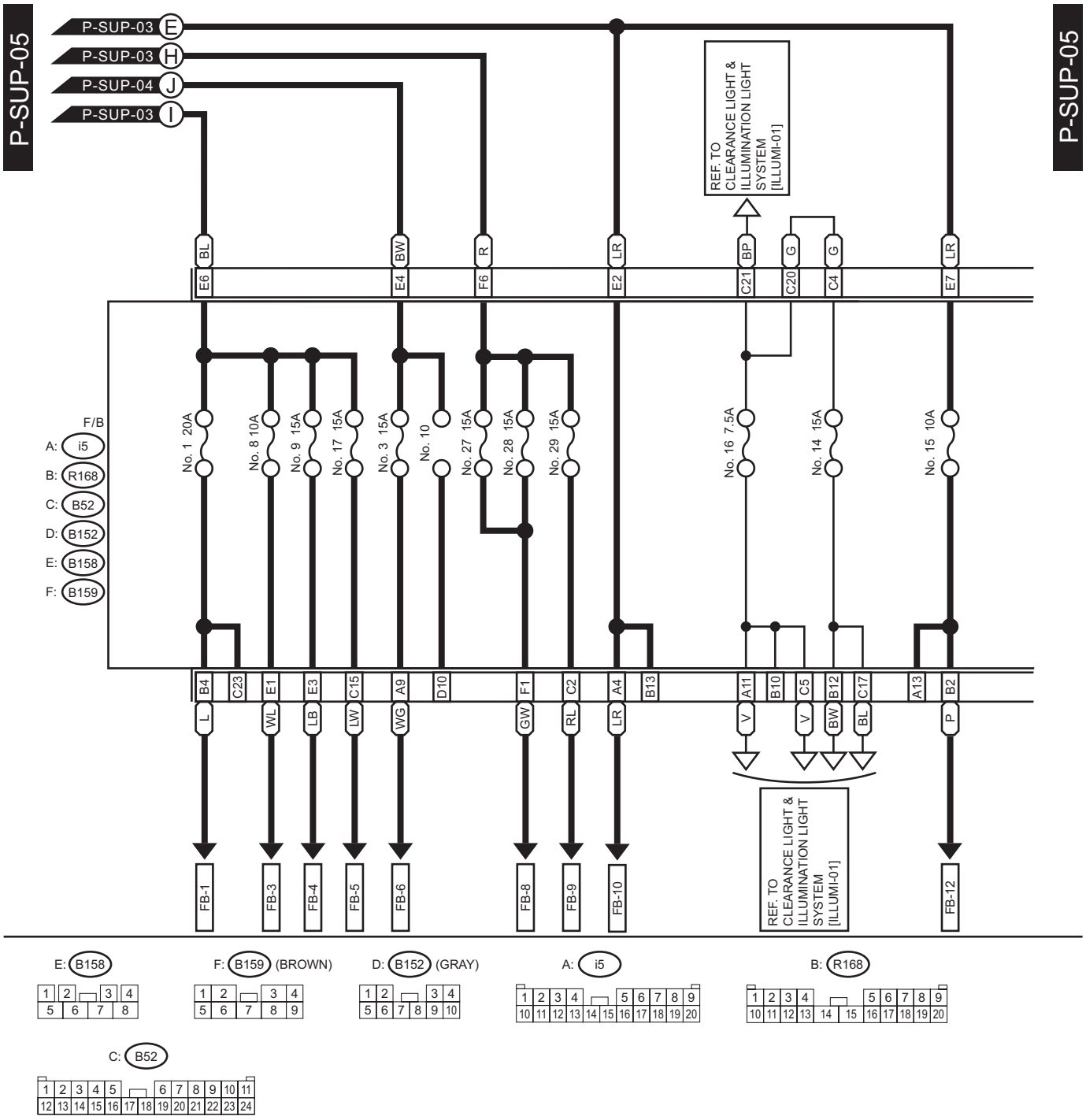
WI-61488

P-SUP-04

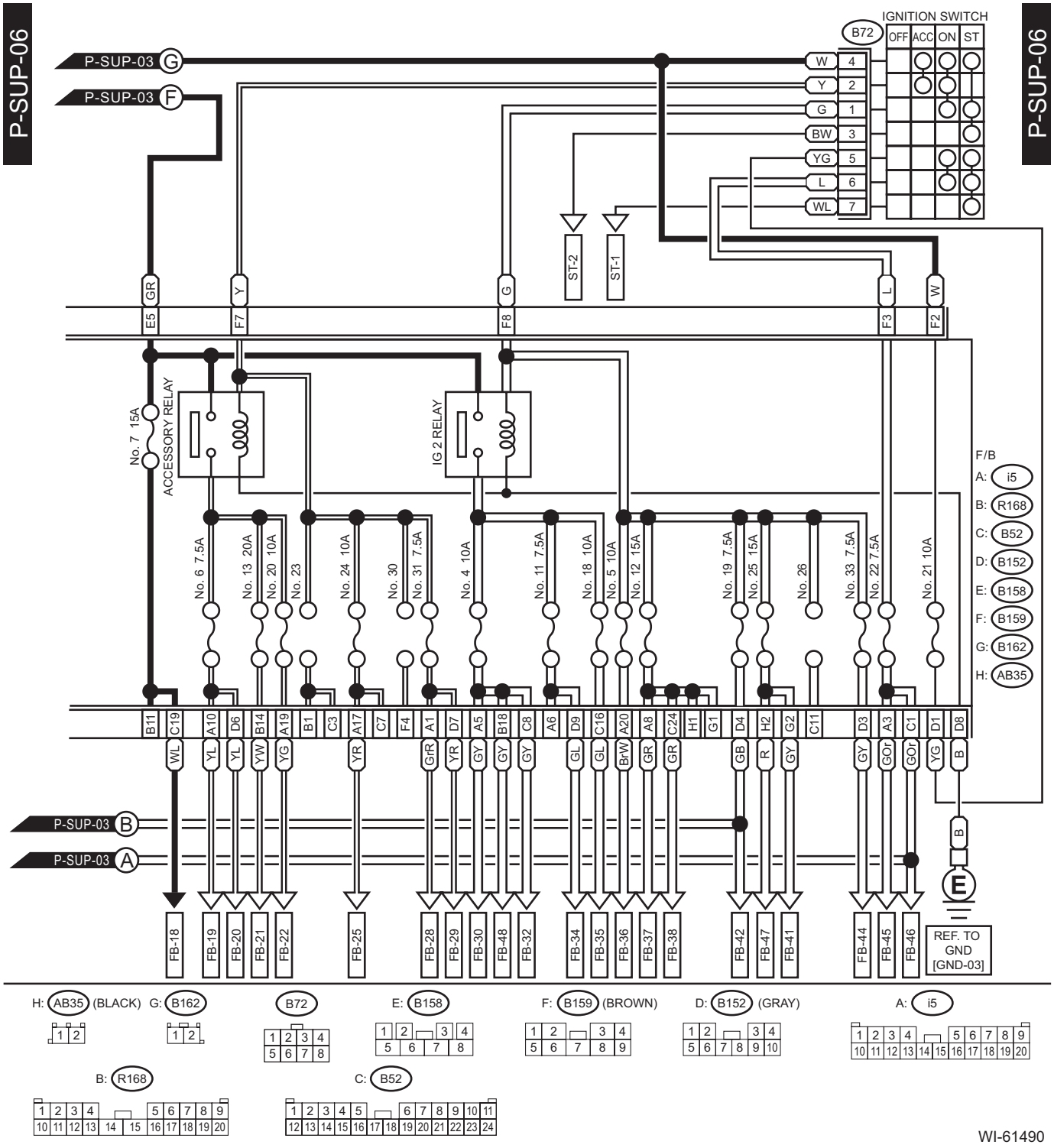
P-SUP-04



WI-48160


P-SUP-05
P-SUP-03 E
P-SUP-03 H
P-SUP-04 J
P-SUP-03 I
P-SUP-05
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
BL
BW
R
LR
BP
G
G
LR
E6
E4
F6
E2
C21
C20
C4
E7
F/B
A: i5
B: R168
C: B52
D: B152
E: B158
F: B159
No. 1 20A
No. 8 10A
No. 9 15A
No. 17 15A
No. 3 15A
No. 10
No. 27 15A
No. 28 15A
No. 29 15A
No. 16 7.5A
No. 14 15A
No. 15 10A
B4
C23
E1
E3
C15
A9
D10
F1
C2
A4
B13
A11
B10
C5
B12
C17
A13
B2
L
WL
LB
LW
WG
GW
RL
LR
V
V
BW
BL
P
FB-1
FB-3
FB-4
FB-5
FB-6
FB-8
FB-9
FB-10
FB-12
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
E: B158
F: B159 (BROWN)
D: B152 (GRAY)
A: i5
B: R168
C: B52

WI-61489


P-SUP-06
P-SUP-06
IGNITION SWITCH
B72
OFF ACC ON ST
W 4
Y 2
G 1
BW 3
YG 5
L 6
WL 7
P-SUP-03 G
P-SUP-03 F
ST-2
ST-1
GR
Y
G
L
W
E5
F7
F8
F3
F2
No. 7 15A
ACCESSORY RELAY
IG 2 RELAY
No. 6 7.5A
No. 13 20A
No. 20 10A
No. 23
No. 24 10A
No. 30
No. 31 7.5A
No. 4 10A
No. 11 7.5A
No. 18 10A
No. 5 10A
No. 12 15A
No. 19 7.5A
No. 25 15A
No. 26
No. 33 7.5A
No. 22 7.5A
No. 21 10A
F/B
A: i5
B: R168
C: B52
D: B152
E: B158
F: B159
G: B162
H: AB35
B11 C19 A10 D6 B14 A19 B1 C3 A17 C7 F4 A1 D7 A5 B18 C8 A6 D9 C16 A20 A8 C24 H1 G1 D4 H2 G2 C11 D3 A3 C1 D1 D8
WL YL YL YW YG YR GrR YR GY GY GY GL GL BrW GR GR GB R GY GY GOr GOr YG B
P-SUP-03 B
P-SUP-03 A
B
E
FB-18 FB-19 FB-20 FB-21 FB-22 FB-25 FB-28 FB-29 FB-30 FB-48 FB-32 FB-34 FB-35 FB-36 FB-37 FB-38 FB-42 FB-47 FB-41 FB-44 FB-45 FB-46
REF. TO GND [GND-03]
H: AB35 (BLACK) G: B162
B72
E: B158
F: B159 (BROWN)
D: B152 (GRAY)
A: i5
B: R168
C: B52
WI-61490

No.	Load
MB-1	VDC CM
MB-2	VDC CM
MB-3	Wiper relay
MB-4	Sub fan relay
MB-5	Mirror heater LH
	Mirror heater RH
	Rear defogger
	A/C control panel
MB-6	Body integrated unit
MB-7	Main fan relay 2
MB-8	Main fan motor
MB-9	ECM
MB-10	Main fan relay 2
MB-11	Main fan relay 2
MB-12	Body integrated unit
MB-13	Body integrated unit
MB-16	Front combination light LH
	Front combination light RH
MB-17	Daytime running light relay
MB-18	Body integrated unit
MB-19	Horn
MB-20	Horn
MB-21	Horn switch
	Body integrated unit
MB-22	A/F, oxygen sensor relay
MB-23	Main relay
	IG relay
MB-24	Electronic throttle control relay
MB-25	Fuel pump relay
MB-26	TCM
	Self shut relay
MB-27	ECM
	Data link connector
MB-28	Key warning switch
	Turn signal and hazard unit
	Body integrated unit
MB-29	Spot map light
	Room light
	Body integrated unit
	Immobilizer antenna
MB-30	Power window circuit breaker
MB-32	Tail & illumination relay
	Daytime running light relay
MB-34	Data communication module
ALT-1	Combination meter
ALT-2	ECM
ST-1	Starter relay 1
	Clutch start switch
ST-2	Starter relay 1
FB-1	Trailer connector

No.	Load
FB-3	Stop light and brake switch
	Brake relay
FB-4	Wiper deicer relay
FB-5	Seat heater relay
FB-6	Body integrated unit
FB-8	Blower motor relay
FB-9	Front fog light relay
	Front fog light relay LH
	Front fog light relay RH
FB-10	Audio
	MFD
	Navigation unit
FB-12	Keyless entry CM
	TPMS & keyless entry CM
	Trunk room light (4 door model)
	Luggage room light (5 door model/Crosstrek model)
FB-18	Combination meter
	Body integrated unit
	Impact sensor
	Air mix door actuator LH (with left/right independent air conditioner)
	Air mix door actuator RH (with left/right independent air conditioner)
	Mode door actuator
	Air mix door actuator (without left/right independent air conditioner)
	Security CM
	A/C control panel
	Stereo camera
FB-19	Remote control mirror switch
FB-20	Seat heater relay
	Rear view mirror
FB-21	Rear accessory power supply socket
FB-22	Front accessory power supply socket
FB-25	Audio
	Navigation unit
	AUX input terminal
	Data communication module
FB-28	A/C control panel
FB-29	Body integrated unit
FB-30	Radar sensor LH (master)
	Radar sensor RH (slave)
	BSD/RCTA OFF switch

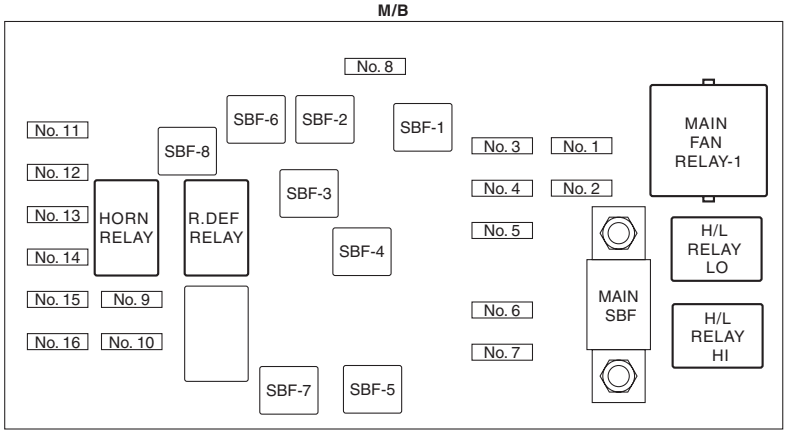
No.	Load
FB-32	Clutch switch
	Impact sensor
	Data link connector
	Stop light and brake switch
	Wiper deicer relay
	Sunroof motor assembly
	Sunroof switch
	Sunroof switch (tilt)
FB-34	Turn signal and hazard unit
FB-35	Inhibitor switch
	Back-up light switch
	Auto headlight beam leveler CM
FB-36	Combination meter
	MFD
FB-37	Data communication module
FB-38	ECM
	TCM
	Body integrated unit
	Fuel pump relay
	Stereo camera
FB-41	Airbag CM
FB-42	Power window relay
	Wiper relay
FB-44	VDC CM
	Steering angle sensor
	Power steering CM
FB-45	A/C control panel
FB-46	A/C relay
	Sub fan relay
	Pressure switch
	Blower motor relay
FB-47	Occupant detection control module
FB-48	TPMS & keyless entry CM
BAT-1	Power steering CM

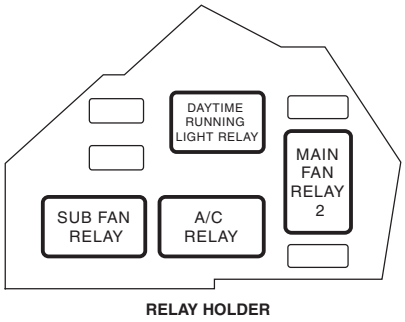
2. WITH PUSH BUTTON START

- **Engine room side**

P-SUP(P)-01

P-SUP(P)-01



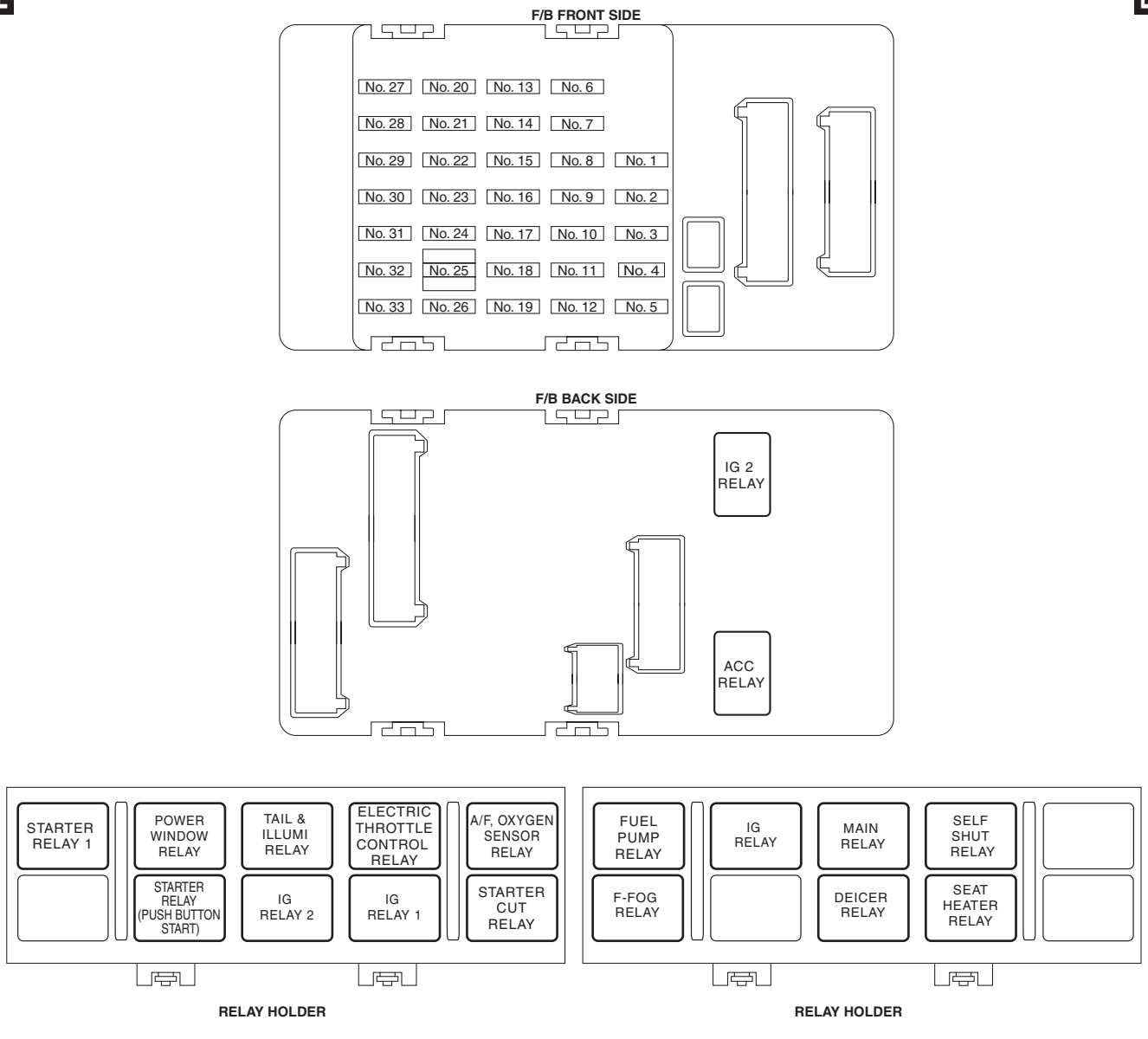


WI-48161

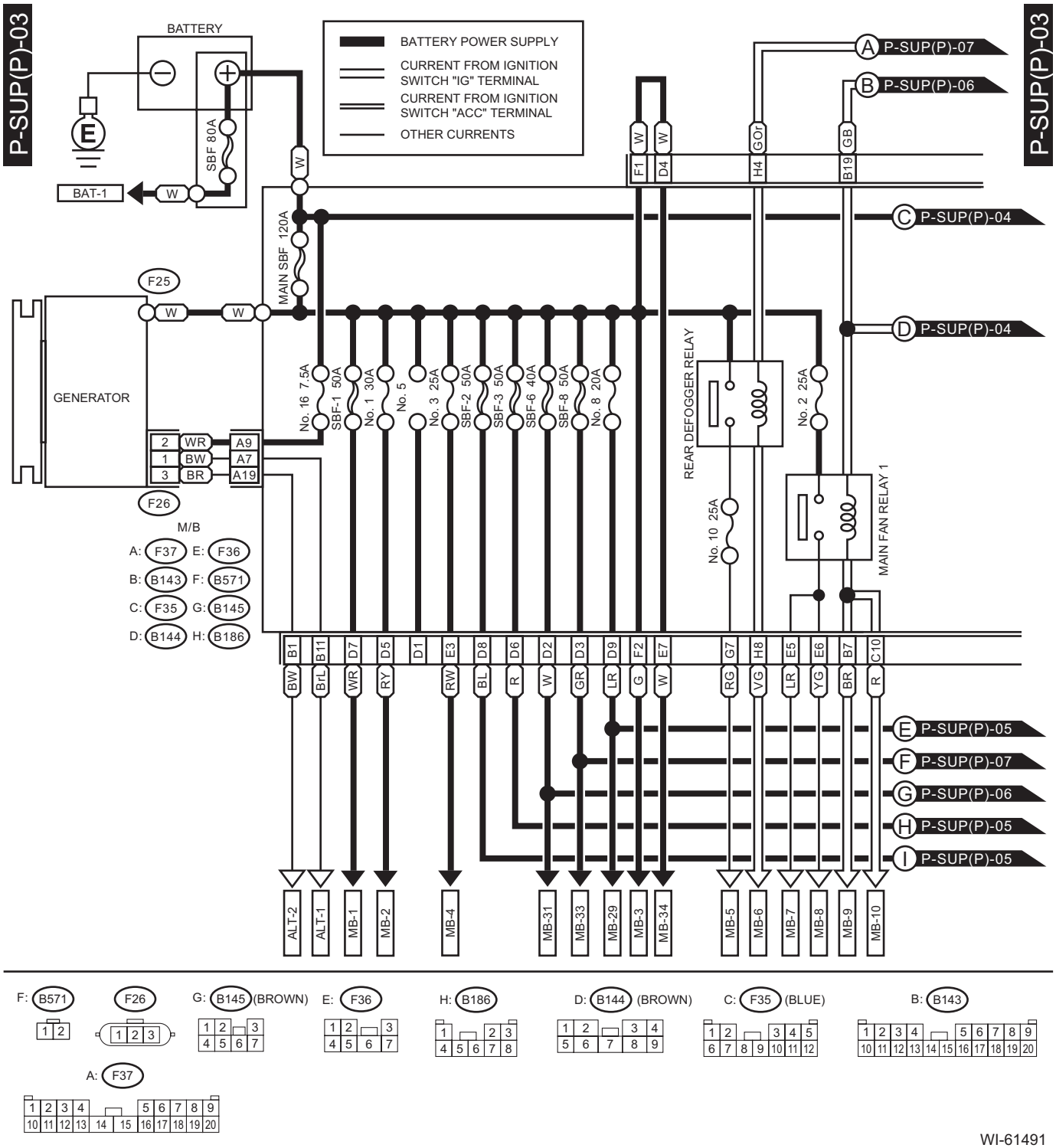
- **Passenger room side**

P-SUP(P)-02

P-SUP(P)-02



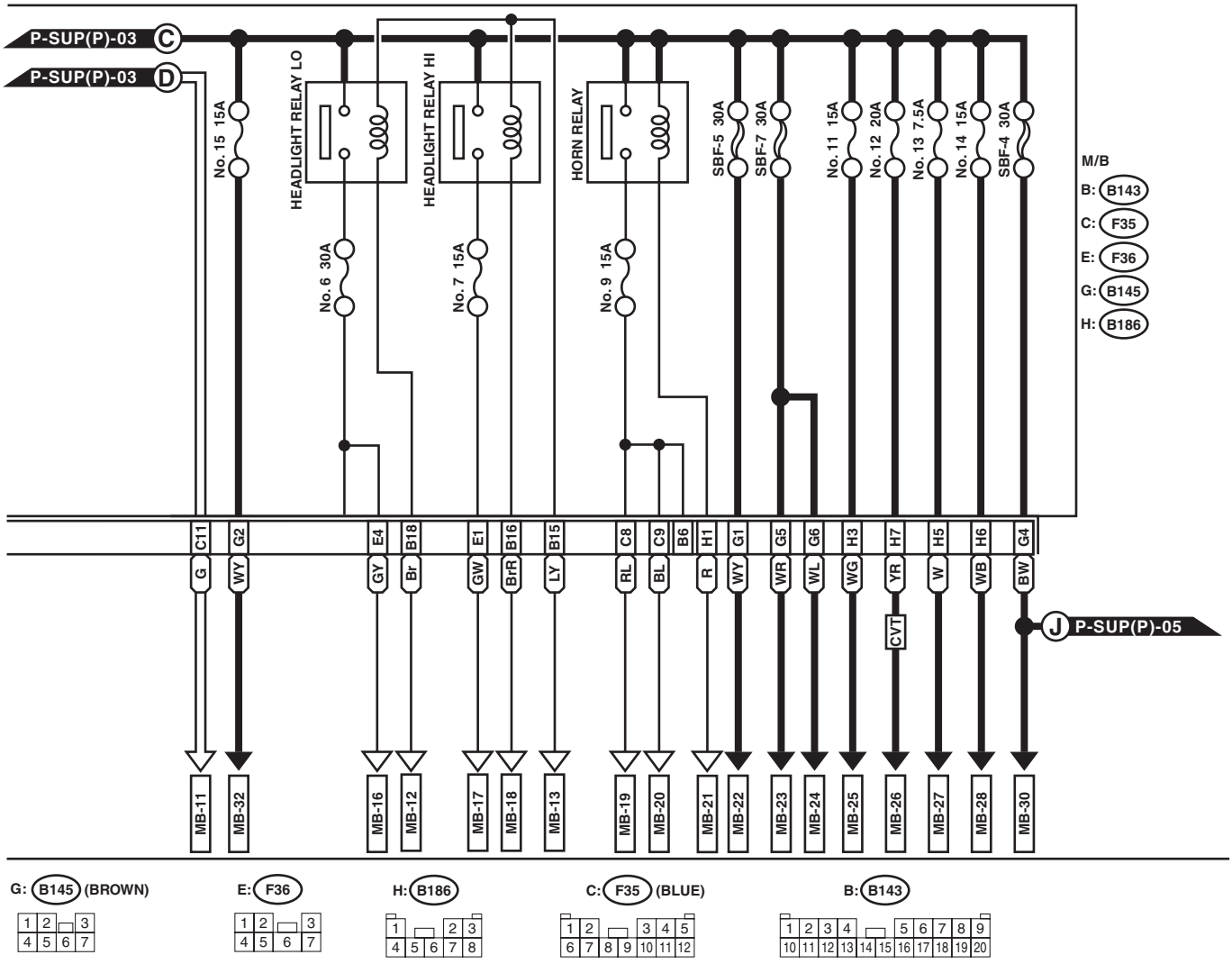
WI-48162


P-SUP(P)-03
BATTERY
BATTERY POWER SUPPLY
CURRENT FROM IGNITION SWITCH "IG" TERMINAL
CURRENT FROM IGNITION SWITCH "ACC" TERMINAL
OTHER CURRENTS
SBF 80A
BAT-1
W
MAIN SBF 120A
F25
F26
GENERATOR
2 WR A9
1 BW A7
3 BR A19
M/B
A: F37 E: F36
B: B143 F: B571
C: F35 G: B145
D: B144 H: B186
No. 16 7.5A
SBF-1 50A
No. 1 30A
No. 5
No. 3 25A
SBF-2 50A
SBF-3 50A
SBF-6 40A
SBF-8 50A
No. 8 20A
No. 10 25A
No. 2 25A
REAR DEFOGGER RELAY
MAIN FAN RELAY 1
A P-SUP(P)-07
B P-SUP(P)-06
C P-SUP(P)-04
D P-SUP(P)-04
E P-SUP(P)-05
F P-SUP(P)-07
G P-SUP(P)-06
H P-SUP(P)-05
I P-SUP(P)-05
ALT-2
ALT-1
MB-1
MB-2
MB-4
MB-31
MB-33
MB-29
MB-3
MB-34
MB-5
MB-6
MB-7
MB-8
MB-9
MB-10

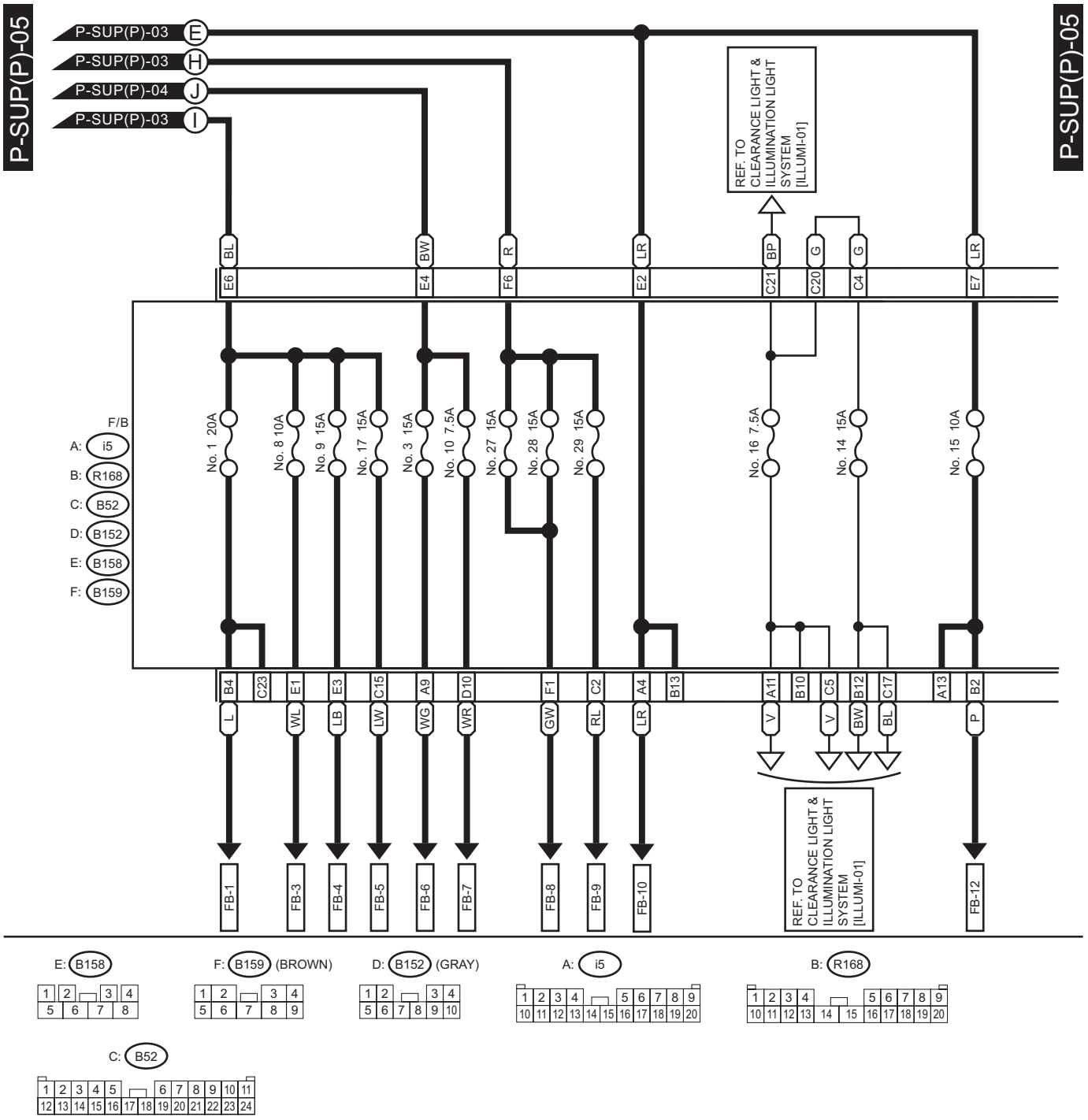
F: B571
F26
G: B145 (BROWN)
E: F36
H: B186
D: B144 (BROWN)
C: F35 (BLUE)
B: B143
A: F37

WI-61491

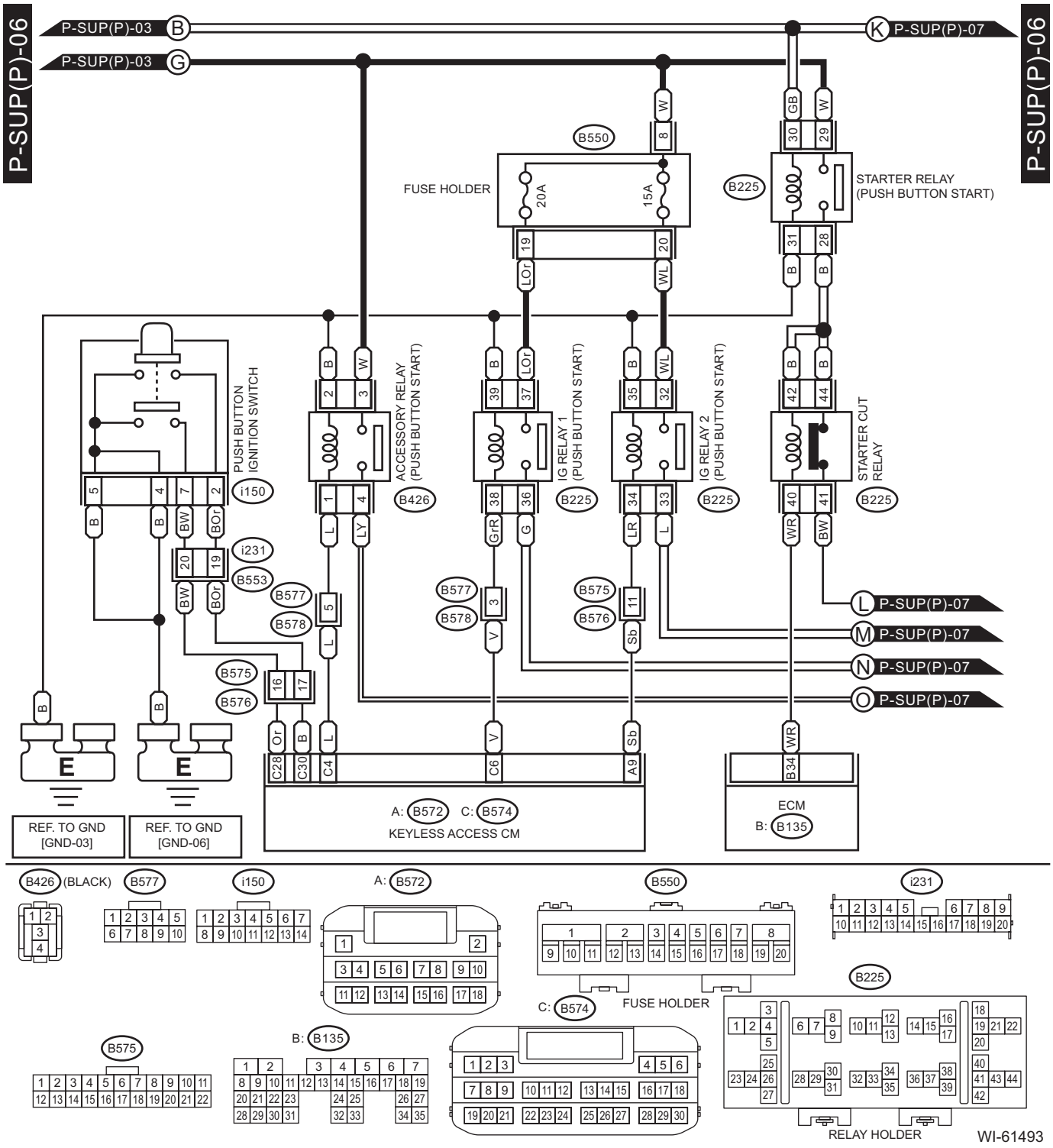
P-SUP(P)-04

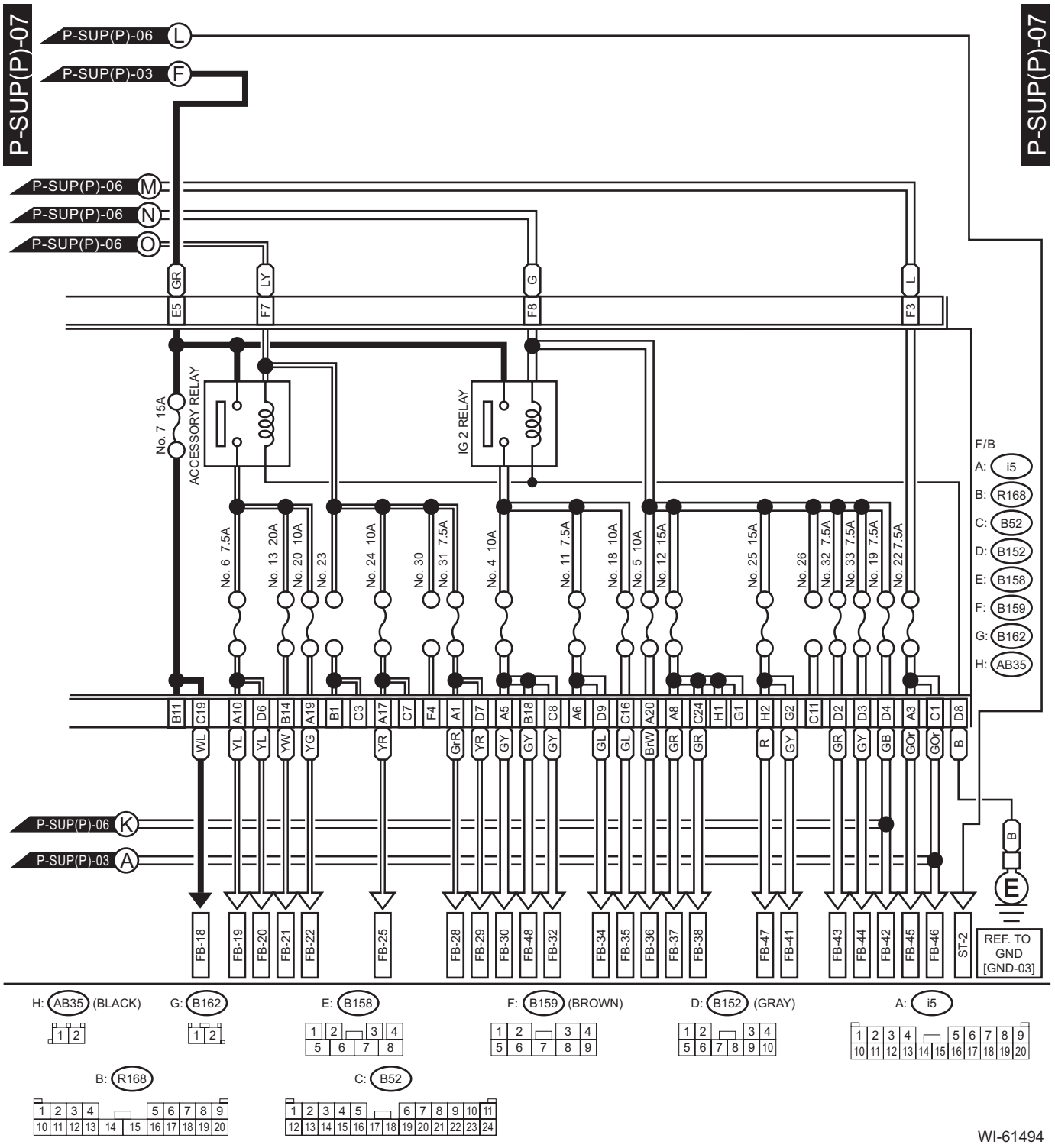


WI-48164


P-SUP(P)-05
P-SUP(P)-03 E
P-SUP(P)-03 H
P-SUP(P)-04 J
P-SUP(P)-03 I
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
BL BW R LR BP G G LR
E6 E4 F6 E2 C21 C20 C4 E7
F/B
A: i5
B: R168
C: B52
D: B152
E: B158
F: B159
No. 1 20A
No. 8 10A
No. 9 15A
No. 17 15A
No. 3 15A
No. 10 7.5A
No. 27 15A
No. 28 15A
No. 29 15A
No. 16 7.5A
No. 14 15A
No. 15 10A
B4 C23 E1 E3 C15 A9 D10 F1 C2 A4 B13 A11 B10 C5 B12 C17 A13 B2
L WL LB LW WG WR GW RL LR V V BW BL P
FB-1 FB-3 FB-4 FB-5 FB-6 FB-7 FB-8 FB-9 FB-10 FB-12
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
E: B158
F: B159 (BROWN)
D: B152 (GRAY)
A: i5
B: R168
C: B52

WI-61492


P-SUP(P)-06
P-SUP(P)-03 B
P-SUP(P)-03 G
K P-SUP(P)-07
P-SUP(P)-06
B550
FUSE HOLDER
20A
15A
B225
STARTER RELAY
(PUSH BUTTON START)
PUSH BUTTON
IGNITION SWITCH
i150
i231
B553
B577
B578
B575
B576
ACCESSORY RELAY
(PUSH BUTTON START)
B426
IG RELAY 1
(PUSH BUTTON START)
IG RELAY 2
(PUSH BUTTON START)
STARTER CUT
RELAY
L P-SUP(P)-07
M P-SUP(P)-07
N P-SUP(P)-07
O P-SUP(P)-07
REF. TO GND
[GND-03]
REF. TO GND
[GND-06]
A: B572 C: B574
KEYLESS ACCESS CM
ECM
B: B135
B426 (BLACK)
B577
i150
A: B572
B550
i231
C: B574
FUSE HOLDER
B225
B575
B: B135
RELAY HOLDER
WI-61493


P-SUP(P)-07
P-SUP(P)-06 L
P-SUP(P)-03 F
P-SUP(P)-06 M
P-SUP(P)-06 N
P-SUP(P)-06 O
GR
LY
G
L
E5
F7
F8
F3
No. 7 15A
ACCESSORY RELAY
IG 2 RELAY
No. 6 7.5A
No. 13 20A
No. 20 10A
No. 23
No. 24 10A
No. 30
No. 31 7.5A
No. 4 10A
No. 11 7.5A
No. 18 10A
No. 5 10A
No. 12 15A
No. 25 15A
No. 26
No. 32 7.5A
No. 33 7.5A
No. 19 7.5A
No. 22 7.5A
F/B
A: i5
B: R168
C: B52
D: B152
E: B158
F: B159
G: B162
H: AB35
B11 C19 A10 D6 B14 A19 B1 C3 A17 C7 F4 A1 D7 A5 B18 C8 A6 D9 C16 A20 A8 C24 H1 G1 H2 G2 C11 D2 D3 D4 A3 C1 D8
WL YL YL YW YG YR GrR YR GY GY GY GL GL BrW GR GR R GY GR GY GB GOr GOr B
P-SUP(P)-06 K
P-SUP(P)-03 A
B
E
FB-18 FB-19 FB-20 FB-21 FB-22 FB-25 FB-28 FB-29 FB-30 FB-48 FB-32 FB-34 FB-35 FB-36 FB-37 FB-38 FB-47 FB-41 FB-43 FB-44 FB-42 FB-45 FB-46 ST-2
REF. TO GND [GND-03]
H: AB35 (BLACK)
G: B162
E: B158
F: B159 (BROWN)
D: B152 (GRAY)
A: i5
B: R168
C: B52
WI-61494

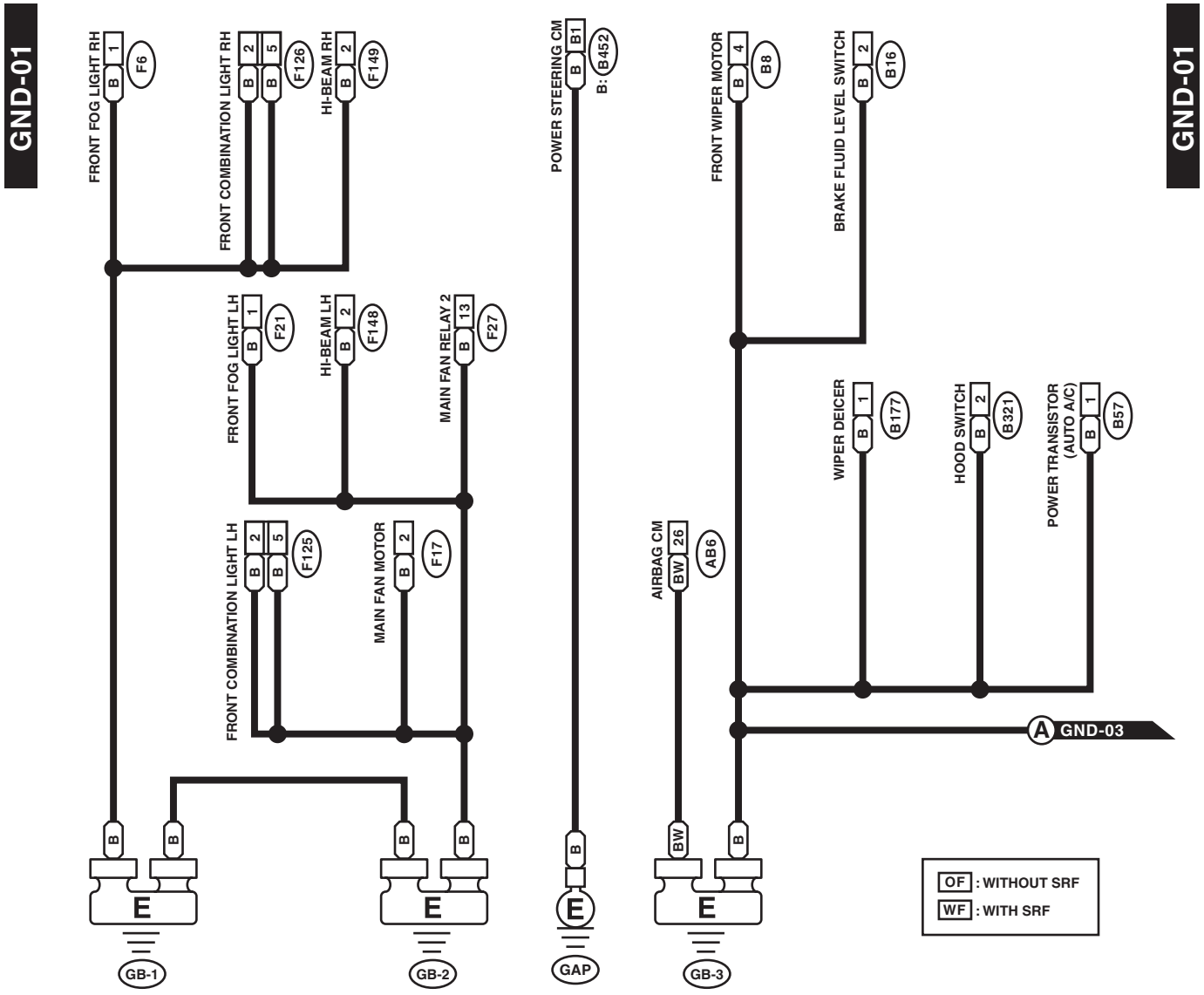
No.	Load
MB-1	VDC CM
MB-2	VDC CM
MB-3	Wiper relay
MB-4	Sub fan relay
MB-5	Mirror heater LH
	Mirror heater RH
	Rear defogger
	A/C control panel
MB-6	Body integrated unit
MB-7	Main fan relay 2
MB-8	Main fan motor
MB-9	ECM
MB-10	Main fan relay 2
MB-11	Main fan relay 2
MB-12	Body integrated unit
MB-13	Body integrated unit
MB-16	Front combination light LH
	Front combination light RH
MB-17	Daytime running light relay
MB-18	Body integrated unit
MB-19	Horn
MB-20	Horn
MB-21	Horn switch
	Body integrated unit
MB-22	A/F, oxygen sensor relay
MB-23	Main relay
	IG relay
MB-24	Electronic throttle control relay
MB-25	Fuel pump relay
MB-26	TCM
	Self shut relay
MB-27	ECM
	Data link connector
MB-28	Turn signal and hazard unit
	Body integrated unit
MB-29	Spot map light
	Room light
	Body integrated unit
	Immobilizer antenna
MB-30	Power window circuit breaker
MB-31	Accessory relay
	IG relay 1
	IG relay 2
MB-32	Tail & illumination relay
	Daytime running light relay
MB-33	Keyless access CM
	ID code box
MB-34	Data communication module
ALT-1	Combination meter
ALT-2	ECM

No.	Load
ST-2	Starter relay 1
FB-1	Trailer connector
FB-3	Stop light and brake switch
	Brake relay
FB-4	Wiper deicer relay
FB-5	Seat heater relay
FB-6	Body integrated unit
FB-7	Remote engine start CM
FB-8	Blower motor relay
FB-9	Front fog light relay
	Front fog light relay LH
	Front fog light relay RH
FB-10	Audio
	MFD
	Navigation unit
FB-12	Keyless entry CM
	TPMS & keyless entry CM
	Trunk room light (4 door model)
	Luggage room light (5 door model/Crosstrek model)
FB-18	Combination meter
	Body integrated unit
	Impact sensor
	Air mix door actuator LH (with left/right independent air conditioner)
	Air mix door actuator RH (with left/right independent air conditioner)
	Mode door actuator
	Air mix door actuator (without left/right independent air conditioner)
	Security CM
	A/C control panel
	Steering lock CM
	Stereo camera
FB-19	Remote control mirror switch
FB-20	Seat heater relay
	Rear view mirror
FB-21	Rear accessory power supply socket
FB-22	Front accessory power supply socket
FB-25	Audio
	Navigation unit
	AUX input terminal
	Data communication module
FB-28	A/C control panel
FB-29	Body integrated unit
FB-30	Radar sensor LH (master)
	Radar sensor RH (slave)
	BSD/RCTA OFF switch

No.	Load
FB-32	Impact sensor
	Data link connector
	Stop light and brake switch
	Wiper deicer relay
	Sunroof motor assembly
	Sunroof switch
	Sunroof switch (tilt)
	Remote engine start CM
FB-34	Turn signal and hazard unit
FB-35	Inhibitor switch
	Back-up light switch
	Auto headlight beam leveler CM
FB-36	Combination meter
	MFD
FB-37	Data communication module
FB-38	ECM
	TCM
	Body integrated unit
	Fuel pump relay
	Keyless access CM
	Stereo camera
FB-41	Airbag CM
FB-42	Power window relay
	Wiper relay
FB-43	Steering lock CM
FB-44	VDC CM
	Steering angle sensor
	Power steering CM
FB-45	A/C control panel
FB-46	A/C relay
	Sub fan relay
	Pressure switch
	Blower motor relay
FB-47	Occupant detection control module
FB-48	TPMS CM
BAT-1	Power steering CM

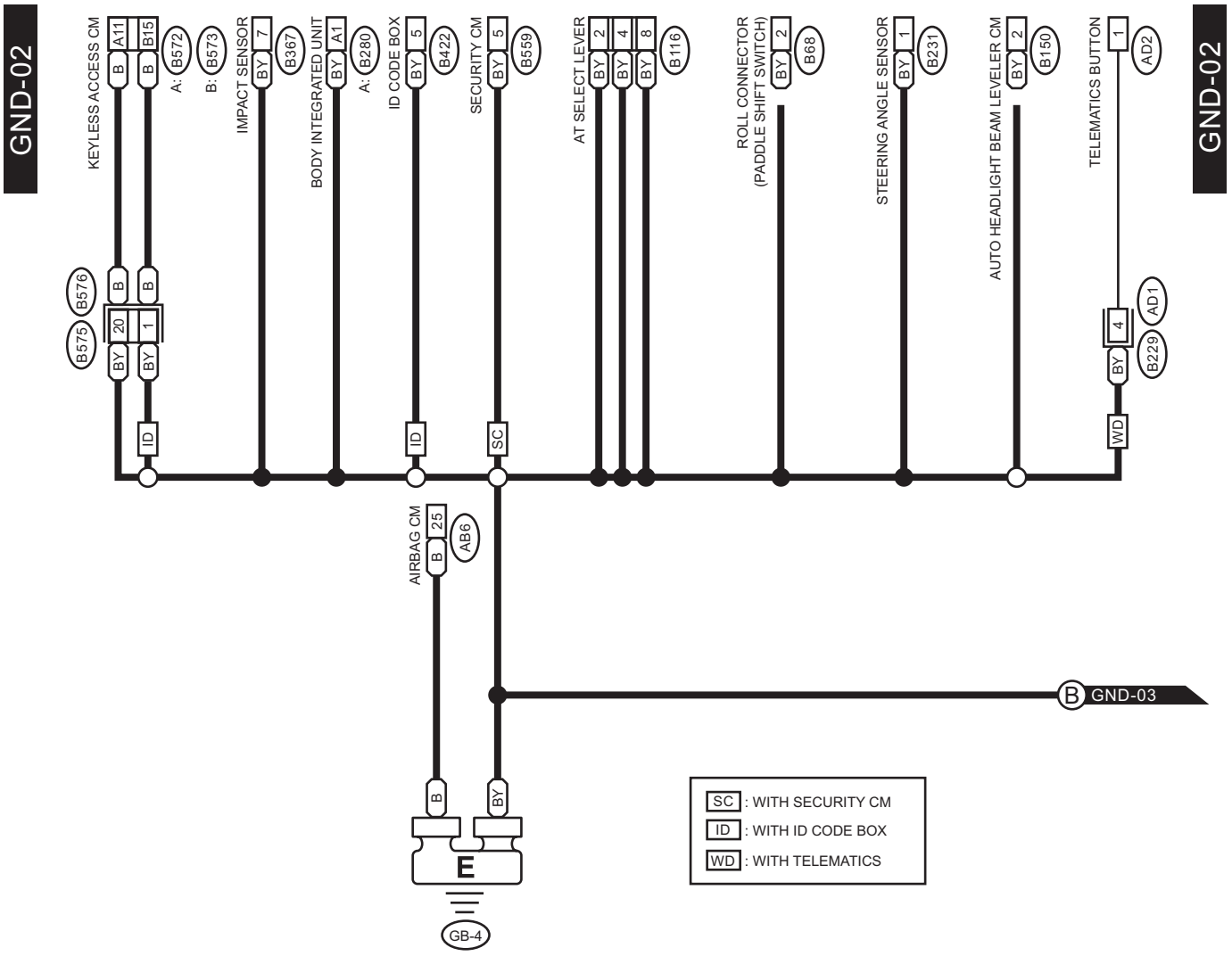
4. Ground Circuit

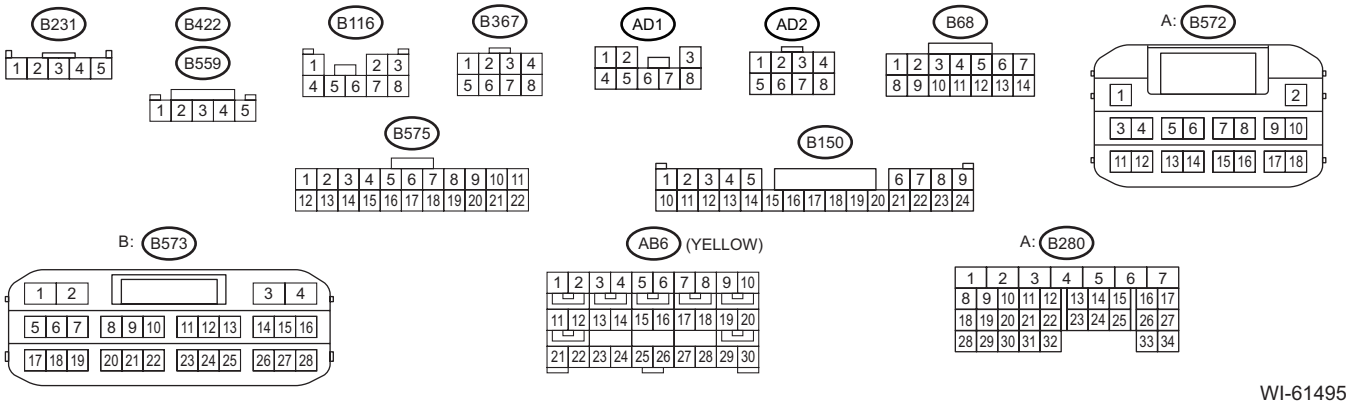
A: WIRING DIAGRAM



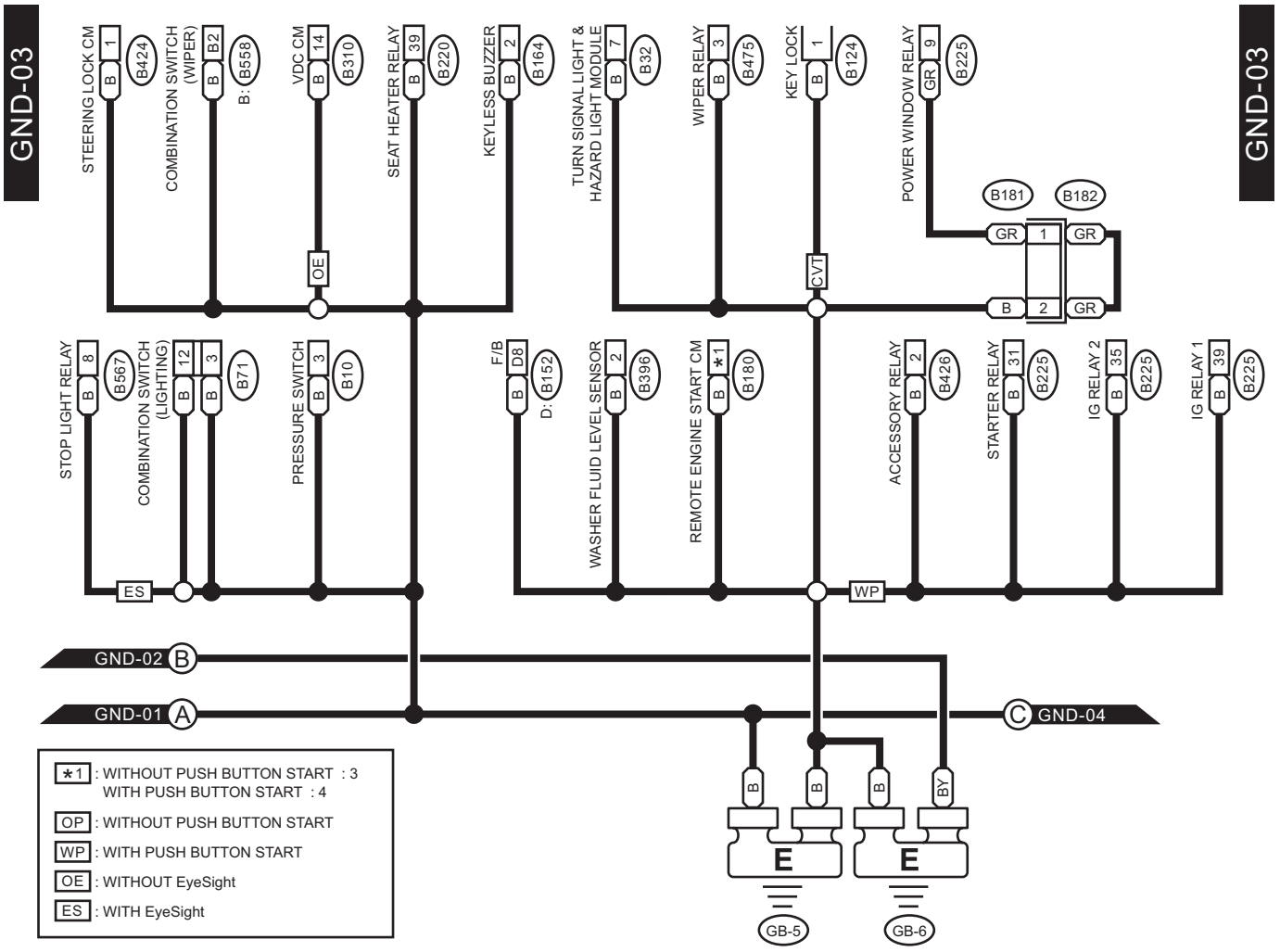
WI-48168

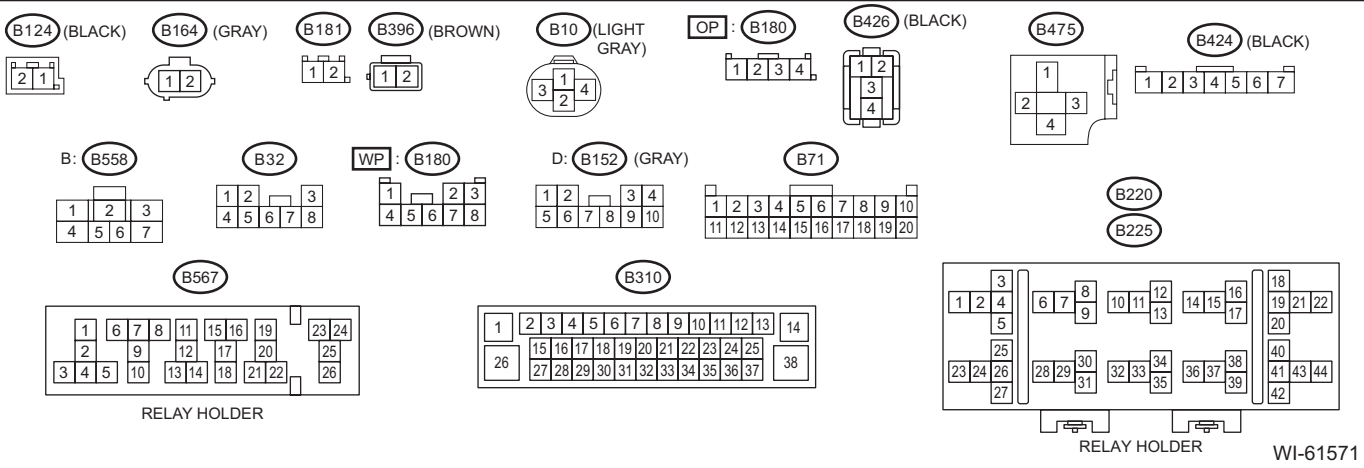
WIRING SYSTEM



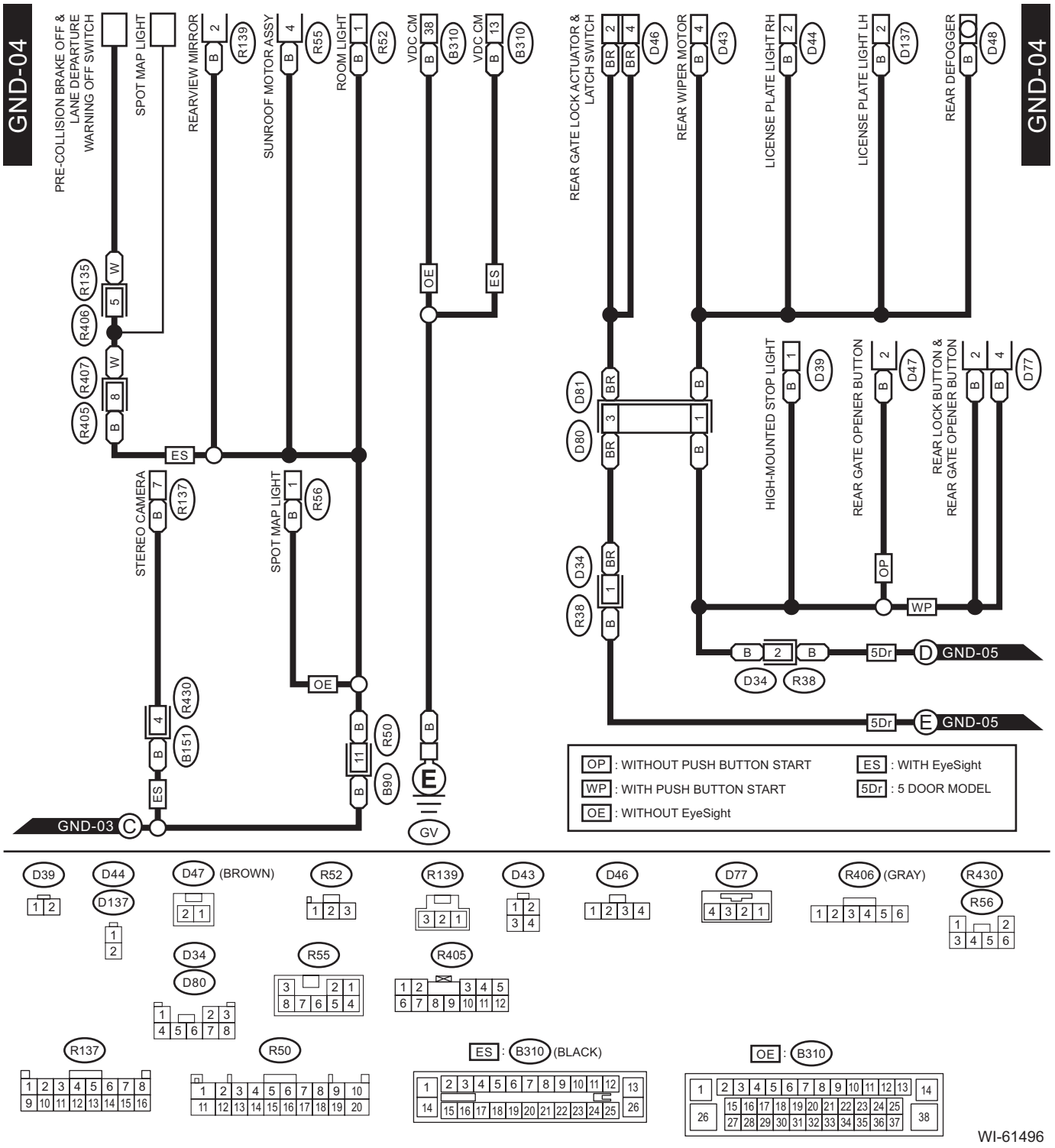


WI-61495


GND-03
GND-03
STEERING LOCK CM
COMBINATION SWITCH (WIPER)
B: B558
VDC CM
SEAT HEATER RELAY
KEYLESS BUZZER
TURN SIGNAL LIGHT & HAZARD LIGHT MODULE
WIPER RELAY
KEY LOCK
POWER WINDOW RELAY
B181
B182
OE
CVT
STOP LIGHT RELAY
COMBINATION SWITCH (LIGHTING)
PRESSURE SWITCH
F/B
D: B152
WASHER FLUID LEVEL SENSOR
REMOTE ENGINE START CM
ACCESSORY RELAY
STARTER RELAY
IG RELAY 2
IG RELAY 1
ES
WP
GND-02 B
GND-01 A
C GND-04
*1 : WITHOUT PUSH BUTTON START : 3
WITH PUSH BUTTON START : 4
OP : WITHOUT PUSH BUTTON START
WP : WITH PUSH BUTTON START
OE : WITHOUT EyeSight
ES : WITH EyeSight
GB-5
GB-6

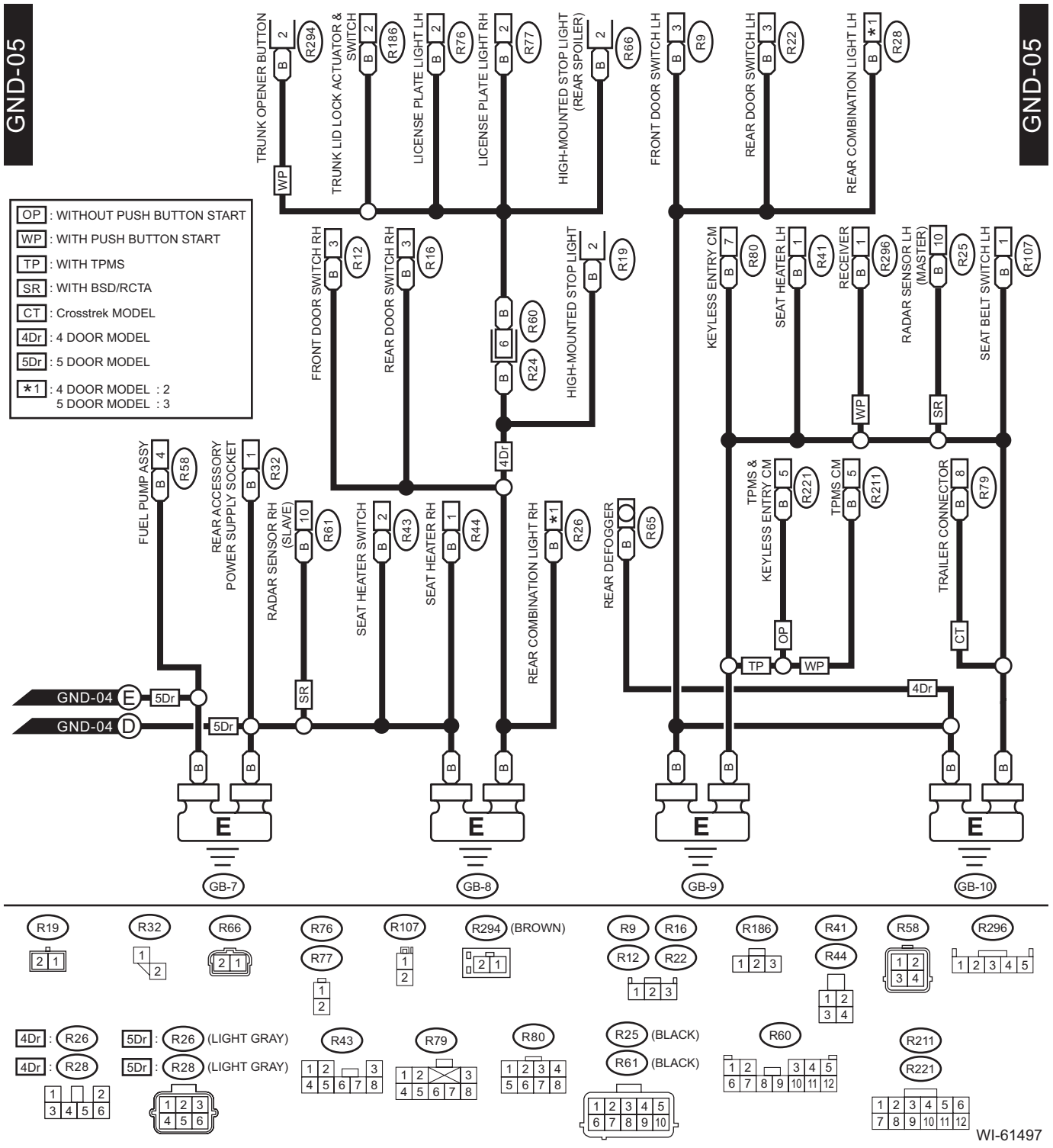

B124 (BLACK)
B164 (GRAY)
B181
B396 (BROWN)
B10 (LIGHT GRAY)
OP : B180
B426 (BLACK)
B475
B424 (BLACK)
B: B558
B32
WP : B180
D: B152 (GRAY)
B71
B220
B225
B567
B310
RELAY HOLDER
RELAY HOLDER
WI-61571

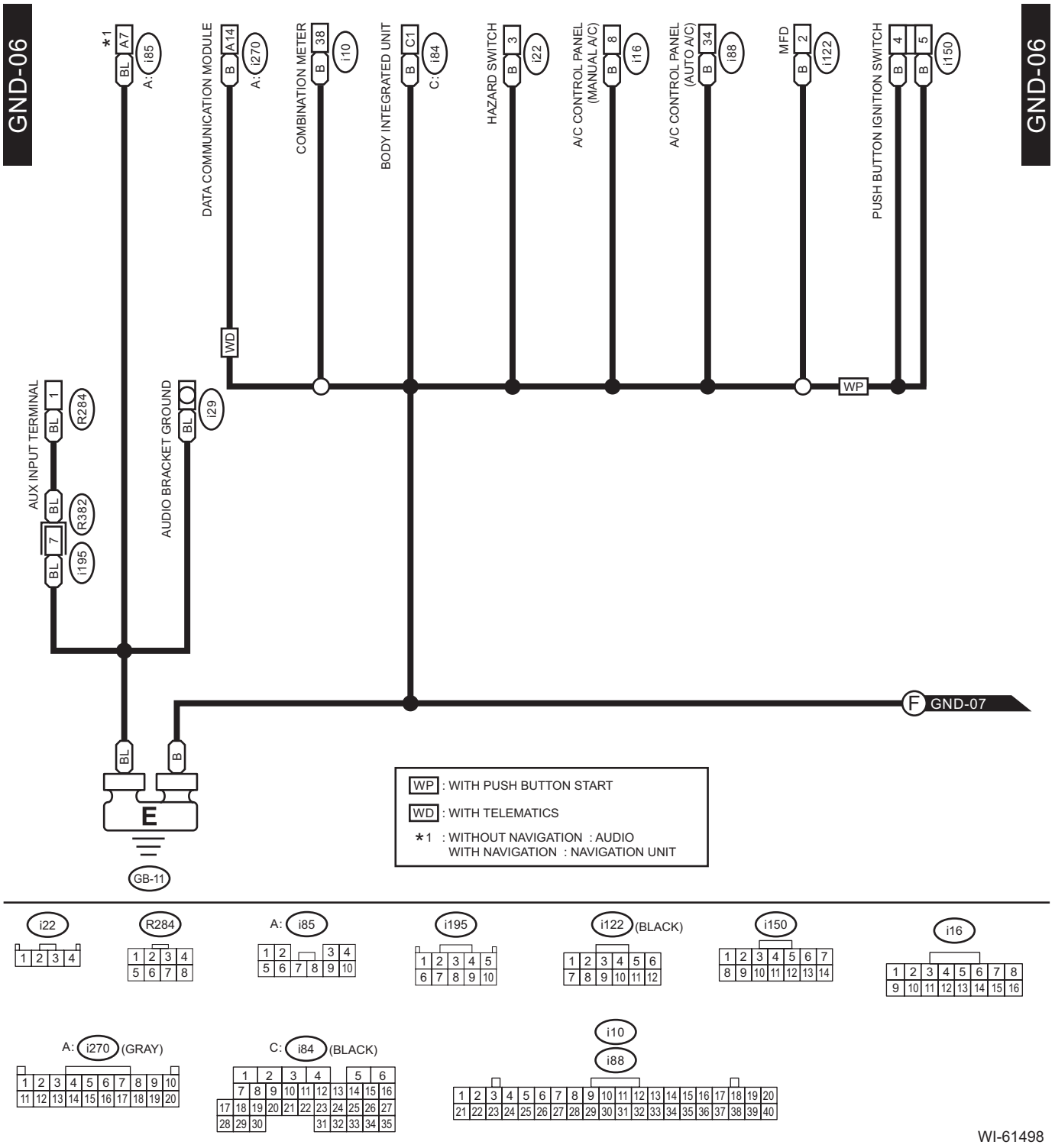
WIRING SYSTEM



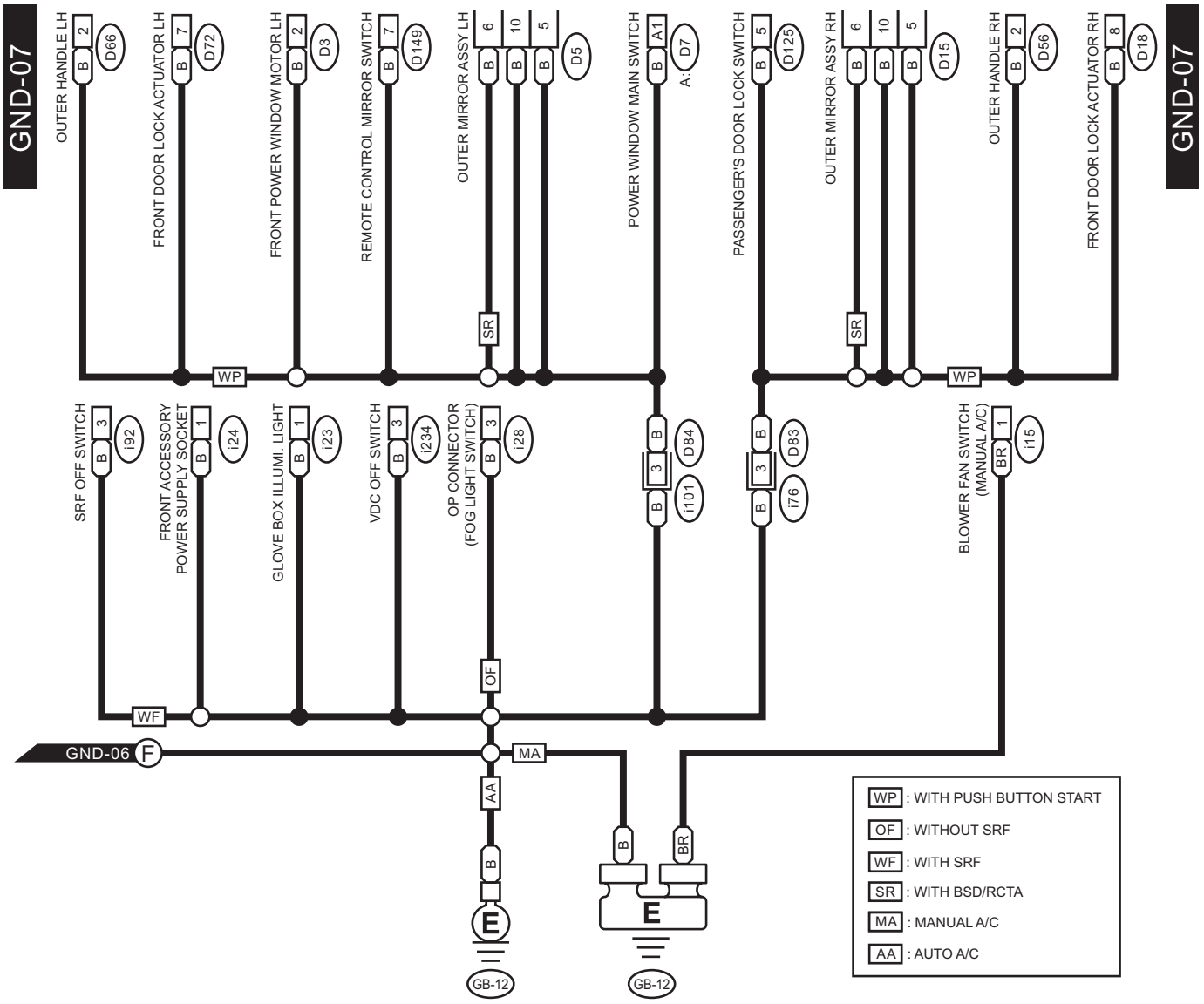
WI-61496

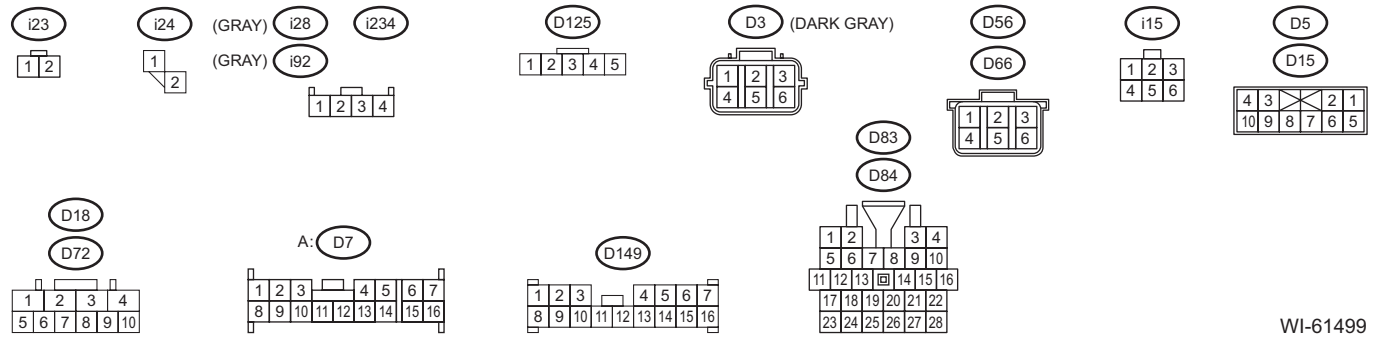
Ground Circuit




GND-06
GND-06
*1
A7
BL
i85
A:
DATA COMMUNICATION MODULE
A14
B
i270
A:
COMBINATION METER
38
B
i10
BODY INTEGRATED UNIT
C1
B
i84
C:
HAZARD SWITCH
3
B
i22
A/C CONTROL PANEL (MANUAL A/C)
8
B
i16
A/C CONTROL PANEL (AUTO A/C)
34
B
i88
MFD
2
B
i122
PUSH BUTTON IGNITION SWITCH
4
B
5
B
i150
WD
WP
AUX INPUT TERMINAL
1
BL
R284
BL
R382
7
BL
i195
AUDIO BRACKET GROUND
BL
i29
F
GND-07
BL
B
E
GB-11
WP : WITH PUSH BUTTON START
WD : WITH TELEMATICS
*1 : WITHOUT NAVIGATION : AUDIO
WITH NAVIGATION : NAVIGATION UNIT
i22
R284
A: i85
i195
i122 (BLACK)
i150
i16
A: i270 (GRAY)
C: i84 (BLACK)
i10
i88
WI-61498

Ground Circuit

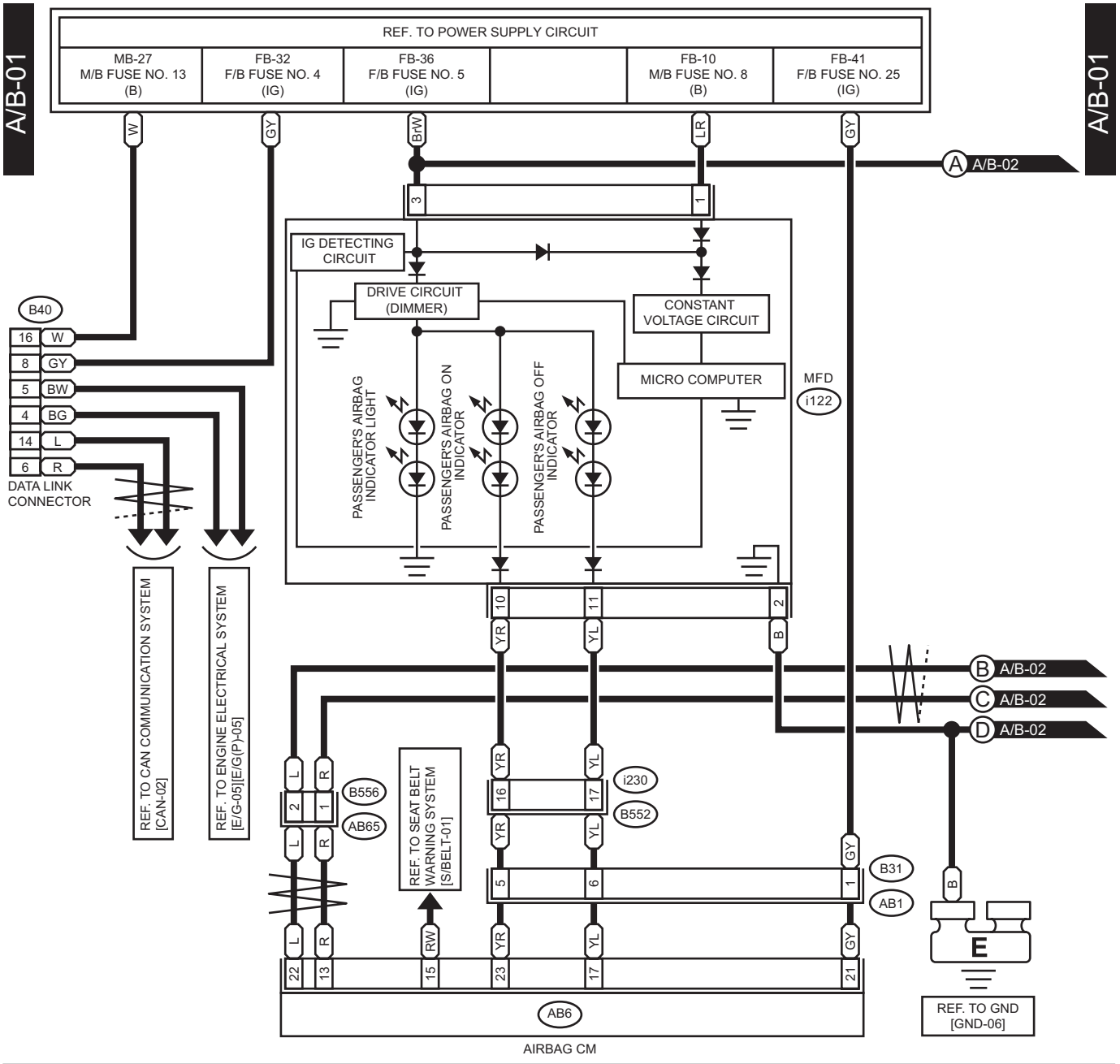


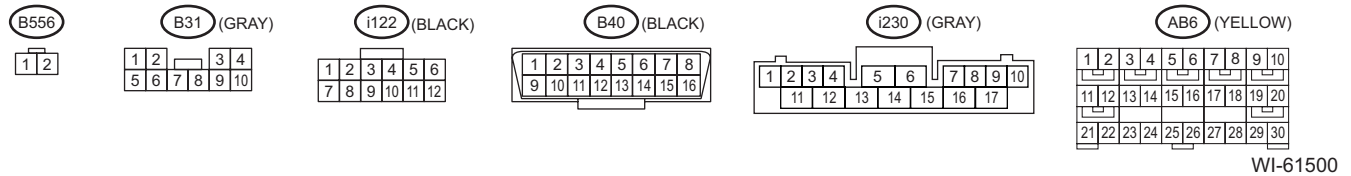


WI-61499

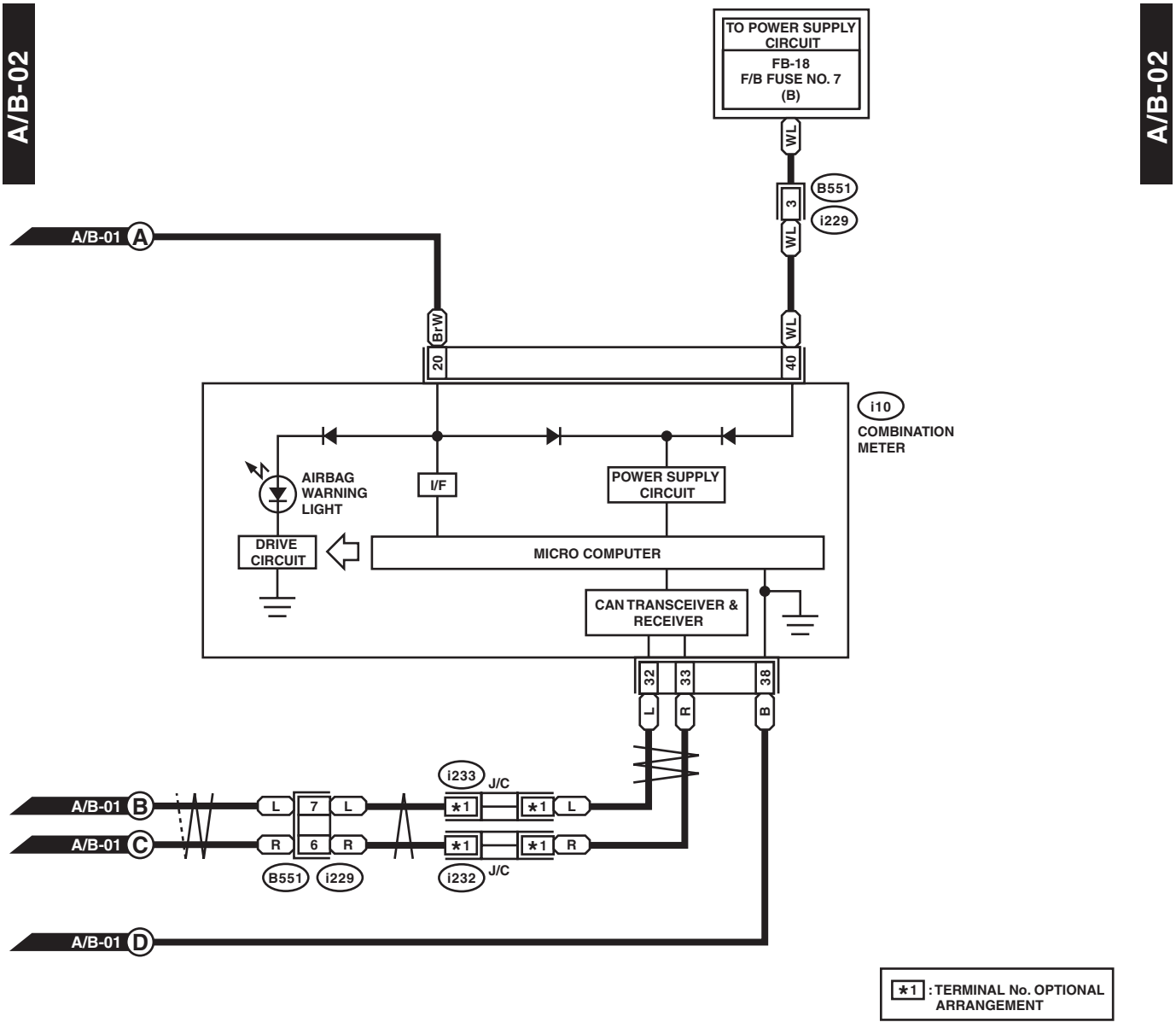
5. Airbag System

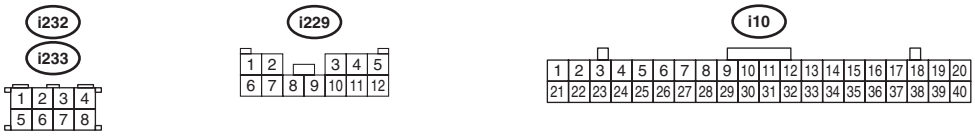
A: WIRING DIAGRAM





WI-61500

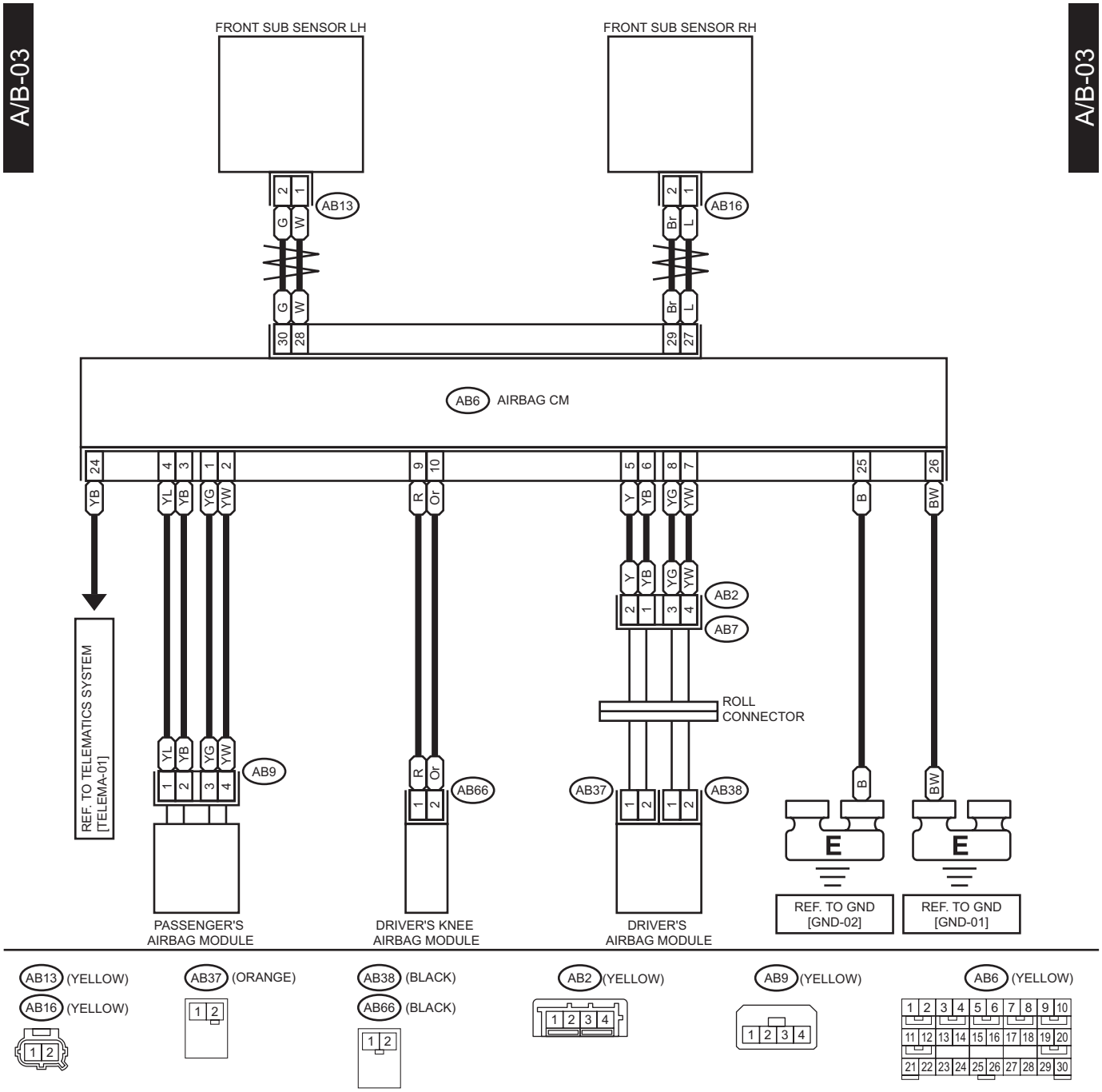

A/B-02
A/B-02
TO POWER SUPPLY CIRCUIT
FB-18
F/B FUSE NO. 7
(B)
WL
B551
3
i229
WL
A/B-01 A
BrW
WL
20
40
i10
COMBINATION METER
AIRBAG WARNING LIGHT
I/F
POWER SUPPLY CIRCUIT
DRIVE CIRCUIT
MICRO COMPUTER
CAN TRANSCEIVER & RECEIVER
32
33
38
L
R
B
i233
J/C
A/B-01 B
L
7
L
*1
*1
L
A/B-01 C
R
6
R
*1
*1
R
B551
i229
i232
J/C
A/B-01 D
*1 : TERMINAL No. OPTIONAL ARRANGEMENT


i232
i233
1 2 3 4
5 6 7 8
i229
1 2 3 4 5
6 7 8 9 10 11 12
i10
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

WI-34148

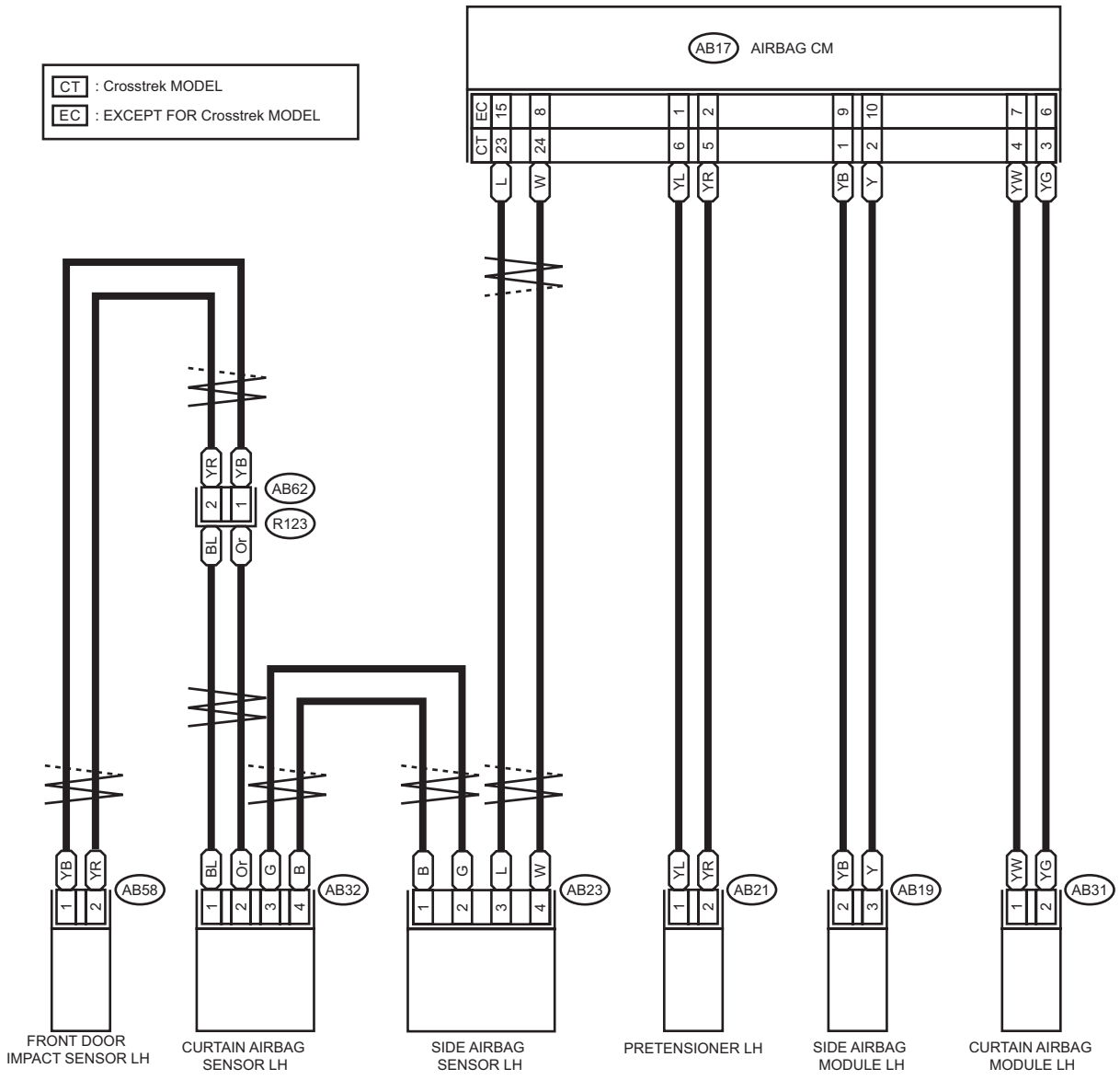
WIRING SYSTEM

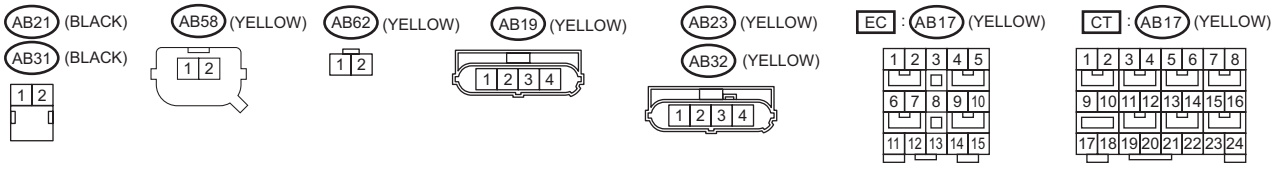
A/B-03



WI-62492

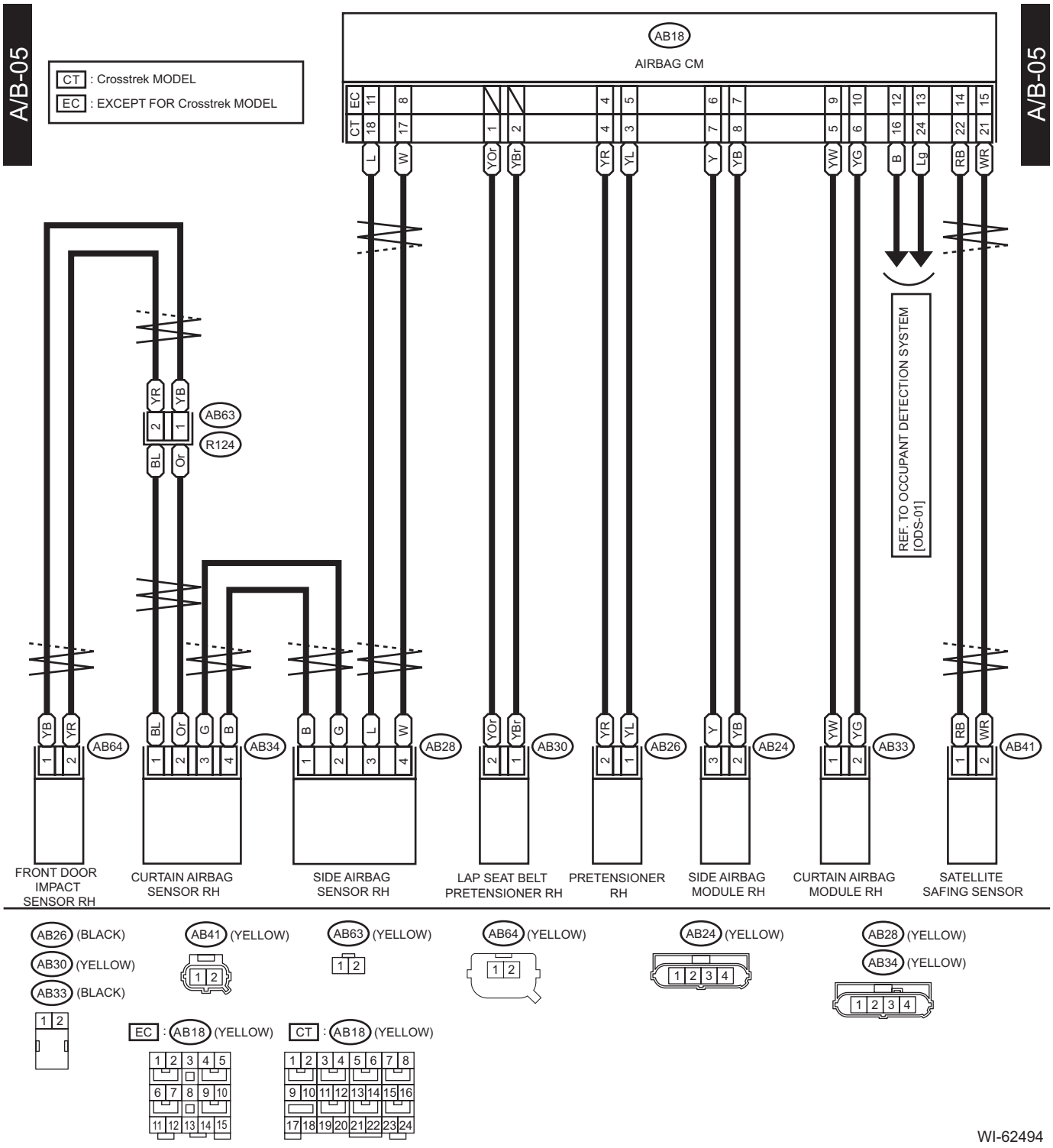
A/B-04





WI-62493

WIRING SYSTEM

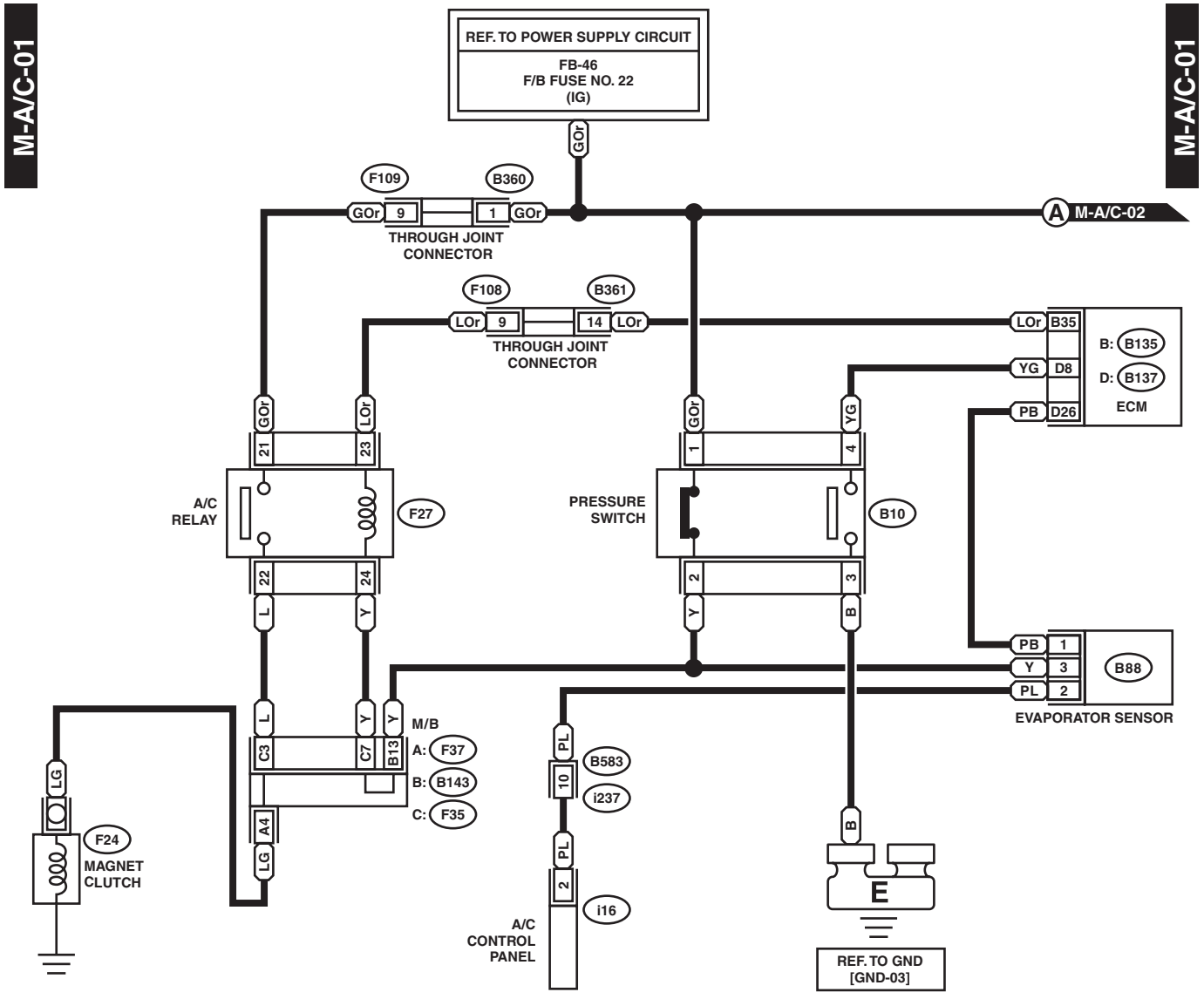


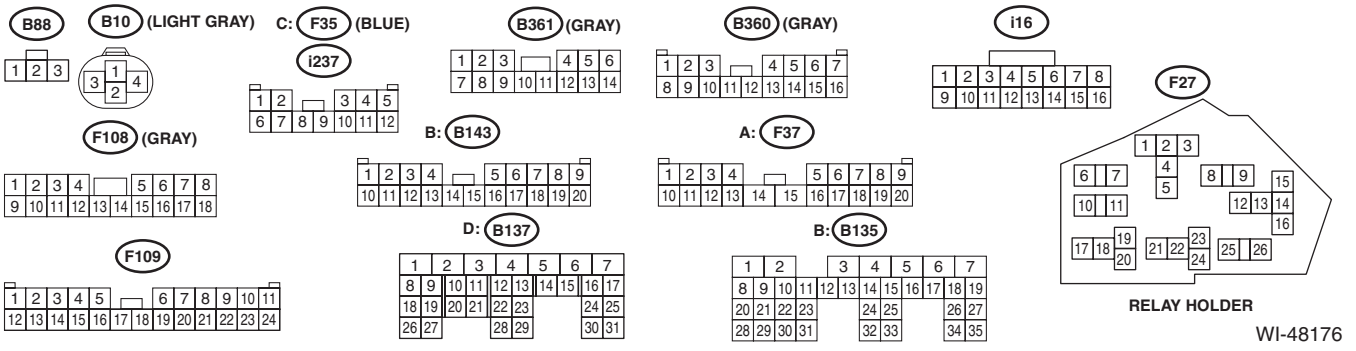
WI-62494

6. Air Conditioning System

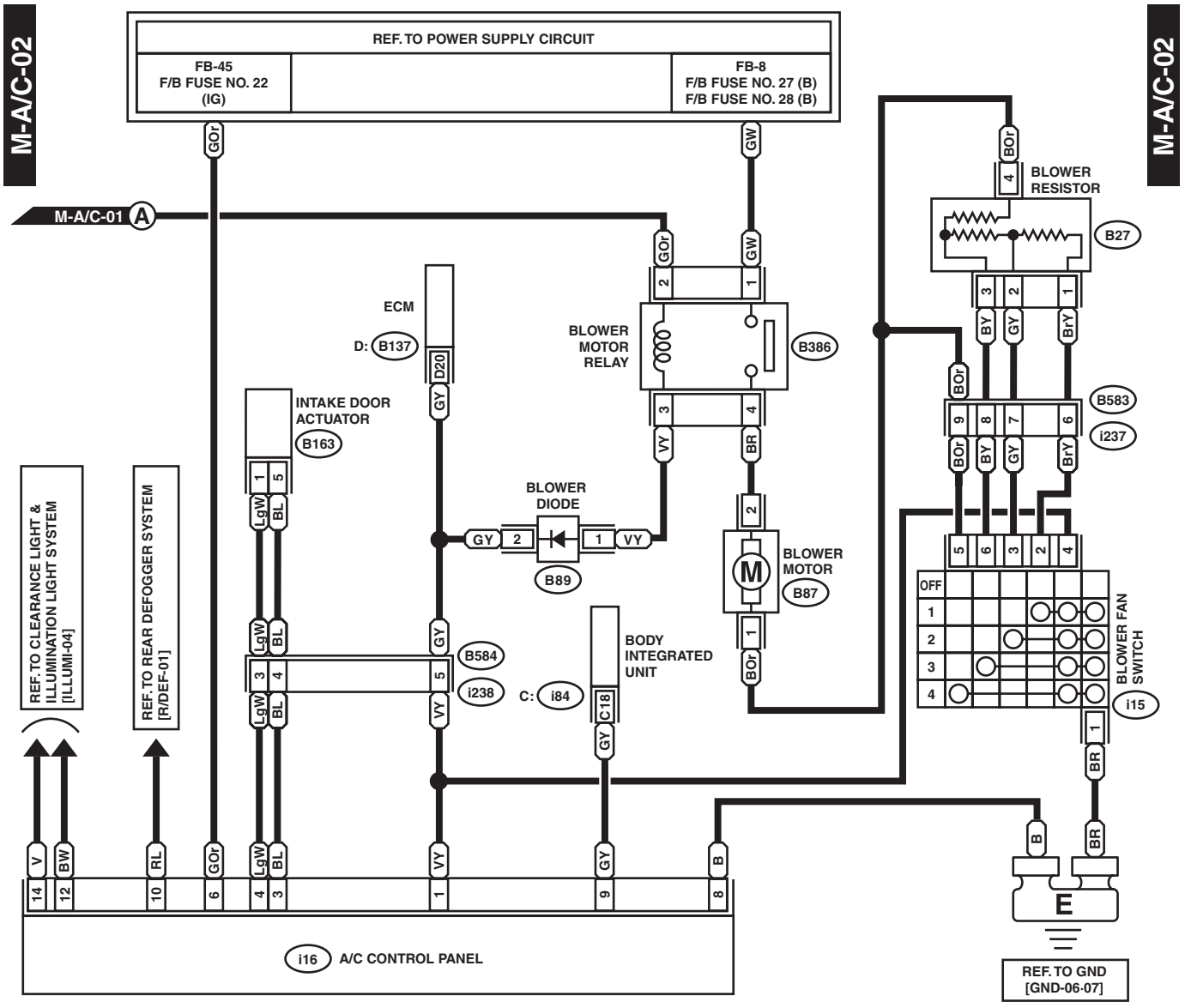
A: WIRING DIAGRAM

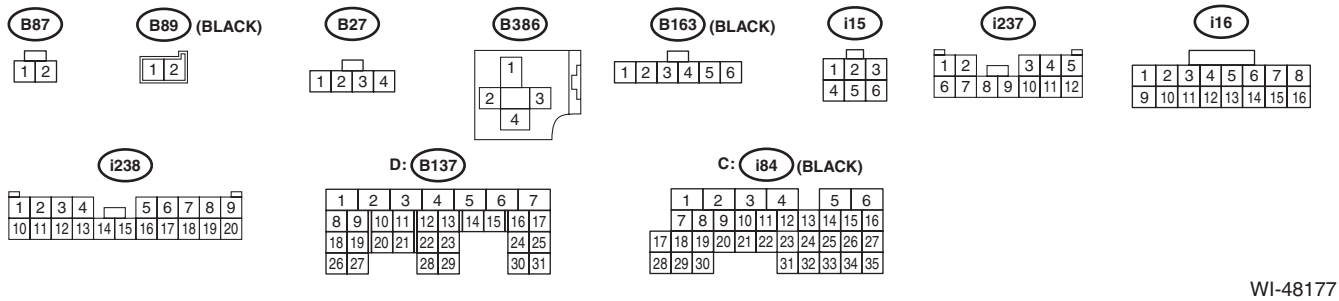
1. MANUAL A/C MODEL





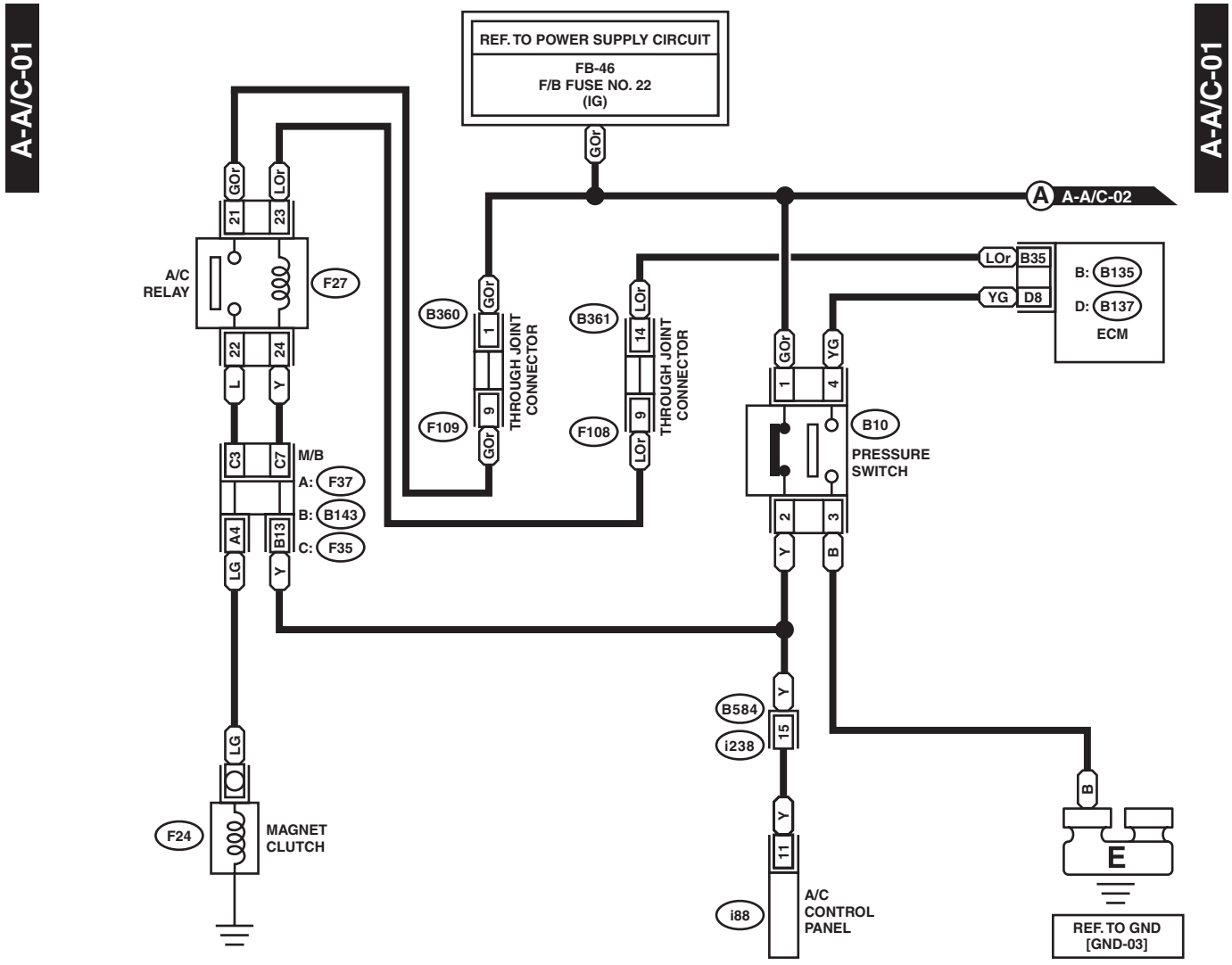
WIRING SYSTEM

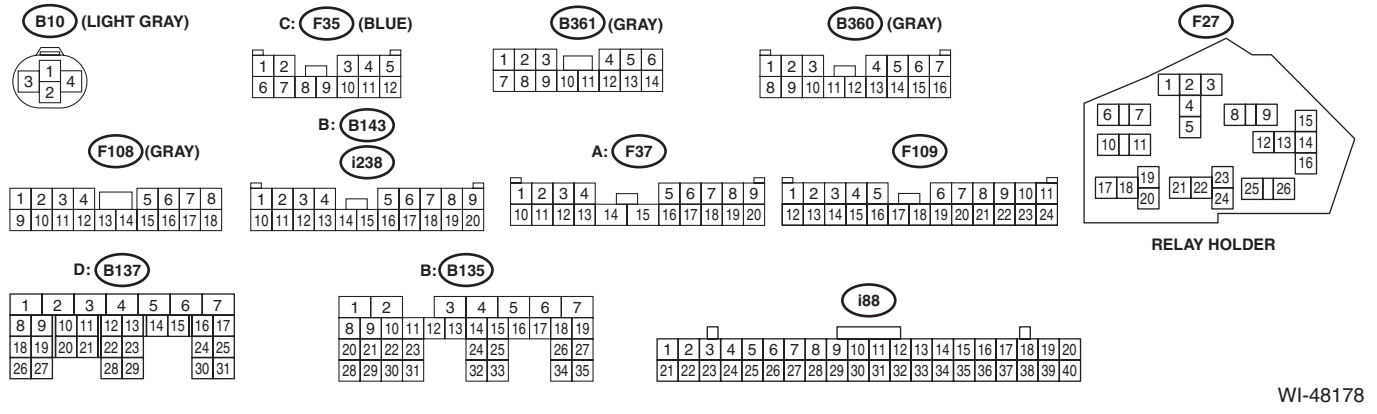




WI-48177

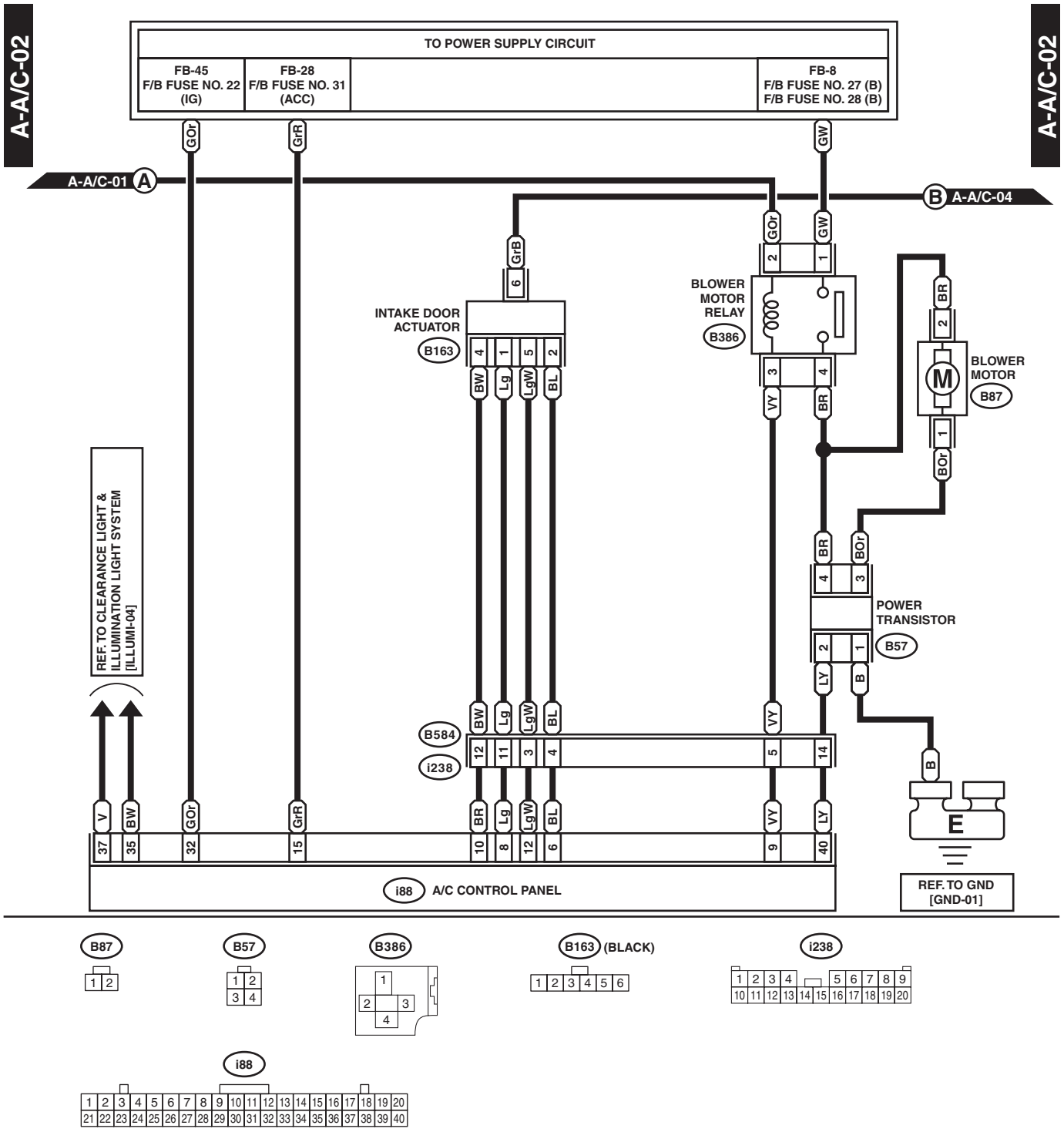
2. AUTO A/C MODEL

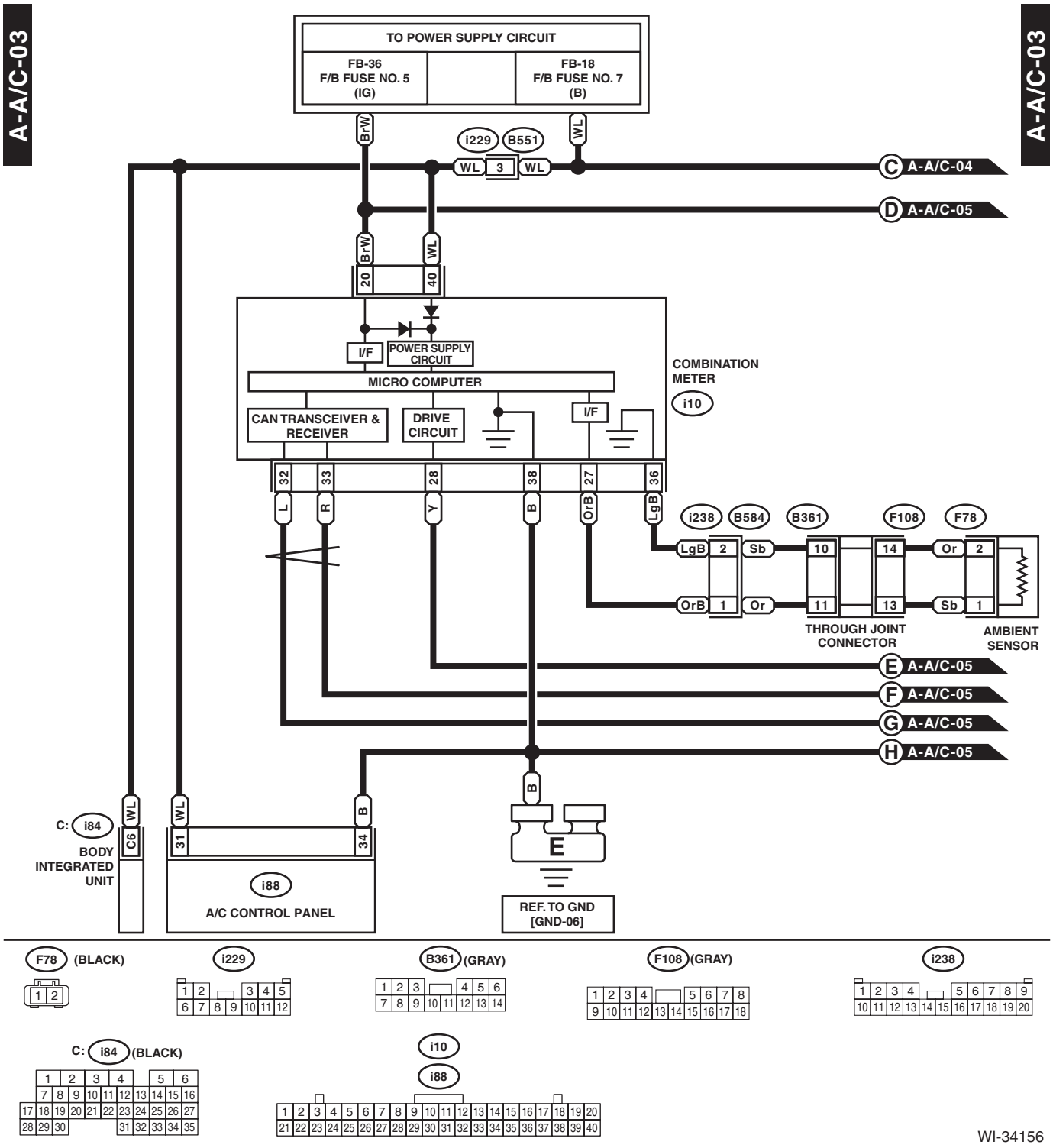




WI-48178

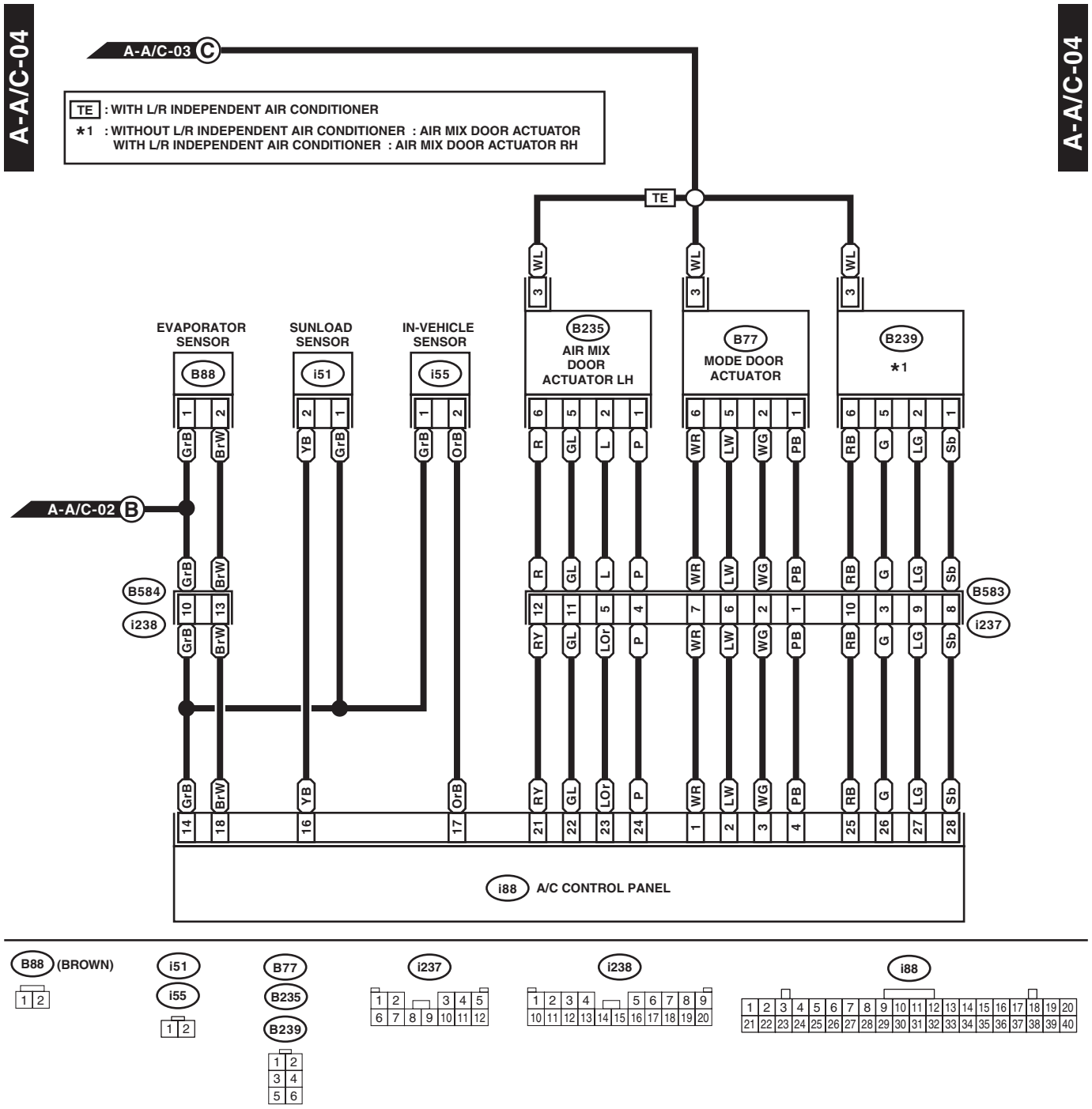
WIRING SYSTEM




A-A/C-03
A-A/C-03
TO POWER SUPPLY CIRCUIT
FB-36
F/B FUSE NO. 5
(IG)
FB-18
F/B FUSE NO. 7
(B)
BrW
WL
i229
B551
WL
3
WL
C A-A/C-04
D A-A/C-05
BrW
WL
20
40
I/F
POWER SUPPLY CIRCUIT
MICRO COMPUTER
CAN TRANSCEIVER & RECEIVER
DRIVE CIRCUIT
I/F
COMBINATION METER
i10
32
33
28
38
27
36
L
R
Y
B
OrB
LgB
i238
B584
B361
F108
F78
LgB
2
Sb
10
14
Or
2
OrB
1
Or
11
13
Sb
1
THROUGH JOINT CONNECTOR
AMBIENT SENSOR
E A-A/C-05
F A-A/C-05
G A-A/C-05
H A-A/C-05
B
C: i84
WL
C6
BODY INTEGRATED UNIT
WL
B
31
34
i88
A/C CONTROL PANEL
E
REF. TO GND [GND-06]

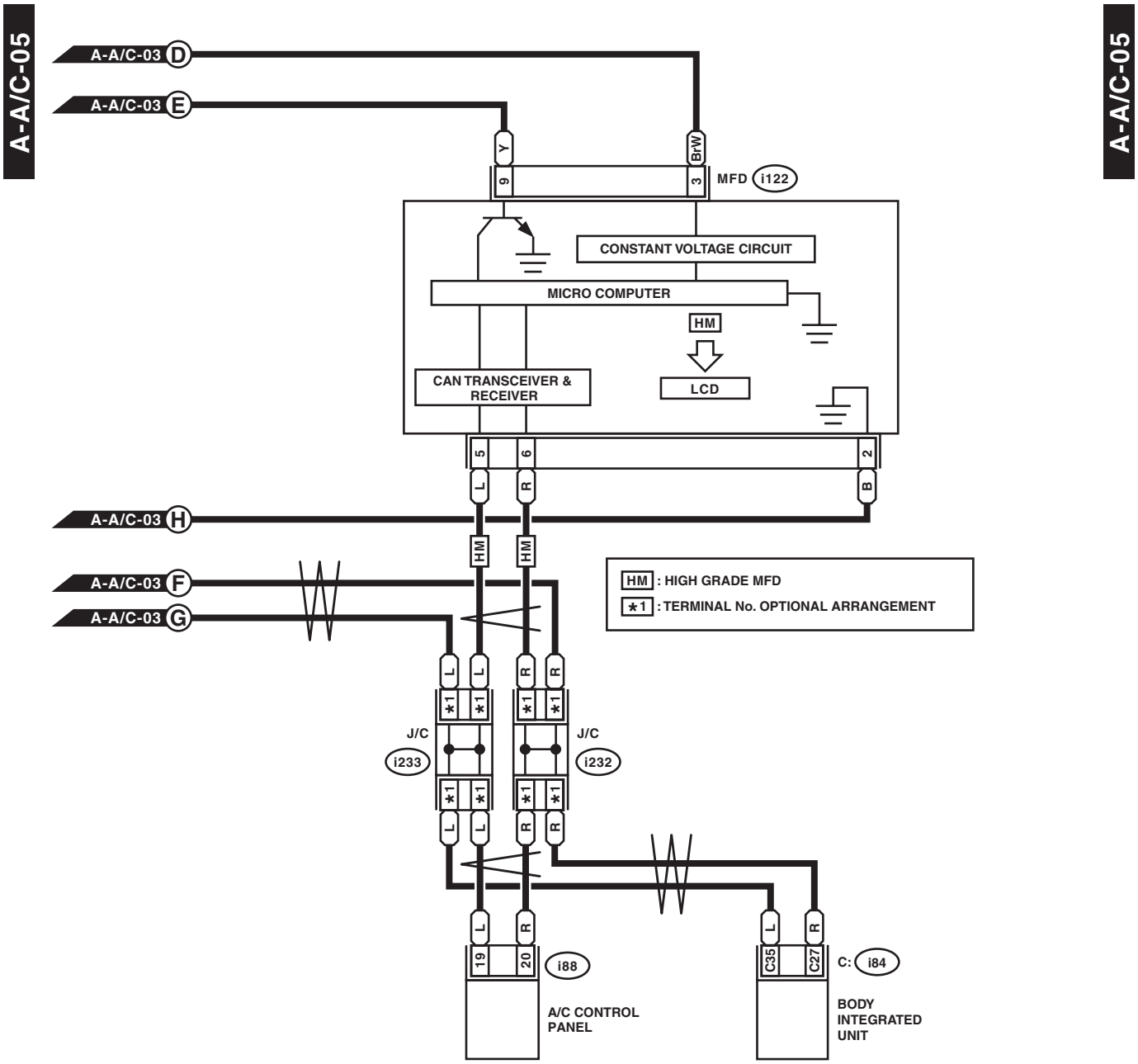
F78 (BLACK)
i229
B361 (GRAY)
F108 (GRAY)
i238
C: i84 (BLACK)
i10
i88

WI-34156


A-A/C-04
A-A/C-04
A-A/C-03 C
TE : WITH L/R INDEPENDENT AIR CONDITIONER
*1 : WITHOUT L/R INDEPENDENT AIR CONDITIONER : AIR MIX DOOR ACTUATOR
WITH L/R INDEPENDENT AIR CONDITIONER : AIR MIX DOOR ACTUATOR RH
TE
EVAPORATOR SENSOR
B88
SUNLOAD SENSOR
i51
IN-VEHICLE SENSOR
i55
B235
AIR MIX DOOR ACTUATOR LH
B77
MODE DOOR ACTUATOR
B239
*1
A-A/C-02 B
B584
i238
B583
i237
i88 A/C CONTROL PANEL

B88 (BROWN)
i51
i55
B77
B235
B239
i237
i238
i88

WI-34157

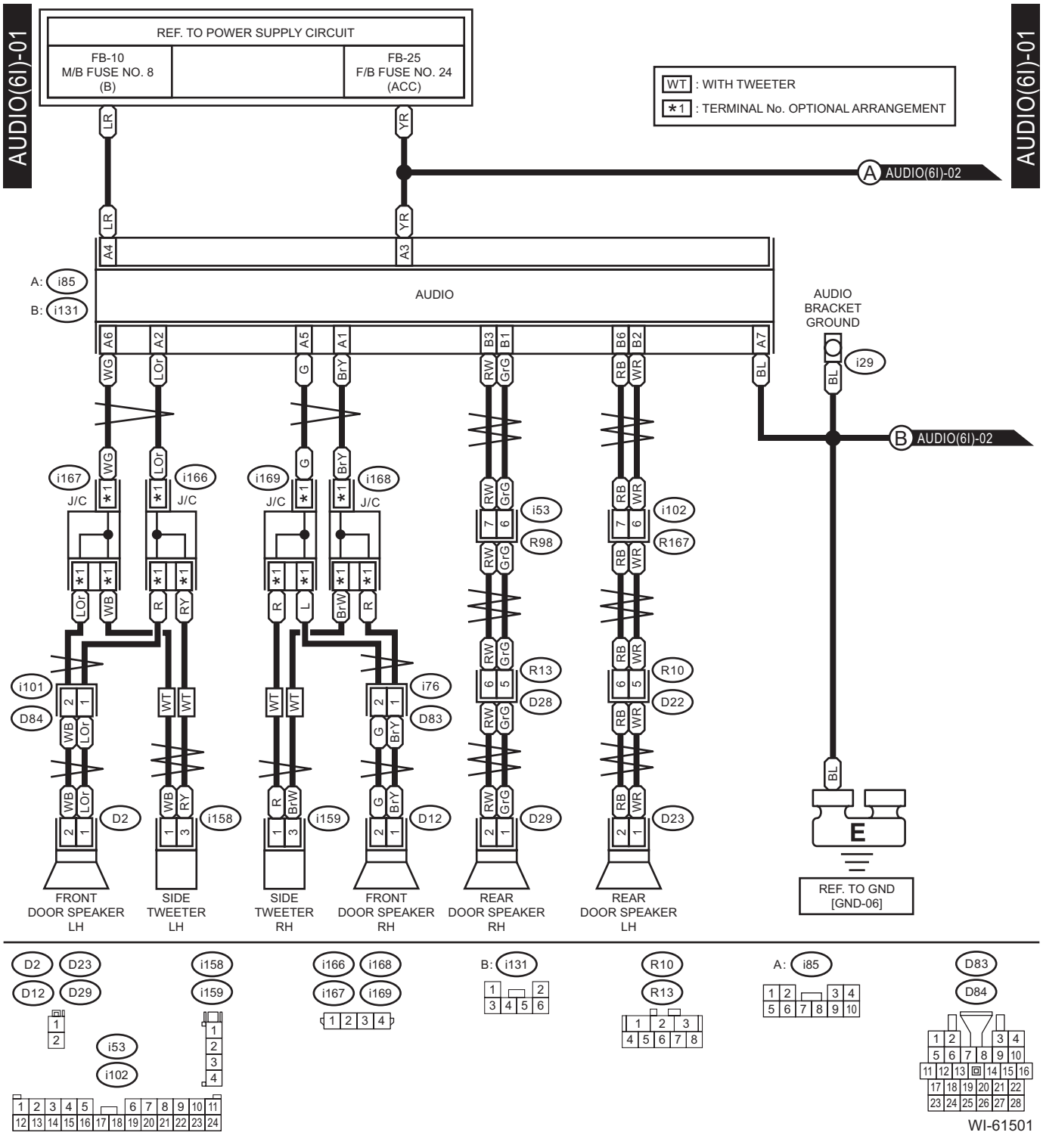

A-A/C-05
A-A/C-05
A-A/C-03 D
A-A/C-03 E
Y
Br-W
9
3
MFD i122
CONSTANT VOLTAGE CIRCUIT
MICRO COMPUTER
HM
LCD
CAN TRANSCEIVER & RECEIVER
5
6
2
L
R
B
A-A/C-03 H
HM
HM
A-A/C-03 F
A-A/C-03 G
HM : HIGH GRADE MFD
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
L
R
*1
J/C i233
J/C i232
19
20
i88
A/C CONTROL PANEL
C35
C27
C: i84
BODY INTEGRATED UNIT
i232
i233
i122 (BLACK)
C: i84 (BLACK)
i88

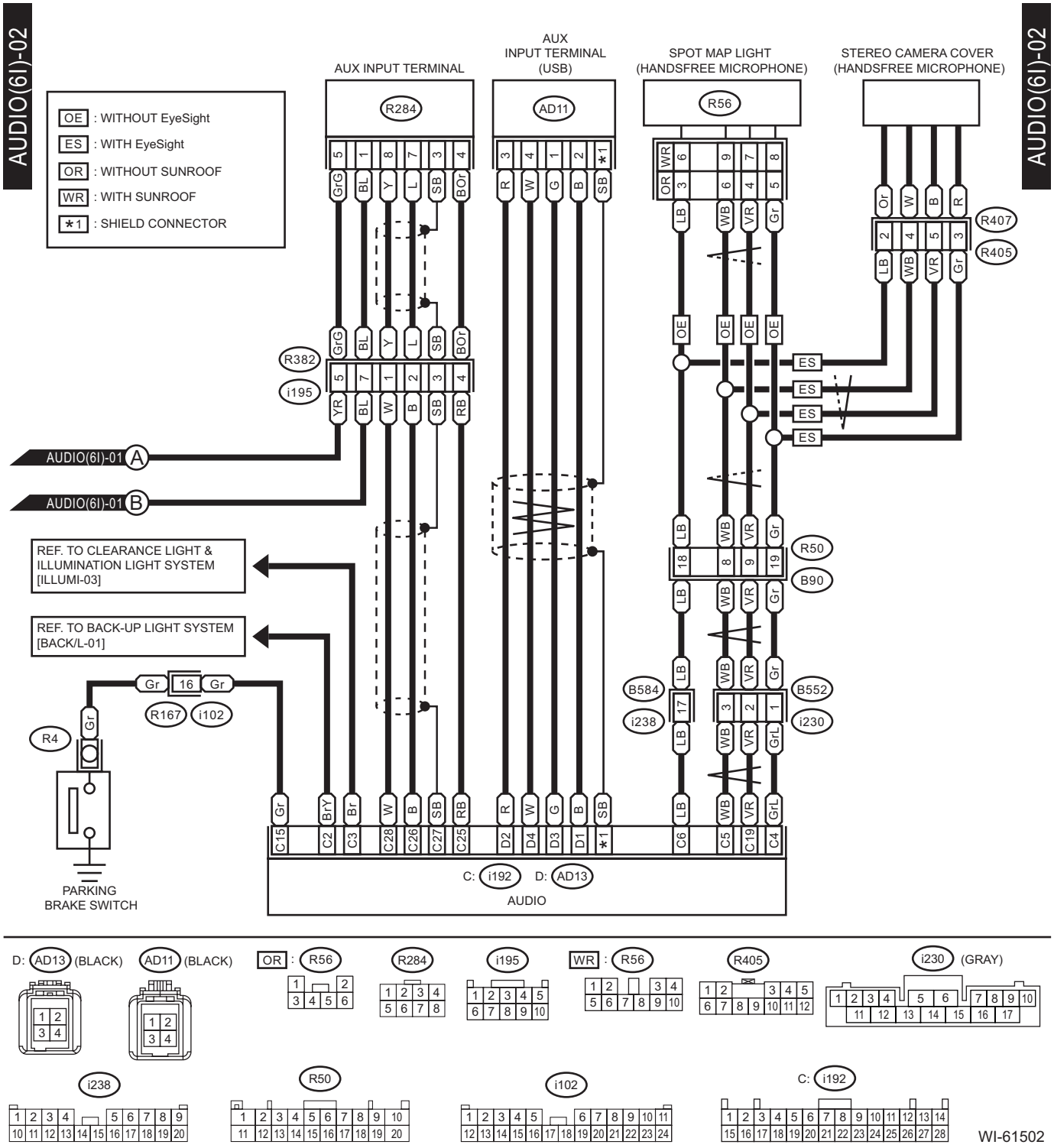
WI-48179

7. Audio System

A: WIRING DIAGRAM

1. 6.2-INCH DISPLAY

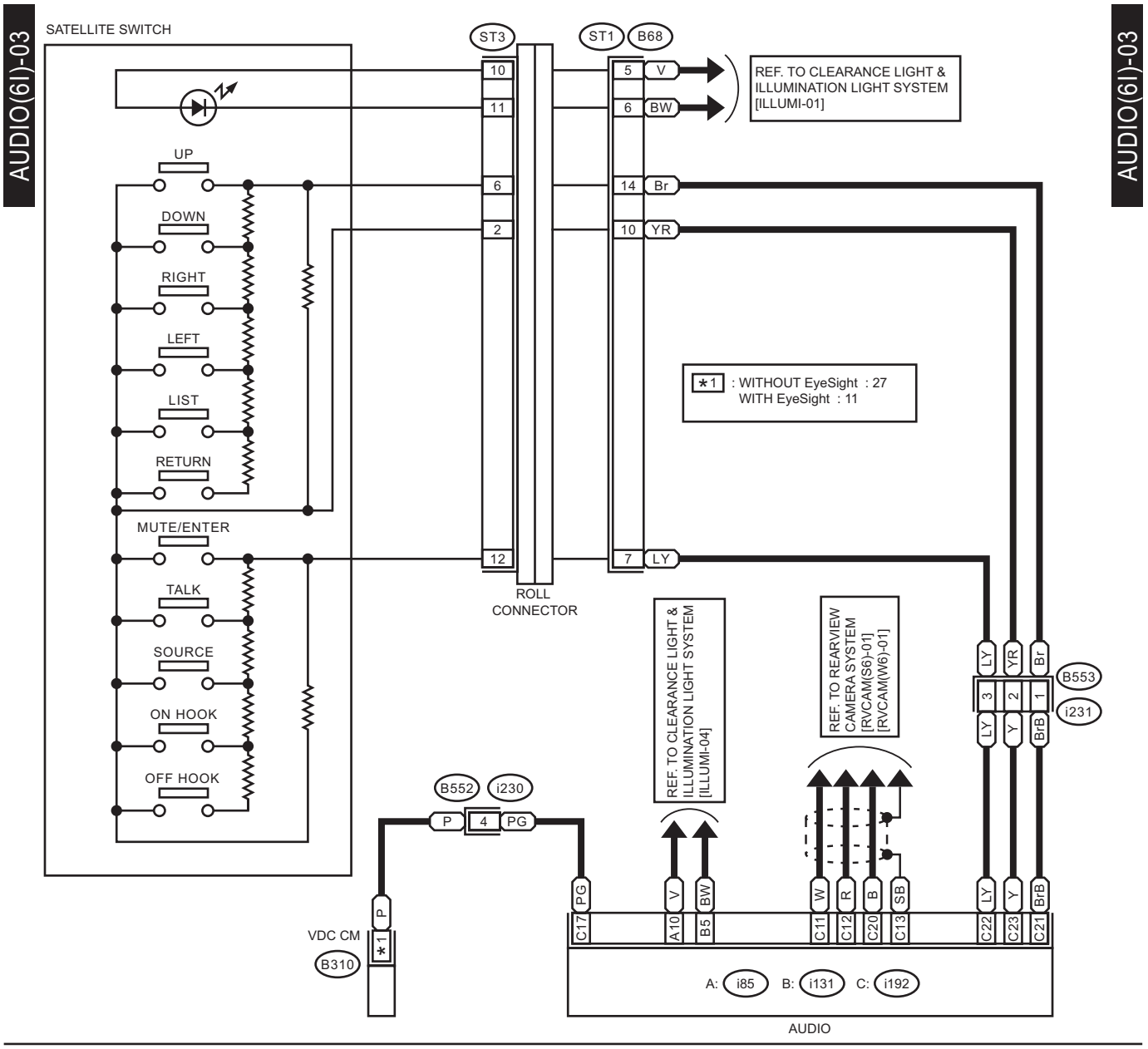


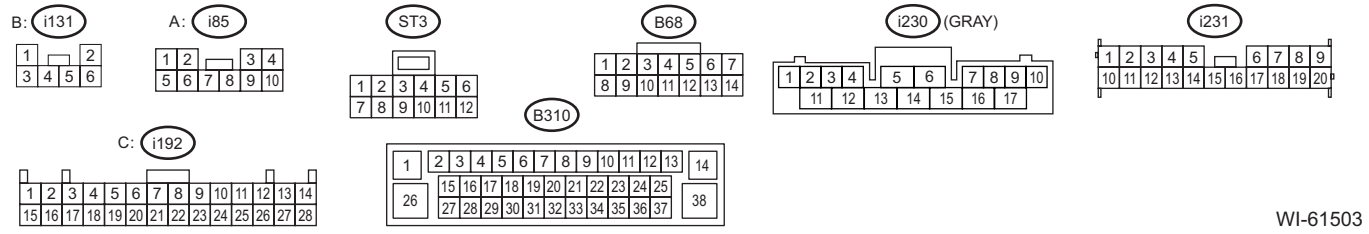

AUDIO(6I)-02
AUDIO(6I)-02
OE : WITHOUT EyeSight
ES : WITH EyeSight
OR : WITHOUT SUNROOF
WR : WITH SUNROOF
*1 : SHIELD CONNECTOR
AUX INPUT TERMINAL
R284
AUX INPUT TERMINAL (USB)
AD11
SPOT MAP LIGHT (HANDSFREE MICROPHONE)
R56
STEREO CAMERA COVER (HANDSFREE MICROPHONE)
R407
R405
R382
i195
AUDIO(6I)-01 A
AUDIO(6I)-01 B
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-03]
REF. TO BACK-UP LIGHT SYSTEM [BACK/L-01]
R50
B90
B584
i238
B552
i230
R167
i102
R4
PARKING BRAKE SWITCH
C: i192 D: AD13
AUDIO

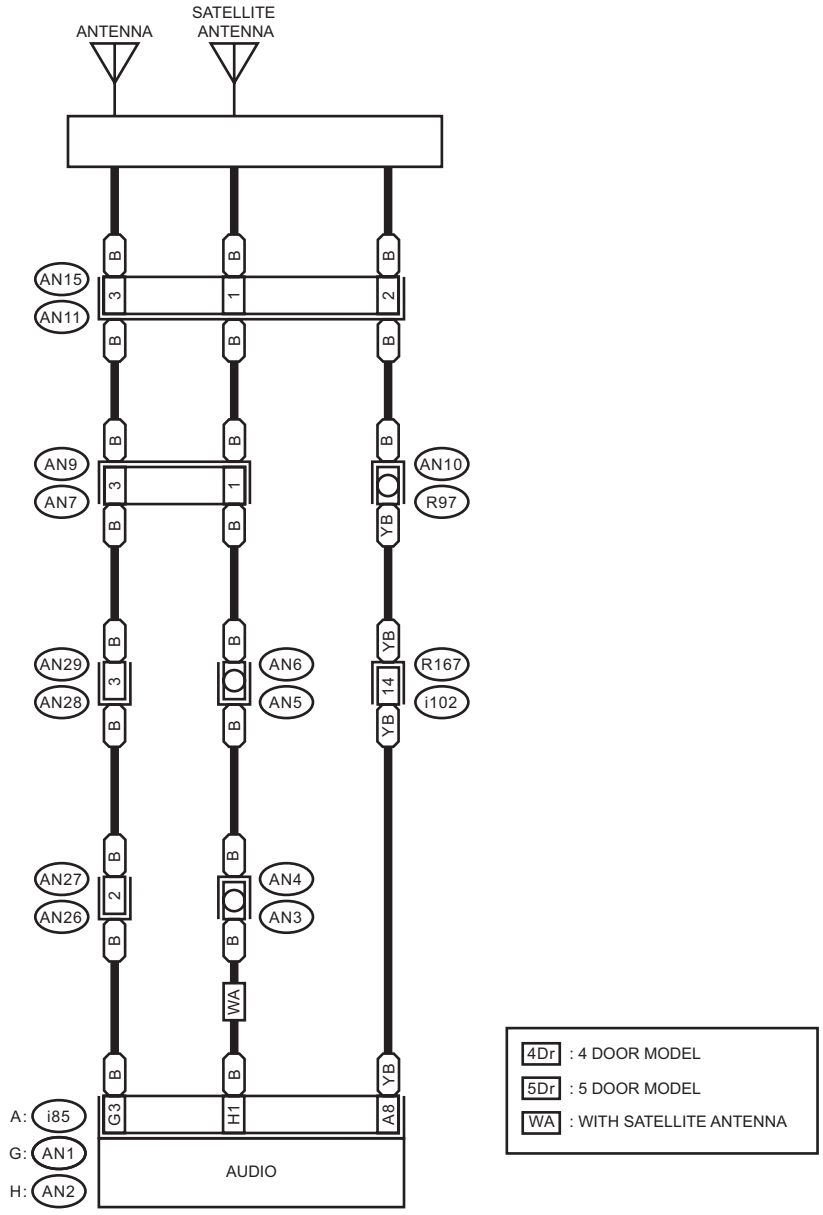
D: AD13 (BLACK)
AD11 (BLACK)
OR : R56
R284
i195
WR : R56
R405
i230 (GRAY)
i238
R50
i102
C: i192

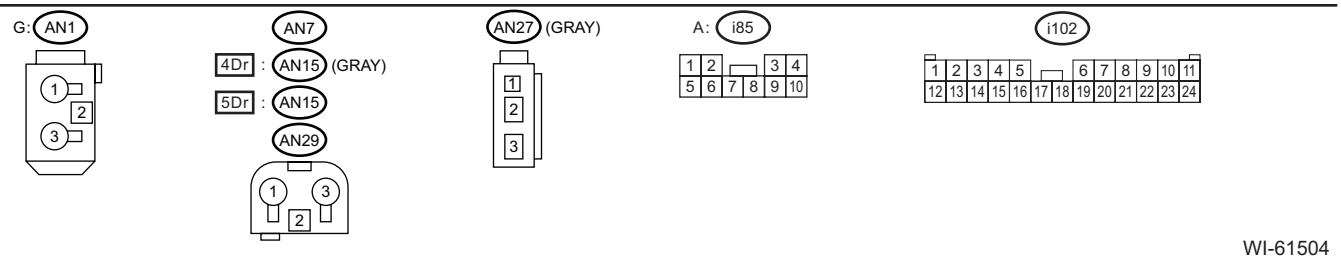
WI-61502

WIRING SYSTEM



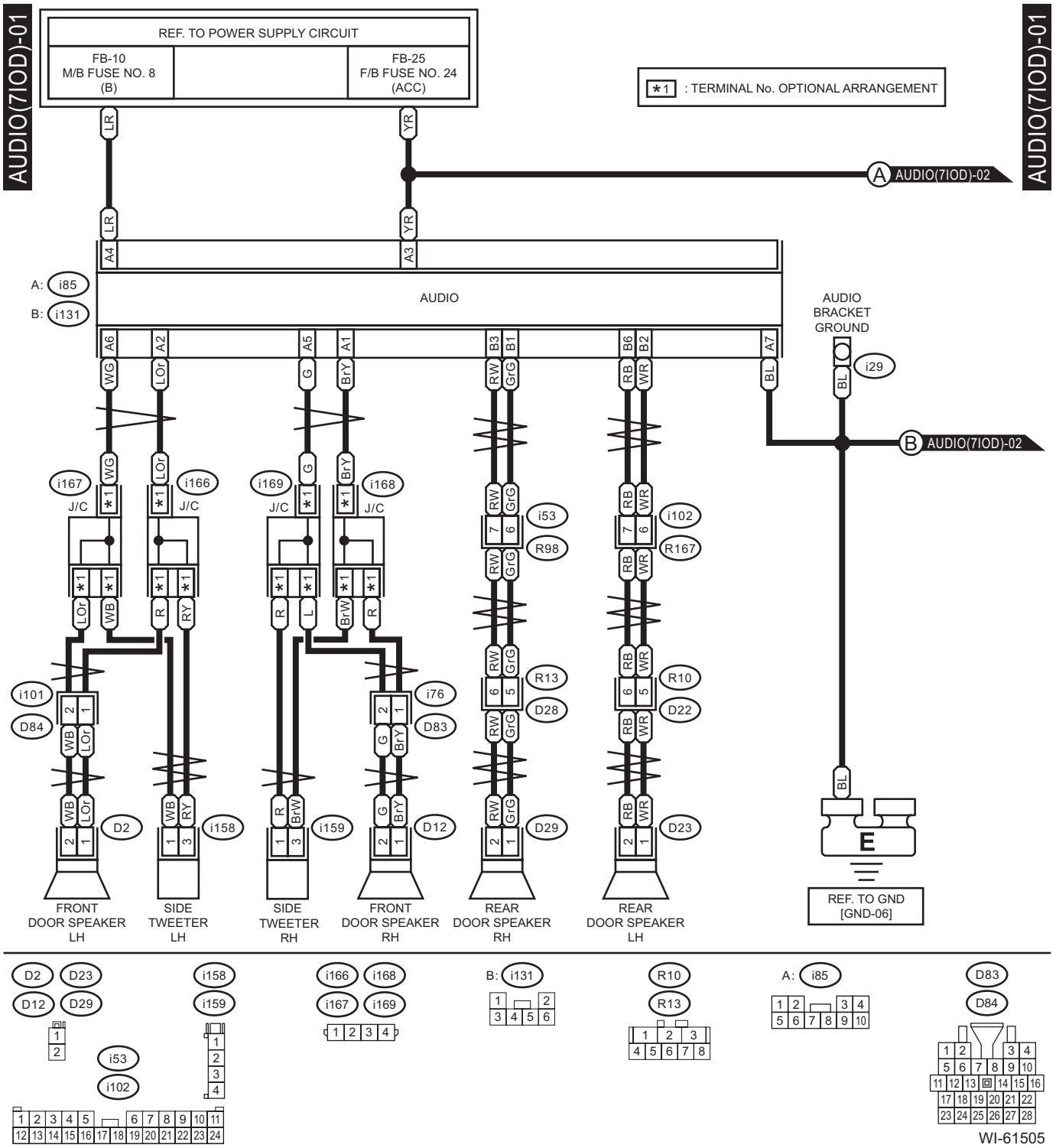



ANTENNA
SATELLITE ANTENNA
AN15
AN11
AN9
AN7
AN10
R97
AN29
AN28
AN6
AN5
R167
i102
AN27
AN26
AN4
AN3
WA
A: i85
G: AN1
H: AN2
G3
H1
A8
AUDIO
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
WA : WITH SATELLITE ANTENNA

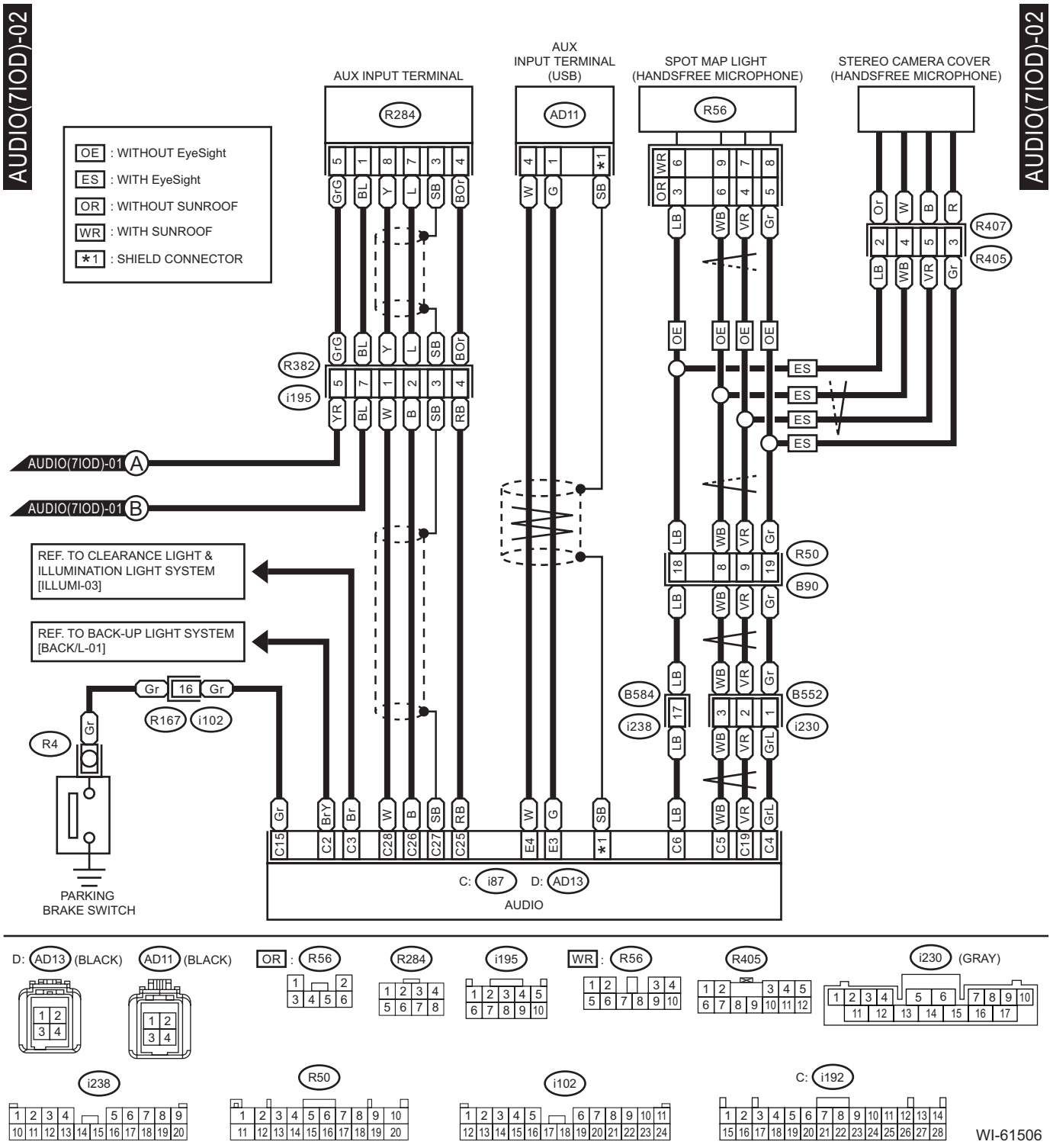

G: AN1
AN7
4Dr : AN15 (GRAY)
5Dr : AN15
AN29
AN27 (GRAY)
A: i85
i102

WI-61504

2. 7 INCH DISPLAY (WITHOUT TELEMATICS)



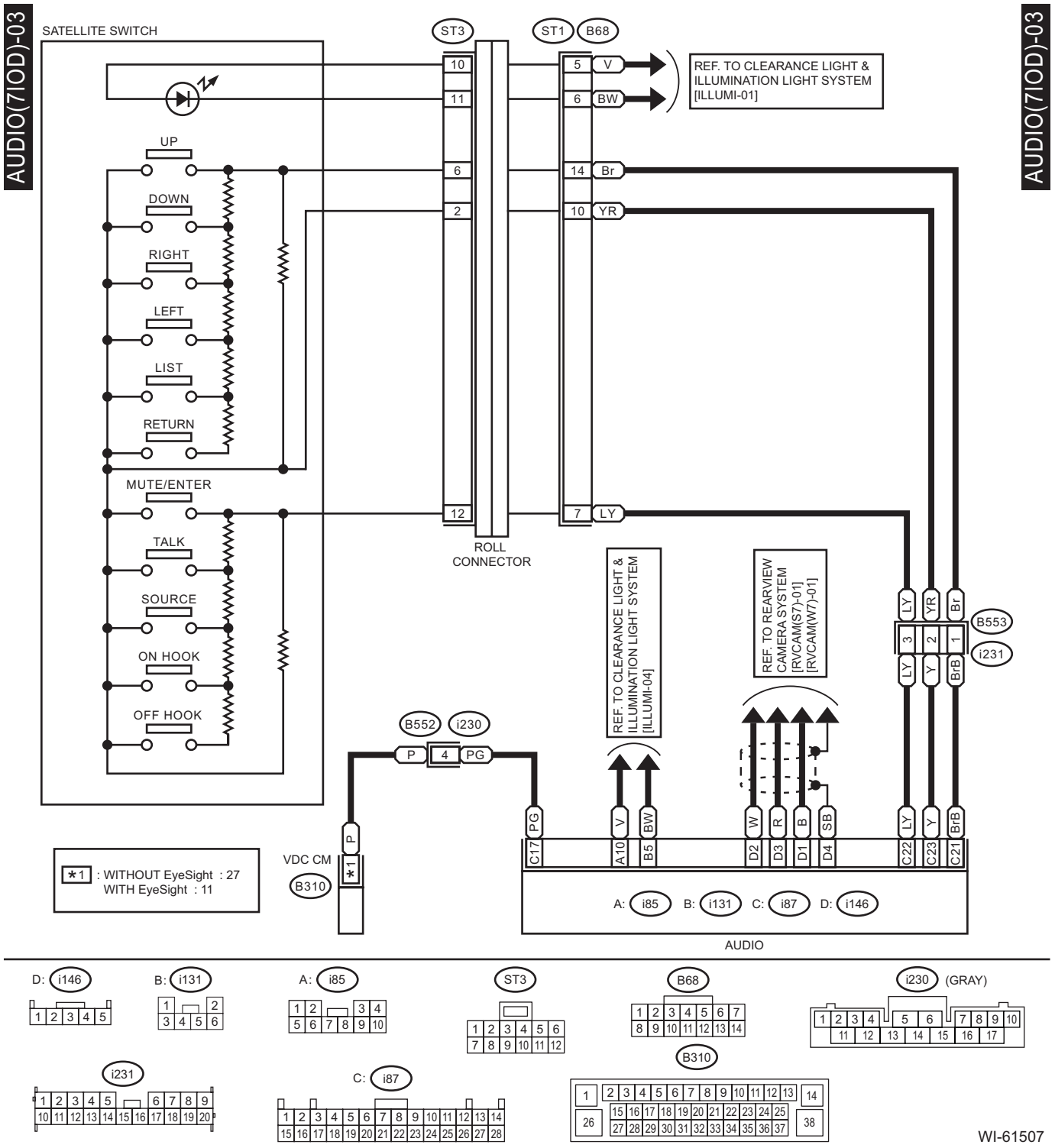
WI-61505


AUDIO(7IOD)-02
AUDIO(7IOD)-02
OE : WITHOUT EyeSight
ES : WITH EyeSight
OR : WITHOUT SUNROOF
WR : WITH SUNROOF
*1 : SHIELD CONNECTOR
AUX INPUT TERMINAL
R284
AUX INPUT TERMINAL (USB)
AD11
SPOT MAP LIGHT (HANDSFREE MICROPHONE)
R56
STEREO CAMERA COVER (HANDSFREE MICROPHONE)
R407
R405
R382
i195
AUDIO(7IOD)-01 A
AUDIO(7IOD)-01 B
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-03]
REF. TO BACK-UP LIGHT SYSTEM [BACK/L-01]
R50
B90
B584
i238
B552
i230
R167
i102
R4
PARKING BRAKE SWITCH
C: i87 D: AD13
AUDIO

D: AD13 (BLACK)
AD11 (BLACK)
OR : R56
R284
i195
WR : R56
R405
i230 (GRAY)
i238
R50
i102
C: i192

WI-61506

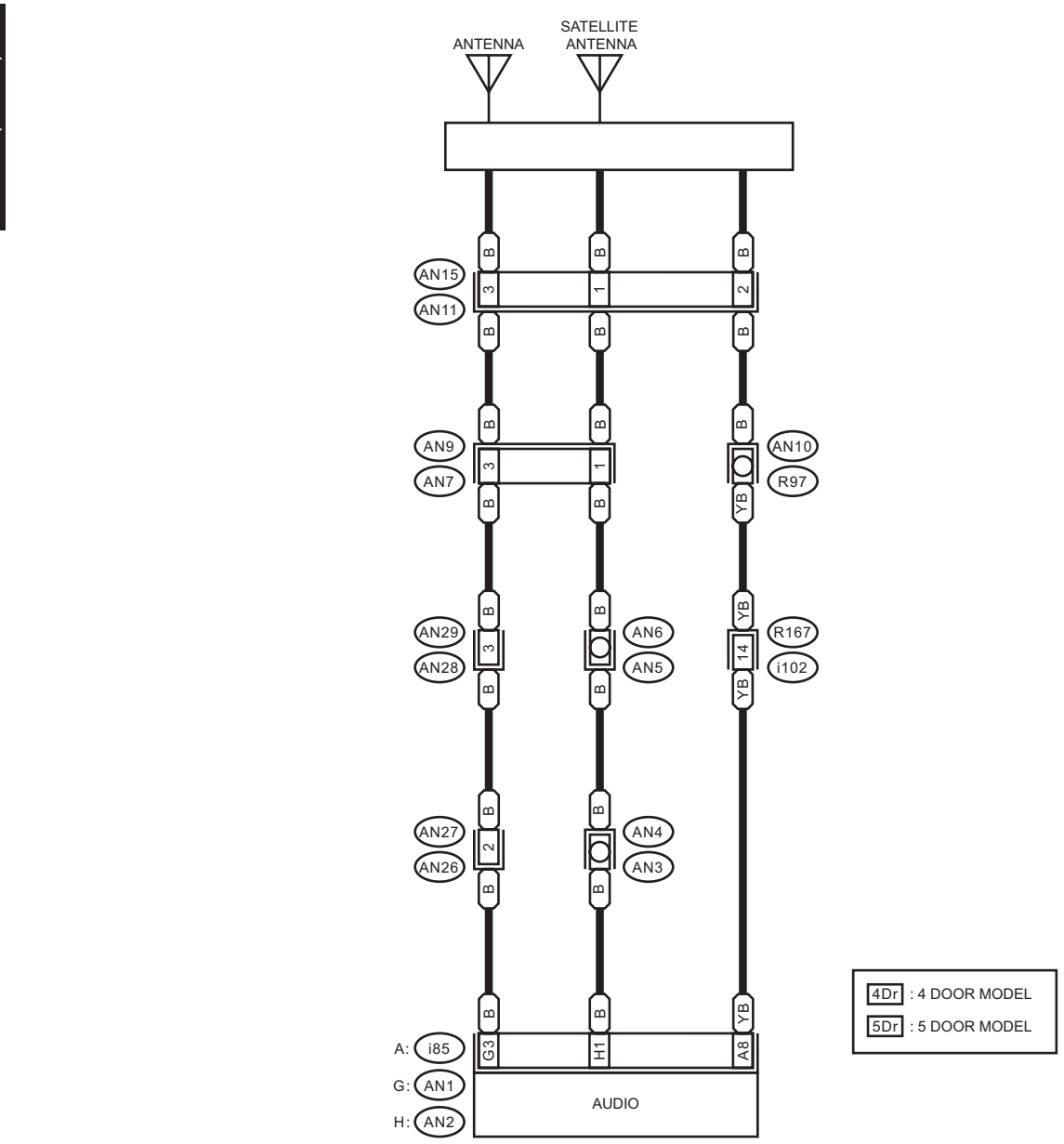
WIRING SYSTEM

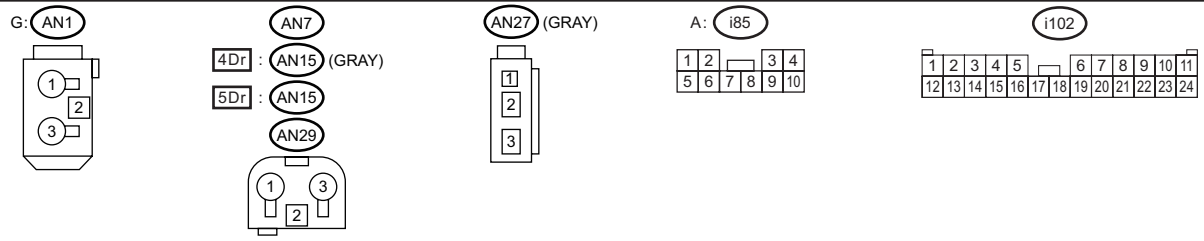


WI-61507

AUDIO(7IOD)-04

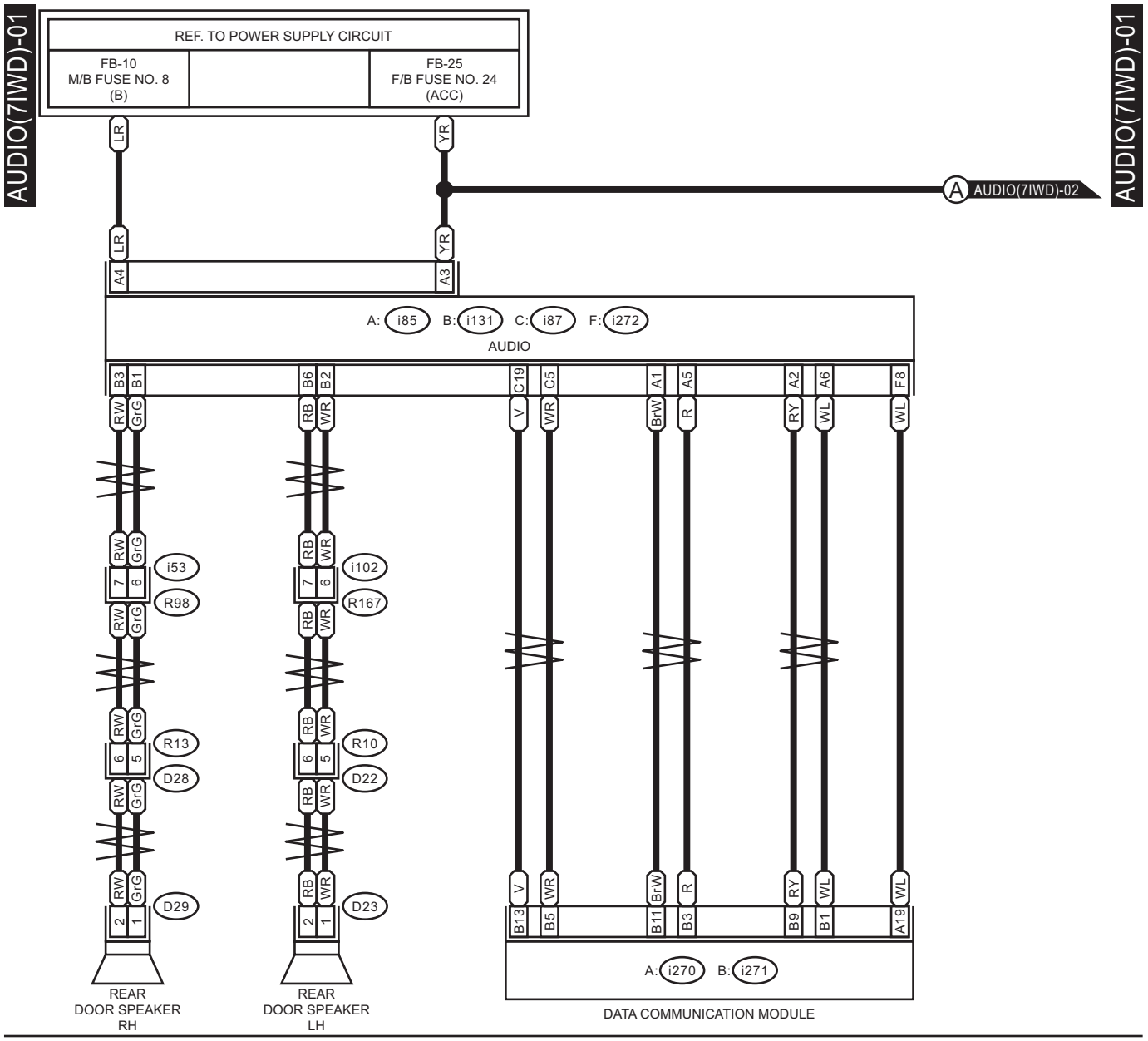
AUDIO(7IOD)-04



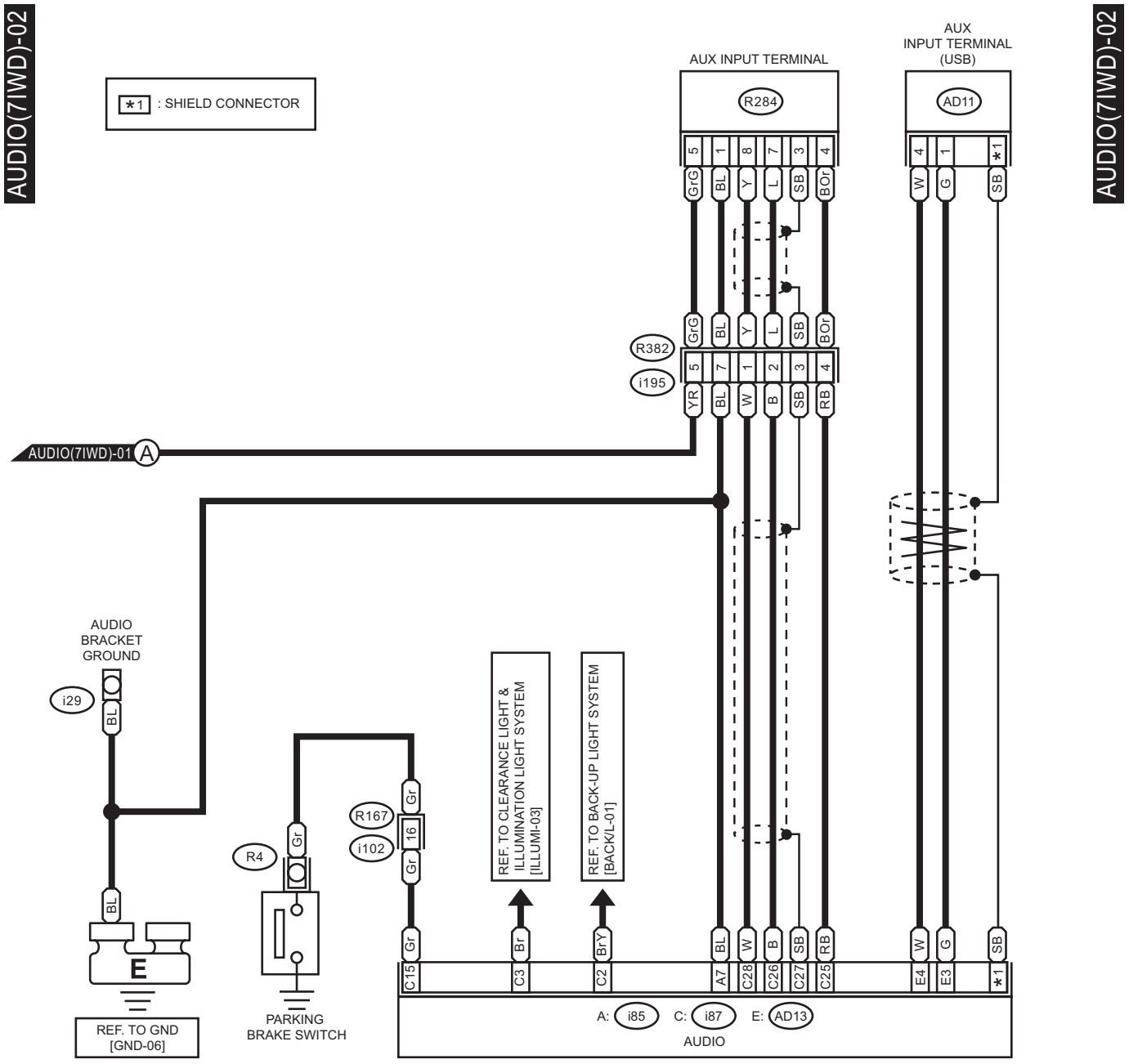


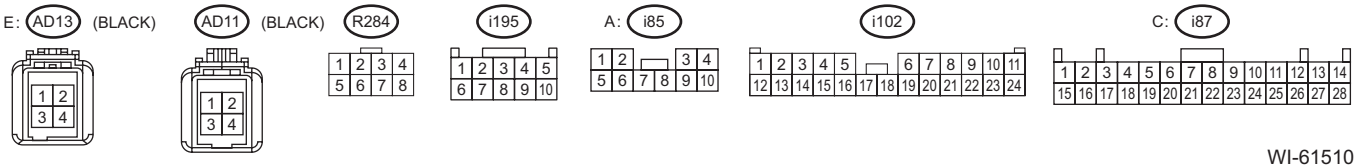
WI-61508

3. 7 INCH DISPLAY (WITH TELEMATICS)



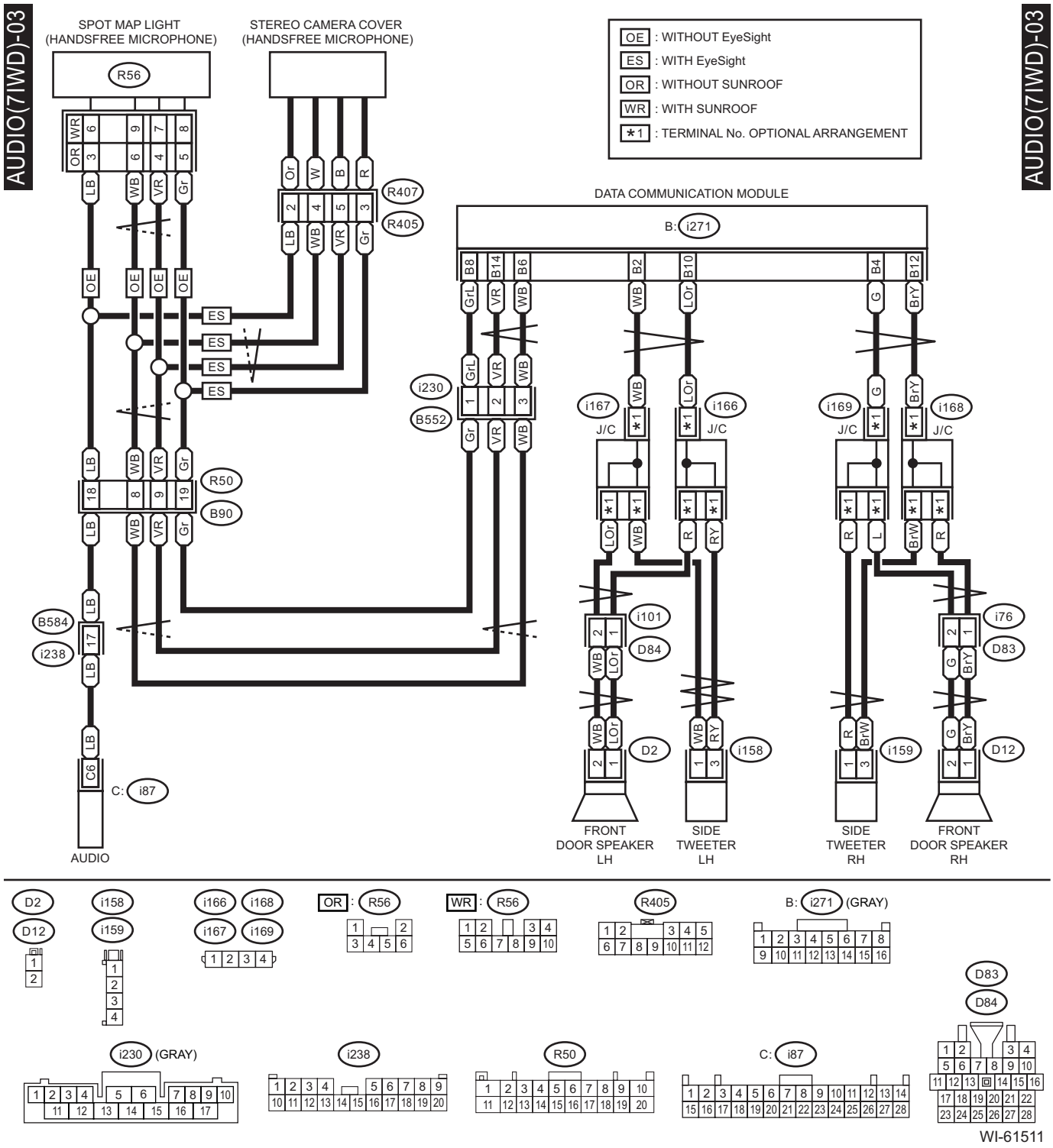
WI-61509

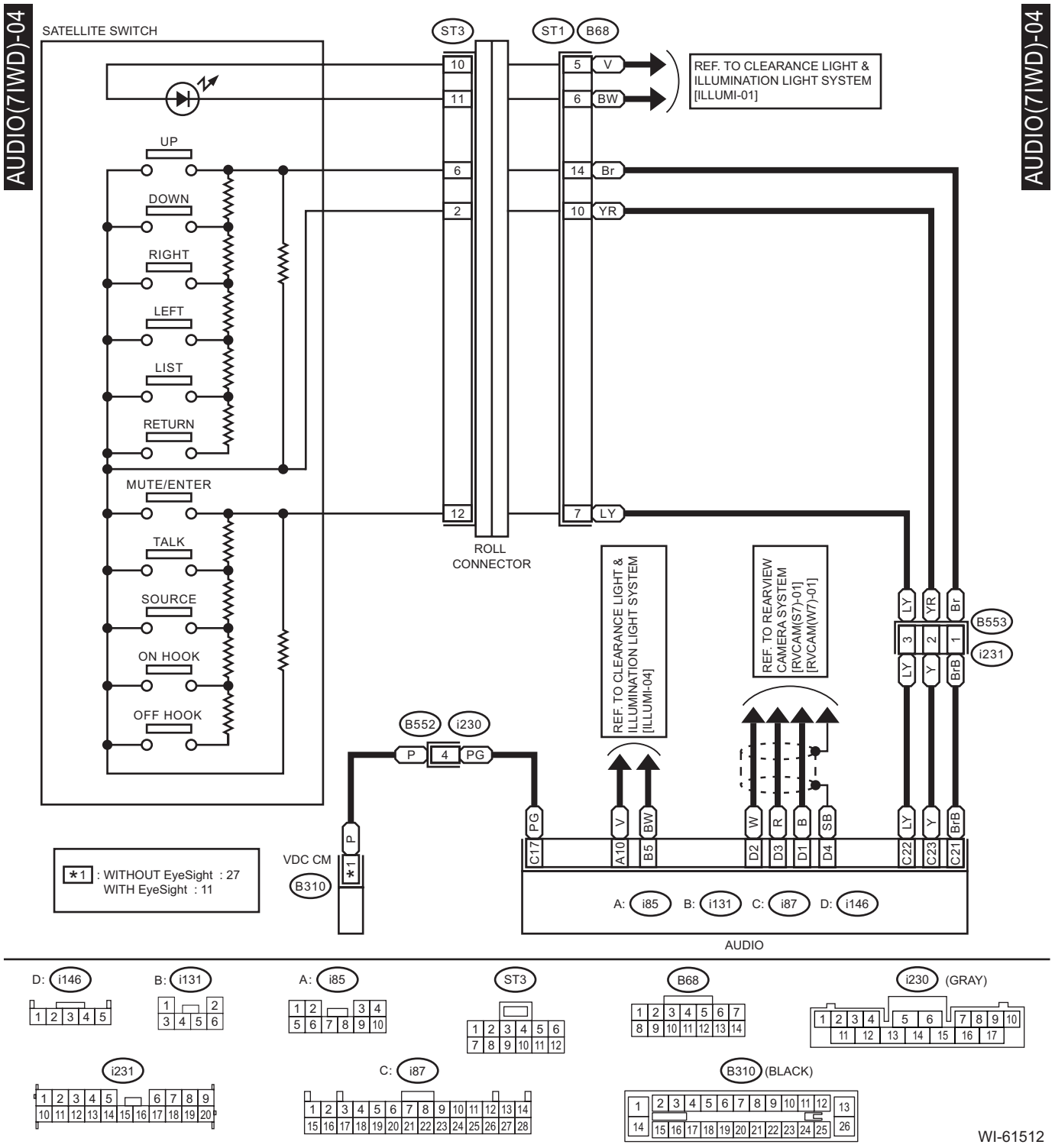

AUDIO(7IWD)-02
AUDIO(7IWD)-02
*1 : SHIELD CONNECTOR
AUX INPUT TERMINAL
R284
AUX INPUT TERMINAL (USB)
AD11
GrG BL Y L SB BOr
W G SB
R382
i195
YR BL W B SB RB
AUDIO(7IWD)-01 A
AUDIO BRACKET GROUND
i29
BL
E
REF. TO GND [GND-06]
R4
Gr
PARKING BRAKE SWITCH
R167
i102
Gr
16
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-03]
REF. TO BACK-UP LIGHT SYSTEM [BACK/L-01]
C15 C3 C2 A7 C28 C26 C27 C25
E4 E3 *1
A: i85 C: i87 E: AD13
AUDIO


E: AD13 (BLACK)
AD11 (BLACK)
R284
i195
A: i85
i102
C: i87

WI-61510

WIRING SYSTEM

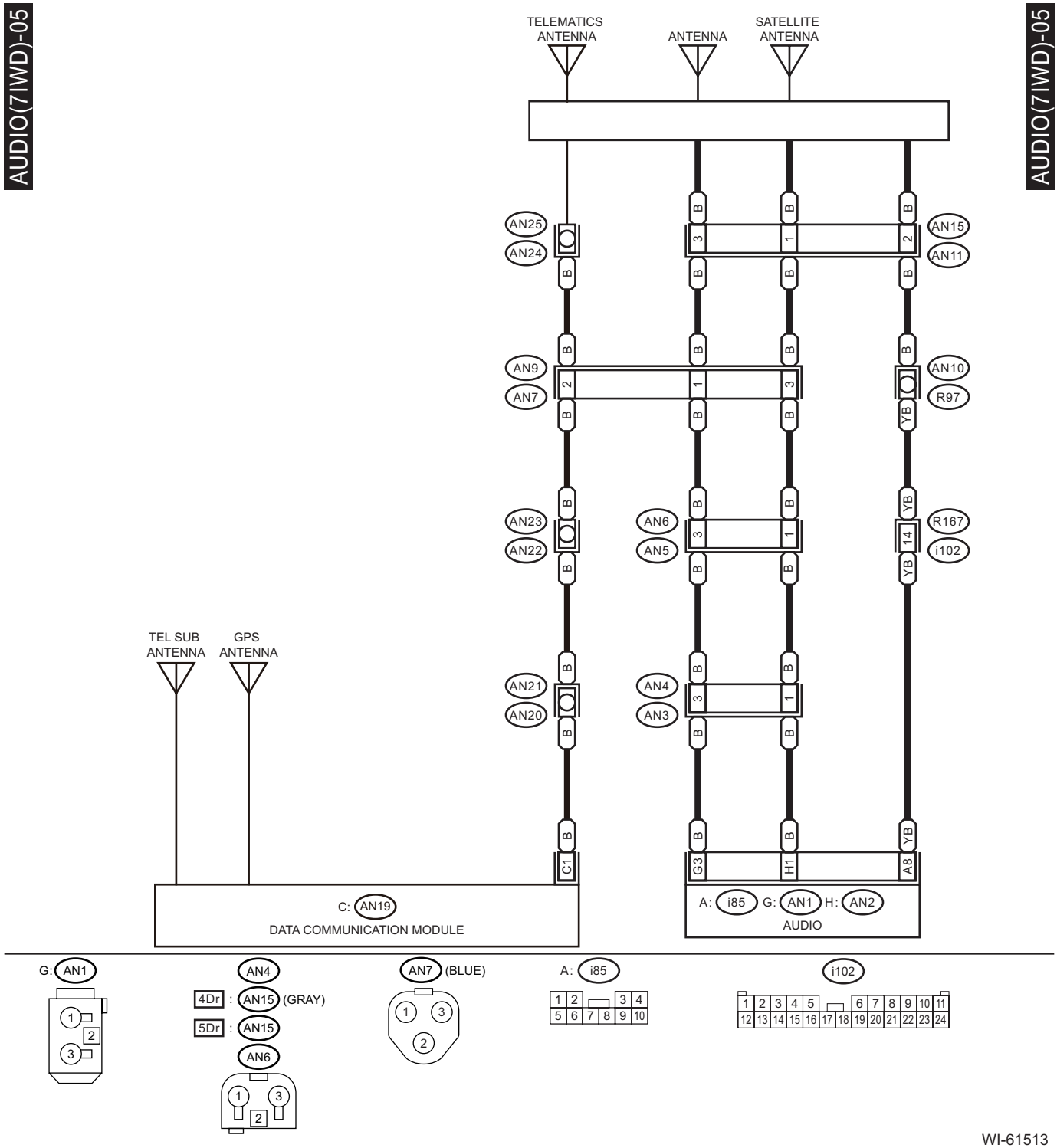



AUDIO(7IWD)-04
SATELLITE SWITCH
UP
DOWN
RIGHT
LEFT
LIST
RETURN
MUTE/ENTER
TALK
SOURCE
ON HOOK
OFF HOOK
ST3
ST1
B68
10
11
6
2
12
5 V
6 BW
14 Br
10 YR
7 LY
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
ROLL CONNECTOR
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-04]
REF. TO REARVIEW CAMERA SYSTEM [RVCAM(S7)-01] [RVCAM(W7)-01]
B553
i231
LY
YR
Br
LY
Y
BrB
B552
i230
P
4
PG
VDC CM
B310
*1 : WITHOUT EyeSight : 27
WITH EyeSight : 11
C17 PG
A10 V
B5 BW
D2 W
D3 R
D1 B
D4 SB
C22 LY
C23 Y
C21 BrB
A: i85 B: i131 C: i87 D: i146
AUDIO
AUDIO(7IWD)-04

D: i146
B: i131
A: i85
ST3
B68
i230 (GRAY)
i231
C: i87
B310 (BLACK)

WI-61512

AUDIO(7IWD)-05

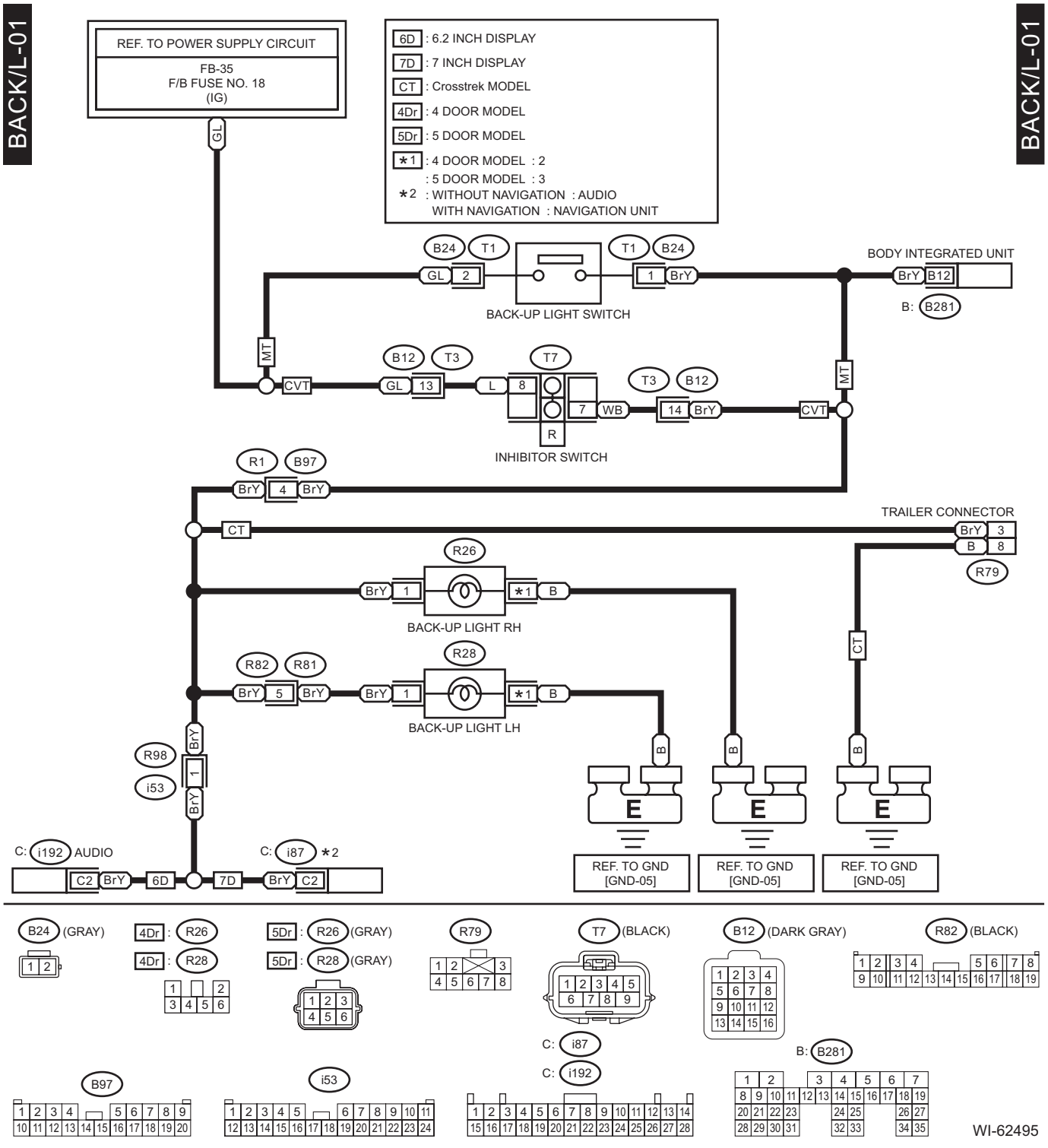


AUDIO(7IWD)-05

WI-61513

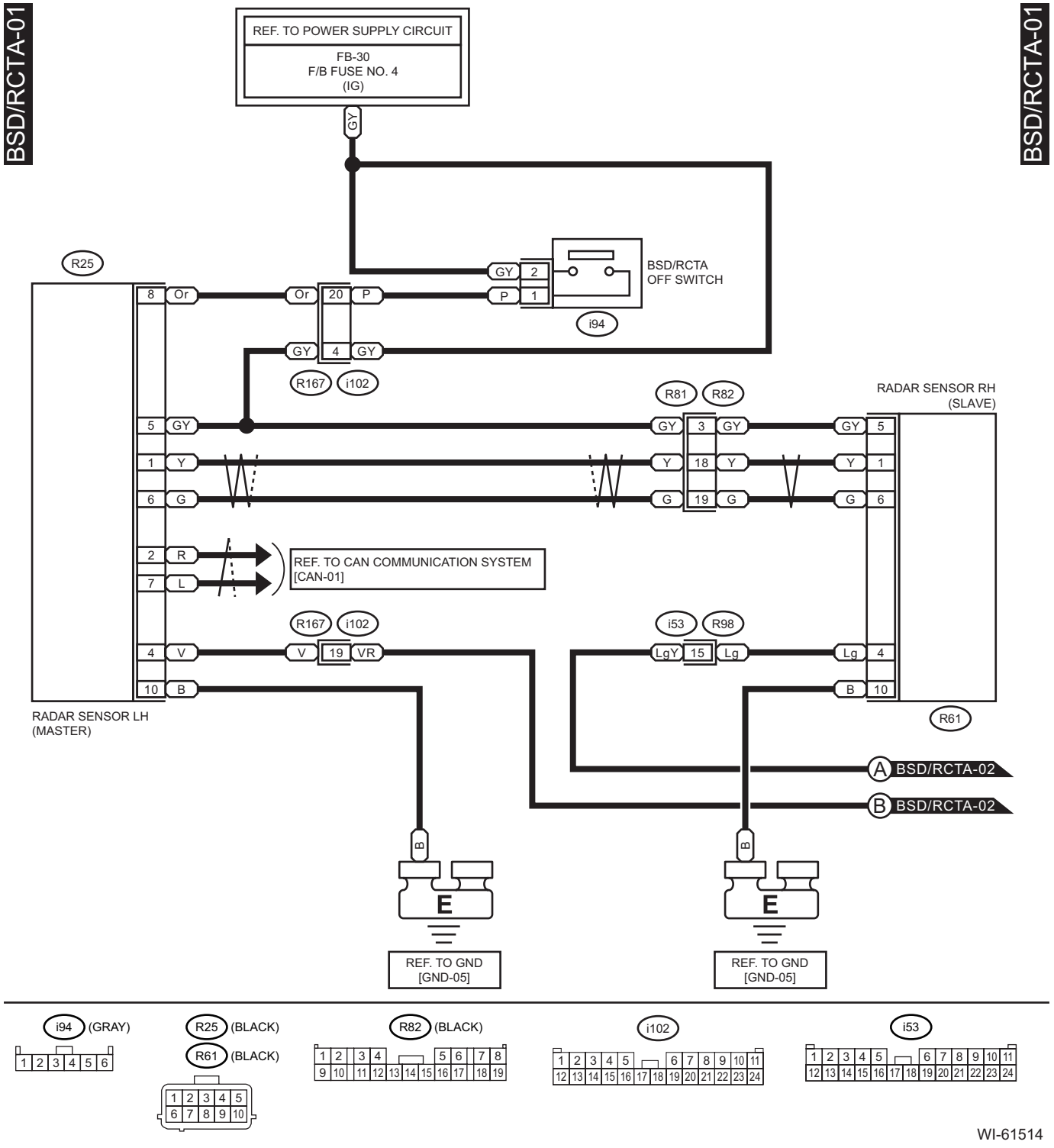
8. Back-up Light System

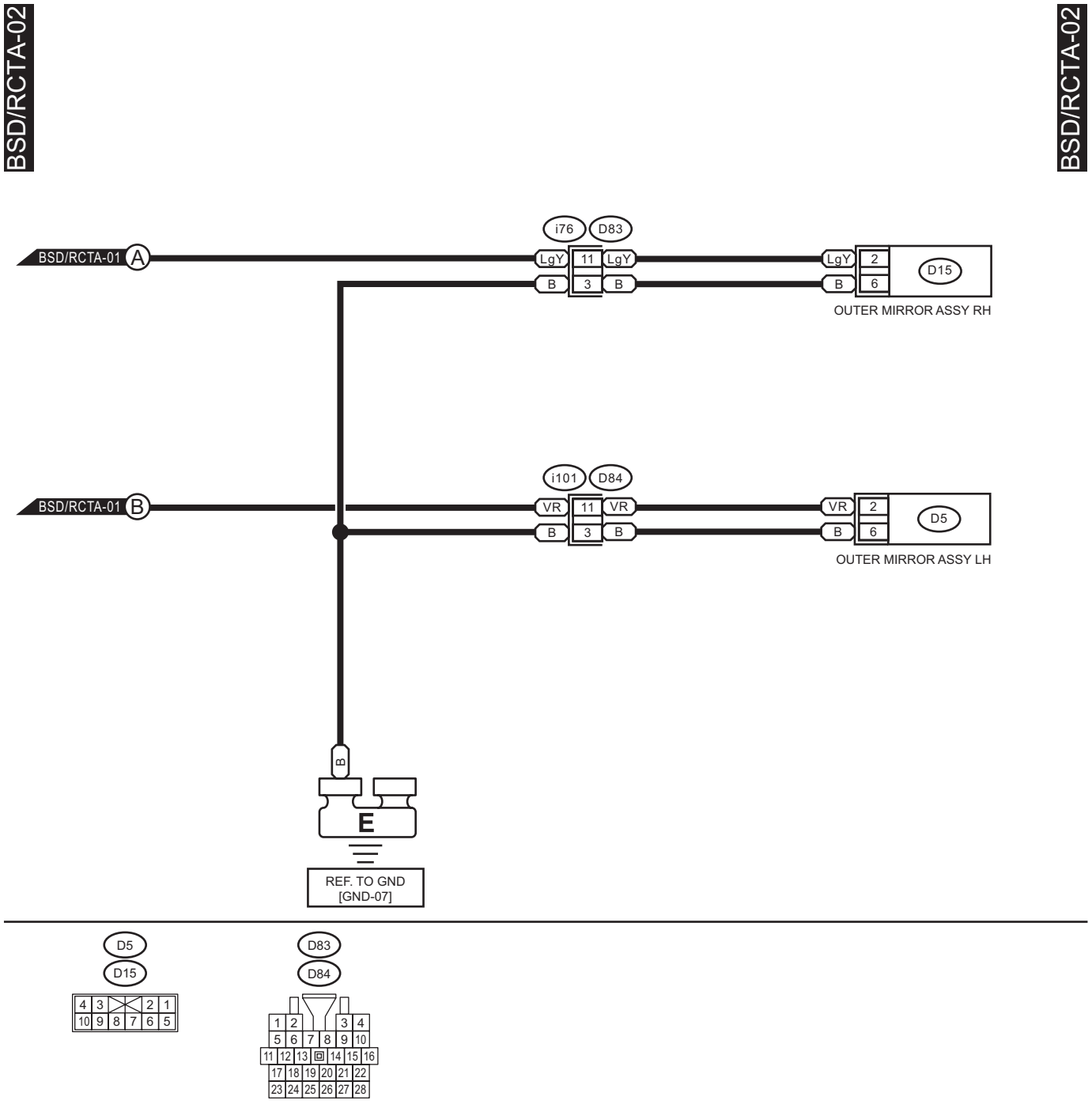
A: WIRING DIAGRAM



9. Blind Spot Detection/Rear Cross Traffic Alert

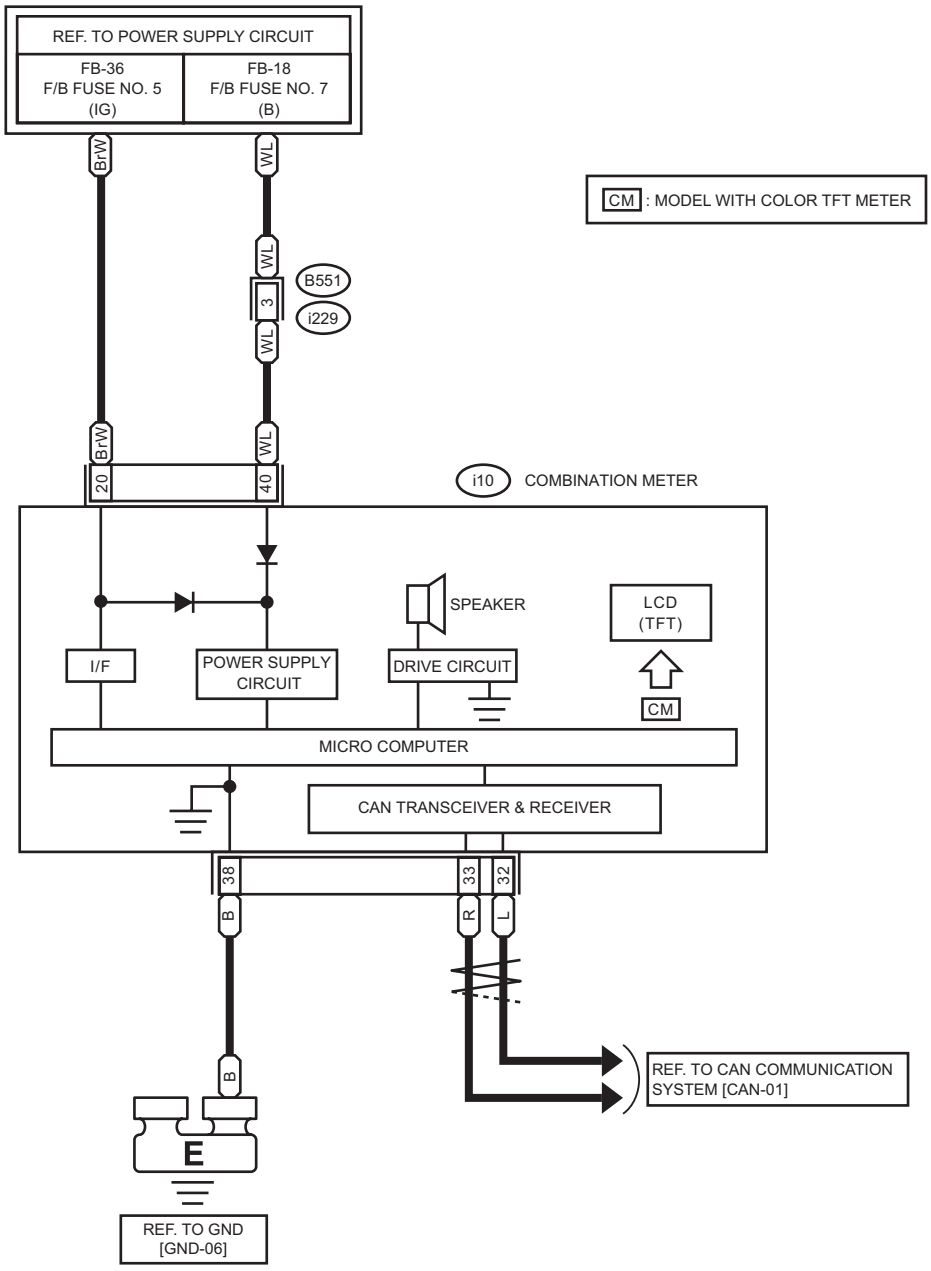
A: WIRING DIAGRAM

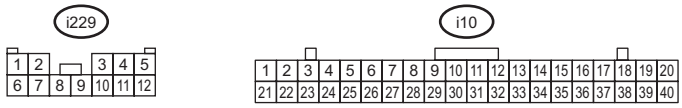



BSD/RCTA-02
BSD/RCTA-02
BSD/RCTA-01 A
i76
D83
LgY
11
LgY
B
3
B
LgY
2
B
6
D15
OUTER MIRROR ASSY RH
BSD/RCTA-01 B
i101
D84
VR
11
VR
B
3
B
VR
2
B
6
D5
OUTER MIRROR ASSY LH
B
E
REF. TO GND
[GND-07]
D5
D15
4 3 2 1
10 9 8 7 6 5
D83
D84
1 2 3 4
5 6 7 8 9 10
11 12 13 14 15 16
17 18 19 20 21 22
23 24 25 26 27 28

WI-61515

BSD/RCTA-03

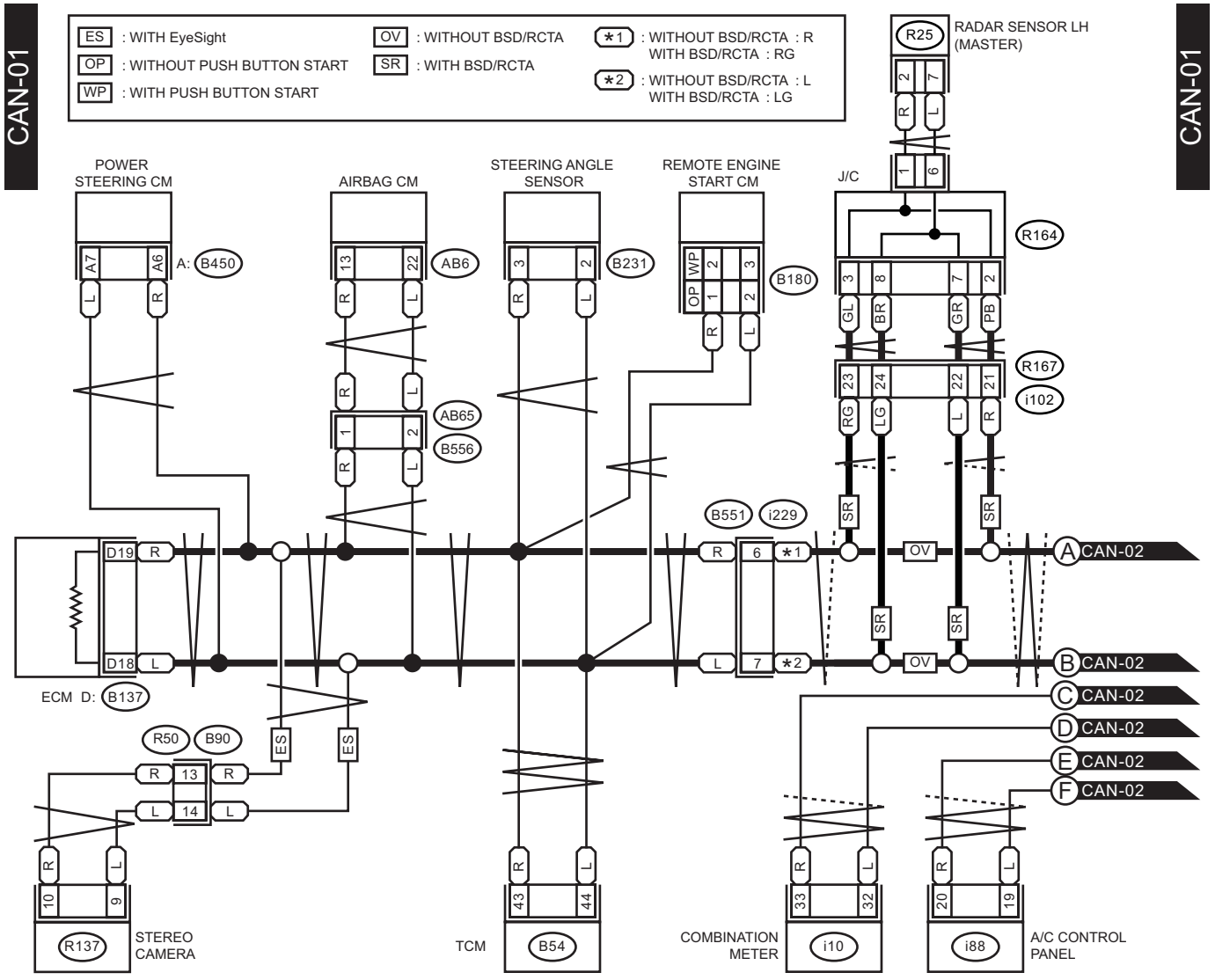


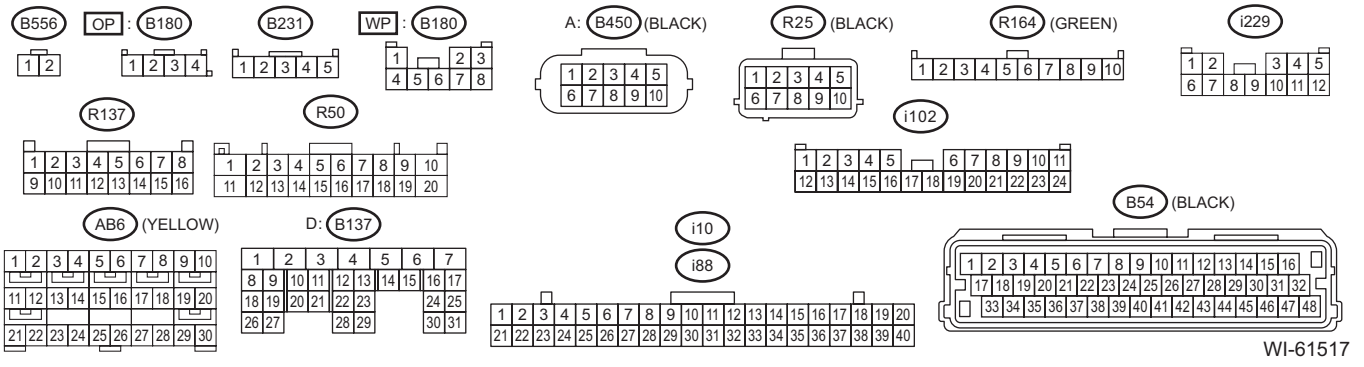


WI-61516

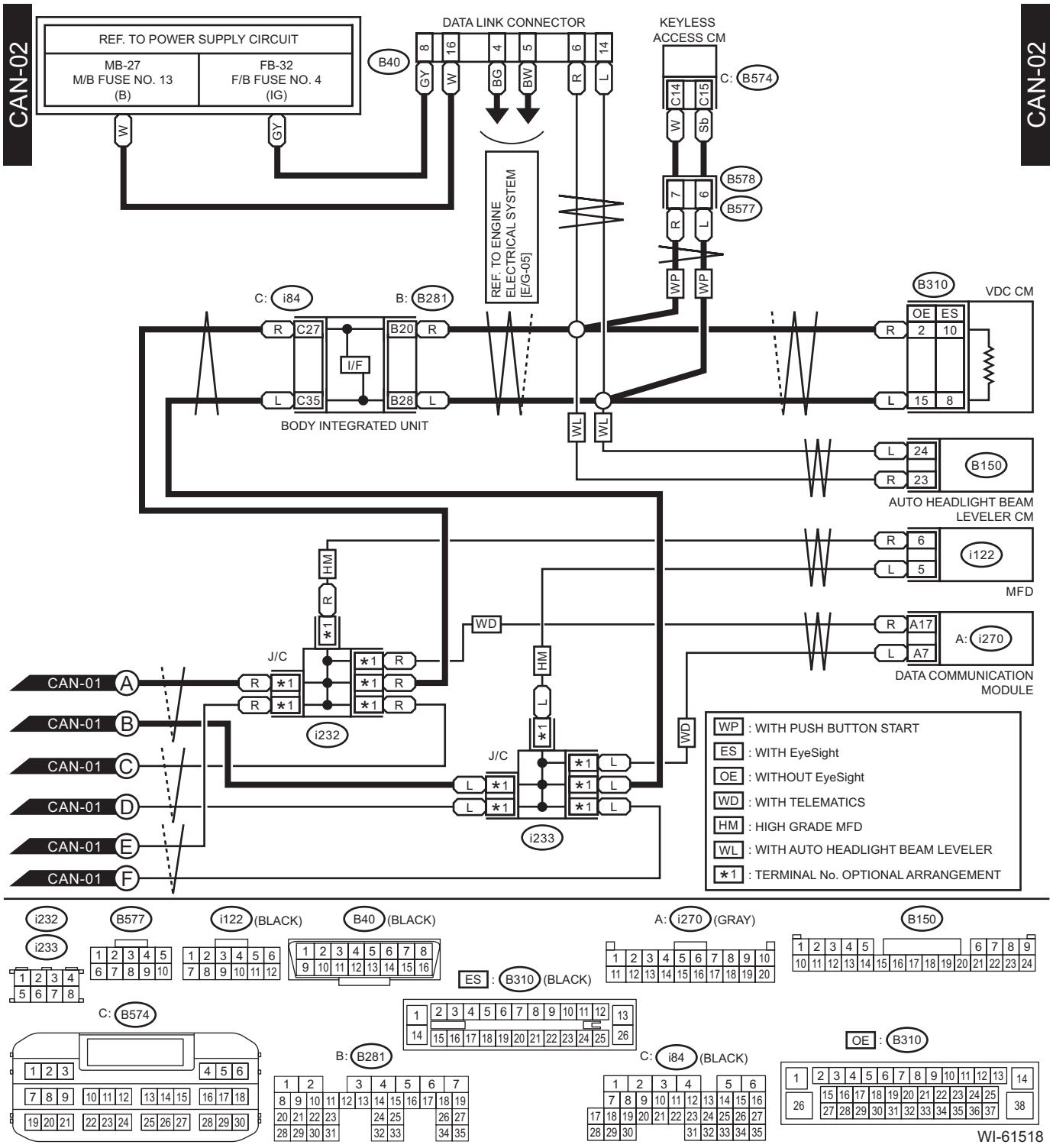
10.CAN Communication System

A: WIRING DIAGRAM



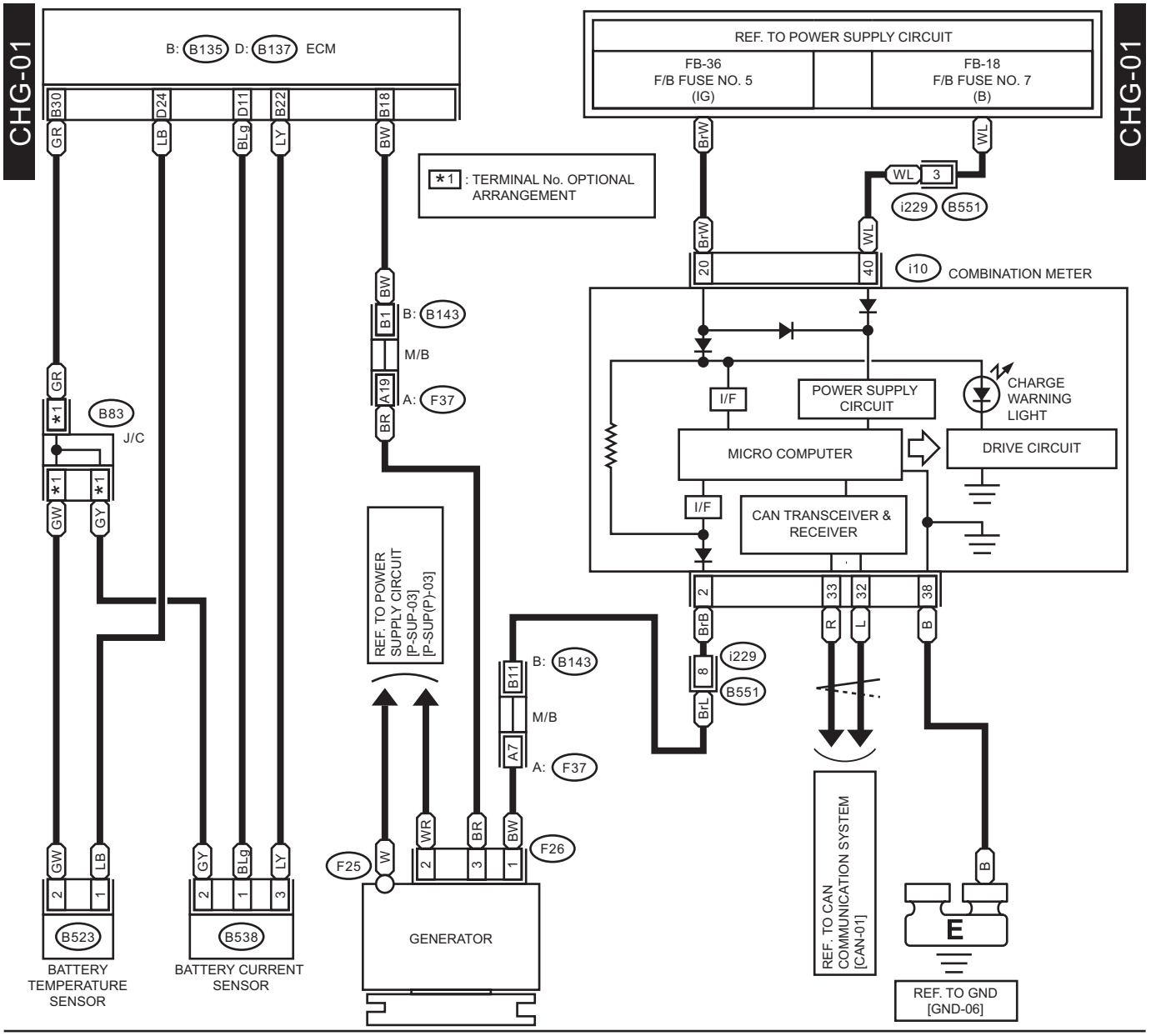


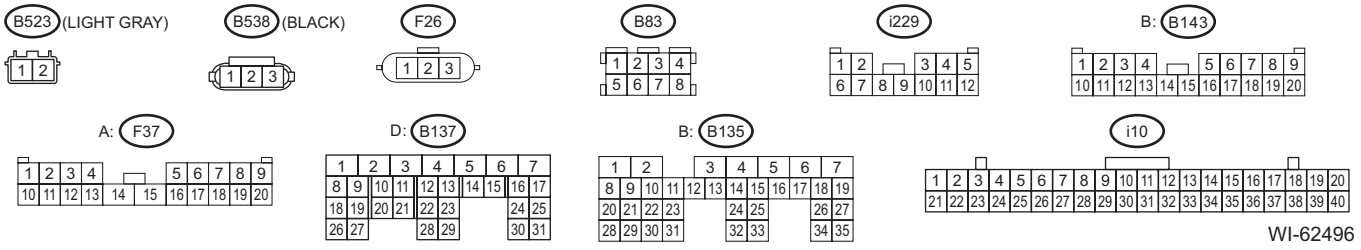
WIRING SYSTEM



11.Charging System

A: WIRING DIAGRAM

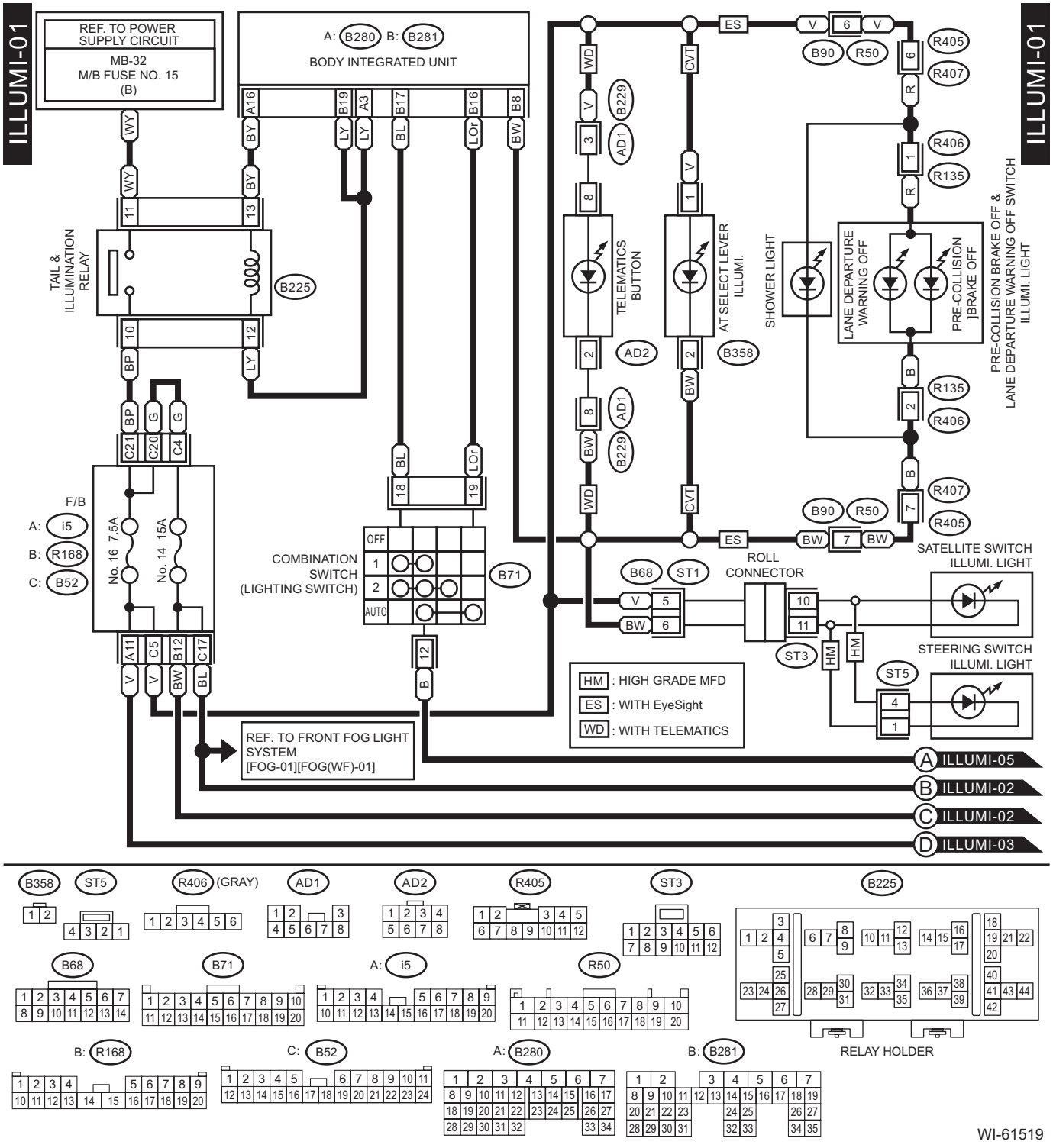




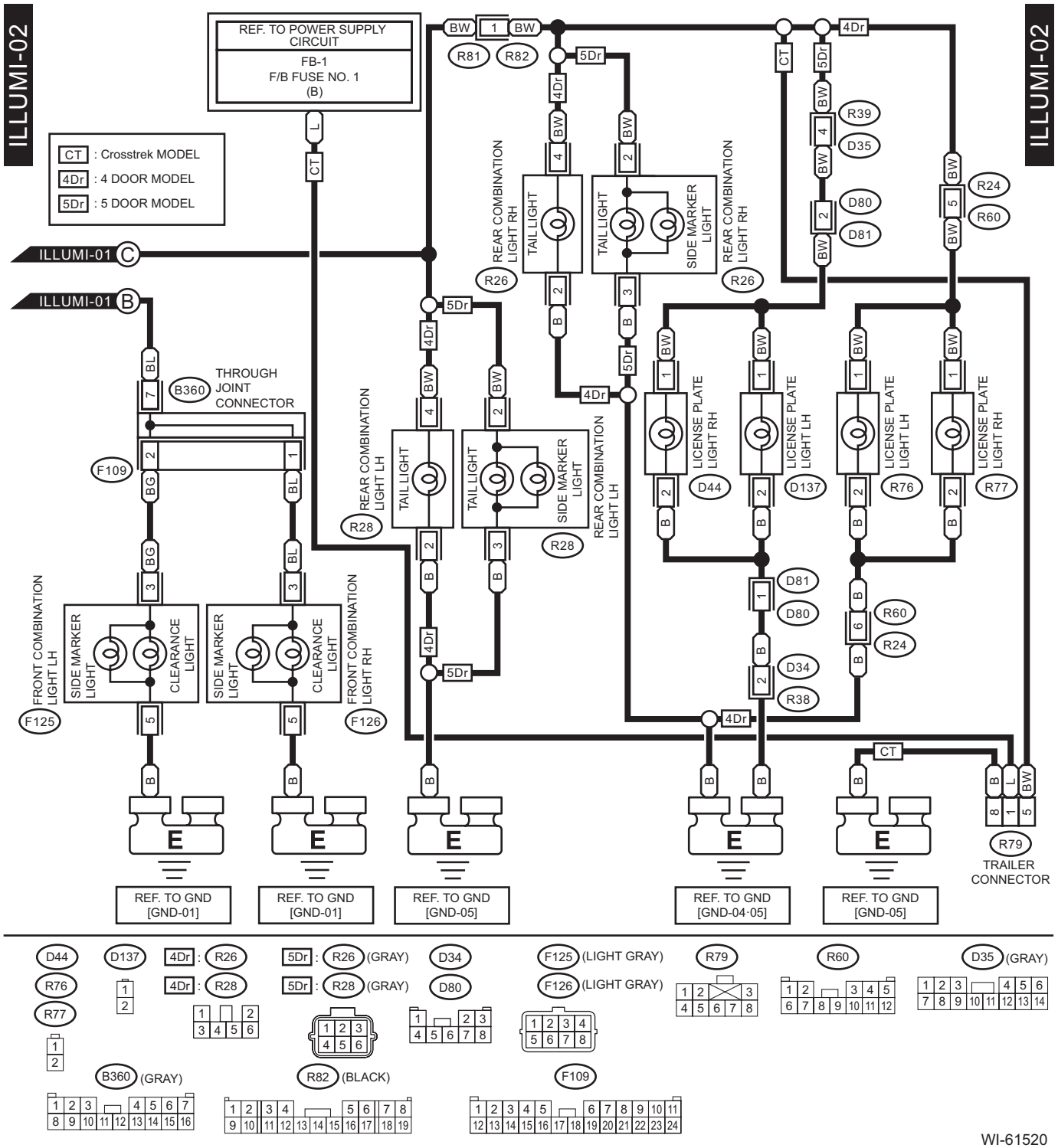
WI-62496

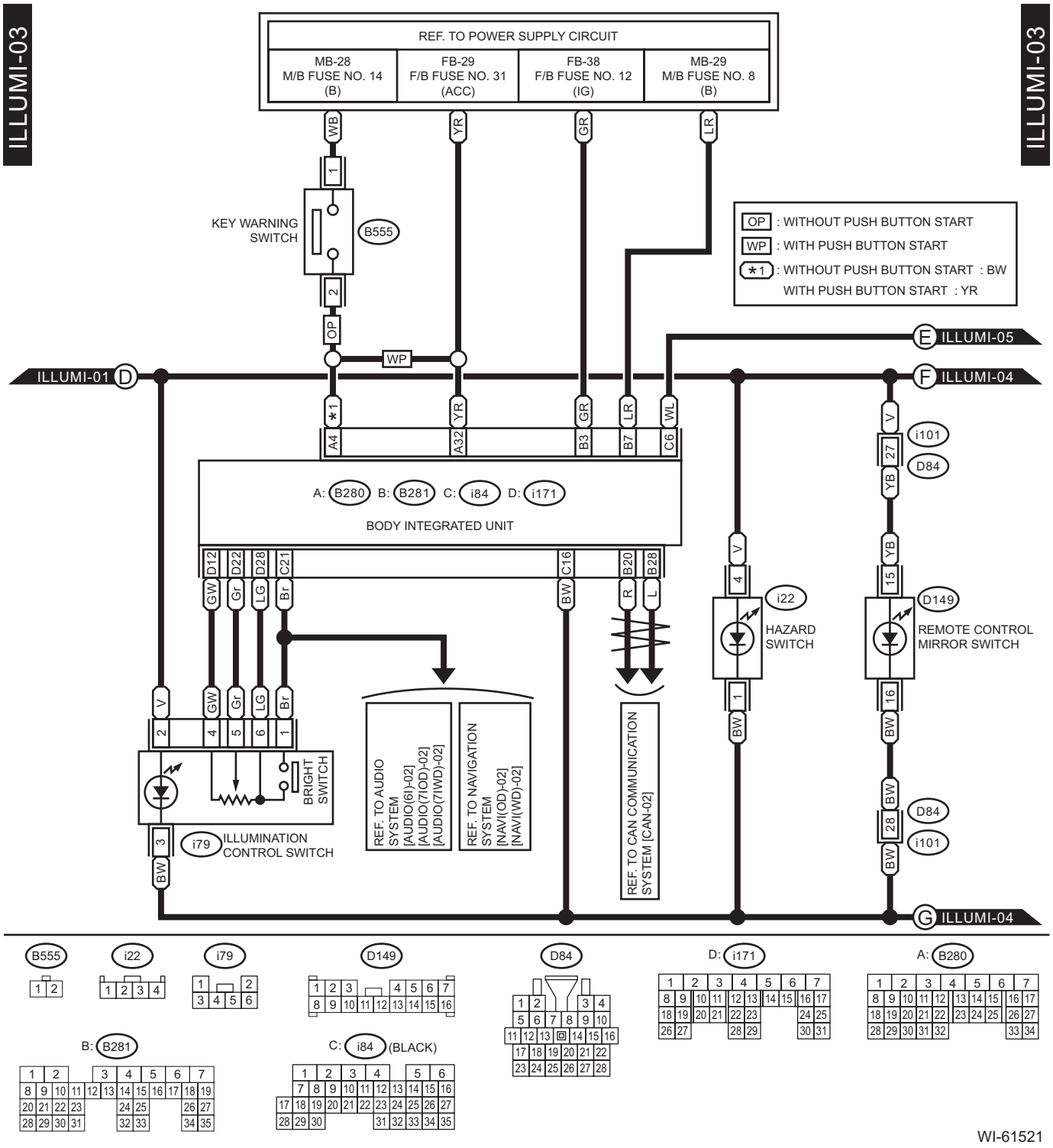
12.Clearance Light and Illumination Light System

A: WIRING DIAGRAM



WI-61519

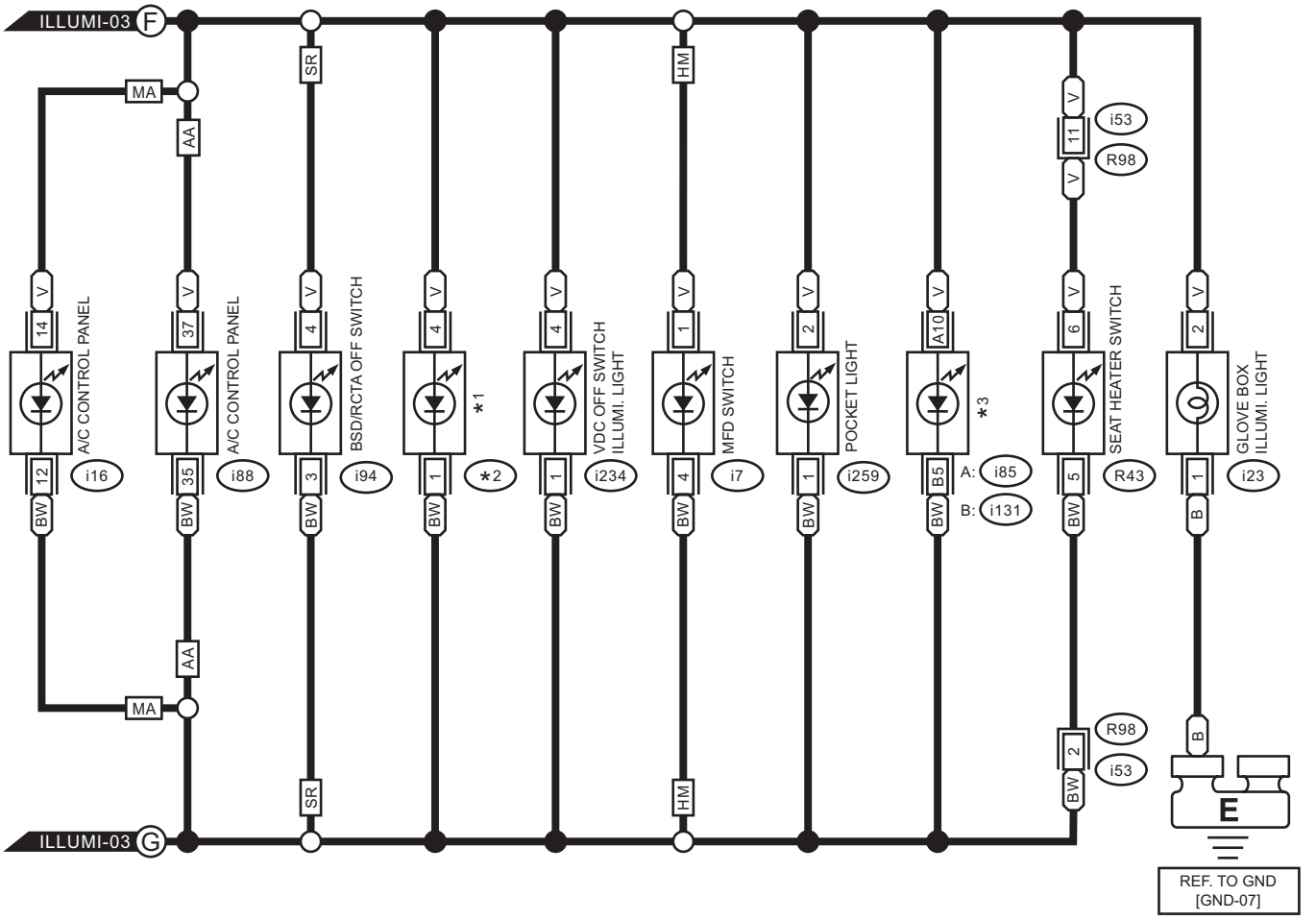

ILLUMI-02
ILLUMI-02
REF. TO POWER SUPPLY CIRCUIT
FB-1
F/B FUSE NO. 1
(B)
CT : Crosstrek MODEL
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
ILLUMI-01 C
ILLUMI-01 B
THROUGH JOINT CONNECTOR
B360
F109
REAR COMBINATION LIGHT RH
REAR COMBINATION LIGHT LH
TAIL LIGHT
SIDE MARKER LIGHT
LICENSE PLATE LIGHT RH
LICENSE PLATE LIGHT LH
FRONT COMBINATION LIGHT LH
FRONT COMBINATION LIGHT RH
CLEARANCE LIGHT
F125
F126
R79
TRAILER CONNECTOR
REF. TO GND [GND-01]
REF. TO GND [GND-01]
REF. TO GND [GND-05]
REF. TO GND [GND-04·05]
REF. TO GND [GND-05]
D44
D137
4Dr : R26
4Dr : R28
5Dr : R26 (GRAY)
5Dr : R28 (GRAY)
D34
D80
F125 (LIGHT GRAY)
F126 (LIGHT GRAY)
R79
R60
D35 (GRAY)
R76
R77
B360 (GRAY)
R82 (BLACK)
F109
WI-61520

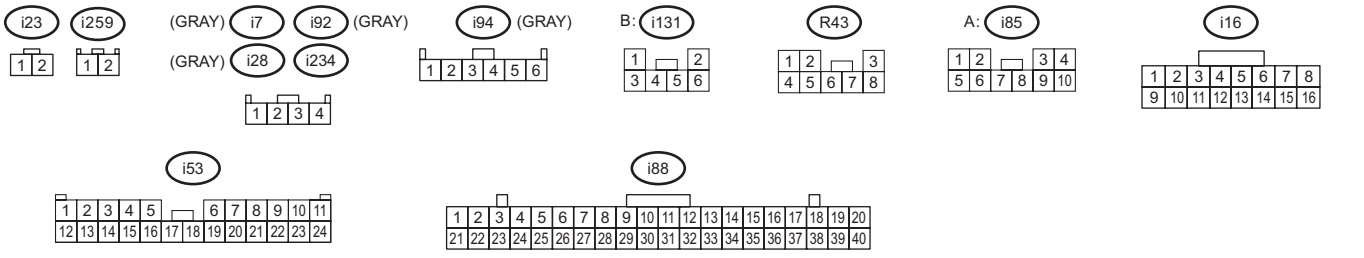

ILLUMI-03
ILLUMI-03
REF. TO POWER SUPPLY CIRCUIT
MB-28 M/B FUSE NO. 14 (B)
FB-29 F/B FUSE NO. 31 (ACC)
FB-38 F/B FUSE NO. 12 (IG)
MB-29 M/B FUSE NO. 8 (B)
KEY WARNING SWITCH
B555
OP : WITHOUT PUSH BUTTON START
WP : WITH PUSH BUTTON START
*1 : WITHOUT PUSH BUTTON START : BW
WITH PUSH BUTTON START : YR
ILLUMI-01 D
E ILLUMI-05
F ILLUMI-04
G ILLUMI-04
A: B280 B: B281 C: i84 D: i171
BODY INTEGRATED UNIT
i22
HAZARD SWITCH
D149
REMOTE CONTROL MIRROR SWITCH
i101
D84
BRIGHT SWITCH
i79
ILLUMINATION CONTROL SWITCH
REF. TO AUDIO SYSTEM [AUDIO(6I)-02] [AUDIO(7IOD)-02] [AUDIO(7IWD)-02]
REF. TO NAVIGATION SYSTEM [NAVI(OD)-02] [NAVI(WD)-02]
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
B: B281
C: i84 (BLACK)
WI-61521

ILLUMI-04

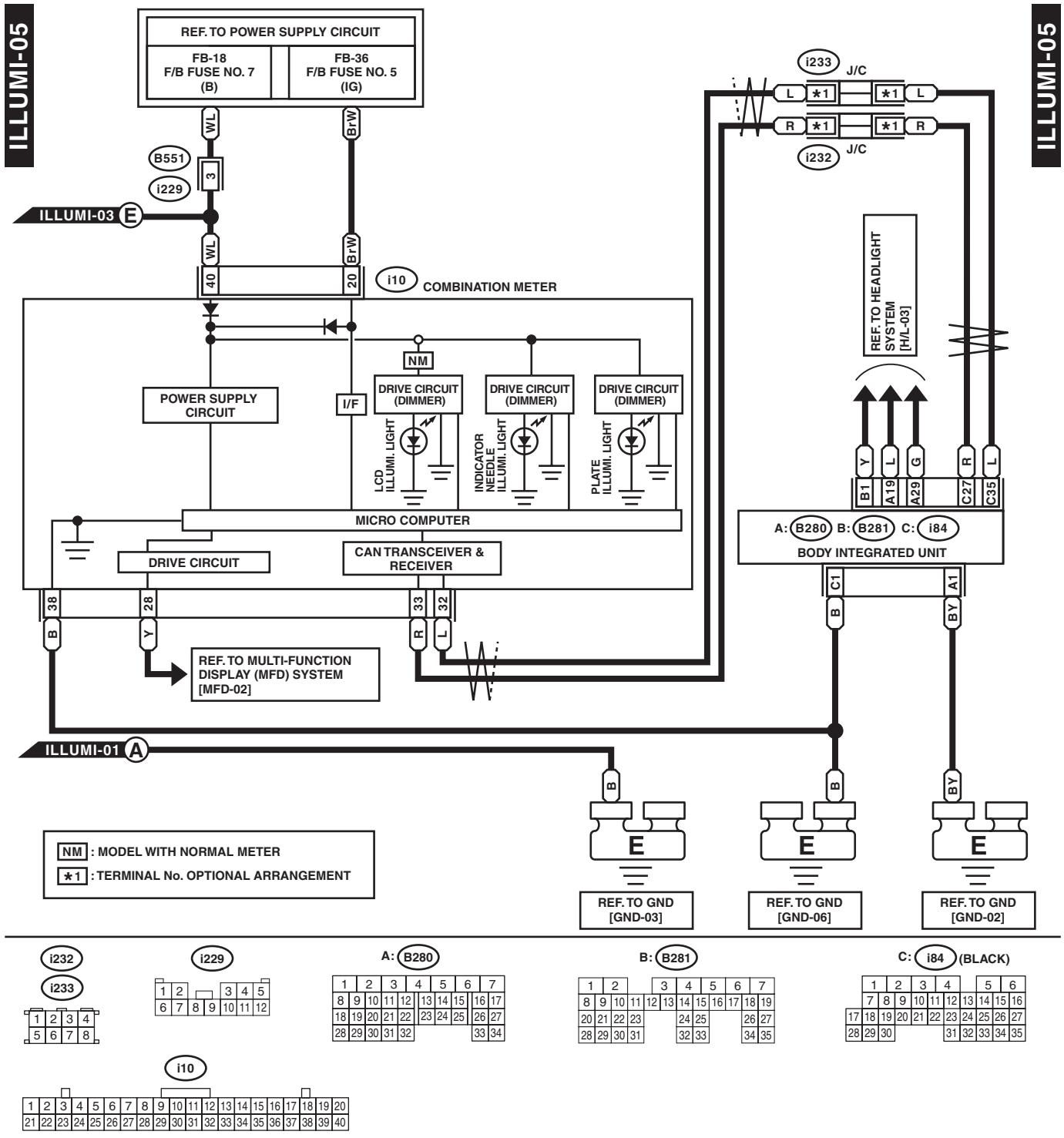
MA : MANUAL A/C
AA : AUTO A/C
HM : HIGH GRADE MFD
SR : WITH BSD/RCTA

*1 : WITHOUT SRF : OP CONNECTOR (FOG LIGHT SWITCH)
WITH SRF : SRF OFF SWITCH
*2 : WITHOUT SRF : i28
WITH SRF : i92
*3 : WITHOUT NAVIGATION : AUDIO
WITH NAVIGATION : NAVIGATION UNIT





WI-61522


ILLUMI-05
REF. TO POWER SUPPLY CIRCUIT
FB-18 F/B FUSE NO. 7 (B)
FB-36 F/B FUSE NO. 5 (IG)
WL
BrW
B551
i229
3
ILLUMI-03 E
40
20
i10
COMBINATION METER
NM
POWER SUPPLY CIRCUIT
I/F
DRIVE CIRCUIT (DIMMER)
LCD ILLUMI. LIGHT
INDICATOR NEEDLE ILLUMI. LIGHT
PLATE ILLUMI. LIGHT
MICRO COMPUTER
DRIVE CIRCUIT
CAN TRANSCEIVER & RECEIVER
38
28
33
32
B
Y
R
L
REF. TO MULTI-FUNCTION DISPLAY (MFD) SYSTEM [MFD-02]
i233 J/C
i232 J/C
L
R
*1
REF. TO HEADLIGHT SYSTEM [H/L-03]
Y
L
G
R
L
B1
A19
A29
C27
C35
A: B280 B: B281 C: i84
BODY INTEGRATED UNIT
C1
A1
B
BY
ILLUMI-01 A
E
REF. TO GND [GND-03]
REF. TO GND [GND-06]
REF. TO GND [GND-02]
NM : MODEL WITH NORMAL METER
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
i232
i233
i229
A: B280
B: B281
C: i84 (BLACK)
i10

WI-48199

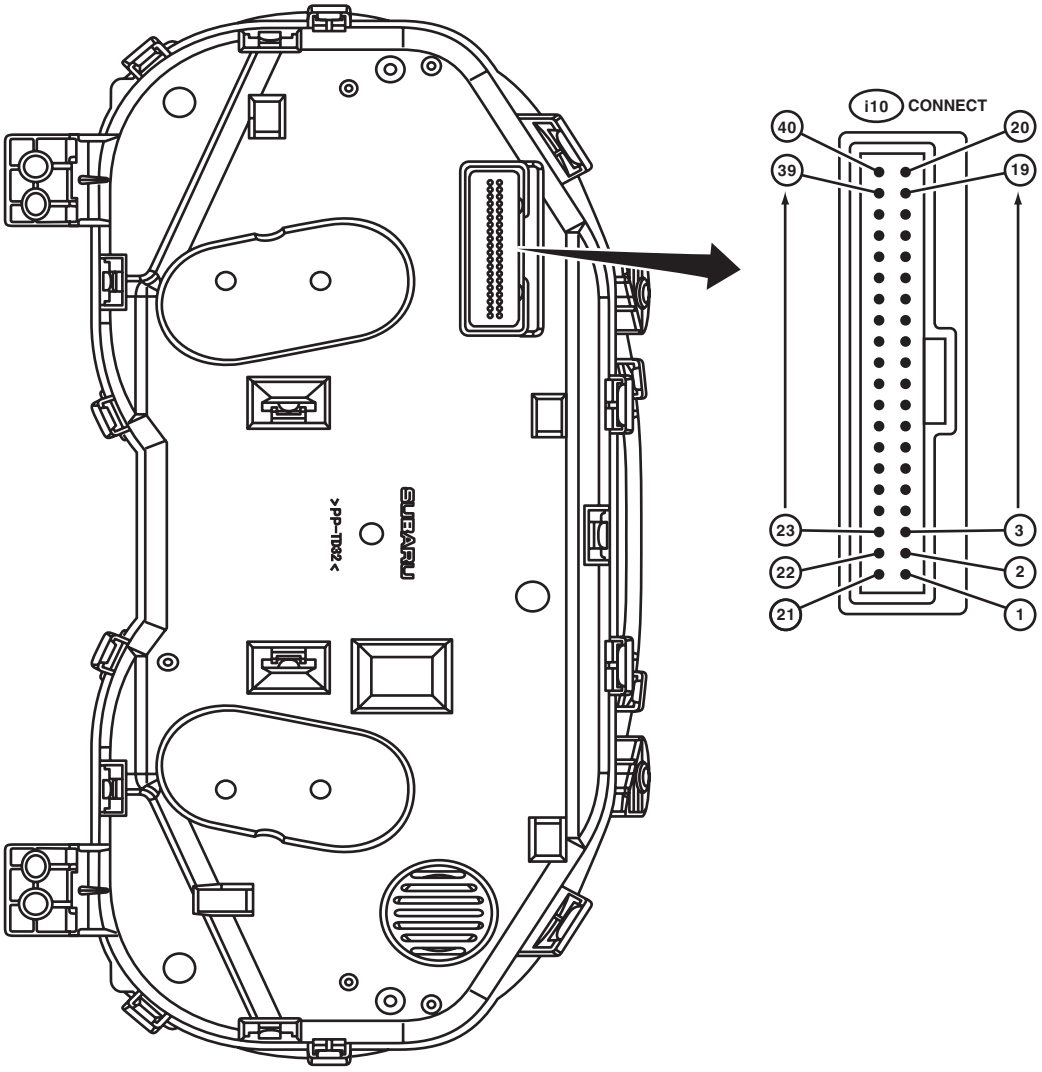
13.Combination Meter System

A: WIRING DIAGRAM

1. MODEL WITH NORMAL METER

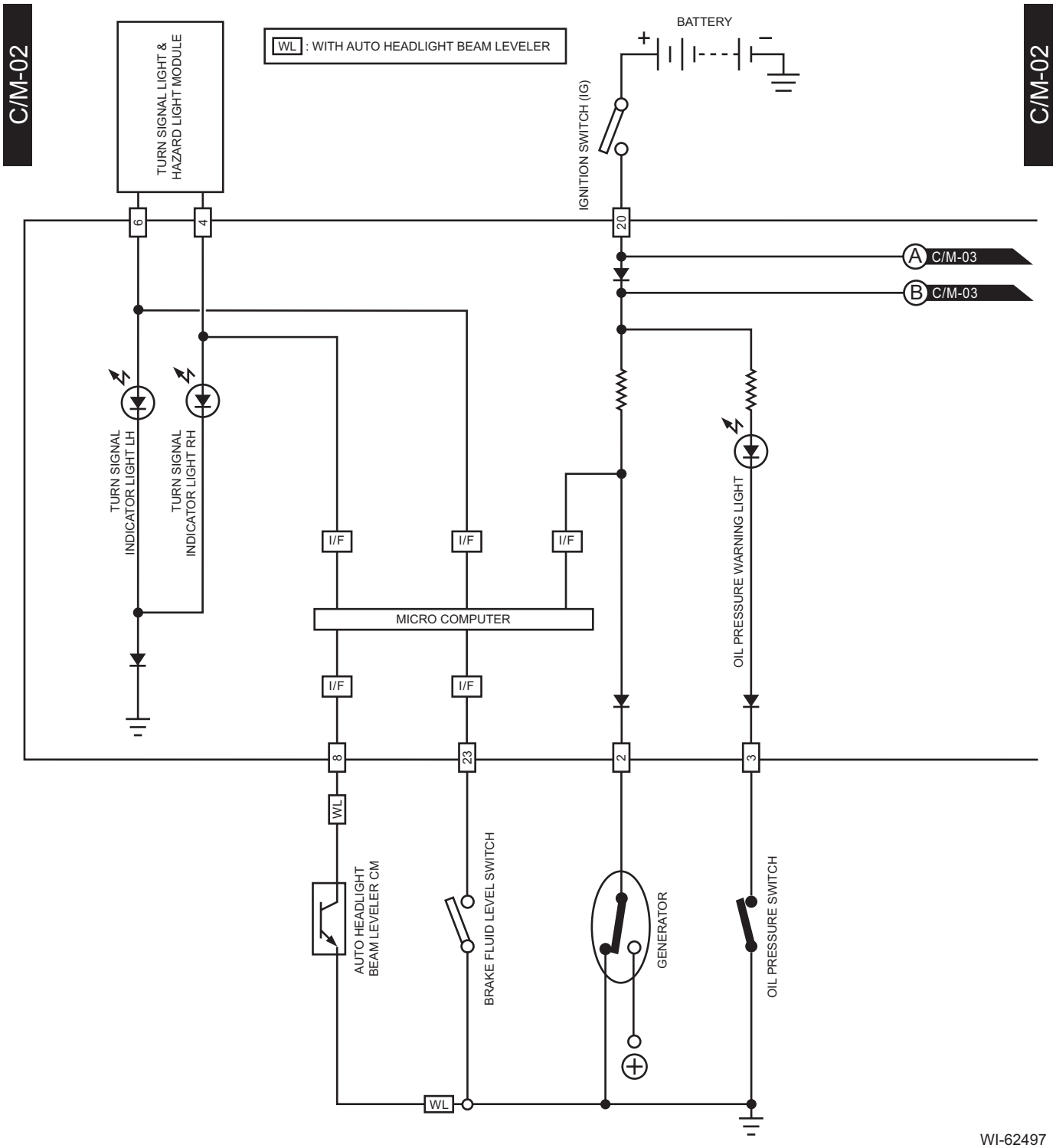
C/M-01

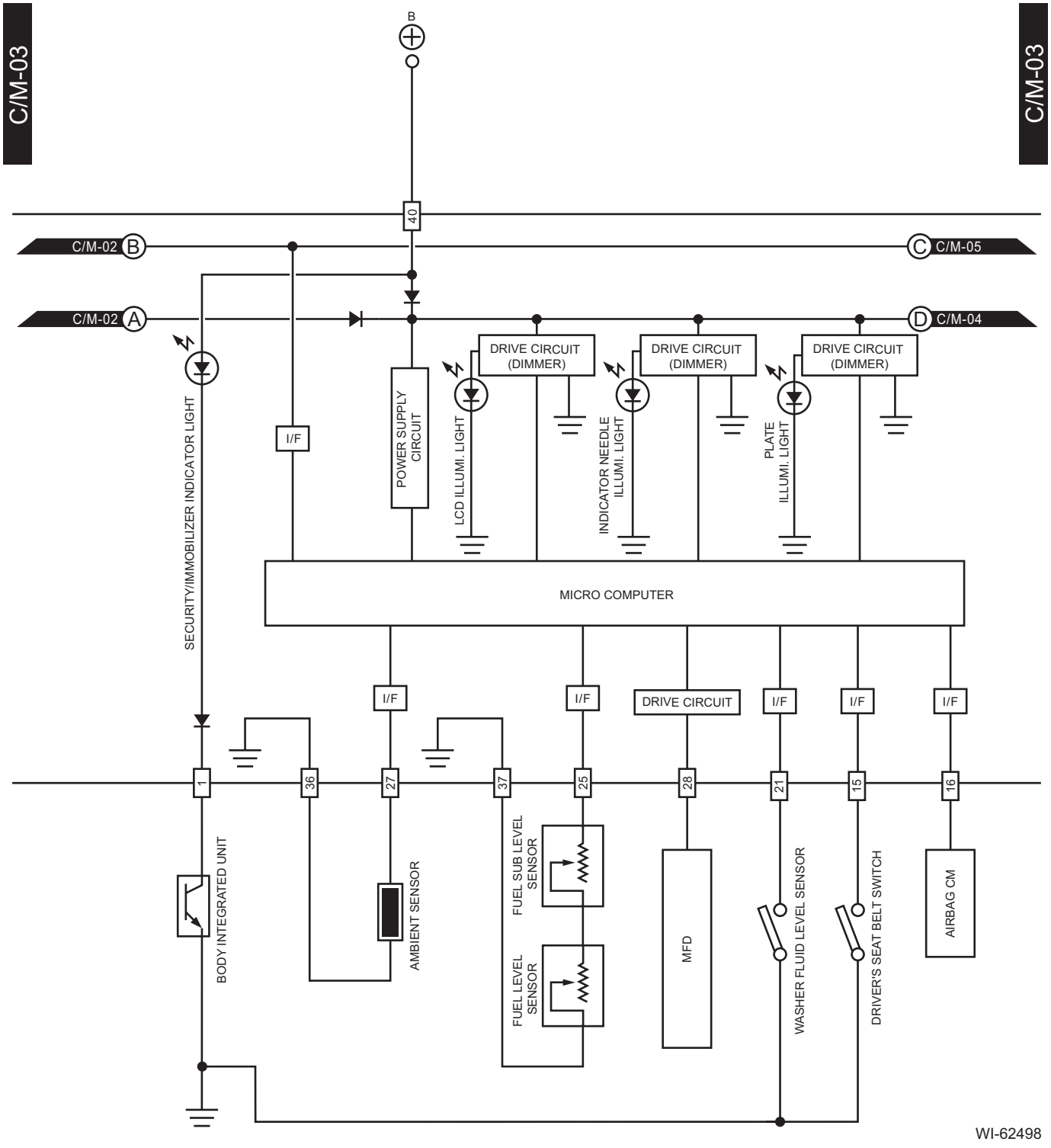
C/M-01



WI-34175

WIRING SYSTEM



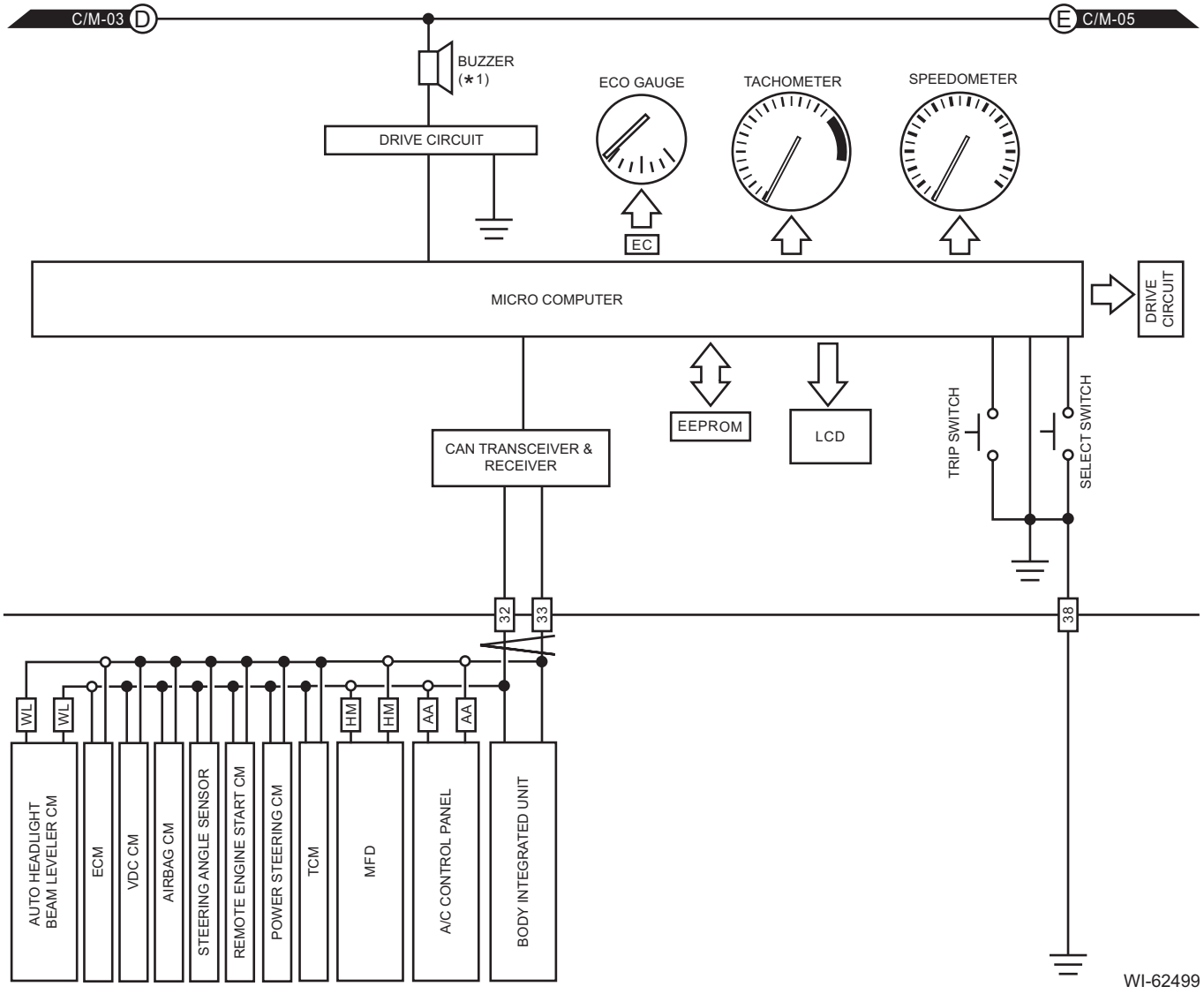

C/M-03
C/M-03
B
40
C/M-02 B
C C/M-05
C/M-02 A
D C/M-04
DRIVE CIRCUIT (DIMMER)
DRIVE CIRCUIT (DIMMER)
DRIVE CIRCUIT (DIMMER)
SECURITY/IMMOBILIZER INDICATOR LIGHT
I/F
POWER SUPPLY CIRCUIT
LCD ILLUMI. LIGHT
INDICATOR NEEDLE ILLUMI. LIGHT
PLATE ILLUMI. LIGHT
MICRO COMPUTER
I/F
I/F
DRIVE CIRCUIT
I/F
I/F
I/F
1
36
27
37
25
28
21
15
16
BODY INTEGRATED UNIT
AMBIENT SENSOR
FUEL SUB LEVEL SENSOR
FUEL LEVEL SENSOR
MFD
WASHER FLUID LEVEL SENSOR
DRIVER'S SEAT BELT SWITCH
AIRBAG CM
WI-62498

WIRING SYSTEM

C/M-04

AA : AUTO A/C
HM : HIGH GRADE MFD
EC : WITH ECO GAUGE
WL : WITH AUTO HEADLIGHT BEAM LEVELER
*1 : SEAT BELT
KEY WARNING
HEADLIGHT ON WARNING
CUSTOMIZED
MANUAL SHIFT

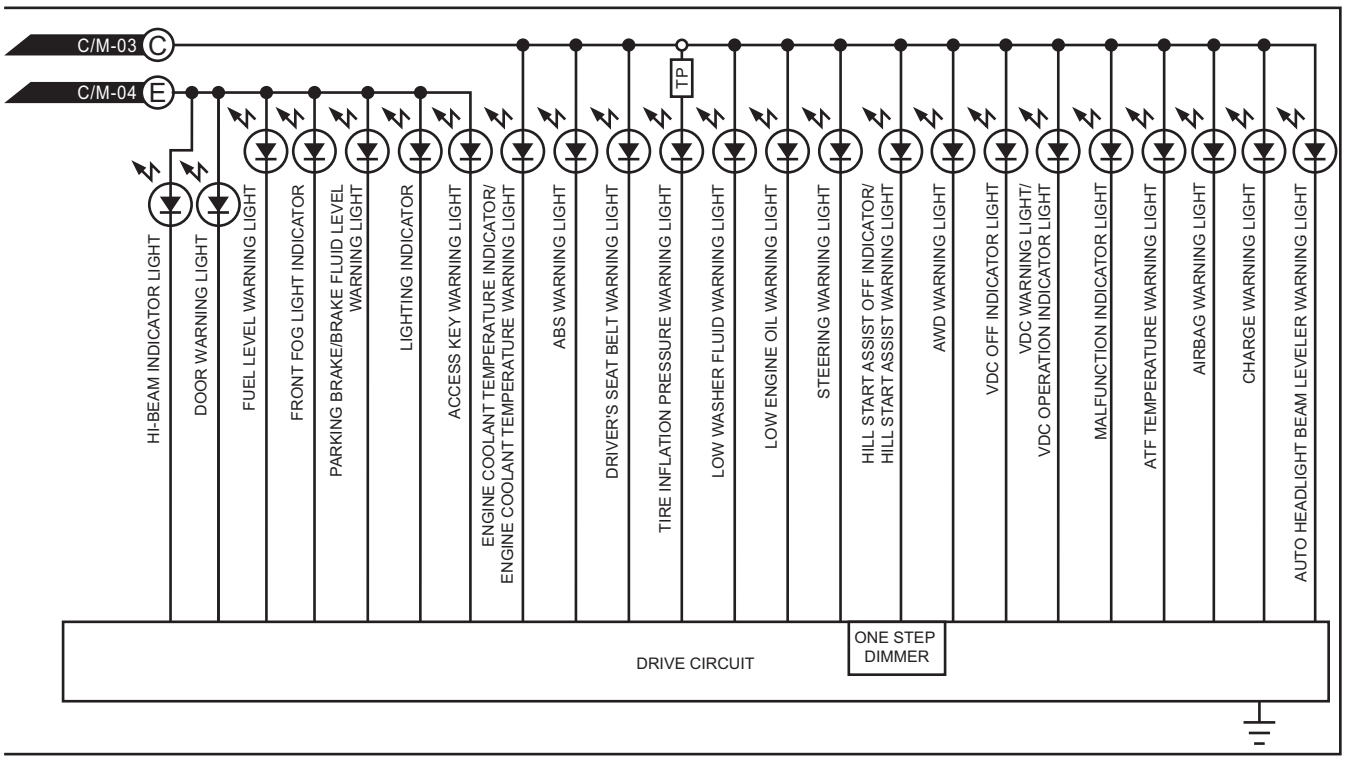
C/M-04



C/M-05

C/M-05

TP : WITH TPMS

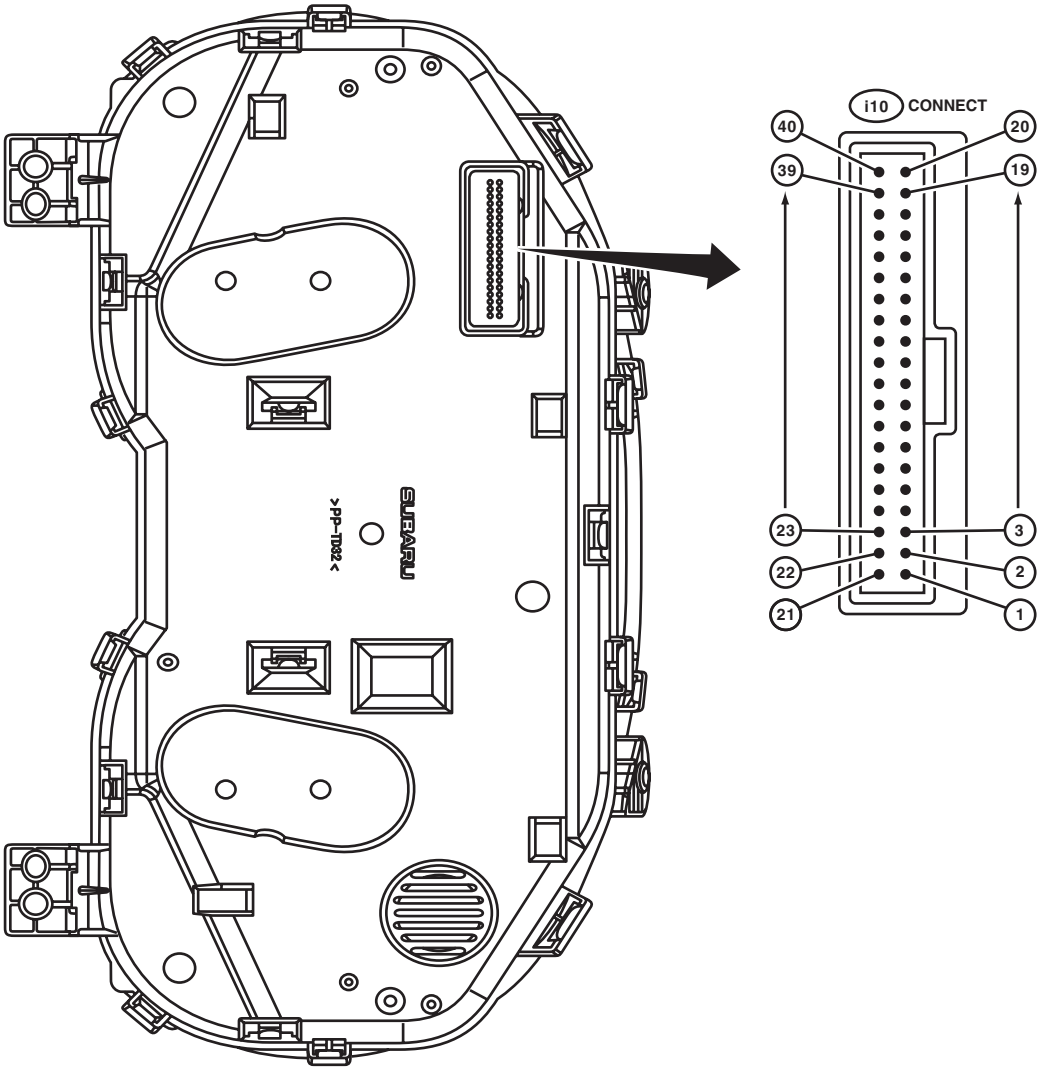


WI-62500

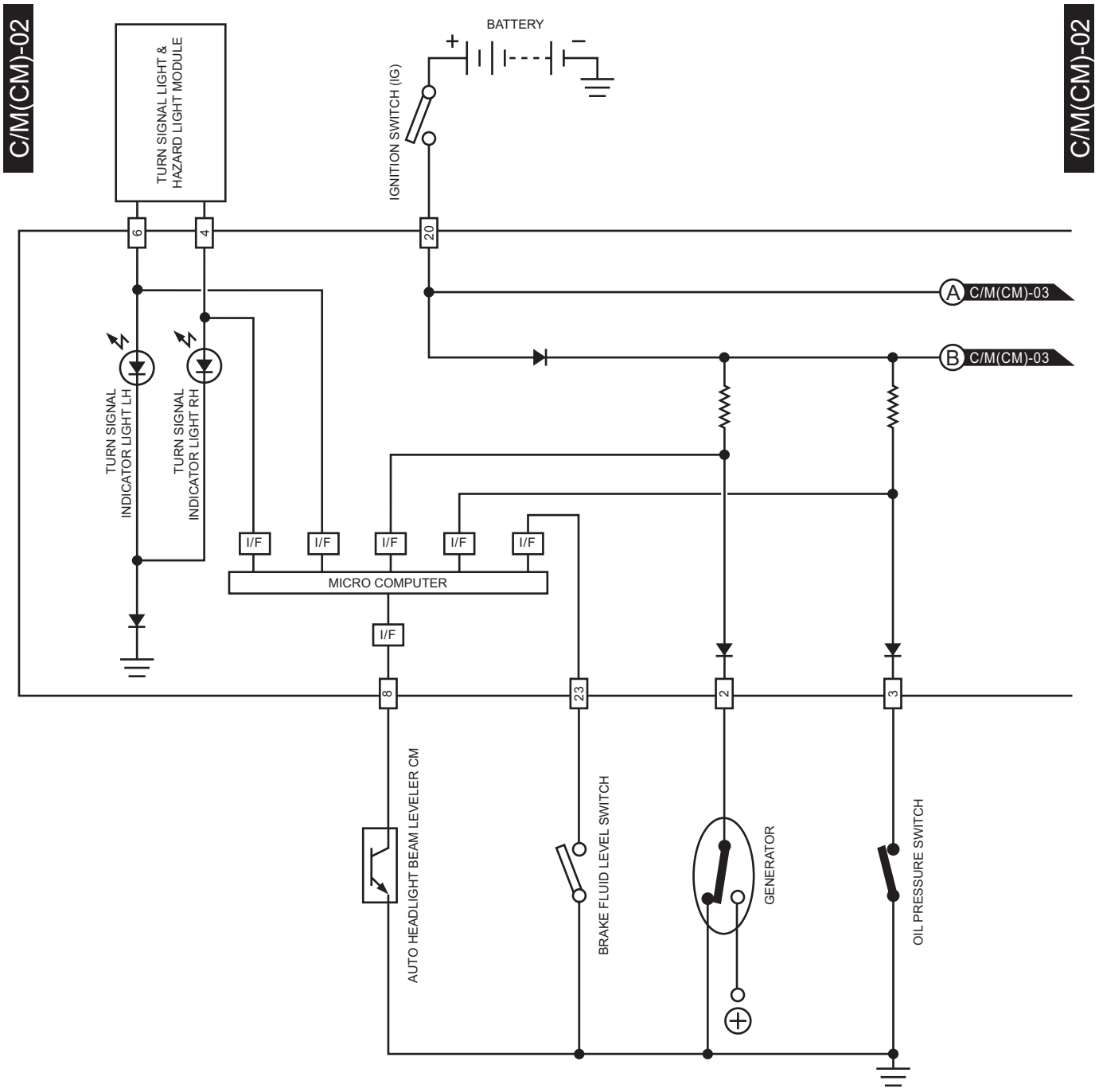
2. MODEL WITH COLOR TFT METER

C/M(CM)-01

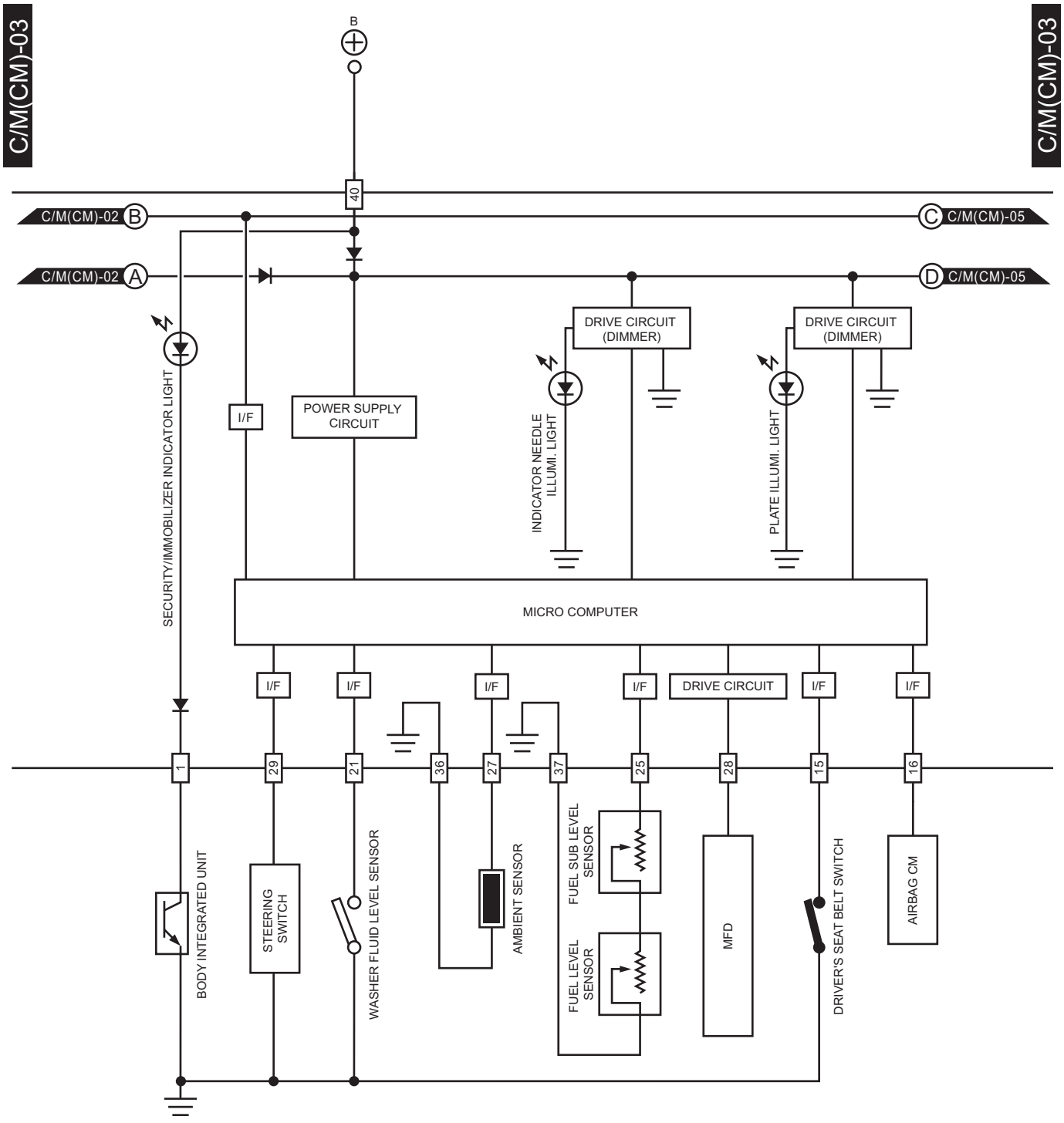
C/M(CM)-01



WI-48200


C/M(CM)-02
C/M(CM)-02
TURN SIGNAL LIGHT & HAZARD LIGHT MODULE
BATTERY
IGNITION SWITCH (IG)
6
4
20
A C/M(CM)-03
B C/M(CM)-03
TURN SIGNAL INDICATOR LIGHT LH
TURN SIGNAL INDICATOR LIGHT RH
I/F
I/F
I/F
I/F
I/F
MICRO COMPUTER
I/F
8
23
2
3
AUTO HEADLIGHT BEAM LEVELER CM
BRAKE FLUID LEVEL SWITCH
GENERATOR
OIL PRESSURE SWITCH

WI-62501


C/M(CM)-03
C/M(CM)-03
B
40
C/M(CM)-02 B
C/M(CM)-02 A
C C/M(CM)-05
D C/M(CM)-05
DRIVE CIRCUIT (DIMMER)
DRIVE CIRCUIT (DIMMER)
SECURITY/IMMOBILIZER INDICATOR LIGHT
I/F
POWER SUPPLY CIRCUIT
INDICATOR NEEDLE ILLUMI. LIGHT
PLATE ILLUMI. LIGHT
MICRO COMPUTER
I/F
I/F
I/F
I/F
DRIVE CIRCUIT
I/F
I/F
1
29
21
36
27
37
25
28
15
16
BODY INTEGRATED UNIT
STEERING SWITCH
WASHER FLUID LEVEL SENSOR
AMBIENT SENSOR
FUEL SUB LEVEL SENSOR
FUEL LEVEL SENSOR
MFD
DRIVER'S SEAT BELT SWITCH
AIRBAG CM

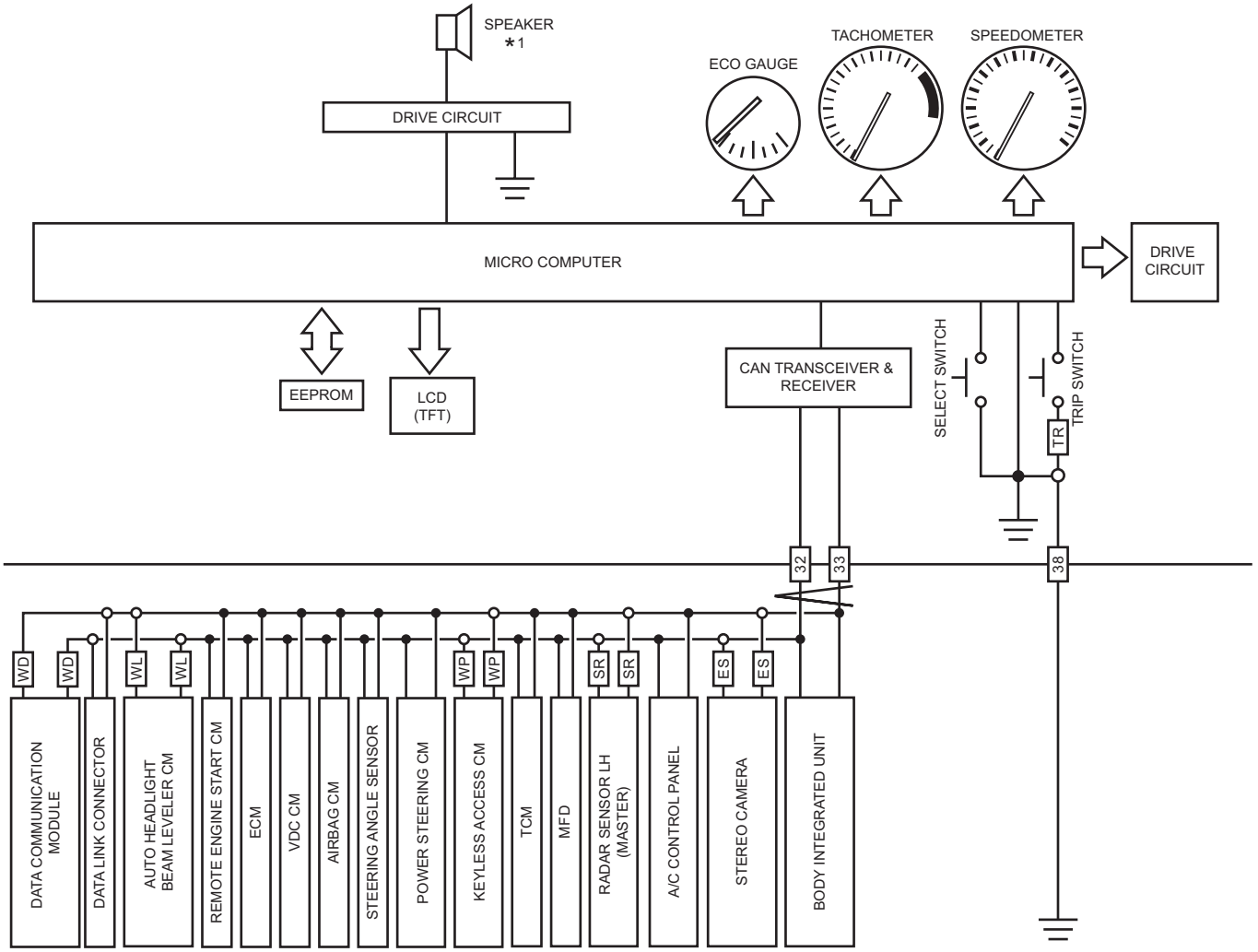
WI-62502

C/M(CM)-04

TR : WITH TRIP SWITCH
WP : WITH PUSH BUTTON START
WL : WITH AUTO HEADLIGHT BEAM LEVELER
ES : WITH EyeSight
SR : WITH BSD/RCTA
WD : WITH TELEMATICS

*1 : SEAT BELT
KEY WARNING
HEADLIGHT ON WARNING
CUSTOMIZED
MANUAL SHIFT
KEYLESS ACCESS
EyeSight

C/M(CM)-04

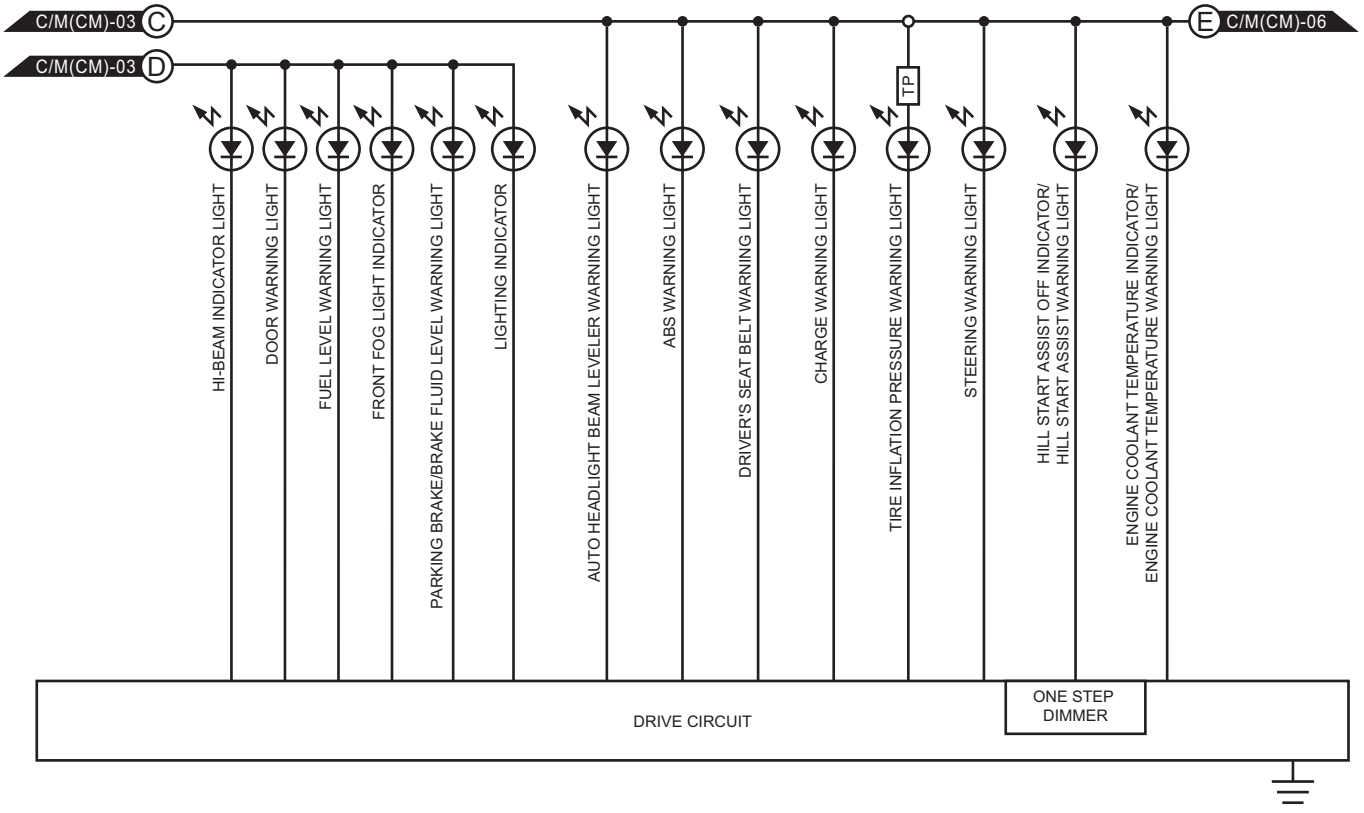


WI-61523

C/M(CM)-05

C/M(CM)-05

TP : WITH TPMS

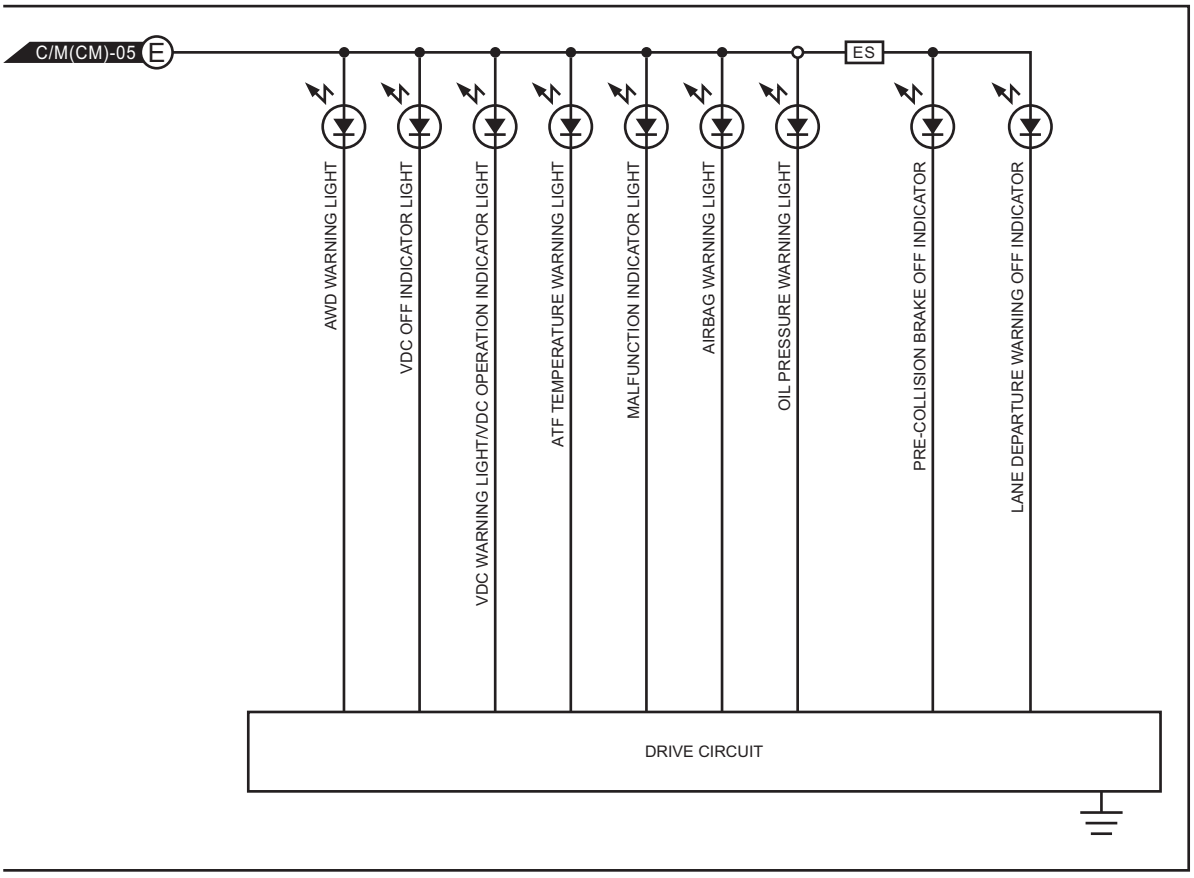


WI-62503

C/M(CM)-06

C/M(CM)-06

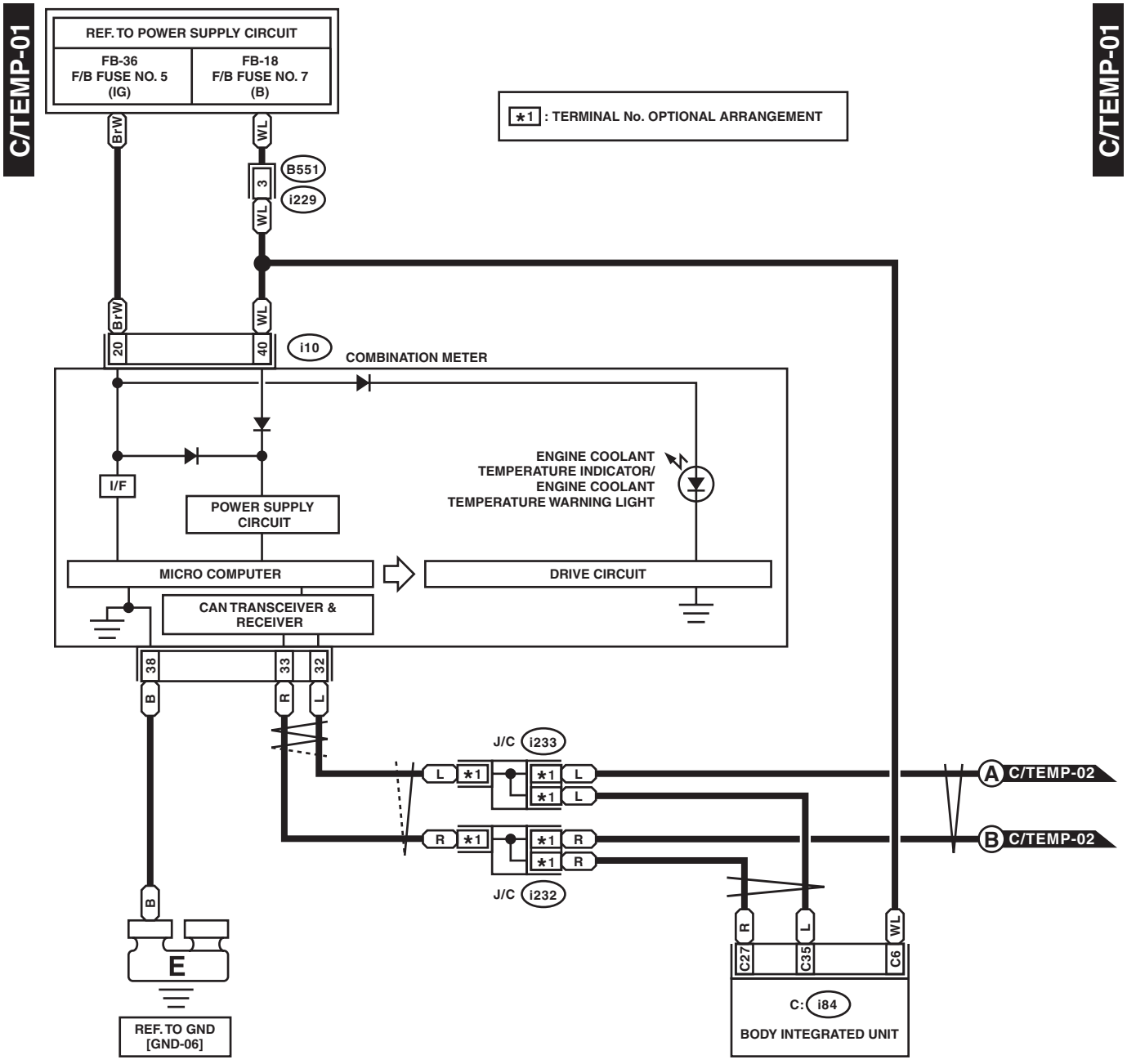
ES : WITH EyeSight

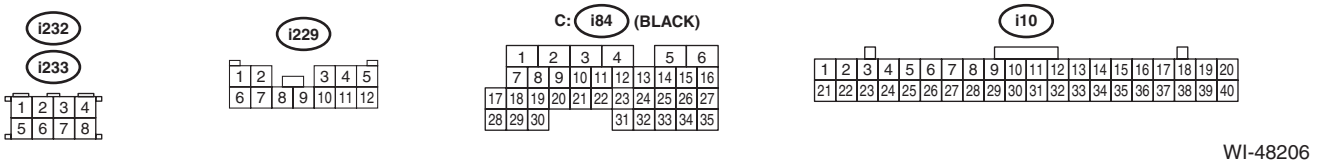


WI-62504

14.Coolant Temperature System

A: WIRING DIAGRAM

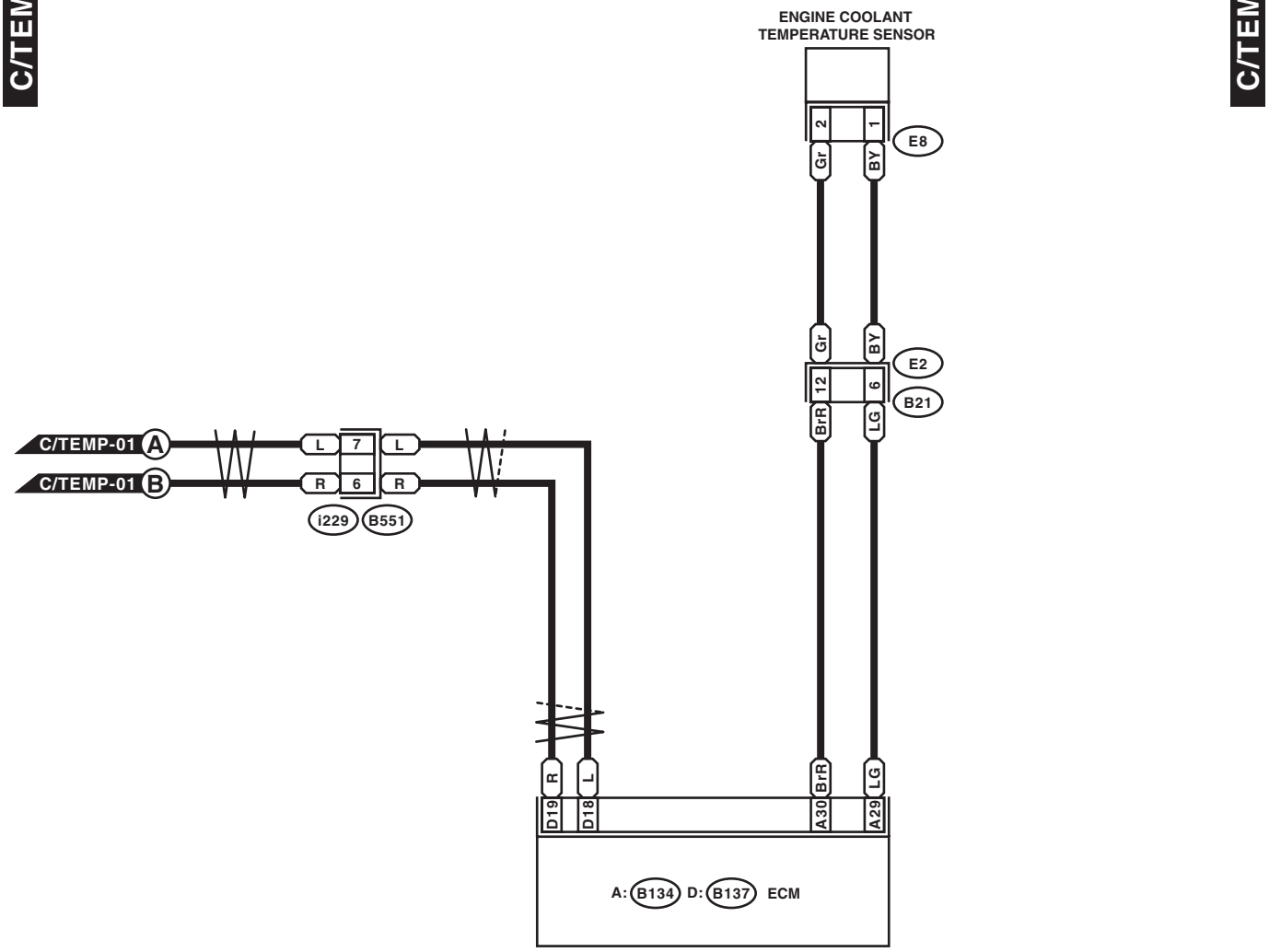


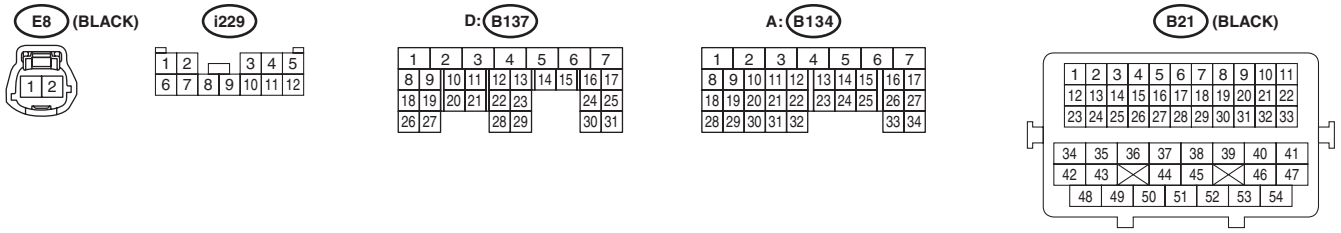


WI-48206

C/TEMP-02

C/TEMP-02

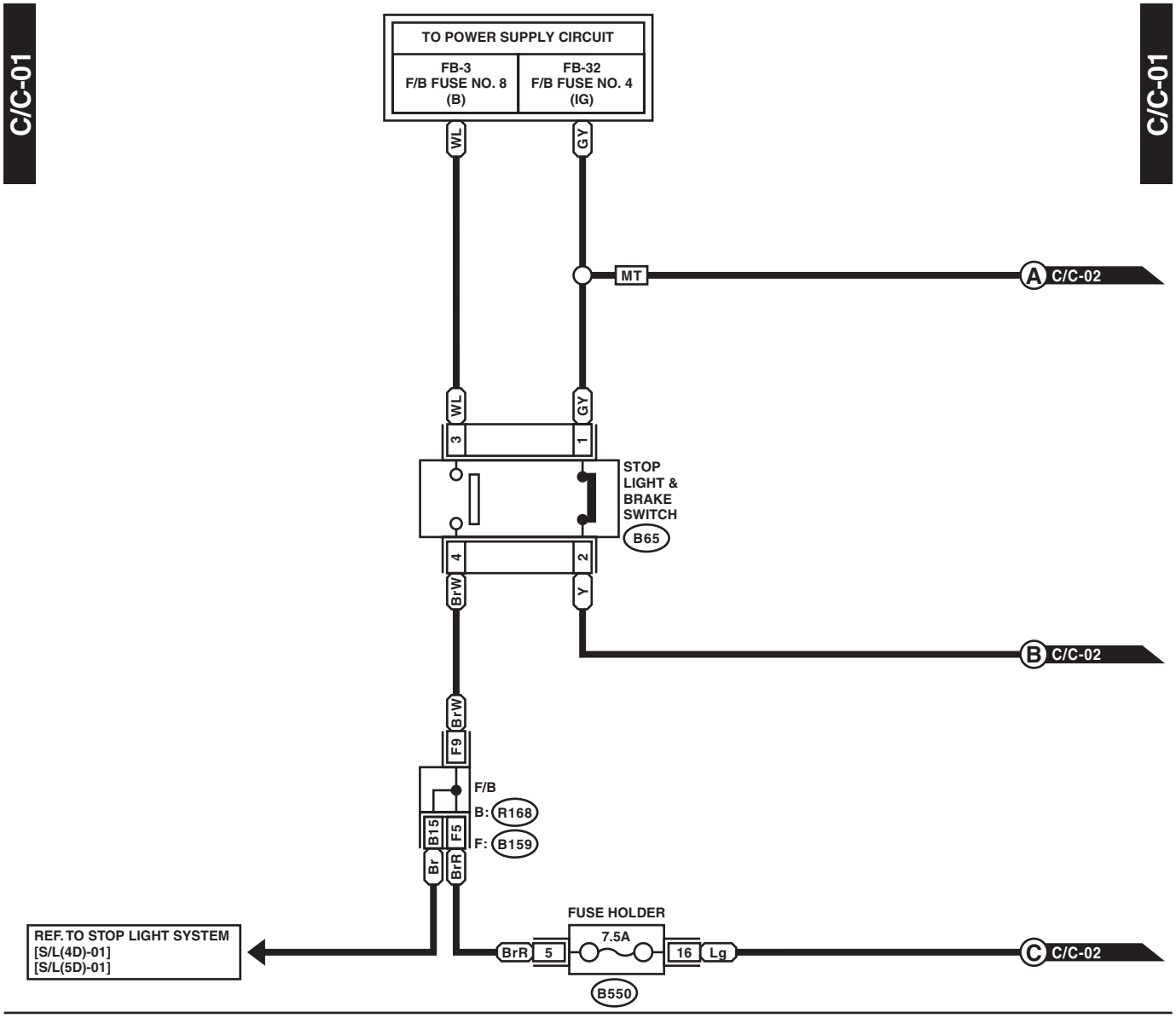




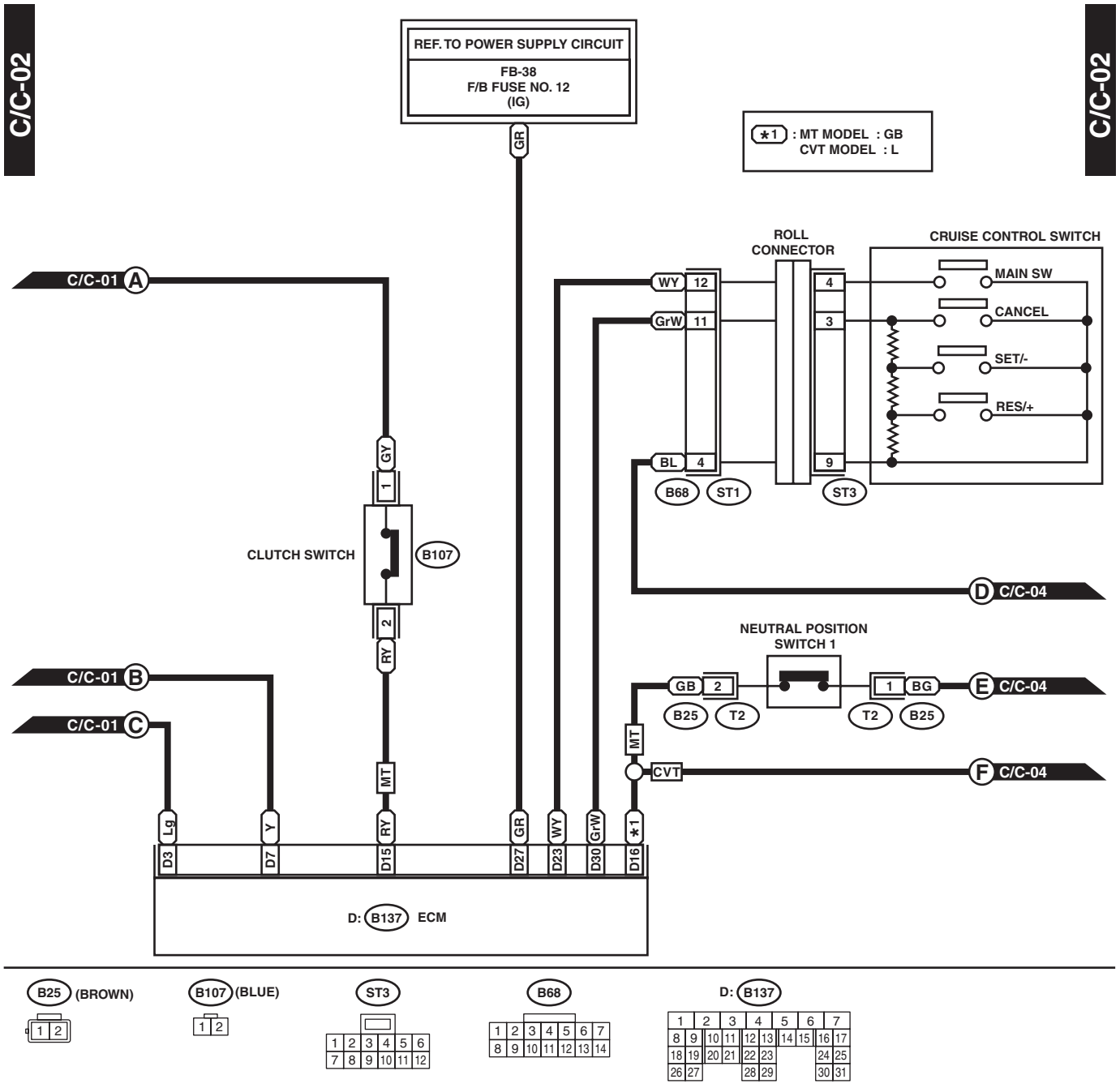
WI-48207

15.Cruise Control System

A: WIRING DIAGRAM



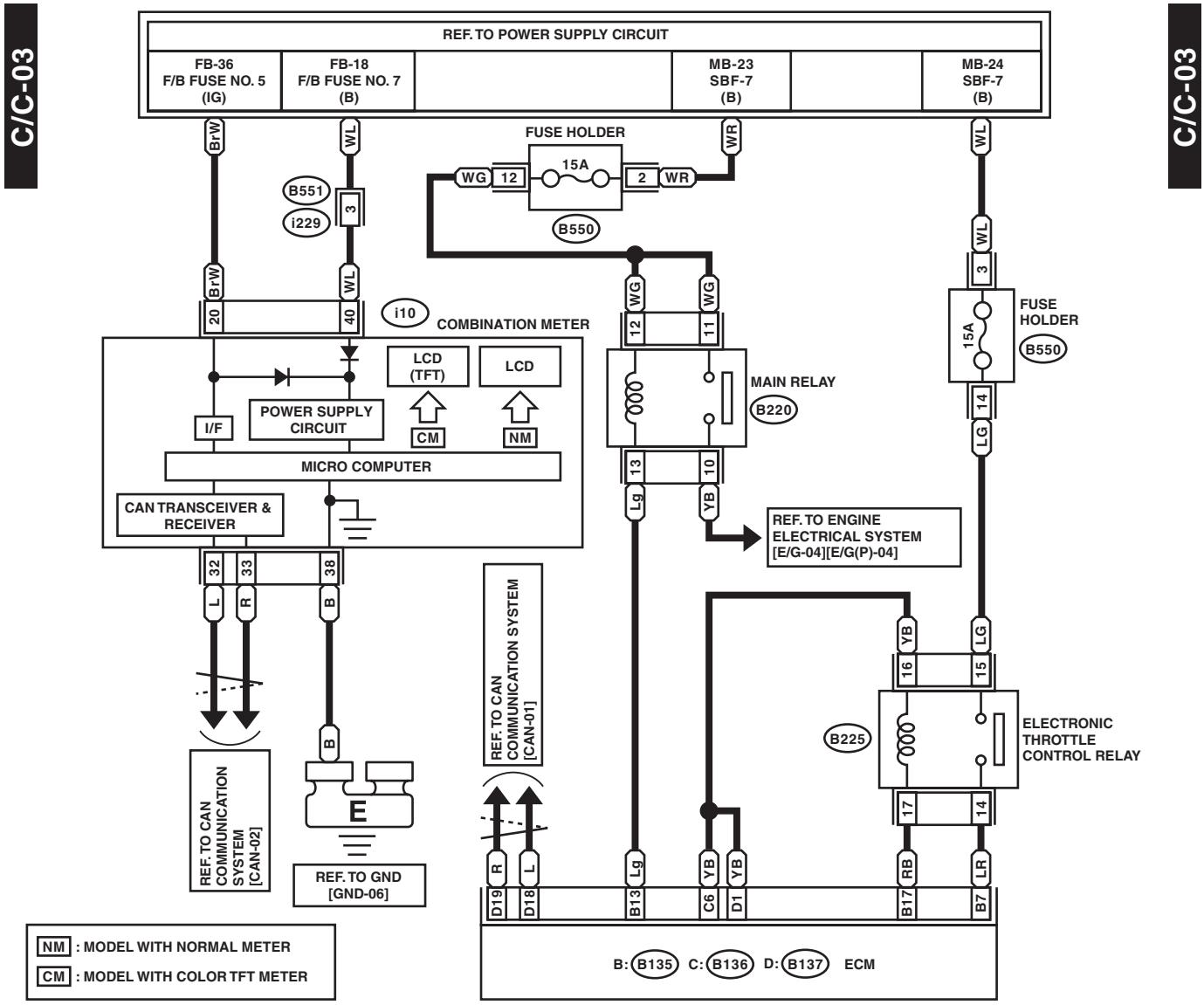
WI-37825

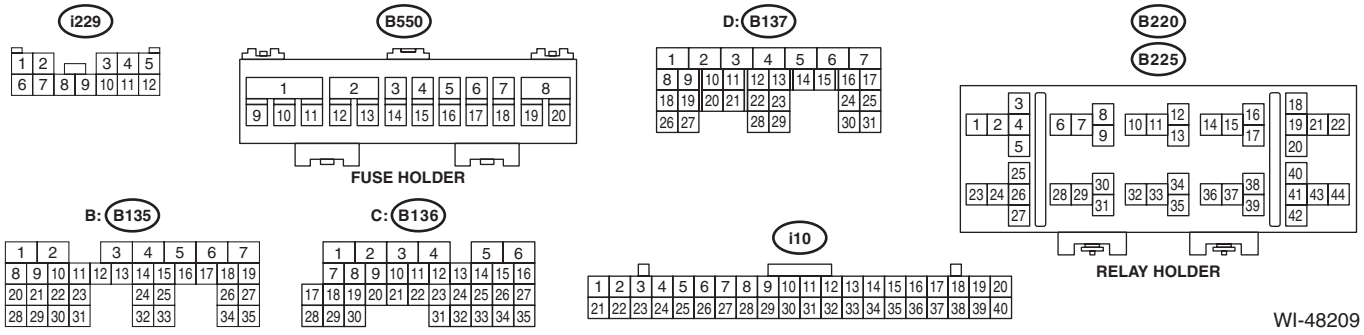

C/C-02
C/C-02
REF. TO POWER SUPPLY CIRCUIT
FB-38
F/B FUSE NO. 12
(IG)
GR
*1 : MT MODEL : GB
CVT MODEL : L
ROLL CONNECTOR
CRUISE CONTROL SWITCH
MAIN SW
CANCEL
SET/-
RES/+
C/C-01 A
WY 12
GrW 11
BL 4
4
3
9
B68
ST1
ST3
D C/C-04
GY
1
CLUTCH SWITCH
B107
2
RY
NEUTRAL POSITION SWITCH 1
C/C-01 B
GB 2
1 BG
E C/C-04
B25
T2
T2
B25
C/C-01 C
MT
CVT
F C/C-04
MT
Lg
Y
RY
GR
WY
GrW
*1
D3
D7
D15
D27
D23
D30
D16
D: B137 ECM

B25 (BROWN)
B107 (BLUE)
ST3
B68
D: B137

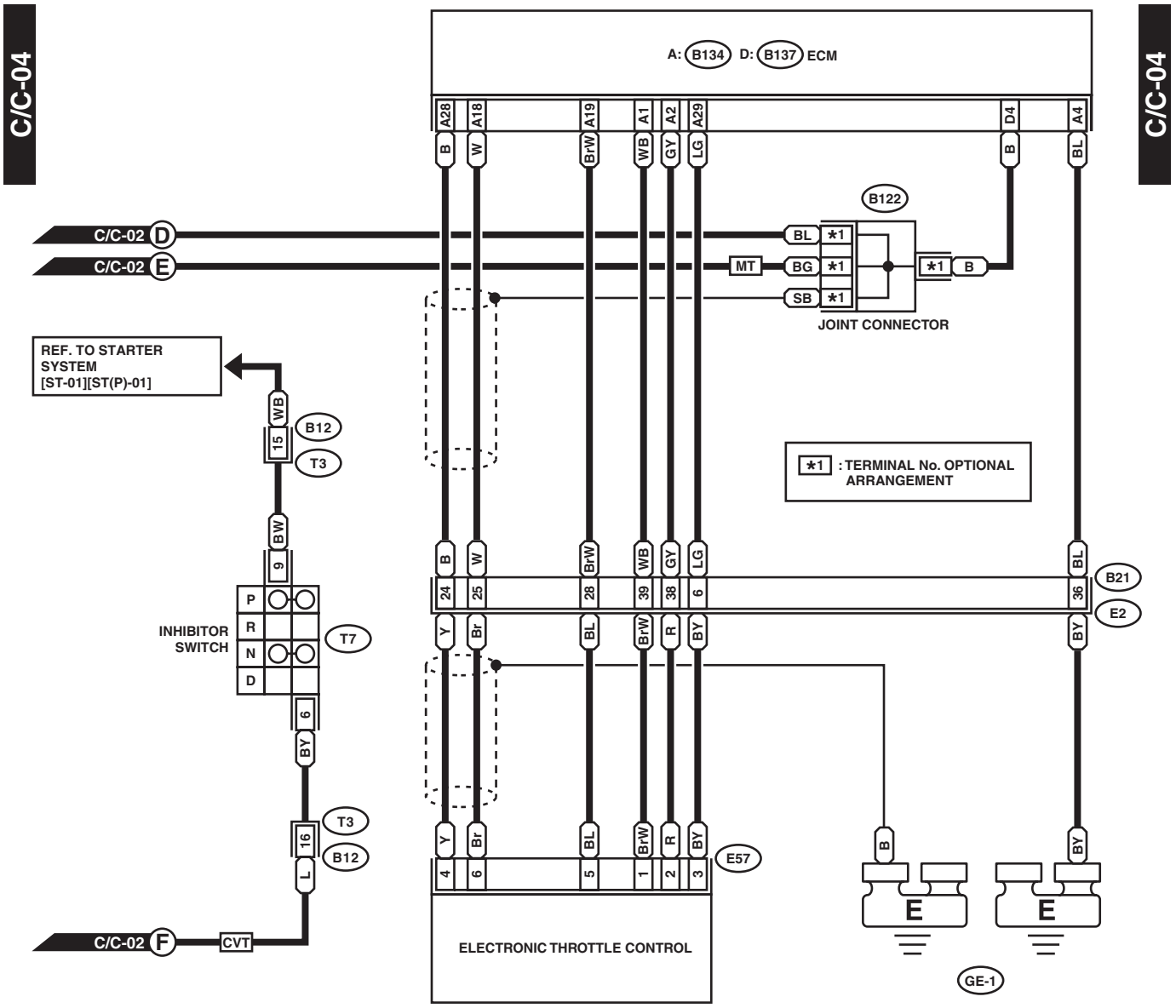
WI-48208

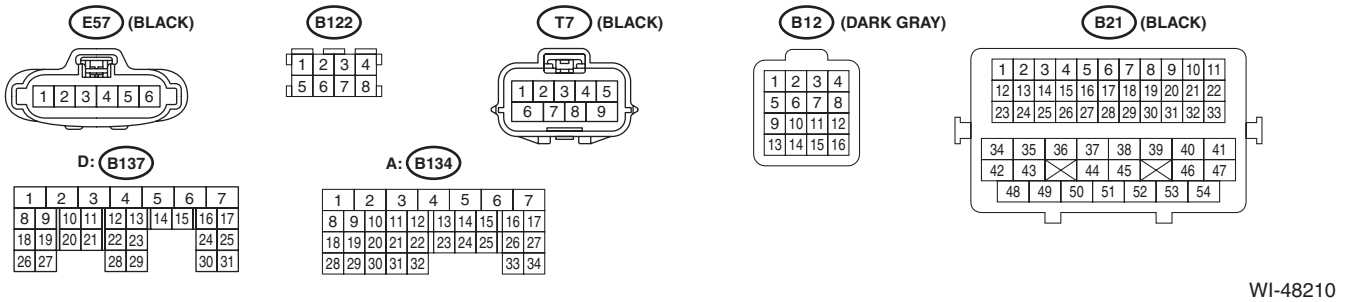
C/C-03





WI-48209

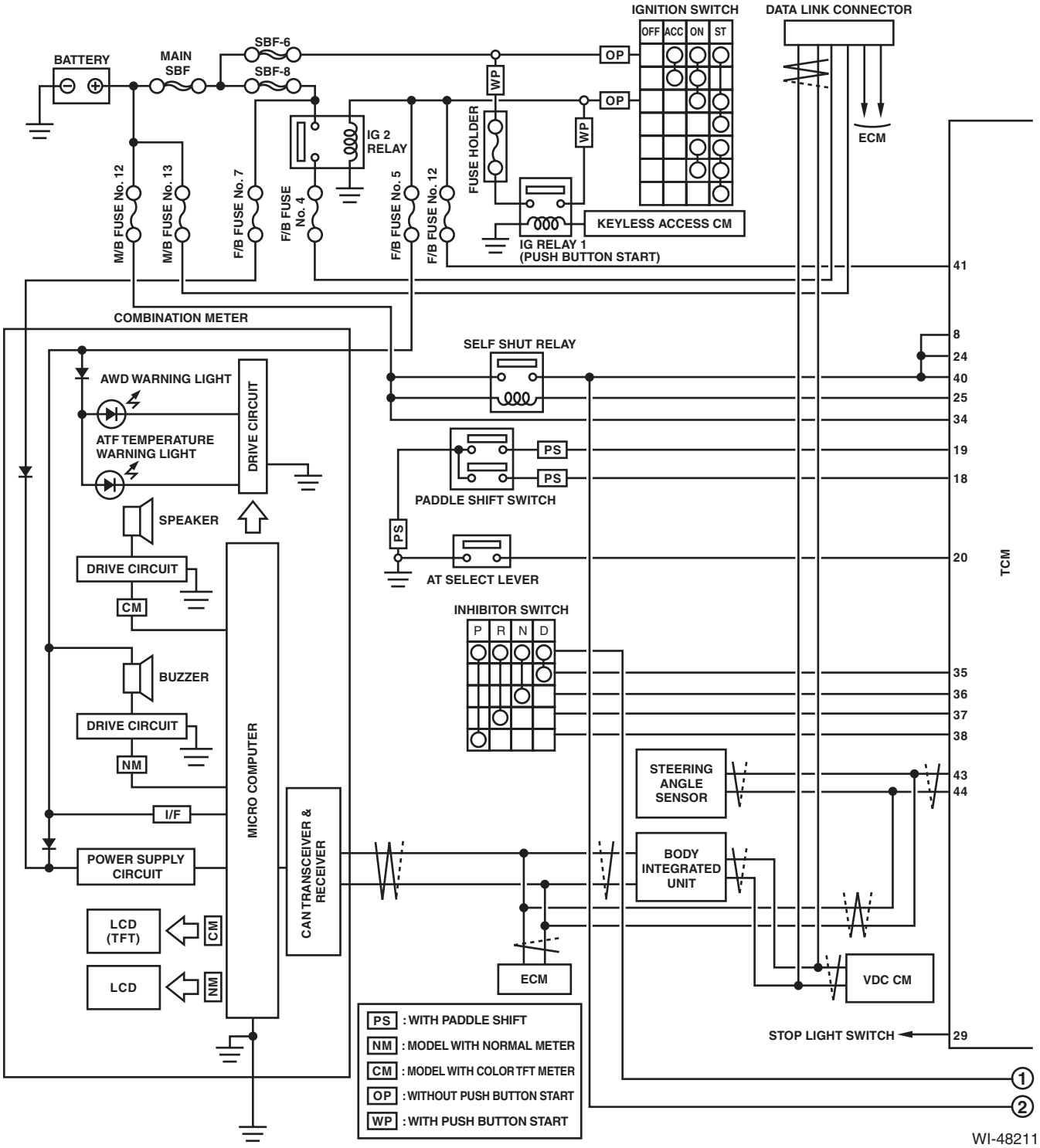

C/C-04
C/C-04
A: B134 D: B137 ECM
A28
A18
A19
A1
A2
A29
D4
A4
B
W
BrW
WB
GY
LG
B
BL
B122
C/C-02 D
C/C-02 E
BL *1
MT
BG *1
SB *1
*1 B
JOINT CONNECTOR
REF. TO STARTER SYSTEM [ST-01][ST(P)-01]
WB
15
B12
T3
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
BW
9
B
W
BrW
WB
GY
LG
BL
B21
24
25
28
39
38
6
36
E2
P
R
N
D
INHIBITOR SWITCH
T7
Y
Br
BL
BrW
R
BY
BY
6
BY
T3
16
B12
L
Y
Br
BL
BrW
R
BY
B
BY
4
6
5
1
2
3
E57
C/C-02 F
CVT
ELECTRONIC THROTTLE CONTROL
E
E
GE-1

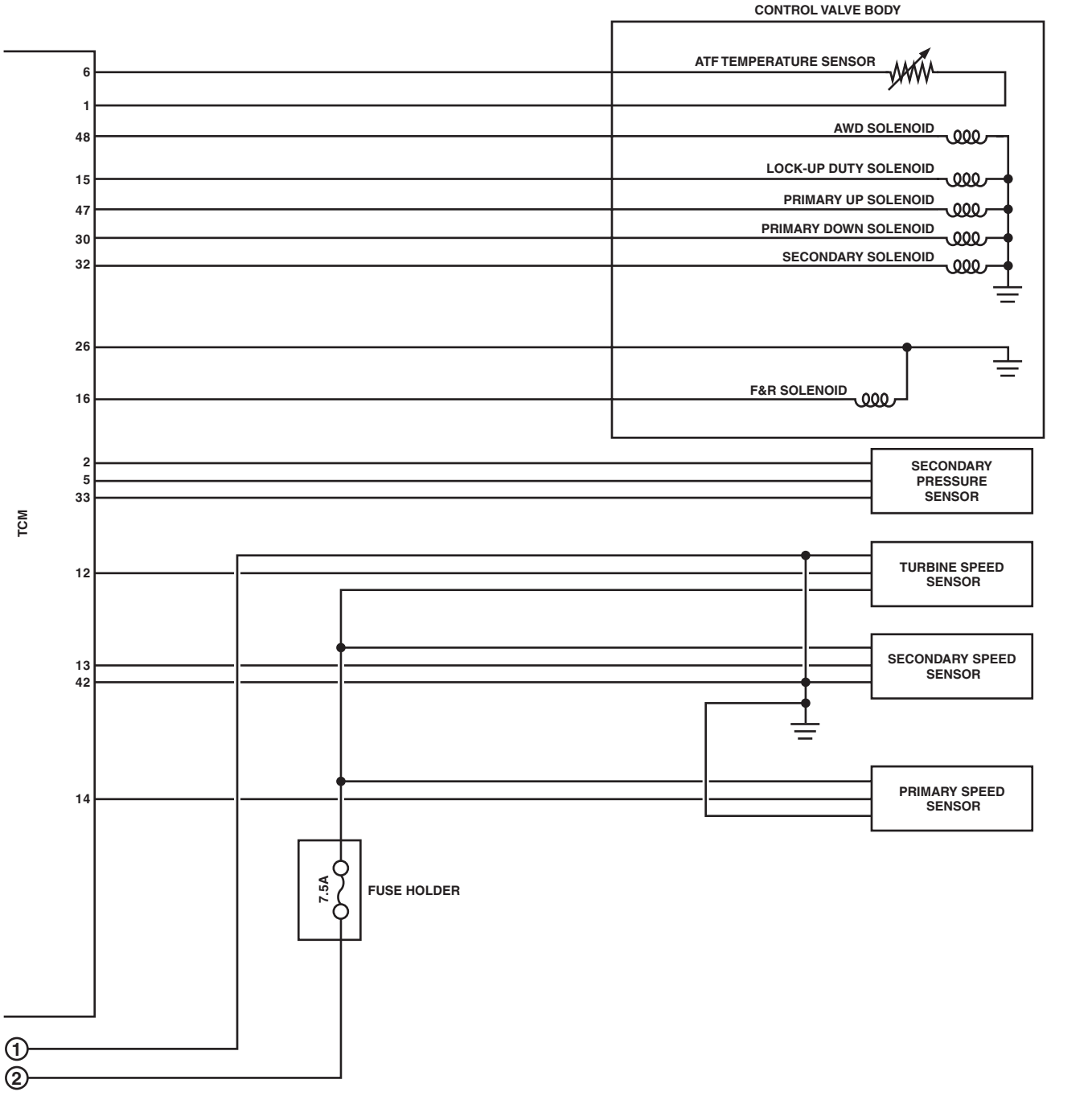

E57 (BLACK)
B122
T7 (BLACK)
B12 (DARK GRAY)
B21 (BLACK)
D: B137
A: B134

WI-48210

16.CVT Control System

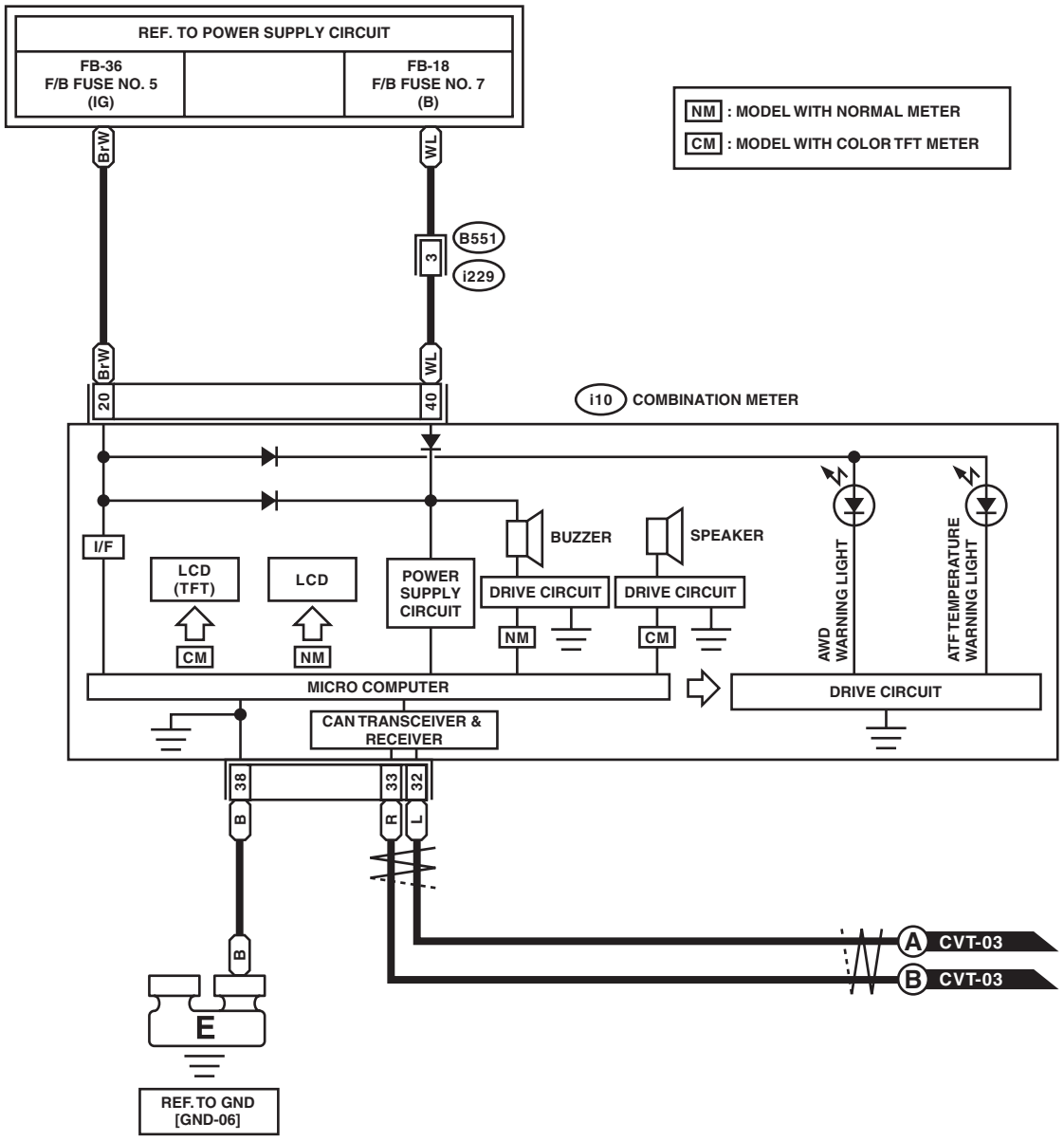
A: WIRING DIAGRAM

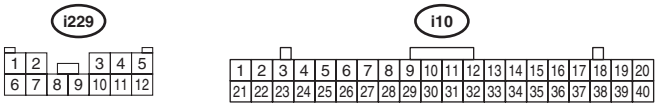



CONTROL VALVE BODY
ATF TEMPERATURE SENSOR
AWD SOLENOID
LOCK-UP DUTY SOLENOID
PRIMARY UP SOLENOID
PRIMARY DOWN SOLENOID
SECONDARY SOLENOID
F&R SOLENOID
TCM
6
1
48
15
47
30
32
26
16
2
5
33
12
13
42
14
SECONDARY PRESSURE SENSOR
TURBINE SPEED SENSOR
SECONDARY SPEED SENSOR
PRIMARY SPEED SENSOR
7.5A
FUSE HOLDER
1
2

WI-48212

CVT-01

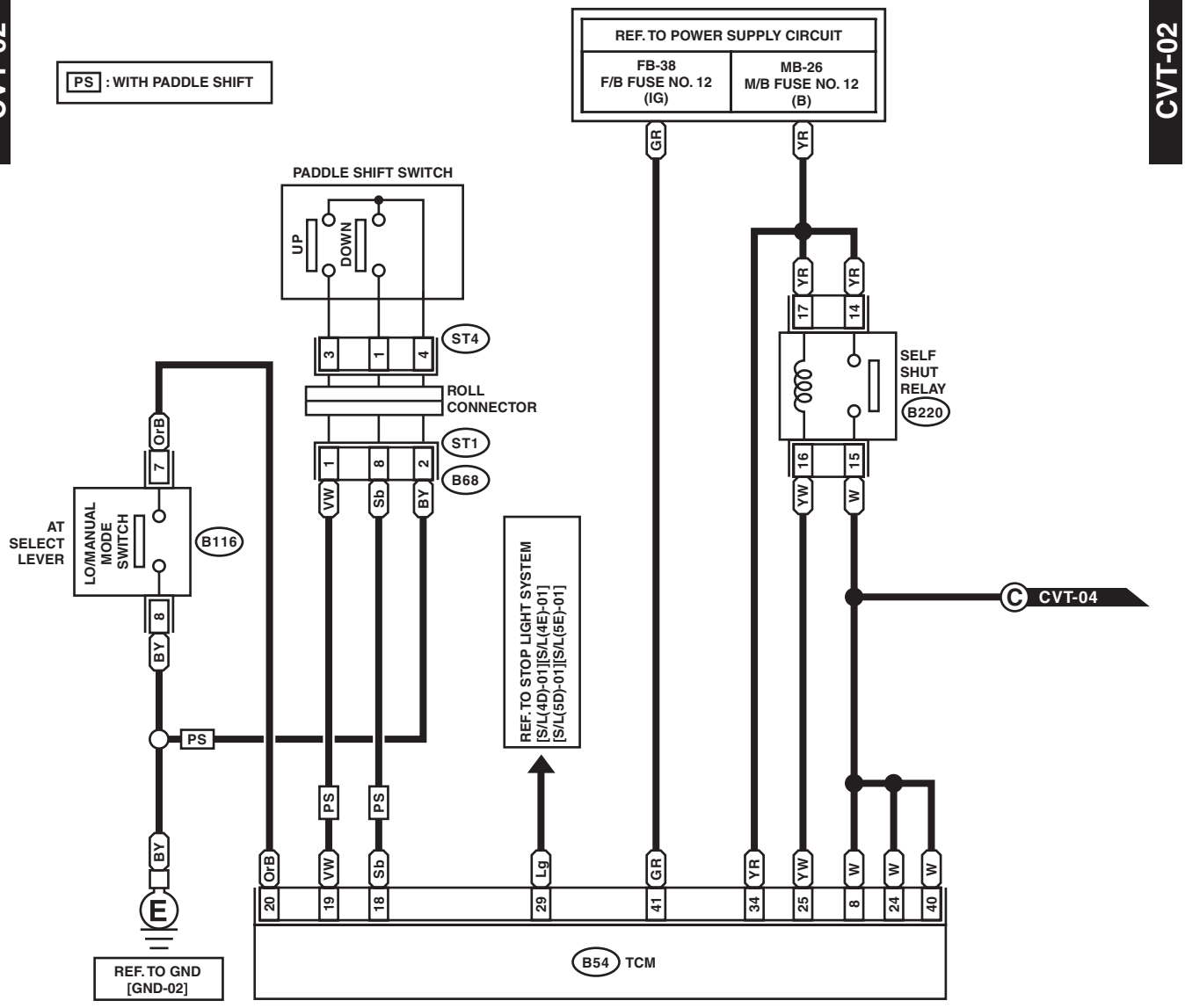


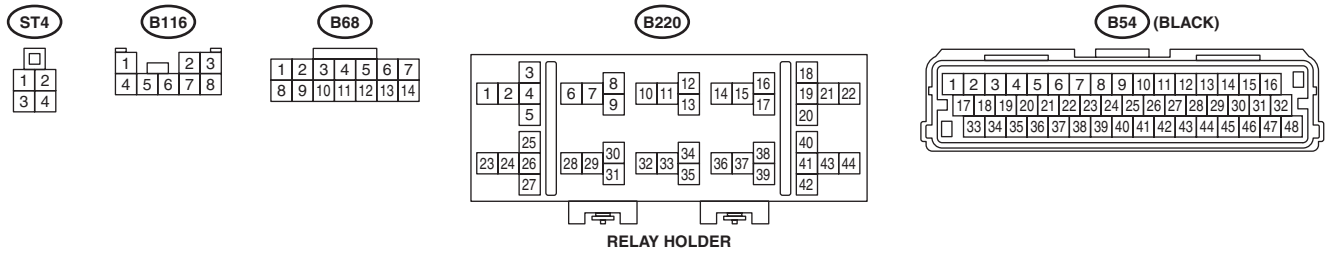


WI-48213

CVT-02

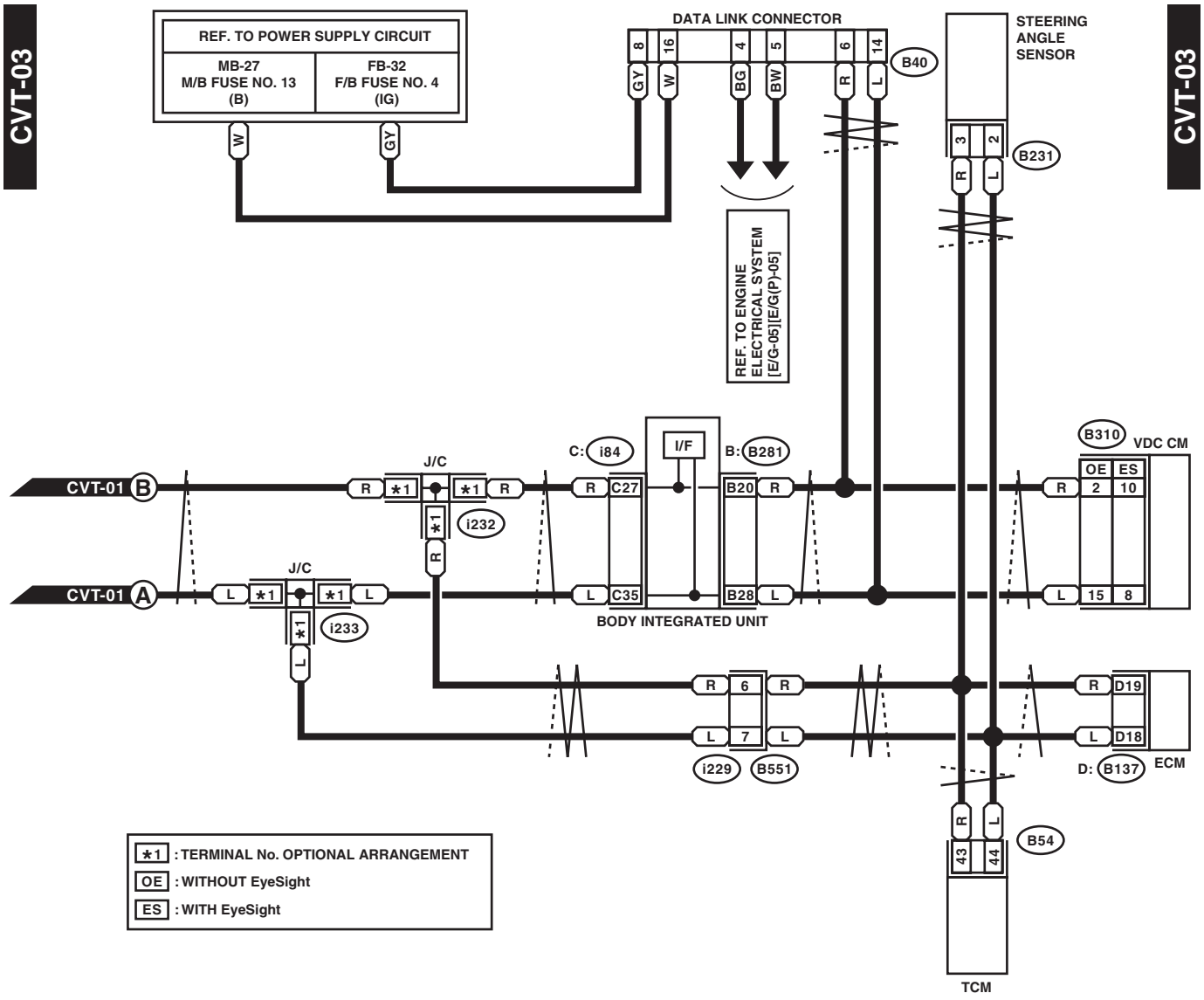
CVT-02

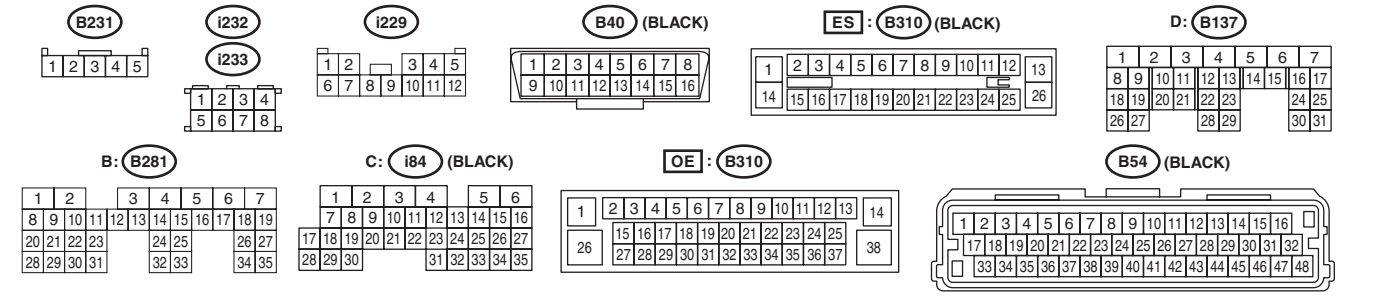




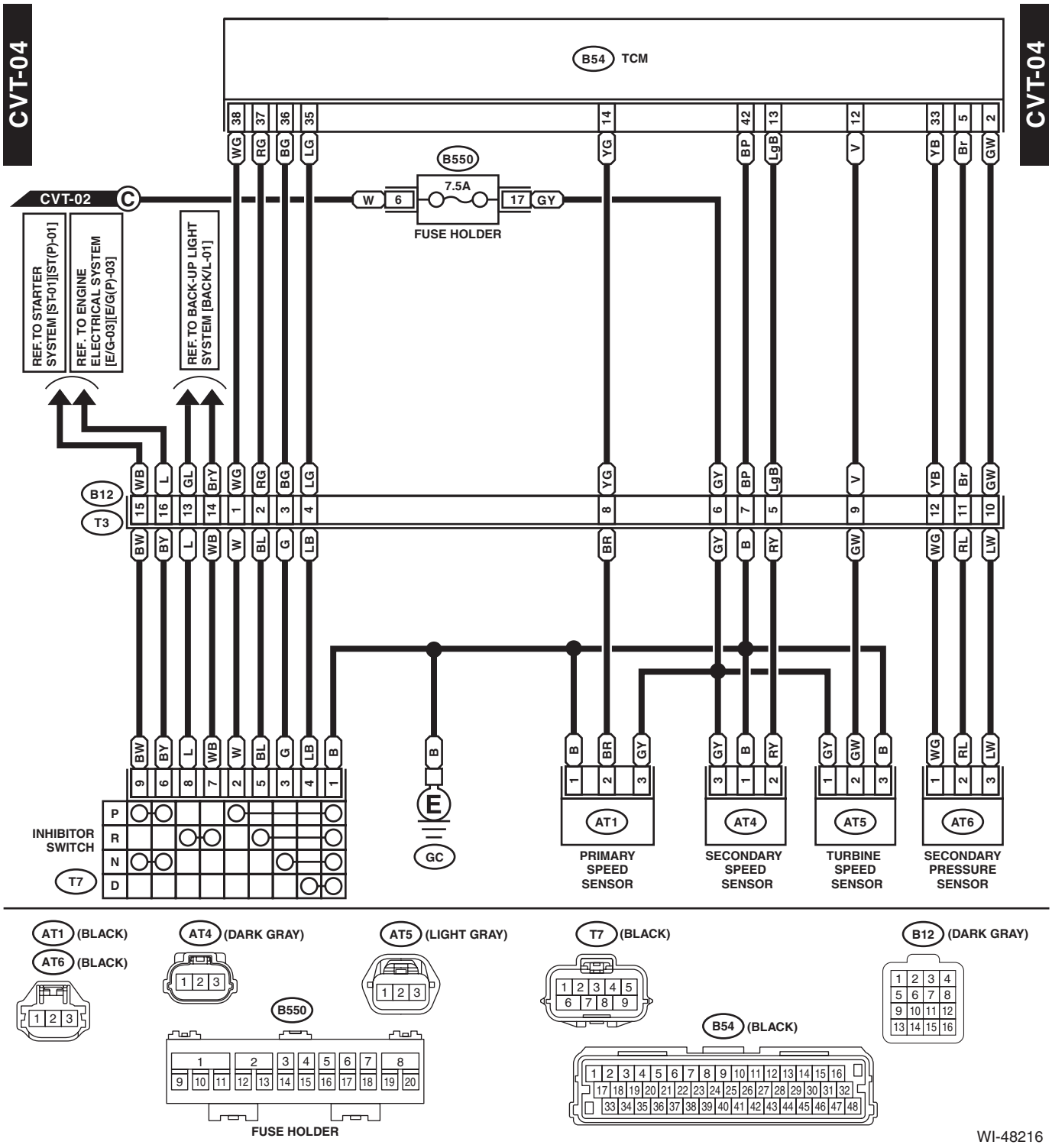
WI-48214

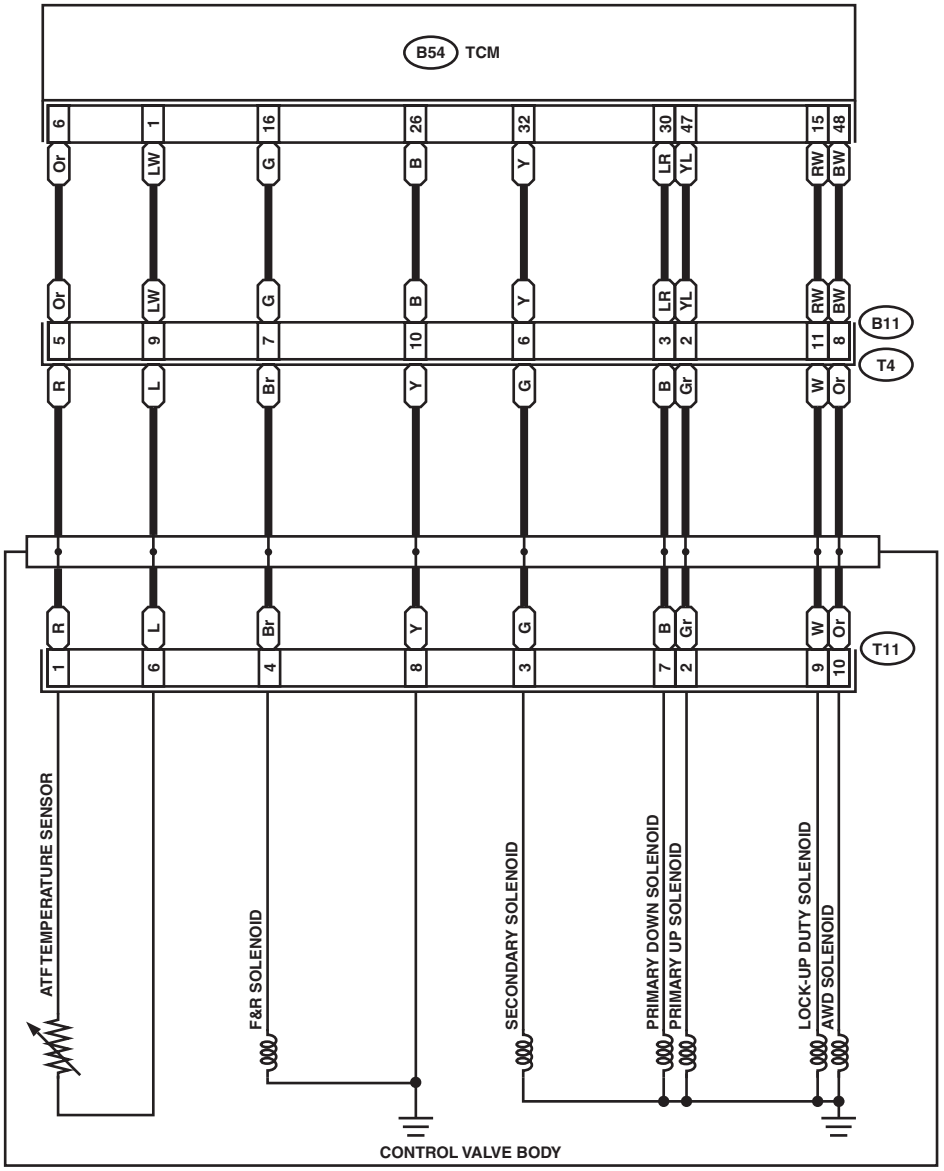
WIRING SYSTEM

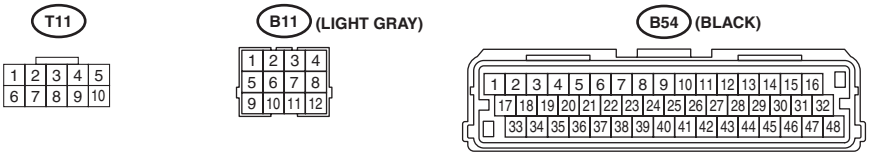




WI-48215


CVT-04
CVT-04
B54 TCM
38 37 36 35 14 42 13 12 33 5 2
WG RG BG LG YG BP LgB V YB Br GW
B550
7.5A
W 6 17 GY
FUSE HOLDER
CVT-02 C
REF. TO STARTER SYSTEM [ST-01][ST(P)-01]
REF. TO ENGINE ELECTRICAL SYSTEM [E/G-03][E/G(P)-03]
REF. TO BACK-UP LIGHT SYSTEM [BACK/L-01]
B12
T3
WB L GL BrY WG RG BG LG YG GY BP LgB V YB Br GW
15 16 13 14 1 2 3 4 8 6 7 5 9 12 11 10
BW BY L WB W BL G LB BR GY B RY GW WG RL LW
9 6 8 7 2 5 3 4 1
B B B BR GY GY B RY GY GW B WG RL LW
1 2 3 3 1 2 1 2 3 1 2 3
INHIBITOR SWITCH
P R N D
T7
E
GC
AT1
AT4
AT5
AT6
PRIMARY SPEED SENSOR
SECONDARY SPEED SENSOR
TURBINE SPEED SENSOR
SECONDARY PRESSURE SENSOR
AT1 (BLACK)
AT6 (BLACK)
AT4 (DARK GRAY)
AT5 (LIGHT GRAY)
T7 (BLACK)
B12 (DARK GRAY)
B550
FUSE HOLDER
B54 (BLACK)
WI-48216

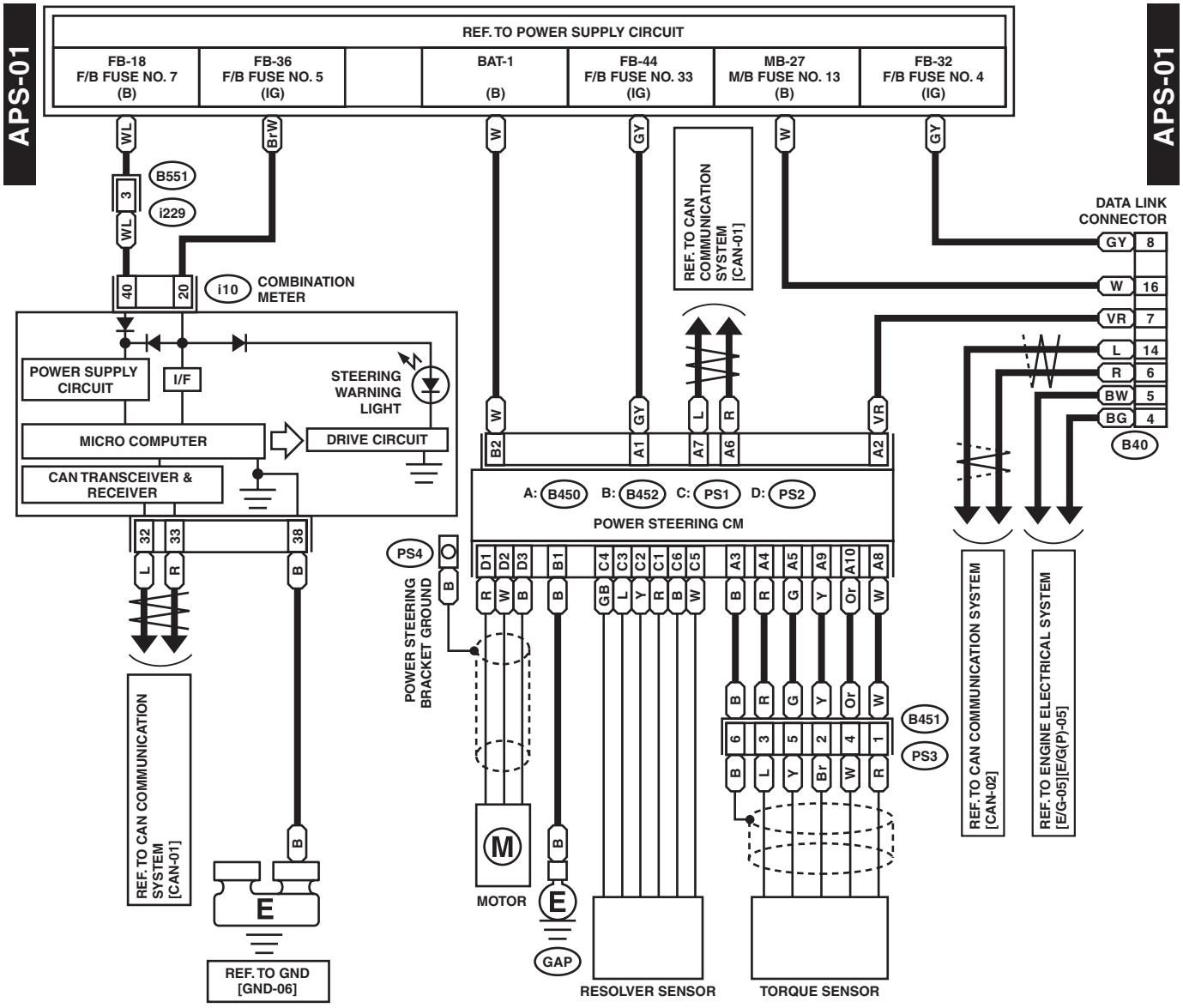

B54 TCM
6 1 16 26 32 30 47 15 48
Or LW G B Y LR YL RW BW
B11
5 9 7 10 6 3 2 11 8
T4
R L Br Y G B Gr W Or
T11
1 6 4 8 3 7 2 9 10
ATF TEMPERATURE SENSOR
F&R SOLENOID
SECONDARY SOLENOID
PRIMARY DOWN SOLENOID
PRIMARY UP SOLENOID
LOCK-UP DUTY SOLENOID
AWD SOLENOID
CONTROL VALVE BODY

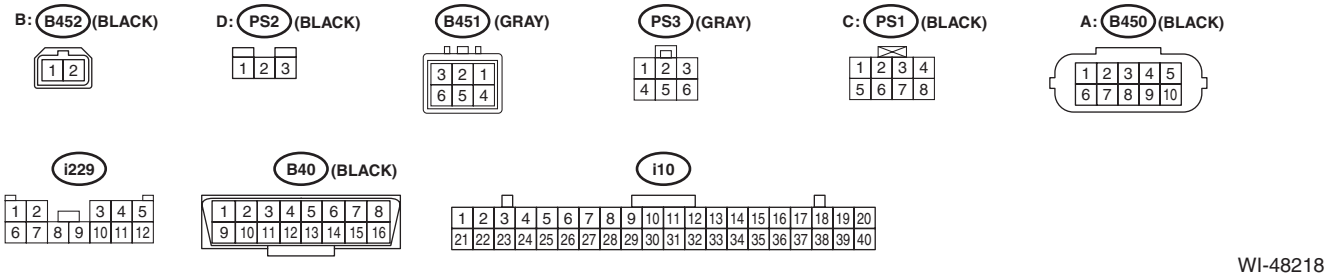

T11
1 2 3 4 5
6 7 8 9 10
B11 (LIGHT GRAY)
1 2 3 4
5 6 7 8
9 10 11 12
B54 (BLACK)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

WI-48217

17.Electric Power Steering System

A: WIRING DIAGRAM



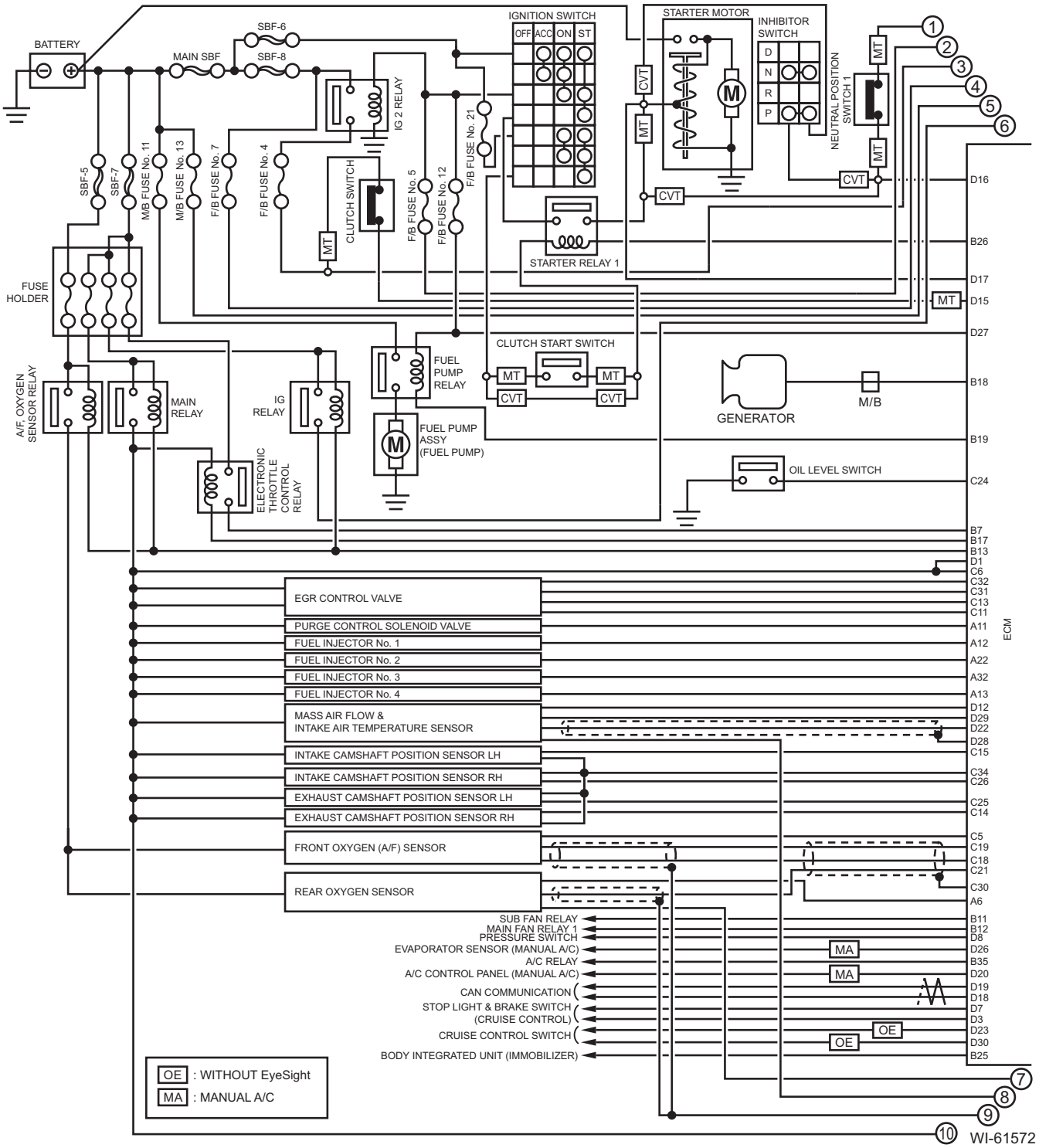


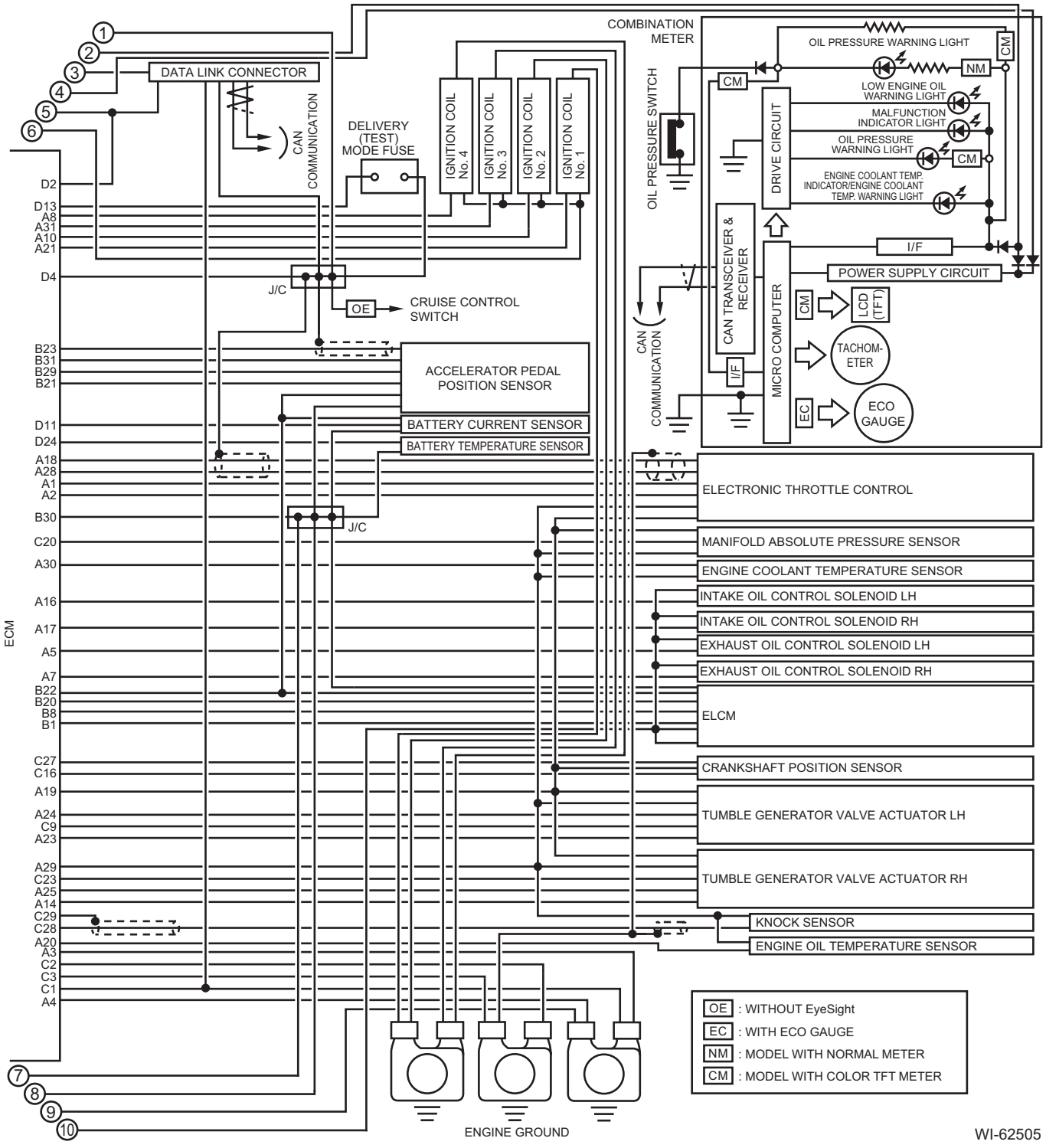
WI-48218

18.Engine Electrical System

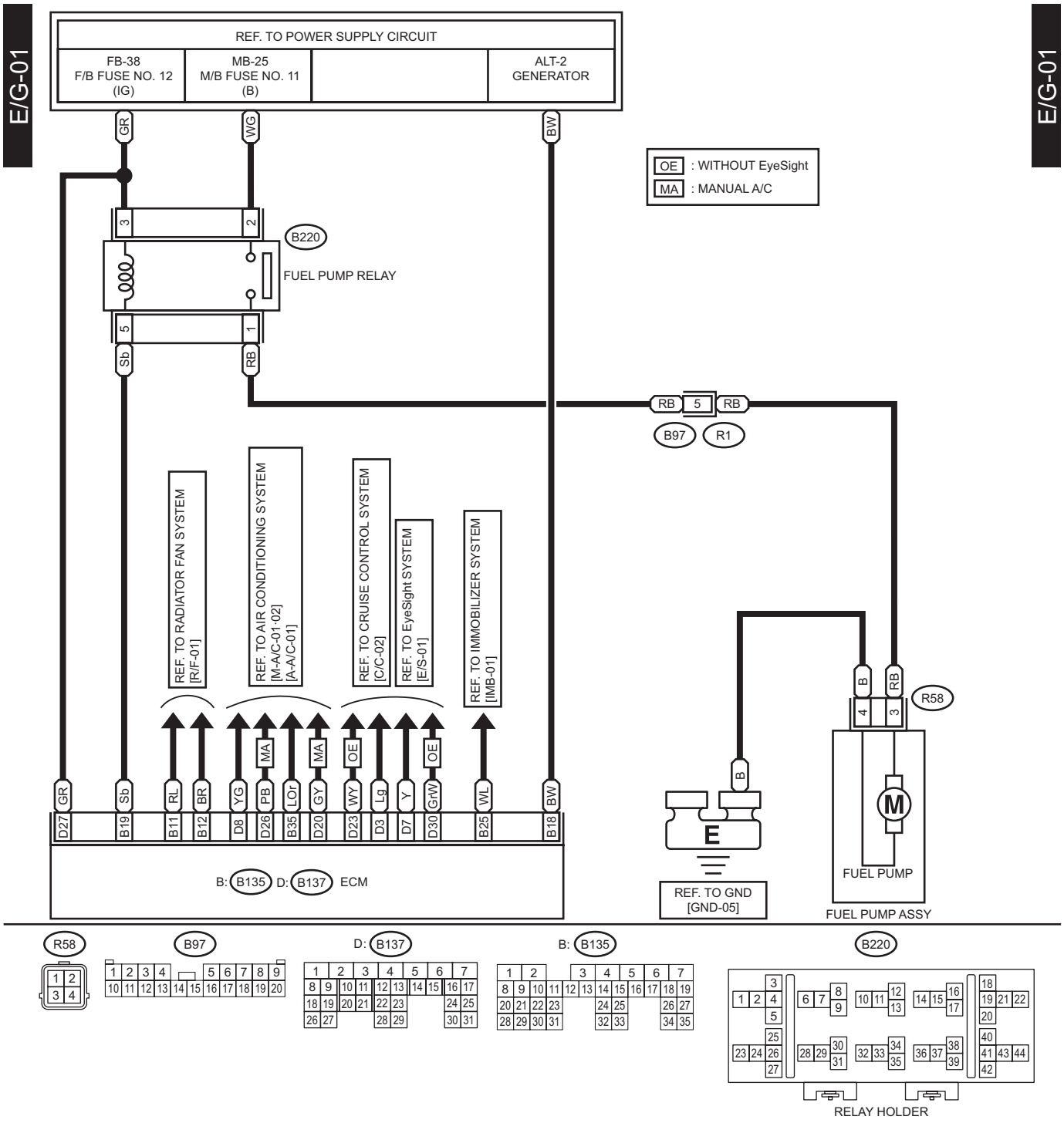
A: WIRING DIAGRAM

1. WITHOUT PUSH BUTTON START



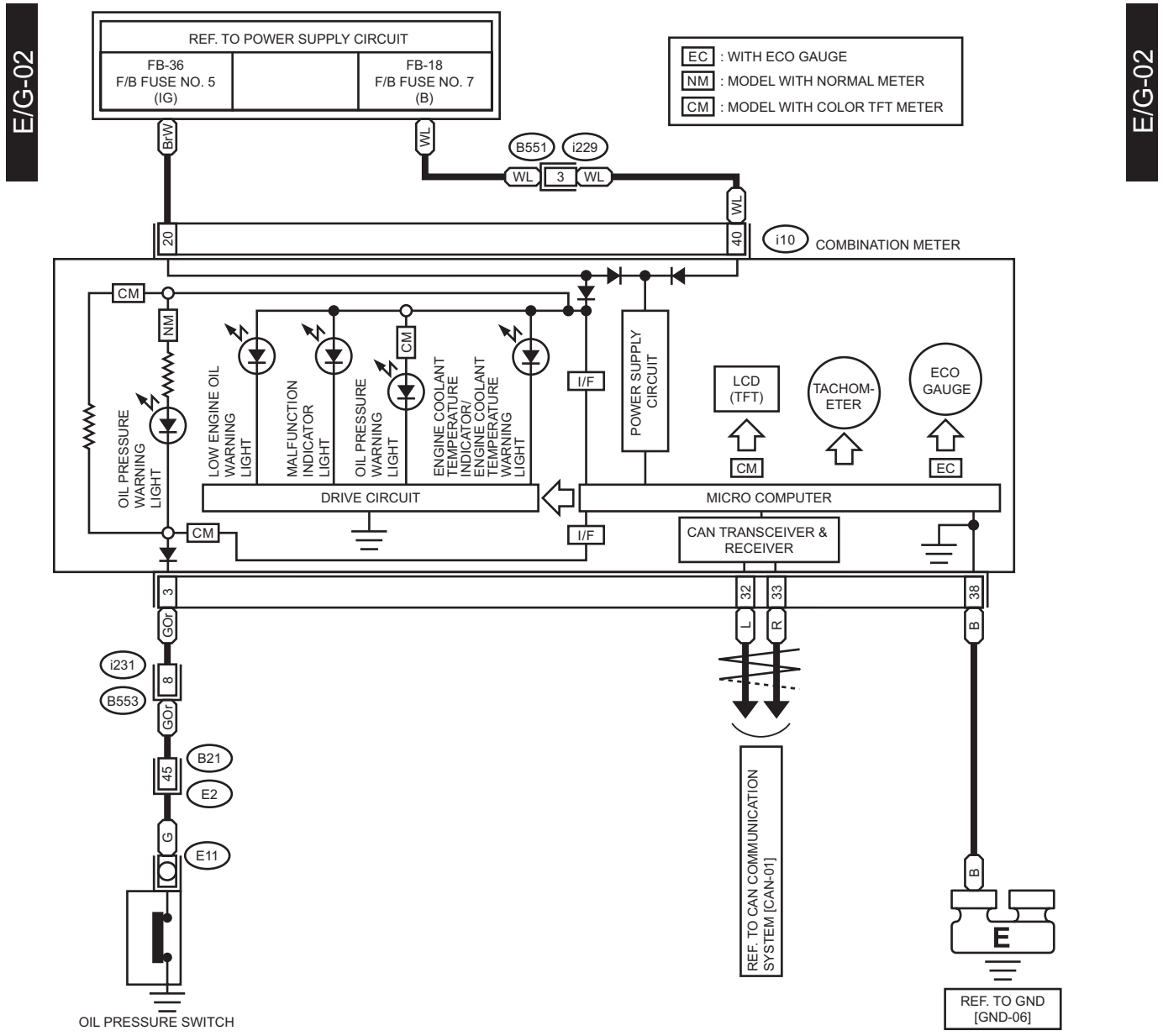

COMBINATION METER
OIL PRESSURE WARNING LIGHT
CM
NM
LOW ENGINE OIL WARNING LIGHT
MALFUNCTION INDICATOR LIGHT
OIL PRESSURE WARNING LIGHT
ENGINE COOLANT TEMP. INDICATOR/ENGINE COOLANT TEMP. WARNING LIGHT
DRIVE CIRCUIT
I/F
POWER SUPPLY CIRCUIT
CAN TRANSCEIVER & RECEIVER
MICRO COMPUTER
LCD (TFT)
TACHOM-ETER
ECO GAUGE
EC
OIL PRESSURE SWITCH
CAN COMMUNICATION
DATA LINK CONNECTOR
DELIVERY (TEST) MODE FUSE
IGNITION COIL No. 4
IGNITION COIL No. 3
IGNITION COIL No. 2
IGNITION COIL No. 1
J/C
OE
CRUISE CONTROL SWITCH
ACCELERATOR PEDAL POSITION SENSOR
BATTERY CURRENT SENSOR
BATTERY TEMPERATURE SENSOR
ELECTRONIC THROTTLE CONTROL
MANIFOLD ABSOLUTE PRESSURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR
INTAKE OIL CONTROL SOLENOID LH
INTAKE OIL CONTROL SOLENOID RH
EXHAUST OIL CONTROL SOLENOID LH
EXHAUST OIL CONTROL SOLENOID RH
ELCM
CRANKSHAFT POSITION SENSOR
TUMBLE GENERATOR VALVE ACTUATOR LH
TUMBLE GENERATOR VALVE ACTUATOR RH
KNOCK SENSOR
ENGINE OIL TEMPERATURE SENSOR
ECM
ENGINE GROUND
OE : WITHOUT EyeSight
EC : WITH ECO GAUGE
NM : MODEL WITH NORMAL METER
CM : MODEL WITH COLOR TFT METER
WI-62505

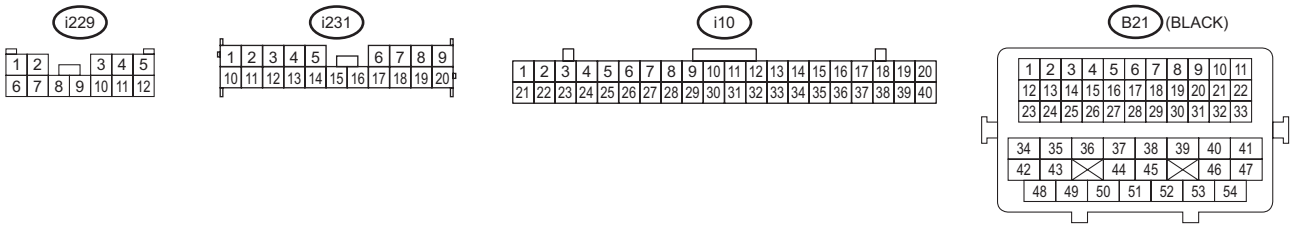
WIRING SYSTEM



WI-62506

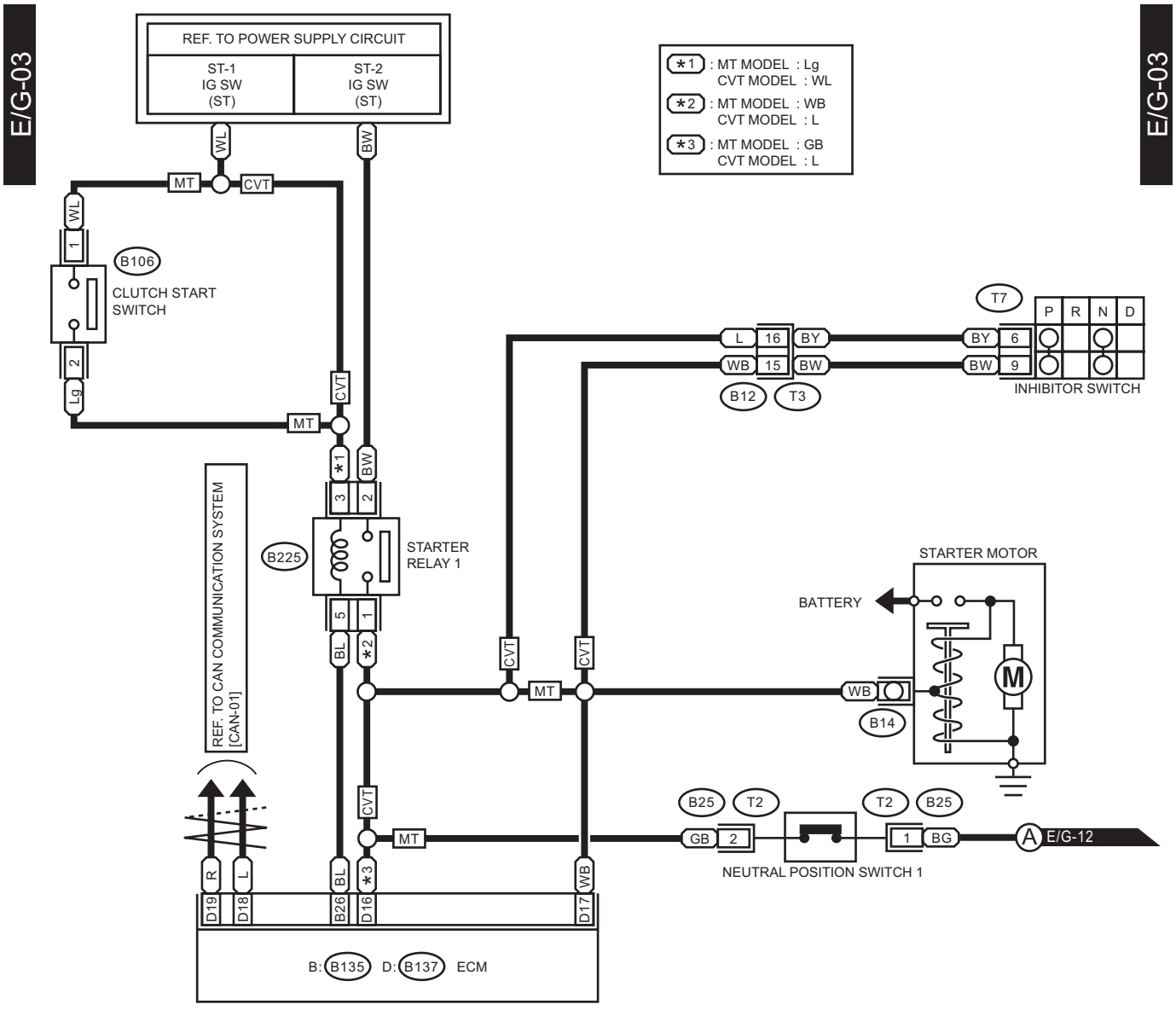
E/G-02

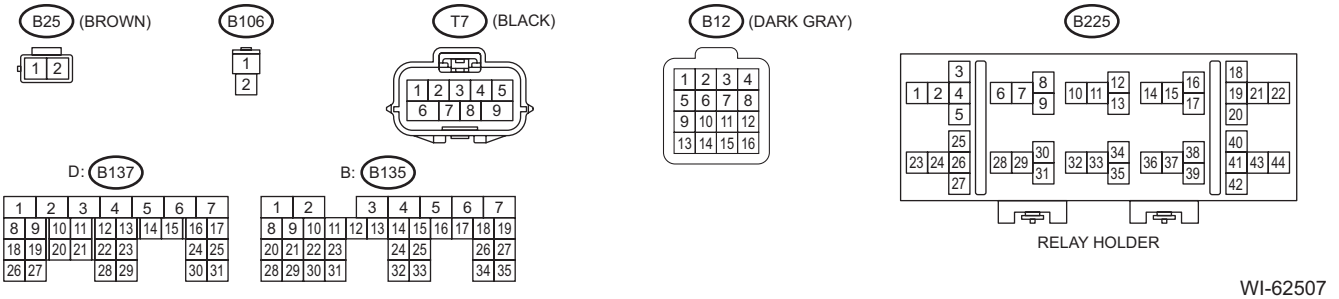




WI-61524

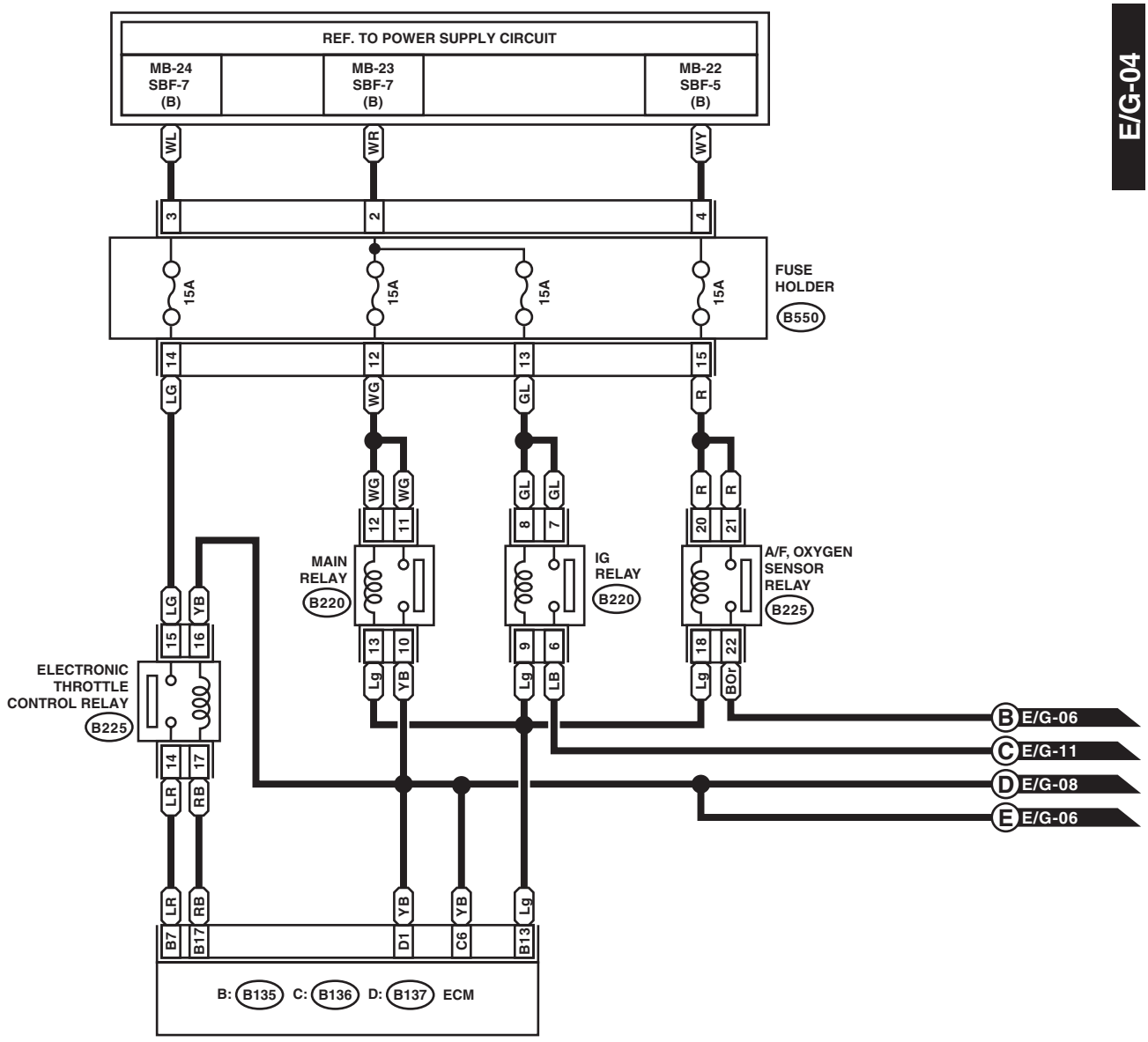
WIRING SYSTEM

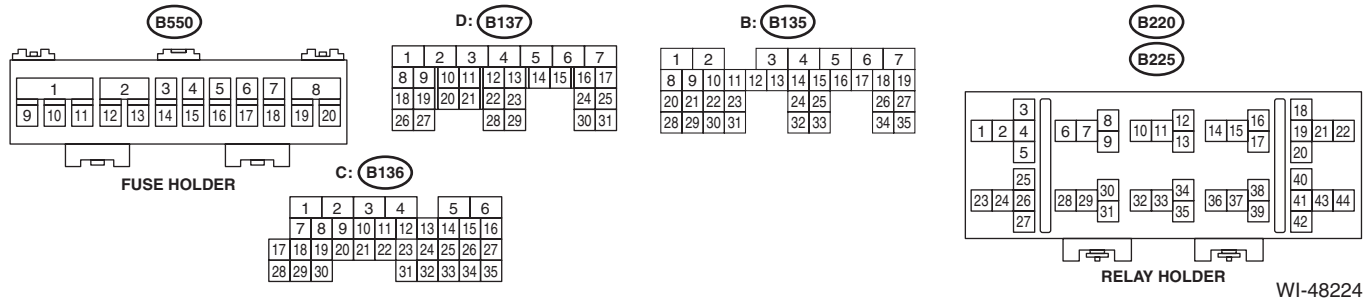




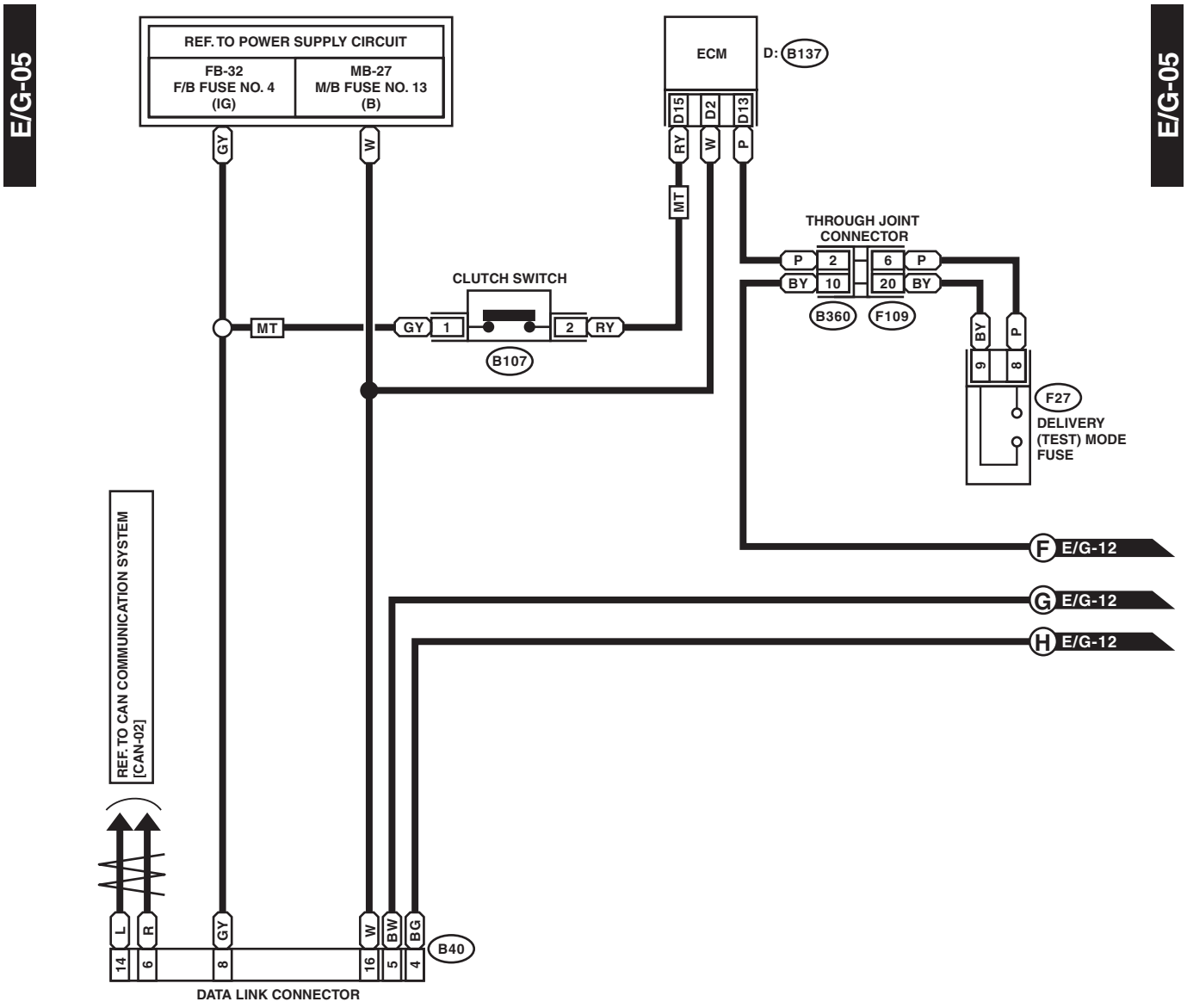
WI-62507

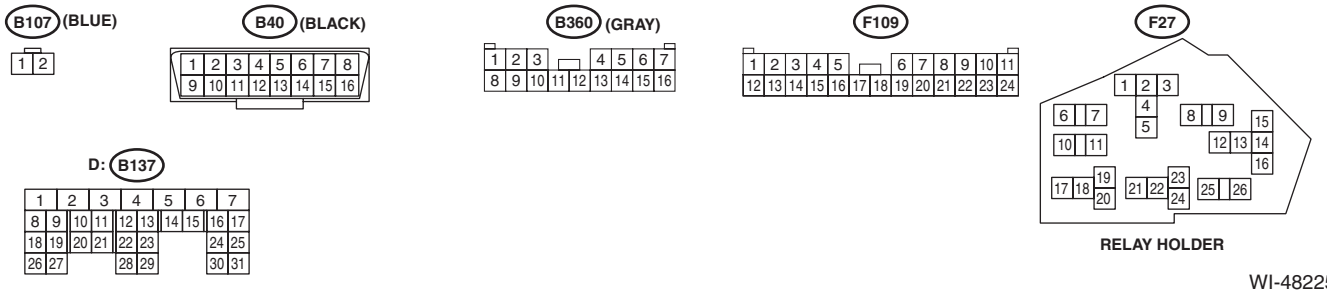
E/G-04



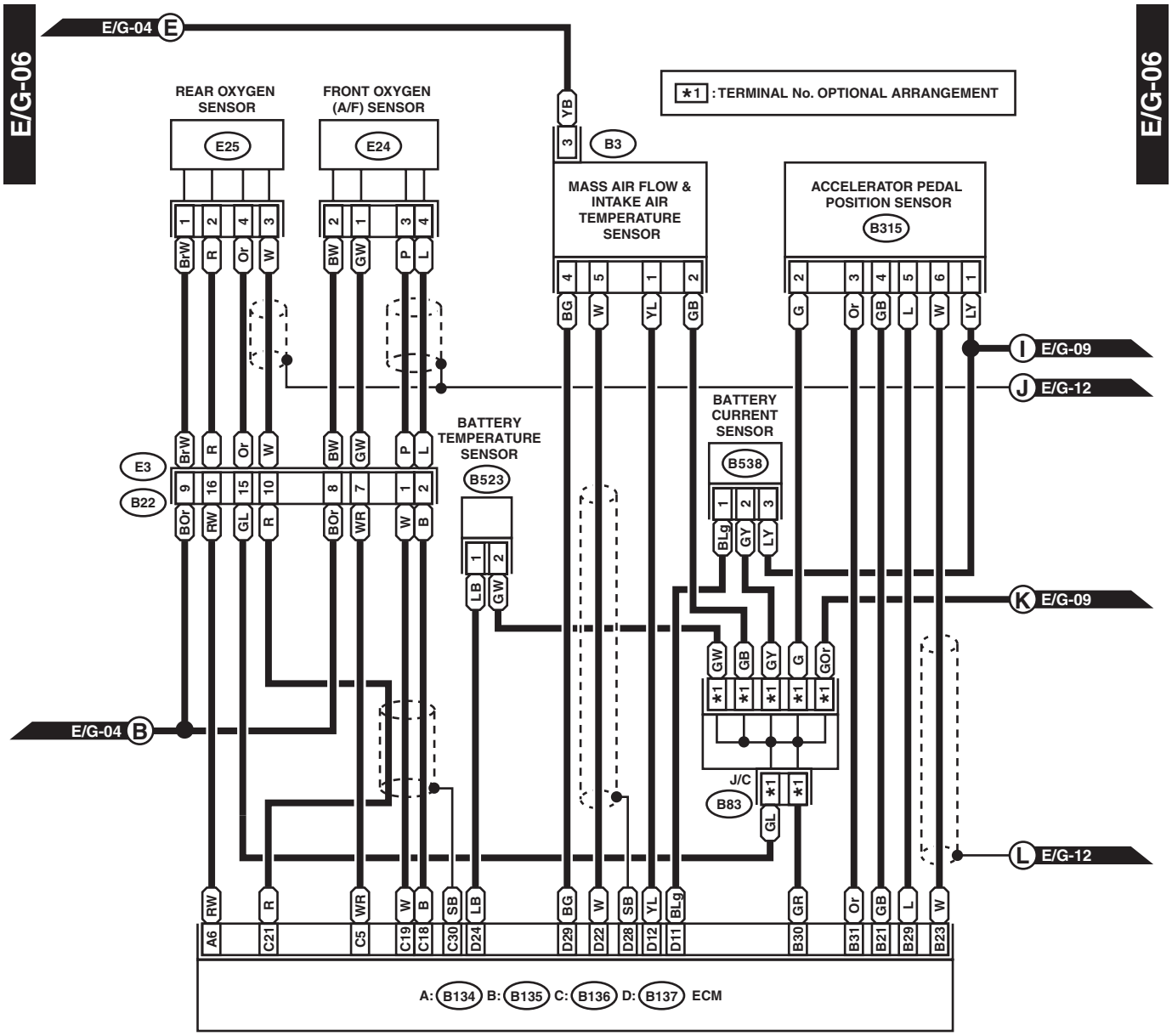


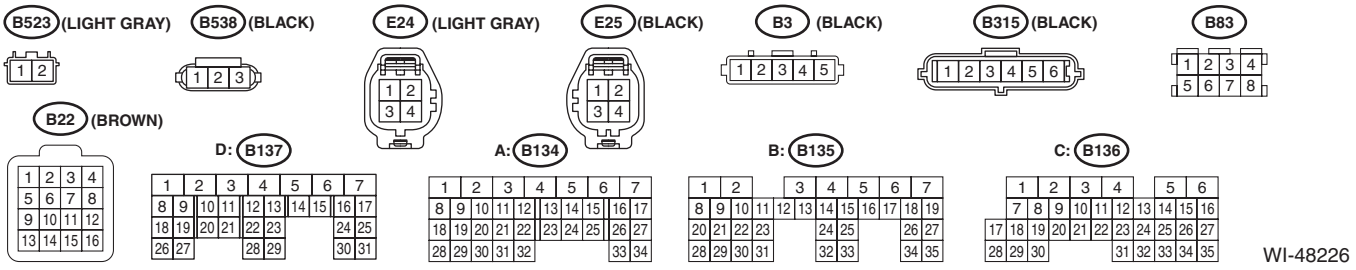
WI-48224

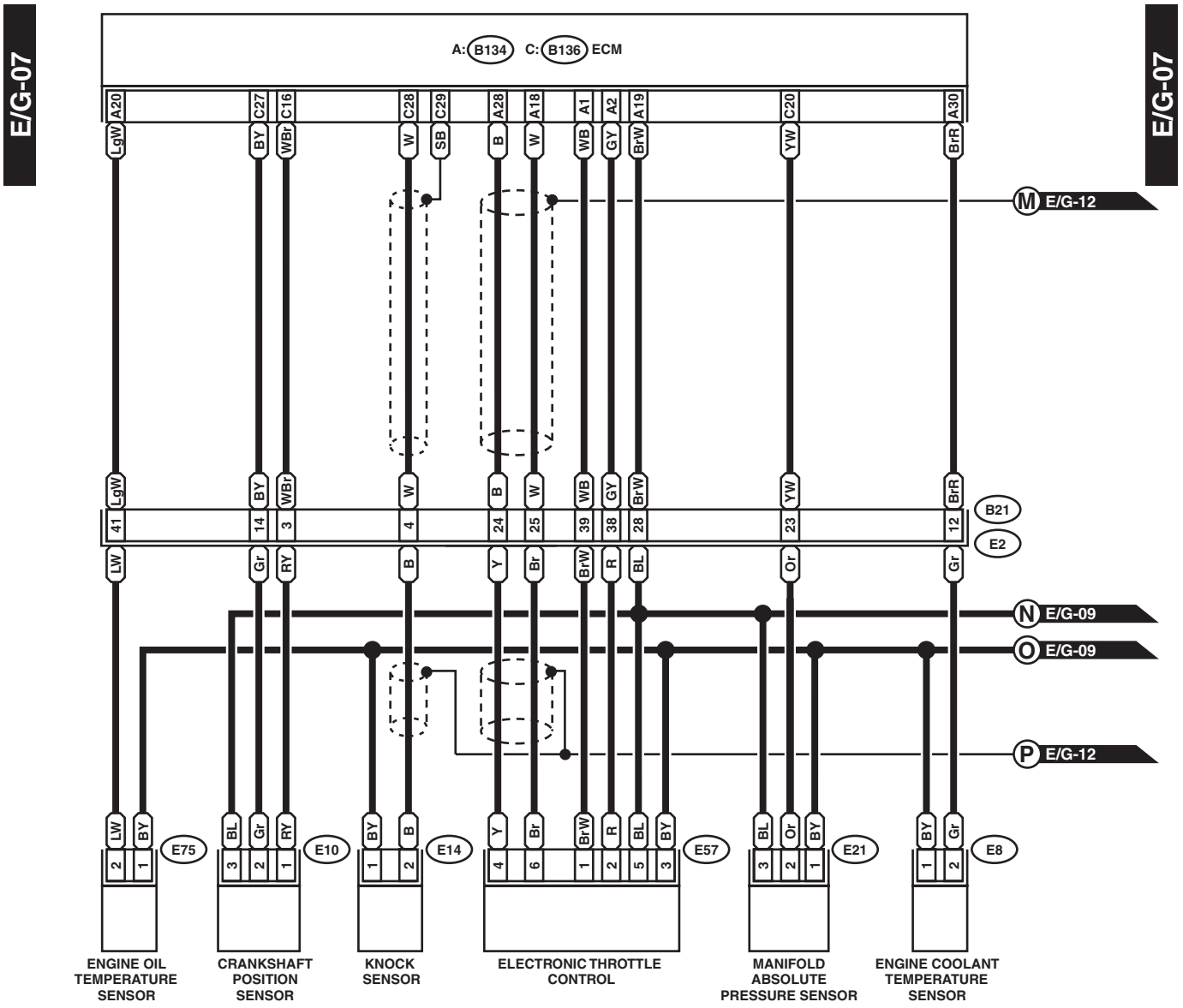

E/G-05
E/G-05
REF. TO POWER SUPPLY CIRCUIT
FB-32
F/B FUSE NO. 4
(IG)
MB-27
M/B FUSE NO. 13
(B)
ECM
D: B137
D15
D2
D13
RY
W
P
MT
GY
W
MT
CLUTCH SWITCH
GY
1
2
RY
B107
THROUGH JOINT CONNECTOR
P
2
6
P
BY
10
20
BY
B360
F109
BY
P
9
8
F27
DELIVERY
(TEST) MODE
FUSE
F E/G-12
G E/G-12
H E/G-12
REF. TO CAN COMMUNICATION SYSTEM
[CAN-02]
L
R
GY
W
BW
BG
14
6
8
16
5
4
B40
DATA LINK CONNECTOR

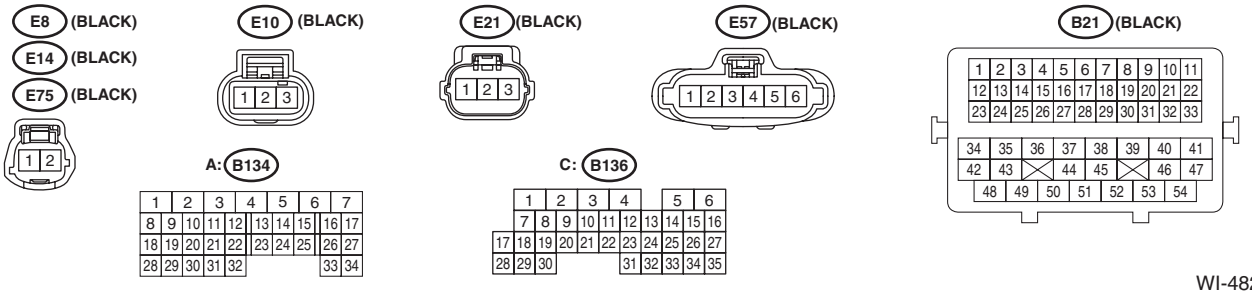

B107 (BLUE)
1 2
B40 (BLACK)
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
B360 (GRAY)
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16
F109
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22 23 24
F27
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
RELAY HOLDER
D: B137
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25
26 27 28 29 30 31

WI-48225

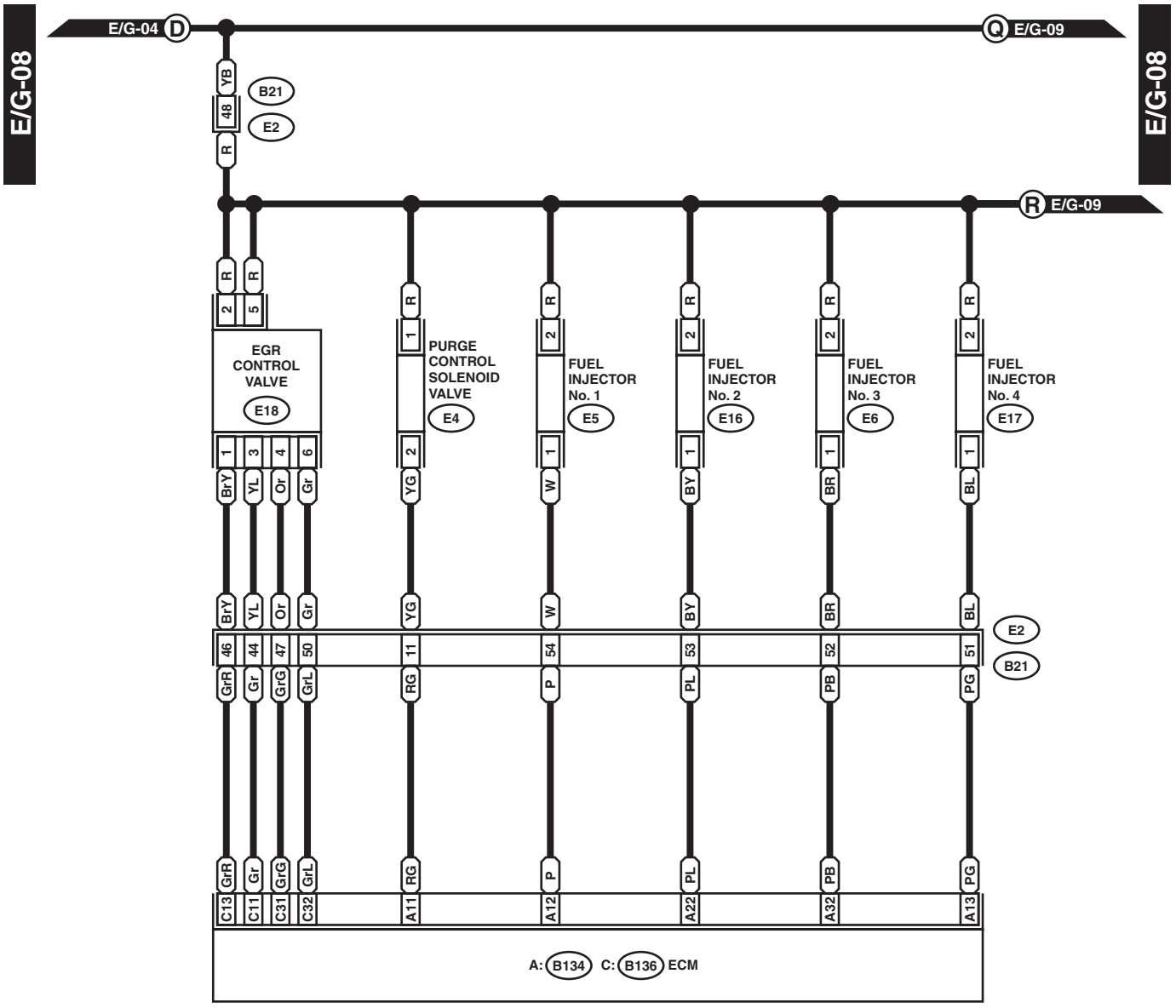

E/G-06
E/G-04 E
REAR OXYGEN SENSOR
FRONT OXYGEN (A/F) SENSOR
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
E25
E24
B3
MASS AIR FLOW & INTAKE AIR TEMPERATURE SENSOR
ACCELERATOR PEDAL POSITION SENSOR
B315
BATTERY TEMPERATURE SENSOR
B523
BATTERY CURRENT SENSOR
B538
E3
B22
I E/G-09
J E/G-12
K E/G-09
L E/G-12
E/G-04 B
J/C
B83
A: B134 B: B135 C: B136 D: B137 ECM


B523 (LIGHT GRAY)
B538 (BLACK)
E24 (LIGHT GRAY)
E25 (BLACK)
B3 (BLACK)
B315 (BLACK)
B83
B22 (BROWN)
D: B137
A: B134
B: B135
C: B136
WI-48226

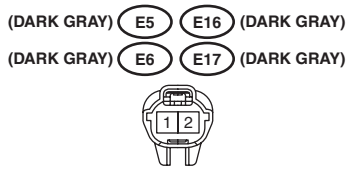

E/G-07
E/G-07
A: B134 C: B136 ECM
A20 C27 C16 C28 C29 A28 A18 A1 A2 A19 C20 A30
LgW BY WBr W SB B W WB GY BrW YW BrR
M E/G-12
41 14 3 4 24 25 39 38 28 23 12
B21
E2
LW Gr RY B Y Br BrW R BL Or Gr
N E/G-09
O E/G-09
P E/G-12
LW BY E75
BL Gr RY E10
BY B E14
Y Br BrW R BL BY E57
BL Or BY E21
BY Gr E8
ENGINE OIL TEMPERATURE SENSOR
CRANKSHAFT POSITION SENSOR
KNOCK SENSOR
ELECTRONIC THROTTLE CONTROL
MANIFOLD ABSOLUTE PRESSURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR


E8 (BLACK)
E14 (BLACK)
E75 (BLACK)
E10 (BLACK)
E21 (BLACK)
E57 (BLACK)
B21 (BLACK)
A: B134
C: B136

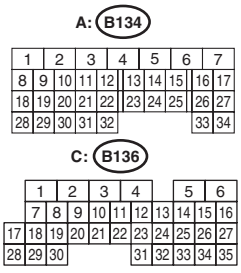
WI-48227

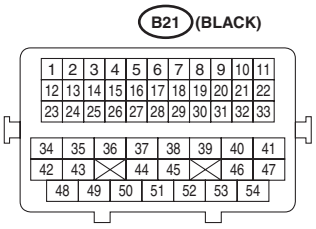

E/G-08
E/G-04 D
Q E/G-09
E/G-08
YB
48
B21
E2
R
R E/G-09
R
2
R
5
EGR CONTROL VALVE
E18
1
3
4
6
BrY
YL
Or
Gr
R
1
PURGE CONTROL SOLENOID VALVE
E4
2
YG
R
2
FUEL INJECTOR No. 1
E5
1
W
R
2
FUEL INJECTOR No. 2
E16
1
BY
R
2
FUEL INJECTOR No. 3
E6
1
BR
R
2
FUEL INJECTOR No. 4
E17
1
BL
BrY
YL
Or
Gr
YG
W
BY
BR
BL
E2
B21
46
44
47
50
11
54
53
52
51
GrR
Gr
GrG
GrL
RG
P
PL
PB
PG
C13
C11
C31
C32
A11
A12
A22
A32
A13
A: B134 C: B136 ECM


E4 (BLUE)
1 2

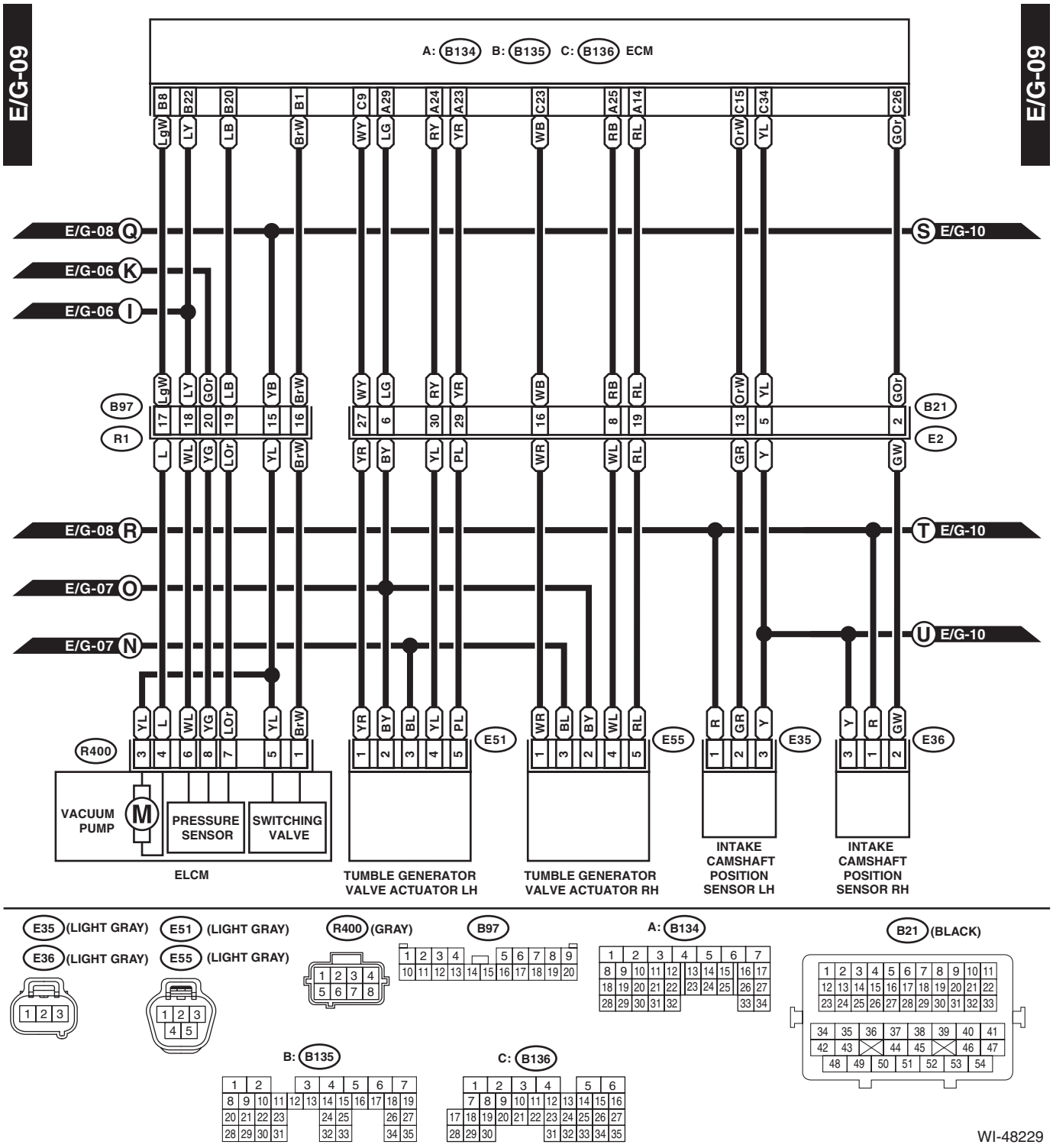

(DARK GRAY) E5
E16 (DARK GRAY)
(DARK GRAY) E6
E17 (DARK GRAY)
1 2

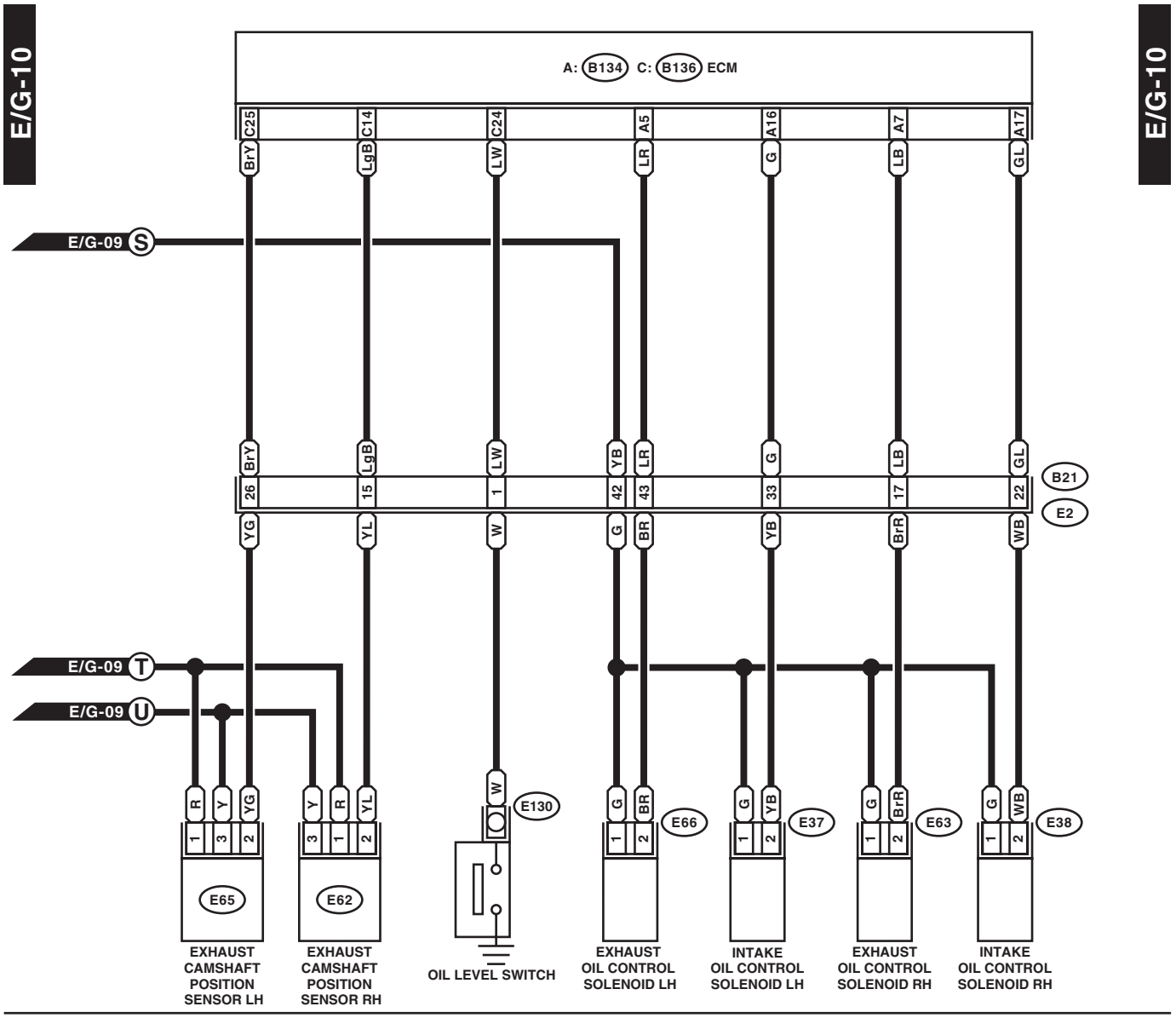

E18 (DARK GRAY)
1 2 3
4 5 6

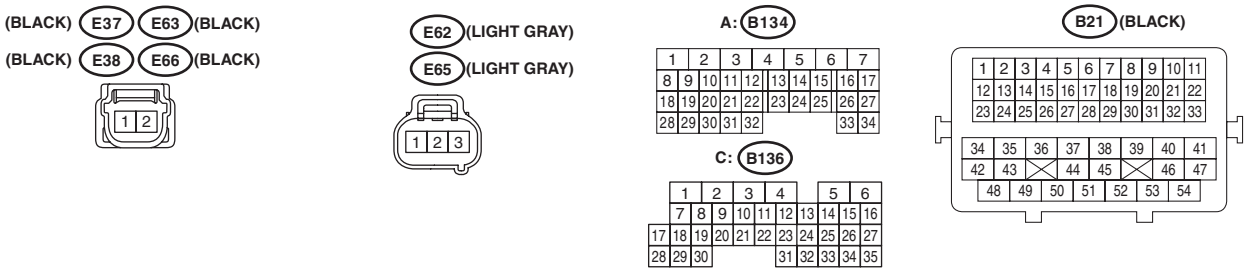

A: B134
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34
C: B136
1 2 3 4 5 6
7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35


B21 (BLACK)
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
23 24 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47
48 49 50 51 52 53 54

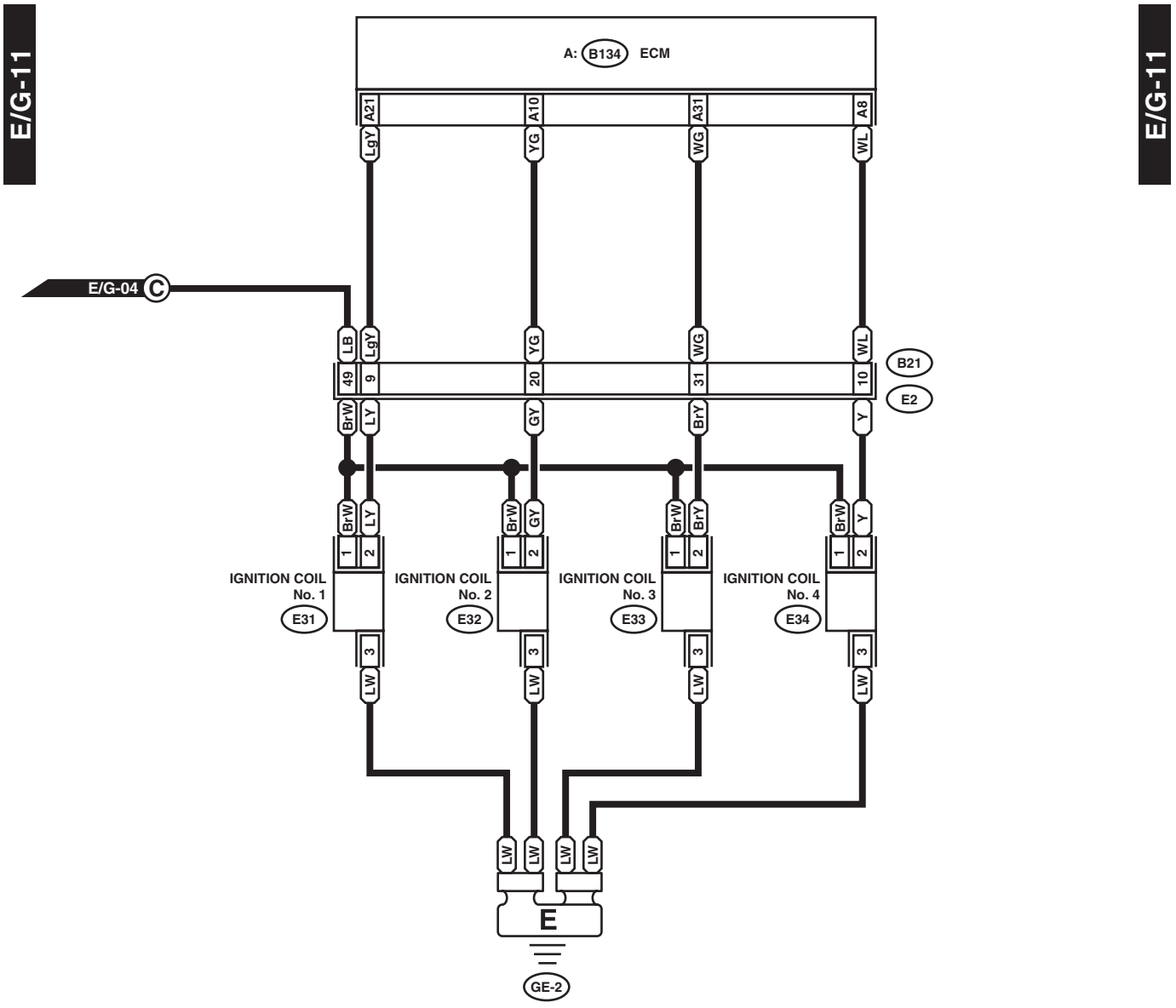
WI-48228

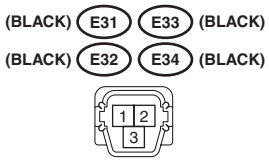

E/G-09
E/G-09
A: B134 B: B135 C: B136 ECM
B8 B22 B20 B1 C9 A29 A24 A23 C23 A25 A14 C15 C34 C26
LgW LY LB BrW WY LG RY YR WB RB RL OrW YL GOr
E/G-08 Q
E/G-06 K
E/G-06 I
S E/G-10
B97
R1
17 18 20 19 15 16
27 6 30 29 16 8 19 13 5 2
B21
E2
L WL YG LOr YL BrW YR BY YL PL WR WL RL GR Y GW
E/G-08 R
E/G-07 O
E/G-07 N
T E/G-10
U E/G-10
R400
3 4 6 8 7 5 1
1 2 3 4 5
E51
1 3 2 4 5
E55
1 2 3
E35
3 1 2
E36
VACUUM PUMP
M
PRESSURE SENSOR
SWITCHING VALVE
ELCM
TUMBLE GENERATOR VALVE ACTUATOR LH
TUMBLE GENERATOR VALVE ACTUATOR RH
INTAKE CAMSHAFT POSITION SENSOR LH
INTAKE CAMSHAFT POSITION SENSOR RH
E35 (LIGHT GRAY)
E36 (LIGHT GRAY)
E51 (LIGHT GRAY)
E55 (LIGHT GRAY)
R400 (GRAY)
B97
A: B134
B21 (BLACK)
B: B135
C: B136
WI-48229

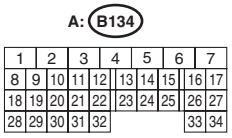

E/G-10
E/G-10
A: B134 C: B136 ECM
C25
C14
C24
A5
A16
A7
A17
BrY
LgB
LW
LR
G
LB
GL
E/G-09 S
BrY
LgB
LW
YB
LR
G
LB
GL
26
15
1
42
43
33
17
22
B21
E2
YG
YL
W
G
BR
YB
BrR
WB
E/G-09 T
E/G-09 U
R
Y
YG
Y
R
YL
W
G
BR
G
YB
G
BrR
G
WB
1
3
2
3
1
2
E130
1
2
E66
1
2
E37
1
2
E63
1
2
E38
E65
E62
EXHAUST CAMSHAFT POSITION SENSOR LH
EXHAUST CAMSHAFT POSITION SENSOR RH
OIL LEVEL SWITCH
EXHAUST OIL CONTROL SOLENOID LH
INTAKE OIL CONTROL SOLENOID LH
EXHAUST OIL CONTROL SOLENOID RH
INTAKE OIL CONTROL SOLENOID RH

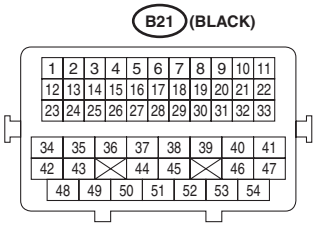

(BLACK) E37 E63 (BLACK)
(BLACK) E38 E66 (BLACK)
1 2
E62 (LIGHT GRAY)
E65 (LIGHT GRAY)
1 2 3
A: B134
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34
C: B136
1 2 3 4 5 6
7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35
B21 (BLACK)
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
23 24 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47
48 49 50 51 52 53 54

WI-48230

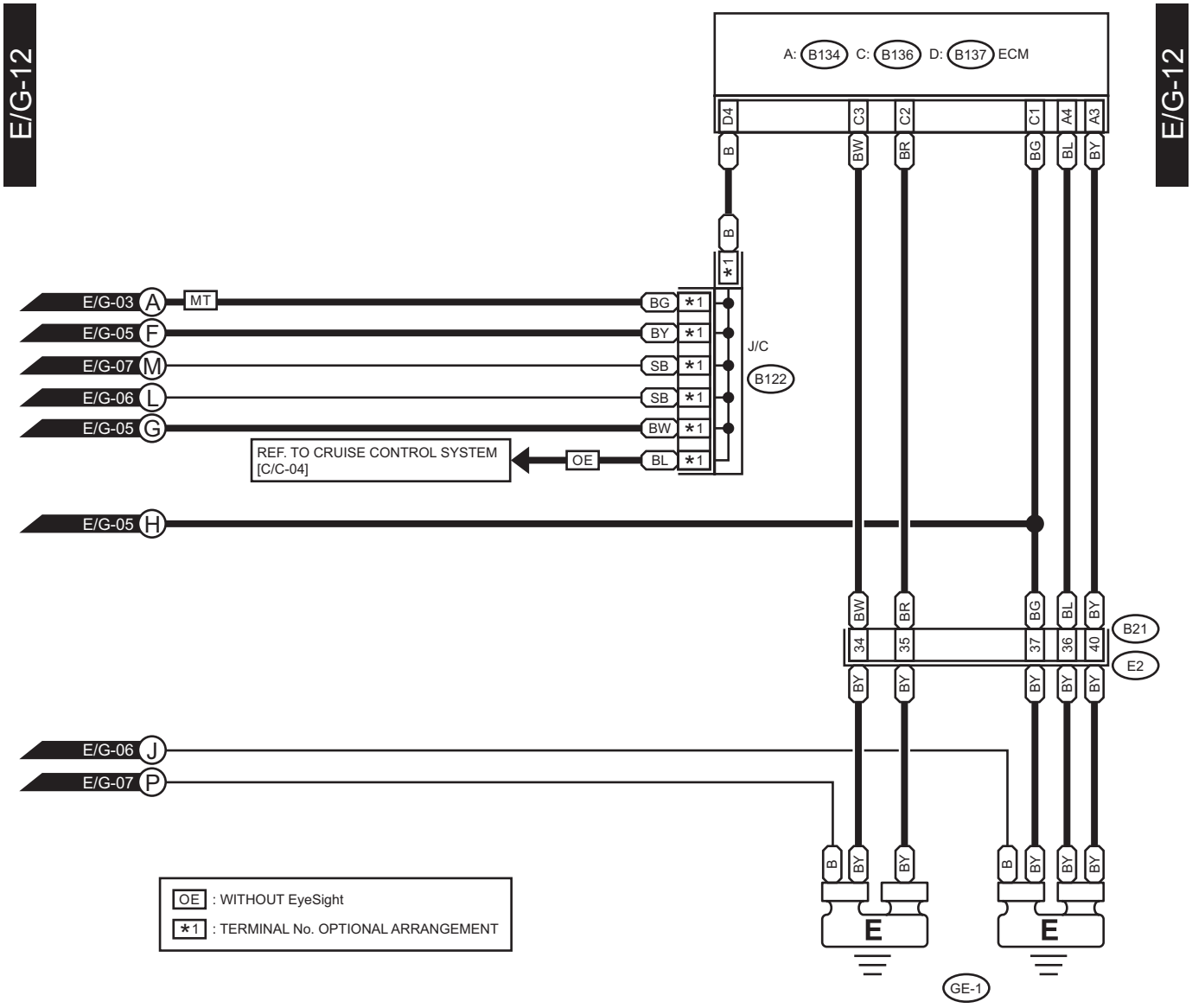

E/G-11
E/G-11
A: B134 ECM
A21
A10
A31
A8
LgY
YG
WG
WL
E/G-04 C
LB
LgY
YG
WG
WL
B21
49
9
20
31
10
E2
BrW
LY
GY
BrY
Y
BrW
LY
BrW
GY
BrW
BrY
BrW
Y
1
2
1
2
1
2
1
2
IGNITION COIL No. 1
E31
IGNITION COIL No. 2
E32
IGNITION COIL No. 3
E33
IGNITION COIL No. 4
E34
3
3
3
3
LW
LW
LW
LW
LW
LW
LW
LW
E
GE-2

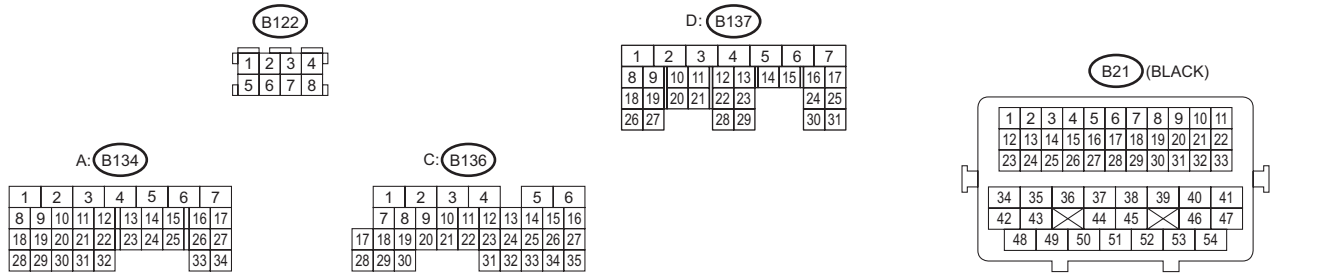

(BLACK) E31 E33 (BLACK)
(BLACK) E32 E34 (BLACK)
1 2
3


A: B134
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34


B21 (BLACK)
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
23 24 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47
48 49 50 51 52 53 54

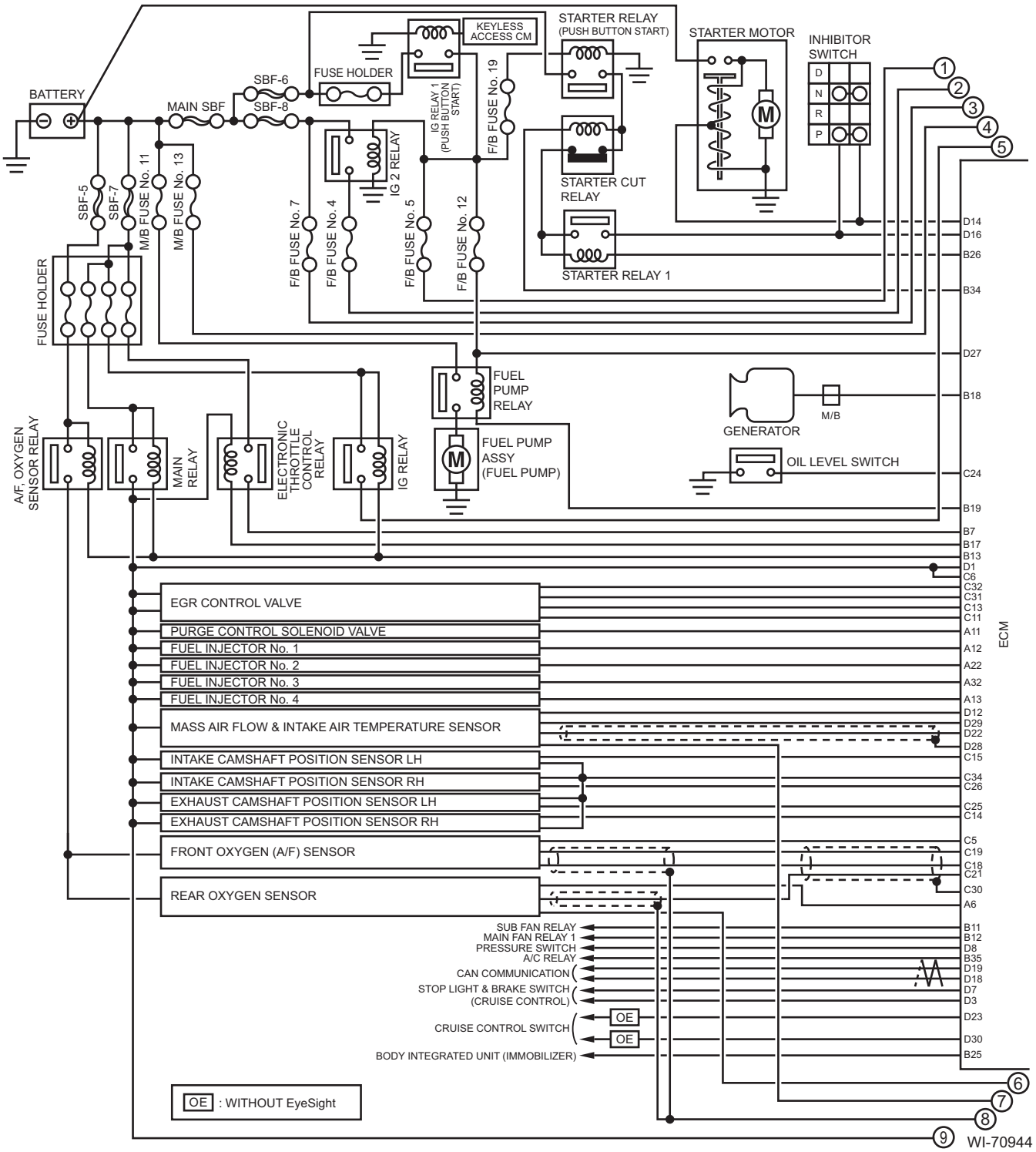
WI-48231

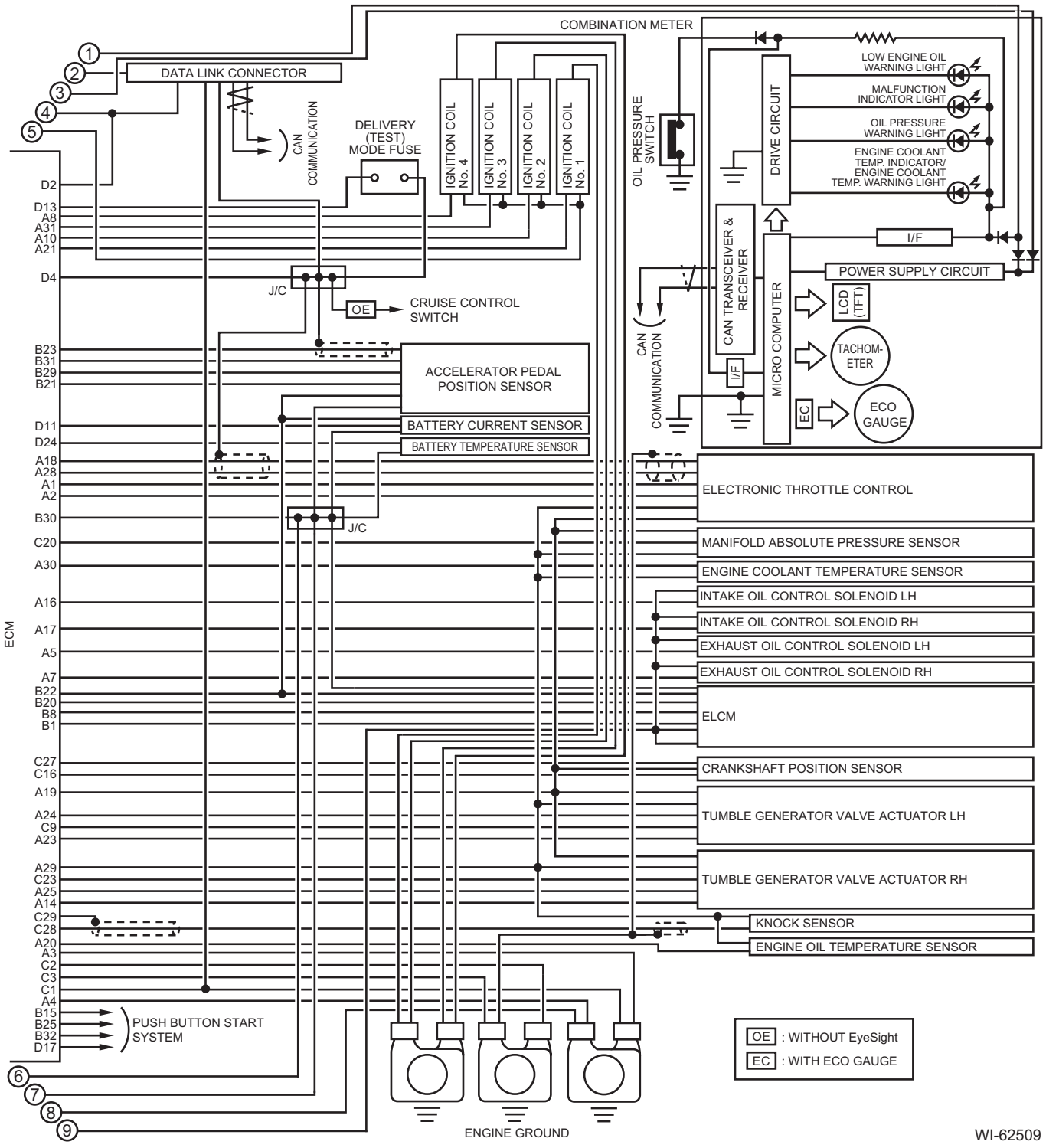

E/G-12
E/G-12
A: B134 C: B136 D: B137 ECM
D4 C3 C2 C1 A4 A3
B BW BR BG BL BY
E/G-03 A MT
E/G-05 F
E/G-07 M
E/G-06 L
E/G-05 G
BG BY SB SB BW BL
*1
J/C
B122
REF. TO CRUISE CONTROL SYSTEM [C/C-04]
OE
E/G-05 H
34 35 37 36 40
B21
E2
E/G-06 J
E/G-07 P
E
GE-1
OE : WITHOUT EyeSight
*1 : TERMINAL No. OPTIONAL ARRANGEMENT

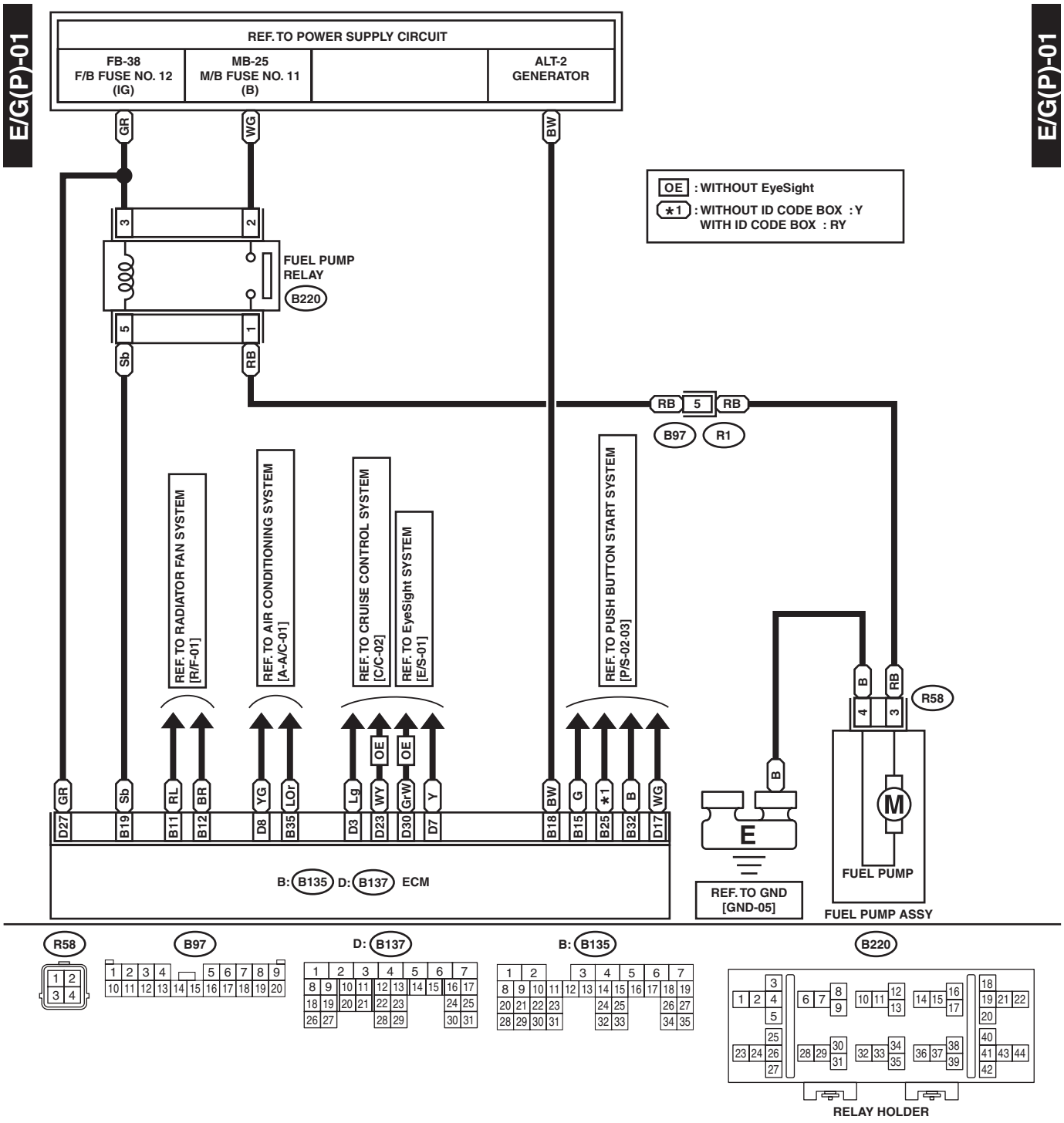

B122
D: B137
A: B134
C: B136
B21 (BLACK)

WI-62508

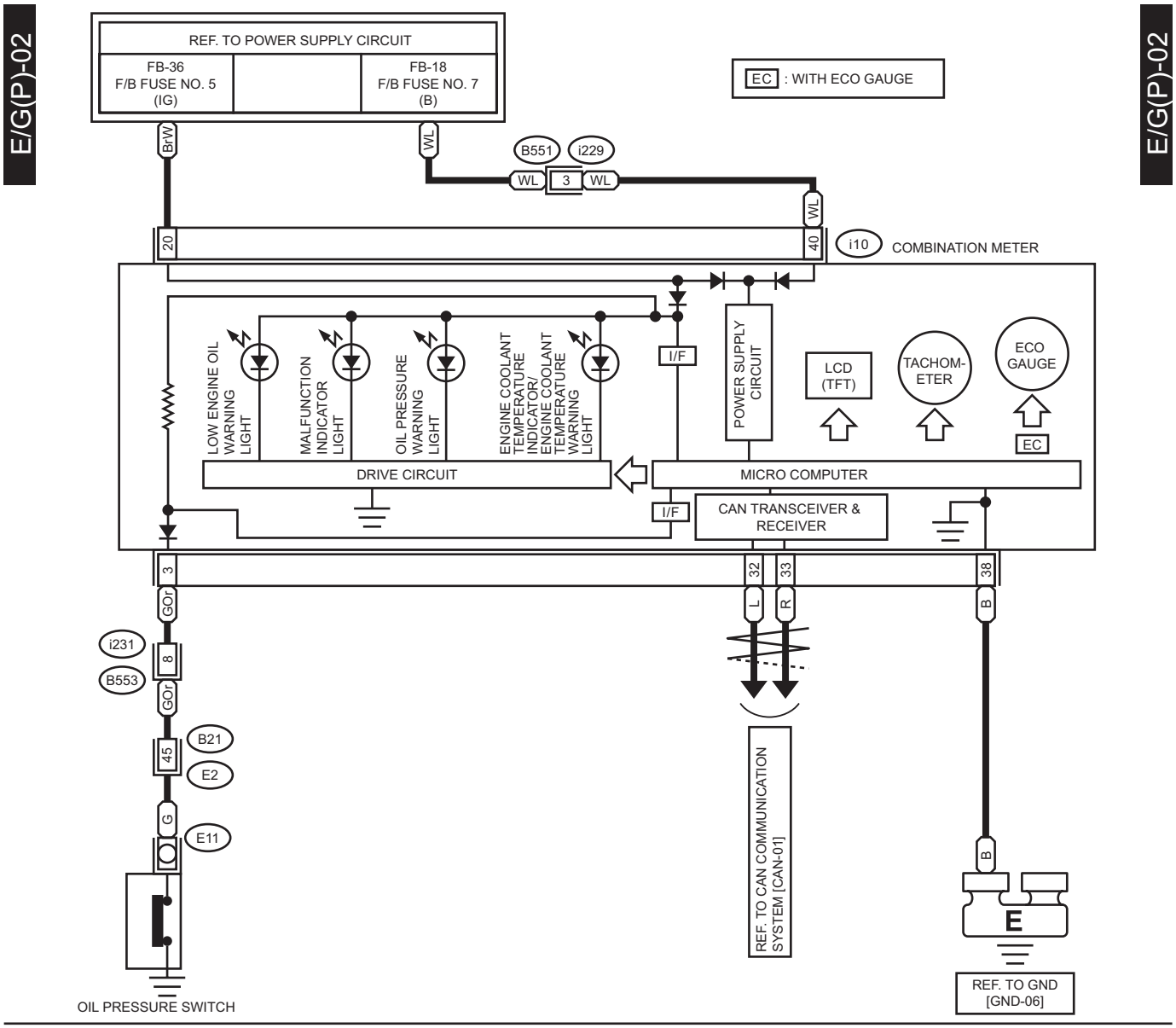
2. WITH PUSH BUTTON START



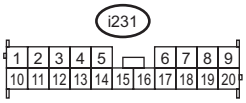

COMBINATION METER
DATA LINK CONNECTOR
CAN COMMUNICATION
DELIVERY (TEST) MODE FUSE
IGNITION COIL No. 4
IGNITION COIL No. 3
IGNITION COIL No. 2
IGNITION COIL No. 1
OIL PRESSURE SWITCH
DRIVE CIRCUIT
LOW ENGINE OIL WARNING LIGHT
MALFUNCTION INDICATOR LIGHT
OIL PRESSURE WARNING LIGHT
ENGINE COOLANT TEMP. INDICATOR/ ENGINE COOLANT TEMP. WARNING LIGHT
I/F
POWER SUPPLY CIRCUIT
CAN TRANSCEIVER & RECEIVER
MICRO COMPUTER
LCD (TFT)
TACHOM-ETER
ECO GAUGE
EC
I/F
CAN COMMUNICATION
J/C
OE
CRUISE CONTROL SWITCH
ACCELERATOR PEDAL POSITION SENSOR
BATTERY CURRENT SENSOR
BATTERY TEMPERATURE SENSOR
ELECTRONIC THROTTLE CONTROL
MANIFOLD ABSOLUTE PRESSURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR
INTAKE OIL CONTROL SOLENOID LH
INTAKE OIL CONTROL SOLENOID RH
EXHAUST OIL CONTROL SOLENOID LH
EXHAUST OIL CONTROL SOLENOID RH
ELCM
CRANKSHAFT POSITION SENSOR
TUMBLE GENERATOR VALVE ACTUATOR LH
TUMBLE GENERATOR VALVE ACTUATOR RH
KNOCK SENSOR
ENGINE OIL TEMPERATURE SENSOR
ECM
PUSH BUTTON START SYSTEM
ENGINE GROUND
OE : WITHOUT EyeSight
EC : WITH ECO GAUGE
WI-62509

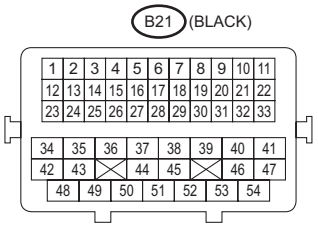

E/G(P)-01
E/G(P)-01
REF. TO POWER SUPPLY CIRCUIT
FB-38
F/B FUSE NO. 12
(IG)
MB-25
M/B FUSE NO. 11
(B)
ALT-2
GENERATOR
OE : WITHOUT EyeSight
*1 : WITHOUT ID CODE BOX : Y
WITH ID CODE BOX : RY
FUEL PUMP
RELAY
B220
REF. TO RADIATOR FAN SYSTEM [R/F-01]
REF. TO AIR CONDITIONING SYSTEM [A-A/C-01]
REF. TO CRUISE CONTROL SYSTEM [C/C-02]
REF. TO EyeSight SYSTEM [E/S-01]
REF. TO PUSH BUTTON START SYSTEM [P/S-02-03]
B: B135 D: B137 ECM
REF. TO GND [GND-05]
FUEL PUMP
FUEL PUMP ASSY
R58
B97
D: B137
B: B135
B220
RELAY HOLDER

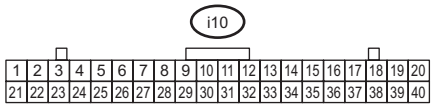
WI-48235


E/G(P)-02
E/G(P)-02
REF. TO POWER SUPPLY CIRCUIT
FB-36
F/B FUSE NO. 5
(IG)
FB-18
F/B FUSE NO. 7
(B)
EC : WITH ECO GAUGE
BrW
WL
B551
i229
WL
3
WL
WL
20
40
i10
COMBINATION METER
LOW ENGINE OIL WARNING LIGHT
MALFUNCTION INDICATOR LIGHT
OIL PRESSURE WARNING LIGHT
ENGINE COOLANT TEMPERATURE INDICATOR/ ENGINE COOLANT TEMPERATURE WARNING LIGHT
I/F
POWER SUPPLY CIRCUIT
LCD (TFT)
TACHOM-ETER
ECO GAUGE
EC
DRIVE CIRCUIT
MICRO COMPUTER
I/F
CAN TRANSCEIVER & RECEIVER
3
32
33
38
GOr
L
R
B
i231
B553
8
GOr
B21
E2
45
G
E11
B
E
REF. TO CAN COMMUNICATION SYSTEM [CAN-01]
REF. TO GND [GND-06]
OIL PRESSURE SWITCH

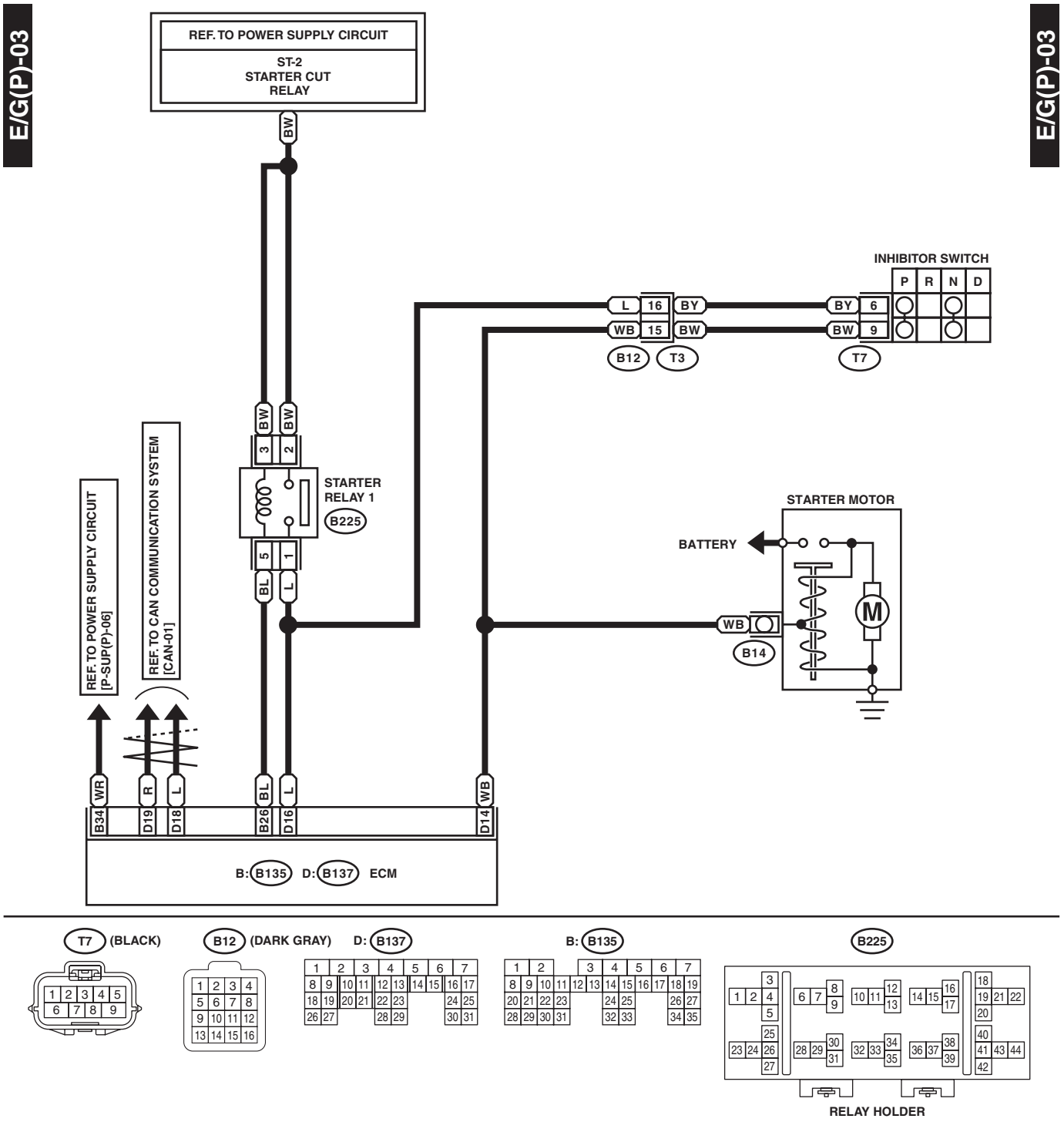

i229
1 2 3 4 5
6 7 8 9 10 11 12


i231
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19 20


B21 (BLACK)
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
23 24 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47
48 49 50 51 52 53 54

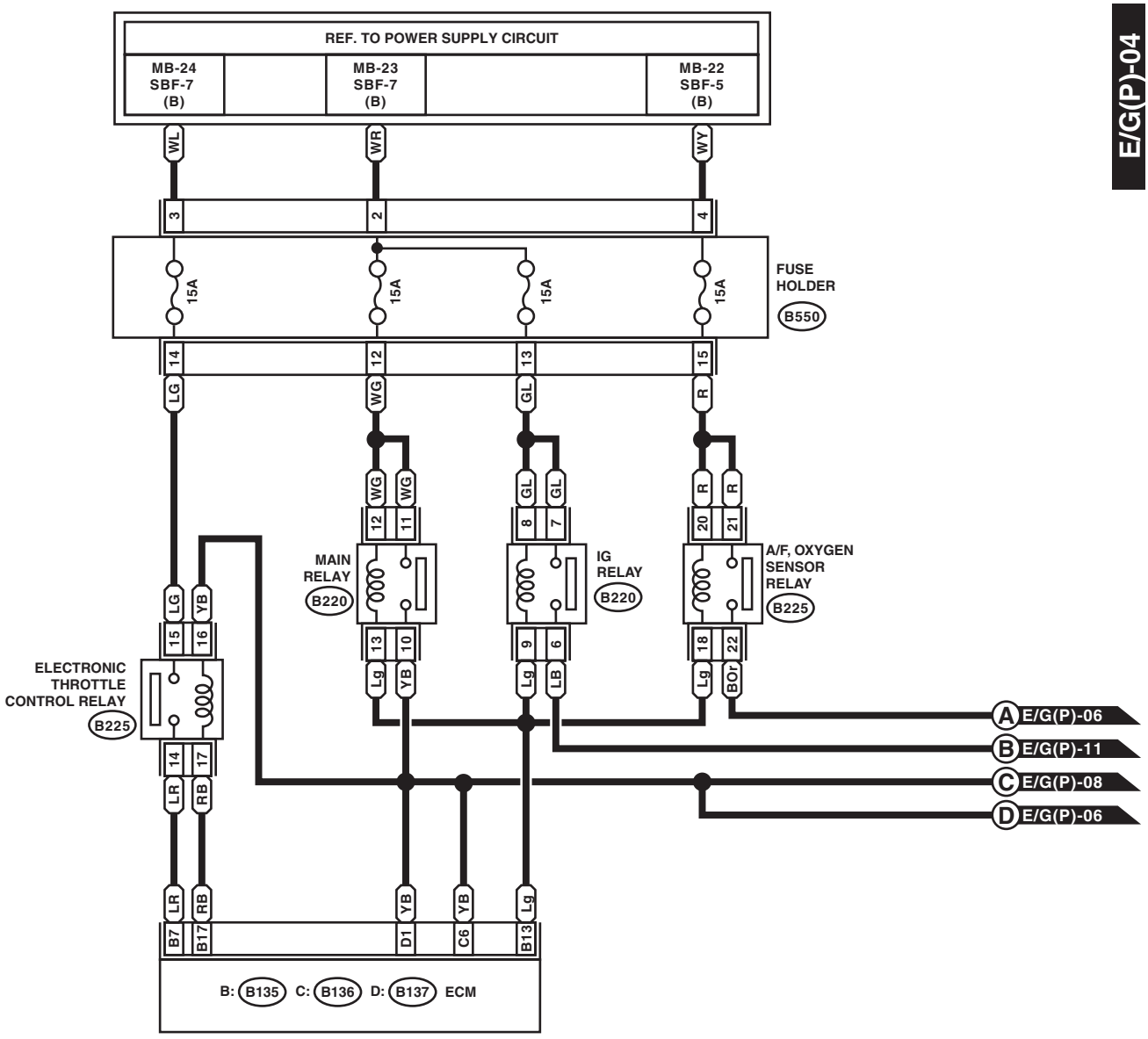

i10
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

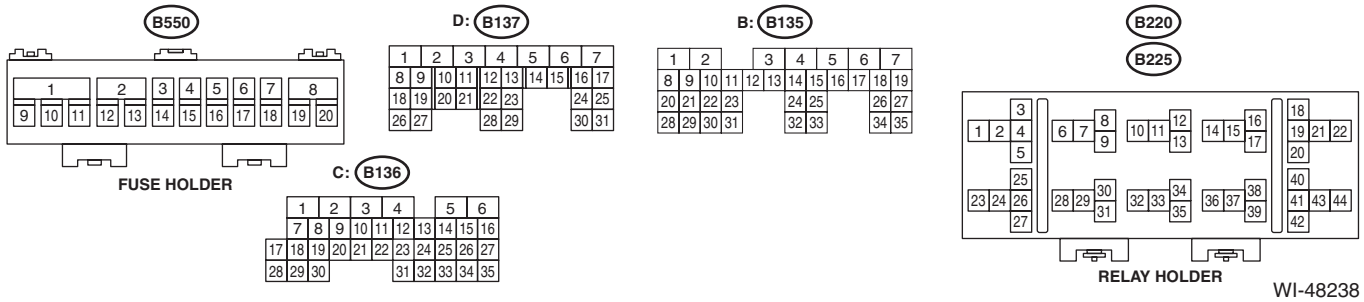
WI-61525


E/G(P)-03
E/G(P)-03
REF. TO POWER SUPPLY CIRCUIT
ST-2
STARTER CUT
RELAY
BW
INHIBITOR SWITCH
P
R
N
D
L
16
BY
WB
15
BW
BY
6
BW
9
B12
T3
T7
BW
BW
3
2
STARTER
RELAY 1
B225
5
1
BL
L
STARTER MOTOR
BATTERY
WB
B14
M
REF. TO POWER SUPPLY CIRCUIT
[P-SUP(P)-06]
REF. TO CAN COMMUNICATION SYSTEM
[CAN-01]
WR
R
L
BL
L
WB
B34
D19
D18
B26
D16
D14
B: B135
D: B137
ECM
T7 (BLACK)
B12 (DARK GRAY)
D: B137
B: B135
B225
RELAY HOLDER

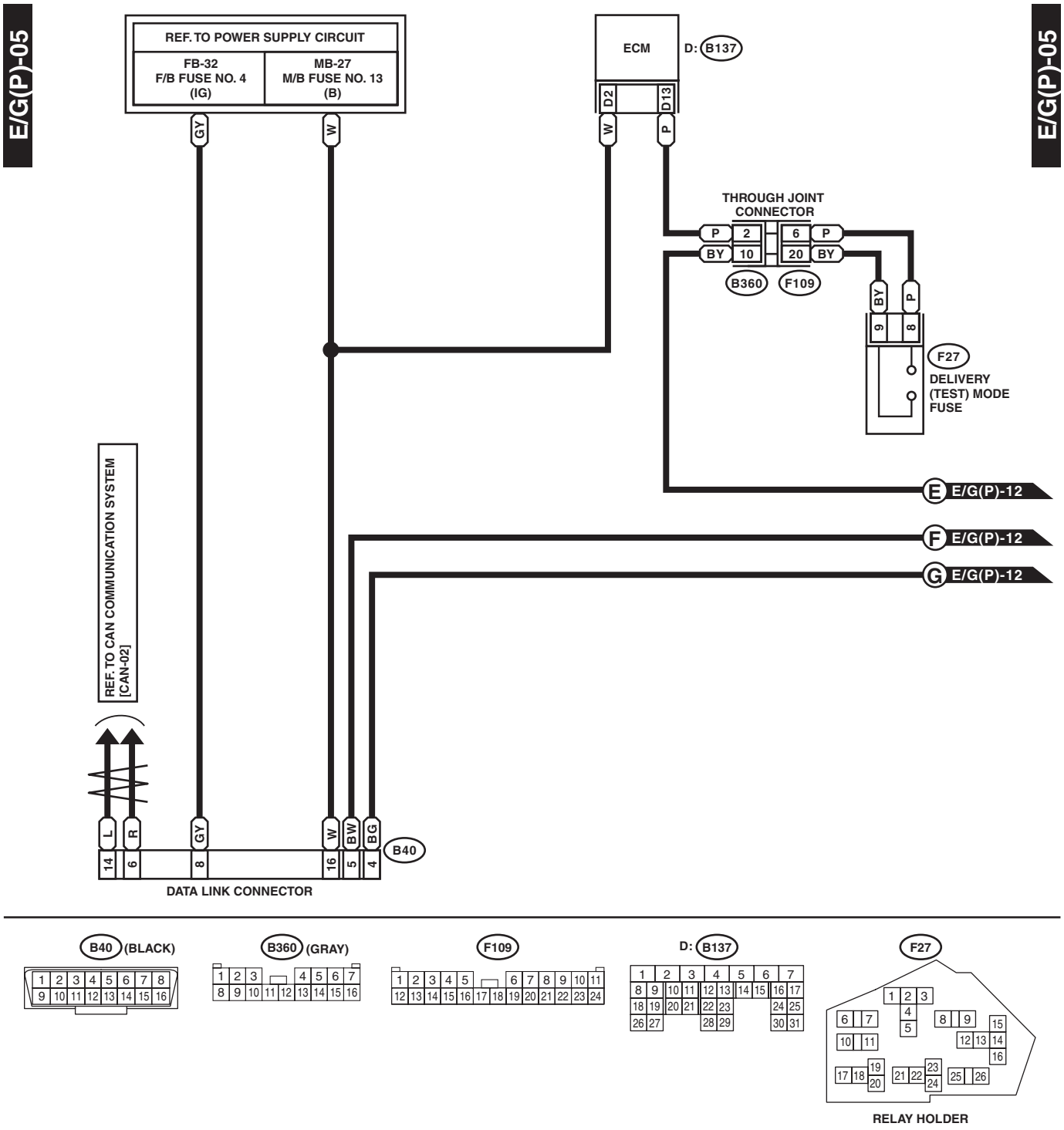
WI-48237

E/G(P)-04



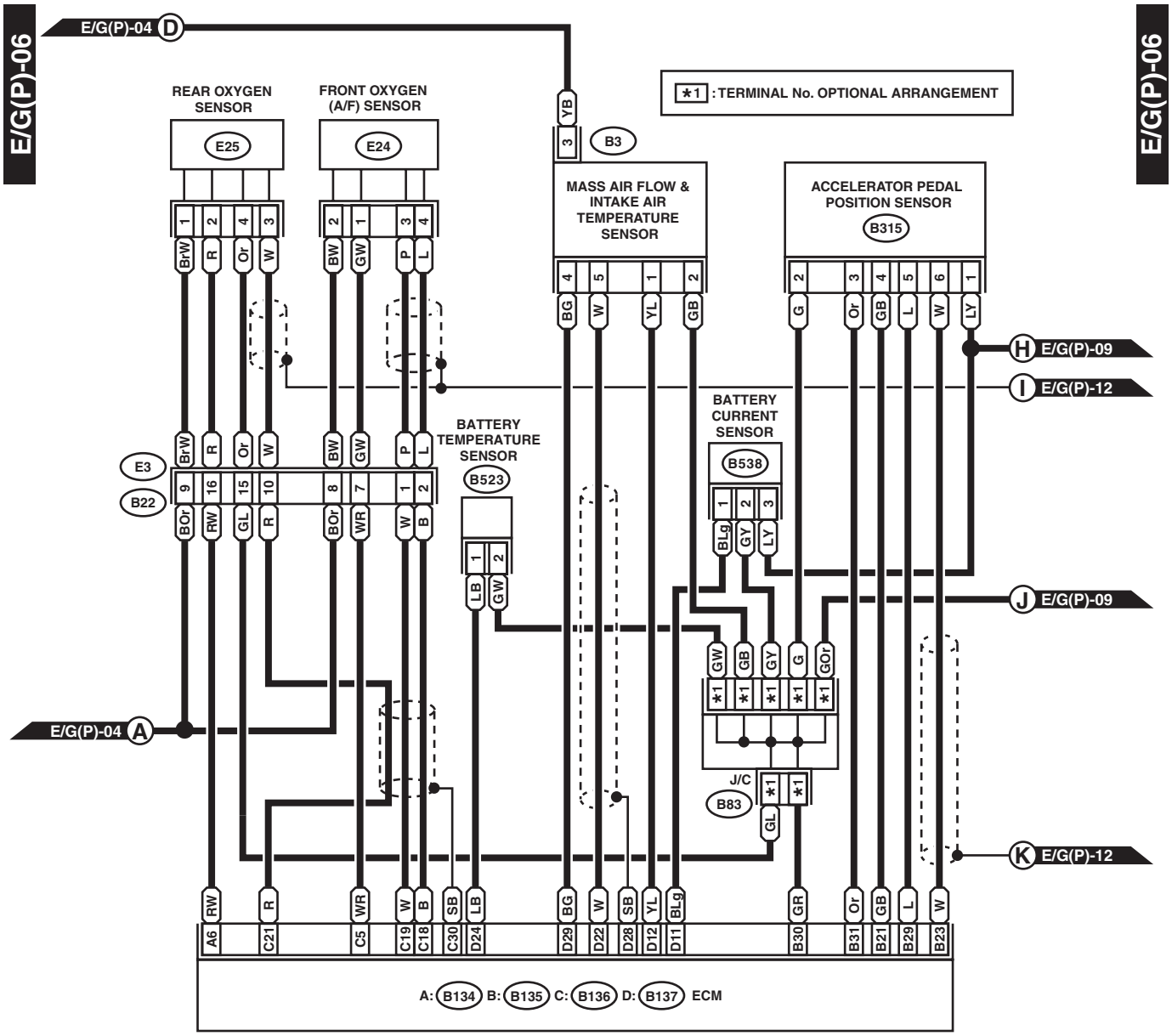


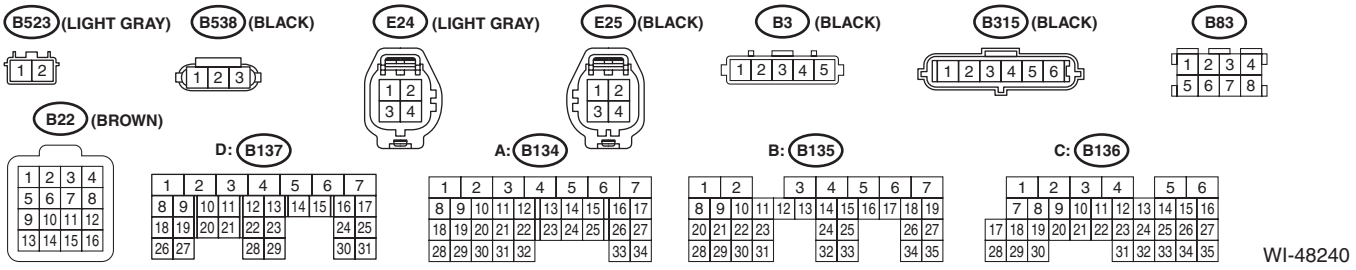
WI-48238

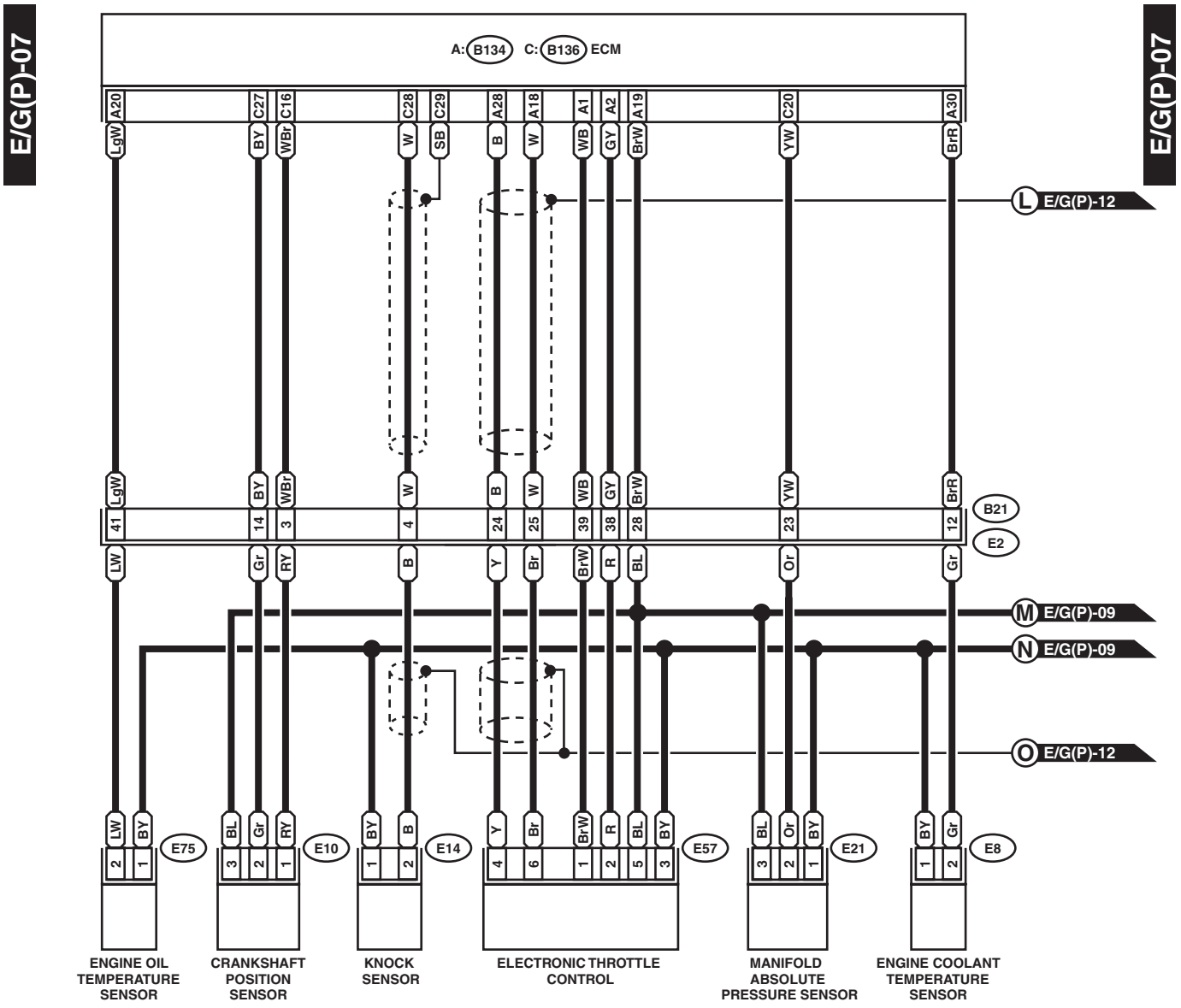

E/G(P)-05
E/G(P)-05
REF. TO POWER SUPPLY CIRCUIT
FB-32
F/B FUSE NO. 4
(IG)
MB-27
M/B FUSE NO. 13
(B)
ECM
D: B137
D2
D13
GY
W
W
P
THROUGH JOINT CONNECTOR
P 2 6 P
BY 10 20 BY
B360
F109
BY
P
9
8
F27
DELIVERY (TEST) MODE FUSE
E E/G(P)-12
F E/G(P)-12
G E/G(P)-12
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
L
R
GY
W
BW
BG
B40
14
6
8
16
5
4
DATA LINK CONNECTOR

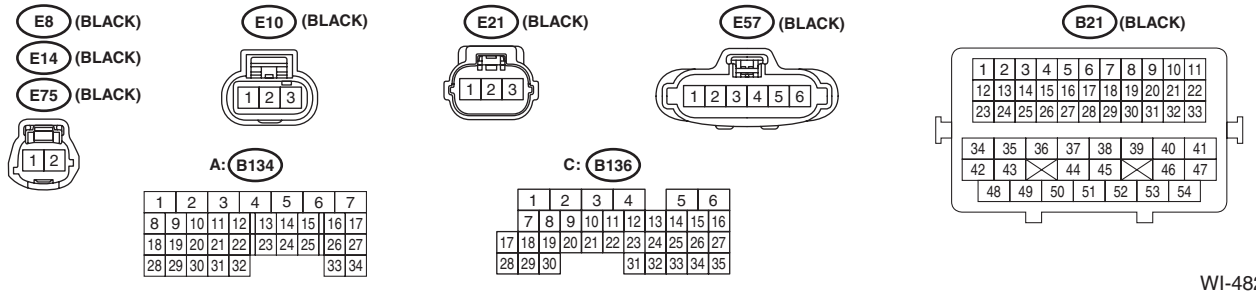
B40 (BLACK)
B360 (GRAY)
F109
D: B137
F27
RELAY HOLDER

WI-48239

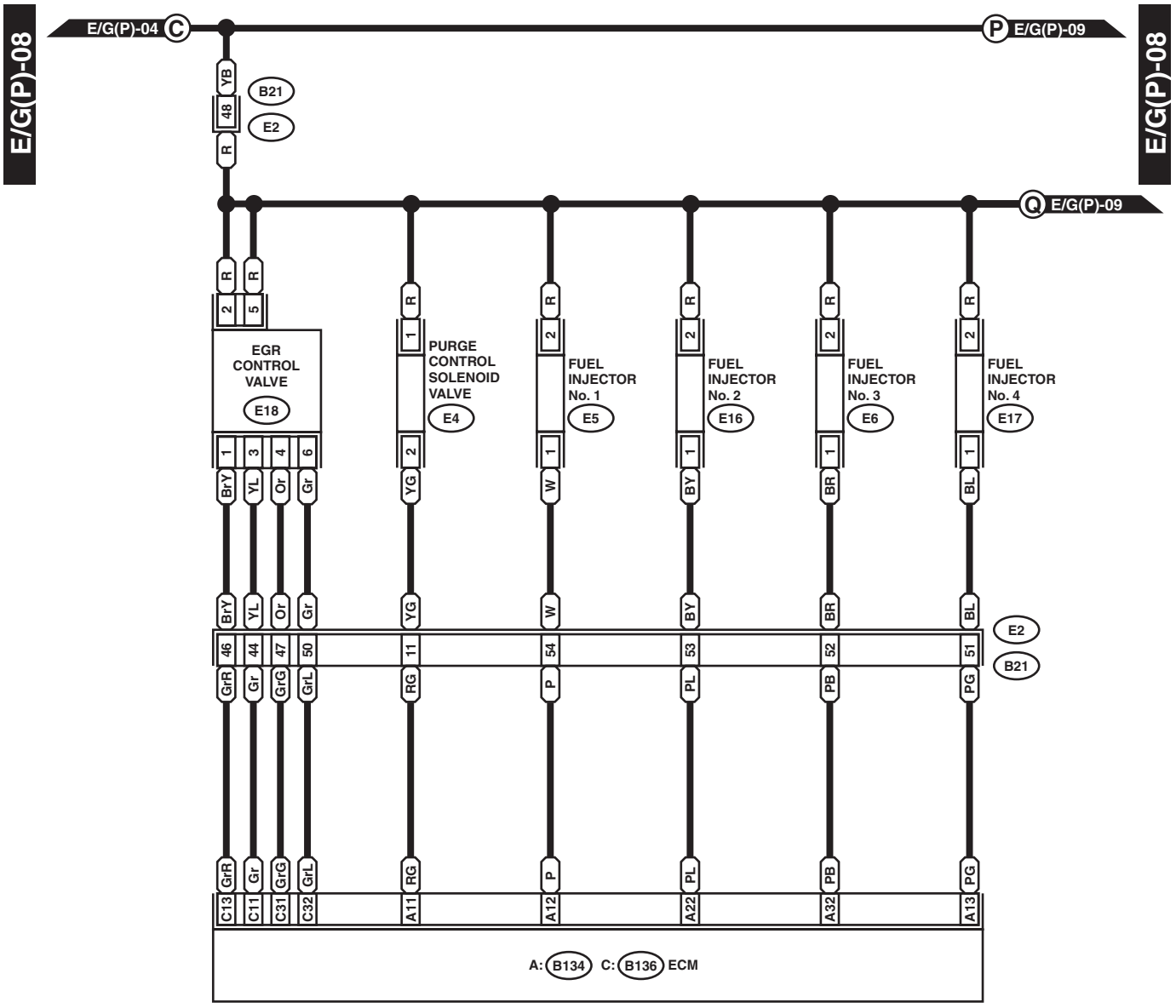

E/G(P)-06
E/G(P)-04 D
REAR OXYGEN SENSOR
E25
FRONT OXYGEN (A/F) SENSOR
E24
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
B3
MASS AIR FLOW & INTAKE AIR TEMPERATURE SENSOR
ACCELERATOR PEDAL POSITION SENSOR
B315
BATTERY TEMPERATURE SENSOR
B523
BATTERY CURRENT SENSOR
B538
E3
B22
J/C
B83
H E/G(P)-09
I E/G(P)-12
J E/G(P)-09
K E/G(P)-12
E/G(P)-04 A
A: B134 B: B135 C: B136 D: B137 ECM

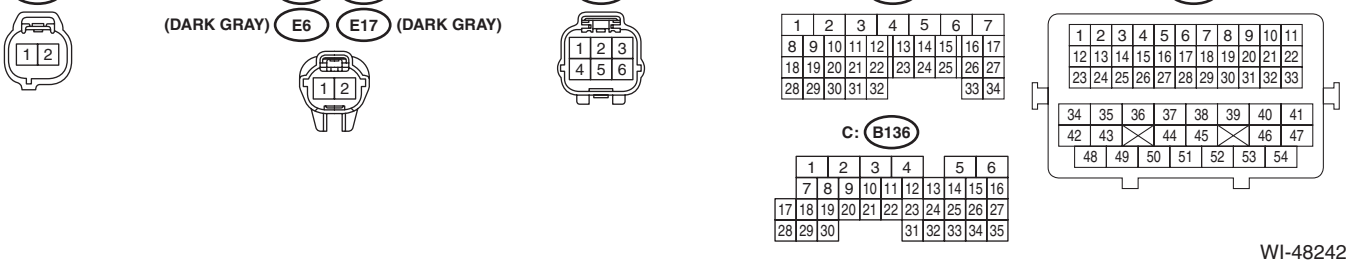

B523 (LIGHT GRAY)
B538 (BLACK)
E24 (LIGHT GRAY)
E25 (BLACK)
B3 (BLACK)
B315 (BLACK)
B83
B22 (BROWN)
D: B137
A: B134
B: B135
C: B136
WI-48240


E/G(P)-07
E/G(P)-07
A: B134 C: B136 ECM
A20 C27 C16 C28 C29 A28 A18 A1 A2 A19 C20 A30
LgW BY WBr W SB B W WB GY BrW YW BrR
L E/G(P)-12
41 14 3 4 24 25 39 38 28 23 12
B21
E2
LW Gr RY B Y Br BrW R BL Or Gr
M E/G(P)-09
N E/G(P)-09
O E/G(P)-12
LW BY E75
BL Gr RY E10
BY B E14
Y Br BrW R BL BY E57
BL Or BY E21
BY Gr E8
ENGINE OIL TEMPERATURE SENSOR
CRANKSHAFT POSITION SENSOR
KNOCK SENSOR
ELECTRONIC THROTTLE CONTROL
MANIFOLD ABSOLUTE PRESSURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR

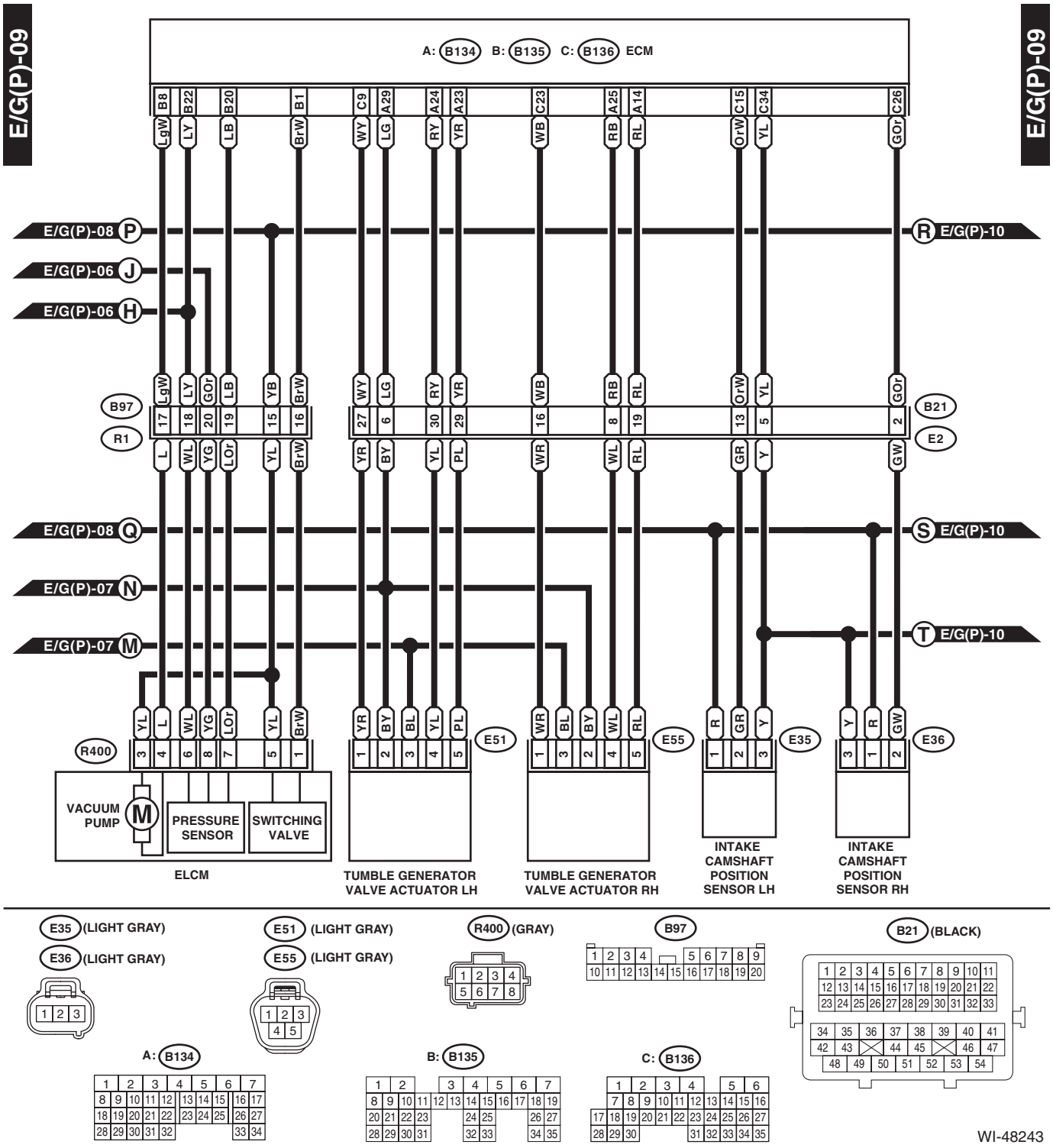

E8 (BLACK)
E14 (BLACK)
E75 (BLACK)
E10 (BLACK)
E21 (BLACK)
E57 (BLACK)
B21 (BLACK)
A: B134
C: B136

WI-48241

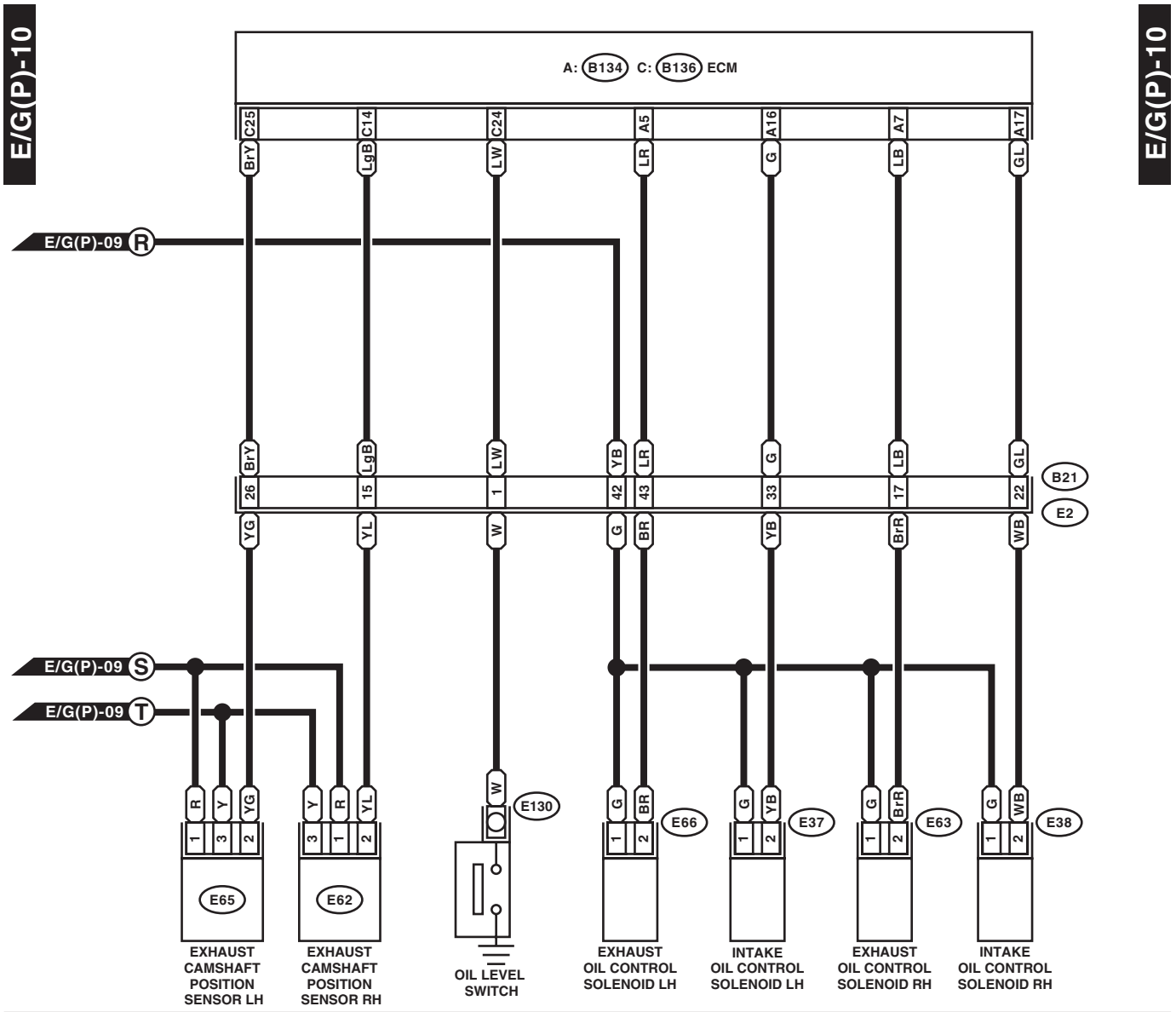

E/G(P)-08
E/G(P)-04 C
P E/G(P)-09
E/G(P)-08
YB
48
B21
E2
R
Q E/G(P)-09
EGR CONTROL VALVE
E18
PURGE CONTROL SOLENOID VALVE
E4
FUEL INJECTOR No. 1
E5
FUEL INJECTOR No. 2
E16
FUEL INJECTOR No. 3
E6
FUEL INJECTOR No. 4
E17
BrY
YL
Or
Gr
YG
W
BY
BR
BL
GrR
GrG
GrL
RG
P
PL
PB
PG
C13
C11
C31
C32
A11
A12
A22
A32
A13
E2
B21
A: B134 C: B136 ECM


E4 (BLUE)
(DARK GRAY) E5 E16 (DARK GRAY)
(DARK GRAY) E6 E17 (DARK GRAY)
E18 (DARK GRAY)
A: B134
C: B136
B21 (BLACK)

WI-48242


E/G(P)-09
E/G(P)-09
A: B134 B: B135 C: B136 ECM
B8 B22 B20 B1 C9 A29 A24 A23 C23 A25 A14 C15 C34 C26
LgW LY LB BrW WY LG RY YR WB RB RL OrW YL GOr
E/G(P)-08 P
E/G(P)-10 R
E/G(P)-06 J
E/G(P)-06 H
B97
R1
B21
E2
E/G(P)-08 Q
E/G(P)-10 S
E/G(P)-07 N
E/G(P)-07 M
E/G(P)-10 T
R400
E51
E55
E35
E36
VACUUM PUMP
PRESSURE SENSOR
SWITCHING VALVE
ELCM
TUMBLE GENERATOR VALVE ACTUATOR LH
TUMBLE GENERATOR VALVE ACTUATOR RH
INTAKE CAMSHAFT POSITION SENSOR LH
INTAKE CAMSHAFT POSITION SENSOR RH

E35 (LIGHT GRAY)
E36 (LIGHT GRAY)
E51 (LIGHT GRAY)
E55 (LIGHT GRAY)
R400 (GRAY)
B97
B21 (BLACK)
A: B134
B: B135
C: B136
WI-48243



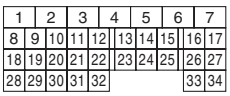
(BLACK) E37 E63 (BLACK)
(BLACK) E38 E66 (BLACK)



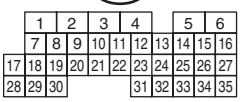
E62 (LIGHT GRAY)
E65 (LIGHT GRAY)



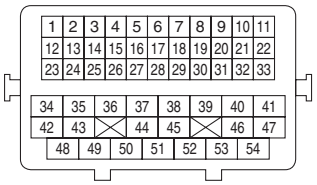
A: B134



C: B136

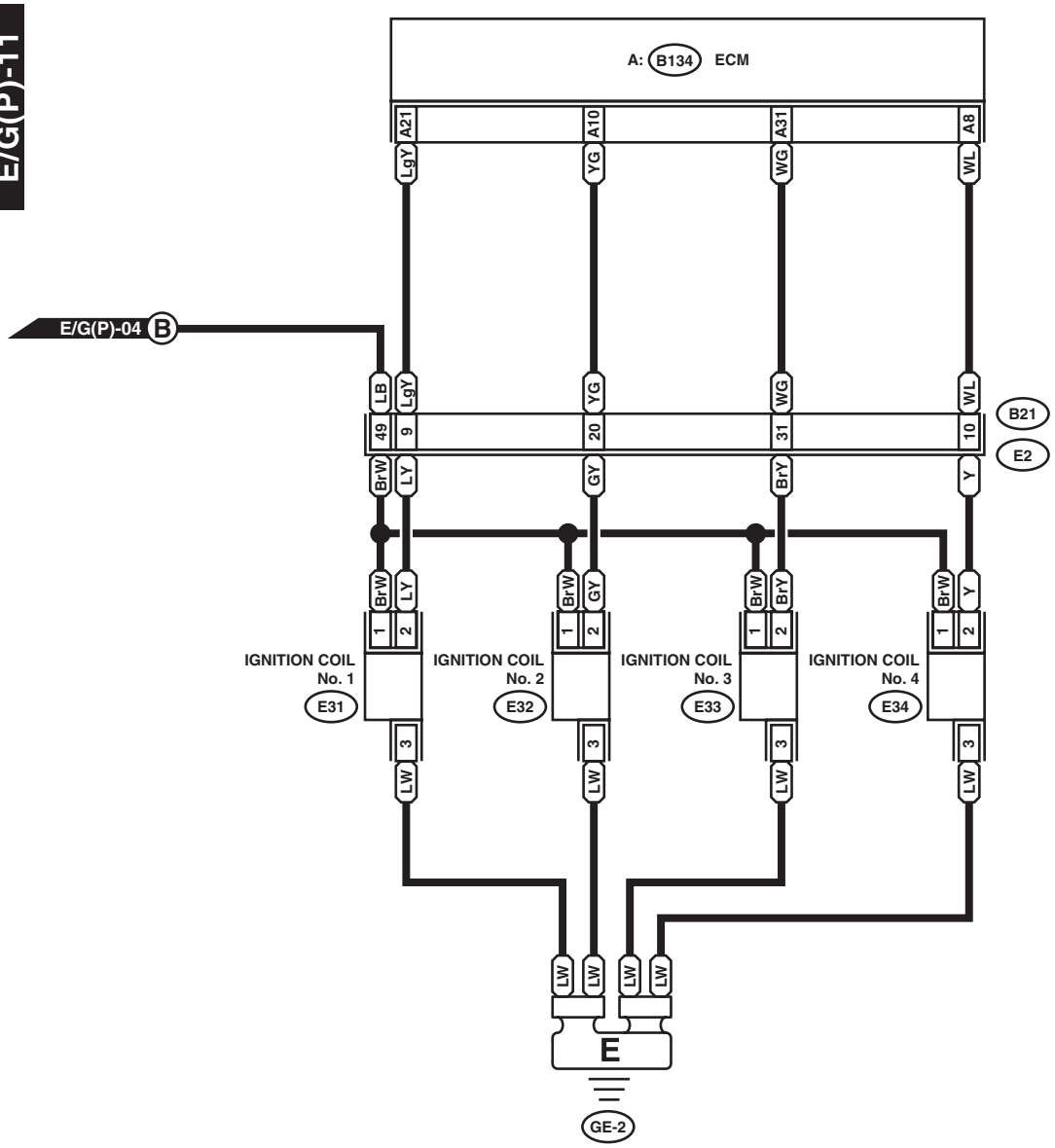


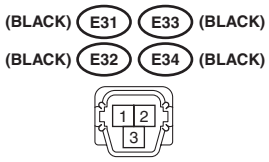
B21 (BLACK)

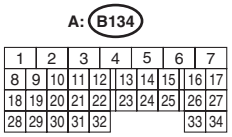


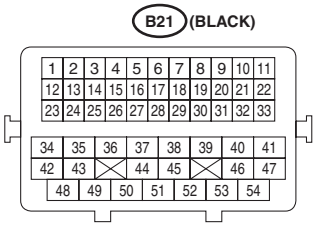
WI-48244

E/G(P)-11

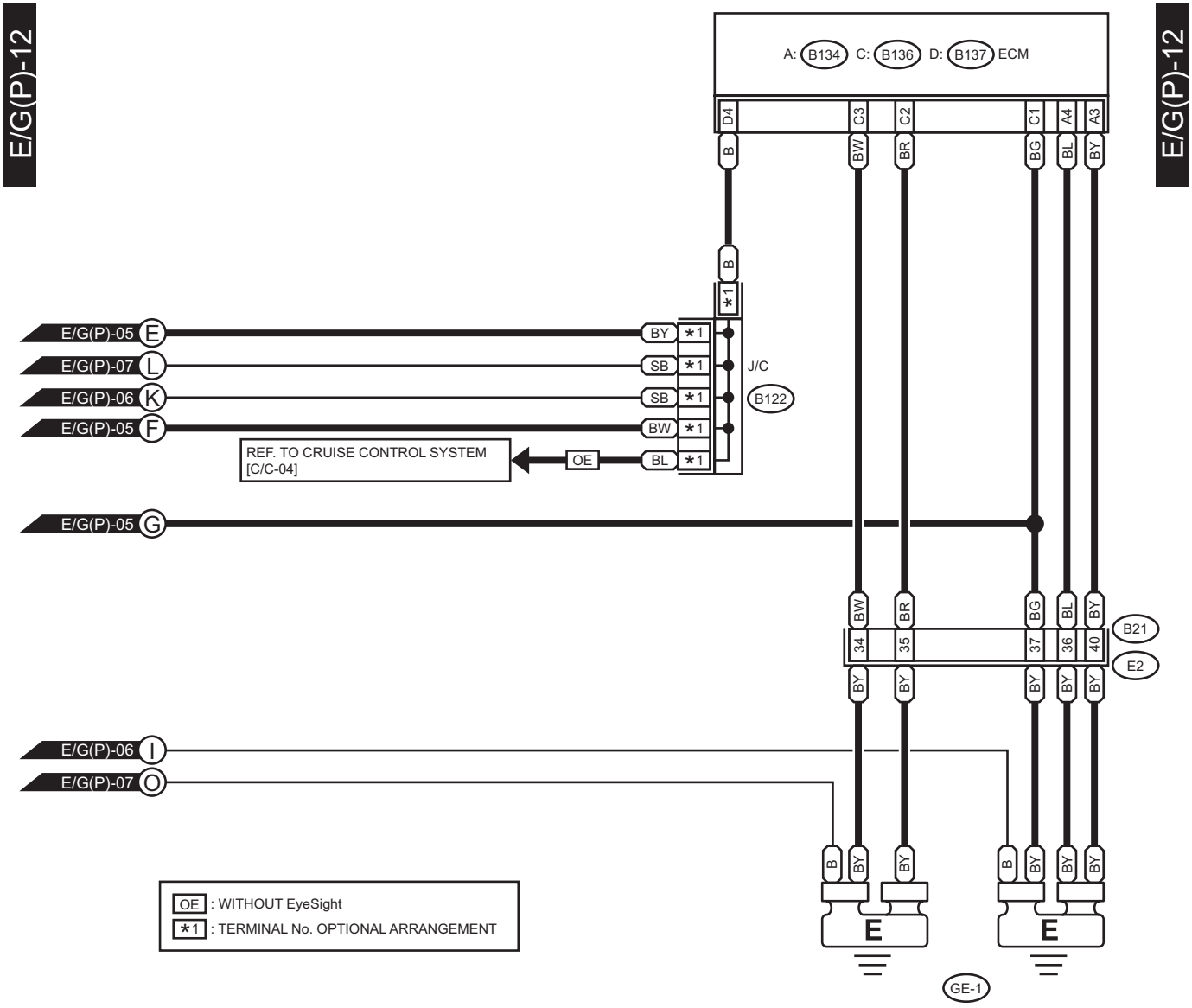


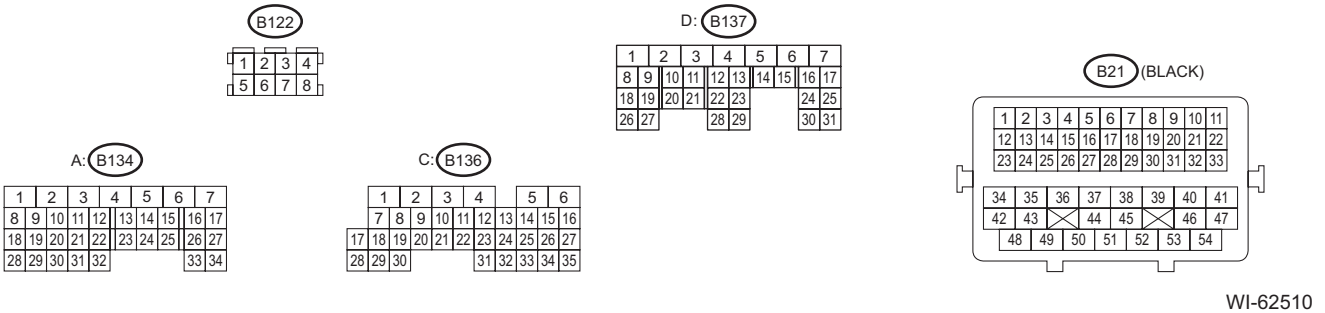






WI-48245

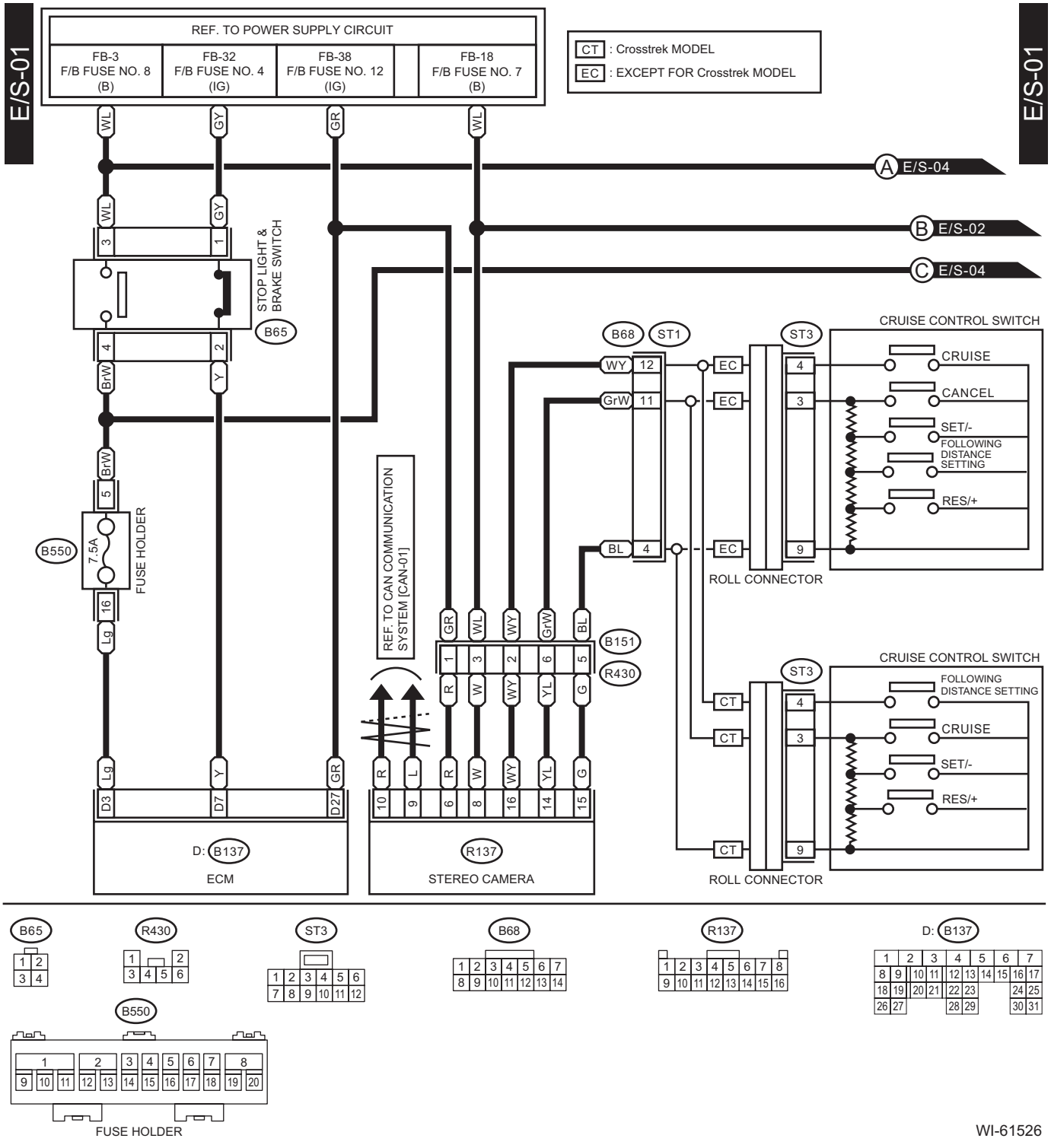

E/G(P)-12
E/G(P)-12
A: B134 C: B136 D: B137 ECM
D4 C3 C2 C1 A4 A3
B BW BR BG BL BY
E/G(P)-05 E
E/G(P)-07 L
E/G(P)-06 K
E/G(P)-05 F
E/G(P)-05 G
E/G(P)-06 I
E/G(P)-07 O
BY SB SB BW BL *1
J/C
B122
REF. TO CRUISE CONTROL SYSTEM [C/C-04]
OE
34 35 37 36 40
B21
E2
E
E
GE-1
OE : WITHOUT EyeSight
*1 : TERMINAL No. OPTIONAL ARRANGEMENT


B122
1 2 3 4
5 6 7 8
D: B137
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25
26 27 28 29 30 31
B21 (BLACK)
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
23 24 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47
48 49 50 51 52 53 54
A: B134
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34
C: B136
1 2 3 4 5 6
7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35

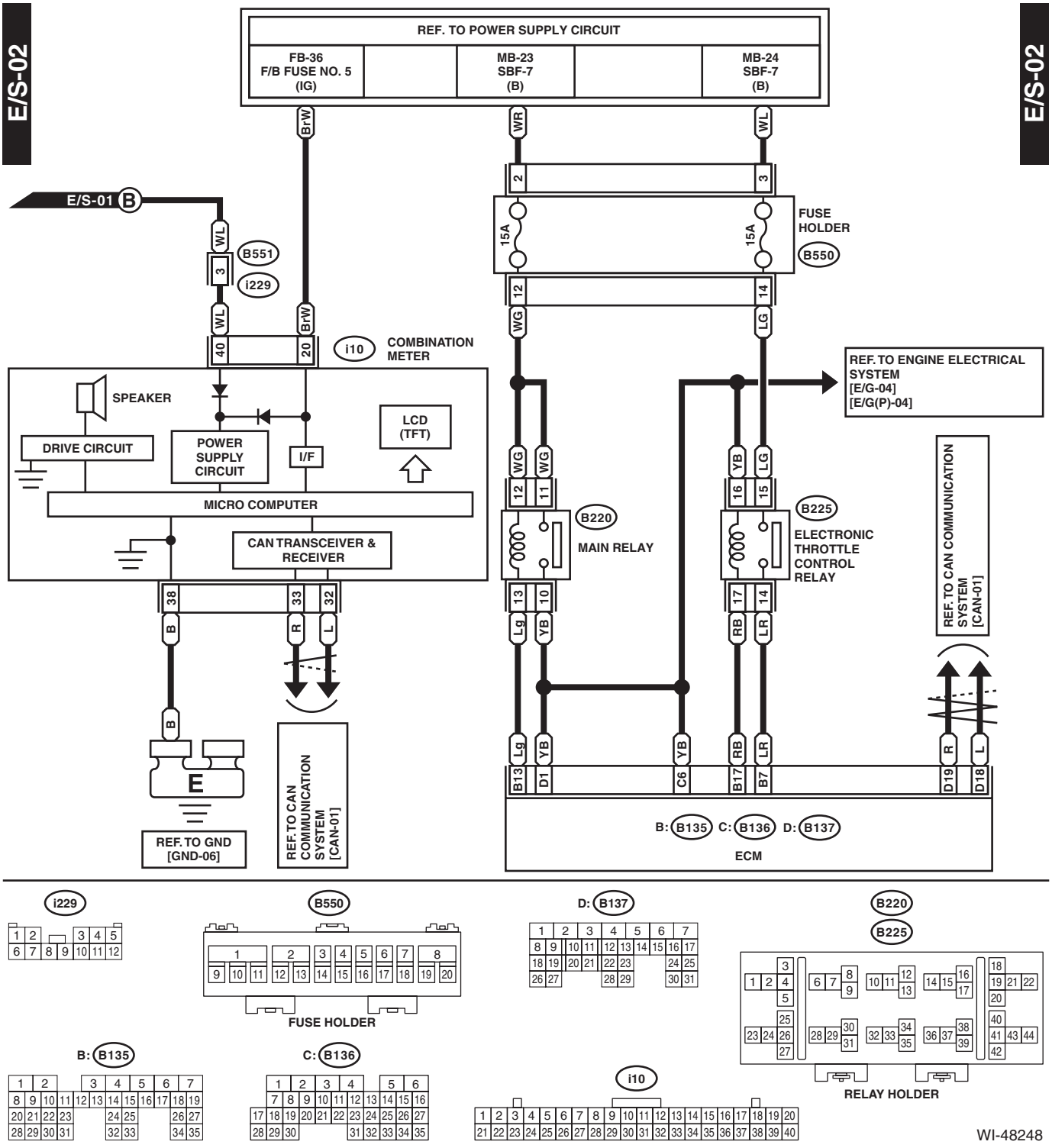
WI-62510

19.EyeSight System

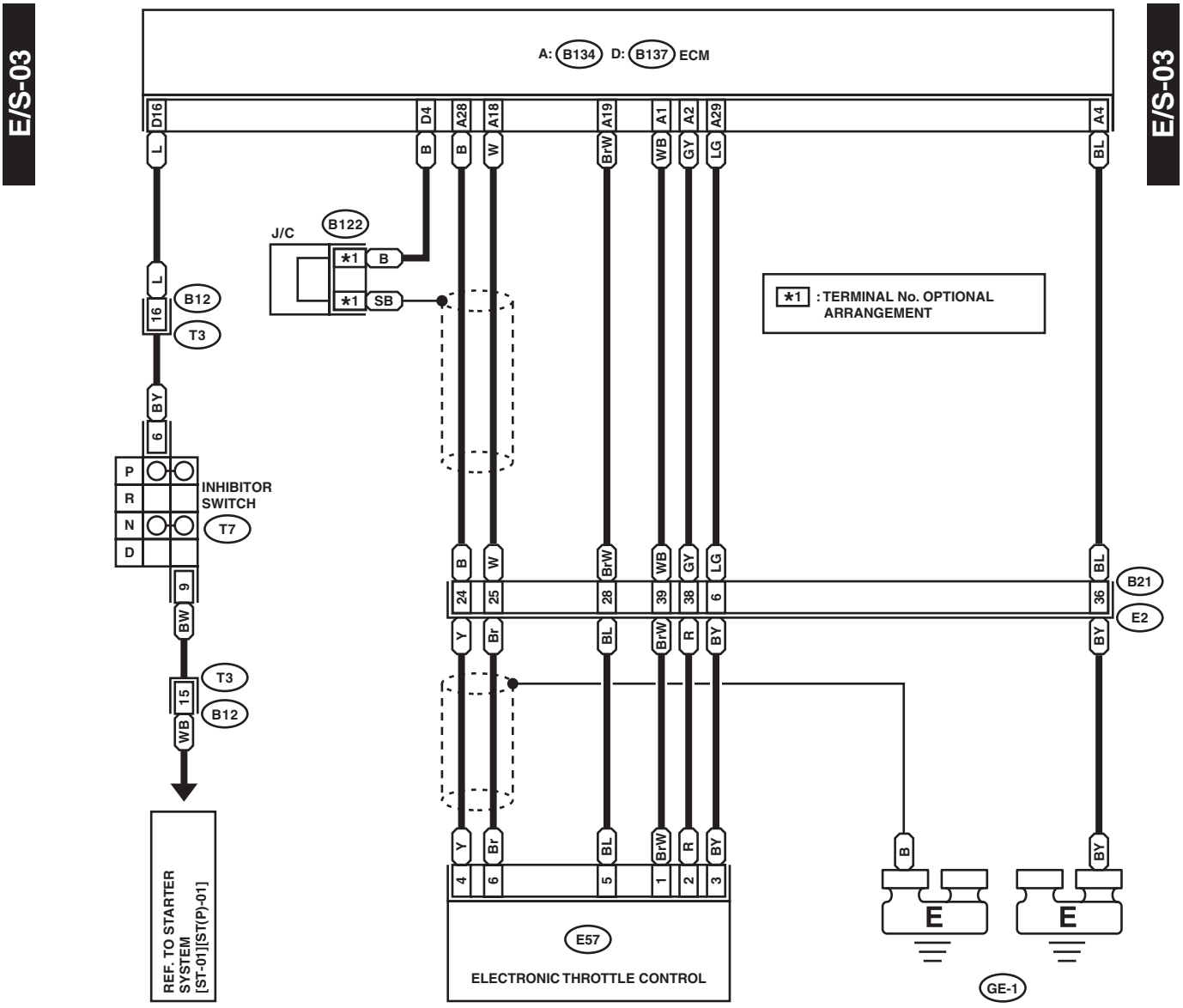
A: WIRING DIAGRAM

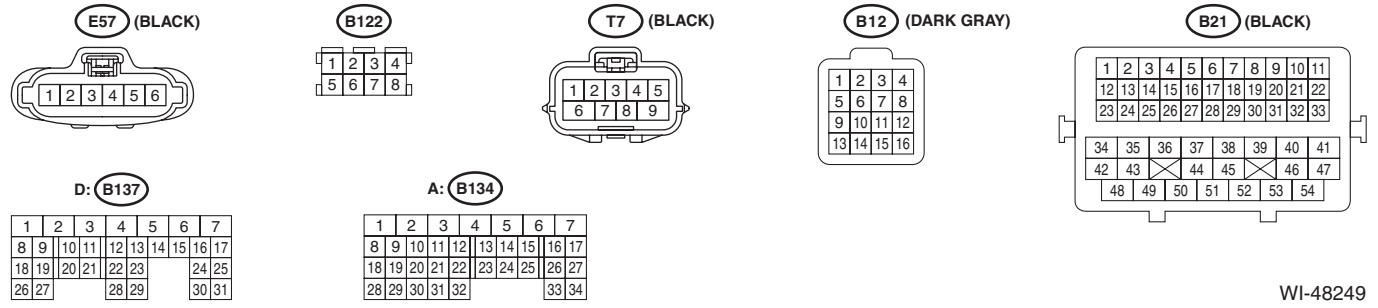


WI-61526

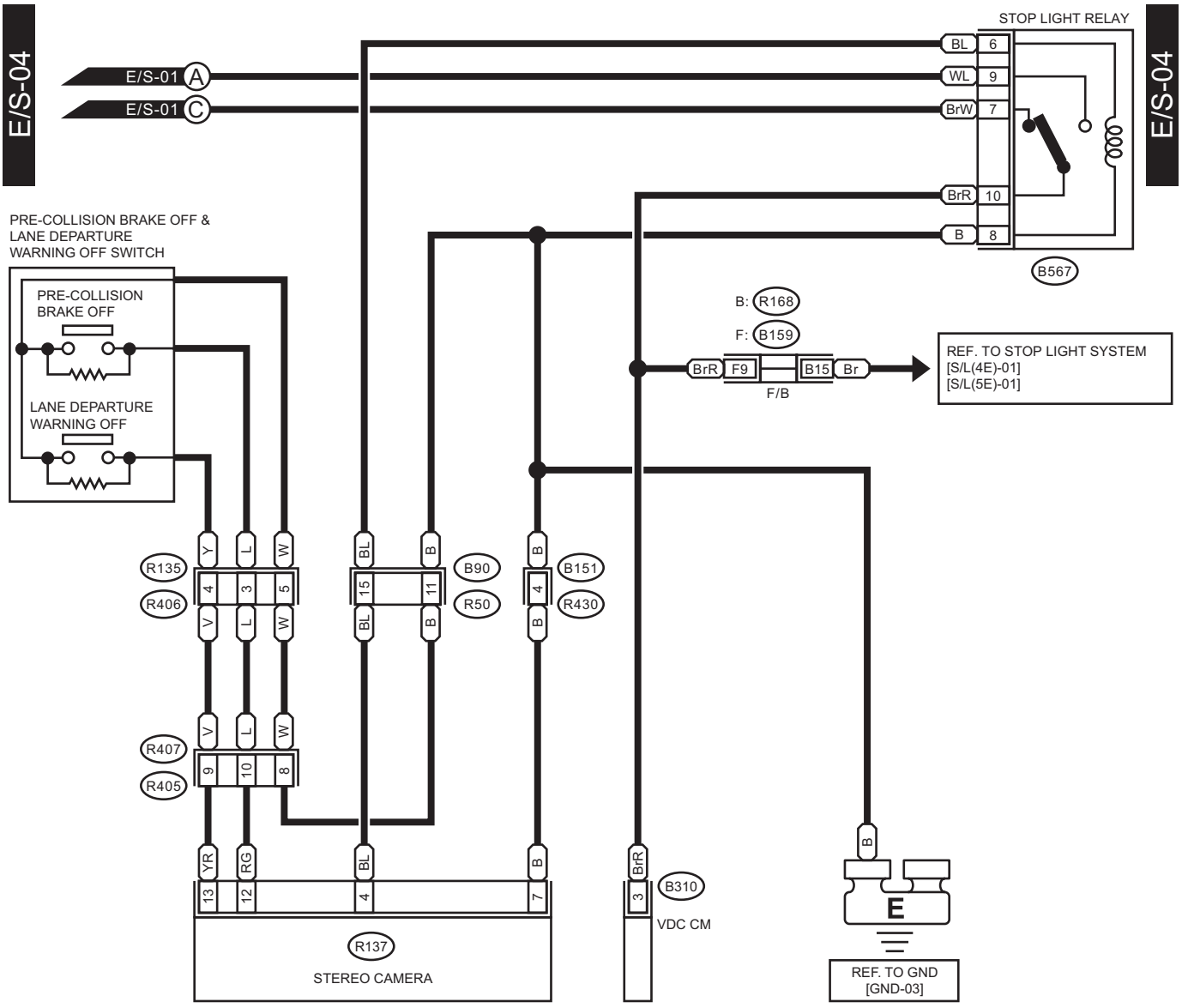

E/S-02
E/S-02
REF. TO POWER SUPPLY CIRCUIT
FB-36
F/B FUSE NO. 5
(IG)
MB-23
SBF-7
(B)
MB-24
SBF-7
(B)
BrW
WR
WL
E/S-01 B
WL
B551
3
i229
WL
BrW
40
20
i10
COMBINATION METER
2
3
15A
15A
FUSE HOLDER
B550
12
14
WG
LG
SPEAKER
DRIVE CIRCUIT
POWER SUPPLY CIRCUIT
I/F
LCD (TFT)
MICRO COMPUTER
CAN TRANSCEIVER & RECEIVER
REF. TO ENGINE ELECTRICAL SYSTEM [E/G-04] [E/G(P)-04]
WG
WG
12
11
B220
MAIN RELAY
YB
LG
16
15
B225
ELECTRONIC THROTTLE CONTROL RELAY
REF. TO CAN COMMUNICATION SYSTEM [CAN-01]
38
33
32
13
10
17
14
B
R
L
Lg
YB
RB
LR
B
E
REF. TO GND [GND-06]
REF. TO CAN COMMUNICATION SYSTEM [CAN-01]
Lg
YB
YB
RB
LR
R
L
B13
D1
C6
B17
B7
D19
D18
B: B135 C: B136 D: B137
ECM
i229
B550
FUSE HOLDER
D: B137
B220
B225
RELAY HOLDER
B: B135
C: B136
i10

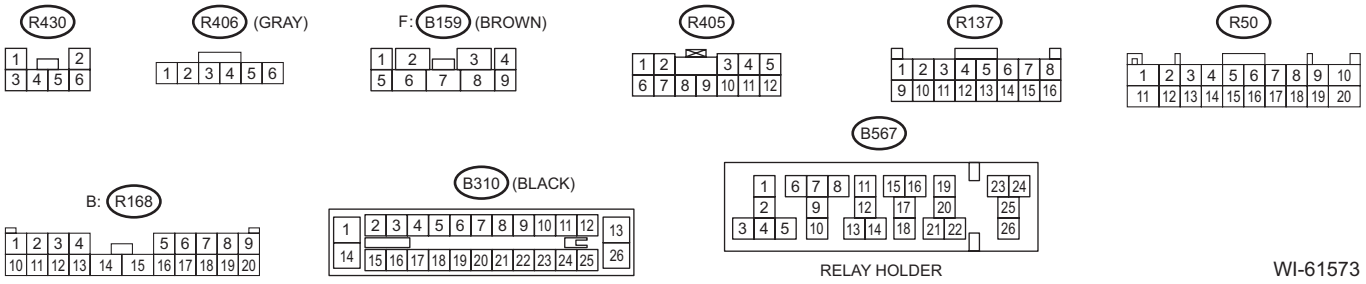
WI-48248


E/S-03
E/S-03
A: B134 D: B137 ECM
D16
D4
A28
A18
A19
A1
A2
A29
A4
L
B
B
W
BrW
WB
GY
LG
BL
J/C
B122
*1
B
*1
SB
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
L
16
B12
T3
BY
6
P
R
N
D
INHIBITOR SWITCH
T7
9
BW
T3
15
WB
B12
REF. TO STARTER SYSTEM [ST-01][ST(P)-01]
B
W
BrW
WB
GY
LG
BL
B21
24
25
28
39
38
6
36
E2
Y
Br
BL
BrW
R
BY
BY
Y
Br
BL
BrW
R
BY
B
BY
4
6
5
1
2
3
E57
ELECTRONIC THROTTLE CONTROL
E
E
GE-1


E57 (BLACK)
1 2 3 4 5 6
B122
1 2 3 4
5 6 7 8
T7 (BLACK)
1 2 3 4 5
6 7 8 9
B12 (DARK GRAY)
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
B21 (BLACK)
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
23 24 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47
48 49 50 51 52 53 54
D: B137
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25
26 27 28 29 30 31
A: B134
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34

WI-48249


E/S-04
E/S-01 A
E/S-01 C
STOP LIGHT RELAY
BL 6
WL 9
BrW 7
BrR 10
B 8
B567
E/S-04
PRE-COLLISION BRAKE OFF & LANE DEPARTURE WARNING OFF SWITCH
PRE-COLLISION BRAKE OFF
LANE DEPARTURE WARNING OFF
B: R168
F: B159
BrR F9 B15 Br
F/B
REF. TO STOP LIGHT SYSTEM
[S/L(4E)-01]
[S/L(5E)-01]
R135
R406
R407
R405
B90
R50
B151
R430
R137
STEREO CAMERA
B310
VDC CM
E
REF. TO GND
[GND-03]

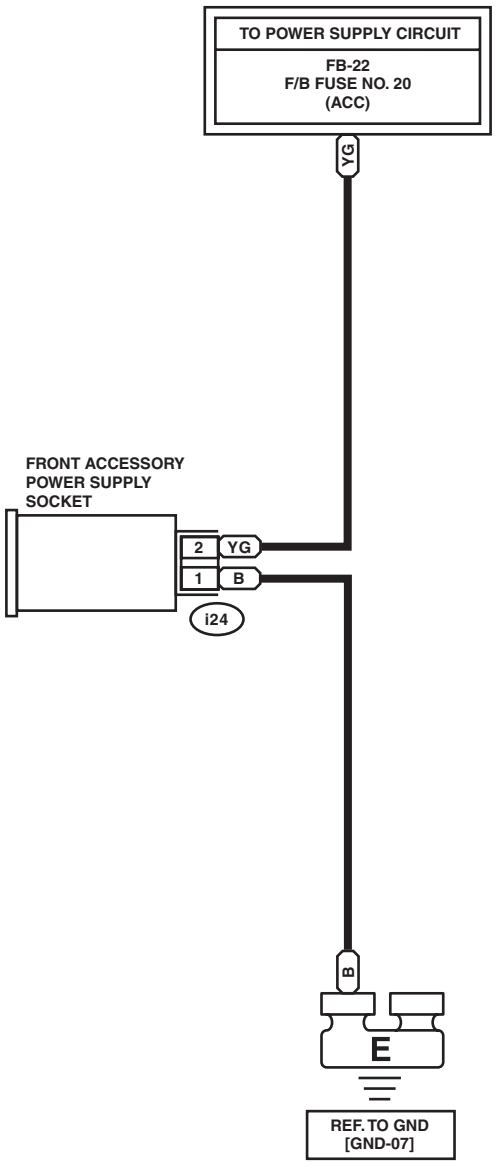

R430
R406 (GRAY)
F: B159 (BROWN)
R405
R137
R50
B: R168
B310 (BLACK)
B567
RELAY HOLDER

WI-61573

20.Front Accessory Power Supply Socket System

A: WIRING DIAGRAM

FAPS-01



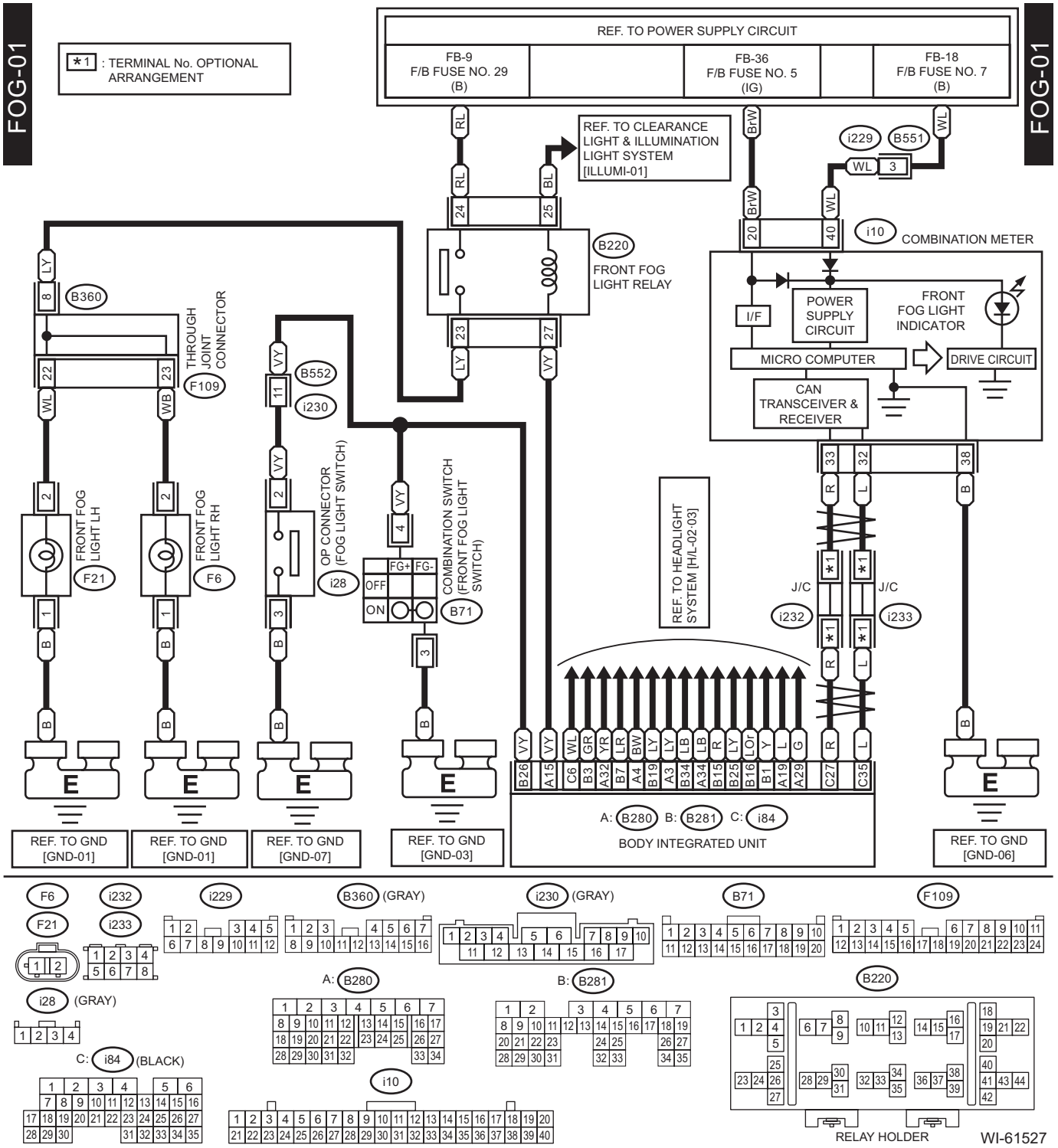


WI-34207

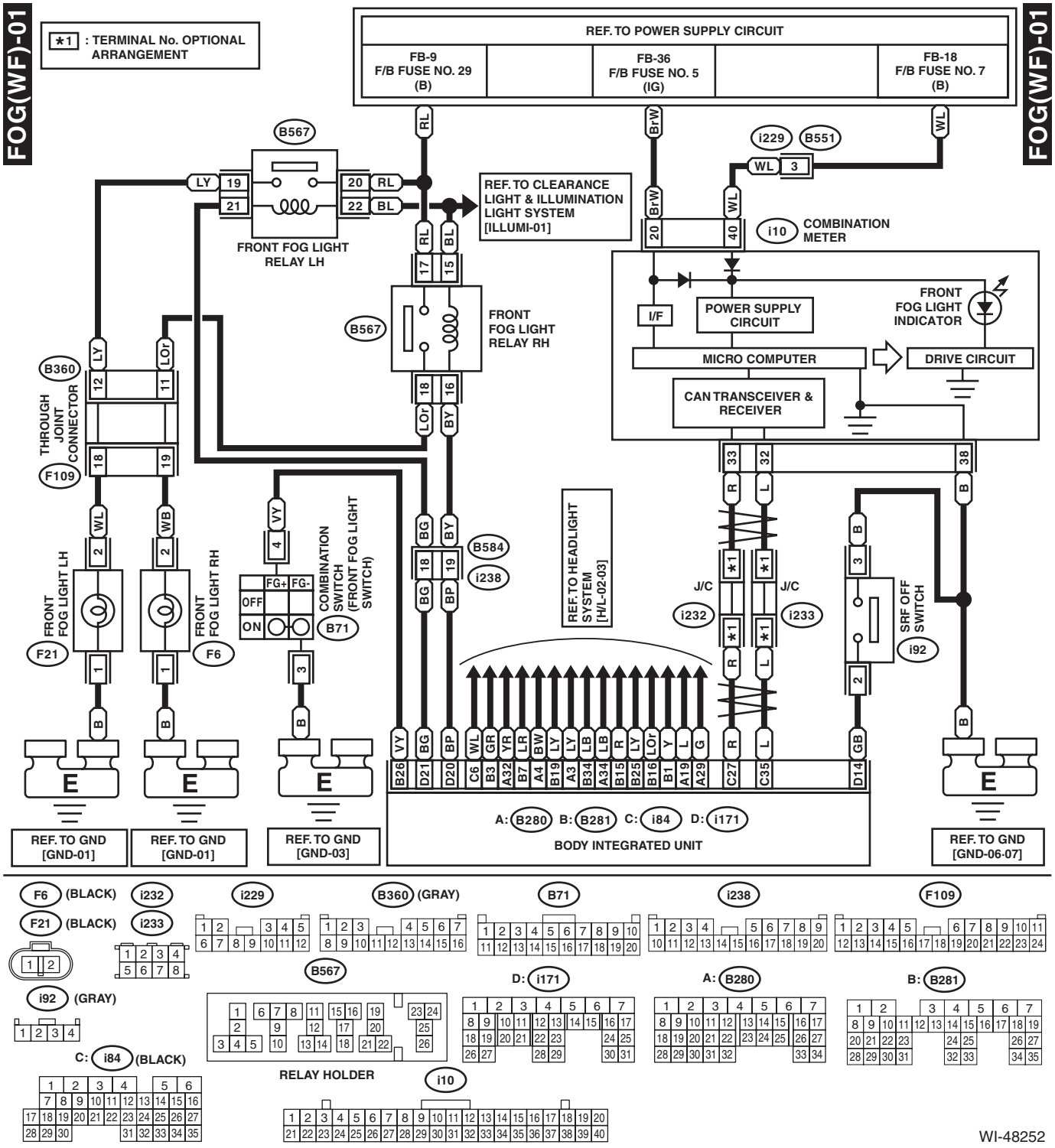
21.Front Fog Light System

A: WIRING DIAGRAM

1. WITHOUT SRF



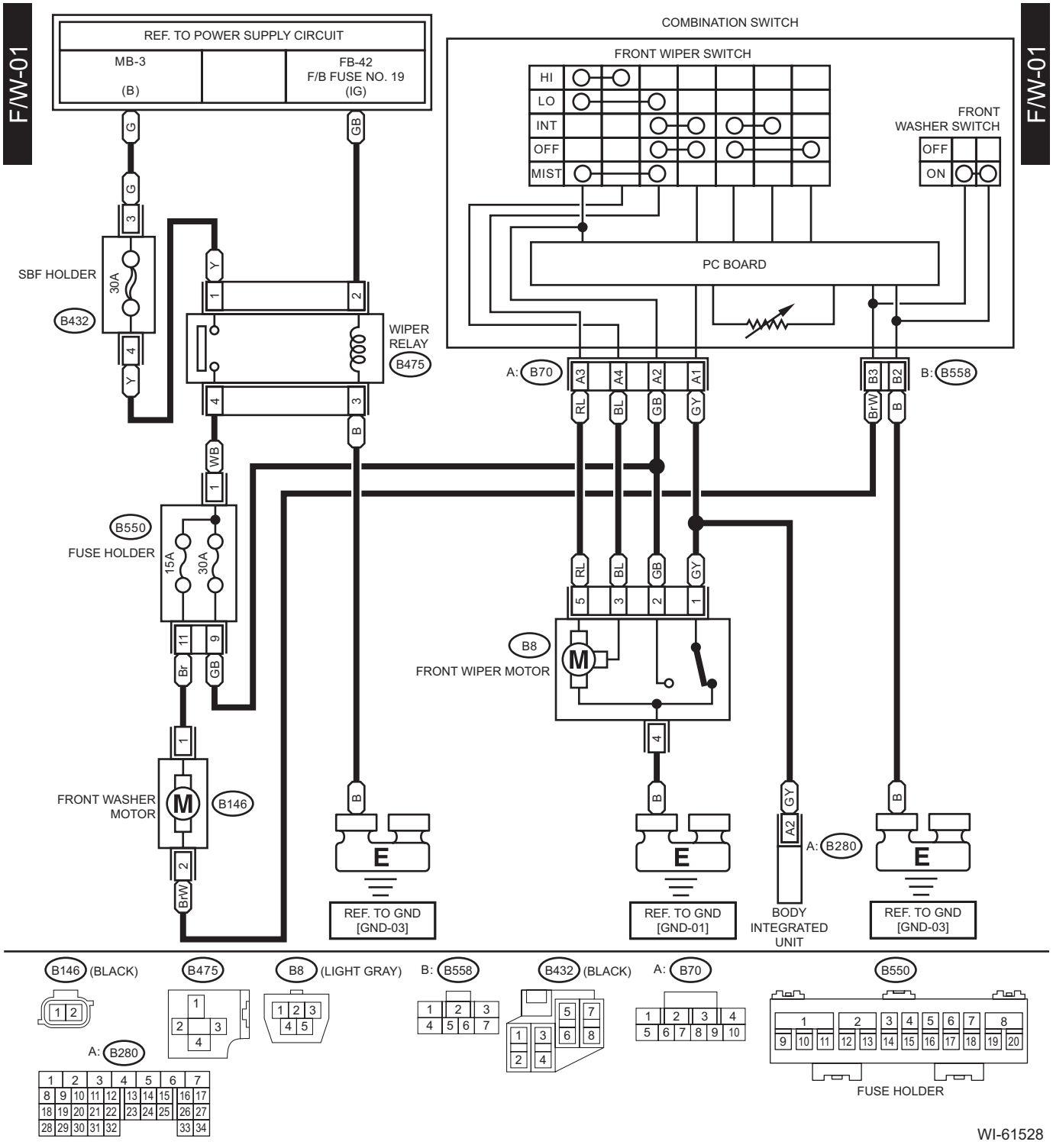
2. WITH SRF



WI-48252

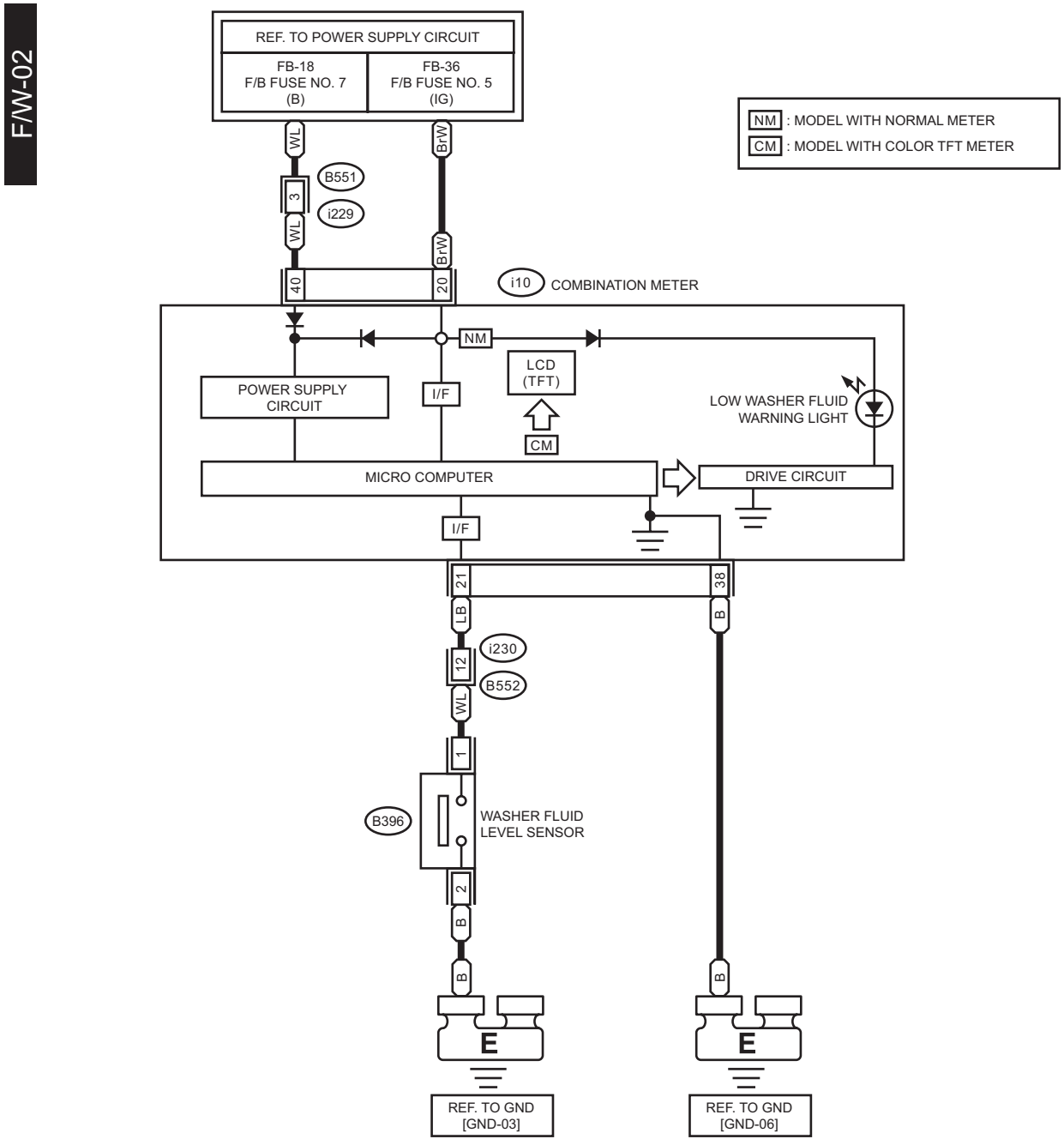
22.Front Wiper and Washer System

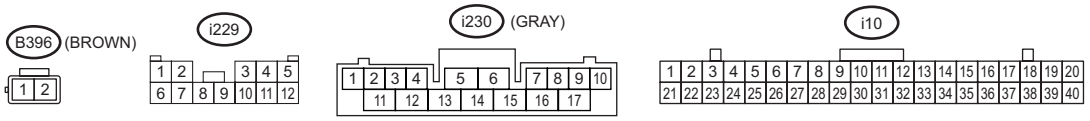
A: WIRING DIAGRAM



WIRING SYSTEM

F/W-02



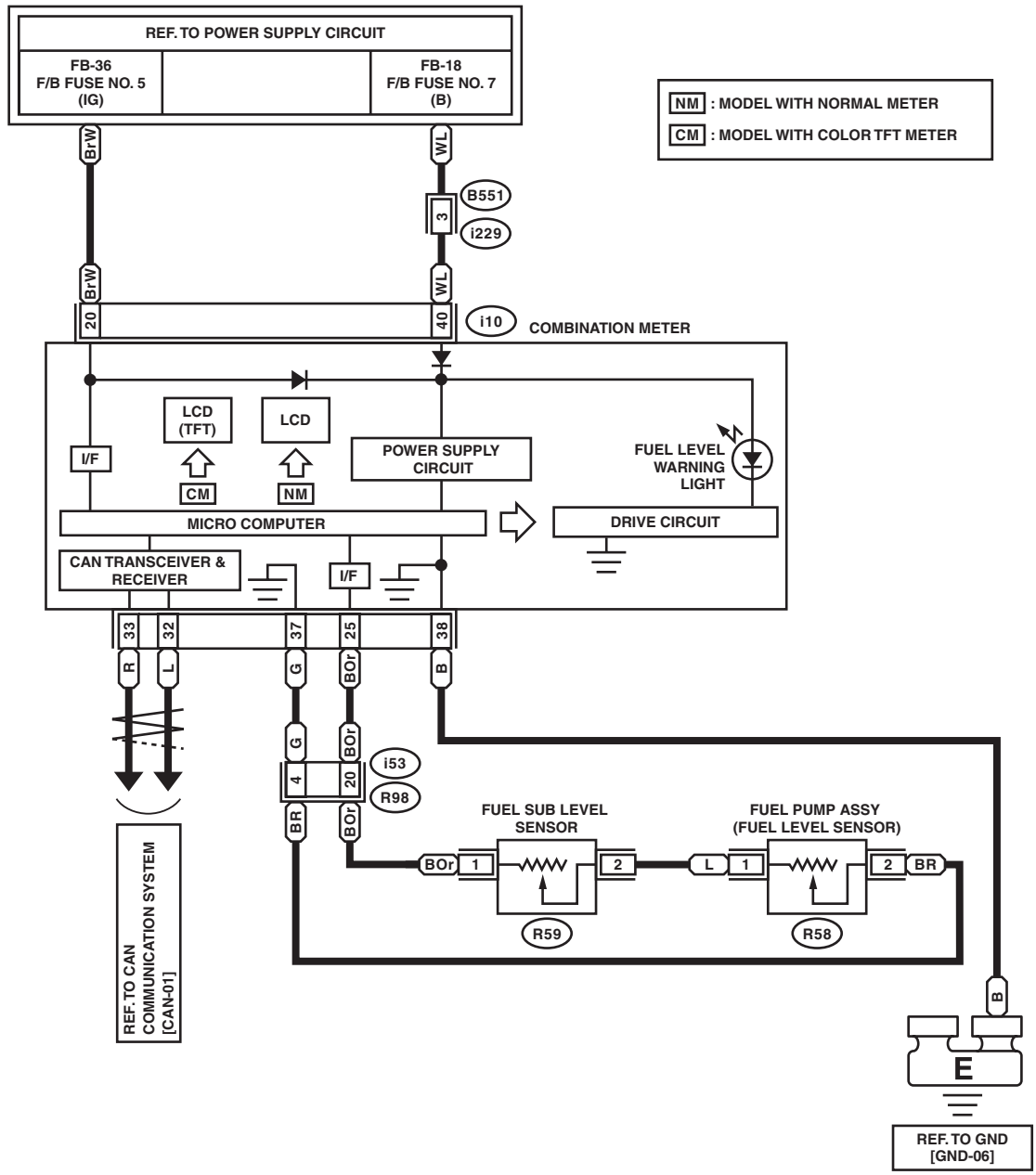


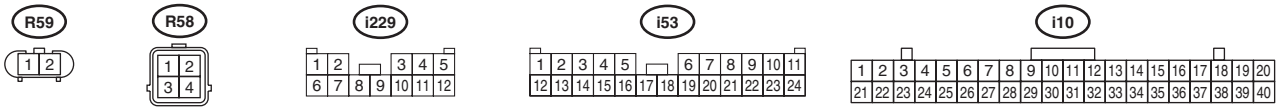
WI-61529

23.Fuel Gauge System

A: WIRING DIAGRAM

F/G-01

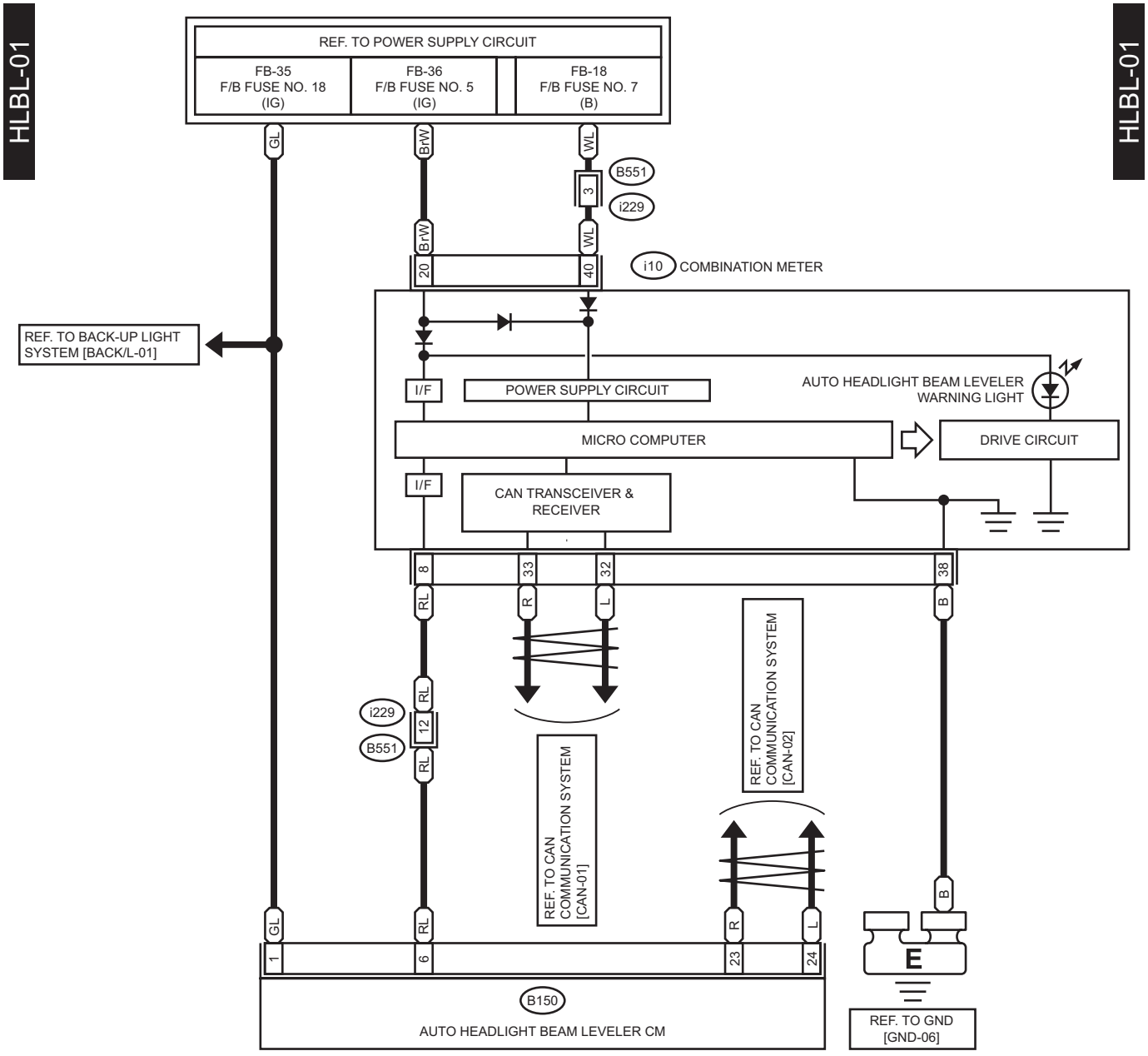


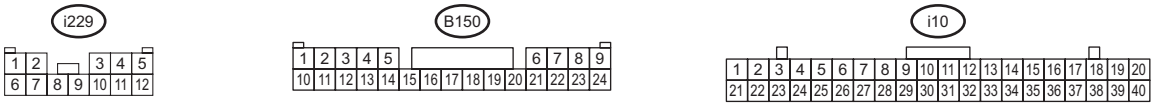


WI-48254

24.Headlight Beam Leveler System

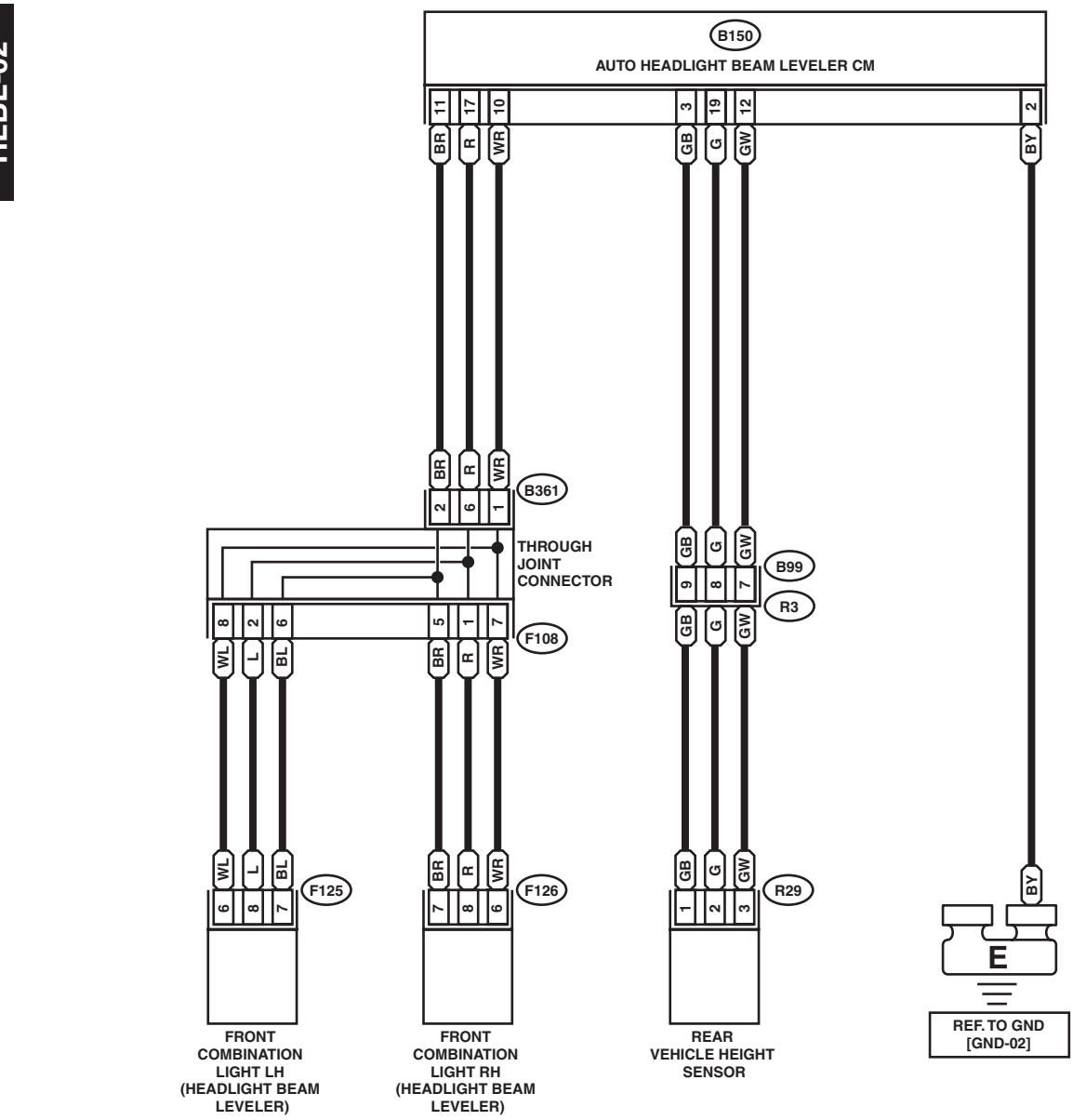
A: WIRING DIAGRAM

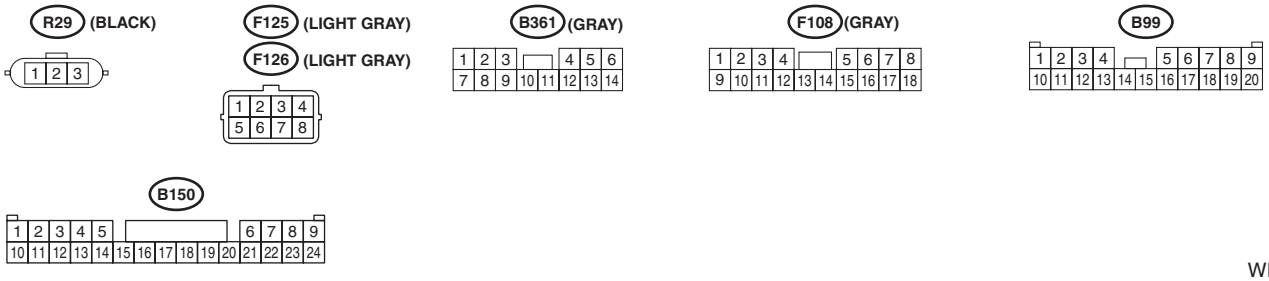




WI-61530

HLBL-02

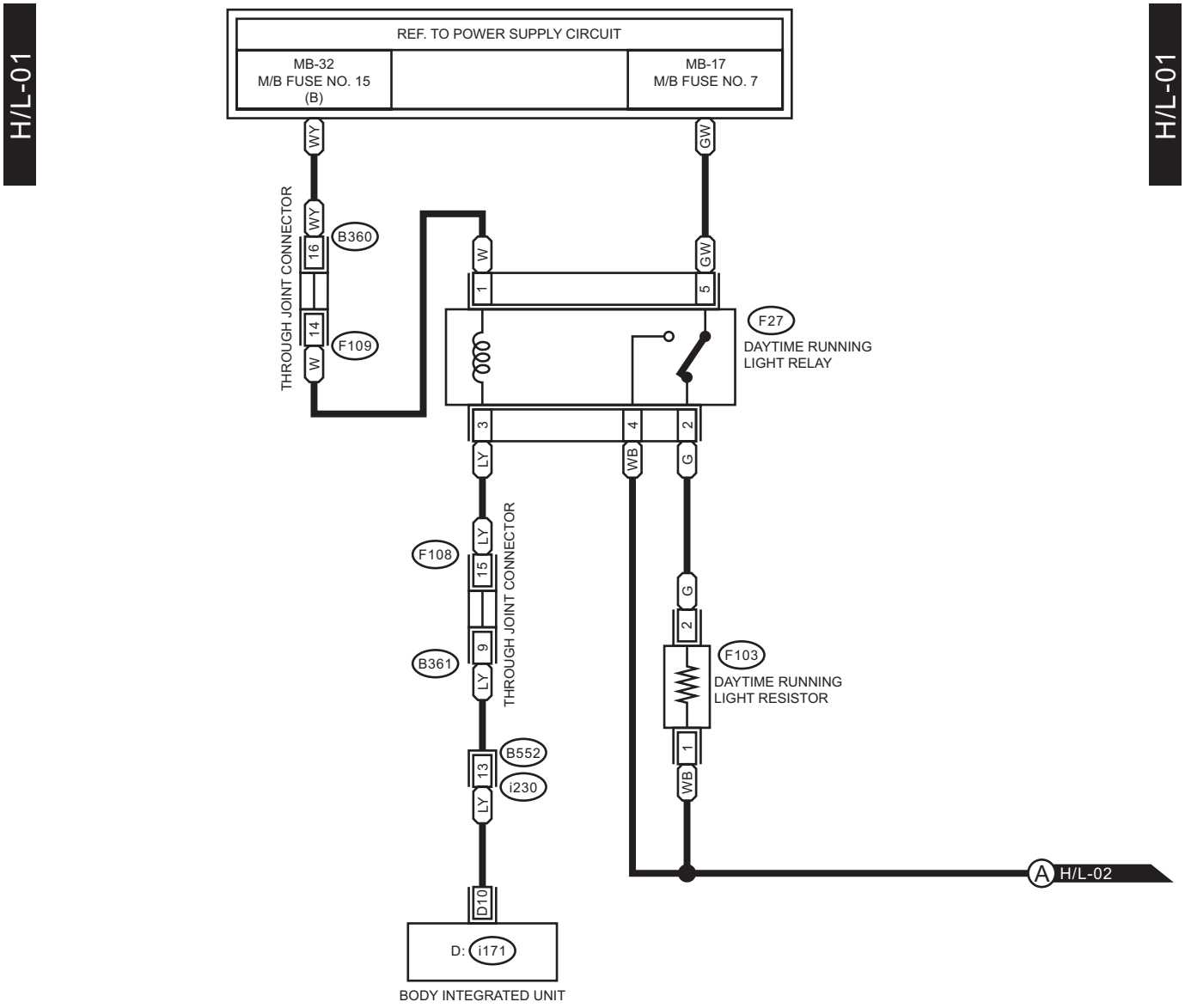


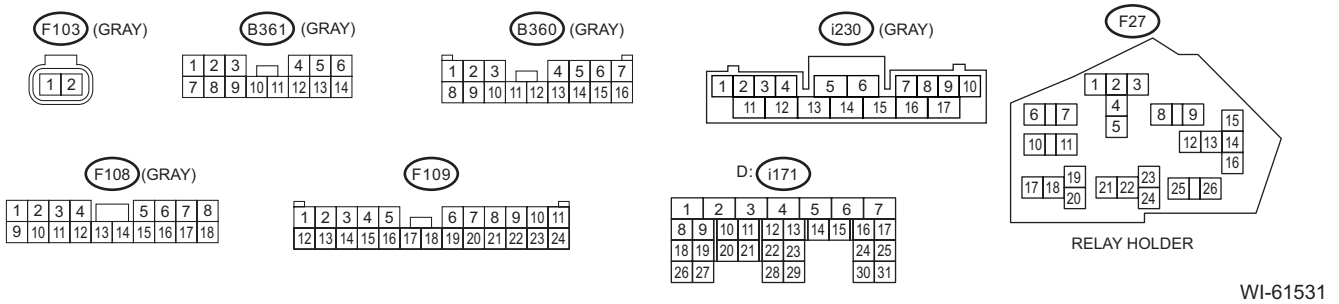


WI-37837

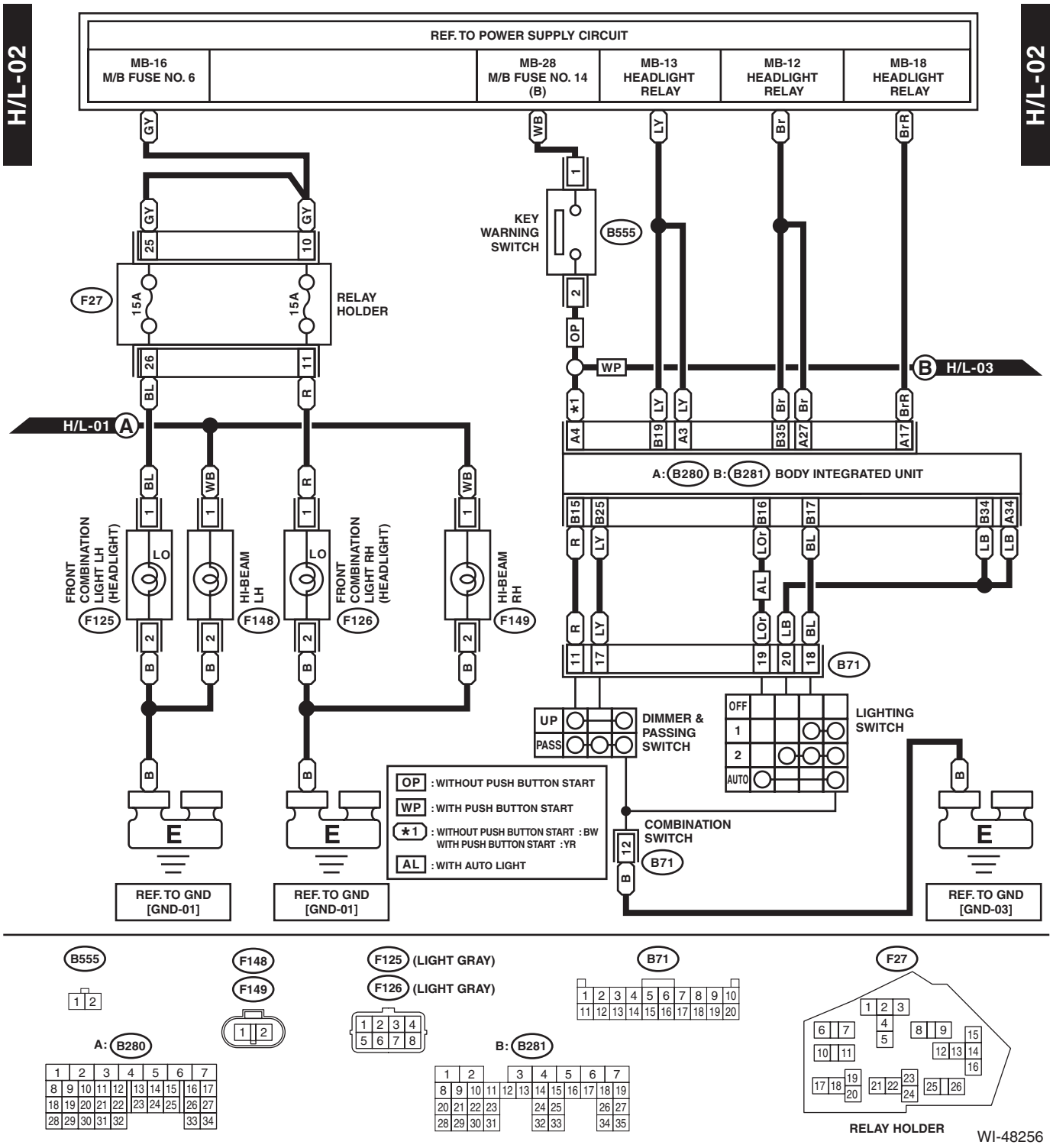
25.Headlight System

A: WIRING DIAGRAM



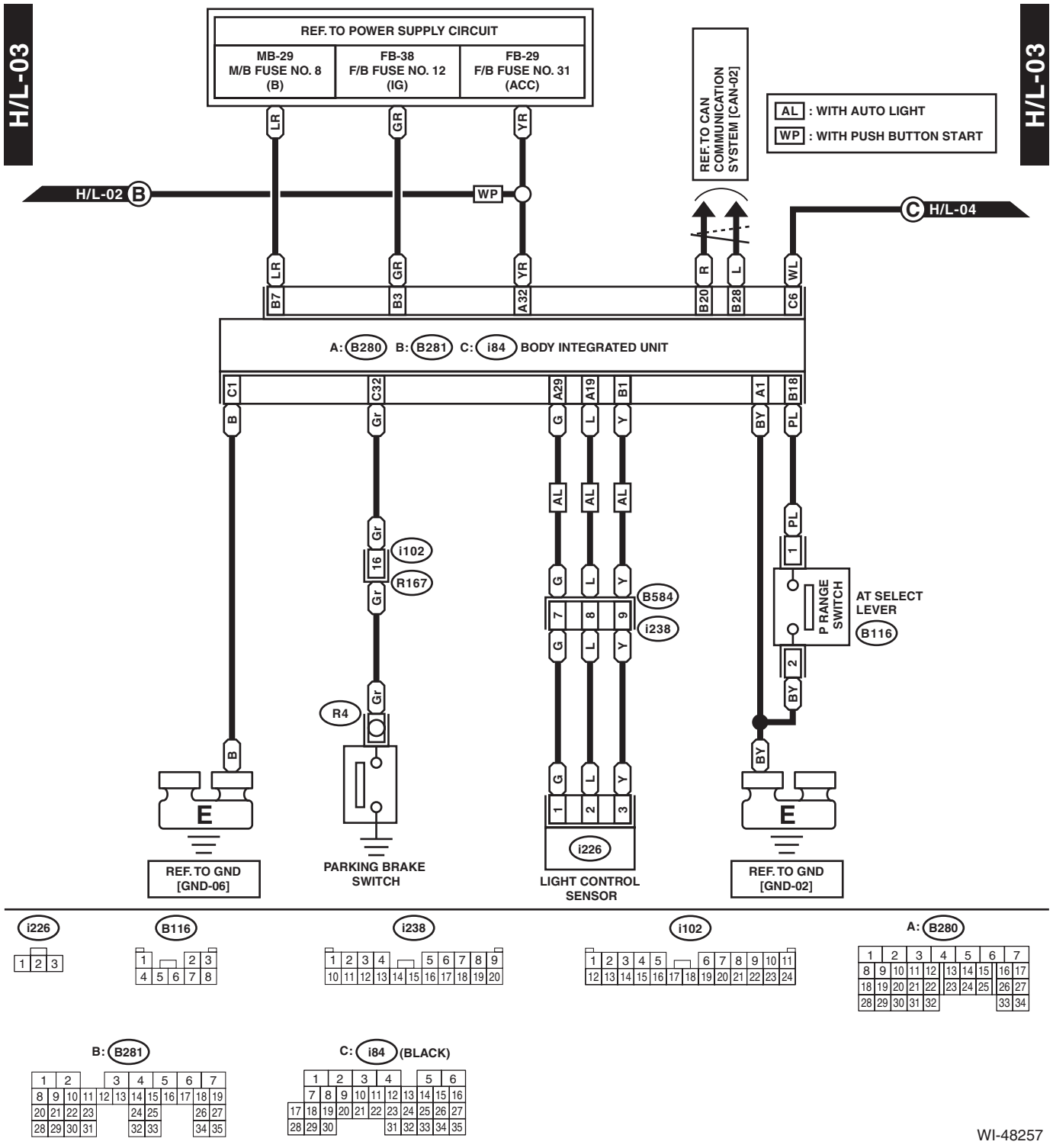


WI-61531

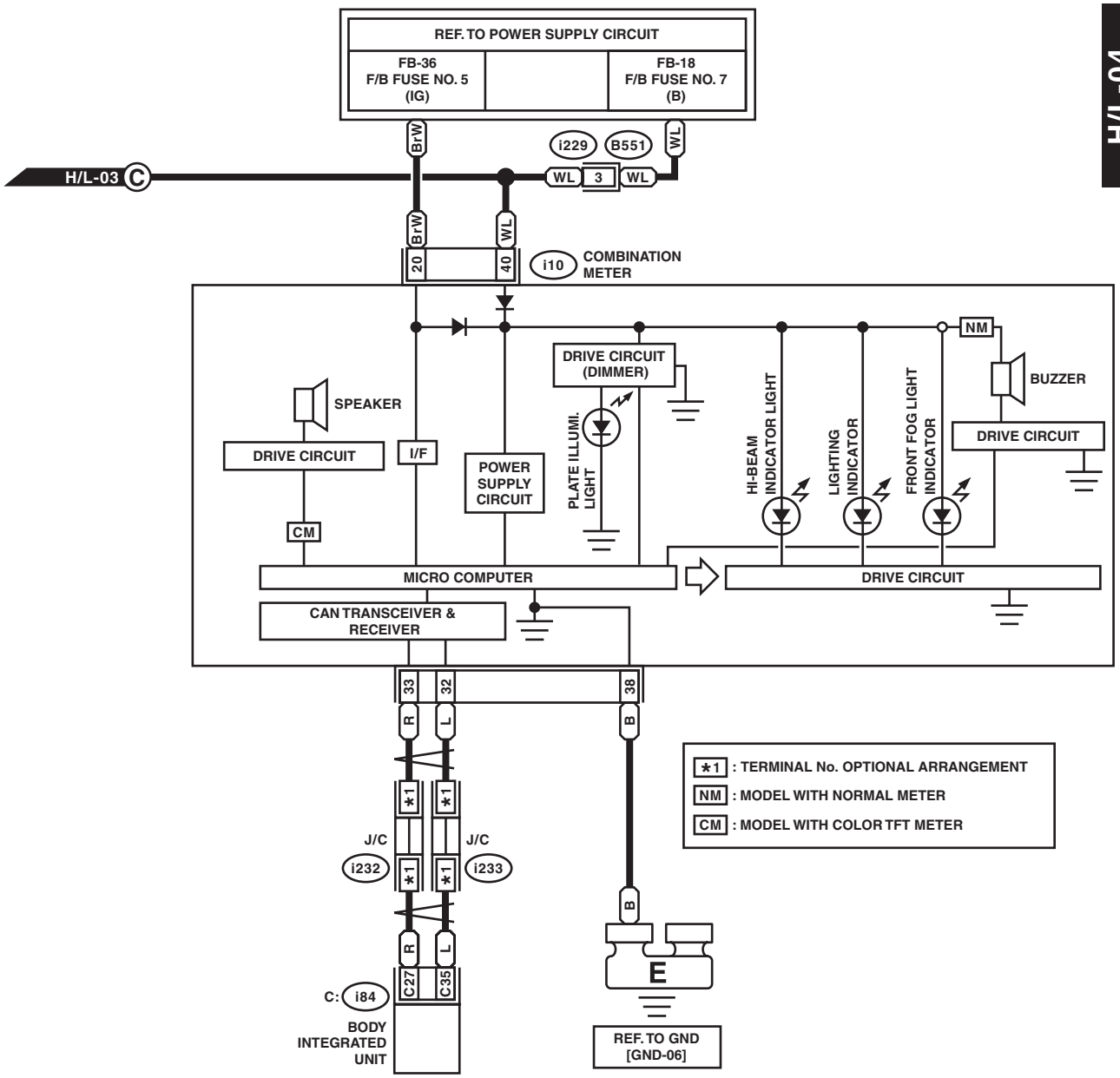

H/L-02
H/L-02
REF. TO POWER SUPPLY CIRCUIT
MB-16 M/B FUSE NO. 6
MB-28 M/B FUSE NO. 14 (B)
MB-13 HEADLIGHT RELAY
MB-12 HEADLIGHT RELAY
MB-18 HEADLIGHT RELAY
F27
15A
15A
RELAY HOLDER
KEY WARNING SWITCH
B555
OP
WP
B H/L-03
H/L-01 A
A: B280 B: B281 BODY INTEGRATED UNIT
FRONT COMBINATION LIGHT LH (HEADLIGHT)
F125
HI-BEAM LH
F148
FRONT COMBINATION LIGHT RH (HEADLIGHT)
F126
HI-BEAM RH
F149
LO
DIMMER & PASSING SWITCH
UP
PASS
LIGHTING SWITCH
OFF
1
2
AUTO
B71
COMBINATION SWITCH
OP : WITHOUT PUSH BUTTON START
WP : WITH PUSH BUTTON START
*1 : WITHOUT PUSH BUTTON START : BW
WITH PUSH BUTTON START : YR
AL : WITH AUTO LIGHT
REF. TO GND [GND-01]
REF. TO GND [GND-01]
REF. TO GND [GND-03]

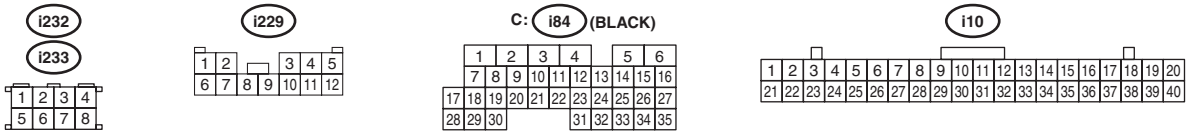
B555
F148
F149
F125 (LIGHT GRAY)
F126 (LIGHT GRAY)
B71
F27
A: B280
B: B281
RELAY HOLDER
WI-48256

WIRING SYSTEM



H/L-04

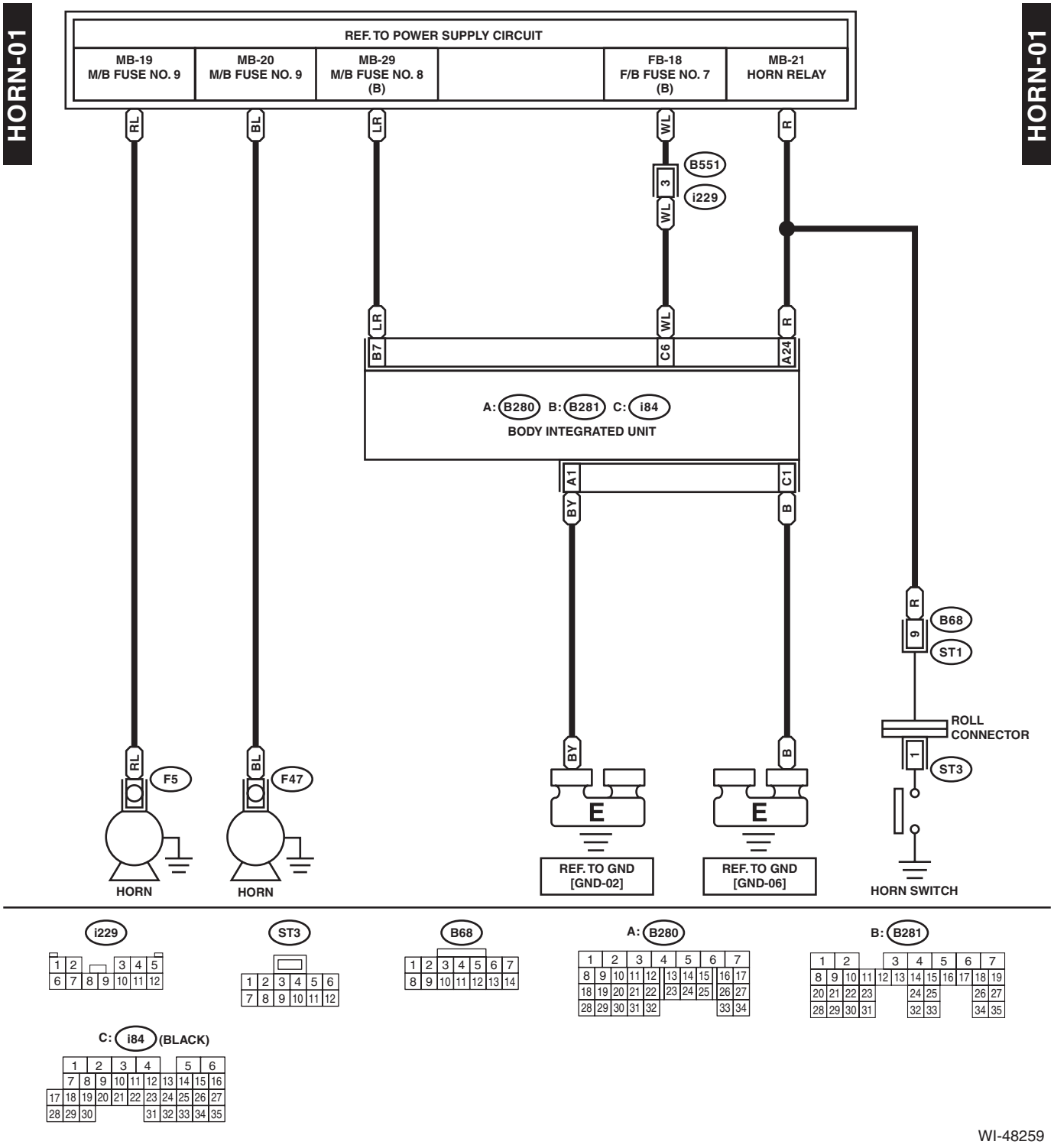




WI-48258

26.Horn System

A: WIRING DIAGRAM

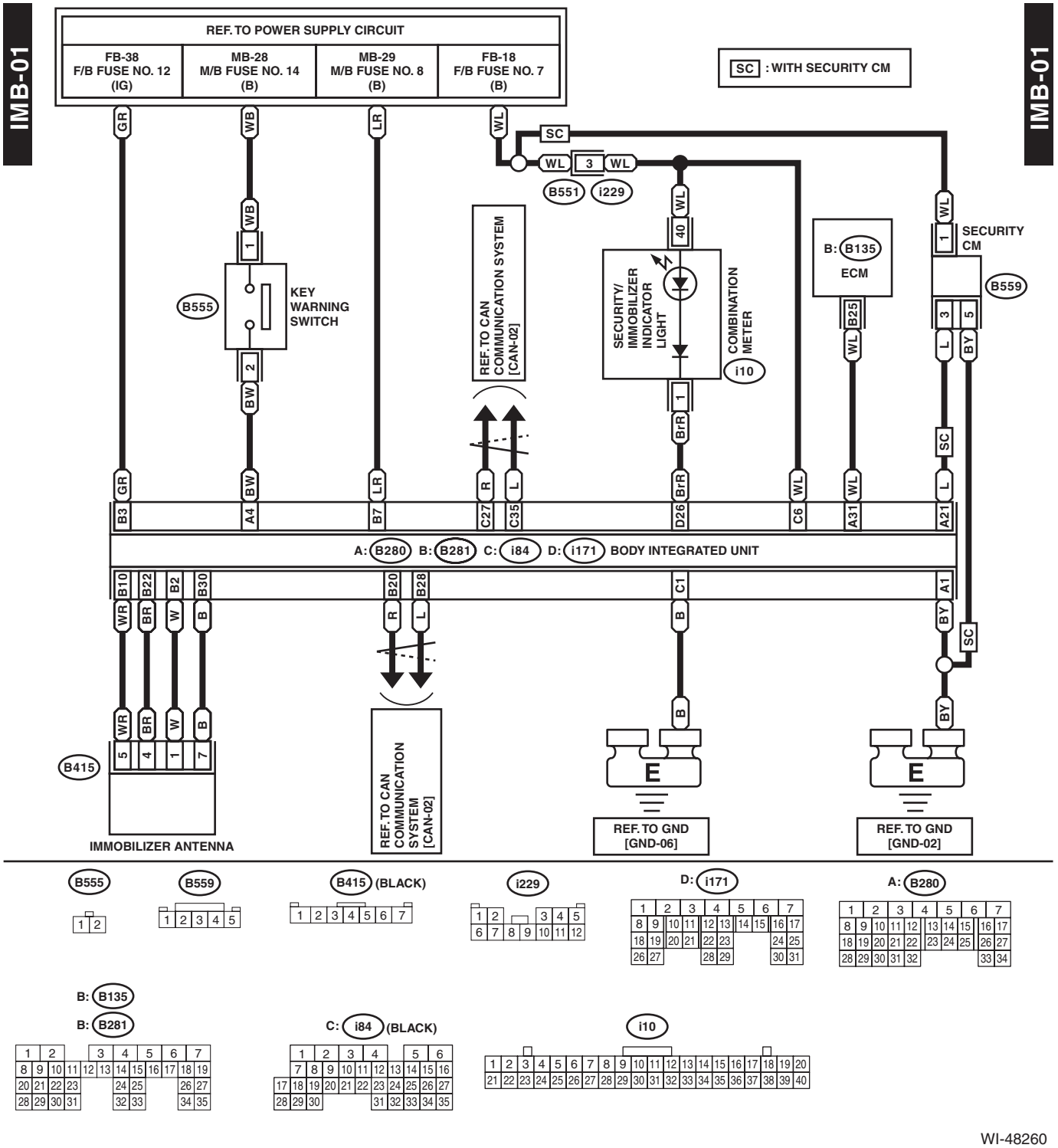


WI-48259

27.Immobilizer System

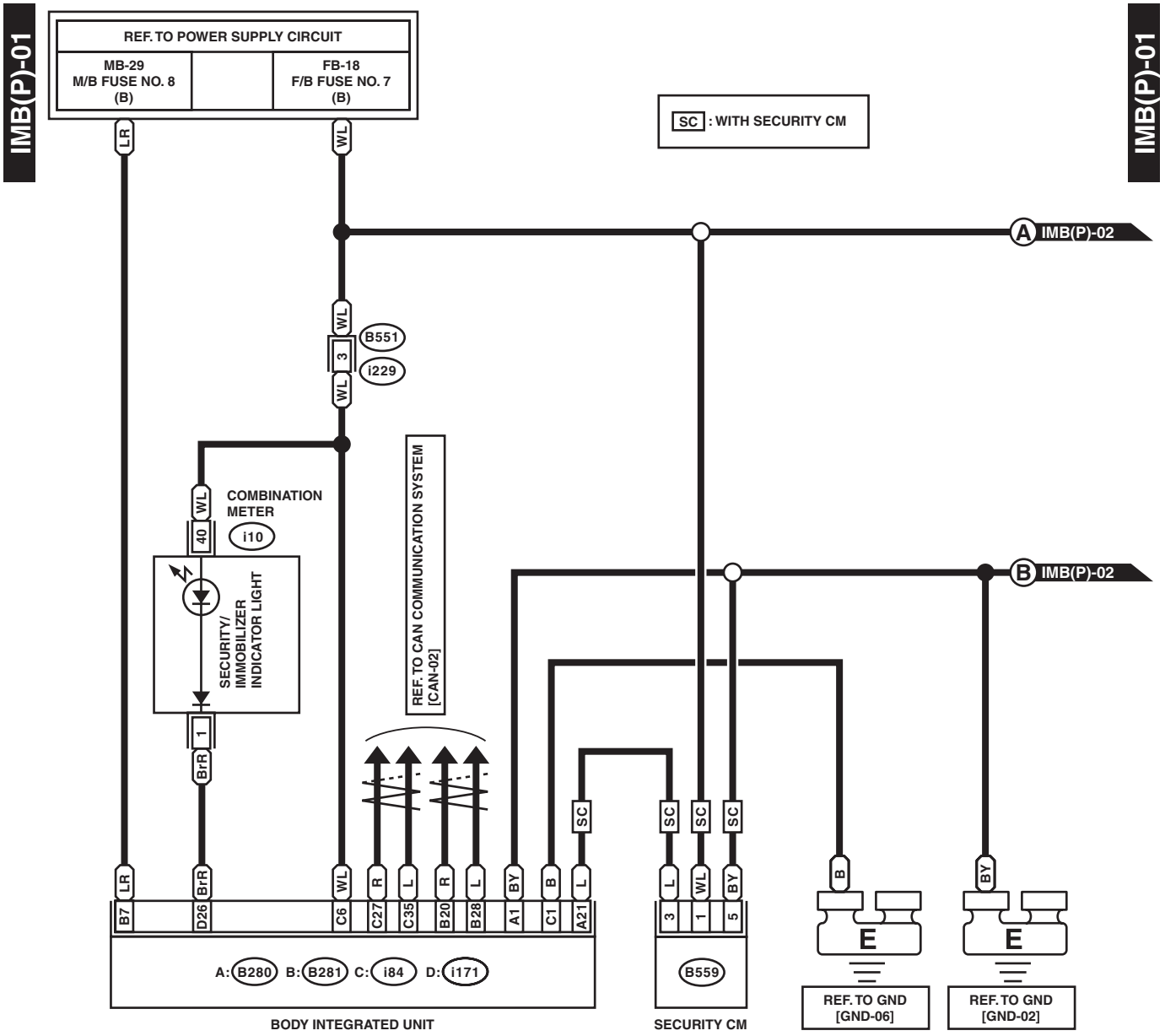
A: WIRING DIAGRAM

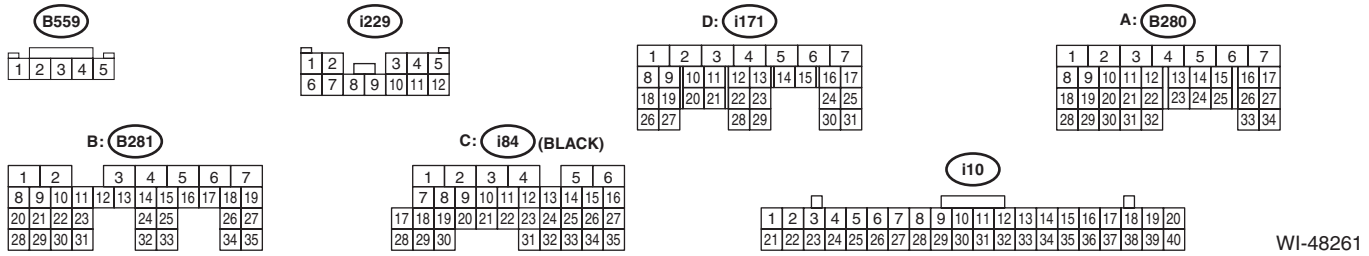
1. WITHOUT PUSH BUTTON START



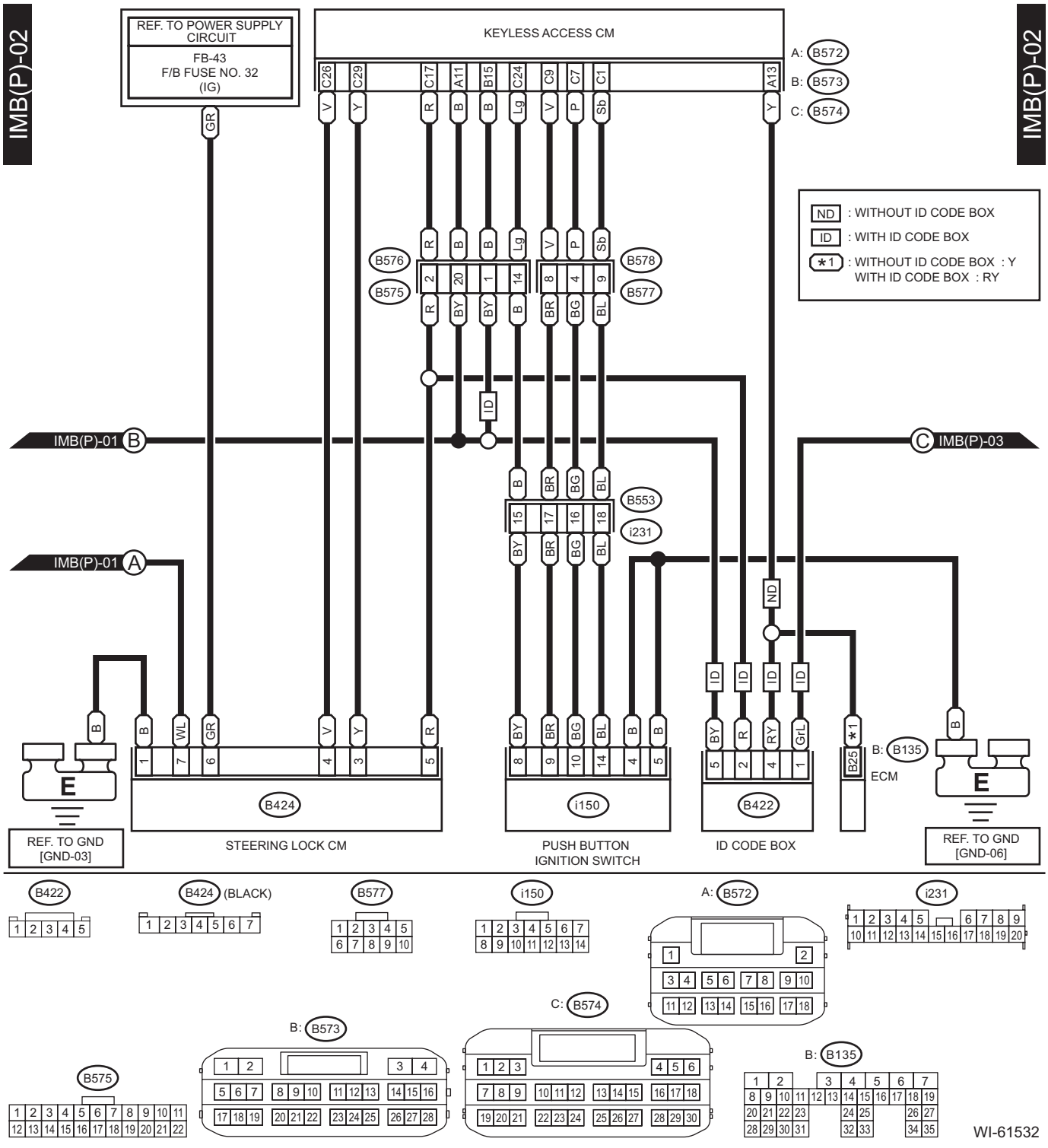
WI-48260

2. WITH PUSH BUTTON START

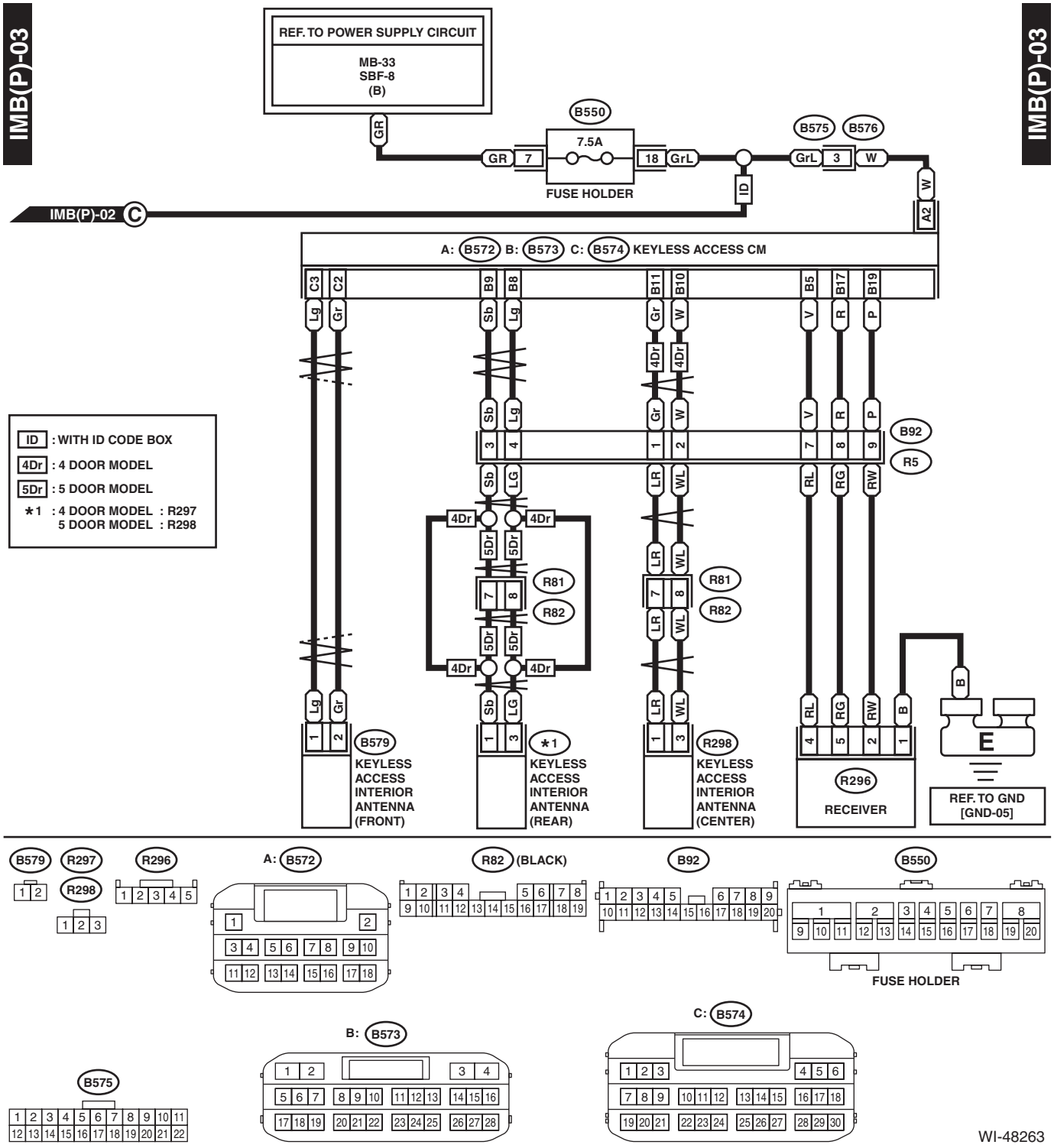




WI-48261


IMB(P)-02
REF. TO POWER SUPPLY CIRCUIT
FB-43
F/B FUSE NO. 32
(IG)
KEYLESS ACCESS CM
A: B572
B: B573
C: B574
ND : WITHOUT ID CODE BOX
ID : WITH ID CODE BOX
*1 : WITHOUT ID CODE BOX : Y
WITH ID CODE BOX : RY
B576
B575
B578
B577
ID
IMB(P)-01 B
IMB(P)-03 C
B553
i231
IMB(P)-01 A
B424
STEERING LOCK CM
i150
PUSH BUTTON IGNITION SWITCH
B422
ID CODE BOX
B: B135
ECM
REF. TO GND [GND-03]
REF. TO GND [GND-06]
B424 (BLACK)
B577
i231
B575
B573
C: B574
B135
WI-61532

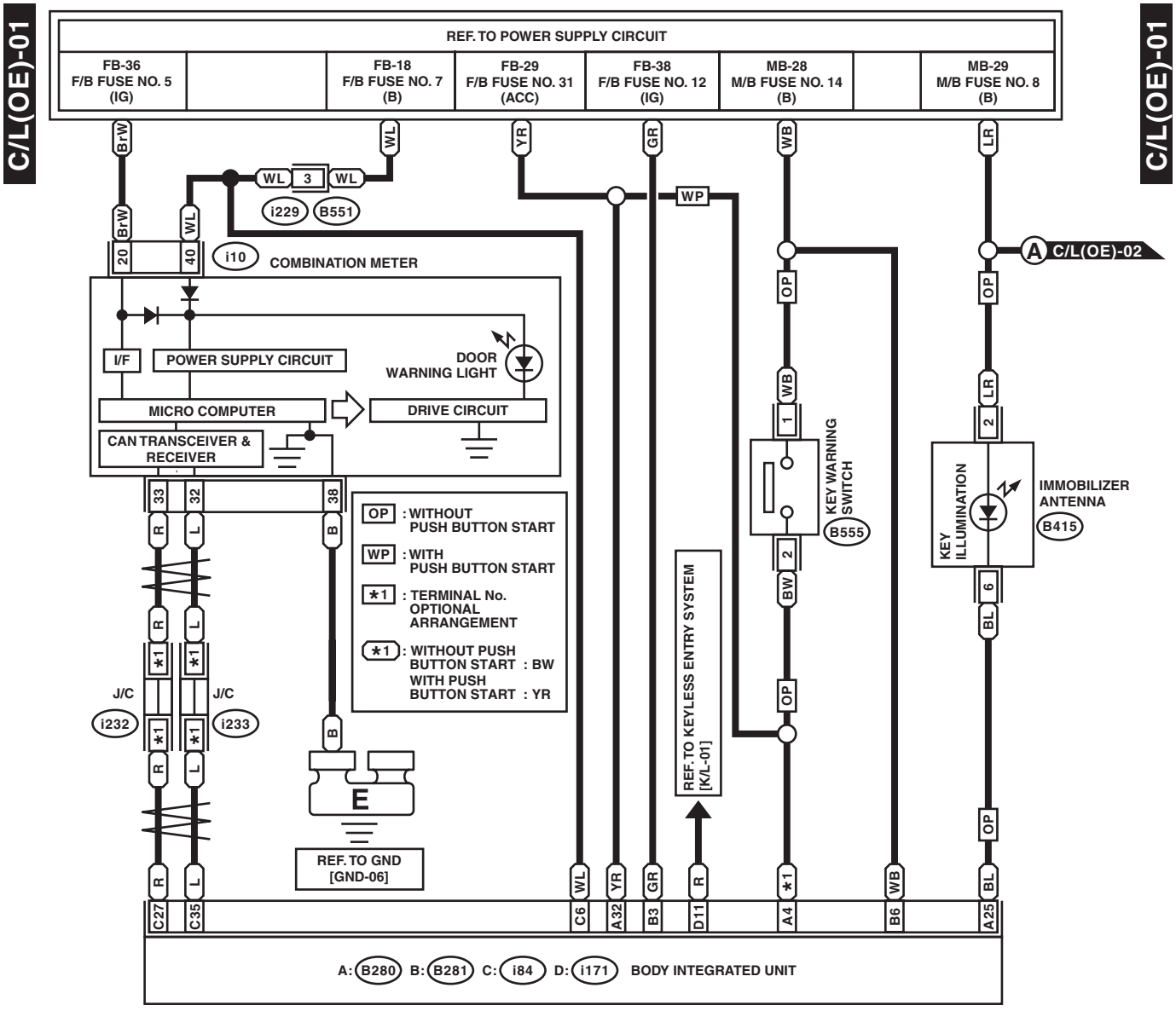
WIRING SYSTEM

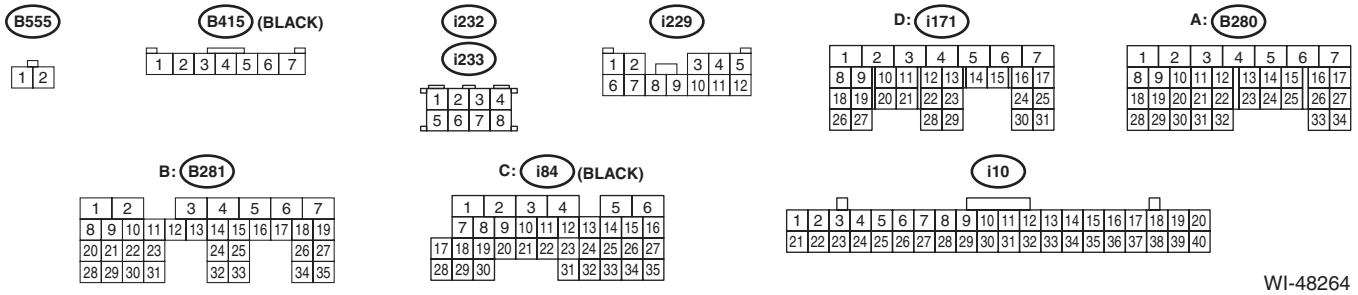


28.Interior Light System

A: WIRING DIAGRAM

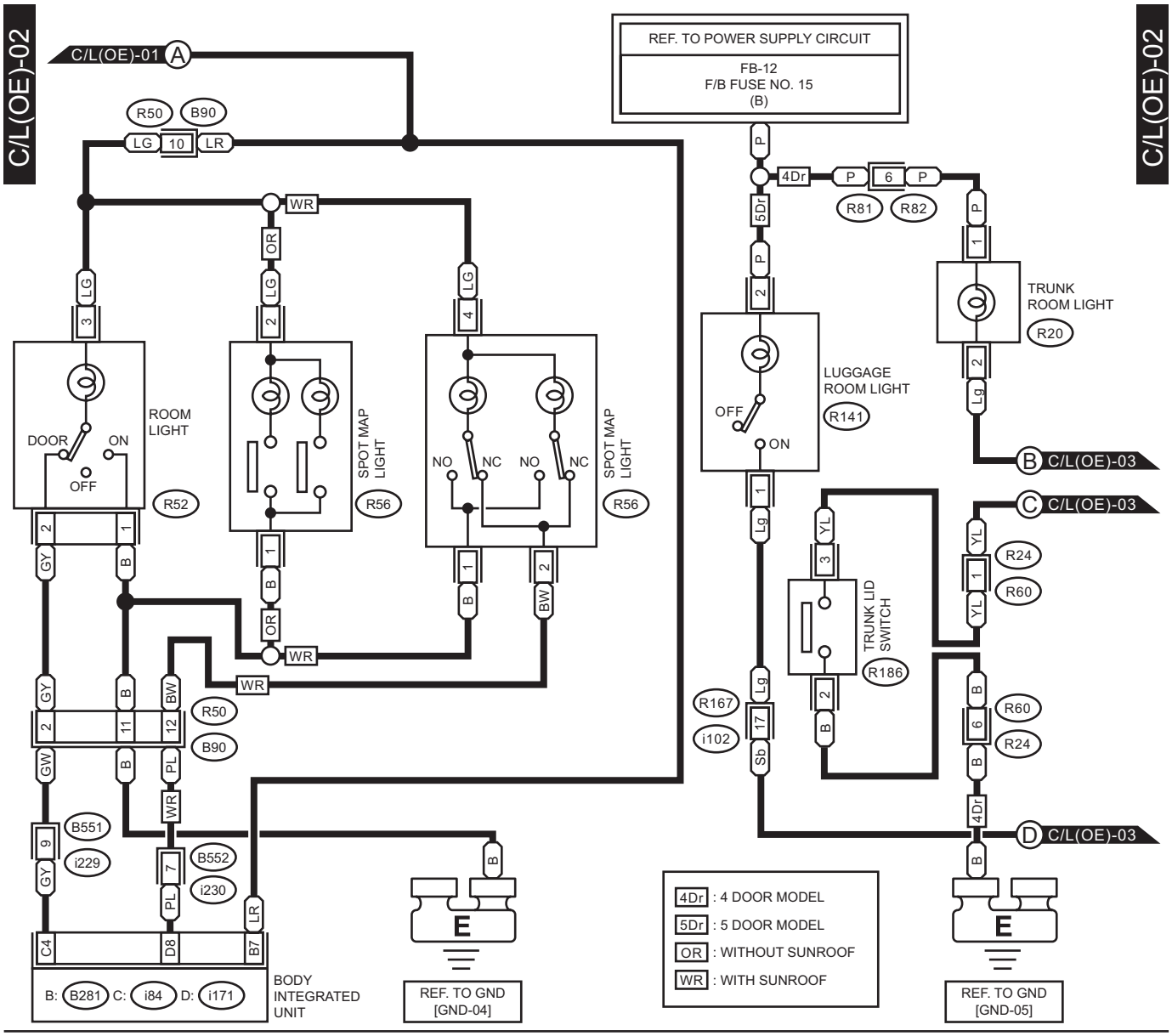
1. WITHOUT EyeSight

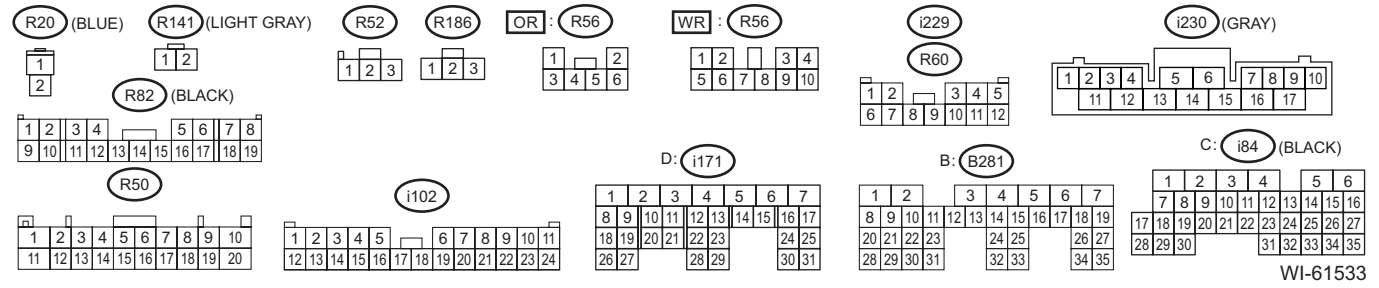


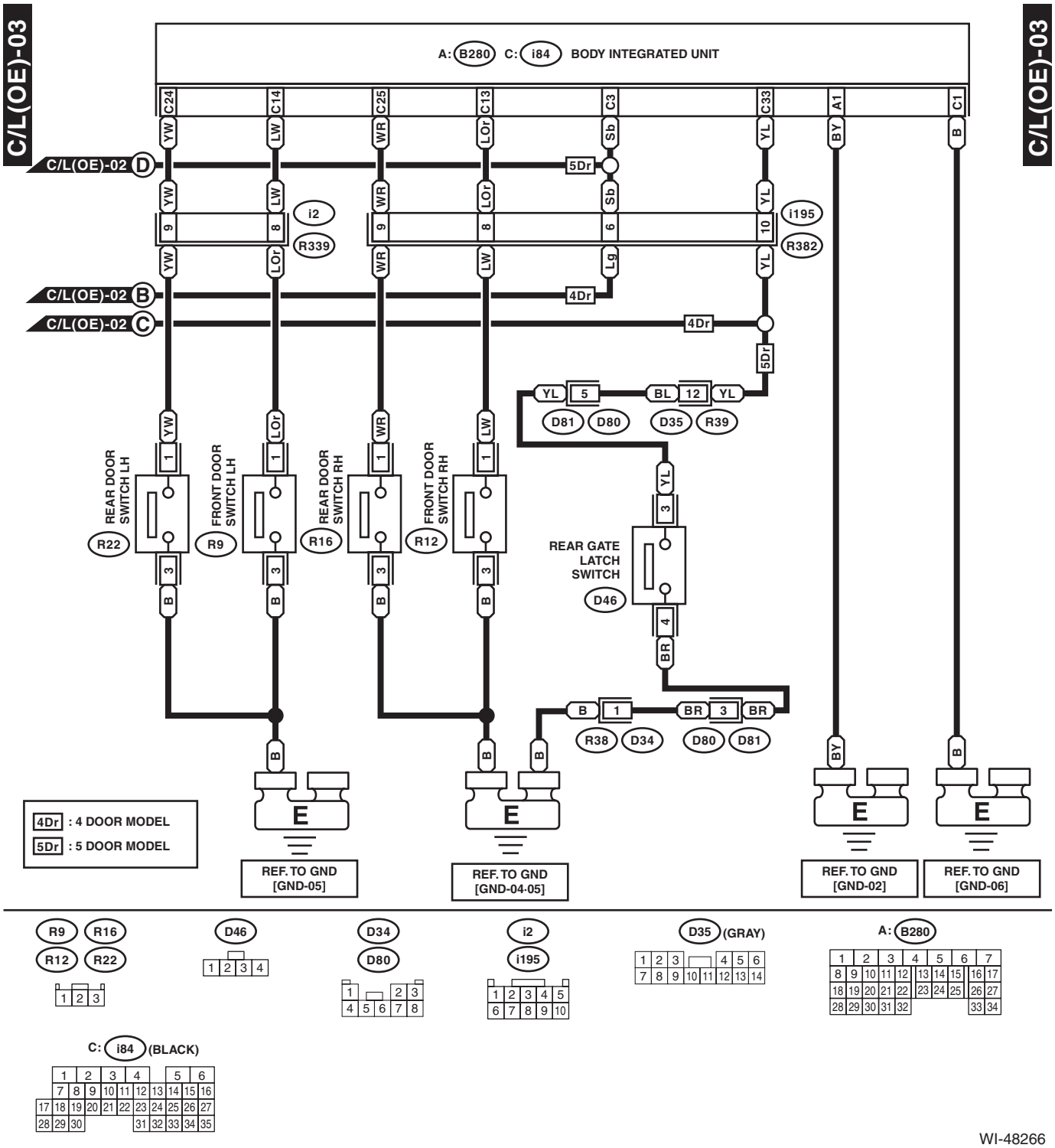


WI-48264

WIRING SYSTEM

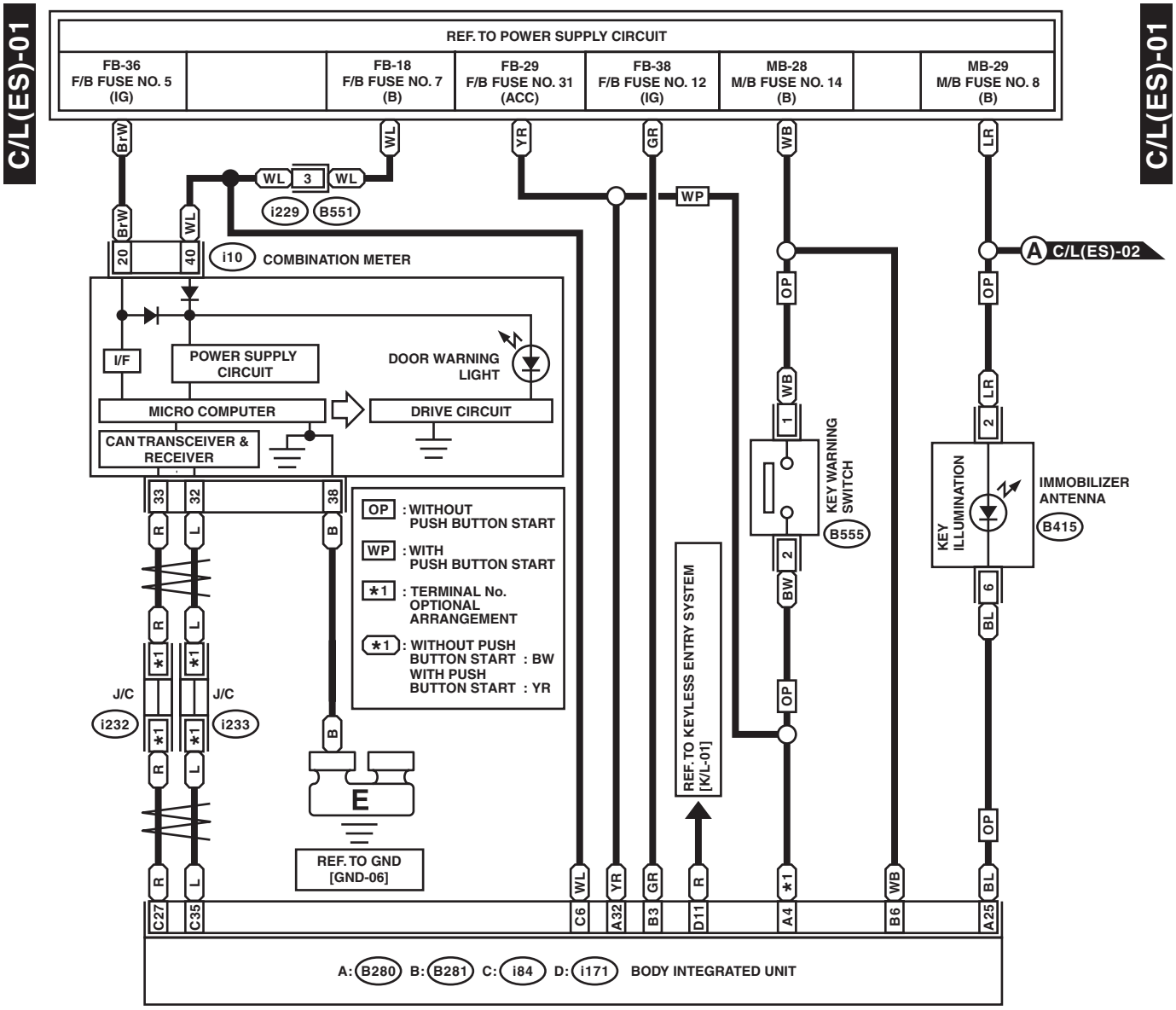


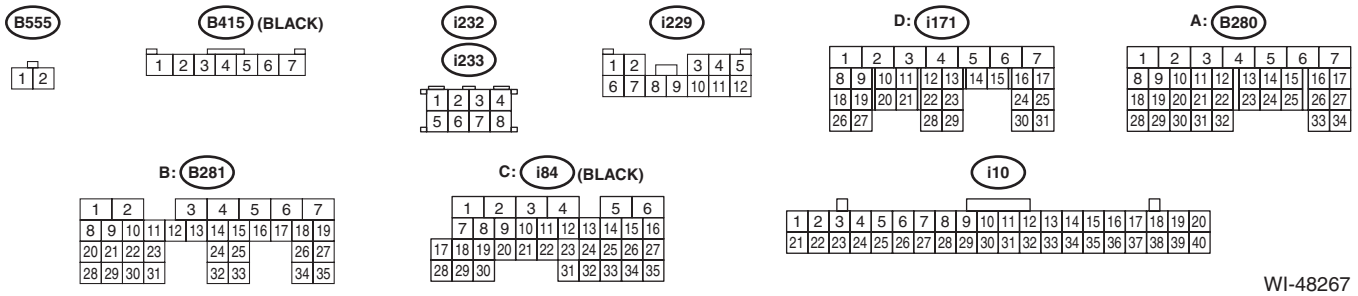



C/L(OE)-03
C/L(OE)-03
A: B280 C: i84 BODY INTEGRATED UNIT
C24
C14
C25
C13
C3
C33
A1
C1
YW
LW
WR
LOr
Sb
YL
BY
B
C/L(OE)-02 D
5Dr
i2
R339
i195
R382
C/L(OE)-02 B
4Dr
Lg
C/L(OE)-02 C
4Dr
5Dr
YL
5
BL
12
YL
D81
D80
D35
R39
REAR DOOR SWITCH LH
R22
FRONT DOOR SWITCH LH
R9
REAR DOOR SWITCH RH
R16
FRONT DOOR SWITCH RH
R12
REAR GATE LATCH SWITCH
D46
BR
B
1
BR
3
BR
R38
D34
D80
D81
E
REF. TO GND [GND-05]
REF. TO GND [GND-04·05]
REF. TO GND [GND-02]
REF. TO GND [GND-06]
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
R9
R16
R12
R22
D46
D34
D80
i2
i195
D35 (GRAY)
A: B280
C: i84 (BLACK)

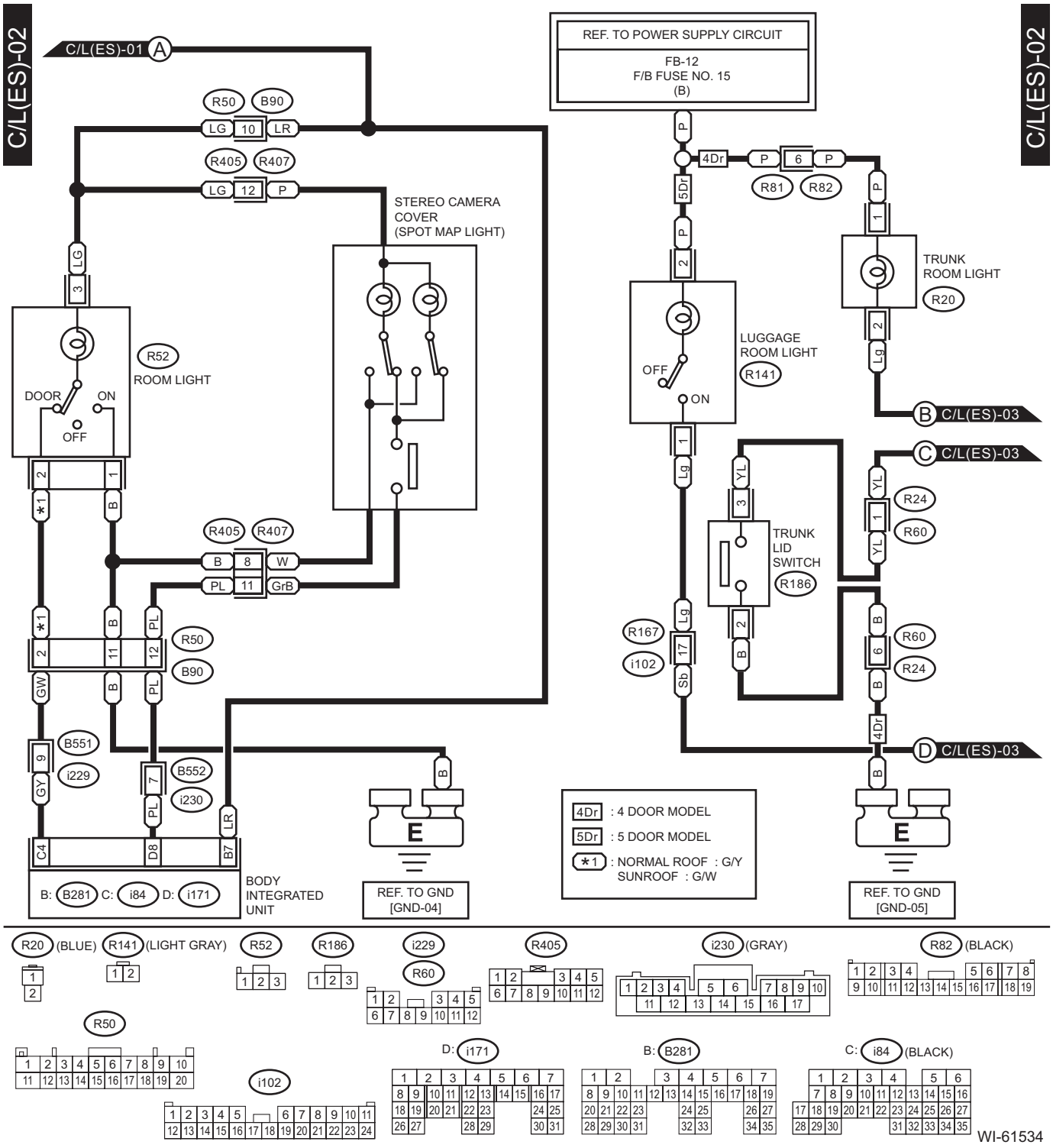
WI-48266

2. WITH EyeSight

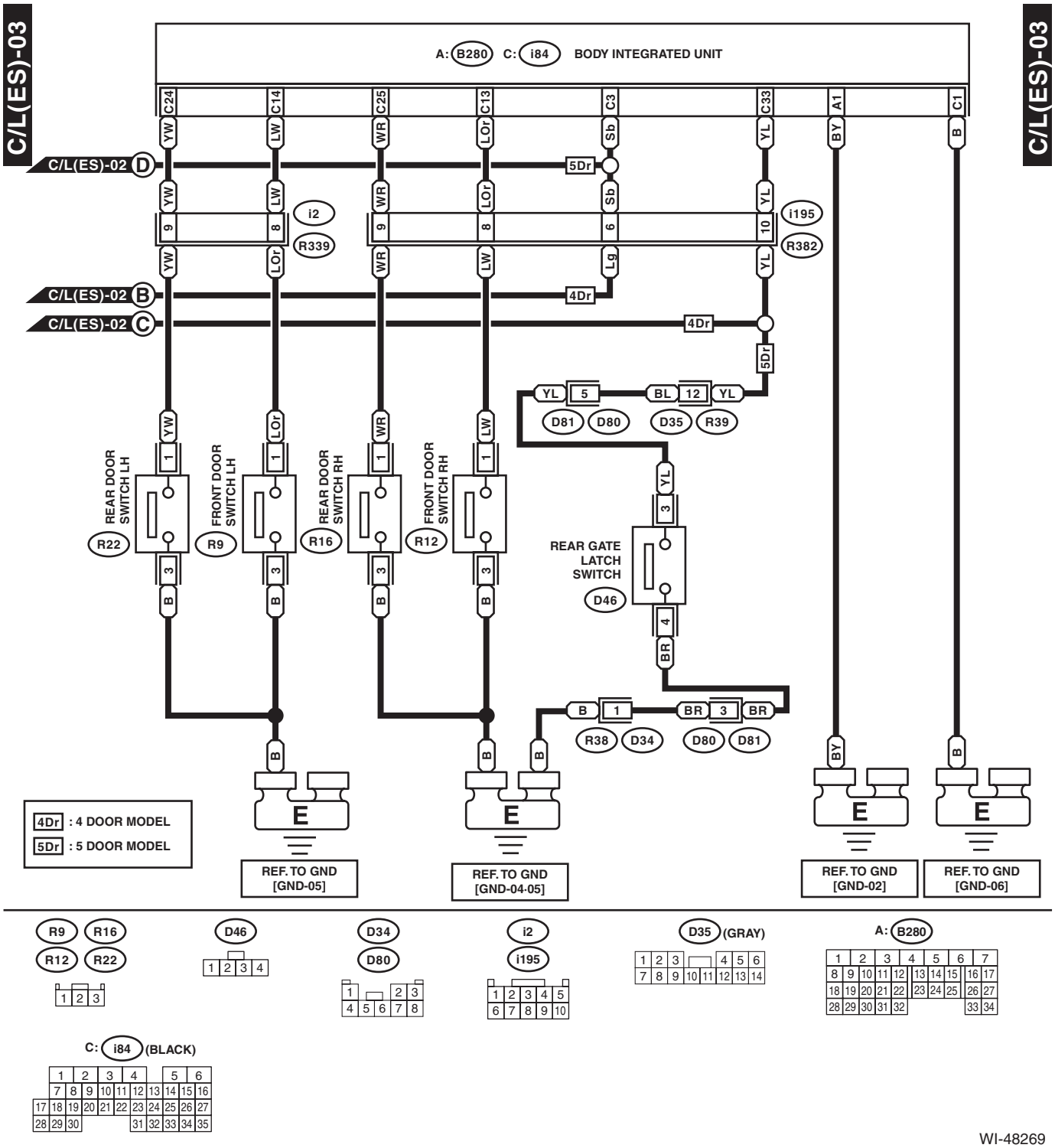




WI-48267


C/L(ES)-02
C/L(ES)-01 A
C/L(ES)-02
REF. TO POWER SUPPLY CIRCUIT
FB-12
F/B FUSE NO. 15
(B)
R50
B90
LG
10
LR
R405
R407
LG
12
P
STEREO CAMERA
COVER
(SPOT MAP LIGHT)
LG
3
R52
ROOM LIGHT
DOOR
ON
OFF
2
1
*1
B
R405
R407
B
8
W
PL
11
GrB
*1
B
PL
2
11
12
R50
B90
GW
B
PL
B551
9
i229
GY
B552
7
i230
PL
LR
C4
D8
B7
B: B281 C: i84 D: i171
BODY
INTEGRATED
UNIT
B
E
REF. TO GND
[GND-04]
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
*1 : NORMAL ROOF : G/Y
SUNROOF : G/W
P
4Dr
P
6
P
R81
R82
5Dr
P
2
P
1
TRUNK
ROOM LIGHT
R20
2
Lg
B C/L(ES)-03
LUGGAGE
ROOM LIGHT
R141
OFF
ON
1
Lg
C C/L(ES)-03
YL
3
TRUNK
LID
SWITCH
R186
YL
1
YL
R24
R60
R167
i102
Lg
17
Sb
2
B
B
6
B
R60
R24
4Dr
D C/L(ES)-03
B
E
REF. TO GND
[GND-05]

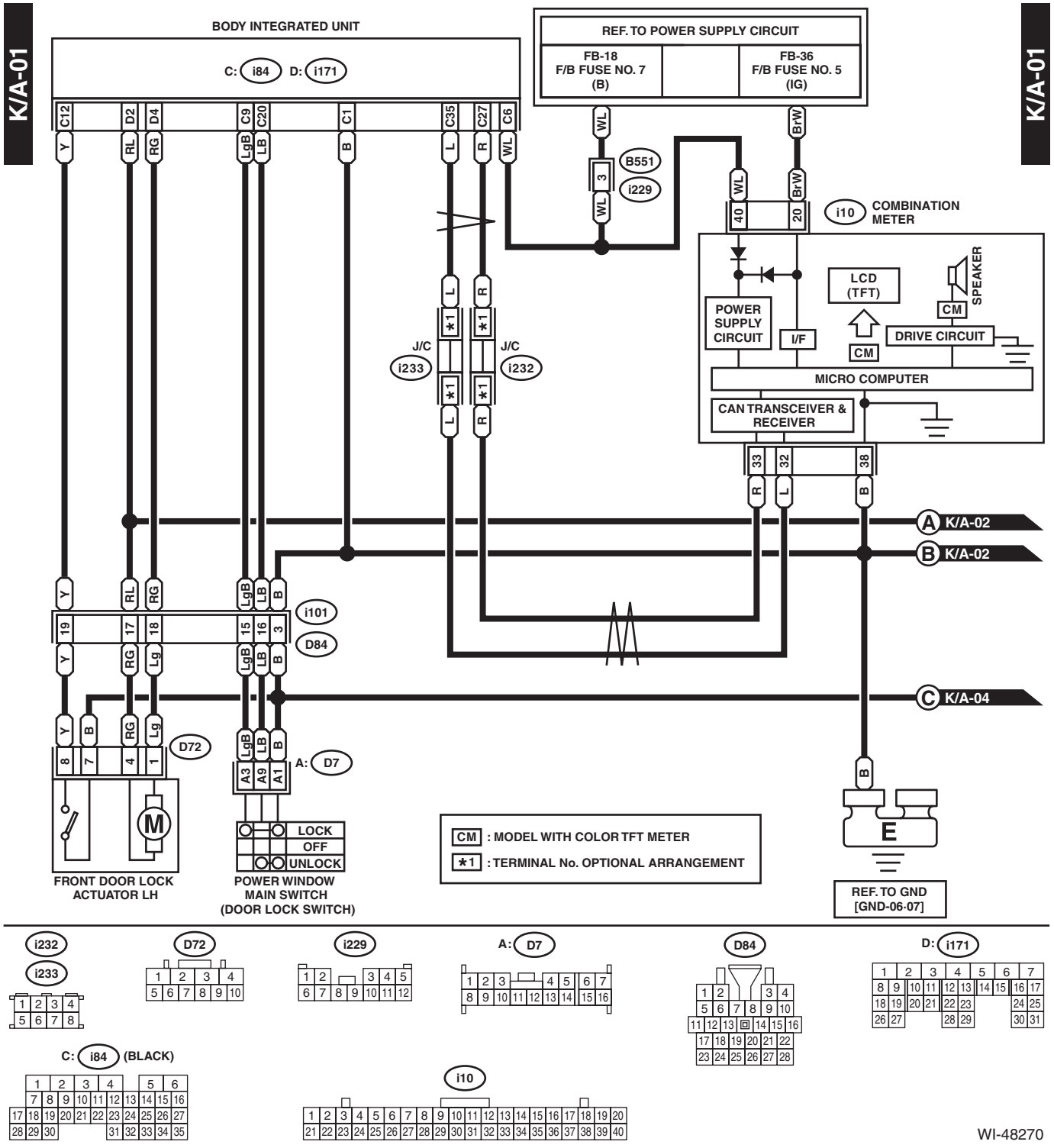
R20 (BLUE)
R141 (LIGHT GRAY)
R52
R186
i229
R60
R405
i230 (GRAY)
R82 (BLACK)
R50
i102
D: i171
B: B281
C: i84 (BLACK)
WI-61534


C/L(ES)-03
C/L(ES)-03
A: B280 C: i84 BODY INTEGRATED UNIT
C24
C14
C25
C13
C3
C33
A1
C1
YW
LW
WR
LOr
Sb
YL
BY
B
C/L(ES)-02 D
5Dr
i2
R339
i195
R382
C/L(ES)-02 B
4Dr
Lg
C/L(ES)-02 C
4Dr
5Dr
YL
5
BL
12
YL
D81
D80
D35
R39
REAR DOOR SWITCH LH
FRONT DOOR SWITCH LH
REAR DOOR SWITCH RH
FRONT DOOR SWITCH RH
R22
R9
R16
R12
REAR GATE LATCH SWITCH
D46
BR
B
1
3
R38
D34
D80
D81
E
REF. TO GND [GND-05]
REF. TO GND [GND-04·05]
REF. TO GND [GND-02]
REF. TO GND [GND-06]
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
R9 R16 R12 R22
D46
D34 D80
i2 i195
D35 (GRAY)
A: B280
C: i84 (BLACK)

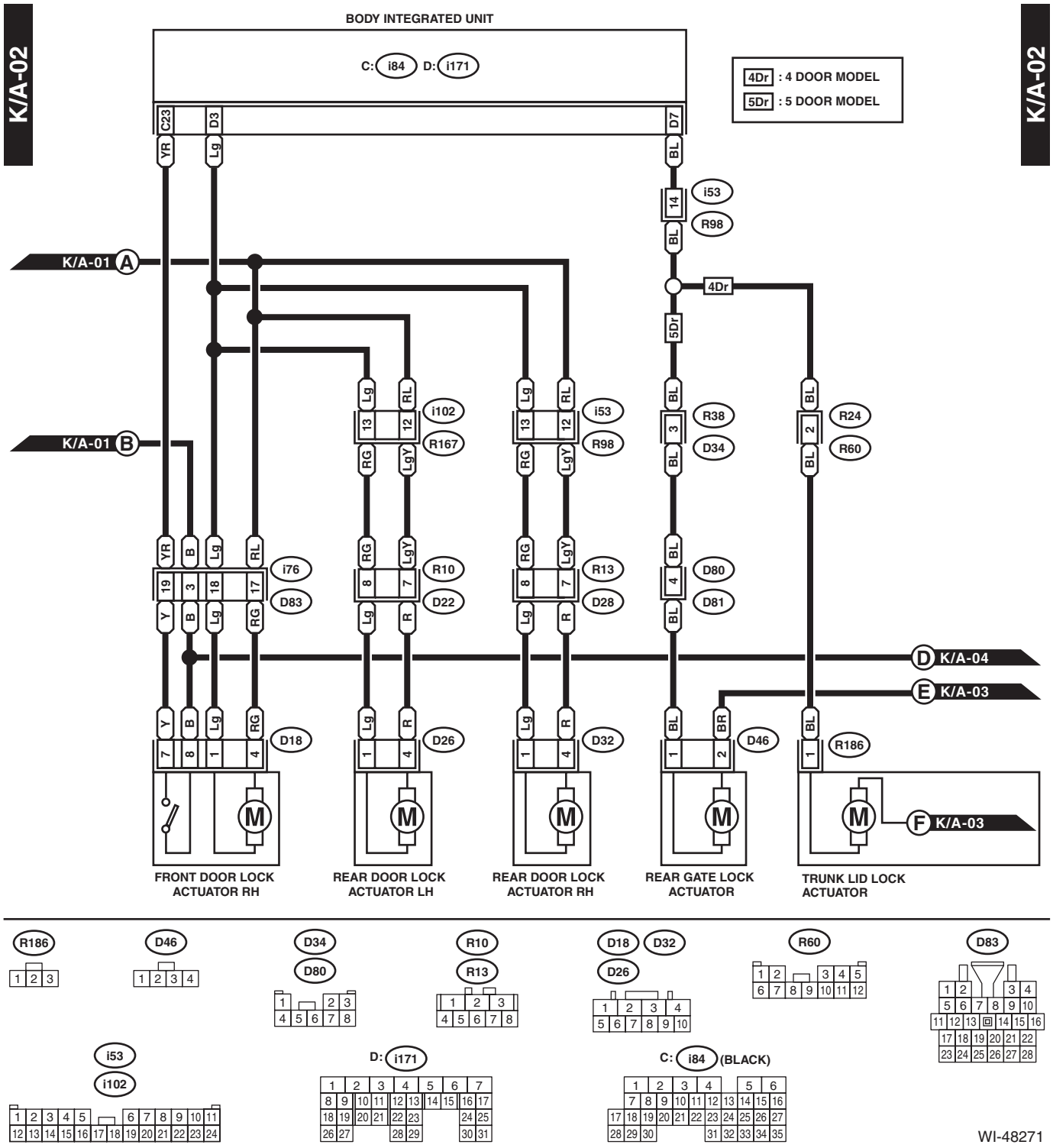
WI-48269

29.Keyless Access System

A: WIRING DIAGRAM

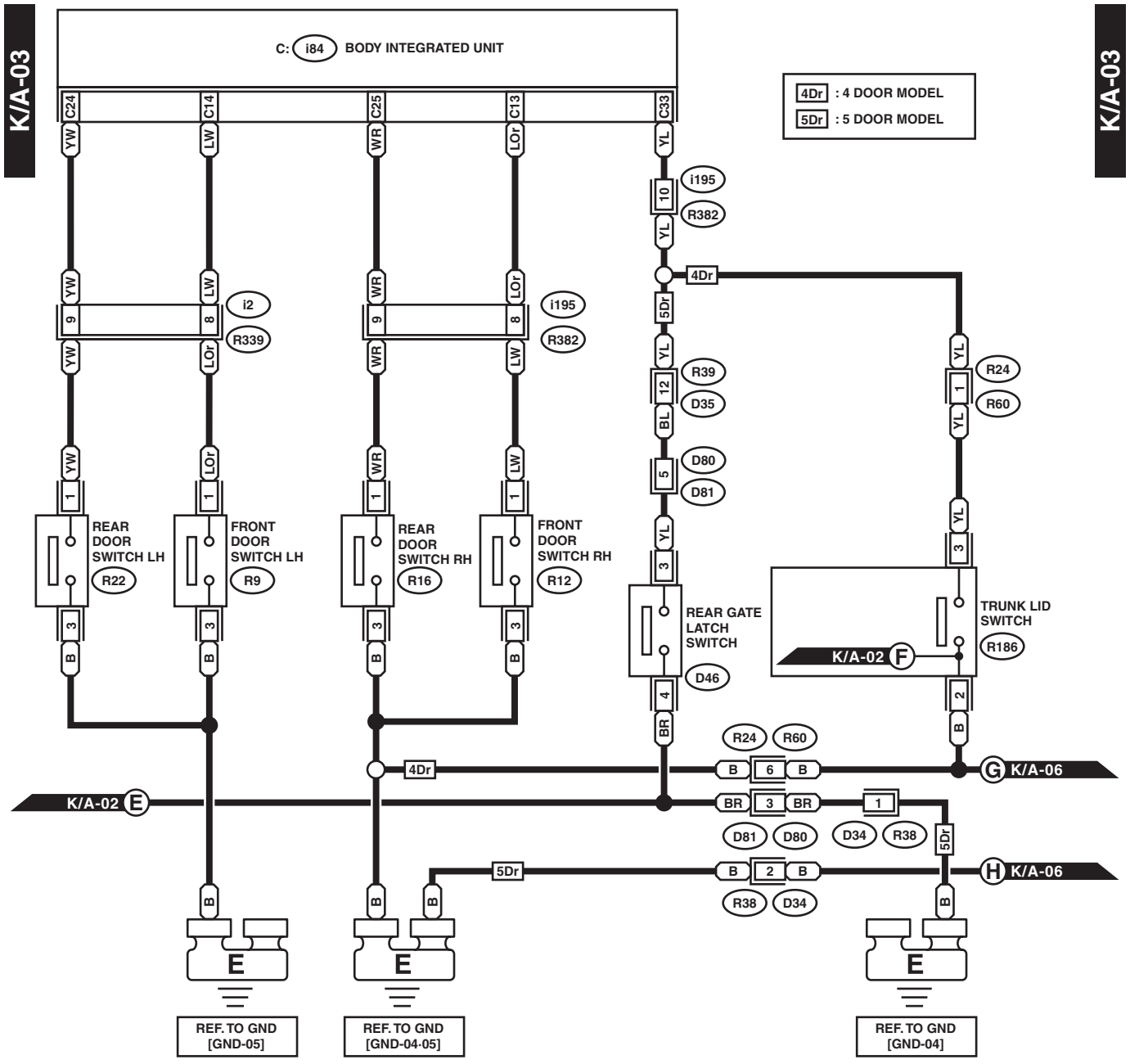


WI-48270

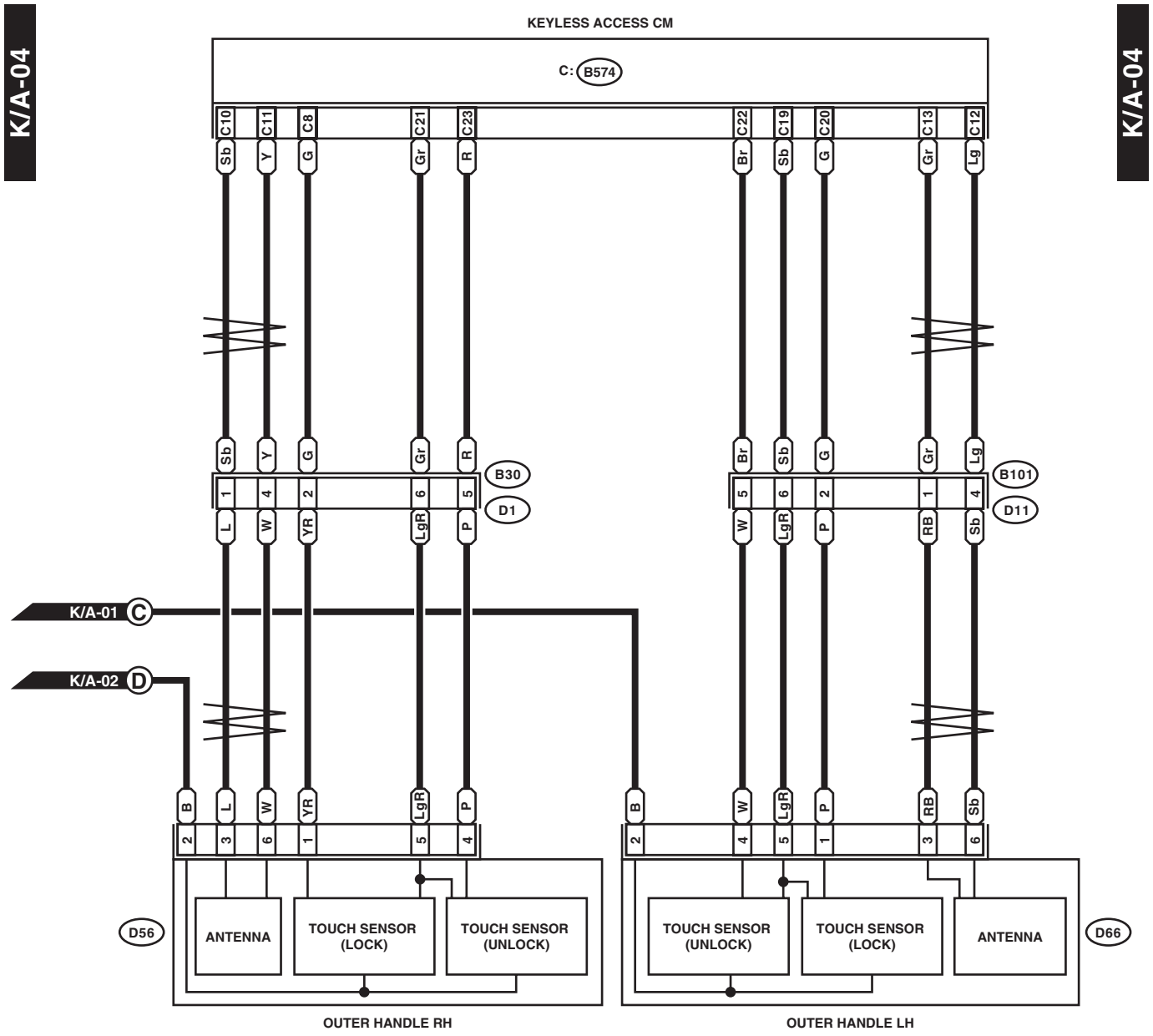

K/A-02
BODY INTEGRATED UNIT
C: i84 D: i171
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
K/A-01 A
K/A-01 B
i53
R98
4Dr
5Dr
i102
R167
R38
D34
R24
R60
i76
D83
R10
D22
R13
D28
D80
D81
D K/A-04
E K/A-03
D18
D26
D32
D46
R186
F K/A-03
FRONT DOOR LOCK ACTUATOR RH
REAR DOOR LOCK ACTUATOR LH
REAR DOOR LOCK ACTUATOR RH
REAR GATE LOCK ACTUATOR
TRUNK LID LOCK ACTUATOR

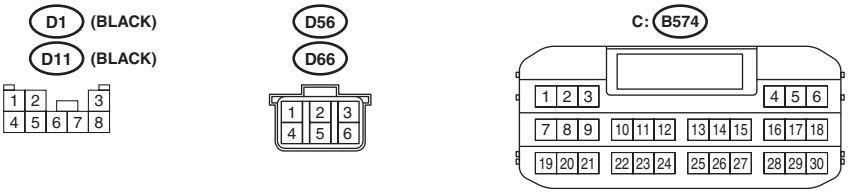
R186
D46
D34
D80
R10
R13
D18
D32
D26
R60
D83
i53
i102
D: i171
C: i84 (BLACK)

WI-48271

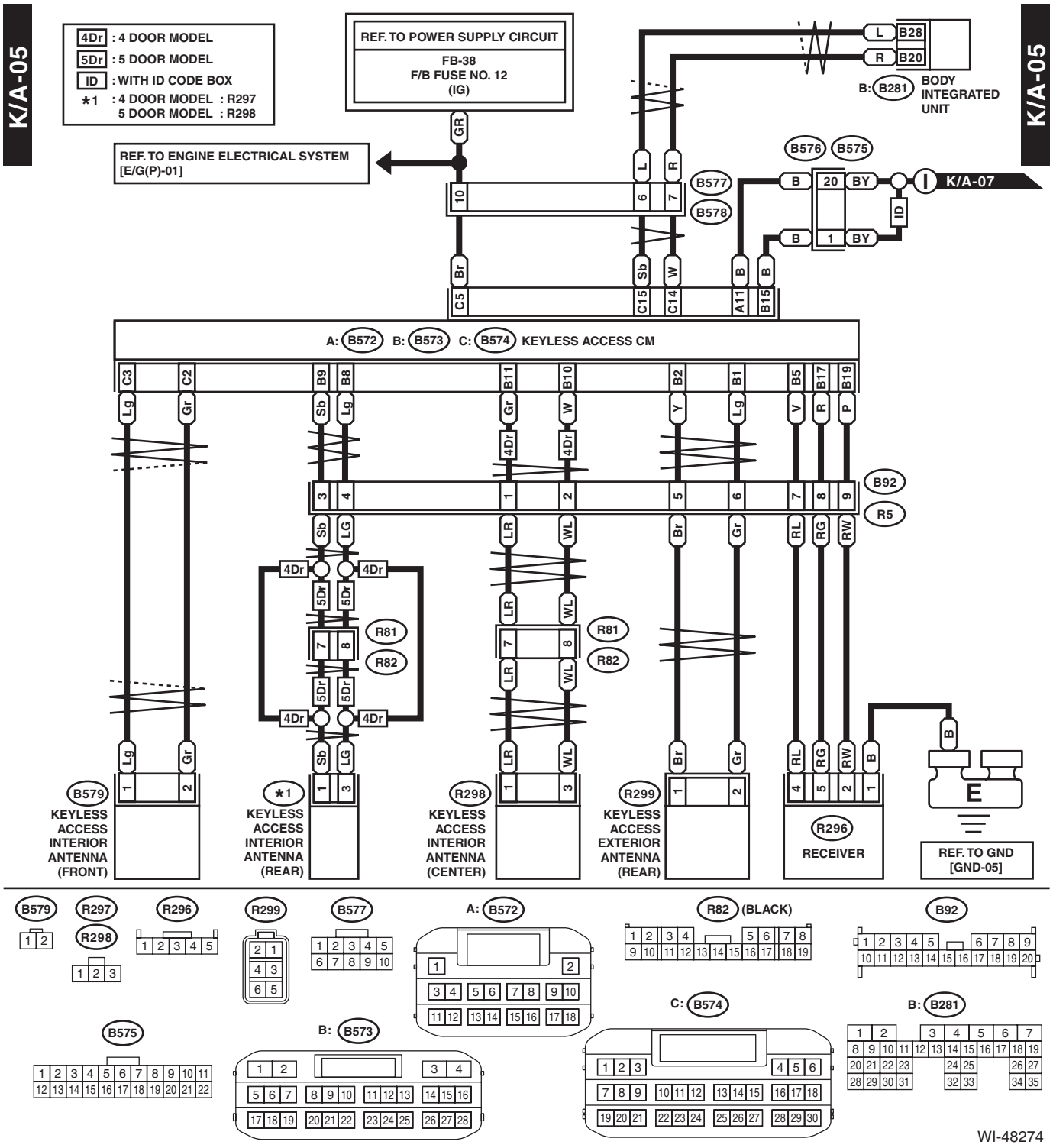

K/A-03
K/A-03
C: i84 BODY INTEGRATED UNIT
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
C24
C14
C25
C13
C33
YW
LW
WR
LOr
YL
i195
10
R382
i2
9
8
R339
R382
R39
12
D35
R24
1
R60
BL
5
D80
D81
3
REAR DOOR SWITCH LH
R22
FRONT DOOR SWITCH LH
R9
REAR DOOR SWITCH RH
R16
FRONT DOOR SWITCH RH
R12
REAR GATE LATCH SWITCH
D46
TRUNK LID SWITCH
R186
K/A-02 F
B
4
2
4Dr
5Dr
R24
R60
6
BR
D81
D80
D34
R38
K/A-06 G
K/A-06 H
K/A-02 E
E
REF. TO GND [GND-05]
REF. TO GND [GND-04·05]
REF. TO GND [GND-04]
R9
R16
R12
R22
R186
D46
D34
D80
i2
i195
R60
D35 (GRAY)
C: i84 (BLACK)

WI-48272

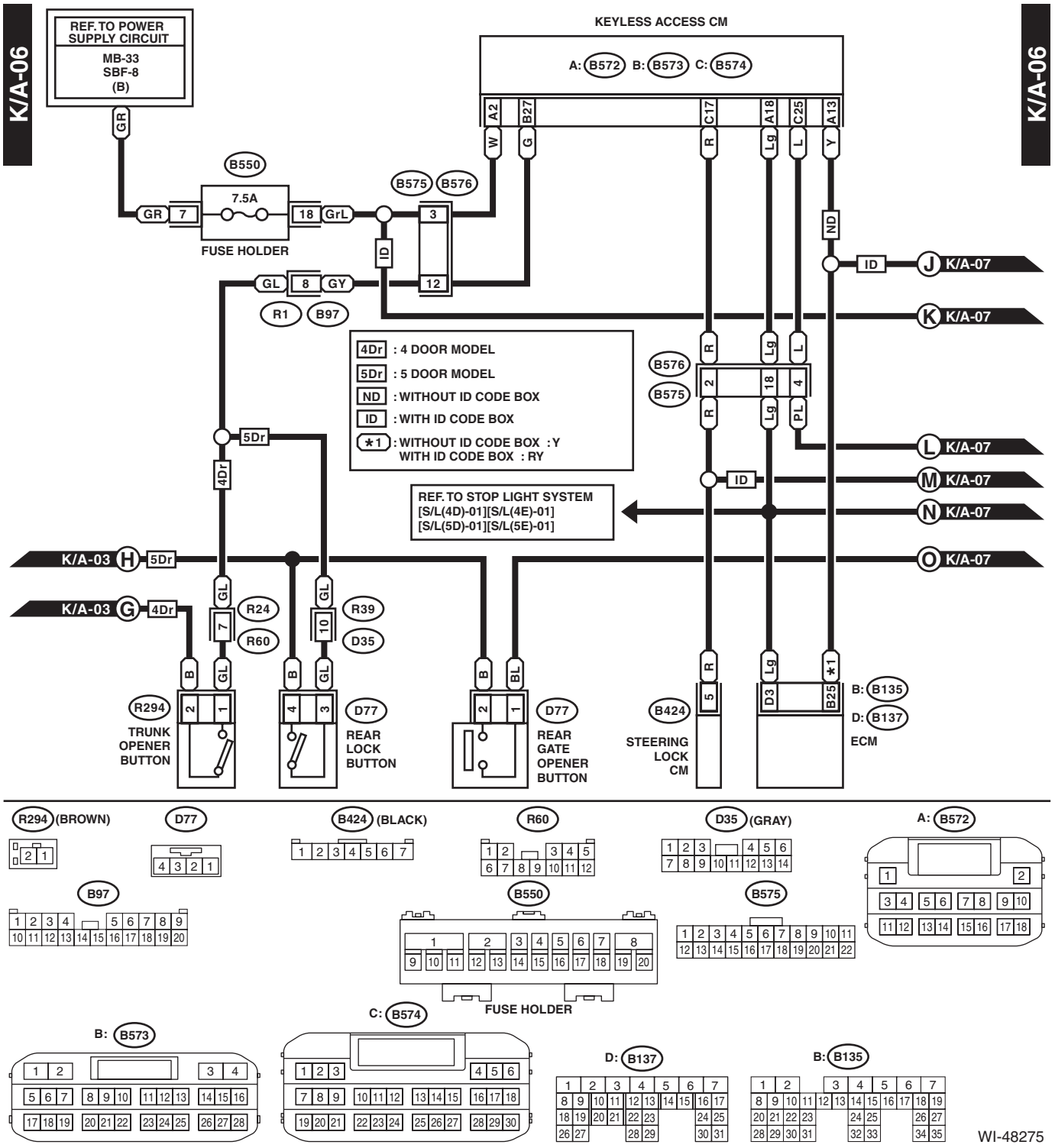

K/A-04
K/A-04
KEYLESS ACCESS CM
C: B574
C10 C11 C8 C21 C23 C22 C19 C20 C13 C12
Sb Y G Gr R Br Sb G Gr Lg
B30
D1
B101
D11
L W YR LgR P W LgR P RB Sb
K/A-01 C
K/A-02 D
B L W YR LgR P B W LgR P RB Sb
D56
ANTENNA
TOUCH SENSOR (LOCK)
TOUCH SENSOR (UNLOCK)
TOUCH SENSOR (UNLOCK)
TOUCH SENSOR (LOCK)
ANTENNA
D66
OUTER HANDLE RH
OUTER HANDLE LH

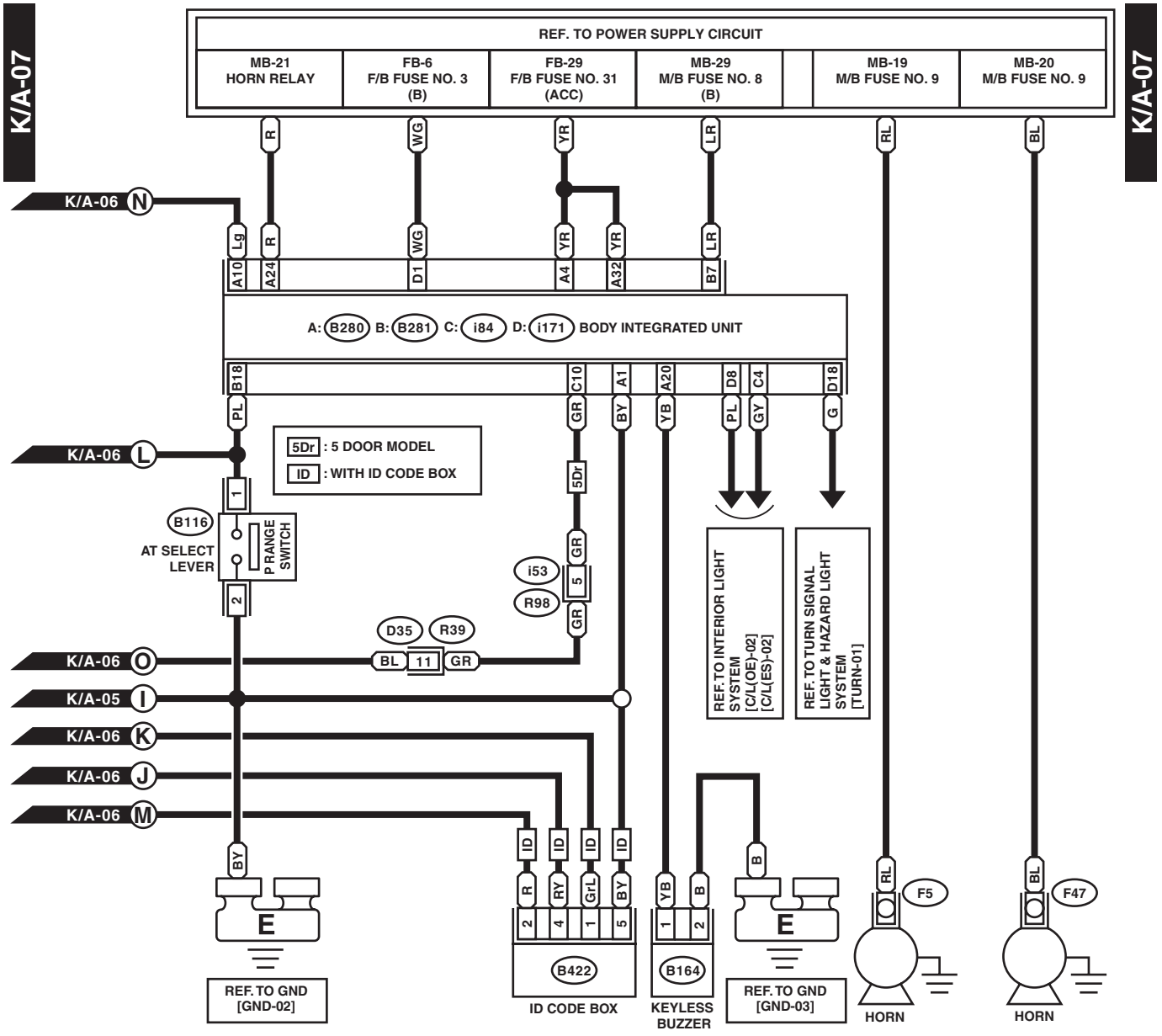

D1 (BLACK)
D11 (BLACK)
D56
D66
C: B574

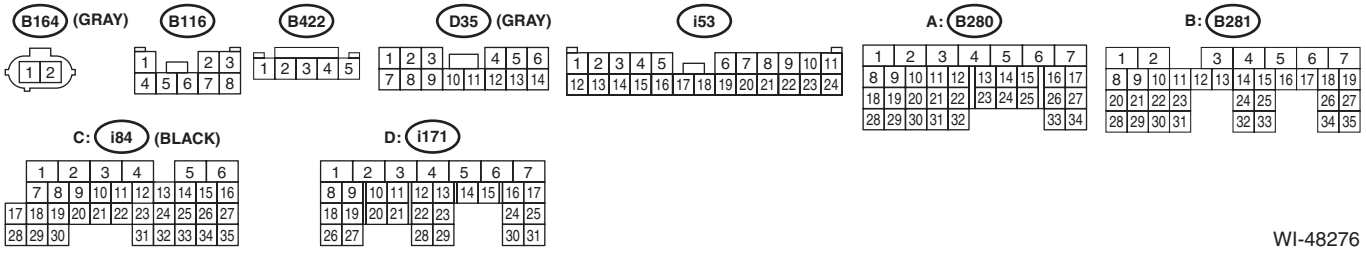
WI-48273


K/A-05
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
ID : WITH ID CODE BOX
*1 : 4 DOOR MODEL : R297
5 DOOR MODEL : R298
REF. TO POWER SUPPLY CIRCUIT
FB-38
F/B FUSE NO. 12
(IG)
REF. TO ENGINE ELECTRICAL SYSTEM
[E/G(P)-01]
B: B281 BODY INTEGRATED UNIT
B576 B575
B577
B578
K/A-07
A: B572 B: B573 C: B574 KEYLESS ACCESS CM
B92
R5
R81
R82
B579 KEYLESS ACCESS INTERIOR ANTENNA (FRONT)
*1 KEYLESS ACCESS INTERIOR ANTENNA (REAR)
R298 KEYLESS ACCESS INTERIOR ANTENNA (CENTER)
R299 KEYLESS ACCESS EXTERIOR ANTENNA (REAR)
R296 RECEIVER
REF. TO GND [GND-05]
R82 (BLACK)
WI-48274

WIRING SYSTEM



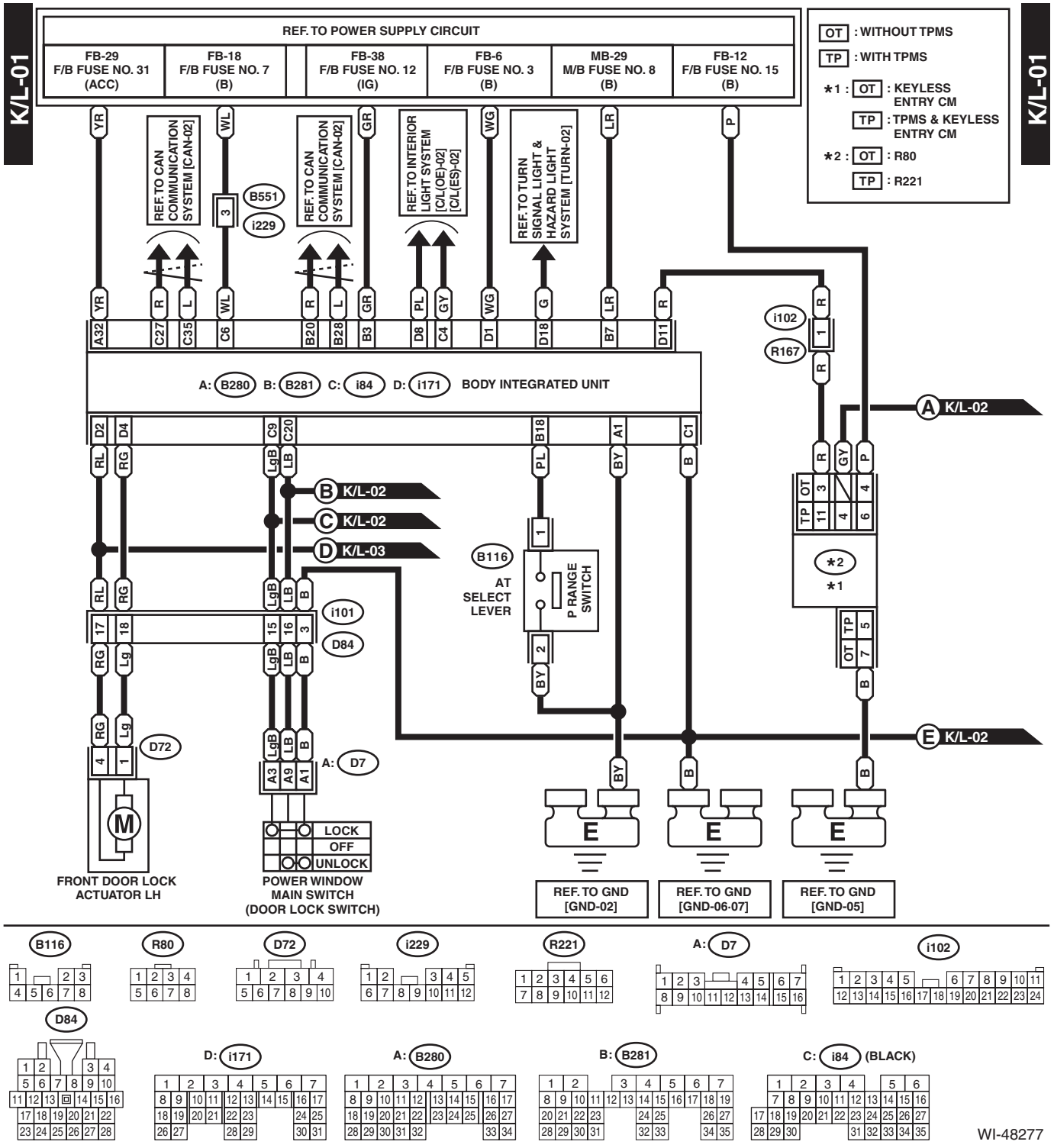

K/A-07
K/A-07
REF. TO POWER SUPPLY CIRCUIT
MB-21 HORN RELAY
FB-6 F/B FUSE NO. 3 (B)
FB-29 F/B FUSE NO. 31 (ACC)
MB-29 M/B FUSE NO. 8 (B)
MB-19 M/B FUSE NO. 9
MB-20 M/B FUSE NO. 9
R
WG
YR
LR
RL
BL
K/A-06 N
Lg
A10
A24
D1
A4
A32
B7
A: B280 B: B281 C: i84 D: i171 BODY INTEGRATED UNIT
B18
C10
A1
A20
D8
C4
D18
PL
GR
BY
YB
PL
GY
G
K/A-06 L
5Dr : 5 DOOR MODEL
ID : WITH ID CODE BOX
B116
AT SELECT LEVER
P RANGE SWITCH
i53
R98
D35
R39
K/A-06 O
K/A-05 I
K/A-06 K
K/A-06 J
K/A-06 M
BL
11
GR
REF.TO INTERIOR LIGHT SYSTEM [C/L(OE)-02] [C/L(ES)-02]
REF. TO TURN SIGNAL LIGHT & HAZARD LIGHT SYSTEM [TURN-01]
ID
R
RY
GrL
B
F5
F47
B422
B164
REF. TO GND [GND-02]
ID CODE BOX
KEYLESS BUZZER
REF. TO GND [GND-03]
HORN
HORN

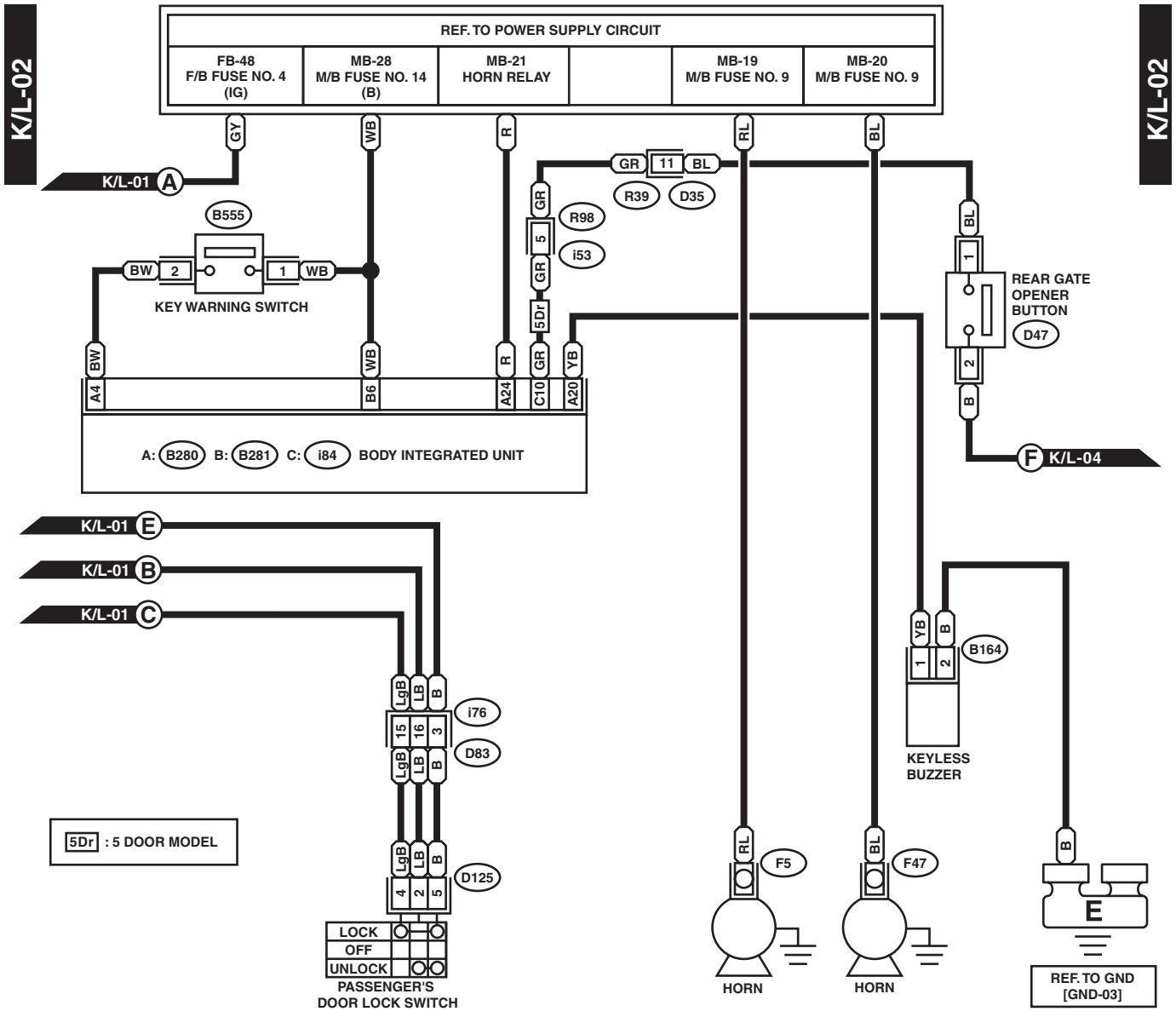

B164 (GRAY)
B116
B422
D35 (GRAY)
i53
A: B280
B: B281
C: i84 (BLACK)
D: i171

WI-48276

30.Keyless Entry System

A: WIRING DIAGRAM





B164 (GRAY)



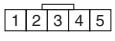
B555



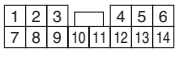
D47 (BROWN)



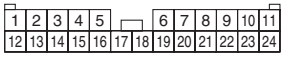
D125



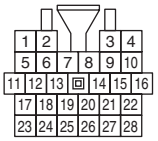
D35 (GRAY)



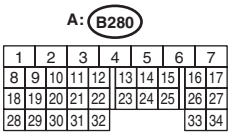
i53



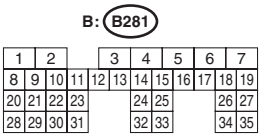
D83



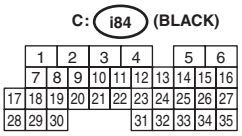
A: B280



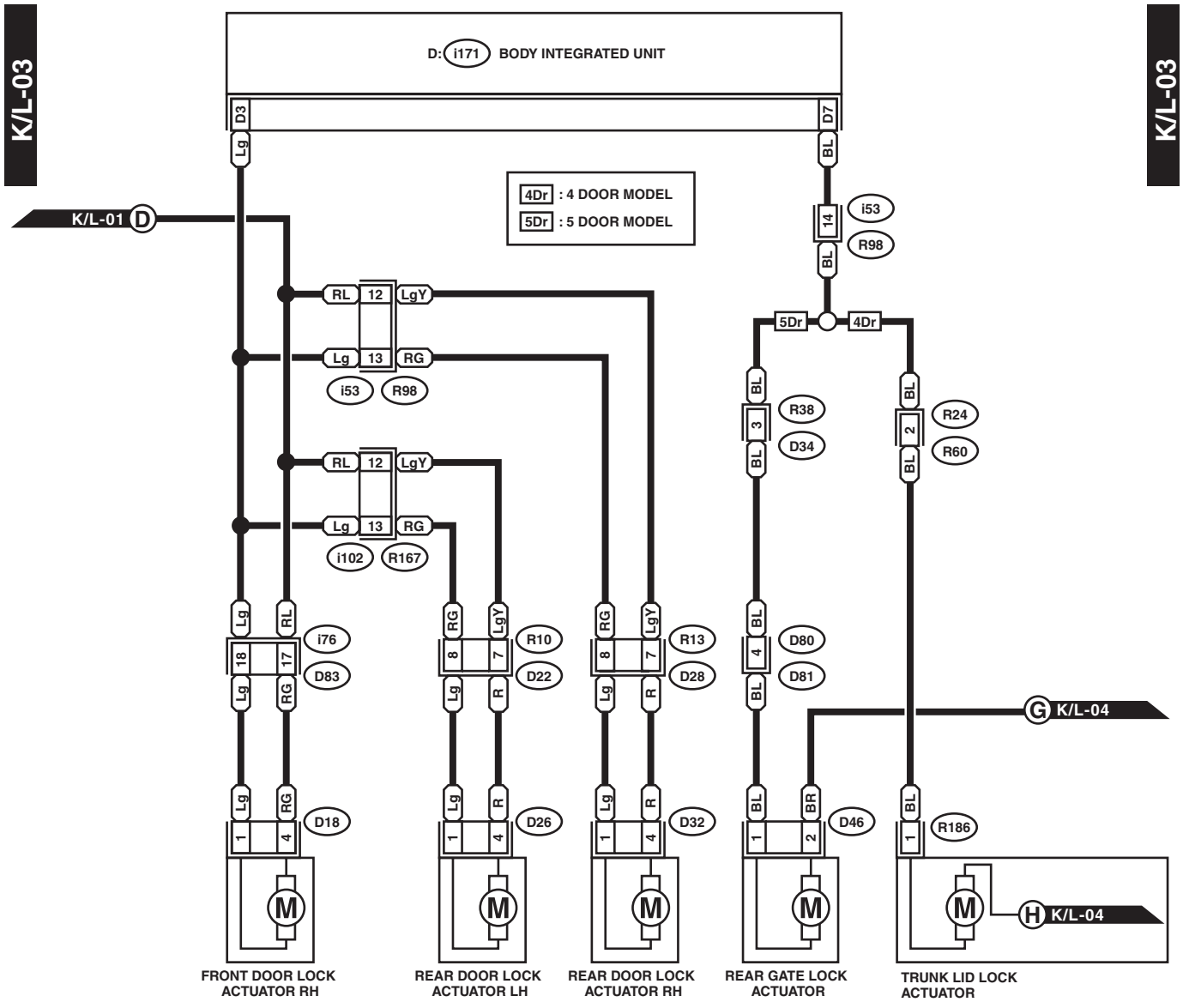
B: B281

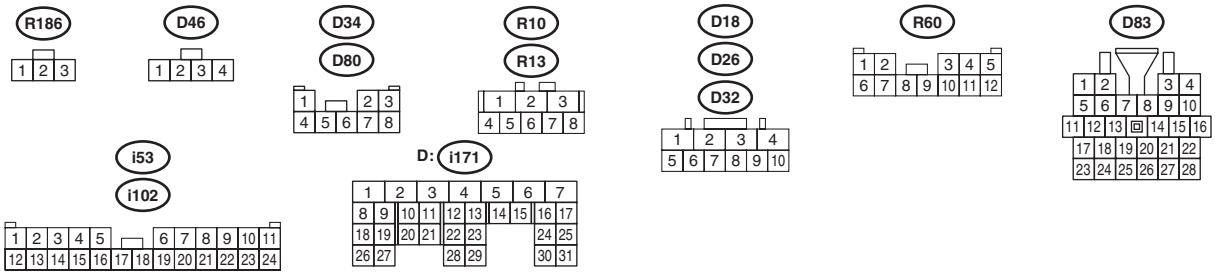


C: i84 (BLACK)

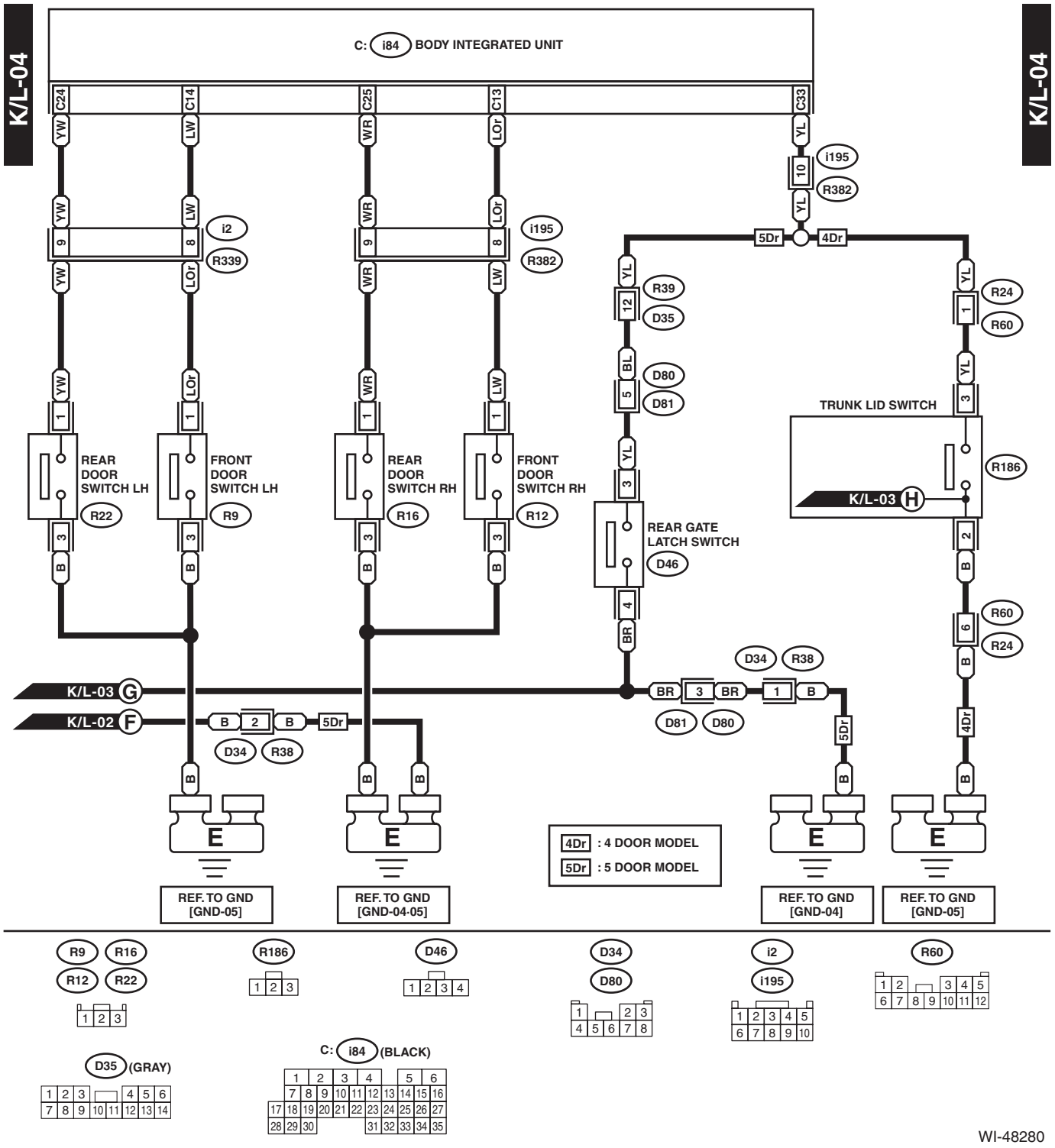


WI-48278


K/L-03
K/L-03
D: i171 BODY INTEGRATED UNIT
D3
D7
Lg
BL
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
K/L-01 D
14
i53
R98
BL
5Dr
4Dr
RL 12 LgY
Lg 13 RG
i53 R98
RL 12 LgY
Lg 13 RG
i102 R167
BL 3 R38 D34 BL
BL 2 R24 R60 BL
Lg RL 18 17 i76 D83 Lg RG
RG LgY 8 7 R10 D22 Lg R
RG LgY 8 7 R13 D28 Lg R
BL 4 D80 D81 BL
G K/L-04
Lg RG 1 4 D18
Lg R 1 4 D26
Lg R 1 4 D32
BL BR 1 2 D46
BL 1 R186
M
H K/L-04
FRONT DOOR LOCK ACTUATOR RH
REAR DOOR LOCK ACTUATOR LH
REAR DOOR LOCK ACTUATOR RH
REAR GATE LOCK ACTUATOR
TRUNK LID LOCK ACTUATOR


R186
D46
D34
D80
R10
R13
D18
D26
D32
R60
D83
i53
i102
D: i171

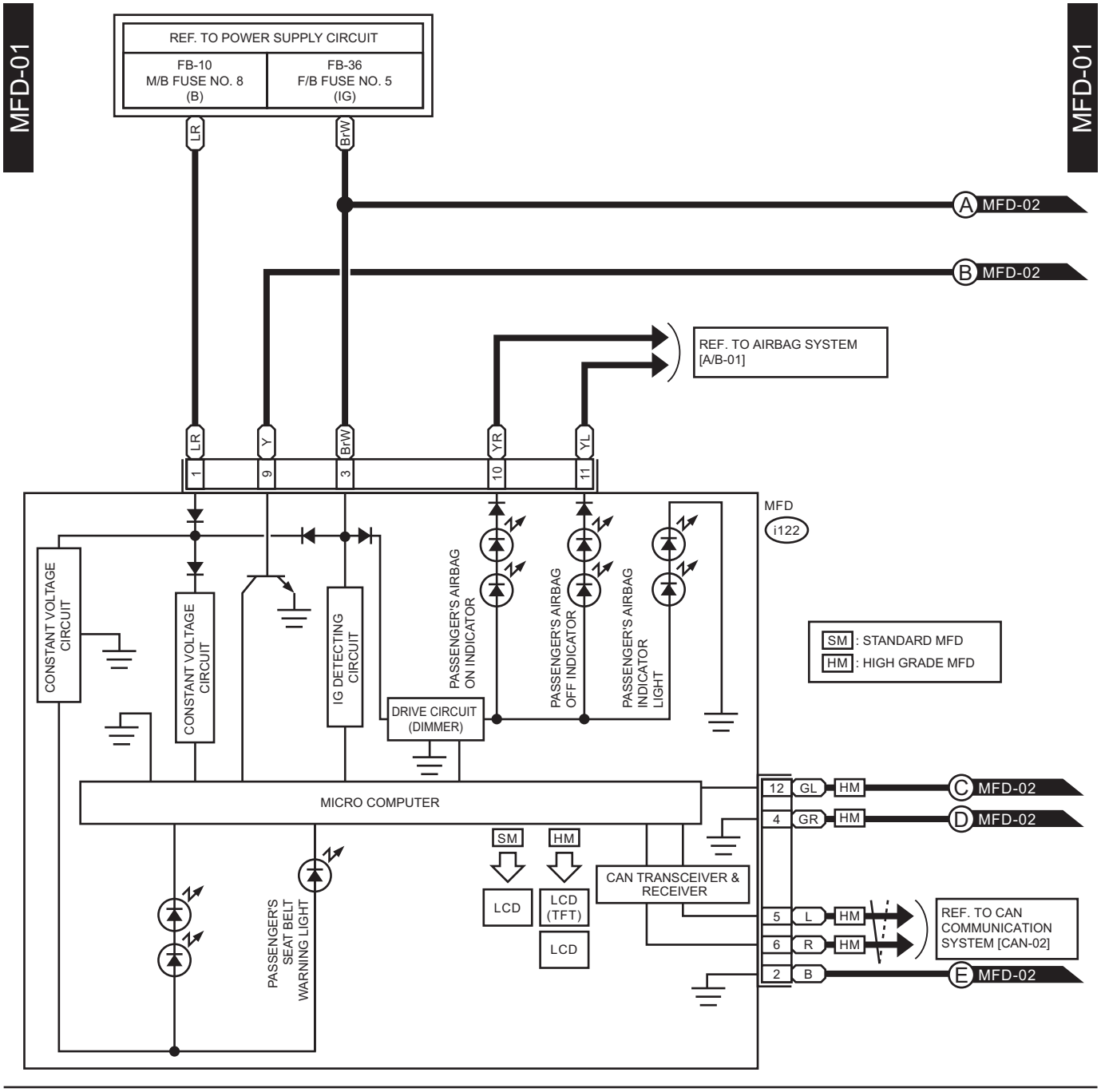
WI-48279


K/L-04
K/L-04
C: i84 BODY INTEGRATED UNIT
C24
C14
C25
C13
C33
YW
LW
WR
LOr
YL
i195
10
R382
i2
9
8
R339
REAR DOOR SWITCH LH
R22
FRONT DOOR SWITCH LH
R9
REAR DOOR SWITCH RH
R16
FRONT DOOR SWITCH RH
R12
5Dr
4Dr
R39
D35
D80
D81
REAR GATE LATCH SWITCH
D46
TRUNK LID SWITCH
R186
K/L-03 H
R24
R60
K/L-03 G
K/L-02 F
D34
R38
BR
B
D81
D80
REF. TO GND [GND-05]
REF. TO GND [GND-04·05]
REF. TO GND [GND-04]
REF. TO GND [GND-05]
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
R9
R16
R12
R22
R186
D46
D34
D80
i2
i195
R60
D35 (GRAY)
C: i84 (BLACK)

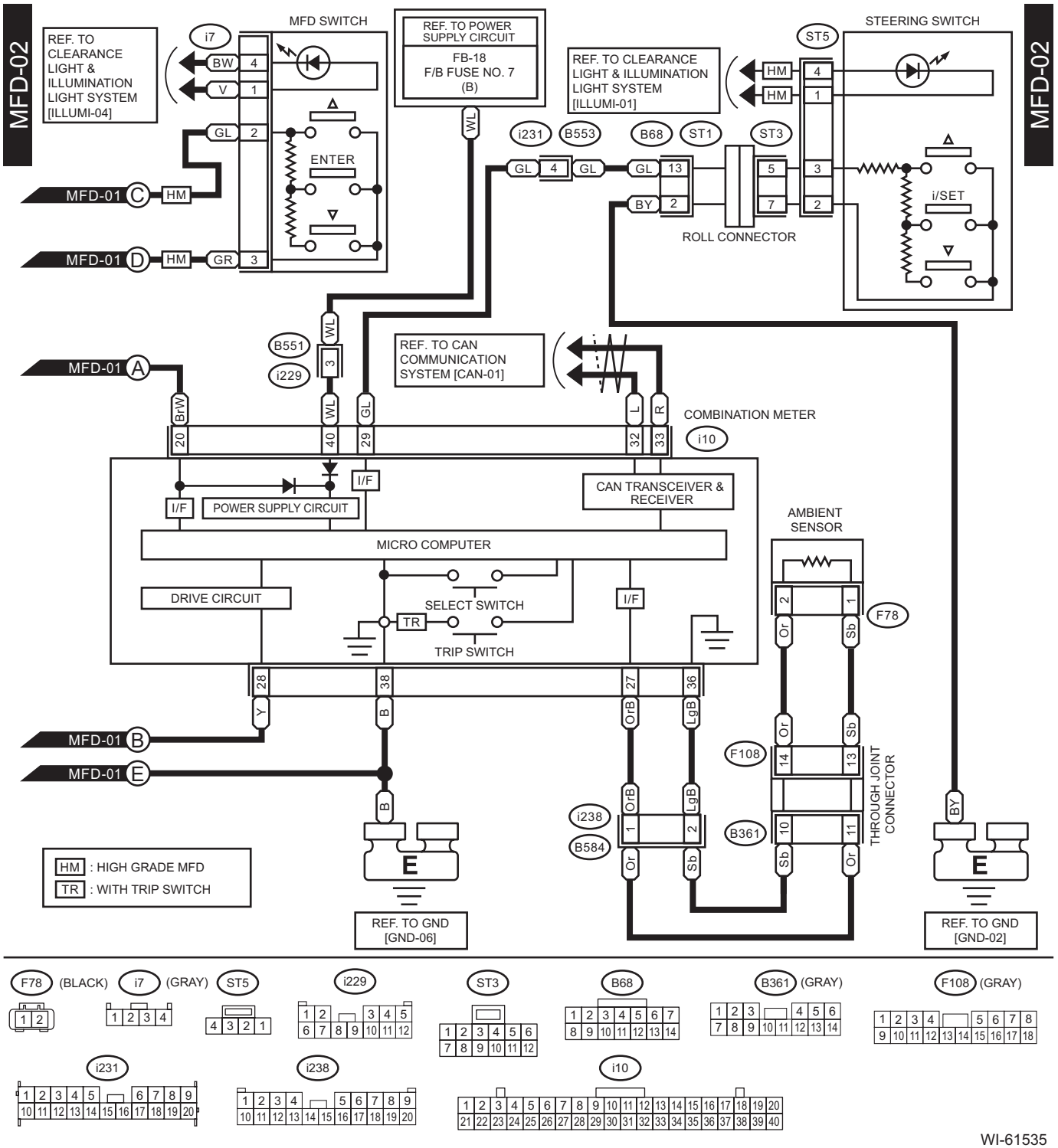
WI-48280

31.Multi-function Display (MFD) System

A: WIRING DIAGRAM



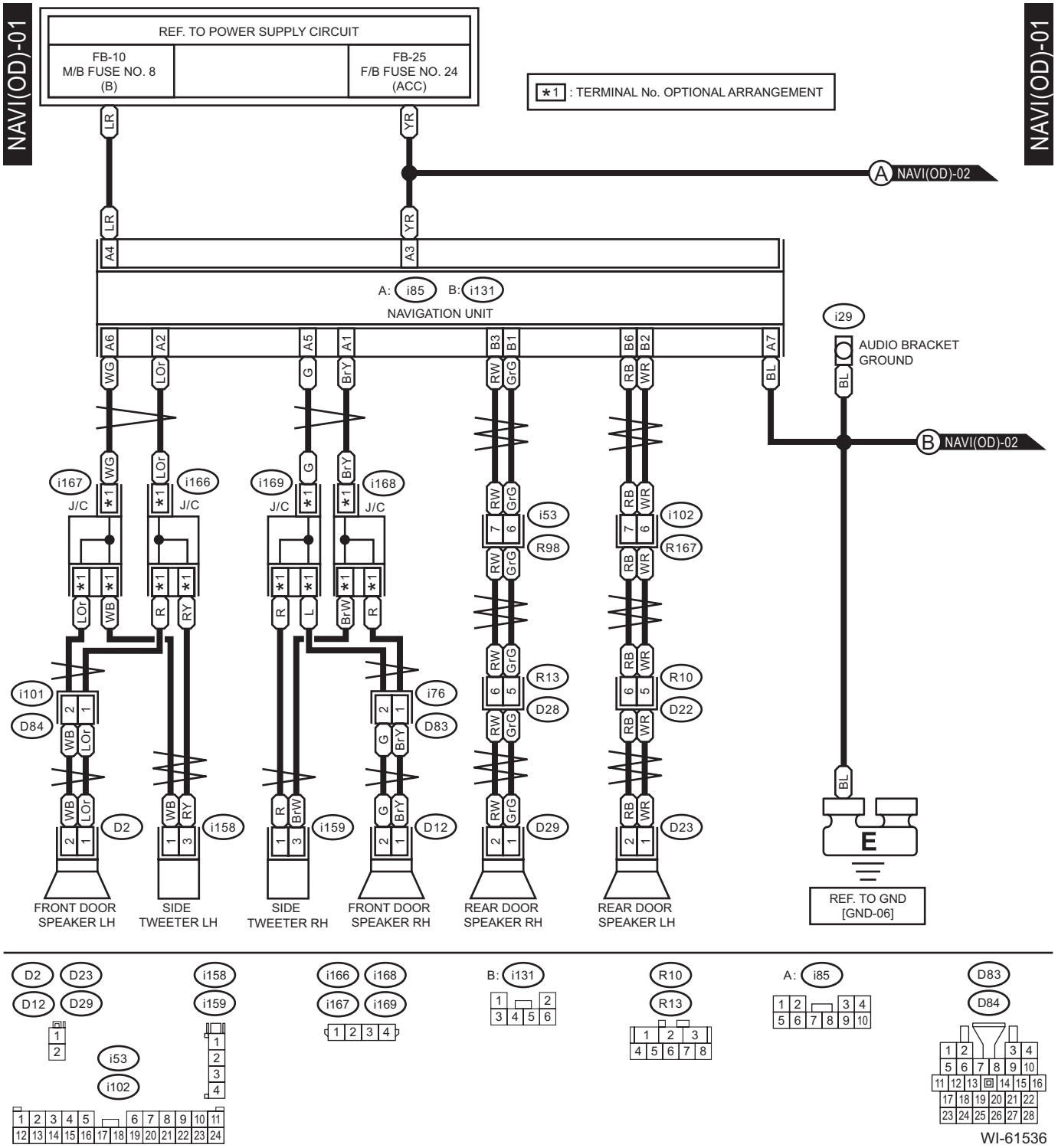
WI-62511


MFD-02
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-04]
MFD SWITCH
ENTER
REF. TO POWER SUPPLY CIRCUIT
FB-18 F/B FUSE NO. 7 (B)
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
STEERING SWITCH
i/SET
ROLL CONNECTOR
MFD-01 C HM
MFD-01 D HM GR
MFD-01 A
MFD-01 B
MFD-01 E
REF. TO CAN COMMUNICATION SYSTEM [CAN-01]
COMBINATION METER
i10
I/F
POWER SUPPLY CIRCUIT
CAN TRANSCEIVER & RECEIVER
MICRO COMPUTER
DRIVE CIRCUIT
SELECT SWITCH
TRIP SWITCH
AMBIENT SENSOR
F78
F108
THROUGH JOINT CONNECTOR
B361
i238
B584
HM : HIGH GRADE MFD
TR : WITH TRIP SWITCH
REF. TO GND [GND-06]
REF. TO GND [GND-02]
F78 (BLACK)
i7 (GRAY)
ST5
i229
ST3
B68
B361 (GRAY)
F108 (GRAY)
i231
i238
i10
WI-61535

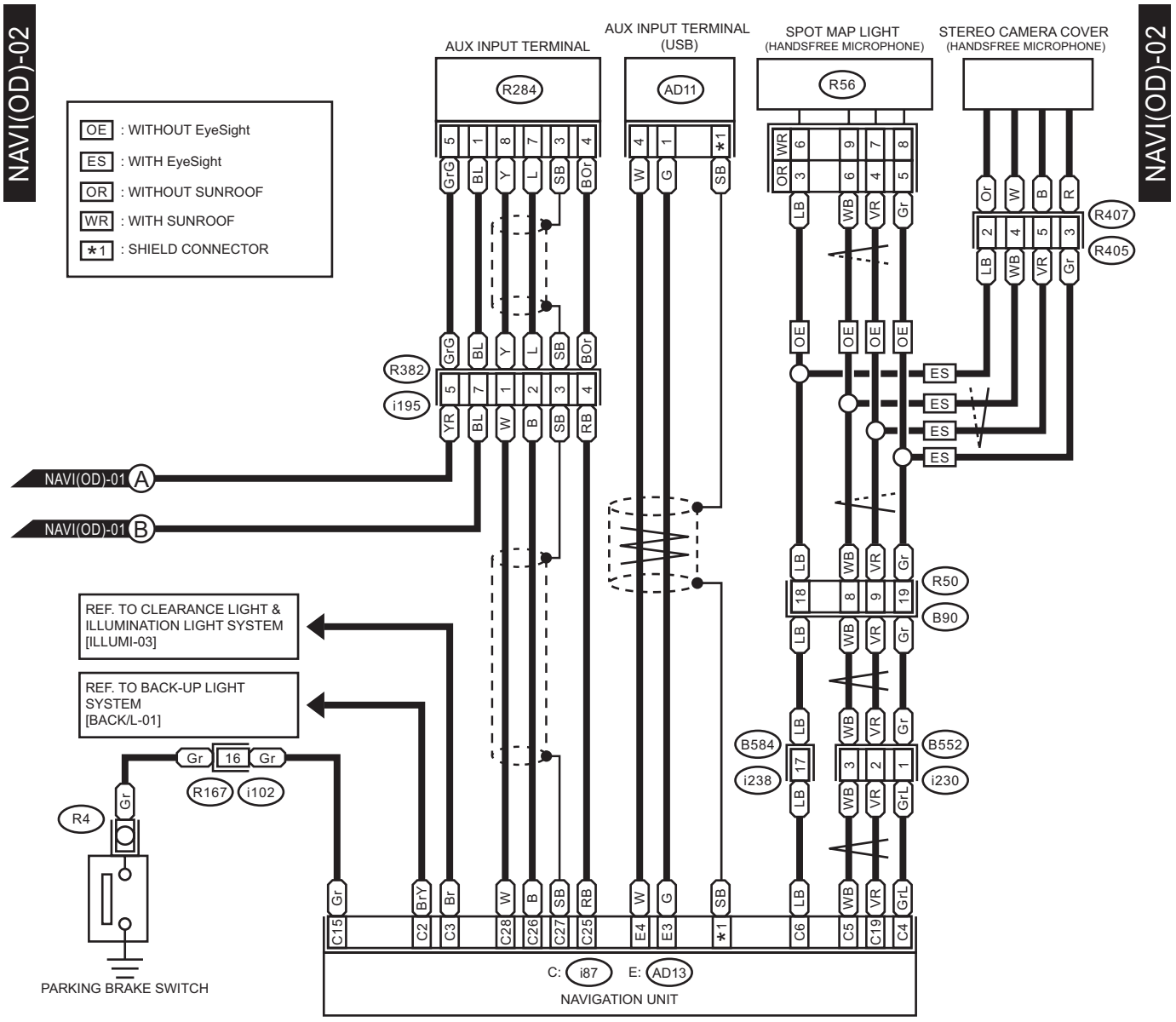
32.Navigation System

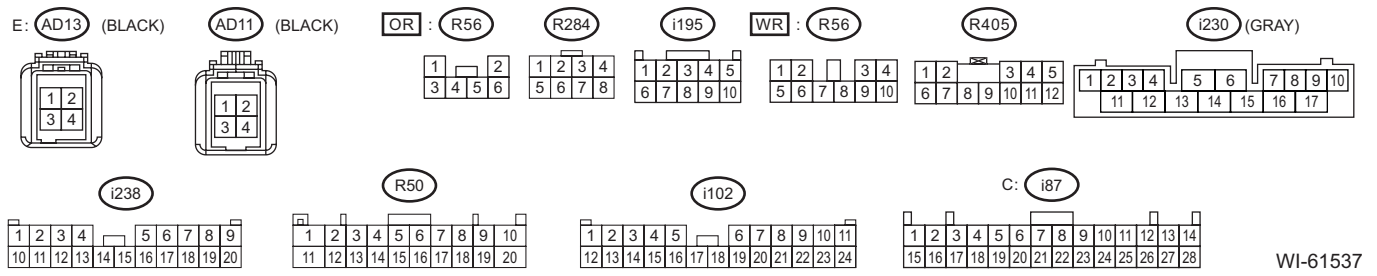
A: WIRING DIAGRAM

1. WITHOUT TELEMATICS



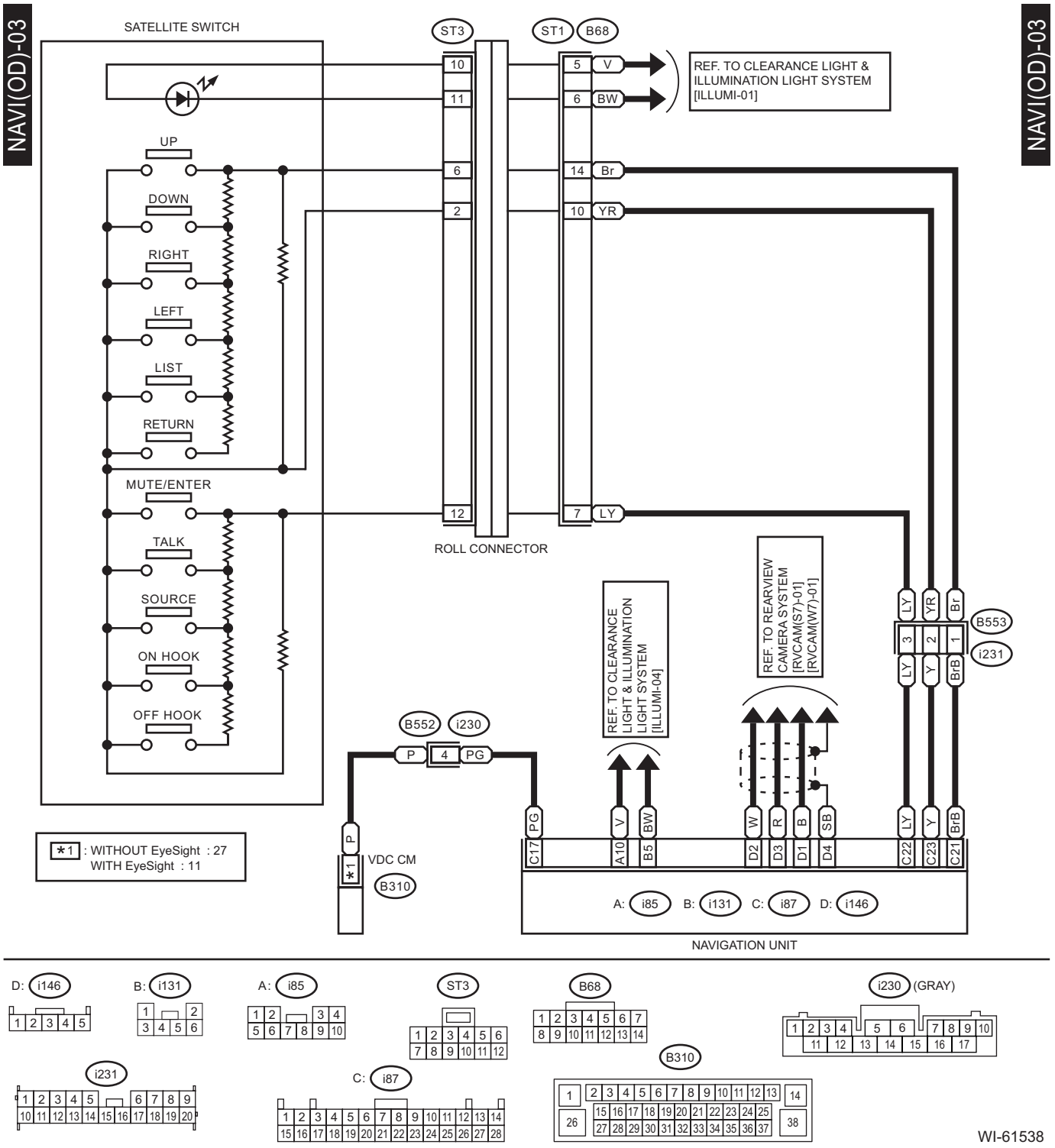
WI-61536


NAVI(OD)-02
OE : WITHOUT EyeSight
ES : WITH EyeSight
OR : WITHOUT SUNROOF
WR : WITH SUNROOF
*1 : SHIELD CONNECTOR
AUX INPUT TERMINAL
AUX INPUT TERMINAL (USB)
SPOT MAP LIGHT (HANDSFREE MICROPHONE)
STEREO CAMERA COVER (HANDSFREE MICROPHONE)
R284
AD11
R56
R407
R405
R382
i195
R50
B90
B584
B552
i238
i230
R4
R167
i102
NAVI(OD)-01 A
NAVI(OD)-01 B
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-03]
REF. TO BACK-UP LIGHT SYSTEM [BACK/L-01]
PARKING BRAKE SWITCH
C: i87 E: AD13
NAVIGATION UNIT

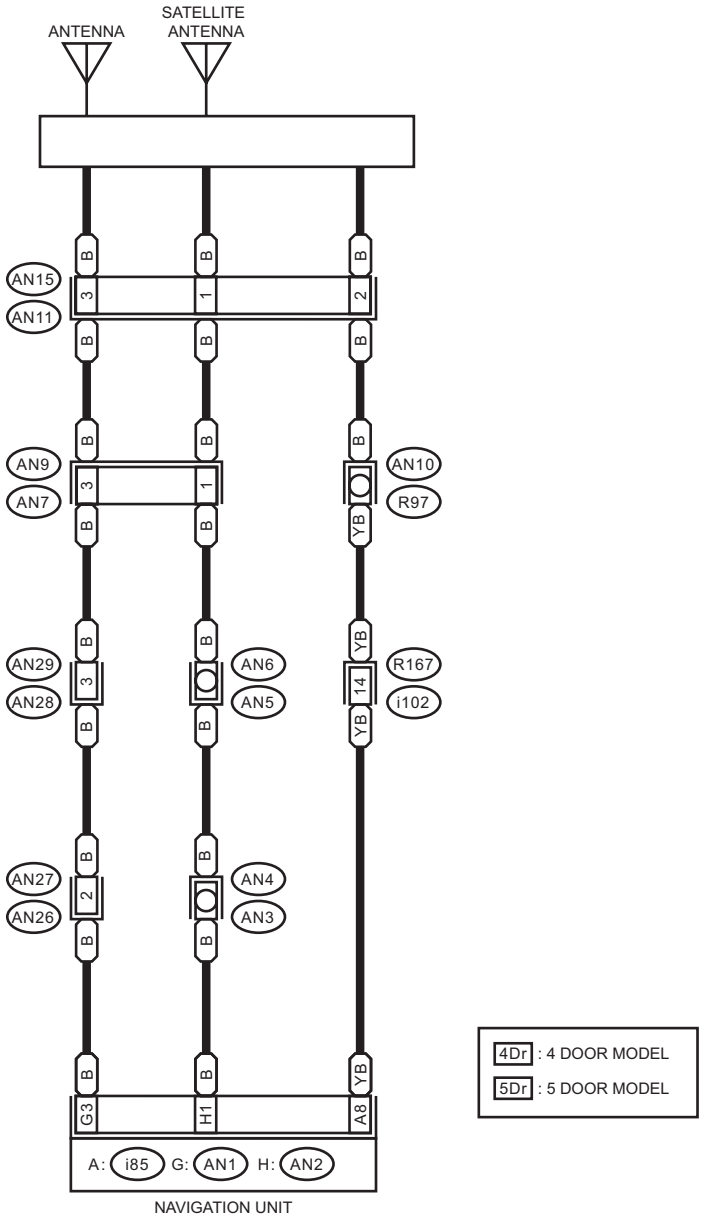

E: AD13 (BLACK)
AD11 (BLACK)
OR : R56
R284
i195
WR : R56
R405
i230 (GRAY)
i238
R50
i102
C: i87

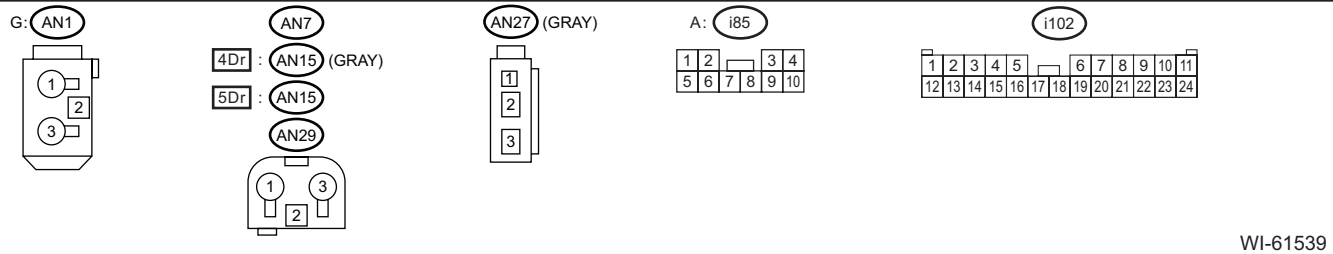
WI-61537

WIRING SYSTEM



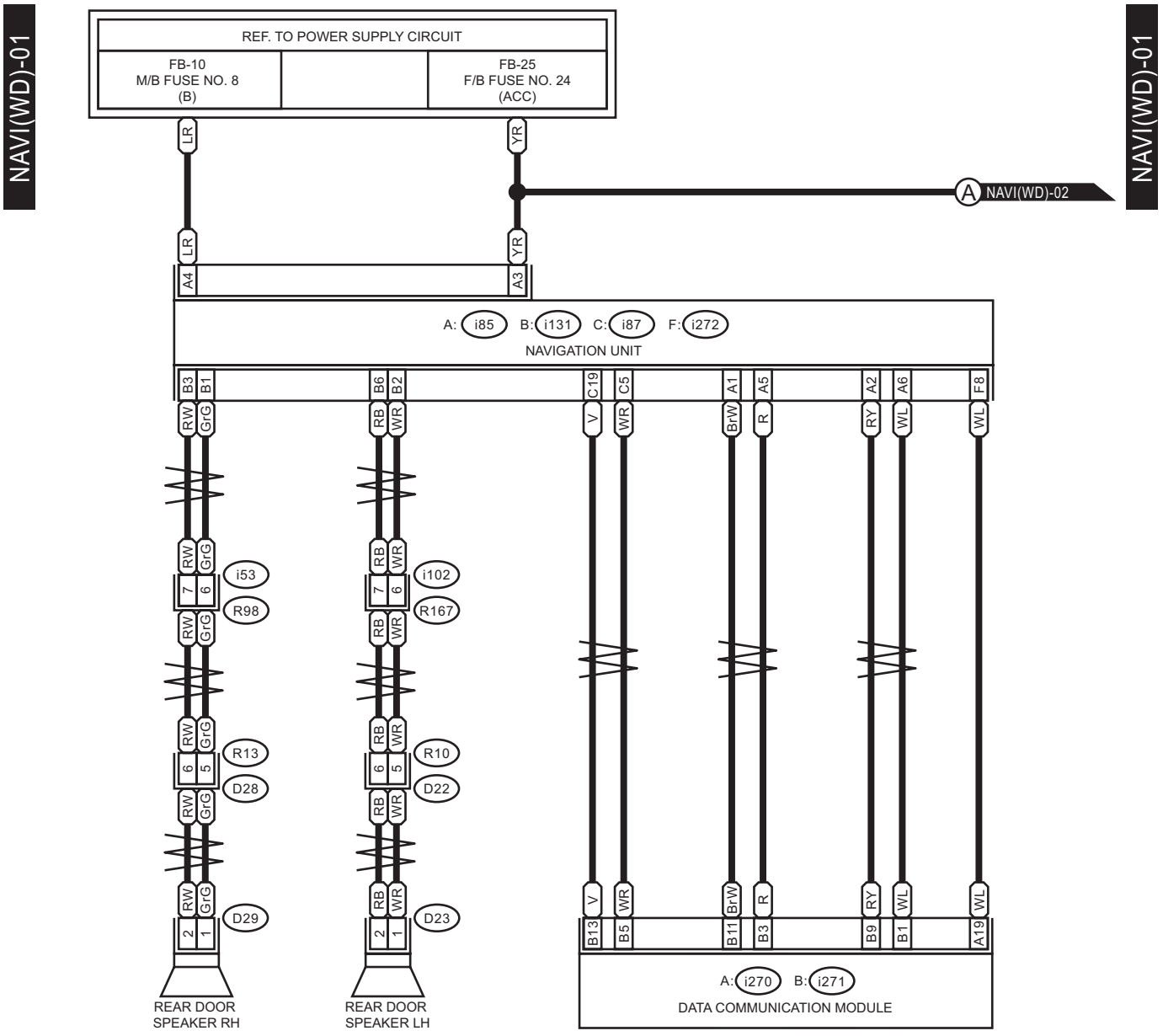
WI-61538


ANTENNA
SATELLITE ANTENNA
AN15
AN11
AN9
AN7
AN10
R97
AN29
AN28
AN6
AN5
R167
i102
AN27
AN26
AN4
AN3
G3
H1
A8
A: i85 G: AN1 H: AN2
NAVIGATION UNIT
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL

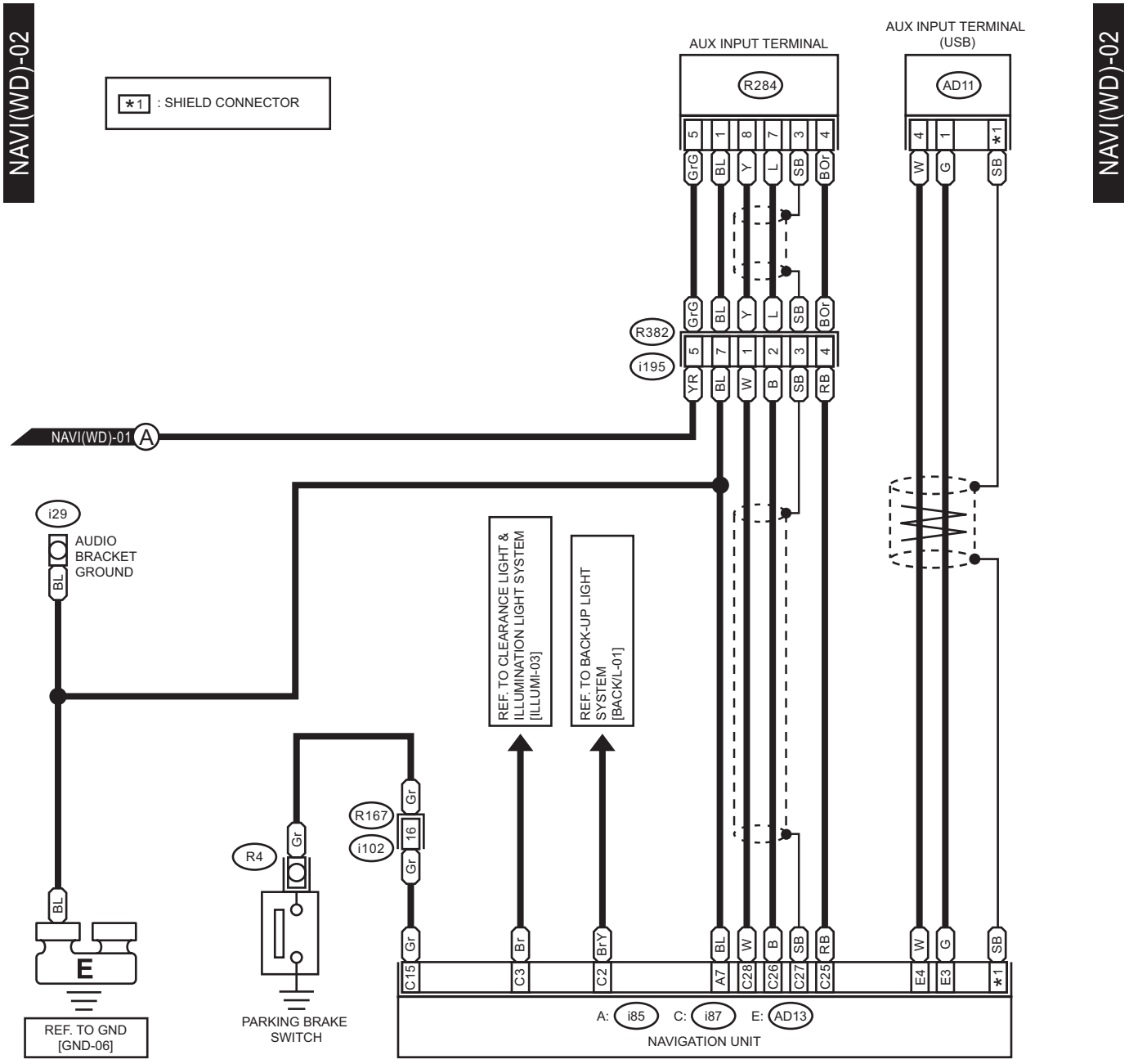

G: AN1
AN7
4Dr : AN15 (GRAY)
5Dr : AN15
AN29
AN27 (GRAY)
A: i85
i102

WI-61539

2. WITH TELEMATICS

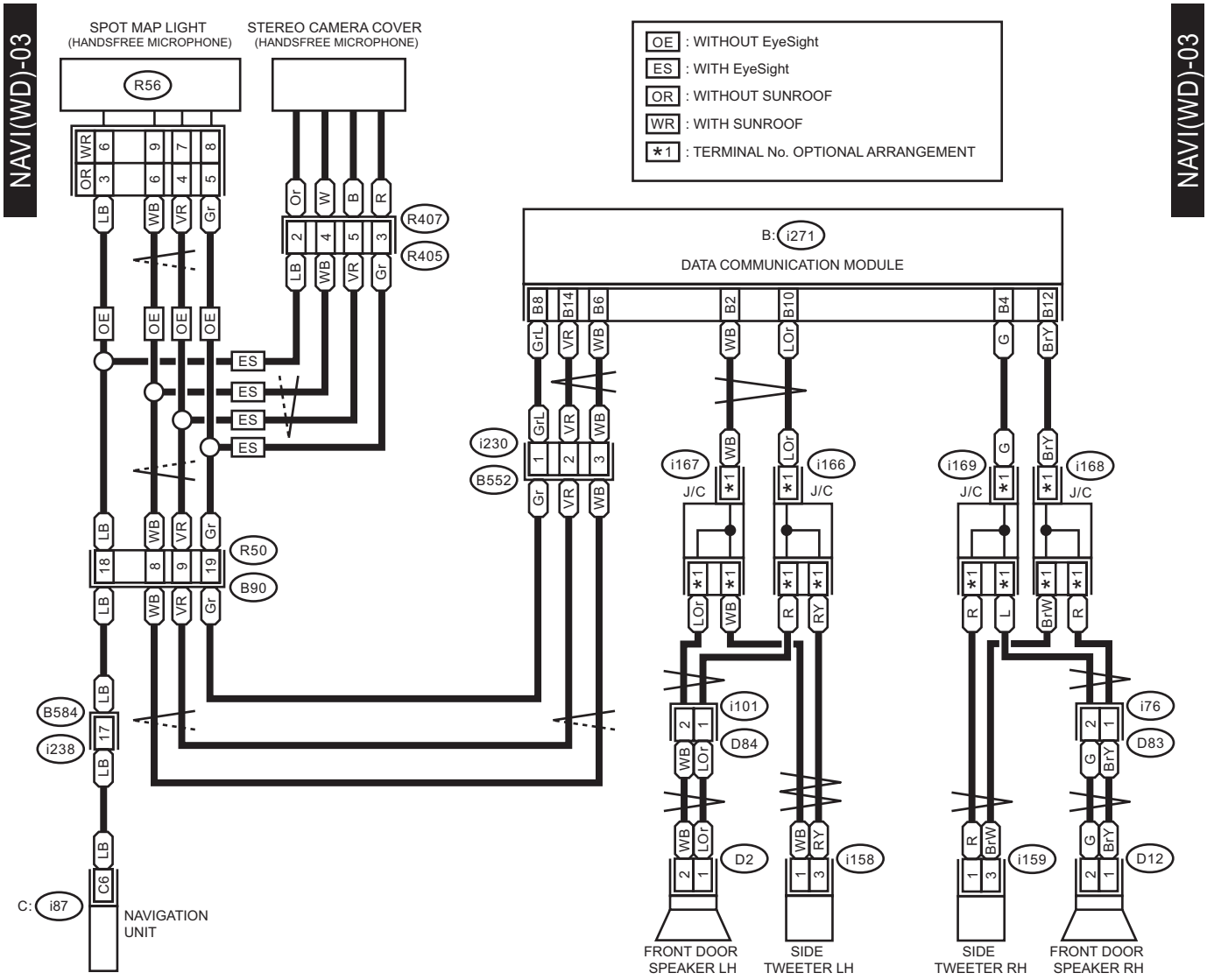


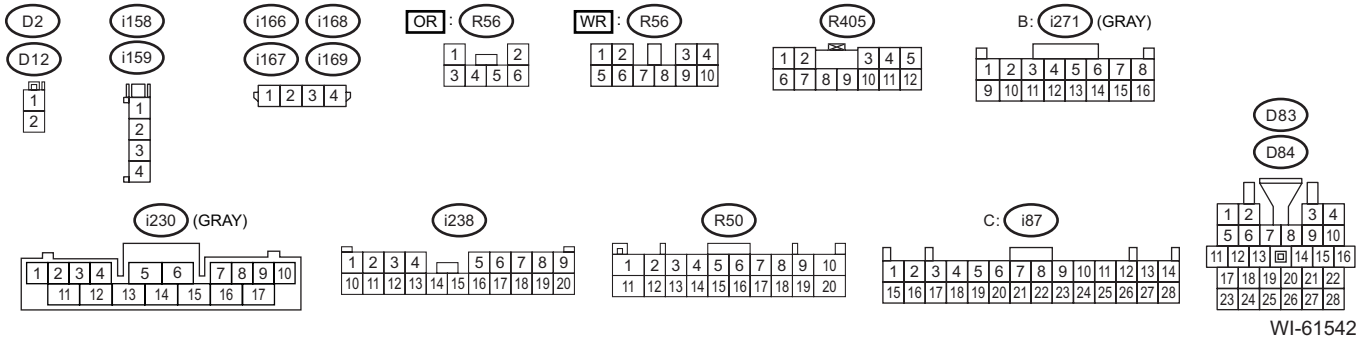
WI-61540


NAVI(WD)-02
*1 : SHIELD CONNECTOR
AUX INPUT TERMINAL
R284
5 1 8 7 3 4
GrG BL Y L SB BOr
AUX INPUT TERMINAL (USB)
AD11
4 1 *1
W G SB
R382
i195
5 7 1 2 3 4
YR BL W B SB RB
NAVI(WD)-01 A
i29
AUDIO BRACKET GROUND
BL
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-03]
REF. TO BACK-UP LIGHT SYSTEM [BACK/L-01]
R167
i102
Gr
16
R4
E
REF. TO GND [GND-06]
PARKING BRAKE SWITCH
C15 C3 C2 A7 C28 C26 C27 C25
E4 E3 *1
A: i85 C: i87 E: AD13
NAVIGATION UNIT
E: AD13 (BLACK)
AD11 (BLACK)
R284
i195
A: i85
i102
C: i87
WI-61541

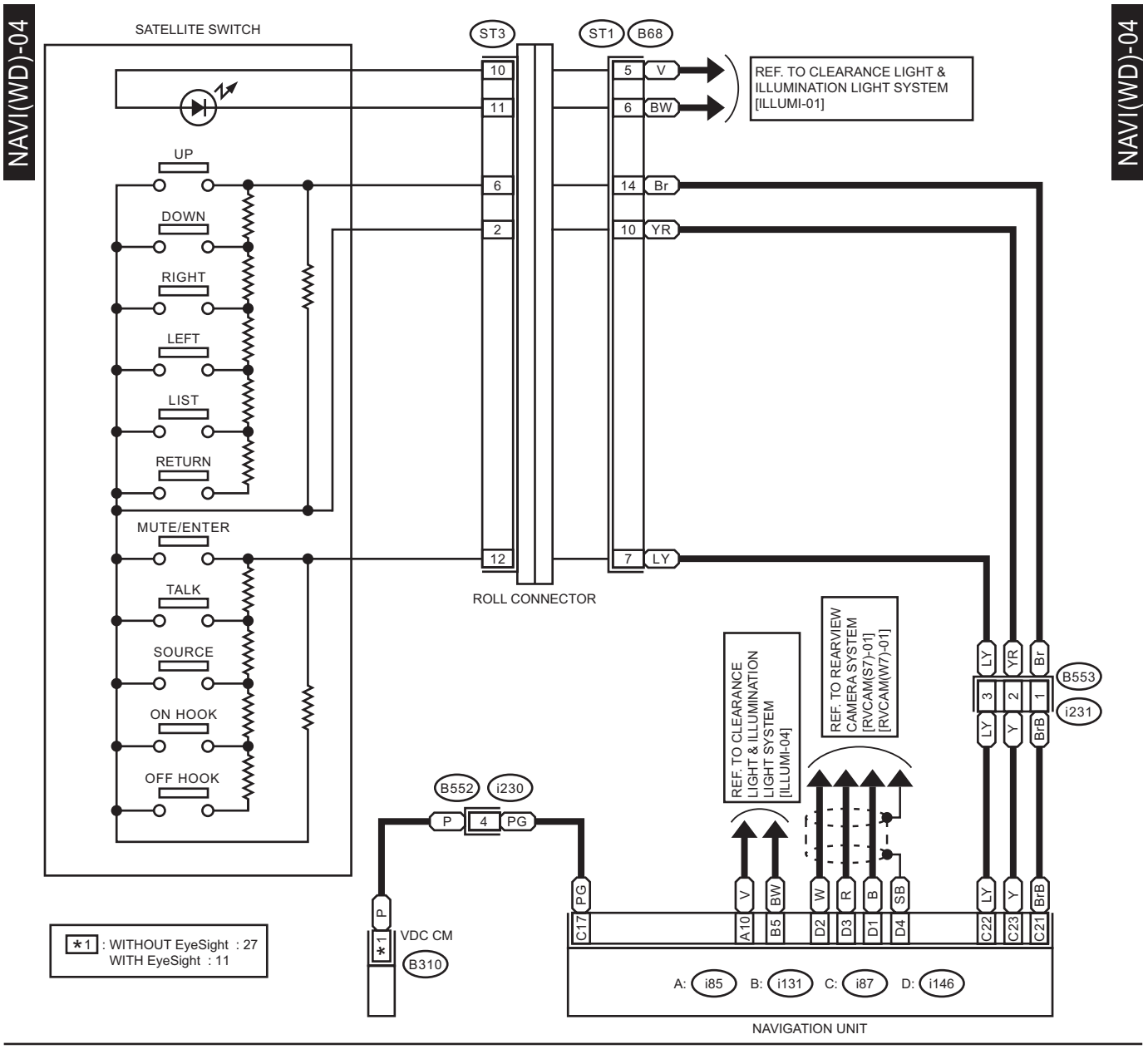
WIRING SYSTEM

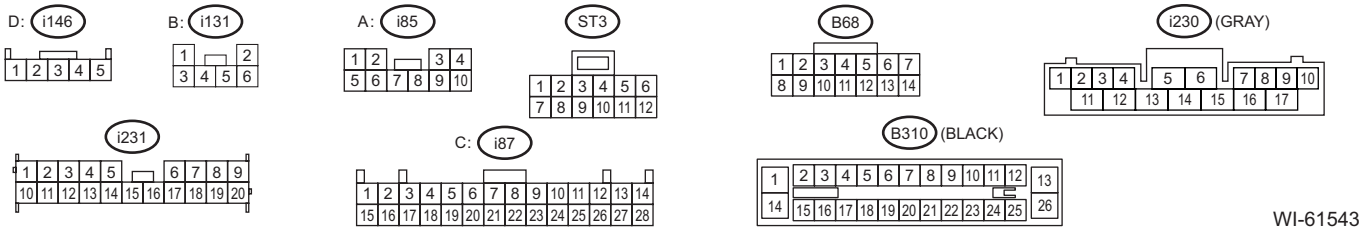
NAVI(WD)-03



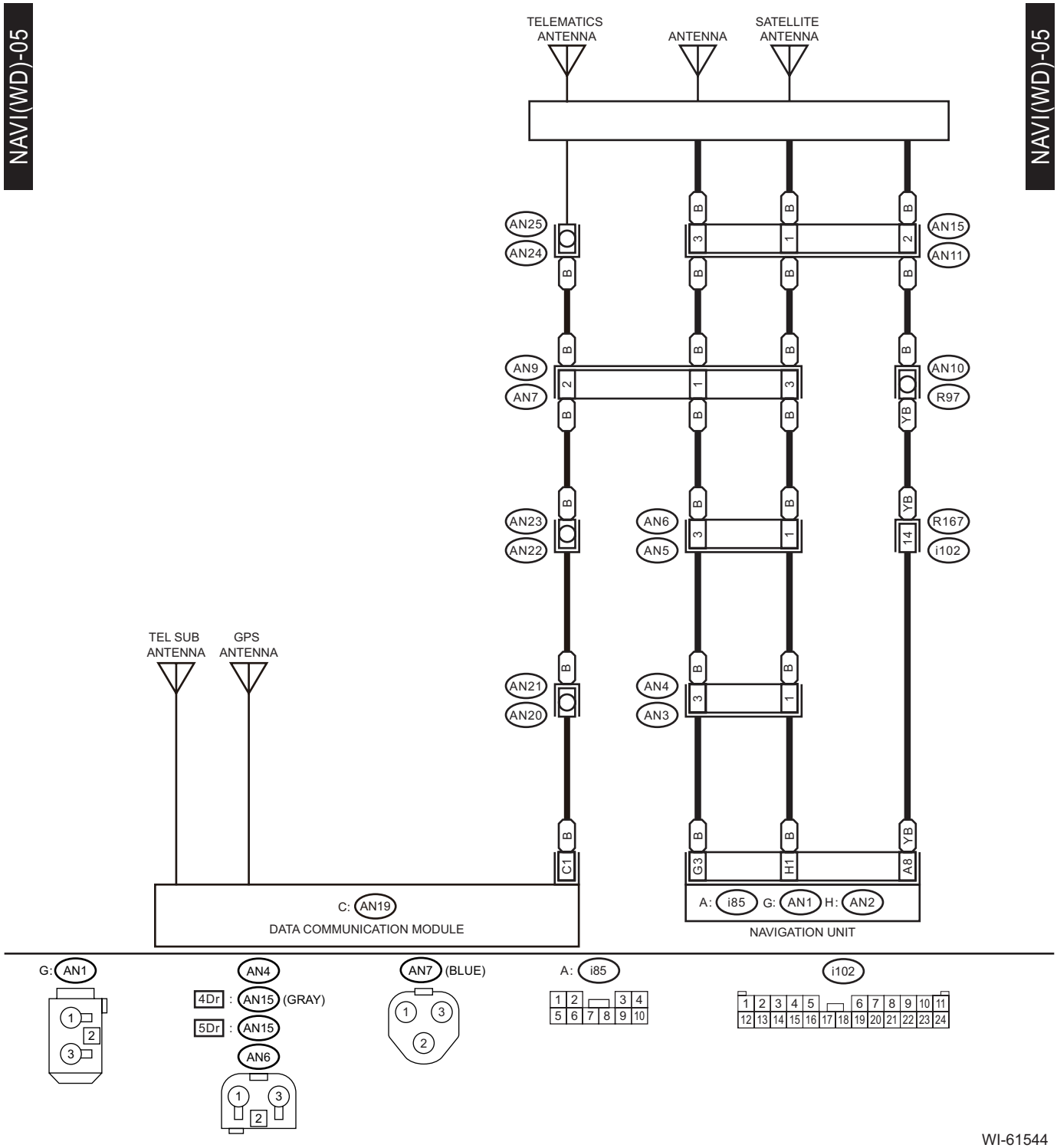


WI-61542


NAVI(WD)-04
SATELLITE SWITCH
UP
DOWN
RIGHT
LEFT
LIST
RETURN
MUTE/ENTER
TALK
SOURCE
ON HOOK
OFF HOOK
ST3
ST1
B68
10
11
6
2
12
5 V
6 BW
14 Br
10 YR
7 LY
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
ROLL CONNECTOR
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-04]
REF. TO REARVIEW CAMERA SYSTEM [RVCAM(S7)-01] [RVCAM(W7)-01]
B553
i231
LY
YR
Br
LY
Y
BrB
B552
i230
P
4
PG
*1 P
VDC CM
B310
C17 PG
A10 V
B5 BW
D2 W
D3 R
D1 B
D4 SB
C22 LY
C23 Y
C21 BrB
A: i85 B: i131 C: i87 D: i146
NAVIGATION UNIT
*1 : WITHOUT EyeSight : 27
WITH EyeSight : 11
NAVI(WD)-04


D: i146
B: i131
A: i85
ST3
B68
i230 (GRAY)
i231
C: i87
B310 (BLACK)
WI-61543

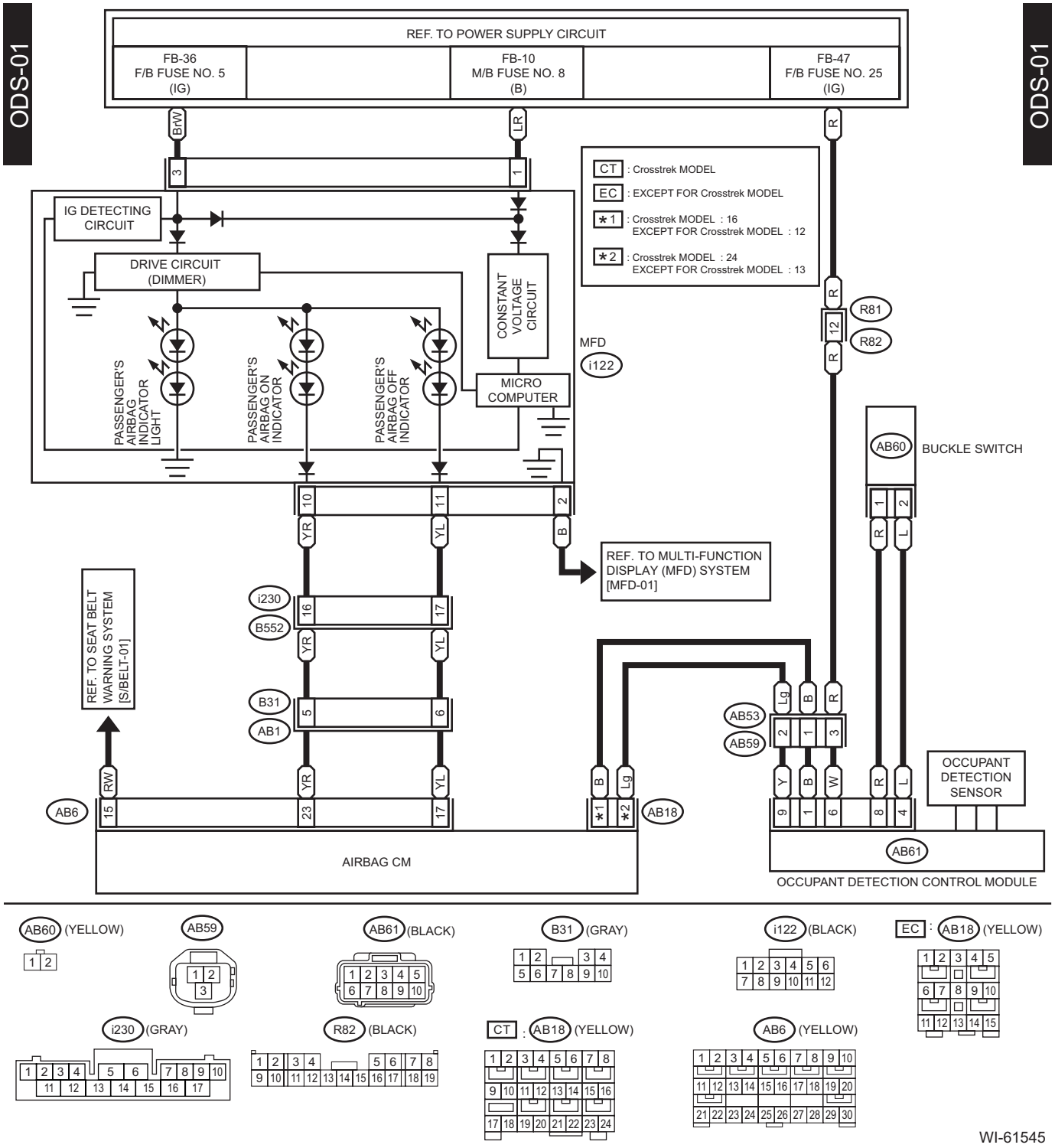
NAVI(WD)-05



WI-61544

33.Occupant Detection System

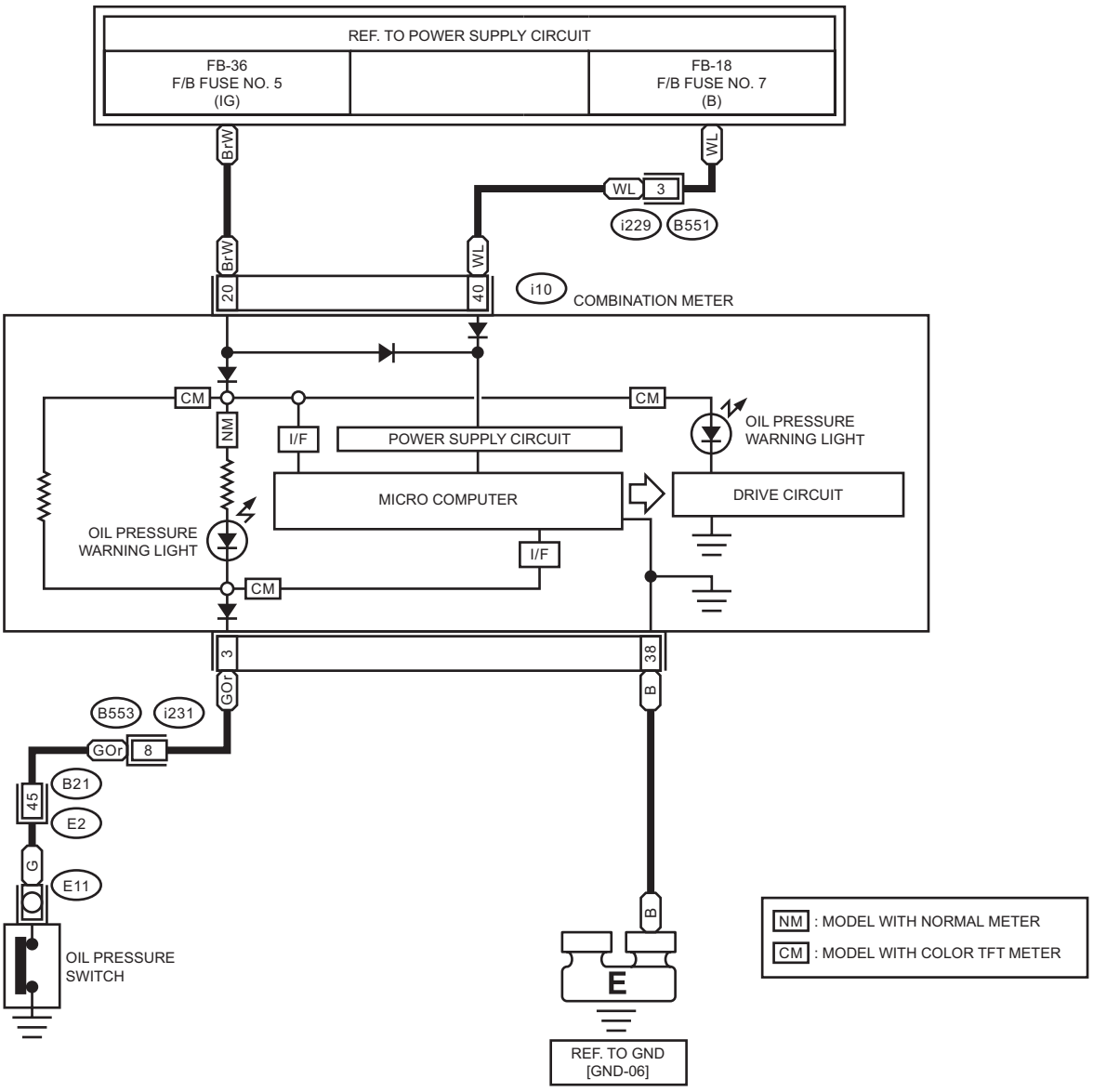
A: WIRING DIAGRAM

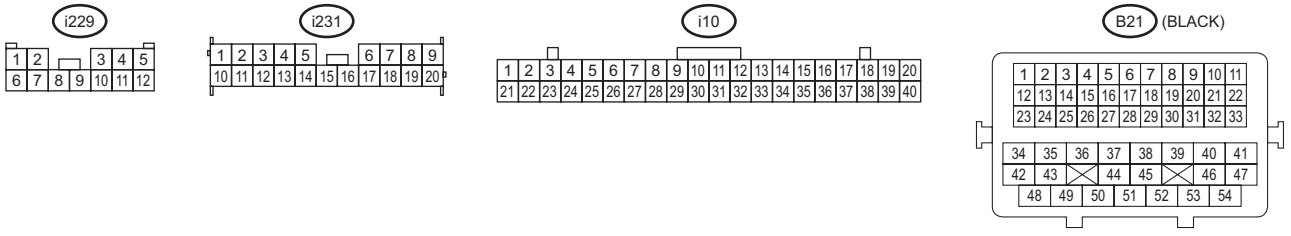


34.Oil Pressure Warning Light System

A: WIRING DIAGRAM

OIL/P-01

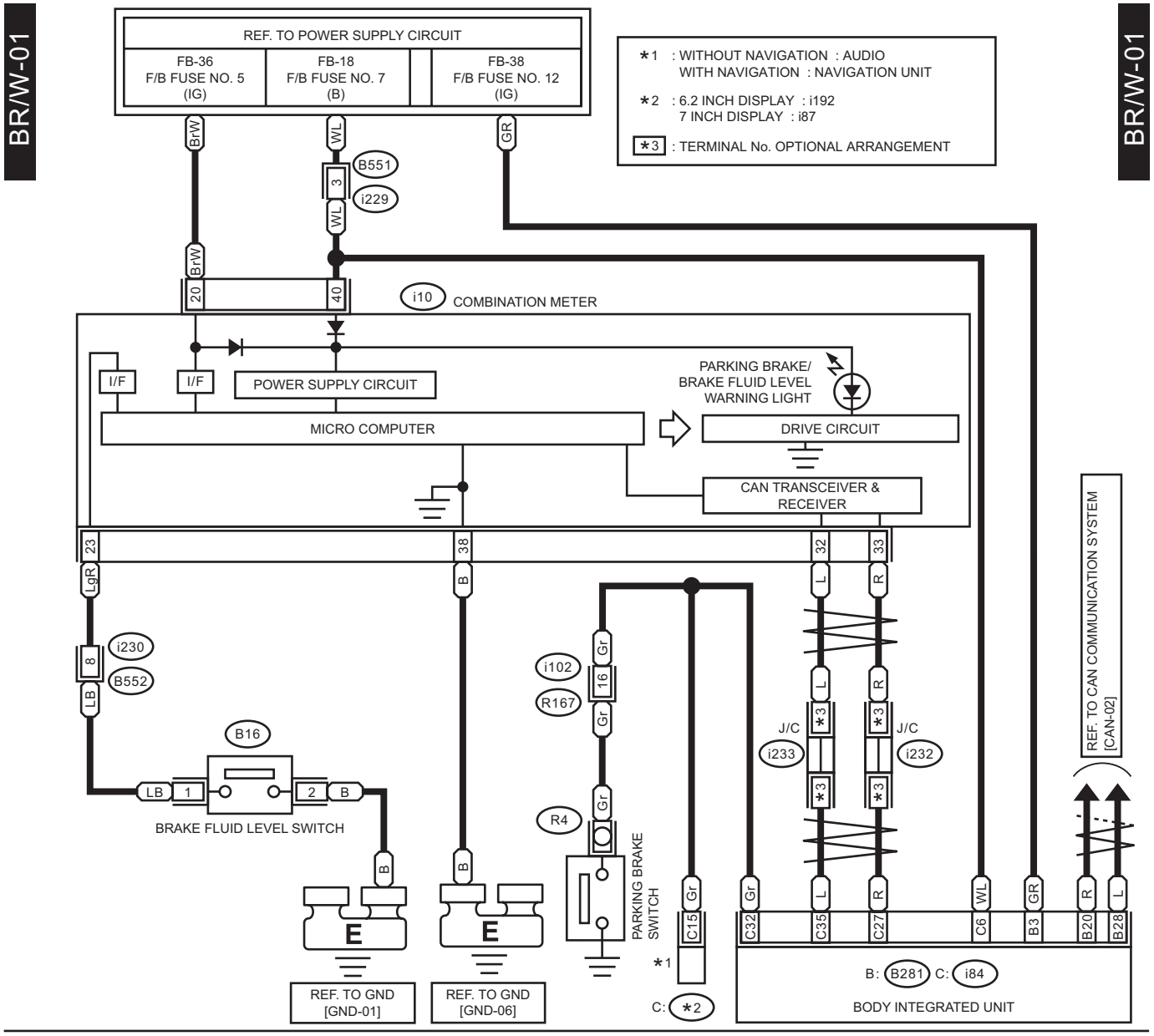




WI-61546

35.Parking Brake / Brake Fluid Level Warning Light System

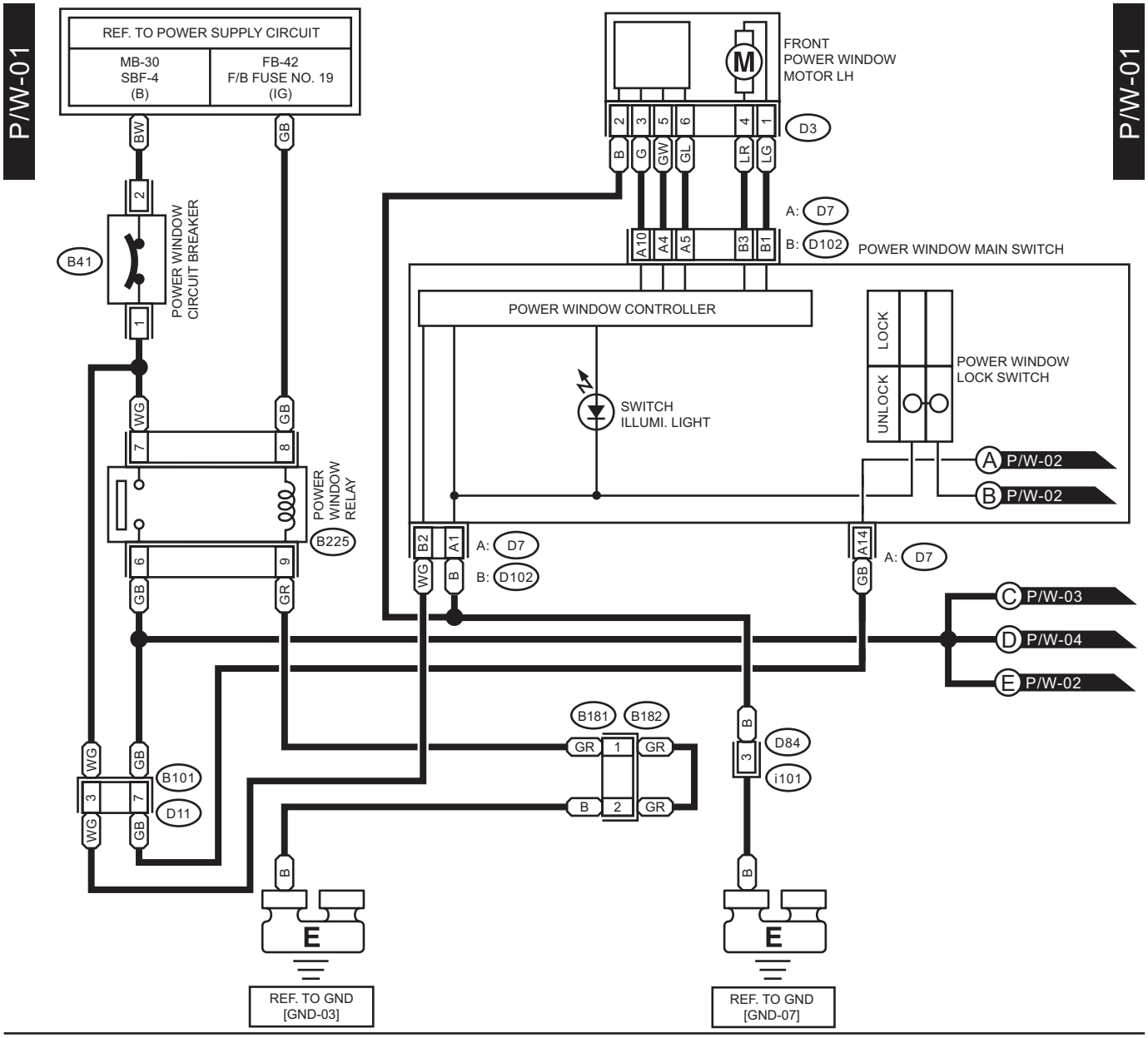
A: WIRING DIAGRAM

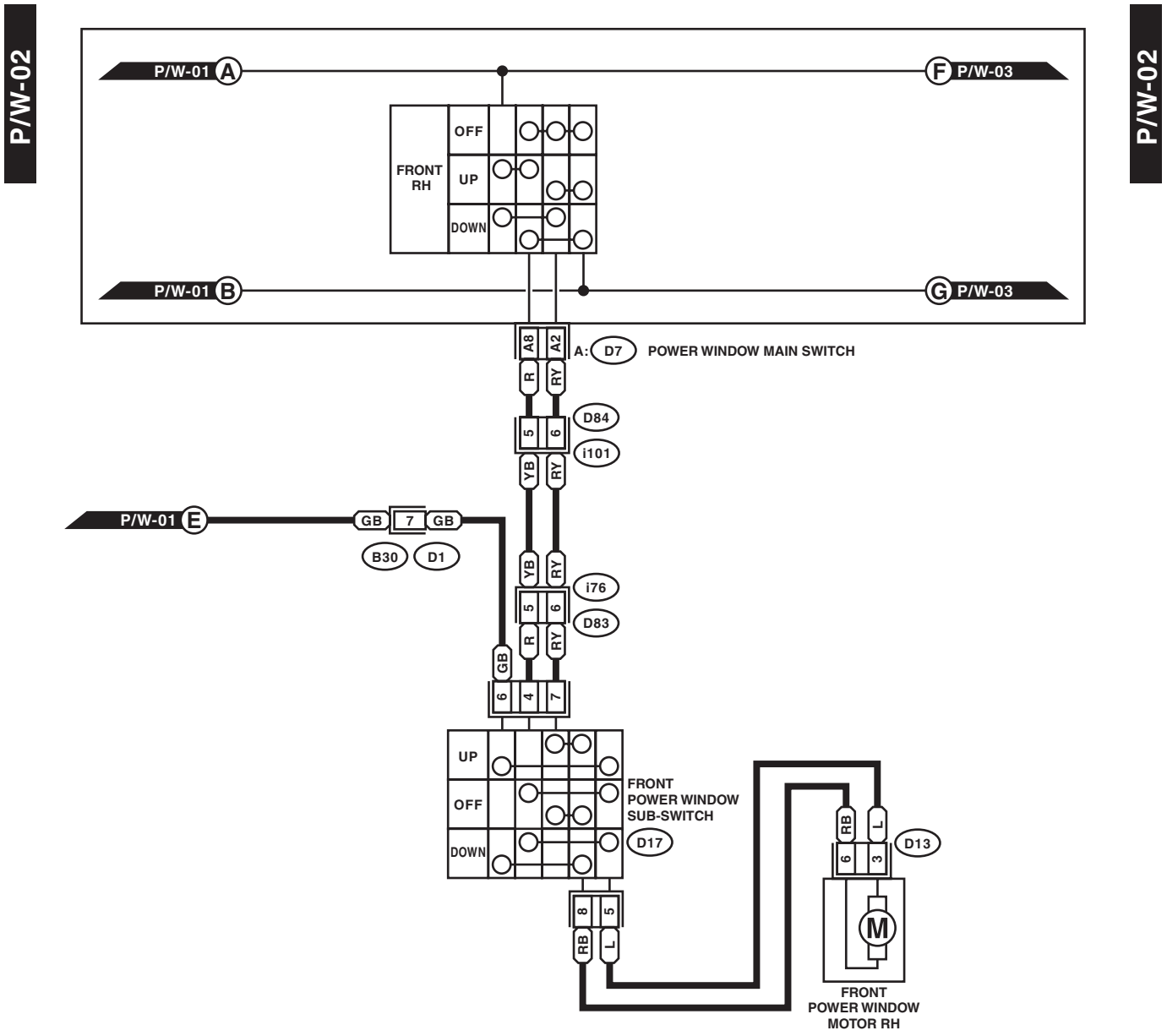


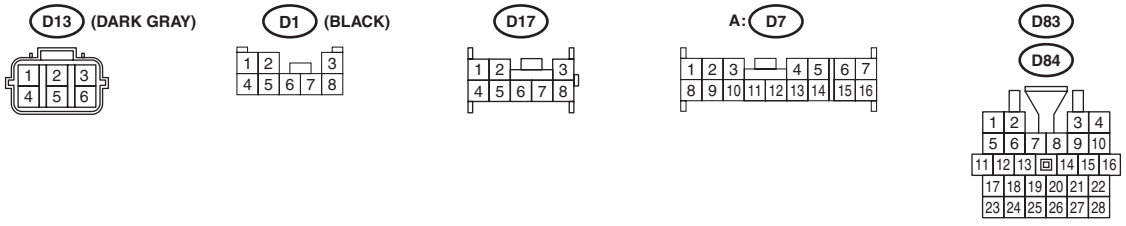
WI-61547

36.Power Window System

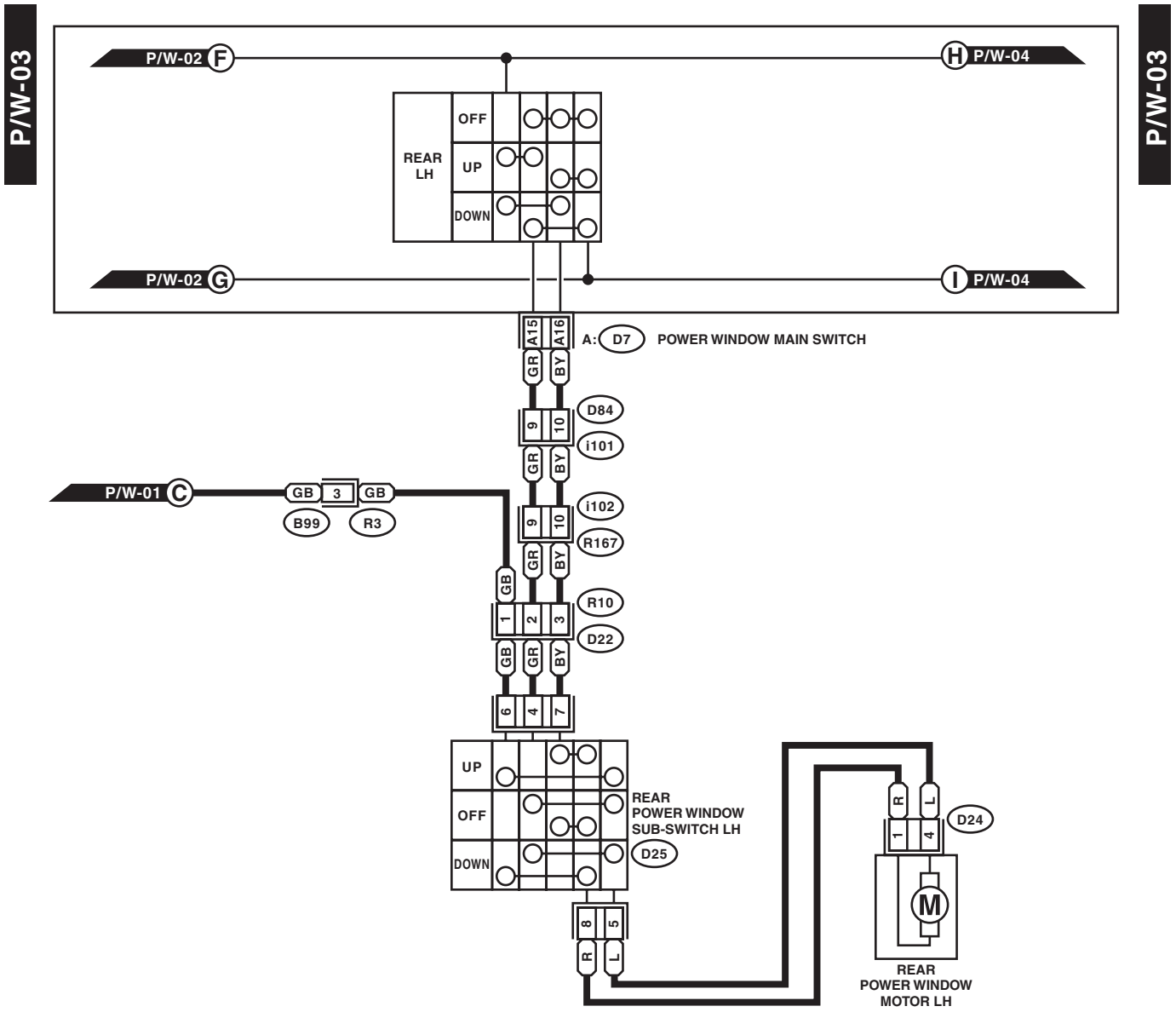
A: WIRING DIAGRAM

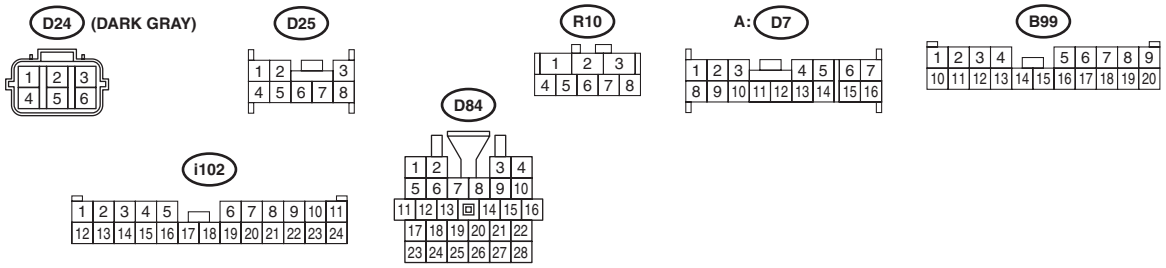



P/W-02
P/W-02
P/W-01 A
F P/W-03
FRONT RH
OFF
UP
DOWN
P/W-01 B
G P/W-03
A8
A2
A: D7 POWER WINDOW MAIN SWITCH
R
RY
D84
5
6
i101
YB
RY
P/W-01 E
GB
7
GB
B30
D1
YB
RY
i76
5
6
D83
R
RY
GB
6
4
7
UP
OFF
DOWN
FRONT POWER WINDOW SUB-SWITCH
D17
8
5
RB
L
RB
L
D13
6
3
M
FRONT POWER WINDOW MOTOR RH


D13 (DARK GRAY)
D1 (BLACK)
D17
A: D7
D83
D84

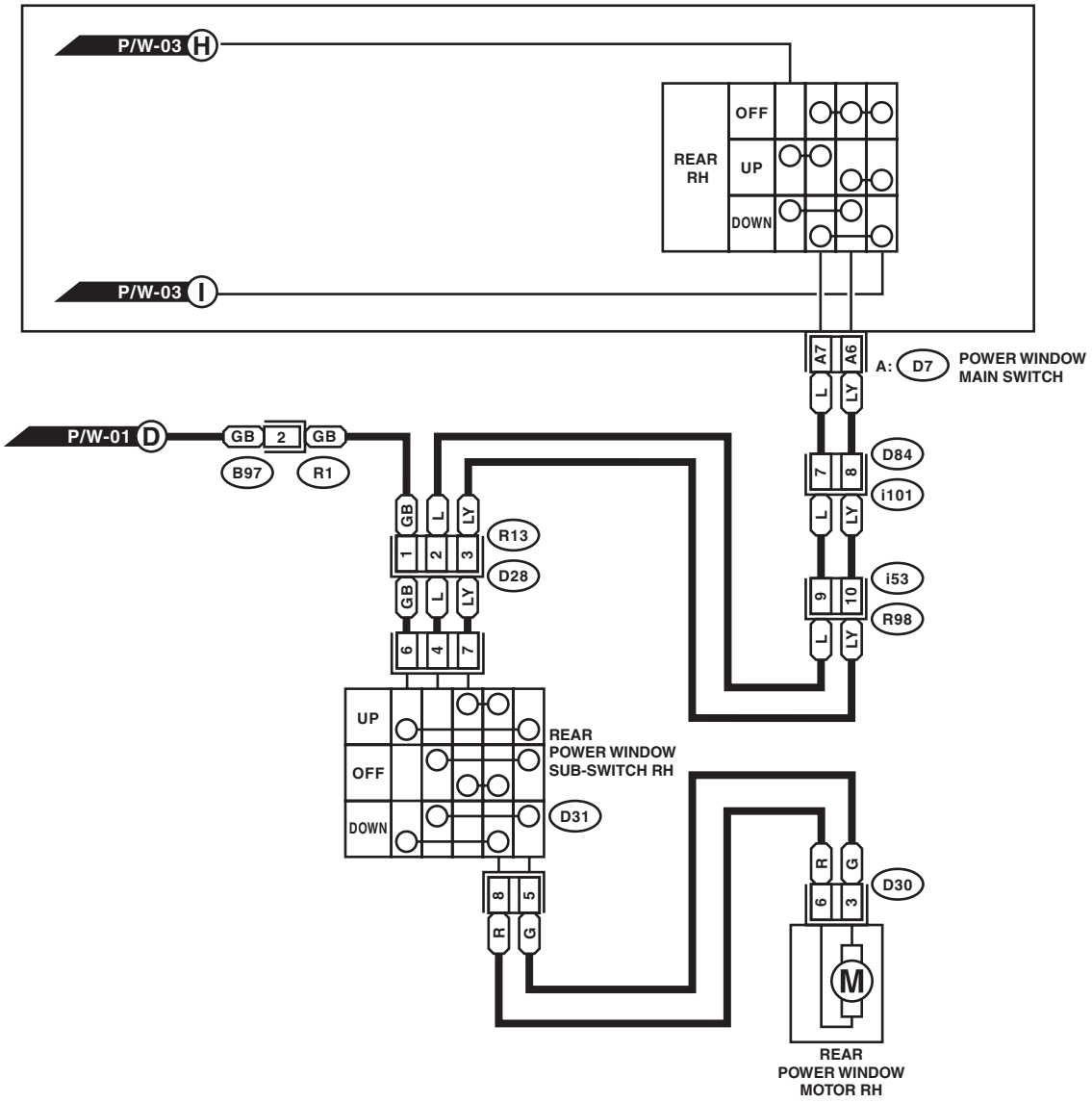
WI-48733

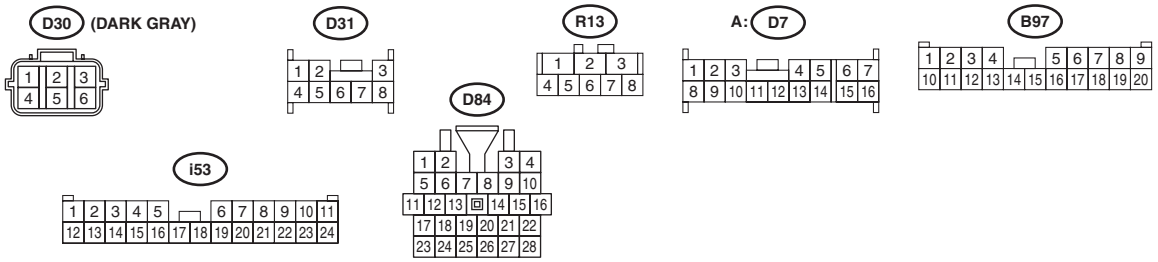

P/W-03
P/W-03
P/W-02 F
H P/W-04
REAR LH
OFF
UP
DOWN
P/W-02 G
I P/W-04
A15
A16
A: D7 POWER WINDOW MAIN SWITCH
GR
BY
D84
9
10
i101
P/W-01 C
GB
3
B99
R3
i102
R167
R10
D22
1
2
6
4
7
UP
OFF
DOWN
REAR POWER WINDOW SUB-SWITCH LH
D25
8
5
R
L
D24
M
REAR POWER WINDOW MOTOR LH


D24 (DARK GRAY)
D25
R10
A: D7
B99
i102
D84

WI-48734

P/W-04

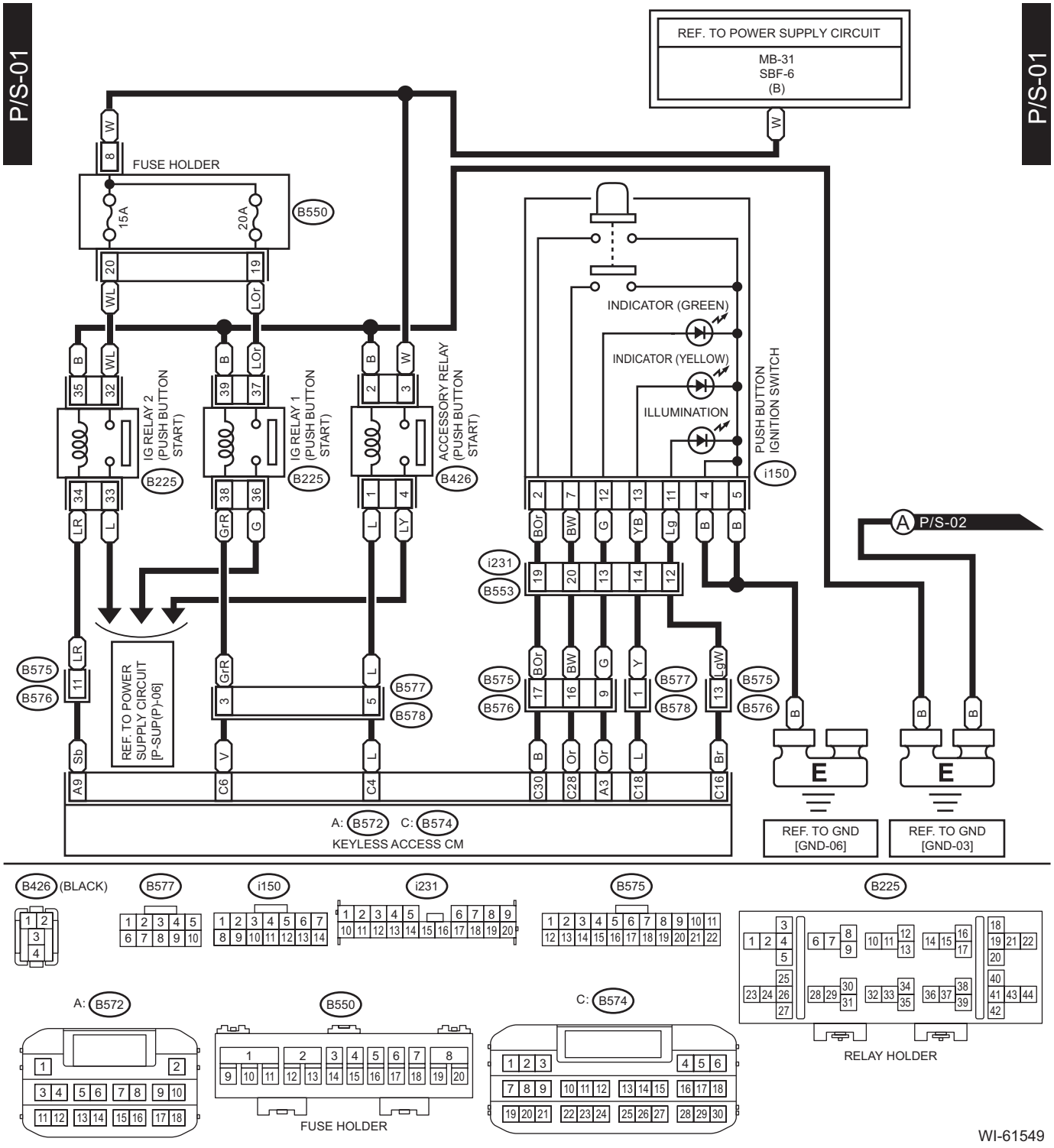


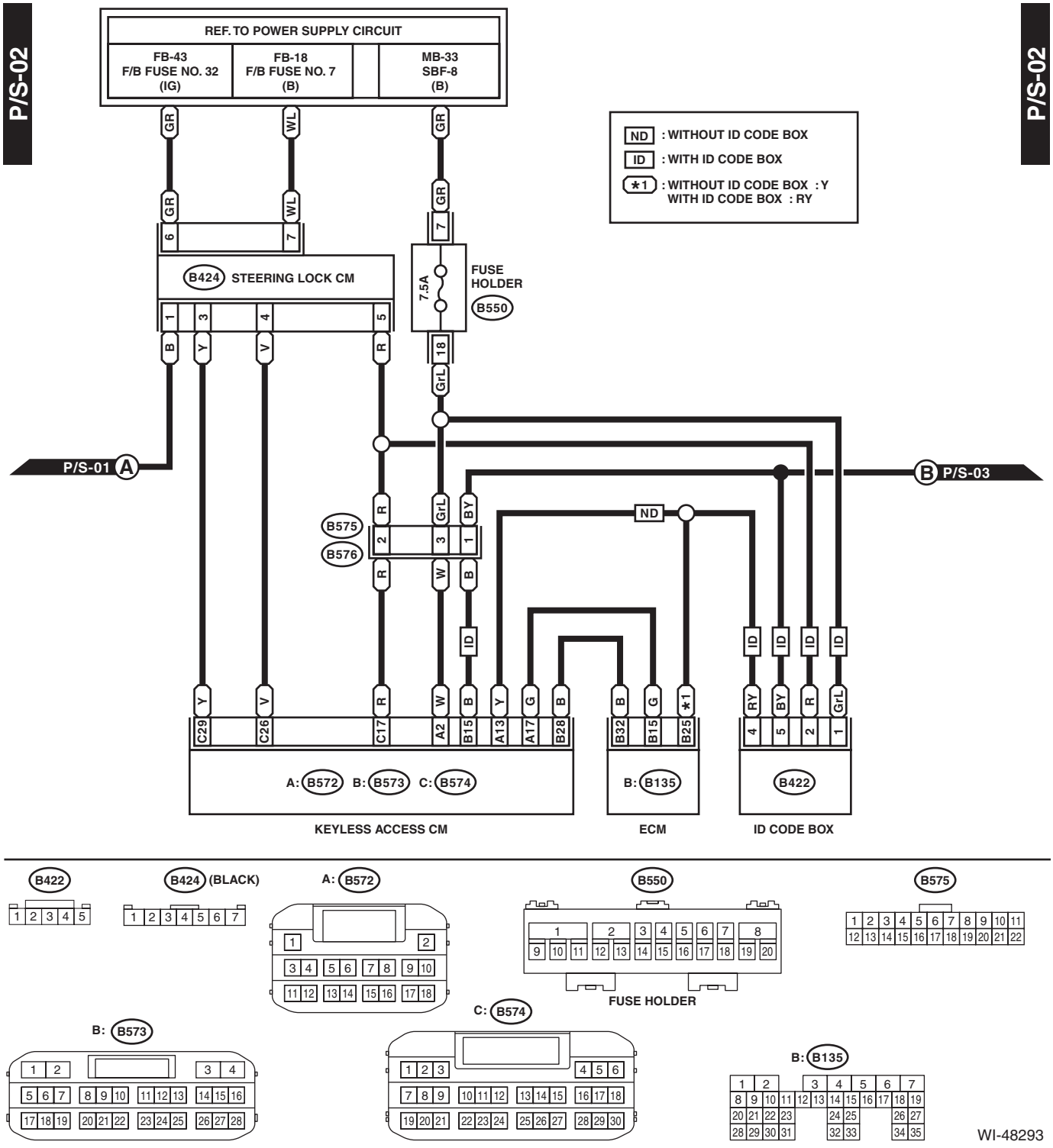


WI-48735

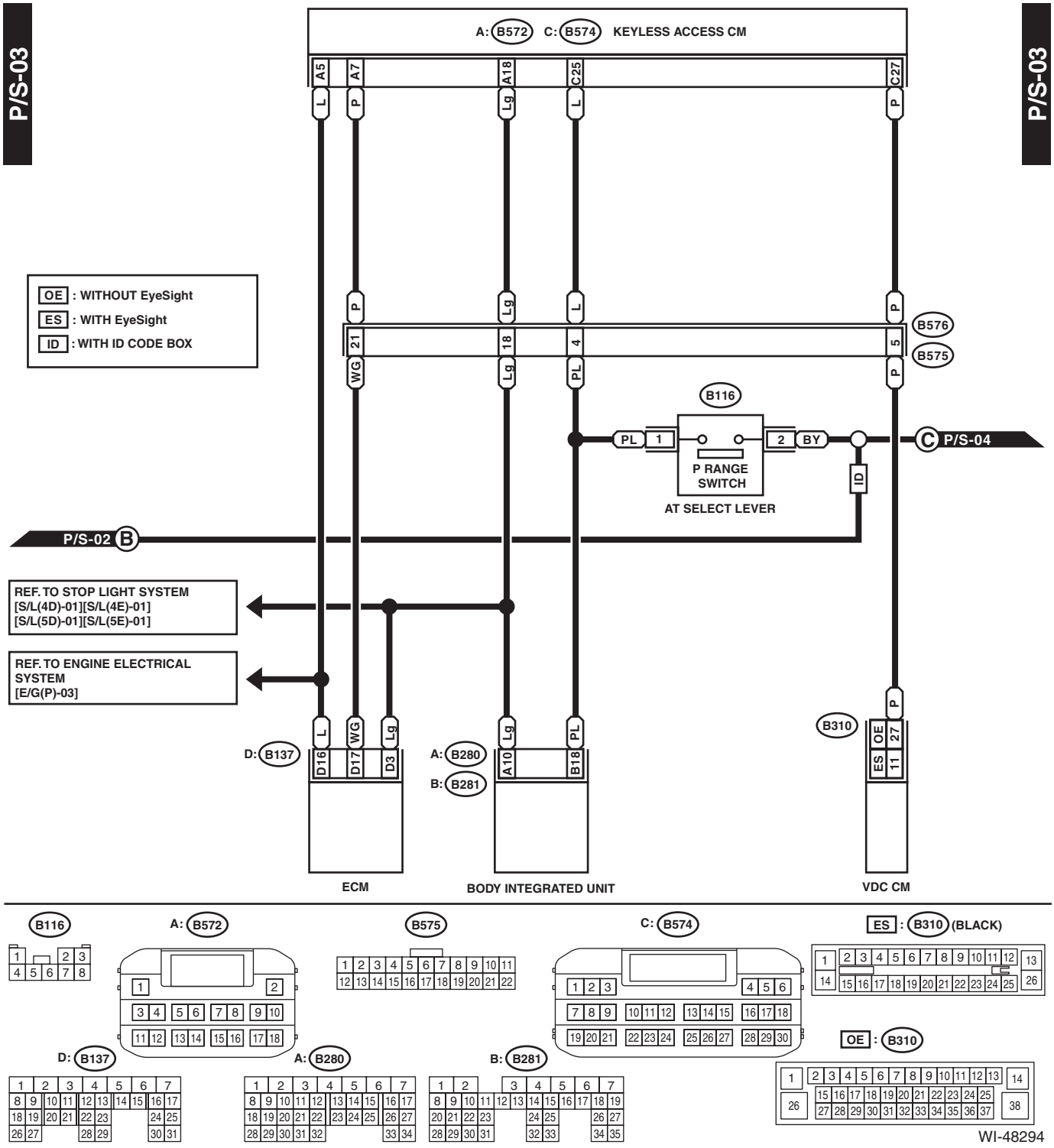
37.Push Button Start System

A: WIRING DIAGRAM

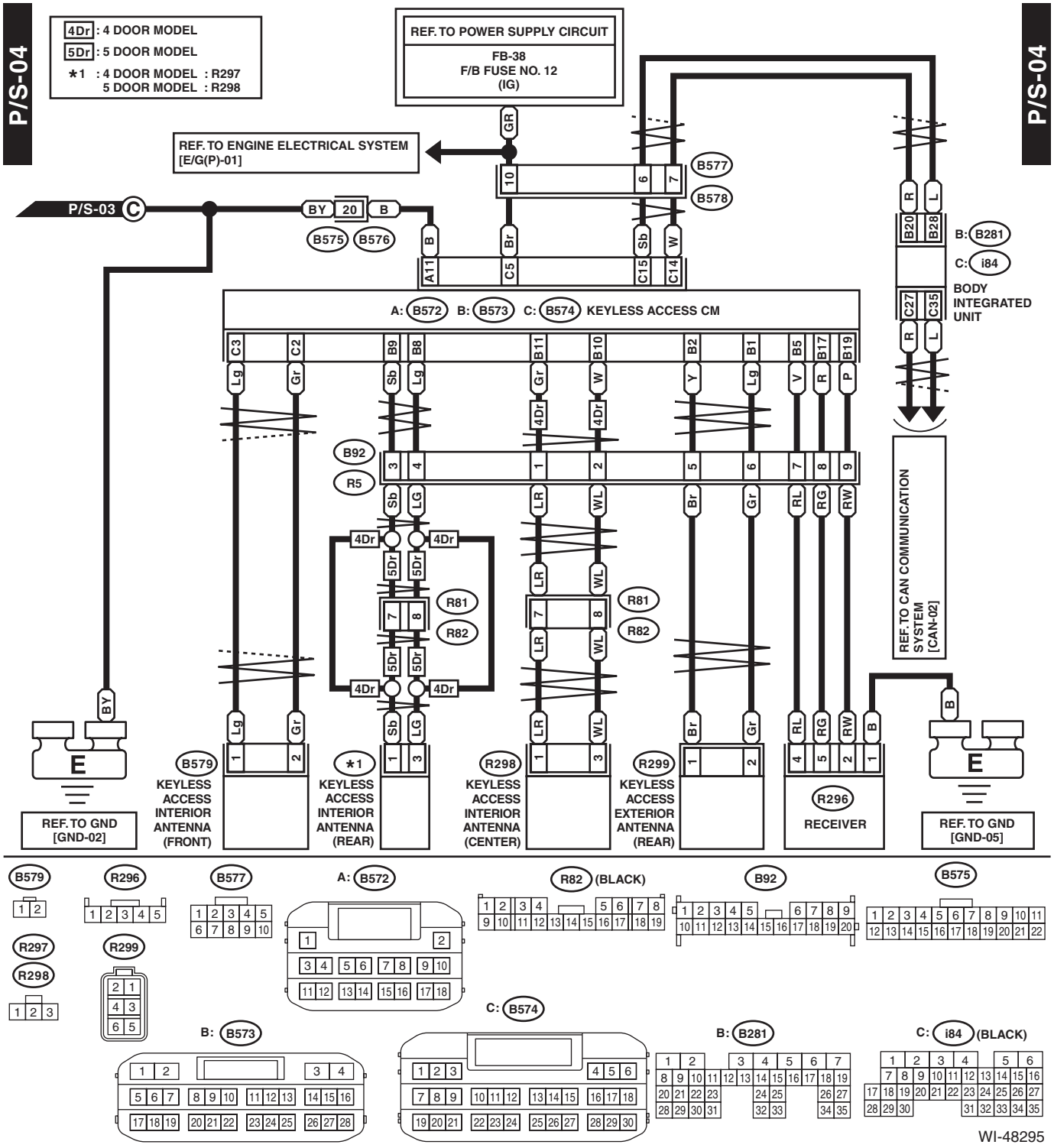



P/S-02
P/S-02
REF. TO POWER SUPPLY CIRCUIT
FB-43 F/B FUSE NO. 32 (IG)
FB-18 F/B FUSE NO. 7 (B)
MB-33 SBF-8 (B)
ND : WITHOUT ID CODE BOX
ID : WITH ID CODE BOX
*1 : WITHOUT ID CODE BOX : Y
WITH ID CODE BOX : RY
B424 STEERING LOCK CM
7.5A
FUSE HOLDER
B550
P/S-01 A
B P/S-03
B575
B576
ND
KEYLESS ACCESS CM
A: B572 B: B573 C: B574
ECM
B: B135
ID CODE BOX
B422

B422
B424 (BLACK)
A: B572
B550
B575
FUSE HOLDER
B: B573
C: B574
B: B135
WI-48293

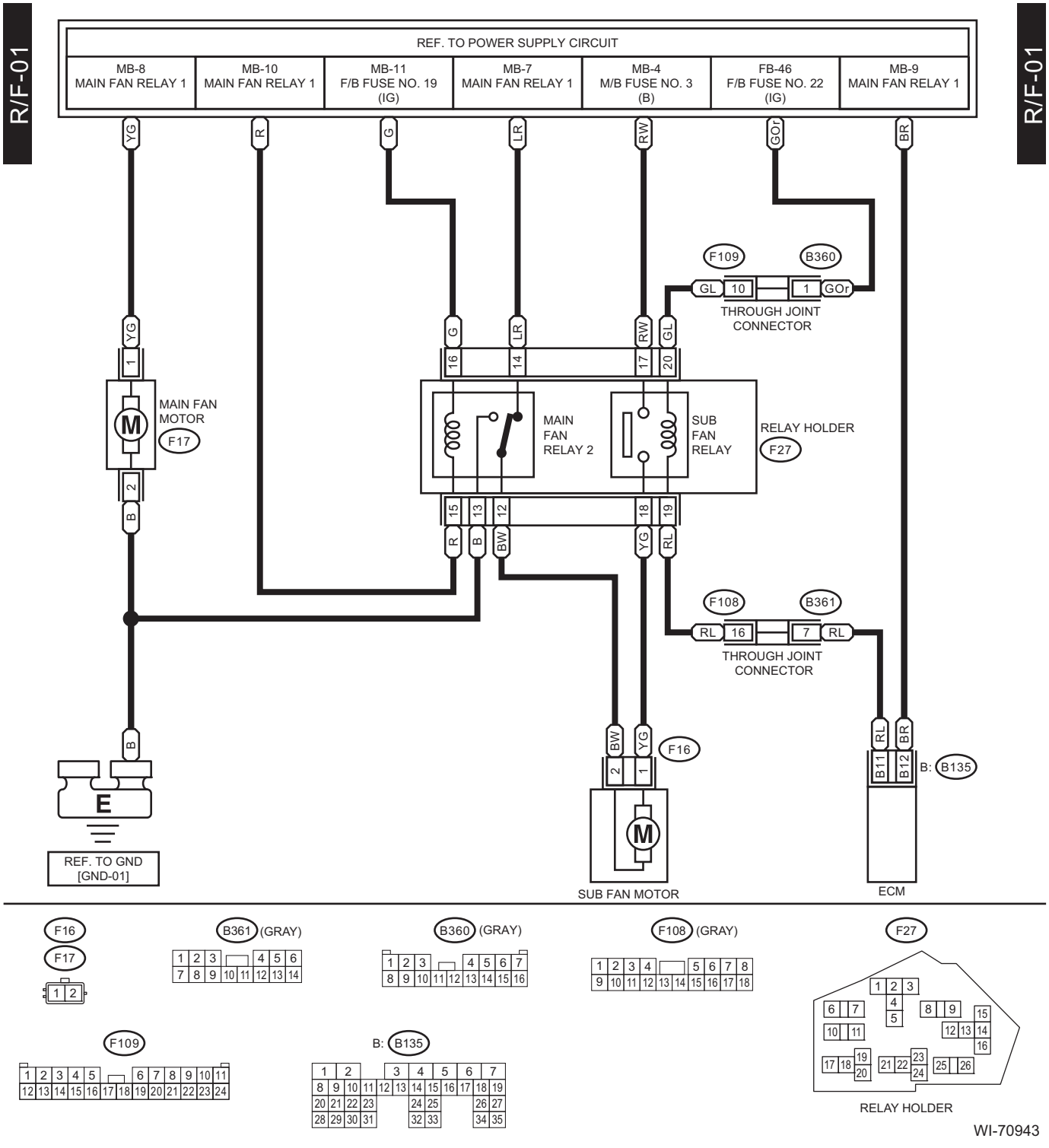

P/S-03
P/S-03
A: B572 C: B574 KEYLESS ACCESS CM
A5
A7
A18
C25
C27
L
P
Lg
L
P
OE : WITHOUT EyeSight
ES : WITH EyeSight
ID : WITH ID CODE BOX
B576
B575
21
18
4
5
WG
Lg
PL
P
B116
PL
1
2
BY
C P/S-04
P RANGE SWITCH
AT SELECT LEVER
ID
P/S-02 B
REF. TO STOP LIGHT SYSTEM [S/L(4D)-01][S/L(4E)-01] [S/L(5D)-01][S/L(5E)-01]
REF. TO ENGINE ELECTRICAL SYSTEM [E/G(P)-03]
D: B137
D16
D17
D3
A: B280
B: B281
A10
B18
B310
OE
ES
27
11
ECM
BODY INTEGRATED UNIT
VDC CM

B116
A: B572
B575
C: B574
ES : B310 (BLACK)
D: B137
A: B280
B: B281
OE : B310
WI-48294


P/S-04
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
*1 : 4 DOOR MODEL : R297
5 DOOR MODEL : R298
REF. TO POWER SUPPLY CIRCUIT
FB-38
F/B FUSE NO. 12
(IG)
REF. TO ENGINE ELECTRICAL SYSTEM [E/G(P)-01]
P/S-03
A: B572 B: B573 C: B574 KEYLESS ACCESS CM
B: B281
C: i84
BODY INTEGRATED UNIT
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
B579 KEYLESS ACCESS INTERIOR ANTENNA (FRONT)
*1 KEYLESS ACCESS INTERIOR ANTENNA (REAR)
R298 KEYLESS ACCESS INTERIOR ANTENNA (CENTER)
R299 KEYLESS ACCESS EXTERIOR ANTENNA (REAR)
R296 RECEIVER
REF. TO GND [GND-02]
REF. TO GND [GND-05]
R82 (BLACK)
C: i84 (BLACK)
WI-48295

38.Radiator Fan System

A: WIRING DIAGRAM

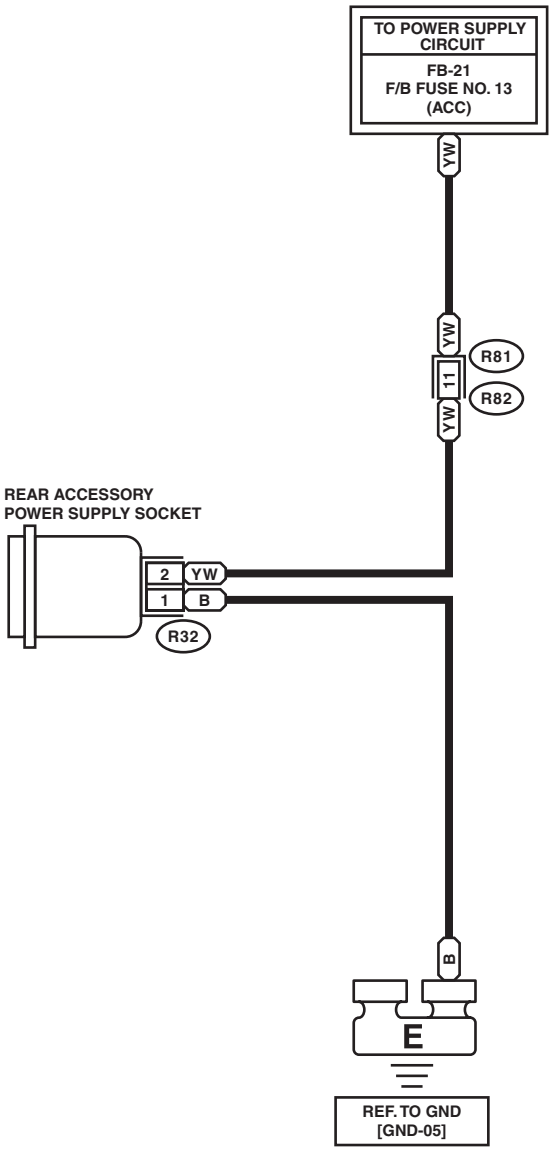


WI-70943

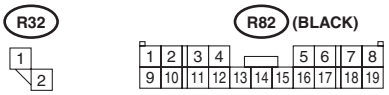
39.Rear Accessory Power Supply Socket System

A: WIRING DIAGRAM

RAPS-01



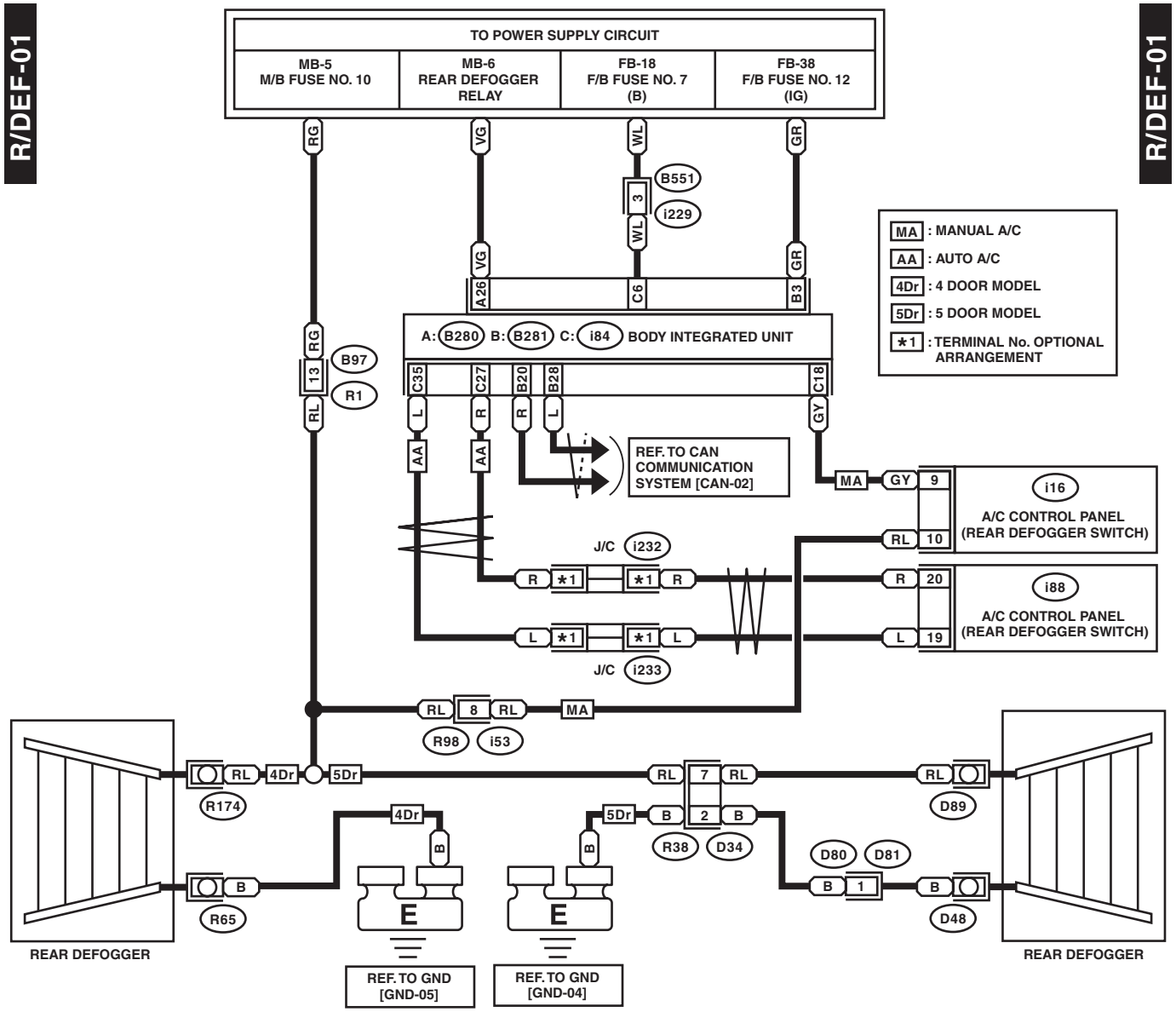
RAPS-01

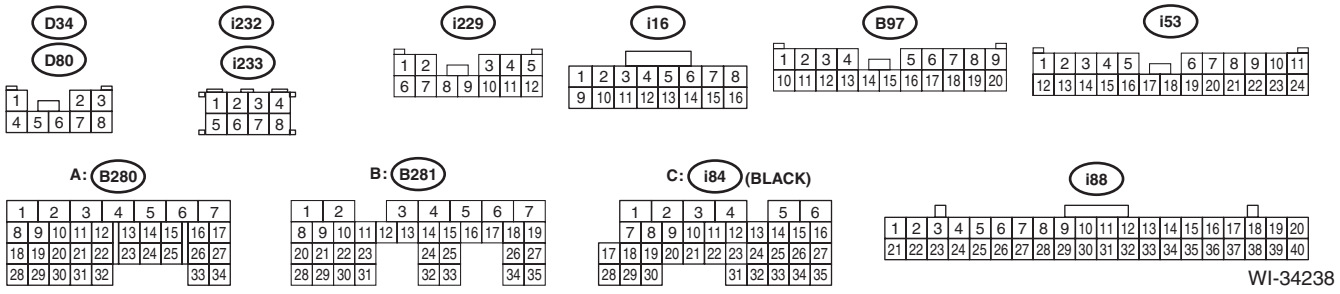


WI-34237

40.Rear Defogger System

A: WIRING DIAGRAM





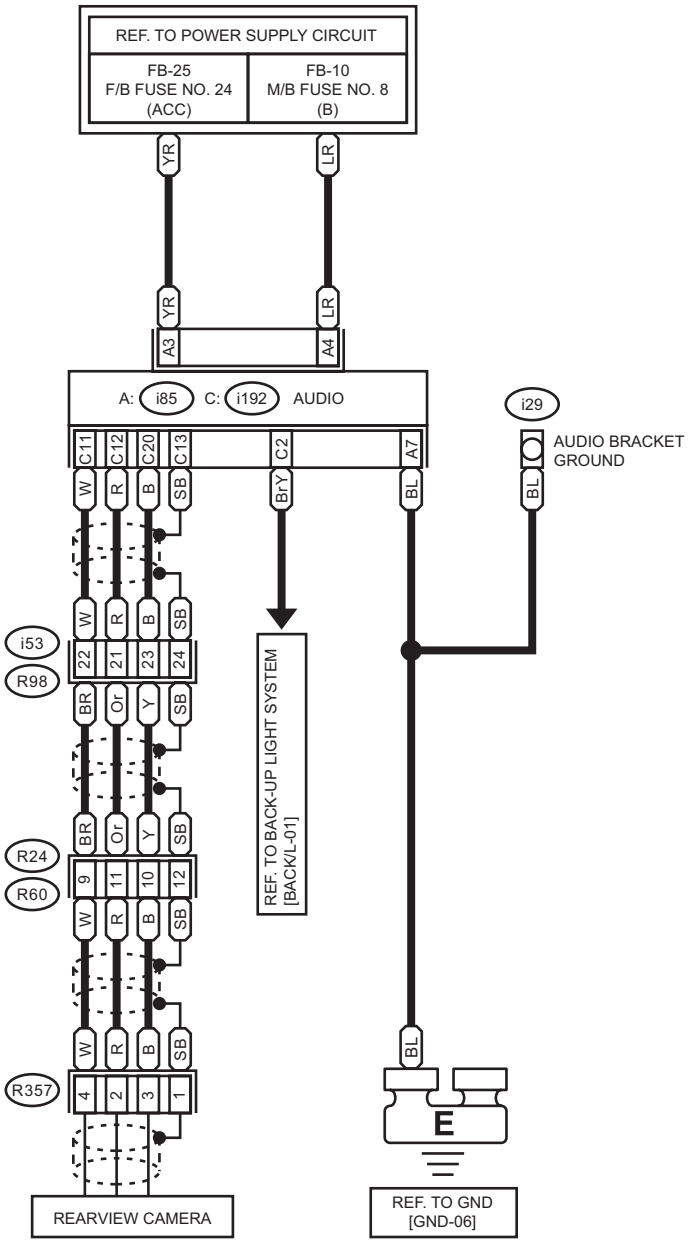
WI-34238

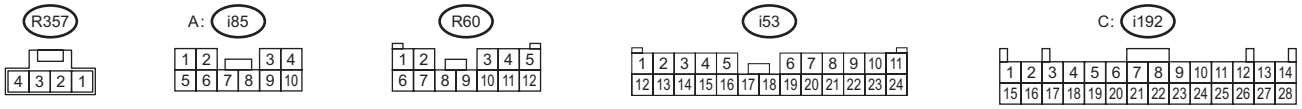
41.Rearview Camera System

A: WIRING DIAGRAM

1. 4 DOOR MODEL (6.2 INCH DISPLAY)

RVCAM(S6)-01

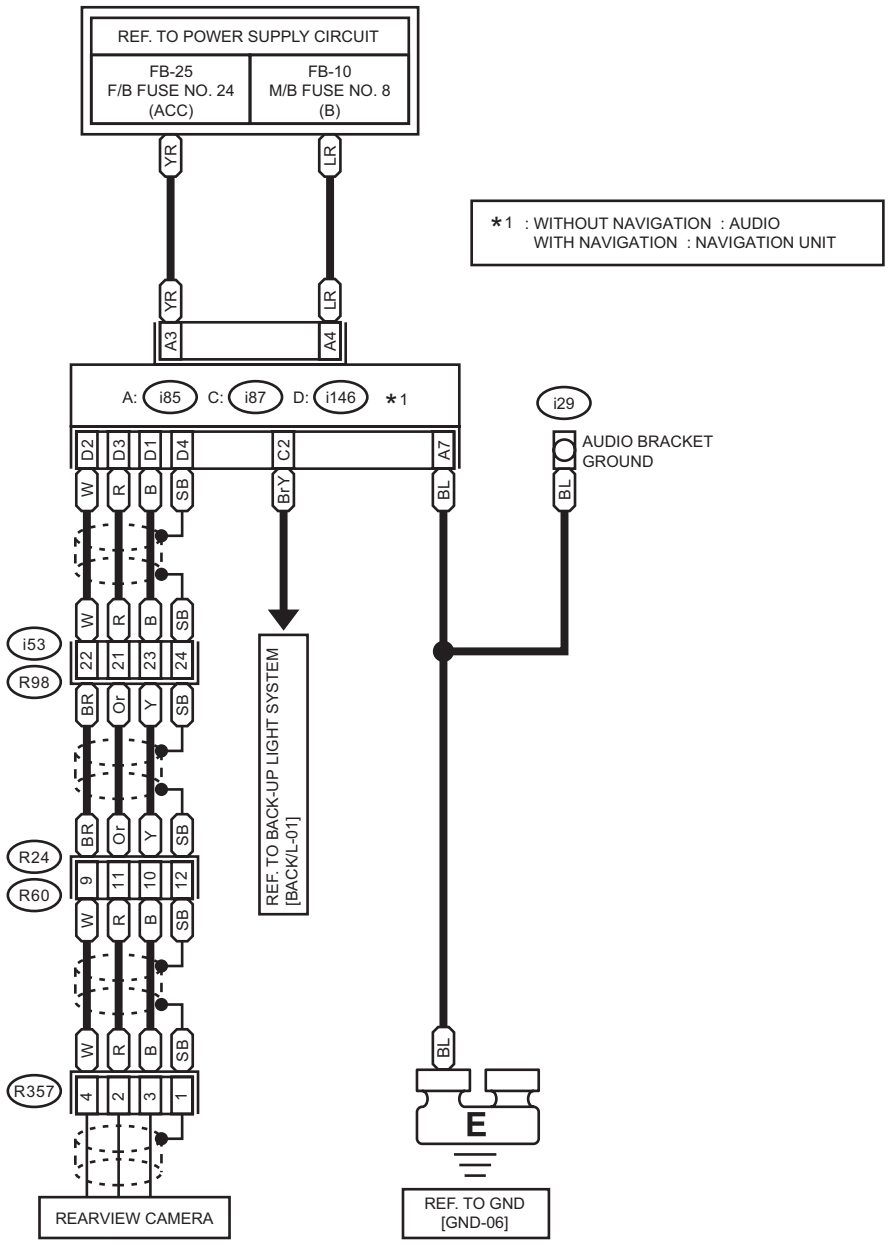


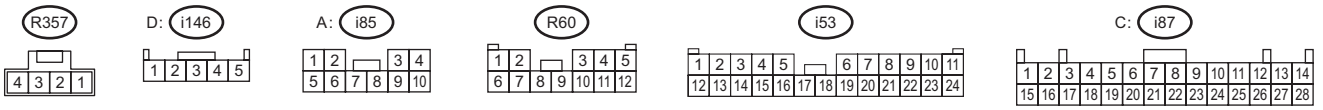


WI-61550

2. 4 DOOR MODEL (7 INCH DISPLAY)

RVCAM(S7)-01



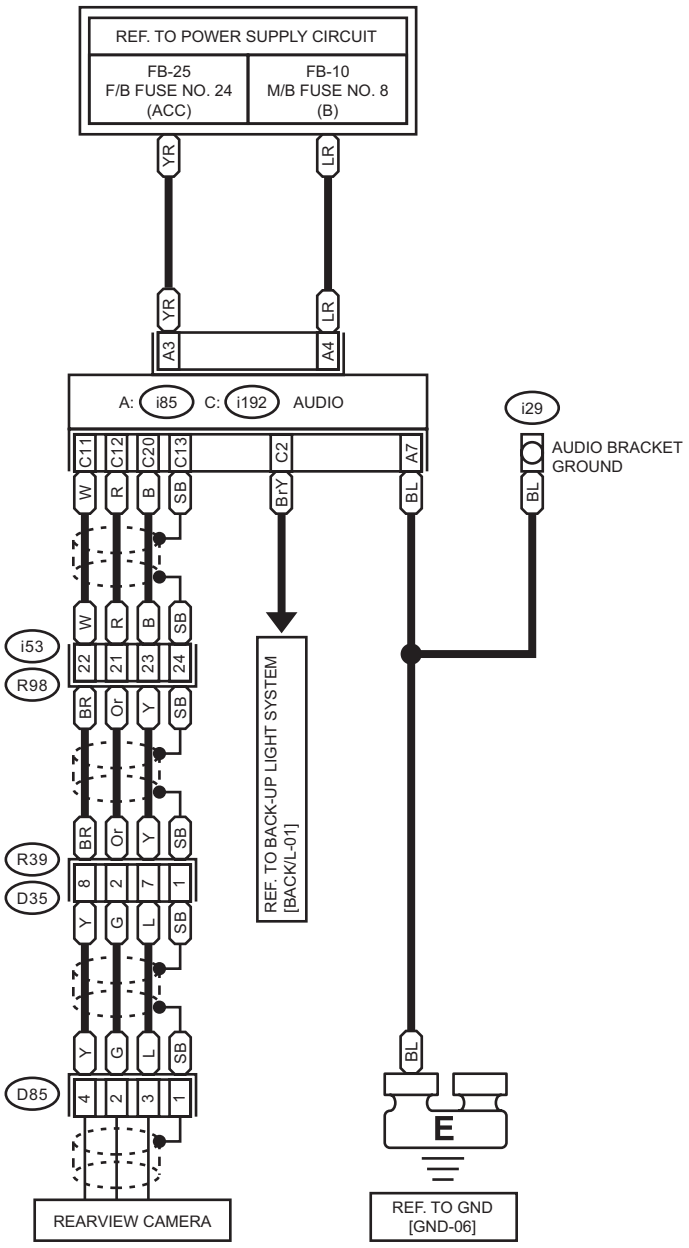


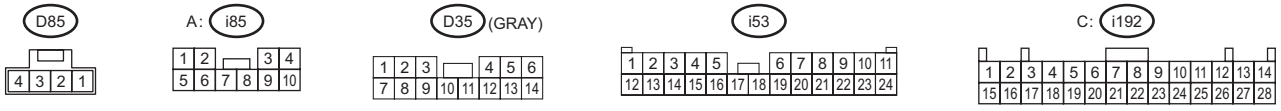
WI-61551

3. 5 DOOR MODEL (6.2 INCH DISPLAY)

RVCAM(W6)-01

RVCAM(W6)-01

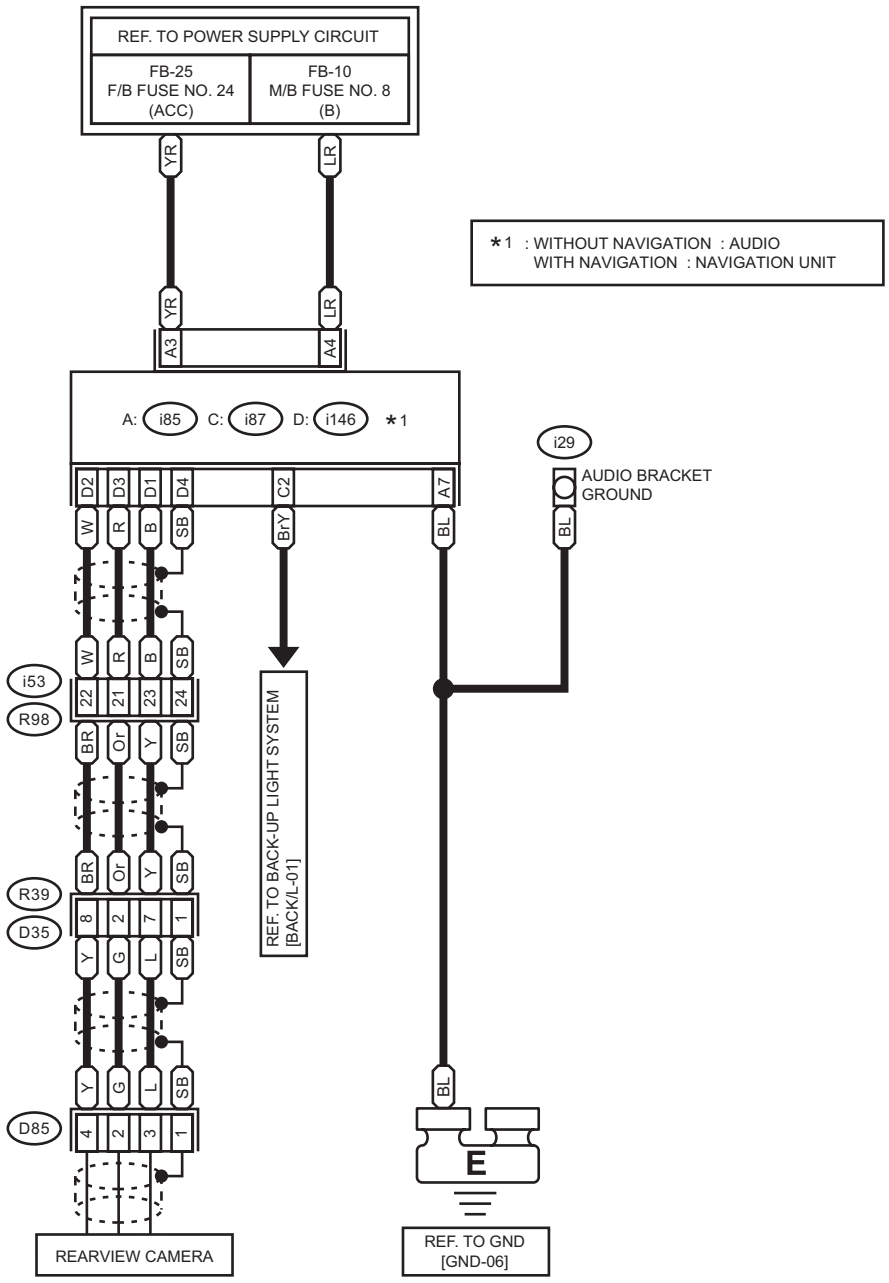


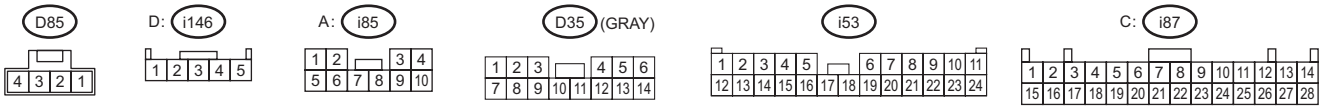


WI-61552

4. 5 DOOR MODEL (7 INCH DISPLAY)

RVCAM(W7)-01



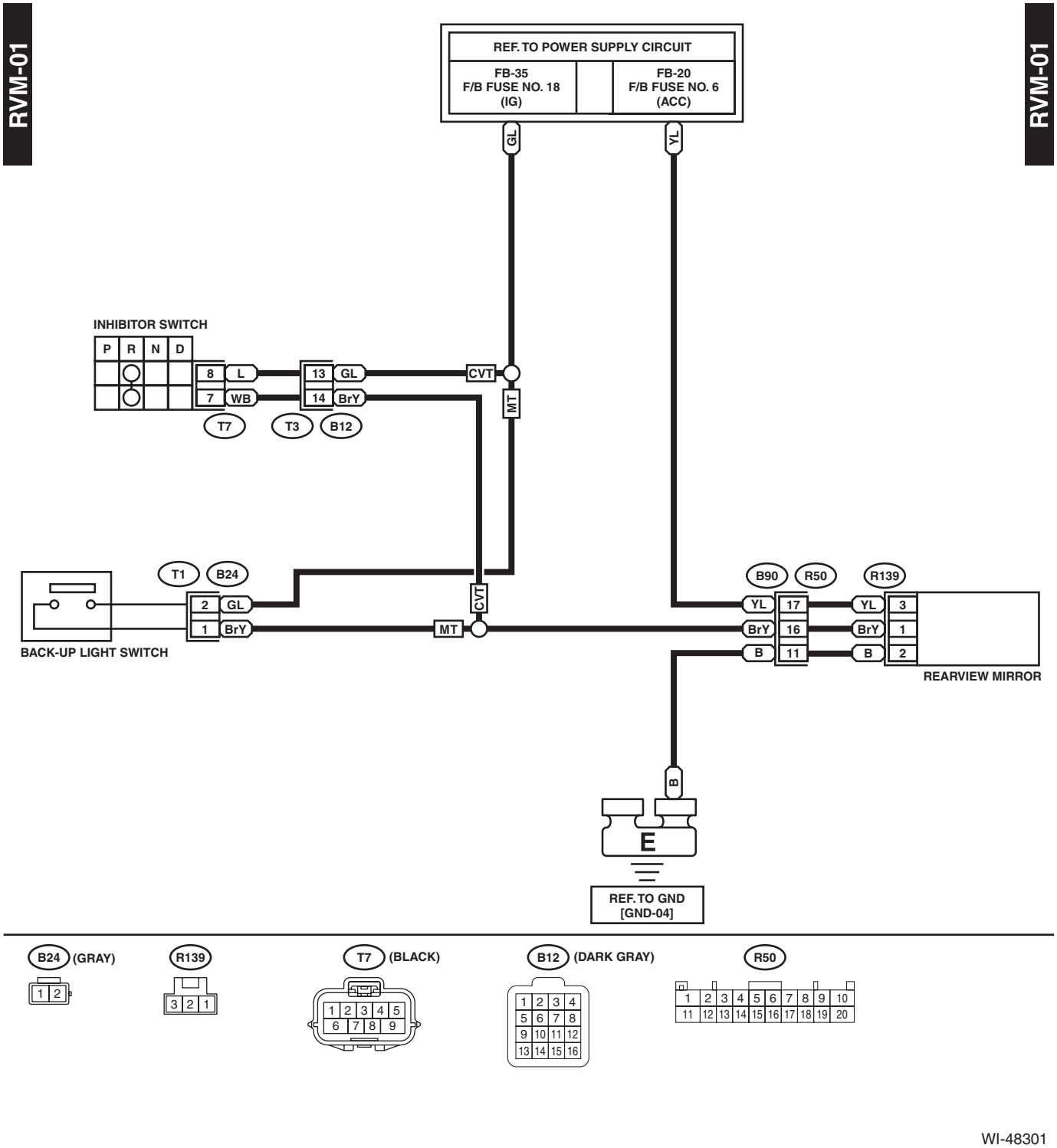


WI-61553

RVCAM(W7)-01

42.Rearview Mirror System

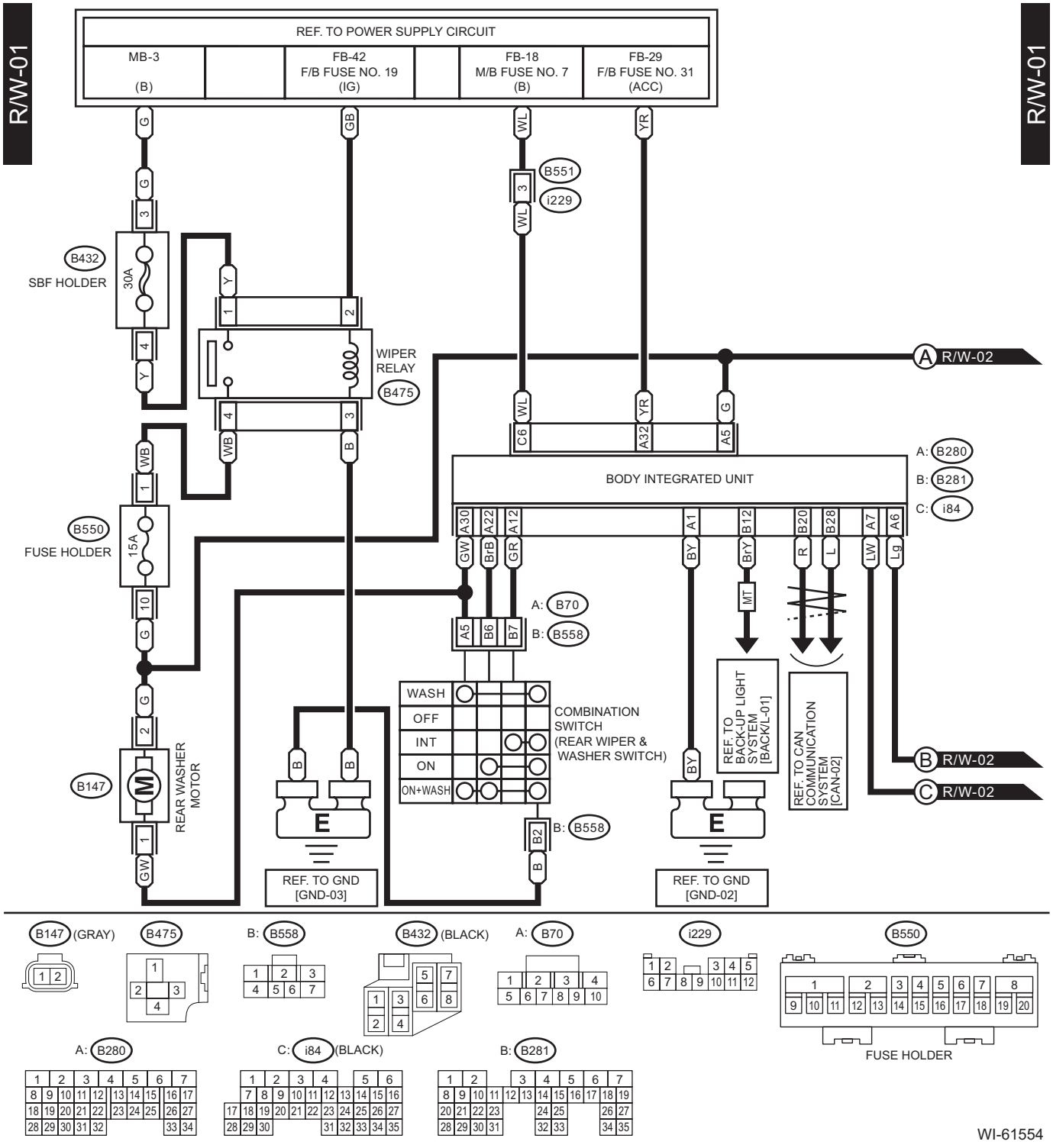
A: WIRING DIAGRAM



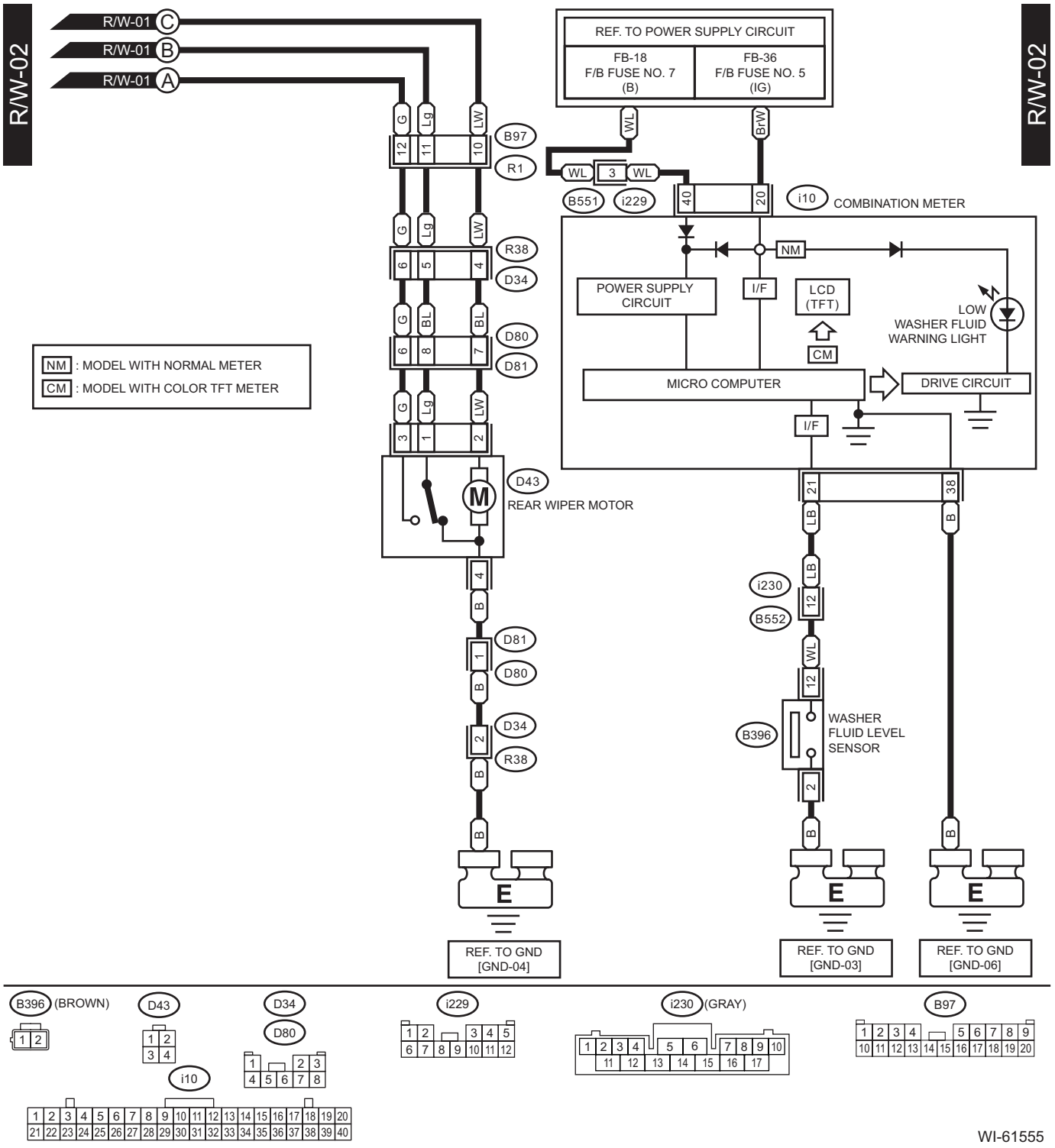
WI-48301

43.Rear Wiper and Washer System

A: WIRING DIAGRAM



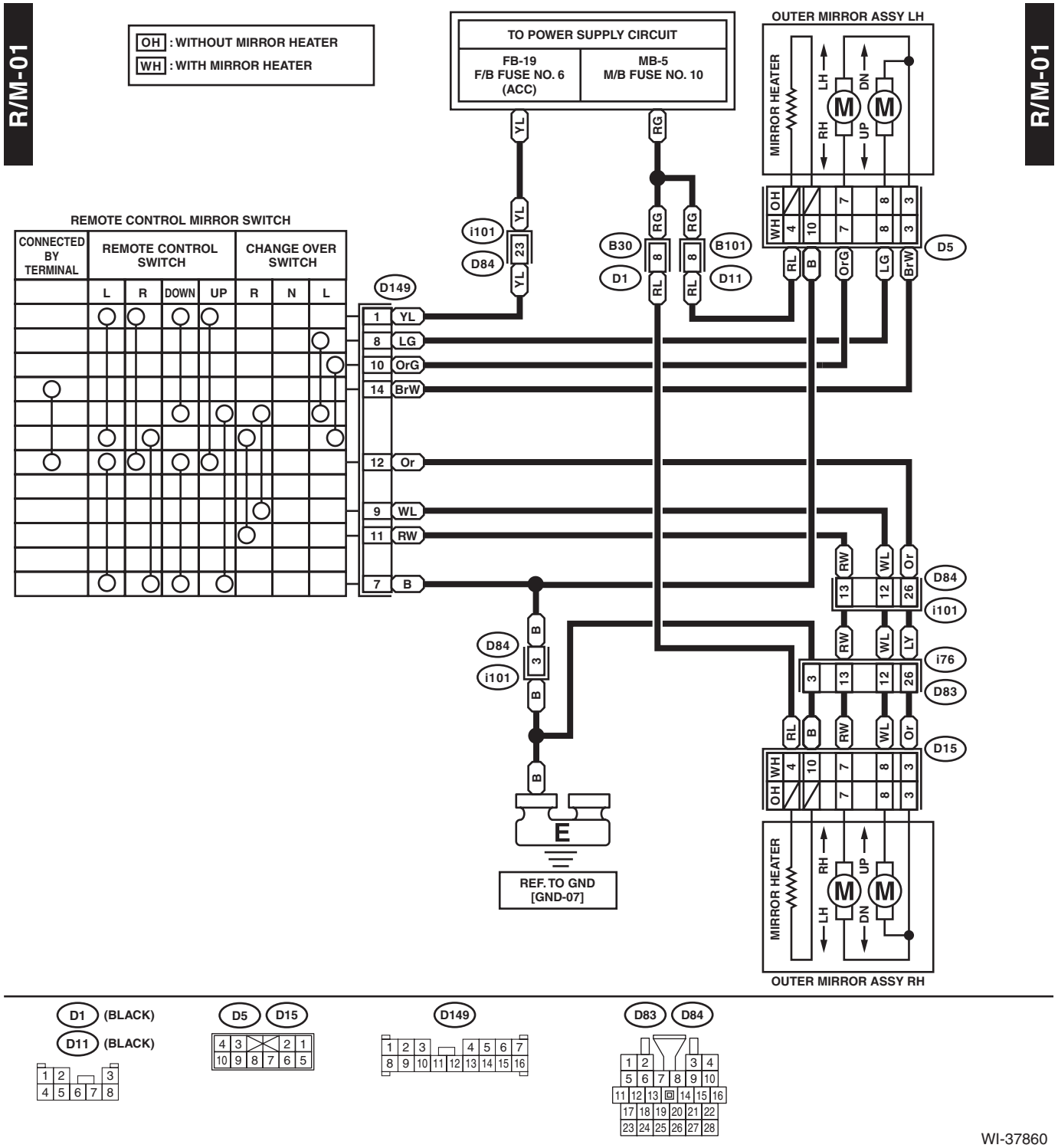
WI-61554


R/W-02
R/W-01 C
R/W-01 B
R/W-01 A
R/W-02
REF. TO POWER SUPPLY CIRCUIT
FB-18
F/B FUSE NO. 7
(B)
FB-36
F/B FUSE NO. 5
(IG)
WL
BrW
WL
3
WL
B551
i229
40
20
i10
COMBINATION METER
NM
POWER SUPPLY CIRCUIT
I/F
LCD (TFT)
CM
LOW WASHER FLUID WARNING LIGHT
MICRO COMPUTER
DRIVE CIRCUIT
I/F
NM : MODEL WITH NORMAL METER
CM : MODEL WITH COLOR TFT METER
B97
R1
R38
D34
D80
D81
D43
REAR WIPER MOTOR
G
Lg
LW
BL
LB
B
21
38
i230
B552
WASHER FLUID LEVEL SENSOR
B396
E
REF. TO GND [GND-04]
REF. TO GND [GND-03]
REF. TO GND [GND-06]
B396 (BROWN)
D43
D34
D80
i10
i229
i230 (GRAY)
B97

WI-61555

44.Remote Control Mirror System

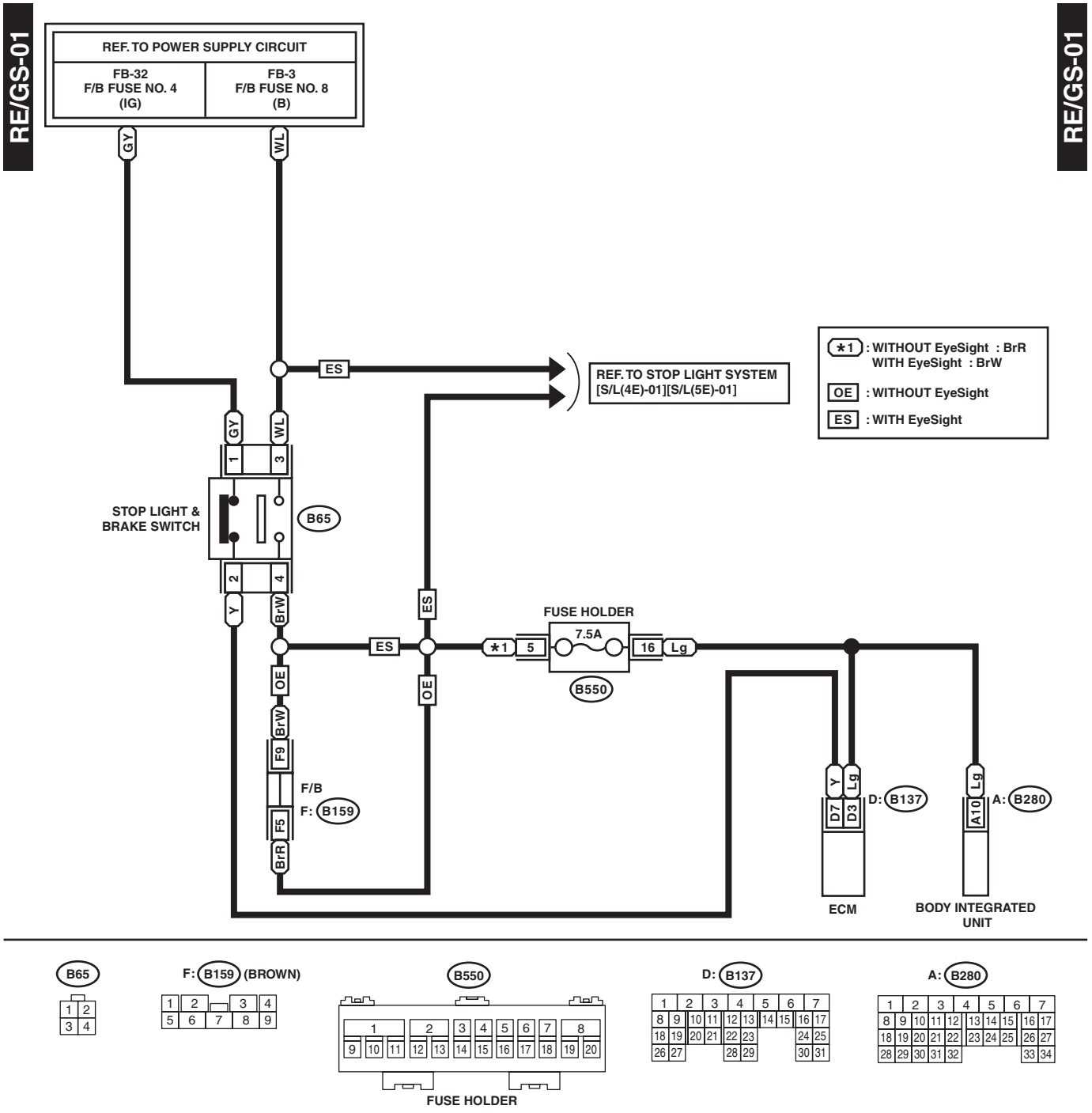
A: WIRING DIAGRAM



WI-37860

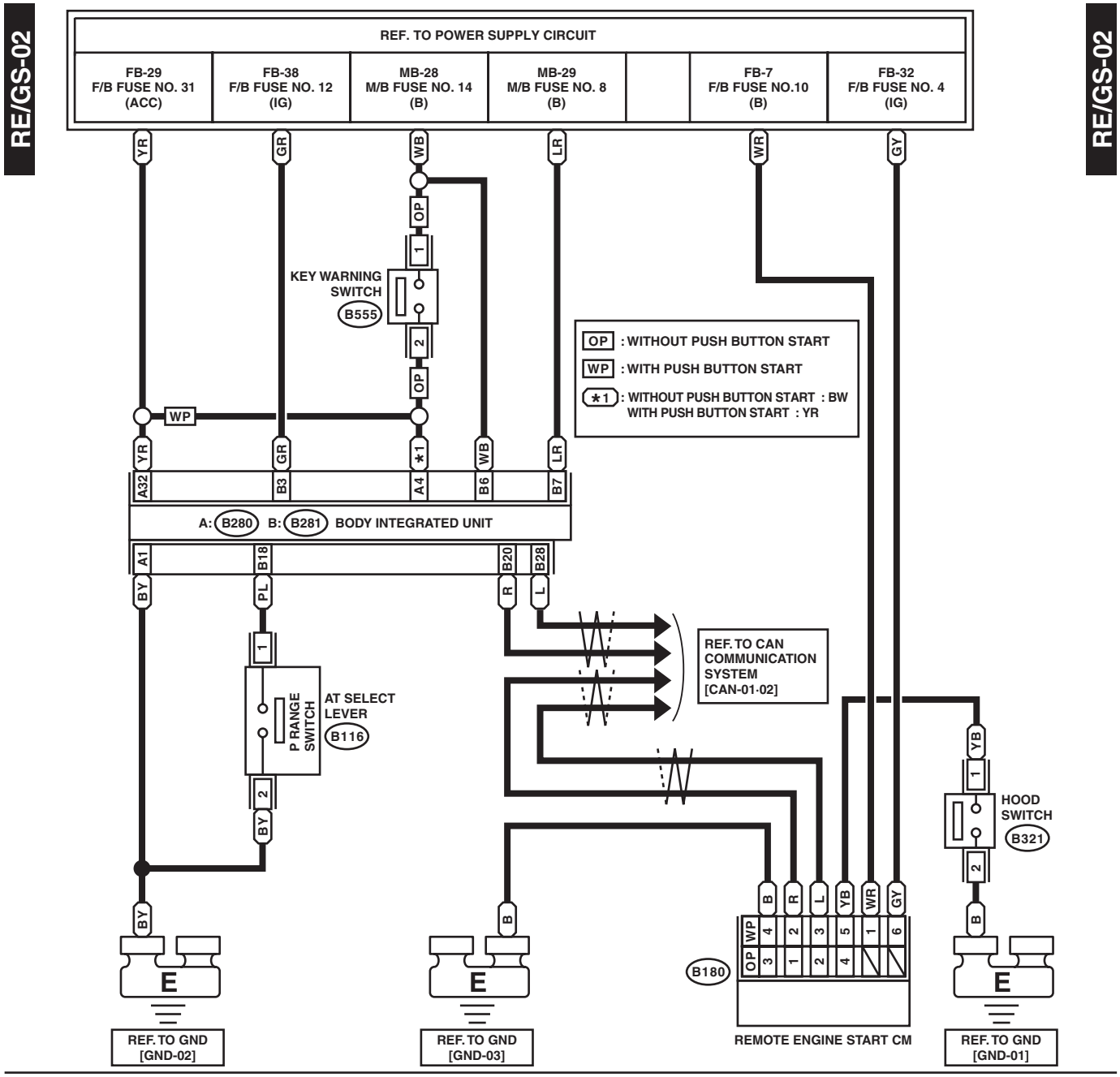
45.Remote Engine Start System

A: WIRING DIAGRAM

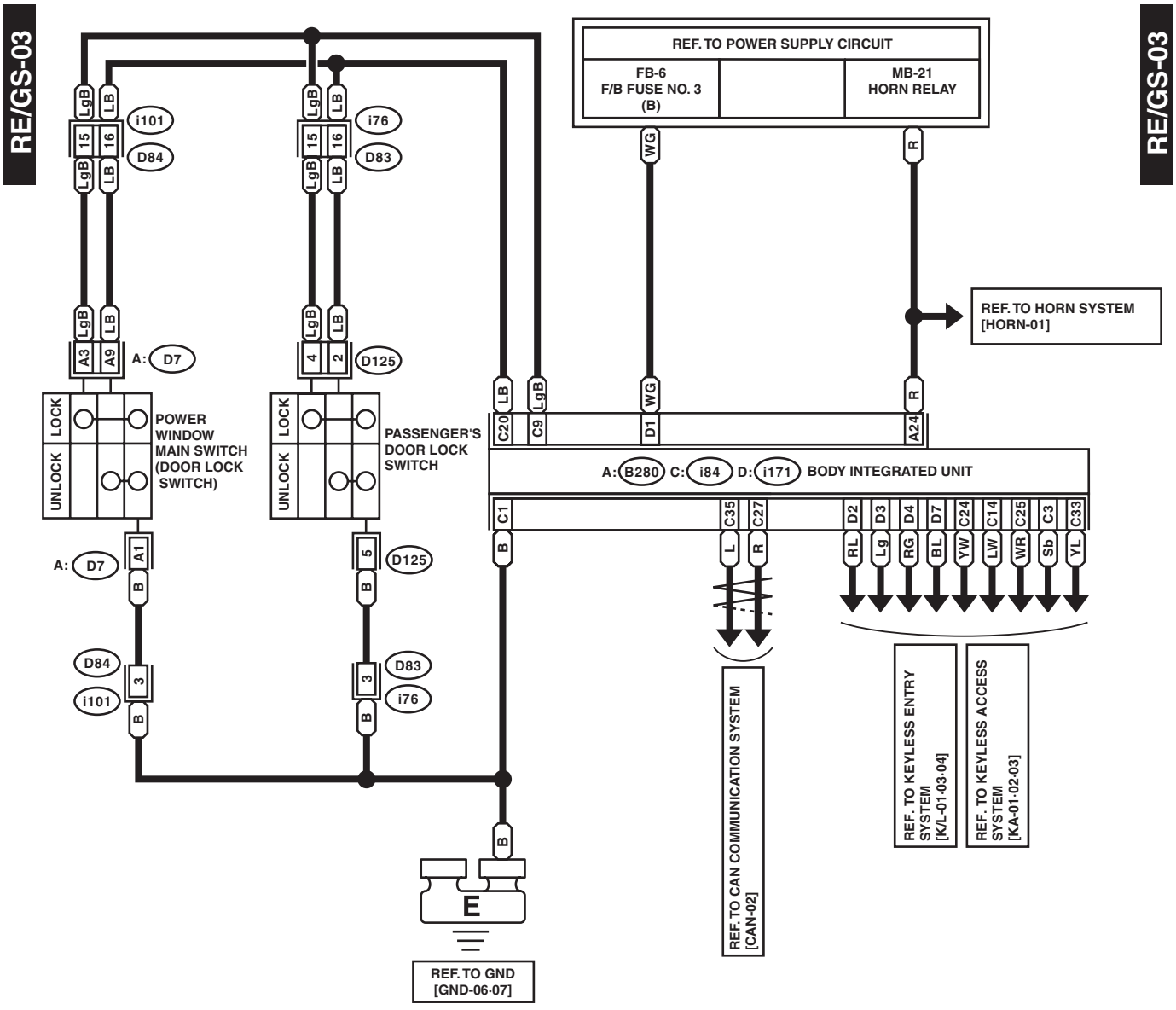


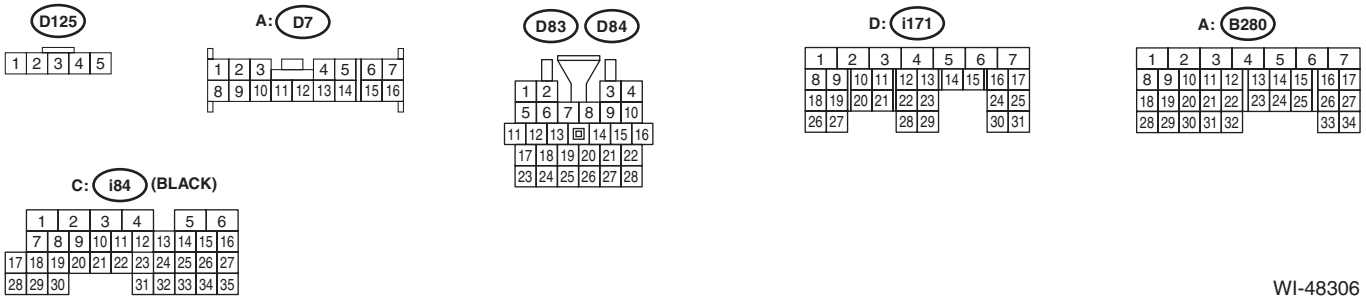
WI-48304

RE/GS-02



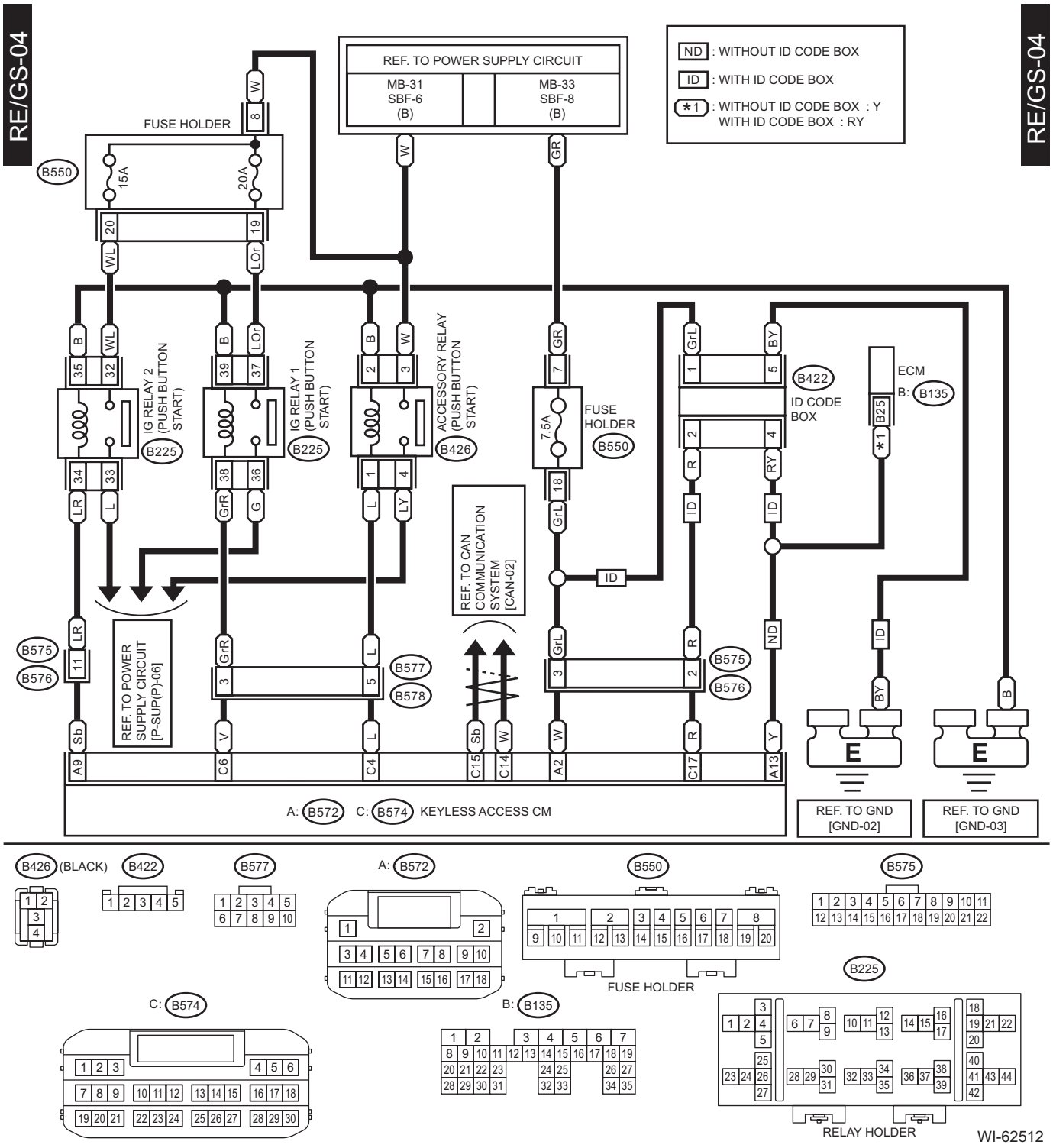
RE/GS-02


RE/GS-03
RE/GS-03
REF. TO POWER SUPPLY CIRCUIT
FB-6
F/B FUSE NO. 3
(B)
MB-21
HORN RELAY
REF. TO HORN SYSTEM
[HORN-01]
i101
D84
i76
D83
A: D7
D125
POWER
WINDOW
MAIN SWITCH
(DOOR LOCK
SWITCH)
PASSENGER'S
DOOR LOCK
SWITCH
LOCK
UNLOCK
A: B280 C: i84 D: i171 BODY INTEGRATED UNIT
REF. TO CAN COMMUNICATION SYSTEM
[CAN-02]
REF. TO KEYLESS ENTRY
SYSTEM
[K/L-01-03-04]
REF. TO KEYLESS ACCESS
SYSTEM
[KA-01-02-03]
E
REF. TO GND
[GND-06-07]


D125
A: D7
D83
D84
D: i171
A: B280
C: i84 (BLACK)

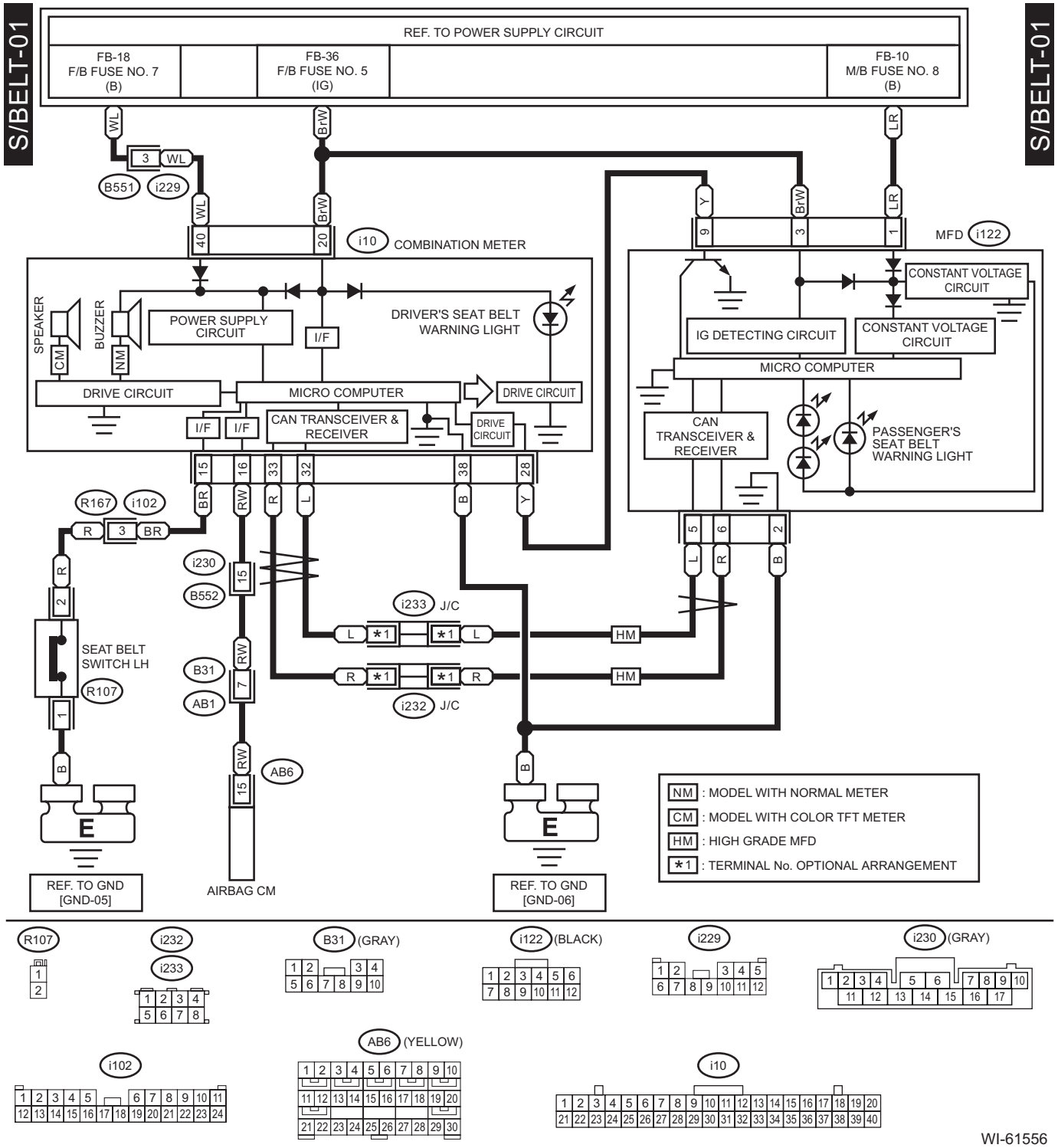
WI-48306

WIRING SYSTEM



46.Seat Belt Warning System

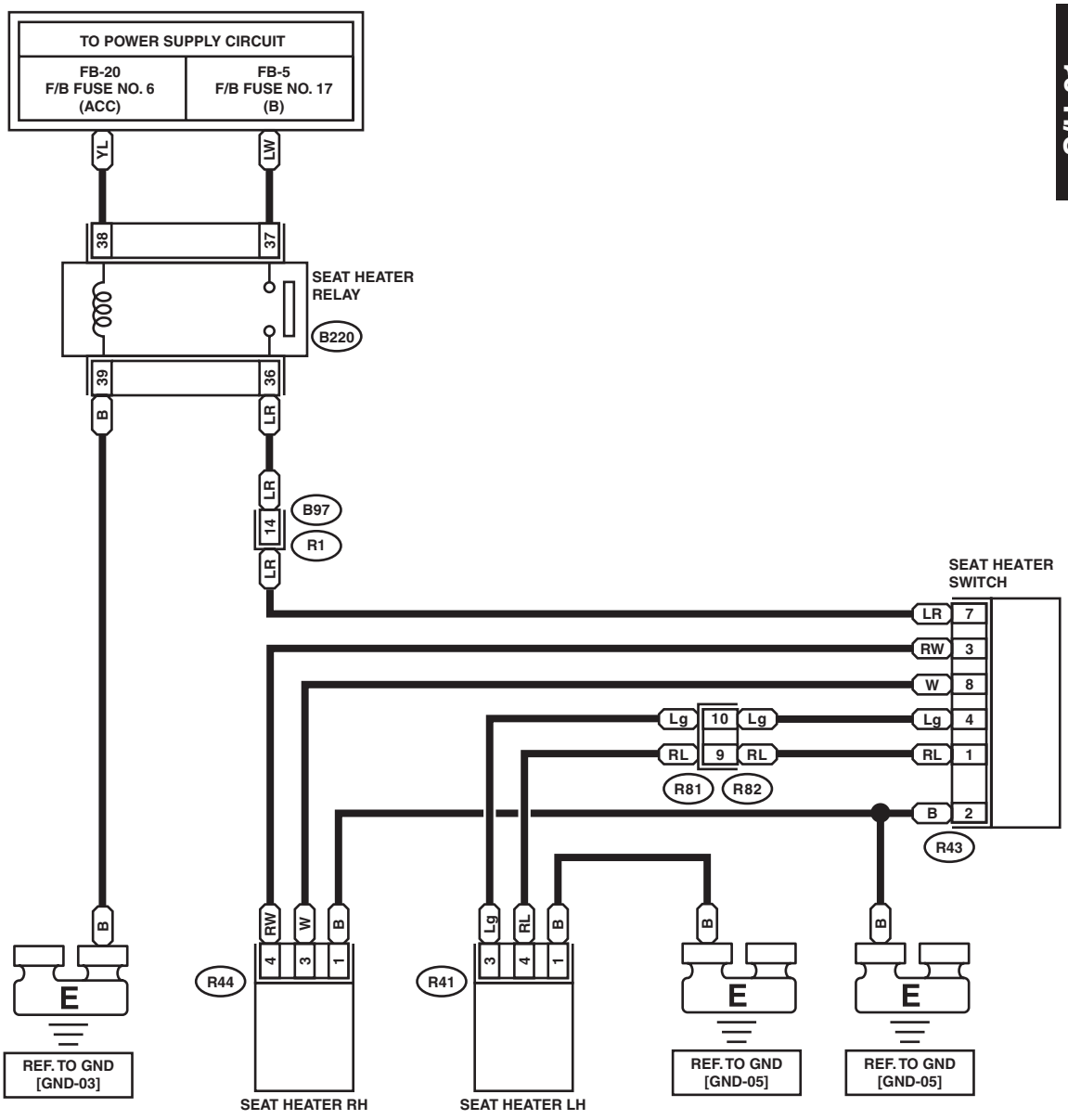
A: WIRING DIAGRAM

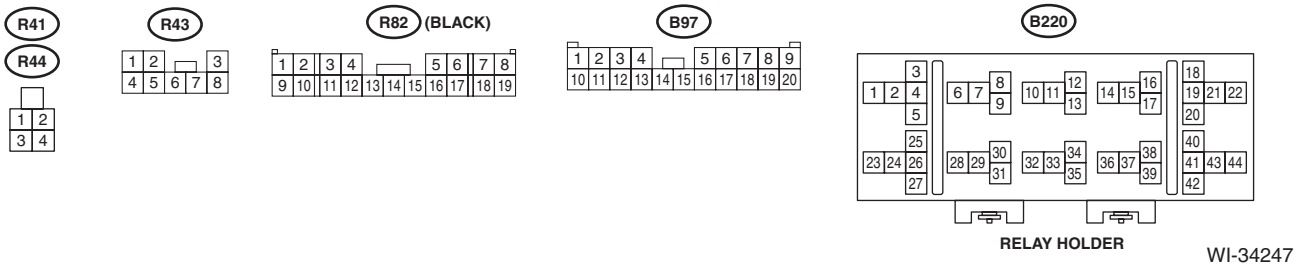


47.Seat Heater System

A: WIRING DIAGRAM

S/H-01



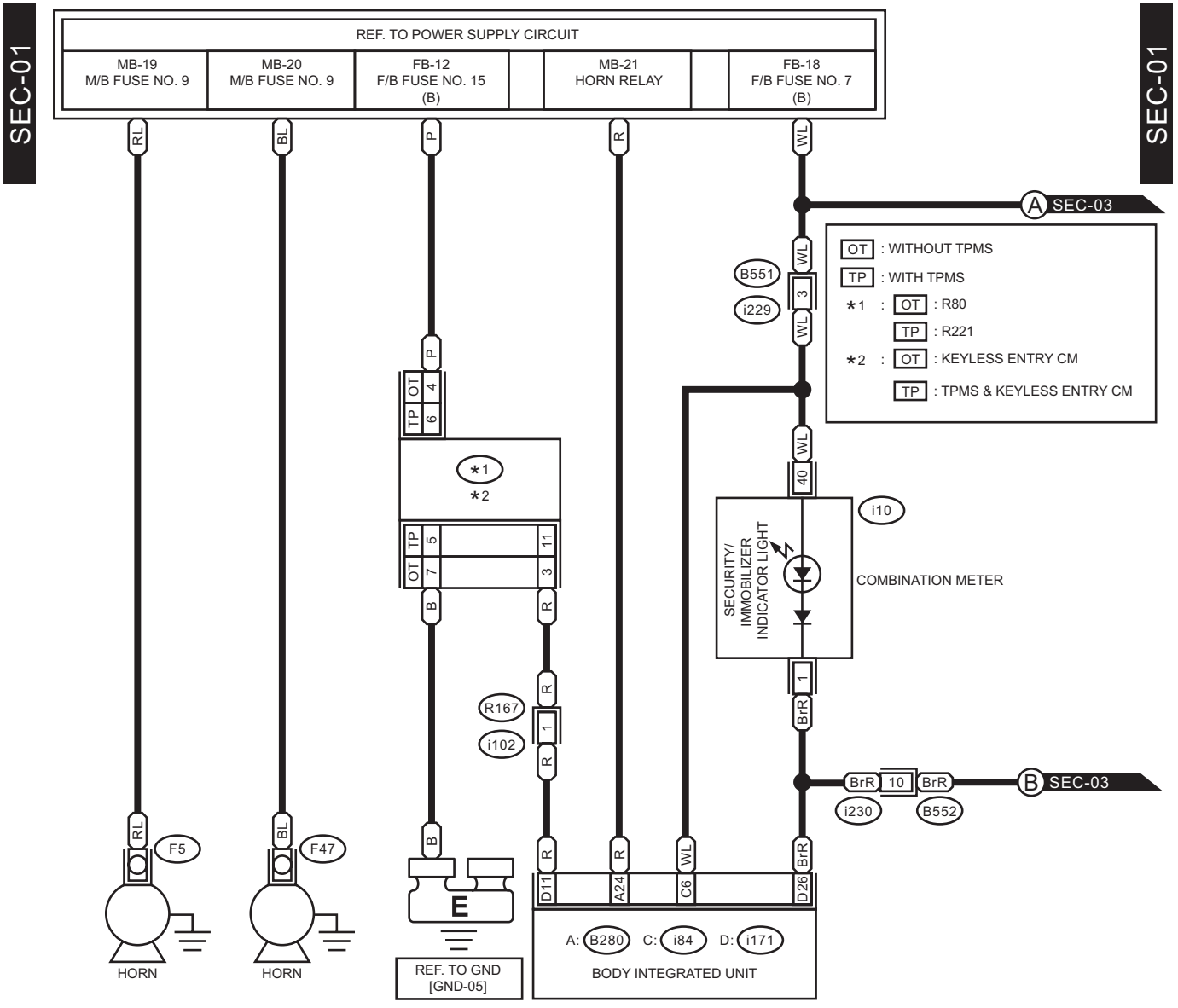


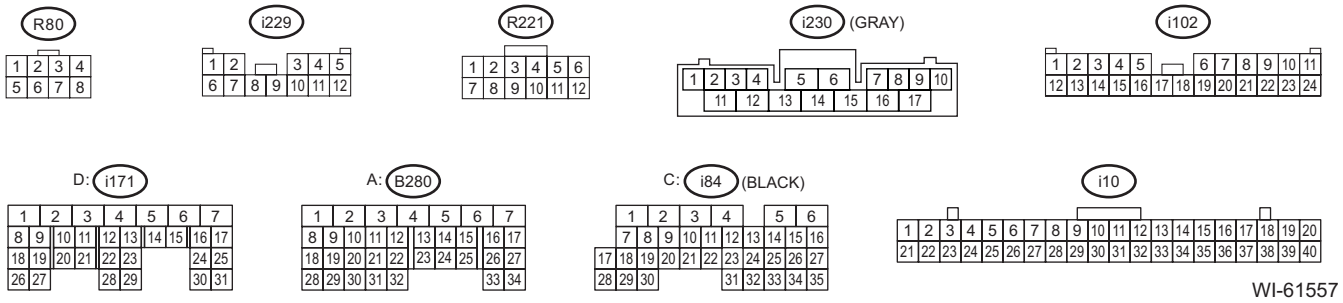
WI-34247

48.Security System

A: WIRING DIAGRAM

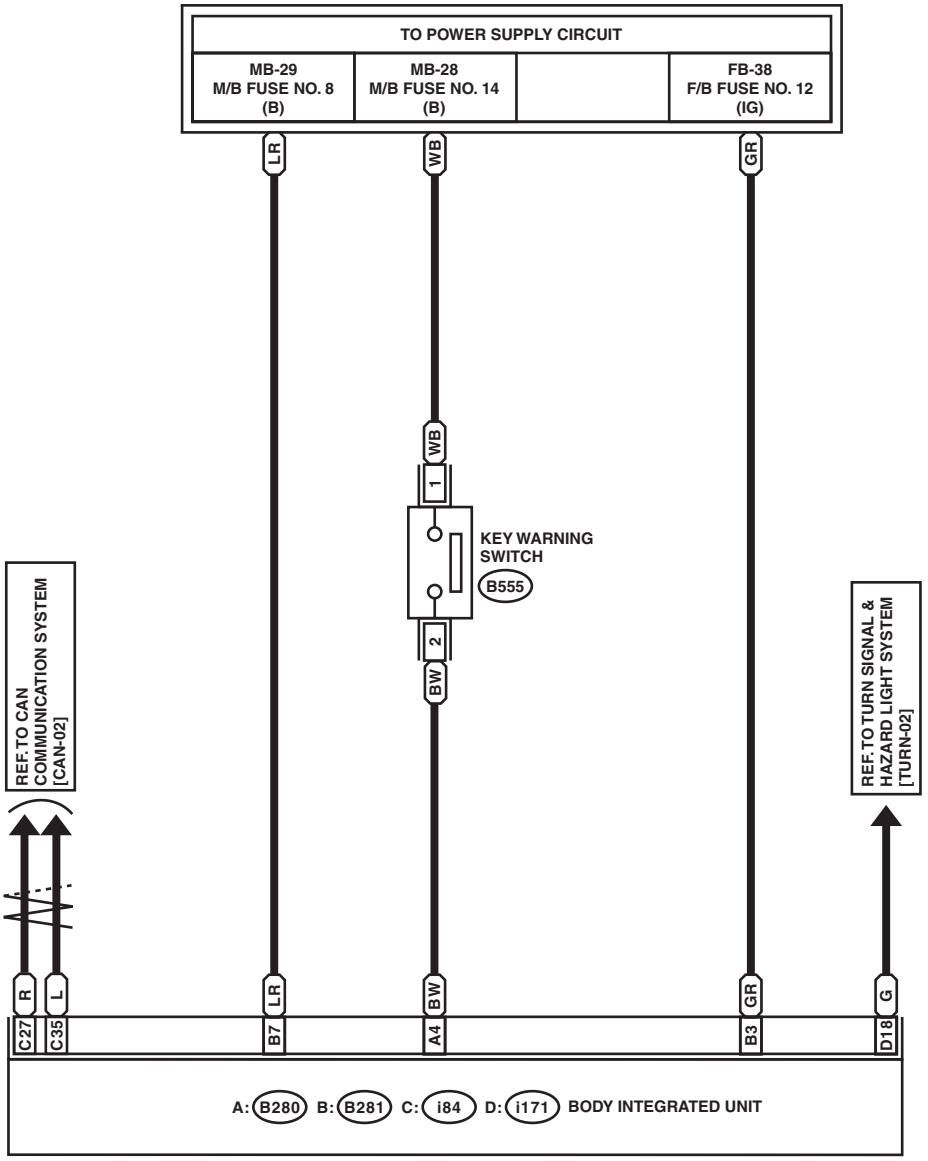
1. WITHOUT PUSH BUTTON START



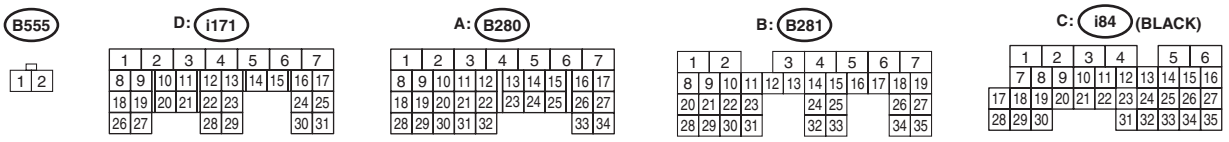


WI-61557

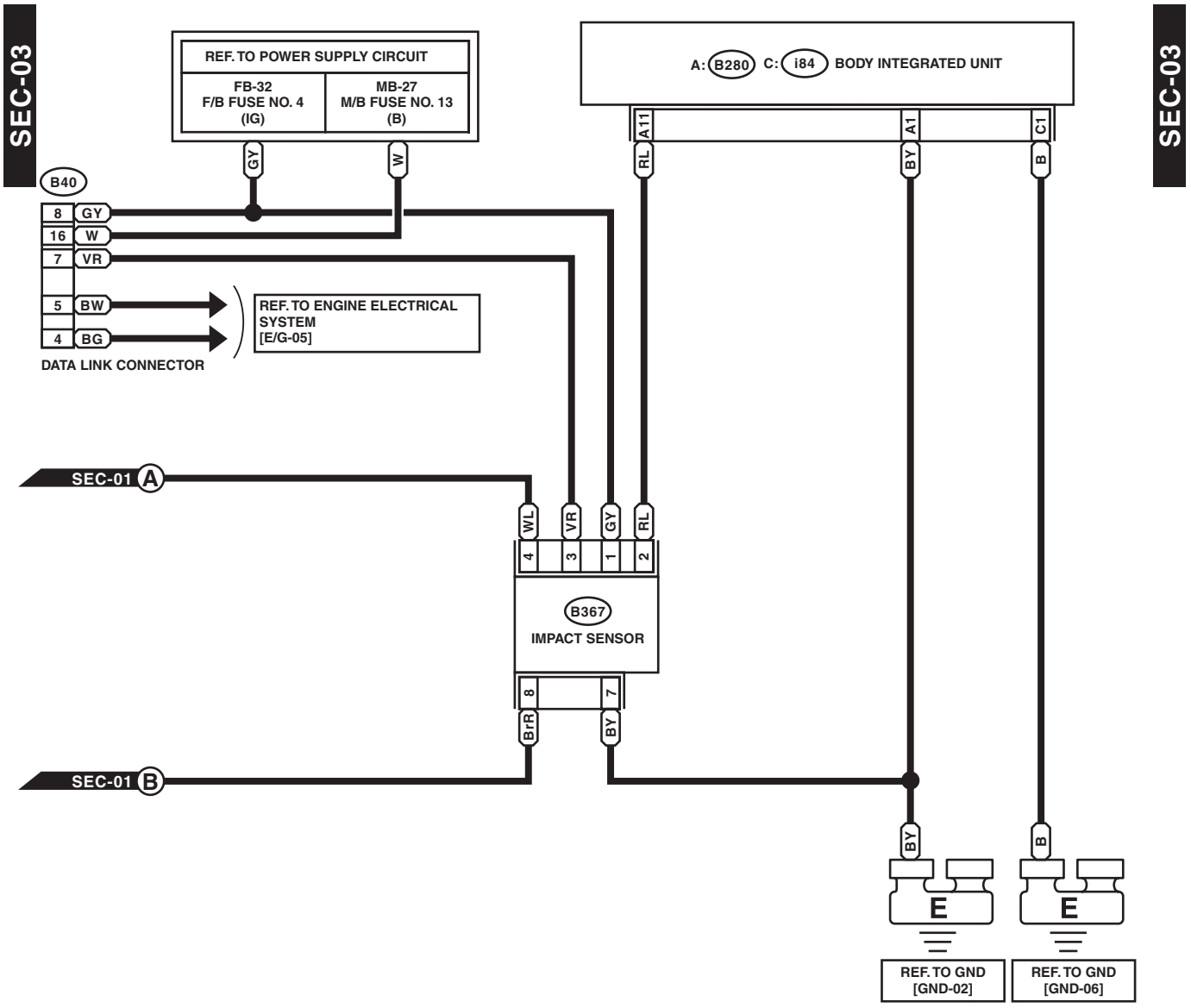
SEC-02

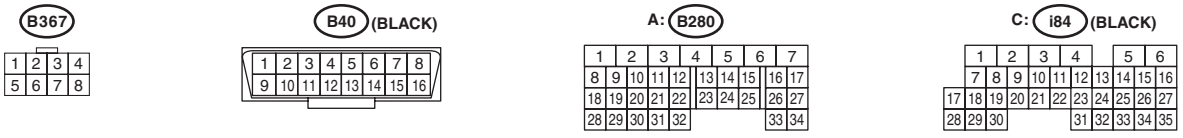


SEC-02



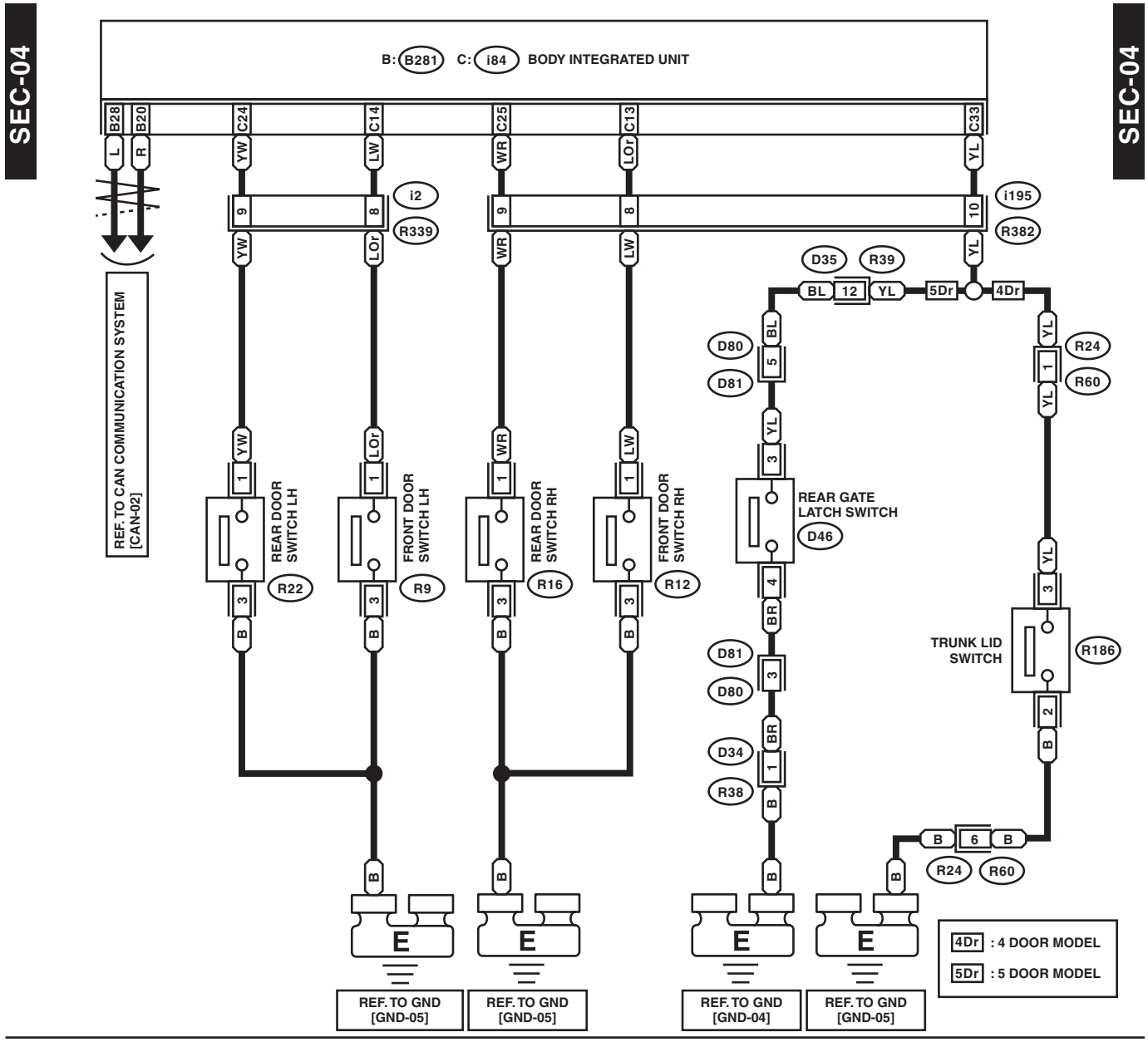
WI-34249

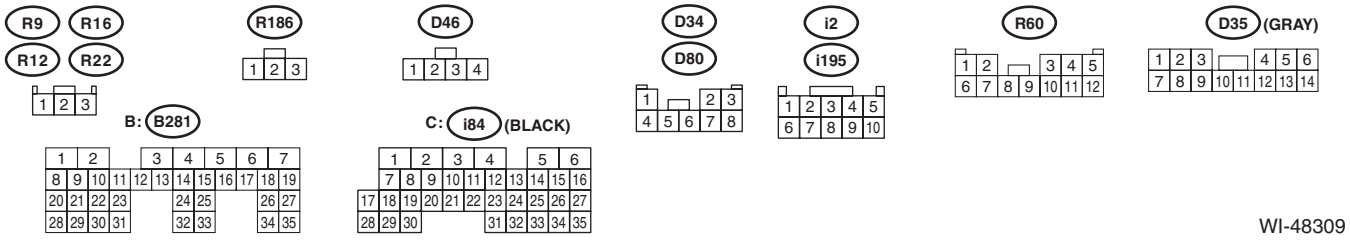

SEC-03
SEC-03
REF. TO POWER SUPPLY CIRCUIT
FB-32
F/B FUSE NO. 4
(IG)
MB-27
M/B FUSE NO. 13
(B)
GY
W
A: B280 C: i84 BODY INTEGRATED UNIT
A11
A1
C1
RL
BY
B
B40
8 GY
16 W
7 VR
5 BW
4 BG
DATA LINK CONNECTOR
REF. TO ENGINE ELECTRICAL SYSTEM [E/G-05]
SEC-01 A
WL
VR
GY
RL
4
3
1
2
B367
IMPACT SENSOR
8
7
BrR
BY
SEC-01 B
BY
B
E
E
REF. TO GND [GND-02]
REF. TO GND [GND-06]


B367
1 2 3 4
5 6 7 8
B40 (BLACK)
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
A: B280
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34
C: i84 (BLACK)
1 2 3 4 5 6
7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35

WI-48308

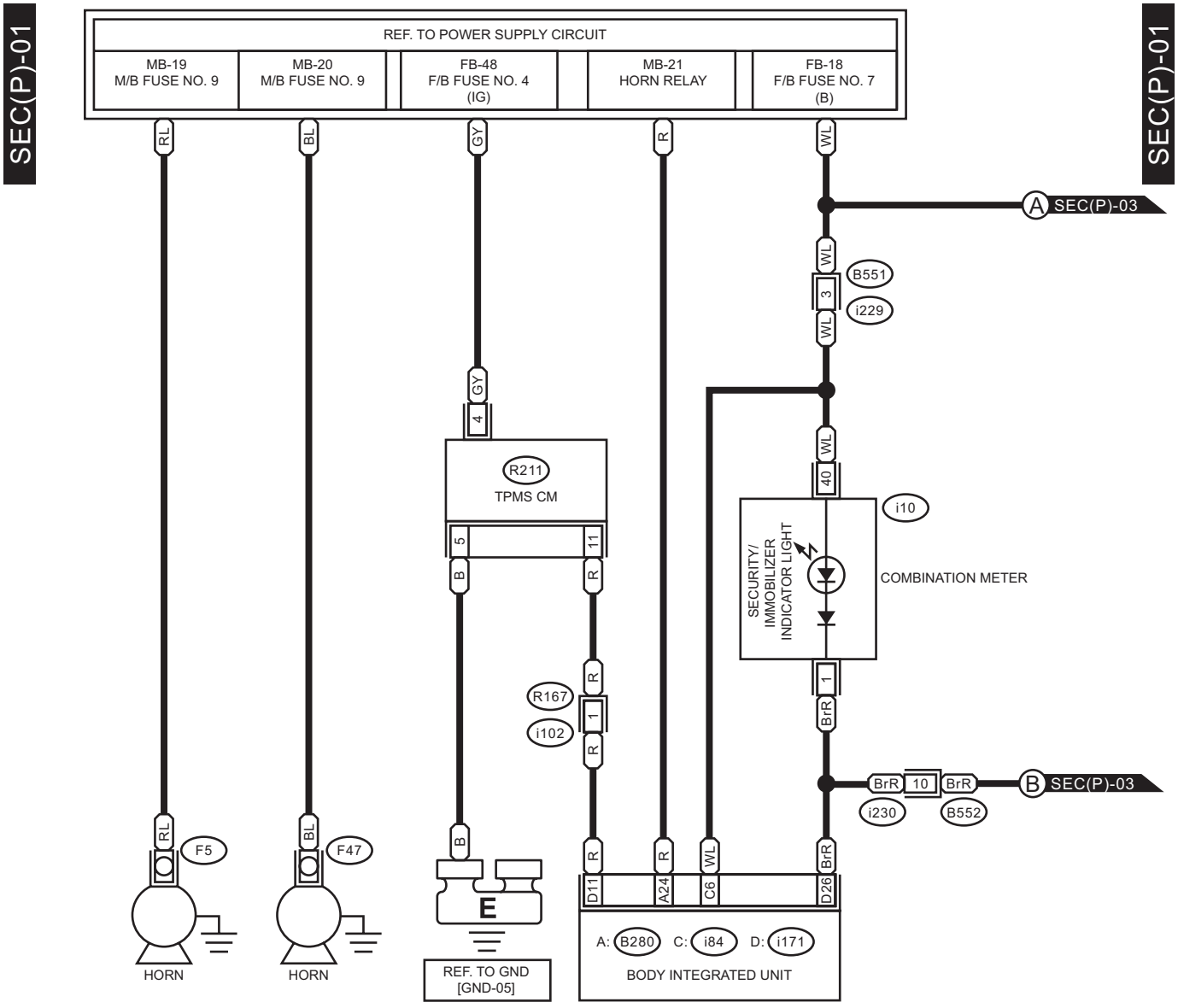
SEC-04

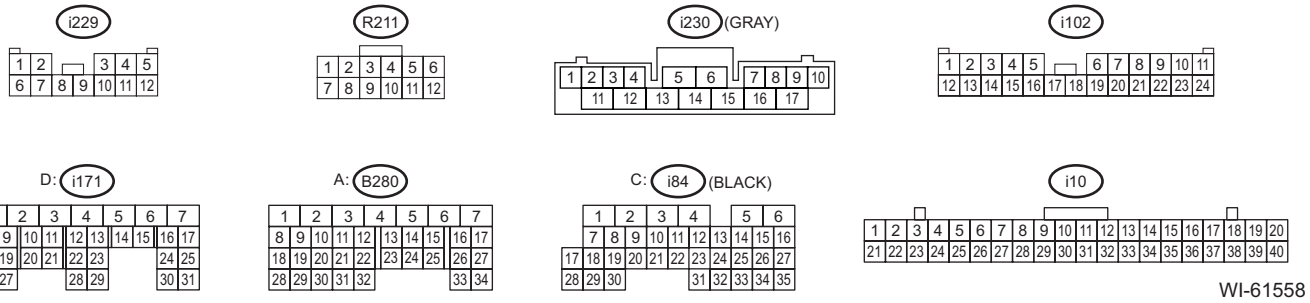




WI-48309

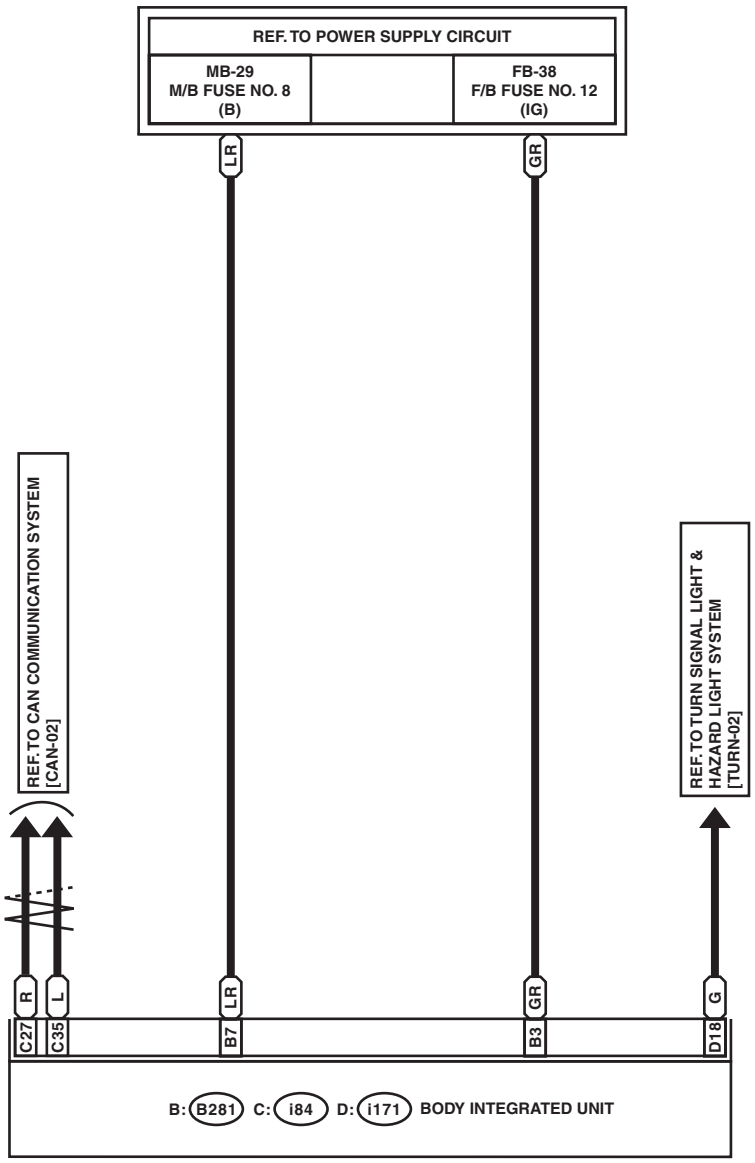
2. WITH PUSH BUTTON START





WI-61558

SEC(P)-02



SEC(P)-02

D: i171

1	2	3	4	5	6	7			
8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23			24	25
26	27			28	29			30	31

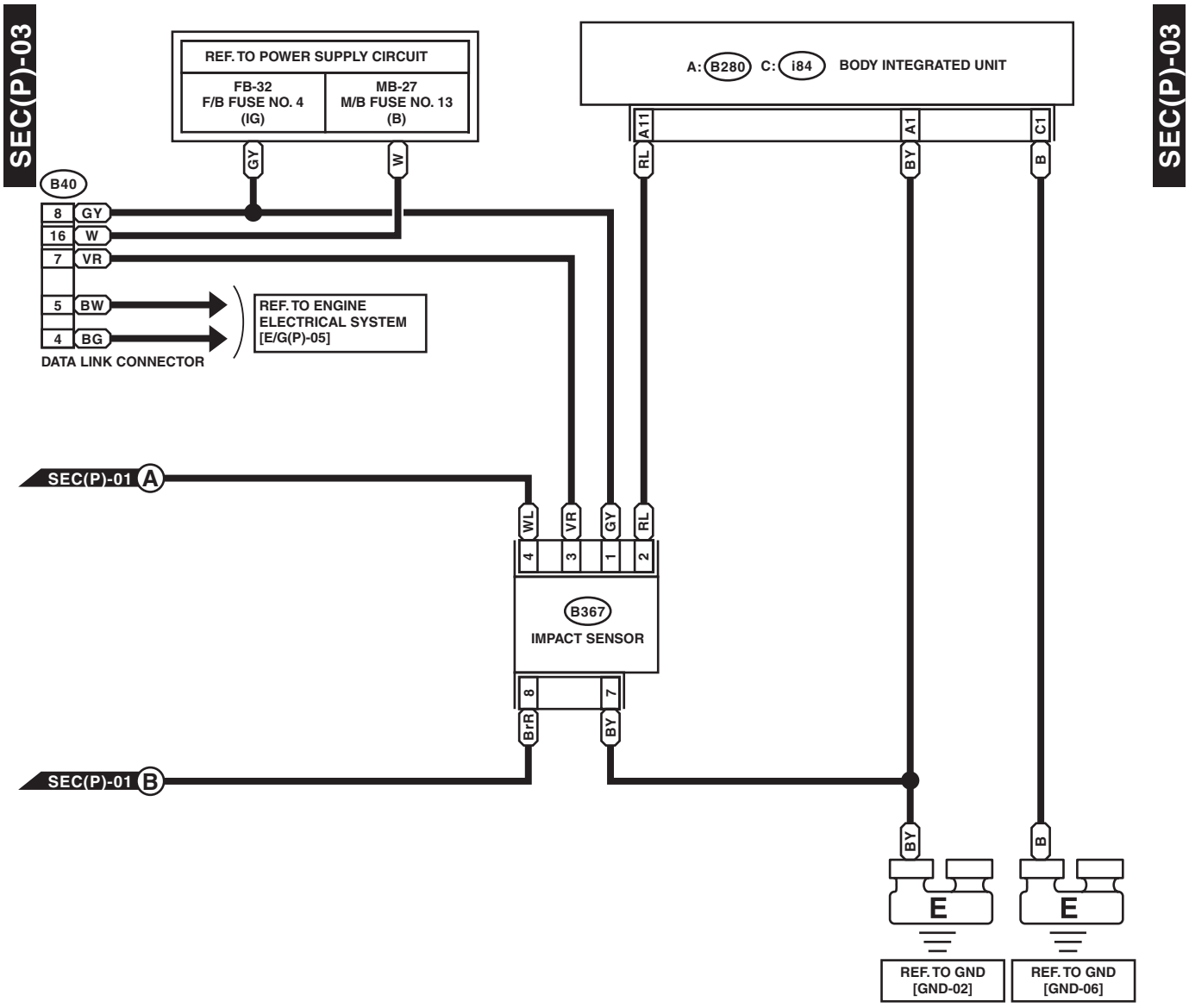
B: B281

1	2			3	4	5	6	7						
8	9	10	11	12	13	14	15	16	17	18	19			
20	21	22	23			24	25			26	27			
28	29	30	31			32	33			34	35			

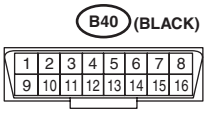
C: i84 (BLACK)

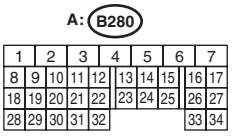
	1	2	3	4				5	6					
7	8	9	10	11	12	13	14	15	16					
17	18	19	20	21	22	23	24	25	26	27				
28	29	30				31	32	33	34	35				

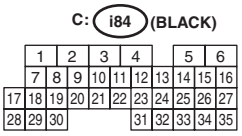
WI-48311


SEC(P)-03
SEC(P)-03
REF. TO POWER SUPPLY CIRCUIT
FB-32
F/B FUSE NO. 4
(IG)
MB-27
M/B FUSE NO. 13
(B)
A: B280 C: i84 BODY INTEGRATED UNIT
A11
A1
C1
RL
BY
B
GY
W
B40
8 GY
16 W
7 VR
5 BW
4 BG
DATA LINK CONNECTOR
REF. TO ENGINE
ELECTRICAL SYSTEM
[E/G(P)-05]
SEC(P)-01 A
SEC(P)-01 B
WL
VR
GY
RL
4
3
1
2
B367
IMPACT SENSOR
8
7
BrR
BY
BY
B
E
E
REF. TO GND
[GND-02]
REF. TO GND
[GND-06]

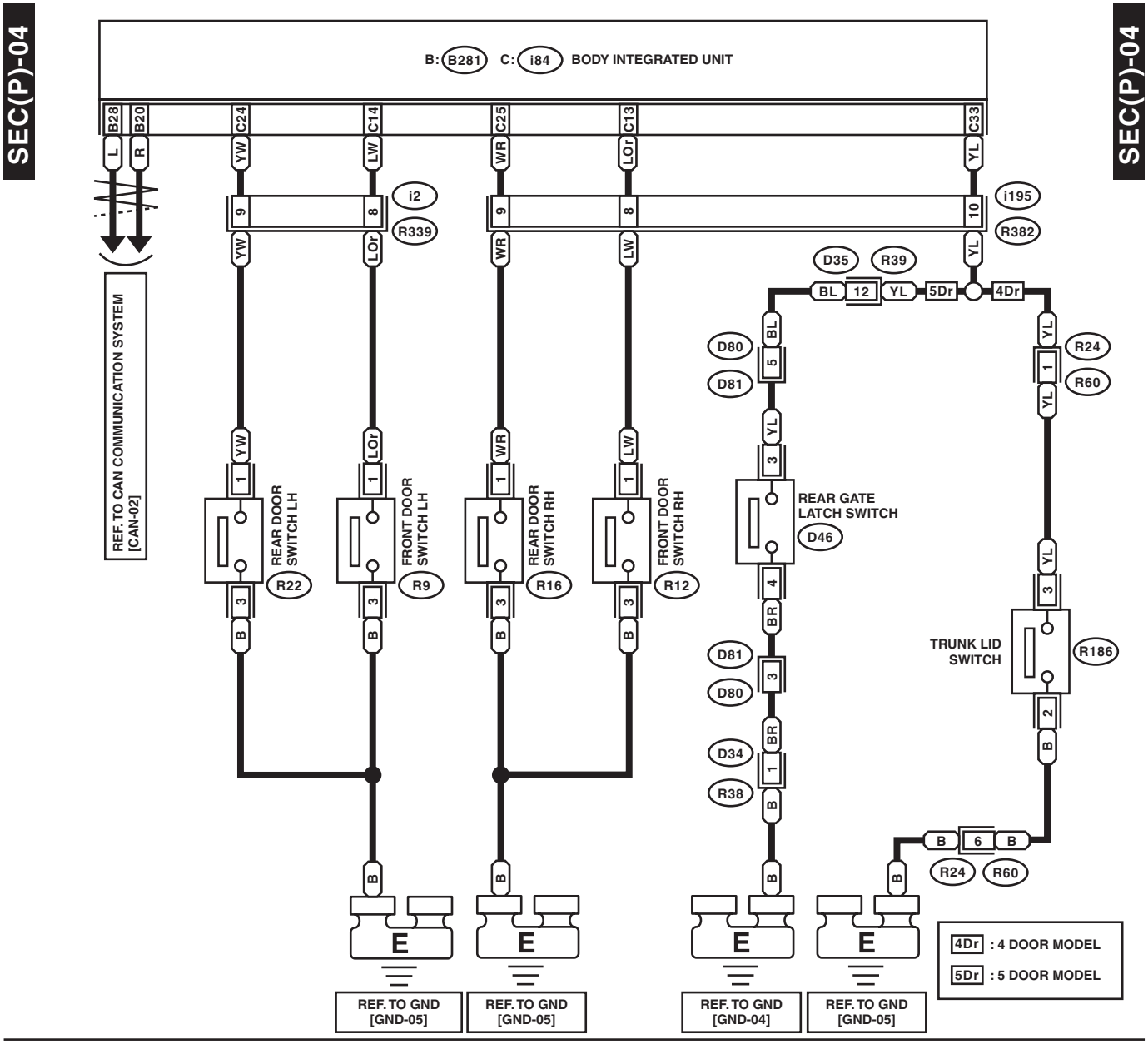

B367
1 2 3 4
5 6 7 8


B40 (BLACK)
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16


A: B280
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34


C: i84 (BLACK)
1 2 3 4 5 6
7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35

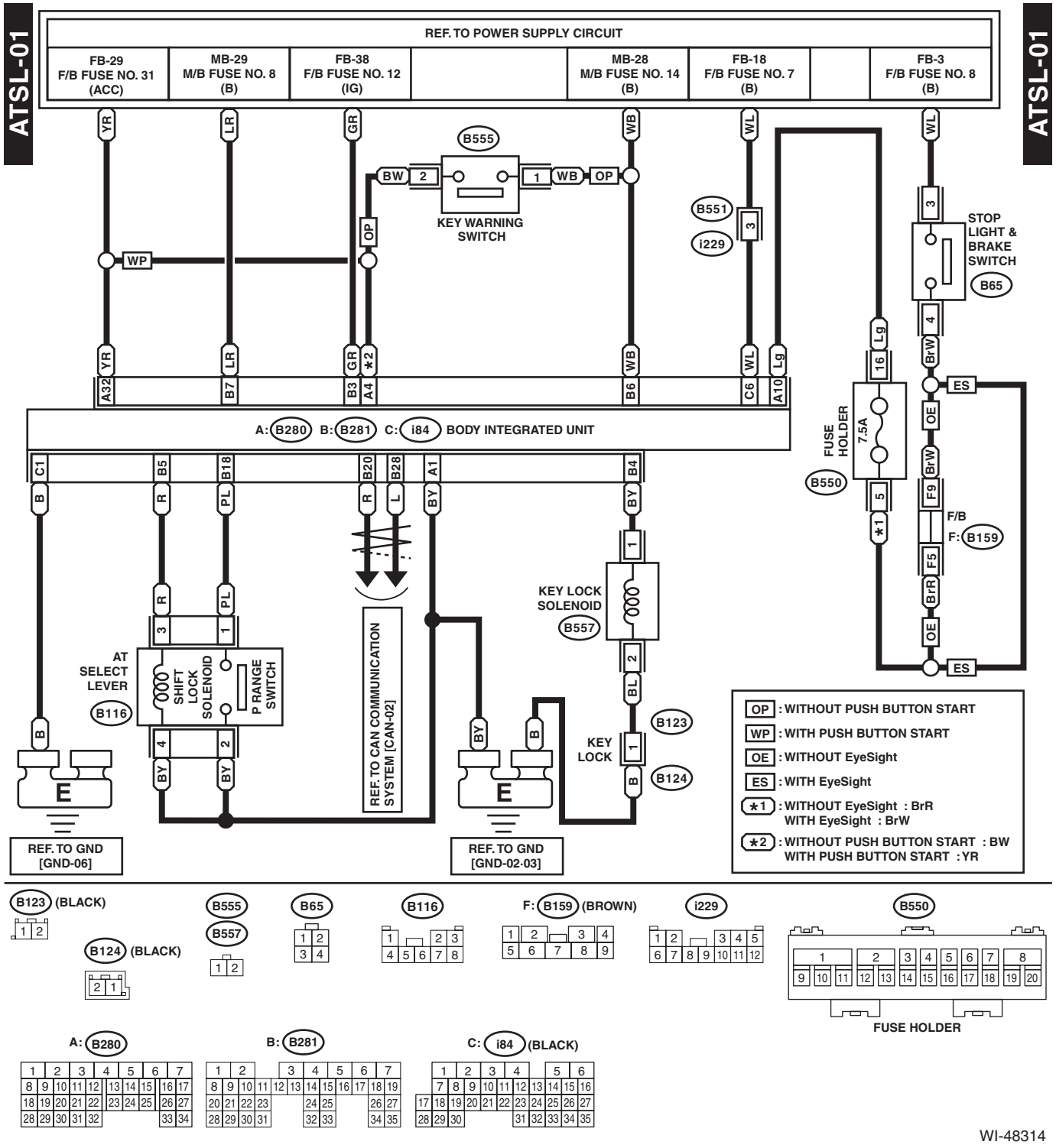
WI-48312


SEC(P)-04
SEC(P)-04
B: B281 C: i84 BODY INTEGRATED UNIT
B28
B20
C24
C14
C25
C13
C33
L
R
YW
LW
WR
LOr
YL
i2
R339
i195
R382
D35
R39
BL
12
YL
5Dr
4Dr
D80
D81
R24
R60
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
REAR DOOR SWITCH LH
R22
FRONT DOOR SWITCH LH
R9
REAR DOOR SWITCH RH
R16
FRONT DOOR SWITCH RH
R12
REAR GATE LATCH SWITCH
D46
TRUNK LID SWITCH
R186
D34
R38
B
6
E
REF. TO GND [GND-05]
REF. TO GND [GND-04]
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
R9
R16
R12
R22
B: B281
R186
D46
C: i84 (BLACK)
D34
D80
i2
i195
R60
D35 (GRAY)

WI-48313

49.Shift Lock Control System

A: WIRING DIAGRAM

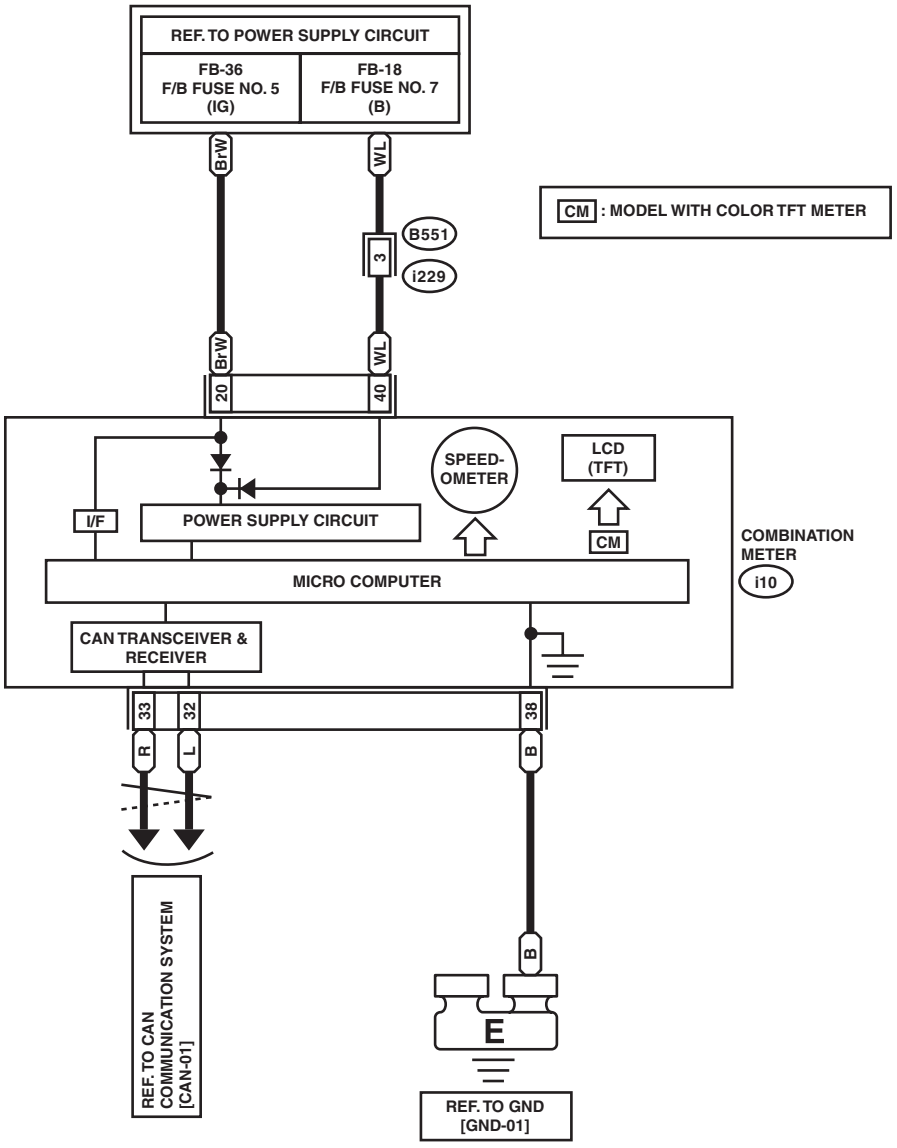


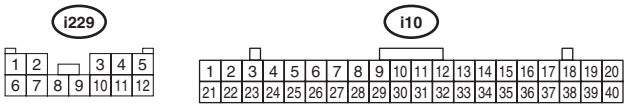
WI-48314

50.Speedometer System

A: WIRING DIAGRAM

SP-01



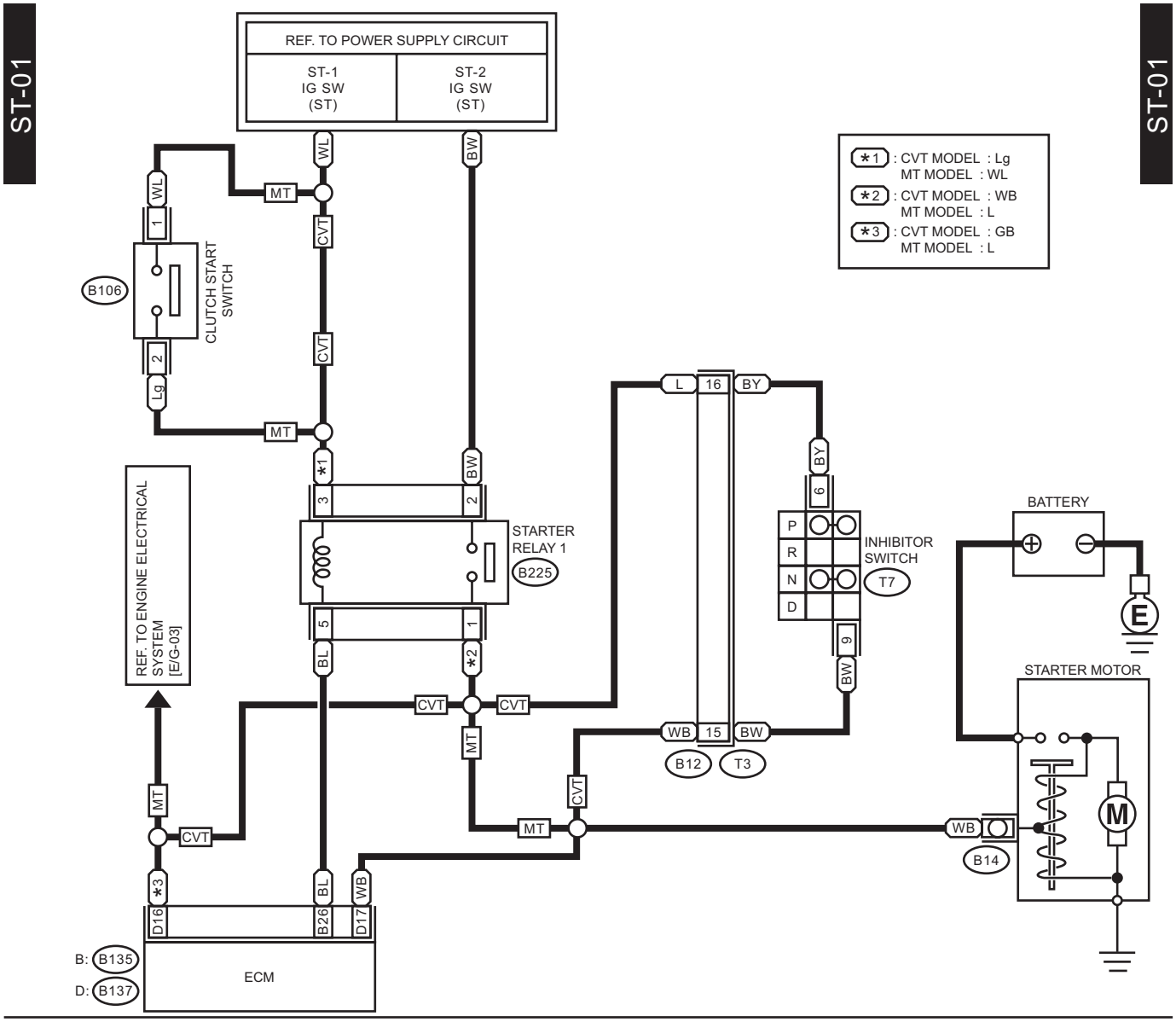


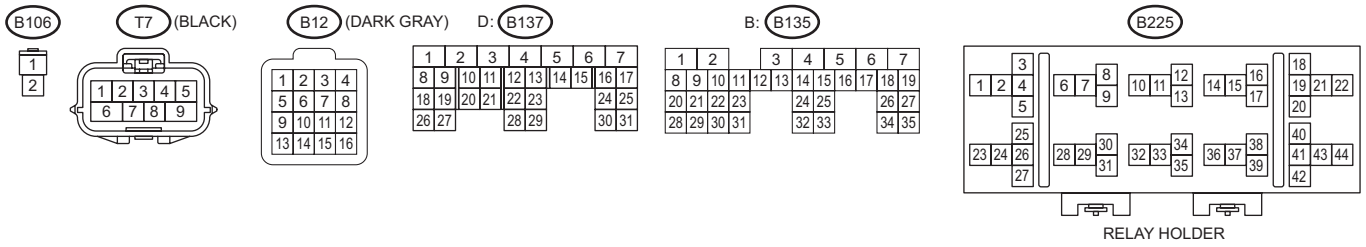
WI-48315

51.Starter System

A: WIRING DIAGRAM

1. WITHOUT PUSH BUTTON START

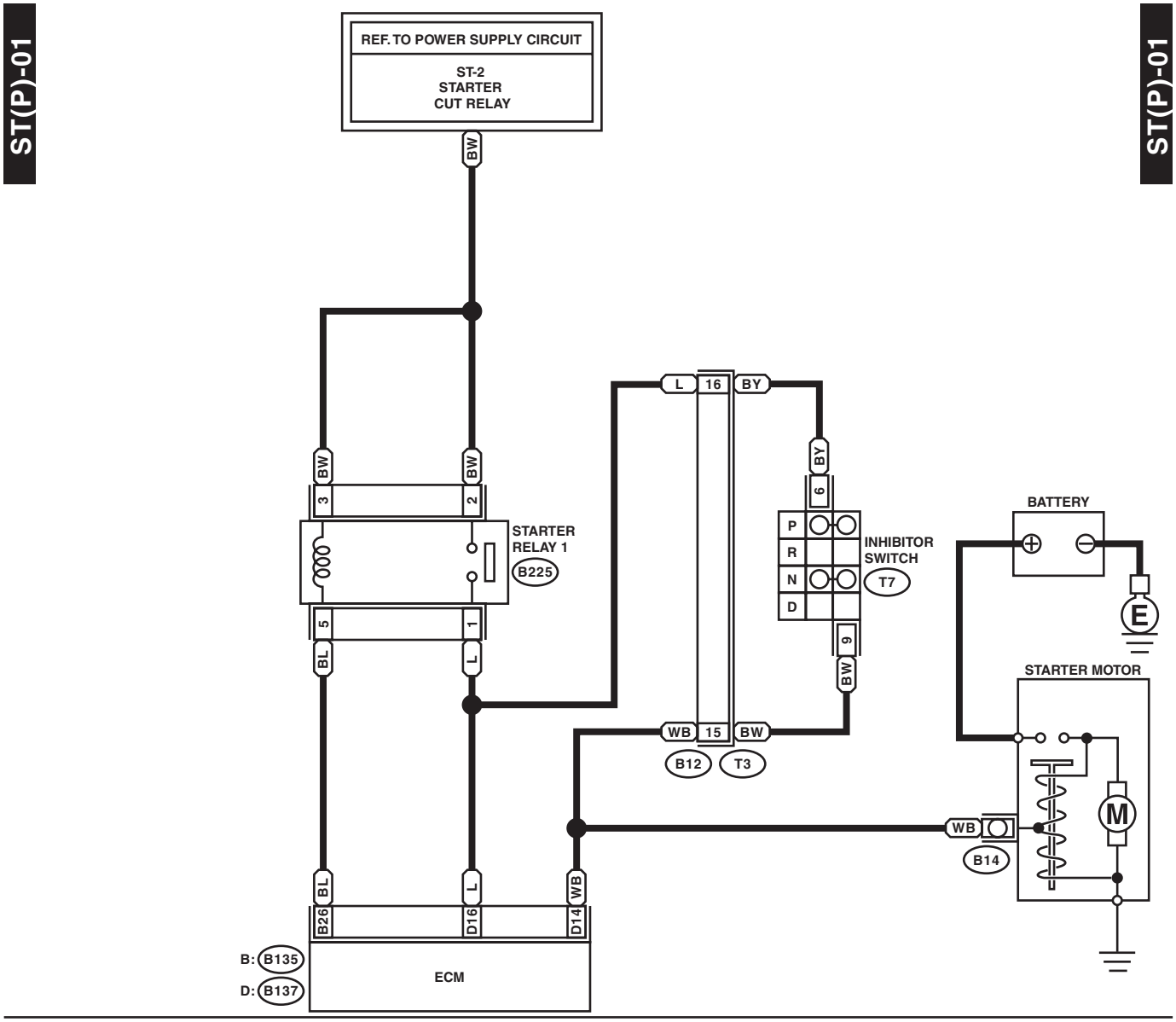


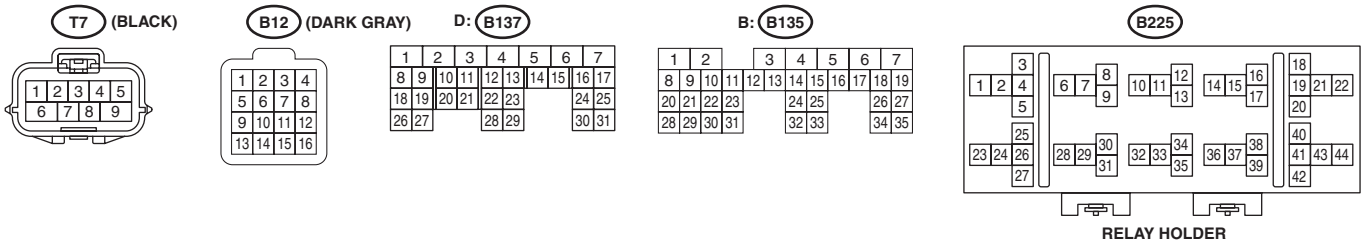


WI-62513

2. WITH PUSH BUTTON START

ST(P)-01



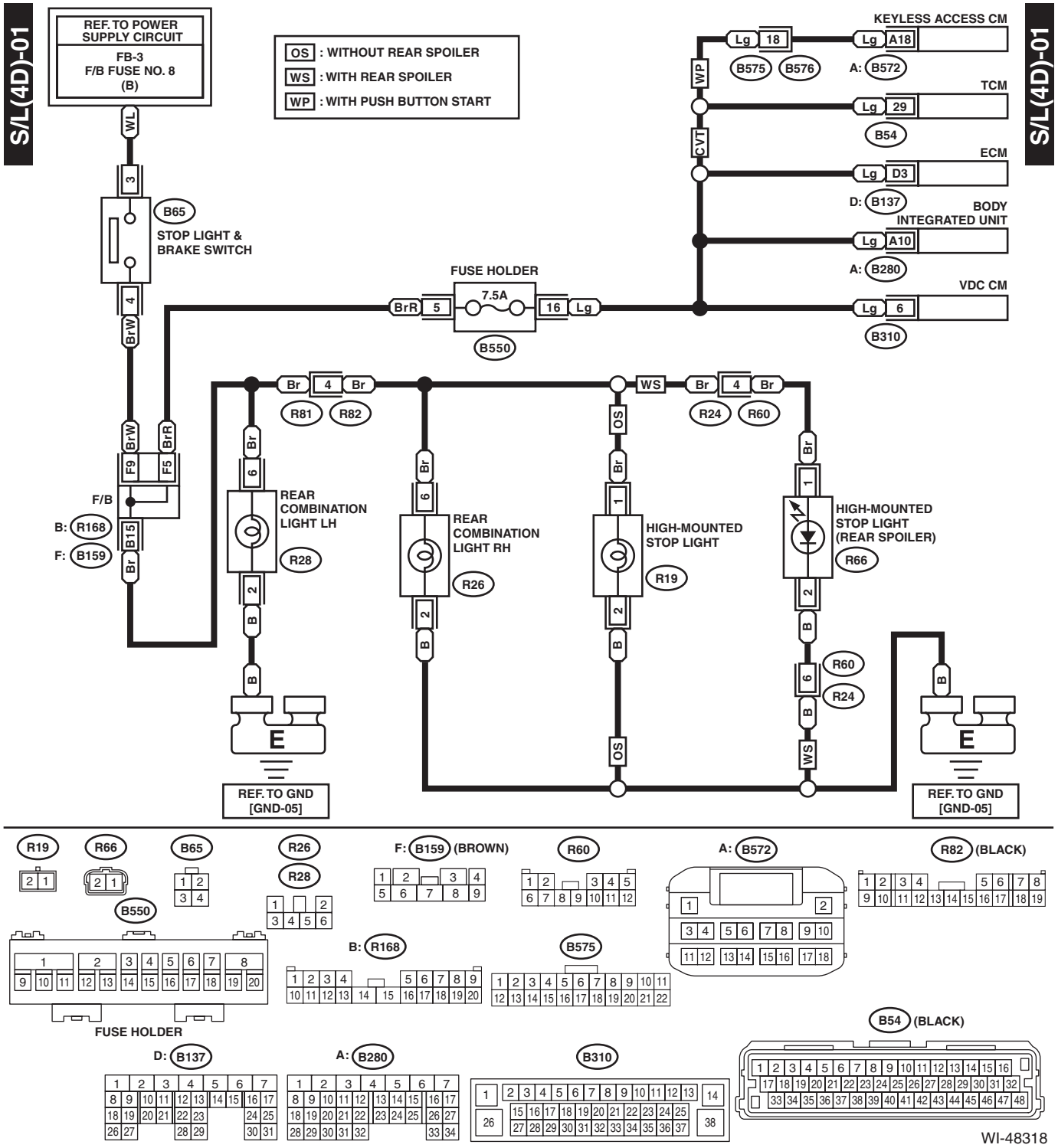


WI-48317

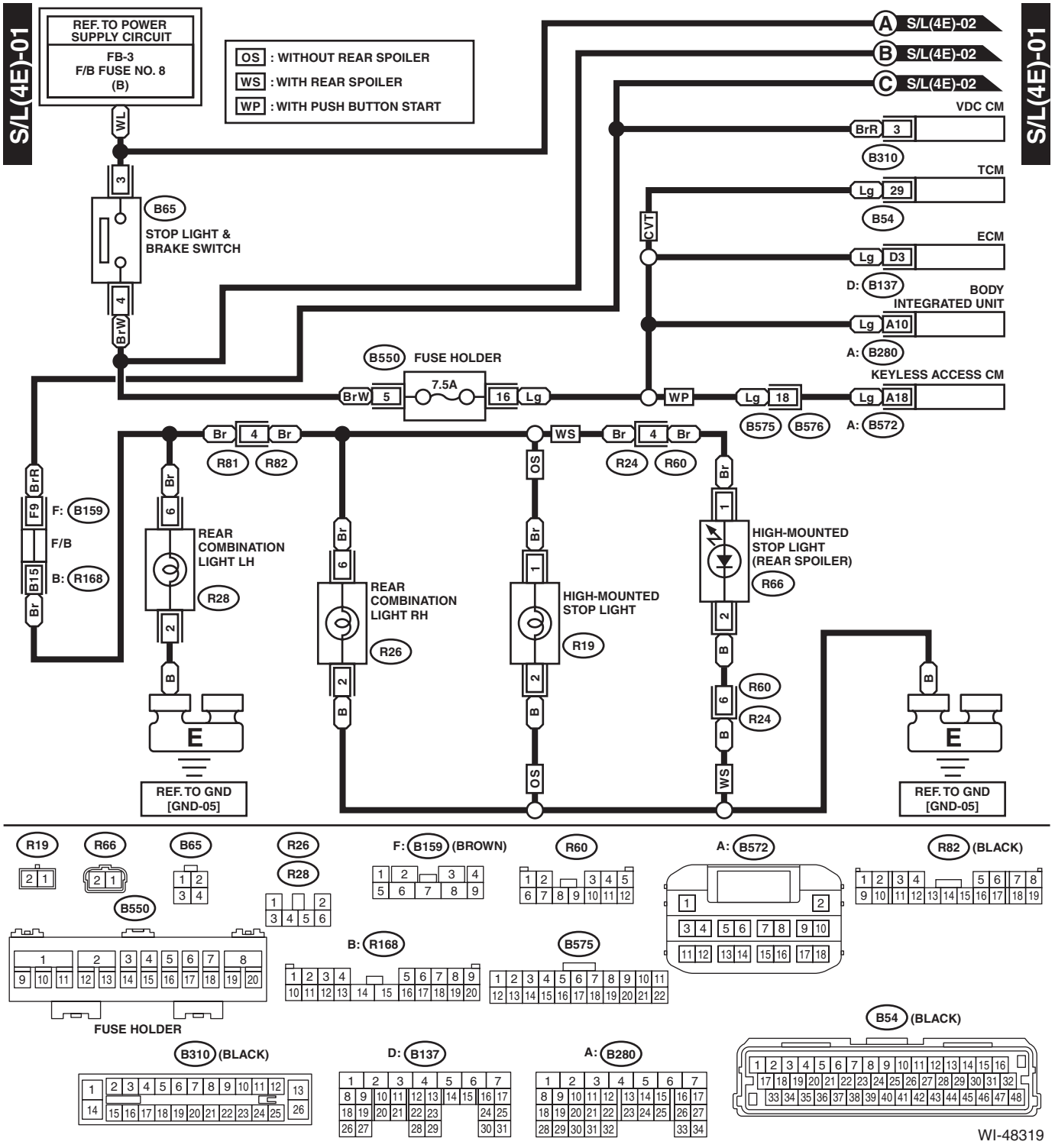
52.Stop Light System

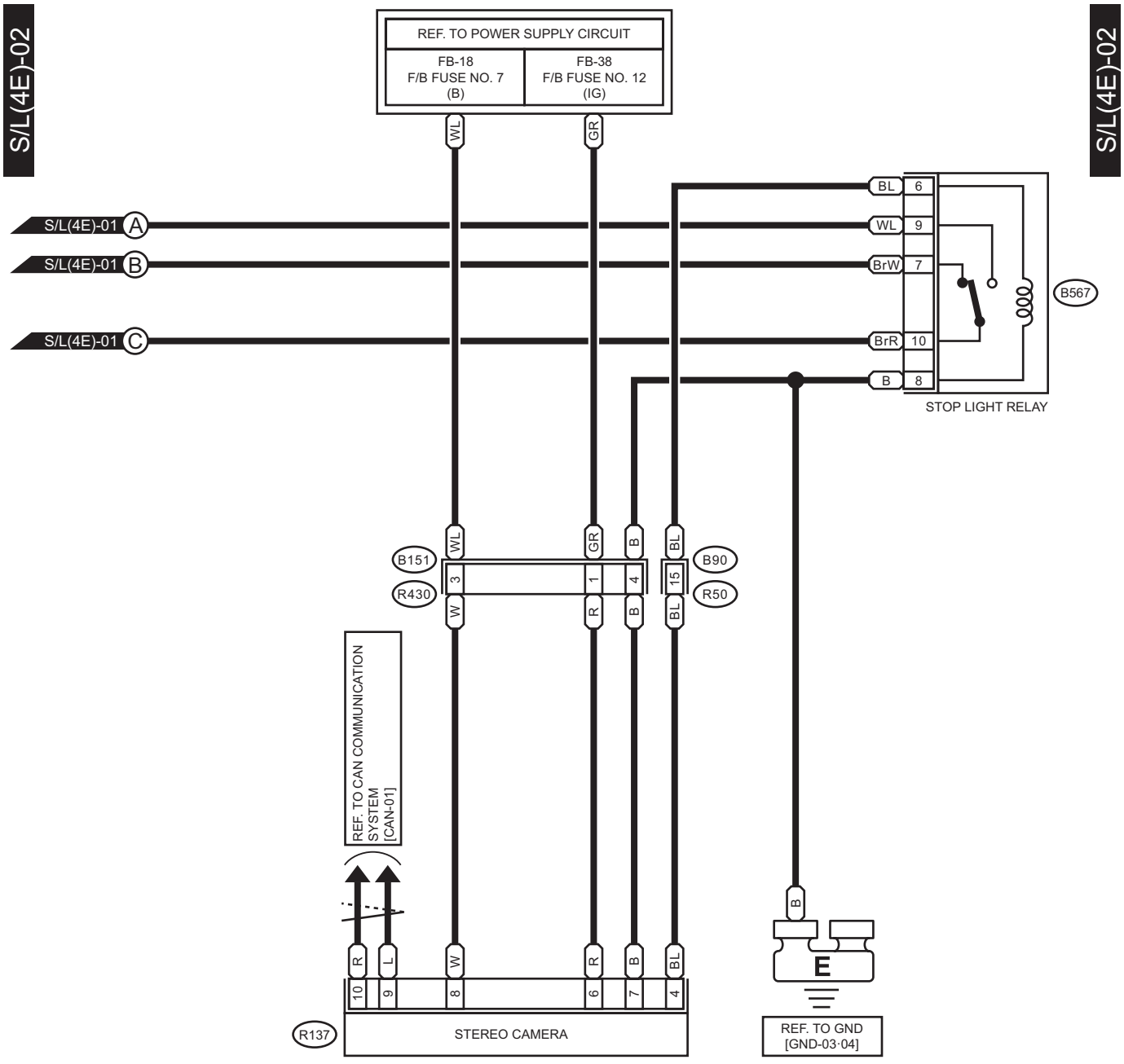
A: WIRING DIAGRAM

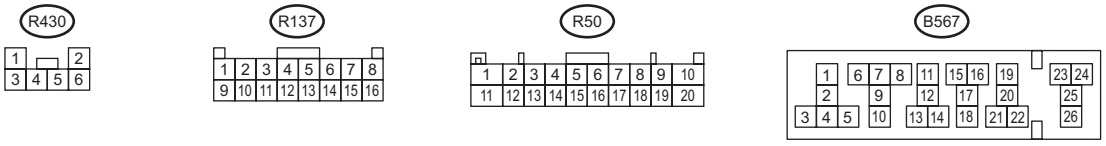
1. 4 DOOR MODEL (WITHOUT EyeSight)



2. 4 DOOR MODEL (WITH EyeSight)

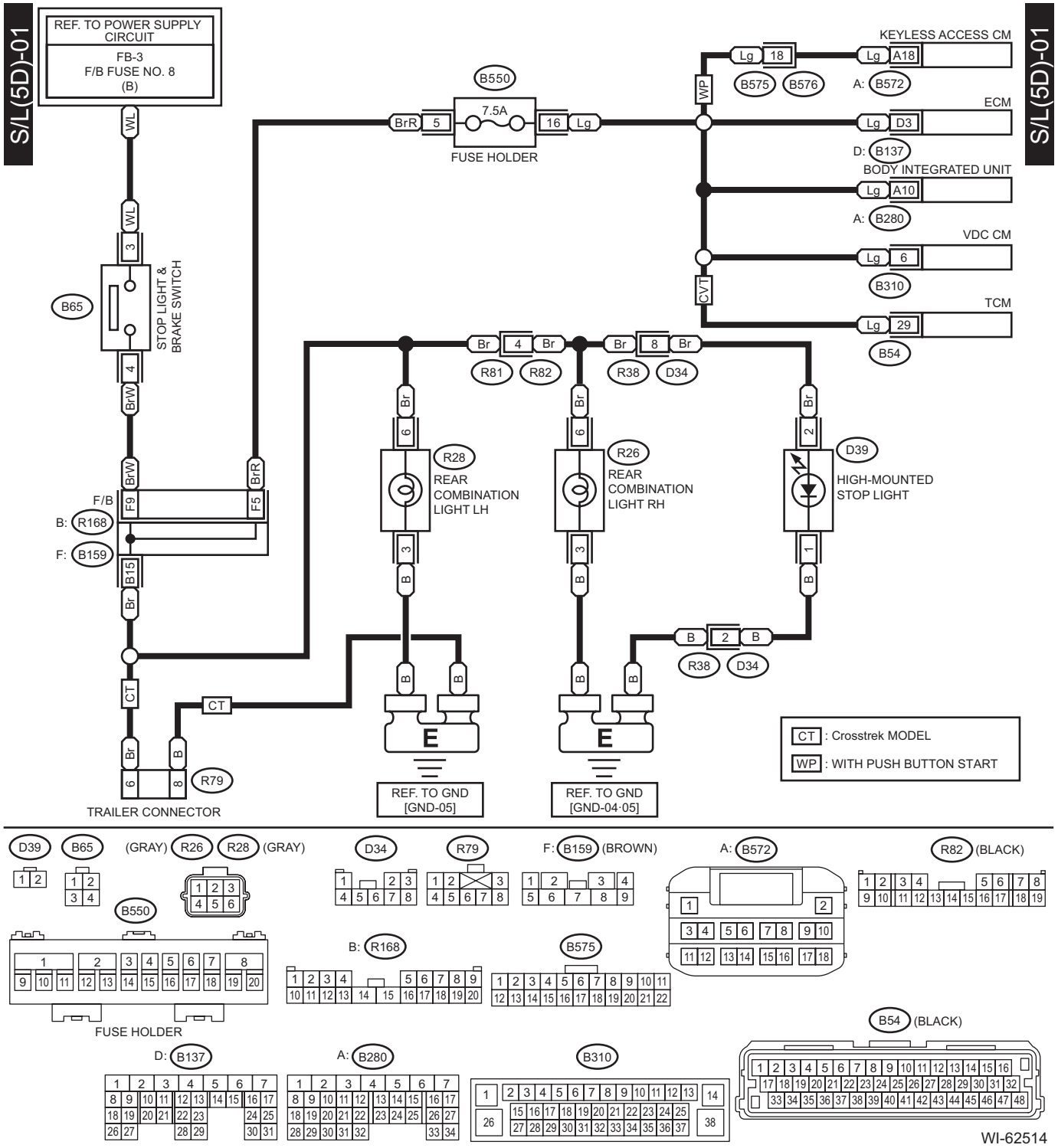



S/L(4E)-02
S/L(4E)-02
REF. TO POWER SUPPLY CIRCUIT
FB-18
F/B FUSE NO. 7
(B)
FB-38
F/B FUSE NO. 12
(IG)
WL
GR
S/L(4E)-01 A
S/L(4E)-01 B
S/L(4E)-01 C
BL 6
WL 9
BrW 7
BrR 10
B 8
B567
STOP LIGHT RELAY
B151
R430
B90
R50
REF. TO CAN COMMUNICATION SYSTEM [CAN-01]
R137
STEREO CAMERA
REF. TO GND [GND-03·04]
E

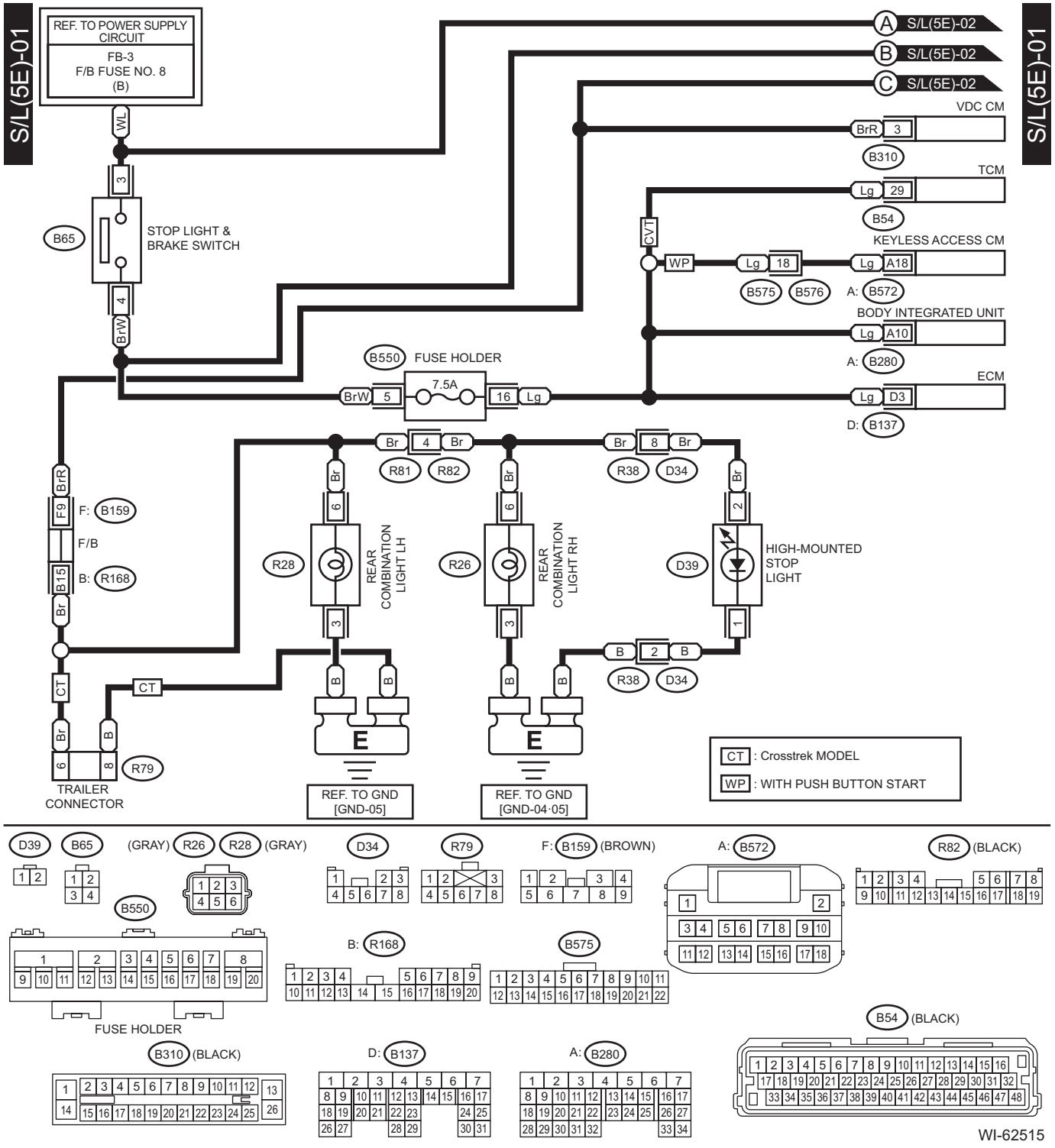

R430
R137
R50
B567
RELAY HOLDER

WI-61574

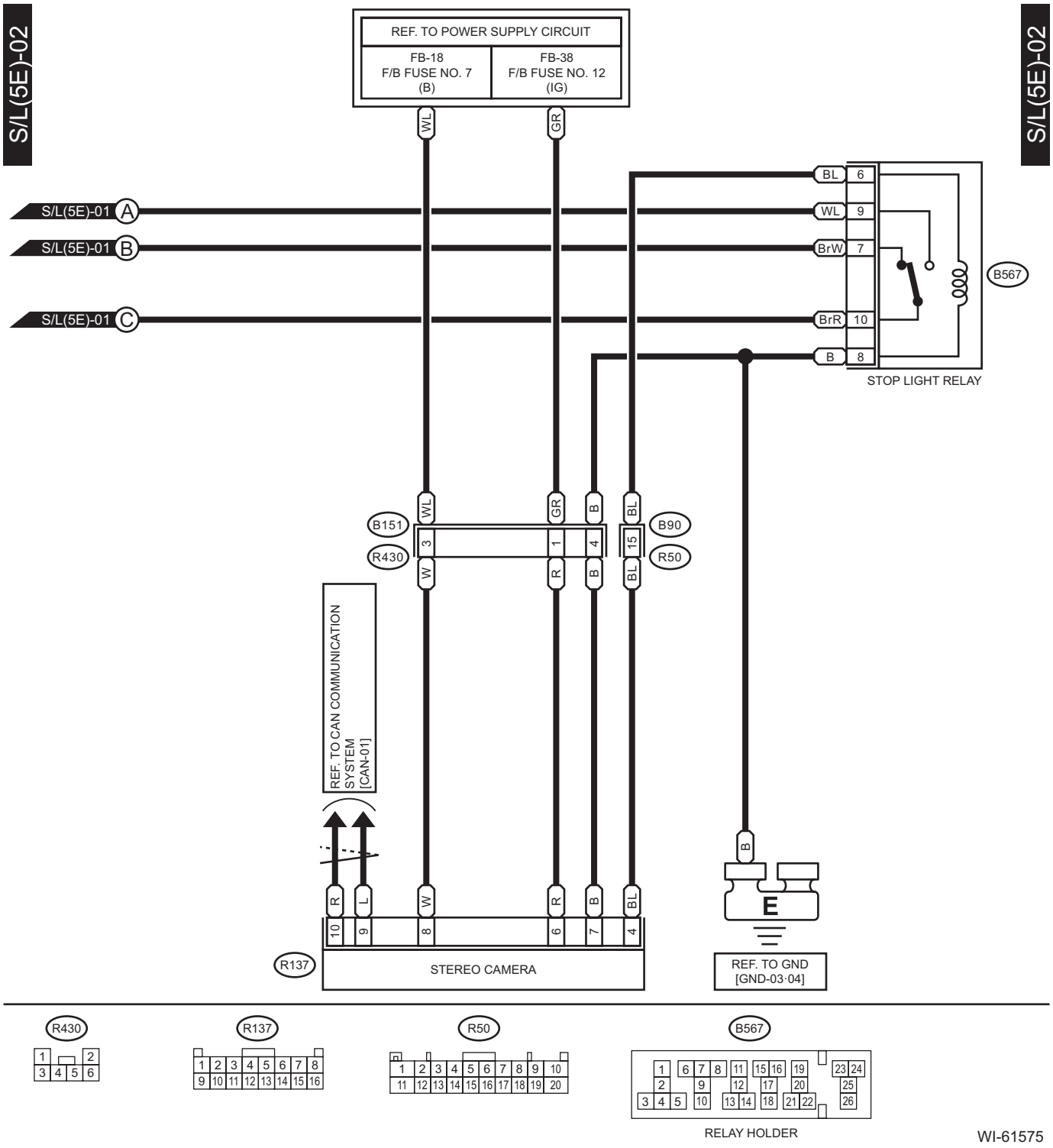
3. 5 DOOR MODEL (WITHOUT EyeSight)



4. 5 DOOR MODEL (WITH EyeSight)



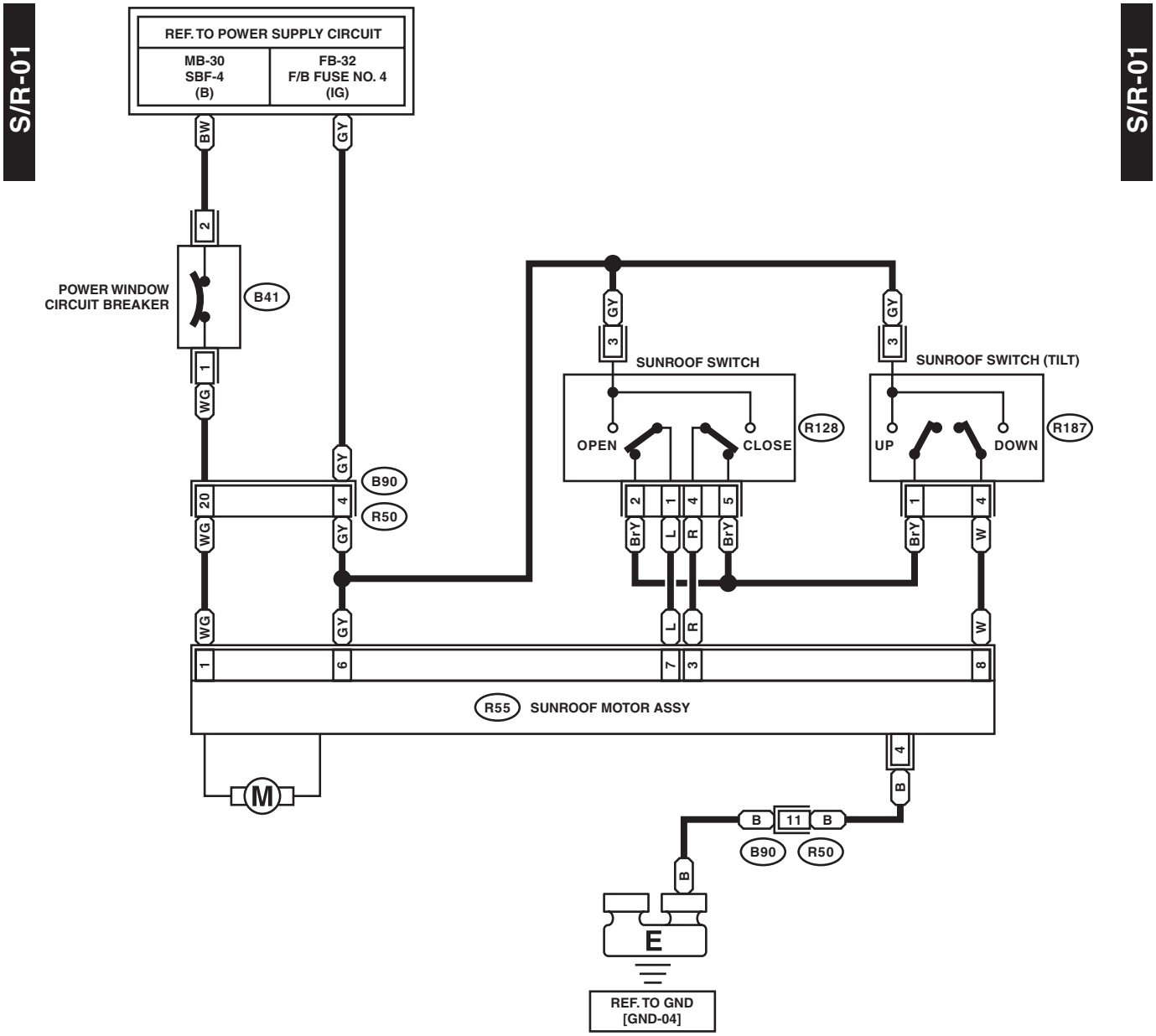
WIRING SYSTEM

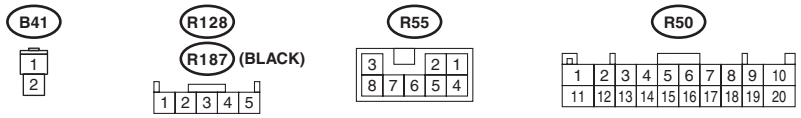


WI-61575

53.Sunroof Control System

A: WIRING DIAGRAM

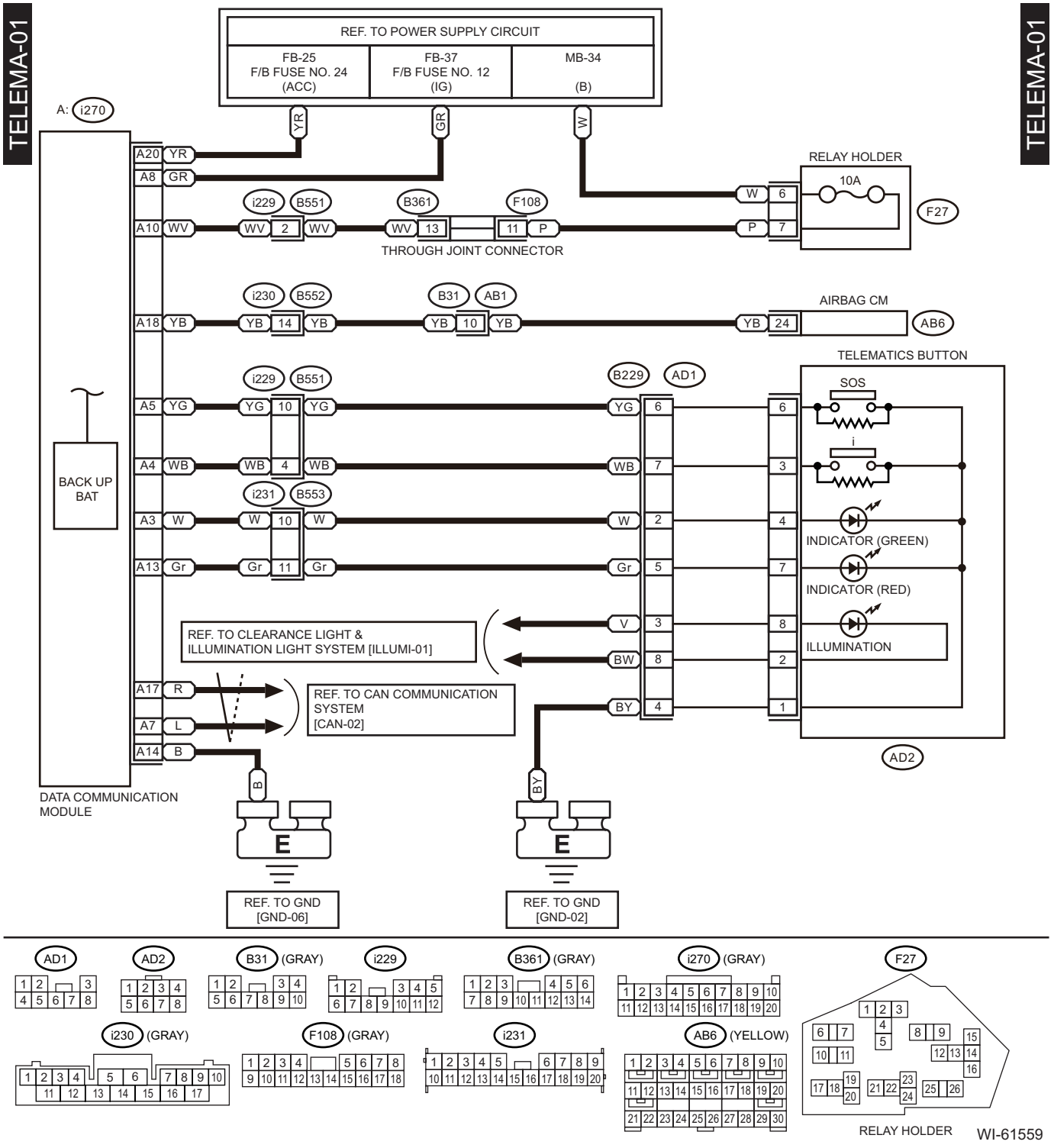




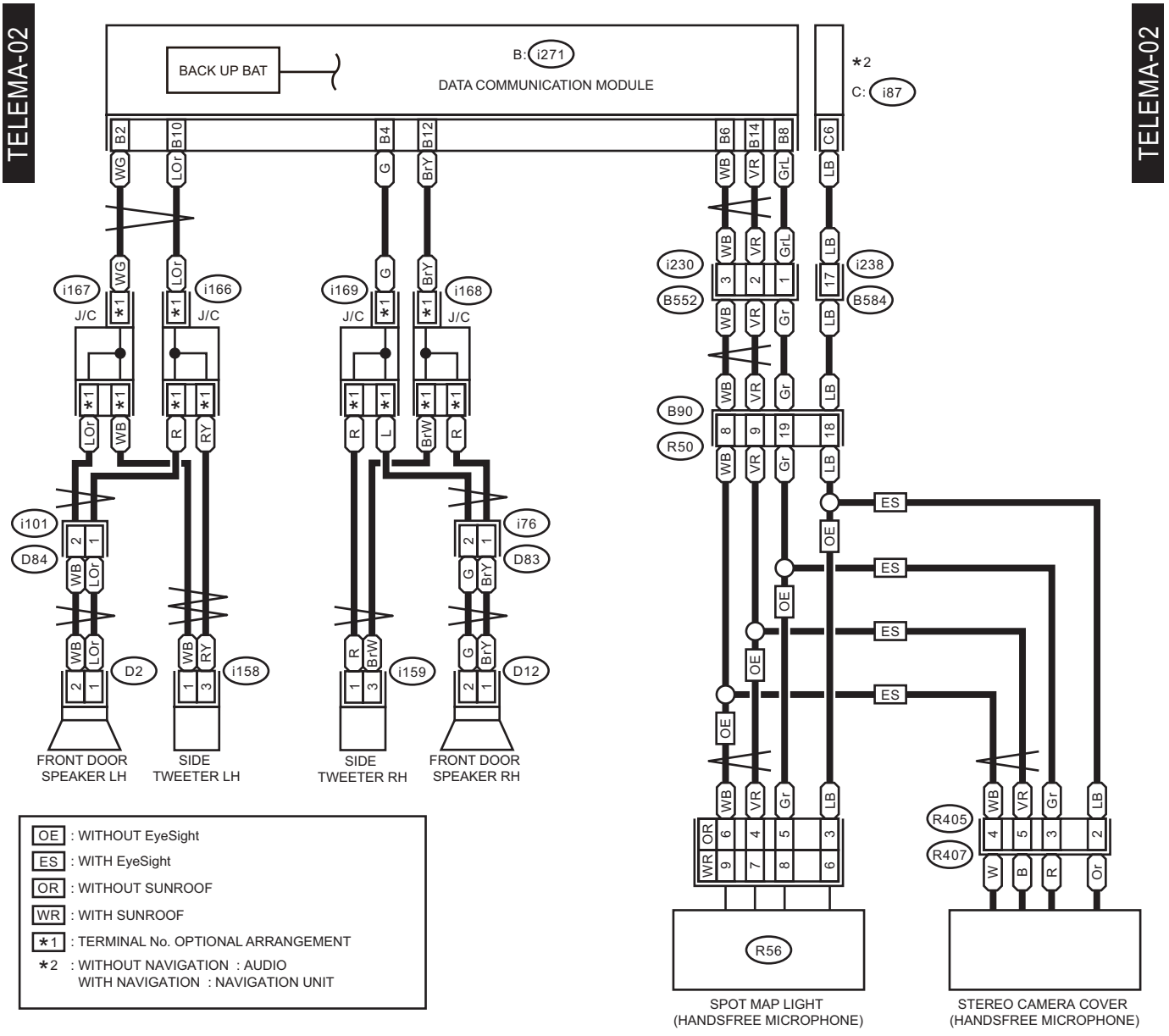
WI-48324

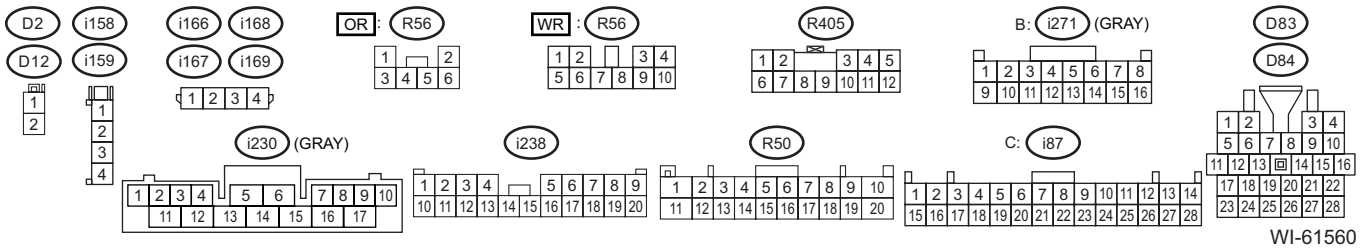
54.TELEMATICS SYSTEM

A: WIRING DIAGRAM



TELEMA-02



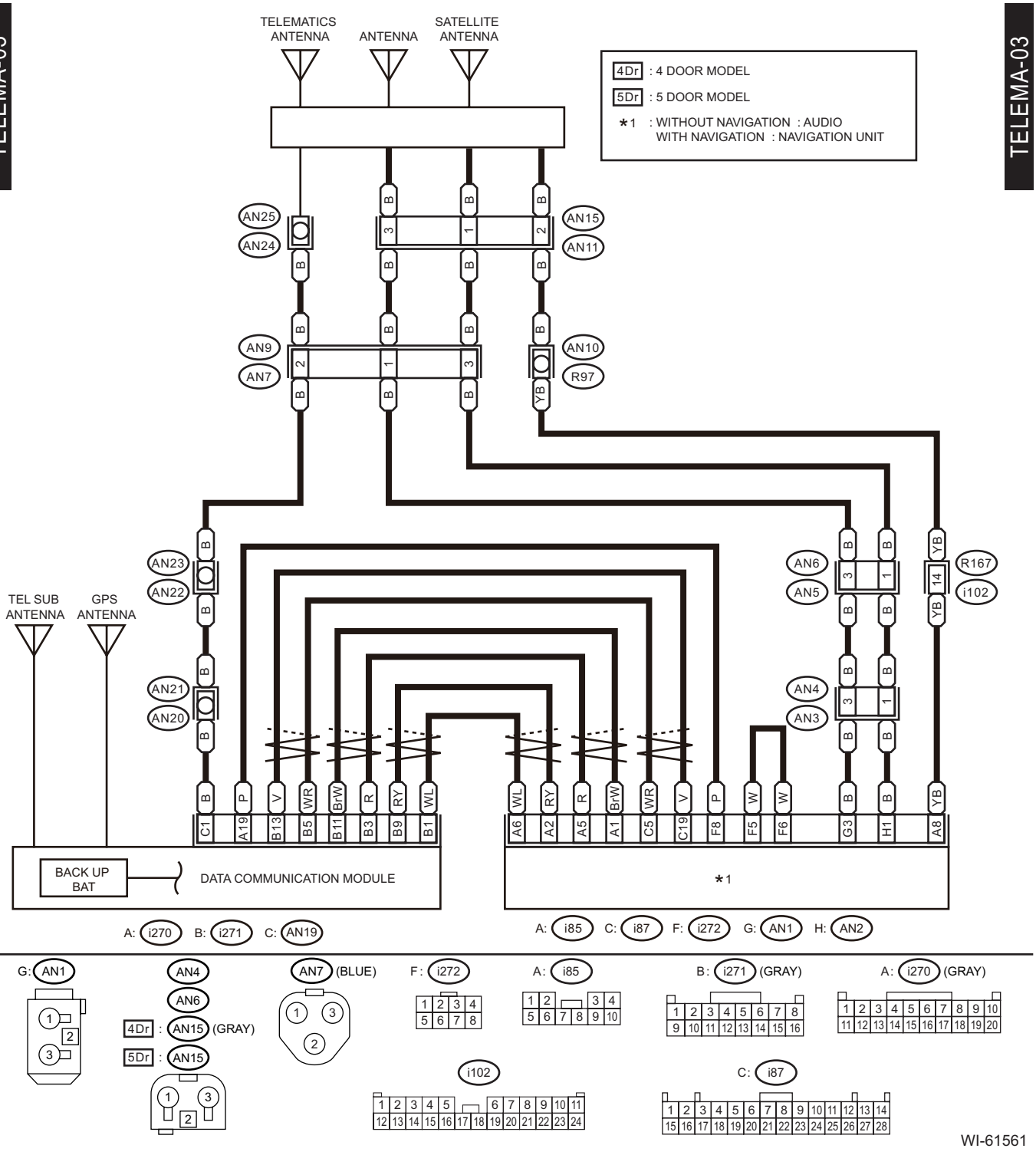


WI-61560

TELEMATICS SYSTEM

WIRING SYSTEM

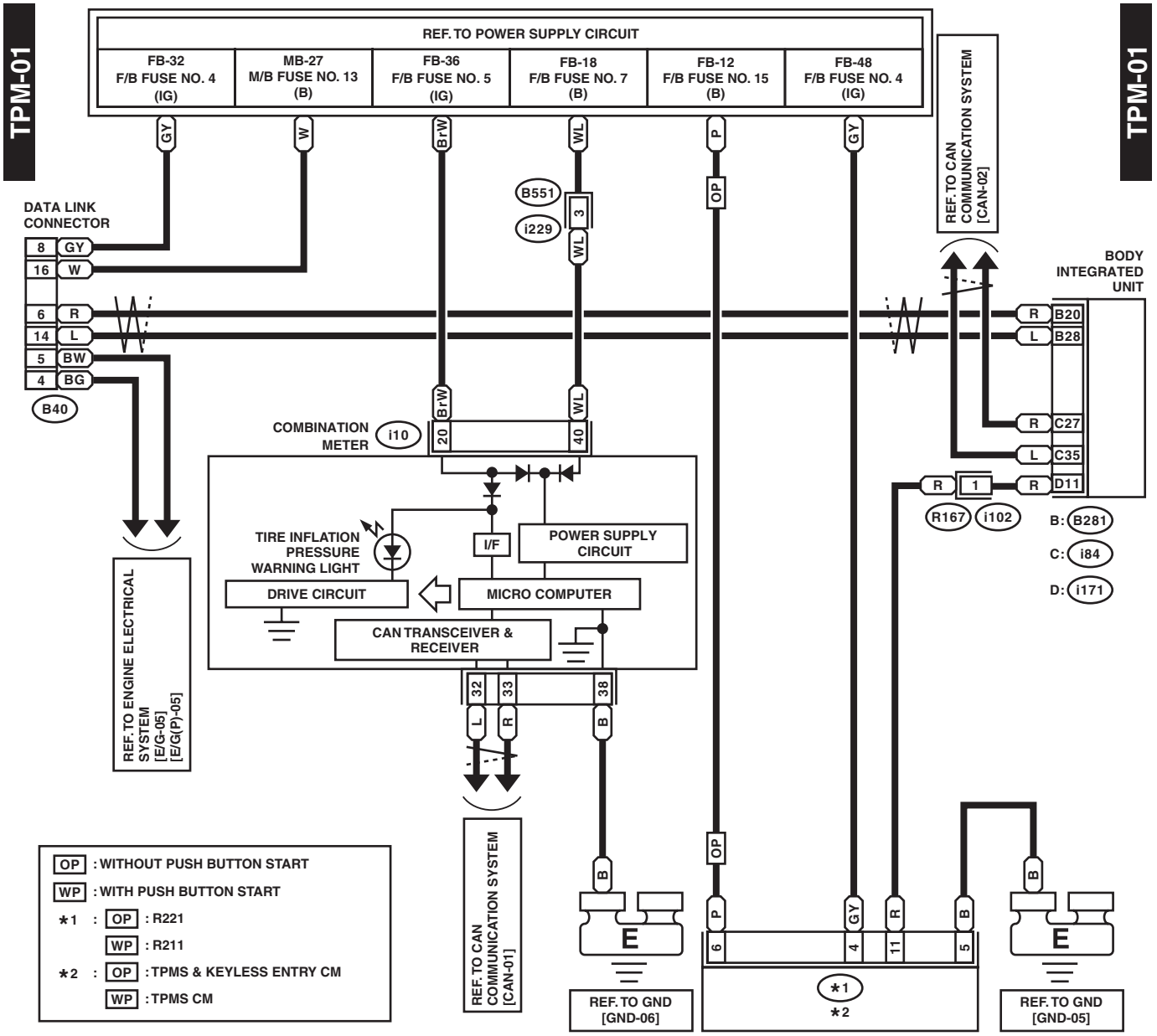
TELEMA-03

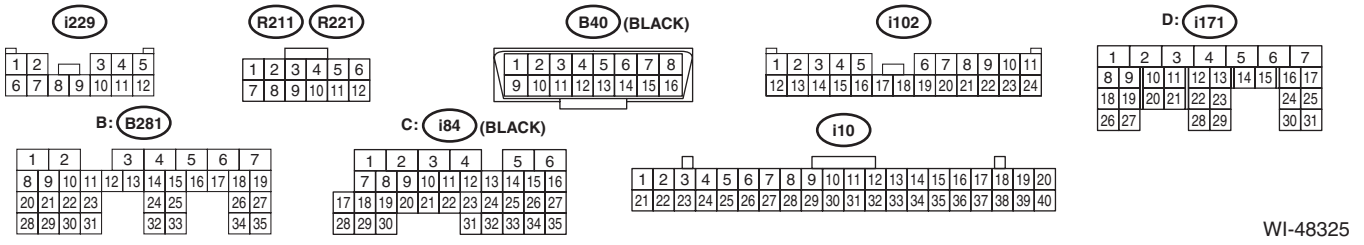


WI-61561

55.Tire Pressure Monitoring System

A: WIRING DIAGRAM

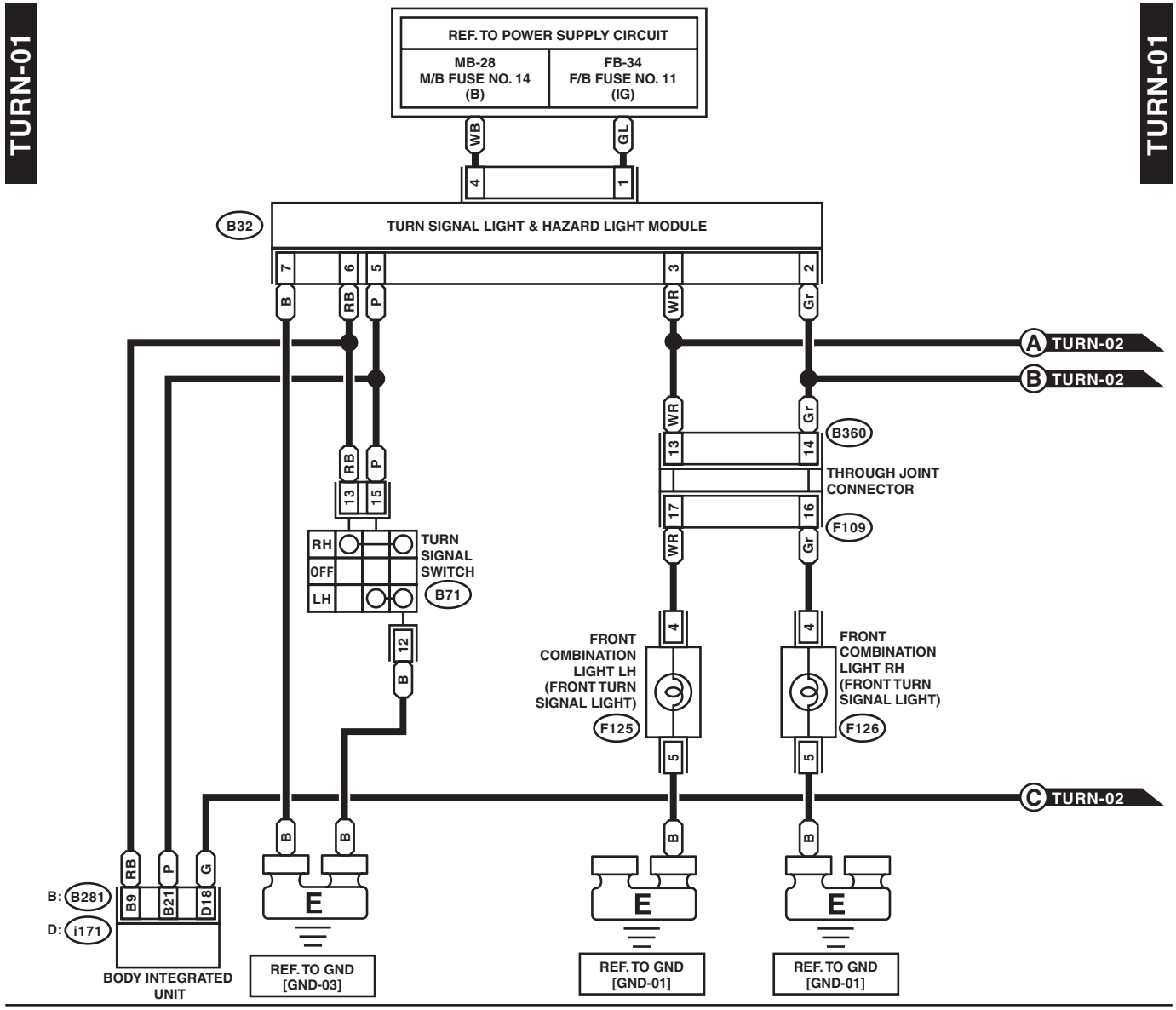


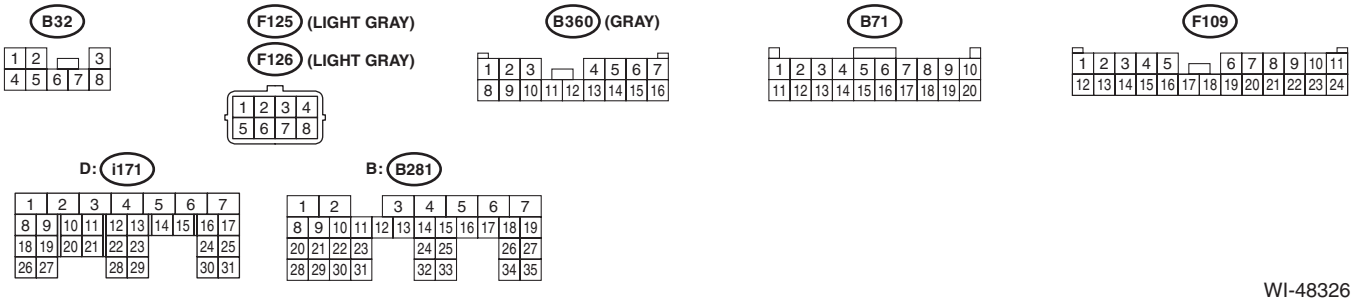


WI-48325

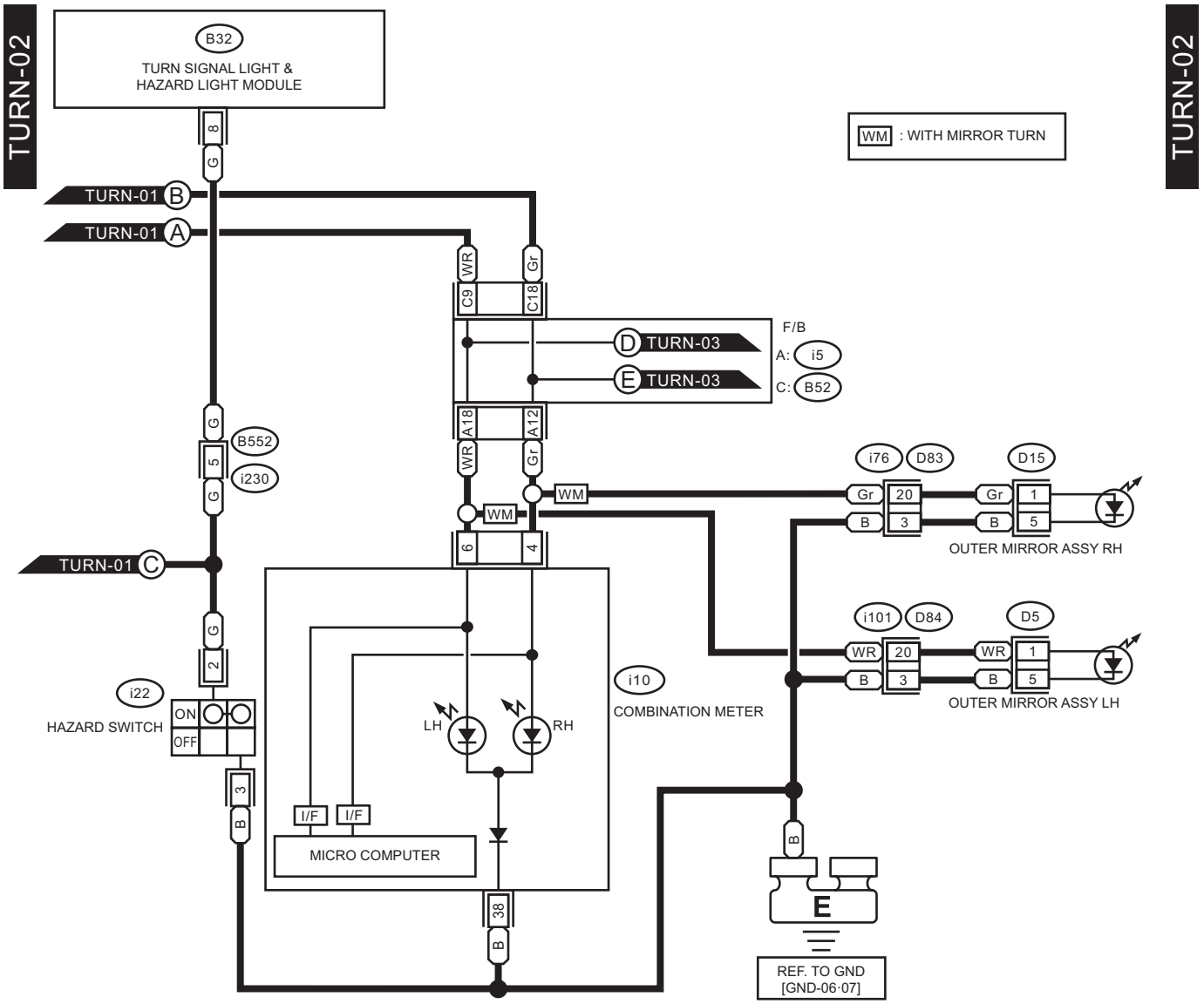
56.Turn Signal Light and Hazard Light System

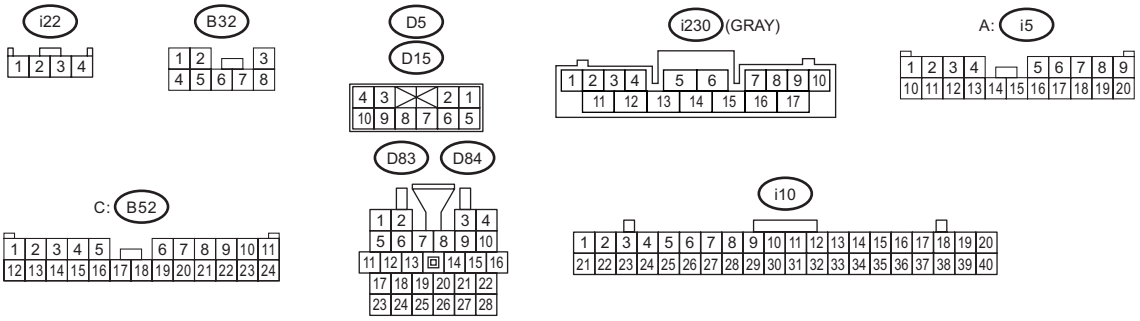
A: WIRING DIAGRAM



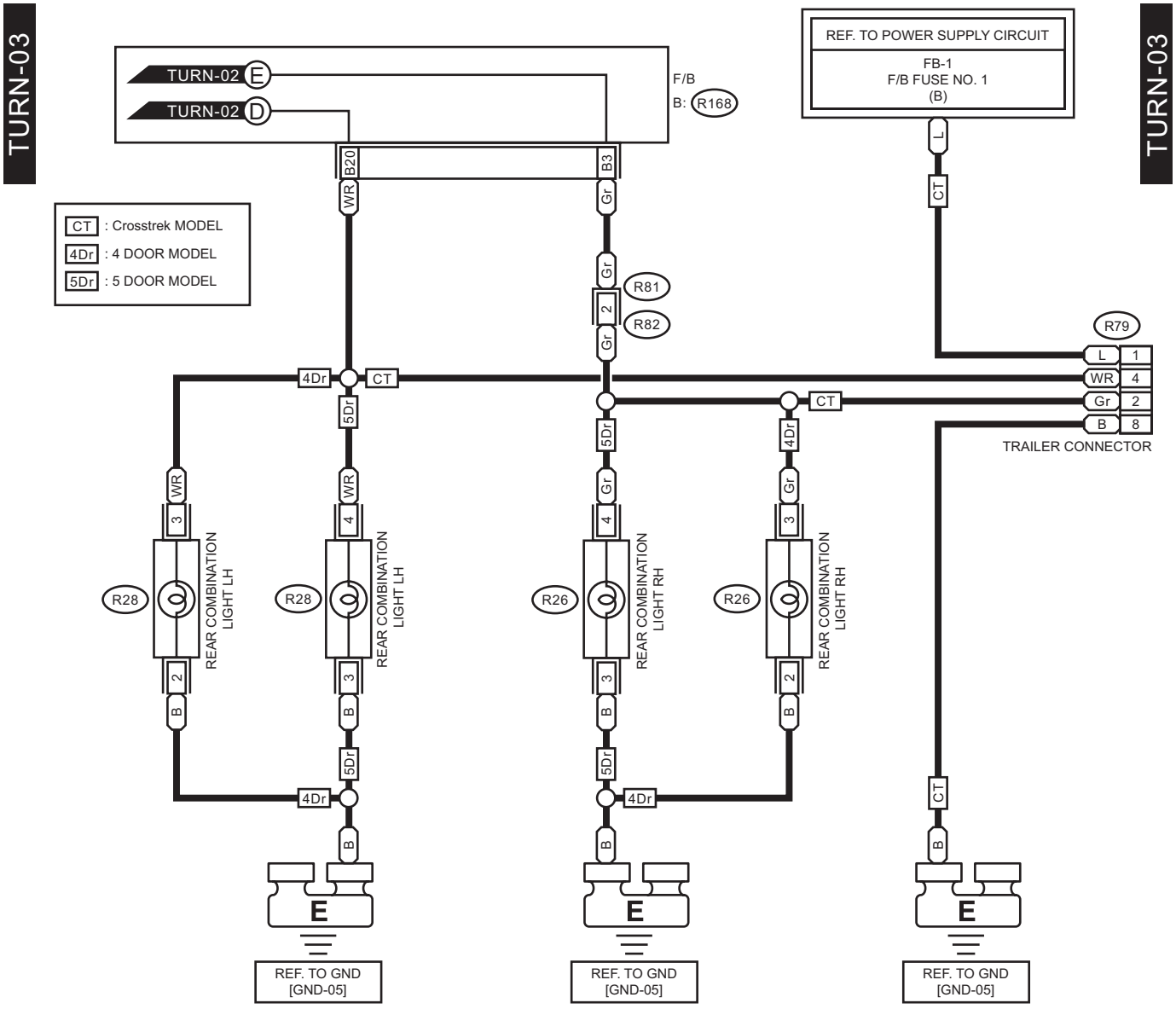


WI-48326


TURN-02
TURN-02
B32
TURN SIGNAL LIGHT & HAZARD LIGHT MODULE
WM : WITH MIRROR TURN
TURN-01 B
TURN-01 A
TURN-01 C
C9
C18
WR
Gr
F/B
D TURN-03
E TURN-03
A: i5
C: B52
A18
A12
B552
i230
WM
i76
D83
D15
OUTER MIRROR ASSY RH
i101
D84
D5
OUTER MIRROR ASSY LH
i22
HAZARD SWITCH
ON
OFF
i10
COMBINATION METER
LH
RH
I/F
MICRO COMPUTER
REF. TO GND [GND-06·07]


i22
B32
D5
D15
i230 (GRAY)
A: i5
C: B52
D83
D84
i10

WI-61562

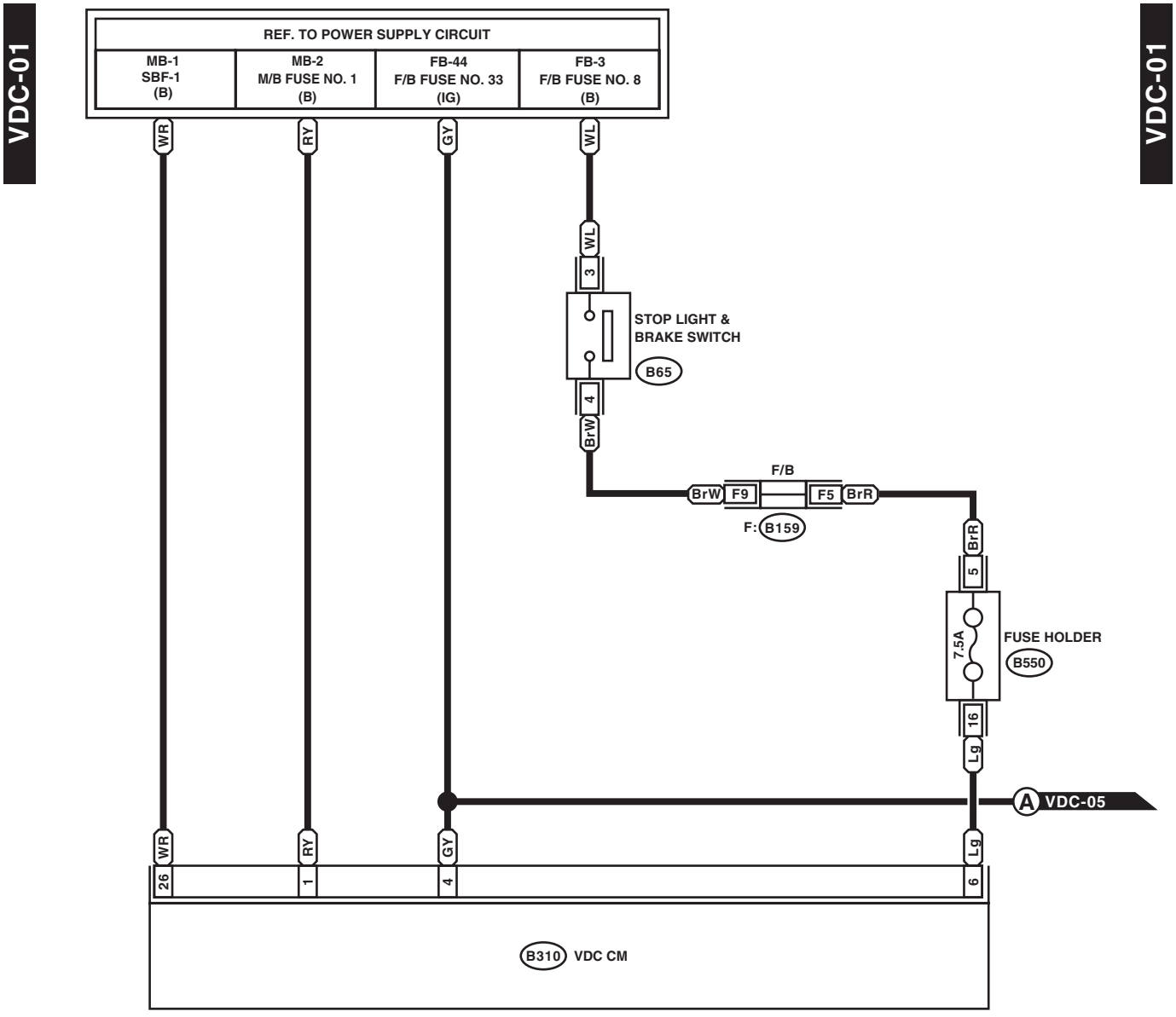

TURN-03
TURN-03
TURN-02 E
TURN-02 D
F/B
B: R168
REF. TO POWER SUPPLY CIRCUIT
FB-1
F/B FUSE NO. 1
(B)
CT : Crosstrek MODEL
4Dr : 4 DOOR MODEL
5Dr : 5 DOOR MODEL
B20
B3
WR
Gr
L
CT
R81
R82
R79
4Dr
5Dr
TRAILER CONNECTOR
REAR COMBINATION LIGHT LH
REAR COMBINATION LIGHT RH
R28
R26
REF. TO GND [GND-05]
4Dr : R26
4Dr : R28
5Dr : R26 (GRAY)
5Dr : R28 (GRAY)
R82 (BLACK)
B: R168

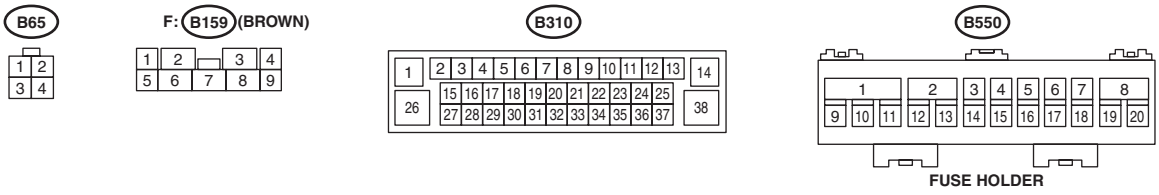
WI-62516

57.Vehicle Dynamics Control System

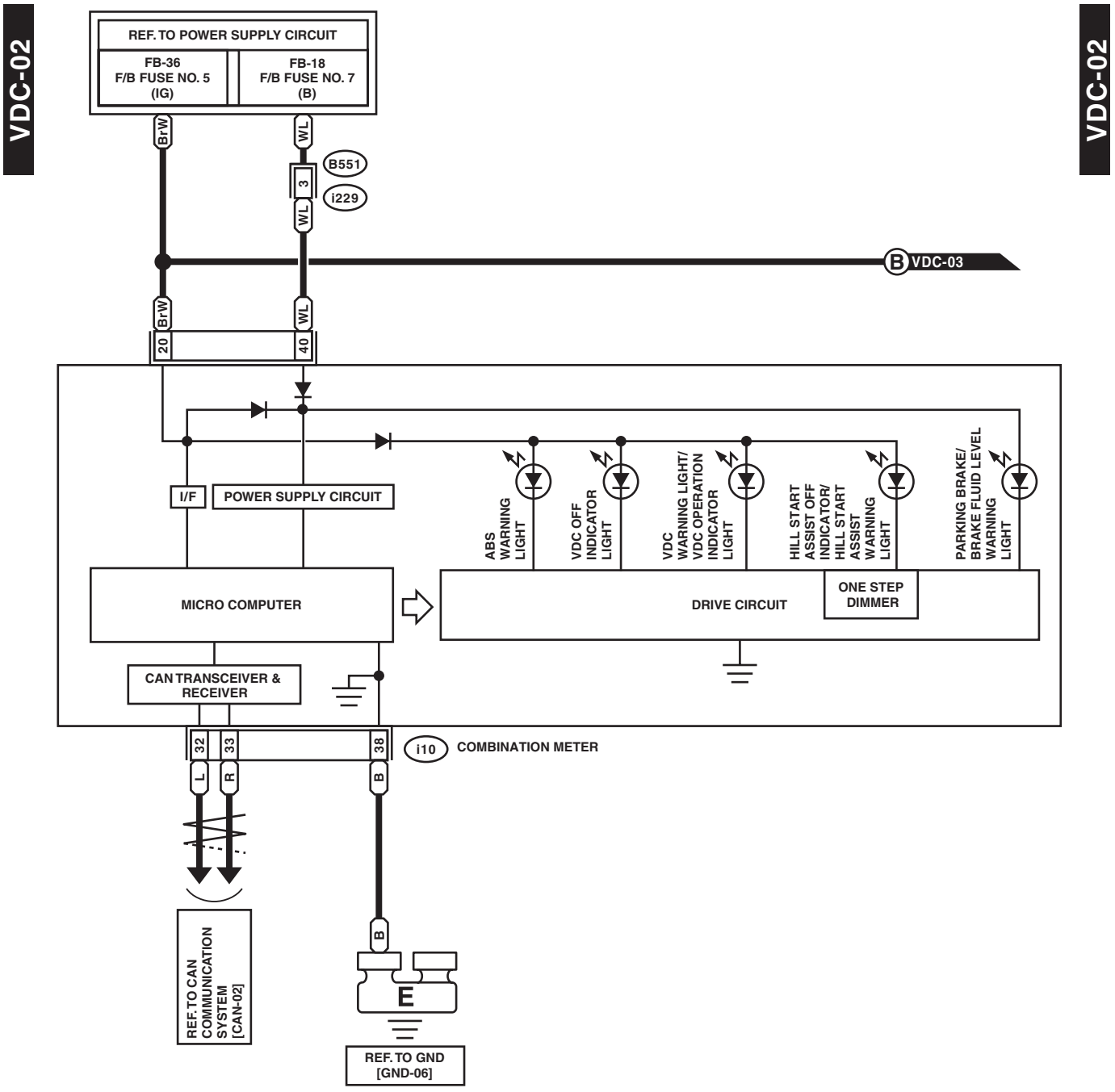
A: WIRING DIAGRAM

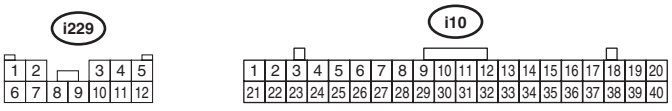
1. WITHOUT EyeSight



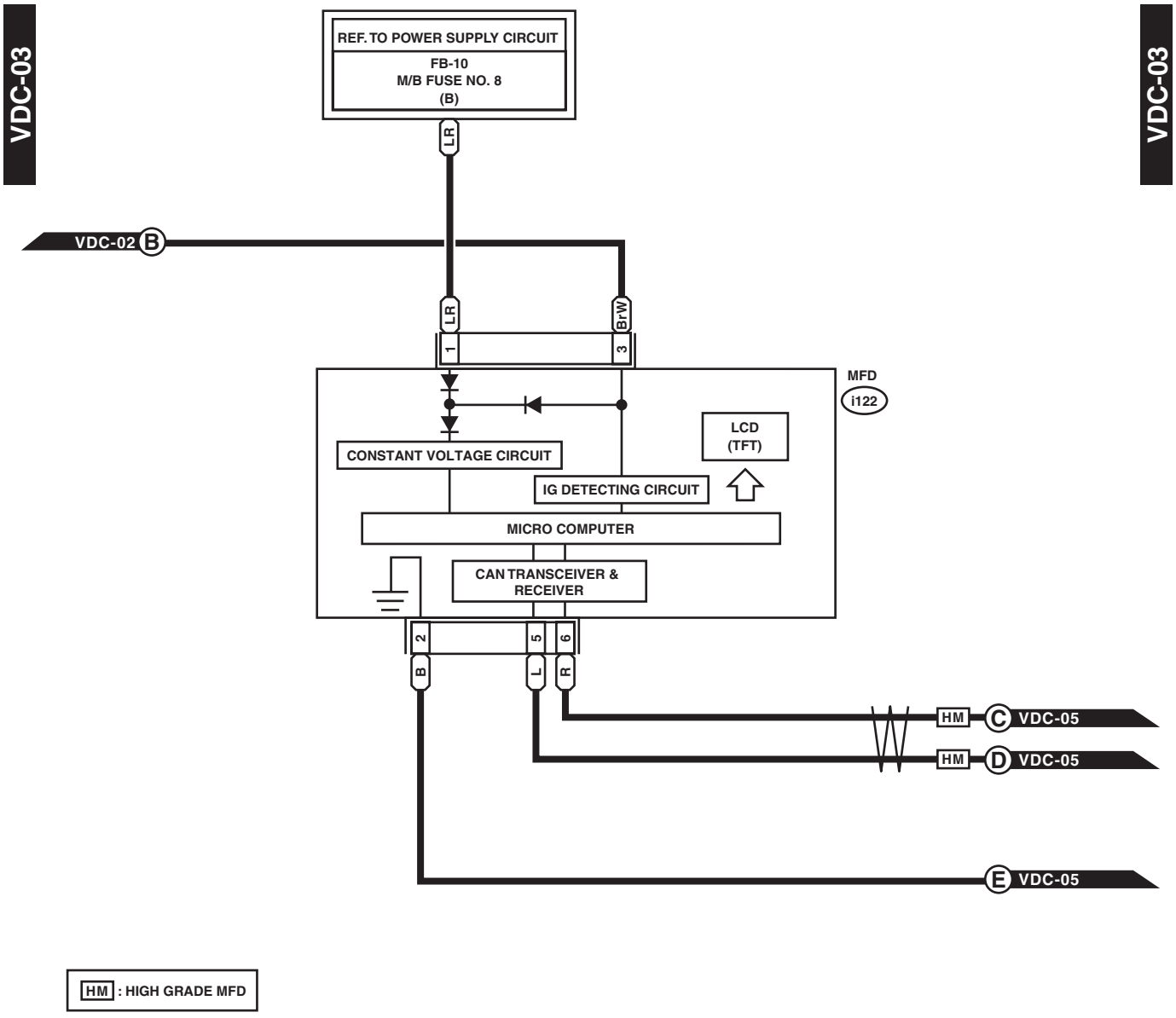


WI-48328


VDC-02
VDC-02
REF. TO POWER SUPPLY CIRCUIT
FB-36
F/B FUSE NO. 5
(IG)
FB-18
F/B FUSE NO. 7
(B)
Br-W
WL
B551
3
i229
WL
B VDC-03
Br-W
WL
20
40
I/F
POWER SUPPLY CIRCUIT
ABS WARNING LIGHT
VDC OFF INDICATOR LIGHT
VDC WARNING LIGHT/ VDC OPERATION INDICATOR LIGHT
HILL START ASSIST OFF INDICATOR/ HILL START ASSIST WARNING LIGHT
PARKING BRAKE/ BRAKE FLUID LEVEL WARNING LIGHT
MICRO COMPUTER
DRIVE CIRCUIT
ONE STEP DIMMER
CAN TRANSCEIVER & RECEIVER
32
33
38
i10
COMBINATION METER
L
R
B
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
B
E
REF. TO GND [GND-06]


i229
1 2 3 4 5
6 7 8 9 10 11 12
i10
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

WI-48329

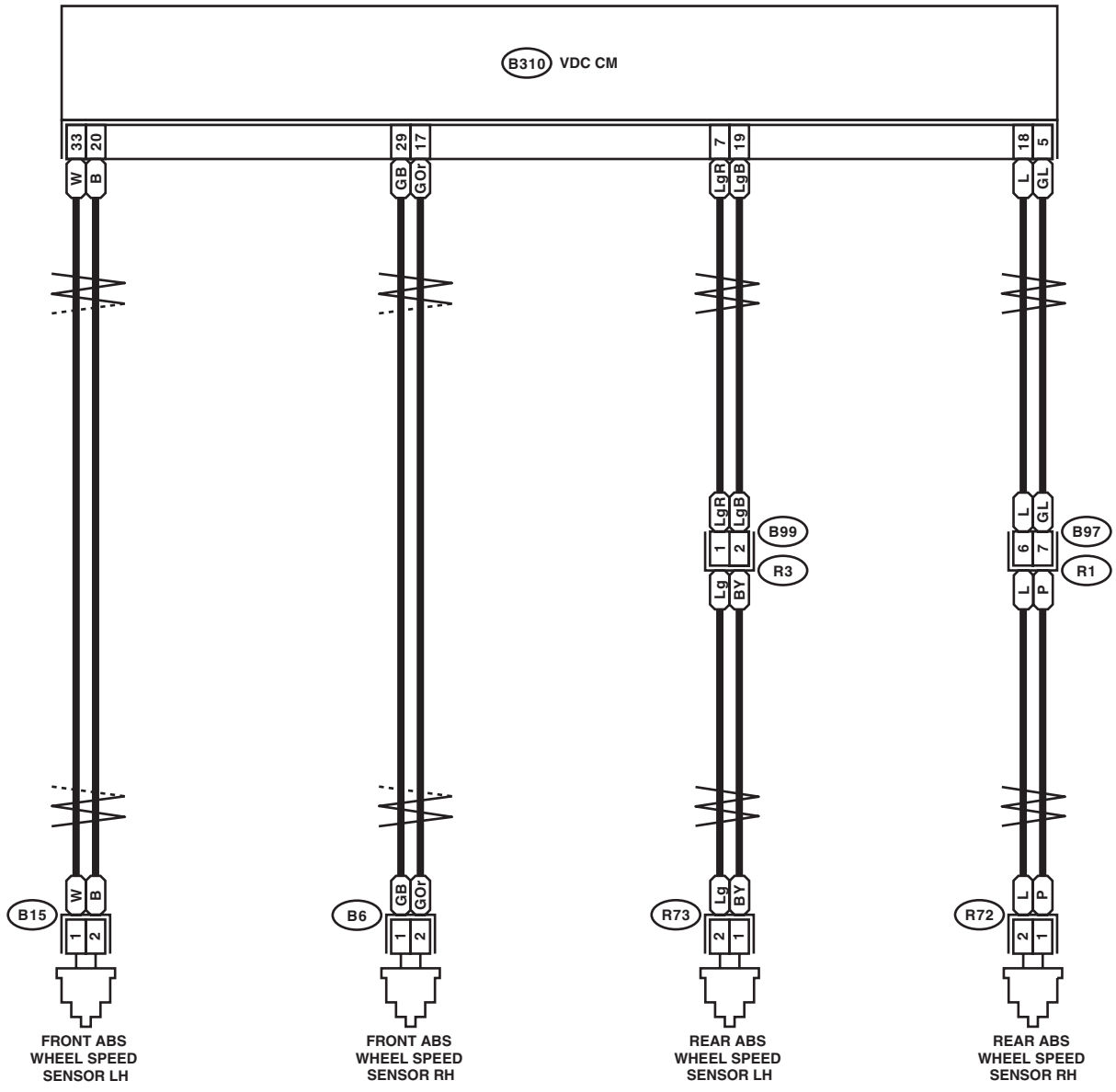


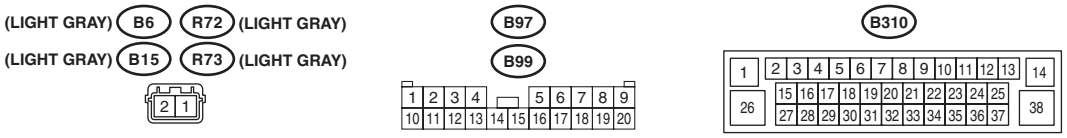
i122 (BLACK)

1	2	3	4	5	6
7	8	9	10	11	12

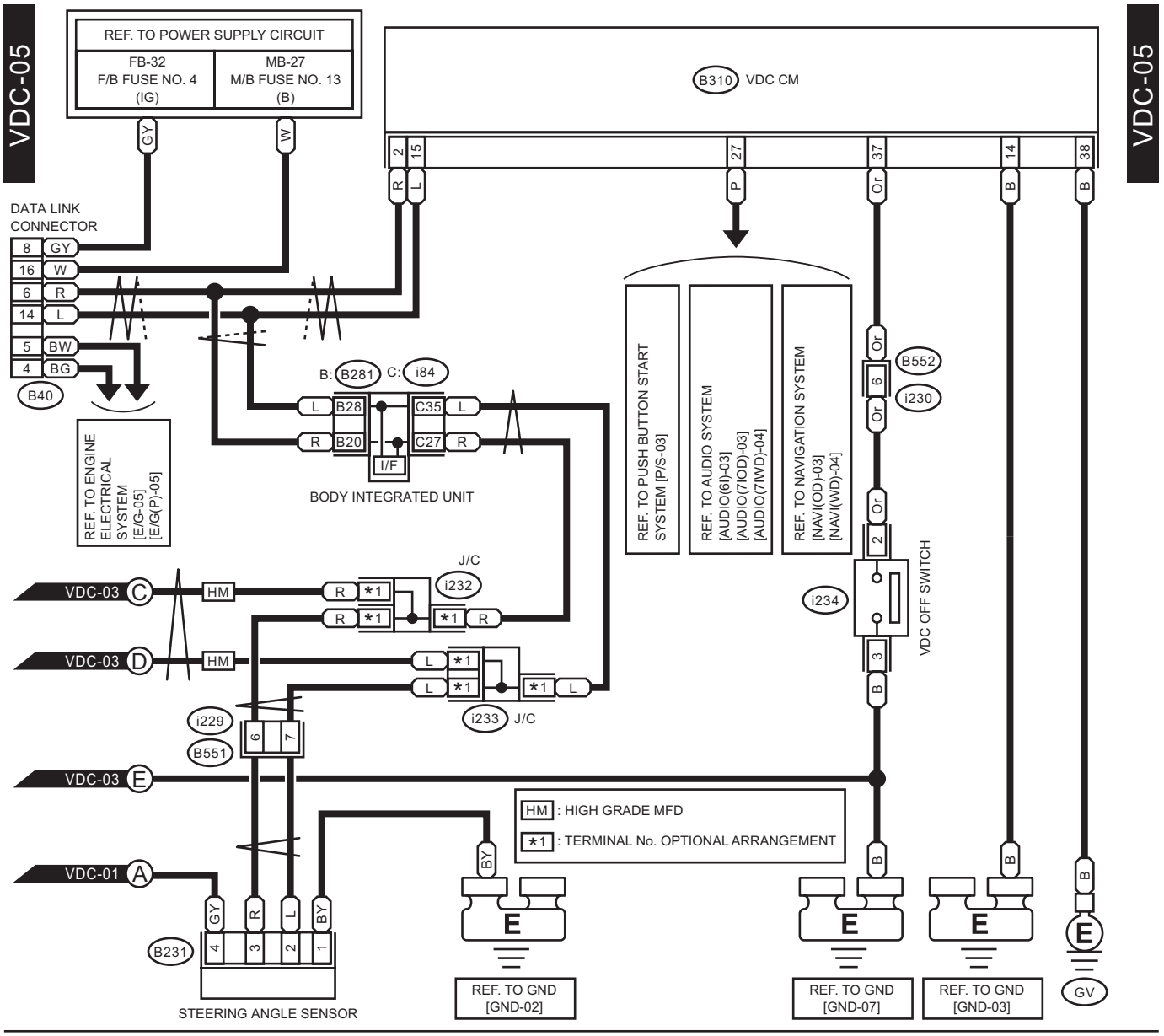
WI-48330

VDC-04

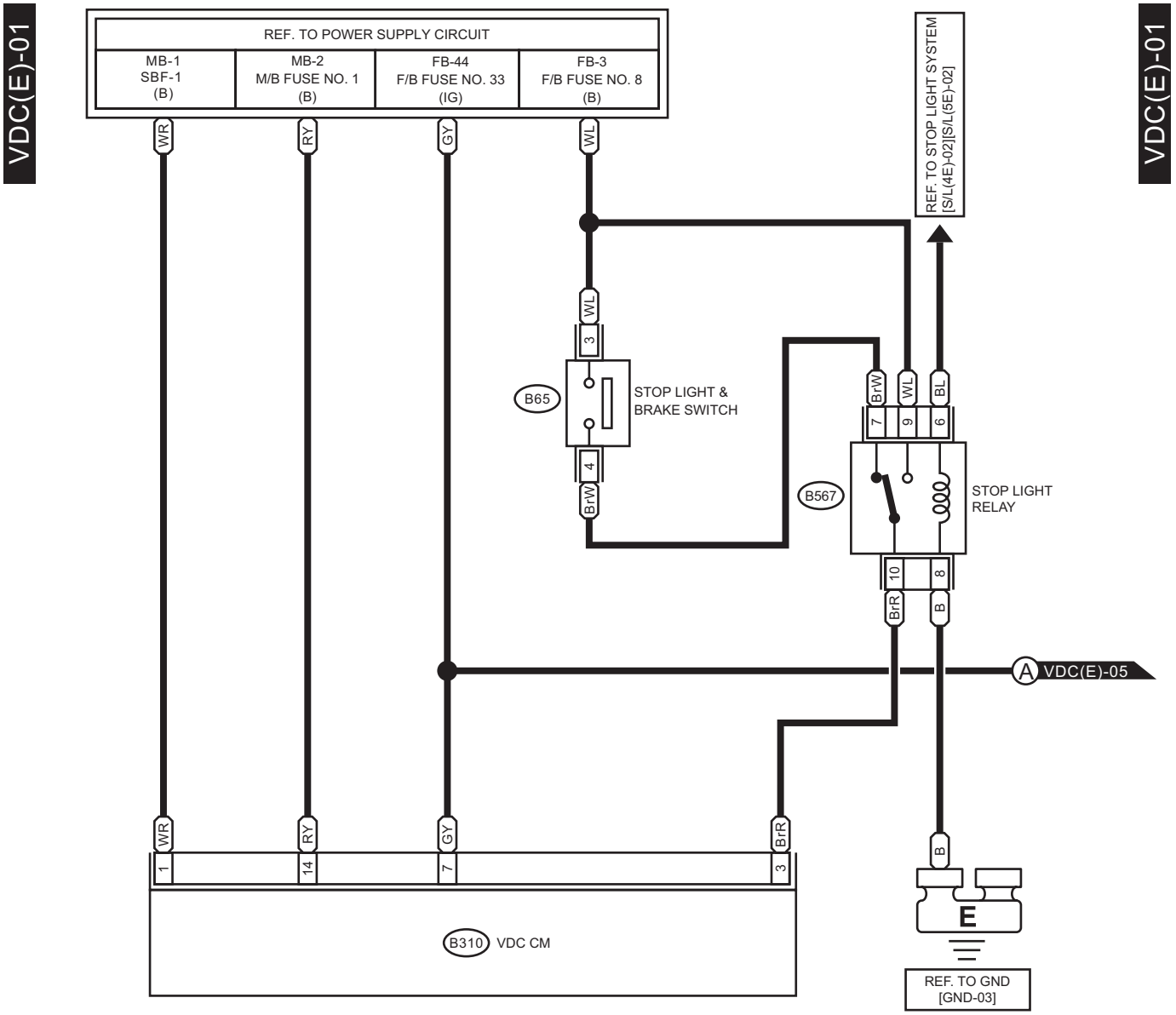


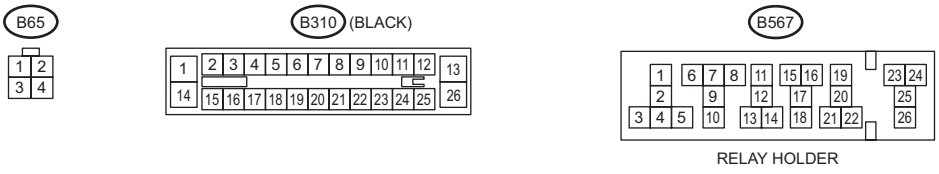


WI-48331

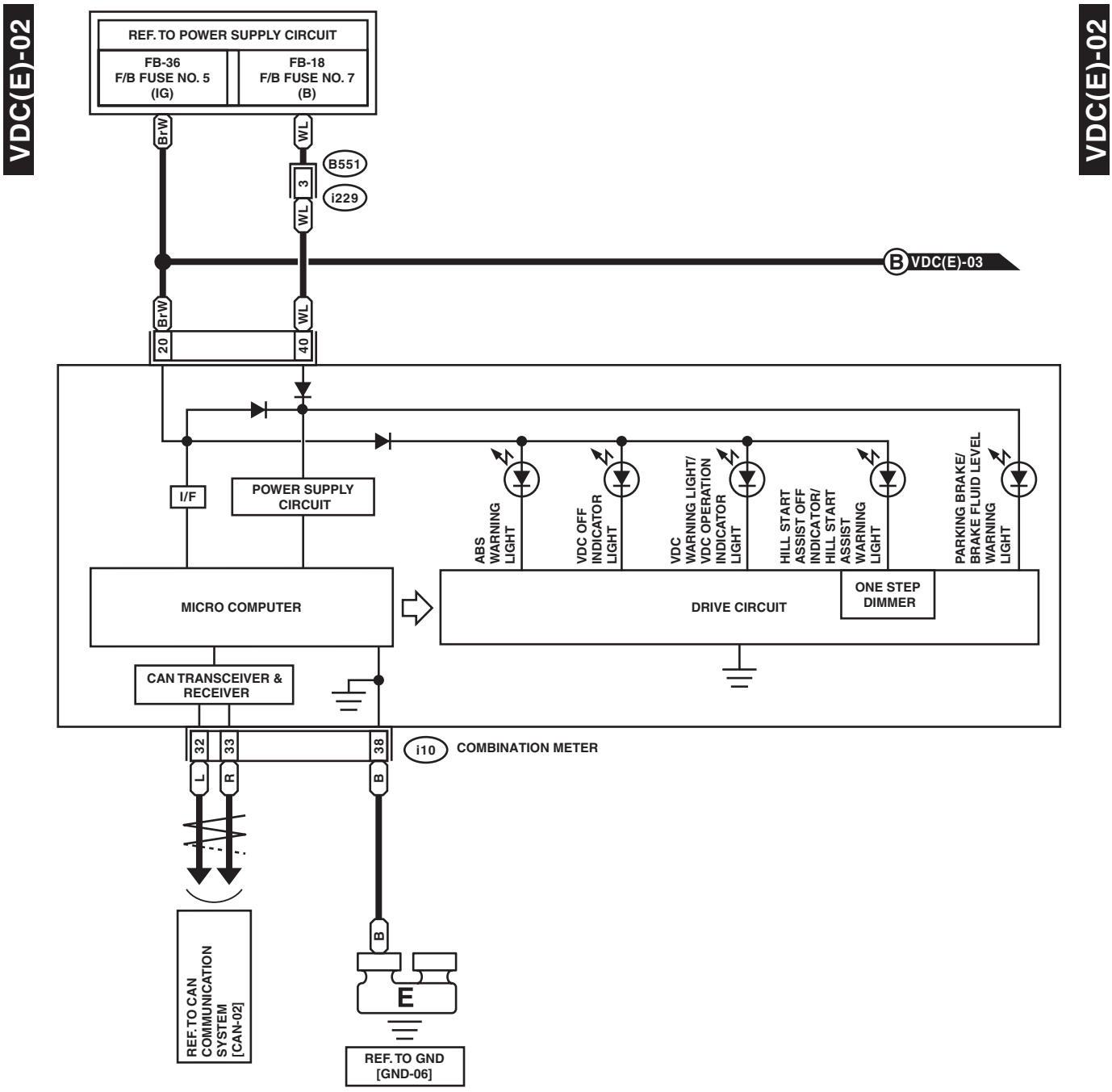

VDC-05
VDC-05
REF. TO POWER SUPPLY CIRCUIT
FB-32
F/B FUSE NO. 4
(IG)
MB-27
M/B FUSE NO. 13
(B)
B310 VDC CM
DATA LINK
CONNECTOR
8 GY
16 W
6 R
14 L
5 BW
4 BG
B40
REF. TO ENGINE
ELECTRICAL
SYSTEM
[E/G-05]
[E/G(P)-05]
B: B281
C: i84
L B28
R B20
C35 L
C27 R
I/F
BODY INTEGRATED UNIT
REF. TO PUSH BUTTON START
SYSTEM [P/S-03]
REF. TO AUDIO SYSTEM
[AUDIO(6I)-03]
[AUDIO(7IOD)-03]
[AUDIO(7IWD)-04]
REF. TO NAVIGATION SYSTEM
[NAVI(OD)-03]
[NAVI(WD)-04]
B552
i230
VDC OFF SWITCH
i234
J/C
i232
i233 J/C
i229
B551
VDC-03 C
VDC-03 D
VDC-03 E
VDC-01 A
HM
*1
HM : HIGH GRADE MFD
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
B231
STEERING ANGLE SENSOR
REF. TO GND
[GND-02]
REF. TO GND
[GND-07]
REF. TO GND
[GND-03]
GV
i234
B231
i232
i233
i229
B40 (BLACK)
i230 (GRAY)
B: B281
C: i84 (BLACK)
B310
WI-61563

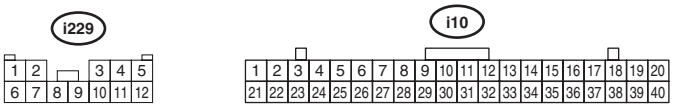
2. WITH EyeSight



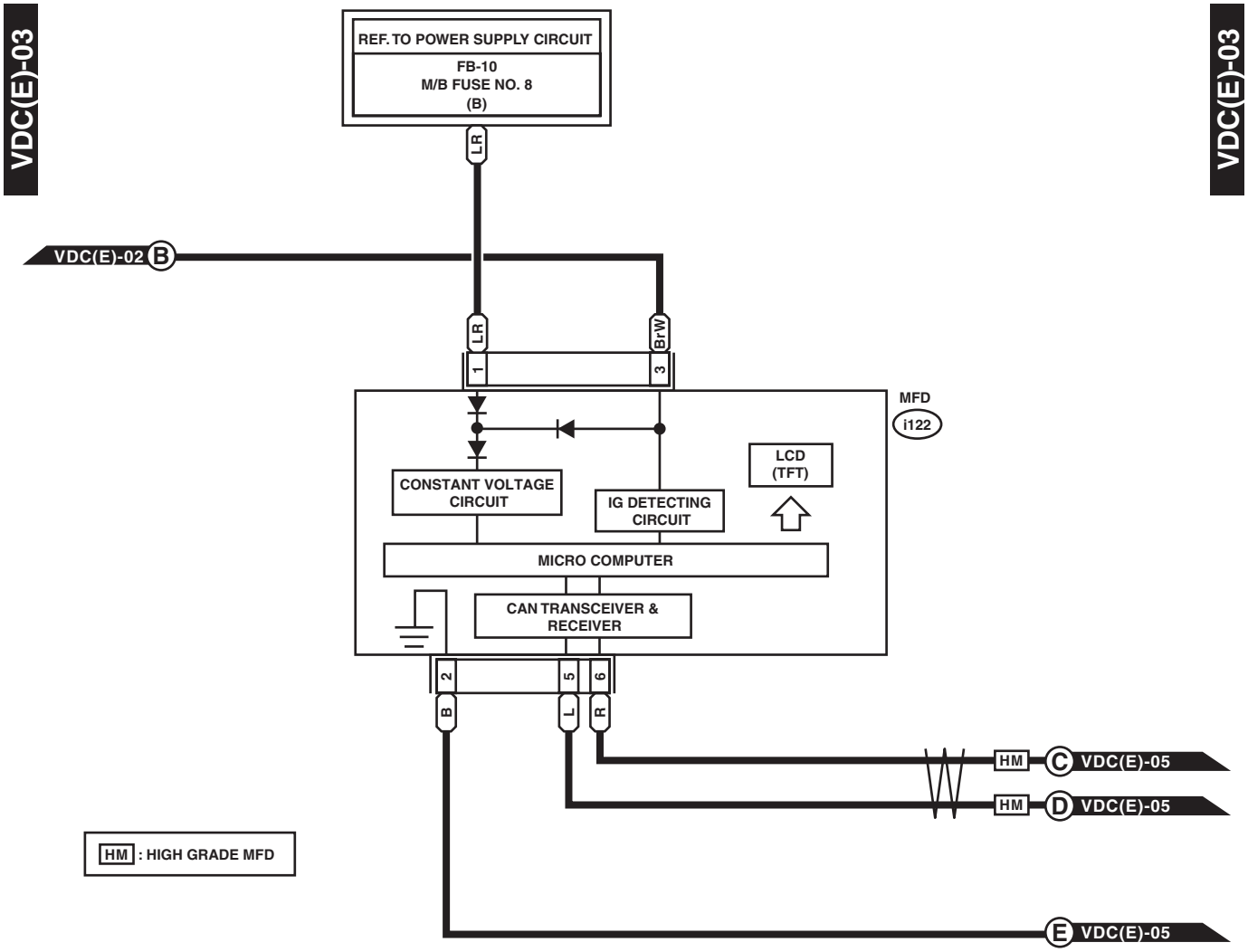


WI-61576


VDC(E)-02
VDC(E)-02
REF. TO POWER SUPPLY CIRCUIT
FB-36
F/B FUSE NO. 5
(IG)
FB-18
F/B FUSE NO. 7
(B)
Br-W
WL
B551
3
i229
WL
B VDC(E)-03
Br-W
WL
20
40
I/F
POWER SUPPLY CIRCUIT
ABS WARNING LIGHT
VDC OFF INDICATOR LIGHT
VDC WARNING LIGHT/ VDC OPERATION INDICATOR LIGHT
HILL START ASSIST OFF INDICATOR/ HILL START ASSIST WARNING LIGHT
PARKING BRAKE/ BRAKE FLUID LEVEL WARNING LIGHT
MICRO COMPUTER
DRIVE CIRCUIT
ONE STEP DIMMER
CAN TRANSCEIVER & RECEIVER
32
33
38
i10
COMBINATION METER
L
R
B
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
B
E
REF. TO GND [GND-06]


i229
1 2 3 4 5
6 7 8 9 10 11 12
i10
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

WI-48334

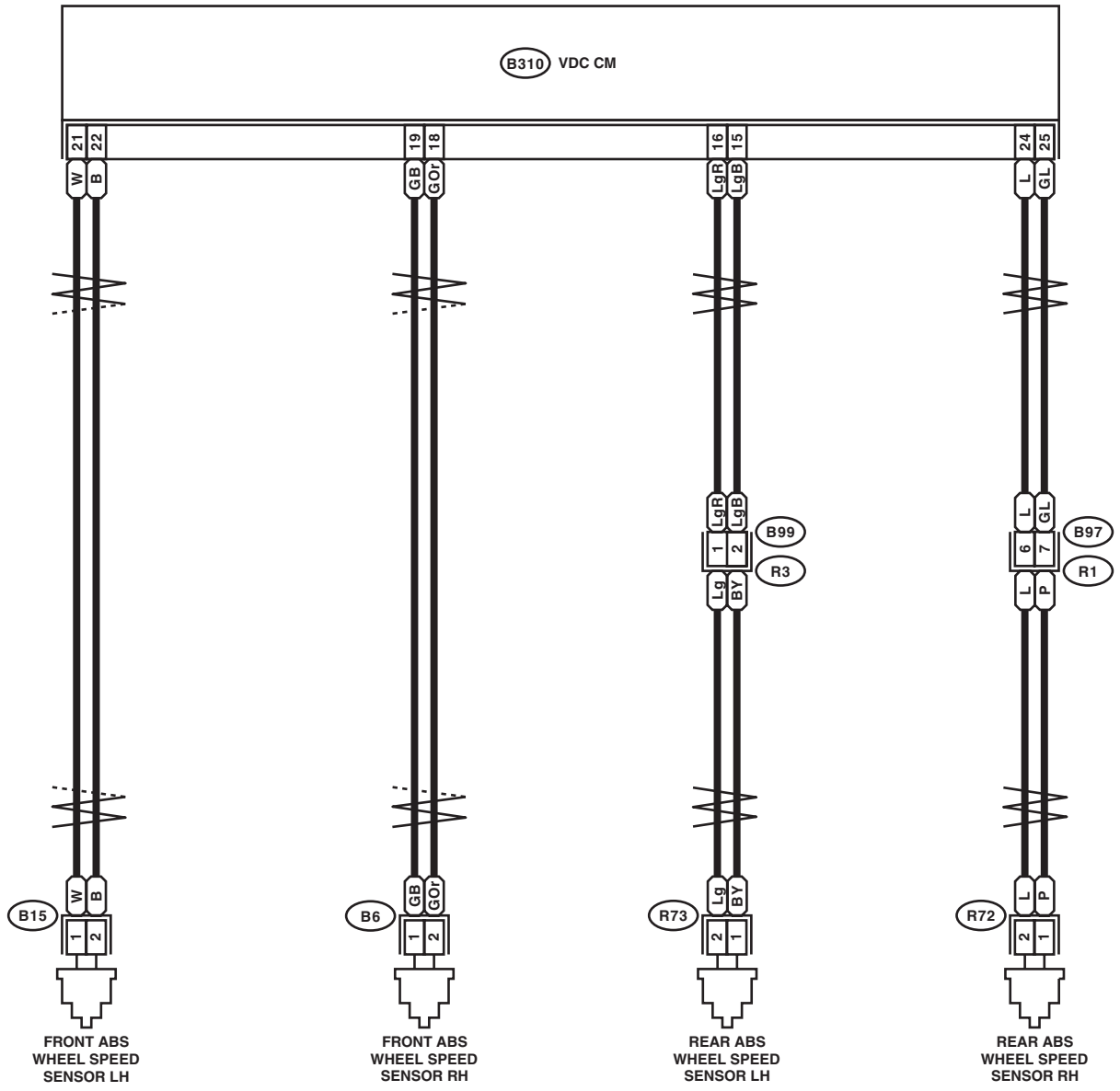


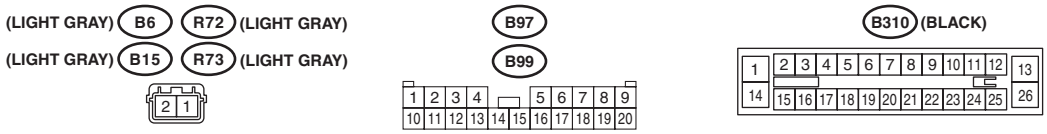
i122 (BLACK)

1	2	3	4	5	6
7	8	9	10	11	12

WI-48335

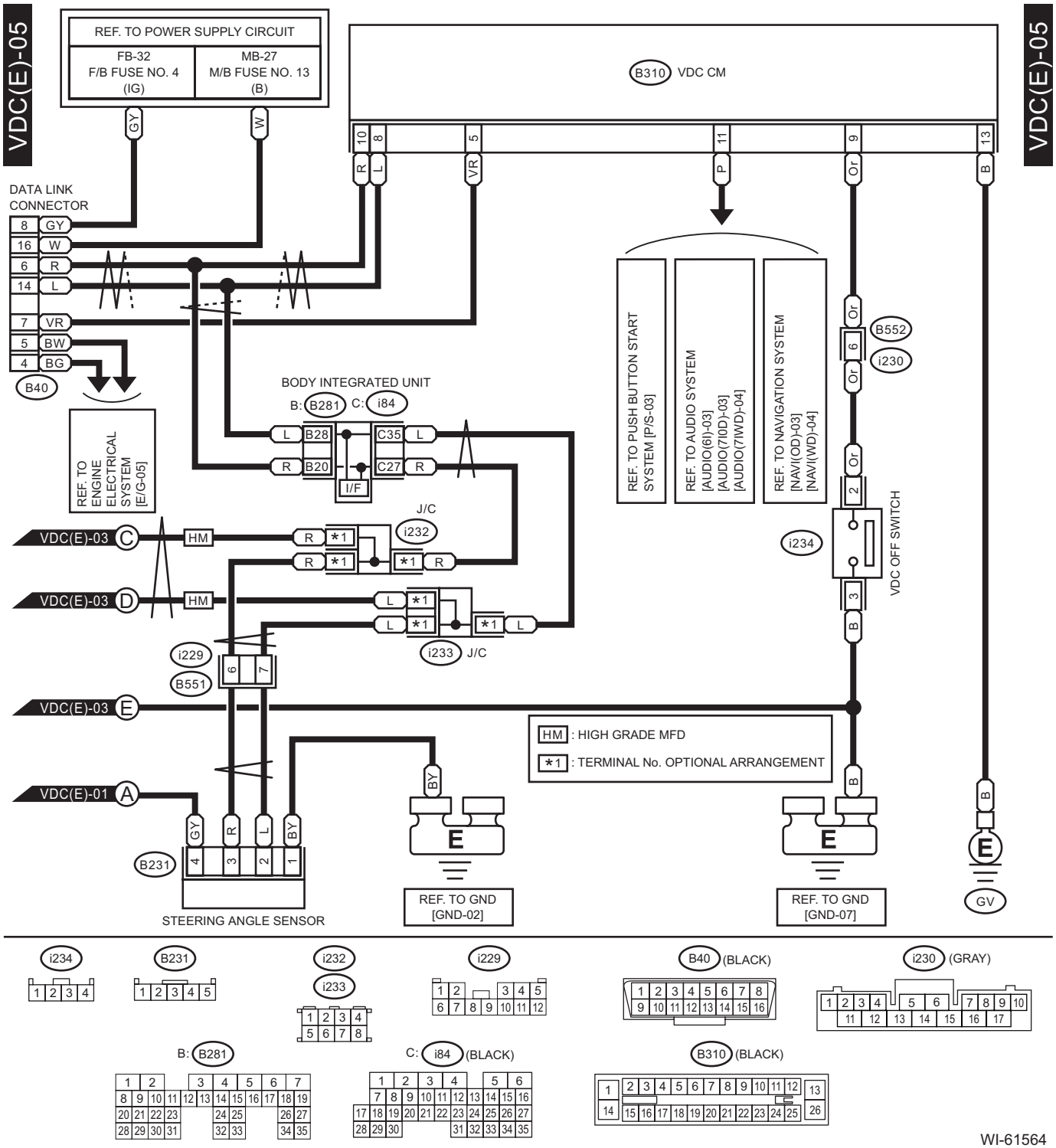
VDC(E)-04





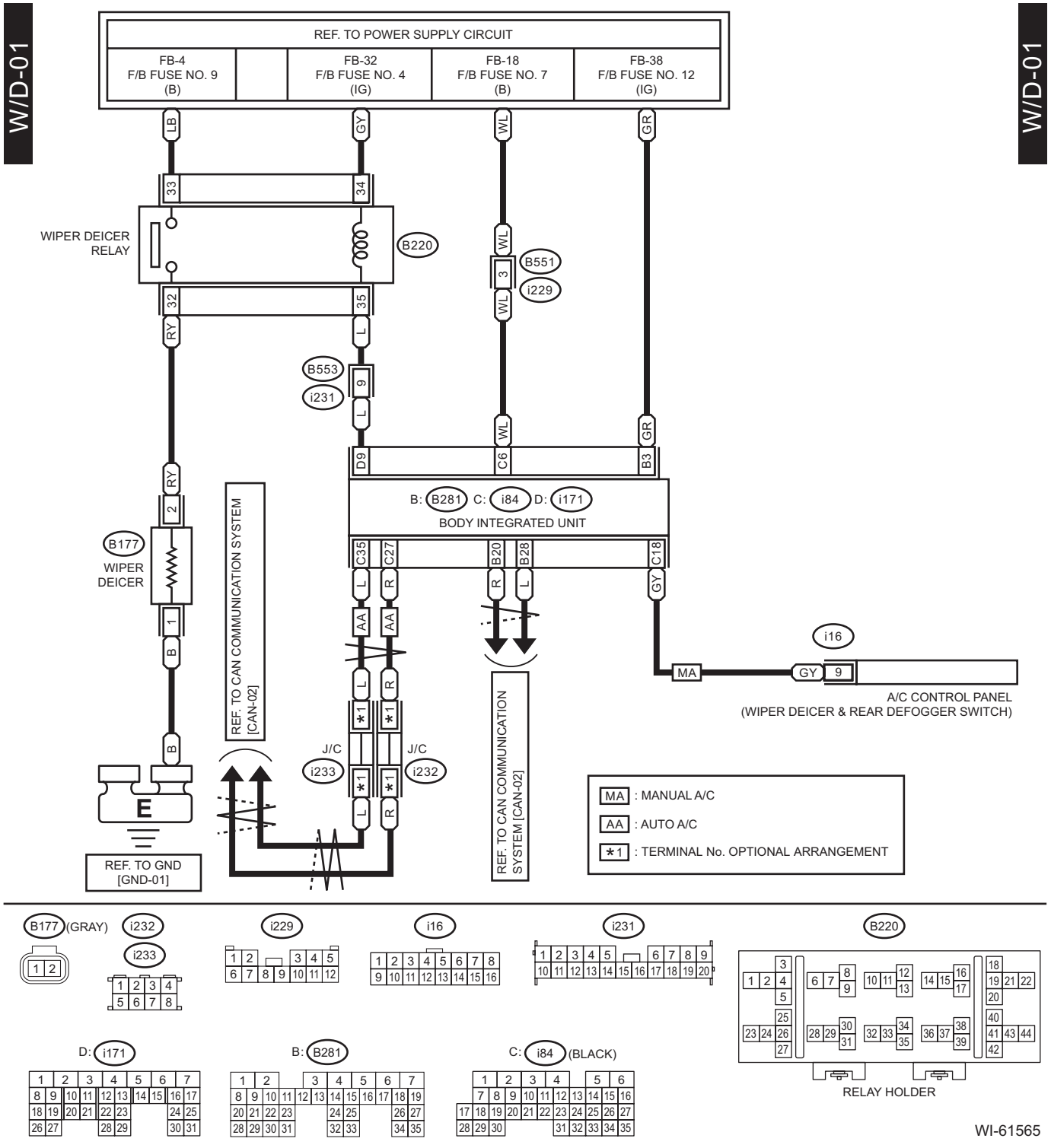
WI-48336

WIRING SYSTEM



58.Wiper Deicer System

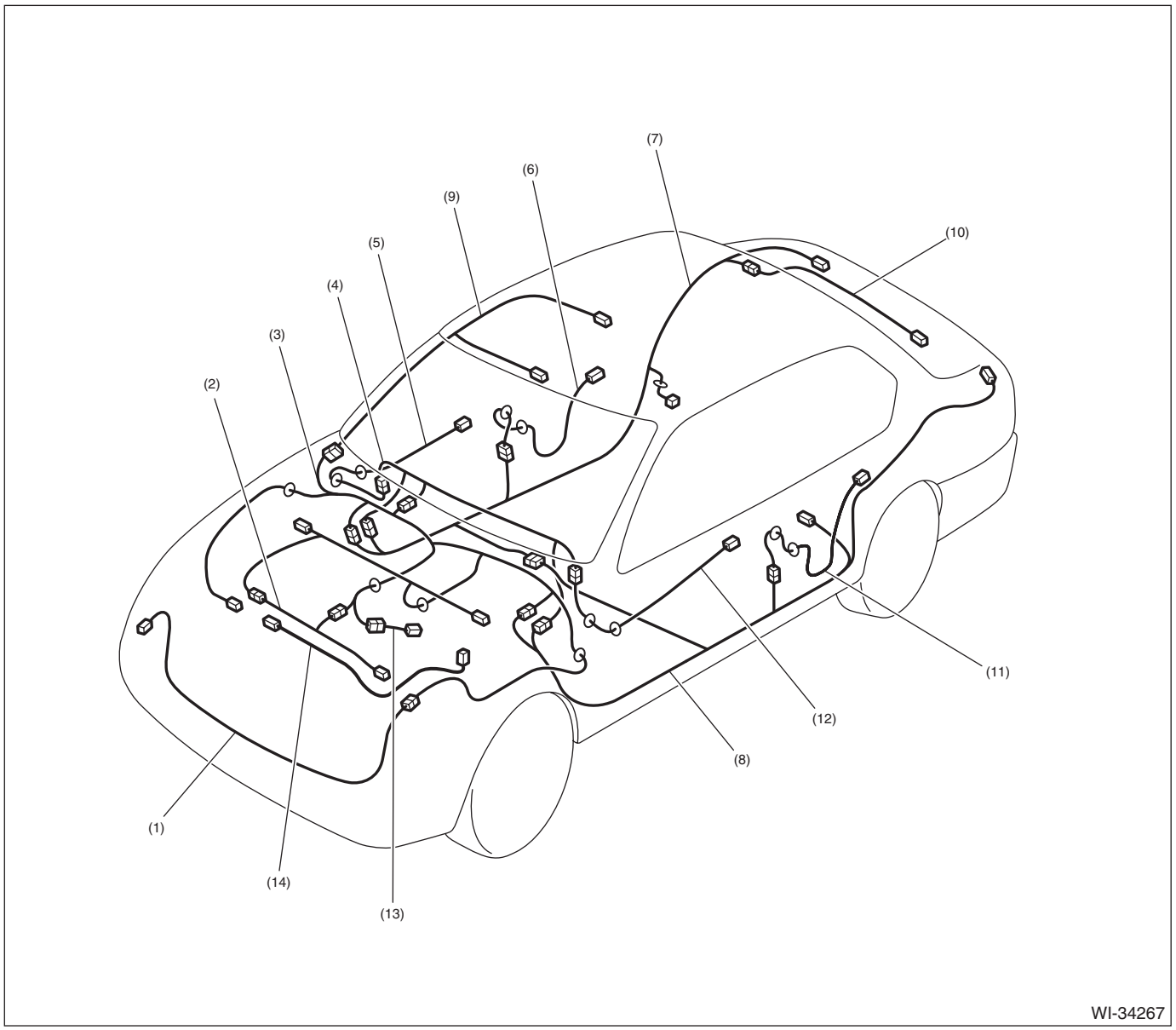
A: WIRING DIAGRAM



59.Harness Components Location

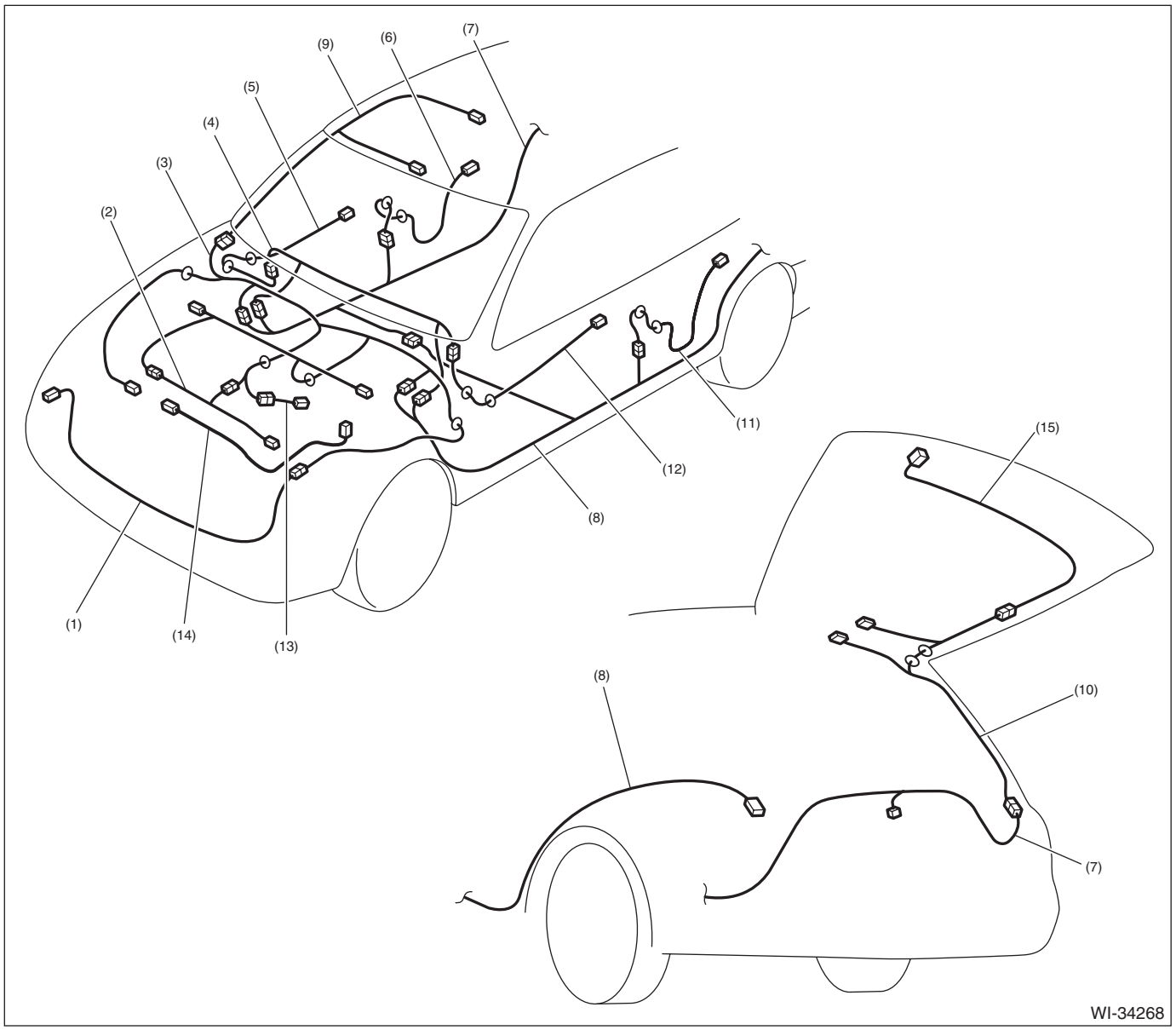
A: LOCATION

1. 4 DOOR MODEL



(1) Front wiring harness
(2) Engine wiring harness
(3) Bulkhead wiring harness
(4) Instrument panel wiring harness
(5) Front door cord RH
(6) Rear door cord RH
(7) Rear wiring harness RH
(8) Rear wiring harness LH
(9) Roof cord
(10) Trunk lid cord
(11) Rear door cord LH
(12) Front door cord LH
(13) Transmission cord
(14) Generator cord

2. 5 DOOR MODEL/CROSSTREK MODEL



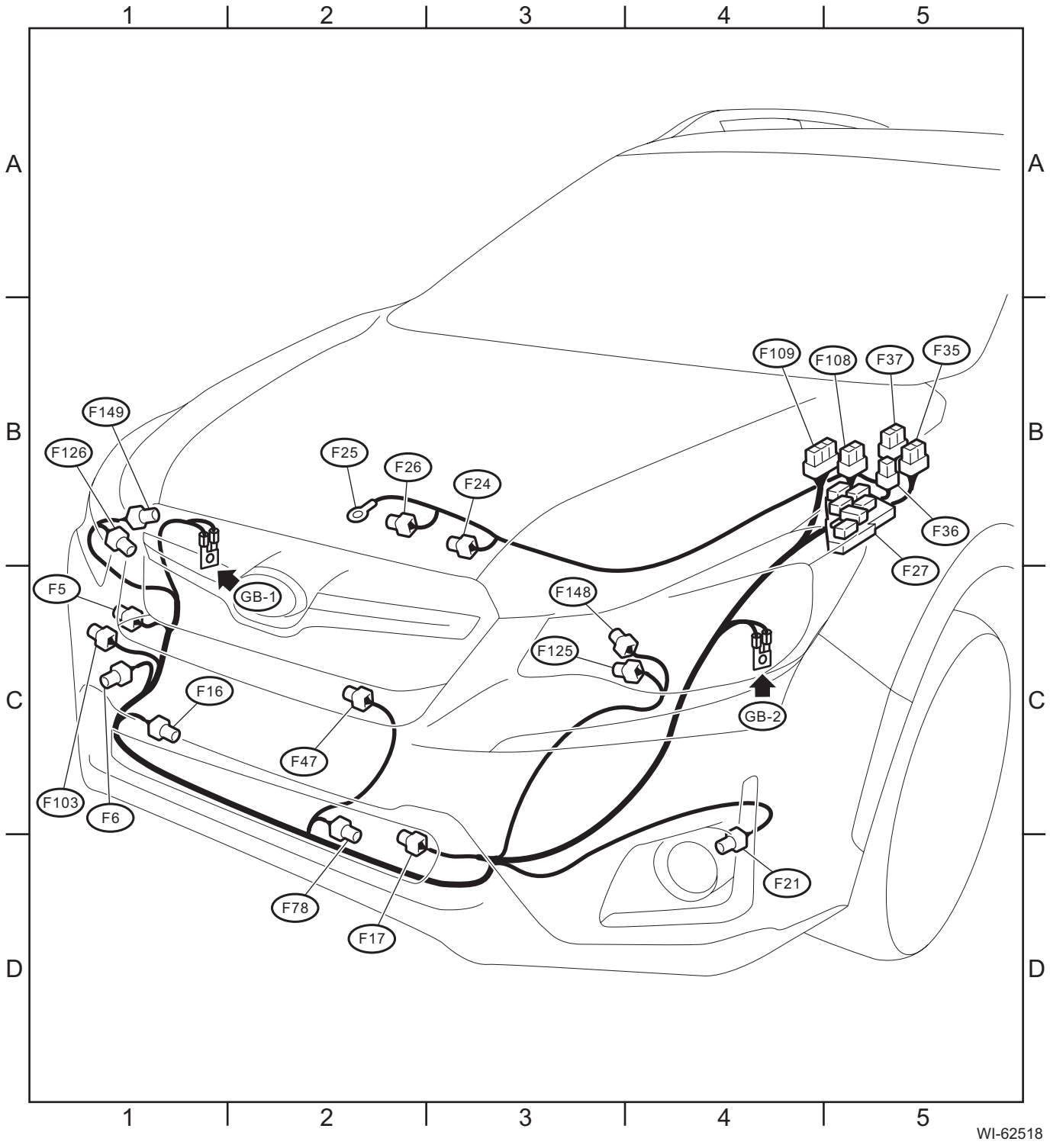
(1) Front wiring harness
(2) Engine wiring harness
(3) Bulkhead wiring harness
(4) Instrument panel wiring harness
(5) Front door cord RH
(6) Rear door cord RH
(7) Rear wiring harness RH
(8) Rear wiring harness LH
(9) Roof cord
(10) Rear gate cord
(11) Rear door cord LH
(12) Front door cord LH
(13) Transmission cord
(14) Generator cord
(15) Rear gate cord

60.Front Wiring Harness

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
F5	1	Black	C-1		Horn
F6	2	★	C-1		Front fog light RH (without SRF)
	2	Black	C-1		Front fog light RH (with SRF)
F16	2	★	C-1		Sub fan motor
F17	2	★	D-2		Main fan motor
F21	2	★	D-4		Front fog light LH (without SRF)
	2	Black	D-4		Front fog light LH (with SRF)
F24	1	★	B-3		Magnet clutch
F25	1	★	B-2		Generator terminal B
F26	3	★	B-2		Generator
F27	26	★	B-5		Relay holder
F35	12	Blue	B-5		M/B
F36	7	★	B-5		
F37	20	★	B-5		
F47	1	Black	C-2		Horn
F78	2	Black	C-2		Ambient sensor
F103	2	Gray	C-1		Daytime running light resistor
F108	18	Gray	B-5	B361	Through joint connector
F109	24	★	B-4	B360	
F125	8	Light gray	C-4		Front combination light LH
F126	8	Light gray	B-1		Front combination light RH
F148	2	★	C-3		High beam LH
F149	2	★	B-1		High beam RH
★: White or natural color					

Front Wiring Harness

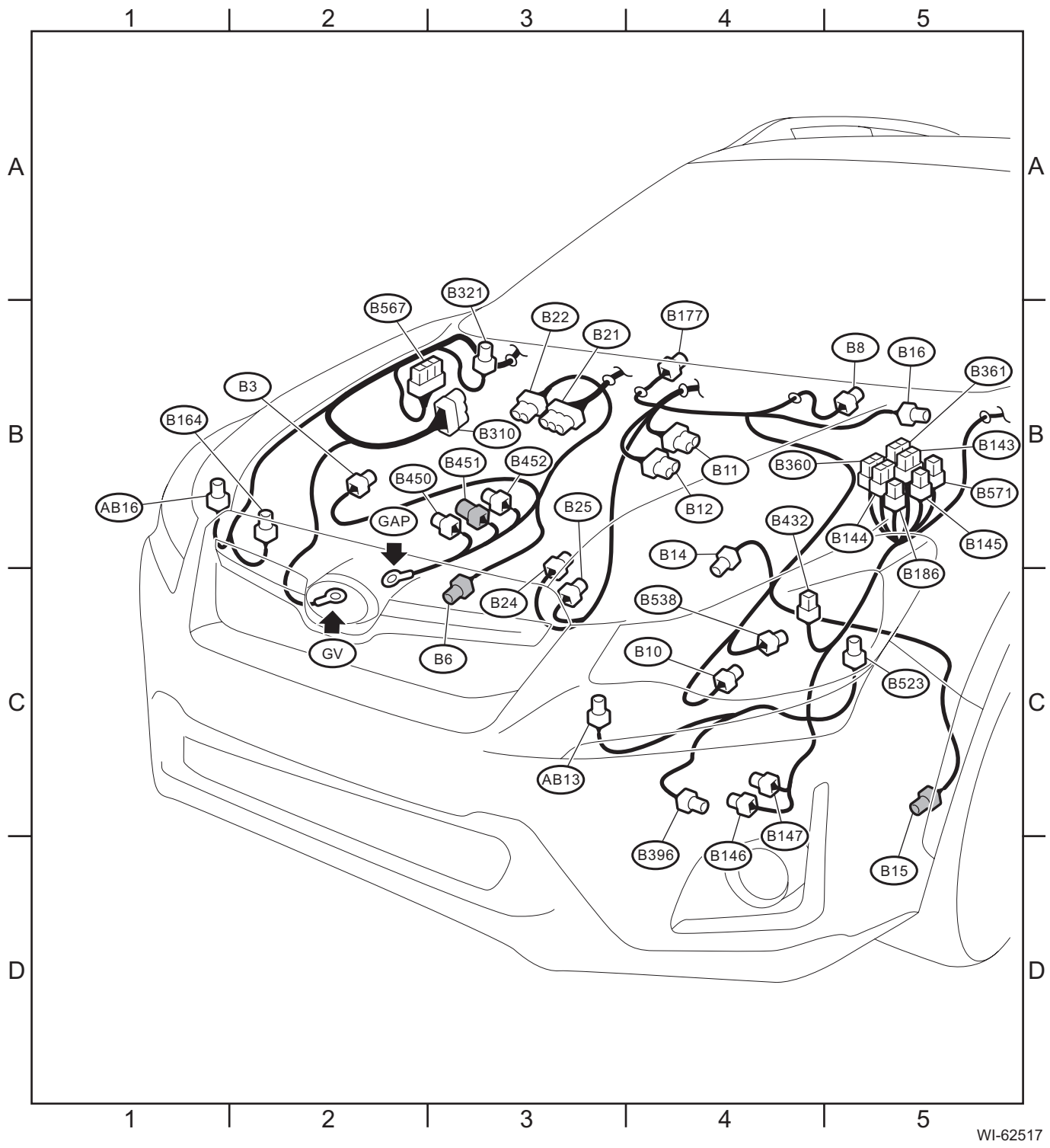


61.Bulkhead Wiring Harness (In Engine Compartment)

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
B3	5	Black	B-2		Mass air flow and intake air temperature sensor
B6	2	Light gray	C-3		Front ABS wheel speed sensor RH
B8	5	Light gray	B-5		Front wiper motor
B10	4	Light gray	C-4		Pressure switch
B11	12	Light gray	B-4	T4	Transmission cord (CVT model)
B12	16	Dark gray	B-4	T3	
B14	1	Black	B-4		Starter motor
B15	2	Light gray	C-5		Front ABS wheel speed sensor LH
B16	2	Gray	B-5		Brake fluid level switch
B21	54	Black	B-3	E2	Engine wiring harness
B22	16	Brown	B-3		
B24	2	Gray	B-3	T1	Back-up light switch (MT model)
B25	2	Brown	C-3	T2	Neutral position switch 1
B143	20	★	B-5		M/B
B144	9	Brown	B-5		
B145	7	Brown	B-5		
B146	2	Black	C-4		Front washer motor
B147	2	Gray	C-4		Rear washer motor
B164	2	Gray	B-2		Keyless buzzer
B177	2	Gray	B-4		Wiper deicer
B186	8	★	B-5		M/B
B310	26	Black	B-3		VDC CM (with EyeSight)
	38	★	B-3		VDC CM (without EyeSight)
B321	2	Black	B-3		Hood switch
B360	16	Gray	B-5	F109	Through joint connector
B361	14	★	B-5	F108	
B396	2	Brown	C-4		Washer fluid level sensor
B432	8	Black	C-4		SBF holder
B450	10	Black	B-3		Power steering CM
B451	6	Gray	B-3		Torque sensor
B452	2	Black	B-3		Power steering CM
B523	2	Light gray	C-5		Battery temperature sensor
B538	3	Black	C-4		Battery current sensor
B567	26	★	B-2		Relay holder
B571	2	★	B-5		M/B
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB13	2	Yellow	C-3		Front sub sensor LH
AB16	2	Yellow	B-1		Front sub sensor RH
★: White or natural color					


1
2
3
4
5
A
B
C
D
B321
B567
B22
B21
B177
B8
B16
B361
B3
B164
B310
B143
B451
B452
B450
B11
B360
B571
AB16
GAP
B25
B12
B432
B144
B145
B14
B186
B24
B538
B6
GV
B10
B523
AB13
B147
B396
B146
B15
WI-62517

62.Bulkhead Wiring Harness (In Compartment)

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
B27	4	★	B-4		Blower Resistor (manual A/C)
B30	8	Black	C-5		Front door cord RH
B31	10	Gray	C-1	AB1	Airbag wiring harness
B32	8	★	B-2		Turn signal and hazard unit
B40	16	Black	C-1		Data link connector
B41	2	★	C-2		Power window circuit breaker
B52	24	★	D-1		F/B
B54	48	Black	B-2		TCM
B57	4	★	B-4		Power transistor (auto A/C)
B65	4	★	B-2		Stop light and brake switch
B68	14	★	B-3		Roll connector
B70	10	★	B-3		Combination switch
B71	20	★	B-3		
B72	6	★	C-3		Ignition switch
B77	6	★	C-4		Mode door actuator (auto A/C)
B83	8	★	B-4		J/C
B87	2	★	B-5		Blower motor
B88	2	Brown	C-4		Evaporator sensor (auto A/C)
	3	★	C-4		Evaporator sensor (manual A/C)
B89	2	Black	B-5		Blower diode
B90	20	★	B-5	R50	Roof cord
B92	20	★	D-1	R5	Rear wiring harness LH
B97	20	★	C-5	R1	Rear wiring harness RH
B99	20	★	D-1	R3	Rear wiring harness LH
B101	8	Black	C-1		Front door cord LH
B106	2	★	C-3		Clutch start switch
B107	2	Blue	C-3		Clutch switch
B116	8	★	C-4		AT select lever
B122	8	★	B-5		J/C
B123	2	Black	C-1	B124	Key lock
B124	2	Black	C-1	B123	
B134	34	★	C-4		ECM
B135	35	★	C-5		
B136	35	★	C-5		
B137	31	★	C-5		
B150	24	★	C-1		Auto headlight beam leveler CM
B151	6	★	B-5	R430	Roof cord
B152	10	Gray	D-1		F/B
B158	8	★	D-1		
B159	9	Brown	D-2		
B162	2	★	D-2		
B163	6	Black	B-5		Intake door actuator
B180	4	★	C-2		Remote engine start CM (without push button start)
	8	★	C-2		Remote engine start CM (with push button start)
B181	2	★	C-2	B182	Bulkhead wiring harness
B182	2	★	C-2	B181	

Bulkhead Wiring Harness (In Compartment)

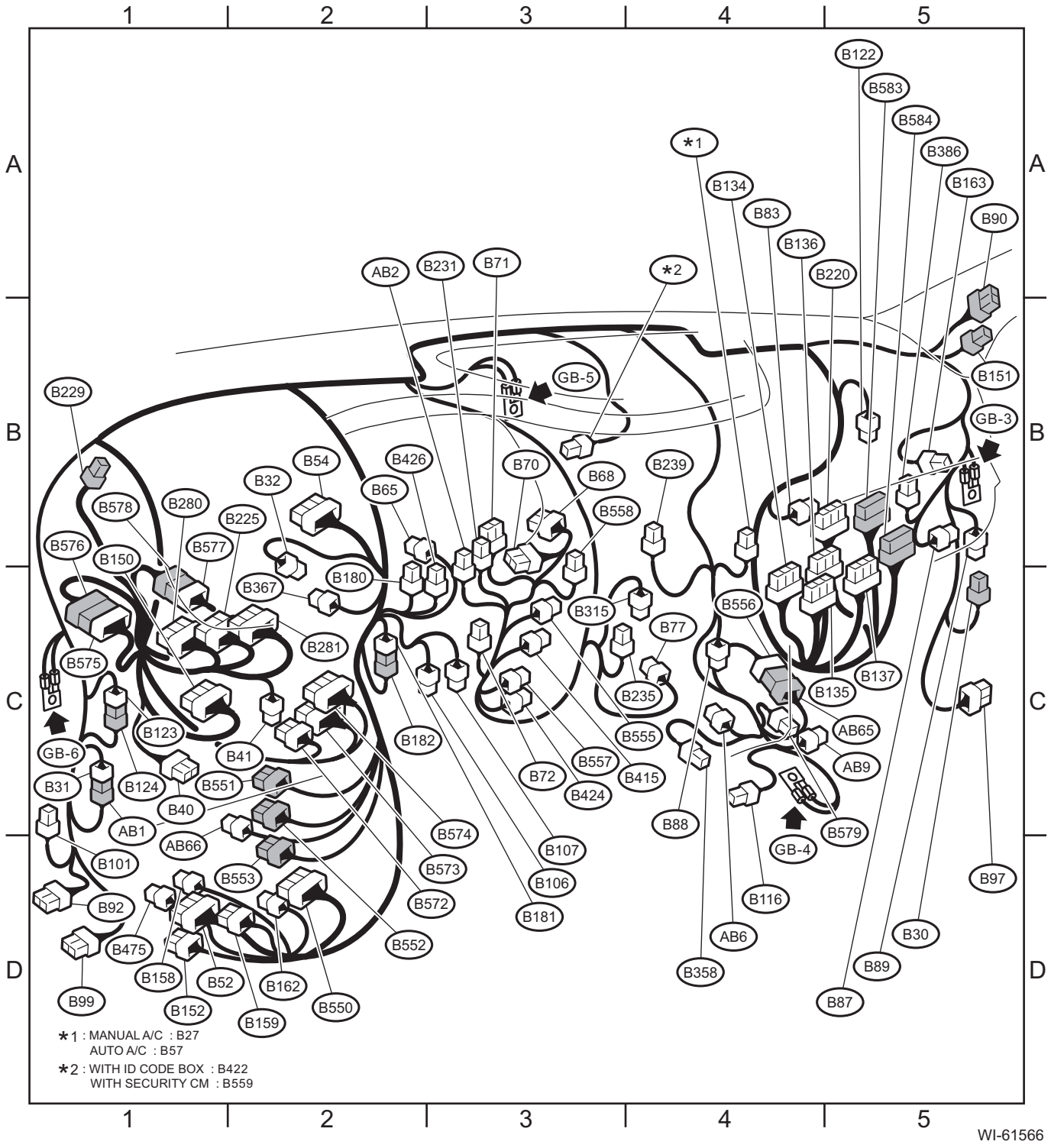
Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
B220	44	★	B-5		Relay holder
B225	44	★	C-2		
B229	8	★	B-1	AD1	Telematics button adapter cord
B231	5	★	B-3		Steering angle sensor
B235	6	★	C-4		Air mix door actuator LH (with left/right independent air conditioner)
B239	6	★	B-4		Air mix door actuator (without left/right independent air conditioner)
					Air mix door actuator RH (with left/right independent air conditioner)
B280	34	★	C-1		Body integrated unit
B281	35	★	C-2		
B315	6	Black	C-4		Accelerator pedal position sensor
B358	2	★	C-4		AT select lever illumination
B367	8	★	C-2		Impact sensor
B386	4	★	B-5		Blower motor relay
B415	7	Black	C-3		Immobilizer antenna
B422	5	★	B-3		ID code box
B424	7	Black	C-3		Steering lock CM
B426	4	Black	C-2		Accessory relay
B475	4	★	D-1		Wiper relay unit
B550	20	★	D-2		Fuse holder
B551	12	★	C-2	i229	Instrument panel wiring harness LH
B552	17	Gray	C-2	i230	
B553	20	★	D-2	i231	
B555	2	★	C-3		Key warning switch
B556	2	★	C-4	AB65	Airbag wiring harness
B557	2	★	C-3		Key lock solenoid
B558	7	★	B-3		Combination switch
B559	5	★	B-3		Security CM
B572	18	★	C-2		Keyless access CM
B573	28	★	C-2		
B574	30	★	C-2		
B575	22	★	C-1	B576	Bulkhead wiring harness
B576	22	★	C-1	B575	
B577	10	★	C-1	B578	
B578	10	★	C-1	B577	
B579	2	★	C-4		Keyless access interior antenna (front)
B583	12	★	B-5	i237	Instrument panel wiring harness RH
B584	20	★	B-5	i238	

★: White or natural color

Bulkhead Wiring Harness (In Compartment)

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB1	10	Gray	C-1	B31	Bulkhead wiring harness
AB2	4	Yellow	B-3	AB7	Driver's airbag module
AB6	30	Yellow	C-4		Airbag CM
AB9	4	Yellow	C-4		Passenger's airbag module
AB65	2	★	C-4	B556	Bulkhead wiring harness
AB66	2	Black	D-2		Driver's knee airbag module
★: White or natural color					

Bulkhead Wiring Harness (In Compartment)



63.Engine Wiring Harness and Transmission Cord

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
E2	54	Black	A-3	B21	Bulkhead wiring harness
E3	16	Brown	A-3	B22	
E4	2	Blue	B-4		Purge control solenoid valve
E5	2	Dark gray	B-2		Fuel injector No. 1
E6	2	Dark gray	A-2		Fuel injector No. 3
E8	2	Black	B-2		Engine coolant temperature sensor
E10	3	Black	B-3		Crankshaft position sensor
E11	1	—	B-3		Oil pressure switch
E14	2	Black	B-3		Knock sensor
E16	2	Dark gray	B-4		Fuel injector No. 2
E17	2	Dark gray	B-4		Fuel injector No. 4
E18	6	Dark gray	A-3		EGR control valve
E21	3	Black	A-3		Manifold absolute pressure sensor
E24	4	Light gray	B-1		Front oxygen (A/F) sensor
E25	4	Black	B-1		Rear oxygen sensor
E31	3	Black	B-2		Ignition coil No. 1
E32	3	Black	B-4		Ignition coil No. 2
E33	3	Black	A-2		Ignition coil No. 3
E34	3	Black	B-4		Ignition coil No. 4
E35	3	Light gray	C-3		Intake camshaft position sensor LH
E36	3	Light gray	B-1		Intake camshaft position sensor RH
E37	2	Black	C-3		Intake oil control solenoid LH
E38	2	Black	B-1		Intake oil control solenoid RH
E51	5	Light gray	B-4		Tumble generator valve actuator LH
E55	5	Light gray	A-2		Tumble generator valve actuator RH
E57	6	Black	A-3		Electronic throttle control
E62	3	Light gray	B-1		Exhaust camshaft position sensor RH
E63	2	Black	B-1		Exhaust oil control solenoid RH
E65	3	Light gray	B-3		Exhaust camshaft position sensor LH
E66	2	Black	C-3		Exhaust oil control solenoid LH
E75	2	Black	B-3		Engine oil temperature sensor
E130	1	★	B-3		Oil level switch
★: White or natural color					

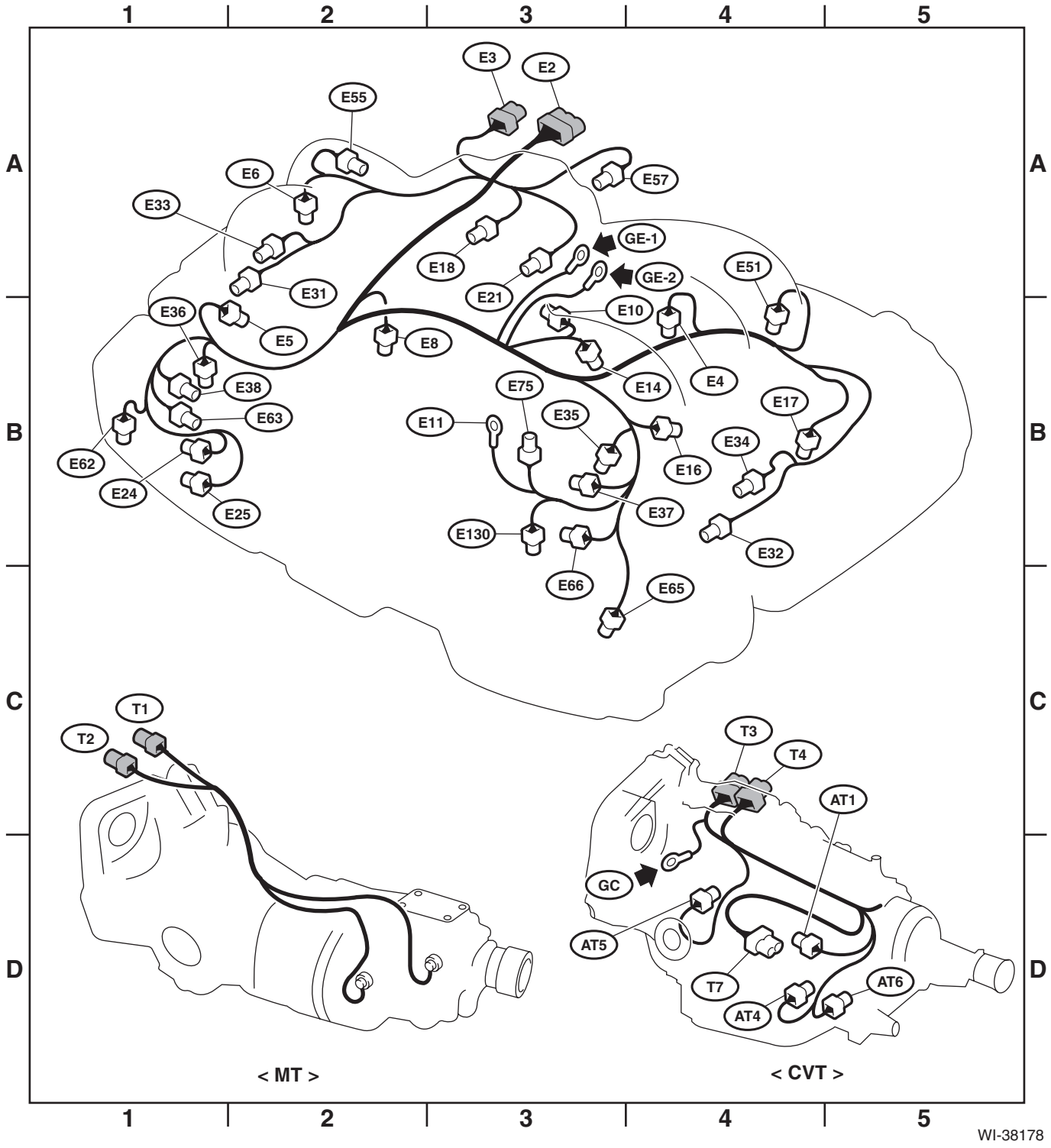
- **MT model**

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
T1	2	Gray	C-1	B24	Bulkhead wiring harness
T2	2	Brown	C-1	B25	
★: White or natural color					

- **CVT model**

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
T3	16	Dark gray	D-4	B12	Bulkhead wiring harness
T4	12	Gray	D-4	B11	
T7	9	Black	D-4		Inhibitor switch
AT1	3	Black	D-4		Primary speed sensor
AT4	3	Dark gray	D-5		Secondary speed sensor
AT5	3	Light gray	D-5		Turbine speed sensor
AT6	3	Black	D-4		Secondary pressure sensor
★: White or natural color					

Engine Wiring Harness and Transmission Cord

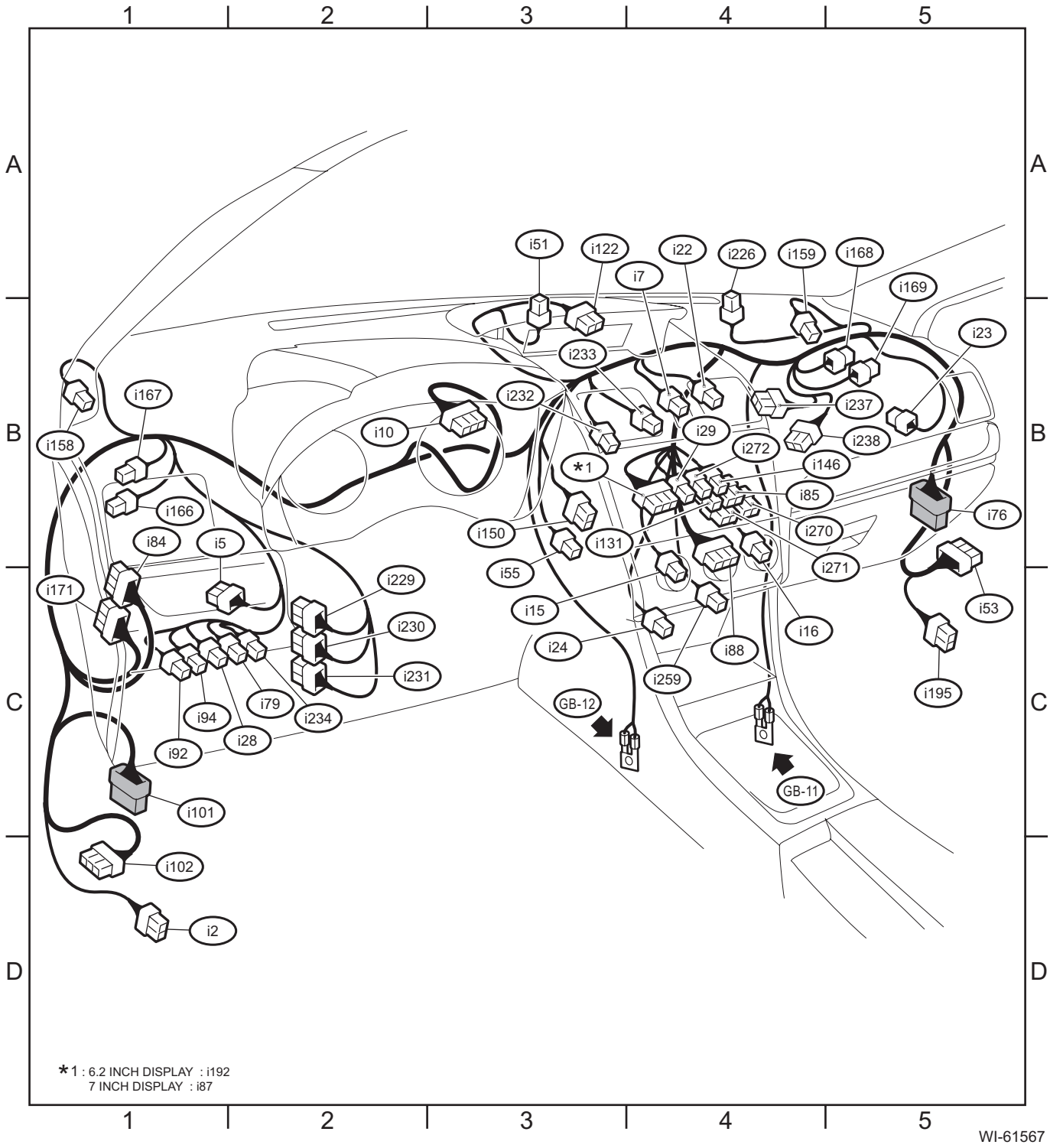


64.Instrument Panel Wiring Harness

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
i2	10	★	D-1	R339	Rear wiring harness LH
i5	20	★	C-1		F/B
i7	4	Gray	B-4		MFD switch
i10	40	★	B-3		Combination meter
i15	6	★	C-4		Blower fan switch (manual A/C)
i16	16	★	B-4		A/C control panel (manual A/C)
i22	4	★	B-4		Hazard switch
i23	2	★	B-5		Glove box light
i24	2	★	C-4		Front accessory power supply socket
i28	4	Gray	C-1		OP connector (fog light switch)
i29	1	★	B-4		Audio bracket ground
i51	2	★	B-3		Sunload sensor
i53	24	★	B-5	R98	Rear wiring harness RH
i55	2	★	B-3		In-vehicle sensor
i76	28	★	B-5	D83	Front door cord RH
i79	6	★	C-2		Illumination control switch
i84	35	Black	C-1		Body integrated unit
i85	10	★	B-4		Audio
	10	★	B-4		Navigation unit
i87	28	★	B-4		Audio
	28	★	B-4		Navigation unit
i88	40	★	B-4		A/C control panel (auto A/C)
i92	4	Gray	C-1		SRF OFF switch
i94	6	Gray	C-1		BSD/RCTA OFF switch
i101	28	★	C-1	D84	Front door cord LH
i102	24	★	D-1	R167	Rear wiring harness LH
i122	12	Black	B-3		MFD
i131	6	★	B-4		Audio
	6	★	B-4		Navigation unit
i146	5	★	B-4		Audio
	5	★	B-4		Navigation unit
i150	14	★	B-3		Push button ignition switch
i158	4	★	B-1		Side tweeter LH
i159	4	★	B-4		Side tweeter RH
i166	4	★	B-1		J/C
i167	4	★	B-1		
i168	4	★	B-5		
i169	4	★	B-5		
i171	31	★	C-1		Body integrated unit
i192	28	★	B-4		Audio
i195	10	★	C-5	R382	Rear wiring harness RH
i226	3	★	B-4		Light control sensor
i229	12	★	C-2	B551	Bulkhead wiring harness LH
i230	17	Gray	C-2	B552	
i231	20	★	C-2	B553	

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
i232	8	★	B-3		J/C
i233	8	★	B-4		
i234	4	★	C-2		VDC OFF switch
i237	12	★	B-4	B583	Bulkhead wiring harness RH
i238	20	★	B-4	B584	
i259	2	★	C-4		Pocket light
i270	20	Gray	B-4		Data communication module
i271	16	Gray	B-4		
i272	8	★	B-4		Audio
	8	★	B-4		Navigation unit
★: White or natural color					


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A
B
C
D
i51
i122
i22
i226
i159
i168
i7
i169
i23
i233
i232
i237
i167
i10
i29
i238
i158
i272
*1
i146
i85
i166
i76
i150
i270
i84
i5
i131
i271
i55
i53
i171
i229
i15
i230
i16
i24
i88
i231
i259
i195
GB-12
i79
i94
i234
i28
i92
GB-11
i101
i102
i2
*1 : 6.2 INCH DISPLAY : i192
7 INCH DISPLAY : i87
WI-61567

65.Rear Wiring Harness

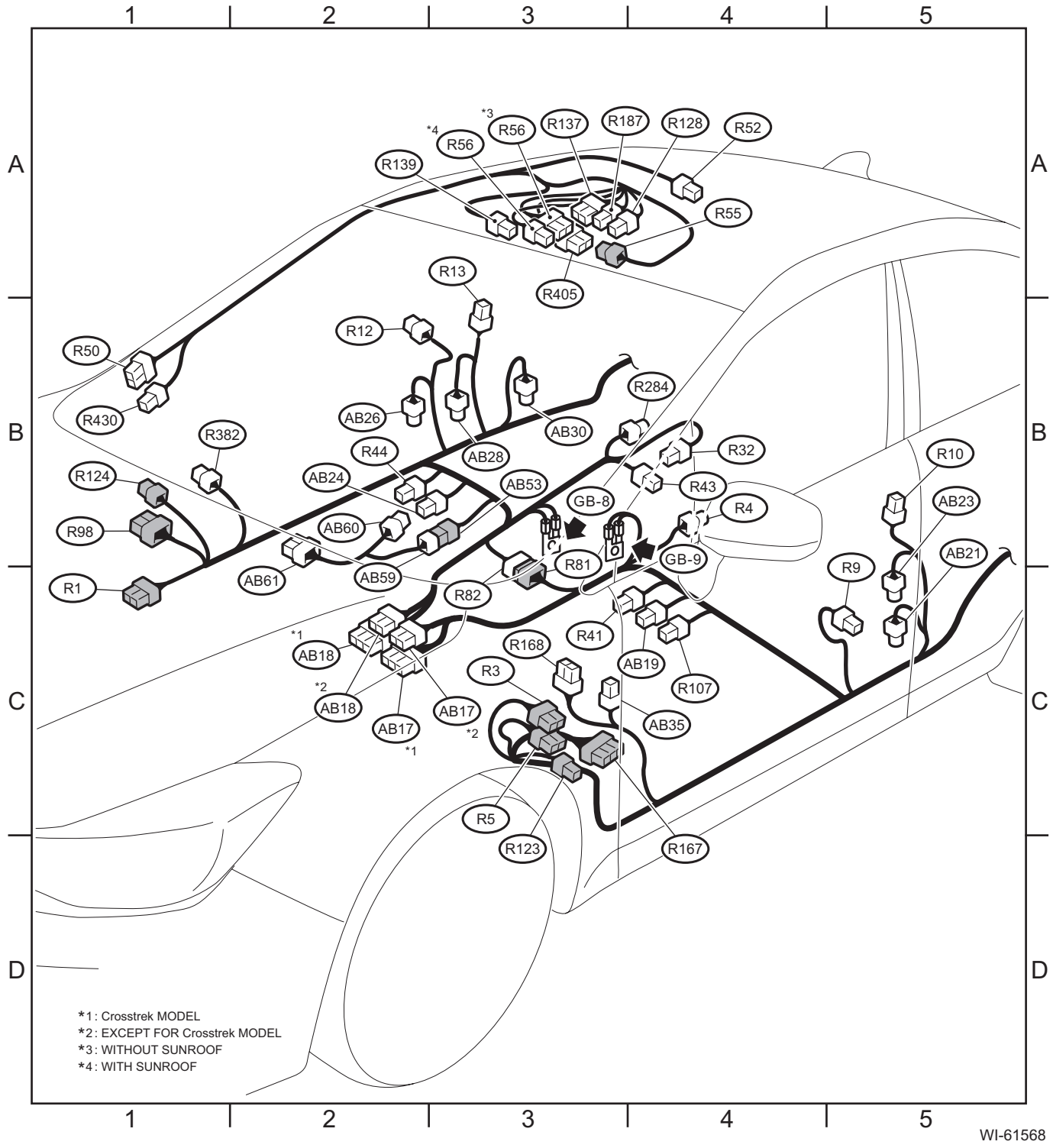
A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
R1	20	★	C-1	B97	Bulkhead wiring harness
R3	20	★	C-3	B99	
R4	1	Black	B-4		Parking brake switch
R5	20	★	C-3	B92	Bulkhead wiring harness
R9	3	★	C-5		Front door switch LH
R10	8	★	B-5	D22	Rear door cord LH
R12	3	★	B-2		Front door switch RH
R13	8	★	B-3	D28	Rear door cord RH
R32	2	★	B-4		Rear accessory power supply socket
R41	4	★	C-4		Seat heater LH
R43	8	★	B-4		Seat heater switch
R44	4	★	B-2		Seat heater RH
R50	20	★	B-1	B90	Bulkhead wiring harness
R52	3	★	A-4		Room light
R55	8	★	A-3		Sunroof motor assembly
R56	10	★	A-3		Spot map light (with sunroof)
	6	★	A-3		Spot map light (without sunroof)
R81	19	Black	C-3	R82	Rear wiring harness RH
R82	19	Black	B-3	R81	Rear wiring harness LH
R98	24	★	B-1	i53	Instrument panel wiring harness
R107	2	★	C-4		Seat belt switch LH
R123	2	Yellow	C-3	AB62	Front door cord LH
R124	2	Yellow	B-1	AB63	Front door cord RH
R128	5	★	A-4		Sunroof switch
R137	16	★	A-3		Stereo camera
R139	3	★	A-3		Rear view mirror
R167	24	★	C-3	i102	Instrument panel wiring harness
R168	20	★	C-3		F/B
R187	5	Black	A-3		Sunroof switch (tilt)
R284	8	★	B-4		AUX input terminal
R382	10	★	B-1	i195	Instrument panel wiring harness
R405	12	★	A-3	R407	Stereo camera cover
R430	6	★	B-1	B151	Bulkhead wiring harness

★: White or natural color

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB17	15	Yellow	C-2		Airbag CM (except for Crosstrek model)
	24	Yellow	C-2		Airbag CM (Crosstrek model)
AB18	15	Yellow	C-2		Airbag CM (except for Crosstrek model)
	24	Yellow	C-2		Airbag CM (Crosstrek model)
AB19	4	Yellow	C-4		Side airbag module LH
AB21	2	Black	C-5		Pretensioner LH
AB23	4	Yellow	C-5		Side airbag sensor LH
AB24	4	Yellow	B-2		Side airbag module RH
AB26	2	Black	B-2		Pretensioner RH
AB28	4	Yellow	B-3		Side airbag sensor RH
AB30	2	Yellow	B-3		Lap seat belt pretensioner RH (Crosstrek model)
AB35	2	Black	C-3		F/B
AB53	3	Dark gray	B-3	AB59	Occupant detection harness
AB59	3	★	B-2	AB53	Rear wiring harness
AB60	2	Yellow	B-2		Buckle switch
AB61	10	Black	B-2		Occupant detection control module
★: White or natural color					

Rear Wiring Harness



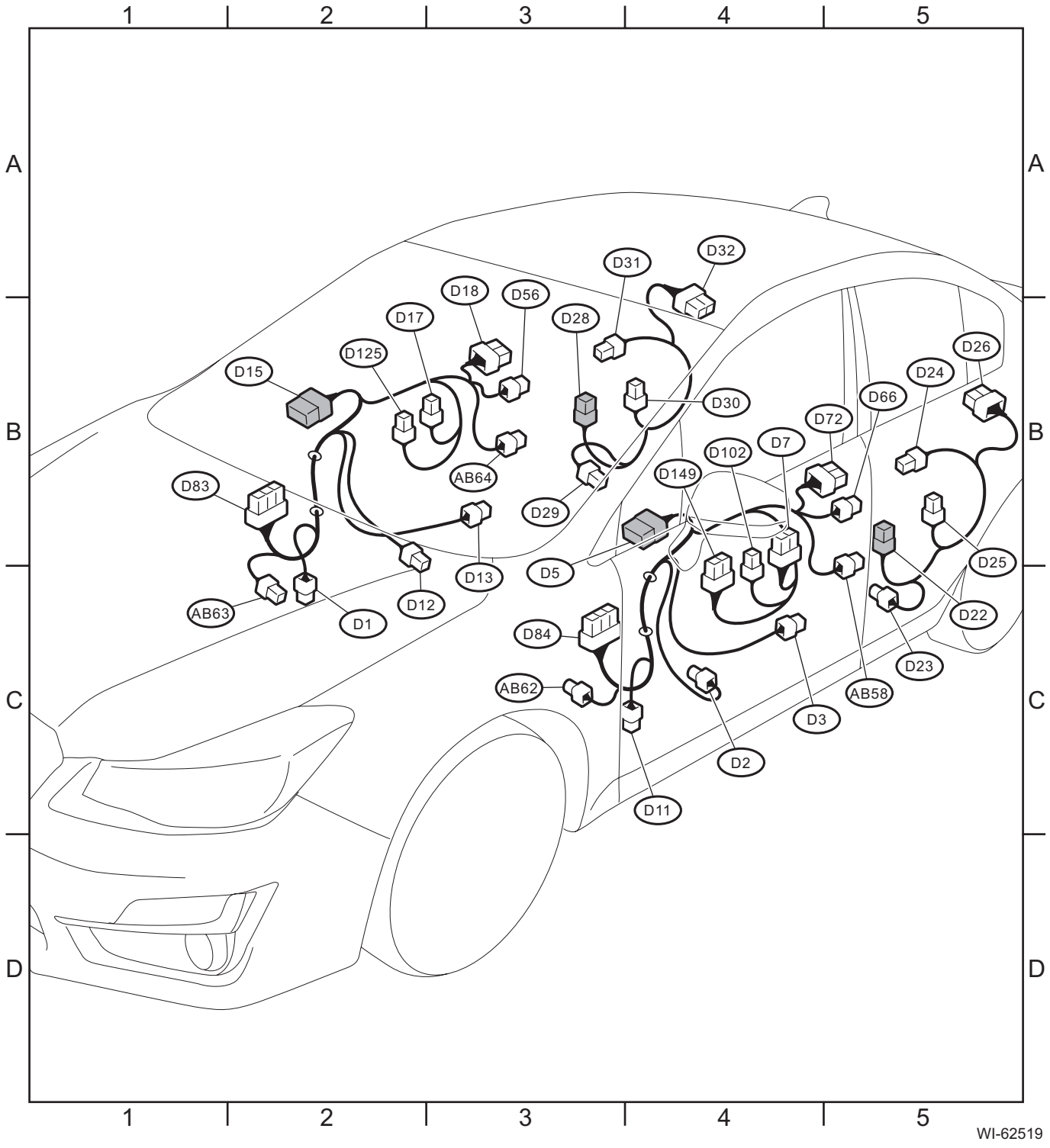
66.Door Cord

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
D1	8	Black	C-2	B30	Bulkhead wiring harness
D2	2	★	C-4		Front door speaker LH
D3	6	Dark gray	C-4		Front power window motor LH
D5	10	★	B-4		Outer mirror assembly LH
D7	16	★	B-4		Power window main switch
D11	8	Black	C-4	B101	Bulkhead wiring harness
D12	2	★	B-2		Front door speaker RH
D13	6	Dark gray	B-3		Front power window motor RH
D15	10	★	B-2		Outer mirror assembly RH
D17	8	★	B-3		Front power window sub-switch
D18	10	★	B-3		Front door lock actuator RH
D22	8	★	B-5	R10	Rear wiring harness LH
D23	2	★	C-5		Rear door speaker LH
D24	6	Dark gray	B-5		Rear power window motor LH
D25	8	★	B-5		Rear power window sub-switch LH
D26	10	★	B-5		Rear door lock actuator LH
D28	8	★	B-3	R13	Rear wiring harness RH
D29	2	★	B-3		Rear door speaker RH
D30	6	Dark gray	B-4		Rear power window motor RH
D31	8	★	B-3		Rear power window sub-switch RH
D32	10	★	B-4		Rear door lock actuator RH
D56	6	★	B-3		Outer handle RH
D66	6	★	B-5		Outer handle LH
D72	10	★	B-5		Front door lock actuator LH
D83	28	★	B-2	i76	Instrument panel wiring harness
D84	28	★	C-3	i101	
D102	3	★	B-4		Power window main switch
D125	5	★	B-2		Passenger's seat door lock switch
D149	16	★	C-4		Remote control mirror switch
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB58	2	Yellow	C-5		Front door impact sensor LH
AB62	2	Yellow	C-3	R123	Rear wiring harness LH
AB63	2	Yellow	C-2	R124	Rear wiring harness RH
AB64	2	Yellow	B-3		Front door impact sensor RH
★: White or natural color					

Door Cord


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D31
D32
D18
D56
D17
D28
D125
D15
D26
D24
D66
D30
D72
D7
D102
AB64
D149
D83
D29
D25
D5
D13
D12
AB63
D1
D22
D84
D23
AB62
AB58
D3
D2
D11
WI-62519

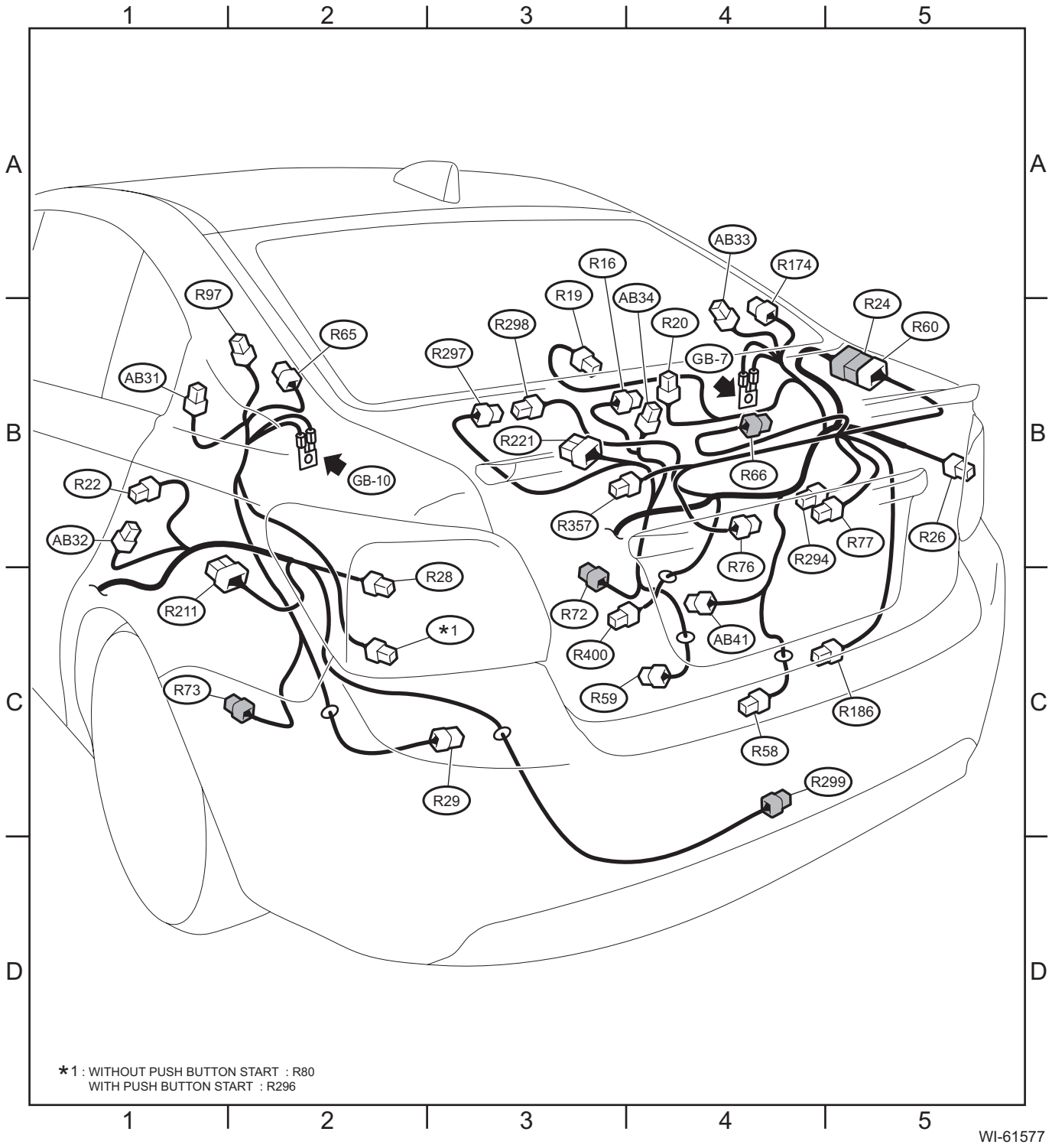
67.Rear Wiring Harness and Trunk Lid Cord

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
R16	3	★	B-3		Rear door switch RH
R19	2	★	B-3		High-mounted stop light
R20	2	Black	B-4		Trunk room light
R22	3	★	B-1		Rear door switch LH
R24	12	★	B-5	R60	Trunk lid cord
R26	6	★	B-5		Rear combination light RH (4 door model)
		Gray			Rear combination light RH (5 door model/Crosstrek model)
R28	6	★	C-2		Rear combination light LH (4 door model)
		Gray			Rear combination light LH (5 door model/Crosstrek model)
R29	3	Black	C-3		Rear vehicle height sensor
R58	4	★	C-4		Fuel pump assembly
R59	2	★	C-4		Fuel sub level sensor
R60	12	★	B-5	R24	Rear wiring harness RH
R65	1	Black	B-2		Rear defogger
R66	2	★	B-4		High-mounted stop light (rear spoiler)
R72	2	Light gray	C-3		Rear ABS wheel speed sensor RH
R73	2	Light gray	C-2		Rear ABS wheel speed sensor LH
R76	2	★	B-4		License plate light LH
R77	2	★	B-5		License plate light RH
R80	8	★	C-2		Keyless entry CM
R97	1	★	B-2		Antenna feeder cord
R174	1	★	B-4		Rear defogger
R186	3	★	C-5		Trunk lid lock actuator & switch
R211	12	★	C-1		TPMS CM
R221	12	★	B-3		TPMS & keyless entry CM
R294	2	Brown	B-4		Trunk opener button
R296	5	★	C-2		Receiver
R297	3	★	B-3		Keyless access interior antenna (rear)
R298	3	★	B-3		Keyless access interior antenna (center)
R299	6	★	C-4		Keyless access exterior antenna (rear)
R357	4	★	C-4		Rearview camera
R400	8	Gray	C-3		ELCM
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB31	2	Black	B-1		Curtain airbag module LH
AB32	4	Yellow	B-1		Curtain airbag sensor LH
AB33	2	Black	B-4		Curtain airbag module RH
AB34	4	Yellow	B-4		Curtain airbag sensor RH
AB41	2	Yellow	C-4		Satellite safing sensor
★: White or natural color					

Rear Wiring Harness and Trunk Lid Cord



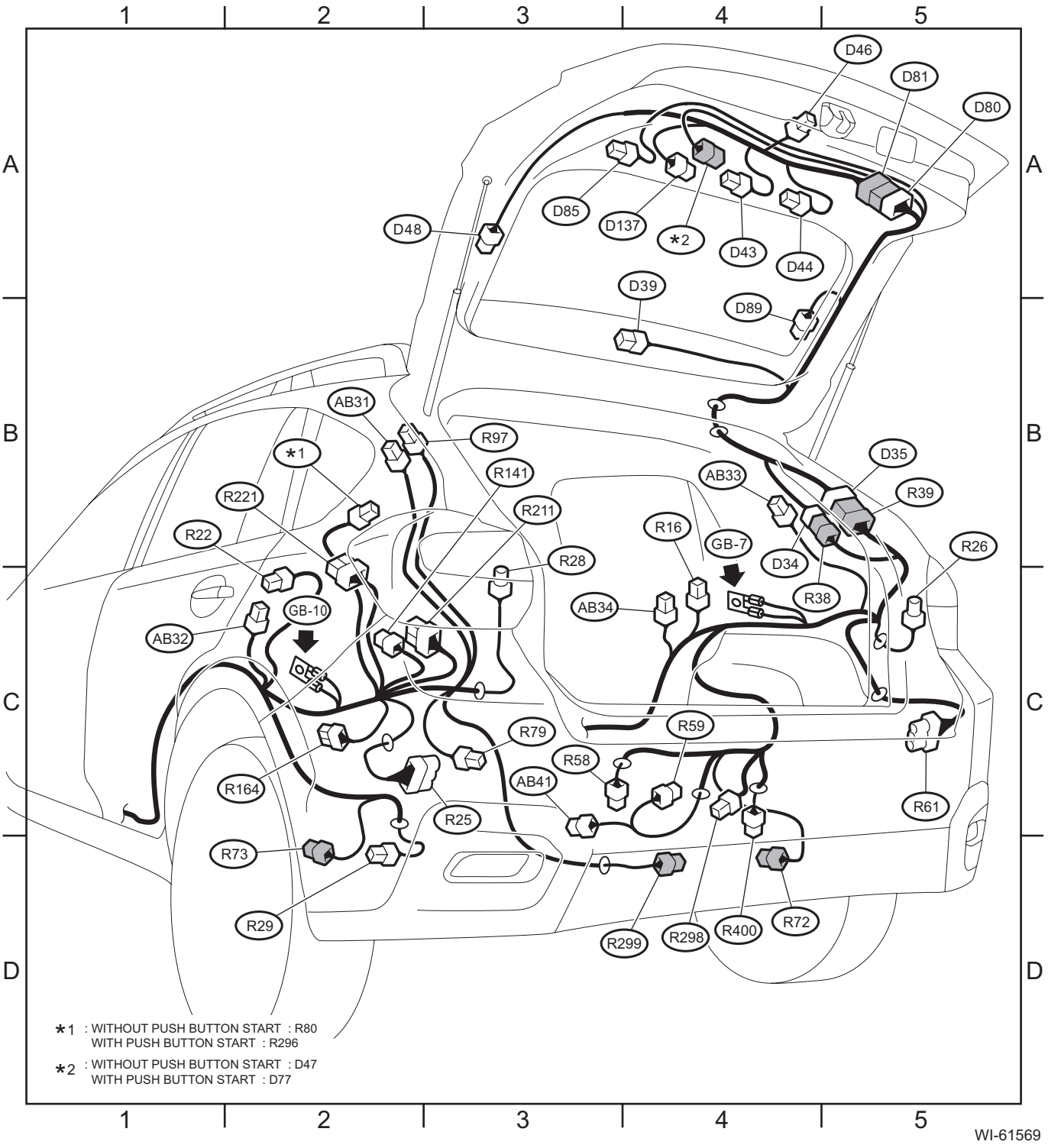
68.Rear Wiring Harness and Rear Gate Cord

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
R16	3	★	C-4		Rear door switch RH
R22	3	★	C-2		Rear door switch LH
R25	10	Black	C-2		Radar sensor LH (master)
R26	6	Gray	C-5		Rear combination light RH
R28	6	Gray	C-3		Rear combination light LH
R29	3	Black	D-2		Rear vehicle height sensor
R38	8	★	B-5	D34	Rear gate cord
R39	14	Gray	B-5	D35	
R58	4	★	C-3		Fuel pump assembly
R59	2	★	C-4		Fuel sub level sensor
R61	10	Black	C-5		Radar sensor RH (slave)
R72	2	Light gray	D-4		Rear ABS wheel speed sensor RH
R73	2	Light gray	D-2		Rear ABS wheel speed sensor LH
R79	8	★	C-3		Trailer connector
R80	8	★	B-2		Keyless entry CM
R97	1	★	B-2		Antenna feeder cord
R141	2	Light gray	C-2		Luggage room light
R164	10	Green	C-2		J/C
R211	12	★	C-2		TPMS CM
R221	12	★	C-2		TPMS & keyless entry CM
R296	5	★	B-2		Receiver
R298	3	★	C-4		Keyless access interior antenna (rear)
R299	6	★	D-4		Keyless access exterior antenna (rear)
R400	8	Gray	C-4		ELCM
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
D34	8	★	B-4	R38	Rear wiring harness RH
D35	14	Gray	B-5	R39	
D39	2	★	B-4		High-mounted stop light
D43	4	★	A-4		Rear wiper motor
D44	2	★	A-4		License plate light RH
D46	4	★	A-4		Rear gate lock actuator & latch switch
D47	2	Brown	A-4		Rear gate opener button
D48	1	Black	A-3		Rear defogger
D77	4	★	A-4		Rear lock button & rear gate opener button
D80	8	★	A-5	D81	Rear gate cord
D81	8	★	A-5	D80	
D85	4	★	A-4		Rearview camera
D89	1	Black	B-4		Rear defogger
D137	2	★	A-4		License plate light LH
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB31	2	Black	B-2		Curtain airbag module LH
AB32	4	Yellow	C-2		Curtain airbag sensor LH
AB33	2	Black	B-4		Curtain airbag module RH
AB34	4	Yellow	C-4		Curtain airbag sensor RH
AB41	2	Yellow	C-3		Satellite safing sensor
★: White or natural color					



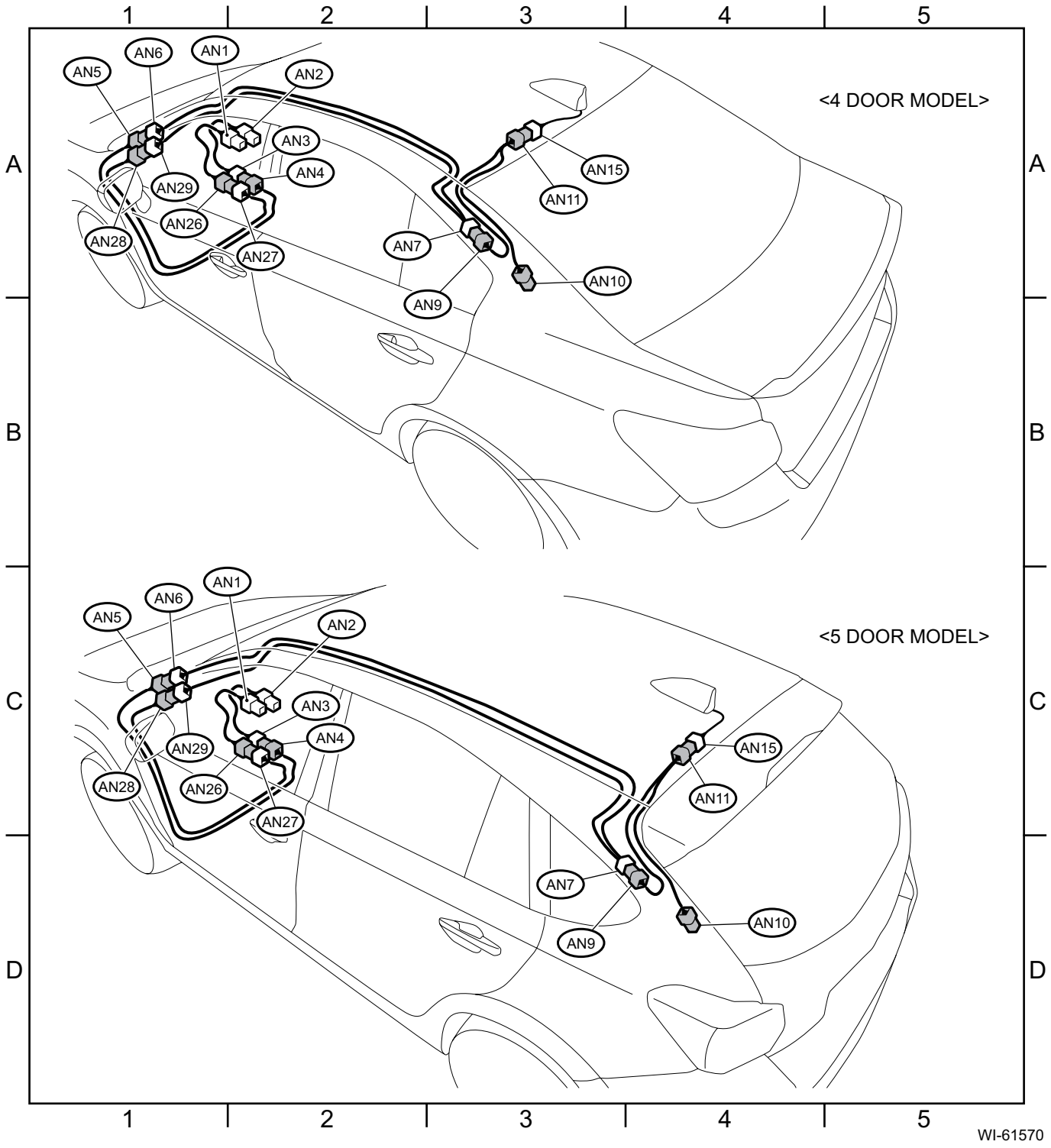
69.Antenna Cord

A: LOCATION

1. WITHOUT TELEMATICS

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AN1	3	★	A-2		Audio (4 door model)
	3	★	C-2		Audio (5 door model)
	3	★	A-2		Navigation unit (4 door model)
	3	★	C-2		Navigation unit (5 door model)
AN2	1	★	A-2		Audio (4 door model)
	1	★	C-2		Audio (5 door model)
	1	★	A-2		Navigation unit (4 door model)
	1	★	C-2		Navigation unit (5 door model)
AN3	1	★	A-2	AN4	Antenna cord (4 door model)
	1	★	C-2	AN4	Antenna cord (5 door model)
AN4	1	★	A-2	AN3	Antenna cord (4 door model)
	1	★	C-2	AN3	Antenna cord (5 door model)
AN5	1	★	A-1	AN6	Antenna cord (4 door model)
	1	★	C-1	AN6	Antenna cord (5 door model)
AN6	1	★	A-1	AN5	Antenna cord (4 door model)
	1	★	C-1	AN5	Antenna cord (5 door model)
AN7	3	★	A-3	AN9	Antenna cord (4 door model)
	3	★	D-3	AN9	Antenna cord (5 door model)
AN9	3	★	A-3	AN7	Antenna cord (4 door model)
	3	★	D-4	AN7	Antenna cord (5 door model)
AN10	1	★	A-3	R97	Antenna cord (4 door model)
	1	★	D-4	R97	Antenna cord (5 door model)
AN11	3	Gray	A-3	AN15	Antenna (4 door model)
	3	★	C-4	AN15	Antenna (5 door model)
AN15	3	Gray	A-3	AN11	Antenna (4 door model)
	3	★	C-4	AN11	Antenna (5 door model)
AN26	3	★	A-1	AN27	Antenna cord (4 door model)
	3	★	C-2	AN27	Antenna cord (5 door model)
AN27	3	Gray	A-2	AN26	Antenna cord (4 door model)
	3	Gray	C-2	AN26	Antenna cord (5 door model)
AN28	3	★	A-1	AN29	Antenna cord (4 door model)
	3	★	C-1	AN29	Antenna cord (5 door model)
AN29	3	★	A-1	AN28	Antenna cord (4 door model)
	3	★	C-1	AN28	Antenna cord (5 door model)
★: White or natural color					

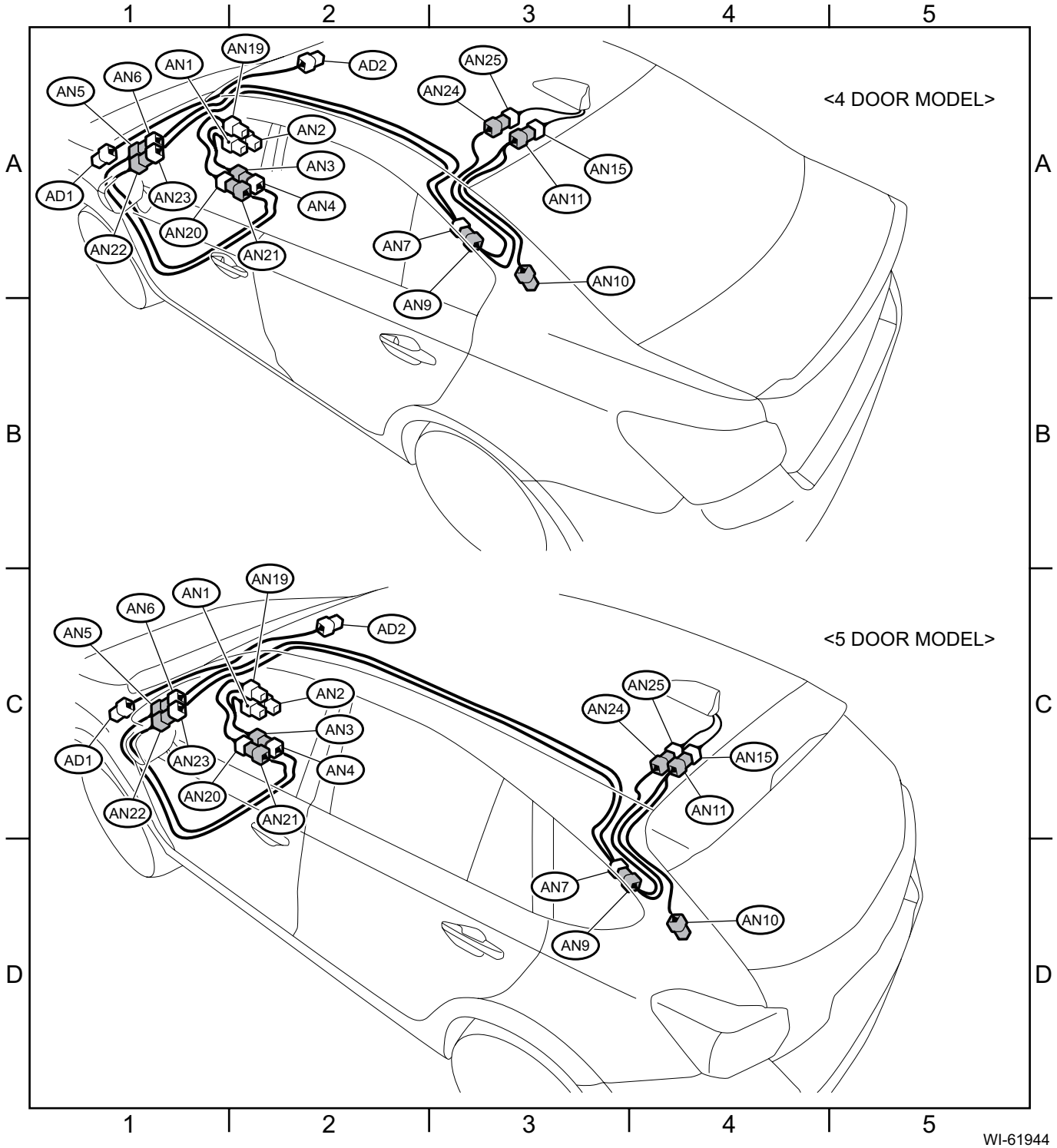
Antenna Cord



2. WITH TELEMATICS

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AN1	3	★	A-2		Audio (4 door model)
	3	★	C-2		Audio (5 door model)
	3	★	A-2		Navigation unit (4 door model)
	3	★	C-2		Navigation unit (5 door model)
AN2	1	★	A-2		Audio (4 door model)
	1	★	C-2		Audio (5 door model)
	1	★	A-2		Navigation unit (4 door model)
	1	★	C-2		Navigation unit (5 door model)
AN3	3	★	A-2	AN4	Antenna cord (4 door model)
	3	★	C-2	AN4	Antenna cord (5 door model)
AN4	3	★	A-2	AN3	Antenna cord (4 door model)
	3	★	C-2	AN3	Antenna cord (5 door model)
AN5	3	★	A-1	AN6	Antenna cord (4 door model)
	3	★	C-1	AN6	Antenna cord (5 door model)
AN6	3	★	A-1	AN5	Antenna cord (4 door model)
	3	★	C-1	AN5	Antenna cord (5 door model)
AN7	3	Blue	A-3	AN9	Antenna cord (4 door model)
	3	Blue	D-3	AN9	Antenna cord (5 door model)
AN9	3	★	A-3	AN7	Antenna cord (4 door model)
	3	★	D-3	AN7	Antenna cord (5 door model)
AN10	1	★	A-3	R97	Antenna cord (4 door model)
	1	★	D-4	R97	Antenna cord (5 door model)
AN11	3	Gray	A-3	AN15	Antenna (4 door model)
	3	★	C-4	AN15	Antenna (5 door model)
AN15	3	Gray	A-3	AN11	Antenna (4 door model)
	3	★	C-4	AN11	Antenna (5 door model)
AN19	1	★	A-2		Data communication module (4 door model)
	1	★	C-2		Data communication module (5 door model)
AN20	1	★	A-1	AN21	Antenna cord (4 door model)
	1	★	C-2	AN21	Antenna cord (5 door model)
AN21	1	★	A-2	AN20	Antenna cord (4 door model)
	1	★	C-2	AN20	Antenna cord (5 door model)
AN22	1	★	A-1	AN23	Antenna cord (4 door model)
	1	★	C-1	AN23	Antenna cord (5 door model)
AN23	1	★	A-1	AN22	Antenna cord (4 door model)
	1	★	C-1	AN22	Antenna cord (5 door model)
AN24	1	★	A-3	AN25	Telematics antenna (4 door model)
	1	★	C-4	AN25	Telematics antenna (5 door model)
AN25	1	★	A-3	AN24	Antenna cord (4 door model)
	1	★	C-4	AN24	Antenna cord (5 door model)
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AD1	8	★	A-1	B229	Bulkhead wiring harness (4 door model)
	8	★	C-1	B229	Bulkhead wiring harness (5 door model)
AD2	8	★	A-2		Telematics button (4 door model)
	8	★	C-2		Telematics button (5 door model)
★: White or natural color					



WIRING SYSTEM

WI(HEV)

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1. Basic Diagnostic Procedure

A: BASIC PROCEDURES

1. GENERAL DESCRIPTION

The most important purpose of diagnostics is to quickly determine which part is malfunctioning, to save time and labor.

2. IDENTIFICATION OF TROUBLE SYMPTOM

Determine what the problem is based on the symptom.

3. PROBABLE CAUSE OF TROUBLE

Look at the wiring diagram and check the system's circuit. Then check the switch, relay, fuse, ground, etc.

4. LOCATION AND REPAIR OF TROUBLE

1) Using the diagnostics, narrow down the causes.
2) If necessary, use a voltmeter, ohmmeter, etc.
3) Before replacing certain component parts (switch, relay, etc.), check the power supply, ground, for open wiring harness, poor connectors, etc. If no problem is encountered, check the component parts.

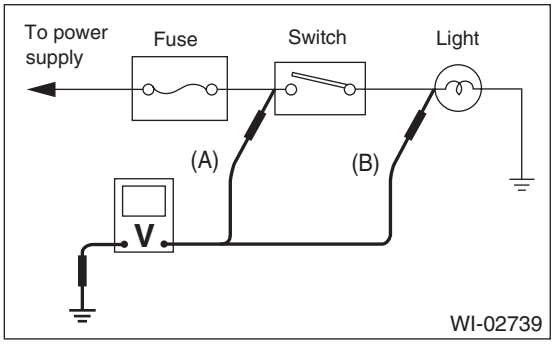
5. SYSTEM OPERATION CHECK

After repairing, ensure that the system operates properly.

B: BASIC INSPECTION

1. VOLTAGE MEASUREMENT

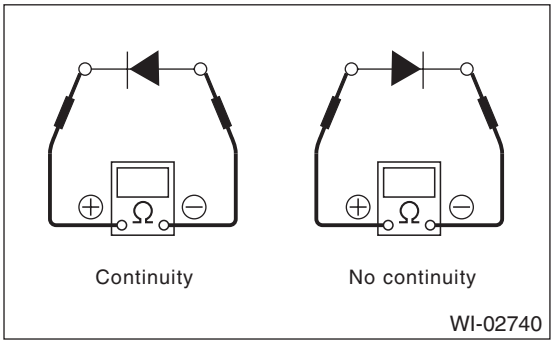
1) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal and the positive lead to the connector or component terminal.
2) Contact the positive lead of the voltmeter on connector (A). The voltmeter will indicate a voltage.
3) Touch connector (B) with the positive probe. The voltmeter will indicate no voltage.



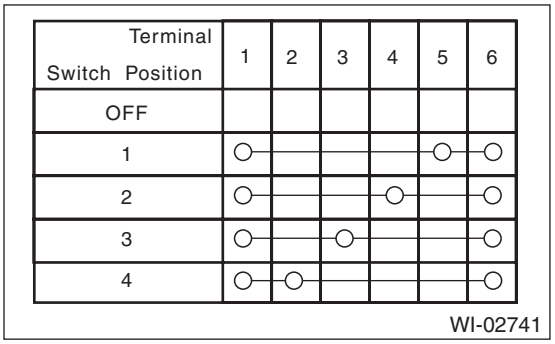
4) With the test set-up held as it is, turn the switch to ON. The voltmeter will indicate a voltage and, at the same time, the light will illuminate.
5) The circuit is in good order. If a problem such as a light failing to illuminate occurs, use the procedures outlined above to track down the malfunction.

2. CIRCUIT CONTINUITY CHECKS

1) Disconnect the battery terminal or connector so there is no voltage between the check points.
Contact the two leads of an ohmmeter to each of the check points.
If the circuit has diodes, reverse the two leads and check again.
2) Use an ohmmeter to check for diode continuity.
When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity.
When contacting the two leads in reverse, there should be no continuity.



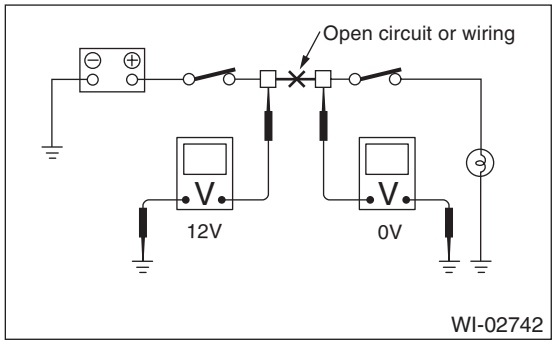
3) The symbol "❍ — ❍" indicates that continuity exists between two points or terminals. For example, when a switch position is at "3", continuity exists among terminals 1, 3 and 6, as shown in the table below.



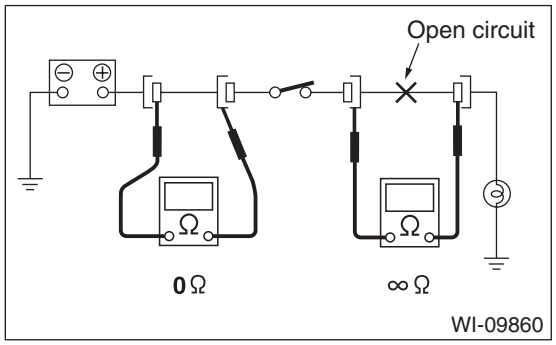
Terminal / Switch Position	1	2	3	4	5	6
OFF						
1	○				○	○
2	○			○		○
3	○		○			○
4	○	○				○

3. HOW TO DETERMINE AN OPEN CIRCUIT

1) With voltmeter:
An open circuit is determined by measuring the voltage between respective connectors and ground using a voltmeter, starting with the connector closest to the power supply. The power supply must be turned ON so that current flows in the circuit. If voltage is not present between a particular connector and ground, the circuit between that connector and the previous connector is open.

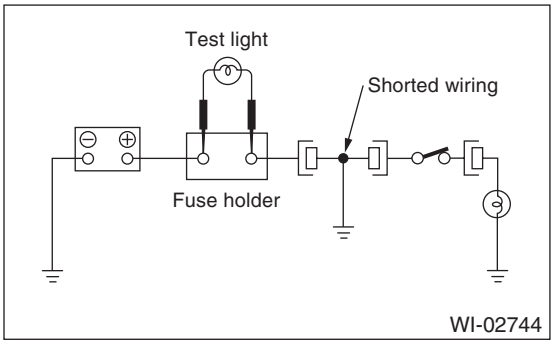


2) With ohmmeter:
Disconnect all connectors affected, and check continuity in the wiring between adjacent connectors. When the ohmmeter indicates “infinite”, the wiring is open.

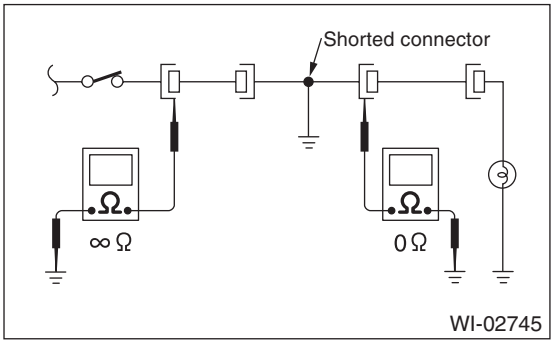


4. HOW TO DETERMINE A SHORT CIRCUIT

1) With test light:
Connect a test light (rated at approx. 3 watts) in place of the blown fuse and allow current to flow through the circuit. Disconnect one connector at a time from the circuit. Starting with the one located farthest from the power supply. If the test light goes out when a connector is disconnected, the wiring between that connector and the next connector (farther from the power supply) is shorted.



2) With ohmmeter:
Disconnect all affected connectors, and check continuity between each connector and ground. When the ohmmeter indicates continuity between a particular connector and a ground, that connector is shorted.

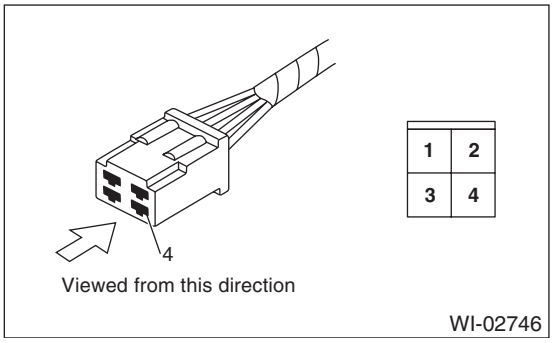


C: HOW TO READ WIRING DIAGRAMS

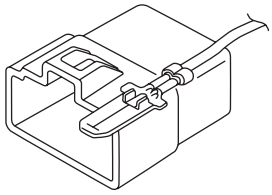
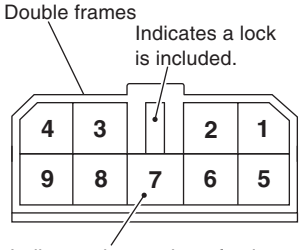
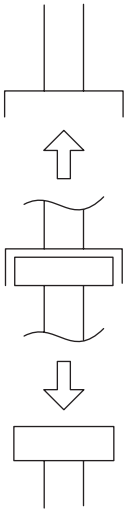
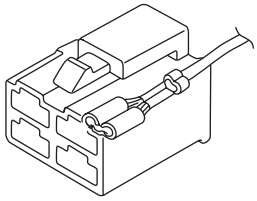
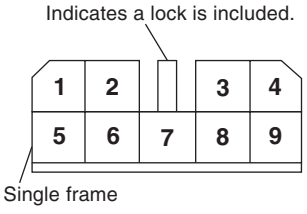
1. WIRING DIAGRAM

The wiring diagram of each system is illustrated so that you can understand the path through which the electric current flows from the battery.
Sketches and codes are used in the diagrams. They should read as follows:

- Each connector and its terminal position are indicated by a sketch of the connector in a disconnected state which is viewed from the front.

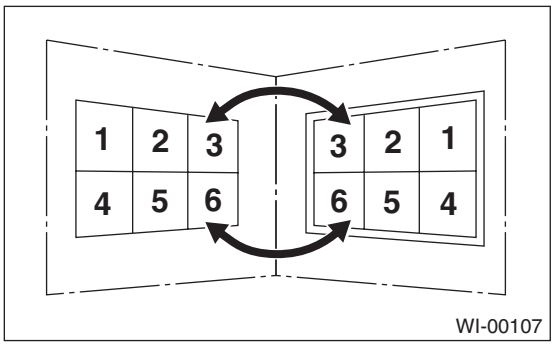


- The number of poles or pins, presence of a lock are indicated in the sketch of each connector. In the sketch, the highest pole number refers to the number of poles which the connector has. For example, the sketch of the connector shown in figure indicates the connector has 9 poles.

Connector used in vehicle	Connector shown in wiring diagram		
	Sketch	Symbol	Number of poles
			Numbered in order from upper right to lower left.
			Numbered in order from upper left to lower right.

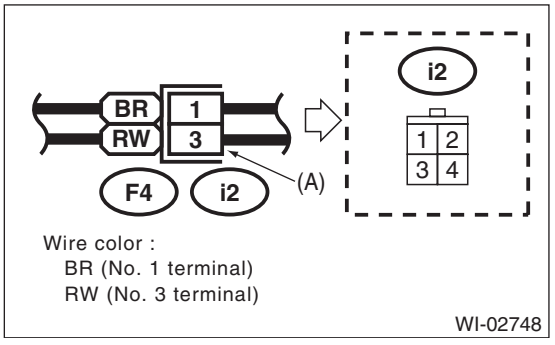
WI-02747

• When one set of connectors is viewed from the front side, the pole numbers of one connector are symmetrical to those of the other. When these two connectors are connected as a unit, the poles which have the same number are joined.

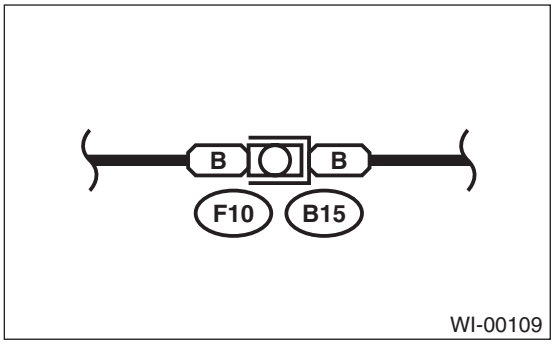


• WIRING DIAGRAM:
The connectors are numbered along with the number of poles, external colors, and mating connections in the accompanying list.
• The sketch of each connector in the wiring diagram usually shows the (A) side of the connector. The relationship between the wire color, terminal number and connector is described in the figure.

NOTE:
A wire which runs in one direction from a connector terminal sometimes may have a different color from that which runs in the other direction from that terminal.

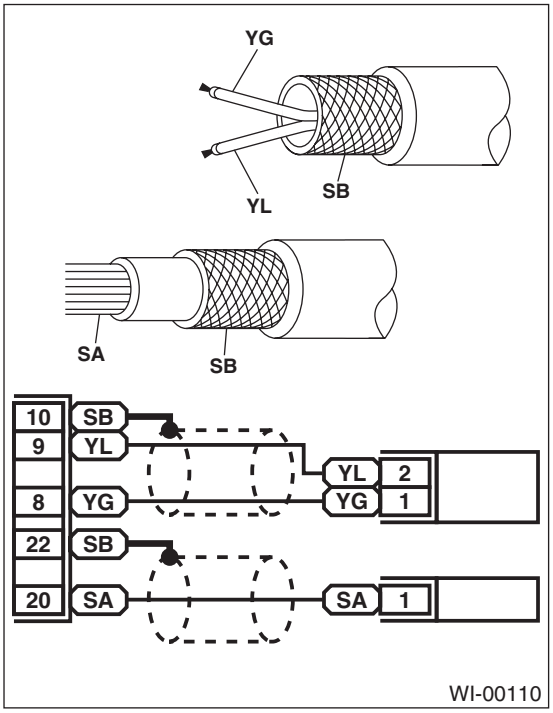


• In the wiring diagram, connectors which have no terminal number refer to one-pole types. Sketches of these connectors are omitted intentionally.

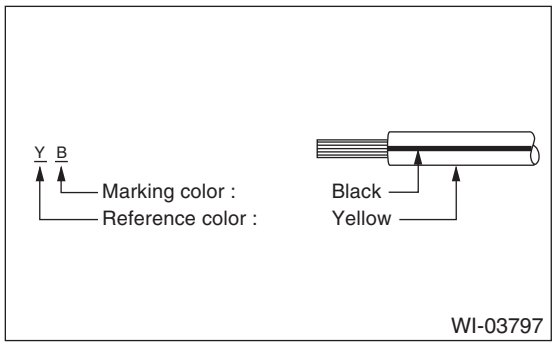


• The following color codes are used to indicate the colors of the wires.

Color code	Color
L	Blue
B	Black
Y	Yellow
G	Green
R	Red
W	White
Br	Brown
Lg	Light green
Gr	Gray
P	Pink
Or	Orange
Sb	Light blue
V	Violet
SA	Sealed (inner)
SB	Sealed (outer)



• The wire color code, which consists of two letters (or three letters including Br or Lg), indicates the standard color (base color of the wire covering) by its first letter and the stripe marking by its second letter.



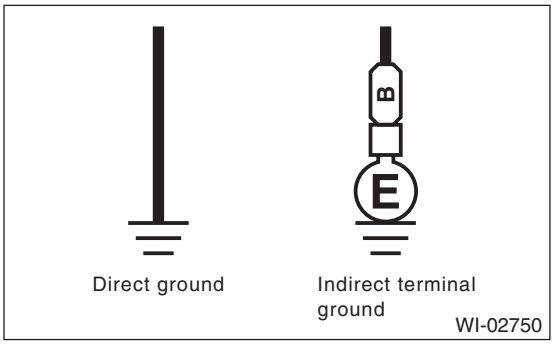
• The table lists the nominal sectional areas and allowable currents of the wires.

CAUTION:
When replacing or repairing a wire, be sure to use the same size and type of the wire which was originally used.

NOTE:
• The allowable current in the table indicates the tolerable amperage of each wire at an ambient temperature of 40°C (104°F).
• The allowable current changes with ambient temperature. Also, it changes if a bundle of more than two wires is used.

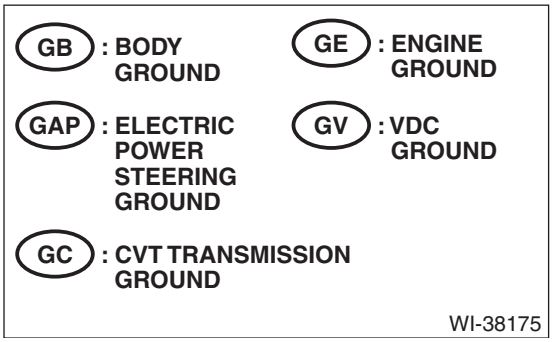
Nominal sectional area mm^2	No. of strands/ strand diameter	Outside diameter of wiring mm	Allowable current Amps/ 40°C (104°F)
0.3	7/0.26	1.8	7
0.5	7/0.32	2.2 (or 2.0)	12
0.75	30/0.18	2.6 (or 2.4)	16
0.85	11/0.32	2.4 (or 2.2)	16
1.25	16/0.32	2.7 (or 2.5)	21
2	26/0.32	3.1 (or 2.9)	28
3	41/0.32	3.8 (or 3.6)	38
5	65/0.32	4.6 (or 4.4)	51
8	50/0.45	5.5	67

• Each unit is either directly grounded to the body or indirectly grounds through a harness ground terminal. Different symbols are used in the wiring diagram to identify the two grounding systems.



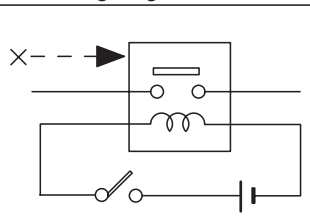
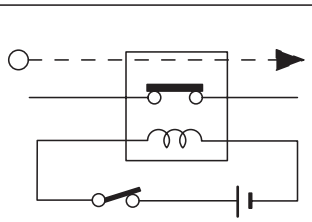
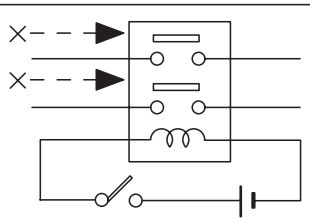
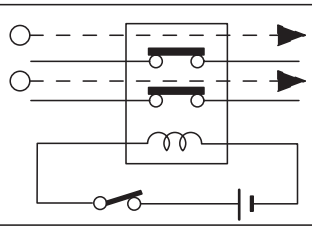
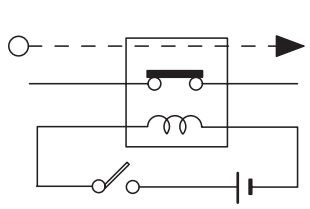
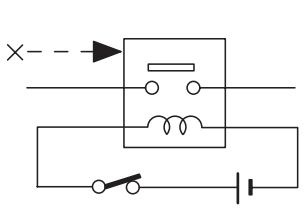
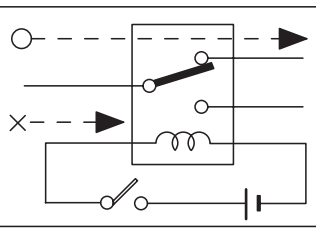
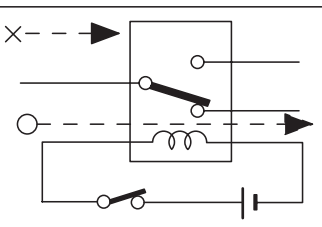
• The ground points shown in the wiring diagram refer to the following:

NOTE:
All wiring harnesses are provided with a ground point which must be securely connected.



- Relays are classified as normally-open or normally-closed.

The normally-closed relay has one or more contacts. The wiring diagram shows the relay mode when the energizing circuit is OFF.

Relay type		Energizing circuit OFF	Energizing circuit ON
Normally-open type	4-pole		
	6-pole		
Normally-closed type	4-pole		
Mixed type	6-pole		

Key to symbols:

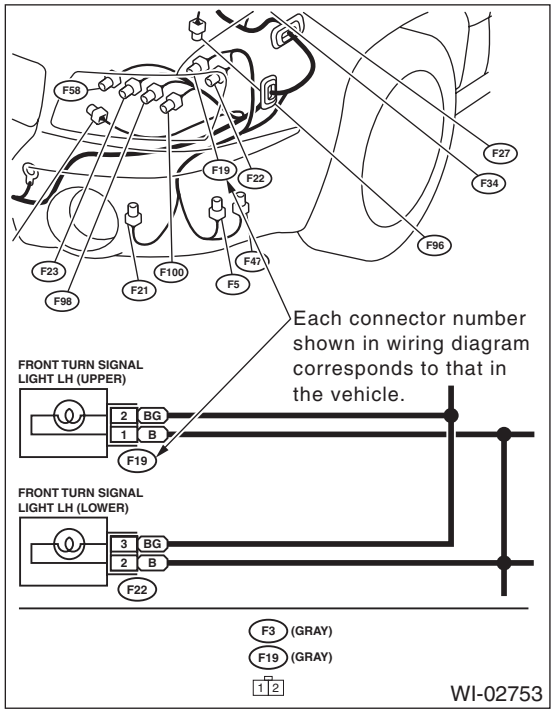
○ ⟶ : Current flows.

× ⟶ : Current does not flow.

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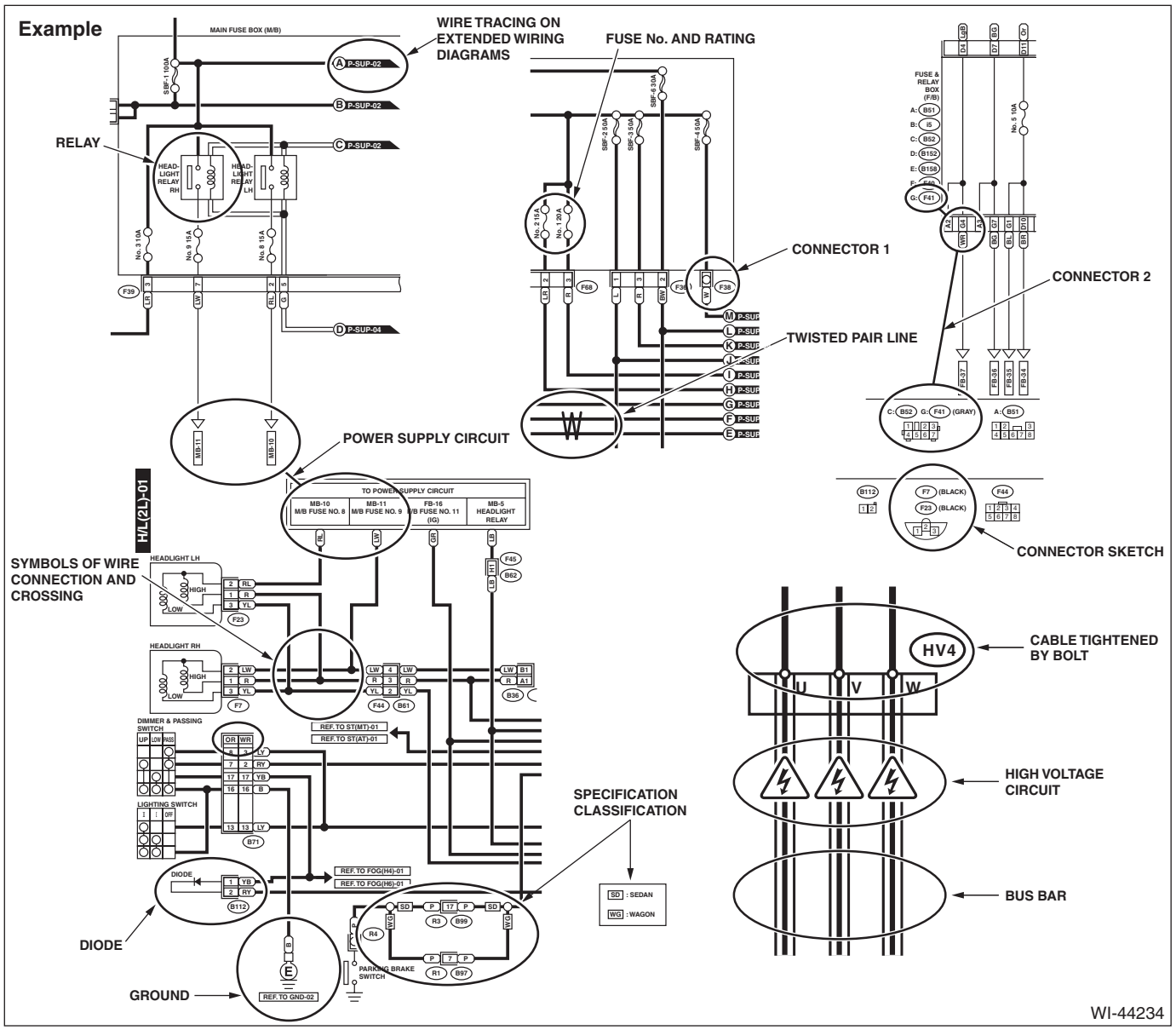
• Each connector number shown in the wiring diagram corresponds to that in the wiring harness. The location of each connector in the actual vehicle is determined by reading the first character of the connector (for example, a “F” for F8, “i” for i16, etc.) and the type of wiring harness. The first character of each connector number corresponds to the area or system of the vehicle.

Symbol	Wiring harness and cord
F	Front wiring harness
B	Bulkhead wiring harness
E	Engine wiring harness
T	Transmission cord
D	Door cord LH & RH, Rear gate cord Rear door cord LH & RH, Rear defogger cord
i	Instrument panel wiring harness
R	Rear wiring harness, Fuel tank cord, Roof cord, Rear gate cord
AB	Airbag wiring harness



D: SYMBOLS IN WIRING DIAGRAMS

A number of symbols are used in each wiring diagram to easily identify parts or circuits.



1. RELAY

A symbol used to indicate a relay.

2. CONNECTOR 1

The sketch of the connector indicates the one-pole types.

3. WIRING CONNECTION

Some wiring diagrams are indicated in foldouts for convenience. Wiring destinations are indicated where necessary by corresponding symbols. (When two pages are needed for clear indication)

4. FUSE NO. & RATING

The “FUSE No. & RATING” corresponds with that used in the fuse box (main fuse box, fuse and joint box).

5. CONNECTOR 2

- Each connector is indicated by a symbol.
- Each terminal number is indicated in the corresponding wiring diagram in an abbreviated form.
- For example, terminal number “G4” refers to No. 4 terminal of connector (G: F41) shown in the connector sketch.

6. CONNECTOR SKETCH

- Each connector sketch clearly identifies the shape and color of a connector as well as terminal locations. Non-colored connectors are indicated in natural color.
- When more than two types of connector number are indicated in a connector sketch, it means that the same type connectors are used.

7. GROUND

Each grounding point can be located easily by referring to the corresponding wiring harness.

8. DIODE

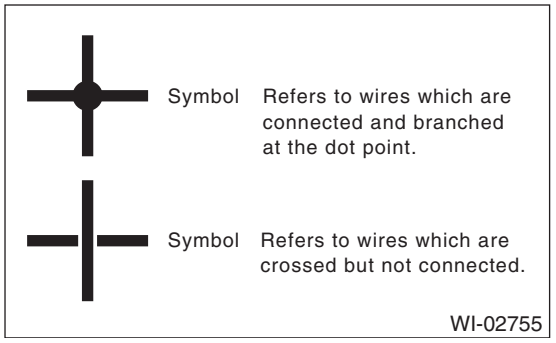
A symbol is used to indicate a diode.

9. WIRE TRACING ON EXTENDED WIRING DIAGRAMS

For a wiring diagram extending over at least two pages, a symbol (consisting of the same characters with arrows), facilitates wire tracing from one page to the next.

A ←→ A, B ←→ B

10.SYMBOLS OF WIRE CONNECTION AND CROSSING



11.POWER SUPPLY CIRCUIT

A symbol is used to indicate the power supply in each wiring diagram.

“MB – 5”, “MB – 6”, etc., which are used as power-supply symbols throughout the text, correspond with those shown in the “DC POWER SUPPLY CIRCUIT” in the wiring diagram.

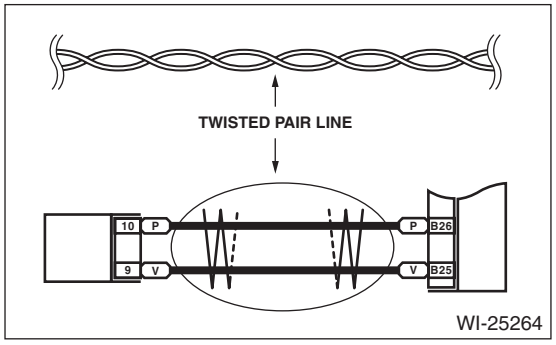
Accordingly, using the “DC POWER SUPPLY CIRCUIT” and wiring diagrams permits service personnel to understand the entire electrical arrangement of a system.

12.CLASSIFICATION BY SPECIFICATION

When the wiring diagram differ according to vehicle specifications, the specification difference is described by using abbreviations.

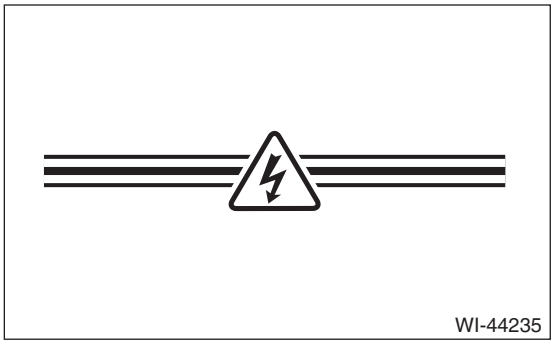
13.TWISTED PAIR LINE

The twisted pair line is indicated by a symbol in the wiring diagrams.



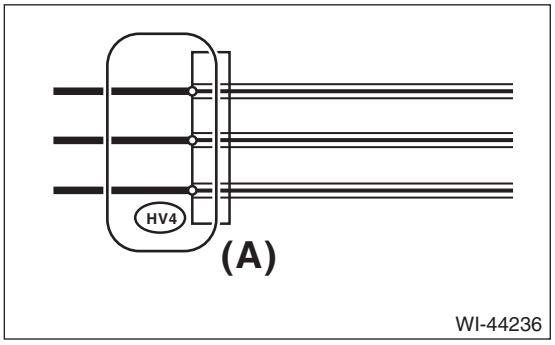
14.HIGH VOLTAGE CIRCUIT

The following signs denote high voltage circuit.



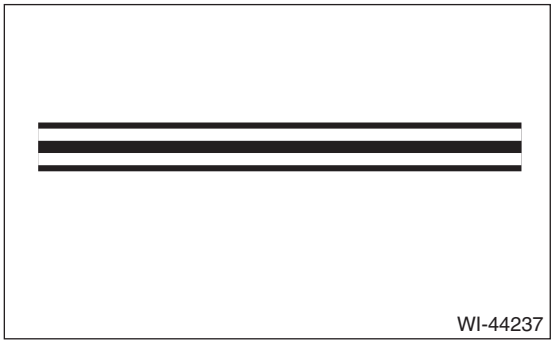
15.CABLE WITH BOLT CONNECTION

Cable connections with bolt (HV**) are denoted by (A) below. Signs for connection (HV**) are also used in location section.



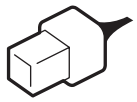
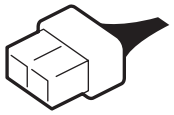
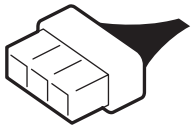
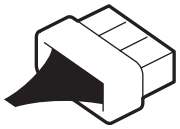
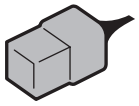
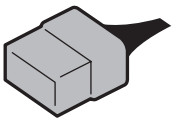
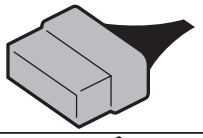
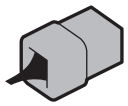
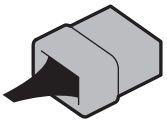
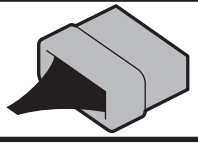
16.BUS BAR

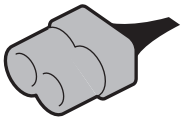
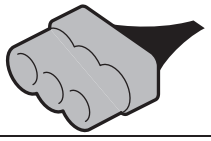
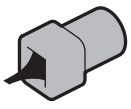
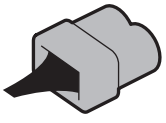
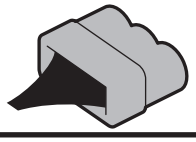
The following signs denote bus bar.



E: CONNECTOR SYMBOL IN WIRING HARNESS

A number of connector symbols are used in each wiring diagram to easily identify the wiring harness connectors.

Standard type: Female		
Pole: From 1 to 8	Pole: From 9 to 20	Pole: More than 21
		
		
Standard type: Male		
		
		

Water proof type: Female		
Pole: From 1 to 8	Pole: From 9 to 20	Pole: More than 21
		
		
Water proof type: Male		
		
		

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F: ABBREVIATION IN WIRING DIAGRAMS

Abbr.	Full name
ABS	Anti-lock Brake System
ACC	Accessory
A/C	Air Conditioner
ASSY	Assembly
AT	Automatic Transmission
A/F	Air/Fuel (air fuel ratio sensor)
ATF	Automatic Transmission Fluid
AUX	Auxiliary Audio Input Terminal
AWD	All Wheel Drive
B	Battery
BECM	Battery Energy Control Module
BSD/RCTA	Subaru Rear Vehicle Detection system
CAN	Controller Area Network
CM	Control Module
CVT	Continuously Variable Transmission
D	Drive range or Down
DMCM	Drive Motor Control Module
DN	Down
E	Ground
ELCM	Evaporative Leak Check Module
ECO	Economy
ECM	Engine Control Module
EEPROM	Electrically Erasable Programmable Read-Only Memory
EGR	Exhaust Gas Recirculation
F/B	Fuse & Relay Box
FL	Front Left
FR	Front Right
G	Gravity (G sensor)
GPS	Global Positioning System
H/L	Headlight
HI	High
HPCM	Hybrid Powertrain Control Module
I/F	Interface
IG	Ignition
INT	Intermittent
ISG	Integrated Starter Generator
ISO	International Organization for Standardization
J/C	Joint Connector
LCD	Liquid Crystal Display
LH	Left Hand
LO	Low
LWR	Lower
M	Motor
M/B	Main Fuse Box
MFD	Multi Function Display
MT	Manual Transmission
N	Neutral Range

Abbr.	Full name
NAVI	Navigation
OP	Open or Optional Parts
P	Parking or Parking range
PASS	Passing
PCV	Positive Crankcase Ventilation Valve
R	Reverse Range
RH	Right Hand
RL	Rear Left
RR	Rear Right
SBF	Slow Blow Fuse
ST	Starter
SW	Switch
TCM	Transmission Control Module
TEL	Telephone
TFT	Thin Film Transistor
TPMS	Tire Pressure Monitor System
UPR	Upper
VDC	Vehicle Dynamics Control
WASH	Washer

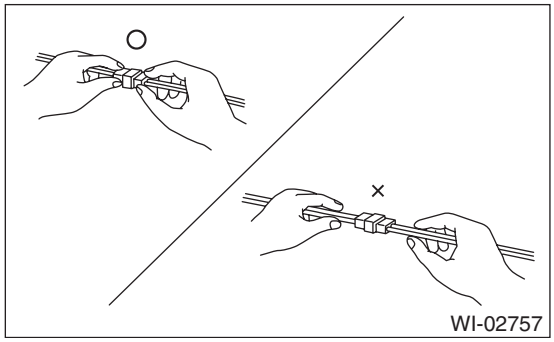
2. Working Precautions

A: PRECAUTIONS WHEN WORKING WITH THE PARTS MOUNTED ON THE VEHICLE

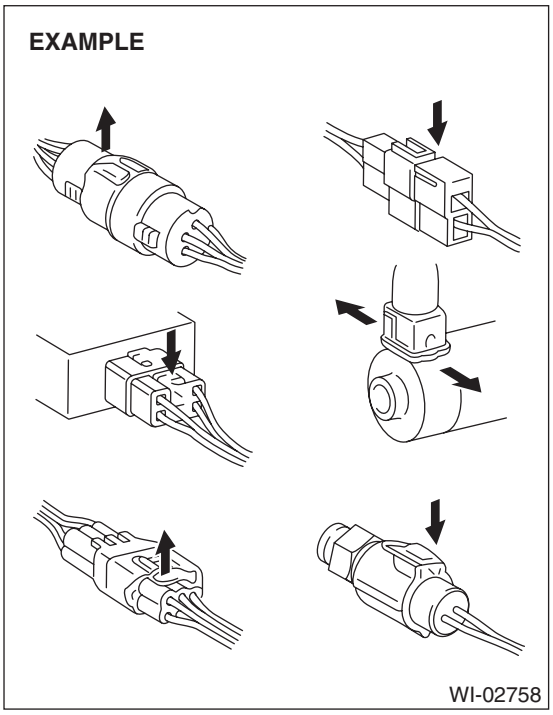
1) When working under a vehicle which is jacked-up, always be sure to use rigid rack.
2) The parking brake must always be applied during working. Also, in automatic transmission vehicles, keep the select lever set to the P (Parking) range.
3) Be sure the workshop is properly ventilated when running the engine. Further, be careful not to touch the belt or fan while the engine is operating.
4) Be careful not to touch hot metal parts, especially the radiator and exhaust system immediately after the engine has been turned off.

B: PRECAUTIONS IN TROUBLE DIAGNOSIS AND REPAIR OF ELECTRIC PARTS

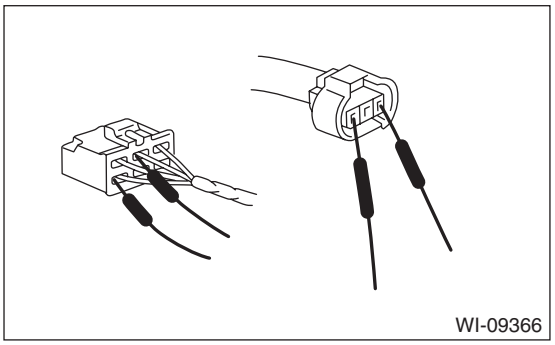
1) The battery cable must be disconnected from the battery's (–) terminal, and the ignition switch must be set to the OFF position, unless otherwise required by the diagnostics.
2) Securely fasten the wiring harness with clamps and clips so that the harness does not interfere with the body end parts, edges, bolts or screws.
3) When installing parts, be careful not to catch them on the wiring harness.
4) When disconnecting a connector, do not pull the wires, but pull while holding the connector body.



5) Some connectors are provided with a lock. One type of such a connector is disconnected by pushing the lock, and the other, by moving the lock up. In either type the lock shape must be identified before attempting to disconnect the connector.
To connect, insert the connector until it snaps and confirm that it is connected securely.



6) When checking continuity between connector terminals, or measuring voltage across the terminal and ground, always touch tester probe(s) to terminals from the wiring connection side. If the probe is too thick to gain access to the terminal, use "mini" test leads.
To check water-proof connectors (which are not measurable from the wiring side), touch test probes on the terminal side and be careful not to bend or damage the terminals.



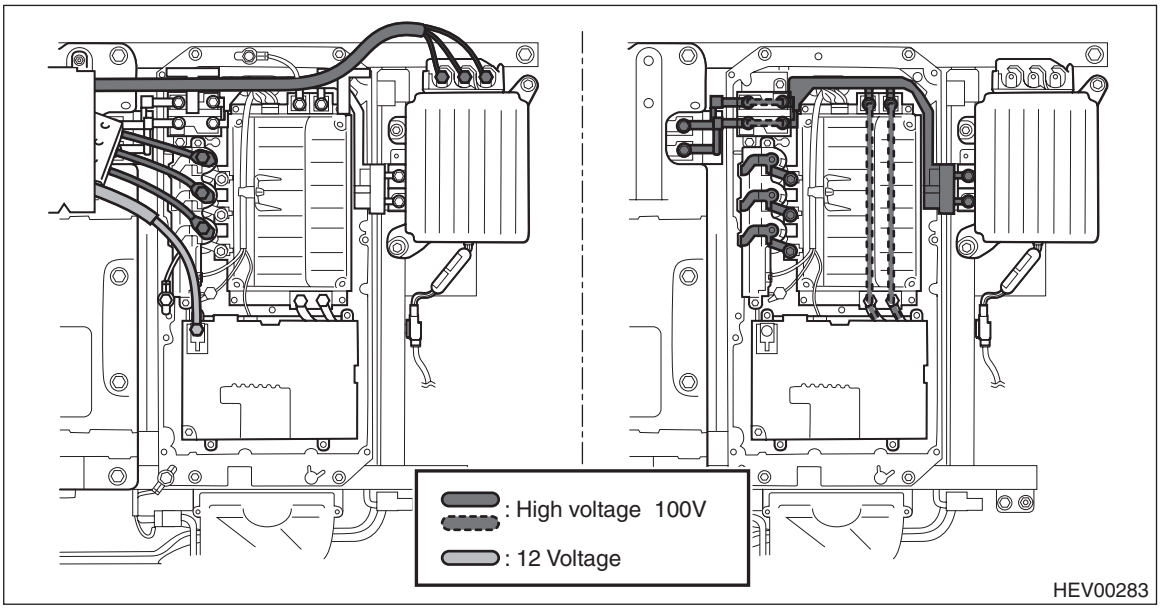
7) Sensors, relays, electrical unit, etc., are sensitive to strong impacts.
Handle them with care so that they are not dropped or mishandled.
8) For inspection of airbag system, always refer to “CAUTION” of “General Description” under AIR-BAG SYSTEM in the service manual for the same model to prevent malfunctioning.
9) When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal. Never insert the tapered pin into the terminal at this time. Doing so may cause internal deformation and a malfunction can occur.

C: PRECAUTIONS REGARDING THE HYBRID SYSTEM

1. PRECAUTIONS FOR MAINTENANCE

The hybrid system includes a high voltage circuit. Mishandling may cause electric shocks and leakage. Therefore, perform proper operations by following procedures in this manual.

- Engineers are required to receive a special training in order to perform maintenance of high voltage system.
- All the harnesses and connectors for power cables are orange in color. In addition, caution labels indicating [High Voltage] are attached on the High voltage battery and its battery cover. Do not touch the wires and parts related to high voltage carelessly.
- Use great care when handling the high voltage system power supply circuits shown in the figure below.



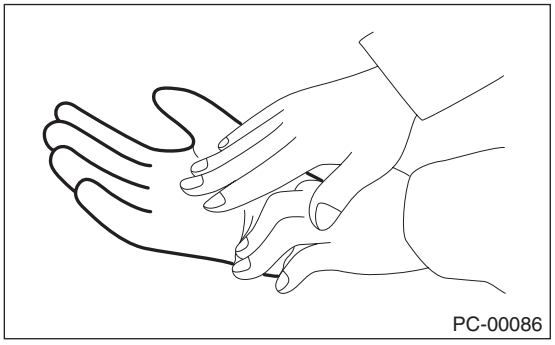
- When performing maintenance of the high voltage system, make sure to take measures for preventing electrocution, by wearing insulated gloves, removing the service disconnect plug, etc. In addition, carry the removed service disconnect plug in your pocket in order to prevent other servicemen from accidentally installing during work.

NOTE:
Do not turn the ignition to ON with the service disconnect plug removed in order to prevent malfunctions.

- After removing the service disconnect plug, be sure to wait for ten minutes before touching the high voltage connectors and terminals.

NOTE:
This time allows the high voltage condenser in the inverter to discharge.

- When wearing insulated gloves for work, make sure there is no holes or damages on the gloves.
- During the work, do not carry any metallic products, such as mechanical pencils and scales, which may be dropped and may cause short.
- Parts with high voltage and strong magnetic force are used. Therefore, during the work, do not carry any metallic products that may cause short, or magnetic recording media (such as cash cards and prepaid cards) whose magnetic record may get destroyed.
- When touching the high voltage terminals without insulation covering, make sure, in advance, to wear insulated gloves and to confirm that the voltage is 0 V using an insulation multimeter.
- Insulate the high voltage connectors and terminals with insulating tape immediately after removing.
- Be sure to tighten the high voltage screw terminals firmly to the specified torque. Lack of, or excess torque causes failures.
- Be careful not to allow foreign matter to enter the battery.
- Make sure to insulate the power cable terminals by wrapping insulating tape around.
- To work on the high voltage wire connections, use insulated tools, or wrap tools with vinyl tape for insulation before use.
- When using tools wrapped with vinyl tape as alternatives to insulated tools, cover tools with the standardized product, pressure-sensitive polyvinyl chloride tapes for electrical purposes (JIS C2336), and confirm the insulated condition before working, using an insulation multimeter.
- When inspecting insulated gloves, make sure there is no cracks, breakage, other damages, or air leakage by rolling insulated gloves from the opening side up to the wrist area and pressing the inflated portion. Do not use wet insulated gloves.


PC-00086

- When performing work, wear or use insulated gloves, protective goggles, and rubber boots for electrical purposes, insulated protective shoes or insulating rubber sheet.
- Even after the service disconnect plug is removed, make sure to wear insulated gloves during maintenance of all the parts inside the cover including the battery cover, and of underfloor power cable. (Maintenance of the high voltage battery cooling fan and cooling duct parts outside the battery cover, and the drive motor control module parts does not require to wear insulated gloves even in the compartment, because the voltage is 12 V only.)
- For maintenance of engine compartment and of CVT unit except for the power cable, insulated gloves are not required.

• During the work for the high voltage system, make sure to alert other servicemen to take precautions, for instance by displaying [HIGH VOLTAGE WORK. DO NOT TOUCH] on the vehicle. (An example is shown. Make a photocopy for use.)

HIGH VOLTAGE CAUTION LABEL

Person in charge: _____

CAUTION:
HIGH VOLTAGE.
DO NOT TOUCH
DURING OPERATION

CAUTION:
HIGH VOLTAGE.
DO NOT TOUCH
DURING OPERATION

Person in charge: _____

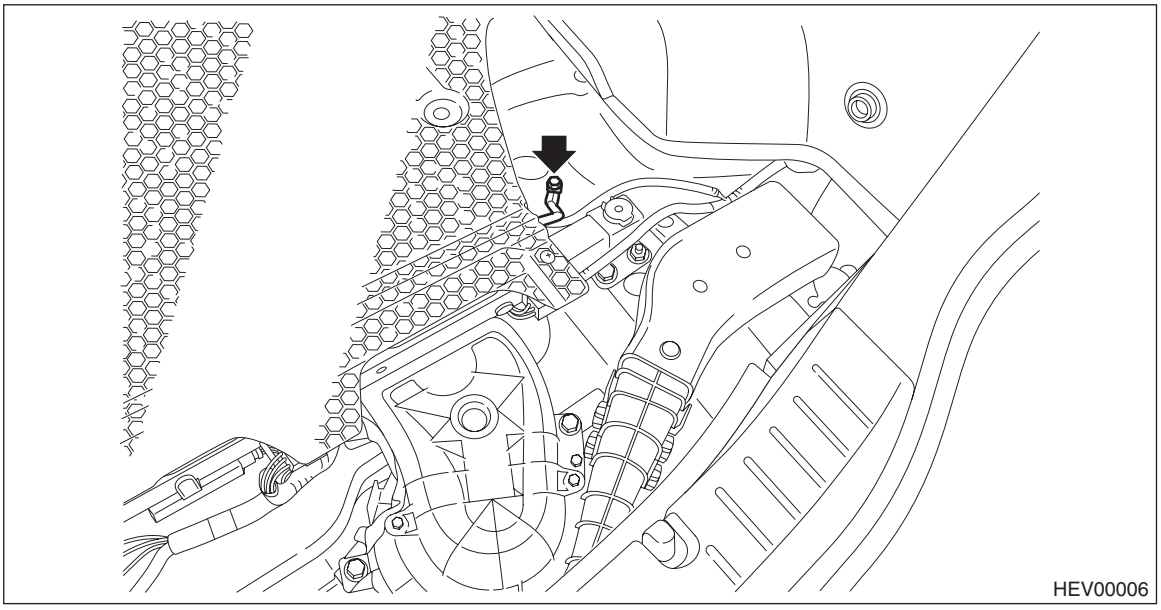
Copy this page and put it after folding on the roof of the vehicle in service.

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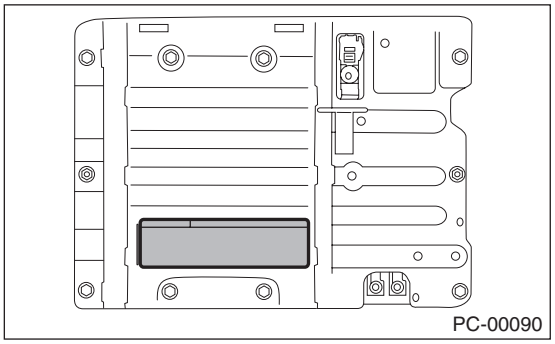
• After performing work for the high voltage system, make sure to check again for misplaced parts and tools, tightening conditions of high voltage terminals, and connector connections, before connecting the service disconnect plug.

CAUTION:
Make sure the connectors are connected completely without insecurity.

• Make sure to check the positive and negative terminal connections during the battery removal and installation procedures.
• Never connect the battery in reverse polarity. Otherwise, the control module will be broken instantly, and other parts will also be damaged.
• Do not disconnect the battery cables while the engine is running. A large counter electromotive force will be generated, and this voltage may damage electronic parts such as control modules.
• When disconnecting the connectors of the electrical components, always be sure to turn the ignition switch to OFF.
• When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal. Never insert the tapered pin into the terminal at this time. Doing so may cause internal deformation and a malfunction can occur.
• Take care not to allow water to get into the connectors when servicing or washing the vehicle in rainy weather. Avoid exposure to water even if the connectors are waterproof.
• Use the engine ground terminal or engine assembly for the grounding point when measuring the voltage and resistance in engine compartment.
• All parts related to the hybrid system are precision parts. Do not drop or otherwise apply impact. Do not reuse the parts that are dropped accidentally.
• Use the body ground bolt on the inverter frame as the grounding point, when measuring voltage and resistance in rear of the vehicle.



• Take the ignition key or access key out of the vehicle, except when the key is needed inside.
• When the part is replaced or the label is detached, make sure to attach a new label in the original position and direction.



• This engine starts and stops automatically, when the Hybrid READY indicator light in the meter illuminates. Make sure to turn the ignition to OFF before performing maintenance.
• When the state of battery charge is in a good condition while the engine is warmed-up, the engine will be stopped automatically while the vehicle is stopped. Therefore, when continuous running of the engine is necessary during vehicle stoppage in the cases such as ignition timing inspection, set to «Auto Start Stop Cancel Drive Mode (Engine only or Engine + Motor)».

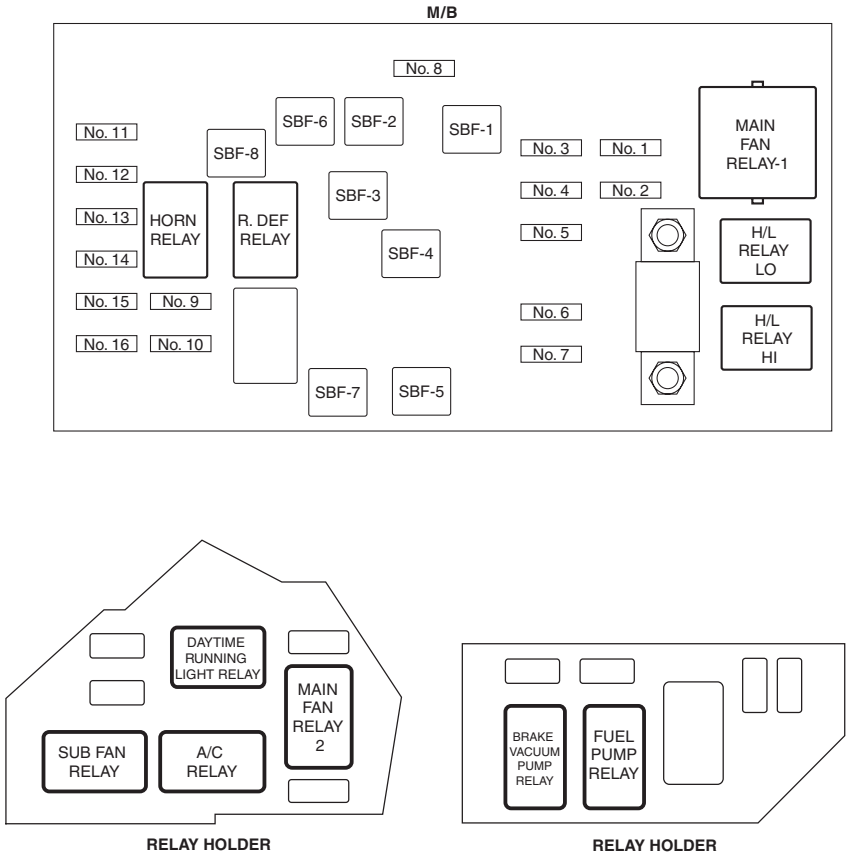
3. Power Supply Circuit

A: WIRING DIAGRAM

- **Engine room side**

P-SUP(P)-01

P-SUP(P)-01

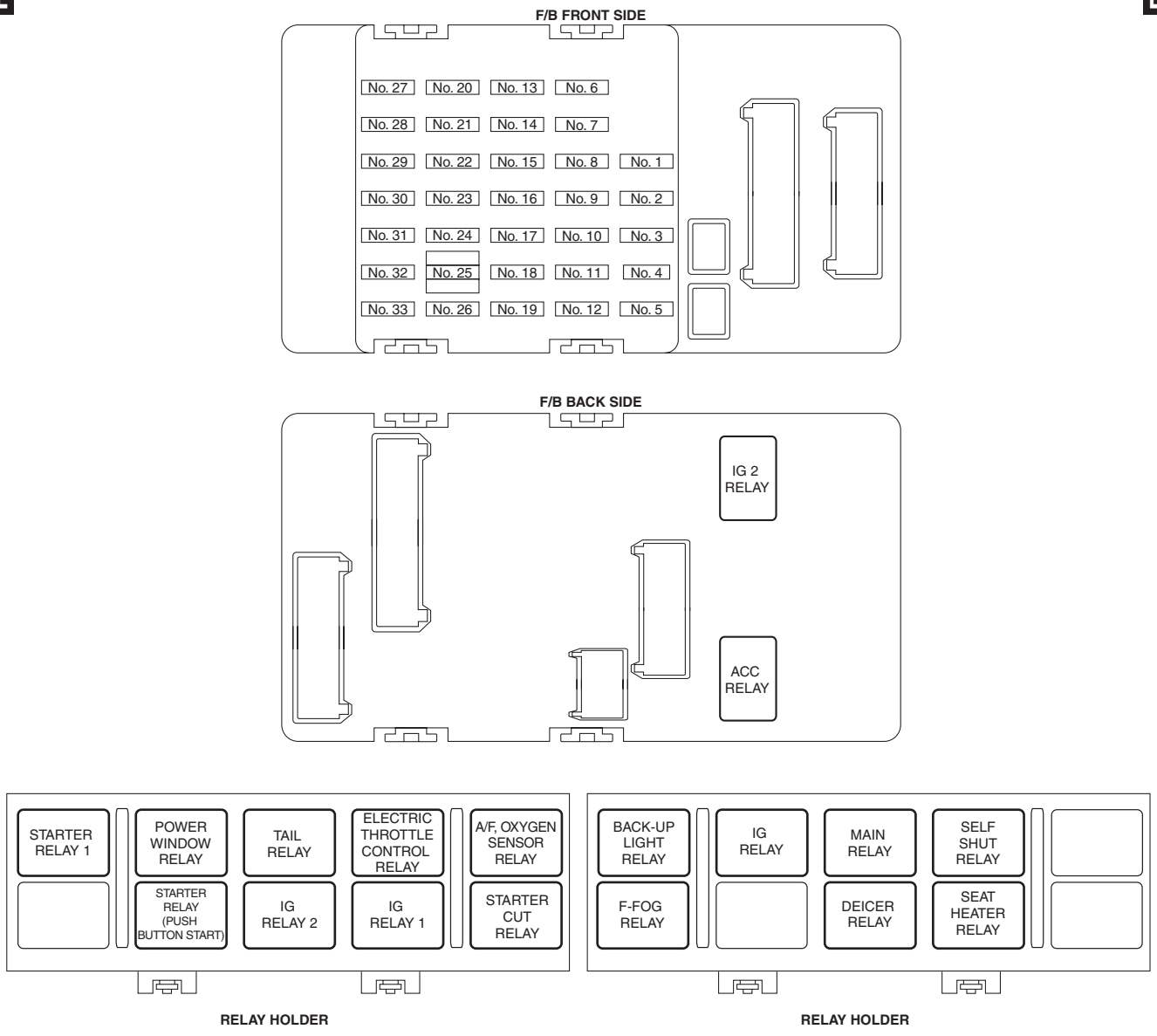


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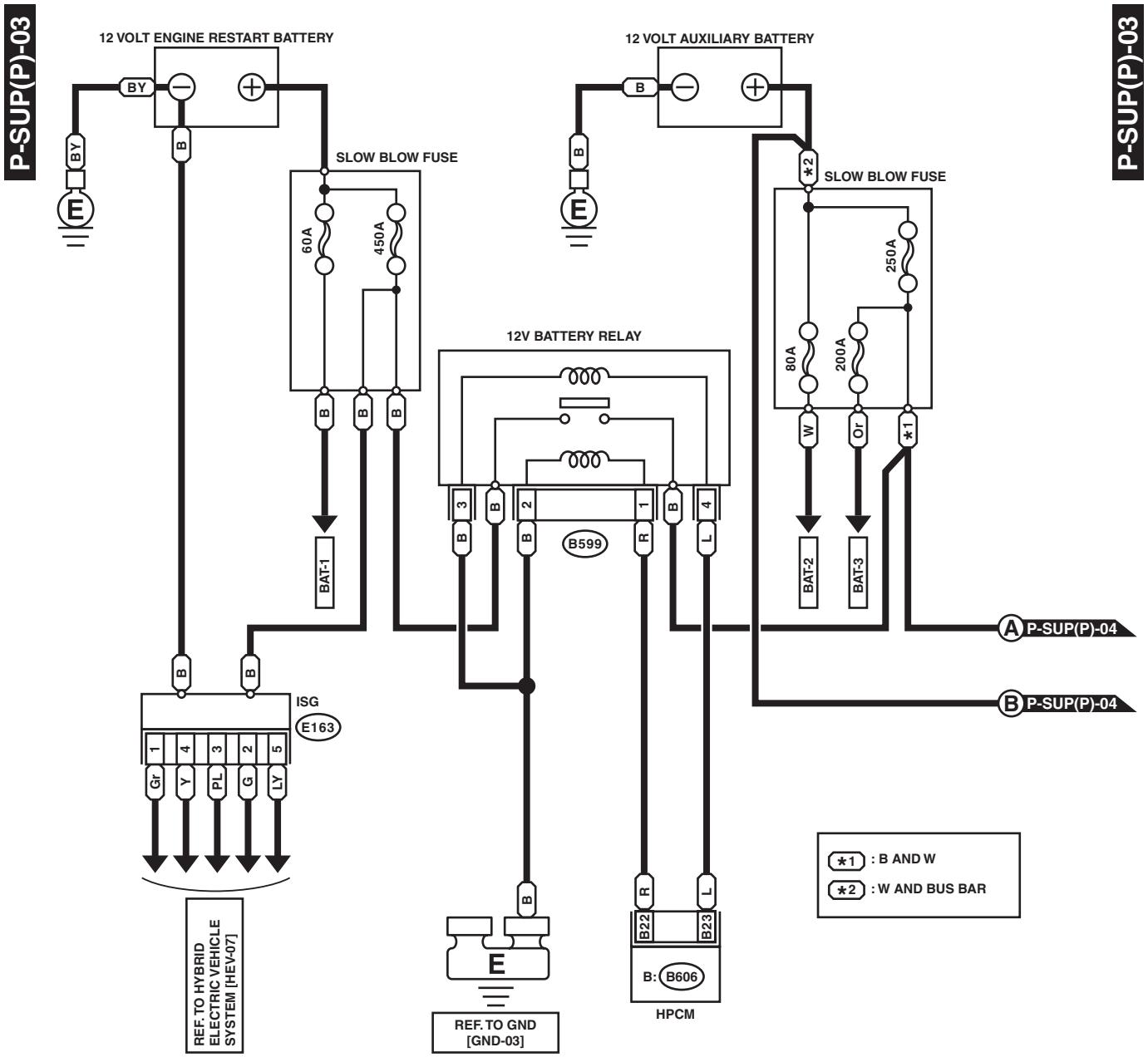
- **Passenger room side**

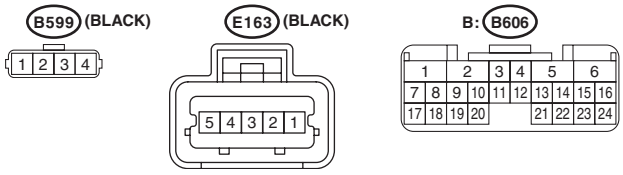
P-SUP(P)-02

P-SUP(P)-02

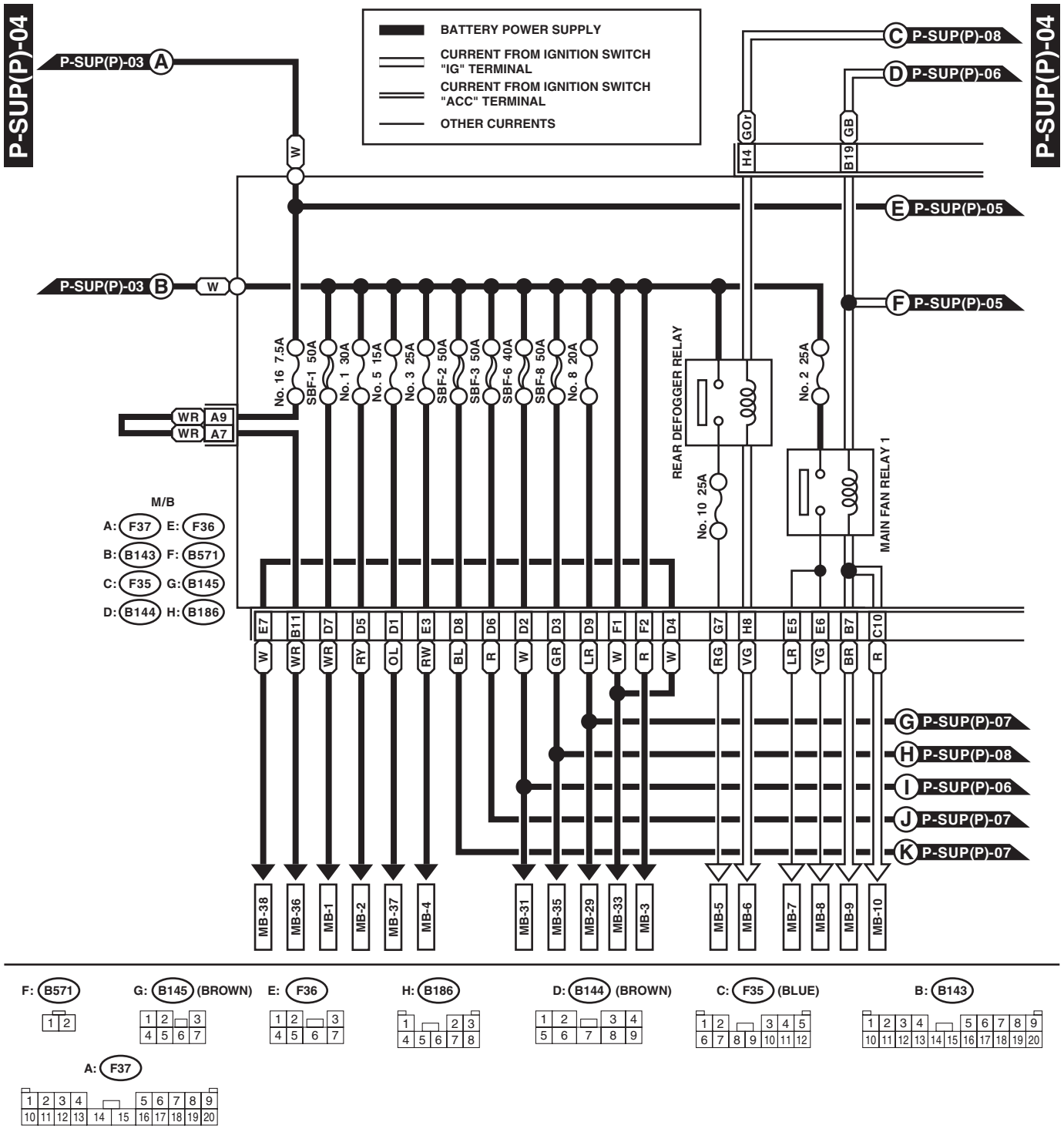


WI-41783


P-SUP(P)-03
P-SUP(P)-03
12 VOLT ENGINE RESTART BATTERY
12 VOLT AUXILIARY BATTERY
SLOW BLOW FUSE
SLOW BLOW FUSE
60A
450A
250A
80A
200A
12V BATTERY RELAY
BAT-1
BAT-2
BAT-3
B599
ISG
E163
REF.TO HYBRID ELECTRIC VEHICLE SYSTEM [HEV-07]
REF.TO GND [GND-03]
B: B606
HPCM
A P-SUP(P)-04
B P-SUP(P)-04
*1 : B AND W
*2 : W AND BUS BAR


B599 (BLACK)
E163 (BLACK)
B: B606

WI-61949

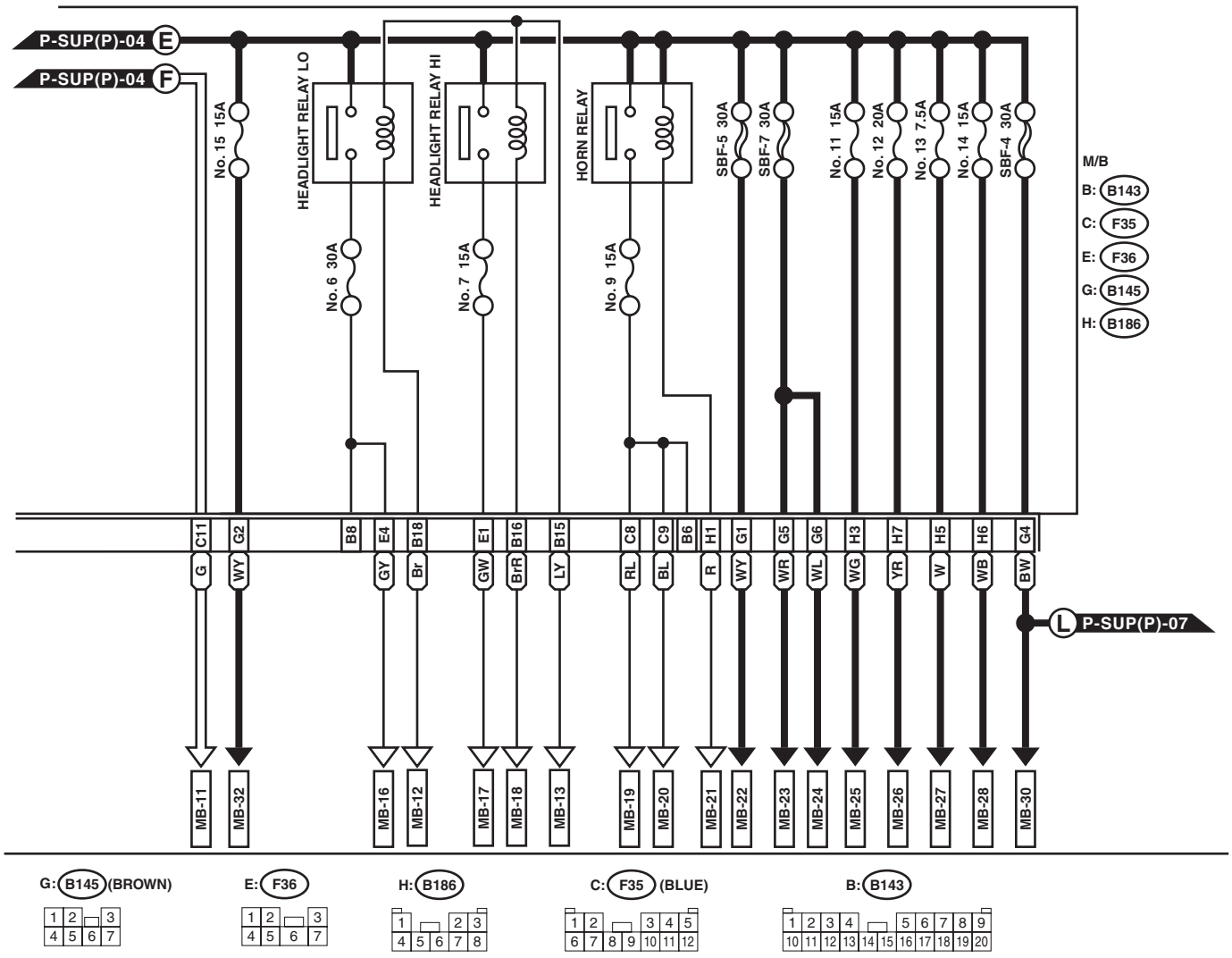

P-SUP(P)-04
P-SUP(P)-04
BATTERY POWER SUPPLY
CURRENT FROM IGNITION SWITCH "IG" TERMINAL
CURRENT FROM IGNITION SWITCH "ACC" TERMINAL
OTHER CURRENTS
P-SUP(P)-03 A
P-SUP(P)-03 B
C P-SUP(P)-08
D P-SUP(P)-06
E P-SUP(P)-05
F P-SUP(P)-05
G P-SUP(P)-07
H P-SUP(P)-08
I P-SUP(P)-06
J P-SUP(P)-07
K P-SUP(P)-07
No. 16 7.5A
SBF-1 50A
No. 1 30A
No. 5 15A
No. 3 25A
SBF-2 50A
SBF-3 50A
SBF-6 40A
SBF-8 50A
No. 8 20A
No. 2 25A
No. 10 25A
REAR DEFOGGER RELAY
MAIN FAN RELAY 1
M/B
A: F37 E: F36
B: B143 F: B571
C: F35 G: B145
D: B144 H: B186
MB-38
MB-36
MB-1
MB-2
MB-37
MB-4
MB-31
MB-35
MB-29
MB-33
MB-3
MB-5
MB-6
MB-7
MB-8
MB-9
MB-10

F: B571
G: B145 (BROWN)
E: F36
H: B186
D: B144 (BROWN)
C: F35 (BLUE)
B: B143
A: F37

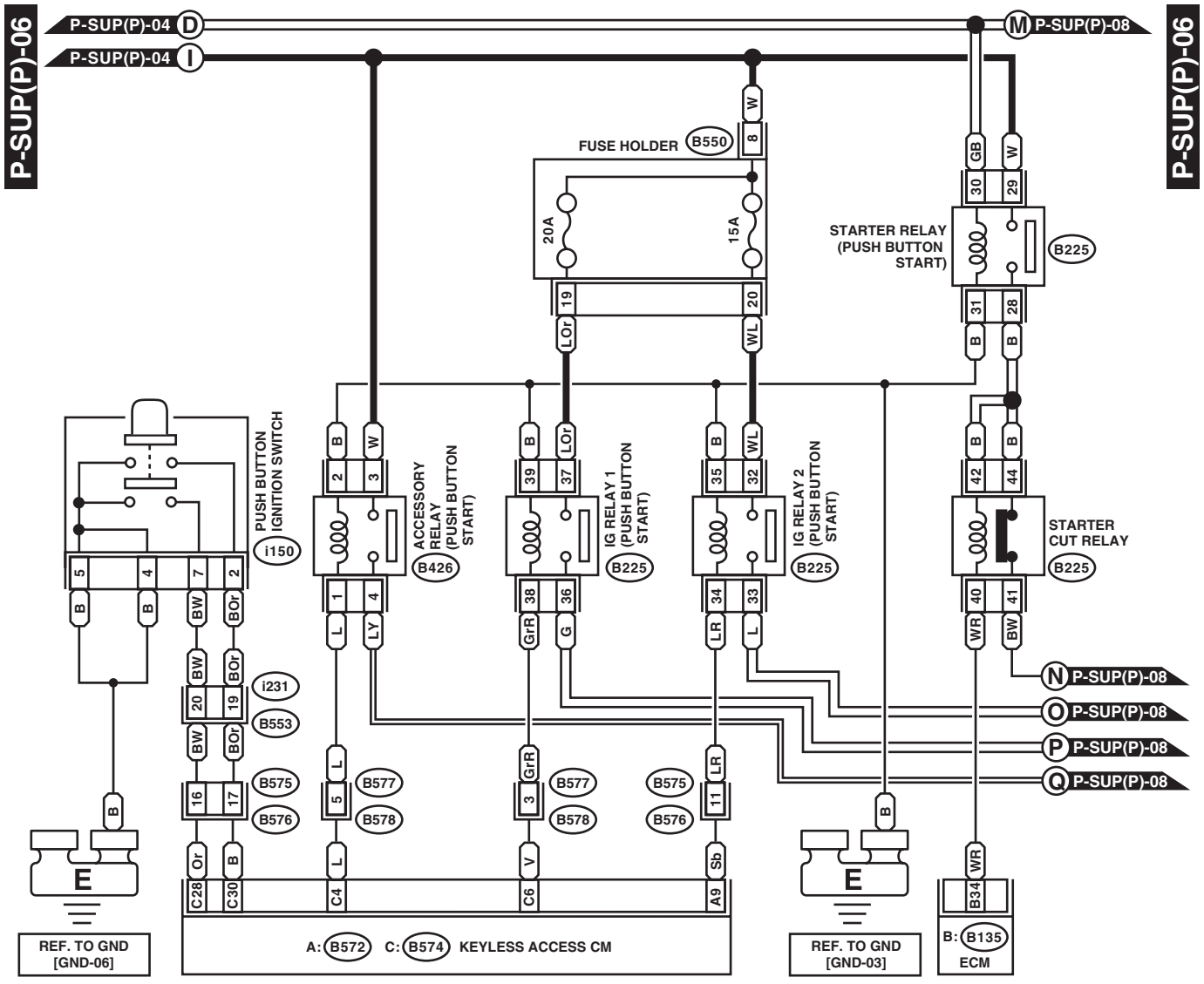
WI-61672

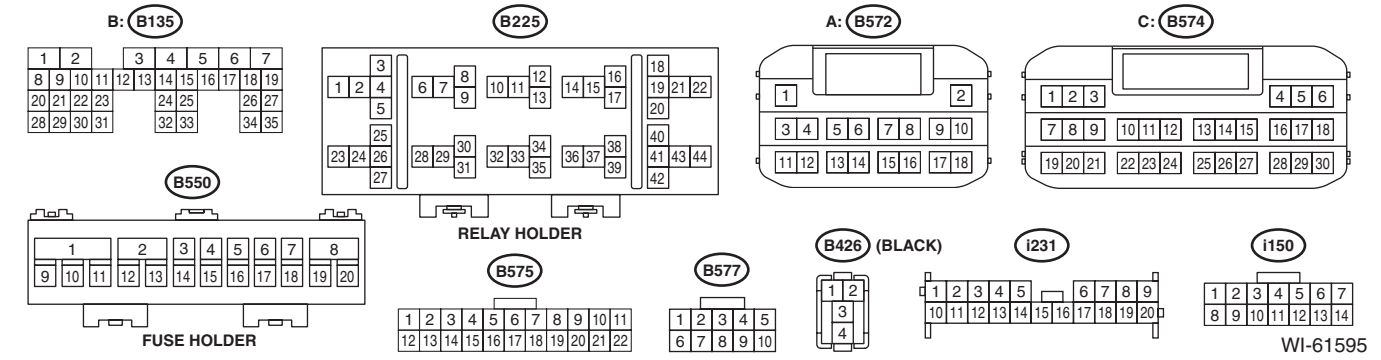
P-SUP(P)-05

P-SUP(P)-05

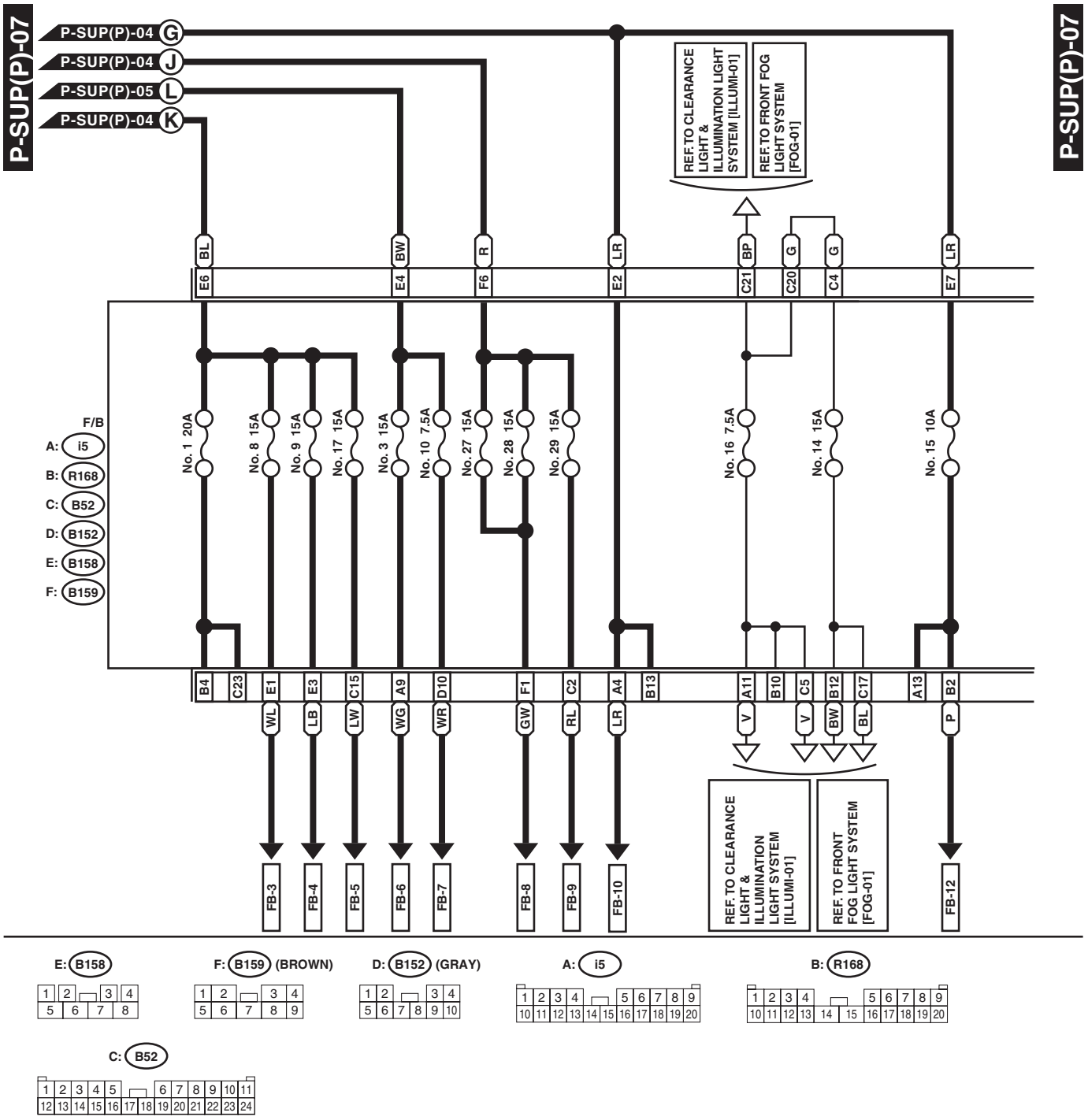


WI-48061


P-SUP(P)-06
P-SUP(P)-04 D
P-SUP(P)-04 I
M P-SUP(P)-08
FUSE HOLDER B550
20A
15A
STARTER RELAY (PUSH BUTTON START)
B225
PUSH BUTTON IGNITION SWITCH
i150
ACCESSORY RELAY (PUSH BUTTON START)
B426
IG RELAY 1 (PUSH BUTTON START)
IG RELAY 2 (PUSH BUTTON START)
STARTER CUT RELAY
i231
B553
B575
B576
B577
B578
N P-SUP(P)-08
O P-SUP(P)-08
P P-SUP(P)-08
Q P-SUP(P)-08
REF. TO GND [GND-06]
A: B572 C: B574 KEYLESS ACCESS CM
REF. TO GND [GND-03]
B: B135 ECM

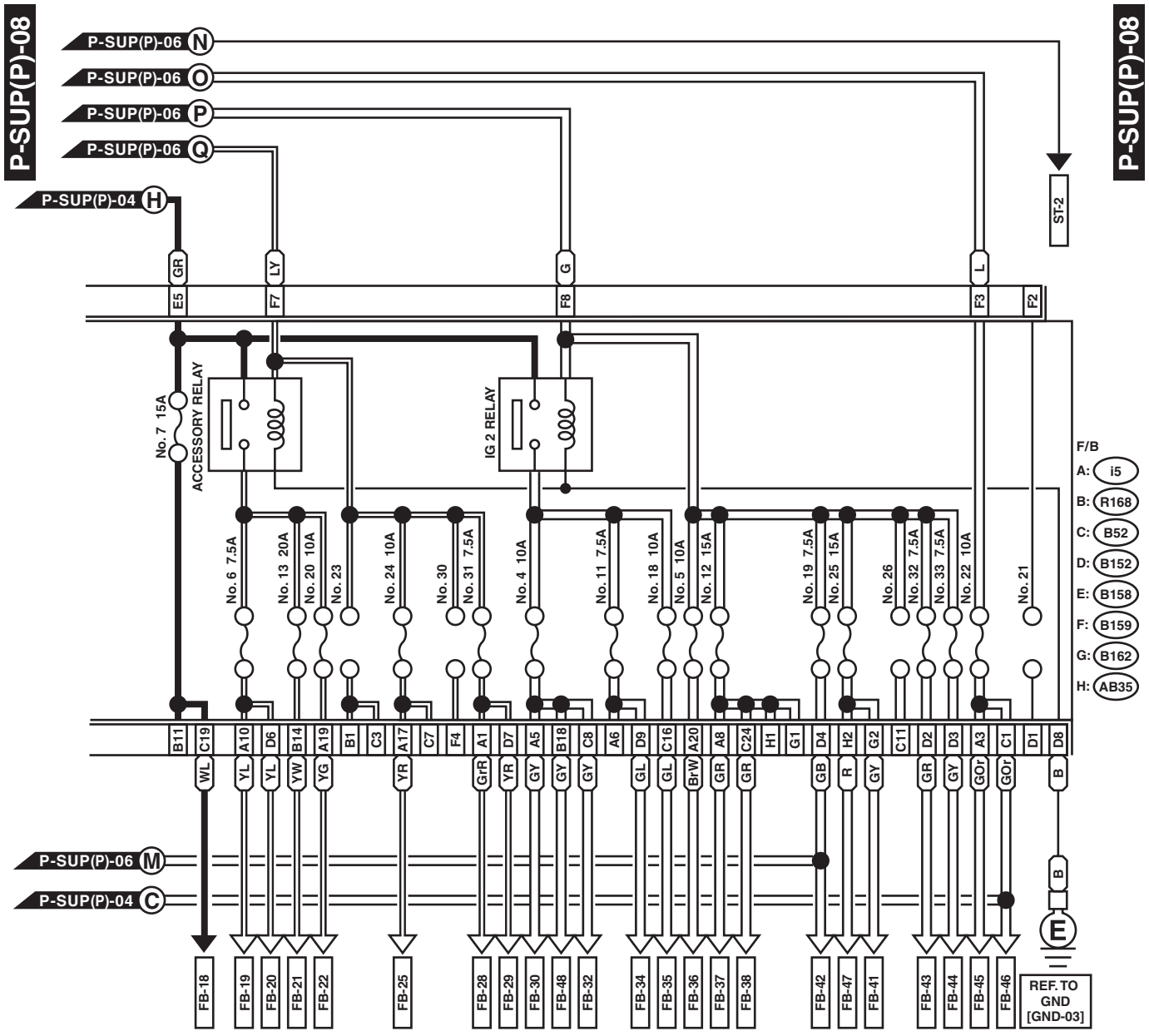

B: B135
B225
A: B572
C: B574
B550
FUSE HOLDER
RELAY HOLDER
B575
B577
B426 (BLACK)
i231
i150

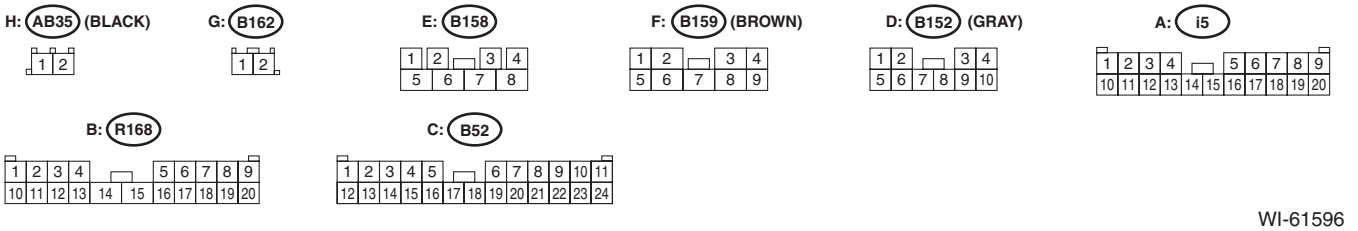
WI-61595


P-SUP(P)-07
P-SUP(P)-04 G
P-SUP(P)-04 J
P-SUP(P)-05 L
P-SUP(P)-04 K
P-SUP(P)-07
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
REF. TO FRONT FOG LIGHT SYSTEM [FOG-01]
BL E6
BW E4
R F6
LR E2
BP C21
G C20
G C4
LR E7
F/B
A: i5
B: R168
C: B52
D: B152
E: B158
F: B159
No. 1 20A
No. 8 15A
No. 9 15A
No. 17 15A
No. 3 15A
No. 10 7.5A
No. 27 15A
No. 28 15A
No. 29 15A
No. 16 7.5A
No. 14 15A
No. 15 10A
B4 C23 E1 E3 C15 A9 D10 F1 C2 A4 B13 A11 B10 C5 B12 C17 A13 B2
WL LB LW WG WR GW RL LR V V BW BL P
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
REF. TO FRONT FOG LIGHT SYSTEM [FOG-01]
FB-3 FB-4 FB-5 FB-6 FB-7 FB-8 FB-9 FB-10 FB-12
E: B158
F: B159 (BROWN)
D: B152 (GRAY)
A: i5
B: R168
C: B52

WI-48063

Power Supply Circuit





WI-61596

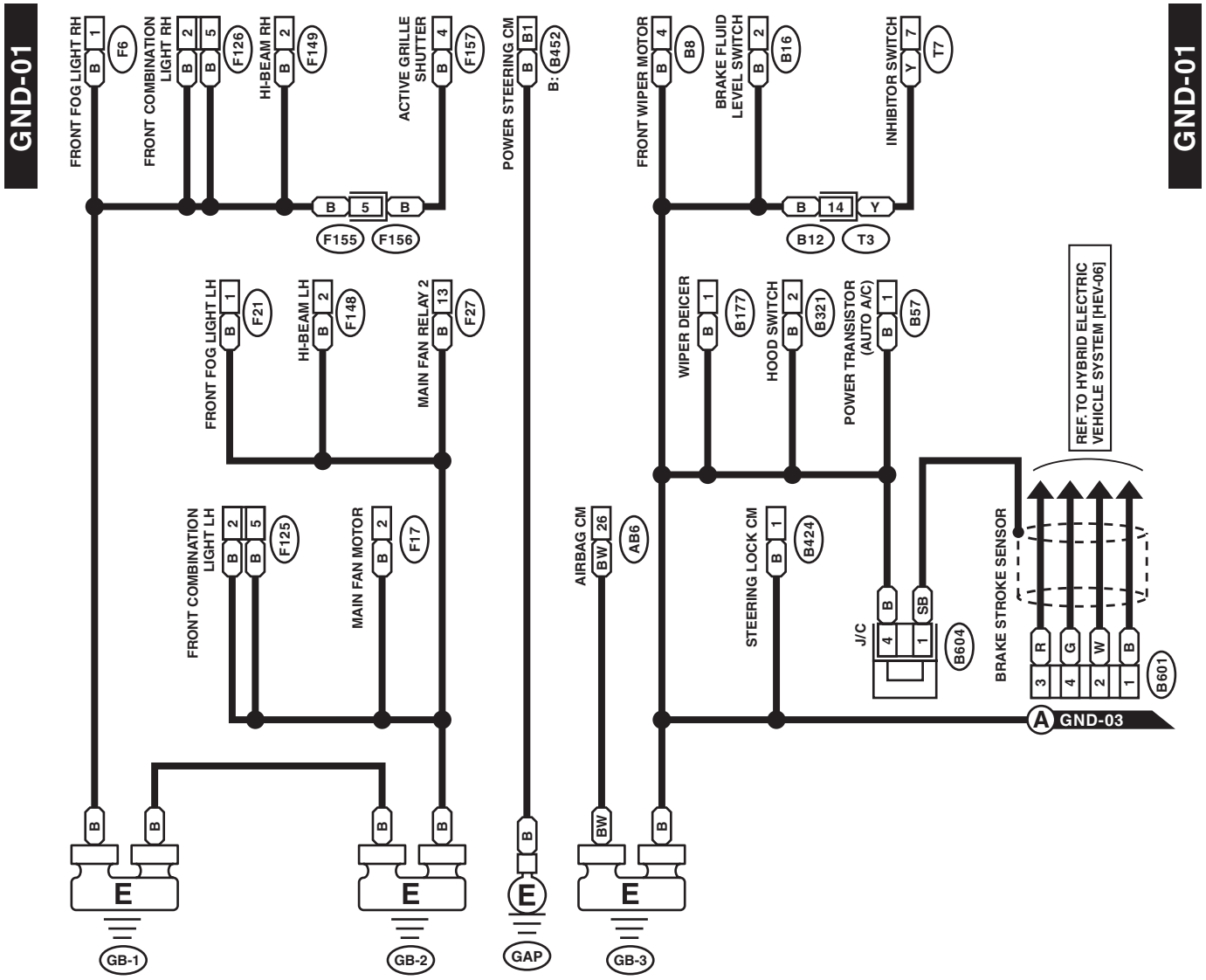
No.	Load
MB-1	VDC CM
MB-2	VDC CM
MB-3	Wiper relay
	Brake vacuum pump relay
MB-4	Sub fan relay
MB-5	Mirror heater LH
	Mirror heater RH
	Rear defogger
MB-6	Body integrated unit
MB-7	Main fan relay 2
MB-8	Main fan motor
MB-9	ECM
MB-10	Main fan relay 2
MB-11	Main fan relay 2
MB-12	Body integrated unit
MB-13	Body integrated unit
MB-16	Front combination light LH
	Front combination light RH
MB-17	Daytime running light relay
MB-18	Body integrated unit
MB-19	Horn
MB-20	Horn
MB-21	Horn switch
	Body integrated unit
MB-22	A/F, oxygen sensor relay
MB-23	Main relay
	IG relay
MB-24	Electronic throttle control relay
MB-25	Fuel pump relay
MB-26	TCM
	Self shut relay
MB-27	ECM
	Data link connector
MB-28	Turn signal and hazard unit
	Body integrated unit
MB-29	Spot map light
	Room light
	Body integrated unit
	Immobilizer antenna
MB-30	Power window circuit breaker
MB-31	IG relay 1 (push button start)
	IG relay 2 (push button start)
	Accessory relay (push button start)
MB-32	Tail relay
	Daytime running light relay

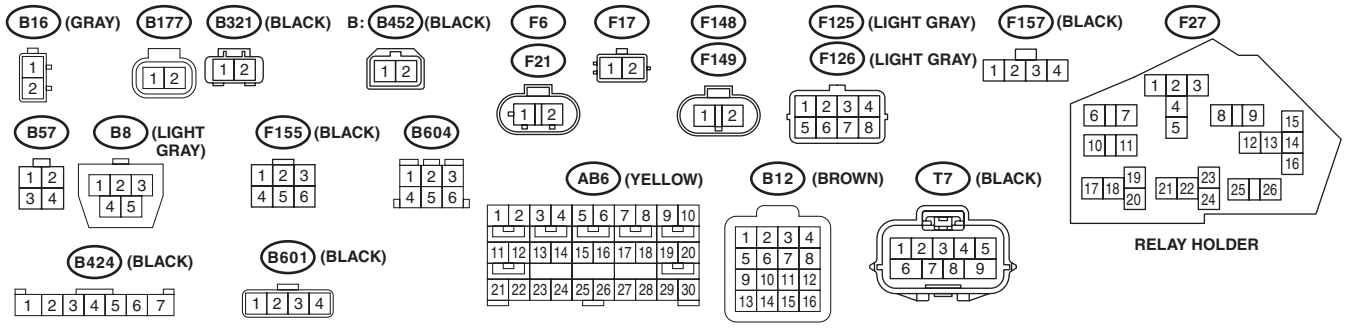
No.	Load
MB-33	DMCM relay
	High voltage battery cooling fan / drive motor inverter relay
	High voltage battery
	HPCM
	ISG
MB-35	ID code box
	Keyless access CM
MB-36	HPCM
MB-37	Brake vacuum pump relay
MB-38	Data communication module
ST-2	Starter relay 1
FB-3	Stop light and brake switch
FB-4	Wiper deicer relay
FB-5	Seat heater relay
FB-6	Body integrated unit
FB-7	Remote engine start CM
FB-8	Blower motor relay
FB-9	Front fog light relay
FB-10	Audio
	MFD
	Navigation unit
FB-12	Keyless entry CM
	Luggage room light
FB-18	Combination meter
	Body integrated unit
	Impact sensor
	Air mix door actuator LH (with left/right independent air conditioner)
	Air mix door actuator RH (with left/right independent air conditioner)
	Mode door actuator
	Air mix door actuator (without left/right independent air conditioner)
	Steering lock CM
	A/C control panel
	Active grille shutter
FB-19	Remote control mirror switch
FB-20	Seat heater relay
	Rear view mirror
FB-21	Rear accessory power supply socket
FB-22	Front accessory power supply socket
FB-25	AUX input terminal
	Audio
	Navigation unit
	Data communication module
FB-28	A/C control panel
FB-29	Body integrated unit

No.	Load
FB-30	Pedestrian alert CM
	BSD/RCTA OFF switch
	Radar sensor LH (master)
	Radar sensor RH (slave)
FB-32	Remote engine start CM
	Impact sensor
	Data link connector
	Stop light and brake switch
	Wiper deicer relay
	Sunroof motor assembly
	Sunroof switch
	Sunroof switch (tilt)
FB-34	Turn signal and hazard unit
FB-35	Back-up light relay
	Auto headlight beam leveler CM
FB-36	Combination meter
	MFD
	HPCM
FB-37	Data communication module
FB-38	HPCM
	DMCM
	High voltage battery
	Electric oil pump inverter
	Keyless access CM
	ECM
	TCM
	Body integrated unit
	Fuel pump relay
FB-41	Airbag CM
FB-42	Power window relay
	Wiper relay
FB-43	Steering lock CM
FB-44	VDC CM
	Steering angle sensor
	Power steering CM
FB-45	A/C control panel
FB-46	A/C relay
	Sub fan relay
	Pressure switch
	Blower motor relay
FB-47	Occupant detection control module
FB-48	TPMS CM
BAT-1	12V engine restart battery sensor
BAT-2	Power steering CM
BAT-3	DC/DC converter

4. Ground Circuit

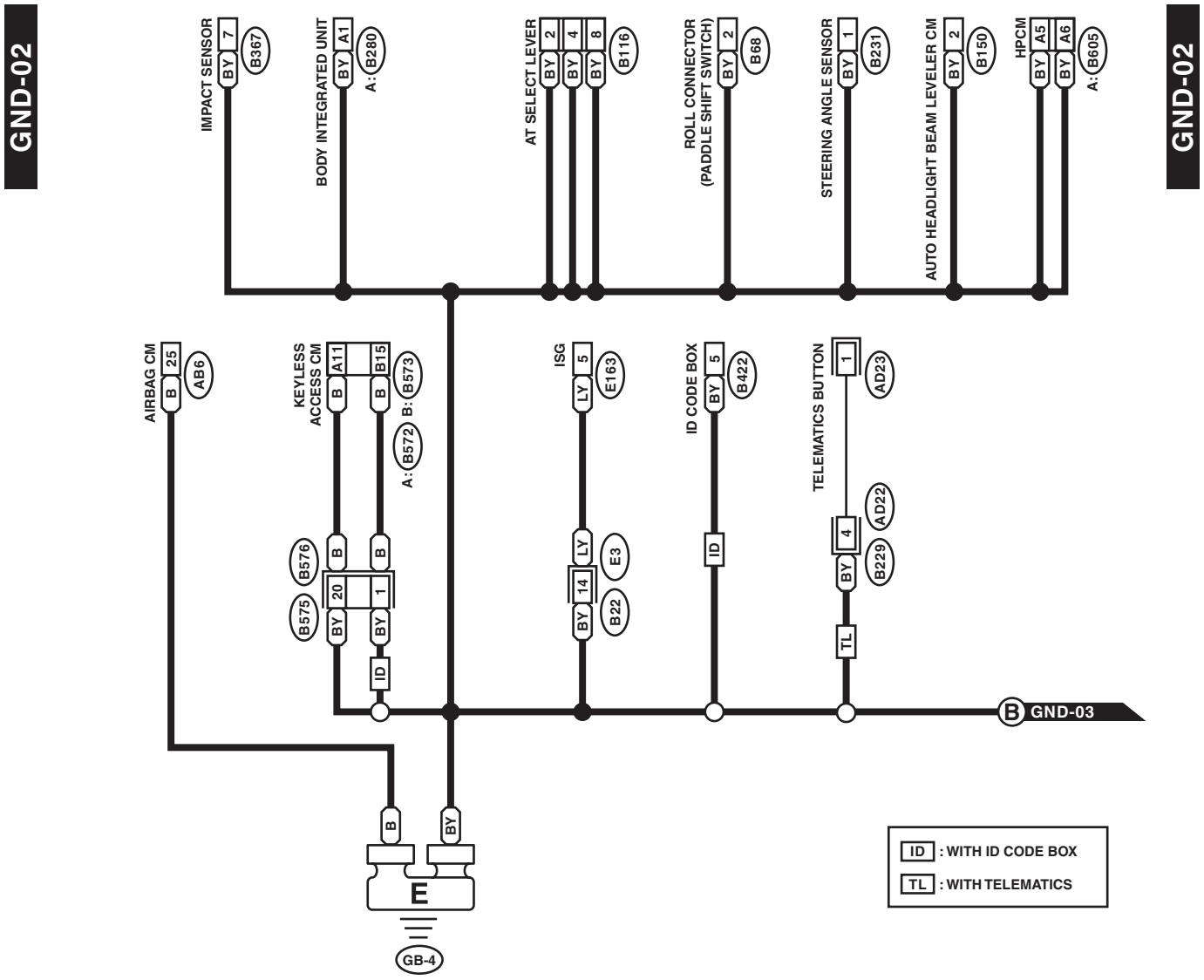
A: WIRING DIAGRAM

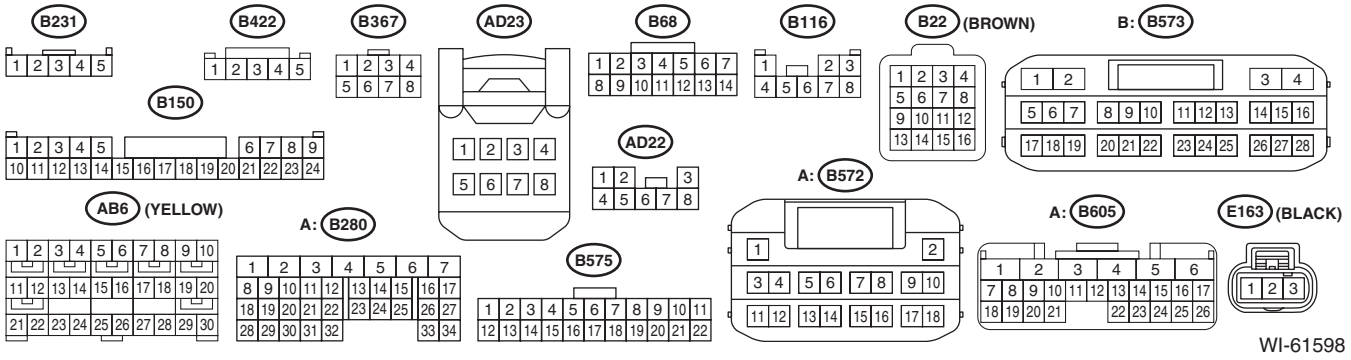




WI-61597

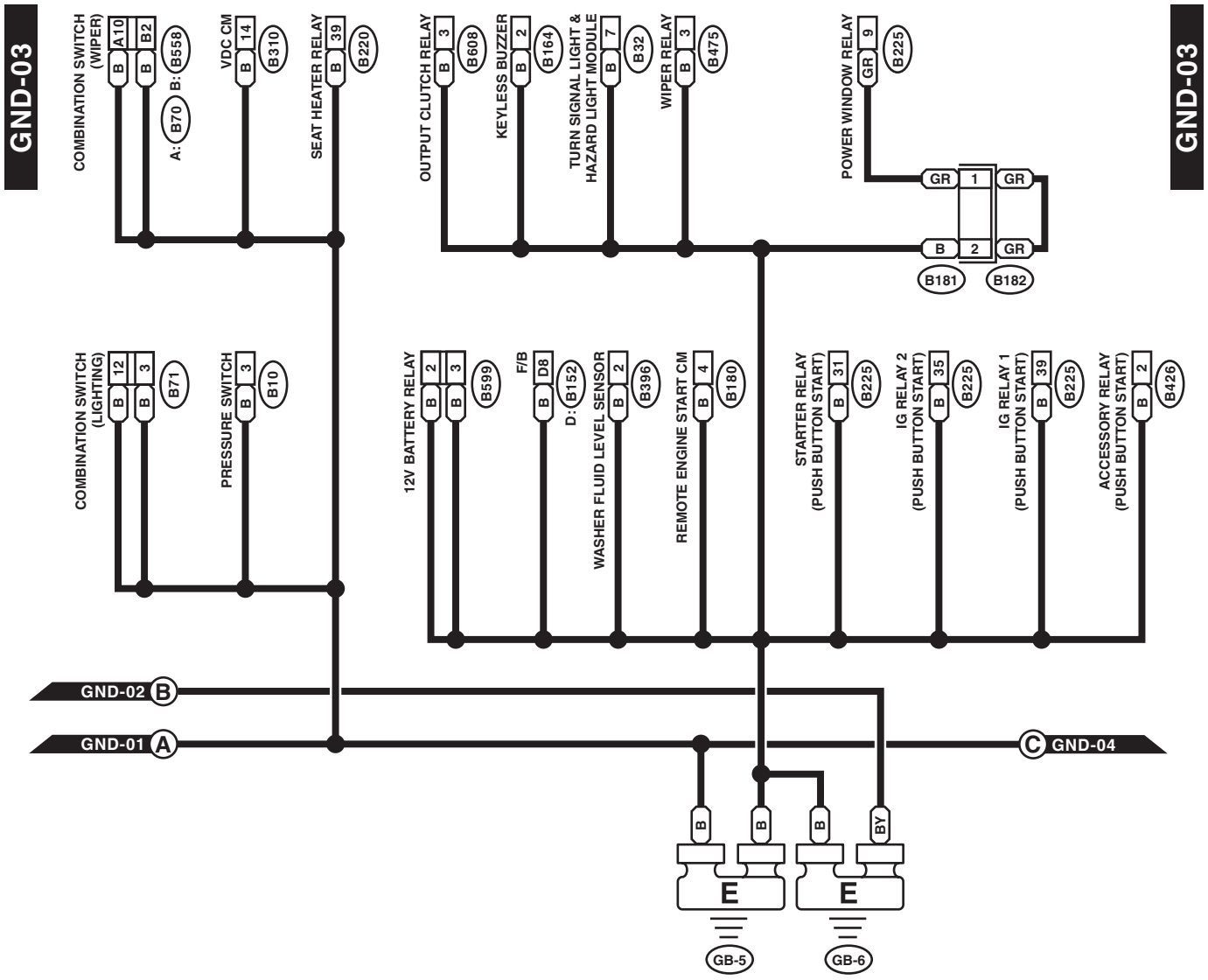
Ground Circuit

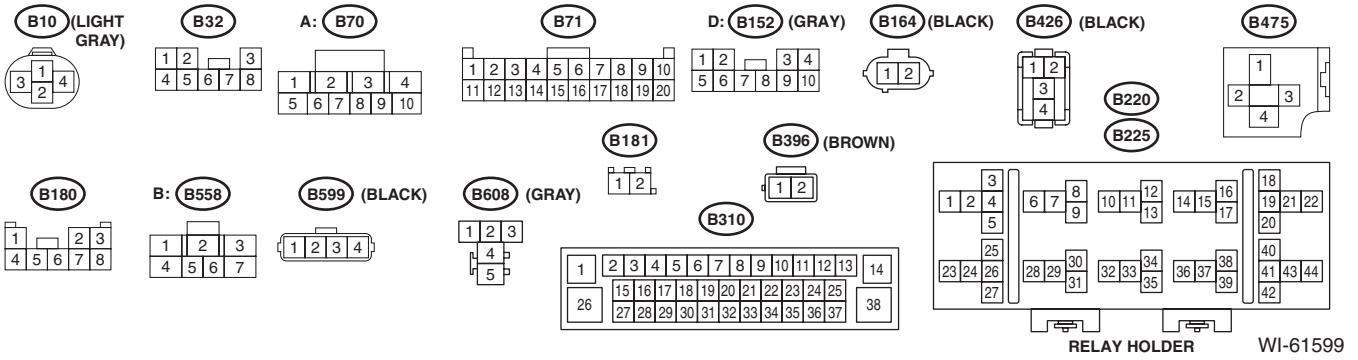


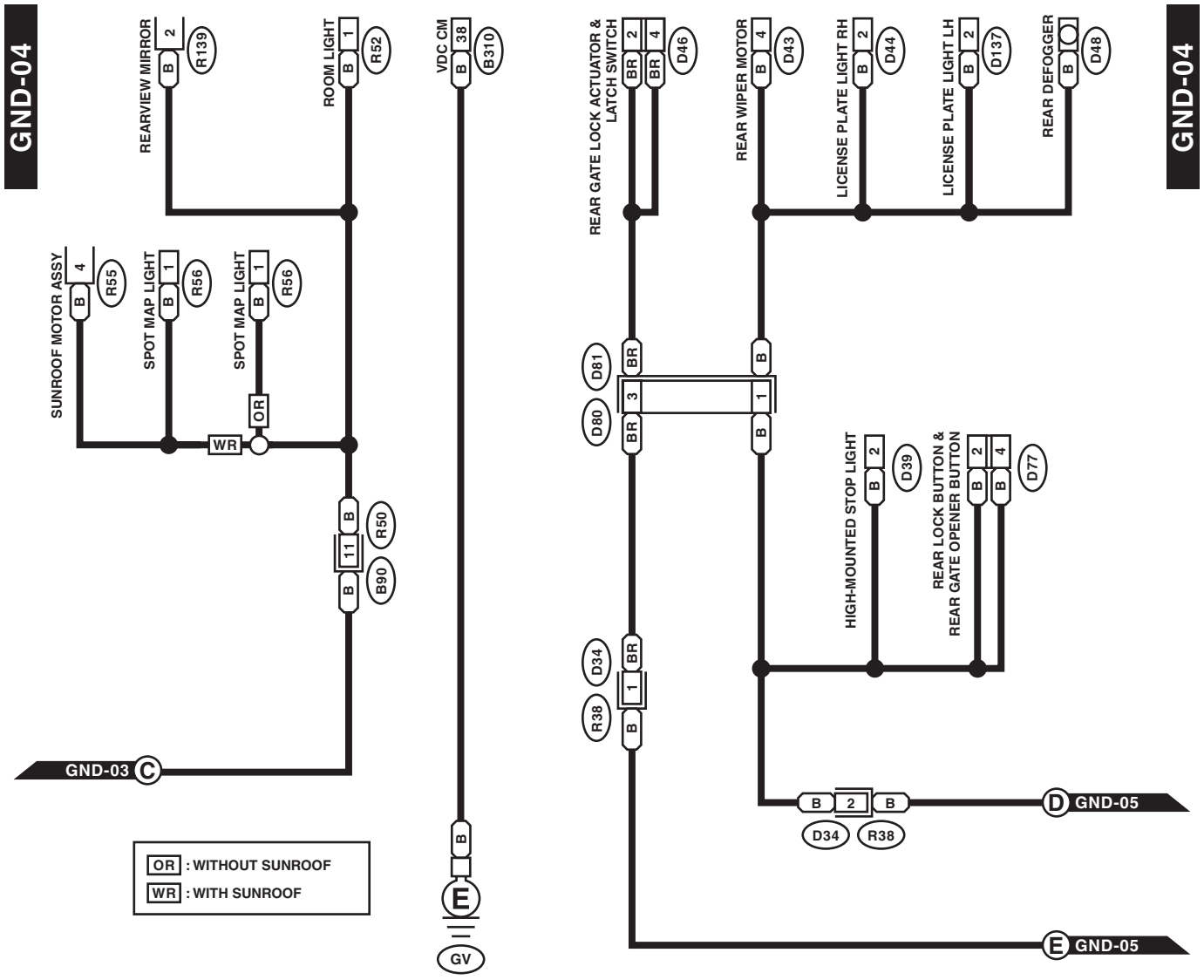


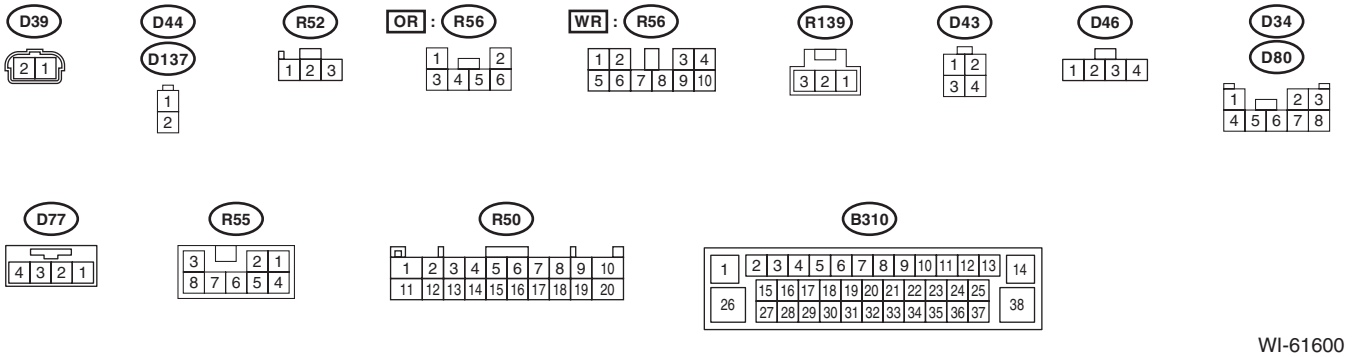
WI-61598

Ground Circuit

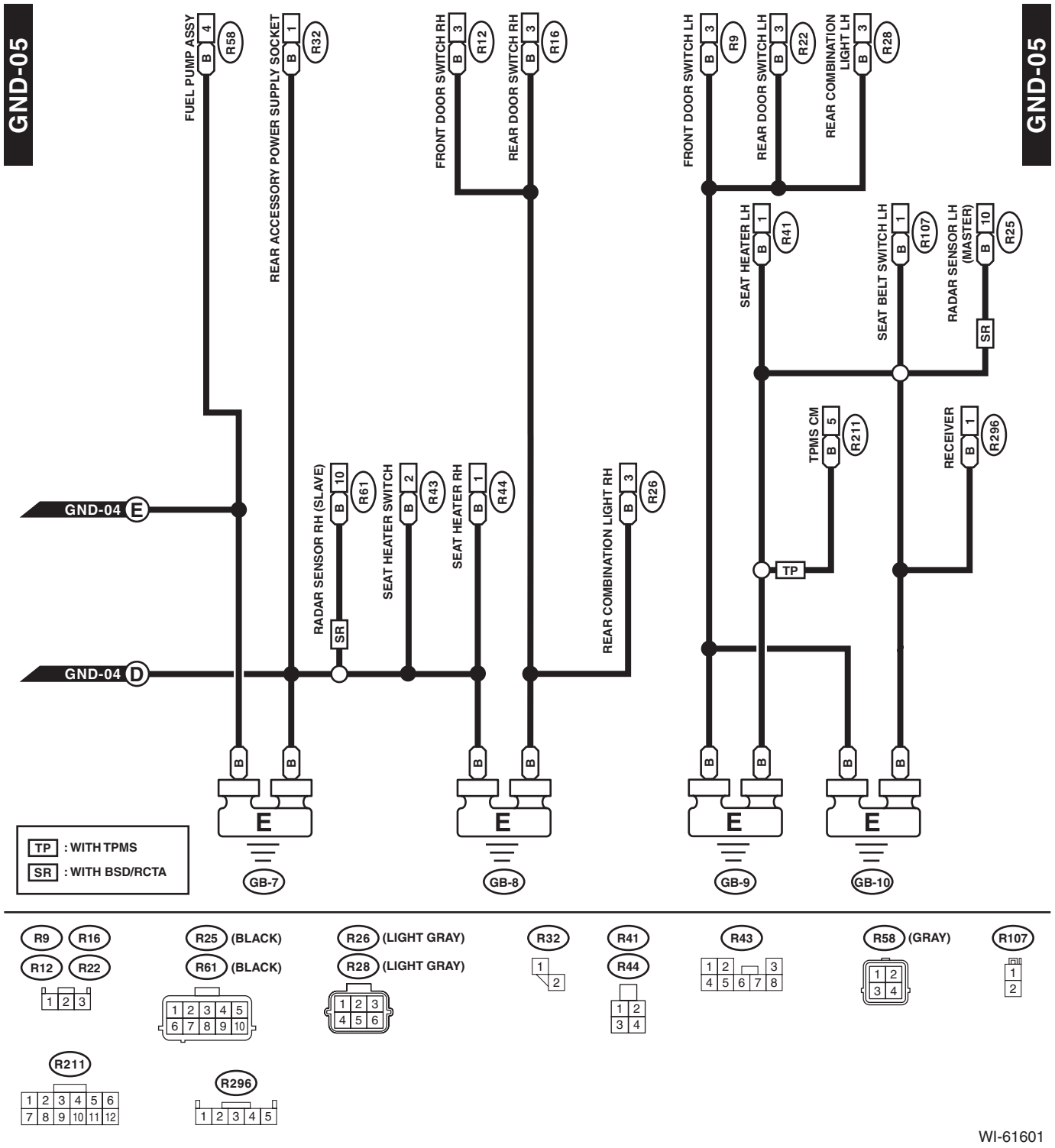





GND-04
REARVIEW MIRROR
R139
ROOM LIGHT
R52
VDC CM
B310
REAR GATE LOCK ACTUATOR & LATCH SWITCH
D46
REAR WIPER MOTOR
D43
LICENSE PLATE LIGHT RH
D44
LICENSE PLATE LIGHT LH
D137
REAR DEFOGGER
D48
GND-04
SUNROOF MOTOR ASSY
R55
SPOT MAP LIGHT
R56
SPOT MAP LIGHT
R56
WR
OR
R50
B90
D81
D80
HIGH-MOUNTED STOP LIGHT
D39
REAR LOCK BUTTON & REAR GATE OPENER BUTTON
D77
D34
R38
GND-03 C
GND-05 D
GND-05 E
GV
OR : WITHOUT SUNROOF
WR : WITH SUNROOF

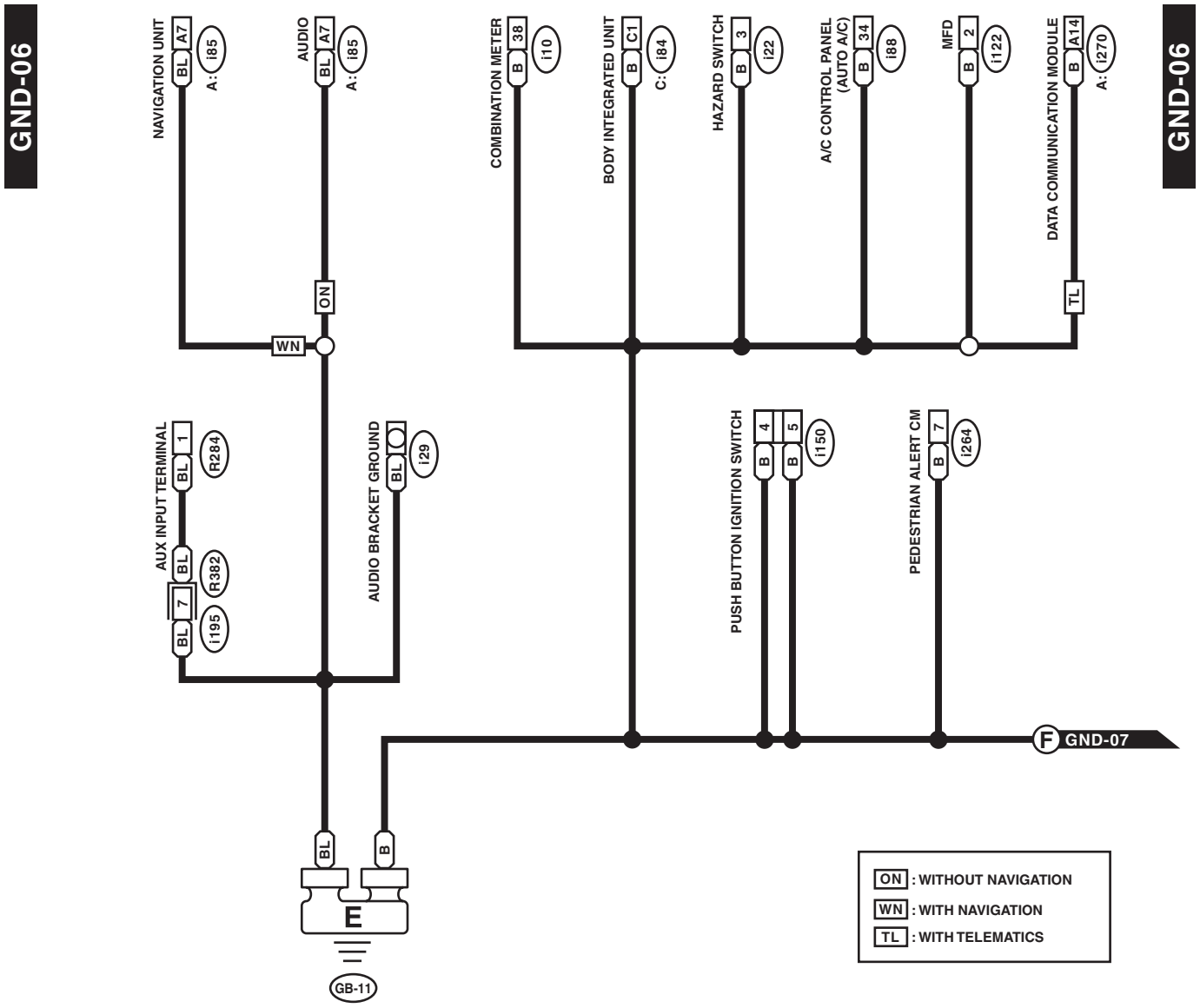

D39
D44
D137
R52
OR : R56
WR : R56
R139
D43
D46
D34
D80
D77
R55
R50
B310

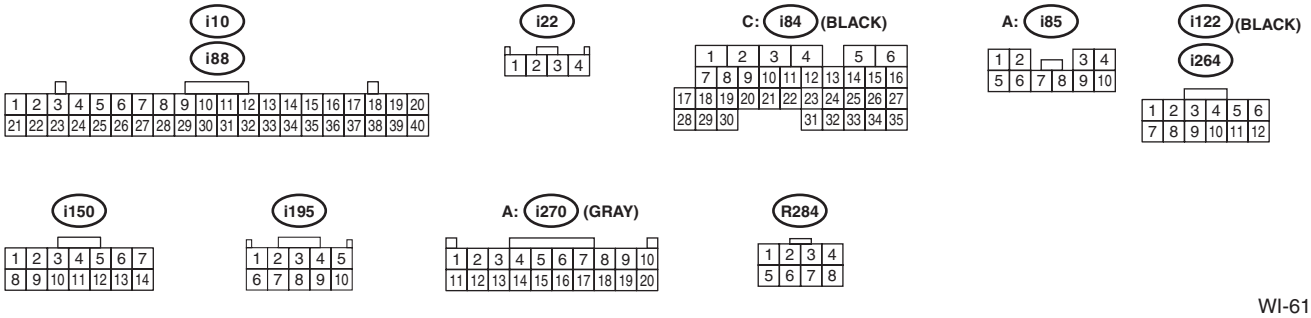
WI-61600


GND-05
GND-05
FUEL PUMP ASSY
REAR ACCESSORY POWER SUPPLY SOCKET
FRONT DOOR SWITCH RH
REAR DOOR SWITCH RH
FRONT DOOR SWITCH LH
REAR DOOR SWITCH LH
REAR COMBINATION LIGHT LH
SEAT HEATER LH
SEAT BELT SWITCH LH
RADAR SENSOR LH (MASTER)
TPMS CM
RECEIVER
RADAR SENSOR RH (SLAVE)
SEAT HEATER SWITCH
SEAT HEATER RH
REAR COMBINATION LIGHT RH
GND-04 E
GND-04 D
TP
SR
GB-7
GB-8
GB-9
GB-10
TP : WITH TPMS
SR : WITH BSD/RCTA
R9 R16 R12 R22
R25 (BLACK) R61 (BLACK)
R26 (LIGHT GRAY) R28 (LIGHT GRAY)
R32
R41 R44
R43
R58 (GRAY)
R107
R211
R296

WI-61601

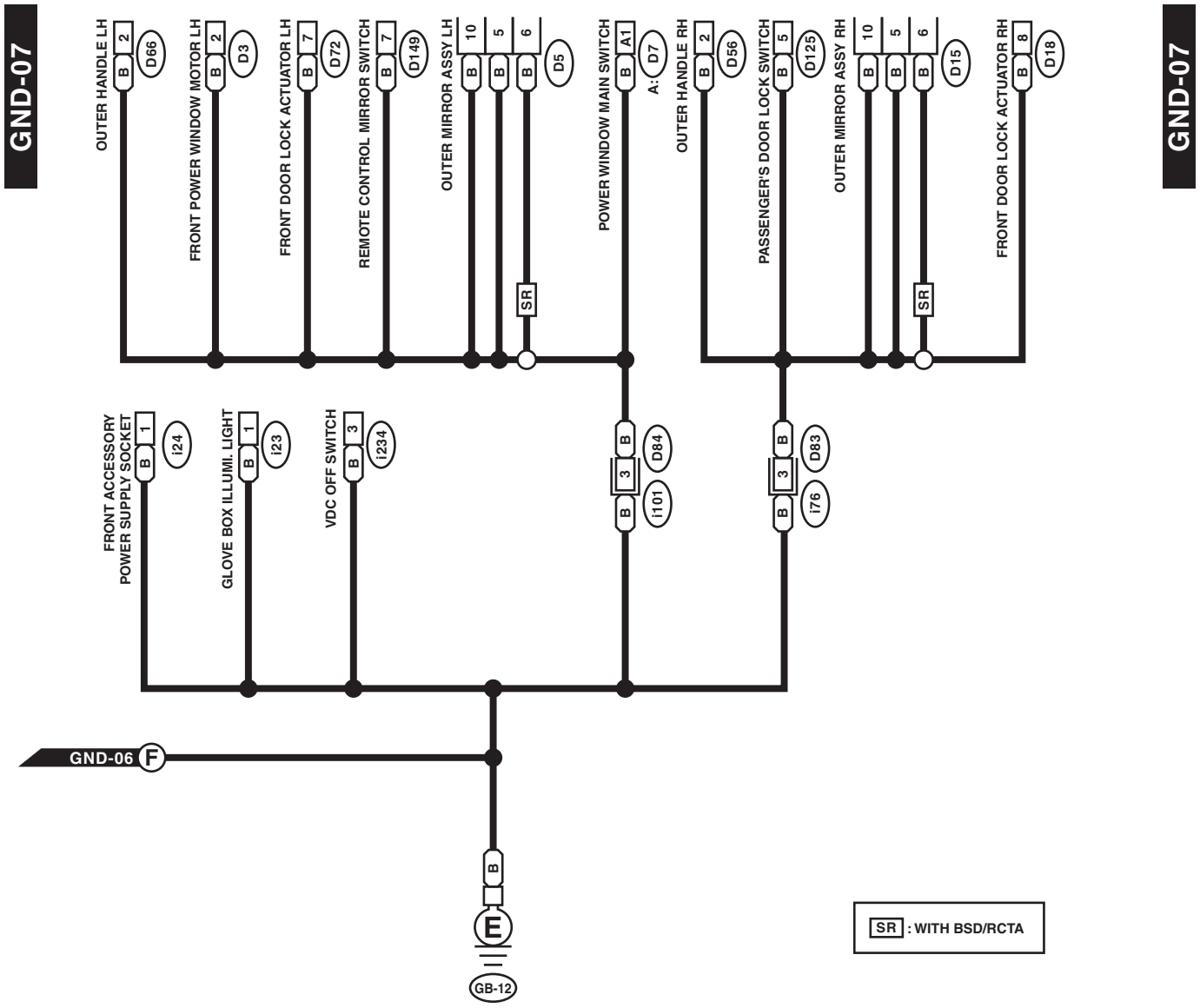
Ground Circuit

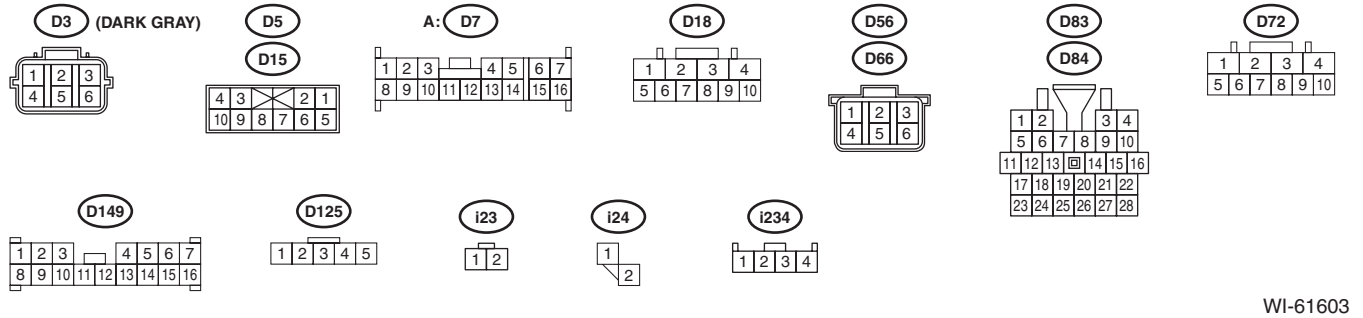




WI-61602

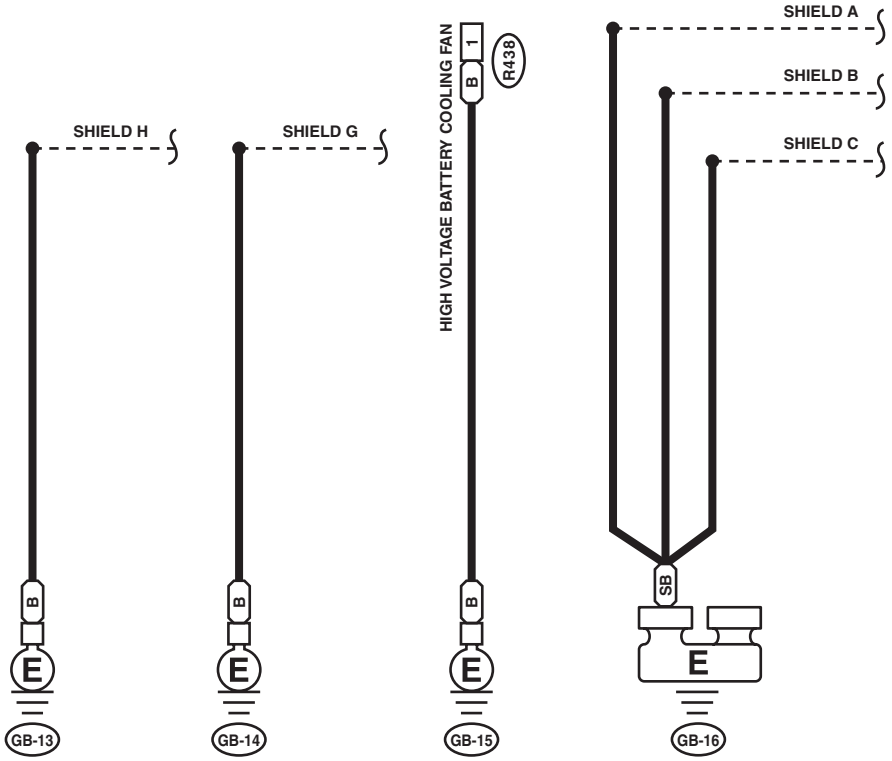
Ground Circuit





WI-61603

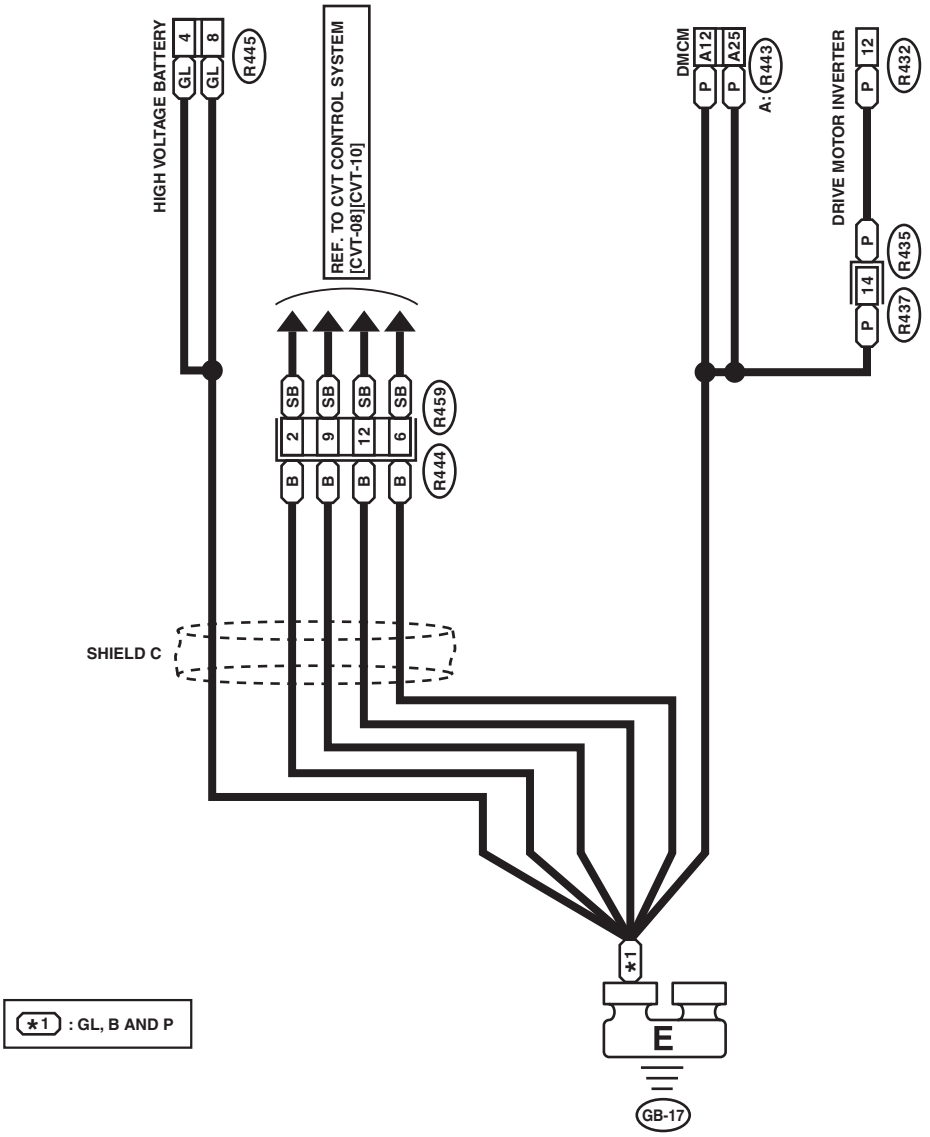
GND-08

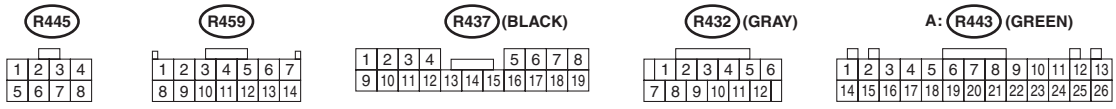




WI-41797

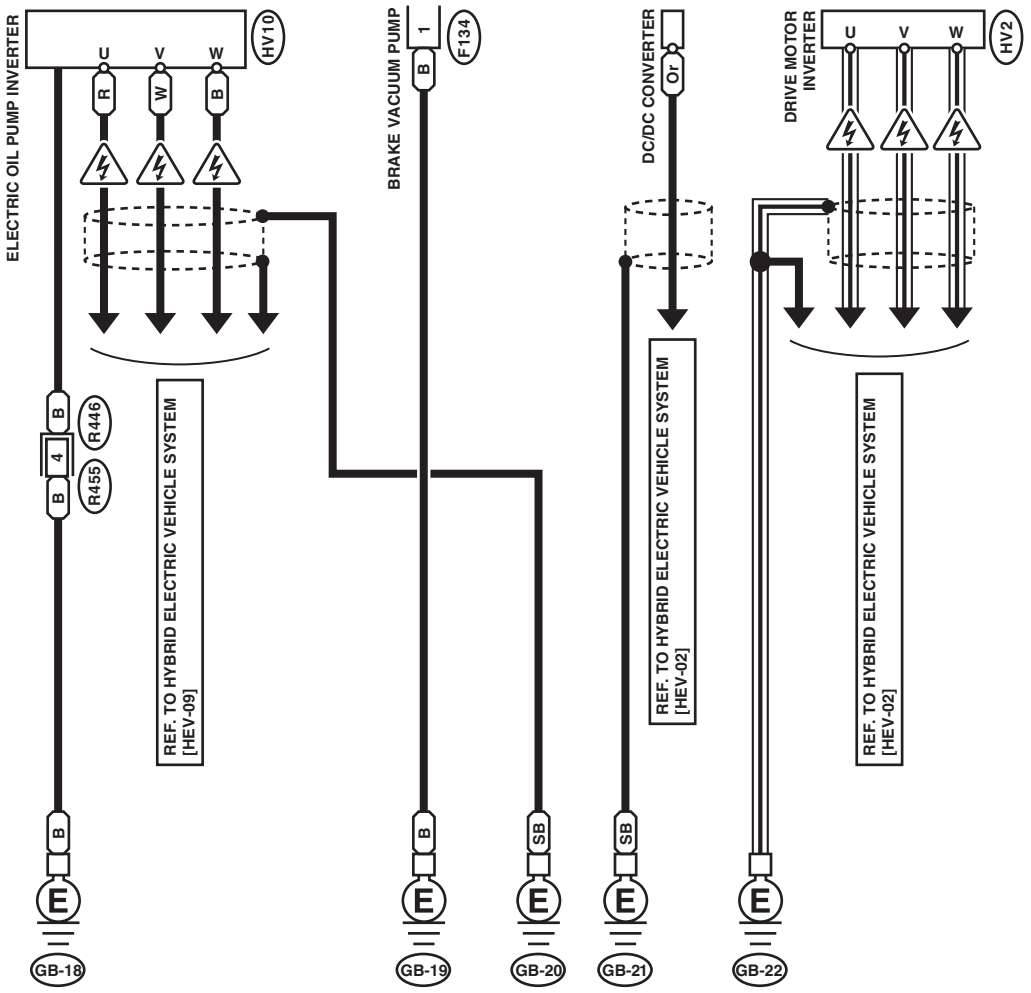
GND-09





WI-41798

GND-10



F134 (DARK GRAY)



R455

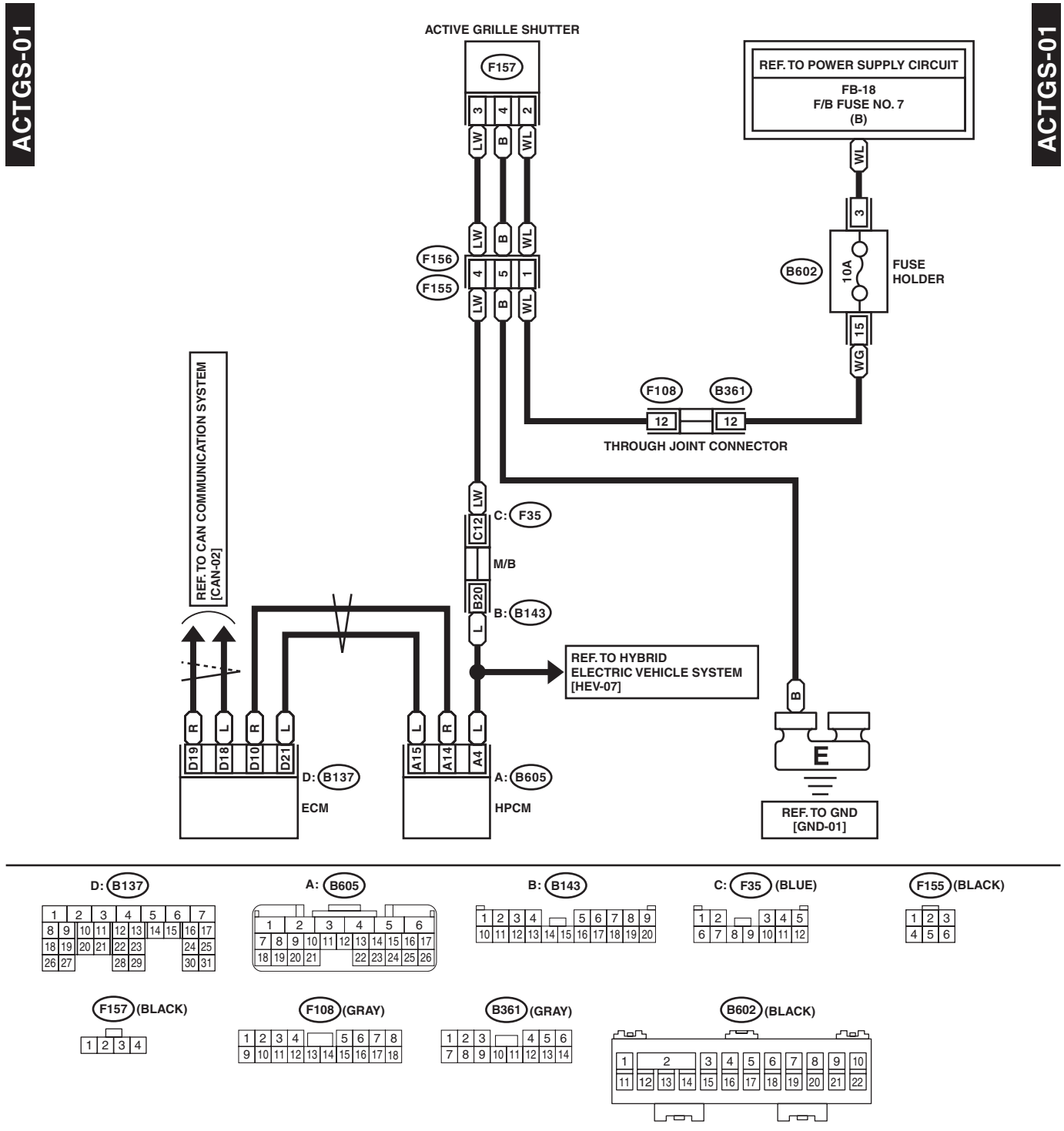


WI-61941

5. Active Grille Shutter

A: WIRING DIAGRAM

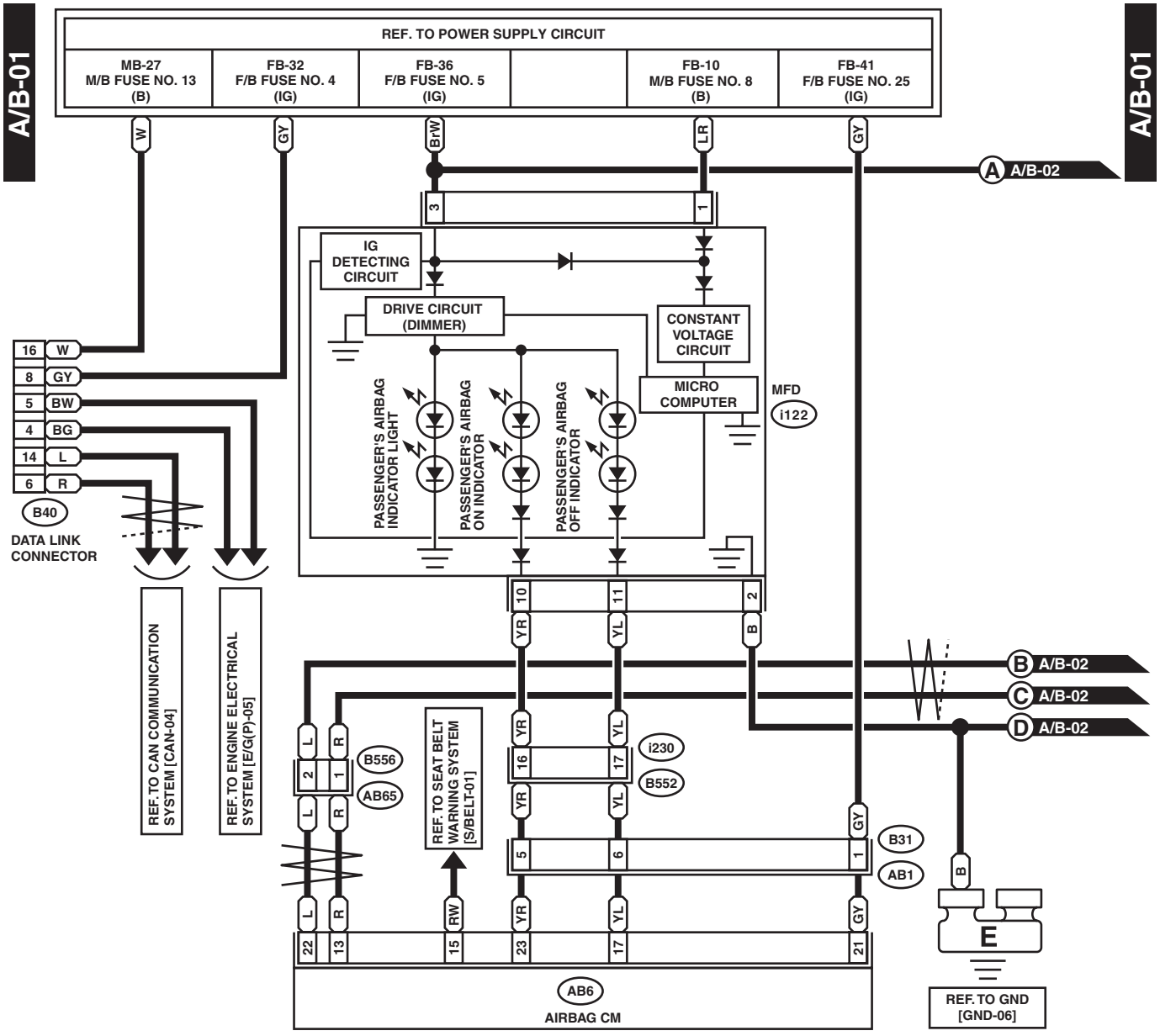
ACTGS-01

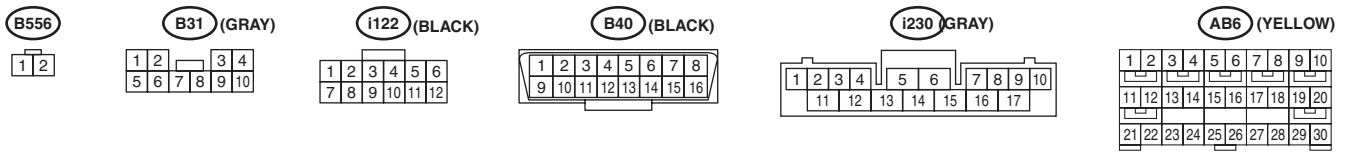


WI-48155

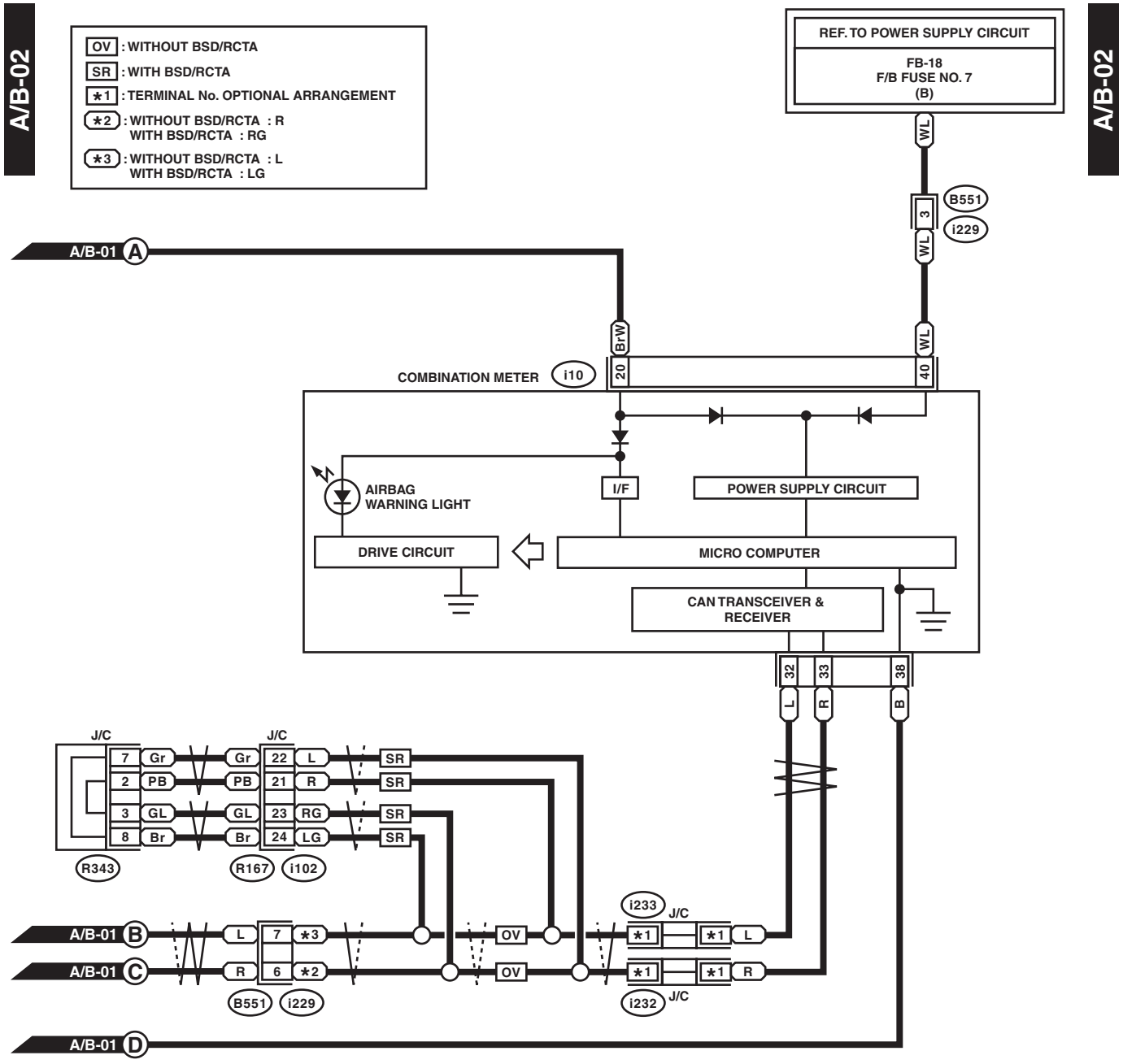
6. Airbag System

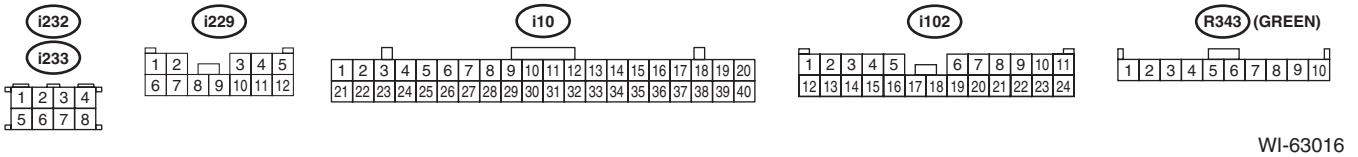
A: WIRING DIAGRAM



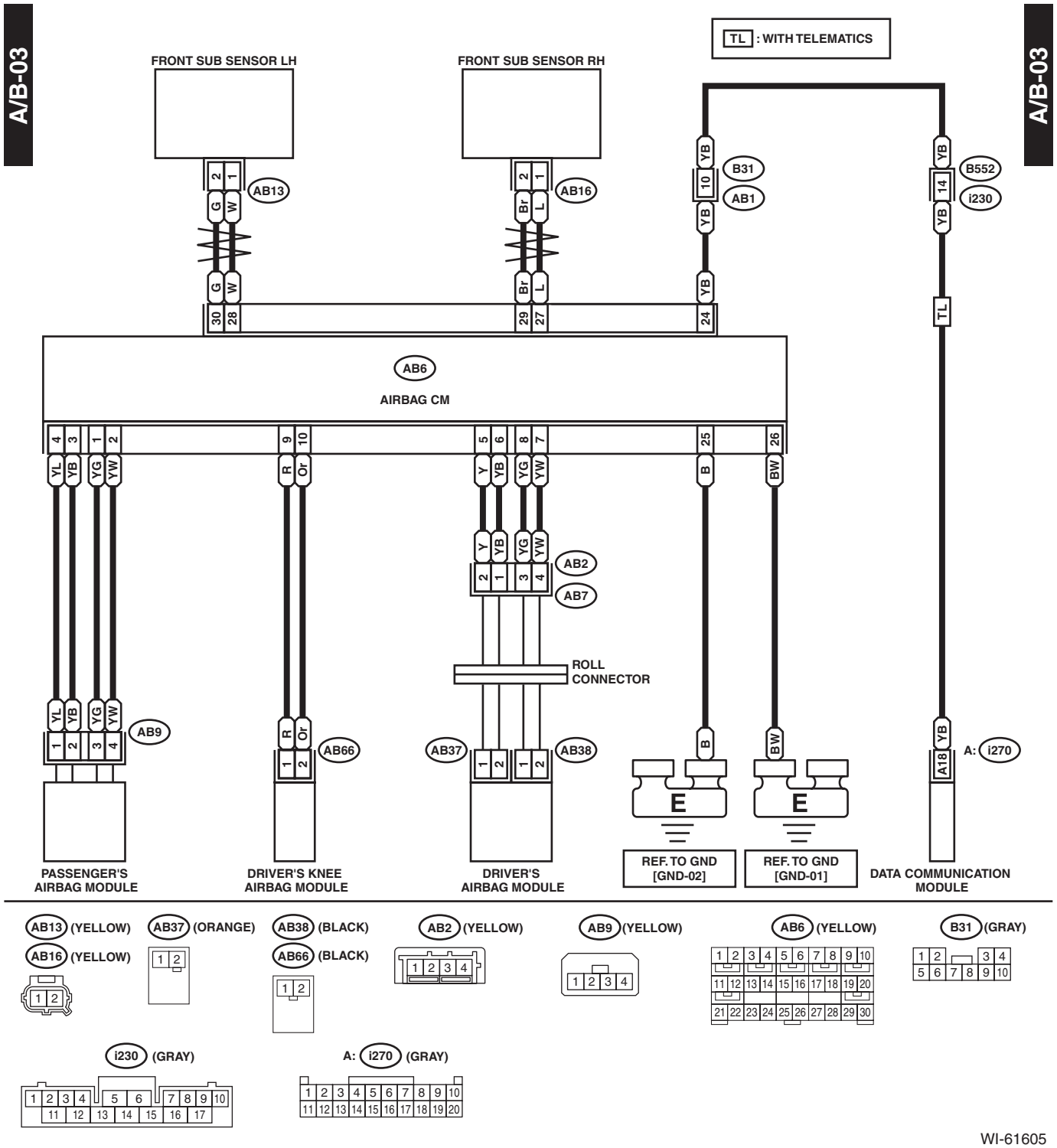


WI-61604


A/B-02
OV : WITHOUT BSD/RCTA
SR : WITH BSD/RCTA
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
*2 : WITHOUT BSD/RCTA : R
WITH BSD/RCTA : RG
*3 : WITHOUT BSD/RCTA : L
WITH BSD/RCTA : LG
REF. TO POWER SUPPLY CIRCUIT
FB-18
F/B FUSE NO. 7
(B)
A/B-02
WL
B551
3
i229
WL
A/B-01 A
Br-W
WL
20
40
COMBINATION METER
i10
AIRBAG
WARNING LIGHT
I/F
POWER SUPPLY CIRCUIT
DRIVE CIRCUIT
MICRO COMPUTER
CAN TRANSCEIVER &
RECEIVER
32
33
38
L
R
B
J/C
J/C
7 Gr Gr 22 L SR
2 PB PB 21 R SR
3 GL GL 23 RG SR
8 Br Br 24 LG SR
R343
R167
i102
i233
J/C
A/B-01 B
L
7
*3
OV
*1
*1
L
A/B-01 C
R
6
*2
OV
*1
*1
R
B551
i229
i232
J/C
A/B-01 D

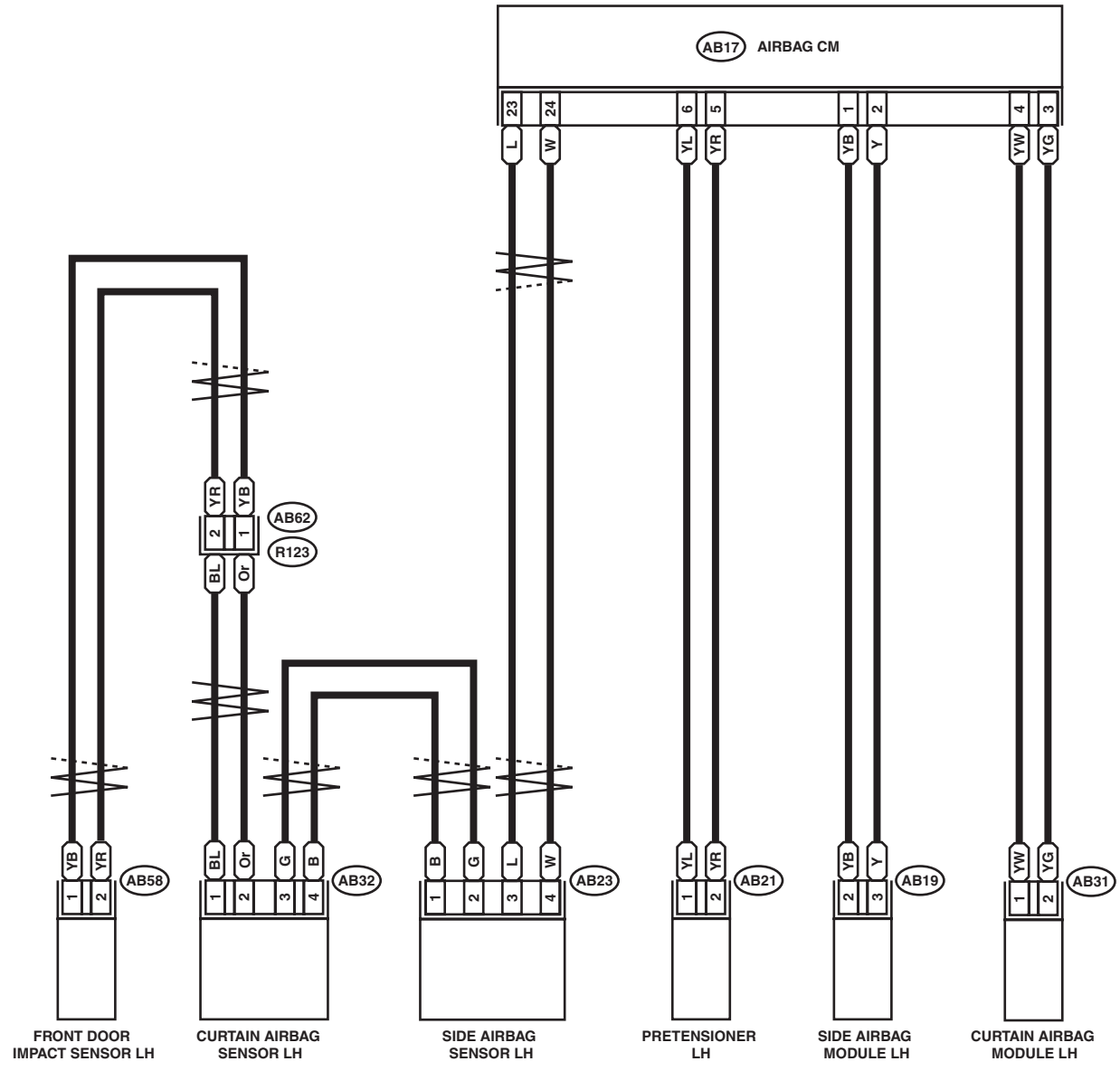

i232
i233
i229
i10
i102
R343 (GREEN)

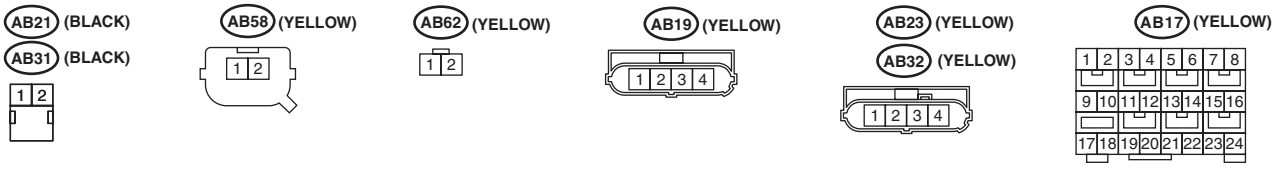
WI-63016


A/B-03
A/B-03
TL : WITH TELEMATICS
FRONT SUB SENSOR LH
FRONT SUB SENSOR RH
AB13
AB16
B31
AB1
B552
i230
AB6
AIRBAG CM
TL
AB2
AB7
ROLL CONNECTOR
AB9
AB66
AB37
AB38
A: i270
PASSENGER'S AIRBAG MODULE
DRIVER'S KNEE AIRBAG MODULE
DRIVER'S AIRBAG MODULE
REF. TO GND [GND-02]
REF. TO GND [GND-01]
DATA COMMUNICATION MODULE
AB13 (YELLOW)
AB16 (YELLOW)
AB37 (ORANGE)
AB38 (BLACK)
AB66 (BLACK)
AB2 (YELLOW)
AB9 (YELLOW)
AB6 (YELLOW)
B31 (GRAY)
i230 (GRAY)
A: i270 (GRAY)

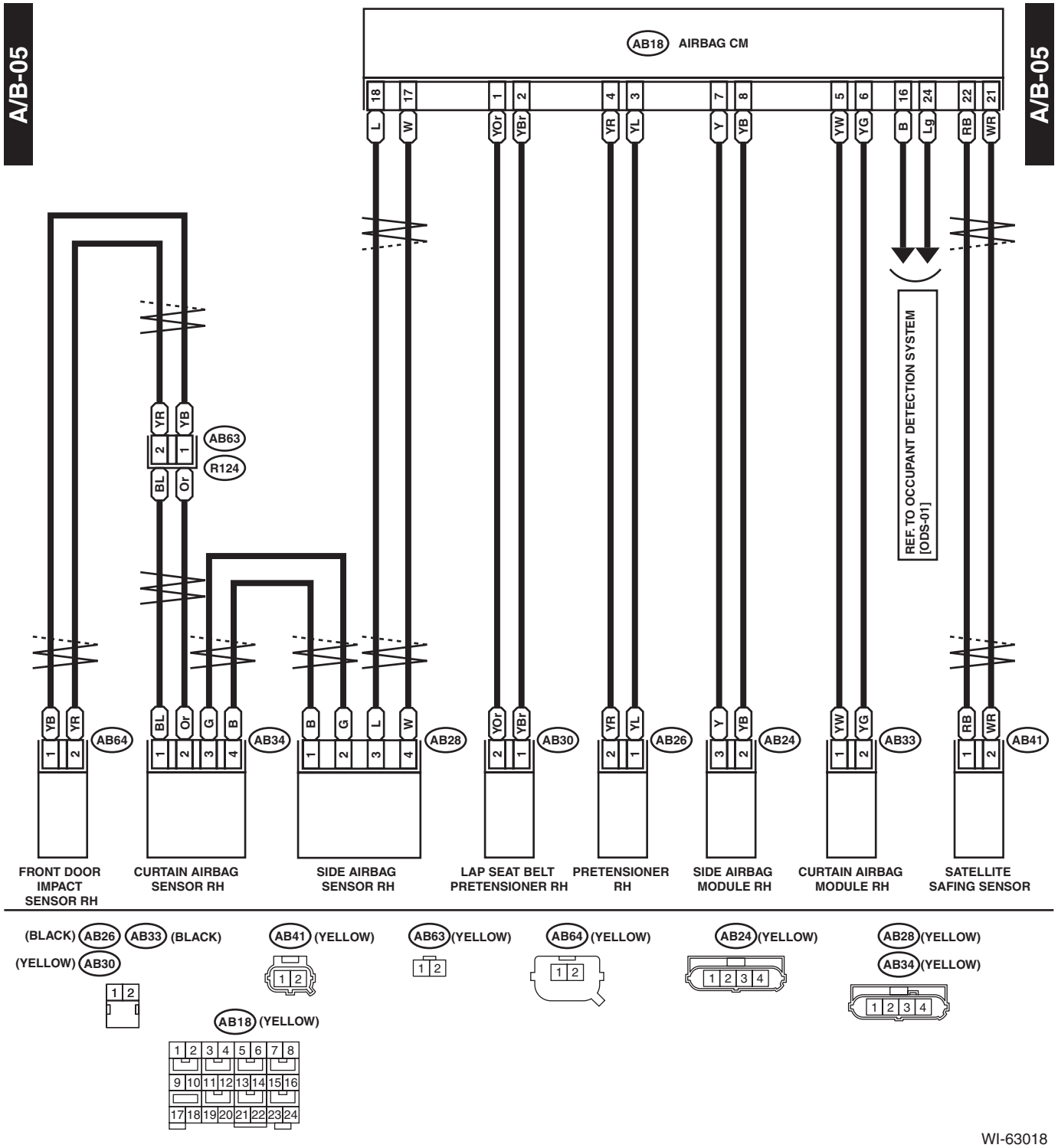
WI-61605

A/B-04





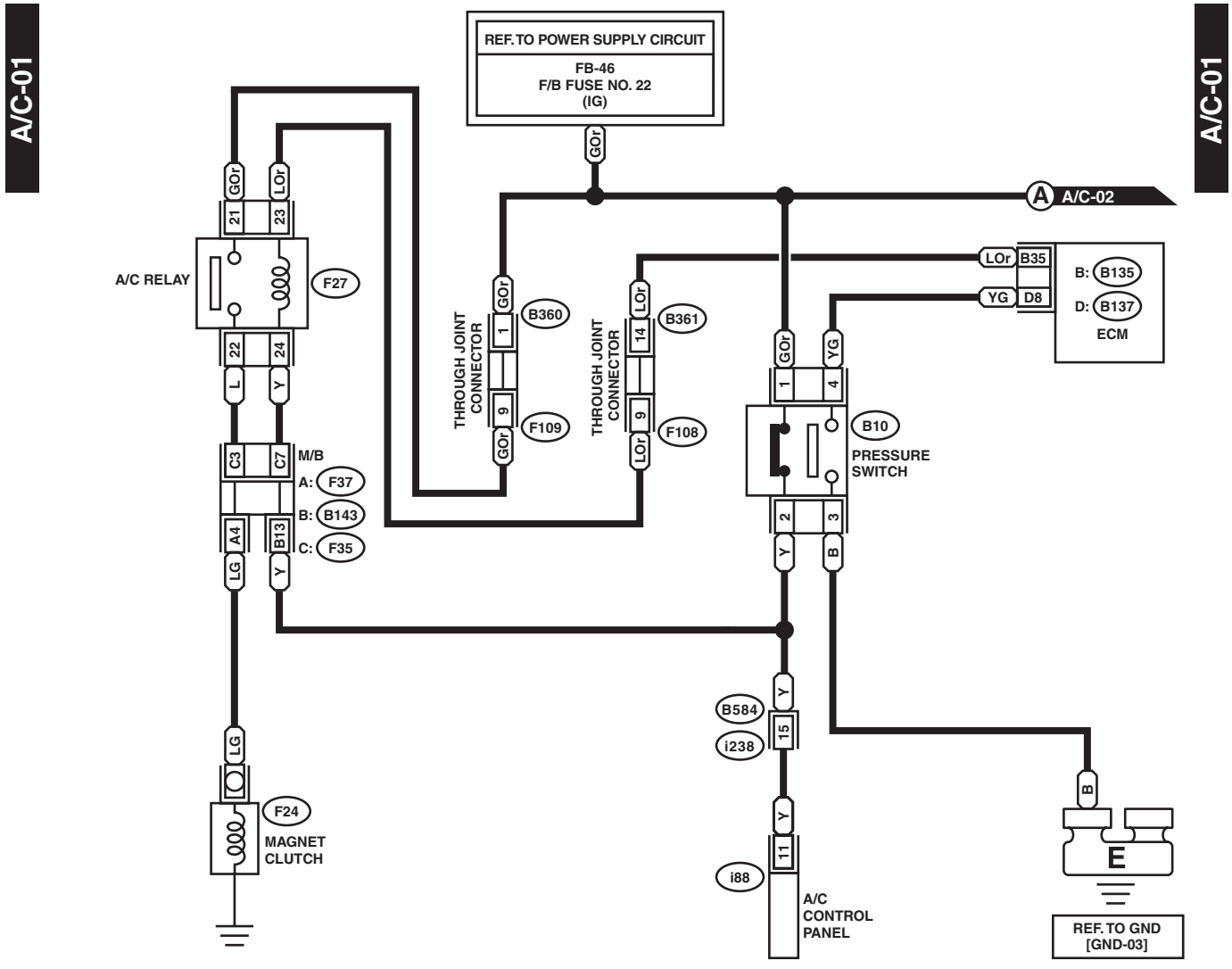
WI-63017

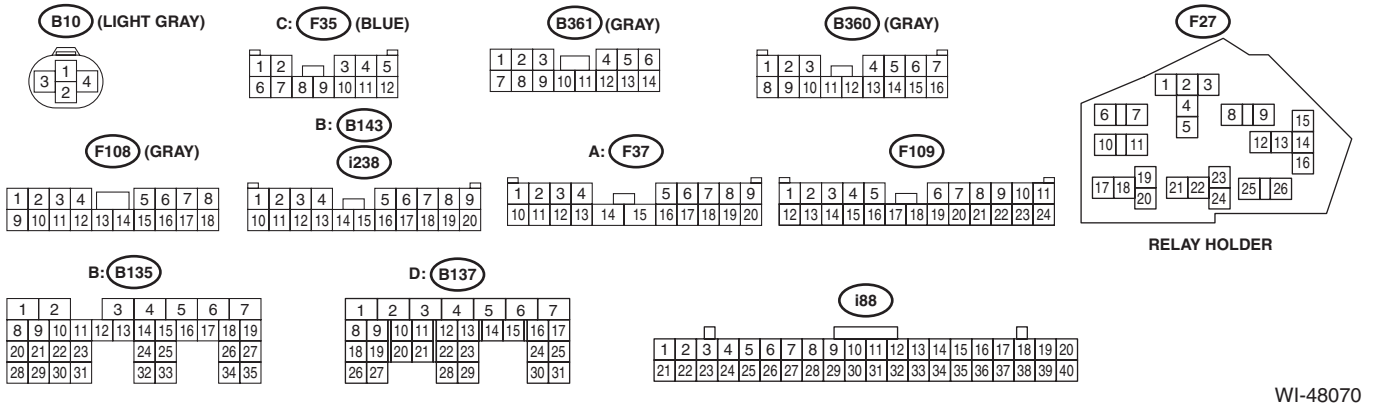

A/B-05
A/B-05
AB18 AIRBAG CM
18 17 1 2 4 3 7 8 5 6 16 24 22 21
L W YOr YBr YR YL Y YB YW YG B Lg RB WR
REF. TO OCCUPANT DETECTION SYSTEM [ODS-01]
YR YB
AB63
R124
BL Or
YB YR AB64
BL Or G B AB34
B G L W AB28
YOr YBr AB30
YR YL AB26
Y YB AB24
YW YG AB33
RB WR AB41
FRONT DOOR IMPACT SENSOR RH
CURTAIN AIRBAG SENSOR RH
SIDE AIRBAG SENSOR RH
LAP SEAT BELT PRETENSIONER RH
PRETENSIONER RH
SIDE AIRBAG MODULE RH
CURTAIN AIRBAG MODULE RH
SATELLITE SAFING SENSOR
(BLACK) AB26 AB33 (BLACK)
(YELLOW) AB30
AB41 (YELLOW)
AB63 (YELLOW)
AB64 (YELLOW)
AB24 (YELLOW)
AB28 (YELLOW)
AB34 (YELLOW)
AB18 (YELLOW)

WI-63018

7. Air Conditioning System

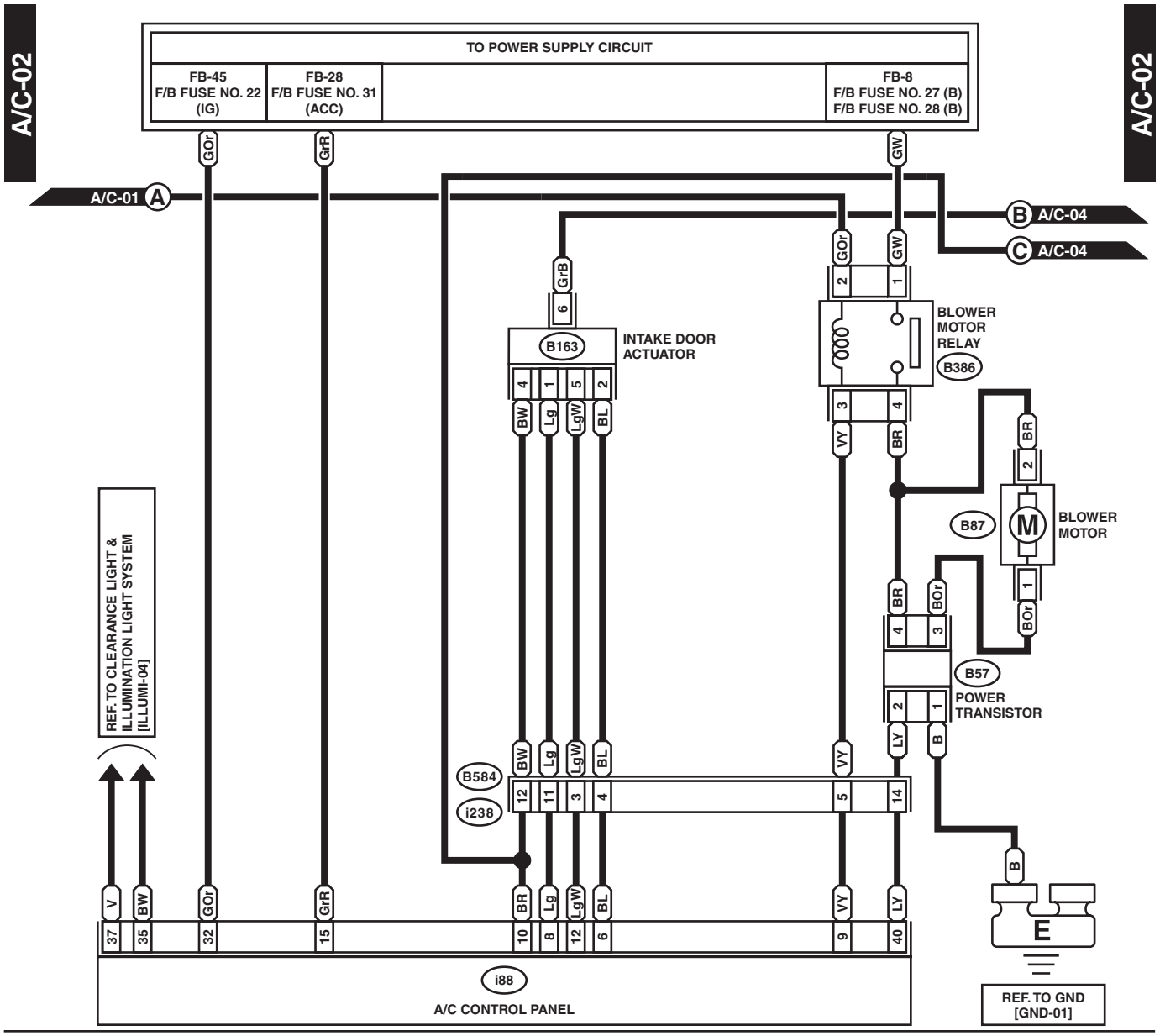
A: WIRING DIAGRAM

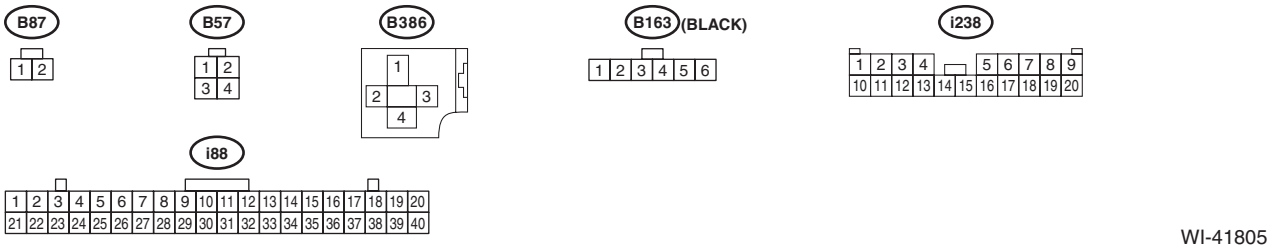




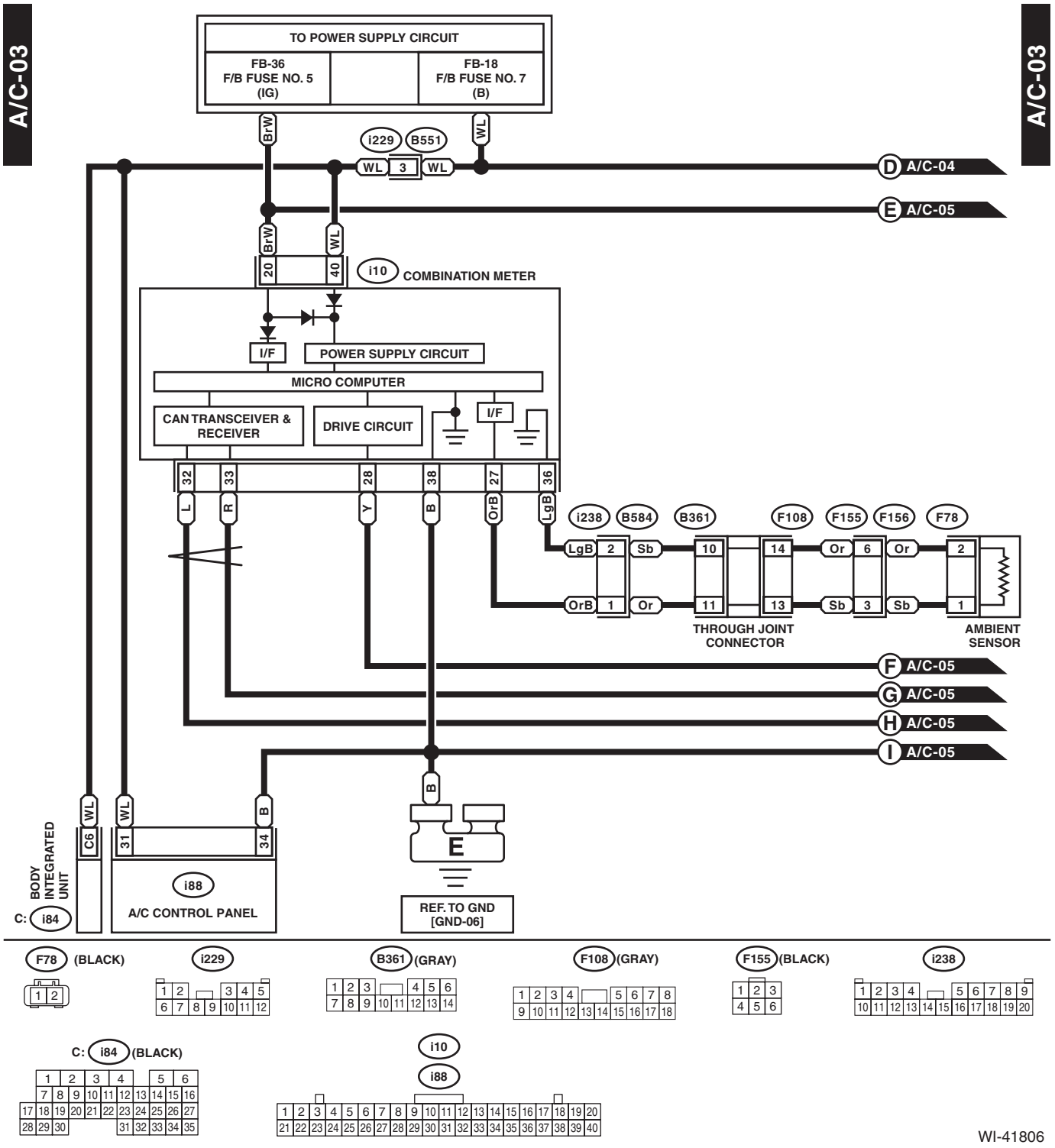
WI-48070

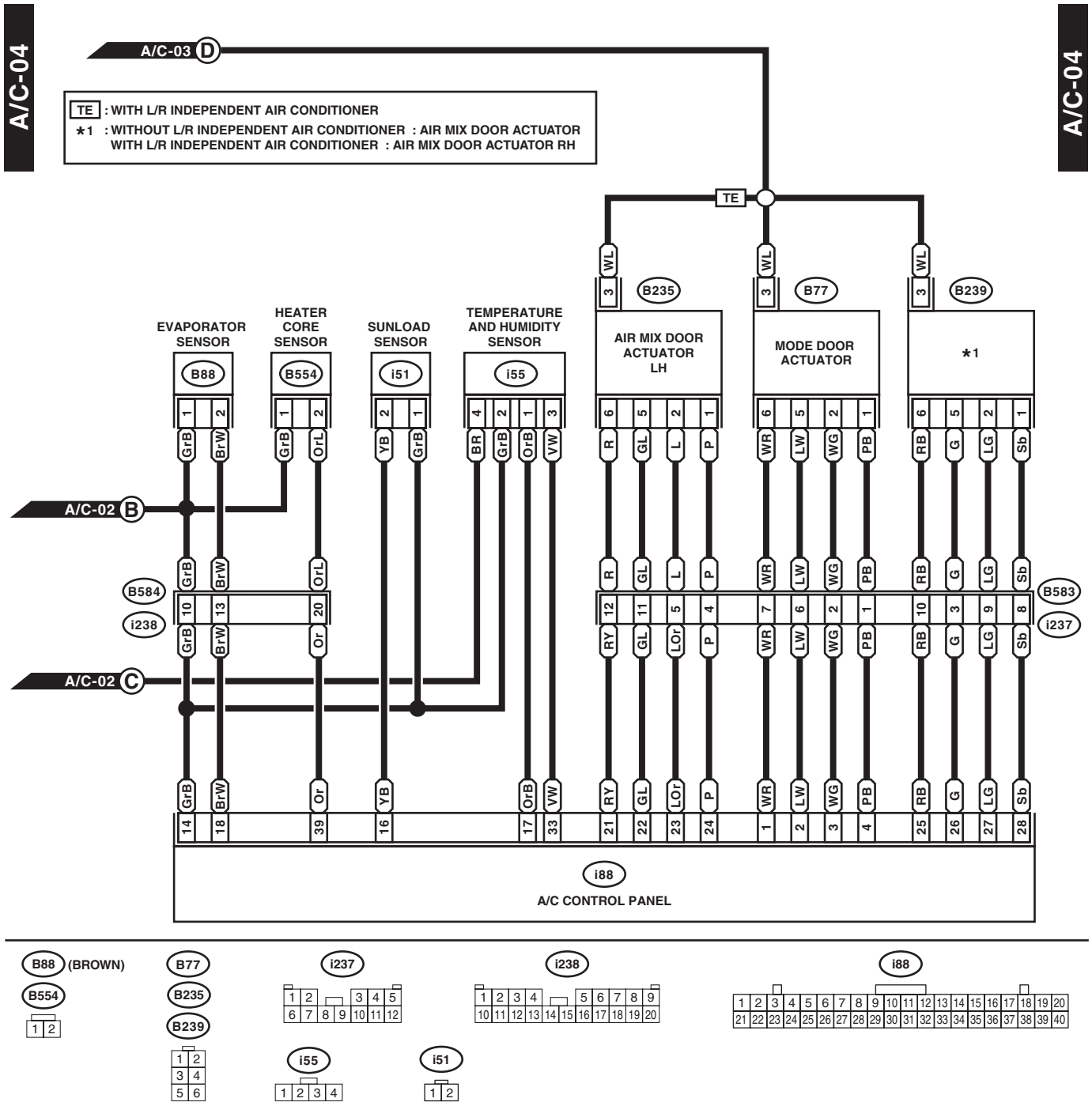
WIRING SYSTEM



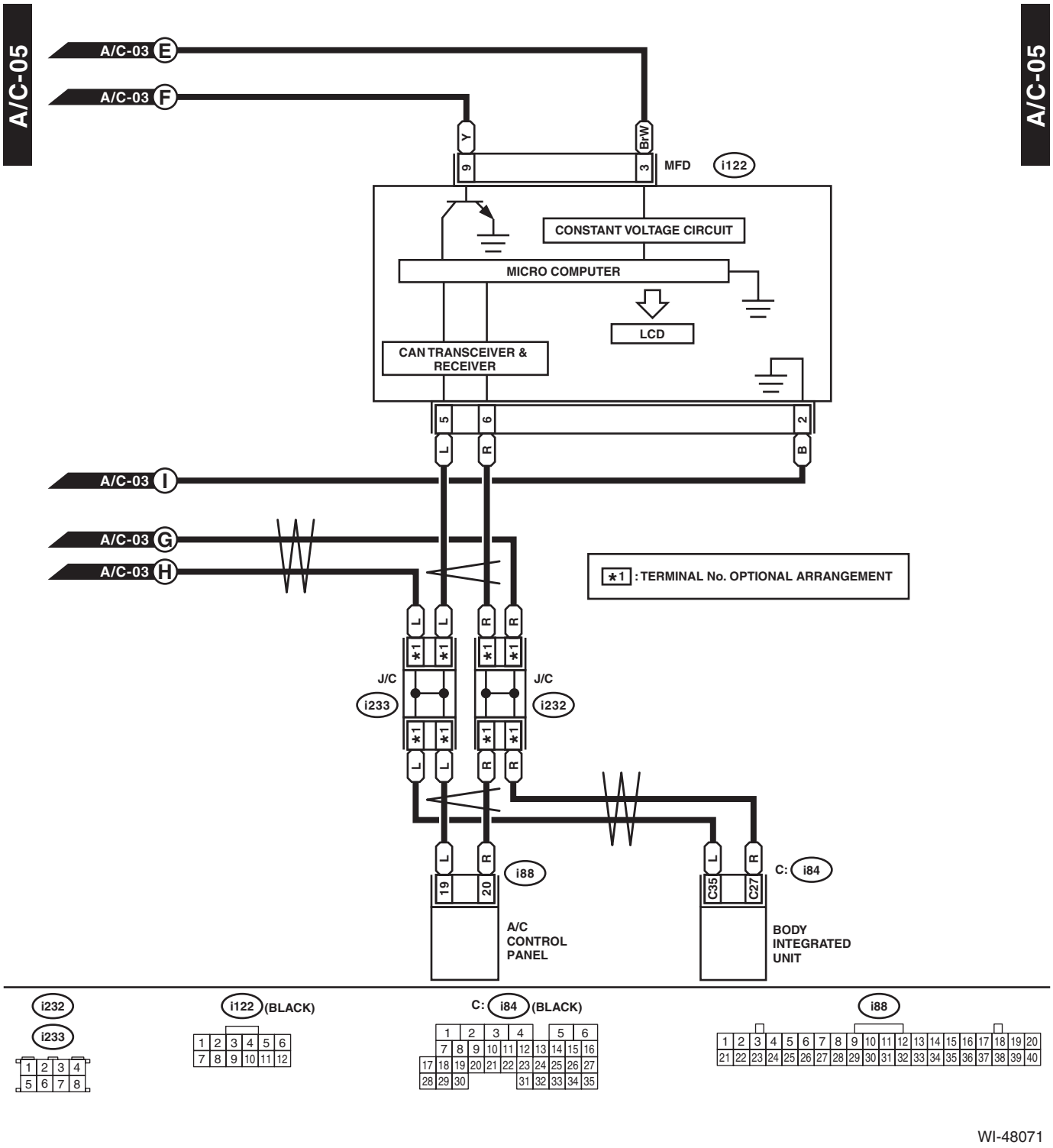


WI-41805


A/C-03
A/C-03
TO POWER SUPPLY CIRCUIT
FB-36
F/B FUSE NO. 5
(IG)
FB-18
F/B FUSE NO. 7
(B)
BrW
WL
i229
B551
WL
3
WL
D A/C-04
E A/C-05
BrW
WL
20
40
i10
COMBINATION METER
I/F
POWER SUPPLY CIRCUIT
MICRO COMPUTER
CAN TRANSCEIVER &
RECEIVER
DRIVE CIRCUIT
I/F
32
33
28
38
27
36
L
R
Y
B
OrB
LgB
i238
B584
B361
F108
F155
F156
F78
LgB
2
Sb
10
14
Or
6
Or
2
OrB
1
Or
11
13
Sb
3
Sb
1
THROUGH JOINT
CONNECTOR
AMBIENT
SENSOR
F A/C-05
G A/C-05
H A/C-05
I A/C-05
WL
WL
B
B
C6
31
34
i88
A/C CONTROL PANEL
BODY
INTEGRATED
UNIT
C:
i84
E
REF. TO GND
[GND-06]
F78 (BLACK)
i229
B361 (GRAY)
F108 (GRAY)
F155 (BLACK)
i238
C: i84 (BLACK)
i10
i88
WI-41806


A/C-04
A/C-04
A/C-03 D
TE : WITH L/R INDEPENDENT AIR CONDITIONER
*1 : WITHOUT L/R INDEPENDENT AIR CONDITIONER : AIR MIX DOOR ACTUATOR
WITH L/R INDEPENDENT AIR CONDITIONER : AIR MIX DOOR ACTUATOR RH
TE
B235
B77
B239
EVAPORATOR SENSOR
HEATER CORE SENSOR
SUNLOAD SENSOR
TEMPERATURE AND HUMIDITY SENSOR
AIR MIX DOOR ACTUATOR LH
MODE DOOR ACTUATOR
*1
B88
B554
i51
i55
A/C-02 B
A/C-02 C
B584
i238
B583
i237
i88
A/C CONTROL PANEL
B88 (BROWN)
B554
B77
B235
B239
i237
i55
i51
i238
i88

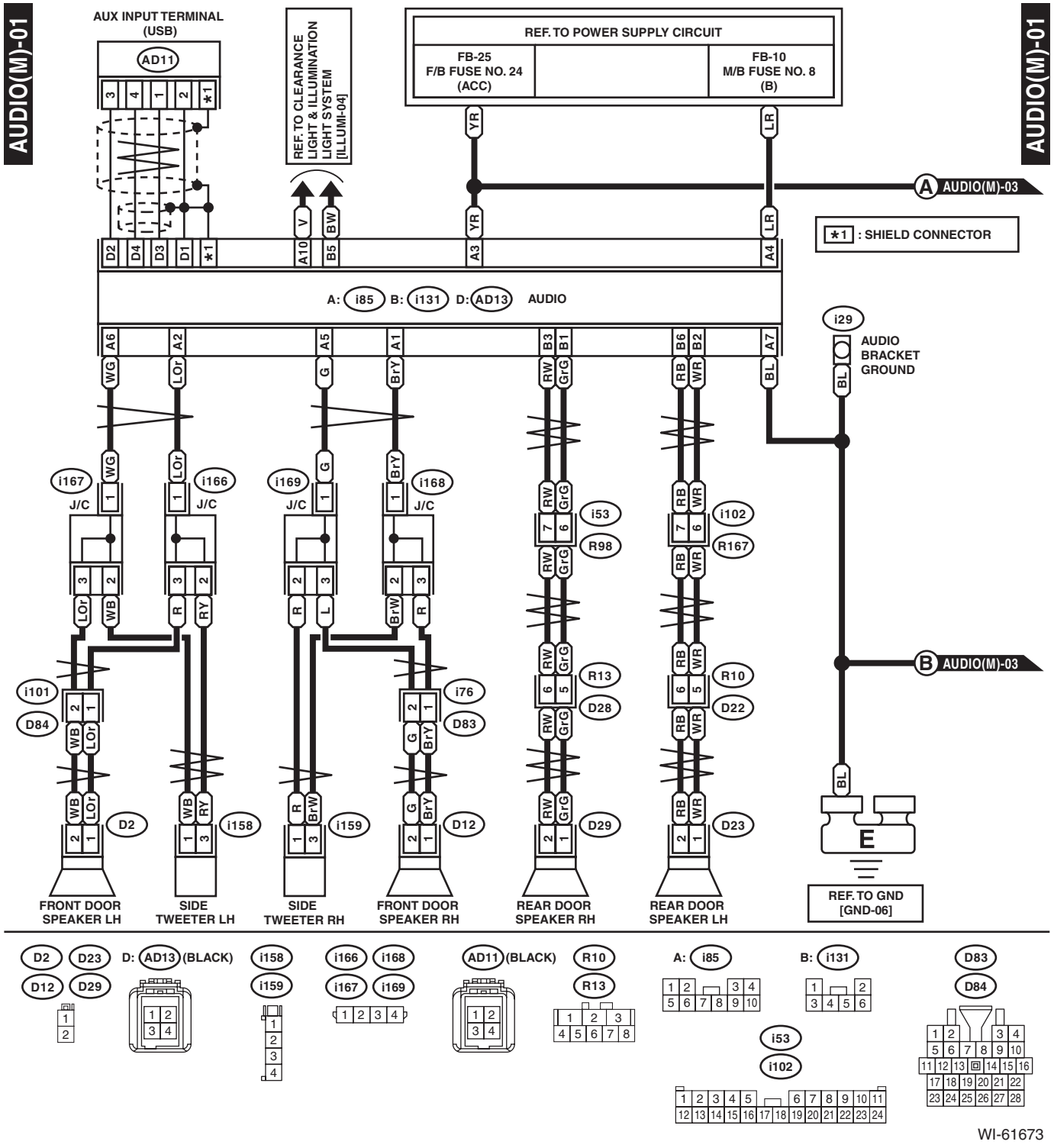
WI-41807

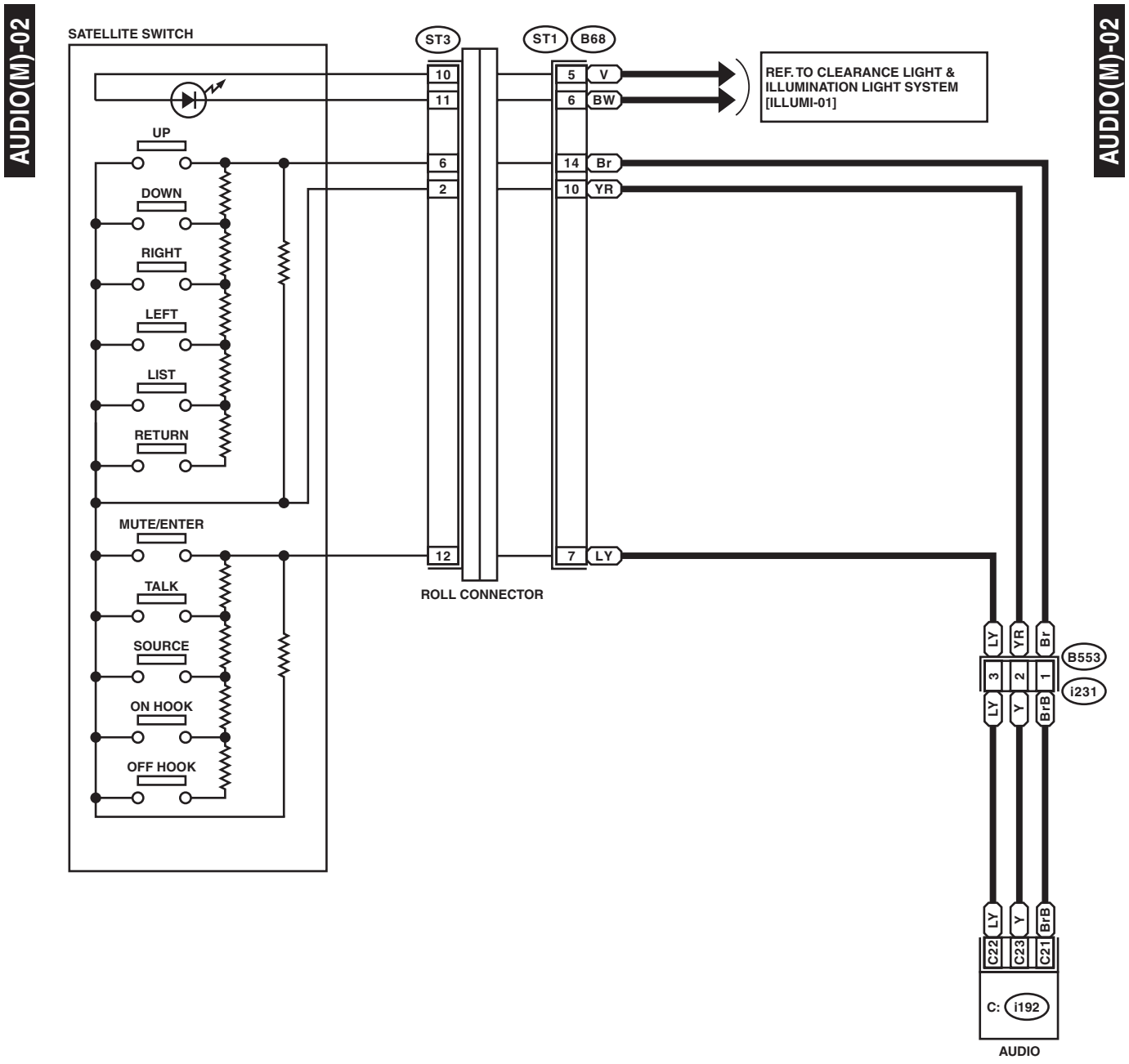

A/C-05
A/C-05
A/C-03 E
A/C-03 F
A/C-03 I
A/C-03 G
A/C-03 H
Y
Br•W
9
3
MFD
i122
CONSTANT VOLTAGE CIRCUIT
MICRO COMPUTER
LCD
CAN TRANSCEIVER & RECEIVER
5
6
2
L
R
B
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
J/C
i233
J/C
i232
i88
19
20
A/C CONTROL PANEL
C: i84
C35
C27
BODY INTEGRATED UNIT
i232
i233
i122 (BLACK)
C: i84 (BLACK)
i88

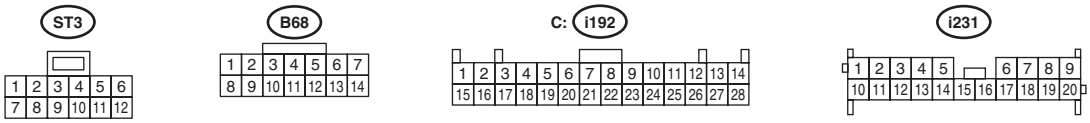
WI-48071

8. Audio System

A: WIRING DIAGRAM

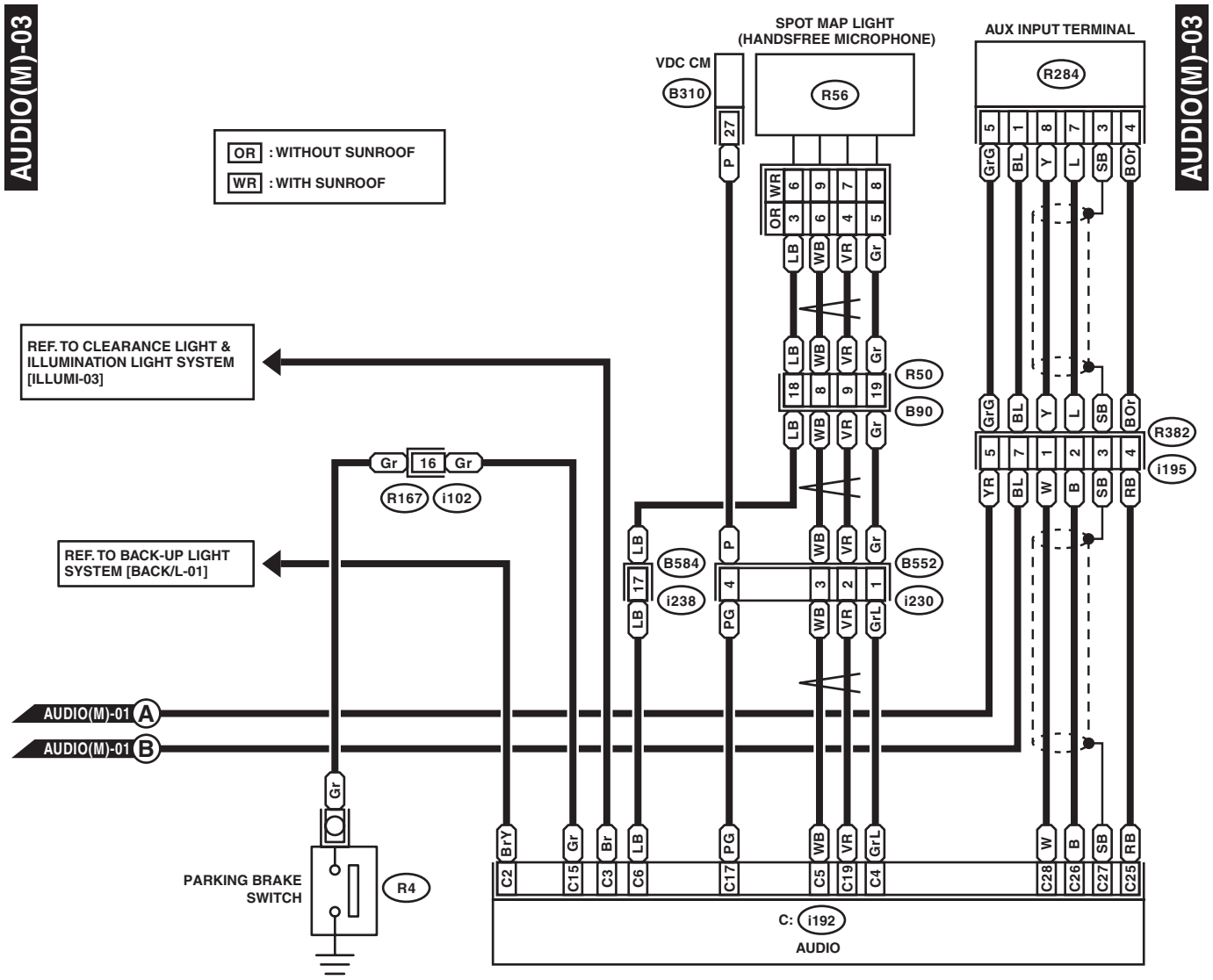


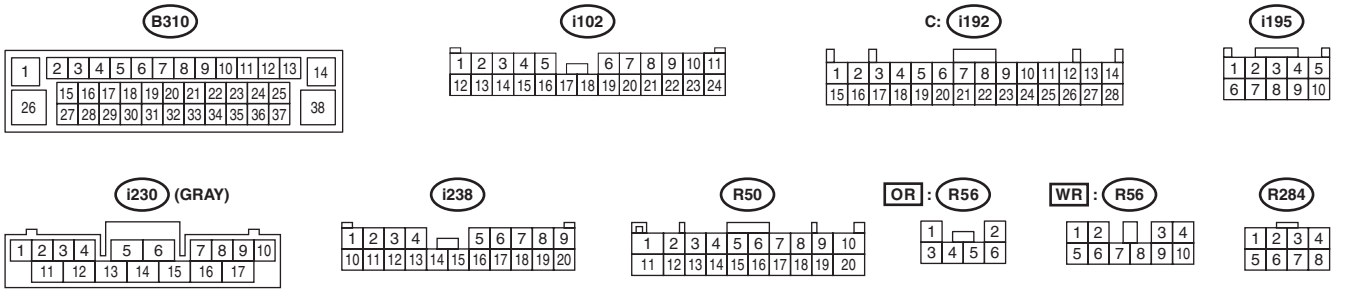

AUDIO(M)-02
AUDIO(M)-02
SATELLITE SWITCH
UP
DOWN
RIGHT
LEFT
LIST
RETURN
MUTE/ENTER
TALK
SOURCE
ON HOOK
OFF HOOK
ST3
10
11
6
2
12
ST1
B68
5
V
6
BW
14
Br
10
YR
7
LY
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-01]
ROLL CONNECTOR
LY
YR
Br
B553
3
2
1
i231
LY
Y
BrB
C22
C23
C21
C:
i192
AUDIO


ST3
1 2 3 4 5 6
7 8 9 10 11 12
B68
1 2 3 4 5 6 7
8 9 10 11 12 13 14
C: i192
1 2 3 4 5 6 7 8 9 10 11 12 13 14
15 16 17 18 19 20 21 22 23 24 25 26 27 28
i231
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19 20

WI-61606

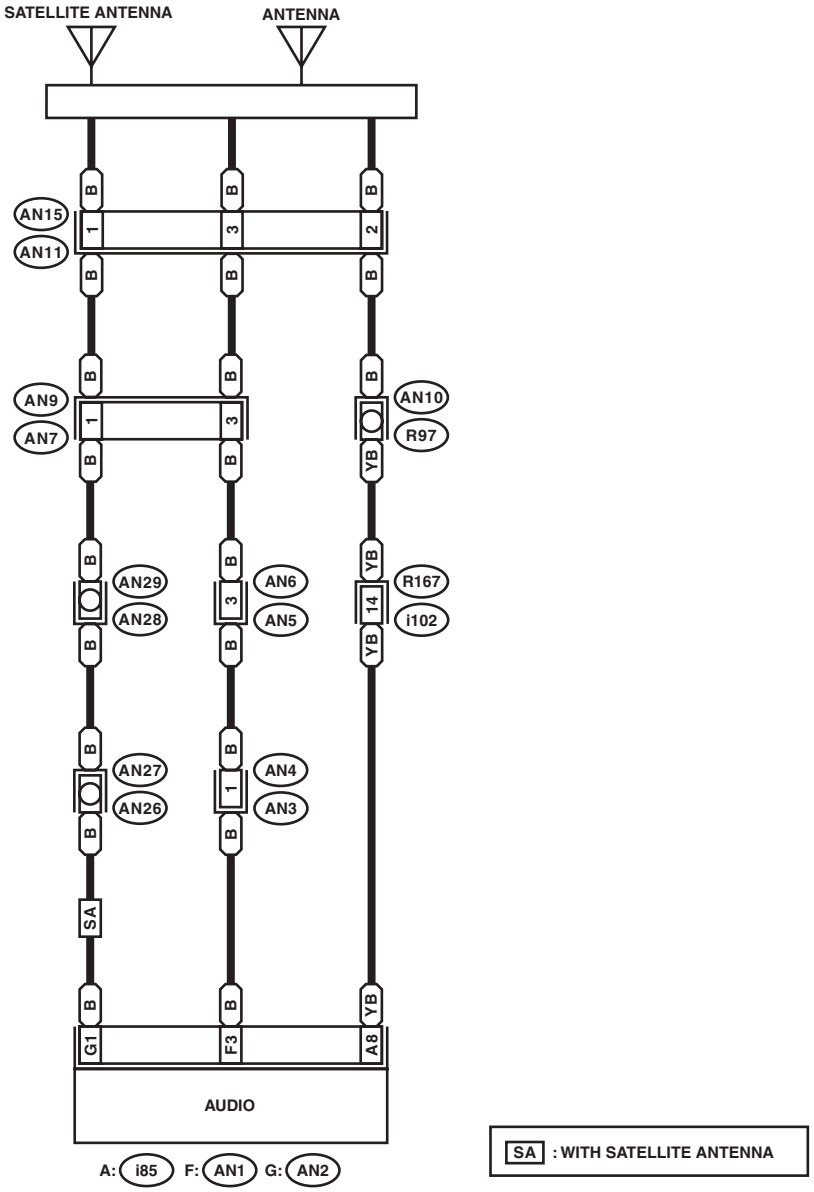
WIRING SYSTEM

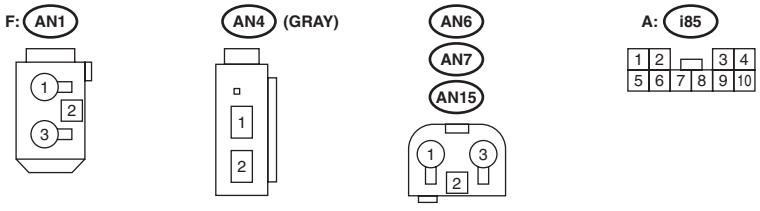




WI-61607

AUDIO(M)-04

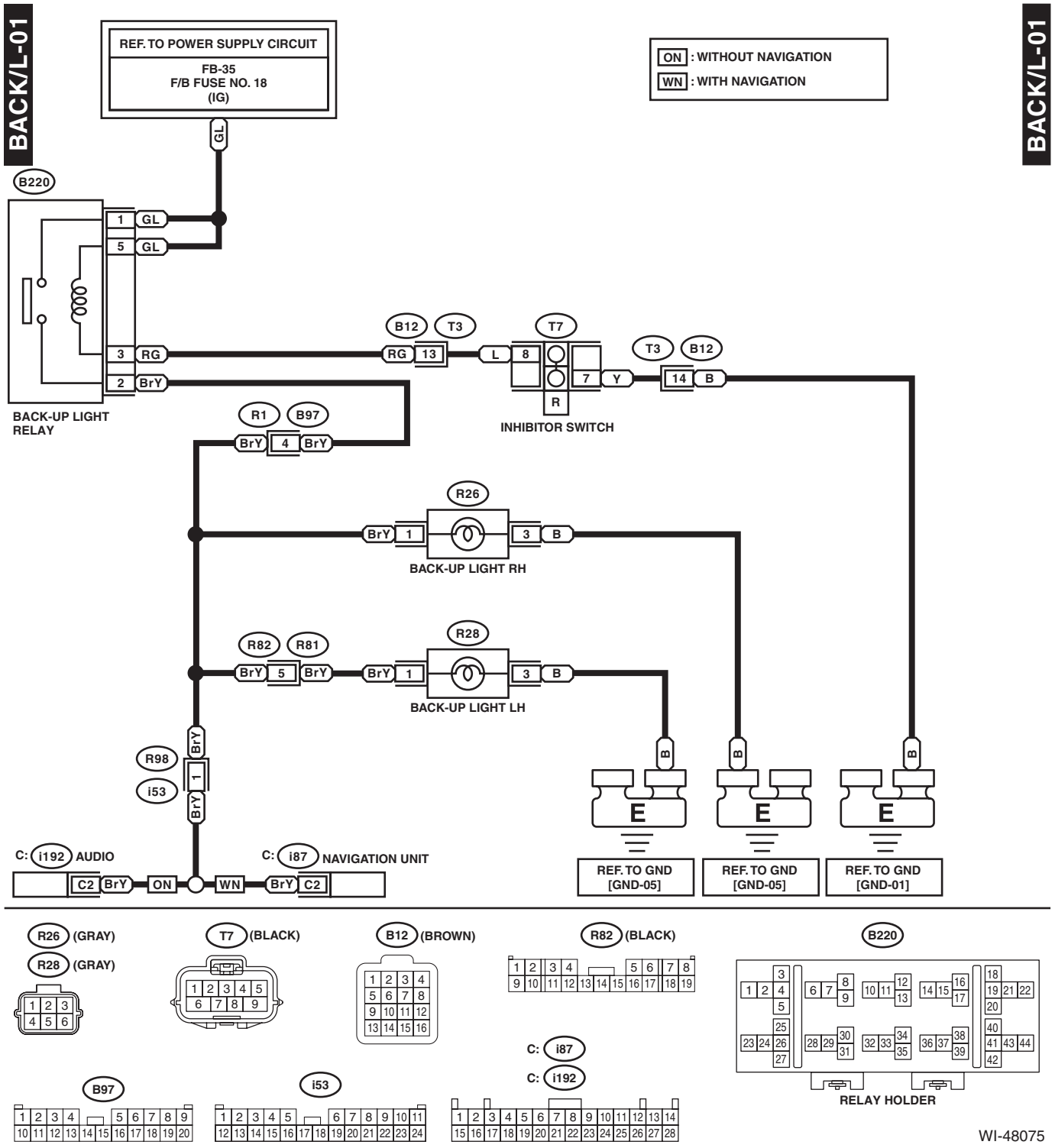




WI-61674

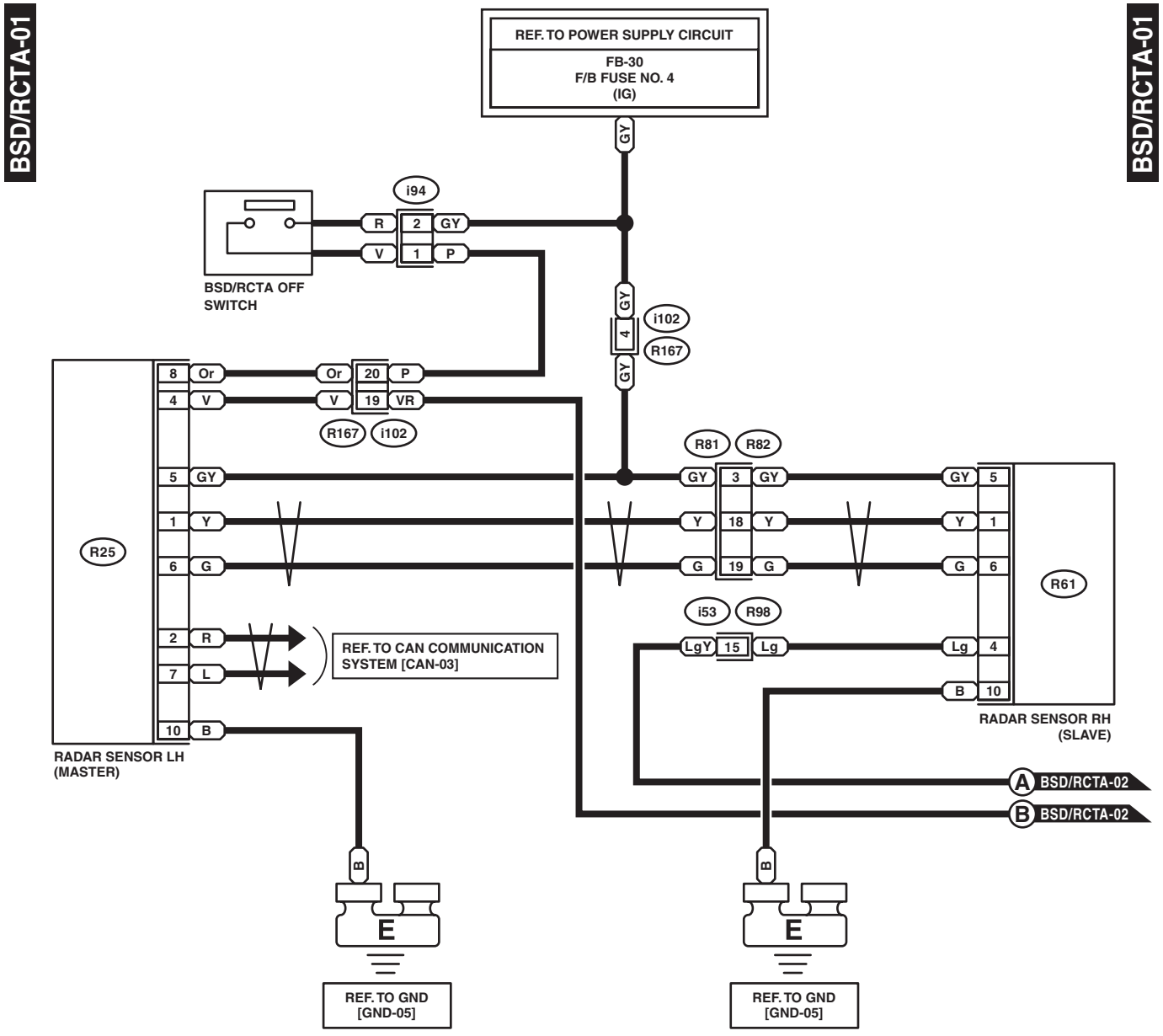
9. Back-up Light System

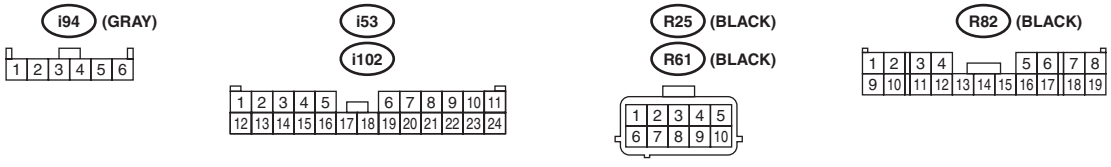
A: WIRING DIAGRAM



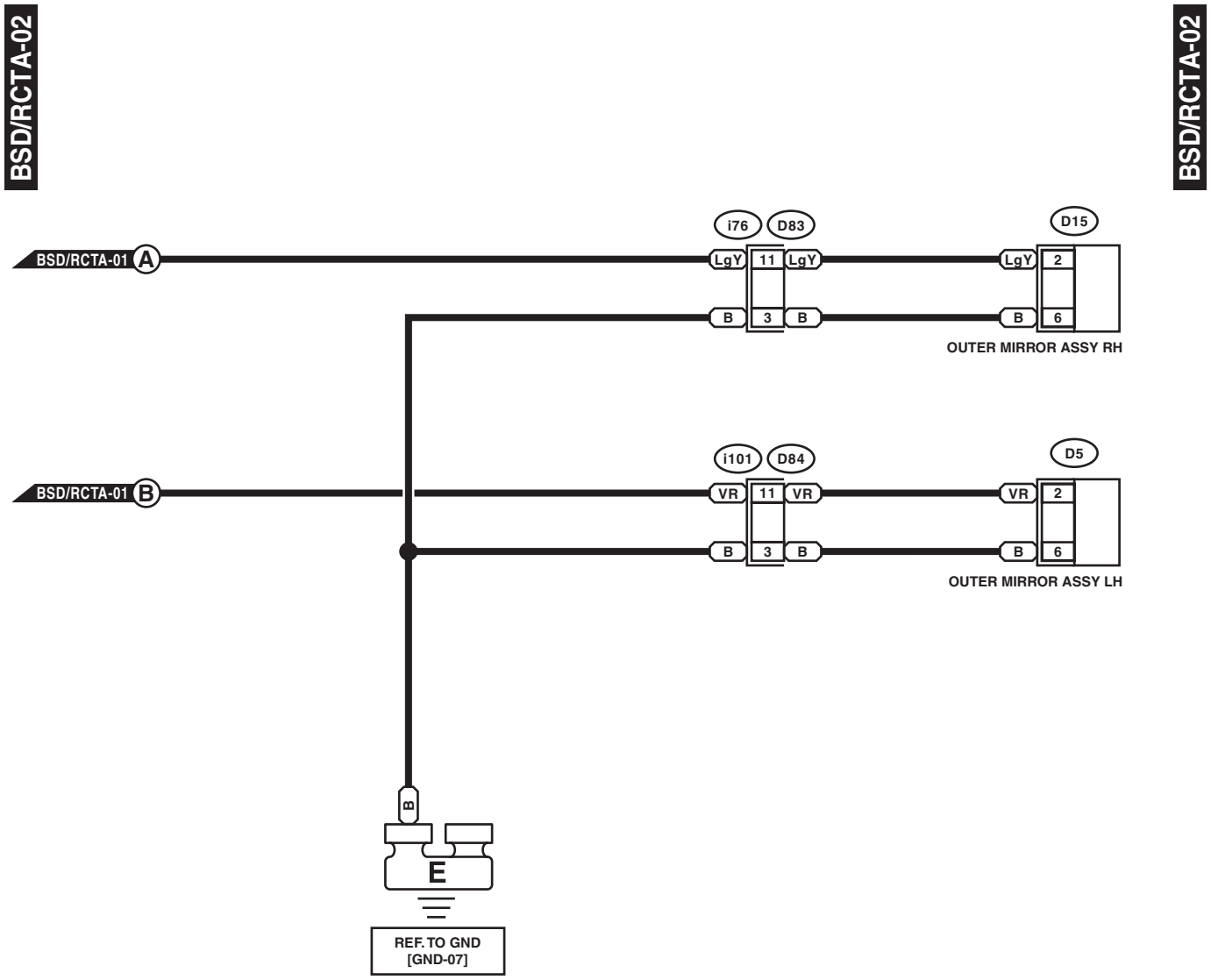
10.Blind Spot Detection/Rear Cross Traffic Alert

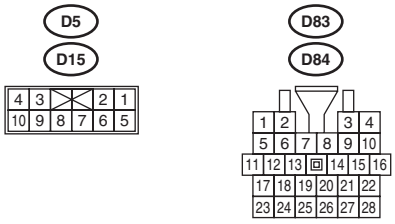
A: WIRING DIAGRAM





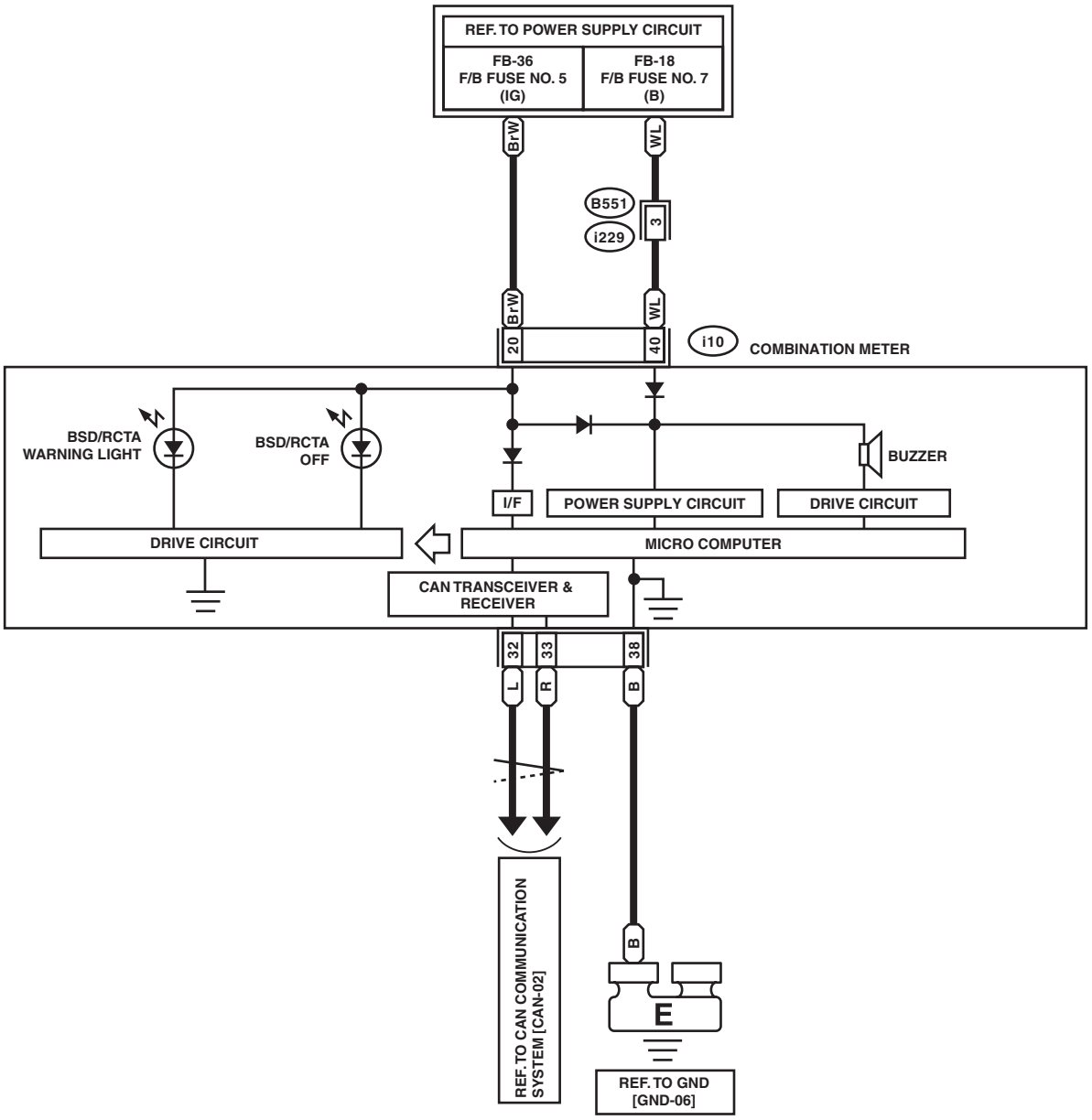
WI-61608

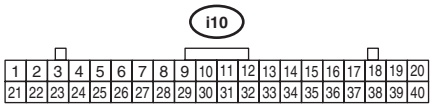

BSD/RCTA-02
BSD/RCTA-02
BSD/RCTA-01 A
BSD/RCTA-01 B
i76
D83
D15
LgY
11
LgY
LgY
2
B
3
B
B
6
OUTER MIRROR ASSY RH
i101
D84
D5
VR
11
VR
VR
2
B
3
B
B
6
OUTER MIRROR ASSY LH
B
E
REF. TO GND
[GND-07]

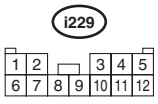

D5
D15
4 3 2 1
10 9 8 7 6 5
D83
D84
1 2 3 4
5 6 7 8 9 10
11 12 13 14 15 16
17 18 19 20 21 22
23 24 25 26 27 28

WI-61609

BSD/RCTA-03



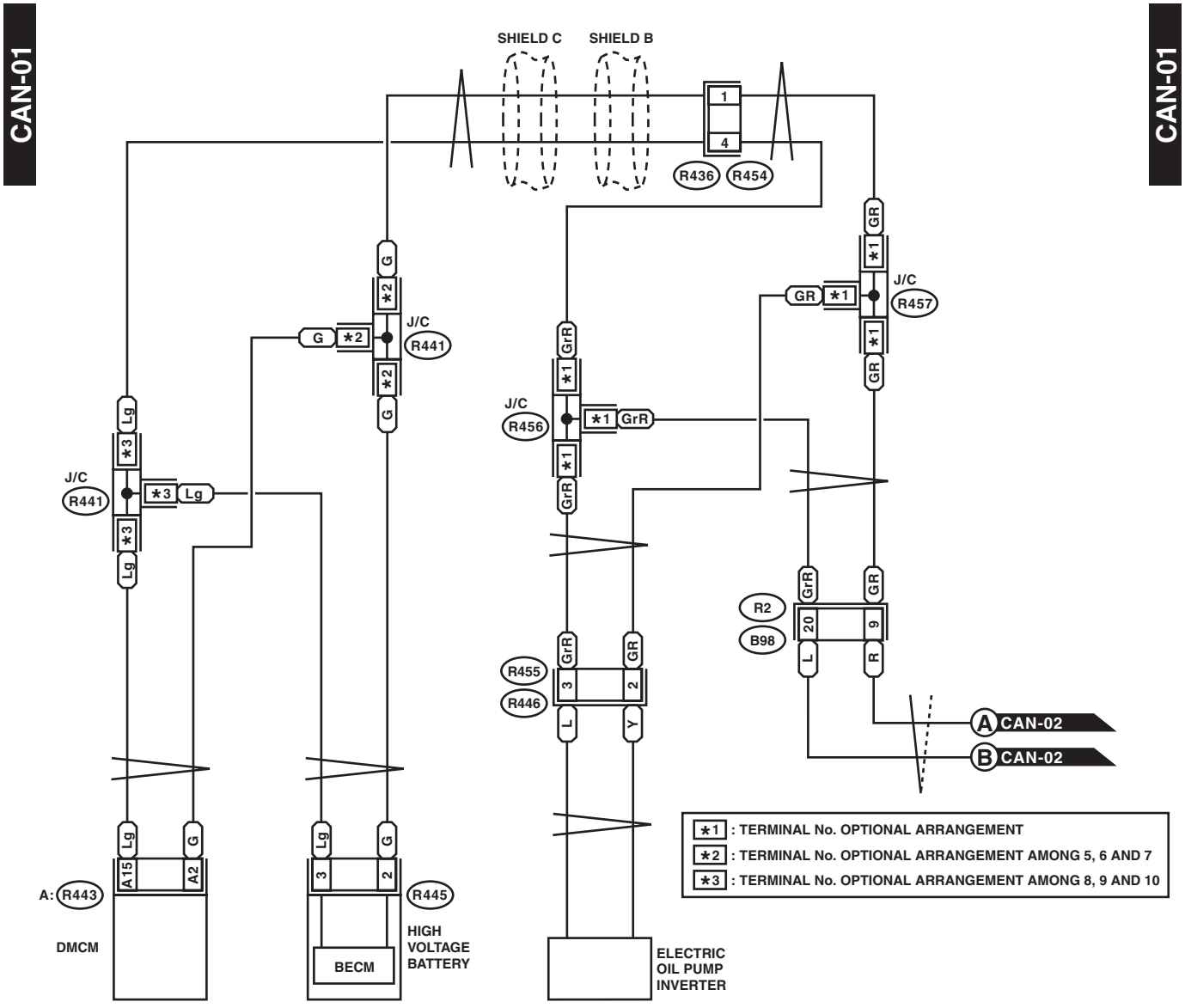


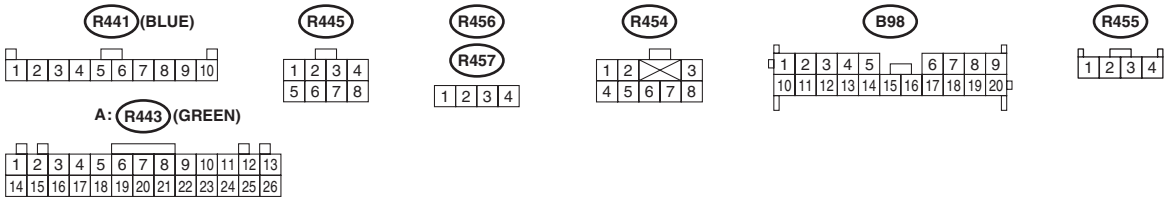


WI-61610

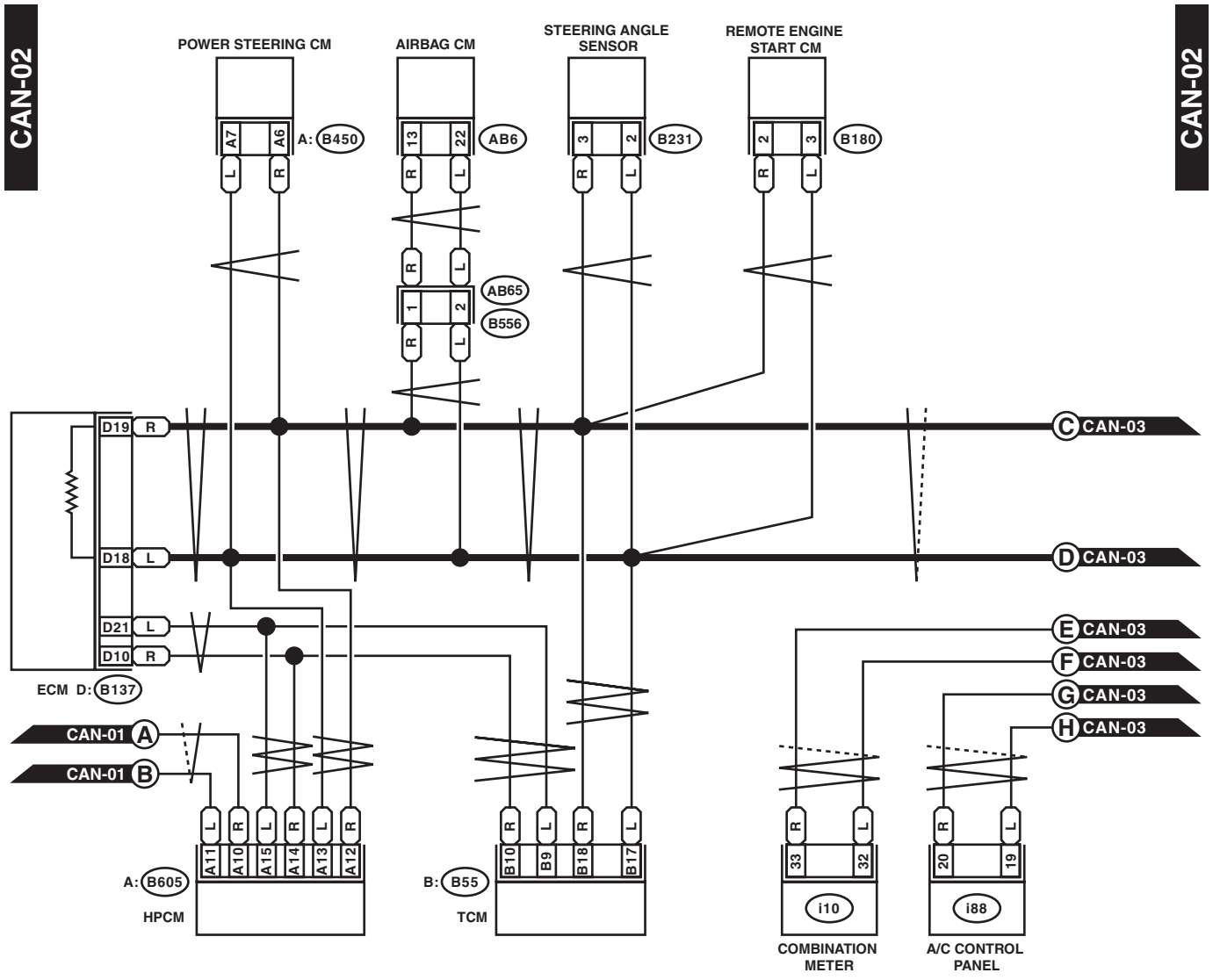
11.CAN Communication System

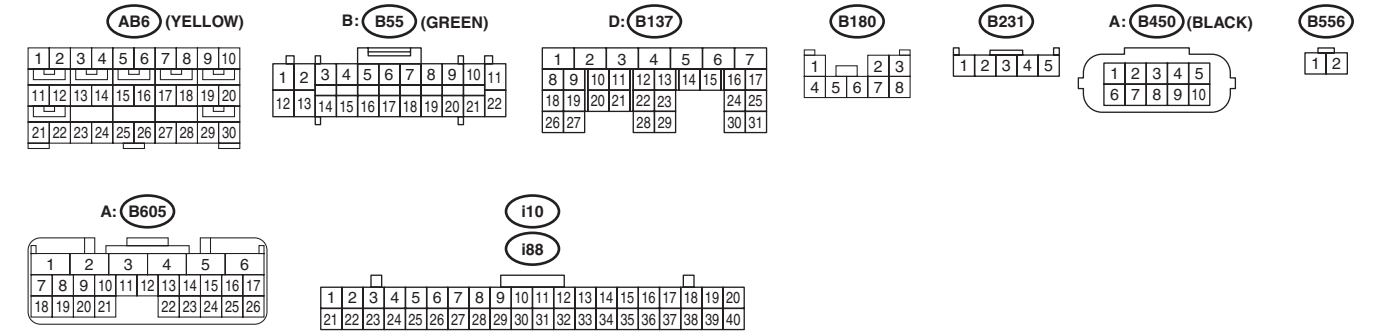
A: WIRING DIAGRAM





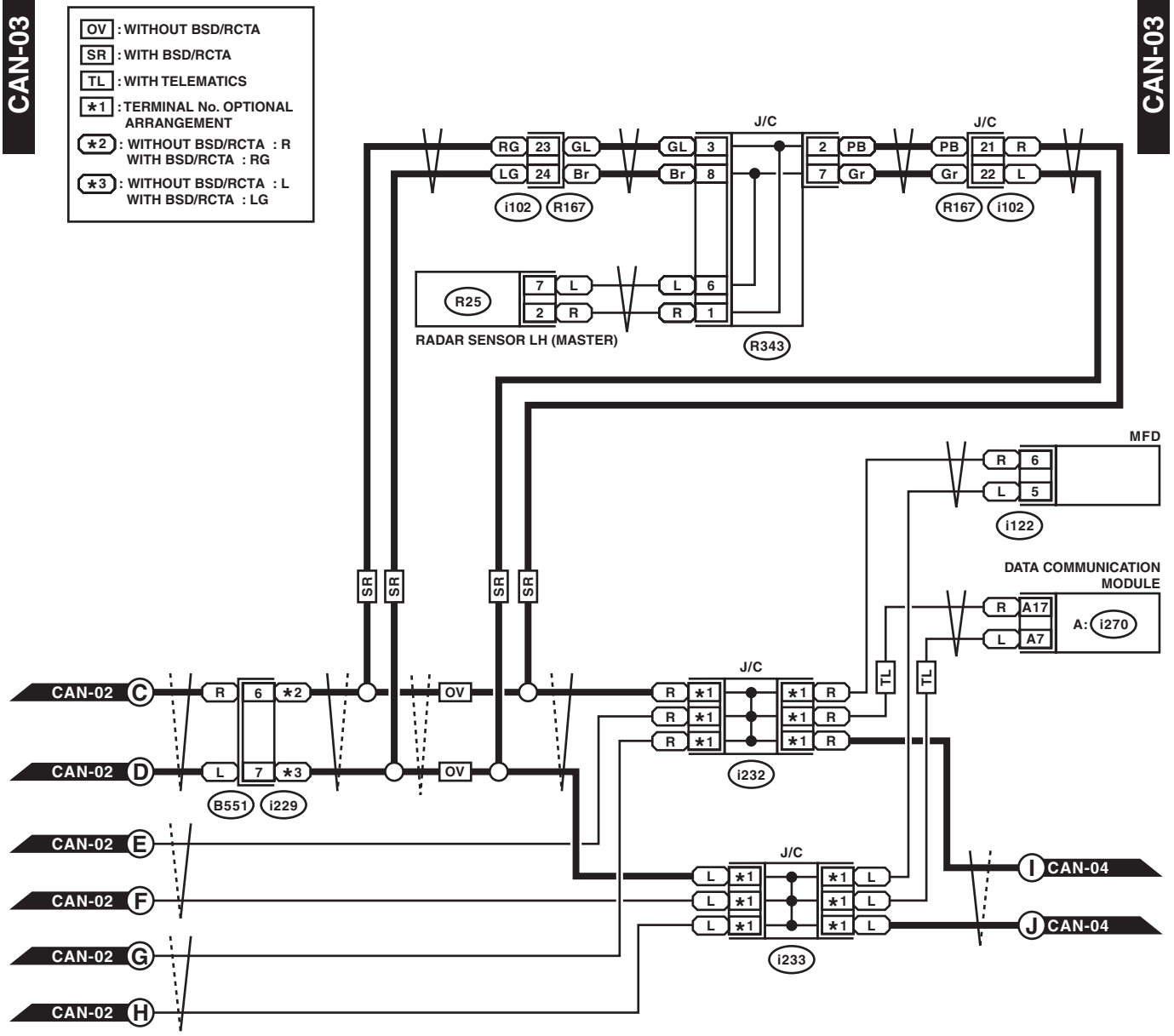
WI-41813

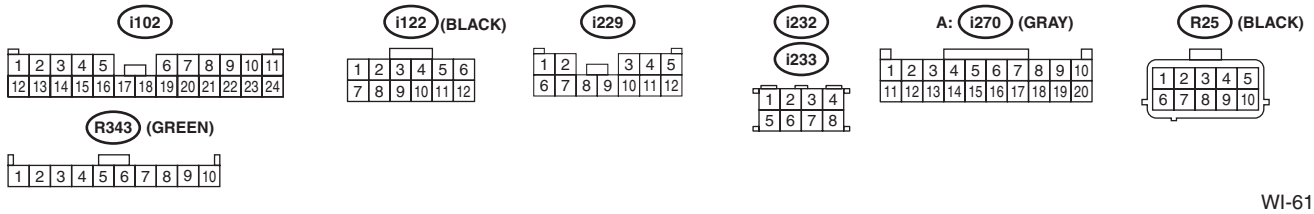

CAN-02
CAN-02
POWER STEERING CM
AIRBAG CM
STEERING ANGLE SENSOR
REMOTE ENGINE START CM
A: B450
AB6
B231
B180
AB65
B556
D19 R
D18 L
D21 L
D10 R
C CAN-03
D CAN-03
E CAN-03
F CAN-03
G CAN-03
H CAN-03
ECM D: B137
CAN-01 A
CAN-01 B
A: B605
HPCM
B: B55
TCM
i10
COMBINATION METER
i88
A/C CONTROL PANEL


AB6 (YELLOW)
B: B55 (GREEN)
D: B137
B180
B231
A: B450 (BLACK)
B556
A: B605
i10
i88

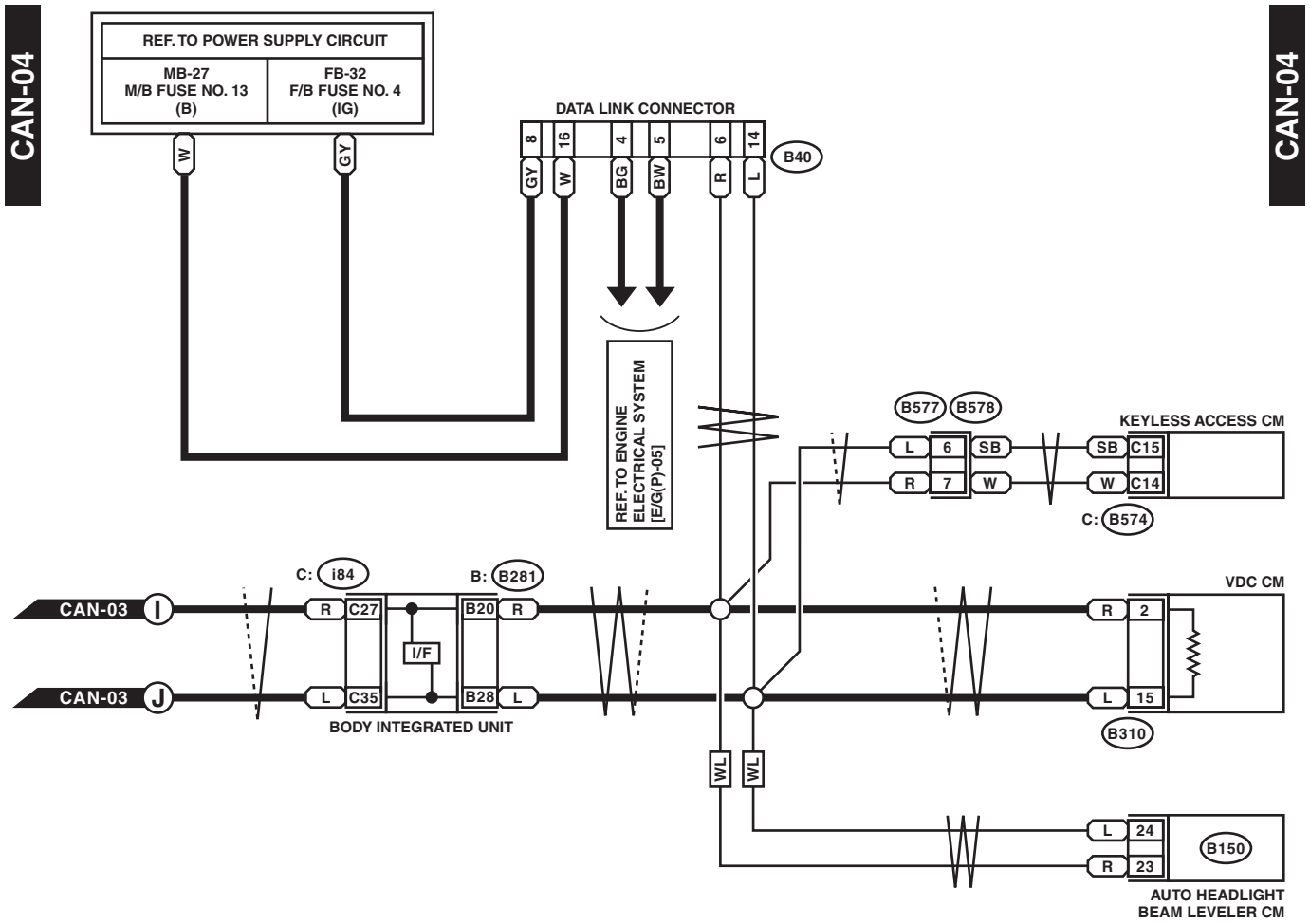
WI-61611

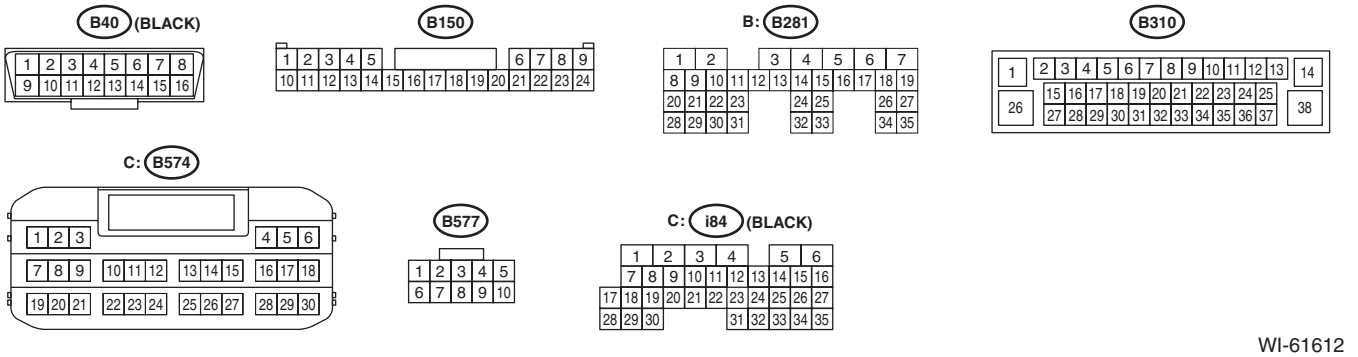
CAN-03





WI-61945

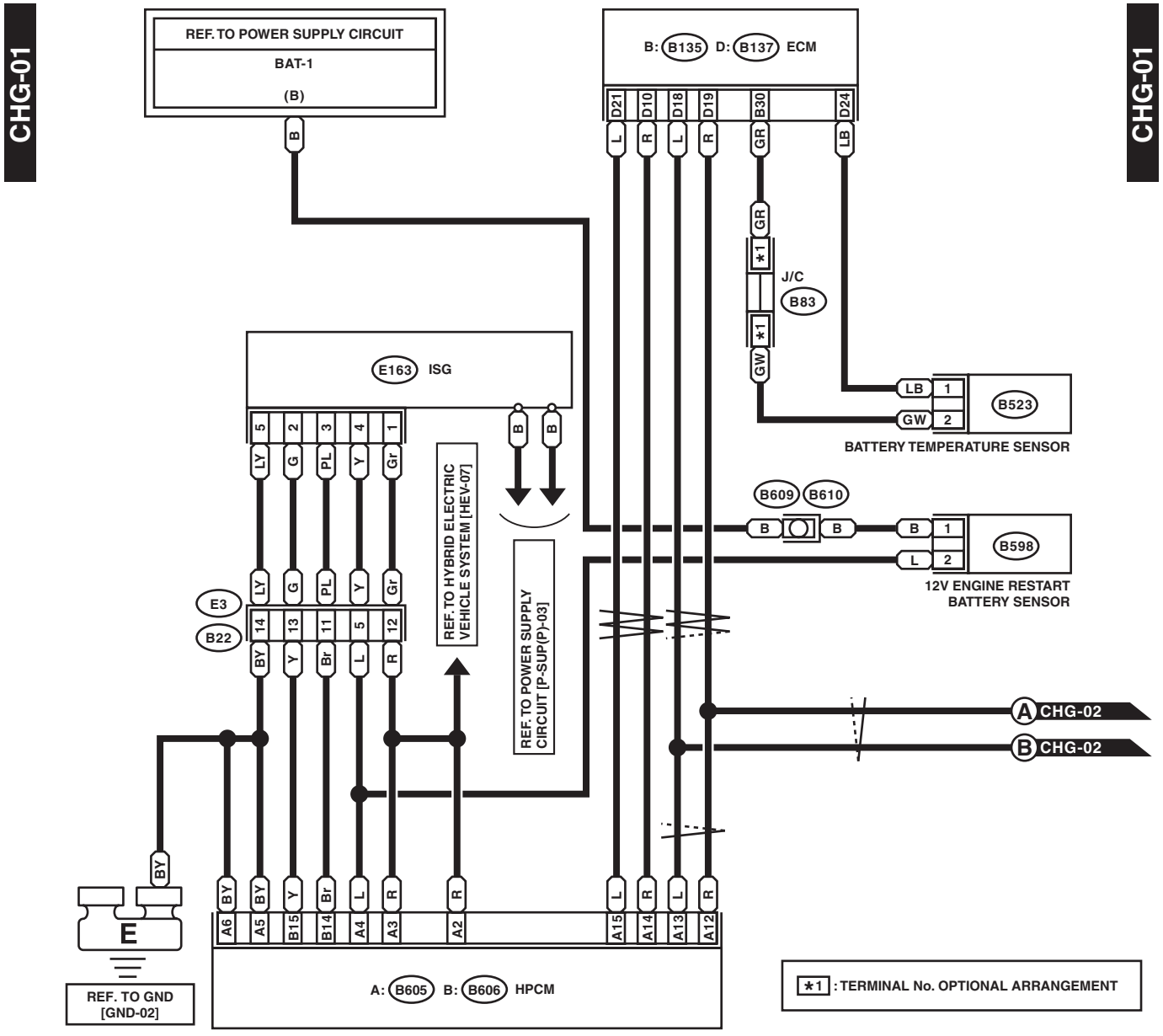

CAN-04
CAN-04
REF. TO POWER SUPPLY CIRCUIT
MB-27
M/B FUSE NO. 13
(B)
FB-32
F/B FUSE NO. 4
(IG)
DATA LINK CONNECTOR
B40
REF. TO ENGINE ELECTRICAL SYSTEM [E/G(P)-05]
B577
B578
KEYLESS ACCESS CM
C: B574
C: i84
B: B281
CAN-03 I
CAN-03 J
I/F
BODY INTEGRATED UNIT
VDC CM
B310
WL
WL
B150
AUTO HEADLIGHT BEAM LEVELER CM
WL : WITH AUTO HEADLIGHT BEAM LEVELER

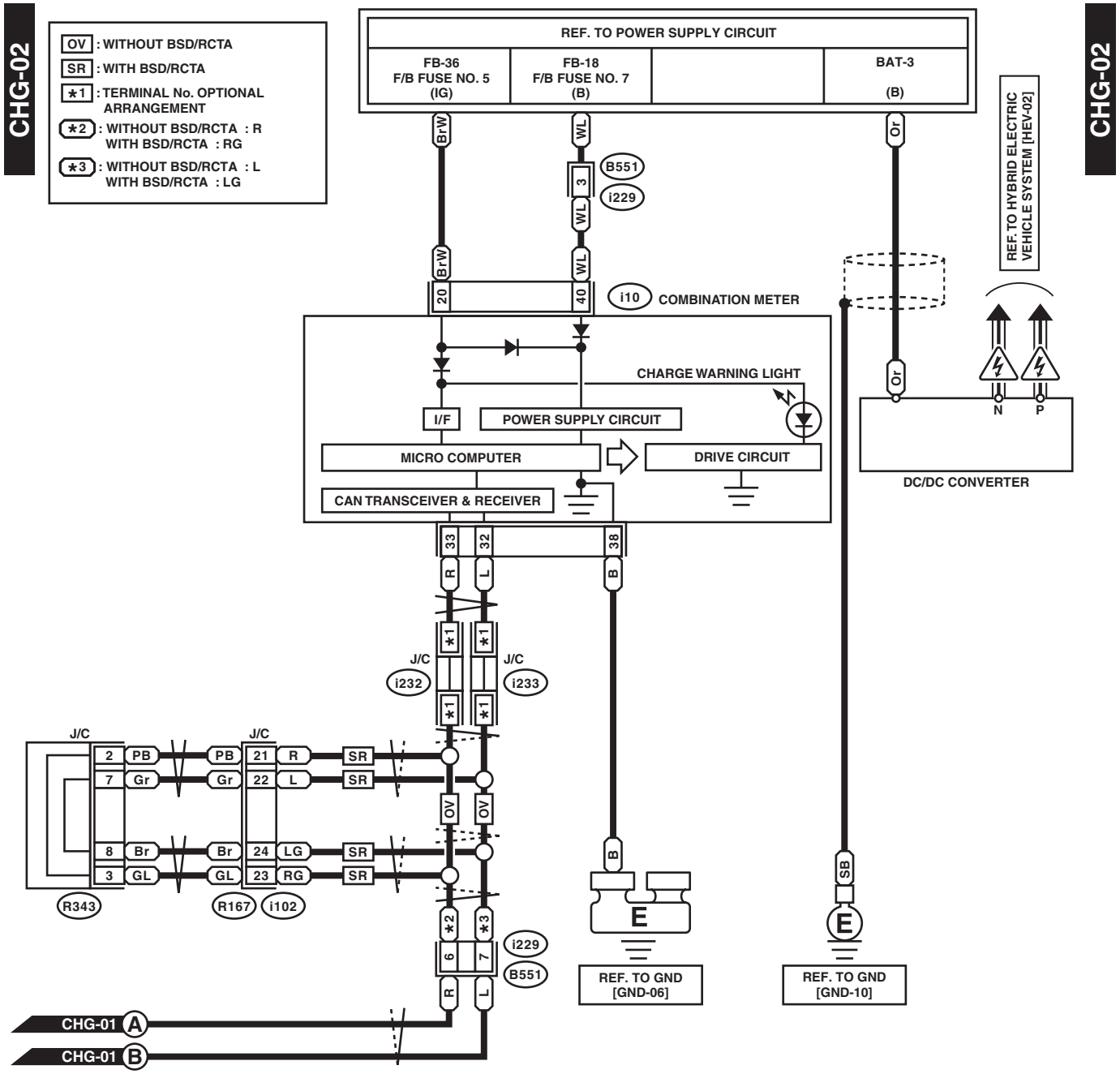

B40 (BLACK)
B150
B: B281
B310
C: B574
B577
C: i84 (BLACK)

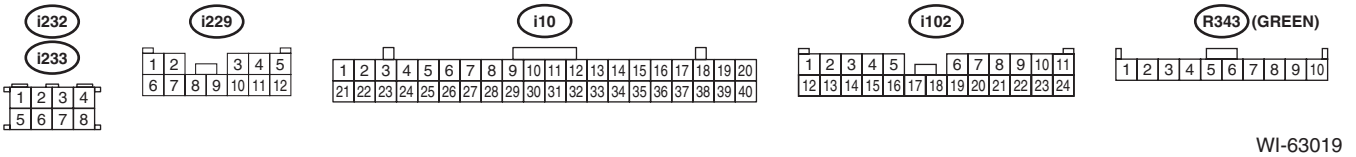
WI-61612

12.Charging System

A: WIRING DIAGRAM



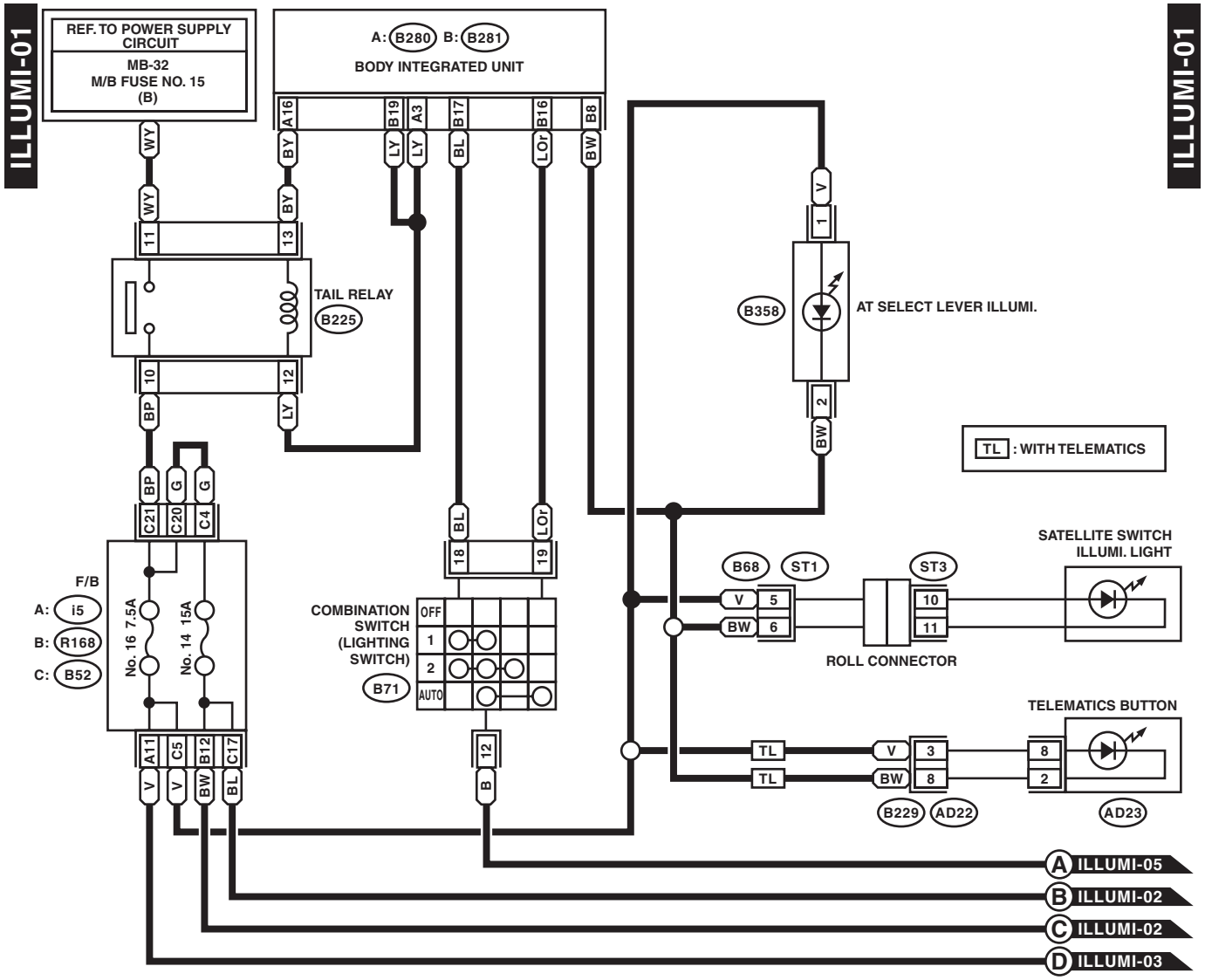

CHG-02
OV : WITHOUT BSD/RCTA
SR : WITH BSD/RCTA
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
*2 : WITHOUT BSD/RCTA : R WITH BSD/RCTA : RG
*3 : WITHOUT BSD/RCTA : L WITH BSD/RCTA : LG
REF. TO POWER SUPPLY CIRCUIT
FB-36 F/B FUSE NO. 5 (IG)
FB-18 F/B FUSE NO. 7 (B)
BAT-3 (B)
REF. TO HYBRID ELECTRIC VEHICLE SYSTEM [HEV-02]
B551
i229
i10 COMBINATION METER
CHARGE WARNING LIGHT
I/F
POWER SUPPLY CIRCUIT
MICRO COMPUTER
DRIVE CIRCUIT
CAN TRANSCEIVER & RECEIVER
DC/DC CONVERTER
N
P
J/C
i232
i233
R343
R167
i102
REF. TO GND [GND-06]
REF. TO GND [GND-10]
CHG-01 A
CHG-01 B

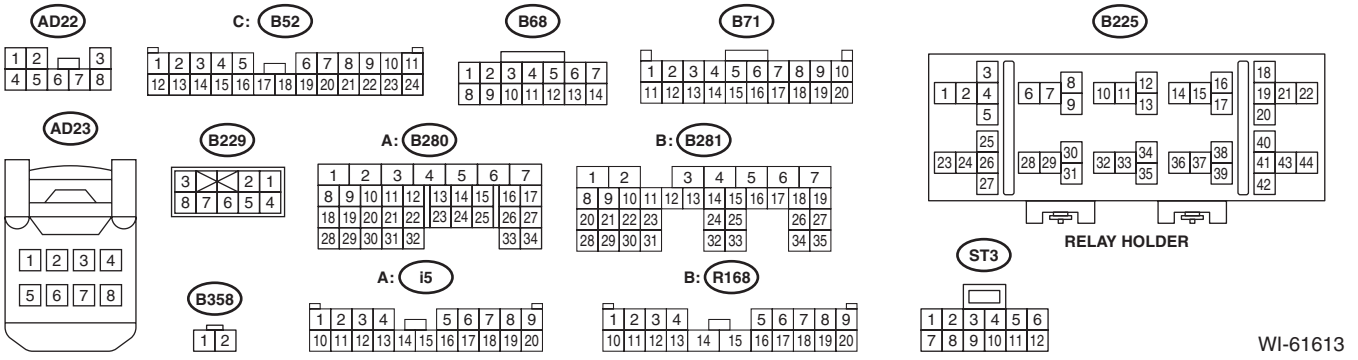

i232
i233
i229
i10
i102
R343 (GREEN)

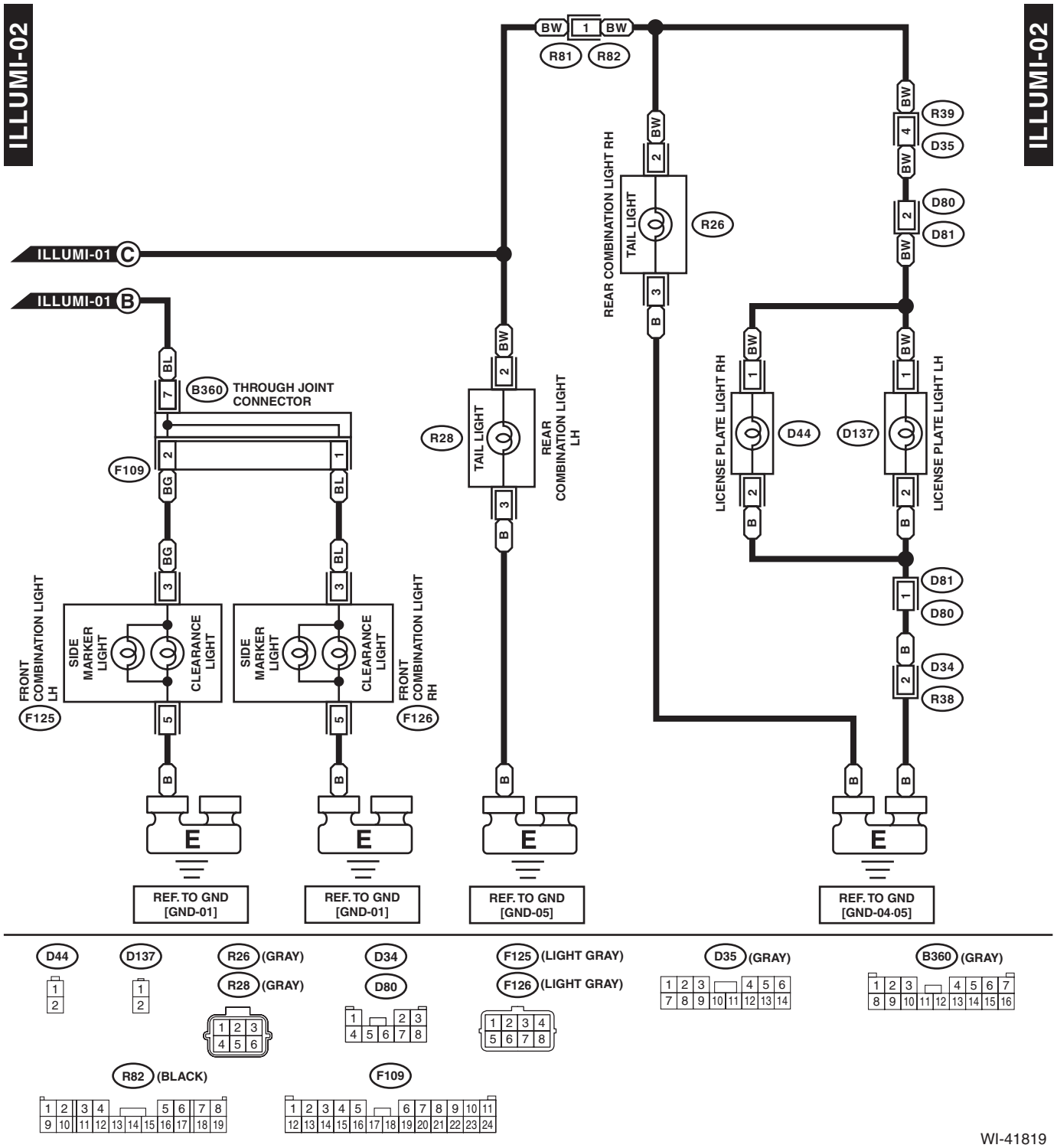
WI-63019

13.Clearance Light and Illumination Light System

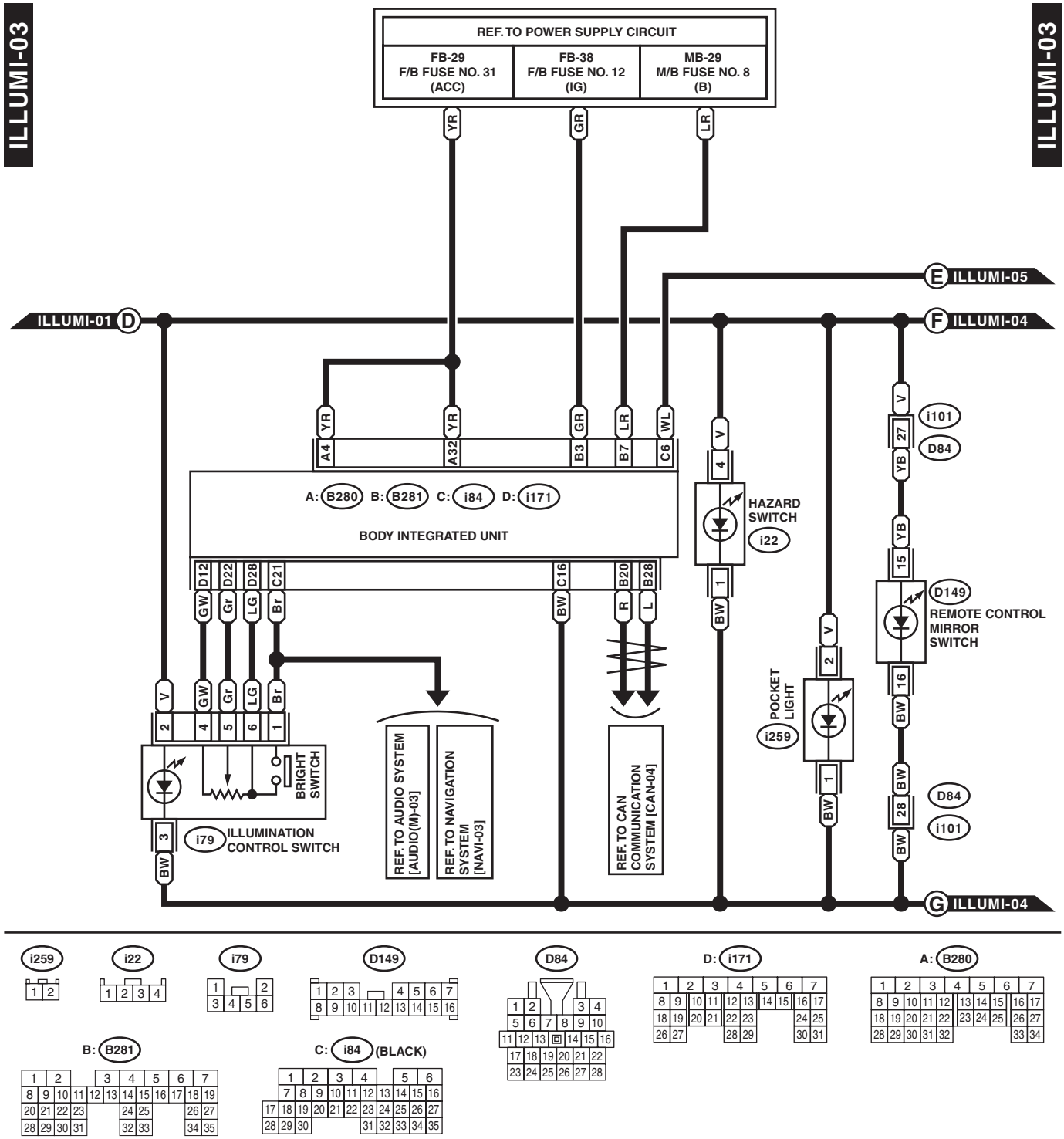
A: WIRING DIAGRAM






ILLUMI-02
ILLUMI-02
BW
1
BW
R81
R82
REAR COMBINATION LIGHT RH
TAIL LIGHT
R26
BW
2
3
B
BW
R39
4
D35
BW
D80
2
D81
BW
ILLUMI-01 C
ILLUMI-01 B
BL
7
B360 THROUGH JOINT CONNECTOR
F109
2
1
BG
BL
BG
3
BL
3
FRONT COMBINATION LIGHT LH
SIDE MARKER LIGHT
CLEARANCE LIGHT
SIDE MARKER LIGHT
CLEARANCE LIGHT
FRONT COMBINATION LIGHT RH
F125
5
5
F126
B
B
B
B
E
E
E
E
REF. TO GND [GND-01]
REF. TO GND [GND-01]
REF. TO GND [GND-05]
REF. TO GND [GND-04·05]
BW
2
R28
TAIL LIGHT
REAR COMBINATION LIGHT LH
3
B
BW
1
LICENSE PLATE LIGHT RH
D44
D137
LICENSE PLATE LIGHT LH
2
B
D81
1
D80
B
2
D34
R38
D44
D137
R26 (GRAY)
R28 (GRAY)
D34
D80
F125 (LIGHT GRAY)
F126 (LIGHT GRAY)
D35 (GRAY)
B360 (GRAY)
R82 (BLACK)
F109

WI-41819

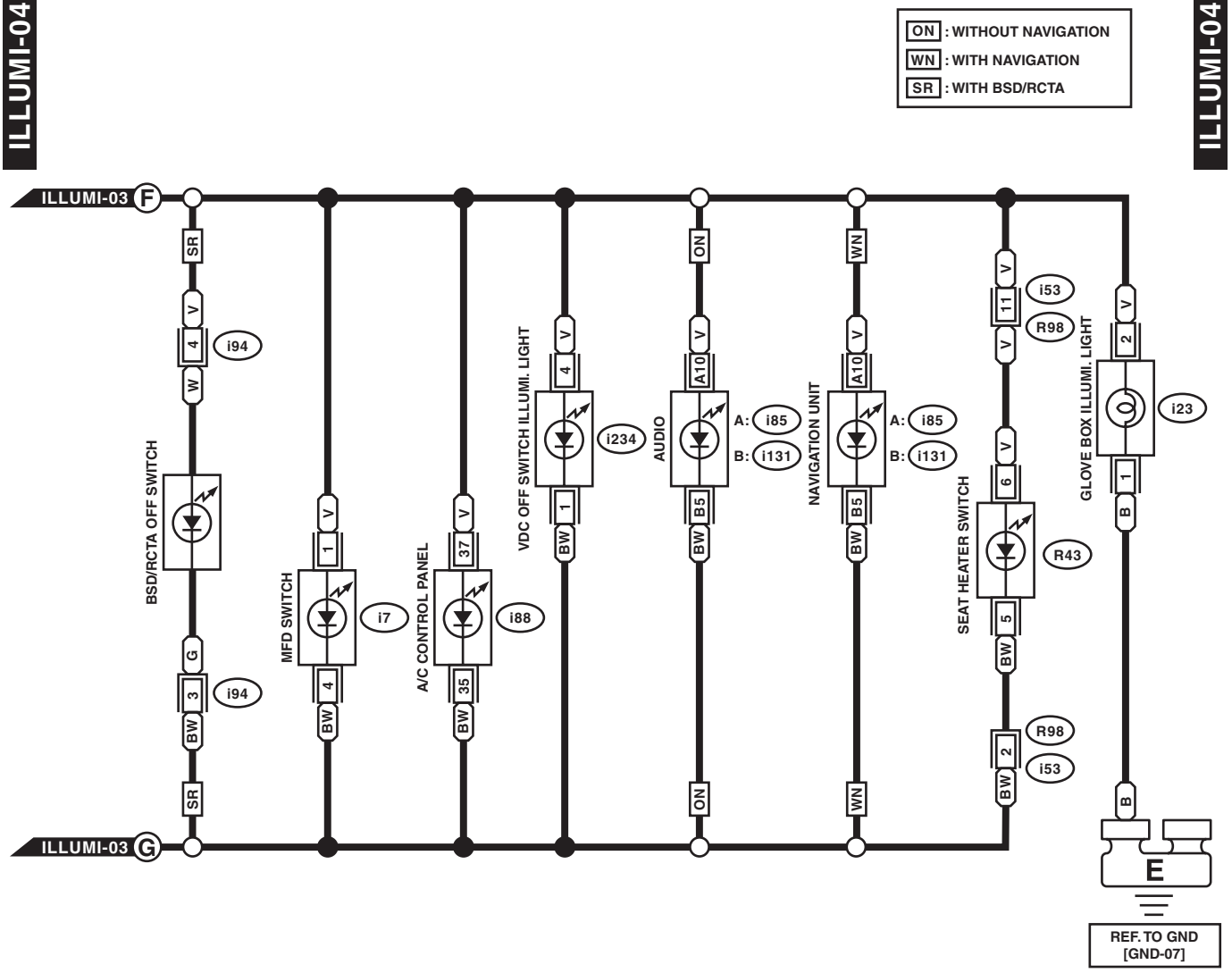

ILLUMI-03
ILLUMI-03
REF. TO POWER SUPPLY CIRCUIT
FB-29 F/B FUSE NO. 31 (ACC)
FB-38 F/B FUSE NO. 12 (IG)
MB-29 M/B FUSE NO. 8 (B)
YR
GR
LR
E ILLUMI-05
ILLUMI-01 D
F ILLUMI-04
A4
A32
B3
B7
C6
WL
A: B280 B: B281 C: i84 D: i171
BODY INTEGRATED UNIT
D12
D22
D28
C21
C16
B20
B28
GW
Gr
LG
Br
BW
R
L
HAZARD SWITCH
i22
V
4
1
BW
i101
27
D84
YB
15
D149
REMOTE CONTROL MIRROR SWITCH
16
BW
POCKET LIGHT
i259
2
1
BW
28
D84
i101
BRIGHT SWITCH
i79
ILLUMINATION CONTROL SWITCH
3
BW
REF. TO AUDIO SYSTEM [AUDIO(M)-03]
REF. TO NAVIGATION SYSTEM [NAVI-03]
REF. TO CAN COMMUNICATION SYSTEM [CAN-04]
G ILLUMI-04

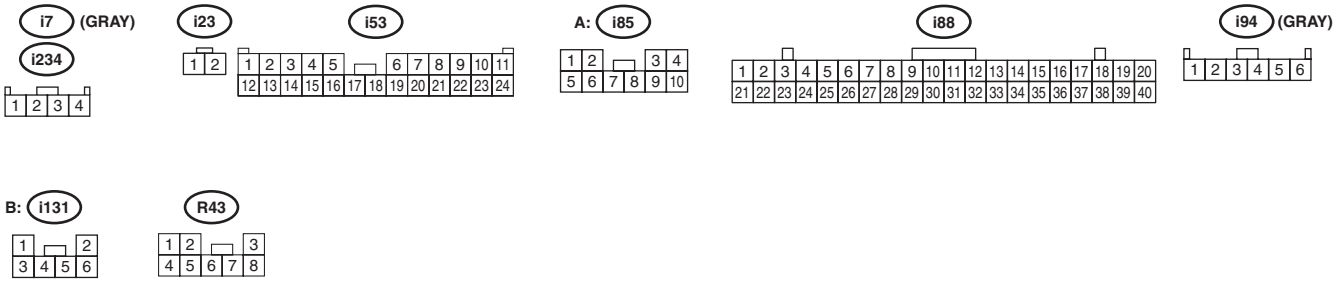
i259
i22
i79
D149
D84
D: i171
A: B280
B: B281
C: i84 (BLACK)

WI-61614

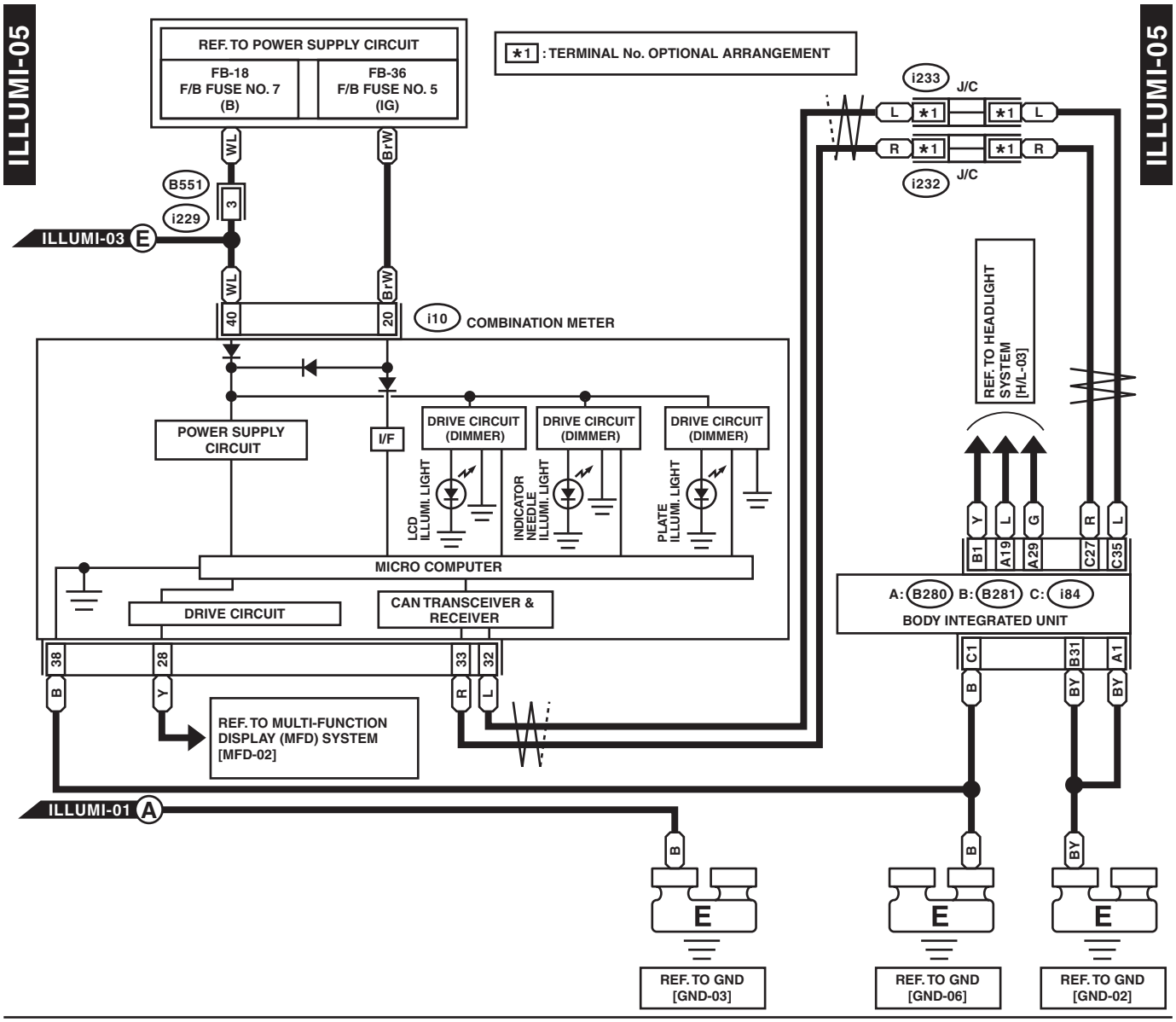
ILLUMI-04

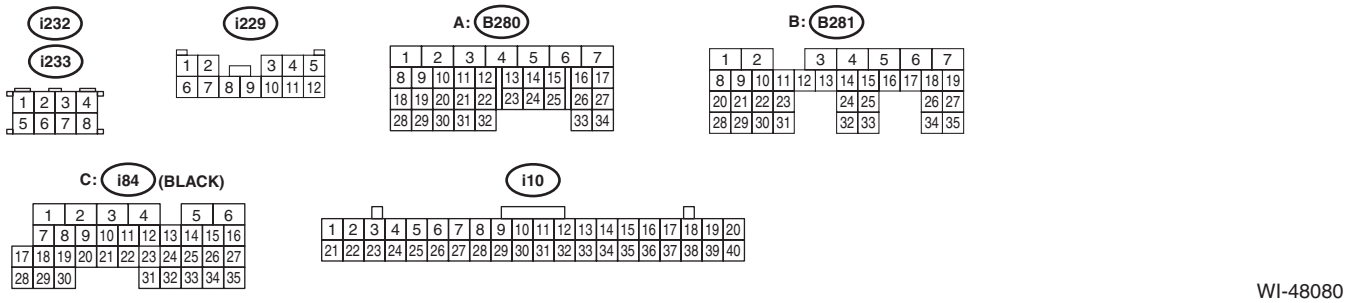
ILLUMI-04





WI-61615


ILLUMI-05
ILLUMI-05
REF. TO POWER SUPPLY CIRCUIT
FB-18 F/B FUSE NO. 7 (B)
FB-36 F/B FUSE NO. 5 (IG)
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
i233 J/C
i232 J/C
B551
i229
ILLUMI-03 E
i10 COMBINATION METER
POWER SUPPLY CIRCUIT
I/F
DRIVE CIRCUIT (DIMMER)
DRIVE CIRCUIT (DIMMER)
DRIVE CIRCUIT (DIMMER)
LCD ILLUMI. LIGHT
INDICATOR NEEDLE ILLUMI. LIGHT
PLATE ILLUMI. LIGHT
MICRO COMPUTER
DRIVE CIRCUIT
CAN TRANSCEIVER & RECEIVER
REF. TO MULTI-FUNCTION DISPLAY (MFD) SYSTEM [MFD-02]
REF. TO HEADLIGHT SYSTEM [H/L-03]
A: B280 B: B281 C: i84
BODY INTEGRATED UNIT
ILLUMI-01 A
REF. TO GND [GND-03]
REF. TO GND [GND-06]
REF. TO GND [GND-02]


i232
i233
i229
A: B280
B: B281
C: i84 (BLACK)
i10

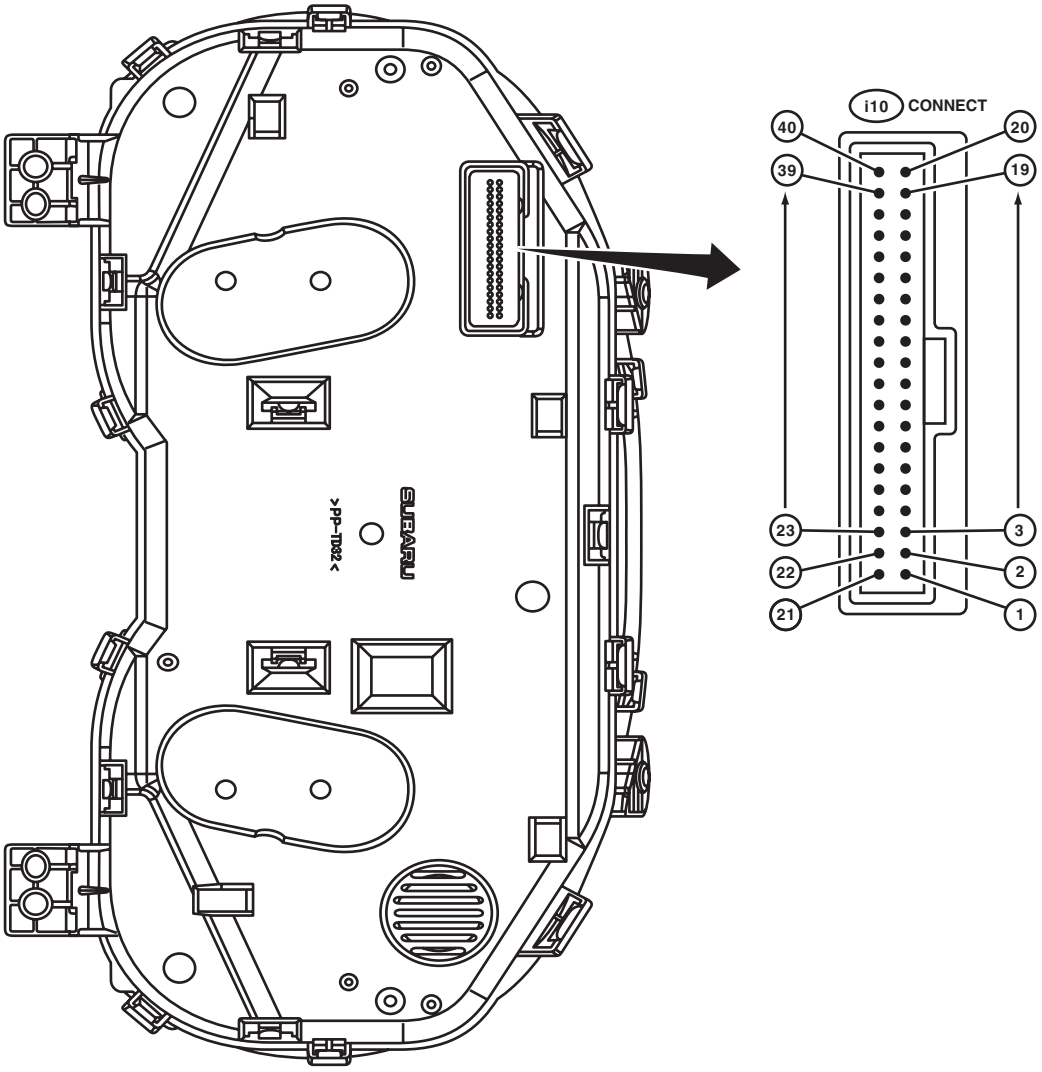
WI-48080

14.Combination Meter System

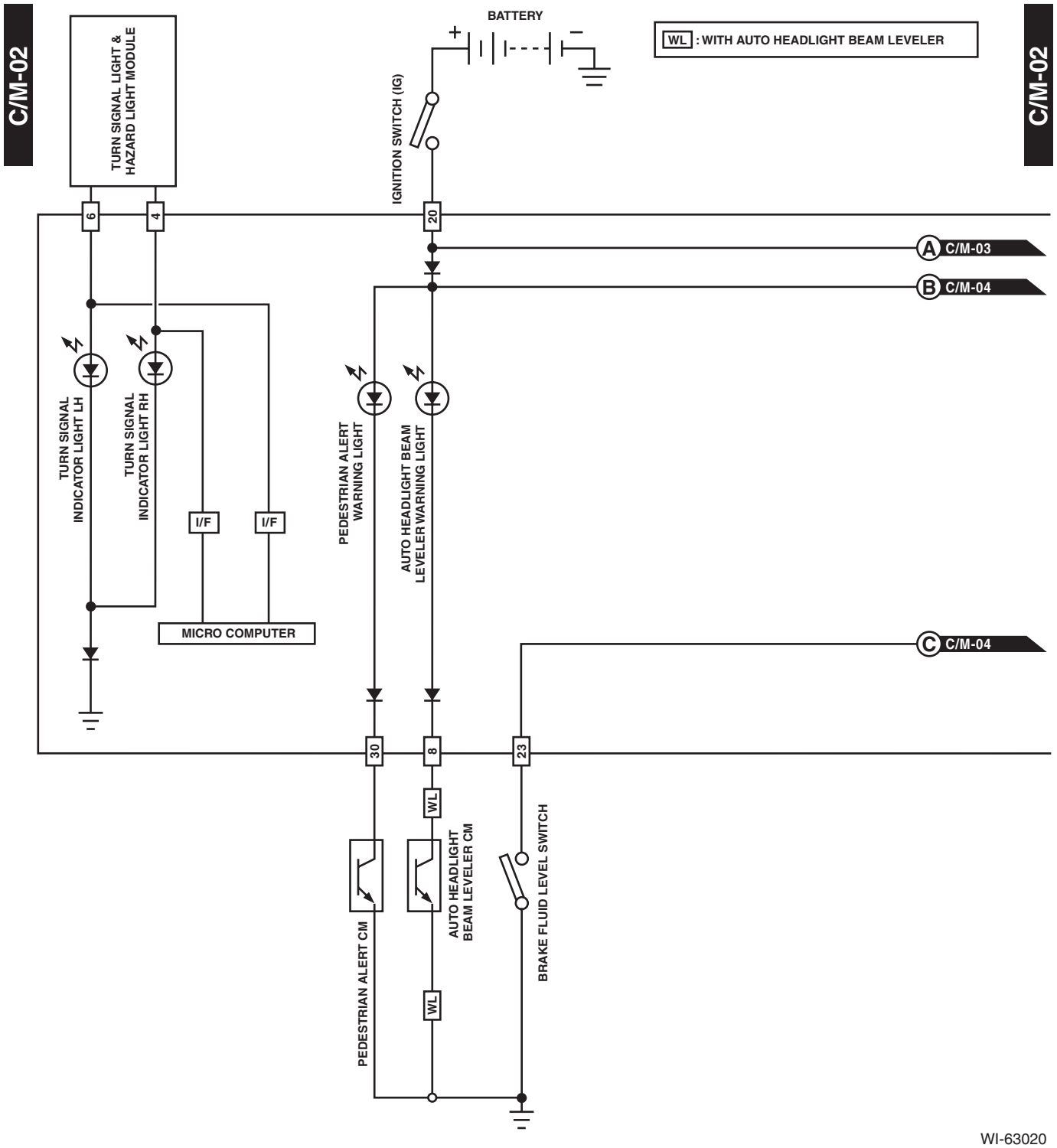
A: WIRING DIAGRAM

C/M-01

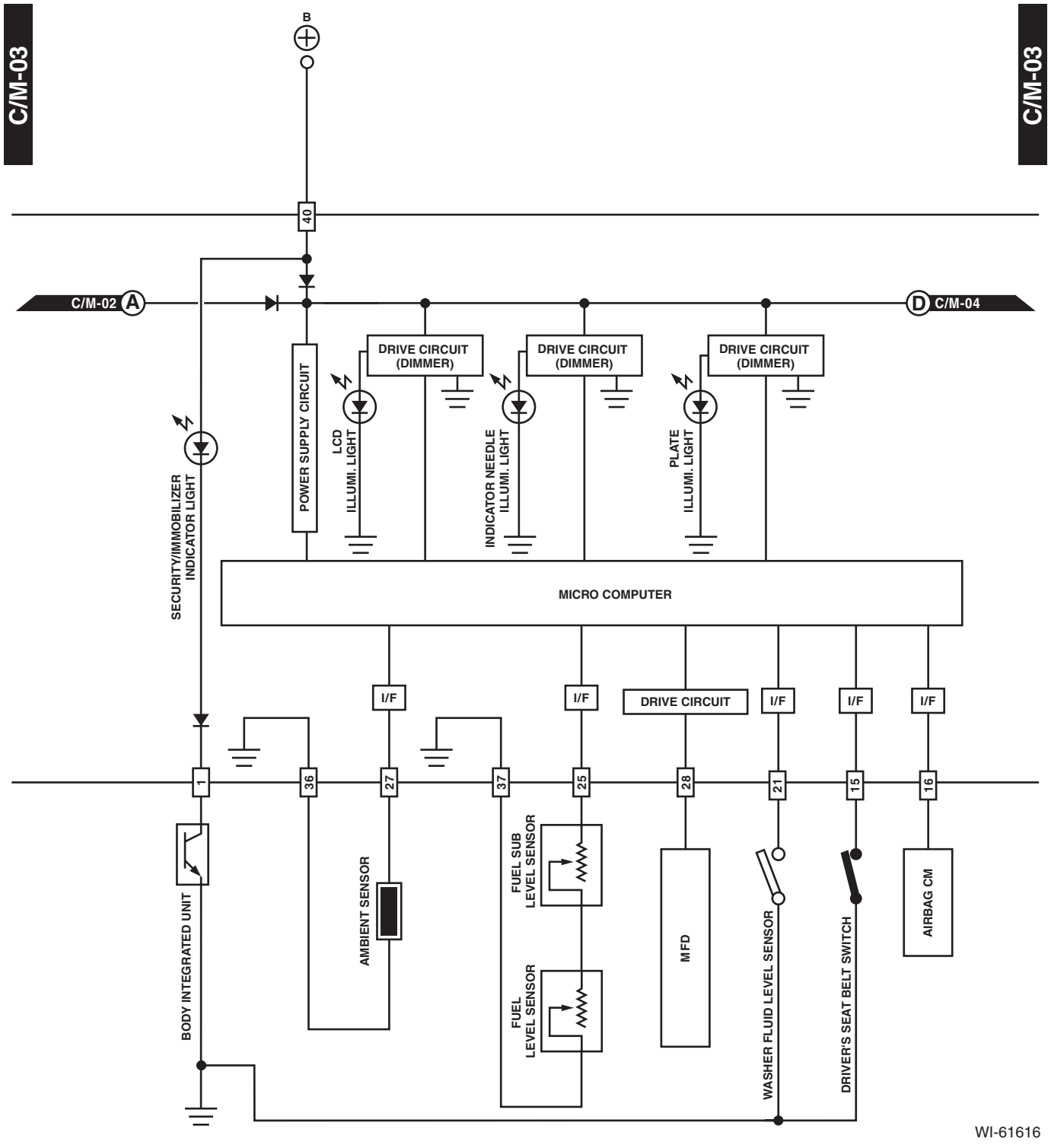
C/M-01



WI-34175


C/M-02
TURN SIGNAL LIGHT & HAZARD LIGHT MODULE
BATTERY
WL : WITH AUTO HEADLIGHT BEAM LEVELER
C/M-02
IGNITION SWITCH (IG)
6
4
20
A C/M-03
B C/M-04
TURN SIGNAL INDICATOR LIGHT LH
TURN SIGNAL INDICATOR LIGHT RH
I/F
I/F
PEDESTRIAN ALERT WARNING LIGHT
AUTO HEADLIGHT BEAM LEVELER WARNING LIGHT
MICRO COMPUTER
C C/M-04
30
8
23
WL
WL
AUTO HEADLIGHT BEAM LEVELER CM
PEDESTRIAN ALERT CM
BRAKE FLUID LEVEL SWITCH

WI-63020

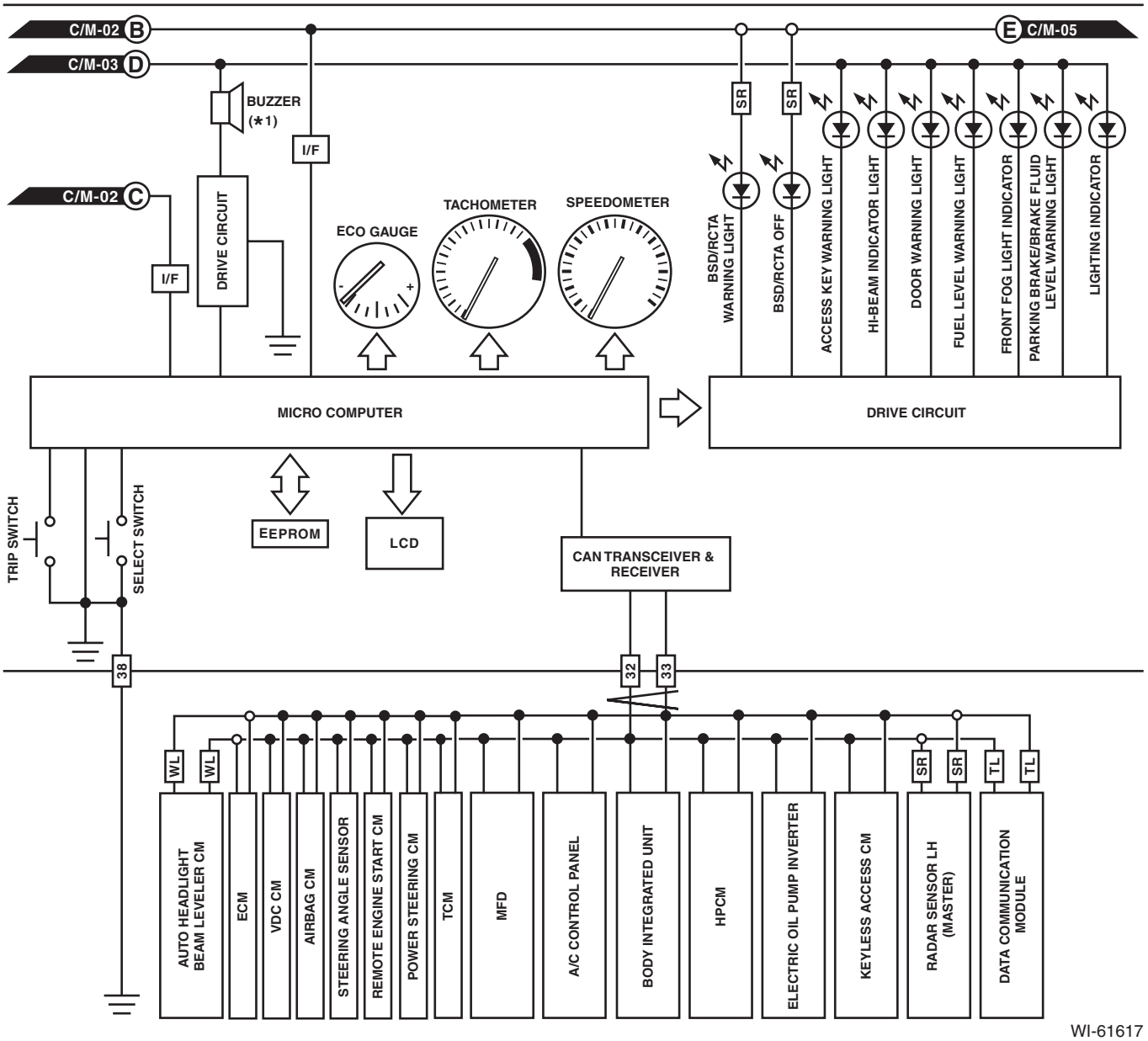

C/M-03
C/M-03
B
40
C/M-02 A
D C/M-04
DRIVE CIRCUIT (DIMMER)
DRIVE CIRCUIT (DIMMER)
DRIVE CIRCUIT (DIMMER)
POWER SUPPLY CIRCUIT
LCD ILLUMI. LIGHT
INDICATOR NEEDLE ILLUMI. LIGHT
PLATE ILLUMI. LIGHT
SECURITY/IMMOBILIZER INDICATOR LIGHT
MICRO COMPUTER
I/F
I/F
DRIVE CIRCUIT
I/F
I/F
I/F
1
36
27
37
25
28
21
15
16
BODY INTEGRATED UNIT
AMBIENT SENSOR
FUEL SUB LEVEL SENSOR
FUEL LEVEL SENSOR
MFD
WASHER FLUID LEVEL SENSOR
DRIVER'S SEAT BELT SWITCH
AIRBAG CM

WI-61616

C/M-04

SR : WITH BSD/RCTA
TL : WITH TELEMATICS
WL : WITH AUTO HEADLIGHT BEAM LEVELER
*1 : SEAT BELT
BSD/RCTA
KEY WARNING
HEADLIGHT ON WARNING
CUSTOMIZED
MANUAL SHIFT
KEYLESS ACCESS

C/M-04

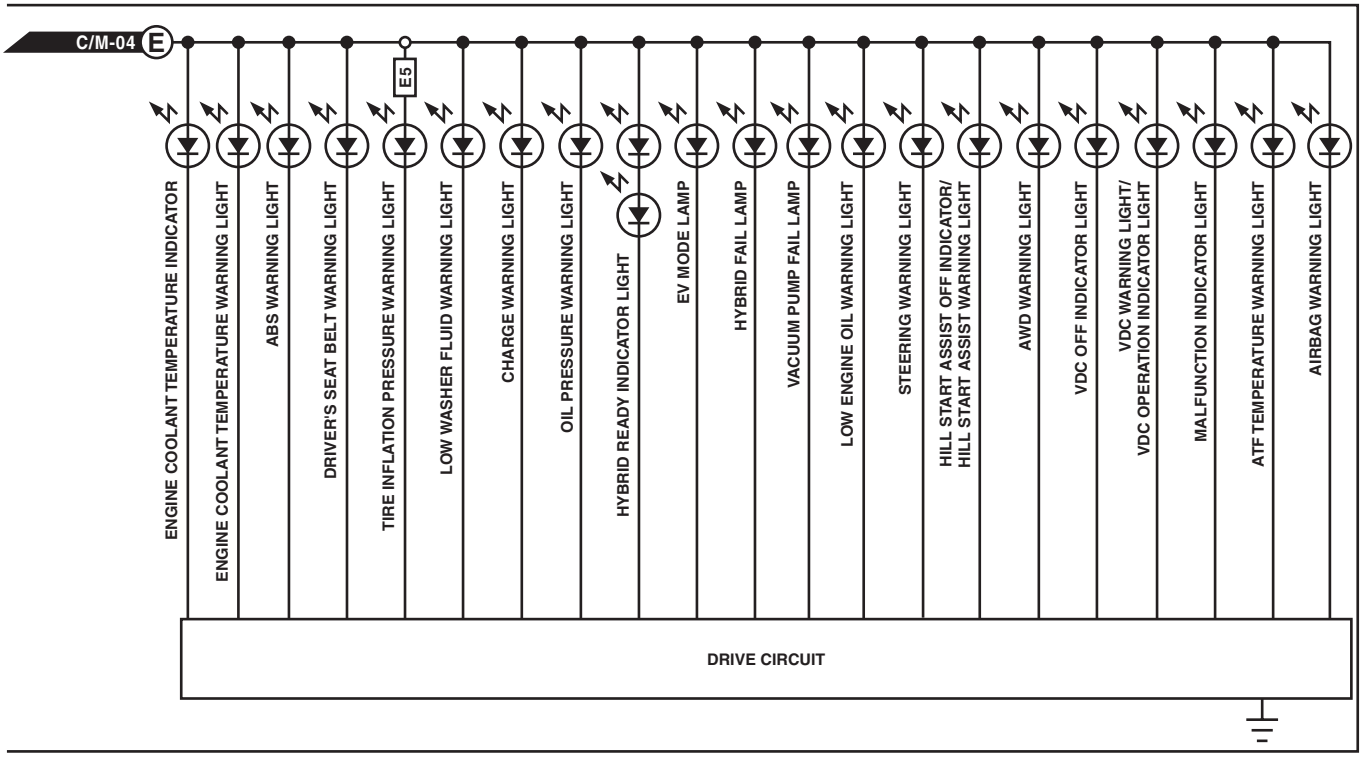


WI-61617

C/M-05

C/M-05

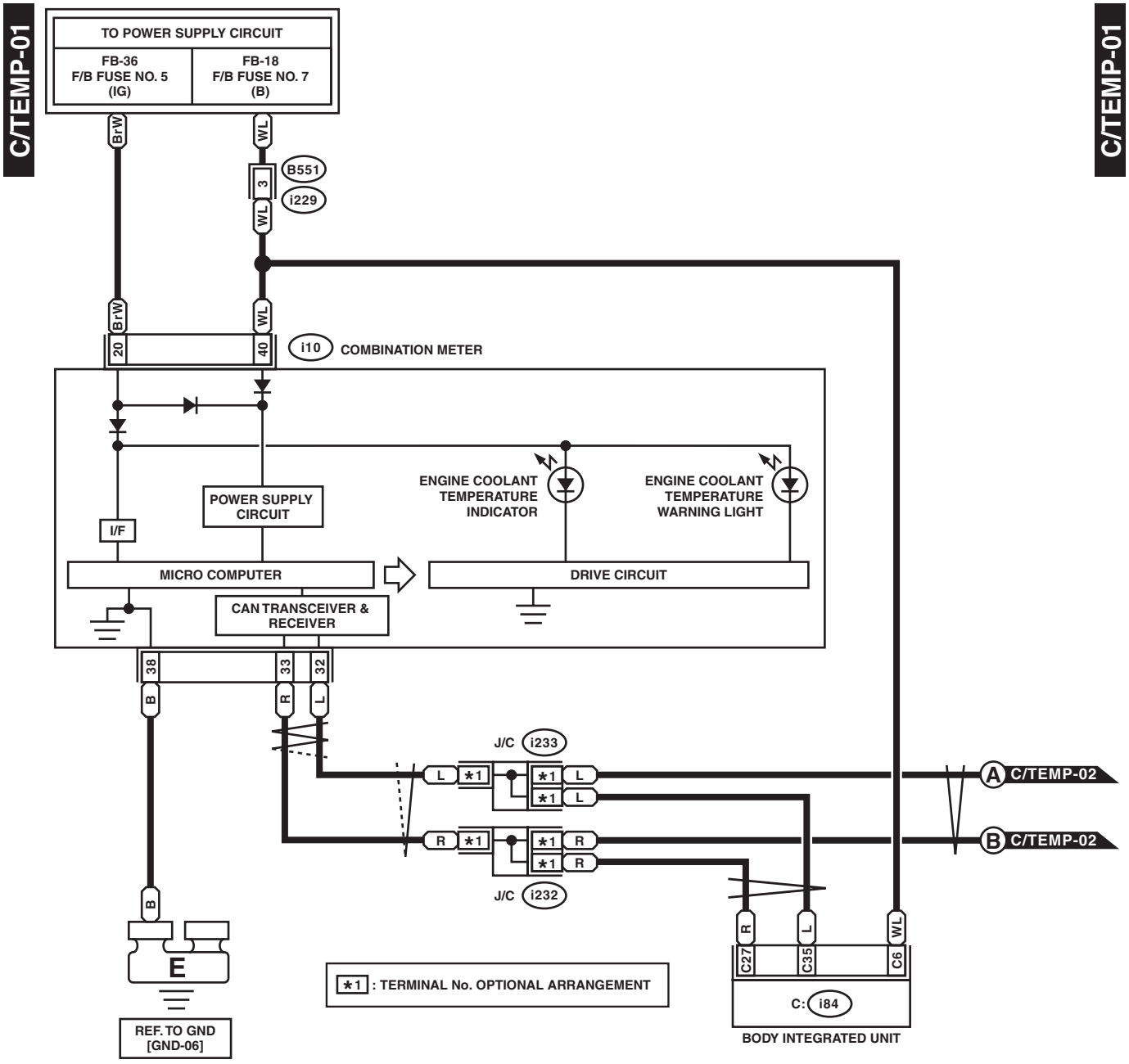
E5 : EXCEPT FOR C5 MODEL

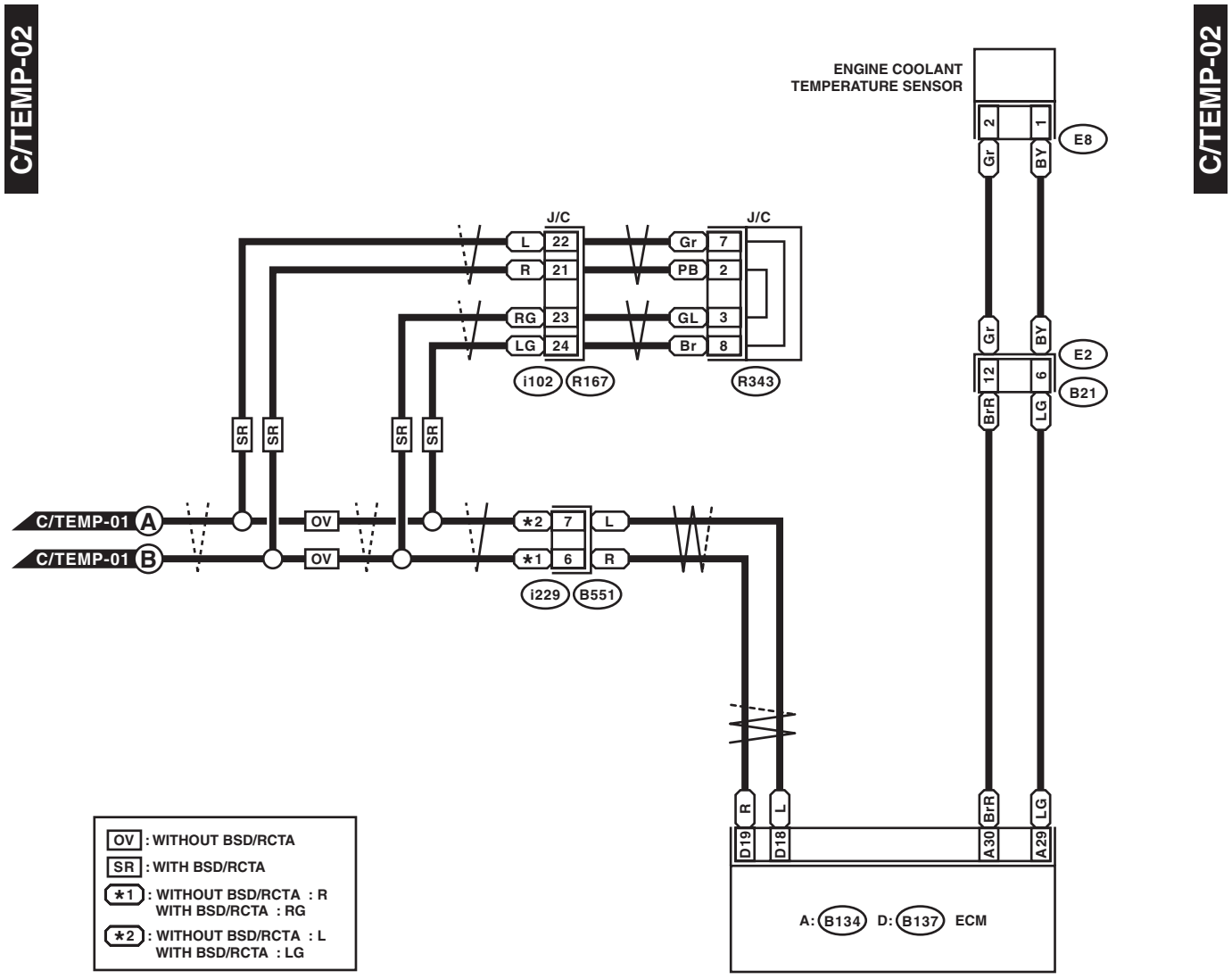


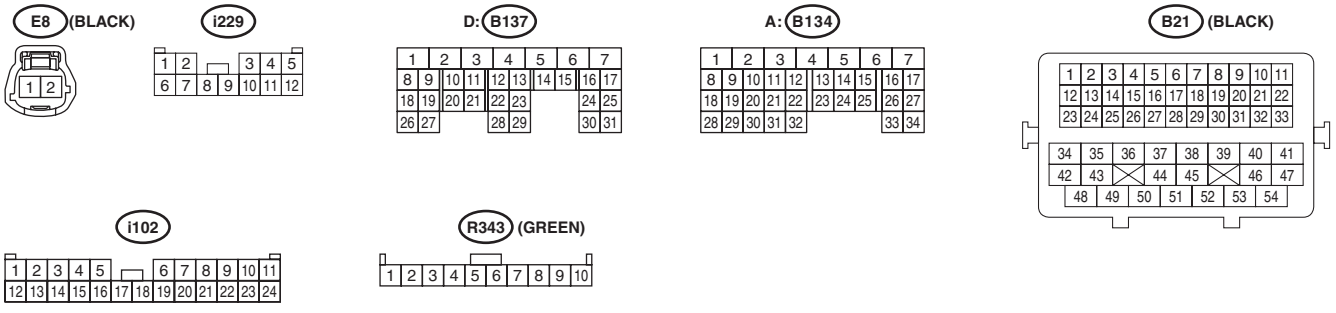
WI-63021

15.Coolant Temperature System

A: WIRING DIAGRAM



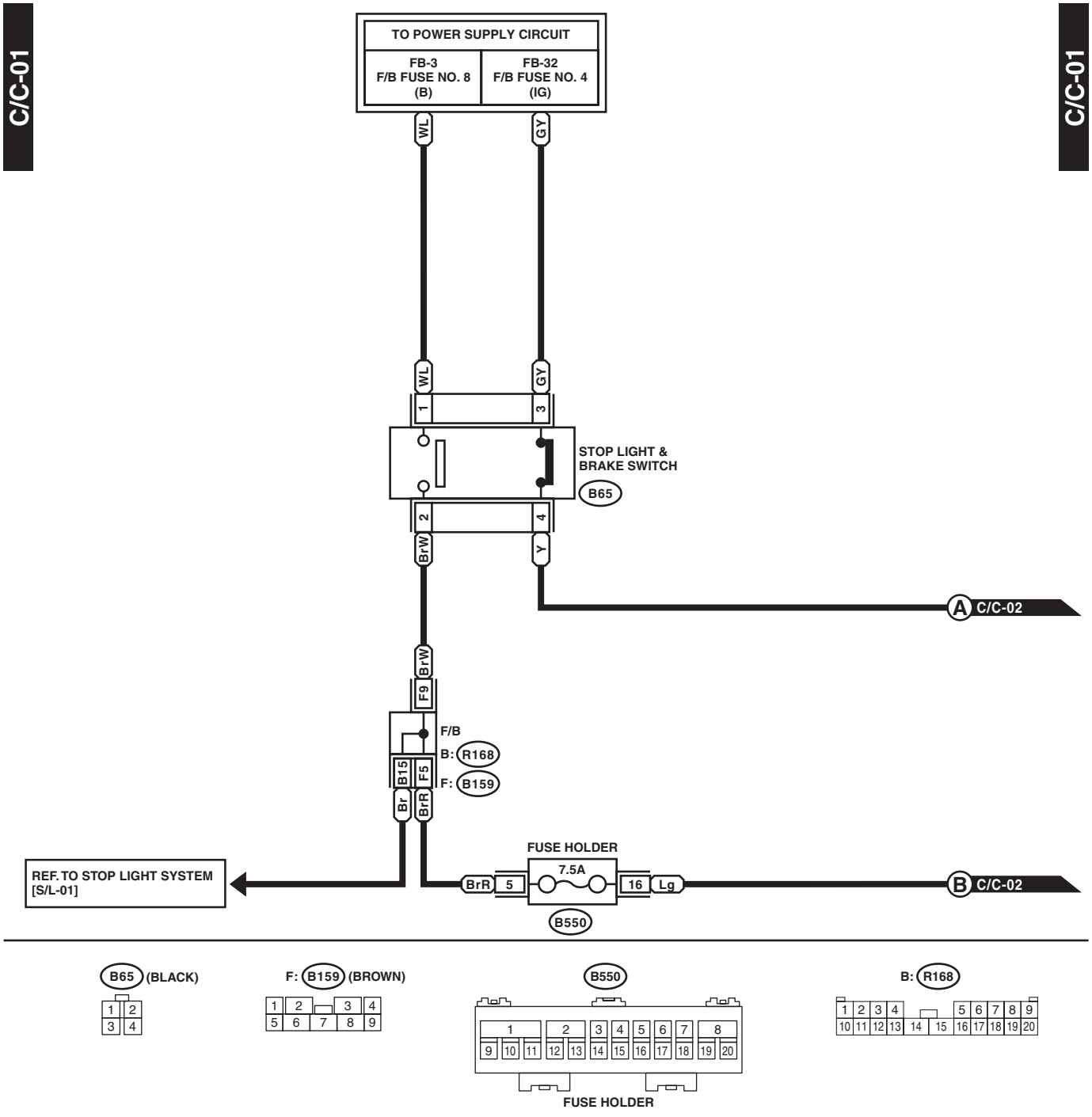

C/TEMP-02
C/TEMP-02
ENGINE COOLANT TEMPERATURE SENSOR
E8
2
1
Gr
BY
J/C
J/C
L
22
R
21
RG
23
LG
24
Gr
7
PB
2
GL
3
Br
8
i102
R167
R343
E2
12
6
B21
BrR
LG
SR
SR
SR
SR
C/TEMP-01 A
C/TEMP-01 B
OV
OV
*2
7
L
*1
6
R
i229
B551
R
L
BrR
LG
D19
D18
A30
A29
A: B134 D: B137 ECM
OV : WITHOUT BSD/RCTA
SR : WITH BSD/RCTA
*1 : WITHOUT BSD/RCTA : R
WITH BSD/RCTA : RG
*2 : WITHOUT BSD/RCTA : L
WITH BSD/RCTA : LG


E8 (BLACK)
i229
D: B137
A: B134
B21 (BLACK)
i102
R343 (GREEN)

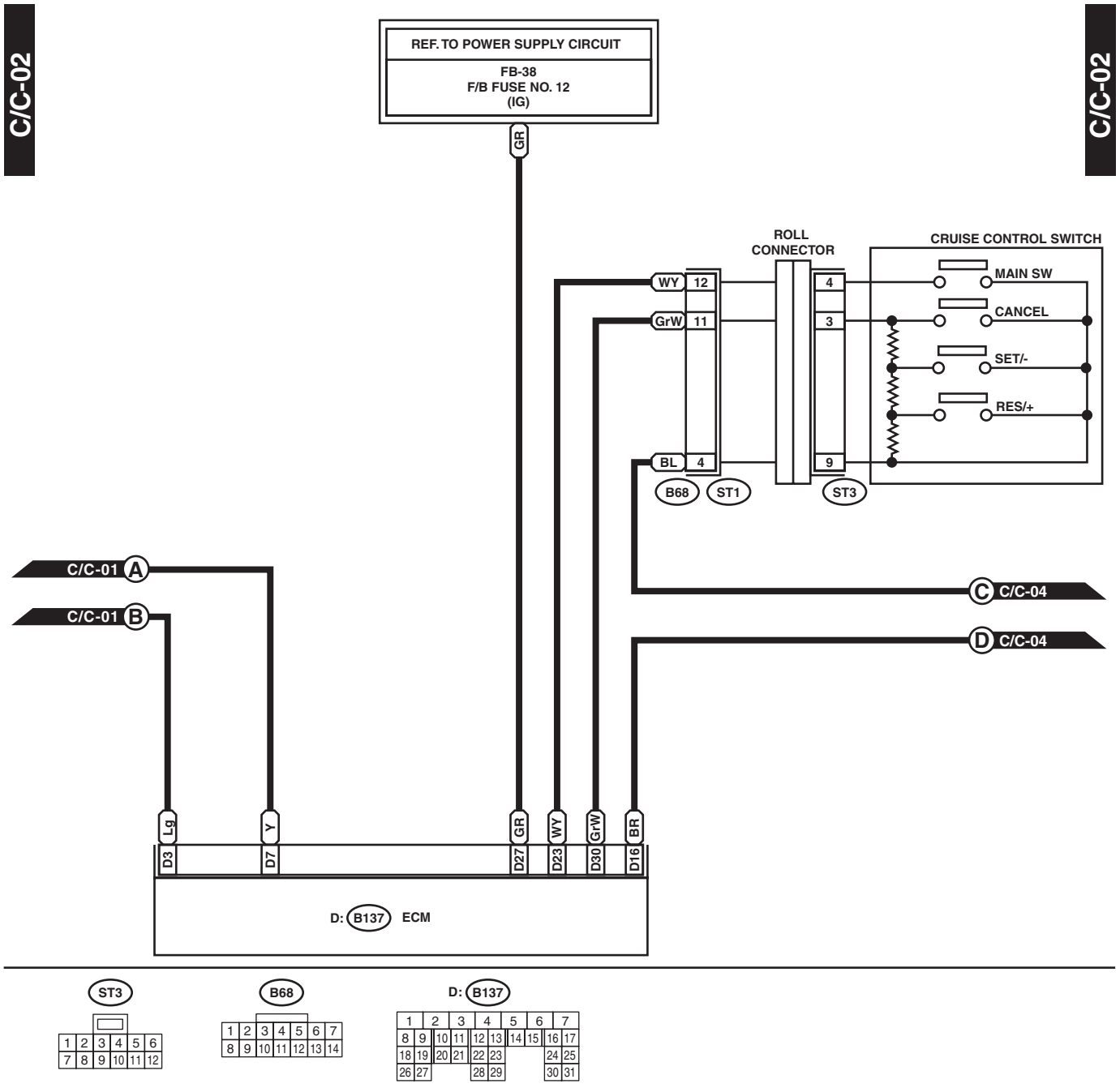
WI-63022

16.Cruise Control System

A: WIRING DIAGRAM



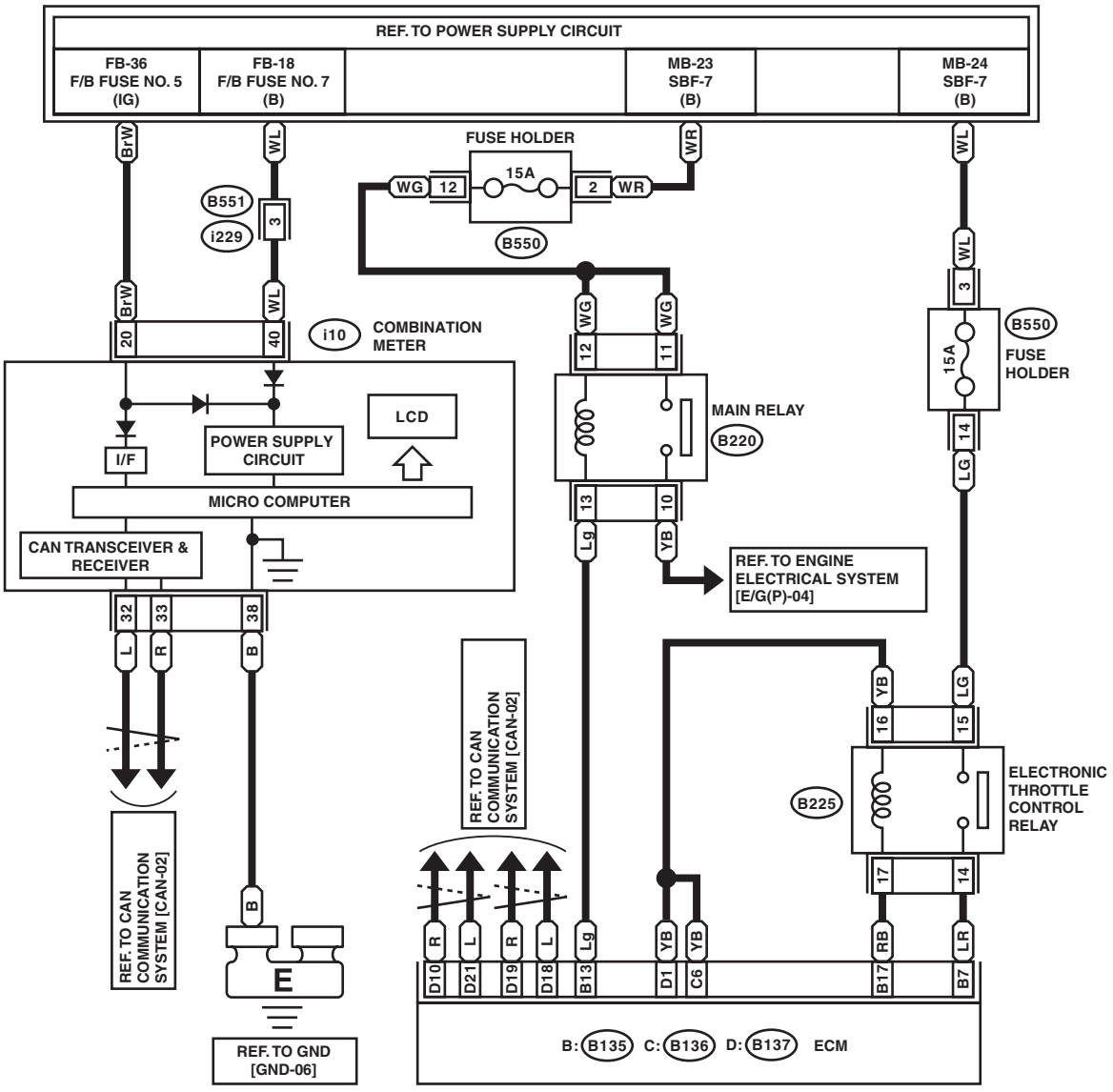
WI-41829

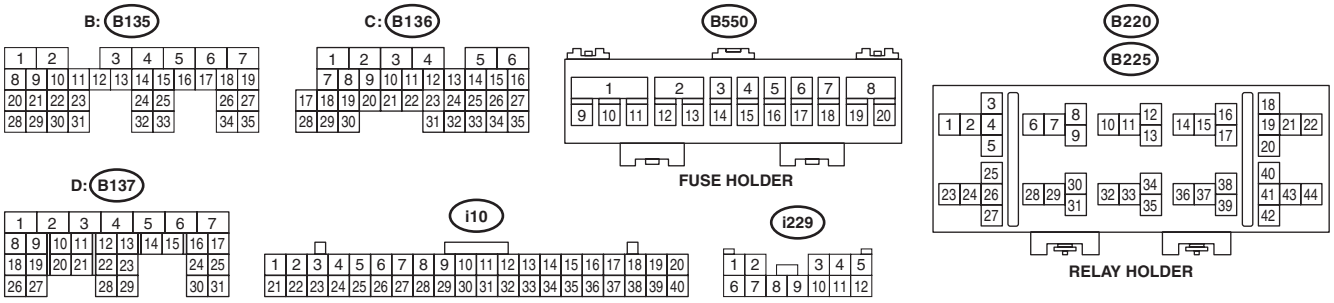

C/C-02
C/C-02
REF. TO POWER SUPPLY CIRCUIT
FB-38
F/B FUSE NO. 12
(IG)
GR
ROLL
CONNECTOR
CRUISE CONTROL SWITCH
WY
12
GrW
11
BL
4
4
3
9
MAIN SW
CANCEL
SET/-
RES/+
B68
ST1
ST3
C/C-01 A
C/C-01 B
C C/C-04
D C/C-04
Lg
Y
GR
WY
GrW
BR
D3
D7
D27
D23
D30
D16
D: B137 ECM

ST3
1 2 3 4 5 6
7 8 9 10 11 12
B68
1 2 3 4 5 6 7
8 9 10 11 12 13 14
D: B137
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25
26 27 28 29 30 31

WI-48081

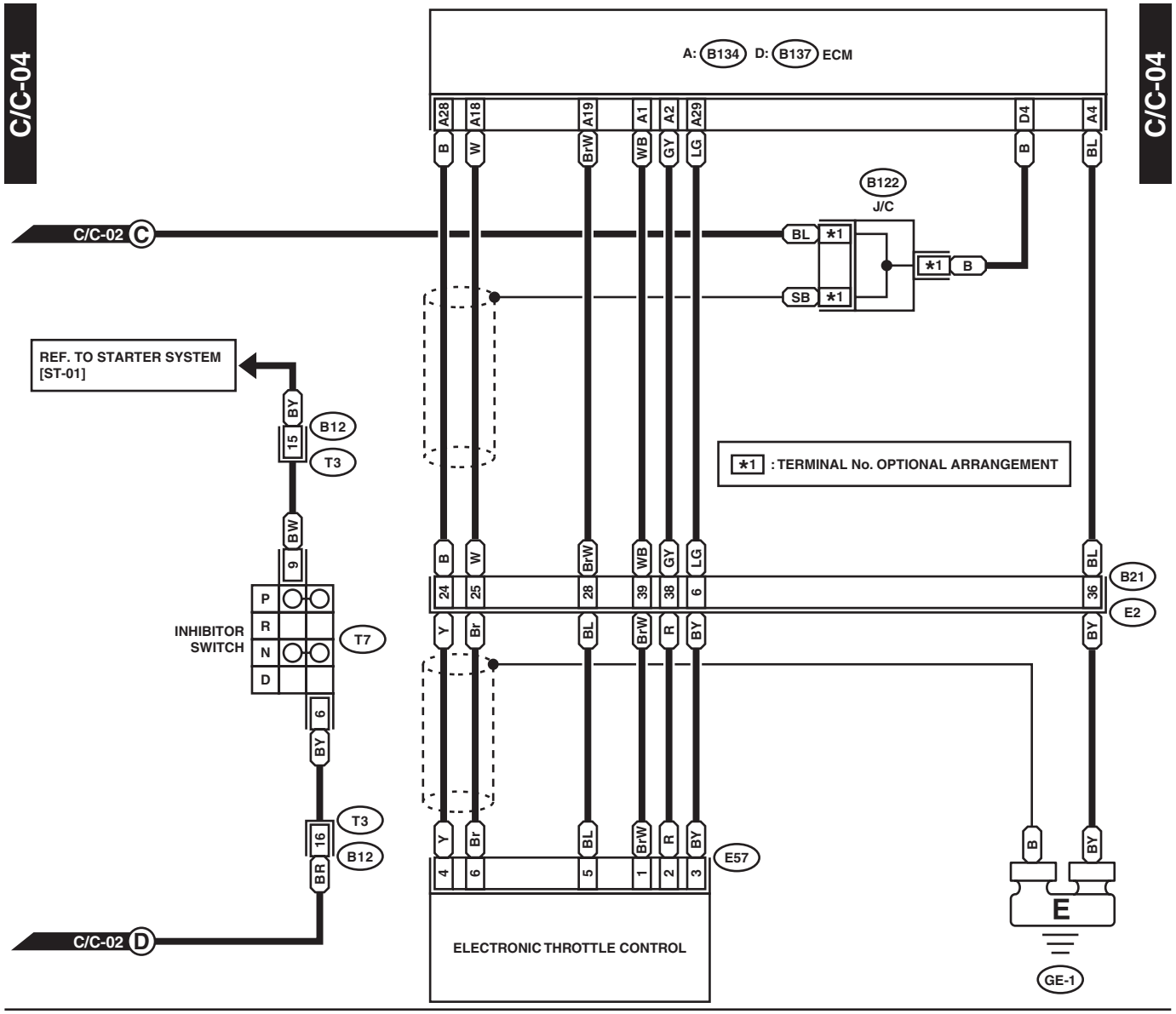
C/C-03

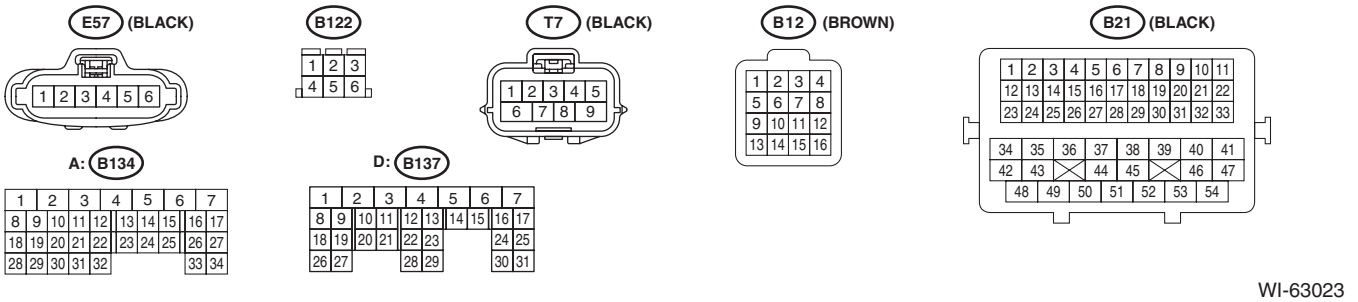




WI-61676

C/C-03

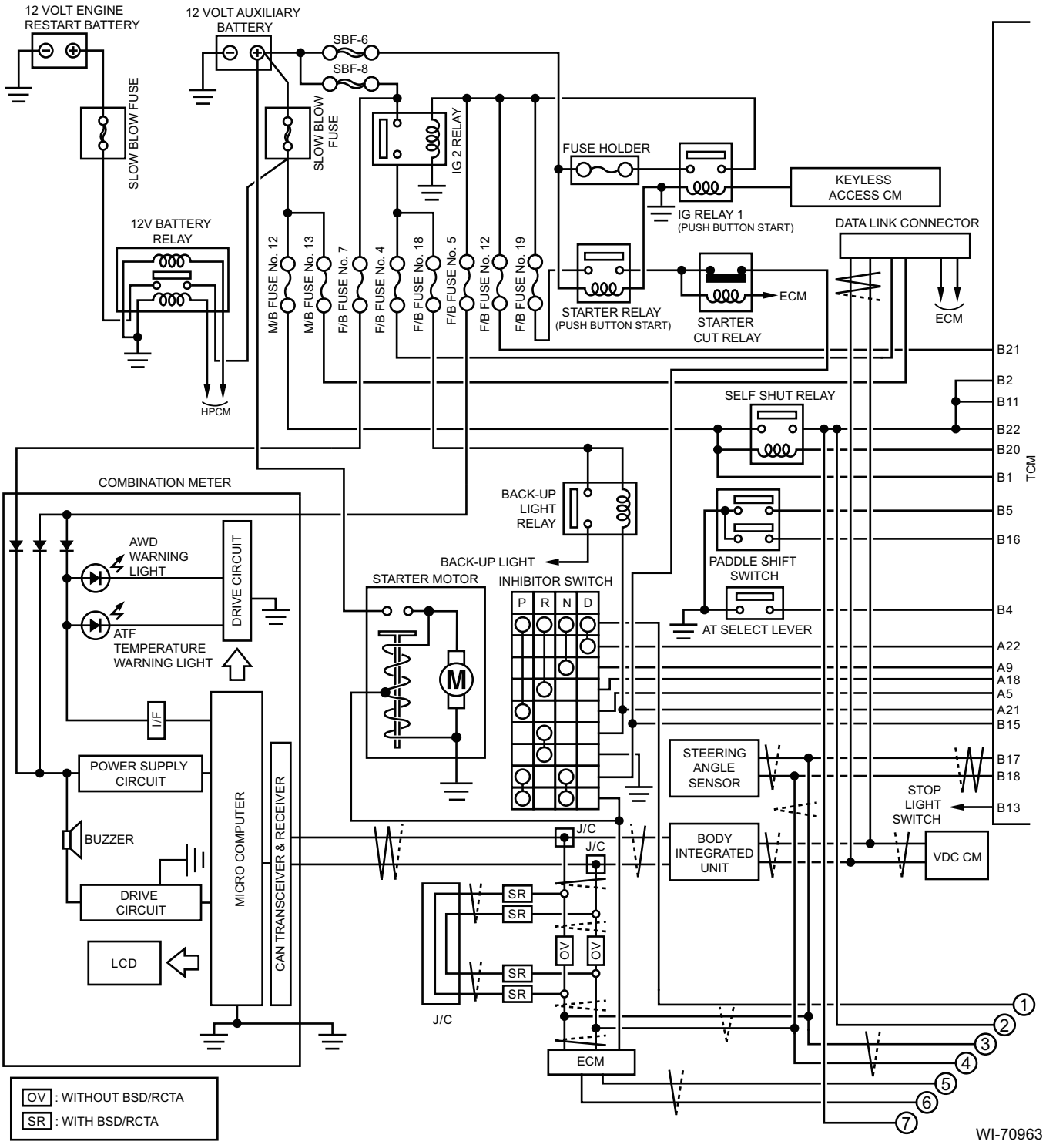

C/C-04
C/C-04
A: B134 D: B137 ECM
A28
A18
A19
A1
A2
A29
D4
A4
B
W
BrW
WB
GY
LG
B
BL
B122
J/C
C/C-02 C
BL *1
SB *1
*1 B
REF. TO STARTER SYSTEM [ST-01]
BY
15
B12
T3
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
BW
9
P
R
N
D
INHIBITOR SWITCH
T7
6
BY
T3
16
B12
BR
C/C-02 D
B
W
BrW
WB
GY
LG
BL
B21
24
25
28
39
38
6
36
E2
Y
Br
BL
BrW
R
BY
BY
Y
Br
BL
BrW
R
BY
E57
4
6
5
1
2
3
ELECTRONIC THROTTLE CONTROL
B
BY
E
GE-1

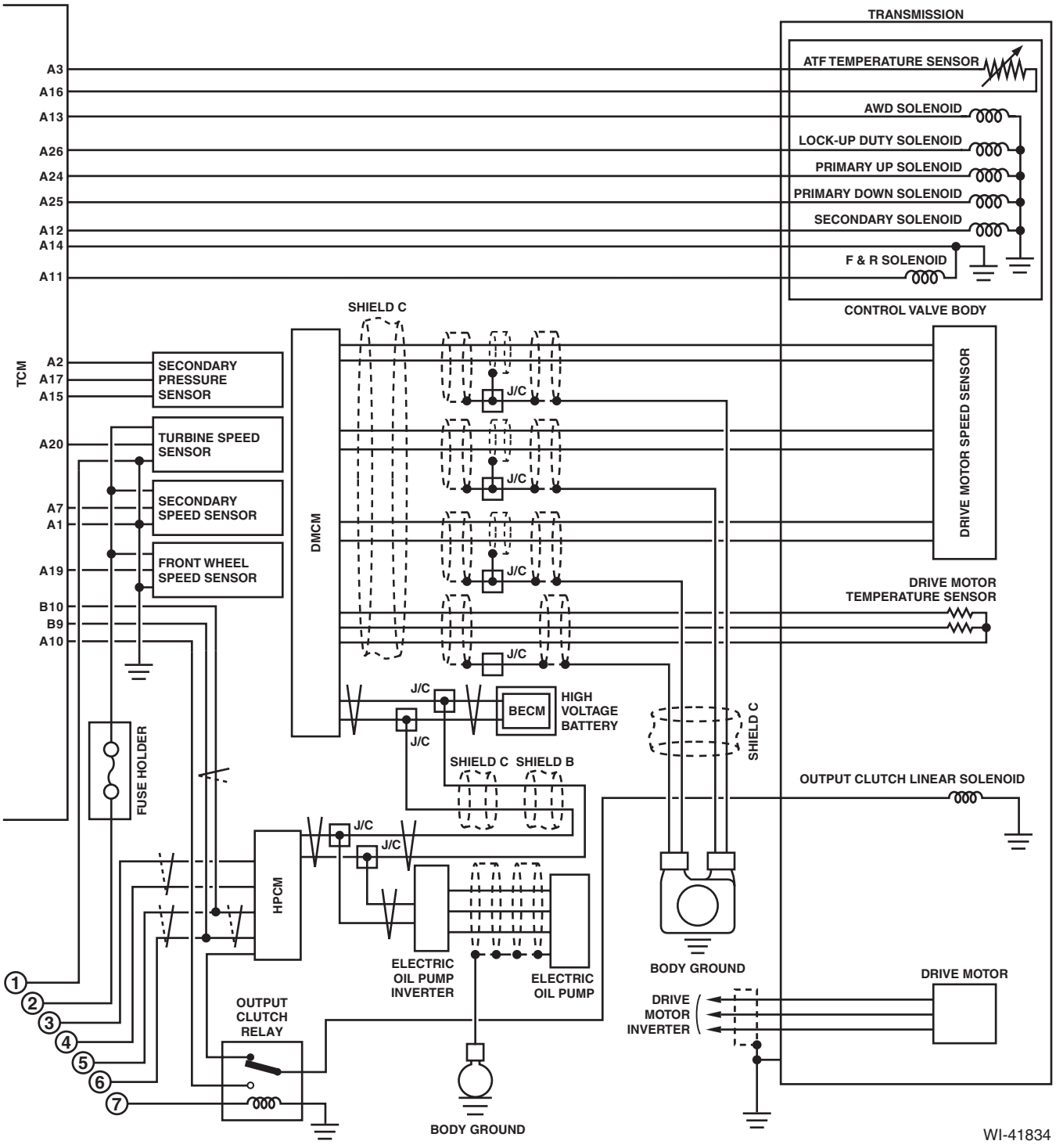

E57 (BLACK)
1 2 3 4 5 6
B122
1 2 3
4 5 6
T7 (BLACK)
1 2 3 4 5
6 7 8 9
B12 (BROWN)
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
B21 (BLACK)
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
23 24 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47
48 49 50 51 52 53 54
A: B134
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34
D: B137
1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25
26 27 28 29 30 31

WI-63023

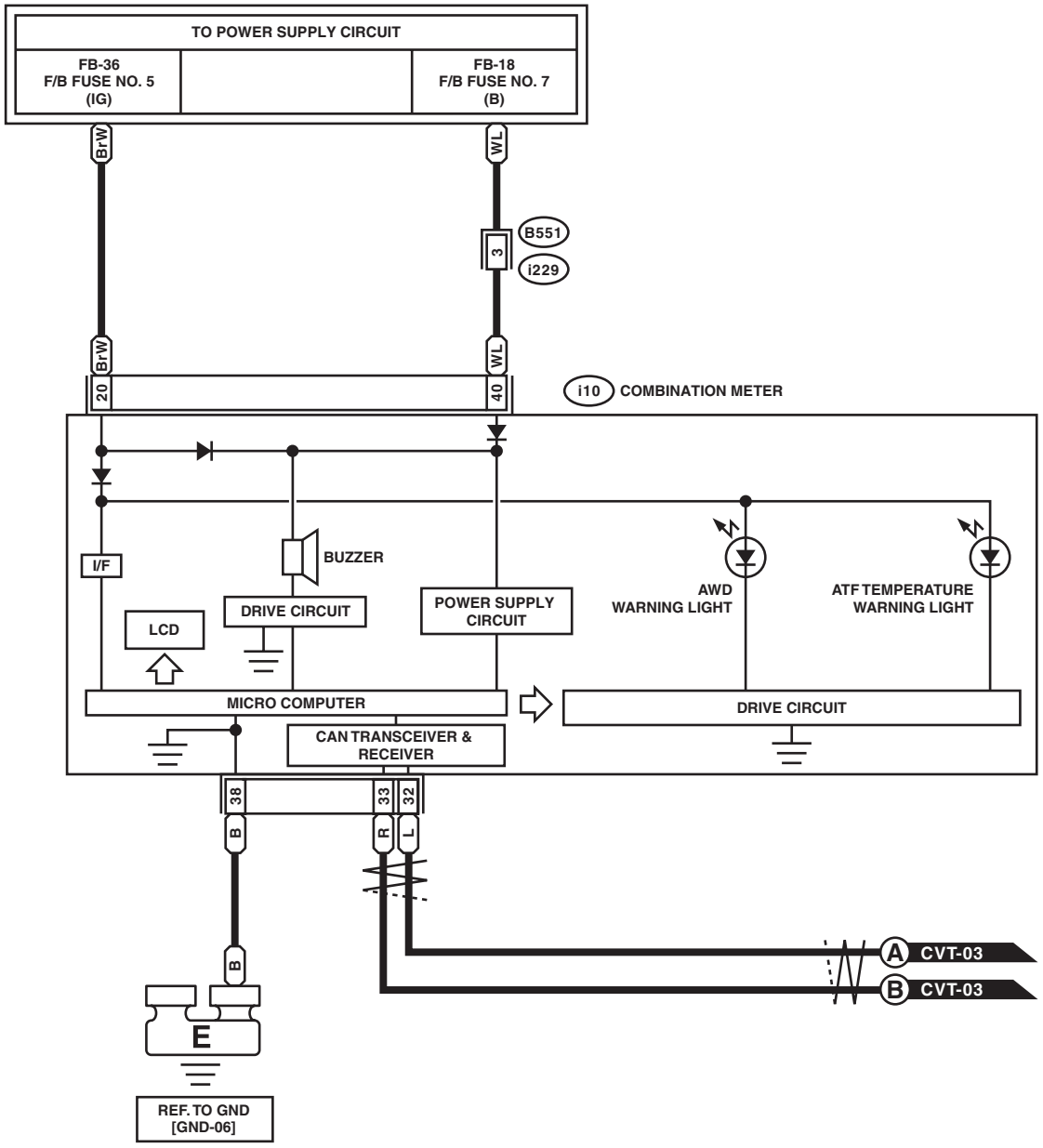
17.CVT Control System

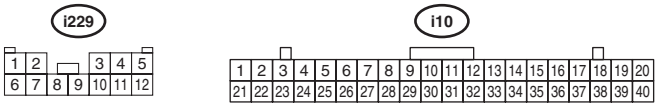
A: WIRING DIAGRAM




TRANSMISSION
ATF TEMPERATURE SENSOR
AWD SOLENOID
LOCK-UP DUTY SOLENOID
PRIMARY UP SOLENOID
PRIMARY DOWN SOLENOID
SECONDARY SOLENOID
F & R SOLENOID
CONTROL VALVE BODY
A3
A16
A13
A26
A24
A25
A12
A14
A11
TCM
A2
A17
A15
SECONDARY PRESSURE SENSOR
A20
TURBINE SPEED SENSOR
A7
A1
SECONDARY SPEED SENSOR
A19
FRONT WHEEL SPEED SENSOR
B10
B9
A10
SHIELD C
DMCM
J/C
DRIVE MOTOR SPEED SENSOR
DRIVE MOTOR TEMPERATURE SENSOR
BECM
HIGH VOLTAGE BATTERY
SHIELD C
SHIELD B
FUSE HOLDER
OUTPUT CLUTCH LINEAR SOLENOID
HPCM
ELECTRIC OIL PUMP INVERTER
ELECTRIC OIL PUMP
BODY GROUND
DRIVE MOTOR
DRIVE MOTOR INVERTER
OUTPUT CLUTCH RELAY
1
2
3
4
5
6
7
BODY GROUND
WI-41834

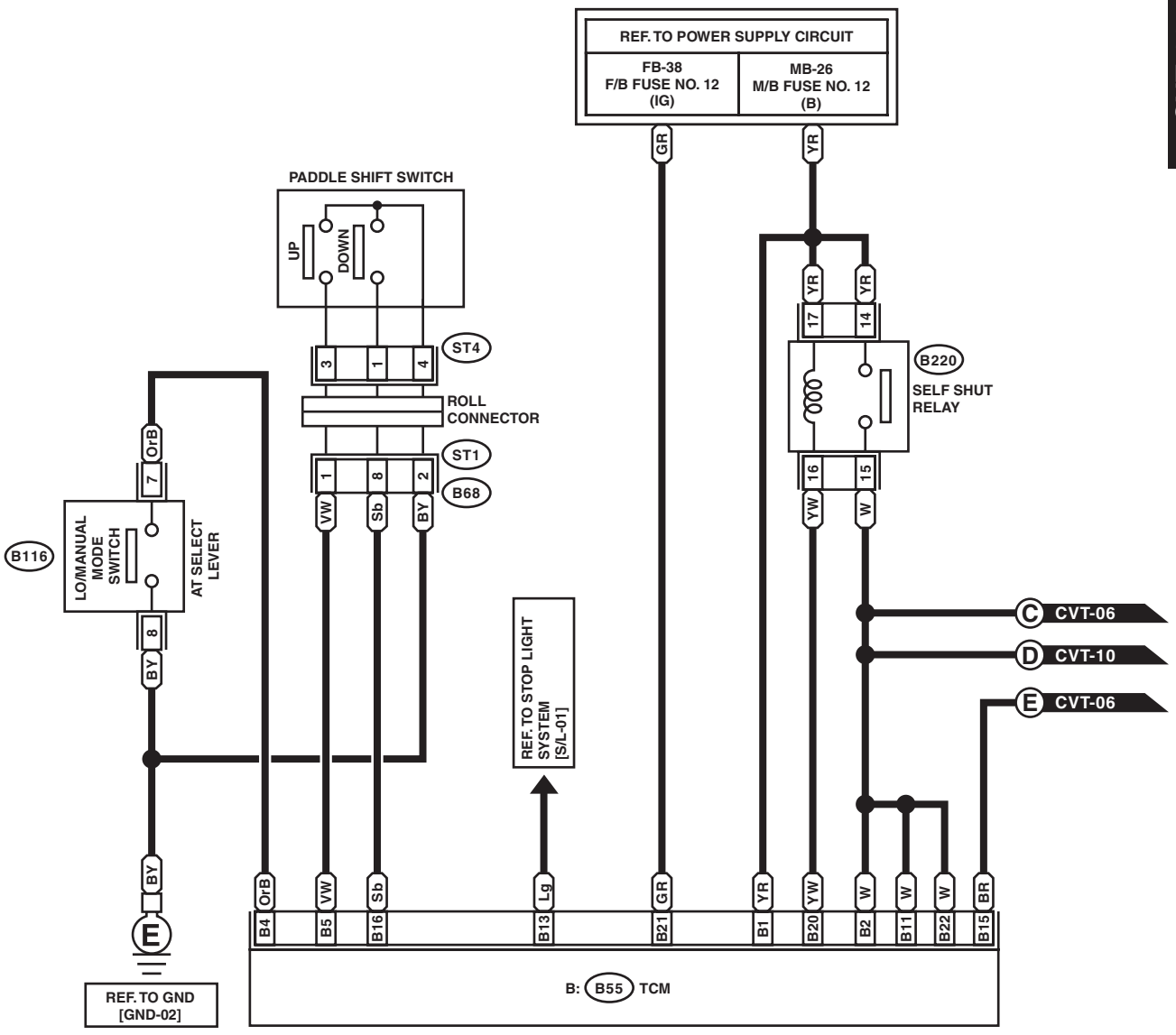
CVT-01

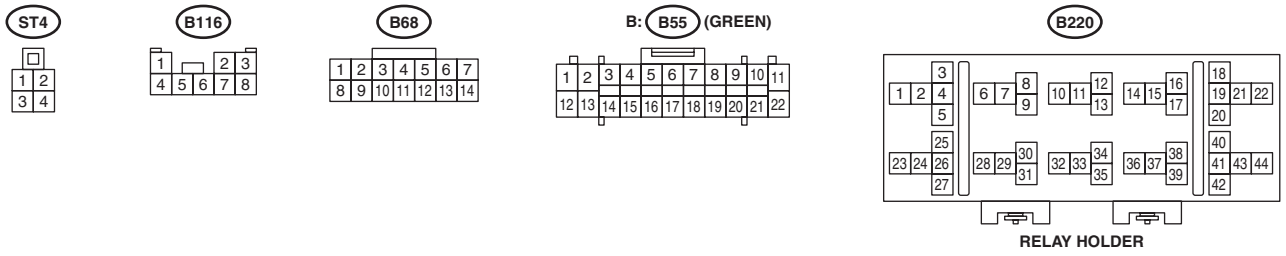




WI-41835

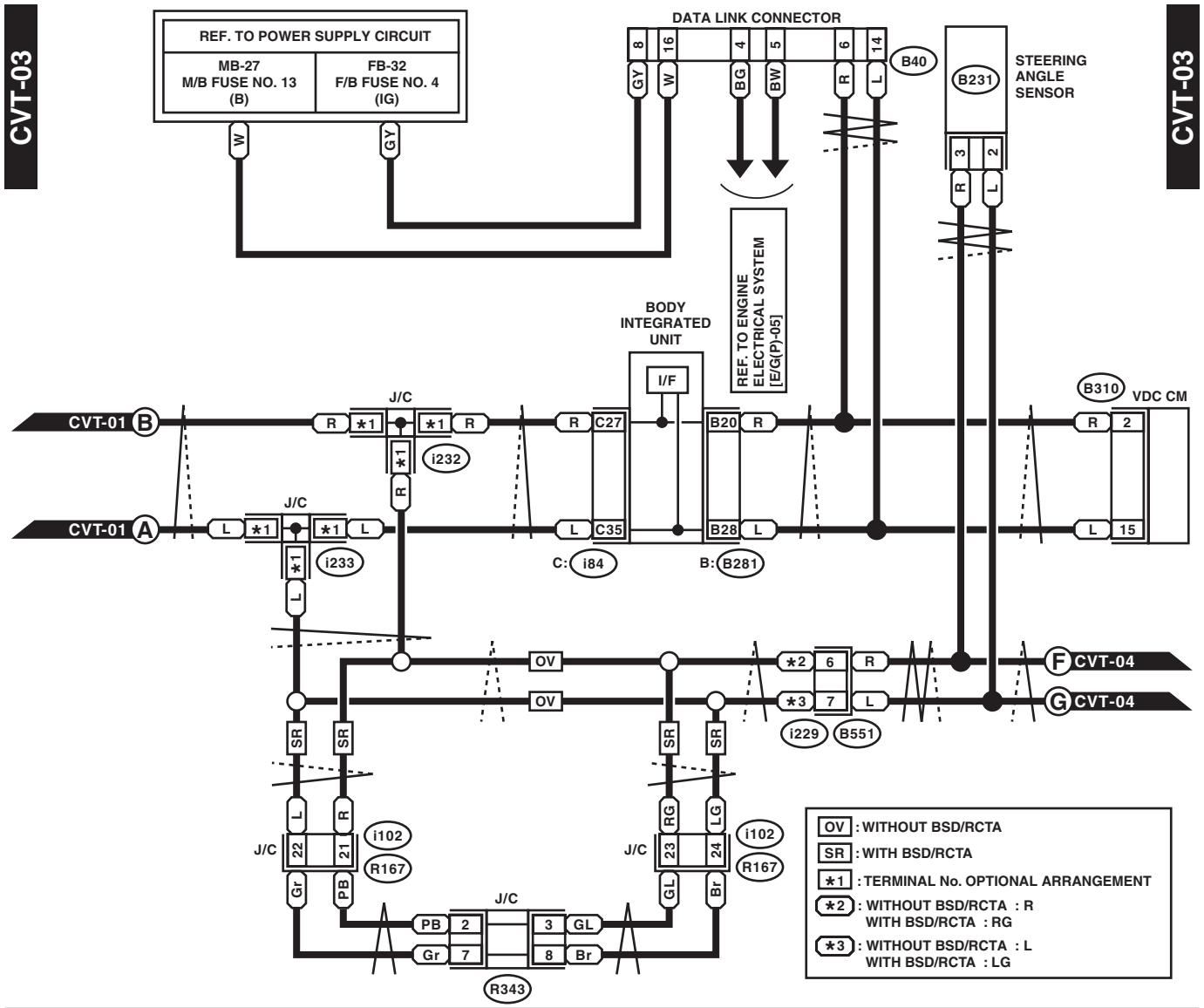
CVT-02

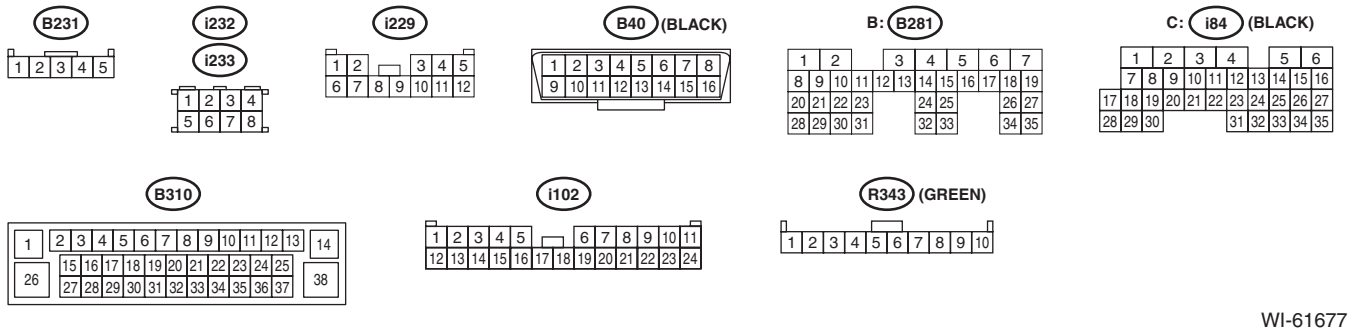




WI-48082

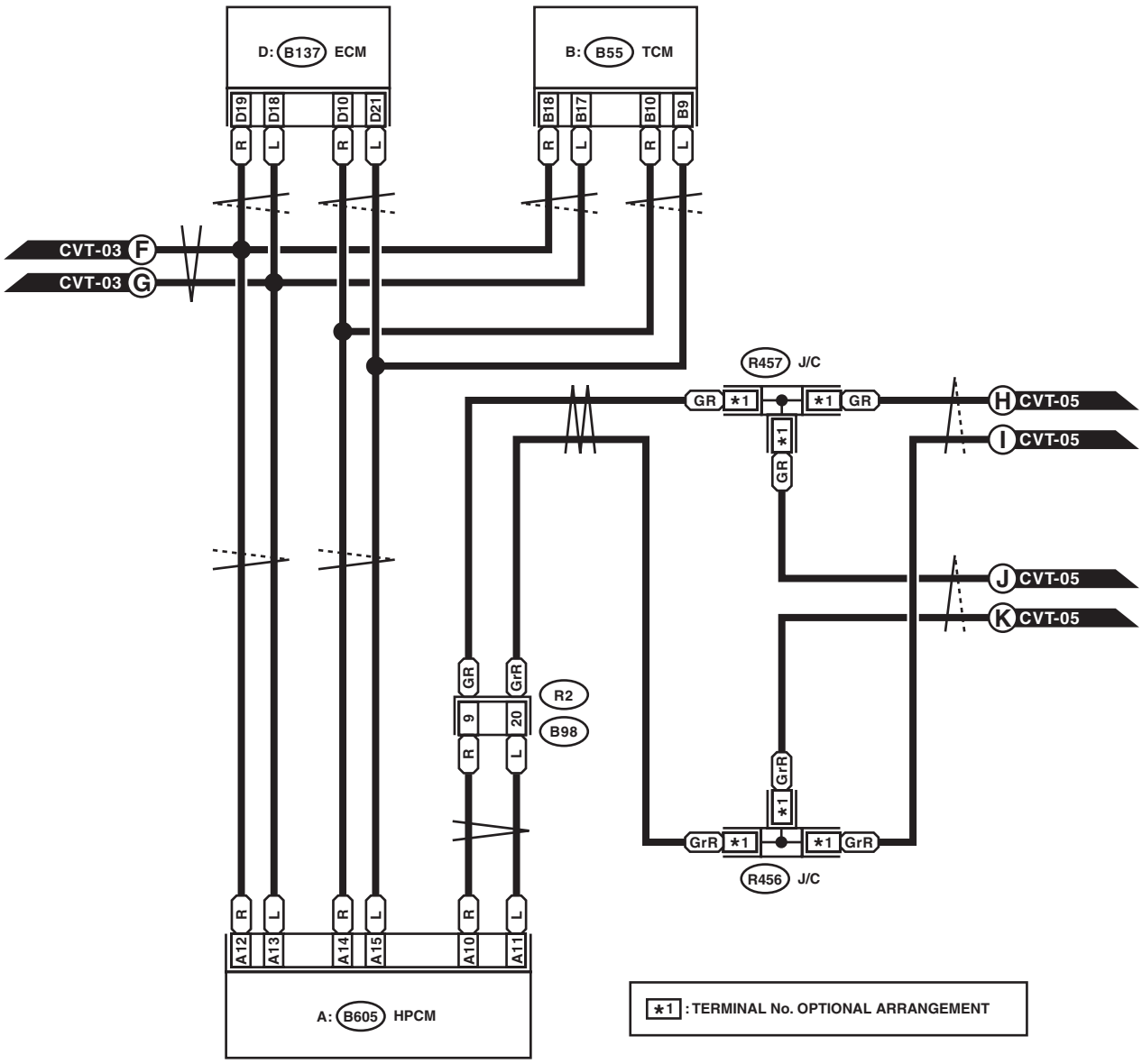
WIRING SYSTEM

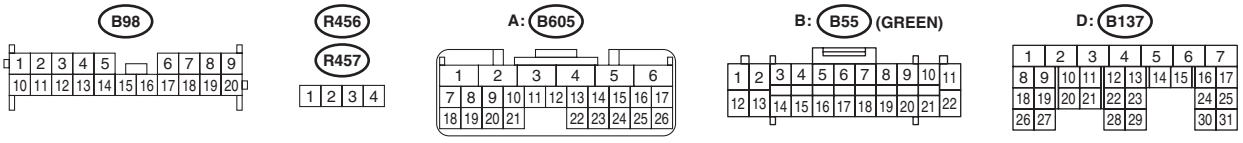




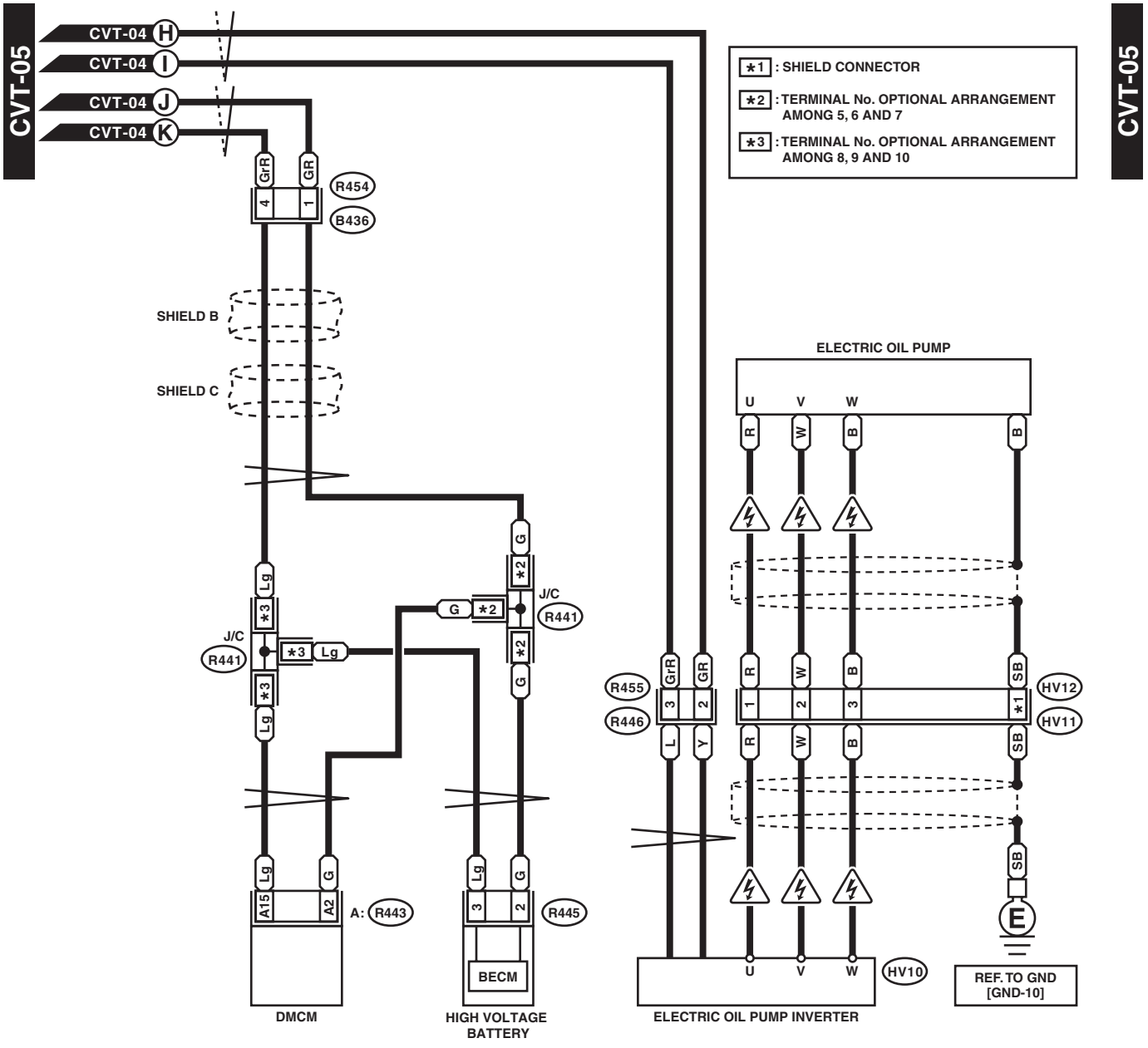
WI-61677

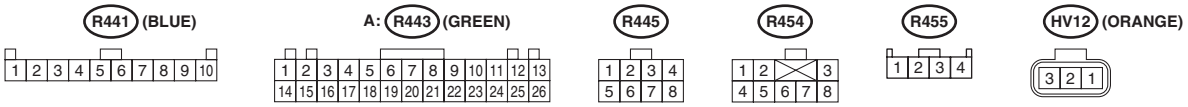
CVT-04



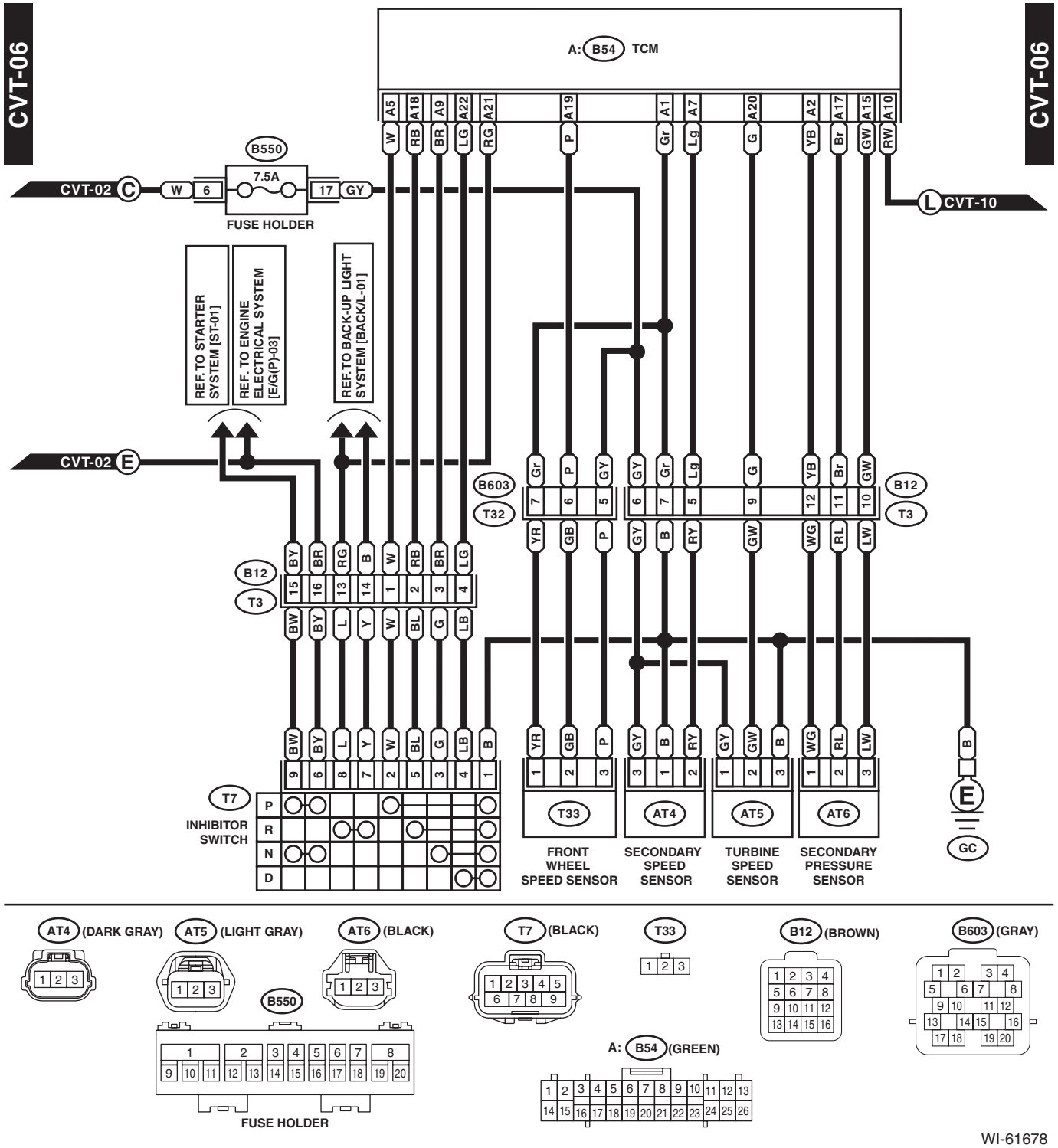


WI-48708


CVT-05
CVT-04 H
CVT-04 I
CVT-04 J
CVT-04 K
*1 : SHIELD CONNECTOR
*2 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 5, 6 AND 7
*3 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 8, 9 AND 10
R454
B436
SHIELD B
SHIELD C
J/C
R441
R455
R446
ELECTRIC OIL PUMP
HV12
HV11
HV10
REF. TO GND [GND-10]
A: R443
R445
DMCM
HIGH VOLTAGE BATTERY
BECM
ELECTRIC OIL PUMP INVERTER

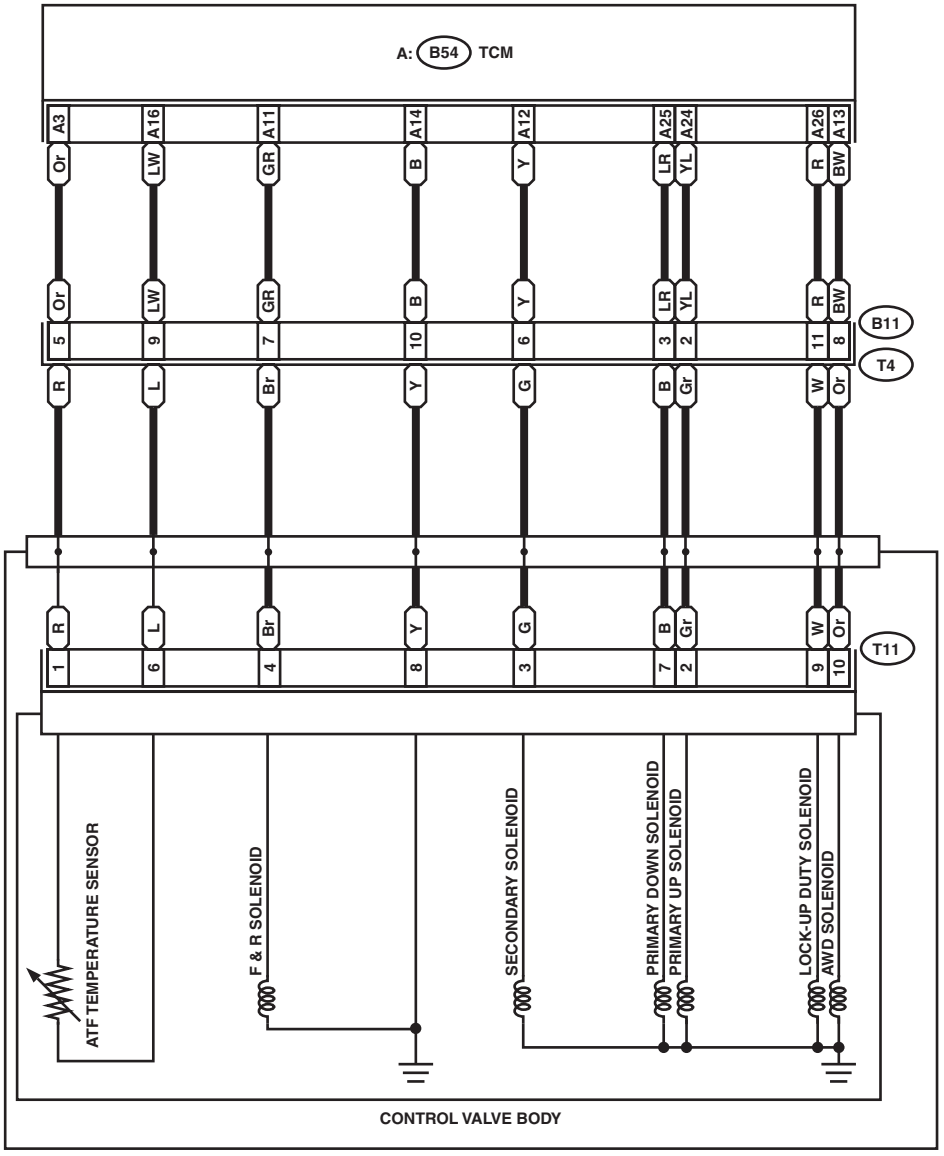

R441 (BLUE)
A: R443 (GREEN)
R445
R454
R455
HV12 (ORANGE)

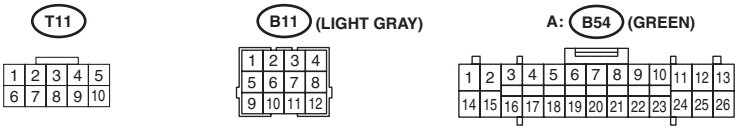
WI-41839


CVT-06
CVT-06
A: B54 TCM
A5 A18 A9 A22 A21 A19 A1 A7 A20 A2 A17 A15 A10
W RB BR LG RG P Gr Lg G YB Br GW RW
B550
7.5A
FUSE HOLDER
CVT-02 C
W 6
17 GY
L CVT-10
REF. TO STARTER SYSTEM [ST-01]
REF. TO ENGINE ELECTRICAL SYSTEM [E/G(P)-03]
REF. TO BACK-UP LIGHT SYSTEM [BACK/L-01]
CVT-02 E
B603
T32
B12
T3
BY BR RG B W RB BR LG
BW BY L Y W BL G LB
YR GB P GY B RY GW WG RL LW
B
T7
INHIBITOR SWITCH
P
R
N
D
T33
AT4
AT5
AT6
FRONT WHEEL SPEED SENSOR
SECONDARY SPEED SENSOR
TURBINE SPEED SENSOR
SECONDARY PRESSURE SENSOR
E
GC

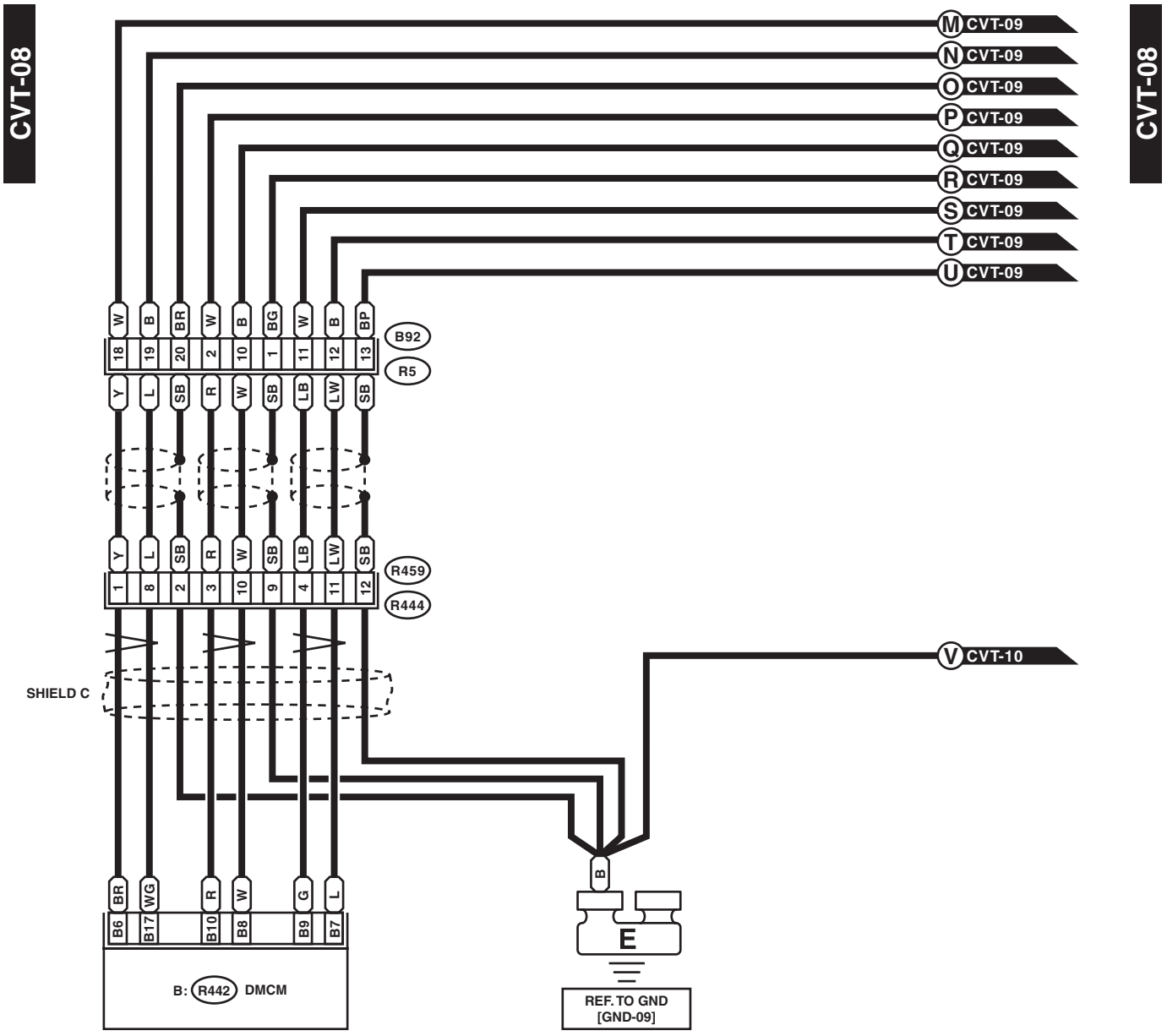
AT4 (DARK GRAY)
AT5 (LIGHT GRAY)
AT6 (BLACK)
T7 (BLACK)
T33
B12 (BROWN)
B603 (GRAY)
B550
FUSE HOLDER
A: B54 (GREEN)

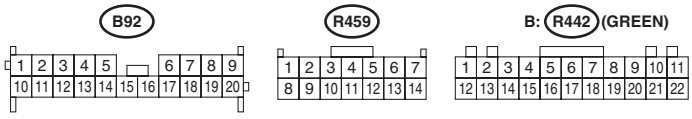
WI-61678


A: B54 TCM
A3
A16
A11
A14
A12
A25
A24
A26
A13
Or
LW
GR
B
Y
LR
YL
R
BW
5
9
7
10
6
3
2
11
8
B11
T4
R
L
Br
Y
G
B
Gr
W
Or
1
6
4
8
3
7
2
9
10
T11
ATF TEMPERATURE SENSOR
F & R SOLENOID
SECONDARY SOLENOID
PRIMARY DOWN SOLENOID
PRIMARY UP SOLENOID
LOCK-UP DUTY SOLENOID
AWD SOLENOID
CONTROL VALVE BODY
TRANSMISSION

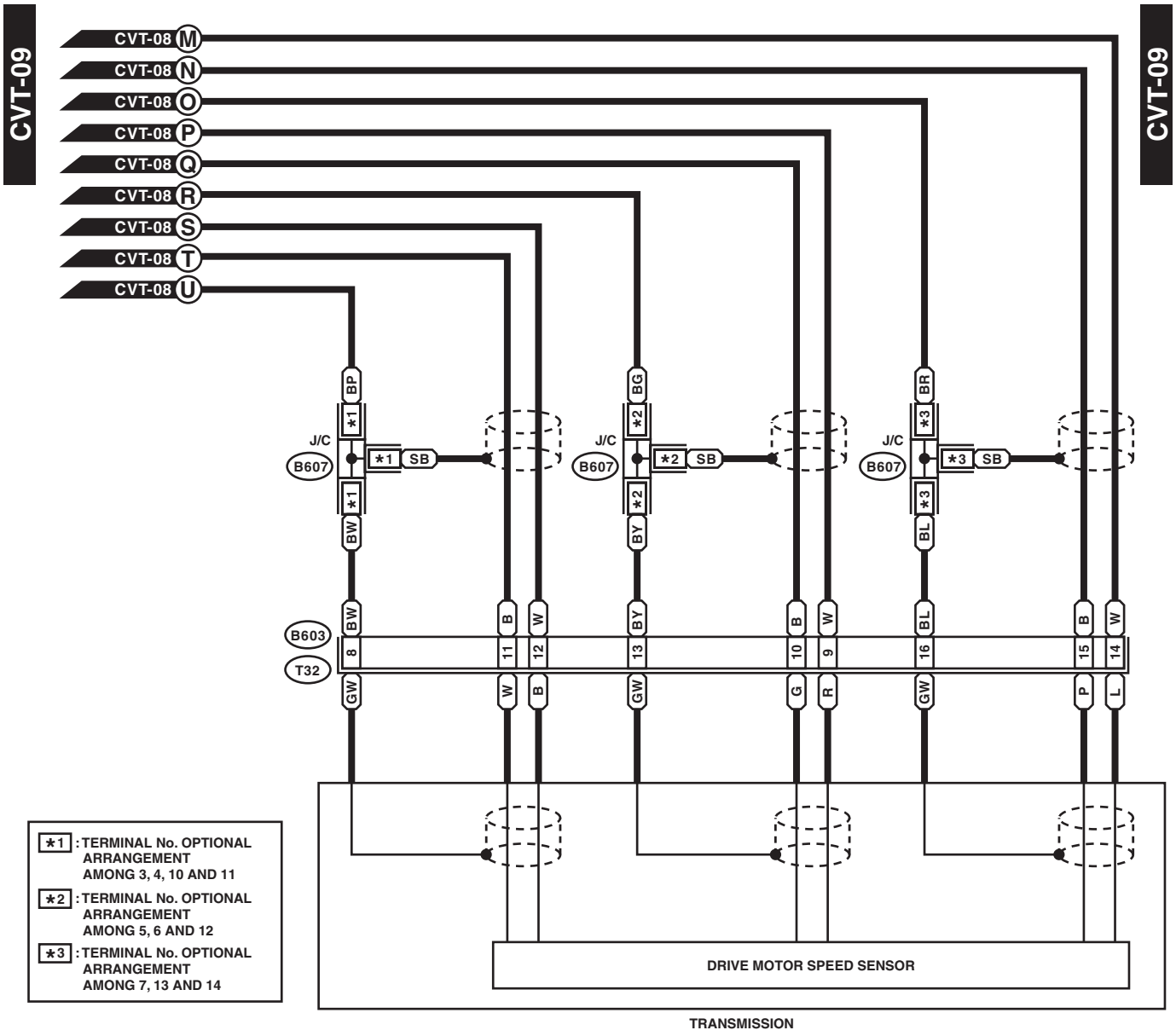

T11
1 2 3 4 5
6 7 8 9 10
B11 (LIGHT GRAY)
1 2 3 4
5 6 7 8
9 10 11 12
A: B54 (GREEN)
1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18 19 20 21 22 23 24 25 26

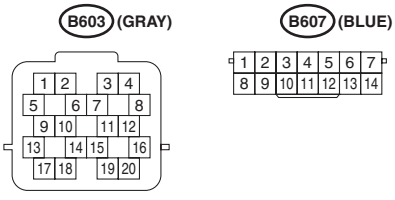
WI-41841


CVT-08
CVT-08
M CVT-09
N CVT-09
O CVT-09
P CVT-09
Q CVT-09
R CVT-09
S CVT-09
T CVT-09
U CVT-09
B92
R5
R459
R444
V CVT-10
SHIELD C
B
E
REF. TO GND
[GND-09]
B: R442 DMCM

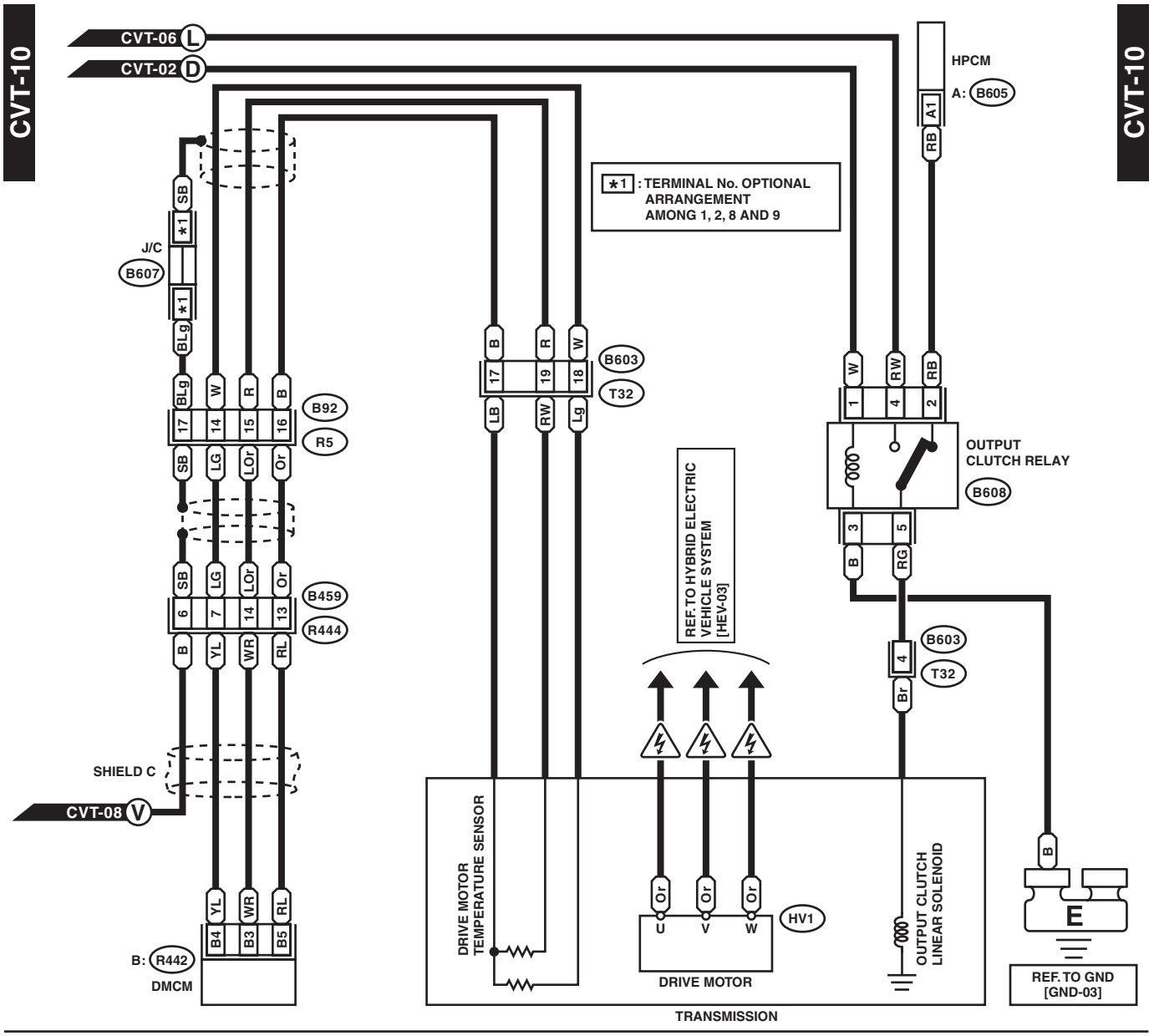

B92
R459
B: R442 (GREEN)

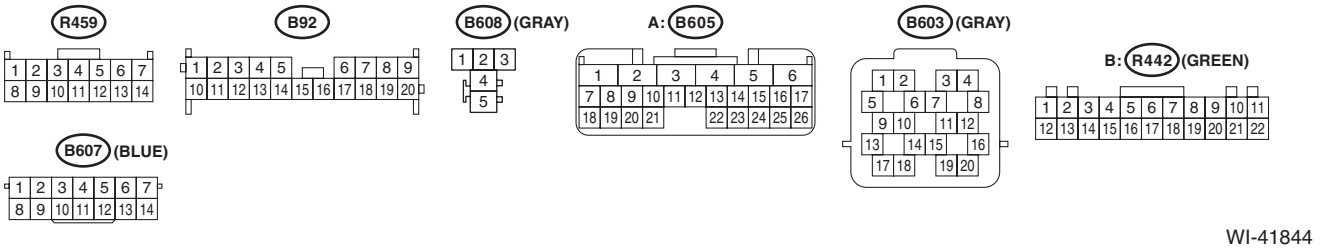
WI-41842


CVT-09
CVT-09
CVT-08 M
CVT-08 N
CVT-08 O
CVT-08 P
CVT-08 Q
CVT-08 R
CVT-08 S
CVT-08 T
CVT-08 U
J/C
B607
J/C
B607
J/C
B607
BP
BW
BG
BY
BR
BL
B603
T32
GW
W
B
G
R
P
L
DRIVE MOTOR SPEED SENSOR
TRANSMISSION
*1 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 3, 4, 10 AND 11
*2 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 5, 6 AND 12
*3 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 7, 13 AND 14


B603 (GRAY)
B607 (BLUE)

WI-41843

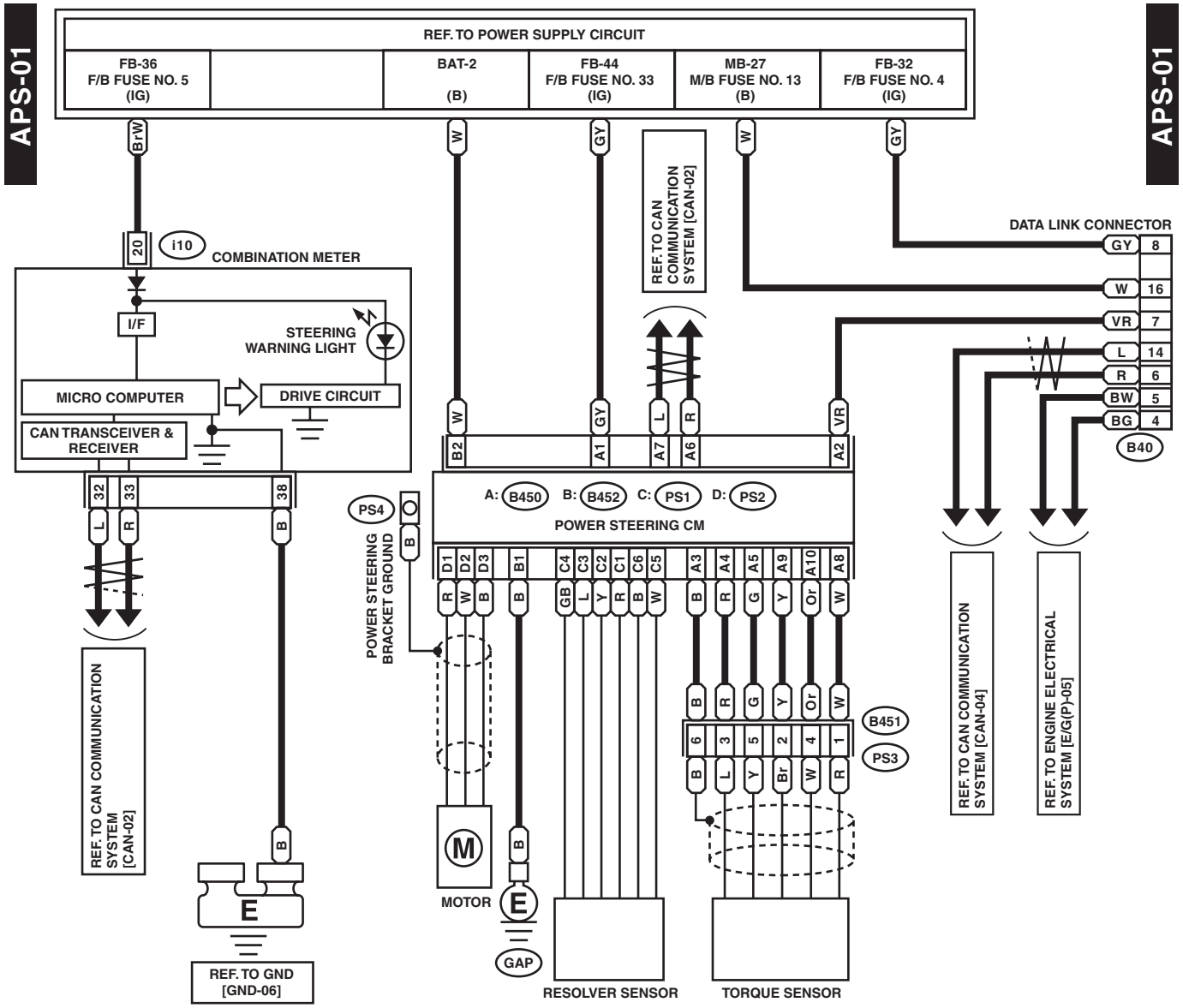

CVT-10
CVT-06 L
CVT-02 D
HPCM
A: B605
A1
RB
*1 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 1, 2, 8 AND 9
J/C
B607
SB
BLg
B603
T32
17
19
18
LB
RW
Lg
B92
R5
W
R
B
14
15
16
LG
LOr
Or
B459
R444
6
7
13
YL
WR
RL
REF. TO HYBRID ELECTRIC VEHICLE SYSTEM [HEV-03]
OUTPUT CLUTCH RELAY
B608
1
4
2
3
5
RG
Br
SHIELD C
CVT-08 V
DRIVE MOTOR TEMPERATURE SENSOR
B4
B3
B5
B: R442
DMCM
U
V
W
HV1
DRIVE MOTOR
OUTPUT CLUTCH LINEAR SOLENOID
E
REF. TO GND [GND-03]
TRANSMISSION

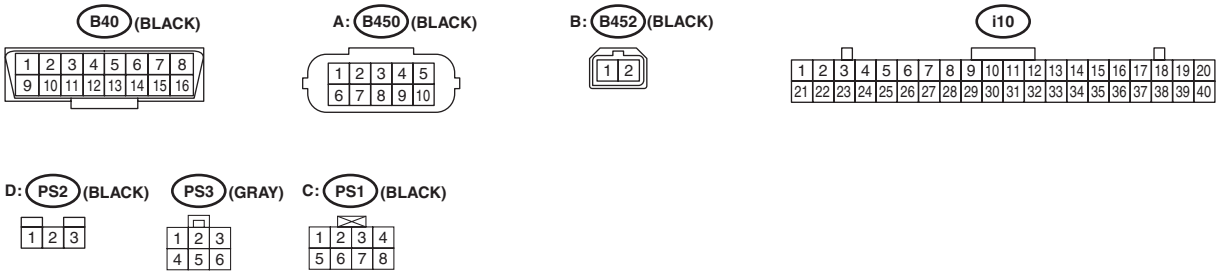

R459
B92
B608 (GRAY)
A: B605
B603 (GRAY)
B: R442 (GREEN)
B607 (BLUE)

WI-41844

18.Electric Power Steering System

A: WIRING DIAGRAM

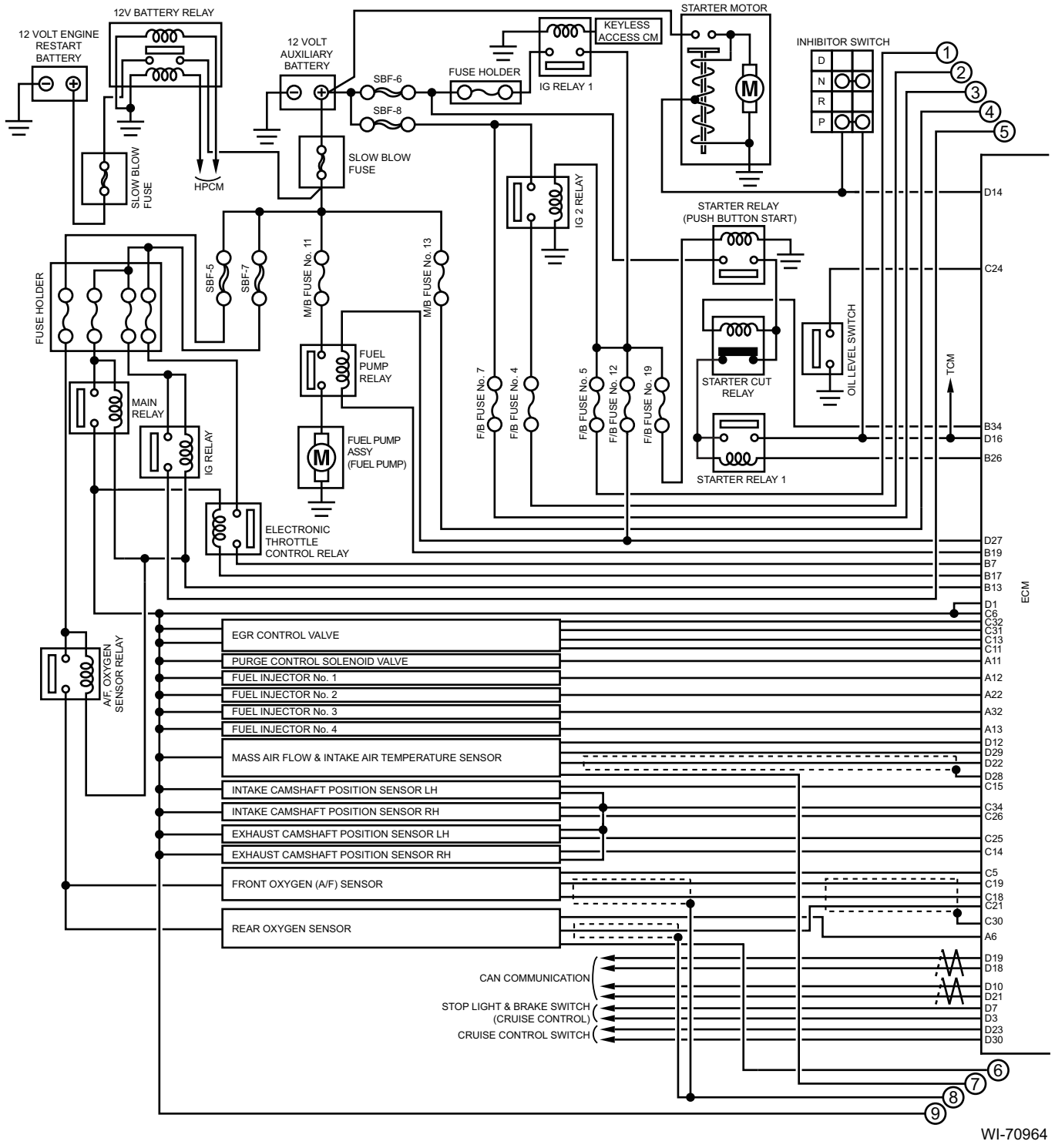


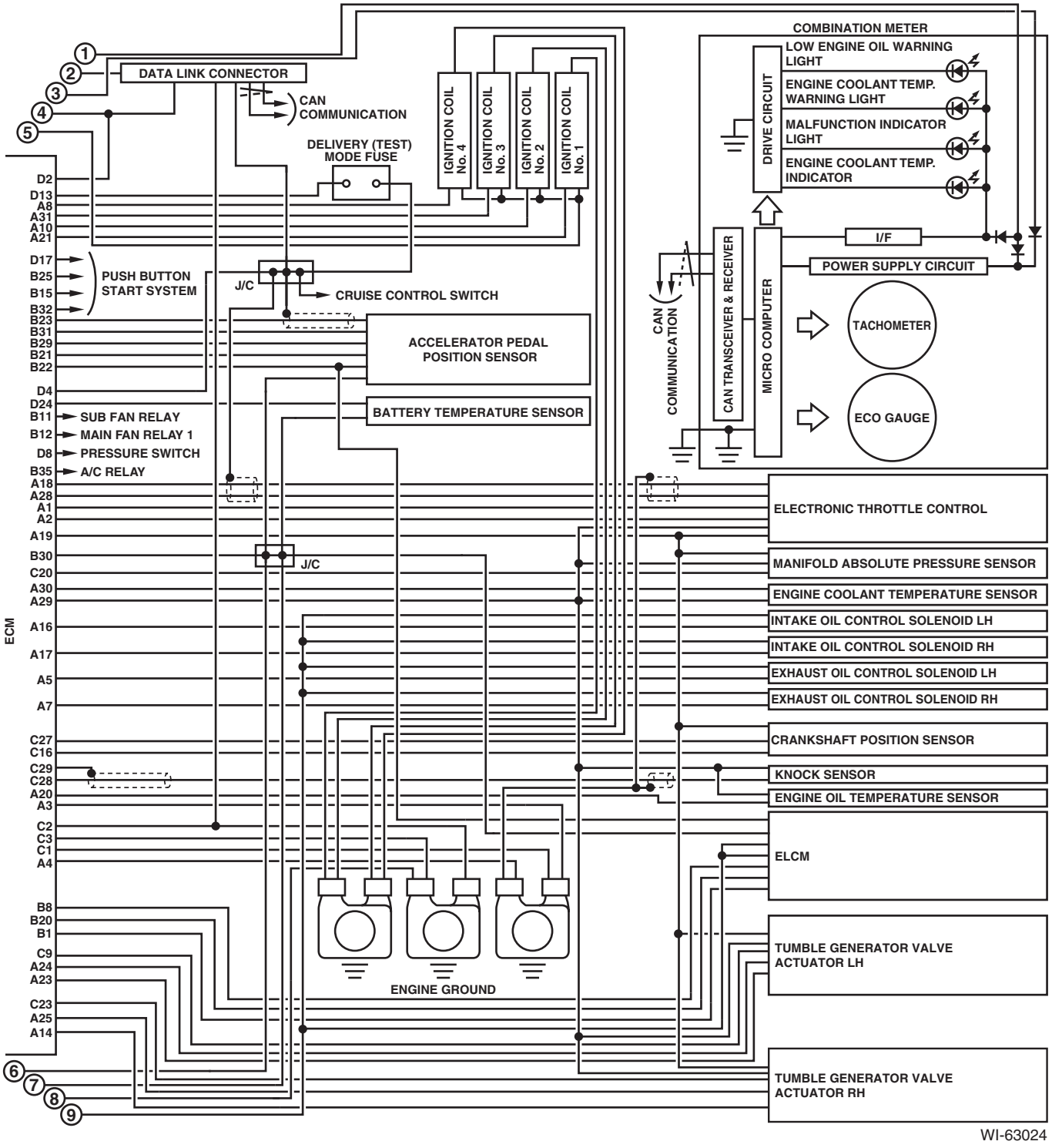


WI-61679

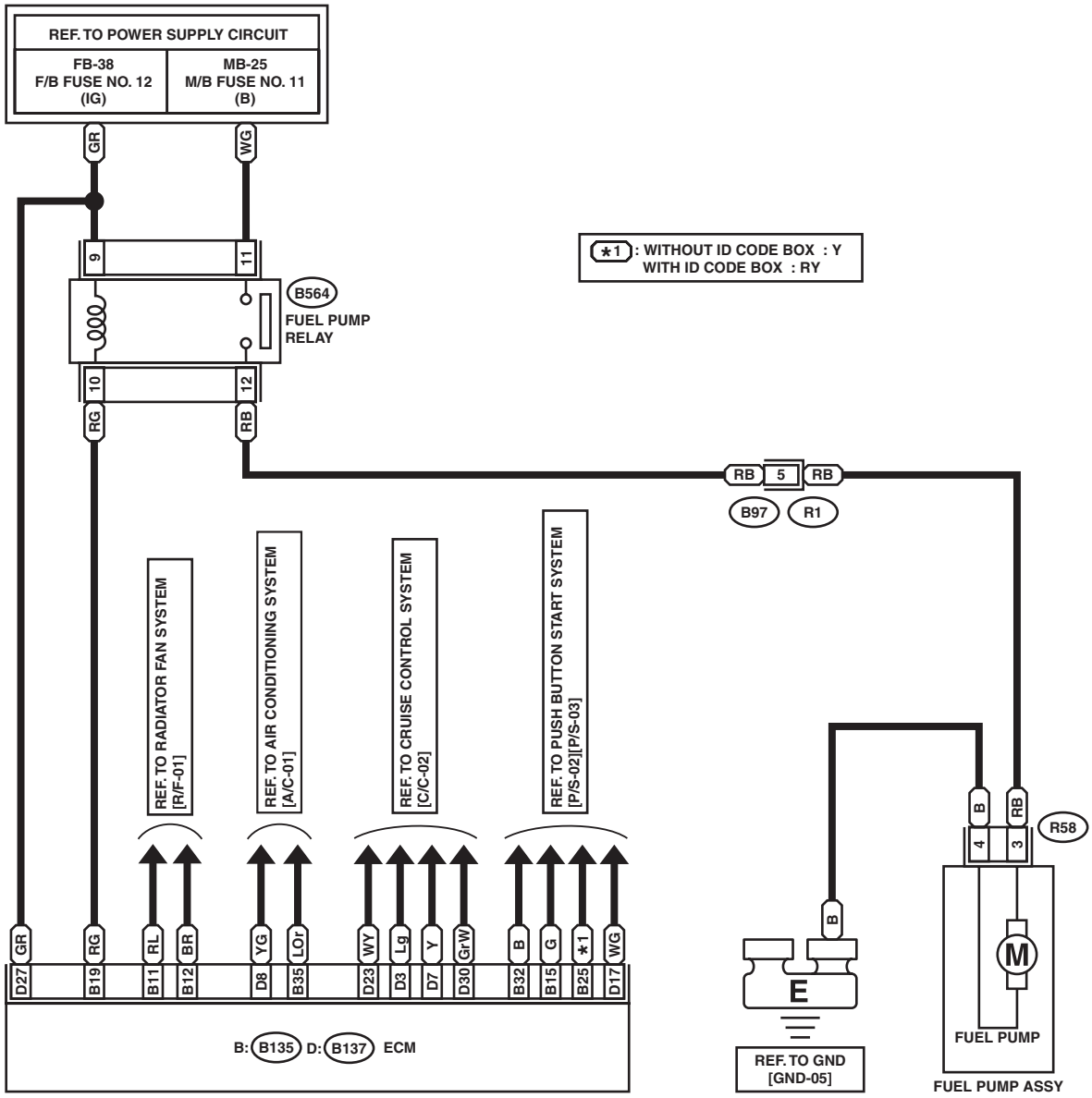
19.Engine Electrical System

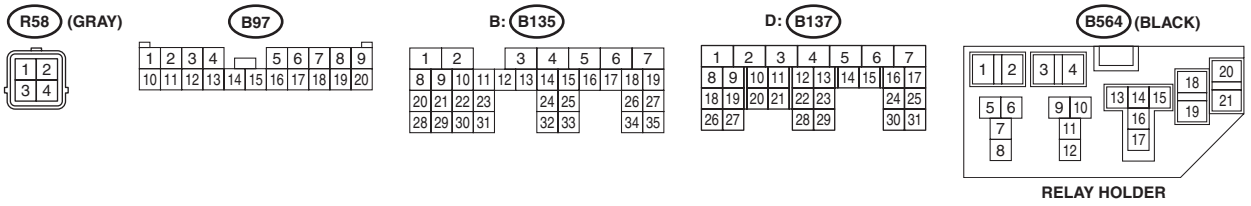
A: WIRING DIAGRAM




COMBINATION METER
LOW ENGINE OIL WARNING LIGHT
ENGINE COOLANT TEMP. WARNING LIGHT
MALFUNCTION INDICATOR LIGHT
ENGINE COOLANT TEMP. INDICATOR
DRIVE CIRCUIT
I/F
POWER SUPPLY CIRCUIT
TACHOMETER
ECO GAUGE
MICRO COMPUTER
CAN TRANSCEIVER & RECEIVER
CAN COMMUNICATION
DATA LINK CONNECTOR
CAN COMMUNICATION
DELIVERY (TEST) MODE FUSE
IGNITION COIL No. 4
IGNITION COIL No. 3
IGNITION COIL No. 2
IGNITION COIL No. 1
PUSH BUTTON START SYSTEM
J/C
CRUISE CONTROL SWITCH
ACCELERATOR PEDAL POSITION SENSOR
BATTERY TEMPERATURE SENSOR
SUB FAN RELAY
MAIN FAN RELAY 1
PRESSURE SWITCH
A/C RELAY
ECM
ELECTRONIC THROTTLE CONTROL
MANIFOLD ABSOLUTE PRESSURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR
INTAKE OIL CONTROL SOLENOID LH
INTAKE OIL CONTROL SOLENOID RH
EXHAUST OIL CONTROL SOLENOID LH
EXHAUST OIL CONTROL SOLENOID RH
CRANKSHAFT POSITION SENSOR
KNOCK SENSOR
ENGINE OIL TEMPERATURE SENSOR
ELCM
TUMBLE GENERATOR VALVE ACTUATOR LH
TUMBLE GENERATOR VALVE ACTUATOR RH
ENGINE GROUND
WI-63024

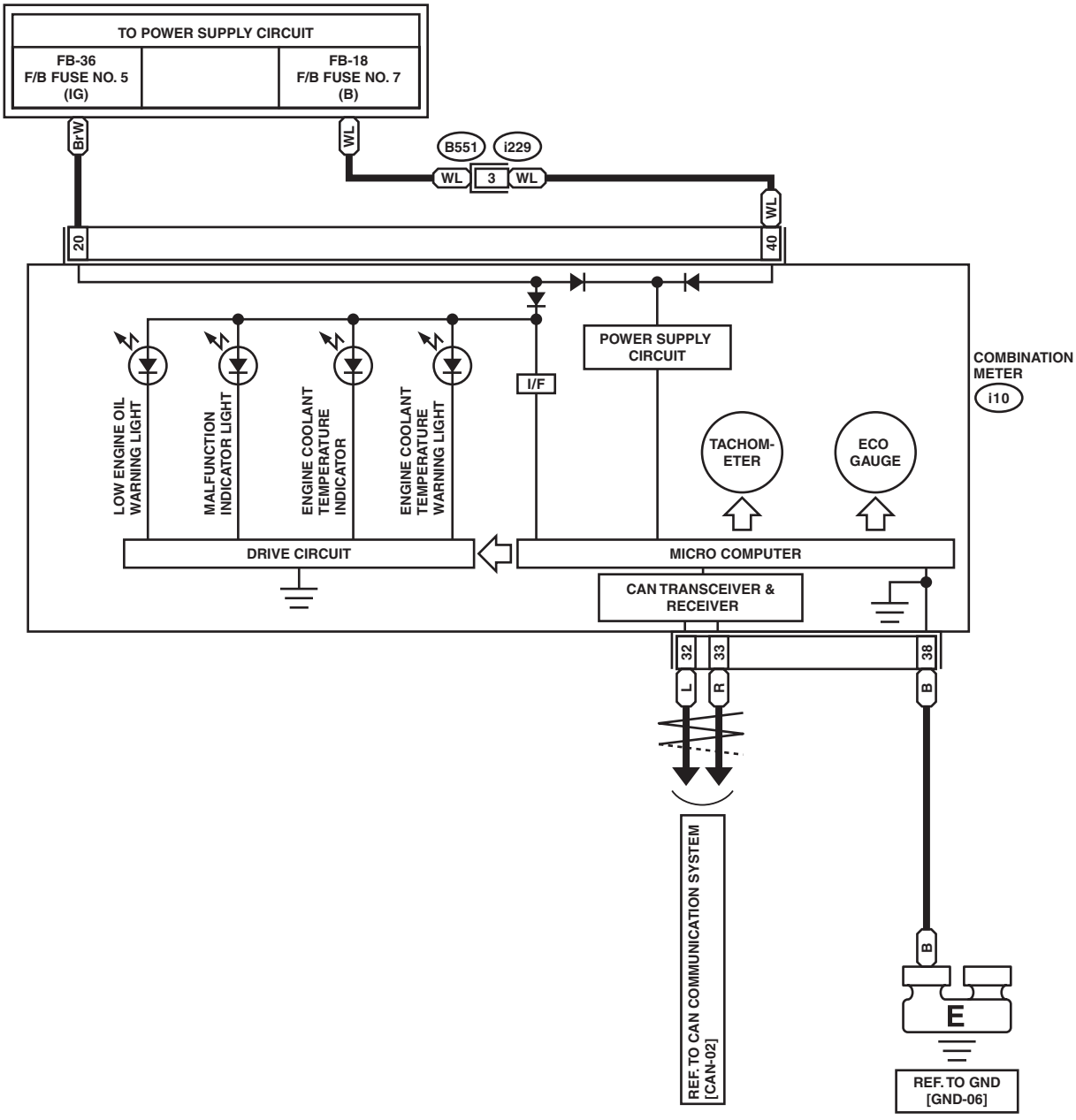
E/G(P)-01

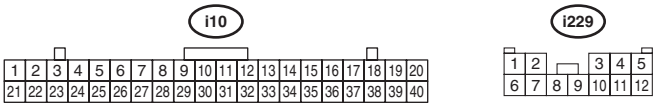




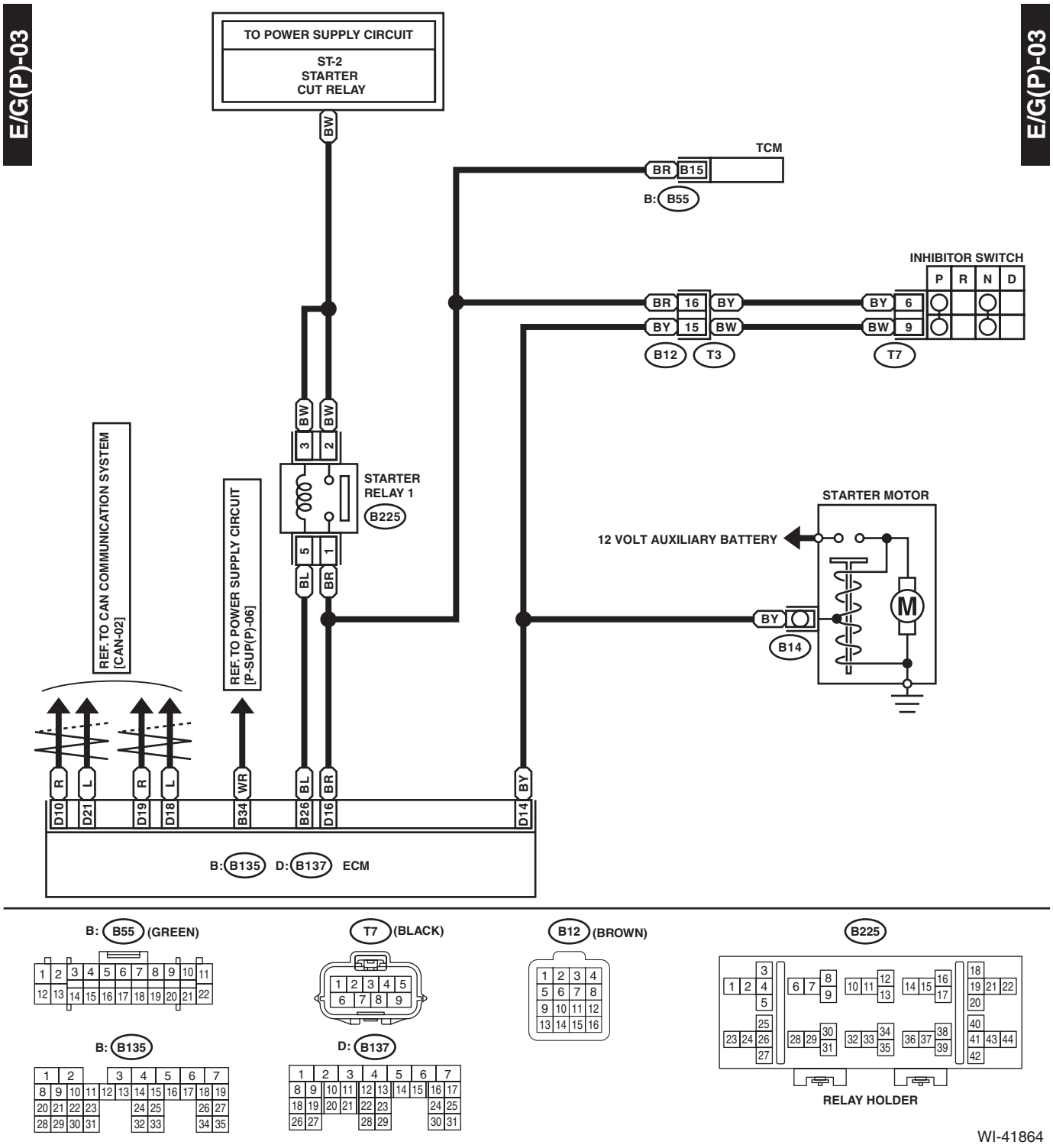
WI-48087

E/G(P)-02





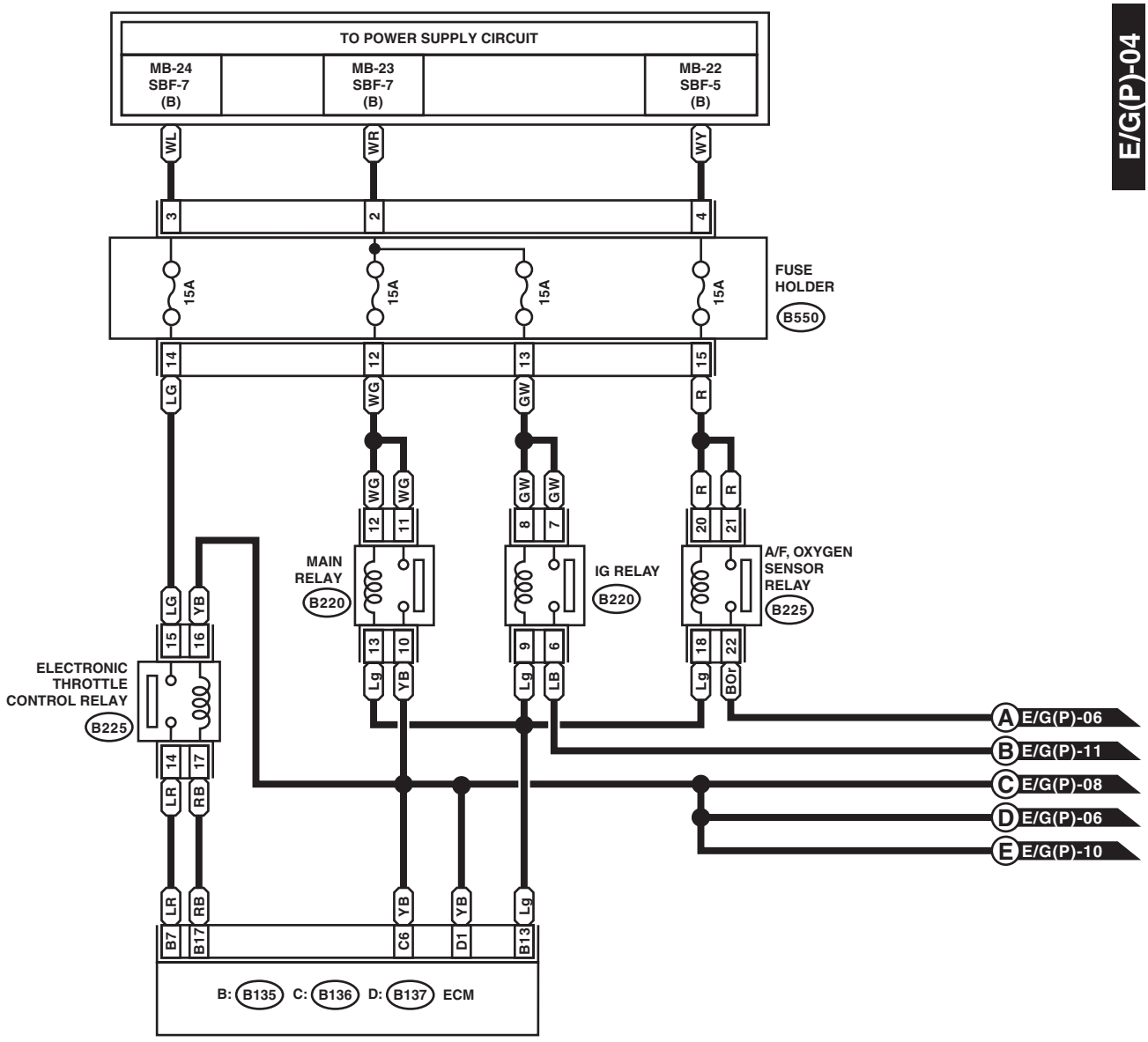
WI-41863

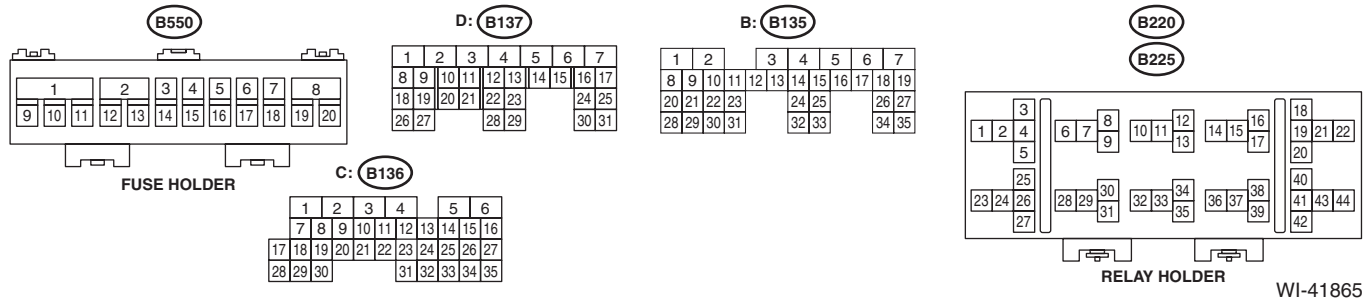

E/G(P)-03
E/G(P)-03
TO POWER SUPPLY CIRCUIT
ST-2
STARTER
CUT RELAY
BW
TCM
BR B15
B: B55
INHIBITOR SWITCH
P R N D
BR 16 BY
BY 15 BW
BY 6
BW 9
B12 T3
T7
BW BW
3 2
STARTER
RELAY 1
B225
5 1
BL BR
STARTER MOTOR
12 VOLT AUXILIARY BATTERY
BY
B14
M
REF. TO CAN COMMUNICATION SYSTEM
[CAN-02]
REF. TO POWER SUPPLY CIRCUIT
[P-SUP(P)-06]
R L R L WR BL BR BY
D10 D21 D19 D18 B34 B26 D16 D14
B: B135 D: B137 ECM

B: B55 (GREEN)
T7 (BLACK)
B12 (BROWN)
B225
B: B135
D: B137
RELAY HOLDER

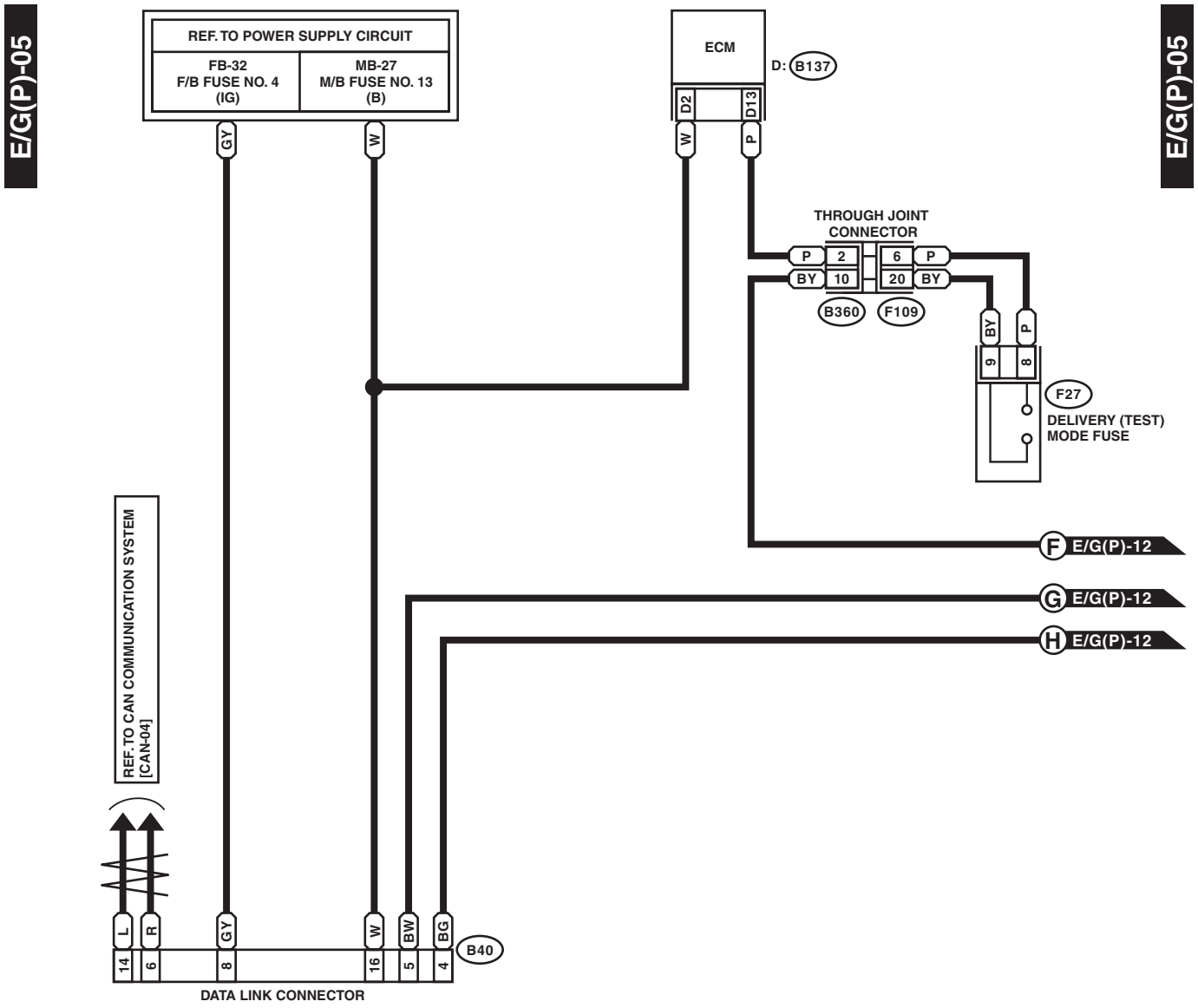
WI-41864

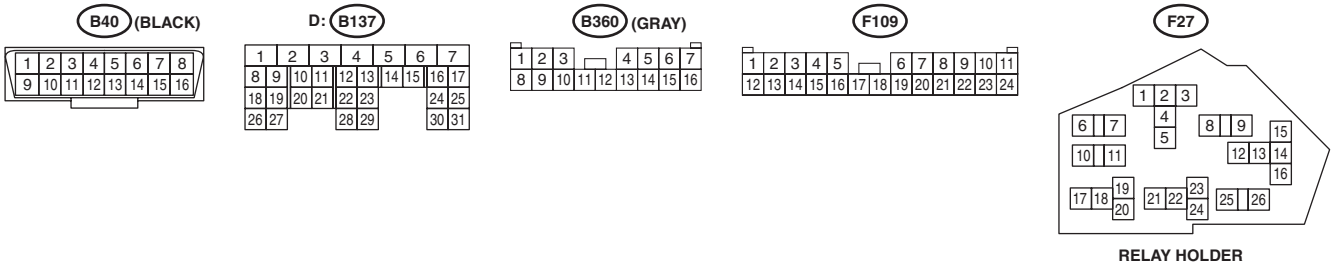
E/G(P)-04



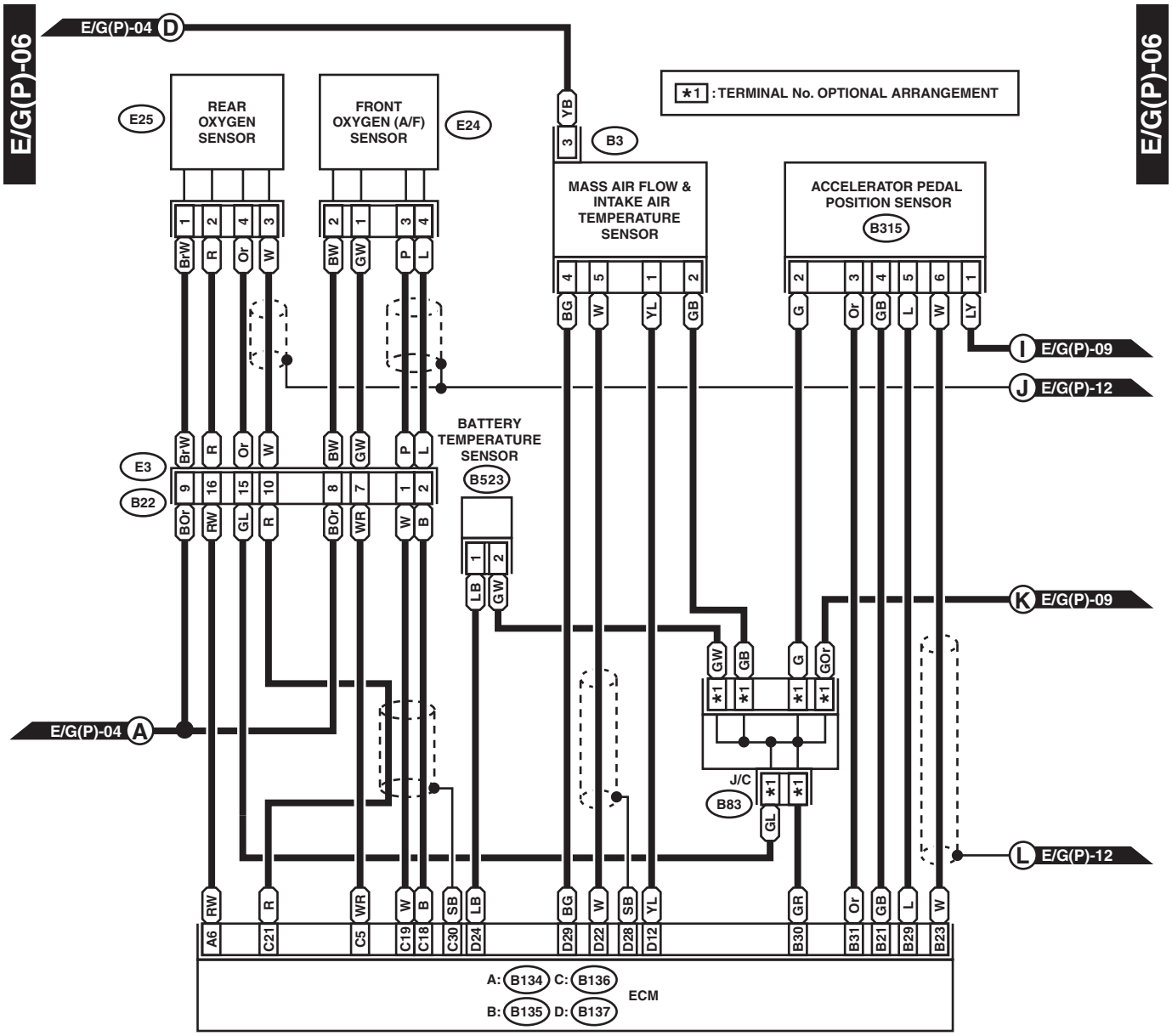


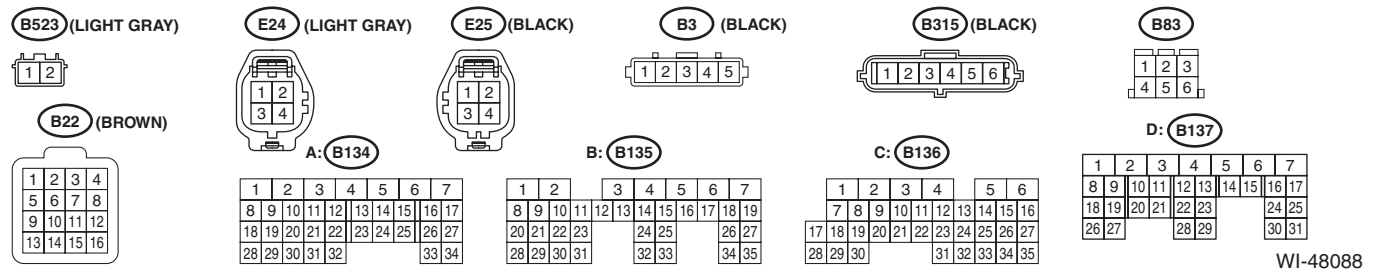
WI-41865


E/G(P)-05
E/G(P)-05
REF. TO POWER SUPPLY CIRCUIT
FB-32
F/B FUSE NO. 4
(IG)
MB-27
M/B FUSE NO. 13
(B)
ECM
D: B137
D2
D13
GY
W
W
P
THROUGH JOINT CONNECTOR
P 2
BY 10
6 P
20 BY
B360
F109
BY
P
9
8
F27
DELIVERY (TEST) MODE FUSE
REF. TO CAN COMMUNICATION SYSTEM [CAN-04]
F E/G(P)-12
G E/G(P)-12
H E/G(P)-12
L
R
GY
W
BW
BG
14
6
8
16
5
4
B40
DATA LINK CONNECTOR

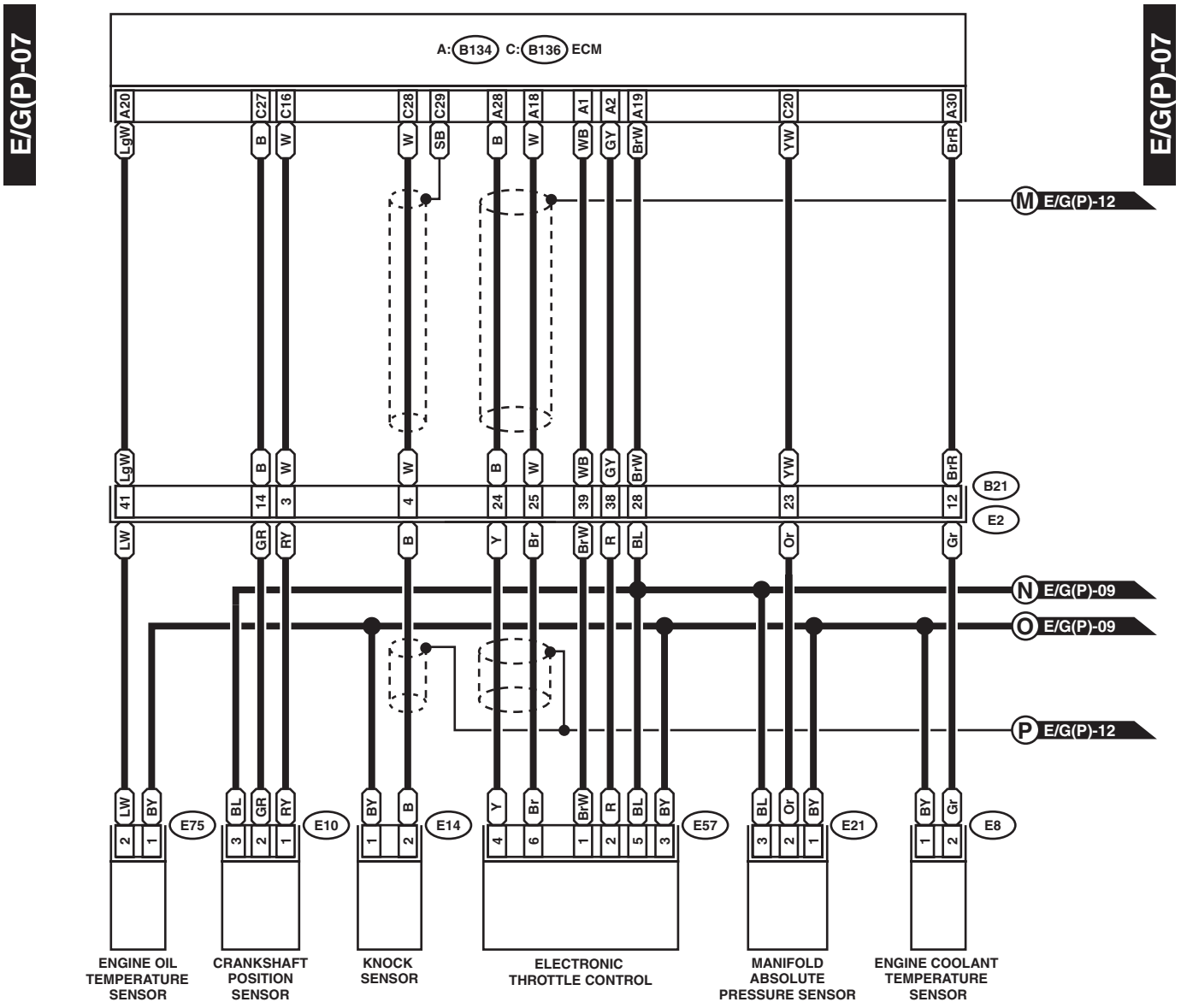

B40 (BLACK)
D: B137
B360 (GRAY)
F109
F27
RELAY HOLDER

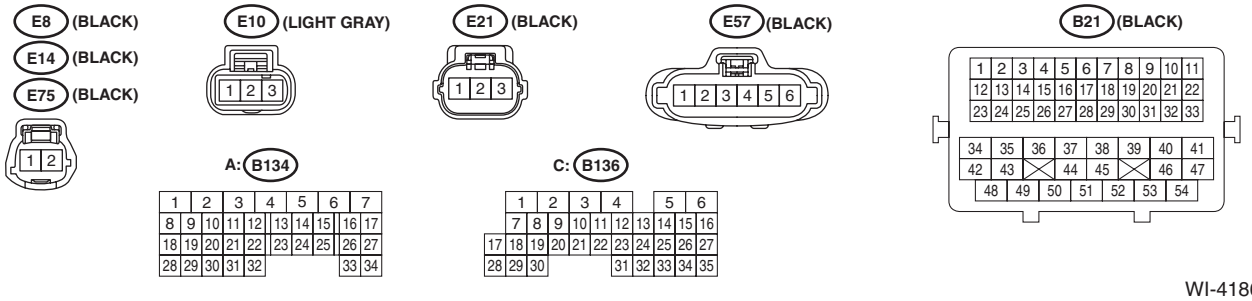
WI-63025


E/G(P)-06
E/G(P)-04 D
E25
REAR OXYGEN SENSOR
FRONT OXYGEN (A/F) SENSOR
E24
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
B3
MASS AIR FLOW & INTAKE AIR TEMPERATURE SENSOR
ACCELERATOR PEDAL POSITION SENSOR
B315
I E/G(P)-09
J E/G(P)-12
BATTERY TEMPERATURE SENSOR
B523
E3
B22
K E/G(P)-09
E/G(P)-04 A
J/C
B83
L E/G(P)-12
A6
C21
C5
C19
C18
C30
D24
D29
D22
D28
D12
B30
B31
B21
B29
B23
A: B134 C: B136
B: B135 D: B137
ECM

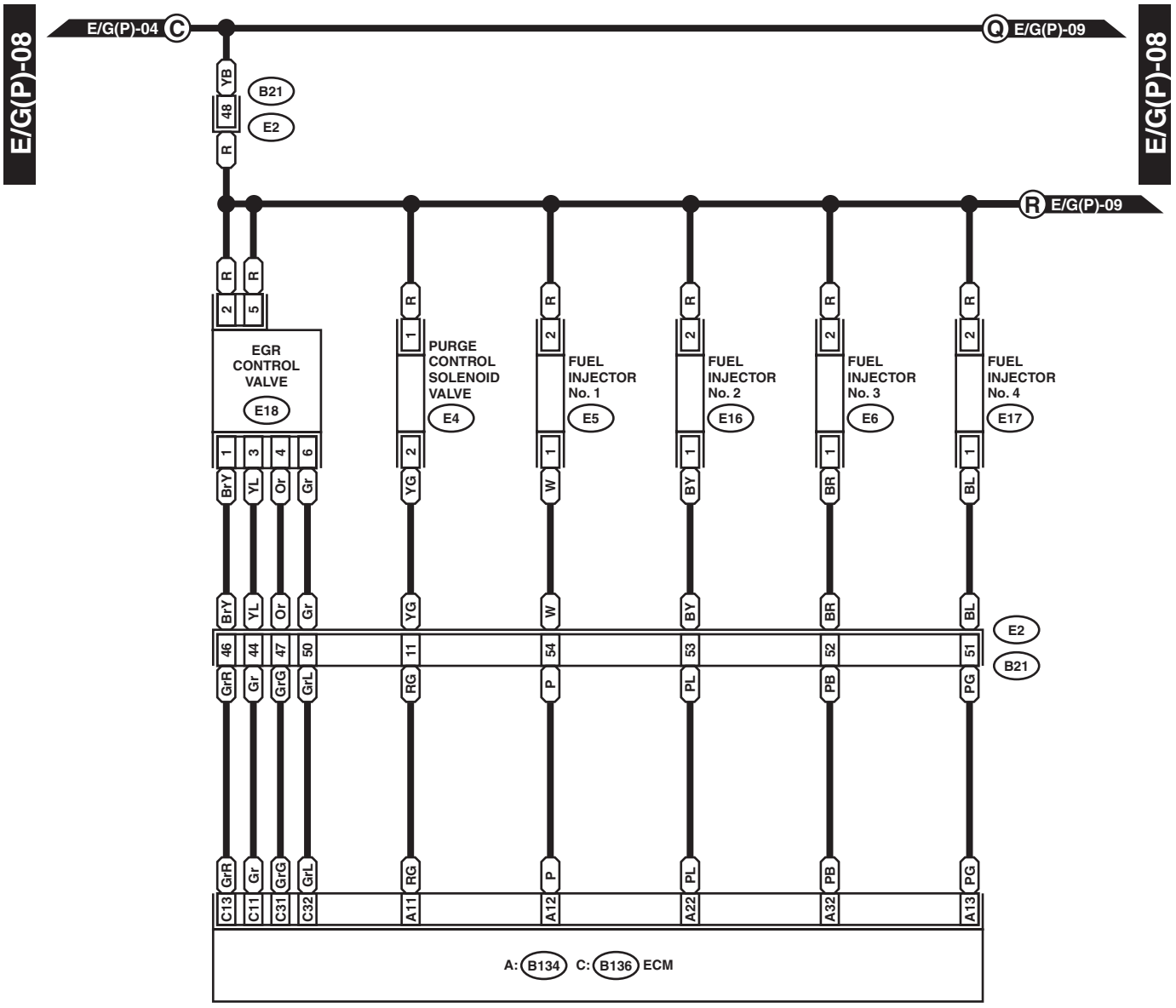

B523 (LIGHT GRAY)
B22 (BROWN)
E24 (LIGHT GRAY)
A: B134
E25 (BLACK)
B3 (BLACK)
B: B135
B315 (BLACK)
C: B136
B83
D: B137

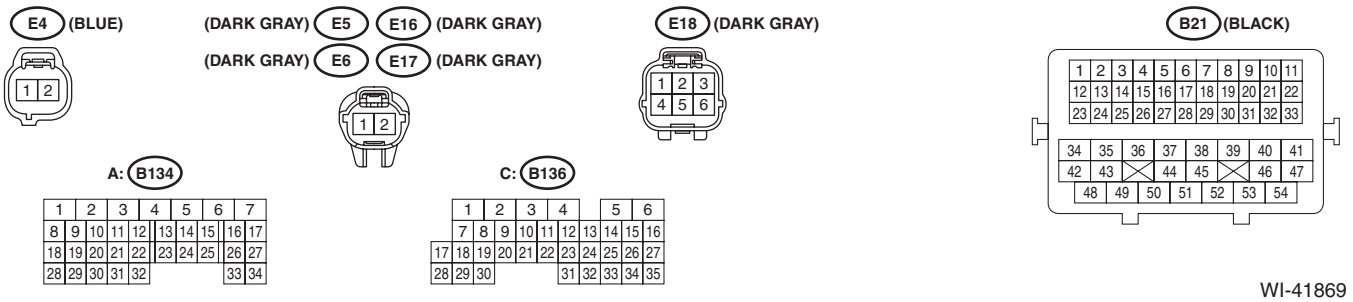
WI-48088


E/G(P)-07
E/G(P)-07
A: B134 C: B136 ECM
A20 C27 C16 C28 C29 A28 A18 A1 A2 A19 C20 A30
LgW B W W SB B W WB GY BrW YW BrR
M E/G(P)-12
41 14 3 4 24 25 39 38 28 23 12
B21
E2
LW GR RY B Y Br BrW R BL Or Gr
N E/G(P)-09
O E/G(P)-09
P E/G(P)-12
LW BY E75
BL GR RY E10
BY B E14
Y Br BrW R BL BY E57
BL Or BY E21
BY Gr E8
ENGINE OIL TEMPERATURE SENSOR
CRANKSHAFT POSITION SENSOR
KNOCK SENSOR
ELECTRONIC THROTTLE CONTROL
MANIFOLD ABSOLUTE PRESSURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR

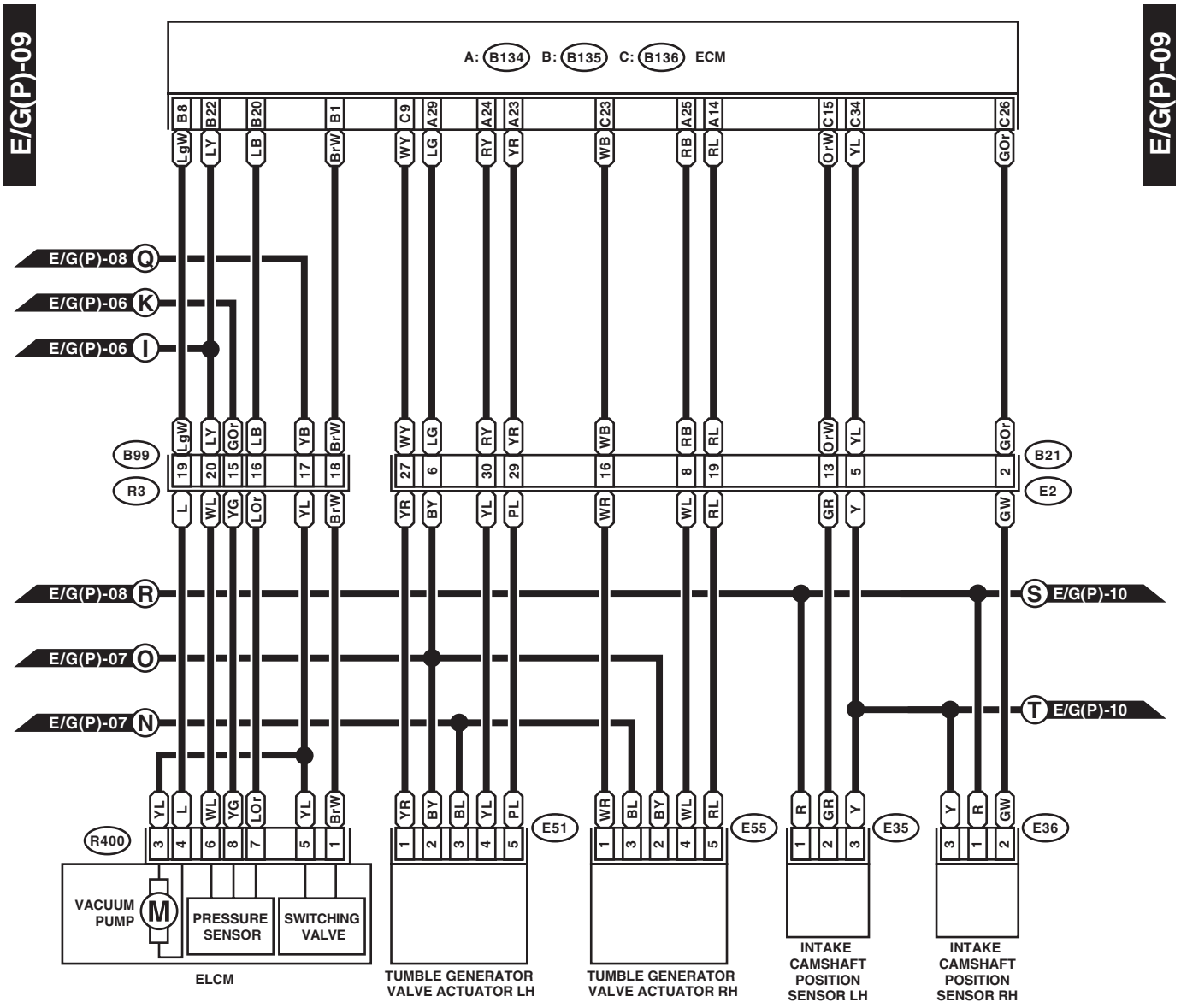

E8 (BLACK)
E14 (BLACK)
E75 (BLACK)
E10 (LIGHT GRAY)
E21 (BLACK)
E57 (BLACK)
B21 (BLACK)
A: B134
C: B136

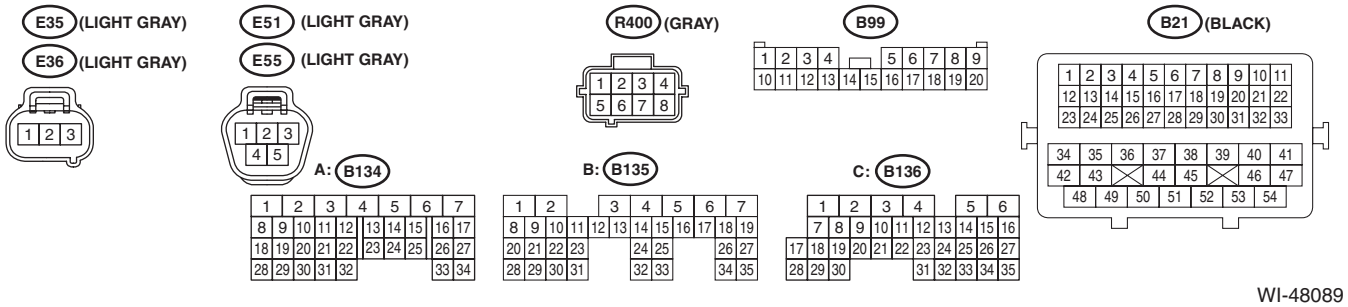
WI-41868


E/G(P)-08
E/G(P)-04 C
Q E/G(P)-09
E/G(P)-08
YB
48
B21
E2
R
R E/G(P)-09
R
2
5
EGR CONTROL VALVE
E18
1
3
4
6
BrY
YL
Or
Gr
R
1
PURGE CONTROL SOLENOID VALVE
E4
2
YG
R
2
FUEL INJECTOR No. 1
E5
1
W
R
2
FUEL INJECTOR No. 2
E16
1
BY
R
2
FUEL INJECTOR No. 3
E6
1
BR
R
2
FUEL INJECTOR No. 4
E17
1
BL
BrY
YL
Or
Gr
YG
W
BY
BR
BL
E2
B21
46
44
47
50
11
54
53
52
51
GrR
Gr
GrG
GrL
RG
P
PL
PB
PG
C13
C11
C31
C32
A11
A12
A22
A32
A13
A: B134 C: B136 ECM

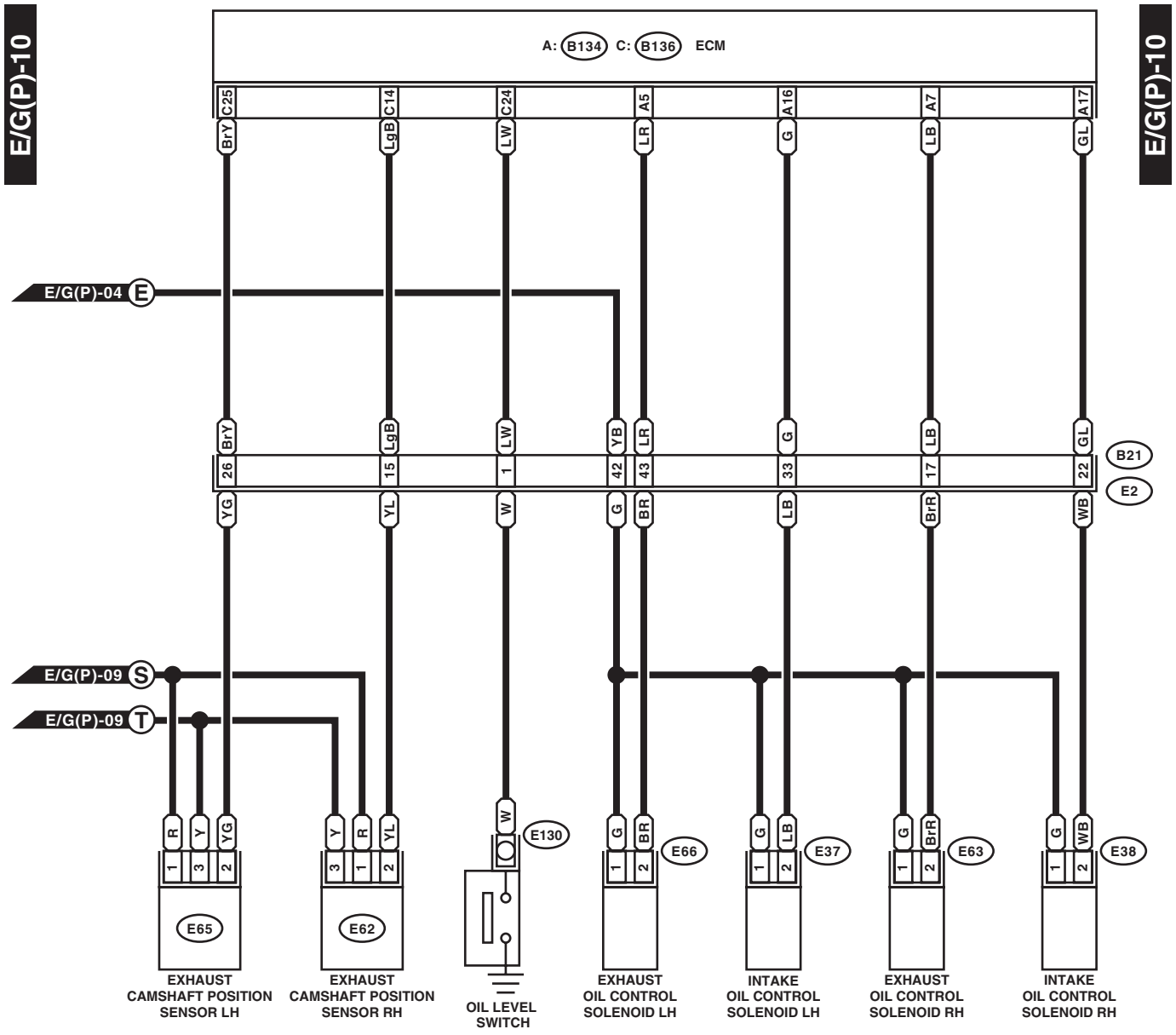

E4 (BLUE)
(DARK GRAY) E5 E16 (DARK GRAY)
(DARK GRAY) E6 E17 (DARK GRAY)
E18 (DARK GRAY)
B21 (BLACK)
A: B134
C: B136

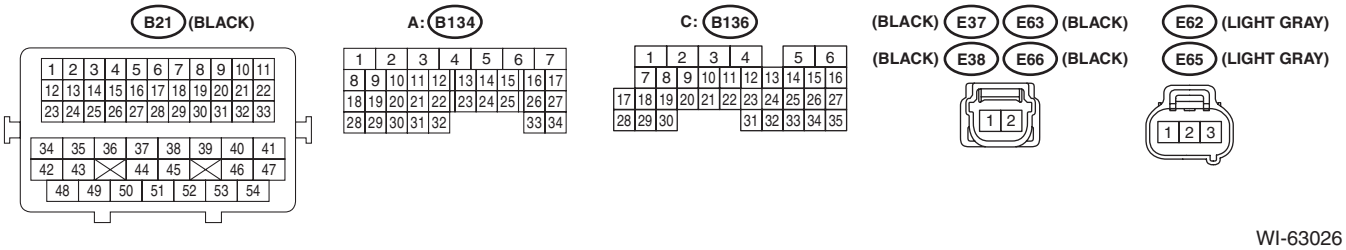
WI-41869


E/G(P)-09
E/G(P)-09
A: B134 B: B135 C: B136 ECM
B8 B22 B20 B1 C9 A29 A24 A23 C23 A25 A14 C15 C34 C26
LgW LY LB BrW WY LG RY YR WB RB RL OrW YL GOr
E/G(P)-08 Q
E/G(P)-06 K
E/G(P)-06 I
B99
R3
19 20 15 16 17 18
27 6 30 29 16 8 19 13 5 2
B21
E2
L WL YG LOr YL BrW YR BY YL PL WR WL RL GR Y GW
E/G(P)-08 R
E/G(P)-07 O
E/G(P)-07 N
S E/G(P)-10
T E/G(P)-10
YL L WL YG LOr YL BrW YR BY BL YL PL WR BL BY WL RL R GR Y Y R GW
R400
3 4 6 8 7 5 1
1 2 3 4 5
1 2 3 1 2 3 1 2 3
E51
E55
E35
E36
VACUUM PUMP
M
PRESSURE SENSOR
SWITCHING VALVE
ELCM
TUMBLE GENERATOR VALVE ACTUATOR LH
TUMBLE GENERATOR VALVE ACTUATOR RH
INTAKE CAMSHAFT POSITION SENSOR LH
INTAKE CAMSHAFT POSITION SENSOR RH


E35 (LIGHT GRAY)
E36 (LIGHT GRAY)
E51 (LIGHT GRAY)
E55 (LIGHT GRAY)
R400 (GRAY)
B99
B21 (BLACK)
A: B134
B: B135
C: B136

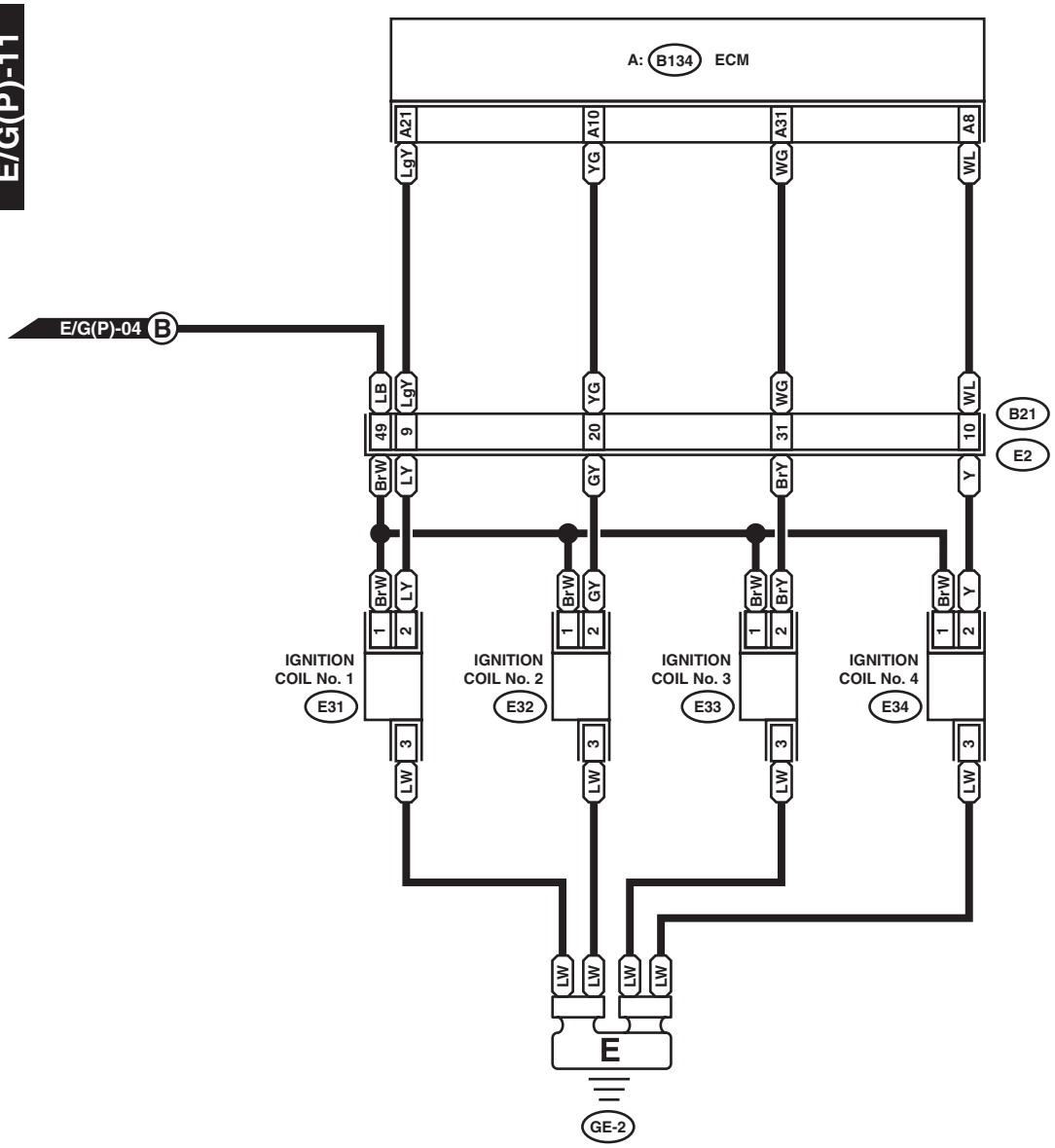
WI-48089

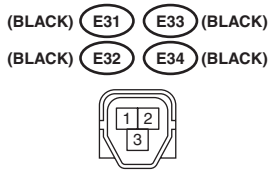

E/G(P)-10
E/G(P)-10
A: B134 C: B136 ECM
C25
C14
C24
A5
A16
A7
A17
BrY
LgB
LW
LR
G
LB
GL
E/G(P)-04 E
BrY
LgB
LW
YB
LR
G
LB
GL
B21
E2
26
15
1
42
43
33
17
22
YG
YL
W
G
BR
LB
BrR
WB
E/G(P)-09 S
E/G(P)-09 T
R
Y
YG
Y
R
YL
W
G
BR
G
LB
G
BrR
G
WB
1
3
2
3
1
2
E130
E66
E37
E63
E38
E65
E62
EXHAUST CAMSHAFT POSITION SENSOR LH
EXHAUST CAMSHAFT POSITION SENSOR RH
OIL LEVEL SWITCH
EXHAUST OIL CONTROL SOLENOID LH
INTAKE OIL CONTROL SOLENOID LH
EXHAUST OIL CONTROL SOLENOID RH
INTAKE OIL CONTROL SOLENOID RH

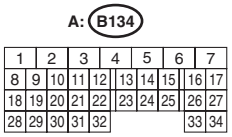

B21 (BLACK)
A: B134
C: B136
(BLACK) E37 E63 (BLACK)
(BLACK) E38 E66 (BLACK)
E62 (LIGHT GRAY)
E65 (LIGHT GRAY)

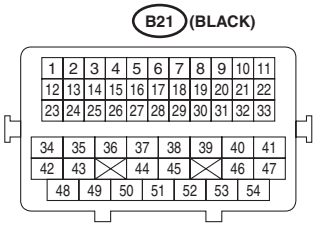
WI-63026

E/G(P)-11

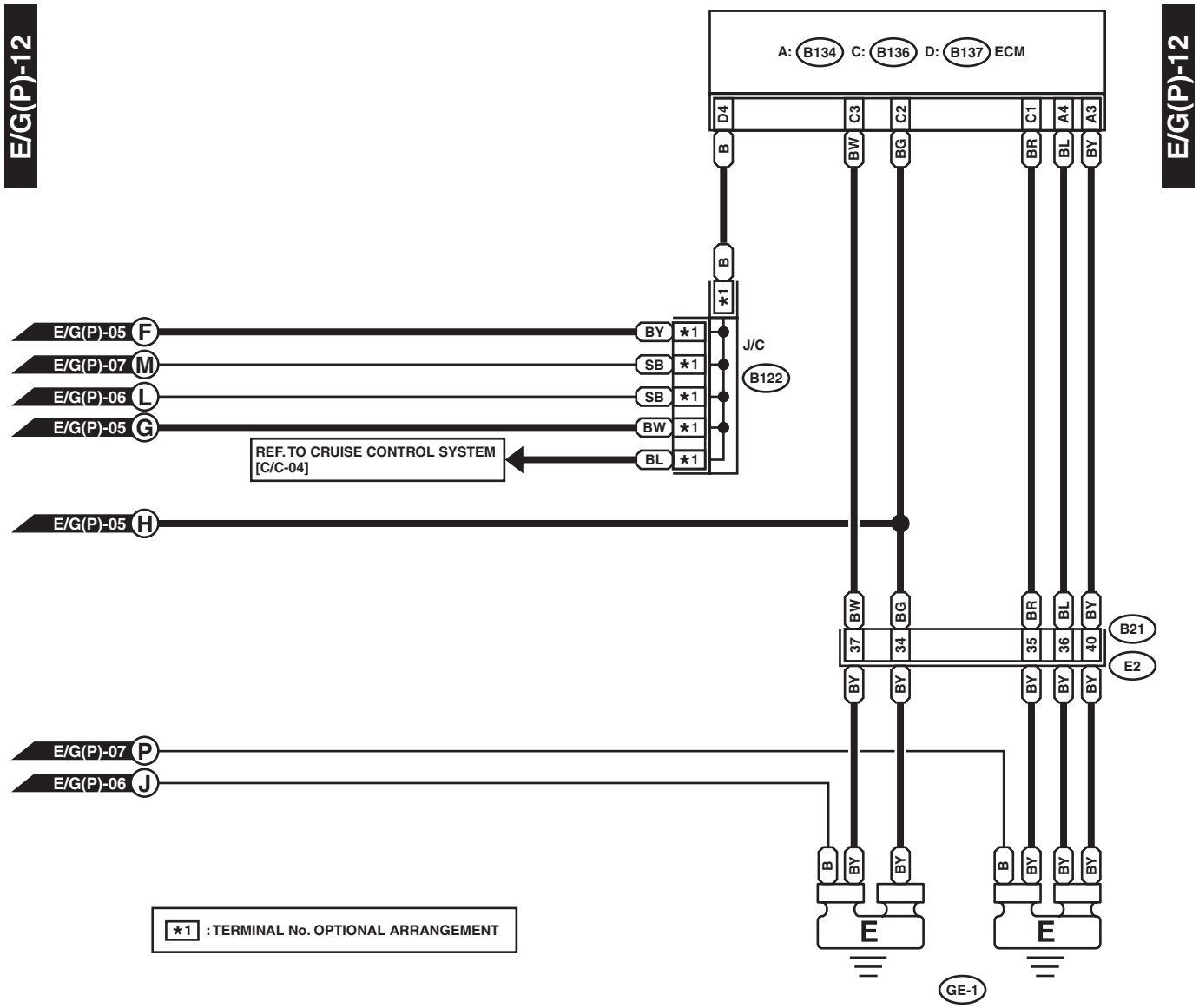


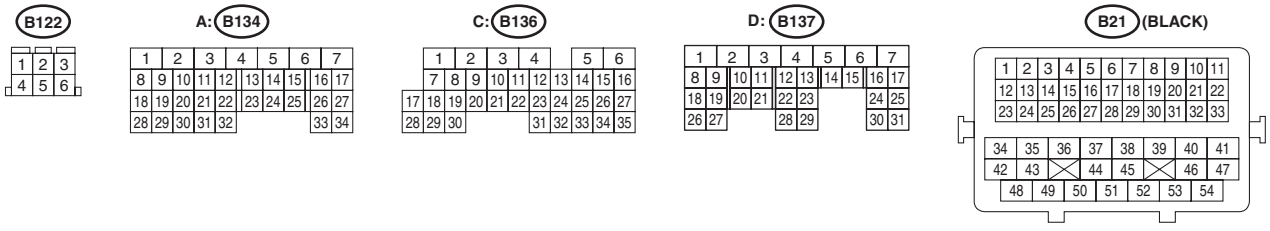






WI-48090


E/G(P)-12
E/G(P)-12
A: B134 C: B136 D: B137 ECM
D4
C3
C2
C1
A4
A3
B
BW
BG
BR
BL
BY
*1
J/C
B122
E/G(P)-05 F
E/G(P)-07 M
E/G(P)-06 L
E/G(P)-05 G
E/G(P)-05 H
E/G(P)-07 P
E/G(P)-06 J
SB
REF. TO CRUISE CONTROL SYSTEM [C/C-04]
B21
E2
37
34
35
36
40
E
GE-1
*1 : TERMINAL No. OPTIONAL ARRANGEMENT

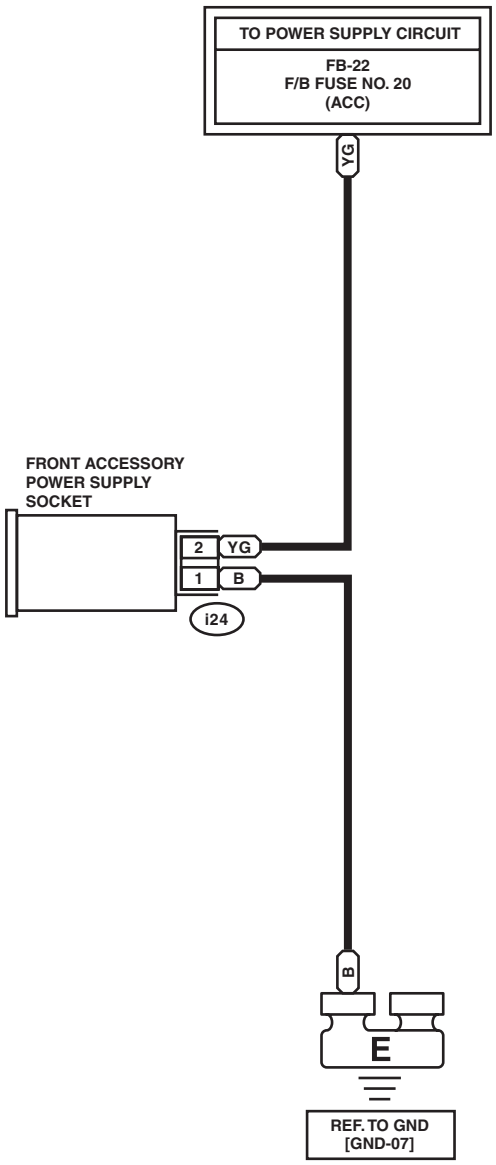

B122
A: B134
C: B136
D: B137
B21 (BLACK)

WI-63027

20.Front Accessory Power Supply Socket System

A: WIRING DIAGRAM

FAPS-01



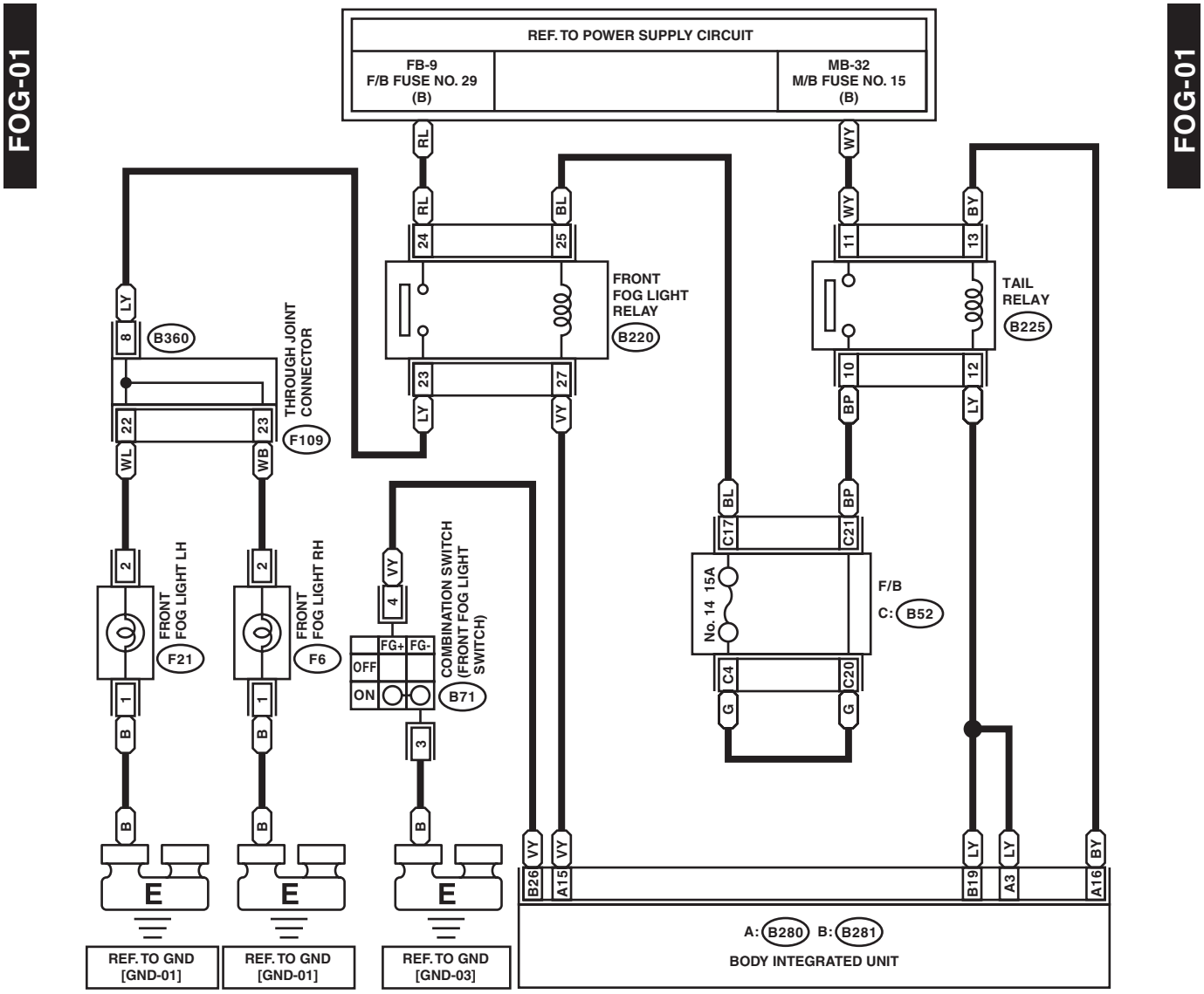
FAPS-01

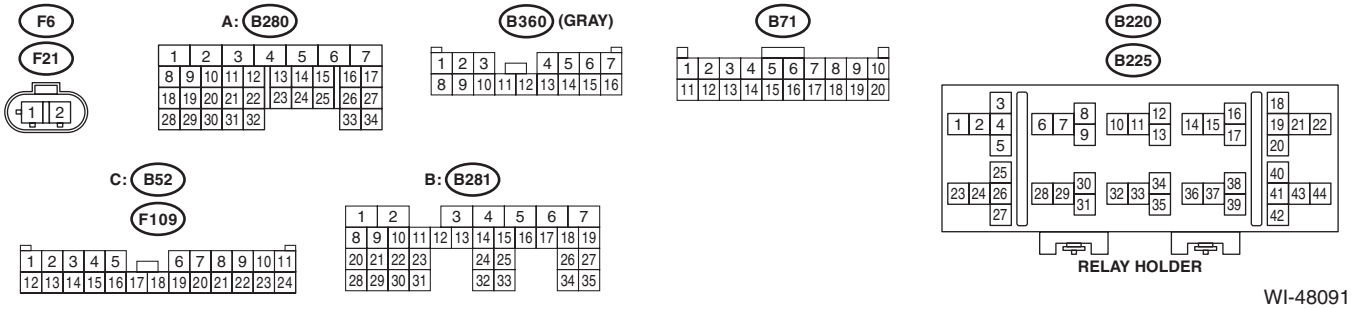


WI-34207

21.Front Fog Light System

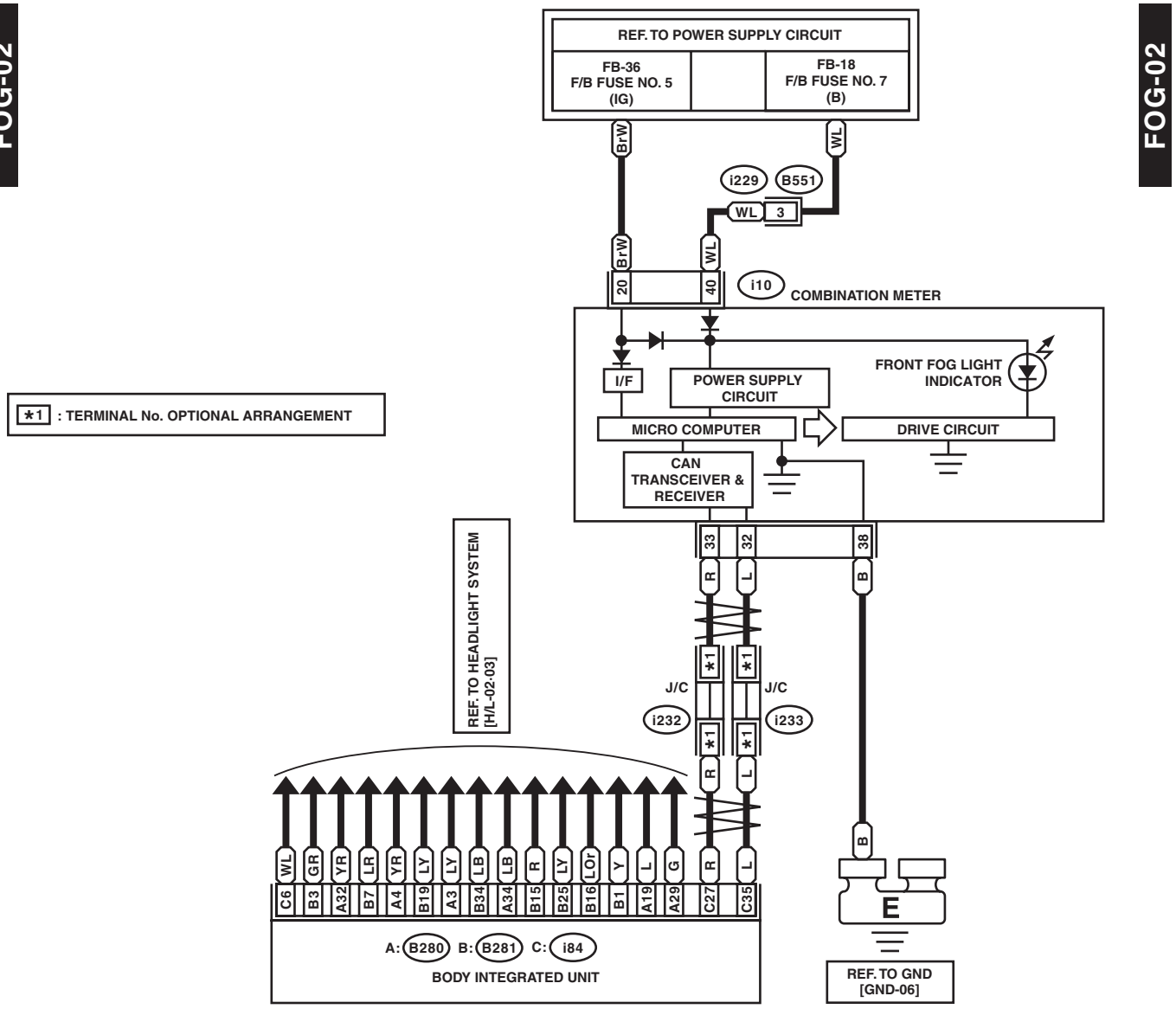
A: WIRING DIAGRAM

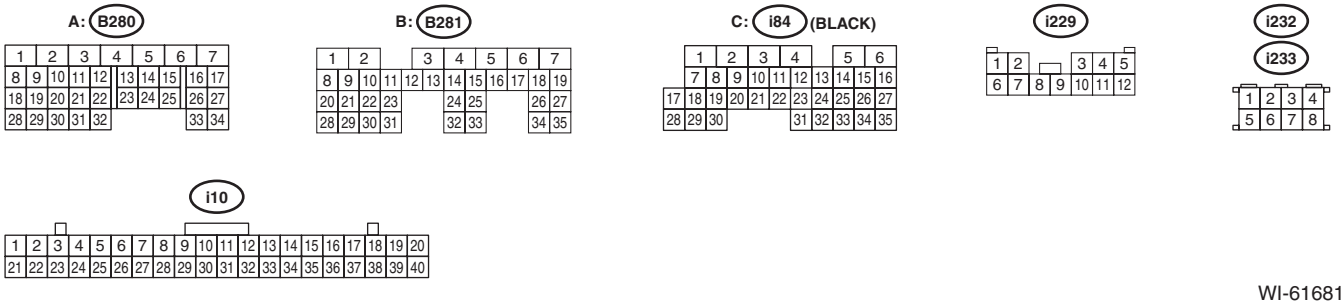




WI-48091

FOG-02

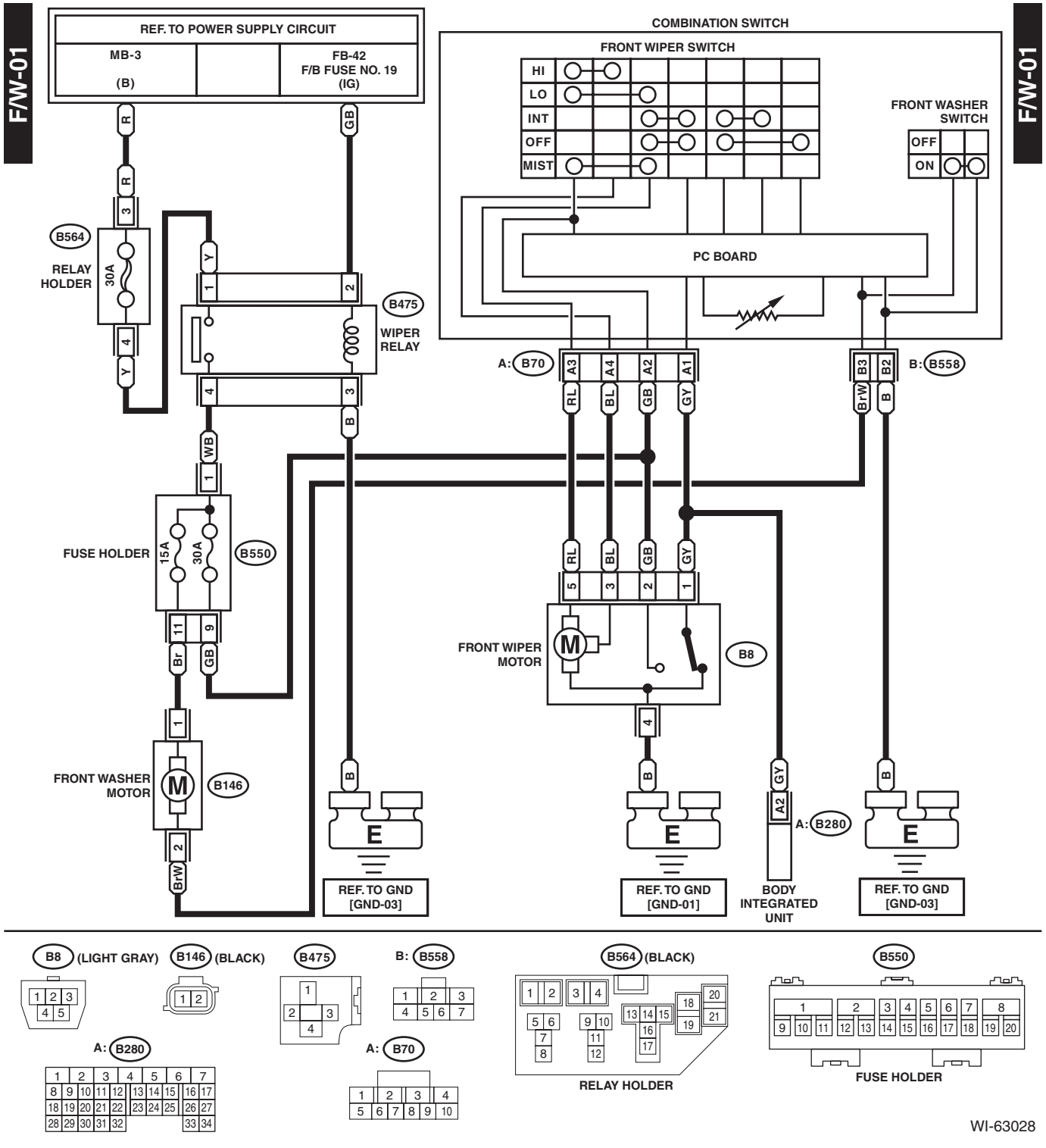




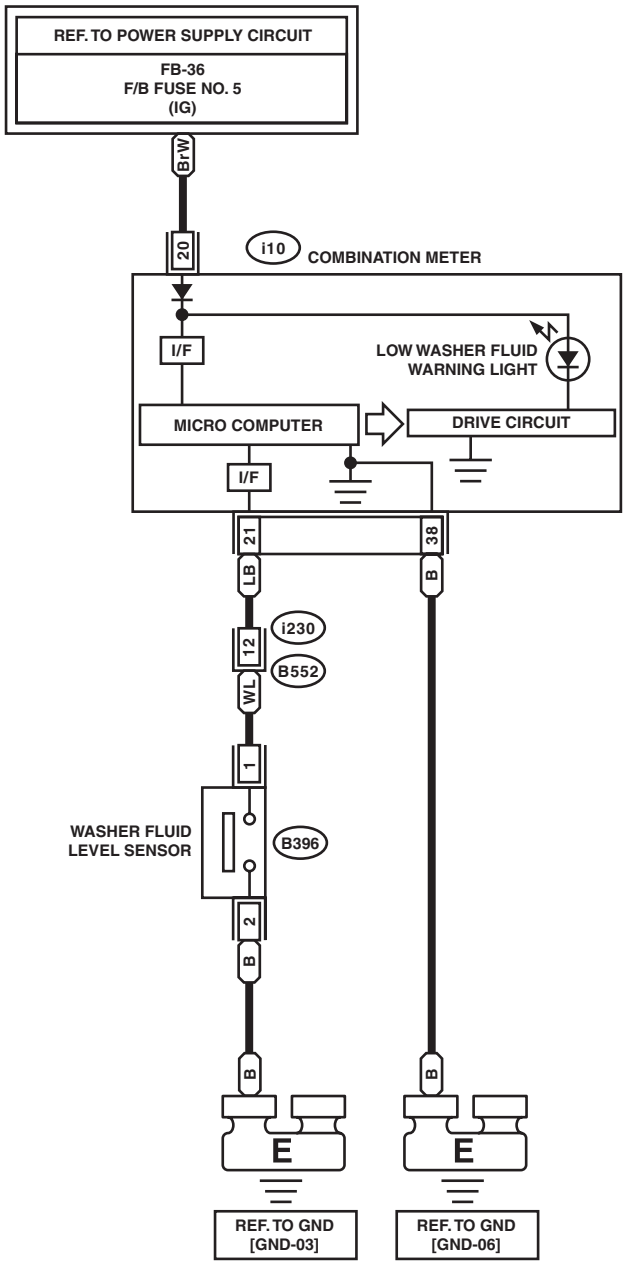
WI-61681

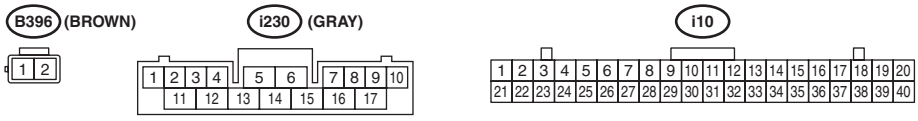
22.Front Wiper and Washer System

A: WIRING DIAGRAM



F/W-02



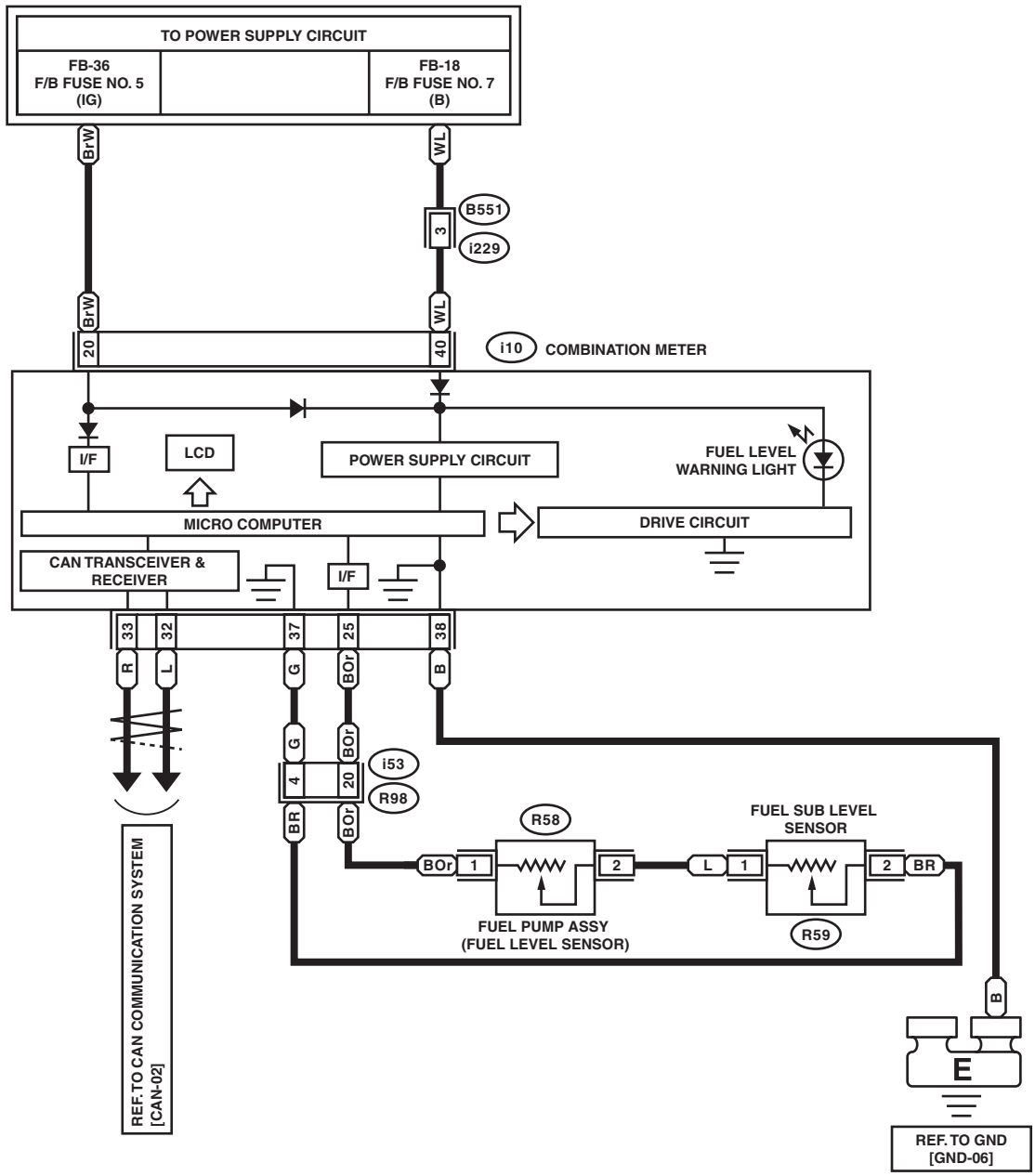


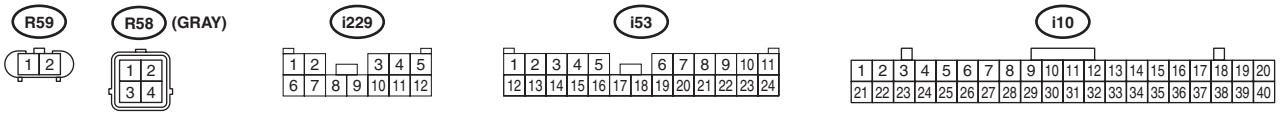
WI-61619

23.Fuel Gauge System

A: WIRING DIAGRAM

F/G-01



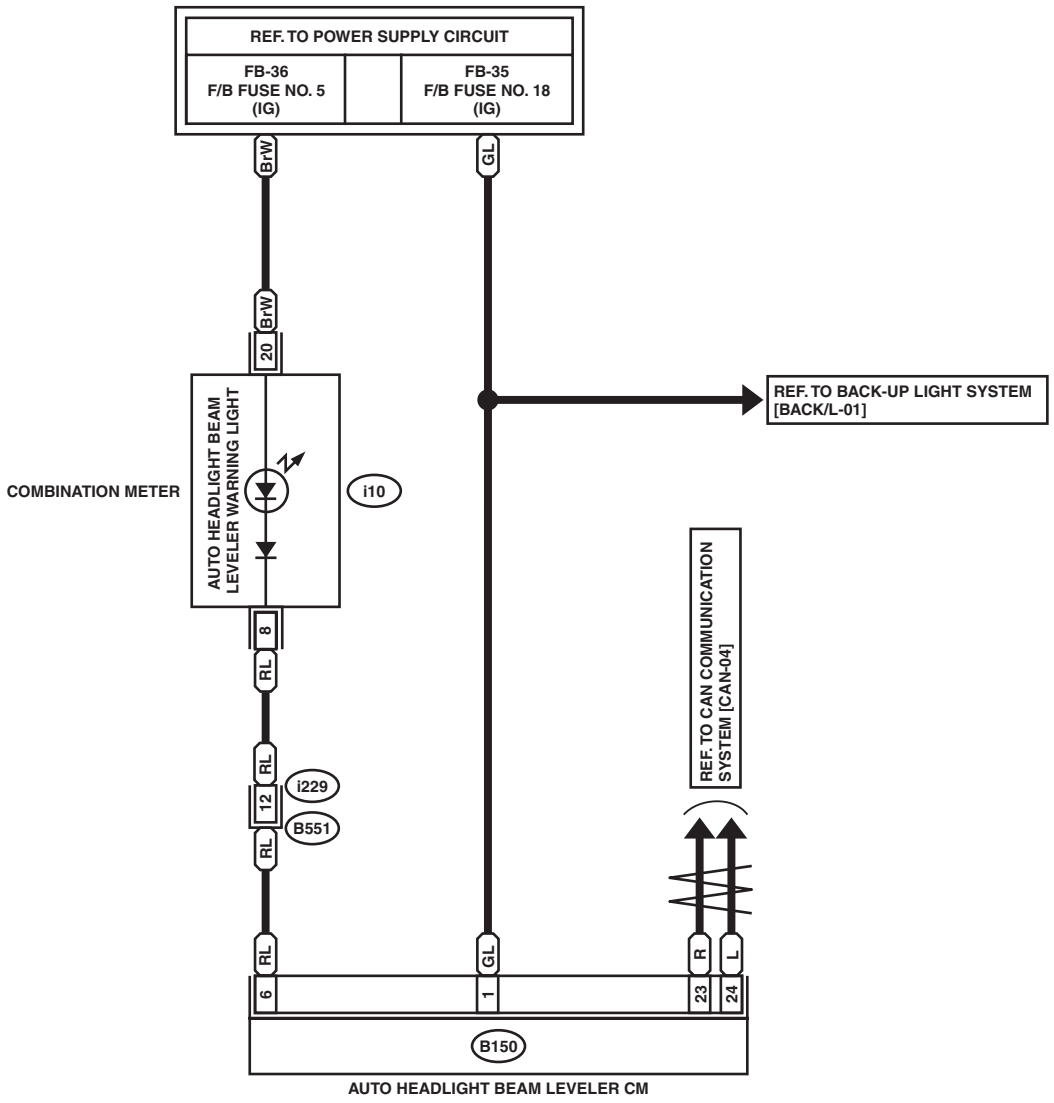


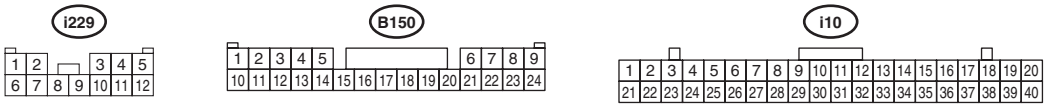
WI-41877

24.Headlight Beam Leveler System

A: WIRING DIAGRAM

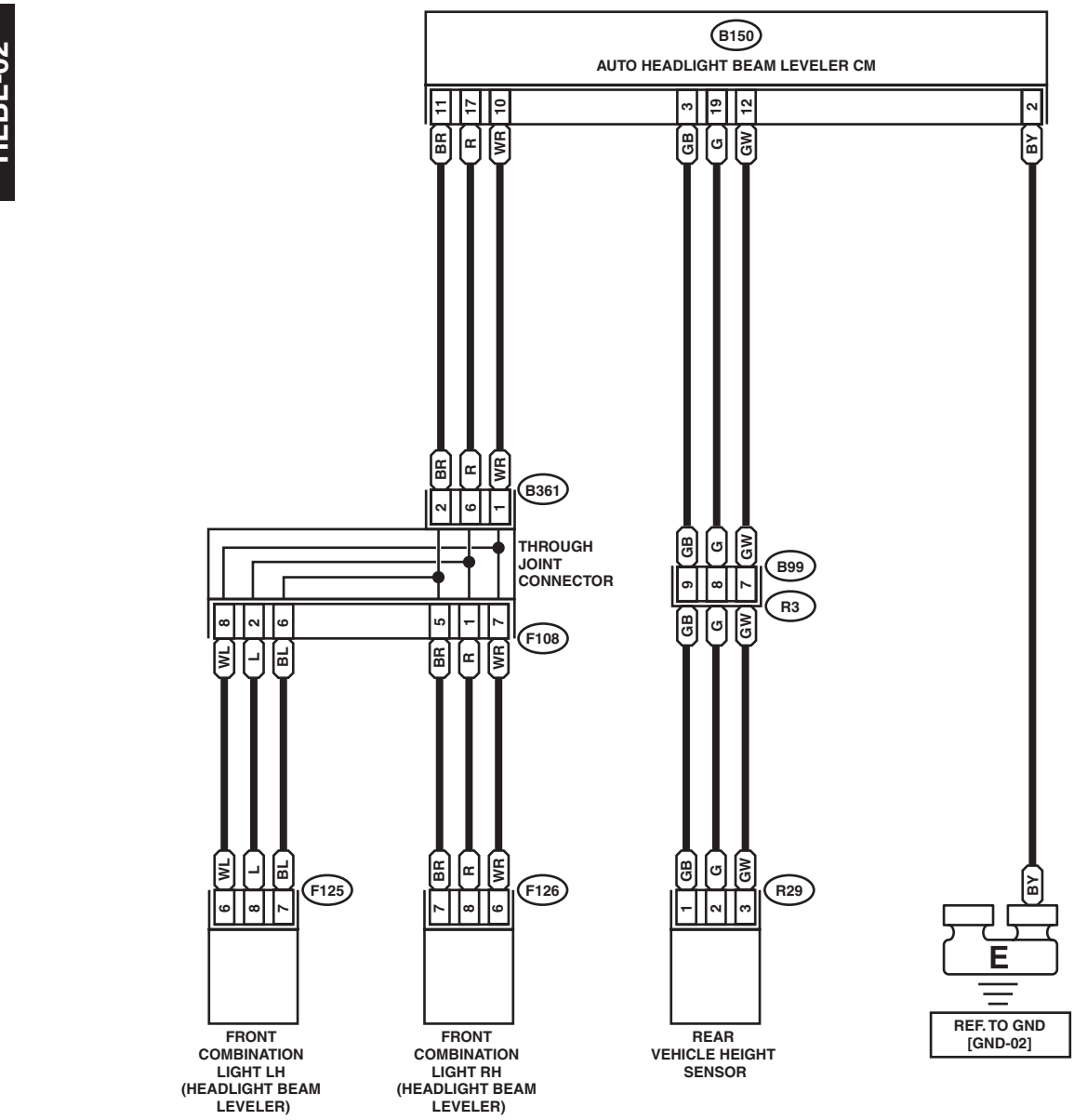
HLBL-01

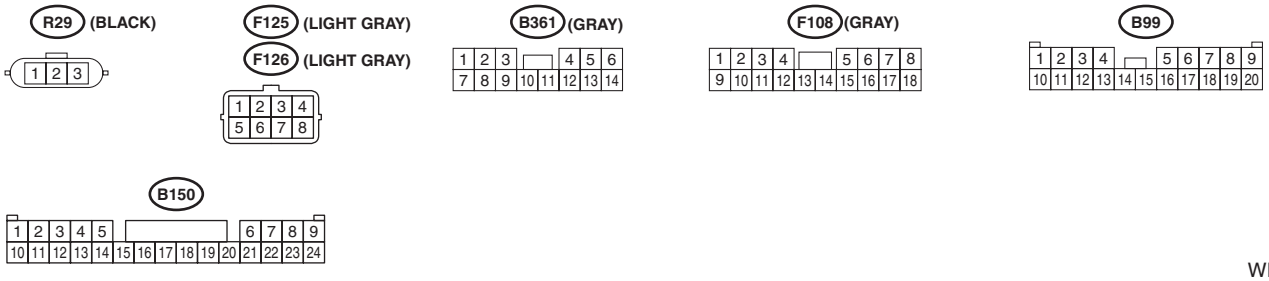




WI-63029

HLBL-02

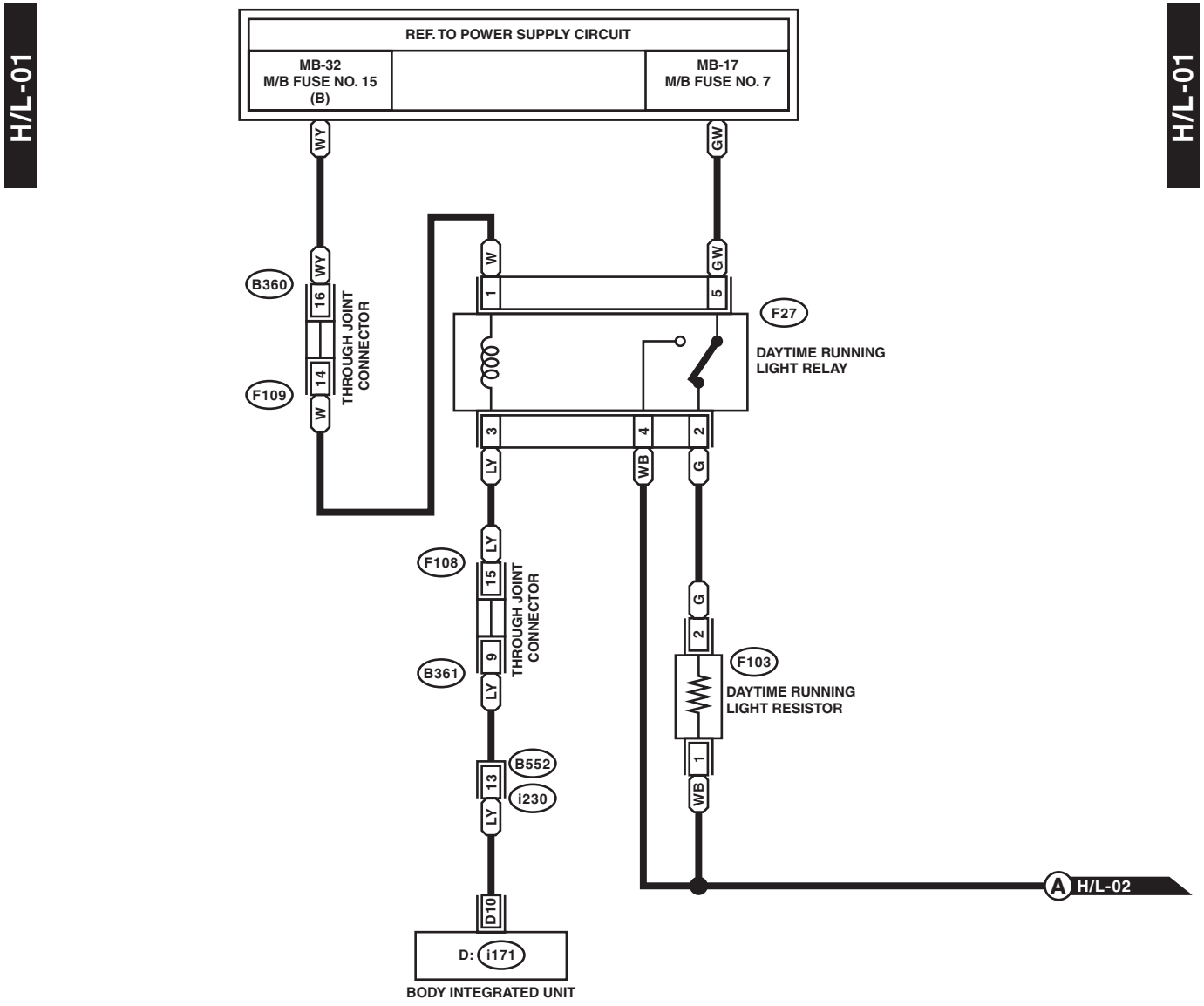


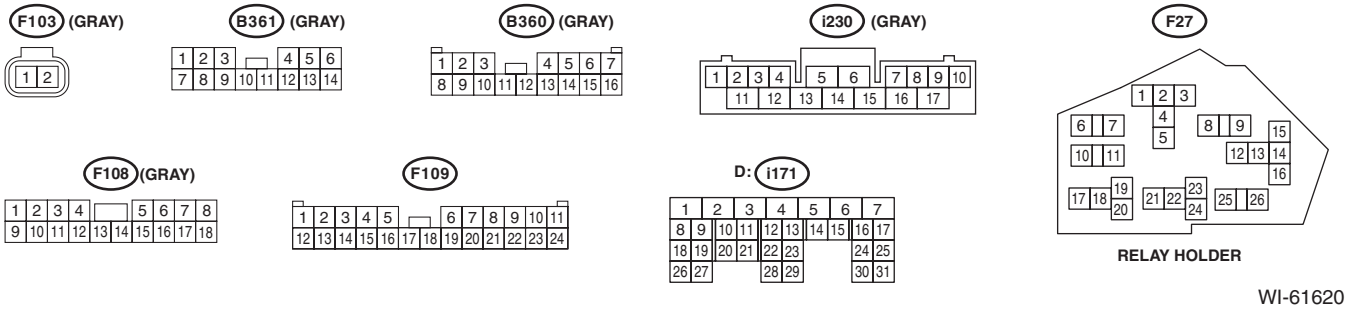


WI-37837

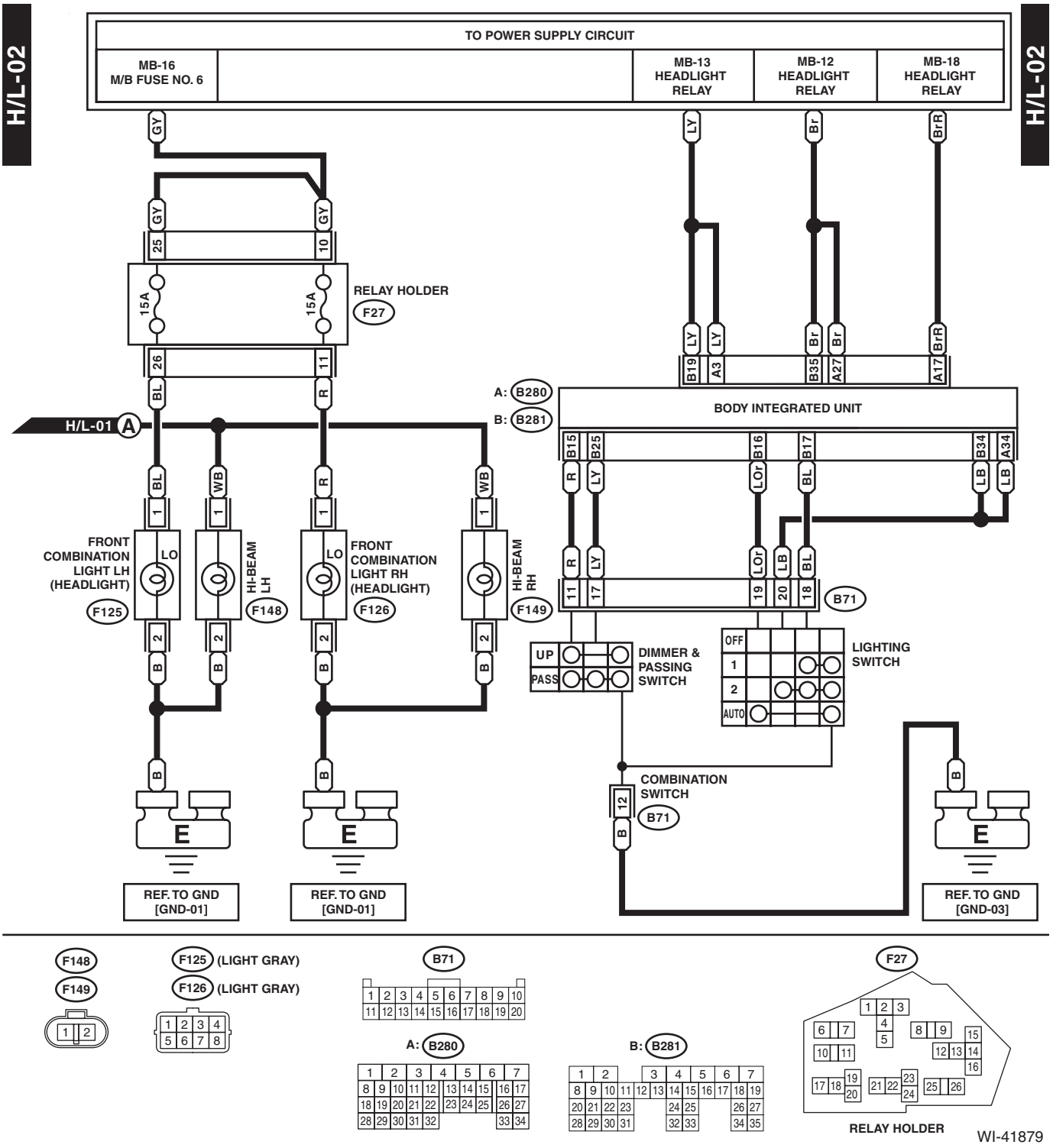
25.Headlight System

A: WIRING DIAGRAM



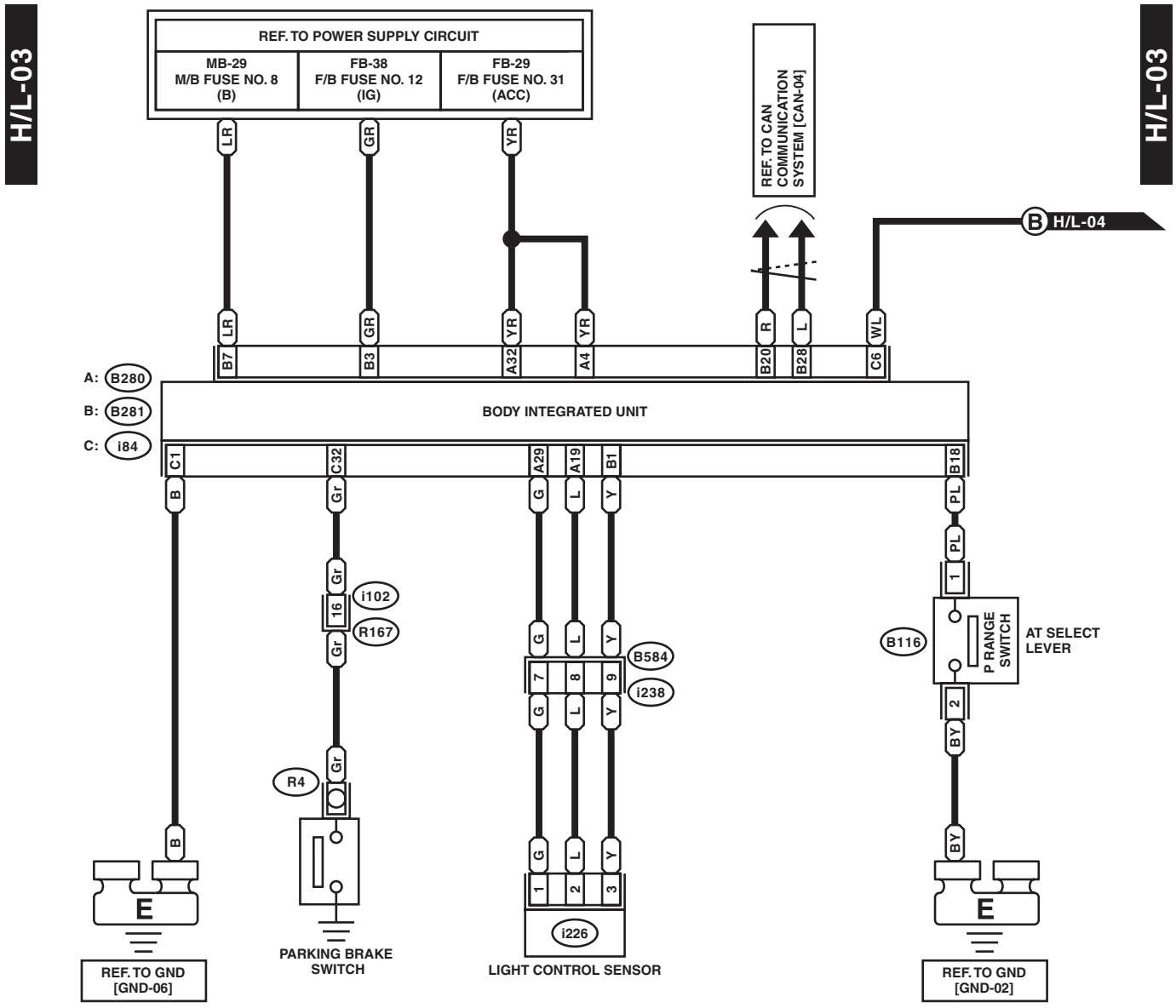


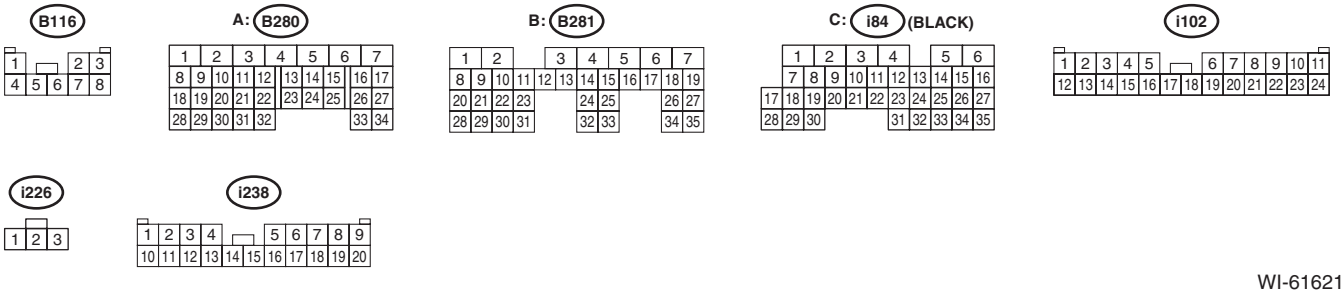
WI-61620


H/L-02
H/L-02
TO POWER SUPPLY CIRCUIT
MB-16
M/B FUSE NO. 6
MB-13
HEADLIGHT
RELAY
MB-12
HEADLIGHT
RELAY
MB-18
HEADLIGHT
RELAY
RELAY HOLDER
F27
15A
15A
H/L-01
A
A: B280
B: B281
BODY INTEGRATED UNIT
FRONT
COMBINATION
LIGHT LH
(HEADLIGHT)
F125
LO
HI-BEAM
LH
F148
LO
FRONT
COMBINATION
LIGHT RH
(HEADLIGHT)
F126
HI-BEAM
RH
F149
DIMMER &
PASSING
SWITCH
UP
PASS
LIGHTING
SWITCH
OFF
1
2
AUTO
COMBINATION
SWITCH
B71
REF. TO GND
[GND-01]
REF. TO GND
[GND-01]
REF. TO GND
[GND-03]

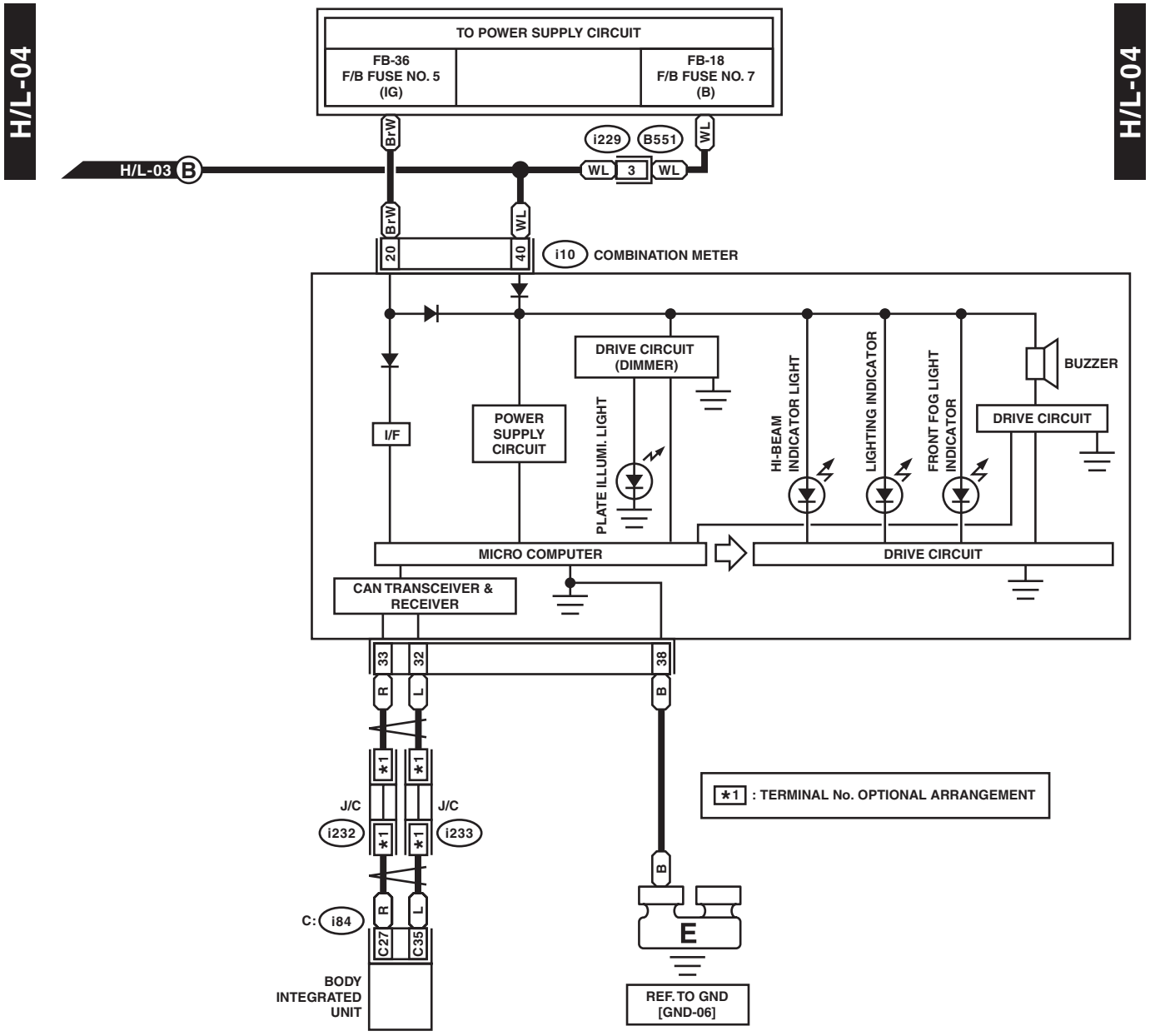
F148
F149
F125 (LIGHT GRAY)
F126 (LIGHT GRAY)
B71
A: B280
B: B281
F27
RELAY HOLDER

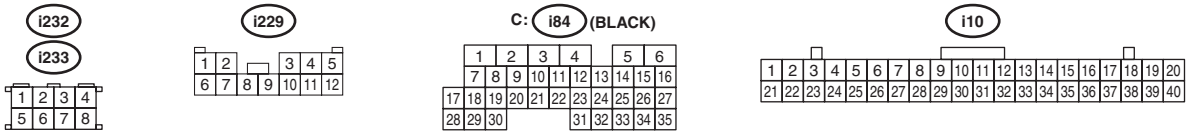
WI-41879


H/L-03
H/L-03
REF. TO POWER SUPPLY CIRCUIT
MB-29
M/B FUSE NO. 8
(B)
FB-38
F/B FUSE NO. 12
(IG)
FB-29
F/B FUSE NO. 31
(ACC)
REF. TO CAN COMMUNICATION SYSTEM [CAN-04]
B H/L-04
LR
GR
YR
YR
R
L
WL
B7
B3
A32
A4
B20
B28
C6
A: B280
B: B281
C: i84
BODY INTEGRATED UNIT
C1
C32
A29
A19
B1
B18
B
Gr
G
L
Y
PL
1
16
i102
R167
B584
7
8
9
i238
R4
2
BY
B116
P RANGE SWITCH
AT SELECT LEVER
E
REF. TO GND [GND-06]
PARKING BRAKE SWITCH
1
2
3
i226
LIGHT CONTROL SENSOR
E
REF. TO GND [GND-02]


B116
A: B280
B: B281
C: i84 (BLACK)
i102
i226
i238

WI-61621

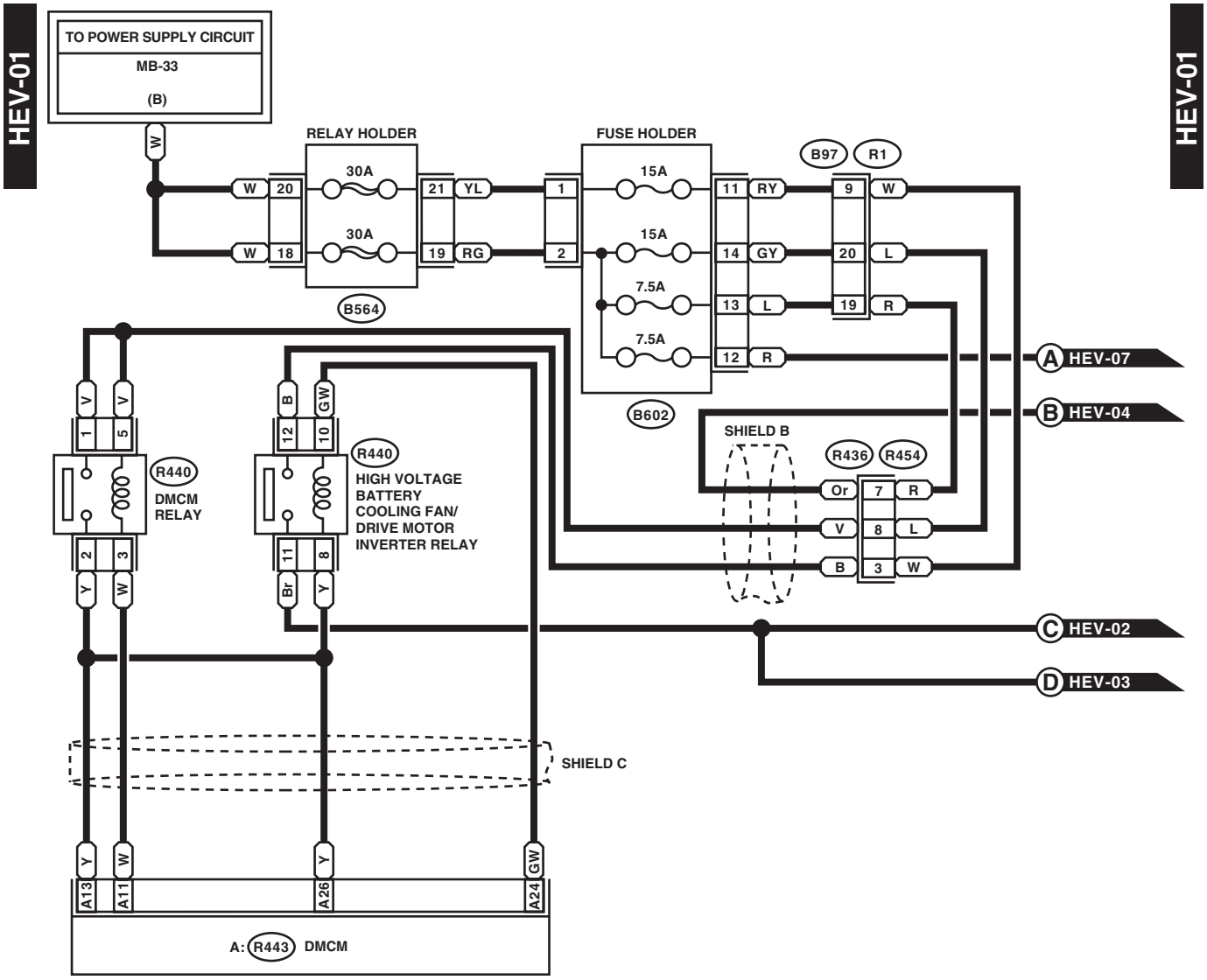

H/L-04
H/L-04
TO POWER SUPPLY CIRCUIT
FB-36
F/B FUSE NO. 5
(IG)
FB-18
F/B FUSE NO. 7
(B)
H/L-03 B
BrW
WL
i229
B551
WL
3
WL
BrW
WL
20
40
i10
COMBINATION METER
DRIVE CIRCUIT
(DIMMER)
BUZZER
I/F
POWER
SUPPLY
CIRCUIT
PLATE ILLUMI. LIGHT
HI-BEAM
INDICATOR LIGHT
LIGHTING INDICATOR
FRONT FOG LIGHT
INDICATOR
DRIVE CIRCUIT
MICRO COMPUTER
DRIVE CIRCUIT
CAN TRANSCEIVER &
RECEIVER
33
32
38
R
L
B
*1
*1
J/C
i232
J/C
i233
*1
*1
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
B
C:
i84
R
L
C27
C35
E
BODY
INTEGRATED
UNIT
REF. TO GND
[GND-06]

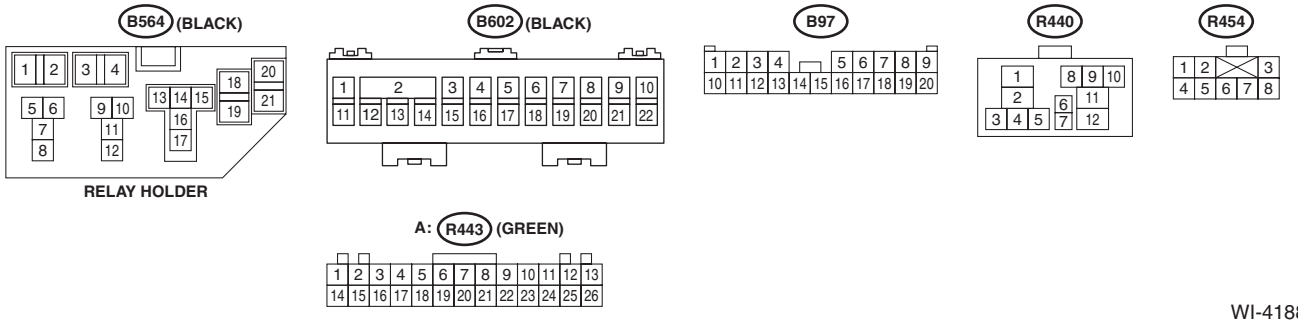

i232
i233
i229
C:
i84
(BLACK)
i10

WI-41881

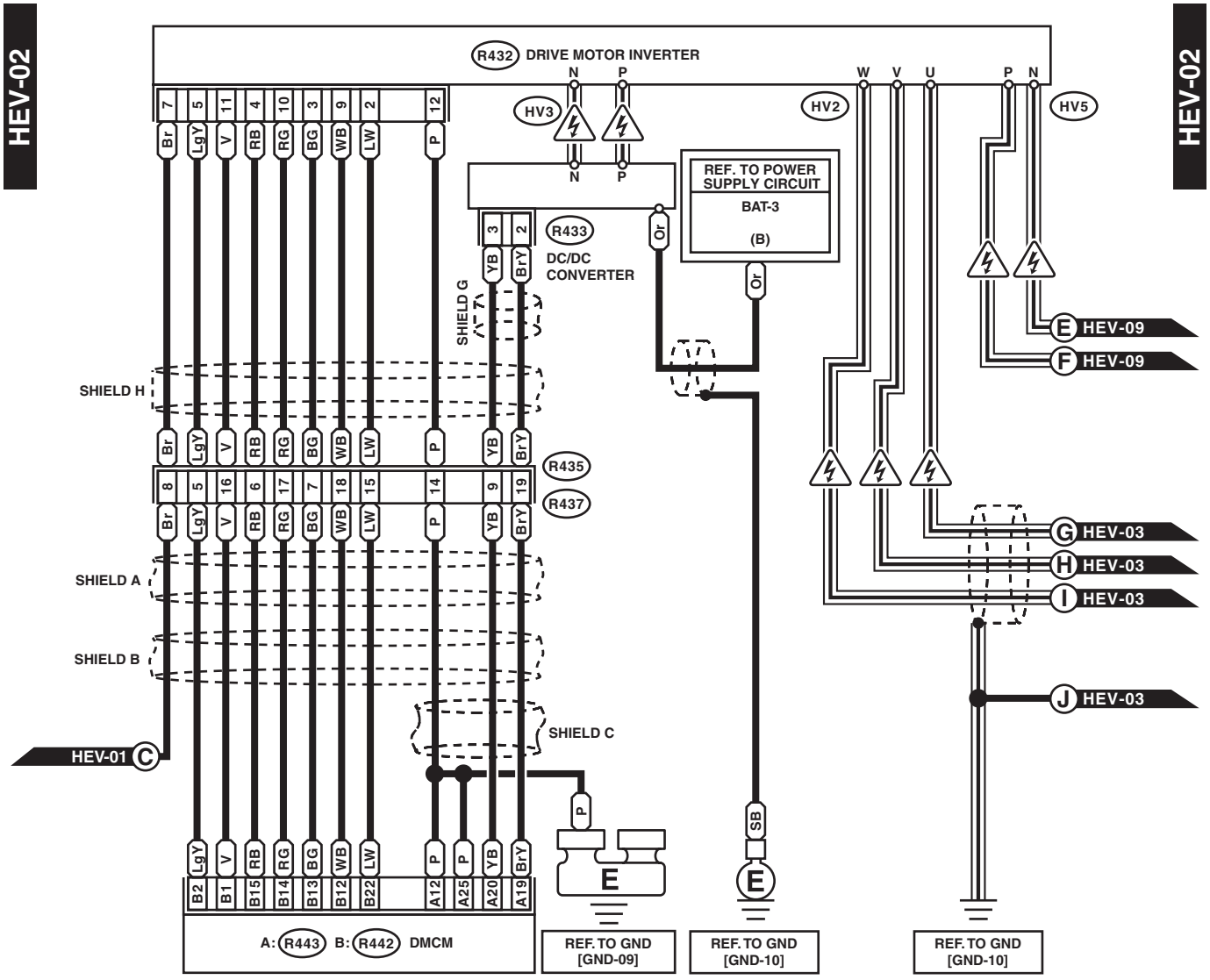
26.Hybrid Electric Vehicle System

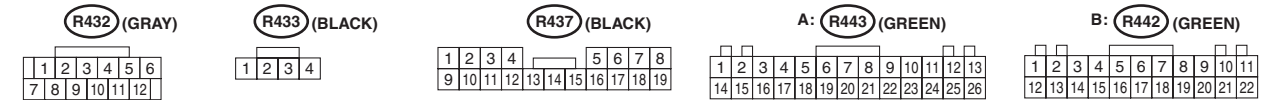
A: WIRING DIAGRAM



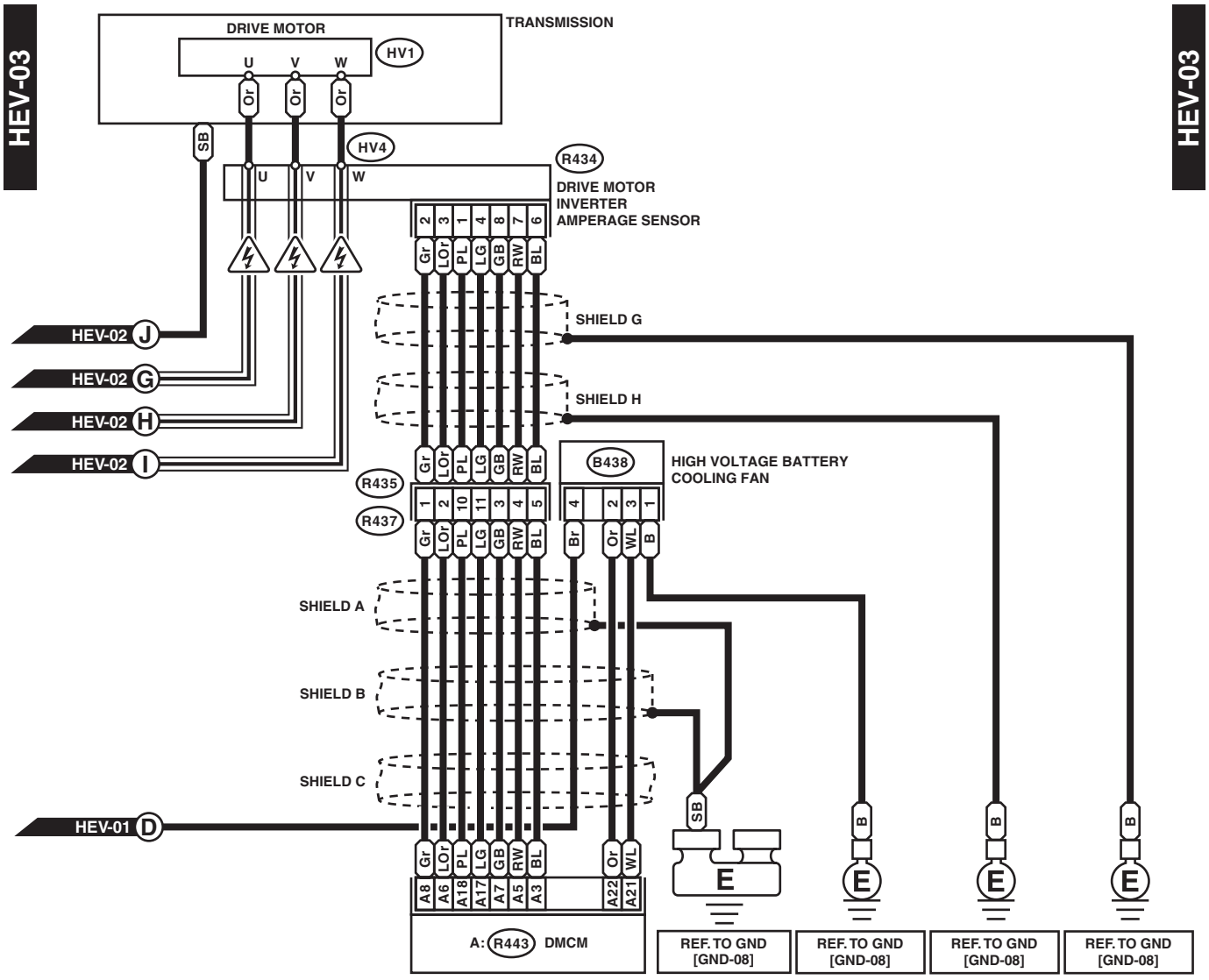


WI-41882


HEV-02
HEV-02
R432 DRIVE MOTOR INVERTER
N
P
W
V
U
P
N
HV3
HV2
HV5
REF. TO POWER SUPPLY CIRCUIT
BAT-3
(B)
R433
DC/DC CONVERTER
Or
SHIELD G
SHIELD H
SHIELD A
SHIELD B
SHIELD C
R435
R437
E HEV-09
F HEV-09
G HEV-03
H HEV-03
I HEV-03
J HEV-03
HEV-01 C
SB
A: R443 B: R442 DMCM
REF. TO GND [GND-09]
REF. TO GND [GND-10]
REF. TO GND [GND-10]


R432 (GRAY)
R433 (BLACK)
R437 (BLACK)
A: R443 (GREEN)
B: R442 (GREEN)

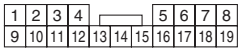
WI-48725



R434 (BLACK)



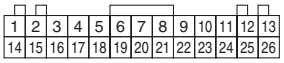
R437 (BLACK)



R438

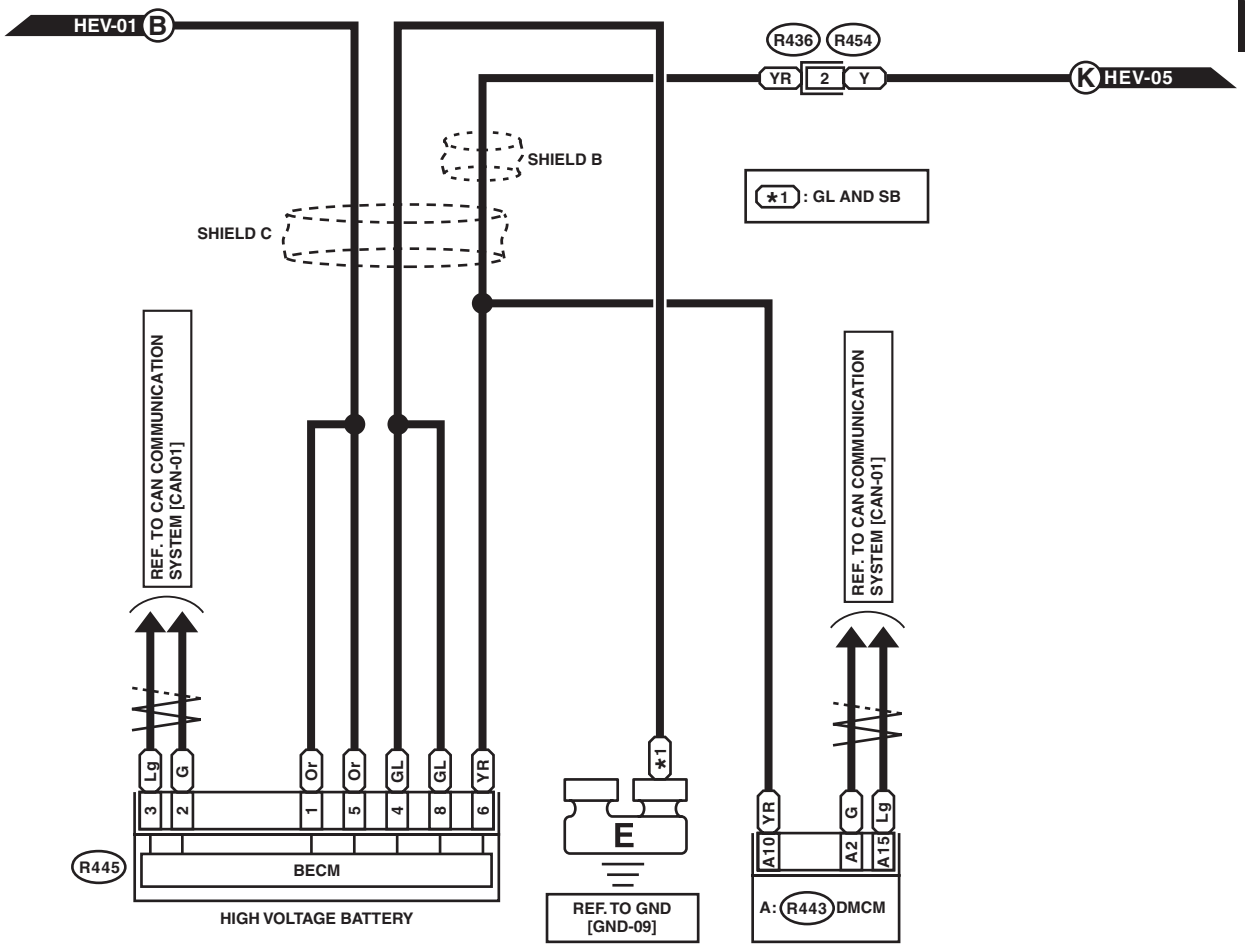


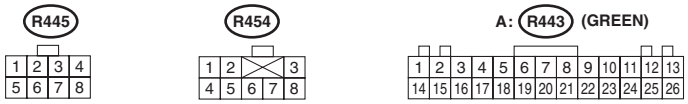
A: R443 (GREEN)



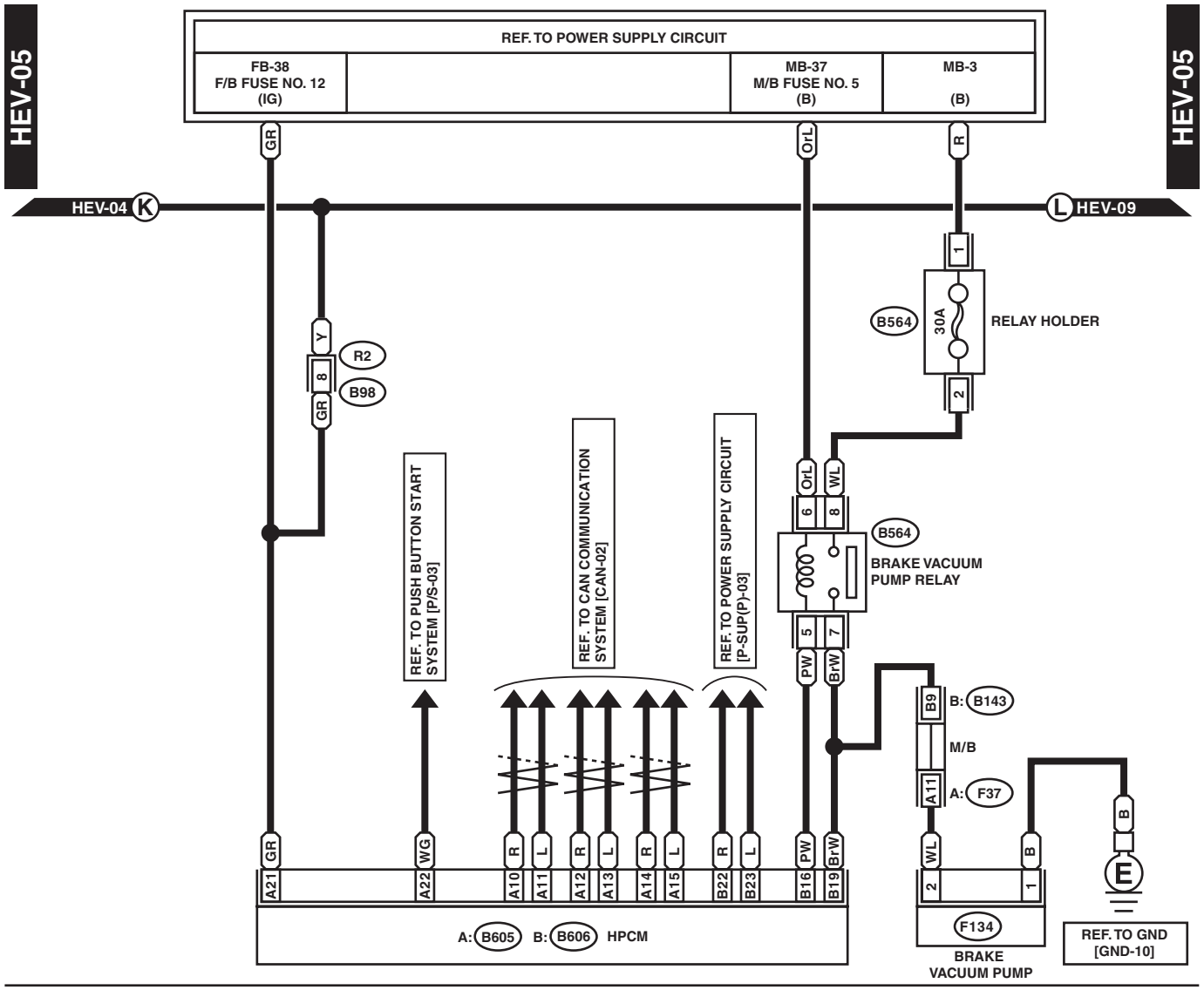
WI-42220

HEV-04

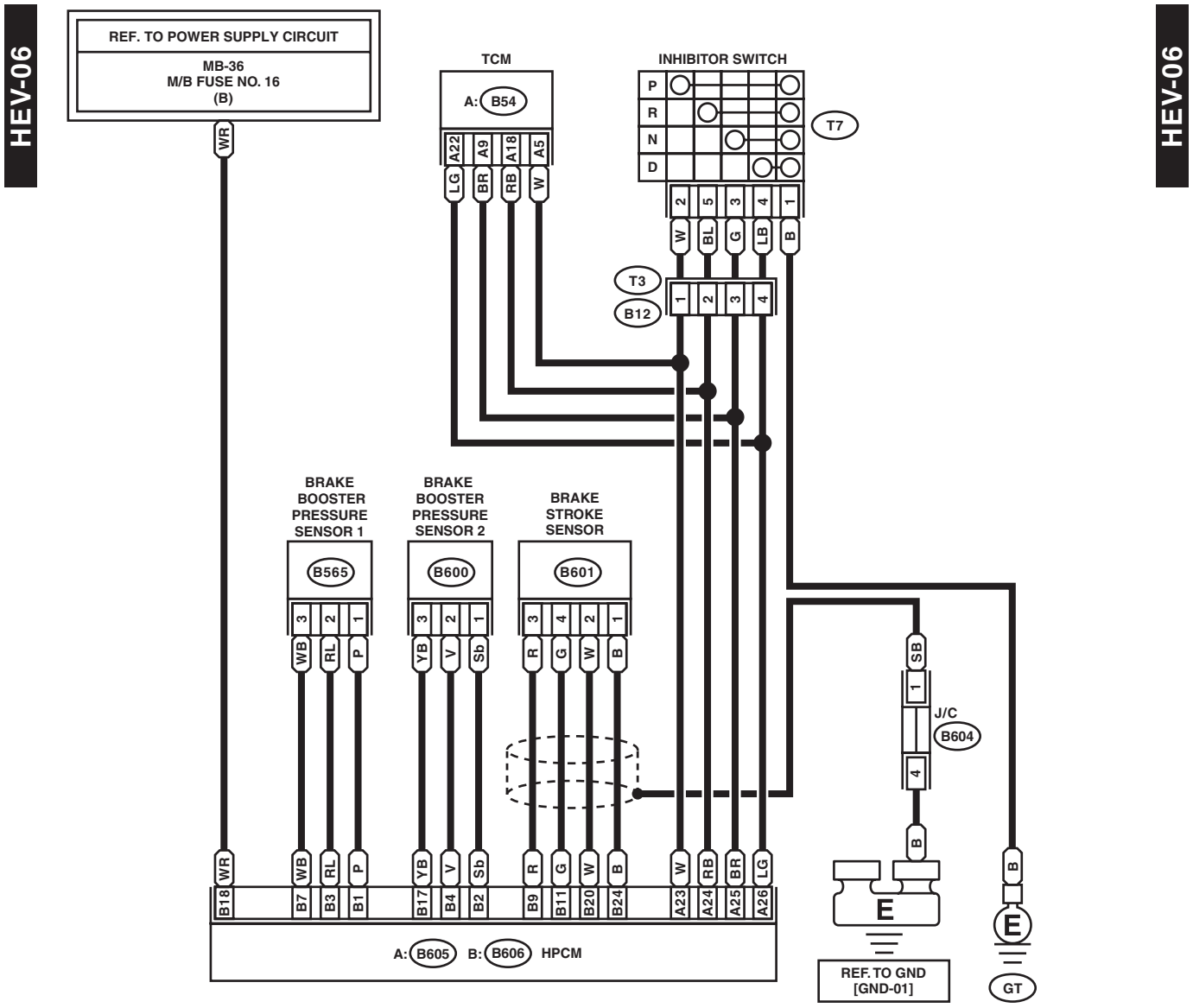


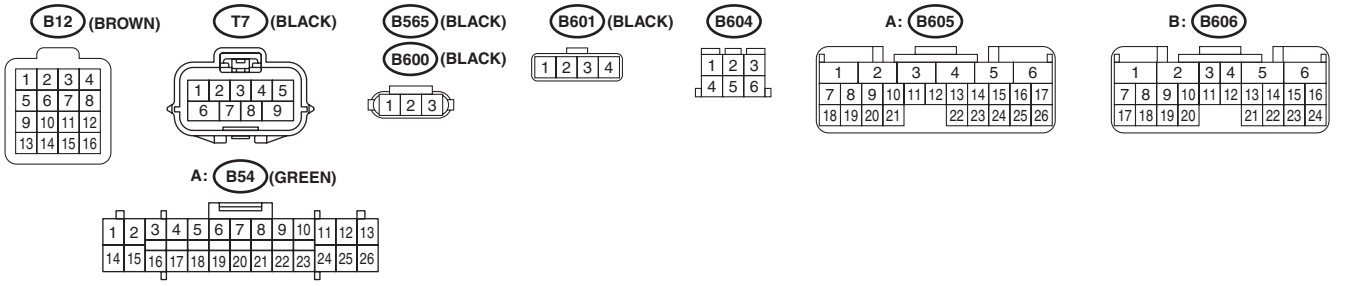


WI-61682

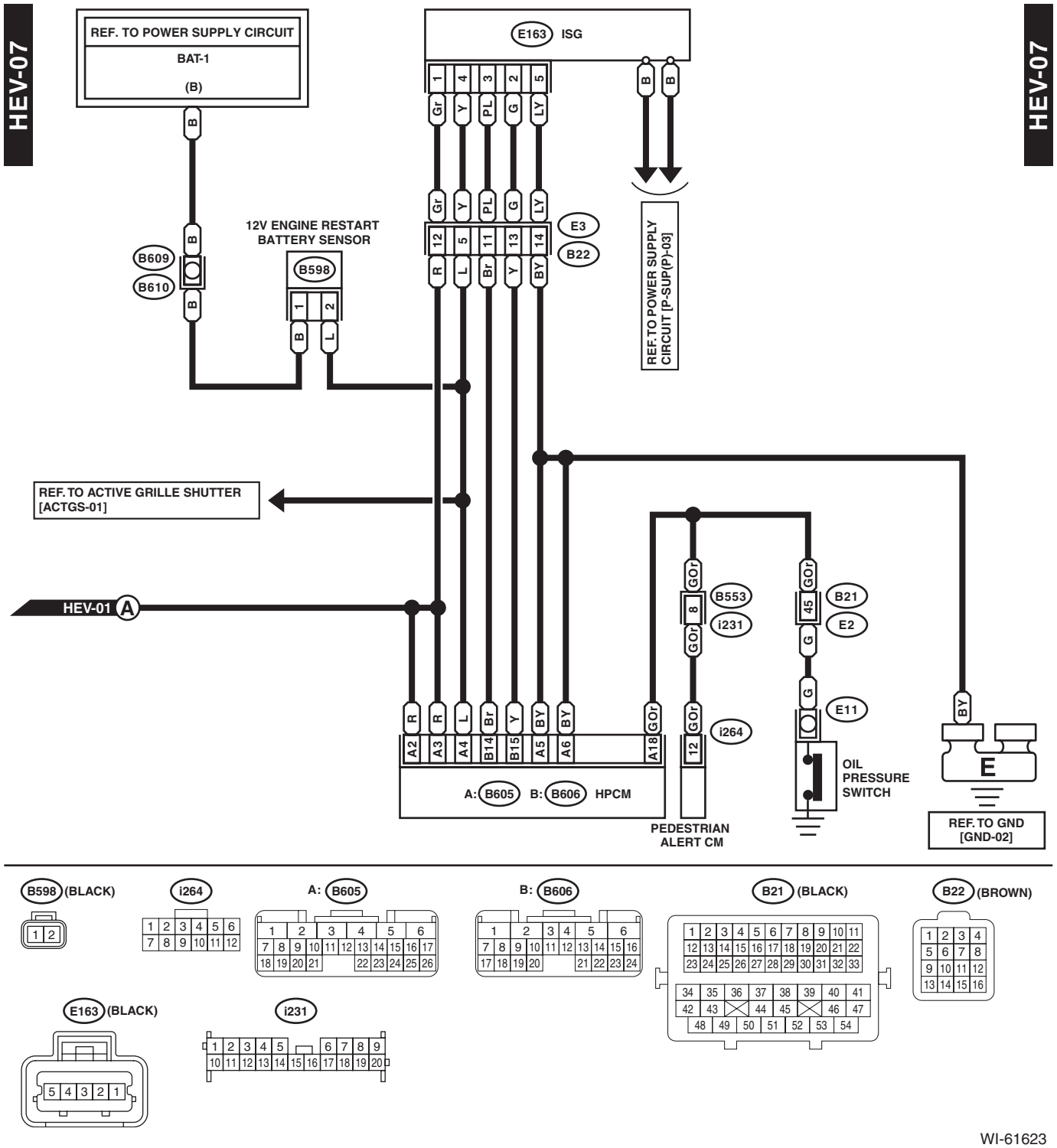

HEV-05
HEV-05
REF. TO POWER SUPPLY CIRCUIT
FB-38
F/B FUSE NO. 12
(IG)
MB-37
M/B FUSE NO. 5
(B)
MB-3
(B)
GR
OrL
R
HEV-04 K
L HEV-09
B564
30A
RELAY HOLDER
Y
R2
8
B98
GR
REF. TO PUSH BUTTON START SYSTEM [P/S-03]
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
REF. TO POWER SUPPLY CIRCUIT [P-SUP(P)-03]
OrL
WL
6
8
B564
BRAKE VACUUM PUMP RELAY
5
7
PW
BrW
B9
B: B143
M/B
A11
A: F37
GR
WG
R
L
R
L
R
L
R
L
PW
BrW
WL
B
A21
A22
A10
A11
A12
A13
A14
A15
B22
B23
B16
B19
2
1
A: B605
B: B606
HPCM
F134
BRAKE VACUUM PUMP
REF. TO GND [GND-10]
B98
B564 (BLACK)
F134 (DARK GRAY)
A: B605
B: B606
RELAY HOLDER
A: F37
B: B143

WI-61622


REF. TO POWER SUPPLY CIRCUIT
MB-36
M/B FUSE NO. 16
(B)
WR
TCM
A: B54
A22
A9
A18
A5
LG
BR
RB
W
INHIBITOR SWITCH
P
R
N
D
T7
2
5
3
4
1
W
BL
G
LB
B
T3
B12
1
2
3
4
BRAKE BOOSTER PRESSURE SENSOR 1
B565
BRAKE BOOSTER PRESSURE SENSOR 2
B600
BRAKE STROKE SENSOR
B601
WB
RL
P
YB
V
Sb
R
G
W
B
SB
J/C
B604
B18
B7
B3
B1
B17
B4
B2
B9
B11
B20
B24
A23
A24
A25
A26
A: B605 B: B606 HPCM
REF. TO GND
[GND-01]
GT

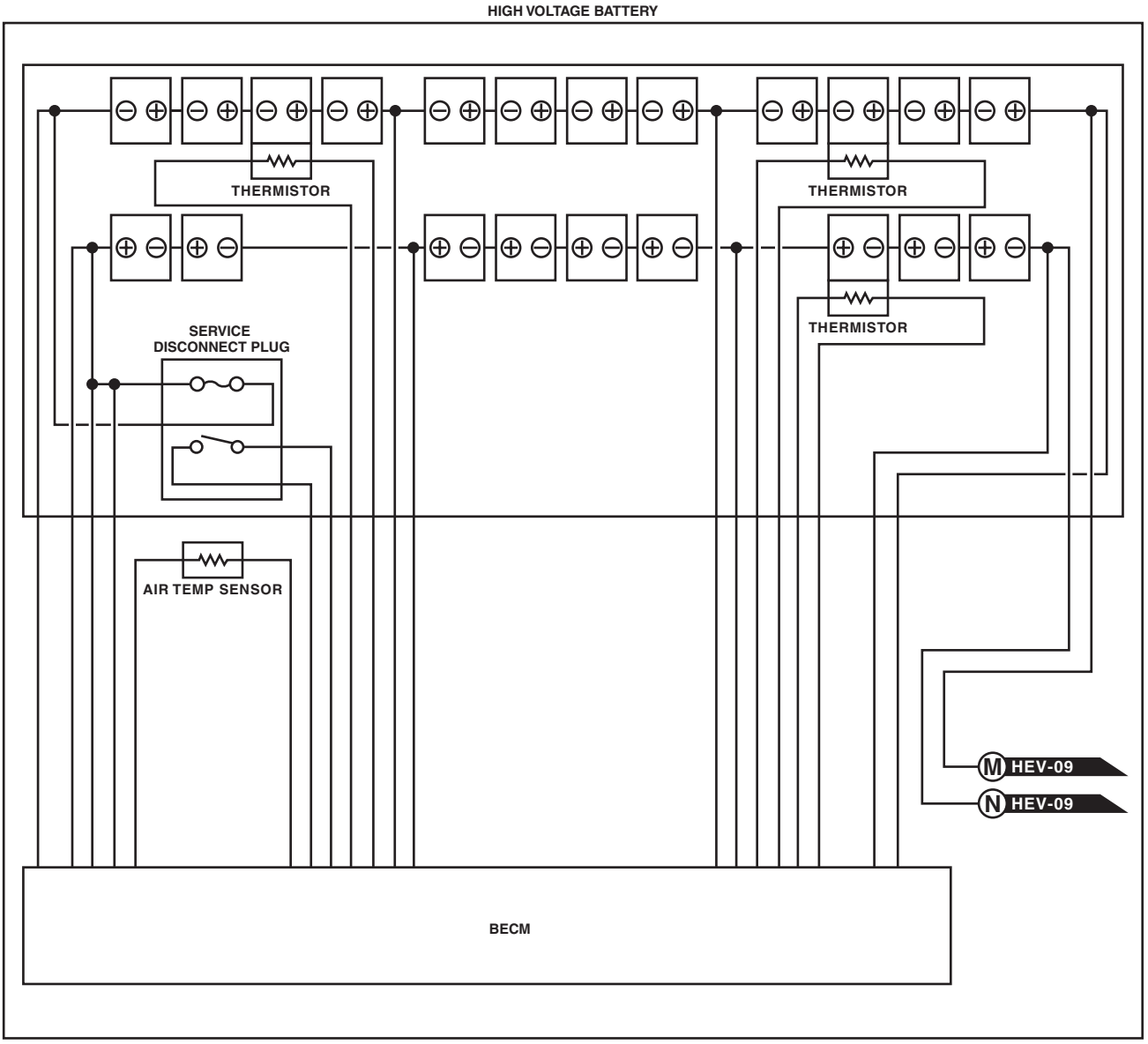

B12 (BROWN)
T7 (BLACK)
B565 (BLACK)
B600 (BLACK)
B601 (BLACK)
B604
A: B605
B: B606
A: B54 (GREEN)

WI-61683

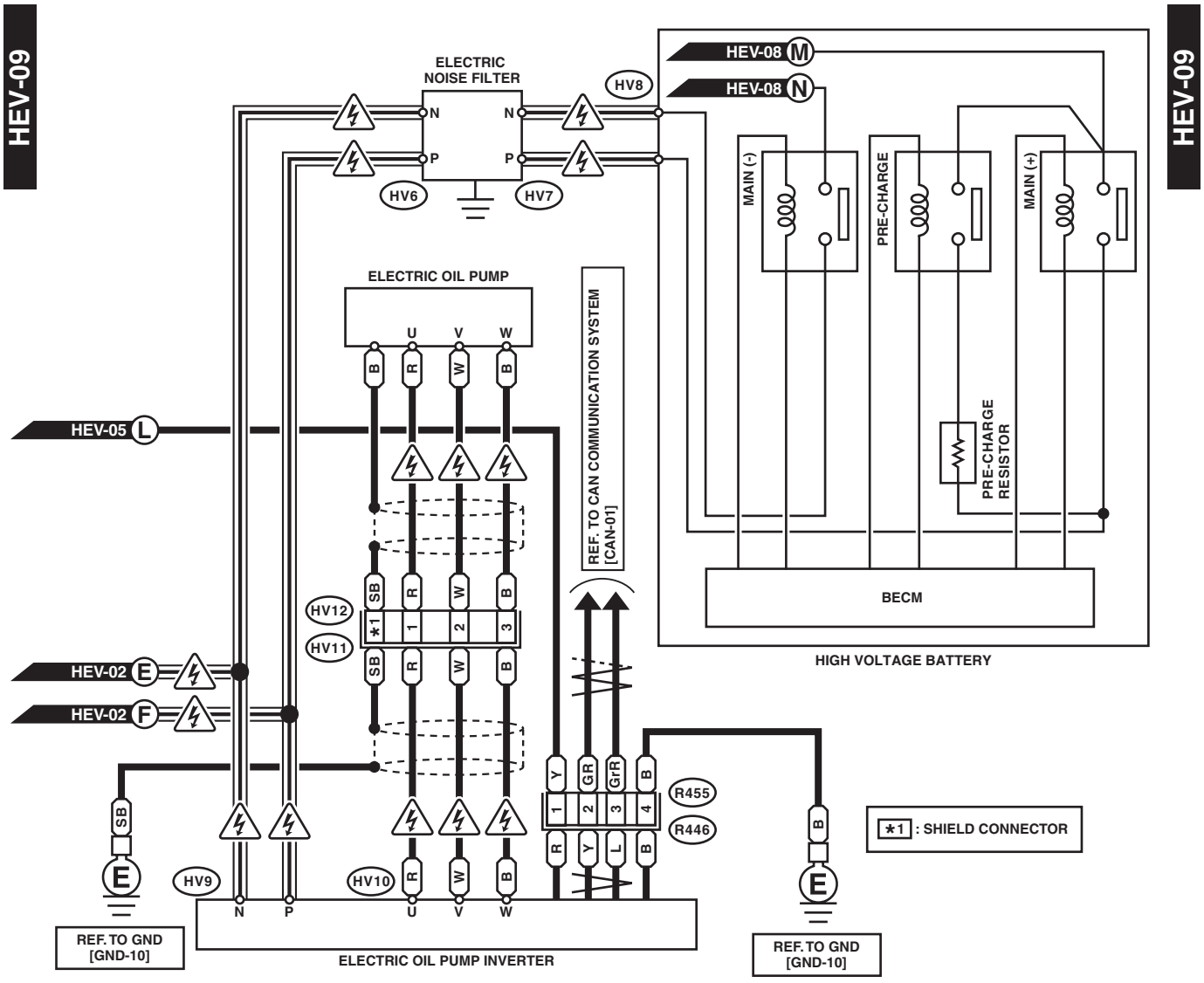

HEV-07
HEV-07
REF. TO POWER SUPPLY CIRCUIT
BAT-1
(B)
E163 ISG
12V ENGINE RESTART BATTERY SENSOR
B609
B610
B598
E3
B22
REF. TO POWER SUPPLY CIRCUIT [P-SUP(P)-03]
REF. TO ACTIVE GRILLE SHUTTER [ACTGS-01]
HEV-01 A
B553
i231
B21
E2
E11
i264
OIL PRESSURE SWITCH
A: B605 B: B606 HPCM
PEDESTRIAN ALERT CM
REF. TO GND [GND-02]
B598 (BLACK)
i264
A: B605
B: B606
B21 (BLACK)
B22 (BROWN)
E163 (BLACK)
i231

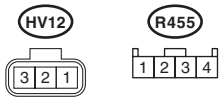
WI-61623

HEV-08

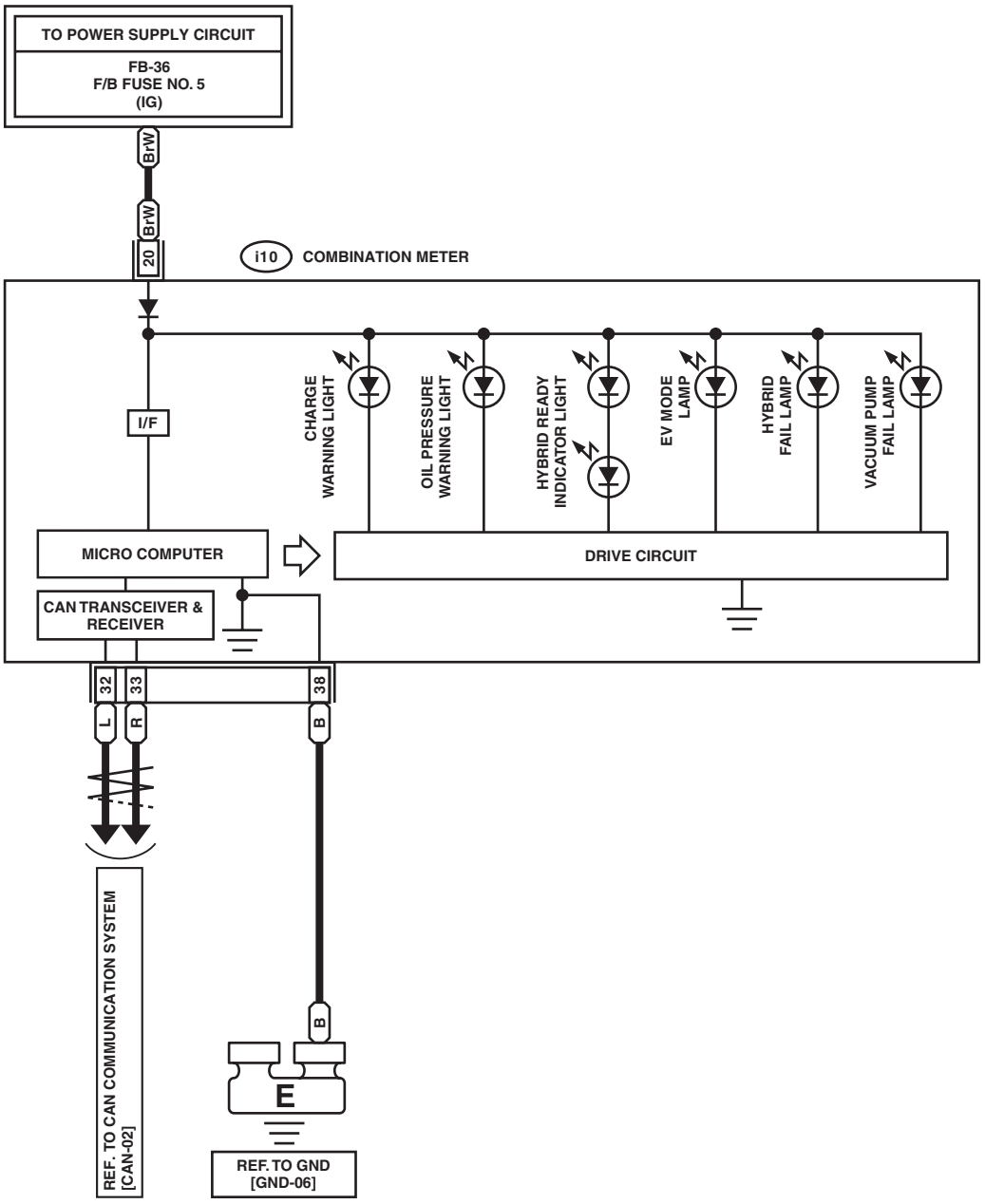


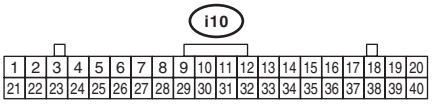
WI-42225


HEV-09
HEV-09
ELECTRIC NOISE FILTER
HV8
HV6
HV7
N
P
HEV-08 M
HEV-08 N
MAIN (-)
PRE-CHARGE
MAIN (+)
PRE-CHARGE RESISTOR
ELECTRIC OIL PUMP
U V W
REF. TO CAN COMMUNICATION SYSTEM [CAN-01]
HEV-05 L
HV12
HV11
*1
BECM
HIGH VOLTAGE BATTERY
HEV-02 E
HEV-02 F
R455
R446
*1 : SHIELD CONNECTOR
HV9
HV10
REF. TO GND [GND-10]
ELECTRIC OIL PUMP INVERTER
REF. TO GND [GND-10]


HV12
R455
3 2 1
1 2 3 4

WI-42226

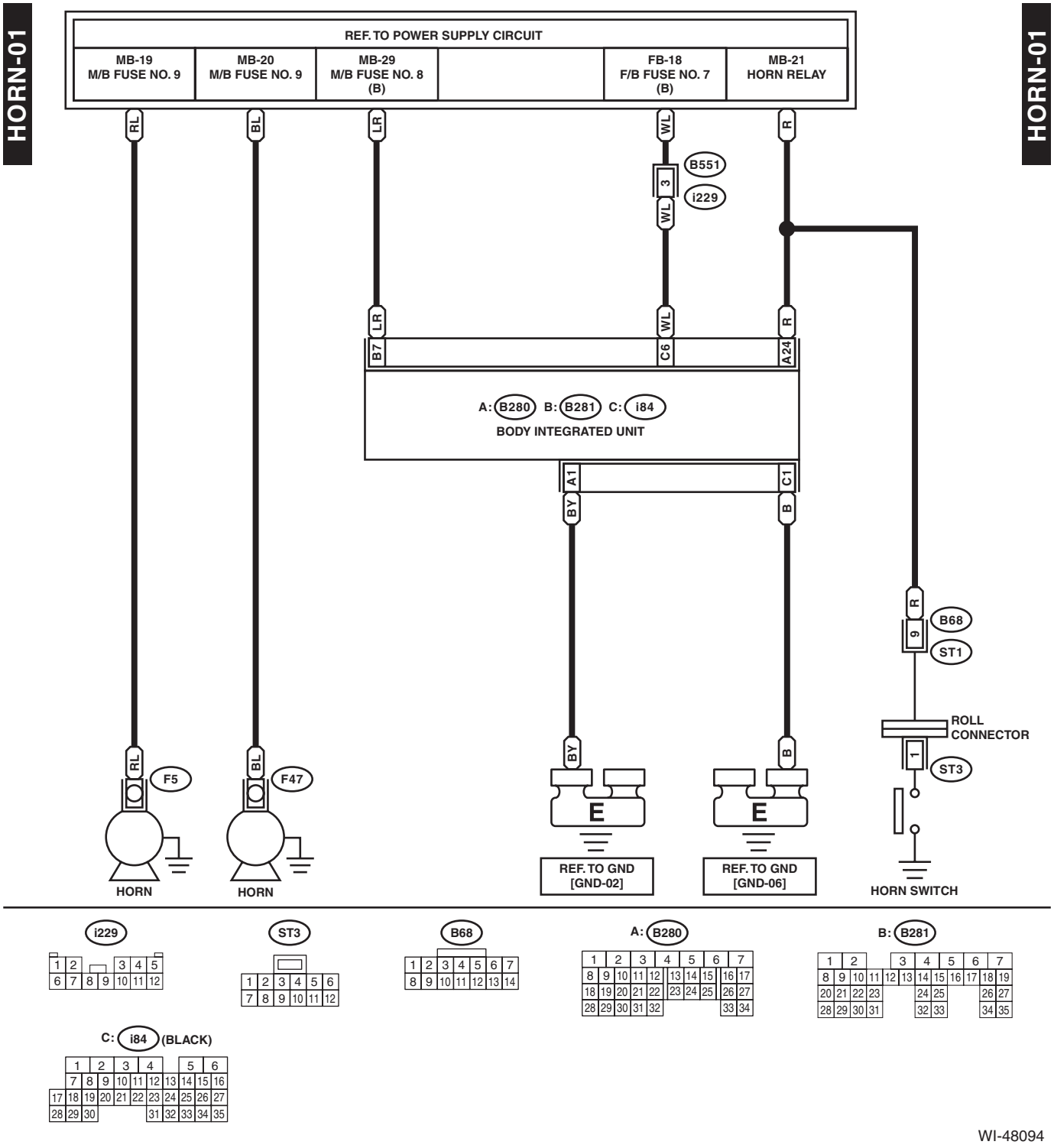

TO POWER SUPPLY CIRCUIT
FB-36
F/B FUSE NO. 5
(IG)
BrW
BrW
20
i10
COMBINATION METER
I/F
CHARGE WARNING LIGHT
OIL PRESSURE WARNING LIGHT
HYBRID READY INDICATOR LIGHT
EV MODE LAMP
HYBRID FAIL LAMP
VACUUM PUMP FAIL LAMP
MICRO COMPUTER
DRIVE CIRCUIT
CAN TRANSCEIVER & RECEIVER
32
33
38
L
R
B
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
B
E
REF. TO GND [GND-06]


i10
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

WI-42227

27.Horn System

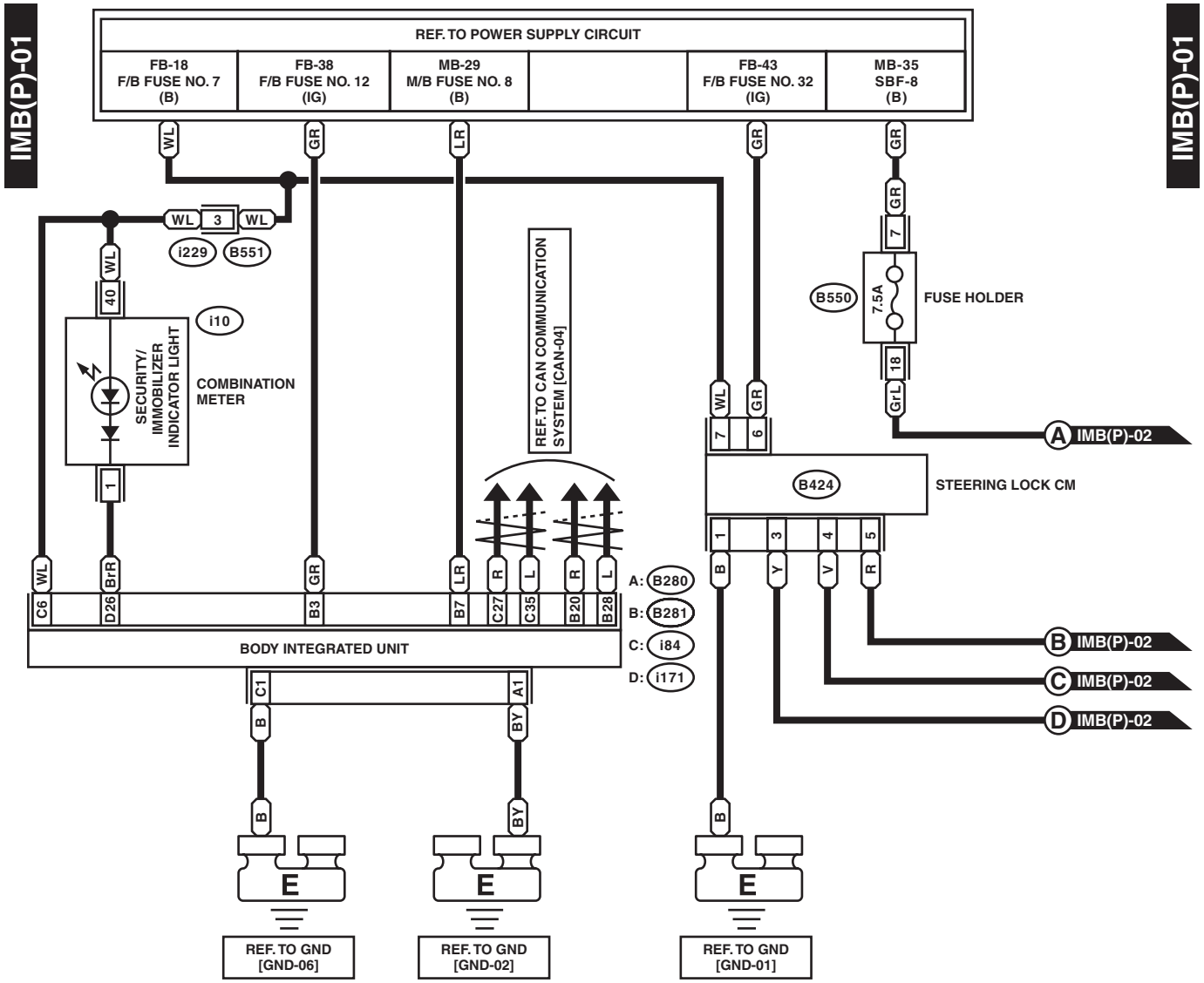
A: WIRING DIAGRAM

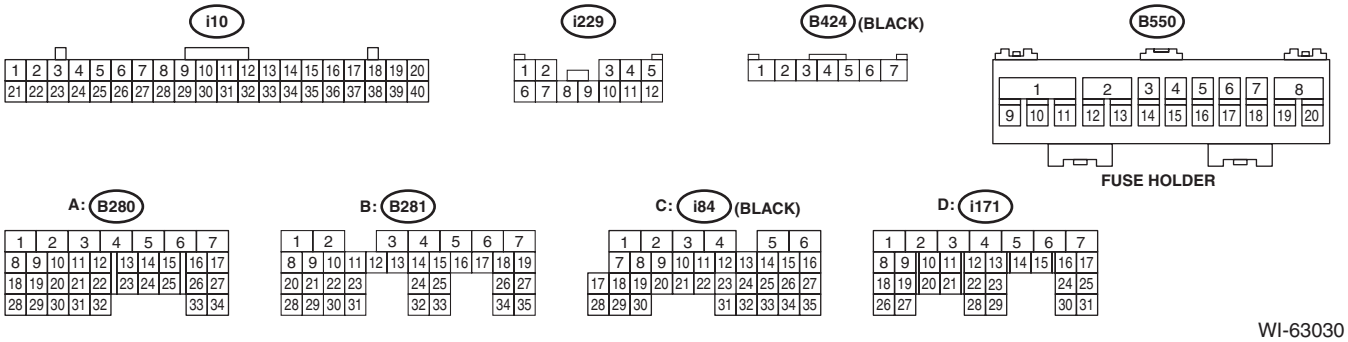


WI-48094

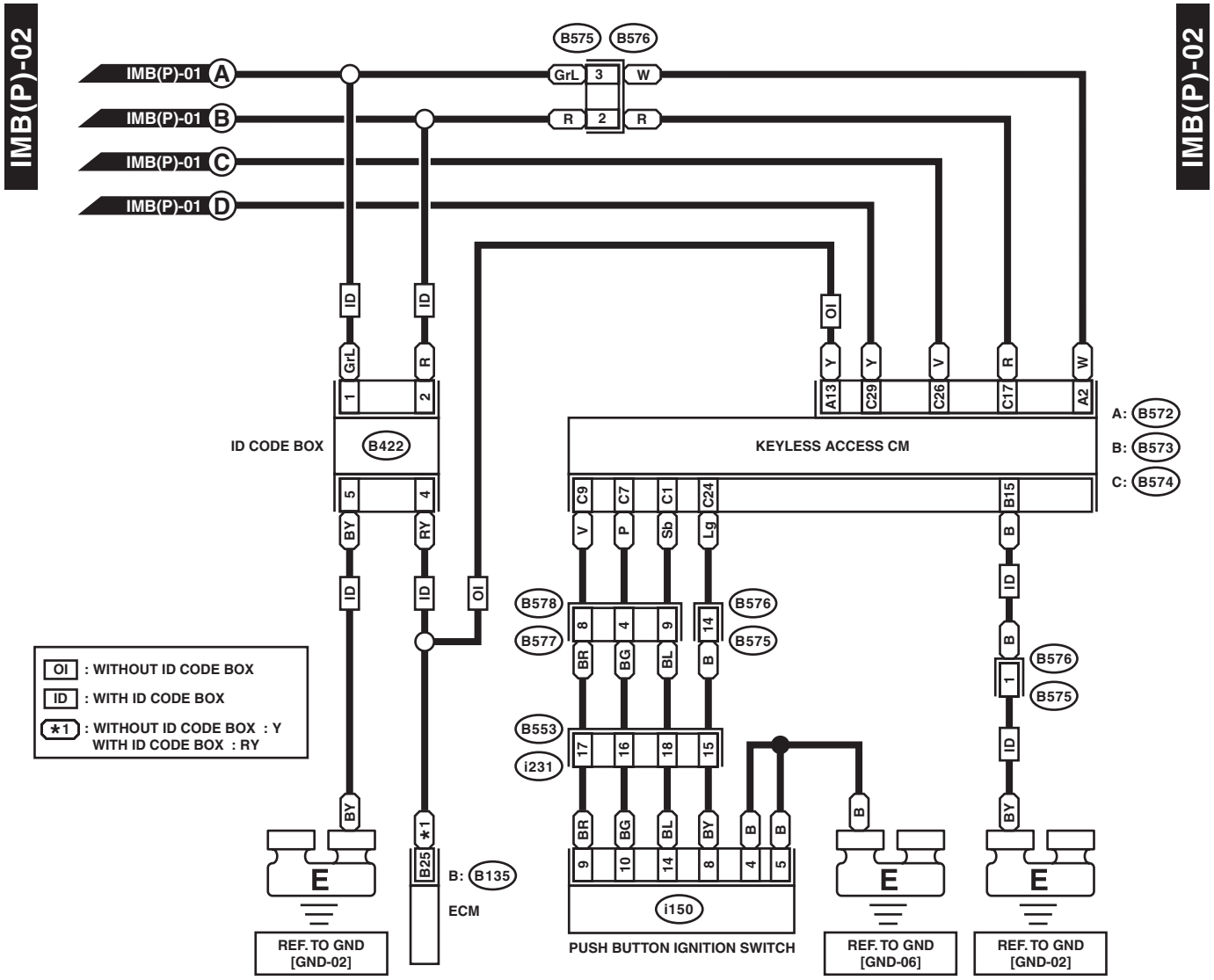
28.Immobilizer System

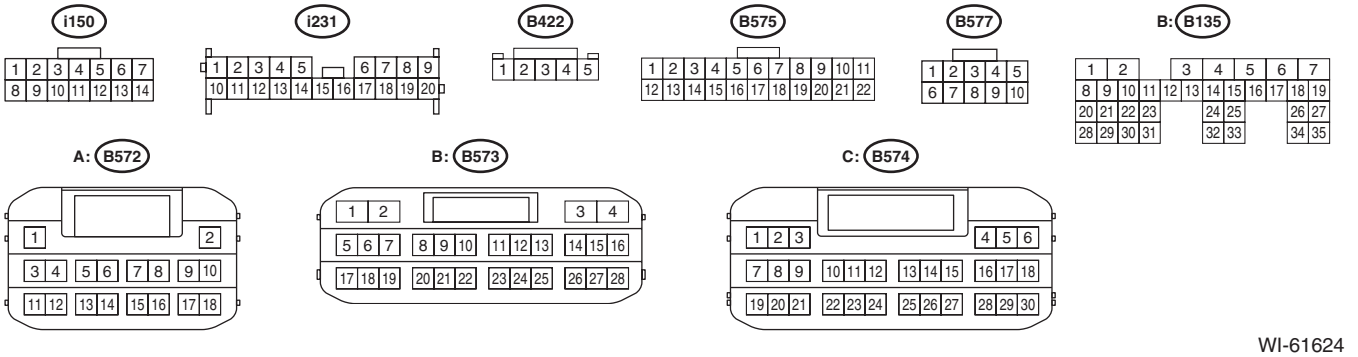
A: WIRING DIAGRAM





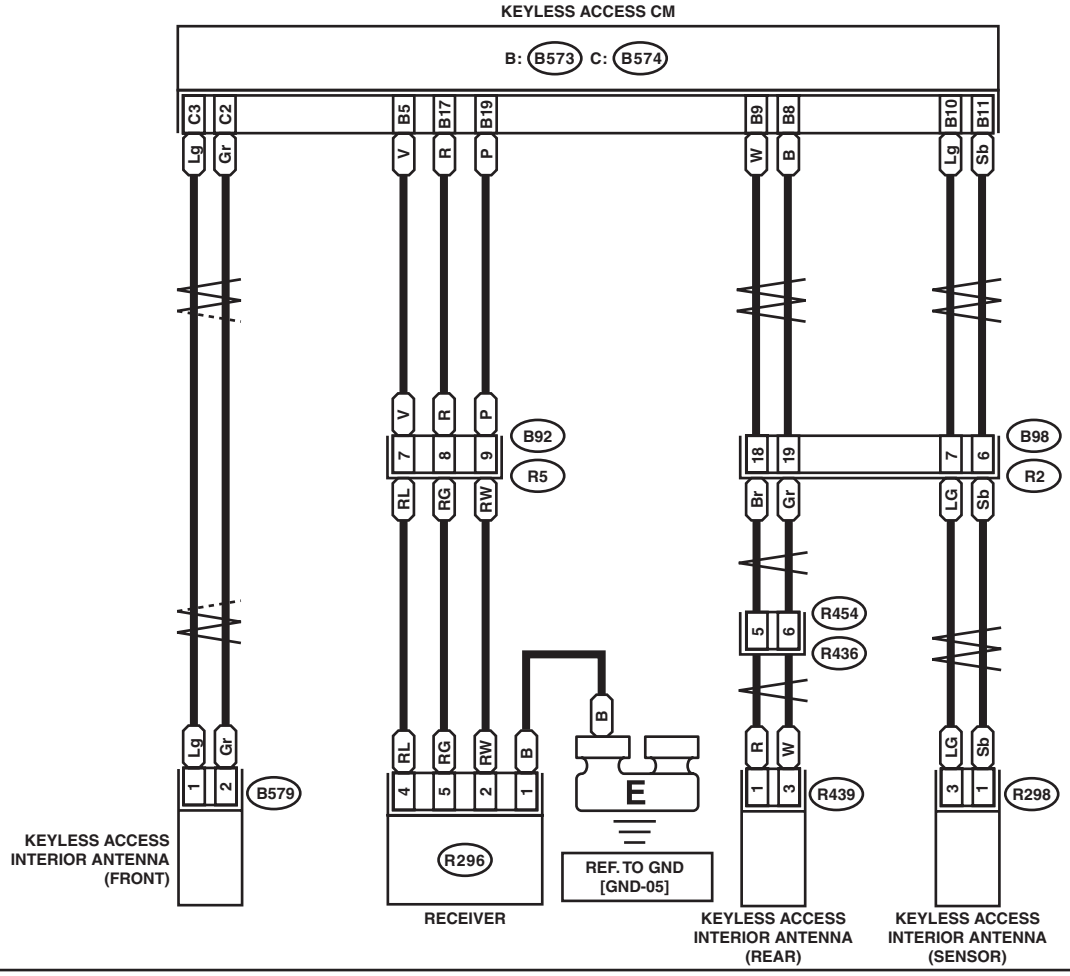
WI-63030

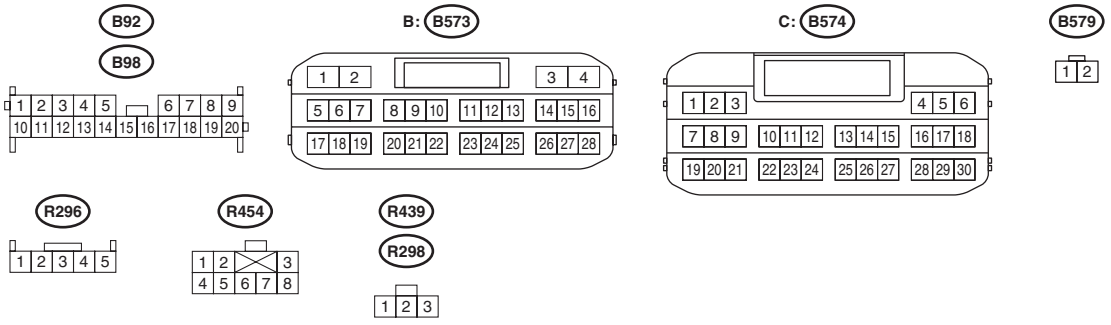

IMB(P)-02
IMB(P)-01 A
IMB(P)-01 B
IMB(P)-01 C
IMB(P)-01 D
B575
B576
GrL
3
W
R
2
R
ID
OI
ID CODE BOX
B422
KEYLESS ACCESS CM
A: B572
B: B573
C: B574
A13
C29
C26
C17
A2
C9
C7
C1
C24
B15
V
P
Sb
Lg
B
B578
B577
B576
B575
B553
i231
B25
B: B135
ECM
i150
PUSH BUTTON IGNITION SWITCH
REF. TO GND [GND-02]
REF. TO GND [GND-06]
REF. TO GND [GND-02]
OI : WITHOUT ID CODE BOX
ID : WITH ID CODE BOX
*1 : WITHOUT ID CODE BOX : Y
WITH ID CODE BOX : RY


i150
i231
B422
B575
B577
B: B135
A: B572
B: B573
C: B574

WI-61624

IMB(P)-03

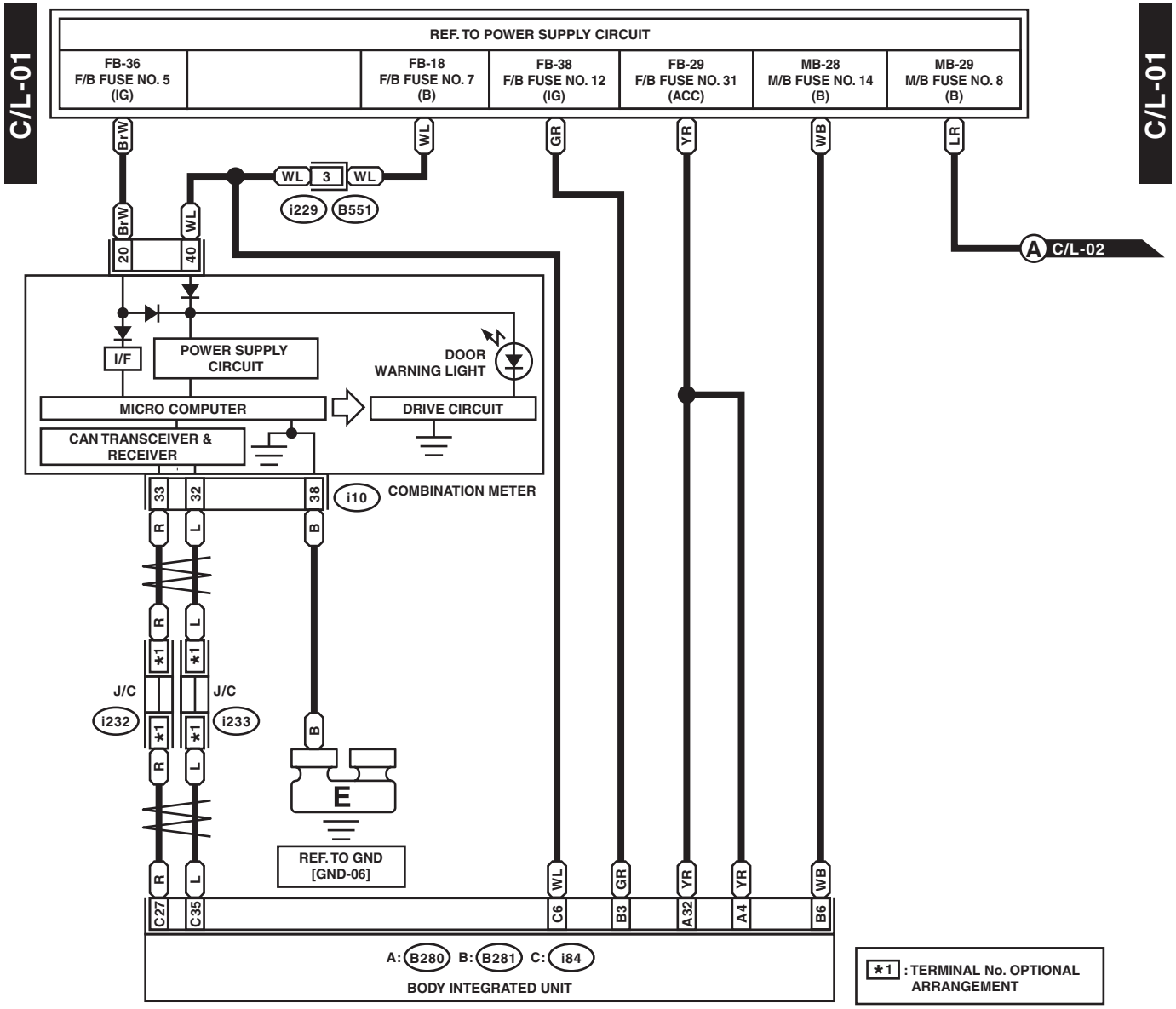


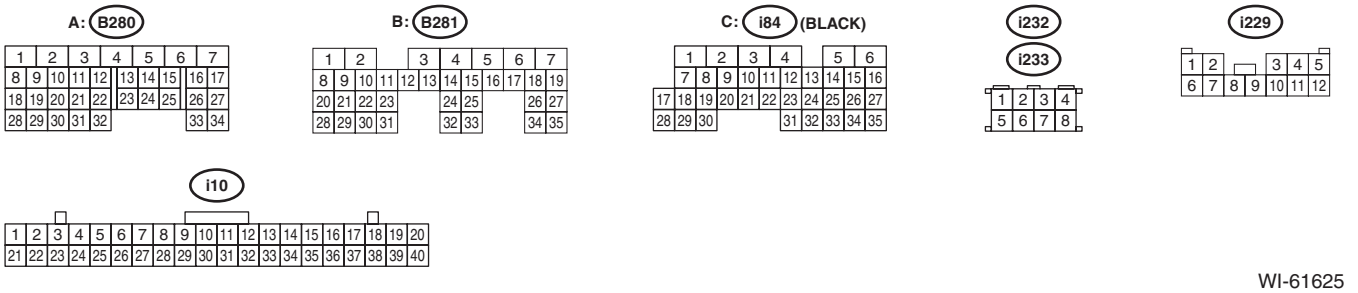


WI-48098

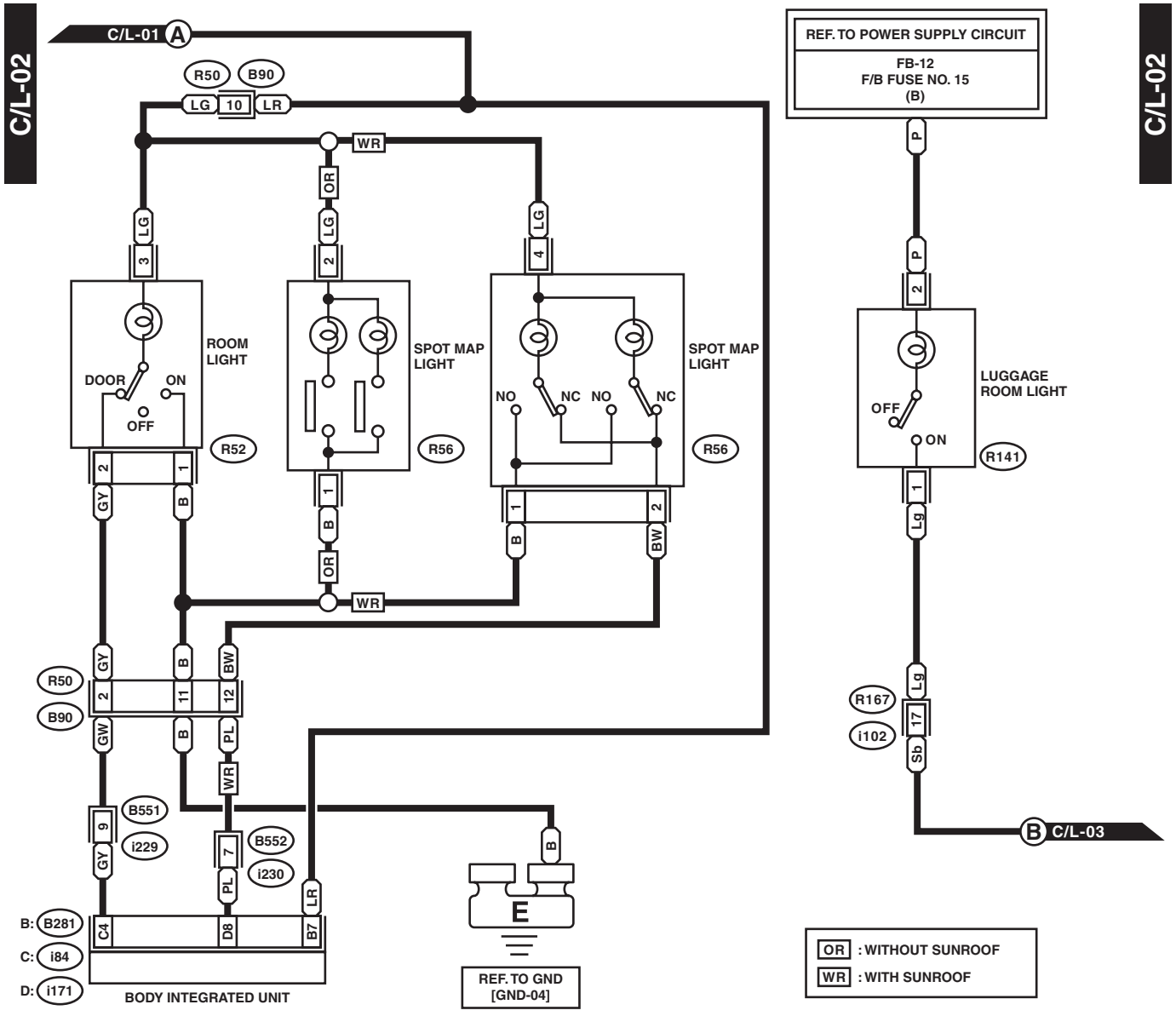
29.Interior Light System

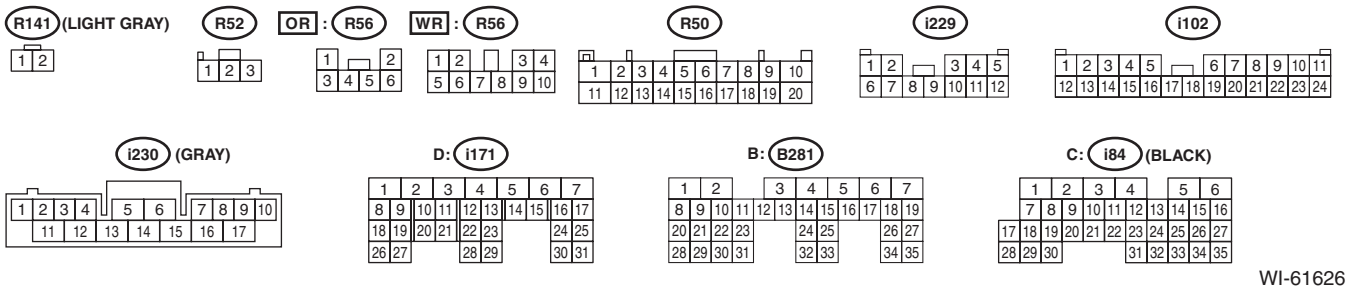
A: WIRING DIAGRAM



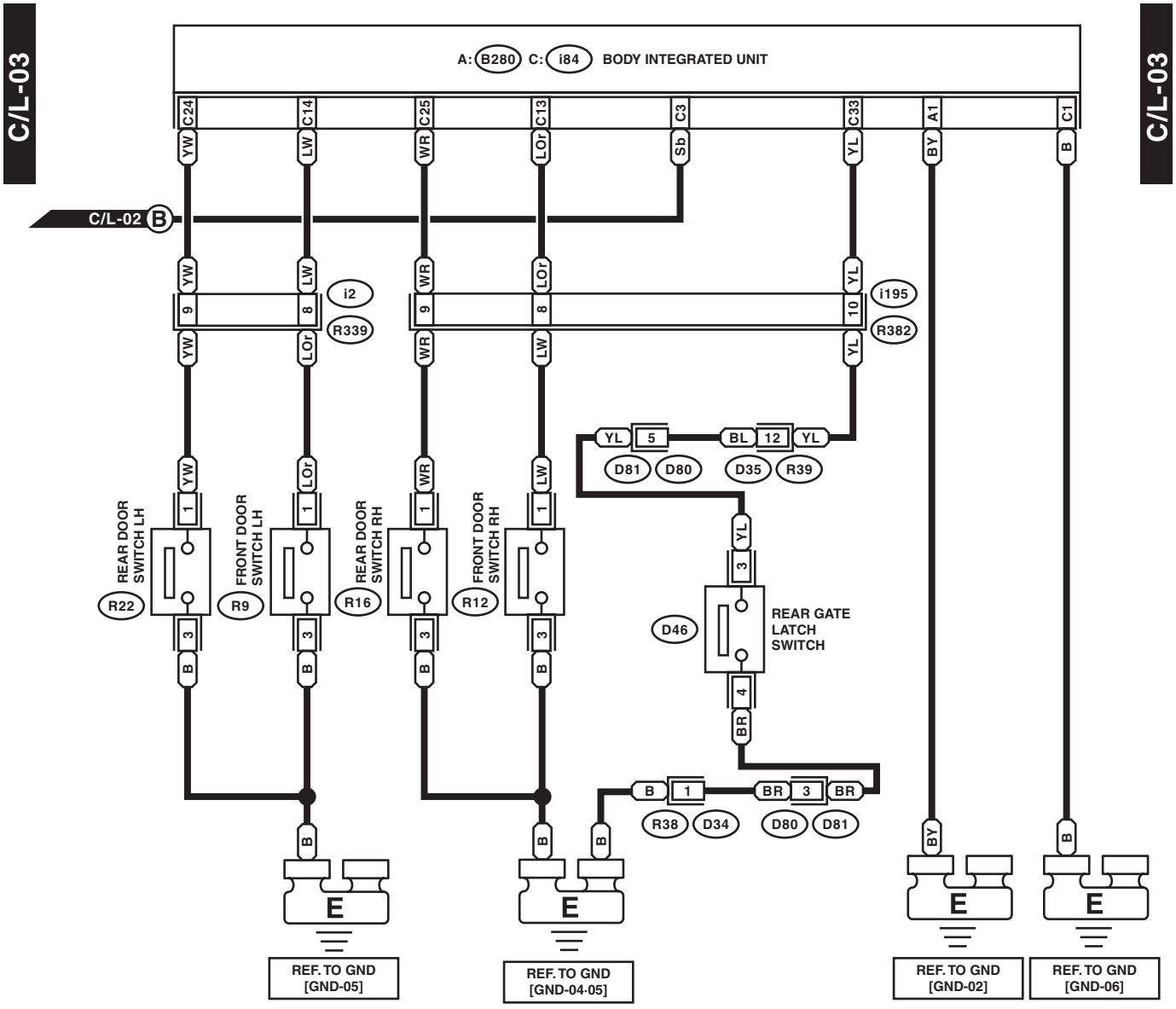


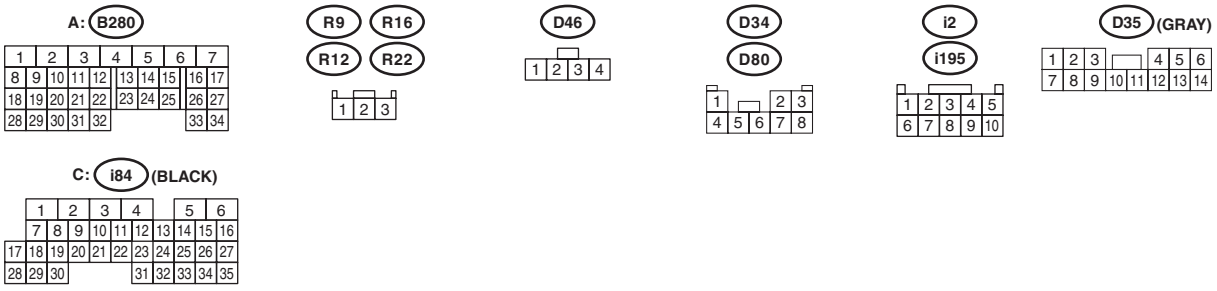
WI-61625


C/L-02
C/L-01 A
R50
B90
LG
10
LR
WR
OR
LG
LG
LG
3
2
4
ROOM LIGHT
DOOR
ON
OFF
SPOT MAP LIGHT
SPOT MAP LIGHT
NO
NC
NO
NC
R52
R56
R56
GY
B
B
OR
B
BW
WR
R50
B90
GY
B
BW
2
11
12
GW
B
PL
WR
B551
i229
B552
i230
PL
LR
B
E
B: B281
C: i84
D: i171
C4
D8
B7
BODY INTEGRATED UNIT
REF. TO GND [GND-04]
REF. TO POWER SUPPLY CIRCUIT
FB-12
F/B FUSE NO. 15
(B)
P
P
LUGGAGE ROOM LIGHT
OFF
ON
R141
Lg
R167
i102
Lg
17
Sb
B C/L-03
C/L-02
OR : WITHOUT SUNROOF
WR : WITH SUNROOF


R141 (LIGHT GRAY)
R52
OR : R56
WR : R56
R50
i229
i102
i230 (GRAY)
D: i171
B: B281
C: i84 (BLACK)

WI-61626

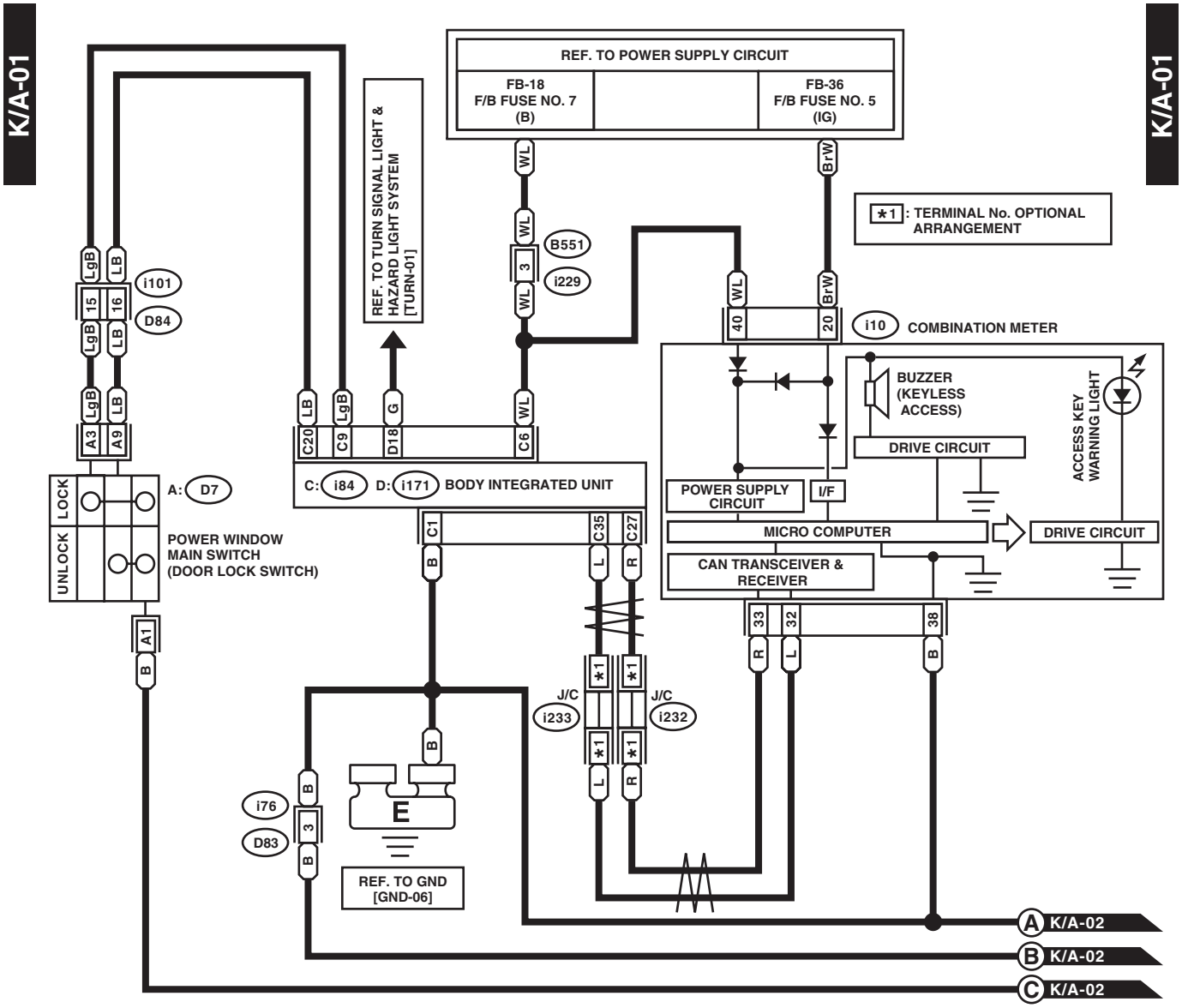

C/L-03
C/L-03
A: B280 C: i84 BODY INTEGRATED UNIT
C24
C14
C25
C13
C3
C33
A1
C1
YW
LW
WR
LOr
Sb
YL
BY
B
C/L-02 B
i2
R339
i195
R382
REAR DOOR SWITCH LH
R22
FRONT DOOR SWITCH LH
R9
REAR DOOR SWITCH RH
R16
FRONT DOOR SWITCH RH
R12
D81
D80
D35
R39
REAR GATE LATCH SWITCH
D46
R38
D34
REF. TO GND [GND-05]
REF. TO GND [GND-04·05]
REF. TO GND [GND-02]
REF. TO GND [GND-06]

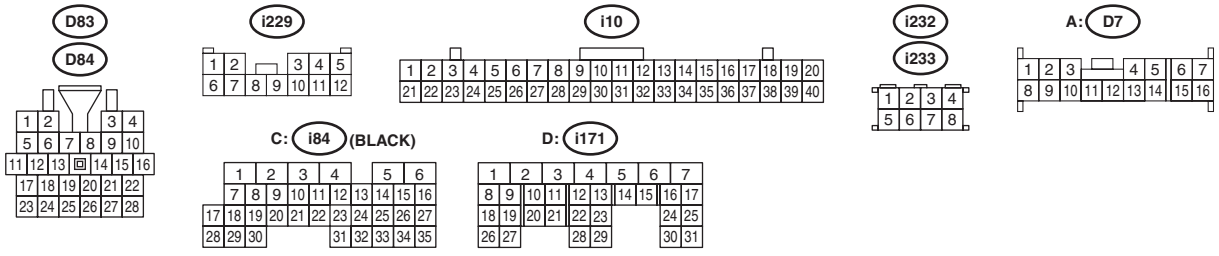

A: B280
C: i84 (BLACK)
R9 R16 R12 R22
D46
D34 D80
i2 i195
D35 (GRAY)

WI-48100

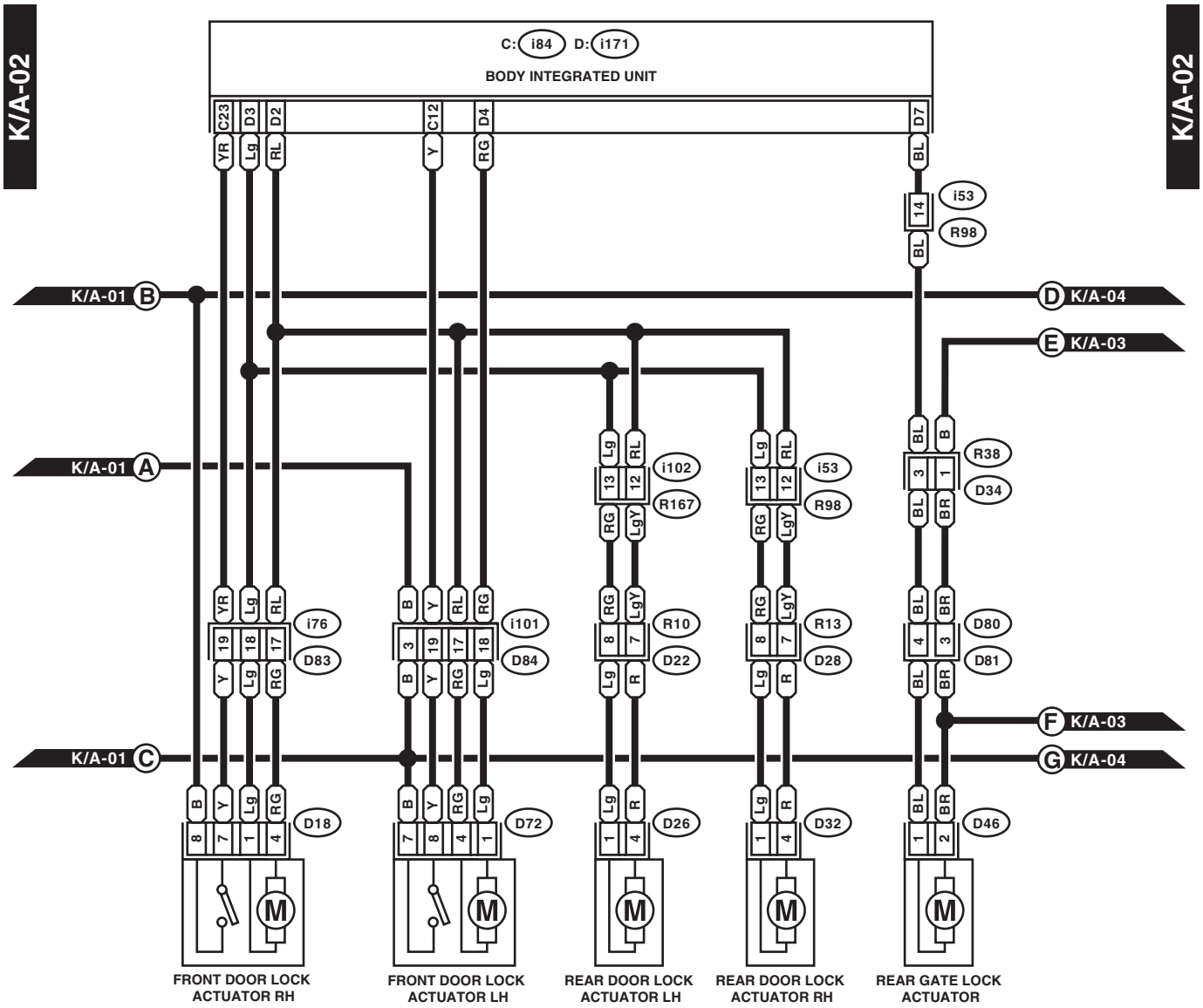
30.Keyless Access System

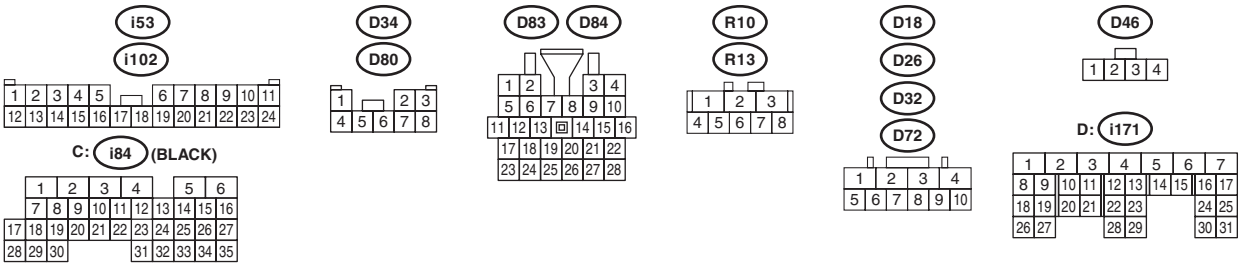
A: WIRING DIAGRAM





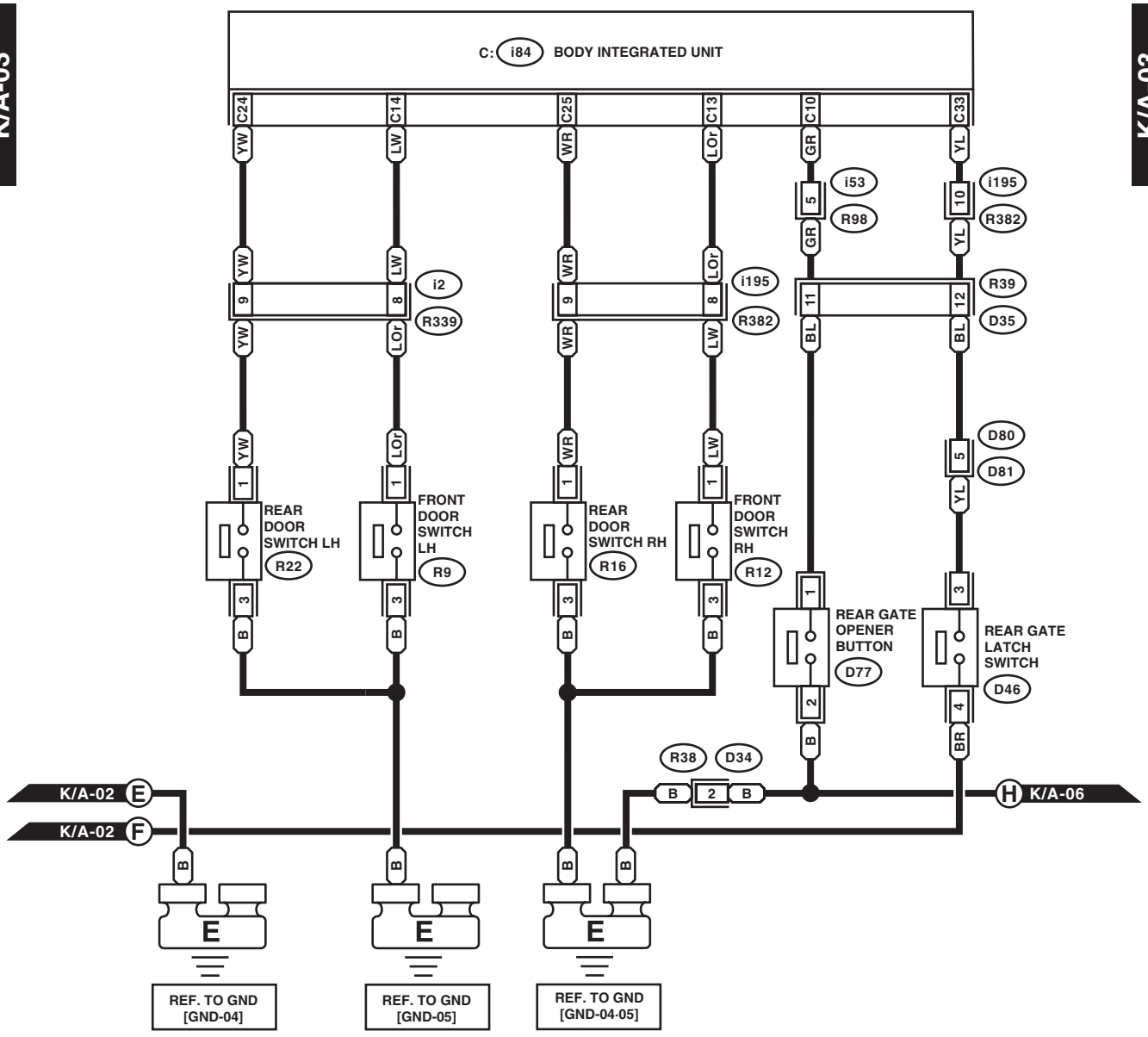
WI-48101

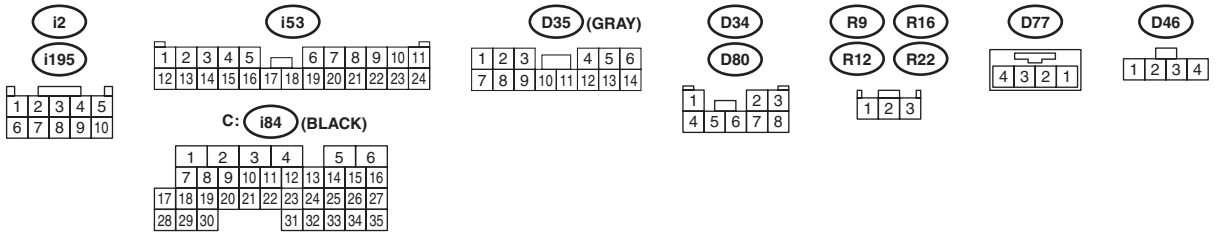

K/A-02
K/A-02
C: i84 D: i171
BODY INTEGRATED UNIT
C23 D3 D2 C12 D4 D7
YR Lg RL Y RG BL
i53
14
R98
BL
K/A-01 B
D K/A-04
E K/A-03
K/A-01 A
i102
R167
i53
R98
R38
D34
i76
D83
i101
D84
R10
D22
R13
D28
D80
D81
F K/A-03
K/A-01 C
G K/A-04
D18
D72
D26
D32
D46
M
FRONT DOOR LOCK ACTUATOR RH
FRONT DOOR LOCK ACTUATOR LH
REAR DOOR LOCK ACTUATOR LH
REAR DOOR LOCK ACTUATOR RH
REAR GATE LOCK ACTUATOR


i53
i102
C: i84 (BLACK)
D34
D80
D83
D84
R10
R13
D18
D26
D32
D72
D46
D: i171

WI-48102

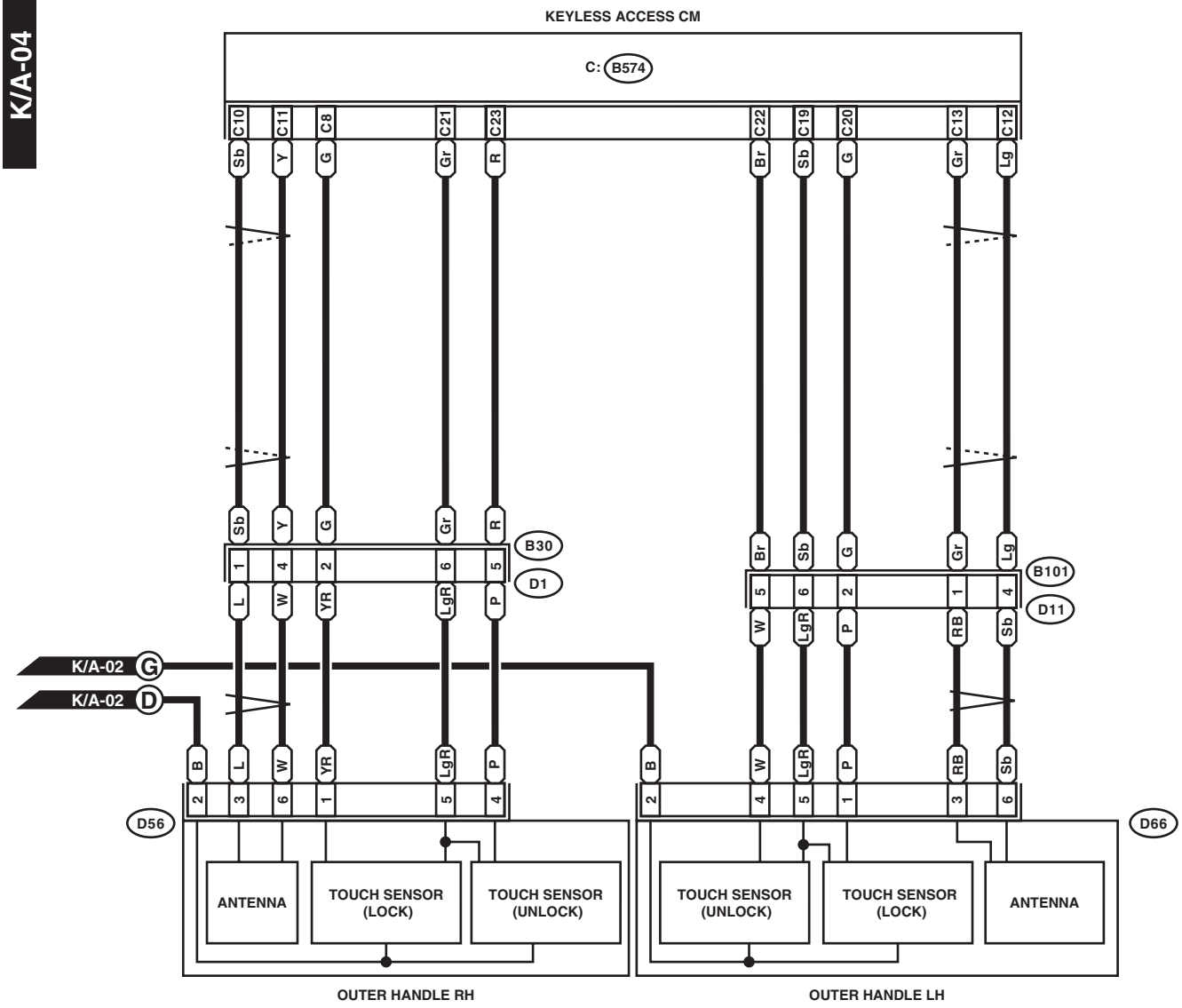
K/A-03

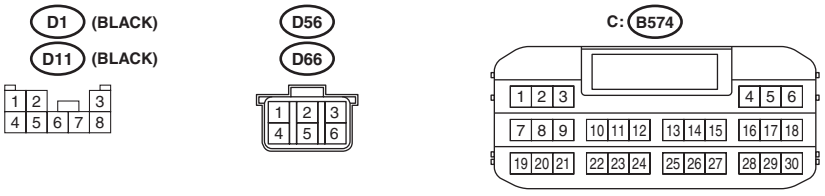




WI-42237

K/A-04

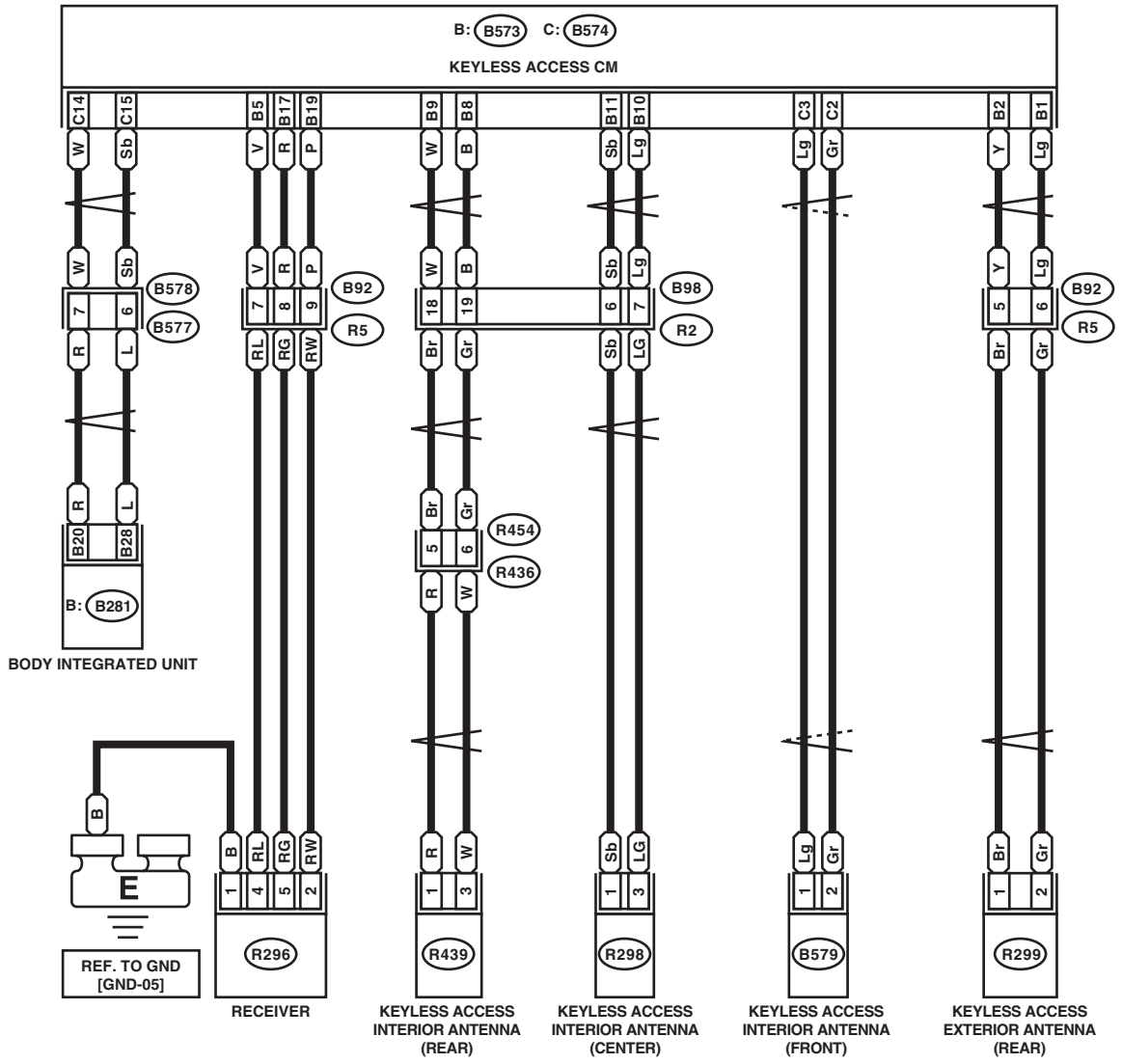


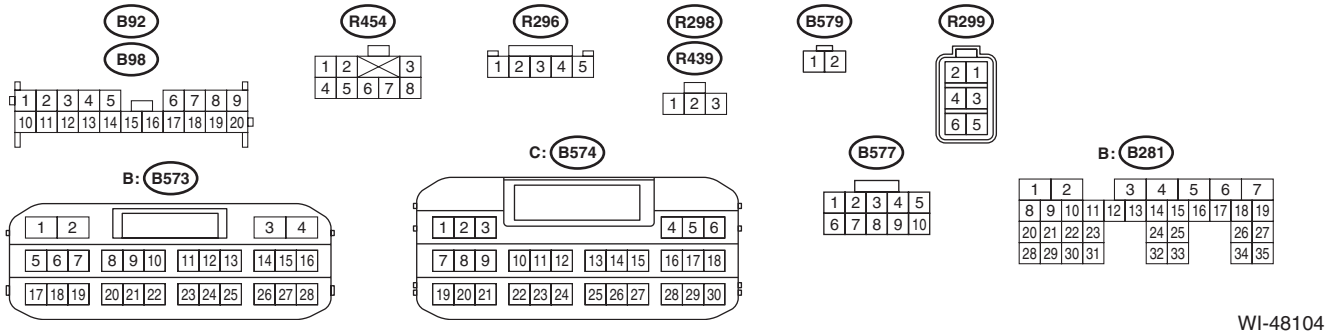


WI-48103

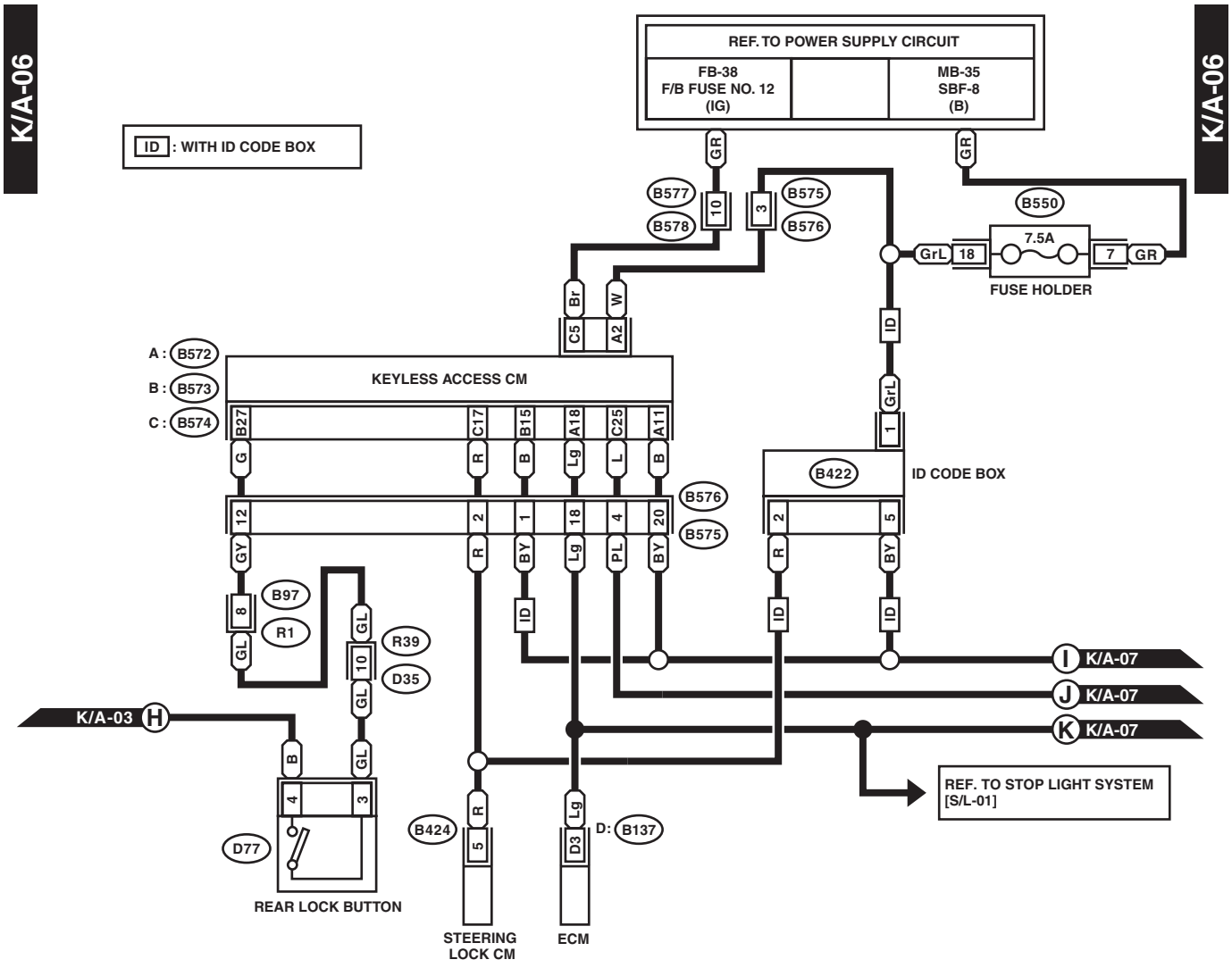
K/A-05

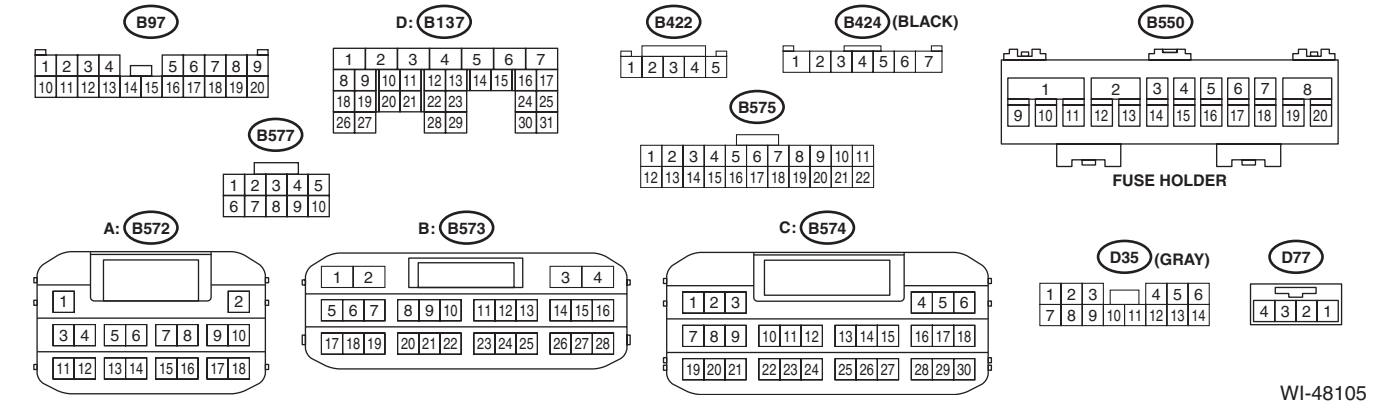
K/A-05



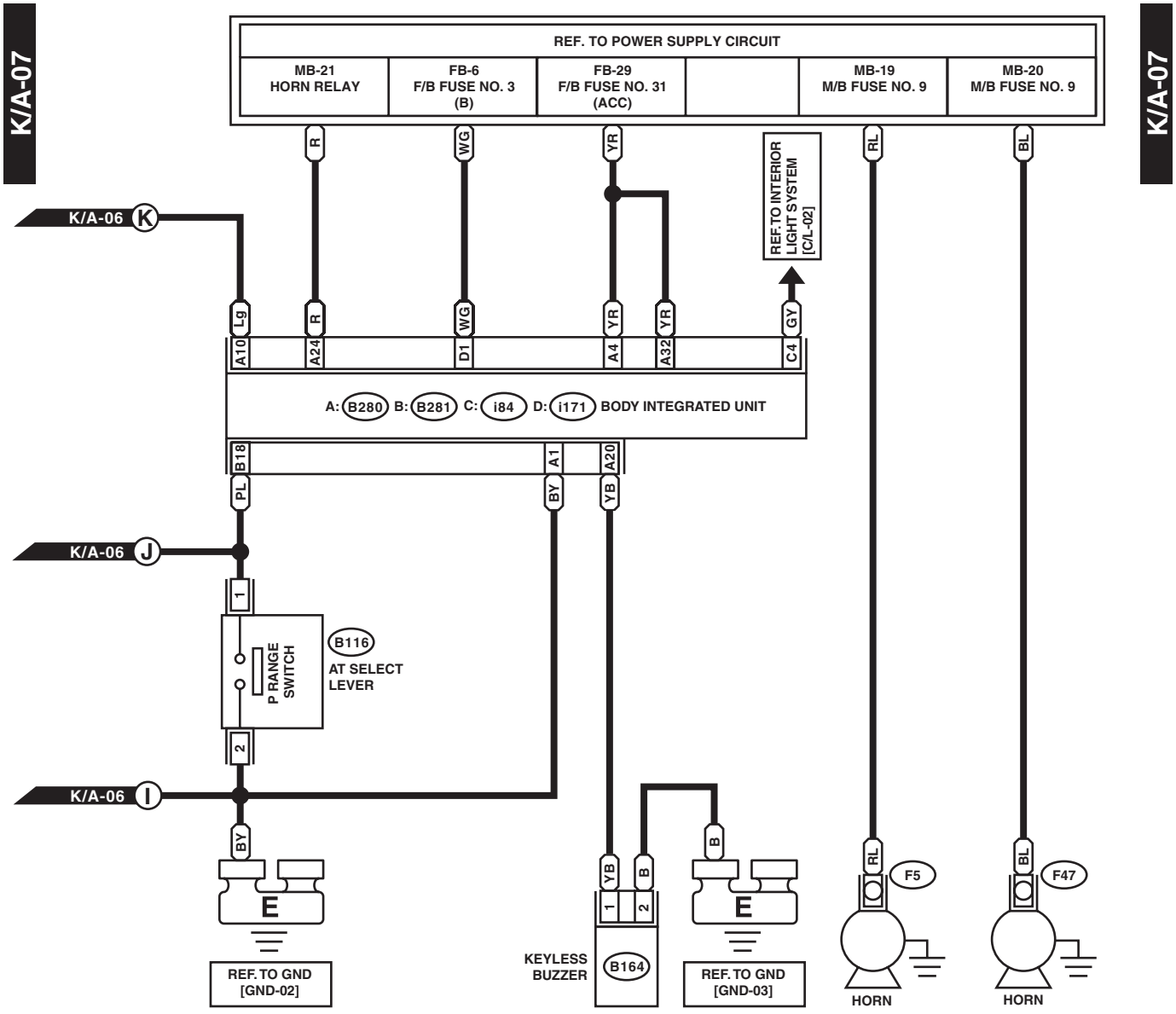


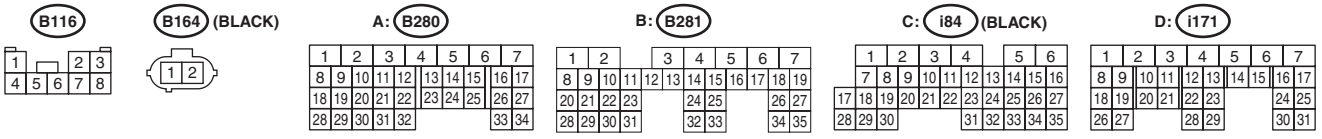
WI-48104


K/A-06
K/A-06
REF. TO POWER SUPPLY CIRCUIT
FB-38
F/B FUSE NO. 12
(IG)
MB-35
SBF-8
(B)
ID : WITH ID CODE BOX
B577
B578
B575
B576
B550
7.5A
FUSE HOLDER
A : B572
B : B573
C : B574
KEYLESS ACCESS CM
ID CODE BOX
B422
B97
R1
R39
D35
K/A-03 H
I K/A-07
J K/A-07
K K/A-07
REF. TO STOP LIGHT SYSTEM
[S/L-01]
D77
REAR LOCK BUTTON
B424
D: B137
STEERING
LOCK CM
ECM


B97
D: B137
B422
B424 (BLACK)
B550
B575
B577
FUSE HOLDER
A: B572
B: B573
C: B574
D35 (GRAY)
D77

WI-48105

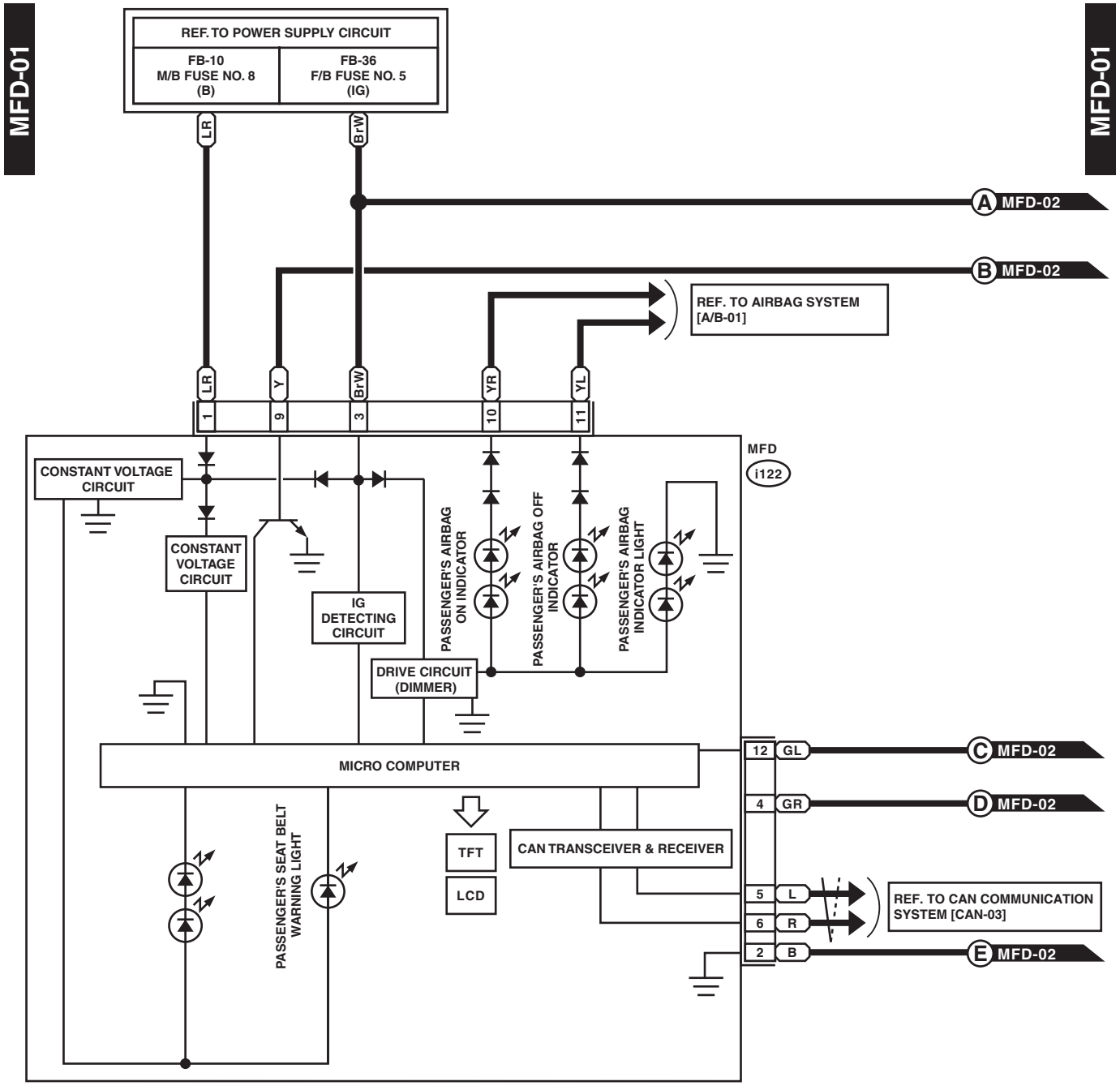

K/A-07
K/A-07
REF. TO POWER SUPPLY CIRCUIT
MB-21 HORN RELAY
FB-6 F/B FUSE NO. 3 (B)
FB-29 F/B FUSE NO. 31 (ACC)
MB-19 M/B FUSE NO. 9
MB-20 M/B FUSE NO. 9
R
WG
YR
RL
BL
REF.TO INTERIOR LIGHT SYSTEM [C/L-02]
K/A-06 K
Lg
R
WG
YR
YR
GY
A10
A24
D1
A4
A32
C4
A: B280 B: B281 C: i84 D: i171 BODY INTEGRATED UNIT
B18
A1
A20
PL
BY
YB
K/A-06 J
1
P RANGE SWITCH
B116
AT SELECT LEVER
2
K/A-06 I
BY
E
REF. TO GND [GND-02]
YB
B
1
2
KEYLESS BUZZER
B164
B
E
REF. TO GND [GND-03]
RL
F5
HORN
BL
F47
HORN

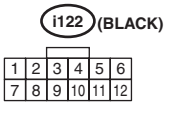

B116
B164 (BLACK)
A: B280
B: B281
C: i84 (BLACK)
D: i171

WI-48106

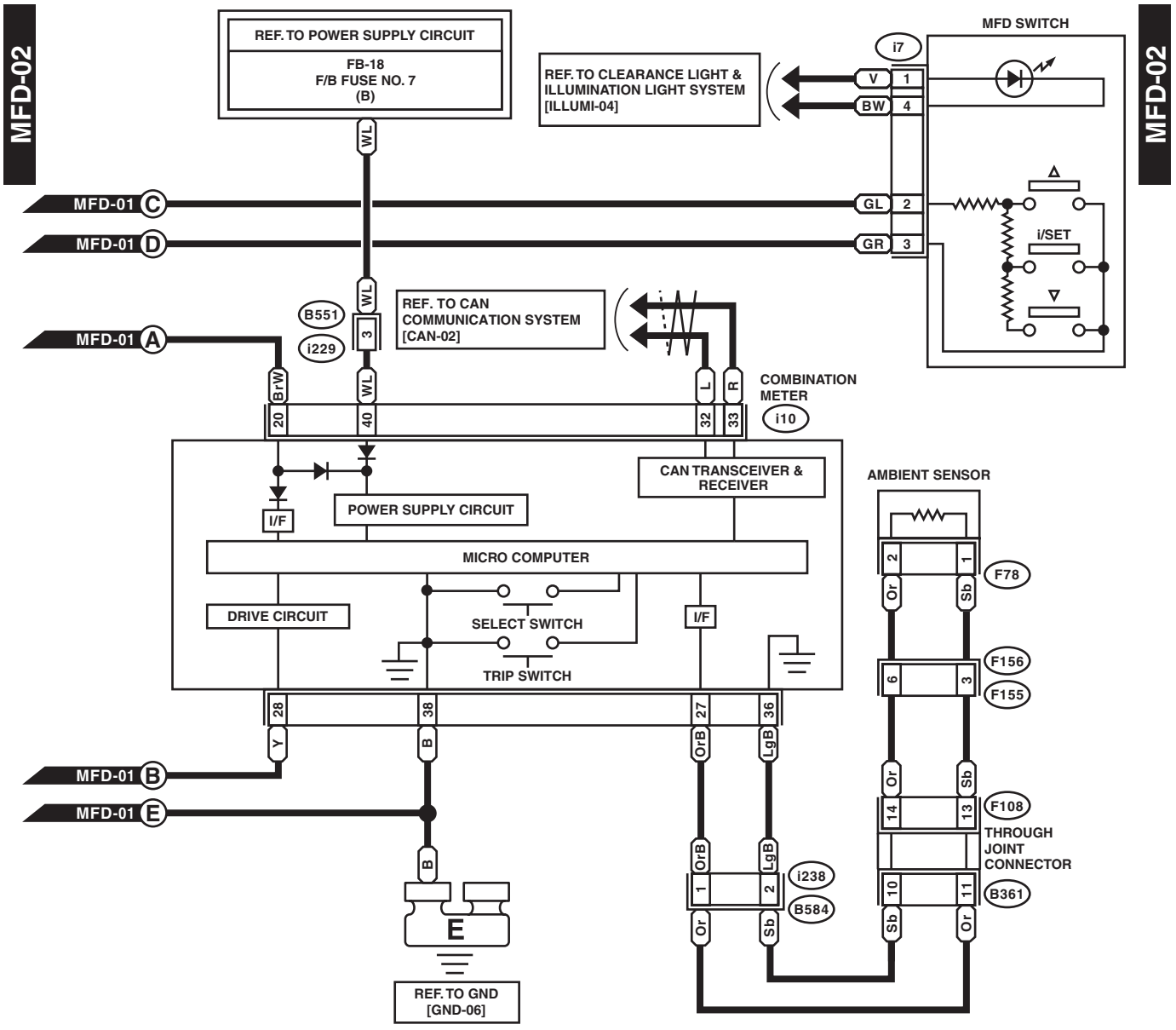
31.Multi-function Display (MFD) System

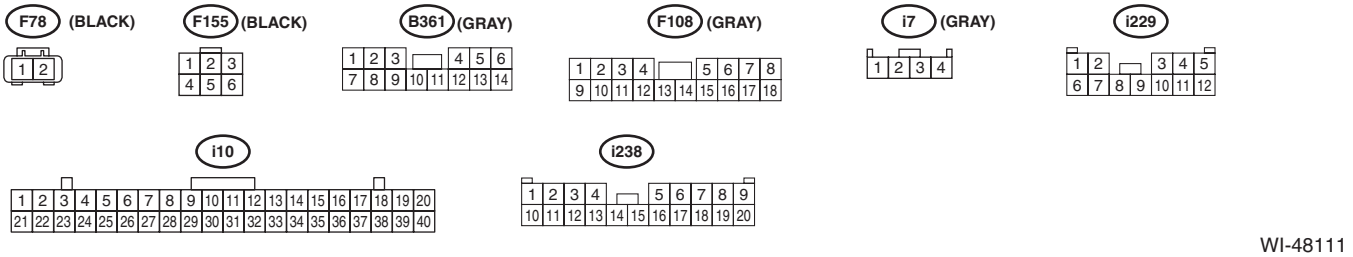
A: WIRING DIAGRAM





WI-63031


MFD-02
MFD-02
REF. TO POWER SUPPLY CIRCUIT
FB-18
F/B FUSE NO. 7
(B)
REF. TO CLEARANCE LIGHT & ILLUMINATION LIGHT SYSTEM [ILLUMI-04]
MFD SWITCH
i7
V 1
BW 4
GL 2
GR 3
i/SET
MFD-01 C
MFD-01 D
MFD-01 A
MFD-01 B
MFD-01 E
B551
i229
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
COMBINATION METER
i10
CAN TRANSCEIVER & RECEIVER
POWER SUPPLY CIRCUIT
I/F
MICRO COMPUTER
DRIVE CIRCUIT
SELECT SWITCH
TRIP SWITCH
AMBIENT SENSOR
F78
F156
F155
F108
THROUGH JOINT CONNECTOR
B361
i238
B584
REF. TO GND [GND-06]

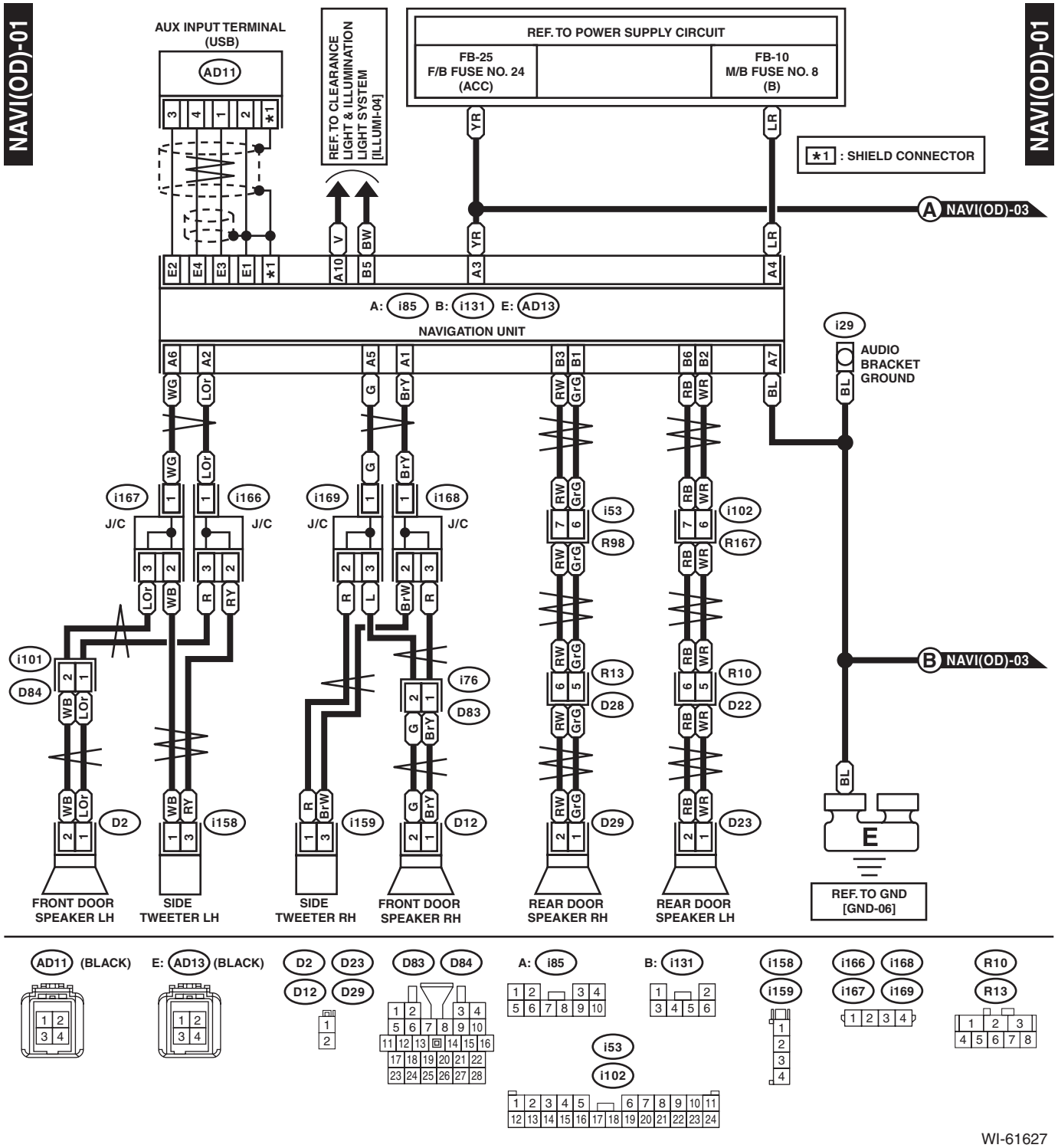

F78 (BLACK)
F155 (BLACK)
B361 (GRAY)
F108 (GRAY)
i7 (GRAY)
i229
i10
i238

WI-48111

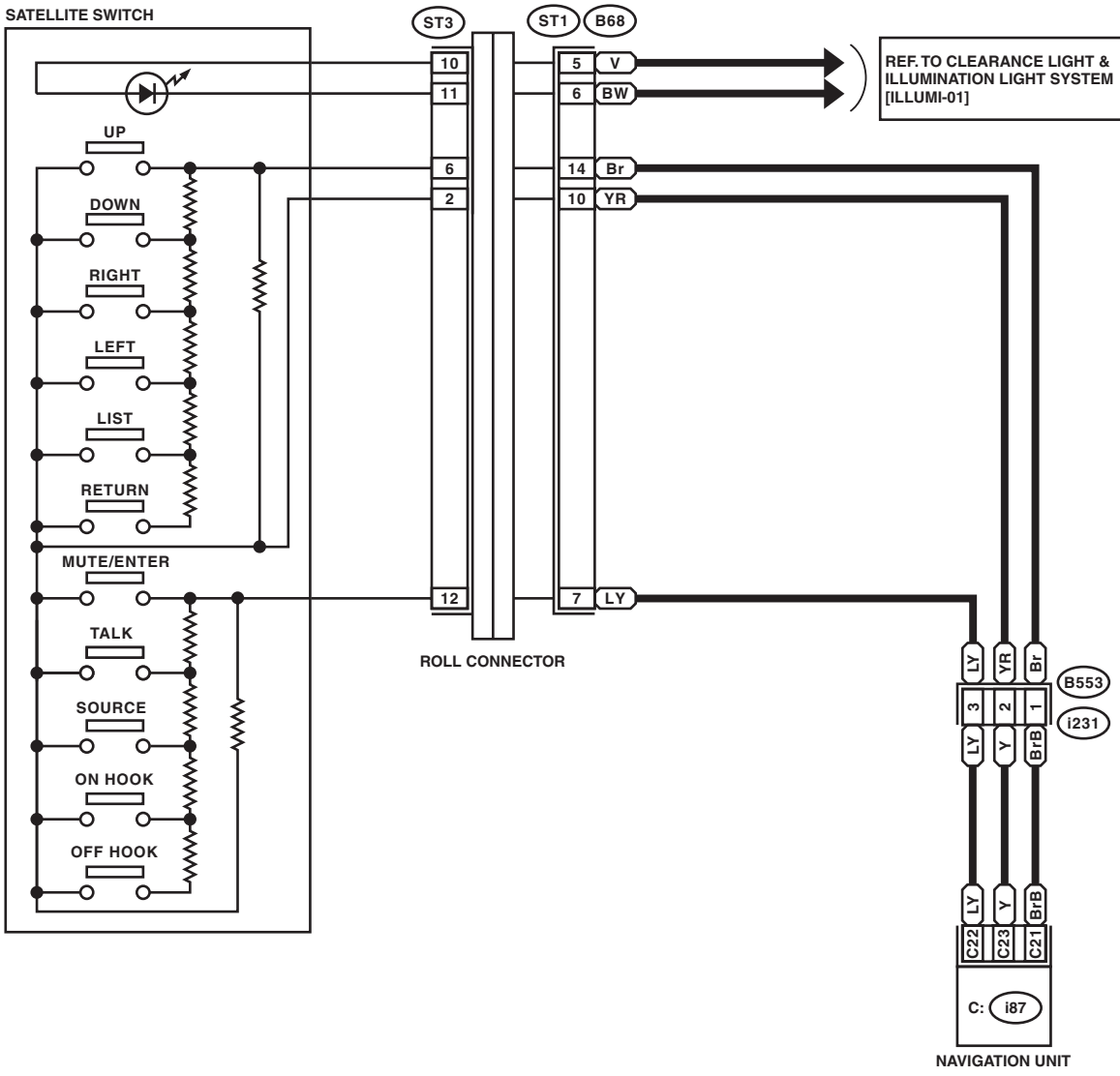
32.Navigation System

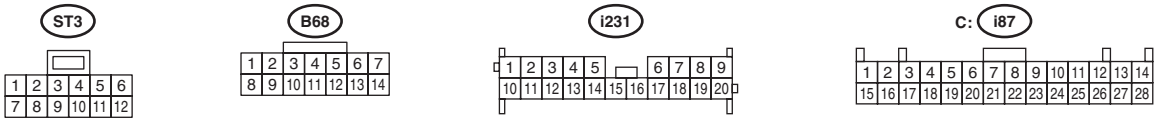
A: WIRING DIAGRAM

1. WITHOUT TELEMATICS



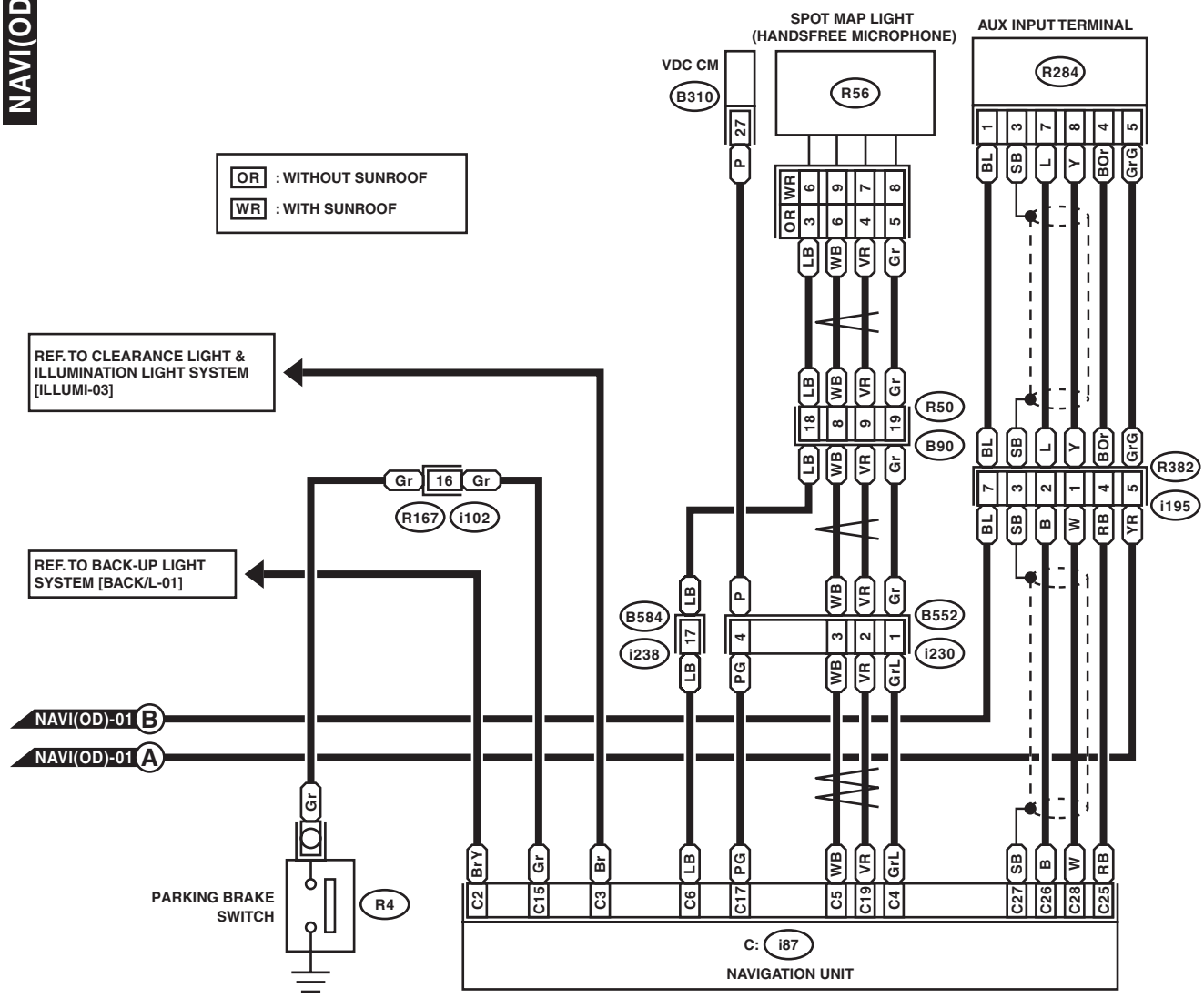
NAVI(OD)-02

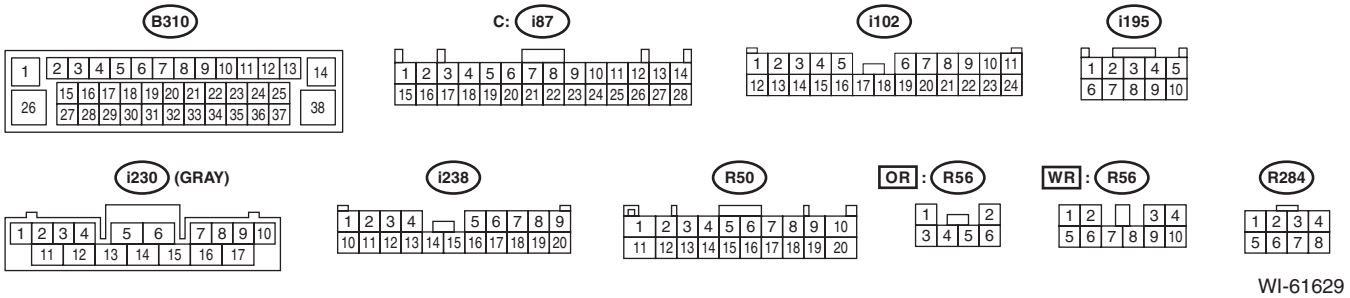




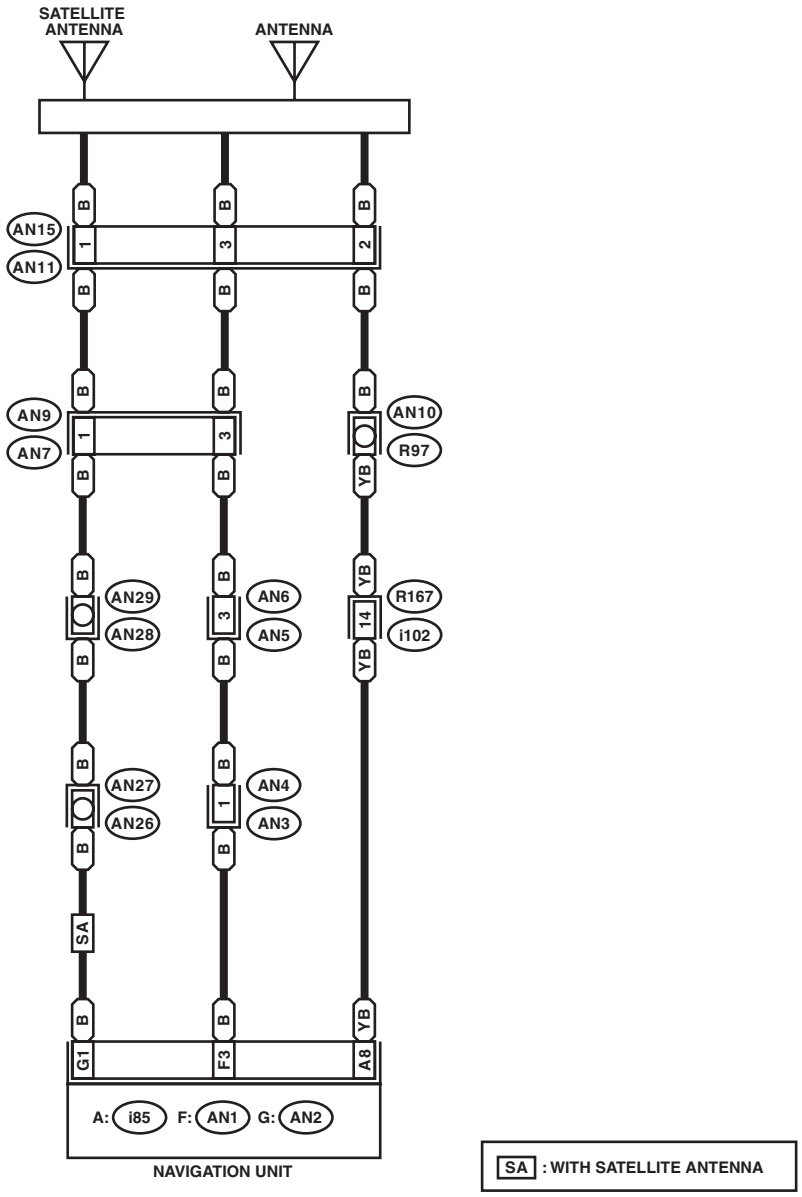
WI-61628

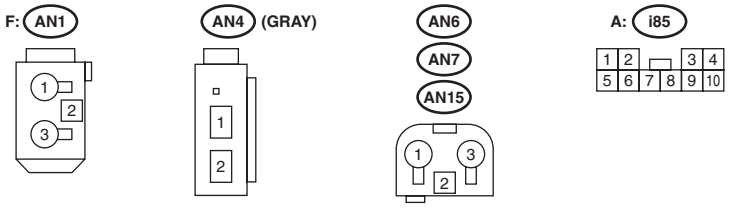
NAVI(OD)-03





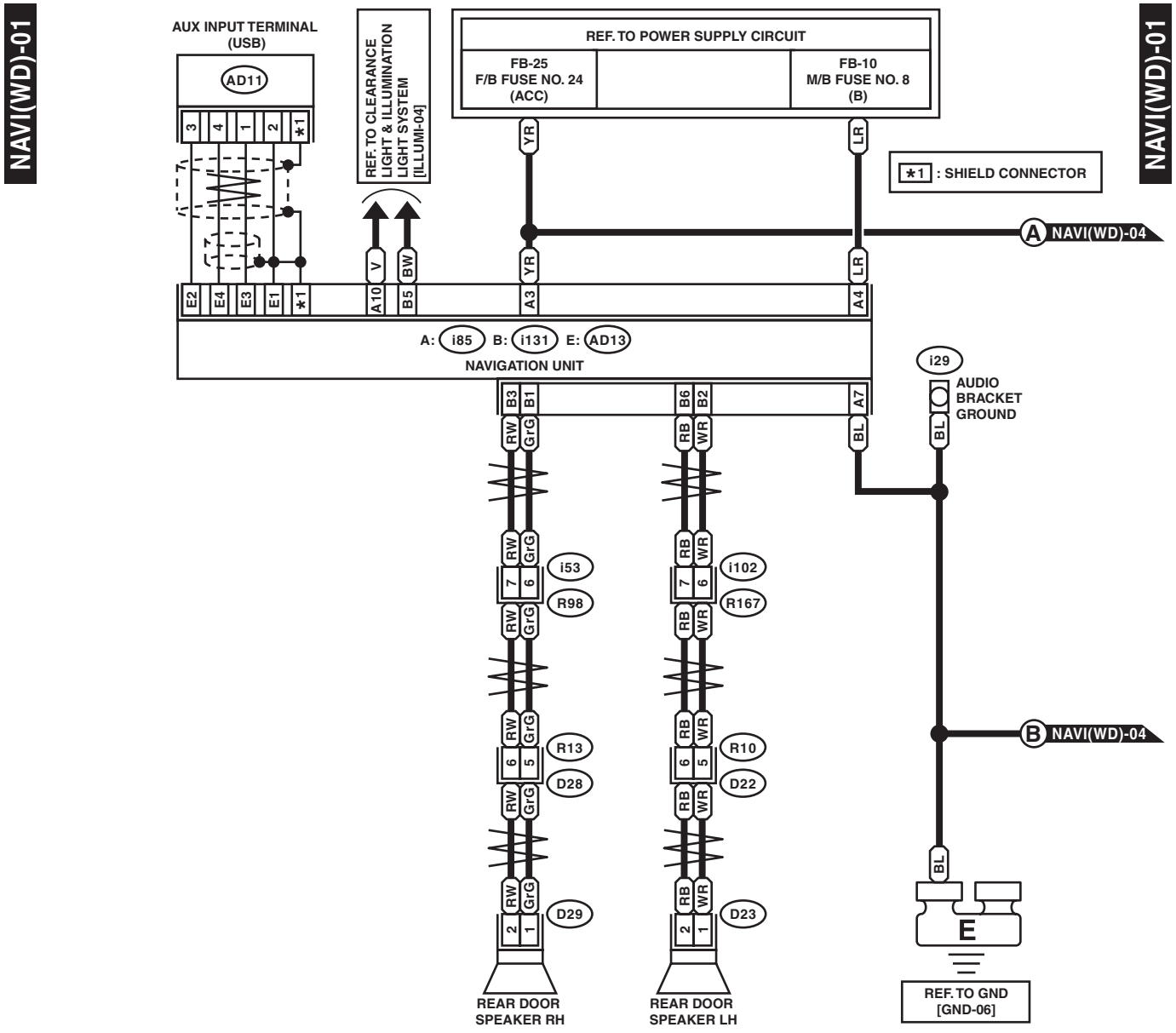
WI-61629

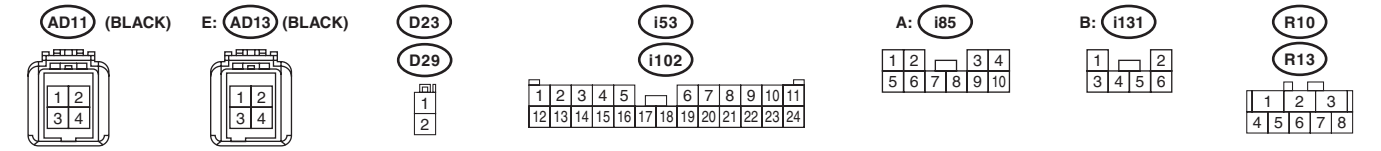

SATELLITE ANTENNA
ANTENNA
AN15
AN11
AN9
AN7
AN10
R97
AN29
AN28
AN6
AN5
R167
i102
AN27
AN26
AN4
AN3
SA
G1
F3
A8
A: i85 F: AN1 G: AN2
NAVIGATION UNIT
SA : WITH SATELLITE ANTENNA


F: AN1
AN4 (GRAY)
AN6
AN7
AN15
A: i85

WI-61684

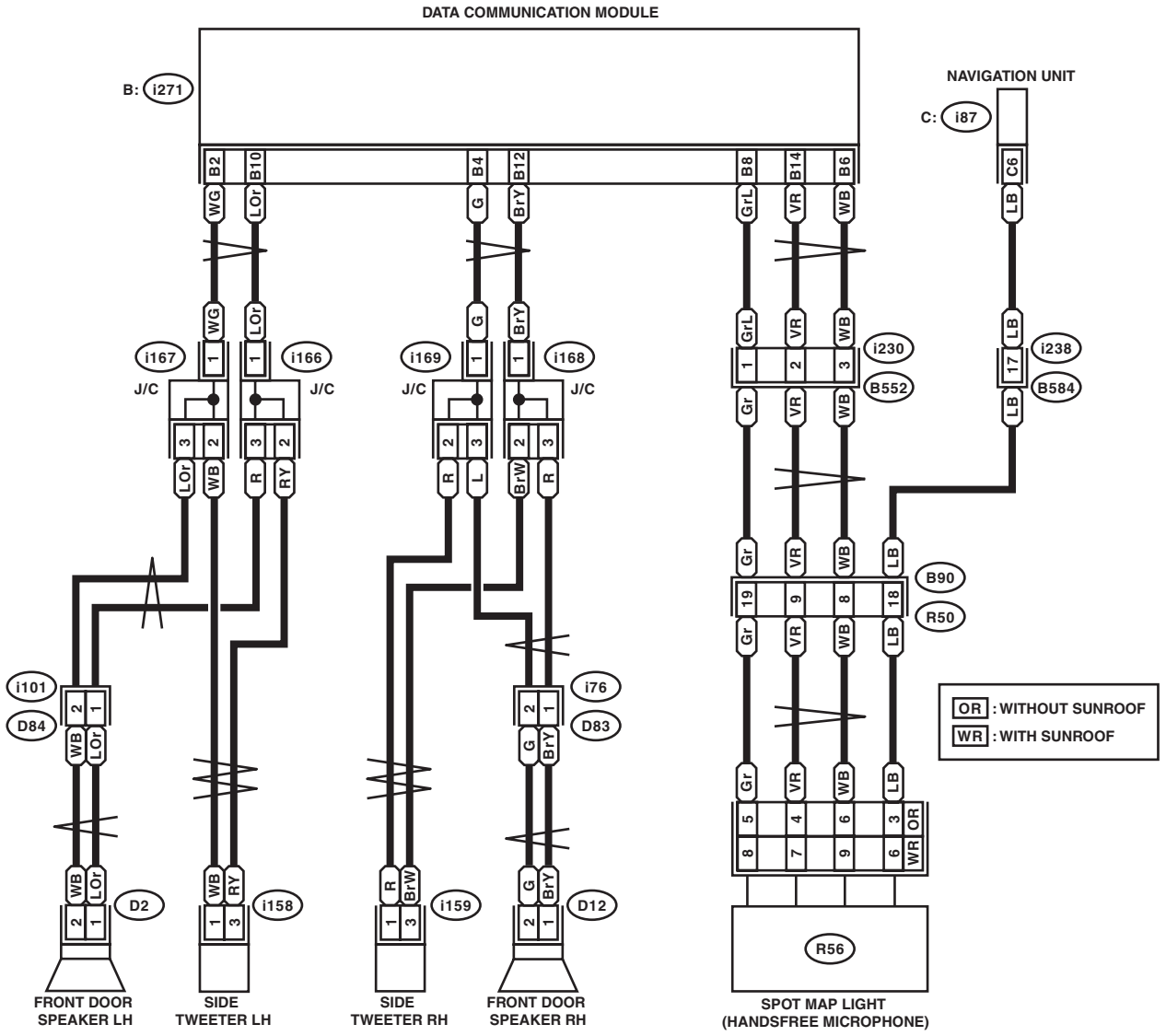
2. WITH TELEMATICS

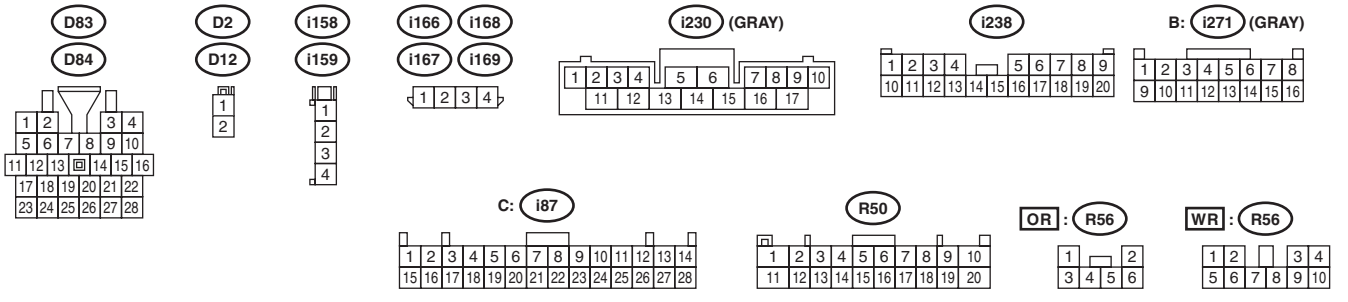




WI-61630

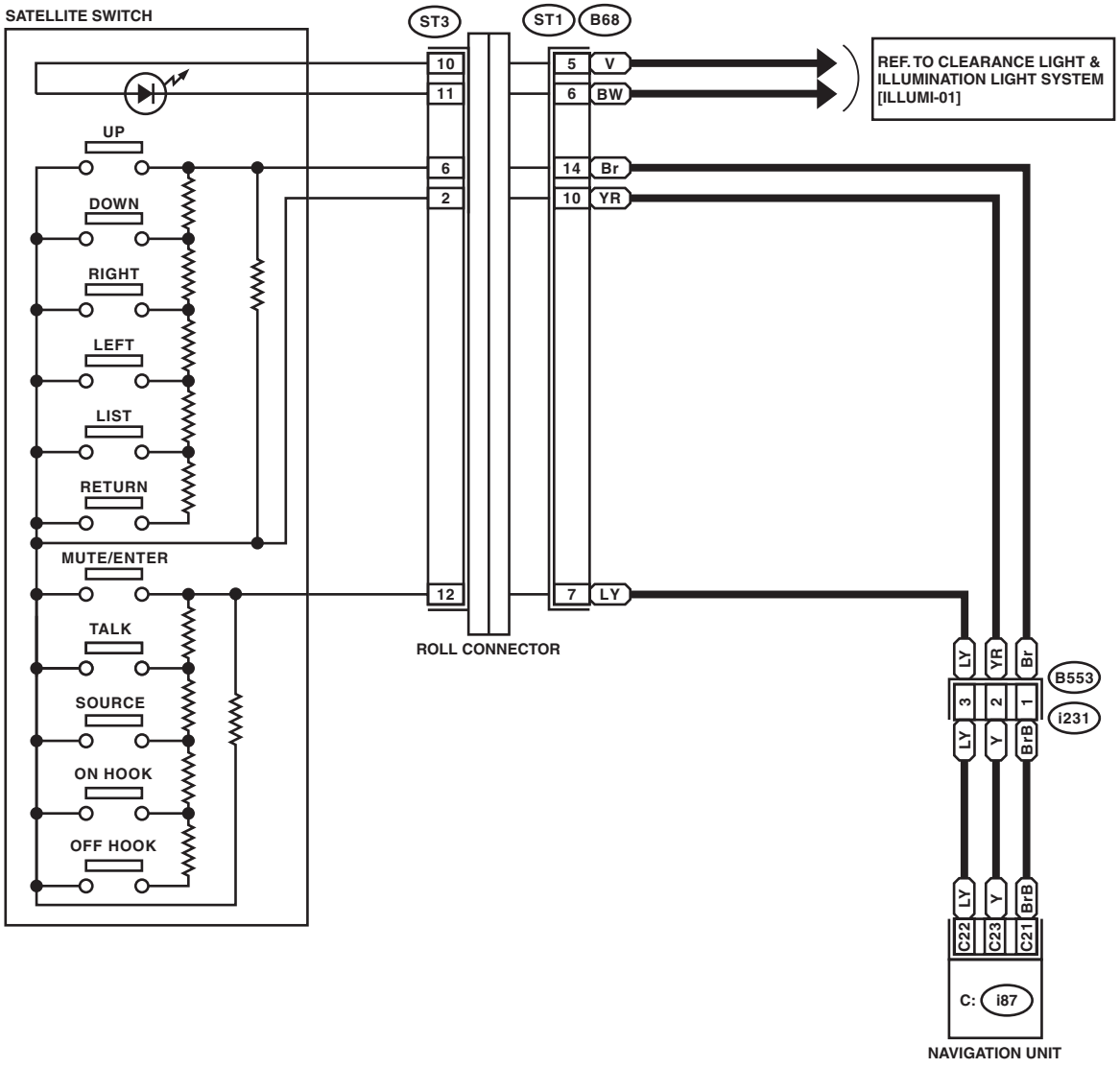
NAVI(WD)-02

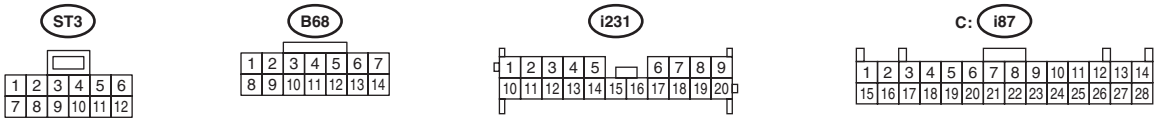




WI-61631

NAVI(WD)-03

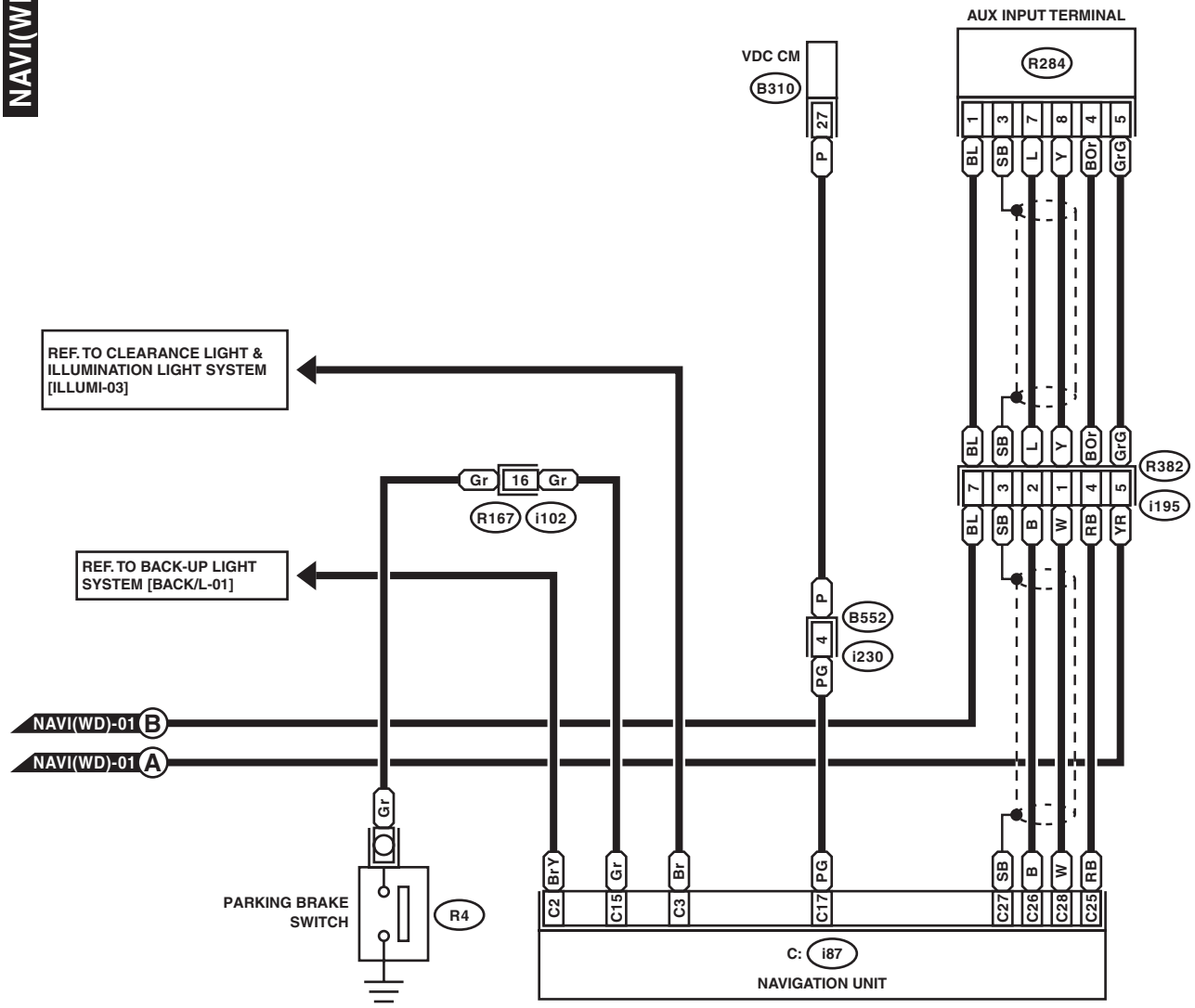


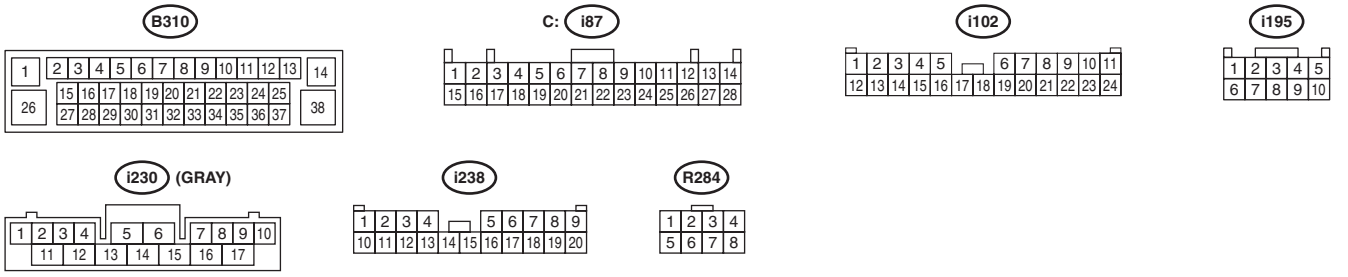


WI-61632

NAVI(WD)-04

NAVI(WD)-04

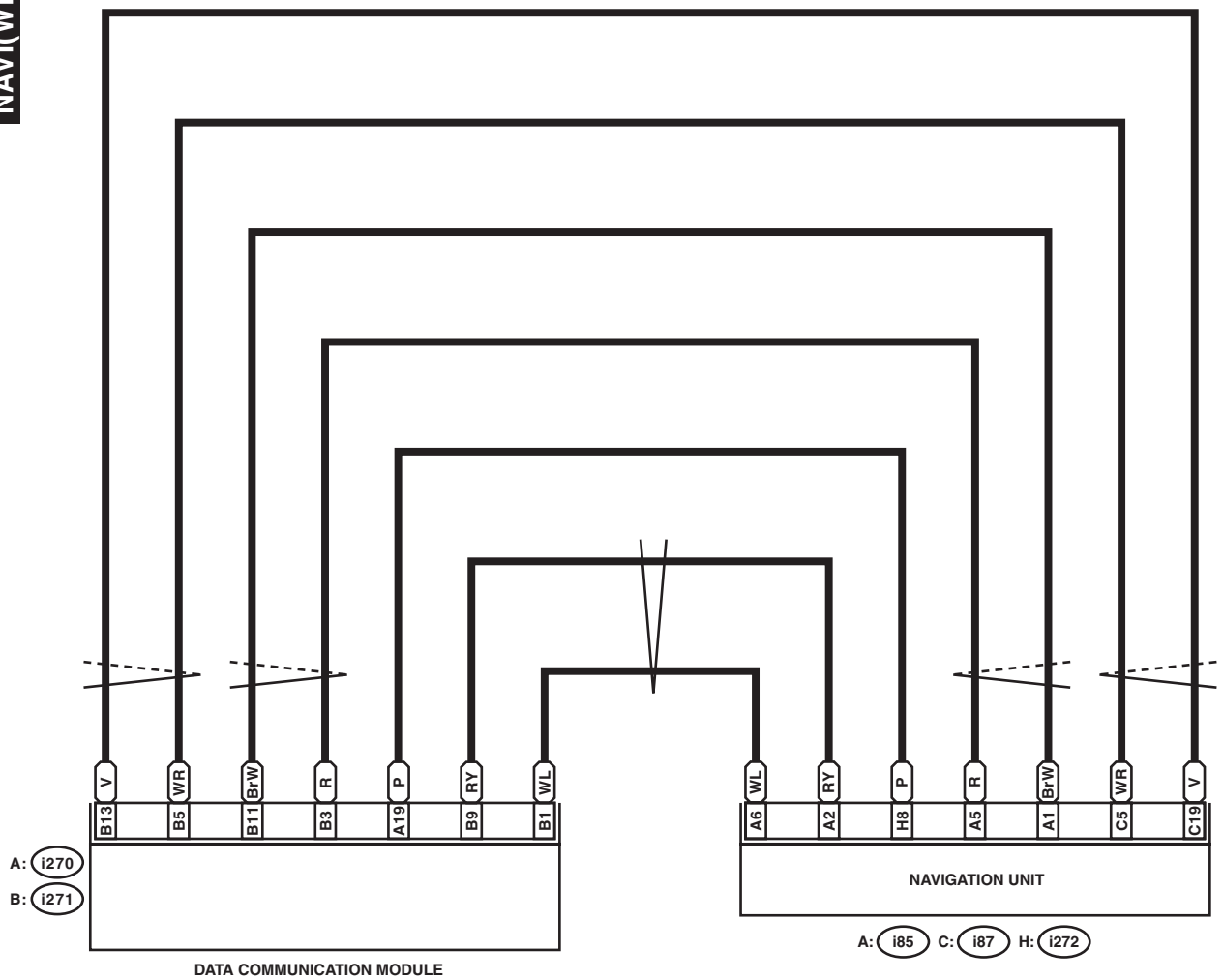


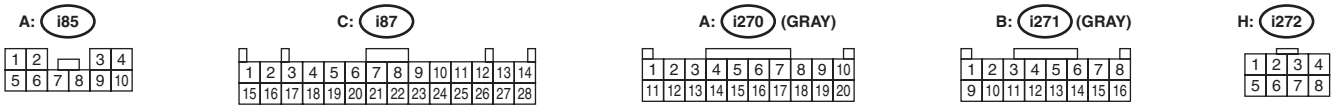


WI-61633

NAVI(WD)-05

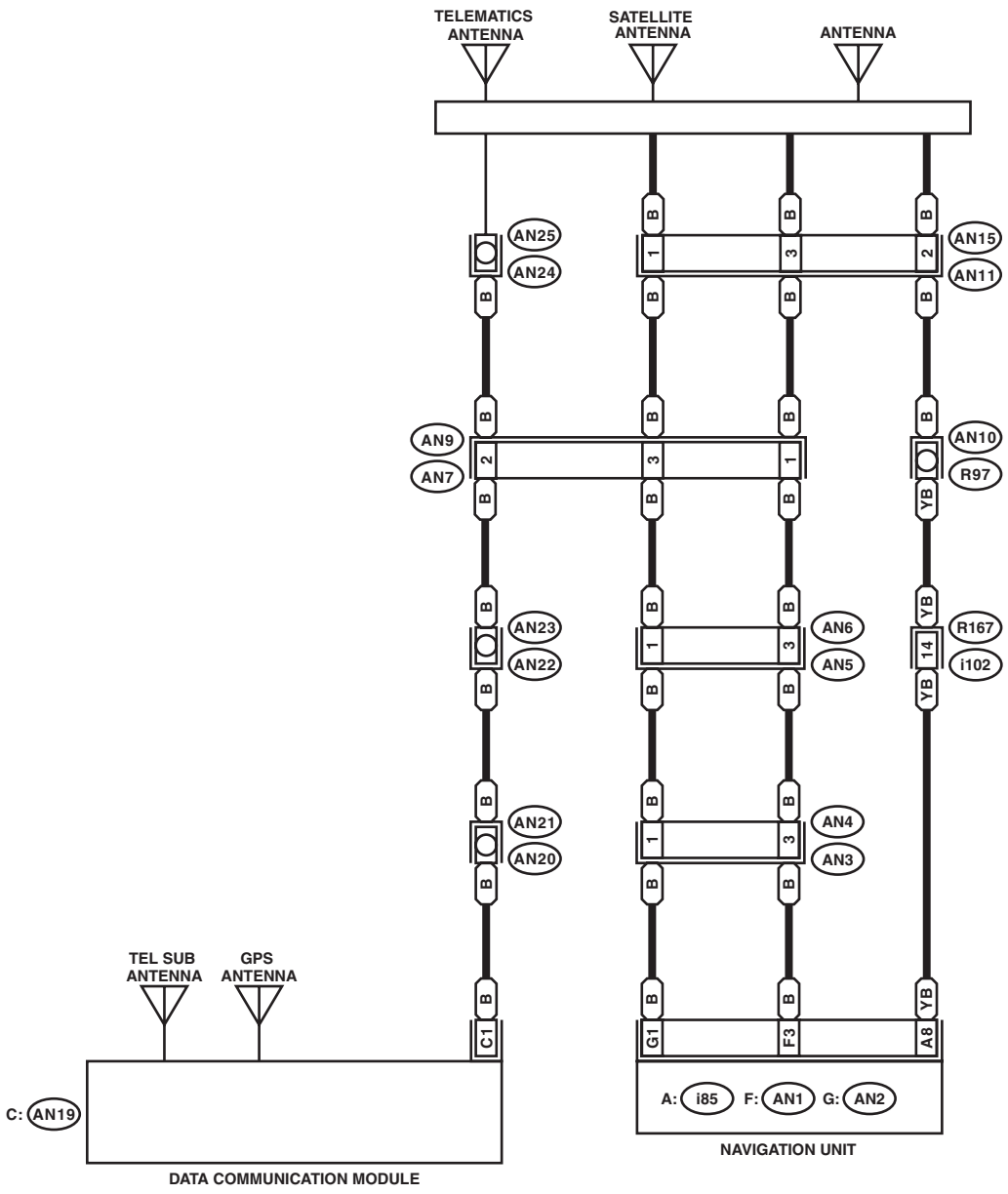
NAVI(WD)-05

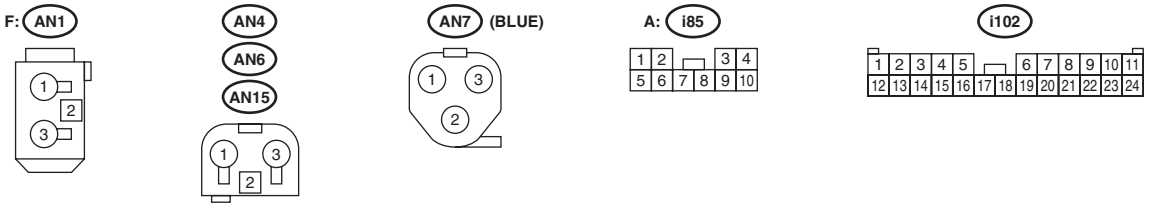




WI-61634

NAVI(WD)-06

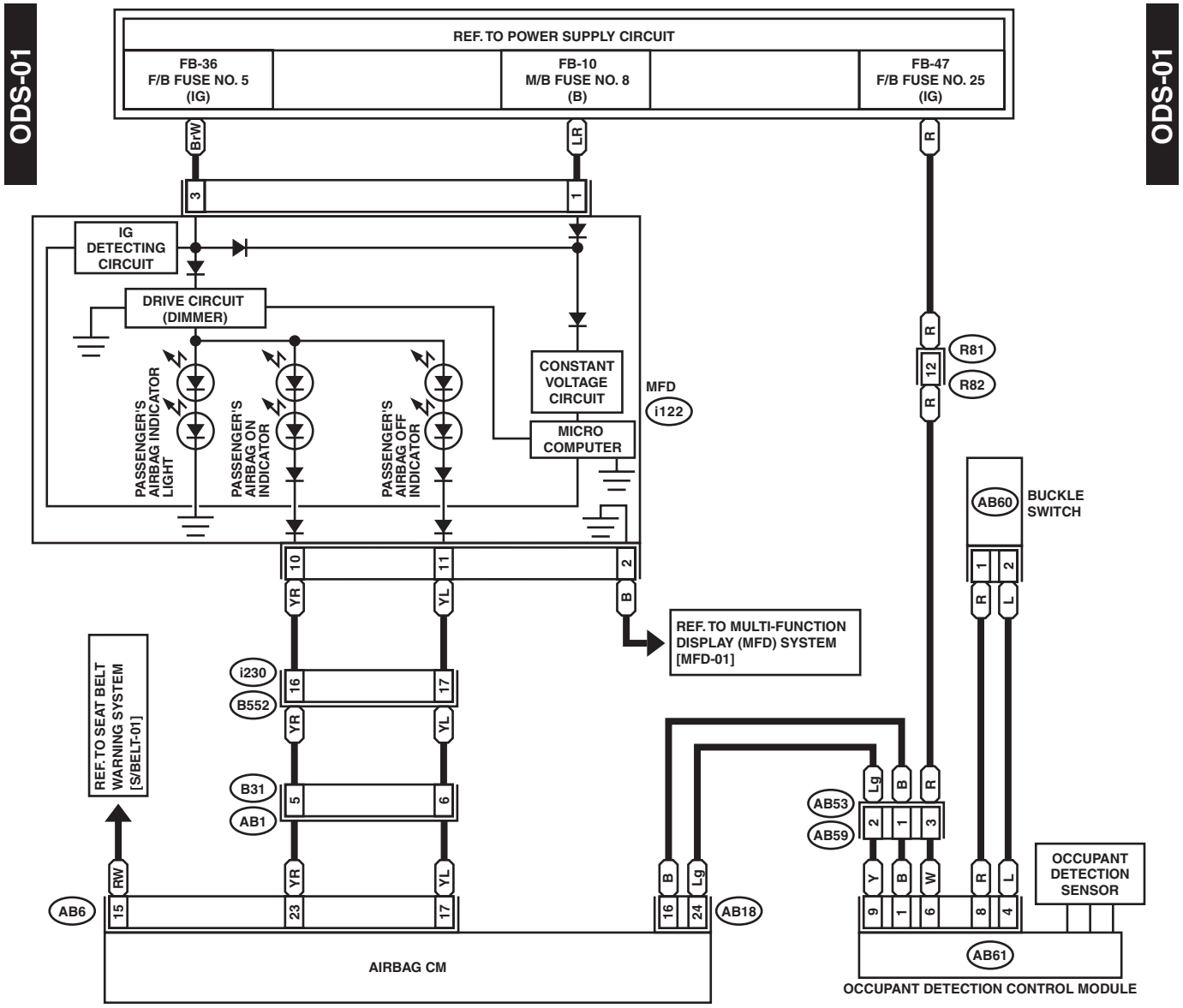


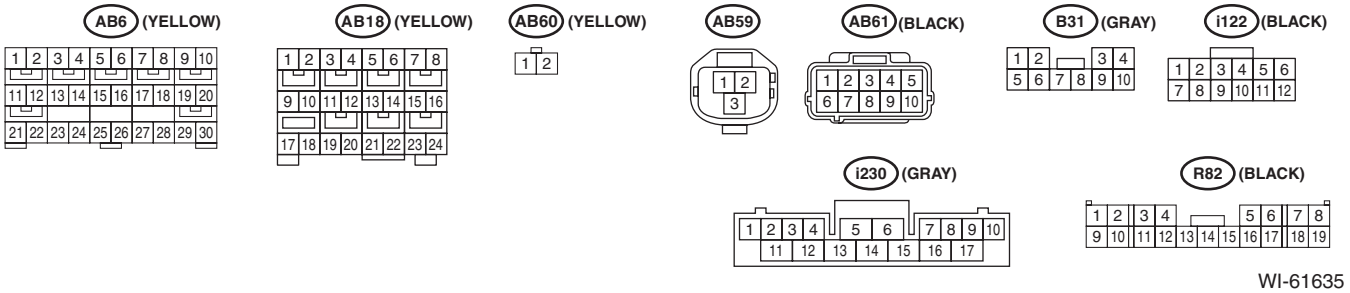


WI-61685

33.Occupant Detection System

A: WIRING DIAGRAM

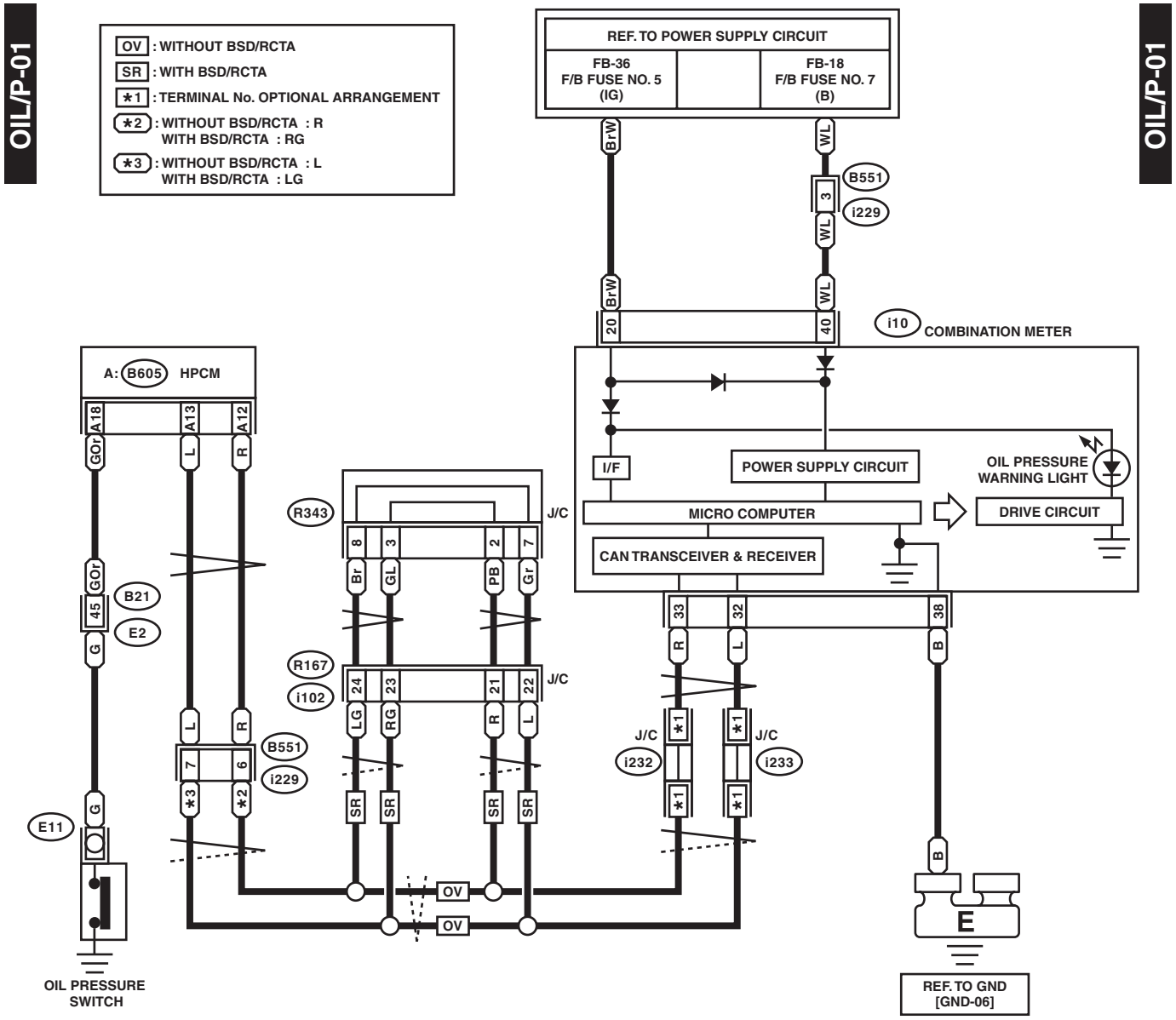


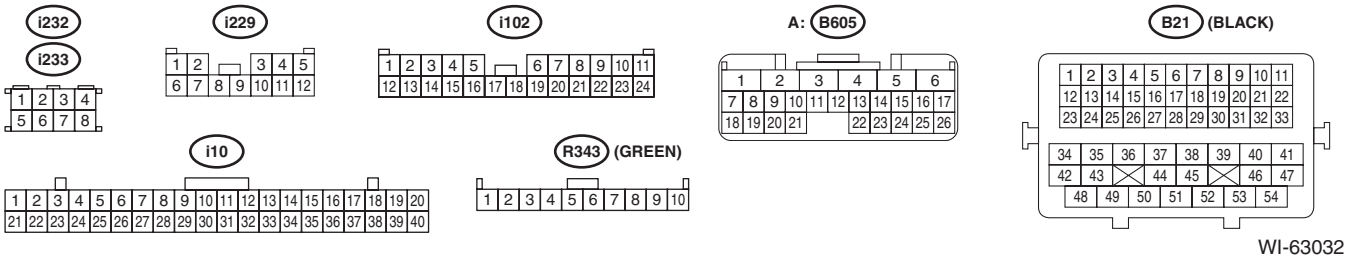


WI-61635

34.Oil Pressure Warning Light System

A: WIRING DIAGRAM

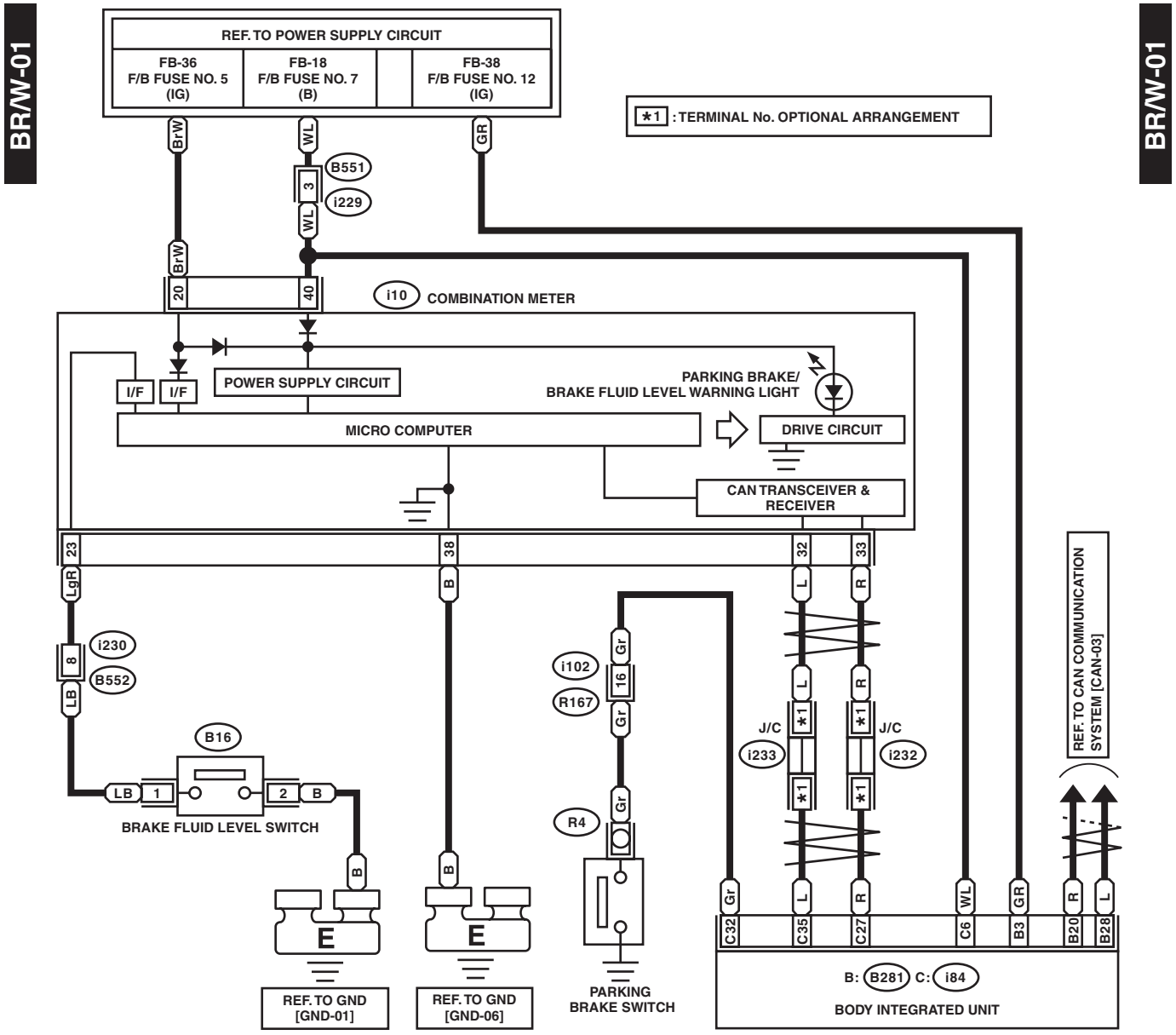


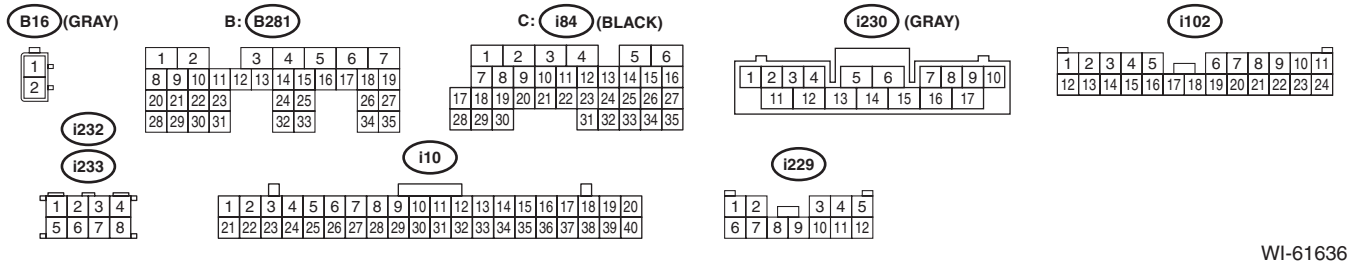


WI-63032

35.Parking Brake / Brake Fluid Level Warning Light System

A: WIRING DIAGRAM

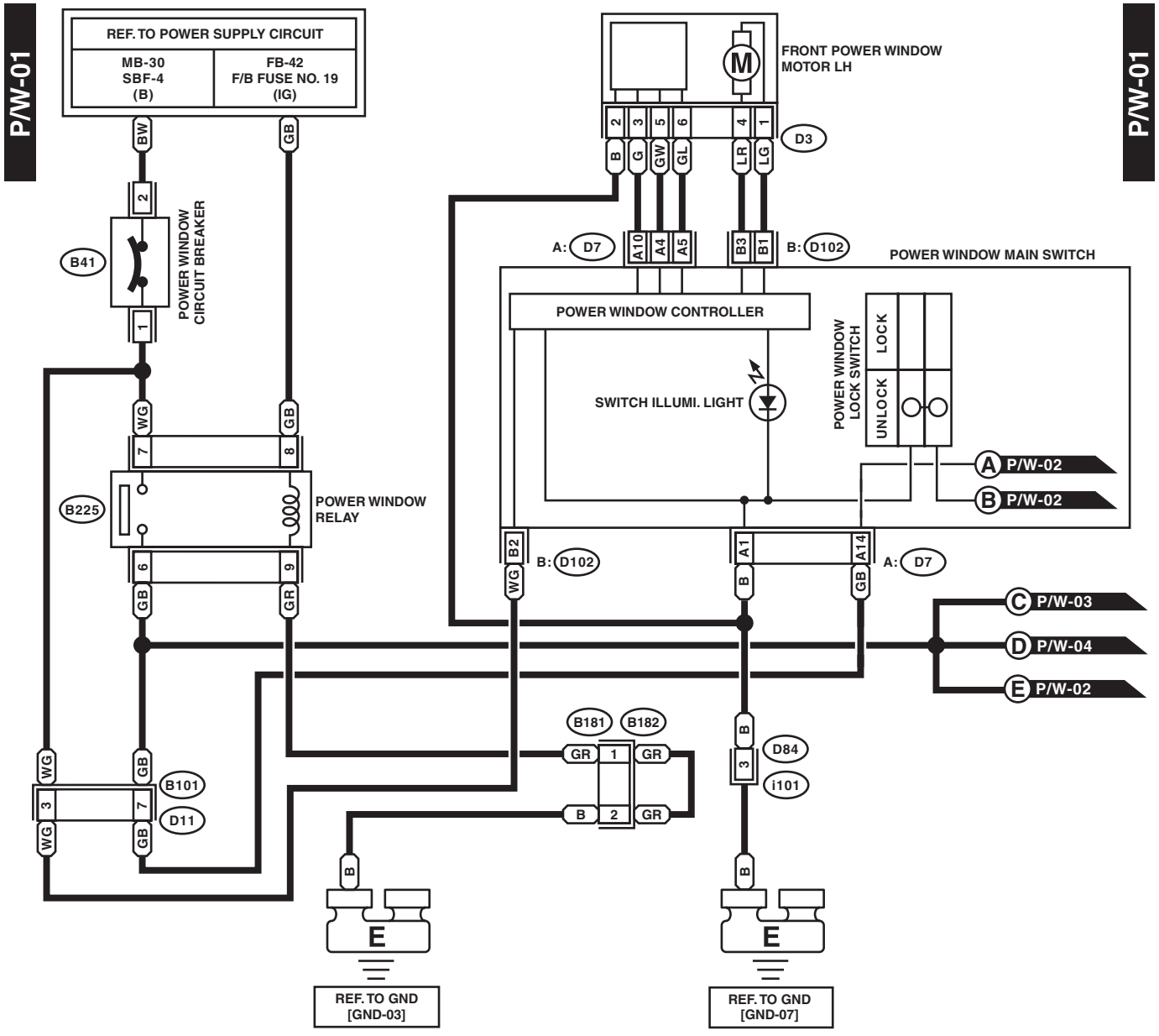


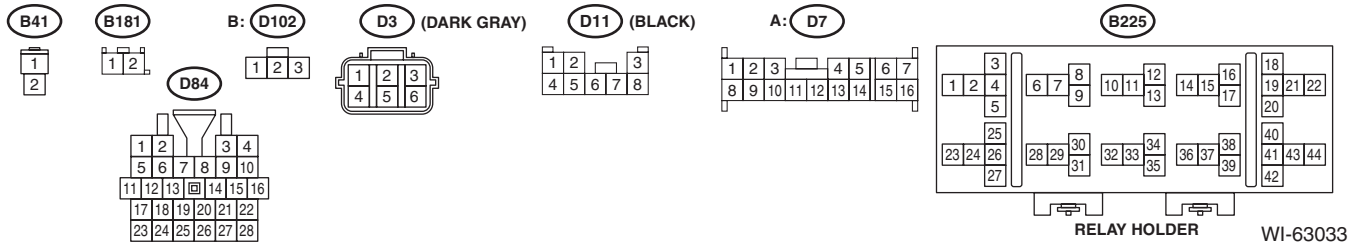


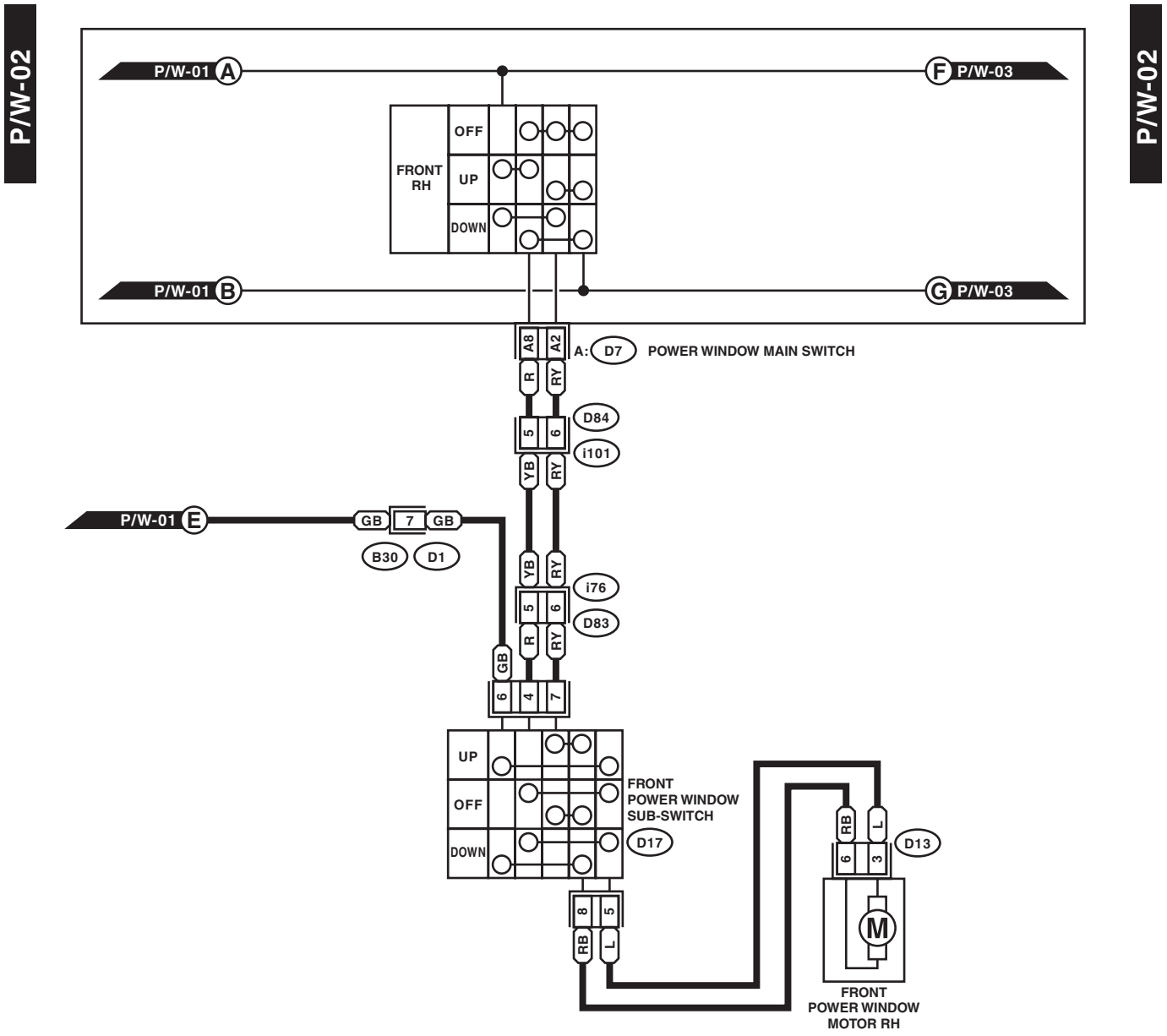
WI-61636

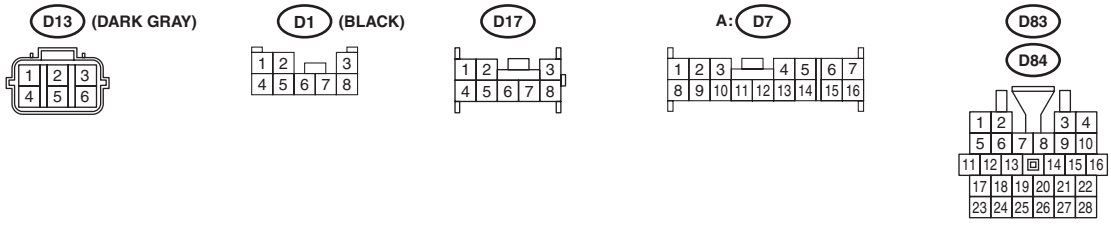
36.Power Window System

A: WIRING DIAGRAM

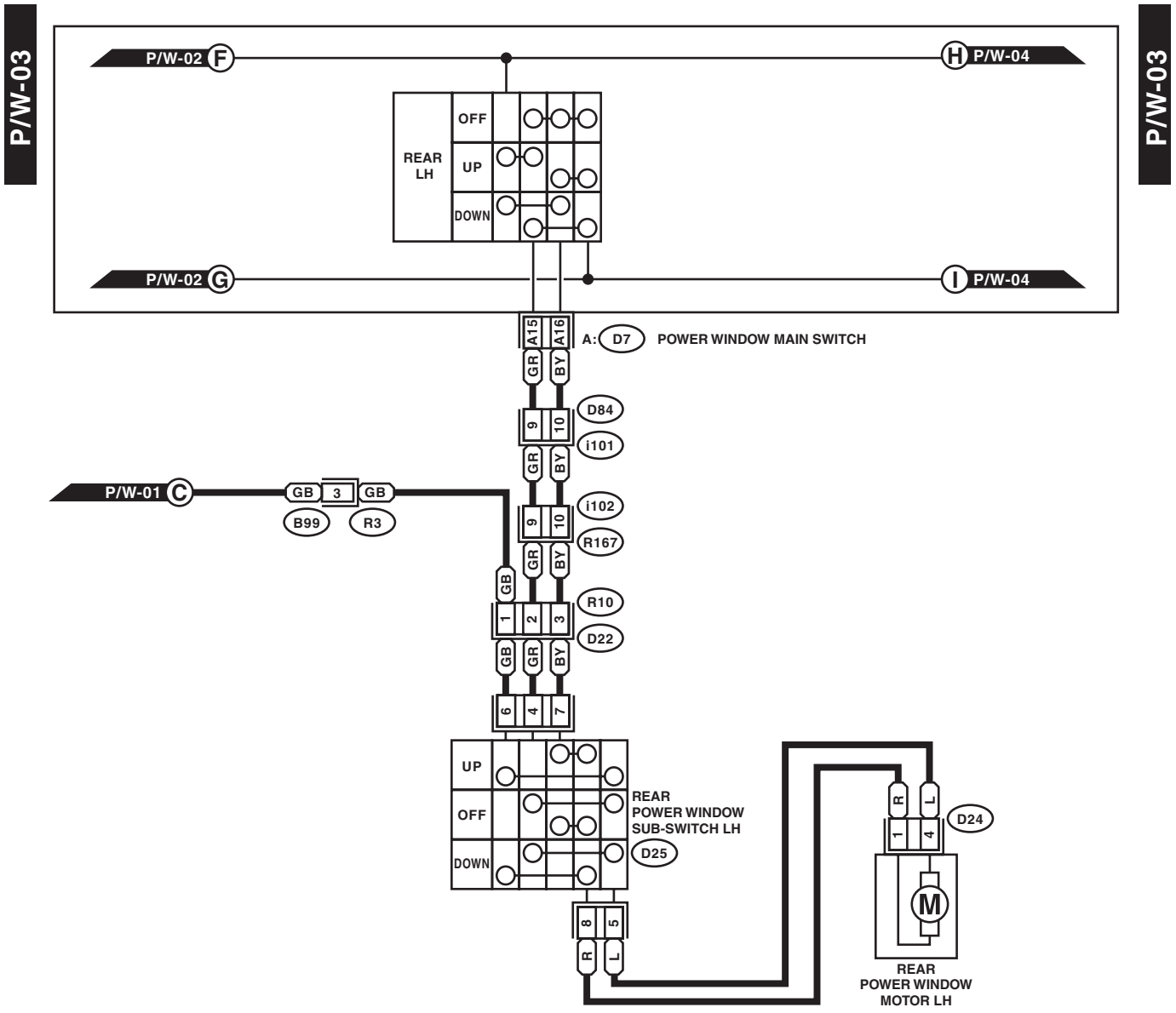


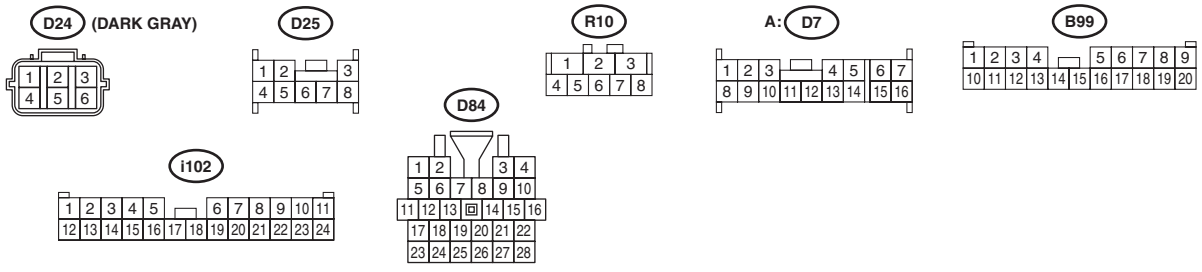



P/W-02
P/W-02
P/W-01 A
F P/W-03
FRONT RH
OFF
UP
DOWN
P/W-01 B
G P/W-03
A8
A2
A: D7 POWER WINDOW MAIN SWITCH
R
RY
D84
5
6
i101
YB
RY
P/W-01 E
GB
7
GB
B30
D1
YB
RY
i76
5
6
D83
R
RY
GB
6
4
7
UP
OFF
DOWN
FRONT POWER WINDOW SUB-SWITCH
D17
8
5
RB
L
RB
L
D13
6
3
M
FRONT POWER WINDOW MOTOR RH


D13 (DARK GRAY)
D1 (BLACK)
D17
A: D7
D83
D84

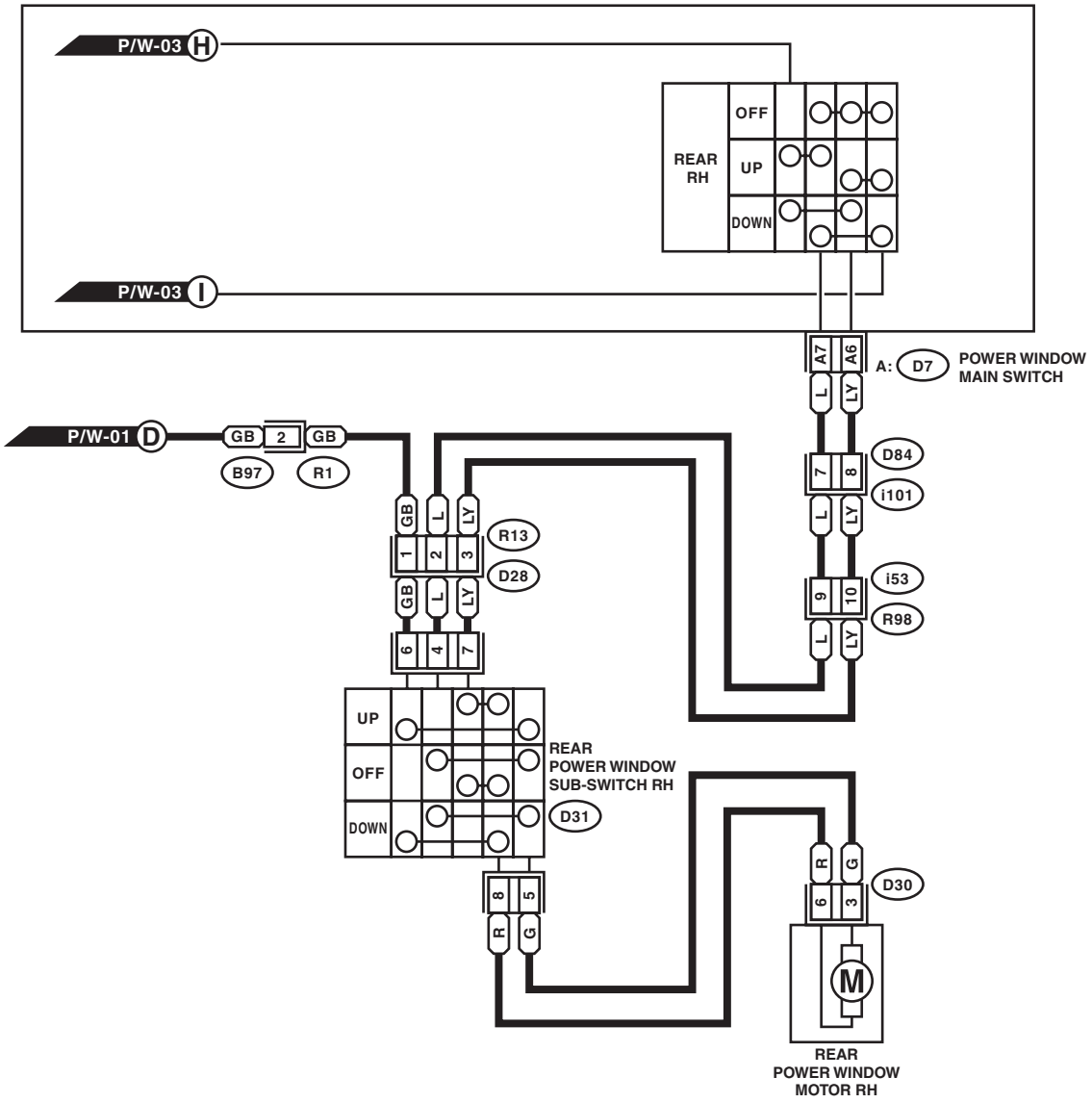
WI-48719

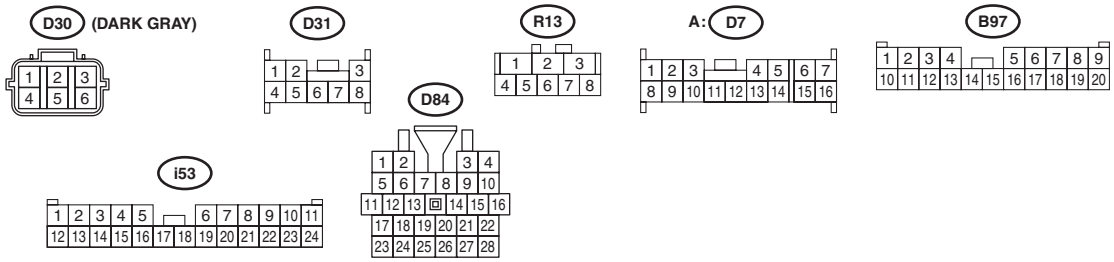

P/W-03
P/W-03
P/W-02 F
H P/W-04
REAR LH
OFF
UP
DOWN
P/W-02 G
I P/W-04
A15
A16
A: D7 POWER WINDOW MAIN SWITCH
GR
BY
D84
9
10
i101
P/W-01 C
GB
3
GB
B99
R3
i102
R167
R10
D22
1
2
3
6
4
7
UP
OFF
DOWN
REAR POWER WINDOW SUB-SWITCH LH
D25
8
5
R
L
D24
M
REAR POWER WINDOW MOTOR LH


D24 (DARK GRAY)
D25
R10
A: D7
B99
i102
D84

WI-48720

P/W-04

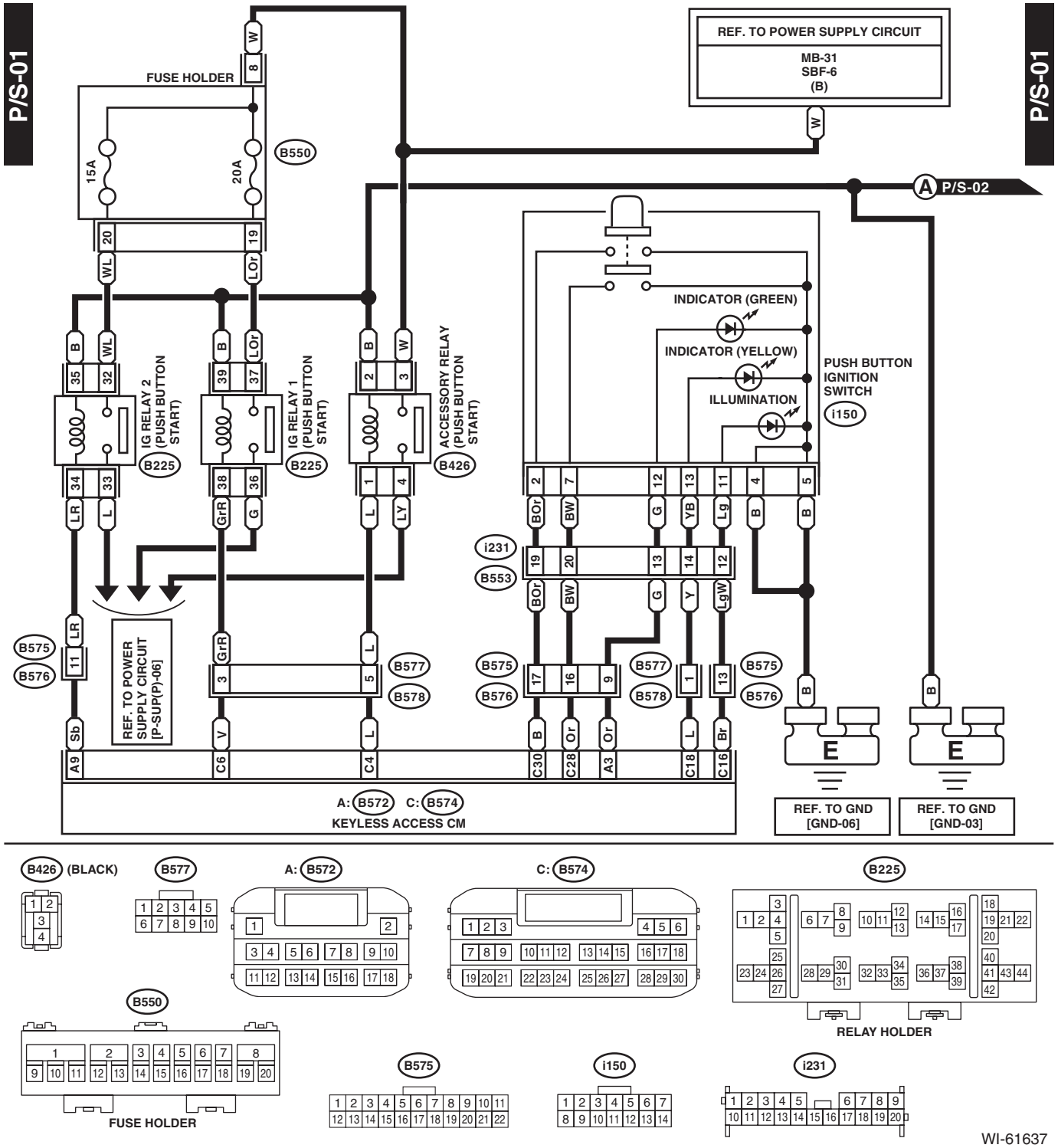




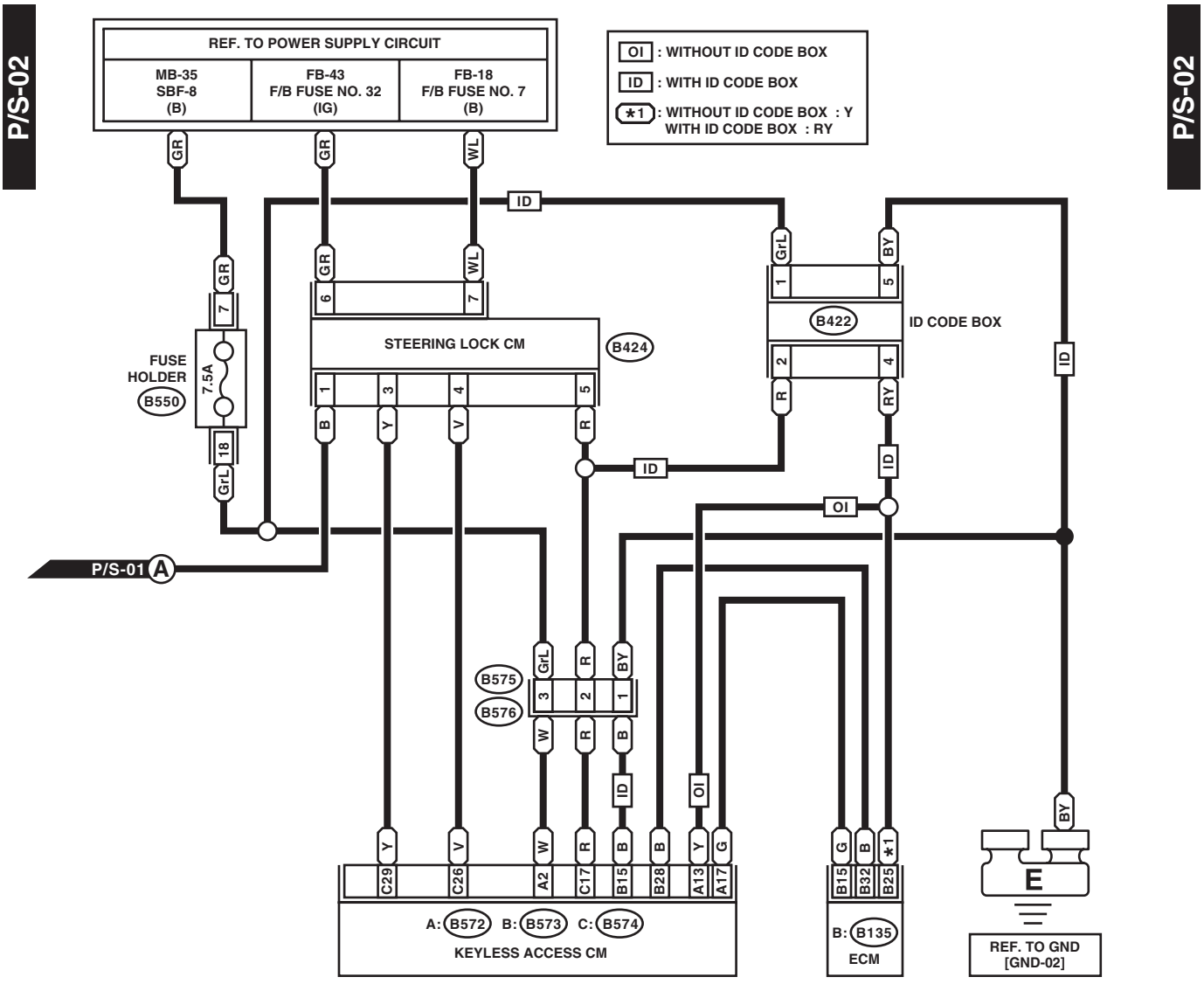
WI-48721

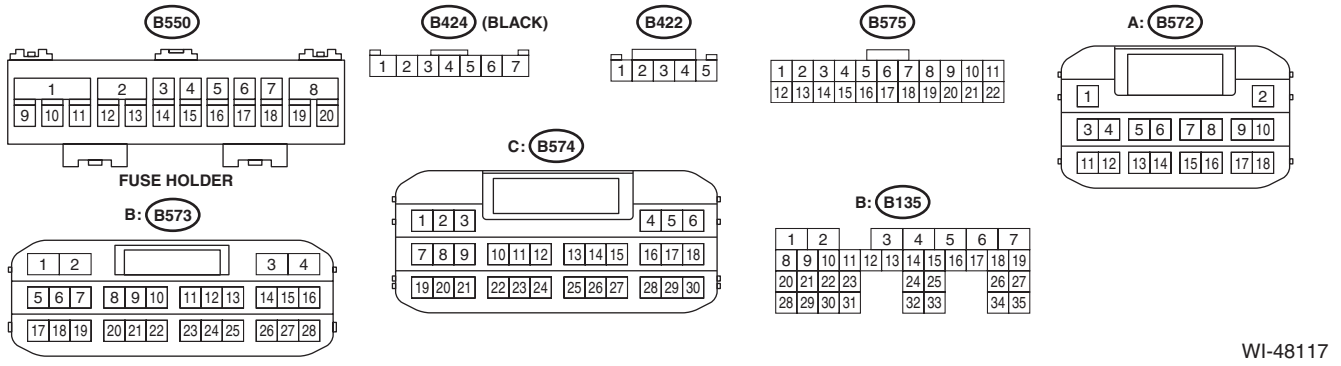
37.Push Button Start System

A: WIRING DIAGRAM



WI-61637

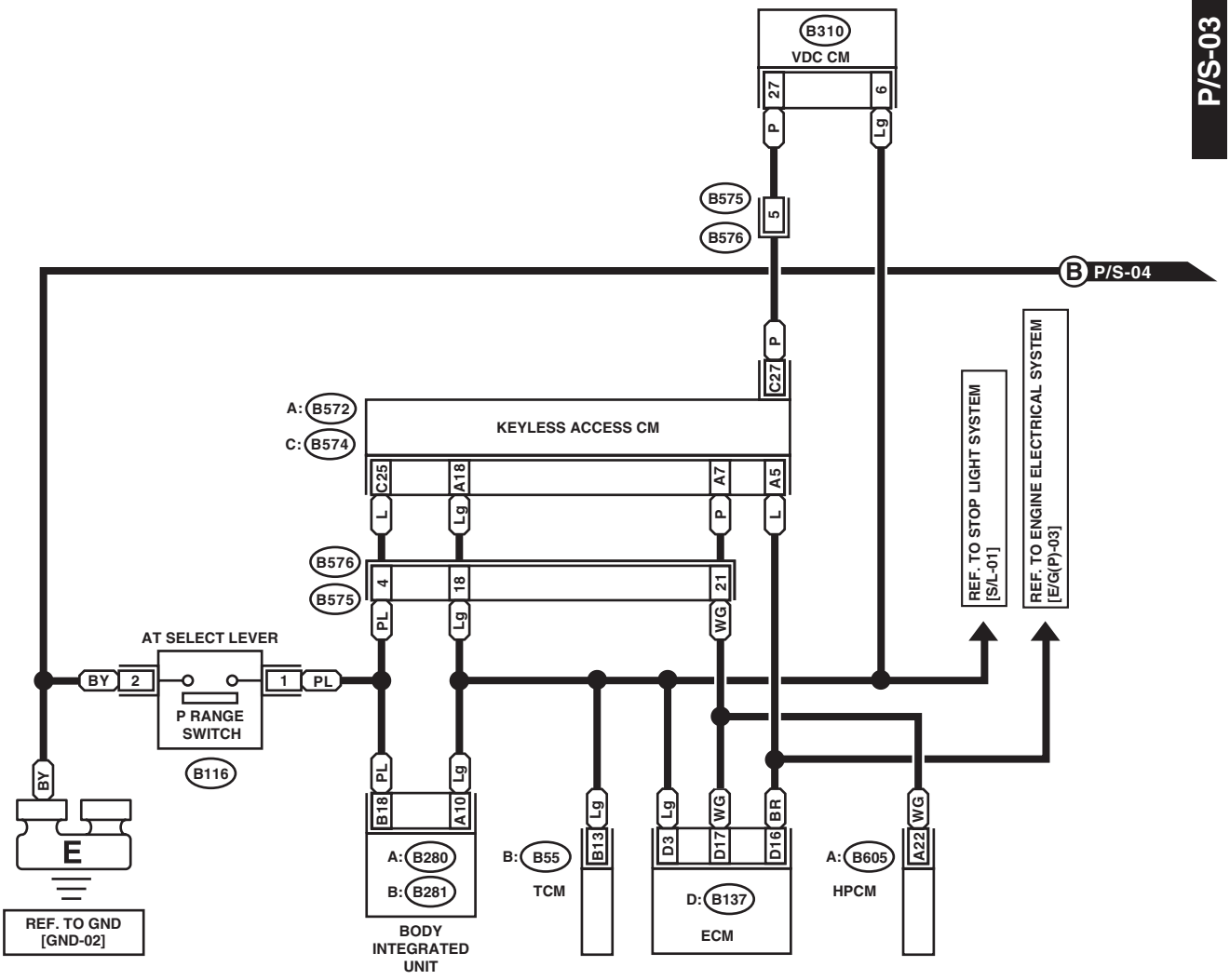

P/S-02
P/S-02
REF. TO POWER SUPPLY CIRCUIT
MB-35
SBF-8
(B)
FB-43
F/B FUSE NO. 32
(IG)
FB-18
F/B FUSE NO. 7
(B)
OI : WITHOUT ID CODE BOX
ID : WITH ID CODE BOX
*1 : WITHOUT ID CODE BOX : Y
WITH ID CODE BOX : RY
FUSE HOLDER
B550
7.5A
STEERING LOCK CM
B424
ID CODE BOX
B422
B575
B576
KEYLESS ACCESS CM
A: B572 B: B573 C: B574
ECM
B: B135
REF. TO GND
[GND-02]
P/S-01 A

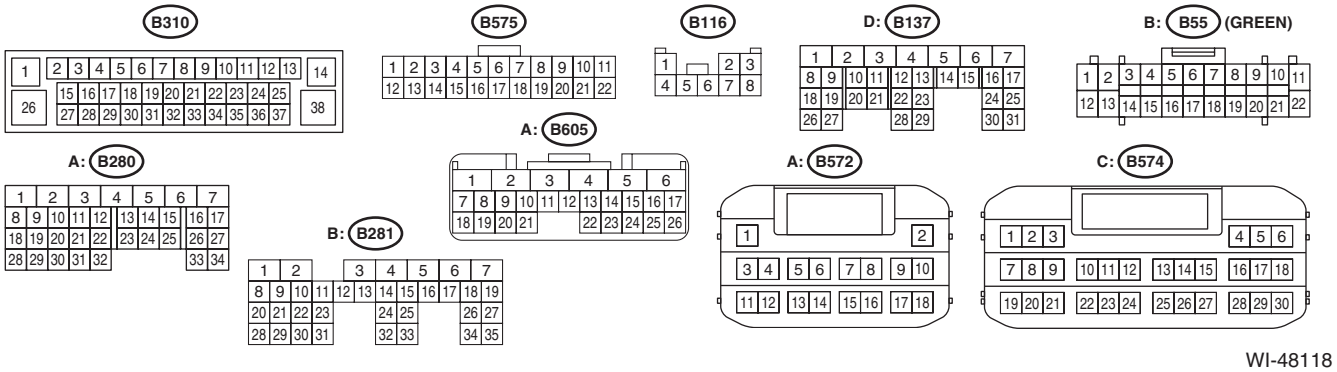

B550
FUSE HOLDER
B424 (BLACK)
B422
B575
A: B572
B: B573
C: B574
B: B135

WI-48117

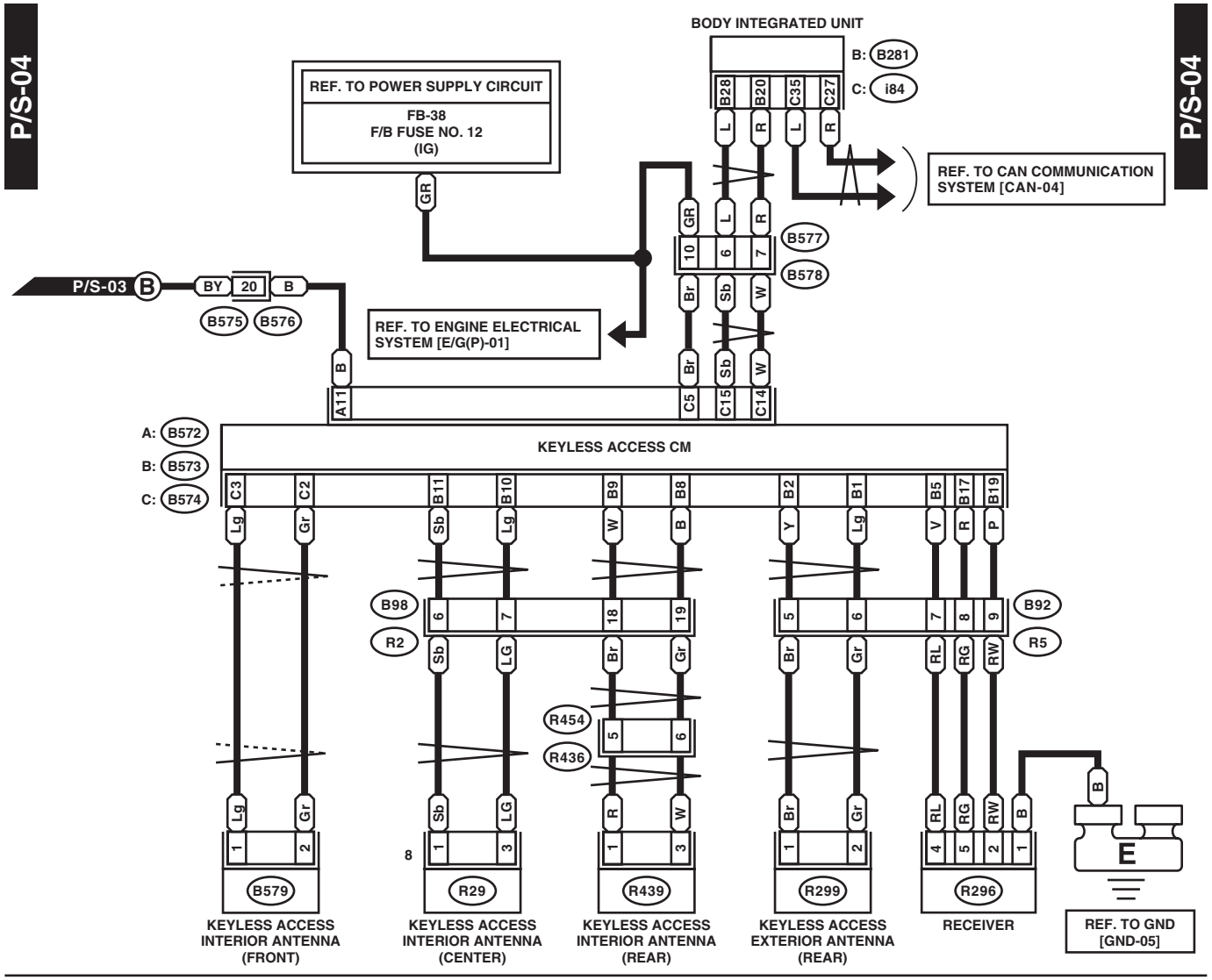
P/S-03

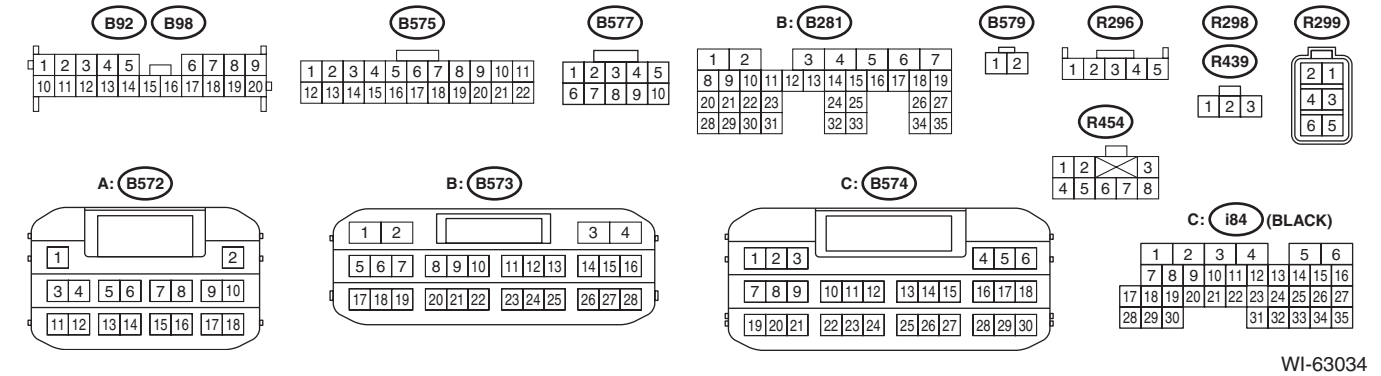
P/S-03





WI-48118

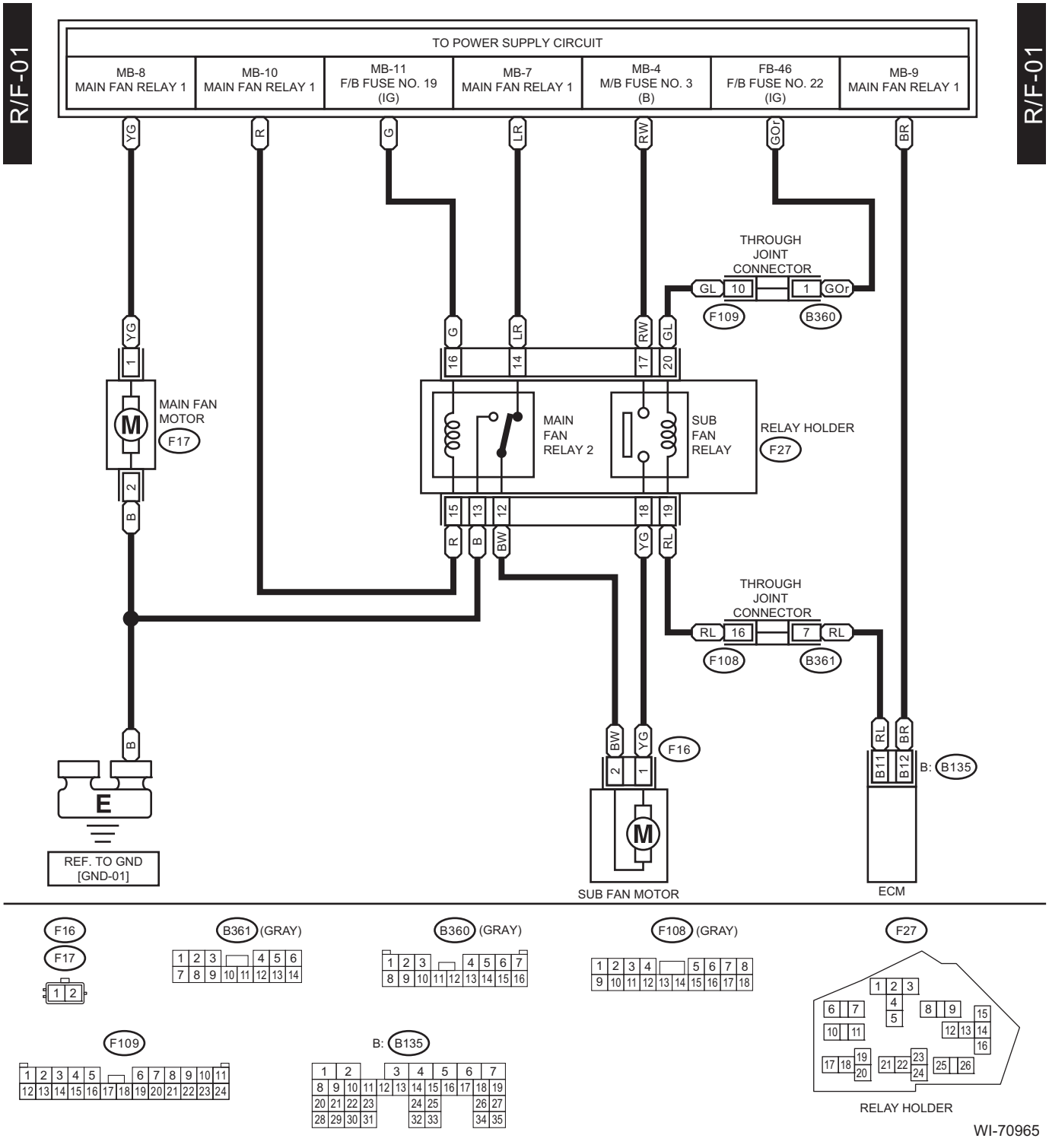

P/S-04
P/S-04
BODY INTEGRATED UNIT
B: B281
C: i84
B28 B20 C35 C27
L R L R
REF. TO POWER SUPPLY CIRCUIT
FB-38
F/B FUSE NO. 12
(IG)
GR
REF. TO CAN COMMUNICATION SYSTEM [CAN-04]
GR L R
B577
10 6 7
B578
Br Sb W
P/S-03 B
BY 20 B
B575 B576
REF. TO ENGINE ELECTRICAL SYSTEM [E/G(P)-01]
B
Br Sb W
A11 C5 C15 C14
A: B572
B: B573
C: B574
KEYLESS ACCESS CM
C3 C2 B11 B10 B9 B8 B2 B1 B5 B17 B19
Lg Gr Sb Lg W B Y Lg V R P
B98
R2
6 7 18 19
5 6 7 8 9
B92
R5
Sb LG Br Gr Br Gr RL RG RW
R454
R436
5 6
Lg Gr Sb LG R W Br Gr RL RG RW B
1 2 8 1 3 1 3 1 2 4 5 2 1
B579 R29 R439 R299 R296
E
KEYLESS ACCESS INTERIOR ANTENNA (FRONT)
KEYLESS ACCESS INTERIOR ANTENNA (CENTER)
KEYLESS ACCESS INTERIOR ANTENNA (REAR)
KEYLESS ACCESS EXTERIOR ANTENNA (REAR)
RECEIVER
REF. TO GND [GND-05]


B92 B98
B575
B577
B: B281
B579
R296
R298
R439
R299
R454
A: B572
B: B573
C: B574
C: i84 (BLACK)

WI-63034

38.Radiator Fan System

A: WIRING DIAGRAM

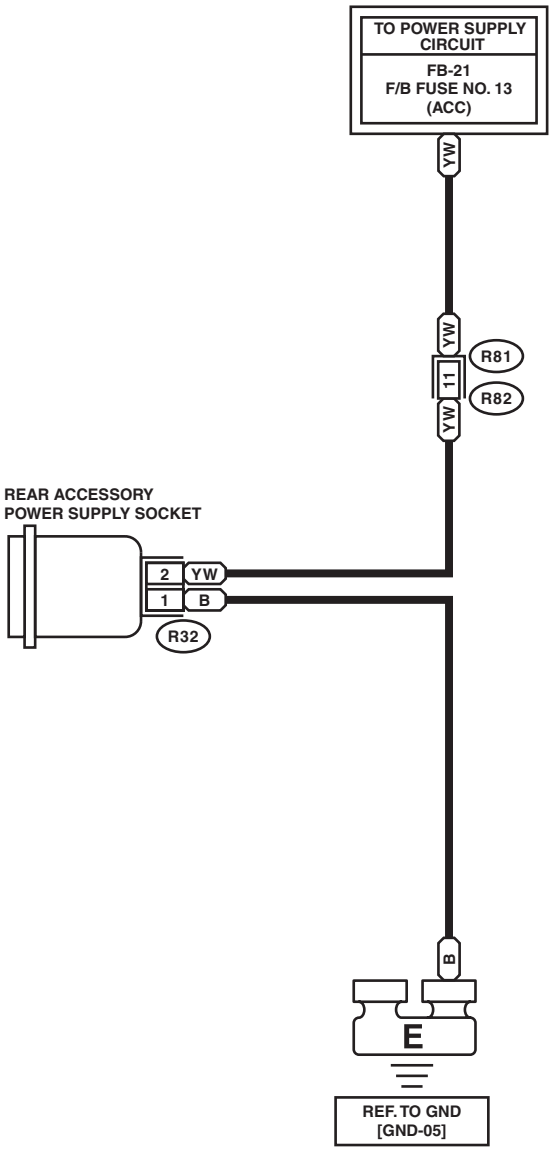


WI-70965

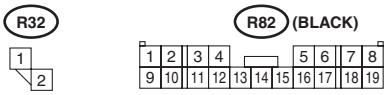
39.Rear Accessory Power Supply Socket System

A: WIRING DIAGRAM

RAPS-01



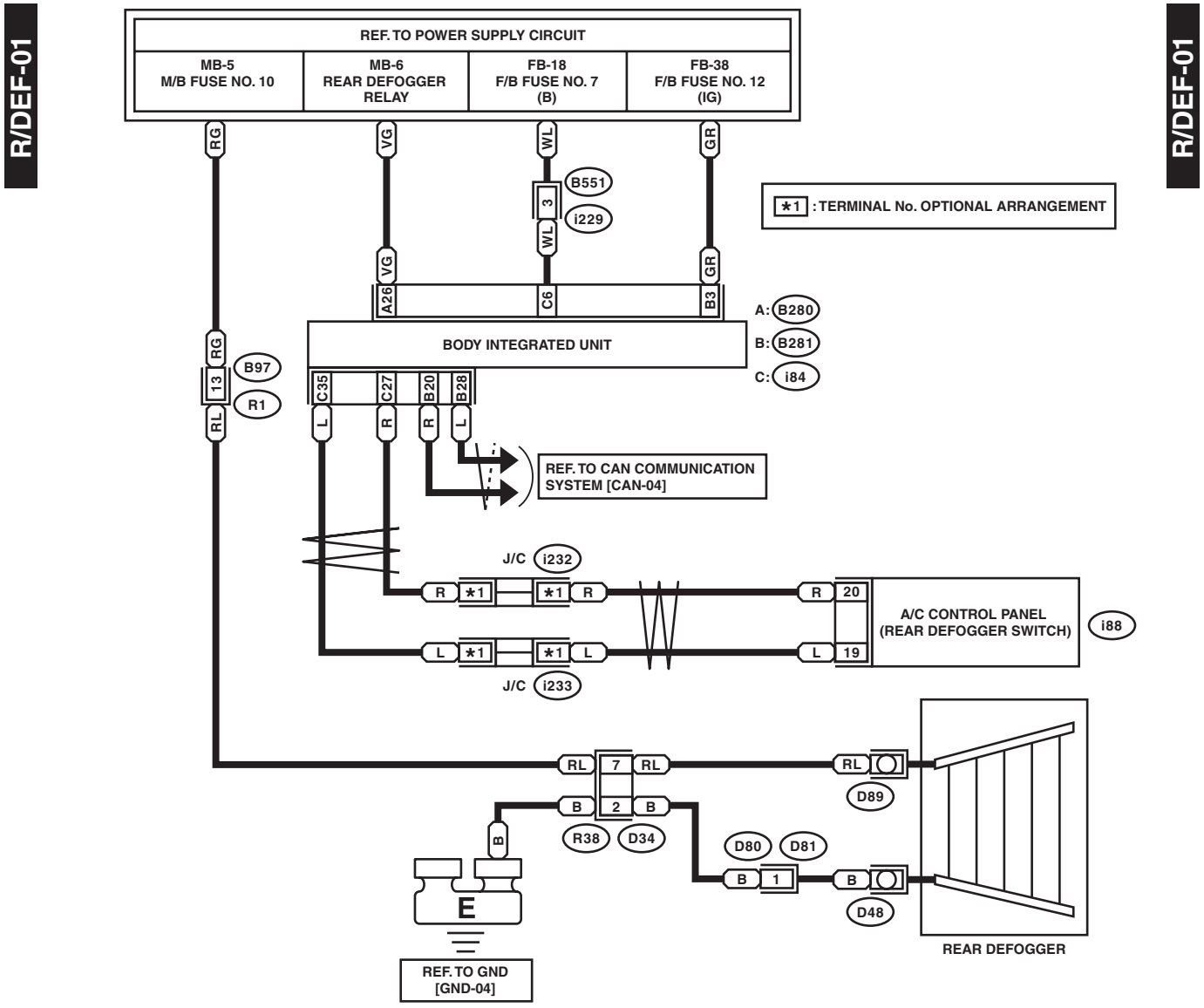
RAPS-01

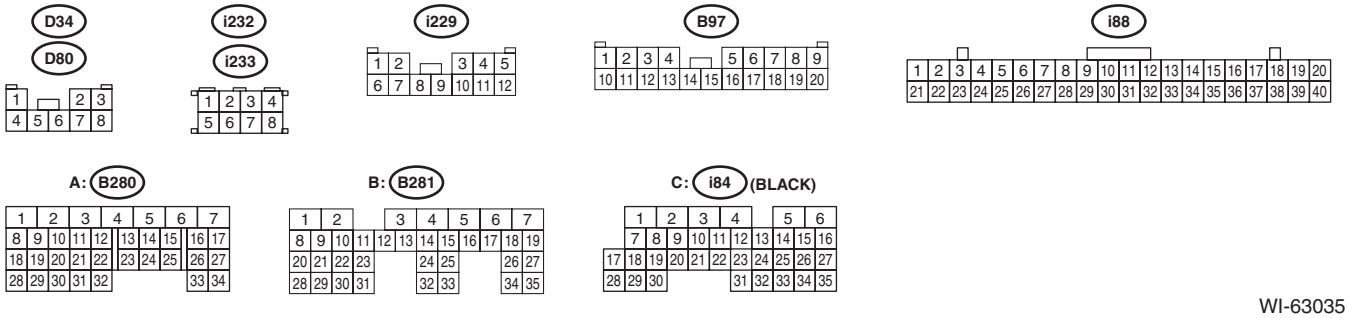


WI-34237

40.Rear Defogger System

A: WIRING DIAGRAM





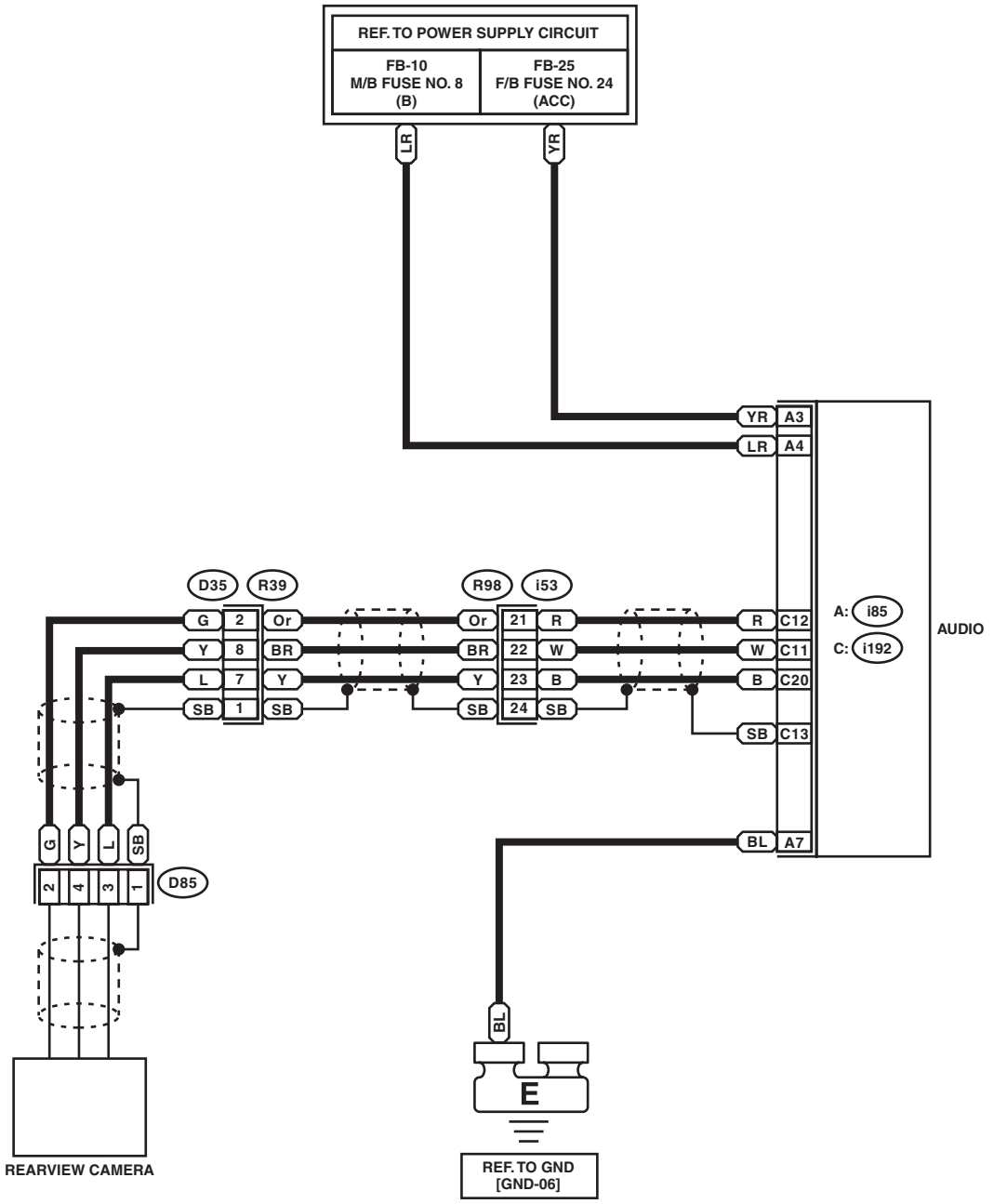
WI-63035

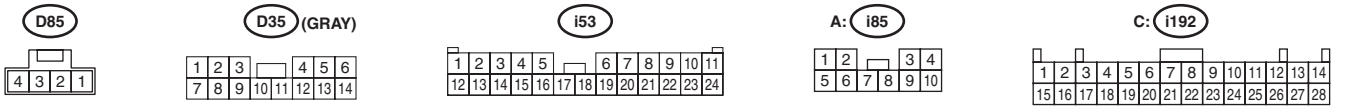
41.Rearview Camera System

A: WIRING DIAGRAM

1. MODELS WITHOUT NAVIGATION SYSTEM

RVCAM(ON)-01



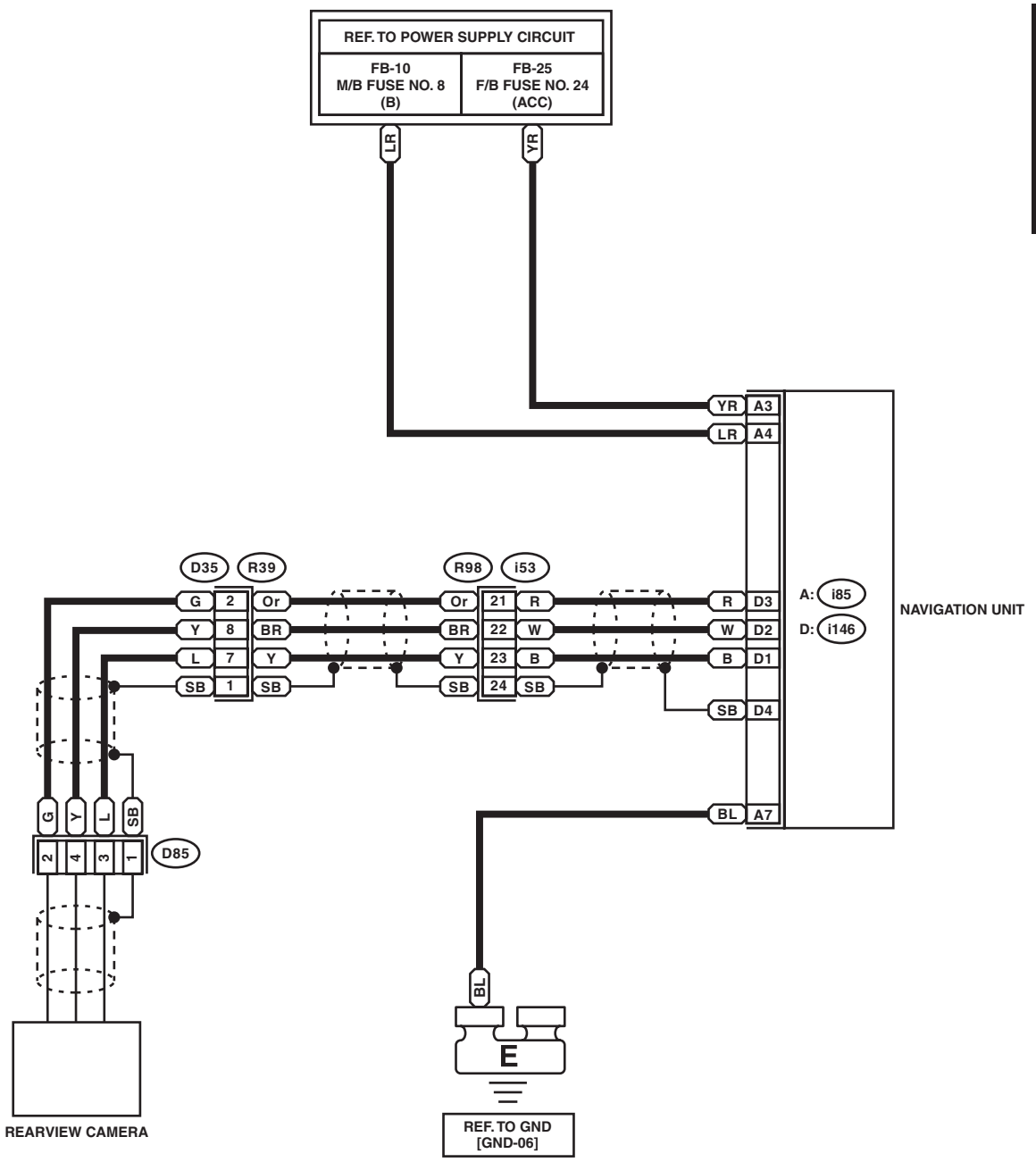


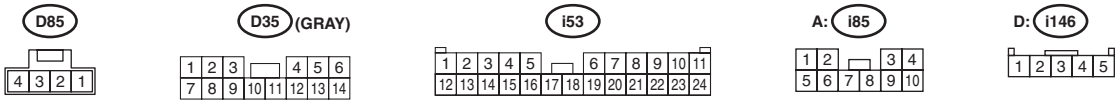
WI-63036

RVCAM(ON)-01

2. MODELS WITH NAVIGATION SYSTEM

RVCAM(WN)-01

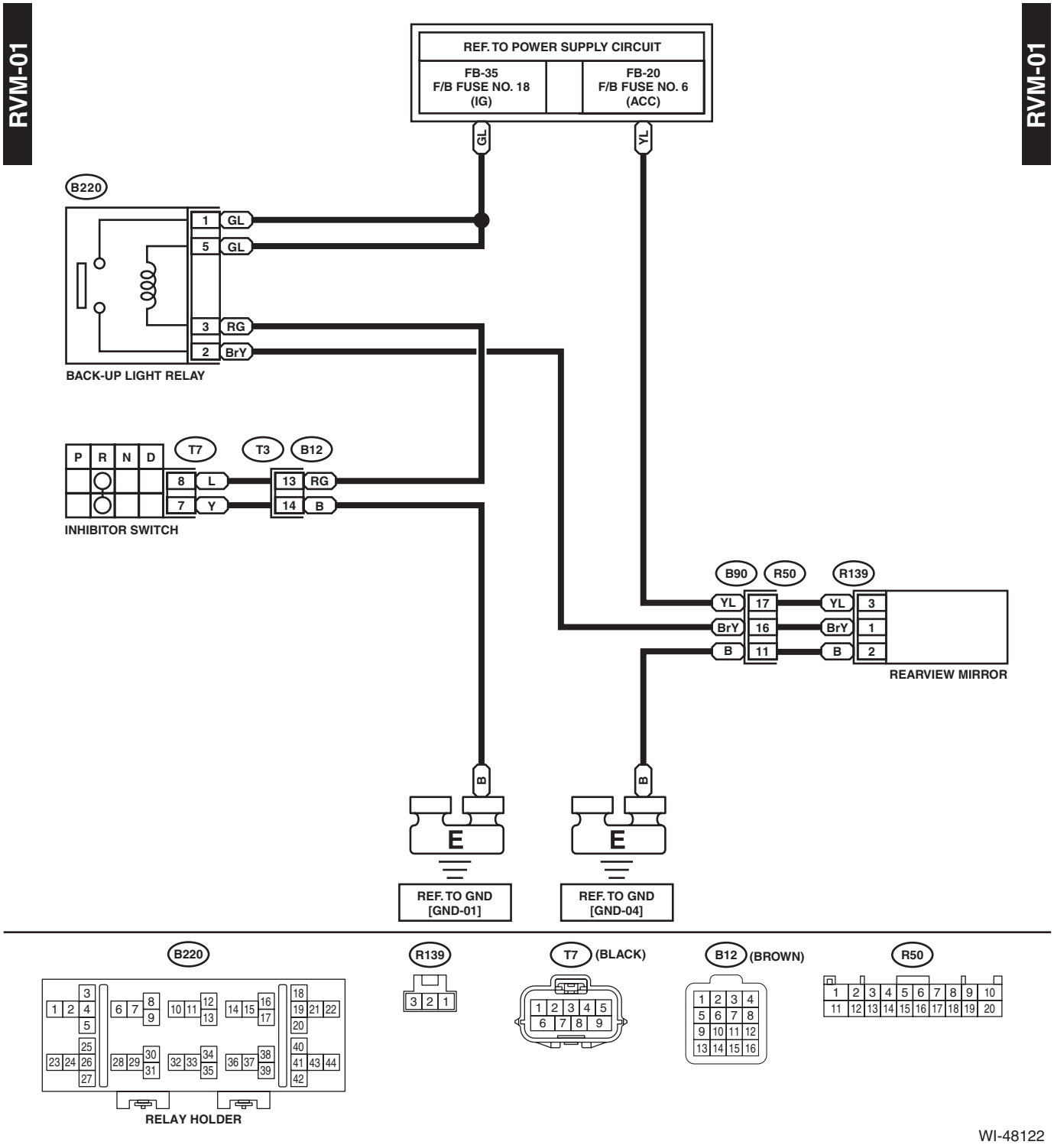




WI-63037

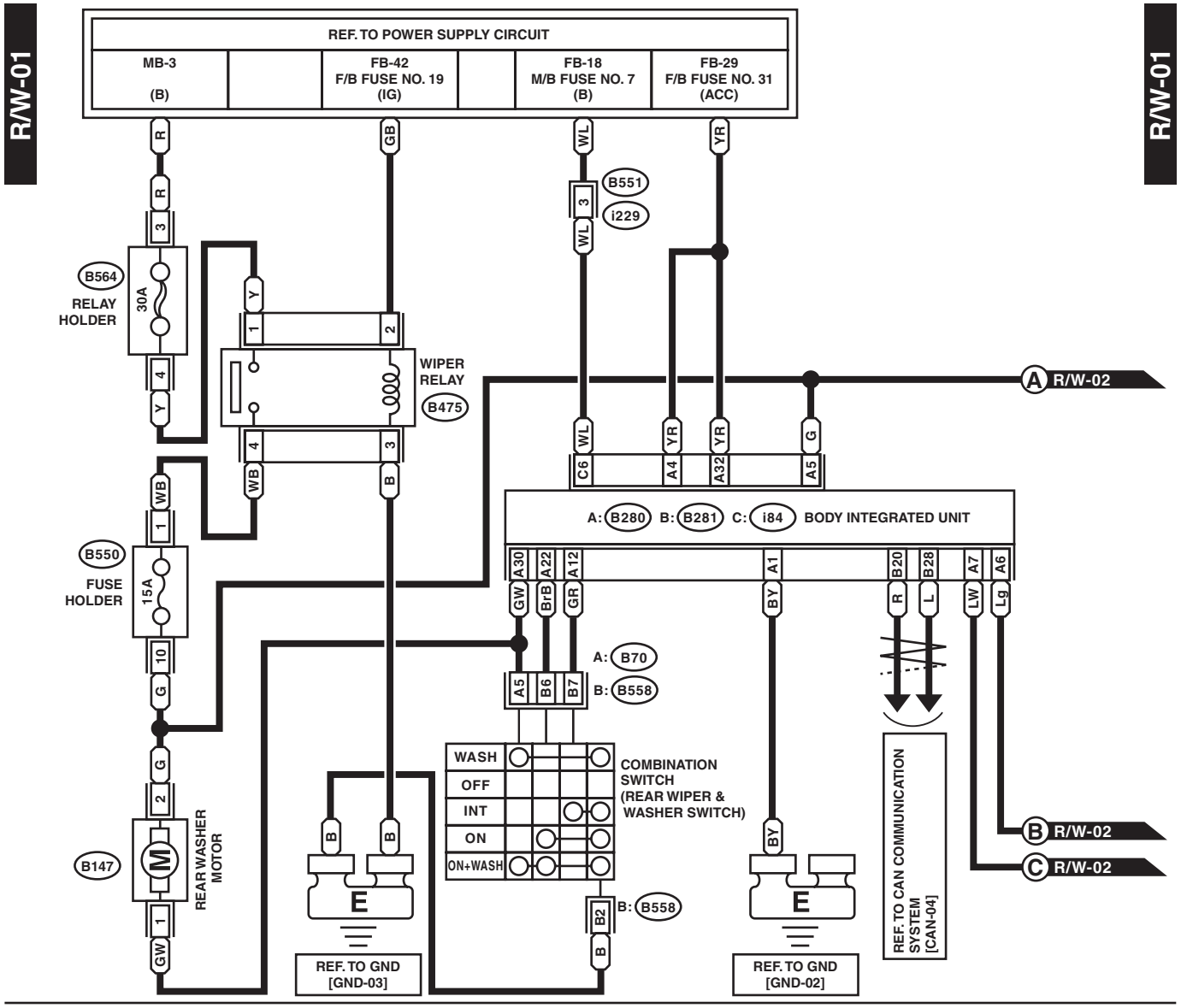
42.Rearview Mirror System

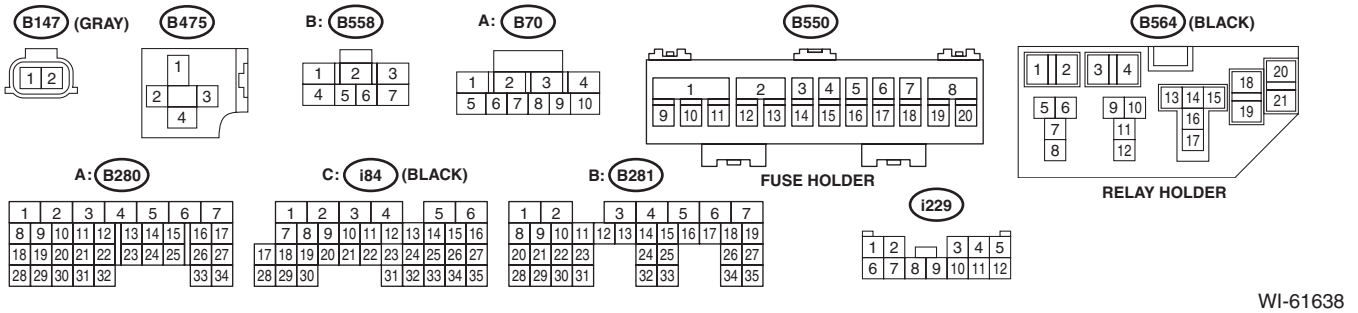
A: WIRING DIAGRAM



43.Rear Wiper and Washer System

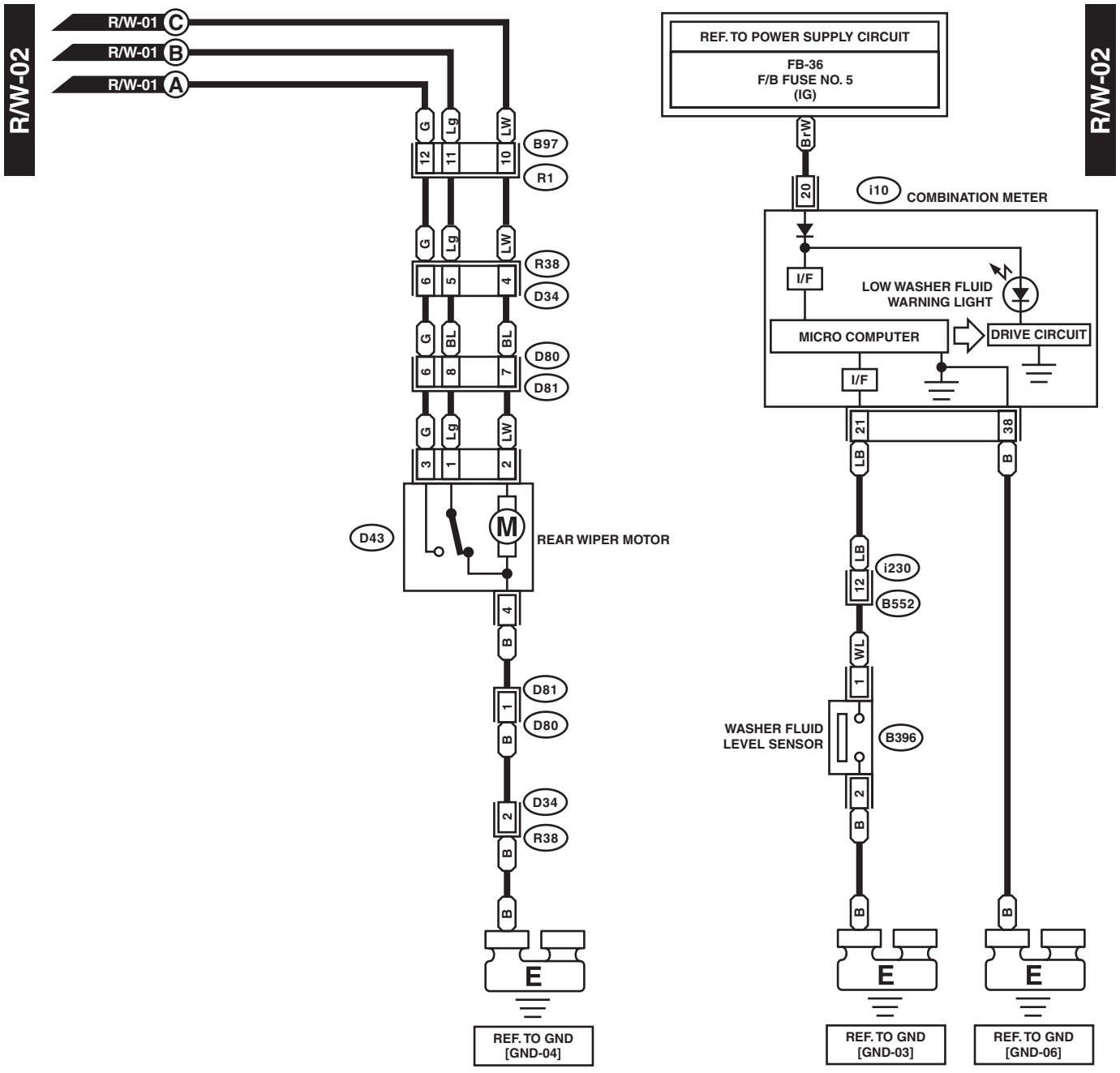
A: WIRING DIAGRAM

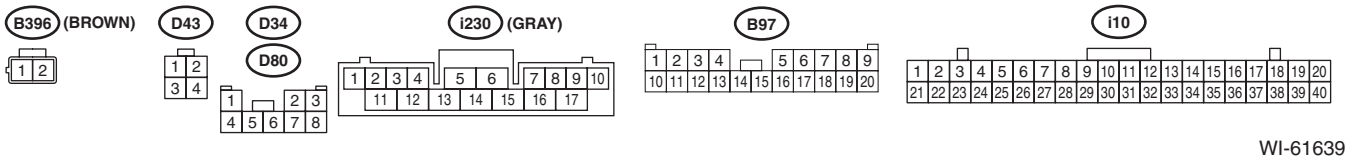




WI-61638

WIRING SYSTEM

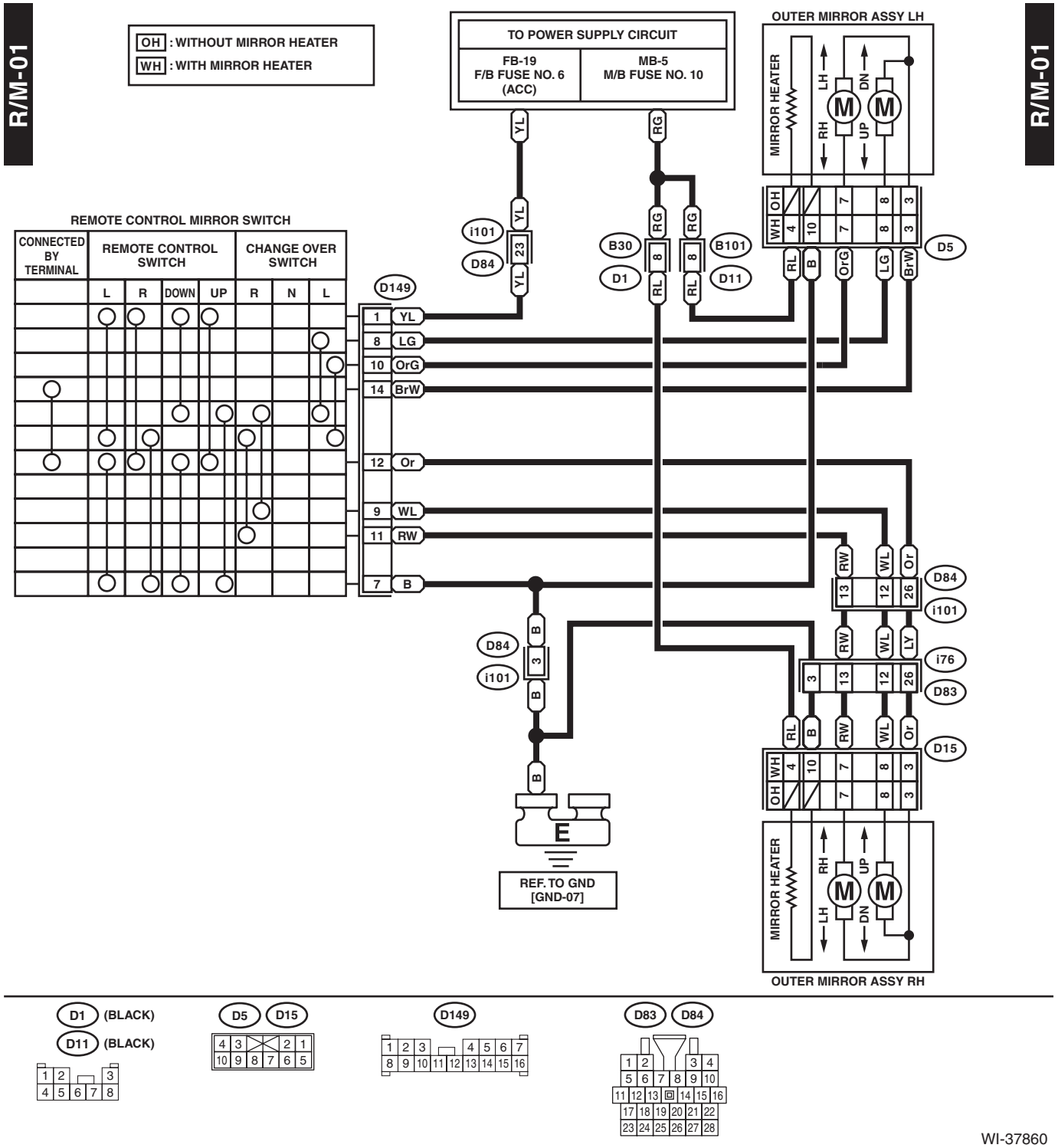




WI-61639

44.Remote Control Mirror System

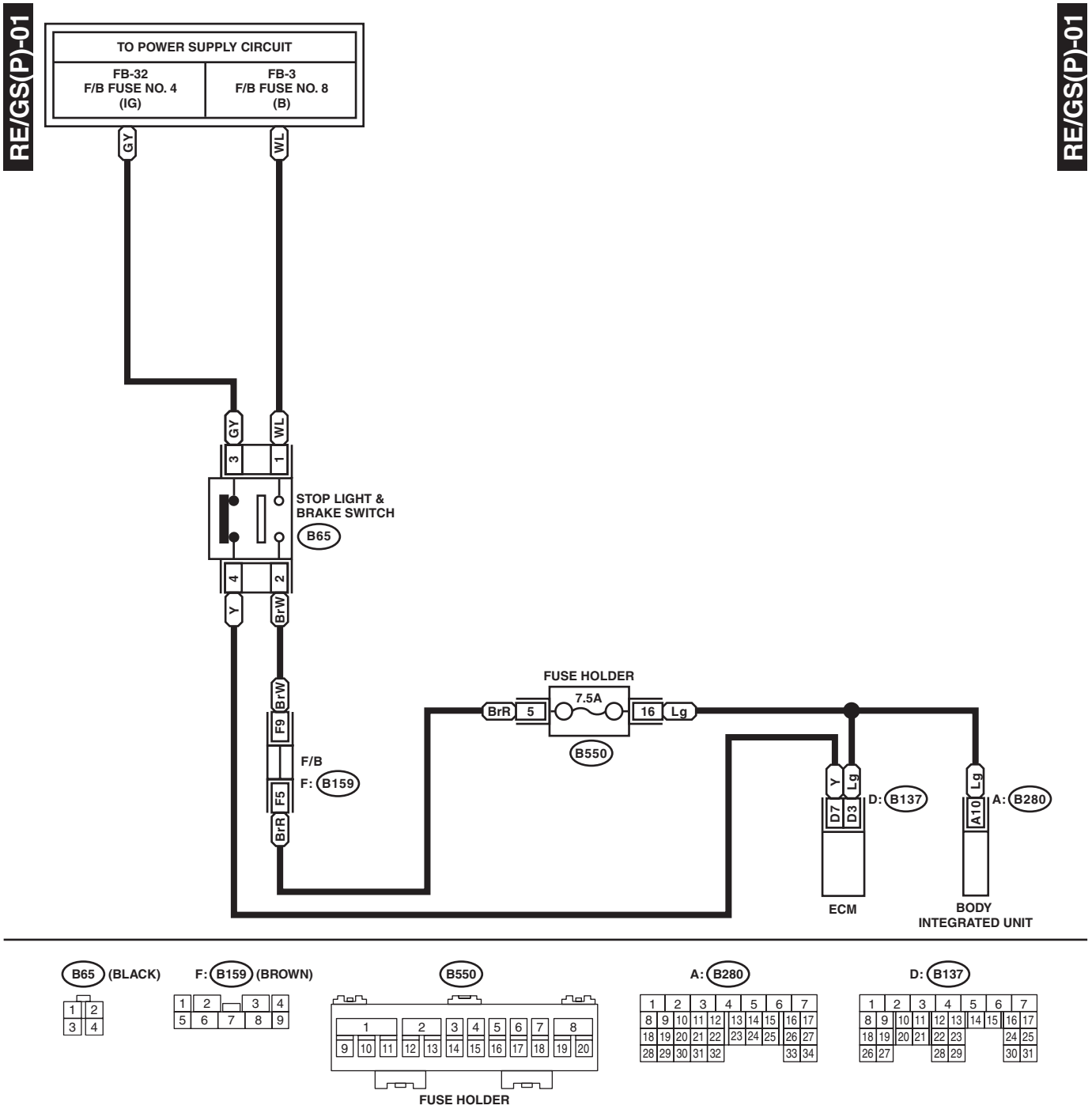
A: WIRING DIAGRAM



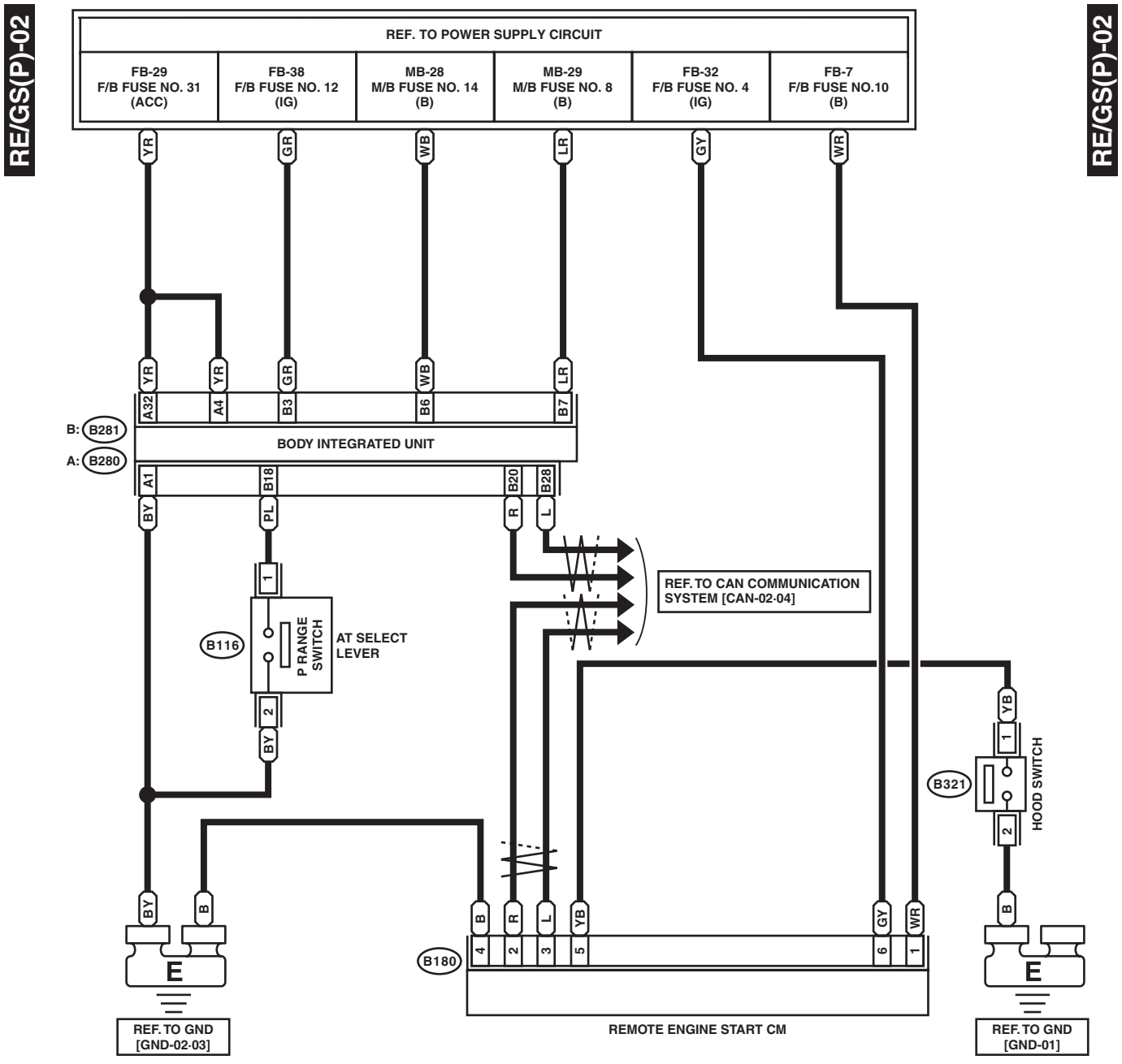
WI-37860

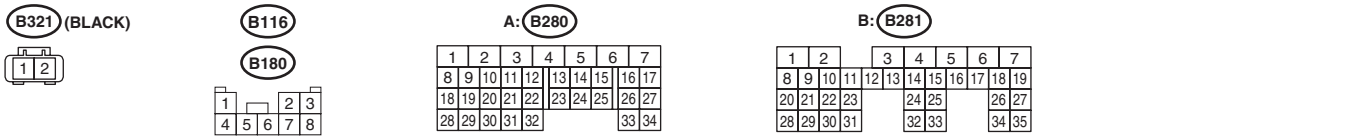
45.Remote Engine Start System

A: WIRING DIAGRAM

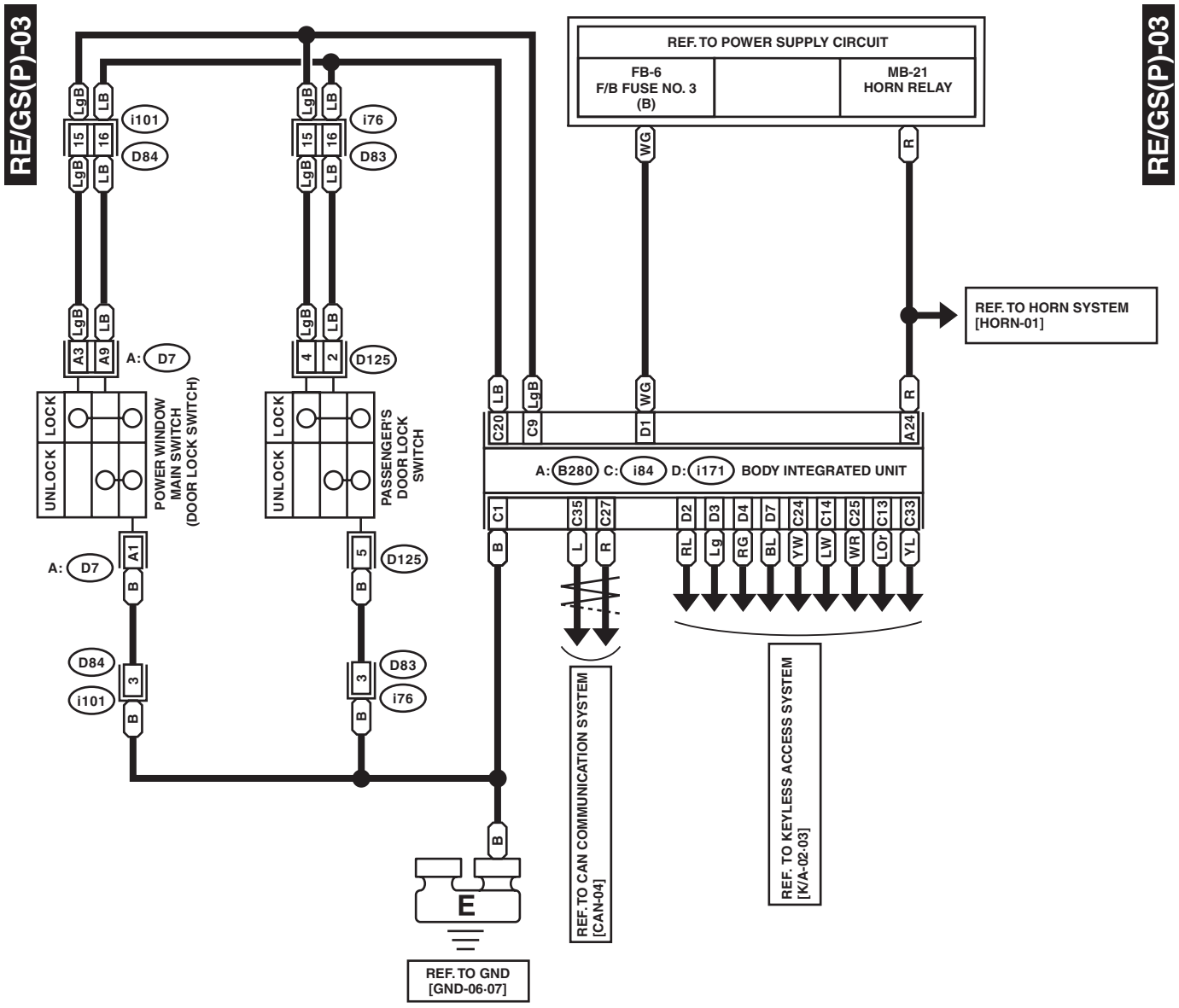


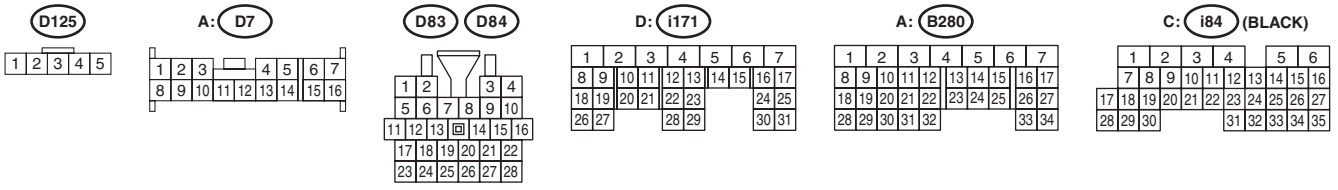
WI-42266


RE/GS(P)-02
RE/GS(P)-02
REF. TO POWER SUPPLY CIRCUIT
FB-29 F/B FUSE NO. 31 (ACC)
FB-38 F/B FUSE NO. 12 (IG)
MB-28 M/B FUSE NO. 14 (B)
MB-29 M/B FUSE NO. 8 (B)
FB-32 F/B FUSE NO. 4 (IG)
FB-7 F/B FUSE NO.10 (B)
YR
GR
WB
LR
GY
WR
B: B281
A: B280
BODY INTEGRATED UNIT
A32
A4
B3
B6
B7
A1
B18
B20
B28
BY
PL
R
L
B116
P RANGE SWITCH
AT SELECT LEVER
REF. TO CAN COMMUNICATION SYSTEM [CAN-02-04]
YB
B321
HOOD SWITCH
B
E
B180
REMOTE ENGINE START CM
REF. TO GND [GND-02-03]
REF. TO GND [GND-01]

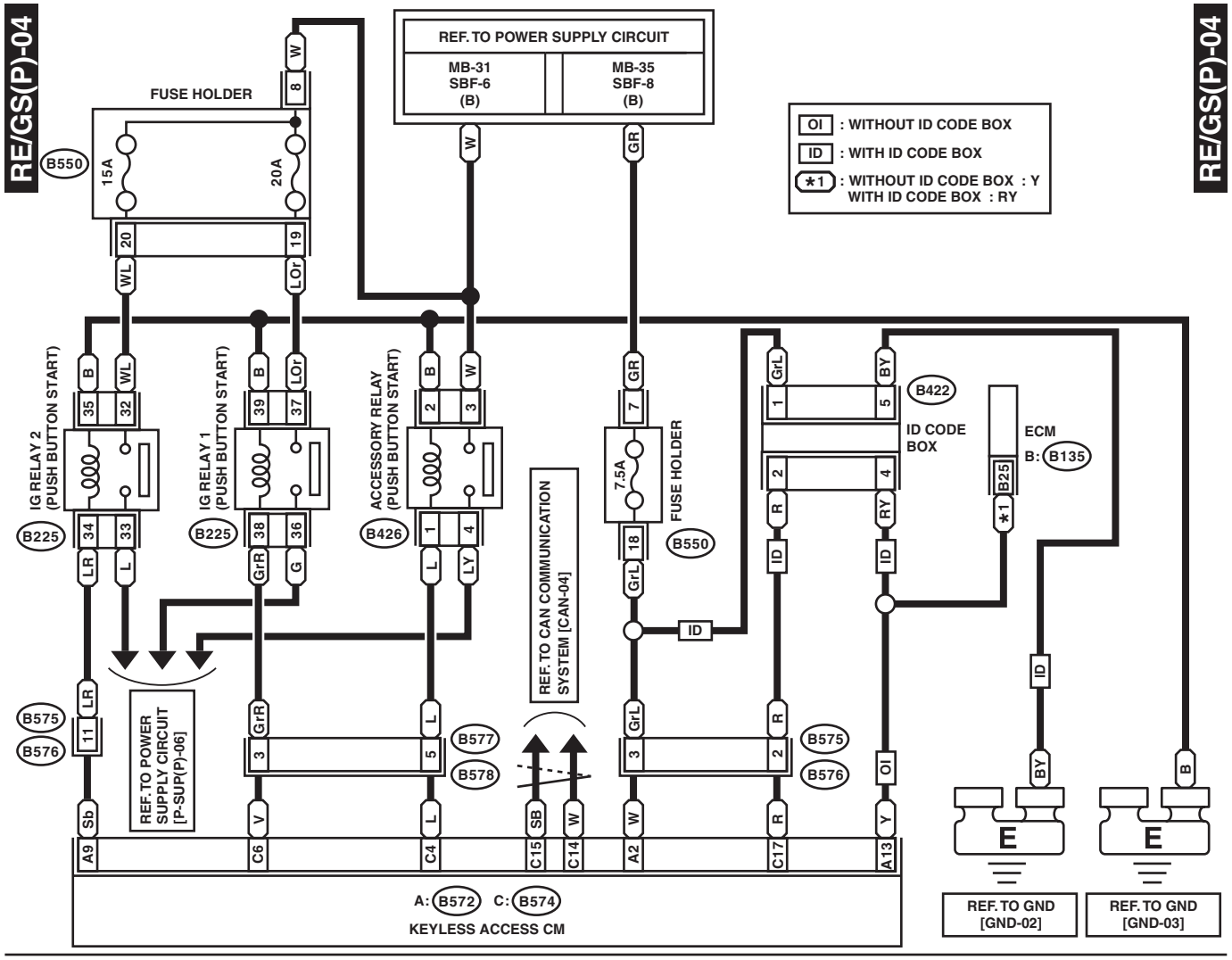

B321 (BLACK)
B116
B180
A: B280
B: B281

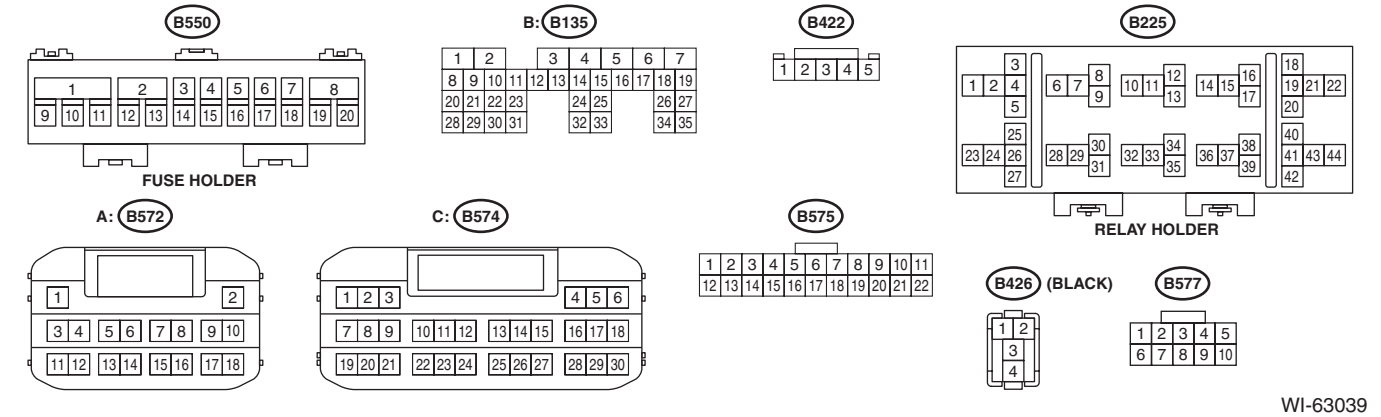
WI-63038


RE/GS(P)-03
RE/GS(P)-03
REF. TO POWER SUPPLY CIRCUIT
FB-6
F/B FUSE NO. 3
(B)
MB-21
HORN RELAY
REF. TO HORN SYSTEM
[HORN-01]
i101
D84
i76
D83
A: D7
D125
POWER WINDOW
MAIN SWITCH
(DOOR LOCK SWITCH)
PASSENGER'S
DOOR LOCK
SWITCH
LOCK
UNLOCK
A: B280 C: i84 D: i171 BODY INTEGRATED UNIT
REF. TO CAN COMMUNICATION SYSTEM
[CAN-04]
REF. TO KEYLESS ACCESS SYSTEM
[K/A-02-03]
E
REF. TO GND
[GND-06-07]


D125
A: D7
D83
D84
D: i171
A: B280
C: i84 (BLACK)

WI-61686

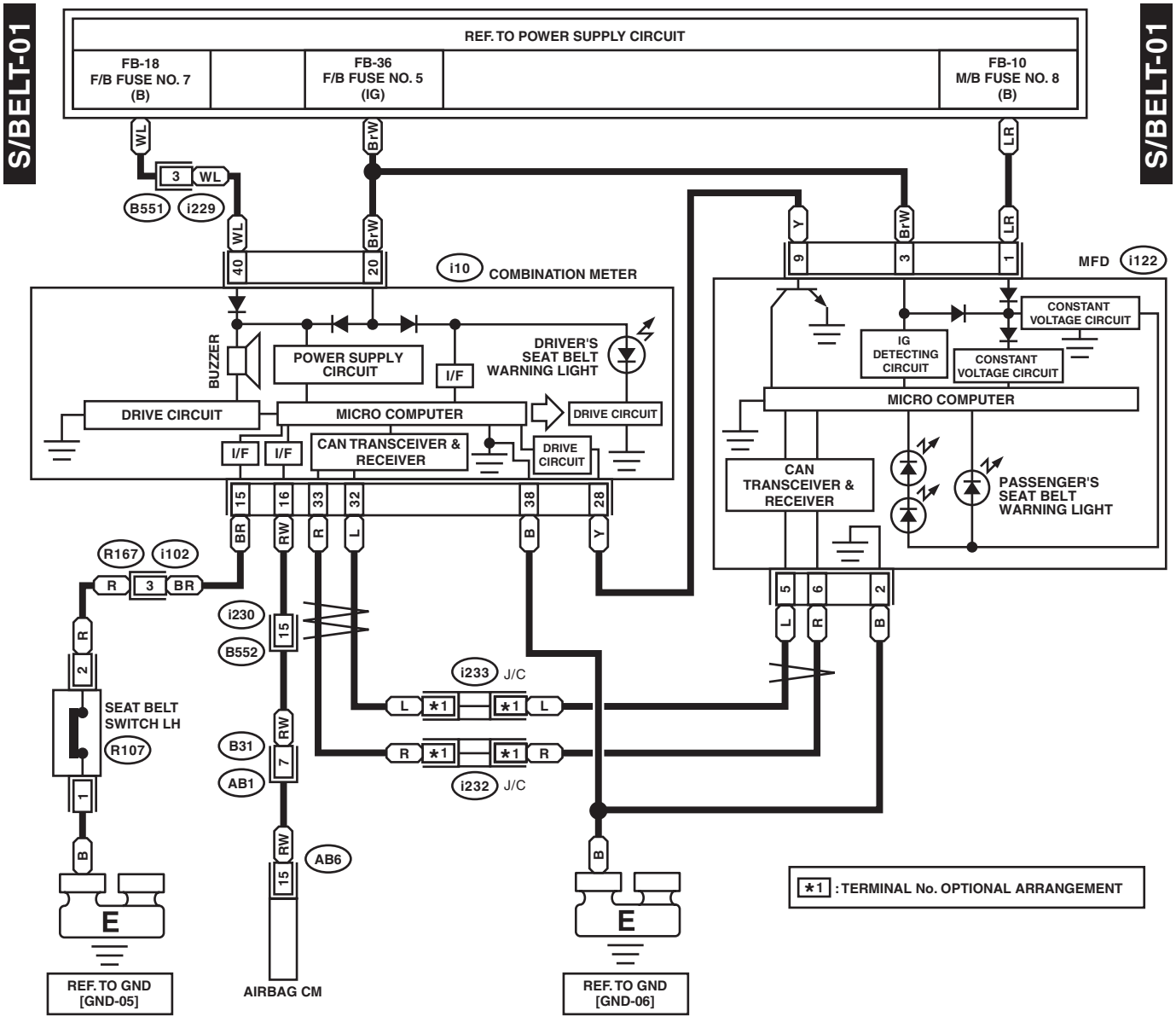

RE/GS(P)-04
RE/GS(P)-04
REF. TO POWER SUPPLY CIRCUIT
MB-31 SBF-6 (B)
MB-35 SBF-8 (B)
OI : WITHOUT ID CODE BOX
ID : WITH ID CODE BOX
*1 : WITHOUT ID CODE BOX : Y
WITH ID CODE BOX : RY
FUSE HOLDER
B550
15A
20A
IG RELAY 2 (PUSH BUTTON START)
IG RELAY 1 (PUSH BUTTON START)
ACCESSORY RELAY (PUSH BUTTON START)
B225
B426
7.5A
FUSE HOLDER
B422
ID CODE BOX
ECM
B: B135
B25
REF. TO CAN COMMUNICATION SYSTEM [CAN-04]
REF. TO POWER SUPPLY CIRCUIT [P-SUP(P)-06]
B575
B576
B577
B578
A: B572 C: B574
KEYLESS ACCESS CM
REF. TO GND [GND-02]
REF. TO GND [GND-03]

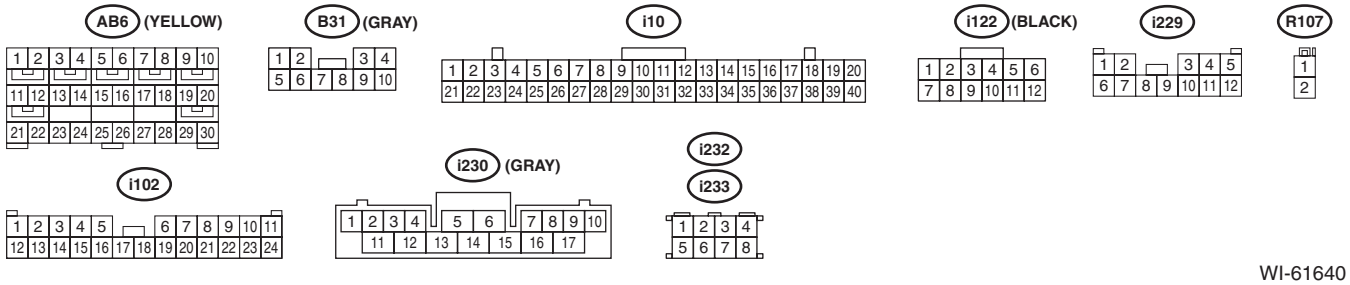

B550
FUSE HOLDER
B: B135
B422
B225
RELAY HOLDER
A: B572
C: B574
B575
B426 (BLACK)
B577

WI-63039

46.Seat Belt Warning System

A: WIRING DIAGRAM



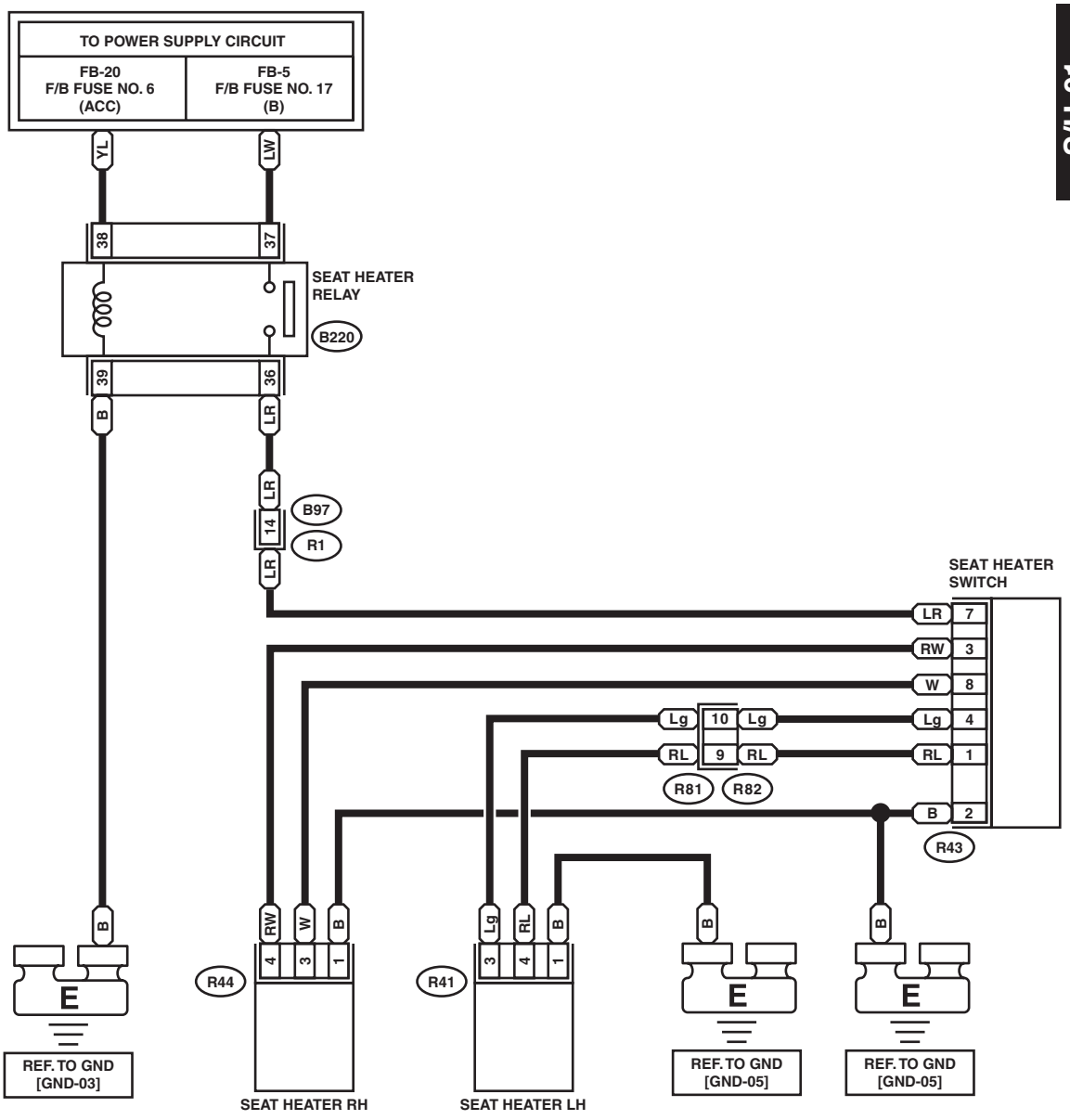


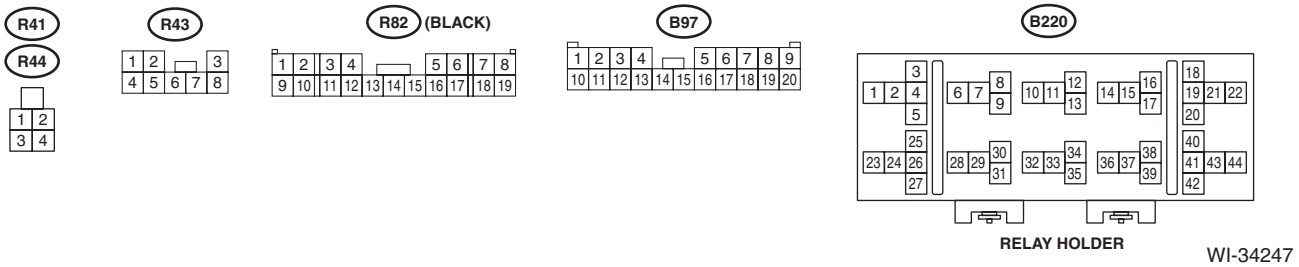
WI-61640

47.Seat Heater System

A: WIRING DIAGRAM

S/H-01

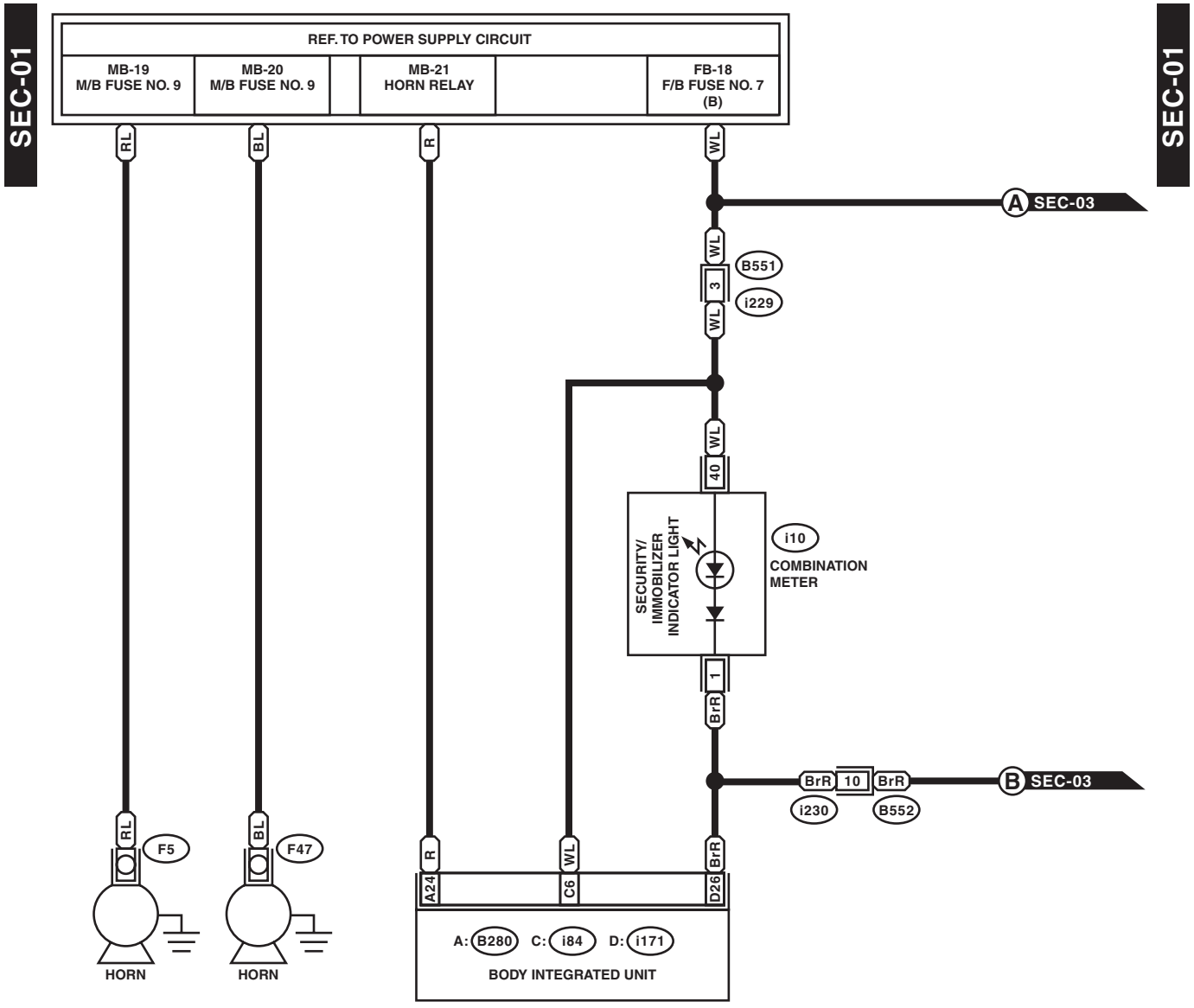


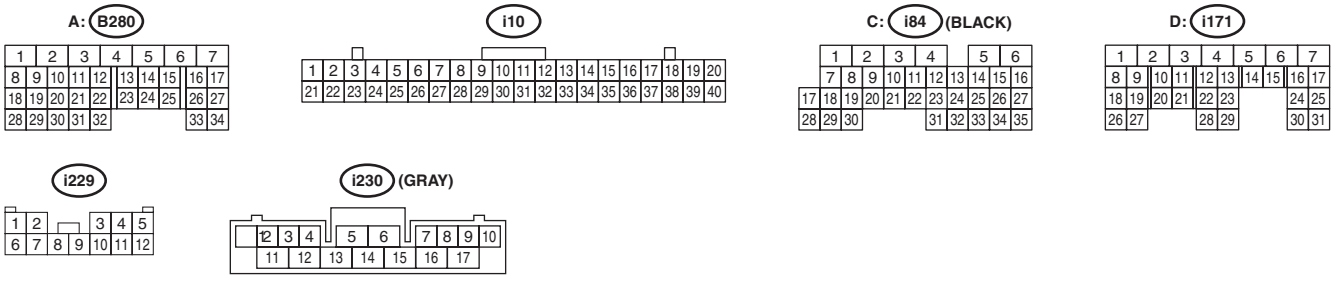


WI-34247

48.Security System

A: WIRING DIAGRAM

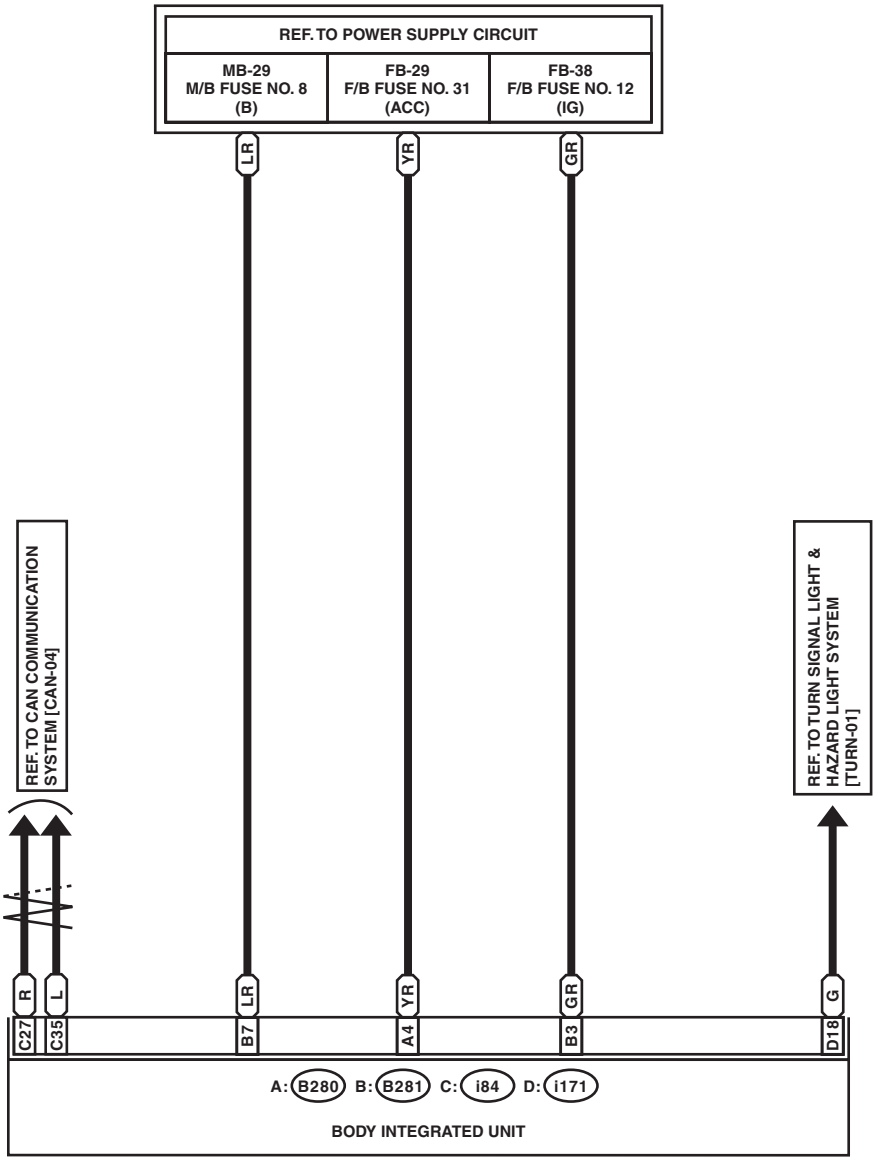


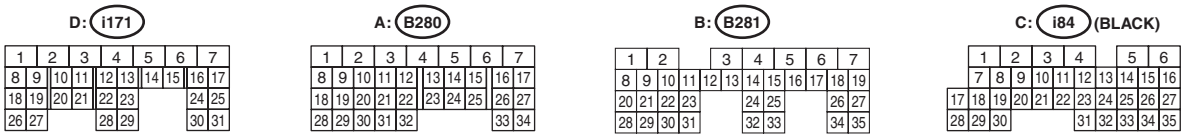


WI-61641

SEC-02

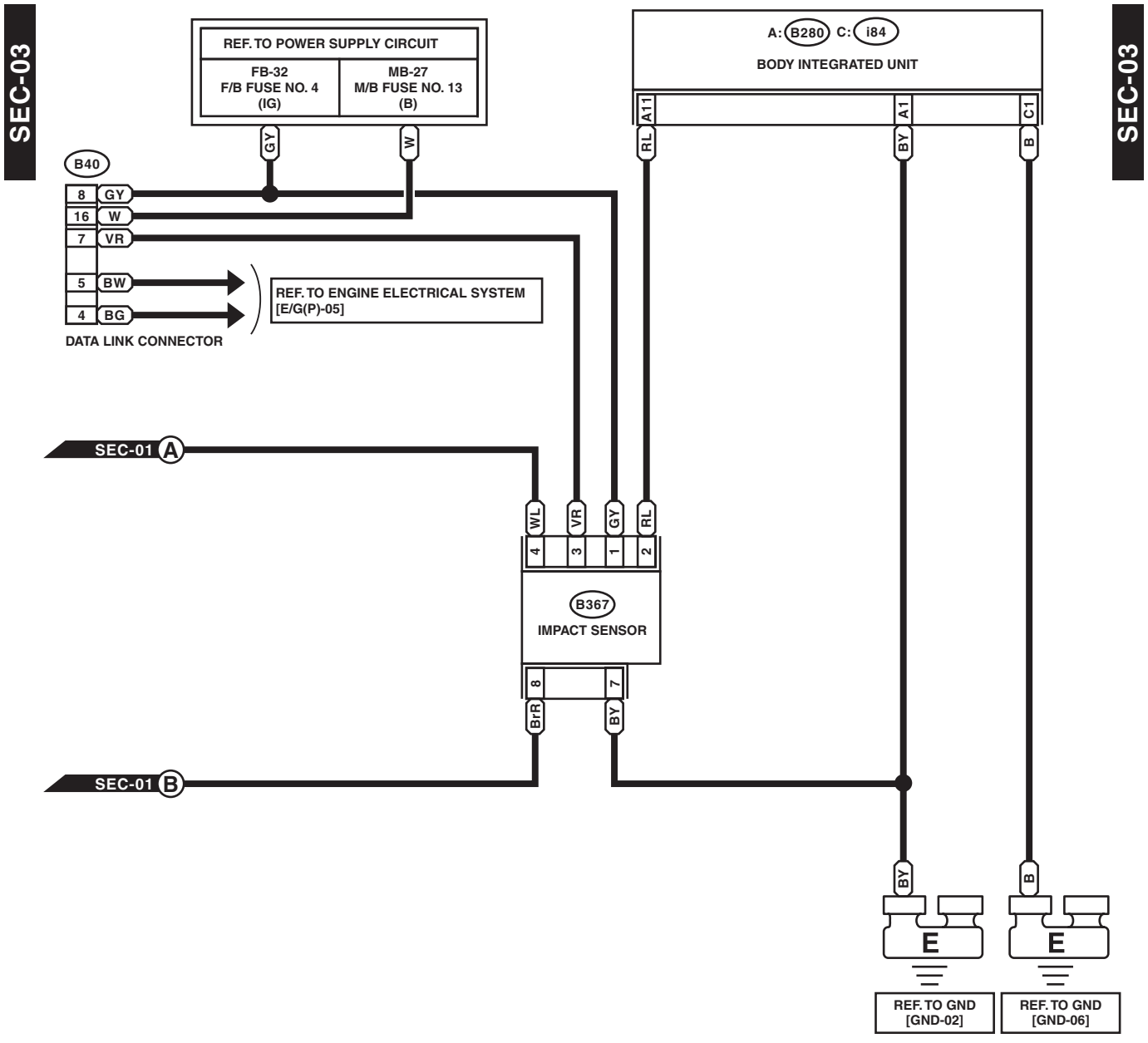
SEC-02

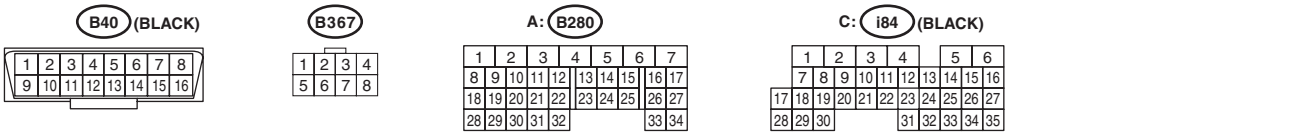




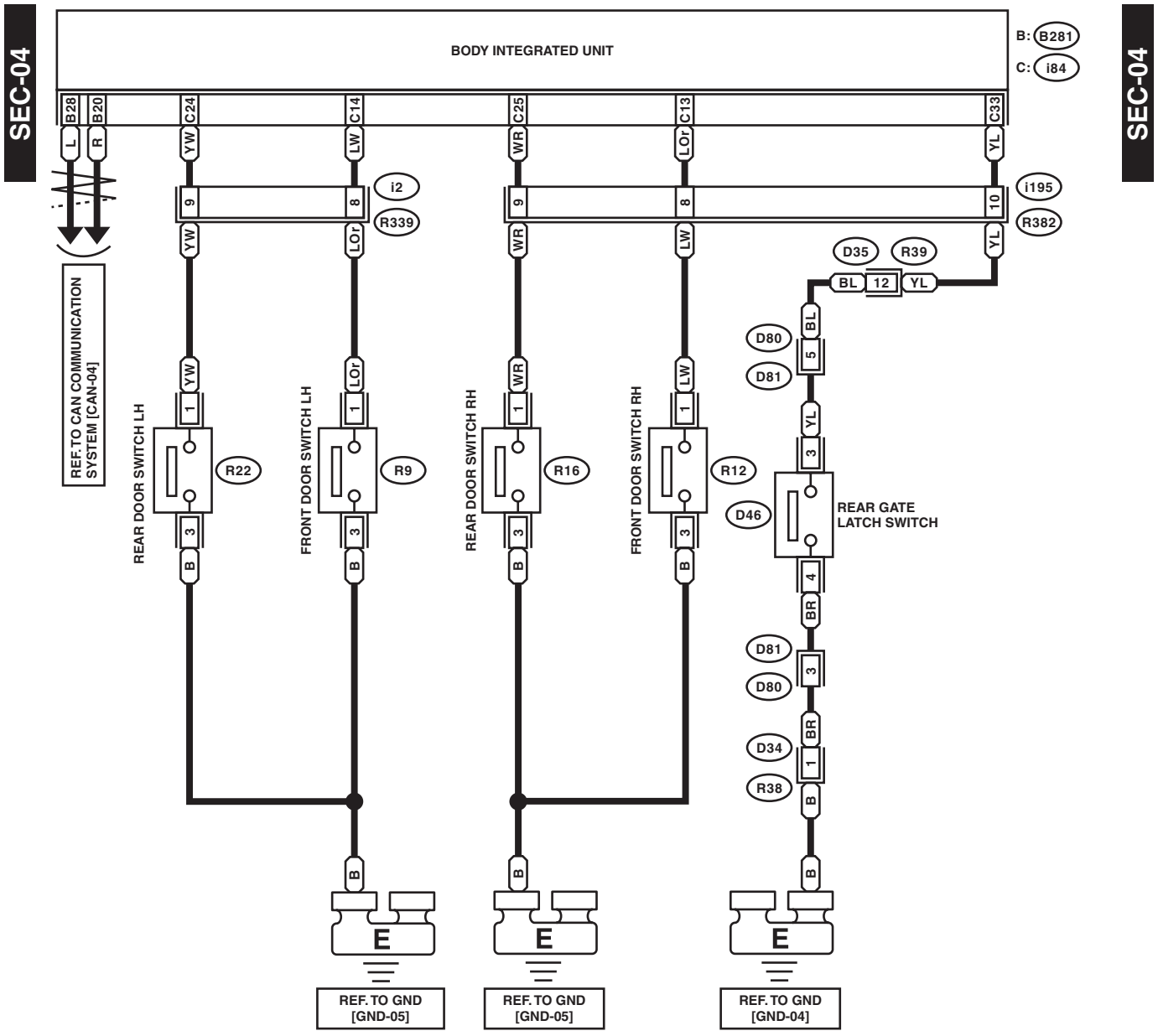
WI-61642

WIRING SYSTEM





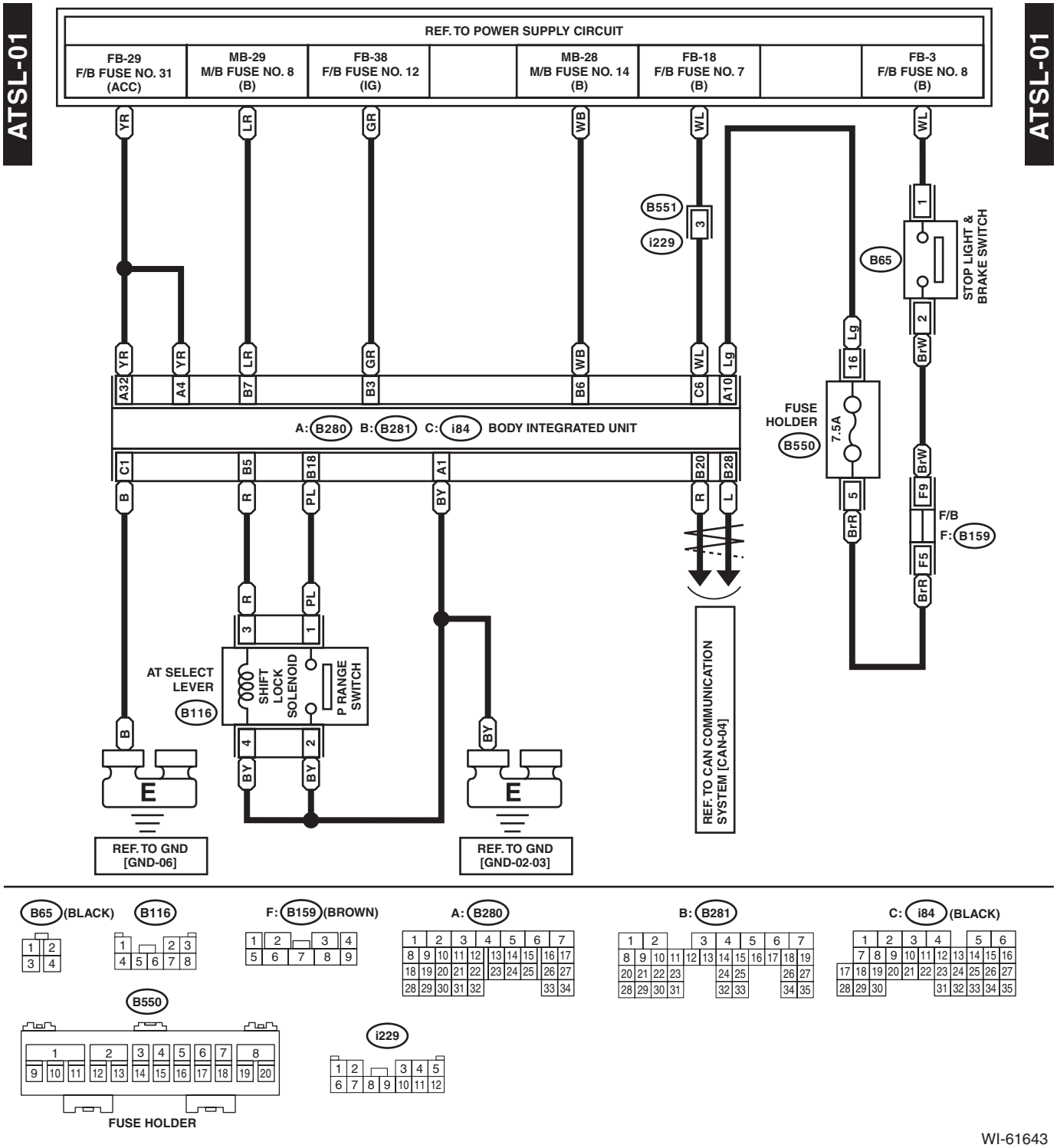
WI-61687


SEC-04
SEC-04
BODY INTEGRATED UNIT
B: B281
C: i84
B28
B20
C24
C14
C25
C13
C33
L
R
YW
LW
WR
LOr
YL
i2
R339
i195
R382
D35
R39
BL
12
YL
REF. TO CAN COMMUNICATION SYSTEM [CAN-04]
REAR DOOR SWITCH LH
FRONT DOOR SWITCH LH
REAR DOOR SWITCH RH
FRONT DOOR SWITCH RH
R22
R9
R16
R12
D80
D81
D46
REAR GATE LATCH SWITCH
D34
R38
REF. TO GND [GND-05]
REF. TO GND [GND-05]
REF. TO GND [GND-04]
R9
R16
R12
R22
D35 (GRAY)
D46
D34
D80
i2
i195
B: B281
C: i84 (BLACK)

WI-63040

49.Shift Lock Control System

A: WIRING DIAGRAM

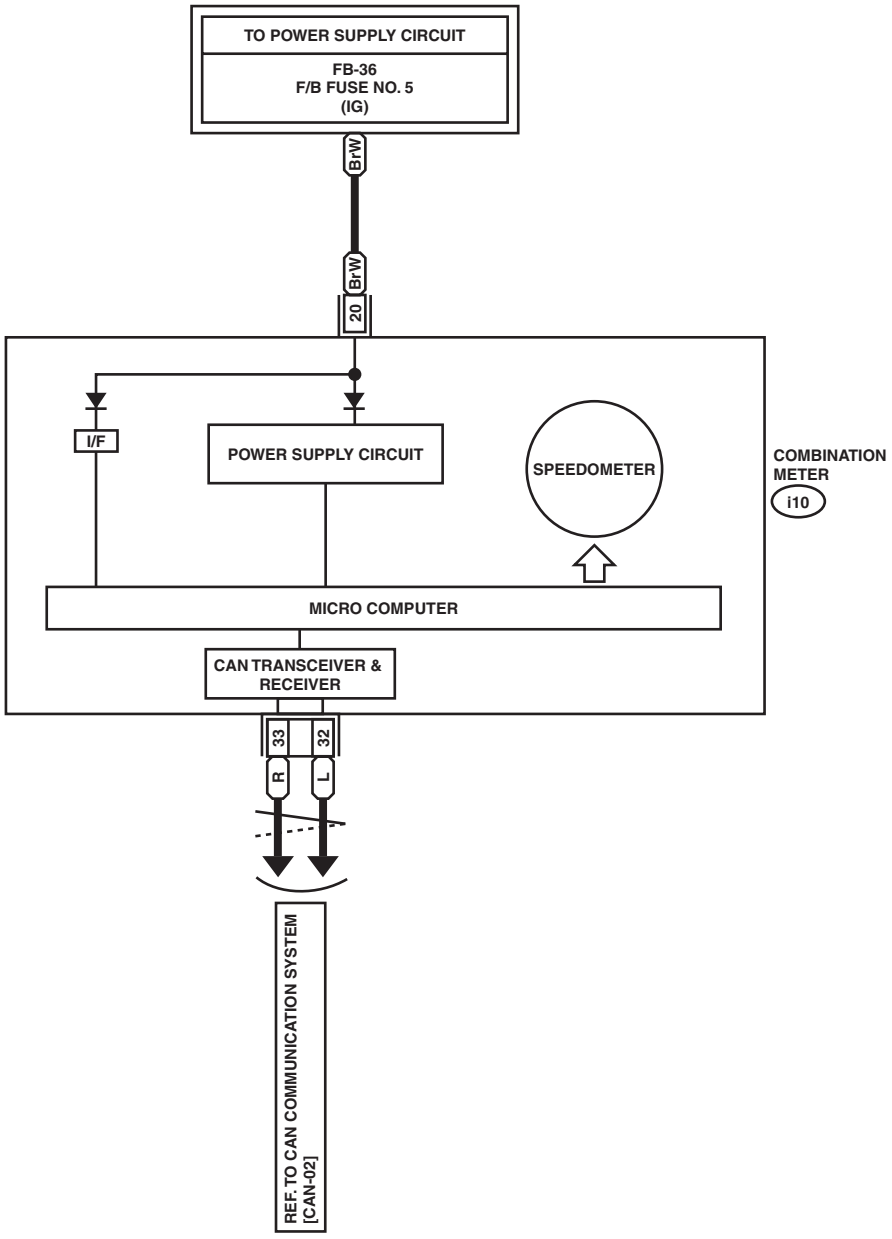


WI-61643

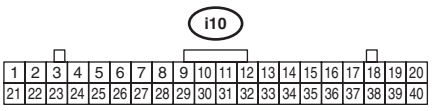
50.Speedometer System

A: WIRING DIAGRAM

SP-01



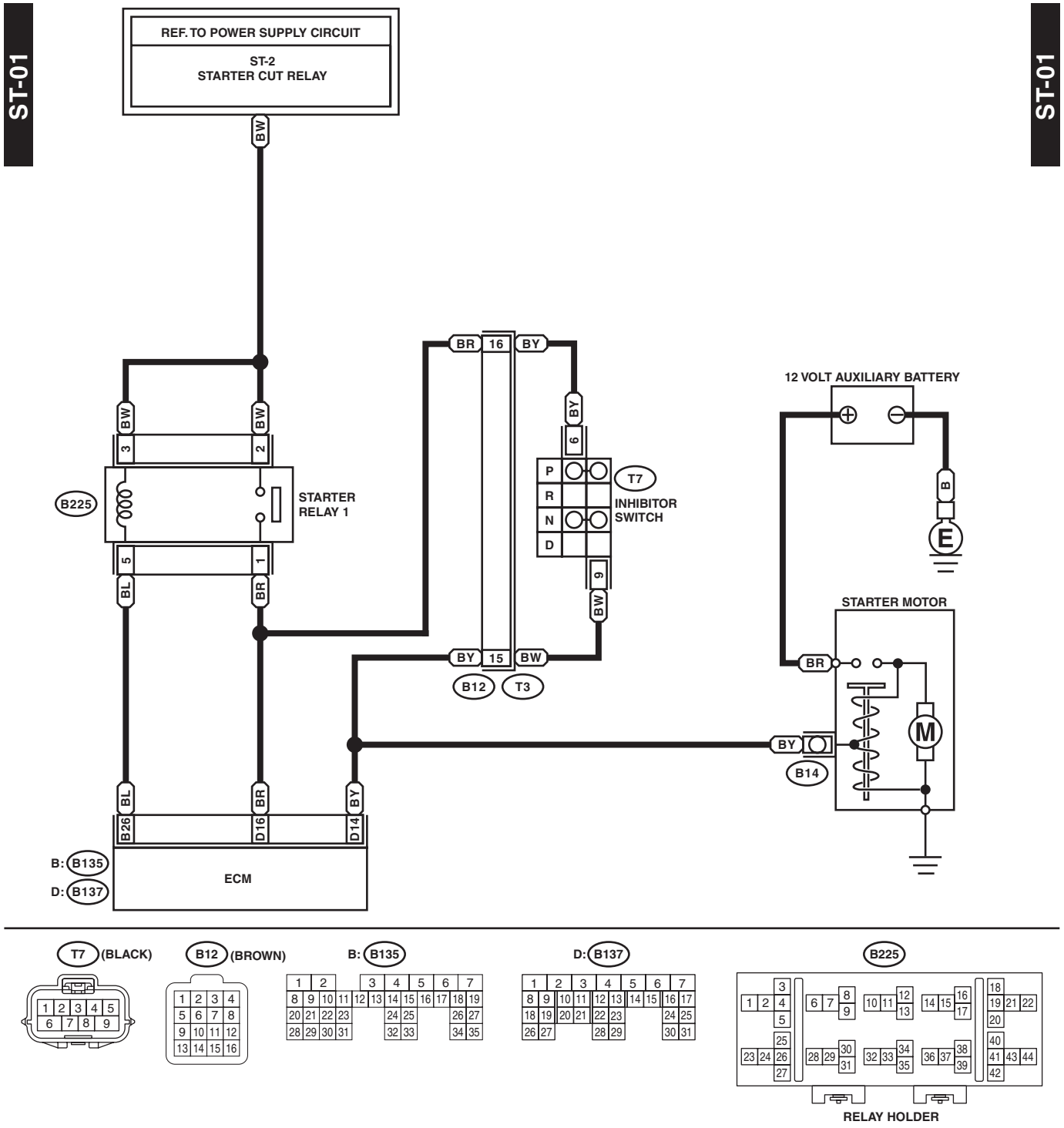
SP-01



WI-42275

51.Starter System

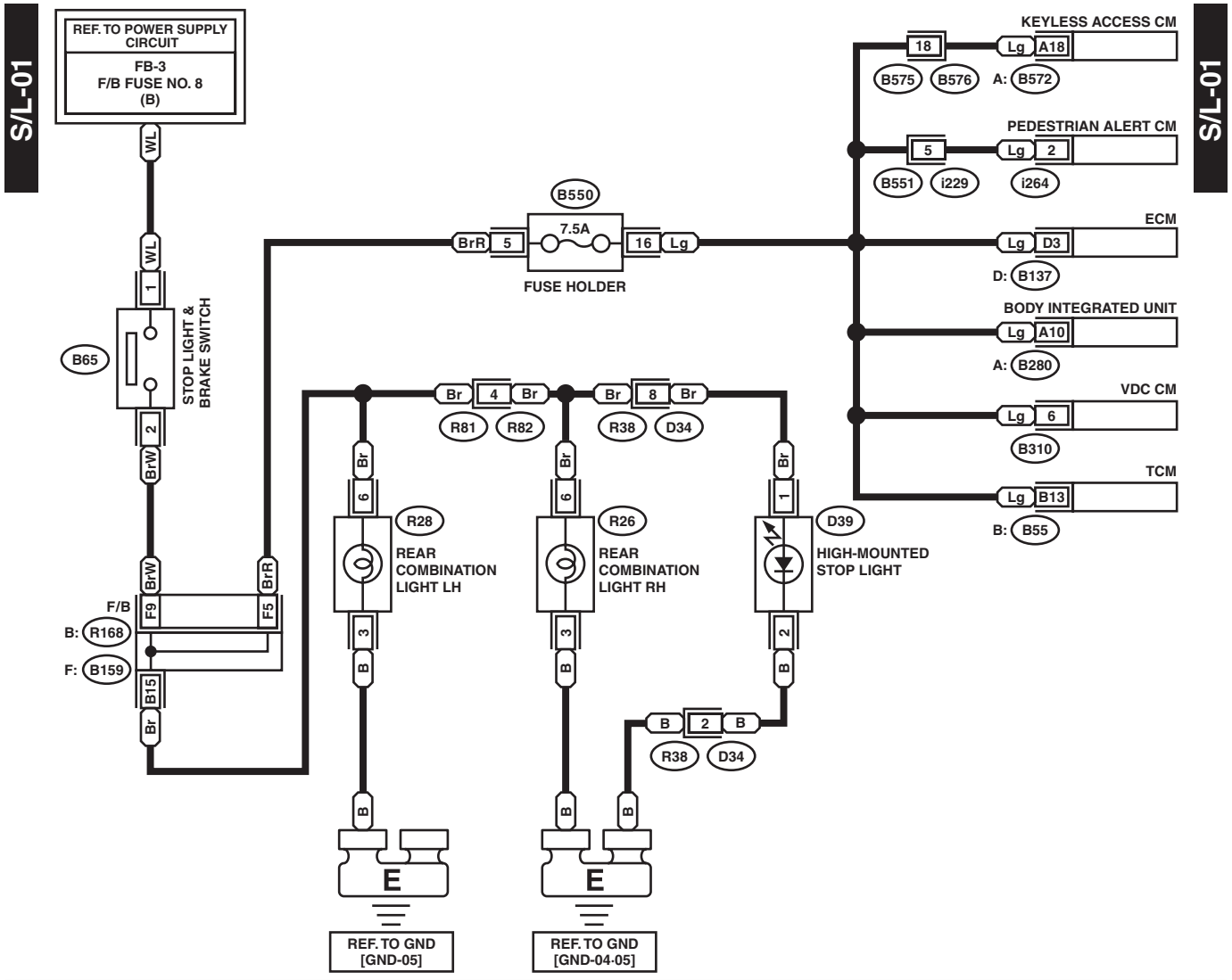
A: WIRING DIAGRAM

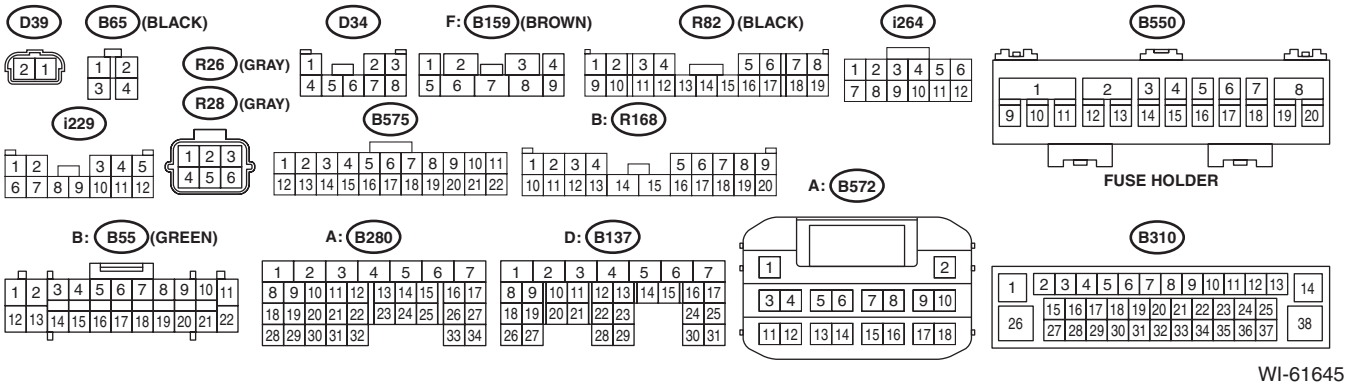


WI-61644

52.Stop Light System

A: WIRING DIAGRAM

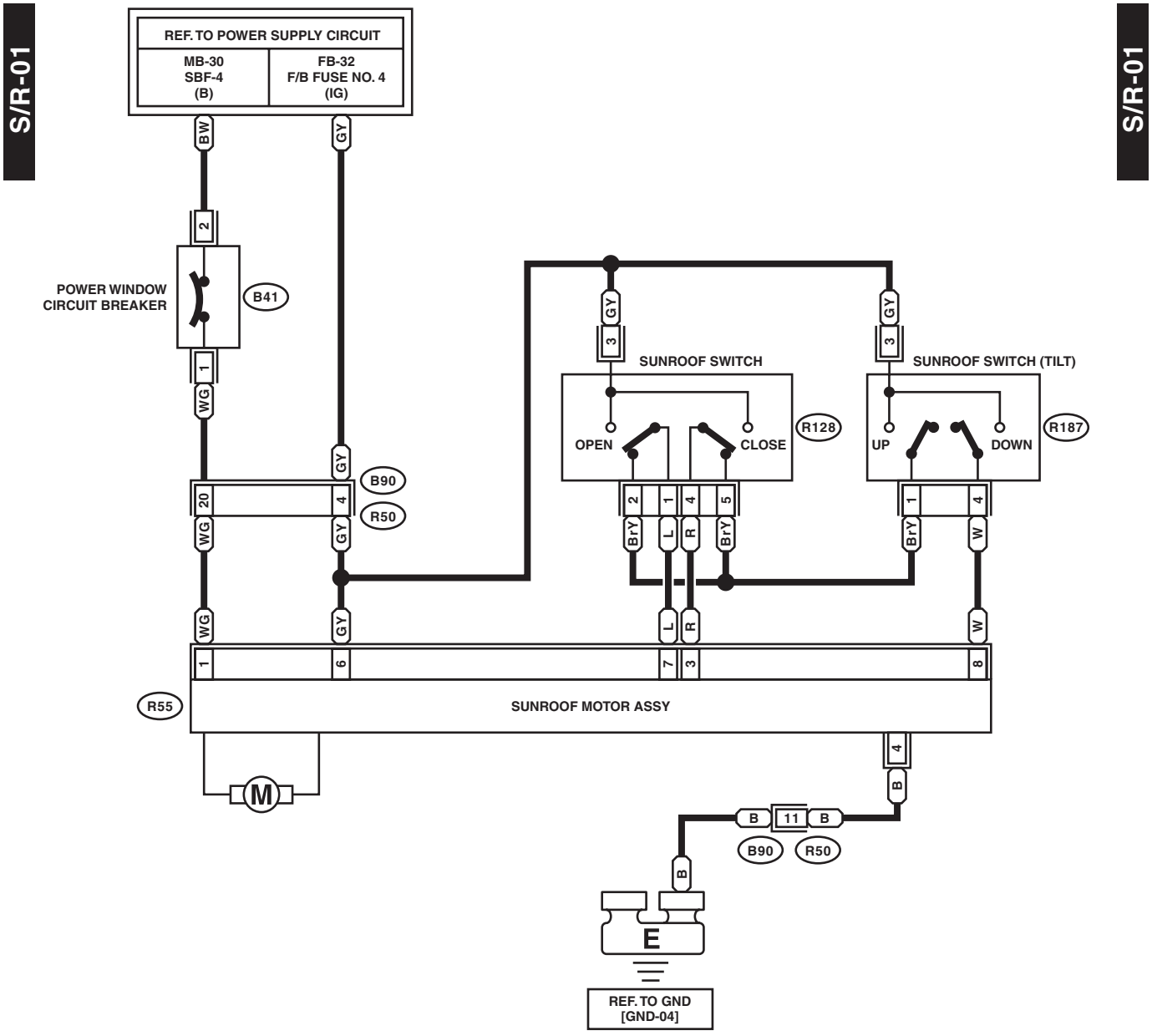


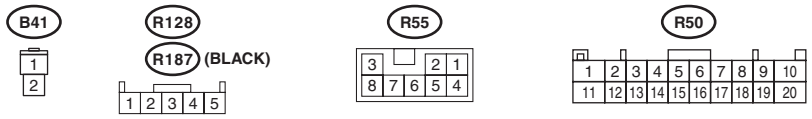


WI-61645

53.Sunroof Control System

A: WIRING DIAGRAM

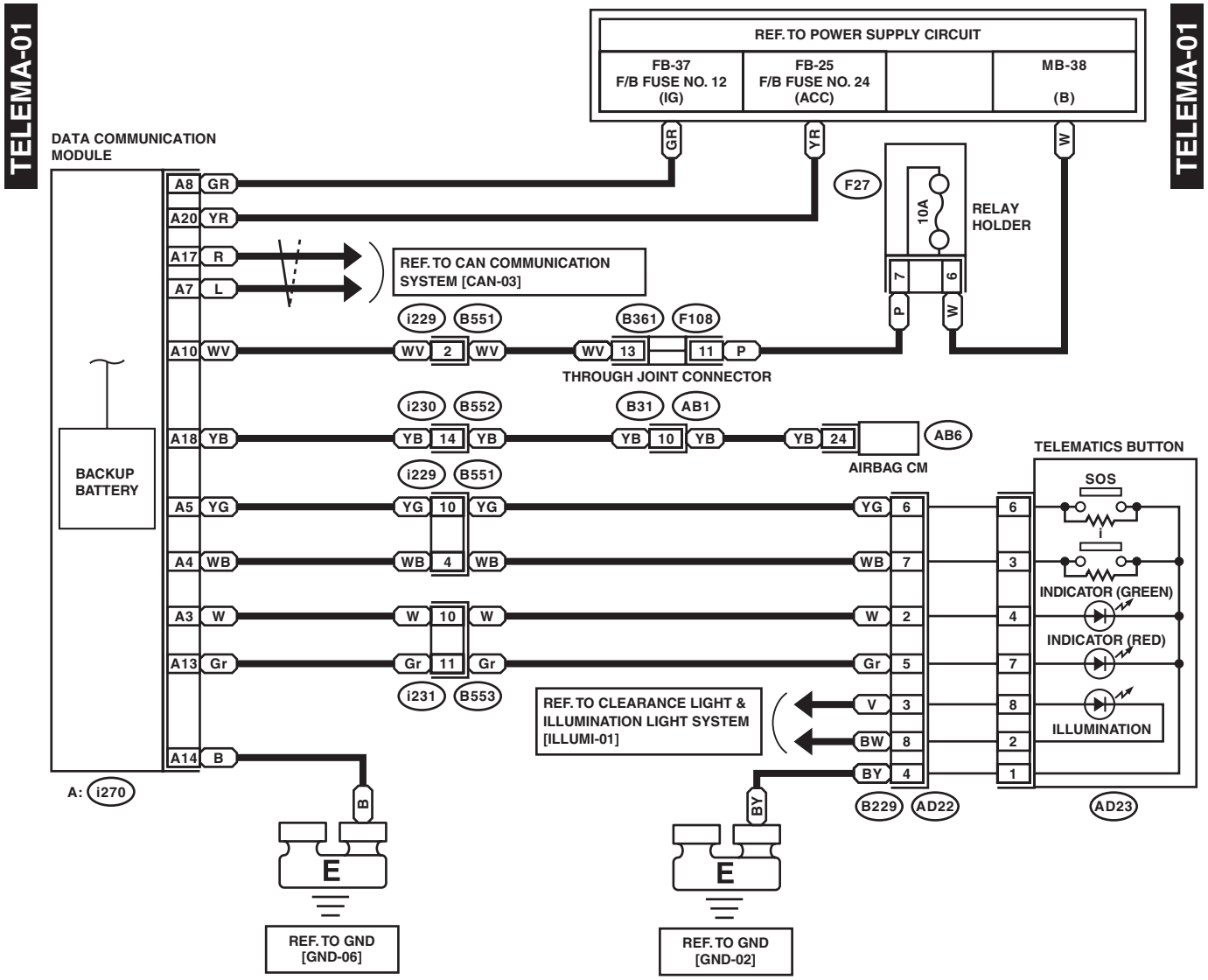


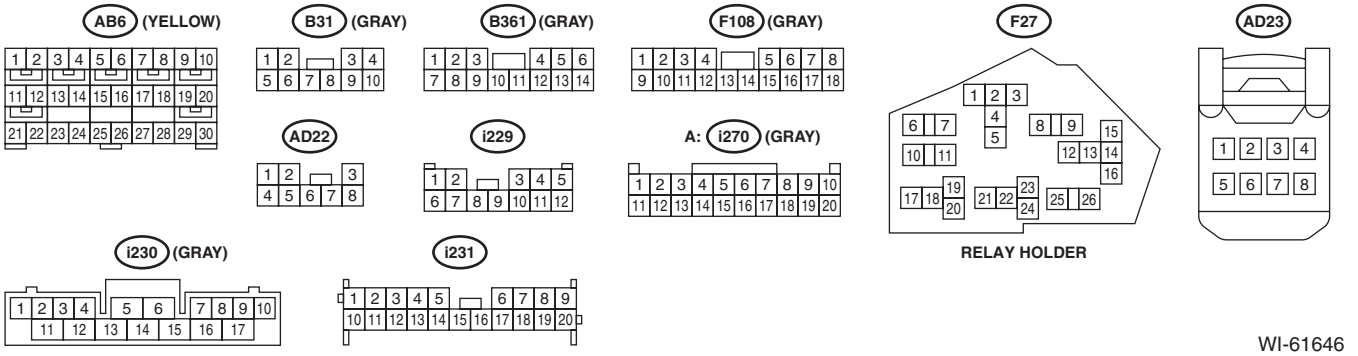


WI-48133

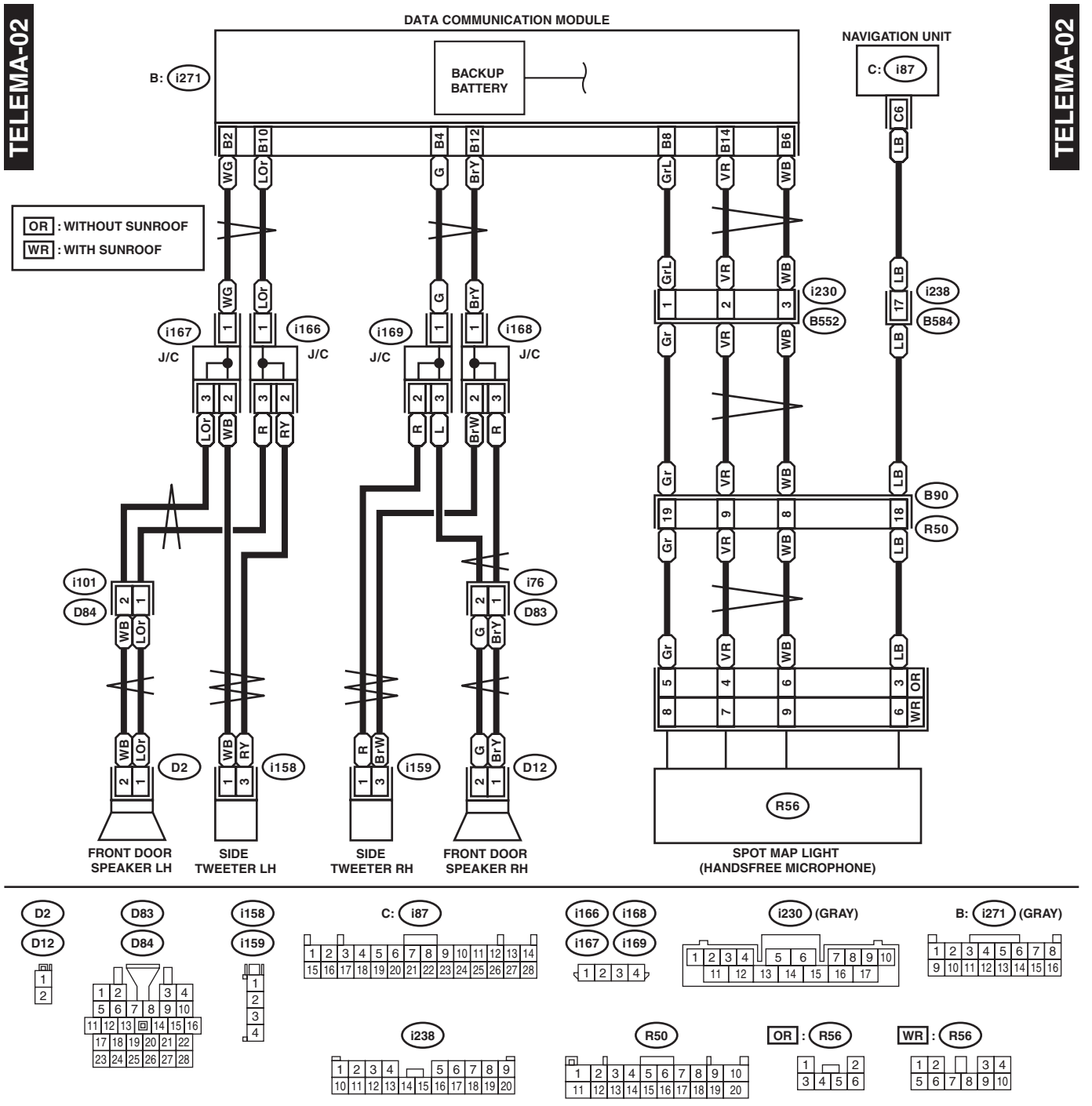
54.TELEMATICS SYSTEM

A: WIRING DIAGRAM





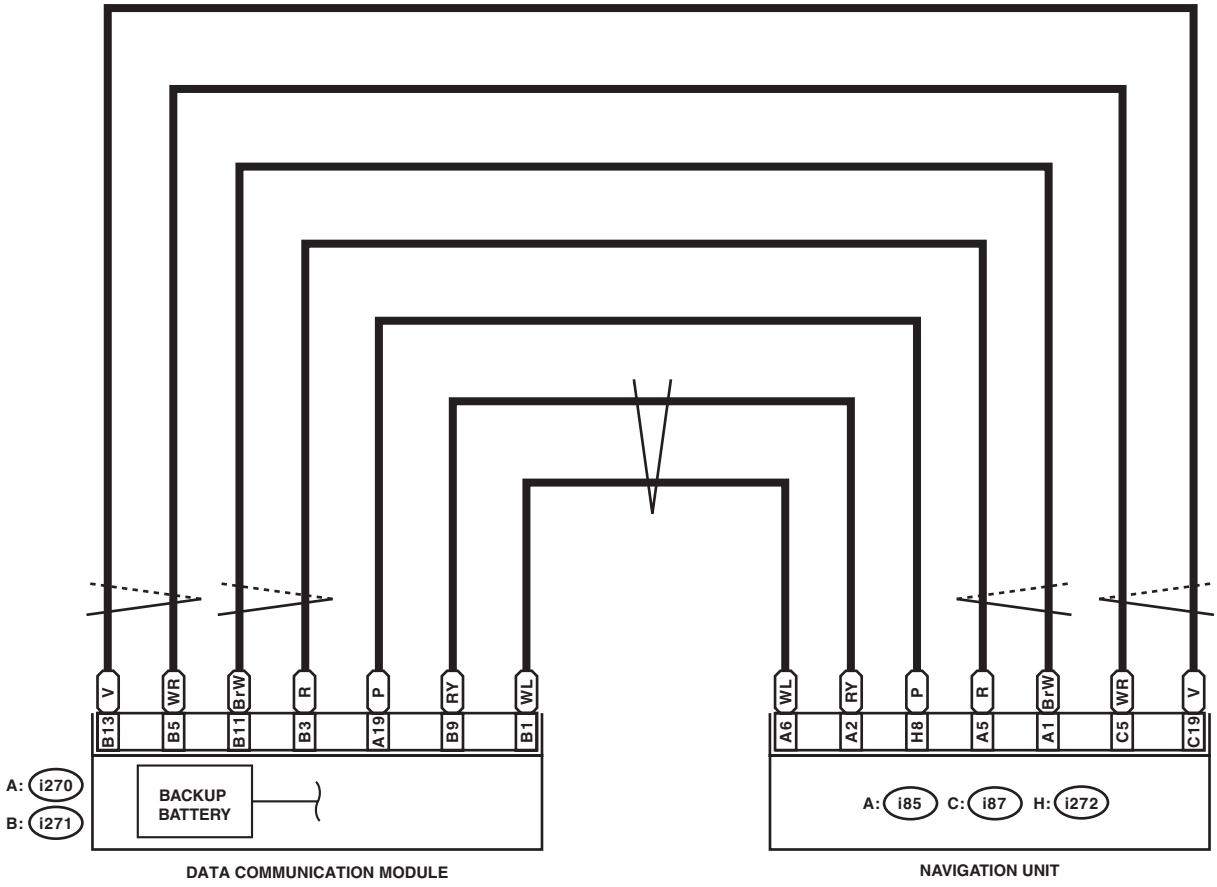
WI-61646

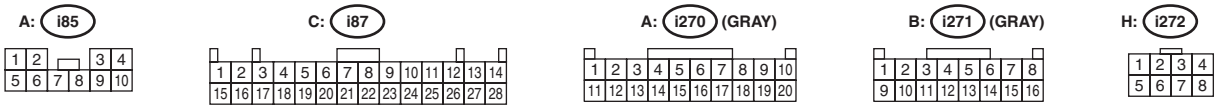

TELEMA-02
TELEMA-02
DATA COMMUNICATION MODULE
BACKUP BATTERY
B: i271
NAVIGATION UNIT
C: i87
OR : WITHOUT SUNROOF
WR : WITH SUNROOF
i167
J/C
i166
J/C
i169
J/C
i168
J/C
i230
B552
i238
B584
B90
R50
i101
D84
i76
D83
D2
i158
i159
D12
R56
FRONT DOOR SPEAKER LH
SIDE TWEETER LH
SIDE TWEETER RH
FRONT DOOR SPEAKER RH
SPOT MAP LIGHT (HANDSFREE MICROPHONE)
(GRAY)
(GRAY)

WI-61647

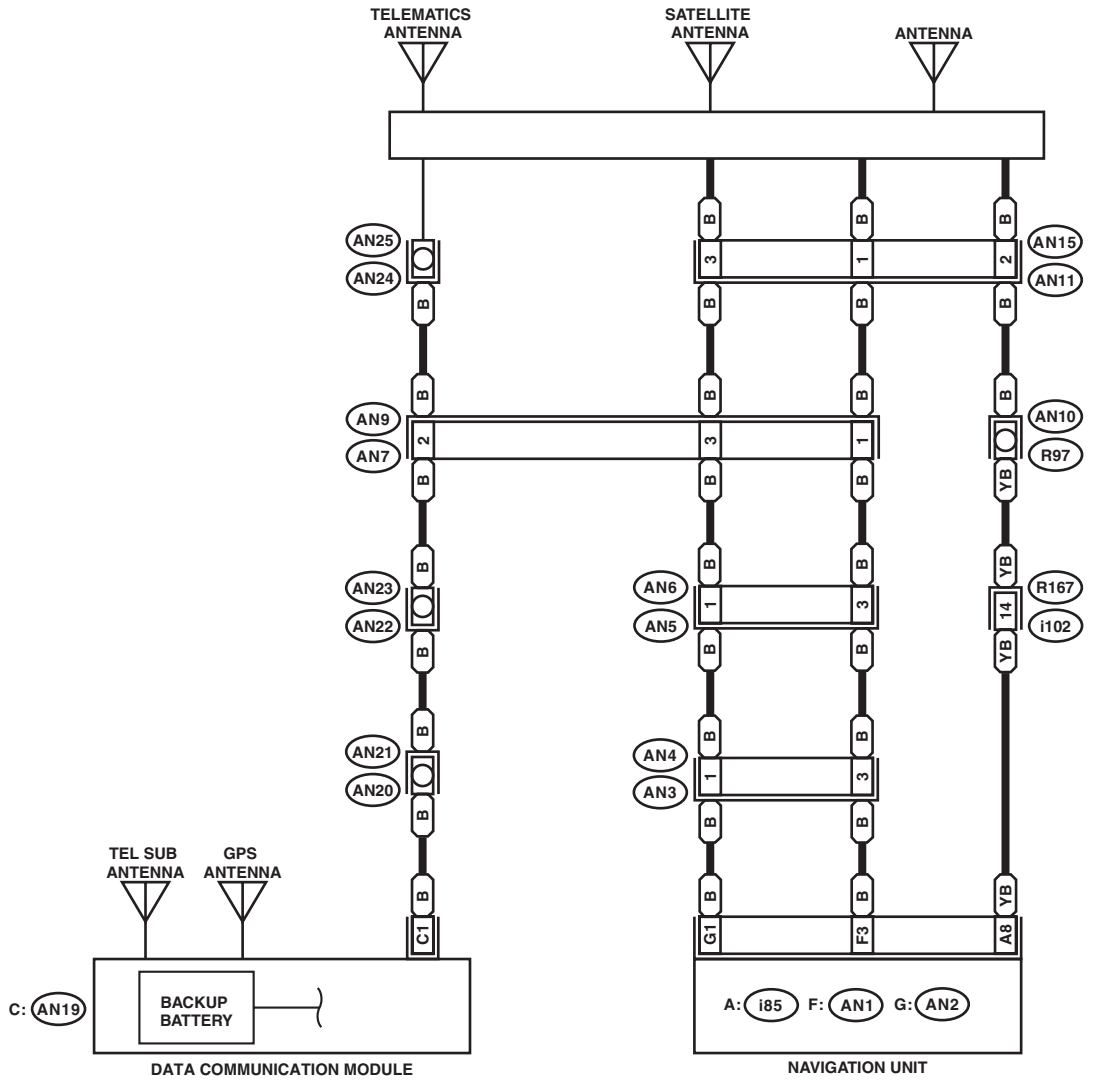
TELEMA-03

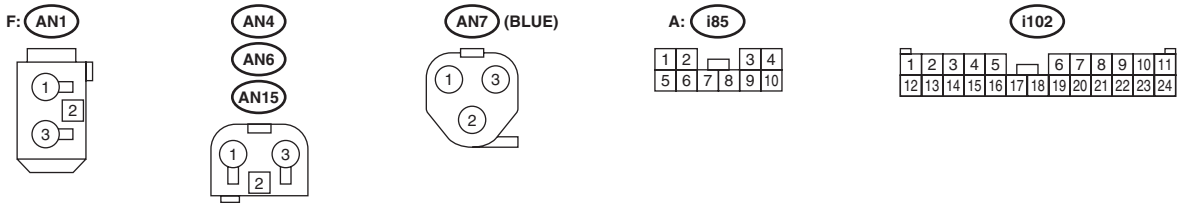
TELEMA-03





WI-61648

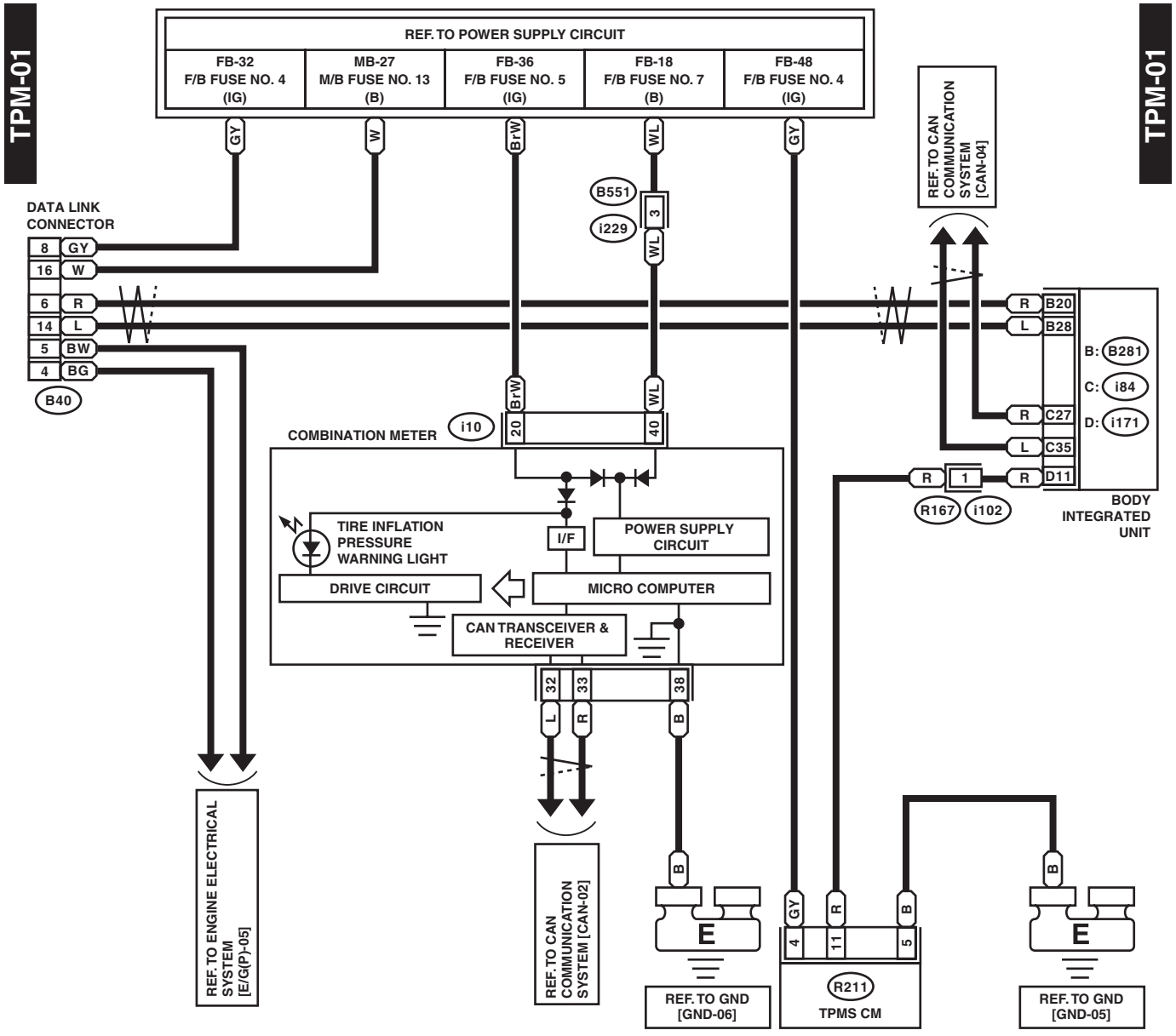

TELEMATICS ANTENNA
SATELLITE ANTENNA
ANTENNA
AN25
AN24
AN15
AN11
AN9
AN7
AN10
R97
AN23
AN22
AN6
AN5
R167
i102
AN21
AN20
AN4
AN3
TEL SUB ANTENNA
GPS ANTENNA
C1
G1
F3
A8
C: AN19
BACKUP BATTERY
A: i85
F: AN1
G: AN2
DATA COMMUNICATION MODULE
NAVIGATION UNIT

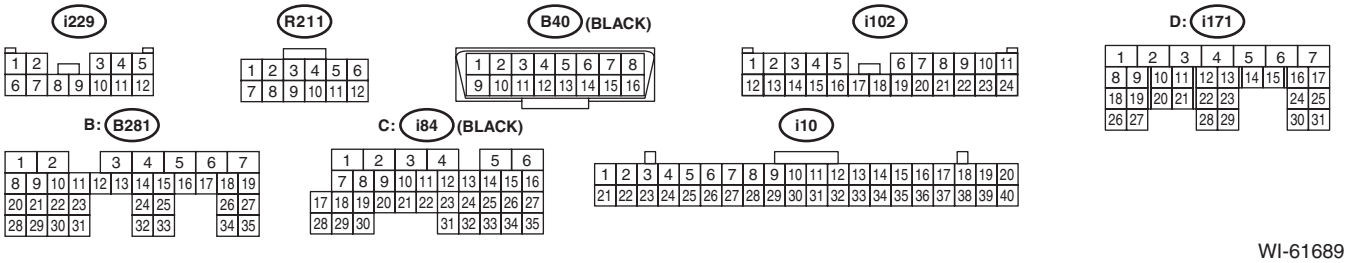

F: AN1
AN4
AN6
AN15
AN7 (BLUE)
A: i85
i102

WI-61688

55.Tire Pressure Monitoring System

A: WIRING DIAGRAM

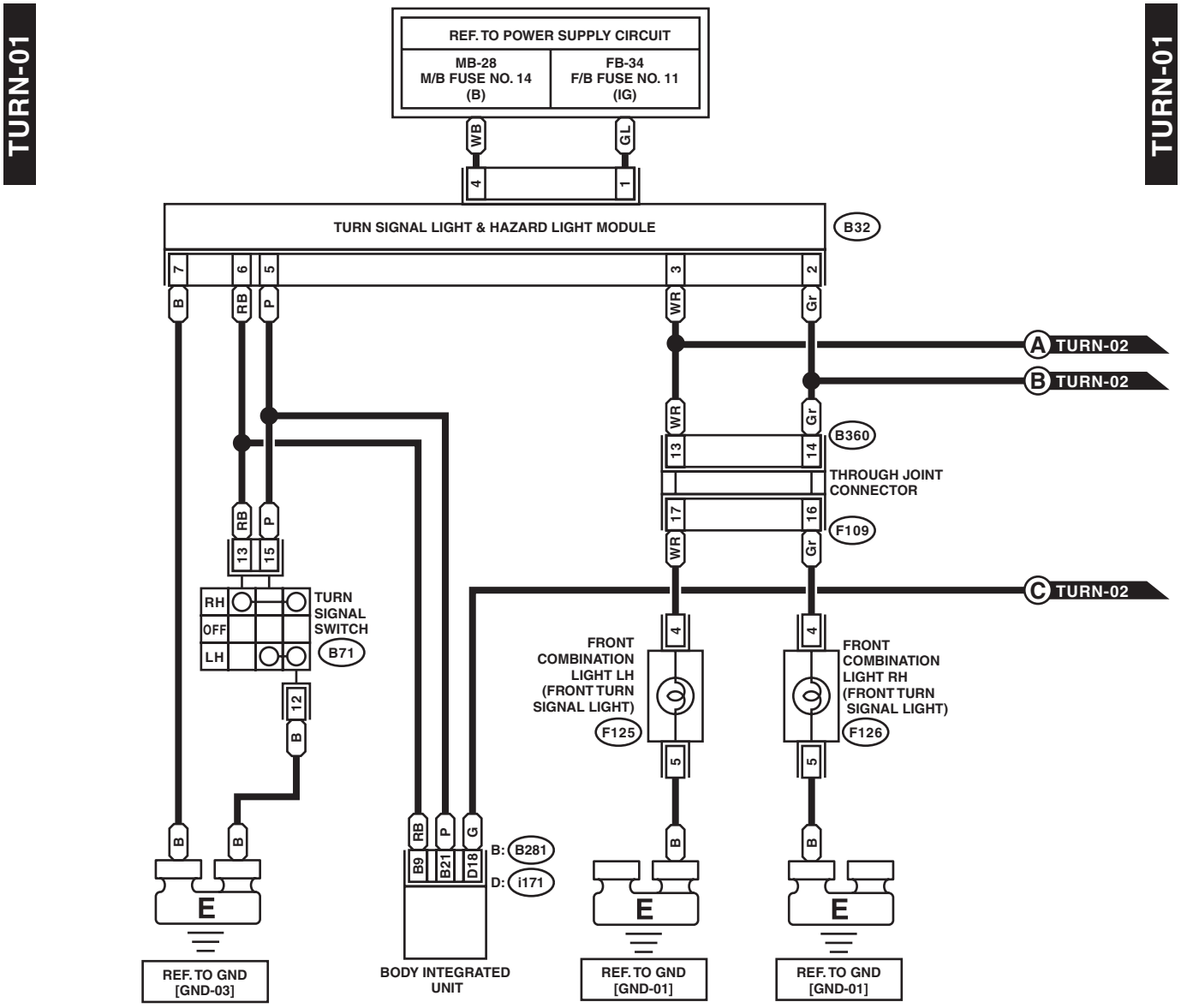


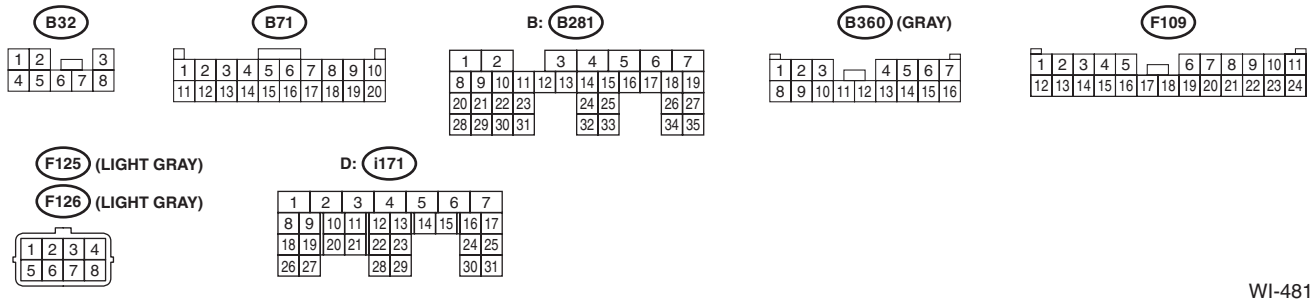


WI-61689

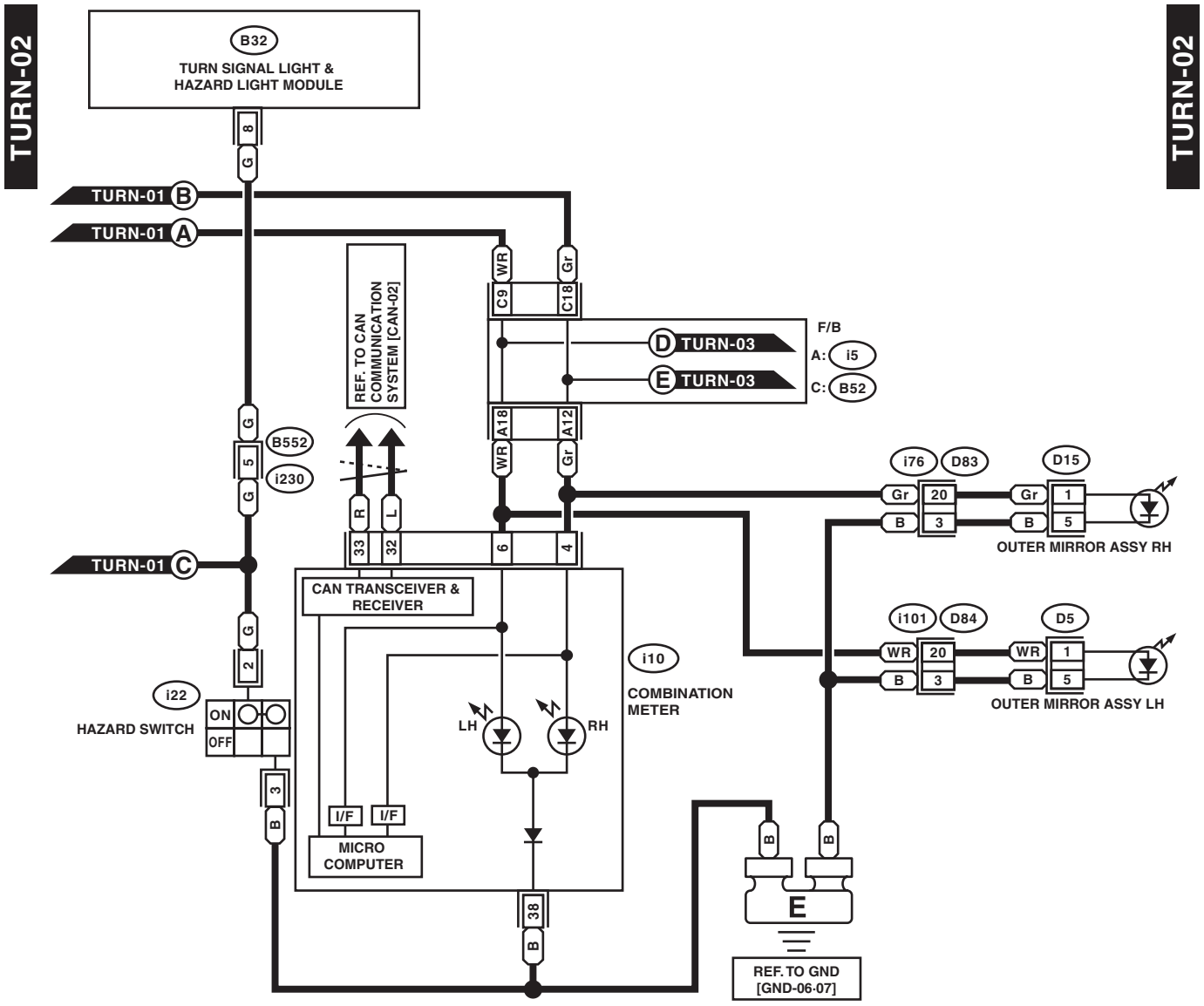
56.Turn Signal Light and Hazard Light System

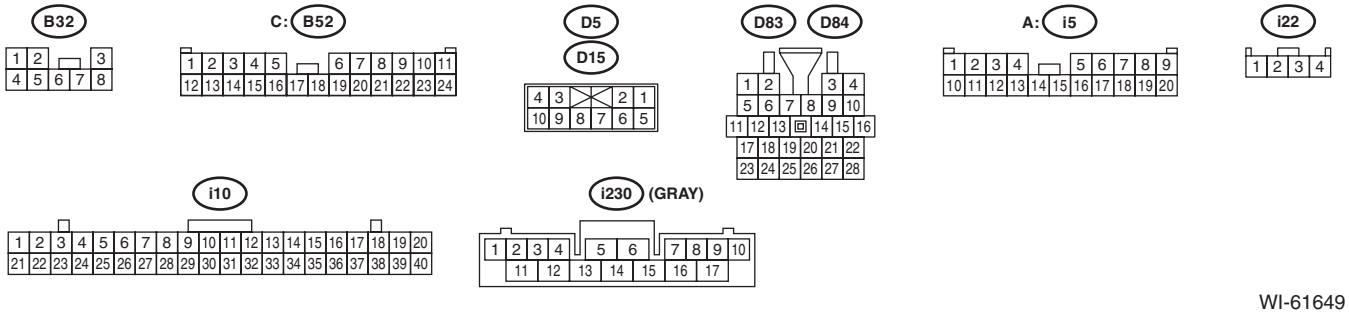
A: WIRING DIAGRAM





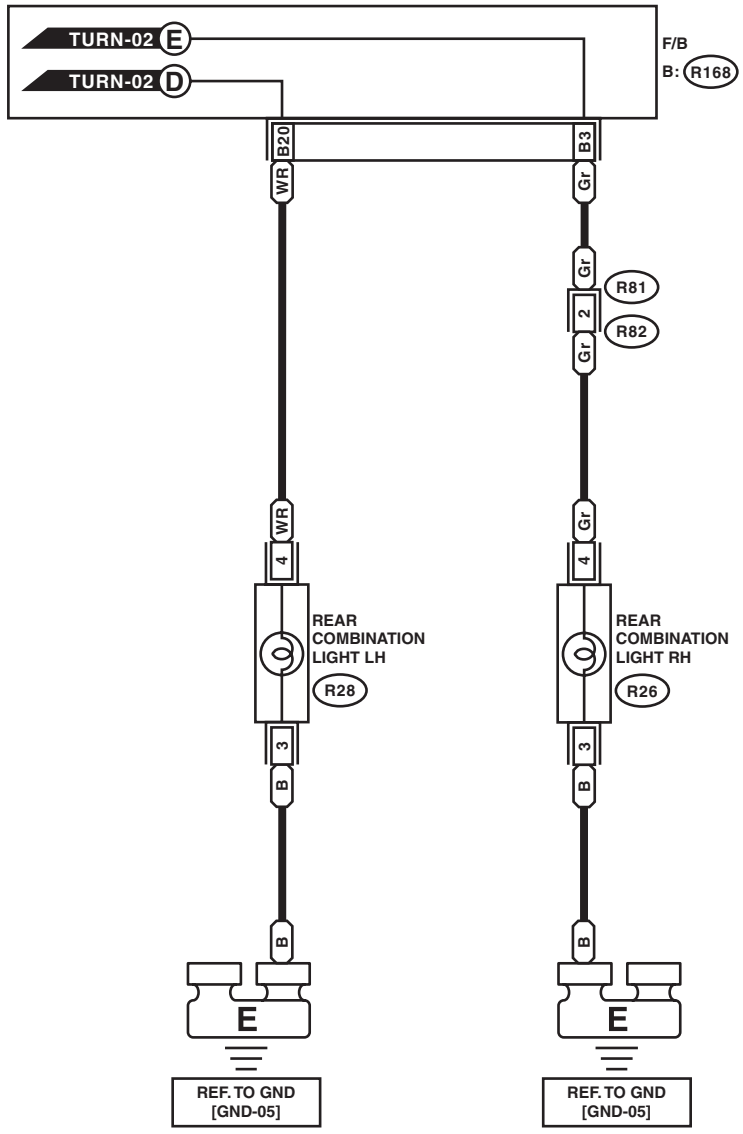
WI-48135


TURN-02
TURN-02
B32
TURN SIGNAL LIGHT & HAZARD LIGHT MODULE
TURN-01 B
TURN-01 A
TURN-01 C
REF. TO CAN COMMUNICATION SYSTEM [CAN-02]
D TURN-03
E TURN-03
F/B
A: i5
C: B52
B552
i230
i76
D83
D15
OUTER MIRROR ASSY RH
i101
D84
D5
OUTER MIRROR ASSY LH
CAN TRANSCEIVER & RECEIVER
i10
COMBINATION METER
i22
HAZARD SWITCH
ON
OFF
LH
RH
I/F
I/F
MICRO COMPUTER
E
REF. TO GND [GND-06·07]

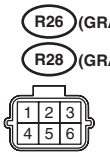

B32
C: B52
D5
D15
D83
D84
A: i5
i22
i10
i230 (GRAY)

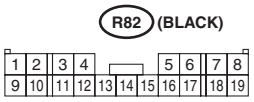
WI-61649

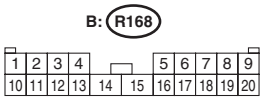
TURN-03



TURN-03



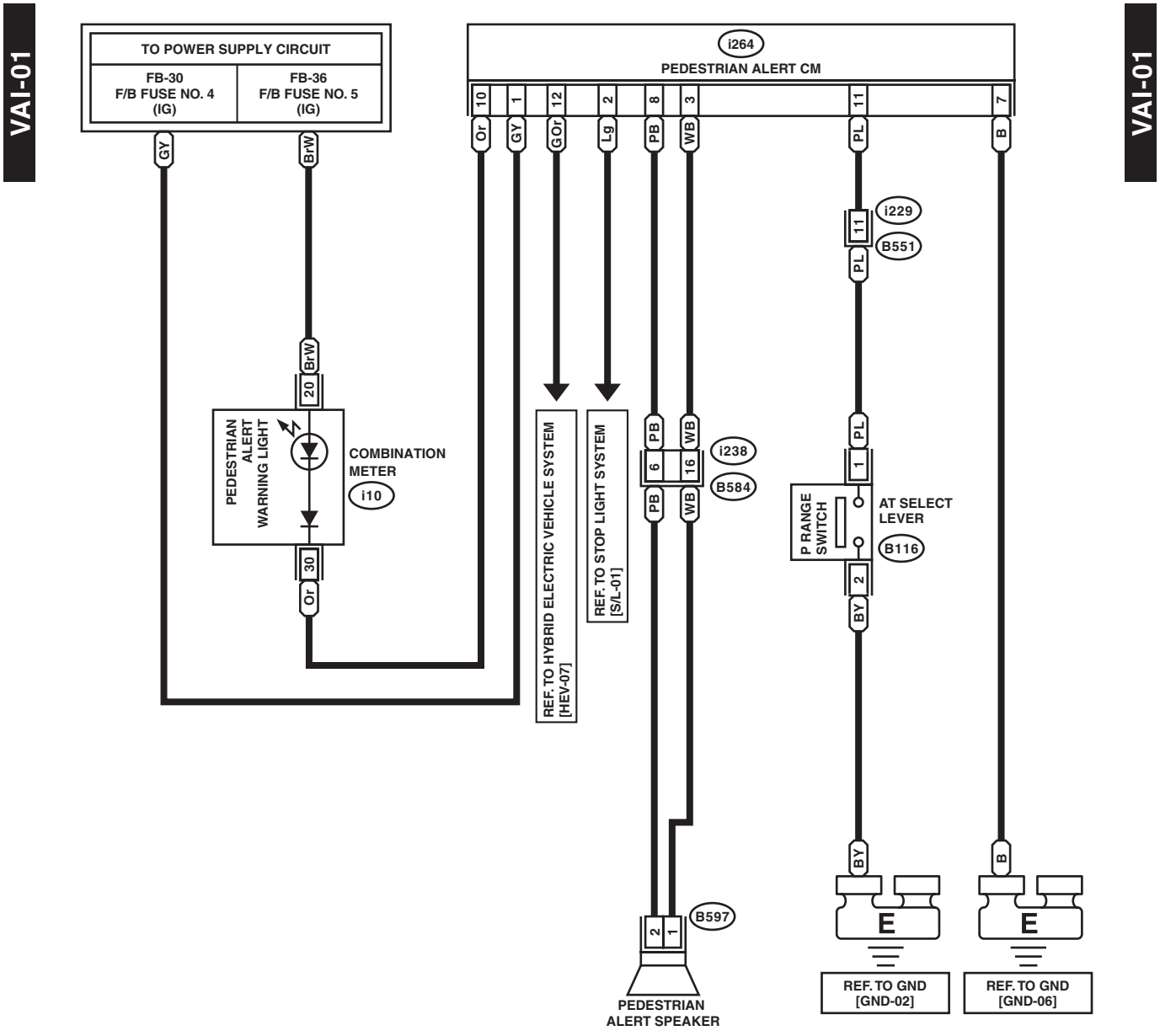


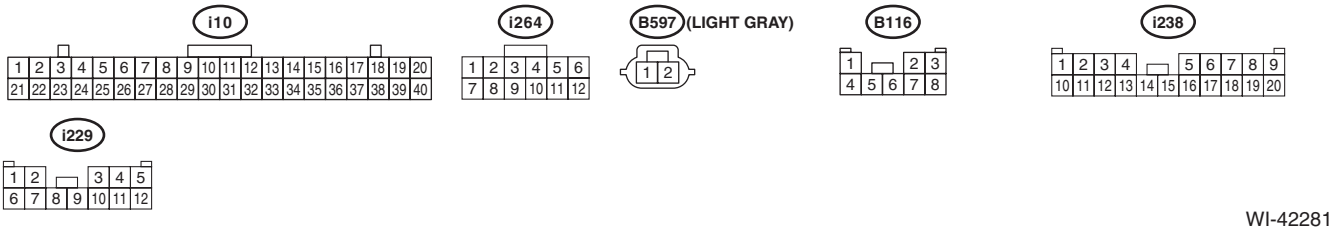


WI-48137

57.Pedestrian Alert System

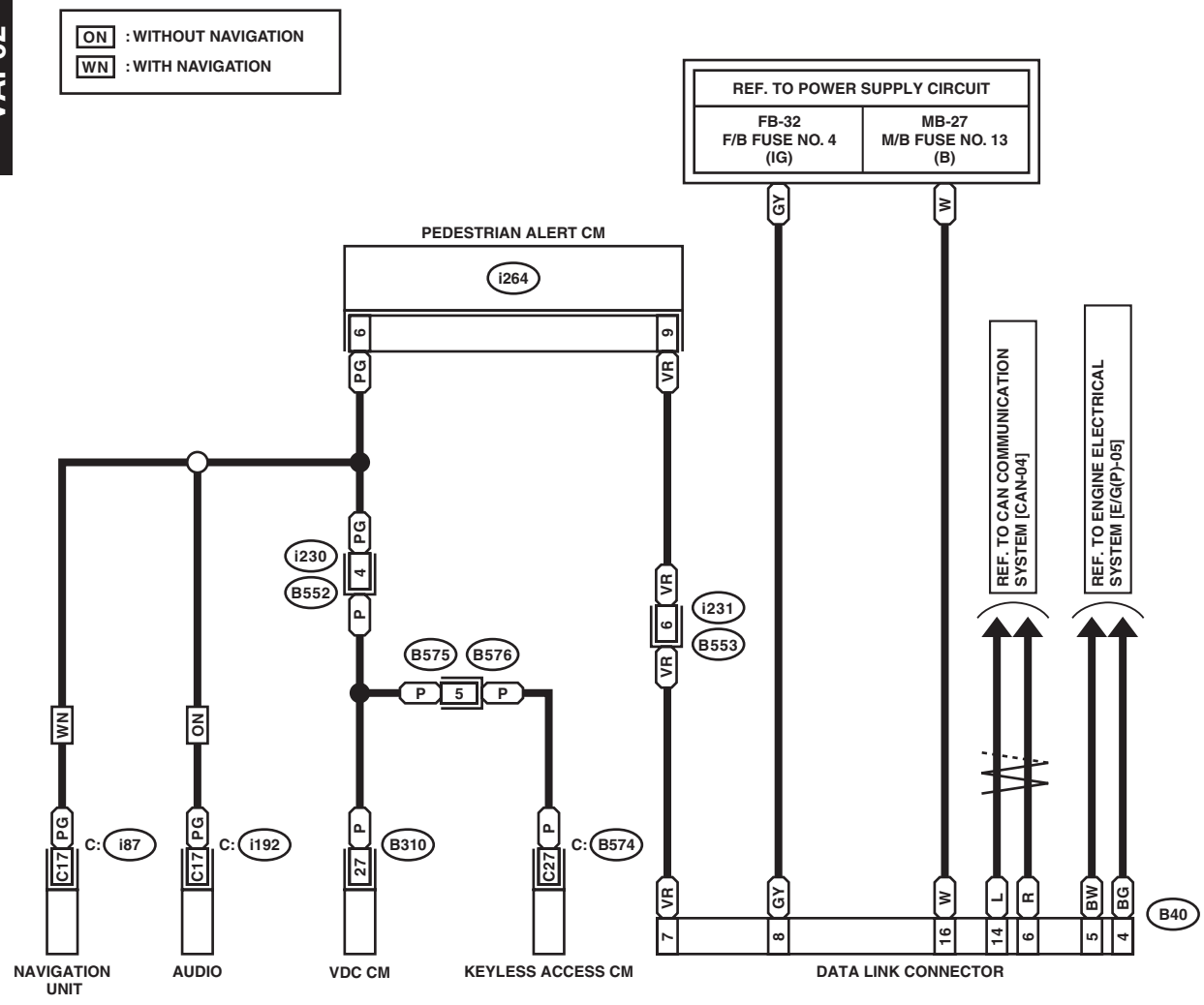
A: WIRING DIAGRAM

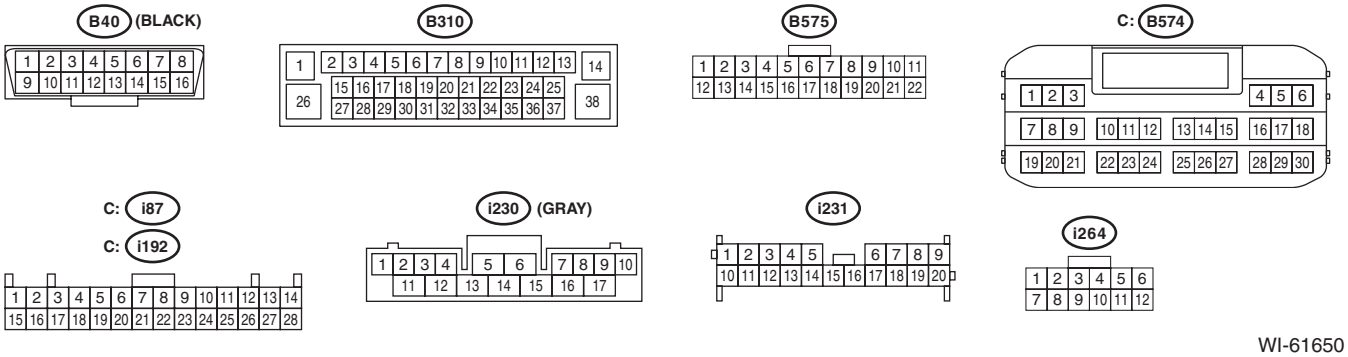




WI-42281

VAI-02

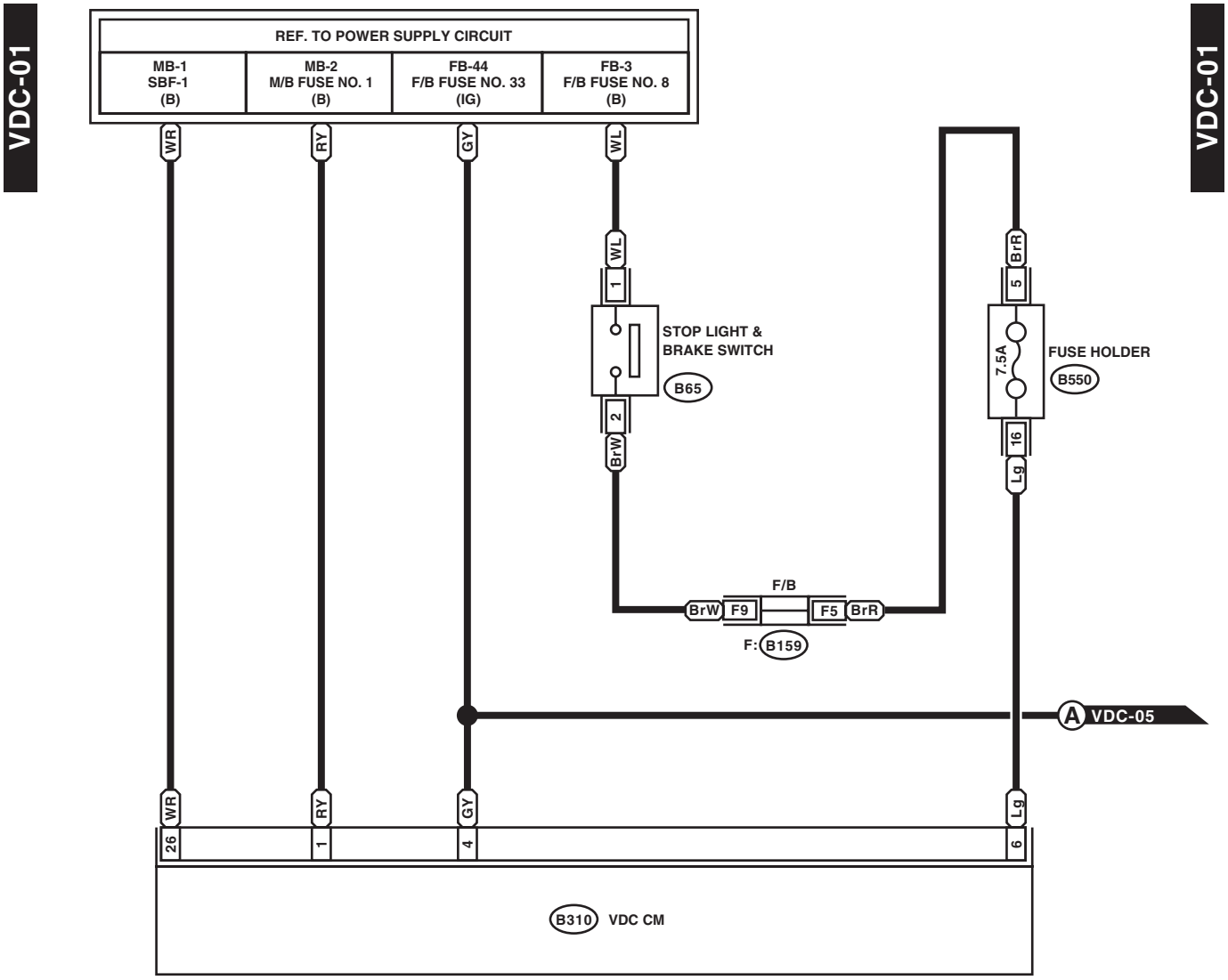


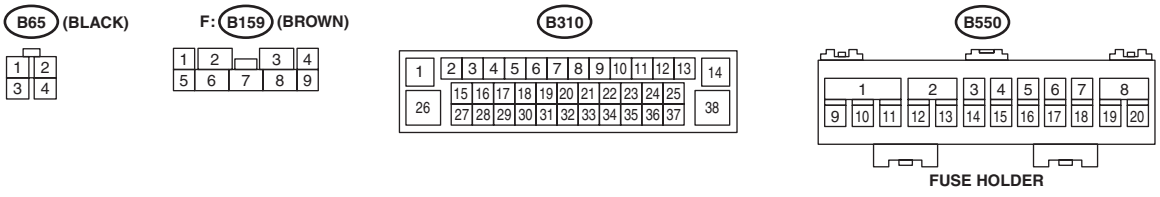


WI-61650

58.Vehicle Dynamics Control System

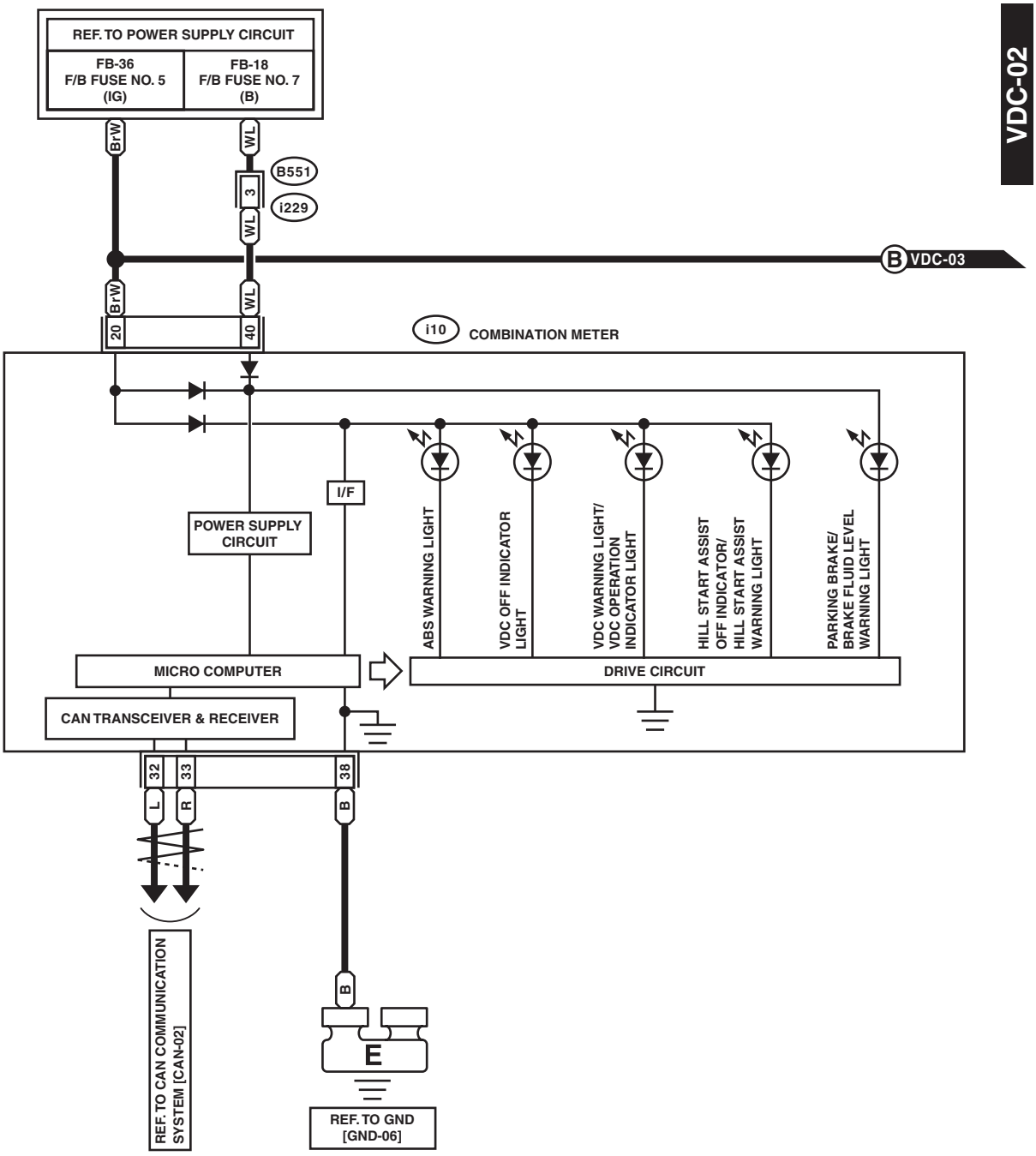
A: WIRING DIAGRAM

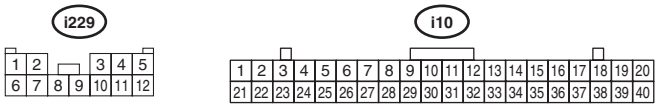




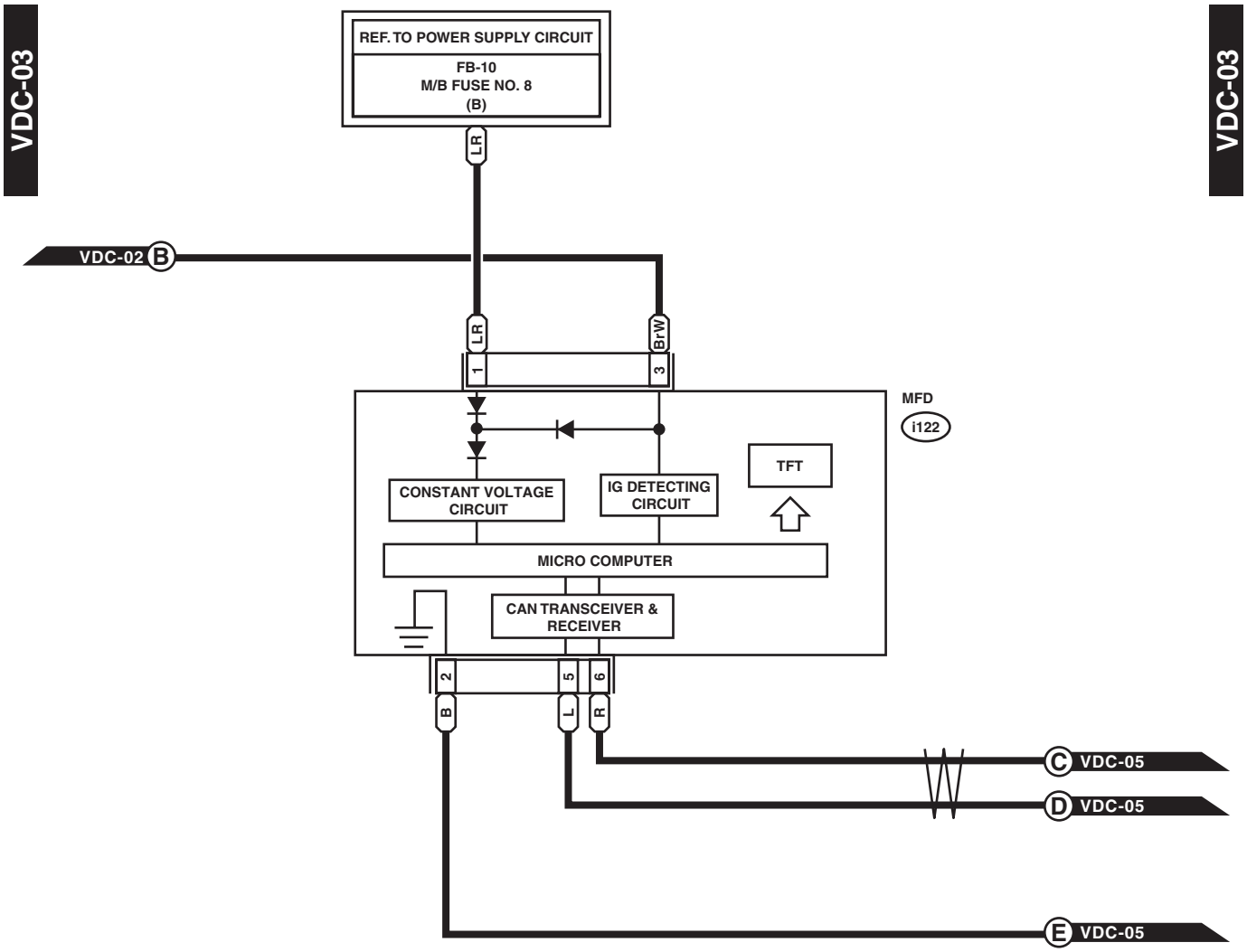
WI-48150

VDC-02





WI-63042

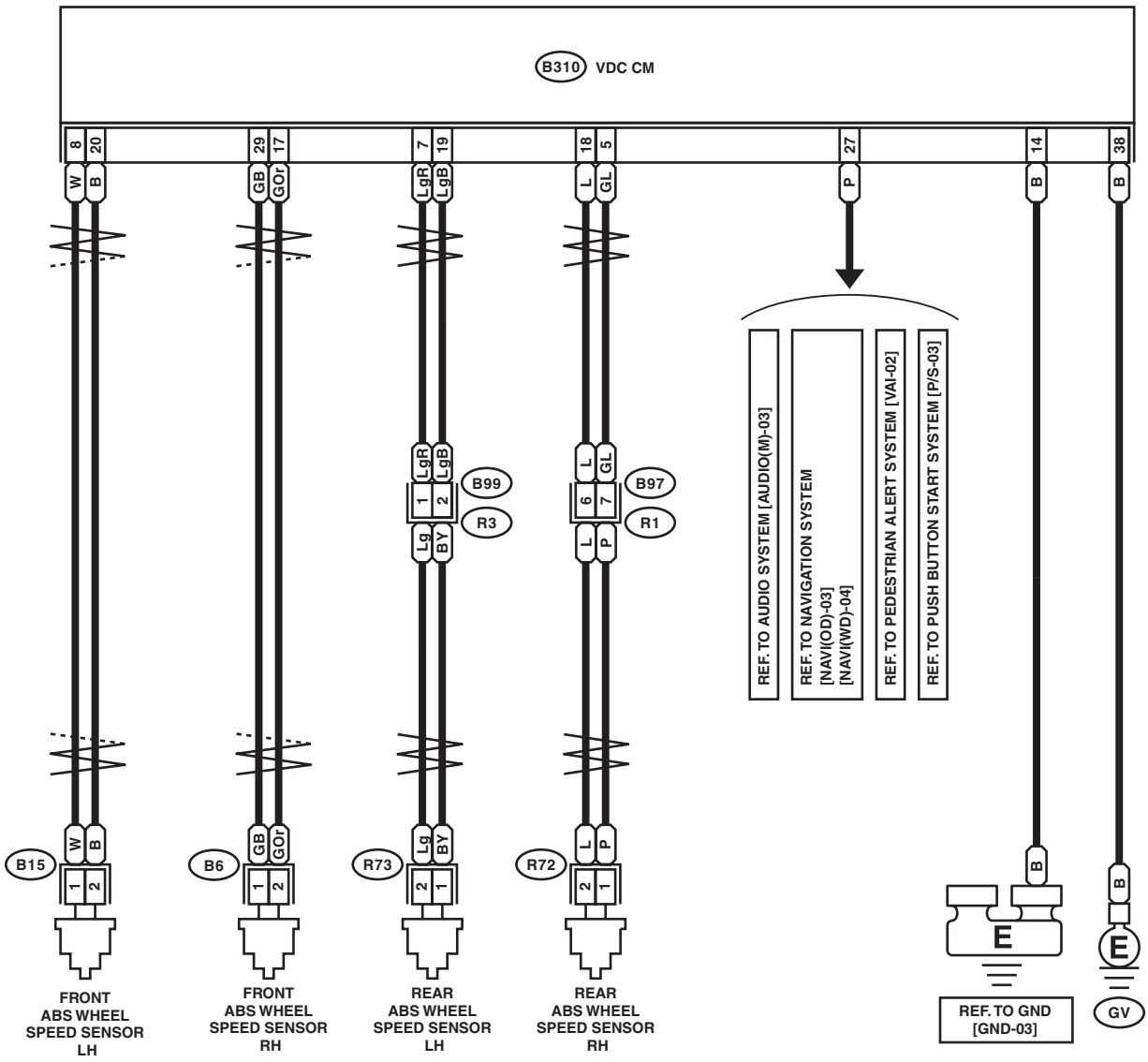


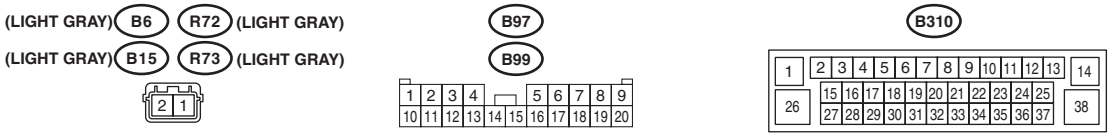
i122 (BLACK)

1	2	3	4	5	6
7	8	9	10	11	12

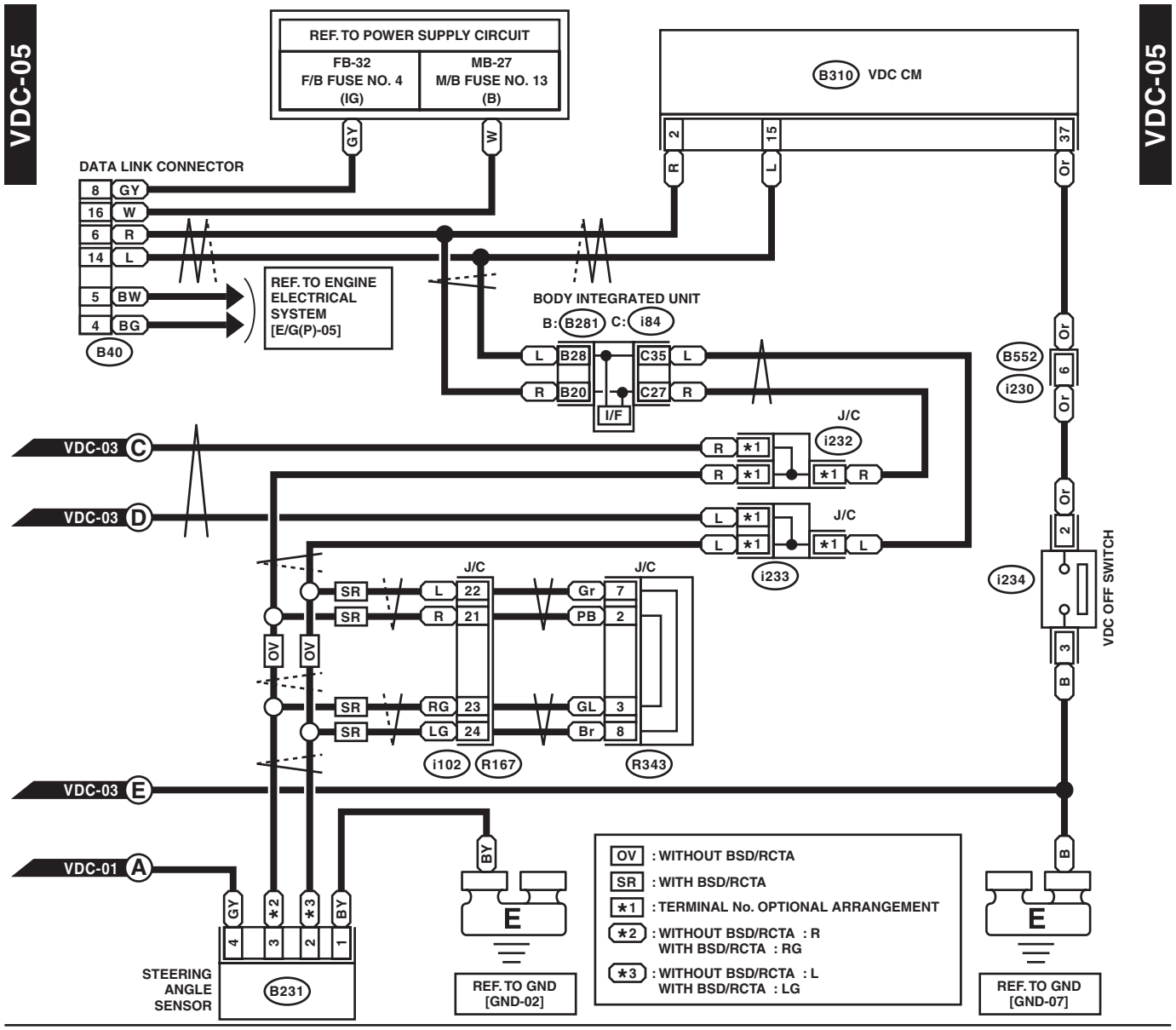
WI-48139

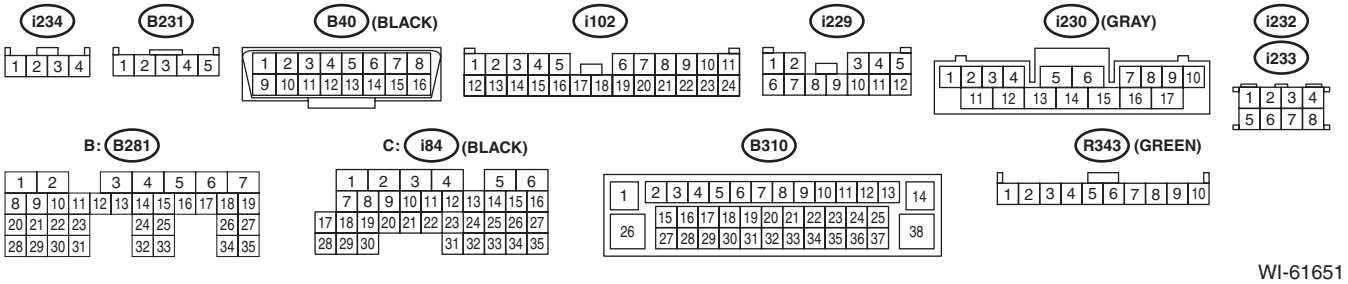
VDC-04





WI-63041


VDC-05
VDC-05
REF. TO POWER SUPPLY CIRCUIT
FB-32
F/B FUSE NO. 4
(IG)
MB-27
M/B FUSE NO. 13
(B)
B310 VDC CM
DATA LINK CONNECTOR
8 GY
16 W
6 R
14 L
5 BW
4 BG
B40
REF. TO ENGINE ELECTRICAL SYSTEM [E/G(P)-05]
BODY INTEGRATED UNIT
B: B281 C: i84
L B28 C35 L
R B20 C27 R
I/F
B552
i230
J/C
i232
VDC-03 C
VDC-03 D
i233
i234
VDC OFF SWITCH
SR L 22 Gr 7
SR R 21 PB 2
SR RG 23 GL 3
SR LG 24 Br 8
OV
i102
R167
R343
VDC-03 E
VDC-01 A
STEERING ANGLE SENSOR
B231
REF. TO GND [GND-02]
REF. TO GND [GND-07]
OV : WITHOUT BSD/RCTA
SR : WITH BSD/RCTA
*1 : TERMINAL No. OPTIONAL ARRANGEMENT
*2 : WITHOUT BSD/RCTA : R
WITH BSD/RCTA : RG
*3 : WITHOUT BSD/RCTA : L
WITH BSD/RCTA : LG

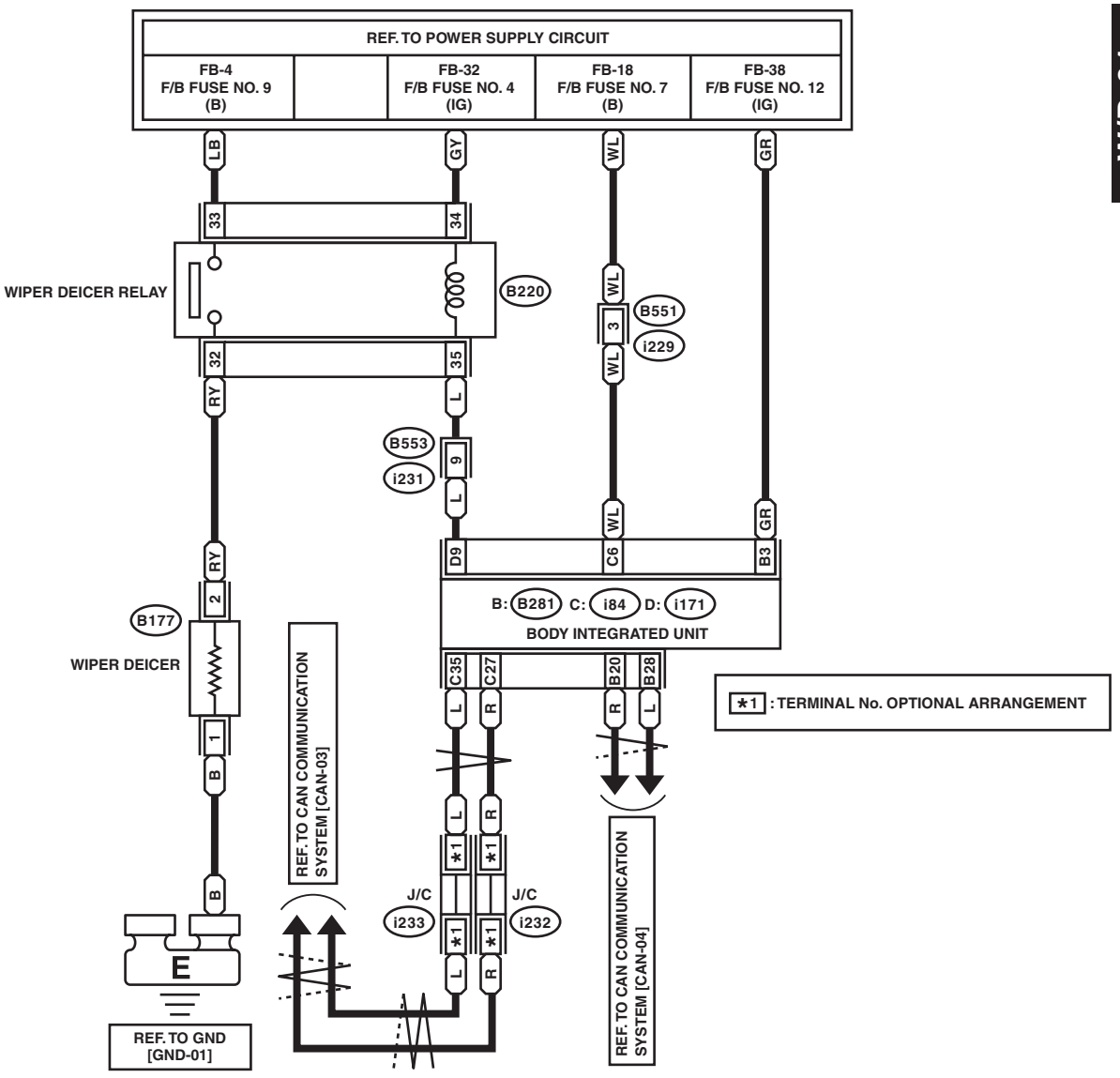

i234
B231
B40 (BLACK)
i102
i229
i230 (GRAY)
i232
i233
B: B281
C: i84 (BLACK)
B310
R343 (GREEN)

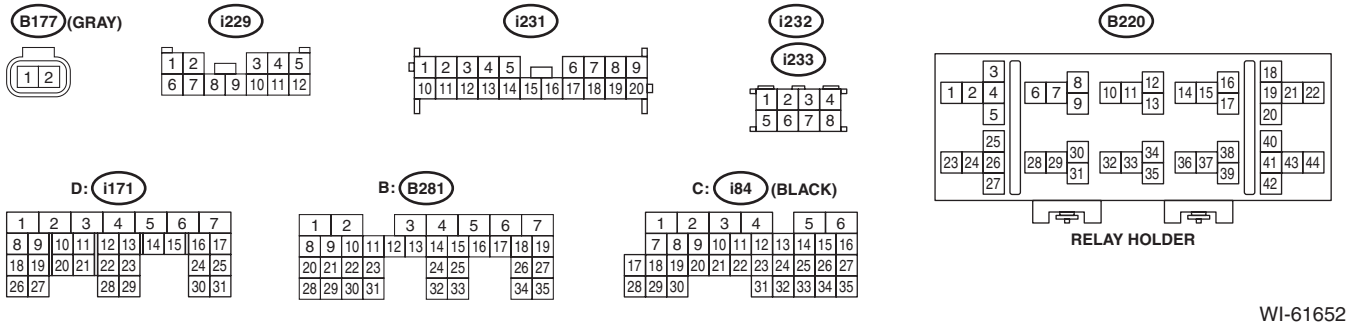
WI-61651

59.Wiper Deicer System

A: WIRING DIAGRAM

W/D-01



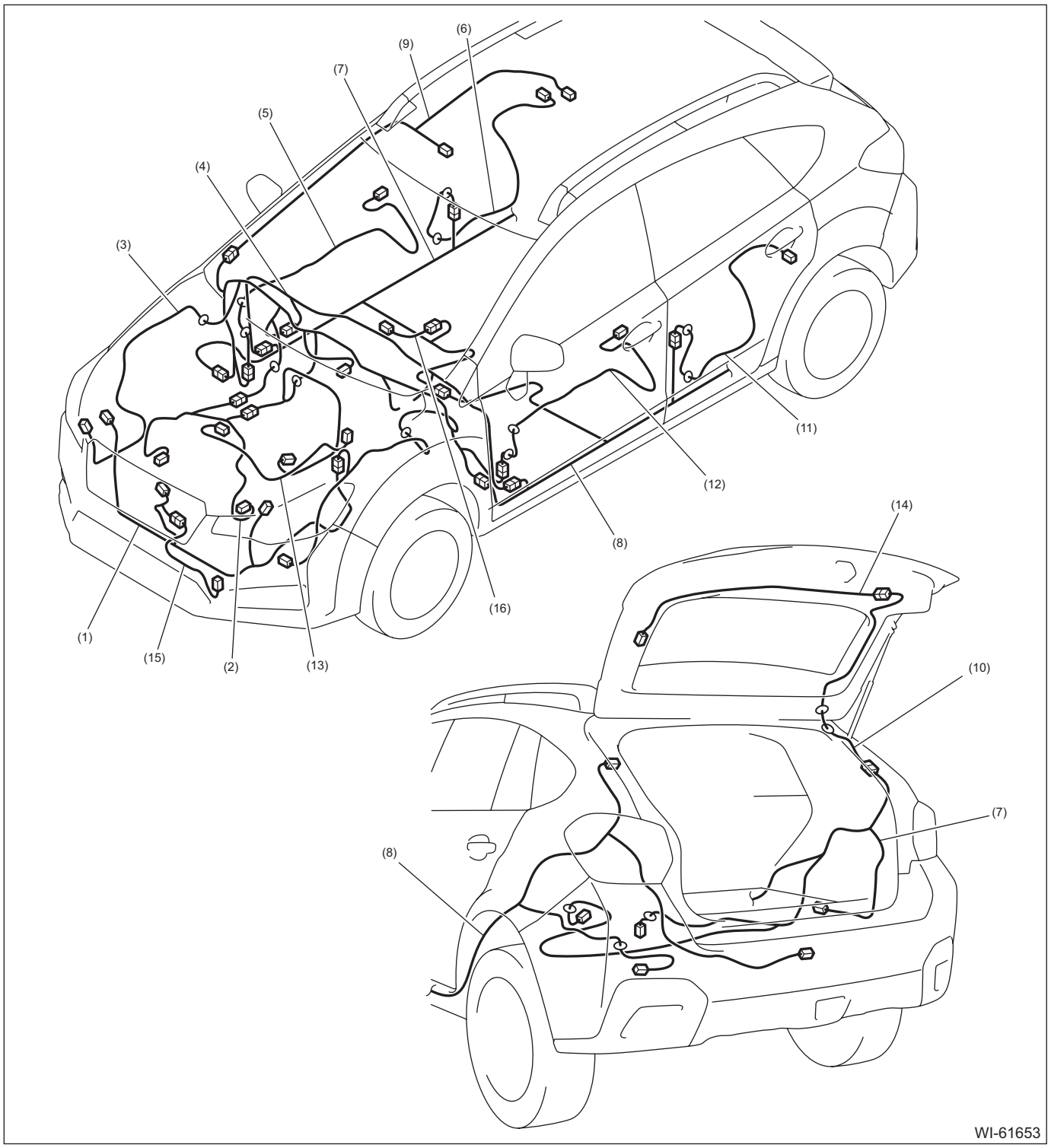


WI-61652

60.Harness Components Location

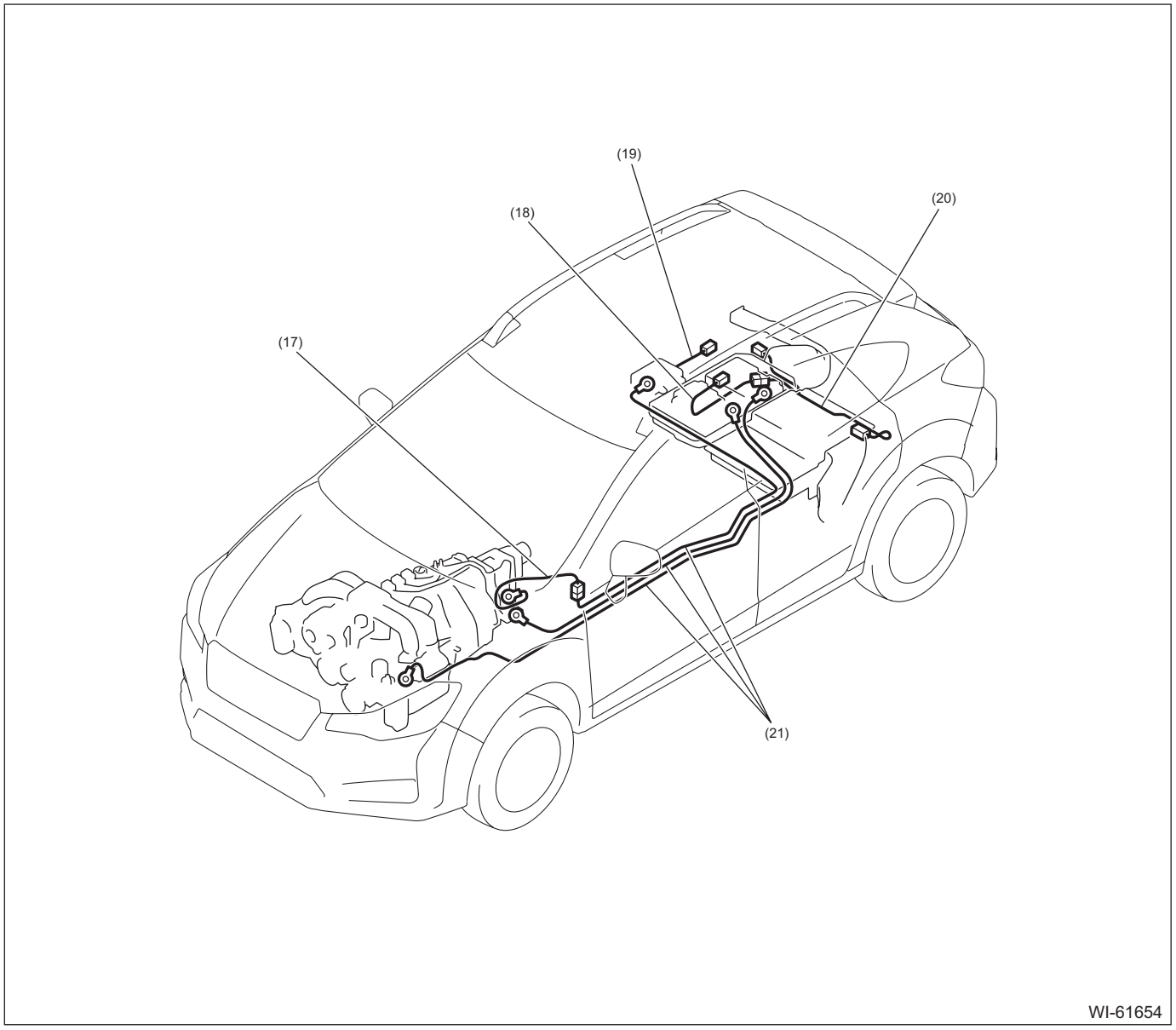
A: LOCATION

1. BODY HARNESS



(1) Front wiring harness
(2) Engine wiring harness
(3) Bulkhead wiring harness
(4) Instrument panel wiring harness
(5) Front door cord RH
(6) Rear door cord RH
(7) Rear wiring harness RH
(8) Rear wiring harness LH
(9) Roof cord
(10) Rear gate cord (UPR)
(11) Rear door cord LH
(12) Front door cord LH
(13) Generator cord
(14) Rear gate cord (LWR)
(15) Active grille shutter adapter cord
(16) Occupant detection harness

2. HYBRID HARNESS



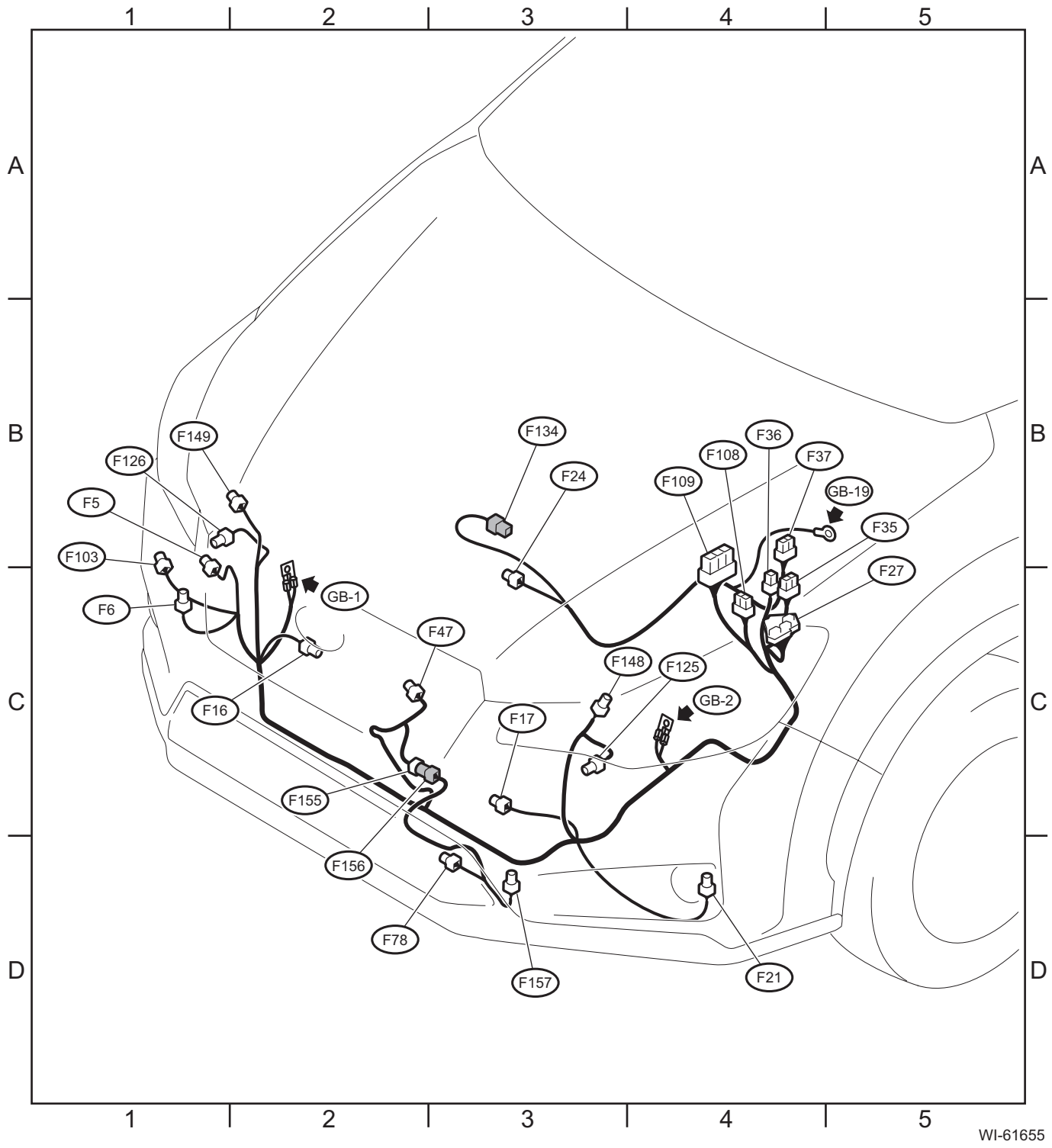
(17) Electric oil pump harness
(18) Inverter harness
(19) Inverter harness
(20) Inverter harness
(21) Power cable

61.Front Wiring Harness

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
F5	1	Black	C-1		Horn
F6	2	★	C-1		Front fog light RH
F16	2	★	C-2		Sub fan motor
F17	2	★	C-3		Main fan motor
F21	2	★	D-4		Front fog light LH
F24	1	★	C-3		Magnet clutch
F27	26	★	C-4		Relay holder
F35	12	Blue	C-4		M/B
F36	7	★	C-4		
F37	20	★	B-4		
F47	1	Black	C-2		Horn
F78	2	Black	D-3		Ambient sensor
F103	2	Gray	C-1		Daytime running light resistor
F108	18	Gray	C-4	B361	Through joint connector
F109	24	★	B-4	B360	
F125	8	Light gray	C-3		Front combination light LH
F126	8	Light gray	B-1		Front combination light RH
F134	2	Dark gray	B-3		Brake vacuum pump
F148	2	★	C-3		High beam LH
F149	2	★	B-1		High beam RH
F155	6	Black	C-2	F156	Active grille shutter adapter cord
F156	6	Black	C-2	F155	Front wiring harness
F157	4	Black	D-3		Active grille shutter
★: White or natural color					

Front Wiring Harness



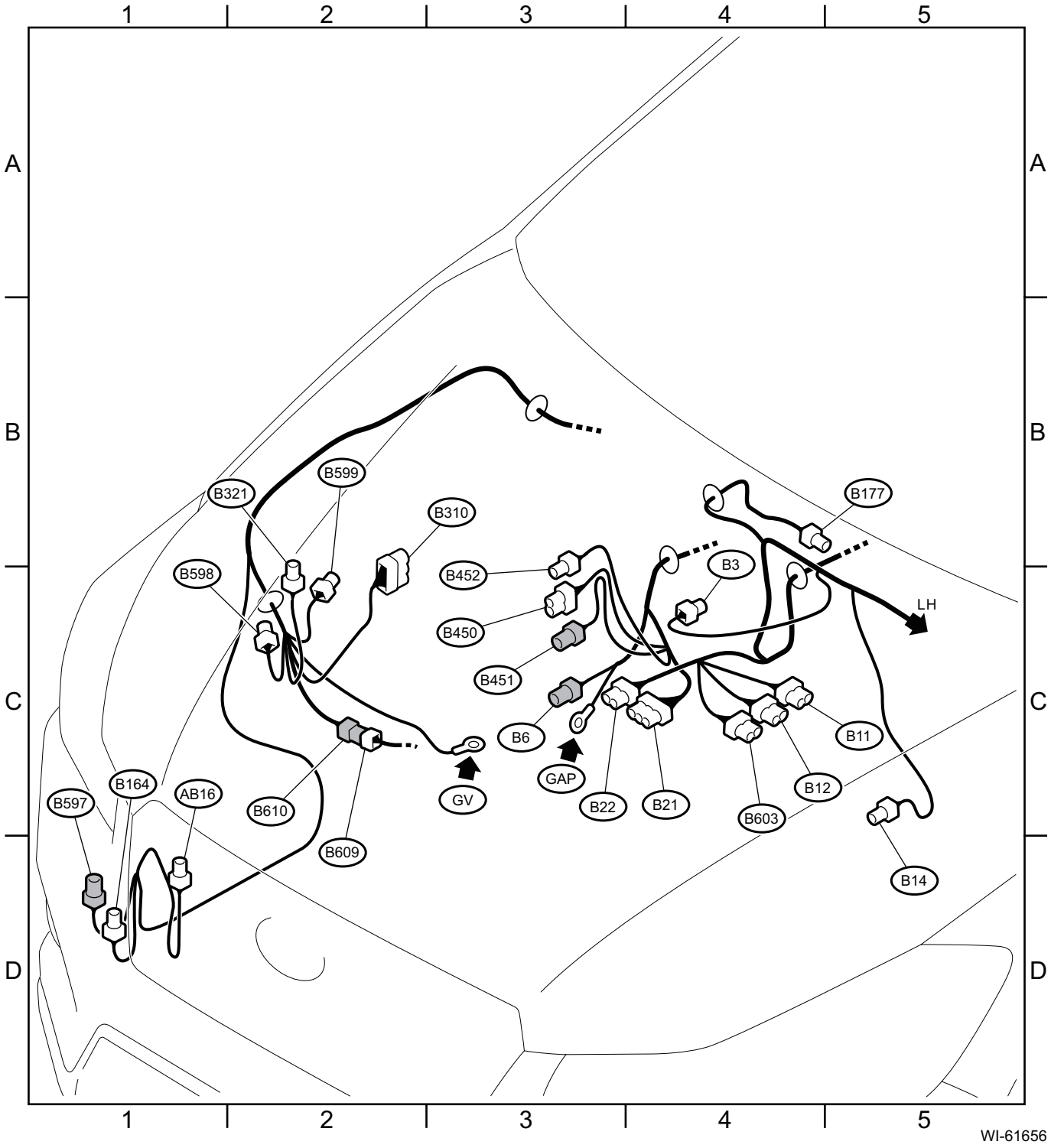
62.Bulkhead Wiring Harness (In Engine Compartment) RH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
B3	5	Black	C-4		Mass air flow and intake air temperature sensor
B6	2	Light gray	C-3		Front ABS wheel speed sensor RH
B11	12	Light gray	C-4	T4	Transmission cord
B12	16	Brown	C-4	T3	
B14	1	Black	C-5		Starter motor
B21	54	Black	C-4	E2	Engine wiring harness
B22	16	Brown	C-3	E3	
B164	2	Black	D-1		Keyless buzzer
B177	2	Gray	B-4		Wiper deicer
B310	38	★	B-2		VDC CM
B321	2	Black	C-2		Hood switch
B450	10	Black	C-3		Power steering CM
B451	6	Gray	C-3		Torque sensor
B452	2	Black	B-3		Power steering CM
B597	2	Light gray	D-1		Pedestrian alert speaker
B598	2	Black	C-2		12V engine restart battery sensor
B599	4	Black	C-2		12V battery relay
B603	20	Gray	C-4	T32	Transmission cord
B609	1	Gray	C-2	B610	Generator cord
B610	1	Gray	C-2	B609	Bulkhead wiring harness
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB16	2	Yellow	D-1		Front sub sensor RH
★: White or natural color					

Bulkhead Wiring Harness (In Engine Compartment) RH



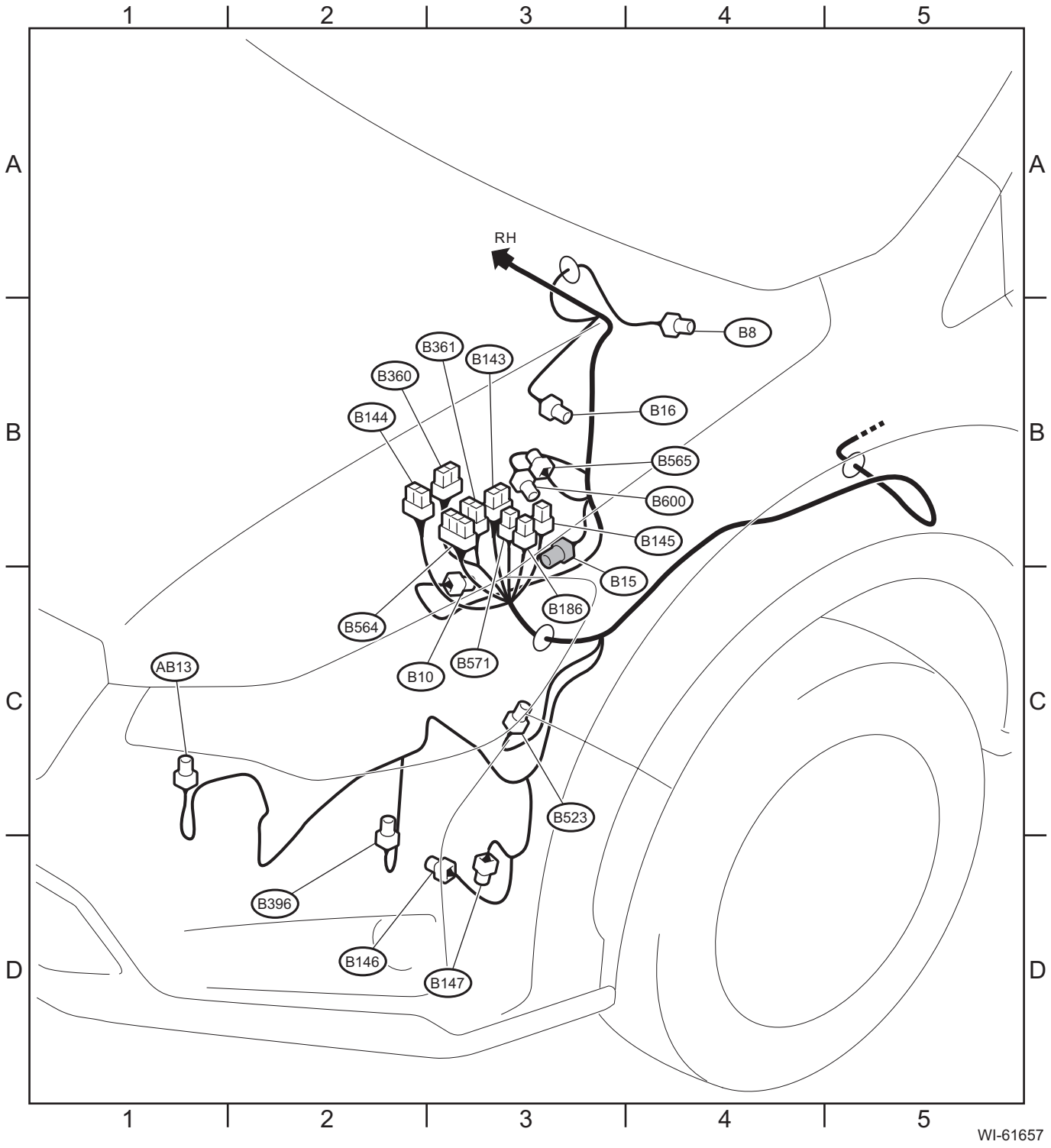
63.Bulkhead Wiring Harness (In Engine Compartment) LH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
B8	5	Light gray	B-4		Front wiper motor
B10	4	Light gray	C-3		Pressure switch
B15	2	Light gray	B-3		Front ABS wheel speed sensor LH
B16	2	Gray	B-3		Brake fluid level switch
B143	20	★	B-3		M/B
B144	9	Brown	B-2		
B145	7	Brown	B-3		
B146	2	Black	D-3		Front washer motor
B147	2	Gray	D-3		Rear washer motor
B186	8	★	B-3		M/B
B360	16	Gray	B-3	F109	Through joint connector
B361	14	Gray	B-3	F108	
B396	2	Brown	D-2		Washer fluid level sensor
B523	2	Light gray	C-3		Battery temperature sensor
B564	21	Black	B-3		Relay holder
B565	3	Black	B-3		Brake booster pressure sensor 1
B571	2	★	B-3		M/B
B600	3	Black	B-3		Brake booster pressure sensor 2
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB13	2	Yellow	C-1		Front sub sensor LH
★: White or natural color					

Bulkhead Wiring Harness (In Engine Compartment) LH



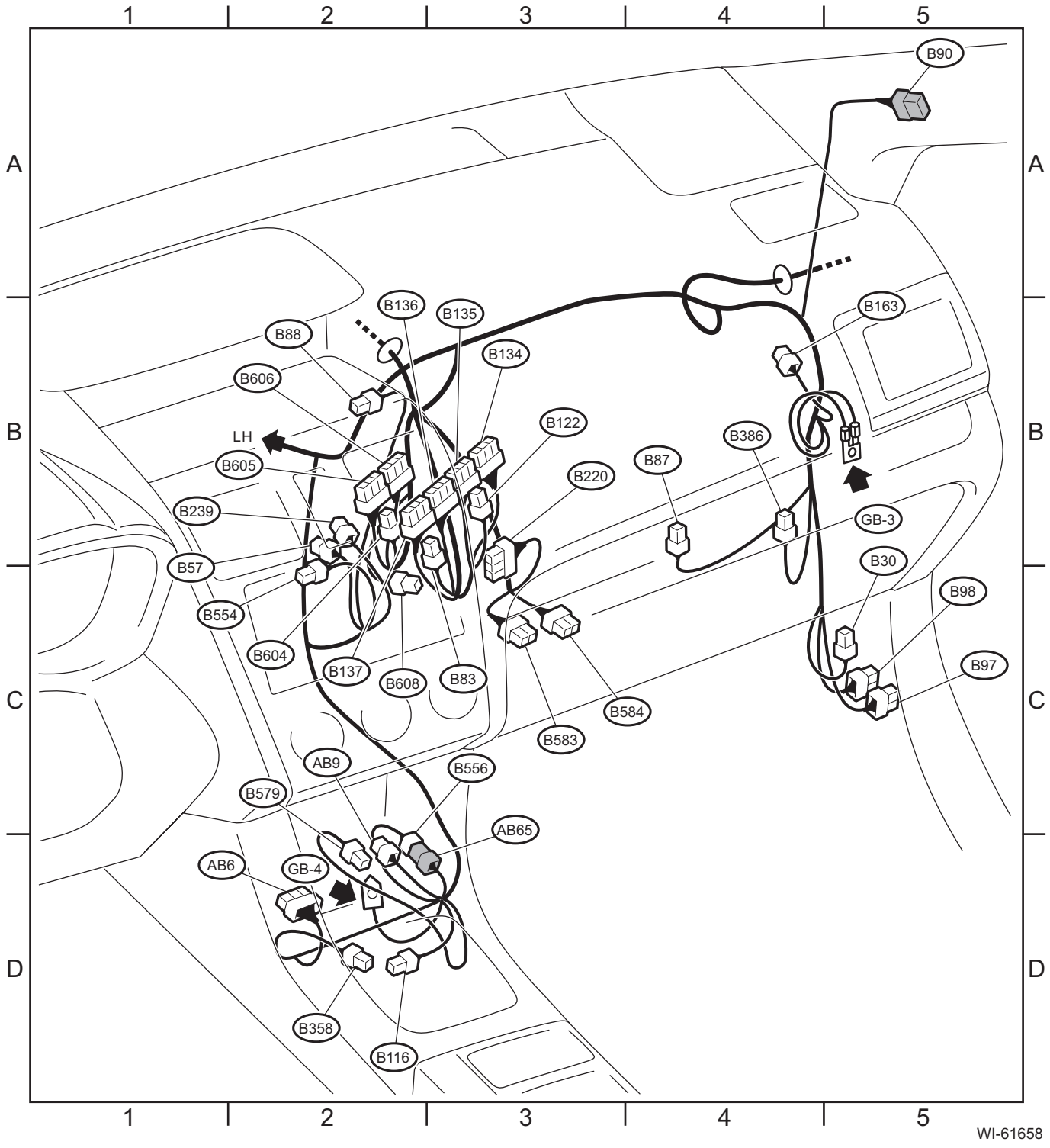
64.Bulkhead Wiring Harness (In Compartment) RH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
B30	8	Black	C-5	D1	Front door cord RH
B57	4	★	B-2		Power transistor
B83	6	★	B-3		J/C
B87	2	★	B-4		Blower motor
B88	2	Brown	B-2		Evaporator sensor
B90	20	★	A-5	R50	Roof cord
B97	20	★	C-5	R1	Rear wiring harness RH
B98	20	★	C-5	R2	
B116	8	★	D-2		AT select lever
B122	6	★	B-3		J/C
B134	34	★	B-3		ECM
B135	35	★	B-3		
B136	35	★	B-3		
B137	31	★	B-2		
B163	6	Black	B-4		Intake door actuator
B220	44	★	B-3		Relay holder
B239	6	★	B-2		Air mix door actuator (without left/right independent air conditioner)
					Air mix door actuator RH (with left/right independent air conditioner)
B358	2	★	D-2		AT select lever illumination
B386	4	★	B-4		Blower motor relay
B554	2	★	C-2		Heater core sensor
B556	2	★	D-2	AB65	Airbag wiring harness
B579	2	★	D-2		Keyless access interior antenna (front)
B583	12	★	C-3	i237	Instrument panel wiring harness RH
B584	20	★	C-3	i238	
B604	6	★	B-2		J/C
B605	26	★	B-2		HPCM
B606	24	★	B-2		
B608	5	Gray	C-2		Output clutch relay
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB6	30	Yellow	D-2		Airbag CM
AB9	4	Yellow	D-2		Passenger's airbag module
AB65	2	★	D-2	B556	Bulkhead wiring harness
★: White or natural color					

Bulkhead Wiring Harness (In Compartment) RH



65.Bulkhead Wiring Harness (In Compartment) LH

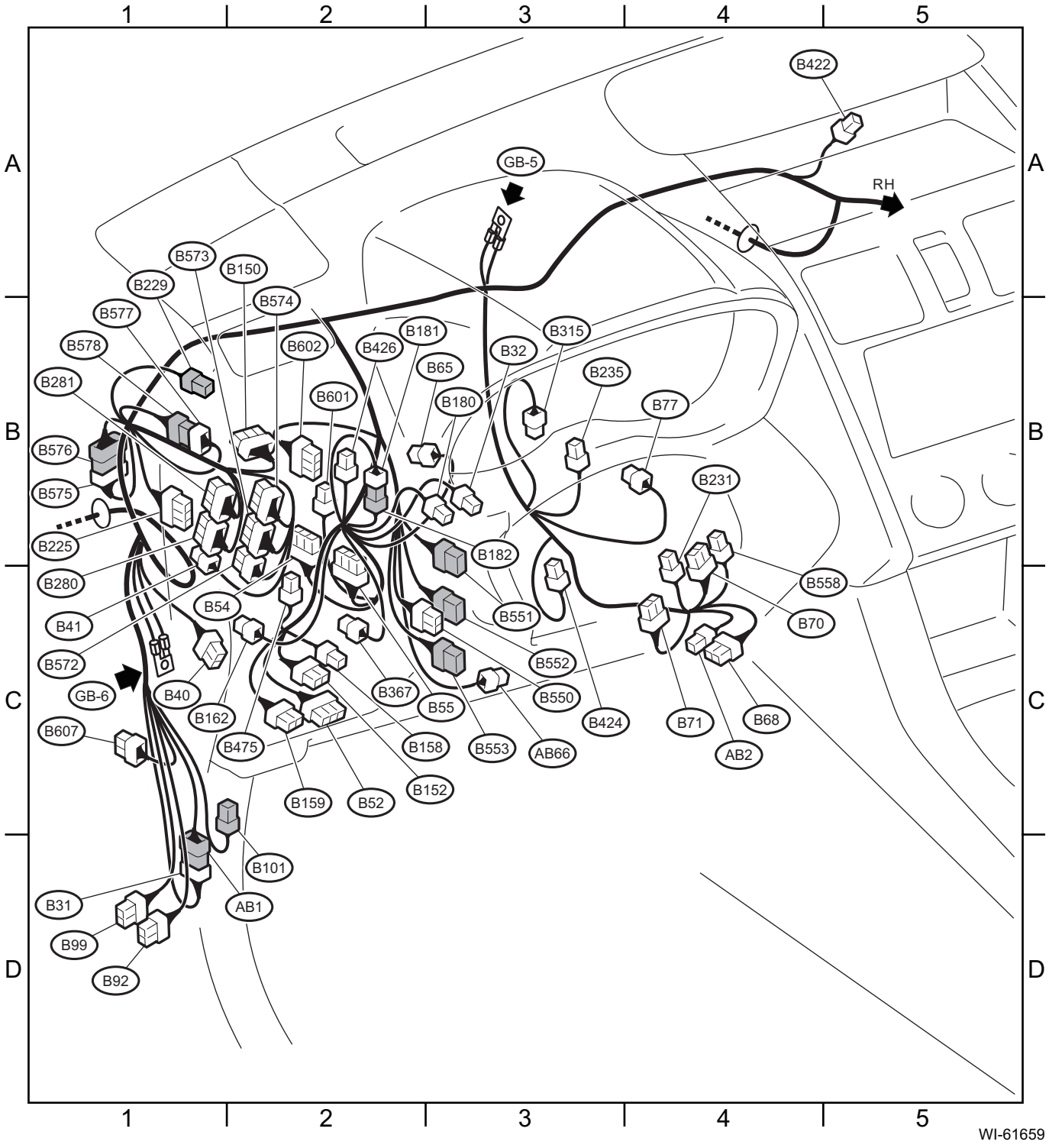
A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
B31	10	Gray	D-1	AB1	Airbag wiring harness
B32	8	★	B-3		Turn signal and hazard unit
B40	16	Black	C-1		Data link connector
B41	2	★	C-1		Power window circuit breaker
B52	24	★	C-2		F/B
B54	26	Green	B-2		TCM
B55	22	Green	B-2		
B65	4	Black	B-2		Stop light and brake switch
B68	14	★	C-4		Roll connector
B70	10	★	B-4		Combination switch
B71	20	★	C-4		
B77	6	★	B-4		Mode door actuator
B92	20	★	D-1	R5	Rear wiring harness
B99	20	★	D-1	R3	Rear wiring harness LH
B101	8	Black	C-1	D11	Front door cord LH
B150	24	★	B-2		Auto headlight beam leveler CM
B152	10	Gray	C-2		F/B
B158	8	★	C-2		
B159	9	Brown	C-2		
B162	2	★	C-2		
P180	8	★	B-3		Remote engine start CM
B181	2	★	B-2	B182	Bulkhead wiring harness
B182	2	★	B-2	B181	
B225	44	★	B-1		Relay holder
B229	8	★	B-1		Telematics button
B231	5	★	B-4		Steering angle sensor
B235	6	★	B-3		Air mix door actuator LH (with left/right independent air conditioner)
B280	34	★	B-1		Body integrated unit
B281	35	★	B-1		
B315	6	Black	B-3		Accelerator pedal position sensor
B367	8	★	C-2		Impact sensor
B422	5	★	A-5		ID code box
B424	7	Black	C-3		Steering lock CM
B426	4	Black	B-2		Accessory relay (with push button start)
B475	4	★	C-2		Wiper relay unit
B550	20	★	C-2		Fuse holder
B551	12	★	B-3	i229	Instrument panel wiring harness LH
B552	17	Gray	C-3	i230	
B553	20	★	C-3	i231	
B558	7	★	B-4		Combination switch
B572	18	★	C-2		Keyless access CM
B573	28	★	B-2		
B574	30	★	B-2		

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
B575	22	★	B-1	B576	Bulkhead wiring harness
B576	22	★	B-1	B575	
B577	10	★	B-1	B578	
B578	10	★	B-1	B577	
B601	4	Black	B-2		Brake stroke sensor
B602	22	Black	B-2		Fuse holder
B607	14	Blue	C-1		J/C
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB1	10	Gray	D-1	B31	Bulkhead wiring harness
AB2	4	Yellow	C-4	AB7	Driver's airbag module
AB66	2	Black	C-3		Driver's knee airbag module
★: White or natural color					

Bulkhead Wiring Harness (In Compartment) LH



66.Engine Wiring Harness and Transmission Cord

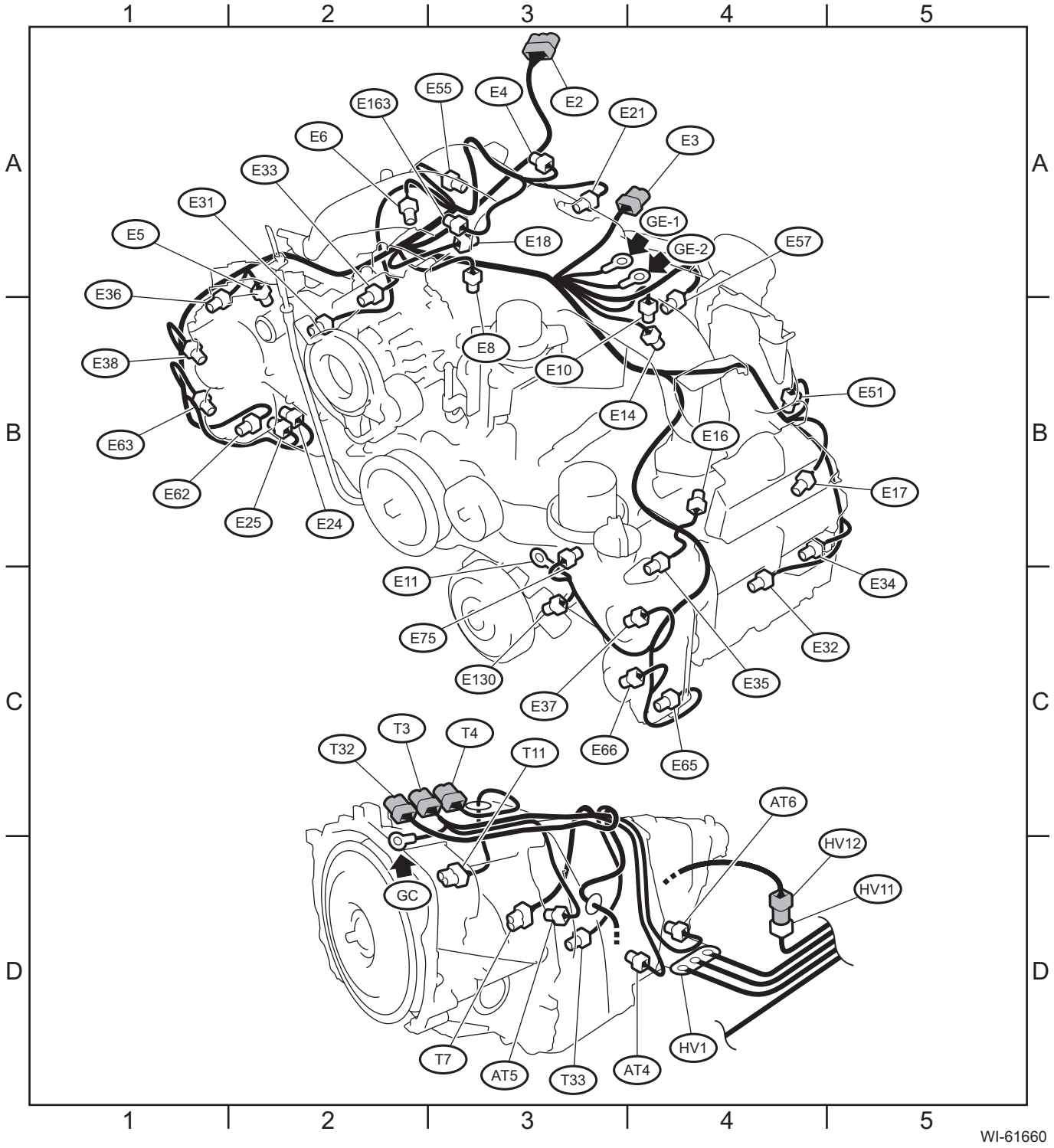
A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
E2	54	Black	A-3	B21	Bulkhead wiring harness
E3	16	Brown	A-4	B22	
E4	2	Blue	A-3		Purge control solenoid valve
E5	2	Dark gray	B-2		Fuel injector No. 1
E6	2	Dark gray	A-2		Fuel injector No. 3
E8	2	Black	A-3		Engine coolant temperature sensor
E10	3	Black	B-4		Crankshaft position sensor
E11	1	—	B-3		Oil pressure switch
E14	2	Black	B-4		Knock sensor
E16	2	Dark gray	B-4		Fuel injector No. 2
E17	2	Dark gray	B-4		Fuel injector No. 4
E18	6	Dark gray	A-3		EGR control valve
E21	3	Black	A-3		Manifold absolute pressure sensor
E24	4	Light gray	B-2		Front oxygen (A/F) sensor
E25	4	Black	B-2		Rear oxygen sensor
E31	3	Black	B-2		Ignition coil No. 1
E32	3	Black	C-4		Ignition coil No. 2
E33	3	Black	A-2		Ignition coil No. 3
E34	3	Black	B-4		Ignition coil No. 4
E35	3	Light gray	C-4		Intake camshaft position sensor LH
E36	3	Light gray	B-1		Intake camshaft position sensor RH
E37	2	Black	C-4		Intake oil control solenoid LH
E38	2	Black	B-1		Intake oil control solenoid RH
E51	5	Light gray	B-4		Tumble generator valve actuator LH
E55	5	Light gray	A-3		Tumble generator valve actuator RH
E57	6	Black	B-4		Electronic throttle control
E62	3	Light gray	B-2		Exhaust camshaft position sensor RH
E63	2	Black	B-1		Exhaust oil control solenoid RH
E65	3	Light gray	C-4		Exhaust camshaft position sensor LH
E66	2	Black	C-4		Exhaust oil control solenoid LH
E75	2	Black	B-3		Engine oil temperature sensor
E130	1	★	C-3		Oil level switch
E163	5	Black	A-3		ISG
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
T3	16	Brown	C-3	B12	Bulkhead wiring harness
T4	12	Light gray	C-3	B11	
T7	9	Black	D-3		Inhibitor switch
T11	10	★	D-3		Control valve body
T32	20	Gray	C-2	B603	Bulkhead wiring harness
T33	3	Black	D-3		Front wheel speed sensor
AT4	3	Dark gray	D-4		Secondary speed sensor
AT5	3	Light gray	D-3		Turbine speed sensor
AT6	3	Black	D-4		Secondary pressure sensor

Engine Wiring Harness and Transmission Cord

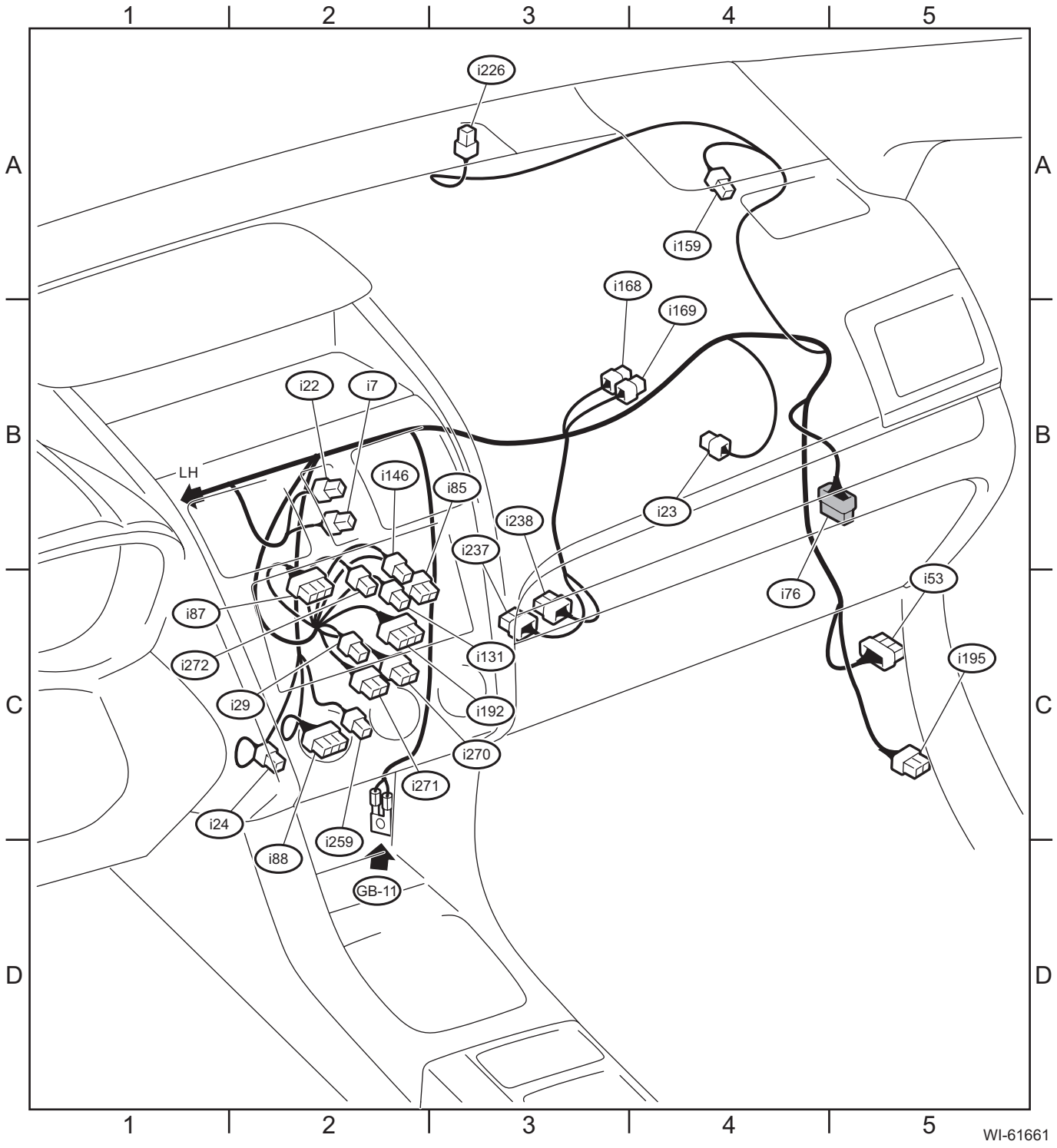
Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
HV1	—	—	D-4		Drive motor
HV11	3	Orange	D-4	HV12	Electric oil pump harness
HV12	3	Orange	D-4	HV11	Power cable
★: White or natural color					



67.Instrument Panel Wiring Harness RH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
i7	4	Gray	B-2		MFD switch
i22	4	★	B-2		Hazard switch
i23	2	★	B-4		Glove box light
i24	2	★	C-2		Front accessory power supply socket
i29	1	★	C-2		Audio bracket ground
i53	24	★	C-5	R98	Rear wiring harness RH
i76	28	★	B-5	D83	Front door cord RH
i85	10	★	C-2		Audio
	10	★	C-2		Navigation unit
i87	28	★	C-2		
i88	40	★	C-2		A/C control panel
i131	6	★	C-2		Audio
	6	★	C-2		Navigation unit
i146	5	★	B-2		
i159	4	★	A-4		Side tweeter RH
i168	4	★	B-3		J/C
i169	4	★	B-4		
i192	28	★	C-2		Audio
i195	10	★	C-5	R382	Rear wiring harness RH
i226	3	★	A-3		Light control sensor
i237	12	★	C-3	B583	Bulkhead wiring harness RH
i238	20	★	C-3	B584	
i259	8	★	C-2		Pocket light
i270	20	Gray	C-2		Data communication module
i271	16	Gray	C-2		
i272	8	★	C-2		Navigation unit
★: White or natural color					

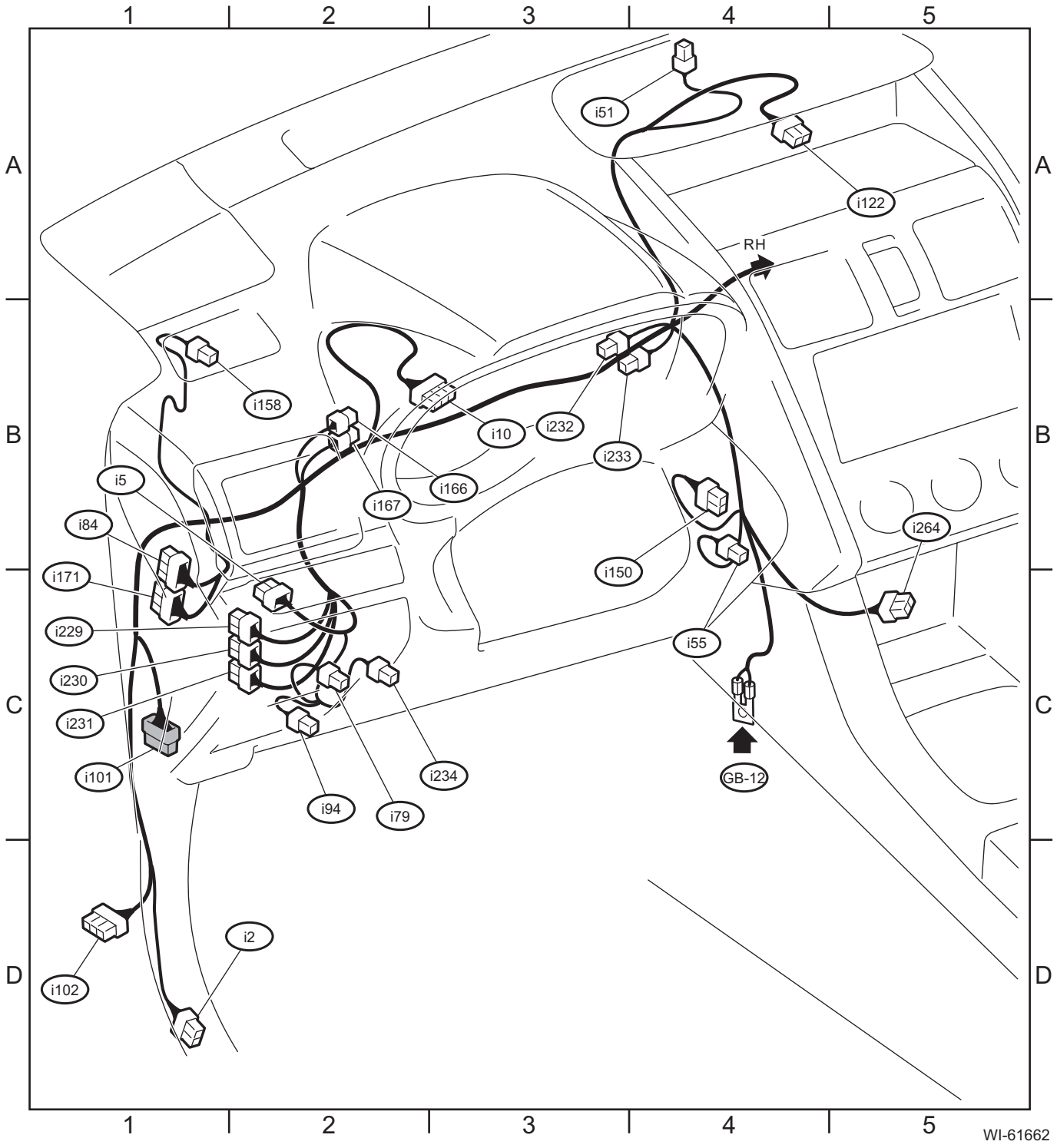

1
2
3
4
5
A
B
C
D
i226
i159
i168
i169
i22
i7
LH
i146
i85
i238
i237
i23
i53
i76
i87
i272
i131
i195
i29
i192
i270
i271
i24
i259
i88
GB-11
WI-61661

68.Instrument Panel Wiring Harness LH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
i2	10	★	D-1	R339	Rear wiring harness LH
i5	20	★	C-2		F/B
i10	40	★	B-3		Combination meter
i51	2	★	A-4		Sunload sensor
i55	2	★	B-4		Temperature and humidity sensor
i79	6	★	C-2		Illumination control switch
i84	35	Black	B-1		Body integrated unit
i94	6	Gray	C-2		BSD/RCTA OFF switch
i101	28	★	C-1	D84	Front door cord LH
i102	24	★	D-1	R167	Rear wiring harness LH
i122	12	Black	A-4		MFD
i150	14	★	B-4		Push button ignition switch (with push button start)
i158	4	★	B-1		Side tweeter LH
i166	4	★	B-2		J/C
i167	4	★	B-2		
i171	31	★	C-1		Body integrated unit
i229	12	★	C-2	B551	Bulkhead wiring harness LH
i230	17	Gray	C-2	B552	
i231	20	★	C-2	B553	
i232	8	★	B-3		J/C
i233	8	★	B-4		
i234	4	★	C-2		VDC OFF switch
i264	12	★	C-5		Pedestrian alert CM
★: White or natural color					

Instrument Panel Wiring Harness LH

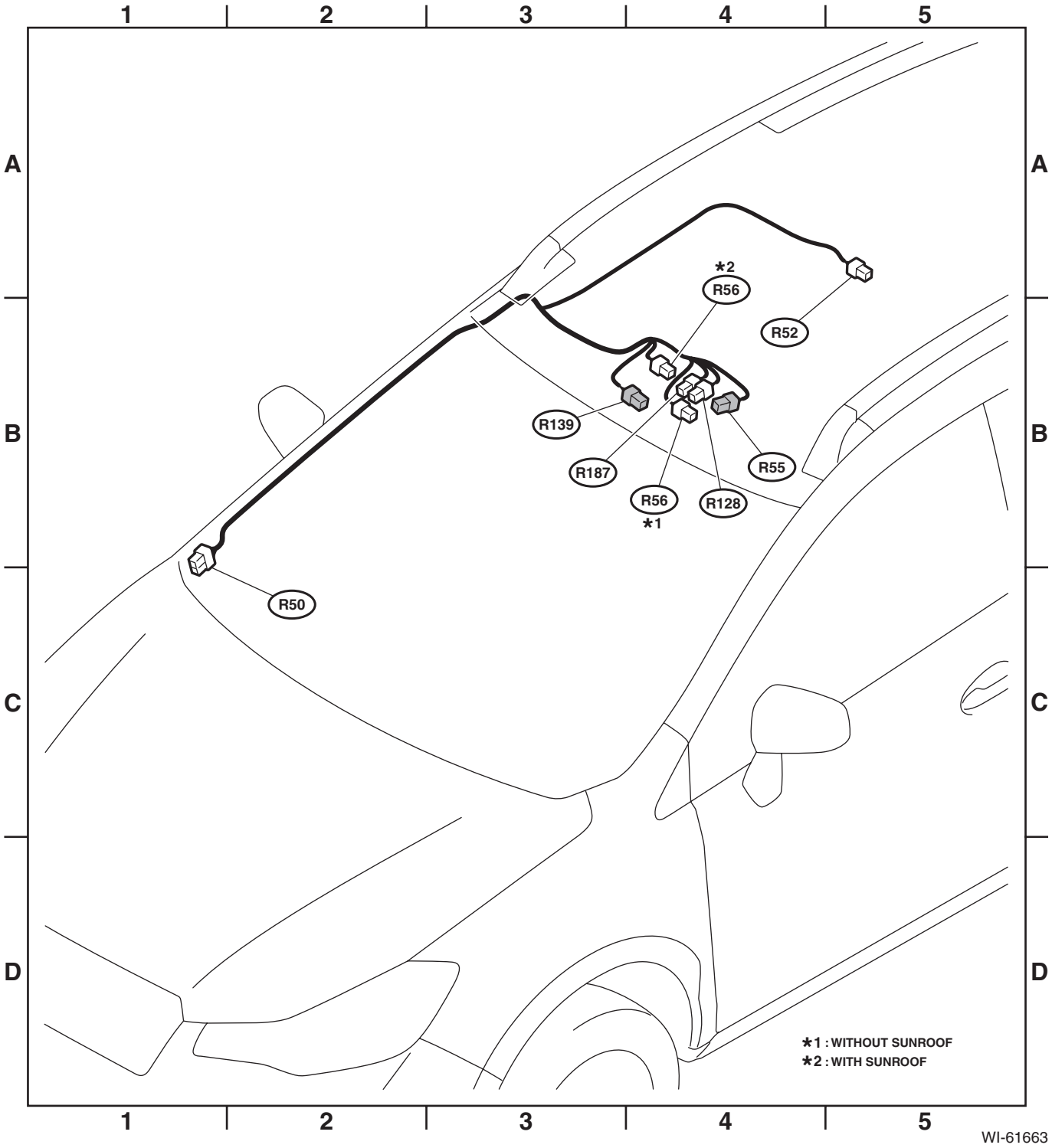


69.Roof Cord

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
R50	20	★	B-1	B90	Bulkhead wiring harness
R52	3	★	A-5		Room light
R55	8	★	B-4		Sunroof motor assembly
R56	6	★	B-4		Spot map light (without sunroof)
	10	★	B-4		Spot map light (with sunroof)
R128	5	★	B-4		Sunroof switch
R139	3	★	B-4		Rear view mirror
R187	5	Black	B-4		Sunroof switch (tilt)
★: White or natural color					

Roof Cord


1
2
3
4
5
A
B
C
D
*2
R56
R52
R139
R187
R56
*1
R128
R55
R50
*1 : WITHOUT SUNROOF
*2 : WITH SUNROOF
WI-61663

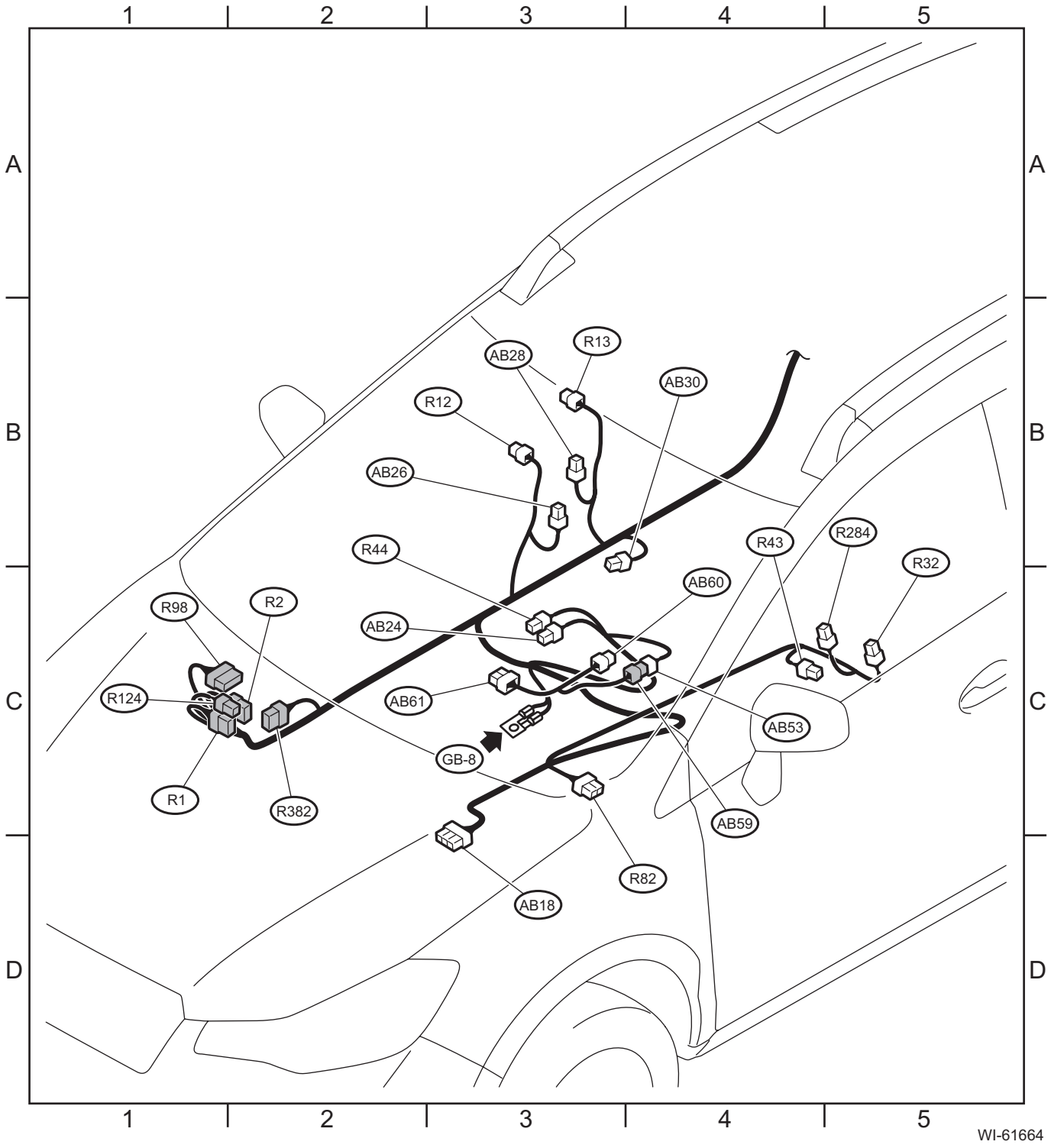
70.Rear Wiring Harness RH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
R1	20	★	C-1	B97	Bulkhead wiring harness
R2	20	★	C-2	B98	
R12	3	★	B-3		Front door switch RH
R13	8	★	B-3	D28	Rear door cord RH
R32	2	★	C-5		Rear accessory power supply socket
R43	8	★	C-4		Seat heater switch
R44	4	★	C-3		Seat heater RH
R82	19	Black	C-3	R81	Rear wiring harness LH
R98	24	★	C-1	i53	Instrument panel wiring harness
R124	2	Yellow	C-1	AB63	Front door cord RH
R284	8	★	C-5		AUX input terminal
R382	10	★	C-2	i195	Instrument panel wiring harness
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB18	24	Yellow	D-3		Airbag CM
AB24	4	Yellow	C-3		Side airbag module RH
AB26	2	Black	B-3		Pretensioner RH
AB28	4	Yellow	B-3		Side airbag sensor RH
AB30	2	Yellow	B-3		Lap seat belt pretensioner RH
AB53	3	Dark gray	C-4	AB59	Occupant detection harness
AB59	3	★	C-3	AB53	Rear wiring harness
AB60	2	Yellow	C-3		Buckle switch
AB61	10	Black	C-3		Occupant detection control module
★: White or natural color					

Rear Wiring Harness RH



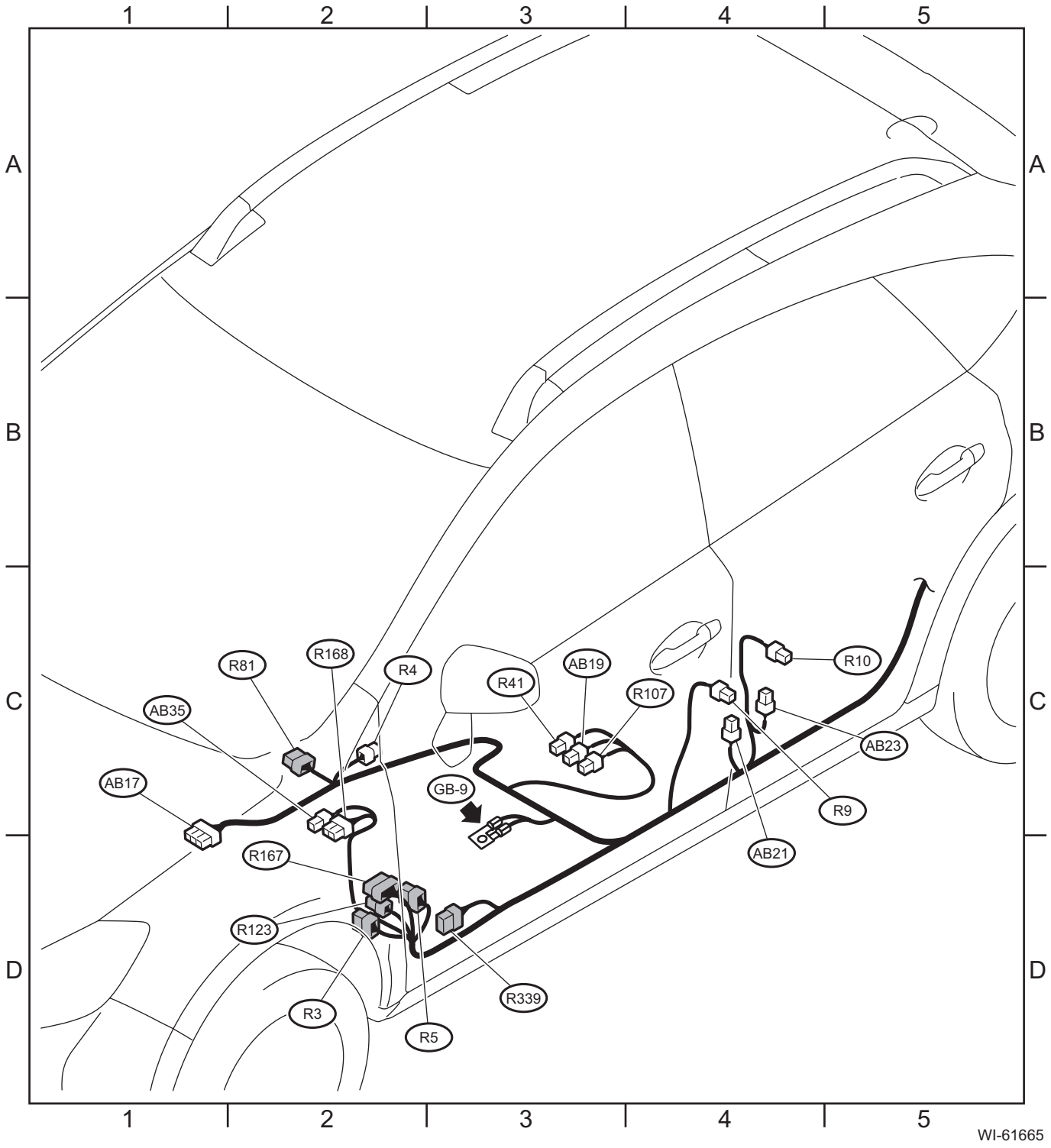
71.Rear Wiring Harness LH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
R3	20	★	D-2	B99	Bulkhead wiring harness
R4	1	Black	C-2		Parking brake switch
R5	20	★	D-2	B92	Bulkhead wiring harness
R9	3	★	C-4		Front door switch LH
R10	8	★	C-4	D22	Rear door cord LH
R41	4	★	C-3		Seat heater LH
R81	19	Black	C-2	R82	Rear wiring harness RH
R107	2	★	C-3		Seat belt switch LH
R123	2	Yellow	D-2	AB62	Front door cord LH
R167	24	★	D-2	i102	Instrument panel wiring harness
R168	20	★	C-2		F/B
R339	10	★	D-3	i2	Instrument panel wiring harness
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB17	24	Yellow	D-1		Airbag CM
AB19	4	Yellow	C-3		Side airbag module LH
AB21	2	Black	C-4		Pretensioner LH
AB23	4	Yellow	C-4		Side airbag sensor LH
AB35	2	Black	C-2		F/B
★: White or natural color					

Rear Wiring Harness LH



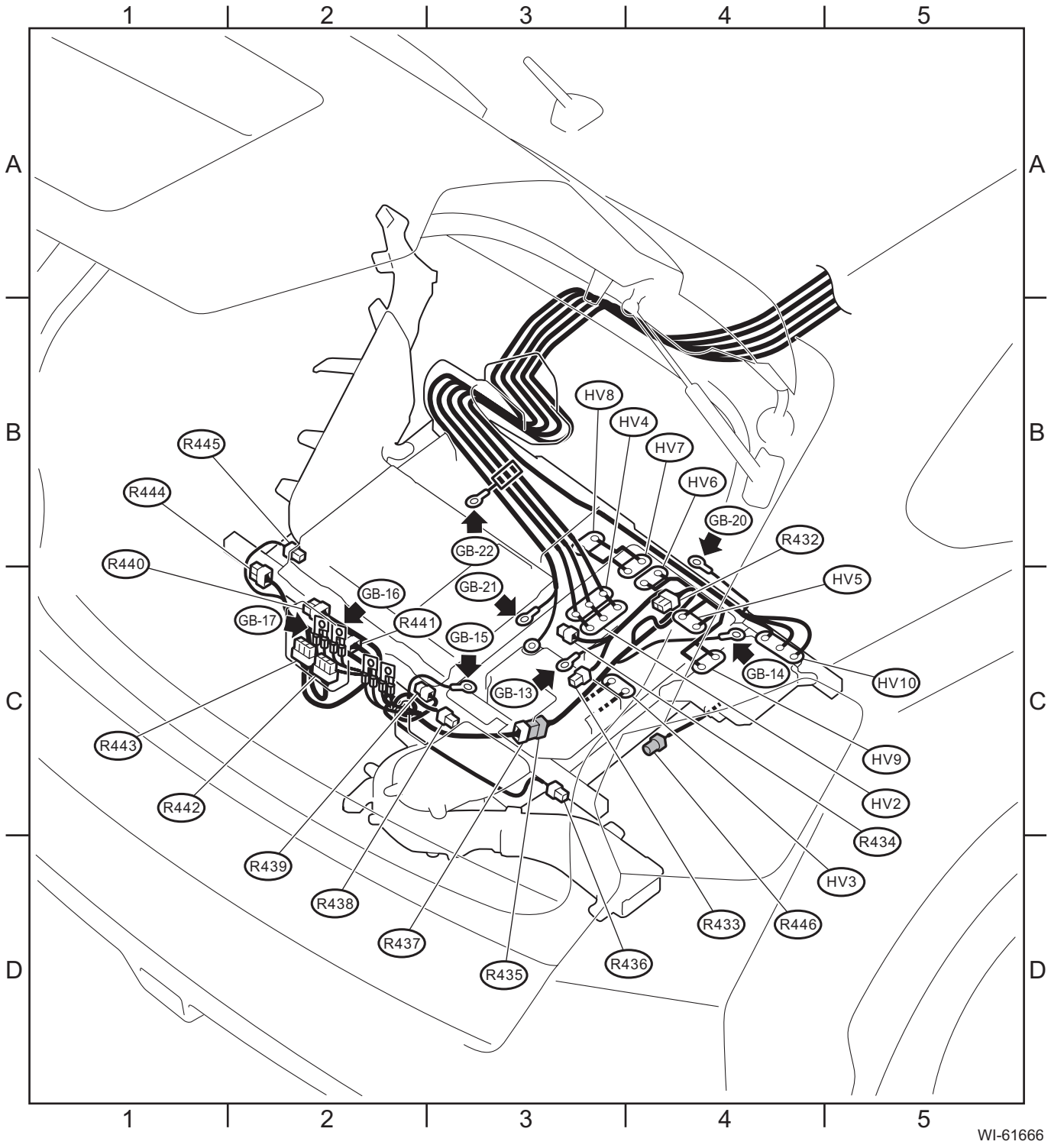
72.Rear Wiring Harness (HEV)

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
R432	12	Gray	C-4		Drive motor inverter
R433	4	Black	C-3		DC/DC converter
R434	8	Black	C-3		Drive motor inverter amperage sensor
R435	19	Black	C-3	R437	Inverter harness
R436	8	★	C-3	R454	Rear wiring harness
R437	19	Black	C-3	R435	Inverter harness
R438	4	★	C-3		High voltage battery cooling fan
R439	3	★	C-2		Keyless access interior antenna (rear)
R440	12	★	C-2		Relay holder
R441	10	Blue	C-2		J/C
R442	22	Green	C-2		DMCM
R443	26	Green	C-2		
R444	14	★	C-2	R459	Rear wiring harness
R445	8	★	B-2		High voltage battery
R446	4	★	C-4	R455	Rear wiring harness
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
HV2	—	—	C-3		Drive motor inverter
HV3	—	—	C-3		
HV4	—	—	C-3		Drive motor inverter amperage sensor
HV5	—	—	C-4		Drive motor inverter
HV6	—	—	C-4		Electric noise filter
HV7	—	—	B-4		
HV8	—	—	B-3		High voltage battery
HV9	—	—	C-4		Electric oil pump inverter
HV10	—	—	C-4		
★: White or natural color					

Rear Wiring Harness (HEV)



73.Door Cord RH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
D1	8	Black	C-2	B30	Bulkhead wiring harness
D12	2	★	C-2		Front door speaker RH
D13	6	Dark gray	C-2		Front power window motor RH
D15	10	★	B-2		Outer mirror assembly RH
D17	8	★	B-2		Front power window sub-switch
D18	10	★	B-3		Front door lock actuator RH
D28	8	★	B-4	R13	Rear wiring harness RH
D29	2	★	B-4		Rear door speaker RH
D30	6	Dark gray	B-4		Rear power window motor RH
D31	8	★	B-4		Rear power window sub-switch RH
D32	10	★	A-4		Rear door lock actuator RH
D56	6	★	B-3		Outer handle RH
D83	28	★	C-2	i76	Instrument panel wiring harness
D125	5	★	B-2		Passenger's seat door lock switch
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB63	2	Yellow	C-1	R124	Rear wiring harness RH
AB64	2	Yellow	B-3		Front door impact sensor RH
★: White or natural color					

Door Cord RH


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D32
D30
D31
D28
D29
AB64
D56
D17
D18
D125
D15
D12
D83
AB63
D1
D13
WI-61667

74.Door Cord LH

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
D2	2	★	D-3		Front door speaker LH
D3	6	Dark gray	D-3		Front power window motor LH
D5	10	★	C-3		Outer mirror assembly LH
D7	16	★	C-3		Power window main switch
D11	8	Black	D-2	B101	Bulkhead wiring harness
D22	8	★	C-4	R10	Rear wiring harness LH
D23	2	★	C-4		Rear door speaker LH
D24	6	Dark gray	B-5		Rear power window motor LH
D25	8	★	C-4		Rear power window sub-switch LH
D26	10	★	B-5		Rear door lock actuator LH
D66	6	★	C-4		Outer handle LH
D72	10	★	C-4		Front door lock actuator LH
D84	28	★	D-2	i101	Instrument panel wiring harness
D102	3	★	C-3		Power window main switch
D149	16	★	C-3		Remote control mirror switch
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB58	2	Yellow	C-4		Front door impact sensor LH
AB62	2	Yellow	D-2	R123	Rear wiring harness LH
★: White or natural color					

Door Cord LH


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D26
D24
D25
D22
D72
D66
D5
D2
D84
D23
AB58
AB62
D7
D102
D11
D149
D3
WI-61668

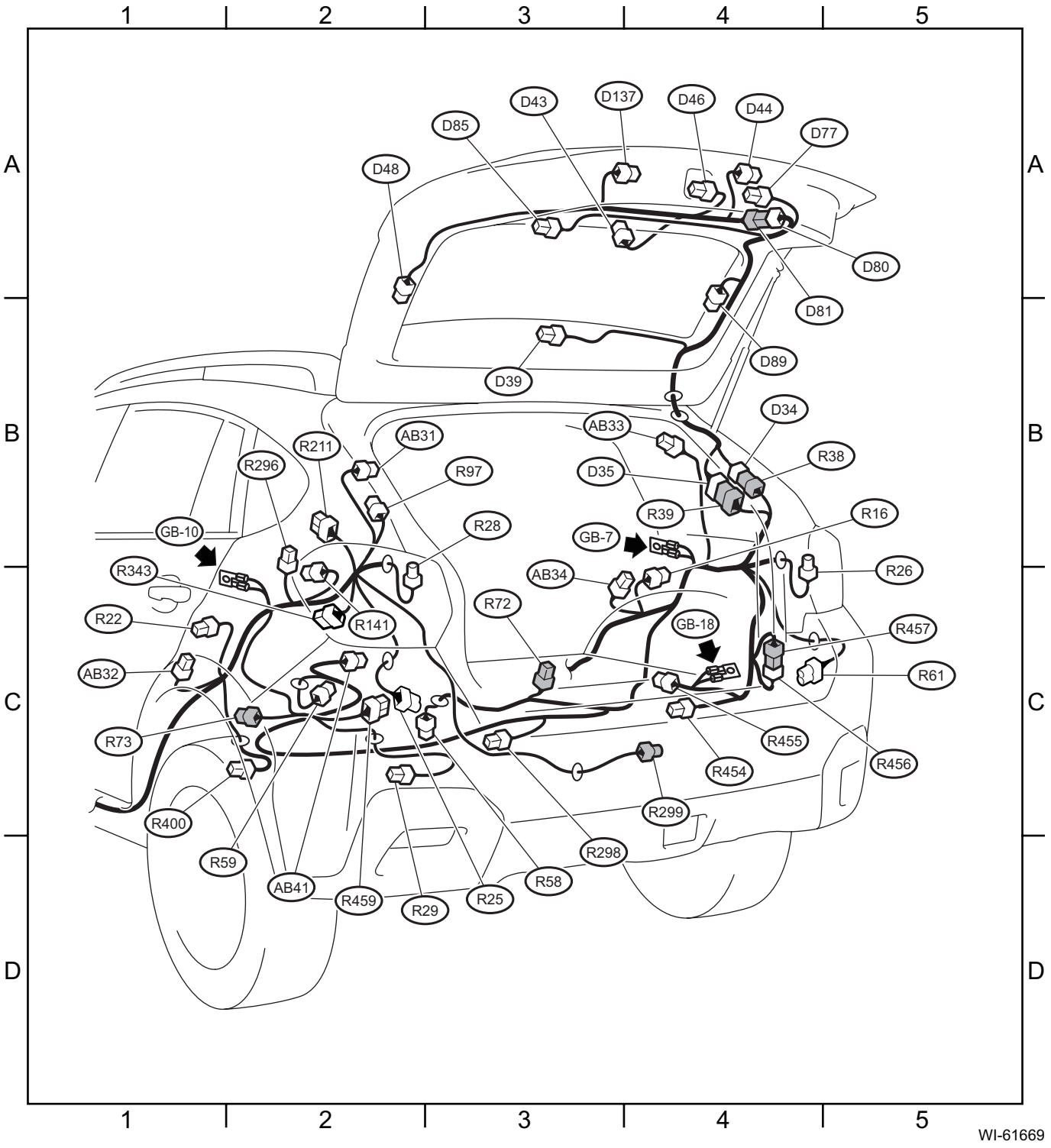
75.Rear Wiring Harness and Rear Gate Cord

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
R16	3	★	C-4		Rear door switch RH
R22	3	★	C-1		Rear door switch LH
R25	10	Black	C-2		Radar sensor LH (master)
R26	6	Gray	C-4		Rear combination light RH
R28	6	Gray	C-2		Rear combination light LH
R29	3	Black	C-2		Rear vehicle height sensor
R38	8	★	B-4	D34	Rear gate cord
R39	14	Gray	B-4	D35	
R58	4	Gray	C-2		Fuel pump assembly
R59	2	★	C-2		Fuel sub level sensor
R61	10	Black	C-4		Radar sensor RH (slave)
R72	2	Light gray	C-3		Rear ABS wheel speed sensor RH
R73	2	Light gray	C-2		Rear ABS wheel speed sensor LH
R97	1	★	B-2		Antenna feeder cord
R141	2	Light gray	C-2		Luggage room light
R211	12	★	B-2		TPMS CM
R296	5	★	B-2		Receiver (with push button start)
R298	3	★	C-3		Keyless access interior antenna (center)
R299	6	★	C-4		Keyless access exterior antenna (rear)
R343	10	Green	C-2		J/C
R400	8	Gray	C-2		ELCM
R454	8	★	C-4	R436	Inverter harness
R455	4	★	C-4	R446	Electric oil pump inverter
R456	4	★	C-4		J/C
R457	4	★	C-4		
R459	14	★	C-2	R444	Inverter harness
★: White or natural color					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
D34	8	★	B-4	R38	Rear wiring harness RH
D35	14	Gray	B-4	R39	
D39	2	★	B-3		High-mounted stop light
D43	4	★	A-4		Rear wiper motor
D44	2	★	A-4		License plate light RH
D46	4	★	A-4		Rear gate lock actuator & latch switch
D48	1	Black	B-2		Rear defogger
D77	4	★	A-4		Rear lock button & rear gate opener button
D80	8	★	A-4	D81	Rear gate cord
D81	8	★	A-4	D80	
D85	4	★	A-3		Rearview camera
D89	1	Black	B-4		Rear defogger
D137	2	★	A-4		License plate light LH
★: White or natural color					

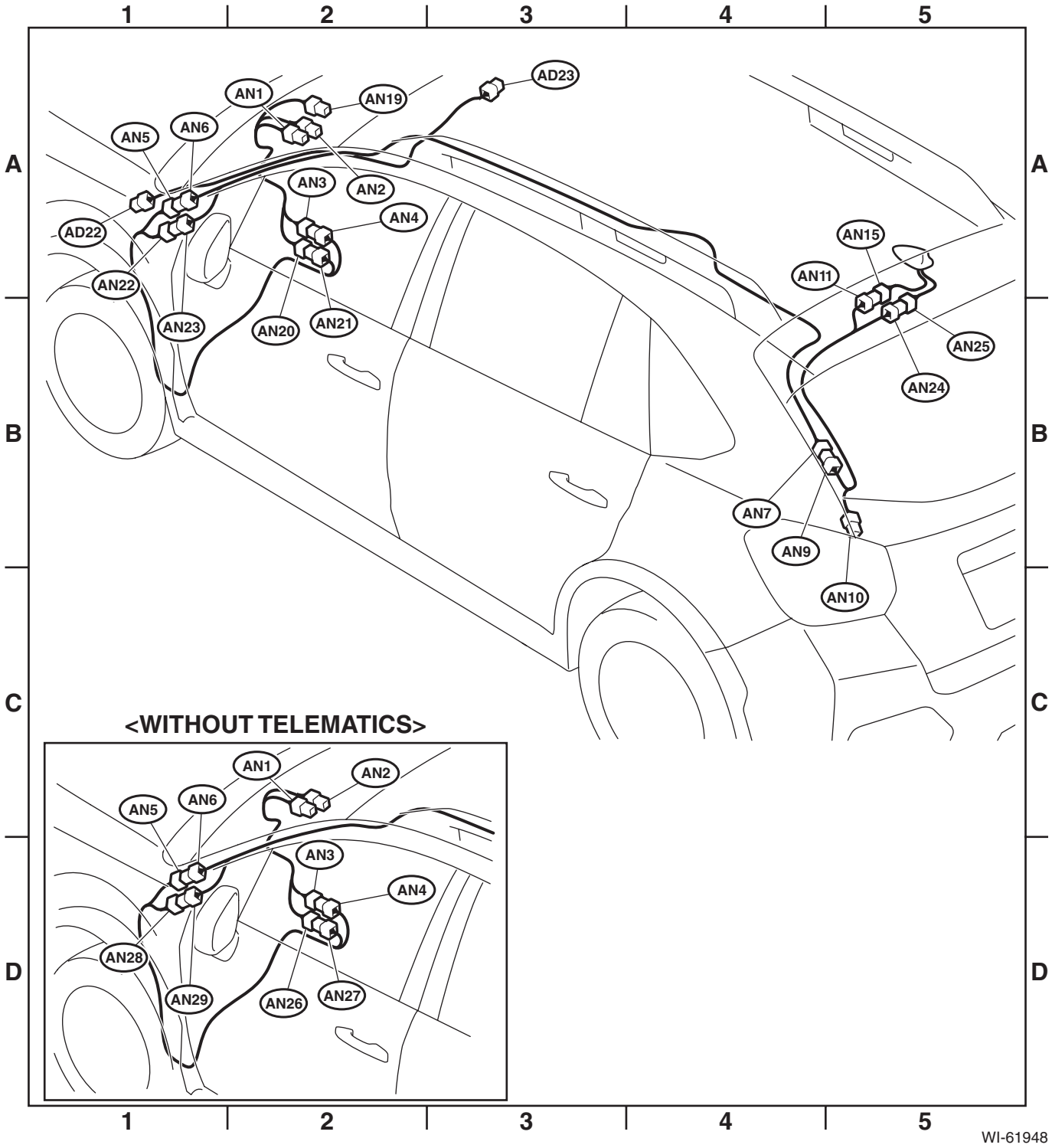
Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AB31	2	Black	B-2		Curtain airbag module LH
AB32	4	Yellow	C-1		Curtain airbag sensor LH
AB33	2	Black	B-4		Curtain airbag module RH
AB34	4	Yellow	C-3		Curtain airbag sensor RH
AB41	2	Yellow	C-2		Satellite safing sensor
★: White or natural color					



76.Antenna Cord

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Description
AN1	3	★	A-2		Audio (with telematics)
	3	★	A-2		Navigation unit (with telematics)
	3	★	C-2		Audio (without telematics)
	3	★	C-2		Navigation unit (without telematics)
AN2	1	Blue	A-2		Audio (with telematics)
	1	Blue	A-2		Navigation unit (with telematics)
	1	Blue	C-2		Audio (without telematics)
	1	Blue	C-2		Navigation unit (without telematics)
AN3	3	★	A-2	AN4	Antenna cord (with telematics)
	3	Gray	D-2	AN4	Antenna cord (without telematics)
AN4	1	★	A-2	AN3	Antenna cord (with telematics)
	2	Gray	D-2	AN3	Antenna cord (without telematics)
AN5	3	★	A-1	AN6	Antenna cord (with telematics)
	3	★	D-1	AN6	Antenna cord (without telematics)
AN6	3	★	A-1	AN5	Antenna cord (with telematics)
	3	★	D-1	AN5	Antenna cord (without telematics)
AN7	3	Blue	B-4	AN9	Antenna cord (with telematics)
	3	★	B-4	AN9	Antenna cord (without telematics)
AN9	3	Blue	B-4	AN7	Antenna cord (with telematics)
	3	★	B-4	AN7	Antenna cord (without telematics)
AN10	1	★	B-5	R97	Antenna cord
AN11	3	★	B-5	AN15	
AN15	3	★	B-5	AN11	Antenna
AN19	1	Brown	A-2		Data communication module
AN20	1	Violet	A-2	AN21	Antenna cord
AN21	1	Violet	A-2	AN20	
AN22	1	Violet	A-1	AN23	
AN23	1	Violet	A-1	AN22	
AN24	1	Violet	B-5	AN25	
AN25	1	Violet	B-5	AN24	Antenna
AN26	1	Green	D-2	AN27	Antenna cord
AN27	1	Green	D-2	AN26	
AN28	1	Green	D-1	AN29	
AN29	1	Green	D-1	AN28	
AD22	8	★	A-1	B229	Bulkhead wiring harness
AD23	8	★	A-3		Telematics button
★: White or natural color					


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AN1
AN19
AD23
AN5
AN6
AN3
AN2
AN4
AD22
AN22
AN23
AN20
AN21
AN15
AN11
AN25
AN24
AN7
AN9
AN10
<WITHOUT TELEMATICS>
AN1
AN2
AN5
AN6
AN3
AN4
AN28
AN29
AN26
AN27
WI-61948